



Wood Buffalo Environmental Association

FEBRUARY 2017 MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
March 30, 2017

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



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March 30, 2017

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

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Enclosed is the February 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



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, H₂S, NH₃, NO₂, PM_{2.5}, O₃, and SO₂.

There were 7 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.

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 4 Buffalo Viewpoint	H ₂ S	06Feb17, 18:00	320749	1hr	11	11	exc
AMS 11 Lower Camp	H ₂ S	05Feb17, 16:00	320714	1hr	11	11	exc
AMS 11 Lower Camp	H ₂ S	08Feb17, 18:00	320839	1hr	10	11	exc
AMS 11 Lower Camp	H ₂ S	08Feb17, 20:00	320840	1hr	11	11	exc
AMS 11 Lower Camp	H ₂ S	16Feb17, 01:00	321083	1hr	10	10	nae
AMS 11 Lower Camp	H ₂ S	27Feb17, 19:00	321474	1hr	11	11	exc
AMS 15 CNRL Horizon	TRS	10Feb17, 24:00	320912	1hr	12	11	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 February 2017, there were no compliance monitoring instruments operating less than 90% of the time.

In February 2017, there was 1 incident of a monitoring instrument not required for air quality compliance operating less than 90% of the time:

The precipitation collector at Fort Chipewyan (AMS 8) had 207 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.

Intermittent Monitoring

Results for integrated monitoring of precipitation, PAH, VOC, PM_{2.5} and PM₁₀ samples for January 2016 are included with this report. The results for passive samples were not available in time. 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 1000 ppb operating range with a detection level of 5 ppb in the WBEA network. This was changed from 0 to 2500 to 0 to 1000 to improve analyzer response and linearity. 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 1-2 hours following the daily spans have been reported as invalid for a total of 29 hours this month.

Unstable operation due to baseline drift on February 7 affected the normal operation of the O₃ analyzer for 4 hours.

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

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

Station 2, Mildred Lake

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

Unstable operation due to fluctuating station temperature on February 28 interrupted the normal operation of the THC analyzer for 1 hour.

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 9, 10, and 10 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 February 19 interrupted the routine operation of the SO₂ and THC analyzers for 1 hour.

Maintenance to the daily zero/span system on February 20 interrupted the routine operation of the H₂S analyzer for 2 hours.

Flat lines in output signals of the sonic wind sensors at 20, 45, and 75 m elevations resulted in 11, 2, and 1 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 11 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 28 hours this month.

Maintenance to replace the power supply cable on the NH₃ analyzer on February 27 resulted in 14 hours of downtime.

Station 7, Athabasca Valley

Replacement of a failed interface board and recalibration on February 13 interrupted the routine operation of the THC analyzer for 45 hours.

Multiple instances of unstable operation due to baseline drift affected the normal operation of the PM_{2.5} analyzer for a total of 8 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 8, Fort Chipewyan

Flat-lines in the output signal of the wind sensor resulted in 2 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 207 hours of invalid data during the month of February. The analyzer was re-installed on February 9 following in-shop repairs.

Station 9, Barge Landing

Maintenance and cleaning of the sample manifold on February 8 interrupted the normal operation of the THC analyzer for 1 hour.

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

Station 11, Lower Camp

The as found span of the THC analyzer did not meet calibration acceptance criteria ($\pm 10\%$) on February 11. Consequently, data was invalidated back until the last valid span response, resulting in 31 hours of invalid data.

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

Station 13, Fort McKay South

Negative baseline drift throughout the month affected the normal operation of the PM_{2.5} analyzer for 5 hours.

Station 14, Anzac

Maintenance and cleaning of the sample manifold on February 3 interrupted the normal operations of all air quality analyzers for 1 hour.

Negative baseline drift on throughout the month affected the normal operation of the PM_{2.5} analyzer for 42 hours.

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

Station 15, CNRL Horizon

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

Station 16, Shell Muskeg River

An internal WBEA audit on February 9 interrupted the normal operation of all air quality analyzers for 2 to 3 hours.

Sample pump failure and maintenance to replace the pump and recalibrate on February 13 interrupted the routine operation of the SO₂ analyzer for 37 hours.

A power spike at the station followed by stabilization time on February 24 interrupted the routine operation of the THC analyzer for 1 hour.

Station 17, Wapasu

Unstable operation due to baseline drift affected the normal operation of the PM_{2.5} analyzer for 1 hour this reporting period.

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

Station 18, Stony Mountain

Sample actuator failure and maintenance to replace the actuator and recalibrate on February 8 interrupted the routine operation of the THC analyzer for 12 hours.

Maintenance to the sample inlet, flow and zero reference checks on February 22 interrupted the normal operation of the PM_{2.5} analyzer for 2 hours.

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

Station 19, Firebag

A program update in the data acquisition system on February 19 interrupted the normal operations of all air quality analyzers for 1 hour.

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

Station 20, Brion MacKay River

An internal WBEA audit on February 16 and 17 interrupted the normal operations of the H₂S, SO₂, and NO₂ analyzers for 2 to 5 hours.

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

Station 21, Conklin Community

Unstable operation due to baseline drift affected the normal operation of the THC analyzer for 2 hours this reporting period.

Negative baseline drift on February 28 affected the normal operation of the PM_{2.5} analyzer for 3 hours.

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

Station 22, Janvier

The sample pump failed to operate on February 4 interrupting the normal operation of the PM_{2.5} analyzer for 8 hours.

Replacement of the carrier gas cylinder at the station on February 15 affected the normal operation of the THC analyzer for 2 hours.

An internal WBEA audit on February 6 interrupted the normal operation of the O₃ analyzer for 2 hours.

Multiple instances of negative baseline drift affected the normal operation of the PM_{2.5} analyzer for 59 hours this month.

Station 500, Cenovus Christina Lake

No operational issues to report this month.

Station 502, ConocoPhillips Surrmont

Unstable operation due to fluctuating station temperature on February 6 interrupted the normal operation of the SO₂ analyzer for 12 hours.

Flat-lines in the output signal of the wind sensor resulted in 16 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

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

FEBRUARY 2017

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Prepared: Mar 30 2017 10:46


APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	2	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	100.00	0.087	0	0.011	0
189942-00-02	SO2(ppm)	2	100.00	0.049	0	0.010	0
206355-00-00	SO2(ppm)	4	100.00	0.030	0	0.006	0
46586-00-00	SO2(ppm)	5	99.85	0.056	0	0.008	0
216466-00-04	SO2(ppm)	6	100.00	0.018	0	0.004	0
137467-00-00	SO2(ppm)	7	100.00	0.018	0	0.003	0
20809-01-00	SO2(ppm)	8	100.00	0.002	0	0.001	0
241311-00-00	SO2(ppm)	11	100.00	0.086	0	0.016	0
094-02-00	SO2(ppm)	13	100.00	0.066	0	0.009	0
305529-00-00	SO2(ppm)	14	99.85	0.013	0	0.004	0
026-02-00	SO2(ppm)	15	100.00	0.048	0	0.007	0
228044-00-00	SO2(ppm)	16	94.49	0.029	0	0.007	0
73203-01-00	SO2(ppm)	17	100.00	0.020	0	0.005	0
236394-00-00	SO2(ppm)	18	100.00	0.005	0	0.002	0
	SO2(ppm)	19	99.85	0.036	0	0.006	0
	SO2(ppm)	20	99.70	0.012	0	0.002	0
	SO2(ppm)	21	100.00	0.006	0	0.002	0
	SO2(ppm)	22	100.00	0.003	0	0.001	0
	SO2(ppm)	500	100.00	0.015	0	0.002	0
	SO2(ppm)	502	98.21	0.010	0	0.003	0
	H2S(ppm)	2	100.00	0.005	0	0.002	0
	H2S(ppm)	4	100.00	0.011	1	0.002	0
	H2S(ppm)	5	99.70	0.005	0	0.001	0
	H2S(ppm)	11	100.00	0.011	4	0.002	0
	H2S(ppm)	17	100.00	0.002	0	0.000	0
	H2S(ppm)	19	99.85	0.006	0	0.001	0
	H2S(ppm)	20	99.70	0.002	0	0.000	0
	H2S(ppm)	500	100.00	0.001	0	0.000	0
	H2S(ppm)	502	100.00	0.009	0	0.001	0
	TRS(ppm)	1	100.00	0.005	0	0.002	0
	TRS(ppm)	6	100.00	0.002	0	0.001	0
	TRS(ppm)	7	100.00	0.002	0	0.001	0
	TRS(ppm)	9	100.00	0.004	0	0.001	0
	TRS(ppm)	13	100.00	0.004	0	0.001	0
	TRS(ppm)	14	99.85	0.002	0	0.000	0
	TRS(ppm)	15	100.00	0.011	1	0.003	0
	TRS(ppm)	18	100.00	0.001	0	0.000	0
	TRS(ppm)	21	100.00	0.001	0	0.000	0
	TRS(ppm)	22	100.00	0.000	0	0.000	0
	THC(ppm)	1	100.00	5.0	-	2.9	-
	THC(ppm)	2	99.85	5.5	-	3.2	-
	THC(ppm)	4	100.00	12.2	-	4.5	-
	THC(ppm)	5	99.85	7.5	-	3.1	-
	THC(ppm)	6	100.00	2.8	-	2.2	-
	THC(ppm)	7	93.30	4.0	-	2.7	-
	THC(ppm)	9	99.85	6.3	-	3.1	-
	THC(ppm)	11	95.39	5.5	-	3.1	-
	THC(ppm)	13	100.00	7.5	-	3.4	-
	THC(ppm)	14	99.85	2.4	-	2.0	-
	THC(ppm)	15	100.00	7.0	-	3.2	-
	THC(ppm)	16	99.40	7.9	-	3.7	-
	THC(ppm)	17	100.00	2.8	-	2.3	-
	THC(ppm)	18	98.21	2.2	-	2.0	-
	THC(ppm)	19	99.85	2.8	-	2.3	-
	THC(ppm)	20	100.00	3.1	-	2.4	-
	THC(ppm)	21	99.70	2.2	-	2.1	-
	THC(ppm)	22	99.70	2.2	-	2.0	-
	O3(ppm)	1	99.40	0.047	0	0.044	-
	O3(ppm)	6	100.00	0.049	0	0.048	-
	O3(ppm)	7	100.00	0.047	0	0.046	-

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

FEBRUARY 2017

page 2 of 2

Prepared: Mar 30 2017 10:46

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	2	2017					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	O3(ppm)	8	100.00	0.047	0	0.042	-
206355-00-00	O3(ppm)	13	100.00	0.046	0	0.040	-
46586-00-00	O3(ppm)	14	99.85	0.048	0	0.048	-
216466-00-04	O3(ppm)	17	100.00	0.048	0	0.040	-
137467-00-00	O3(ppm)	18	100.00	0.054	0	0.051	-
20809-01-00	O3(ppm)	21	100.00	0.052	0	0.050	-
241311-00-02	O3(ppm)	22	99.70	0.052	0	0.050	-
094-02-00	NO2(ppm)	1	100.00	0.045	0	0.024	-
305529-00-00	NO2(ppm)	6	100.00	0.041	0	0.018	-
026-02-00	NO2(ppm)	7	100.00	0.044	0	0.025	-
228044-00-00	NO2(ppm)	8	100.00	0.015	0	0.004	-
73203-01-00	NO2(ppm)	13	100.00	0.040	0	0.022	-
236394-00-00	NO2(ppm)	14	99.85	0.027	0	0.007	-
	NO2(ppm)	15	100.00	0.039	0	0.021	-
	NO2(ppm)	16	99.55	0.064	0	0.029	-
	NO2(ppm)	17	100.00	0.033	0	0.010	-
	NO2(ppm)	18	100.00	0.012	0	0.006	-
	NO2(ppm)	19	99.85	0.054	0	0.019	-
	NO2(ppm)	20	99.26	0.041	0	0.010	-
	NO2(ppm)	21	100.00	0.018	0	0.007	-
	NO2(ppm)	22	100.00	0.015	0	0.005	-
	NO2(ppm)	500	100.00	0.028	0	0.012	-
	NO2(ppm)	502	100.00	0.017	0	0.008	-
	CO(ppm)	7	100.00	0.6	0	0.3	-
	NH3(ppm)	1	95.68	0.000	0	0.000	-
	NH3(ppm)	6	93.60	0.011	0	0.001	-
	PM2.5(ug/m3)	1	100.00	60.0	-	15.5	0
	PM2.5(ug/m3)	6	100.00	35.1	-	8.3	0
	PM2.5(ug/m3)	7	98.81	29.9	-	11.8	0
	PM2.5(ug/m3)	8	100.00	55.4	-	6.3	0
	PM2.5(ug/m3)	13	99.26	24.0	-	8.9	0
	PM2.5(ug/m3)	14	93.75	34.8	-	5.8	0
	PM2.5(ug/m3)	15	100.00	23.7	-	11.2	0
	PM2.5(ug/m3)	16	100.00	29.9	-	13.7	0
	PM2.5(ug/m3)	17	99.85	21.6	-	7.5	0
	PM2.5(ug/m3)	18	99.70	10.4	-	6.6	0
	PM2.5(ug/m3)	21	99.55	16.7	-	8.5	0
	PM2.5(ug/m3)	22	90.03	36.2	-	6.4	0
	WIND	1	99.85	-	-	-	-
	WIND	2	99.70	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	98.36	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	99.85	-	-	-	-
	WIND	8	99.70	-	-	-	-
	WIND	9	99.11	-	-	-	-
	WIND	11	99.70	-	-	-	-
	WIND	13	100.00	-	-	-	-
	WIND	14	99.40	-	-	-	-
	WIND	15	98.81	-	-	-	-
	WIND	16	100.00	-	-	-	-
	WIND	17	99.55	-	-	-	-
	WIND	18	97.62	-	-	-	-
	WIND	19	99.70	-	-	-	-
	WIND	20	99.40	-	-	-	-
	WIND	21	98.81	-	-	-	-
	WIND	22	100.00	-	-	-	-
	WIND	500	100.00	-	-	-	-
	WIND	502	97.62	-	-	-	-
							
	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
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)
 FEBRUARY 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	640	32	32	100	87	0	11	0
TRS(ppb) Average	640	32	32	100	5	0	2	0
THC(ppm) Average	640	32	32	100	5	-	2.9	-
NMHC(ppm) Average	640	32	32	100	1.205	-	0.305	-
CH4(ppm) Average	640	32	32	100	3.8	-	2.6	-
O3 (ppb) Average	637	31	35	99.4	47	0	44	-
NO2 (ppb) Average	638	34	34	100	45	0	24	-
NO (ppb) Average	638	34	34	100	69	-	18	-
NOX (ppb) Average	638	34	34	100	111	-	40	-
NH3 (ppb) Average	603	40	69	95.68	0	0	0	-
PM2.5 (ug/m3) Average	670	2	2	100	60	-	15.5	0
Wind Speed 10 m (km/h) Average	671	0	1	99.85	24	-	9	-
Wind Direction 10 m (deg) Average	671	0	1	99.85	-	-	-	-
Temperature 2 m (C) Average	672	0	0	100	10	-	4.8	-
Temperature 10 m (C) Average	672	0	0	100	10.6	-	6.2	-
Relative Humidity (%) Average	672	0	0	100	96	-	90	-
Precipitation (mm) Total	672	0	0	100	0.2	-	0.4	-
Leaf Wetness (% of range) Average	672	0	0	100	12	-	2	-
Global Solar Radiation (W/m2) Average	672	0	0	100	469	-	124	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)
 FEBRUARY 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	640	1.5	6	-	0	0	0	0	1	3	87
TRS (ppb) Average	640	0.7	1	-	0	0	0	1	1	1	5
THC (ppm) Average	640	2.18	0.3	-	1.9	2	2	2.1	2.3	2.5	5
NMHC(ppm) Average	640	0.058	0.109	-	0	0	0	0	0.1	0.2	1.205
CH4(ppm) Average	640	2.12	0.2	-	1.9	2	2	2.1	2.2	2.3	3.8
O3 (ppb) Average	637	22.3	12	-	0	4	13	23	31	38	47
NO2 (ppb) Average	638	12.7	10	-	0	1	4	11	19	29	45
NO (ppb) Average	638	4.3	8	-	0	0	0	0	4	14	69
NOX (ppb) Average	638	17	17	-	0	1	5	12	24	41	111
NH3 (ppb) Average	603	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	670	7.05	7.2	-	0.2	1.7	2.7	4.8	9.1	15.1	60
Wind Speed 10 m (km/h) Average	671	5.8	3	-	0	2	3	5	8	10	24
Wind Direction 10 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	672	-11.46	10.3	-	-33.5	-24	-19.4	-12.6	-2.5	2.6	10
Temperature 10 m (C) Average	672	-10.9	10.1	-	-31.8	-22.8	-18.7	-12.6	-2.4	3.2	10.6
Relative Humidity (%) Average	672	69.8	13	-	37	51	61	72	79	84	96
Precipitation (mm) Total	672	-	-	0.82	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	672	0.3	1	-	-1	0	0	0	0	1	12
Global Solar Radiation (W/m2) Average	672	57.8	101	-	0	0	0	0	83	220	469

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	07 Feb 2017 09:00	07 Feb 2017 10:00	2	Unstable operation - excessive baseline drift
O3	07 Feb 2017 12:00	07 Feb 2017 13:00	2	Unstable operation - excessive baseline drift
NH3	01 Feb 2017 06:00	28 Feb 2017 09:00	29	Stabilization after daily span
Wind Speed, Wind Direction	23 Feb 2017 07:00	23 Feb 2017 07:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

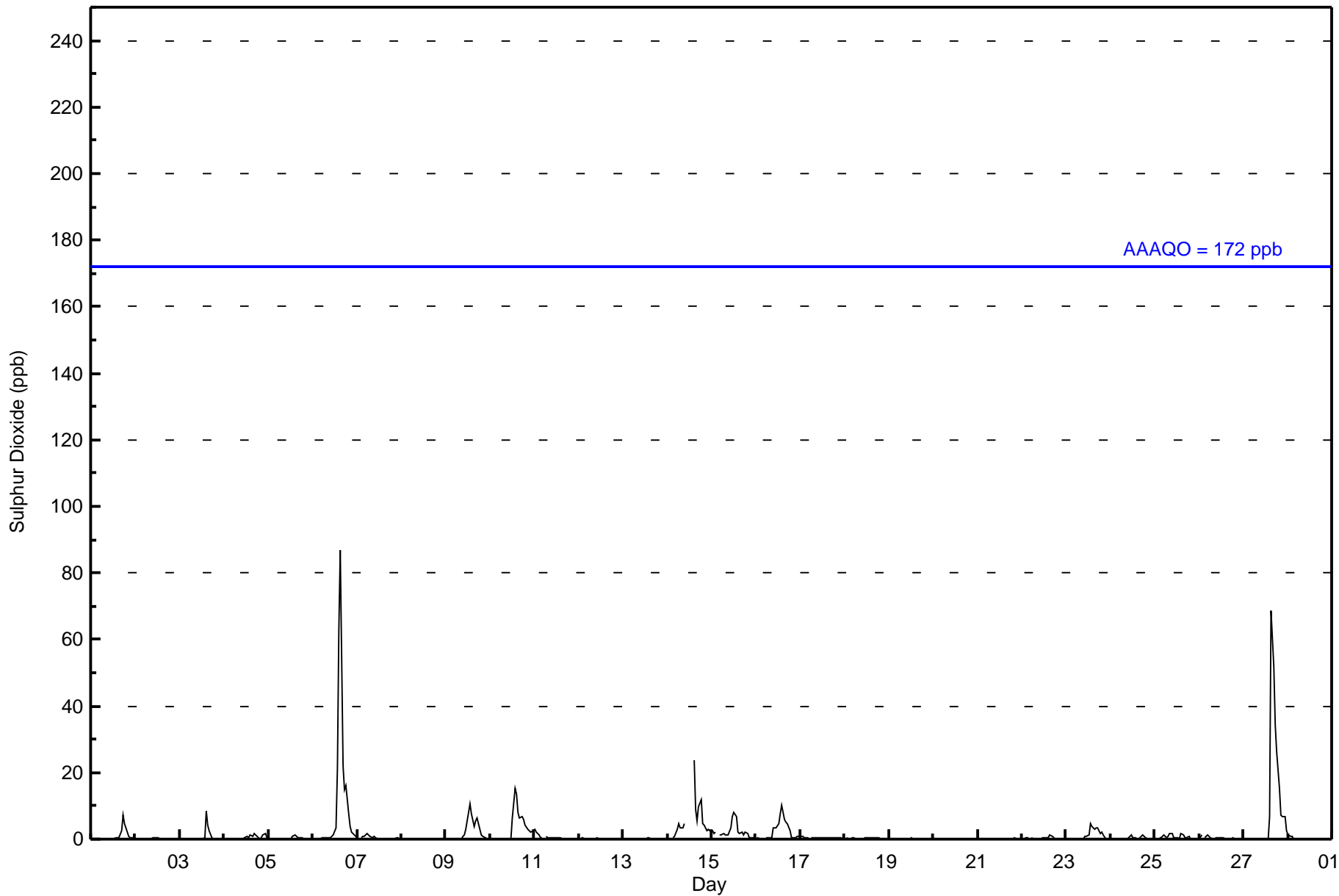
Sulphur Dioxide (SO₂) - ppb

Fort McKay - Bertha Ganter - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 87 ppb on Feb 6 16:00	Maximum Daily Average: 10.8 ppb on Feb 6		Hours of Data:	640
Minimum Value: 0 ppb on Feb 1 04:00	Minimum Daily Average: 0.0 ppb on Feb 8		Hours of Missing Data:	32
Maximum Diurnal Average: 7.1 ppb at hour 16	Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:	32
Monthly Average: 1.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 19		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	5	2	1	0	0	0	0.9	7	
2-Feb	0	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	8	4	3	0	0	0	0	0	0	0	0.7	8	
4-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	1	2	1	1	0	0	1	2	0	0	0.5	2	
5-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.2	1	
6-Feb	Z	0	0	0	0	1	1	0	0	1	1	1	3	21	63	87	22	15	16	8	4	2	1	1	10.8	87	
7-Feb	1	Z	0	1	1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	2	
8-Feb	0	0	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-Feb	0	0	0	Z	0	0	0	0	0	1	1	3	8	11	8	4	5	6	3	1	1	0	0	0	2.3	11	
10-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	6	15	14	8	6	7	6	4	3	2	2	3	3.3	15	
11-Feb	3	2	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3	
12-Feb	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	
13-Feb	0	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	
14-Feb	0	0	Z	0	1	3	5	3	3	5	C	C	C	C	24	9	6	10	12	5	4	3	3	3	5.1	24	
15-Feb	2	2	2	Z	1	1	2	1	1	1	3	7	8	7	2	2	2	1	2	2	1	0	0	0	2.2	8	
16-Feb	0	0	0	0	Z	0	0	0	0	3	3	3	5	8	10	6	5	5	3	1	0	1	1	1	2.4	10	
17-Feb	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1	
19-Feb	0	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	
20-Feb	0	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	
21-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1	
23-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	5	4	3	3	4	2	2	1	0	0	0	1.2	5	
24-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1	
25-Feb	0	Z	0	1	1	1	0	1	2	2	1	1	0	0	2	1	1	0	1	0	0	0	0	0	0.6	2	
26-Feb	0	1	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	7	68	52	34	26	15	7	7	7	2	9.8	68	
28-Feb	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
	0.4	0.4	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.6	0.5	0.8	1.4	2.6	5.2	7.1	4.0	3.4	2.8	1.5	0.9	0.7	0.6	0.4	Diurnal Average		
	3	2	2	1	1	3	5	3	3	5	3	7	8	21	63	87	52	34	26	15	7	7	7	3	Diurnal Maximum		

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	624	97.50	97.50
11 - 20	7	1.09	98.59
21 - 60	6	0.94	99.53
61 - 110	3	0.47	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



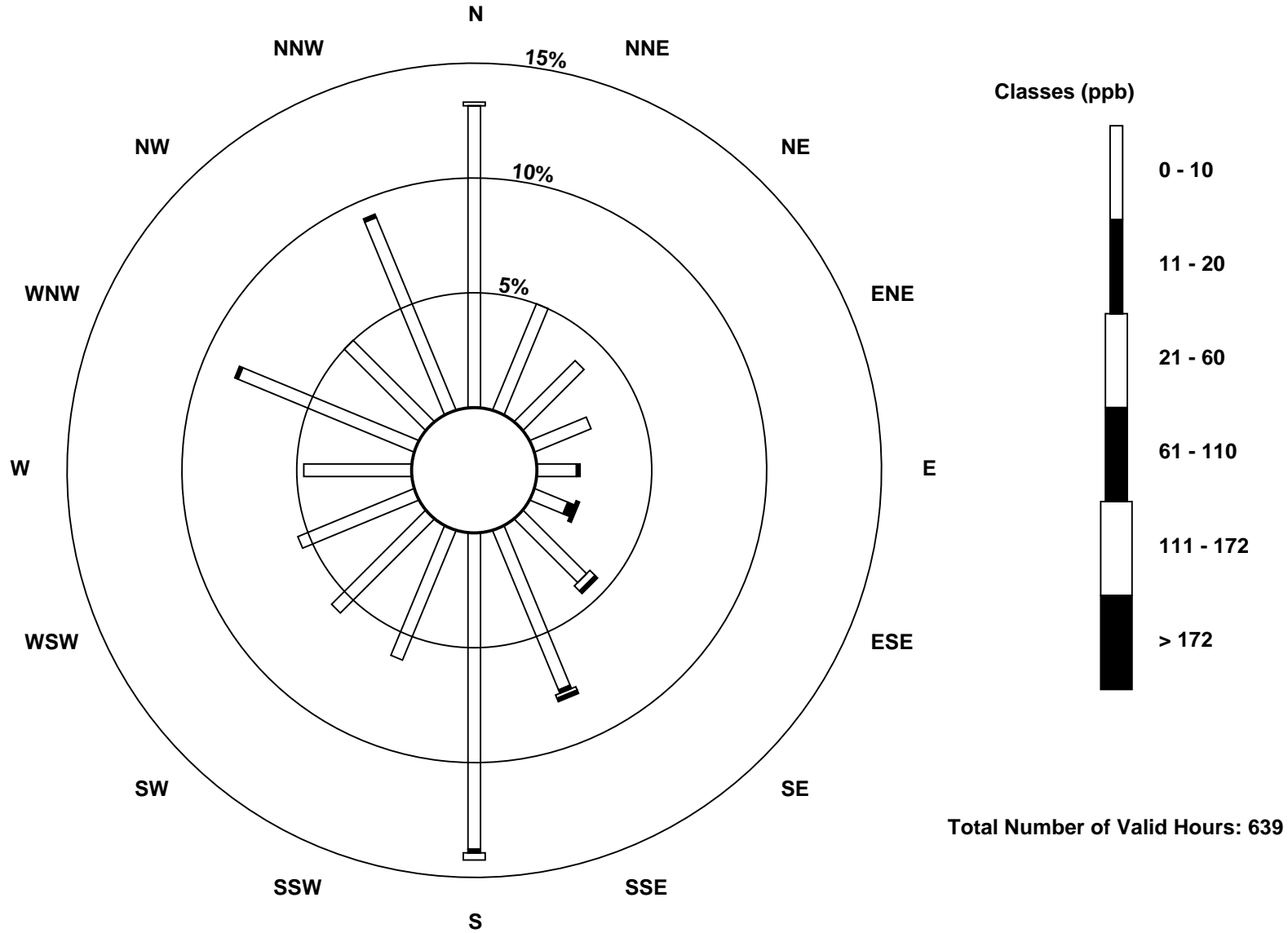
Wood Buffalo Environmental Association
Frequency Distribution

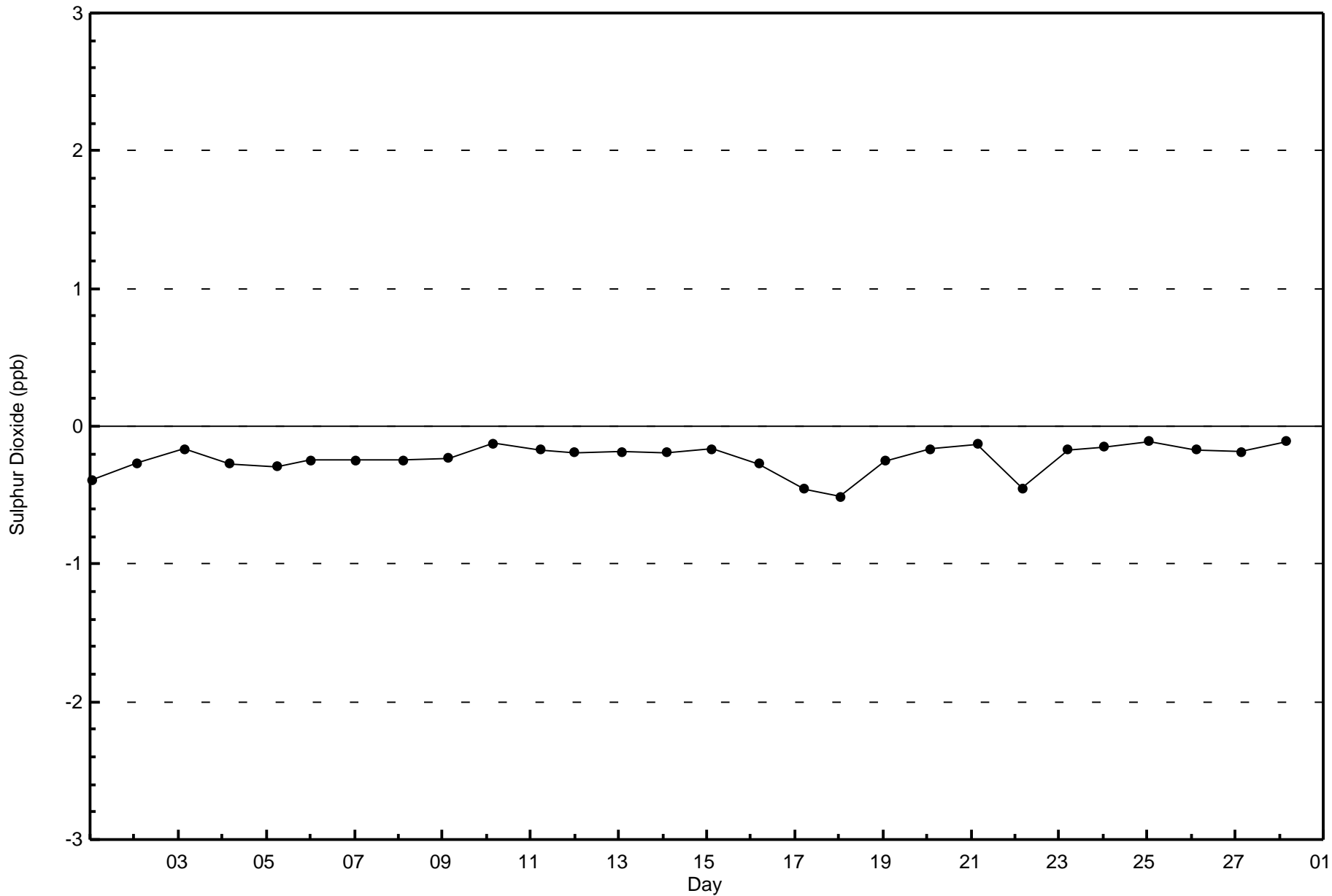
Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - February 2017

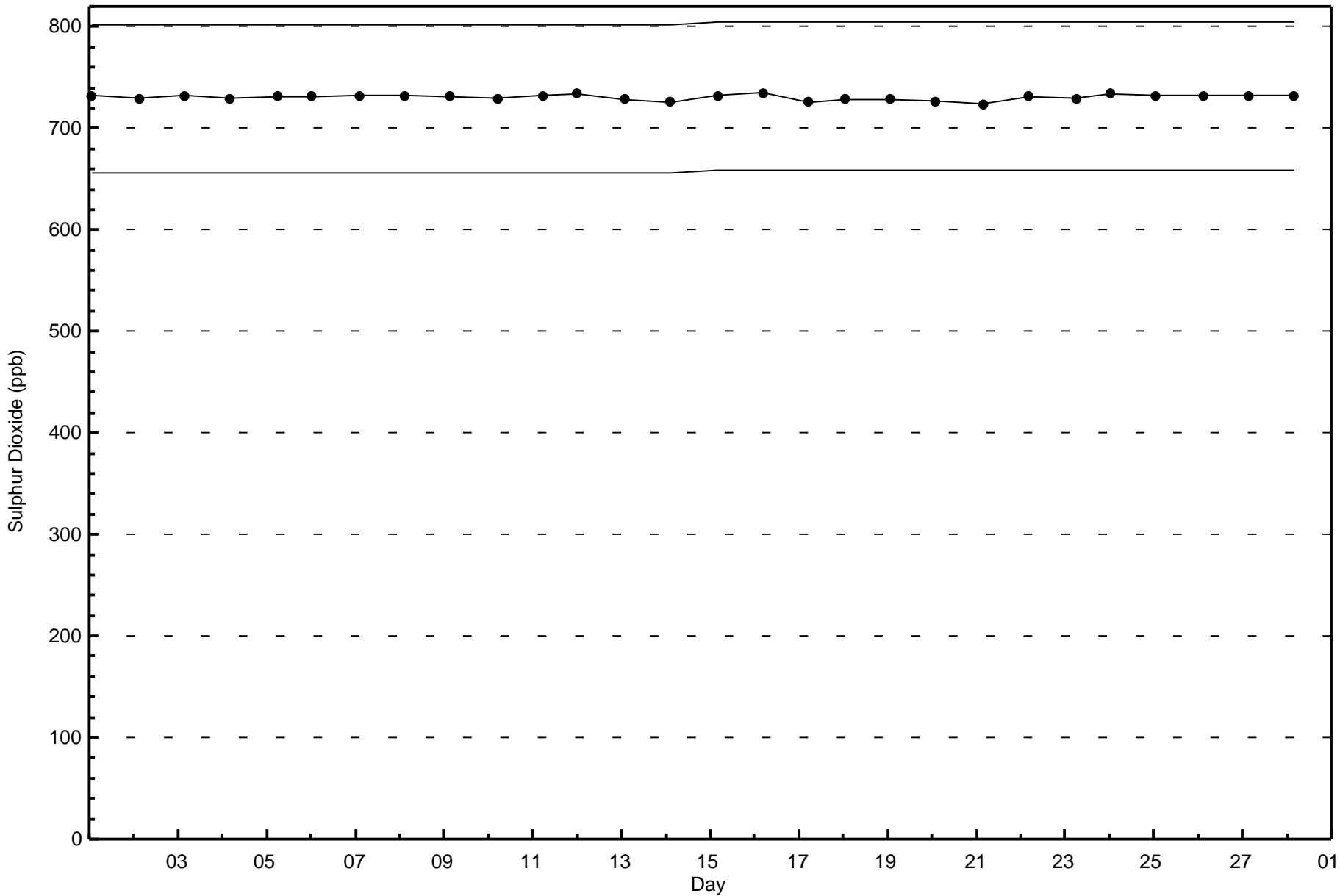
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	84	32	24	17	11	10	25	48	88	39	37	35	30	53	32	58	623
11 - 20	0	0	0	0	1	2	0	1	1	0	0	0	0	1	0	1	7
21 - 60	1	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	6
61 - 110	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	3
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	32	24	17	12	13	28	51	91	39	37	35	30	54	32	59	639

Total Number of Valid Hours: 639

Total Number of Hours: 672









Wood Buffalo Environmental Association

Summary of Hour Averages

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

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 5 ppb on Feb 10 20:00	Maximum Daily Average: 2.0 ppb on Feb 14		Hours of Data:	640
Minimum Value: 0 ppb on Feb 20 06:00	Minimum Daily Average: 0.4 ppb on Feb 20		Hours of Missing Data:	32
Maximum Diurnal Average: 0.9 ppb at hour 16	Minimum Diurnal Average: 0.5 ppb at hour 4		Hours of Calibration:	32
Monthly Average: 0.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 3		Percent Operational Time:	100.0

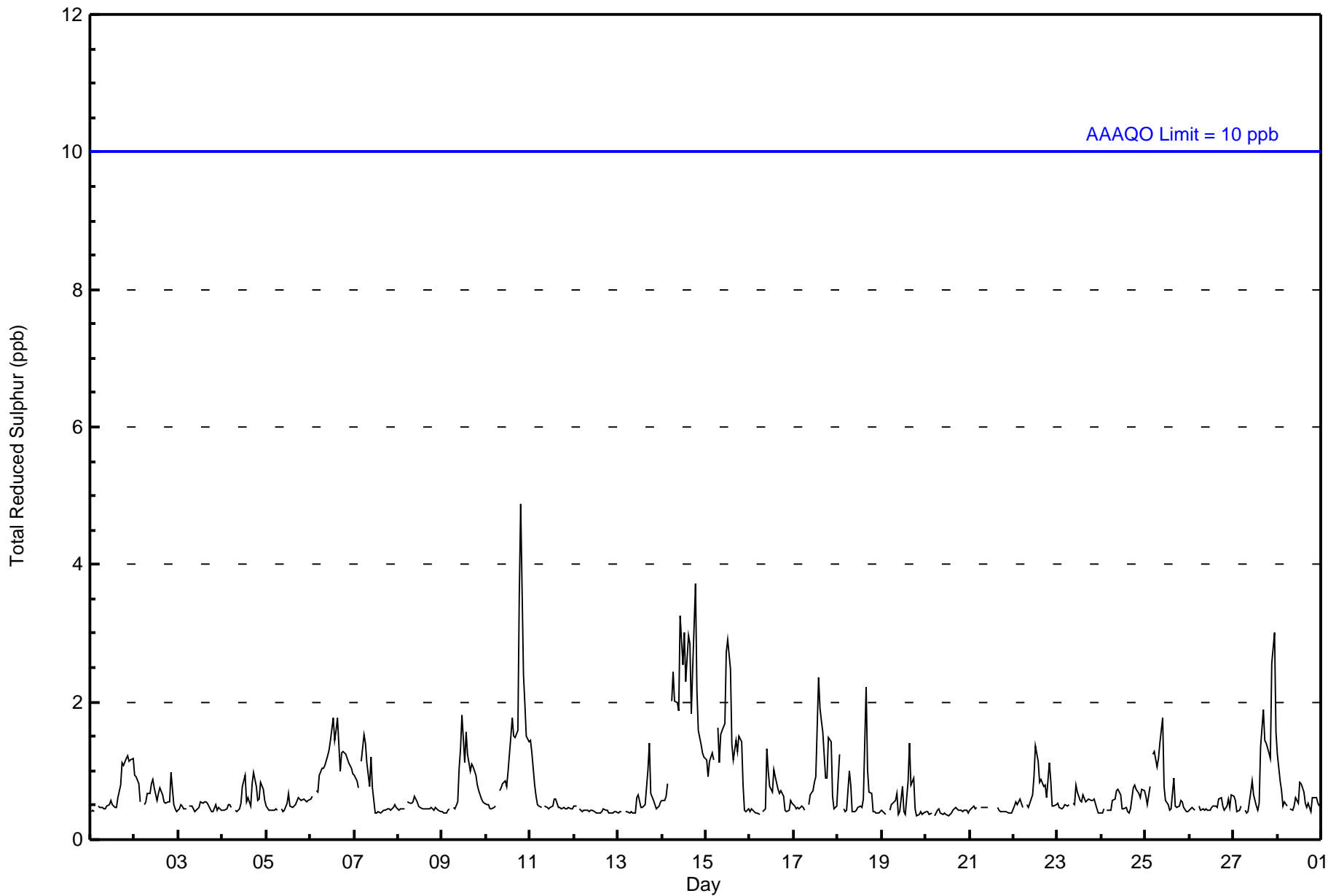
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0.7	1
2-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	1
3-Feb	0	1	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0.5	1
4-Feb	0	0	0	1	1	0	Z	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.6	1
5-Feb	0	0	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	1	0.5	1
6-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	1.1	2
7-Feb	1	1	1	Z	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
8-Feb	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
9-Feb	0	0	0	0	0	Z	0	0	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	0.8	2
10-Feb	1	1	0	0	0	0	Z	1	1	1	1	1	1	2	2	2	1	2	4	5	2	2	2	1	1.4	5
11-Feb	1	1	1	1	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.6	1
12-Feb	0	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
13-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	0	0	1	0.5	1
14-Feb	1	1	1	1	Z	2	2	2	2	2	3	3	3	2	3	3	2	3	4	2	2	1	1	1	2.0	4
15-Feb	1	1	1	1	1	Z	2	1	2	2	3	3	3	2	1	1	1	1	1	1	0	0	0	0	1.4	3
16-Feb	0	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0.6	1
17-Feb	0	0	0	0	0	0	0	Z	1	1	1	1	1	2	2	2	2	1	1	1	1	1	0	0	0.9	2
18-Feb	1	1	Z	0	0	0	1	1	0	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0.7	2
19-Feb	0	0	0	Z	0	1	1	1	1	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0.5	1
20-Feb	0	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
21-Feb	0	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0.4	0
22-Feb	0	1	1	1	1	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0.7	1
23-Feb	1	0	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1
24-Feb	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0.6	1
25-Feb	1	1	1	Z	1	1	1	1	1	2	1	1	1	0	0	1	0	0	0	0	1	1	0	0	0.8	2
26-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0.5	1
27-Feb	1	1	0	0	0	Z	0	0	0	1	1	1	0	0	1	1	2	1	1	1	1	3	3	2	1.0	3
28-Feb	1	1	1	0	1	0	Z	0	0	0	1	1	1	1	1	1	0	1	0	1	1	1	1	0	0.6	1
	0.6	0.6	0.5	0.5	0.6	0.6	0.7	0.7	0.6	0.7	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.9	0.9	0.8	0.7	0.7	0.6	Diurnal Average	
	1	1	1	1	1	2	2	2	2	2	3	3	3	2	3	3	2	3	4	5	2	3	3	2	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	627	97.97	97.97
3 - 4	12	1.88	99.84
5 - 7	1	0.16	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - February 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	83	33	23	17	12	14	28	52	84	37	38	33	30	55	28	59	626
3 - 4	0	0	0	0	0	0	0	5	5	1	0	0	0	0	1	0	12
5 - 7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	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	84	33	23	17	12	14	28	57	89	38	38	33	30	55	29	59	639

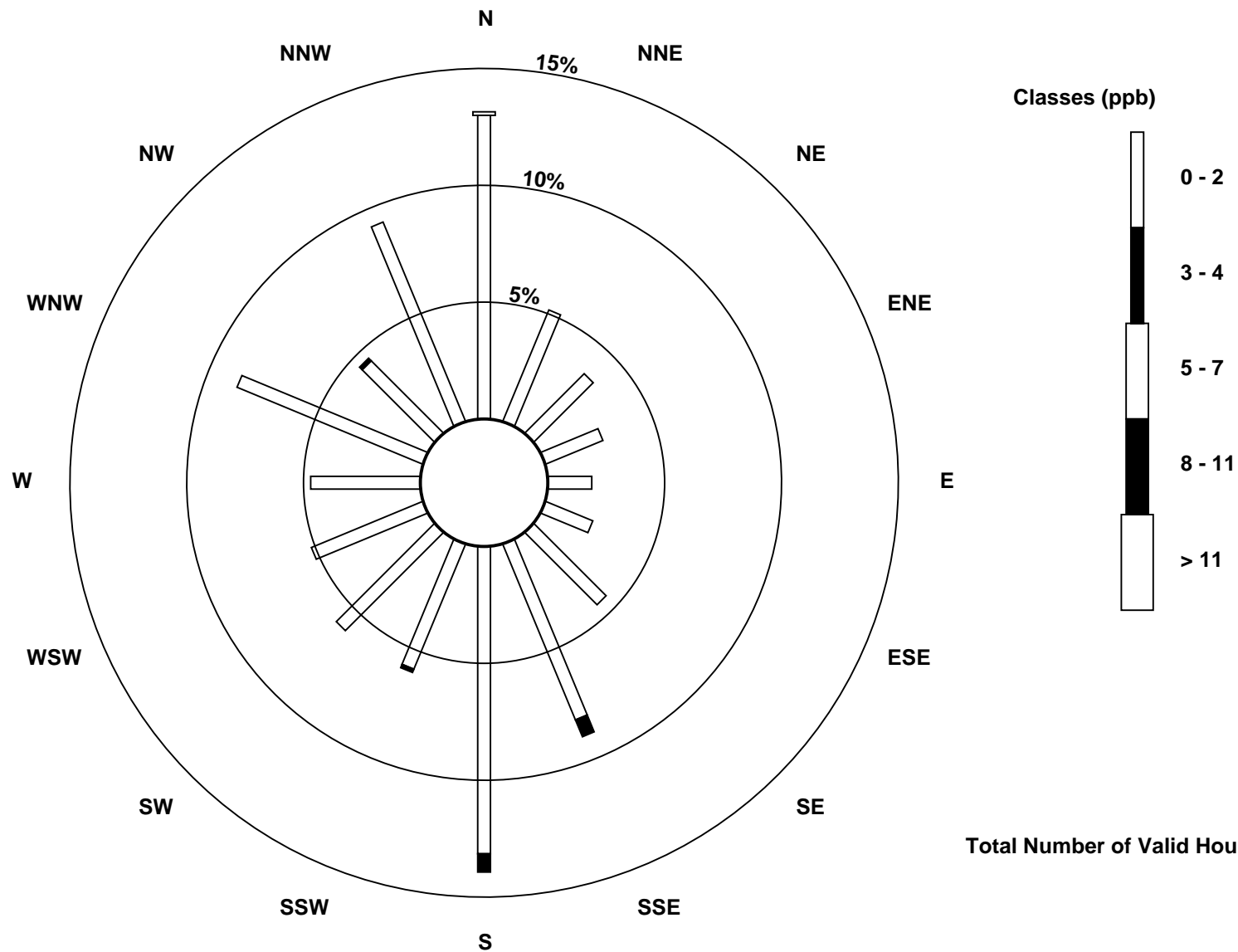
Total Number of Valid Hours: 639

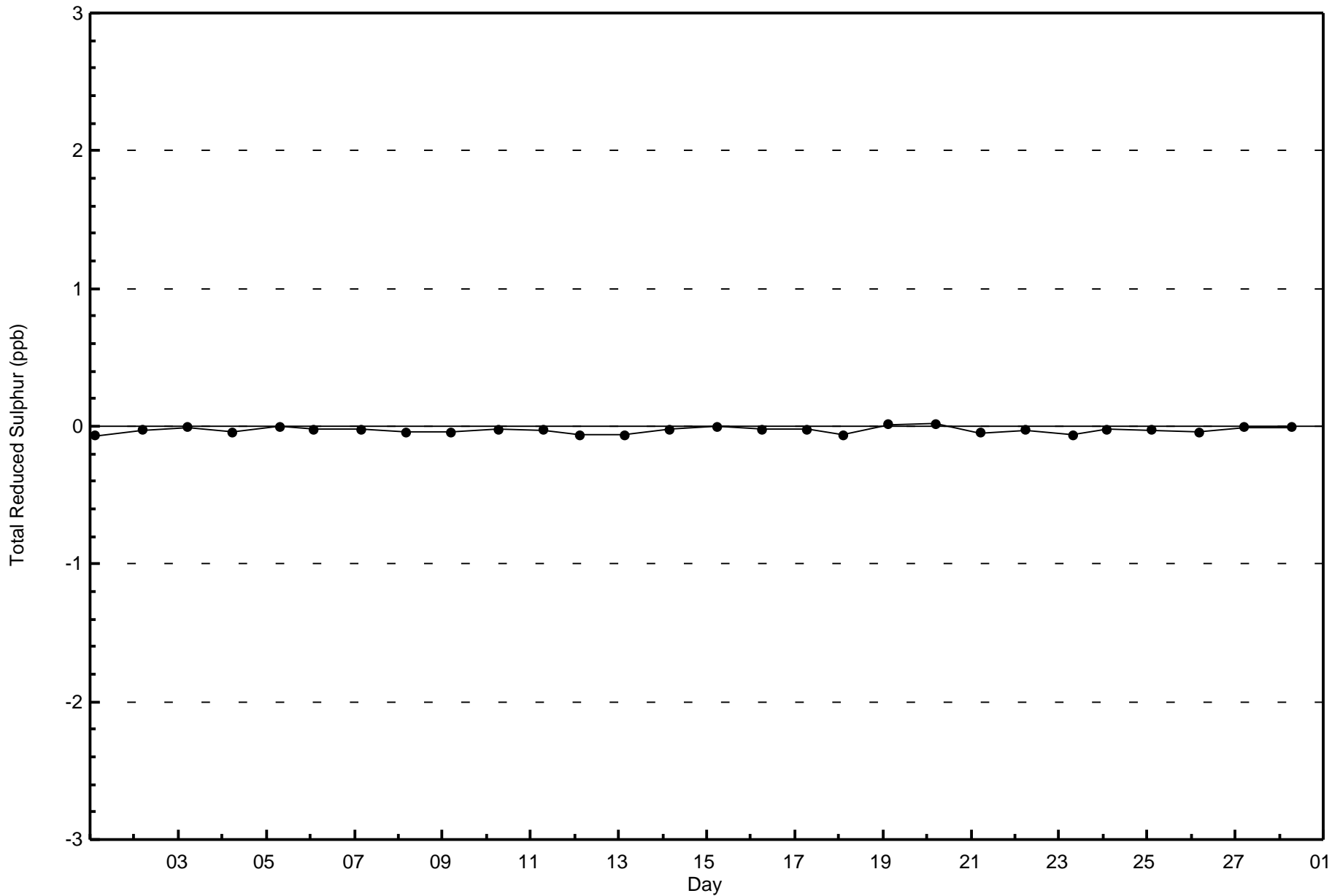
Total Number of Hours: 672

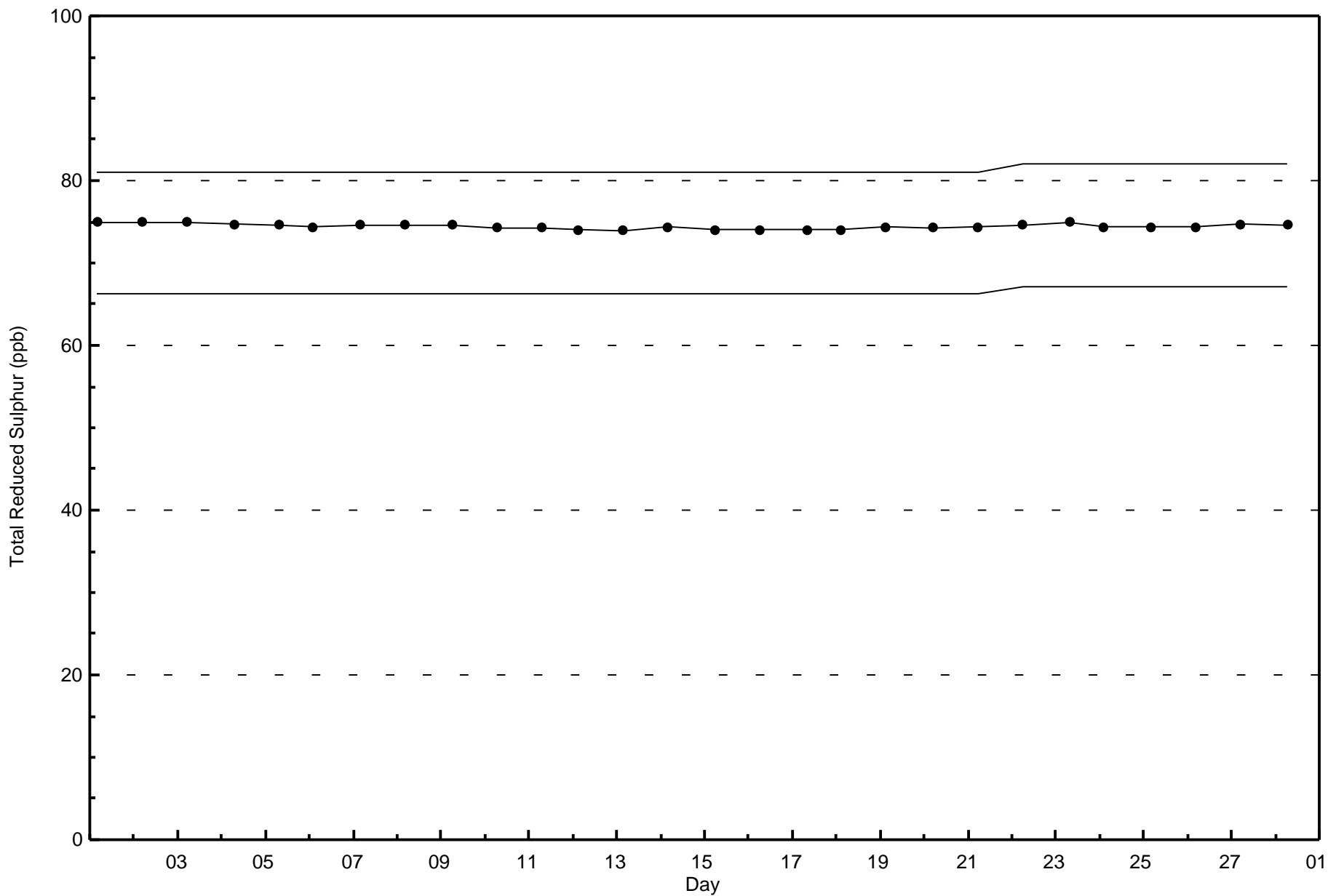


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









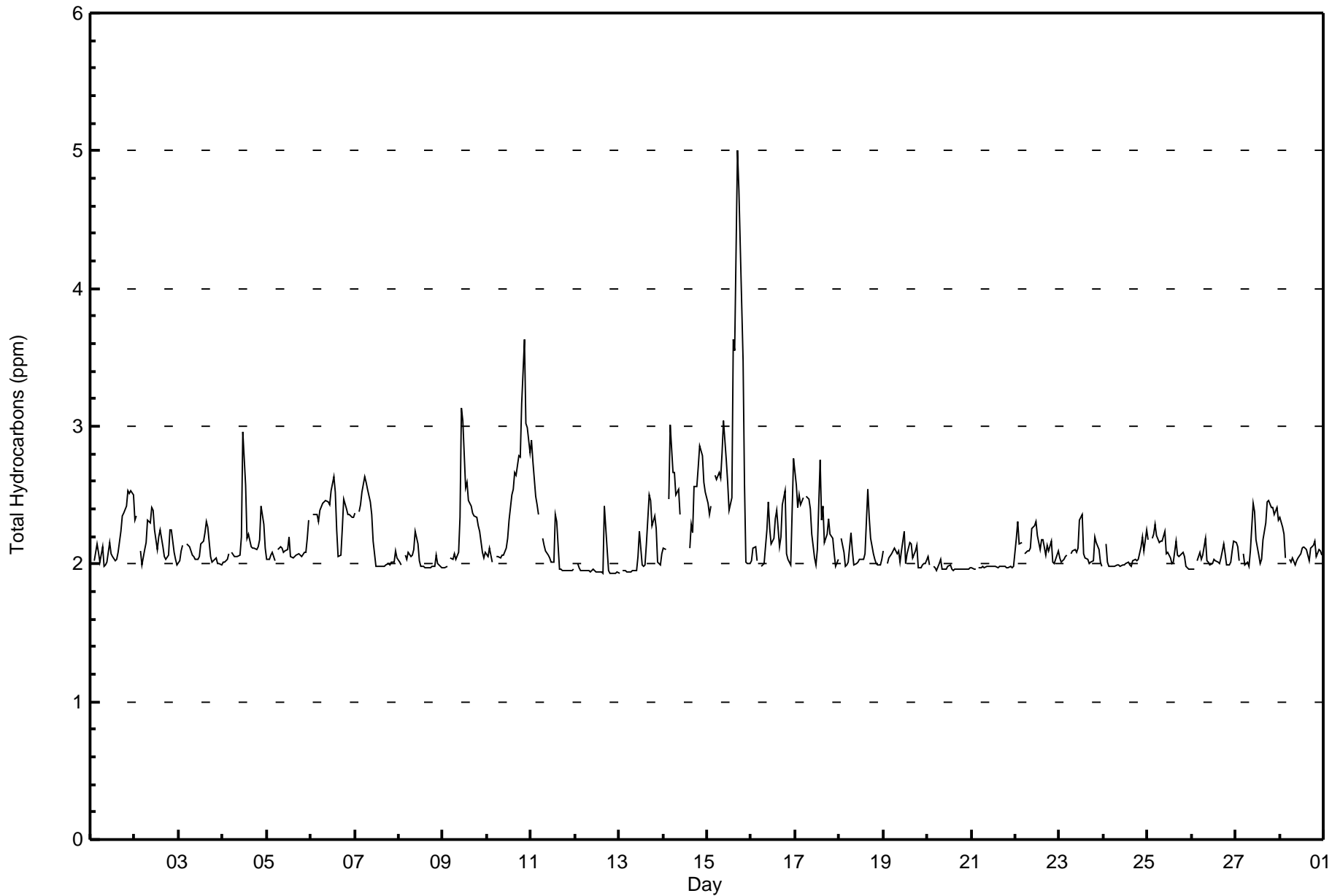
Maximum Value: 5.0 ppm on Feb 15 17:00		Maximum Daily Average: 2.9 ppm on Feb 15		Hours in Service: 672																							
Minimum Value: 1.9 ppm on Feb 12 20:00		Minimum Daily Average: 2.0 ppm on Feb 12		Hours of Data: 640																							
Maximum Diurnal Average: 2.3 ppm at hour 18		Minimum Diurnal Average: 2.1 ppm at hour 6		Hours of Missing Data: 32																							
Monthly Average: 2.18 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.5		Hours of Calibration: 32																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2.0	Z	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.5	2.5	2.5	2.2	2.5	
2-Feb	2.3	2.4	Z	2.1	2.0	2.1	2.2	2.3	2.3	2.4	2.4	2.2	2.1	2.2	2.3	2.1	2.1	2.0	2.1	2.2	2.2	2.1	2.0	2.0	2.2	2.4	
3-Feb	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3		
4-Feb	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.2	3.0	2.6	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.4	2.3	2.1	2.2	3.0	
5-Feb	2.0	2.0	2.1	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.3		
6-Feb	Z	2.4	2.4	2.4	2.3	2.4	2.4	2.5	2.5	2.5	2.4	2.5	2.6	2.5	2.2	2.1	2.1	2.3	2.5	2.4	2.4	2.4	2.3	2.3	2.4	2.6	
7-Feb	2.4	Z	2.4	2.4	2.5	2.6	2.6	2.5	2.5	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.2	2.6		
8-Feb	2.0	2.0	Z	2.1	2.0	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	2.1	2.0	2.0	2.0	2.2	2.2	
9-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.0	2.1	2.3	3.1	3.0	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.2	2.1	2.0	2.1	2.3	3.1	
10-Feb	2.1	2.1	2.1	2.0	Z	2.0	2.1	2.0	2.1	2.1	2.1	2.2	2.3	2.5	2.5	2.7	2.6	2.8	2.8	3.2	3.6	3.0	3.0	2.8	2.5	3.6	
11-Feb	2.9	2.8	2.5	2.4	2.4	Z	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.4	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.9	
12-Feb	Z	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.4	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.4	
13-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.0	2.0	2.0	2.1	2.5	2.5	2.3	2.3	2.3	2.0	2.0	2.1	2.1	2.5	
14-Feb	2.1	2.1	Z	2.5	3.0	2.7	2.7	2.5	2.5	2.4	C	C	C	C	2.1	2.3	2.2	2.6	2.6	2.7	2.9	2.8	2.6	2.5	2.5	3.0	
15-Feb	2.4	2.4	2.4	Z	2.6	2.6	2.7	2.6	2.8	3.0	2.8	2.6	2.4	2.5	3.6	3.5	5.0	4.7	4.3	3.5	2.6	2.0	2.0	2.0	2.9	5.0	
16-Feb	2.0	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.2	2.4	2.3	2.1	2.2	2.3	2.4	2.1	2.2	2.4	2.5	2.1	2.0	2.0	2.4	2.8	2.2	2.8	
17-Feb	2.6	2.4	2.5	2.4	2.5	Z	2.5	2.5	2.4	2.2	2.0	2.0	2.1	2.8	2.3	2.4	2.2	2.2	2.3	2.2	2.2	2.1	2.0	2.0	2.3	2.8	
18-Feb	Z	2.2	2.1	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.5	
19-Feb	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.0	2.1	2.2	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	
20-Feb	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
21-Feb	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
22-Feb	2.2	2.3	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.0	2.0	2.0	2.1	2.1	2.3	
23-Feb	2.0	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.1	2.0	2.0	2.1	2.4	
24-Feb	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	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.2	2.0	2.2	
25-Feb	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.3	
26-Feb	2.0	2.0	Z	2.0	2.1	2.0	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.0	2.2	
27-Feb	2.2	2.1	2.0	Z	2.1	2.0	2.0	2.0	2.1	2.4	2.4	2.2	2.1	2.0	2.0	2.2	2.3	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.2	2.5	
28-Feb	2.3	2.3	2.2	2.0	Z	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	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.2			
																								2.9			
																								2.1			
																								2.5			
																								3.0			
																								2.7			
																								2.7			
																								2.6			
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																								3.5			
																								5.0			
																								4.7			
																								4.3			
																								3.5			
																								3.6			
																								3.0			
																								3.0			
																								2.8			

Z - zerospan C - Calibration



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	265	41.41	41.41
2.1 - 3.0	366	57.19	98.59
3.1 - 10.0	9	1.41	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - February 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	26	11	8	9	6	2	9	12	16	17	23	26	18	34	18	30	265
2.1 - 3.0	58	21	16	8	6	11	19	36	71	22	14	9	12	20	14	28	365
3.1 - 10.0	1	0	0	0	0	0	0	3	4	0	0	0	0	0	0	1	9
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	32	24	17	12	13	28	51	91	39	37	35	30	54	32	59	639

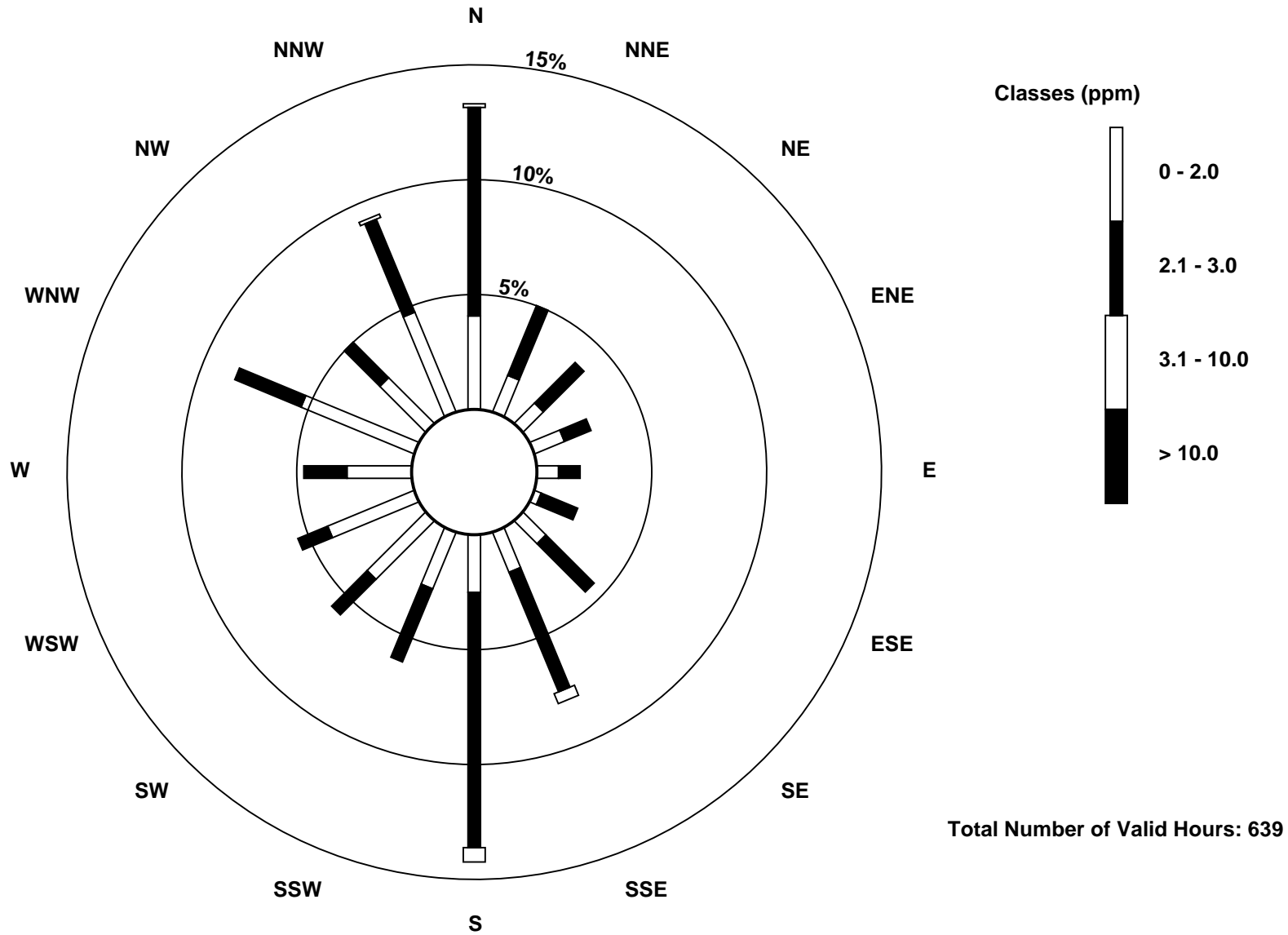
Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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



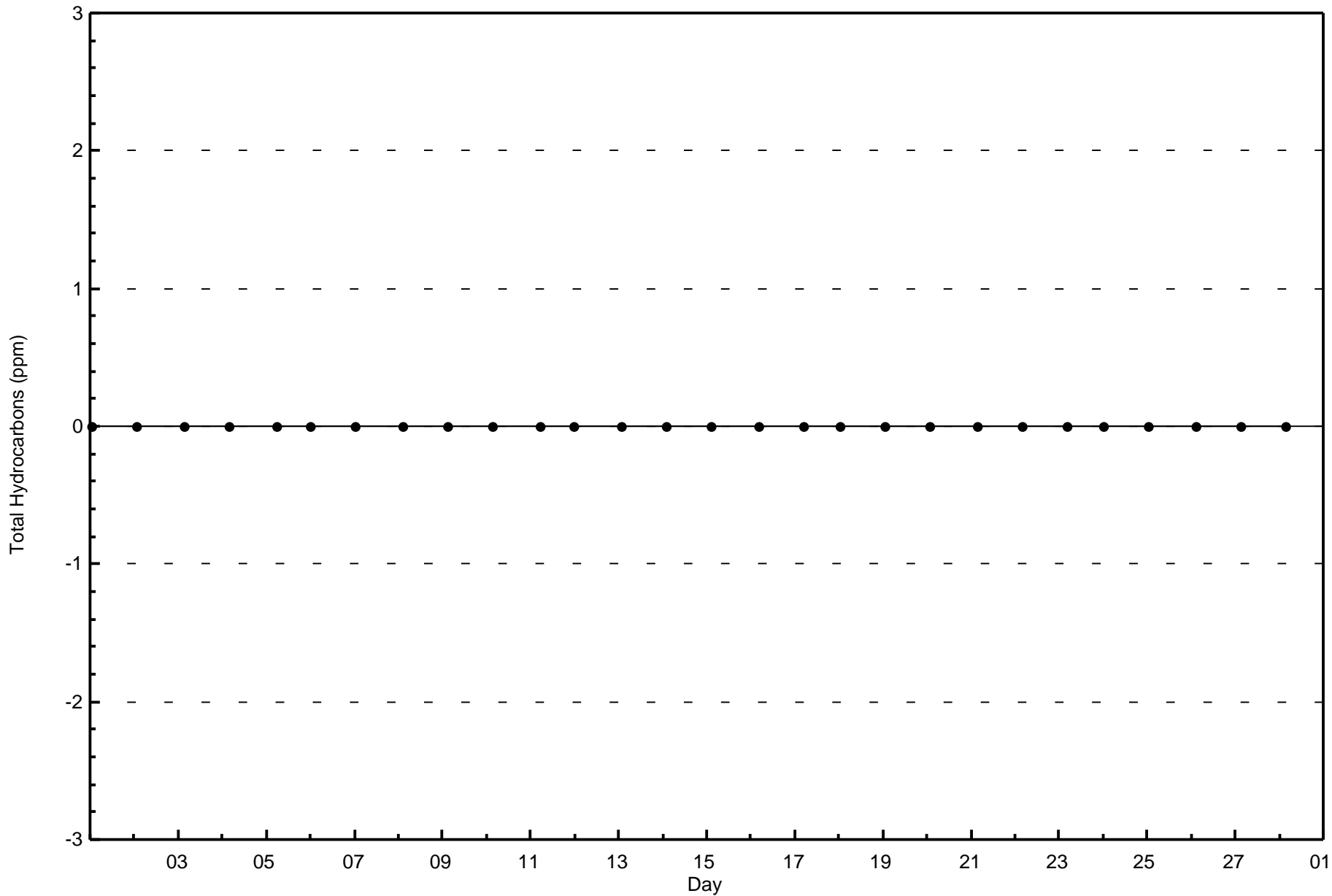


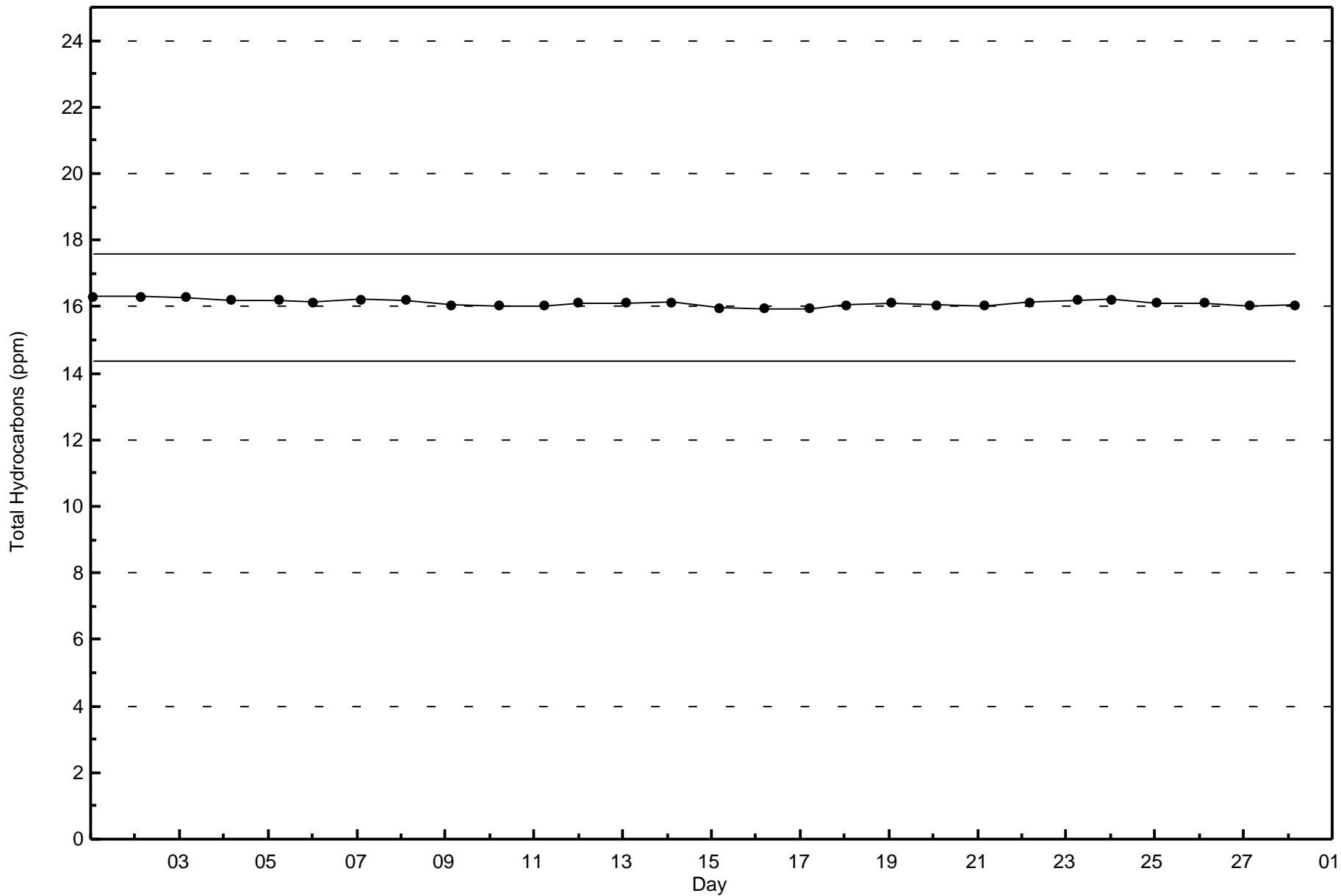
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - February 2017

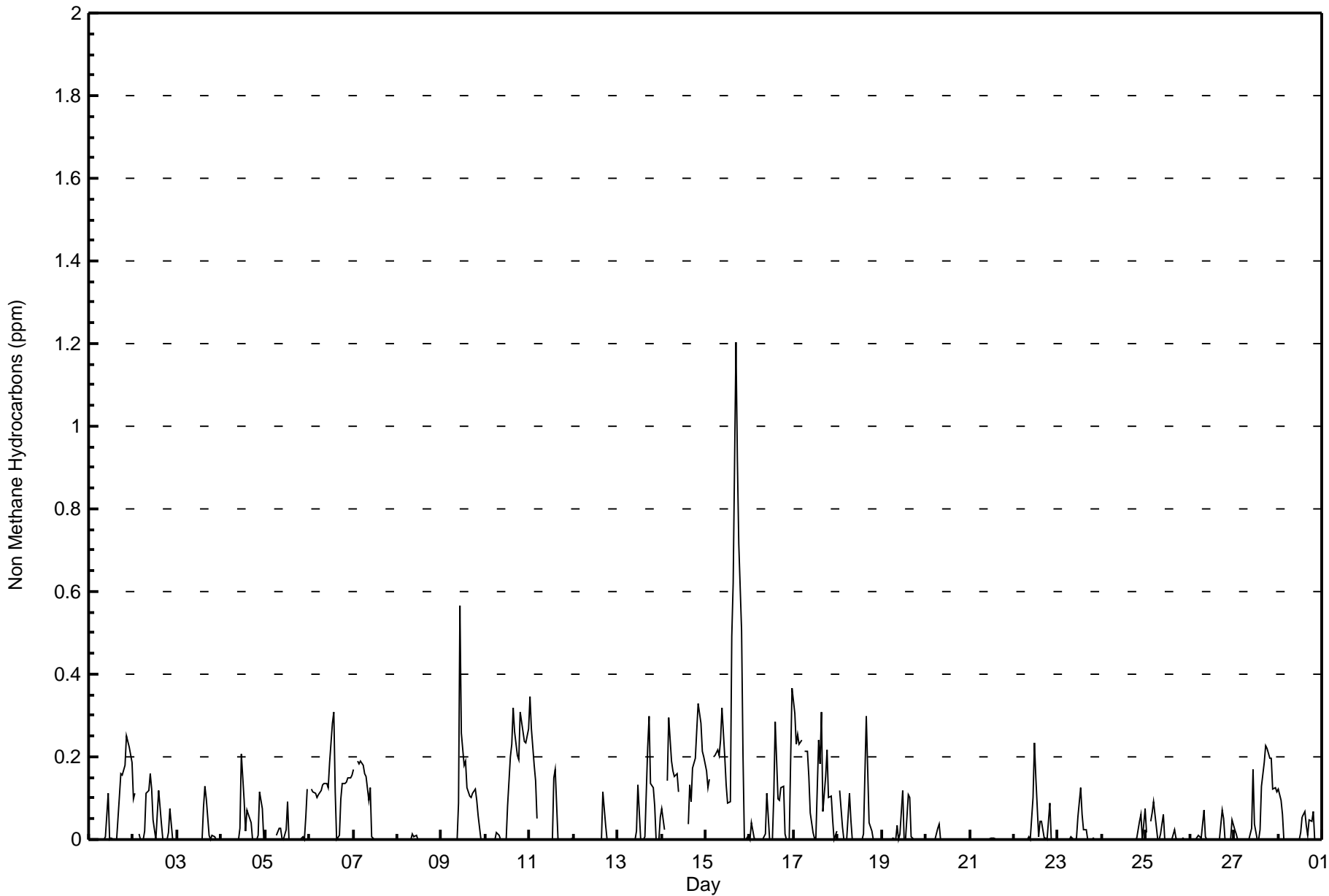






Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	365	57.03	57.03
0.006 - 0.05	79	12.34	69.38
0.06 - 0.1	101	15.78	85.16
> 0.1	95	14.84	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



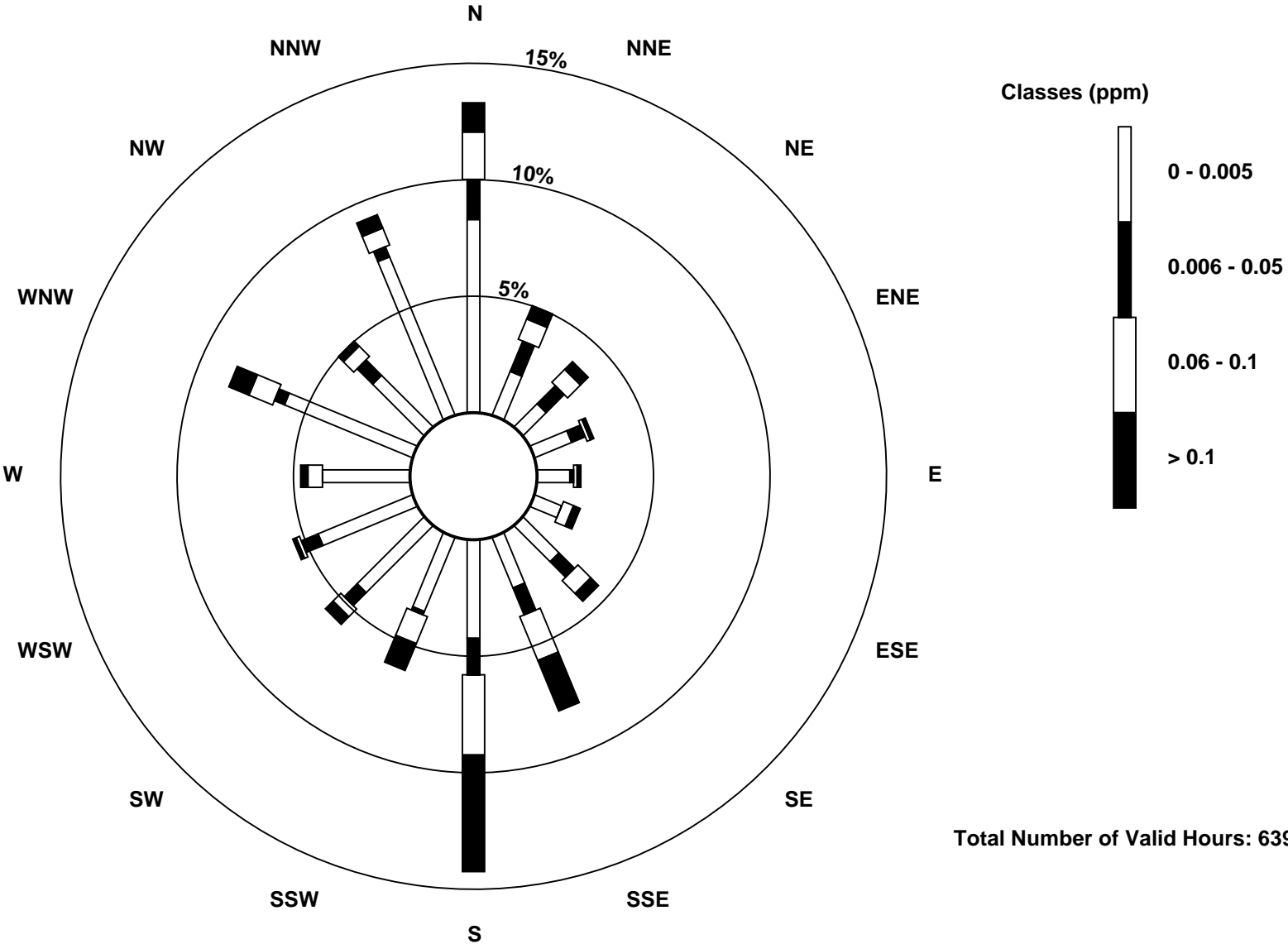
**Wood Buffalo Environmental Association
Frequency Distribution**

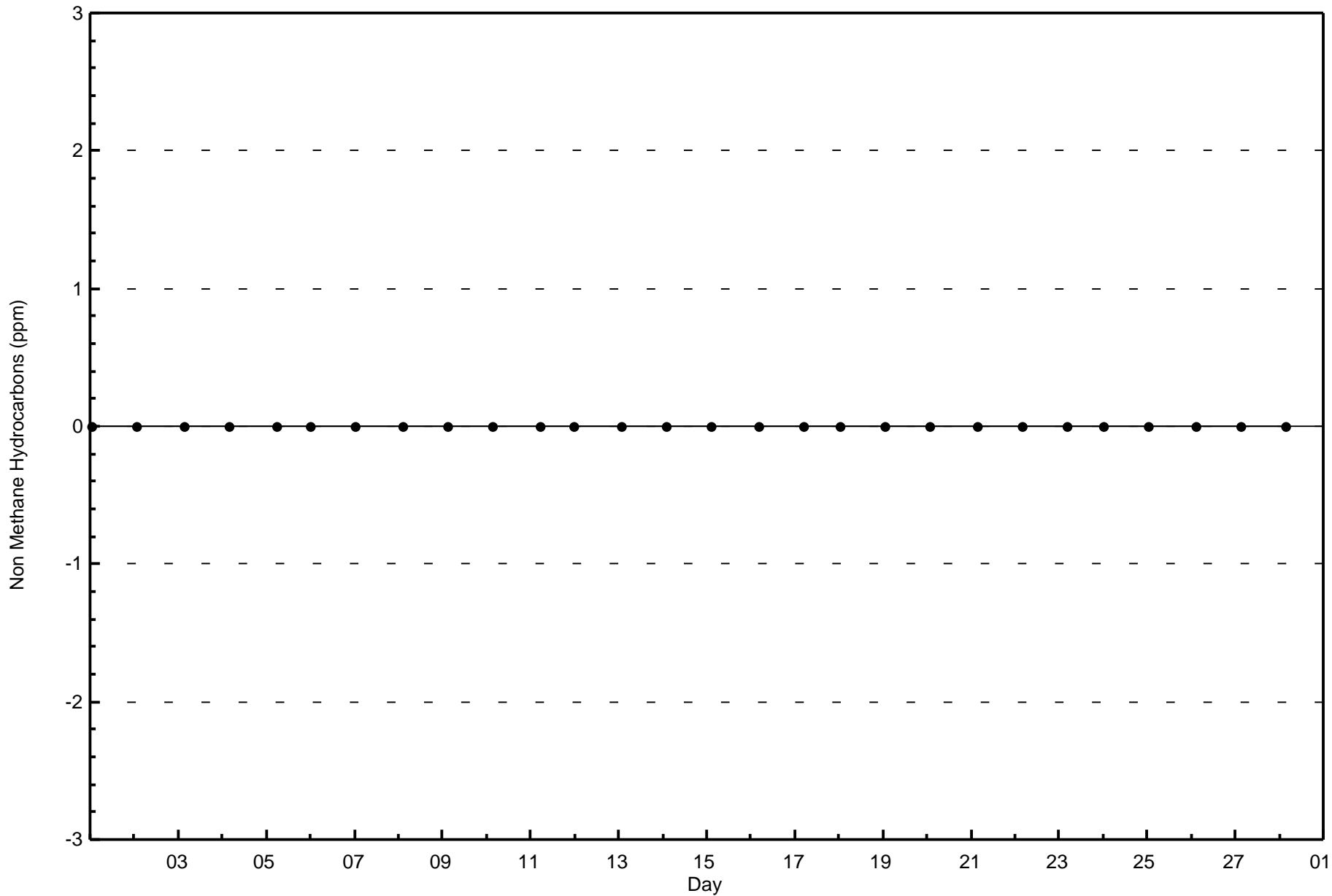
**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - February 2017**

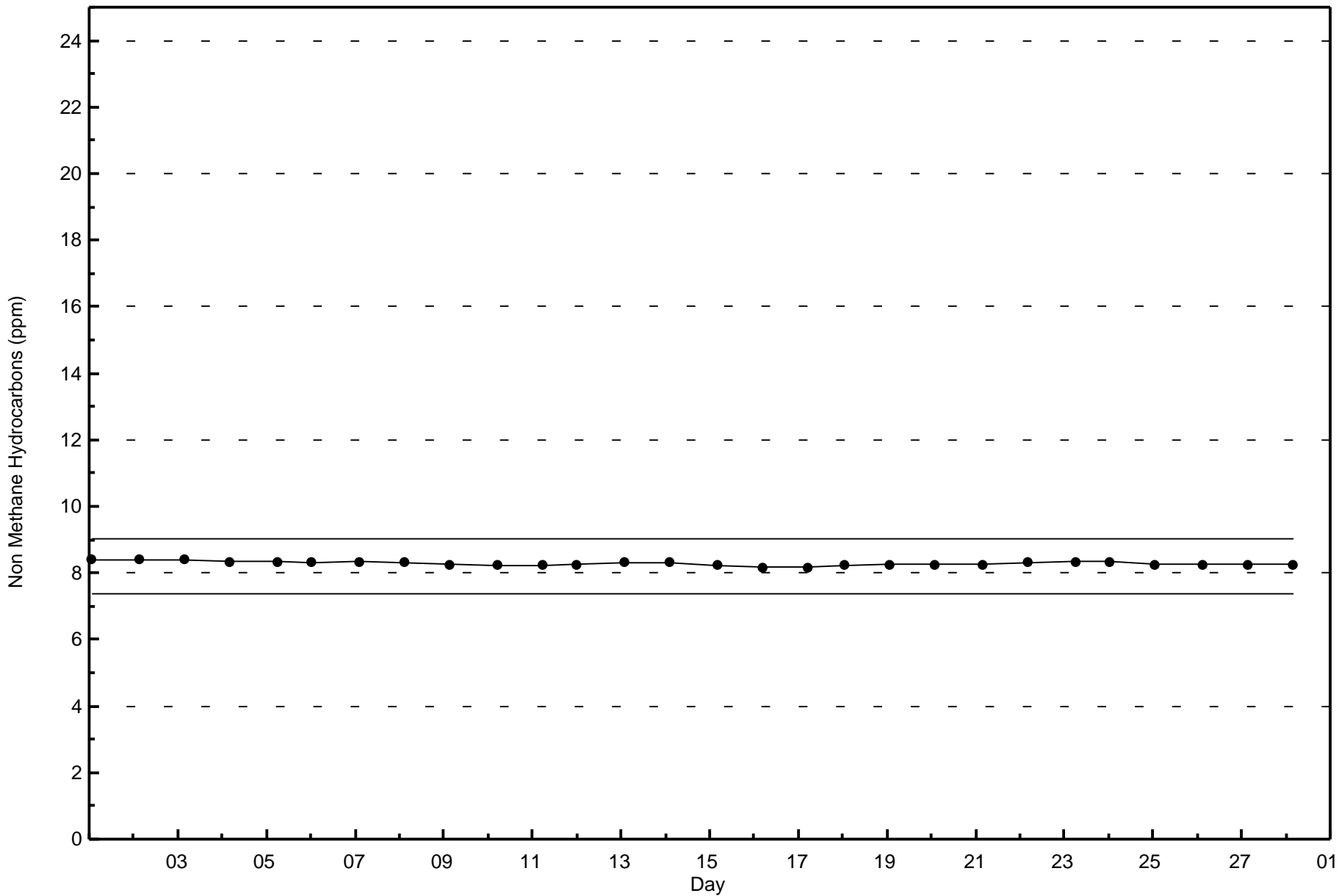
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	53	13	9	11	9	8	14	15	27	22	26	28	24	38	20	47	364
0.006 - 0.05	11	9	7	4	1	0	6	8	10	1	5	5	0	3	6	3	79
0.06 - 0.1	13	6	5	1	1	3	5	13	22	8	3	1	4	7	4	5	101
> 0.1	8	4	3	1	1	2	3	15	32	8	3	1	2	6	2	4	95
Totals	85	32	24	17	12	13	28	51	91	39	37	35	30	54	32	59	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

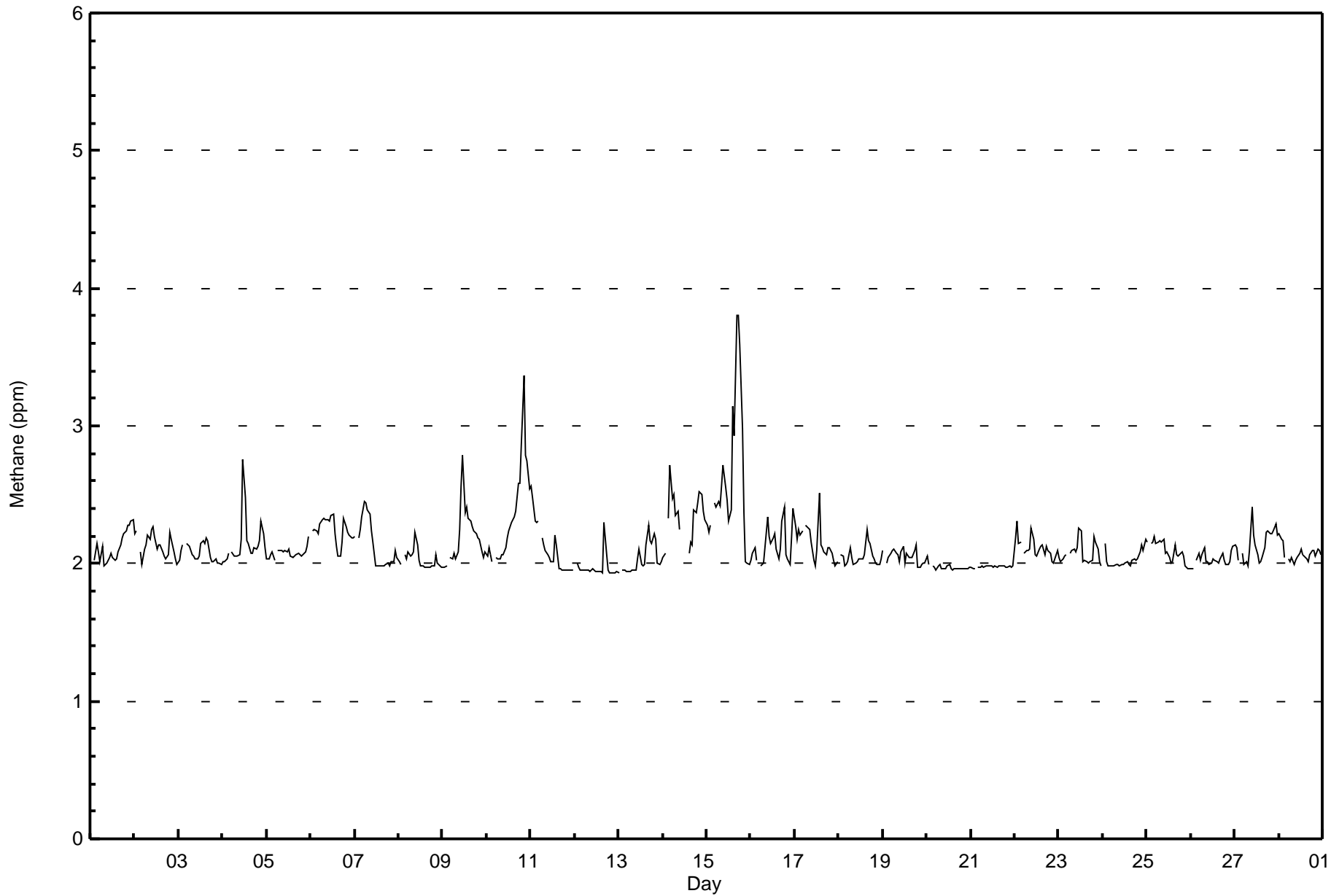








Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 672										
Maximum Value: 3.8 ppm on Feb 15 18:00																	Maximum Daily Average: 2.6 ppm on Feb 15										
Minimum Value: 1.9 ppm on Feb 12 20:00																	Hours of Data: 640										
Maximum Diurnal Average: 2.2 ppm at hour 18																	Hours of Missing Data: 32										
Monthly Average: 2.12 ppm																	Hours of Calibration: 32										
Minimum Daily Average: 2.0 ppm on Feb 12																	Percent Operational Time: 100.0										
Minimum Diurnal Average: 2.1 ppm at hour 4																	Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.8										
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-Feb	2.0	Z	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.1	2.3	
2-Feb	2.2	Z	Z	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.1	2.0	2.0	2.1	2.3	
3-Feb	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	
4-Feb	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.8	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.8	
5-Feb	2.0	2.0	2.1	2.1	2.0	Z	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	2.2	
6-Feb	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	
7-Feb	2.2	Z	2.2	2.2	2.3	2.5	2.4	2.4	2.4	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.5	
8-Feb	2.0	2.0	Z	2.1	2.0	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	2.1	2.0	2.0	2.0	2.0	2.2	
9-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.0	2.1	2.3	2.6	2.8	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.0	2.1	2.2	2.8	
10-Feb	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.4	2.6	2.6	2.9	3.4	2.8	2.8	2.5	2.3	3.4	
11-Feb	2.6	2.5	2.3	2.3	2.3	Z	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6
12-Feb	Z	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.3	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3
13-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.3	2.2	2.1	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.3
14-Feb	2.0	2.1	Z	2.3	2.7	2.5	2.5	2.3	2.4	2.2	2.2	C	C	C	C	2.1	2.2	2.1	2.4	2.4	2.5	2.5	2.4	2.3	2.3	2.7	
15-Feb	2.3	2.2	2.3	Z	2.4	2.4	2.5	2.4	2.6	2.7	2.6	2.5	2.3	2.4	3.1	2.9	3.8	3.8	3.6	3.0	2.4	2.0	2.0	2.0	2.6	3.8	
16-Feb	2.0	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.2	2.3	2.2	2.1	2.2	2.2	2.1	2.0	2.1	2.3	2.4	2.1	2.0	2.0	2.2	2.4	2.1	2.4	
17-Feb	2.3	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.0	2.0	2.1	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.5	
18-Feb	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
19-Feb	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	
20-Feb	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
21-Feb	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	
22-Feb	2.2	2.3	2.2	2.2	Z	2.1	2.1	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	2.0	2.0	2.0	2.1	2.1	2.3	
23-Feb	2.0	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.1	2.0	2.0	2.1	2.3	
24-Feb	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.2	
25-Feb	2.2	Z	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	
26-Feb	2.0	2.0	Z	2.0	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	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	
27-Feb	2.1	2.1	2.0	Z	2.1	2.0	2.0	2.0	2.1	2.4	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.4	
28-Feb	2.2	2.2	2.2	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
																								Diurnal Average			
																								Diurnal Maximum			
2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.2 2.2 2.2 2.2 2.1 2.1 2.1 2.1 2.1 2.1																											
2.6 2.5 2.3 2.3 2.7 2.5 2.5 2.4 2.6 2.7 2.6 2.8 2.5 2.5 3.1 2.9 3.8 3.8 3.6 3.0 3.4 2.8 2.8 2.5																											
Z - zerospan C - Calibration																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	282	44.06	44.06
2.1 - 3.0	353	55.16	99.22
3.1 - 10.0	5	0.78	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - February 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	30	11	10	12	6	2	9	16	17	17	24	26	18	34	19	31	282
2.1 - 3.0	55	21	14	5	6	11	19	33	72	22	13	9	12	20	13	27	352
3.1 - 10.0	0	0	0	0	0	0	0	2	2	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	0
Totals	85	32	24	17	12	13	28	51	91	39	37	35	30	54	32	59	639

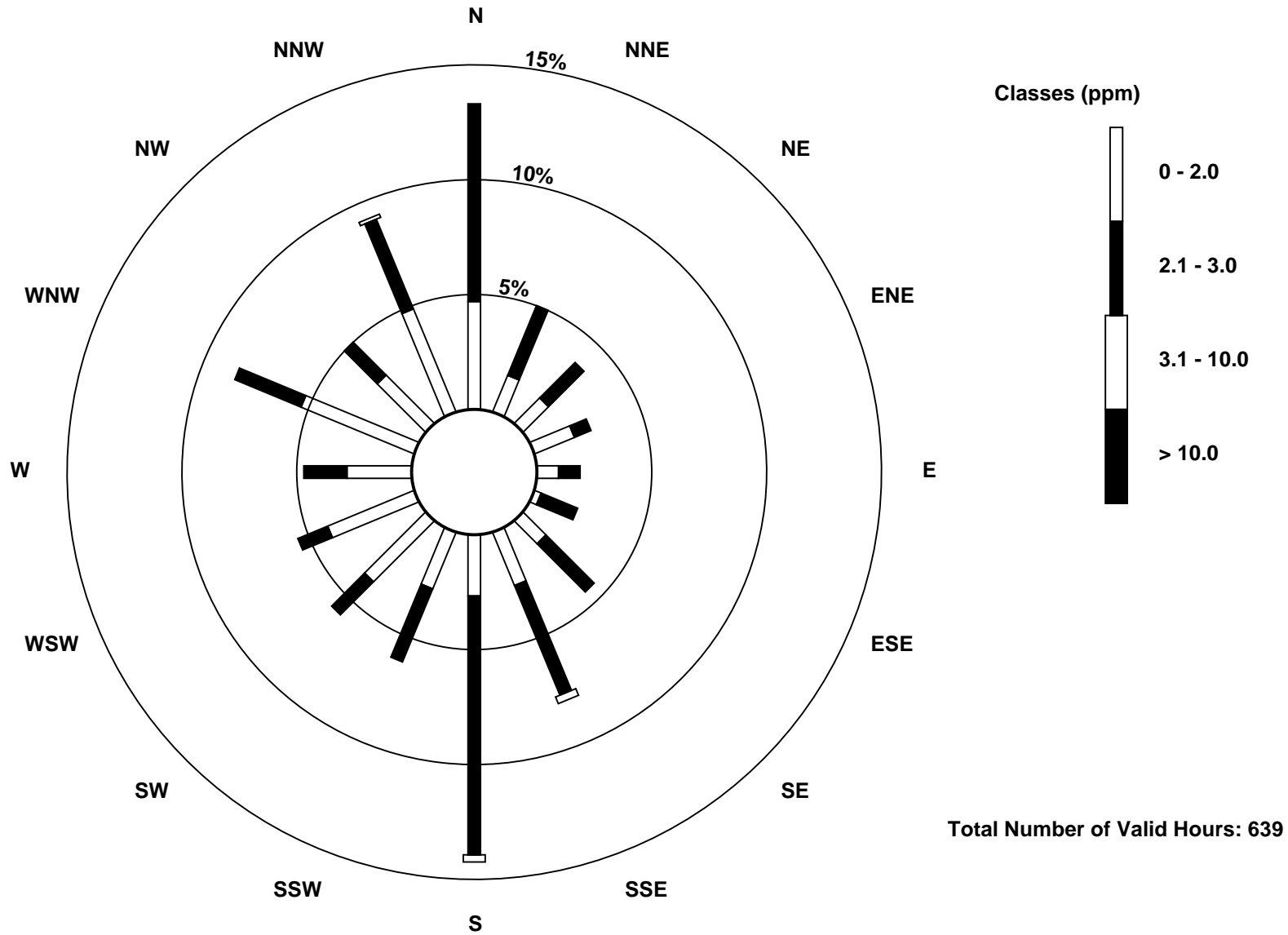
Total Number of Valid Hours: 639

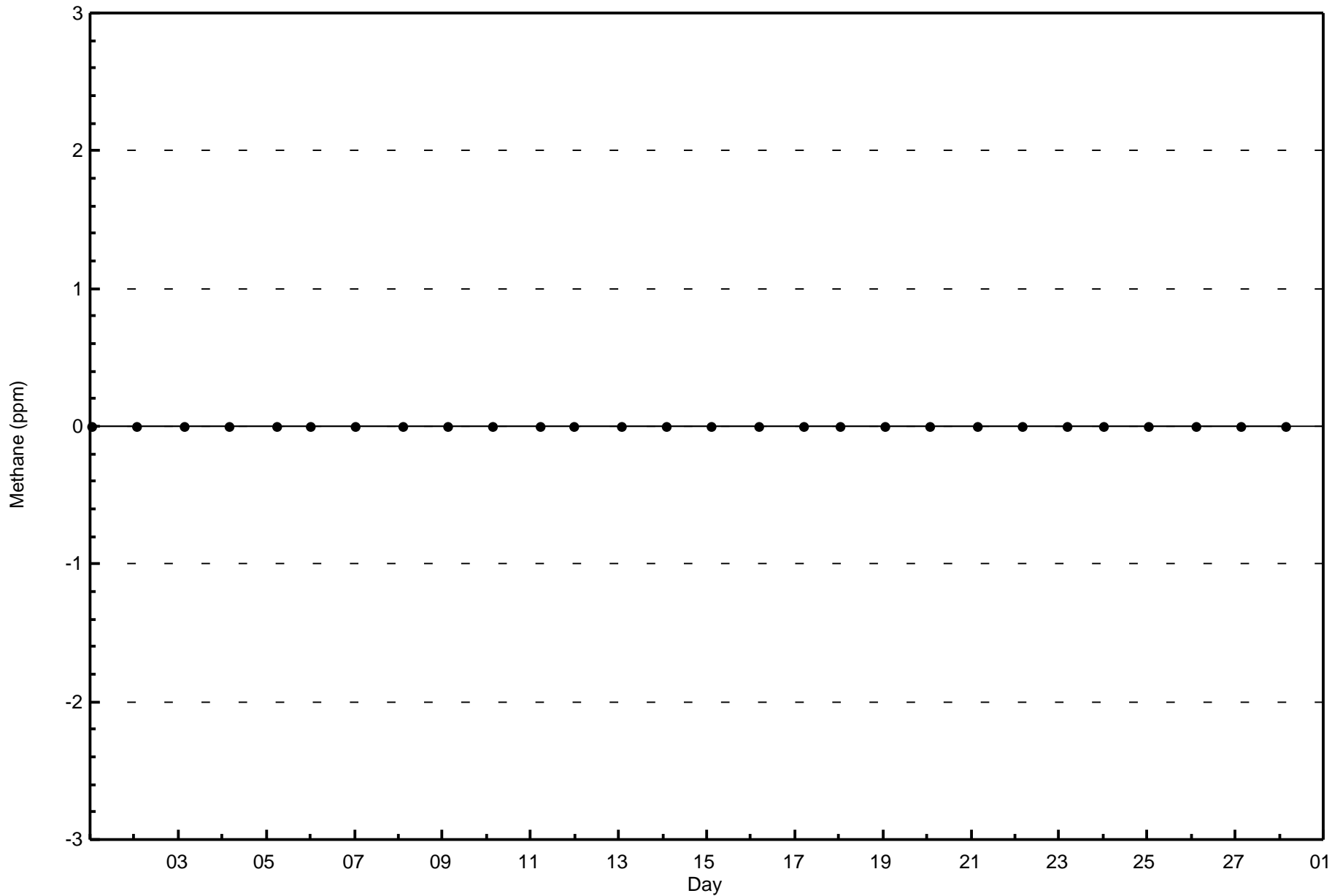
Total Number of Hours: 672

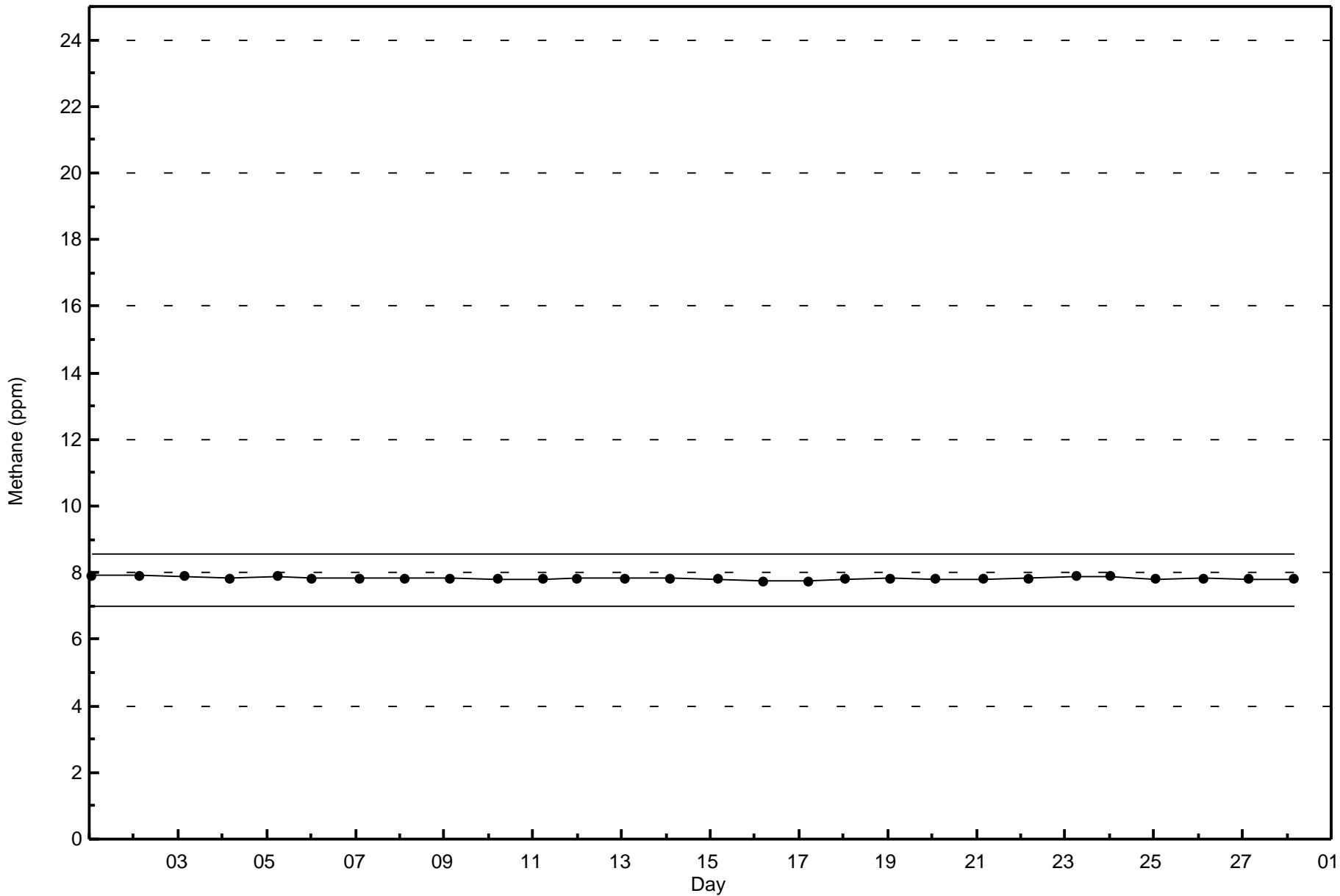


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter (AMS 1)

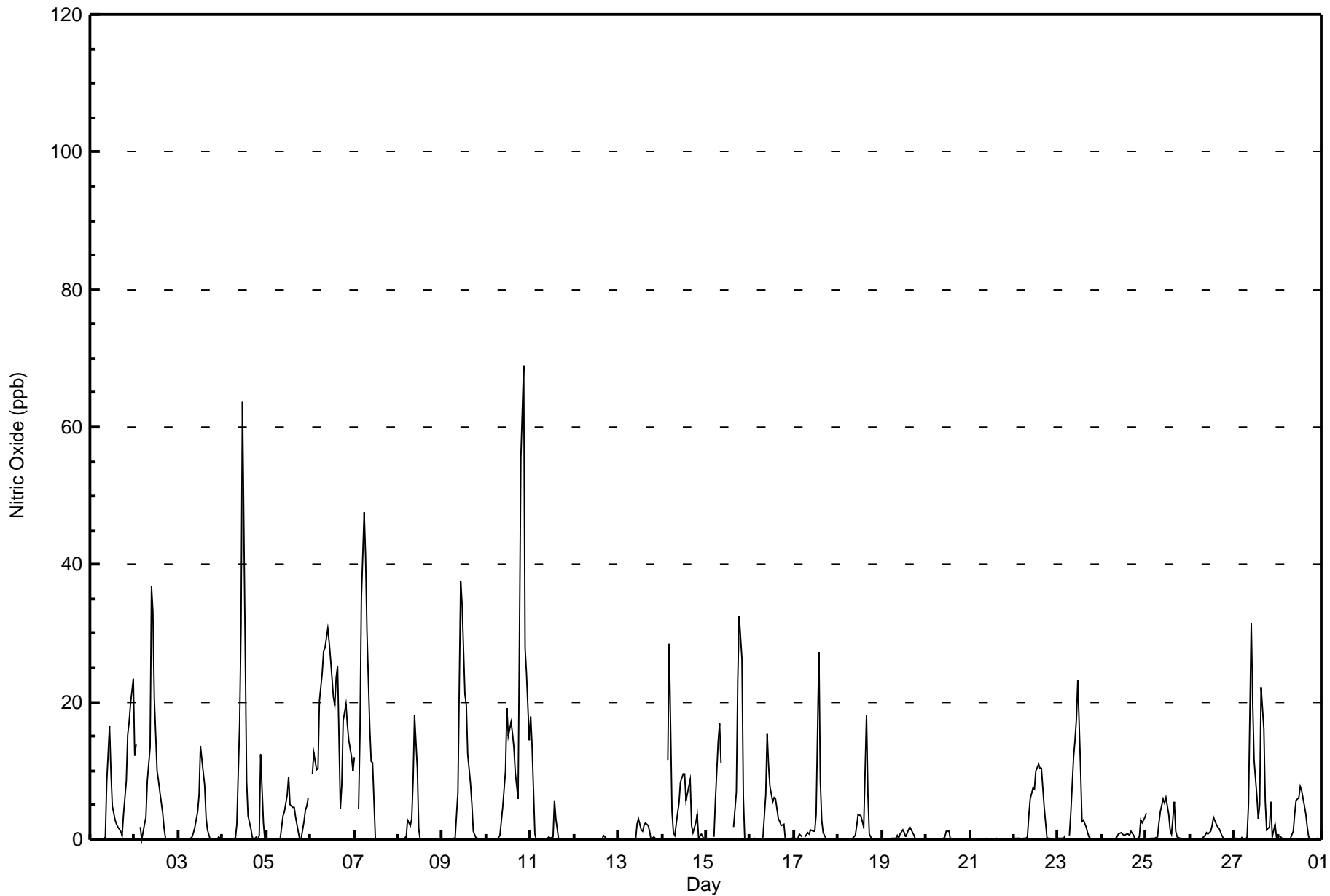








Maximum Value: 69 ppb on Feb 10 21:00		Maximum Daily Average: 18.2 ppb on Feb 6		Hours in Service: 672																						
Minimum Value: 0 ppb on Feb 1 01:00		Minimum Daily Average: 0.0 ppb on Feb 12		Hours of Data: 638																						
Maximum Diurnal Average: 10.1 ppb at hour 12		Minimum Diurnal Average: 0.8 ppb at hour 3		Hours of Missing Data: 34																						
Monthly Average: 4.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 4 P ₉₀ = 14 P ₉₉ = 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-Feb	0	Z	0	0	0	0	0	0	0	8	16	10	5	3	2	2	1	1	4	8	15	17	20	23	5.9	23
2-Feb	12	14	Z	2	0	2	3	9	13	37	33	20	10	8	7	4	2	0	0	0	0	0	0	0	7.7	37
3-Feb	0	0	0	Z	0	0	0	0	1	2	4	7	14	10	8	3	2	0	0	0	0	0	0	0	2.2	14
4-Feb	0	0	0	0	Z	0	0	0	2	17	31	64	28	8	3	2	0	0	1	12	2	0	0	0	7.5	64
5-Feb	0	0	0	0	0	Z	0	0	2	3	4	7	9	5	5	5	3	1	0	0	3	4	5	6	2.7	9
6-Feb	Z	10	13	10	10	20	24	28	28	31	29	26	21	20	24	25	4	8	17	20	17	14	12	10	18.2	31
7-Feb	12	Z	4	16	35	48	41	30	16	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	9.8	48
8-Feb	0	0	Z	1	0	3	2	3	9	18	10	2	0	0	0	0	0	0	0	0	0	0	0	0	2.1	18
9-Feb	0	0	0	Z	0	0	0	0	7	23	38	34	21	19	12	8	5	1	0	0	0	0	0	0	7.4	38
10-Feb	0	0	0	0	Z	0	0	1	3	5	10	19	15	17	15	13	10	6	30	56	69	28	24	14	14.5	69
11-Feb	18	14	1	0	0	Z	0	0	0	0	0	0	0	6	3	0	0	0	0	0	0	0	0	0	1.8	18
12-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.0	1
13-Feb	0	Z	0	0	0	0	0	0	0	0	2	3	1	1	2	2	2	1	0	0	0	0	0	0	0.7	3
14-Feb	0	0	Z	12	29	4	1	1	4	5	8	9	9	6	8	9	2	1	3	4	0	1	0	0	5.0	29
15-Feb	0	0	0	Z	1	6	14	17	11	C	C	C	C	C	C	2	7	23	32	26	6	0	0	0	--	32
16-Feb	0	0	0	0	Z	0	0	0	7	15	11	8	5	6	6	3	3	2	2	0	0	0	0	0	3.0	15
17-Feb	0	0	0	1	0	Z	0	1	1	1	1	1	4	27	8	3	1	0	0	0	0	0	0	0	2.3	27
18-Feb	Z	0	0	0	0	0	0	0	0	1	2	4	3	3	2	18	7	1	0	0	0	0	0	0	1.8	18
19-Feb	0	Z	0	0	0	0	0	0	1	0	1	1	1	0	1	2	1	1	0	0	0	0	0	0	0.5	2
20-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	0	0	0	0	Z	0	0	0	3	6	7	7	10	11	10	10	5	2	0	0	0	0	0	0	3.2	11
23-Feb	0	0	0	0	1	Z	1	4	12	14	17	23	10	3	3	2	1	0	0	0	0	0	0	0	4.0	23
24-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	3	2	3	0.7	3
25-Feb	4	Z	0	0	0	0	0	2	4	6	5	6	4	2	1	5	1	0	0	0	0	0	0	0	1.9	6
26-Feb	0	0	Z	0	0	0	0	0	1	1	1	1	2	3	2	2	2	1	0	0	0	0	0	0	0.7	3
27-Feb	0	0	0	Z	0	0	0	0	5	31	20	12	6	3	5	22	16	6	1	2	6	0	2	0	6.1	31
28-Feb	1	0	0	0	Z	0	0	0	1	4	6	6	8	7	5	4	2	0	0	0	0	0	0	0	1.9	8
		2.0	1.7	0.8	1.8	3.3	3.5	3.2	3.5	4.7	9.0	10.0	10.1	7.0	6.3	5.0	5.2	2.8	2.0	3.2	4.2	4.2	2.9	2.5	2.1	Diurnal Average
		18	14	13	16	35	48	41	30	28	37	38	64	28	27	24	25	16	23	32	56	69	28	24	23	Diurnal Maximum
Z - zerospan		C - Calibration																								





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	602	94.36	94.36
21 - 40	31	4.86	99.22
41 - 80	5	0.78	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - February 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	83	32	23	17	12	12	23	44	78	37	36	35	30	52	30	57	601
21 - 40	1	0	1	0	0	1	5	7	8	2	1	0	0	2	2	1	31
11 - 80	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	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	85	32	24	17	12	13	28	52	88	39	37	35	30	54	32	59	637

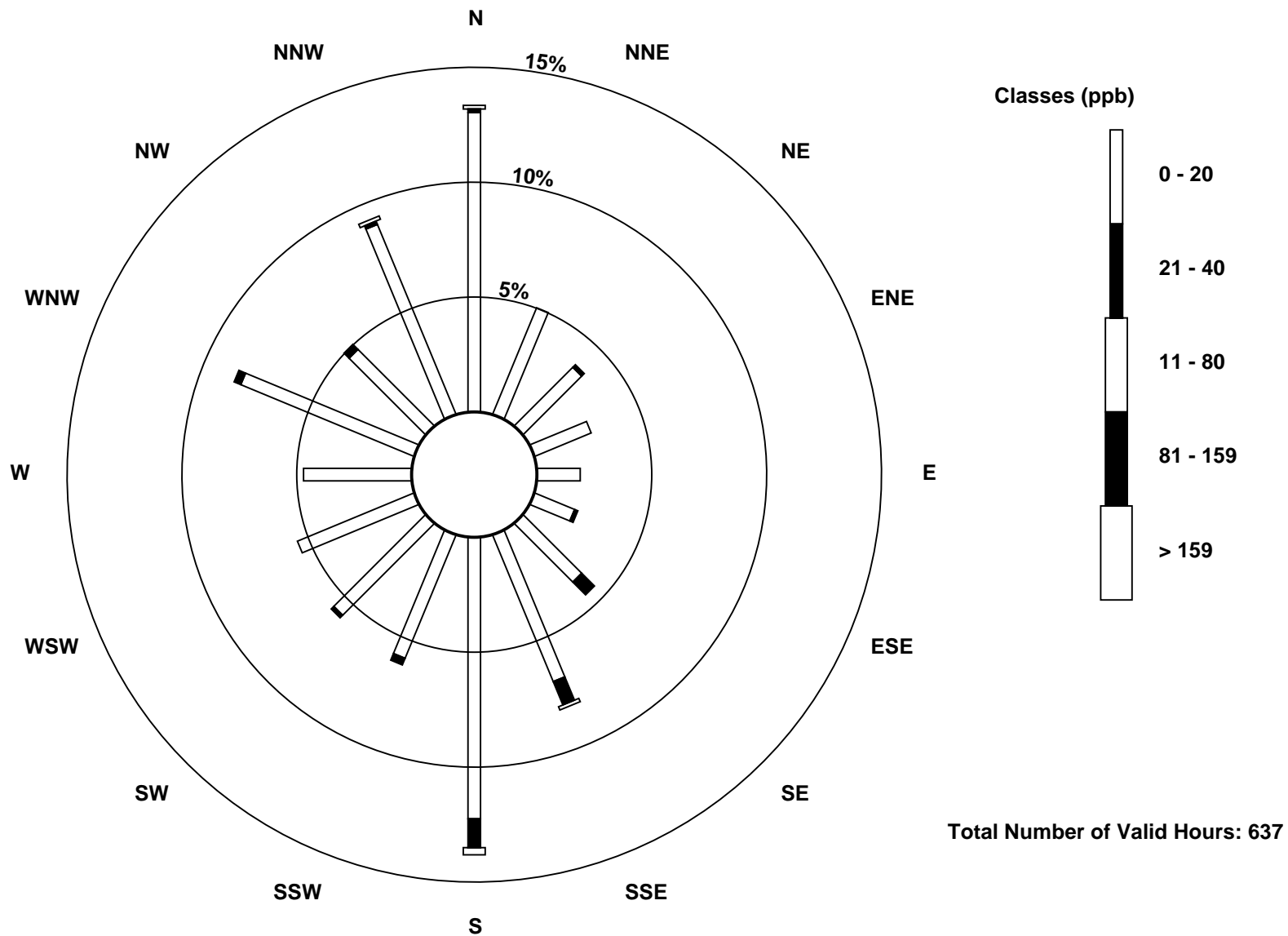
Total Number of Valid Hours: 637

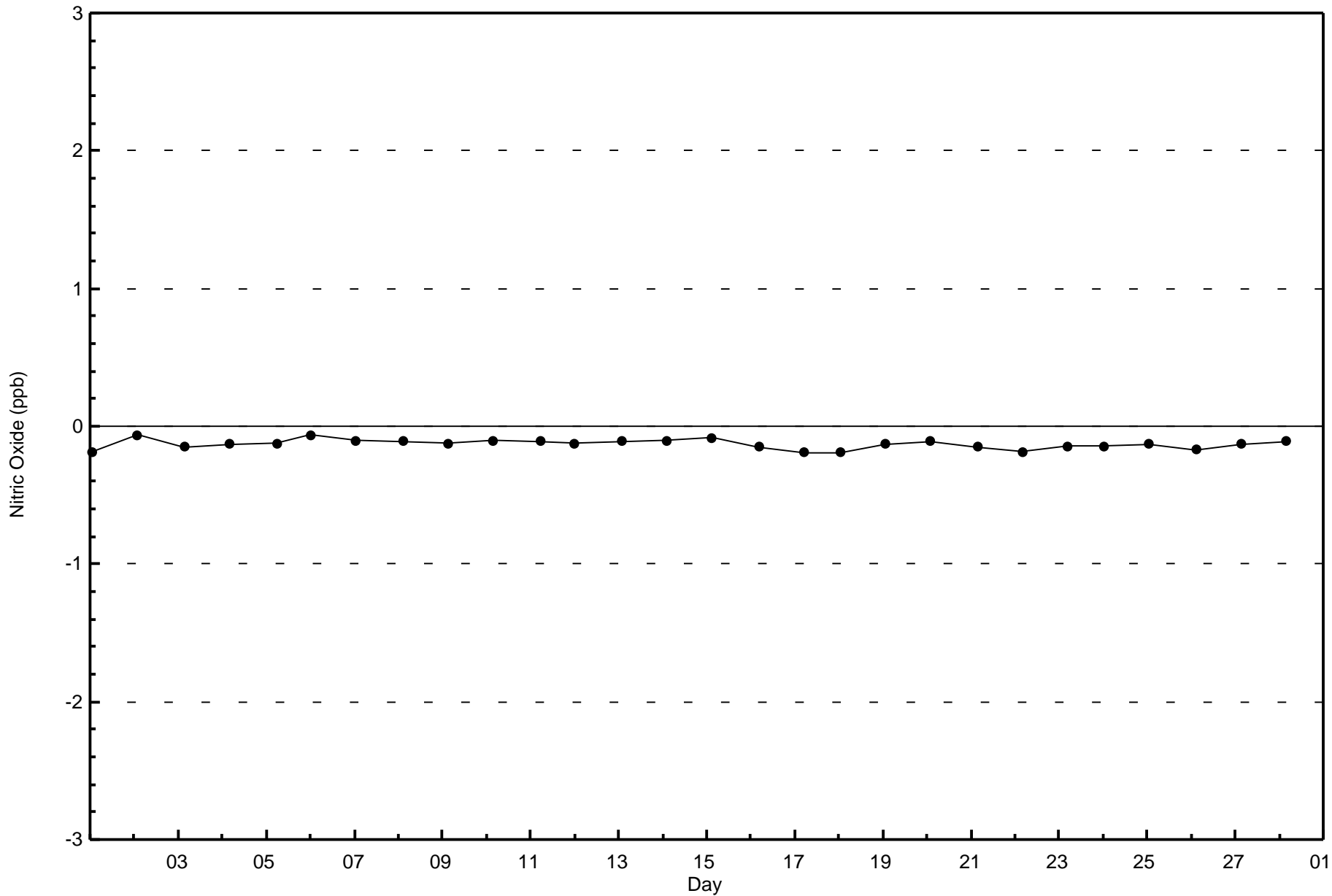
Total Number of Hours: 672

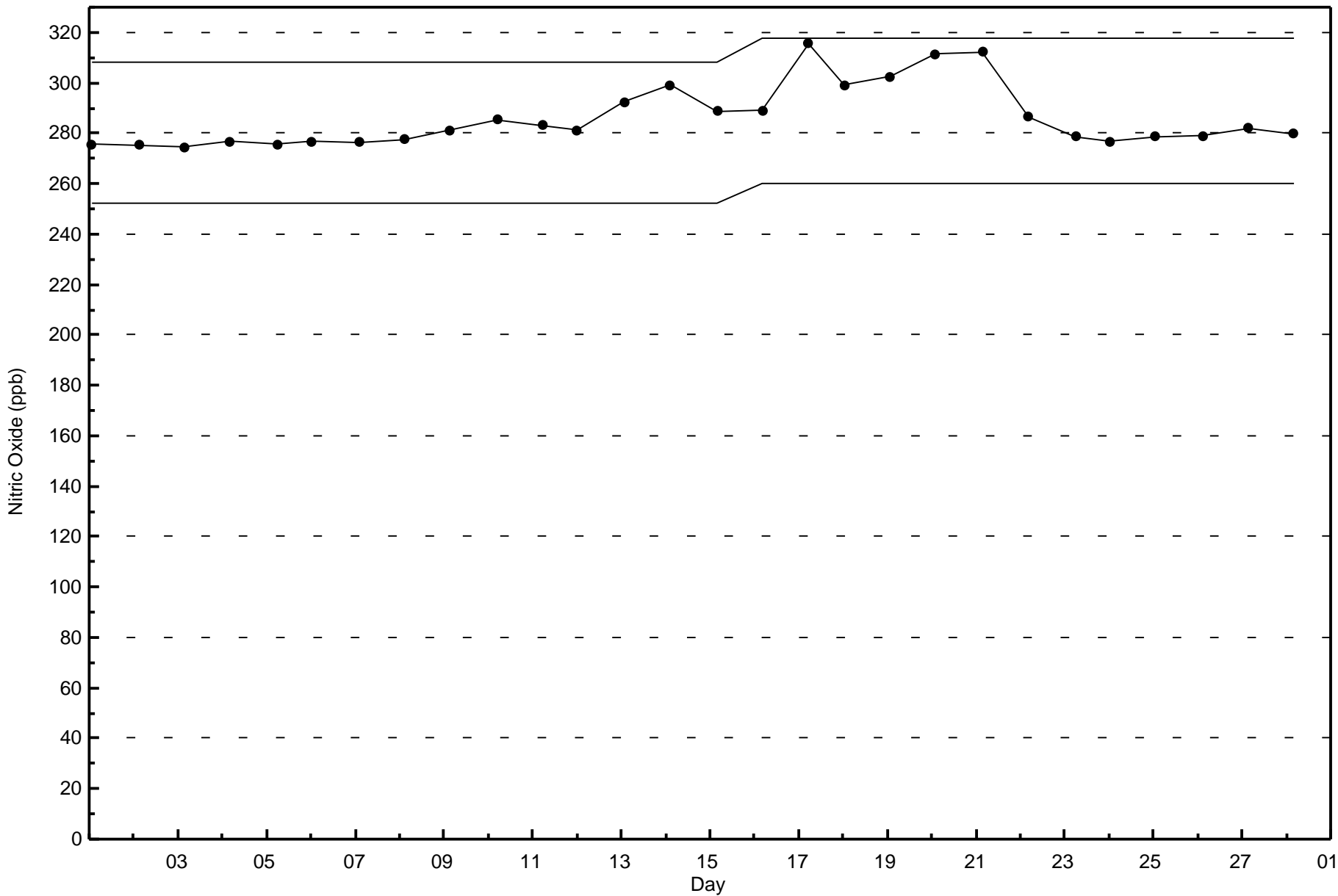


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

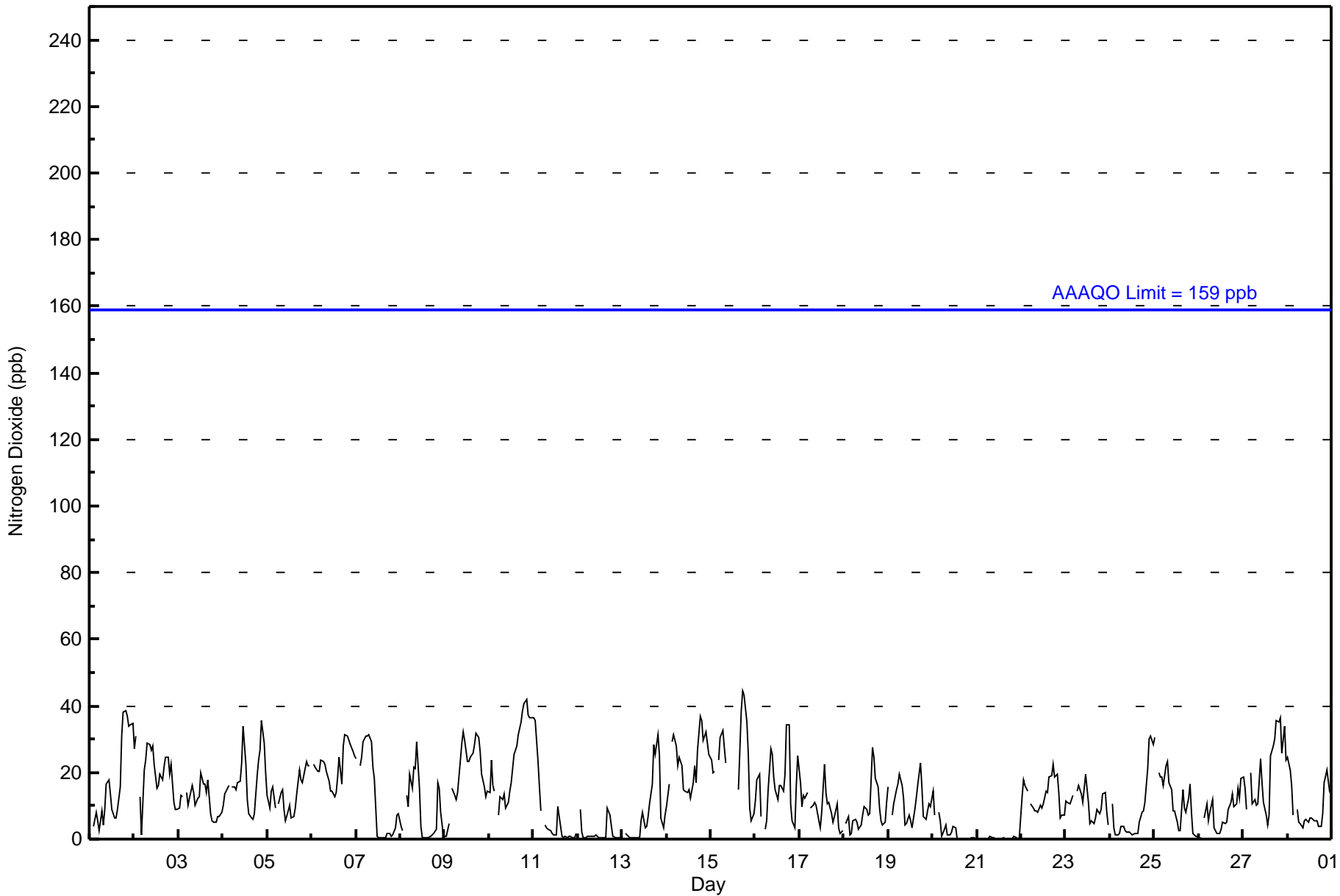
Fort McKay - Bertha Ganter - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 45 ppb on Feb 15 18:00										Maximum Daily Average: 23.6 ppb on Feb 10										Hours of Data: 638						
Minimum Value: 0 ppb on Feb 20 18:00										Minimum Daily Average: 0.3 ppb on Feb 21										Hours of Missing Data: 34						
Maximum Diurnal Average: 17.5 ppb at hour 19										Minimum Diurnal Average: 8.6 ppb at hour 13										Hours of Calibration: 34						
Monthly Average: 12.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 11 Q ₃ = 19 P ₉₀ = 29 P ₉₉ = 39										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2	Z	4	8	5	3	9	4	9	17	18	13	9	6	6	9	16	31	38	39	37	34	35	35	16.7	39
2-Feb	27	31	Z	13	1	21	24	29	29	27	28	22	15	16	19	18	21	24	25	19	23	11	9	9	20.0	31
3-Feb	9	13	13	Z	14	10	12	16	14	10	12	13	20	16	17	14	18	8	6	5	5	7	7	8	11.6	20
4-Feb	10	13	15	16	Z	16	16	15	17	17	23	34	22	12	8	6	6	8	19	24	27	36	29	20	17.7	36
5-Feb	13	9	15	16	9	Z	11	14	15	9	6	8	10	7	7	10	14	21	18	17	21	23	22	22	13.7	23
6-Feb	Z	22	22	20	20	24	23	23	20	17	15	14	13	14	19	25	17	28	32	31	30	29	26	25	22.1	32
7-Feb	24	Z	22	25	29	31	31	31	29	22	18	1	1	1	0	0	1	2	2	1	1	3	7	8	12.6	31
8-Feb	4	3	Z	13	10	20	15	21	21	29	15	4	1	1	1	1	1	1	2	3	17	15	8	1	8.9	29
9-Feb	1	1	5	Z	15	13	12	14	24	29	32	30	23	23	25	26	29	32	30	26	20	16	13	15	19.6	32
10-Feb	14	24	16	14	Z	7	13	12	14	9	11	15	17	26	27	28	32	35	39	41	42	37	37	36	23.6	42
11-Feb	37	36	23	16	8	Z	4	3	3	2	2	1	1	10	7	1	1	1	1	1	1	1	1	2	7.0	37
12-Feb	Z	9	2	1	1	1	1	1	1	1	1	1	1	1	0	1	9	7	4	1	0	0	0	0	1.8	9
13-Feb	1	Z	2	1	0	0	0	0	1	1	5	8	4	4	7	10	16	29	25	31	26	7	4	7	8.2	31
14-Feb	10	17	Z	29	31	28	22	24	22	15	14	14	15	12	17	22	17	27	37	36	30	32	29	25	22.8	37
15-Feb	24	20	20	Z	24	31	33	28	23	C	C	C	C	C	C	15	39	45	43	35	26	10	6	8	--	45
16-Feb	12	18	20	7	Z	3	5	15	27	26	19	15	12	16	15	19	34	35	11	5	3	16	25	16.2	35	
17-Feb	17	10	13	12	14	Z	9	10	11	10	6	4	8	23	14	11	11	8	5	7	11	3	2	3	9.5	23
18-Feb	Z	5	7	1	2	5	6	5	3	4	7	10	9	7	8	28	25	18	16	9	5	4	5	11	8.7	28
19-Feb	16	Z	7	11	15	17	20	16	12	4	5	7	5	4	9	12	16	23	16	7	6	8	11	10	11.1	23
20-Feb	14	7	Z	8	6	1	3	4	1	1	2	4	4	0	0	0	0	0	0	0	0	1	1	0	2.5	14
21-Feb	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.3	1
22-Feb	13	18	16	14	Z	10	9	9	9	8	10	9	11	14	14	19	19	22	19	20	14	6	7	7	12.9	22
23-Feb	12	11	11	12	13	Z	14	16	14	11	15	20	11	5	6	5	6	9	8	9	13	14	8	4	10.7	20
24-Feb	Z	10	3	1	1	2	4	4	3	2	2	2	1	2	2	5	8	9	11	21	30	31	29	8.0	31	
25-Feb	30	Z	20	19	19	16	22	23	17	15	9	9	5	2	3	15	9	8	12	17	8	2	1	1	12.2	30
26-Feb	0	1	Z	7	11	6	8	12	4	3	2	2	3	5	5	5	9	11	13	10	11	15	12	18	7.4	18
27-Feb	19	15	9	Z	20	11	12	10	10	24	17	11	7	4	7	25	28	30	35	35	36	26	34	24	19.6	36
28-Feb	24	21	16	7	Z	9	5	5	4	6	6	5	6	7	6	6	5	4	4	8	17	21	17	14	9.6	24
13.8 13.6 12.2 11.7 11.7 11.8 12.2 13.0 12.7 11.8 11.0 10.1 8.6 8.7 9.1 11.6 13.8 16.9 17.5 16.2 16.2 14.1 13.5 13.1																								Diurnal Average		
37 36 23 29 31 31 33 31 29 29 32 34 23 26 27 28 39 45 43 41 42 37 37 36																								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
Fort McKay - Bertha Ganter - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	495	77.59	77.59
21 - 40	139	21.79	99.37
41 - 80	4	0.63	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - February 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	69	31	19	16	11	9	24	33	43	24	33	31	26	45	28	52	494
21 - 40	15	1	5	1	1	4	4	18	44	15	4	4	4	9	4	6	139
11 - 80	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	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	85	32	24	17	12	13	28	52	88	39	37	35	30	54	32	59	637

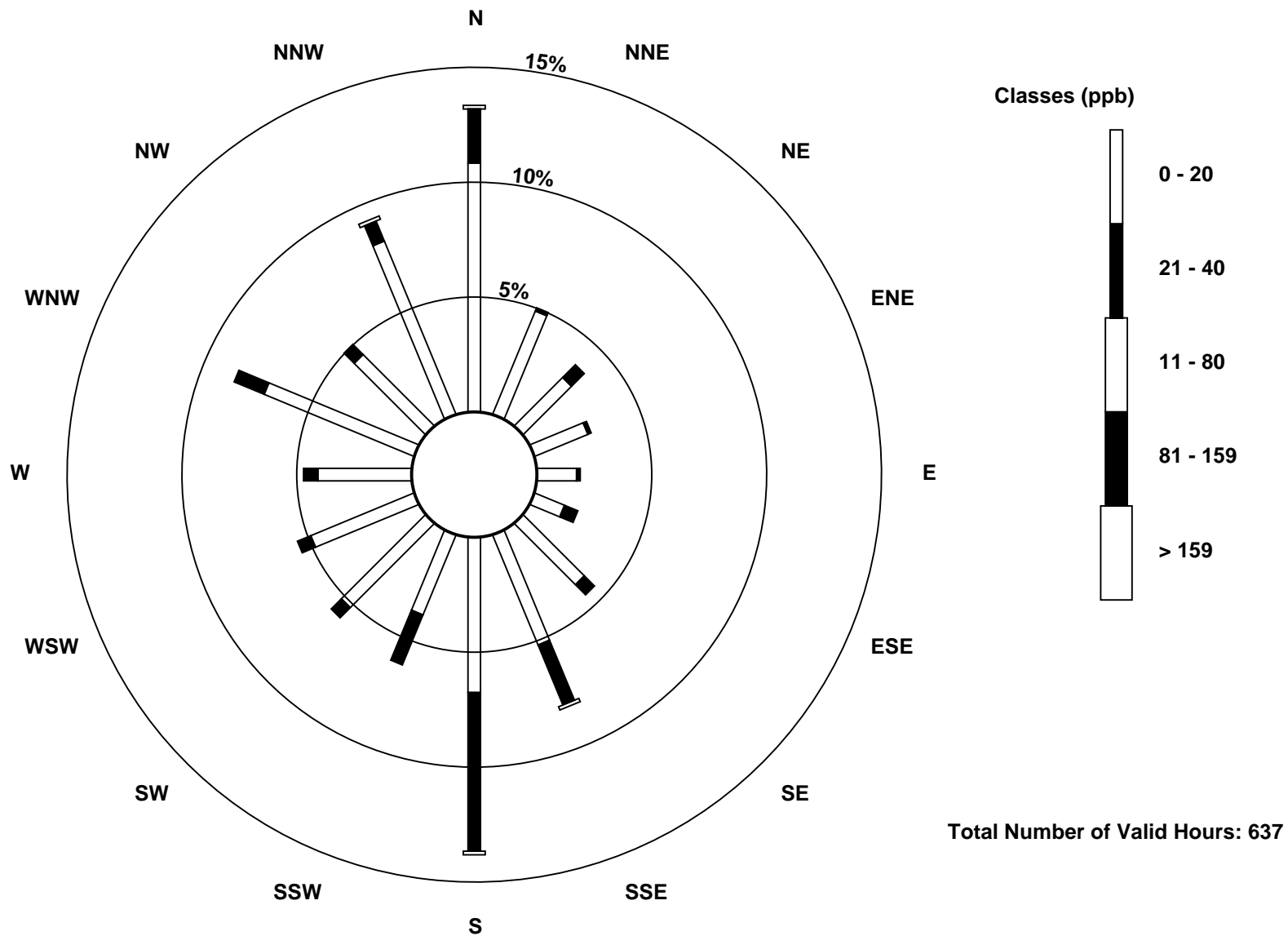
Total Number of Valid Hours: 637

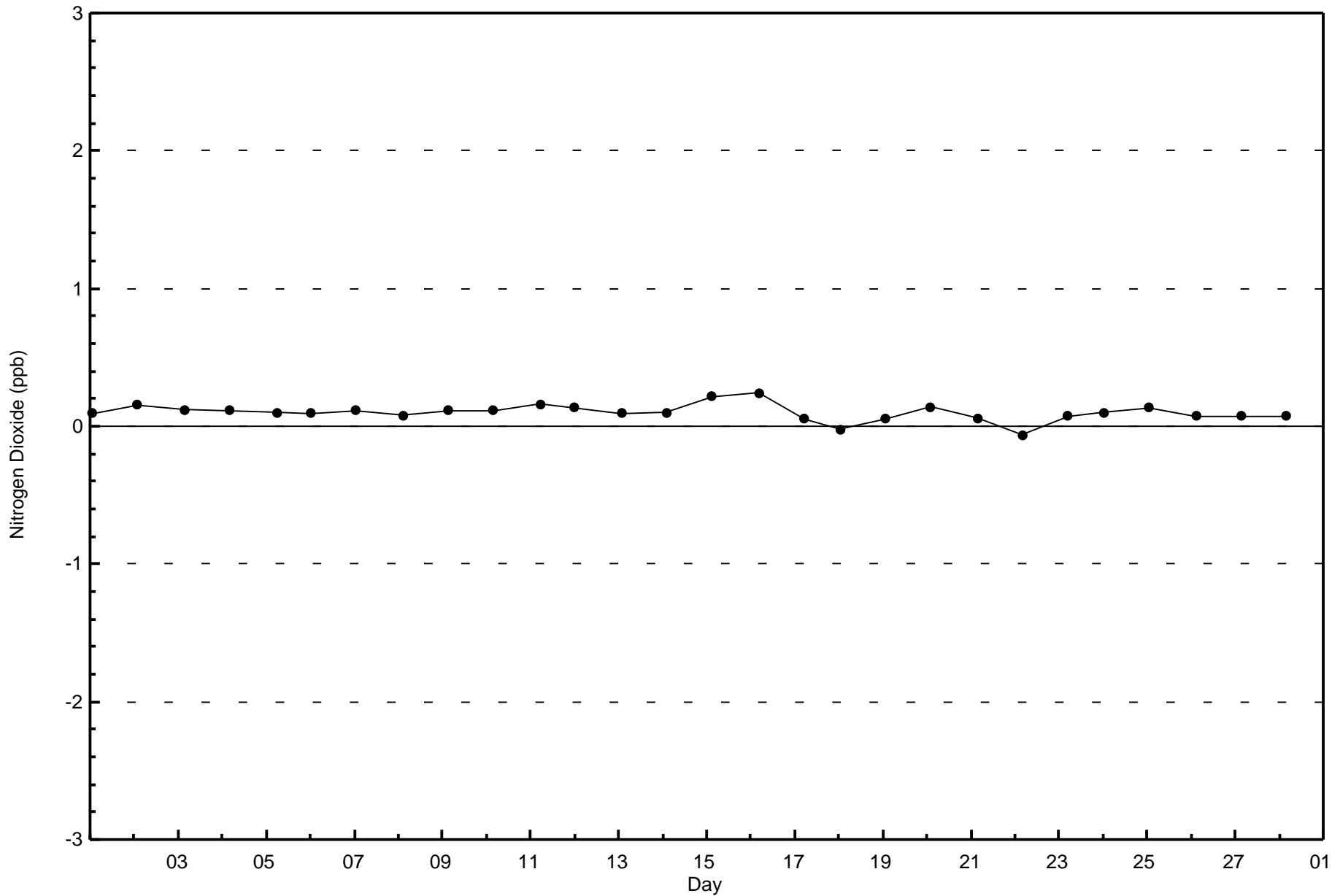
Total Number of Hours: 672

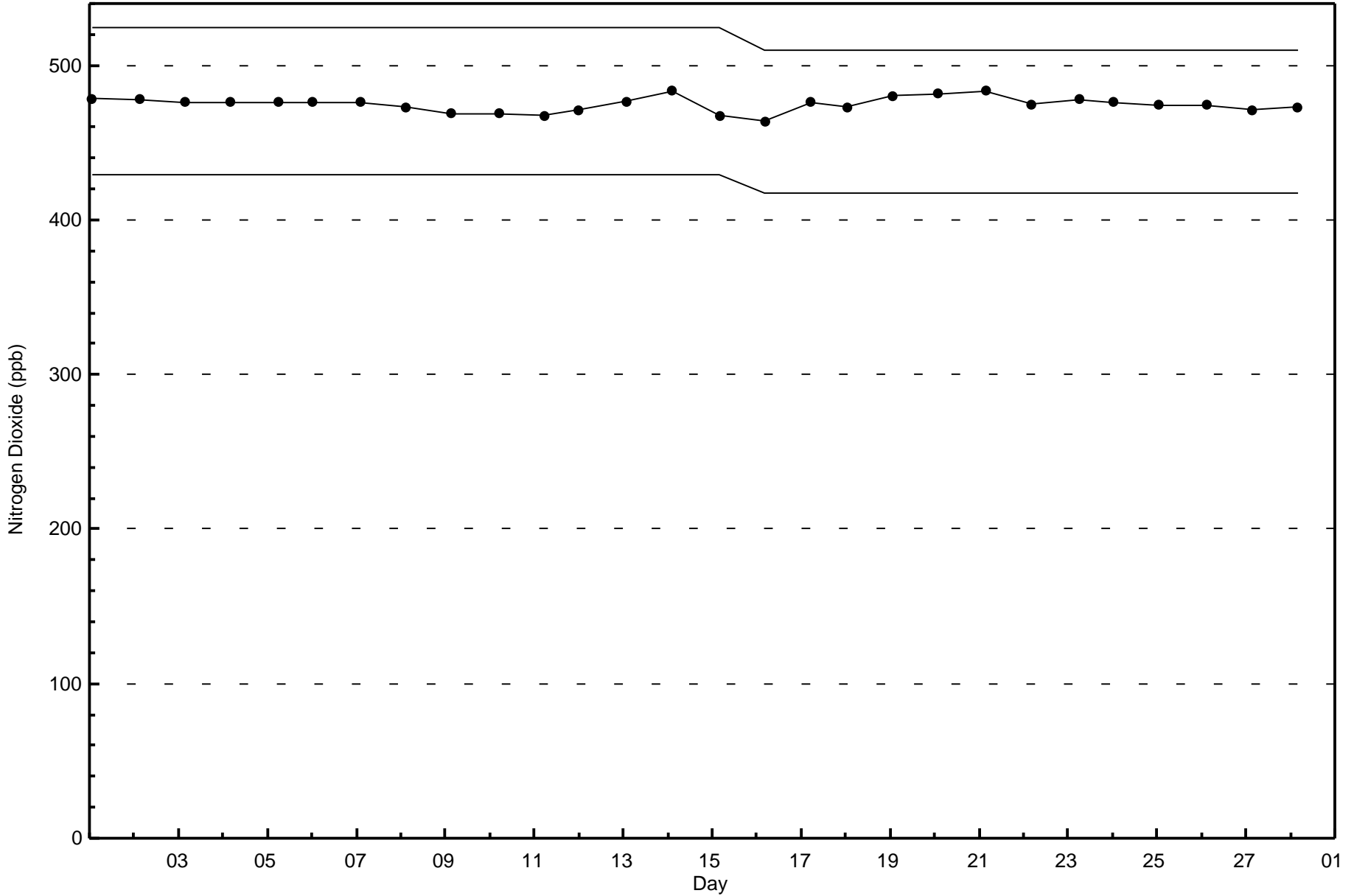


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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







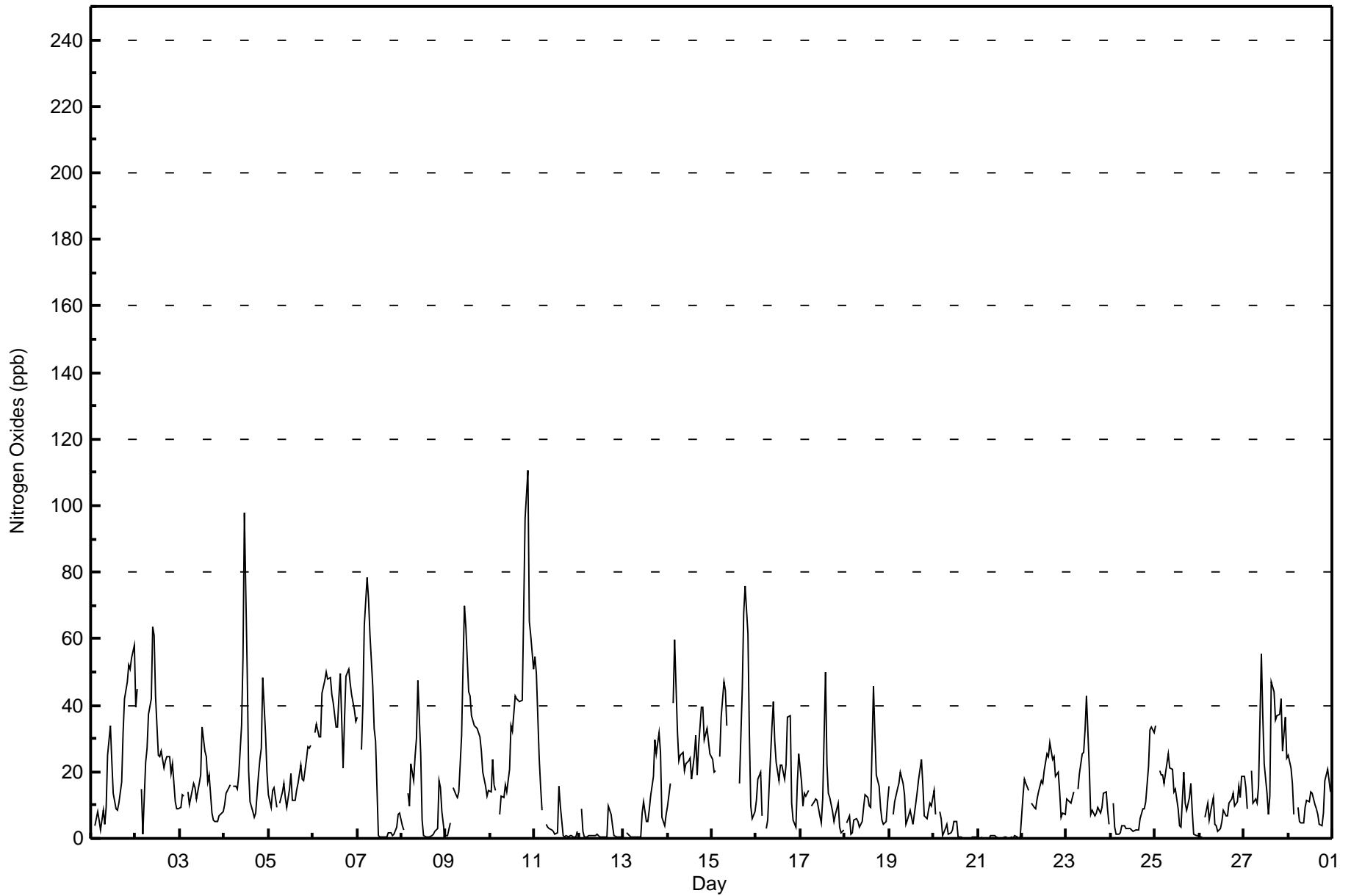


Maximum Value: 111 ppb on Feb 10 21:00																			Maximum Daily Average: 40.3 ppb on Feb 6						Hours in Service: 672																			
Minimum Value: 0 ppb on Feb 20 21:00																			Minimum Daily Average: 0.3 ppb on Feb 21						Hours of Data: 638																			
Maximum Diurnal Average: 21.1 ppb at hour 11																			Minimum Diurnal Average: 13.0 ppb at hour 3						Hours of Missing Data: 34																			
Monthly Average: 17.0 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 5 Median = 12 Q ₃ = 24 P ₉₀ = 41 P ₉₉ = 69						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-Feb	2	Z	4	8	5	3	8	4	9	25	34	23	14	9	9	11	17	32	42	47	52	51	54	58	22.6	58																		
2-Feb	39	45	Z	15	1	23	27	37	42	63	61	43	25	24	26	21	23	25	25	19	23	11	9	9	27.7	63																		
3-Feb	9	13	13	Z	14	10	12	17	15	12	16	19	33	26	25	17	19	8	6	5	5	7	7	8	13.8	33																		
4-Feb	10	13	15	16	Z	16	16	15	19	34	54	98	50	20	11	8	6	8	19	24	27	48	31	20	25.2	98																		
5-Feb	13	9	15	15	9	Z	11	14	17	12	9	15	19	11	12	14	17	22	18	17	24	28	27	28	16.3	28																		
6-Feb	Z	32	34	31	31	44	47	50	48	48	43	41	33	34	42	50	21	36	49	51	47	43	38	35	40.3	51																		
7-Feb	36	Z	27	40	64	78	72	62	46	33	29	1	1	1	0	0	1	2	2	1	1	3	7	8	22.4	78																		
8-Feb	4	2	Z	14	10	22	17	24	30	48	26	6	1	1	1	1	1	1	2	3	17	15	8	1	11.0	48																		
9-Feb	1	1	5	Z	15	13	12	14	31	52	70	64	44	43	37	34	34	33	30	26	20	16	13	14	27.0	70																		
10-Feb	14	24	16	14	Z	7	13	12	16	14	21	34	32	43	42	42	41	41	68	96	111	65	61	51	38.2	111																		
11-Feb	55	49	24	16	8	Z	4	3	3	3	2	1	2	16	10	1	1	1	1	1	1	1	1	2	8.9	55																		
12-Feb	Z	9	2	1	1	1	1	1	1	1	1	1	0	0	0	1	10	7	4	1	0	0	0	0	1.9	10																		
13-Feb	1	Z	2	1	0	0	0	0	0	0	8	11	5	5	9	13	18	30	25	32	26	7	4	7	8.9	32																		
14-Feb	10	17	Z	41	60	32	23	25	26	20	23	23	24	18	25	31	19	27	39	39	30	33	29	25	27.9	60																		
15-Feb	24	20	20	Z	24	36	47	44	34	C	C	C	C	C	C	16	45	68	76	62	32	10	6	8	--	76																		
16-Feb	12	18	20	7	Z	3	5	15	34	41	29	23	17	22	22	18	22	36	37	11	5	4	17	25	19.2	41																		
17-Feb	17	10	13	13	14	Z	10	11	12	12	7	5	12	50	22	13	12	8	5	7	11	3	2	2	11.8	50																		
18-Feb	Z	5	7	1	2	5	6	5	3	5	9	13	12	10	10	46	31	19	16	9	5	4	5	11	10.4	46																		
19-Feb	16	Z	7	11	15	17	20	16	13	4	5	9	6	4	11	14	18	24	16	7	6	8	11	10	11.6	24																		
20-Feb	15	7	Z	8	6	1	3	4	1	1	3	5	5	0	0	0	0	0	0	0	0	1	0	0	2.7	15																		
21-Feb	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.3	1																		
22-Feb	13	18	16	14	Z	10	9	9	12	14	18	17	21	25	24	29	24	25	19	20	14	6	7	7	16.2	29																		
23-Feb	12	11	11	12	14	Z	15	20	26	26	33	43	21	7	8	7	7	9	8	9	13	14	8	4	14.7	43																		
24-Feb	Z	10	3	1	1	2	4	4	3	3	3	3	2	2	3	2	6	9	9	11	22	33	33	32	8.8	33																		
25-Feb	34	Z	20	19	19	16	22	26	21	21	14	15	9	4	3	20	11	8	12	17	8	1	1	1	14.0	34																		
26-Feb	0	1	Z	7	11	6	8	12	4	4	2	3	5	8	7	7	11	12	14	10	11	15	12	19	8.1	19																		
27-Feb	19	15	9	Z	20	11	12	11	16	55	37	23	13	7	13	47	44	36	37	37	42	26	36	24	25.7	55																		
28-Feb	25	21	16	7	Z	9	5	5	5	9	12	11	14	14	10	9	7	4	4	7	17	21	17	14	11.5	25																		
																			15.8	15.2	13.0	13.6	15.0	15.3	15.4	16.5	17.4	20.8	21.1	20.3	15.6	15.0	14.1	16.8	16.6	18.9	20.7	20.3	20.3	16.9	16.0	15.2	Diurnal Average	
																			55	49	34	41	64	78	72	62	48	63	70	98	50	50	42	50	45	68	76	96	111	65	61	58	Diurnal Maximum	
Z - zerospan																			C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	444	69.59	69.59
21 - 40	126	19.75	89.34
41 - 80	65	10.19	99.53
81 - 159	3	0.47	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - February 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	27	16	14	10	6	15	25	36	19	32	31	26	44	27	50	443
21 - 40	15	4	7	2	1	4	8	13	33	15	3	4	3	4	3	7	126
11 - 80	4	1	1	1	1	3	5	13	19	5	2	0	1	6	2	1	65
81 - 159	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	32	24	17	12	13	28	52	88	39	37	35	30	54	32	59	637

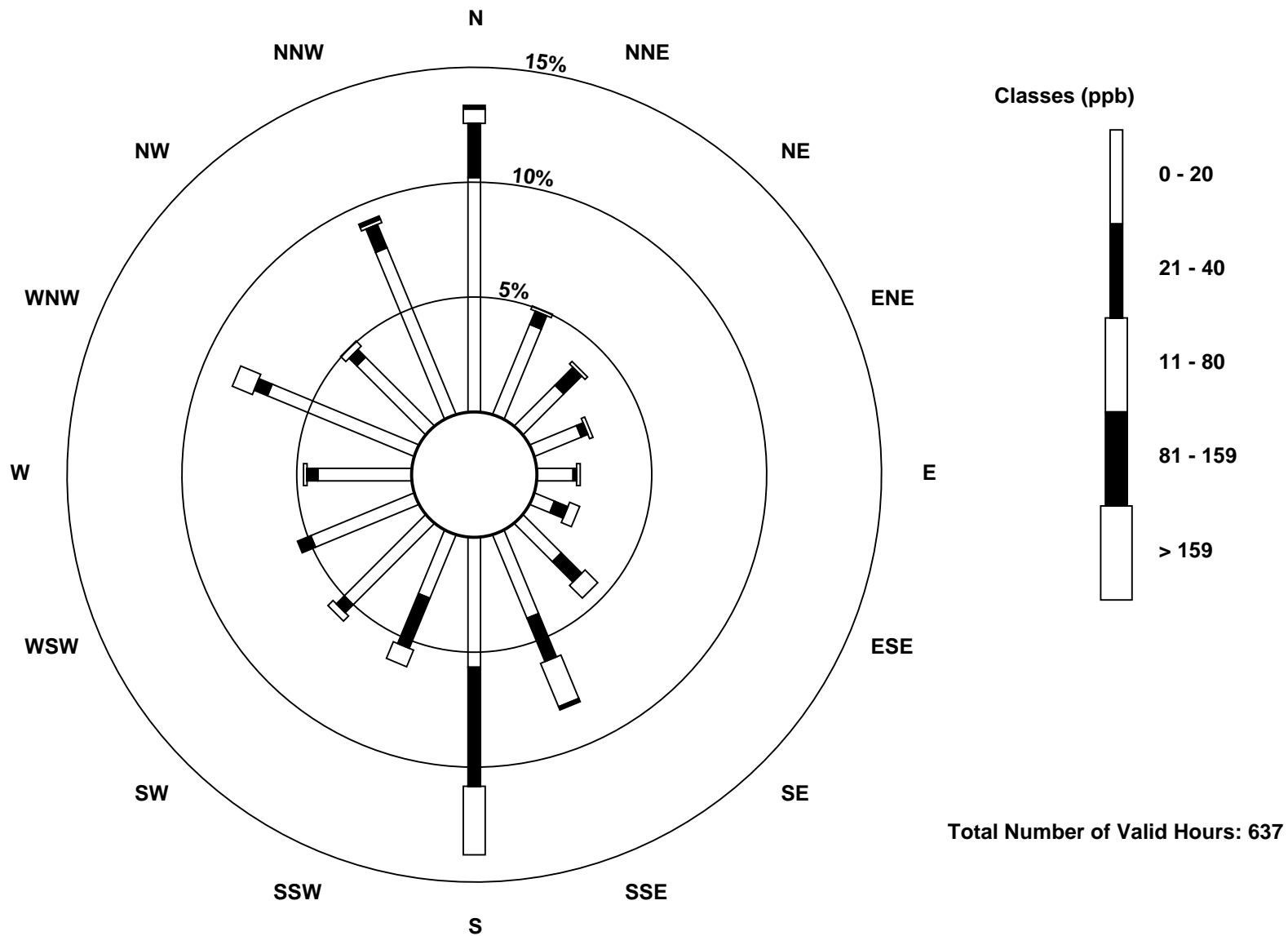
Total Number of Valid Hours: 637

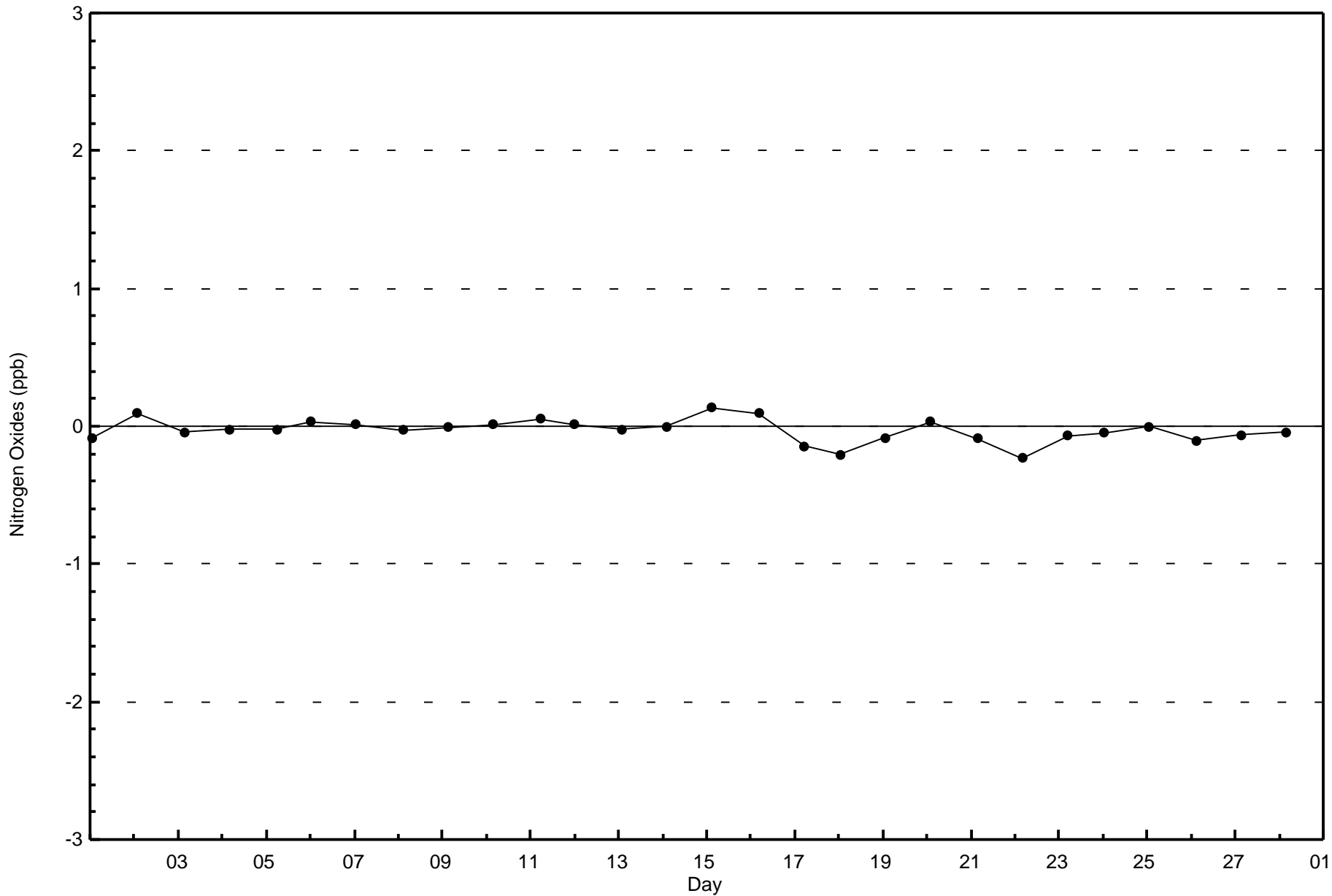
Total Number of Hours: 672

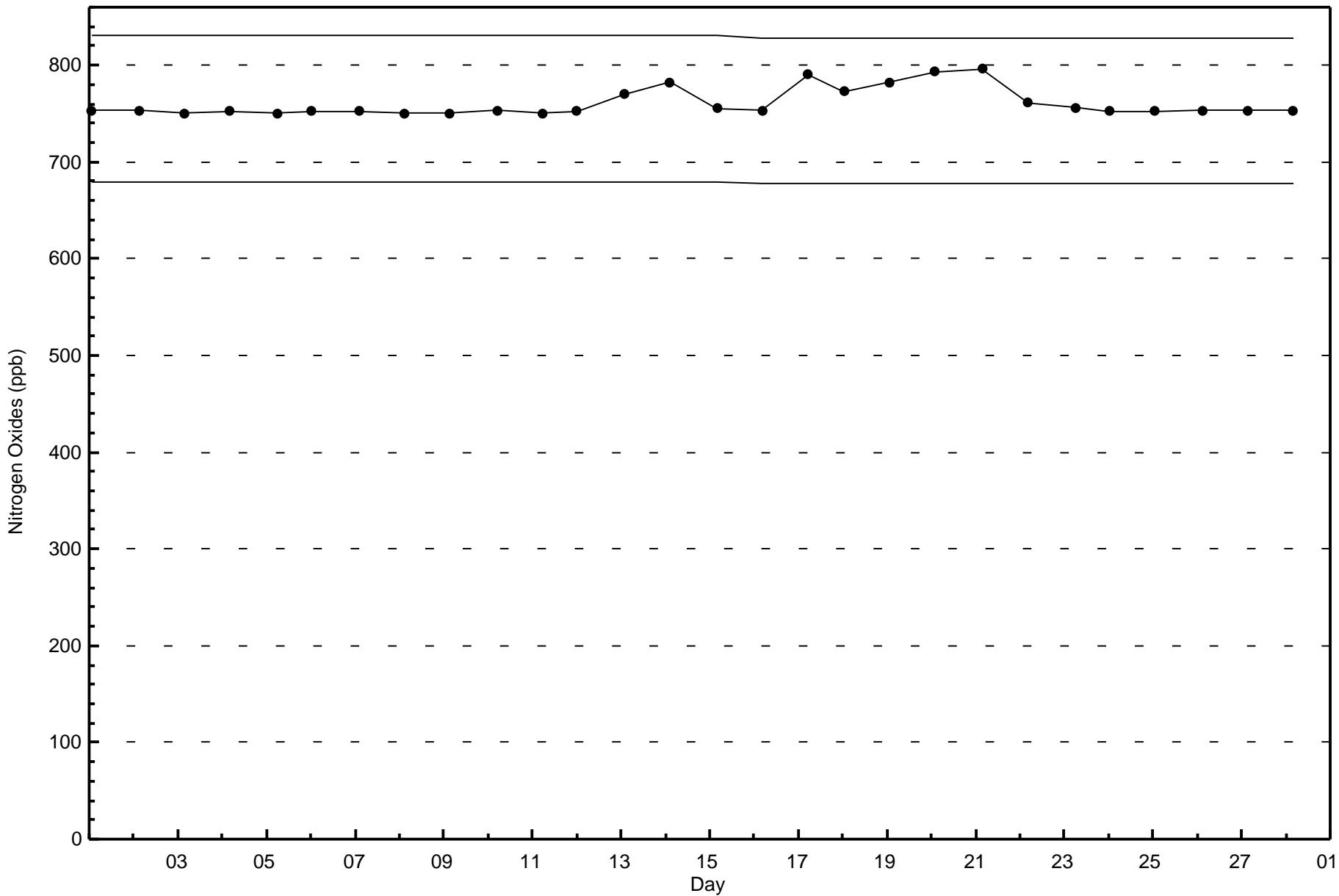


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Summary of Hour Averages

Fort McKay - Bertha Ganter - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 47 ppb on Feb 12 16:00	Maximum Daily Average: 43.8 ppb on Feb 12		Hours of Data:	637
Minimum Value: 0 ppb on Feb 10 23:00	Minimum Daily Average: 4.5 ppb on Feb 6		Hours of Missing Data:	35
Maximum Diurnal Average: 29.1 ppb at hour 15	Minimum Diurnal Average: 17.5 ppb at hour 8		Hours of Calibration:	31
Monthly Average: 22.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 4 Q ₁ = 13 Median = 23 O ₃ = 31 P ₉₀ = 38 P ₉₉ = 46		Percent Operational Time:	99.4

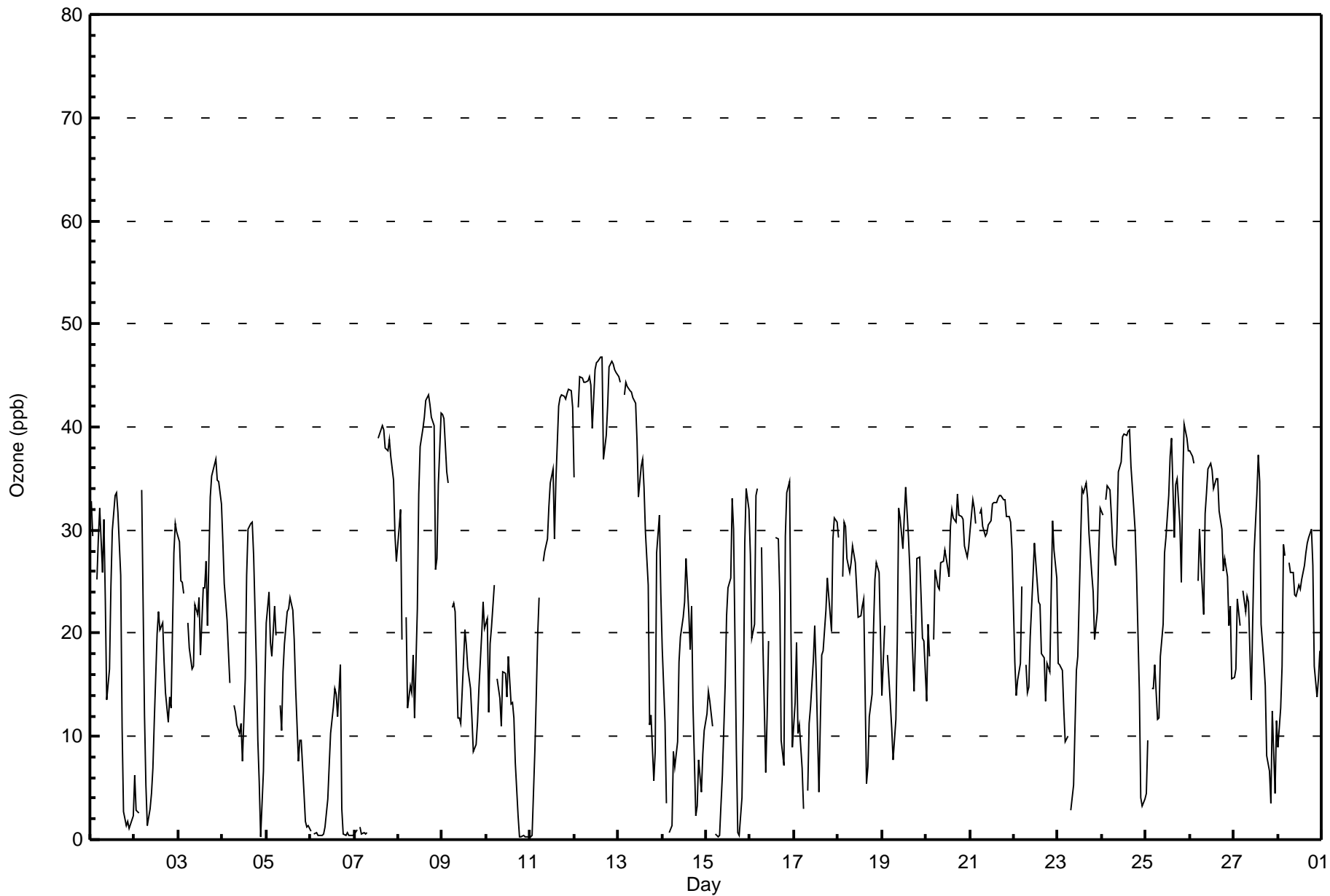
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	33	29	Z	25	29	32	26	31	23	14	16	25	30	33	34	32	26	11	3	1	2	1	2	2	20.0	34	
2-Feb	6	3	3	Z	34	12	5	1	3	4	7	12	20	22	20	21	17	14	11	14	13	28	31	30	14.4	34	
3-Feb	29	25	25	24	Z	21	19	17	17	23	22	24	18	24	24	27	21	33	35	36	37	35	35	33	26.2	37	
4-Feb	29	25	21	18	15	Z	13	12	11	10	11	8	16	26	30	31	31	27	17	10	6	0	7	15	16.9	31	
5-Feb	21	24	19	18	23	20	Z	13	11	16	19	22	22	23	22	19	15	8	10	10	4	2	1	1	14.9	24	
6-Feb	1	Z	1	1	0	0	0	1	1	4	7	10	13	15	14	12	17	3	1	0	1	0	0	0	4.5	17	
7-Feb	1	1	Z	1	1	1	1	1	UO	UO	14	UO	UO	39	40	40	40	38	38	39	37	35	30	27	22.1	40	
8-Feb	30	32	19	Z	21	13	15	14	18	12	22	33	38	40	41	43	43	42	41	40	26	27	34	41	29.9	43	
9-Feb	41	41	36	35	Z	22	23	22	12	12	11	14	20	19	17	15	12	9	9	11	15	20	23	21	19.9	41	
10-Feb	21	12	19	21	25	Z	16	14	11	16	16	14	18	13	13	12	8	2	0	0	0	0	0	0	11.0	25	
11-Feb	0	0	9	14	20	23	Z	27	28	29	32	35	36	29	35	42	43	43	43	43	43	43	44	43	42	30.6	44
12-Feb	35	Z	42	45	45	44	44	44	45	44	40	46	46	46	47	47	37	39	42	46	46	46	45	45	43.8	47	
13-Feb	45	44	Z	43	44	44	44	43	43	42	39	33	36	37	34	30	25	11	12	6	8	28	31	24	32.5	45	
14-Feb	19	11	4	Z	1	1	9	7	9	17	20	22	23	27	22	18	23	13	2	3	8	5	8	11	12.3	27	
15-Feb	12	14	13	11	Z	1	0	0	3	6	15	22	24	25	33	30	9	1	0	4	12	29	34	32	14.5	34	
16-Feb	28	20	21	33	34	Z	28	19	6	12	19	C	C	C	29	29	24	10	7	29	34	35	20	9	22.3	35	
17-Feb	13	19	10	11	7	3	Z	5	11	13	17	21	16	5	11	18	18	22	25	24	20	29	31	31	16.6	31	
18-Feb	29	Z	26	31	30	27	26	27	28	27	24	22	22	23	23	5	7	12	14	20	25	27	26	20	22.7	31	
19-Feb	14	21	Z	18	13	11	8	12	19	32	31	28	31	34	29	26	22	14	19	27	27	24	20	19	21.8	34	
20-Feb	13	21	18	Z	19	26	25	24	27	27	28	27	26	30	32	31	31	33	31	31	31	28	27	28	26.8	33	
21-Feb	30	33	32	31	Z	32	32	30	29	30	30	31	33	33	33	33	33	33	33	33	31	31	31	28	31.5	33	
22-Feb	17	14	16	17	25	Z	17	14	15	20	25	29	27	23	23	18	18	13	17	16	24	31	28	25	20.5	31	
23-Feb	17	17	16	13	9	10	Z	3	5	11	16	18	29	34	34	35	33	30	26	24	19	22	28	32	20.9	35	
24-Feb	31	Z	33	34	34	31	29	27	30	36	37	39	39	39	40	40	36	32	30	26	14	4	3	4	29.0	40	
25-Feb	4	10	Z	15	15	17	12	12	18	21	28	29	33	37	39	29	34	35	31	25	35	40	39	38	25.9	40	
26-Feb	38	37	37	Z	25	30	27	22	32	34	36	37	36	34	35	35	32	30	26	27	25	21	23	16	30.1	38	
27-Feb	16	17	23	21	Z	24	22	24	23	14	21	28	34	37	35	21	17	15	8	7	3	13	4	12	19.0	37	
28-Feb	9	13	17	29	27	Z	27	26	26	24	24	25	24	25	27	28	29	29	30	27	17	14	16	18	23.0	30	
	20.8	20.1	19.9	22.0	21.6	19.4	19.4	17.5	18.7	20.3	22.5	25.0	27.3	28.7	29.1	27.4	24.9	21.6	20.1	20.7	20.2	22.1	22.2	21.6		Diurnal Average	
	45	44	42	45	45	44	44	44	45	44	40	46	46	46	47	47	43	43	43	46	46	46	45	45		Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	275	43.17	43.17
21 - 50	362	56.83	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - February 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	9	6	3	3	7	12	32	59	21	16	7	11	15	10	25	275
21 - 50	43	23	18	14	9	7	16	24	31	14	23	28	20	35	22	35	362
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	82	32	24	17	12	14	28	56	90	35	39	35	31	50	32	60	637

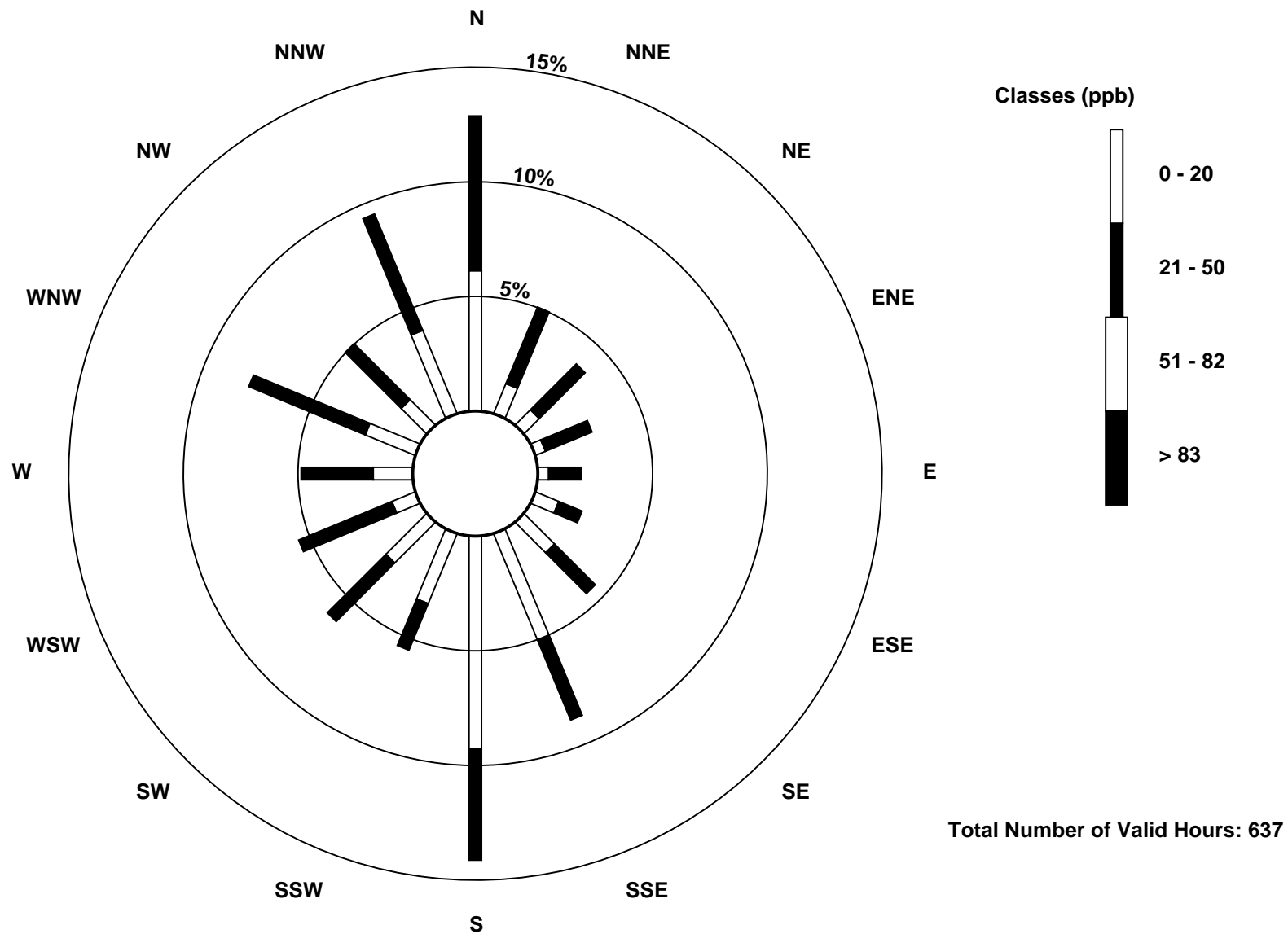
Total Number of Valid Hours: 637

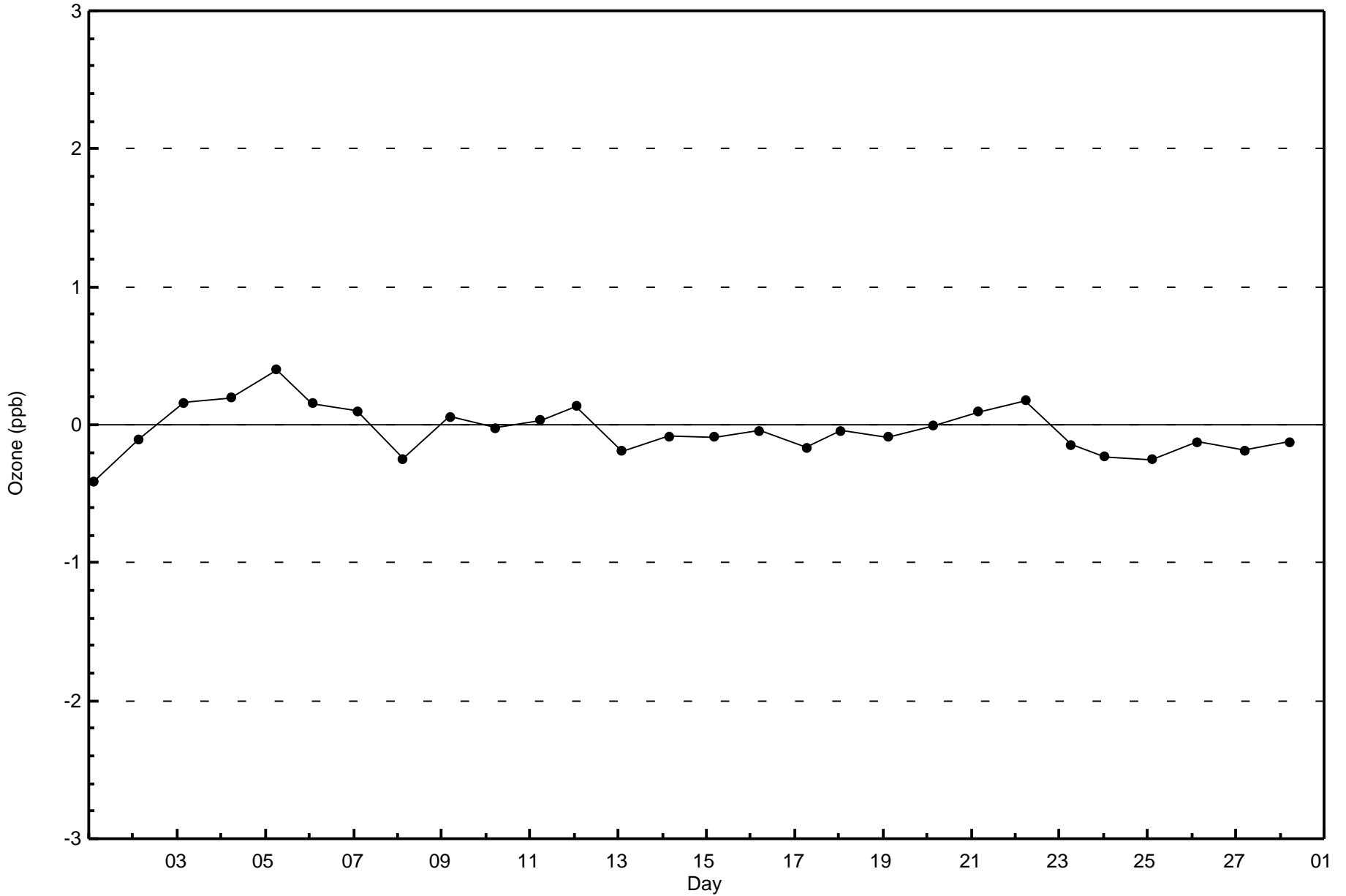
Total Number of Hours: 672

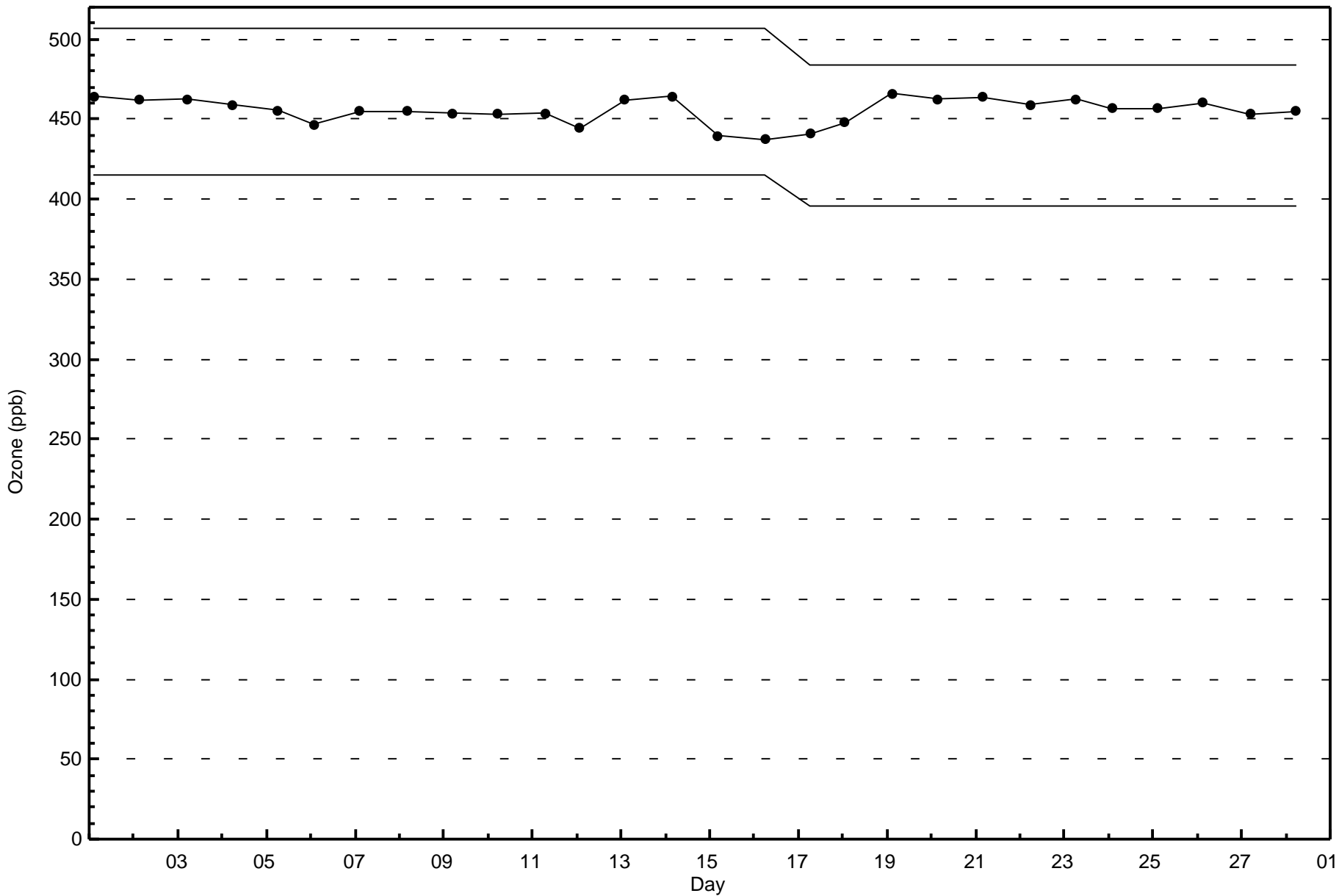


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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

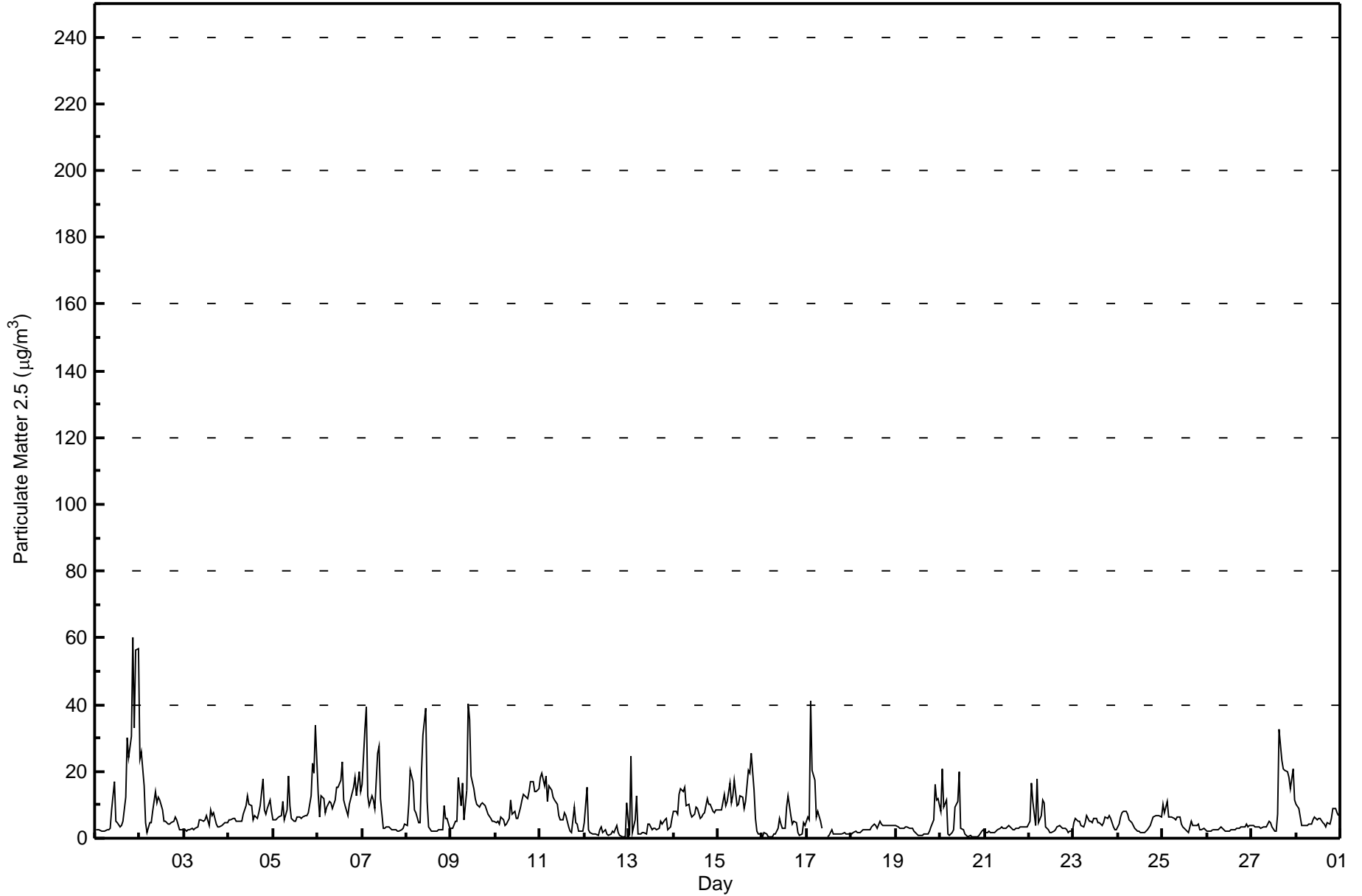
Fort McKay - Bertha Ganter - February 2017

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																								
Maximum Value: 60.0 µg/m ³ on Feb 1 21:00		Maximum Daily Average: 15.5 µg/m ³ on Feb 1																								
Minimum Value: 0.2 µg/m ³ on Feb 16 06:00		Hours of Data: 670																								
Maximum Diurnal Average: 9.5 µg/m ³ at hour 10		Hours of Missing Data: 2																								
Monthly Average: 7.05 µg/m ³		Hours of Calibration: 2																								
Minimum Daily Average: 2.7 µg/m ³ on Feb 12		Percent Operational Time: 100.0																								
Minimum Diurnal Average: 5.1 µg/m ³ at hour 15		Percentiles: P ₁ = 0.5 P ₁₀ = 1.7 Q ₁ = 2.7 Median = 4.8 Q ₃ = 9.1 P ₉₀ = 15.1 P ₉₉ = 38.8																								
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-Feb	2.4	2.6	2.5	2.2	2.2	2.1	2.5	2.6	2.9	8.7	16.7	4.9	4.6	3.6	3.7	5.1	12.3	29.9	24.1	30.4	60.0	33.2	56.4	56.6	15.5	60.0
2-Feb	23.6	25.7	15.7	4.6	1.9	4.5	4.5	8.2	13.9	10.8	12.2	11.4	8.5	5.2	5.1	4.1	4.4	4.5	5.1	6.3	5.6	2.7	2.4	2.5	8.1	25.7
3-Feb	2.4	2.2	2.3	2.4	3.1	2.5	3.0	3.5	5.3	5.4	5.2	5.6	6.9	4.0	8.6	6.6	7.7	4.2	3.5	3.4	3.7	4.2	4.6	4.7	4.4	8.6
4-Feb	5.3	5.6	6.0	6.0	5.1	5.0	5.0	5.2	7.3	9.7	12.8	10.4	9.7	5.4	6.8	5.8	7.5	9.8	17.7	8.4	7.2	9.1	11.6	7.9	7.9	17.7
5-Feb	5.4	5.5	6.1	6.2	6.7	10.8	5.5	8.5	18.7	9.8	5.8	5.2	5.3	6.3	6.5	6.0	6.3	6.9	6.8	7.5	12.8	22.6	19.6	34.0	9.8	34.0
6-Feb	12.9	6.4	12.9	11.9	7.6	9.5	10.9	10.6	8.8	11.5	15.4	15.2	17.3	22.9	11.3	9.7	6.9	10.2	11.8	15.1	18.2	12.5	20.0	13.8	12.6	22.9
7-Feb	16.0	32.7	39.2	12.7	9.6	12.7	11.4	9.0	25.6	27.5	11.8	3.0	3.2	3.3	3.4	2.8	2.6	2.5	2.3	2.2	2.3	2.5	2.8	4.1	10.2	39.2
8-Feb	4.0	10.2	20.3	17.1	8.3	7.5	4.8	4.8	20.0	30.8	38.9	11.1	3.4	2.3	2.3	2.1	2.2	2.4	2.4	2.5	9.9	6.1	5.8	2.8	9.2	38.9
9-Feb	2.8	2.9	4.9	5.0	18.4	9.7	16.4	5.6	14.5	40.1	35.8	18.6	14.9	12.0	10.3	9.5	10.2	10.6	9.9	8.3	7.0	5.9	5.0	5.0	11.8	40.1
10-Feb	4.6	5.1	4.4	6.2	5.6	3.7	4.2	6.1	11.5	7.2	8.1	5.7	5.7	9.1	11.2	13.1	12.9	11.9	13.9	17.0	17.0	13.9	14.1	15.0	9.5	17.0
11-Feb	18.2	19.3	15.7	18.8	11.1	15.7	14.4	12.1	11.3	10.0	7.0	5.4	5.3	7.6	6.7	3.4	1.9	1.7	9.3	4.7	4.1	2.0	2.3	2.3	8.8	19.3
12-Feb	4.8	15.3	2.5	1.6	1.1	1.2	1.1	1.0	2.5	3.4	1.6	2.7	1.1	1.0	1.3	2.0	1.7	4.0	1.7	1.0	0.5	0.4	0.3	10.6	2.7	15.3
13-Feb	0.6	24.4	1.9	5.4	12.5	1.2	1.3	1.7	1.5	1.3	4.2	4.1	2.7	2.9	3.0	2.7	3.2	5.2	4.4	5.6	6.1	2.8	3.4	5.8	4.5	24.4
14-Feb	7.9	8.0	7.2	13.0	14.8	14.0	15.1	9.9	10.1	7.6	6.6	7.3	9.2	9.0	6.1	6.5	7.0	7.4	11.7	10.0	10.1	8.0	7.5	8.5	9.3	15.1
15-Feb	8.4	8.4	8.4	13.2	9.5	10.8	16.4	10.4	12.7	17.3	9.7	10.3	12.5	12.2	8.7	10.9	20.3	19.5	25.6	14.6	6.1	2.3	1.4	1.3	11.3	25.6
16-Feb	0.6	1.7	1.1	0.4	0.3	0.2	1.3	1.1	2.9	5.9	4.2	3.0	2.9	9.4	12.6	6.6	4.1	4.9	4.7	1.6	0.9	1.1	4.9	3.8	3.3	12.6
17-Feb	6.3	5.3	41.1	20.3	17.3	6.5	8.0	5.0	2.9	C	C	0.5	0.8	2.6	1.3	1.4	1.2	1.3	1.1	1.3	1.8	1.4	1.2	1.2	5.9	41.1
18-Feb	1.4	1.7	2.0	1.6	1.7	1.7	2.6	2.5	2.3	2.4	2.6	3.5	4.0	4.0	3.0	5.1	4.4	3.7	3.8	3.7	3.8	3.9	3.8	3.7	3.0	5.1
19-Feb	3.9	3.3	2.8	3.0	3.2	3.4	3.4	3.1	3.1	3.0	2.0	1.2	0.9	0.7	1.0	1.1	1.2	1.4	2.3	3.5	5.7	16.3	11.5	12.1	3.9	16.3
20-Feb	8.1	20.6	9.4	11.5	1.2	1.0	1.9	2.7	9.4	11.2	19.7	3.0	2.3	1.1	0.6	0.6	0.6	0.5	0.6	0.5	0.4	0.9	1.9	2.7	4.7	20.6
21-Feb	1.9	1.6	2.3	1.5	1.6	1.6	2.1	2.5	2.8	3.3	3.0	2.9	3.4	3.8	3.1	2.7	2.7	2.8	3.1	3.2	3.5	3.4	3.4	3.5	2.7	3.8
22-Feb	4.9	16.5	11.1	4.0	17.9	4.5	6.6	11.4	10.5	3.5	2.6	1.8	1.9	1.9	2.7	3.4	3.6	3.5	2.9	3.0	2.6	1.9	2.1	2.0	5.3	17.9
23-Feb	4.6	6.0	5.2	5.1	3.7	3.5	4.5	6.9	5.2	5.2	4.5	6.0	5.9	4.8	4.7	3.6	4.6	6.5	5.9	6.7	5.9	3.2	2.6	2.6	4.9	6.9
24-Feb	4.2	6.5	7.6	8.0	7.9	7.0	5.5	4.7	3.9	2.8	2.3	2.0	1.7	1.7	1.7	2.0	2.6	3.7	5.0	6.2	6.9	6.9	6.8	6.4	4.7	8.0
25-Feb	10.3	7.7	11.1	6.5	6.5	6.3	5.8	5.7	6.3	6.4	4.1	3.5	2.7	2.1	1.6	4.9	3.6	3.7	3.9	4.1	2.7	2.7	2.9	2.5	4.9	11.1
26-Feb	2.1	2.2	2.0	2.4	2.7	2.4	2.5	3.4	2.8	2.4	2.2	2.2	2.2	2.6	2.4	2.4	2.8	2.9	3.3	3.5	3.5	4.1	3.3	3.9	2.8	4.1
27-Feb	3.9	3.9	3.3	3.5	3.5	2.9	3.3	3.2	3.2	5.0	4.6	3.4	2.2	1.9	7.3	32.6	23.3	20.6	20.1	19.8	18.4	14.9	20.6	11.4	9.9	32.6
28-Feb	10.1	9.0	6.2	3.7	3.9	3.7	3.7	4.1	4.2	5.5	6.6	5.3	5.8	5.9	4.7	4.2	3.5	4.8	4.1	6.1	8.8	9.1	7.7	6.9	5.7	10.1
																								Diurnal Average		
																								Diurnal Maximum		
																								6.5 9.3 9.1 7.1 6.7 5.6 6.0 5.6 8.1 9.5 9.3 5.7 5.3 5.3 5.1 5.7 5.9 6.8 7.5 7.2 8.4 7.1 8.2 8.5		
																								23.6 32.7 41.1 20.3 18.4 15.7 16.4 12.1 25.6 40.1 38.9 18.6 17.3 22.9 12.6 32.6 23.3 29.9 25.6 30.4 60.0 33.2 56.4 56.6		
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 McKay - Bertha Ganter - February 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 - February 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	357	53.28	53.28
6 - 15	227	33.88	87.16
16 - 25	44	6.57	93.73
26 - 80	19	2.84	96.57
> 81.0	0	0.00	96.57

Total Number of Valid Hours: 670

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay - Bertha Ganter - February 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	65	29	21	13	9	7	12	16	15	15	26	20	19	34	20	35	356
6 - 15	21	2	3	3	3	7	12	26	63	14	5	10	11	14	12	21	227
16 - 25	1	0	0	0	0	0	4	10	6	7	7	2	0	2	0	5	44
26 - 80	0	0	0	0	0	0	0	5	9	3	2	0	0	0	0	0	19
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	87	31	24	16	12	14	28	57	93	39	40	32	30	50	32	61	646

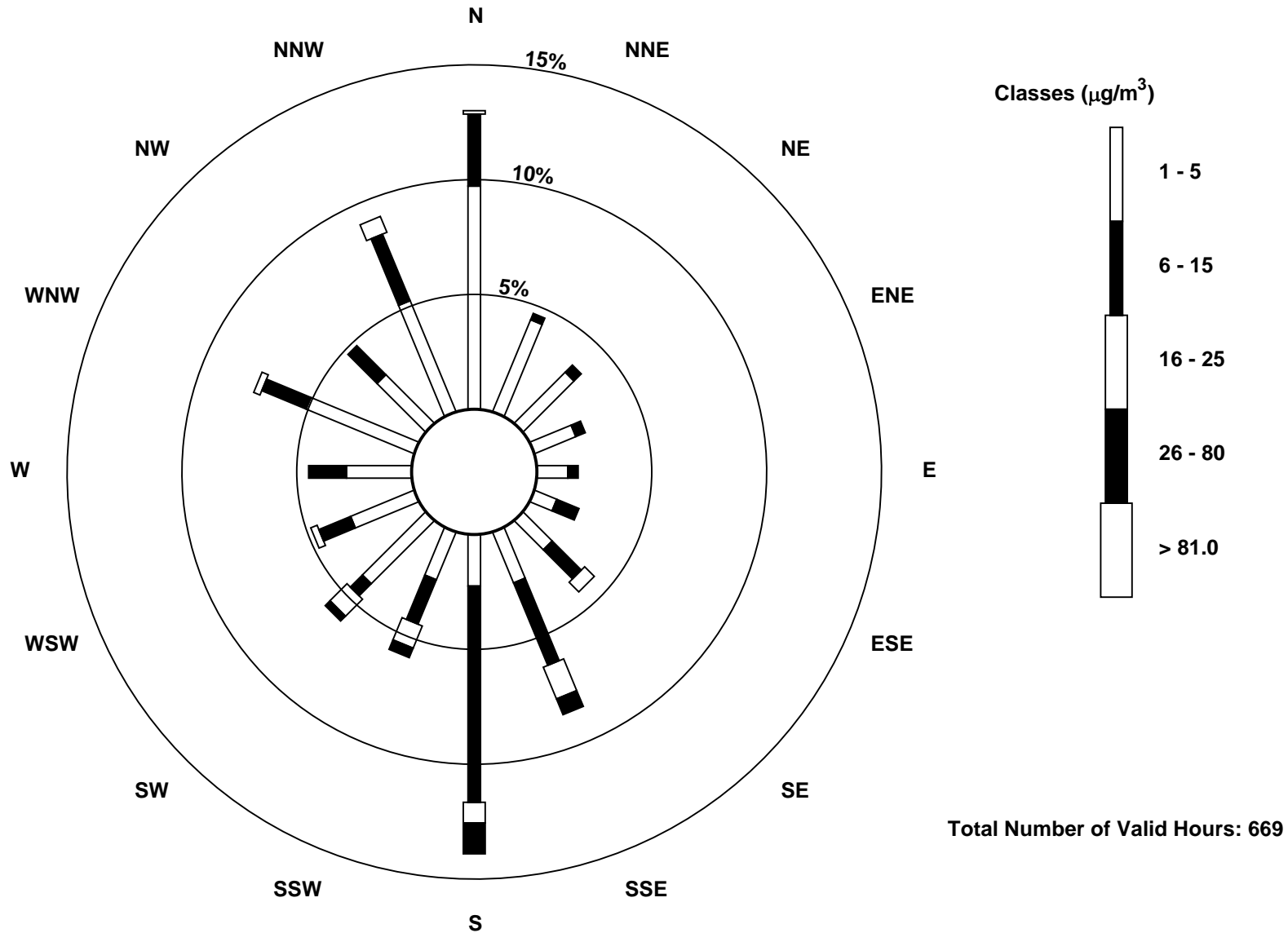
Total Number of Valid Hours: 669

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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



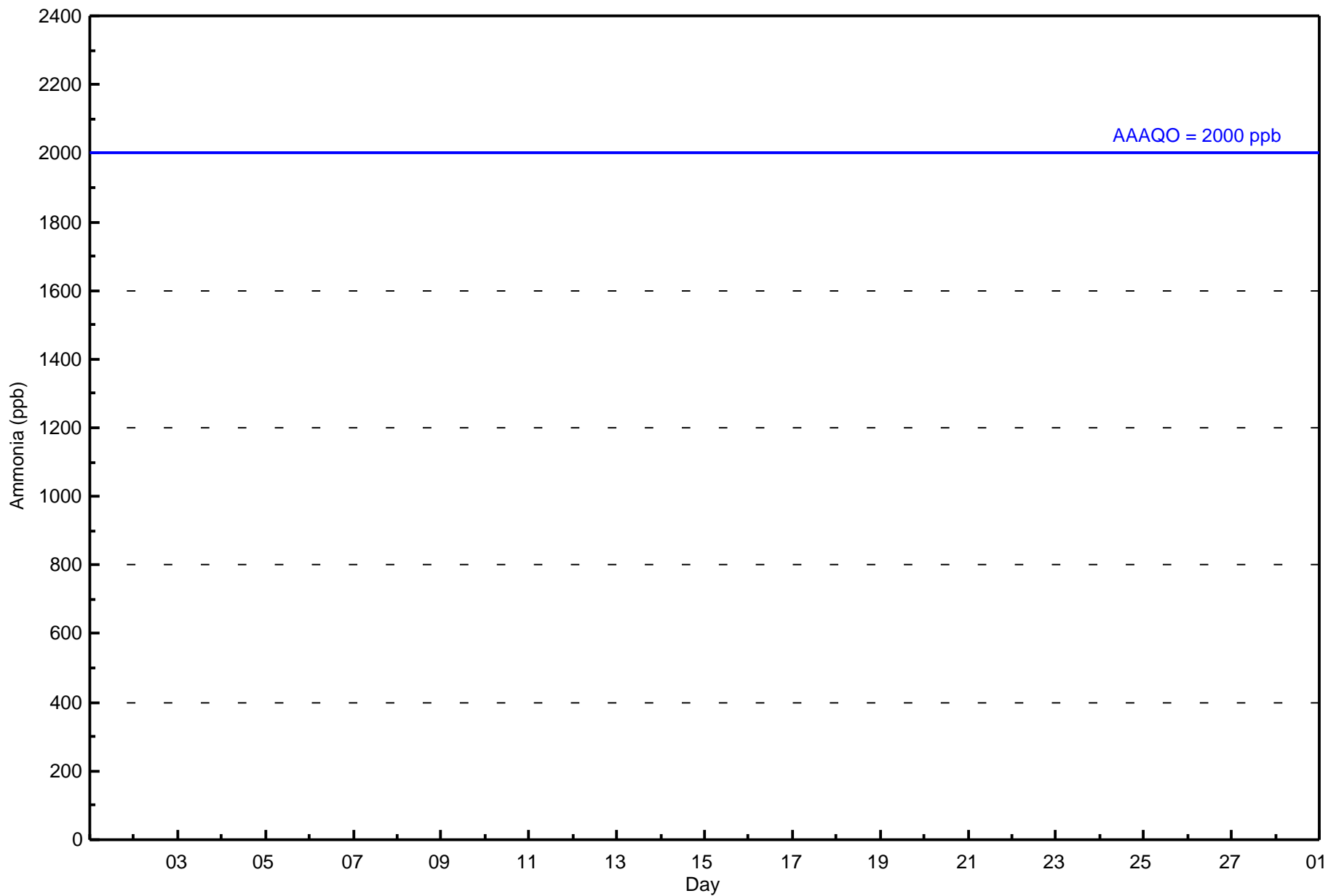


Number of Exceedences (AAAQO): 1-hr: 0										Hours in Service: 672										Daily	Daily						
Maximum Value: 0 ppb on Feb 1 01:00										Maximum Daily Average: 0.0 ppb on Feb 1										Hours of Data: 603	Average	Maximum					
Minimum Value: 0 ppb on Feb 1 01:00										Minimum Daily Average: 0.0 ppb on Feb 1										Hours of Missing Data: 69	Hours of Calibration: 40	Percent Operational Time: 95.7					
Maximum Diurnal Average: 0.0 ppb at hour 1										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																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	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
2-Feb	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
3-Feb	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
4-Feb	0	0	0	0	0	0	0	Z	RE	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Feb	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
6-Feb	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
7-Feb	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
8-Feb	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
9-Feb	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
10-Feb	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
11-Feb	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
12-Feb	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
13-Feb	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
14-Feb	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
15-Feb	0	0	0	0	0	0	Z	RE	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0
16-Feb	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
17-Feb	0	0	0	0	0	0	0	0	Z	RE	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
18-Feb	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
19-Feb	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
20-Feb	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
21-Feb	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
22-Feb	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
23-Feb	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
24-Feb	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
25-Feb	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
26-Feb	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
27-Feb	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
28-Feb	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
0.0																								Diurnal Average			
0																								Diurnal Maximum			
Z - zerospan C - Calibration RE - Recovery																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	603	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: 603

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - February 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	82	30	23	15	11	13	28	53	79	33	39	30	28	54	25	59	602
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	82	30	23	15	11	13	28	53	79	33	39	30	28	54	25	59	602

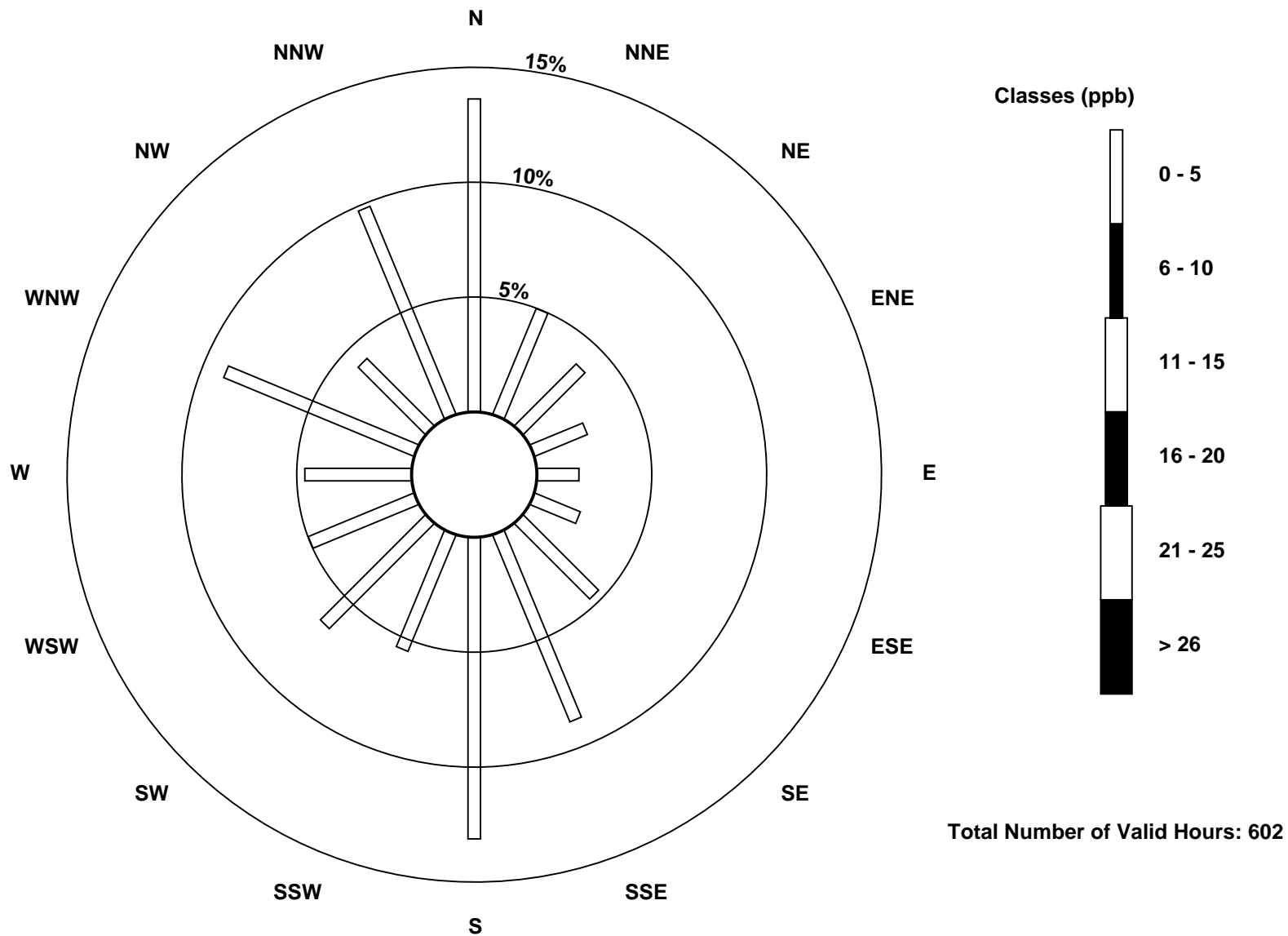
Total Number of Valid Hours: 602

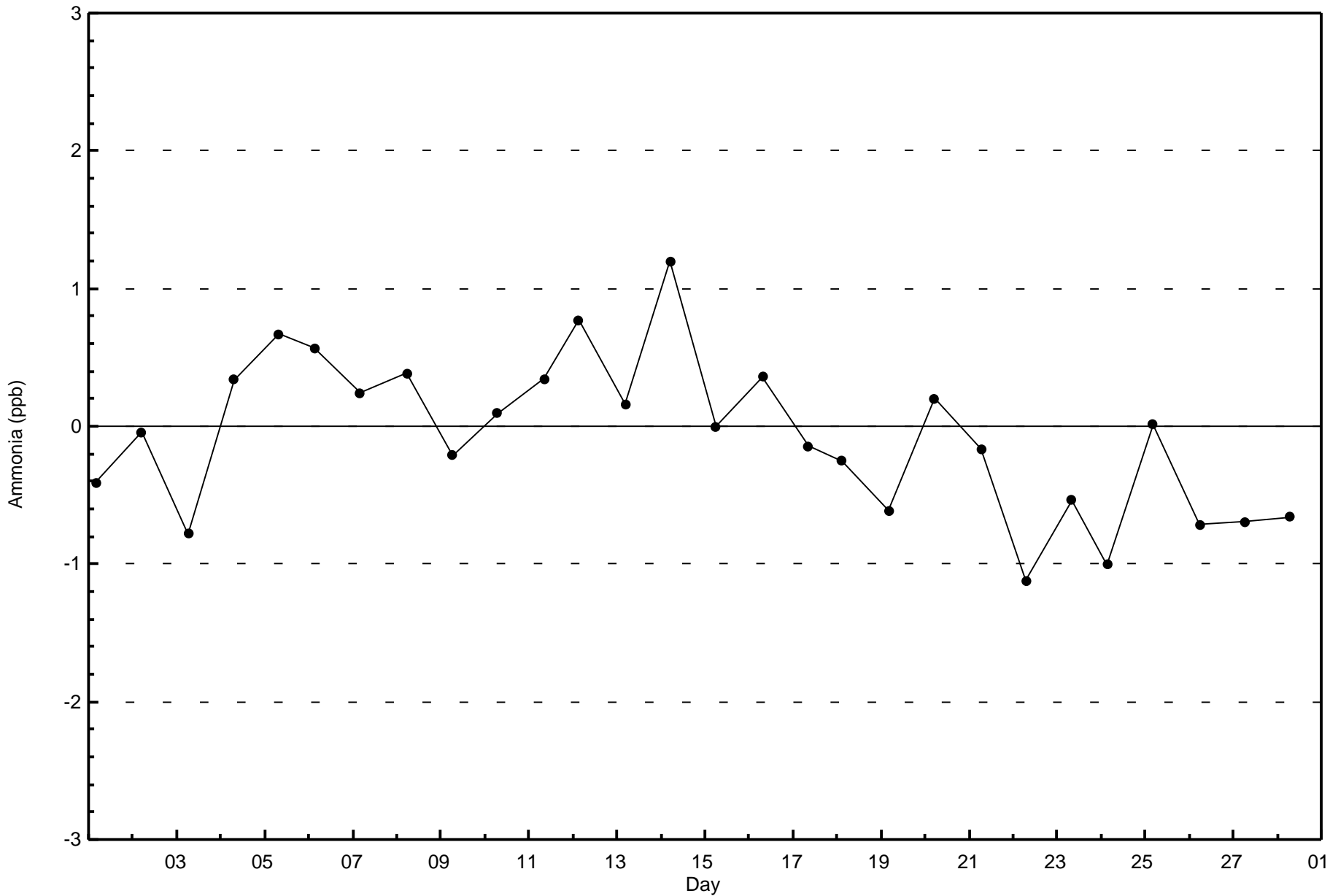
Total Number of Hours: 672

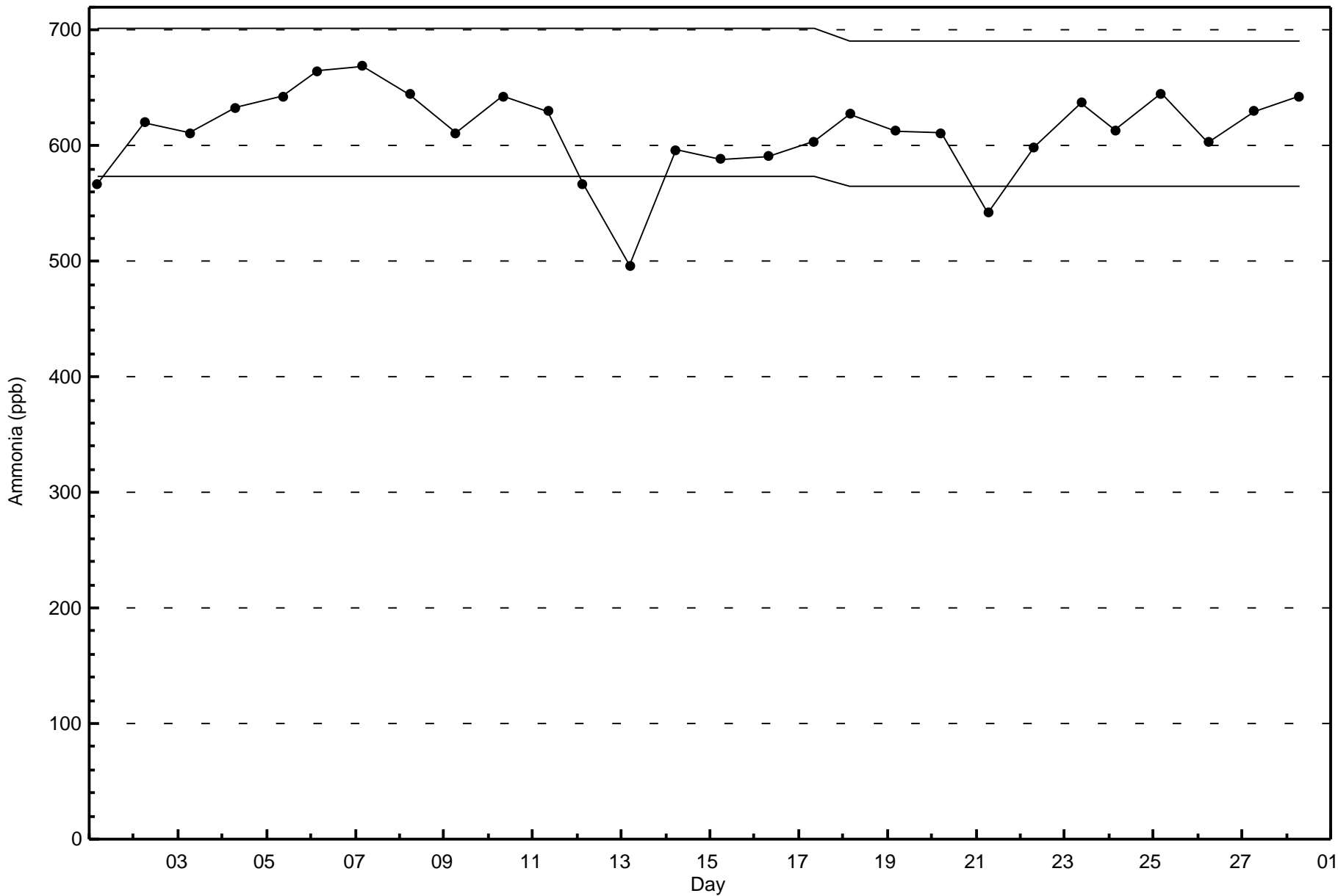


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Wood Buffalo Environmental Association
Summary of Hour Averages

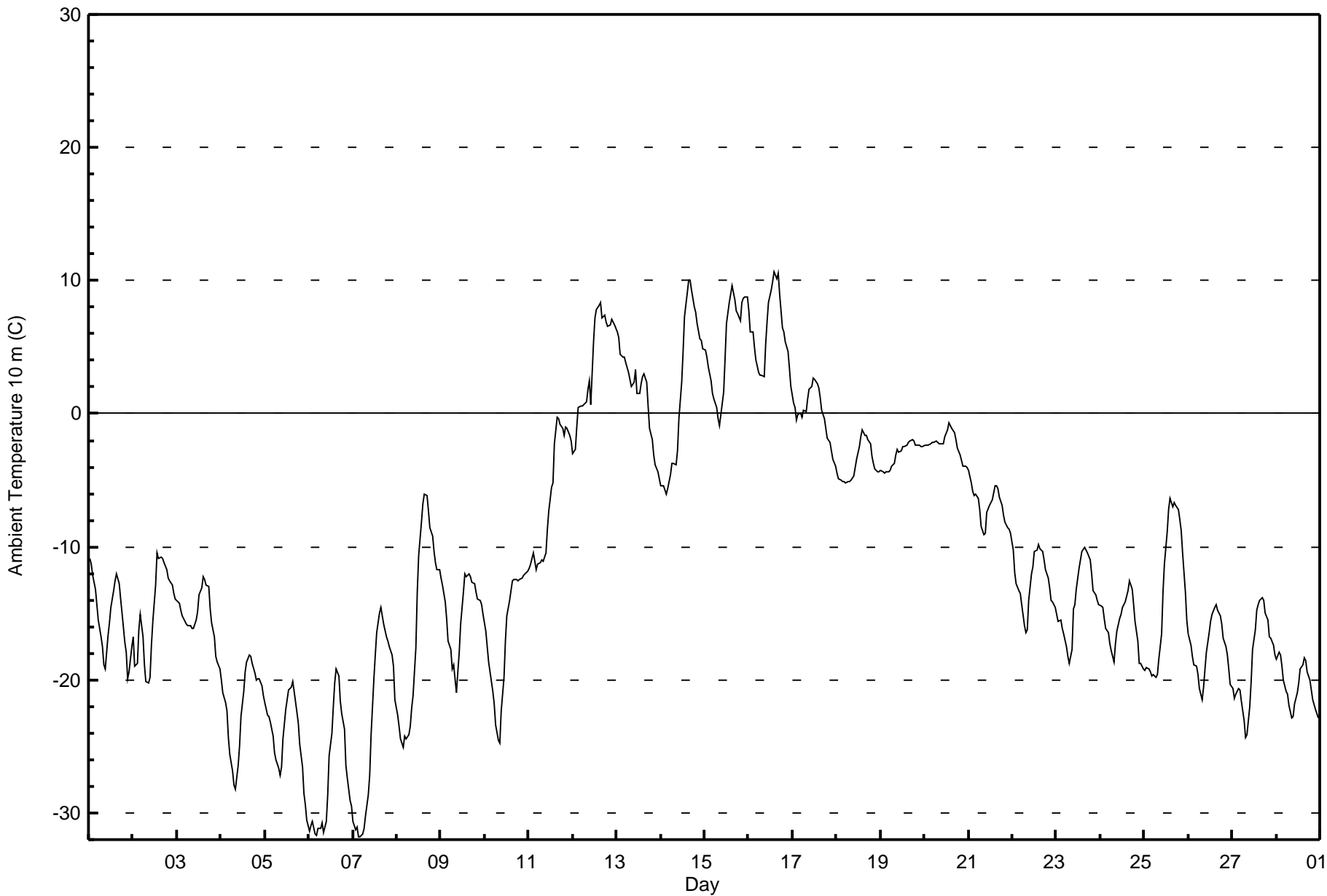
Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - February 2017

Maximum Value: 10.6 C on Feb 16 15:00 Maximum Daily Average: 6.2 C on Feb 16																						Hours in Service: 672 Hours of Data: 672				
Minimum Value: -31.8 C on Feb 7 05:00 Minimum Daily Average: -27.1 C on Feb 6 Maximum Diurnal Average: -6.9 C at hour 16 Minimum Diurnal Average: -14.5 C at hour 8 Monthly Average: -10.90 C Percentiles: P ₁ = -31.3 P ₁₀ = -22.8 Q ₁ = -18.7 Median = -12.6 Q ₃ = -2.4 P ₉₀ = 3.2 P ₉₉ = 9.5																						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-Feb	-10.9	-11.4	-12.2	-13.2	-14.4	-15.5	-16.7	-17.5	-18.9	-19.2	-16.7	-15.7	-14.6	-13.3	-12.6	-12.0	-12.7	-14.0	-15.0	-17.2	-17.9	-19.9	-19.4	-17.5	-15.3	-10.9
2-Feb	-16.8	-18.9	-18.8	-16.2	-15.1	-16.8	-18.8	-20.1	-20.3	-19.8	-17.4	-15.6	-12.9	-10.5	-10.9	-10.8	-10.9	-11.2	-11.7	-12.4	-12.5	-12.9	-13.5	-14.0	-14.9	-10.5
3-Feb	-14.2	-14.3	-14.7	-15.2	-15.6	-15.8	-15.9	-16.1	-16.1	-15.6	-14.9	-13.6	-13.0	-12.3	-12.5	-12.9	-13.0	-14.6	-15.7	-16.8	-18.2	-18.6	-19.2	-15.2	-12.3	
4-Feb	-20.0	-20.9	-21.7	-22.3	-24.4	-25.6	-26.8	-27.9	-28.2	-26.5	-25.0	-22.8	-20.9	-19.4	-18.7	-18.1	-18.3	-18.8	-19.5	-20.0	-20.0	-19.9	-20.4	-21.2	-22.0	-18.1
5-Feb	-21.8	-22.6	-22.8	-23.1	-24.2	-25.5	-26.0	-26.6	-27.1	-26.5	-24.4	-22.2	-21.5	-20.8	-20.5	-20.2	-20.9	-22.5	-23.3	-24.9	-26.6	-28.5	-29.3	-30.5	-24.3	-20.2
6-Feb	-31.3	-31.0	-30.6	-31.6	-31.7	-31.2	-31.2	-30.8	-31.5	-30.6	-28.6	-25.7	-24.0	-22.1	-20.2	-19.2	-19.7	-21.6	-22.5	-23.7	-26.4	-27.4	-29.1	-29.5	-27.1	-19.2
7-Feb	-30.6	-31.2	-31.0	-31.8	-31.8	-31.6	-31.1	-30.2	-28.7	-27.2	-24.2	-19.9	-18.1	-16.4	-15.0	-14.6	-15.2	-15.9	-16.7	-17.1	-17.5	-18.1	-19.0	-21.5	-23.1	-14.6
8-Feb	-22.6	-23.5	-24.4	-25.1	-24.3	-24.4	-24.2	-23.4	-22.2	-21.1	-17.6	-13.4	-10.6	-8.1	-6.8	-6.1	-6.1	-7.3	-8.6	-9.2	-10.4	-11.2	-11.7	-11.7	-15.6	-6.1
9-Feb	-12.4	-12.9	-14.1	-15.4	-17.0	-17.7	-19.2	-18.9	-20.9	-19.4	-17.9	-15.8	-13.4	-12.1	-12.2	-12.0	-12.3	-12.7	-12.8	-13.4	-13.9	-14.0	-14.4	-15.1	-15.0	-12.0
10-Feb	-16.4	-17.5	-18.7	-19.4	-20.8	-21.8	-23.3	-24.5	-24.7	-22.4	-19.8	-17.1	-15.2	-14.0	-13.3	-12.5	-12.4	-12.5	-12.5	-12.4	-12.3	-12.2	-12.0	-11.8	-16.7	-11.8
11-Feb	-11.6	-11.3	-10.4	-11.1	-11.7	-11.3	-11.1	-11.0	-11.0	-10.4	-8.7	-7.3	-5.5	-5.2	-2.3	-0.3	-0.4	-0.8	-1.1	-1.6	-1.0	-1.1	-1.7	-2.1	-6.2	-0.3
12-Feb	-3.0	-2.7	-1.0	0.5	0.6	0.6	0.7	0.9	1.8	2.5	0.7	5.4	7.1	7.8	8.1	8.3	7.2	7.4	6.9	6.6	6.7	7.1	6.9	6.7	3.9	8.3
13-Feb	6.2	5.8	4.5	4.3	4.2	3.9	3.1	2.6	2.0	2.4	3.3	1.5	1.5	2.3	2.8	3.0	2.4	0.6	-1.1	-2.0	-3.1	-3.8	-4.3	-4.9	1.5	6.2
14-Feb	-5.4	-5.4	-5.7	-6.0	-5.6	-4.6	-3.7	-3.7	-3.9	-2.8	-0.4	2.3	4.6	7.3	9.1	10.0	10.0	9.3	8.0	7.6	6.8	5.7	5.5	4.9	1.8	10.0
15-Feb	4.7	4.3	3.6	2.4	1.5	1.1	0.5	-0.4	-0.9	0.0	1.6	4.2	6.7	8.3	9.0	9.6	8.6	7.7	7.5	6.9	8.4	8.6	8.8	8.7	5.1	9.6
16-Feb	7.8	6.1	6.1	5.0	4.0	3.1	2.9	2.9	2.8	5.2	6.9	8.3	9.3	10.0	10.6	10.2	10.5	9.0	6.4	6.1	5.4	4.7	3.4	2.1	6.2	10.6
17-Feb	0.8	0.5	-0.5	0.0	0.1	-0.3	0.3	0.2	1.1	1.9	2.0	2.6	2.6	2.3	2.0	1.2	0.3	-0.4	-1.1	-1.9	-2.1	-2.8	-3.4	-3.9	0.1	2.6
18-Feb	-4.4	-4.9	-5.0	-5.1	-5.1	-5.2	-5.1	-5.1	-5.0	-4.7	-4.0	-3.4	-2.4	-1.7	-1.2	-1.6	-1.7	-2.0	-2.3	-3.2	-3.7	-4.1	-4.3	-4.4	-3.7	-1.2
19-Feb	-4.2	-4.4	-4.5	-4.4	-4.4	-4.3	-4.0	-3.7	-3.1	-2.7	-2.9	-2.8	-2.4	-2.4	-2.4	-2.2	-2.1	-2.0	-2.1	-2.4	-2.4	-2.4	-2.4	-2.5	-3.0	-2.0
20-Feb	-2.4	-2.4	-2.3	-2.3	-2.2	-2.2	-2.1	-2.1	-2.3	-2.3	-2.3	-1.8	-1.2	-0.7	-0.9	-1.1	-1.4	-2.0	-2.6	-3.1	-3.6	-3.9	-3.9	-4.0	-2.3	-0.7
21-Feb	-4.2	-5.2	-5.8	-6.1	-6.1	-6.4	-7.2	-8.5	-9.0	-9.0	-7.4	-6.9	-6.7	-6.4	-5.4	-5.4	-5.7	-6.3	-6.9	-7.6	-8.2	-8.6	-8.7	-9.0	-6.9	-4.2
22-Feb	-10.3	-11.9	-12.7	-13.3	-13.5	-14.4	-15.9	-16.4	-16.2	-14.1	-12.1	-11.5	-10.3	-10.2	-9.8	-10.2	-10.4	-10.9	-11.7	-12.3	-13.1	-14.0	-14.2	-14.6	-12.7	-9.8
23-Feb	-15.0	-15.6	-15.5	-16.2	-16.6	-17.5	-18.3	-18.7	-17.7	-14.6	-14.3	-13.2	-11.6	-11.0	-10.4	-10.0	-10.3	-10.4	-11.0	-12.0	-13.3	-13.6	-14.1	-14.4	-14.0	-10.0
24-Feb	-14.5	-14.6	-15.4	-16.1	-16.4	-17.3	-17.8	-18.6	-17.3	-16.3	-15.4	-15.1	-14.6	-14.1	-13.7	-13.2	-12.5	-13.2	-14.3	-15.6	-17.1	-18.8	-18.8	-19.2	-15.8	-12.5
25-Feb	-19.3	-19.1	-19.1	-19.4	-19.7	-19.6	-19.8	-19.6	-18.5	-16.5	-13.4	-11.3	-8.9	-7.2	-6.4	-7.0	-6.7	-6.9	-7.2	-8.0	-8.8	-10.5	-13.4	-15.5	-13.4	-6.4
26-Feb	-16.6	-17.4	-18.3	-18.9	-19.0	-19.6	-20.6	-21.5	-20.5	-19.2	-17.9	-16.5	-15.6	-15.1	-14.6	-14.4	-14.8	-15.2	-15.8	-16.8	-17.5	-18.2	-19.2	-20.3	-17.6	-14.4
27-Feb	-20.6	-21.4	-21.1	-20.7	-20.7	-21.6	-23.1	-24.3	-24.1	-22.1	-20.1	-17.7	-16.3	-14.7	-14.3	-14.0	-13.8	-14.0	-14.9	-15.5	-16.8	-16.9	-17.4	-18.1	-18.5	-13.8
28-Feb	-18.4	-17.9	-18.1	-19.0	-20.0	-20.9	-21.1	-21.9	-22.8	-22.8	-21.8	-20.9	-20.2	-19.2	-18.8	-18.4	-18.6	-19.4	-20.0	-20.7	-21.5	-22.2	-22.6	-22.9	-20.4	-17.9
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

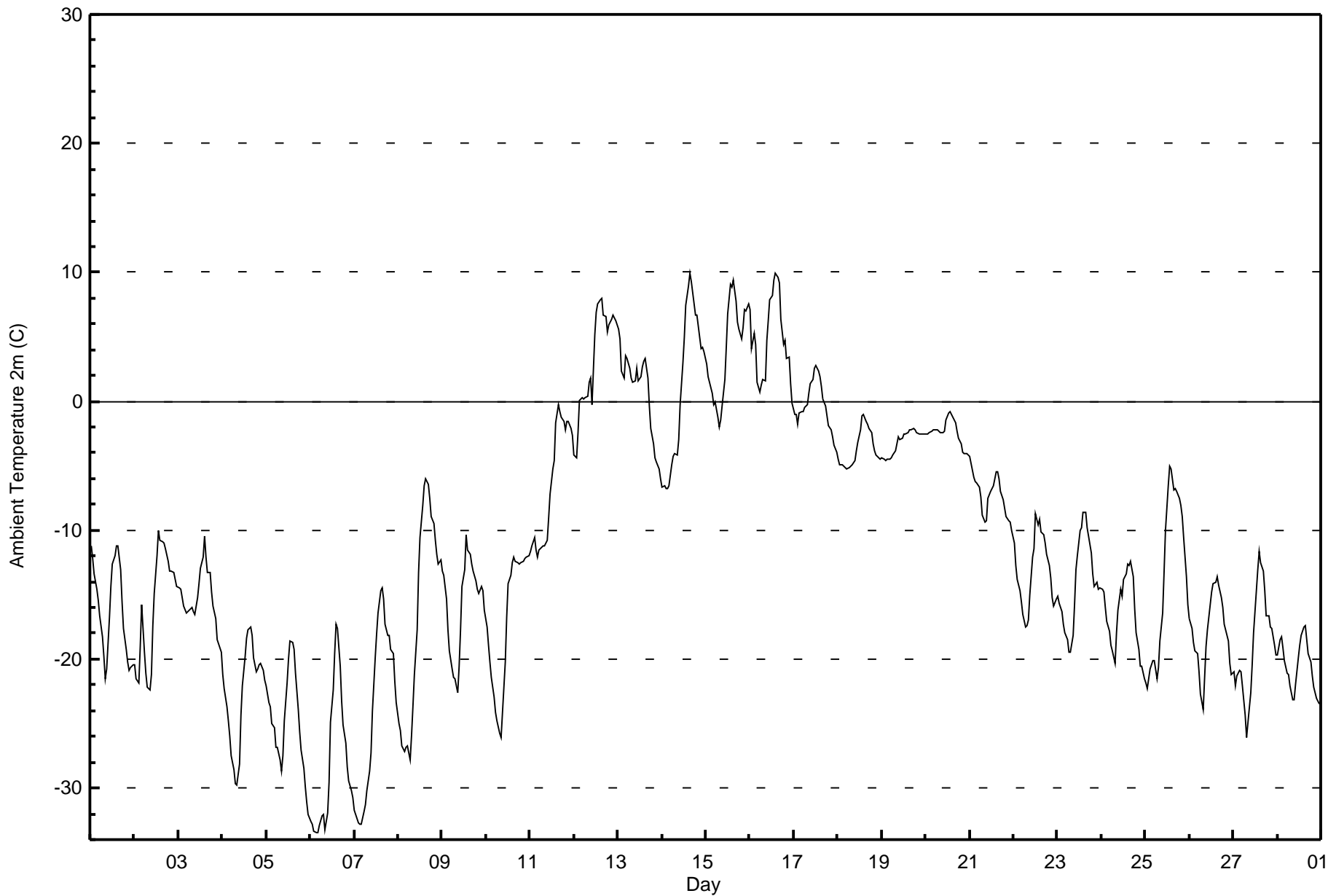
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	123	18.30	18.30
-20 - 0	438	65.18	83.48
0 - 10	106	15.77	99.26
10 - 20	5	0.74	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Value: 10.0 C on Feb 14 16:00		Maximum Daily Average: 4.8 C on Feb 16		Hours in Service:	672																						
Minimum Value: -33.5 C on Feb 6 04:00		Minimum Daily Average: -28.1 C on Feb 6		Hours of Data:	672																						
Maximum Diurnal Average: -6.5 C at hour 15		Minimum Diurnal Average: -15.5 C at hour 8		Hours of Missing Data:	0																						
Monthly Average: -11.46 C		Percentiles: P ₁ = -32.8 P ₁₀ = -24.0 Q ₁ = -19.4 Median = -12.6 Q ₃ = -2.5 P ₉₀ = 2.6 P ₉₉ = 9.2		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-Feb	-11.2	-12.1	-13.3	-14.6	-15.4	-16.7	-18.3	-19.8	-21.6	-20.7	-16.7	-14.4	-12.6	-11.9	-11.2	-11.2	-13.1	-15.5	-17.6	-19.2	-20.2	-20.9	-20.7	-20.4	-16.2	-11.2	
2-Feb	-20.4	-21.5	-21.8	-19.1	-15.8	-19.4	-21.1	-22.2	-22.4	-21.2	-17.4	-14.9	-12.0	-10.1	-10.8	-10.9	-11.0	-11.4	-12.4	-13.2	-13.2	-13.3	-13.8	-14.3	-16.0	-10.1	
3-Feb	-14.5	-14.6	-15.2	-15.9	-16.4	-16.3	-16.2	-16.0	-16.3	-16.5	-15.2	-14.1	-12.9	-12.1	-10.5	-12.1	-13.3	-13.3	-14.8	-15.9	-16.9	-18.4	-18.8	-19.5	-15.2	-10.5	
4-Feb	-21.2	-22.3	-23.7	-24.8	-25.9	-27.5	-28.5	-29.7	-29.8	-28.1	-24.3	-22.1	-19.8	-18.4	-17.8	-17.6	-18.2	-19.9	-20.9	-20.8	-20.4	-20.3	-20.8	-21.6	-22.7	-17.6	
5-Feb	-22.1	-23.4	-23.7	-25.0	-25.4	-26.8	-26.8	-27.8	-28.7	-27.5	-24.7	-21.8	-20.1	-18.6	-18.7	-19.2	-21.1	-23.9	-25.6	-27.1	-28.5	-29.9	-31.0	-32.1	-25.0	-18.6	
6-Feb	-32.6	-32.8	-33.3	-33.5	-33.4	-32.9	-32.2	-32.1	-33.3	-31.9	-29.6	-24.9	-22.4	-19.6	-17.3	-17.6	-20.5	-23.2	-25.1	-26.5	-28.3	-29.4	-30.2	-30.7	-28.1	-17.3	
7-Feb	-31.7	-32.4	-32.7	-32.8	-32.8	-31.8	-31.3	-30.2	-28.7	-27.2	-24.1	-19.9	-18.1	-16.4	-14.7	-14.5	-15.4	-17.3	-18.1	-18.2	-19.3	-19.6	-21.7	-23.4	-23.8	-14.5	
8-Feb	-25.0	-25.6	-26.7	-27.2	-26.8	-26.7	-27.8	-25.8	-23.6	-21.2	-17.7	-13.2	-10.5	-8.0	-6.5	-6.0	-6.5	-7.6	-8.9	-9.5	-10.8	-11.9	-12.6	-12.3	-16.6	-6.0	
9-Feb	-13.2	-13.5	-15.4	-17.7	-19.4	-20.7	-21.5	-21.5	-22.7	-20.5	-17.7	-14.3	-13.0	-10.4	-11.6	-11.9	-12.7	-13.2	-14.0	-14.6	-14.9	-14.4	-14.7	-16.3	-15.8	-10.4	
10-Feb	-17.5	-18.9	-20.2	-21.4	-23.0	-24.1	-24.8	-25.7	-26.1	-24.2	-20.2	-16.8	-14.1	-13.5	-12.6	-12.0	-12.4	-12.6	-12.6	-12.5	-12.4	-12.2	-12.1	-12.0	-17.3	-12.0	
11-Feb	-11.6	-11.2	-10.6	-11.6	-12.1	-11.5	-11.4	-11.2	-11.3	-10.8	-9.0	-7.2	-5.2	-4.6	-1.7	-0.3	-0.8	-1.2	-1.6	-2.2	-1.6	-1.6	-2.1	-2.6	-6.5	-0.3	
12-Feb	-4.1	-4.4	-2.5	0.1	0.2	0.2	0.2	0.4	1.4	1.8	-0.3	5.1	6.9	7.5	7.8	8.0	6.7	6.6	5.4	5.9	6.3	6.7	6.5	6.2	3.3	8.0	
13-Feb	5.6	4.8	2.4	1.8	3.6	3.3	2.6	1.8	1.5	1.6	2.6	1.6	1.9	2.7	3.1	3.3	1.8	-0.4	-2.1	-3.4	-4.3	-4.7	-5.2	-6.0	0.8	5.6	
14-Feb	-6.7	-6.5	-6.8	-6.8	-6.6	-4.9	-4.3	-4.0	-4.2	-2.9	-0.3	3.0	5.0	7.5	9.0	10.0	9.3	8.4	6.7	6.7	5.8	4.1	4.2	3.8	1.2	10.0	
15-Feb	2.9	2.0	1.5	0.6	-0.2	-0.1	-1.3	-2.0	-1.5	-0.3	1.7	4.2	6.8	9.1	8.9	9.3	7.7	6.1	5.6	4.8	5.7	7.1	7.1	7.5	3.9	9.3	
16-Feb	7.1	4.1	5.3	4.4	1.5	0.7	1.3	1.7	1.6	4.8	6.2	7.9	8.2	9.4	9.9	9.6	9.2	6.3	4.4	4.7	3.4	3.4	1.3	-0.2	4.8	9.9	
17-Feb	-1.0	-1.0	-1.8	-0.9	-0.8	-0.8	-0.4	-0.2	0.6	1.3	1.7	2.6	2.8	2.4	1.9	1.2	0.2	-0.4	-1.1	-1.9	-2.2	-2.8	-3.4	-3.9	-0.3	2.8	
18-Feb	-4.5	-4.9	-5.0	-5.0	-5.2	-5.2	-5.2	-5.1	-4.9	-4.6	-3.8	-3.2	-2.2	-1.1	-1.1	-1.6	-1.7	-2.1	-2.4	-3.3	-3.8	-4.2	-4.4	-4.5	-3.7	-1.1	
19-Feb	-4.3	-4.5	-4.6	-4.5	-4.5	-4.4	-4.1	-3.9	-3.3	-2.8	-3.0	-2.8	-2.5	-2.5	-2.4	-2.2	-2.2	-2.1	-2.2	-2.5	-2.5	-2.5	-2.5	-2.6	-3.2	-2.1	
20-Feb	-2.5	-2.5	-2.4	-2.4	-2.2	-2.3	-2.2	-2.3	-2.5	-2.4	-2.4	-1.5	-0.9	-0.8	-1.0	-1.3	-1.7	-2.3	-2.8	-3.3	-3.9	-4.1	-4.1	-4.1	-2.4	-0.8	
21-Feb	-4.3	-5.4	-5.9	-6.3	-6.3	-6.6	-7.4	-8.8	-9.4	-9.2	-7.6	-7.0	-6.8	-6.5	-5.5	-5.5	-6.0	-7.0	-7.6	-8.3	-8.9	-9.3	-9.4	-10.0	-7.3	-4.3	
22-Feb	-11.0	-12.7	-13.8	-14.7	-15.5	-16.6	-17.5	-17.4	-17.0	-15.0	-12.1	-11.4	-8.7	-9.6	-9.2	-10.1	-10.4	-11.0	-11.9	-12.8	-13.8	-15.2	-15.9	-15.3	-13.3	-8.7	
23-Feb	-15.1	-15.7	-16.3	-17.3	-18.0	-18.5	-19.4	-19.5	-18.1	-15.7	-13.0	-12.0	-10.1	-9.8	-8.6	-8.6	-9.8	-10.5	-11.8	-13.4	-14.4	-14.0	-14.6	-14.5	-14.1	-8.6	
24-Feb	-14.6	-14.8	-16.0	-17.1	-17.8	-19.0	-19.4	-20.3	-17.9	-16.2	-14.6	-15.1	-13.8	-13.4	-12.6	-12.8	-12.4	-13.6	-16.1	-18.0	-19.3	-20.6	-20.6	-21.6	-16.6	-12.4	
25-Feb	-21.9	-22.3	-20.8	-20.5	-20.1	-20.2	-21.5	-20.7	-18.6	-16.4	-13.2	-10.0	-6.5	-5.0	-5.3	-6.9	-6.8	-7.0	-7.5	-8.1	-8.9	-10.6	-13.6	-15.7	-13.7	-5.0	
26-Feb	-16.9	-17.6	-18.7	-19.3	-19.6	-20.9	-22.7	-23.9	-21.4	-19.1	-17.7	-15.8	-14.8	-14.2	-14.1	-13.6	-14.3	-15.2	-16.0	-17.3	-18.2	-18.6	-20.3	-21.2	-18.0	-13.6	
27-Feb	-21.0	-22.1	-21.3	-20.9	-20.9	-22.1	-24.4	-26.1	-24.9	-22.6	-20.5	-18.0	-14.7	-13.1	-11.7	-12.5	-13.2	-14.7	-16.7	-16.6	-17.5	-17.7	-18.9	-19.6	-18.8	-11.7	
28-Feb	-19.7	-18.5	-18.2	-19.1	-20.1	-21.1	-21.1	-22.0	-23.1	-23.1	-22.0	-19.9	-18.9	-18.1	-17.6	-17.4	-18.5	-19.6	-20.3	-21.4	-22.1	-23.1	-23.2	-23.5	-20.5	-17.4	
		-12.6	-13.2	-13.6	-14.0	-14.3	-14.8	-15.2	-15.5	-15.2	-14.0	-12.0	-9.9	-8.2	-7.1	-6.5	-6.6	-7.4	-8.5	-9.6	-10.3	-10.9	-11.3	-12.0	-12.5	Diurnal Average	
		7.1	4.8	5.3	4.4	3.6	3.3	2.6	1.8	1.6	4.8	6.2	7.9	8.2	9.4	9.9	10.0	9.3	8.4	6.7	6.7	6.3	7.1	7.1	7.5	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	152	22.62	22.62
-20 - 0	420	62.50	85.12
0 - 10	100	14.88	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

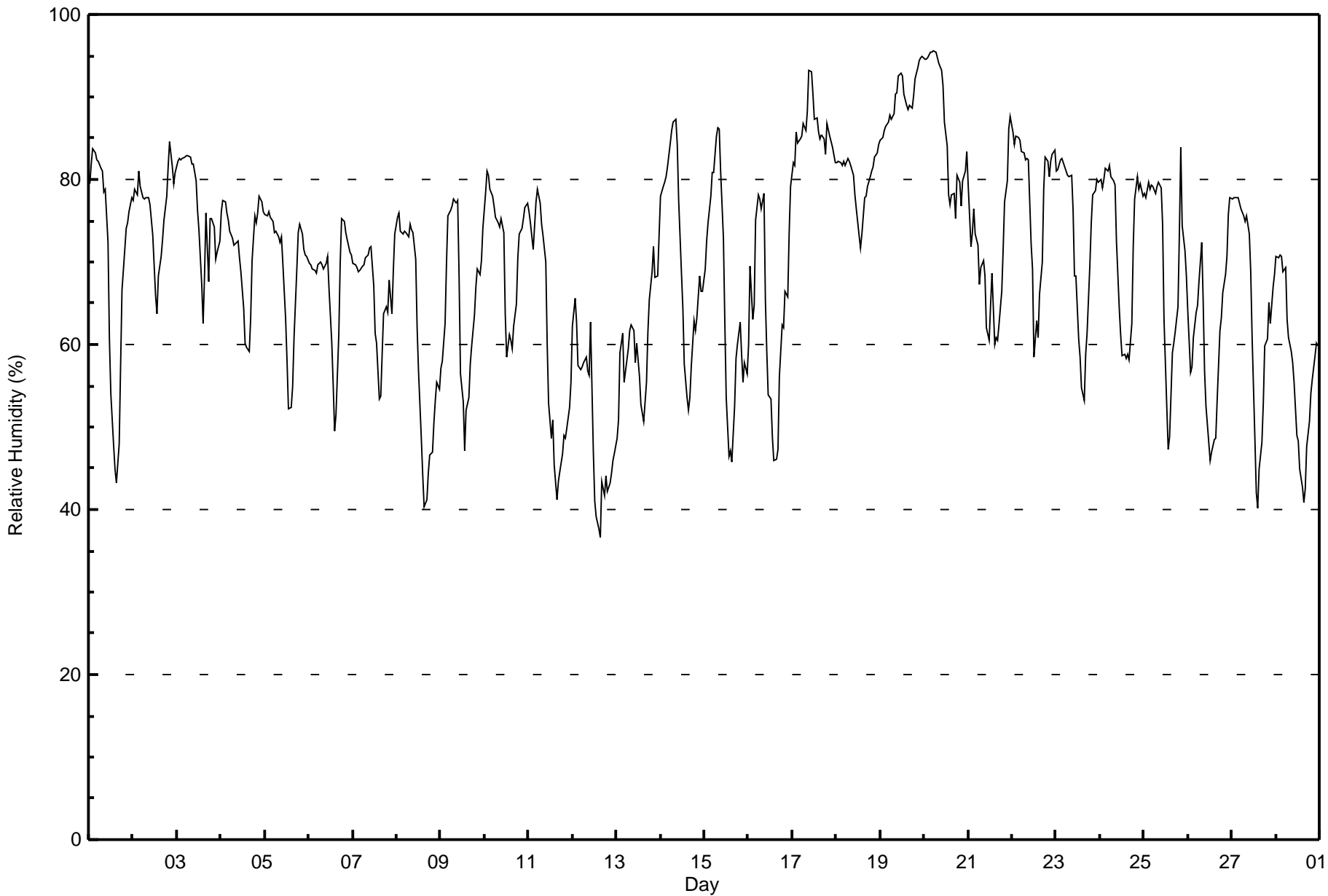


Maximum Value: 96 % on Feb 20 06:00																			Maximum Daily Average: 89.9 % on Feb 19						Hours in Service: 672	
Minimum Value: 37 % on Feb 12 16:00																			Minimum Daily Average: 50.3 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 76.8 % at hour 6																			Minimum Diurnal Average: 56.0 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 69.8 %																			Percentiles: P ₁ = 41 P ₁₀ = 51 Q ₁ = 61 Median = 72 Q ₃ = 79 P ₉₀ = 84 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-Feb	80	82	84	83	82	82	81	81	79	79	72	61	54	48	45	43	48	57	67	72	74	75	76	78	70.1	84
2-Feb	78	79	78	81	79	78	78	78	78	77	75	73	66	64	68	71	73	75	78	81	85	82	80	81	76.4	85
3-Feb	82	83	82	83	83	83	83	83	82	82	80	76	74	67	63	68	76	68	75	75	74	70	71	73	76.5	83
4-Feb	76	77	77	76	75	74	73	72	72	72	70	69	64	60	60	59	63	70	76	75	76	78	77	76	71.6	78
5-Feb	76	76	76	75	75	74	74	73	72	73	70	63	58	52	52	55	61	69	74	75	73	72	71	71	69.1	76
6-Feb	70	70	69	69	69	70	70	70	69	70	71	67	60	55	49	52	61	70	75	75	74	73	71	71	67.4	75
7-Feb	70	70	69	69	69	69	70	70	71	72	72	67	61	60	53	54	59	64	65	64	68	64	69	73	66.3	73
8-Feb	75	76	74	73	74	74	73	75	74	74	70	62	57	49	44	40	41	44	47	47	50	53	55	55	60.7	76
9-Feb	57	58	62	70	76	76	77	78	77	77	68	56	53	47	52	53	58	60	64	67	69	68	70	74	65.3	78
10-Feb	78	81	81	79	78	77	75	75	74	75	74	64	58	61	60	60	62	65	70	73	74	75	77	77	71.8	81
11-Feb	76	75	72	74	77	79	77	75	73	70	60	53	49	51	45	41	43	45	47	49	49	50	52	55	59.9	79
12-Feb	62	66	63	57	57	57	58	59	57	56	63	47	41	39	38	37	43	42	44	42	43	44	46	47	50.3	66
13-Feb	49	51	59	61	55	57	60	62	62	62	58	60	56	53	52	51	55	62	65	69	72	68	68	73	60.0	73
14-Feb	78	79	80	80	81	84	86	87	87	84	77	69	64	58	54	52	54	57	63	62	63	68	67	66	70.9	87
15-Feb	69	73	75	78	81	81	85	86	86	81	73	63	54	46	47	46	52	58	60	63	59	55	58	56	66.1	86
16-Feb	60	70	63	65	75	78	78	76	78	65	59	54	53	49	46	46	47	56	62	62	67	66	74	79	63.7	79
17-Feb	82	82	86	84	85	85	87	86	88	93	93	90	87	88	86	85	85	85	83	87	85	84	84	82	86.0	93
18-Feb	82	82	82	82	82	82	83	82	82	81	78	76	73	72	73	78	78	79	80	81	82	83	83	84	80.0	84
19-Feb	85	85	86	86	87	88	87	88	90	91	93	93	93	90	89	89	89	89	90	92	94	94	95	95	89.9	95
20-Feb	95	94	95	95	96	96	95	95	94	93	91	87	84	78	77	78	78	75	81	80	77	80	81	83	86.6	96
21-Feb	79	72	73	76	73	72	67	69	70	68	62	60	65	69	60	61	61	62	66	72	77	80	86	88	70.4	88
22-Feb	86	84	85	85	85	83	83	82	83	82	72	69	58	63	61	66	70	79	83	82	80	82	83	84	78.0	86
23-Feb	81	81	82	82	82	81	81	80	80	76	68	68	61	59	55	53	59	61	70	75	78	79	80	80	73.0	82
24-Feb	80	79	80	81	81	82	80	80	79	73	64	61	59	59	58	59	58	62	72	78	80	79	79	78	72.6	82
25-Feb	78	78	80	79	79	79	78	79	80	79	75	63	52	47	49	59	60	61	65	74	84	74	71	68	70.5	84
26-Feb	64	57	57	61	64	65	68	72	65	57	53	48	46	47	49	49	53	62	63	66	68	71	76	78	60.7	78
27-Feb	78	78	78	78	77	76	76	75	76	73	69	61	48	42	40	45	48	53	60	61	65	63	67	68	64.7	78
28-Feb	71	71	71	71	69	69	63	61	59	58	55	49	48	45	43	41	42	48	51	54	56	59	60	60	57.2	71
	74.9	75.2	75.7	76.3	76.6	76.8	76.6	76.7	76.4	74.8	70.9	65.4	60.6	57.7	56.0	56.8	60.0	63.5	67.6	69.7	71.3	71.0	72.4	73.3	Diurnal Average	
	95	94	95	95	96	96	95	95	94	93	93	93	93	90	89	89	89	89	90	92	94	94	95	95	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Summary of Hour Averages

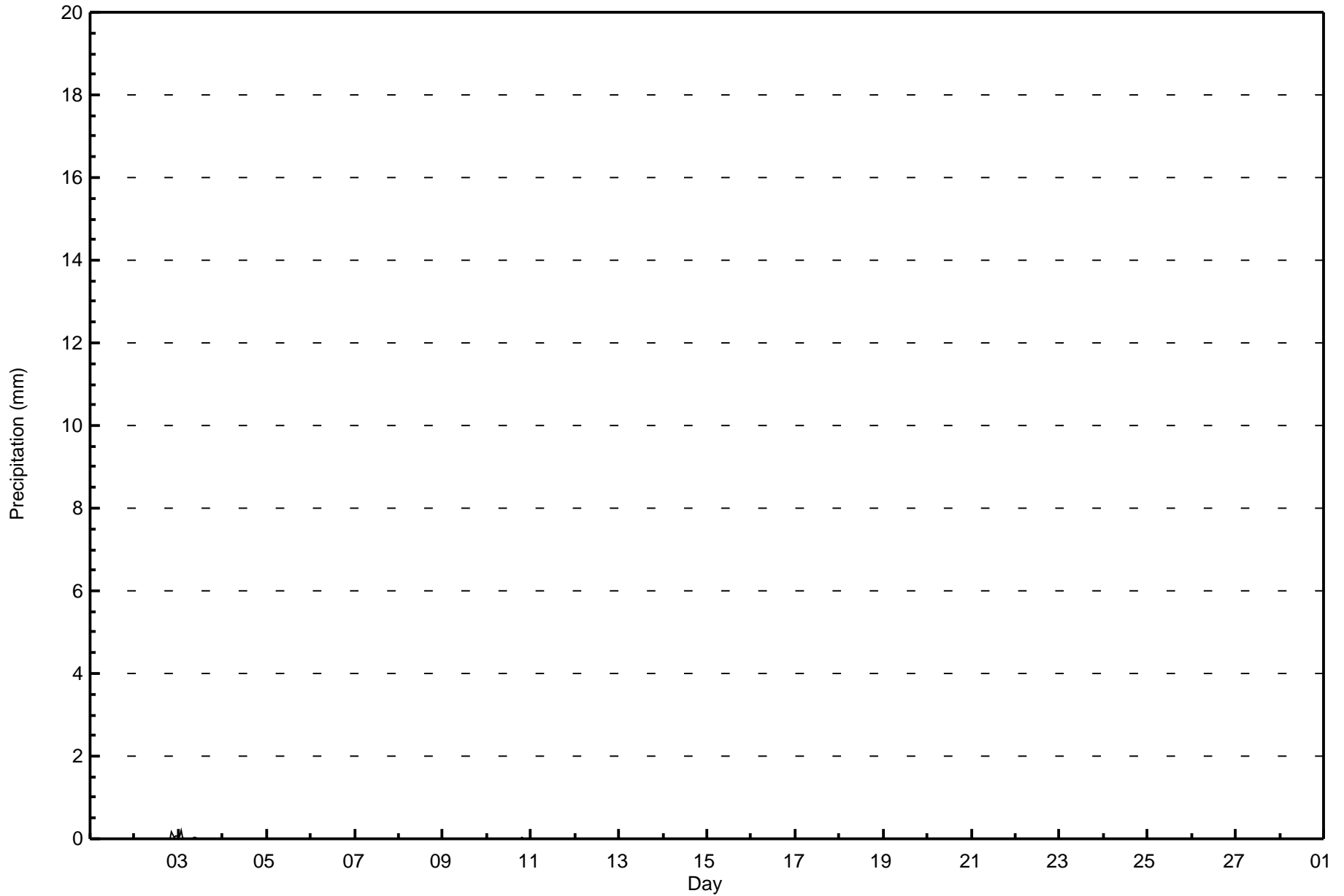
Fort McKay - Bertha Ganter - February 2017

Maximum Value: 0.2 mm on Feb 3 02:00		Maximum Daily Total: 0.4 mm on Feb 3														Hours in Service: 672											
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1														Hours of Data: 672											
Maximum Diurnal Total: 0.2 mm at hour 2		Minimum Diurnal Total: 0.0 mm at hour 4														Hours of Missing Data: 0											
Monthly Total: 0.82 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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.0	
3-Feb	0.1	0.2	0.1	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	0.0	0.0	0.0	
4-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
11-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.0	
		0.1	0.2	0.1	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	0.1	0.2	0.1	0.1	0.1	0.0	
		Diurnal Average																								Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	672	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: 672

Total Number of Hours: 672

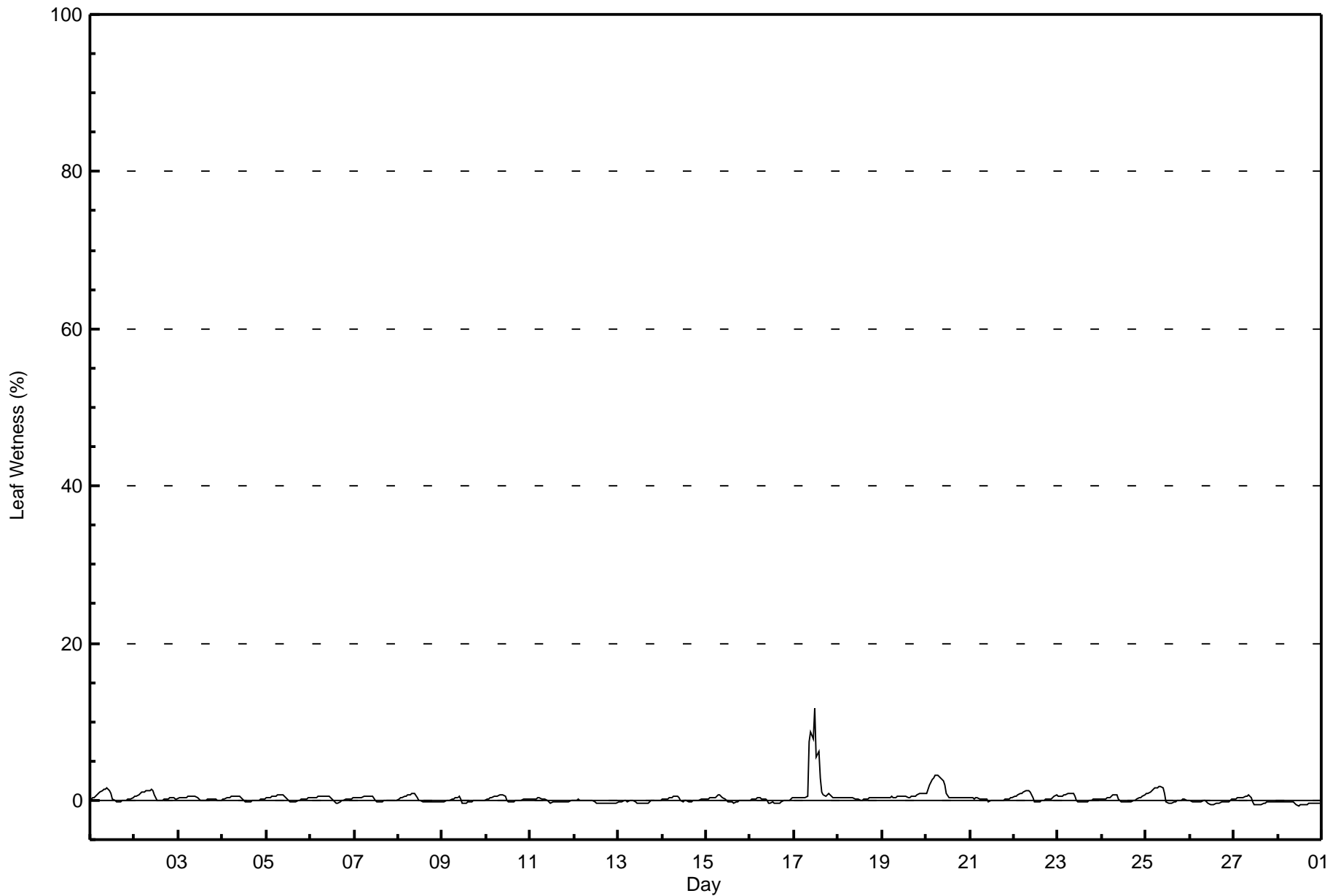


Maximum Value: 12 % on Feb 17 12:00																	Maximum Daily Average: 2.4 % on Feb 17																	Hours in Service: 672	
Minimum Value: -1 % on Feb 28 12:00																	Minimum Daily Average: -0.3 % on Feb 28																	Hours of Data: 672	
Maximum Diurnal Average: 0.9 % at hour 9																	Minimum Diurnal Average: -0.1 % at hour 16																	Hours of Missing Data: 0	
Monthly Average: 0.3 %																	Percentiles: P ₁ = -1 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-Feb	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1									
2-Feb	0	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									
3-Feb	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
4-Feb	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
5-Feb	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
6-Feb	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
7-Feb	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
8-Feb	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
9-Feb	0	0	0	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-Feb	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
11-Feb	0	0	0	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-Feb	0	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									
13-Feb	0	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-Feb	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
15-Feb	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
16-Feb	0	0	0	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-Feb	0	0	0	0	0	0	0	0	8	9	8	12	6	6	3	1	1	0	1	1	0	0	0	0	2.4	12									
18-Feb	0	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									
19-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1									
20-Feb	1	1	2	3	3	3	3	3	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.3	3									
21-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
22-Feb	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1									
23-Feb	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
24-Feb	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1									
25-Feb	1	1	1	1	1	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2									
26-Feb	0	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-0.2	0									
27-Feb	0	0	0	0	0	0	0	1	1	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0.0	1									
28-Feb	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	-0.3	0									
0.2																	0.3																	Diurnal Average	
1																	2																	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

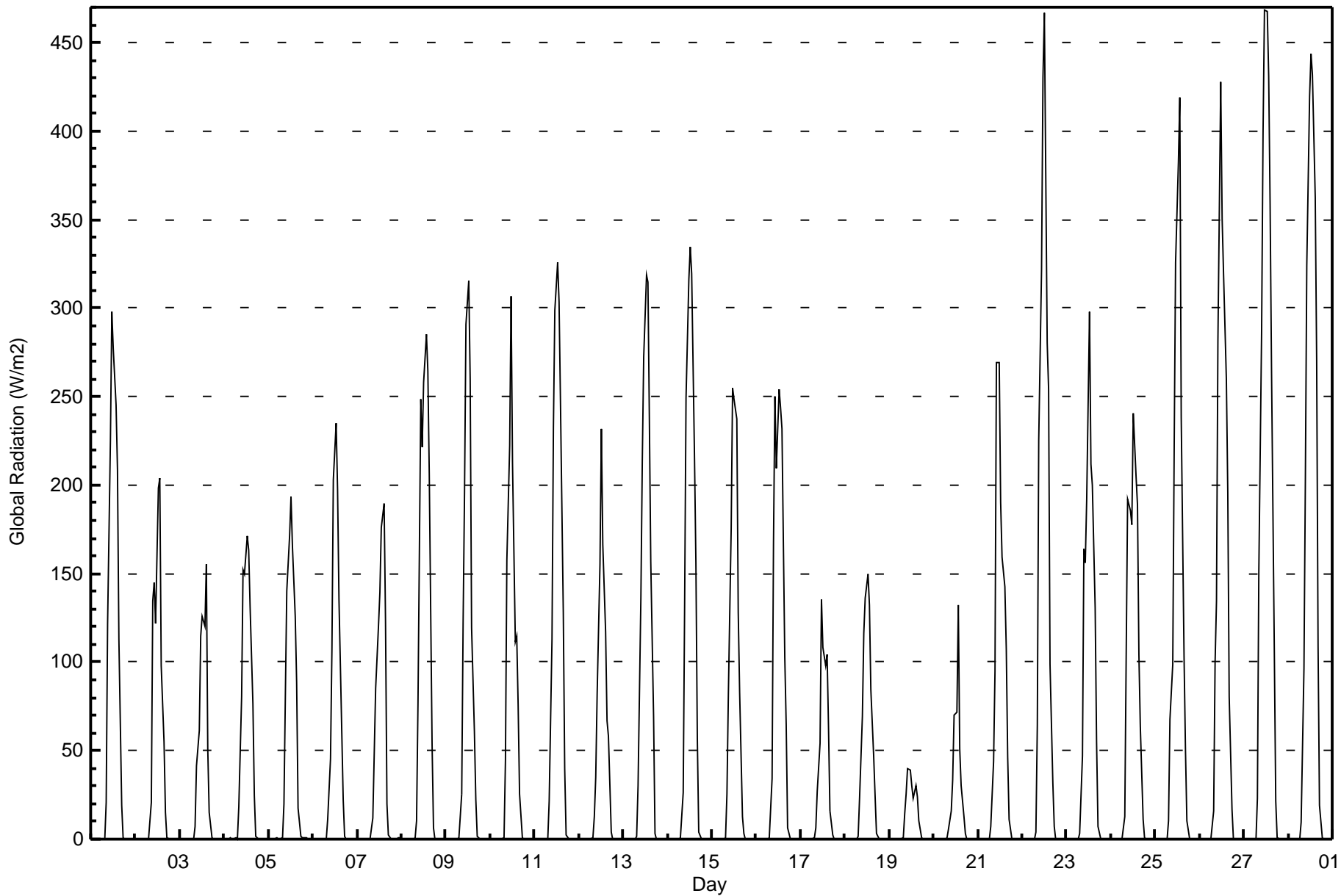
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	216	51.31	51.31
0.4 - 0.5	98	23.28	74.58
0.6 - 0.7	40	9.50	84.09
0.8 - 1.4	45	10.69	94.77
1.5 - 10	20	4.75	99.52
> 10	1	0.24	99.76

Total Number of Valid Hours: 421

Total Number of Hours: 672



Maximum Value: 469 W/m2 on Feb 27 12:00		Maximum Daily Average: 124.2 W/m2 on Feb 27		Hours in Service: 672																						
Minimum Value: 0 W/m2 on Feb 1 01:00		Minimum Daily Average: 9.9 W/m2 on Feb 19		Hours of Data: 672																						
Maximum Diurnal Average: 251.4 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 5		Hours of Missing Data: 0																						
Monthly Average: 57.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 83 P ₉₀ = 220 P ₉₉ = 430		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-Feb	0	0	0	0	0	0	0	0	21	122	226	298	277	246	209	113	19	1	0	0	0	0	0	0	63.8	298
2-Feb	0	0	0	0	0	0	0	0	21	134	145	122	198	204	98	55	15	0	0	0	0	0	0	0	41.3	204
3-Feb	0	0	0	0	0	0	0	0	7	42	62	114	126	120	156	51	15	1	0	0	0	0	0	0	28.9	156
4-Feb	0	0	0	0	0	0	0	1	0	19	80	153	149	172	163	132	77	25	1	0	0	0	0	0	40.5	172
5-Feb	0	0	0	0	0	0	0	0	20	81	140	171	194	166	126	88	18	1	0	0	1	0	0	0	42.0	194
6-Feb	0	0	0	0	0	0	0	0	11	45	107	203	235	198	136	98	23	2	0	0	0	0	0	0	44.1	235
7-Feb	0	0	0	0	0	0	0	0	12	49	85	120	139	176	190	123	20	2	0	0	0	0	1	1	38.3	190
8-Feb	0	0	0	0	0	0	0	0	10	76	248	222	258	285	265	206	53	6	0	0	0	0	0	0	68.0	285
9-Feb	0	0	0	0	0	0	0	1	26	123	196	291	316	260	120	60	22	2	0	0	0	0	0	0	59.0	316
10-Feb	0	0	0	0	0	0	0	1	45	158	222	306	213	111	115	75	25	1	0	0	0	0	0	0	53.1	306
11-Feb	0	0	0	0	0	0	0	0	21	113	233	299	326	304	247	128	40	3	0	0	0	0	0	0	71.4	326
12-Feb	0	0	0	0	0	0	0	1	12	35	82	156	232	167	117	67	58	4	0	0	0	0	0	0	38.8	232
13-Feb	0	0	0	0	0	0	0	1	30	136	214	273	319	315	239	157	69	3	0	0	0	0	0	0	73.2	319
14-Feb	0	0	0	0	0	0	0	1	26	131	249	316	334	320	216	156	58	4	0	0	0	0	0	0	75.5	334
15-Feb	0	0	0	0	0	0	0	1	25	81	175	255	248	238	128	83	13	3	0	0	0	0	0	0	52.1	255
16-Feb	0	0	0	0	0	0	0	1	34	167	250	210	254	244	232	102	65	6	0	0	0	0	0	0	65.2	254
17-Feb	0	0	0	0	0	0	0	1	7	27	54	136	108	98	104	63	16	3	0	0	0	0	0	0	25.6	136
18-Feb	0	0	0	0	0	0	0	1	23	69	117	136	149	133	84	47	25	3	0	0	0	0	0	0	32.8	149
19-Feb	0	0	0	0	0	0	0	1	15	25	40	39	30	23	30	24	11	1	0	0	0	0	0	0	9.9	40
20-Feb	0	0	0	0	0	0	0	1	5	16	33	70	72	132	51	30	12	3	0	0	0	0	0	0	17.7	132
21-Feb	0	0	0	0	0	0	0	7	44	95	269	269	190	160	142	108	46	11	0	0	0	0	0	0	55.9	269
22-Feb	0	0	0	0	0	0	0	4	65	225	322	430	467	281	254	99	32	7	0	0	0	0	0	0	91.1	467
23-Feb	0	0	0	0	0	0	0	3	47	164	156	192	298	212	200	130	55	7	0	0	0	0	0	0	61.0	298
24-Feb	0	0	0	0	0	0	0	13	104	192	186	178	241	205	189	105	64	11	0	0	0	0	0	0	62.0	241
25-Feb	0	0	0	0	0	0	0	10	68	99	220	326	382	419	238	104	51	10	0	0	0	0	0	0	80.3	419
26-Feb	0	0	0	0	0	0	0	16	100	135	282	428	350	320	260	196	80	17	0	0	0	0	0	0	91.0	428
27-Feb	0	0	0	0	0	0	0	23	151	288	399	469	467	431	359	266	105	22	1	0	0	0	0	0	124.2	469
28-Feb	0	0	0	0	0	0	0	10	97	203	324	419	443	432	363	271	109	19	1	0	0	0	0	0	112.1	443
		0.0	0.0	0.0	0.0	0.0	0.1	0.1	3.5	38.1	111.2	185.3	235.6	251.4	227.1	178.5	110.1	40.8	5.5	0.1	0.0	0.0	0.0	0.1	0.0	Diurnal Average
		0	0	0	0	0	0	1	23	151	288	399	469	467	432	363	271	109	22	1	0	1	0	1	1	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (W/m²)	Number of Hours	%	Cumulative %
0 - 20	438	65.18	65.18
21 - 100	78	11.61	76.79
101 - 300	128	19.05	95.83
301 - 600	28	4.17	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 672

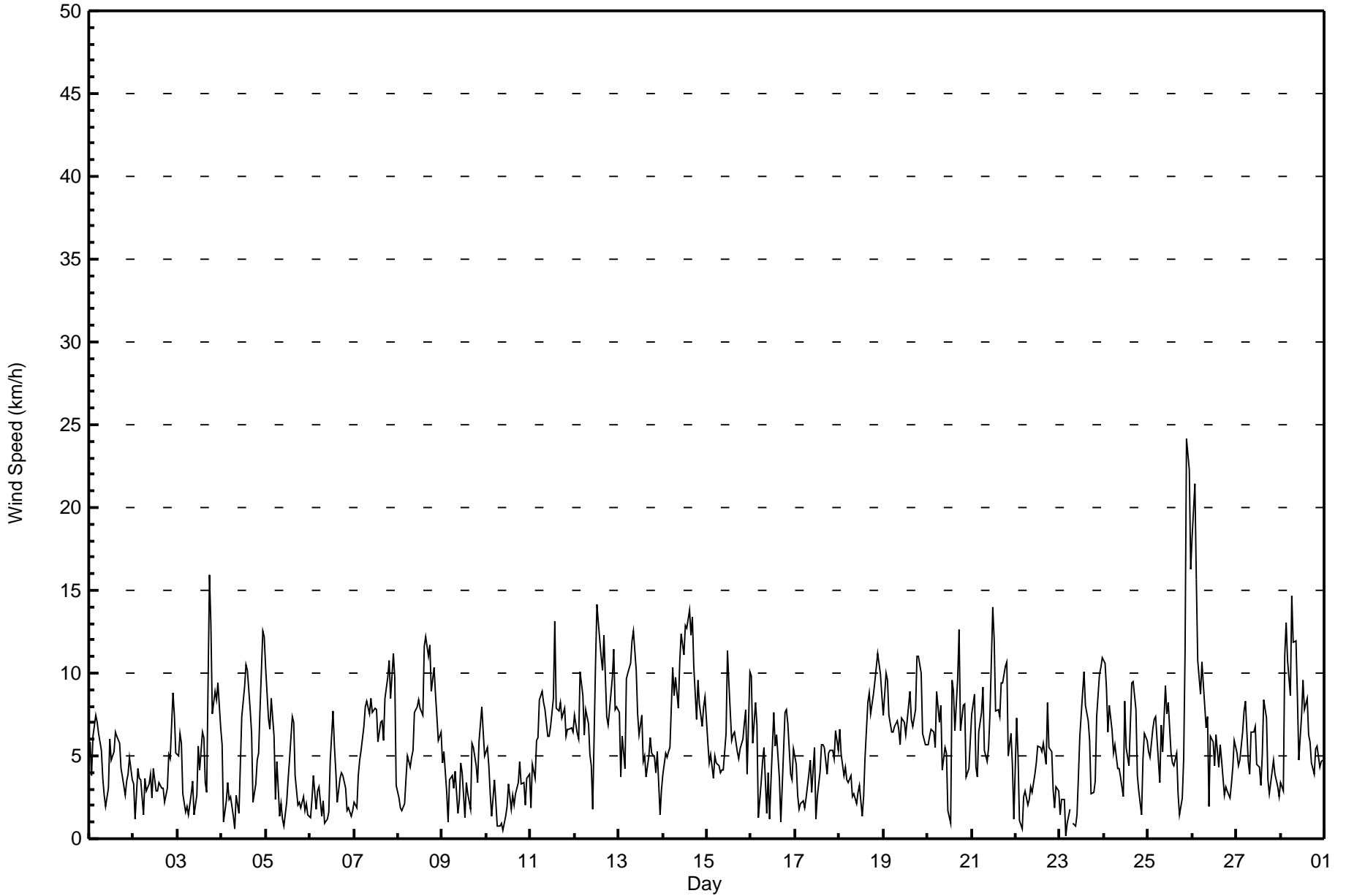
Total Number of Hours: 672



Maximum Speed: 24 km/h on Feb 25 22:00	Maximum Daily Speed Average: 9.1 km/h on Feb 14	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 23 04:00	Minimum Daily Speed Average: 0.1 km/h on Feb 24	Hours of Data: 671
Maximum Diurnal Speed Average: 3.0 km/h at hour 22	Minimum Diurnal Speed Average: 0.5 km/h at hour 17	Hours of Missing Data: 1
Monthly Average Velocity: 1.0 km/h 280.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 10 P ₉₉ = 16	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	NNW6	NNW4	N6	N7	N7	N6	NNW5	WNN4	W3	S2	SSE3	SSE6	SE5	SSE5	SSE6	S6	S6	S4	SW4	S3	SSW4	S4	S5	S4	SSW0.8	N7
2-Feb	S3	S1	SSE4	WSW4	WSW4	SSW1	S4	S3	SSW3	S4	SE2	SSE4	SE3	NE3	NE3	NNE3	NE3	NE2	N3	N5	N5	N9	N7	N5	NE0.6	N9
3-Feb	NNW5	N6	NNW6	NW3	NNW2	NNW2	E1	SSE3	S3	WSW1	SE3	SSE6	SE4	SE6	SE6	SE3	N3	NW16	N13	N8	NNE9	N8	N9	N7	N2.5	NW16
4-Feb	NNW6	NNW1	NNW2	W3	NNW2	NNW3	SW1	W1	SSW3	SSW2	SE4	SSE7	SSE9	SSE10	SSE10	SSE8	SSE6	ESE2	SE3	N5	N5	N8	N13	NNW12	SSE0.4	N13
5-Feb	NNW10	NNW7	NNW7	NW9	WNN6	W2	WNN5	W1	SW2	WNN1	E1	SE2	ESE4	W2	WNN5	SSE7	SE4	NE2	N2	NW2	WSW3	SW2	SSW2	SSW1	WNN0.9	NNW10
6-Feb	SW1	SSW2	S4	SSW2	S3	S3	SW1	S2	WNN1	SSW1	SSW2	SSE5	SSE8	SE6	SE4	ESE2	N4	NNW4	WNN4	W3	WNN2	WNN2	WSW1	WSW2	SSW1.3	SSE8
7-Feb	SSW2	SW2	SSW4	S5	S5	S7	S8	S8	S8	S8	SSW8	SW8	SW6	SW7	SW7	W6	WNN8	WNN10	WNN11	WNN8	NW11	WNN10	WSW3	SSW4.2	NW11	
8-Feb	WNN2	W2	SW2	SW2	S4	S5	S4	SSW5	S5	SSE8	SSE8	S8	SSW8	WSW7	SW12	SW12	SSW11	SSW12	S9	S10	S9	S7	SSW6	WSW6	SSW6.3	SW12
9-Feb	WSW5	WSW5	SW3	ESE1	S4	SSW4	S3	SSW4	S2	SSE2	SSE5	SE4	NW1	ESE3	ESE3	NE2	N6	NNW6	WNN4	WNN3	NNW6	N8	N6	NW5	WNN0.8	N8
10-Feb	NNW5	NNW4	NNW3	W1	WNN4	WNN2	SW1	WSW1	WSW1	NNE1	ENE1	ESE2	ESE3	E2	ESE3	ENE2	NNE3	N3	NW5	N3	NNW3	WNN2	NNW4	WNN4	NNW1.5	NNW5
11-Feb	SSW2	SSE5	SSW4	SW6	SW6	WSW8	W9	W8	WSW8	WSW6	WSW6	SW7	SSW8	SSE13	S8	SW8	SW8	WSW7	WSW8	SW6	SW7	WSW7	SW7	S6	SW6.0	SSE13
12-Feb	SSE7	SSE6	SSW6	SSW10	SW9	SW6	WSW8	WSW7	SW5	SSW4	NW2	SW11	WSW14	WSW13	WSW11	SSW10	SSE12	SSW7	S7	SSW8	WSW10	W11	WSW8	WSW8	SW7.1	WSW14
13-Feb	WSW8	S4	S6	WSW4	W10	W10	W11	W12	W13	WNN10	NNW8	NE6	ENE7	NE5	NNE5	NE4	N5	N6	NNW5	NW5	NW4	NW5	W1	S3	WNN3.4	WNN13
14-Feb	SSE4	S5	SSE5	S5	S5	S10	S9	S10	SSE8	S11	SSE12	SSE11	SSE13	S13	S14	S12	S13	S10	S7	S10	S8	S7	SSE8	SSE9	S9.1	S14
15-Feb	S6	S5	S5	SSW4	SSW5	S5	S4	S4	SSW4	SSE4	S6	S11	S9	SSE6	S6	S6	SSE5	SSE5	S5	S6	S7	S8	SW4	SSE10	S5.8	S11
16-Feb	S10	SSE6	S8	SSW7	S1	S3	S5	SSE5	WSW1	SSE4	SW1	N3	N8	NW6	NNW6	N4	NNW1	WNN3	N8	NW8	NW7	NNW4	W4	WNN5	W1.4	S10
17-Feb	WNN4	W3	SW2	SSW2	SW2	S2	WNN2	N4	NNW5	NW3	WNN6	N1	ENE3	NE4	NNE6	NNE6	NNE6	NE4	NNE5	NNE5	NNE5	ENE7	ENE7	ENE5	NNE2.3	ENE7
18-Feb	NNE7	NNE5	NE4	ENE4	NNE4	N3	N4	NE3	ENE3	NNE2	NE3	NNE3	E1	ESE3	NNE5	N8	N9	NNW8	N9	NNW9	NNW10	NNW11	N10	NNW9	N4.9	NNW11
19-Feb	NNW7	NNW10	NNW10	NNW7	N6	N6	N7	N7	N7	NNE6	NNE7	NNE7	NNE6	NNE7	N9	N7	N7	N8	N11	N11	N10	NNW6	N6	NNW6	N7.4	N11
20-Feb	NNW6	NNW6	NNW7	NNW6	WNN6	WNN9	NW7	NW8	NW4	NNW5	NNW5	ENE2	WSW1	WNN10	WNN9	WNN7	WNN10	WNN13	W6	WNN8	WNN8	SW4	SW4	SW6	WNN5.4	WNN13
21-Feb	SW8	W9	SW4	SW4	WNN6	WNN8	W9	W5	SW5	WSW6	W8	NW14	NW12	NW8	W8	W7	WNN9	WNN9	WNN10	WNN11	W5	WNN6	WNN4	WNN1	W6.8	NW14
22-Feb	NNW7	NNW5	N1	N1	WNN3	WNN3	NW2	NW2	NNW3	N3	NE4	NE5	E6	NE6	ENE5	NNE6	NNE5	N8	N5	N5	NE3	NNW2	W3	W3	N2.9	N8
23-Feb	SSW1	SSE2	S2	NW0	W1	W2	AF	SW1	SSW1	ESE1	SE4	SE6	SE9	SSE10	SE8	SE7	SSE6	S3	NNW3	NNW3	NNW7	NNW10	NNW10	NNW11	ESE0.7	NNW11
24-Feb	N11	N9	NNW6	NW8	NW7	WNN5	WNN6	WNN4	NNW4	NE4	ESE3	NNW8	E6	E4	SE7	SSE9	SSE9	SSE8	SSE4	S3	SW1	S5	S6	S6	NW0.1	N11
25-Feb	S5	S5	S7	S7	S7	S6	SSW3	S7	S5	S9	S8	SE8	SE5	SE5	E4	NNE5	N3	S1	ESE2	NE5	N11	N24	N22	N16	E1.1	N24
26-Feb	NNW18	NNW21	NW16	NW11	NW9	NW11	WNN9	WNN7	WNN7	WNN2	NNE6	ENE6	E4	ENE6	NE4	E6	E5	NNE3	ENE3	NE3	ENE2	NNE3	N4	N6	NNW4.9	NNW21
27-Feb	N5	N4	NNW5	N6	N8	N8	NW5	NW4	N6	N6	N7	N4	ESE4	SE3	SE5	SSE8	SSE7	S4	SE3	SSE4	SSE5	SSE4	SSW3	W3	NNE1.1	SSE8
28-Feb	W3	W3	N11	N13	N11	N9	N15	N12	N12	N9	NE5	E7	E10	ENE8	ENE9	ENE6	NNE6	NE5	NNE4	N5	N6	NNW4	N5	NNW5	NNE6.0	N15
NW2.3 NW1.9 WNN1.3 WNN1.8 W2.3 W2.4 W2.5 WSW2.0 W1.6 SSW0.9 SSE0.8 SSE1.8 SE2.6 SE2.1 SSE2.1 SSE1.6 S0.5 WNN1.7 NW2.1 NW2.3 NW2.6 NNW3.0 NW2.8 NW2.0																										
NNW18 NNW21 NNW16 N13 N11 NNW11 N15 W12 WNN13 SSE11 SSE12 NW14 WSW14 SSE13 S14 SSE12 S13 NNW16 N13 N11 N11 N24 N22 N16																										
Diurnal Average																										
Diurnal Maximum																										

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	346	51.56	51.56
6 - 11	293	43.67	95.23
12 - 19	29	4.32	99.55
20 - 28	3	0.45	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - February 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	19	22	10	7	14	19	21	48	28	22	17	18	29	16	27	346
6 - 11	50	14	2	7	5	0	9	31	45	11	17	17	13	26	14	32	293
12 - 19	7	0	0	0	0	0	0	5	3	1	2	2	1	2	4	2	29
20 - 28	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	88	33	24	17	12	14	28	57	96	40	41	36	32	57	34	62	671

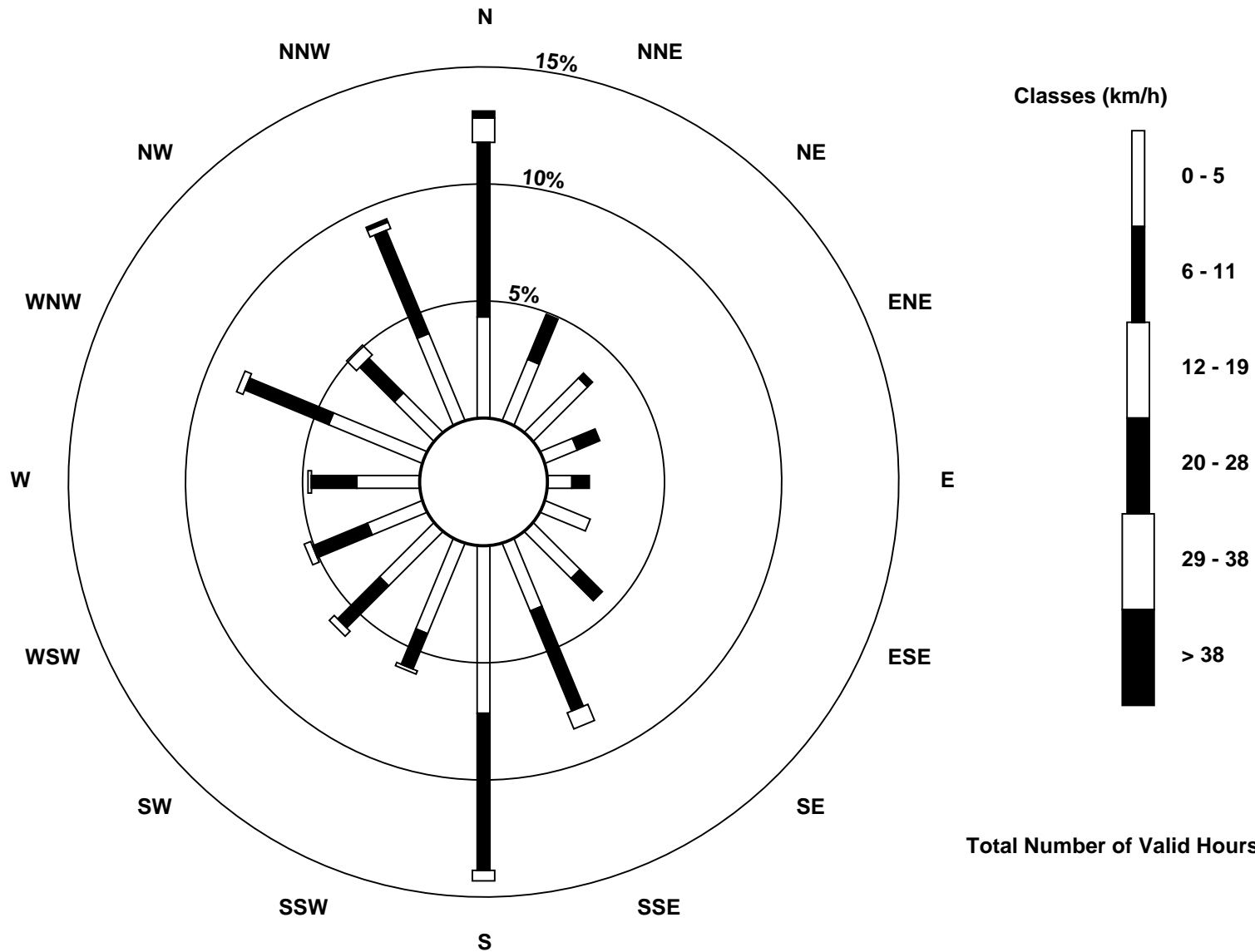
Total Number of Valid Hours: 671

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 26 01:00														Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9												
Minimum Value: 0 km/h on Feb 23 11:00																										
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																										
Day	Hourly Period Ending At (MST)																							Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24	
1-Feb	1	1	2	2	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2	1	1	1	1	2	
2-Feb	1	1	1	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	3	2	1	3	
3-Feb	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	2	4	4	2	3	2	3	2	2	4	
4-Feb	1	1	1	2	2	1	1	1	1	1	2	1	2	2	2	1	2	1	1	2	2	1	2	2	2	
5-Feb	1	3	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	3	
6-Feb	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	2	
7-Feb	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	2	2	1	1	1	2	2	1	3	
8-Feb	1	1	1	1	1	1	1	1	1	1	2	2	3	4	5	5	4	3	2	2	1	1	2	2	5	
9-Feb	2	2	2	1	2	1	2	2	1	1	2	2	1	1	1	1	2	1	1	1	2	1	2	1	2	
10-Feb	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	
11-Feb	1	1	2	2	2	3	3	3	3	3	3	3	3	2	2	3	4	3	3	2	3	3	3	2	4	
12-Feb	2	1	2	3	3	2	3	3	3	2	2	4	6	6	5	4	2	2	2	2	4	4	3	4	6	
13-Feb	3	2	2	2	3	3	3	3	3	2	3	2	2	2	2	1	2	1	1	1	1	1	1	1	3	
14-Feb	1	1	1	2	2	2	2	2	2	2	3	2	2	2	3	2	3	2	2	2	2	1	1	1	3	
15-Feb	1	2	1	2	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	3	3	
16-Feb	3	2	3	2	1	2	2	2	1	2	1	2	2	2	2	2	1	1	2	1	1	2	2	2	3	
17-Feb	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	
18-Feb	2	2	1	2	1	1	1	1	1	1	1	1	1	2	3	2	2	1	2	3	2	2	2	2	3	
19-Feb	1	2	2	2	1	1	2	1	2	2	2	2	2	2	2	2	1	2	2	2	1	1	1	1	2	
20-Feb	1	1	1	2	1	1	1	1	1	1	1	1	2	3	2	2	3	3	2	3	2	1	1	2	3	
21-Feb	3	4	2	2	2	4	3	2	2	2	3	3	3	4	3	3	3	2	3	2	2	1	1	1	4	
22-Feb	4	1	1	1	1	1	2	1	1	1	2	2	1	2	2	2	2	2	1	2	2	1	1	1	4	
23-Feb	1	1	1	1	1	1	AF	1	1	1	0	1	2	2	2	1	1	1	1	1	2	1	1	1	2	
24-Feb	2	2	1	1	1	1	1	1	2	2	2	3	2	1	1	2	1	3	1	1	1	1	1	1	3	
25-Feb	1	1	2	1	1	2	1	2	2	2	2	2	1	1	2	2	3	3	2	2	5	7	6	4	7	
26-Feb	7	4	5	1	1	2	2	2	2	2	3	2	2	2	2	2	1	2	1	1	1	1	1	1	7	
27-Feb	1	1	1	2	2	2	1	1	2	2	2	1	1	2	2	2	1	2	1	1	1	1	1	1	2	
28-Feb	2	2	5	4	3	3	4	3	3	3	2	2	2	2	3	2	2	2	1	1	1	1	1	1	5	
	7	4	5	4	3	4	4	3	3	3	3	4	6	6	5	5	4	4	4	4	3	5	7	6	4	
Diurnal Maximum																										
AF - Analyzer Failure																										



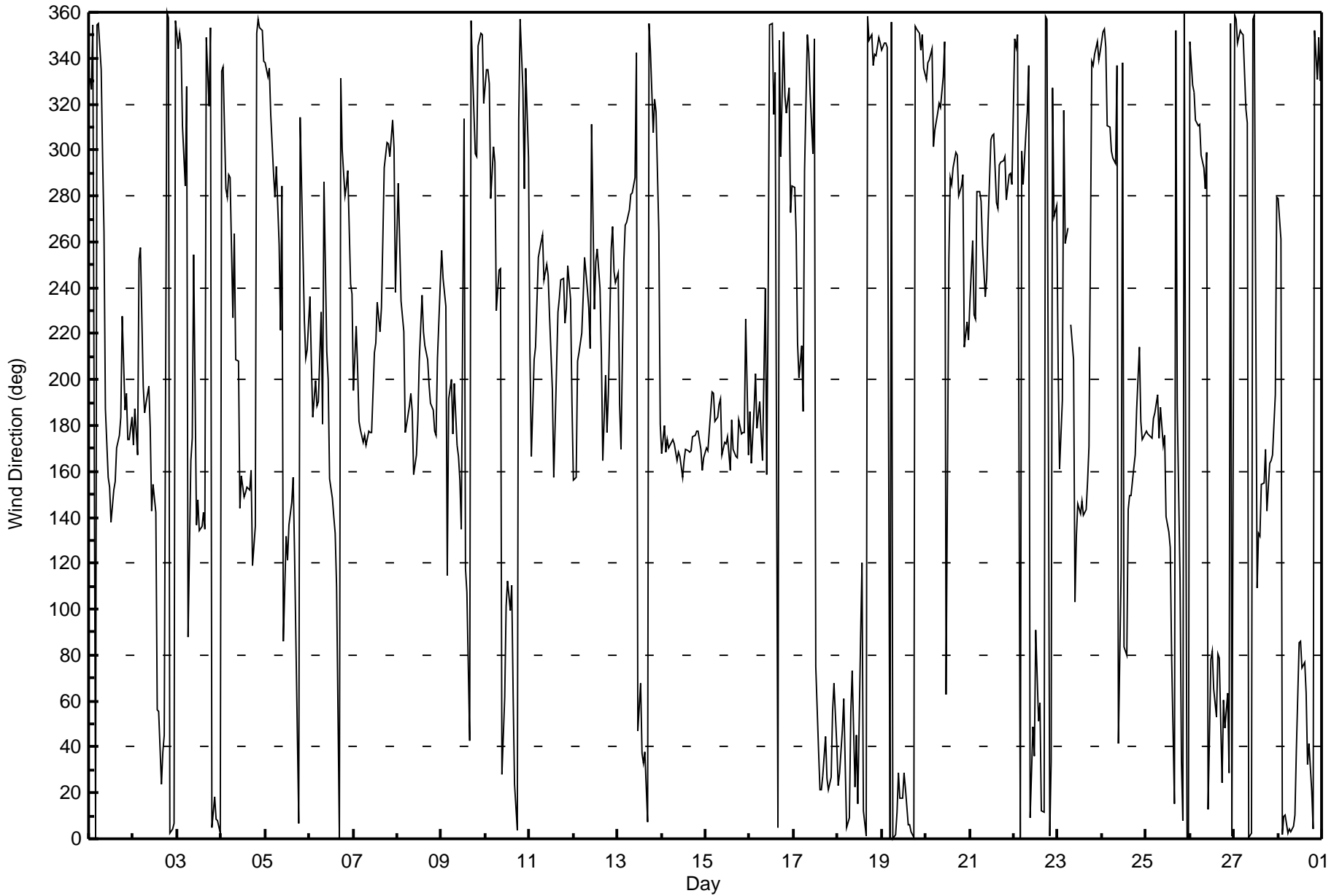
Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 359 deg on Feb 25 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 169.6 deg on Feb 14	Hours of Data: 671
Direction of Minimum Speed: 317 deg on Feb 23 04:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.1 deg on Feb 24	Percent Operational Time: 99.9
Monthly Average Direction: 276.8 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-Feb	331	327	355	0	354	355	335	297	264	187	158	153	138	152	156	170	176	183	227	187	194	174	174	184	193.8
2-Feb	171	187	167	253	258	197	186	190	197	179	143	155	142	56	55	24	38	45	360	357	2	4	6	356	36.0
3-Feb	344	351	346	310	284	328	88	164	174	255	137	148	134	136	142	135	349	319	354	5	18	8	8	3	4.6
4-Feb	334	336	283	279	289	288	227	264	209	208	144	158	149	151	153	152	161	119	136	351	357	353	352	339	146.3
5-Feb	338	332	336	315	290	279	293	259	221	284	86	132	121	136	147	158	124	45	6	314	256	226	209	213	296.0
6-Feb	236	207	184	200	189	190	229	181	286	213	200	157	148	140	133	110	1	331	300	280	284	291	242	238	192.9
7-Feb	195	224	205	182	178	173	176	172	177	177	177	212	216	234	221	231	261	293	303	302	297	313	301	238	232.8
8-Feb	285	260	235	221	177	181	189	194	186	159	167	182	208	237	221	215	208	198	190	187	177	176	209	241	198.9
9-Feb	256	244	232	114	191	200	177	198	172	166	156	135	314	118	108	43	356	335	298	297	346	351	350	320	292.1
10-Feb	335	335	329	279	302	294	230	248	248	28	61	102	112	100	111	64	24	4	313	357	327	283	335	296	338.9
11-Feb	212	167	209	214	234	253	260	263	244	250	245	228	196	157	181	229	235	243	244	224	231	249	235	190	225.9
12-Feb	156	157	208	212	220	236	253	239	231	213	311	231	251	257	240	211	165	202	177	194	257	266	247	242	225.0
13-Feb	246	189	169	252	268	268	274	281	281	288	342	47	67	38	33	38	7	355	343	308	322	317	264	180	300.9
14-Feb	168	180	168	174	170	173	174	172	165	169	167	158	165	169	169	169	169	175	176	177	177	170	161	166	169.6
15-Feb	171	169	178	195	194	182	184	189	192	167	172	172	175	161	182	169	167	166	182	176	177	177	226	167	176.8
16-Feb	186	164	188	203	179	191	176	165	240	159	231	355	355	315	333	5	348	297	352	324	316	327	273	284	271.4
17-Feb	284	264	216	201	215	186	291	350	343	324	299	349	75	38	21	22	28	44	26	21	27	55	67	41	13.6
18-Feb	23	29	47	61	33	5	9	55	73	23	45	15	87	120	12	1	358	348	350	337	342	341	349	347	4.7
19-Feb	343	347	347	345	0	356	0	2	11	29	18	18	28	22	6	6	3	0	354	353	351	344	350	335	359.3
20-Feb	331	338	339	344	301	309	316	320	319	332	347	63	253	288	285	292	299	298	280	284	289	214	225	217	302.1
21-Feb	234	261	228	227	282	282	278	259	236	244	268	304	306	307	277	274	293	294	295	297	279	289	290	285	280.3
22-Feb	348	345	350	0	300	285	307	317	337	9	49	36	91	51	59	12	12	358	357	1	34	327	271	276	3.6
23-Feb	205	161	191	317	259	266	AF	224	209	103	132	146	142	147	141	143	155	171	338	337	342	347	339	343	122.6
24-Feb	351	353	345	310	310	300	296	294	337	42	118	338	83	80	143	149	149	162	167	186	214	182	174	176	318.9
25-Feb	178	176	175	174	183	186	193	174	188	171	176	140	133	127	79	15	352	189	113	34	8	359	1	0	84.6
26-Feb	347	328	325	313	311	311	298	292	283	299	13	78	82	65	53	80	79	24	61	48	63	28	355	1	345.4
27-Feb	359	357	347	352	351	350	318	312	1	3	357	359	109	133	132	154	155	170	143	163	165	167	194	280	18.2
28-Feb	279	261	2	9	10	2	4	3	5	10	38	85	86	74	77	63	33	42	21	4	352	331	349	330	18.5
	310.5	307.3	293.4	284.8	276.8	271.8	274.7	255.0	259.0	210.1	155.1	150.3	144.2	142.9	151.6	160.0	173.8	297.9	317.3	311.8	319.9	326.4	324.3	305.0	
	Diurnal Average																								

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Feb 4 02:00 Minimum Value: 6 deg on Feb 7 20:00 Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 14 Median = 25 Q ₃ = 44 P ₉₀ = 58 P ₉₉ = 86																	Hours in Service: 672 Hours of Data: 671 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-Feb	16	29	17	12	14	16	28	9	33	37	25	14	12	12	11	15	13	18	14	40	26	23	15	30	40		
2-Feb	35	68	15	65	43	50	15	19	15	18	60	19	32	65	52	36	47	46	26	13	14	16	16	13	68		
3-Feb	11	12	13	62	56	79	51	32	28	58	78	13	39	10	13	67	55	14	13	23	27	21	17	18	79		
4-Feb	16	91	53	25	52	29	34	81	52	63	14	10	13	12	12	15	47	27	20	13	13	11	8	91			
5-Feb	9	14	14	8	16	59	21	55	37	76	84	50	29	14	11	11	41	48	33	53	55	53	52	56	84		
6-Feb	54	50	18	46	32	41	54	28	61	34	59	16	10	9	20	61	32	22	14	26	37	55	26	47	61		
7-Feb	35	44	11	12	9	11	9	10	13	12	21	32	36	57	43	46	41	20	10	6	8	10	15	43	57		
8-Feb	60	47	72	45	19	13	29	24	22	13	24	28	31	55	38	34	25	21	16	15	11	10	27	40	72		
9-Feb	49	46	66	88	35	21	59	36	73	41	40	21	86	37	45	72	14	11	25	18	20	12	20	20	88		
10-Feb	11	17	18	46	17	51	58	82	74	84	73	71	46	68	31	49	39	34	24	23	36	50	39	28	84		
11-Feb	56	18	45	26	44	47	44	39	48	57	50	44	27	11	34	45	44	46	42	37	43	52	56	50	57		
12-Feb	12	16	35	27	34	45	47	47	64	47	71	44	43	46	54	35	12	24	24	23	46	38	49	45	71		
13-Feb	42	65	27	34	34	33	29	17	17	15	37	39	34	35	41	48	26	15	22	19	30	16	57	19	65		
14-Feb	22	14	24	34	23	12	13	11	18	12	12	12	11	12	11	11	10	11	10	11	10	12	9	11	34		
15-Feb	11	28	17	23	27	28	14	27	46	22	22	11	13	21	22	12	17	29	23	21	18	18	68	18	68		
16-Feb	14	43	15	23	64	72	54	20	62	20	79	56	13	31	37	34	83	10	16	19	19	31	33	31	83		
17-Feb	19	69	59	61	31	54	41	29	16	29	15	87	56	41	41	37	45	55	43	30	37	60	34	46	87		
18-Feb	37	39	52	56	47	29	22	51	43	55	44	30	82	78	33	12	13	12	12	21	12	10	13	11	82		
19-Feb	11	12	11	15	16	13	15	14	29	45	24	24	51	30	15	16	13	11	11	11	10	12	13	13	51		
20-Feb	11	13	11	15	12	12	11	12	25	15	13	55	86	23	22	19	11	12	24	22	18	25	38	28	86		
21-Feb	41	44	38	43	24	20	27	38	49	46	42	16	19	28	38	33	20	13	12	9	20	11	9	54	54		
22-Feb	45	15	87	71	26	23	58	22	21	40	48	43	24	41	38	38	33	13	13	17	60	60	19	38	87		
23-Feb	67	49	62	91	62	58	AF	61	64	39	11	10	13	11	13	18	15	25	19	14	12	11	9	9	91		
24-Feb	12	12	16	8	9	12	10	20	30	49	71	38	31	36	17	12	10	11	14	12	30	14	7	11	71		
25-Feb	17	16	11	10	11	12	20	12	28	11	23	15	10	27	51	39	85	72	86	41	19	17	16	14	86		
26-Feb	18	10	11	8	12	7	12	18	15	84	51	38	48	30	45	30	29	71	40	36	45	43	12	12	84		
27-Feb	14	18	16	15	11	14	26	22	14	16	16	28	39	59	51	17	11	62	49	11	9	15	26	51	62		
28-Feb	49	47	18	18	18	15	16	17	17	26	55	27	21	35	29	41	39	41	42	14	12	17	18	22	55		
																	Diurnal Maximum										
																	67 91 87 91 64 79 59 82 74 84 84 87 86 78 54 72 85 72 86 53 60 60 68 56										
AF - Analyzer Failure																											



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 19, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:00
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	821
Calculated slope	0.998726	0.995165	Chamber temp	45.1	44.9
Calculated intercept	1.460949	1.362961	Pressure	673.6	682.2
Analyzer Background	15.1	14.9	Flow	0.497	0.503
Analyzer Coefficient	0.948	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	745.6	0.998
calibrator zero	5500	0.0	0.0	0.3	----
high point	5500	83.0	744.0	747.1	0.996
second point	5500	46.5	416.8	416.8	1.000
third point	5500	23.3	208.9	206.6	1.011
as left zero	5500	0.0	0.0	0.0	----
as left span	5500	83.0	744.0	741.4	1.004
Average Correction Factor					1.002

Corrected As found 745.9 Previous response 743.5 % change -0.3%

Notes:

Inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



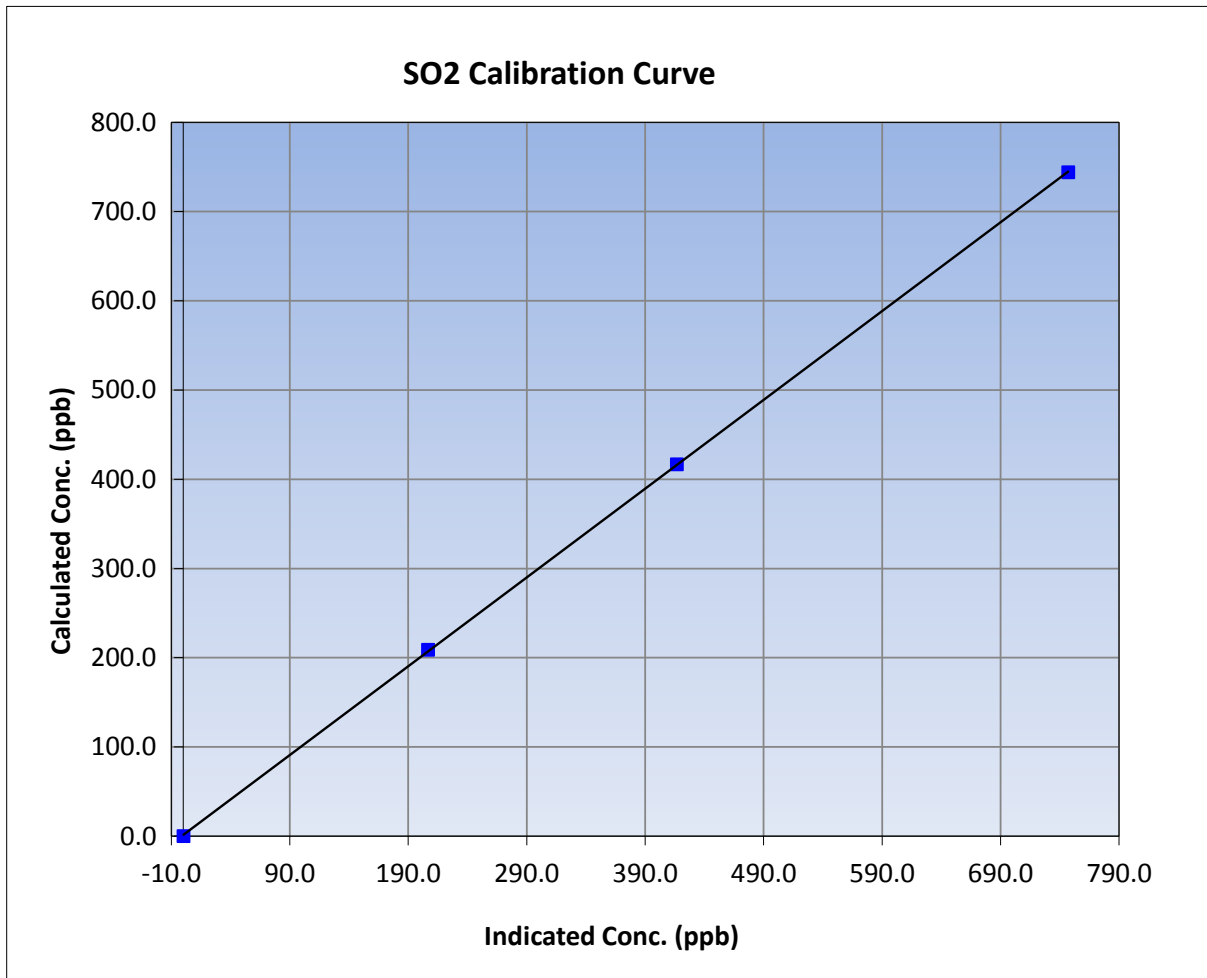
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 19, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	14:00
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

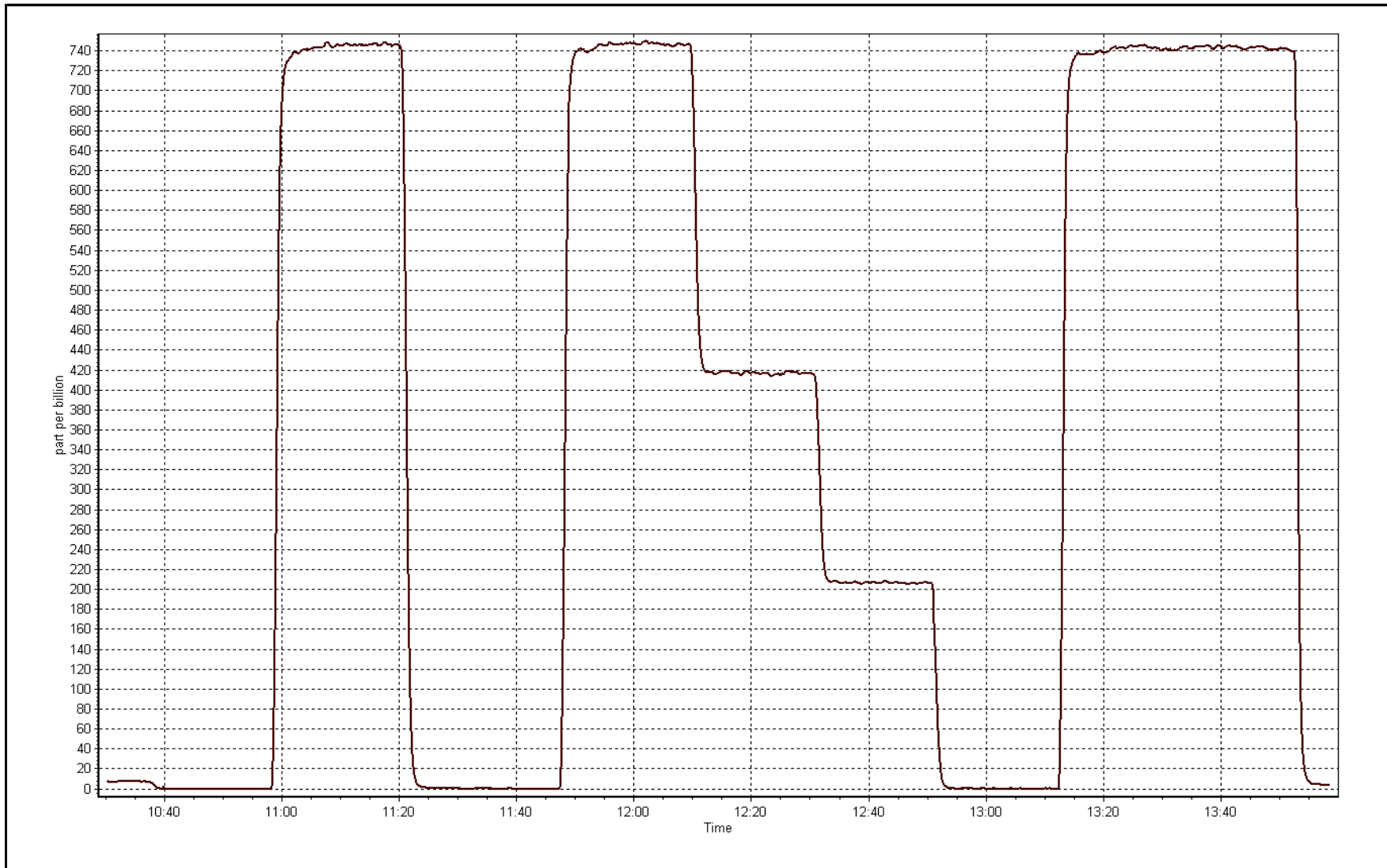
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999976
744.0	747.1	0.9958		
416.8	416.8	1.0000	Slope	0.995165
208.9	206.6	1.0107		
			Intercept	1.362961



SO2 Calibration Plot

Date: February 14, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 21, 2017	Last Calibration	January 16, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:47	End Time (MST)	14:20
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	-860	-860
Analyzer IP address	192.168.1.44		Lamp voltage	1155	1153
Calculated slope	1.004735	0.996837	Chamber temp	45	45
Calculated intercept	-0.107919	-0.066012	Pressure	656.6	669.3
Analyzer Background	1.76	1.74	Flow	0.430	0.438
Analyzer Coefficient	0.937	0.937	Intensity	80	79
			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	75.1	0.999
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	75.4	0.995
second point	6000	48.6	40.0	40.0	1.001
third point	6000	24.3	20.0	20.2	0.989
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	91.1	75.0	75.2	0.998
Average Correction Factor					0.995

Corrected As found	75.0	Previous response	74.8	% change	-0.4%
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Notes:

Inlet filter changed after as founds. Scrubber check completed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



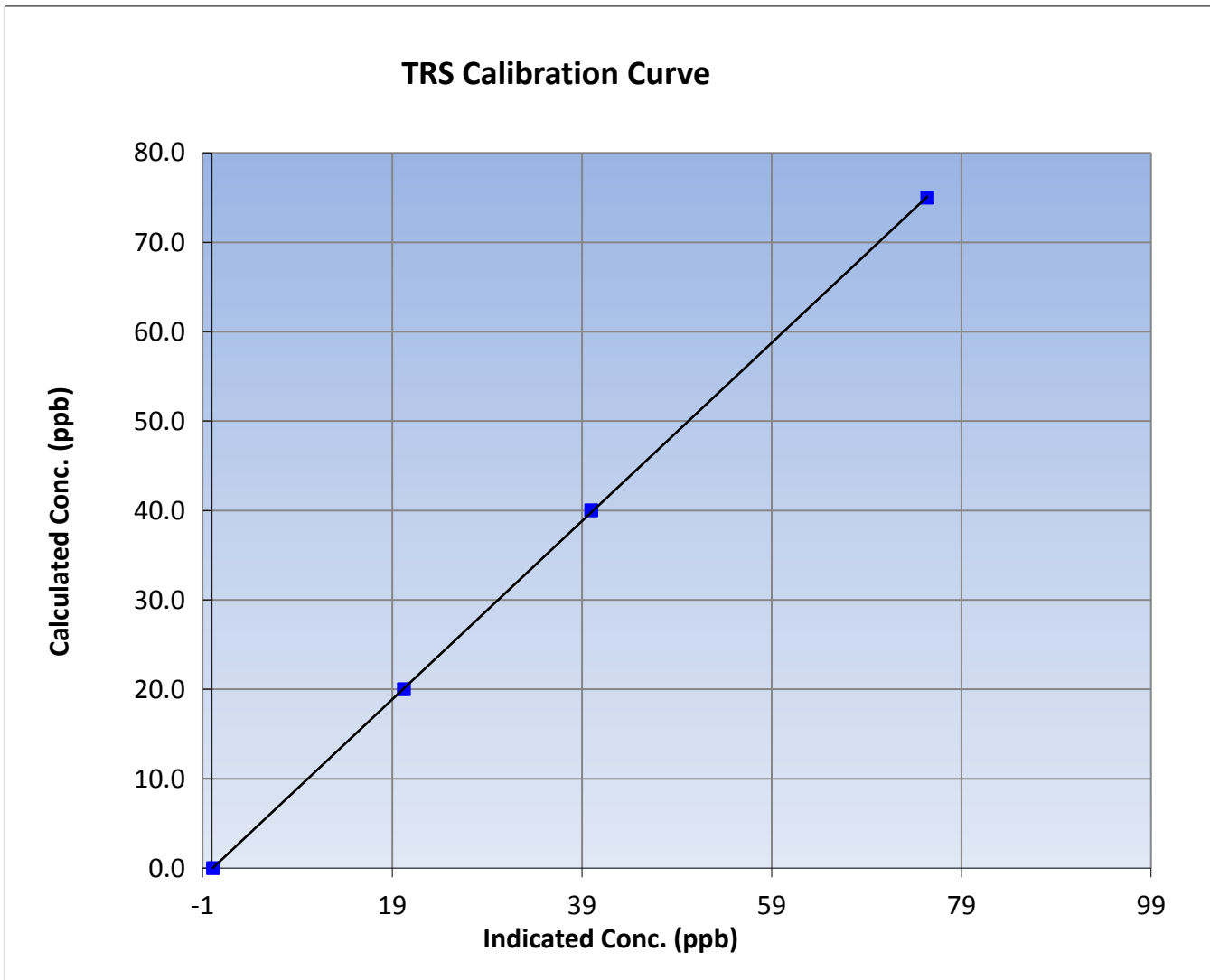
Wood Buffalo Environmental Association TRS Calibration Report

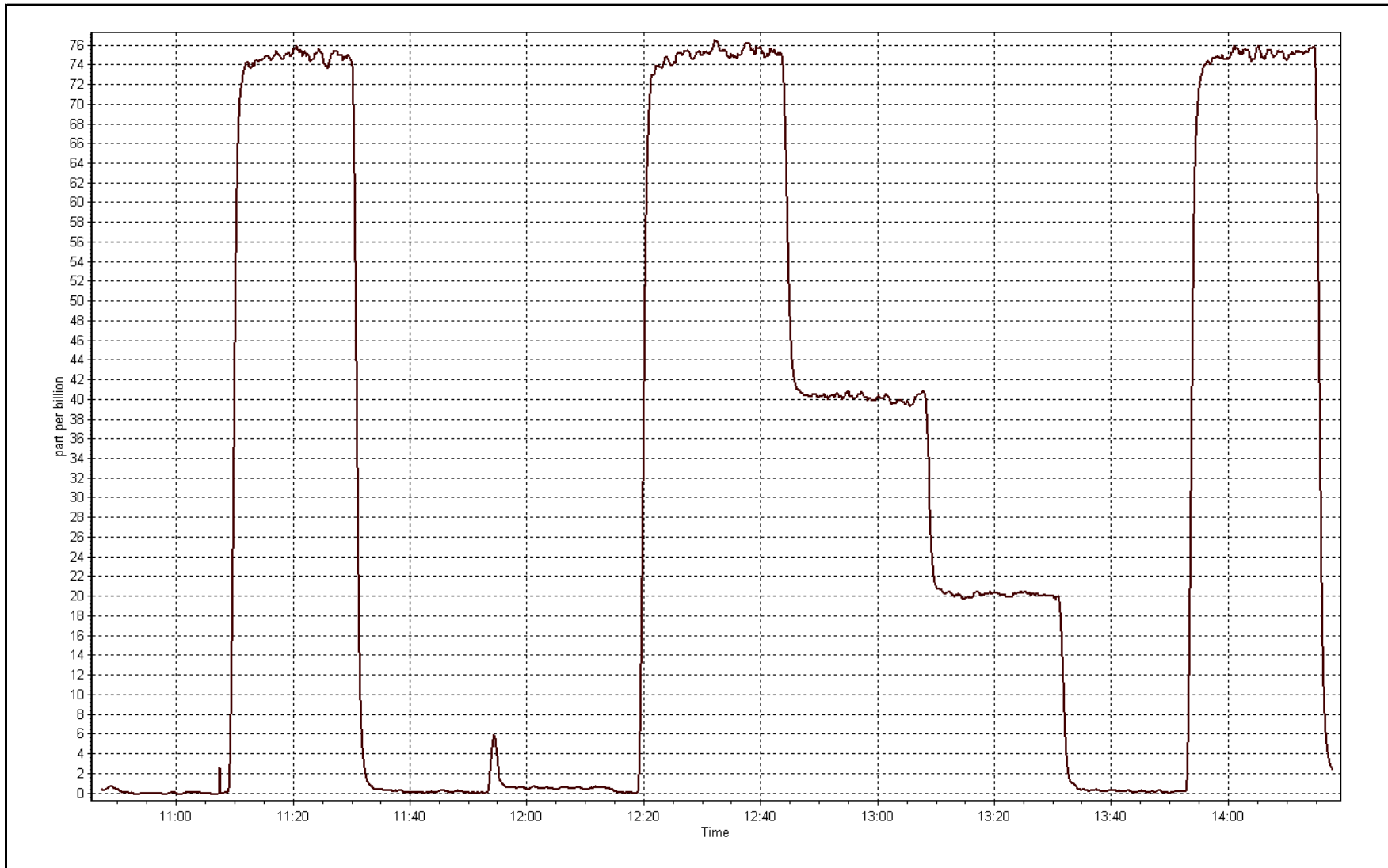
Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 16, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:47	End Time (MST)	14:20
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	0.999979
75.0	75.4	0.9948		
40.0	40.0	1.0006	Slope	0.996837
20.0	20.2	0.9890		
			Intercept	-0.066012







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 19, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:00
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	75.0	75.0
NMHC Range (ppm)	0 - 50 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.000799	0.992543	Carrier Pressure	36.7	36.7
THC Calc intercept	0.041954	0.057804	Fuel Pressure	47.7	47.7
NMHC Calc slope	1.000027	0.991864	Air Pressure	39.0	38.9
NMHC Calc intercept	0.010799	0.019420			

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	16.13	0.994
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	16.03	16.13	0.994
second point	5500	46.5	8.98	8.95	1.003
third point	5500	23.3	4.50	4.42	1.018
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	16.03	16.06	0.998
Average Correction Factor					1.005

Corrected As found 16.13 Previous response 15.98 % change -1.0%

Notes:

Inlet filter changed after as founds. No adjustments made.

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	8.33	0.991
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	8.26	8.32	0.993
second point	5500	46.5	4.63	4.63	0.999
third point	5500	23.3	2.32	2.30	1.008
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	8.26	8.25	1.001
Average Correction Factor					1.000

Corrected As found 8.33 Previous response 8.25 % change -1.0%

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	5500	0	0.00	0.00	----
as found span	5500	83	7.77	7.81	0.995
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	7.77	7.82	0.994
second point	5500	46.5	4.35	4.33	1.006
third point	5500	23.3	2.18	2.13	1.024
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	7.77	7.82	0.994
Average Correction Factor					1.008

Corrected As found 7.81 Previous response 7.73 % change -1.0%



Wood Buffalo Environmental Association

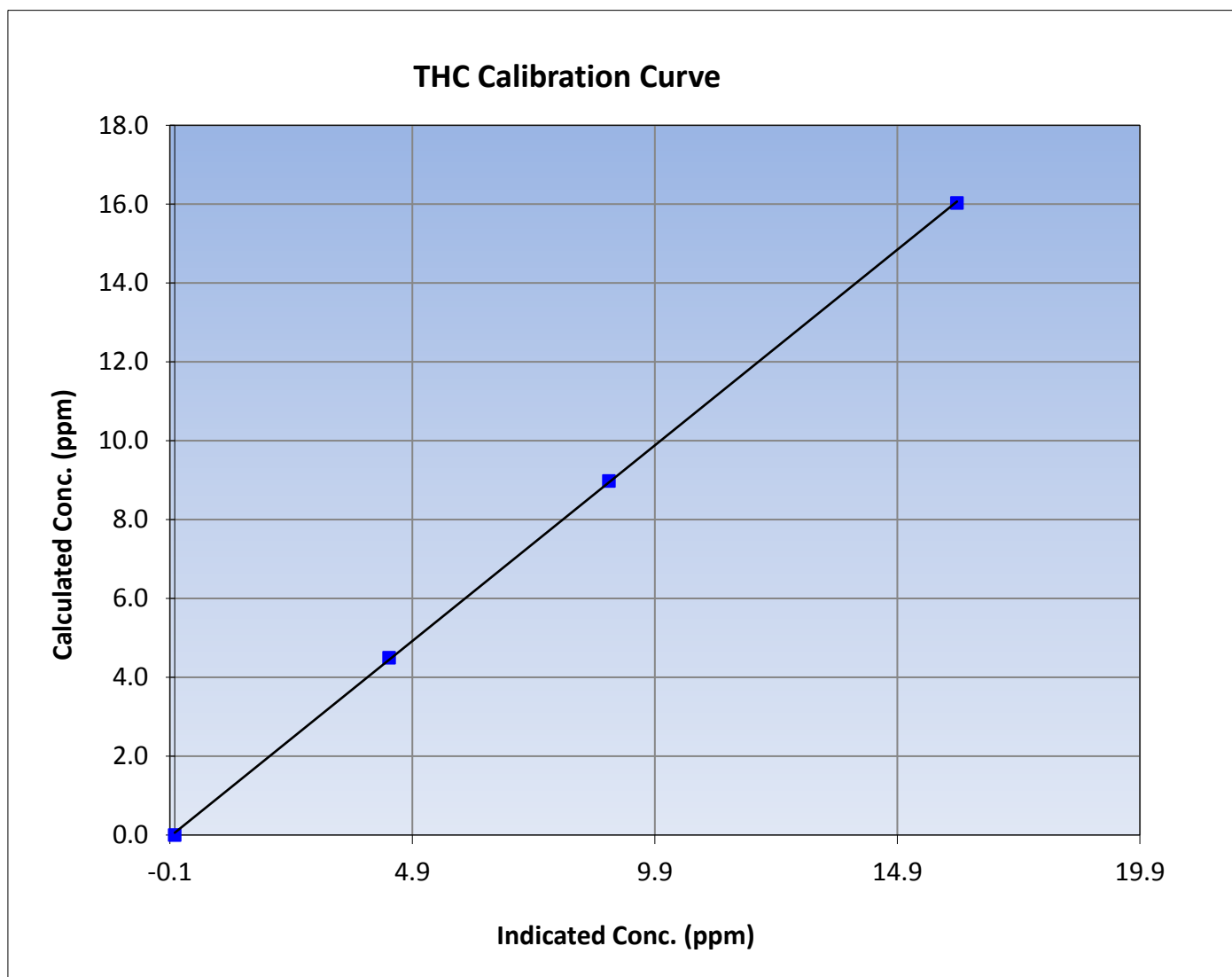
THC Calibration Summary

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 19, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	14:00
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	0.999933
16.03	16.13	0.9938		
8.98	8.95	1.0034	Slope	0.992543
4.50	4.42	1.0181		
			Intercept	0.057804





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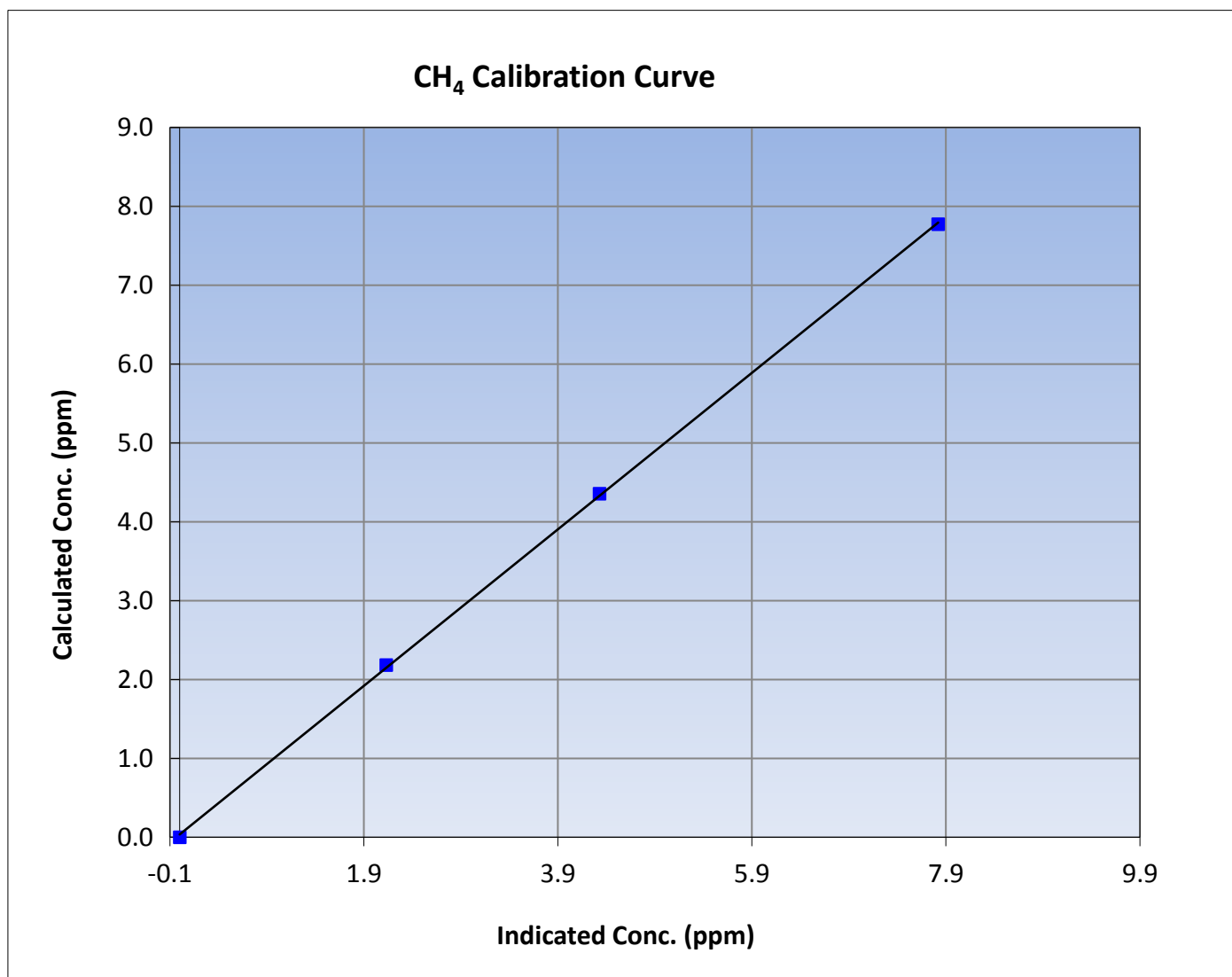
CH₄ Calibration Summary

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 19, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	14:00
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	0.999898
7.77	7.82	0.9938		
4.35	4.33	1.0056	Slope	0.992201
2.18	2.13	1.0243		
			Intercept	0.034752





Wood Buffalo Environmental Association

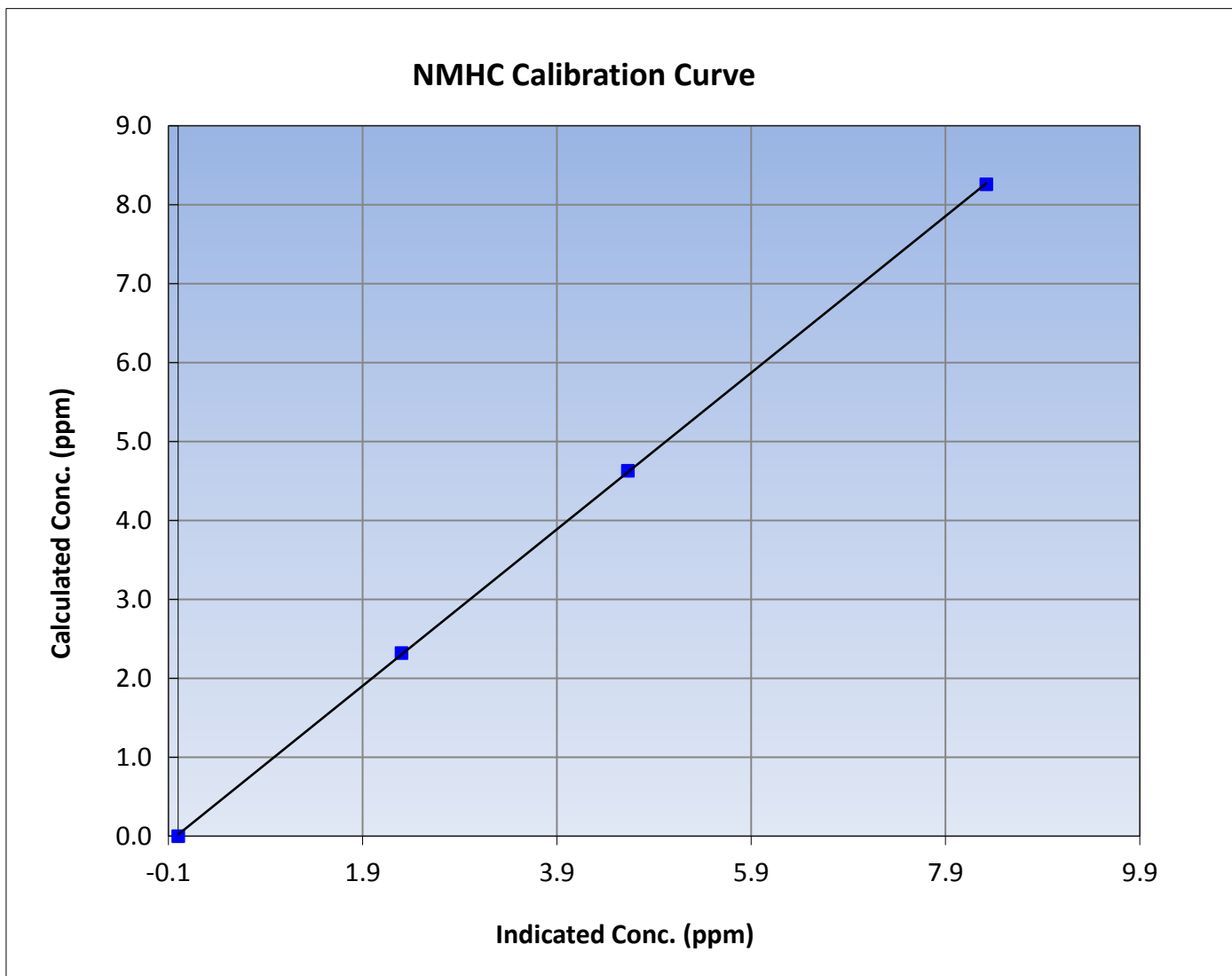
NMHC Calibration Summary

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 19, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	14:00
Analyzer make	Thermo 55i	Analyzer serial #	1152430012
	8:17		

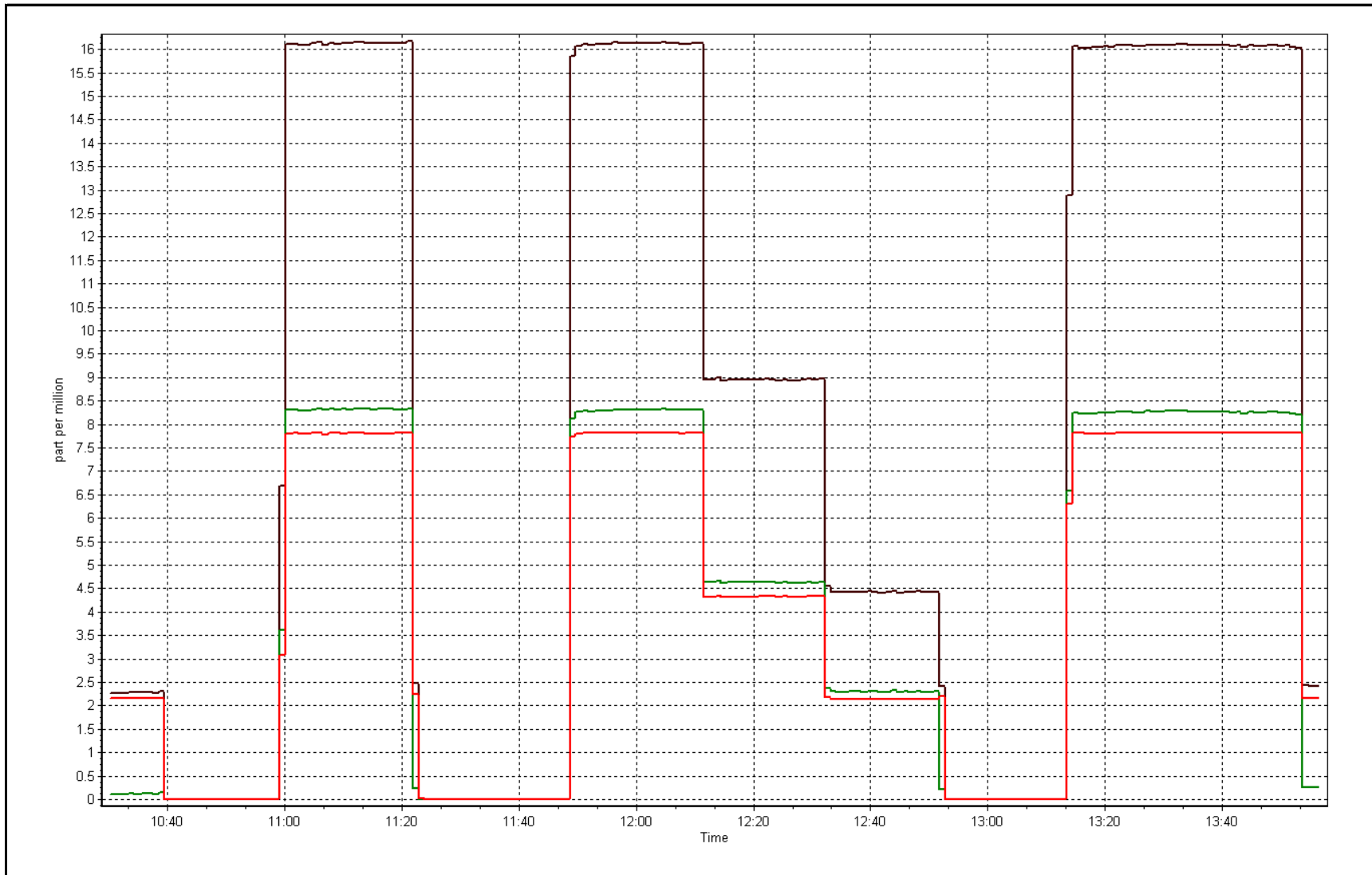
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999971
8.26	8.32	0.9926		
4.63	4.63	0.9993	Slope	0.991864
2.32	2.30	1.0080		
			Intercept	0.019420



THC Calibration Plot

Date: February 14, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 24, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	13:55
NO2 GPT Ref date	February-15-17	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.	26.7	26.6
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	0.998458	0.996734	Pressure	26.7	26.0
Calculated intercept	-0.696127	-0.567425	Flow cell A	753.000	734.0
Analyzer Background	-0.1	0.4	Flow cell B	756.000	734.0
Analyzer Coefficient	1.143	1.048	O3 Measure	4184.7	4239.6
			O3 Reference	4195.6	4256.6

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	6000	0.00		0.0	
as found span	5000	0.88	424.3	421.0	1.008
calibrator zero	6000	0.00	0.0	-0.1	----
high point	5000	0.88	424.3	425.7	0.997
second point	5000	0.56	252.4	254.4	0.992
third point	5000	0.34	129.8	131.4	0.988
As Left Zero	6000	0.00	0.0	-0.1	----
As Left Span	5000	0.88	424.3	439.8	0.965
Average Correction Factor					0.992

Corrected As found	421.0	Previous response	425.7	% change	1.1%
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Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



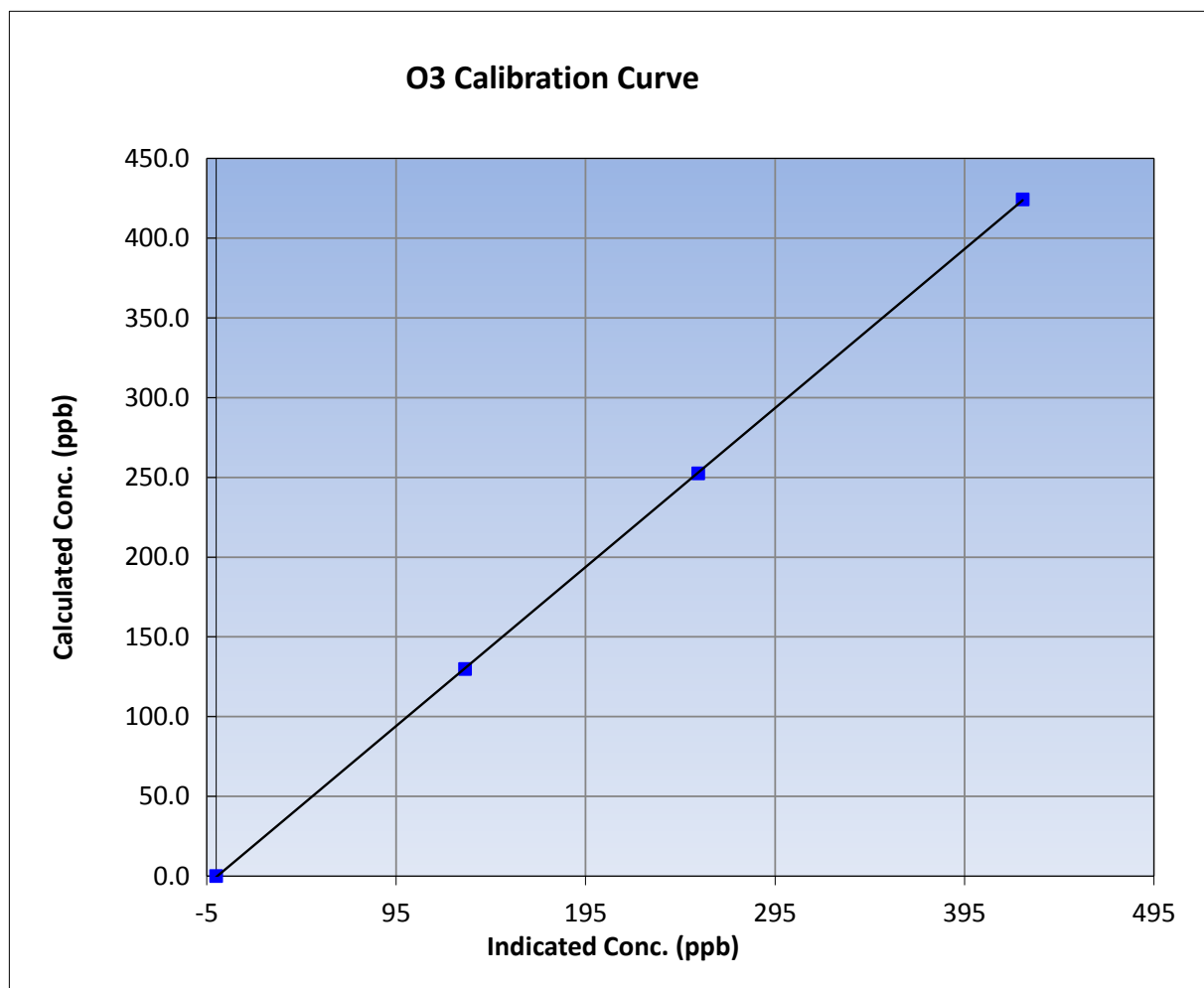
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-16-17	Previous Calibration	January-24-17
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:50	End Time (MST)	13:55
Analyzer make	API T400	Analyzer serial #	1107

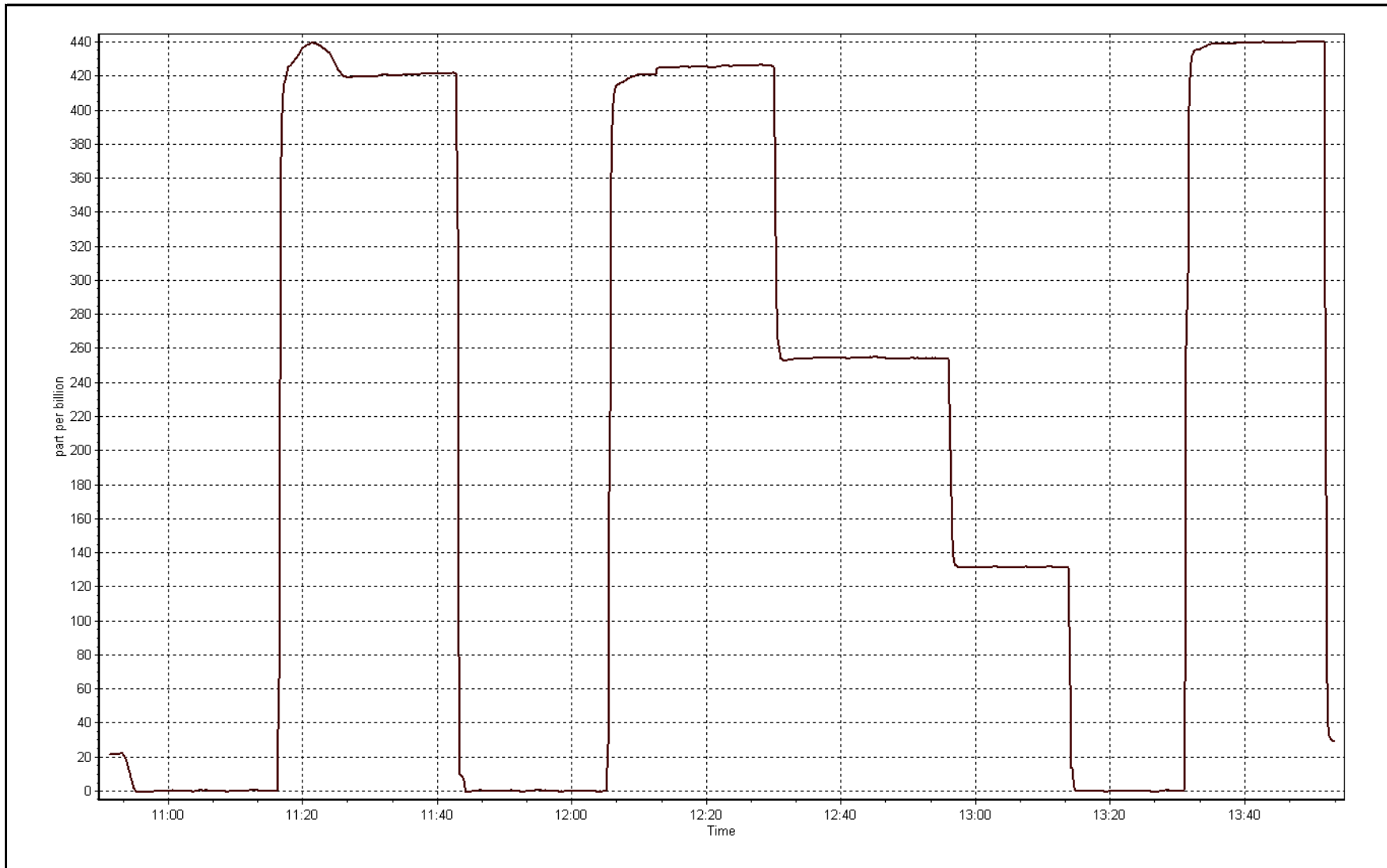
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999986
424.3	425.7	0.9966		
252.4	254.4	0.9923	Slope	0.996734
129.8	131.4	0.9878		
			Intercept	-0.567425



O3 Calibration Plot

Date: February 16, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:45
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	0.997452	0.997533	1.005521
	Data Offset	1.231387	1.512568	-0.135650
Current Calibration	Data Slope	0.998240	0.997145	1.005039
	Data Offset	1.047106	1.262192	0.413716

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	1.166		1.170	
NOX coefficient	0.999		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.9		6.0	
NOX bkgrnd	6.1		6.1	
Chamber Temp	50.4	Deg C	50.5	Deg C
Moly Temp	323.9	Deg C	325.5	Deg C
PMT voltage	-791.1	V	-791.1	V
PMT Temp	-2.9	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	170.8	mmHg	167.9	mmHg
R Cell Press Nox	170.8	mmHg	167.9	mmHg
NO sample flow	0.589	lpm	0.578	lpm
Nox sample Flow	0.589	lpm	0.578	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 15, 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	0.2	0.0	0.2	----	----
as found span	5500	83.0	750.0	750.0	0.0	750.1	748.9	1.3	0.9999	1.0016
calibrator zero	5500	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
high point	5500	83.0	750.0	750.0	0.0	750.4	751.1	-0.7	0.9995	0.9986
second point	5500	46.4	419.3	419.3	0.0	419.9	419.9	0.0	0.9986	0.9985
third point	5500	23.3	210.5	210.5	0.0	207.8	207.9	-0.1	1.0131	1.0127
as left zero	5500	0.0	0.0	0.0	0.0	0.2	-0.1	0.2	----	----
as left span	5500	83.0	750.0	326.4	423.6	747.9	312.8	435.1	1.0028	1.0436
Average Correction Factor									1.0038	1.0033

Corrected As found

NO_x= 749.9

NO= 748.9

Percent Change

NO_x= 0.1%

NO= 0.2%

Previous Response

NO_x= 750.7

NO= 750.4

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	749.7	750.8	0.2	1.0004	0.9990	----	----
1st NO2 (300)	326.4	424.3	748.8	326.4	422.3	1.0017	----	1.0048	99.5%
2nd NO2 (200)	498.4	252.4	748.5	498.4	250.2	1.0020	----	1.0091	99.1%
3rd NO2 (100)	621.0	129.8	749.2	621.0	128.2	1.0011	----	1.0121	98.8%
2nd NO ref point	----	0.0	748.8	749.5	-0.7	1.0016	1.0007	----	----
Average Correction Factor						1.0016		1.0087	99.1%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

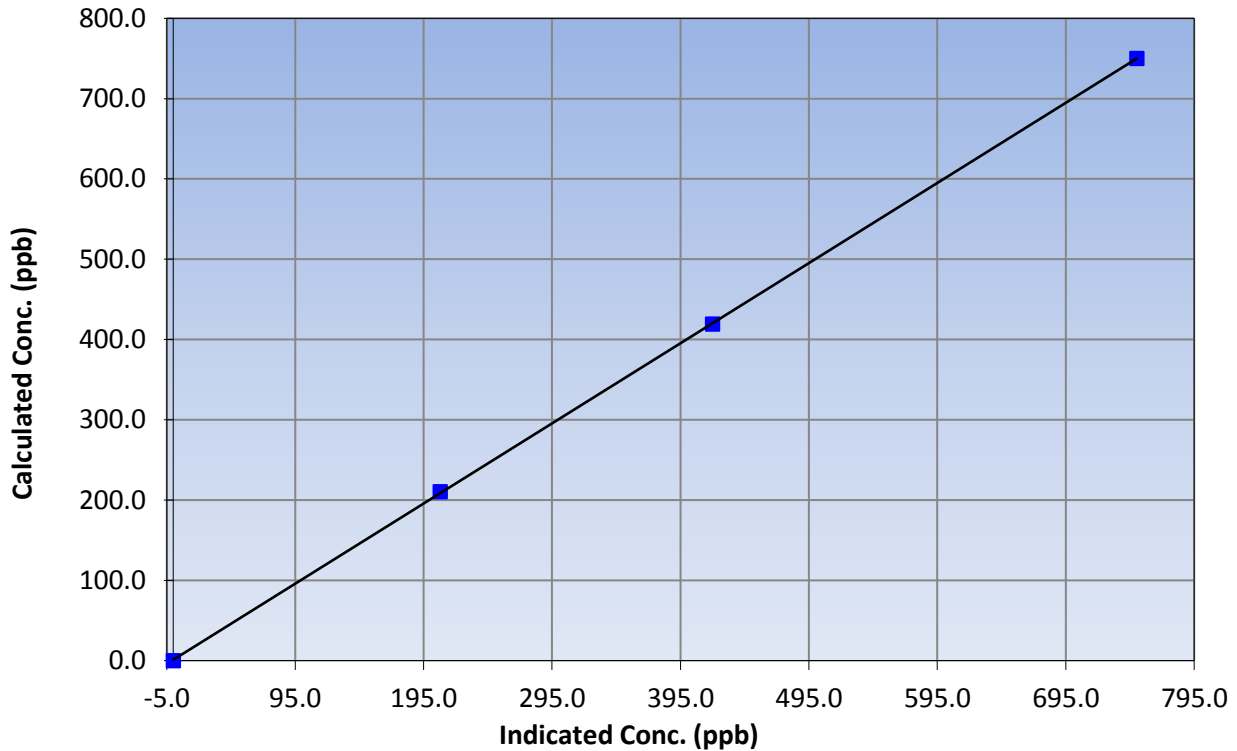
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999980
750.0	750.4	0.9995		
419.3	419.9	0.9986	Slope	0.998240
210.5	207.8	1.0131		
			Intercept	1.047106

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

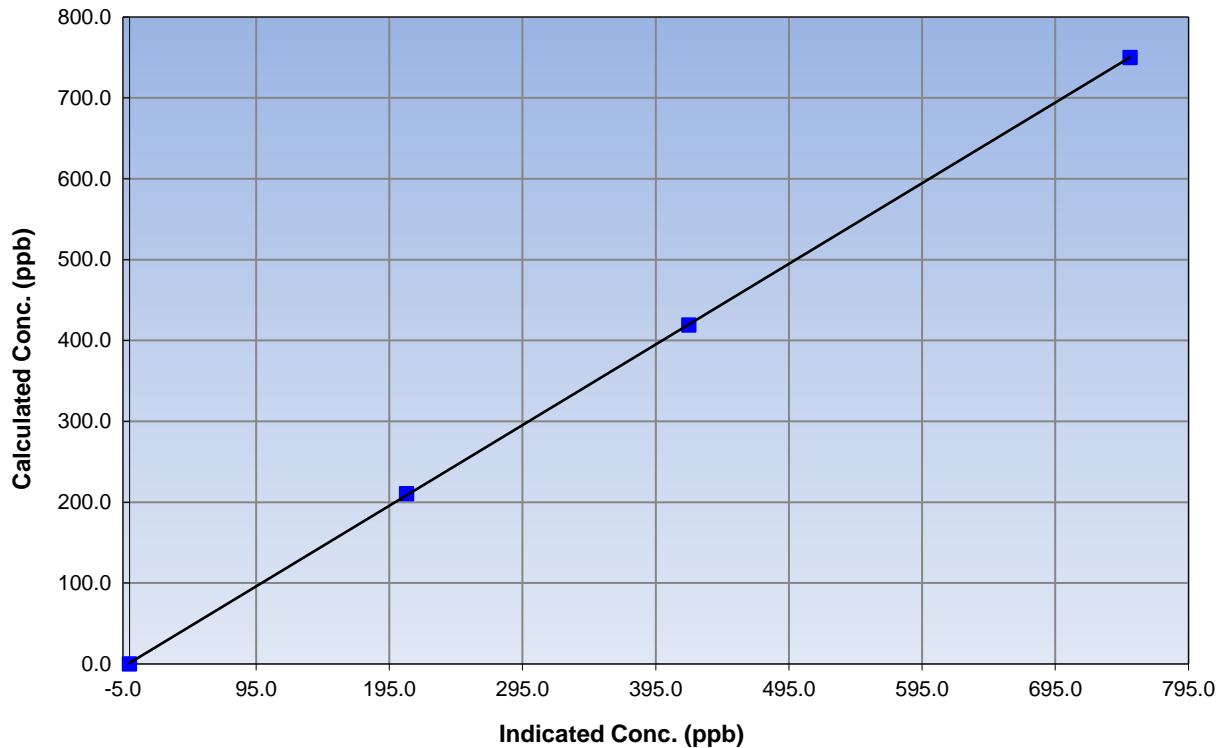
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
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	0.999981
750.0	751.1	0.9986		
419.3	419.9	0.9985	Slope	0.997145
210.5	207.9	1.0127		
			Intercept	1.262192

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

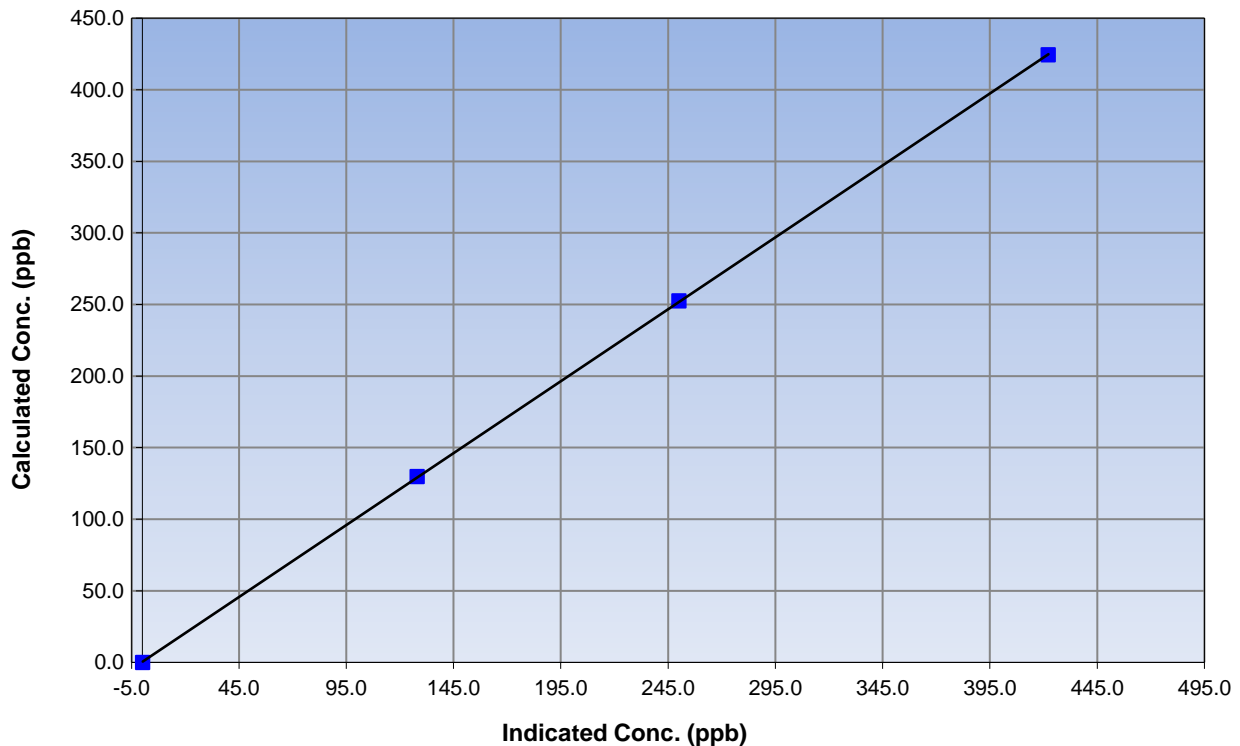
Station Information

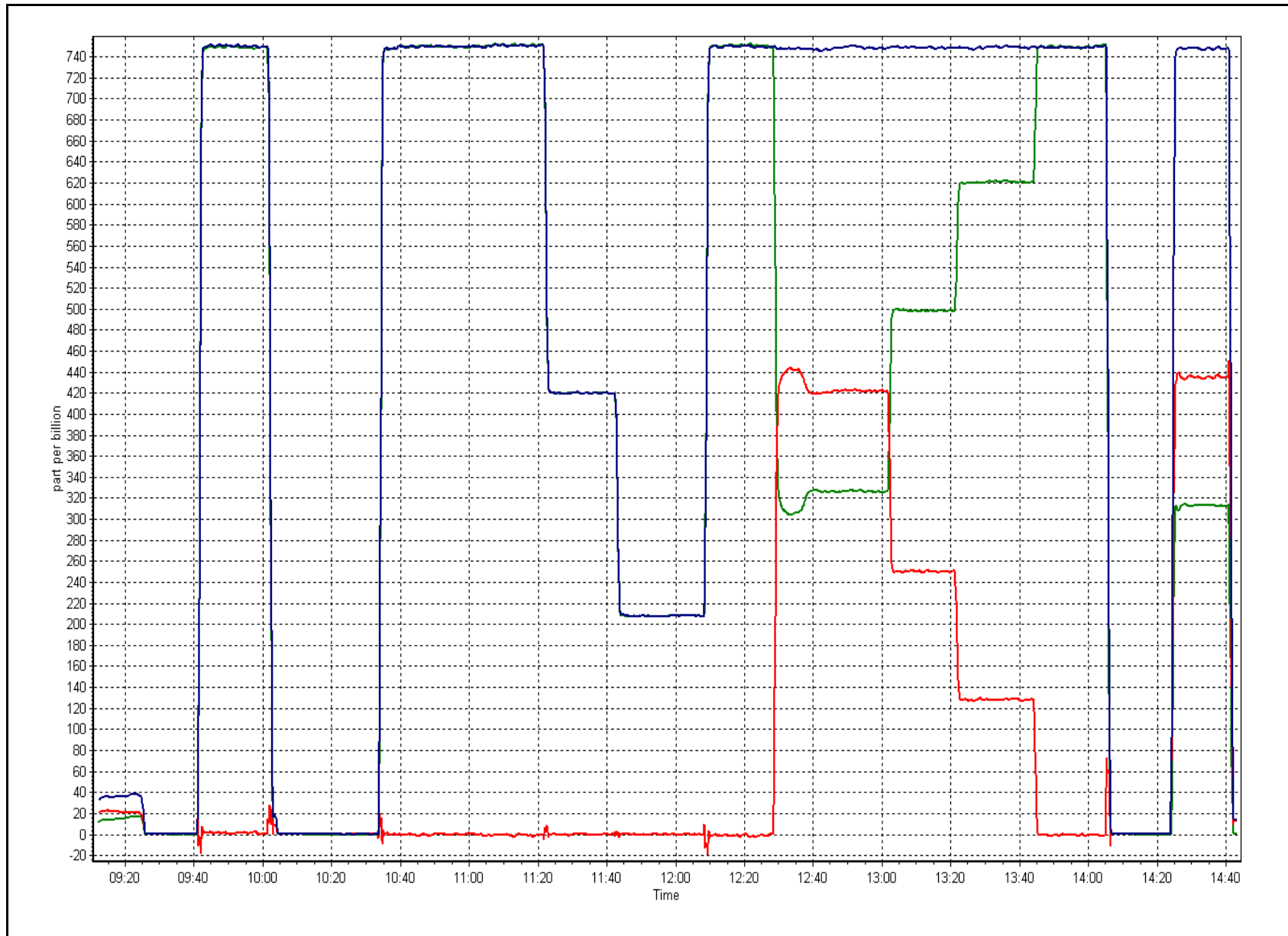
Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999988
424.3	422.3	1.0048		
252.4	250.2	1.0091	Slope	1.005039
129.8	128.2	1.0121		
			Intercept	0.413716

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	February 15, 2017	NOX Previous Cal Date	January 11, 2017
NH3 Calibration Date	February 17, 2017	NH3 Previous Cal Date	January 13, 2017
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	14:45
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	0.998045	0.986249	0.997516	0.998053	1.004704
	Data Offset	-5.929731	-6.5814999	-0.025151	1.505763	-1.620263
Cal Stats After	Data Slope	1.000252	0.982427	0.999905	1.000094	1.005674
	Data Offset	-1.87	-3.89	-1.656392	-0.851974	-0.394332
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		0.9	
NOx BKG	0.0		-0.8	
Nt BKG	0.0		-0.6	
NO coefficient	1.104		1.134	
NO2 coefficient	1.000		1.000	
NOx coefficient	1.254		1.278	
NH3 coefficient	0.871		0.865	
Nt coefficient	1.251		1.281	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.9	Deg C	314.9	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	84.0	ccm	84.0	ccm
R Cell Press	6.2	mmHg	6.0	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	548.0	ccm	541.0	ccm
Sample Flow 2 Nox	521.0	ccm	516.0	ccm
Sample Flow 3 Nt	510.0	ccm	508.0	ccm

Notes:

Inlet filter changed after as founds. NO/Nox Zero and Span adjusted. NH3 span adjusted.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

February 17, 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	5.7	5.3	0.4	----	----
as found NO	5500	83.0	750.0	750.0	----	747.4	746.1	1.2	1.004	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.4	0.5	-0.1	----	----
high NO point	5500	83.0	750.0	750.0	----	750.1	750.6	-0.5	1.000	----
NO/O ₃ point	5500	83.0	750.0	750.0	----	752.3	751.3	1.0	0.997	----
as found NH ₃	5000	41.9	800.3	NA	800.3	803.3	15.2	788.1	0.996	1.015
first NH ₃	5000	41.9	800.3	NA	800.3	815.7	15.6	800.0	0.981	1.000
second NH ₃	5000	20.9	399.2	NA	399.2	415.2	10.6	404.7	0.961	0.986
third NH ₃	5000	10.5	200.6	NA	200.6	209.6	7.2	202.5	0.957	0.990
Average Correction Factor									0.9984	0.9923

Nt Corrected As Found Nt = 741.7 ppb
 NOx Corrected As Found NOx = 740.8 ppb
 NH₃ Previous Converter Efficiency = 87.1 %

Previous Response Nt = 767.1 ppb
 Previous Response NOx = 751.9 ppb
 NH₃ Current Converter Efficiency = 86.5 %

Nt percent change 3.4%
 NOx percent change 1.5%
 NH₃ percent change -0.6%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: February 15, 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	-4.3	-4.5	-4.8	----	----
as found span	5500	83.0	750.0	750.0	750.0	726.7	719.8	726.0	1.0321	1.0421
calibrator zero	5500	0.0	0.0	0.0	0.0	0.5	0.7	0.4	----	----
high point	5500	83.0	750.0	750.0	750.0	750.6	750.8	750.1	0.9992	0.9990
second point	5500	46.4	419.3	419.3	419.3	422.8	420.0	422.4	0.9918	0.9983
third point	5500	23.3	210.5	210.5	210.5	212.7	211.6	211.6	0.9898	0.9949
Average Correction Factor									0.9936	0.9974

	<u>Nt</u>	<u>NO_x</u>	<u>NO</u>	<u>NO₂</u>
Corrected As found	730.8	731.0	724.3	----
Previous Response	767.1	751.9	750.0	----
Percent Change	5.0%	2.9%	3.6%	-0.7%

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

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	751.3	749.2	2.1	0.9983	1.0010	----	----
1st NO ₂ (300)	327.6	421.7	746.9	327.6	419.3	1.0042	----	1.0055	99.4%
2nd NO ₂ (200)	494.9	254.4	748.4	494.9	253.5	1.0022	----	1.0035	99.7%
3rd NO ₂ (100)	620.9	128.4	749.7	620.9	128.8	1.0004	----	0.9965	100.4%
2nd NO ref point	----	0.0	748.4	747.1	1.2	1.0022	1.0039	----	----
Average Correction Factor						1.0023	1.0025	1.0019	99.8%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

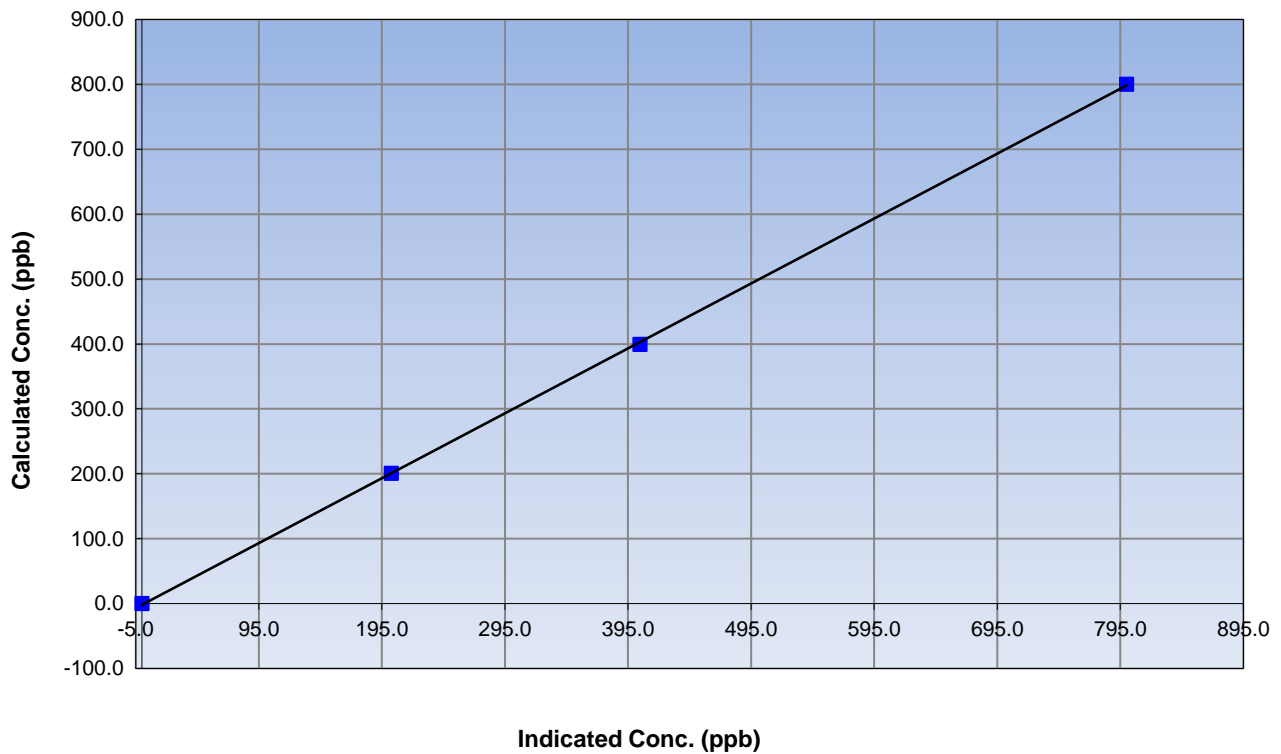
Station Information

Calibration Date	February 17, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999939
800.3	800.0	1.0003		
399.2	404.7	0.9865	Slope	1.000252
200.6	202.5	0.9903		
			Intercept	-1.868671

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

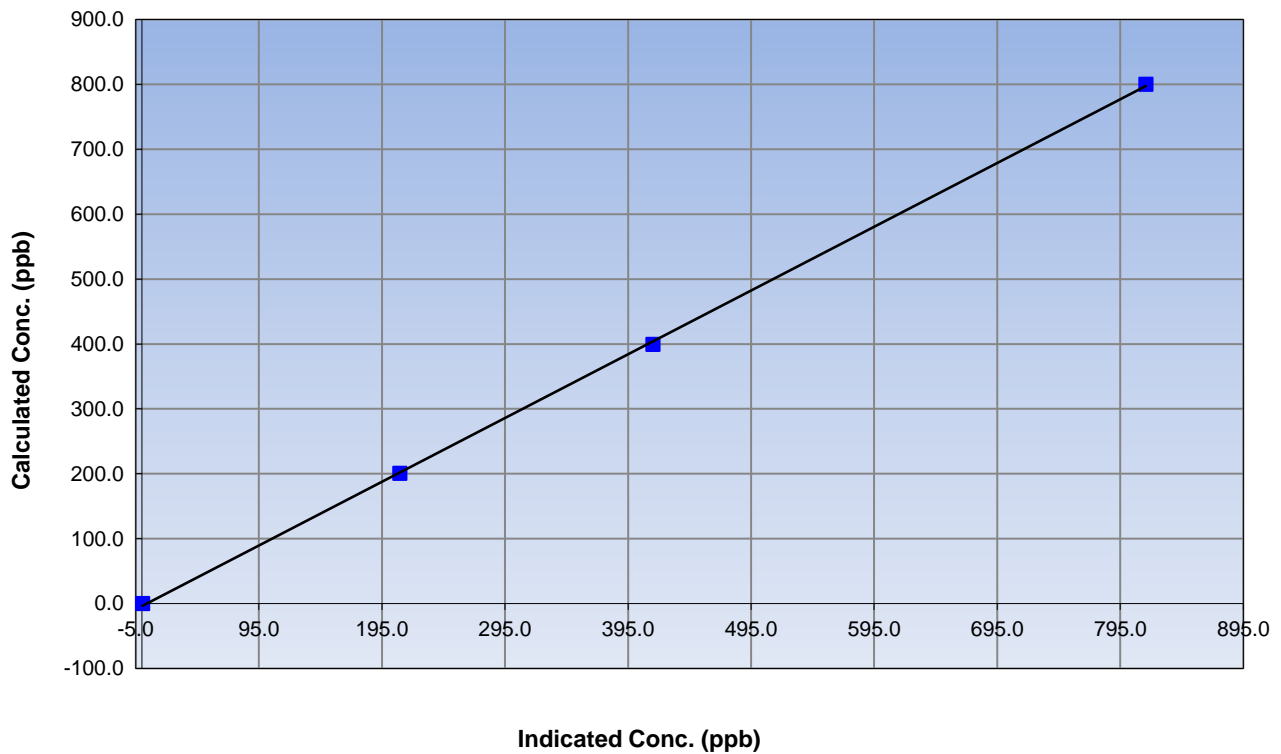
Station Information

Calibration Date	February 17, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
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	0.4	----	Correlation Coefficient	0.999870
800.3	815.7	0.9811		
399.2	415.2	0.9614	Slope	0.982427
200.6	209.6	0.9569		
			Intercept	-3.892011

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

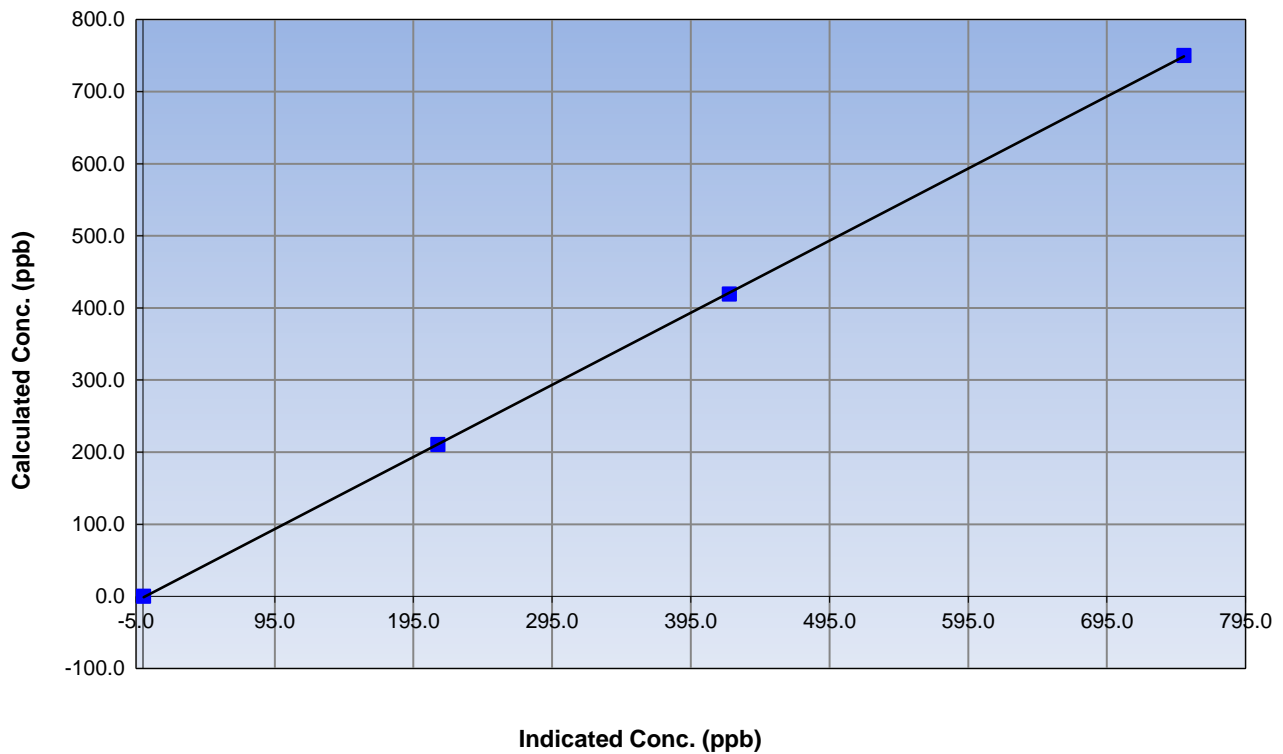
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
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	0.5	----	Correlation Coefficient	0.999980
750.0	750.6	0.9992		
419.3	422.8	0.9918	Slope	0.999905
210.5	212.7	0.9898		
			Intercept	-1.656392

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

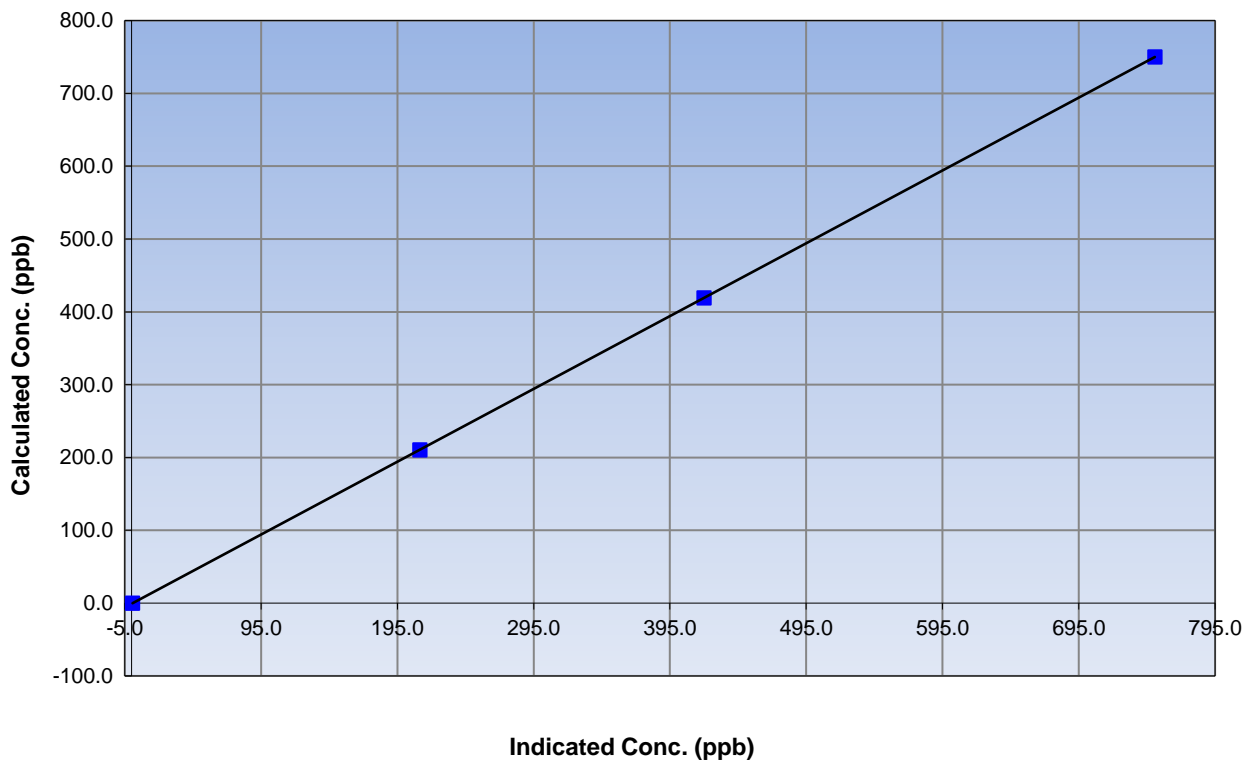
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	1.000000
750.0	750.8	0.9990		
419.3	420.0	0.9983	Slope	1.000094
210.5	211.6	0.9949		
			Intercept	-0.851974

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

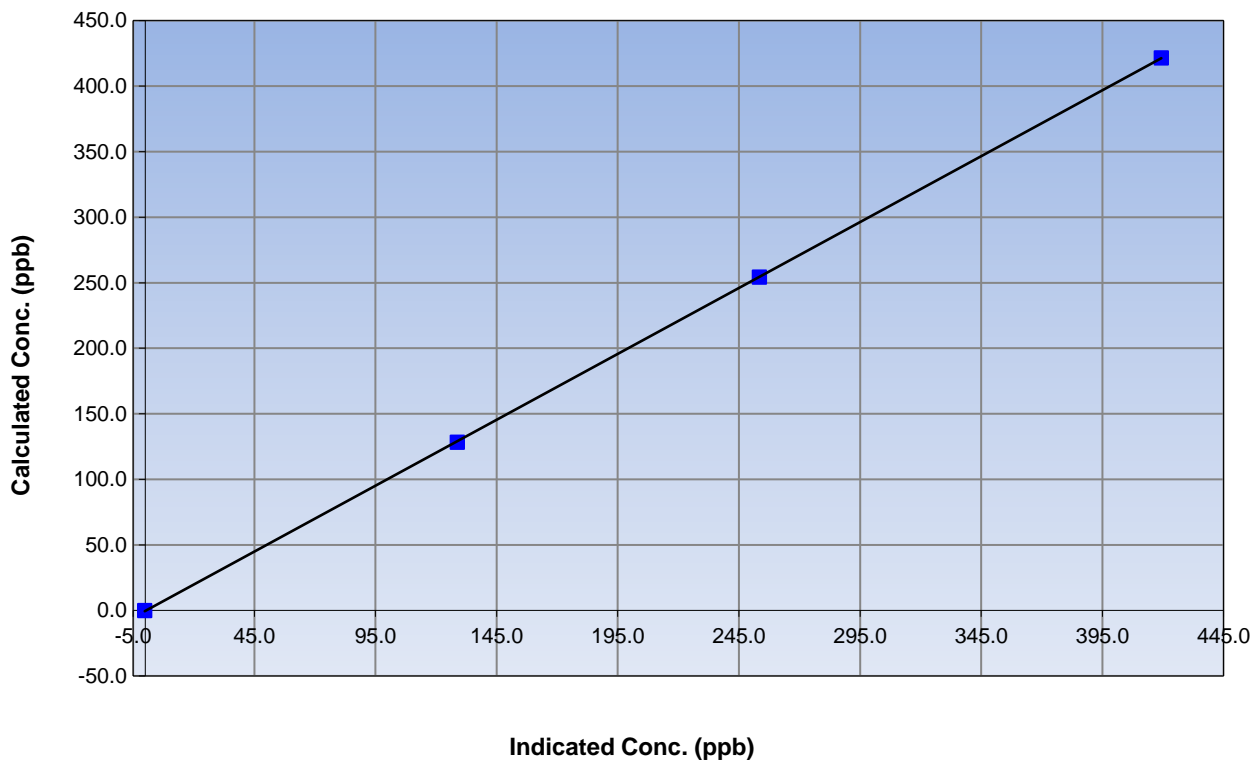
Station Information

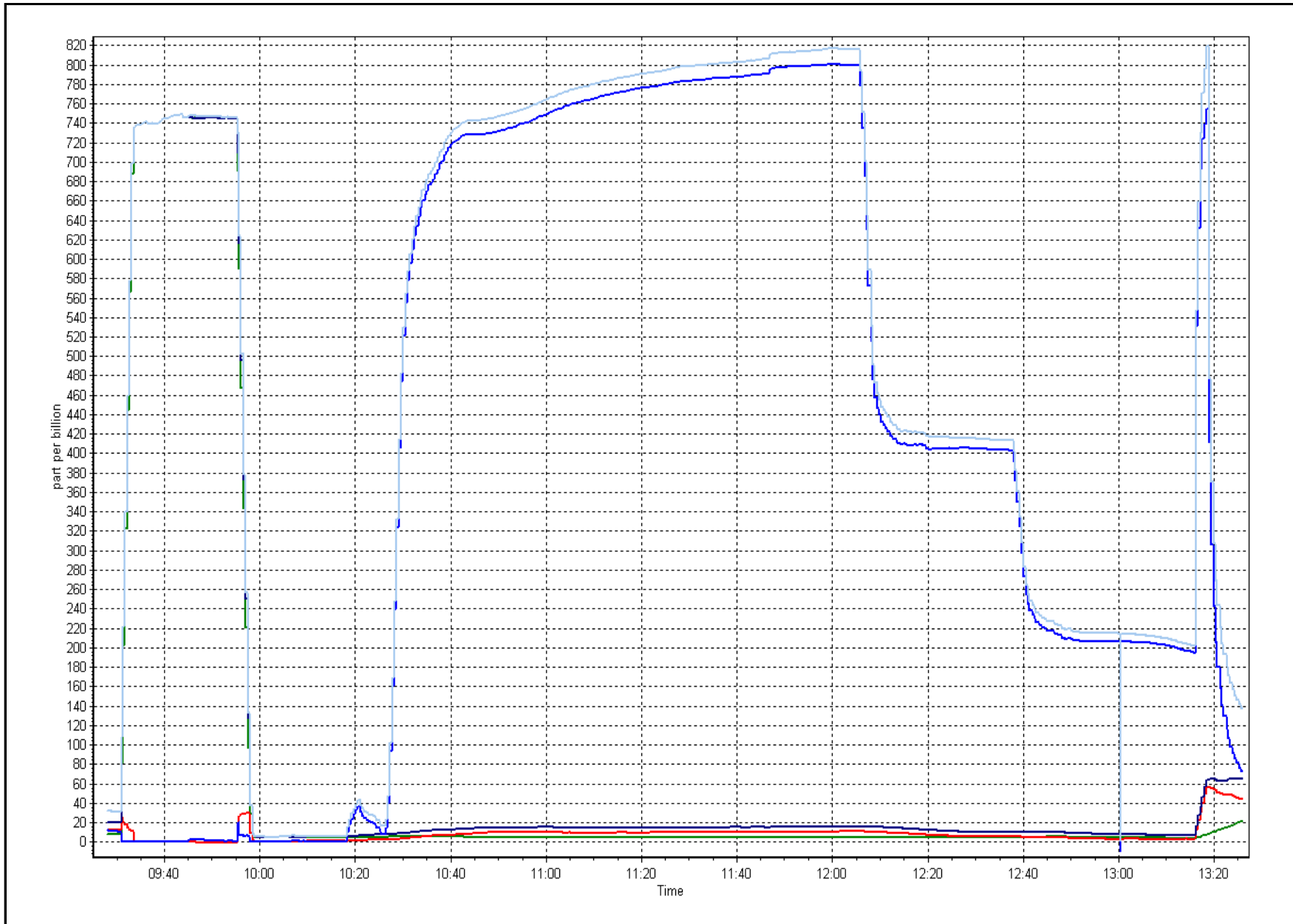
Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999988
421.7	419.3	1.0055		
254.4	253.5	1.0035	Slope	1.005674
128.4	128.8	0.9965		
			Intercept	-0.394332

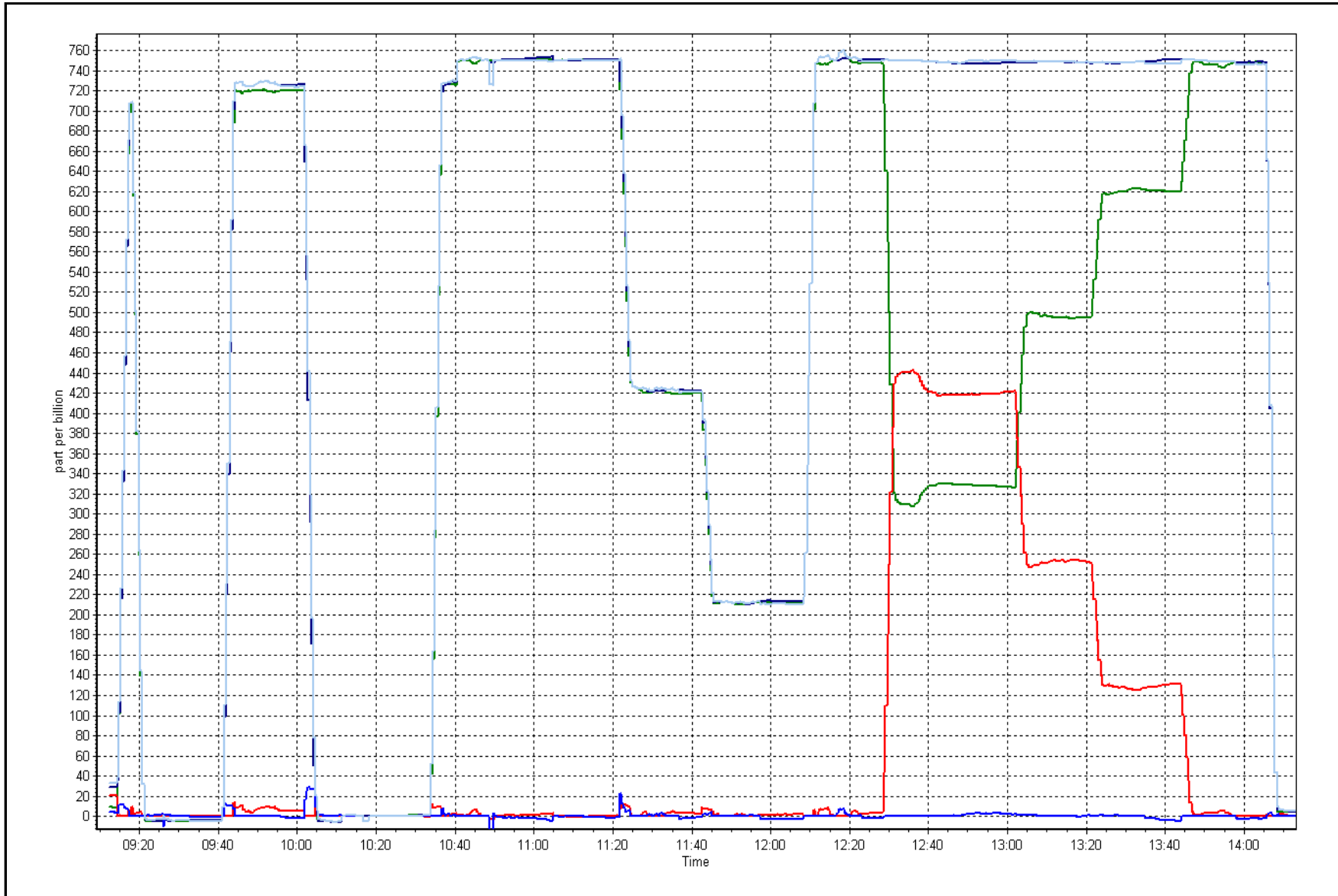
NO₂ Calibration Curve





NOx Calibration Plot

Date: 15-Feb-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:	February 17, 2017	Last Cal Date:	January 13, 2017
Start time (MST):	9:39	End time (MST):	11:07
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)	2	1.9	2	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	960	958.59	960	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	996	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-1.1	-----	0	<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. Nephelometer adjusted.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 2
MILDRED LAKE
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
 FEBRUARY 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	637	35	35	100	49	0	10	0
H2S (ppb) Average	640	32	32	100	5	0	2	0
THC (ppm) Average	639	32	33	99.85	5.5	-	3.2	-
Temperature (C) Average	672	0	0	100	10.6	-	5.8	-
Relative Humidity (%) Average	672	0	0	100	98	-	90	-
Wind Speed 10 m (km/h) Average	670	0	2	99.7	23	-	15	-
Wind Direction 10 m (deg) Average	670	0	2	99.7	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
 FEBRUARY 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	637	2.8	6	-	0	0	0	1	3	8	49
H2S (ppb) Average	640	0.7	1	-	0	0	0	0	1	2	5
THC (ppm) Average	639	2.49	0.5	-	2	2.1	2.2	2.3	2.6	3	5.5
Temperature 2 m (C) Average	672	-10.83	9.8	-	-30.8	-22.9	-18.2	-12.7	-2.6	3.7	10.6
Relative Humidity (%) Average	672	72.7	12	-	43	54	63	75	82	86	98
Wind Speed 10 m (km/h) Average	670	7.5	4	-	0	3	5	7	10	13	23
Wind Direction 10 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	28 Feb 2017 13:00	28 Feb 2017 13:00	1	Unstable Operation - shelter temp fluctuation
Wind Speed, Wind Direction	06 Feb 2017 23:00	06 Feb 2017 23:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	10 Feb 2017 10:00	10 Feb 2017 10:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mildred Lake - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 49 ppb on Feb 13 01:00	Maximum Daily Average: 10.5 ppb on Feb 14
Minimum Value: 0 ppb on Feb 16 02:00	Hours of Data: 637
Maximum Diurnal Average: 4.9 ppb at hour 15	Hours of Missing Data: 35
Monthly Average: 2.8 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.1 ppb on Feb 28	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.9 ppb at hour 4	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 8 P ₉₉ = 27	

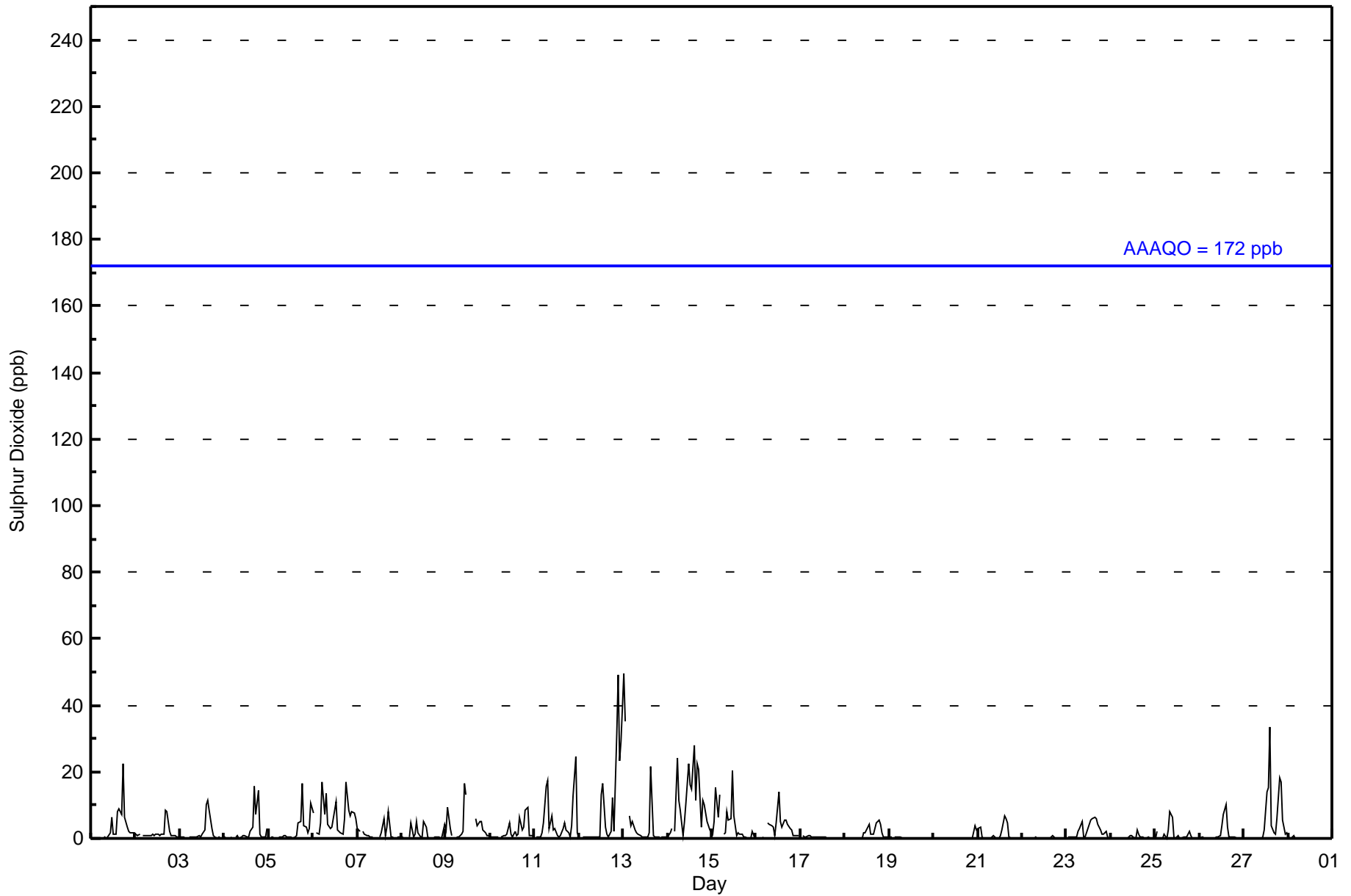
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	2	7	1	1	8	9	7	22	6	3	2	2	2	2	3.3	22
2-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	8	8	2	1	1	1	1	1	1.6	8
3-Feb	1	0	0	0	Z	0	0	0	0	0	1	0	1	3	10	12	8	3	1	0	0	0	0	0	1.9	12
4-Feb	0	0	0	0	0	Z	0	1	0	0	1	1	0	0	2	3	16	7	14	1	0	0	0	3	2.3	16
5-Feb	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	5	5	17	4	3	2	3	10	2.4	17
6-Feb	8	Z	2	1	4	17	7	14	4	3	4	6	11	3	2	2	1	6	17	8	7	8	8	6	6.4	17
7-Feb	3	2	Z	2	1	1	1	1	1	C	C	C	0	2	6	1	3	8	0	0	0	0	0	0	1.6	8
8-Feb	0	0	0	Z	0	4	0	1	5	2	0	0	5	3	0	0	0	0	0	0	0	0	1	4	1.3	5
9-Feb	3	9	3	1	Z	0	0	0	1	2	17	13	C	C	C	C	6	4	5	5	3	2	1	1	4.0	17
10-Feb	0	0	0	0	0	Z	0	1	1	1	5	1	0	2	1	1	6	3	3	9	9	1	1	1	2.1	9
11-Feb	Z	1	1	0	2	5	16	17	3	7	2	3	1	1	1	3	5	3	2	0	4	13	25	2	4.9	25
12-Feb	1	Z	1	0	0	0	1	1	0	0	0	0	13	17	4	1	0	2	12	2	31	49	24	29	8.3	49
13-Feb	49	35	Z	7	4	5	3	2	1	1	1	0	0	0	2	22	1	0	0	0	0	0	0	0	5.9	49
14-Feb	0	2	3	Z	2	24	11	9	1	5	10	22	16	15	28	12	23	21	3	12	10	5	4	3	10.5	28
15-Feb	1	5	15	6	13	Z	1	2	8	6	6	21	7	1	2	1	1	0	0	0	0	0	2	0	4.3	21
16-Feb	0	0	0	0	0	Z	5	4	4	3	1	5	14	5	3	6	5	4	3	3	1	1	1	1	3.0	14
17-Feb	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Feb	0	Z	0	0	0	0	0	0	0	0	2	2	3	4	1	1	3	5	5	4	2	0	0	0	1.4	5
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0.3	4
21-Feb	3	3	0	0	Z	0	0	0	1	1	0	0	1	3	7	6	4	0	0	0	0	0	0	0	1.3	7
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.1	1
23-Feb	Z	0	0	0	0	0	2	3	5	0	0	2	4	5	6	6	6	4	2	1	1	2	0	0	2.4	6
24-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0.4	2
25-Feb	0	2	Z	0	0	1	0	2	8	6	0	0	1	0	0	0	0	0	2	1	0	0	0	0	1.1	8
26-Feb	0	0	1	Z	0	0	0	0	0	0	1	1	4	7	10	3	0	0	0	0	0	0	0	0	1.2	10
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	3	14	15	34	4	2	1	6	18	17	5	1	2	5.3	34
28-Feb	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
	3.0	2.7	1.3	0.9	1.3	2.8	1.8	2.1	1.7	1.5	2.0	3.3	3.7	3.3	4.9	3.6	4.0	3.9	3.7	2.6	3.3	3.3	2.8	2.4	Diurnal Average	
	49	35	15	7	13	24	16	17	8	7	17	22	16	17	34	22	23	22	17	18	31	49	25	29	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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	593	93.09	93.09
11 - 20	28	4.40	97.49
21 - 60	16	2.51	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: 637

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mildred Lake - February 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	92	59	43	21	15	15	14	34	50	38	33	57	28	26	25	41	591
11 - 20	1	0	0	0	0	1	4	10	3	0	1	2	6	0	0	0	28
21 - 60	0	0	0	0	0	0	1	6	1	0	1	0	4	3	0	0	16
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	93	59	43	21	15	16	19	50	54	38	35	59	38	29	25	41	635

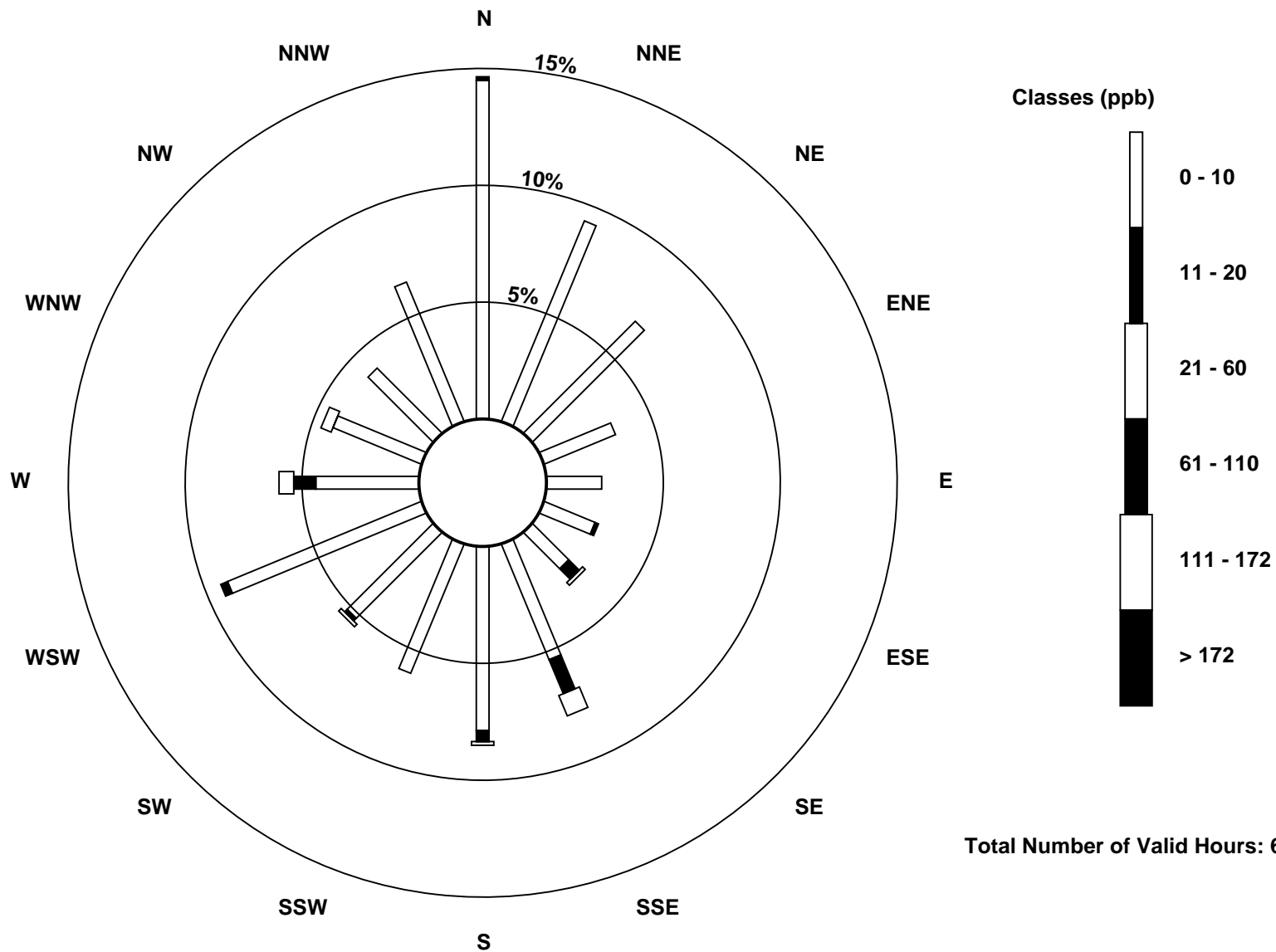
Total Number of Valid Hours: 635

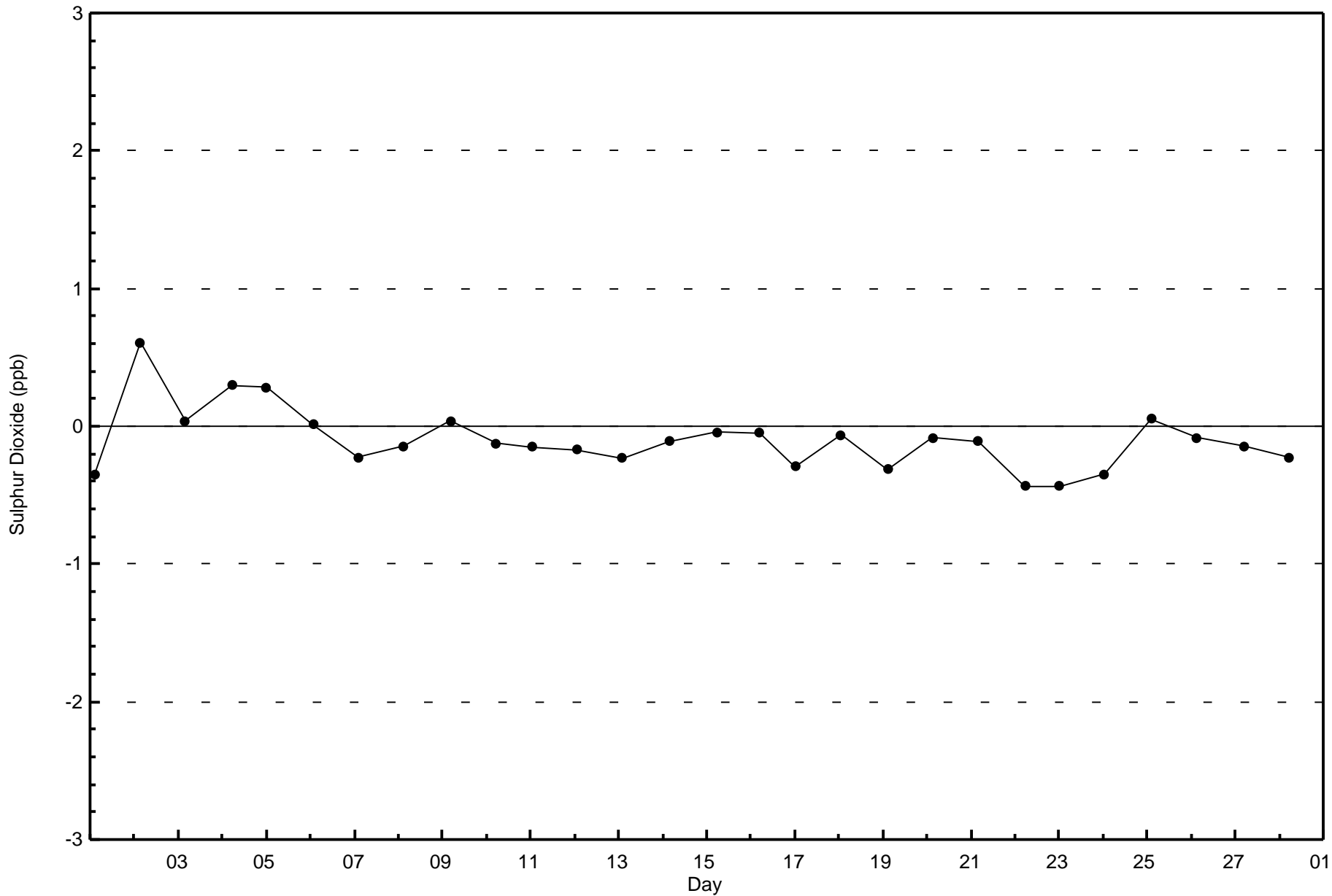
Total Number of Hours: 672

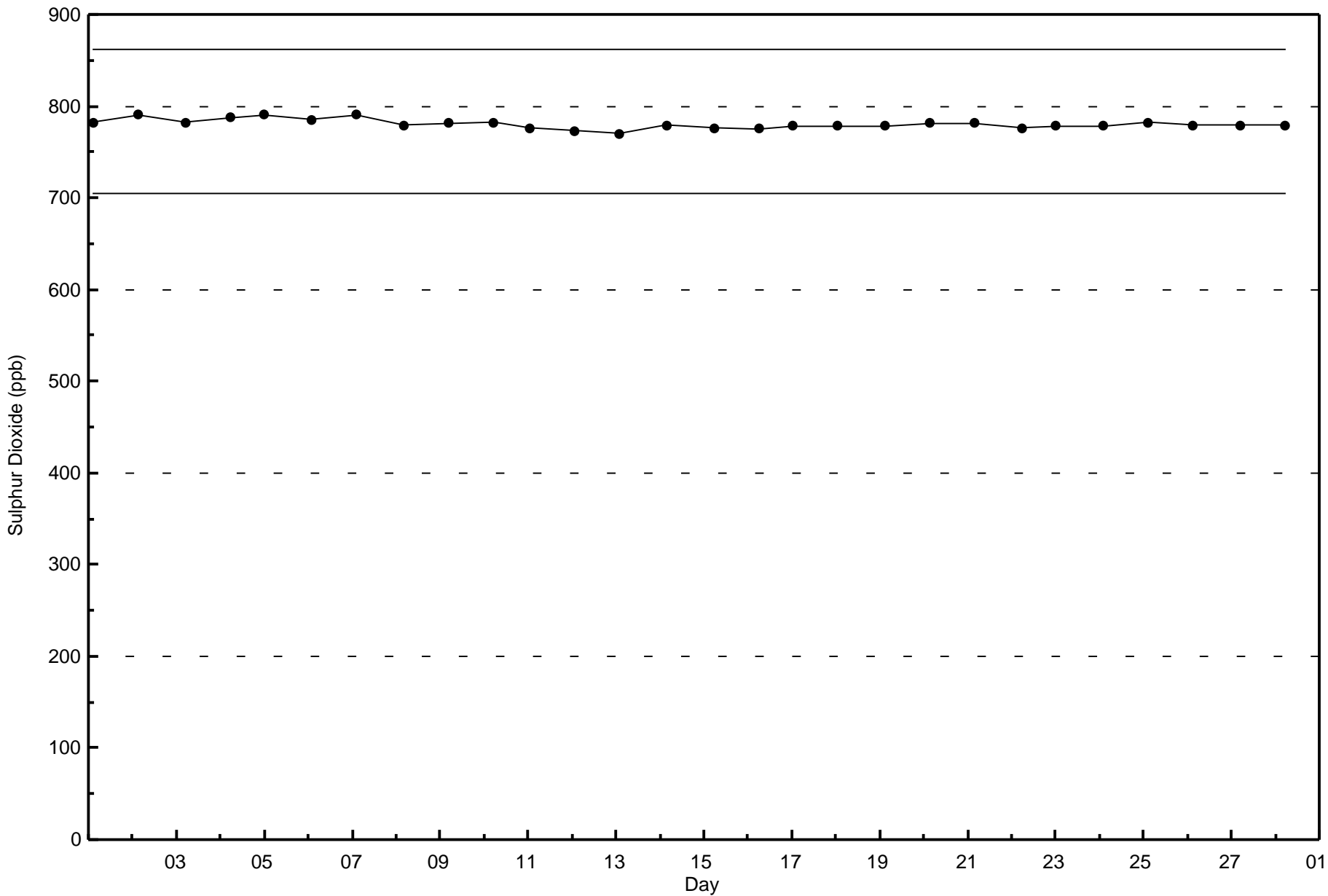


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









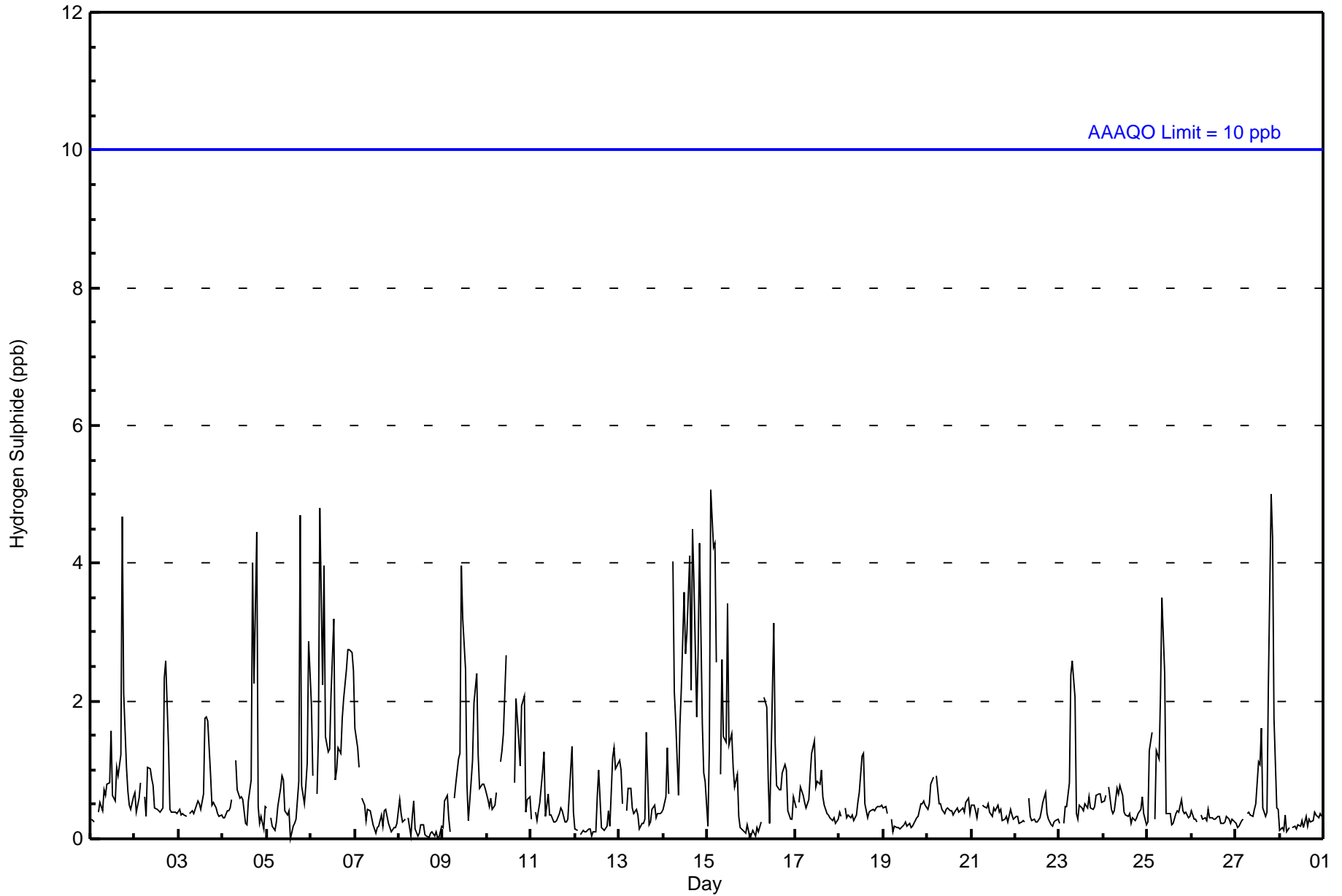
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Mildred Lake - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 ppb on Feb 15 03:00 Maximum Daily Average: 2.2 ppb on Feb 14																	Hours in Service: 672 Hours of Data: 640									
Minimum Value: 0 ppb on Feb 5 14:00 Minimum Daily Average: 0.2 ppb on Feb 8 Maximum Diurnal Average: 1.0 ppb at hour 19 Minimum Diurnal Average: 0.5 ppb at hour 1 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 = 4																	Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	0	Z	0	1	0	1	1	1	1	2	1	1	1	1	1	5	2	1	1	0	0	1	0.9	5
2-Feb	1	0	1	1	Z	1	0	1	1	1	1	0	0	0	0	0	2	3	1	0	0	0	0	0	0.8	3
3-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	0	1	2	2	2	1	0	1	0	0	0	0	0.6	2
4-Feb	0	0	0	0	0	1	Z	1	1	1	1	1	0	0	1	1	4	2	4	0	0	0	0	0	0.9	4
5-Feb	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	5	1	1	1	1	3	0.8	5
6-Feb	2	1	Z	1	1	5	2	4	1	1	1	2	3	1	1	1	1	2	2	2	3	3	3	2	2.0	5
7-Feb	2	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
8-Feb	1	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
9-Feb	0	1	1	0	0	Z	1	1	1	1	4	3	2	1	0	1	1	2	2	1	1	1	1	1	1.2	4
10-Feb	1	0	1	0	0	1	Z	1	1	2	3	C	C	C	C	1	2	1	1	2	2	0	1	1	1.1	3
11-Feb	0	Z	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.5	1
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0.4	1
13-Feb	1	1	1	Z	0	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.5	2
14-Feb	0	1	1	1	Z	4	2	2	1	2	2	4	3	3	4	2	4	4	2	3	4	2	1	1	2.2	4
15-Feb	0	1	5	4	4	3	Z	1	3	1	1	3	1	2	1	1	1	0	0	0	0	0	0	0	1.5	5
16-Feb	0	0	0	0	0	0	Z	2	2	1	0	1	3	1	1	1	1	1	1	1	0	0	0	1	0.8	3
17-Feb	0	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1
18-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
19-Feb	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
20-Feb	0	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.5	1
21-Feb	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Feb	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1
23-Feb	0	Z	0	0	0	1	2	3	2	0	0	0	0	0	1	0	1	0	0	0	1	1	1	1	0.7	3
24-Feb	1	1	Z	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.5	1
25-Feb	0	1	2	Z	0	1	1	2	3	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.8	3
26-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	2	0	0	0	2	5	4	2	0	0	1.0	5
28-Feb	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
0.5 0.5 0.7 0.6 0.6 0.9 0.7 0.9 0.9 0.7 0.8 0.8 0.8 0.8 0.6 0.7 0.6 0.9 1.0 1.0 0.8 0.8 0.6 0.6 0.6 0.6																								Diurnal Average		
2 1 5 4 4 5 2 4 3 2 4 4 4 3 3 4 2 4 5 5 5 5 4 3 3 3																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	605	94.53	94.53
3 - 4	30	4.69	99.22
5 - 7	5	0.78	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - February 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	96	60	40	21	14	15	14	32	49	40	33	59	38	28	25	40	604
3 - 4	0	0	0	0	1	1	5	16	3	0	0	0	1	0	2	0	29
5 - 7	0	0	0	0	0	1	0	2	2	0	0	0	0	0	0	0	5
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	60	40	21	15	17	19	50	54	40	33	59	39	28	27	40	638

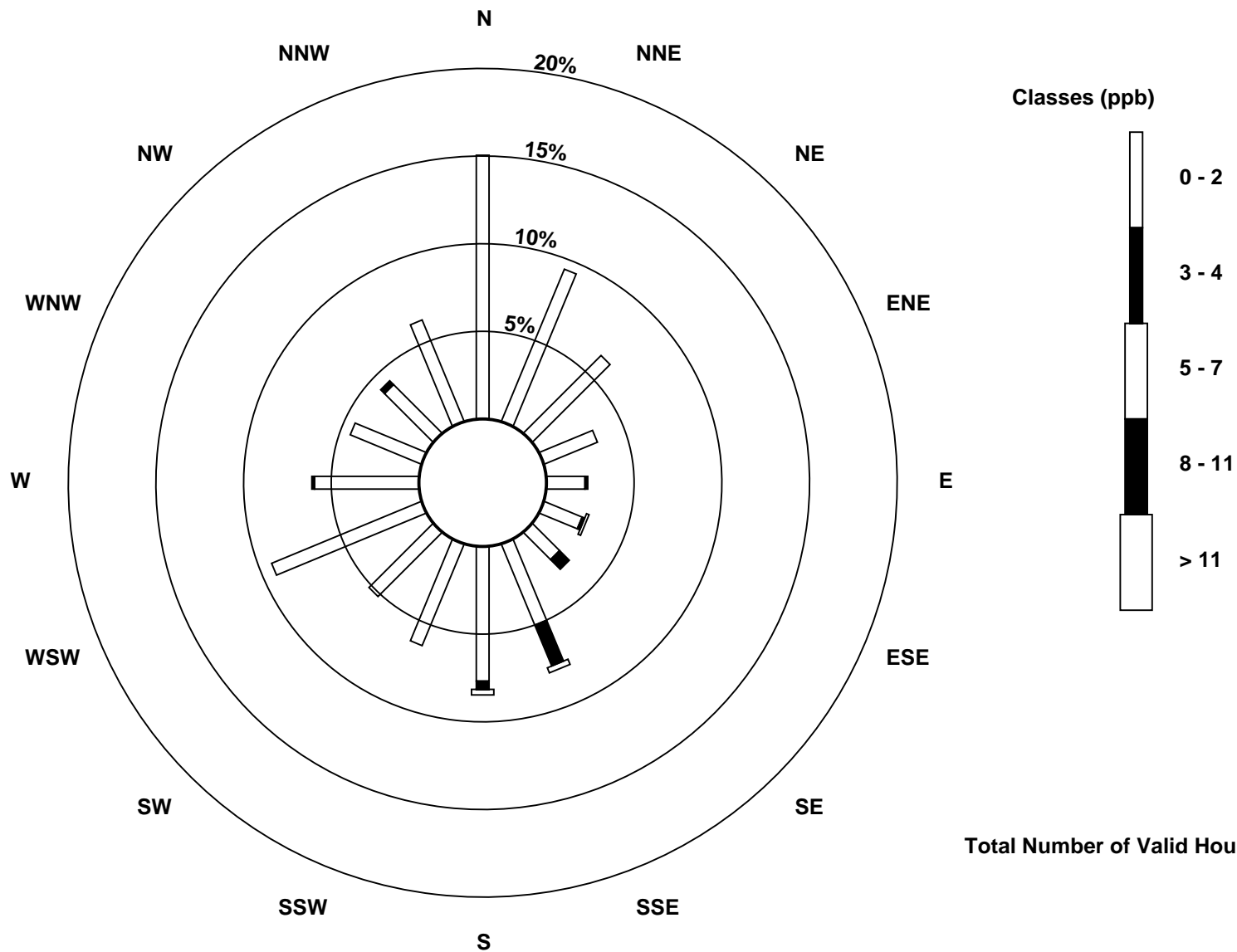
Total Number of Valid Hours: 638

Total Number of Hours: 672

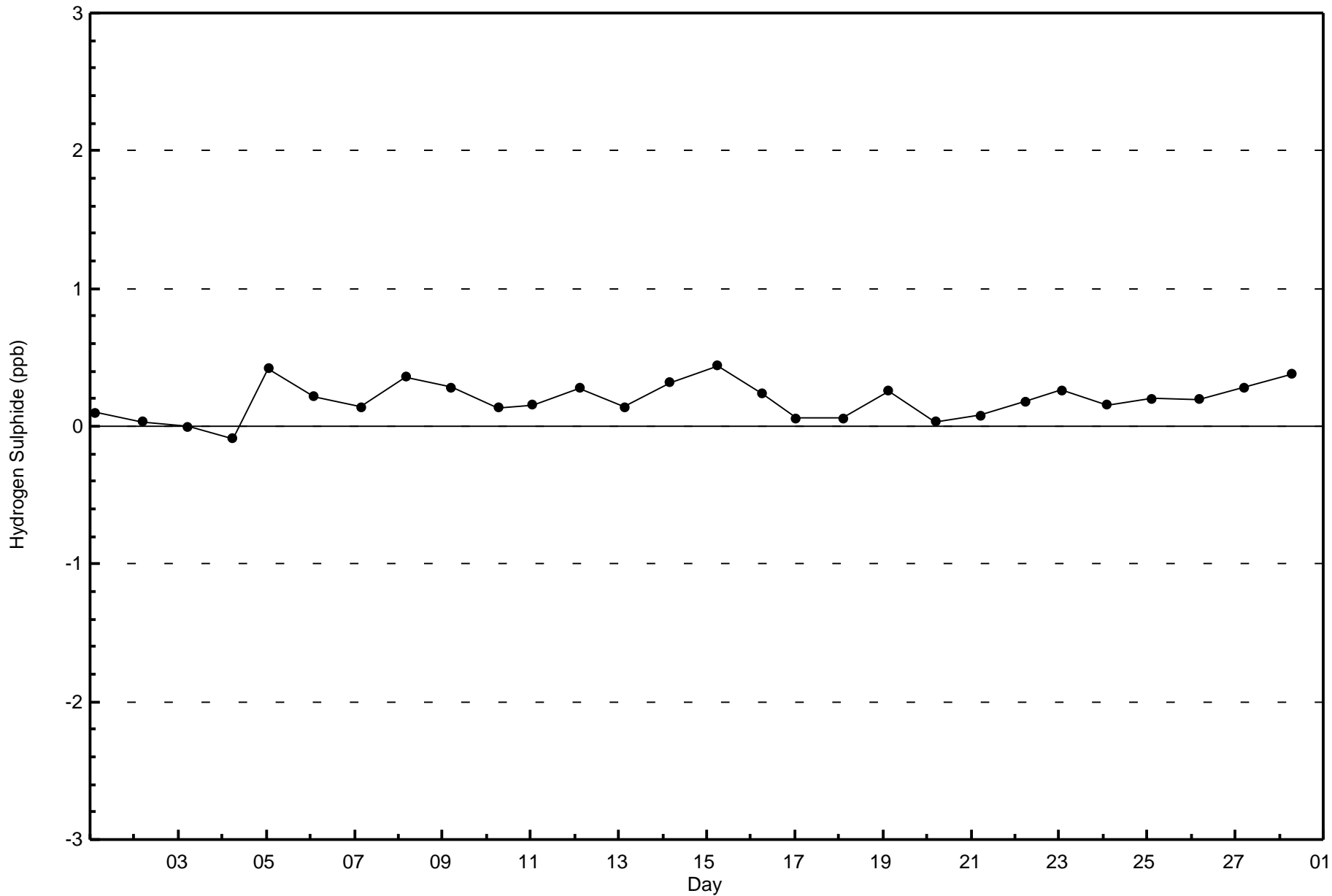


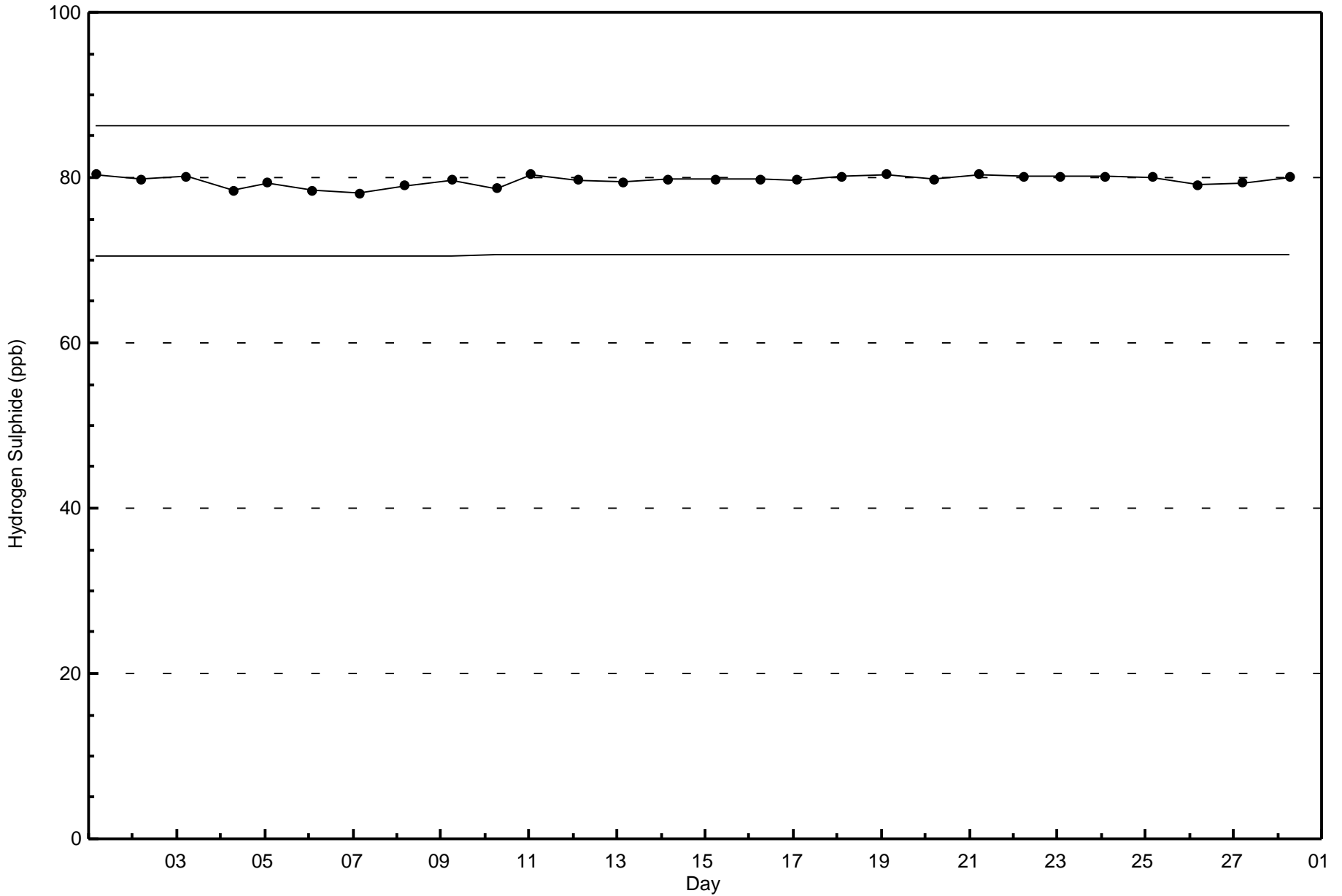
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake (AMS 2)



Total Number of Valid Hours: 638







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

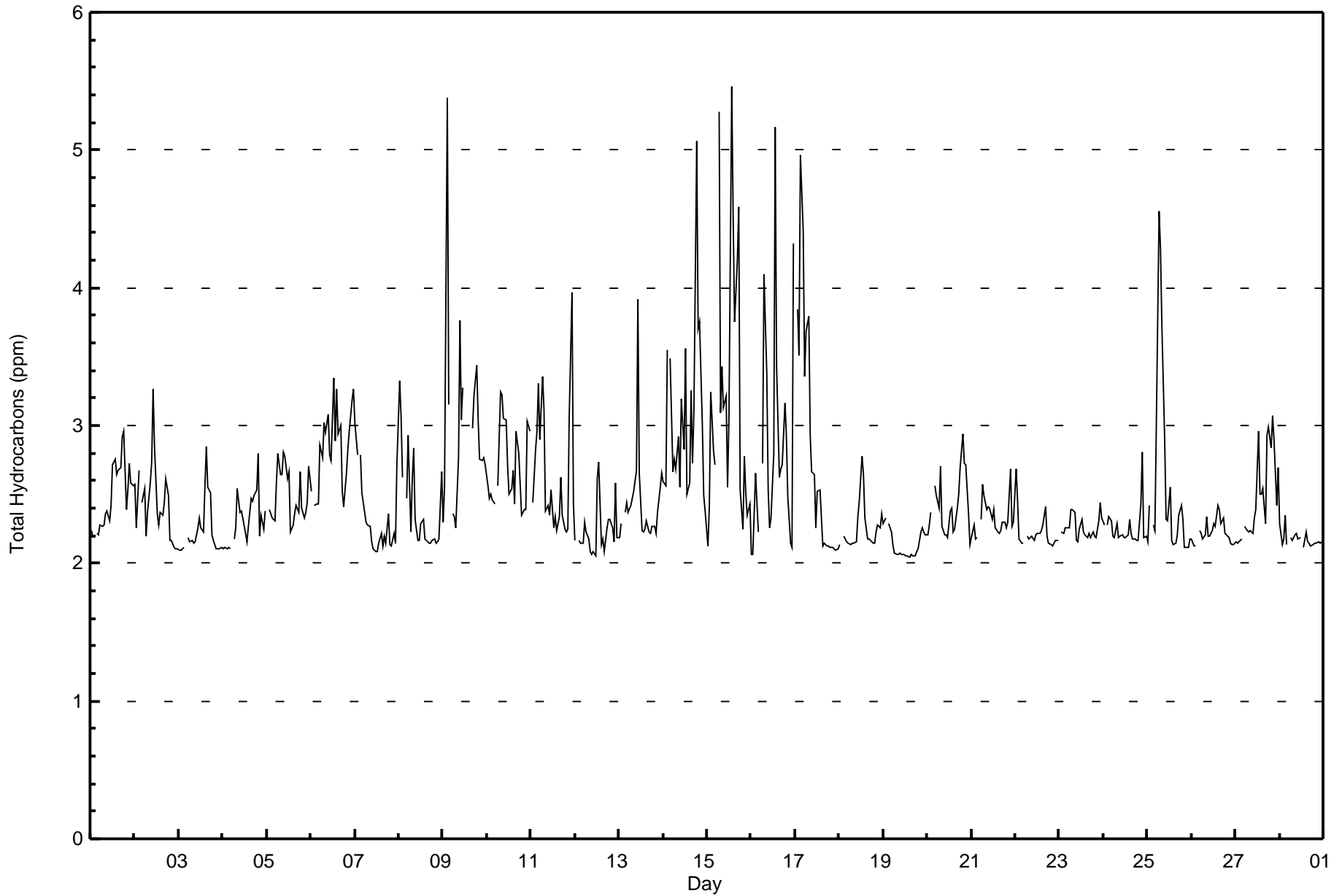
Mildred Lake - February 2017

Maximum Value: 5.5 ppm on Feb 15 14:00																								Maximum Daily Average: 3.2 ppm on Feb 15																								Hours in Service: 672	
Minimum Value: 2.0 ppm on Feb 19 15:00																								Minimum Daily Average: 2.1 ppm on Feb 19																								Hours of Data: 639	
Maximum Diurnal Average: 2.6 ppm at hour 8																								Minimum Diurnal Average: 2.4 ppm at hour 1																								Hours of Missing Data: 33	
Monthly Average: 2.49 ppm																								Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 4.9																								Hours of Calibration: 32	
																								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-Feb	2.2	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.7	2.8	2.6	2.7	2.7	2.9	3.0	2.4	2.5	2.7	2.6	2.6	2.5	3.0																							
2-Feb	2.6	2.3	2.7	Z	2.4	2.5	2.2	2.4	2.6	2.7	3.3	2.9	2.4	2.3	2.4	2.3	2.4	2.6	2.5	2.2	2.2	2.1	2.1	2.1	2.4	3.3																							
3-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.1	2.2	2.3	2.3	2.3	2.2	2.6	2.8	2.6	2.5	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.8																							
4-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.5	2.4	2.4	2.3	2.2	2.2	2.3	2.5	2.5	2.5	2.5	2.8	2.2	2.3	2.2	2.4	2.8																							
5-Feb	Z	2.4	2.4	2.3	2.3	2.6	2.8	2.6	2.6	2.8	2.8	2.6	2.7	2.2	2.3	2.4	2.4	2.4	2.7	2.4	2.3	2.4	2.4	2.7	2.5	2.8																							
6-Feb	2.5	Z	2.4	2.4	2.4	2.9	2.8	3.0	3.0	3.1	2.8	2.7	3.3	2.9	3.3	2.9	3.0	2.5	2.4	2.7	2.8	3.0	3.2	3.3	2.8	3.3																							
7-Feb	3.0	2.8	Z	2.8	2.5	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.4	2.1	2.1	2.2	2.1	2.7	2.3	3.0																							
8-Feb	3.3	3.1	2.6	Z	2.5	2.9	2.2	2.6	2.8	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.7	2.4	3.3																							
9-Feb	2.3	2.6	5.4	3.1	Z	2.4	2.3	2.3	2.8	3.8	3.0	3.3	C	C	C	C	3.0	3.2	3.4	3.0	2.8	2.7	2.8	2.7	3.0	5.4																							
10-Feb	2.6	2.5	2.5	2.5	2.4	Z	2.6	3.2	3.2	3.1	3.0	2.7	2.5	2.5	2.7	2.4	3.0	2.8	2.6	2.3	2.4	2.4	3.0	3.0	2.7	3.2																							
11-Feb	Z	2.4	2.8	3.0	3.3	2.9	3.4	3.1	2.4	2.4	2.3	2.5	2.3	2.3	2.2	2.3	2.6	2.4	2.2	2.2	2.2	3.1	4.0	2.4	2.6	4.0																							
12-Feb	2.2	Z	2.2	2.1	2.1	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.6	2.7	2.1	2.2	2.1	2.3	2.3	2.3	2.2	2.6	2.2	2.2	2.7																							
13-Feb	2.2	2.3	Z	2.4	2.4	2.4	2.4	2.5	2.5	2.7	3.9	2.7	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.4	2.6	2.7	2.4	3.9																							
14-Feb	2.6	2.6	3.5	Z	3.5	2.7	2.8	2.7	2.9	2.6	3.2	2.8	3.6	2.5	2.6	3.3	2.7	3.1	5.1	3.7	3.8	3.0	2.5	2.4	3.0	5.1																							
15-Feb	2.1	2.4	3.2	2.8	2.7	Z	5.3	3.1	3.4	3.1	3.2	2.6	3.1	5.5	4.5	3.8	4.2	4.6	2.5	2.2	2.8	2.5	2.4	2.4	3.2	5.5																							
16-Feb	2.1	2.1	2.7	2.4	2.2	Z	2.7	4.1	3.4	2.5	2.3	2.3	2.8	5.2	3.4	2.6	2.7	2.7	3.2	2.9	2.5	2.1	2.1	4.3	2.8	5.2																							
17-Feb	Z	3.8	3.5	5.0	4.4	3.4	3.7	3.8	2.9	2.7	2.6	2.3	2.5	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.8	5.0																							
18-Feb	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.8	2.6	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.8																						
19-Feb	2.3	2.3	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.1	2.3	2.3																						
20-Feb	2.2	2.3	2.4	Z	2.6	2.5	2.4	2.7	2.3	2.2	2.2	2.2	2.4	2.4	2.2	2.2	2.4	2.5	2.7	2.9	2.7	2.7	2.4	2.1	2.4	2.9																							
21-Feb	2.2	2.3	2.2	2.2	Z	2.3	2.6	2.5	2.4	2.4	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.7	2.3	2.3	2.3	2.7	2.7																						
22-Feb	2.7	2.5	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.7																						
23-Feb	Z	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.4	2.4																						
24-Feb	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.8	2.2	2.2	2.3	2.8																						
25-Feb	2.2	2.4	Z	2.3	2.2	3.0	4.6	4.3	3.7	2.9	2.3	2.3	2.6	2.2	2.1	2.1	2.2	2.3	2.4	2.3	2.1	2.1	2.1	2.2	2.6	4.6																							
26-Feb	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.4	2.4																						
27-Feb	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.4	3.0	2.5	2.5	2.5	2.3	2.9	3.0	2.8	3.1	2.9	2.4	2.7	2.5	3.1																							
28-Feb	2.3	2.1	2.2	2.3	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	UO	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.3																							
																								Diurnal Average																									
																								Diurnal Maximum																									
Z - zerspan			C - Calibration						UO - Unstable Operation																																								



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.31	0.31
2.1 - 3.0	576	90.14	90.45
3.1 - 10.0	61	9.55	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Mildred Lake - February 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	1	1	0	0	0	0	0	0	0	0	0	0	0	2
2.1 - 3.0	89	58	43	20	14	14	18	35	43	36	29	56	34	28	21	38	576
3.1 - 10.0	3	1	0	0	0	2	1	15	11	3	7	4	4	1	4	3	59
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	59	43	21	15	16	19	50	54	39	36	60	38	29	25	41	637

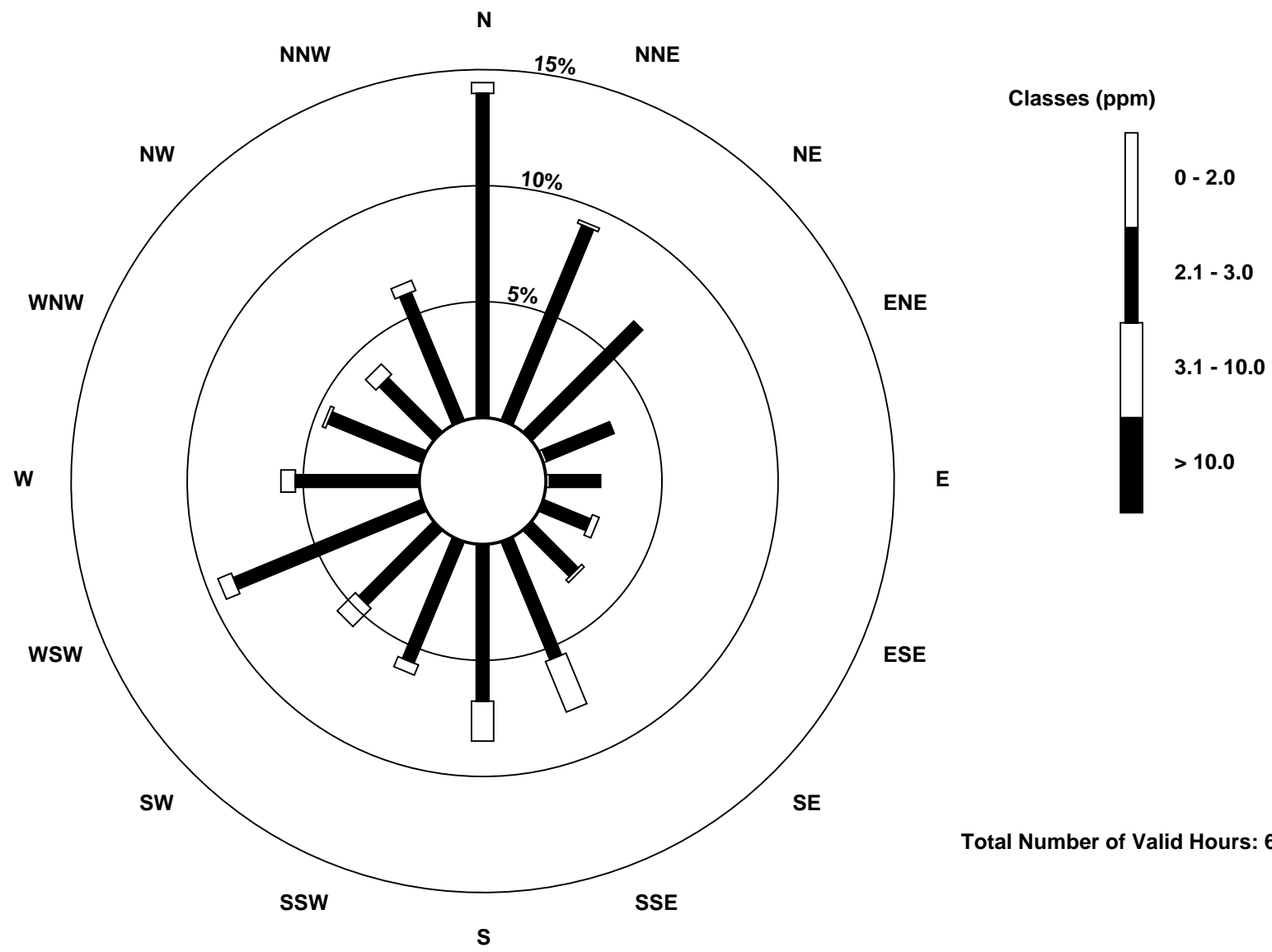
Total Number of Valid Hours: 637

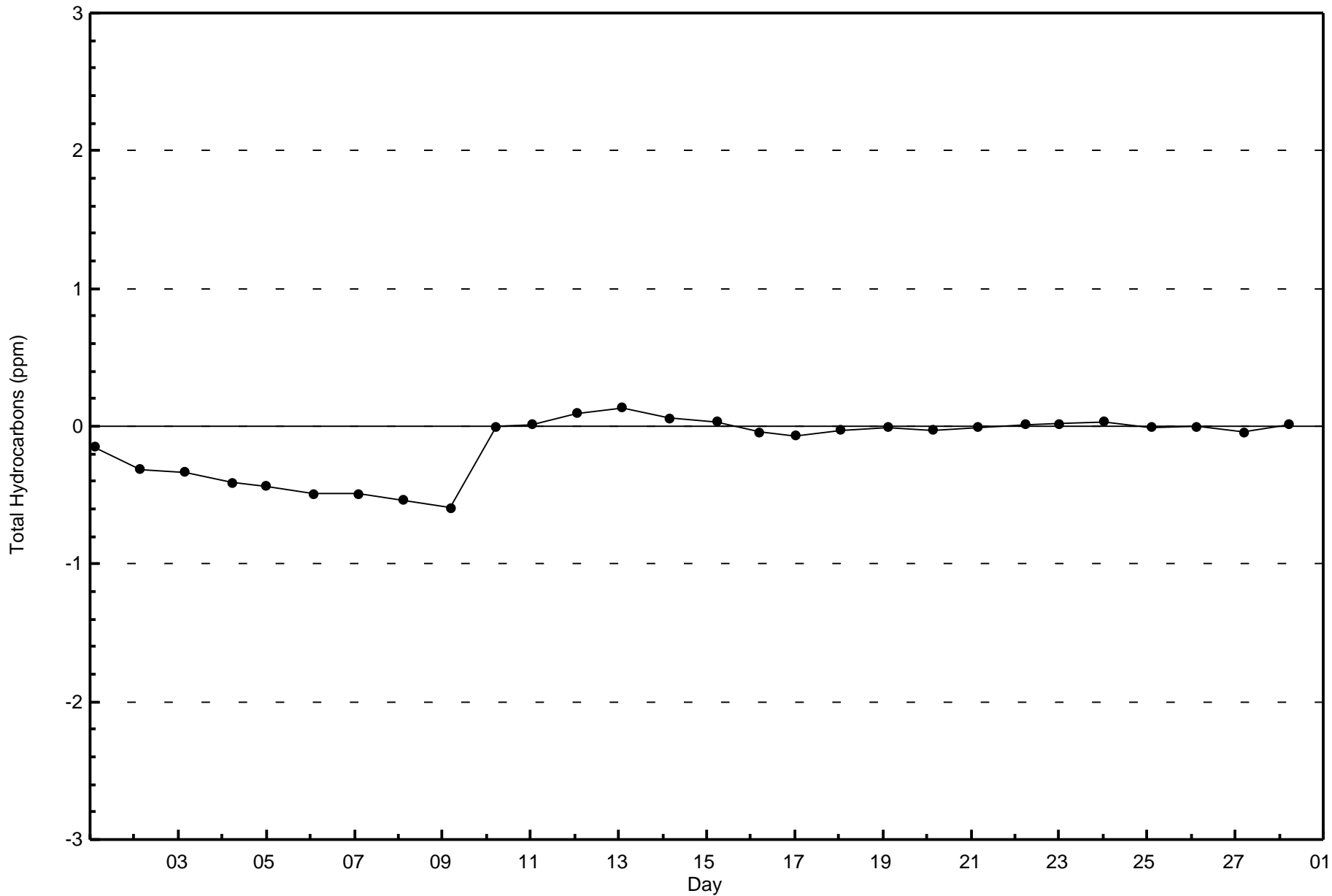
Total Number of Hours: 672

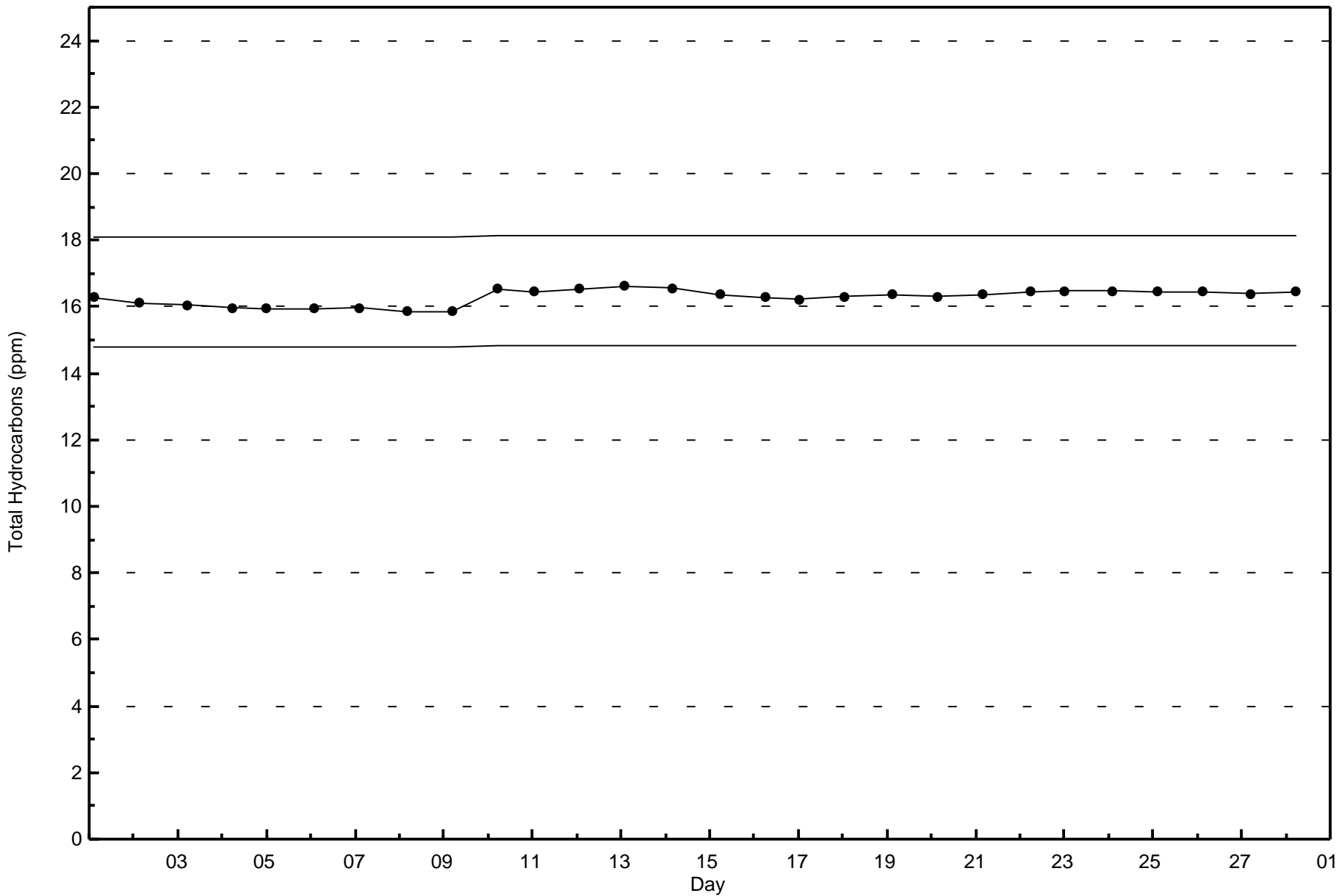


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Wood Buffalo Environmental Association
Summary of Hour Averages

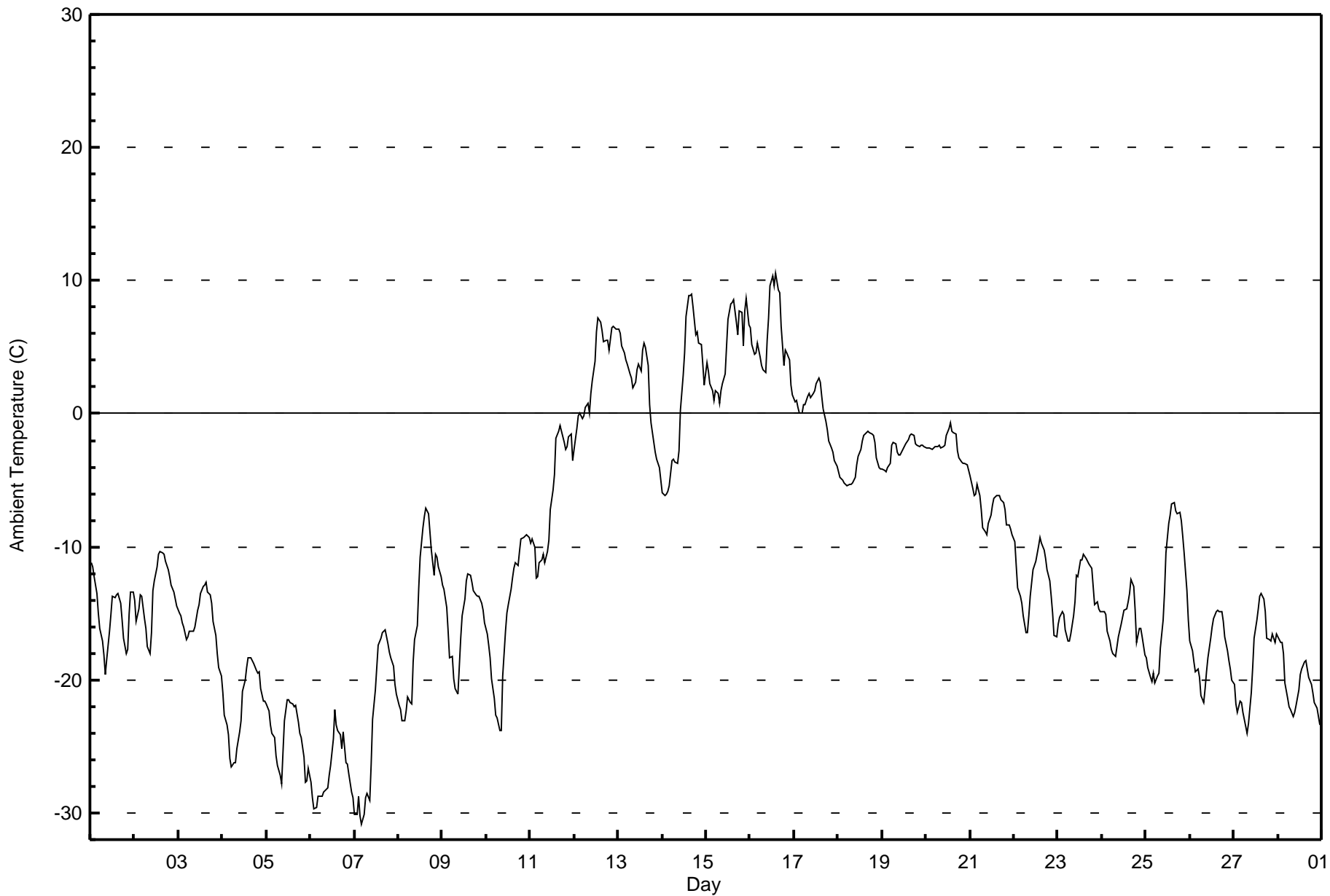
Ambient Temperature (AT) - C
Mildred Lake - February 2017

Maximum Value: 10.6 C on Feb 16 15:00 Maximum Daily Average: 5.8 C on Feb 16																								Hours in Service: 672		
Minimum Value: -30.8 C on Feb 7 05:00 Minimum Daily Average: -26.9 C on Feb 6																								Hours of Data: 672		
Maximum Diurnal Average: -7.4 C at hour 15 Minimum Diurnal Average: -14.0 C at hour 8																								Hours of Missing Data: 0		
Monthly Average: -10.83 C Percentiles: P₁ = -29.2 P₁₀ = -22.9 Q₁ = -18.2 Median = -12.7 Q₃ = -2.6 P₉₀ = 3.7 P₉₉ = 9.0																								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-Feb	-11.1	-11.5	-12.2	-13.5	-15.0	-16.1	-17.0	-18.1	-19.5	-18.4	-16.4	-15.1	-13.7	-13.8	-13.6	-13.5	-14.2	-15.5	-16.8	-18.0	-17.7	-15.1	-13.4	-13.4	-15.1	-11.1
2-Feb	-14.0	-15.6	-14.7	-13.6	-13.7	-15.4	-16.1	-17.5	-18.0	-16.4	-13.2	-12.5	-11.5	-10.5	-10.3	-10.5	-10.5	-11.1	-11.8	-12.2	-12.9	-13.4	-13.9	-14.4	-13.5	-10.3
3-Feb	-14.9	-15.2	-15.7	-16.0	-16.9	-16.7	-16.3	-16.3	-16.3	-16.1	-14.8	-14.3	-13.5	-12.9	-12.9	-12.7	-13.4	-13.6	-14.2	-15.6	-16.6	-18.1	-19.1	-19.8	-15.5	-12.7
4-Feb	-21.0	-22.6	-23.4	-24.1	-25.9	-26.5	-26.2	-26.2	-25.2	-23.9	-23.1	-20.8	-20.1	-19.1	-18.3	-18.3	-18.6	-18.8	-19.3	-19.5	-19.4	-20.6	-21.6	-21.6	-21.8	-18.3
5-Feb	-21.8	-22.3	-23.3	-24.0	-24.3	-25.7	-26.4	-27.2	-27.8	-25.4	-23.0	-21.5	-21.5	-21.7	-21.8	-22.0	-21.9	-23.2	-24.0	-24.3	-25.8	-27.7	-27.6	-26.6	-24.2	-21.5
6-Feb	-27.7	-28.9	-29.7	-29.5	-28.8	-28.8	-28.8	-28.4	-28.3	-28.1	-27.1	-26.5	-24.5	-22.2	-23.4	-23.8	-24.1	-25.2	-24.0	-26.2	-26.4	-27.0	-28.4	-28.8	-26.9	-22.2
7-Feb	-30.1	-30.1	-28.8	-30.2	-30.8	-30.1	-28.8	-28.5	-29.1	-26.4	-22.9	-20.7	-19.0	-17.4	-16.9	-16.5	-16.4	-16.3	-17.3	-17.9	-18.4	-19.0	-20.3	-21.1	-23.0	-16.3
8-Feb	-21.9	-22.3	-23.1	-23.1	-22.3	-21.3	-21.7	-21.8	-18.6	-16.9	-15.9	-13.1	-10.8	-8.6	-7.7	-7.1	-7.5	-8.9	-10.2	-12.2	-10.6	-10.7	-11.5	-12.2	-15.0	-7.1
9-Feb	-12.9	-13.2	-14.5	-16.4	-18.4	-18.2	-19.9	-20.7	-21.0	-19.0	-16.8	-15.2	-13.9	-12.5	-12.1	-12.2	-12.7	-13.2	-13.6	-13.7	-13.8	-14.2	-14.8	-15.7	-15.4	-12.1
10-Feb	-16.6	-17.4	-18.3	-19.9	-21.4	-22.6	-22.9	-23.8	-23.8	-19.7	-16.4	-15.0	-14.3	-13.2	-12.4	-11.7	-11.2	-11.4	-10.3	-9.4	-9.3	-9.2	-9.1	-9.3	-15.4	-9.1
11-Feb	-9.8	-9.4	-10.1	-12.3	-12.2	-11.2	-10.9	-10.5	-11.2	-10.3	-9.5	-7.2	-5.7	-4.5	-1.9	-1.3	-0.9	-1.4	-2.2	-2.7	-2.4	-1.8	-1.5	-3.5	-6.4	-0.9
12-Feb	-2.7	-1.1	-0.1	0.0	-0.3	-0.1	0.5	0.8	0.0	1.5	2.5	3.9	6.2	7.2	6.8	6.2	5.4	5.6	5.5	4.8	6.5	6.6	6.5	6.4	3.3	7.2
13-Feb	6.4	6.0	5.1	4.6	4.1	3.7	3.0	2.6	2.0	2.3	3.3	3.7	3.2	4.8	5.3	5.0	3.6	0.7	-0.7	-2.2	-2.8	-3.4	-4.0	-5.0	2.1	6.4
14-Feb	-5.9	-6.1	-6.1	-5.8	-5.4	-3.5	-3.4	-3.7	-3.7	-2.7	0.3	2.9	4.6	7.3	8.9	8.8	9.0	8.0	6.0	6.2	5.3	5.2	3.7	2.2	1.3	9.0
15-Feb	3.8	3.3	2.2	1.7	1.0	1.7	1.6	0.8	1.7	2.3	3.0	5.1	7.1	8.3	8.4	8.5	6.9	6.0	7.7	7.6	5.1	7.7	8.7	6.7	4.9	8.7
16-Feb	6.4	5.2	4.5	4.6	5.3	4.3	3.7	3.3	3.1	5.5	7.2	9.6	10.3	9.6	10.6	9.3	9.1	6.6	3.6	4.8	4.6	4.0	2.1	1.4	5.8	10.6
17-Feb	0.8	1.0	0.4	0.0	0.1	0.7	0.7	1.3	1.5	1.2	1.5	1.8	2.2	2.7	2.4	1.3	0.3	-0.6	-1.3	-2.1	-2.6	-2.9	-3.5	-4.0	0.1	2.7
18-Feb	-4.4	-4.7	-5.0	-5.2	-5.3	-5.4	-5.3	-5.3	-5.2	-4.8	-3.9	-3.2	-2.7	-2.1	-1.6	-1.4	-1.3	-1.4	-1.5	-1.6	-2.2	-3.3	-4.0	-4.2	-3.5	-1.3
19-Feb	-4.2	-4.3	-4.4	-4.1	-3.7	-2.3	-2.2	-2.3	-2.9	-3.1	-3.1	-2.7	-2.4	-2.2	-2.0	-1.6	-1.6	-1.7	-2.2	-2.4	-2.4	-2.4	-2.4	-2.5	-2.7	-1.6
20-Feb	-2.6	-2.6	-2.6	-2.6	-2.6	-2.4	-2.5	-2.4	-2.5	-2.5	-2.3	-1.6	-1.1	-0.7	-1.3	-1.4	-1.5	-2.7	-3.3	-3.7	-3.8	-3.8	-3.8	-4.2	-2.5	-0.7
21-Feb	-4.7	-5.6	-6.2	-6.0	-5.3	-6.1	-7.2	-8.6	-8.9	-9.1	-8.2	-7.6	-6.9	-6.3	-6.2	-6.1	-6.1	-6.4	-6.7	-7.2	-8.4	-8.4	-8.6	-9.1	-7.1	-4.7
22-Feb	-9.6	-11.4	-13.1	-13.7	-14.2	-15.2	-16.5	-16.5	-15.2	-13.7	-11.7	-11.4	-11.1	-9.9	-9.3	-9.7	-10.3	-10.9	-11.7	-12.6	-13.7	-15.0	-16.6	-16.8	-12.9	-9.3
23-Feb	-15.9	-15.3	-14.9	-15.1	-16.2	-17.1	-17.1	-16.6	-15.2	-14.1	-12.1	-12.2	-11.0	-10.9	-10.5	-10.9	-11.1	-11.3	-11.6	-13.0	-14.3	-14.2	-14.6	-14.8	-13.8	-10.5
24-Feb	-14.9	-14.9	-15.1	-16.3	-17.1	-17.7	-18.0	-18.2	-17.5	-16.8	-15.8	-15.3	-14.8	-14.6	-14.1	-13.5	-12.4	-13.0	-14.8	-17.2	-16.1	-16.1	-16.8	-18.2	-15.8	-12.4
25-Feb	-18.3	-19.1	-19.8	-20.1	-19.5	-20.3	-19.7	-19.5	-17.6	-15.5	-13.4	-10.4	-8.2	-7.6	-6.8	-6.7	-7.3	-7.5	-7.5	-8.0	-9.2	-10.5	-13.3	-15.5	-13.4	-6.7
26-Feb	-17.1	-17.8	-18.7	-19.4	-19.2	-19.8	-21.2	-21.7	-20.7	-19.4	-18.3	-16.8	-16.0	-15.4	-14.8	-14.7	-14.9	-14.9	-15.6	-16.8	-17.8	-18.5	-19.2	-20.0	-17.9	-14.7
27-Feb	-20.4	-21.8	-22.4	-21.6	-21.7	-22.5	-23.4	-24.0	-23.3	-21.0	-19.1	-16.9	-15.5	-14.6	-13.7	-13.5	-13.9	-14.9	-16.9	-16.9	-17.1	-16.6	-17.2	-16.5	-18.6	-13.5
28-Feb	-16.7	-17.2	-17.2	-18.0	-20.2	-21.3	-22.0	-22.2	-22.7	-22.5	-21.9	-20.7	-19.6	-19.1	-18.7	-18.6	-19.1	-19.8	-20.3	-20.9	-21.7	-22.2	-22.7	-23.4	-20.4	-16.7
	-11.5	-12.0	-12.4	-12.8	-13.2	-13.4	-13.7	-14.0	-13.8	-12.6	-11.1	-9.8	-8.7	-7.9	-7.4	-7.4	-7.7	-8.5	-9.1	-9.8	-10.1	-10.4	-11.0	-11.6	Diurnal Average	
	6.4	6.0	5.1	4.6	5.3	4.3	3.7	3.3	3.1	5.5	7.2	9.6	10.3	9.6	10.6	9.3	9.1	8.0	7.7	7.6	6.5	7.7	8.7	6.7	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	122	18.15	18.15
-20 - 0	434	64.58	82.74
0 - 10	114	16.96	99.70
10 - 20	2	0.30	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



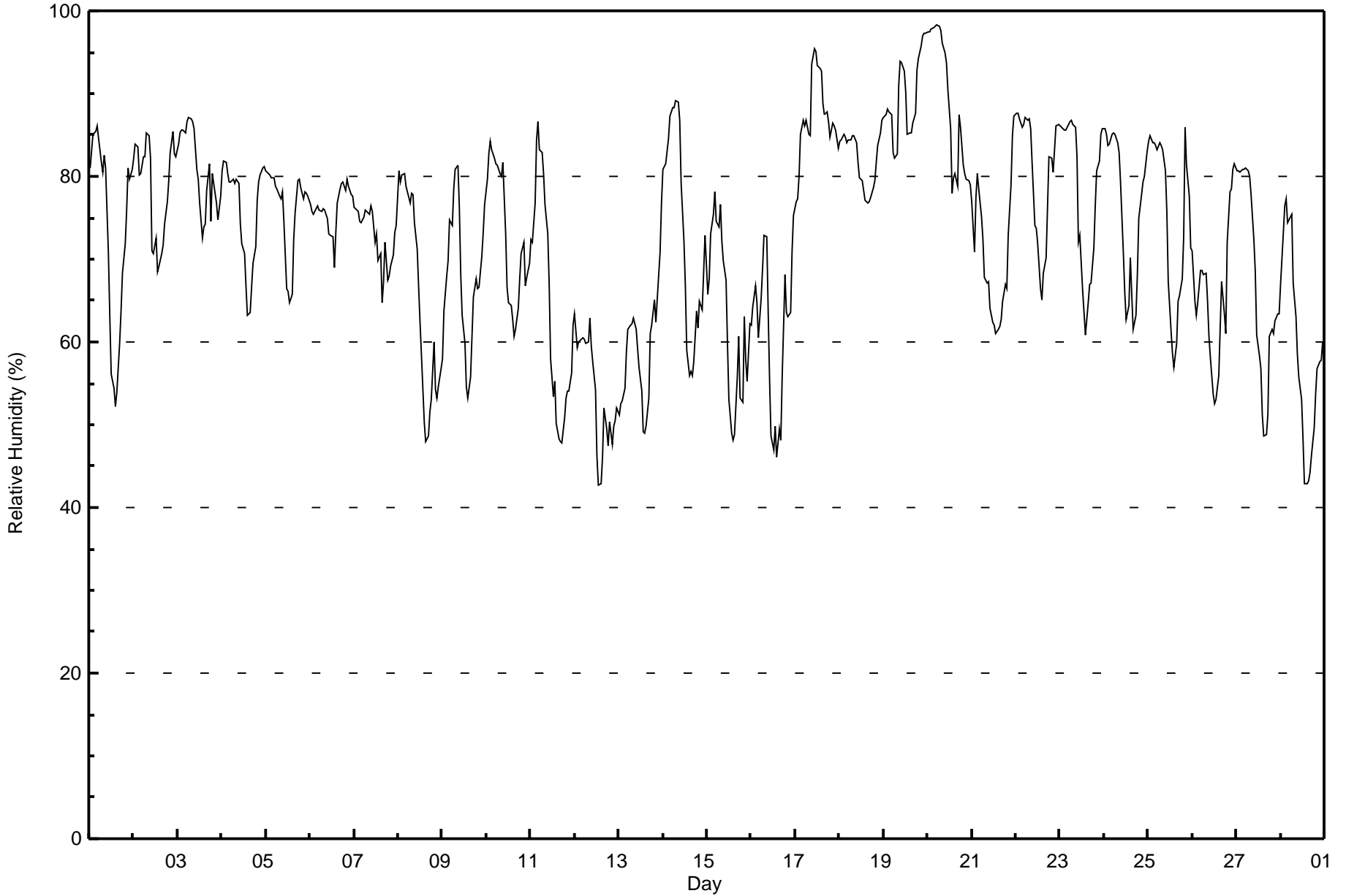
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Mildred Lake - February 2017

Maximum Value: 98 % on Feb 20 06:00 Maximum Daily Average: 89.6 % on Feb 19																			Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 43 % on Feb 12 14:00 Minimum Daily Average: 54.0 % on Feb 12 Maximum Diurnal Average: 79.6 % at hour 5 Minimum Diurnal Average: 61.6 % at hour 15 Monthly Average: 72.7 % Percentiles: P ₁ = 46 P ₁₀ = 54 Q ₁ = 63 Median = 75 Q ₃ = 82 P ₉₀ = 86 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-Feb	81	83	85	85	86	85	82	80	83	81	71	63	56	54	52	54	60	64	68	72	76	81	80	81	73.4	86
2-Feb	82	84	84	80	80	82	82	85	85	82	71	71	73	69	69	71	72	74	77	79	83	85	83	82	78.6	85
3-Feb	84	85	86	86	85	87	87	87	87	86	81	80	77	72	74	74	78	81	75	80	78	77	75	78	80.8	87
4-Feb	81	82	82	80	79	79	80	79	80	79	74	72	71	67	63	64	67	69	72	77	79	80	81	81	75.7	82
5-Feb	81	80	80	80	80	79	79	78	77	78	75	66	66	65	66	72	76	79	80	79	77	78	78	78	76.1	81
6-Feb	77	76	75	76	76	76	76	76	76	75	73	73	73	69	73	77	78	79	79	78	80	79	78	78	76.1	80
7-Feb	76	76	76	75	74	75	76	76	76	76	76	72	73	70	71	65	67	72	67	68	69	70	73	74	72.6	76
8-Feb	81	79	80	80	79	78	77	78	78	74	71	67	62	54	50	48	49	52	53	60	54	53	55	57	65.4	81
9-Feb	58	64	68	70	75	74	79	81	81	76	68	63	60	55	53	56	61	65	68	66	67	70	73	77	67.8	81
10-Feb	80	83	84	83	82	81	81	80	80	82	73	67	65	64	63	61	62	64	68	71	72	67	68	69	72.9	84
11-Feb	72	72	77	84	87	83	83	80	77	73	67	58	53	55	50	48	48	48	51	53	54	54	56	62	64.4	87
12-Feb	63	59	60	60	61	60	60	60	63	60	58	54	46	43	43	46	52	50	48	50	48	50	51	52	54.0	63
13-Feb	51	53	53	54	59	62	62	62	63	61	59	57	54	49	49	50	53	61	62	65	62	65	71	77	59.0	77
14-Feb	81	82	83	85	87	88	88	89	89	87	79	72	67	59	56	56	58	64	62	65	64	68	73	73.2	89	
15-Feb	66	68	73	75	78	74	74	77	72	70	68	60	53	49	48	49	56	61	53	53	63	58	55	62	63.1	78
16-Feb	62	64	67	65	61	65	69	73	73	64	55	49	47	50	46	49	48	56	68	63	63	64	71	75	61.1	75
17-Feb	77	77	80	85	87	86	87	85	85	93	96	95	93	93	93	89	88	88	87	85	86	86	86	83	87.1	96
18-Feb	84	84	85	85	84	84	84	85	85	84	82	80	80	78	77	77	77	78	79	80	82	84	85	87	82.0	87
19-Feb	87	87	88	88	88	83	82	83	91	94	94	93	90	85	85	85	86	88	93	94	96	97	97	97	89.6	97
20-Feb	97	97	98	98	98	98	98	98	96	95	94	91	86	78	80	80	79	88	86	81	80	80	79	88.9	98	
21-Feb	77	71	78	80	78	75	72	68	67	67	64	62	62	61	61	62	63	65	67	66	73	79	85	87	70.5	87
22-Feb	88	88	87	86	86	87	87	87	86	82	74	74	72	66	65	68	70	76	82	82	81	83	86	86	80.4	88
23-Feb	86	86	86	86	86	87	87	86	86	82	72	73	66	64	61	65	67	67	71	76	81	82	85	86	78.0	87
24-Feb	86	85	84	84	85	85	85	84	83	79	71	66	63	64	70	66	61	63	68	75	78	79	80	83	76.2	86
25-Feb	84	85	84	84	84	83	84	84	83	81	76	67	61	59	57	60	65	66	68	73	86	81	78	71	75.1	86
26-Feb	71	65	63	65	69	69	68	68	65	61	58	54	52	53	56	62	67	63	61	72	78	79	81	82	65.9	82
27-Feb	81	81	80	81	81	81	81	80	78	72	68	61	58	57	51	49	49	51	61	62	61	62	63	63	67.2	81
28-Feb	67	73	76	77	74	75	75	67	63	58	56	53	48	43	43	43	44	46	50	54	57	58	60	59.2	77	
																			77.2 77.5 78.6 79.2 79.6 79.4 79.5 79.1 78.8 76.9 72.2 68.2 65.3 62.3 61.6 62.3 64.2 66.8 68.7 70.6 72.5 73.0 74.2 75.7				Diurnal Average			
																			97 97 98 98 98 98 98 98 98 96 95 96 95 93 93 93 89 88 88 93 94 96 97 97 97				Diurnal Maximum			





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mildred Lake - February 2017

Maximum Speed: 23 km/h on Feb 25 22:00	Maximum Daily Speed Average: 14.3 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 4 06:00	Minimum Daily Speed Average: 0.9 km/h on Feb 27	Hours of Data: 670
Maximum Diurnal Speed Average: 4.0 km/h at hour 22	Minimum Diurnal Speed Average: 0.1 km/h at hour 16	Hours of Missing Data: 2
Monthly Average Velocity: 1.9 km/h 315.6 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: 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-Feb	N9	N6	N8	NNE9	N7	N9	N8	N6	N5	NNE2	S5	S5	S3	S5	SE6	SE7	SE6	S5	SSW4	SSW5	W5	W6	W7	WNW9	NNW1.0	N9	
2-Feb	W8	WSW6	W9WNW13	WNW9	SW4	WSW4	W2	WNW3	WNW1	NW5	NNW7	N7	SSW1	SW2	SSE4	E4	E3	NE5	NE7	NNE8	NNE6	NNE10	NNE9	NNW2.6	WNW13		
3-Feb	NNE6	N4	N5	N5	N3	N4	NNE5	SE1	ESE2	S3	SSW3	SSW4	SSW4	S3	SSE6	SSE6	ENE4	N5	NNW16	NNE11	NE11	NE13	NNE11	NNE7	NNE3.4	NNW16	
4-Feb	N5	N4	NNE4	N4	NNE5	ESE0	SW2	SSW3	SSW4	SW4	SSW6	S4	SW5	S7	S7	SSE6	SE5	SE6	SSE7	S6	SE2	N9	NNE8	N13	SE0.9	N13	
5-Feb	N13	N13	N10	N6	N6	NW4	NNW5	NNW2	SSW1	NNE3	NE2	SW3	WSW3	NW8	NW2	SSE5	ESE6	SE5	S5	S7	S4	SE3	SSE3	SSE3	NNE1.3	N13	
6-Feb	SSE3	SSW3	SSW4	SSW3	SSE3	SSE5	S5	S5	S5	S6	S5	ESE4	SSE5	S1	S3	NE2	NNE3	NNE5	N6	N3	NW2	NW2	AF	SW3	S1.6	N6	
7-Feb	SSW4	SSW4	SW3	SSW5	SSW5	SSW7	SW6	SSW8	SSW8	SSW8	WSW9	SW11WSW11	W10	W11	W10	W9WNW12	NNW12	NNW8	NNW7	NNW10	NNW7	NNW7	NNW7	NNW7	W5.1	WNW12	
8-Feb	WNW6	WSW5	SW2	W1	SW6WSW10	WSW8	SW3	W10WSW12WSW12WSW14WSW10	WSW9WSW13WSW14WSW16WSW13WSW10	SW9WSW14WSW15WSW14WSW12	WSW9.7	WSW16	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW10	WSW16
9-Feb	WSW10	W8	WSW4	SW4	S3	WSW3	SSW5	S4	S4	SSE2	SSE5	SSE6	SE5	S6	N1	NNE5	NNE8	N8	N6	NNE6	N9	N9	N9	NNE8	NNW0.9	WSW10	
10-Feb	N12	N11	NNE10	N4	N4	N4	WSW1	SSW3	SW1	AF	S2	SW3	SW2	W1	SSW2	E3	ENE4	NE5	SE7	SSE12	SSE9	S9	SSE9	S6	ESE1.1	N12	
11-Feb	WSW3	SW3	SSW5	SW4	WSW6WSW10	W12	W12WSW12	W9	W6	W3	S6	SSW10WSW11WSW14	W13	W14WSW13WSW12	W14	W14	W13	SSW8	WSW8.9	W14	W14	W13	SSW8	WSW8.9	W14		
12-Feb	SW10WSW14WSW16	W14	W13WSW13WSW13WSW14WSW14WSW14	W13WSW15	W20	W21WSW18WSW13	SW9WSW11	WSW9WSW11	W22	W21	W19WNW20	W14.3	W22	W21	W19WNW20	W14.3	W22	W21	W19WNW20	W14.3	W22	W21	W19WNW20	W14.3	W22		
13-Feb	W20WNW16	W13WNW13WNW20WNW20WNW19WNW18WNW16WNW14	NW12	NNW10	NE9	ENE3	S4	SSE1	N6	N11	NNE9	N9	N7	N5	N4	WSW1	NW8.3	WNW20	WSW1	WSW1	WSW1	WSW1	WSW1	WSW1	WSW1	WSW1	WNW20
14-Feb	SSE3	SSE4	SSW6	SSW7	S7	SSE9	S7	SSE9	S8	SE9	SSE10	SSE11	SSE12	SE11	SSE12	SSE13	SE9	SSE9	SSE6	SE7	SSE5	SW3	SSW4	SSW4	SSE7.2	SSE13	
15-Feb	SSW5	SSE4	ESE6	ESE5	SE5	S7	S8	S6	SSE8	SSE9	SSE9	SSE8	S8	S6	S5	SW2	SW4	SW6	WSW8	WSW7	SW7	WSW9WSW14	WSW10	SSW5.1	WSW14		
16-Feb	SW9	SW9	WSW7	W8WSW10	SSW4	SE3	SSE10	ESE5	SE6	E6	SSW3	W4	NNW5	N5	N8	NNE7	N4	NW2	N12	N10	N5	NW4	NW6	NW1.4	N12		
17-Feb	NNW6	NW7	NNW5	SSW3	SW2	S2	WSW3	NNE3	N8	NNW5	NNW7	NNW7	N6	NE5	NNE9	NNE10	NE9	NE8	NE10	NE10	NE8	NE9	NE8	NNE5.2	NNE10		
18-Feb	NNE9	NNE9	NE8	NE8	NNE7	NNE4	NNE6	NE5	NNE4	ENE1	SSE1	SE2	ESE3	E5	ENE7	E9	ENE8	ENE7	NE5	NE5	NNE8	N10	N11	N11	NE5.5	N11	
19-Feb	N8	N9	N9	NNE6	ENE5	ESE12	E10	E11	ENE9	E9	ENE9	E7	E11	ESE11	E8	ENE7	ENE6	NE4	N6	N6	N6	N6	NNE5	N6	ENE6.1	ESE12	
20-Feb	N8	N8	N8	N7	N8	NNW9	NNW10	NNW10	N9	N9	N8	N6	NNW8	NW11	NNW14	NNW11	NW11	NW11	NW11	WNW10	NNW10	NNW11	W10	W12	NNW8.4	NNW14	
21-Feb	W14WNW14	WSW5	WSW5	NW10	NNW13	NW13WNW15WNW15WNW14WNW14WNW12	NW10	NW13WNW14WNW12WNW12WNW11	NW11	NW12	NNW10	NNW9	NNW8	NNW7	NW10.7	WNW15	WNW15	WNW15	WNW15	WNW15	WNW15	WNW15	WNW15	WNW15	WNW15	WNW15	WNW15
22-Feb	NW6	N10	NNE6	NNE7	NNE5	SW1	NE1	NE3	NE4	ENE5	ENE6	N5	NW7	N8	NNE9	N12	N11	NNE8	NNE6	NE6	NE7	NE5	ENE3	NE2	NNE5.3	N12	
23-Feb	NW1	NE2	S4	SSE3	ESE2	SSE3	SSE3	SSE3	S4	SSW4	SSW5	SSE6	SSE9	SE7	ESE4	ENE5	ESE5	ESE6	E5	ENE3	NNE6	N9	N11	N13	ESE1.8	N13	
24-Feb	N13	NNE13	N13	N9	N6	N7	N7	N6	N7	N6	N9	N10	NNW7	NNW9	S5	S6	SSW7	SW3	SW2	SSW6	W6	WSW5	SW7	S5	NNW3.6	N13	
25-Feb	SSW4	SSE7	SSW7	S7	SSW5	S6	S7	S6	SSE7	S10	S10	S8	WSW1	NNW7	NNW7	NNE8	NNE10	NW5	W6	E6	NE12	NNE23	NNE22	N19	NE1.5	NNE23	
26-Feb	N17	N18	N16	NNW11	NNW11	NNW9	NNW11	NNW9	NNW10	NNW12	NNW13	NW7	SW2	S5	S4	E5	ESE4	E3	NNE6	ENE4	ENE3	NE4	NNE5	NE5	N5.8	N18	
27-Feb	ENE4	NNE5	NNE7	NNE8	N9	N7	N8	N10	NNE9	N6	NNW6	W5	WSW6	SW5	SW5	SW5	S4	SE4	ESE4	SSE5	SSE6	S7	SSE6	S7	NNE0.9	N10	
28-Feb	SW5	W1	NNW3	NNE15	NNE14	NNE11	NNE13	NNE15	NNE15	NE13	NE11	NE9	N10	NE11	NE8	ENE8	NE8	NE7	NNE7	NNE8	NE7	NE8	NE8	N8	NNE8.4	NNE15	

NW3.6NNW3.8	NW2.9	NW2.7	NW2.8	NNW1.9	NNW2.2	NNW1.5	NNW1.8	W1.3	W1.5	WSW1.7	WSW1.7	W1.4	WSW1.4	E0.1	NNE0.9	NNW1.5	NNW2.1	N1.4	NNW3.0	NNW4.0	NNW3.8	NNW3.4	Diurnal Average				
WNW20	N18	N16	NNE15	WNW20	WNW20	WNW19	WNW18	WNW16	WNW14	WNW14	WSW15	W20	W21	WSW18	WSW14	WSW16	W14	NNW16	NW12	W22	NNE23	NNE22	WNW20	Diurnal Maximum			

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 12 14:00	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 0 km/h on Feb 6 17:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

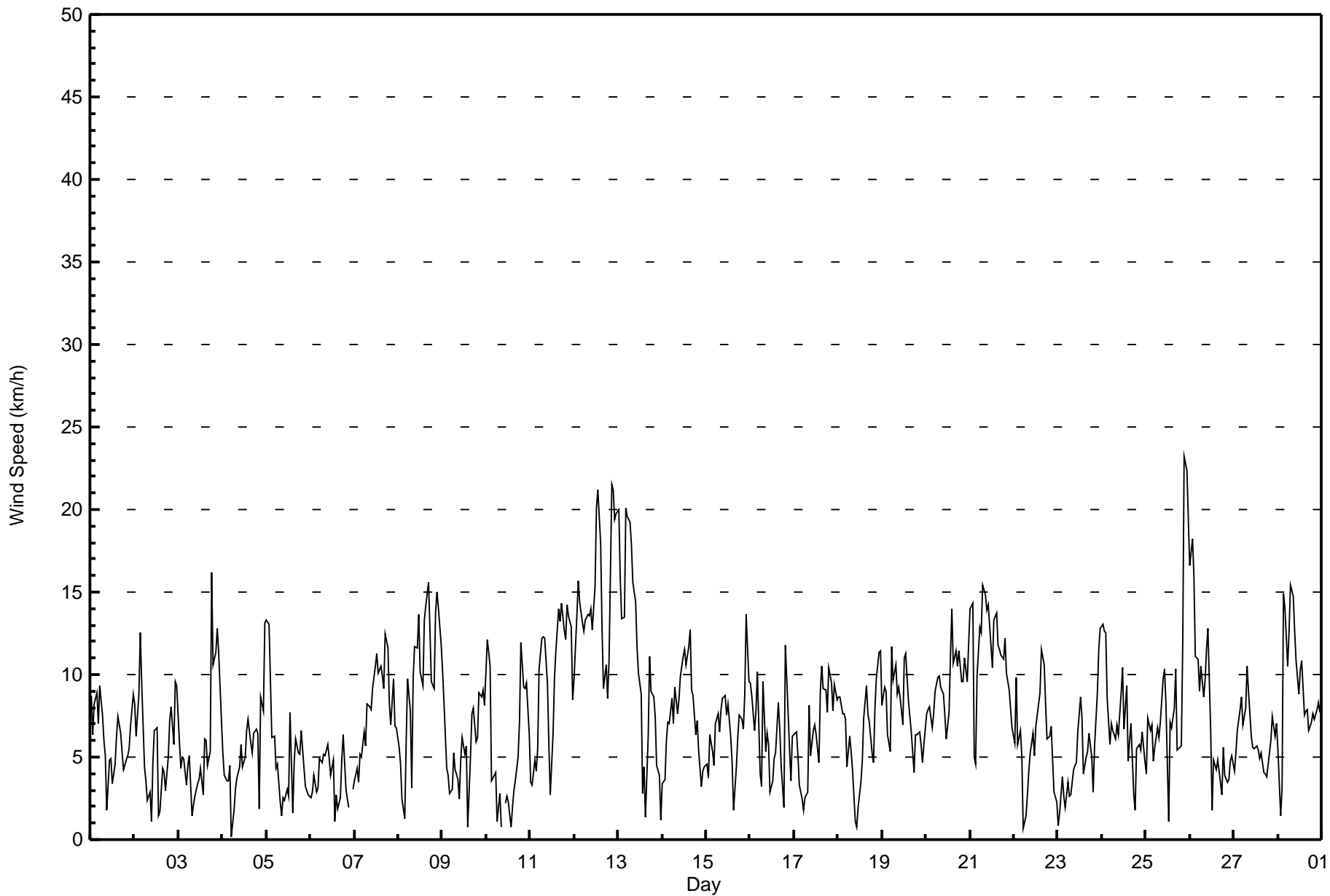
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	3	3
2-Feb	2	2	2	3	3	2	2	1	1	1	3	2	2	2	2	1	1	1	2	2	2	2	2	2	3
3-Feb	2	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	4	3	4	4	3	2	4
4-Feb	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1	1	1	1	1	2	1	2	2	2	2
5-Feb	2	2	2	1	3	1	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	1	3
6-Feb	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0	1	1	2	1	1	AF	1	2	
7-Feb	1	1	1	1	1	2	1	2	1	2	3	3	4	3	3	3	3	3	3	3	2	1	1	4	
8-Feb	1	1	2	2	2	3	3	3	3	4	4	5	4	4	4	5	5	4	3	3	4	4	4	3	5
9-Feb	3	3	2	2	2	2	1	1	2	1	2	2	1	2	1	3	1	2	1	2	2	2	2	2	3
10-Feb	1	1	2	1	1	1	2	1	1	AF	1	1	1	1	2	1	1	1	2	3	3	2	2	3	
11-Feb	2	1	1	1	3	4	5	4	4	4	2	3	2	2	4	4	4	4	4	4	4	4	4	4	5
12-Feb	6	4	5	5	3	3	4	4	4	4	4	5	7	7	6	6	2	4	4	4	7	6	6	6	7
13-Feb	6	5	4	5	6	5	5	5	4	4	3	2	2	2	2	2	3	1	2	2	2	2	1	1	6
14-Feb	2	1	2	1	1	2	2	2	2	3	2	2	2	2	2	2	2	2	2	1	2	1	1	2	3
15-Feb	1	1	1	1	1	2	2	1	2	2	2	2	2	2	2	1	1	2	3	4	2	3	5	2	5
16-Feb	3	2	2	2	4	2	3	2	2	1	2	2	1	2	3	2	2	2	3	2	2	2	2	2	4
17-Feb	2	1	1	2	1	1	1	2	2	1	1	1	1	2	2	3	3	2	2	2	2	2	2	2	3
18-Feb	2	2	2	2	2	2	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2
19-Feb	2	2	1	2	2	2	2	2	2	3	2	3	3	3	2	2	1	1	1	1	1	1	1	1	3
20-Feb	1	1	1	1	1	1	2	2	2	1	1	1	2	3	2	2	3	3	3	2	2	4	3	4	4
21-Feb	5	6	2	2	4	4	3	4	4	4	3	3	3	4	4	3	3	3	3	2	2	2	2	2	6
22-Feb	1	2	2	2	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2
23-Feb	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	2	2	2
24-Feb	2	2	3	2	1	1	1	1	1	2	3	2	3	2	2	2	3	2	2	1	2	2	2	2	3
25-Feb	3	1	1	1	1	1	1	1	1	2	2	2	3	2	3	4	3	2	3	3	5	6	6	5	6
26-Feb	5	5	4	2	2	1	2	2	3	2	2	3	2	2	1	2	2	1	1	1	1	1	1	1	5
27-Feb	2	2	1	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	2
28-Feb	2	1	4	4	4	3	3	4	3	3	3	3	4	3	3	2	2	2	2	2	2	2	2	2	4
	6	6	5	5	6	5	5	5	4	4	4	5	7	7	6	6	5	4	4	4	7	6	6	6	
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	240	35.82	35.82
6 - 11	326	48.66	84.48
12 - 19	94	14.03	98.51
20 - 28	10	1.49	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Mildred Lake - February 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	15	17	12	7	11	9	22	30	30	27	15	7	2	9	6	240
6 - 11	67	40	23	9	8	5	11	24	27	13	11	21	15	6	15	31	326
12 - 19	13	6	3	0	0	1	0	4	0	0	0	26	14	18	3	6	94
20 - 28	0	2	0	0	0	0	0	0	0	0	0	0	4	4	0	0	10
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	101	63	43	21	15	17	20	50	57	43	38	62	40	30	27	43	670

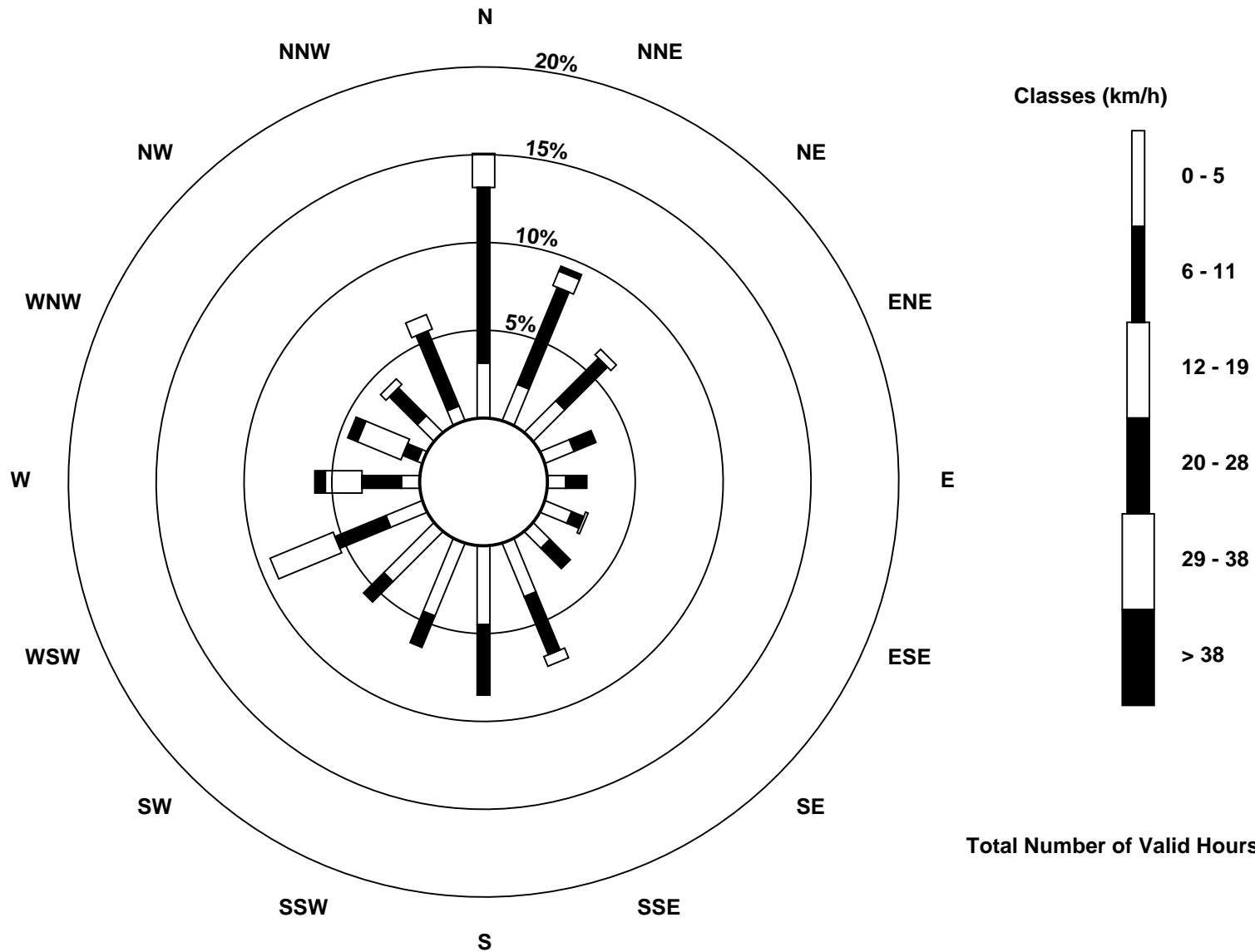
Total Number of Valid Hours: 670

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 18 deg on Feb 25 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 260.3 deg on Feb 12	Hours of Data: 670
Direction of Minimum Speed: 112 deg on Feb 4 06:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.9 deg on Feb 27	Percent Operational Time: 99.7
Monthly Average Direction: 265.1 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-Feb	355	353	359	15	10	9	9	10	7	19	181	188	189	181	131	138	137	169	196	211	259	261	260	282	337.0
2-Feb	276	255	278	294	294	220	250	260	286	283	310	336	2	211	214	154	101	97	42	49	33	20	12	21	327.2
3-Feb	26	9	8	8	5	9	22	139	102	185	205	207	202	174	158	154	69	360	345	20	36	37	24	17	26.2
4-Feb	9	6	26	359	33	112	228	205	207	214	211	183	224	172	177	155	136	144	151	178	134	9	17	8	142.2
5-Feb	2	6	11	5	6	323	345	342	194	14	37	222	250	320	309	147	117	133	178	176	185	157	166	163	11.3
6-Feb	168	199	200	199	159	167	181	174	176	179	181	123	158	180	179	48	17	12	10	358	323	318	AF	215	171.8
7-Feb	204	202	216	208	203	201	216	206	199	195	240	231	240	263	276	269	265	294	329	343	340	340	341	324	260.5
8-Feb	285	255	221	262	234	251	241	236	259	254	242	248	254	251	242	239	243	241	237	235	251	251	252	258	247.5
9-Feb	253	276	238	233	188	243	195	174	174	163	166	161	132	174	354	26	16	7	7	13	11	7	11	13	342.4
10-Feb	7	7	12	356	359	6	240	205	230	AF	191	222	235	260	204	93	61	49	132	151	163	171	168	184	112.7
11-Feb	238	226	212	227	254	255	265	268	256	270	270	281	186	197	244	258	266	260	251	246	259	259	259	206	250.7
12-Feb	232	255	256	260	269	251	251	256	253	256	259	255	266	273	256	246	214	246	246	244	278	280	278	283	260.3
13-Feb	281	284	281	291	290	289	293	296	297	302	314	346	52	67	189	149	11	4	18	10	9	356	352	250	309.5
14-Feb	152	157	203	205	188	168	171	162	190	142	158	156	161	140	153	155	138	162	158	135	157	228	211	200	163.7
15-Feb	205	152	123	115	130	182	184	180	167	163	160	163	174	171	190	218	230	233	237	248	228	251	258	224	195.4
16-Feb	230	227	245	268	246	197	137	166	121	137	92	194	260	335	352	5	12	8	317	359	8	8	315	322	303.9
17-Feb	341	326	327	206	220	174	242	16	357	345	329	345	349	41	30	32	41	35	38	39	35	40	43	37	17.3
18-Feb	33	29	40	46	24	33	22	53	28	76	155	132	115	80	70	97	72	72	36	55	12	360	7	6	40.5
19-Feb	9	8	9	23	76	105	92	84	75	84	67	81	101	111	89	69	61	47	358	1	5	8	16	5	58.4
20-Feb	1	3	4	359	354	337	337	336	353	353	2	356	329	313	335	333	320	305	304	303	317	309	277	263	328.4
21-Feb	264	294	244	246	318	328	315	299	295	294	303	303	306	304	297	297	293	295	316	326	327	327	339	334	303.8
22-Feb	324	3	17	12	19	217	45	41	46	58	59	353	318	355	15	7	9	15	22	34	36	43	73	36	16.4
23-Feb	307	43	173	162	108	167	165	153	184	204	201	165	150	145	115	67	108	109	97	59	13	1	2	6	103.0
24-Feb	9	14	8	6	5	3	8	358	356	7	349	349	347	343	189	179	206	216	232	200	271	250	231	184	344.4
25-Feb	199	167	193	185	193	177	183	173	153	176	180	177	250	345	339	32	13	313	281	86	44	18	25	11	50.6
26-Feb	9	356	351	335	343	337	338	330	328	334	345	319	235	184	172	95	118	79	33	58	70	46	17	41	355.2
27-Feb	76	24	14	18	4	5	0	6	12	10	339	268	245	219	226	221	190	140	117	147	158	172	168	176	15.1
28-Feb	216	261	342	25	29	28	22	30	26	47	34	40	8	42	49	58	55	42	30	24	39	38	39	10	31.8
	318.4	327.4	326.2	325.5	322.9	294.7	299.1	293.3	298.2	277.6	278.1	254.7	246.6	263.0	247.4	98.4	18.0	329.0	333.1	356.8	340.9	334.8	332.2	329.0	
	Diurnal Average																								

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

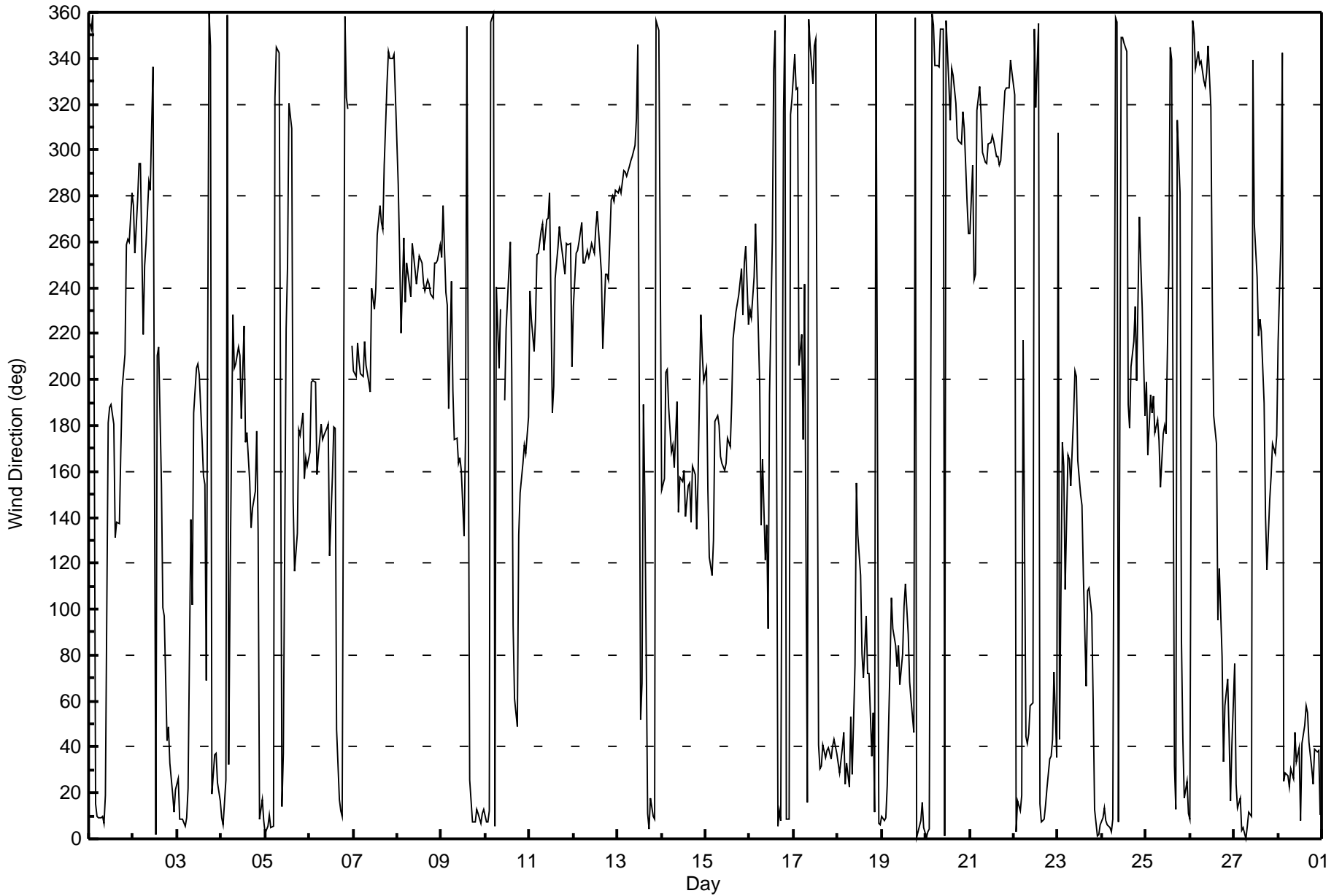
Wind Direction (WD) - deg
Mildred Lake - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Feb 18 11:00 Minimum Value: 6 deg on Feb 5 07:00 Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 15 Median = 19 Q ₃ = 27 P ₉₀ = 47 P ₉₉ = 89		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	13	14	18	13	13	12	11	10	11	71	13	17	40	26	21	17	15	14	21	15	32	13	17	19	71
2-Feb	16	18	21	15	18	34	67	62	38	85	43	14	32	90	92	23	31	28	21	15	15	15	13	15	92
3-Feb	17	12	13	11	10	11	16	54	40	47	21	26	27	56	18	20	48	25	17	20	18	18	16	16	56
4-Feb	16	13	29	16	11	89	30	46	14	25	15	30	30	19	16	21	16	13	14	18	68	12	14	12	89
5-Feb	12	11	13	12	16	24	6	15	40	36	67	67	80	23	78	24	7	14	15	10	24	28	33	37	80
6-Feb	49	26	17	31	39	12	20	21	20	15	21	36	17	87	47	28	21	9	8	60	35	56	AF	13	87
7-Feb	10	11	24	11	13	14	17	17	14	20	25	24	22	23	20	22	30	17	21	13	12	7	8	15	30
8-Feb	26	35	57	89	29	22	25	69	26	22	22	22	26	29	22	22	22	22	24	22	20	19	21	20	89
9-Feb	24	31	53	47	59	38	13	20	32	31	23	22	35	29	69	24	15	11	14	11	10	11	11	9	69
10-Feb	10	9	9	24	12	10	67	44	90	AF	37	54	65	94	63	25	32	16	22	16	20	15	16	19	94
11-Feb	49	42	15	31	38	25	25	23	22	26	31	70	27	16	26	22	21	20	23	21	21	23	24	30	70
12-Feb	36	21	22	22	18	19	22	21	21	20	22	21	21	20	23	26	17	27	32	25	19	18	18	18	36
13-Feb	17	18	19	18	16	17	16	16	15	18	15	29	20	63	35	82	38	11	13	13	17	40	26	63	82
14-Feb	27	22	15	11	21	17	16	16	16	29	17	15	15	18	15	14	17	14	18	11	34	33	19	35	35
15-Feb	23	25	17	13	23	13	12	17	19	17	15	17	15	19	19	50	51	24	24	27	22	22	22	21	51
16-Feb	20	22	29	17	24	61	56	12	20	18	26	65	27	36	12	12	11	13	69	12	12	20	45	13	69
17-Feb	22	17	37	34	38	38	30	65	11	14	12	12	12	34	17	17	18	21	18	19	20	20	17	19	65
18-Feb	18	17	18	19	19	32	17	18	23	86	105	59	31	24	16	15	17	14	27	21	16	12	12	15	105
19-Feb	16	13	11	16	38	11	14	13	17	16	20	26	20	16	17	15	17	27	11	9	9	9	13	9	38
20-Feb	11	11	11	9	8	10	11	9	12	11	11	21	18	17	10	10	15	17	16	16	15	16	21	23	23
21-Feb	25	21	38	40	34	14	17	16	16	16	16	17	19	19	18	17	17	17	19	12	11	11	11	10	40
22-Feb	14	15	17	19	49	87	61	19	22	21	30	48	19	19	15	15	15	17	17	19	17	14	24	35	87
23-Feb	66	69	55	49	40	19	22	24	16	19	30	19	22	26	58	25	22	9	12	21	8	10	11	12	69
24-Feb	11	13	13	12	10	11	10	11	15	27	16	17	24	15	58	31	32	65	60	11	31	20	25	44	65
25-Feb	40	8	15	13	15	14	12	12	19	16	16	19	86	26	41	58	23	28	53	50	20	18	18	16	86
26-Feb	15	16	12	11	10	10	9	10	13	12	13	39	81	39	40	38	37	49	17	20	18	17	12	17	81
27-Feb	32	19	14	13	9	10	8	11	11	14	16	34	31	26	23	16	28	17	13	13	10	18	16	21	34
28-Feb	20	58	71	17	17	16	15	15	17	20	23	34	30	29	39	28	27	19	14	14	16	16	15	13	71
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 11, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	11:48	End Time (MST)	15:36
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	809	810
Calculated slope	0.997720	0.999129	Chamber temp	45.3	45.2
Calculated intercept	1.780685	0.959536	Pressure	694.1	688.2
Analyzer Background	21.4	21.4	Flow	0.494	0.490
Analyzer Coefficient	0.977	0.971	Intensity	91	89

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	-0.1	----
as found span	5000	76.4	782.3	784.4	0.997
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	76.4	782.3	782.8	0.999
second point	5000	38.3	392.2	390.6	1.004
third point	5000	19.2	196.6	195.1	1.008
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	76.4	782.3	783.2	0.999
Average Correction Factor					1.004

Corrected As found 784.5 Previous response 782.3 % change -0.3%

Notes:

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By: Aswin Sasi Kumar



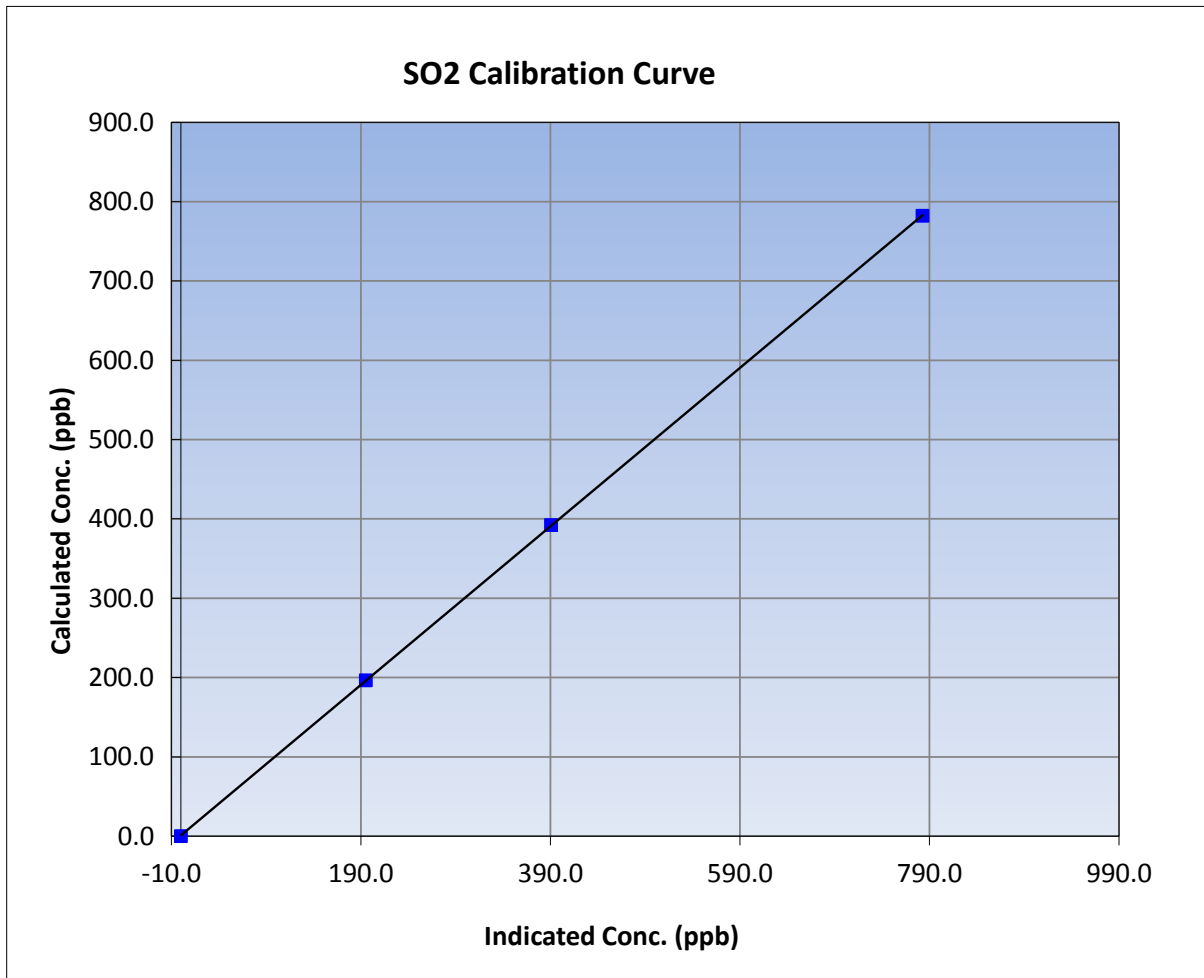
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 11, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:48	End Time (MST)	15:37
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

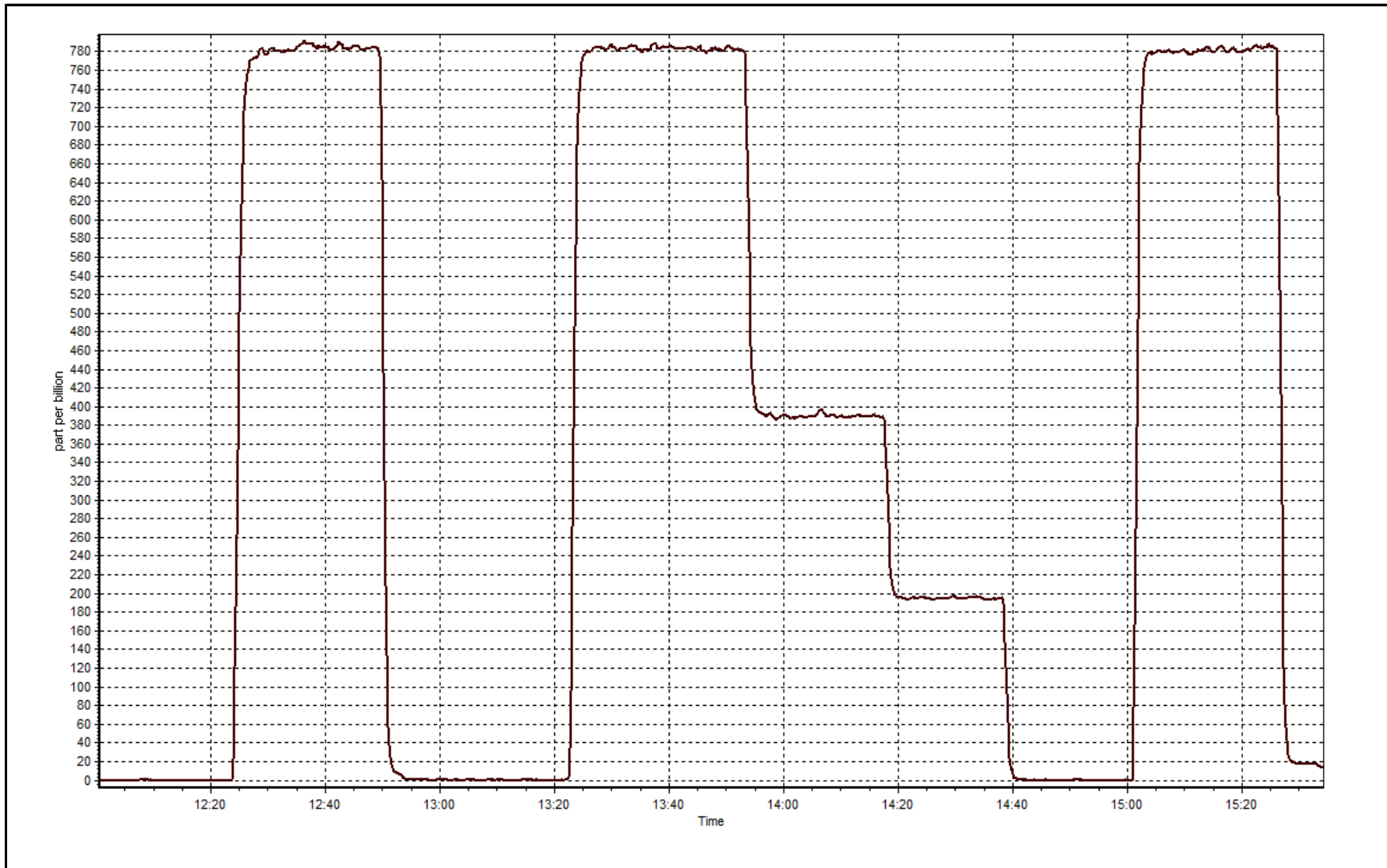
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999990
782.3	782.8	0.9995		
392.2	390.6	1.0042	Slope	0.999129
196.6	195.1	1.0079		
			Intercept	0.959536



SO2 Calibration Plot

Date: February 9, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 10, 2017	Last Calibration	January 11, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:53	End Time (MST)	14:41
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	-601	-601
Analyzer IP address	192.168.1.42		Lamp voltage	786	791
Calculated slope	0.996136	0.996880	Chamber temp	45	45
Calculated intercept	0.239303	-0.071035	Pressure	558.8	555.7
Analyzer Background	16.8	17	Flow	1.033	0.938
Analyzer Coefficient	0.967	0.976	Intensity	88	88
			Converter temp.	324	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	0.2	----
as found span	5000	80.1	80.7	80.5	1.003
SO2 scrubber check	5000	19.2	196.6	2.9	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	80.1	80.7	81.1	0.996
second point	5000	40.1	40.4	40.7	0.994
third point	5000	20.1	20.3	20.2	1.002
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	80.1	80.7	81.4	0.992
Average Correction Factor					0.997

Corrected As found	80.3	Previous response	80.8	% change	0.6%
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Notes:

Changed inlet filter and changed out pump for preventative maintenance after as founds. Completed scrubber check. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



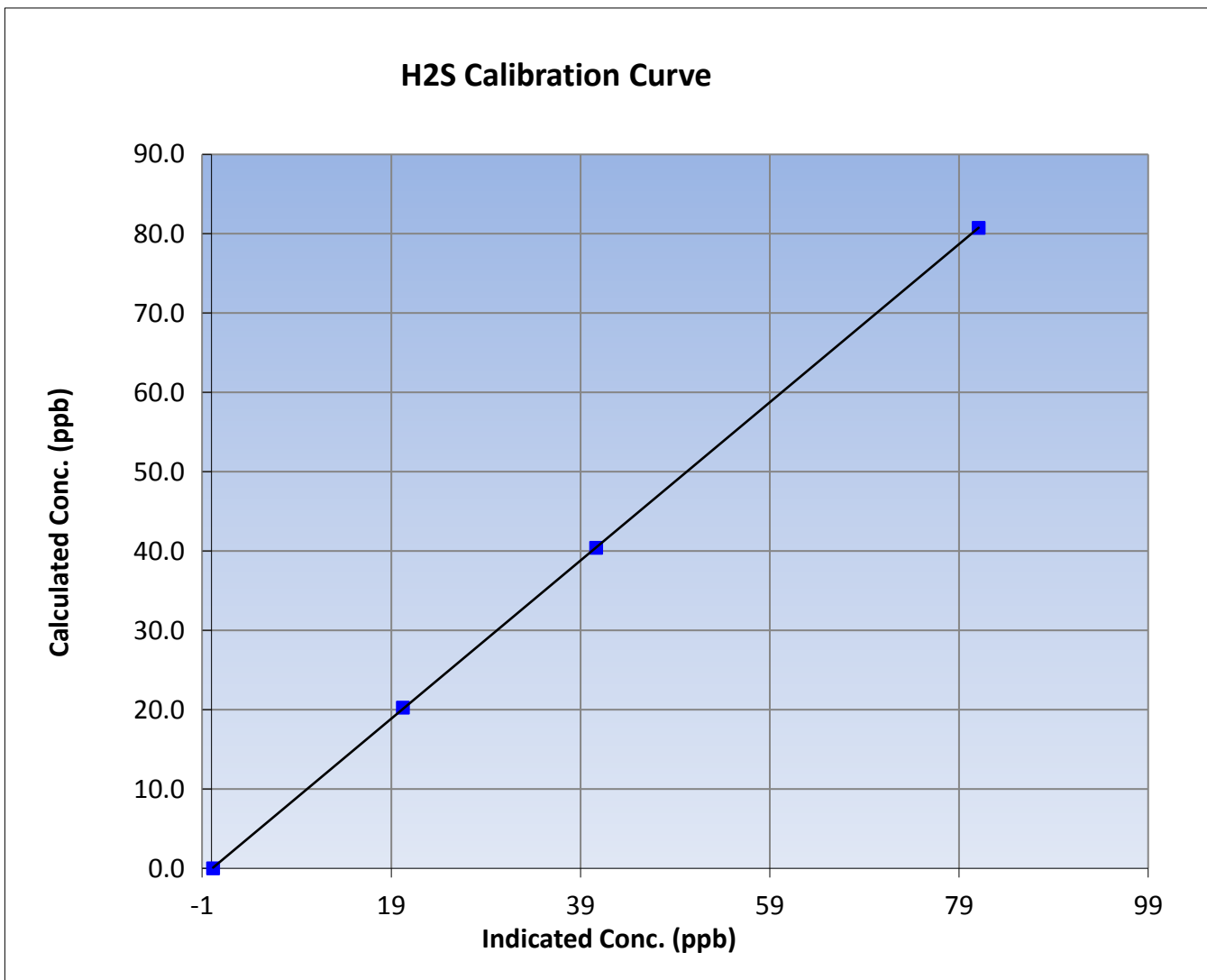
Wood Buffalo Environmental Association H2S Calibration Report

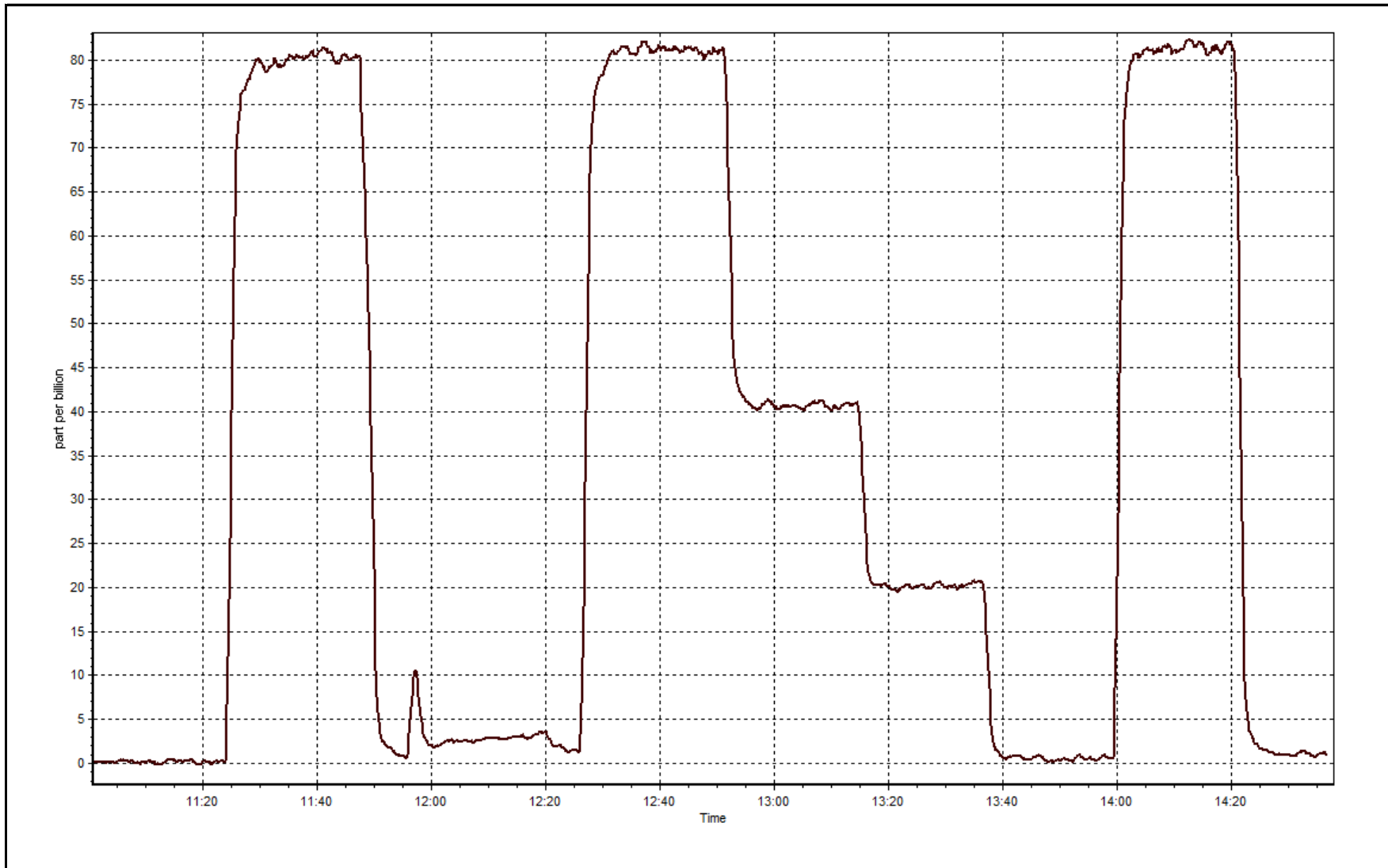
Station Information

Calibration Date	February 10, 2017	Previous Calibration	January 11, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:53	End Time (MST)	14:41
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	0.2	----	Correlation Coefficient	0.999989
80.7	81.1	0.9958		
40.4	40.7	0.9939	Slope	0.996880
20.3	20.2	1.0015		
			Intercept	-0.071035







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 11, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	11:48	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	0.999490	0.999907	Fuel Pressure	25.8	25.8
Calculated intercept	-0.009010	0.002970	Analyzer Coeff	5.006	5.022
			Analyzer BKG	2.19	1.61

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	-0.64	----
as found span	5000	76.4	16.52	15.79	1.046
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.4	16.52	16.52	1.000
second point	5000	38.3	8.28	8.27	1.001
third point	5000	19.2	4.15	4.15	1.000
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	76.4	16.52	16.42	1.006
Average Correction Factor					1.000

Corrected As found 16.43 Previous response 16.54 % change 0.6%

Notes:

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

Calibration Performed By:

Aswin Sasi Kumar



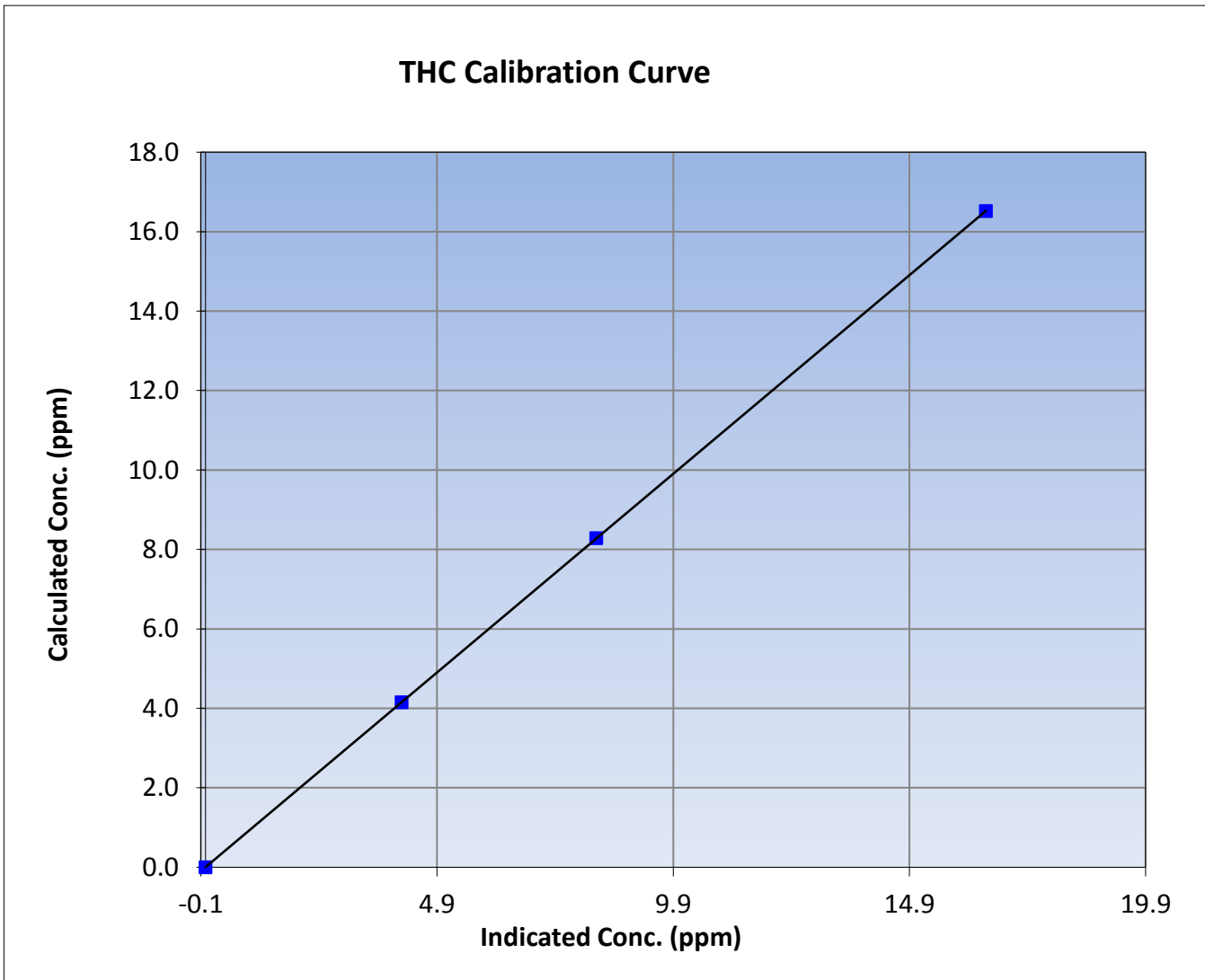
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 11, 2017
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:48	End Time (MST)	15:37
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

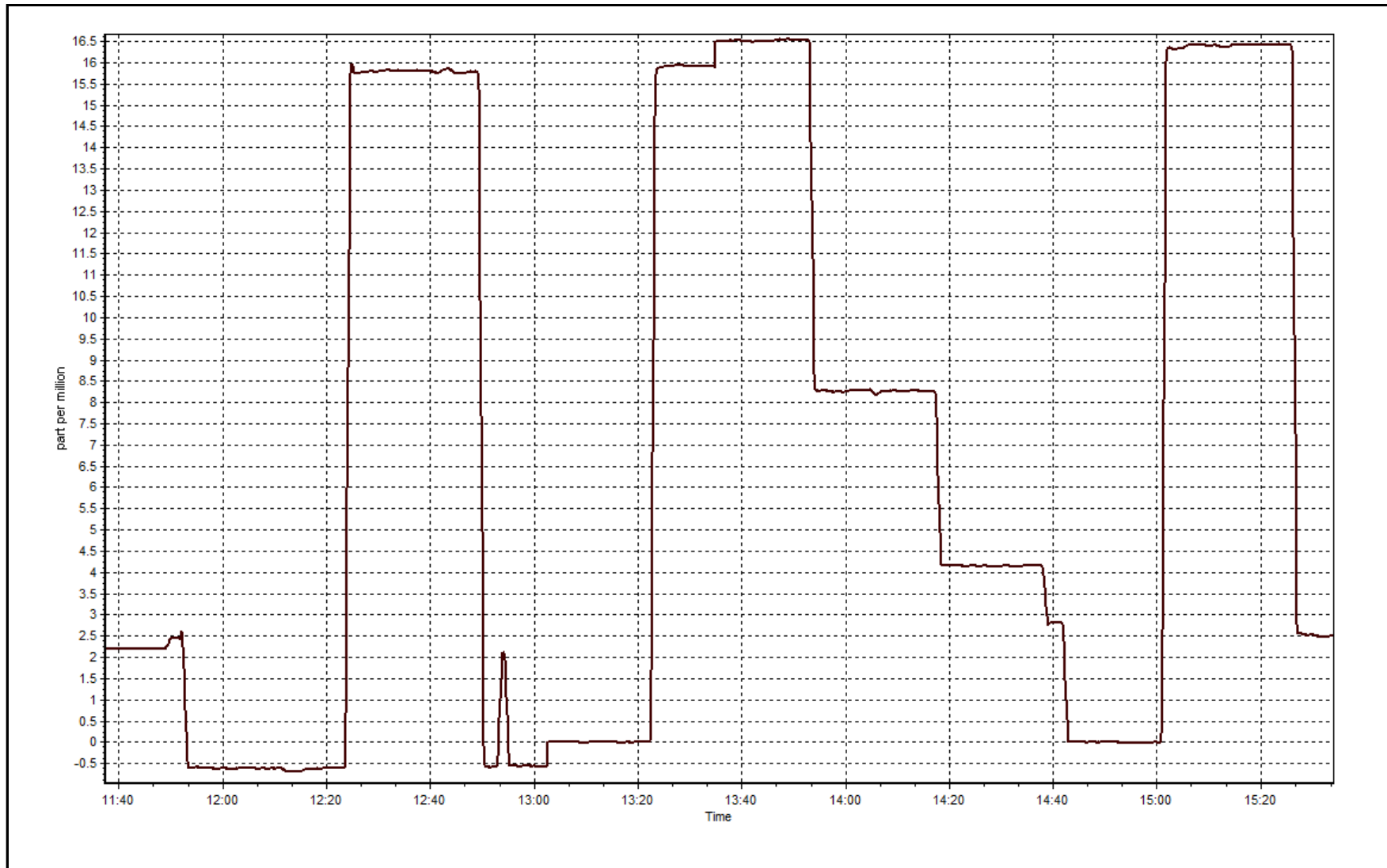
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999999
16.52	16.52	0.9999		
8.28	8.27	1.0013	Slope	0.999907
4.15	4.15	1.0003		
			Intercept	0.002970



THC Calibration Plot

Date: February 9, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3 LOWER CAMP METEOROLOGY FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
FEBRUARY 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	672	0	0	100	11.2	-	6.0	-
Temperature 45 m (C) Average	672	0	0	100	11.3	-	6.5	-
Temperature 100 m (C) Average	672	0	0	100	13	-	7.6	-
Temperature 167 m (C) Average	672	0	0	100	14.1	-	9.0	-
Relative Humidity 20 m (%) Average	672	0	0	100	97	-	87.0	-
Relative Humidity 45 m (%) Average	672	0	0	100	97	-	86.0	-
Relative Humidity 100 m (%) Average	672	0	0	100	97	-	88.0	-
Relative Humidity 167 m (%) Average	672	0	0	100	97	-	89.0	-
Wind Speed 20 m (km/h) Average	672	0	0	100	24	-	16.0	-
Wind Speed 45 m (km/h) Average	663	0	9	98.66	34	-	22.0	-
Wind Speed 100 m (km/h) Average	662	0	10	98.51	46	-	32.0	-
Wind Speed 167 m (km/h) Average	662	0	10	98.51	57	-	42.0	-
Wind Direction 20 m (deg) Average	672	0	0	100	-	-	-	-
Wind Direction 45 m (deg) Average	663	0	9	98.66	-	-	-	-
Wind Direction 100 m (deg) Average	662	0	10	98.51	-	-	-	-
Wind Direction 167 m (deg) Average	662	0	10	98.51	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	672	0	0	100	0.6	-	0.1	-
Vertical Wind Speed 45 m (km/h) Average	663	0	9	98.66	2.2	-	0.6	-
Vertical Wind Speed 100 m (km/h) Average	662	0	10	98.51	2.7	-	0.8	-
Vertical Wind Speed 167 m (km/h) Average	662	0	10	98.51	4	-	1.5	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
FEBRUARY 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	672	-10.89	10.2	-	-31.4	-23	-18.4	-12.7	-2.3	3.6	11.2
Temperature 45 m (C) Average	672	-10.63	10.1	-	-30.8	-22.7	-18.1	-12.6	-2.2	4	11.3
Temperature 100 m (C) Average	672	-10.09	10	-	-29.2	-22.1	-17.3	-12.9	-2.3	5	13
Temperature 167 m (C) Average	672	-9.97	10.1	-	-27.7	-22	-17.4	-12.8	-2.1	5.8	14.1
Relative Humidity 20 m (%) Average	672	71.1	12	-	37	53	62	74	81	85	97
Relative Humidity 45 m (%) Average	672	69.7	12	-	37	51	60	73	79	83	97
Relative Humidity 100 m (%) Average	672	69.1	14	-	34	48	60	73	79	84	97
Relative Humidity 167 m (%) Average	672	68.6	14	-	34	46	59	72	79	84	97
Wind Speed 20 m (km/h) Average	672	6.3	5	-	0	2	3	5	9	14	24
Wind Speed 45 m (km/h) Average	663	8.6	6	-	0	2	4	7	11	18	34
Wind Speed 100 m (km/h) Average	662	12.5	9	-	1	3	6	10	17	25	46
Wind Speed 167 m (km/h) Average	662	15.6	11	-	1	4	7	13	21	32	57
Wind Direction 20 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	663	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	662	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	662	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	672	-0.05	0.2	-	-1	-0.3	-0.1	0	0.1	0.1	0.6
Vertical Wind Speed 45 m (km/h) Average	663	0.02	0.5	-	-1.7	-0.5	-0.2	0	0.2	0.6	2.2
Vertical Wind Speed 100 m (km/h) Average	662	0.17	0.5	-	-1.6	-0.3	-0.1	0.1	0.4	0.8	2.7
Vertical Wind Speed 167 m (km/h) Average	662	0.49	0.7	-	-1.4	-0.1	0.1	0.3	0.7	1.4	4

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	20 Feb 2017 05:00	20 Feb 2017 13:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	20 Feb 2017 04:00	20 Feb 2017 13:00	10	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	20 Feb 2017 05:00	20 Feb 2017 14:00	10	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association
Summary of Hour Averages

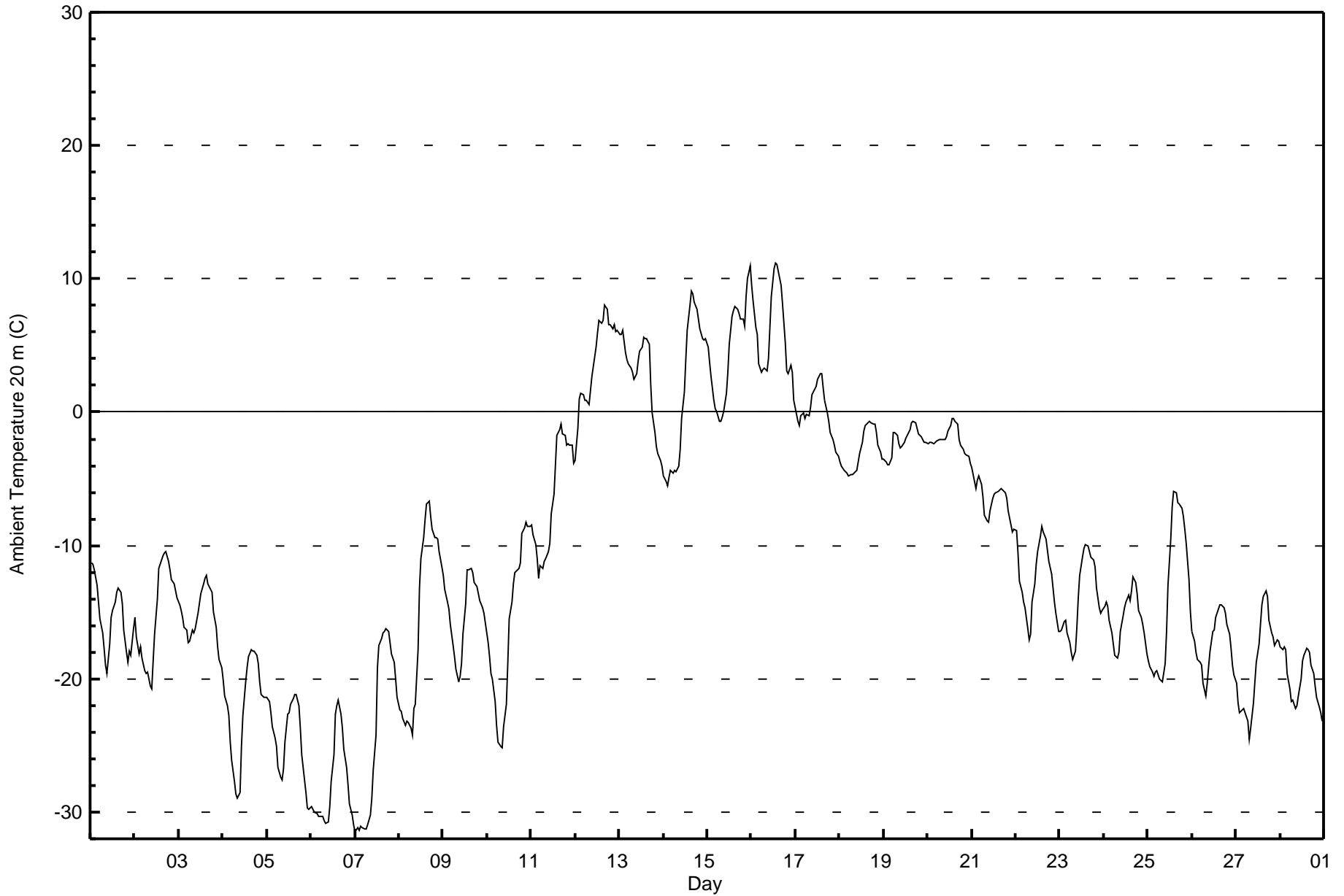
Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - February 2017

Maximum Value: 11.2 C on Feb 16 14:00 Maximum Daily Average: 6.0 C on Feb 16																						Hours in Service:	672			
Minimum Value: -31.4 C on Feb 7 01:00 Minimum Daily Average: -27.9 C on Feb 6																						Hours of Data:	672			
Maximum Diurnal Average: -7.0 C at hour 16 Minimum Diurnal Average: -14.5 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -10.89 C Percentiles: P ₁ = -31.0 P ₁₀ = -23.0 Q ₁ = -18.4 Median = -12.7 Q ₃ = -2.3 P ₉₀ = 3.6 P ₉₉ = 9.4																						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-Feb	-11.3	-11.4	-11.8	-13.0	-14.2	-15.5	-16.5	-17.7	-18.9	-19.6	-17.4	-15.4	-14.8	-14.2	-13.5	-13.1	-13.5	-14.3	-16.3	-18.0	-18.7	-17.9	-18.3	-16.3	-15.5	-11.3
2-Feb	-15.4	-16.8	-18.2	-17.6	-18.4	-19.4	-19.6	-19.5	-20.6	-20.7	-18.7	-16.7	-14.1	-11.8	-11.4	-10.7	-10.6	-10.5	-11.2	-11.8	-12.5	-12.9	-13.4	-13.9	-15.3	-10.5
3-Feb	-14.5	-14.9	-15.4	-16.1	-16.3	-17.3	-17.2	-16.3	-16.6	-16.2	-15.1	-14.4	-13.6	-12.9	-12.5	-12.2	-12.9	-13.3	-13.5	-14.9	-16.1	-17.6	-18.5	-19.2	-15.3	-12.2
4-Feb	-20.1	-21.2	-22.0	-22.8	-24.8	-26.1	-27.7	-28.6	-29.0	-28.5	-25.1	-22.8	-20.2	-19.2	-18.4	-17.8	-17.9	-18.0	-18.3	-18.9	-20.2	-21.2	-21.4	-21.4	-22.1	-17.8
5-Feb	-21.4	-21.7	-22.5	-23.6	-24.4	-25.1	-26.6	-27.4	-27.6	-26.8	-24.7	-22.6	-22.5	-21.9	-21.5	-21.2	-21.1	-22.0	-23.7	-25.6	-27.6	-28.5	-29.6	-29.7	-24.6	-21.1
6-Feb	-29.6	-29.8	-30.0	-30.1	-30.3	-30.3	-30.3	-30.6	-30.8	-30.7	-29.6	-27.7	-25.7	-22.7	-22.0	-21.6	-22.7	-23.7	-25.3	-26.7	-27.9	-29.4	-30.3	-31.0	-27.9	-21.6
7-Feb	-31.4	-31.2	-31.4	-31.1	-31.1	-31.2	-31.3	-31.0	-30.2	-28.9	-26.8	-24.2	-19.2	-17.5	-17.0	-16.5	-16.4	-16.2	-16.4	-17.3	-18.2	-18.8	-20.0	-21.4	-24.0	-16.2
8-Feb	-22.3	-22.5	-22.9	-23.5	-23.2	-23.2	-23.7	-24.2	-22.2	-22.0	-17.8	-13.2	-11.0	-9.4	-8.0	-6.8	-6.6	-7.9	-8.7	-9.4	-9.4	-9.5	-10.5	-11.6	-15.4	-6.6
9-Feb	-12.3	-13.3	-14.2	-14.8	-15.9	-17.5	-18.4	-19.3	-20.3	-19.8	-18.8	-16.7	-14.4	-11.8	-11.9	-11.7	-12.1	-12.7	-13.0	-13.6	-14.1	-14.7	-15.1	-15.8	-15.1	-11.7
10-Feb	-17.3	-18.3	-19.6	-20.0	-21.7	-23.5	-24.7	-25.1	-25.1	-23.6	-21.9	-18.9	-15.5	-14.3	-12.9	-12.0	-11.9	-11.8	-11.3	-9.1	-8.7	-8.2	-8.6	-8.6	-16.4	-8.2
11-Feb	-8.5	-9.1	-9.9	-11.0	-12.5	-11.5	-11.7	-11.1	-11.0	-10.4	-9.8	-7.6	-6.2	-4.0	-1.7	-1.4	-0.8	-1.6	-1.7	-2.5	-2.4	-2.5	-2.5	-3.8	-6.5	-0.8
12-Feb	-3.6	-1.2	1.0	1.5	1.3	0.9	0.8	0.6	1.6	2.7	3.4	4.9	5.9	6.9	6.7	6.9	8.1	7.7	6.6	6.5	6.2	6.6	6.1	6.1	3.9	8.1
13-Feb	5.8	5.8	6.1	4.5	4.0	3.6	3.3	3.0	2.5	2.9	3.8	4.6	4.9	5.7	5.5	5.5	5.1	2.1	0.0	-1.5	-2.6	-3.1	-3.7	-4.1	2.7	6.1
14-Feb	-4.8	-5.2	-5.5	-4.9	-4.4	-4.5	-4.4	-4.4	-4.0	-2.7	-0.5	1.5	4.0	6.2	8.1	9.1	8.9	8.3	7.7	7.0	6.2	5.5	5.4	5.6	1.6	9.1
15-Feb	4.9	3.7	2.7	0.9	0.2	0.0	-0.7	-0.7	-0.3	0.0	1.4	3.0	5.1	7.2	7.6	8.0	7.7	7.4	7.0	7.0	6.5	8.7	10.0	11.0	4.5	11.0
16-Feb	9.5	8.4	6.4	5.9	3.6	3.0	3.2	3.3	3.1	4.0	6.4	8.7	10.8	11.2	11.0	10.1	9.5	8.1	5.2	3.1	2.9	3.5	2.9	0.9	6.0	11.2
17-Feb	-0.2	-0.7	-1.0	-0.3	-0.1	-0.4	-0.2	-0.2	0.4	1.3	1.8	2.0	2.4	2.9	2.9	1.9	0.9	-0.1	-0.7	-1.5	-2.0	-2.4	-3.0	-3.4	0.0	2.9
18-Feb	-3.7	-4.1	-4.4	-4.5	-4.6	-4.7	-4.7	-4.7	-4.5	-4.3	-3.7	-3.1	-2.2	-1.4	-1.0	-0.8	-0.6	-0.7	-0.8	-0.9	-1.5	-2.4	-3.0	-3.6	-2.9	-0.6
19-Feb	-3.5	-3.7	-3.9	-3.9	-3.4	-1.6	-1.5	-1.7	-2.4	-2.7	-2.6	-2.3	-1.9	-1.7	-1.3	-0.8	-0.7	-0.8	-1.2	-1.6	-1.9	-2.1	-2.2	-2.3	-2.2	-0.7
20-Feb	-2.4	-2.3	-2.3	-2.3	-2.3	-2.1	-2.1	-2.1	-2.1	-2.0	-1.8	-1.4	-1.0	-0.4	-0.5	-0.7	-0.9	-2.1	-2.5	-2.8	-3.1	-3.2	-3.3	-3.9	-2.1	-0.4
21-Feb	-4.2	-5.2	-5.7	-5.1	-4.7	-5.4	-6.3	-7.7	-8.1	-8.3	-7.4	-6.5	-6.2	-6.0	-5.9	-5.8	-5.7	-5.8	-6.0	-6.4	-7.4	-8.4	-9.0	-8.8	-6.5	-4.2
22-Feb	-8.9	-10.5	-12.6	-13.6	-14.2	-14.7	-16.2	-17.1	-16.7	-14.2	-12.9	-11.4	-10.4	-9.3	-8.6	-9.0	-9.5	-10.3	-11.2	-12.1	-13.2	-14.2	-15.1	-16.5	-12.6	-8.6
23-Feb	-16.4	-16.3	-15.7	-15.6	-16.6	-17.3	-18.0	-18.6	-17.9	-16.1	-14.0	-12.2	-10.8	-10.2	-9.9	-10.1	-10.5	-10.9	-11.1	-11.6	-13.2	-14.7	-15.0	-14.9	-14.1	-9.9
24-Feb	-14.5	-14.3	-14.5	-15.6	-16.6	-17.4	-18.2	-18.5	-18.0	-16.5	-15.3	-14.6	-14.3	-13.7	-14.1	-13.4	-12.4	-12.7	-13.7	-14.8	-15.4	-16.0	-16.6	-18.1	-15.4	-12.4
25-Feb	-18.7	-19.0	-19.5	-19.8	-19.5	-19.4	-20.0	-20.1	-20.3	-18.8	-16.4	-13.0	-9.5	-7.1	-5.9	-6.0	-6.8	-6.9	-7.1	-7.8	-8.8	-9.8	-12.6	-15.0	-13.7	-5.9
26-Feb	-16.4	-17.2	-18.0	-18.5	-18.8	-18.9	-20.3	-21.3	-20.3	-19.1	-17.9	-16.4	-16.4	-15.4	-14.7	-14.4	-14.4	-14.6	-15.1	-16.0	-16.7	-17.7	-19.0	-19.7	-17.4	-14.4
27-Feb	-20.3	-21.8	-22.6	-22.4	-22.2	-22.5	-23.2	-24.5	-23.7	-21.8	-20.2	-18.8	-17.4	-16.0	-14.5	-13.8	-13.4	-13.9	-15.6	-16.6	-16.9	-17.5	-17.1	-17.2	-18.9	-13.4
28-Feb	-17.6	-17.8	-17.7	-17.8	-19.6	-20.8	-21.7	-21.6	-22.2	-22.0	-21.3	-20.0	-18.7	-18.3	-17.7	-17.8	-18.0	-19.0	-19.6	-20.5	-21.4	-22.1	-22.5	-23.1	-20.0	-17.6
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	129	19.20	19.20
-20 - 0	436	64.88	84.08
0 - 10	101	15.03	99.11
10 - 20	6	0.89	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Summary of Hour Averages

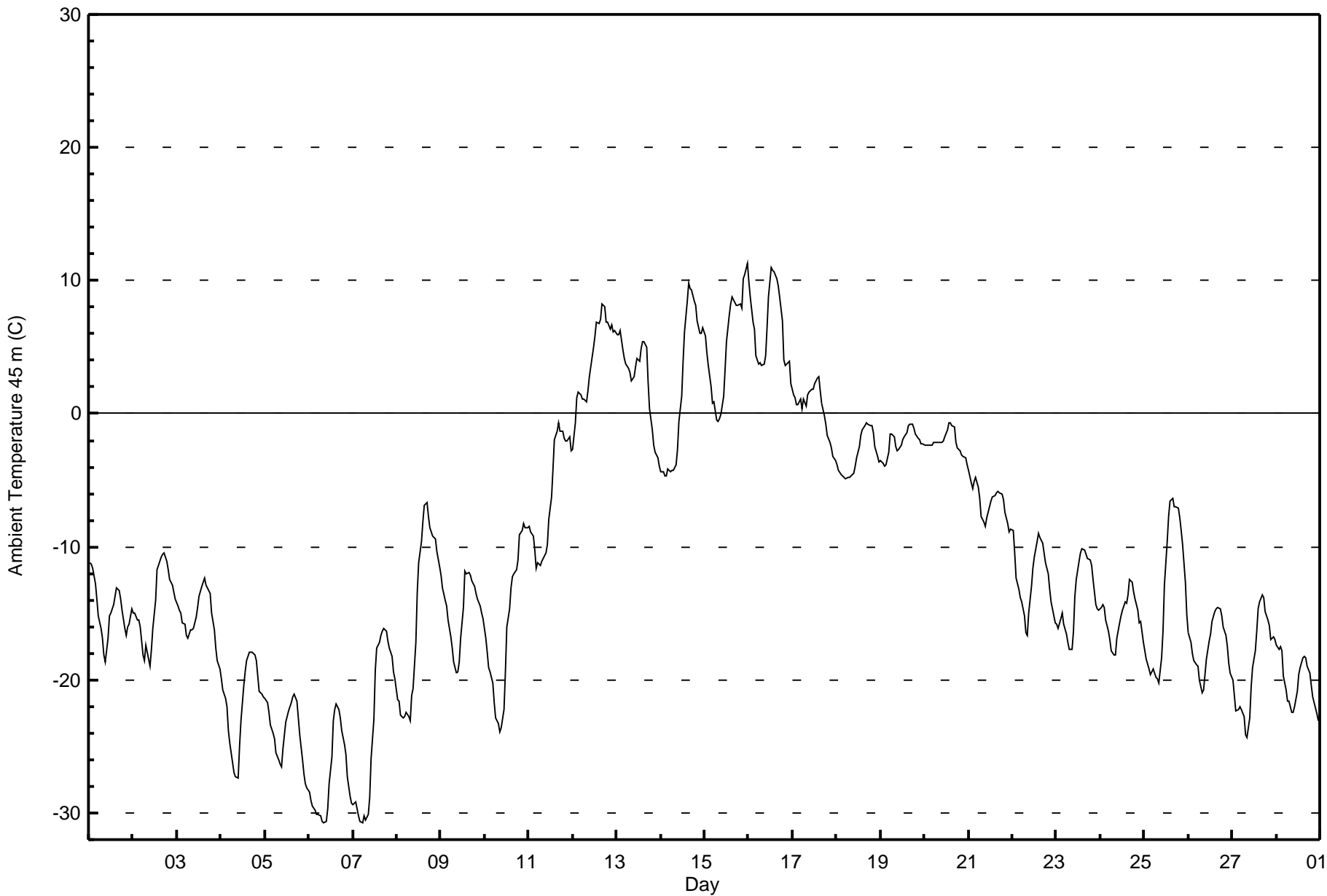
Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - February 2017

Maximum Value: 11.3 C on Feb 16 00:00 Maximum Daily Average: 6.5 C on Feb 16																						Hours in Service: 672 Hours of Data: 672				
Minimum Value: -30.8 C on Feb 6 09:00 Minimum Daily Average: -27.3 C on Feb 6 Maximum Diurnal Average: -7.1 C at hour 16 Minimum Diurnal Average: -14.1 C at hour 9 Monthly Average: -10.63 C Percentiles: P ₁ = -30.3 P ₁₀ = -22.7 Q ₁ = -18.1 Median = -12.6 Q ₃ = -2.2 P ₉₀ = 4.0 P ₉₉ = 10.1																						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-Feb	-11.2	-11.3	-11.7	-12.7	-13.9	-15.2	-16.1	-16.9	-18.1	-18.6	-16.9	-15.2	-15.0	-14.4	-13.7	-13.1	-13.3	-14.0	-14.8	-16.1	-16.6	-16.0	-15.8	-14.7	-14.8	-11.2
2-Feb	-14.9	-15.0	-15.5	-15.5	-16.0	-18.1	-18.5	-17.4	-18.4	-19.0	-17.7	-16.1	-14.0	-11.7	-11.4	-10.8	-10.6	-10.5	-11.1	-11.7	-12.4	-12.9	-13.4	-14.0	-14.4	-10.5
3-Feb	-14.4	-14.8	-15.0	-15.7	-15.8	-16.6	-16.8	-16.2	-16.2	-16.2	-15.3	-14.6	-13.7	-13.0	-12.7	-12.3	-12.9	-13.3	-13.5	-15.0	-16.2	-17.6	-18.6	-19.1	-15.2	-12.3
4-Feb	-19.9	-20.7	-21.4	-22.0	-23.8	-24.8	-26.3	-27.0	-27.3	-27.3	-25.0	-23.0	-20.5	-19.4	-18.6	-17.9	-17.9	-17.9	-18.1	-18.5	-19.7	-20.9	-21.1	-21.3	-21.7	-17.9
5-Feb	-21.3	-21.7	-22.5	-23.4	-24.0	-24.4	-25.5	-26.1	-26.3	-26.5	-25.1	-23.1	-22.7	-22.3	-21.7	-21.2	-21.1	-21.6	-22.8	-24.1	-26.0	-27.1	-27.8	-28.1	-24.0	-21.1
6-Feb	-28.4	-29.0	-29.5	-29.8	-30.1	-30.1	-30.2	-30.6	-30.8	-30.7	-29.7	-27.8	-25.8	-23.1	-22.2	-21.8	-22.2	-22.9	-23.8	-24.8	-25.6	-27.3	-28.7	-29.2	-27.3	-21.8
7-Feb	-29.3	-29.2	-29.6	-30.2	-30.7	-30.8	-30.3	-30.6	-30.1	-28.9	-25.9	-23.0	-19.3	-17.6	-17.1	-16.7	-16.4	-16.2	-16.3	-17.1	-17.6	-18.3	-19.4	-20.0	-23.3	-16.2
8-Feb	-21.5	-21.6	-22.6	-22.9	-22.7	-22.4	-22.8	-23.1	-21.2	-20.7	-17.2	-13.4	-11.2	-9.6	-8.2	-6.9	-6.6	-7.8	-8.6	-9.2	-9.3	-9.4	-10.4	-11.5	-15.0	-6.6
9-Feb	-12.1	-13.1	-14.0	-14.4	-15.5	-16.8	-17.6	-18.7	-19.5	-19.4	-18.7	-16.8	-14.6	-11.9	-12.0	-11.9	-12.1	-12.6	-12.9	-13.5	-14.0	-14.5	-15.0	-15.4	-14.9	-11.9
10-Feb	-16.9	-17.9	-19.0	-19.4	-20.3	-21.7	-22.9	-23.2	-23.9	-23.6	-22.2	-19.4	-16.0	-14.6	-13.1	-12.3	-12.0	-11.7	-11.0	-9.0	-8.7	-8.3	-8.6	-8.6	-16.0	-8.3
11-Feb	-8.4	-8.9	-9.2	-10.2	-11.6	-11.2	-11.4	-11.0	-10.9	-10.5	-9.8	-7.9	-6.3	-4.1	-1.9	-1.3	-0.7	-1.3	-1.4	-1.8	-2.1	-2.1	-1.7	-2.8	-6.2	-0.7
12-Feb	-2.6	-0.7	1.2	1.6	1.4	1.1	1.1	0.9	1.7	2.8	3.5	5.0	5.9	6.9	6.8	7.1	8.2	8.1	6.9	6.8	6.4	6.7	6.2	6.3	4.1	8.2
13-Feb	5.9	6.0	6.2	4.7	4.1	3.7	3.4	3.1	2.5	2.8	3.5	4.1	4.0	4.9	5.4	5.4	5.0	2.4	0.4	-1.2	-2.3	-2.9	-3.4	-4.0	2.7	6.2
14-Feb	-4.3	-4.4	-4.7	-4.6	-4.1	-4.4	-4.2	-4.3	-3.8	-2.7	-0.6	1.3	4.0	6.2	8.4	9.8	9.4	9.3	8.4	8.1	6.9	6.1	6.0	6.4	2.0	9.8
15-Feb	5.8	4.6	3.6	2.0	0.8	0.9	-0.5	-0.5	-0.3	-0.1	1.3	3.3	5.4	7.4	8.2	8.8	8.4	8.1	8.1	8.3	7.9	10.1	10.4	11.3	5.1	11.3
16-Feb	9.9	8.8	6.9	6.3	4.4	3.7	3.8	3.6	3.7	4.4	6.5	8.8	11.0	10.8	10.7	10.2	9.6	8.7	7.0	4.0	3.6	3.8	4.0	2.2	6.5	11.0
17-Feb	1.4	1.2	0.7	0.7	1.1	0.4	1.1	0.6	1.4	1.6	1.8	1.9	2.3	2.7	2.8	1.8	0.8	-0.1	-0.8	-1.6	-2.2	-2.6	-3.2	-3.5	0.4	2.8
18-Feb	-3.9	-4.2	-4.5	-4.6	-4.8	-4.9	-4.8	-4.8	-4.7	-4.5	-3.9	-3.3	-2.5	-1.7	-1.2	-0.9	-0.7	-0.8	-0.9	-0.9	-1.5	-2.5	-3.2	-3.6	-3.0	-0.7
19-Feb	-3.5	-3.7	-3.9	-3.8	-2.9	-1.5	-1.5	-1.8	-2.4	-2.8	-2.6	-2.4	-2.0	-1.8	-1.4	-0.9	-0.8	-0.8	-1.1	-1.5	-1.9	-2.0	-2.2	-2.3	-2.2	-0.8
20-Feb	-2.4	-2.4	-2.4	-2.4	-2.3	-2.2	-2.2	-2.2	-2.2	-2.2	-2.1	-1.8	-1.2	-0.6	-0.7	-0.9	-1.0	-2.2	-2.6	-2.8	-3.2	-3.2	-3.3	-3.9	-2.2	-0.6
21-Feb	-4.2	-5.2	-5.6	-5.1	-4.8	-5.5	-6.4	-7.7	-8.2	-8.4	-7.8	-7.0	-6.5	-6.3	-6.1	-5.9	-5.8	-5.9	-6.1	-6.5	-7.4	-8.2	-8.9	-8.6	-6.6	-4.2
22-Feb	-8.7	-10.4	-12.3	-13.1	-13.8	-14.1	-15.2	-16.5	-16.6	-15.0	-13.0	-11.6	-10.8	-9.7	-9.0	-9.3	-9.8	-10.4	-11.2	-12.1	-13.2	-14.1	-14.7	-15.7	-12.5	-8.7
23-Feb	-15.8	-16.2	-15.4	-15.0	-15.8	-16.6	-17.2	-17.7	-17.8	-16.3	-13.8	-12.5	-11.1	-10.5	-10.2	-10.3	-10.6	-10.8	-11.0	-11.4	-12.5	-14.3	-14.7	-14.8	-13.8	-10.2
24-Feb	-14.5	-14.3	-14.6	-15.5	-16.4	-17.0	-17.8	-18.1	-18.1	-16.9	-15.7	-15.2	-14.7	-14.1	-14.3	-13.6	-12.5	-12.6	-13.4	-13.9	-14.7	-15.7	-15.6	-17.2	-15.3	-12.5
25-Feb	-17.8	-18.5	-19.2	-19.6	-19.4	-19.2	-19.8	-19.9	-20.2	-18.3	-16.4	-12.8	-9.6	-7.7	-6.6	-6.4	-6.9	-7.0	-7.1	-7.8	-8.8	-9.9	-12.7	-15.0	-13.6	-6.4
26-Feb	-16.5	-17.2	-18.0	-18.5	-18.8	-18.9	-20.0	-21.0	-20.8	-19.6	-18.4	-17.1	-16.6	-15.6	-14.9	-14.6	-14.6	-14.7	-15.1	-16.0	-16.7	-17.5	-18.8	-19.5	-17.5	-14.6
27-Feb	-20.0	-21.1	-22.3	-22.2	-22.0	-22.2	-22.7	-24.2	-24.4	-22.8	-20.6	-19.1	-17.8	-16.4	-14.7	-14.1	-13.6	-13.8	-14.9	-15.5	-16.0	-17.0	-16.8	-17.0	-18.8	-13.6
28-Feb	-17.4	-17.7	-17.5	-17.8	-19.7	-20.8	-21.6	-21.6	-22.4	-22.4	-22.0	-20.8	-19.6	-19.1	-18.4	-18.2	-18.3	-19.0	-19.5	-20.5	-21.3	-22.1	-22.5	-23.1	-20.1	-17.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	119	17.71	17.71
-20 - 0	438	65.18	82.89
0 - 10	108	16.07	98.96
10 - 20	7	1.04	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

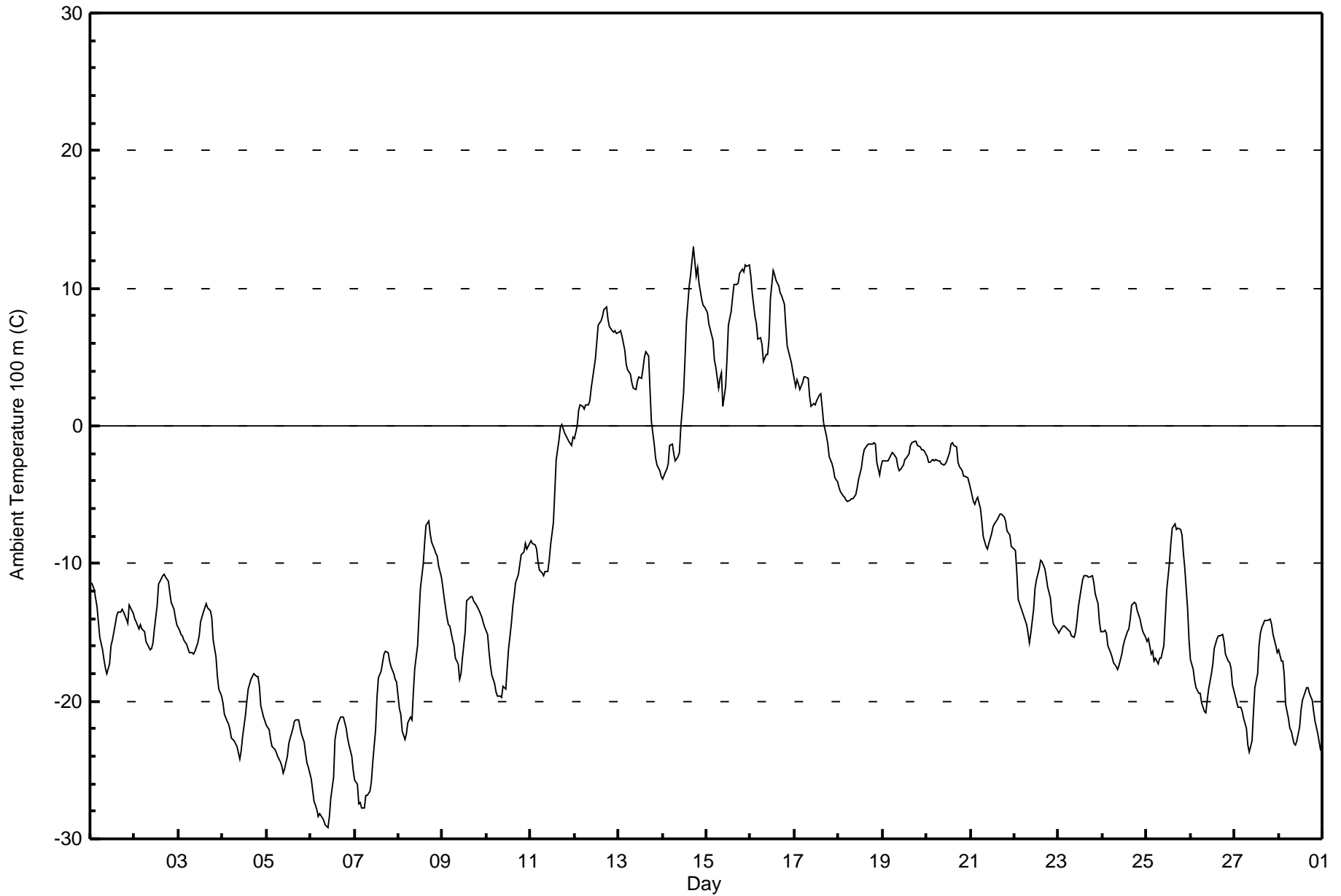


Maximum Value: 13.0 C on Feb 14 18:00 Maximum Daily Average: 7.6 C on Feb 16																								Hours in Service:	672	
Minimum Value: -29.2 C on Feb 6 10:00 Minimum Daily Average: -25.3 C on Feb 6																								Hours of Data:	672	
Maximum Diurnal Average: -7.2 C at hour 17 Minimum Diurnal Average: -12.9 C at hour 9																								Hours of Missing Data:	0	
Monthly Average: -10.09 C Percentiles: P ₁ = -27.9 P ₁₀ = -22.1 Q ₁ = -17.3 Median = -12.9 Q ₃ = -2.3 P ₉₀ = 5.0 P ₉₉ = 11.4																								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-Feb	-11.4	-11.6	-11.9	-13.1	-14.2	-15.4	-16.3	-17.0	-17.6	-18.0	-17.3	-16.0	-15.5	-14.4	-13.9	-13.5	-13.6	-13.4	-13.5	-14.0	-14.3	-13.1	-13.2	-13.7	-14.4	-11.4
2-Feb	-14.1	-14.3	-14.8	-14.5	-14.8	-15.0	-15.7	-15.9	-16.3	-16.1	-15.8	-14.7	-13.0	-11.5	-11.2	-10.9	-10.8	-10.9	-11.3	-12.1	-12.8	-13.3	-13.9	-14.4	-13.7	-10.8
3-Feb	-14.8	-15.1	-15.3	-15.6	-15.9	-16.2	-16.4	-16.5	-16.6	-16.4	-15.8	-15.2	-14.2	-13.5	-13.3	-12.9	-13.2	-13.5	-14.0	-15.5	-16.8	-18.2	-19.1	-19.6	-15.6	-12.9
4-Feb	-20.2	-20.9	-21.5	-21.7	-22.1	-22.7	-22.9	-23.1	-23.3	-24.2	-23.6	-22.5	-21.0	-20.1	-19.1	-18.4	-18.2	-18.0	-18.2	-18.2	-18.9	-20.4	-21.1	-21.5	-20.9	-18.0
5-Feb	-21.8	-22.1	-22.8	-23.3	-23.5	-23.7	-24.0	-24.4	-24.8	-25.2	-24.9	-24.0	-23.1	-22.6	-21.9	-21.4	-21.4	-21.4	-21.9	-22.4	-23.0	-23.8	-24.5	-24.8	-23.2	-21.4
6-Feb	-25.6	-26.4	-27.3	-27.9	-28.3	-28.2	-28.5	-28.6	-29.0	-29.2	-28.4	-27.0	-25.5	-22.8	-22.2	-21.6	-21.1	-21.1	-21.1	-22.0	-22.7	-23.2	-24.0	-25.0	-25.3	-21.1
7-Feb	-25.8	-26.0	-27.5	-27.4	-27.7	-27.8	-26.9	-26.9	-26.5	-25.8	-24.4	-22.1	-19.8	-18.3	-17.8	-17.2	-16.6	-16.4	-16.5	-17.1	-17.5	-18.0	-18.4	-18.7	-21.9	-16.4
8-Feb	-20.5	-20.9	-22.2	-22.8	-22.3	-21.5	-21.2	-21.4	-19.3	-17.6	-15.9	-13.8	-11.8	-10.1	-8.6	-7.2	-6.9	-7.8	-8.5	-9.0	-9.2	-9.4	-10.2	-11.0	-14.6	-6.9
9-Feb	-11.7	-12.5	-13.9	-14.4	-14.5	-15.6	-16.0	-16.9	-17.3	-18.4	-18.0	-16.9	-15.0	-12.7	-12.6	-12.4	-12.5	-12.7	-13.0	-13.3	-13.5	-13.9	-14.3	-14.7	-14.4	-11.7
10-Feb	-15.2	-16.4	-17.4	-18.1	-18.7	-19.4	-19.7	-19.7	-19.7	-18.9	-19.1	-17.6	-16.2	-14.4	-13.1	-12.3	-11.3	-10.7	-10.1	-9.3	-9.2	-8.5	-9.0	-8.5	-14.7	-8.5
11-Feb	-8.3	-8.5	-8.6	-8.9	-9.9	-10.5	-10.6	-10.8	-10.6	-10.6	-9.8	-8.6	-7.0	-4.8	-2.5	-1.0	-0.1	0.1	-0.5	-0.8	-0.9	-1.1	-1.4	-0.8	-5.7	0.1
12-Feb	-0.9	0.0	1.2	1.6	1.5	1.2	1.5	1.5	1.9	2.7	3.5	4.9	6.1	7.4	7.6	7.9	8.4	8.6	7.8	7.2	6.9	6.9	6.9	6.8	4.5	8.6
13-Feb	6.8	6.9	6.5	5.5	4.5	4.1	3.7	3.2	2.8	2.6	3.3	3.6	3.5	4.2	5.0	5.4	5.1	2.6	0.3	-1.3	-2.3	-2.8	-3.2	-3.7	2.8	6.9
14-Feb	-3.8	-3.4	-3.2	-2.8	-1.4	-1.3	-2.0	-2.5	-2.2	-1.9	-0.1	2.5	4.9	7.5	10.1	11.0	12.0	13.0	10.9	11.5	10.3	9.1	8.7	8.7	4.0	13.0
15-Feb	8.2	7.5	7.0	6.2	4.7	4.3	2.8	3.5	3.9	1.4	2.8	4.9	7.3	8.4	9.3	10.3	10.3	10.4	11.0	11.4	11.2	11.7	11.6	11.7	7.6	11.7
16-Feb	10.8	9.7	7.9	7.4	6.3	6.4	5.9	4.7	5.2	5.2	6.4	9.3	11.3	11.0	10.5	10.2	9.7	9.4	8.9	7.3	5.8	5.0	4.5	4.0	7.6	11.3
17-Feb	2.9	3.3	3.1	2.6	3.2	3.5	3.6	3.5	2.1	1.4	1.6	1.5	1.8	2.2	2.3	1.3	0.2	-0.7	-1.3	-2.2	-2.8	-3.2	-3.8	-4.1	0.9	3.6
18-Feb	-4.5	-4.8	-5.1	-5.2	-5.4	-5.5	-5.4	-5.3	-5.3	-5.0	-4.5	-3.8	-3.0	-2.2	-1.8	-1.5	-1.3	-1.3	-1.3	-1.2	-1.3	-2.7	-3.5	-2.9	-3.5	-1.2
19-Feb	-2.6	-2.6	-2.6	-2.6	-2.1	-2.0	-2.0	-2.3	-2.9	-3.3	-3.1	-2.9	-2.5	-2.3	-2.0	-1.5	-1.2	-1.2	-1.2	-1.5	-1.6	-1.7	-1.7	-1.8	-2.1	-1.2
20-Feb	-2.2	-2.7	-2.7	-2.5	-2.5	-2.4	-2.5	-2.5	-2.7	-2.8	-2.8	-2.6	-2.0	-1.3	-1.3	-1.4	-1.5	-2.7	-3.0	-3.3	-3.6	-3.6	-3.7	-4.2	-2.6	-1.3
21-Feb	-4.6	-5.4	-5.7	-5.4	-5.2	-6.0	-6.9	-8.1	-8.7	-9.0	-8.5	-7.9	-7.3	-7.2	-6.9	-6.6	-6.4	-6.4	-6.6	-7.0	-7.6	-8.0	-8.7	-8.8	-7.0	-4.6
22-Feb	-9.1	-10.7	-12.6	-13.2	-13.5	-13.8	-14.4	-15.0	-15.7	-15.1	-13.3	-11.8	-11.1	-10.4	-9.7	-9.9	-10.4	-11.0	-11.7	-12.5	-13.6	-14.3	-14.6	-14.8	-12.6	-9.1
23-Feb	-15.0	-14.9	-14.5	-14.5	-14.7	-14.9	-14.9	-15.2	-15.4	-14.9	-14.1	-13.1	-11.8	-11.2	-10.9	-10.9	-11.0	-11.0	-10.9	-11.4	-12.2	-12.9	-14.2	-14.9	-13.3	-10.9
24-Feb	-15.0	-14.8	-15.1	-15.9	-16.5	-16.7	-17.2	-17.5	-17.7	-17.4	-16.6	-16.0	-15.6	-14.9	-14.8	-14.1	-13.0	-12.8	-12.9	-13.4	-14.0	-14.5	-15.0	-15.3	-15.3	-12.8
25-Feb	-15.7	-15.5	-16.5	-16.4	-17.1	-16.9	-17.3	-16.9	-16.9	-15.9	-14.0	-12.0	-9.9	-8.5	-7.5	-7.1	-7.5	-7.5	-7.5	-7.9	-9.2	-10.4	-13.3	-15.6	-12.6	-7.1
26-Feb	-16.9	-17.7	-18.5	-19.0	-19.4	-19.4	-20.2	-20.8	-20.8	-19.9	-19.2	-18.0	-17.3	-16.2	-15.5	-15.2	-15.3	-15.2	-15.7	-16.5	-17.1	-17.2	-17.6	-18.8	-17.8	-15.2
27-Feb	-19.6	-20.1	-20.4	-20.4	-20.8	-21.2	-22.0	-23.2	-23.7	-22.9	-20.9	-19.0	-18.0	-16.0	-15.0	-14.6	-14.2	-14.1	-14.1	-14.0	-14.4	-15.2	-16.0	-16.5	-18.2	-14.0
28-Feb	-16.2	-17.0	-17.1	-18.1	-20.2	-21.3	-22.0	-22.2	-23.1	-23.2	-22.9	-21.8	-20.6	-20.0	-19.3	-19.0	-19.0	-19.5	-19.9	-20.8	-21.5	-22.3	-23.0	-23.5	-20.6	-16.2
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	112	16.67	16.67
-20 - 0	440	65.48	82.14
0 - 10	99	14.73	96.88
10 - 20	21	3.13	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 167 m (AT167m) - C

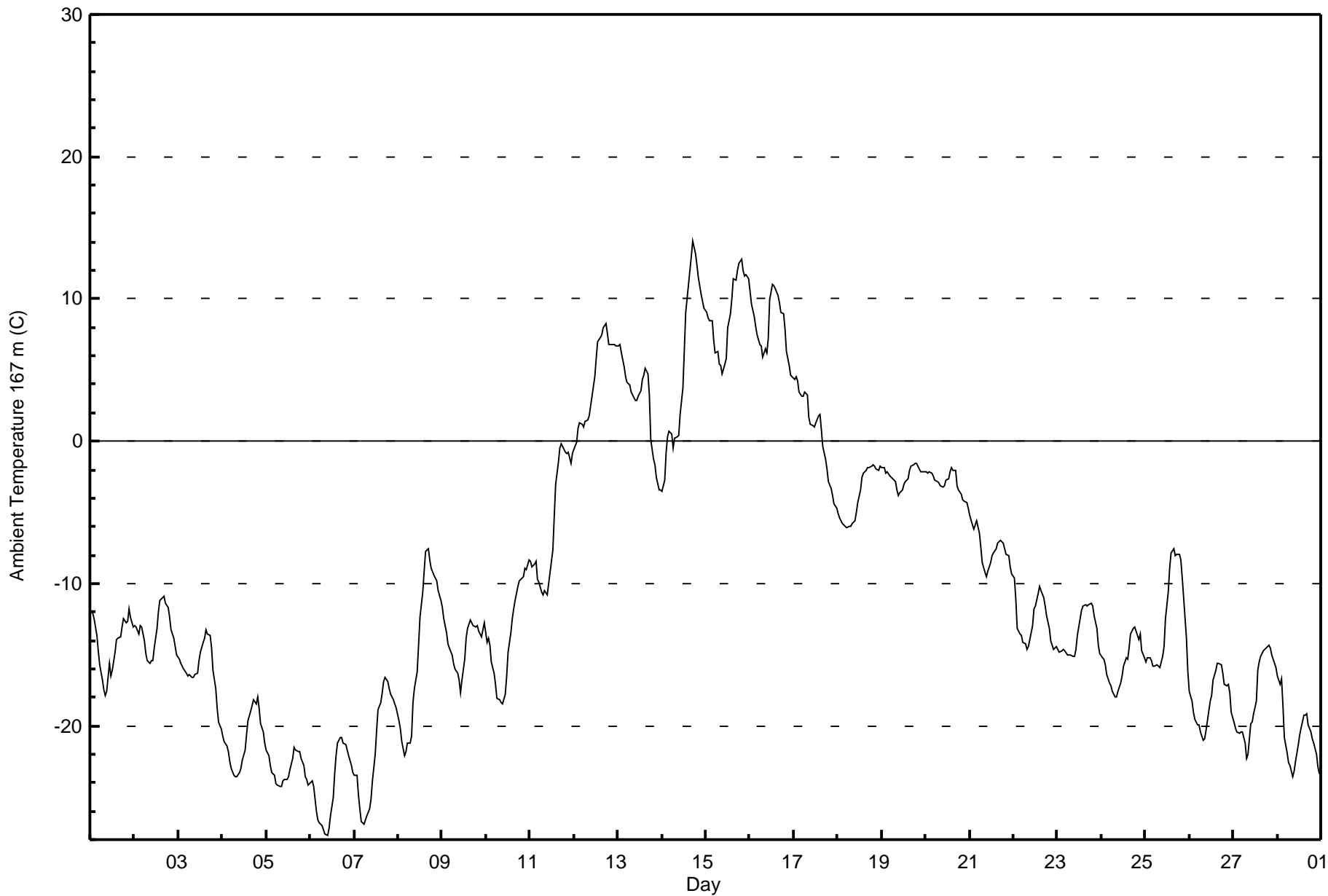
Lower Camp Met Tower - February 2017

Maximum Value: 14.1 C on Feb 14 18:00 Maximum Daily Average: 9.0 C on Feb 15																						Hours in Service:	672			
Minimum Value: -27.7 C on Feb 6 10:00 Minimum Daily Average: -24.2 C on Feb 6																						Hours of Data:	672			
Maximum Diurnal Average: -7.4 C at hour 17 Minimum Diurnal Average: -12.4 C at hour 9																						Hours of Missing Data:	0			
Monthly Average: -9.97 C Percentiles: P ₁ = -26.7 P ₁₀ = -22.0 Q ₁ = -17.4 Median = -12.8 Q ₃ = -2.1 P ₉₀ = 5.8 P ₉₉ = 12.0																						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-Feb	-12.0	-12.1	-12.5	-13.7	-14.7	-15.7	-16.8	-17.4	-17.9	-17.6	-15.7	-16.5	-16.1	-14.8	-13.9	-13.9	-13.8	-13.0	-12.4	-12.8	-12.7	-11.8	-12.4	-13.0	-14.3	-11.8
2-Feb	-12.9	-13.1	-13.5	-13.0	-13.0	-14.1	-14.9	-15.4	-15.6	-15.4	-15.4	-14.6	-13.1	-12.0	-11.2	-11.0	-10.9	-11.4	-11.7	-12.3	-13.2	-13.9	-14.5	-15.0	-13.4	-10.9
3-Feb	-15.3	-15.6	-15.8	-16.0	-16.3	-16.5	-16.4	-16.6	-16.6	-16.4	-16.3	-15.5	-14.8	-14.1	-13.9	-13.3	-13.6	-13.7	-14.5	-16.1	-17.4	-18.7	-19.7	-20.2	-16.0	-13.3
4-Feb	-20.7	-21.1	-21.5	-21.8	-22.5	-23.0	-23.5	-23.6	-23.6	-23.3	-22.9	-22.4	-21.7	-20.6	-19.6	-18.9	-18.6	-18.1	-18.4	-17.9	-18.7	-19.8	-20.5	-21.2	-21.0	-17.9
5-Feb	-21.7	-22.1	-22.8	-23.3	-23.5	-24.1	-24.1	-24.2	-24.3	-23.9	-23.8	-23.8	-23.6	-23.1	-22.3	-21.5	-21.8	-21.8	-21.8	-22.3	-22.8	-23.6	-23.8	-24.1	-23.1	-21.5
6-Feb	-24.0	-23.9	-24.3	-26.0	-26.7	-26.8	-27.0	-27.3	-27.7	-27.7	-27.2	-26.3	-25.1	-23.4	-22.1	-21.2	-20.8	-20.8	-21.2	-21.3	-21.8	-22.1	-22.8	-23.2	-24.2	-20.8
7-Feb	-23.5	-23.5	-24.8	-25.9	-26.7	-27.0	-26.6	-26.4	-25.8	-25.1	-23.9	-22.0	-20.3	-18.9	-18.4	-17.7	-16.9	-16.6	-16.9	-17.4	-17.8	-18.2	-18.5	-18.8	-21.6	-16.6
8-Feb	-19.6	-20.3	-21.1	-22.1	-21.9	-21.2	-21.2	-20.7	-18.3	-17.4	-16.2	-14.3	-12.3	-10.6	-9.1	-7.7	-7.5	-8.3	-8.9	-9.4	-9.6	-9.8	-10.5	-11.2	-14.6	-7.5
9-Feb	-11.7	-12.5	-13.5	-14.2	-14.5	-15.0	-15.7	-16.0	-16.3	-16.8	-17.7	-16.8	-15.3	-13.8	-13.1	-12.5	-12.8	-13.0	-13.1	-13.0	-13.3	-13.8	-13.3	-12.8	-14.2	-11.7
10-Feb	-14.2	-13.8	-14.3	-15.5	-16.3	-17.1	-18.0	-18.2	-18.3	-18.5	-17.7	-16.5	-14.8	-13.5	-12.5	-11.8	-11.2	-10.2	-9.9	-9.7	-9.6	-8.9	-9.1	-8.3	-13.7	-8.3
11-Feb	-8.5	-8.8	-8.7	-8.4	-9.7	-9.9	-10.6	-10.8	-10.5	-10.8	-10.0	-9.2	-7.7	-5.3	-3.0	-1.4	-0.5	-0.2	-0.6	-0.8	-0.9	-0.8	-1.6	-0.9	-5.8	-0.2
12-Feb	-0.5	-0.1	0.9	1.3	1.2	1.0	1.4	1.5	1.8	2.5	3.2	4.5	5.9	7.0	7.3	7.5	8.0	8.3	7.6	6.8	6.8	6.8	6.8	6.8	4.3	8.3
13-Feb	6.7	6.8	6.2	5.2	4.5	4.2	3.9	3.5	3.3	2.8	2.9	3.2	3.5	4.3	4.6	5.1	4.7	3.2	0.1	-1.3	-1.7	-2.6	-3.4	-3.4	2.8	6.8
14-Feb	-3.5	-2.7	-0.8	0.3	0.7	0.5	-0.5	0.3	0.3	0.4	1.9	3.8	6.4	9.0	11.1	12.0	13.0	14.1	13.2	12.4	11.5	10.3	9.8	9.3	5.5	14.1
15-Feb	9.0	8.6	8.5	8.5	7.1	6.3	6.4	5.4	5.4	4.7	5.4	5.8	7.9	8.9	10.0	11.4	11.3	12.0	12.5	12.8	12.0	11.7	11.7	11.5	9.0	12.8
16-Feb	10.6	9.6	8.8	8.1	7.4	6.8	6.7	5.9	6.5	6.2	7.2	10.0	11.0	11.0	10.7	10.2	9.8	9.1	9.0	7.9	6.3	5.4	4.7	4.6	8.1	11.0
17-Feb	4.3	4.5	4.3	3.4	3.1	3.2	3.5	3.2	1.7	1.2	1.1	1.0	1.3	1.8	1.8	0.8	-0.3	-1.2	-1.9	-2.8	-3.4	-3.8	-4.4	-4.7	0.7	4.5
18-Feb	-5.1	-5.4	-5.7	-5.8	-6.0	-6.1	-6.0	-5.9	-5.8	-5.6	-5.0	-4.3	-3.4	-2.6	-2.3	-2.1	-1.9	-1.9	-1.7	-1.6	-1.7	-2.0	-2.0	-1.8	-3.8	-1.6
19-Feb	-1.9	-1.8	-2.2	-2.1	-2.4	-2.5	-2.6	-2.9	-3.5	-3.8	-3.7	-3.4	-3.0	-2.9	-2.6	-2.1	-1.8	-1.7	-1.6	-1.6	-1.9	-2.1	-2.1	-2.2	-2.4	-1.6
20-Feb	-2.1	-2.2	-2.1	-2.2	-2.4	-2.8	-2.9	-2.9	-3.1	-3.2	-3.2	-2.8	-2.6	-2.2	-1.9	-2.0	-2.1	-3.2	-3.4	-3.7	-4.1	-4.2	-4.3	-4.7	-2.9	-1.9
21-Feb	-5.2	-5.9	-6.1	-5.9	-5.6	-6.5	-7.5	-8.5	-9.2	-9.5	-9.1	-8.5	-8.0	-7.8	-7.5	-7.2	-7.0	-7.0	-7.1	-7.5	-7.9	-8.1	-8.8	-9.3	-7.5	-5.2
22-Feb	-9.6	-11.0	-13.1	-13.5	-13.7	-14.1	-14.2	-14.7	-14.5	-14.0	-13.0	-11.8	-11.6	-10.7	-10.2	-10.5	-11.0	-11.5	-12.3	-13.2	-14.0	-14.3	-14.6	-14.5	-12.7	-9.6
23-Feb	-14.6	-14.9	-14.7	-14.6	-14.8	-15.0	-15.0	-15.0	-15.1	-15.1	-14.6	-13.7	-12.4	-11.9	-11.6	-11.4	-11.6	-11.5	-11.4	-11.5	-12.3	-13.1	-14.3	-14.9	-13.5	-11.4
24-Feb	-15.2	-15.3	-15.7	-16.4	-17.0	-17.2	-17.6	-17.9	-18.0	-17.6	-17.0	-16.5	-15.8	-15.2	-15.3	-14.5	-13.6	-13.2	-13.0	-13.4	-13.9	-13.6	-14.7	-15.3	-15.5	-13.0
25-Feb	-15.5	-15.2	-15.2	-15.4	-15.8	-15.8	-15.7	-15.8	-15.9	-15.1	-14.4	-12.4	-10.6	-8.9	-7.8	-7.5	-8.0	-8.0	-8.0	-8.4	-9.7	-11.0	-13.9	-16.2	-12.5	-7.5
26-Feb	-17.6	-18.3	-19.0	-19.5	-19.9	-20.0	-20.4	-21.0	-21.0	-20.4	-19.6	-18.3	-17.9	-16.8	-16.1	-15.6	-15.6	-15.7	-16.3	-17.1	-17.2	-17.1	-17.7	-19.1	-18.2	-15.6
27-Feb	-19.7	-20.2	-20.5	-20.5	-20.4	-20.5	-21.2	-22.3	-22.0	-19.9	-19.7	-19.2	-18.3	-16.1	-15.5	-15.1	-14.8	-14.6	-14.5	-14.3	-14.5	-15.0	-15.6	-15.9	-17.9	-14.3
28-Feb	-16.5	-17.1	-16.7	-18.5	-20.8	-21.9	-22.6	-22.8	-23.5	-23.2	-22.5	-21.4	-20.6	-20.1	-19.3	-19.3	-19.2	-19.9	-20.5	-21.0	-21.2	-22.1	-22.9	-23.4	-20.7	-16.5
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	113	16.82	16.82
-20 - 0	434	64.58	81.40
0 - 10	102	15.18	96.58
10 - 20	23	3.42	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

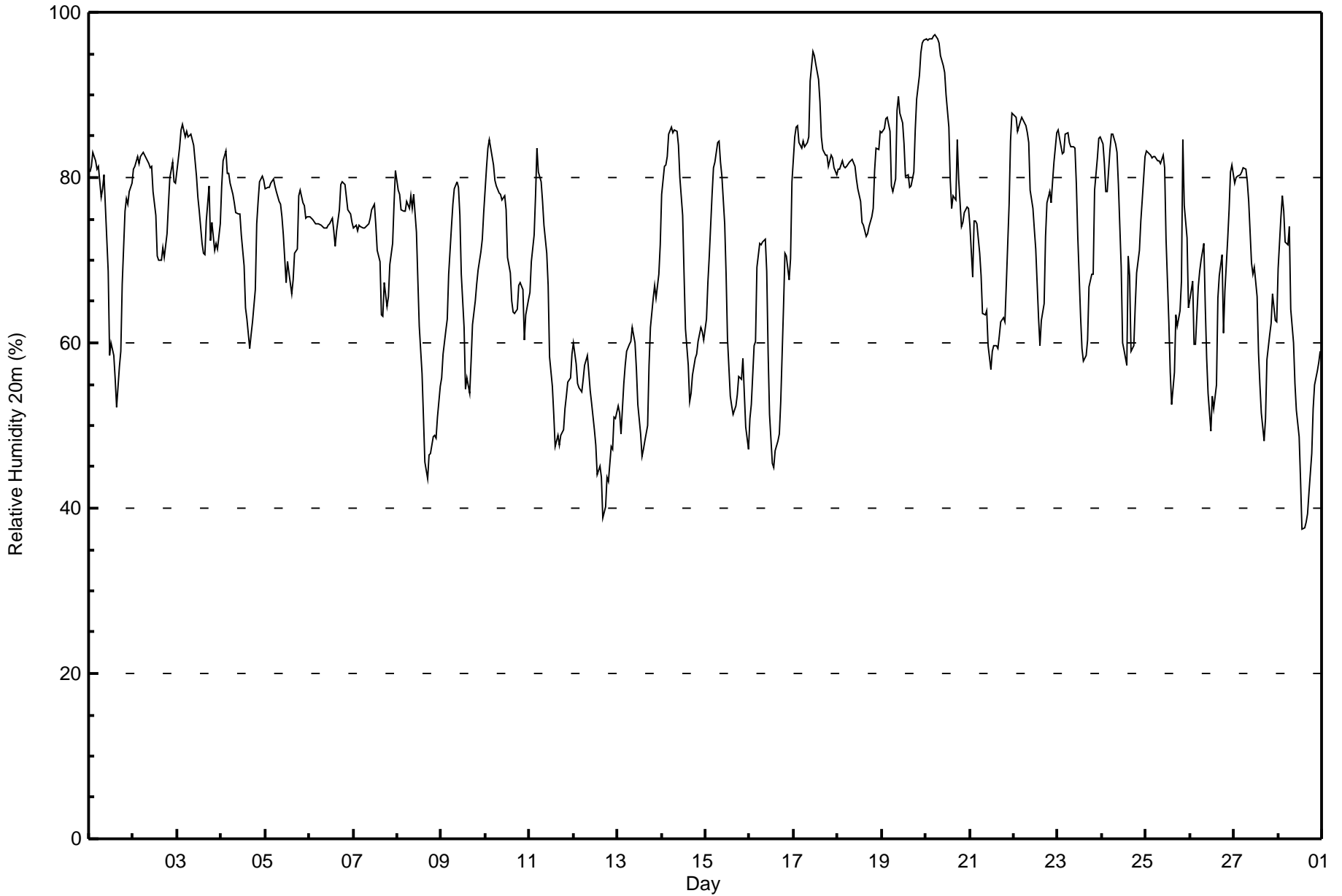
Lower Camp Met Tower - February 2017

Maximum Value: 97 % on Feb 20 06:00																		Maximum Daily Average: 86.8 % on Feb 20						Hours in Service: 672																																															
Minimum Value: 37 % on Feb 28 14:00																		Minimum Daily Average: 50.3 % on Feb 12						Hours of Data: 672																																															
Maximum Diurnal Average: 78.5 % at hour 6																		Minimum Diurnal Average: 60.3 % at hour 16						Hours of Missing Data: 0																																															
Monthly Average: 71.1 %																		Percentiles: P ₁ = 43 P ₁₀ = 53 Q ₁ = 62 Median = 74 Q ₃ = 81 P ₉₀ = 85 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-Feb	81	81	83	82	81	81	78	79	80	76	69	58	60	59	56	52	57	59	67	76	78	77	78	79	72.0	83																																													
2-Feb	81	81	83	82	83	83	83	82	82	81	81	78	75	70	70	70	72	70	73	77	80	82	79	79	78.3	83																																													
3-Feb	82	84	86	86	85	86	85	85	85	84	80	78	76	72	71	71	75	79	72	75	71	72	71	74	78.5	86																																													
4-Feb	79	82	83	80	81	79	78	77	76	76	73	69	64	63	59	61	63	67	74	77	80	80	80	80	74.0	83																																													
5-Feb	79	79	79	79	80	79	78	77	77	75	73	67	70	69	66	68	71	71	78	78	77	77	75	75	74.9	80																																													
6-Feb	75	75	75	74	74	74	74	74	74	74	74	74	75	74	72	73	76	79	80	79	78	76	76	75	75.2	80																																													
7-Feb	74	74	74	74	74	74	74	74	74	75	76	77	74	71	70	63	63	67	64	66	69	72	77	81	72.2	81																																													
8-Feb	78	78	76	76	76	77	76	78	76	78	73	68	62	56	51	46	44	46	47	49	49	48	51	55	63.1	78																																													
9-Feb	56	59	62	63	68	74	77	79	79	79	75	68	62	54	56	54	58	62	65	67	69	71	73	76	66.9	79																																													
10-Feb	81	84	85	84	82	80	79	78	78	77	78	76	70	68	65	64	64	64	67	67	66	60	63	65	72.7	85																																													
11-Feb	66	70	73	78	84	81	80	77	74	71	67	58	55	51	48	49	48	49	49	52	54	55	56	59	62.6	84																																													
12-Feb	60	57	55	55	54	56	57	59	56	54	53	49	48	44	45	44	39	40	44	43	47	47	51	51	50.3	60																																													
13-Feb	52	51	49	55	57	59	60	60	62	60	57	53	49	46	47	48	50	57	62	65	67	65	68	72	57.2	72																																													
14-Feb	78	81	82	83	85	86	85	86	86	84	80	75	68	62	57	53	54	56	58	59	60	62	61	60	70.9	86																																													
15-Feb	63	67	71	78	81	82	84	84	82	80	74	68	61	54	52	51	52	54	56	56	58	54	50	47	65.0	84																																													
16-Feb	51	53	60	60	69	72	72	72	73	69	59	51	45	45	47	48	49	53	64	71	71	68	70	79	61.3	79																																													
17-Feb	85	86	86	84	84	84	84	84	85	92	95	95	94	92	89	85	83	83	83	81	83	82	81	80	85.9	95																																													
18-Feb	81	81	82	81	81	81	82	82	82	81	80	79	77	75	74	73	73	74	75	76	81	84	83	86	79.4	86																																													
19-Feb	85	86	87	87	86	79	78	80	88	90	88	87	84	80	80	79	79	81	86	90	92	95	96	97	85.8	97																																													
20-Feb	97	97	97	97	97	97	97	96	95	93	93	90	86	80	76	78	77	85	80	74	75	76	76	76	86.8	97																																													
21-Feb	74	68	75	75	74	71	68	64	63	64	60	57	59	60	60	59	61	63	63	63	67	77	84	88	67.3	88																																													
22-Feb	87	87	86	87	87	87	86	85	84	79	76	74	71	63	60	63	65	73	77	78	77	80	82	85	78.3	87																																													
23-Feb	86	85	83	83	85	85	84	84	84	83	79	73	63	59	58	59	60	67	68	68	78	82	85	85	76.1	86																																													
24-Feb	84	82	78	78	83	85	85	84	83	79	69	60	59	57	71	68	59	60	64	69	71	75	77	83	73.5	85																																													
25-Feb	83	83	83	82	83	83	82	82	82	83	81	72	63	56	53	56	63	62	64	68	85	77	73	64	73.4	85																																													
26-Feb	65	68	60	60	67	69	70	72	64	58	54	49	54	52	55	65	68	71	61	66	73	76	81	82	64.9	82																																													
27-Feb	79	80	80	80	81	81	81	80	77	70	68	69	66	59	55	52	48	51	58	61	62	66	63	63	67.9	81																																													
28-Feb	69	75	78	76	72	72	74	64	60	55	52	49	43	37	38	38	39	42	47	52	55	57	58	59	56.7	78																																													
75.4																		76.2						76.7		77.1		78.3		78.5		78.3		77.8		77.2		75.7		72.9		68.8		65.7		61.8		60.8		60.3		61.0		63.6		65.7		67.8		70.3		71.1		72.1		73.4		Diurnal Average			
97																		97						97		97		97		97		97		97		96		95		93		95		95		94		92		89		85		83		85		86		90		92		95		96		97		Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	5	0.74	0.74
40 - 60	146	21.73	22.47
60 - 80	337	50.15	72.62
80 - 100	184	27.38	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 45m (RH45m) - %

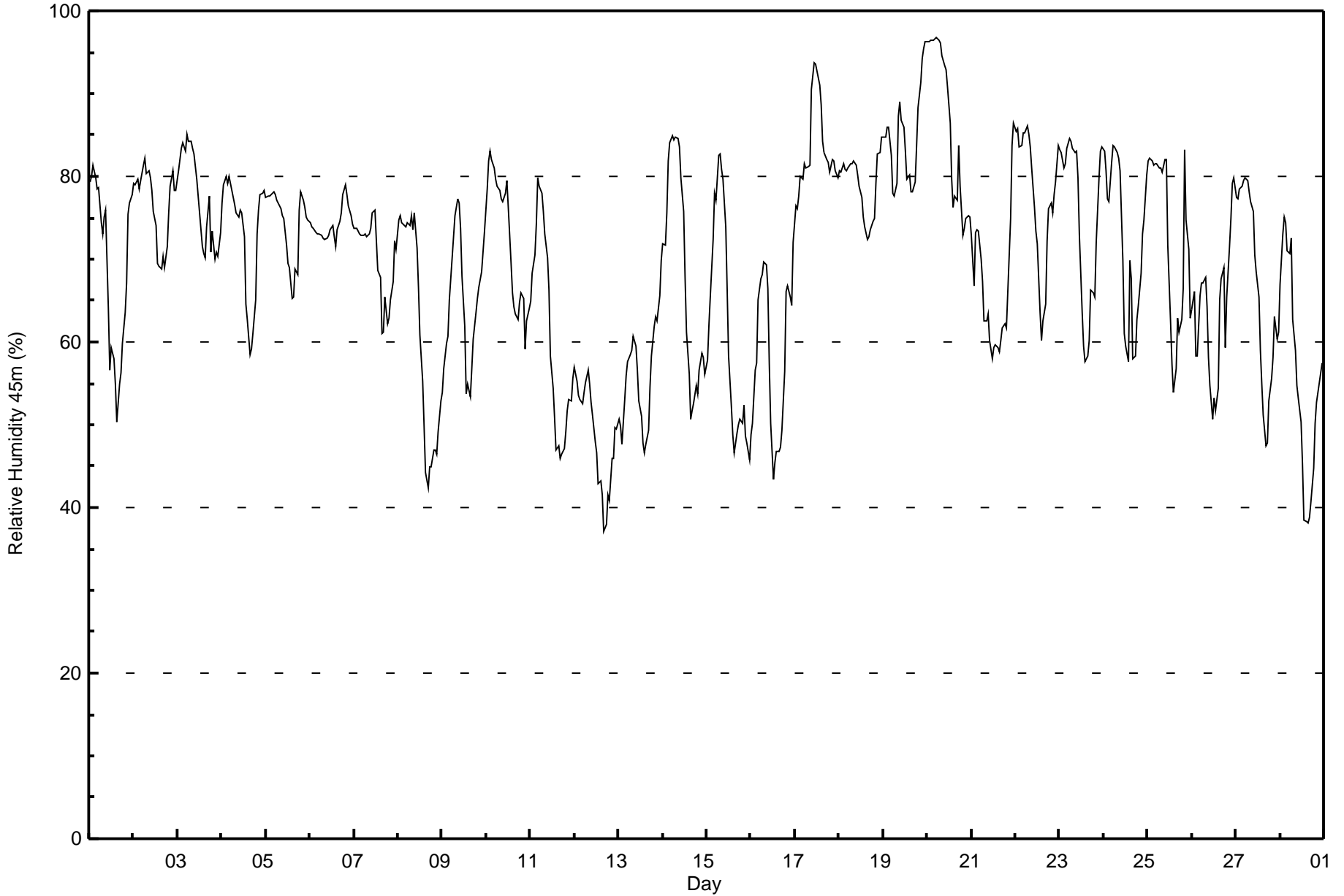
Lower Camp Met Tower - February 2017

Maximum Value: 97 % on Feb 20 06:00																			Maximum Daily Average: 86.4 % on Feb 20						Hours in Service: 672	
Minimum Value: 37 % on Feb 12 17:00																			Minimum Daily Average: 48.6 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 76.9 % at hour 6																			Minimum Diurnal Average: 59.3 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 69.7 %																			Percentiles: P ₁ = 40 P ₁₀ = 51 Q ₁ = 60 Median = 73 Q ₃ = 79 P ₉₀ = 83 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-Feb	79	80	81	80	79	79	74	73	75	76	64	57	59	58	55	50	55	56	60	64	67	75	77	78	68.8	81
2-Feb	79	79	80	79	79	81	82	80	81	80	78	76	74	69	69	69	70	69	71	76	79	81	78	78	76.6	82
3-Feb	81	82	83	84	83	85	84	84	83	83	80	78	76	72	71	70	74	78	71	73	70	71	70	73	77.4	85
4-Feb	77	79	80	79	80	79	78	77	76	75	76	73	64	63	59	59	61	65	73	76	78	78	78	78	73.2	80
5-Feb	78	78	78	78	78	78	77	76	76	75	75	72	70	69	65	65	69	68	76	78	77	76	75	75	74.2	78
6-Feb	74	74	74	73	73	73	73	73	72	72	73	73	74	73	72	74	75	76	78	79	78	76	75	74	74.2	79
7-Feb	74	74	73	73	73	73	73	73	73	74	76	76	72	69	68	61	61	65	62	63	65	67	72	71	70.0	76
8-Feb	75	75	74	74	74	74	74	75	74	76	71	67	61	55	50	44	42	45	45	47	47	46	49	53	61.2	76
9-Feb	54	57	60	61	65	70	73	75	77	77	74	68	62	54	55	53	57	60	64	65	67	68	71	73	65.0	77
10-Feb	79	82	83	82	81	80	79	78	77	77	78	79	76	69	66	64	63	63	65	66	65	59	62	64	72.4	83
11-Feb	65	68	71	74	80	79	78	76	73	70	66	58	54	51	47	47	46	47	47	49	52	53	53	56	60.8	80
12-Feb	57	55	53	53	53	54	55	57	55	53	51	48	47	43	43	41	37	38	41	41	46	46	50	50	48.6	57
13-Feb	51	50	48	53	56	58	59	59	61	59	57	53	51	48	47	48	49	55	58	62	63	63	66	70	55.8	70
14-Feb	72	72	76	82	84	85	84	85	85	84	80	76	68	61	56	51	52	53	55	54	57	59	58	56	68.4	85
15-Feb	58	62	66	72	78	77	83	83	81	80	74	66	58	52	49	47	49	50	51	50	52	49	48	46	61.6	83
16-Feb	49	50	57	57	65	68	68	70	69	66	57	50	43	45	47	47	47	49	56	66	67	65	64	72	58.2	72
17-Feb	76	76	78	80	80	82	81	81	81	90	94	94	93	91	89	84	83	82	82	81	82	82	81	80	83.4	94
18-Feb	81	80	82	81	81	81	82	82	82	81	80	79	77	75	74	72	73	73	75	75	79	83	83	85	78.9	85
19-Feb	85	85	86	86	83	78	78	79	87	89	87	86	83	80	80	78	78	79	84	88	91	94	96	96	84.8	96
20-Feb	96	96	96	96	97	97	96	96	95	93	93	91	86	80	76	78	77	84	79	73	74	75	75	75	86.4	97
21-Feb	73	67	73	74	73	70	67	63	63	63	60	58	59	60	59	59	60	62	62	62	66	75	84	86	66.6	86
22-Feb	85	86	84	84	85	85	86	85	83	81	76	73	72	64	60	62	65	72	76	77	76	78	79	84	77.4	86
23-Feb	83	83	81	82	83	85	84	83	83	83	80	73	64	59	58	58	60	66	66	65	72	80	83	84	74.9	85
24-Feb	83	81	77	77	82	84	84	83	82	81	70	61	59	58	70	68	58	58	63	64	68	73	75	80	72.4	84
25-Feb	82	82	82	81	81	82	81	81	81	82	82	72	62	57	54	57	63	61	63	66	83	75	71	63	72.7	83
26-Feb	64	66	58	58	66	67	67	68	64	58	55	51	53	52	54	65	68	69	59	65	71	75	79	80	63.9	80
27-Feb	77	77	78	79	79	80	79	78	77	76	71	68	65	59	55	51	48	48	53	56	58	63	60	61	66.6	80
28-Feb	67	73	75	74	71	71	72	63	59	55	53	50	45	38	38	38	39	41	45	50	53	55	56	57	55.8	75
	73.3	73.9	74.5	75.2	76.5	76.9	76.9	76.2	75.9	75.3	72.5	68.8	65.6	61.6	60.3	59.3	59.9	61.7	63.2	65.3	67.9	69.3	70.3	71.3	Diurnal Average	
	96	96	96	96	97	97	96	96	95	93	94	94	93	91	89	84	83	84	84	88	91	94	96	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	6	0.89	0.89
40 - 60	162	24.11	25.00
60 - 80	363	54.02	79.02
80 - 100	141	20.98	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 100m (RH100m) - %

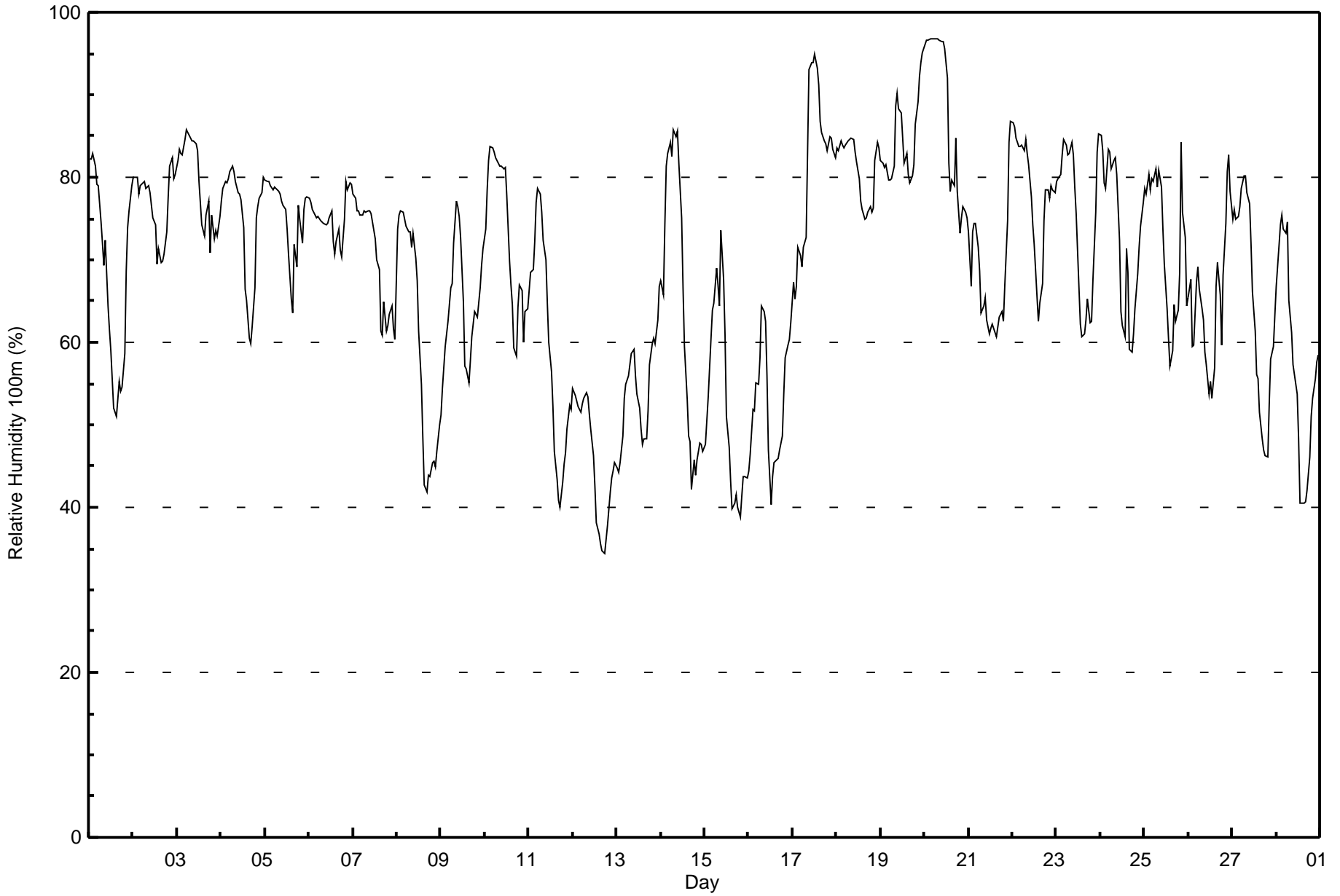
Lower Camp Met Tower - February 2017

Maximum Value: 97 % on Feb 20 06:00 Maximum Daily Average: 87.8 % on Feb 20																		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 34 % on Feb 12 18:00 Minimum Daily Average: 45.7 % on Feb 12 Maximum Diurnal Average: 75.7 % at hour 6 Minimum Diurnal Average: 59.6 % at hour 16 Monthly Average: 69.1 % Percentiles: P ₁ = 38 P ₁₀ = 48 Q ₁ = 60 Median = 73 Q ₃ = 79 P ₉₀ = 84 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-Feb	82	82	83	81	79	79	75	72	69	72	64	62	59	52	51	51	55	54	55	59	69	74	76	79	68.1	83
2-Feb	80	80	80	78	79	79	80	79	79	78	77	75	74	70	71	70	70	71	73	78	81	82	80	80	76.8	82
3-Feb	82	83	83	83	85	86	85	85	84	84	84	83	80	74	74	73	75	77	71	75	73	74	73	75	79.2	86
4-Feb	77	79	80	79	80	81	81	81	80	78	78	77	74	67	65	60	60	62	67	75	76	77	78	80	74.6	81
5-Feb	80	80	79	79	79	79	79	78	78	77	77	76	74	71	65	64	72	69	77	75	72	76	77	78	75.4	80
6-Feb	77	77	76	75	75	75	75	75	74	74	74	75	76	72	71	72	74	71	70	75	79	78	79	79	75.0	79
7-Feb	78	78	76	76	75	75	76	76	76	76	76	74	73	70	69	61	61	65	61	62	63	64	62	60	70.1	78
8-Feb	74	75	76	76	75	74	73	73	72	73	70	68	61	55	48	43	42	44	44	45	46	45	47	50	60.4	76
9-Feb	51	54	60	61	63	67	67	72	77	77	75	73	65	57	57	55	58	61	64	63	63	67	69	71	64.4	77
10-Feb	74	79	82	84	84	83	82	82	81	81	81	81	78	70	67	65	59	58	64	67	66	60	64	64	73.1	84
11-Feb	66	69	69	72	77	79	78	76	72	70	65	60	57	52	47	43	41	40	43	45	47	49	52	52	59.2	79
12-Feb	54	53	53	52	52	52	53	54	53	51	50	46	43	38	37	36	35	34	36	38	42	44	44	45	45.7	54
13-Feb	45	44	45	49	53	55	56	57	59	59	56	54	52	50	48	48	48	52	57	60	61	60	63	67	54.0	67
14-Feb	68	66	74	81	83	84	83	86	85	86	82	75	67	59	53	49	48	42	46	44	46	48	48	47	64.5	86
15-Feb	48	50	53	60	64	65	69	67	64	74	68	61	51	47	43	40	41	42	40	39	41	44	44	44	52.4	74
16-Feb	44	46	52	52	55	55	58	64	64	62	56	47	40	44	45	46	46	47	49	54	58	60	60	62	52.8	64
17-Feb	67	65	67	72	71	69	72	73	83	93	94	94	95	93	91	87	86	84	84	83	85	85	83	82	81.6	95
18-Feb	83	83	84	84	84	84	84	85	85	85	83	82	80	77	76	75	75	76	76	76	76	82	84	83	80.9	85
19-Feb	82	82	81	81	80	80	80	81	89	90	88	88	85	82	83	80	79	80	82	86	89	92	94	95	84.5	95
20-Feb	96	97	97	97	97	97	97	97	97	96	96	96	92	82	78	80	79	85	78	73	75	76	76	75	87.8	97
21-Feb	73	67	73	74	74	71	69	64	64	65	63	61	62	62	61	61	62	63	64	63	67	75	84	87	67.9	87
22-Feb	87	86	85	84	84	84	83	85	83	81	78	74	72	66	63	65	67	75	78	78	77	79	78	78	77.9	87
23-Feb	79	80	80	83	85	84	83	83	84	83	79	76	67	62	61	61	63	65	62	62	68	76	83	85	74.7	85
24-Feb	85	83	79	79	83	83	81	82	82	80	72	64	62	61	71	68	59	59	61	64	68	71	74	77	72.9	85
25-Feb	79	78	80	78	80	79	81	79	81	79	74	69	64	60	57	59	65	63	64	68	84	76	73	64	72.3	84
26-Feb	65	68	59	60	67	69	66	64	63	59	57	54	55	53	57	67	70	66	60	68	74	81	83	78	65.1	83
27-Feb	75	76	75	75	76	79	80	80	78	77	72	66	61	56	56	51	48	47	46	46	53	58	59	63	64.8	80
28-Feb	67	72	74	75	74	73	75	65	61	57	56	54	48	40	41	41	41	42	46	51	53	56	58	59	57.4	75
72.1 72.6 73.4 74.3 75.4 75.7 75.7 75.4 75.6 75.7 73.0 70.1 66.6 62.2 60.9 59.6 59.9 60.5 61.4 63.3 66.2 68.1 69.5 70.1																		Diurnal Average								
96 97 97 97 97 97 97 97 97 97 96 96 95 93 91 87 86 85 84 86 89 92 94 95																		Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	11	1.64	1.64
40 - 60	159	23.66	25.30
60 - 80	356	52.98	78.27
80 - 100	146	21.73	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 167m (RH167m) - %

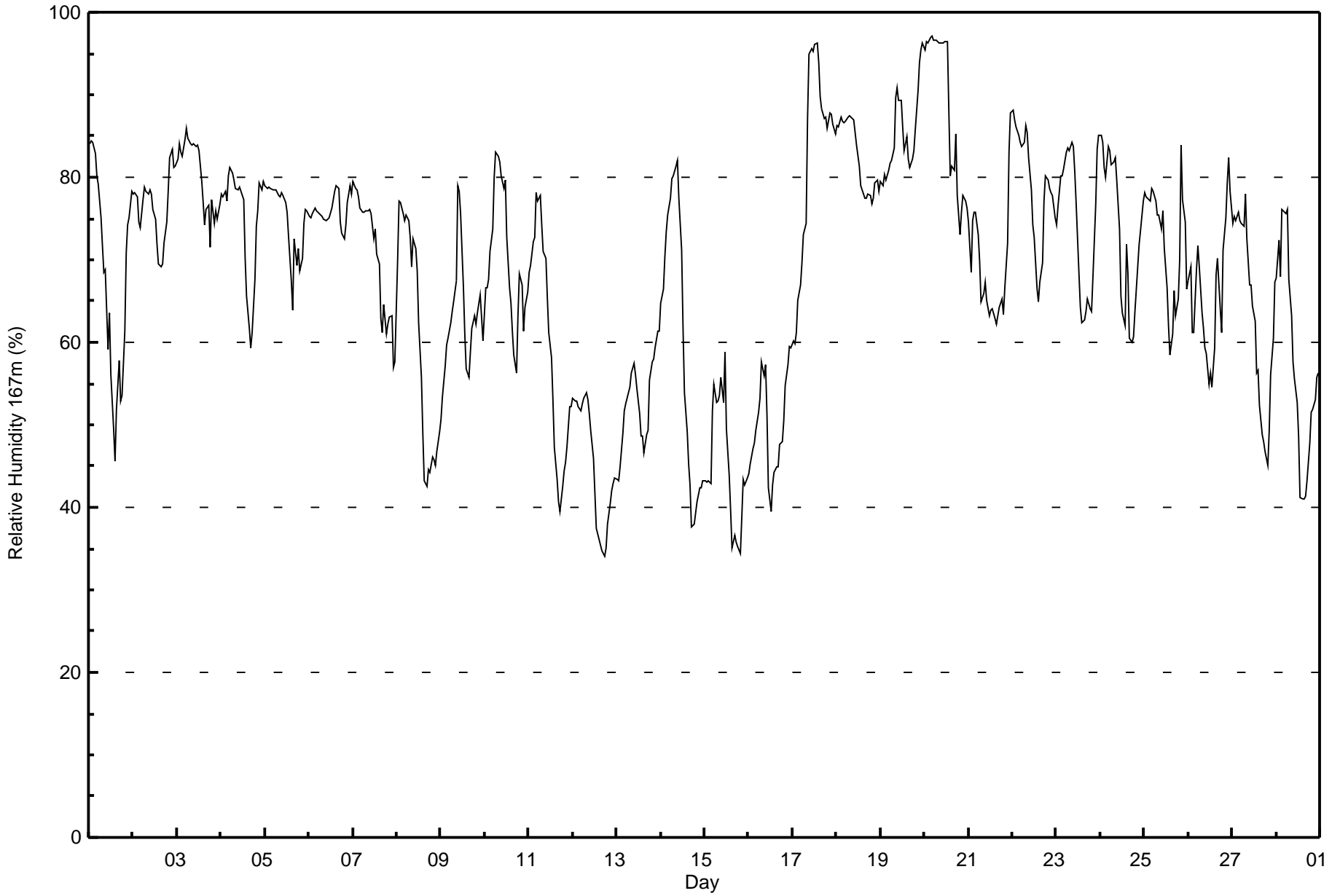
Lower Camp Met Tower - February 2017

Maximum Value: 97 % on Feb 20 05:00																			Maximum Daily Average: 88.6 % on Feb 20						Hours in Service: 672																			
Minimum Value: 34 % on Feb 12 18:00																			Minimum Daily Average: 45.2 % on Feb 12						Hours of Data: 672																			
Maximum Diurnal Average: 74.8 % at hour 7																			Minimum Diurnal Average: 60.3 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 68.6 %																			Percentiles: P ₁ = 35 P ₁₀ = 46 Q ₁ = 59 Median = 72 Q ₃ = 79 P ₉₀ = 84 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-Feb	84	84	84	83	80	79	75	72	69	69	59	64	56	49	46	52	58	53	54	61	71	74	75	78	67.9	84																		
2-Feb	78	78	78	75	74	77	79	78	78	79	78	76	75	72	69	69	69	72	75	78	82	83	81	81	76.5	83																		
3-Feb	82	84	83	82	85	86	85	84	84	84	84	84	83	79	77	74	76	77	72	77	74	76	75	77	80.2	86																		
4-Feb	78	78	78	77	80	81	81	80	79	78	79	78	77	70	66	62	59	61	68	74	76	79	78	79	74.9	81																		
5-Feb	79	79	79	79	79	79	78	78	78	78	78	77	76	73	67	64	73	69	71	69	70	74	76	76	74.9	79																		
6-Feb	75	75	76	76	76	76	75	75	75	75	75	75	76	77	78	79	79	75	73	73	74	77	79	78	75.9	79																		
7-Feb	79	79	78	78	76	76	76	76	76	76	76	73	74	71	69	63	61	65	61	62	63	63	57	58	70.2	79																		
8-Feb	70	77	77	76	75	75	75	73	69	73	71	69	62	56	49	43	43	45	44	46	46	45	47	49	60.6	77																		
9-Feb	51	53	57	60	61	62	64	65	67	79	78	76	67	61	57	56	59	62	63	62	64	66	63	60	63.0	79																		
10-Feb	67	67	68	71	74	80	83	83	82	80	79	80	73	67	65	61	59	56	63	68	67	61	64	66	70.1	83																		
11-Feb	69	69	72	73	78	77	78	74	71	70	65	61	58	53	47	43	41	40	43	44	45	47	52	52	59.3	78																		
12-Feb	53	53	53	52	52	52	53	54	53	51	49	46	42	37	36	35	35	34	35	38	40	42	43	44	45.2	54																		
13-Feb	43	43	45	49	52	53	54	55	56	58	56	54	51	49	49	47	49	49	56	58	58	59	61	61	52.7	61																		
14-Feb	65	66	70	73	75	78	80	80	81	82	77	71	62	54	49	45	43	38	38	39	41	42	42	43	59.8	82																		
15-Feb	43	43	43	43	52	55	53	53	54	56	53	59	49	44	40	35	37	36	35	34	39	43	43	44	45.2	59																		
16-Feb	44	45	47	48	49	51	53	58	56	57	51	42	40	43	44	45	45	48	48	51	55	57	60	59	49.8	60																		
17-Feb	60	60	61	65	67	70	73	74	87	95	96	95	96	96	94	90	88	87	87	86	88	88	86	85	82.3	96																		
18-Feb	86	86	87	87	87	87	87	87	87	87	85	84	81	79	78	77	77	78	78	77	78	79	80	78	82.5	87																		
19-Feb	79	79	80	80	81	82	82	84	90	91	89	89	86	83	85	82	81	82	83	86	91	94	95	96	85.4	96																		
20-Feb	95	96	96	97	97	97	97	97	96	96	96	97	96	88	80	81	81	85	78	73	76	78	77	76	88.6	97																		
21-Feb	75	69	75	76	76	73	70	65	66	67	65	63	64	64	63	62	63	64	65	63	67	72	83	88	69.1	88																		
22-Feb	88	87	86	85	84	84	84	86	85	82	78	74	73	67	65	67	70	77	80	80	79	78	78	75	78.9	88																		
23-Feb	74	76	80	80	81	83	84	83	84	84	81	77	68	64	62	63	64	65	64	64	68	77	83	85	74.8	85																		
24-Feb	85	84	81	80	84	83	81	82	82	80	74	66	64	62	72	68	60	60	61	64	69	72	74	77	73.5	85																		
25-Feb	78	78	77	77	79	78	77	75	75	74	76	71	67	62	59	61	66	63	65	70	84	77	75	66	72.1	84																		
26-Feb	67	69	61	61	69	72	69	64	62	59	59	55	56	55	59	68	70	64	61	71	75	79	82	78	66.1	82																		
27-Feb	74	75	75	76	75	74	74	78	73	67	67	64	63	56	57	52	49	48	47	45	49	56	60	67	63.4	78																		
28-Feb	68	72	68	76	76	76	76	68	63	58	56	53	49	41	41	41	41	43	48	52	52	53	56	56	57.6	76																		
																			71.1	71.6	72.1	72.6	73.9	74.8	74.8	74.3	74.2	74.4	72.5	70.4	67.3	63.3	61.5	60.3	60.5	60.5	61.3	63.0	65.7	67.6	68.8	69.1	Diurnal Average	
																			95	96	96	97	97	97	97	97	96	96	96	97	96	96	94	90	88	87	87	86	91	94	95	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	19	2.83	2.83
40 - 60	161	23.96	26.79
60 - 80	356	52.98	79.76
80 - 100	136	20.24	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



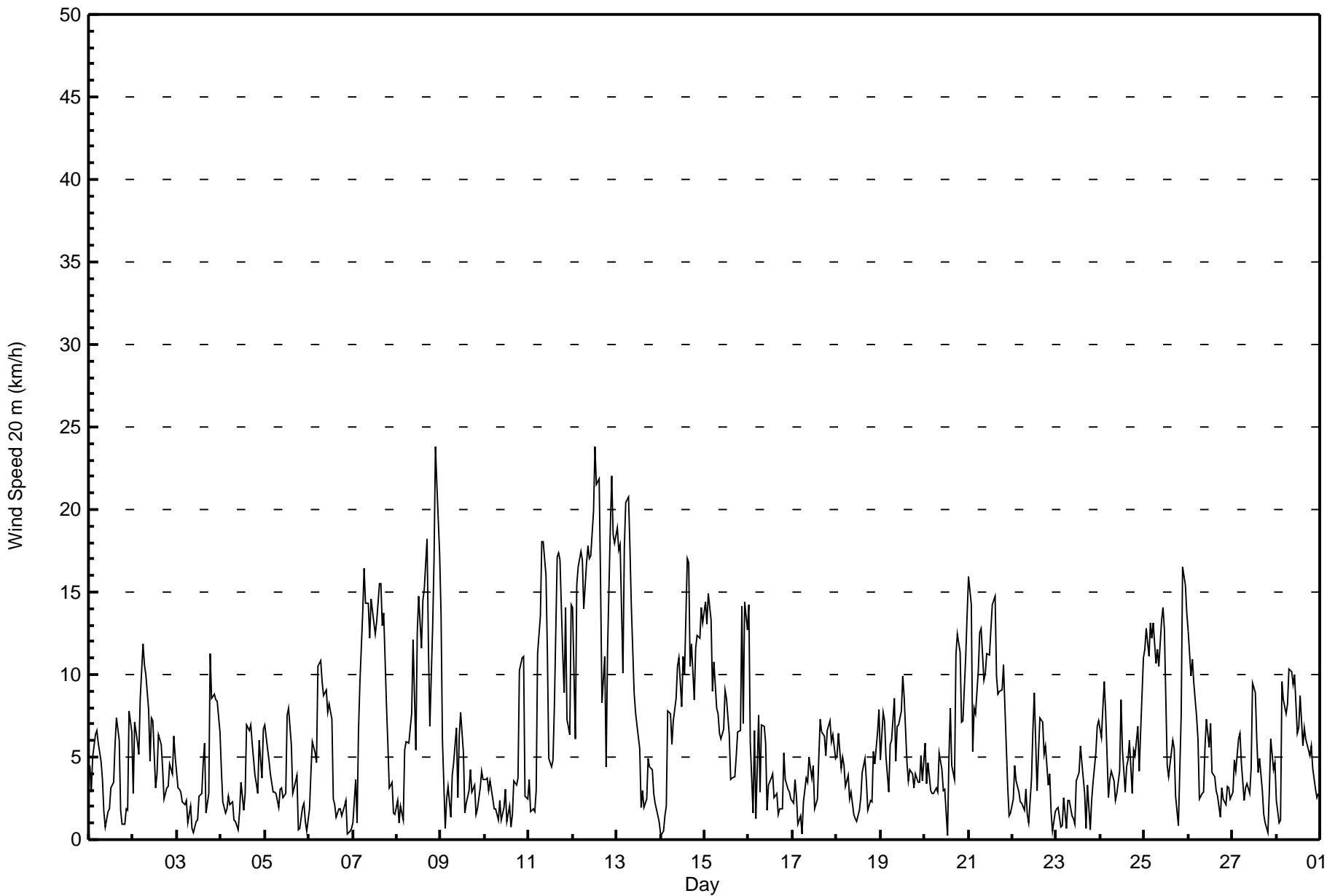
Maximum Speed: 24 km/h on Feb 8 22:00		Maximum Daily Speed Average: 14.4 km/h on Feb 12		Hours in Service: 672																							
Minimum Speed Value: 0 km/h on Feb 14 01:00		Minimum Daily Speed Average: 0.3 km/h on Feb 1		Hours of Data: 672																							
Maximum Diurnal Speed Average: 3.1 km/h at hour 13		Minimum Diurnal Speed Average: 0.9 km/h at hour 4		Hours of Missing Data: 0																							
Monthly Average Velocity: 1.2 km/h 265.2 deg		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 9 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-Feb	NNW4	NNW3	NNW5	N6	NNW7	NNW6	NNW5	N4	NW2	W1	SSW2	S2	SSE3	SSE3	SE6	SSE7	SSE6	S2	NNW1	W1	SSE2	SE2	SE8	SE6	ESE0.3	SE8	
2-Feb	SSE3	SE7	SE6	SE5	SE9	SSE12	SE11	SE10	SE8	SE5	SE7	SE7	SSE3	SSW4	SSE6	SSE6	SE4	E2	NNE3	NNE3	N5	NNW4	NNW6	NNW5	SE3.8	SSE12	
3-Feb	NW3	NW3	NNW3	NNW2	NNW2	NNW2	NNW1	WSW2	NNE1	NW0	SSE1	S1	S3	SE3	SE5	SSE6	NE2	NNW3	NNW11	N9	NNE9	N9	N8	N7	N2.1	NNW11	
4-Feb	N4	NNW2	NW2	NW2	NNW3	NNW2	NNW2	NNW1	SSE1	SSE1	SE2	SSE3	S2	S3	SSE7	SSE7	SE7	SE6	SE4	SSE3	N3	N6	N4	N7	ESE0.6	SE7	
5-Feb	N7	NNW5	NNW5	NNW4	NNW3	NNW3	NNW3	NNW3	NNW3	NW3	NW3	W3	WSW8	WSW8	WSW6	SSW3	SE3	SE4	NW1	NNW1	NNW2	NNW2	NNW1	WSW1	NW1.9	WSW8	
6-Feb	SE2	SSE4	SSE6	SSE5	SSE5	SSE10	SSE11	SSE10	SSE9	SSE9	SSE8	SSE8	SSE7	SSE2	S2	W1	NW2	WNW2	NNW1	NW2	NNW2	NW0	NNW1	SE1	SSE3.7	SSE11	
7-Feb	SSE1	SSE4	SE1	SSE7	SSE9	SSE14	SSE16	SSE14	SE14	SSE12	SSE15	SSE13	WSW12	W13	W16	WSW15	W13	W14	NW8	NNW6	NNW3	NNW3	NW2	WNW2	SSW4.4	SSE16	
8-Feb	NNW2	W1	SW2	S1	SSE5	S6	S6	SSE7	SSE8	SSE12	SSW5	W13	WSW15	WSW12	WSW14	WSW15	SW18	SW12	SSW7	SW13	WSW17	WSW24	W22	W17	WSW8.6	WSW24	
9-Feb	W14	W6	S1	SSW2	SSE3	SE1	SSE4	SE5	SE7	S3	SSE6	SSE8	SSE5	SSW2	NNE2	N3	NNW4	NNW3	NNW3	WNW2	NW2	N3	N4	NNW4	SW0.7	W14	
10-Feb	NNW4	NNW4	NNW3	NW4	NNW2	NNW2	NNW2	NNW1	NW2	NW1	NW2	NW3	W1	NW2	N1	NW2	NNW4	NNW3	NW4	SE10	SSE11	S11	SE3	SSE2	WNW0.4	S11	
11-Feb	SSE4	N2	NNW2	WNW2	WNW3	W11	W14	W18	W18	W16	W11	WSW5	SSW4	SW5	WSW8	W17	W17	W17	W11	W9	W14	WSW7	SSE6	SE14	W8.0	W18	
12-Feb	SE14	SSW6	WSW15	WSW17	WSW17	WSW17	WSW14	SW17	WSW18	WSW17	WSW17	WSW20	W24	W22	W22	WSW16	SSW8	WSW11	SW4	WSW11	W19	W22	W19	W18	WSW14.4	W24	
13-Feb	W19	W18	NNW18	W10	W18	W20	NNW21	NNW18	NNW14	NNW9	N8	N7	N6	NNW2	S3	SSE2	NNW2	N5	N4	N4	NNW3	NW2	N1	W1	WNW7.6	WNW21	
14-Feb	SE0	NNW1	SW1	SSE2	SE8	SSE8	SSE6	SSE7	SSE9	SSE11	SSE11	SSE8	SSE11	SSE10	SSE17	SSE17	SSE10	SSE12	SSE10	SSE12	SSE8	SSE12	SSE12	SE14	SE13	SSE9.1	SSE11
15-Feb	SSE14	SSE13	SSE15	SSE13	SSE9	SSE11	SE8	SE8	SE6	SE6	SE7	SE9	SSE9	SE6	W4	S4	S4	SSE5	SSE6	SE7	SE14	SSW7	WSW14	SW13	SSE7.5	SSE15	
16-Feb	SW14	SSW6	SSE2	SW7	S1	SSE8	SE3	SE7	SSE7	SSE6	SSW2	WSW3	WSW4	NNW4	NW3	NNW3	NNW1	WNW2	NW2	N5	NNW4	WNW3	WNW3	NW2	SW1.5	SW14	
17-Feb	NW2	NNW4	NNW3	SSE1	NW1	W0	NNW2	NNW4	NNW4	NNW4	NNW4	NNW4	NNW2	N2	NNE5	N7	NNE7	NNE6	NNE5	NNE7	NNE7	NNE6	NNE6	NNE5	N3.5	N7	
18-Feb	NNE5	NNE6	NNE4	NNE5	N4	N3	N4	NNE2	N3	N2	NNW1	NNW1	NNW2	N3	NE4	ENE5	ENE4	NE2	N2	NNW2	N5	N5	N7	N8	NNE3.4	N8	
19-Feb	N5	N8	N7	N5	N3	ESE6	E6	E9	ENE5	E7	E7	ESE8	ESE10	ESE9	ESE5	E4	ENE4	ENE4	N3	NNW4	N4	N3	N5	N4	ENE3.5	ESE10	
20-Feb	N6	N3	N5	N3	NNW3	NNW3	NNW3	NW3	NNW5	NNW4	NNW3	NNE3	SSW0	WNW5	NW8	NW4	NW4	NW11	NW12	NW11	NW7	WNW7	W11	WSW14	NW5.0	WSW14	
21-Feb	W16	W14	W5	WSW8	W8	NNW10	NW13	NW13	NNW10	NNW10	NW11	NW11	W13	W14	W15	NNW10	WNW9	WNW9	WNW9	NNW11	NNW8	NNW3	NNW1	NNE2	WNW8.7	W16	
22-Feb	W2	NNW5	N4	N3	N2	NNW2	N2	NNW3	NNW2	WNW1	WSW4	WSW7	W9	WNW3	N5	N7	N7	N5	N6	N3	N4	N2	E0	NNW2	NNW2.8	W9	
23-Feb	N2	NW2	SE1	ENE1	NNW3	NNW1	NNW2	NNW2	NW1	NW1	ESE1	ESE4	SE4	SE6	SE5	ENE3	NE1	ESE3	NNW1	N2	N3	N5	N7	N7	NNE1.3	N7	
24-Feb	N6	N8	N10	N8	NNW3	N4	N4	N4	NNW2	NW3	NNE4	NNW8	NNE5	NNE3	SSE4	SE5	SSW6	S3	SE5	SE5	WSW7	WSW4	SSE7	SSE11	N1.1	SSE11	
25-Feb	SSE12	SSE13	SSE11	SE13	SE12	SSE13	SE11	SE11	SE11	SSE13	SE14	SSE13	SSE5	NNE4	NNW5	N6	N6	NW3	SSW1	ENE4	NE8	N17	NNE15	N14	ESE4.6	N17	
26-Feb	N13	N10	NNW11	NNW10	NNW7	NNW6	NNW2	NNW3	NNW3	N6	NNW7	N6	SW7	SW4	WSW4	NE3	NNE3	SW1	NNE3	ENE2	NNE2	NNW3	NNW3	NNW2	NNW3.8	N13	
27-Feb	NNW3	NNW5	NNW4	N6	N6	N5	NNW2	NW3	N3	NNE3	WSW4	WSW10	WSW9	WSW6	WSW4	WSW5	WSW3	SSW2	W1	S0	SSE3	SE6	SSE4	SE5	WNW1.7	WSW10	
28-Feb	SSE2	N1	N1	NNE10	N9	N8	N8	N10	NNE10	NNE9	N10	N6	N7	NNE9	NNE6	NE7	NNE6	NNE6	NNE5	N6	NNE4	NNE3	N3	NNW3	NNE5.9	NNE10	
WNW1.6 NW1.6 NW1.4 NNW0.9 W1.0 SW1.2 SW1.0 SSW1.0 SW1.2 SSW1.1 SSW1.3 SW1.7 SW3.1 WSW2.4 WSW2.4 WSW1.6 WSW1.3 W1.7 NW2.0 NW1.2 NW1.8 NW2.4 NW2.0 NNW1.3																								Diurnal Average			
W19 W18 WNW18 WSW17 W18 W20 WNW21 W18 W18 WSW17 WSW17 WSW20 W24 W22 W22 W17 SW18 W17 NW12 SW13 W19 WSW24 W22 W18																								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 - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 12 22:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Feb 22 23:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Feb	1	1	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	1	1	1	1	2	3	2	3
2-Feb	2	2	2	2	3	2	2	2	2	2	3	3	2	2	2	2	2	1	1	2	2	2	2	2	3
3-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	5	4	4	3	3	3	5
4-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
5-Feb	3	2	2	1	2	1	1	1	1	1	1	1	2	2	3	2	1	1	1	1	1	1	1	1	3
6-Feb	1	1	2	2	2	3	2	3	2	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	3
7-Feb	1	1	1	2	2	4	3	3	3	3	3	5	5	5	5	5	4	5	3	2	1	1	1	1	5
8-Feb	1	1	1	1	3	3	3	3	4	4	3	5	5	4	4	5	5	4	2	6	5	6	6	5	6
9-Feb	5	4	1	2	2	1	2	1	2	1	3	2	2	1	1	2	2	1	1	1	1	1	2	1	5
10-Feb	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	6	5	4	2	2	6
11-Feb	2	1	2	2	3	3	4	4	5	5	3	2	2	2	4	5	5	4	4	3	4	4	6	3	6
12-Feb	2	3	6	5	4	4	3	3	5	4	4	6	7	6	6	7	3	4	4	4	6	7	6	6	7
13-Feb	6	6	6	4	6	6	7	7	6	7	3	3	2	1	2	2	2	2	2	2	1	1	1	1	7
14-Feb	1	1	1	2	3	4	3	3	5	4	4	5	5	4	4	3	5	2	2	2	2	2	2	2	5
15-Feb	2	3	2	2	4	4	4	3	3	3	2	3	3	4	1	2	3	4	3	6	3	4	5	5	6
16-Feb	4	3	2	3	1	4	3	2	2	2	2	2	2	3	2	2	1	1	2	2	2	1	1	1	4
17-Feb	1	1	2	2	2	1	1	2	1	1	1	2	2	1	2	3	3	3	2	3	3	3	3	2	3
18-Feb	3	3	2	2	2	2	2	1	1	1	1	1	1	1	2	2	3	1	1	2	2	2	2	2	3
19-Feb	3	2	2	2	2	2	3	3	3	3	3	3	5	6	2	2	2	1	1	1	2	2	2	1	6
20-Feb	2	1	2	1	2	1	1	1	2	2	1	2	1	4	3	2	3	4	4	4	3	4	3	4	4
21-Feb	5	6	2	3	3	3	5	5	4	4	5	4	5	5	5	4	4	3	4	3	2	2	1	1	6
22-Feb	1	2	2	1	1	1	1	1	1	1	2	3	3	2	2	3	3	2	2	1	1	1	1	1	3
23-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	2	2	2	2	2
24-Feb	2	3	3	3	1	2	2	2	1	1	2	3	2	2	2	2	2	2	1	2	3	4	3	2	4
25-Feb	3	2	3	4	3	3	4	5	4	3	3	3	2	2	2	3	2	1	2	3	4	6	7	5	7
26-Feb	4	4	4	3	3	2	1	1	1	3	3	4	3	2	2	2	2	1	2	1	1	1	1	1	4
27-Feb	2	2	2	2	2	2	2	1	2	1	3	3	3	2	2	2	2	1	1	1	2	3	2	1	3
28-Feb	2	2	2	5	4	3	4	4	4	4	4	3	3	4	3	3	3	2	2	2	2	2	2	1	5
														Diurnal Maximum											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	368	54.76	54.76
6 - 11	203	30.21	84.97
12 - 19	92	13.69	98.66
20 - 28	9	1.34	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

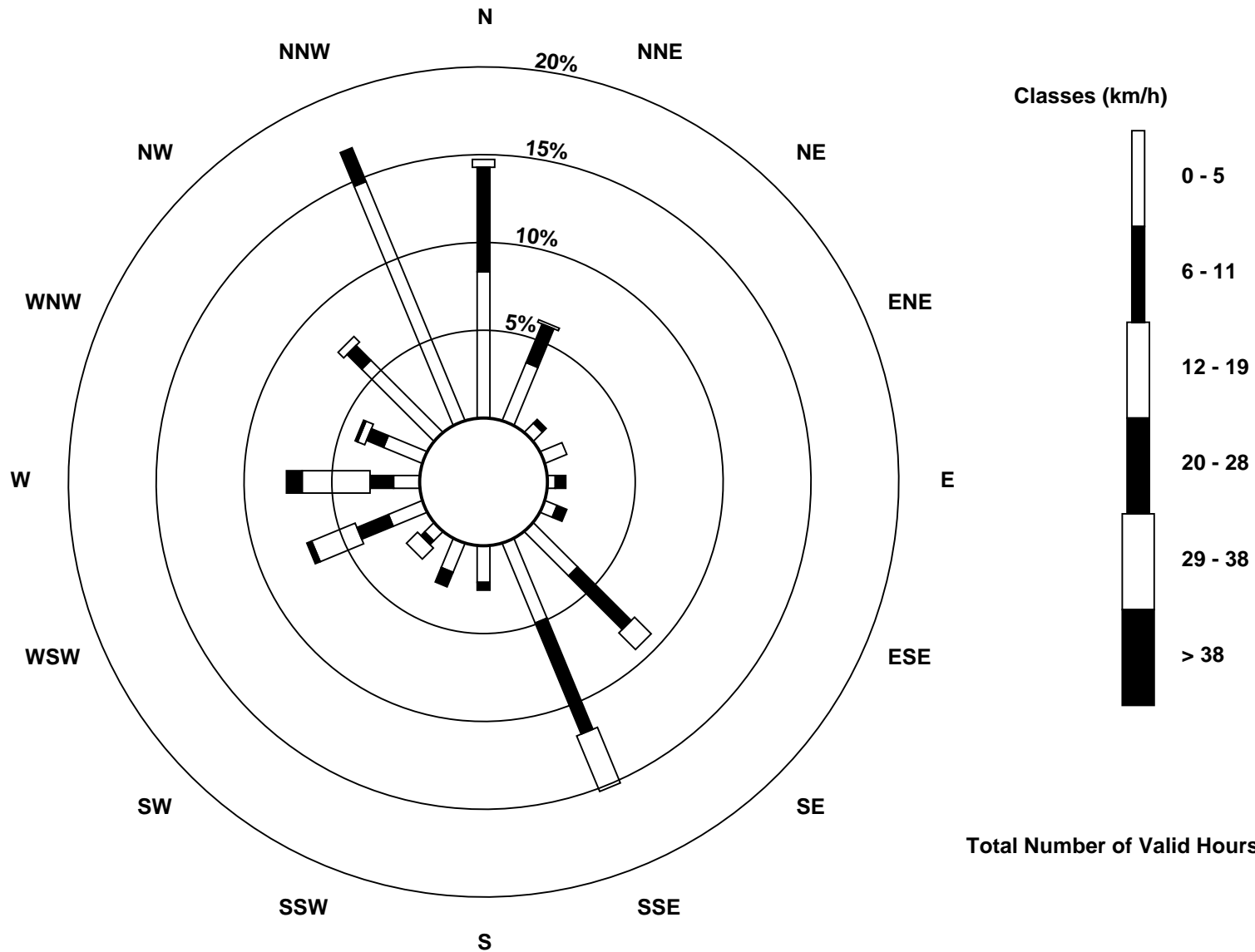


Wood Buffalo Environmental Association

Wind Rose Feb 2017

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower (AMS 3)





Maximum Speed: 34 km/h on Feb 8 22:00	Maximum Daily Speed Average: 20.0 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 22 23:00	Minimum Daily Speed Average: 0.5 km/h on Feb 10	Hours of Data: 663
Maximum Diurnal Speed Average: 3.8 km/h at hour 22	Minimum Diurnal Speed Average: 1.3 km/h at hour 8	Hours of Missing Data: 9
Monthly Average Velocity: 1.7 km/h 266.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 18 P ₉₉ = 29	Percent Operational Time: 98.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	NNW7	NNW5	NNW8	N10	NNW10	NNW9	NNW7	NNW7	NW3	WNW1	SSE2	SSE2	SE3	SE4	SE7	SE10	SE7	SSE4	S1	WSW3	S3	SW1	SE6	SSE4	N0.7	NNW10	
2-Feb	SSW3	SSE4	SSE3	SSE3	SE6	SE15	SE12	SSE7	SE9	SE10	SE9	SE6	SE3	SSW4	SE6	SE7	SE5	E4	NNE4	NNE5	N7	NNW6	NNW9	NNW7	SE3.4	SE15	
3-Feb	NNW4	NW5	NNW6	NNW4	W4	NW3	NW3	WSW2	NE1	NNW1	SE1	SSW1	SSE2	ESE3	SE6	SE7	NE3	NNW4	NNW15	N12	NNE14	N13	N12	N9	N3.6	NNW15	
4-Feb	NNW7	NNW5	NW3	NNW3	NNW4	NW3	NNW4	NW3	SE3	S2	SE3	SE4	SSE2	S3	SE8	SE9	SE9	SE9	SE7	SE6	N4	N8	NNW6	NNW9	ENE0.8	NNW9	
5-Feb	NNW10	NNW8	NNW8	NNW6	NNW5	NNW4	NNW5	WNW3	NW3	NW4	WNW3	W4	WSW9	WSW11	SW7	SSW3	SE4	SE6	ESE2	NNE1	NNW3	NW3	NNW2	SSE3	WNW2.6	WSW11	
6-Feb	SSE6	SSE8	SSE10	SE8	SE7	SE13	SE13	SE12	SE11	SE11	SE9	SE11	SE10	SE2	SSE3	SW1	NW3	NW2	NW2	WNW3	NW3	NW2	NW1	S1	SE5.0	SE13	
7-Feb	SSE4	SSE8	SSE6	SSE10	SE13	SE17	SE20	SE17	SE20	SE16	SE15	SSE12	WSW18	WSW19	WSW21	WSW23	WSW19	W19	NW11	NNW9	NNW6	NNW6	NNW3	WNW2	SSW5.7	WSW23	
8-Feb	WNW5	WSW3	SW4	SSW2	S5	SSW8	SW7	S5	SSW7	SSE11	SW8	WSW18	WSW21	WSW16	WSW20	WSW20	SW22	SW15	SSW10	SW17	WSW25	WSW34	WSW30	WSW25	SW12.8	WSW34	
9-Feb	WSW21	W11	SSW2	SSW4	SE5	SE3	SSE6	SE7	SE10	SE5	SE8	SE10	SE6	SSW2	N3	N4	NNW6	NNW5	NNW5	NNW2	NNW4	N6	N7	NNW6	SSW0.6	WSW21	
10-Feb	NNW7	NNW6	NNW6	NNW5	NNW3	NNW2	NW3	NNW2	WNW2	NW2	NNW2	NW4	NW1	NW2	NNW1	NW2	NNW5	NNW4	NW4	SE14	SSE14	SSE13	SE5	SE6	NNW0.5	SE14	
11-Feb	SE5	NW1	W2	WSW2	W5	WSW17	W19	WSW25	W25	W21	WSW16	WSW6	S5	SSW6	WSW10	WSW23	W24	WSW23	WSW17	WSW14	W21	WSW12	SSE6	SE16	WSW11.5	WSW25	
12-Feb	SE15	SW9	WSW22	WSW23	WSW24	SW21	SW18	SW21	WSW25	WSW23	SW23	WSW29	WSW31	W29	WSW30	WSW22	SSW11	SW16	SW8	SW16	W26	W30	W25	W24	WSW20.0	WSW31	
13-Feb	W26	W25	W24	W15	W24	W28	W28	W23	W20	NNW12	NNW11	N9	N7	NNW3	SSE3	SE2	NNW4	NNW8	NNW7	NNW7	NNW5	NNW4	N3	N1	WNW10.5	W28	
14-Feb	E0	WSW1	S2	SE5	SE11	SE14	SE10	SE11	SE12	SE14	SE15	SE13	SE15	SE16	SE22	SE21	SE16	SE17	SE9	SE13	SE15	SE14	SE16	SE15	SE12.4	SE22	
15-Feb	SE18	SE18	SE18	SE14	SE11	SE11	SE10	SE13	SE11	SE9	SE9	SE11	SE10	SE7	WSW4	SSE4	S4	SSE7	SSE9	SSE8	SE12	SSW11	WSW21	SW18	SSE9.1	WSW21	
16-Feb	SW19	SSW9	S4	SW8	S1	SE10	SE7	SE9	SE8	SSE8	SSE2	WSW3	SW3	NNW5	NNW4	NNW5	NNW4	NNW3	WNW3	NNW9	NNW8	NW5	WNW4	NW2	SW1.5	SW19	
17-Feb	WSW4	NW5	WNW3	SSW1	WNW2	SSE1	WNW3	NW6	NW8	NW8	WNW6	NNW7	NNW3	NNW4	NNE8	N11	NNE10	NNE10	NNE9	NNE10	NNE11	NNE9	NNE9	NNE7	N5.3	NNE11	
18-Feb	NNE7	N10	NNE7	NNE8	N6	NNW4	N6	NNE3	NNW4	NNW2	NNW2	NNW1	NNW2	N3	NNE6	ENE7	ENE5	NE3	NNE3	NNW3	N8	N7	N9	N10	N4.8	N10	
19-Feb	NNW6	N10	N10	NNW7	NNE3	ESE8	E9	E12	ENE8	E9	E9	ESE10	ESE13	ESE11	E6	ENE5	ENE6	ENE7	NNE4	NNW5	N6	NNW4	N7	NNW5	ENE4.7	ESE13	
20-Feb	NNW8	NNW5	NNW7	NNW4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	WSW20
21-Feb	WSW23	W19	WSW8	SW10	W10	NW13	NW16	NNW16	NNW13	NNW13	NW14	NW14	W17	W18	W19	W13	NNW12	NNW12	NW12	NW14	NNW12	NNW6	N4	N2	WNW11.4	WSW23	
22-Feb	W4	NNW7	NNW6	NNW5	NNW4	NNW3	NNW3	NNW4	NNW4	WNW2	W3	WSW8	W11	NW4	N7	N11	N10	N8	N8	N5	N6	NNE3	ENE0	NW2	NNW4.3	W11	
23-Feb	NNW2	NNW2	SSW1	E2	NNW3	NW1	NNW3	NNW4	NW2	NNW2	ESE1	ESE4	ESE4	SE6	ESE5	ENE4	ENE1	ESE6	E1	NNE2	N5	N9	NNW10	NNW11	NNE1.8	NNW11	
24-Feb	NNW9	N11	N15	N11	NNW5	N7	N8	N7	NNW4	NNW3	N5	NNW12	N8	N4	SSE5	ESE5	SSW7	S4	SE6	SE8	WSW12	WSW7	SSE6	SE11	N2.3	N15	
25-Feb	SE14	SE16	SE16	SE19	SE17	SE17	SE15	SE16	SE15	SE16	SE17	SE14	SSE4	NNE5	NNW5	N8	N8	NW4	SSE1	ENE7	NE12	N25	N24	N20	ESE6.3	N25	
26-Feb	N18	NNW14	NNW16	NNW13	NW10	NW8	NNW5	NNW5	NNW5	N8	NNW9	NNW7	SW8	SW5	WSW4	NE3	NNE4	SW1	NNE5	ENE3	NE3	N4	NNW5	NNE3	NNW5.4	N18	
27-Feb	NNW2	NNW7	NNW7	NNW9	N9	N7	NW3	NNW5	NNW6	NNW4	WSW5	WSW11	WSW11	WSW7	WSW5	WSW6	SW3	SSE2	WSW1	SSW1	SE6	SE9	SE6	SE6	WNW1.8	WSW11	
28-Feb	SE4	N2	NNE2	N15	N12	N11	N12	N16	N15	NNE15	N13	N8	NNW8	N11	NNE7	NE9	NNE9	NNE9	NNE9	N10	NNE8	NNE6	N4	NNW4	N8.7	N16	

W2.3	NNW2.5	NNW2.1	NNW1.3	W1.4	SSW1.5	SW1.4	SW1.3	SSW1.6	S1.7	SSW1.5	SW2.0	SW3.8	WSW3.1	WSW3.0	WSW1.8	WSW1.4	W1.9	NW2.4	NW1.5	NW2.9	NW3.8	NW3.3	NNW2.0	Diurnal Average
W26	W25	W24	WSW23	W24	W28	W28	WSW25	WSW25	WSW23	SW23	WSW29	WSW31	W29	WSW30	WSW23	W24	WSW23	WSW17	SW17	W26	WSW34	WSW30	WSW25	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

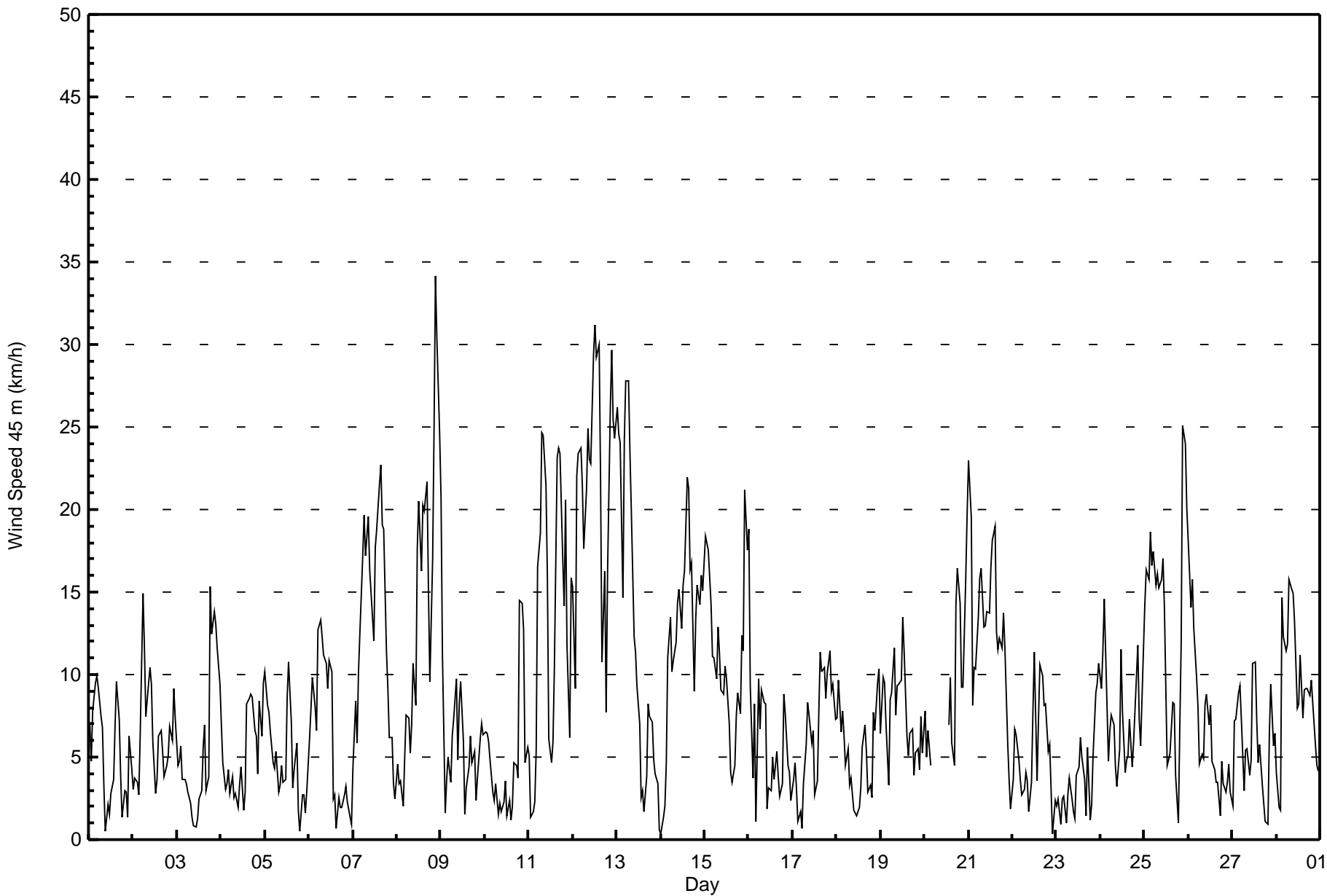
Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 25 23:00														Hours in Service: 672 Hours of Data: 663 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.7													
Minimum Value: 1 km/h on Feb 6 17:00																											
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7																											
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	3		
2-Feb	2	2	2	2	3	2	2	2	2	2	3	2	2	1	2	1	2	1	2	2	2	2	3	2	3		
3-Feb	2	1	1	2	1	1	1	1	1	1	1	1	1	3	2	2	2	2	5	4	4	4	3	3	5		
4-Feb	1	2	1	1	1	1	1	1	2	1	1	2	2	2	2	2	2	2	2	2	2	3	1	2	3		
5-Feb	3	2	3	1	3	1	1	1	1	1	1	2	2	2	2	1	1	1	2	1	2	1	1	2	3		
6-Feb	1	1	1	3	2	2	2	2	2	2	4	4	2	1	1	1	1	1	1	1	1	1	1	1	4		
7-Feb	2	1	1	1	2	2	2	3	2	2	2	4	4	4	5	3	3	5	4	3	2	1	2	2	5		
8-Feb	3	2	2	2	2	4	6	3	5	4	5	5	3	4	3	5	5	4	3	6	5	4	5	4	6		
9-Feb	4	5	2	2	2	1	3	1	2	2	3	3	3	1	1	2	2	1	2	2	1	1	2	1	5		
10-Feb	2	2	1	2	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	8	6	4	3	4	8		
11-Feb	3	2	1	2	4	3	5	3	4	4	3	3	2	3	4	5	4	4	5	3	3	4	6	3	6		
12-Feb	2	4	7	5	4	3	2	3	4	3	4	5	6	6	6	8	3	5	5	4	6	7	6	6	8		
13-Feb	5	5	6	4	6	6	6	7	6	8	3	3	2	2	1	1	3	2	2	2	2	1	1	1	8		
14-Feb	1	1	2	3	3	4	3	3	6	4	5	6	4	5	3	2	5	3	1	2	2	1	2	2	6		
15-Feb	2	2	2	2	4	3	4	4	4	3	2	2	3	3	2	2	4	4	3	5	4	4	5	5	5		
16-Feb	4	5	2	4	1	5	3	3	2	1	2	2	2	4	2	2	1	2	3	3	3	2	1	2	5		
17-Feb	2	1	1	1	1	1	2	1	2	1	1	2	2	1	3	3	4	4	3	4	4	3	3	3	4		
18-Feb	2	3	3	3	2	2	2	1	1	1	1	1	1	1	2	3	3	1	1	2	2	3	3	1	3		
19-Feb	3	2	2	2	2	3	3	3	3	3	3	3	5	7	3	2	2	1	1	2	1	2	2	1	7		
20-Feb	2	1	2	1	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	3	3	4	4	4	4	4	5	3	4	5		
21-Feb	4	6	3	3	4	3	5	5	4	4	4	4	4	5	5	4	4	3	4	3	3	3	2	1	6		
22-Feb	2	3	2	2	2	1	1	1	2	1	1	2	2	3	3	3	3	2	2	2	2	2	1	1	3		
23-Feb	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	2	2	2	2		
24-Feb	2	3	4	4	1	2	2	2	1	1	3	3	2	3	2	2	2	2	1	2	4	5	3	2	5		
25-Feb	2	2	2	2	3	2	4	5	4	2	2	2	2	3	2	5	3	2	2	4	5	7	8	6	8		
26-Feb	5	4	5	4	3	2	2	1	2	3	3	4	3	2	2	2	2	1	2	2	1	1	1	2	5		
27-Feb	3	2	2	2	2	2	1	1	3	1	4	2	2	2	1	1	1	1	1	1	2	2	3	2	4		
28-Feb	2	2	2	7	5	3	4	4	4	5	4	3	3	4	3	3	3	2	2	2	2	3	2	2	7		
														5 6 7 7 6 6 6 7 6 8 5 6 6 7 6 8 5 5 5 8 6 7 8 6 6													
																		Diurnal Maximum									
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	259	39.06	39.06
6 - 11	239	36.05	75.11
12 - 19	112	16.89	92.01
20 - 28	46	6.94	98.94
29 - 38	7	1.06	100.00
> 38	0	0.00	100.00

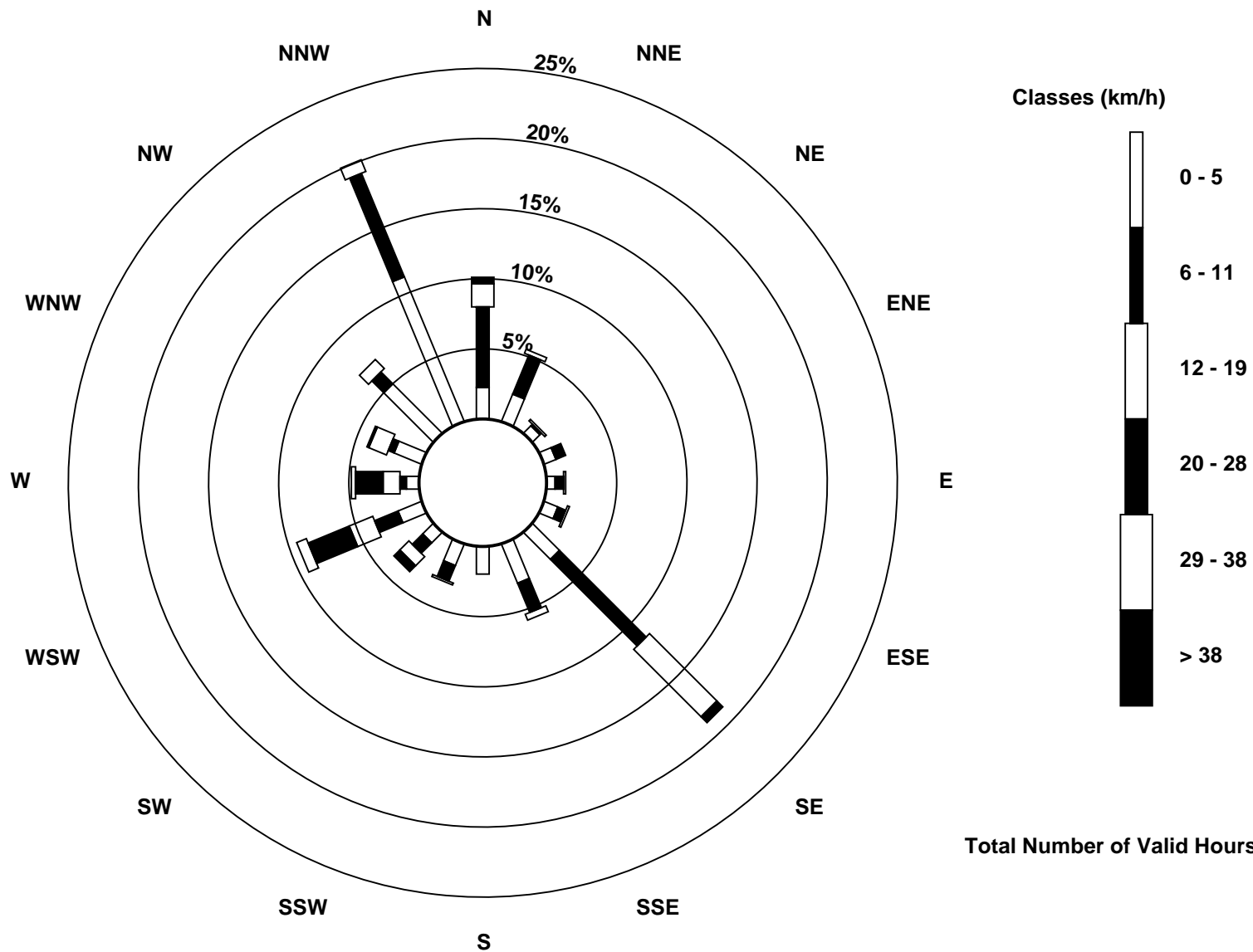
Total Number of Valid Hours: 663

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





Maximum Speed: 46 km/h on Feb 12 22:00	Maximum Daily Speed Average: 31.4 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 3 10:00	Minimum Daily Speed Average: 1.7 km/h on Feb 4	Hours of Data: 662
Maximum Diurnal Speed Average: 5.8 km/h at hour 2	Minimum Diurnal Speed Average: 2.0 km/h at hour 17	Hours of Missing Data: 10
Monthly Average Velocity: 3.6 km/h 267.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 10 Q ₃ = 17 P ₉₀ = 25 P ₉₉ = 43	Percent Operational Time: 98.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	NNW14	NNW10	NNW13	N14	N17	N17	N13	N11	N9	NNE3	ENE3	SSW3	SW4	SSW2	SE7	SE11	SE12	SSE12	SSE8	S5	WSW8	WSW18	WSW16	WSW17	NW2.6	WSW18																						
2-Feb	WSW18	WSW13	WSW11	WSW15	WSW11	SW7	SW8	WSW13	WSW9	WSW7	WSW8	WSW7	W3	SSW3	SSW3	SSE3	ESE4	E5	ENE7	NE12	NNE12	N10	N14	N13	W3.9	WSW18																						
3-Feb	N9	NNW7	N9	N9	NNW5	NNW8	N6	E1	ENE3	SSW1	W2	SW5	SSW2	SE3	SE7	SE8	ENE4	N7	NNW24	N17	NNE18	N18	N15	N13	N6.0	NNW24																						
4-Feb	N11	N10	NNE7	NNE6	NNE7	NNE3	NW3	NNW3	SE3	S2	SSE5	SSW3	SSW2	SSW5	SE9	SSE9	SE11	SSE12	SSE11	SSE9	SE4	NNE7	N10	N16	E1.7	N16																						
5-Feb	N17	NNW14	NNW13	NNW12	N11	NW7	NNW8	NNW6	WNW4	NW4	WNW4	WNW5	W6	W9	W4	SE2	ESE5	SE10	SE7	SSE6	SSE7	SSE6	SSE5	SSE7	NW2.4	N17																						
6-Feb	SSE8	SSE9	SSE9	SSE9	SSE9	SSE10	SSE8	SSE7	SSE8	SSE9	SSE10	SE12	SE7	SE3	SE4	E3	N2	NNW5	N8	NNW7	NW5	NW2	W2	SSW2	SSE4.0	SE12																						
7-Feb	S3	SSE3	SSE4	SSW5	SSW4	SSW7	SW11	S9	S10	S9	SW11	SW12	WSW21	WSW22	WSW25	WSW25	WSW26	W27	NW20	NNW18	NNW13	NNW13	NNW14	NW12	WSW9.2	W27																						
8-Feb	W12	W10	WSW14	WSW11	SW15	WSW23	WSW23	WSW20	WSW21	WSW18	WSW23	WSW25	WSW24	WSW21	WSW25	WSW26	SW29	SW23	SW20	SW28	WSW32	WSW40	WSW40	WSW35	WSW22.9	WSW40																						
9-Feb	WSW32	WSW22	WSW11	SW8	SE5	SSW1	S3	SSE7	SSE15	SE13	SSE11	SE13	SE8	S2	WNW3	N5	N10	N9	NNW9	NNW10	NNW12	N9	N10	N9	W1.8	WSW32																						
10-Feb	NNW14	NNW13	N11	NNW8	NW5	NNW6	NW5	W2	N1	NNE1	NW2	NNE2	WNW4	WNW2	WSW2	ENE2	ENE3	ESE6	ESE11	SE26	SE22	SSE19	SE14	SSE15	ESE2.0	SE26																						
11-Feb	S8	SW4	SW5	SW7	WSW15	WSW27	WSW30	WSW34	WSW35	WSW31	WSW22	WSW8	SSW5	SW10	WSW17	WSW34	WSW36	WSW35	WSW28	WSW25	WSW31	WSW25	SW10	S9	WSW19.6	WSW36																						
12-Feb	S9	SW22	WSW32	WSW32	WSW33	SW30	SW25	SW30	WSW35	SW31	SW31	WSW37	WSW45	W45	WSW44	WSW34	SW22	WSW27	WSW19	WSW24	W43	W46	W42	W41	WSW31.4	W46																						
13-Feb	W44	W39	W36	W23	W40	W44	W43	W38	W32	NNW22	NNW16	NNW12	NNE7	NNW2	SSE3	ESE1	N3	N14	N12	N11	NNW8	NNW9	NW3	WNW1	NNW16.5	W44																						
14-Feb	ESE2	SE4	SSE10	SSE12	SSE19	SE25	SSE21	SSE22	SSE21	SE20	SE19	SSE19	SSE17	SE22	SSE23	SSE26	SE22	SSE18	SSE12	SSE14	S11	S8	SSW9	SSW11	SSE15.6	SSE26																						
15-Feb	S7	S8	SSE12	SSE18	SE19	SSE14	SSE15	SSE18	SSE20	SSE18	SE16	SE17	SSE10	SE7	SSW5	S5	SW7	SW12	SW15	SW17	SW22	SW26	WSW36	SW30	S12.4	WSW36																						
16-Feb	SW33	SW25	SW19	SW22	SW5	SSE9	SE13	SSE16	SE15	ESE9	E6	ESE1	SE7	WNW2	NNW6	NNW11	N9	N6	NNW5	NNW20	N19	NNW12	NNW8	NW8	WSW2.3	SW33																						
17-Feb	N5	NW9	NW7	W4	WSW6	WNW2	WNW7	NNW11	N16	NNW12	NW10	NNW11	NNW4	N5	NNE10	NNE15	NNE13	NNE13	NNE11	NNE13	NNE15	NNE11	NNE12	NNE9	N8.1	N16																						
18-Feb	NNE10	NNE12	NNE9	NE9	N8	N5	N7	NE4	N4	N1	NE1	NE2	NE2	NNE4	NNE8	ENE9	ENE9	ENE6	ENE6	E5	NE6	N9	N12	NNE13	NNE6.0	NNE13																						
19-Feb	NNE7	NNE9	NE8	E6	ESE12	ESE16	ESE14	E17	E12	E13	E14	ESE13	ESE19	ESE17	ESE10	E8	E11	ESE11	E7	ENE4	NNE3	SSW1	NE2	NNE3	E8.8	ESE19																						
20-Feb	N9	N10	N11	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WNW10	NW14	NW9	WNW6	WNW21	WNW25	WNW22	NW14	WNW14	WSW21	WSW26	----	WSW26																					
21-Feb	WSW28	W30	WSW14	SW16	W15	NW21	NW24	WNW27	W19	WNW19	WNW18	WNW18	W20	W24	W24	W17	W15	WNW16	NW17	NW22	NW21	NW16	NW8	WNW4	WNW17.4	W30																						
22-Feb	WNW5	N11	N12	N9	N6	N4	ENE2	NE1	ENE4	NE4	NNW3	WNW6	W10	NNW6	N10	N13	N12	NNE11	N12	NNE8	NNE9	NE8	ENE3	E2	N5.8	N13																						
23-Feb	W2	NNW4	SW4	SSW3	ESE3	SSE6	SSE4	SE7	SE7	SSE3	S2	SE5	SE5	SE7	ESE6	ENE4	E4	ESE8	ESE8	E6	NE3	N9	NNW16	NNW17	E2.1	NNW17																						
24-Feb	N16	N17	N21	N17	NNW11	N13	N14	NNW11	NNW9	NNW5	NNW8	NNW15	N10	N5	S4	SSE5	SSW10	SSW10	S10	SSW8	WSW20	WSW18	SW14	S7	NW5.2	N21																						
25-Feb	S6	SSE11	SSE11	SSE14	SSE16	SSE16	SSE16	SSE17	SSE17	SSE12	S10	SSE8	SSW4	N6	NNW7	N12	N12	NW8	SW2	ENE11	NE20	N36	NNE35	N29	E3.0	N36																						
26-Feb	N27	NNW21	NNW25	NNW20	NNW15	NNW13	NNW12	NNW11	NW11	NNW12	NNW11	NNW9	SW8	WSW5	W5	NNE4	NNE5	NNW1	NNE7	ENE4	E4	SE4	SE5	ESE10	NNW7.3	N27																						
27-Feb	ESE11	E6	ENE8	NNE10	NNE11	NNE9	N8	NNW14	N10	NW6	NW6	W5	WSW7	WSW3	SW4	SSW5	S4	SSE4	SE5	SSE8	SSE15	SSE21	SSE15	SSE14	ESE2.1	SSE21																						
28-Feb	S8	W4	W3	N22	NNE18	N16	N17	N21	N20	NNE20	N16	N10	N11	N14	NNE9	NE11	NNE12	NNE11	NNE12	NNE15	NE16	NE13	NNE9	NNE8	NNE11.8	N22																						
W5.6																								WNW5.8	NNW4.4	W3.4	W3.2	W3.8	W4.3	WSW4.1	WSW3.7	WSW2.8	WSW3.0	WSW3.4	SW4.6	WSW4.0	WSW4.1	WSW2.5	SW2.0	WSW3.1	NNW2.6	NNW2.1	NNW4.2	NNW5.8	NNW5.6	NNW4.5	Diurnal Average	
W44																								W39	W36	WSW32	W40	W44	W43	W38	WSW35	SW31	WSW31	WSW37	WSW45	W45	WSW44	WSW34	WSW36	WSW35	WSW28	SW28	W43	W46	W42	W41	Diurnal Maximum	

AF - Analyzer Failure

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



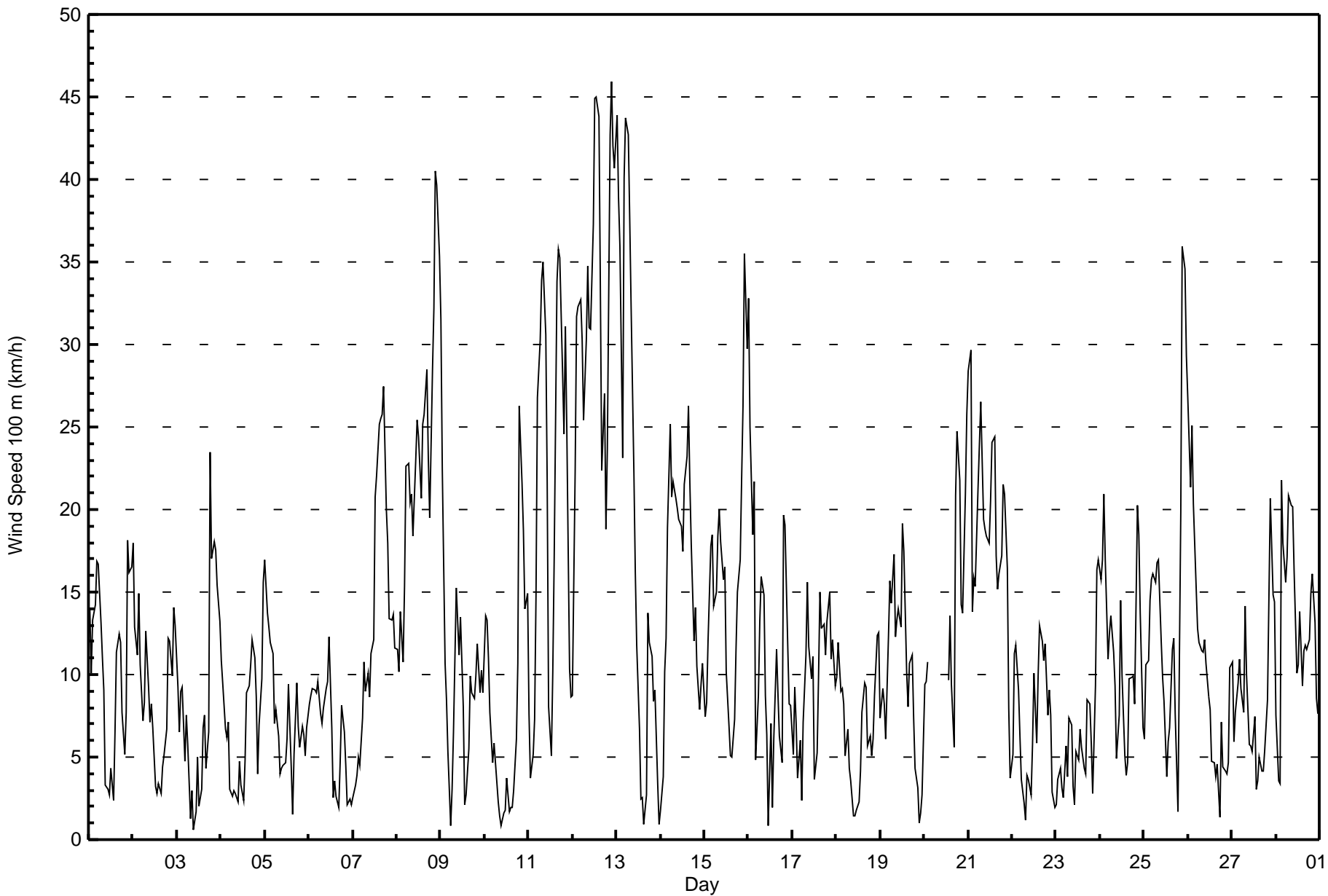
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Feb 13 10:00	Hours in Service: 672 Hours of Data: 662 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.5
Minimum Value: 0 km/h on Feb 6 17:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 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-Feb	2	1	2	2	3	2	3	2	2	1	2	2	1	1	2	2	1	1	2	2	4	3	2	3	4
2-Feb	3	3	3	5	3	2	3	3	2	2	2	1	2	2	2	1	1	1	3	2	4	2	2	2	5
3-Feb	2	1	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	4	4	3	3	3	2	3	4
4-Feb	2	2	1	1	1	2	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	4	2	2	4
5-Feb	3	1	2	1	3	1	1	2	1	1	1	1	1	2	2	1	1	1	2	2	2	2	2	2	3
6-Feb	3	2	2	4	3	3	2	2	2	2	2	4	2	2	2	0	0	2	1	1	1	1	1	1	4
7-Feb	1	1	3	2	2	2	2	3	2	2	3	4	3	4	3	2	3	4	3	2	1	2	2	1	4
8-Feb	2	2	2	3	3	4	3	4	5	6	3	3	2	3	3	4	4	3	3	5	4	3	2	3	6
9-Feb	2	5	4	4	3	2	1	3	3	2	2	2	4	1	1	2	1	2	2	1	1	2	2	2	5
10-Feb	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	4	5	8	8	5	2	3	8
11-Feb	3	2	1	3	5	4	5	2	3	2	4	3	2	4	4	4	2	3	5	3	2	4	5	3	5
12-Feb	3	5	6	4	4	3	3	4	3	3	3	4	4	5	4	9	3	5	7	5	5	6	5	5	9
13-Feb	4	4	6	5	5	5	5	8	5	11	5	4	1	2	1	1	3	1	1	1	2	1	1	1	11
14-Feb	2	1	4	5	3	3	3	2	3	3	3	2	3	2	3	3	3	4	3	2	3	2	4	3	5
15-Feb	2	2	5	2	3	4	3	3	3	2	2	2	2	2	2	2	4	5	8	5	6	4	4	5	8
16-Feb	3	7	6	6	4	4	3	3	1	3	4	2	3	1	2	3	2	1	4	2	4	2	1	2	7
17-Feb	2	3	4	3	3	2	2	2	2	2	1	1	2	1	2	2	3	3	3	3	3	2	2	2	4
18-Feb	2	2	2	2	2	2	2	2	1	1	1	1	1	2	1	2	4	2	2	3	1	2	2	1	4
19-Feb	3	2	2	3	4	3	3	4	3	4	4	4	6	8	4	3	2	2	2	2	2	1	1	2	8
20-Feb	1	1	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	3	4	5	3	3	4	6	6	3	3	6
21-Feb	4	7	2	2	5	4	5	5	5	4	4	5	3	3	4	4	4	3	4	2	2	4	3	1	7
22-Feb	2	3	1	1	2	1	1	1	1	1	1	2	3	3	2	3	2	2	2	2	3	3	1	2	3
23-Feb	2	1	2	2	1	2	2	1	1	2	1	1	2	2	2	2	1	1	1	3	1	4	2	2	4
24-Feb	2	2	2	3	1	2	2	2	1	3	3	3	3	3	1	3	3	2	3	3	4	3	4	2	4
25-Feb	2	2	3	4	2	2	3	3	3	4	2	2	2	3	2	5	3	2	3	7	5	5	7	5	7
26-Feb	5	4	4	4	3	2	1	2	3	3	3	4	4	2	2	2	2	1	2	1	1	1	1	3	5
27-Feb	3	2	1	1	1	2	1	2	4	1	1	1	2	2	1	1	1	1	1	2	3	2	2	2	4
28-Feb	4	2	2	6	4	2	4	3	3	3	3	3	4	4	3	3	3	2	2	2	3	5	3	2	6
5 7 6 6 5 5 5 8 5 11 5 5 6 8 4 9 5 5 8 8 8 6 7 5																									
Diurnal Maximum																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	154	23.26	23.26
6 - 11	225	33.99	57.25
12 - 19	160	24.17	81.42
20 - 28	77	11.63	93.05
29 - 38	32	4.83	97.89
> 38	14	2.11	100.00

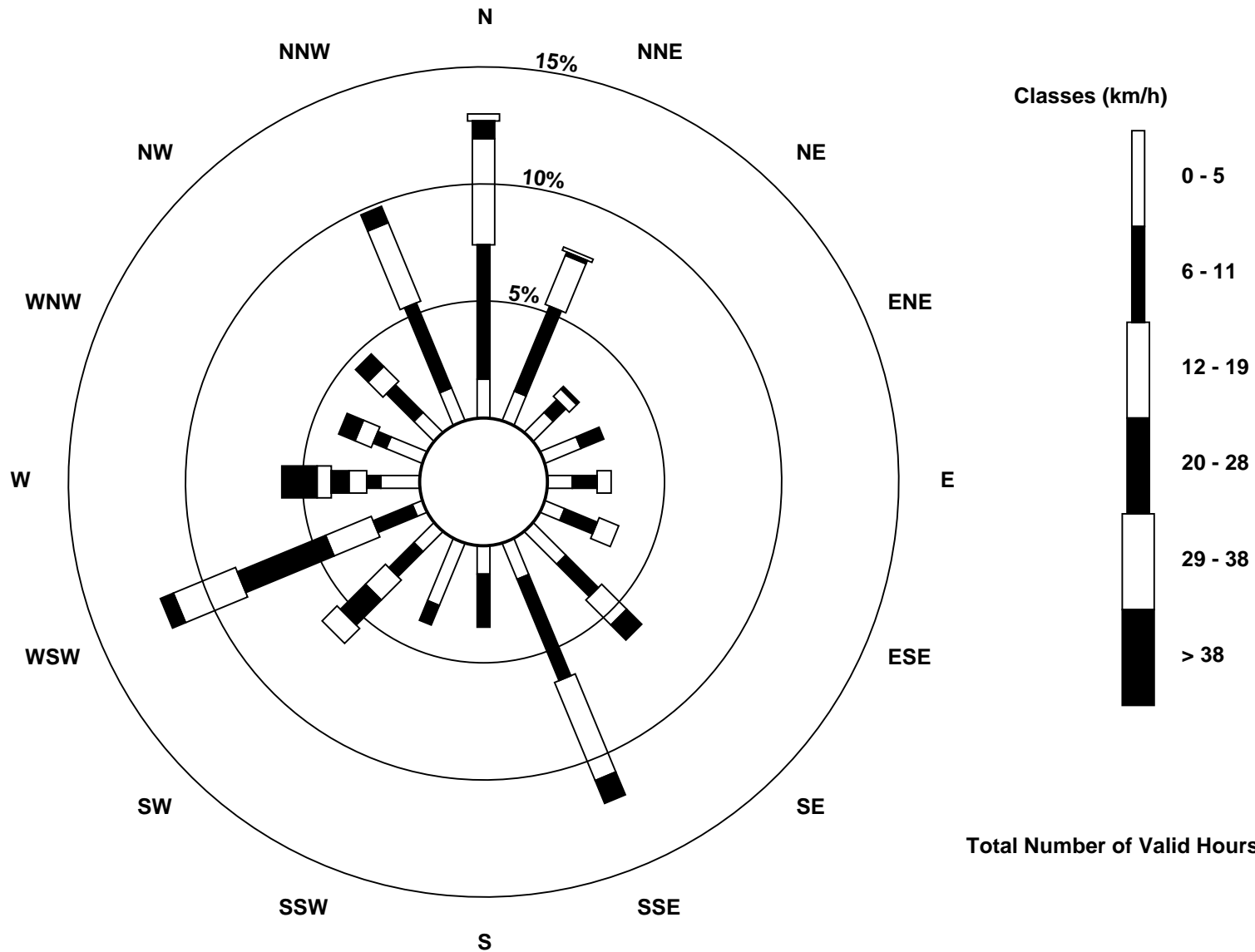
Total Number of Valid Hours: 662

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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



Total Number of Valid Hours: 662



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - February 2017

Maximum Speed: 57 km/h on Feb 12 22:00	Maximum Daily Speed Average: 40.7 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 23 02:00	Minimum Daily Speed Average: 1.9 km/h on Feb 4	Hours of Data: 662
Maximum Diurnal Speed Average: 7.0 km/h at hour 1	Minimum Diurnal Speed Average: 3.2 km/h at hour 17	Hours of Missing Data: 10
Monthly Average Velocity: 5.2 km/h 267.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 13 Q ₃ = 21 P ₉₀ = 32 P ₉₉ = 51	Percent Operational Time: 98.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	N16	N13	N16	N18	N23	N23	N19	N15	N12	N7	N2	SW6	WSW7	SW4	SE4	SE10	SSE13	S13	SSW11	W11	WNW17	W23	W22	W22	NW5.7	W23	
2-Feb	W22	W19	W24	W29	W24	WSW19	WSW21	W17	W18	WNW12	WNW8	W5	NNW6	E4	WNW3	SSE1	ENE2	E6	E8	NE19	NE19	NNE15	N16	N16	WNW7.6	W29	
3-Feb	NNE15	NNE10	NNE13	NNE14	NNE8	N9	NNE10	NE5	NNE2	WSW3	WSW6	WSW6	SW3	S2	SSE6	SSE6	ESE2	NNW10	NNW25	N17	NNE21	NNE18	NNE16	N15	N7.4	NNW25	
4-Feb	NNE12	NNE14	NE14	NE13	NE11	NE8	NE3	N2	SE3	SSW5	SSW7	SW9	SW6	SW8	SSE8	SSE8	SSE10	SSE11	S12	S12	S7	N5	NNE11	NNE20	E1.9	NNE20	
5-Feb	N23	N17	NNE16	NNE15	NNE17	N7	N10	N9	N8	NNE10	N5	NNW5	WNW6	WNW8	NW4	NE1	SE4	SE8	S8	S12	SSW8	SW6	WSW7	SW4	N4.3	NNE23	
6-Feb	SW5	S6	S8	S10	S9	S11	S8	SSE8	S11	SSE10	S7	SE8	SSE6	SSE6	S4	SSW2	NNW3	NNE7	NNE9	NNE7	N6	N5	NW4	NW4	SSE3.2	S11	
7-Feb	WSW3	SW3	WSW6	SW12	WSW15	WSW18	WSW18	SW14	SW18	SW14	WSW24	WSW22	WSW25	WSW27	WSW29	WSW29	W31	W33	NW25	NNW23	NNW18	NNW19	NNW21	NNW16	W15.2	W33	
8-Feb	WNW13	WNW13	W19	W19	WSW23	WSW32	WSW32	W31	W36	WSW30	WSW32	WSW33	WSW30	WSW26	WSW31	WSW30	SW31	SW28	SW25	SW33	WSW41	WSW51	WSW49	W44	WSW29.7	WSW51	
9-Feb	WSW40	W32	WSW24	WSW16	SW6	WSW5	SW8	SW7	S8	SSE10	SSE11	SSE13	SSE9	SSE5	WSW3	NNE6	NNE12	NNE13	NNE10	NNE11	NNE11	NE11	ENE12	E11	WSW2.7	WSW40	
10-Feb	ENE8	ENE9	ENE9	ENE6	E3	SSW2	SW3	S5	SE9	SE10	S9	SSE7	S4	SE7	S5	SSE5	SE8	SE18	SE23	SE31	SSE24	SSE21	SSE16	S19	SE9.4	SE31	
11-Feb	SW12	SW6	SW7	SW16	WSW21	WSW40	W40	W42	W43	W35	W21	W11	SSW9	SW15	WSW22	WSW40	WSW42	WSW44	WSW40	WSW38	WSW44	WSW40	WSW20	SW16	WSW26.9	WSW44	
12-Feb	SW19	WSW34	WSW43	WSW43	WSW43	WSW40	WSW36	WSW38	WSW47	WSW40	WSW41	WSW48	WSW53	W52	WSW52	WSW40	SW27	WSW34	WSW26	WSW30	W53	W57	W51	W51	WSW40.7	W57	
13-Feb	W51	W44	W41	W26	W48	W52	W49	WNW44	WNW36	WNW29	NW22	NNW14	NE6	N1	SE1	SW1	ENE1	NNE9	NNE13	NNE13	NE11	N5	NW7	W4	WNW18.3	W52	
14-Feb	S3	SSE8	S18	S18	S17	SSE22	S24	S23	S22	S18	S16	SSE18	S16	SSE18	S23	S28	SSE21	S18	SSW20	SSW17	SW24	SW23	SW25	SW23	S18.2	S28	
15-Feb	SW21	SW17	SSW13	SSW10	SSE14	SSE18	S25	S24	S26	S27	S20	SSE16	SSE14	SSE13	S8	S9	SW11	WSW27	WSW29	WSW32	SW32	WSW35	WSW49	SW34	SSW18.0	WSW49	
16-Feb	SW35	SW32	SW33	SW34	WSW18	SW8	SE8	S19	S10	SE16	E12	ESE11	SE12	SSW4	W3	N10	NNE11	NE8	NE5	N20	N22	N16	N11	NNW16	WSW3.7	SW35	
17-Feb	NNW16	NNW17	NNW14	N5	NNW2	NNW4	NNW11	N16	N20	N17	NNW12	NNW13	NNW6	N6	NNE10	NNE14	NNE12	NNE13	NNE10	NNE14	NNE16	NNE11	NNE13	NE9	N10.9	N20	
18-Feb	NNE9	NNE11	NNE9	NE9	NNE8	N4	NNE6	NE5	NNE3	NNW1	E2	E3	E2	NNE5	NE8	E10	E11	E9	E12	E10	E8	ENE7	ENE8	E11	ENE6.1	E12	
19-Feb	ESE8	ESE12	ESE15	ESE15	SE18	ESE20	ESE18	E20	E16	E17	E18	ESE16	ESE23	ESE22	ESE13	ESE10	ESE13	ESE13	ESE10	ESE10	ESE5	SE5	ESE3	ESE4	ESE13.2	ESE23	
20-Feb	NE3	NNE6	NNE13	NNE10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW15	NW11	WNW7	WNW25	WNW28	WNW26	WNW19	WNW19	W26	WSW31	---	WSW31
21-Feb	WSW33	W34	WSW20	WSW23	W21	NW25	NW29	WNW33	W26	WNW23	WNW21	WNW20	W22	W26	W26	W20	W18	WNW18	NW20	NW25	NW25	WNW21	NW14	NW7	WNW21.5	W34	
22-Feb	WNW7	N12	NNE13	NNE12	NE9	ENE4	ESE4	SE3	N2	NE4	NE6	NNW5	NNW10	NNW8	N11	N14	N12	NNE11	NNE14	NNE10	NE14	ENE15	E7	E7	NNE6.9	ENE15	
23-Feb	ESE4	SSW1	SW5	SSW7	SSW3	SSW4	SSW5	S5	SSW6	SSW7	SSW7	SSE5	SSE5	SE6	ESE5	ENE4	E4	ESE7	ESE6	E7	E7	NNE7	NNE17	N22	ESE2.0	N22	
24-Feb	N20	NNE20	N23	N21	N13	N16	N13	N12	N12	N7	NNW8	NNW15	N10	N5	SSW4	SSW5	SW12	SW13	SSW13	SW18	W27	W20	WSW21	SW13	NW7.0	W27	
25-Feb	SW12	SSW13	SSW15	SSW14	SSW15	SSW13	SSW15	SSW16	S12	SSW9	SSW10	SSW9	WSW8	NNW8	NNW7	N12	N14	NW11	W5	ENE7	NE24	N40	NNE38	N32	NW2.6	N40	
26-Feb	N30	NNW25	NNW30	NNW25	NNW20	NNW16	NNW17	NNW18	NW17	NNW16	NNW11	NNW10	WSW7	W6	W5	NNE4	NNE5	N3	NE9	ENE4	ESE6	SE9	SE9	SE14	NNW9.2	N30	
27-Feb	SE16	ESE13	ESE10	E10	E11	ENE12	ENE9	NNE6	NE10	NNE10	NNW7	WNW5	W5	WNW2	SSW3	SSW4	S5	S5	SSE7	S10	SSE13	SSE20	SSE17	SSE16	SE5.1	SSE20	
28-Feb	S10	SW5	NNW8	NNE25	NNE21	NNE16	NNE20	NNE21	NNE21	NNE20	NNE16	N10	N11	NNE14	NNE10	NE12	NE12	NNE12	NE14	NE18	ENE19	NE20	NE16	NE14	NNE13.2	NNE25	

W7.0	NNW6.7	NNW6.0	W4.9	W5.6	W6.3	W6.5	W6.9	W6.9	WSW4.9	WSW4.9	WSW4.7	WSW5.7	WSW4.8	WSW5.6	WSW4.0	WSW3.2	WSW4.6	W3.8	W3.3	NNW5.4	NNW6.8	NNW6.9	W5.5	Diurnal Average
W51	W44	WSW43	WSW43	W48	W52	W49	WNW44	WSW47	WSW40	WSW41	WSW48	WSW53	W52	WSW52	WSW40	WSW42	WSW44	WSW40	WSW38	W53	W57	W51	W51	Diurnal Maximum

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



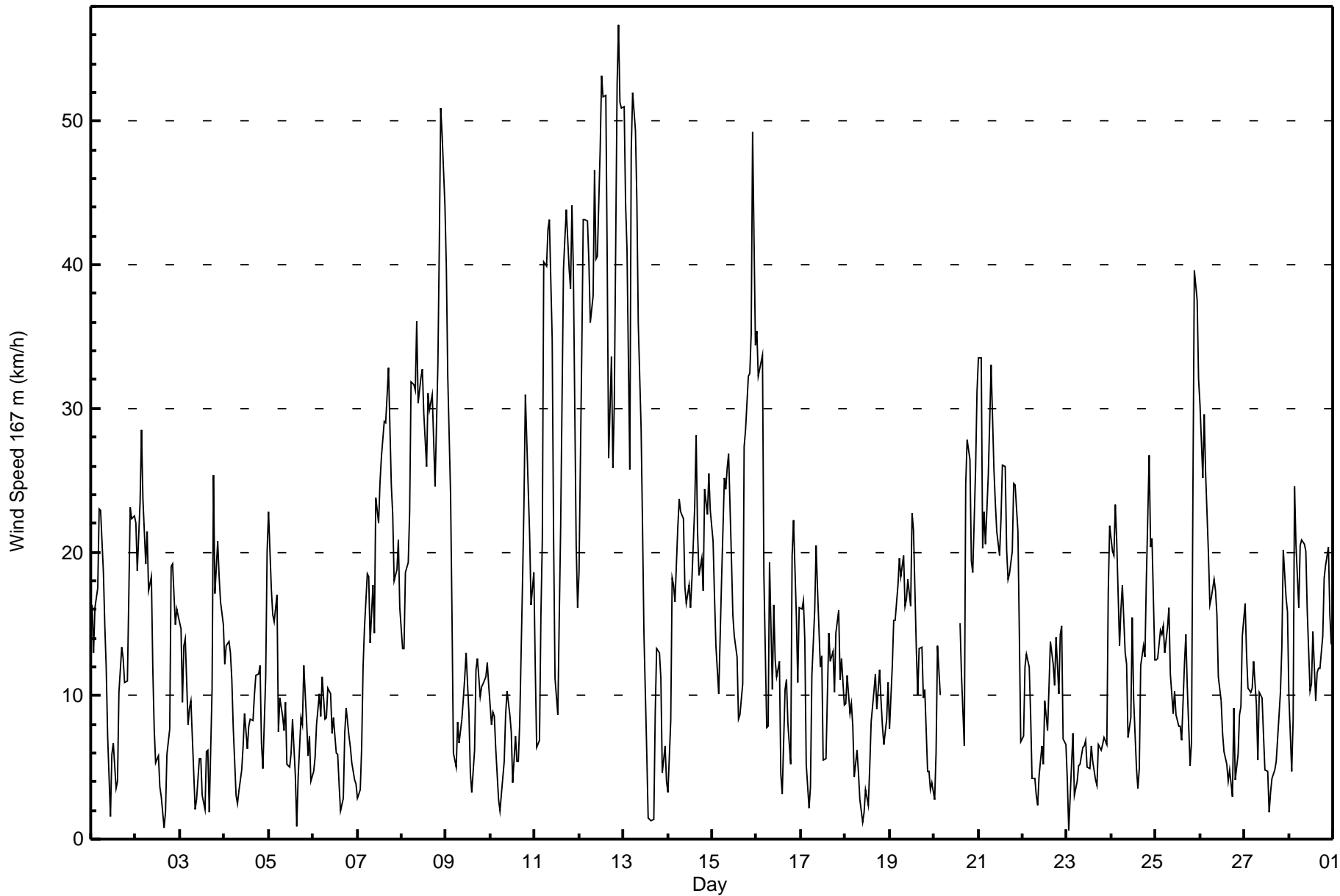
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Feb 13 10:00	Hours in Service: 672 Hours of Data: 662 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.5
Minimum Value: 0 km/h on Feb 7 01:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	2	1	3	3	3	3	4	2	2	2	1	3	1	1	2	2	2	1	1	4	3	2	3	2	4
2-Feb	2	1	5	2	3	1	1	3	3	3	3	2	2	2	1	1	1	1	3	2	6	3	2	2	6
3-Feb	3	2	2	2	1	1	1	2	1	2	1	2	1	2	2	2	1	5	3	4	3	4	2	3	5
4-Feb	2	1	1	1	1	2	2	1	2	2	1	1	2	1	2	2	1	2	2	2	4	3	4	3	4
5-Feb	3	2	1	2	4	2	1	2	1	1	1	1	1	2	2	1	2	1	1	2	2	1	1	1	4
6-Feb	1	2	1	3	2	2	1	2	3	1	3	3	1	1	1	1	1	2	1	1	1	2	1	1	3
7-Feb	0	1	2	2	2	2	2	2	2	3	3	3	3	3	1	1	3	3	4	2	1	2	3	2	4
8-Feb	2	3	2	2	2	2	3	4	2	4	2	2	3	3	3	5	4	4	4	5	5	3	2	3	5
9-Feb	3	4	2	4	2	2	2	2	3	2	2	4	4	2	2	3	1	2	2	2	1	2	1	1	4
10-Feb	1	1	1	1	1	1	1	1	2	3	3	2	1	2	1	2	3	5	4	6	8	3	4	3	8
11-Feb	3	1	3	4	6	4	4	2	2	5	3	3	3	4	4	3	2	2	4	3	2	3	9	5	9
12-Feb	5	4	6	5	4	3	4	4	4	4	4	4	4	4	3	10	3	7	8	8	4	4	4	3	10
13-Feb	3	3	6	6	4	2	4	6	3	10	7	5	2	1	1	2	1	2	2	2	4	2	1	1	10
14-Feb	2	2	5	3	2	3	3	3	3	2	3	3	3	2	3	3	3	2	4	3	5	4	3	5	5
15-Feb	2	2	4	1	3	3	3	3	3	3	2	4	3	2	4	3	1	4	3	7	3	3	5	5	7
16-Feb	3	3	2	4	5	3	3	3	4	3	3	4	4	3	1	4	2	1	4	2	3	2	1	1	5
17-Feb	2	2	3	1	2	2	2	3	2	2	2	1	3	2	2	2	3	4	3	3	3	2	2	2	4
18-Feb	2	2	2	2	2	2	2	2	1	1	2	1	1	2	1	3	3	3	2	3	2	2	2	1	3
19-Feb	2	3	2	3	3	3	3	3	2	4	4	5	6	8	4	3	2	2	2	3	3	3	2	1	8
20-Feb	1	2	1	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	4	5	3	2	3	6	7	3	3	7
21-Feb	3	7	2	2	7	5	4	5	5	4	4	5	3	2	3	3	4	3	4	2	2	3	2	2	7
22-Feb	2	3	2	2	3	1	1	1	1	1	1	2	3	3	2	2	2	2	2	2	4	4	1	1	4
23-Feb	2	1	2	2	1	2	1	2	1	1	1	1	2	2	2	2	1	1	1	1	2	4	2	1	4
24-Feb	2	2	2	3	1	3	2	3	1	4	4	3	3	2	1	3	3	1	2	3	4	2	3	1	4
25-Feb	2	2	2	2	2	1	2	3	2	2	2	2	2	3	3	5	3	2	3	6	5	5	6	5	6
26-Feb	5	4	4	5	3	1	2	3	2	3	4	5	3	2	2	2	2	1	2	2	1	1	1	2	5
27-Feb	2	2	2	2	1	1	3	2	3	1	1	1	1	2	1	1	1	1	2	1	3	3	3	2	3
28-Feb	4	2	4	6	5	3	3	4	4	3	3	3	3	4	3	3	2	2	2	2	4	3	3	3	6
Diurnal Maximum																									
5 7 6 6 7 5 4 6 5 10 7 5 6 8 4 10 5 7 8 8 8 8 7 9 5																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	105	15.86	15.86
6 - 11	190	28.70	44.56
12 - 19	179	27.04	71.60
20 - 28	102	15.41	87.01
29 - 38	46	6.95	93.96
> 38	40	6.04	100.00

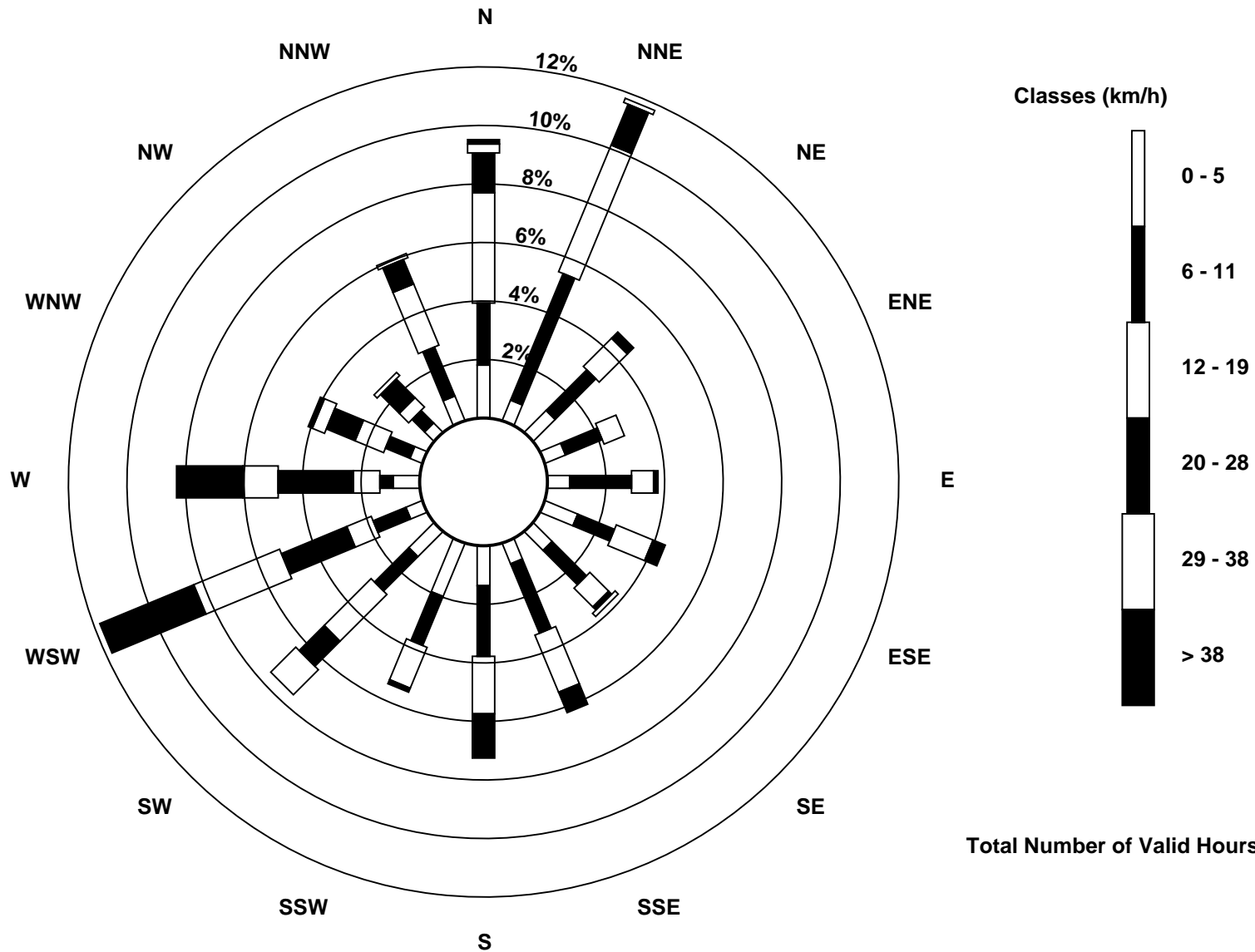
Total Number of Valid Hours: 662

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 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 - February 2017

Direction of Maximum Speed: 258 deg on Feb 8 22:00 Direction of Maximum Daily Speed Average: 253.1 deg on Feb 12	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0
Direction of Minimum Speed: 140 deg on Feb 14 01:00 Direction of Minimum Daily Speed Average: 0.3 deg on Feb 1	Percent Operational Time: 100.0
Monthly Average Direction: 311.4 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-Feb	334	329	337	355	342	338	333	358	308	279	211	174	155	152	146	150	148	180	327	269	163	125	139	140	103.6
2-Feb	156	140	131	135	138	149	146	146	146	144	144	146	148	196	147	154	141	88	15	16	356	345	348	345	136.8
3-Feb	323	313	332	330	296	324	299	253	27	324	161	191	170	133	136	149	52	332	338	5	26	11	0	0	357.9
4-Feb	354	348	321	326	331	336	337	337	159	161	141	156	181	188	149	152	145	138	151	349	0	355	355	355	103.2
5-Feb	354	341	340	345	342	348	329	340	344	324	306	276	254	257	240	210	144	141	324	344	340	331	327	257	308.0
6-Feb	146	154	163	155	154	153	153	151	151	154	153	158	149	164	183	262	307	294	329	319	348	307	328	141	156.8
7-Feb	154	151	134	161	158	149	147	150	146	148	149	151	245	260	261	256	259	272	319	335	345	345	314	301	198.2
8-Feb	337	270	236	171	162	185	187	152	166	151	209	262	258	254	257	246	232	226	213	229	253	258	264	267	238.0
9-Feb	268	277	169	195	161	134	157	146	146	173	154	154	159	211	25	354	340	339	344	303	322	358	350	347	215.6
10-Feb	344	346	331	323	333	345	342	339	310	309	315	304	273	315	8	320	346	348	325	144	164	180	146	148	290.3
11-Feb	148	356	346	286	282	264	267	264	271	269	263	256	199	216	247	266	269	267	265	275	277	252	149	141	259.2
12-Feb	139	205	248	251	249	242	237	235	252	246	244	256	267	272	264	257	201	237	236	239	276	280	278	280	253.1
13-Feb	277	279	284	276	279	279	282	292	291	302	356	357	357	334	178	157	344	356	350	352	336	325	0	281	294.7
14-Feb	140	285	223	157	146	152	147	149	147	148	150	156	157	150	153	150	152	147	150	153	148	143	143	146	149.8
15-Feb	148	151	149	149	149	152	144	144	142	133	144	148	151	143	259	169	173	161	167	143	143	196	256	220	160.0
16-Feb	228	203	163	232	176	155	134	141	152	155	198	241	242	347	319	341	335	283	306	350	341	302	299	326	222.3
17-Feb	307	327	335	168	308	267	333	330	339	314	303	337	345	353	16	8	30	27	19	29	19	33	25	21	2.7
18-Feb	19	14	26	33	5	354	355	33	351	356	340	332	337	353	36	70	66	40	6	328	3	357	5	359	12.2
19-Feb	350	360	359	356	3	115	96	94	73	93	91	110	115	119	103	83	73	73	356	334	2	359	2	352	63.1
20-Feb	1	354	352	352	347	337	342	324	333	342	346	13	200	291	319	318	318	310	308	310	321	298	263	258	313.4
21-Feb	260	276	263	239	278	330	325	309	294	295	315	319	273	274	274	287	295	292	315	330	337	338	345	15	295.1
22-Feb	281	343	353	354	353	340	351	347	332	303	248	253	268	302	355	360	357	11	358	356	2	7	90	338	334.4
23-Feb	349	320	136	68	343	328	339	342	324	319	119	121	125	136	124	72	48	115	330	5	351	355	357	359	29.0
24-Feb	352	360	4	354	341	359	351	352	330	326	17	347	23	15	161	127	198	185	139	145	254	246	155	150	8.3
25-Feb	150	149	152	146	144	147	146	146	145	148	144	150	163	23	339	1	357	317	192	70	40	8	15	6	120.2
26-Feb	1	352	342	334	331	330	331	345	344	8	338	350	229	233	249	47	25	226	18	72	28	347	347	343	341.8
27-Feb	329	342	348	356	358	353	338	323	350	15	257	255	255	248	248	249	238	211	266	174	150	144	157	145	283.4
28-Feb	147	9	356	13	4	3	356	11	14	26	4	5	354	15	24	42	25	16	16	9	23	16	0	348	12.4
283.1	306.0	308.7	288.5	268.6	216.2	233.1	212.2	221.2	196.0	197.1	218.1	231.4	251.0	243.2	242.0	254.3	270.7	318.6	320.0	316.2	307.2	309.2	296.7		
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

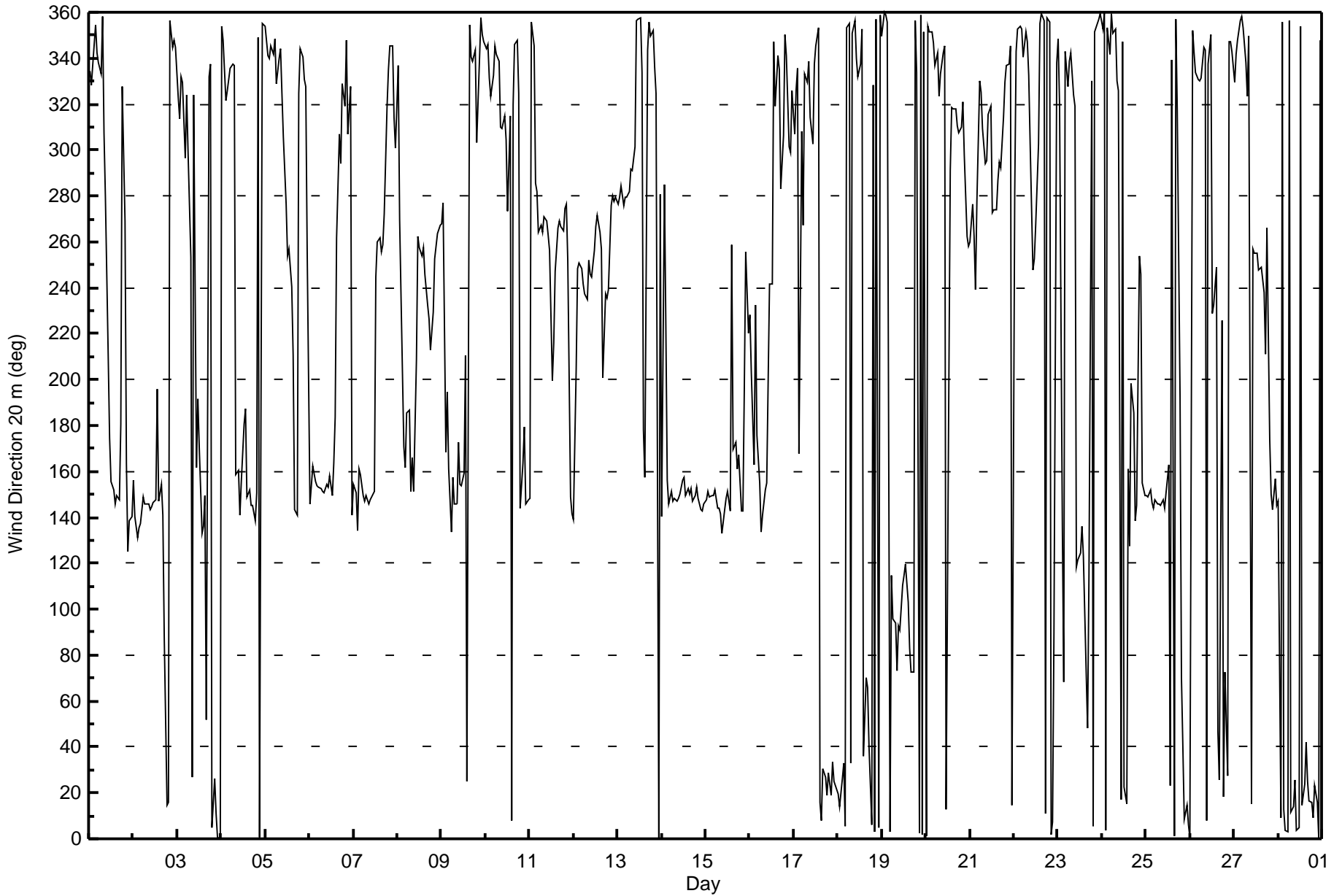
Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Feb 17 06:00 Minimum Value: 5 deg on Feb 14 20:00 Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 16 Median = 23 Q ₃ = 37 P ₉₀ = 63 P ₉₉ = 95		Hours in Service: 672 Hours of Data: 672 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-Feb	17	23	15	15	14	16	21	17	46	63	26	23	16	15	12	11	12	38	69	58	58	78	13	18	78	
2-Feb	48	12	24	24	15	8	8	8	9	17	24	13	39	36	14	14	17	26	33	41	25	23	20	17	48	
3-Feb	30	21	20	40	39	29	50	32	85	85	46	37	34	57	21	20	68	24	19	22	25	23	16	19	85	
4-Feb	15	32	44	44	26	44	26	81	82	91	26	18	55	43	16	12	11	18	22	29	83	11	15	15	91	
5-Feb	17	17	19	16	52	22	22	25	16	27	29	55	15	15	17	31	18	15	67	77	47	36	66	98	98	
6-Feb	27	15	11	27	32	10	9	11	11	11	14	11	14	22	27	63	34	25	34	24	18	84	83	63	84	
7-Feb	66	12	85	8	8	10	9	7	11	11	9	13	21	18	17	14	14	17	27	20	23	21	45	40	85	
8-Feb	50	70	62	73	40	30	42	22	39	19	47	19	15	13	14	15	10	13	18	12	13	12	14	14	73	
9-Feb	19	72	96	54	24	62	25	12	16	25	20	15	18	43	56	23	21	30	28	55	34	21	27	14	96	
10-Feb	20	18	20	15	21	26	31	35	43	55	32	36	93	41	80	64	30	45	30	32	27	18	68	90	93	
11-Feb	53	76	66	63	54	15	10	11	12	13	13	32	18	22	23	14	13	11	13	14	14	21	62	7	76	
12-Feb	8	46	15	14	12	9	8	7	14	11	11	14	14	15	13	19	13	22	44	16	17	17	16	17	46	
13-Feb	16	17	17	18	16	16	16	20	20	75	28	34	22	77	17	66	49	16	23	25	40	46	41	47	77	
14-Feb	95	71	39	81	14	32	32	21	25	23	19	32	23	23	9	7	20	8	8	5	6	7	7	7	95	
15-Feb	6	9	6	5	14	9	18	23	30	24	16	14	13	36	22	29	61	42	24	47	9	37	18	12	61	
16-Feb	10	41	85	28	80	20	66	15	9	14	62	29	34	38	40	61	54	58	43	37	26	20	32	37	85	
17-Feb	67	27	55	105	62	107	50	26	17	13	22	19	71	26	28	21	25	24	24	24	24	24	24	32	107	
18-Feb	24	22	30	25	23	27	22	39	25	64	83	75	45	32	26	25	52	61	50	55	17	32	18	13	83	
19-Feb	42	12	15	21	48	28	24	20	29	19	22	21	21	26	30	36	29	18	45	17	21	32	21	18	48	
20-Feb	13	17	17	29	37	19	19	24	19	22	29	37	96	44	21	25	34	17	16	16	16	22	18	13	96	
21-Feb	15	16	17	16	35	16	16	19	25	22	24	23	20	19	18	21	20	19	19	14	15	54	65	42	65	
22-Feb	42	23	50	37	27	32	36	12	64	67	31	15	25	67	26	24	21	21	16	25	22	71	89	64	89	
23-Feb	32	41	74	91	28	78	26	19	26	32	83	24	33	32	33	47	72	15	85	31	19	17	11	14	91	
24-Feb	18	18	15	18	32	21	19	23	23	32	38	25	33	66	24	26	31	62	18	25	32	49	17	6	66	
25-Feb	8	8	11	12	12	10	16	18	18	10	10	10	34	63	38	37	28	48	86	37	27	20	23	21	86	
26-Feb	19	19	16	14	15	14	29	37	30	24	29	47	25	23	55	48	46	31	40	31	17	21	25	40	55	
27-Feb	31	23	19	14	13	14	29	26	30	23	62	11	14	16	22	18	27	26	83	96	19	17	30	19	96	
28-Feb	37	76	94	23	24	21	17	22	22	23	20	31	33	34	47	32	29	20	16	17	21	46	45	30	94	
		95	76	96	105	80	107	66	81	85	91	83	75	96	77	80	66	72	62	86	96	83	84	89	98	
		Diurnal Maximum																								



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 248 deg on Feb 8 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 244.5 deg on Feb 12	Hours of Data: 663
Direction of Minimum Speed: 60 deg on Feb 22 23:00	Hours of Missing Data: 9
Direction of Minimum Daily Speed Average: 0.5 deg on Feb 10	Percent Operational Time: 98.7
Monthly Average Direction: 307.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	333	330	334	349	339	336	327	342	323	284	164	161	145	140	130	135	134	153	177	244	182	235	146	166	352.8
2-Feb	204	165	147	150	136	139	136	154	141	145	141	130	131	208	137	142	130	87	24	27	355	339	342	340	128.7
3-Feb	331	315	328	328	276	320	319	255	47	338	136	199	161	120	126	139	55	338	334	1	19	5	356	356	354.5
4-Feb	348	342	321	337	327	309	330	314	140	172	142	136	164	184	138	141	136	139	134	142	4	349	339	345	75.5
5-Feb	346	335	332	333	329	329	330	299	306	320	290	269	249	251	236	194	131	138	123	22	331	318	343	152	301.6
6-Feb	147	149	149	145	140	139	139	139	138	139	140	144	140	140	164	226	305	307	318	300	310	326	312	172	144.0
7-Feb	151	150	154	149	145	136	137	136	137	136	145	151	238	250	253	247	250	262	309	328	331	341	334	287	195.0
8-Feb	292	239	232	206	174	212	216	170	192	150	233	254	248	246	248	238	225	220	209	221	243	248	254	256	236.2
9-Feb	256	261	212	197	138	133	149	142	138	146	141	139	144	199	3	349	338	331	344	337	338	354	351	345	212.8
10-Feb	345	346	344	331	329	330	321	330	299	313	329	306	304	304	338	323	342	341	319	133	149	168	135	139	346.4
11-Feb	139	308	278	252	275	252	259	254	259	259	253	253	191	209	239	257	259	256	250	256	263	246	158	133	249.6
12-Feb	128	215	239	241	239	233	231	226	242	237	236	246	257	262	254	247	195	230	230	231	265	269	266	269	244.5
13-Feb	266	268	273	263	269	270	272	281	279	290	345	352	355	332	165	139	340	341	341	343	330	333	355	353	286.6
14-Feb	88	243	170	144	136	142	138	139	140	138	138	138	146	141	142	139	141	139	129	135	134	130	132	135	138.4
15-Feb	137	137	135	136	136	137	131	140	138	127	132	140	137	128	253	163	173	148	163	148	145	212	245	214	153.1
16-Feb	218	200	180	217	170	143	135	130	136	147	164	246	219	336	333	340	339	327	292	345	346	319	290	313	213.8
17-Feb	258	315	296	212	286	155	287	319	326	315	300	329	348	348	12	6	23	18	16	23	14	26	18	17	355.2
18-Feb	14	10	20	29	3	348	350	29	346	348	331	336	340	353	26	67	63	45	17	346	353	353	355	351	8.8
19-Feb	341	349	349	345	33	108	93	89	73	89	86	104	109	114	98	77	76	77	20	329	349	340	354	341	60.0
20-Feb	348	343	345	346	AF	AF	AF	AF	AF	AF	AF	AF	AF	286	311	313	307	300	297	301	312	289	253	250	--
21-Feb	250	266	248	230	268	323	318	300	282	284	306	309	263	266	265	278	283	284	306	322	327	327	351	350	285.8
22-Feb	279	335	342	338	343	343	333	333	341	301	260	251	261	309	351	356	352	9	355	353	0	16	60	324	333.1
23-Feb	337	338	195	88	332	326	327	330	312	289	104	114	119	127	115	67	59	106	83	22	351	351	343	348	20.3
24-Feb	346	354	1	349	336	350	349	355	345	327	359	339	11	6	154	122	194	186	142	142	241	238	161	133	350.1
25-Feb	139	137	140	138	137	139	138	138	136	139	135	138	156	12	334	358	352	312	147	65	36	4	10	2	104.5
26-Feb	357	346	336	328	325	324	327	339	330	352	331	344	223	233	246	36	18	220	16	70	35	0	345	14	338.6
27-Feb	333	339	343	347	351	353	322	336	340	348	255	250	249	241	243	238	221	168	248	192	134	138	141	137	287.6
28-Feb	136	8	17	7	0	358	350	5	7	18	2	0	347	9	18	35	18	12	13	8	24	19	3	346	8.6
274.1 295.6 300.0 292.5 268.7 210.3 235.7 218.7 211.9 184.6 192.1 219.3 225.9 247.2 240.7 241.4 253.6 262.9 314.9 322.2 314.6 305.4 307.0 295.4																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Feb 1 22:00	Hours in Service: 672 Hours of Data: 663 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.7
Minimum Value: 2 deg on Feb 15 01:00	
Percentiles: P ₁ = 4 P ₁₀ = 7 Q ₁ = 11 Median = 17 Q ₃ = 30 P ₉₀ = 52 P ₉₉ = 80	

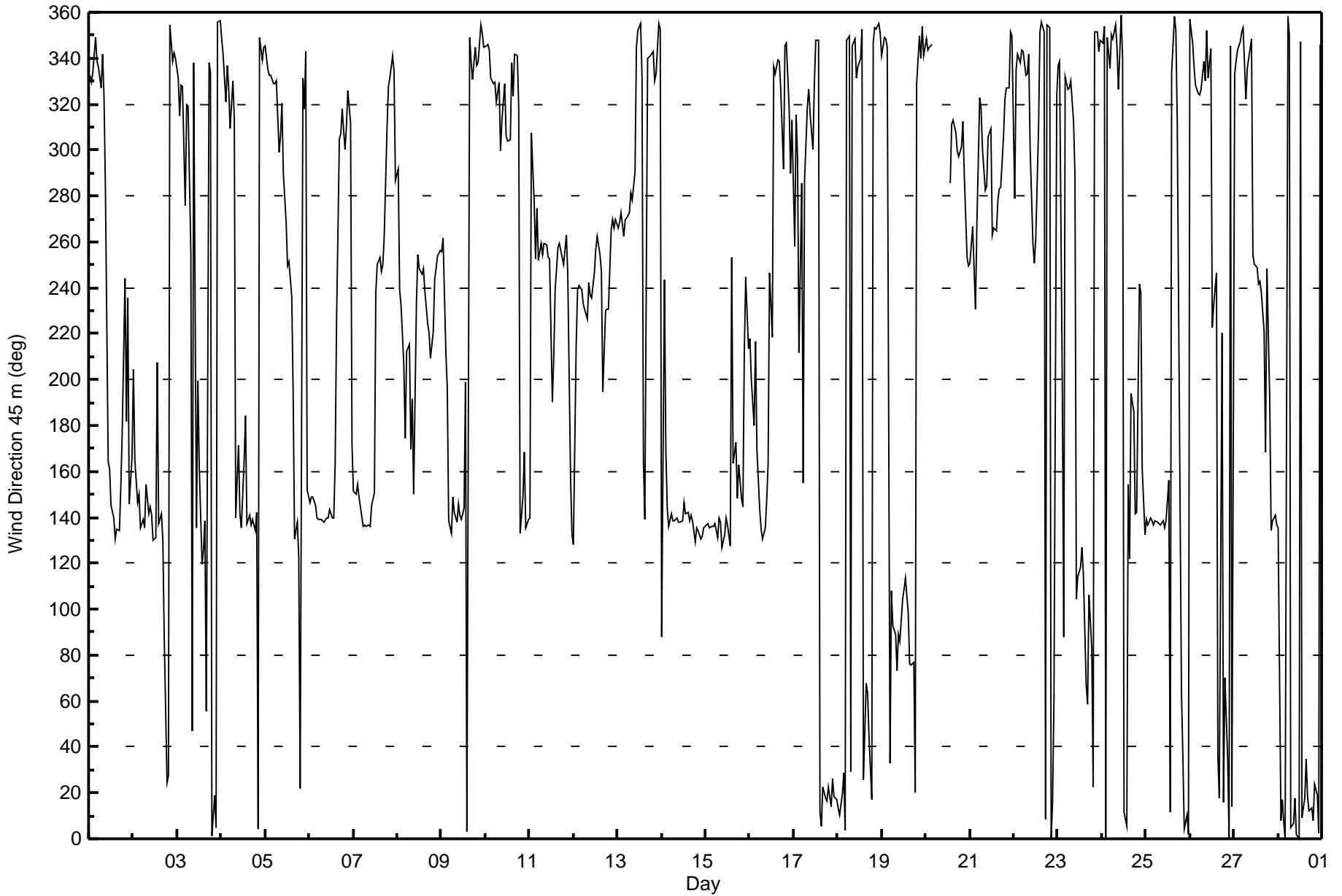
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	14	15	13	12	12	12	15	11	36	78	20	26	19	15	9	7	7	16	67	34	34	100	20	37	100
2-Feb	58	33	46	59	29	5	8	17	8	4	19	13	54	36	17	11	12	19	30	28	22	17	15	14	59
3-Feb	17	9	10	29	22	19	26	29	62	85	72	42	51	50	17	17	60	27	18	16	20	17	12	14	85
4-Feb	12	11	18	30	15	36	12	39	53	45	10	19	64	47	13	8	9	10	12	13	69	9	7	11	69
5-Feb	12	13	13	11	28	15	8	25	22	18	18	30	9	10	12	32	12	7	69	78	39	28	38	61	78
6-Feb	9	7	5	9	11	5	5	5	6	7	10	7	7	29	24	80	27	18	35	24	14	16	42	60	80
7-Feb	9	4	7	7	4	4	4	4	4	5	9	15	13	10	9	7	9	12	26	13	14	11	38	21	38
8-Feb	37	37	44	59	31	29	40	38	45	28	37	12	8	7	7	12	9	11	16	11	8	6	8	8	59
9-Feb	9	52	79	43	15	26	13	7	10	15	12	11	18	41	44	19	15	17	21	55	18	8	16	8	79
10-Feb	14	25	9	14	15	13	7	40	40	32	26	32	70	35	60	42	26	36	47	23	25	16	42	38	70
11-Feb	30	87	63	66	40	12	7	6	7	8	7	27	20	22	18	9	8	7	8	9	9	13	66	6	87
12-Feb	6	36	9	8	7	5	5	6	9	7	7	7	9	10	8	16	12	19	34	14	11	11	12	12	36
13-Feb	10	11	12	13	11	11	11	14	14	72	25	34	17	61	15	70	35	11	13	15	22	36	26	62	72
14-Feb	80	48	39	37	8	15	16	13	17	16	13	21	13	11	4	4	8	4	6	3	3	6	5	6	80
15-Feb	2	5	4	4	11	7	13	13	17	16	12	9	12	22	17	42	58	28	33	46	20	27	13	11	58
16-Feb	8	29	58	27	82	20	33	10	7	7	74	31	42	37	28	23	19	24	33	19	10	19	30	63	82
17-Feb	28	28	63	95	64	77	47	19	8	9	11	14	63	17	24	15	18	16	17	17	14	15	19	22	95
18-Feb	19	15	23	18	18	17	15	35	21	60	75	72	45	21	22	18	35	44	40	52	11	17	12	7	75
19-Feb	35	8	9	14	53	18	16	14	19	14	15	19	16	23	24	29	20	13	44	14	11	26	13	10	53
20-Feb	8	12	13	19	AF	AF	AF	AF	AF	AF	AF	AF	AF	37	19	20	32	13	12	12	14	20	13	7	37
21-Feb	10	11	11	11	34	13	13	16	19	17	20	19	12	12	11	18	17	16	17	12	12	45	51	61	61
22-Feb	45	20	18	26	25	29	16	9	19	54	29	13	20	63	22	18	16	15	14	17	18	51	83	62	83
23-Feb	38	36	59	45	31	69	27	9	15	30	77	18	29	28	28	39	49	8	60	38	16	9	8	10	77
24-Feb	14	13	12	12	12	11	9	10	14	31	29	18	22	61	24	24	27	58	16	16	26	33	26	6	61
25-Feb	5	4	4	5	6	4	10	10	11	4	5	5	41	61	35	33	24	44	81	25	21	15	17	16	81
26-Feb	15	16	13	12	12	12	16	26	21	16	24	38	24	22	50	40	31	46	34	24	14	23	13	49	50
27-Feb	78	13	10	8	9	8	22	17	16	19	65	7	8	9	18	12	27	21	73	75	11	10	23	12	78
28-Feb	19	62	62	20	19	15	13	17	16	15	15	26	28	28	37	27	22	13	13	13	13	25	32	20	62
80 87 79 95 82 77 47 40 62 85 77 72 70 63 60 80 60 58 81 78 69 100 83 63																									
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 265 deg on Feb 12 22:00																				Hours in Service: 672							
Direction of Maximum Daily Speed Average: 245.6 deg on Feb 12																				Hours of Data: 662							
Direction of Minimum Speed: 208 deg on Feb 3 10:00										Direction of Minimum Daily Speed Average: 1.7 deg on Feb 4										Hours of Missing Data: 10							
Monthly Average Direction: 282.1 deg																								Percent Operational Time: 98.5			
Day	Hourly Period Ending At (MST)																								Daily Average		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	342	339	346	2	356	356	350	353	352	23	69	210	219	201	125	129	136	151	157	169	238	256	244	243	319.9		
2-Feb	244	237	244	257	251	229	233	248	252	257	248	248	277	208	210	159	114	94	63	51	23	7	355	353	268.5		
3-Feb	5	343	358	6	339	346	11	91	65	208	262	235	203	129	136	139	77	9	334	4	23	11	4	4	6.0		
4-Feb	2	4	24	25	27	22	320	348	132	180	152	198	213	209	146	147	146	148	151	166	140	13	10	352	82.9		
5-Feb	349	348	345	338	356	325	327	330	286	307	299	290	271	273	272	144	118	137	142	168	163	156	159	156	322.7		
6-Feb	151	159	155	156	155	157	158	165	160	149	149	144	144	134	137	100	11	345	354	344	322	310	263	208	151.0		
7-Feb	183	167	166	207	198	203	215	179	178	175	218	227	238	251	252	247	252	260	311	327	330	329	332	323	255.7		
8-Feb	264	260	245	245	234	246	248	251	255	247	251	252	246	246	245	238	227	226	223	226	241	245	250	253	243.6		
9-Feb	251	254	251	236	136	194	186	157	148	141	147	142	142	184	302	354	0	356	341	345	345	355	352	354	260.5		
10-Feb	348	346	356	341	326	334	322	274	354	17	322	18	295	300	246	72	69	107	123	136	146	162	141	155	115.0		
11-Feb	179	222	224	225	256	251	257	255	254	258	258	257	199	219	238	255	257	253	245	243	249	244	216	183	247.5		
12-Feb	179	232	237	238	237	234	236	233	238	236	236	243	255	260	253	245	216	238	241	239	264	265	262	265	245.6		
13-Feb	263	267	270	262	268	268	274	277	278	290	317	336	16	345	147	121	355	349	357	351	344	334	318	290	283.5		
14-Feb	112	145	148	149	153	145	149	149	154	146	143	153	154	141	150	151	144	158	160	157	186	189	200	193	153.5		
15-Feb	190	172	154	151	144	153	159	154	154	149	153	146	158	160	199	176	215	225	232	228	218	229	241	222	187.3		
16-Feb	227	219	220	225	214	149	134	153	142	116	91	104	139	291	337	346	4	3	344	342	352	347	327	314	239.0		
17-Feb	351	314	310	262	255	286	302	345	350	348	324	329	333	4	23	14	27	22	18	23	18	29	25	27	358.3		
18-Feb	18	14	22	35	11	356	1	35	3	355	52	38	49	24	33	73	72	71	73	83	37	359	358	15	28.5		
19-Feb	13	24	42	83	122	116	102	95	83	95	92	106	111	118	108	96	101	106	97	60	27	207	49	19	94.5		
20-Feb	349	349	351	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	294	313	318	301	299	296	296	305	282	257	251	--		
21-Feb	252	266	242	236	268	313	309	294	280	284	300	302	264	264	264	273	274	286	305	316	316	308	324	284	283.4		
22-Feb	284	351	354	356	5	1	57	45	62	47	329	291	279	337	352	356	350	14	7	15	27	53	67	89	359.4		
23-Feb	278	328	228	197	115	151	148	138	138	152	178	138	135	129	118	75	86	113	112	90	44	359	345	347	93.3		
24-Feb	352	2	3	359	345	349	360	348	339	346	344	338	6	1	171	151	210	211	182	200	252	253	227	181	321.8		
25-Feb	180	164	167	162	161	159	160	159	151	163	169	163	206	352	336	1	356	311	235	67	41	6	12	5	82.6		
26-Feb	1	347	337	330	327	329	329	329	314	330	337	344	230	253	259	26	24	347	31	72	92	129	127	120	341.6		
27-Feb	120	96	66	33	29	29	353	338	351	317	310	267	244	254	218	208	190	164	138	155	148	149	148	151	120.9		
28-Feb	173	261	272	10	13	7	2	7	10	19	6	3	351	11	20	36	25	21	28	27	42	43	32	14	16.0		
280.8 287.9 288.6 276.1 267.6 259.7 266.9 255.8 242.0 237.4 247.0 241.2 232.6 249.8 245.1 245.6 235.9 254.5 293.5 302.0 297.6 289.7 290.0 282.2																											
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 100 m (WD100m) - deg
Lower Camp Met Tower - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Feb 9 06:00	Hours in Service: 672 Hours of Data: 662 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.5
Minimum Value: 2 deg on Feb 11 08:00	
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 12 Q ₃ = 19 P ₉₀ = 36 P ₉₉ = 78	

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-Feb	6	7	11	11	8	9	12	9	11	32	16	40	10	23	10	5	6	6	9	35	17	6	7	9	40
2-Feb	8	10	14	17	15	15	19	9	11	9	17	14	54	50	44	18	16	14	30	13	20	16	9	7	54
3-Feb	10	10	10	8	15	5	16	55	32	77	43	10	70	43	11	8	43	28	16	8	14	12	8	9	77
4-Feb	8	8	12	8	10	27	32	20	44	18	16	28	59	38	12	9	9	6	11	12	44	27	10	7	59
5-Feb	6	6	5	4	13	16	4	9	19	22	18	17	18	14	29	36	13	7	7	11	9	13	13	15	36
6-Feb	12	7	8	14	12	11	8	10	10	10	10	11	13	40	16	12	29	10	6	10	8	31	31	23	40
7-Feb	20	17	21	18	22	16	8	14	9	12	12	15	6	7	4	4	5	8	20	4	6	4	6	10	22
8-Feb	15	17	8	14	8	7	4	9	10	11	5	5	5	5	5	10	6	7	7	5	4	4	4	3	17
9-Feb	2	13	21	23	20	102	30	19	5	6	12	5	20	32	44	18	6	9	8	3	3	7	7	8	102
10-Feb	4	4	5	18	8	6	30	35	32	91	64	46	24	78	46	48	41	40	24	10	18	11	7	13	91
11-Feb	24	22	8	10	18	5	3	2	3	4	3	21	21	16	11	4	3	3	5	4	3	6	43	20	43
12-Feb	24	12	6	5	4	3	4	4	5	4	5	5	5	4	3	11	5	13	19	10	6	6	6	6	24
13-Feb	4	6	7	7	4	5	6	9	7	37	16	30	15	72	24	70	79	6	6	8	12	9	19	59	79
14-Feb	59	12	8	14	6	4	8	6	9	11	9	4	8	4	5	6	6	6	11	7	21	16	14	17	59
15-Feb	13	11	13	4	6	8	11	9	5	9	9	7	7	14	26	19	38	23	21	14	8	6	6	6	38
16-Feb	4	9	12	8	40	15	15	8	11	14	55	85	24	72	8	8	11	8	15	6	5	5	15	11	85
17-Feb	34	11	38	45	15	49	20	27	8	7	9	9	30	14	15	9	13	8	10	10	9	10	11	15	49
18-Feb	11	9	14	15	15	23	16	19	21	69	58	56	45	22	16	12	16	24	23	71	17	19	8	7	71
19-Feb	20	15	19	37	13	10	9	10	11	10	12	14	11	11	15	19	11	8	24	45	52	96	69	46	96
20-Feb	6	4	5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	31	14	14	28	8	5	7	10	17	10	3	31
21-Feb	8	5	6	5	31	10	10	11	13	11	15	15	8	6	6	13	15	13	12	6	7	8	17	23	31
22-Feb	21	20	7	10	14	16	19	73	25	25	30	18	16	43	13	12	13	8	9	17	16	20	27	48	73
23-Feb	70	24	42	23	13	12	25	4	6	29	36	13	26	18	19	25	26	4	10	30	34	19	5	5	70
24-Feb	7	6	5	5	4	9	8	8	6	28	19	13	14	52	22	28	20	10	11	21	13	12	16	12	52
25-Feb	14	7	8	6	5	4	6	8	10	15	12	13	43	53	28	21	19	19	94	17	17	9	10	8	94
26-Feb	7	12	6	7	8	8	5	7	10	13	21	28	36	30	41	59	19	60	18	19	24	13	11	11	60
27-Feb	13	30	14	13	7	8	13	3	11	13	16	28	7	28	21	13	15	16	10	10	5	4	7	7	30
28-Feb	21	49	46	16	12	10	7	11	9	9	9	15	19	21	24	19	14	8	8	8	8	15	18	15	49
	70	49	46	45	40	102	32	73	44	91	64	85	70	78	46	70	79	60	94	71	52	96	69	59	

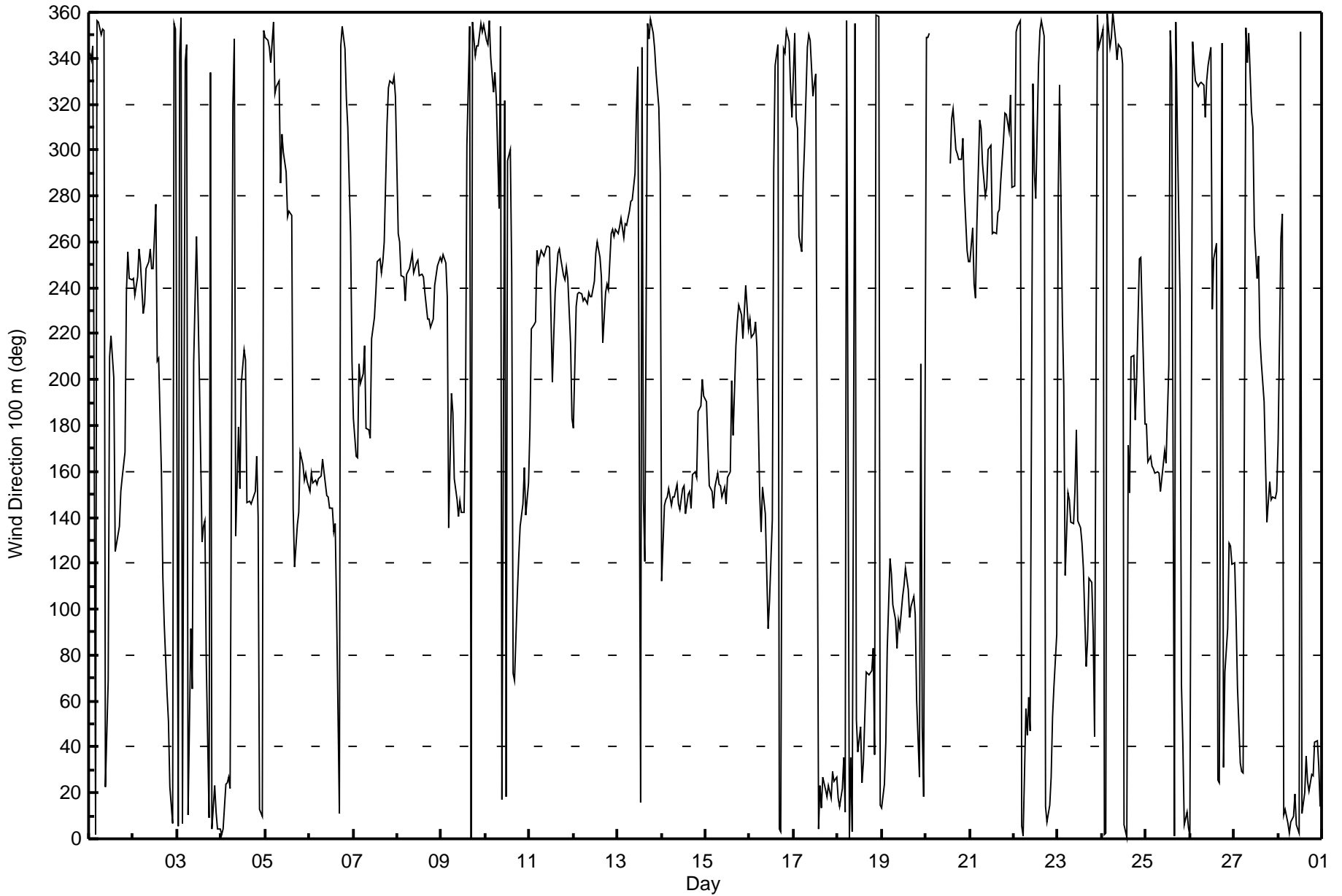
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

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





Maximum Value: 0.6 km/h on Feb 14 23:00 Maximum Daily Average: 0.1 km/h on Feb 2																				Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: -1.0 km/h on Feb 12 13:00 Minimum Daily Average: -0.3 km/h on Feb 12 Maximum Diurnal Average: 0.0 km/h at hour 11 Minimum Diurnal Average: -0.1 km/h at hour 13 Monthly Average: -0.05 km/h Percentiles: P ₁ = -0.7 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.1 P ₉₉ = 0.4																										
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-Feb	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	0.1	0.0	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.3	0.3	0.0	0.3
2-Feb	0.1	0.5	0.4	0.2	0.4	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.0	-0.2	0.1	0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	0.1	0.5
3-Feb	-0.1	0.0	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	-0.1	0.0	-0.2	-0.2	-0.2	0.0	-0.1	-0.1	-0.2	0.0	0.2
4-Feb	-0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	-0.1	-0.2	-0.2	-0.1	0.0	0.0	-0.1	0.0	0.1	-0.2	-0.1	-0.1	0.1	0.0	0.1
5-Feb	0.0	0.2	0.2	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.1	0.5	-0.3	-0.1	-0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.5
6-Feb	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.0	-0.3	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2
7-Feb	0.0	0.1	0.1	0.1	0.1	0.2	0.4	0.1	0.0	0.0	0.3	0.5	-0.2	-0.3	-0.5	-0.3	-0.3	-0.4	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.5
8-Feb	0.0	0.1	-0.1	0.1	0.3	0.4	0.3	0.3	0.2	0.3	0.4	-0.5	-0.4	-0.3	-0.4	-0.4	-0.4	-0.1	0.0	-0.1	-0.3	-0.4	-0.7	-0.5	-0.1	0.4
9-Feb	-0.3	-0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	-0.1	-0.2	-0.2	0.4	0.0	0.0	0.0	-0.1	0.1	0.0	0.0	-0.1	-0.2	0.0	0.4
10-Feb	-0.2	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	0.0	0.2	0.0	0.5	0.1	-0.1	0.0	-0.1	-0.1	0.0	0.3	-0.1	0.0	0.0	0.5
11-Feb	0.1	0.0	0.0	0.1	-0.1	-0.3	-0.5	-0.6	-0.7	-0.6	-0.5	-0.1	-0.1	-0.1	-0.2	-0.7	-0.6	-0.6	-0.4	-0.3	-0.5	-0.2	0.0	0.3	-0.3	0.3
12-Feb	0.3	0.0	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.3	-0.2	-0.3	-1.0	-0.8	-0.7	-0.5	0.1	0.0	-0.1	-0.2	-0.7	-0.9	-0.5	-0.6	-0.3	0.3
13-Feb	-0.7	-0.5	-0.6	-0.3	-0.6	-0.6	-0.7	-0.7	-0.3	-0.1	0.0	-0.2	-0.3	0.1	0.0	0.2	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.1	-0.2	0.2
14-Feb	0.1	0.0	0.0	0.1	0.1	-0.4	-0.2	-0.3	0.1	-0.4	-0.3	-0.7	-0.4	-0.1	-0.4	-0.2	-0.2	-0.1	0.0	0.4	0.3	0.4	0.6	0.3	-0.1	0.6
15-Feb	0.4	0.1	0.0	0.3	0.2	0.4	-0.1	-0.1	0.0	-0.2	-0.1	-0.2	0.1	0.1	-0.1	0.1	0.1	0.2	0.1	0.3	0.3	0.1	-0.2	-0.1	0.1	0.4
16-Feb	-0.1	0.2	0.2	-0.1	0.1	0.2	0.0	-0.1	0.2	0.2	0.2	0.0	-0.2	-0.1	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	0.2
17-Feb	0.0	0.0	-0.1	0.1	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.1	-0.1	-0.1	-0.1	0.1	0.0	0.2
18-Feb	0.1	0.0	0.1	0.1	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	0.1	0.1	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.2	-0.2	-0.3	-0.5	0.0	0.1
19-Feb	-0.2	-0.3	-0.5	-0.2	-0.1	-0.1	-0.1	-0.2	0.1	-0.2	-0.3	-0.3	-0.2	-0.3	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.0	-0.4	-0.2	-0.2	-0.2	0.1
20-Feb	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-0.2	-0.1	-0.2	0.0	-0.1	-0.3	-0.3	-0.3	-0.1	-0.3	-0.3	-0.2	-0.1	0.1
21-Feb	-0.3	-0.5	-0.1	-0.1	-0.2	-0.1	-0.3	-0.3	0.0	-0.3	-0.2	-0.2	-0.5	-0.5	-0.7	-0.4	0.0	-0.2	-0.2	-0.2	0.1	0.1	0.0	0.1	-0.2	0.1
22-Feb	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.4	-0.1	-0.2	0.0	-0.1	-0.2	-0.2	0.1	-0.1	0.1	-0.1	0.0	0.1	0.0	0.0	0.4
23-Feb	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.1	0.0	0.0	-0.1	0.1	-0.1	0.1	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.4
24-Feb	0.0	-0.1	-0.1	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.2	-0.1	0.3	0.3	0.0	-0.1	0.2	0.2	0.2	-0.1	-0.1	0.4	0.4	0.4	0.1	0.4
25-Feb	0.3	0.0	0.0	0.1	0.0	0.0	-0.3	-0.1	-0.2	-0.1	-0.1	-0.1	0.1	0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	-0.2	-0.1	-0.3	0.0	0.3
26-Feb	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.2	0.1	-0.2	-0.2	-0.3	-0.2	0.1	0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	-0.1	0.1
27-Feb	-0.1	-0.2	-0.1	-0.3	-0.3	-0.2	-0.1	-0.1	-0.1	0.0	0.1	-0.5	-0.3	0.0	0.1	-0.1	-0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	-0.1	0.1
28-Feb	0.2	0.0	0.0	0.0	-0.2	0.0	-0.1	0.1	-0.1	0.1	-0.5	-0.1	-0.1	-0.4	0.0	-0.1	0.1	0.0	-0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on Feb 12 22:00 Minimum Value: 0.1 km/h on Feb 14 02:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.2 Q ₁ = 0.5 Median = 1.0 Q ₃ = 1.5 P ₉₀ = 2.2 P ₉₉ = 3.5																						Hours in Service: 672 Hours of Data: 672 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-Feb	0.8	0.4	0.8	1.0	1.1	1.1	0.8	0.5	0.3	0.2	0.3	0.5	0.7	0.7	0.8	0.9	0.5	0.3	0.1	0.1	0.3	0.9	1.0	1.2	1.2
2-Feb	1.1	1.0	1.0	1.1	1.4	1.2	0.9	1.2	0.9	0.5	1.1	1.0	0.7	0.8	1.0	0.8	0.6	0.3	0.6	0.8	1.0	0.9	1.4	1.1	1.4
3-Feb	0.6	0.4	0.3	0.3	0.2	0.2	0.1	0.1	0.2	0.3	0.5	0.5	0.7	1.1	1.1	0.6	0.4	2.2	1.8	2.2	2.1	1.7	1.3	2.2	
4-Feb	0.6	0.3	0.2	0.2	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.6	0.9	0.9	1.4	1.0	0.6	0.8	0.8	0.5	0.7	0.7	0.5	1.3	1.4
5-Feb	1.4	1.2	1.0	0.6	0.6	0.3	0.2	0.2	0.2	0.4	0.6	1.0	1.2	1.5	0.9	0.4	0.4	0.3	0.2	0.1	0.2	0.2	0.1	0.2	1.5
6-Feb	0.2	0.3	0.6	0.6	0.6	1.3	1.4	1.4	1.3	1.3	1.3	1.2	1.3	0.6	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.4
7-Feb	0.1	0.2	0.2	0.4	0.9	1.7	2.0	1.5	2.1	1.6	1.8	1.9	2.0	2.3	2.5	2.4	1.9	2.3	1.5	0.9	0.4	0.3	0.3	0.2	2.5
8-Feb	0.7	0.5	0.9	0.6	0.9	1.3	1.5	1.3	1.5	2.0	1.6	2.5	2.4	1.8	2.2	1.9	1.8	1.4	0.9	1.5	2.4	3.3	3.2	2.7	3.3
9-Feb	2.4	1.7	0.7	0.7	0.3	0.2	0.2	0.2	0.5	0.3	1.0	1.3	1.0	0.6	0.8	0.6	0.8	0.4	0.4	0.3	0.3	0.5	0.7	0.5	2.4
10-Feb	0.7	0.6	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.3	0.5	1.0	0.6	0.8	0.6	0.6	0.7	0.7	0.7	2.6	2.3	1.4	1.2	1.1	2.6
11-Feb	1.0	0.4	0.2	0.2	0.4	1.6	1.6	2.4	2.5	2.5	1.7	1.3	0.8	1.0	1.4	2.6	2.6	2.3	1.7	1.1	2.2	1.4	1.4	0.9	2.6
12-Feb	0.9	1.4	2.5	2.5	2.4	1.7	1.1	1.5	2.6	2.2	2.2	3.1	3.5	3.6	3.2	2.5	1.2	1.7	1.2	1.4	3.4	4.0	3.3	3.1	4.0
13-Feb	3.3	3.1	3.3	1.6	3.1	3.5	3.7	3.6	3.0	2.6	2.0	1.7	1.4	1.1	0.5	0.4	0.6	0.8	0.7	0.7	0.5	0.4	0.3	0.1	3.7
14-Feb	0.1	0.1	0.2	0.5	1.0	2.1	1.5	1.4	1.5	1.8	2.2	2.4	2.0	2.2	1.9	1.4	1.5	1.2	0.6	0.7	0.8	0.8	1.0	1.0	2.4
15-Feb	1.1	1.3	1.1	1.1	1.3	1.0	1.5	2.0	1.8	1.5	1.3	1.2	1.1	0.9	0.3	0.4	0.8	1.0	1.0	1.0	1.1	1.4	2.2	1.7	2.2
16-Feb	1.7	1.5	1.0	0.8	0.3	0.8	0.6	0.8	0.6	0.8	0.7	0.8	0.8	1.1	0.7	0.5	0.4	0.2	0.4	0.9	0.8	0.3	0.2	0.2	1.7
17-Feb	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.4	0.5	0.5	0.4	0.8	0.7	0.6	1.2	1.7	1.7	1.6	1.4	1.7	1.9	1.5	1.7	1.4	1.9
18-Feb	1.4	1.6	1.3	1.2	1.2	0.8	0.9	0.7	0.7	0.7	0.7	0.8	0.8	0.9	1.1	1.2	1.2	0.7	0.6	0.5	0.9	1.0	1.3	1.1	1.6
19-Feb	0.9	1.0	1.1	1.0	0.8	1.5	1.5	1.8	1.3	1.5	1.6	1.7	2.1	2.2	1.3	1.0	1.0	0.8	0.5	0.6	0.7	0.8	1.0	0.6	2.2
20-Feb	1.0	0.6	0.9	0.6	0.6	0.5	0.7	0.5	1.0	1.0	0.8	1.1	0.7	1.4	1.5	1.2	0.9	2.1	2.3	2.1	1.4	1.4	1.7	2.0	2.3
21-Feb	2.5	2.6	0.7	1.0	1.5	1.9	2.4	2.7	2.3	2.1	2.4	2.4	2.4	2.7	2.5	2.0	1.7	1.7	1.7	1.8	1.5	0.8	0.5	0.3	2.7
22-Feb	0.3	1.0	0.7	0.5	0.4	0.2	0.2	0.3	0.2	0.5	1.1	1.4	1.6	1.4	1.4	1.7	1.5	1.2	1.1	0.7	0.8	0.7	0.2	0.2	1.7
23-Feb	0.2	0.3	0.3	0.3	0.2	0.1	0.1	0.2	0.3	0.4	0.4	1.2	1.4	1.6	1.4	1.0	0.3	0.5	0.2	0.3	0.3	0.8	0.9	1.2	1.6
24-Feb	1.3	1.7	1.9	1.5	0.5	0.5	0.7	0.6	0.4	1.0	1.4	2.0	1.8	1.6	1.0	1.1	1.1	0.7	0.6	0.7	1.1	1.1	1.0	0.9	2.0
25-Feb	1.0	1.2	1.4	1.8	1.8	1.6	1.8	1.9	1.9	1.7	2.0	1.7	1.1	1.6	1.5	1.6	1.4	0.6	0.8	1.1	2.0	3.8	3.8	3.2	3.8
26-Feb	2.8	2.1	2.3	1.8	1.5	1.0	0.5	0.4	0.6	1.6	1.7	1.9	1.3	1.1	1.1	1.0	0.9	0.4	0.9	0.6	0.3	0.3	0.4	0.4	2.8
27-Feb	0.4	0.6	0.6	0.9	1.0	0.7	0.3	0.3	0.6	0.8	1.3	1.4	1.6	1.5	1.4	1.2	0.7	0.3	0.2	0.2	0.3	1.0	0.7	0.6	1.6
28-Feb	0.5	0.5	0.4	2.5	2.0	1.7	1.6	2.4	2.3	2.4	2.3	2.0	2.0	2.2	2.0	1.9	1.7	1.2	0.9	1.0	0.9	0.9	0.8	0.6	2.5
3.3 3.1 3.3 2.5 3.1 3.5 3.7 3.6 3.0 2.6 2.4 3.1 3.5 3.6 3.2 2.6 2.6 2.3 2.3 2.6 3.4 4.0 3.8 3.2																									
Diurnal Maximum																									



Maximum Value: 2.2 km/h on Feb 7 07:00																								Hours in Service: 672			
Maximum Daily Average: 0.6 km/h on Feb 14																								Hours of Data: 663			
Minimum Value: -1.7 km/h on Feb 12 22:00																								Hours of Missing Data: 9			
Minimum Daily Average: -0.5 km/h on Feb 13																								Hours of Calibration: 0			
Maximum Diurnal Average: 0.2 km/h at hour 11																								Percent Operational Time: 98.7			
Minimum Diurnal Average: -0.1 km/h at hour 22																											
Monthly Average: 0.02 km/h																											
Percentiles: P ₁ = -1.3 P ₁₀ = -0.5 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.2 P ₉₀ = 0.6 P ₉₉ = 1.5																											
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-Feb	0.0	-0.1	-0.2	-0.1	-0.2	-0.3	-0.3	-0.3	-0.1	0.1	0.1	0.0	0.1	0.0	0.3	0.5	0.4	0.2	0.1	0.0	0.1	0.0	0.6	0.3	0.0	0.6	
2-Feb	-0.2	0.3	0.4	0.2	0.6	1.4	1.0	0.4	0.8	0.8	0.9	0.5	0.2	-0.1	0.4	0.4	0.3	0.0	0.0	0.1	-0.1	-0.2	-0.1	0.0	0.3	1.4	
3-Feb	-0.1	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	0.0	0.1	-0.1	0.1	0.0	0.2	0.5	0.2	0.5	0.0	-0.2	-0.7	-0.1	0.0	-0.2	-0.2	-0.2	-0.1	0.5	
4-Feb	-0.2	-0.1	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.2	0.2	0.2	0.1	-0.3	-0.1	0.3	0.5	0.5	0.4	0.3	0.4	-0.3	-0.3	-0.3	-0.1	0.0	0.5	
5-Feb	-0.1	-0.1	0.0	-0.3	-0.1	-0.2	-0.2	-0.1	-0.1	-0.2	0.0	0.4	-0.3	-0.3	0.0	-0.1	0.2	0.5	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.5	
6-Feb	0.4	0.5	0.8	0.6	0.6	0.9	0.8	0.8	0.7	0.8	0.6	0.6	0.4	-0.2	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	0.4	0.9	
7-Feb	0.2	0.5	0.3	0.6	1.0	1.7	2.2	1.3	1.3	1.0	1.5	1.3	0.0	-0.3	-0.5	-0.3	-0.3	-0.7	-0.5	-0.3	-0.3	-0.3	-0.1	0.0	0.4	2.2	
8-Feb	-0.1	-0.1	-0.4	-0.1	0.3	0.4	0.4	0.3	0.5	1.0	0.5	-0.7	-0.4	-0.4	-0.6	-0.4	-0.3	-0.3	-0.1	-0.1	-0.2	-0.5	-1.0	-0.7	-0.1	1.0	
9-Feb	-0.3	-0.1	-0.2	0.0	0.4	0.2	0.5	0.6	0.8	0.3	0.4	0.3	0.0	-0.4	0.4	0.0	-0.1	-0.1	-0.2	0.0	-0.1	-0.1	-0.2	-0.4	0.1	0.8	
10-Feb	-0.3	-0.2	-0.2	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.2	0.0	0.5	0.0	-0.1	-0.1	-0.2	0.7	0.6	0.4	0.1	0.4	0.7	
11-Feb	0.3	-0.1	0.0	0.0	-0.2	-0.4	-0.9	-1.0	-1.0	-0.8	-0.5	-0.1	-0.2	-0.2	-0.2	-1.0	-1.1	-1.1	-0.5	-0.6	-1.0	-0.4	0.2	1.1	-0.4	1.1	
12-Feb	1.2	0.1	-0.2	-0.2	-0.3	-0.1	0.1	-0.2	-0.2	-0.2	-0.1	-0.3	-1.2	-1.3	-1.1	-0.8	-0.1	-0.1	-0.3	-0.3	-1.3	-1.7	-1.3	-1.3	-0.5	1.2	
13-Feb	-1.2	-1.3	-1.3	-0.5	-1.3	-1.4	-1.5	-1.3	-0.6	-0.4	-0.2	-0.2	-0.2	0.2	0.0	0.3	0.0	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	0.1	-0.5	0.3	
14-Feb	0.1	0.0	0.1	0.2	0.8	0.0	0.1	0.2	0.8	0.3	0.4	-0.4	0.2	0.8	1.1	1.1	0.8	1.2	0.5	1.3	1.4	1.4	1.6	1.3	0.6	1.6	
15-Feb	1.9	1.6	1.0	1.0	0.7	1.0	0.3	0.4	0.3	0.1	0.2	0.2	0.8	0.4	-0.1	0.2	0.3	0.6	0.5	0.7	0.8	0.1	-0.4	-0.3	0.5	1.9	
16-Feb	-0.2	0.3	0.3	-0.1	0.1	0.8	0.3	0.3	0.7	0.7	0.3	0.1	-0.3	-0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.3	-0.1	-0.3	-0.1	0.0	0.1	0.8	
17-Feb	0.0	-0.2	-0.2	0.1	0.0	0.1	-0.1	-0.4	-0.4	-0.4	-0.3	-0.2	0.2	0.0	0.1	0.0	0.0	0.1	0.1	0.2	-0.2	0.2	0.0	0.3	0.0	0.3	
18-Feb	0.1	0.0	0.3	0.1	0.0	0.0	-0.1	0.0	0.0	-0.2	0.1	0.1	0.2	0.1	0.0	0.2	0.1	0.1	-0.1	-0.1	-0.4	-0.1	-0.3	-0.6	0.0	0.3	
19-Feb	-0.4	-0.5	-0.8	-0.5	0.0	0.4	0.4	0.4	0.4	0.4	0.3	0.1	0.2	0.4	0.4	0.3	0.2	0.1	0.2	-0.1	-0.4	-0.1	-0.5	-0.3	-0.3	0.0	0.4
20-Feb	-0.1	0.0	-0.1	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.3	-0.6	-0.3	-0.2	-0.8	-0.9	-0.9	-0.4	-0.6	-0.5	-0.3	--	0.0	
21-Feb	-0.5	-1.0	-0.2	-0.1	-0.3	-0.5	-0.8	-0.8	-0.3	-0.6	-0.7	-0.4	-0.7	-1.0	-0.8	-0.6	-0.3	-0.5	-0.6	-0.7	-0.4	0.1	0.0	0.0	-0.5	0.1	
22-Feb	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.0	-0.1	-0.2	0.2	0.6	-0.1	-0.5	0.2	-0.2	-0.2	-0.2	0.0	-0.1	-0.1	-0.2	0.0	0.0	0.0	-0.1	0.6	
23-Feb	0.0	-0.1	0.1	0.2	0.0	0.0	0.0	0.0	-0.1	0.0	0.2	0.7	0.4	0.3	0.4	0.0	0.1	0.3	0.1	0.0	-0.1	-0.1	-0.1	-0.2	0.1	0.7	
24-Feb	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	0.2	-0.6	0.2	0.4	0.2	0.2	0.3	0.1	0.4	0.7	-0.1	-0.4	0.5	1.2	0.1	1.2	
25-Feb	1.5	1.1	1.1	1.5	1.2	1.1	0.3	0.8	0.5	0.9	0.9	0.8	0.1	0.1	0.1	0.0	0.0	-0.1	-0.1	0.1	0.4	-0.5	0.2	-0.4	0.5	1.5	
26-Feb	-0.4	-0.3	-0.3	-0.7	-0.5	-0.3	0.0	-0.2	-0.1	-0.3	-0.2	0.3	0.0	-0.3	-0.4	0.0	0.0	-0.1	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.2	0.3	
27-Feb	-0.1	-0.5	-0.4	-0.5	-0.6	-0.4	-0.1	-0.3	-0.1	-0.1	0.1	-0.5	-0.5	-0.2	-0.1	-0.1	-0.2	0.1	0.1	0.1	0.3	0.5	0.3	0.4	-0.1	0.5	
28-Feb	0.4	0.0	0.0	-0.1	-0.2	-0.1	-0.2	0.0	-0.2	0.3	-0.3	0.0	0.0	-0.4	0.1	0.0	0.2	-0.1	0.0	-0.1	0.2	0.2	0.1	-0.1	0.0	0.4	
																								Diurnal Average			
																								Diurnal Maximum			
0.1 0.0 0.0 0.0 0.1 0.2 0.1 0.0 0.1 0.1 0.2 0.1 0.0 -0.1 0.0 0.0 0.0 0.0 -0.1 0.0 -0.1 -0.1 0.0 0.0																											
1.9 1.6 1.1 1.5 1.2 1.7 2.2 1.3 1.3 1.0 1.5 1.3 0.8 0.8 1.1 1.1 0.8 1.2 0.5 1.3 1.4 1.4 1.6 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 - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 4.4 km/h on Feb 12 22:00	Hours of Data: 663
Minimum Value: 0.1 km/h on Feb 6 18:00	Hours of Missing Data: 9
Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.5 Median = 1.0 Q ₃ = 1.6 P ₉₀ = 2.2 P ₉₉ = 3.7	Hours of Calibration: 0
	Percent Operational Time: 98.7

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-Feb	1.0	0.5	1.1	1.2	1.4	1.5	1.1	0.6	0.4	0.2	0.3	0.4	0.8	0.7	0.6	0.7	0.5	0.5	0.2	0.2	0.5	1.2	1.2	1.4	1.5
2-Feb	1.4	1.1	1.1	1.1	1.3	1.0	1.1	1.2	1.0	0.6	1.0	0.7	0.7	0.9	0.9	0.7	0.4	0.2	0.5	1.1	1.1	1.1	1.6	1.3	1.6
3-Feb	0.8	0.4	0.3	0.3	0.3	0.1	0.2	0.2	0.2	0.2	0.5	0.6	0.7	1.0	1.0	1.1	0.6	0.5	2.5	1.9	2.4	2.0	1.6	1.4	2.5
4-Feb	0.6	0.3	0.2	0.2	0.4	0.4	0.2	0.1	0.2	0.3	0.3	0.6	0.9	1.0	1.3	0.9	0.6	0.8	0.8	0.6	0.8	0.5	0.5	1.3	1.3
5-Feb	1.5	1.4	1.3	0.7	0.5	0.3	0.3	0.3	0.2	0.2	0.7	1.1	1.0	1.1	0.9	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.1	0.3	1.5
6-Feb	0.3	0.5	0.6	0.7	0.5	0.9	1.0	1.0	1.0	1.1	1.1	0.9	0.9	0.6	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.1
7-Feb	0.2	0.2	0.3	0.4	0.8	1.0	1.2	0.9	1.3	1.1	1.5	1.7	1.9	2.2	2.4	1.8	1.7	2.3	1.8	1.1	0.4	0.3	0.3	0.2	2.4
8-Feb	0.8	0.8	1.2	0.9	1.1	1.6	1.7	1.5	1.7	1.9	2.0	2.6	2.1	1.5	2.0	1.8	2.2	1.7	1.3	1.9	2.1	2.5	3.0	2.5	3.0
9-Feb	2.3	1.9	1.0	1.0	0.4	0.3	0.4	0.2	0.4	0.4	0.8	1.1	0.9	0.6	0.8	0.6	0.9	0.5	0.4	0.4	0.3	0.5	0.7	0.5	2.3
10-Feb	0.7	0.6	0.5	0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.9	0.8	0.8	0.7	0.6	0.6	1.0	1.1	2.6	2.3	1.6	1.5	1.5	2.6
11-Feb	1.2	0.5	0.3	0.2	0.5	1.6	1.5	1.9	2.4	2.2	1.3	1.5	0.9	1.1	1.6	2.5	2.5	2.1	1.7	1.1	2.1	1.6	2.0	1.0	2.5
12-Feb	1.1	1.8	2.5	2.5	2.2	1.7	1.3	1.7	2.4	1.9	2.2	2.9	3.5	3.7	3.2	2.4	1.5	1.8	1.4	1.5	3.6	4.4	3.6	3.7	4.4
13-Feb	3.6	3.4	3.6	1.6	3.6	4.0	4.0	3.8	3.3	2.9	2.1	1.8	1.2	1.2	0.5	0.4	0.6	0.9	0.8	0.6	0.5	0.4	0.2	0.1	4.0
14-Feb	0.1	0.1	0.3	0.6	1.0	1.9	1.5	1.5	1.6	1.7	2.1	2.6	1.9	1.8	1.2	1.0	1.2	0.7	0.6	0.5	0.6	0.5	0.7	0.9	2.6
15-Feb	0.7	0.8	0.6	0.9	1.2	0.9	1.3	1.9	1.9	1.5	1.3	1.0	0.9	0.6	0.4	0.4	0.9	1.3	1.3	1.4	1.4	1.7	2.4	2.2	2.4
16-Feb	2.2	1.8	1.5	1.1	0.4	0.9	0.6	0.8	0.6	0.7	0.7	0.8	0.8	1.0	0.8	0.7	0.5	0.3	0.5	1.0	0.9	0.4	0.3	0.3	2.2
17-Feb	0.4	0.2	0.3	0.4	0.3	0.2	0.5	0.4	0.7	0.7	0.4	0.9	0.8	0.6	1.2	1.8	1.6	1.6	1.4	1.6	1.8	1.4	1.8	1.5	1.8
18-Feb	1.4	1.5	1.4	1.2	1.2	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	1.1	1.2	1.3	0.8	0.7	0.6	0.7	1.0	1.3	0.9	1.5
19-Feb	0.9	0.9	1.0	1.1	1.2	1.6	1.6	1.8	1.4	1.5	1.6	1.8	2.1	2.1	1.4	1.2	1.1	0.8	0.6	0.7	0.7	0.8	0.9	0.6	2.1
20-Feb	0.8	0.7	0.9	0.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.6	1.8	1.5	1.1	2.4	2.5	2.3	1.6	1.5	1.7	1.9	2.5
21-Feb	2.3	2.8	0.8	1.1	1.6	2.2	2.8	3.1	2.6	2.4	2.7	2.9	2.5	2.9	2.6	2.2	2.1	1.9	1.9	2.2	1.7	1.1	0.5	0.4	3.1
22-Feb	0.4	1.2	0.8	0.6	0.4	0.3	0.2	0.2	0.3	0.6	1.1	1.0	1.4	1.5	1.5	1.7	1.5	1.2	1.0	0.9	1.0	0.8	0.2	0.2	1.7
23-Feb	0.2	0.3	0.3	0.4	0.2	0.1	0.1	0.1	0.3	0.4	0.6	1.3	1.7	1.6	1.5	1.0	0.3	0.5	0.3	0.3	0.4	0.8	0.8	1.1	1.7
24-Feb	1.5	1.7	2.0	1.5	0.6	0.5	0.7	0.6	0.4	1.1	1.6	2.2	1.8	1.6	1.1	1.2	1.3	0.7	0.8	1.0	1.1	1.0	1.1	0.6	2.2
25-Feb	0.8	0.8	0.9	1.3	1.4	1.1	1.7	1.8	1.7	1.1	1.2	1.1	1.1	1.6	1.8	1.7	1.6	0.7	1.0	1.2	2.2	3.9	4.0	3.3	4.0
26-Feb	3.0	2.3	2.7	2.0	1.6	1.2	0.7	0.4	0.7	1.5	1.9	2.2	1.5	1.2	1.2	1.2	1.0	0.5	0.9	0.6	0.3	0.2	0.3	0.6	3.0
27-Feb	0.6	0.5	0.8	0.7	0.8	0.6	0.3	0.3	0.5	0.7	1.1	0.9	1.1	1.2	1.4	1.1	0.6	0.3	0.3	0.3	0.4	1.0	0.9	0.8	1.4
28-Feb	0.6	0.5	0.4	2.5	2.2	1.8	1.7	2.3	2.3	2.4	2.2	2.1	2.2	2.1	2.1	2.0	1.7	1.1	0.9	1.0	1.1	1.1	1.0	0.7	2.5
	3.6	3.4	3.6	2.5	3.6	4.0	4.0	3.8	3.3	2.9	2.7	2.9	3.5	3.7	3.2	2.5	2.5	2.4	2.5	2.6	3.6	4.4	4.0	3.7	

Diurnal Maximum

AF - Analyzer Failure



Maximum Value: 2.7 km/h on Feb 10 20:00																				Maximum Daily Average: 0.8 km/h on Feb 14					Hours in Service: 672				
Minimum Value: -1.6 km/h on Feb 8 03:00																				Minimum Daily Average: -0.2 km/h on Feb 21					Hours of Data: 662				
Maximum Diurnal Average: 0.4 km/h at hour 9																				Minimum Diurnal Average: 0.0 km/h at hour 3					Hours of Missing Data: 10				
Monthly Average: 0.17 km/h																				Percentiles: P ₁ = -1.0 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.8 P ₉₉ = 2.0					Hours of Calibration: 0				
																				Percent Operational Time: 98.5									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	-0.2	-0.1	-0.2	-0.1	-0.1	0.1	-0.3	-0.2	0.0	0.1	0.0	-0.1	-0.1	-0.1	0.0	0.4	0.3	0.6	0.3	0.3	-0.2	-0.4	-0.2	-0.6	0.0	0.6			
2-Feb	-1.5	-0.8	-0.6	-0.7	-0.5	0.0	0.0	-0.3	0.2	0.0	0.0	-0.1	-0.1	0.1	0.2	0.1	0.1	0.0	0.2	0.6	0.0	-0.1	0.0	0.0	-0.1	0.6			
3-Feb	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.3	0.3	0.7	0.1	0.0	-0.6	0.2	-0.4	-0.1	0.1	-0.2	0.0	0.7			
4-Feb	-0.1	-0.1	0.1	-0.1	-0.1	0.1	0.0	0.0	0.1	0.0	0.3	0.0	-0.1	0.0	0.3	0.5	0.5	0.9	0.5	0.1	0.1	0.0	-0.2	-0.1	0.1	0.9			
5-Feb	-0.1	0.1	0.0	-0.2	-0.1	-0.3	-0.3	-0.1	0.0	-0.1	-0.1	0.2	-0.1	-0.2	-0.2	-0.1	0.1	0.6	0.5	0.1	0.2	0.3	0.2	0.3	0.0	0.6			
6-Feb	0.4	0.2	0.6	0.3	0.5	0.2	0.2	0.2	0.2	0.7	0.6	0.8	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.0	-0.1	0.0	0.0	0.0	0.2	0.8			
7-Feb	0.0	0.1	0.1	0.0	0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.3	0.9	1.0	0.7	0.6	0.5	0.5	0.2	-0.5	-0.5	-0.3	-0.4	-0.3	-0.4	0.1	1.0			
8-Feb	0.7	-0.4	-1.6	-0.6	1.2	2.2	2.1	1.8	1.9	1.3	1.5	0.5	0.3	0.0	0.4	0.2	0.9	0.8	0.6	1.3	1.1	0.8	0.6	0.9	0.8	2.2			
9-Feb	1.6	2.0	0.4	-0.2	0.3	0.0	0.1	0.3	1.0	0.8	0.3	0.7	0.1	-0.2	0.0	-0.1	0.1	0.1	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.3	2.0			
10-Feb	0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.1	0.1	0.1	-0.3	0.0	-0.1	0.0	0.1	0.3	1.0	2.7	2.3	1.0	2.1	2.0	0.5	2.7			
11-Feb	0.6	0.1	0.1	0.3	0.2	0.7	-0.2	-0.3	-0.2	0.0	0.1	0.0	-0.2	-0.3	0.4	0.3	0.1	0.1	0.1	0.0	0.6	-0.3	-0.2	-0.1	0.1	0.7			
12-Feb	0.0	1.3	1.3	1.0	0.6	0.8	0.7	0.9	0.9	0.6	0.6	0.9	0.0	0.1	0.3	0.4	0.8	0.8	0.1	0.5	-0.5	-0.6	-0.2	-0.6	0.4	1.3			
13-Feb	0.3	-0.1	-0.3	0.5	-0.9	-1.0	-0.7	-0.4	0.5	0.6	-0.2	-0.1	0.3	0.5	-0.1	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.2	0.0	0.0	-0.1	0.6			
14-Feb	0.1	0.2	0.6	0.5	0.8	1.8	1.4	1.1	1.7	1.0	1.1	1.7	1.2	1.9	1.3	0.8	1.5	0.8	0.2	0.8	0.1	-0.1	-0.1	-0.1	0.8	1.9			
15-Feb	0.0	0.1	0.4	1.2	1.5	0.6	0.2	1.6	2.0	0.7	-0.1	0.9	0.6	0.2	0.0	-0.1	0.1	0.4	0.5	0.1	0.3	1.0	0.7	1.3	0.6	2.0			
16-Feb	1.6	1.4	0.2	0.6	0.2	0.7	0.9	0.5	1.1	0.4	0.1	0.1	0.3	0.2	-0.2	0.0	0.1	0.0	0.0	-0.2	0.1	-0.1	-0.1	-0.2	0.3	1.6			
17-Feb	0.0	-0.3	-0.2	0.0	0.1	0.0	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	0.2	-0.1	0.2	0.5	0.1	0.1	0.3	0.4	-0.4	0.4	0.1	0.7	0.0	0.7			
18-Feb	0.1	-0.1	0.7	0.2	0.0	0.0	-0.1	0.3	0.0	0.0	0.2	0.0	0.4	-0.1	0.3	0.1	0.5	0.1	-0.1	0.1	-0.1	-0.1	-0.5	-0.7	0.0	0.7			
19-Feb	-0.3	-0.6	-0.7	0.1	0.7	0.9	0.4	0.1	0.1	0.1	0.0	-0.1	0.3	0.7	0.4	0.2	0.1	0.1	0.5	0.2	0.2	0.2	0.1	0.0	0.1	0.9			
20-Feb	-0.1	-0.2	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.1	-0.1	-0.2	0.1	-1.0	-1.3	-0.8	-0.7	-0.4	0.1	0.5	--	0.5		
21-Feb	0.3	-0.4	0.0	0.6	0.1	-0.7	-0.7	-0.7	0.1	-0.3	-0.7	0.1	-0.1	-0.6	-0.2	0.4	0.1	-0.5	-0.1	-1.0	-0.7	0.2	0.0	-0.3	-0.2	0.6			
22-Feb	-0.2	0.3	0.1	-0.3	0.0	0.0	0.1	0.1	0.0	0.0	-0.1	-0.2	-0.4	1.0	-0.1	-0.1	0.2	0.3	0.1	0.1	-0.1	0.1	-0.1	0.1	0.0	1.0			
23-Feb	0.0	0.0	0.1	0.0	0.2	0.3	0.2	0.5	0.2	0.1	0.4	0.2	0.3	0.6	0.0	0.2	0.3	0.4	0.1	0.0	0.0	-0.1	-0.1	0.2	0.2	0.6			
24-Feb	0.1	0.3	0.2	0.1	0.0	-0.2	0.0	-0.1	-0.1	0.0	-0.2	-1.0	-0.1	0.6	-0.2	0.0	0.7	0.3	-0.2	-0.1	0.6	0.3	0.8	-0.1	0.1	0.8			
25-Feb	0.0	0.1	0.4	0.8	1.0	0.5	0.6	0.7	0.6	0.6	0.2	0.1	0.1	-0.1	0.1	0.6	0.1	-0.1	0.0	0.4	0.3	0.5	1.0	0.8	0.4	1.0			
26-Feb	0.8	-0.2	-0.6	-0.7	-0.5	-0.2	-0.1	-0.3	-0.3	-0.5	0.2	0.6	0.5	-0.4	-0.5	0.0	-0.1	-0.3	0.3	0.0	0.0	0.2	0.2	0.6	0.0	0.8			
27-Feb	0.8	0.2	0.1	-0.2	-0.5	-0.2	0.0	-0.2	0.0	-0.3	0.1	-0.2	0.0	-0.4	-0.5	-0.2	-0.2	0.0	0.4	0.3	0.9	1.4	0.5	0.3	0.1	1.4			
28-Feb	0.4	-0.1	0.0	-0.1	0.4	0.4	0.0	0.4	0.3	0.4	-0.1	-0.4	0.4	-0.5	0.3	0.1	0.5	0.0	0.0	0.2	0.6	0.8	0.4	0.0	0.2	0.8			
																								Diurnal Average					
																								Diurnal Maximum					
0.2 0.1 0.0 0.1 0.2 0.2 0.2 0.2 0.4 0.2 0.2 0.2 0.2 0.1 0.1 0.2 0.3 0.2 0.1 0.2 0.1 0.2 0.2 0.1 0.1 0.2																													
1.6 2.0 1.3 1.2 1.5 2.2 2.1 1.8 2.0 1.3 1.5 1.7 1.2 1.9 1.3 0.8 1.5 0.9 1.0 2.7 2.3 1.4 2.1 2.0																													
AF - Analyzer Failure																													



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.9 km/h on Feb 25 23:00 Minimum Value: 0.1 km/h on Feb 6 17:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.6 P ₉₀ = 2.2 P ₉₉ = 3.2																								Hours in Service: 672 Hours of Data: 662 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.5	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	0.6	0.4	1.2	1.6	1.6	1.5	1.7	1.1	0.5	0.3	0.2	0.3	0.4	0.4	0.3	0.6	0.7	0.8	0.7	0.7	0.9	1.3	1.4	2.0	2.0
2-Feb	1.9	1.8	2.0	1.9	2.1	1.4	1.8	1.5	1.1	0.4	0.6	0.3	0.8	0.6	0.8	0.3	0.3	0.3	0.6	1.5	1.7	1.7	1.4	1.0	2.1
3-Feb	1.0	0.6	0.7	0.6	0.5	0.2	0.2	0.3	0.4	0.2	0.5	0.7	0.7	0.9	0.9	0.7	0.7	0.8	2.0	1.4	2.6	1.9	1.3	1.3	2.6
4-Feb	0.6	0.4	0.4	0.6	0.7	0.5	0.5	0.1	0.2	0.3	0.5	0.4	1.0	0.8	1.2	1.0	0.9	0.9	1.1	1.1	0.8	0.4	0.4	1.0	1.2
5-Feb	1.3	1.0	0.6	0.4	0.5	0.6	0.4	0.6	0.4	0.4	0.4	1.2	0.9	1.1	0.8	0.3	0.3	0.3	0.4	0.8	0.6	0.6	0.5	0.6	1.3
6-Feb	0.6	0.6	0.7	0.9	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.7	0.6	0.4	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.3	0.9
7-Feb	0.3	0.4	0.4	0.5	0.6	0.9	0.9	0.8	1.0	0.9	1.4	2.2	2.1	2.2	1.7	1.1	1.1	1.8	1.4	0.8	0.3	0.6	0.5	0.4	2.2
8-Feb	1.7	1.4	1.5	1.6	1.4	2.1	1.6	1.6	2.2	2.8	2.2	1.9	1.6	1.1	1.4	1.9	2.1	2.1	1.4	1.7	2.0	2.1	1.8	1.5	2.8
9-Feb	1.3	1.4	1.7	1.4	0.7	0.4	0.5	0.6	0.7	0.5	0.7	0.9	0.8	0.5	0.7	0.5	0.5	0.5	0.3	0.2	0.2	0.4	0.5	0.5	1.7
10-Feb	0.6	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.4	0.5	0.6	0.3	0.4	0.3	0.5	0.3	0.7	1.7	2.0	2.5	2.2	2.0	1.3	1.7	2.5
11-Feb	1.6	0.4	0.5	0.6	0.7	1.3	1.0	1.0	1.1	1.1	0.7	1.4	1.0	1.4	1.4	1.3	1.2	0.9	1.2	1.4	1.1	1.9	2.9	1.6	2.9
12-Feb	1.8	2.6	3.3	3.1	2.6	2.0	1.9	1.6	2.5	2.3	2.4	2.6	2.5	2.1	2.2	1.8	1.9	2.0	1.4	1.7	2.9	3.8	2.8	3.1	3.8
13-Feb	2.1	2.5	3.2	1.9	2.5	3.0	2.7	3.3	2.6	2.9	2.3	1.9	1.2	1.4	0.6	0.3	0.4	0.4	0.6	0.4	0.3	0.4	0.3	0.1	3.3
14-Feb	0.2	0.3	0.7	1.0	1.0	1.1	1.5	1.7	1.8	1.5	1.8	1.3	1.6	1.2	1.1	1.9	1.0	1.2	1.2	1.2	1.3	1.1	1.4	1.7	1.9
15-Feb	1.0	1.1	0.9	0.7	1.0	1.0	1.4	1.2	1.4	1.3	1.2	0.9	0.9	0.9	0.6	0.5	1.2	1.7	1.7	1.6	1.6	2.4	2.4	2.6	2.6
16-Feb	2.0	2.3	2.5	1.8	0.9	1.2	0.9	1.1	0.9	0.4	0.5	0.6	1.2	0.9	0.6	0.6	0.4	0.2	0.7	0.4	0.4	0.3	0.3	0.3	2.5
17-Feb	0.5	0.4	0.5	0.5	0.6	0.5	0.8	0.6	0.9	0.9	0.8	0.7	0.8	0.4	1.2	1.4	1.8	1.5	1.2	1.7	1.7	1.6	1.7	1.7	1.8
18-Feb	1.6	1.2	1.6	1.6	1.0	0.7	0.6	0.9	0.6	0.7	0.6	0.7	0.7	0.5	1.3	1.4	1.6	1.1	1.0	1.0	0.8	1.1	0.8	0.5	1.6
19-Feb	0.7	1.0	1.2	1.5	1.8	1.9	1.6	1.9	1.6	1.7	2.3	2.4	2.5	2.3	1.9	1.5	1.3	0.9	0.7	1.2	1.1	0.9	0.8	0.8	2.5
20-Feb	0.3	0.4	0.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.9	2.0	1.5	1.5	2.2	1.4	1.8	1.7	1.9	1.6	1.4	2.2
21-Feb	1.8	1.6	0.9	1.2	1.9	2.2	2.9	3.0	3.2	2.6	2.9	3.0	2.2	2.1	2.0	2.4	2.3	1.9	1.8	1.7	1.2	1.1	0.8	0.9	3.2
22-Feb	0.5	1.2	0.9	0.8	0.6	0.5	0.3	0.2	0.2	0.4	0.8	1.0	1.5	1.6	1.4	1.7	1.6	1.1	1.0	1.3	1.7	1.2	0.4	0.3	1.7
23-Feb	0.3	0.2	0.4	0.5	0.3	0.5	0.3	0.3	0.3	0.4	0.5	0.9	1.6	1.9	1.8	1.2	0.4	0.3	0.3	0.4	0.5	0.4	0.5	0.9	1.9
24-Feb	1.2	1.1	1.3	0.8	0.5	0.9	0.7	0.3	0.3	1.0	1.5	2.7	1.7	1.9	1.2	1.3	1.3	1.0	0.9	1.6	1.1	1.0	1.2	0.8	2.7
25-Feb	0.8	0.9	1.0	1.1	1.1	0.9	1.2	1.3	1.2	1.1	1.2	1.1	1.0	1.1	1.8	1.8	1.7	0.9	1.3	1.1	2.5	3.7	3.9	3.2	3.9
26-Feb	2.6	2.6	2.3	1.7	1.6	1.1	0.6	0.8	0.9	1.9	2.4	2.5	2.2	1.2	1.2	1.2	0.7	0.6	1.1	0.8	0.3	0.4	0.4	0.9	2.6
27-Feb	0.7	0.8	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	1.2	0.8	0.5	0.6	0.7	0.7	0.5	0.5	0.6	0.8	0.8	1.0	1.3	1.2	1.3
28-Feb	1.0	0.6	0.3	2.5	2.5	1.8	1.4	2.0	2.3	2.3	1.6	2.0	2.7	2.3	2.2	2.4	1.9	1.1	0.8	0.9	1.0	1.2	1.4	1.0	2.7
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 4.0 km/h on Feb 10 20:00																				Maximum Daily Average: 1.5 km/h on Feb 8					Hours in Service: 672	
Minimum Value: -1.4 km/h on Feb 8 03:00																				Minimum Daily Average: 0.1 km/h on Feb 2					Hours of Data: 662	
Maximum Diurnal Average: 0.6 km/h at hour 20																				Minimum Diurnal Average: 0.3 km/h at hour 14					Hours of Missing Data: 10	
Monthly Average: 0.49 km/h																				Percentiles: P ₁ = -0.8 P ₁₀ = -0.1 Q ₁ = 0.1 Median = 0.3 Q ₃ = 0.7 P ₉₀ = 1.4 P ₉₉ = 3.0					Hours of Calibration: 0	
																									Percent Operational Time: 98.5	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-0.1	0.1	0.1	-0.1	0.0	0.2	0.0	-0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.1	0.5	0.4	0.4	0.7	0.1	-0.3	-0.2	0.2	0.0	0.1	0.7
2-Feb	-1.1	-0.7	-0.2	0.0	-0.6	0.6	0.7	0.2	0.3	-0.1	0.0	0.0	-0.1	0.1	0.0	0.1	0.2	0.1	0.7	1.4	0.1	-0.3	0.1	0.1	0.1	1.4
3-Feb	0.1	-0.1	-0.1	0.3	0.2	0.1	0.4	0.1	0.1	0.3	0.3	0.5	0.2	0.3	0.2	0.4	0.2	0.1	-0.3	0.1	-0.4	0.1	0.0	-0.2	0.1	0.5
4-Feb	0.0	0.2	0.3	-0.1	-0.1	0.0	0.1	0.0	0.2	0.3	0.5	0.6	0.5	0.4	0.1	0.2	0.3	0.7	0.7	0.7	0.5	0.1	0.1	0.3	0.3	0.7
5-Feb	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	-0.2	-0.4	-0.1	-0.1	0.3	0.6	0.3	0.2	0.5	0.3	0.2	0.3	0.1	0.6
6-Feb	0.3	0.2	0.2	0.1	0.2	0.0	0.1	0.2	0.3	0.3	0.3	0.6	0.2	0.4	0.3	0.2	0.0	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.2	0.6
7-Feb	0.1	0.3	0.4	0.6	0.6	0.7	0.3	0.7	1.1	0.6	1.2	1.8	1.8	1.3	1.0	1.0	1.0	0.9	-0.2	-0.5	-0.2	-0.3	-0.1	-0.2	0.6	1.8
8-Feb	0.5	-0.3	-1.4	-0.2	2.2	3.2	2.8	2.9	3.2	2.1	2.3	1.3	1.0	0.3	1.1	1.0	1.9	1.7	1.6	2.3	2.3	1.6	1.4	2.1	1.5	3.2
9-Feb	2.7	3.3	2.0	0.1	0.1	0.3	0.5	0.4	0.3	0.6	0.3	0.9	0.3	0.4	0.2	0.0	0.3	0.4	0.2	0.2	0.3	0.1	0.2	0.3	0.6	3.3
10-Feb	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.1	0.4	0.6	0.0	0.4	0.2	0.5	0.3	0.3	0.4	1.2	2.5	4.0	3.0	1.3	2.2	1.8	0.9	4.0
11-Feb	1.0	0.4	0.4	1.3	0.9	1.7	0.4	0.2	0.6	0.3	0.2	0.6	0.5	0.6	1.2	1.1	1.0	1.1	0.9	0.9	1.3	1.2	0.2	0.9	0.8	1.7
12-Feb	1.0	2.9	3.0	2.6	1.8	2.0	1.6	1.9	2.1	1.7	1.7	2.1	1.3	1.0	1.3	1.5	2.3	1.6	0.8	1.2	0.3	0.0	0.3	0.1	1.5	3.0
13-Feb	0.4	0.2	0.4	0.6	0.0	-0.1	-0.2	0.3	1.2	1.1	0.1	-0.1	0.3	0.6	0.2	0.2	0.2	0.3	0.1	0.2	0.1	0.1	0.0	0.2	0.3	1.2
14-Feb	0.2	0.4	0.6	0.2	0.5	1.9	1.0	0.5	1.5	0.6	0.5	1.6	1.1	1.1	0.7	0.2	1.0	0.8	1.6	1.5	1.7	1.3	1.4	1.4	1.0	1.9
15-Feb	1.2	1.1	0.8	0.8	1.0	0.9	0.5	0.8	1.4	0.9	-0.2	0.9	0.8	0.3	0.3	0.2	0.8	1.5	1.6	1.6	2.0	2.3	2.0	2.3	1.1	2.3
16-Feb	2.2	3.1	2.0	2.3	1.1	0.1	0.8	0.6	0.7	1.6	0.5	0.7	0.8	0.7	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	-0.1	0.8	3.1
17-Feb	0.1	-0.2	0.1	0.0	0.1	0.0	-0.1	0.1	0.1	0.0	-0.2	-0.3	0.4	-0.1	0.5	0.7	0.2	0.1	0.5	0.4	-0.6	0.4	0.3	0.8	0.1	0.8
18-Feb	0.1	0.1	0.8	0.3	0.0	0.0	0.0	0.3	0.1	0.0	0.1	0.2	0.1	-0.1	0.3	0.4	1.2	0.4	0.7	0.3	0.3	0.4	0.0	0.0	0.2	1.2
19-Feb	0.2	0.4	0.6	1.5	1.4	1.5	1.0	0.6	0.8	0.5	0.2	-0.2	0.5	0.8	0.7	0.4	0.5	0.3	0.9	1.4	0.3	0.2	0.0	0.1	0.6	1.5
20-Feb	0.3	0.1	0.1	0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.4	0.2	0.4	-0.8	-1.1	-0.5	-0.5	0.1	0.4	0.9	--	0.9
21-Feb	0.7	0.0	0.5	1.1	0.4	-0.7	-0.6	-0.1	0.9	0.3	-0.1	0.4	0.5	-0.1	0.3	1.0	0.7	0.1	0.1	-1.1	-0.8	0.3	0.0	-0.2	0.2	1.1
22-Feb	-0.1	0.5	0.1	-0.2	0.1	0.1	0.3	0.3	0.1	0.1	-0.3	-0.2	-0.2	1.0	-0.1	-0.1	0.5	0.4	0.3	0.3	-0.1	0.6	0.2	0.4	0.2	1.0
23-Feb	0.4	0.1	0.4	0.7	0.3	0.3	0.4	0.3	0.4	0.5	0.5	0.2	0.0	0.0	0.6	0.3	0.4	0.3	0.4	0.5	0.3	0.1	0.3	0.2	0.3	0.7
24-Feb	0.1	0.3	0.2	0.1	0.1	0.0	0.2	0.1	0.0	0.1	-0.4	-1.1	-0.4	0.8	-0.1	0.0	1.5	1.5	1.1	0.9	0.9	0.3	1.4	0.8	0.4	1.5
25-Feb	0.7	0.9	1.1	1.5	1.9	1.3	1.4	1.4	0.6	0.6	0.8	0.6	0.3	-0.3	0.2	0.6	0.3	0.0	0.2	0.4	0.8	0.6	1.3	1.3	0.8	1.9
26-Feb	1.2	-0.1	-0.4	-0.6	-0.5	-0.1	0.0	-0.2	-0.3	-0.6	0.3	0.5	0.8	-0.6	-0.4	0.1	-0.3	-0.4	0.5	0.2	0.3	0.6	0.7	0.9	0.1	1.2
27-Feb	1.4	1.2	0.7	0.3	0.2	0.3	0.3	0.2	0.3	0.1	-0.4	-0.1	0.0	-0.6	-0.1	0.2	0.2	0.1	0.3	0.2	0.6	1.3	0.7	0.3	0.3	1.4
28-Feb	0.6	0.3	-0.1	0.0	0.7	0.4	0.2	0.4	0.3	0.6	0.0	-1.0	0.0	-0.4	0.5	0.4	0.4	0.2	0.1	0.6	1.2	1.7	1.2	0.4	0.4	1.7
																								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 - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.1 km/h on Feb 25 23:00 Minimum Value: 0.1 km/h on Feb 6 17:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.5 Median = 0.9 Q ₃ = 1.5 P ₉₀ = 2.1 P ₉₉ = 3.0																								Hours in Service: 672 Hours of Data: 662 Hours of Missing Data: 10 Hours of Calibration: 0 Percent Operational Time: 98.5	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	0.6	0.6	1.5	1.7	1.9	1.7	2.2	1.4	0.8	0.2	0.2	0.4	0.4	0.4	0.3	0.7	0.7	0.8	0.6	0.7	0.9	0.6	0.6	0.7	2.2
2-Feb	0.8	0.9	1.0	0.9	1.0	0.9	1.3	0.9	0.7	0.4	0.6	0.4	1.2	0.5	0.6	0.4	0.3	0.4	0.6	0.9	1.9	1.9	1.5	1.0	1.9
3-Feb	1.0	0.8	0.7	0.6	0.6	0.4	0.3	0.3	0.3	0.3	0.5	0.5	0.6	0.7	0.7	0.6	0.6	0.8	1.6	1.6	2.4	1.7	1.5	1.4	2.4
4-Feb	0.8	0.4	0.4	0.4	0.6	0.6	0.7	0.3	0.4	0.4	0.5	0.4	0.8	0.6	0.9	0.9	0.7	0.7	0.8	0.8	0.8	0.4	0.5	0.6	0.9
5-Feb	0.8	0.9	0.5	0.5	0.6	0.9	0.4	0.6	0.6	0.6	0.5	1.2	1.2	1.1	1.0	0.3	0.4	0.5	0.5	0.6	0.7	0.5	0.4	0.5	1.2
6-Feb	0.4	0.4	0.5	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.3	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.6
7-Feb	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.2	1.3	2.0	1.8	1.7	1.0	0.9	1.0	1.7	1.2	0.9	0.4	0.7	0.6	0.3	2.0
8-Feb	0.8	0.8	0.9	1.2	0.9	1.1	1.1	1.1	1.2	1.9	1.7	1.3	1.3	1.0	1.3	1.7	2.1	2.2	1.7	1.8	2.2	2.1	1.7	1.4	2.2
9-Feb	1.3	1.3	1.1	1.1	1.0	0.6	0.6	0.5	0.4	0.5	0.7	1.0	0.8	0.7	0.8	0.4	0.5	0.6	0.4	0.2	0.3	0.7	0.6	0.3	1.3
10-Feb	0.9	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.8	1.1	0.6	0.6	0.3	0.4	0.4	0.8	1.2	2.0	2.1	2.3	2.3	1.9	1.5	1.5	2.3
11-Feb	1.5	0.6	0.8	0.9	0.8	1.0	1.2	0.8	1.0	1.0	0.9	1.1	0.9	1.2	1.5	1.2	1.2	0.9	1.0	1.5	1.1	1.1	2.7	2.1	2.7
12-Feb	2.3	2.4	3.0	2.8	2.4	1.8	2.1	2.1	2.2	2.2	2.2	2.5	2.3	1.9	1.8	1.8	2.0	2.0	1.6	1.8	2.2	2.4	1.9	2.0	3.0
13-Feb	1.9	2.5	3.2	2.3	1.4	1.3	1.7	2.1	2.1	2.6	2.6	1.9	1.2	1.3	0.9	0.2	0.4	0.3	0.7	0.7	0.3	0.3	0.5	0.3	3.2
14-Feb	0.3	0.5	0.9	0.8	0.9	1.1	1.3	1.3	1.3	1.3	1.3	1.8	1.2	1.2	0.8	1.3	1.3	1.0	1.0	1.0	1.3	1.3	1.3	2.6	2.6
15-Feb	1.1	0.5	0.9	0.8	0.8	1.1	1.1	0.9	1.0	1.0	1.0	0.9	0.9	0.9	0.6	0.4	0.9	1.6	1.4	0.8	1.2	2.8	2.3	2.9	2.9
16-Feb	2.1	1.9	1.5	1.2	1.1	1.7	0.9	1.0	0.8	0.7	0.6	0.9	1.5	1.0	0.6	0.5	0.4	0.3	0.8	0.5	0.5	0.5	0.3	0.3	2.1
17-Feb	0.4	0.5	0.3	0.4	0.4	0.7	0.9	0.7	1.2	1.1	0.9	0.5	0.9	0.6	1.2	1.6	2.0	1.6	1.2	1.8	1.5	1.5	1.7	1.7	2.0
18-Feb	1.7	1.2	1.7	1.5	1.0	0.5	0.5	0.9	0.4	0.6	0.6	0.6	0.4	0.3	1.4	1.3	1.5	1.1	1.1	1.4	1.0	0.9	0.8	0.8	1.7
19-Feb	1.0	1.1	1.0	1.5	1.9	1.8	1.5	1.8	1.6	1.7	2.7	2.5	3.0	2.5	2.1	1.7	1.3	1.1	0.9	1.6	1.8	1.5	1.2	1.1	3.0
20-Feb	0.4	0.2	0.3	0.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.0	1.5	1.7	1.9	1.0	1.5	1.5	1.9	1.2	1.0	2.0
21-Feb	1.5	1.0	0.9	1.1	2.0	2.1	3.0	2.8	3.1	2.7	3.0	3.0	1.9	1.4	1.5	2.3	2.3	1.6	1.9	1.1	0.7	0.7	0.6	1.2	3.1
22-Feb	0.7	1.2	0.9	1.0	0.9	0.7	0.3	0.2	0.2	0.2	0.5	1.1	1.4	1.9	1.4	1.7	1.7	1.1	0.9	1.5	1.8	1.2	0.6	0.4	1.9
23-Feb	0.3	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.8	1.5	1.8	1.8	1.3	0.4	0.3	0.3	0.3	0.8	0.4	0.3	0.4	1.8
24-Feb	0.8	1.2	1.3	0.9	0.5	1.1	0.8	0.4	0.4	0.9	1.7	2.7	1.8	2.3	0.9	1.4	1.5	1.0	0.6	1.5	1.0	0.8	0.8	1.0	2.7
25-Feb	1.0	0.9	1.0	1.0	0.8	0.8	0.9	1.3	0.9	0.7	1.0	1.1	1.5	1.3	2.0	1.9	1.8	1.0	1.6	1.3	2.4	3.9	4.1	3.4	4.1
26-Feb	2.9	2.3	1.7	1.4	1.5	1.1	0.7	0.8	0.9	2.0	2.4	2.5	2.3	1.1	1.5	1.0	0.7	0.7	1.0	0.8	0.4	0.4	0.5	0.8	2.9
27-Feb	0.6	0.8	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.4	1.0	0.6	0.7	0.8	0.6	0.5	0.5	0.5	0.8	0.7	0.9	1.2	1.1	1.1	1.2
28-Feb	1.0	0.7	0.5	2.3	2.7	2.2	1.7	2.2	2.6	2.6	1.8	2.1	2.9	2.8	2.9	2.8	2.1	1.0	0.7	0.5	0.4	0.9	1.2	1.1	2.9
Diurnal Maximum																									
AF - Analyzer Failure																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 4 BUFFALO VIEWPOINT FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
 FEBRUARY 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	641	31	31	100	30	0	6	0
H2S (ppb) Average	641	31	31	100	11	1	2	0
THC (ppm) Average	641	31	31	100	12.2	-	4.5	-
Temperature (C) Average	672	0	0	100	12.1	-	6	-
Relative Humidity (%) Average	672	0	0	100	97	-	91	-
Wind Speed 10 m (km/h) Average	672	0	0	100	32	-	20	-
Wind Direction 10 m (deg) Average	672	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
 FEBRUARY 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	641	1.2	3	-	0	0	0	0	1	3	30
H2S (ppb) Average	641	0.5	1	-	0	0	0	0	0	1	11
THC (ppm) Average	641	2.5	0.7	-	2.1	2.2	2.3	2.3	2.5	2.9	12.2
Temperature 2 m (C) Average	672	-10.67	10.2	-	-33.9	-22.6	-18	-12.4	-2.4	3.8	12.1
Relative Humidity (%) Average	672	71.3	13	-	38	51	62	74	82	85	97
Wind Speed 10 m (km/h) Average	672	9.1	5	-	1	4	5	8	11	16	32
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
FEBRUARY 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 - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 30 ppb on Feb 6 18:00	Maximum Daily Average: 6.4 ppb on Feb 6		Hours of Data:	641
Minimum Value: 0 ppb on Feb 1 01:00	Minimum Daily Average: 0.1 ppb on Feb 8		Hours of Missing Data:	31
Maximum Diurnal Average: 3.2 ppb at hour 18	Minimum Diurnal Average: 0.2 ppb at hour 8		Hours of Calibration:	31
Monthly Average: 1.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 20		Percent Operational Time:	100.0

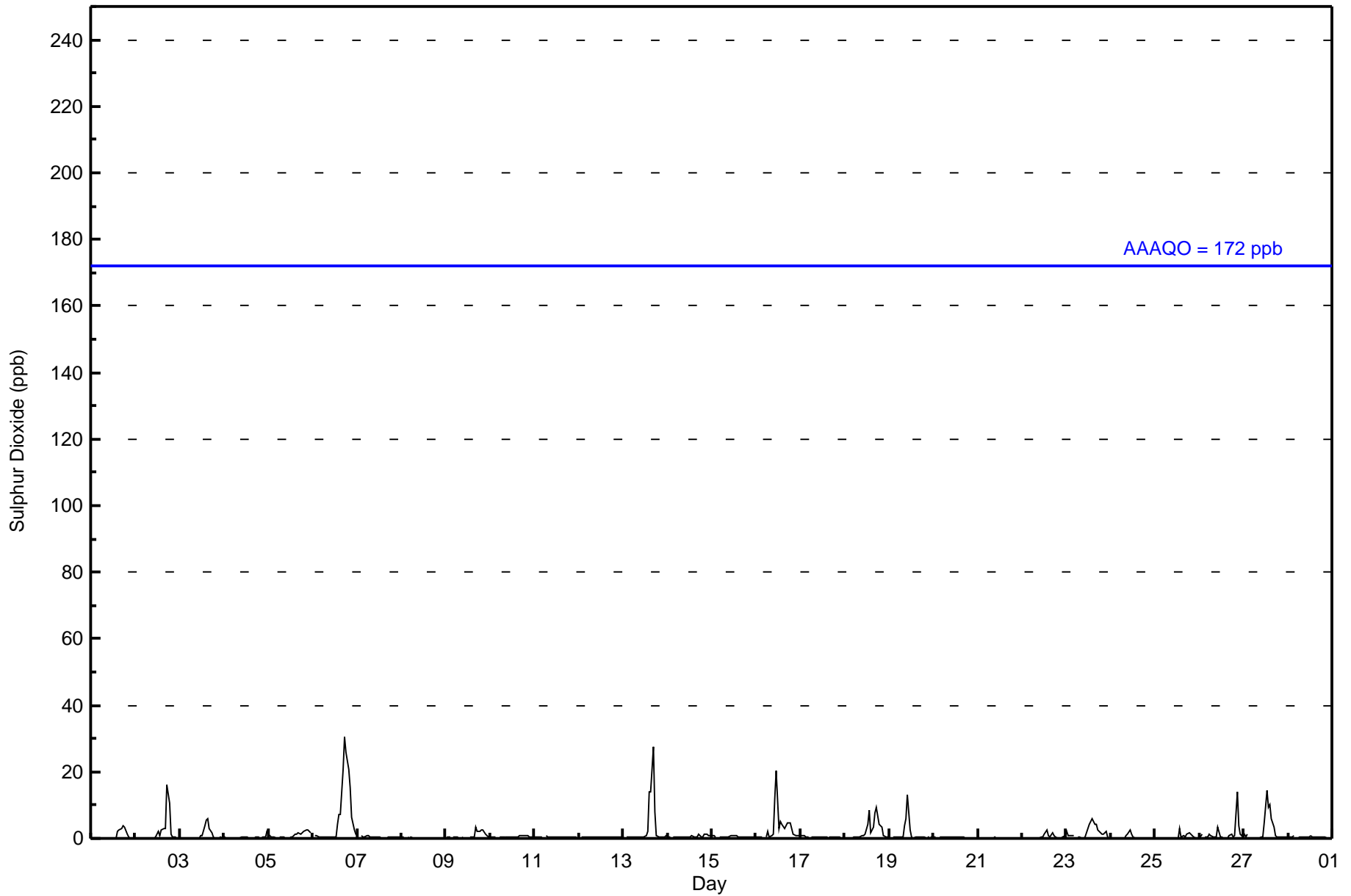
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	4	3	1	0	0	0	0	0.8	4
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	2	1	3	3	3	16	10	1	0	0	0	0	1.8	16
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	4	6	6	3	2	0	0	0	0	0	0	1.0	6
4-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	2	0.3	2
5-Feb	1	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	1	1	1	2	2	3	2	2	2	1.0	3
6-Feb	Z	1	1	1	0	0	0	0	0	0	0	0	0	4	7	7	21	30	26	21	15	6	3	1	6.4	30
7-Feb	1	Z	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Feb	0	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
9-Feb	0	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	3	2	2	3	2	1	1	0	0.9	3
10-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
11-Feb	1	1	0	0	0	Z	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Feb	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
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	14	14	27	8	1	1	1	0	1	1	3.2	27
14-Feb	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	1	1	1	1	0.6	1
15-Feb	1	1	1	Z	1	1	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
16-Feb	0	0	0	0	Z	0	2	1	1	1	12	21	3	5	4	3	4	5	5	3	1	1	1	1	3.2	21
17-Feb	1	1	1	1	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	4	9	2	3	8	9	4	4	3	1	1	0	2.3	9
19-Feb	0	Z	0	0	0	0	0	0	4	6	13	2	0	0	0	0	0	0	0	0	0	0	0	0	1.3	13
20-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	3	1	0	2	1	0	0	0	0	0	1	0.5	3
23-Feb	2	1	1	1	1	Z	0	0	0	0	0	2	4	5	6	4	4	3	2	1	1	2	1	0	1.8	6
24-Feb	Z	0	0	0	0	0	0	0	1	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
25-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	3	0	1	1	1	2	1	1	0	0	0	0.5	3
26-Feb	0	1	Z	0	0	1	1	0	0	0	3	0	0	0	0	0	1	1	1	1	1	14	4	1	1.4	14
27-Feb	1	1	1	Z	0	0	0	0	0	0	5	14	9	10	6	3	1	1	0	0	0	0	0	0	2.4	14
28-Feb	0	0	0	1	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
	0.5	0.4	0.4	0.3	0.3	0.3	0.4	0.2	0.4	0.5	1.4	1.4	1.4	1.8	2.2	2.0	3.2	3.2	2.2	1.6	1.7	0.9	0.5	0.5	Diurnal Average	
	2	1	1	1	1	1	2	1	4	6	13	21	14	9	14	14	27	30	26	21	15	6	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
Buffalo Viewpoint - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	627	97.82	97.82
11 - 20	8	1.25	99.06
21 - 60	6	0.94	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: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - February 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	77	68	29	10	16	13	67	66	22	13	35	65	39	43	38	26	627
11 - 20	0	1	2	1	1	1	0	0	0	0	0	0	0	1	0	1	8
21 - 60	0	2	2	0	0	0	1	0	0	0	0	0	0	0	1	0	6
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	77	71	33	11	17	14	68	66	22	13	35	65	39	44	39	27	641

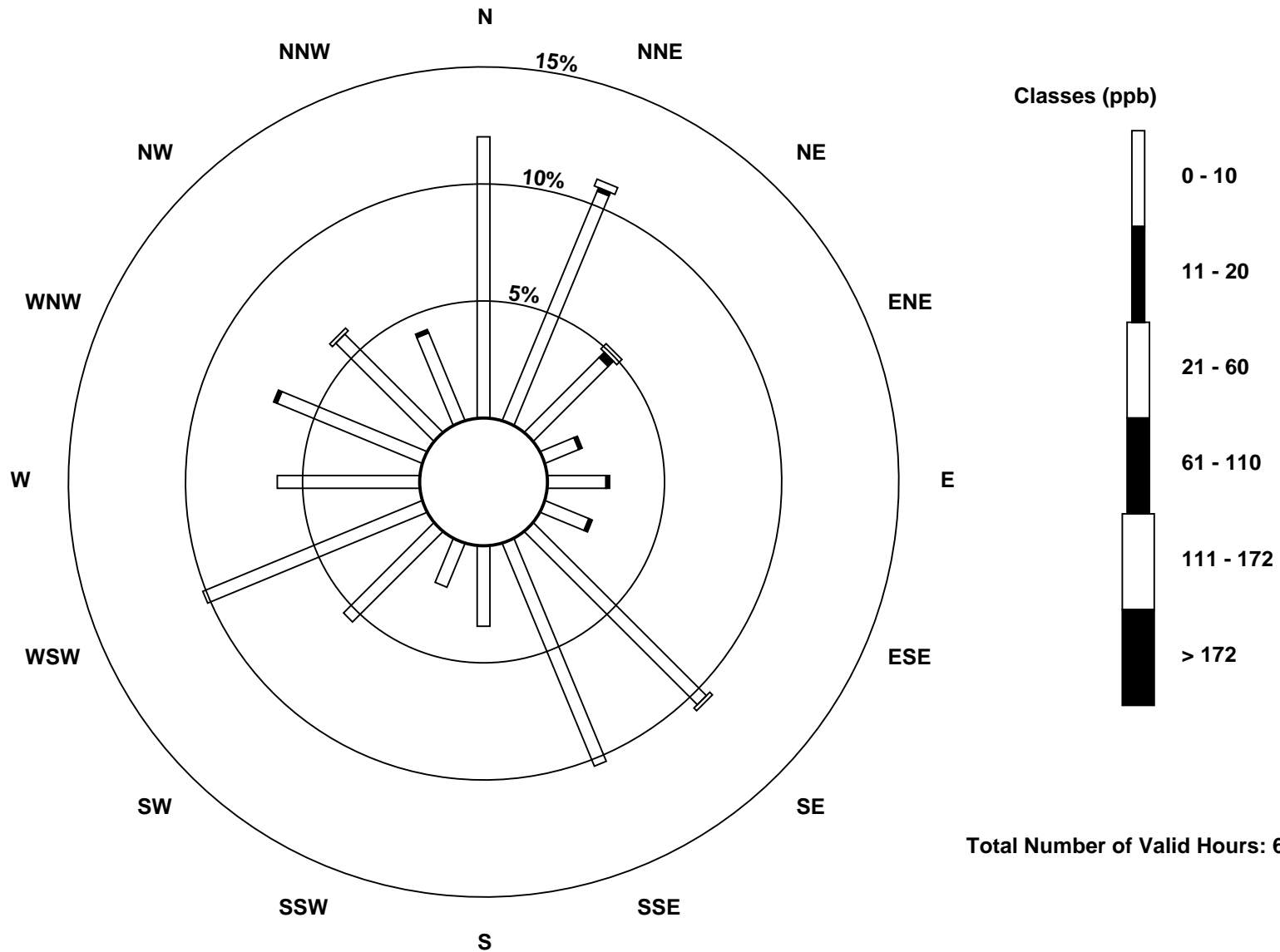
Total Number of Valid Hours: 641

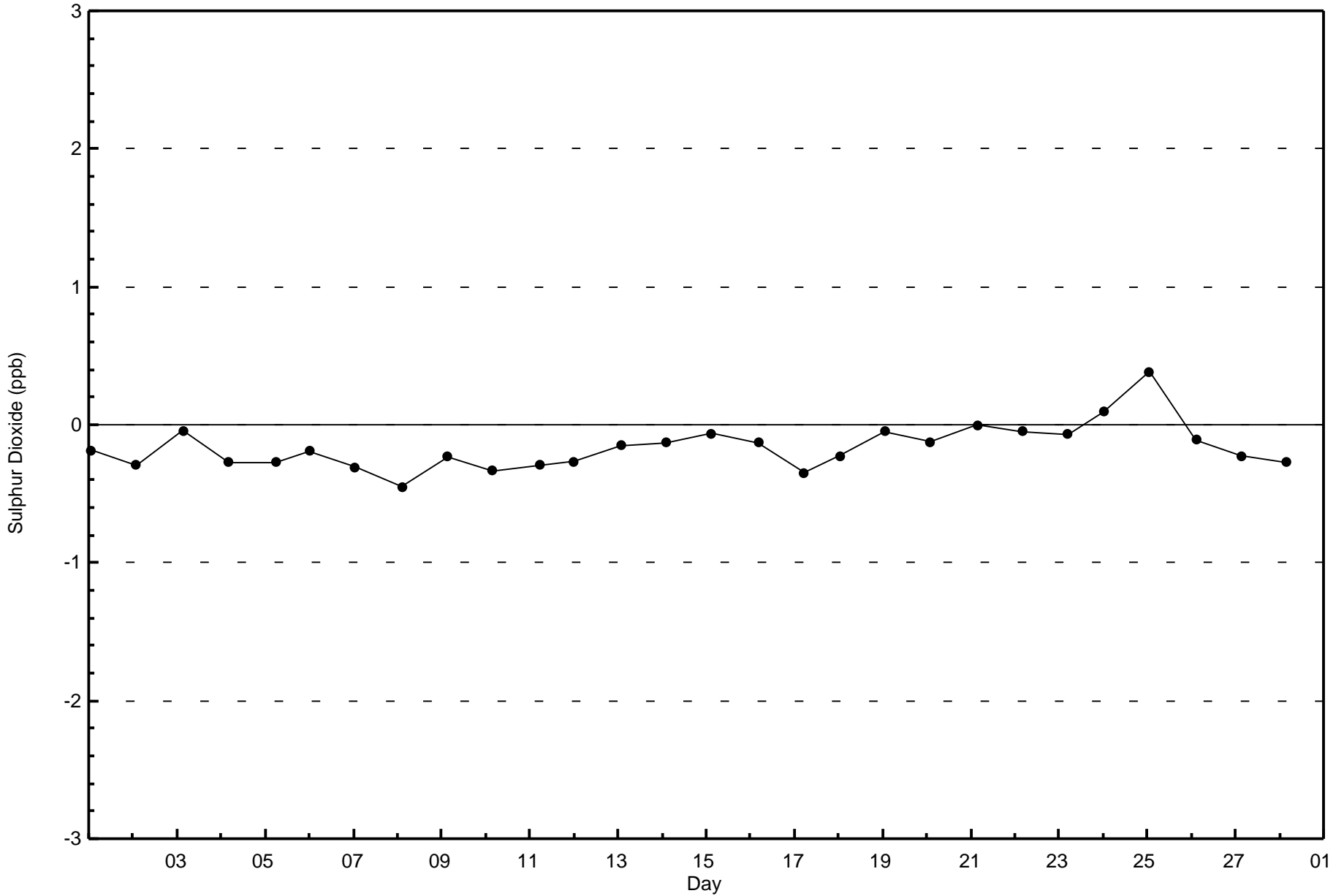
Total Number of Hours: 672

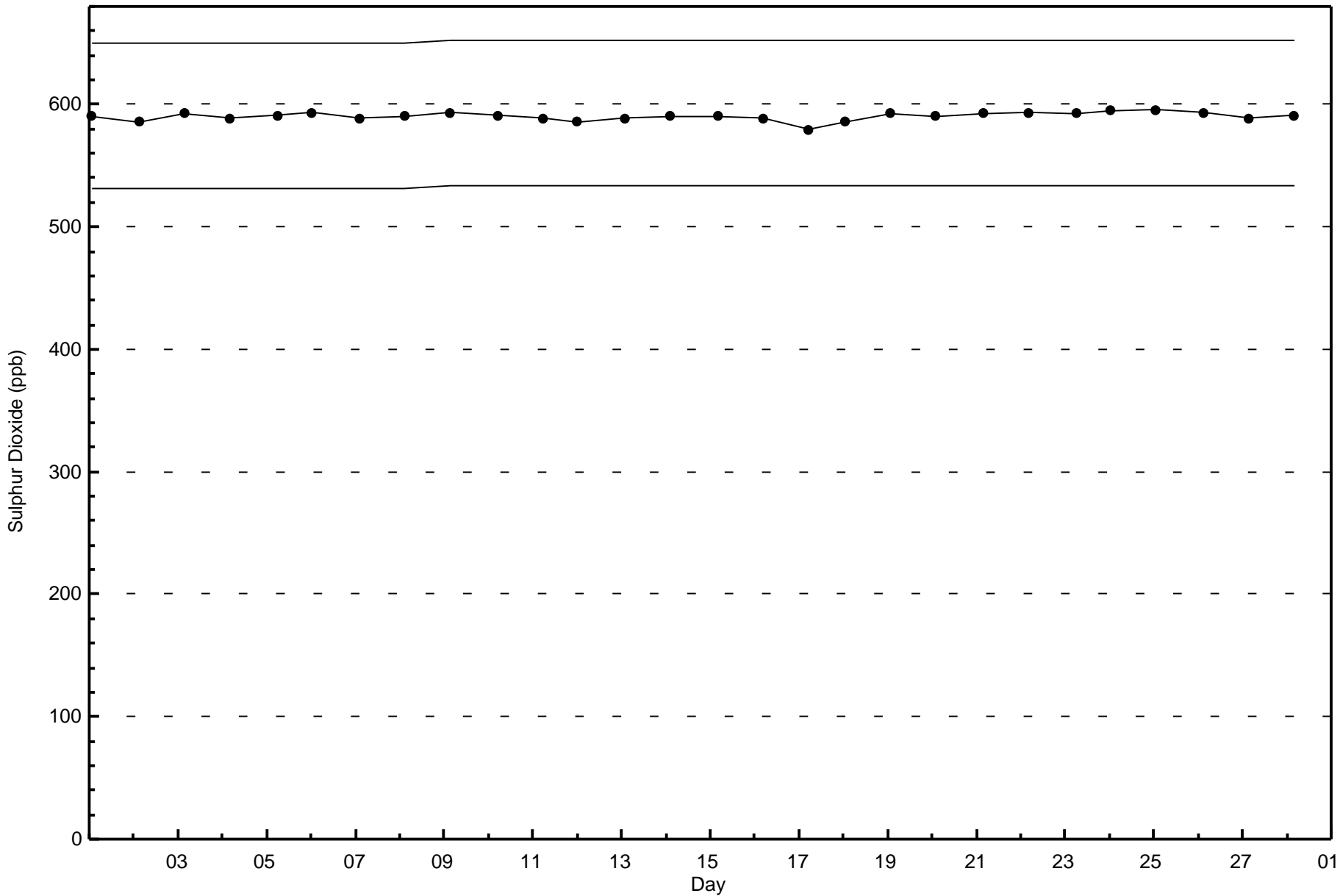


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Number of Exceedences (AAAQO):	1-hr: 1	24-hr: 0	Hours in Service:	672
Maximum Value: 11 ppb on Feb 6 18:00	Maximum Daily Average: 2.4 ppb on Feb 6		Hours of Data:	641
Minimum Value: 0 ppb on Feb 16 01:00	Minimum Daily Average: 0.1 ppb on Feb 12		Hours of Missing Data:	31
Maximum Diurnal Average: 1.0 ppb at hour 18	Minimum Diurnal Average: 0.3 ppb at hour 6		Hours of Calibration:	31
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 = 4		Percent Operational Time:	100.0

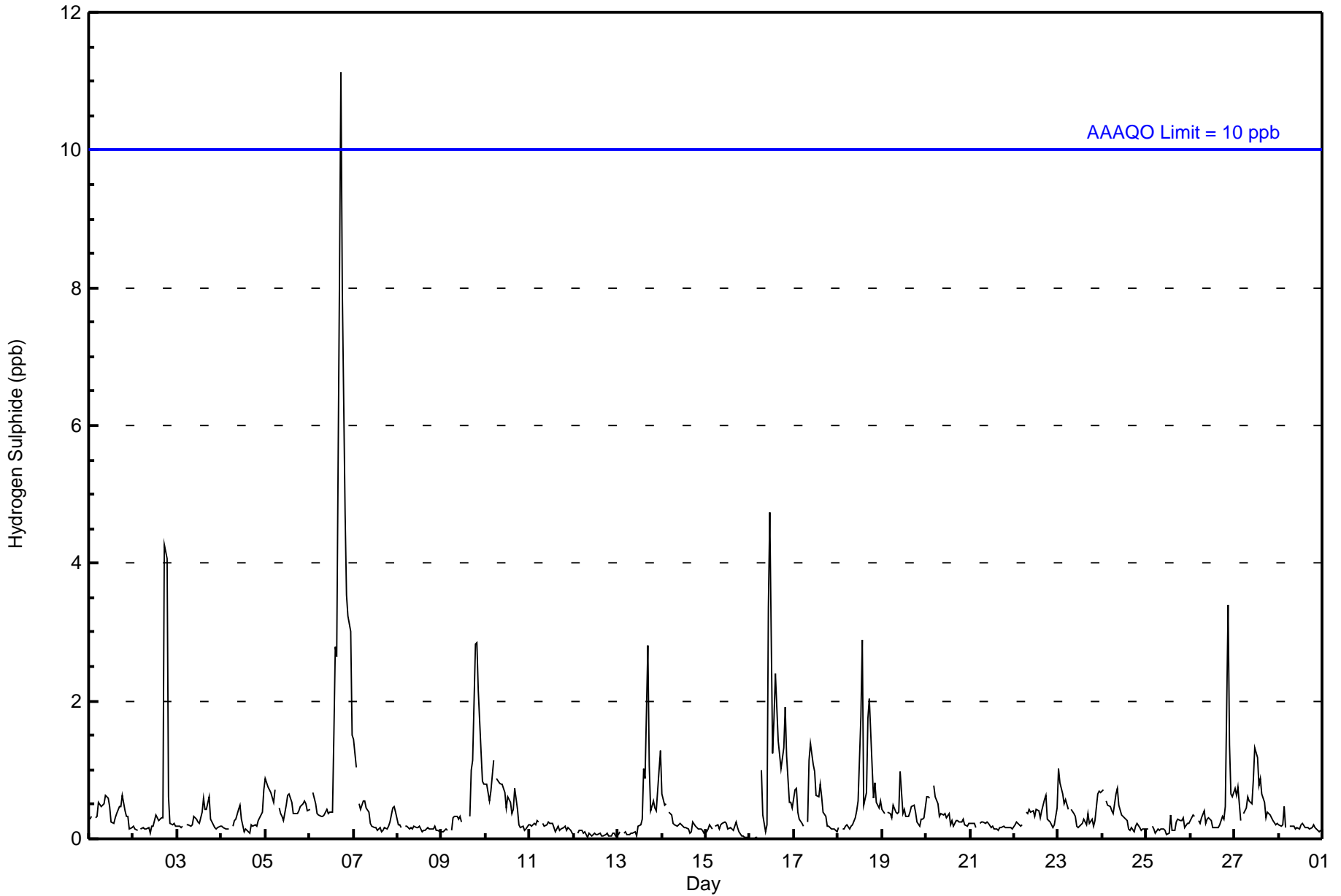
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	1	0	0	0	0	0.6	4
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0.3	1
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
5-Feb	1	1	1	1	1	1	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0	0.5	1
6-Feb	0	Z	1	1	0	0	0	0	0	0	0	0	0	2	3	3	8	11	8	5	4	3	3	2	2.4	11
7-Feb	1	1	Z	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	1	1	3	3	2	1	1	1	0.8	3
10-Feb	1	1	1	1	1	Z	1	1	1	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0.5	1
11-Feb	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-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	3	1	0	1	0	0	1	1	0.5	3
14-Feb	1	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Feb	0	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-Feb	0	0	0	0	0	Z	1	0	0	0	3	5	1	2	2	1	1	1	1	2	1	1	1	0	1.1	5
17-Feb	1	1	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	2	3	0	1	2	2	1	1	1	1	0	1	0.7	3
19-Feb	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Feb	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Feb	0	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
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
23-Feb	1	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
24-Feb	1	Z	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	1	1	0.5	3
27-Feb	1	1	1	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	1
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.5	0.5	0.4	0.8	1.0	0.8	0.6	0.6	0.4	0.4	0.4	Diurnal Average
	1	1	1	1	1	1	1	1	1	1	1	3	5	2	3	3	3	8	11	8	5	4	3	3	2	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	623	97.19	97.19
3 - 4	13	2.03	99.22
5 - 7	2	0.31	99.53
8 - 11	2	0.31	99.84
> 11	1	0.16	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - February 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	76	69	28	9	16	13	64	69	19	12	38	67	34	43	38	28	623
3 - 4	1	0	5	1	1	1	0	0	1	1	0	0	0	1	0	1	13
5 - 7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	2
8 - 11	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	77	71	34	10	17	14	65	69	20	13	38	67	34	44	39	29	641

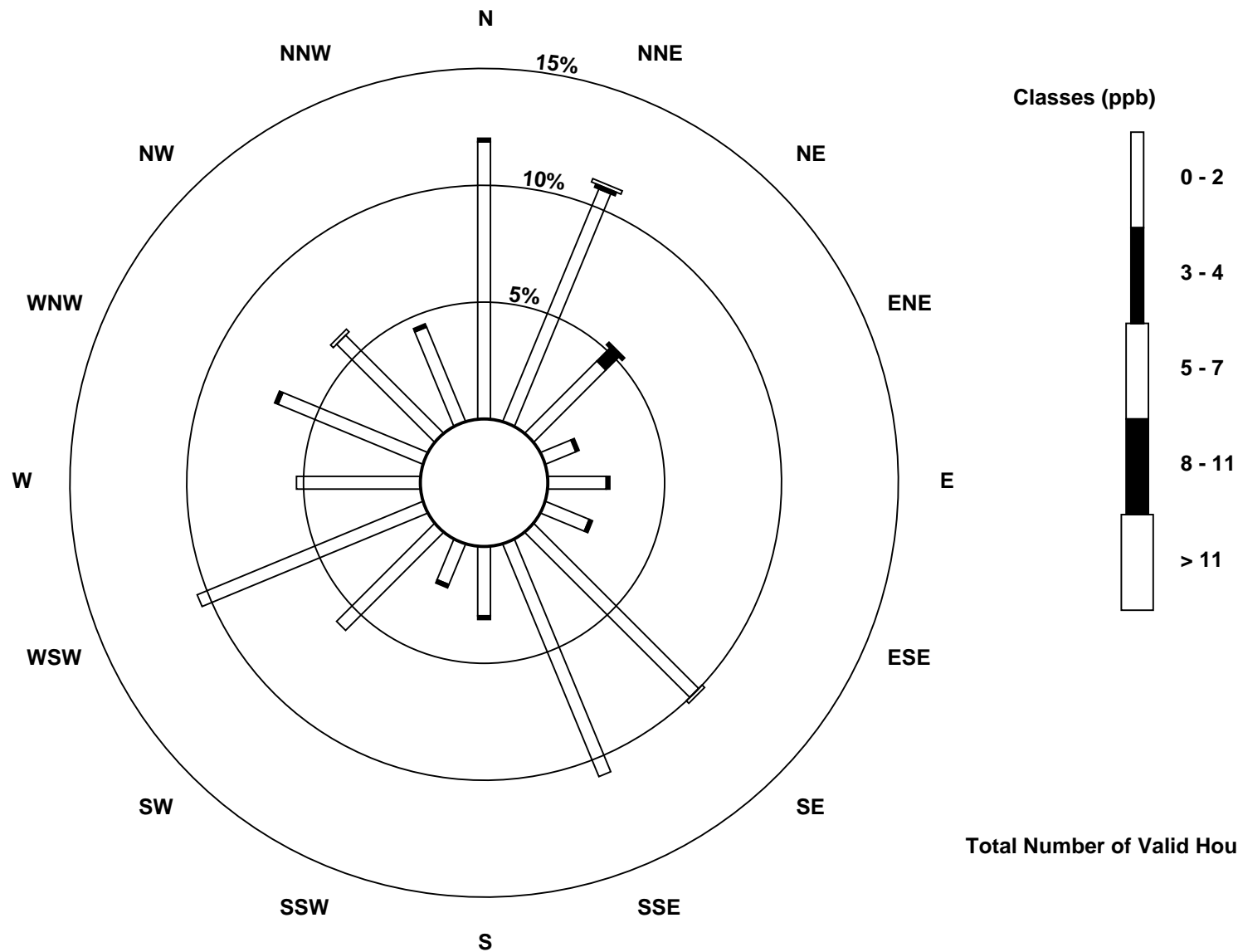
Total Number of Valid Hours: 641

Total Number of Hours: 672

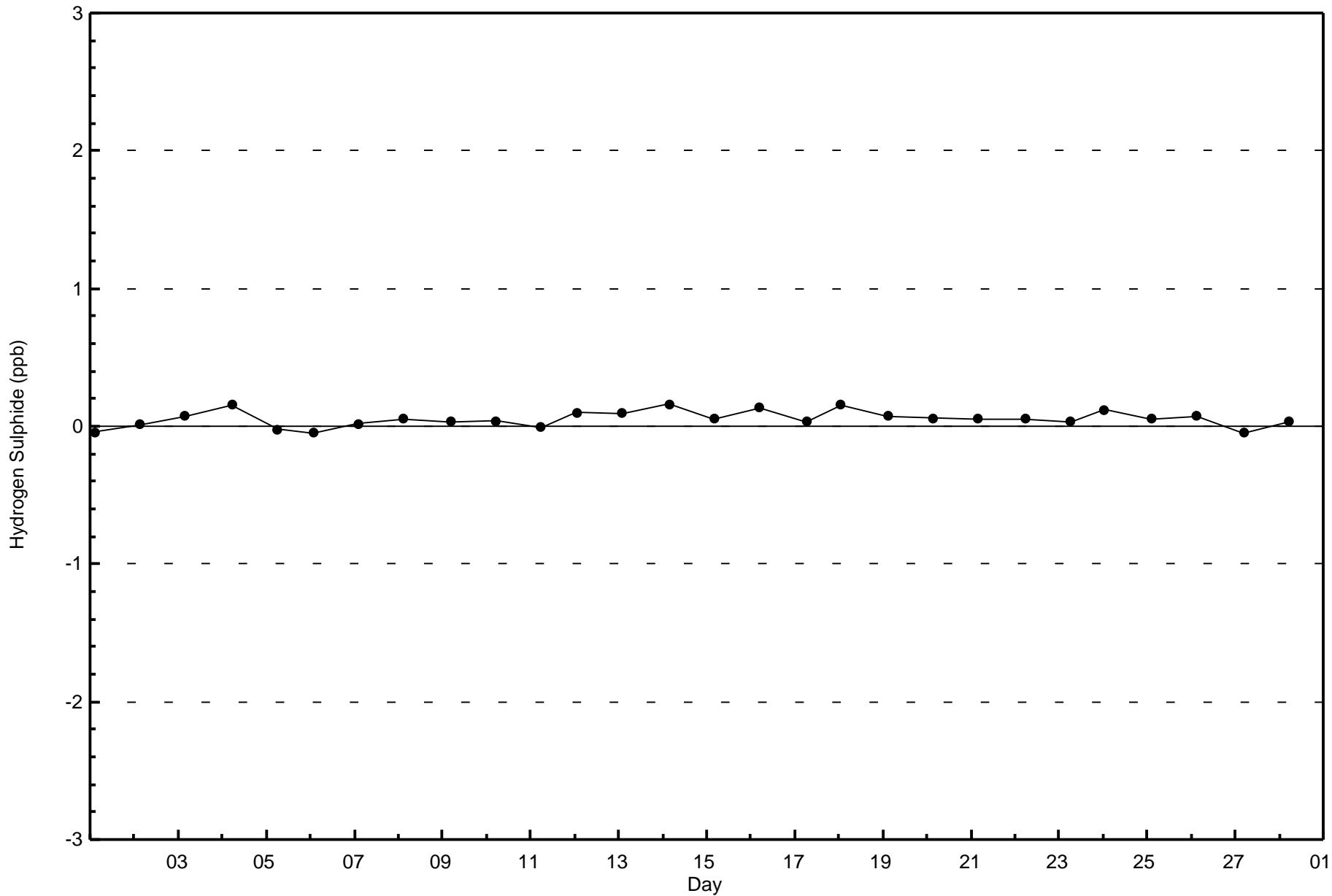


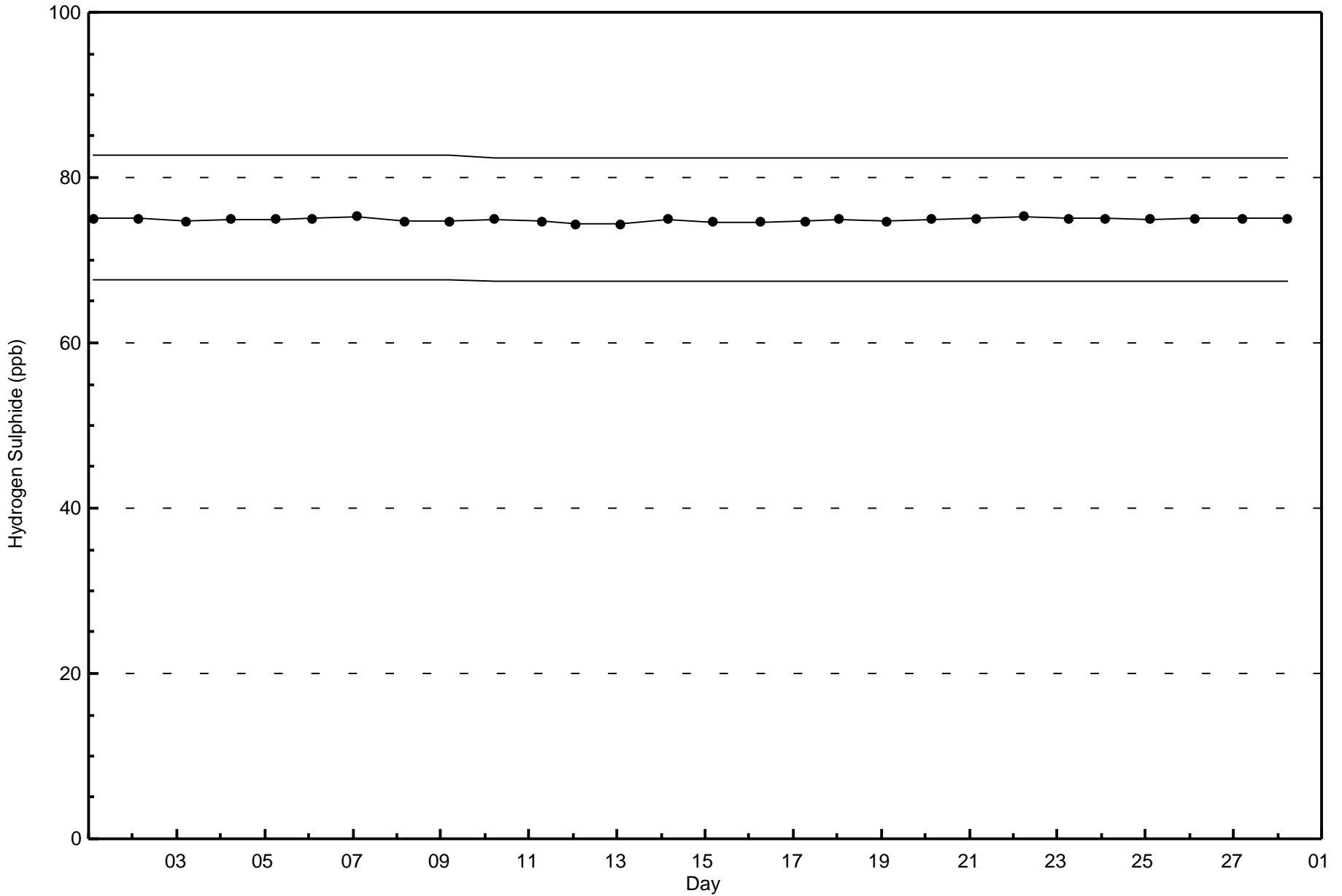
Wood Buffalo Environmental Association
Wind Rose Feb 2017

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



Total Number of Valid Hours: 641







Wood Buffalo Environmental Association

Summary of Hour Averages

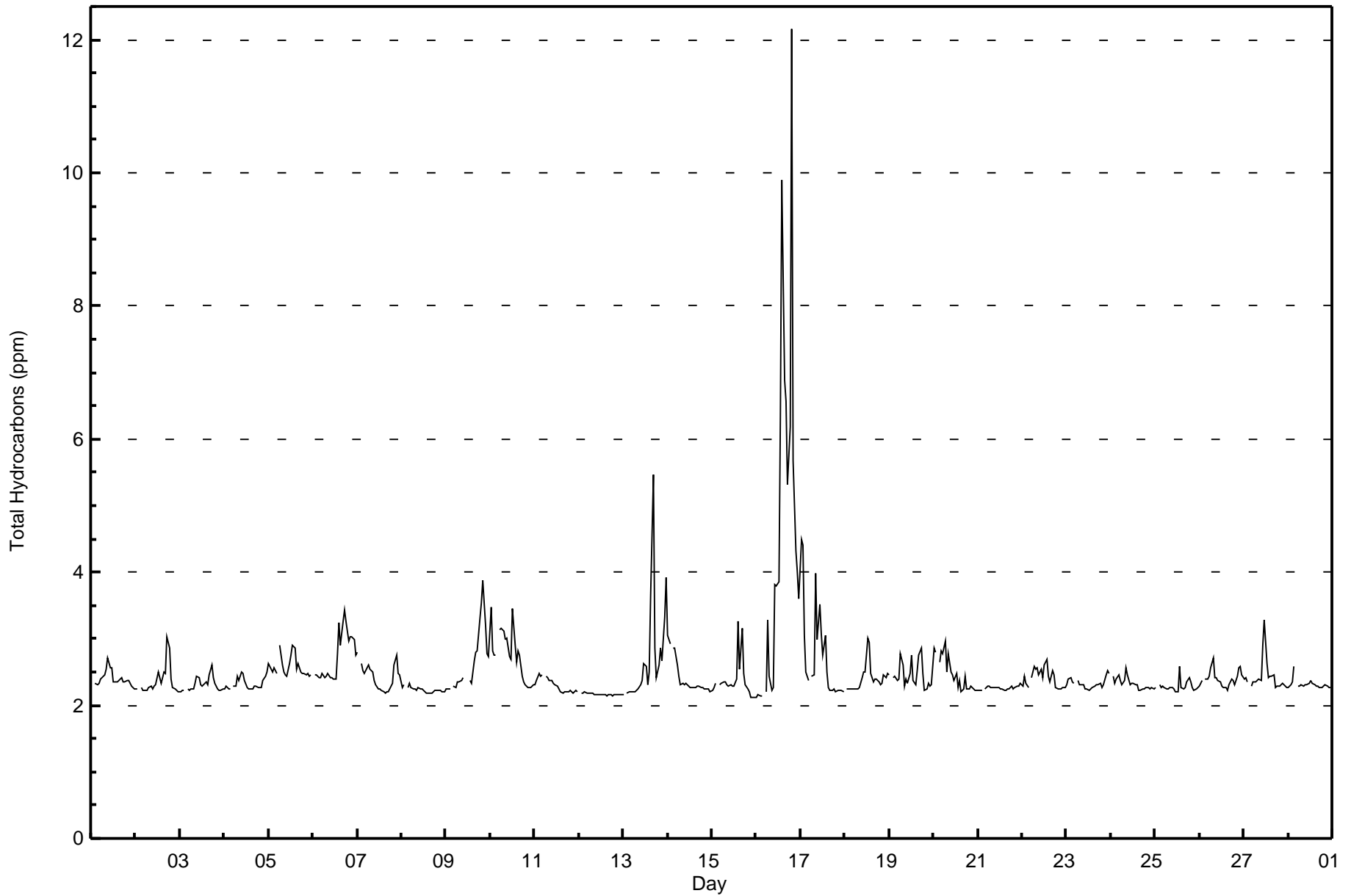
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - February 2017

Maximum Value: 12.2 ppm on Feb 16 20:00		Maximum Daily Average: 4.5 ppm on Feb 16		Hours in Service: 672																						
Minimum Value: 2.1 ppm on Feb 15 23:00		Minimum Daily Average: 2.2 ppm on Feb 12		Hours of Data: 641																						
Maximum Diurnal Average: 2.7 ppm at hour 20		Minimum Diurnal Average: 2.4 ppm at hour 5		Hours of Missing Data: 31																						
Monthly Average: 2.50 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.9 P ₉₉ = 6.0		Hours of Calibration: 31																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.4	Z	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.7	2.6	2.6	2.3	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.2	2.4	2.7
2-Feb	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.5	2.5	3.0	2.9	2.4	2.3	2.2	2.2	2.2	2.4	3.0
3-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.5	2.6	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.6
4-Feb	2.2	2.3	2.2	2.3	Z	2.3	2.3	2.4	2.4	2.5	2.5	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.5	2.3	2.5
5-Feb	2.6	2.5	2.5	2.6	2.5	Z	2.9	2.6	2.5	2.5	2.4	2.6	2.8	2.9	2.9	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.9
6-Feb	Z	2.4	2.5	2.4	2.4	2.5	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.8	3.2	2.9	3.3	3.4	3.3	3.0	3.0	3.0	3.0	2.7	2.7	3.4
7-Feb	2.8	Z	2.6	2.5	2.5	2.6	2.6	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.6	2.8	2.5	2.5	2.4	2.8
8-Feb	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
9-Feb	2.2	2.2	2.2	Z	2.3	2.3	2.4	2.4	2.4	2.4	C	C	C	2.4	2.3	2.7	2.8	2.8	3.3	3.5	3.9	3.2	2.8	2.7	2.7	3.9
10-Feb	3.5	2.8	2.8	2.7	Z	3.1	3.2	3.1	3.0	3.0	2.7	2.7	3.4	2.9	2.7	2.8	2.8	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.8	3.5
11-Feb	2.3	2.4	2.5	2.4	2.5	Z	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
12-Feb	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	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2
13-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.6	2.6	2.3	2.5	3.6	5.5	2.9	2.4	2.6	2.9	2.7	3.3	3.9	2.7	5.5
14-Feb	3.1	2.9	Z	2.9	2.8	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.4	3.1
15-Feb	2.2	2.3	2.3	Z	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	3.3	2.6	3.2	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.4	3.3
16-Feb	2.1	2.2	2.1	2.1	Z	2.2	3.3	2.4	2.2	2.3	3.8	3.8	3.9	6.4	9.9	6.9	6.6	5.3	6.2	12.2	5.7	4.3	4.0	3.6	4.5	12.2
17-Feb	4.5	4.4	3.1	2.5	2.4	Z	2.4	2.5	4.0	3.0	3.5	3.1	2.8	3.0	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.8	4.5
18-Feb	Z	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.5	3.0	2.9	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.5	2.4	2.5	2.4	3.0
19-Feb	2.5	Z	2.4	2.4	2.4	2.4	2.8	2.6	2.3	2.4	2.3	2.5	2.8	2.4	2.3	2.5	2.8	2.9	2.5	2.2	2.2	2.3	2.3	2.3	2.5	2.9
20-Feb	2.9	2.8	Z	2.7	2.8	2.8	3.0	2.5	2.8	2.5	2.4	2.4	2.5	2.3	2.4	2.2	2.2	2.4	2.2	2.2	2.3	2.3	2.2	2.2	2.5	3.0
21-Feb	2.2	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
22-Feb	2.3	2.4	2.3	2.3	Z	2.4	2.6	2.5	2.6	2.5	2.5	2.4	2.6	2.7	2.4	2.4	2.5	2.5	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.7
23-Feb	2.3	2.4	2.4	2.3	2.3	Z	2.4	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	2.5	2.5	2.5	2.3	2.5
24-Feb	Z	2.4	2.3	2.4	2.5	2.4	2.3	2.4	2.6	2.5	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.6
25-Feb	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.6	2.3	2.2	2.3	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.6
26-Feb	2.3	2.4	Z	2.4	2.4	2.4	2.6	2.7	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.4	2.4	2.3	2.4	2.6	2.6	2.5	2.4	2.7
27-Feb	2.4	2.4	2.4	Z	2.3	2.3	2.4	2.4	2.4	2.4	2.9	3.3	2.6	2.4	2.4	2.4	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	3.3
28-Feb	2.3	2.3	2.3	2.6	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.6
																								Diurnal Average		
																								Diurnal Maximum		
2.5 2.5 2.4 2.4 2.4 2.4 2.5 2.4 2.4 2.4 2.5 2.5 2.5 2.6 2.7 2.6 2.7 2.6 2.5 2.7 2.5 2.5 2.4 2.4																										
4.5 4.4 3.1 2.9 2.8 3.1 3.3 3.1 4.0 3.0 3.8 3.8 3.9 6.4 9.9 6.9 6.6 5.3 6.2 12.2 5.7 4.3 4.0 3.9																										
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	599	93.45	93.45
3.1 - 10.0	41	6.40	99.84
> 10.0	1	0.16	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - February 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	71	67	28	11	15	14	66	66	21	12	35	62	38	40	33	20	599
3.1 - 10.0	6	4	5	0	2	0	2	0	1	1	0	3	1	4	6	6	41
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	77	71	33	11	17	14	68	66	22	13	35	65	39	44	39	27	641

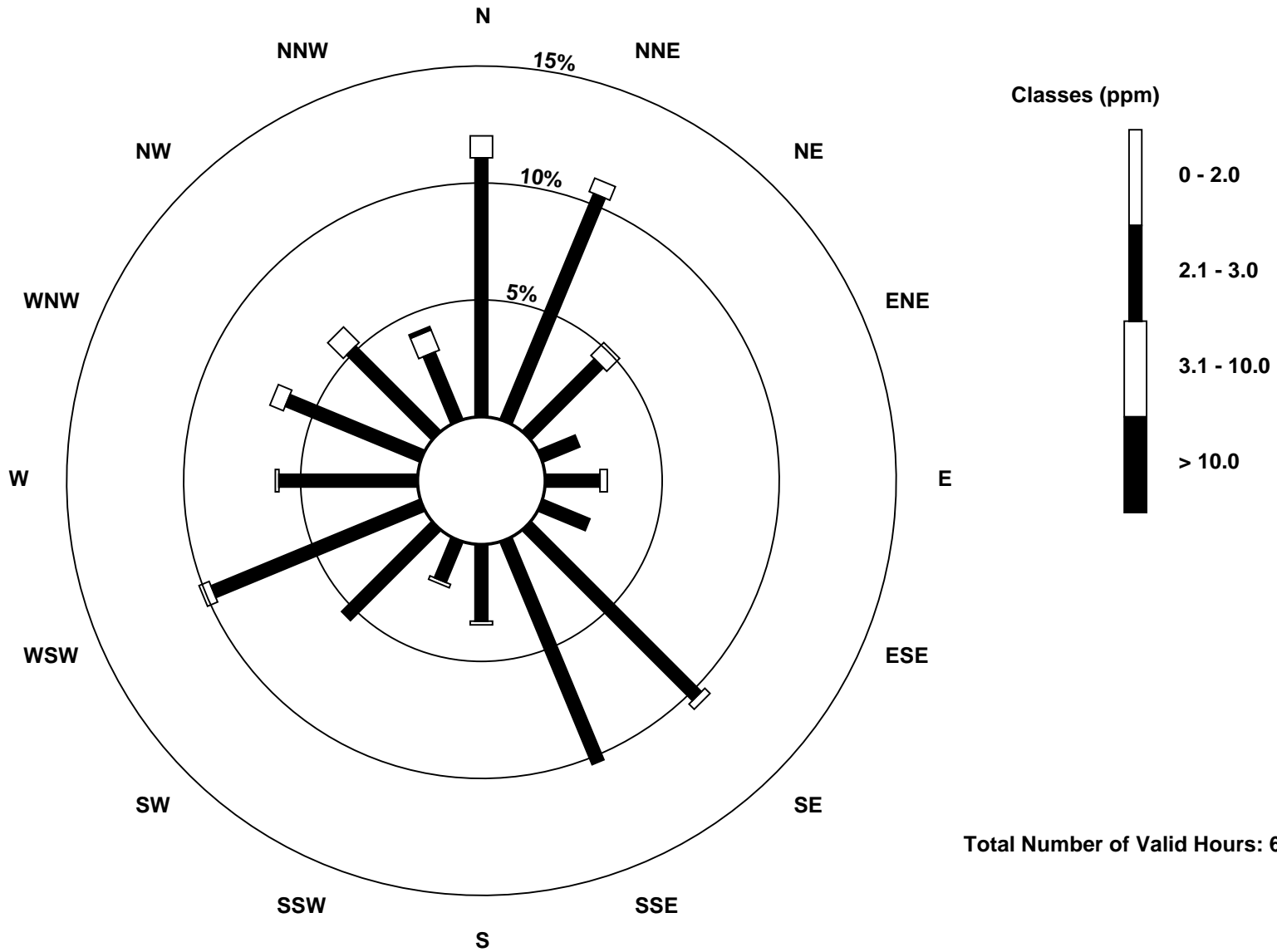
Total Number of Valid Hours: 641

Total Number of Hours: 672

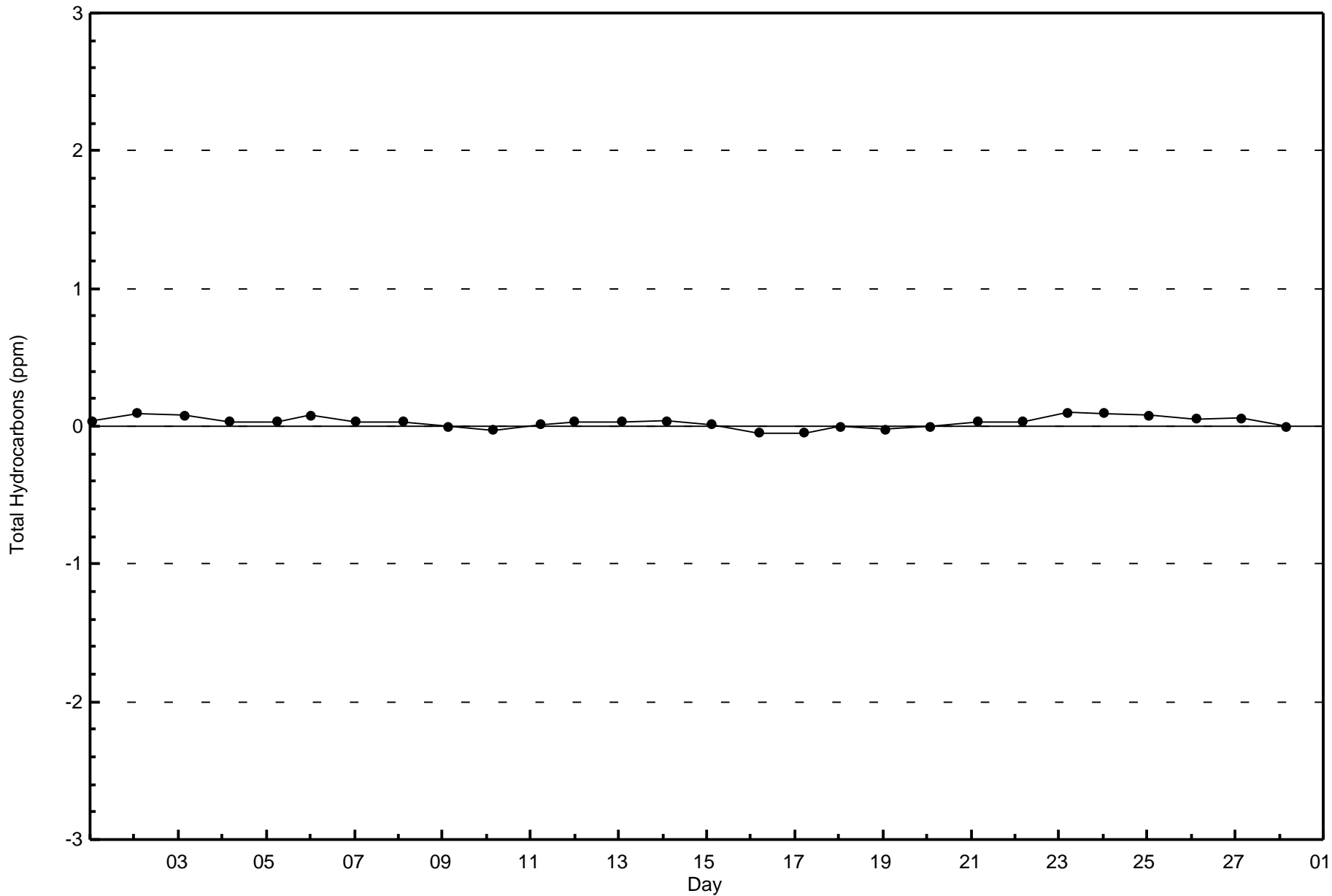


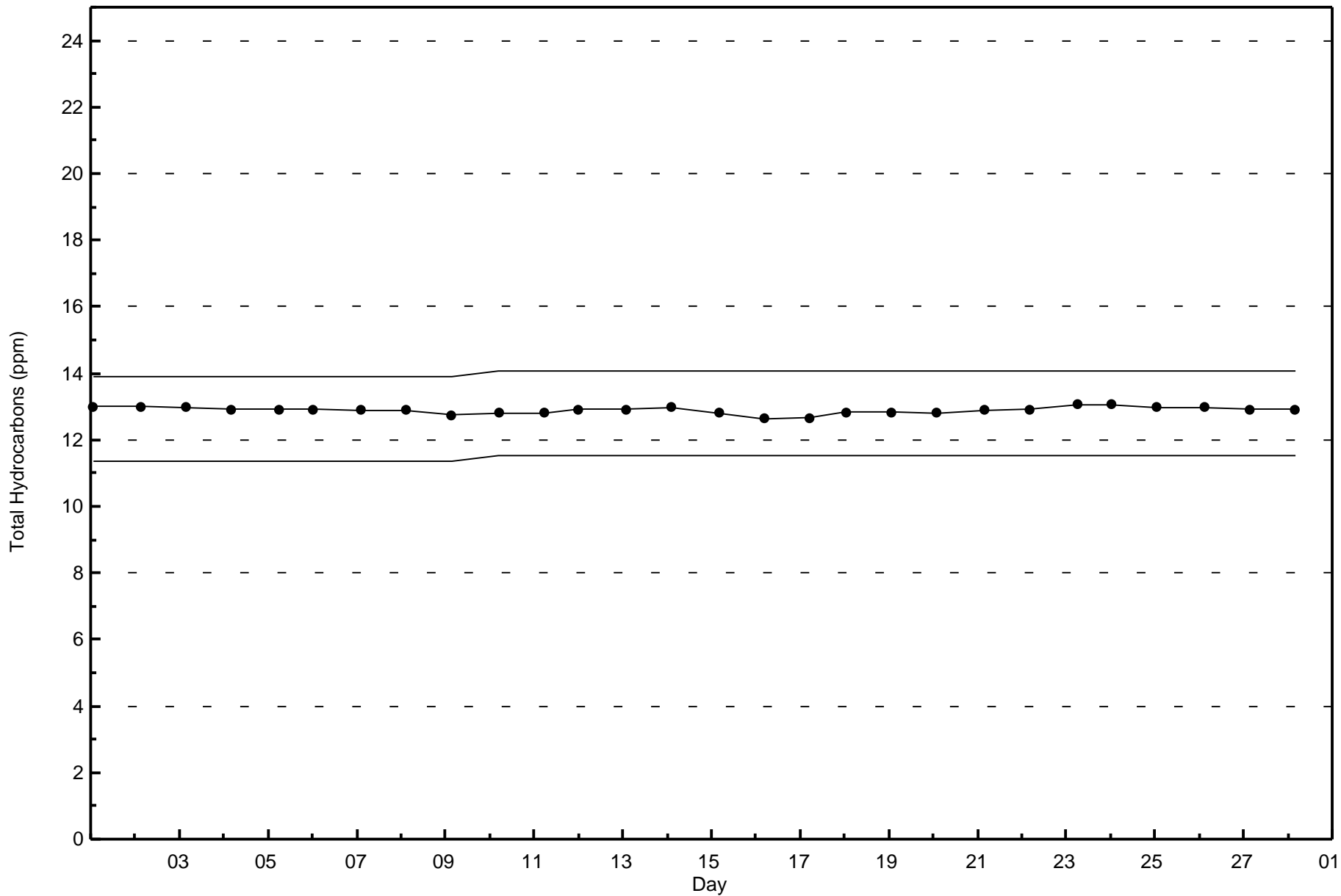
Wood Buffalo Environmental Association
Wind Rose Feb 2017

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



Total Number of Valid Hours: 641



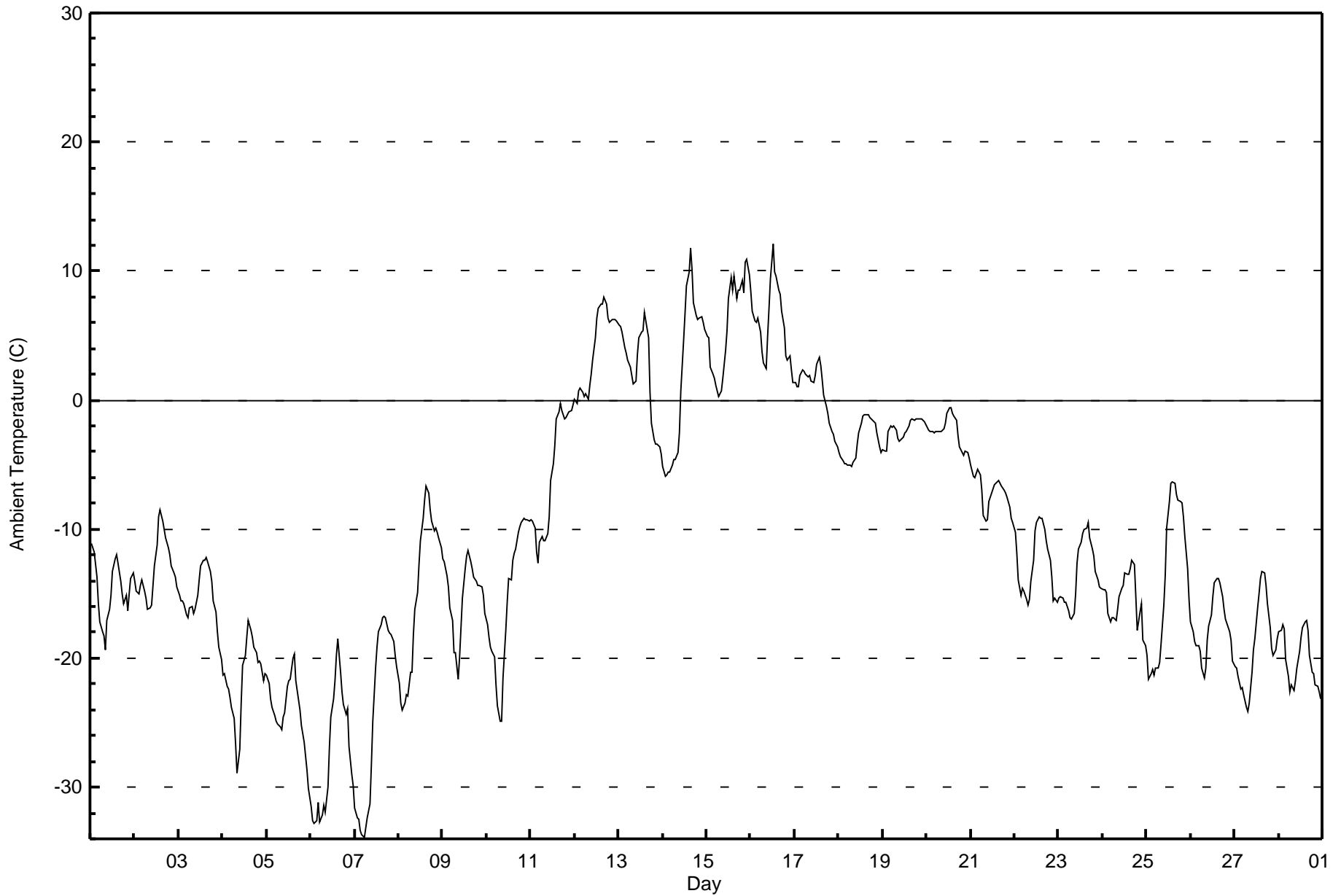




Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Value: 12.1 C on Feb 16 13:00 Maximum Daily Average: 6.0 C on Feb 16 Minimum Value: -33.9 C on Feb 7 06:00 Minimum Daily Average: -27.3 C on Feb 6 Maximum Diurnal Average: -6.7 C at hour 16 Minimum Diurnal Average: -14.2 C at hour 8 Monthly Average: -10.67 C Percentiles: P ₁ = -32.6 P ₁₀ = -22.6 Q ₁ = -18.0 Median = -12.4 Q ₃ = -2.4 P ₉₀ = 3.8 P ₉₉ = 9.9																						Hours in Service: 672 Hours of Data: 672 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-Feb	-11.1	-11.4	-11.8	-13.7	-15.8	-17.2	-17.9	-18.3	-19.4	-17.1	-16.2	-15.1	-13.3	-12.3	-12.0	-12.6	-14.0	-15.0	-15.8	-15.1	-16.4	-15.1	-13.8	-13.4	-14.7	-11.1
2-Feb	-14.0	-14.8	-15.0	-14.3	-14.0	-14.8	-15.3	-16.2	-16.1	-15.9	-14.3	-12.8	-11.2	-9.0	-8.5	-9.4	-10.0	-10.7	-11.4	-12.0	-12.9	-13.4	-13.8	-14.4	-13.1	-8.5
3-Feb	-15.1	-15.5	-15.5	-15.8	-16.6	-16.9	-16.1	-16.0	-16.6	-16.2	-15.1	-13.9	-12.8	-12.4	-12.4	-12.2	-12.5	-13.3	-14.0	-15.6	-16.5	-18.0	-19.2	-20.1	-15.3	-12.2
4-Feb	-21.4	-21.2	-22.2	-22.4	-23.0	-23.8	-24.6	-26.6	-28.9	-27.0	-23.5	-20.5	-19.8	-18.3	-17.1	-17.9	-18.4	-19.1	-19.6	-20.3	-20.2	-20.4	-21.8	-21.2	-21.6	-17.1
5-Feb	-21.3	-22.0	-23.2	-23.8	-24.4	-24.8	-25.1	-25.3	-25.5	-24.5	-24.2	-22.2	-21.8	-21.6	-20.0	-19.7	-21.7	-23.3	-24.0	-25.3	-26.6	-27.6	-28.7	-30.1	-24.0	-19.7
6-Feb	-31.6	-32.6	-32.8	-32.6	-31.2	-32.7	-32.1	-31.4	-31.9	-30.0	-27.0	-24.6	-23.2	-21.8	-19.8	-18.5	-21.1	-22.6	-23.6	-24.3	-23.9	-26.9	-29.0	-29.9	-27.3	-18.5
7-Feb	-31.6	-32.4	-32.5	-33.3	-33.7	-33.9	-33.2	-32.4	-31.3	-28.3	-24.9	-20.8	-19.1	-17.9	-17.4	-16.9	-16.8	-16.8	-17.9	-18.1	-18.2	-18.7	-19.8	-20.7	-24.4	-16.8
8-Feb	-22.0	-23.4	-24.0	-23.5	-22.8	-23.0	-21.0	-21.1	-18.2	-16.3	-14.9	-12.8	-10.9	-9.2	-7.7	-6.7	-7.2	-8.5	-9.4	-10.1	-9.9	-10.2	-10.7	-11.4	-14.8	-6.7
9-Feb	-12.3	-12.6	-13.6	-14.5	-16.1	-17.1	-19.5	-19.6	-21.6	-19.9	-17.6	-15.4	-13.1	-12.1	-11.7	-12.5	-13.1	-13.7	-14.0	-14.3	-14.3	-14.5	-15.1	-16.5	-15.2	-11.7
10-Feb	-17.4	-18.4	-19.2	-19.4	-19.9	-22.1	-23.7	-24.9	-24.9	-21.6	-17.8	-15.6	-13.8	-14.0	-12.4	-11.9	-11.6	-10.3	-9.8	-9.4	-9.2	-9.3	-9.3	-9.3	-15.6	-9.2
11-Feb	-9.3	-9.4	-9.9	-11.8	-12.6	-11.0	-10.6	-10.9	-10.8	-10.3	-9.0	-6.2	-5.0	-3.5	-1.5	-0.9	-0.3	-0.8	-1.4	-1.3	-1.2	-0.9	-0.8	-0.3	-5.8	-0.3
12-Feb	0.1	-0.3	0.7	0.9	0.6	0.3	0.5	0.1	1.1	2.0	3.1	4.9	6.3	7.2	7.4	7.4	7.9	7.4	6.4	6.1	6.3	6.3	6.3	6.1	4.0	7.9
13-Feb	5.8	5.7	5.3	4.1	3.7	3.1	2.5	2.0	1.2	1.5	3.5	4.8	5.2	5.3	6.8	6.1	4.8	0.6	-1.8	-3.1	-3.4	-3.4	-3.6	-4.1	2.2	6.8
14-Feb	-5.1	-5.9	-5.8	-5.6	-5.6	-5.0	-4.6	-4.6	-4.1	-2.5	0.8	4.6	6.7	8.9	9.9	11.7	10.2	7.5	6.6	6.2	6.4	6.5	6.0	5.5	2.0	11.7
15-Feb	5.0	4.8	2.5	2.0	1.7	1.1	0.2	0.5	0.7	1.7	3.9	5.4	7.9	9.5	8.5	9.7	7.8	8.5	8.5	9.3	8.3	10.7	10.9	9.7	5.8	10.9
16-Feb	8.4	6.9	6.1	6.0	6.3	5.2	3.8	2.9	2.5	4.9	7.1	9.4	12.1	10.0	9.6	8.5	8.2	6.9	5.6	3.5	3.1	3.4	2.3	1.4	6.0	12.1
17-Feb	1.3	1.0	1.0	1.9	2.3	2.2	2.0	1.8	2.0	1.4	1.4	1.9	2.7	3.3	2.7	1.5	0.4	-0.4	-1.1	-1.8	-2.4	-2.7	-3.2	-3.6	0.7	3.3
18-Feb	-4.0	-4.3	-4.7	-4.9	-5.0	-5.0	-5.0	-5.1	-4.9	-4.5	-3.5	-2.6	-1.8	-1.2	-1.1	-1.1	-1.1	-1.3	-1.6	-1.7	-1.7	-2.6	-3.6	-4.0	-3.2	-1.1
19-Feb	-3.9	-3.9	-4.0	-2.4	-2.0	-2.1	-2.0	-2.3	-2.9	-3.2	-3.1	-2.9	-2.5	-2.4	-2.0	-1.6	-1.5	-1.5	-1.5	-1.4	-1.5	-1.5	-1.6	-1.7	-2.3	-1.4
20-Feb	-2.1	-2.3	-2.4	-2.4	-2.5	-2.5	-2.5	-2.4	-2.4	-2.2	-1.8	-1.1	-0.5	-0.6	-1.0	-1.2	-1.6	-2.8	-3.6	-4.1	-4.2	-4.0	-4.1	-4.5	-2.4	-0.5
21-Feb	-5.0	-5.9	-6.0	-5.7	-5.3	-5.8	-7.0	-8.9	-9.3	-9.2	-7.9	-7.2	-6.8	-6.5	-6.3	-6.3	-6.4	-6.7	-6.9	-7.2	-7.5	-8.3	-9.1	-9.5	-7.1	-5.0
22-Feb	-10.2	-11.8	-14.0	-15.1	-14.6	-14.8	-15.4	-15.9	-15.5	-14.0	-12.4	-10.2	-9.5	-9.1	-9.2	-9.2	-10.0	-10.8	-11.5	-12.4	-13.8	-15.5	-15.4	-15.7	-12.7	-9.1
23-Feb	-15.3	-15.3	-15.3	-15.6	-15.7	-16.3	-16.9	-17.0	-16.5	-15.1	-12.7	-11.6	-11.1	-10.4	-10.0	-9.9	-9.5	-10.7	-11.6	-12.1	-13.2	-14.0	-14.5	-14.5	-13.5	-9.5
24-Feb	-14.7	-14.7	-14.9	-16.6	-17.2	-16.9	-16.8	-17.1	-16.3	-15.3	-14.5	-14.4	-13.4	-13.5	-13.0	-12.4	-12.7	-15.2	-17.8	-16.4	-15.7	-18.6	-19.1	-19.1	-15.4	-12.4
25-Feb	-19.7	-21.6	-21.2	-20.9	-21.3	-20.8	-20.7	-20.3	-18.9	-15.8	-13.6	-10.0	-7.8	-6.4	-6.3	-6.4	-7.3	-7.8	-7.9	-7.9	-9.0	-10.6	-13.0	-15.5	-13.8	-6.3
26-Feb	-17.2	-18.0	-18.8	-19.0	-19.0	-19.5	-20.8	-21.6	-20.8	-18.6	-17.5	-16.7	-15.2	-14.2	-13.8	-13.8	-14.1	-15.2	-16.2	-16.9	-17.6	-17.9	-18.6	-20.2	-17.6	-13.8
27-Feb	-20.7	-20.8	-21.4	-22.4	-22.3	-22.8	-23.8	-24.1	-23.4	-21.0	-19.4	-18.5	-16.1	-15.0	-13.8	-13.3	-13.4	-14.4	-15.8	-17.6	-19.3	-19.8	-19.3	-18.5	-19.0	-13.3
28-Feb	-18.0	-17.8	-17.4	-17.8	-20.1	-21.5	-22.6	-22.1	-22.5	-21.7	-20.7	-19.5	-18.4	-17.6	-17.2	-17.1	-17.8	-19.8	-21.1	-21.2	-22.1	-22.2	-22.6	-23.2	-20.1	-17.1
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	124	18.45	18.45
-20 - 0	428	63.69	82.14
0 - 10	115	17.11	99.26
10 - 20	5	0.74	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



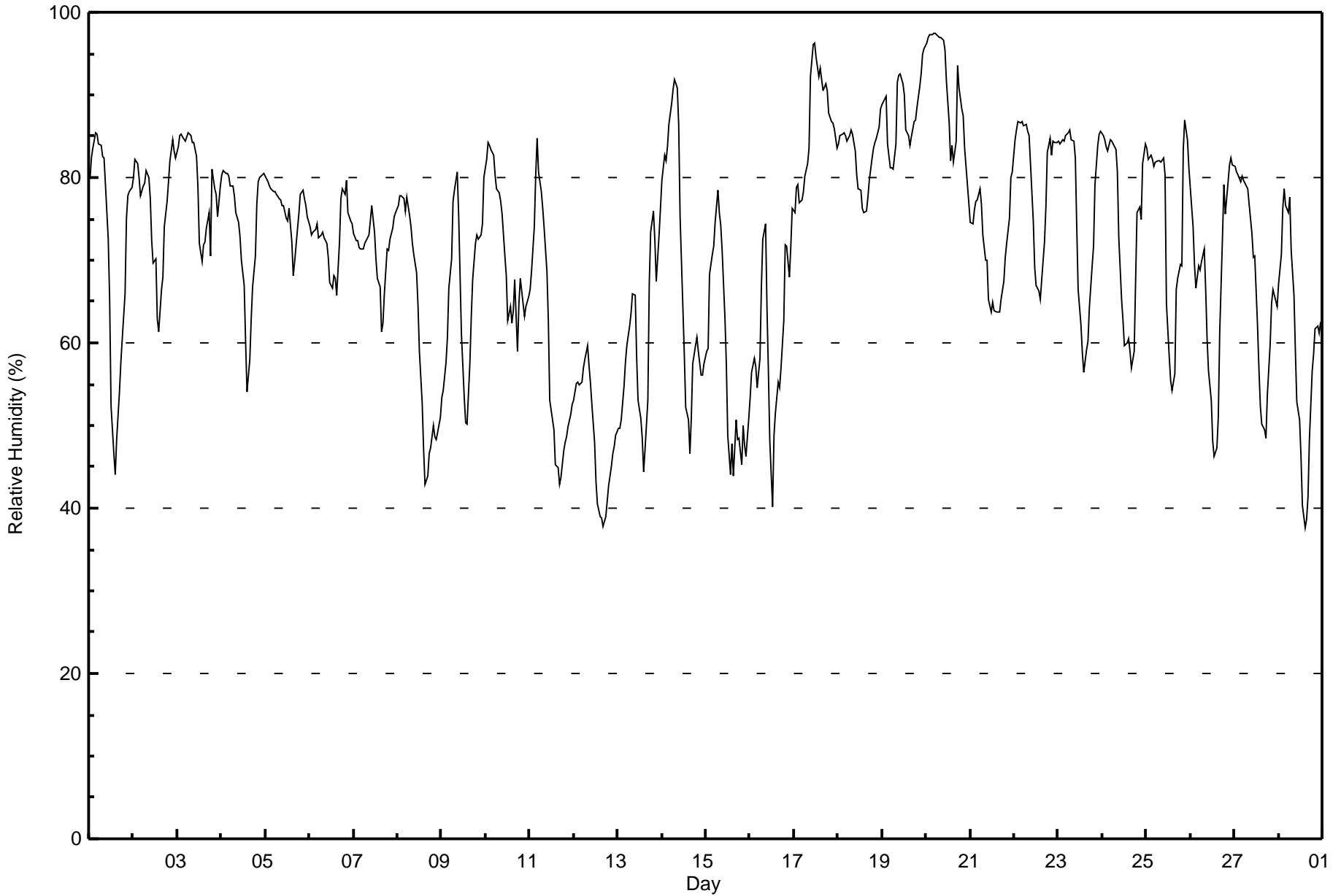
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Buffalo Viewpoint - February 2017

Maximum Value: 97 % on Feb 20 05:00																			Maximum Daily Average: 90.7 % on Feb 20						Hours in Service: 672																								
Minimum Value: 38 % on Feb 28 15:00																			Minimum Daily Average: 48.8 % on Feb 12						Hours of Data: 672																								
Maximum Diurnal Average: 78.6 % at hour 7																			Minimum Diurnal Average: 59.0 % at hour 15						Hours of Missing Data: 0																								
Monthly Average: 71.3 %																			Percentiles: P ₁ = 40 P ₁₀ = 51 Q ₁ = 62 Median = 74 Q ₃ = 82 P ₉₀ = 85 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-Feb	80	82	84	85	85	84	84	83	82	79	73	65	52	47	44	48	54	58	60	66	75	78	78	79	71.1	85																							
2-Feb	80	82	82	80	78	79	79	81	80	77	72	70	70	63	61	66	68	74	77	79	82	85	83	82	76.3	85																							
3-Feb	84	85	85	85	84	85	85	85	84	84	82	79	72	70	72	72	74	76	71	81	79	78	75	79	79.4	85																							
4-Feb	80	81	81	80	80	79	79	78	76	75	73	70	67	60	54	58	63	67	70	77	80	80	80	81	73.6	81																							
5-Feb	80	80	79	79	78	78	78	77	77	77	77	75	75	76	72	68	70	74	76	78	78	77	77	75	76.3	80																							
6-Feb	74	73	73	74	74	73	73	73	73	72	70	67	67	68	68	66	72	77	79	78	80	76	75	74	72.9	80																							
7-Feb	73	72	72	72	71	71	72	72	73	75	77	73	70	68	67	61	62	66	71	71	73	74	75	76	71.2	77																							
8-Feb	77	78	78	78	76	78	75	74	72	71	68	65	59	53	47	43	44	47	47	50	49	48	49	51	61.5	78																							
9-Feb	53	54	58	61	67	70	77	78	81	76	68	61	53	50	50	58	63	68	72	73	73	73	74	80	66.3	81																							
10-Feb	82	84	84	83	83	80	79	78	77	76	70	68	63	64	62	64	68	59	65	68	65	63	64	66	71.5	84																							
11-Feb	66	69	74	80	85	81	78	76	74	69	63	53	51	49	45	45	43	44	47	48	49	50	51	52	60.1	85																							
12-Feb	53	55	55	55	55	57	58	60	57	55	53	48	43	40	39	39	38	39	41	43	45	47	48	49	48.8	60																							
13-Feb	50	50	51	55	58	60	62	64	66	66	58	53	51	48	44	47	53	67	73	76	72	67	73	76	60.0	76																							
14-Feb	80	83	82	84	86	89	91	92	91	86	75	64	59	52	51	47	51	57	60	61	59	56	56	58	69.5	92																							
15-Feb	59	59	68	71	72	75	79	76	74	71	63	57	49	44	48	44	51	48	48	45	50	48	46	51	58.2	79																							
16-Feb	53	56	58	57	55	58	67	73	74	64	57	48	40	49	52	55	55	57	63	72	72	68	72	76	60.4	76																							
17-Feb	76	79	79	77	77	78	80	82	84	92	96	96	95	92	93	92	90	91	90	88	87	87	86	84	86.3	96																							
18-Feb	84	85	85	85	85	84	85	86	85	83	80	79	79	76	76	76	78	80	82	83	84	85	86	88	82.5	88																							
19-Feb	89	90	90	84	81	81	81	84	91	92	92	91	90	86	85	84	85	87	87	88	91	93	95	96	88.0	96																							
20-Feb	96	97	97	97	97	97	97	97	97	97	95	92	87	82	84	82	84	94	91	88	87	84	79	77	90.7	97																							
21-Feb	75	74	76	77	77	79	77	73	70	70	65	64	65	64	64	64	64	65	67	70	72	75	80	81	71.2	81																							
22-Feb	85	86	87	87	87	86	86	86	85	82	75	69	67	66	65	68	72	77	83	85	83	84	84	84	79.9	87																							
23-Feb	84	84	85	84	85	85	86	85	84	82	74	66	62	59	56	59	60	64	69	72	79	84	85	86	75.9	86																							
24-Feb	85	85	84	83	85	84	84	83	81	73	65	63	60	60	60	59	57	59	68	76	77	75	82	84	73.8	85																							
25-Feb	84	82	83	82	81	82	82	82	82	82	80	65	58	55	54	56	66	68	69	69	83	87	85	81	75.0	87																							
26-Feb	79	74	69	67	69	69	70	71	66	61	57	53	48	46	47	51	61	73	79	76	80	82	82	81	67.1	82																							
27-Feb	81	81	80	79	80	80	79	79	77	73	70	71	62	57	52	50	49	48	54	60	65	66	65	64	67.6	81																							
28-Feb	67	71	76	79	77	76	78	71	66	59	53	51	46	40	38	39	41	48	57	59	62	62	61	63	59.9	79																							
																								75.3	76.1	77.0	77.2	77.5	77.8	78.6	78.5	77.8	75.7	71.6	67.0	62.8	60.2	59.0	59.3	62.0	65.4	68.5	70.7	72.4	72.5	73.2	74.0	Diurnal Average	
																								96	97	97	97	97	97	97	97	97	97	96	96	95	92	93	92	90	94	91	88	91	93	95	96	Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - February 2017

Maximum Speed: 32 km/h on Feb 25 22:00	Maximum Daily Speed Average: 19.2 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 23 02:00	Minimum Daily Speed Average: 0.3 km/h on Feb 9	Hours of Data: 672
Maximum Diurnal Speed Average: 3.1 km/h at hour 22	Minimum Diurnal Speed Average: 0.8 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 288.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 16 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-Feb	N16	N11	N15	N15	N10	N11	N8	NNW6	NNW6	N2	SSE3	WSW2	WNW4	NE5	ENE5	SE9	SE9	SE9	SSE9	WSW6	WSW7	W7	W8	W10	NNW2.8	N16
2-Feb	WSW8	WSW5	WNW11	W11	W9	SSW5	W5	W7	W8	W8	W8	W7	WNW6	N4	NNE4	NE5	SSE4	E3	ENE3	NNE9	NNE9	NNE11	NNE15	NNE17	NW3.7	NNE17
3-Feb	N10	N6	NNE7	N6	N3	N4	NNE6	ENE1	S3	SW4	SW3	WSW4	ESE1	SSE2	ESE4	SE6	N4	NW12	NNW21	N15	NNE15	NNE18	N15	N11	N5.2	NNW21
4-Feb	N10	NNE9	NE6	NNE3	NE6	ENE2	SW3	WSW4	SSE6	S4	SSE4	WSW5	W6	SW6	S6	NNE4	SE5	SE8	SE8	SSE8	SE7	NNE5	N11	N17	ENE1.3	N17
5-Feb	N14	N15	N13	N13	N11	WNW7	WNW6	W3	W5	WNW4	W2	N3	NNW3	NW4	NE4	E3	SE7	SSE7	SSE7	SSE8	SE7	SE6	SE5	SSE6	N1.7	N15
6-Feb	SSE8	SSE9	SSE9	SSE8	SSE8	SSE8	SSE8	SE9	SE9	SE8	SSE4	ESE3	SE5	NNE5	NE4	NE3	NE4	NNE4	NNE5	NW2	WNW4	SSW2	S3	S3	SE3.5	SSE9
7-Feb	SSE7	SSE8	SE7	SSE7	SSE8	SSE9	SE9	SSE8	SSE8	SE6	S4	SW11	SW11	WSW12	WSW16	WSW16	WSW16	WSW16	WNW13	NW13	NW13	NW11	NW11	W6	WSW5.2	WSW16
8-Feb	W8	WSW7	SW6	W8	SW8	SSW6	WSW14	WSW13	WSW18	WSW15	WSW17	WSW19	WSW18	WSW18	WSW16	SW16	SW17	SW16	SW11	SW11	WSW14	WSW15	WSW16	WSW17	WSW13.1	WSW19
9-Feb	WSW14	WSW14	W10	WSW3	SE3	S1	SSE6	SE8	SSE8	SSE6	SSE6	SE7	ESE6	SE5	S4	NE6	NNE9	NNE11	N7	NNW4	N6	NNE8	N8	NNW7	NE0.3	WSW14
10-Feb	N9	N8	N8	NW6	NW4	W1	WSW2	S4	SE4	SE3	SE3	SE4	N3	NNE4	NNW2	NE4	ENE4	SE6	SE7	SE11	SSE11	SSE11	SSE9	SSE8	SE1.7	SSE11
11-Feb	S6	SW3	SSW2	S7	W7	WSW16	WSW20	WSW19	WSW17	WSW16	W11	WNW4	W5	WSW13	WSW11	WSW19	WSW20	WSW17	SW15	SW16	WSW18	WSW21	WSW20	SW18	WSW12.8	WSW21
12-Feb	SW18	SW21	SW23	SW22	SW19	SW17	SW15	SW16	SW20	SW19	SW17	WSW21	WSW29	WSW27	WSW25	SW15	SSW10	WSW16	SW10	WSW14	WSW26	WSW29	WSW26	WSW25	WSW19.2	WSW29
13-Feb	WSW23	WSW21	W18	W12	WSW24	W22	W20	W18	WNW14	WNW15	NW12	NW13	NNE8	NE6	NNE2	NE4	NE4	N9	N11	NNW9	NNW6	NW4	NW4	WSW2	WNW8.8	WSW24
14-Feb	SE5	SE3	SSE8	SSE9	SSE9	SSE10	SSE12	SSE13	SSE14	SE12	SSE10	SE10	SE9	SE9	SE10	SE10	SE9	SE10	SSE11	SE12	SSE12	S11	SSE12	SSE13	SSE9.9	SSE14
15-Feb	SE11	SE10	SE11	SE9	SE8	SE9	SSE8	SSE11	SE11	SE9	SE8	SE9	SE9	SE6	NNW2	SE5	SSW4	S10	S10	SSW10	S10	SW19	SW21	S11	SSE7.7	SW21
16-Feb	S10	SSW10	S11	SSW12	SW7	S5	E7	SE9	SE9	SE6	NE5	SE4	E1	NNW5	NNE6	N6	N6	NNW5	WSW3	NNW10	N11	NW7	NW7	NW9	SW0.5	SSW12
17-Feb	NW10	NW10	WNW8	WSW6	W7	W5	W5	WNW5	NNW12	NNW7	WNW6	WNW6	WNW6	NE5	NNE9	NNE11	NNE12	NNE11	N10	NNE13	NNE13	NNE10	NE11	NNE10	N6.2	NNE13
18-Feb	NNE10	N11	NNE10	NNE10	NNE7	NNE4	N5	NE4	NNE4	SSW2	NE1	NNE4	NNE6	NE6	NE9	ENE7	NE7	ENE4	NNE6	NNE3	NNE5	N8	NNE10	N9	NNE6.0	NNE11
19-Feb	NNE7	NNE8	NNE6	E10	ESE11	ESE12	E10	E10	ENE10	E11	ENE12	E10	E10	ESE12	ESE10	E7	E8	E6	E6	E6	E5	E3	ESE4	ESE2	E7.5	ENE12
20-Feb	N5	N6	N8	NW4	WNW8	NW11	WNW11	WNW9	NW8	NNW4	N4	NNE4	NW8	NW12	NW11	WNW9	WNW9	NW13	WNW12	WNW9	WNW7	W9	WSW15	WSW15	WNW7.5	WSW15
21-Feb	WSW17	WSW12	SW9	SW9	W9	WNW14	NW17	NW17	WNW16	NW20	NW16	WNW14	WNW13	WNW16	WNW13	WNW13	W13	W11	W11	WNW12	WNW12	WNW8	WNW6	W8	WNW11.9	NW20
22-Feb	W8	NW8	N11	N6	NW4	WNW4	WNW3	WSW2	N3	NNE4	N4	NNW4	NW8	N7	NE4	N9	N11	N9	N9	N8	NE9	NE7	ENE4	SSW3	N4.8	N11
23-Feb	WNW2	SW1	SSE2	S5	SSE5	SSE6	SE7	SSE6	SSE5	S4	S5	SE6	SE7	ESE8	SE4	ENE3	NE5	SE4	SSE2	SSE2	NNE4	N6	N13	N12	ESE2.0	N13
24-Feb	N14	N14	N13	N13	N7	NNW7	N6	NNW7	NNW8	N10	NNW12	NW12	NW8	NW6	W5	SW8	SW8	SSW6	SSE8	SSE10	SW10	WSW10	SSE9	SE10	NW3.6	N14
25-Feb	SE9	SSE9	SSE8	SSE9	SSE8	SE10	SSE8	SE10	SE9	SE6	SSE6	WSW7	W9	NNE6	NNE5	N5	NNE15	NNW8	WSW9	SSW2	NE16	N32	N31	N28	NE3.2	N32
26-Feb	N25	NNW30	NNW25	NW19	NW15	NW15	NW13	NW10	WNW12	NW12	NW10	WNW7	WNW2	N3	WNW6	WNW9	N6	NE5	NNE5	NE6	ESE4	ESE3	SE4	NE5	NNW8.4	NNW30
27-Feb	ESE2	NE2	NNE7	NNE7	NNE7	NNE9	NNE7	NNE7	NNE7	N4	WNW5	WNW6	NNW5	N7	N7	NNE5	NE4	ESE5	SE6	SSE7	SSE8	SSE8	SSE10	SSE10	NE2.4	SSE10
28-Feb	S5	SSE3	NNW4	N22	NNE20	NNE16	N12	N19	N18	NNE13	NNE9	N6	N9	NNE10	NE8	NE8	NE9	NNE10	NNE9	NNE11	NNE10	NNE9	NNE12	NNE10	NNE10.0	N22
WNW2.8 NW3.0 NW2.6WNW2.0WNW2.1 W1.8 W2.4WSW2.2WSW2.0WSW1.8 W1.9 W2.7 W2.7 NW1.9 NW1.6 NW1.2NNW0.8 W1.2 W0.9WNW0.8 NW1.7 NW3.1 NW2.8WNW2.7																								Diurnal Average		
N25 NNW30 NNW25 SW22WSW24 W22 W20 N19 SW20 NW20 SW17WSW21WSW29WSW27WSW25WSW19WSW20WSW17NNW21 SW16WSW26 N32 N31 N28																								Diurnal Maximum		

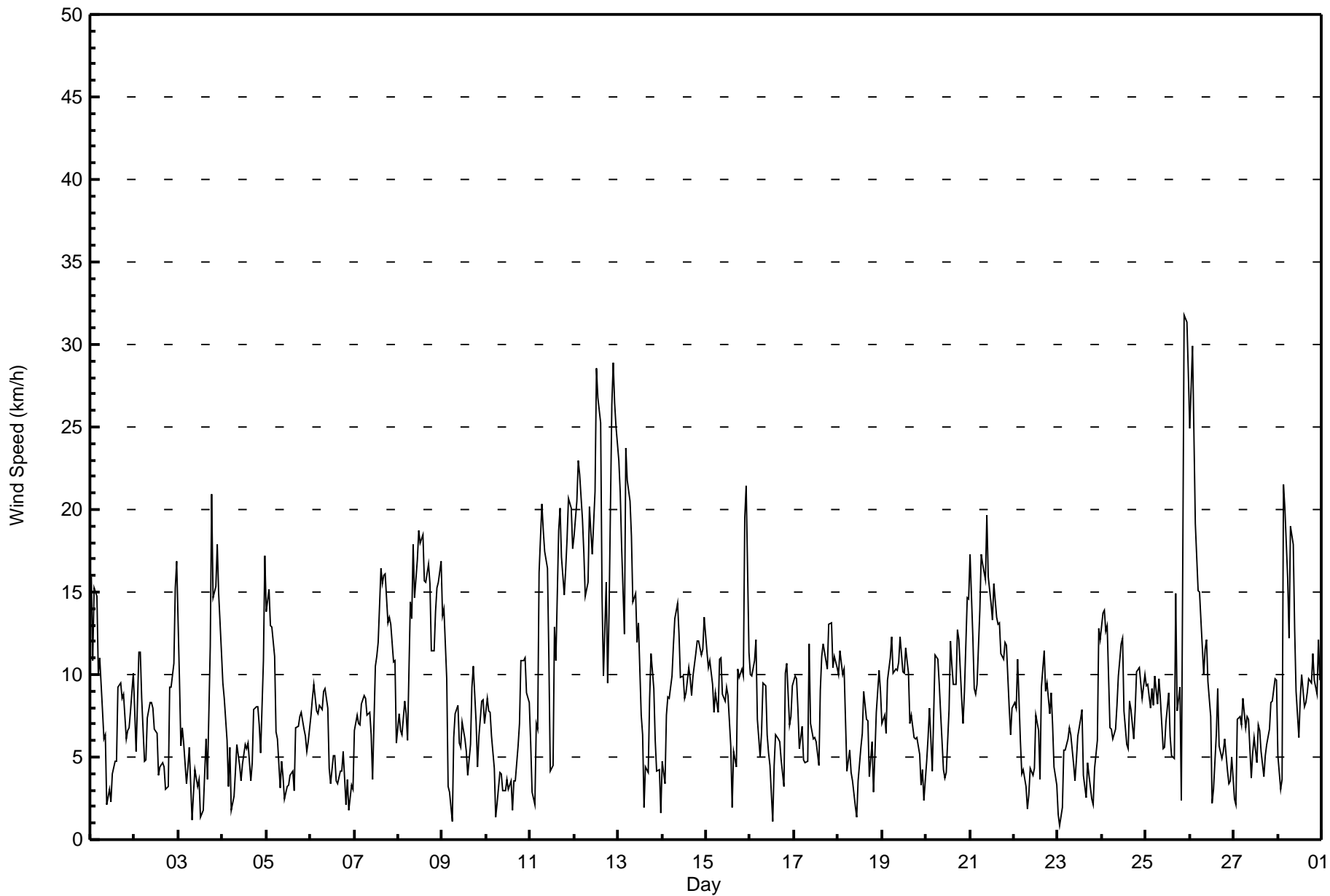
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 26 03:00																	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 0 km/h on Feb 23 08:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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-Feb	3	3	3	3	3	2	2	2	1	1	1	1	1	1	1	2	1	1	1	2	1	3	2	2	3
2-Feb	3	3	2	2	3	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	2	3	4	3	4
3-Feb	3	1	1	2	1	1	1	1	1	1	1	2	2	1	2	2	6	4	4	4	4	4	2	6	
4-Feb	2	2	1	1	1	2	1	1	1	1	2	1	2	2	1	2	1	1	1	2	3	2	3	3	
5-Feb	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
6-Feb	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0	1	1	1	1	1	1	2	
7-Feb	1	1	1	1	1	1	1	2	1	2	1	3	3	3	4	4	4	3	3	2	2	3	2	4	
8-Feb	2	1	1	2	2	4	3	5	4	4	4	4	4	4	5	4	4	3	3	4	4	5	4	5	
9-Feb	4	4	3	2	1	1	2	1	1	1	1	2	2	2	1	2	2	1	1	1	1	1	1	4	
10-Feb	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	3	2	3	
11-Feb	1	2	1	2	3	3	4	4	4	4	3	3	3	3	4	5	4	4	3	3	4	5	5	5	
12-Feb	4	5	5	5	4	3	3	3	5	4	4	5	7	6	6	6	2	6	4	6	5	6	5	7	
13-Feb	5	4	5	5	5	5	6	4	4	3	2	2	2	1	1	2	1	1	2	1	2	1	1	6	
14-Feb	2	2	2	2	2	2	2	2	1	2	3	2	2	3	2	2	2	2	1	1	1	1	1	3	
15-Feb	1	1	2	1	2	1	1	2	2	2	2	2	2	3	1	1	3	2	2	2	5	7	3	7	
16-Feb	3	2	2	2	3	2	3	2	2	2	2	2	1	1	1	1	1	1	1	3	2	2	1	3	
17-Feb	2	2	2	2	1	2	1	1	3	2	1	1	1	2	2	2	2	2	2	3	3	2	3	3	
18-Feb	2	2	2	2	3	2	1	1	1	1	2	1	1	2	3	2	2	1	2	2	1	2	2	3	
19-Feb	1	1	1	3	3	3	3	3	3	4	3	3	3	3	3	2	2	2	1	1	1	1	1	4	
20-Feb	1	1	2	1	2	2	2	2	2	2	1	1	2	3	2	2	2	3	3	2	1	3	3	4	
21-Feb	5	4	2	2	2	4	4	4	4	4	4	3	3	4	3	4	3	2	3	3	2	2	1	5	
22-Feb	1	2	2	2	1	1	1	1	2	1	1	1	2	2	2	4	2	2	2	2	2	1	1	4	
23-Feb	1	1	1	1	1	1	1	0	1	1	1	2	3	2	2	2	1	1	1	1	1	3	2	3	
24-Feb	2	2	2	3	2	3	2	2	3	3	5	3	3	1	2	2	3	1	1	1	4	3	1	5	
25-Feb	1	1	2	1	1	1	1	2	2	2	2	3	2	2	2	4	4	2	2	3	5	7	7	7	
26-Feb	4	6	7	4	3	3	3	3	2	3	2	2	2	1	3	3	2	1	2	1	1	2	1	7	
27-Feb	1	2	2	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	
28-Feb	2	2	5	4	4	3	2	4	4	3	2	2	3	3	2	2	2	2	2	2	2	2	2	5	
																	5 6 7 5 5 5 6 5 5 4 5 5 7 6 6 6 4 6 4 6 5 7 7 5								
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	174	25.89	25.89
6 - 11	338	50.30	76.19
12 - 19	128	19.05	95.24
20 - 28	27	4.02	99.26
29 - 38	5	0.74	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	20	19	8	5	9	16	11	13	7	5	10	9	10	7	10	174
6 - 11	41	43	14	2	12	4	52	55	9	5	14	9	25	21	18	14	338
12 - 19	19	11	1	1	0	2	2	6	0	1	15	34	4	15	15	2	128
20 - 28	3	1	0	0	0	0	0	0	0	0	5	13	2	0	1	2	27
29 - 38	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	80	75	34	11	17	15	70	72	22	13	39	68	40	46	41	29	672

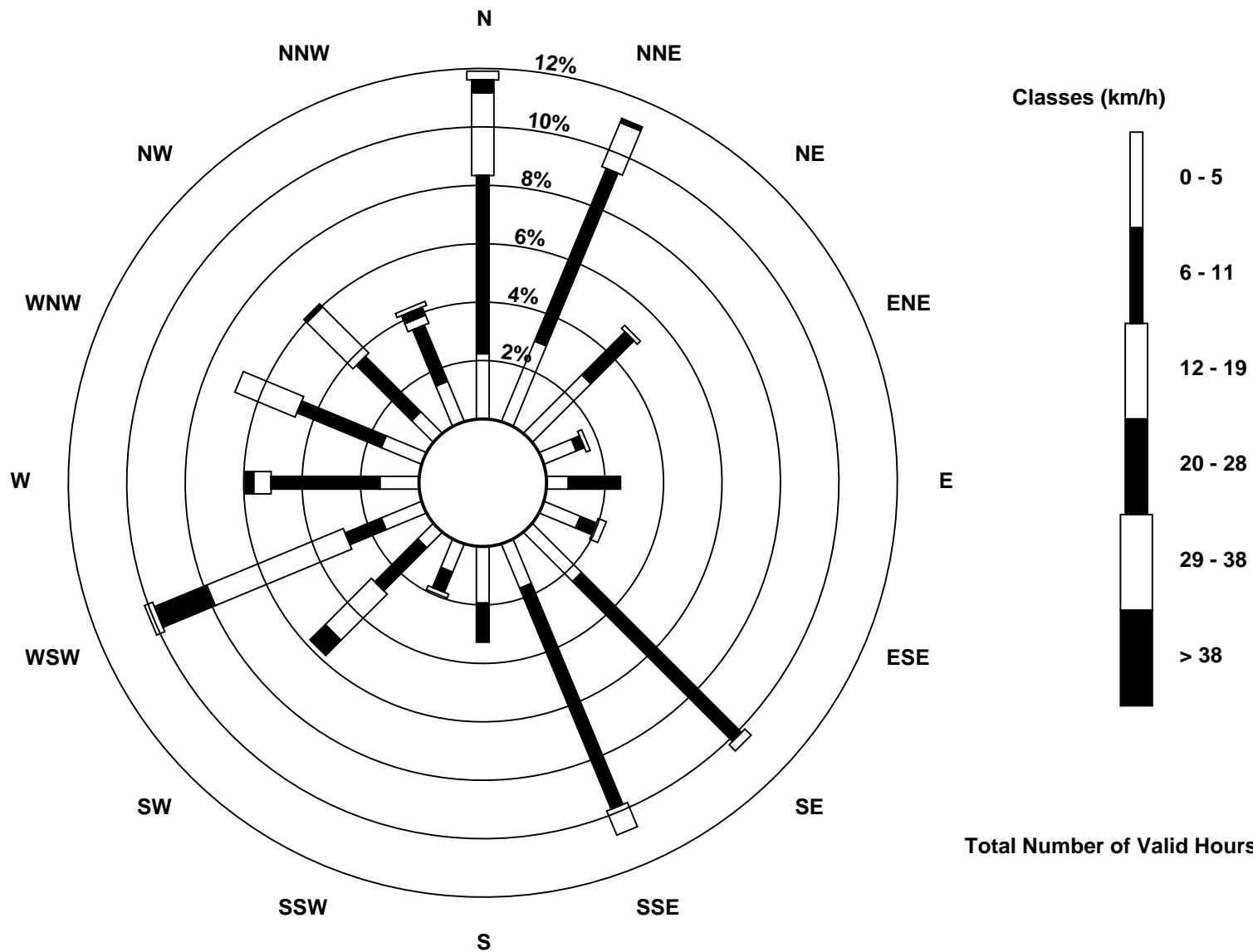
Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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



Total Number of Valid Hours: 672



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 8 deg on Feb 25 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 237.3 deg on Feb 12	Hours of Data: 672
Direction of Minimum Speed: 223 deg on Feb 23 02:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.3 deg on Feb 9	Percent Operational Time: 100.0
Monthly Average Direction: 268.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	357	349	0	7	360	3	1	335	335	355	165	250	297	40	75	130	141	146	150	238	242	269	259	266	345.8
2-Feb	252	255	284	279	265	195	263	274	264	272	267	276	300	6	28	43	152	87	70	31	27	23	12	12	317.2
3-Feb	9	1	14	1	5	0	12	70	188	217	234	242	117	166	119	144	349	325	331	9	21	22	8	2	2.5
4-Feb	2	16	47	22	39	66	235	241	150	170	163	248	267	217	170	29	127	129	136	147	140	17	11	356	67.9
5-Feb	352	354	351	355	352	299	296	261	281	286	270	355	341	319	43	82	138	154	159	156	156	143	141	149	352.2
6-Feb	153	158	152	159	157	155	149	145	144	144	149	120	135	31	37	46	34	19	25	320	303	213	178	186	139.2
7-Feb	153	147	146	150	150	161	146	160	155	142	178	231	235	246	254	251	253	255	291	311	311	326	321	263	237.3
8-Feb	268	246	230	264	232	212	243	254	254	241	243	250	251	252	248	233	223	227	221	215	239	238	243	256	242.0
9-Feb	250	249	262	241	125	177	156	140	157	156	148	127	121	137	173	43	17	12	0	335	359	14	11	347	44.8
10-Feb	1	355	356	321	310	278	242	169	143	142	134	130	8	12	348	35	62	124	145	146	158	156	155	162	125.6
11-Feb	169	220	194	189	270	247	252	249	247	254	266	300	264	238	244	254	252	245	233	231	238	242	242	228	243.5
12-Feb	223	227	229	226	224	220	218	215	225	222	226	238	252	256	252	234	198	240	220	237	258	258	253	257	237.3
13-Feb	257	257	261	264	258	262	272	272	291	294	304	307	19	43	19	39	45	8	6	348	342	316	314	249	288.1
14-Feb	142	145	163	162	160	154	158	150	153	139	151	145	138	125	134	135	124	142	148	142	149	173	162	153	148.3
15-Feb	143	133	131	130	128	139	163	156	142	140	137	134	132	132	342	142	200	189	185	195	185	226	234	183	165.1
16-Feb	176	192	186	211	228	172	99	142	138	131	51	130	97	336	22	6	9	327	254	337	349	324	314	310	222.7
17-Feb	314	307	291	240	277	265	262	291	342	342	301	302	290	41	30	18	25	20	11	21	13	19	34	28	350.1
18-Feb	20	11	19	28	16	12	11	37	15	204	56	24	28	42	43	67	53	63	29	13	32	3	19	10	26.3
19-Feb	12	20	33	97	112	109	99	91	72	82	77	86	93	110	106	97	93	87	98	99	98	100	110	107	89.0
20-Feb	350	357	352	321	302	307	302	297	326	348	9	18	305	309	310	282	293	310	293	289	297	275	254	245	301.6
21-Feb	254	252	227	226	264	299	313	304	287	306	305	298	283	287	289	286	264	266	269	292	296	300	292	278	283.8
22-Feb	270	325	9	357	310	301	285	252	3	14	6	334	305	9	46	2	1	6	9	2	36	41	69	199	355.0
23-Feb	296	223	159	172	150	147	146	159	160	186	178	145	136	112	130	60	36	124	158	147	15	349	5	350	119.2
24-Feb	352	1	1	354	349	346	2	344	340	352	329	325	325	320	281	235	221	194	152	150	231	244	162	138	324.1
25-Feb	140	147	157	147	150	141	148	142	135	145	149	237	276	12	24	11	13	330	237	201	37	8	10	2	43.4
26-Feb	2	346	334	319	317	319	316	311	297	314	313	298	303	7	297	291	11	39	29	51	102	114	140	37	333.3
27-Feb	118	41	24	20	28	30	22	16	12	353	300	291	343	7	7	14	45	122	127	150	149	162	149	156	49.2
28-Feb	188	156	333	3	12	12	1	6	6	15	20	6	10	21	36	39	39	22	14	18	21	30	27	24	16.1
299.7 306.2 314.3 302.0 284.7 262.2 264.2 242.9 252.2 258.1 263.1 265.6 278.3 309.4 304.6 305.9 339.0 278.4 271.8 289.8 312.3 305.9 312.6 302.9																									
Diurnal Average																									

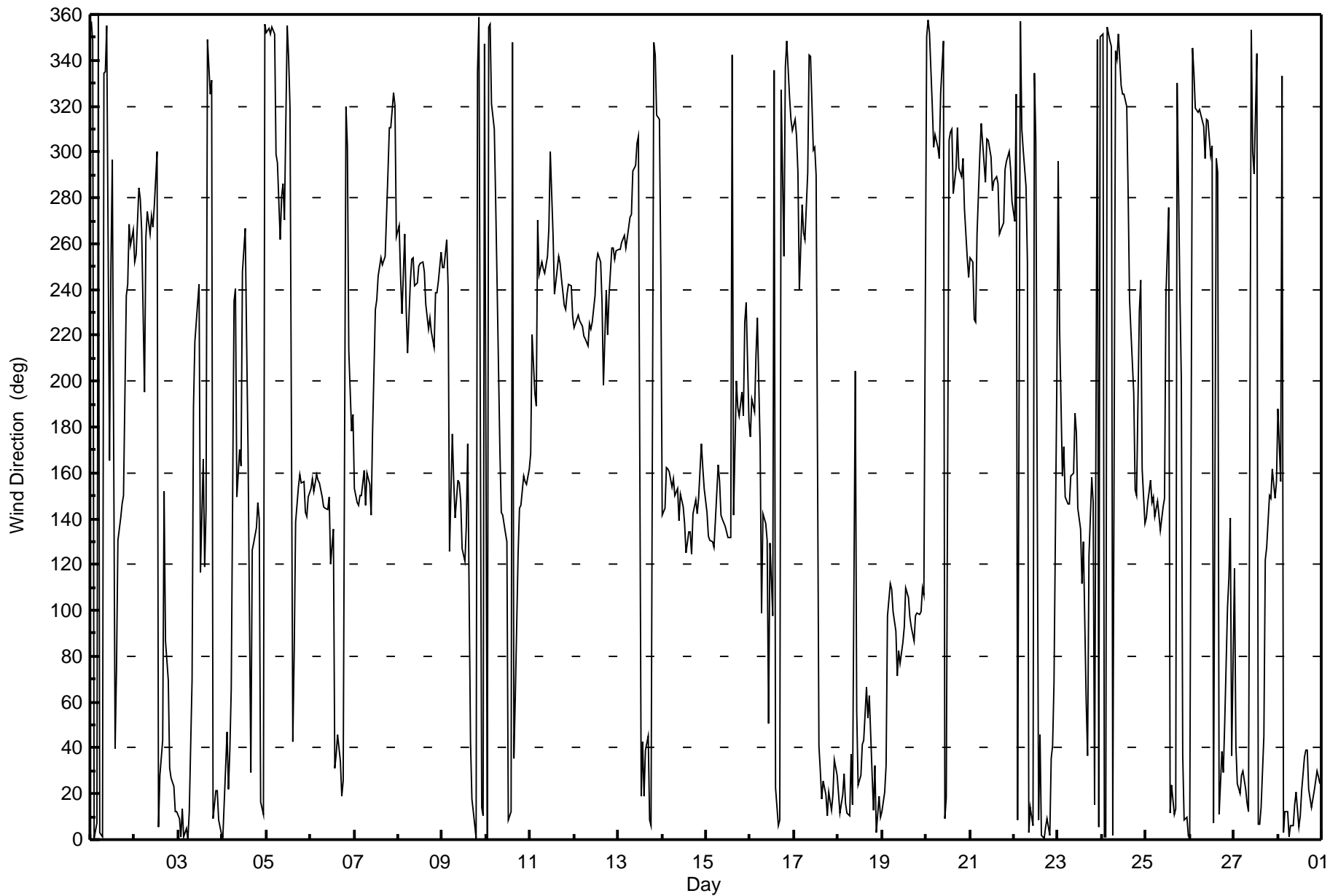
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Feb 3 13:00 Minimum Value: 4 deg on Feb 25 00:00 Percentiles: P ₁ = 6 P ₁₀ = 11 Q ₁ = 13 Median = 17 Q ₃ = 25 P ₉₀ = 41 P ₉₉ = 81																		Hours in Service: 672 Hours of Data: 672 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-Feb	16	19	16	13	17	14	24	22	11	68	28	67	29	11	41	14	11	19	6	35	14	15	19	16	68
2-Feb	24	34	12	15	26	36	33	16	13	18	20	22	26	44	36	21	29	44	44	14	15	14	15	13	44
3-Feb	15	16	11	17	15	13	14	63	27	17	38	33	95	89	38	20	60	28	17	15	14	16	14	13	95
4-Feb	14	20	11	23	12	66	39	23	15	18	26	33	27	45	33	52	27	11	9	10	13	67	13	16	67
5-Feb	15	14	12	13	13	16	12	32	14	28	45	33	35	37	20	51	10	12	6	8	8	6	9	15	51
6-Feb	12	8	4	6	8	6	8	5	5	13	23	58	22	38	40	34	12	10	11	53	47	28	32	35	58
7-Feb	9	11	4	9	7	10	11	12	15	15	37	18	17	17	13	12	12	12	19	9	10	15	10	30	37
8-Feb	15	22	18	19	27	52	16	17	14	16	15	13	14	14	17	18	14	14	14	15	17	17	17	14	52
9-Feb	20	19	18	59	57	91	34	9	10	15	21	20	27	48	40	18	12	8	13	17	13	8	8	12	91
10-Feb	14	12	17	7	13	57	46	25	23	20	37	70	30	35	66	49	37	17	20	18	20	18	18	17	70
11-Feb	13	41	69	16	32	12	11	12	13	13	20	65	53	18	26	14	12	13	14	13	14	14	15	15	69
12-Feb	14	13	13	13	13	12	13	13	13	14	14	16	14	13	12	22	17	23	25	22	13	13	12	12	25
13-Feb	13	12	14	19	13	15	17	16	20	15	13	12	35	17	81	28	31	11	11	11	17	29	35	62	81
14-Feb	18	41	12	16	19	14	13	10	8	13	17	17	17	17	18	13	17	10	10	11	10	14	8	41	81
15-Feb	10	6	6	7	14	8	14	13	12	14	17	15	17	34	64	13	57	23	38	19	22	15	16	23	64
16-Feb	18	12	10	13	47	44	53	12	7	17	39	50	90	42	13	16	12	17	42	29	12	18	18	12	90
17-Feb	9	11	12	19	15	33	20	27	16	16	19	14	17	35	18	16	16	14	15	14	15	17	16	16	35
18-Feb	15	14	14	15	18	27	20	20	26	64	80	44	18	21	19	21	21	34	14	54	20	14	12	13	80
19-Feb	10	15	13	26	18	17	20	21	21	22	19	20	21	18	18	21	19	19	17	17	17	18	21	49	49
20-Feb	15	13	16	22	14	12	13	14	20	23	23	31	21	15	15	20	17	12	15	14	15	23	12	14	31
21-Feb	16	16	13	13	20	20	14	14	16	14	15	15	17	16	18	19	17	16	15	16	14	14	14	9	20
22-Feb	10	39	11	15	16	23	28	45	72	20	16	39	21	29	38	16	18	15	16	18	14	9	34	30	72
23-Feb	58	81	68	33	17	10	18	7	11	26	36	38	34	25	68	60	49	26	30	60	13	33	13	15	81
24-Feb	15	17	15	16	19	28	18	23	23	24	29	19	31	32	35	22	16	20	11	7	41	20	25	4	41
25-Feb	7	11	15	7	5	5	9	12	11	23	31	29	30	40	23	41	16	28	24	75	17	17	18	20	75
26-Feb	19	21	16	12	14	13	12	16	12	17	22	28	82	68	45	22	43	18	11	14	25	19	20	19	82
27-Feb	62	60	14	16	15	8	7	9	16	32	35	19	39	22	20	19	44	12	11	10	8	10	10	11	62
28-Feb	30	65	56	22	17	18	23	21	20	18	20	31	25	23	21	18	18	13	12	14	12	13	13	13	65
																		62 81 69 59 57 91 53 63 72 68 80 70 95 89 81 60 60 44 44 75 47 67 35 62							
Diurnal Maximum																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 10, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	12:24
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	842	842
Calculated slope	1.003000	1.008932	Chamber temp	45.0	45.0
Calculated intercept	0.705896	0.468199	Pressure	689.2	687.0
Analyzer Background	11.6	11.6	Flow	0.491	0.492
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	-0.3	----
as found span	5000	60.4	600.4	592.8	1.013
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	60.4	600.4	594.4	1.010
second point	5000	30.2	300.2	298.1	1.007
third point	5000	15.1	150.1	147.0	1.021
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.4	600.4	597.1	1.005
Average Correction Factor					1.013

Corrected As found 593.1 Previous response 597.9 % change 0.8%

Notes:

pump changed out for preventative maintenance, filter changed out, no adjustments done

Calibration Performed By: Melissa Lemay



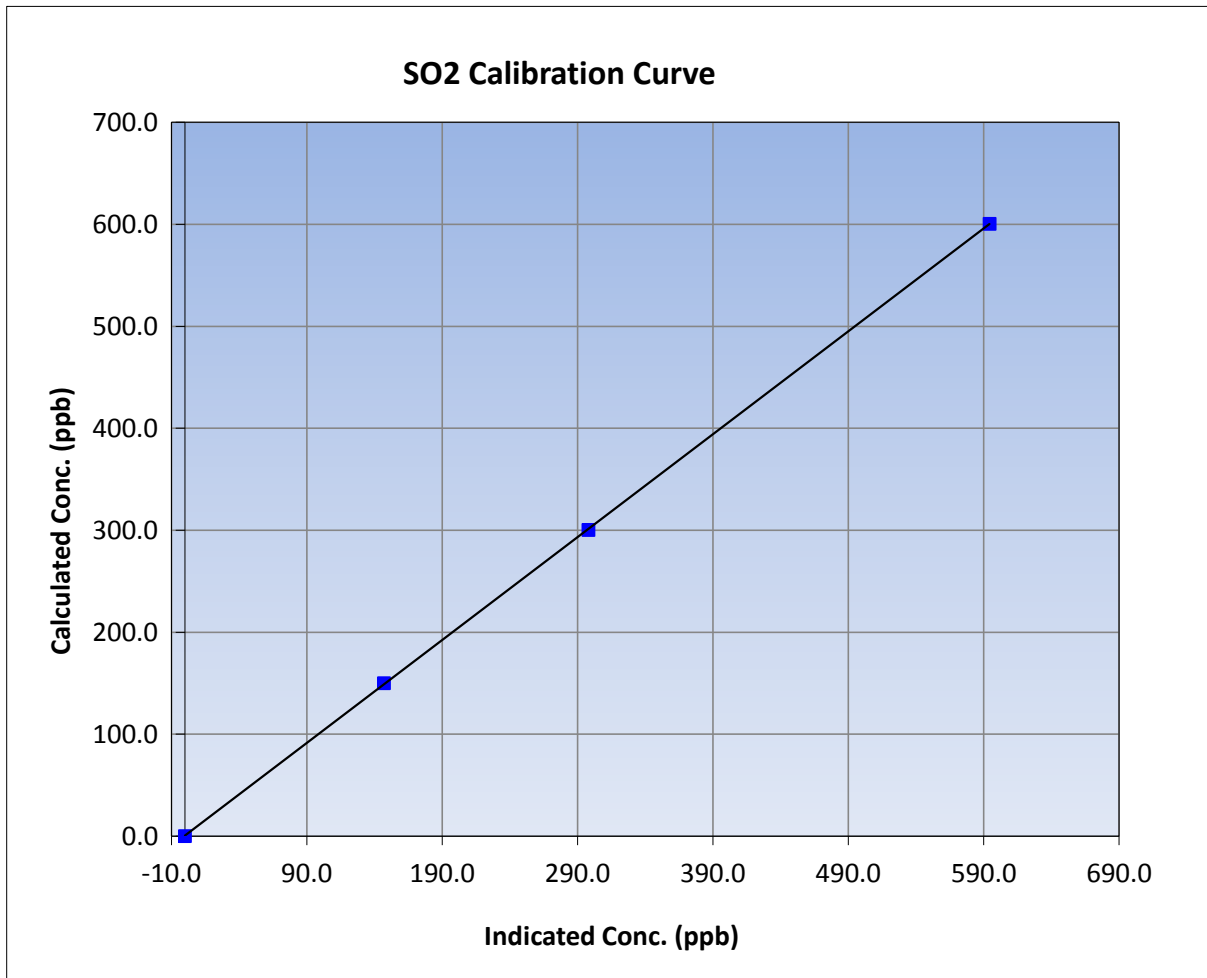
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 10, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:55	End Time (MST)	12:24
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

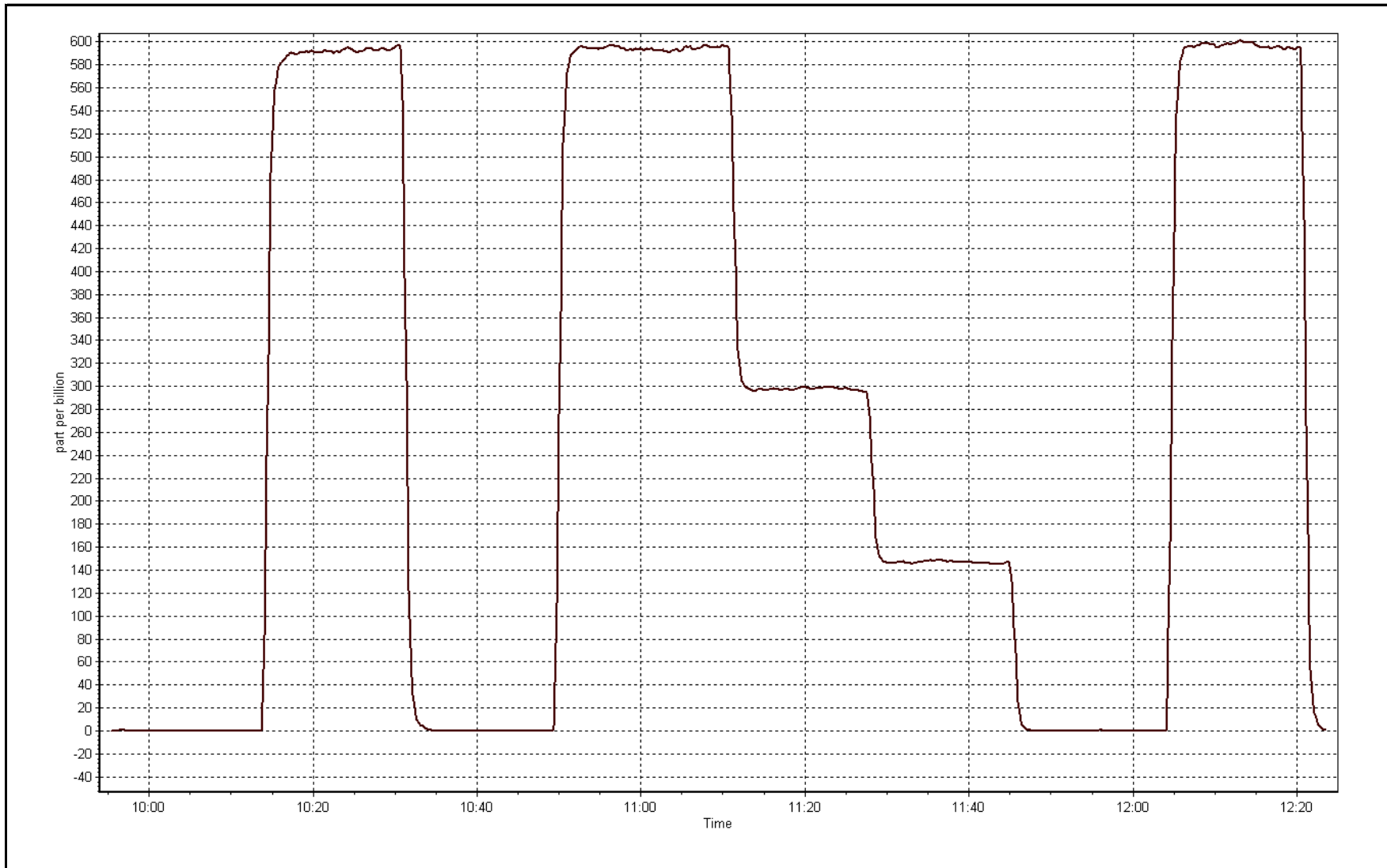
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999984
600.4	594.4	1.0101		
300.2	298.1	1.0070	Slope	1.008932
150.1	147.0	1.0210		
			Intercept	0.468199



SO2 Calibration Plot

Date: February 9, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 24, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:20	End Time (MST)	15:00
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	0.996398	0.997633	Chamber temp	45	45
Calculated intercept	-0.074582	-0.068754	Pressure	547.8	543.6
Analyzer Background	13.7	13.7	Flow	1.043	1.049
Analyzer Coefficient	0.806	0.806	Intensity	94	94
			Converter temp.	332	332
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	0.0	----
as found span	6000	88.1	75.0	74.7	1.004
SO2 scrubber check	5000	15.1	150.1	1.5	----
calibrator zero	6000	0.0	0.0	0.0	----
high point	6000	88.1	75.0	75.2	0.998
second point	6000	49.2	41.9	42.2	0.993
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	74.9	1.002
Average Correction Factor					0.995

Corrected As found 74.7 Previous response 75.4 % change 0.9%

Notes:

scrubber done after as found span, filter changed out, no adjustments done, pump changed out for preventative maintenance

Calibration Performed By:

_____ Melissa Lemay



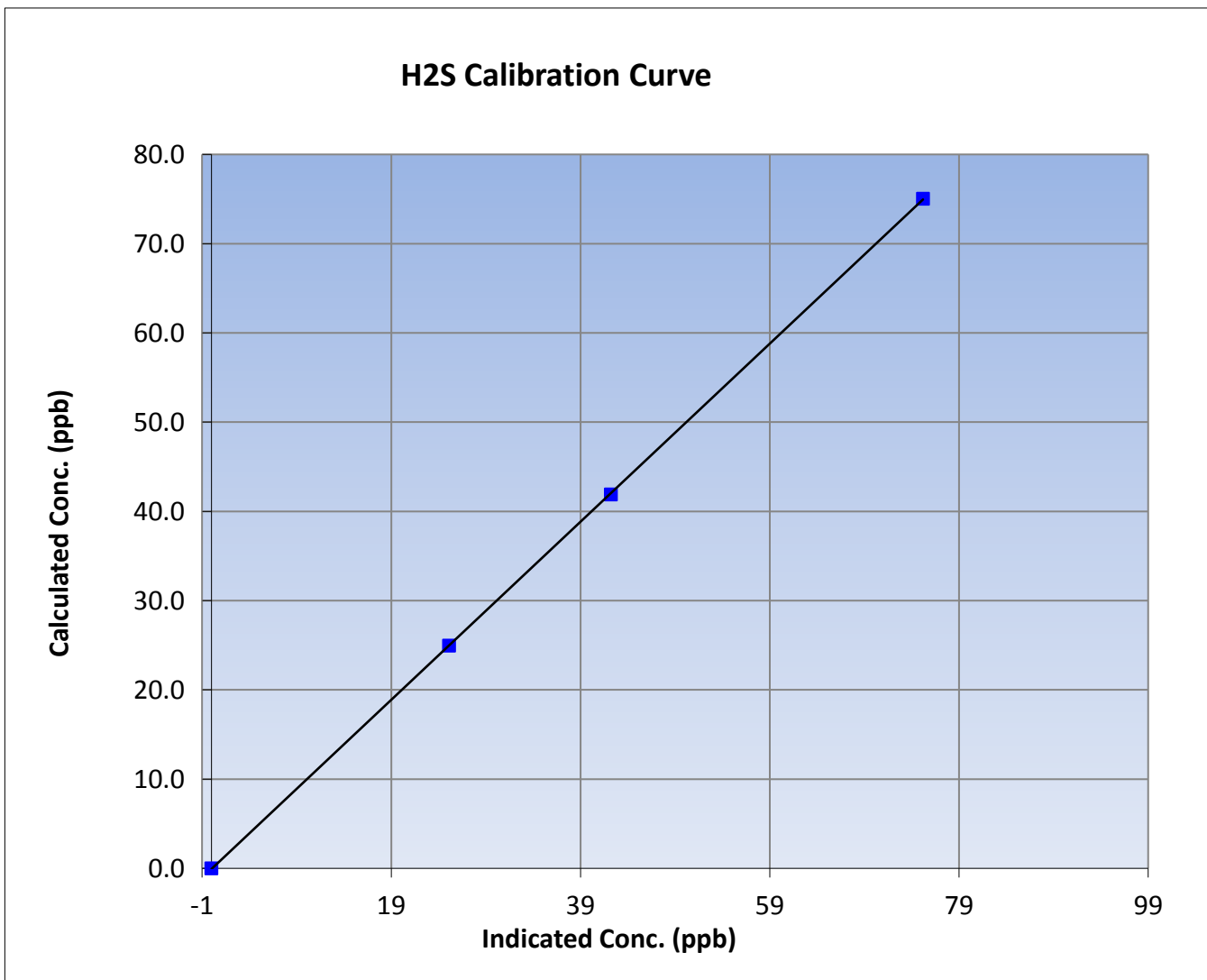
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 24, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	12:20	End Time (MST)	15:00
Analyzer make	Routine	Analyzer serial #	1336160094

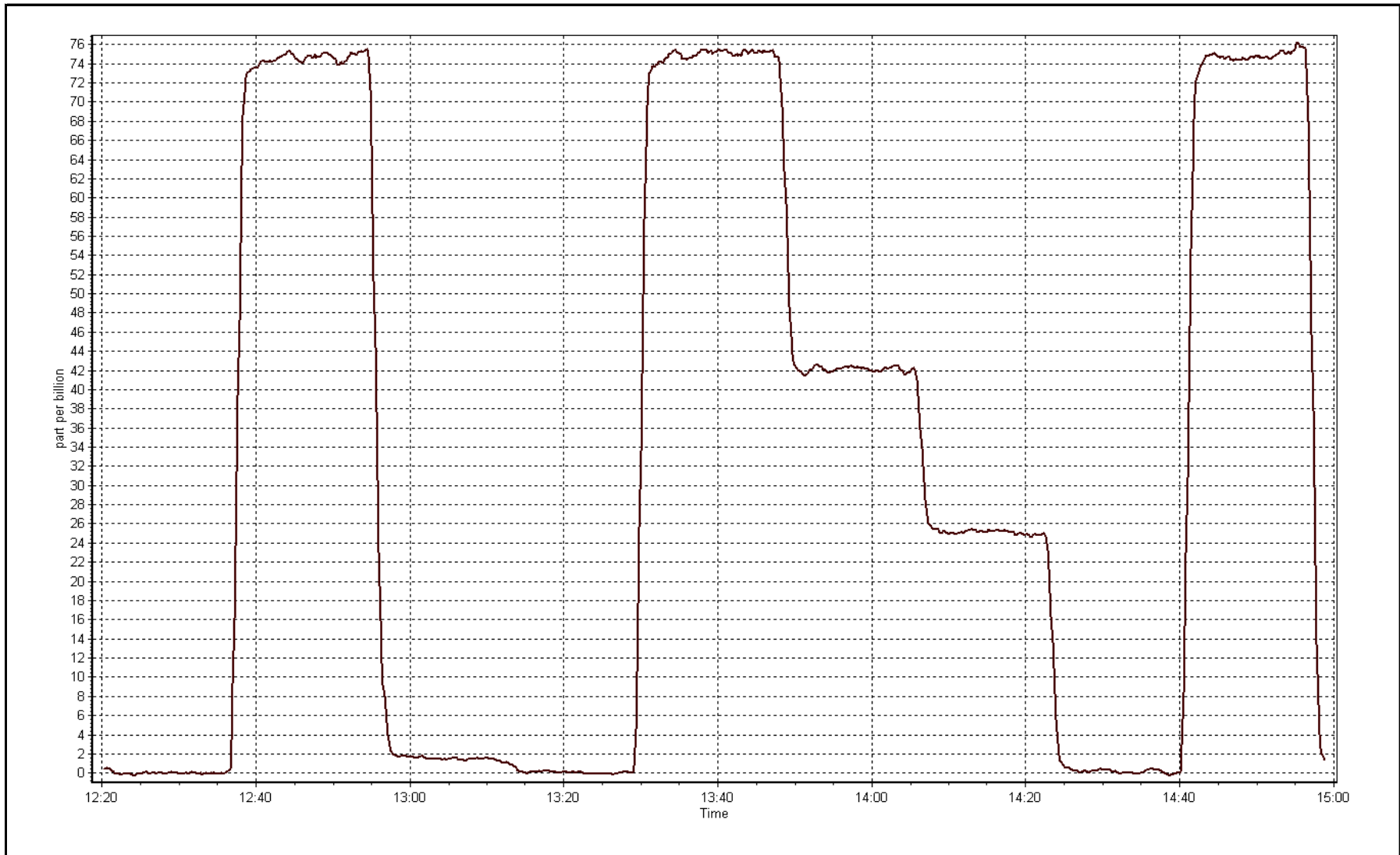
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
75.0	75.2	0.9978		
41.9	42.2	0.9929	Slope	0.997633
25.0	25.1	0.9942		
			Intercept	-0.068754



H2S Calibration Plot

Date: February 9, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 10, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	12:22
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	1.003690	1.000383	Fuel Pressure	19.9	19.9
Calculated intercept	-0.021994	0.014065	Analyzer Coeff	4.253	4.285
			Analyzer BKG	0.750	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	-0.02	----
as found span	5000	60.4	12.82	12.74	1.006
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	60.4	12.82	12.79	1.002
second point	5000	30.2	6.41	6.42	0.998
third point	5000	15.1	3.20	3.18	1.008
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	60.4	12.82	12.80	1.002
Average Correction Factor					1.003

Corrected As found 12.76 Previous response 12.79 % change 0.3%

Notes:

span adjusted, no maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

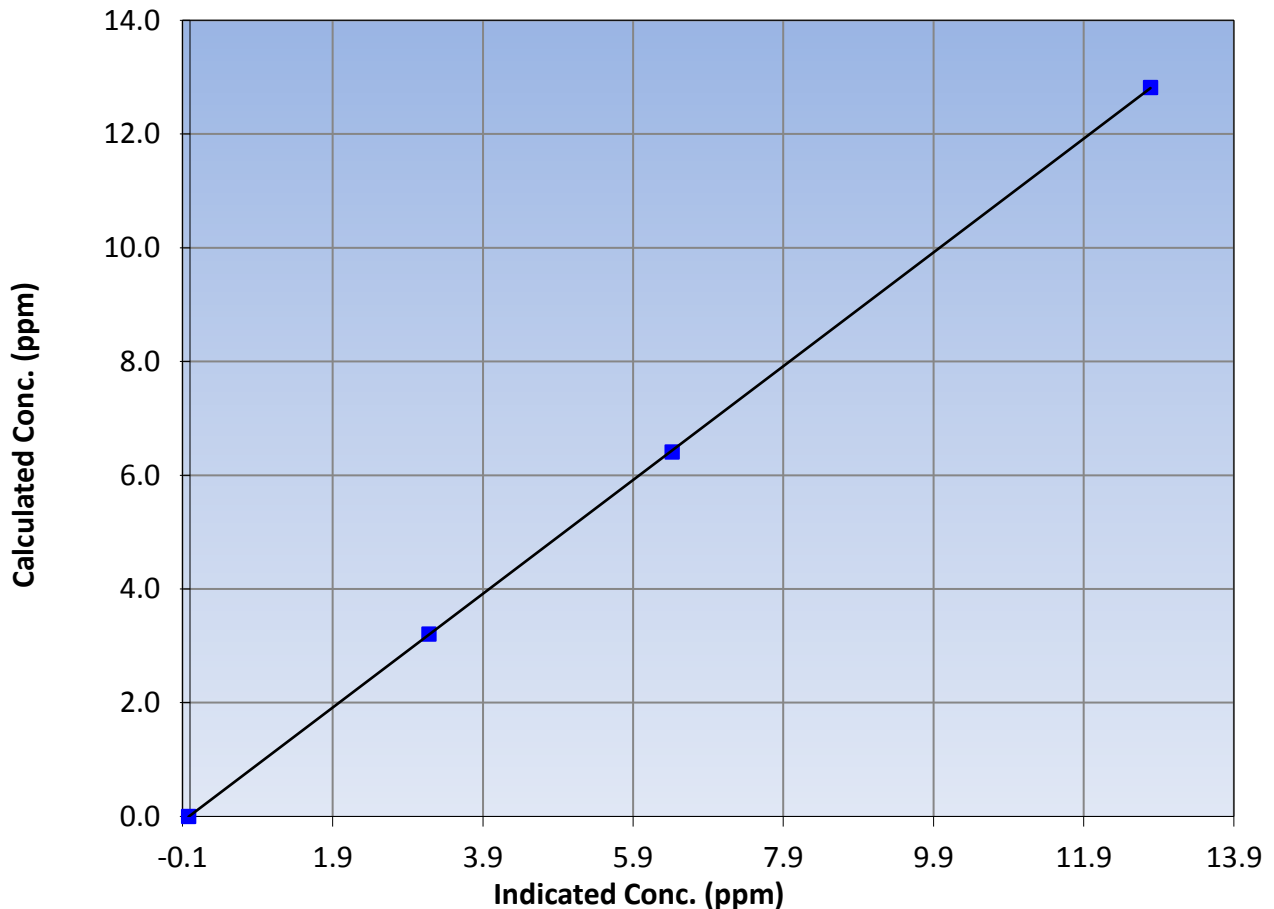
Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 10, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:55	End Time (MST)	12:22
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

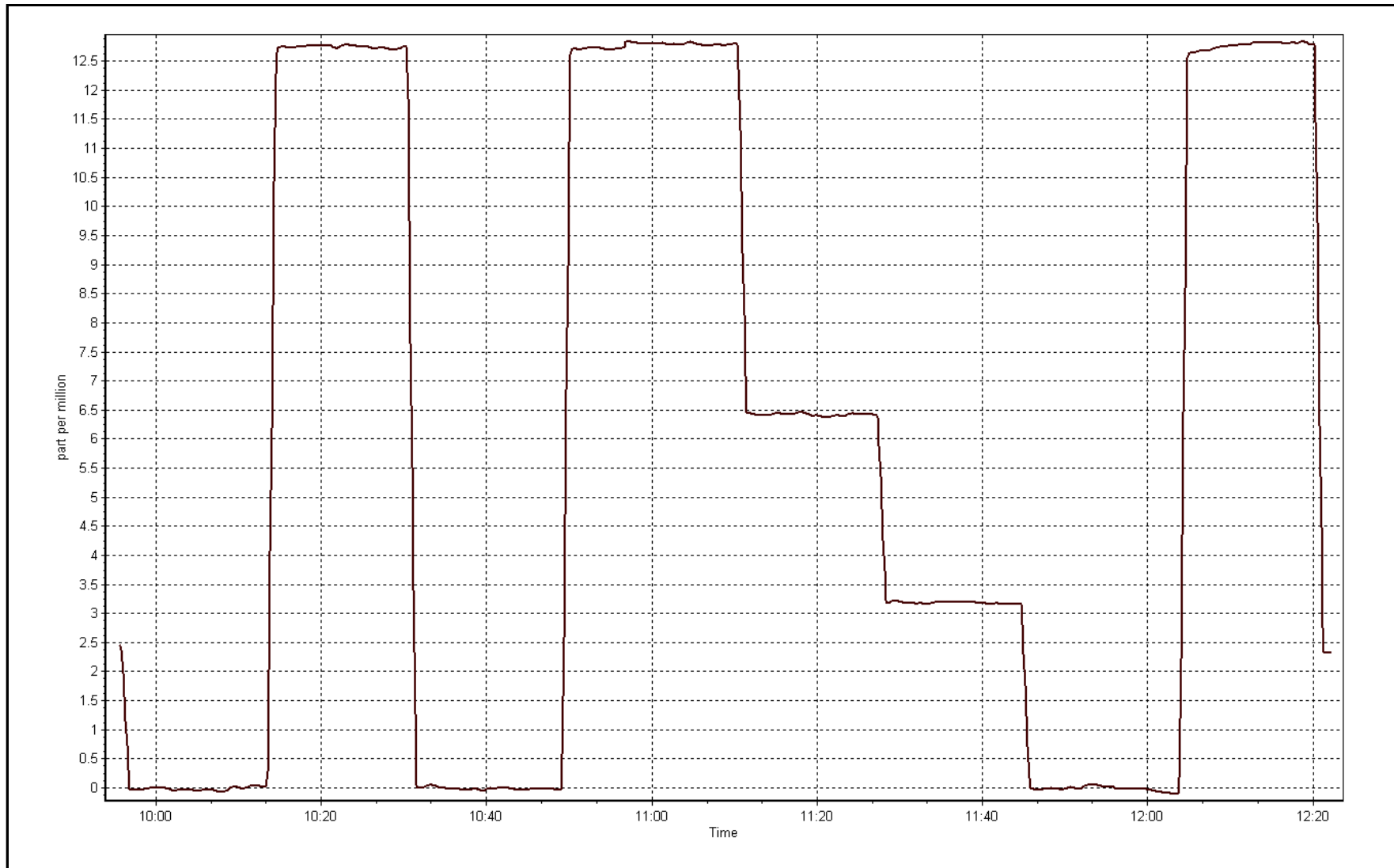
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	----	Correlation Coefficient	0.999989
12.82	12.79	1.0023		
6.41	6.42	0.9984	Slope	1.000383
3.20	3.18	1.0079		
			Intercept	0.014065

THC Calibration Curve



THC Calibration Plot

Date: February 9, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 5
MANNIX
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
FEBRUARY 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	639	32	33	99.85	56	0	8	0
H2S (ppb) Average	639	31	33	99.7	5	0	1	0
THC (ppm) Average	639	32	33	99.85	7.5	-	3.1	-
Temperature 2 m (C) Average	672	0	0	100	11.2	-	5.4	-
Temperature 20 m (C) Average	661	0	11	98.36	11.8	-	7.1	-
Temperature 45 m (C) Average	672	0	0	100	13.5	-	7.6	-
Temperature 75 m (C) Average	672	0	0	100	13.6	-	8.7	-
Temperature 90 m (C) Average	672	0	0	100	13.7	-	9	-
Relative Humidity 2 m (%) Average	672	0	0	100	96	-	89	-
Relative Humidity 20 m (%) Average	661	0	11	98.36	96	-	89	-
Relative Humidity 45 m (%) Average	672	0	0	100	97	-	89	-
Relative Humidity 75 m (%) Average	672	0	0	100	97	-	90	-
Relative Humidity 90 m (%) Average	672	0	0	100	97	-	90	-
Wind Speed 20 m (km/h) Average	661	0	11	98.36	33	-	22	-
Wind Speed 45 m (km/h) Average	670	0	2	99.7	38	-	29	-
Wind Speed 75 m (km/h) Average	671	0	1	99.85	43	-	34	-
Wind Speed 90 m (km/h) Average	672	0	0	100	45	-	36	-
Wind Direction 20 m (deg) Average	661	0	11	98.36	-	-	-	-
Wind Direction 45 m (deg) Average	670	0	2	99.7	-	-	-	-
Wind Direction 75 m (deg) Average	671	0	1	99.85	-	-	-	-
Wind Direction 90 m (deg) Average	672	0	0	100	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	661	0	11	98.36	1.3	-	0.9	-
Vertical Wind Speed 45 m (km/h) Average	670	0	2	99.7	1.9	-	1.2	-
Vertical Wind Speed 75 m (km/h) Average	671	0	1	99.85	1.6	-	0.7	-
Vertical Wind Speed 90 m (km/h) Average	672	0	0	100	1.6	-	0.5	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
FEBRUARY 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	639	2.3	5	-	0	0	0	0	2	6	56
H2S (ppb) Average	639	0.7	1	-	0	0	0	0	1	2	5
THC (ppm) Average	639	2.42	0.4	-	2.1	2.2	2.2	2.3	2.4	2.8	7.5
Temperature 2 m (C) Average	672	-10.64	9.7	-	-30.7	-22	-18.1	-12.5	-2	3.3	11.2
Temperature 20 m (C) Average	661	-9.84	9.7	-	-29.1	-21.4	-17.3	-12.4	-1.8	4.3	11.8
Temperature 45 m (C) Average	672	-10.03	9.9	-	-30.1	-21.8	-17.5	-12.6	-2.2	4.7	13.5
Temperature 75 m (C) Average	672	-9.96	10	-	-28.5	-21.9	-17.4	-12.6	-2.1	5.5	13.6
Temperature 90 m (C) Average	672	-9.94	10	-	-27.7	-21.9	-17.4	-12.5	-2.2	5.8	13.7
Relative Humidity 2 m (%) Average	672	71.2	12	-	40	54	63	74	80	84	96
Relative Humidity 20 m (%) Average	661	69.1	13	-	36	49	59	72	79	84	96
Relative Humidity 45 m (%) Average	672	68.8	14	-	34	47	59	72	79	84	97
Relative Humidity 75 m (%) Average	672	68.8	14	-	34	46	59	73	79	84	97
Relative Humidity 90 m (%) Average	672	68.8	15	-	34	46	59	73	79	85	97
Wind Speed 20 m (km/h) Average	661	9.5	6	-	0	3	5	9	12	17	33
Wind Speed 45 m (km/h) Average	670	12.8	8	-	0	4	7	12	17	23	38
Wind Speed 75 m (km/h) Average	671	14.8	9	-	0	4	8	13	20	28	43
Wind Speed 90 m (km/h) Average	672	15.8	9	-	0	4	9	14	22	29	45
Wind Direction 20 m (deg) Average	661	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	661	0.05	0.4	-	-1.1	-0.4	-0.2	0	0.3	0.6	1.3
Vertical Wind Speed 45 m (km/h) Average	670	0.02	0.6	-	-1.6	-0.6	-0.4	-0.1	0.4	0.9	1.9
Vertical Wind Speed 75 m (km/h) Average	671	0.15	0.3	-	-0.9	-0.2	-0.1	0.1	0.3	0.5	1.6
Vertical Wind Speed 90 m (km/h) Average	672	0.18	0.4	-	-1	-0.3	0	0.2	0.4	0.6	1.6

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC	19 Feb 2017 09:00	19 Feb 2017 09:00	1	Maintenance - automated daily zero response verified
H2S	20 Feb 2017 09:00	20 Feb 2017 10:00	2	Maintenance - automated daily zero response verified
Temperature, Relative Humidity 20 m	06 Feb 2017 04:00	06 Feb 2017 10:00	7	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 20 m	07 Feb 2017 06:00	07 Feb 2017 09:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	06 Feb 2017 04:00	06 Feb 2017 10:00	7	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	07 Feb 2017 06:00	07 Feb 2017 09:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	20 Feb 2017 18:00	20 Feb 2017 19:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	20 Feb 2017 19:00	20 Feb 2017 19:00	1	Flat line in sensor output signal - Sensor frozen



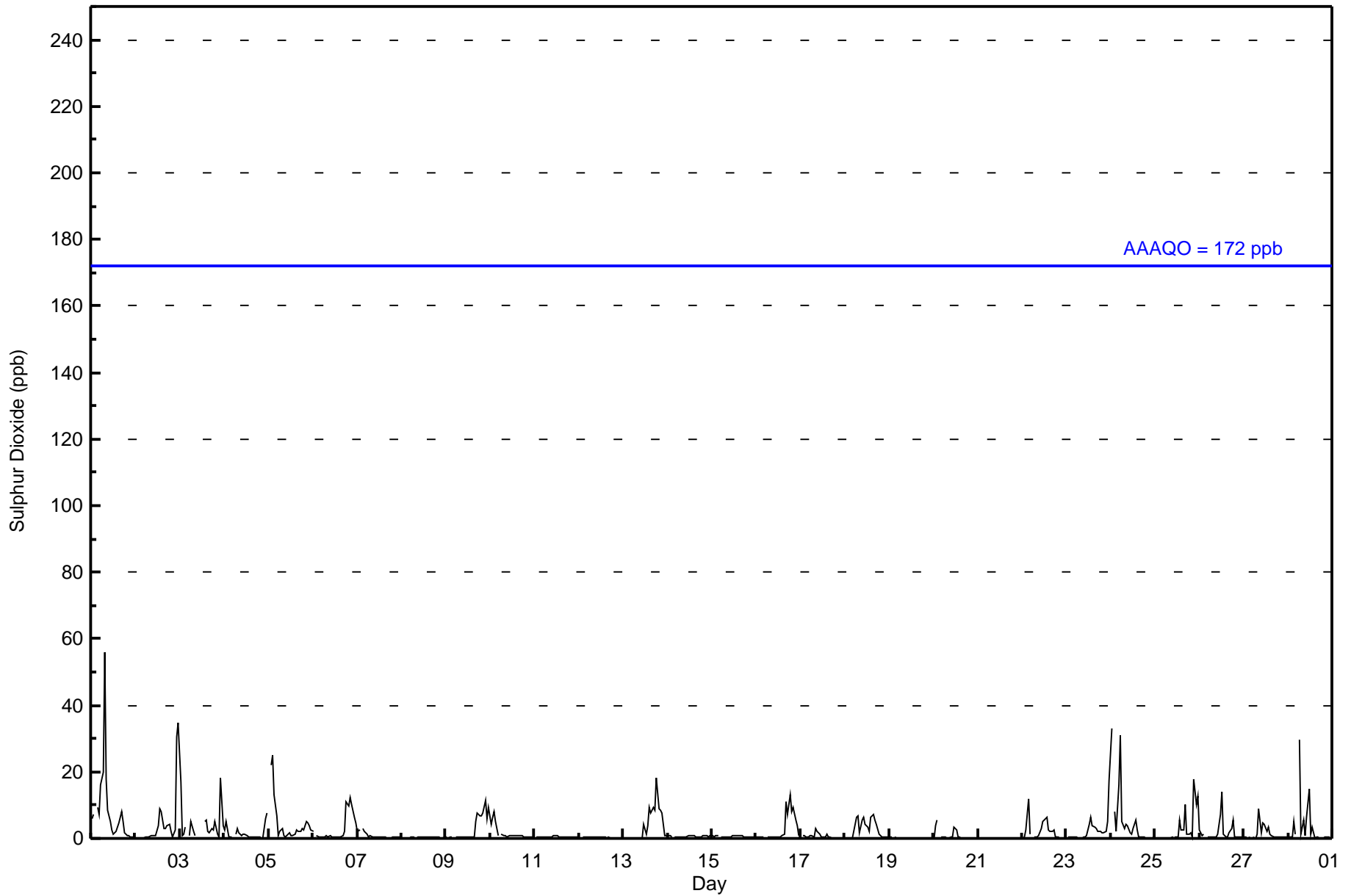
Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mannix - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 56 ppb on Feb 1 08:00 Maximum Daily Average: 8.0 ppb on Feb 1																	Hours in Service: 672 Hours of Data: 639										
Minimum Value: 0 ppb on Feb 20 22:00 Minimum Daily Average: 0.0 ppb on Feb 21 Maximum Diurnal Average: 3.5 ppb at hour 24 Minimum Diurnal Average: 1.2 ppb at hour 10 Monthly Average: 2.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 29																	Hours of Missing Data: 33 Hours of Calibration: 32 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-Feb	6	7	Z	9	7	16	20	56	18	8	5	3	1	2	3	5	8	5	2	1	1	0	0	0	8.0	56	
2-Feb	0	0	0	Z	0	0	0	0	1	1	1	1	4	9	8	3	3	4	4	2	0	3	31	35	4.7	35	
3-Feb	17	1	1	4	Z	1	5	2	1	C	C	C	C	5	6	2	2	3	3	5	1	0	18	4	4.2	18	
4-Feb	3	5	1	0	0	Z	1	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	6	8	1.5	8	
5-Feb	Z	22	25	13	7	1	2	3	1	0	1	2	1	1	1	2	2	2	0	3	3	5	5	4	2	4.7	25
6-Feb	2	Z	1	1	0	0	1	1	1	1	0	0	1	0	0	0	1	2	11	10	12	10	6	5	2.9	12	
7-Feb	2	3	Z	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.8	3	
8-Feb	0	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-Feb	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	5	8	7	7	8	11	6	9	2.8	11	
10-Feb	4	6	8	5	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1.6	8	
11-Feb	Z	1	0	0	1	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1	
12-Feb	0	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	
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	4	1	4	9	8	9	9	18	9	9	8	1	1	3.9	18	
14-Feb	1	1	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
15-Feb	1	1	1	1	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1	
16-Feb	0	0	0	0	0	Z	0	0	0	1	0	0	0	1	1	1	11	7	13	8	9	5	4	1	2.8	13	
17-Feb	Z	1	1	1	0	1	1	0	3	2	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.7	3	
18-Feb	0	Z	0	0	0	2	6	7	2	5	6	4	3	2	6	7	6	4	1	1	0	0	0	0	2.9	7	
19-Feb	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
20-Feb	0	4	5	Z	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0.8	5	
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
22-Feb	0	0	2	12	1	Z	0	0	0	1	3	5	5	6	3	2	2	2	2	0	0	0	0	0	2.1	12	
23-Feb	Z	1	1	0	0	0	0	0	0	0	1	4	6	4	3	3	2	2	2	2	2	5	17	2.5	17		
24-Feb	33	Z	8	2	16	31	5	3	4	4	2	1	3	5	3	1	0	0	0	0	0	0	0	0	5.4	33	
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	5	2	2	10	1	1	2	0	18	10	13	3.0	18	
26-Feb	3	1	1	Z	0	0	0	0	0	1	1	7	14	1	0	0	2	3	5	1	0	0	0	0	1.9	14	
27-Feb	0	0	0	0	Z	0	0	1	9	2	5	4	2	3	1	1	0	0	0	0	0	0	0	0	1.4	9	
28-Feb	0	0	0	5	1	Z	30	1	6	1	6	15	1	3	0	0	0	0	0	0	0	0	0	0	3.2	30	
3.1 2.2 2.5 2.5 1.8 2.5 2.8 3.0 1.9 1.2 1.4 2.2 1.9 2.2 1.9 1.5 2.4 2.1 2.7 1.9 1.9 2.4 3.4 3.5																								Diurnal Average			
33 22 25 13 16 31 30 56 18 8 6 15 14 9 9 8 11 9 9 18 10 12 18 31 35																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	612	95.77	95.77
11 - 20	19	2.97	98.75
21 - 60	8	1.25	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	45	42	12	11	22	21	56	87	24	25	43	52	52	41	34	34	601
11 - 20	13	2	0	0	0	0	0	0	0	0	0	0	1	1	1	1	19
21 - 60	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	44	12	11	22	21	56	87	24	25	43	52	53	42	35	35	628

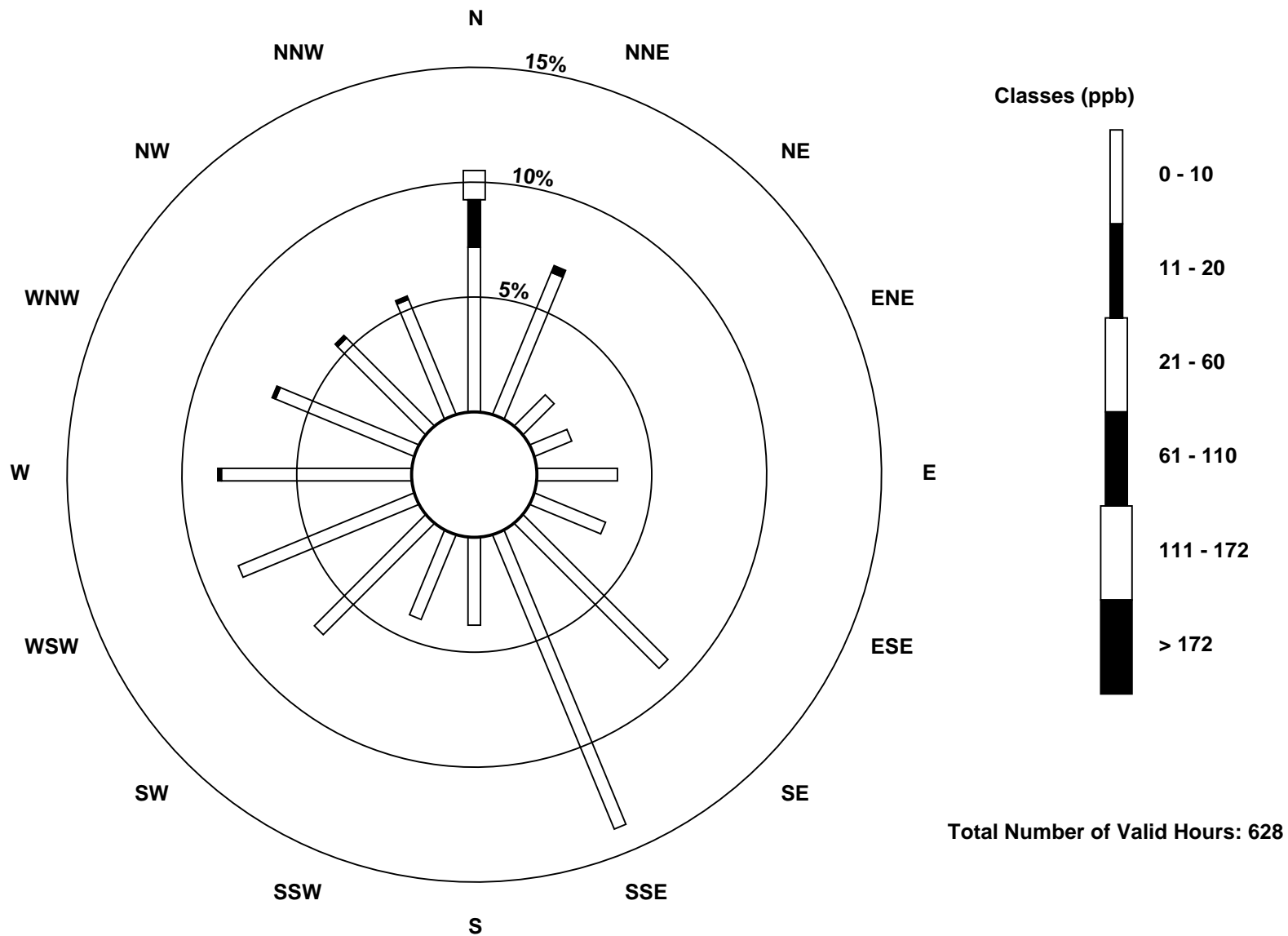
Total Number of Valid Hours: 628

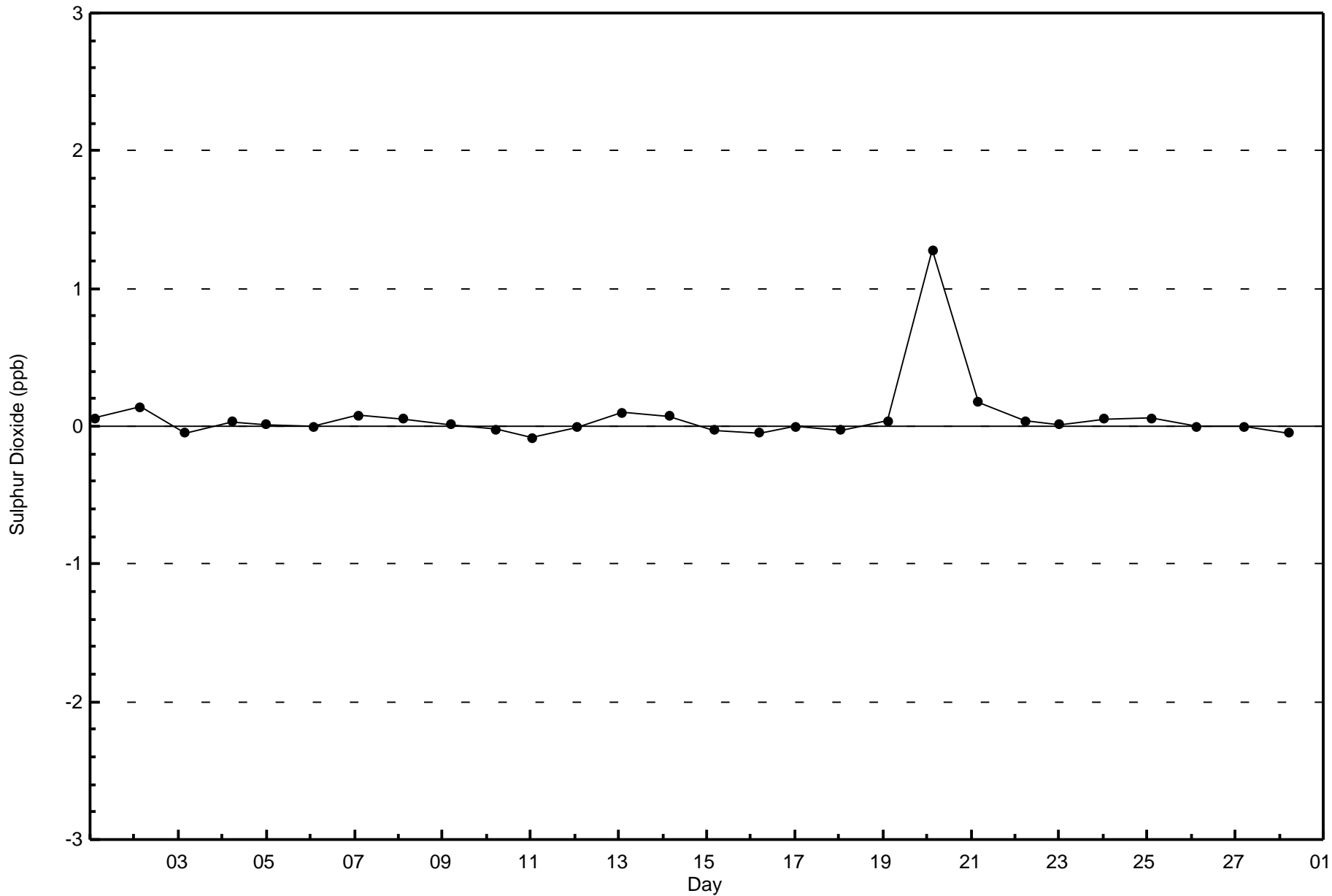
Total Number of Hours: 672

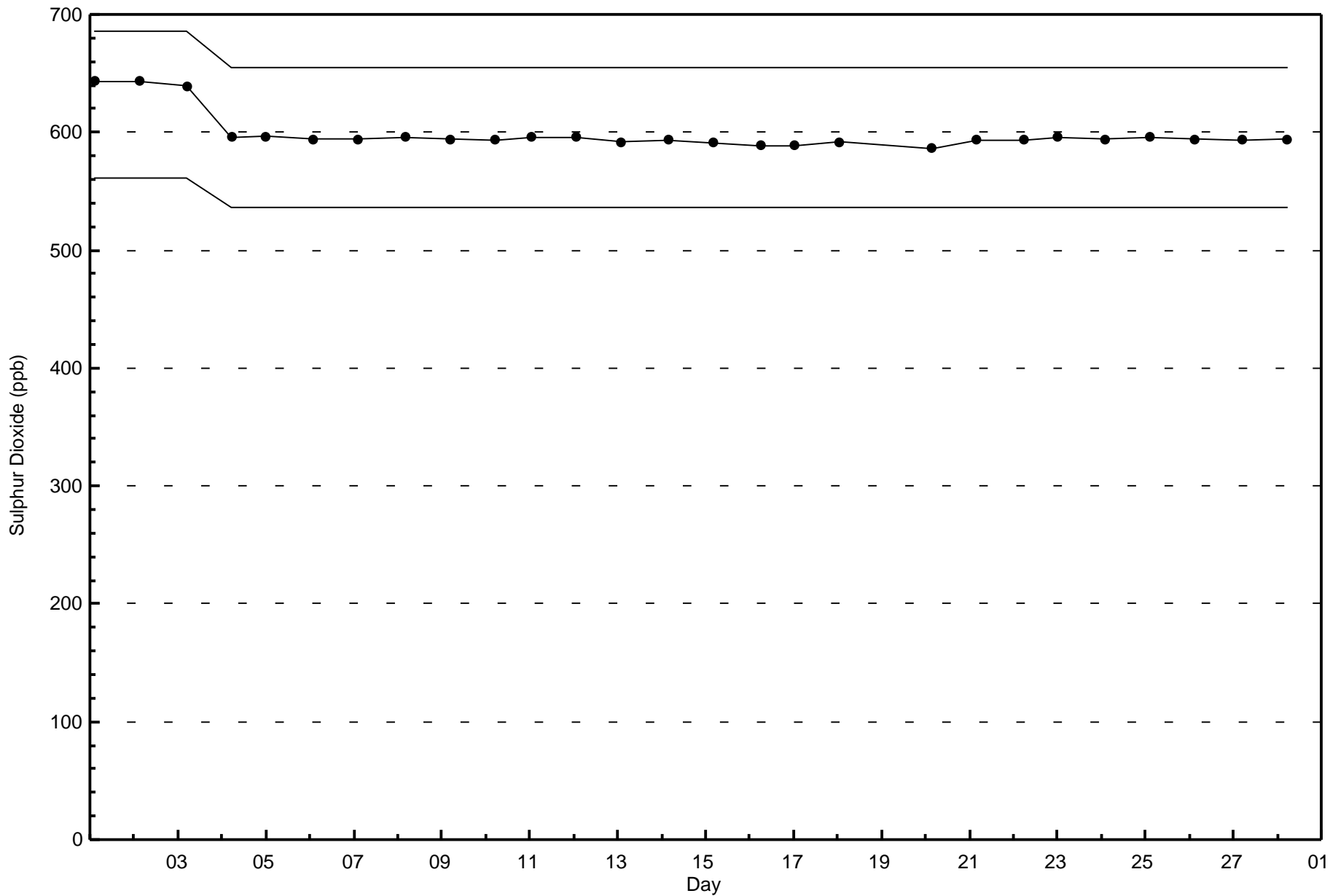


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 5 ppb on Feb 2 14:00	Maximum Daily Average: 1.4 ppb on Feb 9
Minimum Value: 0 ppb on Feb 2 03:00	Hours of Data: 639
Maximum Diurnal Average: 0.8 ppb at hour 21	Hours of Missing Data: 33
Monthly Average: 0.7 ppb	Hours of Calibration: 31
Minimum Daily Average: 0.1 ppb on Feb 12	Percent Operational Time: 99.7
Minimum Diurnal Average: 0.4 ppb at hour 15	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 4	

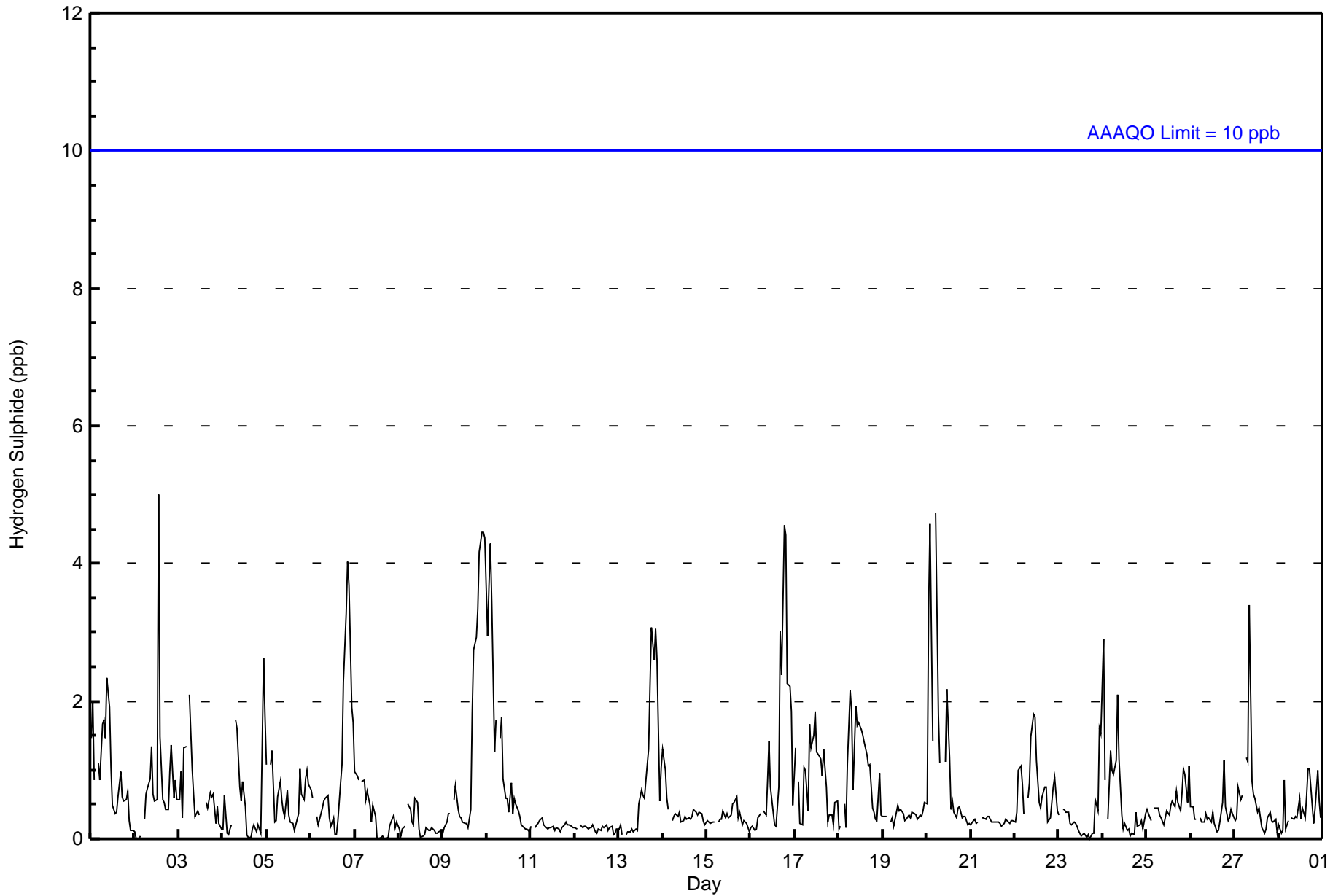
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	2	1	Z	1	1	2	2	1	2	2	1	0	0	0	1	1	1	1	1	1	0	0	0	1.0	2
2-Feb	0	0	0	0	Z	0	1	1	1	1	1	1	1	5	1	1	1	0	0	1	1	1	1	1	0.8	5
3-Feb	1	1	0	1	1	Z	2	1	1	0	0	0	C	C	C	1	0	1	1	1	0	0	0	0.7	2	
4-Feb	0	1	0	0	0	0	Z	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	3	2	0.5	3
5-Feb	1	Z	1	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	0.6	1
6-Feb	1	1	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	2	3	4	4	2	2	1.1	4
7-Feb	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Feb	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
9-Feb	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	2	3	3	3	4	4	4	4	1.4	4
10-Feb	3	4	4	3	1	2	Z	1	2	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0	1.2	4
11-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	2	3	3	3	3	1	1	0.9	3
14-Feb	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.3	1
16-Feb	0	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	1	3	2	5	4	2	2	2	0	1.2	5
17-Feb	1	Z	1	0	0	1	1	0	2	1	2	2	1	1	1	1	1	1	1	0	0	0	1	1	0.9	2
18-Feb	0	0	Z	0	0	1	2	2	1	2	2	2	2	2	1	1	1	1	0	0	0	0	1	0	1.0	2
19-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
20-Feb	1	3	5	1	Z	5	2	1	M	M	1	2	1	0	1	0	0	0	0	0	0	0	0	0	1.2	5
21-Feb	0	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
22-Feb	0	0	1	1	1	0	Z	1	1	1	2	2	1	1	0	1	1	1	0	0	1	1	1	0	0.8	2
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	0.3	2
24-Feb	3	1	Z	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
25-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	1	1	0.5	1
26-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.4	1
27-Feb	0	0	1	1	1	Z	1	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
28-Feb	0	0	0	1	0	0	Z	0	0	0	0	1	0	0	0	1	1	1	0	0	0	1	1	0	0.4	1
	0.6	0.7	0.7	0.6	0.5	0.7	0.7	0.7	0.8	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.6		Diurnal Average
	3	4	5	3	1	5	2	2	3	2	2	2	2	5	1	1	3	3	5	4	4	4	4	4		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
Mannix - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	611	95.62	95.62
3 - 4	24	3.76	99.37
5 - 7	4	0.63	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mannix - February 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	55	39	12	11	24	19	56	87	23	24	45	51	54	37	30	33	600
3 - 4	13	4	0	0	0	0	0	0	0	0	0	0	2	1	2	2	24
5 - 7	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	4
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	69	43	12	12	24	19	56	87	23	24	45	51	56	39	33	35	628

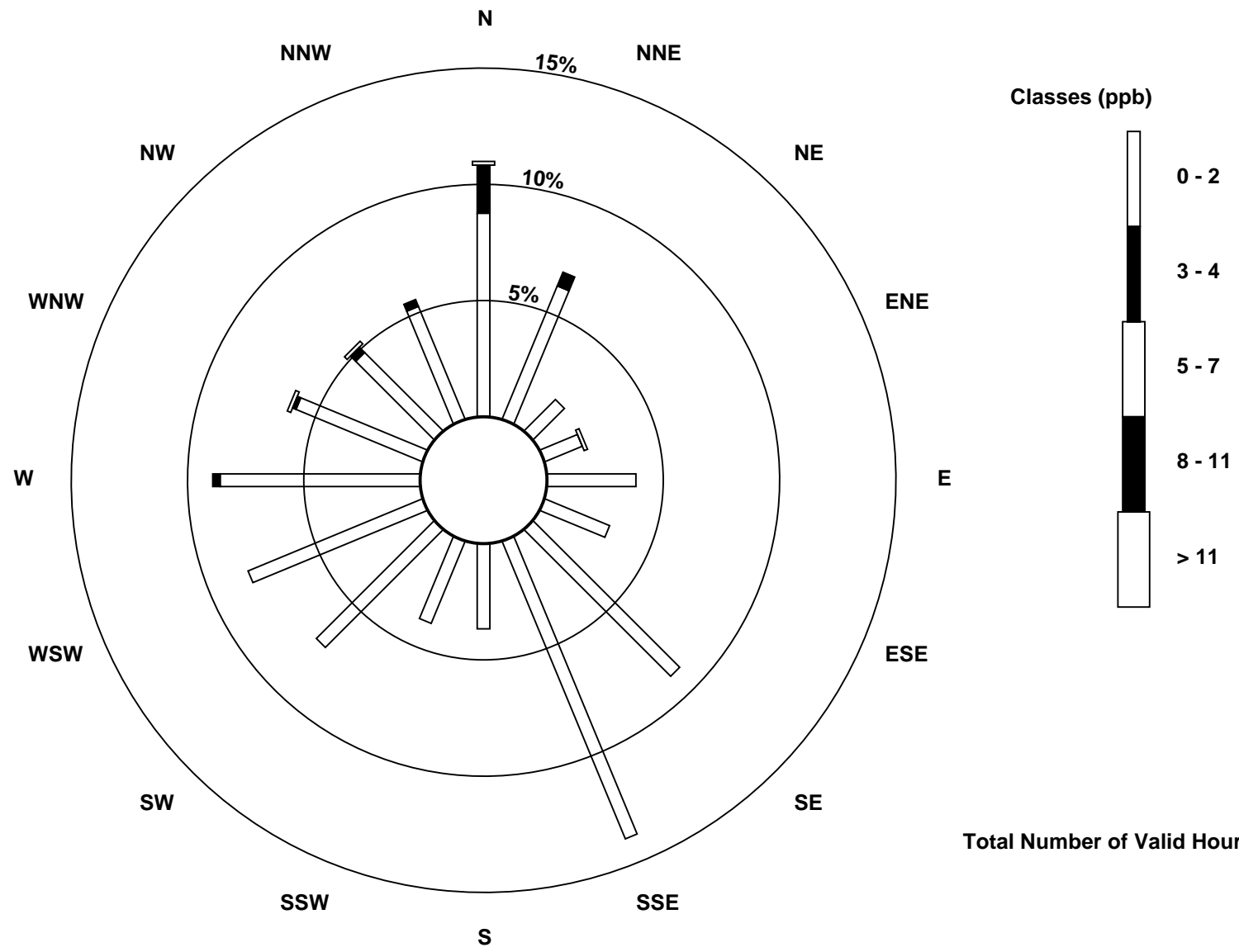
Total Number of Valid Hours: 628

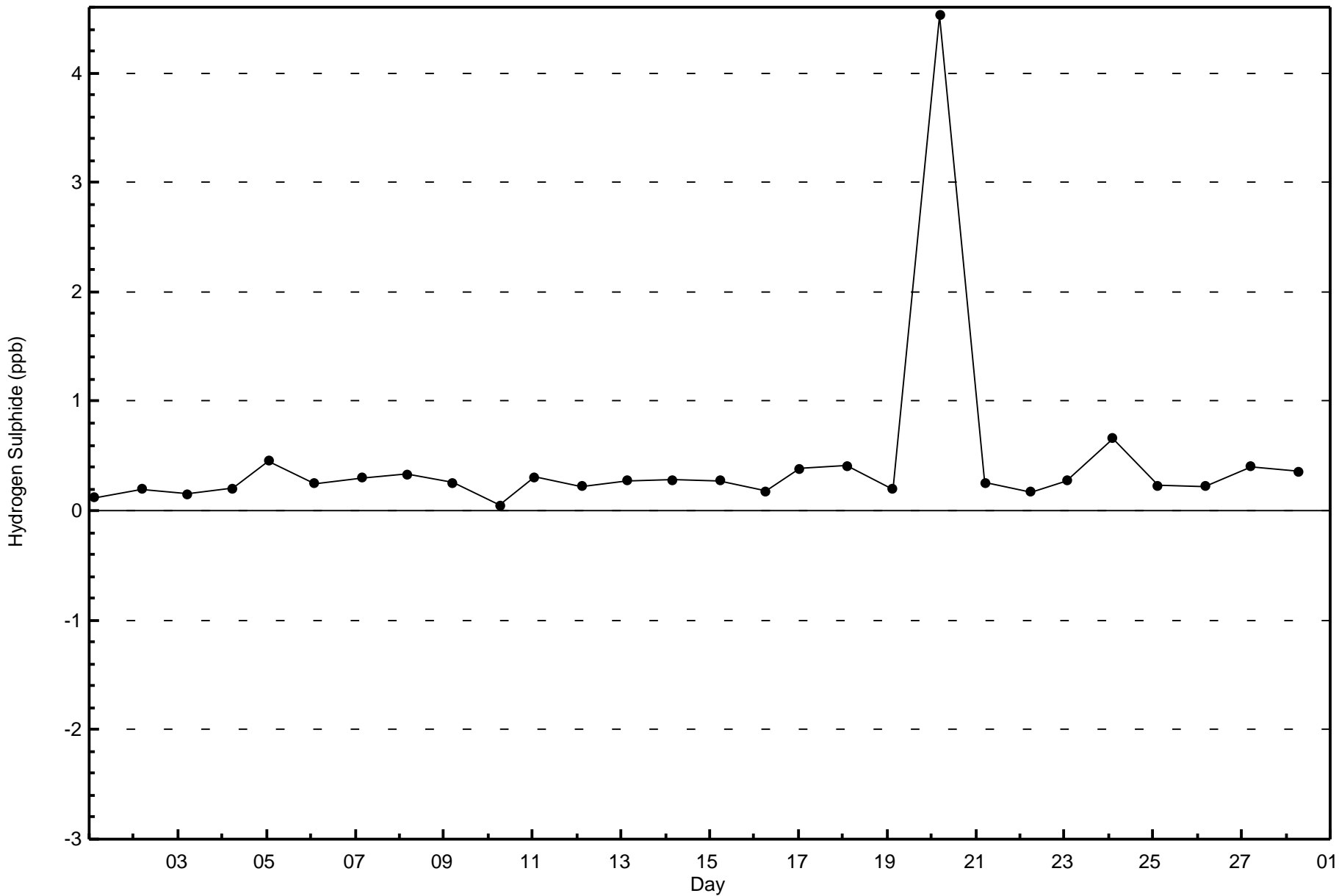
Total Number of Hours: 672

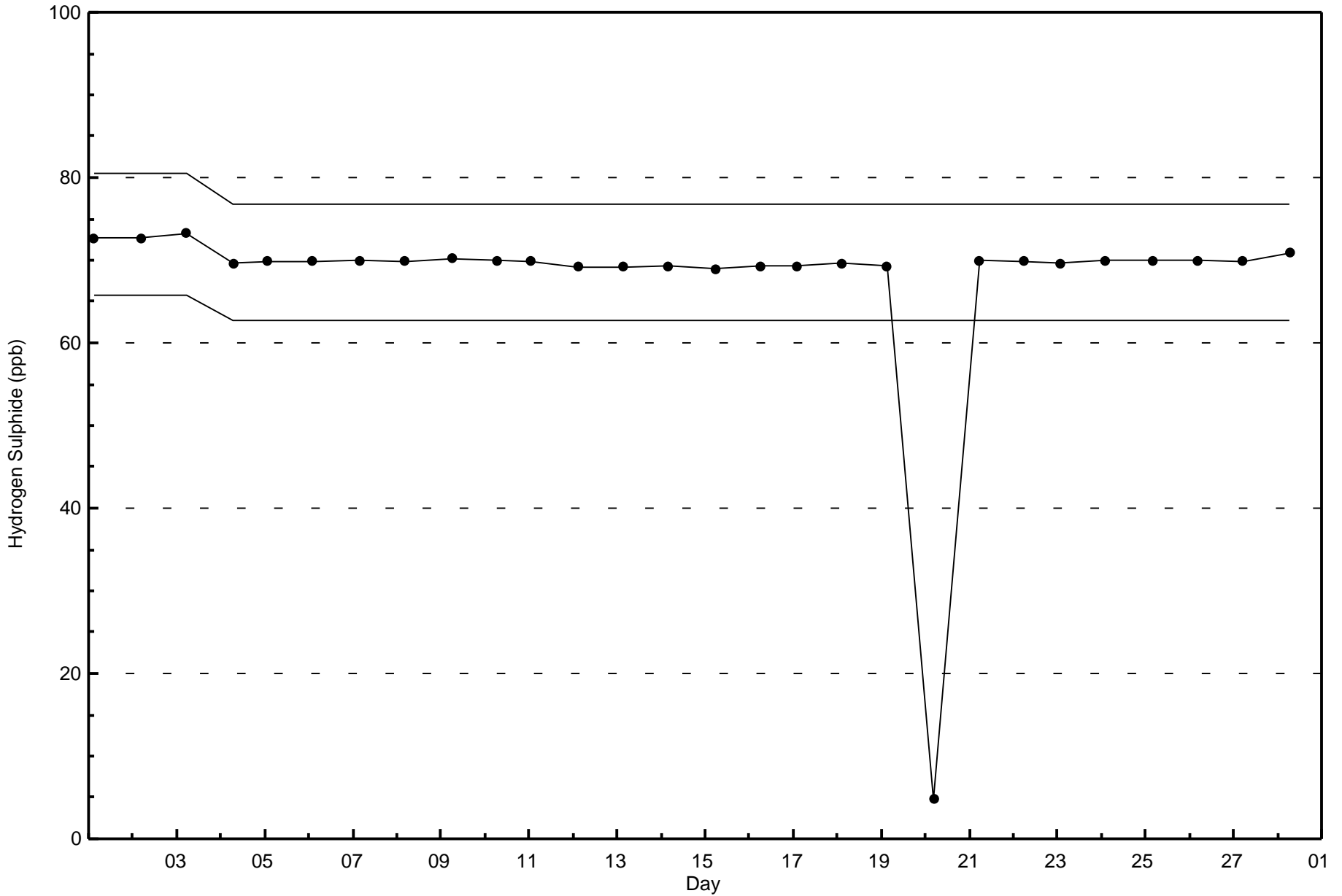


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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

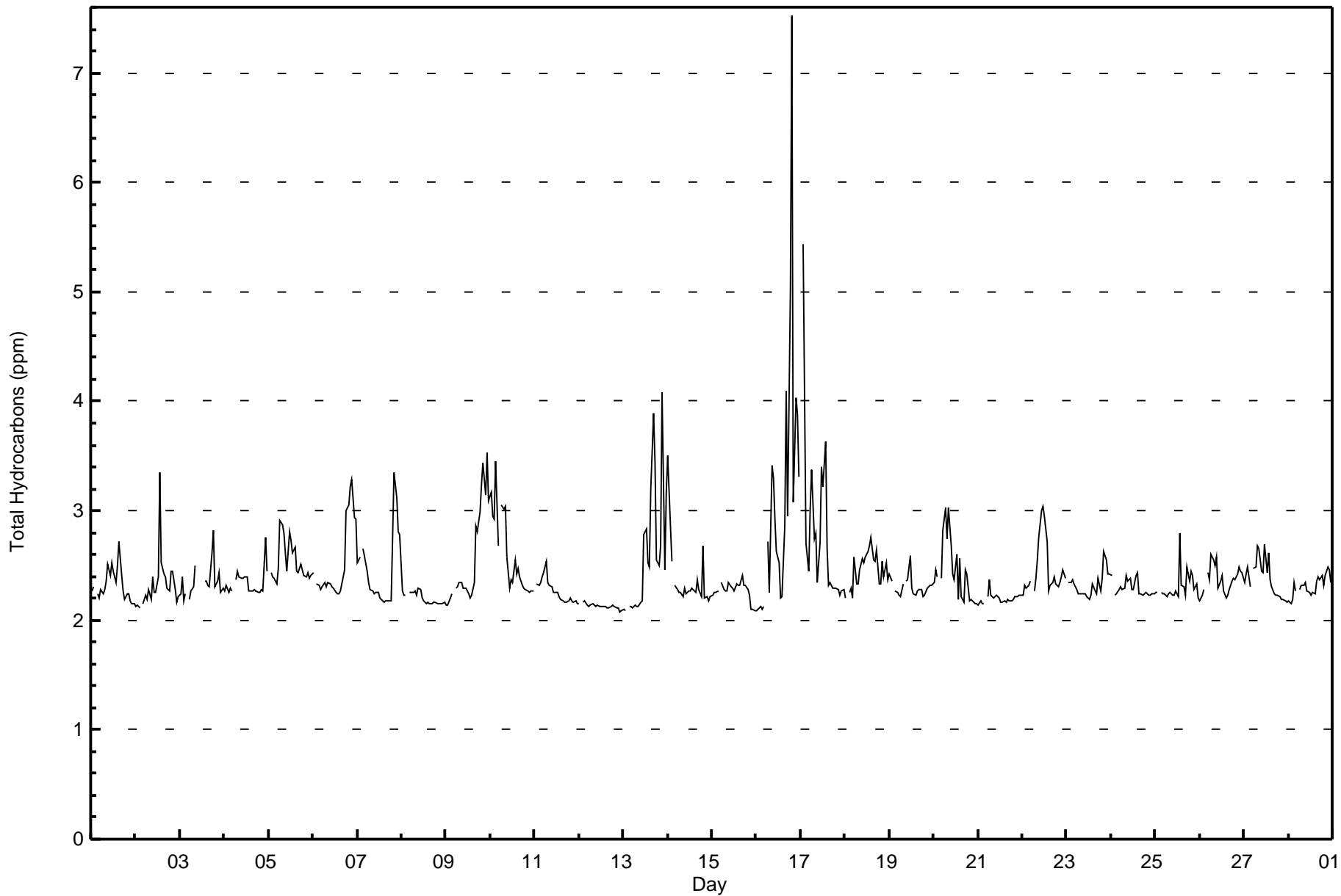








Maximum Value: 7.5 ppm on Feb 16 20:00																				Maximum Daily Average: 3.1 ppm on Feb 16					Hours in Service: 672			
Minimum Value: 2.1 ppm on Feb 12 23:00																				Minimum Daily Average: 2.1 ppm on Feb 12					Hours of Data: 639			
Maximum Diurnal Average: 2.6 ppm at hour 20																				Minimum Diurnal Average: 2.3 ppm at hour 5					Hours of Missing Data: 33			
Monthly Average: 2.42 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 4.1					Hours of Calibration: 32			
																									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-Feb	2.3	2.3	Z	2.2	2.2	2.3	2.2	2.3	2.4	2.5	2.4	2.5	2.4	2.3	2.5	2.7	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.7		
2-Feb	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.3	2.2	2.4	2.2	2.3	2.4	3.3	2.5	2.4	2.4	2.3	2.3	2.4	2.5	2.3	2.2	2.2	2.3	3.3		
3-Feb	2.2	2.4	2.2	2.2	Z	2.2	2.3	2.3	2.5	C	C	C	C	2.4	2.4	2.3	2.3	2.6	2.8	2.3	2.4	2.4	2.3	2.3	2.4	2.8		
4-Feb	2.3	2.3	2.3	2.3	2.3	Z	2.4	2.5	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	2.8	2.4	2.4	2.4	2.8		
5-Feb	Z	2.4	2.4	2.4	2.3	2.5	2.9	2.9	2.8	2.6	2.4	2.8	2.7	2.6	2.7	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.5	2.9		
6-Feb	2.4	Z	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	2.4	2.5	3.0	3.1	3.2	3.3	2.9	2.9	2.5	3.3		
7-Feb	2.5	2.6	Z	2.6	2.6	2.4	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	2.7	3.3	3.1	2.8	2.8	2.5	3.3		
8-Feb	2.3	2.2	2.2	Z	2.3	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	2.2	2.2	2.2	2.2	2.2	2.3		
9-Feb	2.1	2.1	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	2.3	2.9	2.8	3.0	3.2	3.4	3.1	3.5	3.1	2.6	3.5		
10-Feb	3.2	3.0	2.9	3.4	2.7	Z	3.0	3.0	3.0	2.6	2.3	2.4	2.3	2.5	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.6	3.4		
11-Feb	Z	2.3	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5		
12-Feb	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2		
13-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.8	2.8	2.5	2.5	3.2	3.9	3.4	2.5	2.5	2.7	4.1	2.5	3.2	2.6	4.1		
14-Feb	3.5	2.8	2.5	Z	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.7	2.2	2.2	2.2	2.2	2.4	3.5		
15-Feb	2.2	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	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.3	2.4		
16-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.7	2.3	3.4	3.3	2.9	2.6	2.5	2.2	2.2	2.9	4.1	3.0	5.0	7.5	3.1	4.0	3.9	3.3	3.1	7.5		
17-Feb	Z	5.4	4.1	2.7	2.4	3.0	3.4	2.7	2.8	2.3	2.7	3.4	3.2	3.6	2.7	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.8	5.4		
18-Feb	2.2	Z	2.3	2.3	2.2	2.6	2.3	2.3	2.5	2.6	2.5	2.6	2.6	2.7	2.8	2.6	2.5	2.6	2.3	2.3	2.5	2.4	2.5	2.4	2.5	2.8		
19-Feb	2.4	2.4	Z	2.3	2.2	2.2	2.2	2.3	M	2.4	2.4	2.6	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.6		
20-Feb	2.3	2.5	2.4	Z	2.4	2.8	3.0	2.7	3.0	2.7	2.4	2.4	2.6	2.2	2.6	2.2	2.2	2.5	2.4	2.2	2.2	2.2	2.2	2.1	2.4	3.0		
21-Feb	2.1	2.2	2.2	2.2	Z	2.2	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	2.2	2.2	2.4		
22-Feb	2.2	2.3	2.3	2.3	2.4	Z	2.3	2.4	2.5	2.8	3.0	3.0	3.0	2.7	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.5	2.4	2.5	3.0		
23-Feb	Z	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4	2.3	2.4	2.6	2.5	2.4	2.4	2.3	2.6		
24-Feb	2.4	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4		
25-Feb	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.8	2.3	2.3	2.2	2.5	2.4	2.5	2.4	2.3	2.3	2.2	2.3	2.8		
26-Feb	2.2	2.2	2.3	Z	2.4	2.4	2.6	2.6	2.5	2.6	2.3	2.4	2.4	2.3	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.6		
27-Feb	2.3	2.4	2.5	2.3	Z	2.5	2.5	2.7	2.7	2.4	2.4	2.7	2.4	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.7		
28-Feb	2.2	2.1	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.4	2.4	2.4	2.4	2.3	2.4	2.5	2.5	2.3	2.3	2.5		
																								Diurnal Average				
																								Diurnal Maximum				
2.3 2.5 2.4 2.4 2.3 2.4 2.4 2.4 2.5 2.4 2.4 2.4 2.4 2.4 2.3 2.4 2.4 2.4 2.4 2.5 2.6 2.5 2.5 2.4 2.4 2.4																												
3.5 5.4 4.1 3.4 2.7 3.0 3.4 3.0 3.4 3.3 3.0 3.4 3.2 3.6 2.8 3.2 4.1 3.4 5.0 7.5 3.4 4.1 3.9 3.3																												
Z - zerospan C - Calibration M - Maintenance																												





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	605	94.68	94.68
3.1 - 10.0	34	5.32	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Mannix - February 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	40	12	10	21	20	53	87	23	25	43	52	49	36	29	35	594
3.1 - 10.0	7	4	0	1	1	1	3	0	1	0	0	0	4	6	6	0	34
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	44	12	11	22	21	56	87	24	25	43	52	53	42	35	35	628

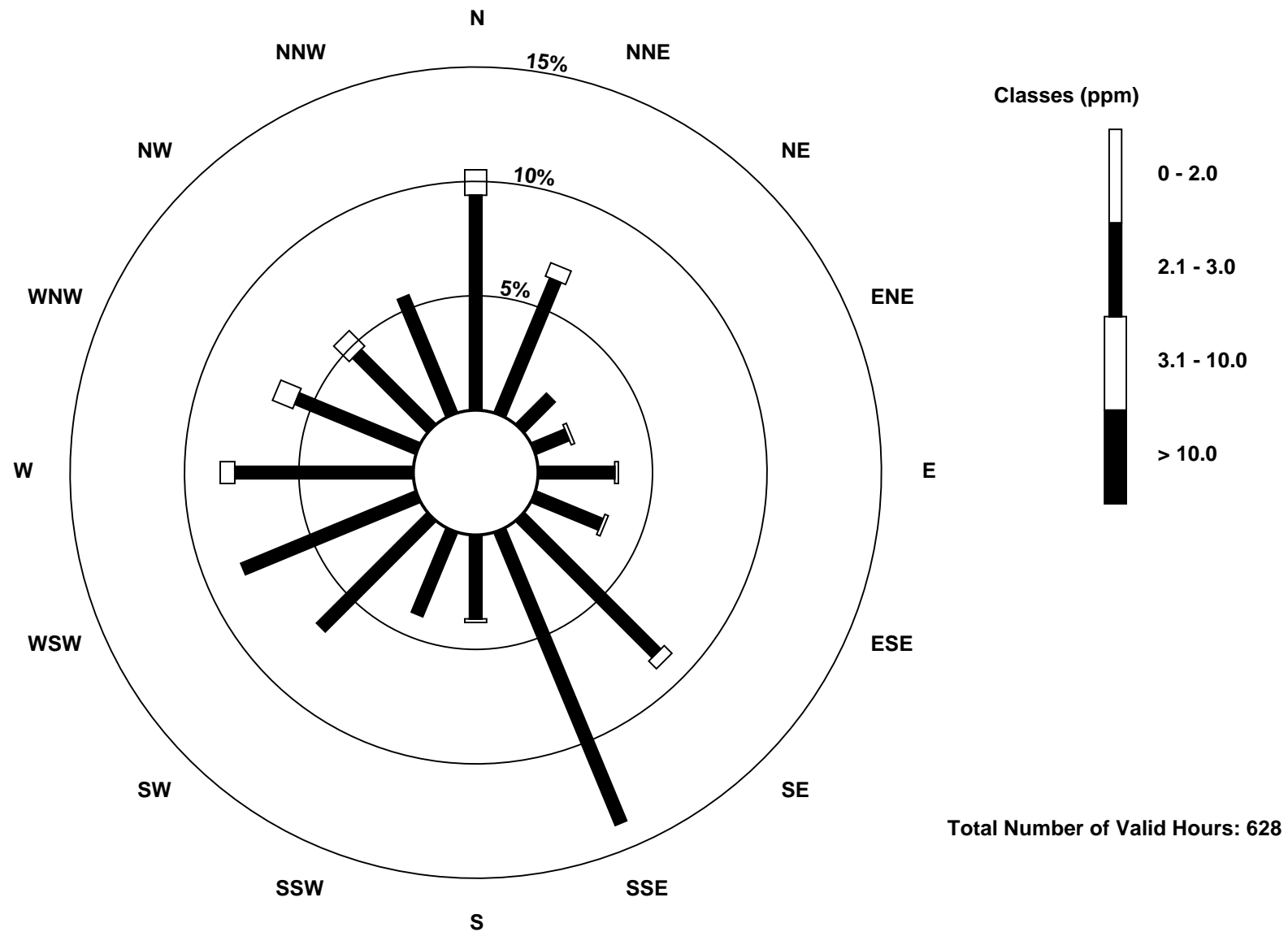
Total Number of Valid Hours: 628

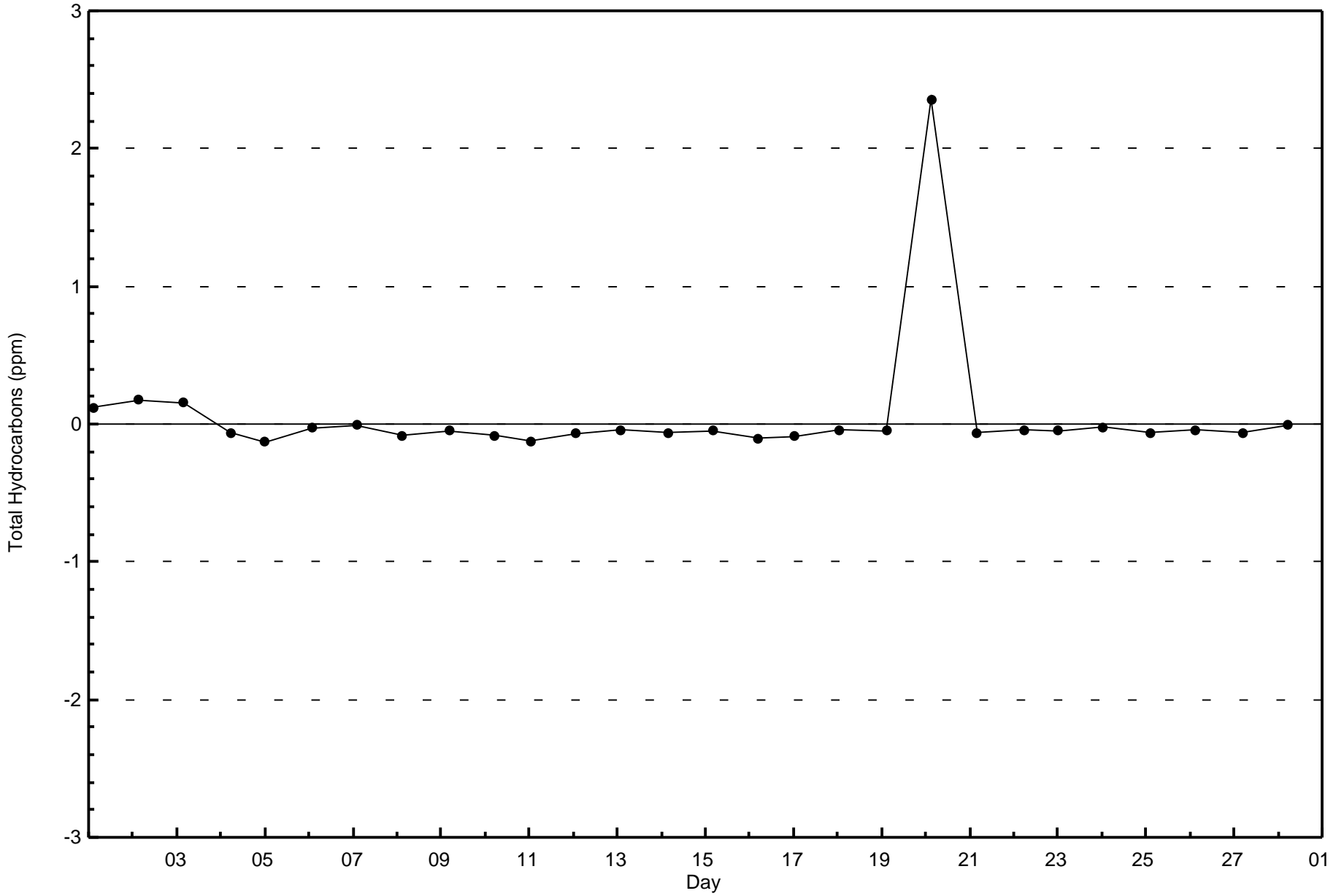
Total Number of Hours: 672

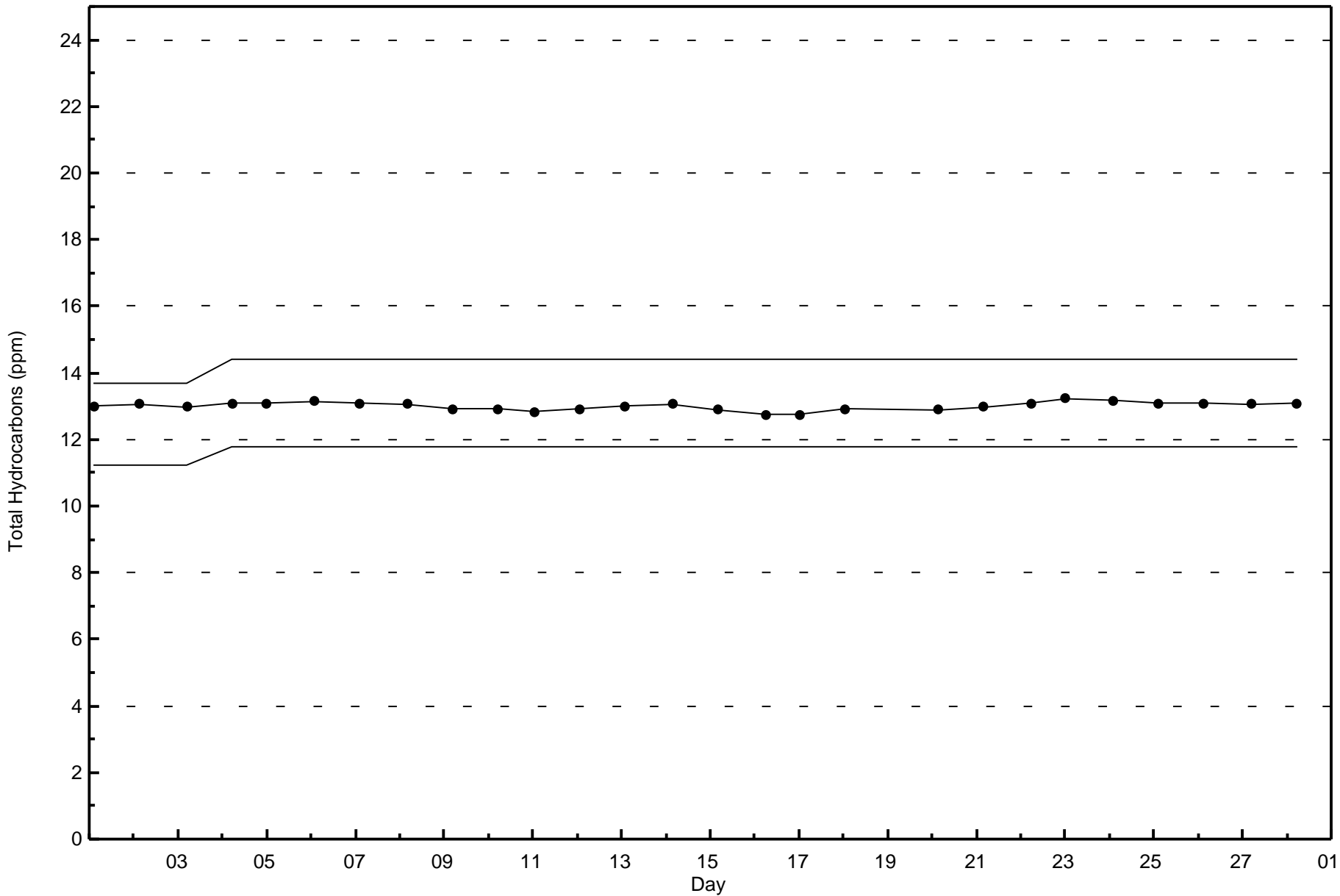


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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







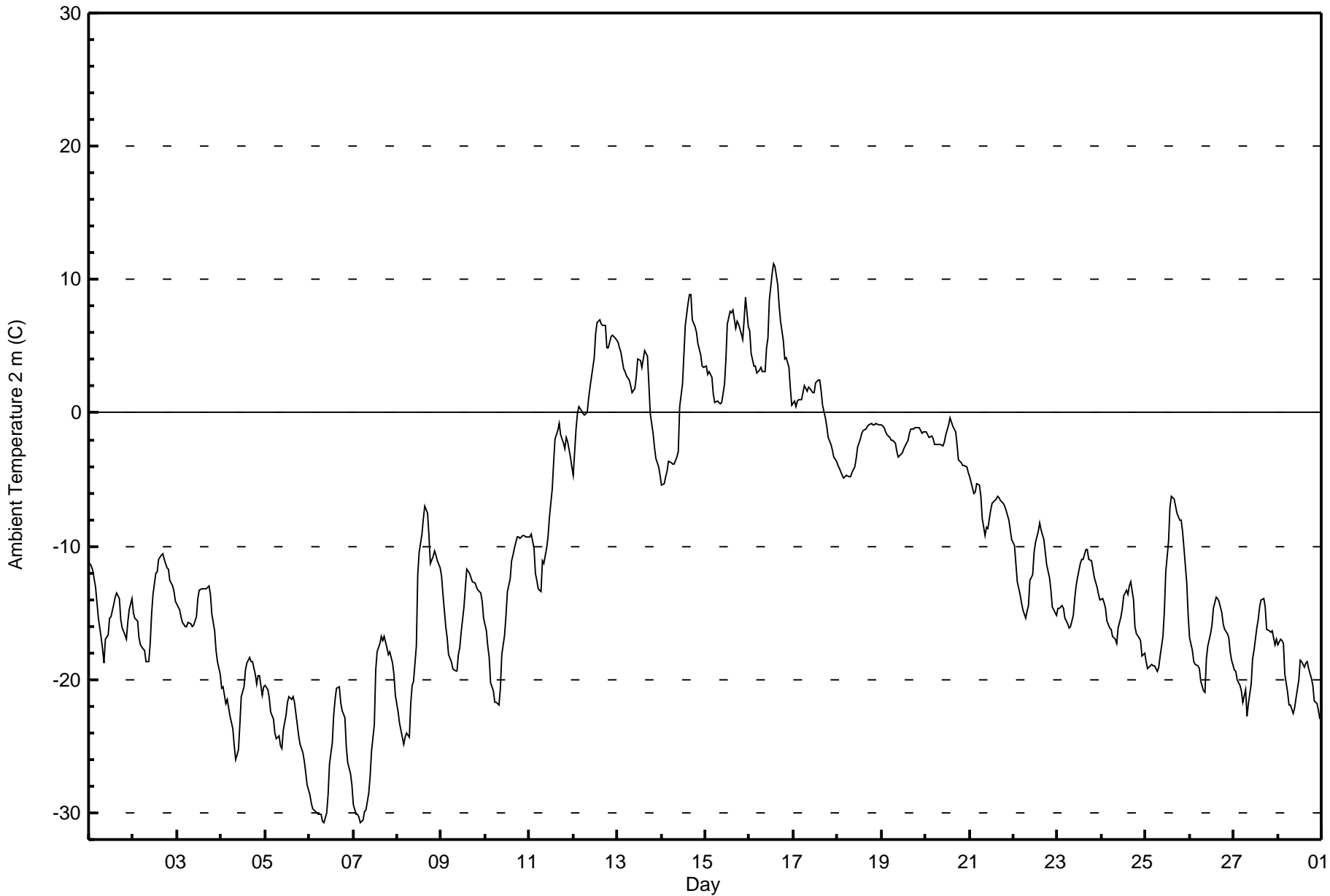


Maximum Value: 11.2 C on Feb 16 14:00 Maximum Daily Average: 5.4 C on Feb 16																						Hours in Service: 672 Hours of Data: 672				
Minimum Value: -30.7 C on Feb 7 05:00 Minimum Daily Average: -26.5 C on Feb 6																						Hours of Missing Data: 0 Hours of Calibration: 0				
Maximum Diurnal Average: -7.2 C at hour 16 Minimum Diurnal Average: -13.6 C at hour 8																						Percent Operational Time: 100.0				
Monthly Average: -10.64 C Percentiles: P ₁ = -30.2 P ₁₀ = -22.0 Q ₁ = -18.1 Median = -12.5 Q ₃ = -2.0 P ₉₀ = 3.3 P ₉₉ = 8.7																										
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-Feb	-11.3	-11.5	-11.9	-13.1	-14.2	-15.4	-16.9	-17.7	-18.8	-16.9	-16.7	-15.4	-15.2	-14.4	-13.8	-13.5	-14.0	-15.5	-16.1	-16.6	-17.0	-15.7	-14.8	-14.0	-15.0	-11.3
2-Feb	-15.0	-15.4	-15.6	-16.9	-17.4	-17.7	-17.8	-18.7	-18.6	-17.2	-15.1	-13.6	-12.0	-11.9	-11.0	-10.7	-10.6	-10.9	-11.7	-11.7	-12.5	-13.0	-13.4	-14.2	-14.3	-10.6
3-Feb	-14.5	-14.8	-15.3	-15.8	-16.0	-16.1	-15.7	-15.8	-16.0	-15.9	-15.3	-13.9	-13.3	-13.2	-13.1	-13.2	-13.2	-13.0	-13.6	-15.1	-16.3	-17.8	-18.6	-19.6	-15.2	-13.0
4-Feb	-20.6	-20.6	-21.8	-21.5	-22.1	-22.8	-23.7	-25.0	-26.0	-25.3	-23.3	-21.3	-20.5	-19.2	-18.7	-18.4	-18.7	-18.6	-19.6	-20.4	-19.7	-19.7	-21.1	-20.5	-21.2	-18.4
5-Feb	-20.4	-20.7	-21.4	-22.4	-23.0	-24.0	-24.5	-24.3	-24.9	-25.1	-23.8	-22.6	-21.7	-21.3	-21.5	-21.3	-21.7	-23.4	-24.2	-24.8	-25.5	-26.1	-26.9	-27.9	-23.5	-20.4
6-Feb	-28.6	-29.3	-29.7	-29.8	-30.0	-30.1	-30.1	-30.6	-30.7	-30.0	-28.6	-26.3	-24.7	-22.6	-21.5	-20.7	-20.5	-21.7	-22.3	-22.8	-25.0	-26.2	-27.0	-27.9	-26.5	-20.5
7-Feb	-29.4	-30.1	-30.1	-30.3	-30.7	-30.5	-29.9	-29.7	-28.5	-27.3	-25.4	-23.4	-19.3	-17.9	-17.3	-16.7	-17.1	-16.8	-17.6	-18.1	-17.9	-18.7	-19.6	-21.2	-23.5	-16.7
8-Feb	-22.5	-23.3	-23.8	-24.9	-24.4	-24.0	-24.4	-21.8	-20.4	-20.1	-17.5	-12.1	-10.4	-9.1	-7.9	-7.0	-7.5	-9.2	-11.3	-10.8	-10.4	-10.7	-11.1	-11.7	-15.7	-7.0
9-Feb	-12.2	-13.6	-16.0	-16.9	-18.1	-18.6	-19.1	-19.3	-19.4	-18.1	-17.6	-16.4	-14.5	-13.1	-11.7	-12.0	-12.4	-12.7	-12.8	-13.0	-13.3	-13.5	-14.1	-15.4	-15.2	-11.7
10-Feb	-16.4	-17.5	-18.3	-20.2	-20.9	-21.7	-21.7	-21.9	-20.6	-18.1	-16.6	-15.2	-13.4	-12.5	-11.1	-10.7	-10.1	-9.3	-9.3	-9.4	-9.2	-9.2	-9.3	-9.3	-14.7	-9.2
11-Feb	-9.3	-9.1	-10.2	-12.0	-12.5	-13.2	-13.4	-11.1	-11.2	-10.1	-9.3	-7.8	-5.8	-3.7	-1.9	-1.3	-0.8	-1.6	-2.3	-2.7	-1.8	-2.2	-3.3	-4.1	-6.7	-0.8
12-Feb	-4.7	-1.2	0.0	0.5	0.2	-0.1	-0.2	0.1	1.1	2.0	2.7	4.1	5.9	6.8	7.0	6.7	6.6	6.6	4.9	4.9	5.7	5.8	5.7	5.6	3.2	7.0
13-Feb	5.4	4.9	4.6	3.3	3.1	2.8	2.5	2.1	1.5	1.8	2.7	4.0	4.0	3.4	4.1	4.6	4.2	2.2	0.0	-1.5	-2.5	-3.5	-4.0	-4.6	1.9	5.4
14-Feb	-5.4	-5.3	-4.8	-4.4	-3.7	-3.7	-3.9	-3.8	-3.3	-2.9	0.4	2.2	4.4	6.6	8.2	8.9	8.9	7.0	6.5	6.0	5.2	4.3	3.5	3.5	1.4	8.9
15-Feb	3.6	2.9	3.1	2.6	1.5	0.8	0.8	0.7	0.7	0.8	2.2	4.1	6.7	7.6	7.5	7.7	6.3	6.8	6.7	6.0	5.6	7.0	8.7	6.5	4.5	8.7
16-Feb	6.1	4.4	3.5	3.5	3.0	3.2	3.4	3.1	3.1	4.8	5.6	8.5	10.5	11.2	11.0	9.6	8.0	6.9	5.4	4.0	4.2	3.5	1.8	0.5	5.4	11.2
17-Feb	0.8	0.5	0.9	1.0	1.0	1.6	2.0	1.6	1.9	1.8	1.5	1.5	2.2	2.5	2.5	1.7	0.6	-0.3	-1.0	-1.8	-2.3	-2.8	-3.3	-3.7	0.4	2.5
18-Feb	-3.9	-4.2	-4.7	-4.9	-4.8	-4.7	-4.7	-4.8	-4.5	-4.1	-3.4	-2.6	-1.9	-1.5	-1.3	-1.2	-1.0	-0.9	-0.8	-0.9	-0.9	-0.7	-0.9	-0.8	-2.7	-0.7
19-Feb	-0.9	-1.1	-1.4	-1.6	-1.9	-2.0	-2.1	-2.3	-2.9	-3.3	-3.2	-3.0	-2.7	-2.5	-2.1	-1.5	-1.2	-1.2	-1.1	-1.1	-1.1	-1.3	-1.5	-1.5	-1.9	-0.9
20-Feb	-1.5	-1.6	-1.8	-1.8	-1.9	-2.3	-2.4	-2.3	-2.4	-2.4	-2.1	-1.7	-0.9	-0.4	-0.6	-1.0	-1.4	-2.3	-3.5	-3.7	-3.9	-4.0	-4.0	-4.5	-2.3	-0.4
21-Feb	-4.8	-5.7	-6.0	-6.0	-5.3	-5.4	-6.3	-8.0	-9.2	-8.6	-8.7	-7.3	-6.7	-6.7	-6.5	-6.3	-6.4	-6.5	-6.8	-7.0	-7.3	-8.1	-8.8	-9.5	-7.0	-4.8
22-Feb	-10.0	-11.3	-12.7	-13.6	-14.3	-14.8	-15.4	-14.9	-14.5	-12.5	-12.1	-10.4	-9.7	-8.9	-8.3	-8.8	-9.5	-10.5	-11.4	-12.3	-13.3	-14.5	-14.8	-15.2	-12.2	-8.3
23-Feb	-14.7	-14.6	-14.4	-14.6	-15.4	-15.9	-16.1	-16.1	-15.2	-14.0	-13.0	-12.3	-11.3	-11.0	-11.0	-10.3	-10.3	-11.0	-11.1	-11.7	-12.4	-13.1	-13.6	-14.0	-13.2	-10.3
24-Feb	-14.0	-14.3	-14.7	-15.6	-16.2	-16.2	-16.7	-17.0	-17.3	-16.1	-15.3	-14.6	-13.8	-13.3	-13.6	-12.9	-12.6	-14.0	-16.0	-16.6	-16.9	-17.1	-18.2	-18.1	-15.5	-12.6
25-Feb	-18.7	-19.2	-19.0	-18.8	-19.0	-19.0	-19.4	-19.1	-18.2	-16.8	-14.9	-11.9	-9.6	-7.1	-6.2	-6.4	-7.0	-7.5	-8.0	-8.0	-8.9	-10.1	-12.8	-15.2	-13.4	-6.2
26-Feb	-16.8	-17.8	-18.6	-18.9	-18.9	-19.2	-20.1	-20.8	-20.9	-18.5	-17.5	-16.6	-15.9	-14.6	-13.8	-14.0	-14.1	-14.9	-15.8	-16.3	-16.6	-16.9	-17.9	-18.5	-17.3	-13.8
27-Feb	-19.3	-19.4	-20.0	-20.5	-20.8	-21.7	-20.8	-22.8	-21.8	-20.3	-18.5	-17.8	-16.2	-15.5	-14.5	-14.0	-14.0	-14.6	-16.2	-16.3	-16.5	-16.4	-17.4	-16.9	-18.0	-14.0
28-Feb	-17.4	-17.0	-17.0	-17.3	-19.6	-21.0	-21.9	-22.0	-22.6	-22.1	-21.4	-20.0	-18.6	-18.7	-19.1	-18.7	-18.6	-19.2	-19.9	-20.4	-21.6	-21.8	-22.3	-23.0	-20.1	-17.0
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	116	17.26	17.26
-20 - 0	440	65.48	82.74
0 - 10	113	16.82	99.55
10 - 20	3	0.45	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

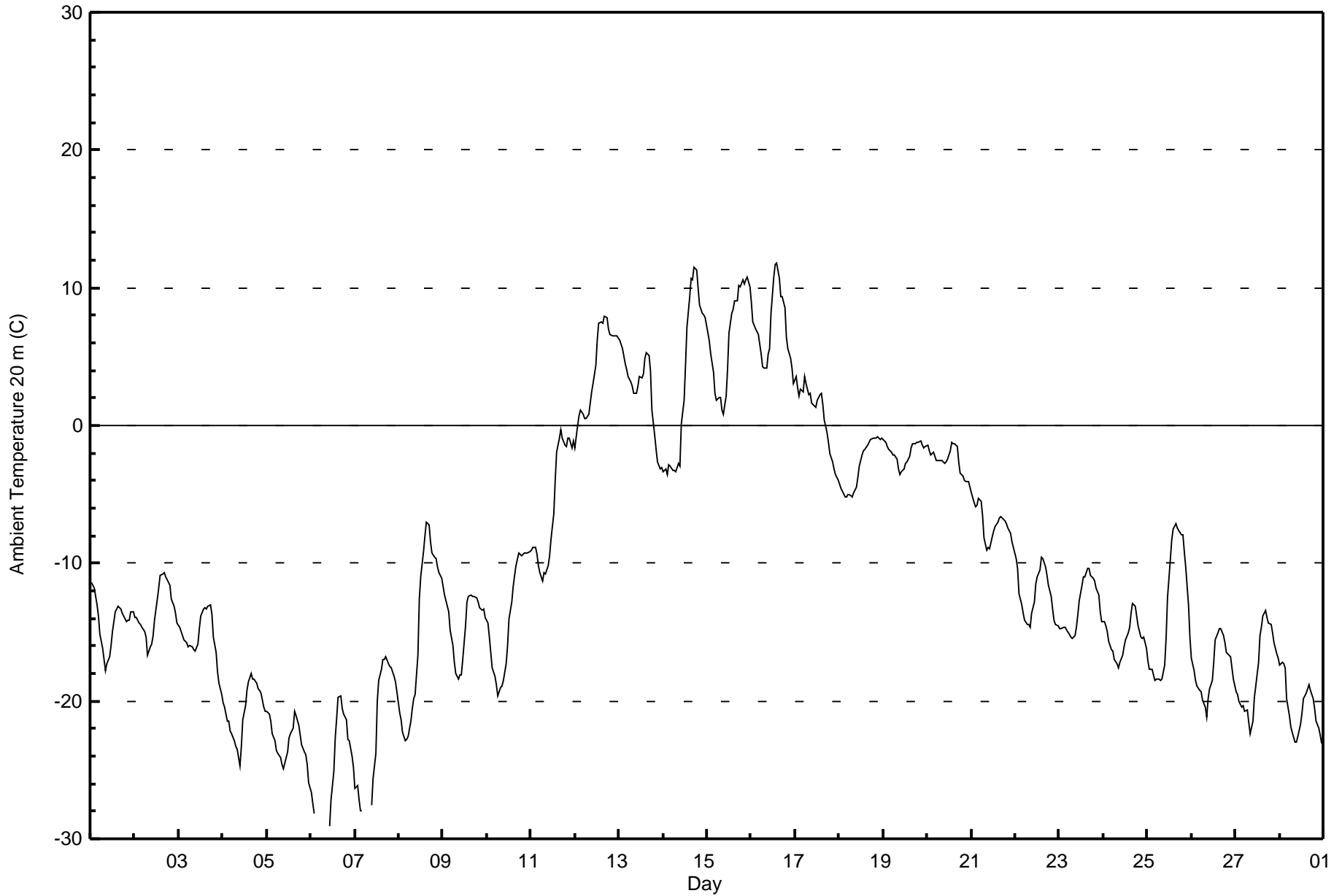
Total Number of Hours: 672



Summary of Hour Averages

Mannix - February 2017

Maximum Value: 11.8 C on Feb 16 15:00 Maximum Daily Average: 7.1 C on Feb 16 Minimum Value: -29.1 C on Feb 6 11:00 Minimum Daily Average: -23.0 C on Feb 5 Maximum Diurnal Average: -7.1 C at hour 16 Minimum Diurnal Average: -12.2 C at hour 10 Monthly Average: -9.84 C Percentiles: P ₁ = -27.5 P ₁₀ = -21.4 Q ₁ = -17.3 Median = -12.4 Q ₃ = -1.8 P ₉₀ = 4.3 P ₉₉ = 10.7																						Hours in Service: 672 Hours of Data: 661 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.4					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	-11.4	-11.6	-11.8	-13.0	-13.8	-15.1	-16.1	-17.0	-17.8	-17.3	-16.8	-16.0	-14.9	-13.5	-13.3	-13.1	-13.4	-13.7	-13.9	-14.2	-14.1	-14.1	-13.5	-13.5	-14.3	-11.4	
2-Feb	-13.9	-13.9	-14.3	-14.5	-14.7	-15.0	-15.3	-16.7	-16.1	-15.9	-15.2	-14.1	-12.6	-11.8	-10.9	-10.8	-10.7	-11.0	-11.4	-11.6	-12.6	-13.1	-13.6	-14.3	-13.5	-10.7	
3-Feb	-14.6	-14.9	-15.2	-15.6	-15.8	-16.0	-16.0	-16.0	-16.2	-16.4	-15.8	-14.7	-13.8	-13.4	-13.3	-13.3	-13.1	-13.0	-13.7	-15.3	-16.5	-17.9	-18.7	-19.6	-15.4	-13.0	
4-Feb	-20.2	-20.5	-21.4	-21.5	-22.1	-22.4	-22.9	-23.3	-23.5	-24.7	-23.3	-21.3	-20.3	-19.2	-18.7	-18.0	-18.4	-18.7	-19.2	-19.2	-19.2	-19.4	-20.4	-20.7	-20.7	-18.0	
5-Feb	-20.7	-20.9	-21.5	-22.4	-22.9	-23.6	-23.8	-24.1	-24.6	-24.9	-24.5	-23.7	-22.6	-22.3	-22.0	-20.8	-21.1	-21.7	-22.5	-23.2	-23.7	-23.9	-24.6	-25.9	-23.0	-20.7	
6-Feb	-26.6	-27.4	-28.2	AF	AF	AF	AF	AF	AF	AF	-29.1	-27.1	-25.1	-22.7	-21.2	-19.7	-19.7	-20.6	-21.0	-21.4	-22.8	-22.8	-24.0	-24.9	--	-19.7	
7-Feb	-26.3	-26.2	-27.1	-27.9	-28.0	AF	AF	AF	AF	AF	-27.6	-25.7	-23.8	-20.1	-18.5	-17.7	-17.0	-17.0	-16.8	-17.3	-17.5	-17.6	-18.2	-18.6	-19.3	-21.4	-16.8
8-Feb	-20.9	-21.3	-22.3	-22.9	-22.8	-22.5	-21.4	-20.5	-19.8	-19.5	-16.7	-12.6	-10.9	-9.2	-8.0	-7.0	-7.3	-8.4	-9.3	-9.5	-9.7	-10.3	-10.7	-11.1	-14.8	-7.0	
9-Feb	-11.7	-12.3	-13.2	-13.6	-14.9	-16.0	-17.2	-18.0	-18.4	-18.1	-18.1	-17.0	-14.6	-12.8	-12.4	-12.3	-12.4	-12.4	-12.5	-12.8	-13.2	-13.4	-13.3	-13.9	-14.3	-11.7	
10-Feb	-14.3	-15.4	-16.5	-17.6	-18.2	-18.8	-19.6	-19.0	-19.0	-18.5	-17.3	-15.9	-14.0	-12.8	-11.7	-10.9	-10.1	-9.3	-9.4	-9.4	-9.2	-9.2	-9.3	-9.1	-13.9	-9.1	
11-Feb	-9.0	-8.8	-8.9	-9.4	-10.2	-10.7	-11.3	-10.7	-10.8	-10.1	-9.4	-8.2	-6.4	-3.9	-1.9	-0.9	-0.3	-0.9	-1.4	-1.5	-0.9	-0.9	-1.6	-1.1	-5.8	-0.3	
12-Feb	-1.7	0.0	0.7	1.1	0.8	0.5	0.5	0.9	1.7	2.4	3.0	4.4	6.2	7.4	7.5	7.4	8.0	7.9	7.0	6.6	6.5	6.5	6.5	6.5	4.1	8.0	
13-Feb	6.2	5.9	5.6	4.5	4.0	3.6	3.1	2.8	2.4	2.3	2.9	3.5	3.5	3.7	4.9	5.3	5.1	4.0	1.2	-0.7	-1.7	-2.7	-3.2	-3.0	2.6	6.2	
14-Feb	-3.4	-3.2	-3.6	-2.8	-2.9	-3.2	-3.3	-3.3	-2.8	-3.0	0.1	1.8	4.4	7.2	9.4	10.6	10.6	11.5	11.3	10.0	8.7	8.1	8.1	7.9	3.3	11.5	
15-Feb	6.7	6.2	5.1	3.9	2.3	1.8	2.0	2.0	1.1	0.8	2.2	4.1	6.7	8.2	8.4	9.0	9.0	10.2	10.1	10.6	10.3	10.6	10.8	10.1	6.3	10.8	
16-Feb	9.0	7.5	7.0	6.8	6.6	5.2	4.3	4.2	4.2	5.2	5.6	8.1	10.8	11.7	11.8	10.7	9.4	9.4	8.5	6.4	5.6	4.8	4.2	3.1	7.1	11.8	
17-Feb	3.6	2.7	2.1	2.6	2.5	3.5	3.1	2.2	2.4	1.7	1.4	1.3	1.9	2.3	2.3	1.5	0.4	-0.5	-1.2	-2.1	-2.7	-3.1	-3.6	-3.9	0.9	3.6	
18-Feb	-4.3	-4.6	-5.0	-5.2	-5.2	-5.0	-5.1	-5.2	-4.9	-4.4	-3.8	-2.9	-2.1	-1.8	-1.7	-1.4	-1.2	-1.0	-0.9	-1.0	-0.9	-0.8	-1.0	-0.9	-2.9	-0.8	
19-Feb	-1.0	-1.2	-1.5	-1.7	-2.0	-2.1	-2.2	-2.4	-3.1	-3.5	-3.4	-3.2	-2.8	-2.6	-2.2	-1.6	-1.3	-1.3	-1.2	-1.2	-1.2	-1.4	-1.6	-1.5	-2.0	-1.0	
20-Feb	-1.4	-1.8	-2.1	-2.0	-2.2	-2.5	-2.5	-2.5	-2.5	-2.7	-2.7	-2.4	-1.9	-1.2	-1.3	-1.3	-1.5	-2.6	-3.5	-3.7	-4.0	-4.0	-4.1	-4.5	-2.5	-1.2	
21-Feb	-4.8	-5.6	-5.9	-5.8	-5.3	-5.5	-6.5	-8.1	-9.1	-8.8	-8.9	-8.1	-7.6	-7.3	-7.0	-6.7	-6.6	-6.7	-6.9	-7.1	-7.4	-7.8	-8.5	-8.9	-7.1	-4.8	
22-Feb	-9.6	-10.4	-12.2	-13.1	-13.6	-14.2	-14.5	-14.4	-14.6	-13.6	-12.8	-11.5	-10.9	-10.5	-9.6	-9.7	-10.3	-10.8	-11.6	-12.4	-13.3	-14.1	-14.4	-14.5	-12.4	-9.6	
23-Feb	-14.7	-14.7	-14.6	-14.6	-14.9	-15.2	-15.3	-15.5	-15.3	-14.7	-13.7	-12.7	-11.6	-11.0	-11.0	-10.4	-10.4	-10.9	-11.1	-11.3	-11.8	-12.3	-13.5	-14.2	-13.1	-10.4	
24-Feb	-14.2	-14.5	-14.9	-15.7	-16.3	-16.4	-16.9	-17.3	-17.6	-17.2	-16.6	-16.1	-15.6	-15.0	-14.6	-13.6	-13.0	-13.1	-13.9	-14.6	-15.3	-15.5	-15.3	-16.2	-15.4	-13.0	
25-Feb	-17.1	-17.7	-17.7	-18.1	-18.5	-18.4	-18.4	-18.5	-18.4	-17.4	-15.4	-12.5	-9.7	-8.3	-7.5	-7.2	-7.4	-7.6	-8.0	-8.0	-9.1	-10.3	-13.0	-15.3	-13.3	-7.2	
26-Feb	-16.8	-17.8	-18.5	-18.9	-19.2	-19.3	-19.9	-20.4	-21.2	-19.8	-19.1	-18.5	-17.2	-15.6	-15.1	-14.7	-14.7	-15.3	-15.7	-16.4	-16.7	-16.8	-17.6	-18.4	-17.7	-14.7	
27-Feb	-19.3	-19.5	-20.0	-20.5	-20.4	-20.7	-20.6	-21.6	-22.4	-21.5	-19.8	-18.9	-17.2	-15.3	-14.7	-13.9	-13.4	-13.9	-14.4	-14.5	-15.0	-15.8	-16.5	-16.9	-17.8	-13.4	
28-Feb	-17.3	-17.2	-17.3	-17.6	-19.8	-21.1	-21.9	-22.2	-23.0	-23.0	-22.6	-21.6	-20.9	-19.8	-19.4	-19.1	-18.9	-19.2	-19.8	-20.5	-21.5	-22.0	-22.5	-23.1	-20.5	-17.2	
-10.4 -10.7 -11.2 -10.9 -11.4 -11.1 -11.5 -11.7 -11.9 -12.2 -12.0 -10.7 -9.3 -8.2 -7.5 -7.1 -7.1 -7.4 -7.9 -8.4 -8.9 -9.3 -9.8 -10.3																								Diurnal Average			
9.0 7.5 7.0 6.8 6.6 5.2 4.3 4.2 4.2 5.2 5.6 8.1 10.8 11.7 11.8 10.7 10.6 11.5 11.3 10.6 10.3 10.6 10.8 10.1																								Diurnal Maximum			
AF - Analyzer Failure																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	94	14.22	14.22
-20 - 0	447	67.62	81.85
0 - 10	105	15.89	97.73
10 - 20	15	2.27	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 661

Total Number of Hours: 672

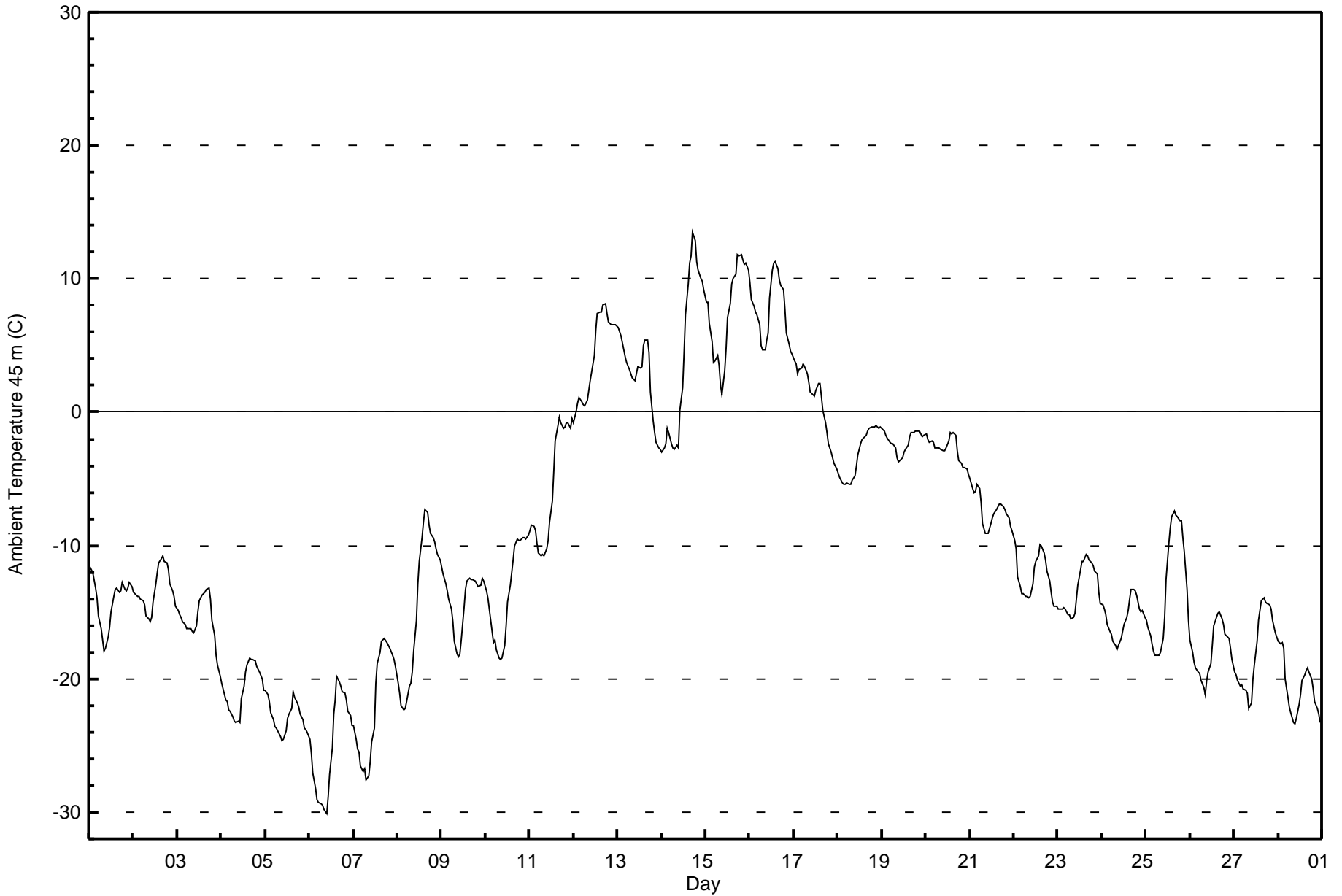


Maximum Value: 13.5 C on Feb 14 18:00 Maximum Daily Average: 7.6 C on Feb 16																						Hours in Service: 672 Hours of Data: 672				
Minimum Value: -30.1 C on Feb 6 10:00 Minimum Daily Average: -25.0 C on Feb 6 Maximum Diurnal Average: -7.2 C at hour 17 Minimum Diurnal Average: -13.0 C at hour 9 Monthly Average: -10.03 C Percentiles: P ₁ = -28.7 P ₁₀ = -21.8 Q ₁ = -17.5 Median = -12.6 Q ₃ = -2.2 P ₉₀ = 4.7 P ₉₉ = 11.4																						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-Feb	-11.6	-11.8	-12.0	-13.2	-14.0	-15.3	-16.2	-17.1	-17.9	-17.8	-16.8	-16.2	-15.0	-13.8	-13.3	-13.2	-13.5	-13.4	-12.8	-13.3	-13.4	-13.2	-12.8	-13.1	-14.2	-11.6
2-Feb	-13.5	-13.7	-13.8	-13.8	-14.1	-14.2	-14.5	-15.3	-15.5	-15.7	-15.4	-14.3	-12.9	-12.0	-11.3	-10.9	-10.8	-11.1	-11.3	-11.9	-12.9	-13.4	-13.8	-14.6	-13.4	-10.8
3-Feb	-14.9	-15.2	-15.4	-15.7	-16.0	-16.2	-16.2	-16.2	-16.4	-16.6	-16.0	-15.0	-14.1	-13.7	-13.6	-13.5	-13.3	-13.2	-14.0	-15.6	-16.8	-18.2	-19.0	-19.8	-15.6	-13.2
4-Feb	-20.3	-20.7	-21.6	-21.7	-22.3	-22.5	-22.9	-23.1	-23.3	-23.2	-23.3	-21.5	-20.5	-19.5	-18.9	-18.4	-18.5	-18.6	-18.7	-19.1	-19.3	-19.5	-20.0	-20.9	-20.8	-18.4
5-Feb	-20.9	-21.2	-21.7	-22.5	-23.1	-23.6	-23.7	-24.1	-24.3	-24.6	-24.6	-23.9	-22.9	-22.7	-22.3	-21.4	-21.8	-22.1	-22.7	-23.0	-23.7	-23.8	-24.1	-22.9	-20.9	-20.9
6-Feb	-24.5	-25.6	-27.1	-28.2	-29.1	-29.2	-29.4	-29.5	-29.8	-30.1	-28.9	-27.1	-25.1	-22.7	-21.6	-19.8	-20.2	-20.5	-20.9	-21.1	-21.6	-22.4	-22.7	-23.5	-25.0	-19.8
7-Feb	-23.5	-24.5	-25.2	-25.5	-26.5	-26.9	-26.7	-27.6	-27.3	-26.2	-24.7	-23.7	-20.4	-18.9	-18.0	-17.2	-17.1	-16.9	-17.3	-17.5	-17.7	-18.2	-18.6	-19.1	-21.9	-16.9
8-Feb	-20.4	-21.1	-22.0	-22.3	-22.2	-21.8	-20.6	-20.3	-19.5	-17.9	-15.6	-12.8	-11.2	-9.4	-8.3	-7.3	-7.5	-8.4	-9.1	-9.4	-9.7	-10.3	-10.7	-11.1	-14.5	-7.3
9-Feb	-11.6	-12.2	-12.8	-13.4	-14.0	-14.8	-15.7	-17.2	-18.1	-18.3	-18.1	-17.1	-14.7	-13.3	-12.7	-12.5	-12.6	-12.5	-12.6	-12.9	-13.1	-13.0	-12.5	-12.6	-14.1	-11.6
10-Feb	-13.4	-13.9	-14.7	-15.6	-17.3	-17.1	-17.8	-18.5	-18.6	-18.4	-17.5	-16.0	-14.3	-13.0	-12.1	-11.1	-10.1	-9.5	-9.6	-9.6	-9.4	-9.4	-9.5	-9.2	-13.6	-9.2
11-Feb	-8.9	-8.5	-8.6	-8.9	-9.8	-10.5	-10.8	-10.7	-10.8	-10.3	-9.6	-8.3	-6.7	-4.4	-2.2	-1.0	-0.3	-0.8	-1.2	-1.1	-0.8	-0.8	-1.2	-0.5	-5.7	-0.3
12-Feb	-0.8	0.0	0.7	1.1	0.8	0.5	0.5	0.9	1.7	2.4	3.0	4.3	6.1	7.4	7.5	7.5	8.0	8.1	7.4	6.8	6.6	6.6	6.6	6.6	4.2	8.1
13-Feb	6.3	6.1	5.7	4.7	4.1	3.7	3.3	2.9	2.6	2.4	2.8	3.4	3.3	3.5	5.0	5.5	5.4	4.5	1.5	-0.7	-1.5	-2.3	-2.7	-2.8	2.8	6.3
14-Feb	-3.0	-2.7	-2.3	-1.2	-1.5	-2.3	-2.7	-2.8	-2.4	-2.7	0.2	1.8	4.4	7.3	9.7	11.2	11.7	13.5	12.9	11.3	10.6	10.1	9.8	9.2	4.2	13.5
15-Feb	8.3	8.2	6.7	5.3	3.7	3.8	4.2	3.5	2.0	1.3	3.1	4.8	7.1	8.1	9.7	10.0	10.3	11.8	11.7	11.8	11.4	11.1	11.2	10.7	7.5	11.8
16-Feb	9.7	8.4	7.9	7.5	7.3	6.6	5.0	4.7	4.7	5.4	5.9	8.6	10.6	11.2	11.3	10.8	9.9	9.5	9.2	7.7	5.9	5.1	4.5	4.3	7.6	11.3
17-Feb	3.9	3.6	2.9	3.2	3.3	3.6	3.4	2.9	2.2	1.5	1.3	1.2	1.6	2.2	2.1	1.3	0.2	-0.8	-1.5	-2.4	-2.9	-3.4	-3.9	-4.2	0.9	3.9
18-Feb	-4.6	-4.9	-5.3	-5.5	-5.4	-5.3	-5.4	-5.4	-5.1	-4.7	-4.1	-3.2	-2.4	-2.1	-2.0	-1.7	-1.5	-1.2	-1.1	-1.2	-1.1	-1.0	-1.2	-1.1	-3.2	-1.0
19-Feb	-1.2	-1.4	-1.7	-2.0	-2.2	-2.3	-2.4	-2.7	-3.4	-3.7	-3.6	-3.4	-3.0	-2.8	-2.5	-1.8	-1.6	-1.5	-1.4	-1.4	-1.4	-1.6	-1.8	-1.7	-2.2	-1.2
20-Feb	-1.6	-2.0	-2.3	-2.2	-2.3	-2.7	-2.7	-2.7	-2.8	-2.9	-2.9	-2.7	-2.2	-1.5	-1.6	-1.5	-1.8	-2.9	-3.6	-3.8	-4.1	-4.2	-4.3	-4.7	-2.7	-1.5
21-Feb	-5.0	-5.7	-6.0	-5.9	-5.4	-5.7	-6.7	-8.3	-9.1	-9.1	-9.1	-8.3	-7.9	-7.6	-7.3	-7.1	-6.9	-6.9	-7.1	-7.3	-7.6	-8.0	-8.6	-8.9	-7.3	-5.0
22-Feb	-9.6	-10.3	-12.3	-13.1	-13.6	-13.6	-13.8	-13.8	-13.9	-13.8	-12.9	-11.6	-11.1	-10.8	-9.9	-10.0	-10.6	-11.1	-11.9	-12.7	-13.5	-14.3	-14.6	-14.6	-12.4	-9.6
23-Feb	-14.8	-14.7	-14.7	-14.7	-14.8	-15.2	-15.2	-15.5	-15.4	-15.1	-14.0	-13.0	-11.8	-11.2	-11.2	-10.7	-10.8	-11.1	-11.3	-11.5	-11.9	-12.2	-13.5	-14.4	-13.3	-10.7
24-Feb	-14.4	-14.8	-15.2	-15.9	-16.5	-16.6	-17.2	-17.5	-17.8	-17.5	-17.0	-16.4	-15.9	-15.4	-14.9	-14.0	-13.3	-13.3	-13.4	-13.7	-14.8	-15.0	-14.9	-15.4	-15.5	-13.3
25-Feb	-15.6	-16.1	-16.8	-17.4	-18.0	-18.2	-18.2	-18.2	-18.1	-17.0	-15.4	-12.5	-9.8	-8.6	-7.9	-7.5	-7.7	-7.8	-8.1	-8.2	-9.4	-10.5	-13.3	-15.6	-13.2	-7.5
26-Feb	-17.1	-18.1	-18.8	-19.2	-19.5	-19.6	-20.1	-20.6	-21.1	-20.1	-19.5	-18.8	-17.5	-16.0	-15.4	-15.1	-15.0	-15.5	-16.0	-16.7	-16.9	-16.9	-17.7	-18.6	-17.9	-15.0
27-Feb	-19.5	-19.7	-20.2	-20.5	-20.5	-20.8	-20.8	-21.1	-22.2	-21.8	-20.0	-19.0	-17.2	-15.6	-14.9	-14.1	-13.9	-14.2	-14.4	-14.4	-14.7	-15.6	-16.5	-16.8	-17.9	-13.9
28-Feb	-17.2	-17.4	-17.3	-17.7	-20.1	-21.4	-22.1	-22.5	-23.3	-23.3	-22.9	-21.9	-21.2	-20.2	-19.8	-19.4	-19.2	-19.5	-20.0	-20.7	-21.7	-22.2	-22.7	-23.3	-20.7	-17.2
	-10.0	-10.3	-10.9	-11.2	-11.7	-12.1	-12.3	-12.7	-13.0	-12.8	-12.0	-10.8	-9.5	-8.4	-7.7	-7.2	-7.2	-7.3	-7.7	-8.3	-8.7	-9.2	-9.6	-10.0	Diurnal Average	
	9.7	8.4	7.9	7.5	7.3	6.6	5.0	4.7	4.7	5.4	5.9	8.6	10.6	11.2	11.3	11.2	11.7	13.5	12.9	11.8	11.4	11.1	11.2	10.7	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

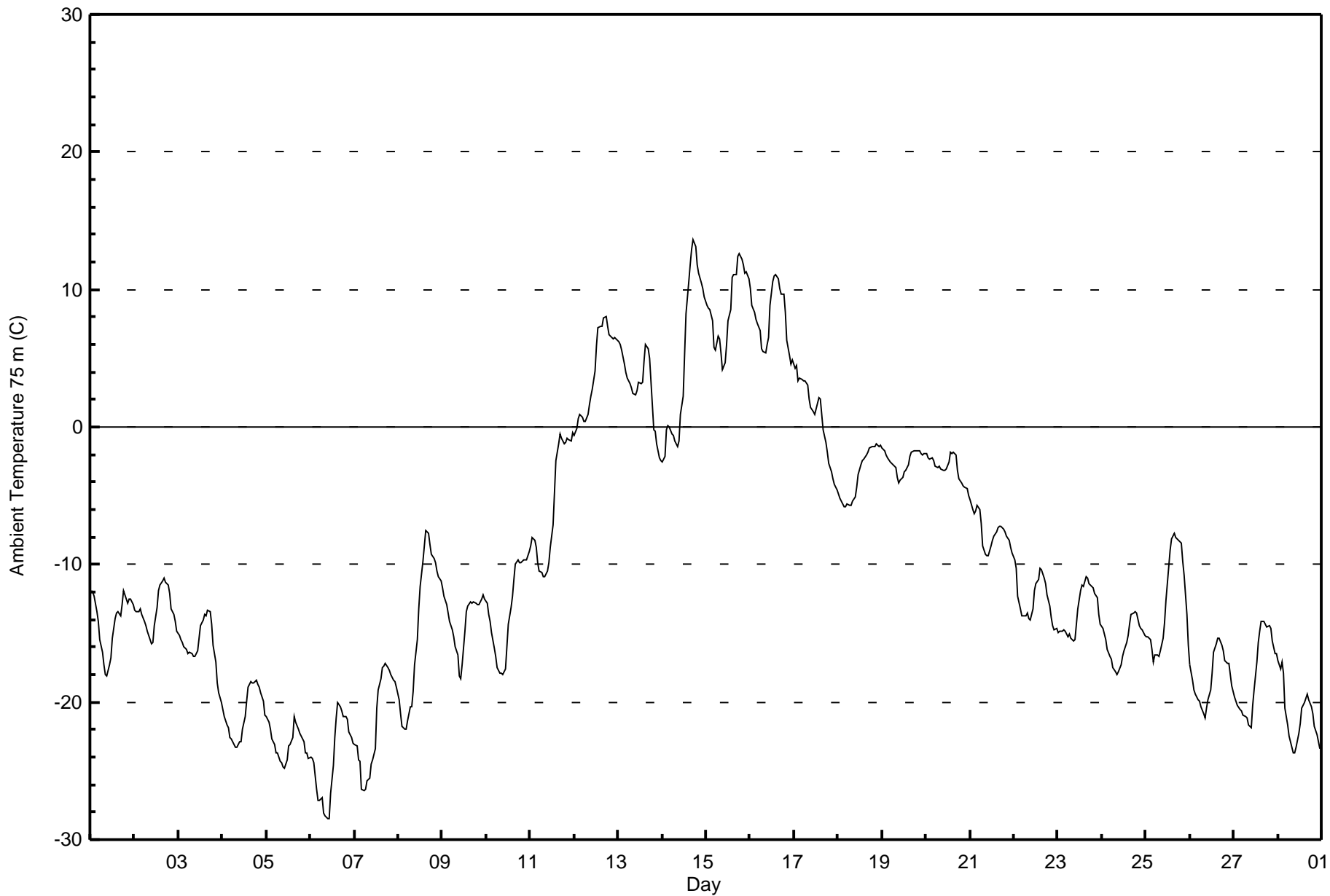
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	112	16.67	16.67
-20 - 0	439	65.33	81.99
0 - 10	101	15.03	97.02
10 - 20	20	2.98	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Value: 13.6 C on Feb 14 18:00 Maximum Daily Average: 8.7 C on Feb 15																							Hours in Service: 672			
Minimum Value: -28.5 C on Feb 6 11:00 Minimum Daily Average: -24.2 C on Feb 6																							Hours of Data: 672			
Maximum Diurnal Average: -7.3 C at hour 17 Minimum Diurnal Average: -12.6 C at hour 9																							Hours of Missing Data: 0			
Monthly Average: -9.96 C Percentiles: P ₁ = -26.8 P ₁₀ = -21.9 Q ₁ = -17.4 Median = -12.6 Q ₃ = -2.1 P ₉₀ = 5.5 P ₉₉ = 11.7																							Hours of Calibration: 0			
																							Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-11.9	-12.0	-12.3	-13.5	-14.2	-15.5	-16.4	-17.3	-18.0	-18.1	-17.3	-16.8	-15.3	-14.0	-13.5	-13.4	-13.7	-12.9	-11.9	-12.5	-12.8	-12.5	-12.5	-12.9	-14.2	-11.9
2-Feb	-13.3	-13.5	-13.5	-13.3	-13.7	-14.1	-14.4	-14.9	-15.5	-15.8	-15.7	-14.5	-13.1	-11.9	-11.5	-11.2	-11.0	-11.3	-11.5	-12.1	-13.2	-13.7	-14.1	-14.9	-13.4	-11.0
3-Feb	-15.2	-15.5	-15.7	-16.0	-16.2	-16.5	-16.4	-16.5	-16.6	-16.7	-16.3	-15.4	-14.5	-14.0	-13.7	-13.7	-13.4	-13.4	-14.3	-15.9	-17.1	-18.6	-19.3	-20.1	-15.9	-13.4
4-Feb	-20.6	-21.0	-21.6	-21.9	-22.5	-22.6	-23.1	-23.3	-23.3	-22.9	-22.9	-22.0	-21.0	-19.9	-19.0	-18.6	-18.6	-18.6	-18.4	-18.7	-18.9	-19.4	-19.9	-20.9	-20.8	-18.4
5-Feb	-21.1	-21.4	-22.0	-22.7	-23.1	-23.7	-23.7	-24.3	-24.4	-24.7	-24.8	-24.2	-23.2	-23.0	-22.5	-21.0	-21.4	-22.0	-22.3	-22.5	-22.9	-23.7	-23.7	-24.1	-23.0	-21.0
6-Feb	-24.0	-24.1	-24.4	-26.3	-27.2	-27.2	-27.0	-28.1	-28.3	-28.4	-28.5	-26.6	-24.6	-22.6	-21.2	-20.0	-20.3	-20.6	-21.0	-21.1	-21.3	-22.1	-22.5	-23.0	-24.2	-20.0
7-Feb	-23.1	-23.2	-24.2	-24.3	-26.4	-26.4	-26.3	-25.7	-25.6	-24.5	-24.2	-23.4	-20.4	-19.2	-18.3	-17.5	-17.4	-17.2	-17.5	-17.7	-18.0	-18.4	-18.5	-19.0	-21.5	-17.2
8-Feb	-19.9	-20.9	-21.7	-21.9	-22.0	-21.4	-20.3	-20.3	-19.2	-17.3	-15.4	-13.2	-11.6	-9.7	-8.6	-7.6	-7.7	-8.6	-9.2	-9.5	-9.9	-10.4	-10.8	-11.2	-14.5	-7.6
9-Feb	-11.7	-12.3	-12.9	-13.5	-14.1	-14.8	-15.3	-15.9	-16.6	-18.1	-18.3	-17.3	-14.8	-13.4	-13.0	-12.7	-12.8	-12.7	-12.8	-12.9	-12.9	-12.5	-12.2	-12.5	-14.0	-11.7
10-Feb	-12.8	-13.6	-14.1	-14.9	-16.1	-16.6	-17.5	-17.9	-17.9	-18.0	-17.6	-16.0	-14.3	-13.1	-12.3	-11.1	-10.0	-9.6	-9.8	-9.9	-9.7	-9.6	-9.7	-9.1	-13.4	-9.1
11-Feb	-8.6	-8.0	-8.2	-8.8	-9.8	-10.5	-10.6	-10.9	-10.9	-10.5	-9.9	-8.7	-7.1	-4.8	-2.5	-1.2	-0.5	-0.8	-1.2	-1.1	-0.8	-0.9	-1.0	-0.4	-5.7	-0.4
12-Feb	-0.7	-0.1	0.6	0.9	0.7	0.4	0.4	0.9	1.6	2.2	2.8	4.1	5.9	7.2	7.3	7.3	8.0	8.1	7.4	6.7	6.5	6.4	6.5	6.4	4.1	8.1
13-Feb	6.2	6.0	5.6	4.6	4.0	3.6	3.1	2.8	2.5	2.4	2.7	3.2	3.2	3.2	4.7	6.0	5.7	5.0	3.2	-0.2	-0.3	-1.2	-2.3	-2.4	3.0	6.2
14-Feb	-2.6	-2.1	-0.2	0.1	0.0	-0.5	-0.6	-1.0	-1.4	-1.0	0.9	2.2	5.3	8.2	10.5	11.8	12.9	13.6	13.1	11.8	11.1	10.4	10.0	9.5	5.1	13.6
15-Feb	8.9	8.7	8.5	7.7	5.8	5.6	6.6	6.4	5.4	4.1	4.7	6.0	7.7	8.5	10.9	11.1	11.0	12.5	12.6	12.2	11.8	11.2	11.2	10.8	8.7	12.6
16-Feb	10.0	8.8	8.3	7.8	7.6	7.0	5.7	5.5	5.4	6.0	6.5	8.8	10.5	11.0	11.1	10.7	10.1	9.7	9.7	8.3	6.3	5.1	4.6	4.9	7.9	11.1
17-Feb	4.3	4.4	3.4	3.6	3.4	3.4	3.4	3.0	2.0	1.4	1.1	0.9	1.4	2.1	2.0	0.9	-0.2	-1.1	-1.8	-2.7	-3.3	-3.7	-4.2	-4.5	0.8	4.4
18-Feb	-4.9	-5.2	-5.6	-5.8	-5.8	-5.6	-5.7	-5.7	-5.4	-5.0	-4.3	-3.4	-2.7	-2.4	-2.3	-2.1	-1.8	-1.5	-1.4	-1.4	-1.4	-1.3	-1.4	-1.4	-3.5	-1.3
19-Feb	-1.5	-1.7	-2.0	-2.3	-2.5	-2.6	-2.7	-3.0	-3.7	-4.0	-3.9	-3.7	-3.3	-3.1	-2.7	-2.1	-1.9	-1.8	-1.7	-1.7	-1.7	-1.9	-2.1	-2.0	-2.5	-1.5
20-Feb	-1.9	-2.2	-2.4	-2.3	-2.4	-2.8	-2.9	-2.9	-3.0	-3.2	-3.2	-3.0	-2.6	-1.8	-2.0	-1.8	-2.1	-3.2	-3.8	-4.0	-4.3	-4.4	-4.5	-5.0	-3.0	-1.8
21-Feb	-5.3	-6.0	-6.3	-6.1	-5.7	-6.0	-7.1	-8.6	-9.3	-9.3	-9.3	-8.6	-8.2	-7.9	-7.6	-7.4	-7.2	-7.2	-7.4	-7.6	-7.9	-8.2	-8.7	-9.1	-7.6	-5.3
22-Feb	-9.7	-10.3	-12.3	-13.2	-13.7	-13.7	-13.5	-13.9	-14.0	-13.3	-11.9	-11.4	-11.1	-10.3	-10.3	-10.9	-11.4	-12.2	-13.0	-13.8	-14.5	-14.8	-14.7	-14.7	-12.6	-9.7
23-Feb	-14.9	-14.9	-14.9	-14.7	-14.8	-15.2	-15.0	-15.4	-15.5	-15.4	-14.4	-13.2	-11.9	-11.5	-11.5	-10.9	-11.0	-11.4	-11.6	-11.7	-12.1	-12.4	-13.6	-14.4	-13.4	-10.9
24-Feb	-14.6	-15.1	-15.5	-16.2	-16.7	-16.9	-17.5	-17.7	-18.0	-17.8	-17.3	-16.7	-16.3	-15.7	-15.1	-14.4	-13.7	-13.5	-13.4	-13.5	-14.5	-14.7	-14.7	-15.2	-15.6	-13.4
25-Feb	-15.3	-15.3	-15.4	-16.2	-17.1	-16.6	-16.6	-16.7	-16.3	-15.4	-14.2	-12.6	-10.1	-8.9	-8.1	-7.8	-8.0	-8.1	-8.3	-8.4	-9.7	-10.8	-13.6	-15.9	-12.7	-7.8
26-Feb	-17.3	-18.4	-19.1	-19.5	-19.8	-19.9	-20.4	-20.8	-21.1	-20.4	-19.8	-19.2	-17.9	-16.4	-15.8	-15.4	-15.3	-15.8	-16.2	-17.0	-17.2	-17.1	-18.0	-18.8	-18.2	-15.3
27-Feb	-19.7	-19.9	-20.2	-20.5	-20.6	-20.9	-21.0	-21.2	-21.7	-21.8	-20.2	-19.1	-17.1	-15.7	-14.9	-14.1	-14.2	-14.3	-14.6	-14.5	-14.7	-15.6	-16.5	-16.5	-17.9	-14.1
28-Feb	-16.9	-17.6	-17.0	-17.9	-20.4	-21.7	-22.5	-22.9	-23.6	-23.7	-23.3	-22.2	-21.5	-20.4	-20.1	-19.7	-19.5	-19.8	-20.3	-20.9	-21.7	-22.4	-22.9	-23.4	-20.9	-16.9
																							Diurnal Average			
																							Diurnal Maximum			





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	112	16.67	16.67
-20 - 0	439	65.33	81.99
0 - 10	96	14.29	96.28
10 - 20	25	3.72	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

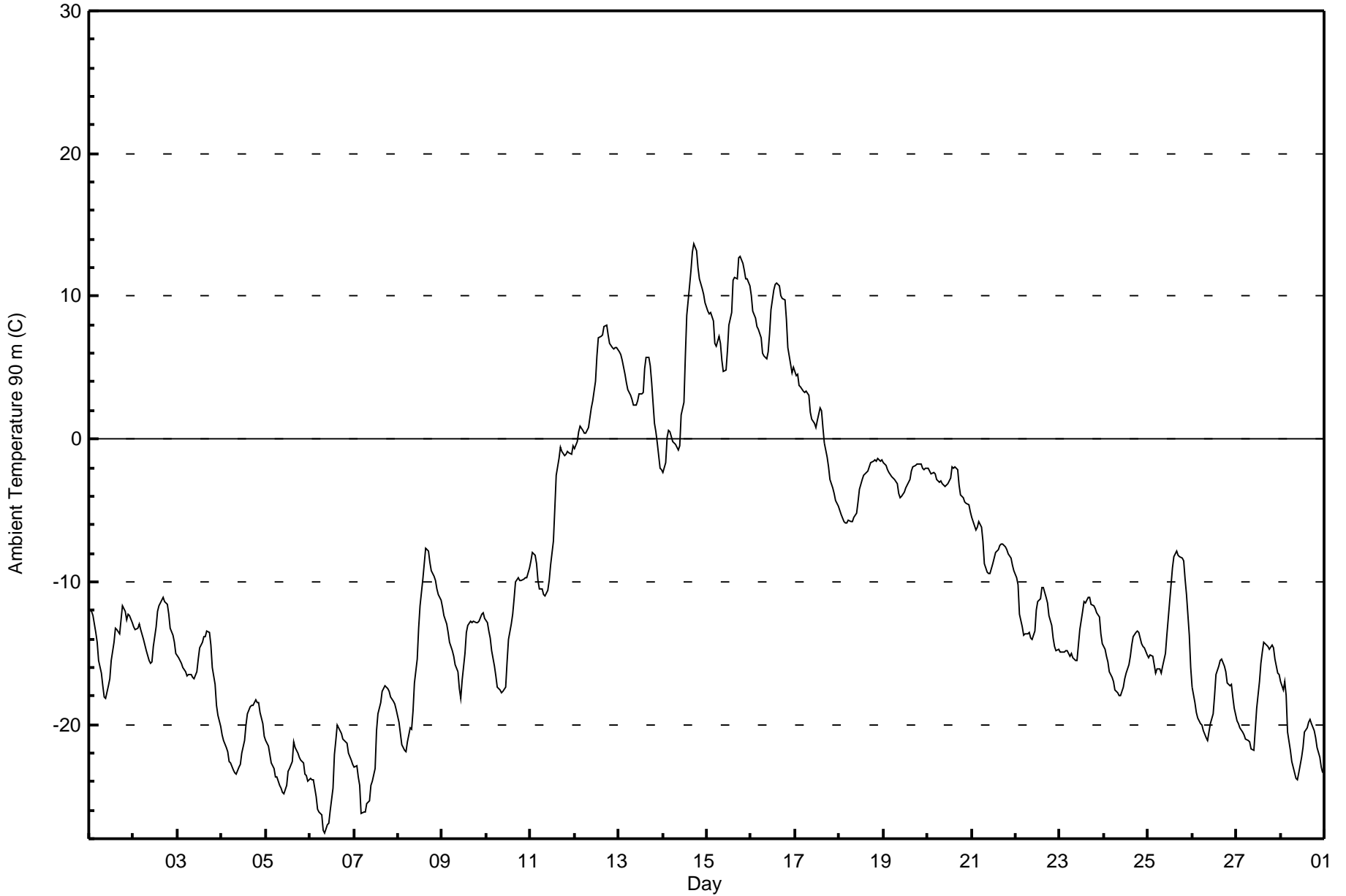


Maximum Value: 13.7 C on Feb 14 18:00 Maximum Daily Average: 9.0 C on Feb 15																							Hours in Service:	672		
Minimum Value: -27.7 C on Feb 6 09:00 Minimum Daily Average: -23.7 C on Feb 6																							Hours of Data:	672		
Maximum Diurnal Average: -7.4 C at hour 17 Minimum Diurnal Average: -12.5 C at hour 9																							Hours of Missing Data:	0		
Monthly Average: -9.94 C Percentiles: P ₁ = -26.1 P ₁₀ = -21.9 Q ₁ = -17.4 Median = -12.5 Q ₃ = -2.2 P ₉₀ = 5.8 P ₉₉ = 11.9																							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-Feb	-12.0	-12.0	-12.4	-13.5	-14.2	-15.5	-16.4	-17.3	-18.1	-18.2	-17.3	-16.8	-15.5	-14.2	-13.3	-13.3	-13.7	-12.7	-11.6	-12.1	-12.6	-12.2	-12.4	-12.9	-14.2	-11.6
2-Feb	-13.1	-13.3	-13.3	-12.9	-13.3	-14.1	-14.4	-14.9	-15.5	-15.7	-15.6	-14.5	-13.2	-12.1	-11.7	-11.3	-11.1	-11.4	-11.6	-12.2	-13.3	-13.8	-14.2	-15.0	-13.4	-11.1
3-Feb	-15.3	-15.6	-15.8	-16.1	-16.3	-16.6	-16.5	-16.5	-16.7	-16.8	-16.3	-15.4	-14.6	-14.2	-13.8	-13.9	-13.4	-13.5	-14.4	-16.0	-17.2	-18.7	-19.4	-20.2	-16.0	-13.4
4-Feb	-20.7	-21.1	-21.6	-21.9	-22.6	-22.7	-23.2	-23.4	-23.4	-23.0	-22.8	-22.0	-21.1	-20.0	-19.3	-18.8	-18.7	-18.6	-18.3	-18.4	-18.5	-19.2	-19.9	-20.9	-20.8	-18.3
5-Feb	-21.1	-21.5	-22.1	-22.7	-23.1	-23.7	-23.7	-24.3	-24.5	-24.7	-24.9	-24.2	-23.3	-23.1	-22.6	-21.2	-21.6	-22.0	-22.3	-22.5	-22.7	-23.5	-23.6	-24.0	-23.0	-21.1
6-Feb	-23.7	-23.9	-23.9	-25.1	-25.9	-26.2	-26.3	-27.4	-27.7	-27.0	-26.9	-26.0	-24.5	-22.1	-21.1	-20.0	-20.4	-20.7	-21.1	-21.2	-21.3	-22.0	-22.5	-22.8	-23.7	-20.0
7-Feb	-23.0	-22.9	-23.7	-24.3	-26.2	-26.1	-26.1	-25.6	-25.4	-24.3	-24.0	-23.1	-20.5	-19.3	-18.4	-17.6	-17.5	-17.3	-17.5	-17.7	-18.1	-18.4	-18.5	-18.9	-21.4	-17.3
8-Feb	-19.8	-20.7	-21.5	-21.8	-21.9	-21.2	-20.2	-20.3	-19.1	-17.1	-15.4	-13.3	-11.7	-9.8	-8.7	-7.7	-7.8	-8.7	-9.3	-9.6	-9.9	-10.5	-10.9	-11.3	-14.5	-7.7
9-Feb	-11.8	-12.3	-12.9	-13.6	-14.2	-14.8	-15.3	-15.8	-16.3	-17.5	-18.1	-16.9	-15.0	-13.6	-13.1	-12.8	-12.8	-12.8	-12.9	-12.9	-12.7	-12.3	-12.1	-12.5	-14.0	-11.8
10-Feb	-12.8	-13.5	-14.0	-14.8	-15.9	-16.6	-17.4	-17.6	-17.7	-17.7	-17.4	-15.6	-14.0	-13.0	-12.2	-11.2	-10.0	-9.7	-9.9	-9.9	-9.8	-9.7	-9.7	-9.0	-13.3	-9.0
11-Feb	-8.5	-7.9	-8.2	-8.7	-9.9	-10.5	-10.5	-10.9	-11.0	-10.6	-10.0	-8.8	-7.2	-4.9	-2.6	-1.3	-0.6	-0.9	-1.2	-1.1	-0.8	-1.0	-1.0	-0.4	-5.8	-0.4
12-Feb	-0.6	-0.2	0.5	0.9	0.6	0.4	0.4	0.8	1.5	2.2	2.7	4.0	5.8	7.1	7.2	7.2	7.9	8.0	7.3	6.7	6.4	6.4	6.4	6.4	4.0	8.0
13-Feb	6.1	5.9	5.5	4.5	4.0	3.5	3.1	2.8	2.4	2.4	2.7	3.2	3.2	3.2	5.0	5.8	5.8	5.1	3.9	1.1	0.5	-0.2	-2.0	-2.2	3.1	6.1
14-Feb	-2.3	-1.7	0.1	0.6	0.5	-0.1	-0.3	-0.4	-0.8	-0.5	1.7	2.6	5.8	8.6	10.7	11.8	13.1	13.7	13.2	12.0	11.2	10.5	10.1	9.5	5.4	13.7
15-Feb	9.0	8.8	8.9	8.3	6.7	6.5	7.2	6.7	5.6	4.7	4.9	6.2	8.0	8.9	11.1	11.3	11.2	12.7	12.8	12.3	11.8	11.2	11.2	10.7	9.0	12.8
16-Feb	10.1	9.0	8.5	7.9	7.7	7.1	6.0	5.8	5.7	6.2	7.3	9.1	10.5	10.8	10.9	10.7	10.1	9.8	9.8	8.4	6.4	5.2	4.6	5.0	8.0	10.9
17-Feb	4.5	4.6	3.7	3.6	3.4	3.3	3.3	3.0	1.9	1.4	1.1	0.8	1.3	2.1	2.0	0.8	-0.3	-1.2	-1.9	-2.8	-3.4	-3.8	-4.3	-4.7	0.8	4.6
18-Feb	-5.0	-5.3	-5.8	-5.9	-5.9	-5.7	-5.8	-5.8	-5.5	-5.2	-4.4	-3.5	-2.8	-2.5	-2.4	-2.2	-1.9	-1.6	-1.5	-1.5	-1.5	-1.4	-1.5	-1.4	-3.6	-1.4
19-Feb	-1.6	-1.8	-2.2	-2.4	-2.6	-2.8	-2.8	-3.1	-3.8	-4.1	-4.0	-3.8	-3.4	-3.2	-2.9	-2.2	-2.0	-1.9	-1.8	-1.8	-1.8	-2.0	-2.2	-2.1	-2.6	-1.6
20-Feb	-2.0	-2.2	-2.4	-2.3	-2.4	-2.8	-3.0	-2.9	-3.1	-3.3	-3.2	-3.1	-2.7	-1.9	-2.1	-2.0	-2.2	-3.3	-3.9	-4.1	-4.4	-4.5	-4.6	-5.1	-3.1	-1.9
21-Feb	-5.4	-6.1	-6.4	-6.2	-5.8	-6.1	-7.2	-8.7	-9.3	-9.4	-9.4	-8.7	-8.3	-8.0	-7.7	-7.5	-7.3	-7.3	-7.5	-7.7	-8.0	-8.3	-8.8	-9.2	-7.7	-5.4
22-Feb	-9.8	-10.2	-12.3	-13.1	-13.7	-13.7	-13.5	-13.9	-14.0	-13.4	-12.0	-11.4	-11.2	-10.4	-10.4	-11.1	-11.5	-12.3	-13.1	-13.9	-14.5	-14.8	-14.7	-12.6	-9.8	
23-Feb	-14.9	-14.9	-14.9	-14.8	-14.8	-15.2	-15.0	-15.3	-15.5	-15.5	-14.5	-13.4	-12.1	-11.4	-11.5	-11.1	-11.1	-11.6	-11.7	-11.9	-12.2	-12.5	-13.6	-14.4	-13.5	-11.1
24-Feb	-14.7	-15.2	-15.6	-16.3	-16.7	-17.0	-17.6	-17.8	-18.0	-17.9	-17.4	-16.8	-16.4	-15.8	-15.2	-14.5	-13.8	-13.6	-13.4	-13.5	-14.4	-14.5	-14.6	-15.1	-15.7	-13.4
25-Feb	-15.3	-15.2	-15.3	-15.8	-16.4	-16.1	-16.1	-16.4	-15.9	-15.0	-13.8	-12.6	-10.2	-9.0	-8.2	-7.9	-8.1	-8.2	-8.4	-8.5	-9.8	-10.9	-13.7	-16.0	-12.6	-7.9
26-Feb	-17.4	-18.5	-19.2	-19.6	-19.9	-20.0	-20.5	-20.9	-21.2	-20.6	-19.9	-19.2	-17.9	-16.5	-15.9	-15.5	-15.4	-15.9	-16.3	-17.1	-17.2	-17.2	-18.0	-18.9	-18.3	-15.4
27-Feb	-19.7	-20.0	-20.2	-20.5	-20.7	-21.0	-21.1	-21.3	-21.7	-21.8	-20.3	-18.9	-17.0	-15.7	-15.0	-14.3	-14.4	-14.6	-14.7	-14.4	-14.6	-15.4	-16.4	-16.5	-17.9	-14.3
28-Feb	-17.0	-17.6	-17.0	-18.0	-20.5	-21.8	-22.6	-23.0	-23.7	-23.8	-23.4	-22.3	-21.6	-20.5	-20.2	-19.8	-19.6	-20.0	-20.4	-20.9	-21.6	-22.3	-22.9	-23.4	-21.0	-17.0
																							Diurnal Average			
																							Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 90 m (AT90m) - C
Mannix - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	114	16.96	16.96
-20 - 0	434	64.58	81.55
0 - 10	99	14.73	96.28
10 - 20	25	3.72	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

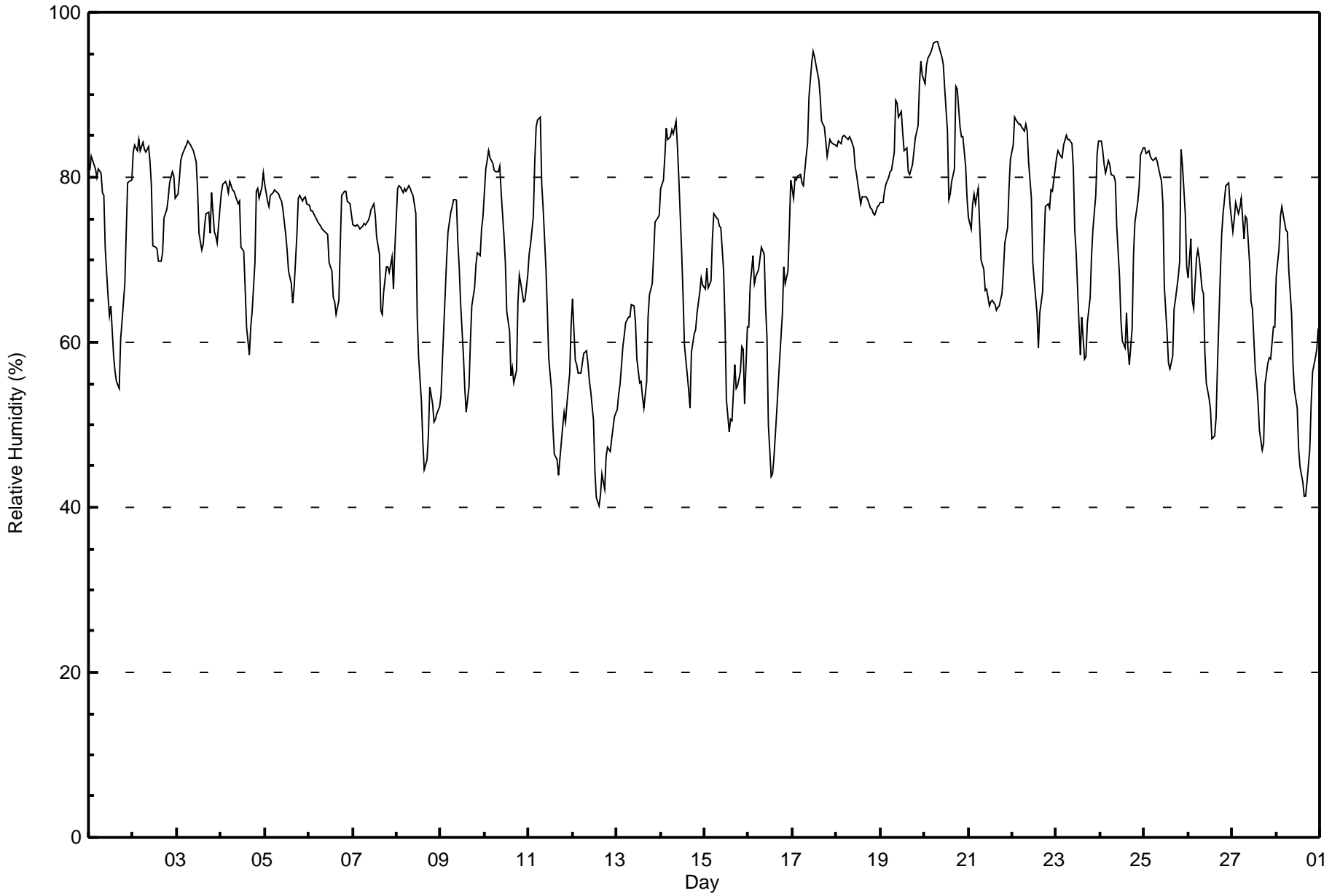
Mannix - February 2017

Maximum Value: 96 % on Feb 20 07:00																			Maximum Daily Average: 88.8 % on Feb 20						Hours in Service: 672	
Minimum Value: 40 % on Feb 12 15:00																			Minimum Daily Average: 51.2 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 78.7 % at hour 6																			Minimum Diurnal Average: 59.8 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 71.2 %																			Percentiles: P ₁ = 42 P ₁₀ = 54 Q ₁ = 63 Median = 74 Q ₃ = 80 P ₉₀ = 84 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-Feb	81	83	82	81	80	81	81	78	78	71	66	63	64	58	56	55	54	60	63	67	73	79	80	80	71.5	83
2-Feb	83	84	83	85	83	84	83	83	84	82	79	72	72	71	70	70	71	75	76	77	79	81	80	77	78.5	85
3-Feb	78	80	82	83	84	84	84	84	83	83	82	79	73	71	72	74	76	76	73	78	73	73	72	76	78.0	84
4-Feb	78	79	79	79	78	80	79	78	78	77	77	72	71	67	62	58	62	64	70	78	79	77	79	80	74.2	80
5-Feb	79	77	76	78	78	78	78	78	78	77	76	73	71	69	67	65	67	73	77	78	77	77	78	77	75.1	79
6-Feb	77	76	76	75	75	75	74	74	74	73	73	70	69	65	65	63	65	72	78	78	78	77	77	75	73.1	78
7-Feb	74	74	74	74	74	74	74	74	75	75	76	77	75	73	71	64	63	66	69	69	68	70	66	71	71.8	77
8-Feb	79	79	79	78	79	78	79	79	78	78	76	63	58	53	48	45	46	49	55	52	50	51	51	52	63.9	79
9-Feb	54	58	66	70	73	76	76	77	77	72	69	65	58	54	52	55	60	64	67	70	71	71	74	75	66.8	77
10-Feb	81	82	83	82	82	81	81	81	81	78	73	70	64	61	56	57	55	57	65	68	66	65	65	68	70.9	83
11-Feb	71	72	75	82	86	87	87	79	76	69	64	58	54	50	46	46	44	46	50	52	50	53	56	62	63.1	87
12-Feb	65	58	57	56	56	57	59	59	57	55	54	50	44	41	40	41	44	42	46	47	47	48	50	51	51.2	65
13-Feb	52	54	55	60	61	62	63	63	65	64	62	58	55	55	53	52	55	63	66	67	71	75	75	75	61.7	75
14-Feb	79	80	83	86	85	85	86	85	87	84	80	71	66	60	56	54	52	59	61	62	64	66	68	67	71.8	87
15-Feb	66	69	67	68	73	76	75	75	74	74	69	62	53	49	51	51	57	54	55	56	59	59	53	62	62.8	76
16-Feb	62	67	71	67	68	69	70	72	71	64	60	50	44	44	46	52	55	58	63	69	67	69	74	80	62.9	80
17-Feb	77	80	80	80	80	79	79	83	84	90	94	95	95	93	92	90	87	86	84	83	85	84	84	84	85.3	95
18-Feb	84	84	84	85	85	85	85	85	85	84	81	80	78	77	78	78	78	77	76	76	76	75	76	77	80.3	85
19-Feb	77	77	78	79	80	81	81	83	89	89	87	88	85	83	84	81	80	82	83	85	86	91	94	92	84.0	94
20-Feb	91	94	94	95	96	96	96	96	96	95	94	91	86	77	78	80	81	91	91	86	85	85	81	78	88.8	96
21-Feb	75	74	77	78	77	79	74	70	69	66	66	64	65	65	65	64	64	64	66	69	72	74	79	82	70.7	82
22-Feb	84	87	87	86	86	86	86	86	86	82	77	70	68	64	59	64	66	72	76	77	76	79	78	81	77.6	87
23-Feb	82	83	82	82	84	85	84	85	84	81	74	71	62	59	63	58	58	62	65	71	74	78	83	84	74.8	85
24-Feb	84	83	82	80	82	80	80	80	74	68	63	60	59	63	59	57	62	71	74	77	79	83	84	84	73.6	84
25-Feb	84	83	83	83	82	82	82	82	81	80	77	67	61	58	57	58	64	65	68	70	83	81	76	69	74.0	84
26-Feb	68	72	65	64	70	71	70	67	66	59	55	53	52	48	49	51	57	68	73	76	79	79	79	77	65.3	79
27-Feb	73	75	77	76	76	78	72	75	75	70	65	64	57	55	53	49	47	48	55	57	58	58	62	62	64.0	78
28-Feb	68	71	75	76	75	74	73	69	63	57	54	52	47	45	43	41	41	43	47	53	56	58	59	62	58.5	76
																			75.2 76.2 76.9 77.4 78.1 78.7 78.3 77.8 77.6 75.1 72.5 68.2 64.5 61.6 60.5 59.8 61.0 64.2 67.5 69.5 70.7 71.9 72.6 73.6						Diurnal Average	
																			91 94 94 95 96 96 96 96 96 95 94 95 95 93 92 90 87 91 91 86 86 91 94 92						Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mannix - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

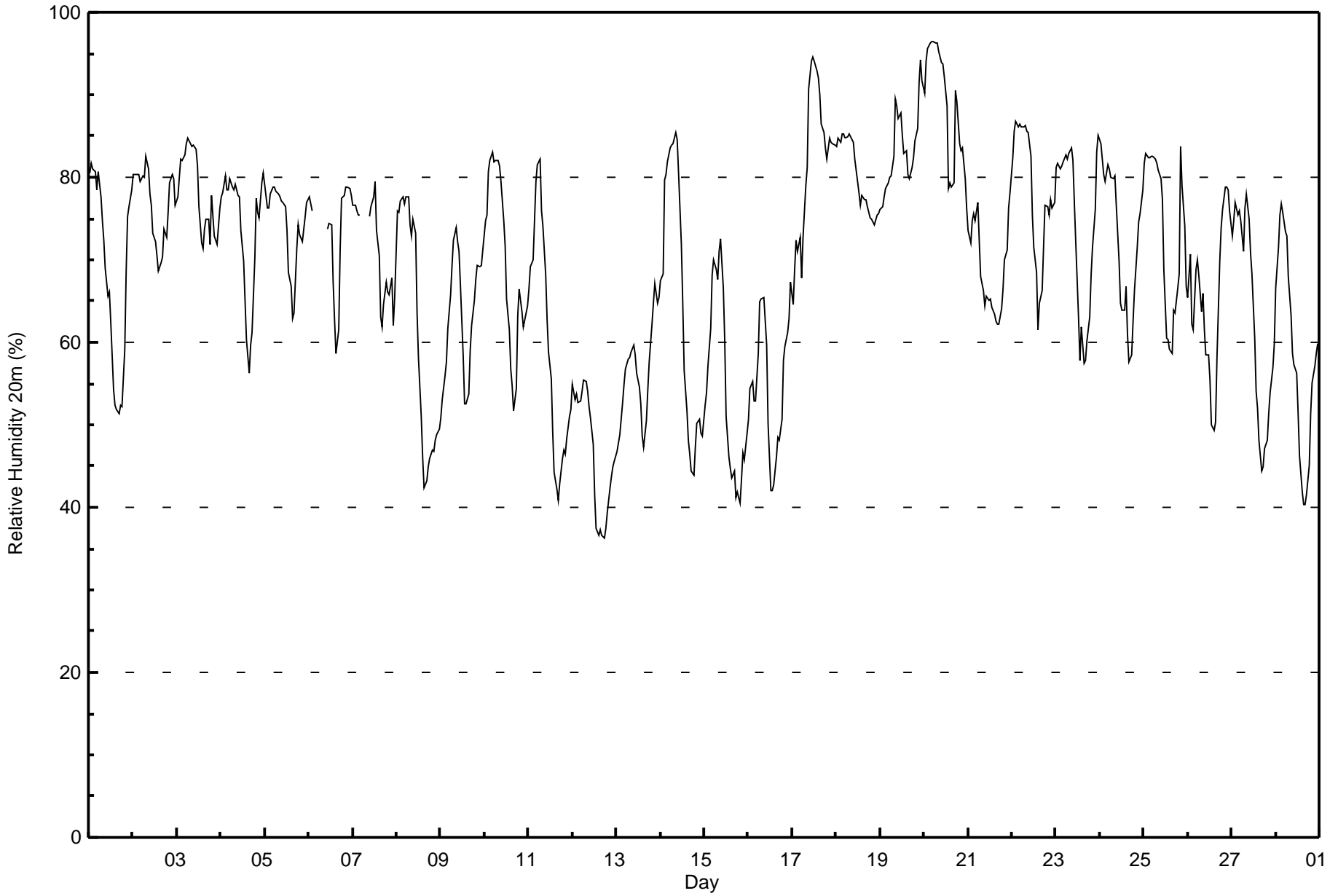
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	137	20.39	20.39
60 - 80	371	55.21	75.60
80 - 100	164	24.40	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Value: 96 % on Feb 20 05:00																			Maximum Daily Average: 88.7 % on Feb 20						Hours in Service: 672	
Minimum Value: 36 % on Feb 12 18:00																			Minimum Daily Average: 46.5 % on Feb 12						Hours of Data: 661	
Maximum Diurnal Average: 76.6 % at hour 7																			Minimum Diurnal Average: 57.9 % at hour 16						Hours of Missing Data: 11	
Monthly Average: 69.1 %																			Percentiles: P ₁ = 40 P ₁₀ = 49 Q ₁ = 59 Median = 72 Q ₃ = 79 P ₉₀ = 84 P ₉₉ = 95						Hours of Calibration: 0	
																									Percent Operational Time: 98.4	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	81	82	81	81	78	81	78	75	72	69	66	66	62	54	52	52	51	52	52	59	69	75	76	78	68.5	82
2-Feb	80	80	80	80	79	80	80	83	81	78	77	73	72	70	69	70	70	74	73	76	79	80	80	77	76.8	83
3-Feb	78	80	82	82	83	84	85	84	84	84	83	81	76	72	71	74	75	75	72	78	73	72	72	76	78.2	85
4-Feb	78	78	80	78	79	80	79	79	79	78	78	74	70	65	60	56	60	61	70	77	76	75	79	81	73.7	81
5-Feb	79	76	76	78	79	79	78	78	78	77	77	76	74	69	67	63	64	71	74	73	72	74	75	77	74.3	79
6-Feb	78	77	76	AF	AF	AF	AF	AF	AF	AF	74	74	74	67	63	59	61	71	77	78	79	79	78	--	79	
7-Feb	77	77	76	75	75	AF	AF	AF	AF	75	76	78	79	74	71	63	62	65	67	66	66	68	62	65	70.8	79
8-Feb	76	76	77	78	77	78	78	74	73	75	73	64	58	51	46	42	43	45	46	47	47	48	49	50	61.2	78
9-Feb	51	53	56	58	62	66	69	72	74	72	71	67	58	52	52	54	59	62	65	68	69	69	69	71	63.4	74
10-Feb	75	75	81	82	83	82	82	82	81	80	75	72	65	62	57	55	52	54	63	66	64	62	63	64	69.9	83
11-Feb	66	69	70	75	80	81	82	76	74	68	63	59	56	49	44	42	41	43	46	47	47	48	51	52	59.5	82
12-Feb	55	53	54	53	53	54	55	55	54	52	51	48	42	37	37	37	37	36	37	39	42	44	45	46	46.5	55
13-Feb	47	48	49	53	55	57	58	58	59	60	59	56	55	53	49	47	50	54	58	62	65	67	65	65	56.1	67
14-Feb	67	68	80	80	82	84	84	84	85	85	80	72	65	57	52	48	46	44	44	44	50	51	49	49	64.7	85
15-Feb	52	54	57	62	68	70	69	68	71	73	67	60	51	46	45	44	44	41	42	41	43	47	46	49	54.5	73
16-Feb	51	54	55	53	53	59	65	65	65	63	60	50	42	42	43	46	48	48	51	58	59	61	63	67	55.1	67
17-Feb	65	69	72	71	73	68	73	79	81	91	94	95	94	93	92	90	86	85	84	82	85	84	84	84	82.2	95
18-Feb	84	85	84	85	85	85	85	85	85	84	82	81	78	77	78	77	77	76	75	75	75	74	75	76	80.1	85
19-Feb	76	76	78	79	79	80	80	83	90	89	87	88	85	83	83	80	80	81	82	84	86	92	94	92	83.6	94
20-Feb	90	94	96	96	96	96	96	96	95	94	94	92	89	79	79	79	79	90	89	84	83	84	80	76	88.7	96
21-Feb	74	72	75	76	75	77	72	68	66	64	66	65	65	64	63	63	62	62	64	66	70	71	76	78	69.0	78
22-Feb	82	86	87	86	87	86	86	86	86	85	83	75	72	68	62	65	66	72	77	76	75	77	76	77	78.2	87
23-Feb	81	82	81	81	82	83	82	83	83	82	77	72	63	58	62	57	58	60	63	68	72	76	83	85	74.0	85
24-Feb	84	82	80	80	82	81	80	80	80	77	70	65	64	64	67	61	58	59	62	66	72	75	76	78	72.5	84
25-Feb	82	83	82	82	83	83	82	82	81	80	77	69	61	60	59	59	64	63	67	68	84	79	74	67	73.7	84
26-Feb	65	71	62	61	69	70	68	64	66	62	58	58	55	50	49	50	58	70	74	76	79	79	78	76	65.4	79
27-Feb	73	75	77	75	76	75	71	76	78	75	71	68	61	54	52	48	44	45	47	48	51	54	57	60	63.0	78
28-Feb	67	72	75	77	76	73	73	68	63	59	57	56	52	46	42	40	40	42	45	51	55	57	59	60	58.5	77
																			71.9 73.1 74.3 74.7 75.8 76.5 76.6 76.2 76.4 75.1 73.0 69.8 65.6 61.3 59.5 57.9 58.5 60.8 63.1 65.3 67.4 68.6 69.1 69.8						Diurnal Average	
																			90 94 96 96 96 96 96 96 95 94 94 95 94 93 92 90 86 90 89 84 86 92 94 92						Diurnal Maximum	
AF - Analyzer Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

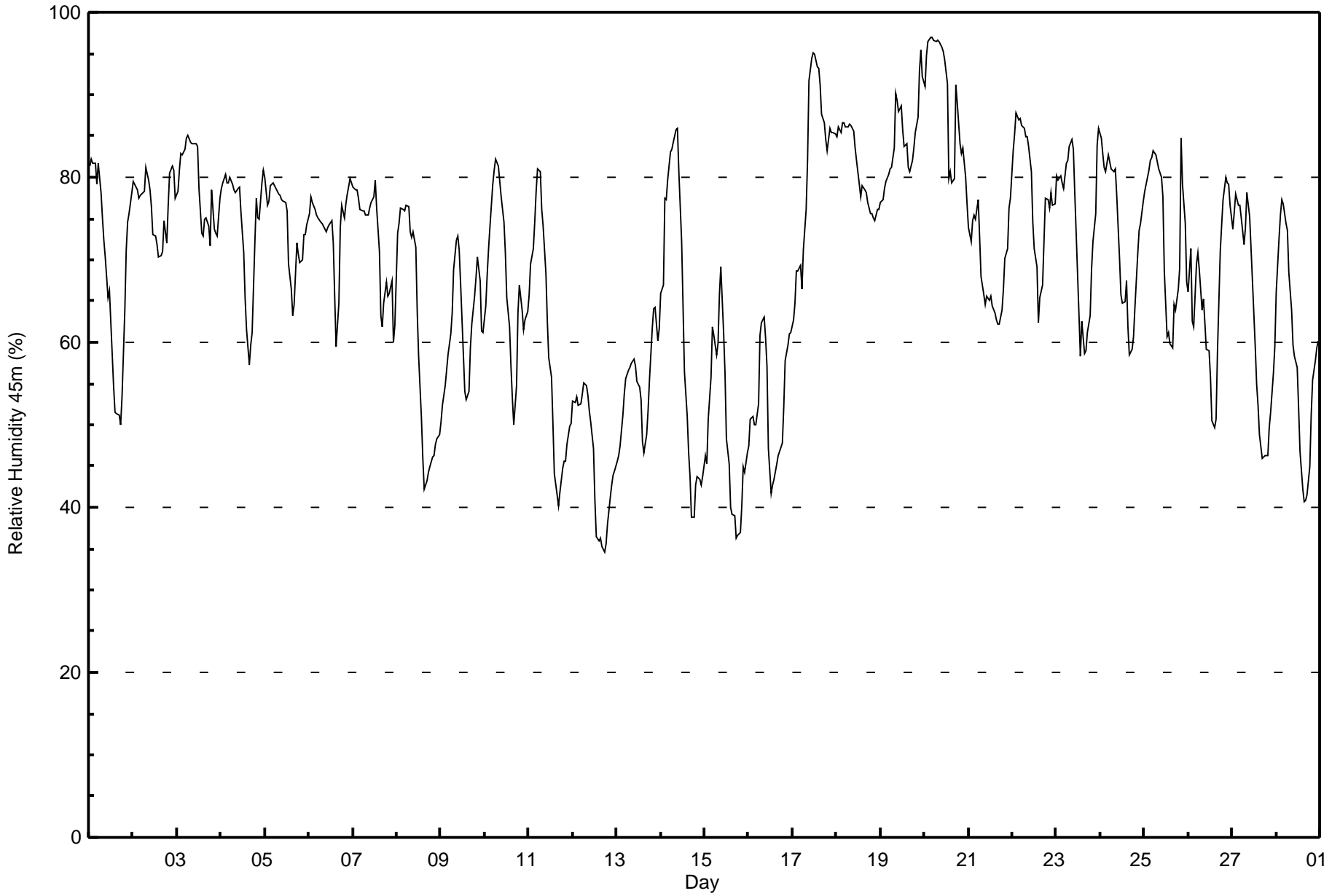
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	7	1.06	1.06
40 - 60	167	25.26	26.32
60 - 80	342	51.74	78.06
80 - 100	145	21.94	100.00

Total Number of Valid Hours: 661

Total Number of Hours: 672



Maximum Value: 97 % on Feb 20 04:00																			Maximum Daily Average: 89.4 % on Feb 20						Hours in Service: 672	
Minimum Value: 34 % on Feb 12 18:00																			Minimum Daily Average: 45.6 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 75.9 % at hour 9																			Minimum Diurnal Average: 58.0 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 68.8 %																			Percentiles: P ₁ = 36 P ₁₀ = 47 Q ₁ = 59 Median = 72 Q ₃ = 79 P ₉₀ = 84 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-Feb	81	82	82	82	79	82	78	75	72	70	65	66	62	55	52	51	51	50	53	64	71	75	76	78	68.9	82
2-Feb	79	79	79	78	78	78	78	81	80	79	76	73	73	72	70	71	71	75	72	77	81	81	81	77	76.6	81
3-Feb	78	81	83	83	83	85	85	84	84	84	84	84	79	73	73	75	75	74	72	79	74	73	73	77	78.9	85
4-Feb	79	79	80	79	79	80	79	78	78	79	79	76	71	65	62	57	60	61	72	77	75	75	79	81	74.2	81
5-Feb	80	77	77	79	79	79	79	78	78	77	77	77	76	69	66	63	65	72	71	70	70	73	73	74	74.1	80
6-Feb	76	78	77	76	75	75	75	74	74	73	74	74	75	72	66	60	65	74	77	75	77	78	80	79	74.1	80
7-Feb	79	78	78	77	76	76	76	75	75	76	77	78	80	76	71	63	62	65	67	66	66	68	60	62	72.0	80
8-Feb	73	74	76	76	76	77	76	73	73	73	72	64	58	51	46	42	43	44	45	46	46	48	48	49	60.5	77
9-Feb	50	52	55	57	59	61	64	69	72	73	71	67	58	54	53	54	59	62	66	68	70	68	61	61	61.9	73
10-Feb	64	68	71	74	79	81	82	81	79	78	75	71	65	62	57	53	50	55	64	67	64	62	63	64	67.9	82
11-Feb	66	69	71	75	78	81	81	76	74	68	63	58	56	50	44	42	40	42	45	46	46	48	50	50	59.1	81
12-Feb	53	53	53	52	52	54	55	55	54	52	50	47	41	36	36	36	35	34	36	38	41	43	44	44	45.6	55
13-Feb	46	46	47	51	54	56	57	57	57	58	57	55	55	53	48	47	49	52	55	62	64	64	60	62	54.6	64
14-Feb	66	67	77	77	80	83	83	84	86	86	81	72	64	56	51	47	44	39	39	43	44	43	43	44	62.4	86
15-Feb	46	45	51	56	62	61	58	60	66	69	61	56	48	45	40	39	39	36	37	37	40	45	44	47	49.5	69
16-Feb	48	51	51	50	50	53	61	62	63	61	57	47	42	43	43	45	46	47	48	52	58	60	61	61	52.4	63
17-Feb	63	65	69	69	69	66	71	76	82	92	94	95	95	93	93	91	88	87	85	83	86	85	85	85	82.0	95
18-Feb	85	86	85	87	87	86	86	86	86	86	84	82	79	78	79	78	77	76	76	75	75	76	76	76	81.2	87
19-Feb	77	77	79	80	80	81	81	83	90	89	88	89	86	84	84	81	81	82	83	86	87	93	95	92	84.5	95
20-Feb	91	95	96	97	97	97	97	97	96	96	95	94	91	80	81	79	80	91	89	84	83	84	80	77	89.4	97
21-Feb	74	72	75	75	75	77	73	68	66	65	66	65	66	64	64	63	62	62	64	66	70	71	76	78	69.0	78
22-Feb	83	85	88	87	87	86	86	85	85	84	81	75	71	69	62	65	67	72	78	77	76	78	77	77	78.4	88
23-Feb	80	80	80	79	79	82	82	84	85	83	78	73	63	58	63	59	59	61	63	69	72	76	84	86	74.1	86
24-Feb	85	83	81	81	83	82	81	81	81	78	70	66	65	65	67	62	59	59	61	64	71	74	74	77	72.8	85
25-Feb	78	79	81	82	82	83	83	82	81	80	78	69	61	61	60	59	65	64	66	69	85	79	74	67	73.7	85
26-Feb	66	71	62	62	69	71	69	64	65	62	59	59	56	51	50	51	59	71	74	77	80	79	79	77	66.0	80
27-Feb	74	76	78	77	77	75	72	74	78	75	71	67	60	55	52	49	46	46	46	46	50	52	56	60	63.0	78
28-Feb	66	73	75	77	77	74	74	69	64	60	58	57	52	47	42	41	41	42	45	51	55	58	59	60	59.0	77
	70.9	72.2	73.6	74.1	75.1	75.7	75.7	75.4	75.9	75.2	72.9	69.8	66.0	62.1	59.8	58.0	58.5	60.6	62.4	64.8	67.0	68.0	68.3	68.7	Diurnal Average	
	91	95	96	97	97	97	97	97	96	96	95	95	95	93	93	91	88	91	89	86	87	93	95	92	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

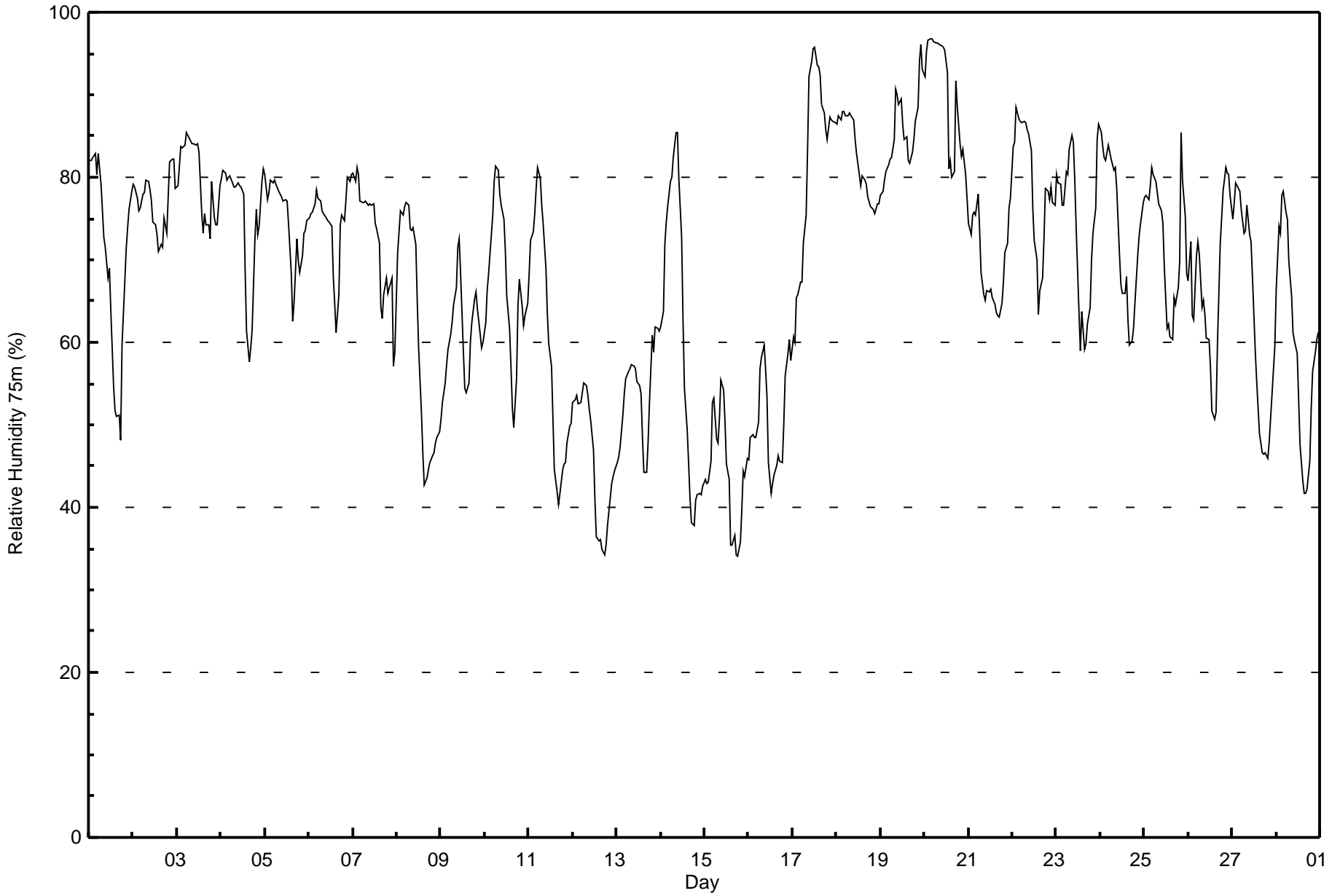
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	15	2.23	2.23
40 - 60	164	24.40	26.64
60 - 80	353	52.53	79.17
80 - 100	140	20.83	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Value: 97 % on Feb 20 04:00																			Maximum Daily Average: 89.8 % on Feb 20						Hours in Service: 672		
Minimum Value: 34 % on Feb 15 19:00																			Minimum Daily Average: 44.2 % on Feb 15						Hours of Data: 672		
Maximum Diurnal Average: 75.6 % at hour 6																			Minimum Diurnal Average: 58.2 % at hour 16						Hours of Missing Data: 0		
Monthly Average: 68.8 %																			Percentiles: P ₁ = 36 P ₁₀ = 46 Q ₁ = 59 Median = 73 Q ₃ = 79 P ₉₀ = 84 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-Feb	82	82	82	83	80	83	79	76	73	72	68	69	64	55	52	51	51	48	60	67	71	74	76	78	69.8	83	
2-Feb	79	79	77	76	76	78	78	80	79	79	77	75	74	73	71	72	72	75	73	78	82	82	82	79	76.9	82	
3-Feb	79	81	84	84	84	85	85	84	84	84	84	84	83	76	73	76	74	74	73	80	75	74	74	79	79.7	85	
4-Feb	80	81	81	80	80	80	79	79	79	79	79	79	78	69	61	58	59	62	72	76	73	74	80	81	74.9	81	
5-Feb	80	77	78	80	79	80	79	78	78	78	77	77	77	74	68	63	65	73	70	69	70	73	74	75	74.7	80	
6-Feb	75	76	76	77	78	77	77	76	76	75	75	75	74	68	65	61	66	74	75	75	77	80	79	80	74.5	80	
7-Feb	81	79	81	80	77	77	77	77	77	77	77	77	74	74	72	64	63	66	68	66	67	68	57	59	72.2	81	
8-Feb	71	73	76	75	76	77	77	74	74	74	72	65	59	52	47	43	44	45	45	46	47	48	48	49	60.6	77	
9-Feb	51	53	55	57	59	61	63	65	67	72	72	68	59	54	54	55	60	62	65	66	64	61	59	60	60.9	72	
10-Feb	62	66	68	71	75	79	81	81	78	77	75	71	66	62	57	52	50	56	64	68	64	62	63	65	67.2	81	
11-Feb	68	72	73	76	79	81	80	77	74	69	64	60	57	51	45	42	40	42	45	45	45	48	50	50	59.7	81	
12-Feb	53	53	54	53	53	54	55	55	54	52	51	47	41	36	36	36	35	34	35	38	41	43	44	44	45.6	55	
13-Feb	45	46	47	51	54	56	56	57	57	57	55	55	54	48	44	44	48	53	61	59	62	62	61	61	53.7	62	
14-Feb	62	64	72	74	76	79	80	82	85	85	80	73	63	54	49	45	41	38	38	41	42	42	41	42	60.4	85	
15-Feb	43	43	43	46	53	53	48	48	51	55	54	50	45	43	35	35	37	34	34	36	40	44	44	46	44.2	55	
16-Feb	46	48	49	48	49	50	57	58	60	57	53	45	42	43	44	45	46	46	45	50	56	59	60	58	50.6	60	
17-Feb	61	60	65	66	67	67	72	75	83	92	94	96	96	94	93	92	89	88	86	85	87	87	87	87	82.0	96	
18-Feb	86	88	87	88	88	87	87	88	87	87	85	83	80	79	80	80	79	78	76	76	76	76	77	77	82.3	88	
19-Feb	78	78	80	81	82	82	82	85	91	90	89	89	87	85	85	82	82	83	85	87	89	94	96	93	85.5	96	
20-Feb	92	95	97	97	97	96	96	96	96	96	96	95	93	81	82	80	81	92	89	84	83	83	80	77	89.8	97	
21-Feb	74	73	75	76	75	78	74	68	66	65	66	66	67	65	65	64	63	63	65	67	71	72	76	77	69.7	78	
22-Feb	84	84	88	87	87	87	87	87	86	85	83	76	72	70	63	66	68	73	79	78	77	79	77	77	79.2	88	
23-Feb	80	79	79	77	77	81	80	83	85	84	80	74	64	59	64	59	60	62	64	70	73	76	85	86	74.2	86	
24-Feb	85	84	82	82	84	83	82	81	81	79	71	67	66	66	68	63	60	60	62	65	71	73	74	77	73.5	85	
25-Feb	78	78	77	79	81	80	80	78	77	76	74	69	62	62	61	60	65	65	67	70	86	80	75	68	72.8	86	
26-Feb	67	72	63	63	70	72	71	64	65	63	61	60	57	52	51	51	60	72	75	78	81	80	80	78	67.0	81	
27-Feb	75	77	79	79	78	76	73	73	77	73	72	68	59	55	52	49	47	46	47	46	48	51	57	60	63.2	79	
28-Feb	66	74	73	78	78	76	75	70	66	61	60	59	53	48	43	42	42	42	46	52	57	59	60	61	60.0	78	
	70.9	72.0	73.0	73.6	74.8	75.6	75.4	74.8	75.1	74.7	73.0	70.5	66.6	62.6	60.1	58.2	58.6	60.7	62.7	65.0	66.8	68.0	68.5	68.8	Diurnal Average		
	92	95	97	97	97	96	96	96	96	96	96	96	96	96	94	93	92	89	92	89	87	89	94	96	93	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	16	2.38	2.38
40 - 60	167	24.85	27.23
60 - 80	343	51.04	78.27
80 - 100	146	21.73	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

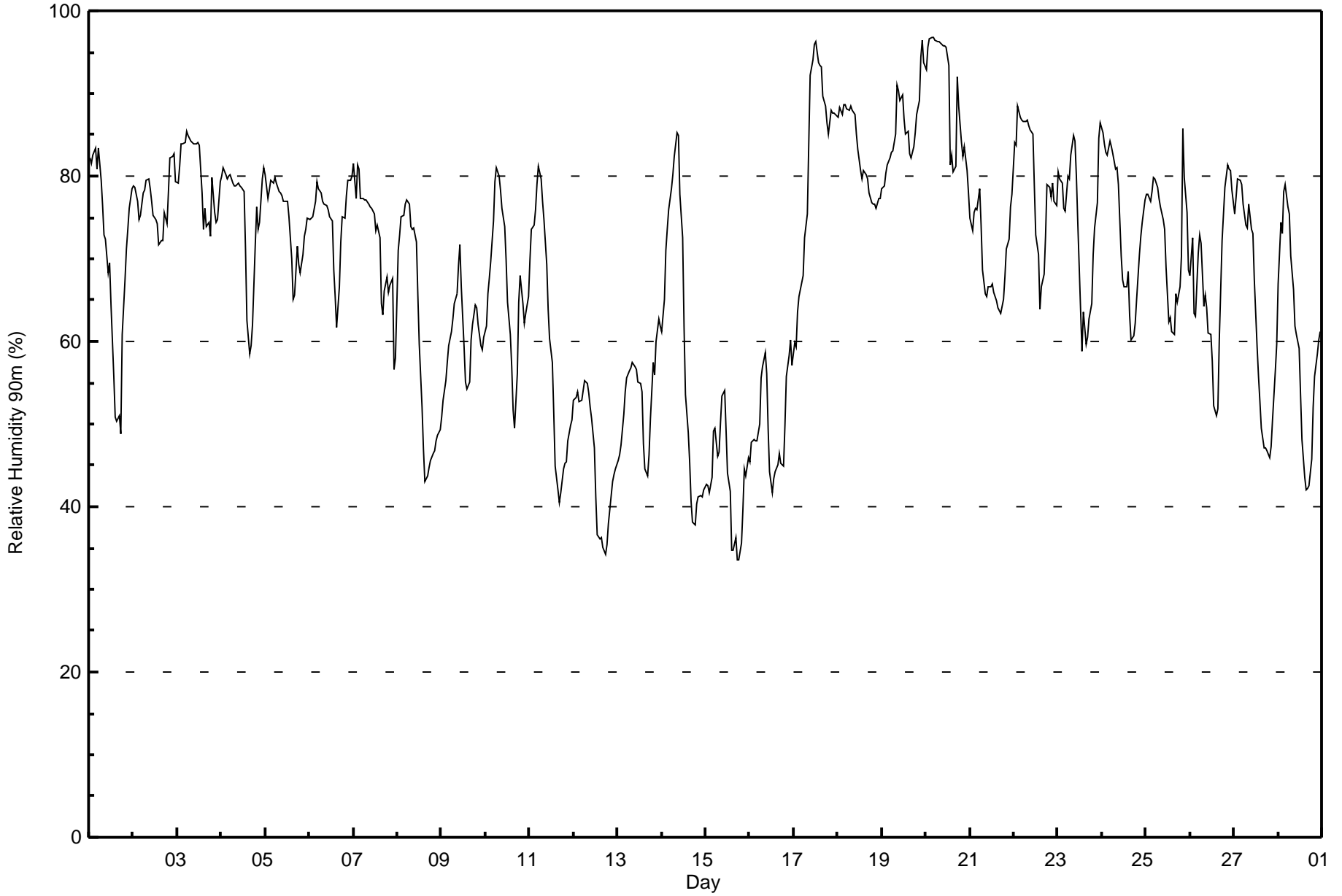


Maximum Value: 97 % on Feb 20 05:00																			Maximum Daily Average: 90.0 % on Feb 20						Hours in Service: 672																																													
Minimum Value: 34 % on Feb 15 19:00																			Minimum Daily Average: 43.2 % on Feb 15						Hours of Data: 672																																													
Maximum Diurnal Average: 75.7 % at hour 6																			Minimum Diurnal Average: 58.6 % at hour 16						Hours of Missing Data: 0																																													
Monthly Average: 68.8 %																			Percentiles: P ₁ = 35 P ₁₀ = 46 Q ₁ = 59 Median = 73 Q ₃ = 79 P ₉₀ = 85 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-Feb	82	82	83	83	81	83	80	76	73	72	68	69	64	56	51	50	51	49	61	68	71	74	76	78	70.1	83																																												
2-Feb	79	79	77	75	75	78	78	80	80	78	77	75	75	74	72	72	72	76	74	78	82	82	83	79	77.1	83																																												
3-Feb	79	81	84	84	84	85	85	84	84	84	84	84	84	78	74	76	74	74	73	80	76	74	75	79	80.0	85																																												
4-Feb	80	81	80	80	80	80	79	79	79	79	79	79	78	71	63	58	60	62	72	76	74	74	80	81	75.1	81																																												
5-Feb	80	77	78	80	79	80	79	78	78	78	77	77	77	75	70	65	66	71	69	68	70	73	74	75	74.8	80																																												
6-Feb	75	75	75	77	79	79	78	77	77	76	76	75	75	69	65	62	67	72	75	75	78	80	79	80	74.8	80																																												
7-Feb	82	77	81	81	77	77	77	77	77	76	76	75	73	74	73	65	63	66	68	66	67	68	57	58	72.1	82																																												
8-Feb	71	73	75	75	77	77	77	74	74	74	72	66	60	52	47	43	44	45	46	47	47	48	49	49	60.8	77																																												
9-Feb	51	53	55	57	59	61	63	65	66	69	72	67	59	55	54	55	60	62	64	64	62	59	59	60	60.5	72																																												
10-Feb	62	66	68	70	75	79	81	80	78	76	74	70	65	61	57	52	50	56	65	68	65	62	63	65	66.9	81																																												
11-Feb	70	74	74	76	79	81	80	77	75	69	64	60	58	51	45	42	40	42	45	45	45	48	50	50	60.0	81																																												
12-Feb	53	53	54	53	53	54	55	55	54	52	51	47	41	37	36	36	35	34	35	38	41	43	44	45	45.8	55																																												
13-Feb	46	46	47	51	54	56	57	57	57	57	55	55	54	48	45	44	46	51	57	56	60	63	62	62	53.3	63																																												
14-Feb	61	65	71	74	76	79	80	82	85	85	78	73	62	54	49	45	41	38	38	40	41	41	41	42	60.0	85																																												
15-Feb	43	43	42	43	49	49	46	47	50	53	54	49	44	42	35	35	36	34	34	36	40	45	44	46	43.2	54																																												
16-Feb	45	48	48	48	48	50	56	57	59	56	49	44	42	43	44	45	46	45	45	50	56	58	60	57	50.0	60																																												
17-Feb	60	59	64	65	67	68	73	75	84	92	94	96	96	94	93	93	90	88	86	85	88	88	88	87	82.2	96																																												
18-Feb	87	88	87	89	89	88	88	89	88	87	85	83	81	80	81	80	80	78	77	77	77	76	77	77	82.8	89																																												
19-Feb	78	79	80	81	82	83	83	85	91	90	89	90	87	85	85	83	82	84	85	87	89	94	96	94	86.0	96																																												
20-Feb	93	96	97	97	97	96	96	96	96	96	96	96	93	81	83	81	81	92	89	84	82	84	81	78	90.0	97																																												
21-Feb	75	73	76	76	76	78	74	69	66	65	67	67	67	66	65	64	64	63	65	68	71	72	76	78	70.0	78																																												
22-Feb	84	84	88	87	87	87	87	87	86	86	85	79	73	70	64	67	68	73	79	79	78	79	77	76	79.5	88																																												
23-Feb	81	80	79	76	76	80	80	83	85	84	80	74	64	59	63	60	60	63	65	71	74	77	85	86	74.3	86																																												
24-Feb	85	84	83	83	84	83	83	81	81	79	70	67	67	67	68	63	60	61	62	65	71	73	74	77	73.8	85																																												
25-Feb	78	78	77	78	80	80	79	77	76	75	74	69	62	63	61	61	66	65	67	70	86	80	76	69	72.7	86																																												
26-Feb	68	73	63	63	71	73	72	64	66	64	61	61	58	52	51	52	60	72	75	79	81	81	81	78	67.4	81																																												
27-Feb	75	77	80	79	79	77	74	74	77	74	73	67	59	56	53	49	47	47	47	46	47	51	56	60	63.5	80																																												
28-Feb	67	74	73	78	79	76	75	70	66	62	61	59	54	48	44	42	42	42	46	52	56	58	60	61	60.3	79																																												
																			71.1		72.0		72.9		73.5		74.7		75.7		75.5		74.8		75.2		74.7		72.9		70.5		66.8		63.1		60.5		58.6		58.9		60.7		62.7		64.9		66.8		67.9		68.7		68.9		Diurnal Average			
																			93		96		97		97		97		96		96		96		96		96		96		96		96		96		94		93		93		90		92		89		87		89		94		96		94		Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	16	2.38	2.38
40 - 60	167	24.85	27.23
60 - 80	345	51.34	78.57
80 - 100	144	21.43	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 33 km/h on Feb 12 22:00	Maximum Daily Speed Average: 21.4 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 6 16:00	Minimum Daily Speed Average: 1.0 km/h on Feb 4	Hours of Data: 661
Maximum Diurnal Speed Average: 2.9 km/h at hour 1	Minimum Diurnal Speed Average: 0.9 km/h at hour 20	Hours of Missing Data: 11
Monthly Average Velocity: 2.0 km/h 260.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 29	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-Feb	NNW13	NNW13	NNW13	N15	N18	N12	N9	N7	NNW5	NE2	SE2	SSW2	SE3	SSE3	E5	ESE7	SE8	SSE7	SSE7	SW5	WSW9	WSW10	W10	WSW10	NNW2.8	N18	
2-Feb	WSW11	W13	W10	W8	WSW4	S5	S5	SE3	S3	SSE2	SSW3	W5	W7	ENE3	SSE4	SE3	SSE3	SE4	SE3	NE8	NNE14	NNE14	N10	N14	WNW1.3	NNE14	
3-Feb	NNE15	NNE11	N8	NNW5	N5	N5	N5	NNE2	SE1	SW4	W3	WSW3	SSE3	SSE4	SSE5	SSE8	SSE2	NW6	NW17	N14	NNE17	NNE17	N15	N10	N4.8	NNE17	
4-Feb	N7	NNW7	N7	NNE8	N8	N6	NW2	NW3	NNW1	SW4	SSE4	SE3	SE3	SW3	SSE8	SSE7	SSE9	SE10	SSE8	SSE7	SSE6	S0	N8	N10	E1.0	N10	
5-Feb	N15	N18	N11	N10	N11	NNW5	NNW5	WNW4	W5	W4	NW3	NW5	NW7	WNW10	W8	E0	SSE5	SE8	SSE7	SSE7	SSE6	SSE6	SSE7	SSE8	NNW1.9	N18	
6-Feb	SSE8	SSE9	SSE9	AF	AF	AF	AF	AF	AF	AF	AF	SSE8	SSE8	SSE7	SSE6	SSE4	SSE0	NNW0	NNW3	N6	N5	WNW4	NW3	WNW4	W3	----	SSE9
7-Feb	WSW6	SSW4	S4	S5	S7	AF	AF	AF	AF	AF	SSE10	SSE6	SSE8	SW12	WSW14	WSW13	WSW16	WSW13	W16	W14	NW11	NW12	WNW10	NW14	WNW9	WSW6.8	W16
8-Feb	WSW11	WSW10	WSW10	WSW8	SSW7	S7	SW8	WSW12	SW8	SSE6	SW6	WSW17	WSW18	WSW16	WSW18	SW18	SSW19	SW14	SSW10	SW18	SW23	WSW23	WSW20	WSW18	SW12.7	WSW23	
9-Feb	WSW16	WSW10	SSW5	S4	SSE8	SSE5	SSE11	SSE7	SE9	SE7	SE8	SE10	SSE5	S4	SW3	NNE3	N4	N7	N4	N4	N6	N9	NNE9	NNE7	SSE1.5	WSW16	
10-Feb	NNE11	N9	NNE8	W6	WNW3	E1	WSW4	SSW3	SE6	SE9	SSE6	SSW3	SW3	SSE2	S4	SSE3	SE9	SE13	SE13	SE14	SE13	SSE10	SSE12	SSE10	SE4.2	SE14	
11-Feb	SSE8	S5	WSW2	SSW7	SW7	SW6	WSW5	WSW13	WSW13	W18	W17	W5	SW7	SSW8	SW13	WSW21	WSW19	WSW16	WSW15	SW15	SW16	SW12	S8	SSW13	WSW10.0	WSW21	
12-Feb	S11	SW19	SW26	SW26	SW25	SW20	SW18	SW21	SW21	SW21	SW22	WSW23	WSW28	WSW31	WSW26	WSW20	SSW12	WSW19	SSW9	SW15	WSW25	W33	WSW30	W32	WSW21.4	W33	
13-Feb	W27	W27	W30	W21	W29	W31	W27	W25	W20	W21	WNW17	NW11	N6	ENE5	ESE3	SE3	ESE3	N5	N8	N4	NNW5	W6	WNW4	S2	W11.7	W31	
14-Feb	SE2	SE6	SSE8	SSE10	SE11	SE12	SE11	SE11	SSE13	SE11	SSE14	SE10	SE13	SE12	SE14	SSE16	SE10	SSE11	SSE12	SSE11	SSE10	SSE12	S8	S9	SSE10.5	SSE16	
15-Feb	SSE11	SSE10	SE11	SE10	SE8	SE9	SSE13	SE12	SE15	SE10	SE12	SE9	SE8	SE6	WSW2	SW2	WSW6	SSW11	SSW10	SSW10	SSW11	SSW15	SW19	SSW15	S8.4	SW19	
16-Feb	SSW16	SSW13	SSW13	SW12	SW7	SE7	ESE7	SSE12	SE5	E6	NE6	ENE1	SE6	S7	S3	NNW1	N8	N6	NW4	NW10	N12	NW6	WNW6	WNW11	SSW1.9	SSW16	
17-Feb	NW6	NW7	W6	W7	W6	N2	W8	WNW6	NNW10	NNW12	NW10	WNW8	WNW5	NNE3	NNE7	NNE10	NNE11	NNE10	NNE11	NNE13	NNE9	NNE11	NNE10	NNE8	NNW6.0	NNE13	
18-Feb	N10	N9	NNE10	NNE9	N5	NW5	N4	N4	NW1	SW3	S3	SE1	E2	ENE4	NE8	NE9	NE8	E8	E11	E9	E11	ESE7	ENE7	E13	NE4.8	E13	
19-Feb	ESE11	E14	E13	ESE12	ESE14	E16	E18	E15	E15	E16	E15	E14	E14	ESE15	ESE14	ESE9	E10	E9	SE9	SE8	ESE7	ESE8	ESE6	ESE5	E11.6	E18	
20-Feb	E1	NNW4	N7	N5	WNW6	WNW10	WNW11	WNW10	WNW13	NW10	NNW6	NW5	WNW6	WNW12	WNW12	W12	W14	WNW14	WNW12	W12	WNW9	W7	WSW12	WSW16	WNW8.4	WSW16	
21-Feb	WSW20	WSW14	SW10	SW8	WSW12	WNW14	WNW16	WNW18	WNW18	WNW22	WNW14	WNW19	WNW14	WNW19	WNW17	W16	W16	W15	WSW15	W16	W12	W12	W9	W9	W14.0	WNW22	
22-Feb	W10	WNW7	N10	N6	WNW3	W6	WSW4	W5	W3	NNE2	NNW1	NW1	WNW7	NNW7	NNW7	NNW9	NNW12	NNW10	NNE11	N10	NNE9	NNE7	ENE5	SSE2	NNW4.7	NNW12	
23-Feb	SW3	WSW2	WSW4	SW4	SSW3	SSE5	SSE6	SSE7	SSE5	S4	SSE6	SE5	SE5	ESE5	E6	SSE2	W1	SSE4	ESE4	ESE2	ENE4	SW1	N7	N11	SSE1.9	N11	
24-Feb	N14	N13	N13	NNW8	N8	N11	N10	NNW10	NNW8	NNW8	SW12	NW13	NNW9	NNW6	NNW3	WSW4	SW8	S6	SSE9	S9	SW9	WSW8	S9	S8	NW4.1	N14	
25-Feb	SSE9	SSE11	SSE15	SSE13	SSE11	SSE13	SSE12	SSE13	SSE12	SSE10	SE6	SE3	NNW7	NW9	NNW7	N11	NW8	SW6	ENE3	NE15	N27	N28	N21	E2.4	N28		
26-Feb	NNW21	NNW18	NNW19	NW16	NW17	NW14	NW11	NW13	WNW11	NW11	NW11	NW9	W4	W5	WNW9	WNW11	NW4	N5	N4	NE7	ENE6	ESE7	SE8	ESE8	NNW7.4	NNW21	
27-Feb	ESE8	E7	NE6	NE9	NE7	NE8	ENE9	NNE6	N5	NNE6	NW3	W6	W4	E1	W2	SSE1	SSW3	SSE4	SSE6	SSE7	SE10	SSE12	SSE11	SSE10	ESE2.7	SSE12	
28-Feb	SSE6	SW3	W4	N13	N18	N19	N21	N18	NNE18	NNE15	N11	N8	NW11	N7	NE10	NNE11	NNE9	NE10	NNE10	NNE13	NNE9	NNE7	NNE9	N8	NNE9.9	N21	
W2.9 W2.6 W2.7 W2.2 W2.4 NNW1.5 W1.6 W2.5 WSW2.2 WSW1.7 WSW1.9 WSW2.5 WSW2.9 WSW2.5 WSW2.4 WSW2.4 WSW1.8 SW1.8 SW1.5 WSW0.9 NNW1.4 W2.5 NNW2.4 W2.5																								Diurnal Average			
W27 W27 W30 SW26 W29 W31 W27 W25 SW21 WNW22 SW22 WSW23 WSW28 WSW31 WSW26 WSW21 SSW19 WSW19 NW17 SW18 WSW25 W33 WSW30 W32																								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

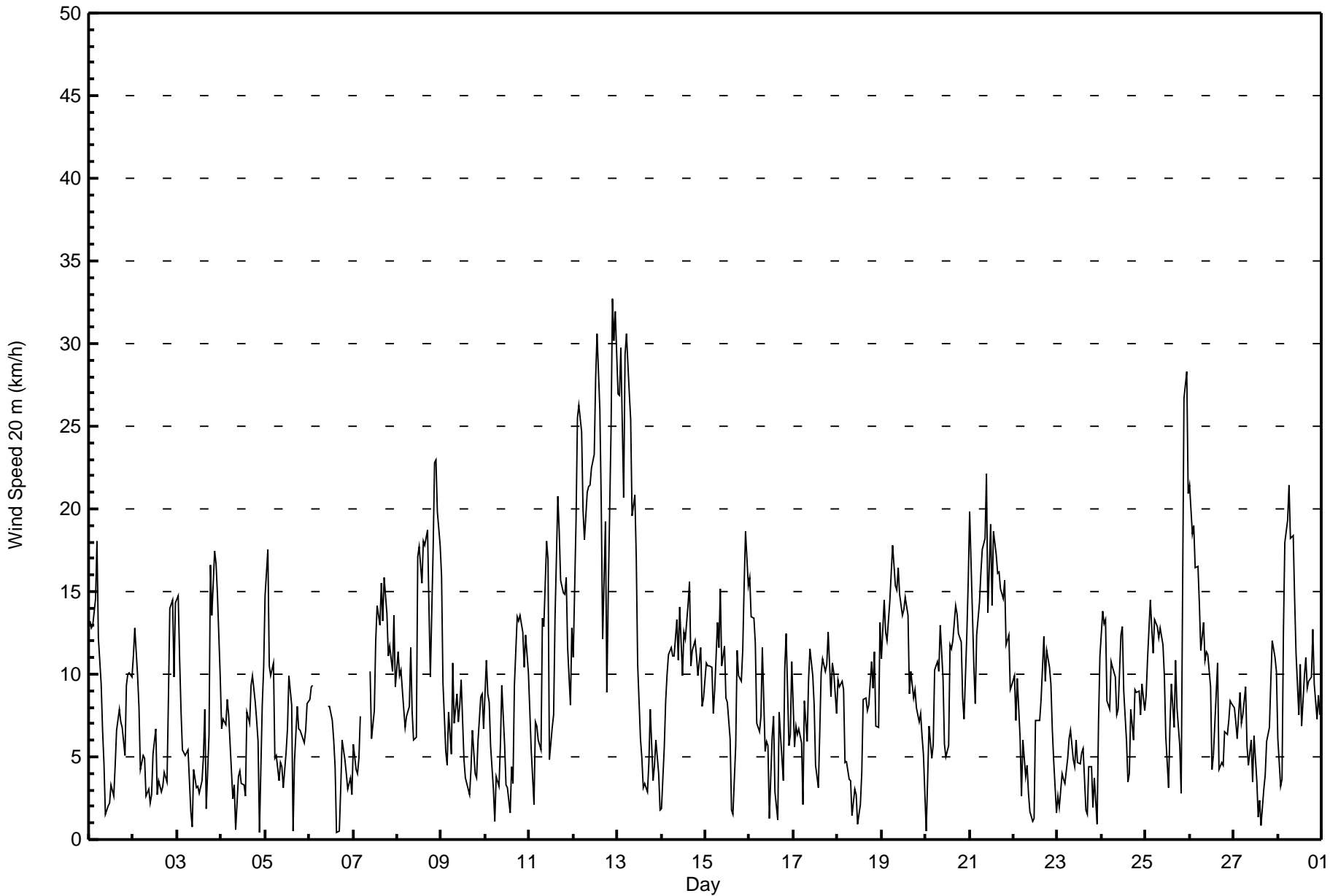
Wind Speed 20 m (WS20m) - km/h
Mannix - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 28 04:00											Hours in Service: 672 Hours of Data: 661 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.4															
Minimum Value: 0 km/h on Feb 6 17:00																										
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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-Feb	3	3	4	4	5	4	3	4	2	1	1	1	1	1	2	2	2	1	1	1	2	2	2	2	5	
2-Feb	2	1	2	2	3	1	1	1	1	1	2	2	2	1	2	2	1	1	2	3	3	3	4	4	4	
3-Feb	4	3	2	2	2	2	2	1	1	2	1	1	2	2	1	1	2	3	5	4	4	5	4	3	5	
4-Feb	2	2	2	2	2	2	1	1	1	2	2	1	1	2	2	2	1	2	1	2	2	1	2	3	3	
5-Feb	4	4	3	3	4	2	1	1	1	2	1	1	4	2	3	1	2	2	1	1	2	2	1	2	4	
6-Feb	2	2	1	AF	AF	AF	AF	AF	AF	AF	2	2	2	1	1	1	0	1	1	1	1	2	2	1	2	
7-Feb	1	1	1	2	1	AF	AF	AF	AF	AF	2	2	2	5	3	4	5	3	3	2	4	3	2	3	1	5
8-Feb	1	2	2	2	2	1	1	4	2	2	5	5	4	4	5	4	5	4	3	5	4	4	4	3	5	
9-Feb	3	4	2	2	3	3	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	
10-Feb	1	2	2	3	2	1	2	2	2	2	3	2	1	1	2	2	4	4	3	4	4	2	2	2	4	
11-Feb	2	1	2	3	2	1	4	3	4	4	5	4	3	3	4	5	4	3	3	4	4	3	4	3	5	
12-Feb	4	5	6	6	5	5	4	5	5	5	5	5	7	8	6	5	3	5	4	4	6	6	6	5	8	
13-Feb	5	4	5	4	5	5	4	4	3	3	3	4	2	1	1	1	3	3	2	1	2	2	1	5	5	
14-Feb	2	1	2	3	2	2	2	3	3	5	4	3	3	3	3	3	3	3	1	2	2	1	1	2	5	
15-Feb	2	2	2	2	3	3	2	2	3	3	2	2	2	3	2	1	3	3	4	2	3	5	5	3	5	
16-Feb	3	3	3	3	3	1	3	3	2	2	2	2	3	4	2	1	2	1	2	2	4	2	2	3	4	
17-Feb	2	2	3	3	1	1	4	3	4	4	2	2	2	1	2	3	3	3	3	4	3	3	3	2	4	
18-Feb	3	3	3	2	2	2	1	2	1	2	2	3	1	2	2	2	2	2	2	3	2	3	2	3	3	
19-Feb	3	3	3	4	4	5	4	4	3	4	4	3	4	4	4	4	3	2	3	3	2	3	2	2	5	
20-Feb	1	1	2	2	2	2	2	2	3	2	2	1	3	2	2	3	2	3	2	2	2	2	4	4	4	
21-Feb	5	4	2	2	3	3	4	4	4	5	4	5	3	4	4	4	3	2	2	3	2	2	1	1	5	
22-Feb	1	2	2	2	2	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	2	1	3	
23-Feb	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	1	2	1	1	2	1	3	3	3	
24-Feb	3	4	4	4	3	3	3	3	2	2	3	3	2	2	3	3	3	2	1	2	2	2	2	2	4	
25-Feb	2	2	2	2	2	2	2	3	2	2	3	2	2	3	3	3	4	3	4	3	5	8	8	7	8	
26-Feb	6	5	6	4	4	4	3	3	3	3	4	4	2	3	4	3	2	1	2	2	1	2	3	2	6	
27-Feb	3	2	2	1	2	2	2	2	3	1	2	2	2	1	2	1	2	1	1	1	2	2	2	2	3	
28-Feb	2	1	2	9	5	5	5	5	5	4	3	3	3	3	3	3	2	2	2	2	3	2	2	2	9	
Diurnal Maximum																										
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	169	25.57	25.57
6 - 11	298	45.08	70.65
12 - 19	156	23.60	94.25
20 - 28	31	4.69	98.94
29 - 38	7	1.06	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 661

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Mannix - February 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	4	1	8	5	6	16	23	14	8	12	10	14	8	11	12	169
6 - 11	38	30	11	3	9	11	31	54	11	9	12	12	17	18	17	15	298
12 - 19	14	10	1	1	10	4	11	16	0	8	13	22	14	15	9	8	156
20 - 28	4	0	0	0	0	0	0	0	0	0	9	9	7	1	0	1	31
29 - 38	0	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	7
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	73	44	13	12	24	21	58	93	25	25	46	55	57	42	37	36	661

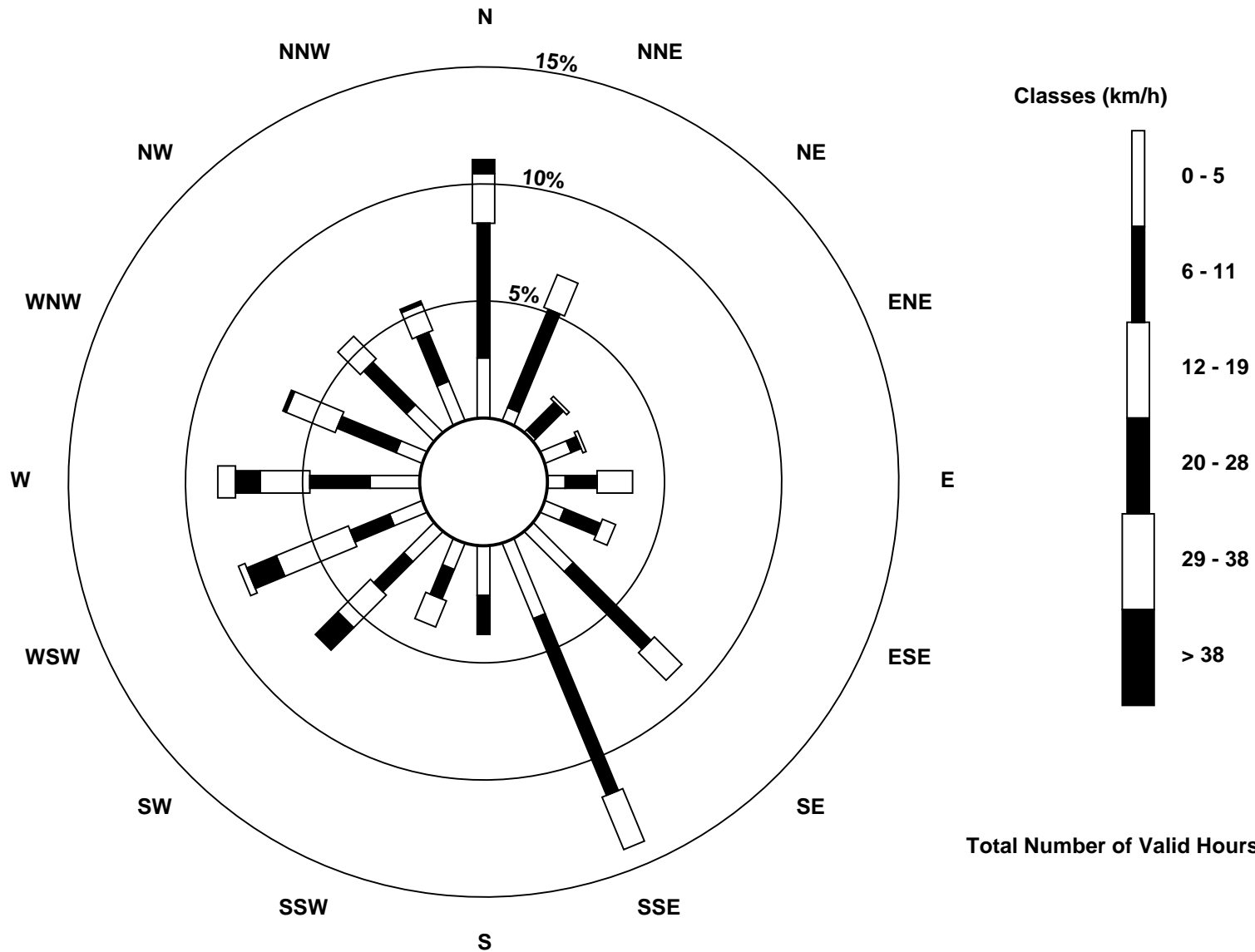
Total Number of Valid Hours: 661

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Mannix - February 2017

Maximum Speed: 38 km/h on Feb 12 22:00	Maximum Daily Speed Average: 28.2 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 6 16:00	Minimum Daily Speed Average: 1.5 km/h on Feb 9	Hours of Data: 670
Maximum Diurnal Speed Average: 4.4 km/h at hour 1	Minimum Diurnal Speed Average: 2.1 km/h at hour 6	Hours of Missing Data: 2
Monthly Average Velocity: 2.9 km/h 247.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 12 Q ₃ = 17 P ₉₀ = 23 P ₉₉ = 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-Feb	NNW18	NNW18	NNW18	N20	NNW25	N17	N14	N11	NNW7	N3	SE2	SSW3	SSE3	SSE2	ESE4	ESE7	SE9	SSE12	S14	WSW10	WSW15	W17	WSW17	WSW18	NW4.8	NNW25
2-Feb	WSW17	WSW18	W17	W15	WSW11	SW9	WSW7	S1	WSW5	W4	WSW4	W8	W8	NE3	S4	SSE2	SSE4	SE4	SE5	NNE11	NNE18	N18	N13	N19	WNW4.1	N19
3-Feb	N19	NNE14	N11	NNW8	N7	N7	NNW8	NNE2	SE1	SSW5	WSW4	WSW4	SSE3	SSE4	SE5	SE9	S3	NW8	NW21	NNW18	N22	NNE21	N19	N13	N6.5	N22
4-Feb	N10	NNW10	N10	N11	N9	N8	N3	NNW4	NE1	S5	S7	SSE4	SSE4	SW4	SE8	SSE7	SE11	SE13	SSE10	SSE11	SSE10	S2	N10	N15	E1.7	N15
5-Feb	N21	N24	N14	N15	N16	NNW8	NNW8	NNW5	NW3	NNW5	NNW5	WNW6	NW8	WNW12	W9	N0	SE5	SE9	SSE10	SSE13	S11	SSE4	SSE7	NNW3.4	N24	
6-Feb	SSE9	SSE15	SSE17	SE15	SSE13	SSE16	SSE17	SSE13	SSE13	SSE14	SE8	SE9	SE7	SE5	SSE4	E0	NNW2	NNW4	N8	N8	NNW7	NNW4	NW5	WNW4	SE5.8	SSE17
7-Feb	W8	SW5	S7	SSW8	SW10	SSW12	S11	SSE17	SSE15	SSE12	S6	SSE9	SW16	WSW17	WSW16	WSW19	WSW17	WSW20	W17	NW16	WNW16	WNW15	NW20	WNW12	WSW8.8	NW20
8-Feb	W15	WSW13	WSW15	WSW15	SW12	SSW11	WSW16	WSW17	WSW12	SW7	SW13	WSW20	WSW21	WSW19	SW22	SW23	SSW26	SSW21	SSW16	SSW25	SW29	WSW30	WSW27	WSW24	SW18.0	WSW30
9-Feb	WSW22	WSW14	SW10	SSW7	S9	S5	SSE12	SSE11	SE13	SE9	SE9	SE10	SE5	S4	SW4	NNE3	N7	N10	N7	N8	N11	N12	NE7	NE8	S1.5	WSW22
10-Feb	NE10	NNE10	NE10	NNE3	ENE2	ESE3	SE2	SSE8	SE11	SE14	SSE8	SSE5	SSW4	SSE2	S6	SSE6	SE13	ESE17	ESE16	SE18	SE16	SSE14	SE16	SSE14	SE7.5	SE18
11-Feb	SSE12	S11	SSW5	SSW14	SW13	SW10	WSW13	WSW18	WSW19	WSW22	W19	W6	SW9	SSW10	SW17	WSW25	WSW25	WSW23	SW22	SW22	SW23	SW18	S12	SSW20	SW14.9	WSW25
12-Feb	SSW18	SW26	SW33	SW34	SW32	SW27	SW26	SW30	SW30	SW29	SW29	WSW35	WSW38	WSW33	SW27	SSW19	SW27	SW14	SW21	WSW31	WSW38	WSW37	WSW36	SW28.2	WSW38	
13-Feb	WSW33	WSW32	W34	W26	W34	W35	W32	W30	W24	W26	W23	WNW14	N7	NE5	E3	ESE3	ESE3	NNE4	N14	N8	N8	WNW5	WNW6	SSW1	W14.1	W35
14-Feb	SE2	SE9	SE16	SSE19	SE20	SE18	SE18	SE20	SSE21	SE18	SSE19	SE13	SE17	SE18	SE22	SSE23	SE20	SSE19	S19	SSE18	S15	S16	SSW18	SSW18	SSE16.7	SSE23
15-Feb	S15	S12	SE17	SE20	SE16	SE19	SE24	SSE22	SE24	SE18	SE21	SE15	SE13	SE10	S6	SSW5	SW10	SW21	SW20	SW19	SSW22	SSW24	SW26	SSW25	S14.5	SW26
16-Feb	SSW26	S24	SSW24	SSW21	SW14	S8	ESE11	SE19	SE10	E9	ENE8	E4	SE9	S11	S5	N1	N12	N9	N4	NNW15	NNW19	NNW9	NW8	NW16	SSW3.1	SSW26
17-Feb	NW10	NW14	WNW8	WNW8	WNW9	N3	WNW8	NW7	NNW14	NNW17	NW14	WNW11	WNW7	N3	NNE8	N13	NNE14	NNE13	N13	N16	N11	N13	NNE12	NNE9	NNW8.8	NNW17
18-Feb	N12	N11	N12	NNE11	N6	NW5	NNW4	N4	NW2	SW3	S3	SE1	ENE2	NE4	NE9	NE10	NE9	ENE9	ENE13	ENE11	E13	E8	ENE8	E16	NE5.7	E16
19-Feb	E13	E17	E15	E14	E17	E19	E21	E18	ENE18	ENE19	ENE17	E16	E16	E17	E16	E10	E12	E10	ESE11	ESE9	ESE9	ESE8	ESE8	ESE6	E13.7	E21
20-Feb	E1	NNW5	NNW10	N8	NW6	WNW13	WNW14	WNW13	WNW16	NW12	NW8	NW6	WNW7	W14	WNW14	W14	W17	AF	AF	W15	WNW13	W10	WSW16	WSW20	WNW10.1	WSW20
21-Feb	WSW25	WSW19	SW15	SW13	WSW16	W17	WNW21	WNW24	W25	WNW28	WNW18	W23	W17	W23	W21	W19	W18	WSW17	WSW18	W18	W15	W15	W12	W13	W17.8	WNW28
22-Feb	W12	WNW10	N14	N10	NNW4	WNW5	W5	W5	WNW3	NNE2	NNW2	NW2	W8	NNW9	NNW9	NNW11	NW16	NNW12	N14	N13	N12	NNE9	ENE7	ESE3	NNW6.4	NNW16
23-Feb	S4	S3	SW5	SSW6	S6	SSE7	SSE9	SSE8	SSE6	S6	SSE7	SE5	SE5	ESE6	E6	SSE2	WSW2	SSE5	ESE4	E2	ENE5	SE2	N11	N15	SSE2.6	N15
24-Feb	N19	N18	NNW18	NNW12	N11	N15	N14	NNW14	NNW11	NNW10	NW15	NW16	NW11	NW7	NW4	WSW6	SW10	S9	S14	SSW16	SW17	WSW13	SSW14	SSW13	NW5.8	N19
25-Feb	S10	SSE16	SSE20	SSE19	SSE18	SSE20	SSE19	SSE18	SSE14	SSE12	SE6	SSE3	NW9	NW12	NNW9	N15	NW11	SW9	NE2	NNE18	N35	N37	NNW28	ESE2.5	N37	
26-Feb	NNW29	NNW25	NW24	NW22	NW21	NW19	NW16	NW18	WNW14	NW14	NW14	NW11	W5	W6	WNW10	W12	WNW5	N5	N6	NE7	ENE6	E8	ESE10	ESE10	NW9.9	NNW29
27-Feb	ESE10	E8	NE7	NE11	NE9	NE10	ENE11	NE7	N7	N7	NW4	W6	W3	ENE2	WSW2	S1	S4	SE4	SSE9	SSE9	SE13	SE18	SE16	SE15	ESE4.1	SE18
28-Feb	SSE11	SSW5	WNW4	N17	N23	N25	N28	N24	N24	N18	N13	N9	NW12	N8	NE11	NNE13	NNE11	NNE12	NNE13	N16	NNE12	NNE9	NNE10	N9	N12.4	N28

W4.4	W3.9	W3.5	WSW2.8	W3.1	WSW2.1	SW2.3	SW3.1	SW3.1	SW2.3	SW2.8	WSW3.0	SW3.7	WSW3.4	WSW3.3	WSW3.4	SW2.6	SSW2.7	SSW2.7	WSW2.1	NNW2.6	W3.7	W3.4	W3.6	Diurnal Average
WSW33	WSW32	W34	SW34	W34	W35	W32	W30	SW30	SW29	SW29	WSW35	WSW38	WSW33	SW27	SSW26	SW27	SW22	SSW25	WSW31	WSW38	WSW37	WSW36	Diurnal Maximum	

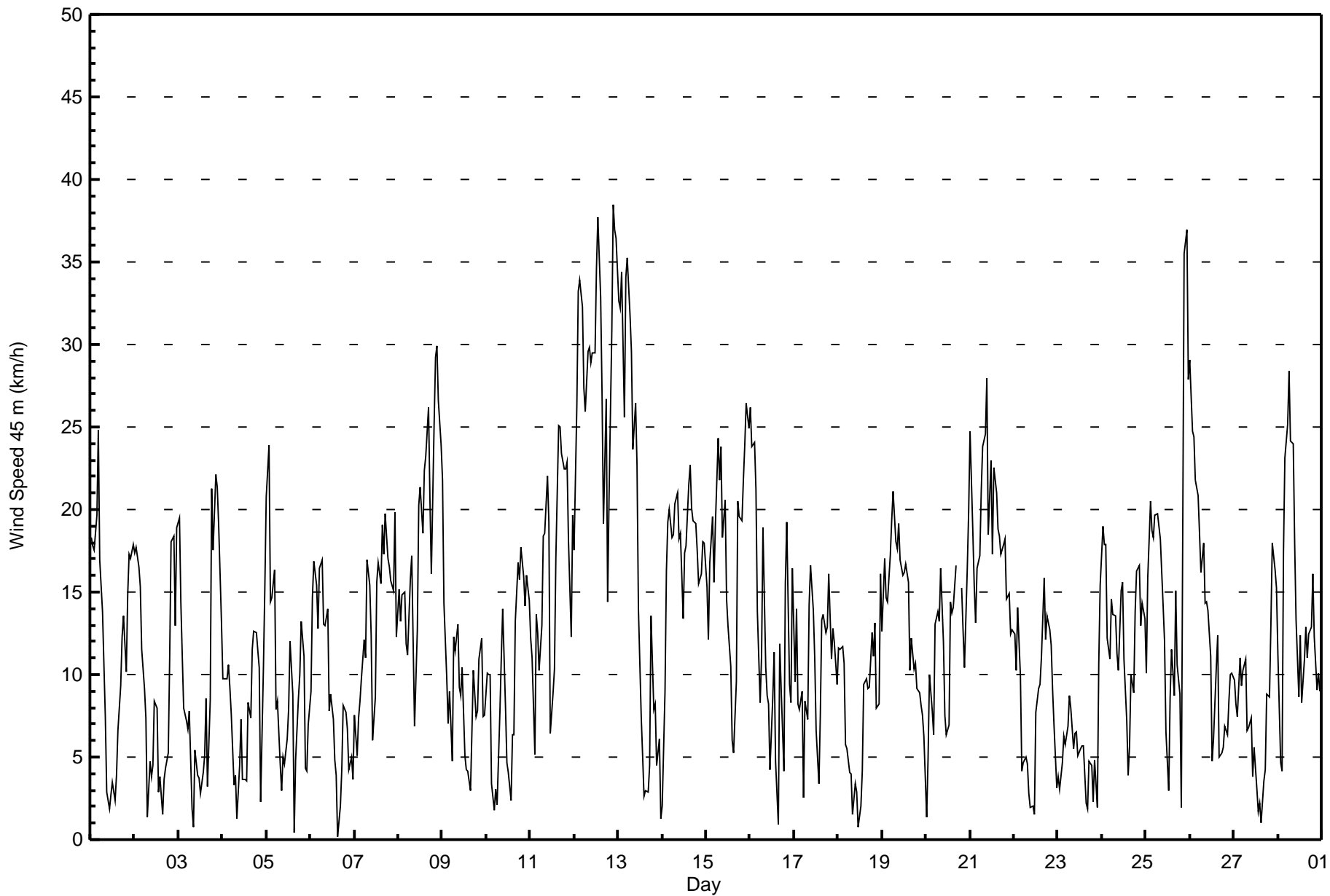
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Feb 28 04:00 Minimum Value: 0 km/h on Feb 6 17:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7																		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7									
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	3	3	3	4	4	5	3	5	2	2	1	1	1	1	1	3	2	2	2	3	1	2	1	1	5		
2-Feb	1	1	2	2	3	2	2	1	2	2	1	3	2	1	2	2	2	1	2	4	3	3	4	4	4		
3-Feb	4	3	2	3	2	2	2	1	1	2	1	1	2	2	1	1	3	3	6	4	4	5	4	3	6		
4-Feb	2	2	2	2	2	2	1	1	1	2	2	1	1	2	2	2	2	3	2	2	4	1	2	2	4		
5-Feb	4	4	3	4	4	2	2	2	1	1	2	1	5	2	3	1	2	1	1	1	4	1	1	1	5		
6-Feb	2	2	2	2	3	2	2	3	3	2	2	2	2	1	1	1	0	1	2	1	1	1	1	2	3		
7-Feb	1	1	1	1	1	1	2	2	1	2	2	2	4	3	4	5	3	3	2	4	2	2	3	2	5		
8-Feb	1	2	1	2	3	2	2	3	2	2	5	5	4	5	4	4	5	4	3	4	4	4	5	3	5		
9-Feb	3	4	3	3	3	3	3	2	3	3	3	2	2	2	2	2	1	2	3	1	2	3	1	1	4		
10-Feb	1	1	2	1	1	1	1	3	3	3	3	2	1	1	2	2	4	3	3	4	5	2	2	2	5		
11-Feb	1	3	1	4	2	1	3	3	5	4	5	5	3	3	4	5	4	3	3	4	4	4	5	3	5		
12-Feb	4	5	6	5	5	4	4	5	5	5	5	5	7	9	6	6	3	6	4	4	5	6	6	5	9		
13-Feb	5	4	5	4	5	4	4	4	3	3	3	4	3	1	1	1	3	3	3	2	3	1	1	1	5		
14-Feb	2	2	3	2	2	2	3	3	3	6	3	3	3	2	3	3	2	2	1	1	2	1	2	2	6		
15-Feb	1	2	4	2	4	4	2	3	2	3	2	3	3	3	2	1	2	4	5	2	3	5	5	3	5		
16-Feb	3	3	2	4	4	2	4	4	3	2	2	3	3	4	2	2	1	1	2	7	4	3	3	3	7		
17-Feb	2	2	4	3	3	1	3	3	4	4	3	2	2	2	2	3	3	3	2	4	2	2	3	2	4		
18-Feb	2	3	3	2	2	2	1	2	1	2	3	3	1	2	2	2	2	3	2	3	2	4	3	3	4		
19-Feb	4	3	3	4	5	5	4	3	3	4	4	4	4	4	4	4	3	2	3	3	3	3	2	2	5		
20-Feb	1	1	2	2	2	2	2	2	2	2	1	1	3	2	2	3	2	AF	AF	2	1	1	5	4	5		
21-Feb	5	4	2	2	3	3	4	3	4	5	4	4	3	3	3	3	3	2	2	3	2	2	2	1	5		
22-Feb	1	2	2	2	1	1	1	1	1	1	1	1	2	2	3	3	2	3	2	2	2	2	3	2	3		
23-Feb	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	1	1	1	1	2	2	3	3	3		
24-Feb	3	4	3	4	4	3	3	3	2	2	3	3	3	2	2	3	3	2	1	1	1	3	3	3	4		
25-Feb	2	3	2	1	2	2	2	3	2	2	4	2	2	3	3	4	5	3	5	4	5	8	8	7	8		
26-Feb	5	4	5	4	4	3	2	3	3	3	3	4	2	3	4	3	2	1	2	2	1	3	3	3	5		
27-Feb	3	2	2	1	2	2	2	1	2	1	2	2	2	2	2	1	2	2	1	1	4	2	2	2	4		
28-Feb	3	2	2	10	5	4	4	5	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	1	10		
																		Diurnal Maximum									
AF - Analyzer Failure																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	125	18.66	18.66
6 - 11	200	29.85	48.51
12 - 19	237	35.37	83.88
20 - 28	81	12.09	95.97
29 - 38	27	4.03	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	5	5	4	5	6	15	16	13	7	5	6	5	6	7	12	125
6 - 11	33	9	14	7	7	12	17	19	15	5	9	4	9	11	13	16	200
12 - 19	35	10	0	4	13	3	25	30	8	10	12	26	21	13	14	13	237
20 - 28	9	1	0	0	1	0	8	6	0	11	14	12	8	3	5	3	81
29 - 38	2	0	0	0	0	0	0	0	0	0	9	10	5	0	0	1	27
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	87	25	19	15	26	21	65	71	36	33	49	58	48	33	39	45	670

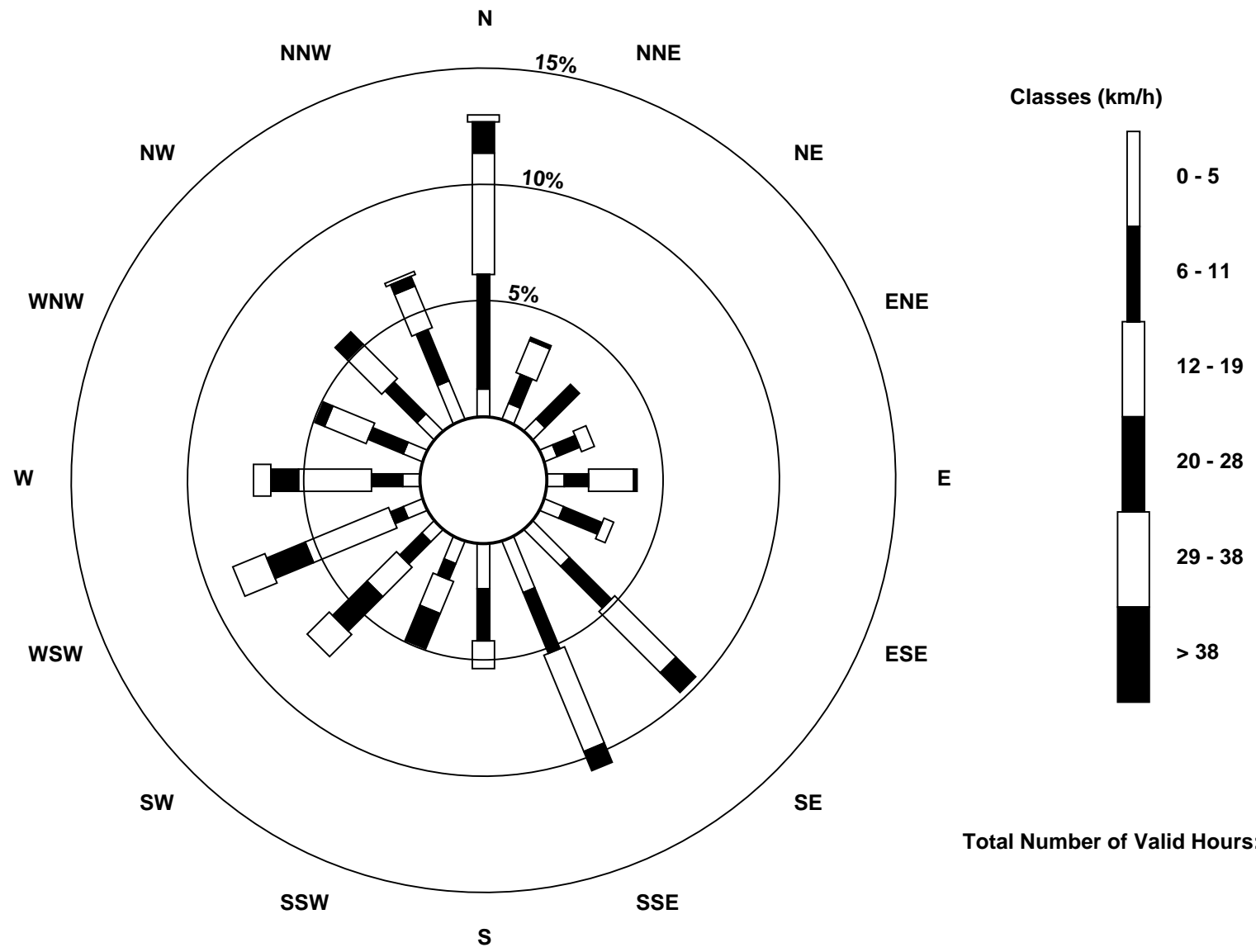
Total Number of Valid Hours: 670

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





Maximum Speed: 43 km/h on Feb 12 22:00	Maximum Daily Speed Average: 32.8 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 16 16:00	Minimum Daily Speed Average: 0.6 km/h on Feb 25	Hours of Data: 671
Maximum Diurnal Speed Average: 5.5 km/h at hour 1	Minimum Diurnal Speed Average: 3.1 km/h at hour 17	Hours of Missing Data: 1
Monthly Average Velocity: 3.7 km/h 250.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 8 Median = 13 Q ₃ = 20 P ₉₀ = 28 P ₉₉ = 40	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	NNW22	NNW22	NNW21	N23	N28	N20	N17	N14	NNW10	NNW5	SSE1	SSW3	S3	S2	SE3	ESE4	SE10	SSE18	SSW15	WSW16	W20	W24	WSW22	WSW22	NW6.8	N28
2-Feb	WSW21	W22	W22	W23	W19	WSW11	WSW12	W6	W8	W9	W8	W10	WNW8	NNE3	S4	SSW0	S3	SE4	SE5	NNE13	NNE22	N22	N15	N22	WNW6.6	W23
3-Feb	N23	NNE18	N13	N10	N9	N8	N9	NNE2	ENE0	SSW5	WSW5	WSW4	SSE2	SSE4	SSE5	SSE9	SSW4	NW10	NW24	N20	NNE25	NNE25	N20	N16	N7.8	NNE25
4-Feb	N12	N11	NNE12	NNE12	NNE11	NNE10	NNE5	NNE4	E2	SSE7	SSE11	S4	S4	SSW4	SE9	SSE8	SSE12	SE15	SSE16	SSE16	SSE17	SSE6	N11	N18	ESE2.6	N18
5-Feb	N25	N28	N17	N19	N21	N12	N12	N7	N5	N8	N6	NW6	NW8	WNW12	WNW9	N1	SE4	SE6	SSE10	SSE16	SSW11	SSW4	SW4	SSW3	N5.4	N28
6-Feb	S3	SSE6	SSE11	SSE19	SSE19	SSE20	SSE16	SSE18	SSE23	SSE21	SSE9	SSE10	SSE8	SE4	SE3	ENE1	NNE2	N5	NNE10	NNE8	N7	NNW5	NW5	NW4	SSE6.3	SSE23
7-Feb	W3	WSW6	SW8	SSW10	SW12	SW15	SW12	SSW13	SSW16	SSW12	SW8	SSW10	SW18	WSW18	WSW17	WSW21	WSW20	WSW23	W20	NW20	NW17	NW18	NNW25	NW16	WSW11.4	NNW25
8-Feb	W16	W16	WSW20	WSW22	WSW16	SW17	WSW22	WSW21	WSW18	WSW14	WSW18	WSW23	WSW23	WSW21	SW25	SW25	SSW30	SSW25	SSW20	SW30	SW33	WSW35	WSW32	WSW28	WSW21.9	WSW35
9-Feb	WSW26	WSW18	WSW12	SW9	SSW9	SW5	SSW6	SSE7	SSE12	SE13	SE12	SE11	SSE5	S5	SW5	NNE3	N9	N14	N11	N12	NNE11	NE10	E7	ENE7	S1.4	WSW26
10-Feb	ENE10	ENE10	ENE9	ESE4	ESE3	ESE3	SE4	SE5	SE12	SE19	SE12	SE7	SSE4	SSE4	S9	SSE9	SE14	SE16	SE14	SE20	SE19	SSE17	SE20	SSE18	SE9.9	SE20
11-Feb	S14	S12	SSW10	SSW17	SW16	WSW15	WSW20	WSW23	WSW23	WSW25	W20	WSW7	SW10	SSW11	SW19	WSW28	WSW29	WSW29	SW28	SW29	SW29	SW23	SSW15	SSW23	SW18.8	WSW29
12-Feb	SSW22	SW31	SW38	SW39	SW37	SW33	SW32	SW35	SW36	SW34	SW34	WSW40	WSW42	WSW37	SW31	SSW23	SW31	SW18	SW24	WSW36	WSW43	WSW42	WSW40	SW32.8	WSW43	
13-Feb	WSW37	W36	W38	W29	W38	W39	W35	W33	W27	W30	W26	NNW15	N8	NE5	E2	SE1	SE3	ENE2	N12	N12	NNE8	N2	NNW4	S2	W15.5	W39
14-Feb	SSE3	SE11	SSE25	SSE21	SSE23	SE27	SSE28	SSE31	SSE28	SSE23	SSE23	SSE18	SSE22	SE21	SSE27	SSE29	SSE23	SSE20	S23	S21	SSW20	SSW20	SSW22	SSW22	SSE21.0	SSE31
15-Feb	SSW19	SSW17	SSE14	SSE18	SE23	SSE28	SSE32	SSE33	SSE29	SSE29	SSE24	SE23	SE17	SE12	SSE13	S10	SW10	SW26	SW25	SW26	SSW28	SW30	SW31	SSW28	S19.0	SSE33
16-Feb	SW32	SSW29	SSW30	SW28	SW20	SSW11	SE10	SSE23	SE12	ESE9	E12	E7	SE9	S13	S5	ESE0	N11	NNE11	NE7	NNW18	N23	N14	NNW9	NW18	SSW4.0	SW32
17-Feb	NNW14	NW20	NW12	NW7	NW6	N3	NW10	NNW12	NNW18	NNW21	NW17	NW12	WNW8	NW5	NNE9	N16	NNE16	NNE14	NNE14	N18	NNE13	NNE14	NNE13	NNE10	N11.2	NNW21
18-Feb	N12	N12	NNE13	NNE12	N6	NW5	NNW4	NNE4	NW1	SW3	SSE3	ESE1	NE2	NE4	NE10	NE11	NE10	ENE10	ENE13	E11	E12	E7	ENE9	E14	NE6.0	E14
19-Feb	ESE10	E15	E12	E11	E13	E16	E17	E17	ENE20	ENE20	ENE19	E16	E14	E13	E12	ESE8	E10	E8	ESE8	ESE7	ESE8	ESE7	ESE6	ESE6	E11.9	ENE20
20-Feb	E2	NNW5	N11	NNE10	NNW7	NNW14	NNW15	NNW14	NW17	NW13	NW9	NW7	WNW8	W15	NNW14	W15	W18	NNW19	AF	W18	NNW16	W13	WSW19	WSW23	NNW11.2	WSW23
21-Feb	WSW28	WSW22	SW18	SW17	WSW19	W19	NNW23	NNW27	W29	NNW31	NNW21	W24	W18	W24	W22	W20	W19	WSW18	WSW20	W20	W16	W16	W15	W15	W19.7	NNW31
22-Feb	NNW14	NNW13	N16	N12	N5	NNW4	WSW3	SW3	NNW4	N3	N3	NNW2	WNW7	NNW10	NNW10	NNW12	NNW17	NNW14	N15	N14	NNE14	NE12	ENE10	ESE4	NNW7.2	NNW17
23-Feb	SSE4	SSE4	SSW5	S8	S8	S8	SSE12	SSE10	SSE8	S8	SSE7	SE5	SE6	ESE5	E5	SSE2	SW2	SSE4	ESE4	E2	ENE6	ESE2	N12	N18	SE3.3	N18
24-Feb	N22	N21	NNW20	N15	N14	N17	N16	NNW16	NNW14	NNW12	NW16	NW16	NNW11	NNW7	NW4	WSW7	SW11	SSW9	S14	SSW19	WSW23	WSW20	SW14	SSW17	NW7.4	WSW23
25-Feb	SSW11	S12	S17	S22	S23	SSE18	SSE22	S19	SSE17	S14	SSE12	SSE6	SSW2	NW10	NW12	NNW9	N17	NW12	SW11	NE1	NNE22	N40	N41	N32	S0.6	N41
26-Feb	NNW33	NNW28	NW28	NW25	NW24	NW21	NW19	NW22	NNW16	NW15	NW14	NW11	W5	W7	NNW11	W13	NNW5	N5	N6	NE8	ENE6	E7	ESE7	ESE7	NW11.5	NNW33
27-Feb	ESE8	E8	ENE8	ENE12	NE10	ENE12	ENE12	ENE8	NNE7	NNE9	NW4	W4	WNW2	ENE2	SW2	SSE1	S4	SSE5	SSE10	SSE11	SE14	SE23	SE22	SE21	ESE5.6	SE23
28-Feb	SE17	S6	NNW7	N20	N26	N28	N31	N27	N26	NNE20	N14	N9	NW13	N9	NE12	NNE14	NNE12	NNE15	NNE16	NNE18	NNE16	NNE12	NNE11	NNE9	NNE13.9	N31

W5.5	W5.5	W4.9	WSW4.0	WSW3.9	WSW3.2	WSW3.5	SW4.2	SW4.2	SW3.4	SW3.6	WSW3.4	SW4.2	WSW4.0	SW3.8	SW3.8	SW3.1	SW3.7	SW3.5	WSW3.2	NNW3.3	W4.5	W4.1	W4.4	Diurnal Average	
WSW37	WSW36	SW38	SW39	W38	W39	W35	SW35	SW36	SW34	SW34	SW34	WSW40	WSW42	WSW37	SW31	SSW30	SW31	SW28	SW30	WSW36	WSW43	WSW42	WSW40	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

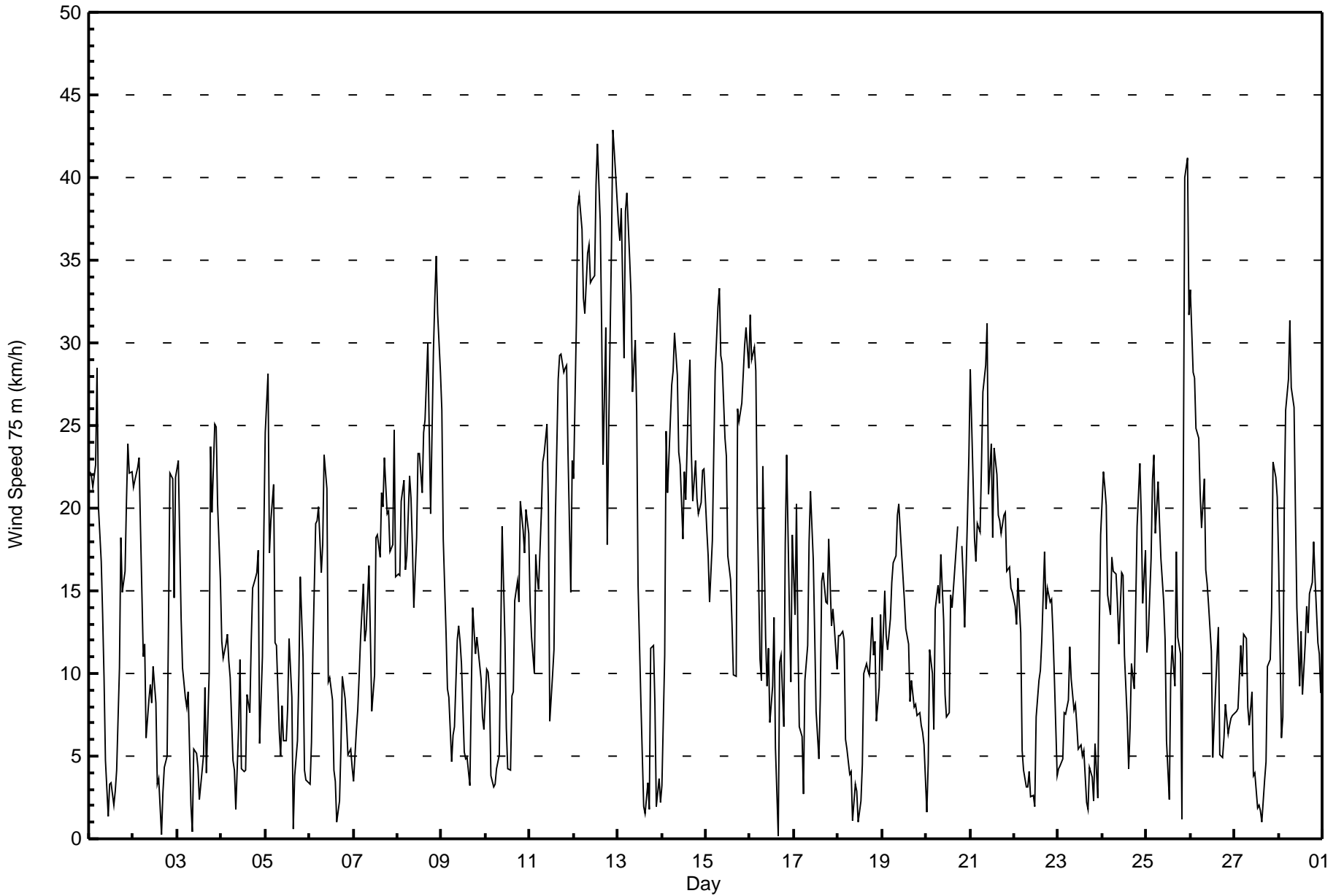
Wind Speed 75 m (WS75m) - km/h
Mannix - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Feb 28 04:00 Minimum Value: 0 km/h on Feb 6 17:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7																	Hours in Service: 672 Hours of Data: 671 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-Feb	3	2	3	4	4	5	4	4	1	2	1	1	1	1	2	3	2	2	3	1	2	2	2	5		
2-Feb	1	1	1	2	4	1	2	2	3	1	2	2	2	2	2	1	2	2	2	5	4	3	3	4		
3-Feb	3	3	2	3	2	2	2	1	1	2	1	2	2	3	2	1	3	4	8	4	3	5	3	2		
4-Feb	3	2	2	2	2	2	2	1	1	2	1	2	1	2	2	1	2	2	2	3	3	3	3	2		
5-Feb	3	3	3	4	3	3	3	1	2	2	2	1	4	2	2	1	2	2	1	2	2	1	1	1		
6-Feb	1	1	2	4	2	2	3	1	2	3	4	2	2	2	1	1	0	1	2	1	1	2	1	1		
7-Feb	1	1	1	2	2	2	2	1	2	2	2	2	3	2	3	4	3	3	2	4	2	2	2	3		
8-Feb	2	2	2	1	3	3	2	3	3	3	4	5	4	5	4	4	5	5	3	4	4	4	5	3		
9-Feb	3	5	2	4	3	4	2	1	3	3	3	3	2	2	2	2	1	2	3	1	1	1	2	1		
10-Feb	1	1	2	2	1	1	1	2	5	4	3	3	1	2	2	2	5	5	5	5	5	2	2	2		
11-Feb	1	3	1	3	2	2	3	3	5	3	5	5	4	3	4	5	4	3	3	4	4	5	4	4		
12-Feb	5	5	6	5	5	4	3	4	4	5	5	5	7	8	6	6	3	6	4	5	5	6	6	5		
13-Feb	5	4	5	4	6	5	4	5	4	3	3	4	4	1	1	1	1	1	3	1	4	1	1	1		
14-Feb	2	3	2	4	2	2	2	2	2	3	2	3	2	4	2	3	2	2	2	2	3	2	2	2		
15-Feb	1	2	3	2	2	1	1	2	1	2	3	2	3	3	3	2	2	5	5	2	3	6	6	3		
16-Feb	3	3	3	5	4	3	8	5	3	5	3	3	3	4	2	1	2	1	2	7	3	3	3	2		
17-Feb	2	1	5	2	3	1	4	3	4	4	4	1	2	2	2	3	4	4	2	4	2	3	3	2		
18-Feb	2	3	3	2	2	2	2	2	1	1	3	3	2	2	2	2	2	2	2	3	3	3	3	4		
19-Feb	4	4	4	4	4	5	5	5	3	4	4	4	5	4	4	3	3	3	3	3	3	3	2	2		
20-Feb	1	2	2	2	2	2	2	1	2	2	1	1	4	2	2	2	2	3	AF	2	1	1	4	4		
21-Feb	5	4	2	2	3	3	3	3	4	6	4	4	2	3	3	3	3	2	2	3	2	2	2	1		
22-Feb	1	2	1	2	2	1	1	1	1	1	1	1	2	3	3	4	2	3	2	2	2	2	3	2		
23-Feb	2	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	1	1	1	1	2	2	3	3		
24-Feb	3	4	3	4	4	2	3	3	2	2	2	3	3	2	2	3	3	2	1	2	2	4	4	3		
25-Feb	2	3	2	3	3	1	1	2	1	2	2	2	2	3	3	4	5	3	5	5	6	8	8	7		
26-Feb	5	4	5	4	4	3	2	3	3	3	3	4	2	4	3	3	2	1	2	2	1	3	3	2		
27-Feb	3	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	2	2	1	1	4	1	2	2		
28-Feb	3	3	1	11	5	4	4	5	4	4	3	3	3	4	3	3	3	2	2	1	1	2	1	1		
																	Diurnal Maximum									
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	115	17.14	17.14
6 - 11	159	23.70	40.83
12 - 19	205	30.55	71.39
20 - 28	136	20.27	91.65
29 - 38	47	7.00	98.66
> 38	9	1.34	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	9	7	4	5	4	10	11	16	10	9	7	3	3	4	7	6	115
6 - 11	18	14	7	11	9	12	8	20	7	10	7	4	6	6	9	11	159
12 - 19	31	20	2	5	13	0	14	22	8	10	11	14	15	12	16	12	205
20 - 28	19	5	0	2	0	0	9	18	4	11	10	26	14	3	8	7	136
29 - 38	2	0	0	0	0	0	0	6	0	3	19	8	7	1	0	1	47
> 38	2	0	0	0	0	0	0	0	0	0	1	5	1	0	0	0	9
Totals	81	46	13	23	26	22	42	82	29	43	55	60	46	26	40	37	671

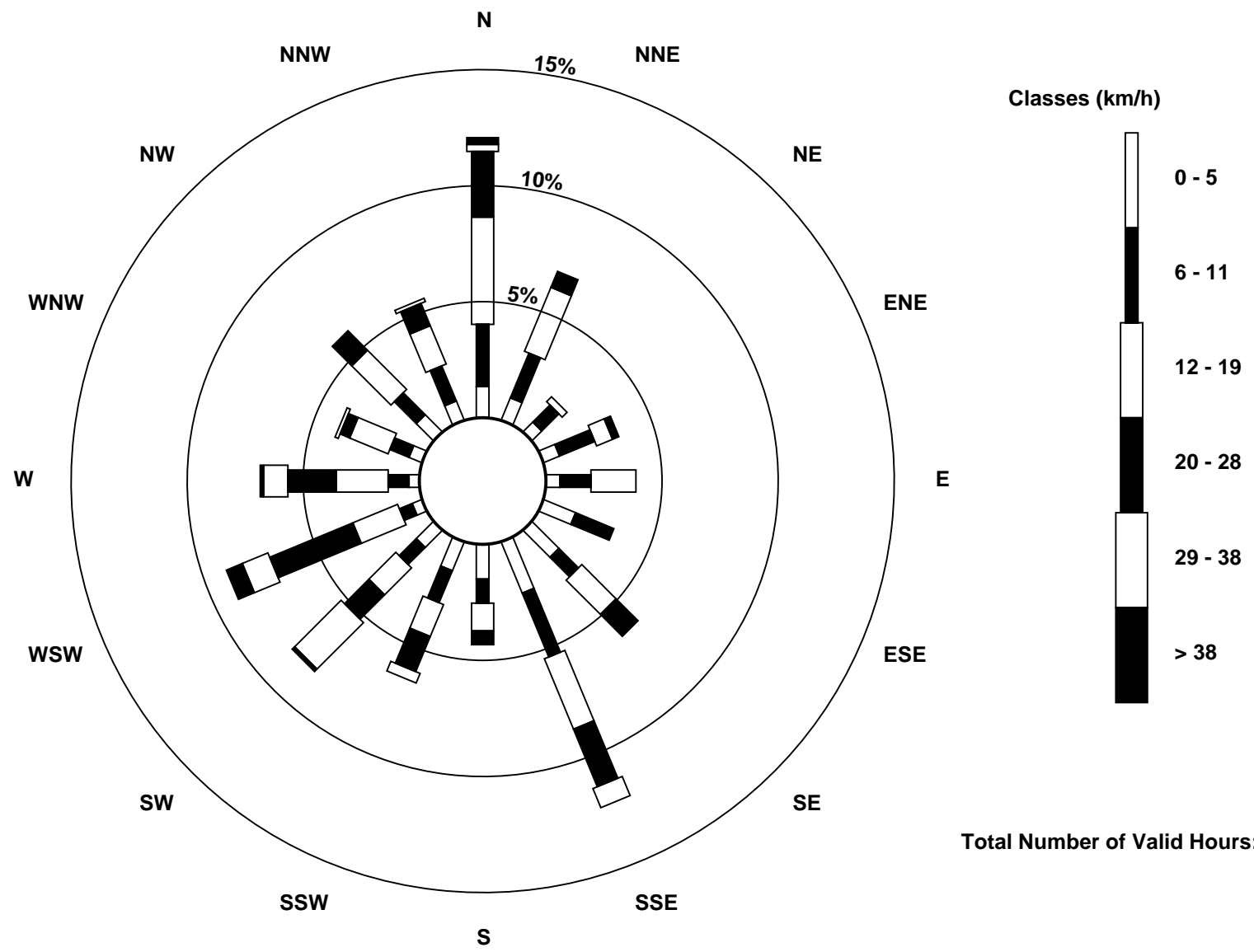
Total Number of Valid Hours: 671

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





Maximum Speed: 45 km/h on Feb 12 22:00		Maximum Daily Speed Average: 35.0 km/h on Feb 12		Hours in Service: 672																						
Minimum Speed Value: 0 km/h on Feb 3 09:00		Minimum Daily Speed Average: 1.6 km/h on Feb 9		Hours of Data: 672																						
Maximum Diurnal Speed Average: 6.2 km/h at hour 2		Minimum Diurnal Speed Average: 3.5 km/h at hour 17		Hours of Missing Data: 0																						
Monthly Average Velocity: 4.4 km/h 255.8 deg		Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 9 Median = 14 Q ₃ = 22 P ₉₀ = 29 P ₉₉ = 42		Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	NNW24	NNW24	NNW23	N24	N30	N21	N18	N15	NNW11	NNW6	S1	SW4	SSW3	SSW2	SE4	ESE6	SE12	S19	SW14	W20	W23	W28	W25	W24	NW8.0	N30
2-Feb	W23	W23	W26	W28	W23	WSW13	WSW14	W9	W11	W12	W11	W11	WNW9	NNE3	SSW4	WNW1	S3	SE4	SE5	NE13	NNE24	N23	N15	N23	WNW8.2	W28
3-Feb	N24	NNE19	N14	N11	N9	N8	N9	NNE2	NE0	SSW6	WSW6	W5	S2	S4	SSE5	SSE10	SW5	NW11	NW26	N21	NNE26	NNE26	N21	N16	N8.2	NNE26
4-Feb	N13	N11	NNE12	NNE13	NNE12	NNE11	NE6	NNE5	E3	SSE7	S12	SSW5	SSW5	SSW5	SSE9	SSE8	SSE11	SSE15	S16	S16	S18	S7	N11	N20	ESE2.5	N20
5-Feb	N26	N29	N18	N21	N23	N14	N13	N7	N6	N9	N6	NW6	NW8	WNW13	WNW9	N0	SE4	SE7	SSE10	S16	SW12	SW7	WSW6	SW4	N6.0	N29
6-Feb	SW4	S4	SSE8	SSE14	S14	S13	SSE11	SSE14	SSE20	SSE19	S10	SSE8	SSE8	SE5	SE4	E1	NNE2	NNW6	NNE10	NNE9	N7	N6	NNW6	NNW5	SSE4.5	SSE20
7-Feb	WSW3	SW5	SW9	SW10	WSW14	WSW19	SW13	SW13	SSW17	SW15	WSW10	SSW12	SW19	WSW19	WSW18	WSW22	WSW22	WSW25	W22	NW22	NW18	NW20	NNW26	NNW18	W13.0	NNW26
8-Feb	WNW16	W17	W23	W25	WSW19	WSW20	WSW25	WSW23	WSW21	WSW18	WSW20	WSW24	WSW24	WSW22	WSW25	SW26	SSW31	SW26	SSW21	SW31	SW34	WSW37	WSW34	WSW30	WSW23.7	WSW37
9-Feb	WSW28	WSW20	WSW14	SW10	SW8	WSW6	SW5	S5	SSE9	SE13	SE14	SE11	SSE6	SSE6	SSW5	NNE3	NNE10	NNE15	N13	NNE13	NE10	ENE9	E9	E6	SSW1.6	WSW28
10-Feb	ENE10	ENE9	E9	ESE6	ESE5	ESE6	SE5	ESE7	ESE12	SE20	SE14	SE9	SE5	SE6	SSE10	SSE11	SE17	SE18	SE17	SE23	SE20	SSE18	SSE22	SSE20	SE11.6	SE23
11-Feb	SSW14	SSW12	SSW12	SSW19	SW17	WSW18	WSW23	WSW25	WSW26	WSW27	W21	WSW8	SW11	SW12	SW20	WSW29	WSW31	WSW32	WSW31	WSW31	WSW32	WSW26	SW17	SW24	WSW20.7	WSW32
12-Feb	SW24	SW34	SW41	SW41	SW39	SW35	SW34	SW38	SW38	SW36	SW36	WSW37	WSW42	WSW44	WSW39	WSW33	SW24	WSW33	SW19	SW26	WSW38	WSW45	WSW44	WSW43	WSW35.0	WSW45
13-Feb	WSW40	W39	W41	W32	W41	W42	W38	W36	W30	W33	WNW28	WNW16	NNW8	NNE4	E2	SSE1	S3	ESE1	N7	N10	NNE8	ESE2	WNW1	SSE3	W16.8	W42
14-Feb	SSE5	SSE14	SSE24	SSE18	SSE20	SSE29	SSE29	SSE30	S30	SSE23	S22	SSE20	SSE23	SSE20	SSE26	SSE30	SSE23	S20	S24	SSW22	SSW22	SSW23	SSW25	SSW25	S21.5	S30
15-Feb	SSW21	SW20	S14	S15	SSE21	SSE26	SSE31	S34	SSE30	SSE29	SSE22	SE24	SE19	SSE18	SSE15	SSE11	SW10	WSW29	WSW28	SW29	SW30	SW32	SW33	SSW30	S19.9	S34
16-Feb	SW34	SSW31	SW32	SW32	SW24	SW13	SE10	SSE22	SSE12	ESE14	E16	E11	SE11	S14	S6	SSE1	N9	NNE11	NE7	NNW18	N24	N16	NNW10	NW19	SSW4.5	SW34
17-Feb	NNW15	NW21	NNW15	NNW7	NW5	NNW2	NW11	NNW14	NNW20	N23	NNW18	NW13	WNW9	NW6	NNE8	N16	NNE17	NNE15	NNE14	N19	NNE13	NNE14	NNE13	NNE11	N12.0	N23
18-Feb	N12	N12	NNE12	NNE12	N6	NW5	NNW4	NNE4	WNW1	SW4	SSE3	SSE1	NE2	NE4	NE10	NE10	NE10	E11	ENE14	E13	E14	ESE9	E10	E18	NE6.1	E18
19-Feb	ESE15	E19	E17	ESE17	ESE20	E23	E23	E21	ENE20	E22	ENE19	E18	E18	ESE19	ESE18	ESE12	ESE14	ESE11	ESE11	ESE10	ESE10	ESE9	ESE9	ESE7	E15.6	E23
20-Feb	ESE2	NNW4	N11	NNE10	NNW6	WNW14	WNW16	WNW16	NW18	NW14	NNW10	NW8	WNW8	WNW15	WNW14	W16	W19	WNW20	WNW21	W19	WNW18	W14	WSW21	WSW24	WNW12.3	WSW24
21-Feb	WSW30	WSW23	SW20	SW18	WSW20	W20	NNW24	WNW29	WNW32	WNW34	WNW23	W25	WNW19	W25	W23	W20	W20	W19	WSW21	W21	W18	W18	WNW17	W16	W21.2	WNW34
22-Feb	WNW15	WNW15	N16	N13	NNE6	NNW3	WSW2	SW2	WNW5	N3	N3	NNW2	WNW7	NNW10	NNW11	NNW12	NNW18	NNW15	N16	NNE15	NNE16	NE14	ENE11	E5	N7.5	NNW18
23-Feb	SSE4	SSE4	SSW5	S8	S8	S10	S12	S11	S9	S9	S7	SE6	SE6	ESE6	E6	SSE3	SW2	SSE4	ESE4	E3	E6	ESE3	N12	N19	SSE3.8	N19
24-Feb	N24	N23	N21	N16	N15	N18	N17	NNW17	NNW16	NNW13	NW17	NW17	NNW11	NW7	NW4	WSW7	SW11	SSW9	SSW14	SW20	WSW26	WSW23	SW15	SW19	NW8.6	WSW26
25-Feb	SW13	SSW13	SSW16	S20	S22	S15	S18	S18	S15	SSW13	S11	S6	SW3	NW10	NW12	NNW10	N18	NW13	WSW13	NNW0	NNE23	N42	N43	N33	W2.2	N43
26-Feb	NNW35	NNW30	NNW30	NW27	NW26	NW22	NW20	NW24	NW17	NW16	NW15	NW12	W5	W8	WNW11	W14	WNW5	N4	N6	NE8	ENE6	E9	ESE9	ESE11	NNW12.0	NNW35
27-Feb	ESE11	E10	E9	ENE12	ENE10	ENE12	ENE12	ENE8	NNE6	NNE8	NW4	W3	NW2	E2	SW2	SSE1	S4	SSE5	SSE11	S12	SSE15	SE25	SE25	SE22	ESE6.4	SE25
28-Feb	SSE18	S7	NNW9	N21	N27	N28	N32	N28	N26	NNE20	N14	N9	NW13	N9	NE12	NNE14	NNE13	NNE15	NNE16	NNE18	NE16	NE13	NE11	NE8	NNE14.1	N32
W6.1																								Diurnal Average		
WSW40 W39 SW41 SW41 W41 W42 W38 SW38 SW38 SW36 SW36 WSW37 WSW42 WSW44 WSW39 WSW33 WSW31 WSW33 WSW31 WSW31 WSW38 WSW45 WSW44 WSW43																								Diurnal Maximum		

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



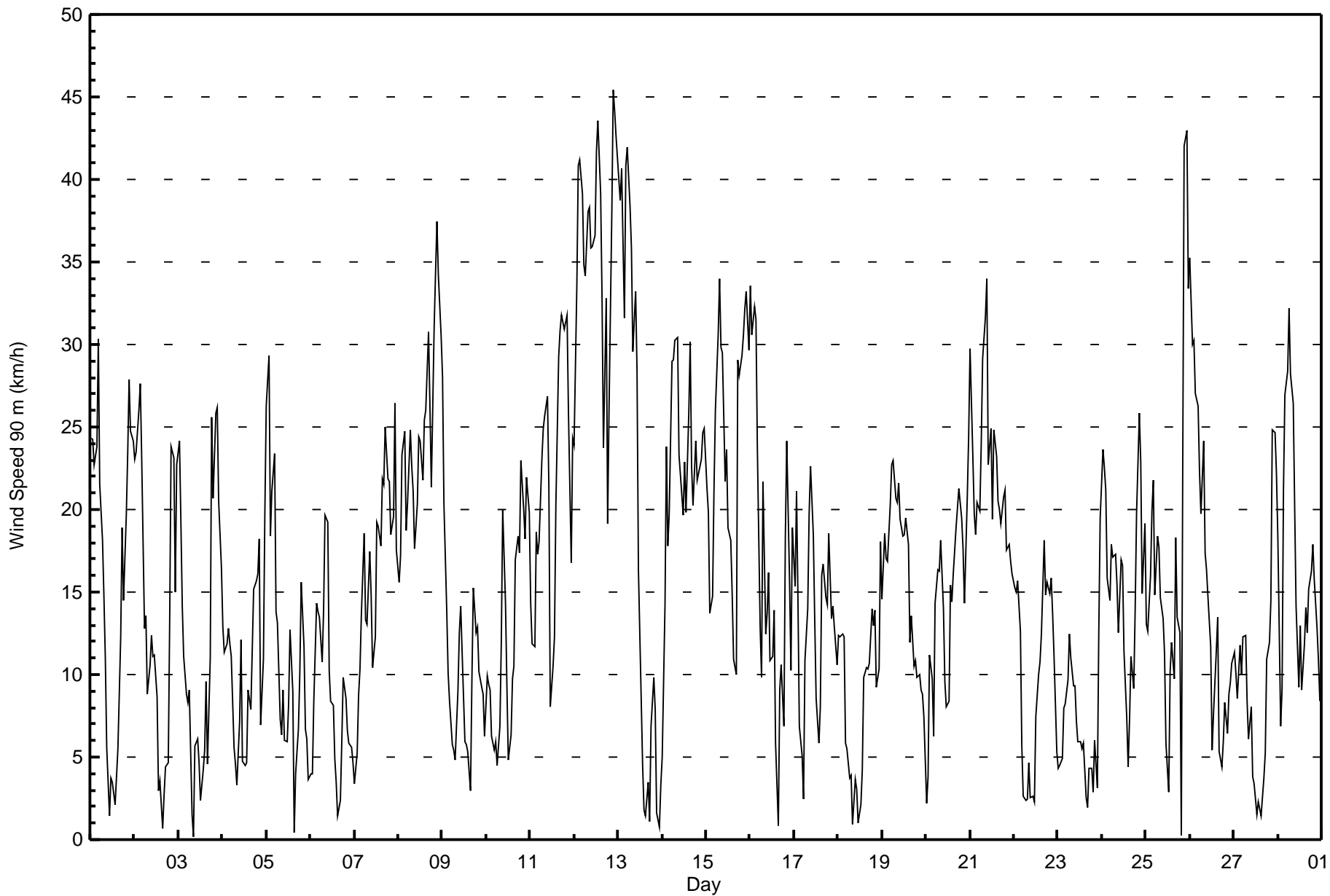
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 90 m (WS90m) - km/h

Mannix - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Feb 28 04:00																	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 0 km/h on Feb 6 17:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Feb	3	2	3	4	4	5	4	3	1	3	1	1	1	1	1	1	3	2	1	3	2	3	2	3	5
2-Feb	1	1	1	2	4	2	2	2	3	1	2	2	2	2	2	1	1	1	2	6	4	3	3	4	6
3-Feb	3	3	2	3	2	1	2	1	1	2	1	2	2	3	2	1	3	4	8	4	3	5	3	2	8
4-Feb	3	2	2	2	2	3	2	1	1	2	1	3	1	2	2	1	2	2	2	3	3	4	3	3	4
5-Feb	3	3	3	4	2	3	3	2	2	2	3	1	4	2	2	1	2	2	1	2	2	1	2	1	4
6-Feb	1	1	2	3	2	3	3	1	2	2	5	3	2	2	1	1	0	1	2	0	1	2	1	1	5
7-Feb	0	1	1	2	1	3	2	2	2	2	2	3	3	2	3	4	3	3	2	4	2	2	2	3	4
8-Feb	2	2	2	2	3	3	2	3	3	3	4	5	4	5	4	4	4	5	3	4	5	4	5	3	5
9-Feb	4	5	2	4	3	4	2	1	2	3	2	2	2	2	3	2	1	2	3	1	1	1	2	1	5
10-Feb	1	1	1	2	2	2	1	3	3	4	3	2	2	2	2	2	4	4	3	4	5	2	2	2	5
11-Feb	1	3	1	2	2	3	3	3	5	3	5	4	4	3	4	5	4	3	3	4	4	5	5	5	5
12-Feb	6	5	6	5	5	4	3	5	5	5	5	5	7	8	6	6	3	7	4	6	5	6	6	5	8
13-Feb	5	5	5	4	6	5	4	5	4	3	3	5	4	1	1	2	1	1	2	2	2	1	1	2	6
14-Feb	3	4	1	6	3	2	2	1	2	3	1	2	2	4	2	3	2	2	2	2	3	3	2	2	6
15-Feb	2	2	2	2	3	2	2	2	1	2	3	2	2	2	3	4	1	2	5	5	2	3	5	6	6
16-Feb	3	3	3	4	4	2	8	4	2	3	2	3	3	4	2	1	2	1	3	7	3	3	2	2	8
17-Feb	2	2	6	2	2	1	5	3	5	4	4	1	2	2	2	3	3	4	2	4	2	2	4	2	6
18-Feb	2	3	3	2	2	2	2	2	1	2	3	3	2	2	2	2	2	2	2	3	2	3	3	3	3
19-Feb	4	3	3	4	4	4	4	3	3	4	4	4	4	4	4	4	3	2	3	3	3	2	3	3	4
20-Feb	2	2	2	2	2	2	1	2	2	3	1	2	4	2	2	3	2	3	2	2	1	2	4	4	4
21-Feb	5	4	2	2	3	4	3	3	4	6	5	4	2	3	3	3	3	2	2	3	2	2	2	1	6
22-Feb	1	1	1	2	3	1	1	1	1	1	1	1	3	3	3	4	2	4	3	2	2	2	3	3	4
23-Feb	2	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	1	1	1	1	2	2	4	3	4
24-Feb	3	4	4	5	4	2	3	3	2	3	2	3	3	3	3	3	3	1	2	2	2	4	3	3	5
25-Feb	2	2	1	2	2	2	1	2	2	2	2	2	2	3	4	5	5	3	5	5	6	8	8	7	8
26-Feb	5	4	5	4	4	3	2	3	3	3	3	4	2	4	4	3	2	1	2	2	1	2	2	3	5
27-Feb	3	2	2	2	1	2	1	2	1	2	2	2	1	2	2	2	2	2	1	1	3	2	2	2	3
28-Feb	2	3	2	10	5	4	4	5	3	4	3	3	3	3	3	3	2	2	1	1	1	2	1	1	10
																	Diurnal Maximum								





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	96	14.29	14.29
6 - 11	162	24.11	38.39
12 - 19	196	29.17	67.56
20 - 28	144	21.43	88.99
29 - 38	58	8.63	97.62
> 38	16	2.38	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	7	3	0	6	6	8	13	8	8	11	2	3	6	5	6	96
6 - 11	20	12	9	7	11	17	6	18	13	3	7	6	5	6	8	14	162
12 - 19	24	23	5	5	8	9	7	13	16	10	15	11	11	13	14	12	196
20 - 28	21	5	0	1	4	1	7	15	5	9	9	28	20	5	9	5	144
29 - 38	4	0	0	0	0	0	0	7	2	3	16	15	5	3	0	3	58
> 38	2	0	0	0	0	0	0	0	0	0	3	7	4	0	0	0	16
Totals	75	47	17	13	29	33	28	66	44	33	61	69	48	33	36	40	672

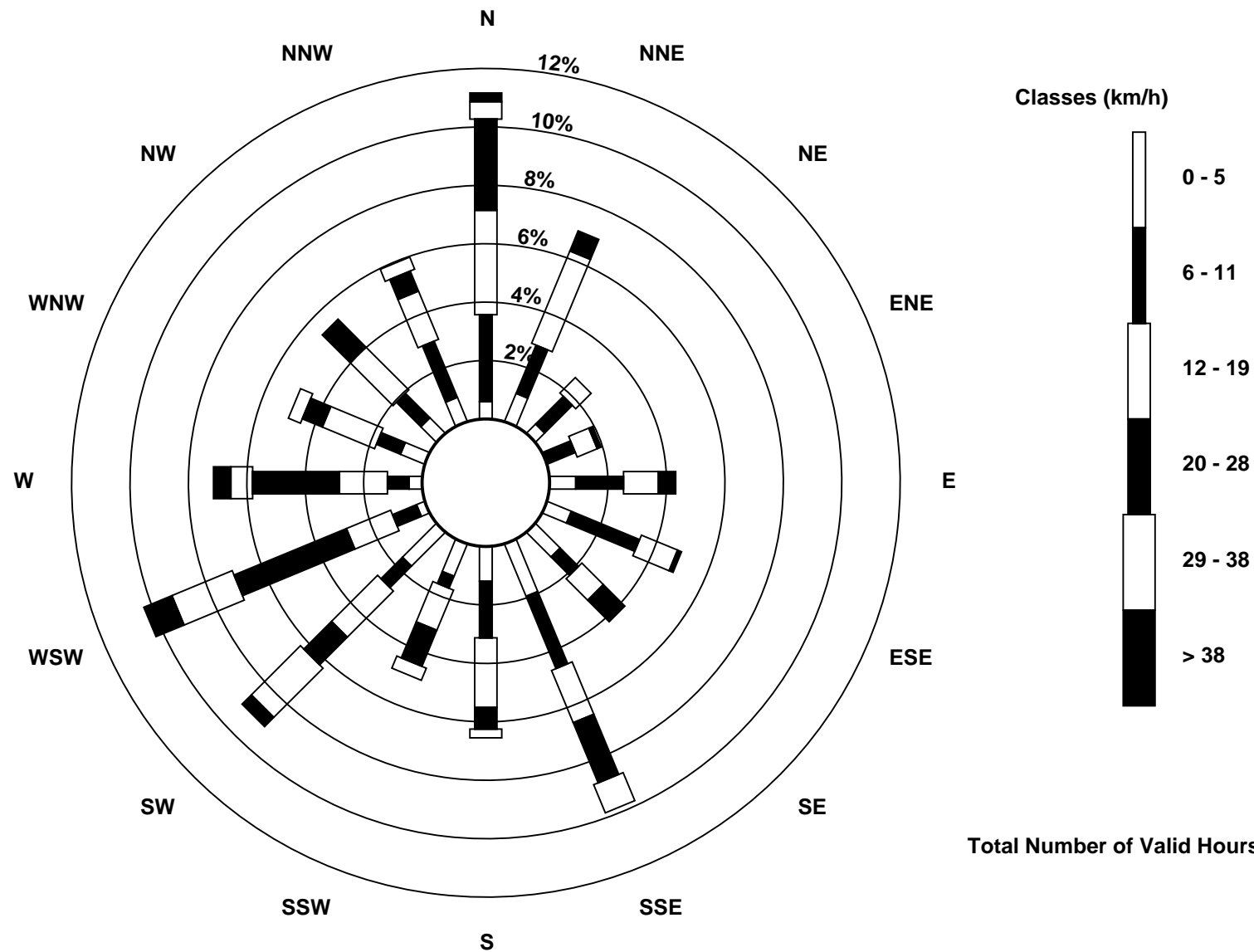
Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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



Total Number of Valid Hours: 672



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg
Mannix - February 2017

Direction of Maximum Speed: 259 deg on Feb 12 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 237.7 deg on Feb 12	Hours of Data: 661
Direction of Minimum Speed: 167 deg on Feb 6 16:00	Hours of Missing Data: 11
Direction of Minimum Daily Speed Average: 1.0 deg on Feb 4	Percent Operational Time: 98.4
Monthly Average Direction: 264.1 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-Feb	331	330	339	3	353	3	3	356	336	39	137	205	141	149	100	121	134	148	166	219	252	255	262	253	328.1	
2-Feb	251	261	260	260	244	182	184	127	181	161	208	265	280	73	157	134	162	145	142	37	23	15	358	7	298.1	
3-Feb	14	24	3	337	359	3	355	20	145	219	269	245	165	156	148	149	161	308	316	353	17	20	9	8	2.0	
4-Feb	355	348	359	12	9	5	314	306	342	221	159	141	144	232	147	155	151	146	155	155	162	181	4	357	85.4	
5-Feb	4	8	0	352	7	327	327	294	269	281	324	304	307	299	276	90	152	144	162	165	168	153	154	157	332.4	
6-Feb	152	155	154	AF	AF	AF	AF	AF	AF	AF	150	155	152	156	160	167	347	343	11	359	297	309	286	272	--	
7-Feb	238	198	171	174	176	AF	AF	AF	AF	AF	158	155	153	233	244	250	253	252	259	269	311	304	303	325	282	251.7
8-Feb	257	251	241	249	213	177	235	248	223	166	224	249	245	249	239	228	212	216	203	217	235	244	247	251	234.1	
9-Feb	249	241	206	187	166	155	164	147	146	135	146	146	149	179	231	29	2	5	353	355	8	8	12	12	162.3	
10-Feb	15	8	13	278	293	82	249	202	132	141	164	200	215	167	188	158	133	128	129	132	145	155	148	157	140.9	
11-Feb	163	172	251	192	220	219	249	253	247	259	270	275	232	209	234	257	249	244	237	236	236	234	176	200	236.3	
12-Feb	186	225	231	231	229	224	219	226	225	228	234	239	247	254	244	240	206	237	213	229	255	259	257	262	237.7	
13-Feb	259	262	265	265	270	270	270	267	266	276	286	305	10	70	103	135	112	11	353	353	331	267	284	171	273.9	
14-Feb	137	138	150	150	143	137	145	144	151	141	151	140	143	136	146	152	134	151	160	153	158	161	181	185	149.3	
15-Feb	162	159	139	141	135	142	147	144	144	141	143	136	140	138	238	228	251	208	205	208	195	211	223	202	171.0	
16-Feb	211	194	202	216	218	139	118	149	127	101	55	73	144	177	186	341	357	8	314	322	353	315	295	293	208.5	
17-Feb	322	306	269	266	280	5	277	285	340	341	308	299	299	17	30	17	27	26	14	15	15	16	20	23	346.5	
18-Feb	8	4	13	23	355	314	354	4	317	236	175	129	79	58	44	49	53	81	83	84	90	103	62	94	51.8	
19-Feb	105	90	100	106	106	100	97	90	79	81	79	88	95	104	103	103	101	100	131	125	111	122	113	114	98.9	
20-Feb	94	337	353	359	296	287	285	287	301	311	333	318	298	284	301	274	277	295	287	279	291	263	248	247	288.7	
21-Feb	249	246	226	216	247	282	296	291	286	294	287	283	285	282	284	280	267	260	256	272	280	275	280	274	273.4	
22-Feb	275	294	356	3	298	281	253	263	261	32	335	316	286	335	344	340	331	335	12	11	14	29	67	157	335.8	
23-Feb	224	240	258	217	206	164	153	150	155	176	158	143	142	115	90	161	271	160	121	102	68	228	350	356	148.3	
24-Feb	356	357	349	344	352	2	360	334	336	348	317	321	327	330	343	245	224	180	164	182	225	242	188	169	321.7	
25-Feb	152	153	159	152	154	154	154	155	153	152	148	142	126	329	315	340	355	320	214	65	38	4	8	353	94.8	
26-Feb	344	341	327	320	322	325	318	324	283	315	320	310	278	277	295	283	306	2	8	52	78	102	126	112	327.2	
27-Feb	119	98	46	43	37	49	69	14	1	14	318	266	276	83	266	155	199	149	157	149	143	147	152	151	104.9	
28-Feb	159	225	268	360	11	8	10	11	12	16	10	7	319	358	48	31	28	34	17	12	18	25	19	5	12.4	
274.8 280.5 277.0 277.7 278.5 285.1 266.6 259.4 245.2 246.7 238.6 247.6 240.2 247.3 245.2 245.6 237.9 227.4 215.5 258.4 294.9 280.5 290.4 267.7																										
Diurnal Average																										

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

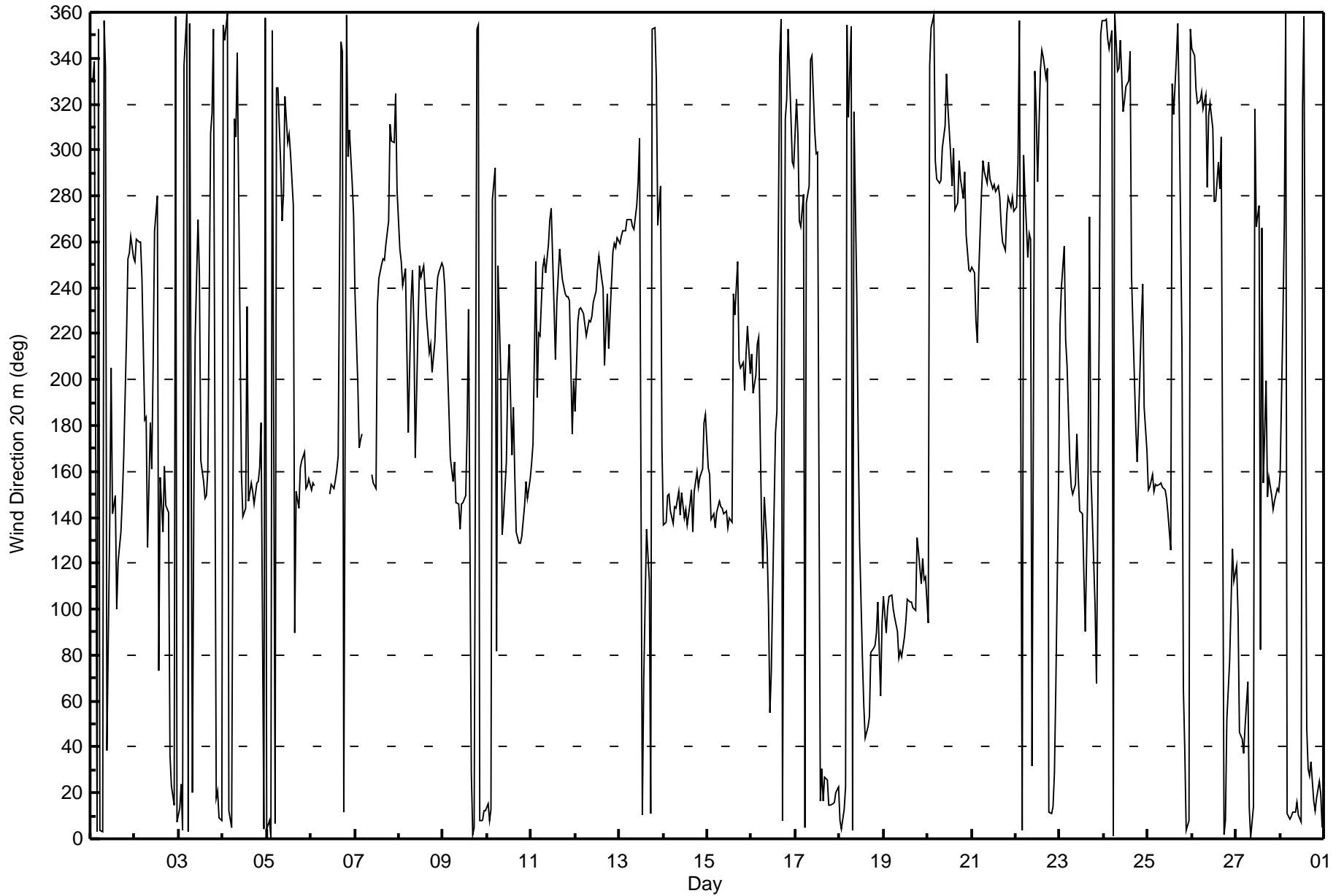


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 96 deg on Feb 18 12:00	Hours of Data: 661
Minimum Value: 4 deg on Feb 22 00:00	Hours of Missing Data: 11
Percentiles: P ₁ = 5 P ₁₀ = 8 Q ₁ = 10 Median = 13 Q ₃ = 22 P ₉₀ = 41 P ₉₉ = 87	Hours of Calibration: 0
	Percent 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-Feb	12	11	16	14	12	16	13	32	20	52	50	56	24	27	13	16	8	8	9	29	6	6	7	9	56	
2-Feb	5	4	8	8	41	15	24	23	37	36	41	23	38	39	27	47	25	27	41	12	11	11	14	12	47	
3-Feb	11	11	12	19	17	17	16	23	74	27	22	29	60	44	10	7	92	23	11	18	10	11	12	13	92	
4-Feb	17	12	13	12	11	11	38	19	76	37	17	17	24	52	14	9	6	9	8	13	13	95	10	13	95	
5-Feb	13	10	15	19	13	32	19	32	23	26	40	18	42	12	15	79	17	10	8	7	15	13	11	10	79	
6-Feb	10	8	8	AF	AF	AF	AF	AF	AF	AF	6	6	7	10	11	93	72	21	10	17	16	57	37	19	93	
7-Feb	9	26	12	13	7	AF	AF	AF	AF	AF	7	11	14	26	12	14	11	10	8	6	15	8	11	9	18	26
8-Feb	6	15	7	9	21	21	11	10	14	22	41	13	13	13	11	12	13	12	13	10	10	8	9	8	41	
9-Feb	9	13	33	37	14	41	6	13	9	13	10	9	14	25	39	47	23	12	34	21	10	9	7	10	47	
10-Feb	5	7	12	25	38	30	23	57	16	13	19	39	33	71	22	35	14	8	8	8	16	12	9	7	71	
11-Feb	10	36	52	15	16	14	64	10	10	11	9	77	28	18	14	10	11	9	9	8	10	13	40	20	77	
12-Feb	19	11	9	10	9	10	10	10	11	10	9	10	11	10	10	13	12	16	25	16	10	8	9	7	25	
13-Feb	8	7	7	8	8	7	7	6	6	10	9	23	46	23	18	20	16	36	13	30	26	14	39	59	59	
14-Feb	55	12	10	12	8	8	10	9	8	20	9	11	9	8	8	10	9	15	9	6	14	8	7	9	55	
15-Feb	5	5	7	8	11	9	6	8	7	9	8	10	12	17	88	53	49	10	18	11	11	13	17	11	88	
16-Feb	10	10	10	10	26	21	30	8	15	17	16	82	26	19	34	95	16	8	52	34	11	28	22	25	95	
17-Feb	32	19	22	14	21	41	18	43	15	13	21	11	14	38	16	15	12	15	11	12	15	12	13	15	43	
18-Feb	12	14	10	15	30	36	22	28	67	38	48	96	42	32	12	15	16	12	12	14	10	19	30	12	96	
19-Feb	14	9	11	11	10	10	9	15	10	12	13	14	12	11	10	14	12	15	10	14	14	13	14	18	18	
20-Feb	88	20	15	15	33	8	9	10	12	12	14	15	30	9	9	12	9	9	9	7	9	18	11	10	88	
21-Feb	11	11	10	10	16	15	11	11	12	11	11	9	10	9	10	12	12	8	8	9	8	6	6	4	16	
22-Feb	6	25	10	12	50	11	23	15	35	21	79	73	25	21	20	23	11	22	10	10	14	15	31	51	79	
23-Feb	29	44	17	11	13	23	7	4	6	22	20	22	29	24	21	72	66	22	29	53	36	81	20	12	81	
24-Feb	12	15	14	15	18	13	16	13	13	18	12	19	20	25	51	47	18	19	8	11	19	15	9	17	51	
25-Feb	6	6	6	5	7	6	7	7	6	6	9	17	47	34	16	34	17	22	57	72	15	15	12	13	72	
26-Feb	13	13	11	13	11	13	11	12	16	18	18	26	40	65	19	13	49	11	18	12	11	25	17	13	65	
27-Feb	17	20	13	9	10	12	11	22	20	12	53	15	33	74	63	93	48	9	11	8	7	10	7	7	93	
28-Feb	14	42	65	34	11	10	11	11	11	13	14	29	17	44	21	17	16	12	10	8	10	13	10	13	65	
	88	44	65	37	50	41	64	57	76	52	79	96	60	74	88	95	92	36	57	72	36	95	40	59		

Diurnal Maximum

AF - Analyzer Failure





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 253 deg on Feb 12 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 231.9 deg on Feb 12	Hours of Data: 670
Direction of Minimum Speed: 94 deg on Feb 6 16:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.5 deg on Feb 9	Percent Operational Time: 99.7
Monthly Average Direction: 269.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	330	329	336	358	348	357	356	355	336	358	143	200	153	158	106	117	128	150	174	243	258	262	256	250	313.0
2-Feb	250	257	260	259	256	228	239	179	243	260	238	268	280	41	169	151	160	137	137	29	17	8	356	2	287.7
3-Feb	7	15	359	341	0	359	347	19	140	210	247	239	167	162	144	144	175	306	312	348	10	14	3	4	355.6
4-Feb	358	346	359	9	7	7	4	347	54	186	169	160	163	215	143	152	144	139	153	151	158	180	3	355	85.6
5-Feb	359	3	357	352	4	346	344	330	323	338	345	302	305	294	277	359	143	130	148	160	178	160	168	166	345.6
6-Feb	151	149	149	145	152	152	151	148	153	148	144	146	146	136	155	94	348	345	11	9	344	328	315	301	144.1
7-Feb	268	228	173	195	219	208	186	163	168	168	180	159	227	239	245	247	247	251	264	306	301	303	324	302	240.0
8-Feb	262	257	248	249	232	213	242	245	242	229	236	244	239	242	235	222	206	212	201	213	230	239	242	246	233.7
9-Feb	245	244	227	208	185	180	164	148	143	132	134	136	146	180	224	24	1	2	356	354	3	11	37	37	170.4
10-Feb	34	29	36	32	73	108	139	155	127	131	150	155	194	161	181	157	126	122	121	127	139	151	143	151	128.3
11-Feb	168	172	201	194	221	232	244	247	242	253	263	264	223	207	228	250	244	239	233	232	232	232	184	203	230.1
12-Feb	196	223	226	226	223	219	215	220	221	222	228	234	242	248	240	234	205	233	214	227	250	253	251	255	231.9
13-Feb	253	257	260	260	263	263	264	263	261	270	280	300	355	50	99	121	118	20	352	351	349	290	293	194	271.3
14-Feb	137	135	142	148	140	131	144	144	151	141	150	142	143	134	143	147	138	151	169	162	178	180	192	192	151.5
15-Feb	177	186	145	145	130	138	145	148	140	143	142	132	135	141	171	206	227	217	219	214	203	211	220	200	172.4
16-Feb	209	191	202	212	225	170	117	146	130	98	69	85	139	172	180	356	354	4	10	331	348	335	310	304	199.9
17-Feb	325	308	303	284	284	355	292	317	336	339	313	299	294	349	25	8	19	18	9	8	9	10	14	15	342.5
18-Feb	3	358	9	17	351	309	344	2	304	227	171	126	57	46	35	40	43	72	72	78	81	94	64	89	44.2
19-Feb	101	83	94	99	99	94	90	82	70	74	71	81	89	99	97	98	94	95	121	115	104	113	106	105	92.1
20-Feb	87	335	348	360	308	285	282	284	299	311	326	319	293	279	294	268	271	AF	AF	275	285	261	245	244	285.7
21-Feb	244	242	223	219	241	277	291	286	280	289	284	277	280	277	278	273	262	254	252	268	276	271	277	272	268.3
22-Feb	276	296	353	0	345	301	269	259	292	21	348	311	280	331	340	334	326	332	6	5	10	28	57	123	337.5
23-Feb	175	184	231	205	187	167	160	149	162	173	158	139	139	108	86	156	254	155	112	92	67	125	349	354	146.3
24-Feb	353	354	345	343	350	357	353	330	333	340	312	317	324	324	319	240	217	183	169	193	229	249	197	192	306.8
25-Feb	179	158	159	155	156	151	151	152	152	154	147	143	147	320	315	332	350	316	221	54	29	358	2	348	109.9
26-Feb	341	336	321	316	317	320	315	318	288	312	316	307	272	275	286	277	299	354	1	40	64	98	116	104	322.7
27-Feb	109	91	52	46	38	48	63	35	349	9	310	265	276	62	248	171	191	145	156	151	134	142	145	141	103.2
28-Feb	147	199	290	355	5	2	3	5	5	10	6	360	315	349	41	22	21	24	13	9	17	22	20	8	7.8
269.0 271.1 262.8 251.8 260.7 245.6 234.0 220.8 221.8 230.4 236.1 242.8 233.9 241.9 236.7 239.3 227.5 211.9 203.2 250.3 282.9 278.4 280.1 263.1																									
Diurnal Average																									

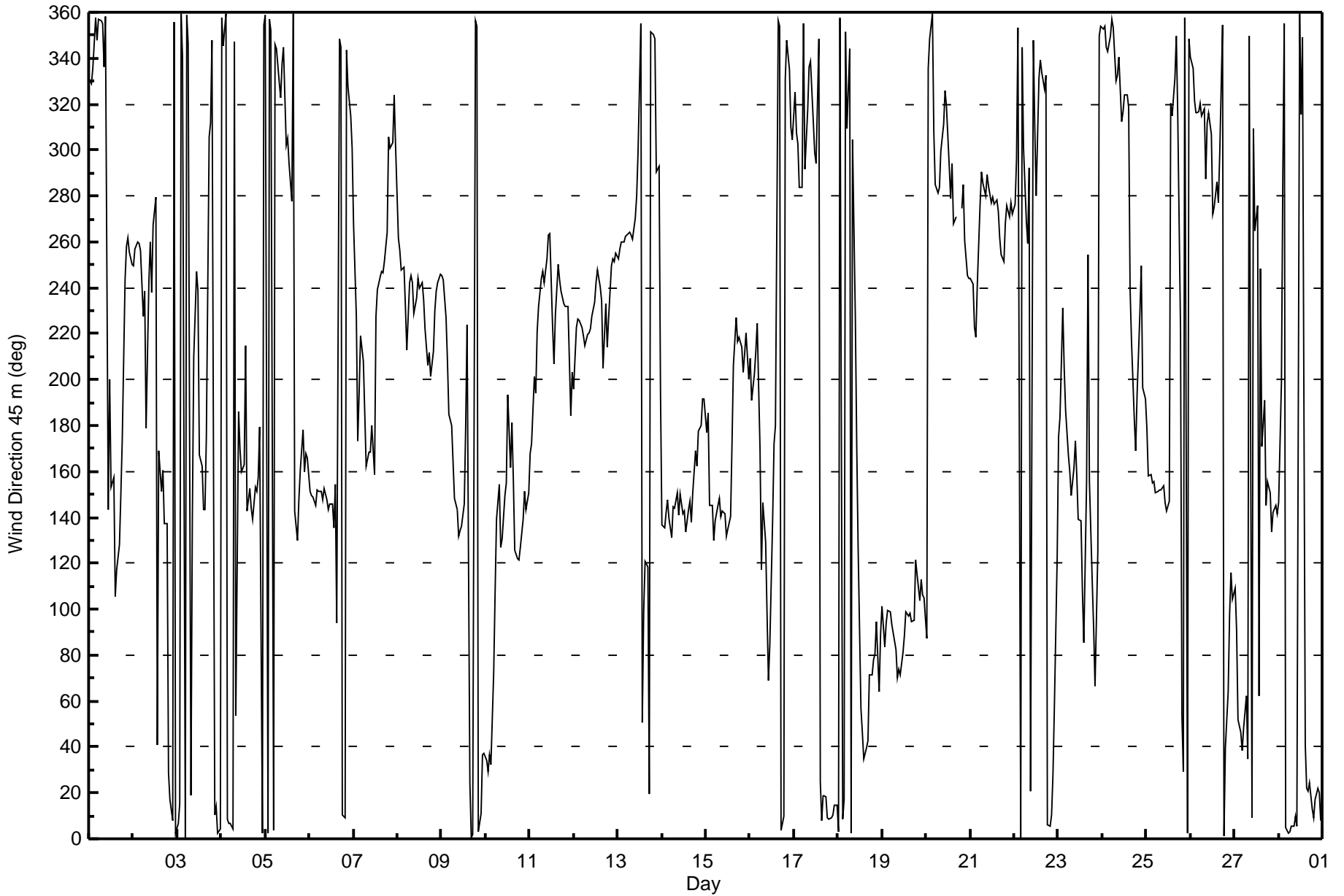
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 96 deg on Feb 18 12:00 Minimum Value: 2 deg on Feb 2 01:00 Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 7 Median = 10 Q ₃ = 18 P ₉₀ = 32 P ₉₉ = 80																		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	9	8	13	12	8	12	9	18	15	35	53	40	25	32	18	12	8	8	13	25	6	3	5	3	53
2-Feb	2	3	3	4	5	8	15	58	30	32	29	15	28	47	31	83	22	23	23	8	8	9	10	8	83
3-Feb	8	8	9	14	14	15	12	26	79	27	18	27	48	44	13	6	79	18	9	17	7	9	8	8	79
4-Feb	15	8	11	10	9	9	25	12	48	21	14	19	26	43	13	19	6	7	8	11	8	75	9	9	75
5-Feb	9	6	12	14	7	21	15	20	37	21	22	13	31	10	19	89	17	7	7	4	19	13	14	11	89
6-Feb	10	5	5	4	8	4	5	7	7	6	10	9	13	12	15	91	13	7	9	6	8	28	20	28	91
7-Feb	3	29	10	12	6	9	13	8	11	11	16	16	19	10	12	9	8	6	6	11	6	9	6	14	29
8-Feb	6	12	6	7	16	19	5	7	8	15	12	11	11	11	9	11	9	9	9	7	8	7	7	6	19
9-Feb	6	7	6	32	15	36	6	9	8	11	10	7	16	22	38	43	16	8	17	9	4	11	14	9	43
10-Feb	6	8	9	25	29	15	36	27	9	7	18	31	25	46	13	19	11	7	7	7	14	10	7	5	46
11-Feb	10	18	25	7	14	13	16	7	7	10	8	45	23	13	13	9	8	6	7	6	7	9	35	15	45
12-Feb	15	8	7	7	7	7	7	7	8	8	7	8	9	8	7	11	8	13	22	13	8	7	7	6	22
13-Feb	7	6	6	6	7	6	6	6	5	8	7	19	42	22	24	15	11	40	5	13	9	39	29	71	71
14-Feb	43	9	6	6	7	6	7	5	5	14	7	8	7	6	5	6	15	7	4	13	7	4	4	4	43
15-Feb	6	8	7	6	6	5	3	6	4	6	5	7	9	11	41	27	30	6	9	10	6	9	14	7	41
16-Feb	6	8	7	7	7	24	25	4	16	14	11	48	23	12	20	88	15	5	28	24	6	16	21	17	88
17-Feb	19	7	21	24	23	33	15	24	11	9	17	8	10	37	13	12	9	10	7	8	11	10	10	11	37
18-Feb	8	10	8	12	31	35	22	27	66	35	50	96	54	28	9	12	14	12	12	12	9	18	25	10	96
19-Feb	13	8	10	10	9	10	7	15	8	11	12	11	11	10	9	13	11	13	9	13	13	13	13	16	16
20-Feb	78	16	11	11	37	5	7	7	10	10	9	12	28	7	8	12	7	AF	AF	6	6	16	9	8	78
21-Feb	9	9	6	7	13	14	8	8	10	9	9	7	8	7	7	10	11	7	6	8	7	6	5	3	14
22-Feb	6	24	5	8	35	22	10	14	32	23	45	63	24	21	14	20	8	20	7	8	12	12	23	38	63
23-Feb	26	28	17	9	8	20	6	5	7	12	19	21	25	27	21	60	51	21	24	41	21	74	8	7	74
24-Feb	7	9	11	11	11	9	12	9	9	14	9	16	18	20	49	36	15	17	7	9	15	10	12	8	49
25-Feb	12	3	3	3	5	3	4	4	4	6	8	16	58	22	14	27	14	18	55	80	13	12	9	10	80
26-Feb	9	10	9	10	9	9	7	9	14	14	14	25	35	44	16	11	46	7	17	11	10	22	14	11	46
27-Feb	14	16	15	7	8	8	9	21	8	8	46	16	41	76	61	96	38	13	8	11	5	7	5	5	96
28-Feb	9	40	40	25	8	6	7	8	7	9	9	24	13	39	17	12	12	8	8	6	8	10	9	9	40
Diurnal Maximum																									
AF - Analyzer Failure																									





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 253 deg on Feb 12 22:00 Direction of Maximum Daily Speed Average: 232.9 deg on Feb 12	Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1
Direction of Minimum Speed: 115 deg on Feb 16 16:00 Direction of Minimum Daily Speed Average: 0.6 deg on Feb 25	Percent Operational Time: 99.9
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-Feb	338	338	341	1	353	359	359	1	343	345	149	213	177	178	127	118	133	158	201	258	269	267	258	254	312.4
2-Feb	258	264	264	262	259	242	250	264	262	275	260	273	292	21	185	211	169	137	138	33	21	10	359	5	290.6
3-Feb	10	18	4	353	9	360	353	26	74	204	247	252	166	166	150	147	208	314	316	352	13	16	6	10	359.3
4-Feb	8	353	13	16	17	16	27	13	79	148	168	186	190	207	146	155	147	144	166	160	160	168	7	2	102.2
5-Feb	5	7	2	360	8	2	0	356	5	6	360	310	312	297	292	356	135	125	147	163	201	213	225	195	355.1
6-Feb	186	151	148	155	161	160	156	153	154	158	162	147	149	125	142	78	19	352	17	13	1	348	326	308	148.4
7-Feb	270	246	216	212	235	234	216	201	198	211	226	194	232	241	247	249	248	252	269	308	305	311	332	321	253.6
8-Feb	277	270	253	254	240	231	246	251	253	253	241	244	241	242	235	222	207	213	206	214	230	239	242	247	237.6
9-Feb	247	248	238	225	204	228	192	163	147	140	136	131	147	169	215	27	10	9	4	5	24	44	79	66	180.2
10-Feb	69	60	67	102	102	117	144	131	126	129	134	129	158	147	169	149	126	124	125	130	140	152	145	156	130.2
11-Feb	187	189	194	200	228	237	246	248	244	254	264	257	224	211	229	250	244	240	235	234	234	234	204	212	232.9
12-Feb	207	224	227	226	223	219	215	220	222	223	228	235	243	249	241	235	208	236	219	231	251	253	253	256	232.9
13-Feb	254	259	262	263	263	263	266	265	264	271	280	299	349	40	85	131	146	70	357	357	16	359	300	176	271.5
14-Feb	158	140	148	156	147	141	154	152	163	155	161	151	153	141	149	150	150	161	181	181	197	197	203	202	161.2
15-Feb	199	207	165	161	143	147	154	163	150	150	150	139	137	147	158	169	223	232	236	220	211	216	225	206	179.9
16-Feb	214	199	211	214	230	207	129	156	146	113	83	87	138	171	172	115	357	14	38	342	353	349	331	319	205.1
17-Feb	335	320	322	323	309	351	313	334	341	346	326	306	296	320	22	10	21	21	13	11	14	14	19	20	349.2
18-Feb	8	0	13	22	0	310	343	14	311	220	155	109	40	39	37	46	45	74	72	81	82	96	73	92	46.2
19-Feb	103	87	95	100	99	95	91	81	73	75	72	82	90	101	100	103	97	100	119	114	107	116	107	106	92.2
20-Feb	87	344	354	13	335	293	287	286	305	320	326	326	291	281	295	269	273	290	AF	278	287	265	247	245	289.4
21-Feb	245	243	226	224	244	278	292	287	280	290	286	279	281	278	279	275	263	256	254	271	279	274	280	276	269.7
22-Feb	284	301	358	9	10	337	258	228	293	2	2	329	283	334	342	337	331	337	10	11	18	35	57	110	347.2
23-Feb	155	161	201	186	174	172	167	161	166	169	163	143	142	108	88	153	236	147	116	79	74	113	357	2	144.7
24-Feb	359	360	348	349	357	0	357	338	337	342	314	320	328	327	313	238	219	195	184	211	241	254	216	209	308.5
25-Feb	213	185	180	174	169	163	166	170	167	176	163	157	193	321	323	336	354	320	231	46	32	0	5	351	182.2
26-Feb	345	339	325	320	320	324	321	322	301	317	318	310	276	275	286	279	296	353	4	42	60	95	116	107	325.6
27-Feb	108	90	70	64	55	57	69	59	17	15	320	274	298	67	236	147	180	147	160	164	139	142	143	135	109.3
28-Feb	142	180	327	360	8	6	7	7	8	14	9	5	320	354	43	26	25	27	19	20	29	33	33	27	14.5
	275.8	280.0	269.6	254.4	256.2	248.8	241.8	230.0	228.7	229.9	235.0	238.4	234.5	242.0	232.5	235.4	228.8	233.6	223.3	255.8	281.3	277.0	280.0	268.1	
	Diurnal Average																								

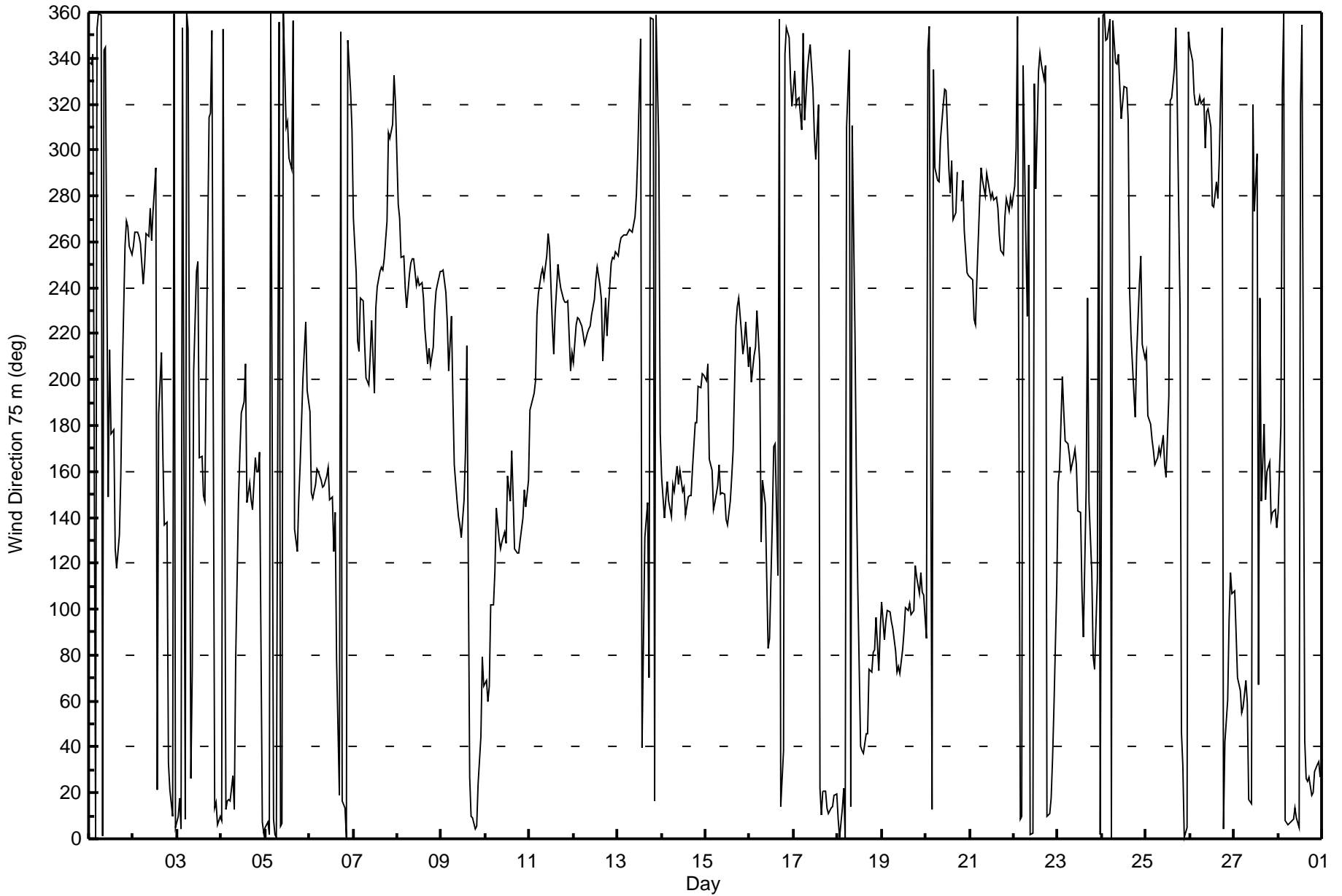
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Feb 2 16:00 Minimum Value: 1 deg on Feb 6 09:00 Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 16 P ₉₀ = 28 P ₉₉ = 82																	Hours in Service: 672 Hours of Data: 671 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-Feb	7	6	11	11	6	10	7	7	14	27	66	29	32	45	26	13	10	6	18	22	6	3	5	4	66	
2-Feb	3	2	3	4	3	5	6	14	12	9	14	10	25	58	37	95	37	19	24	8	7	7	8	7	95	
3-Feb	6	5	8	10	11	13	11	24	88	23	18	28	70	48	22	7	63	12	8	16	6	7	7	6	88	
4-Feb	13	8	9	8	9	9	17	13	35	11	8	25	24	38	13	18	6	7	9	6	5	70	9	7	70	
5-Feb	7	4	9	10	6	12	11	10	20	10	19	13	24	10	26	93	17	10	7	6	23	16	19	19	93	
6-Feb	35	11	5	4	4	3	5	3	1	3	14	7	9	12	15	49	15	7	9	5	6	25	9	8	49	
7-Feb	16	12	8	10	7	6	9	10	10	14	11	20	13	9	10	7	8	6	8	8	5	10	4	9	20	
8-Feb	7	11	7	6	9	13	4	8	7	11	9	9	10	10	8	10	8	7	8	6	8	5	6	5	13	
9-Feb	6	6	6	23	16	55	23	16	5	7	8	8	22	24	34	34	12	5	6	6	7	20	13	10	55	
10-Feb	6	8	16	19	17	14	17	16	10	5	10	18	26	35	10	13	9	9	10	7	12	8	5	8	35	
11-Feb	16	9	11	9	14	11	10	6	6	9	7	39	19	12	13	8	7	4	6	5	6	8	29	12	39	
12-Feb	13	8	7	6	6	6	5	6	6	7	7	7	8	7	6	10	7	13	20	11	7	6	6	6	20	
13-Feb	6	6	7	6	7	5	6	6	6	6	4	15	37	17	30	53	20	49	7	9	20	56	27	70	70	
14-Feb	32	9	6	5	6	4	5	3	4	11	6	7	6	8	6	3	9	15	6	6	8	6	4	5	32	
15-Feb	5	6	12	9	6	2	5	4	4	3	4	5	8	7	16	10	32	5	6	10	5	8	13	6	32	
16-Feb	6	8	7	5	7	16	36	6	17	18	9	23	21	11	17	82	13	7	20	18	4	8	24	15	82	
17-Feb	15	4	16	28	22	25	11	15	10	6	16	7	9	30	21	11	7	8	6	6	10	9	9	9	30	
18-Feb	8	8	6	10	35	33	26	25	70	37	58	87	50	23	10	11	13	11	10	12	11	18	19	13	87	
19-Feb	16	11	13	14	13	12	11	15	7	10	10	12	14	14	13	16	14	16	13	16	16	14	15	17	17	
20-Feb	63	17	12	8	36	4	5	5	11	11	7	9	28	7	8	11	6	8	AF	4	5	15	7	6	63	
21-Feb	7	8	5	5	12	14	8	7	9	7	8	7	7	6	7	9	10	6	6	8	7	5	5	2	14	
22-Feb	9	26	3	8	24	29	24	27	23	23	33	53	23	21	13	18	6	19	6	7	9	9	15	37	53	
23-Feb	23	20	25	11	7	15	3	5	7	10	16	20	26	27	20	59	56	19	20	24	13	67	6	4	67	
24-Feb	6	7	9	10	7	7	11	7	8	15	8	15	16	22	52	33	14	16	8	9	11	7	15	6	52	
25-Feb	11	9	5	3	3	3	4	6	5	6	11	19	83	16	15	24	13	16	33	85	12	11	7	8	85	
26-Feb	7	9	7	9	7	8	5	7	13	11	13	22	36	40	16	10	43	12	16	10	12	20	14	15	43	
27-Feb	16	16	15	6	7	5	8	13	14	7	40	25	66	68	68	95	36	17	7	6	9	4	4	4	95	
28-Feb	5	35	32	16	7	5	6	6	6	7	9	23	14	36	14	10	10	6	5	7	5	8	7	9	36	
																	Diurnal Maximum									
AF - Analyzer Failure																										





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

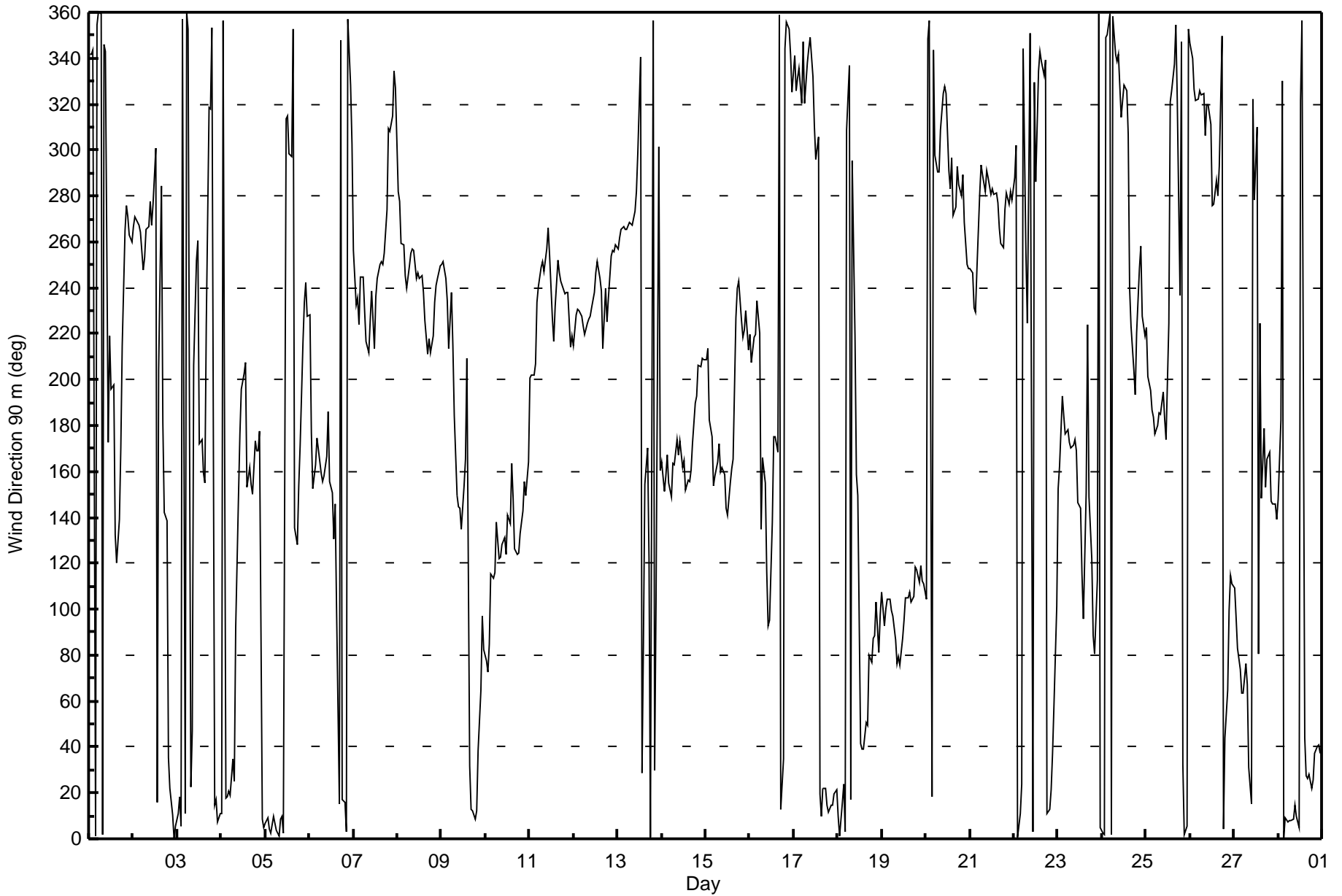
Wind Direction 90 m (WD90m) - deg
Mannix - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Feb 5 16:00																	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 deg on Feb 2 02:00																									
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 6 Median = 9 Q ₃ = 15 P ₉₀ = 28 P ₉₉ = 87																									
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-Feb	6	6	10	10	5	9	6	5	12	26	74	21	30	49	30	8	11	9	15	21	5	3	6	4	74
2-Feb	3	1	2	3	4	4	5	10	10	6	10	9	21	80	39	92	34	19	31	10	6	7	7	6	92
3-Feb	5	4	7	8	9	11	13	43	96	19	18	27	73	53	27	8	53	11	8	15	5	6	7	5	96
4-Feb	12	9	8	7	8	9	16	9	27	13	8	24	21	34	13	19	6	8	8	5	4	62	9	7	62
5-Feb	7	4	8	9	5	11	9	8	15	8	21	14	22	10	25	105	17	8	8	8	22	10	13	22	105
6-Feb	31	22	10	13	6	6	10	3	2	6	12	21	9	9	14	46	15	7	9	5	6	23	6	12	46
7-Feb	20	15	8	5	8	6	9	7	7	10	8	17	10	8	9	7	7	5	10	7	5	10	3	7	20
8-Feb	8	11	6	5	8	10	4	8	6	10	8	8	9	10	7	9	7	7	8	6	7	5	5	5	11
9-Feb	6	6	5	18	16	26	24	19	10	7	6	6	20	21	46	40	10	4	5	6	8	20	8	13	46
10-Feb	5	9	14	10	6	6	10	9	6	4	6	11	24	28	11	11	7	6	8	5	12	8	4	9	28
11-Feb	18	9	11	9	13	9	8	5	5	9	7	35	17	11	12	8	6	4	5	5	6	8	25	11	35
12-Feb	11	7	7	6	6	5	5	5	6	7	7	7	8	7	6	9	7	12	18	11	7	6	6	6	18
13-Feb	6	5	6	6	6	5	6	6	6	6	4	12	35	18	37	71	26	59	12	14	17	87	68	57	87
14-Feb	13	6	5	6	6	3	5	4	5	12	7	6	5	11	8	4	9	14	6	6	6	5	4	4	14
15-Feb	4	5	13	12	7	3	5	4	4	4	4	3	8	6	13	7	38	5	7	9	5	8	11	6	38
16-Feb	5	8	7	5	5	13	58	8	18	11	6	17	22	11	18	82	14	7	24	20	3	7	22	16	82
17-Feb	13	5	13	28	21	26	12	12	9	5	15	7	10	25	29	11	6	7	6	6	9	9	9	9	29
18-Feb	8	7	6	9	38	32	30	29	73	35	45	103	47	23	10	11	14	10	9	10	9	15	17	9	103
19-Feb	11	8	9	8	7	7	6	13	8	10	11	10	11	8	8	12	9	11	9	11	12	10	12	13	13
20-Feb	72	18	13	8	34	5	5	6	9	10	6	8	25	6	7	11	6	9	6	5	4	15	7	6	72
21-Feb	7	8	5	5	11	13	8	7	7	6	7	6	6	6	7	8	10	6	5	8	6	5	4	2	13
22-Feb	9	24	3	9	17	50	30	32	21	25	43	46	23	20	13	18	6	18	6	6	8	7	13	30	50
23-Feb	24	17	27	9	6	12	4	5	5	9	17	17	26	26	19	49	44	19	14	22	10	58	8	4	58
24-Feb	5	6	8	10	6	7	9	6	8	16	7	15	15	24	56	28	12	15	8	9	10	6	14	6	56
25-Feb	9	10	5	3	4	6	6	7	7	6	12	23	84	16	15	23	12	15	21	98	12	10	7	8	98
26-Feb	6	8	6	8	6	7	4	6	11	11	12	21	36	36	15	10	42	16	17	10	12	16	10	10	42
27-Feb	9	12	16	6	8	5	8	10	17	7	39	35	83	58	70	90	33	15	6	6	12	3	3	3	90
28-Feb	4	36	24	16	6	4	5	6	5	6	8	22	14	34	14	10	9	5	4	8	4	7	7	11	36
																	72 36 27 28 38 50 58 43 96 35 74 103 84 80 70 105 53 59 31 98 22 87 68 57								
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





Maximum Value: 1.3 km/h on Feb 19 08:00 Maximum Daily Average: 0.9 km/h on Feb 19																				Hours in Service: 672 Hours of Data: 661 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.4							
Minimum Value: -1.1 km/h on Feb 12 15:00 Minimum Daily Average: -0.7 km/h on Feb 12 Maximum Diurnal Average: 0.2 km/h at hour 14 Minimum Diurnal Average: -0.1 km/h at hour 2 Monthly Average: 0.05 km/h Percentiles: P ₁ = -0.9 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.0 Q ₃ = 0.3 P ₉₀ = 0.6 P ₉₉ = 1.1																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	-0.4	-0.5	-0.2	0.0	-0.4	0.0	-0.1	0.0	-0.1	0.2	0.4	0.3	0.5	0.8	0.4	0.8	0.6	0.4	0.1	-0.1	-0.2	-0.4	-0.3	-0.5	0.1	0.8	
2-Feb	-0.5	-0.3	-0.3	-0.2	0.0	-0.1	-0.1	0.2	0.0	0.1	0.0	-0.1	-0.2	0.2	0.4	0.1	0.1	0.4	0.2	0.5	0.2	0.0	-0.3	-0.2	0.0	0.5	
3-Feb	0.0	0.2	-0.1	-0.1	0.0	0.0	0.1	0.1	0.2	0.0	-0.1	-0.2	0.1	0.4	0.4	0.4	0.2	-0.1	-0.6	-0.2	0.0	0.2	-0.2	0.0	0.0	0.4	
4-Feb	0.0	0.0	-0.1	0.0	0.0	-0.1	-0.1	-0.2	0.0	-0.2	0.2	0.3	0.4	0.1	0.3	0.3	0.5	0.7	0.5	0.4	0.3	0.1	-0.1	0.0	0.1	0.7	
5-Feb	0.1	-0.3	0.0	-0.1	0.0	0.0	-0.2	0.1	0.1	-0.1	0.1	0.0	0.1	0.0	-0.1	0.0	0.3	0.6	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.6	
6-Feb	0.3	0.4	0.3	AF	AF	AF	AF	AF	AF	AF	AF	0.4	0.1	0.1	0.1	0.0	0.3	0.2	0.0	0.0	-0.1	-0.3	-0.1	-0.1	0.0	--	0.4
7-Feb	-0.2	0.0	0.1	0.0	-0.1	AF	AF	AF	AF	AF	0.1	0.1	0.3	-0.4	-0.3	-0.4	-0.5	-0.3	-0.3	-0.2	-0.2	-0.3	-0.2	-0.7	-0.1	-0.2	0.3
8-Feb	-0.3	-0.3	-0.4	-0.2	-0.3	-0.1	-0.4	-0.4	-0.3	0.1	0.0	-0.4	-0.4	-0.2	-0.5	-0.6	-0.7	-0.5	-0.2	-0.7	-1.0	-1.0	-0.9	-0.7	-0.4	0.1	0.5
9-Feb	-0.6	-0.3	-0.2	0.1	0.0	0.1	0.2	0.3	0.5	0.5	0.5	0.4	0.1	-0.1	-0.1	0.2	0.0	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.1	0.5	0.5
10-Feb	0.0	-0.1	-0.1	-0.2	-0.1	0.1	-0.1	-0.1	0.5	0.5	0.2	0.2	0.1	0.2	0.1	0.2	0.5	0.5	0.6	0.7	0.5	0.5	0.8	0.6	0.3	0.8	0.8
11-Feb	0.3	0.2	0.0	-0.1	-0.2	-0.2	-0.1	-0.5	-0.5	-0.3	-0.2	-0.1	-0.3	0.0	-0.4	-0.5	-0.7	-0.6	-0.5	-0.5	-0.5	-0.2	0.2	-0.3	-0.2	0.3	0.3
12-Feb	0.0	-0.6	-0.8	-0.7	-1.0	-0.8	-0.8	-0.7	-0.6	-0.7	-0.6	-0.8	-0.9	-0.9	-1.1	-0.6	-0.3	-0.8	-0.3	-0.6	-0.6	-0.8	-0.9	-0.9	-0.7	0.0	0.0
13-Feb	-0.7	-0.6	-0.5	-0.3	-0.4	-0.5	-0.5	-0.4	-0.2	-0.4	-0.4	-0.1	0.2	0.5	0.2	0.2	0.3	0.0	-0.1	0.0	0.0	-0.1	0.0	0.0	-0.1	0.5	0.5
14-Feb	0.1	0.3	0.4	0.4	0.6	0.8	0.8	0.9	0.9	0.8	0.9	0.8	0.9	1.0	0.9	0.9	1.0	0.5	0.4	0.6	0.2	0.3	0.0	-0.1	0.6	1.0	1.0
15-Feb	0.3	0.2	0.6	0.5	0.6	0.5	0.7	0.8	0.8	0.7	0.8	0.6	0.4	0.4	0.0	0.0	0.0	-0.4	-0.4	-0.3	-0.2	-0.5	-0.6	-0.4	0.2	0.8	0.8
16-Feb	-0.6	-0.3	-0.4	-0.4	-0.2	0.3	0.5	0.6	0.4	0.4	0.2	0.1	0.2	0.1	0.2	0.0	0.0	0.0	-0.1	-0.2	-0.2	-0.1	0.0	-0.3	0.0	0.6	0.6
17-Feb	0.0	-0.1	0.0	-0.1	-0.1	0.0	-0.1	-0.1	0.1	-0.2	-0.2	-0.1	0.1	0.1	0.1	0.2	0.4	0.2	0.0	0.2	0.2	0.0	0.2	0.6	0.1	0.6	0.6
18-Feb	0.0	0.0	0.1	0.2	0.0	-0.1	0.0	0.1	0.2	0.0	0.1	0.4	0.2	0.4	0.4	0.4	0.6	0.7	0.7	0.6	0.7	0.7	0.4	1.0	0.3	1.0	1.0
19-Feb	0.8	0.7	0.8	0.9	0.9	1.1	1.1	1.3	1.1	1.1	0.9	0.6	0.8	1.1	1.1	0.9	1.0	0.9	0.7	0.7	0.8	0.9	0.8	0.7	0.9	1.3	1.3
20-Feb	0.2	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.1	-0.3	-0.2	-0.1	-0.1	0.0	-0.2	-0.2	0.0	-0.2	-0.3	-0.3	-0.2	-0.2	-0.1	-0.2	-0.6	-0.1	0.2	0.2
21-Feb	-0.7	-0.4	-0.3	-0.2	-0.4	-0.2	-0.3	-0.2	-0.2	-0.5	-0.2	-0.4	-0.1	-0.2	-0.3	-0.2	-0.2	-0.3	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1	-0.3	-0.1	-0.1
22-Feb	-0.1	-0.1	-0.2	0.0	0.0	-0.1	-0.2	-0.2	-0.1	0.0	0.0	0.0	-0.3	0.0	0.4	0.1	-0.4	-0.1	-0.1	0.0	0.0	0.2	0.3	0.2	0.0	0.4	0.4
23-Feb	0.0	0.1	0.0	0.0	-0.1	0.1	0.3	0.3	0.2	0.3	0.2	0.4	0.2	0.5	0.5	0.1	0.2	0.3	0.5	0.2	0.3	0.1	-0.1	-0.2	0.2	0.5	0.5
24-Feb	-0.3	-0.2	-0.2	0.1	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.4	-0.3	-0.1	0.0	0.1	0.1	-0.2	0.1	0.3	-0.1	-0.3	-0.3	-0.2	0.1	-0.1	0.3	0.3
25-Feb	0.2	0.4	0.7	0.8	0.7	0.9	0.8	0.8	0.6	0.5	0.5	0.4	0.4	0.0	0.1	0.1	0.0	-0.2	-0.1	0.2	0.5	-0.3	-0.1	-0.3	0.3	0.9	0.9
26-Feb	-0.3	-0.4	-0.6	-0.1	-0.4	-0.2	-0.3	-0.4	-0.1	-0.1	-0.2	-0.1	-0.3	0.2	-0.1	-0.1	0.1	0.0	0.1	0.4	0.5	0.8	0.9	1.0	0.0	1.0	1.0
27-Feb	0.8	0.5	0.3	0.3	0.2	0.3	0.7	0.0	0.0	-0.1	0.1	-0.3	-0.1	0.2	0.0	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.7	0.5	0.3	0.8	0.8
28-Feb	0.3	0.0	0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.0	0.1	0.0	0.3	0.6	0.2	0.4	0.3	0.2	0.0	0.1	0.1	0.0	-0.1	0.1	0.6	0.6
																								Diurnal Average			
																								Diurnal Maximum			
0.0 -0.1 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.0 0.8 0.7 0.8 0.9 0.9 1.1 1.1 1.3 1.1 1.1 0.9 0.8 0.9 1.1 1.1 0.9 1.0 0.9 0.7 0.7 0.8 0.9 0.9 1.0																											
AF - Analyzer Failure																											



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h

Mannix - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 km/h on Feb 12 14:00 Minimum Value: 0.1 km/h on Feb 14 00:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.5 P ₉₀ = 2.0 P ₉₉ = 3.2																				Hours in Service: 672 Hours of Data: 661 Hours of Missing Data: 11 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-Feb	1.8	1.6	1.9	2.1	2.6	1.7	1.3	1.0	0.5	0.5	0.7	0.8	0.9	0.8	0.7	0.9	1.0	0.5	0.5	0.3	0.4	0.6	0.6	1.1	2.6
2-Feb	0.7	0.5	0.7	0.5	0.3	0.4	0.5	0.2	0.5	0.3	0.7	0.7	0.9	0.7	0.8	0.6	0.4	0.5	0.4	1.3	1.8	1.8	1.4	1.8	1.8
3-Feb	1.9	1.5	1.1	0.8	0.6	0.6	0.8	0.4	0.4	0.6	0.5	0.7	0.8	0.9	0.6	0.6	0.5	0.8	2.0	1.8	2.2	2.2	1.8	1.3	2.2
4-Feb	0.9	0.9	0.8	1.0	0.9	0.7	0.5	0.2	0.2	0.4	0.6	0.9	0.8	1.0	1.0	0.8	0.8	1.0	0.6	0.7	0.8	0.4	0.6	1.6	1.6
5-Feb	2.0	2.3	1.7	1.6	1.6	0.8	0.6	0.6	0.4	0.5	0.9	0.8	1.1	1.1	0.9	0.6	0.6	0.7	0.3	0.4	0.5	0.3	0.3	0.4	2.3
6-Feb	0.4	0.4	0.5	AF	AF	AF	AF	AF	AF	AF	0.5	0.7	0.6	0.7	0.5	0.5	0.2	0.1	0.3	0.3	0.3	0.2	0.2	0.2	0.7
7-Feb	0.3	0.2	0.2	0.2	0.4	AF	AF	AF	AF	AF	0.8	0.5	0.7	1.7	1.8	1.7	1.9	1.5	1.6	0.8	1.3	1.1	1.0	1.4	1.9
8-Feb	0.4	0.4	0.4	0.5	0.5	0.4	0.6	1.4	0.6	0.5	1.3	2.4	2.2	2.0	2.3	2.0	2.4	1.9	1.3	2.0	2.4	2.6	2.4	2.0	2.6
9-Feb	1.8	1.1	0.5	0.6	0.5	0.3	0.4	0.5	0.7	0.9	0.8	1.0	0.9	0.9	0.8	0.4	0.5	0.9	0.7	0.6	0.6	0.9	0.5	0.3	1.8
10-Feb	0.4	0.5	0.4	0.3	0.2	0.1	0.3	0.5	0.8	1.1	1.1	0.9	1.0	0.7	0.9	0.6	1.3	1.7	1.6	1.6	1.6	1.1	1.1	0.7	1.7
11-Feb	0.6	0.5	0.2	0.6	0.5	0.3	0.9	1.6	1.6	1.7	1.2	0.9	1.2	1.3	1.7	2.2	2.5	2.0	1.6	1.7	1.9	1.9	1.4	1.5	2.5
12-Feb	1.3	2.3	2.8	3.0	2.6	2.3	2.2	2.5	2.6	2.5	2.6	2.7	3.6	3.7	3.2	2.6	1.5	2.3	1.2	1.8	3.1	3.3	3.3	2.7	3.7
13-Feb	2.7	2.2	2.2	1.5	2.2	2.1	1.9	1.6	1.2	1.6	1.6	1.1	1.2	0.8	0.4	0.4	0.3	0.4	0.9	0.7	0.4	0.2	0.2	0.1	2.7
14-Feb	0.2	0.4	0.6	0.8	1.0	1.1	1.0	1.2	1.2	1.4	1.2	1.2	1.3	1.4	1.3	1.1	1.2	0.7	0.6	0.5	0.6	0.5	0.6	0.7	1.4
15-Feb	0.4	0.3	1.0	1.0	0.8	0.8	0.8	1.0	1.4	1.3	1.1	0.9	0.9	0.8	0.4	0.2	0.3	1.2	0.9	0.8	1.1	2.1	2.2	1.7	2.2
16-Feb	1.7	1.3	1.3	1.2	0.6	0.4	0.8	0.9	0.6	0.7	0.6	0.6	1.0	1.3	0.6	0.3	0.7	0.3	0.3	1.0	1.6	0.9	0.4	0.6	1.7
17-Feb	0.7	0.5	0.6	0.3	0.2	0.2	0.5	0.5	1.6	1.7	1.2	0.9	0.7	0.5	0.8	1.5	1.6	1.4	1.3	1.8	1.4	1.3	1.4	1.3	1.8
18-Feb	1.3	1.2	1.2	1.2	0.8	0.7	0.6	0.6	0.6	0.7	0.8	0.7	0.7	0.9	1.2	1.2	1.1	1.0	1.2	1.0	1.2	1.1	1.2	1.7	1.7
19-Feb	1.7	1.7	1.7	1.8	2.1	2.1	2.0	1.9	1.7	2.0	2.1	1.8	1.9	2.2	1.9	1.4	1.4	1.2	1.3	1.3	1.2	1.2	1.1	1.0	2.2
20-Feb	0.4	0.4	0.8	0.7	0.6	1.0	1.1	1.1	1.4	1.0	0.8	0.8	0.8	1.1	1.1	1.0	1.1	1.4	1.2	0.9	0.9	0.7	1.6	2.0	2.0
21-Feb	2.7	1.8	1.2	1.0	1.4	1.4	1.9	2.2	1.8	2.4	1.6	1.6	1.5	1.7	1.6	1.5	1.3	1.2	1.5	1.1	1.0	0.7	0.6	0.3	2.7
22-Feb	0.4	0.6	1.1	0.7	0.4	0.5	0.6	0.5	0.3	0.5	0.8	1.0	1.0	1.4	1.5	1.4	1.6	1.3	1.2	1.1	1.2	0.8	0.6	0.4	1.6
23-Feb	0.3	0.3	0.3	0.3	0.2	0.4	0.4	0.3	0.3	1.0	1.1	1.0	1.2	1.2	1.1	0.8	0.7	0.5	0.5	0.3	0.5	0.5	0.8	1.5	1.5
24-Feb	1.8	1.9	1.9	1.4	1.1	1.5	1.6	1.3	1.1	1.5	1.4	1.7	1.5	1.3	1.1	1.1	1.2	0.6	0.5	0.8	0.8	0.4	0.7	0.6	1.9
25-Feb	0.5	0.7	0.8	0.9	1.0	1.0	1.0	1.0	0.9	0.8	0.8	0.9	1.0	1.4	1.4	1.3	1.9	1.0	0.9	0.7	2.0	3.6	3.6	3.2	3.6
26-Feb	3.1	2.6	2.5	2.2	2.2	1.8	1.3	1.6	1.0	1.6	1.6	1.5	1.3	1.4	1.4	1.1	1.0	0.5	0.6	0.8	0.6	0.8	1.2	1.3	3.1
27-Feb	1.3	1.0	0.7	0.9	0.7	0.8	1.0	0.4	0.6	1.0	1.1	0.9	1.1	1.1	1.3	1.1	1.0	0.4	0.4	0.3	0.7	1.1	1.0	0.9	1.3
28-Feb	0.6	0.5	0.4	2.0	2.4	2.4	2.8	2.6	2.4	2.0	1.7	1.7	1.6	1.7	1.7	1.8	1.5	1.4	1.1	1.3	1.0	1.0	0.9	0.9	2.8
Diurnal Maximum																									
AF - Analyzer Failure																									



Summary of Hour Averages

Mannix - February 2017

Maximum Value: 1.9 km/h on Feb 14 17:00		Maximum Daily Average: 1.2 km/h on Feb 14		Hours in Service: 672																						
Minimum Value: -1.6 km/h on Feb 26 01:00		Minimum Daily Average: -0.4 km/h on Feb 12		Hours of Data: 670																						
Maximum Diurnal Average: 0.2 km/h at hour 14		Minimum Diurnal Average: -0.2 km/h at hour 1		Hours of Missing Data: 2																						
Monthly Average: 0.02 km/h		Percentiles: P ₁ = -1.1 P ₁₀ = -0.6 Q ₁ = -0.4 Median = -0.1 Q ₃ = 0.4 P ₉₀ = 0.9 P ₉₉ = 1.6		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-Feb	-1.1	-1.1	-0.7	-0.4	-1.1	-0.4	-0.5	-0.3	-0.4	-0.1	0.4	0.6	0.5	0.6	0.4	0.9	0.8	0.8	0.5	-0.2	-0.4	-0.5	-0.5	-0.6	-0.1	0.9
2-Feb	-0.7	-0.5	-0.4	-0.5	-0.2	-0.1	-0.1	0.1	-0.1	0.0	0.0	-0.1	-0.3	0.1	0.4	-0.1	0.1	0.4	0.4	0.2	-0.7	-0.8	-0.7	-0.6	-0.2	0.4
3-Feb	-0.8	-0.5	-0.3	-0.3	-0.3	-0.2	-0.2	0.1	0.2	0.2	0.0	-0.1	0.0	0.5	0.4	0.5	0.3	-0.2	-0.9	-0.8	-0.7	-0.6	-0.9	-0.2	-0.2	0.5
4-Feb	-0.2	-0.3	-0.4	-0.4	-0.4	-0.2	-0.1	-0.1	0.1	0.1	0.2	0.1	0.3	0.2	0.5	0.4	0.7	1.0	0.8	0.8	0.7	0.1	-0.3	-0.4	0.1	1.0
5-Feb	-0.8	-1.0	-0.5	-0.7	-0.4	-0.1	-0.4	0.0	0.0	-0.2	-0.1	-0.2	0.0	-0.3	-0.1	0.1	0.3	0.7	0.6	0.5	0.4	0.2	0.3	0.4	-0.1	0.7
6-Feb	0.7	1.0	1.0	1.2	0.7	1.1	1.1	0.8	0.7	0.8	0.4	0.3	0.3	0.3	0.0	0.2	0.0	-0.1	-0.2	-0.2	-0.3	-0.1	-0.2	0.0	0.4	1.2
7-Feb	-0.1	0.0	0.3	0.1	-0.1	-0.2	0.0	0.4	0.4	-0.1	0.1	0.3	-0.2	-0.2	-0.1	-0.3	-0.3	-0.3	-0.3	-0.6	-0.4	-0.5	-1.4	-0.6	-0.2	0.4
8-Feb	-0.3	-0.4	-0.4	-0.4	-0.2	-0.1	-0.4	-0.5	-0.4	-0.1	0.0	-0.1	-0.4	0.1	-0.3	-0.2	-0.2	-0.3	0.0	-0.3	-0.6	-0.9	-0.7	-0.9	-0.3	0.1
9-Feb	-0.6	-0.2	-0.1	0.1	0.3	0.1	0.5	0.7	1.0	0.7	0.8	0.4	0.0	0.0	0.0	0.1	-0.2	-0.5	-0.3	-0.3	-0.5	-0.3	0.0	0.0	0.1	1.0
10-Feb	-0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.8	0.9	0.3	0.5	0.1	0.4	0.3	0.4	0.7	0.6	0.7	1.1	1.0	1.0	1.1	1.0	0.5	1.1
11-Feb	0.5	0.5	0.0	0.1	-0.2	-0.2	-0.3	-0.5	-0.5	-0.4	-0.3	-0.1	-0.2	0.4	-0.1	-0.5	-0.6	-0.6	-0.4	-0.2	-0.1	-0.2	0.6	-0.2	-0.1	0.6
12-Feb	0.4	-0.2	-0.2	-0.4	-0.5	-0.3	-0.5	-0.3	-0.3	-0.3	-0.3	-0.4	-0.6	-1.0	-0.8	-0.5	0.0	-0.6	-0.2	-0.5	-0.5	-0.8	-0.8	-0.8	-0.4	0.4
13-Feb	-0.8	-0.6	-0.6	-0.7	-0.6	-0.7	-0.5	-0.6	-0.3	-0.7	-0.8	-0.4	-0.1	0.3	0.3	0.2	0.2	0.0	-0.5	-0.4	-0.2	0.0	-0.2	0.1	-0.3	0.3
14-Feb	0.2	0.7	1.0	1.2	1.4	1.4	1.5	1.7	1.8	1.5	1.4	1.1	1.4	1.7	1.6	1.8	1.9	1.2	0.8	1.0	0.5	0.5	0.2	0.3	1.2	1.9
15-Feb	0.4	0.1	1.3	1.1	1.5	1.3	1.6	1.4	1.6	1.4	1.4	1.2	0.8	0.9	0.2	0.1	0.0	-0.4	-0.3	-0.2	-0.1	-0.3	-0.3	-0.2	0.6	1.6
16-Feb	-0.4	0.2	-0.2	-0.3	-0.2	0.3	0.7	1.3	0.8	0.5	0.2	0.2	0.3	0.5	0.4	0.0	-0.3	-0.3	-0.1	-0.7	-0.9	-0.5	-0.3	-0.7	0.0	1.3
17-Feb	-0.5	-0.6	-0.2	-0.3	-0.2	0.0	-0.3	-0.3	-0.3	-0.8	-0.6	-0.4	-0.1	0.0	-0.1	-0.2	-0.1	-0.2	-0.4	-0.5	-0.3	-0.4	0.0	0.4	-0.3	0.4
18-Feb	-0.5	-0.4	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	0.1	0.1	0.5	0.1	0.2	-0.1	0.0	0.2	0.4	0.3	0.5	0.4	0.9	0.2	0.8	0.1	0.9
19-Feb	0.7	0.3	0.6	0.6	0.7	0.9	0.6	0.9	0.8	0.7	0.5	0.1	0.5	0.9	0.9	1.1	0.9	1.0	0.9	1.0	1.3	1.3	1.2	1.2	0.8	1.3
20-Feb	0.2	-0.1	-0.4	-0.2	0.0	-0.4	-0.5	-0.3	-0.6	-0.6	-0.4	-0.3	-0.2	-0.4	-0.3	0.0	-0.4	AF	AF	-0.4	-0.6	-0.2	-0.2	-0.5	-0.3	0.2
21-Feb	-0.6	-0.4	-0.2	-0.1	-0.3	-0.5	-0.7	-0.7	-0.6	-0.7	-0.5	-0.7	-0.4	-0.6	-0.6	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.2	-0.4	-0.3	-0.4	-0.1
22-Feb	-0.3	-0.3	-0.6	-0.3	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	0.1	-0.2	-0.5	-0.4	0.4	-0.2	-1.0	-0.5	-0.7	-0.6	-0.4	0.0	0.1	0.3	-0.2	0.4
23-Feb	0.2	0.2	0.0	0.0	0.1	0.2	0.4	0.5	0.2	0.4	0.2	0.6	0.1	0.6	0.6	0.3	0.5	0.4	0.7	0.1	0.2	0.2	-0.5	-0.6	0.2	0.7
24-Feb	-1.0	-0.6	-0.8	-0.3	-0.5	-0.6	-0.5	-0.6	-0.6	-0.4	-0.7	-0.8	-0.5	-0.1	0.0	0.3	0.1	0.3	0.6	0.0	-0.4	-0.4	0.0	0.1	-0.3	0.6
25-Feb	0.1	0.7	1.3	1.3	1.3	1.6	1.4	1.5	1.1	0.8	0.8	0.5	0.4	-0.2	-0.1	-0.1	-0.3	-0.5	0.0	0.2	-0.1	-1.5	-1.4	-1.0	0.3	1.6
26-Feb	-1.6	-1.5	-1.3	-0.7	-0.9	-1.0	-0.9	-1.0	-0.3	-0.1	-0.8	-0.3	-0.4	0.4	-0.1	-0.4	0.0	-0.1	0.0	0.2	0.2	0.8	1.2	1.4	-0.3	1.4
27-Feb	1.0	0.4	0.2	0.1	0.1	0.2	0.4	0.0	-0.3	-0.4	0.2	-0.4	0.1	0.3	0.0	0.1	0.4	0.0	0.4	0.5	1.0	1.3	1.2	1.0	0.3	1.3
28-Feb	0.6	0.2	0.0	-0.6	-1.2	-1.1	-1.1	-0.9	-0.8	-0.5	-0.7	-0.2	-0.2	0.1	0.4	-0.1	0.2	0.0	-0.2	-0.5	-0.2	-0.1	-0.2	-0.3	-0.3	0.6
																								Diurnal Average		
																								Diurnal Maximum		
																								1.0 1.0 1.3 1.3 1.5 1.6 1.6 1.7 1.8 1.5 1.4 1.2 1.4 1.7 1.6 1.8 1.9 1.2 0.9 1.1 1.3 1.3 1.2 1.4		
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on Feb 12 13:00		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																									
Minimum Value: 0.1 km/h on Feb 14 00:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.6 P ₉₀ = 2.2 P ₉₉ = 3.4																											
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-Feb	2.1	1.7	2.1	2.4	2.5	1.9	1.3	1.0	0.6	0.7	0.8	1.0	0.9	0.9	0.8	0.9	1.1	0.6	0.5	0.4	0.3	0.2	0.4	0.5	2.5		
2-Feb	0.3	0.4	0.3	0.7	0.5	0.2	0.5	0.4	0.7	0.5	0.7	0.6	1.0	0.8	1.0	0.8	0.4	0.6	0.5	1.3	2.0	2.0	1.5	1.9	2.0		
3-Feb	1.9	1.7	1.1	0.9	0.8	0.8	0.8	0.5	0.4	0.5	0.5	0.7	1.0	1.1	0.9	0.9	0.8	1.0	2.4	1.9	2.2	2.4	1.6	1.3	2.4		
4-Feb	1.2	0.9	0.9	1.1	1.0	0.8	0.8	0.2	0.2	0.3	0.7	0.7	1.1	1.1	1.3	1.0	0.8	1.1	0.6	0.7	0.7	0.5	0.4	1.3	1.3		
5-Feb	1.9	1.9	1.8	1.7	1.5	1.0	1.0	0.6	0.7	0.9	1.1	1.0	1.3	1.4	1.0	0.8	0.8	0.7	0.2	0.5	0.6	0.4	0.4	0.4	1.9		
6-Feb	0.5	0.3	0.4	0.6	0.7	0.8	0.8	0.8	0.7	0.8	0.6	0.7	0.7	0.7	0.4	0.5	0.2	0.1	0.5	0.3	0.2	0.2	0.2	0.2	0.8		
7-Feb	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.8	0.7	0.9	0.5	0.7	1.8	1.9	1.8	1.8	1.6	1.6	1.0	1.4	1.1	1.0	1.4	0.9	1.9		
8-Feb	0.2	0.4	0.5	0.4	0.4	0.7	0.6	1.6	0.9	0.7	1.7	2.8	2.5	2.4	2.4	2.1	2.4	2.0	1.5	2.0	2.5	2.7	2.5	1.8	2.8		
9-Feb	1.7	1.2	0.5	0.7	0.4	0.5	0.5	0.5	0.8	1.0	1.2	1.3	0.9	0.9	0.8	0.6	0.6	1.0	0.7	0.7	0.5	0.4	0.5	0.2	1.7		
10-Feb	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.6	1.3	1.4	1.2	1.1	1.2	0.8	0.8	0.7	1.4	1.8	1.6	1.8	1.7	1.2	1.3	0.7	1.8		
11-Feb	0.6	0.4	0.2	0.5	0.4	0.5	1.2	1.7	1.7	1.7	1.5	1.1	1.3	1.7	2.0	2.4	2.6	2.0	1.7	1.7	2.2	2.3	1.8	1.7	2.6		
12-Feb	1.8	2.7	3.1	3.4	2.7	2.4	2.3	2.5	2.7	2.8	2.9	3.1	4.0	3.5	3.2	2.8	1.5	2.5	1.6	2.1	3.2	3.5	3.2	3.0	4.0		
13-Feb	2.9	2.4	2.5	1.8	2.7	2.5	2.3	2.0	1.7	1.5	1.5	1.3	1.3	0.8	0.4	0.4	0.3	0.3	0.7	0.8	0.4	0.2	0.2	0.1	2.9		
14-Feb	0.2	0.4	0.6	0.6	0.8	0.9	1.0	1.1	1.1	1.3	1.1	1.3	1.3	1.4	1.3	1.2	1.1	0.8	0.8	0.5	0.8	0.7	0.6	0.7	1.4		
15-Feb	0.4	0.6	0.9	0.9	0.9	0.8	0.7	1.1	1.0	1.1	1.0	1.0	0.9	1.0	0.5	0.2	0.3	1.1	0.5	0.7	1.2	2.5	2.1	1.7	2.5		
16-Feb	1.3	0.9	0.7	1.1	0.5	0.4	0.9	0.9	0.7	0.8	0.6	0.6	1.2	1.1	0.7	0.3	0.5	0.3	0.2	1.0	1.3	1.1	0.6	0.5	1.3		
17-Feb	1.0	0.6	0.7	0.4	0.4	0.2	0.6	0.7	1.9	2.0	1.4	0.9	0.7	0.5	0.9	1.6	1.9	1.5	1.3	1.7	1.6	1.5	1.7	1.5	2.0		
18-Feb	1.2	1.2	1.2	1.3	0.7	0.8	0.6	0.7	0.5	0.7	0.8	0.9	0.7	1.1	1.2	1.2	1.3	1.1	1.3	1.0	1.2	1.5	1.4	1.9	1.9		
19-Feb	2.1	1.8	1.9	2.2	2.4	2.3	2.1	1.9	1.8	2.2	2.4	2.2	2.2	2.4	2.1	1.8	1.7	1.4	1.6	1.6	1.5	1.5	1.3	1.2	2.4		
20-Feb	0.6	0.3	0.7	0.7	0.6	0.8	0.9	1.0	1.5	1.2	0.8	0.8	1.1	1.0	1.2	1.2	1.1	AF	AF	0.9	0.8	0.8	1.9	2.1	2.1		
21-Feb	2.8	1.8	1.2	1.0	1.4	1.5	1.9	2.2	2.0	2.5	1.6	1.7	1.5	1.7	1.6	1.6	1.4	1.4	1.4	1.2	1.1	0.8	0.6	0.4	2.8		
22-Feb	0.3	0.7	0.9	0.7	0.5	0.3	0.3	0.3	0.2	0.5	0.9	1.0	1.2	1.7	1.9	1.6	1.6	1.5	1.3	1.2	1.4	1.0	0.7	0.6	1.9		
23-Feb	0.4	0.4	0.2	0.3	0.2	0.2	0.3	0.3	0.5	1.0	1.3	1.3	1.5	1.6	1.3	1.2	0.8	0.7	0.8	0.4	0.6	0.4	0.8	1.3	1.6		
24-Feb	1.6	1.9	1.8	1.6	1.1	1.6	1.7	1.3	1.1	1.6	1.7	2.1	2.0	1.8	1.4	1.3	1.4	0.5	0.4	0.6	0.6	0.4	0.7	0.7	2.1		
25-Feb	0.8	0.6	0.6	0.5	0.7	0.8	0.9	1.1	0.8	0.7	1.0	0.8	1.1	1.8	1.7	1.5	2.1	1.2	0.8	0.7	2.0	3.8	3.7	3.6	3.8		
26-Feb	3.2	2.6	2.9	2.8	2.6	2.1	1.5	2.0	1.0	2.0	2.1	2.0	1.5	1.8	1.8	1.2	1.1	0.5	0.8	0.9	0.7	1.0	1.3	1.6	3.2		
27-Feb	1.4	1.0	0.7	0.6	0.7	0.8	1.1	0.6	0.5	0.9	1.3	0.9	1.4	1.5	1.5	1.1	1.3	0.6	0.4	0.4	0.7	0.9	1.1	0.9	1.5		
28-Feb	0.7	0.5	0.4	1.9	2.3	2.0	2.2	2.4	2.3	2.1	1.9	2.2	2.2	2.1	2.2	2.0	1.9	1.4	1.3	1.2	1.2	1.2	0.9	0.7	2.4		
	3.2	2.7	3.1	3.4	2.7	2.5	2.3	2.5	2.7	2.8	2.9	3.1	4.0	3.5	3.2	2.8	2.6	2.5	2.4	2.1	3.2	3.8	3.7	3.6			
	Diurnal Maximum																										
AF - Analyzer Failure																											



Maximum Value: 1.6 km/h on Feb 14 08:00		Maximum Daily Average: 0.7 km/h on Feb 14		Hours in Service: 672																						
Minimum Value: -0.9 km/h on Feb 26 02:00		Minimum Daily Average: 0.0 km/h on Feb 22		Hours of Data: 671																						
Maximum Diurnal Average: 0.3 km/h at hour 16		Minimum Diurnal Average: 0.0 km/h at hour 2		Hours of Missing Data: 1																						
Monthly Average: 0.15 km/h		Percentiles: P ₁ = -0.6 P ₁₀ = -0.2 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.5 P ₉₉ = 1.3		Hours of Calibration: 0																						
				Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-0.5	-0.5	-0.1	0.3	0.0	0.1	0.0	0.0	-0.1	-0.1	0.3	0.5	0.4	0.3	0.3	0.5	0.1	0.7	0.2	0.1	0.1	0.0	0.0	-0.1	0.1	0.7
2-Feb	-0.2	-0.1	0.0	0.0	0.2	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.0	0.0	0.0	-0.1	0.0	0.3	0.2	0.2	-0.3	-0.4	-0.3	-0.2	0.0	0.3
3-Feb	-0.5	-0.3	0.1	0.1	-0.1	0.1	0.2	0.1	0.2	0.2	0.0	0.1	-0.2	0.4	0.1	0.3	0.3	0.1	0.0	-0.2	-0.2	-0.5	-0.5	0.2	0.0	0.4
4-Feb	0.4	-0.1	0.1	-0.2	-0.3	-0.1	-0.1	0.0	0.0	0.3	0.2	0.0	0.3	0.3	0.0	0.0	0.4	0.5	0.4	0.7	0.6	0.4	-0.1	0.0	0.2	0.7
5-Feb	-0.3	-0.4	-0.3	-0.1	0.2	0.2	0.0	0.1	0.1	-0.1	-0.1	-0.1	0.6	0.2	0.1	0.2	0.2	0.0	0.3	0.4	0.2	0.1	0.1	0.1	0.1	0.6
6-Feb	0.2	0.2	0.5	1.2	0.9	1.0	0.9	1.0	1.1	1.2	0.2	0.3	0.5	0.2	0.1	0.4	0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.1	0.1	0.4	1.2
7-Feb	0.1	0.2	0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	-0.1	0.1	0.1	0.4	0.2	0.0	0.3	0.3	0.2	0.2	0.0	-0.7	-0.4	0.0	0.4
8-Feb	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	0.1	0.3	0.5	0.1	0.3	0.1	0.1	-0.2	-0.2	-0.1	-0.3	-0.4	-0.5	-0.1	-0.4	0.0	0.5
9-Feb	-0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.6	0.5	0.3	0.0	-0.1	-0.1	0.0	0.1	-0.1	-0.3	0.0	0.0	-0.1	0.0	-0.1	0.1	0.1	0.6
10-Feb	0.0	0.2	0.2	0.1	0.3	0.0	0.1	0.1	0.1	0.1	-0.1	0.5	0.0	0.3	0.2	0.3	0.0	-0.5	-0.3	0.0	0.3	0.6	0.5	0.6	0.2	0.6
11-Feb	0.2	0.2	0.0	0.1	0.0	0.1	0.1	-0.1	0.0	-0.1	0.2	0.1	0.0	0.2	0.3	0.1	0.3	-0.1	-0.1	0.0	0.2	0.1	0.5	-0.3	0.1	0.5
12-Feb	0.0	0.1	0.1	-0.2	0.0	-0.1	-0.2	-0.1	0.0	0.2	0.1	0.1	0.2	-0.1	-0.1	-0.1	0.0	-0.3	0.0	-0.1	0.2	0.1	0.2	0.0	0.0	0.2
13-Feb	0.2	0.3	0.4	0.1	0.4	0.5	0.4	0.3	0.3	0.3	0.1	0.4	0.3	0.3	0.2	0.0	0.0	0.2	0.0	-0.1	0.2	0.2	0.1	0.1	0.2	0.5
14-Feb	0.2	0.1	0.8	0.8	0.7	0.6	1.4	1.6	1.3	1.0	0.8	0.8	0.9	0.7	1.0	1.3	1.1	0.5	0.4	0.5	0.1	0.1	0.0	0.1	0.7	1.6
15-Feb	-0.1	-0.2	0.6	0.6	1.2	1.0	1.4	1.1	1.2	1.2	1.0	0.6	0.1	0.7	0.4	0.3	0.1	-0.1	-0.1	0.0	-0.1	0.0	0.1	-0.3	0.4	1.4
16-Feb	-0.3	-0.1	-0.2	-0.2	0.0	0.1	0.3	0.8	0.4	0.6	-0.1	0.2	0.3	0.4	0.3	0.1	0.0	-0.1	0.0	-0.1	-0.3	-0.4	0.0	-0.1	0.1	0.8
17-Feb	-0.1	-0.1	0.0	0.0	0.1	0.0	0.0	-0.1	0.4	-0.3	-0.3	-0.1	0.1	0.2	-0.1	0.2	0.1	0.0	-0.3	-0.2	-0.2	-0.1	0.4	0.5	0.0	0.5
18-Feb	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	-0.1	0.0	0.1	0.1	0.5	0.0	0.0	-0.2	0.0	0.1	0.2	0.2	0.1	-0.1	0.7	0.2	0.5	0.1	0.7
19-Feb	0.3	-0.2	0.1	0.2	0.3	0.5	-0.2	0.5	0.5	0.1	0.1	-0.4	0.0	0.4	0.6	0.9	0.6	0.7	0.4	0.7	1.4	1.1	1.5	1.3	0.5	1.5
20-Feb	0.2	0.1	-0.1	0.1	0.5	0.1	0.3	0.1	0.5	-0.4	-0.2	-0.1	0.1	0.0	0.3	0.6	0.2	-0.1	AF	-0.1	-0.1	0.2	0.1	-0.2	0.1	0.6
21-Feb	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.4	0.8	0.5	0.2	0.3	0.2	0.2	0.4	0.1	0.3	0.1	0.3	0.3	0.3	0.1	0.1	0.2	0.8
22-Feb	0.1	0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	-0.2	-0.1	0.6	0.3	-0.7	-0.1	-0.5	-0.5	-0.2	0.0	0.1	0.3	0.0	0.6
23-Feb	0.2	0.3	0.1	0.2	0.2	0.3	0.2	0.3	0.1	0.3	0.0	0.5	-0.3	0.7	0.5	0.3	0.8	0.2	0.6	0.1	0.0	0.3	-0.2	-0.2	0.2	0.8
24-Feb	-0.5	0.0	-0.2	0.2	-0.1	0.0	-0.2	-0.1	-0.1	-0.1	-0.2	-0.1	-0.3	0.2	0.2	0.6	0.2	0.2	0.2	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.6
25-Feb	0.0	0.1	0.4	0.4	0.5	0.7	0.6	0.5	0.3	0.3	0.4	0.1	0.4	0.2	0.4	0.2	0.2	-0.2	0.4	0.3	0.0	-0.7	-0.5	0.3	0.2	0.7
26-Feb	-0.8	-0.9	-0.4	-0.1	-0.2	-0.5	-0.4	-0.4	0.2	0.4	-0.3	0.2	-0.2	0.5	0.2	0.2	0.4	0.0	0.1	0.2	0.1	0.5	0.8	1.4	0.0	1.4
27-Feb	0.9	0.4	0.2	0.1	0.2	0.4	0.3	0.0	0.1	-0.3	0.5	-0.3	0.0	0.5	0.2	0.0	0.6	-0.2	0.3	0.3	0.4	0.4	0.6	0.2	0.2	0.9
28-Feb	0.3	0.3	0.1	-0.1	-0.7	-0.5	-0.6	-0.3	-0.2	-0.3	-0.5	0.0	0.3	0.5	0.5	0.2	0.5	0.0	0.1	0.0	0.1	0.1	-0.1	0.0	0.0	0.5
																								Diurnal Average		
																								Diurnal Maximum		
																								0.9 1.4		
																								0.0 0.5		

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on Feb 12 13:00		Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																								
Minimum Value: 0.1 km/h on Feb 7 01:00																										
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.6 P ₉₀ = 2.3 P ₉₉ = 3.5																										
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1.9	1.4	2.1	2.3	2.3	1.7	1.2	1.0	0.6	0.8	0.8	1.1	1.0	0.8	0.9	1.0	1.0	0.4	0.3	0.3	0.3	0.3	0.3	0.4	2.3	
2-Feb	0.3	0.3	0.4	0.7	0.6	0.3	0.4	0.7	0.9	0.6	0.7	0.5	1.1	0.7	1.1	0.8	0.4	0.6	0.5	0.9	1.8	1.8	1.5	1.9	1.9	
3-Feb	1.6	1.4	1.0	0.9	0.8	0.7	0.7	0.6	0.4	0.3	0.4	0.5	0.9	1.1	0.8	0.7	0.9	1.0	2.0	1.6	1.9	2.1	1.5	1.3	2.1	
4-Feb	1.2	0.9	0.9	1.2	1.1	0.9	1.0	0.2	0.4	0.4	0.5	0.6	1.2	1.4	1.3	1.0	0.6	0.7	0.5	0.4	0.6	0.4	0.4	1.1	1.4	
5-Feb	2.0	1.4	1.8	1.6	1.2	1.0	1.3	0.7	0.9	0.9	1.0	0.9	1.3	1.6	1.2	0.9	0.8	0.9	0.2	0.4	0.5	0.6	0.5	0.3	2.0	
6-Feb	0.2	0.2	0.3	0.5	0.6	0.7	0.8	0.3	0.6	0.6	0.5	0.5	0.6	0.7	0.4	0.4	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.8	
7-Feb	0.1	0.2	0.2	0.2	0.4	0.5	0.5	0.7	0.6	0.8	0.6	0.7	1.7	1.6	1.7	1.8	1.4	1.6	1.1	1.2	1.2	1.0	0.8	0.8	1.8	
8-Feb	0.3	0.3	0.4	0.4	0.5	0.9	0.8	1.7	1.1	1.0	2.1	2.6	2.5	2.3	2.2	2.1	2.0	2.0	1.6	2.1	2.8	2.6	2.3	1.8	2.8	
9-Feb	1.9	1.5	0.6	0.7	0.5	0.7	0.5	0.4	0.5	0.9	1.1	1.1	0.9	0.8	0.7	0.5	0.6	0.8	0.7	0.5	0.5	0.5	1.0	0.4	1.9	
10-Feb	0.2	0.3	0.6	0.9	0.9	0.8	0.4	0.7	1.3	1.4	1.0	1.2	1.1	0.9	0.7	0.6	1.6	2.0	1.9	1.9	1.6	0.9	1.1	0.7	2.0	
11-Feb	0.6	0.4	0.3	0.5	0.5	0.6	1.5	1.7	1.6	1.9	1.6	1.3	1.4	1.6	2.0	2.6	2.5	1.7	1.7	1.9	2.4	2.6	2.1	2.0	2.6	
12-Feb	2.2	2.9	3.5	3.3	2.8	2.4	2.1	2.6	2.7	2.9	2.9	3.2	4.0	3.4	3.1	2.8	1.5	2.5	1.7	2.3	3.1	3.7	3.2	3.3	4.0	
13-Feb	3.0	2.5	2.7	1.9	3.0	2.6	2.6	2.5	1.9	1.7	1.3	1.5	1.3	0.6	0.5	0.5	0.3	0.3	0.4	0.5	0.3	0.2	0.3	0.2	3.0	
14-Feb	0.3	0.3	0.6	0.5	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.8	1.0	0.8	0.9	0.7	1.0	1.1	0.8	1.1	1.0	1.0	1.0	1.1	
15-Feb	0.7	0.7	0.8	0.8	0.7	0.5	0.6	0.6	0.6	0.7	0.6	0.6	0.8	0.9	0.8	0.4	0.3	0.4	1.2	0.5	0.8	1.4	2.6	2.5	1.8	2.6
16-Feb	1.4	0.8	0.7	1.1	0.8	0.6	1.1	0.6	0.8	1.6	1.3	1.3	1.5	1.0	0.6	0.3	0.5	0.3	0.2	0.9	1.1	1.1	0.7	0.6	1.6	
17-Feb	1.3	0.6	0.9	0.5	0.6	0.3	0.7	0.9	1.9	1.4	1.3	0.9	0.8	0.4	0.8	1.4	1.6	1.4	1.1	1.4	1.6	1.4	1.6	1.6	1.9	
18-Feb	1.1	1.0	1.1	1.3	0.7	0.8	0.5	0.6	0.5	0.7	0.7	0.8	0.8	1.1	1.1	1.1	1.2	1.1	1.4	1.4	1.7	2.0	1.8	2.9	2.9	
19-Feb	2.9	2.5	3.0	3.2	3.7	3.5	3.4	2.7	1.9	2.8	2.8	3.0	3.3	3.5	3.3	2.5	2.6	2.1	1.9	2.0	2.0	1.9	1.8	1.5	3.7	
20-Feb	0.8	0.2	0.5	0.6	0.6	0.6	0.9	0.9	1.9	1.2	0.6	0.7	1.1	1.1	1.2	1.3	1.1	1.1	AF	0.8	0.7	0.8	1.8	2.0	2.0	
21-Feb	2.4	1.7	1.1	0.9	1.5	1.6	1.7	2.0	2.0	2.4	1.6	1.6	1.5	1.6	1.5	1.7	1.4	1.3	1.2	1.2	1.0	0.8	0.5	0.3	2.4	
22-Feb	0.3	0.6	0.6	0.7	0.5	0.2	0.3	0.2	0.2	0.4	1.0	1.1	1.3	1.7	1.9	1.6	1.3	1.5	1.2	1.0	1.4	0.9	0.8	0.8	1.9	
23-Feb	0.5	0.4	0.3	0.2	0.3	0.2	0.2	0.3	0.6	0.8	1.3	1.5	1.6	1.8	1.6	1.3	0.8	0.7	0.9	0.6	0.6	0.6	0.7	1.1	1.8	
24-Feb	1.4	1.7	1.7	1.5	1.0	1.4	1.6	1.0	0.8	1.5	1.7	2.3	2.2	2.0	1.6	1.6	1.4	0.5	0.3	0.7	0.5	0.5	0.9	0.8	2.3	
25-Feb	1.0	0.7	0.6	0.3	0.6	0.6	0.6	1.1	0.7	0.6	0.6	0.7	1.3	2.0	1.8	1.6	2.1	1.2	1.0	0.8	1.8	3.4	3.5	3.5	3.5	
26-Feb	2.8	2.1	2.6	2.5	2.3	1.9	1.0	1.7	1.2	2.1	2.2	2.2	1.5	1.9	2.0	1.4	1.3	0.6	0.7	0.8	0.6	1.3	1.9	2.1	2.8	
27-Feb	2.0	1.7	1.0	0.6	0.7	0.7	1.0	0.7	0.3	0.7	1.3	0.8	1.3	1.4	1.4	1.3	1.4	0.7	0.2	0.3	0.4	0.6	1.0	0.7	2.0	
28-Feb	0.4	0.5	0.5	1.6	2.1	1.9	2.1	2.1	1.8	1.9	1.8	2.4	2.4	2.3	2.4	2.1	1.8	1.0	1.0	0.7	0.8	1.0	0.8	0.7	2.4	
Diurnal Maximum																										
AF - Analyzer Failure																										



Summary of Hour Averages

Mannix - February 2017

Maximum Value: 1.6 km/h on Feb 26 00:00		Maximum Daily Average: 0.5 km/h on Feb 19		Hours in Service: 672																							
Minimum Value: -1.0 km/h on Feb 8 21:00		Minimum Daily Average: -0.5 km/h on Feb 12		Hours of Data: 672																							
Maximum Diurnal Average: 0.3 km/h at hour 16		Minimum Diurnal Average: 0.1 km/h at hour 1		Hours of Missing Data: 0																							
Monthly Average: 0.18 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.3 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.6 P ₉₉ = 1.2		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-Feb	0.1	0.1	0.5	1.2	1.1	1.0	0.8	0.5	0.2	-0.1	0.3	0.4	0.3	0.2	0.2	0.5	0.3	0.2	0.0	0.0	0.0	-0.1	-0.2	-0.2	0.3	1.2	
2-Feb	-0.3	-0.2	-0.1	-0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.2	0.3	0.0	0.1	0.0	0.0	-0.1	0.3	0.2	0.7	0.5	0.4	0.4	0.7	0.1	0.7	
3-Feb	0.3	0.4	0.6	0.5	0.2	0.5	0.7	0.2	0.3	0.1	-0.1	0.2	-0.3	0.3	0.0	0.1	0.2	0.3	0.3	0.5	0.8	0.4	0.1	0.9	0.3	0.9	
4-Feb	1.0	0.3	0.7	0.3	0.1	0.4	0.0	0.2	0.1	0.2	0.0	-0.1	0.2	0.3	-0.1	0.2	0.4	0.1	0.2	0.1	0.3	0.4	0.7	0.2	1.0		
5-Feb	0.7	0.6	0.3	0.7	1.2	0.8	0.6	0.4	0.3	0.2	0.0	-0.1	0.7	0.3	0.2	0.2	0.2	0.0	0.2	0.0	0.1	0.1	0.1	0.3	1.2		
6-Feb	0.1	0.1	0.2	0.6	0.3	0.3	0.4	0.5	0.5	0.6	0.1	0.1	0.4	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.0	0.2	0.2	0.6	
7-Feb	0.1	0.1	0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.1	-0.3	-0.1	-0.1	0.2	0.1	-0.2	0.1	0.2	0.4	0.4	0.3	-0.1	-0.1	0.0	0.4	
8-Feb	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.3	0.2	0.2	0.3	-0.1	0.1	-0.2	-0.2	-0.7	-0.6	-0.5	-0.7	-1.0	-0.9	-0.5	-0.6	-0.3	0.3	
9-Feb	-0.4	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.4	0.6	0.6	0.2	-0.2	-0.2	-0.1	0.2	0.3	0.2	0.5	0.5	0.2	0.2	0.1	0.2	0.2	0.6	
10-Feb	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1	-0.2	0.2	0.1	0.5	-0.1	0.3	0.2	0.3	0.0	-0.7	-0.3	0.4	0.6	0.3	0.4	0.1	0.1	0.6	
11-Feb	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2	0.1	0.0	0.0	-0.1	0.0	-0.2	0.0	-0.4	-0.4	-0.4	-0.2	-0.1	0.2	-0.8	-0.2	0.2	
12-Feb	-0.4	-0.3	-0.7	-0.9	-0.6	-0.7	-0.7	-0.6	-0.5	-0.4	-0.4	-0.4	-0.3	-0.5	-0.7	-0.5	-0.3	-0.7	-0.3	-0.4	0.0	-0.2	-0.3	-0.3	-0.5	0.0	
13-Feb	-0.2	0.0	0.1	-0.1	0.3	0.1	0.1	0.1	0.1	0.2	0.1	0.6	0.5	0.5	0.2	0.0	0.0	0.2	0.3	0.3	0.4	0.1	0.1	0.1	0.2	0.6	
14-Feb	0.1	0.2	0.3	0.1	0.4	0.8	0.5	0.7	0.4	0.5	0.1	0.4	0.2	0.6	0.4	0.6	0.6	0.0	-0.1	0.0	-0.3	-0.4	-0.4	-0.4	0.2	0.8	
15-Feb	-0.5	-0.5	0.1	0.1	1.1	0.5	0.3	0.0	0.5	0.5	0.3	0.9	0.3	0.6	0.2	0.1	0.0	-0.3	-0.3	-0.4	-0.5	-0.4	-0.4	-0.8	0.1	1.1	
16-Feb	-0.7	-0.8	-0.6	-0.6	-0.3	0.0	0.2	0.0	0.3	0.6	0.3	0.2	0.2	0.1	0.2	0.1	0.3	0.3	0.1	0.5	0.6	0.1	0.3	0.3	0.1	0.6	
17-Feb	0.2	0.2	0.2	0.1	0.3	0.2	0.1	0.3	1.1	0.5	0.2	0.1	0.2	0.4	0.2	0.9	0.8	0.5	0.2	0.5	0.2	0.3	0.9	0.8	0.4	1.1	
18-Feb	0.3	0.3	0.5	0.5	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.5	0.2	0.1	0.0	0.3	0.4	0.4	0.5	0.4	0.2	0.7	0.6	0.6	0.3	0.7	
19-Feb	0.2	0.2	0.1	-0.1	0.1	0.5	0.2	0.7	0.8	0.3	0.5	-0.2	0.2	0.1	0.3	0.8	0.4	0.7	0.4	0.7	1.4	1.1	1.5	1.5	0.5	1.5	
20-Feb	0.3	0.3	0.3	0.4	0.5	0.3	0.2	0.2	0.3	-0.2	0.0	0.0	0.2	0.0	0.4	0.6	0.1	0.5	0.0	0.1	0.0	0.2	-0.1	-0.4	0.2	0.6	
21-Feb	-0.3	-0.1	-0.2	-0.2	-0.1	0.1	0.4	0.4	0.5	1.0	0.5	0.0	0.2	0.0	0.1	0.3	-0.1	0.1	0.0	0.3	0.2	0.3	0.0	0.0	0.1	1.0	
22-Feb	0.2	0.2	0.4	0.5	0.2	0.1	0.1	0.0	0.1	0.1	0.2	0.2	-0.1	0.2	0.9	0.7	-0.3	0.3	0.1	0.0	0.4	0.4	0.3	0.3	0.2	0.9	
23-Feb	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	-0.1	0.4	-0.3	1.0	0.6	0.3	0.8	0.1	0.6	0.2	0.0	0.3	0.2	0.5	0.2	1.0	
24-Feb	0.2	1.0	0.5	0.8	0.5	0.7	0.3	0.5	0.4	0.3	0.1	0.2	-0.1	0.4	0.4	0.5	0.1	0.0	-0.1	-0.3	-0.2	-0.2	-0.3	-0.3	0.2	1.0	
25-Feb	-0.2	-0.2	-0.2	-0.2	-0.1	0.1	0.1	-0.1	0.0	-0.1	0.0	0.0	0.4	0.5	0.6	0.4	1.0	0.0	0.3	0.4	0.6	0.6	1.0	1.6	0.3	1.6	
26-Feb	0.2	-0.1	0.0	0.2	0.1	-0.2	-0.1	-0.1	0.4	0.7	-0.1	0.4	-0.3	0.5	0.2	0.1	0.5	0.1	0.4	0.3	0.2	0.7	0.7	1.2	0.3	1.2	
27-Feb	0.5	0.3	0.3	0.3	0.4	0.6	0.5	0.2	0.3	0.1	0.6	-0.2	-0.1	0.5	0.2	0.0	0.5	-0.3	0.0	0.1	0.5	0.4	0.6	0.7	0.3	0.7	
28-Feb	0.3	0.1	0.3	0.4	0.2	0.5	0.5	0.7	0.8	0.3	0.1	0.4	0.7	0.9	0.9	0.7	1.0	0.5	0.6	0.6	0.6	0.5	0.1	0.2	0.5	1.0	
		0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.3	0.2	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
		1.0	1.0	0.7	1.2	1.2	1.0	0.8	0.7	1.1	1.0	0.6	0.9	0.7	1.0	0.9	0.9	1.0	0.7	0.6	0.7	1.4	1.1	1.5	1.6	Diurnal Maximum	



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on Feb 12 13:00 Minimum Value: 0.1 km/h on Feb 7 03:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.6 P ₉₀ = 2.3 P ₉₉ = 3.4																								Hours in Service: 672 Hours of Data: 672 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-Feb	1.7	1.2	2.1	2.3	2.3	1.9	1.3	1.0	0.7	0.8	0.7	1.0	1.1	0.9	0.9	0.9	0.8	0.4	0.3	0.3	0.3	0.4	0.3	0.4	2.3	
2-Feb	0.2	0.3	0.4	0.6	0.5	0.4	0.5	0.7	0.9	0.6	0.6	0.5	1.1	0.7	1.0	0.9	0.3	0.5	0.5	0.9	1.7	1.8	1.6	2.0	2.0	
3-Feb	1.6	1.1	1.1	1.0	0.7	0.8	0.8	0.6	0.4	0.4	0.4	0.5	0.9	1.1	0.7	1.0	1.0	1.9	1.6	1.8	2.0	1.6	1.3	2.0		
4-Feb	1.2	0.9	0.8	1.2	1.1	0.9	1.1	0.2	0.3	0.3	0.5	0.7	1.2	1.5	1.4	0.9	0.5	0.6	0.4	0.3	0.4	0.4	0.5	1.1	1.5	
5-Feb	2.0	1.3	1.8	1.5	1.0	1.0	1.5	0.8	1.0	1.0	1.0	0.9	1.3	1.6	1.3	0.9	0.8	0.8	0.2	0.4	0.5	0.6	0.5	0.3	2.0	
6-Feb	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.3	0.5	0.5	0.5	0.4	0.5	0.5	0.4	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.6	
7-Feb	0.2	0.2	0.1	0.2	0.4	0.6	0.6	0.7	0.7	0.8	0.8	0.8	1.8	1.7	1.8	1.9	1.5	1.6	1.2	1.1	1.3	0.9	0.6	0.7	1.9	
8-Feb	0.3	0.3	0.4	0.4	0.6	1.0	0.9	1.9	1.2	1.1	2.3	2.7	2.7	2.5	2.2	2.3	2.1	2.3	1.7	2.4	3.1	2.7	2.2	1.8	3.1	
9-Feb	2.0	1.5	0.8	0.7	0.5	0.7	0.6	0.4	0.4	0.6	0.9	1.0	0.9	0.8	0.7	0.5	0.7	0.7	0.7	0.5	0.5	0.4	0.7	0.3	2.0	
10-Feb	0.2	0.2	0.3	0.8	0.6	0.6	0.3	0.7	1.1	0.9	0.9	1.2	1.0	1.0	0.6	0.7	1.3	1.5	1.6	1.8	1.6	0.9	1.1	0.7	1.8	
11-Feb	0.6	0.4	0.4	0.5	0.6	0.7	1.5	1.7	1.6	1.9	1.8	1.4	1.4	1.6	1.9	2.6	2.3	1.8	1.7	2.0	2.5	2.7	2.4	2.2	2.7	
12-Feb	2.5	3.2	3.7	3.5	3.1	2.6	2.2	2.7	2.9	3.2	3.1	3.3	4.0	3.5	3.2	3.0	1.6	2.7	1.9	2.5	3.3	3.9	3.2	3.5	4.0	
13-Feb	3.0	2.5	2.7	2.0	3.1	2.7	2.7	2.5	1.9	1.8	1.1	1.5	1.4	0.6	0.5	0.5	0.3	0.2	0.5	0.4	0.3	0.3	0.3	0.1	3.1	
14-Feb	0.3	0.3	0.5	0.5	0.7	0.6	0.6	0.7	0.6	0.7	0.6	0.8	0.8	0.8	0.6	0.8	0.8	1.1	1.2	0.9	1.2	1.1	1.1	1.2	1.2	
15-Feb	0.8	0.8	1.0	0.9	0.9	0.6	0.6	0.5	0.7	0.7	0.7	0.6	0.7	0.6	0.8	0.4	0.2	0.4	1.3	0.6	0.8	1.4	3.0	2.9	2.0	3.0
16-Feb	1.5	0.9	0.8	1.1	0.9	0.7	0.7	0.5	0.6	0.9	0.8	1.0	1.5	1.1	0.5	0.3	0.5	0.4	0.3	0.9	1.1	1.1	0.8	0.7	1.5	
17-Feb	1.3	0.6	1.0	0.5	0.7	0.3	0.7	1.0	1.8	1.2	1.2	0.8	0.8	0.5	0.7	1.4	1.5	1.3	1.0	1.4	1.6	1.3	1.6	1.5	1.8	
18-Feb	1.1	1.0	1.0	1.2	0.7	0.8	0.5	0.7	0.4	0.6	0.6	0.7	0.8	1.0	1.0	1.1	1.2	1.0	1.3	1.0	1.3	1.7	1.8	2.2	2.2	
19-Feb	2.5	1.9	2.3	2.5	2.6	2.2	2.1	2.0	1.7	2.7	2.6	2.7	2.8	2.6	2.4	2.2	2.0	1.8	2.0	1.9	1.7	1.9	1.6	1.4	2.8	
20-Feb	0.7	0.2	0.5	0.5	0.6	0.5	0.7	0.9	1.4	1.1	0.6	0.7	1.1	1.1	1.2	1.2	1.1	1.3	0.9	0.8	0.6	0.8	1.8	2.0	2.0	
21-Feb	2.5	1.8	1.2	1.0	1.6	1.5	1.7	2.0	1.9	2.4	1.6	1.6	1.5	1.7	1.6	1.8	1.5	1.4	1.2	1.2	1.0	0.9	0.5	0.3	2.5	
22-Feb	0.3	0.6	0.7	0.7	0.6	0.2	0.3	0.3	0.3	0.3	1.0	1.1	1.4	1.7	1.9	1.6	1.2	1.5	1.1	1.0	1.3	0.9	0.7	0.5	1.9	
23-Feb	0.6	0.4	0.4	0.2	0.3	0.2	0.1	0.2	0.6	0.7	1.2	1.5	1.7	1.8	1.5	1.3	0.8	0.7	0.8	0.5	0.6	0.5	0.7	1.0	1.8	
24-Feb	1.4	1.7	1.7	1.6	1.1	1.5	1.7	0.9	0.7	1.5	1.5	2.4	2.3	2.2	1.7	1.7	1.5	0.5	0.2	0.7	0.6	0.5	0.9	0.8	2.4	
25-Feb	1.2	0.7	0.6	0.3	0.7	0.6	0.5	1.1	0.7	0.5	0.4	0.7	1.3	2.2	1.8	1.7	2.2	1.1	1.1	0.9	1.8	3.6	3.5	3.6	3.6	
26-Feb	2.8	2.0	2.4	2.4	2.1	1.7	0.8	1.5	1.2	2.2	2.2	2.4	1.5	1.9	2.0	1.5	1.3	0.6	0.8	0.8	0.6	1.0	1.8	1.7	2.8	
27-Feb	1.6	1.2	0.7	0.6	0.7	0.7	0.9	0.6	0.3	0.5	1.4	0.8	1.3	1.5	1.4	1.4	1.4	0.7	0.2	0.2	0.5	0.6	0.8	0.7	1.6	
28-Feb	0.4	0.5	0.5	1.7	2.2	2.0	2.2	2.2	1.9	1.8	1.9	2.5	2.5	2.4	2.5	2.1	1.9	1.0	0.8	0.6	0.6	0.9	0.6	0.7	2.5	
3.0 3.2 3.7 3.5 3.1 2.7 2.7 2.7 2.9 3.2 3.1 3.3 4.0 3.5 3.2 3.0 2.3 2.7 2.0 2.5 3.3 3.9 3.5 3.6																										
Diurnal Maximum																										



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 3, 2017	Last Calibration	January 11, 2017
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:17	End Time (MST)	12:04
Gas Cert Reference	EY0000646	Station temp.	22 Deg C
Cal Gas Concentration	49.2 ppm	Cal Gas Exp Date	November 4, 2019
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	824	825
Calculated slope	0.998755	0.992666	Chamber temp	45.1	44.9
Calculated intercept	0.801166	1.219865	Pressure	709.6	699.2
Analyzer Background	7.4	6.8	Flow	0.351	0.469
Analyzer Coefficient	0.972	0.907	Intensity	90	90

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	0.0	----
as found span	5000	61.0	600.2	645.2	0.930
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	61.0	600.2	604.4	0.993
second point	5000	30.5	300.1	299.6	1.002
third point	5000	15.2	149.6	148.9	1.005
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	61.0	600.2	602.3	0.997
Average Correction Factor					1.000

Corrected As found 645.2 Previous response 600.2 % change -7.0%

Notes:

Inlet filter changed out after asfound. Replaced pump after asfound. Adjusted the span.

Calibration Performed By: Jayne Marcoux



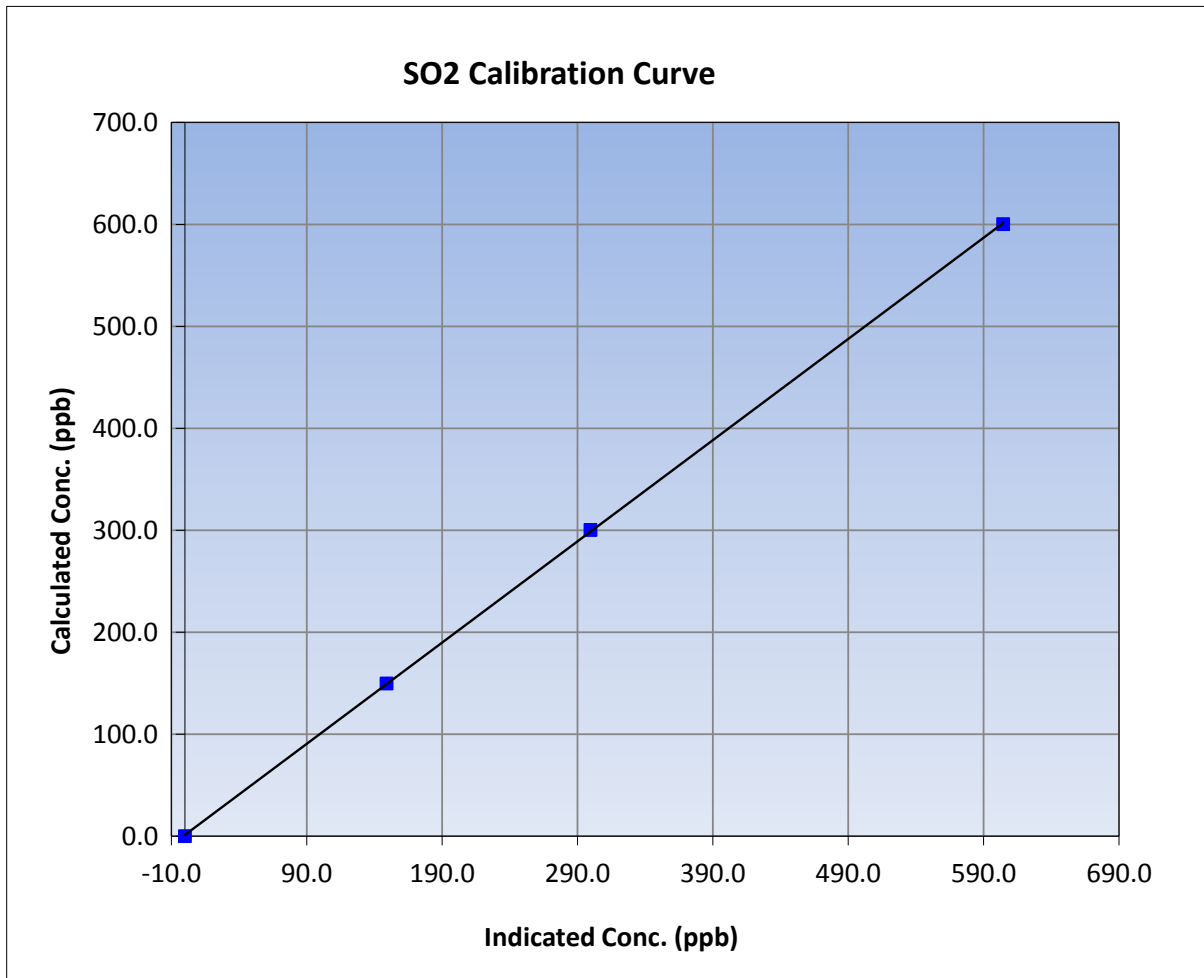
Wood Buffalo Environmental Association SO2 Calibration Report

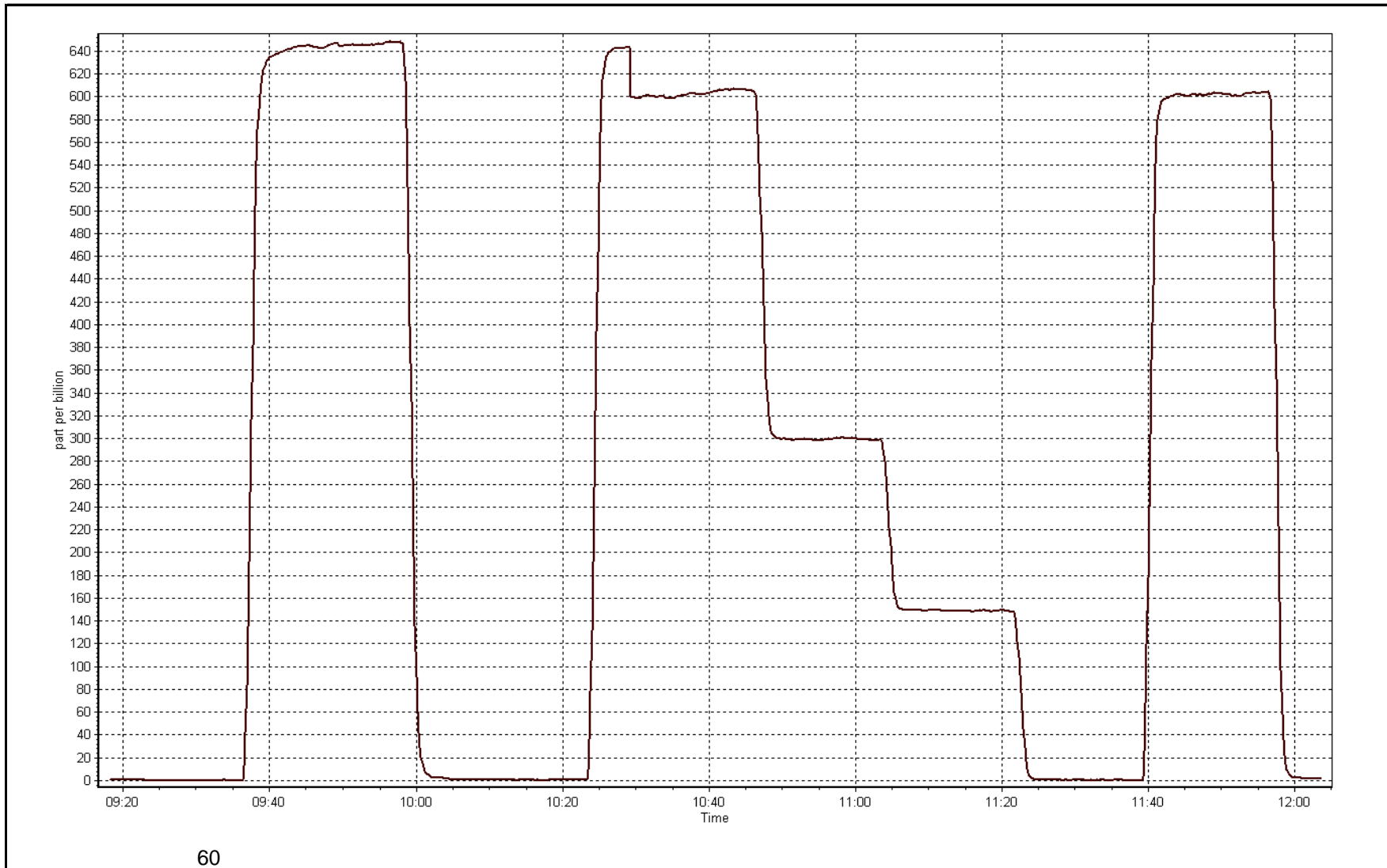
Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 11, 2017
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:17	End Time (MST)	12:04
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	0.999975
600.2	604.4	0.9932		
300.1	299.6	1.0019	Slope	0.992666
149.6	148.9	1.0048		
			Intercept	1.219865







Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 3, 2017	Last Calibration	January 12, 2017
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:55	End Time (MST)	14:44
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	49.2 ppm	SO2 gas cert/exp	EY0000646 04-Nov-19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-643	-644
Analyzer IP address	192.168.1.42		Lamp voltage	796	797
Calculated slope	1.005588	1.007258	Chamber temp	45	45
Calculated intercept	-0.241936	-0.292668	Pressure	524.0	526.8
Analyzer Background	16.2	15.1	Flow	1.037	1.041
Analyzer Coefficient	0.980	0.938	Intensity	96	96
			Converter temp.	328	323

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	0.3	----
as found span	6000	85.2	71.4	73.3	0.975
SO2 scrubber check	5000	15.2	149.6	1.8	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	85.2	71.4	71.2	1.004
second point	6000	45.5	38.1	38.2	0.999
third point	6000	28.4	23.8	24.1	0.990
as left zero	5000	0.0	0.0	0.7	----
as left span	6000	85.2	71.4	70.7	1.010
Average Correction Factor					0.998

Corrected As found	73.0	Previous response	71.3	% change	-2.4%
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Notes:

Scrubber check complete and inlet filter changed after asfinds. Adjusted the span.

Calibration Performed By: Jayme Marcoux



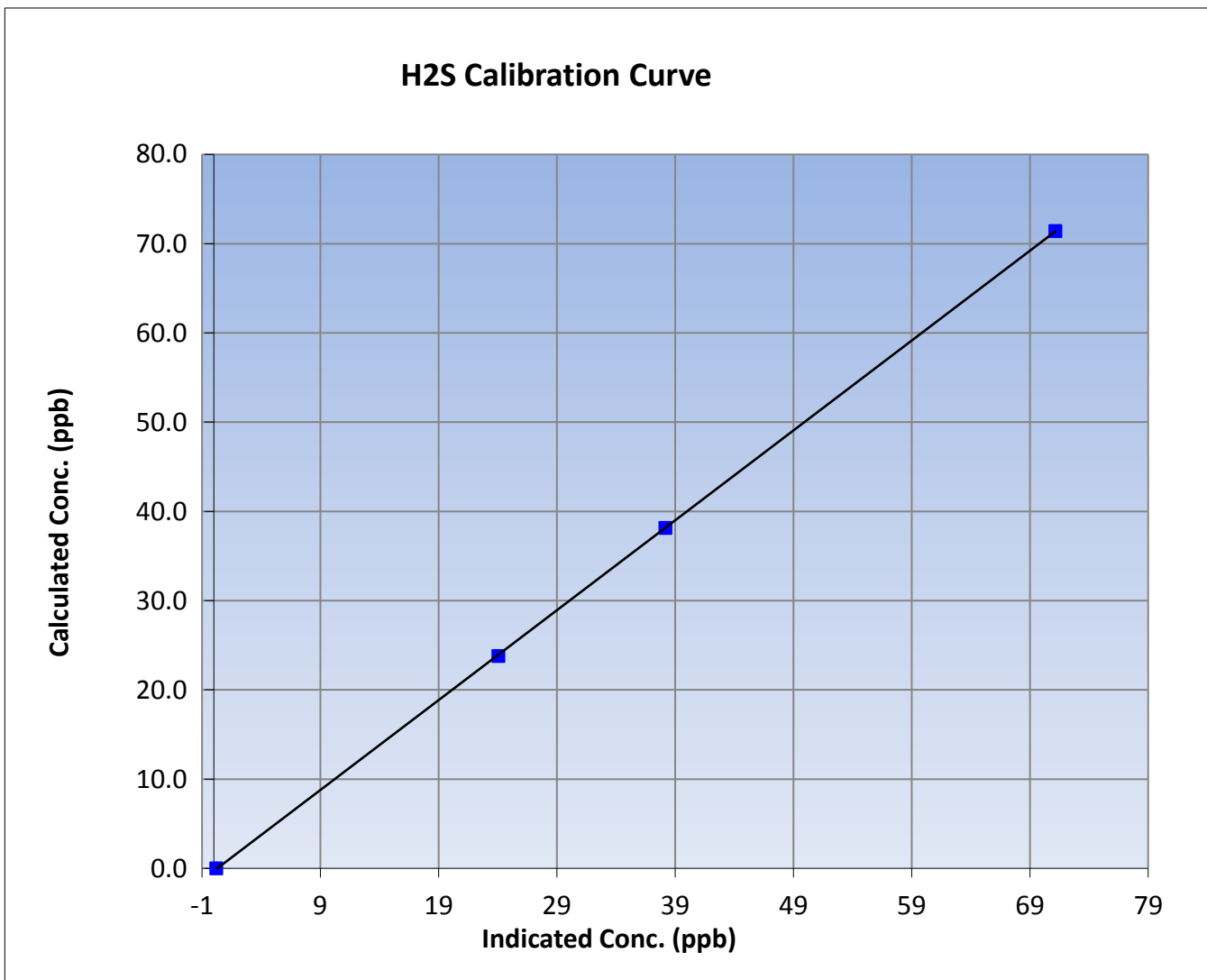
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 12, 2017
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:55	End Time (MST)	14:44
Analyzer make	Thermo 450i	Analyzer serial #	815129108

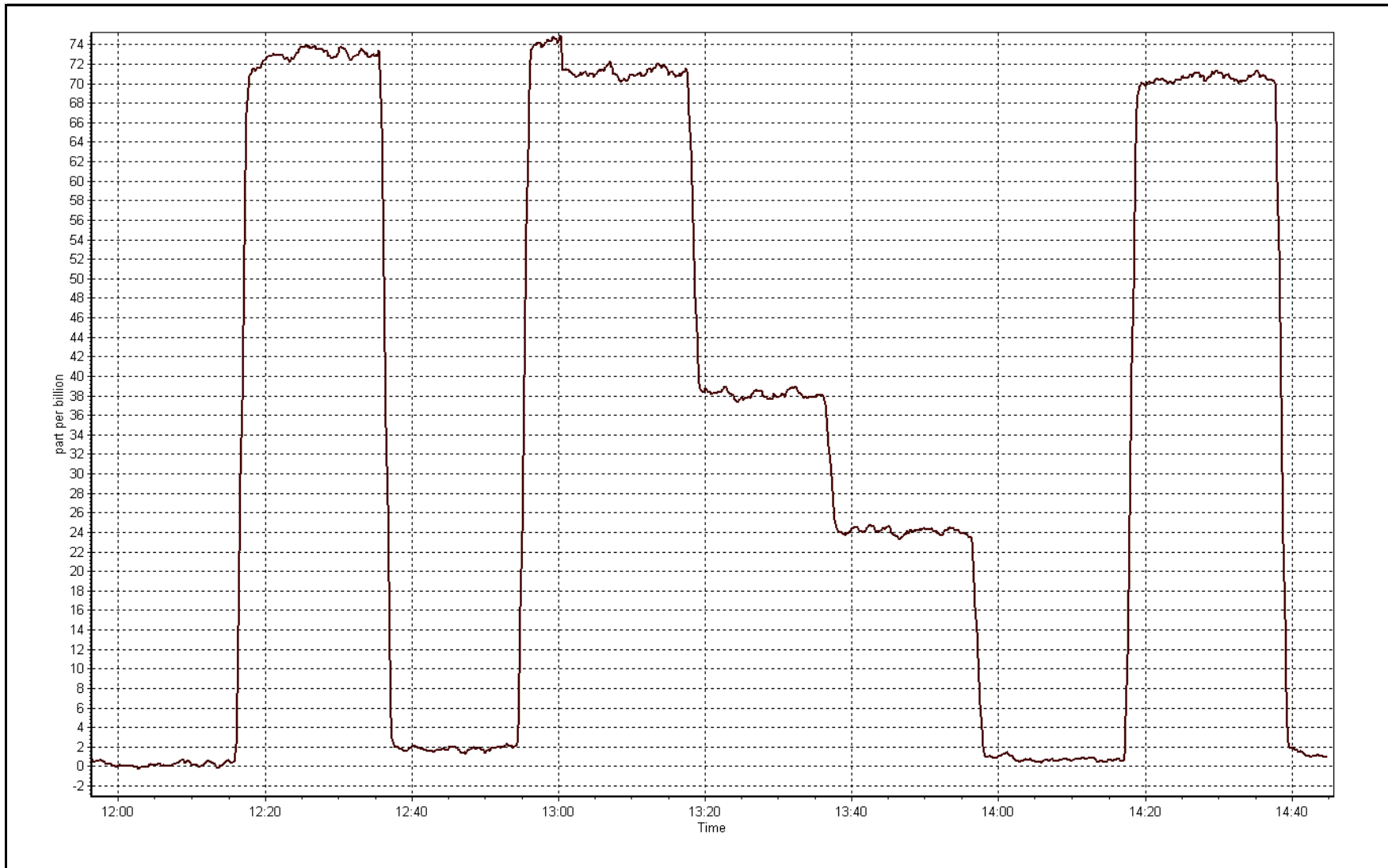
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999990
71.4	71.2	1.0039		
38.1	38.2	0.9991	Slope	1.007258
23.8	24.1	0.9900		
			Intercept	-0.292668



H2S Calibration Plot

Date: February 3, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 3, 2017	Last Calibration	January 11, 2017
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:17	End Time (MST)	12:00
Gas Cert Reference	EY0000646	Cal Gas Expiry Date	Nov-04-2019
CH4 Cal Gas Conc.	514 ppm	CH4 Equiv Conc.	1064.0 ppm
C3H8 Cal Gas Conc.	200 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	1.003494	0.999228	Fuel Pressure	20.2	20.2
Calculated intercept	-0.052157	0.015813	Analyzer Coeff	3.489	3.584
			Analyzer BKG	3.07	3.33

Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295
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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	0.16	----
as found span	5000	61.0	12.98	12.88	1.008
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	61.0	12.98	12.99	0.999
second point	5000	30.5	6.49	6.45	1.006
third point	5000	15.2	3.23	3.22	1.005
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	61.0	12.98	13.00	0.999
Average Correction Factor					1.003

Corrected As found	12.72	Previous response	12.99	% change	2.1%
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Notes:

Replaced inlet filter after asfinds. Replaced Hydrogen cylinder after asfinds. Adjusted the zero and span.

Calibration Performed By:

Jayme Marcoux



Wood Buffalo Environmental Association THC Calibration Report

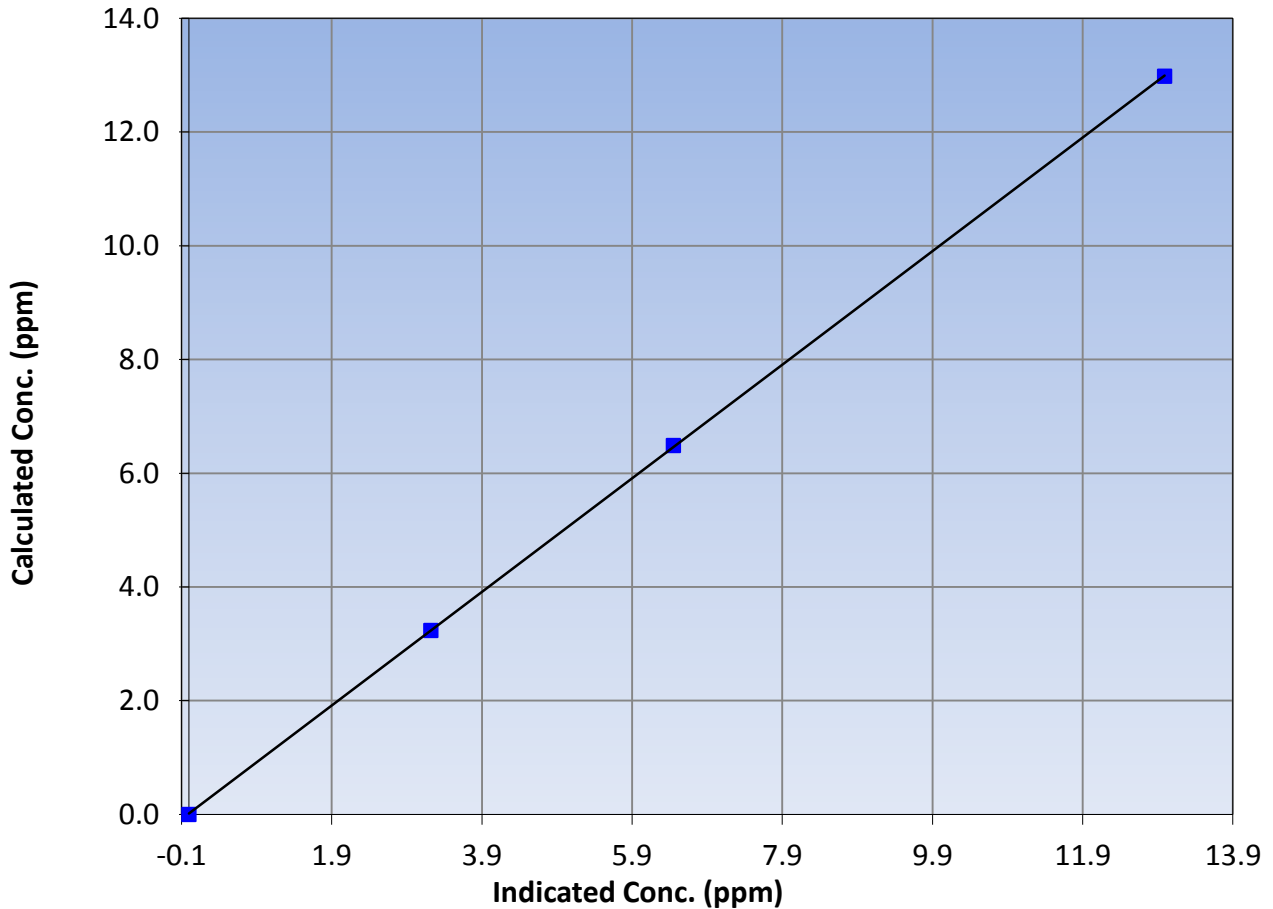
Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 11, 2017
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:17	End Time (MST)	12:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

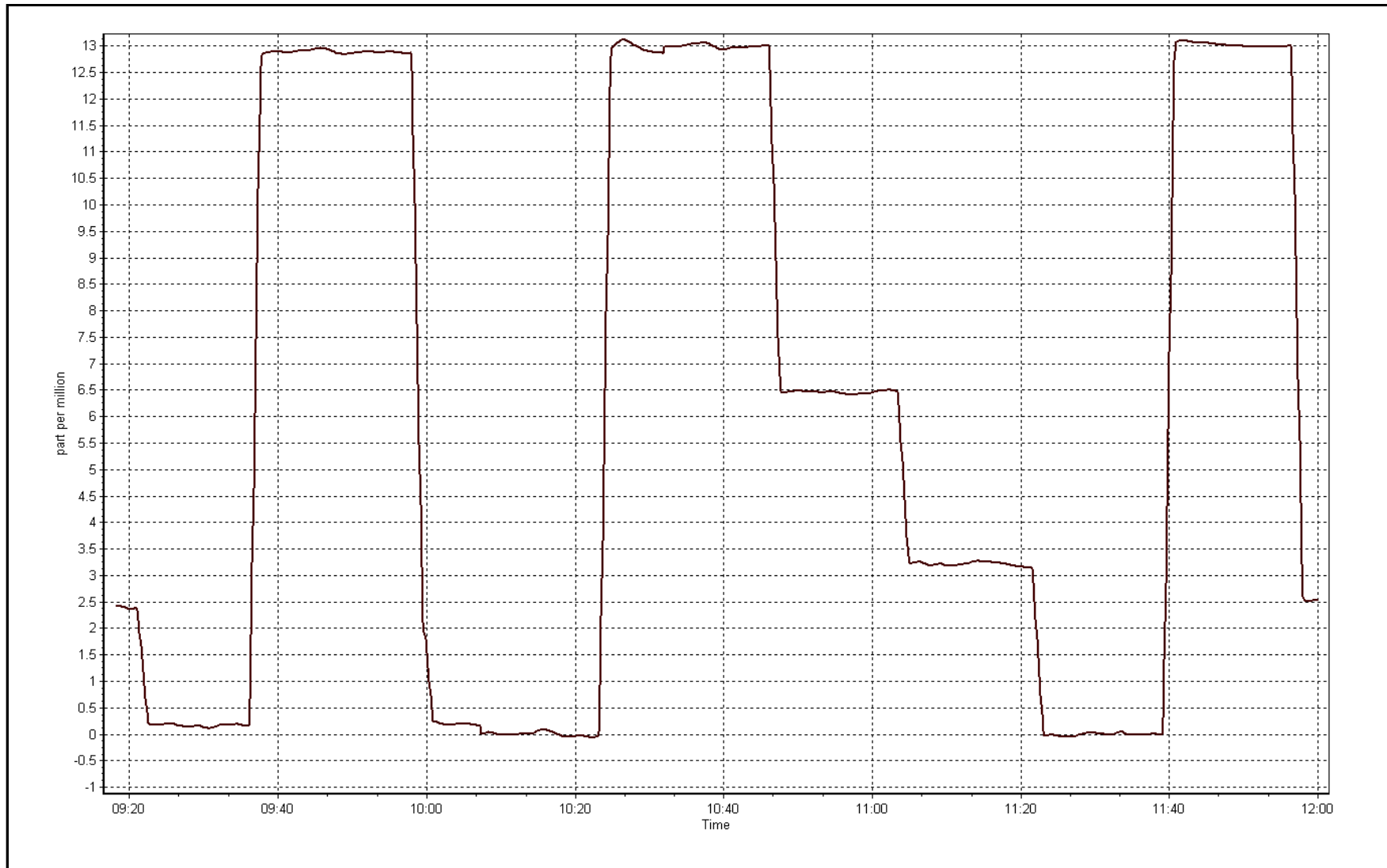
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999985
12.98	12.99	0.9993		
6.49	6.45	1.0063	Slope	0.999228
3.23	3.22	1.0045		
			Intercept	0.015813

THC Calibration Curve



THC Calibration Plot

Date: February 3, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 FEBRUARY 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	640	32	32	100	18	0	4	0
TRS (ppb) Average	640	32	32	100	2	0	1	0
THC (ppm) Average	640	32	32	100	2.8	-	2.2	-
NMHC(ppm) Average	640	32	32	100	0.252	-	0.033	-
CH4(ppm) Average	640	32	32	100	2.7	-	2.2	-
O3 (ppb) Average	640	32	32	100	49	0	48	-
NO2 (ppb) Average	638	34	34	100	41	0	18	-
NO (ppb) Average	638	34	34	100	47	-	8	-
NOX (ppb) Average	638	34	34	100	81	-	25	-
NH3 (ppb) Average	588	41	84	93.6	11	0	1	-
PM2.5 (ug/m3) Average	670	2	2	100	35.1	-	8.3	0
Temperature 2 m (C) Average	672	0	0	100	13.7	-	5.9	-
Relative Humidity (%) Average	672	0	0	100	97	-	86	-
Wind Speed 10 m (km/h) Average	672	0	0	100	30	-	22	-
Wind Direction 10 m (deg) Average	672	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 FEBRUARY 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	640	0.9	2	-	0	0	0	0	1	3	18
TRS (ppb) Average	640	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	640	1.95	0.1	-	1.8	1.9	1.9	1.9	2	2	2.8
NMHC(ppm) Average	640	0.003	0.018	-	0	0	0	0	0	0	0.252
CH4(ppm) Average	640	1.94	0.1	-	1.8	1.9	1.9	1.9	2	2	2.7
O3 (ppb) Average	640	30.3	11	-	3	14	25	32	37	42	49
NO2 (ppb) Average	638	7.9	8	-	0	0	2	6	11	18	41
NO (ppb) Average	638	2.3	5	-	0	0	0	1	2	6	47
NOX (ppb) Average	638	10.2	12	-	0	0	2	7	13	24	81
NH3 (ppb) Average	588	0	1	-	0	0	0	0	0	0	11
PM2.5 (ug/m3) Average	670	3.8	3.7	-	0.2	0.6	1.2	2.7	5.1	8.8	35.1
Temperature 2 m (C) Average	672	-10.3	10.3	-	-32.4	-22.3	-17.8	-11.6	-1.9	4.2	13.7
Relative Humidity (%) Average	672	69.1	13	-	36	48	59	72	79	84	97
Wind Speed 10 m (km/h) Average	672	9.2	5	-	0	3	5	8	12	16	30
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NH3	01 Feb 2017 04:00	28 Feb 2017 07:00	28	Stabilization after daily span
NH3	27 Feb 2017 07:00	27 Feb 2017 20:00	14	Maintenance - replaced power supply cable



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

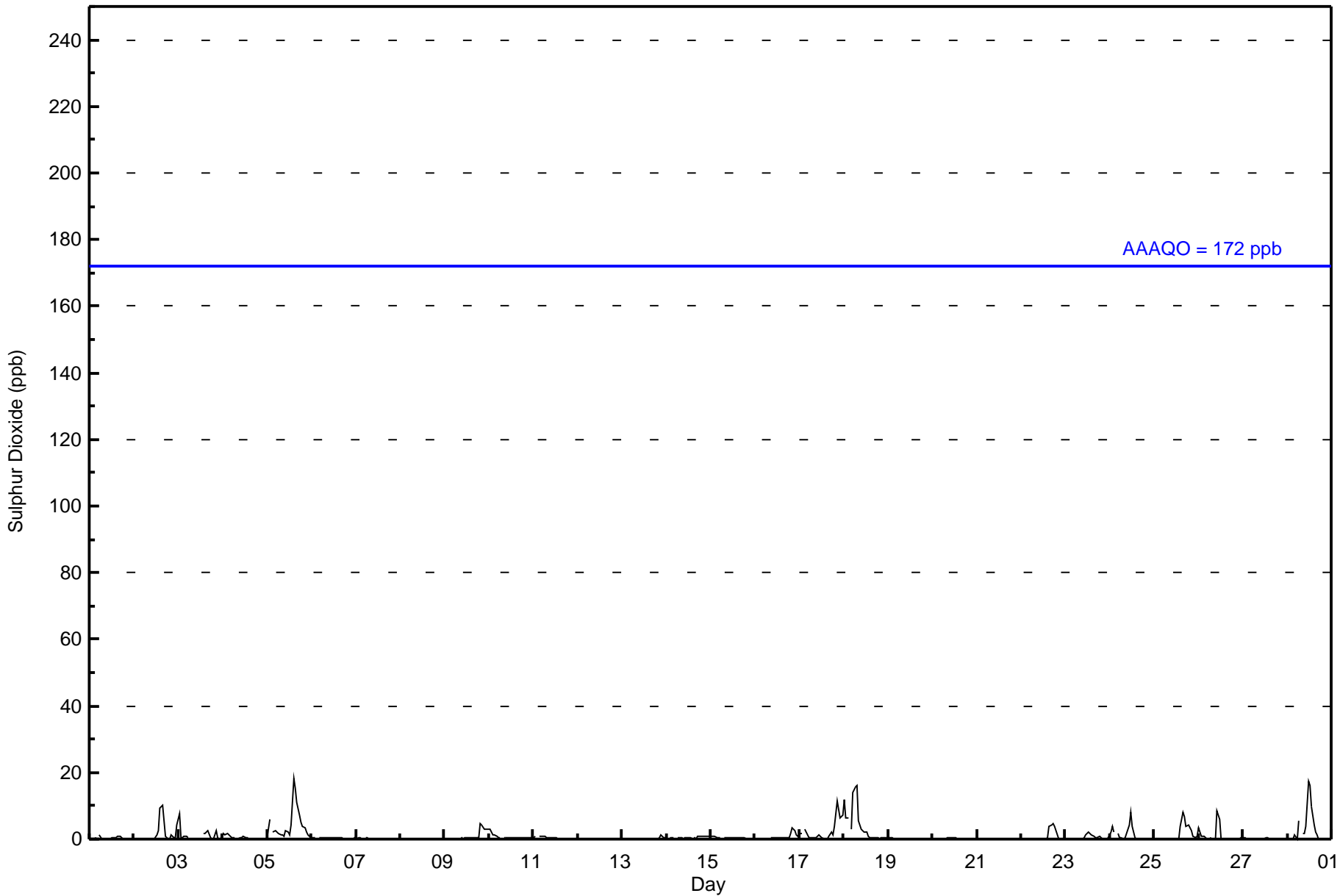
Patricia McInnes - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 18 ppb on Feb 5 15:00										Maximum Daily Average: 4.2 ppb on Feb 5										Hours of Data: 640						
Minimum Value: 0 ppb on Feb 1 02:00										Minimum Daily Average: 0.0 ppb on Feb 21										Hours of Missing Data: 32						
Maximum Diurnal Average: 1.7 ppb at hour 16										Minimum Diurnal Average: 0.4 ppb at hour 10										Hours of Calibration: 32						
Monthly Average: 0.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 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-Feb	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1
2-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	3	9	10	5	1	0	0	1	0	0	4	1.6	10
3-Feb	7	0	0	1	1	1	Z	0	0	C	C	C	C	2	2	2	2	1	0	0	2	1	0	0	1.3	7
4-Feb	2	1	2	1	1	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
5-Feb	1	6	Z	2	3	2	2	1	1	1	2	2	1	4	18	15	11	7	5	4	3	2	1	1	4.2	18
6-Feb	1	1	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Feb	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
8-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	5	4	3	3	3	0.9	5
10-Feb	3	2	1	1	1	1	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.7	3
11-Feb	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.1	1
14-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1
15-Feb	1	1	1	1	1	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
16-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	2	3	3	1	1	1	0.6	3
17-Feb	2	2	Z	3	1	1	0	0	0	1	1	0	0	0	0	1	2	1	4	12	9	6	7	7	2.3	12
18-Feb	12	6	6	Z	3	14	16	16	5	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	4.0	16
19-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	4	4	5	4	1	0	0	0	0	0	0.8	5
23-Feb	0	0	Z	0	0	0	0	0	0	0	1	2	2	1	1	0	0	1	0	0	0	0	1	0.4	2	
24-Feb	2	4	2	Z	2	1	0	0	1	2	4	8	4	1	0	0	0	0	0	0	0	0	0	0	1.3	8
25-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	4	8	7	4	4	4	3	1	0	1	1.5	8
26-Feb	3	1	1	1	0	Z	0	0	0	0	9	6	0	0	0	0	0	0	0	0	0	0	0	0	1.0	9
27-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Feb	0	0	0	0	1	0	5	Z	2	2	4	17	16	10	4	2	1	0	0	0	0	0	0	0	2.9	17
1.3 0.9 0.6 0.5 0.7 1.0 1.2 0.9 0.5 0.4 1.0 1.5 1.1 0.9 1.5 1.7 1.3 0.8 0.7 0.8 1.1 0.8 0.6 0.7																								Diurnal Average		
12 6 6 3 3 14 16 16 5 3 9 17 16 10 18 15 11 7 5 5 12 9 6 7																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	630	98.44	98.44
11 - 20	10	1.56	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - February 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	60	24	14	13	29	23	27	30	18	37	80	74	49	47	39	66	630
11 - 20	3	3	0	0	1	0	0	1	0	0	0	0	0	0	0	2	10
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	27	14	13	30	23	27	31	18	37	80	74	49	47	39	68	640

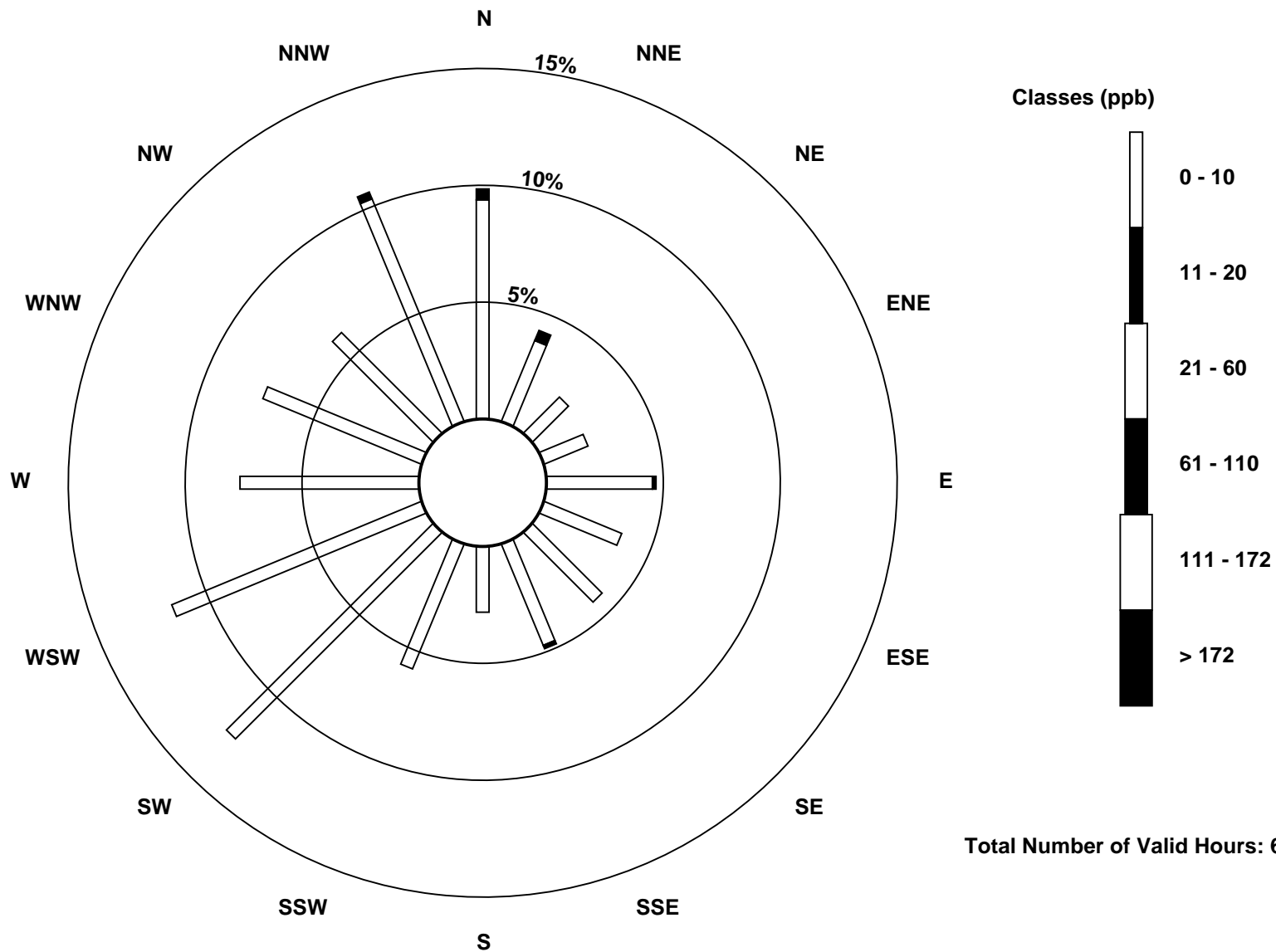
Total Number of Valid Hours: 640

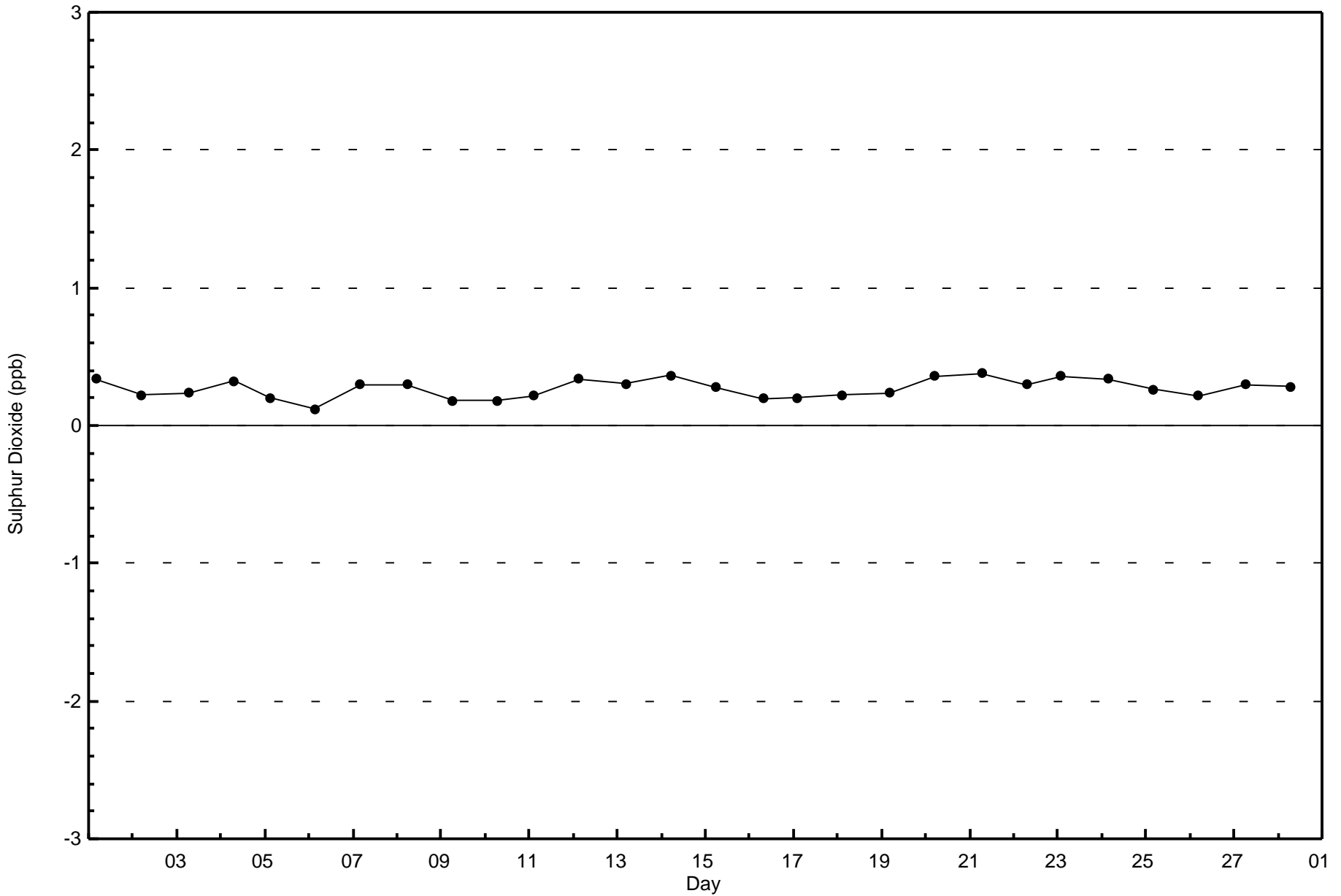
Total Number of Hours: 672

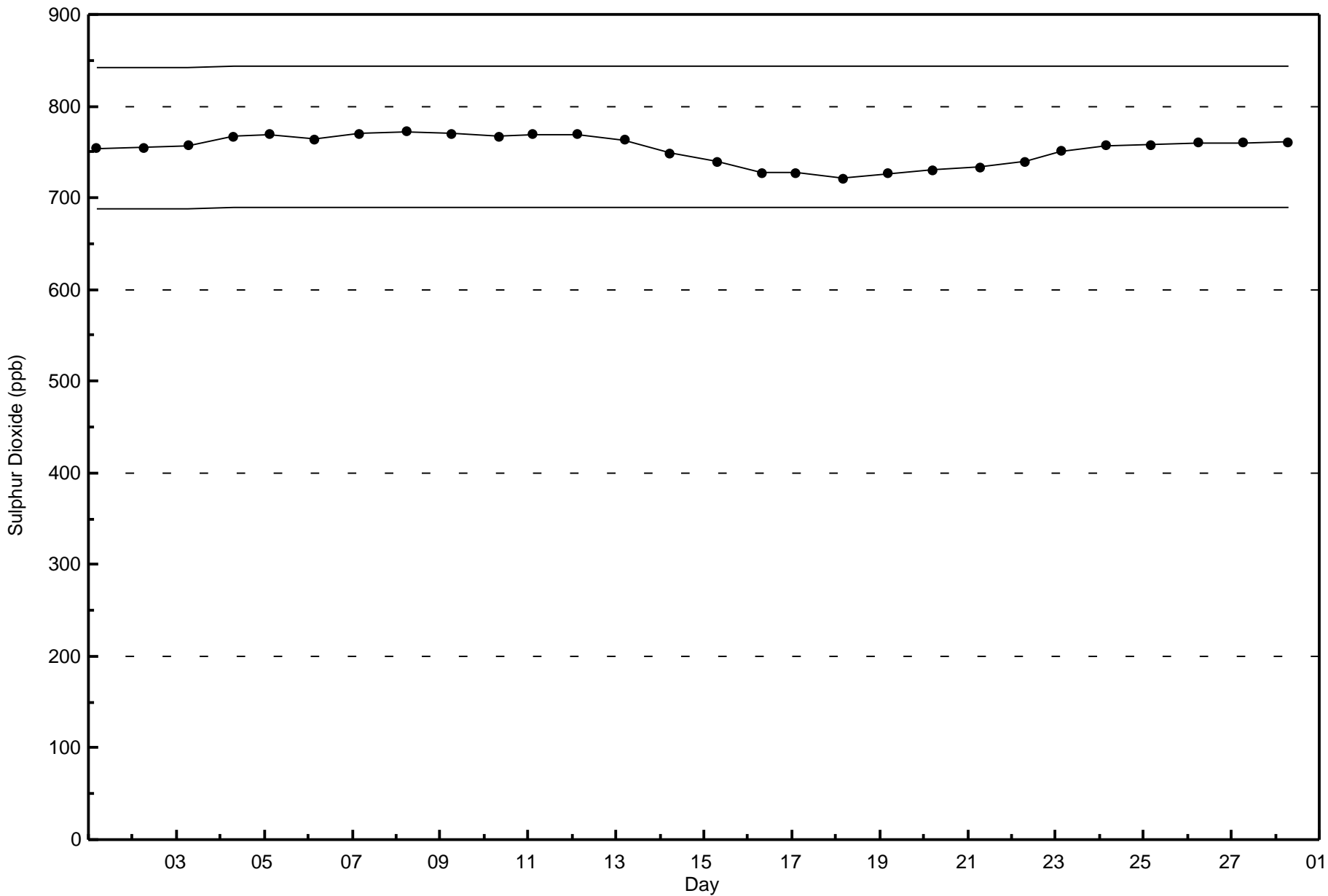


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

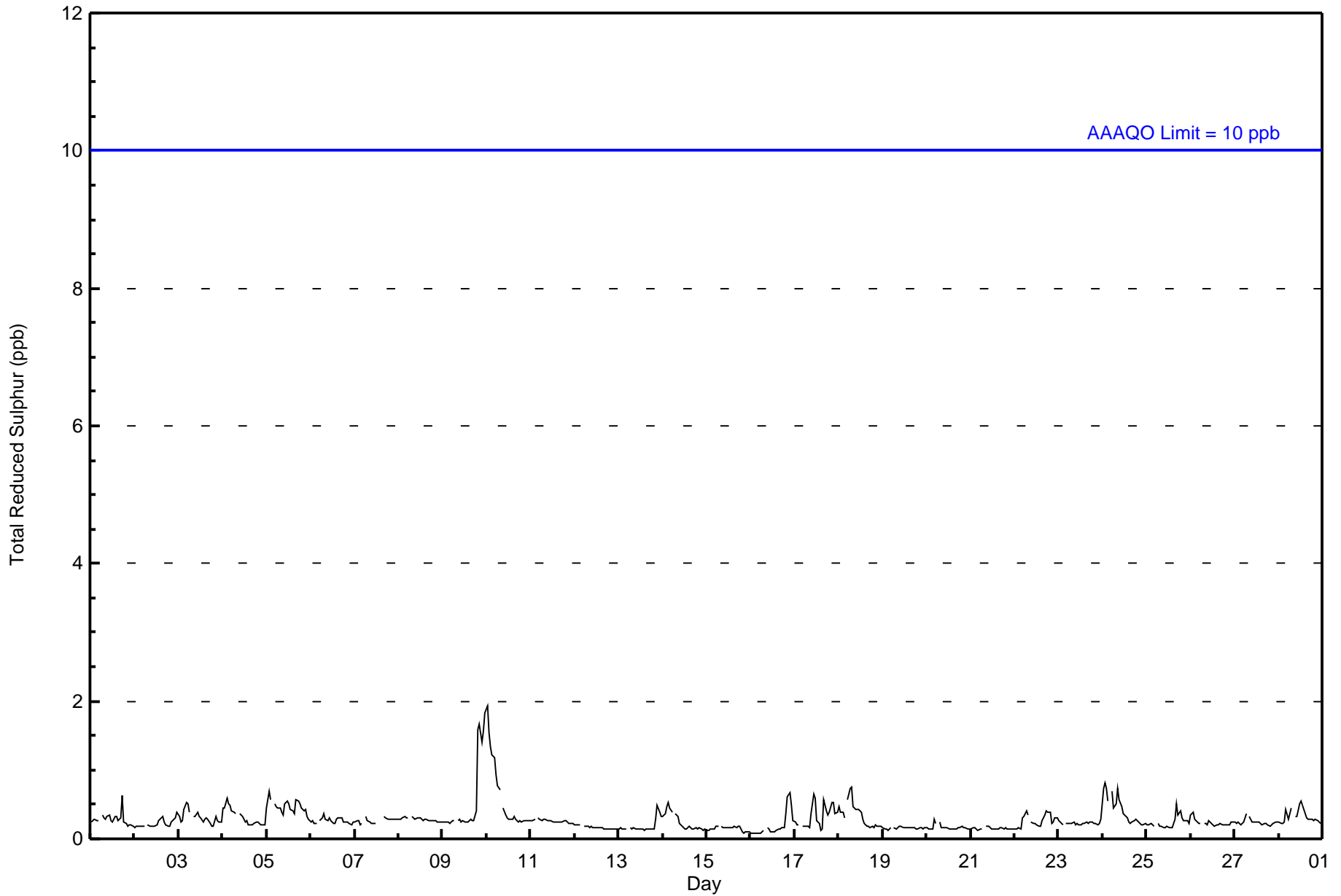
Patricia McInnes - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Feb 10 01:00 Maximum Daily Average: 0.6 ppb on Feb 10										Hours in Service: 672 Hours of Data: 640 Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0																
Minimum Value: 0 ppb on Feb 16 01:00 Minimum Daily Average: 0.1 ppb on Feb 15 Maximum Diurnal Average: 0.3 ppb at hour 6 Minimum Diurnal Average: 0.2 ppb at hour 15 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 = 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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
2-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Feb	0	0	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Feb	0	0	1	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Feb	0	1	1	Z	1	0	0	0	0	0	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0.5	1
6-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.3	0
8-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0.3	0
9-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	0.6	2
10-Feb	2	2	1	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
11-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Feb	0	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Feb	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
16-Feb	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
17-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	1	0	0	0.3	1
18-Feb	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-Feb	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
22-Feb	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Feb	1	1	1	1	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
26-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Feb	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
28-Feb	0	0	0	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.3 0.3 0.2 0.3 0.3 0.3 0.3 0.3 0.3																								Diurnal Average		
2 2 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 1 1 1 2 2 1 2 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 - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	640	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - February 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	65	28	15	13	30	22	27	33	18	38	76	74	47	48	39	67	640
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	65	28	15	13	30	22	27	33	18	38	76	74	47	48	39	67	640

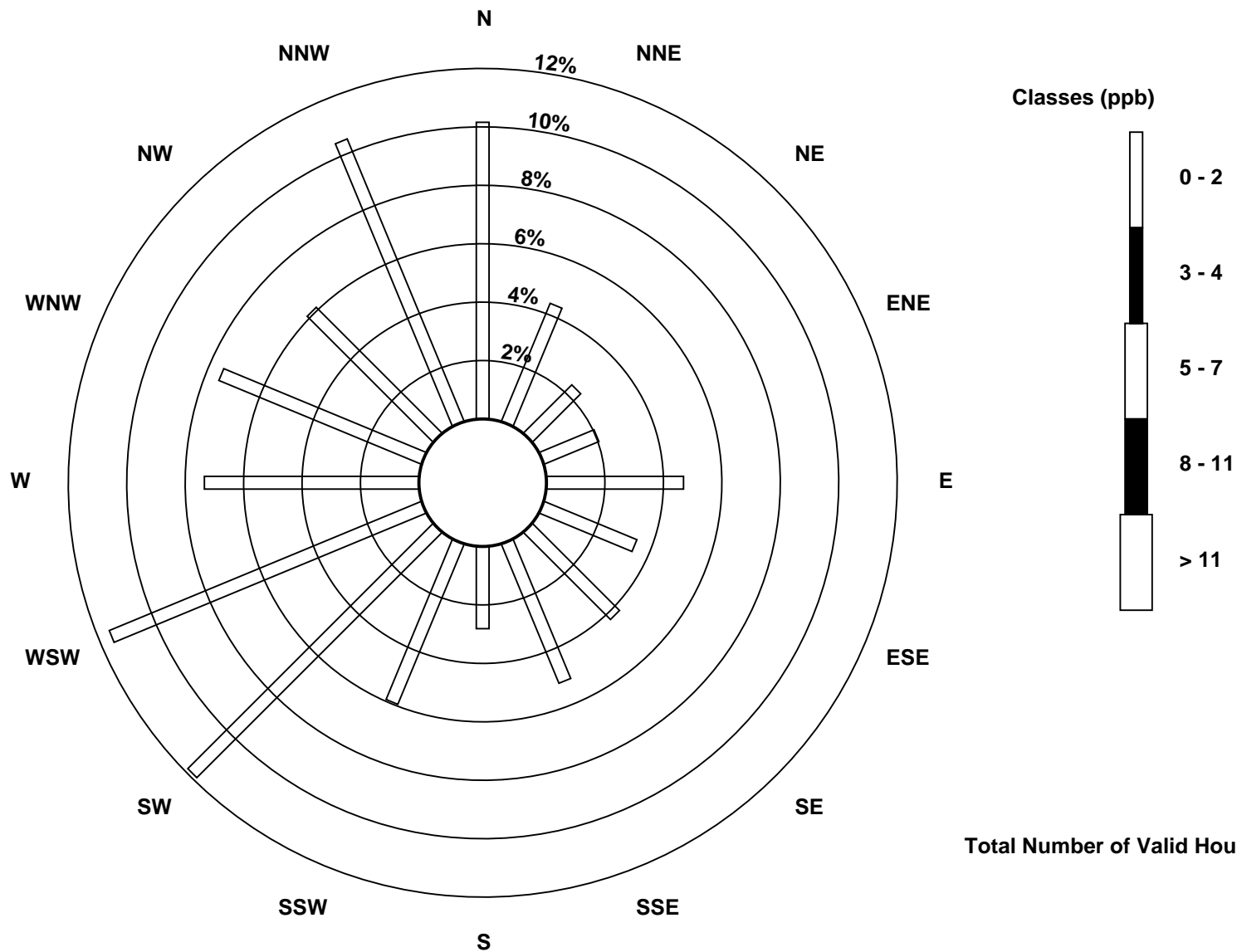
Total Number of Valid Hours: 640

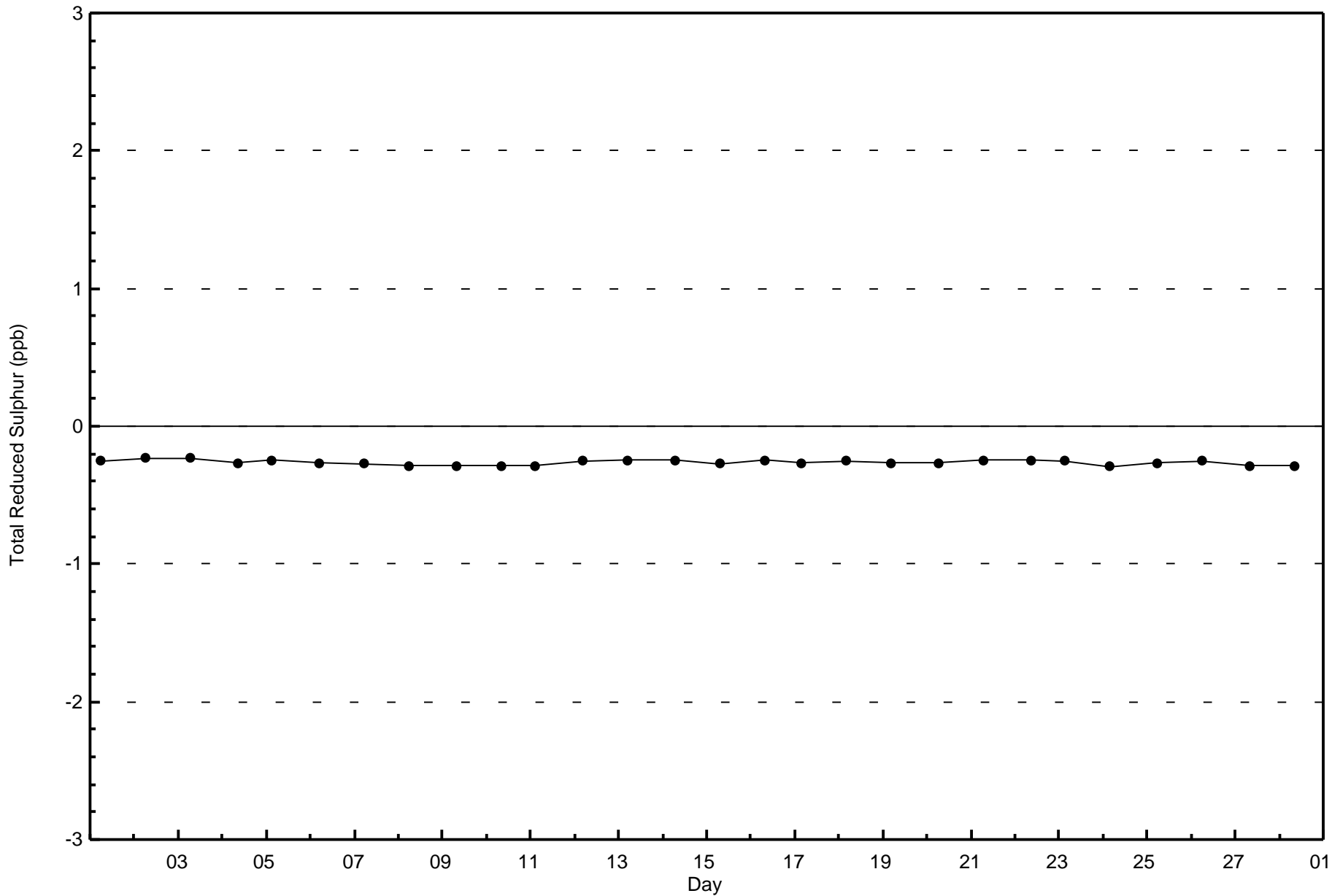
Total Number of Hours: 672

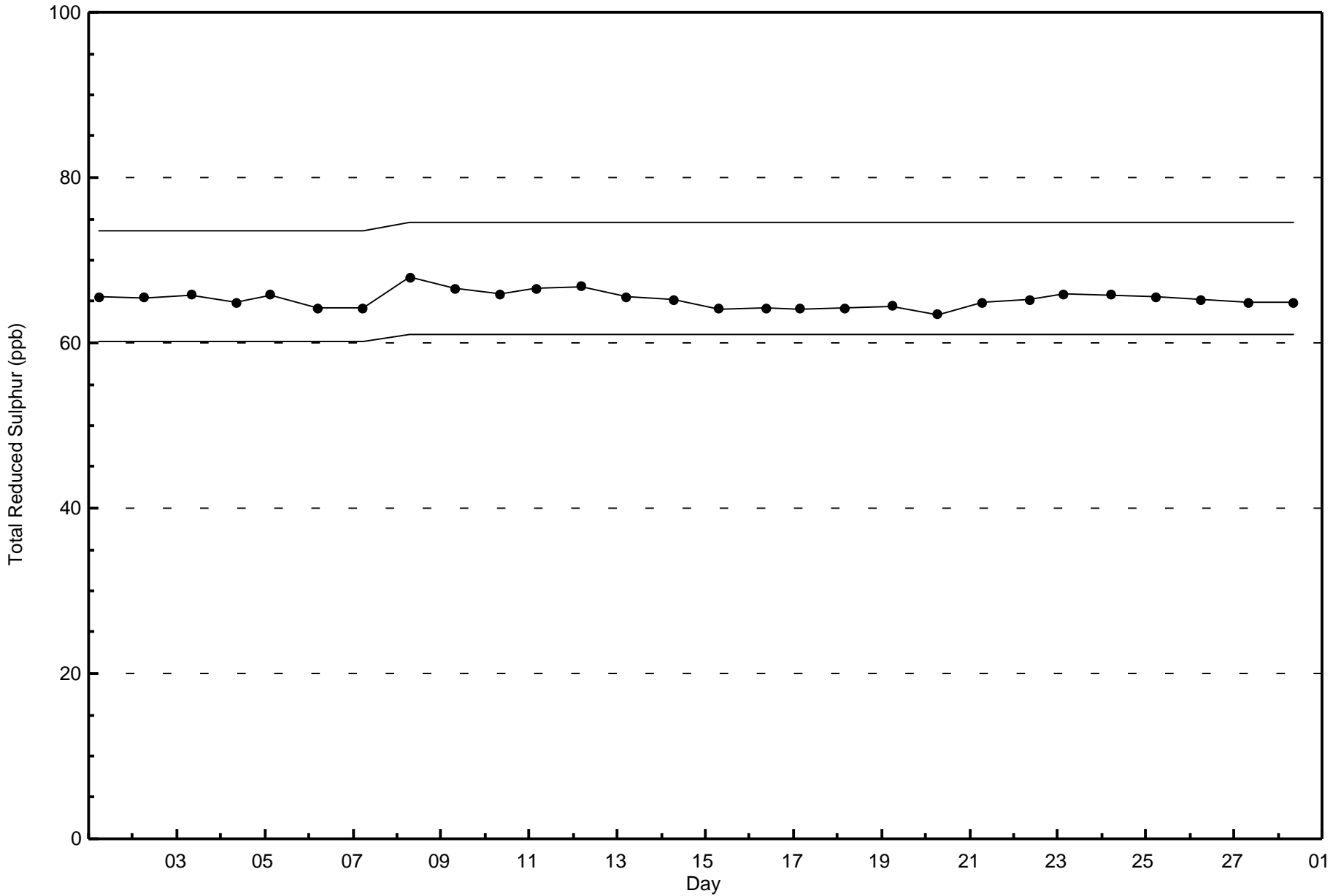


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Wood Buffalo Environmental Association
Summary of Hour Averages

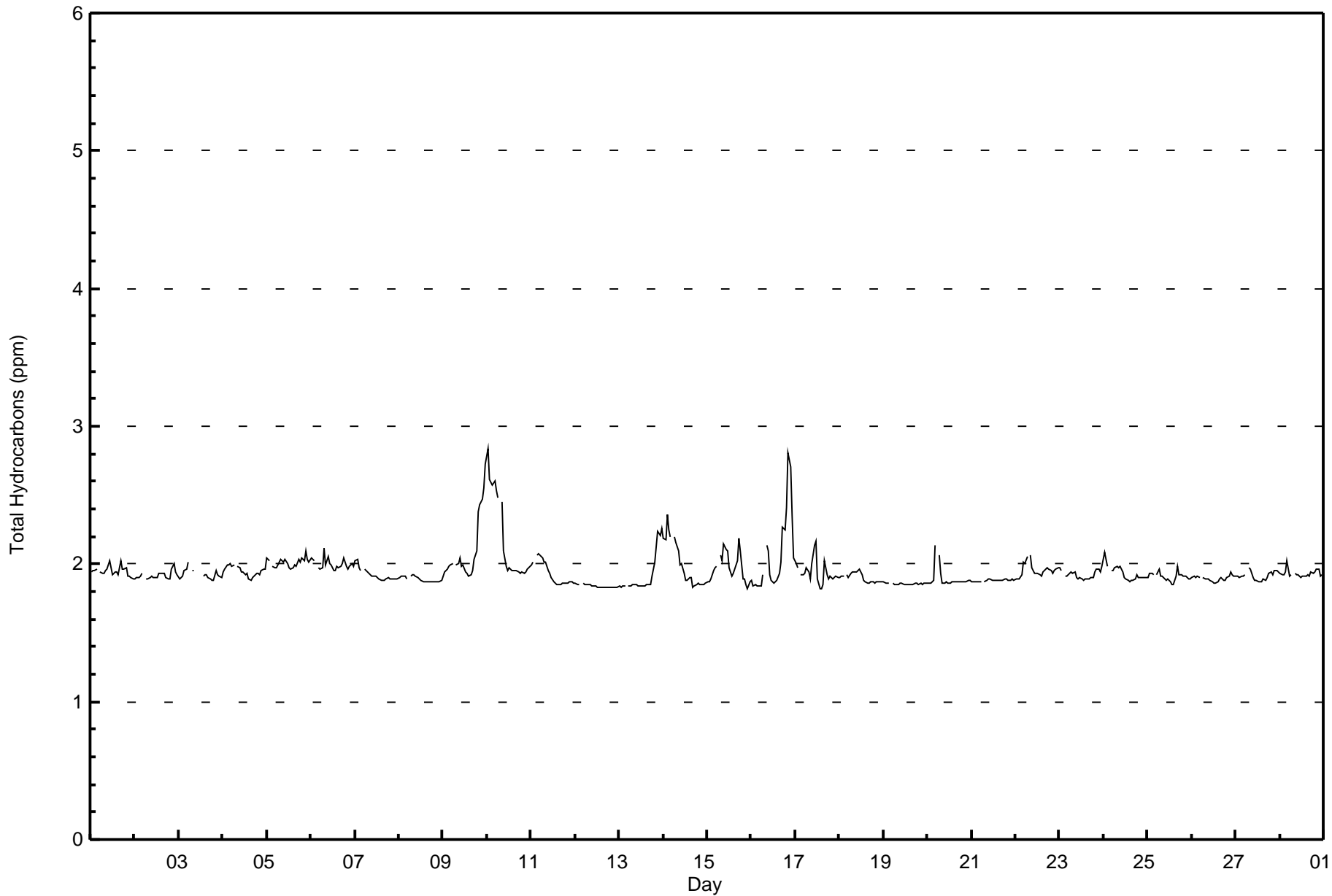
Total Hydrocarbons (THC) - ppm
Patricia McInnes - February 2017

Maximum Value: 2.8 ppm on Feb 10 01:00		Maximum Daily Average: 2.2 ppm on Feb 10		Hours in Service: 672																							
Minimum Value: 1.8 ppm on Feb 17 15:00		Minimum Daily Average: 1.8 ppm on Feb 12		Hours of Data: 640																							
Maximum Diurnal Average: 2.0 ppm at hour 5		Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Missing Data: 32																							
Monthly Average: 1.95 ppm		Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.6		Hours of Calibration: 32																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	1.9	2.0	2.0	2.0	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
2-Feb	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	2.0	2.0	1.9	1.9	1.9	1.9	1.9
3-Feb	1.9	1.9	1.9	1.9	2.0	2.0	Z	2.0	2.0	C	C	C	C	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
4-Feb	1.9	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
5-Feb	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	2.1	2.0	2.0	2.0	2.0
6-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	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
7-Feb	2.0	2.0	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
9-Feb	1.9	1.9	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.4	2.4	2.5	2.5	2.7	2.7	2.1
10-Feb	2.8	2.6	2.6	2.6	2.6	2.5	2.5	Z	2.5	2.1	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.8
11-Feb	2.0	2.0	Z	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
12-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
13-Feb	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.3	1.9	2.3
14-Feb	2.2	2.2	2.4	2.3	2.2	Z	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.4
15-Feb	1.9	1.9	1.9	2.0	2.0	2.0	Z	2.1	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.2	2.1	1.9	1.9	1.9	1.8	1.9	2.0	2.2
16-Feb	1.9	1.8	1.8	1.8	1.8	1.8	1.9	Z	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3	2.2	2.4	2.8	2.7	2.4	2.0	2.1	2.8	
17-Feb	2.0	2.0	Z	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.1	2.2	1.9	1.8	1.8	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
18-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
19-Feb	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	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
20-Feb	1.9	1.9	1.9	1.9	2.1	Z	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-Feb	1.9	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
22-Feb	1.9	1.9	1.9	1.9	2.0	2.0	2.1	Z	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.1
23-Feb	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0
24-Feb	2.1	2.0	2.0	Z	2.0	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
25-Feb	1.9	1.9	1.9	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
26-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
27-Feb	1.9	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0
28-Feb	1.9	1.9	1.9	1.9	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	586	91.56	91.56
2.1 - 3.0	54	8.44	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Patricia McInnes - February 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	58	27	12	13	30	22	26	23	15	31	77	70	48	46	34	54	586
2.1 - 3.0	5	0	2	0	0	1	1	8	3	6	3	4	1	1	5	14	54
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	27	14	13	30	23	27	31	18	37	80	74	49	47	39	68	640

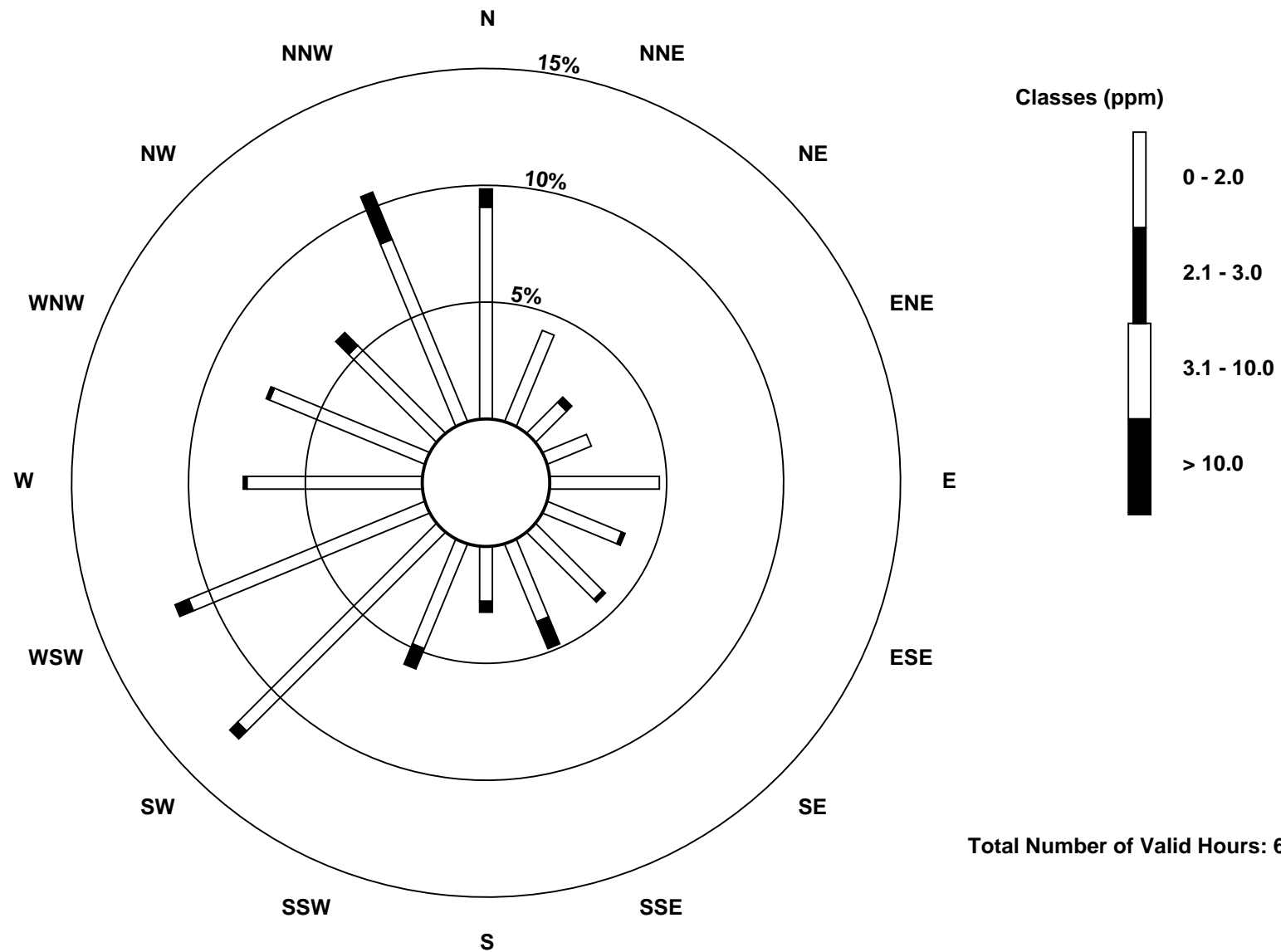
Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

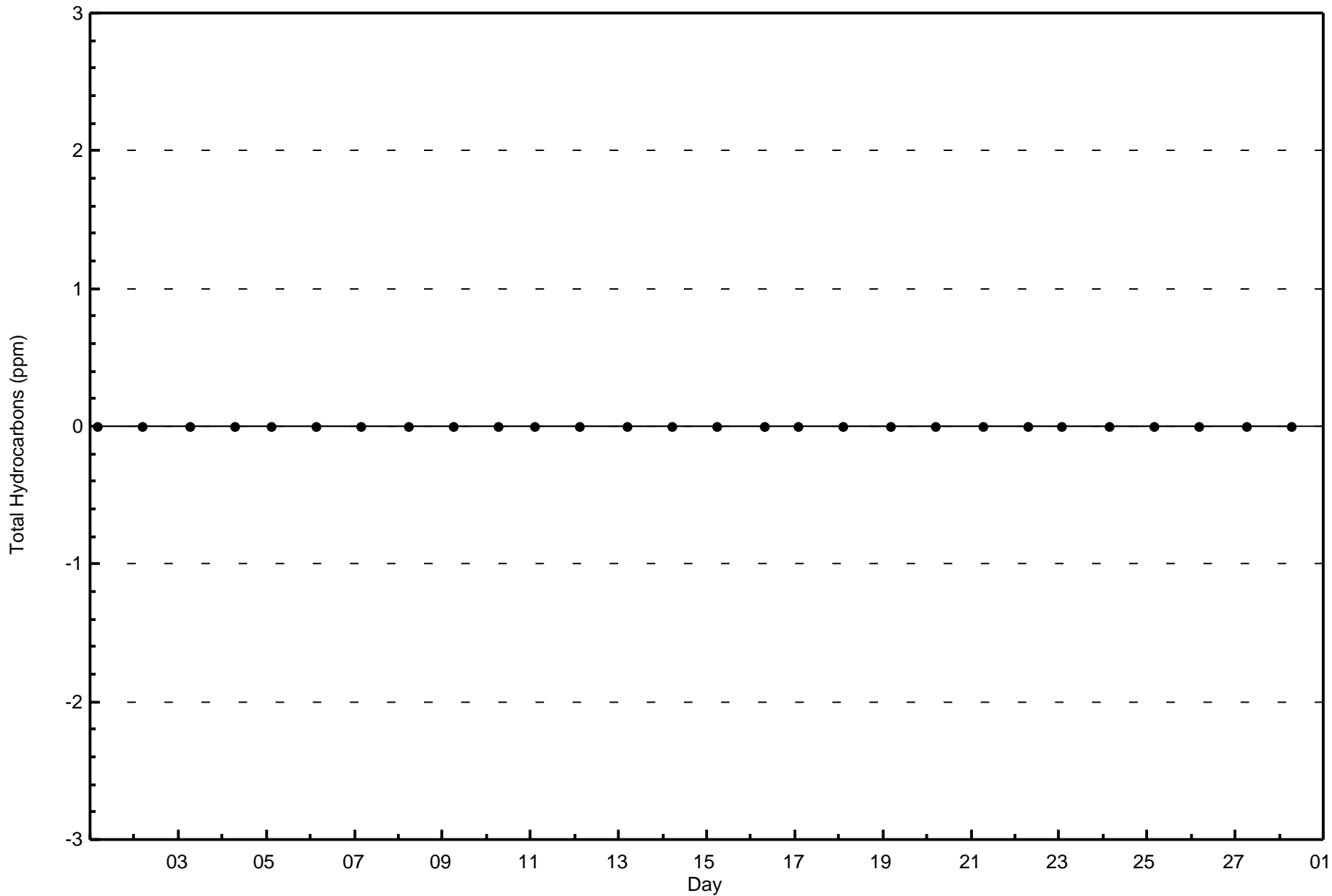
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)

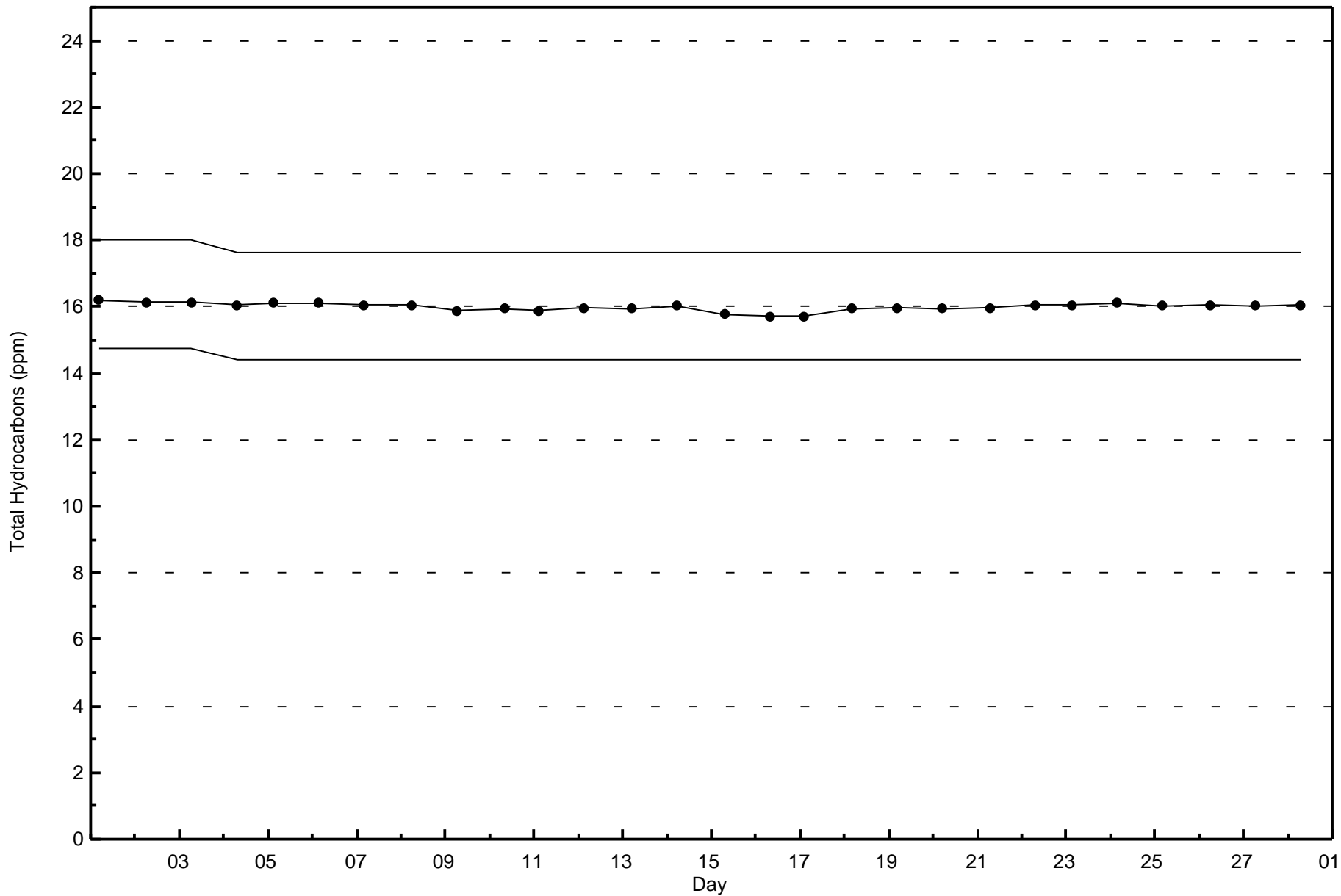




Wood Buffalo Environmental Association
Zero Responses

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







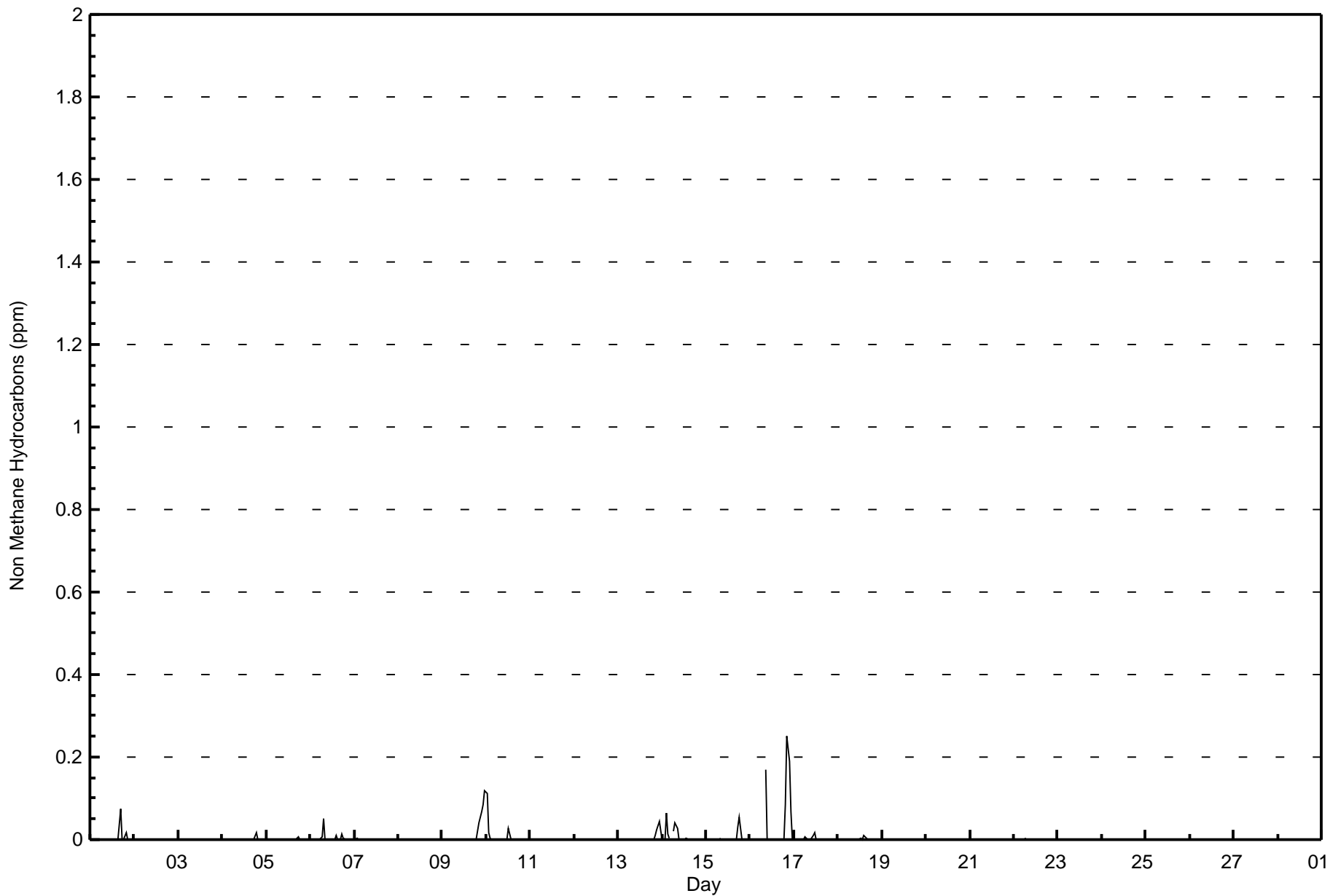
Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - February 2017

Maximum Value: 0.252 ppm on Feb 16 21:00 Maximum Daily Average: 0.033 ppm on Feb 16																						Hours in Service: 672 Hours of Data: 640					
Minimum Value: 0.000 ppm on Feb 1 01:00 Minimum Daily Average: 0.000 ppm on Feb 2 Maximum Diurnal Average: 0.011 ppm at hour 21 Minimum Diurnal Average: 0.000 ppm at hour 6 Monthly Average: 0.003 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 Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	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	0.075	0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.004	0.075	
2-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3-Feb	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4-Feb	0.000	0.000	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	0.018	0.000	0.000	0.000	0.000	0.001	0.018	
5-Feb	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	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
6-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.006	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.015	0.004	0.000	0.000	0.000	0.000	0.000	0.004	0.051	
7-Feb	0.000	0.002	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	0.002	
8-Feb	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	
9-Feb	0.000	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	0.020	0.040	0.067	0.086	0.120	
10-Feb	0.111	0.016	0.004	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.111	
11-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
12-Feb	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	
13-Feb	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	0.010	0.023	0.043	0.020	
14-Feb	0.000	0.000	0.063	0.014	0.002	Z	0.022	0.041	0.028	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	0.008	0.063	
15-Feb	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032	0.054	0.000	0.000	0.000	0.000	0.004	0.054		
16-Feb	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.085	0.252	0.190	0.069	0.000	0.033	0.252	
17-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.009	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.018	
18-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.009	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.009	
19-Feb	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	
20-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
21-Feb	0.000	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	
22-Feb	0.000	0.000	0.000	0.000	0.000	0.000	0.004	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	
23-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
24-Feb	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	
25-Feb	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	
26-Feb	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	
27-Feb	0.000	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	
28-Feb	0.000	0.000	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	
																						Diurnal Average					
0.004 0.001 0.003 0.001 0.000 0.000 0.002 0.004 0.007 0.000 0.000 0.001 0.001 0.000 0.001 0.000 0.003 0.002 0.003 0.004 0.011 0.010 0.007 0.005 0.111 0.016 0.063 0.014 0.002 0.000 0.022 0.051 0.170 0.000 0.009 0.018 0.027 0.005 0.011 0.005 0.075 0.032 0.054 0.085 0.252 0.190 0.086 0.120																						Diurnal Maximum					
Z - zerospan C - Calibration																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	604	94.38	94.38
0.006 - 0.05	25	3.91	98.28
0.06 - 0.1	8	1.25	99.53
> 0.1	3	0.47	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



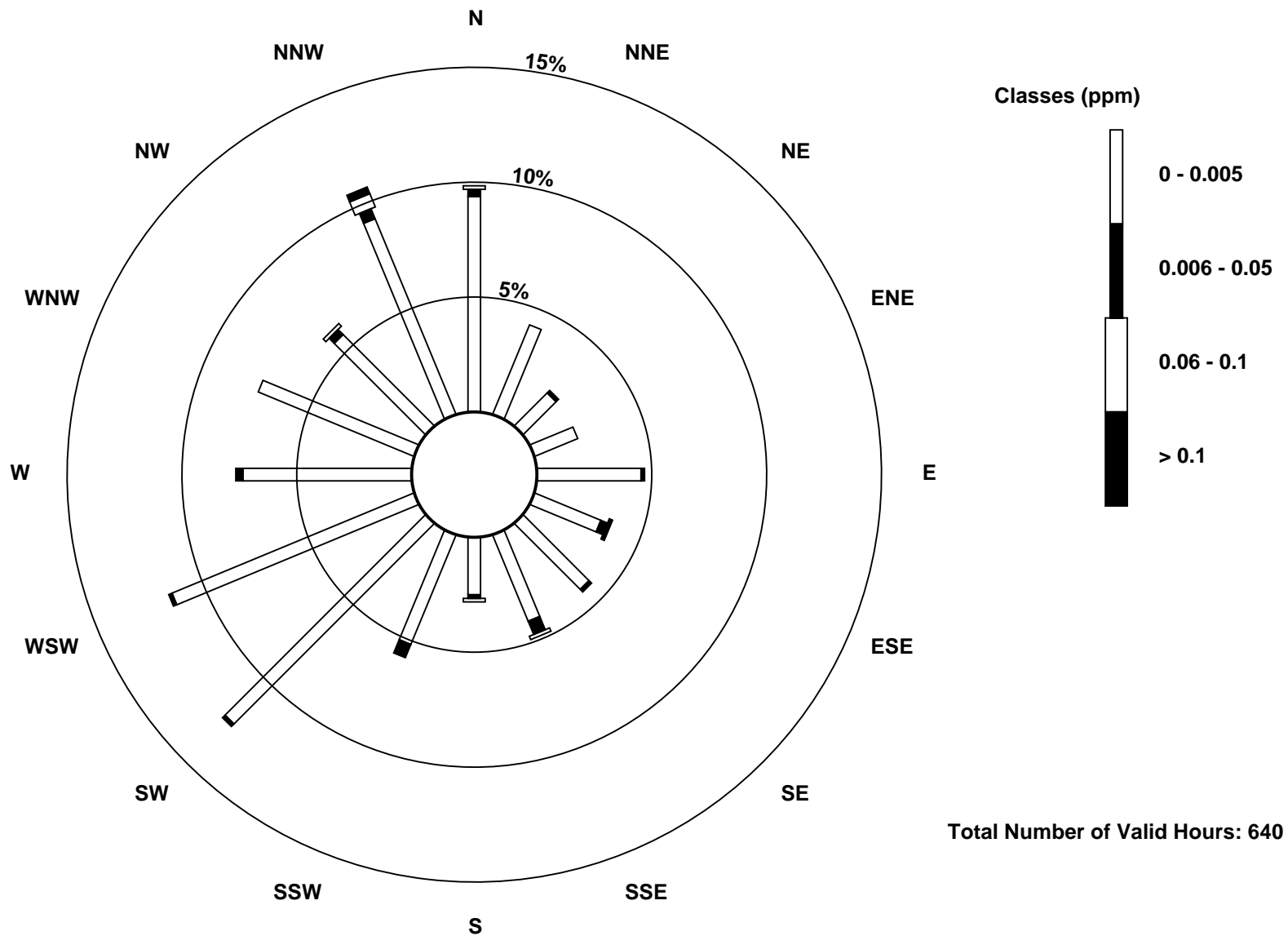
**Wood Buffalo Environmental Association
Frequency Distribution**

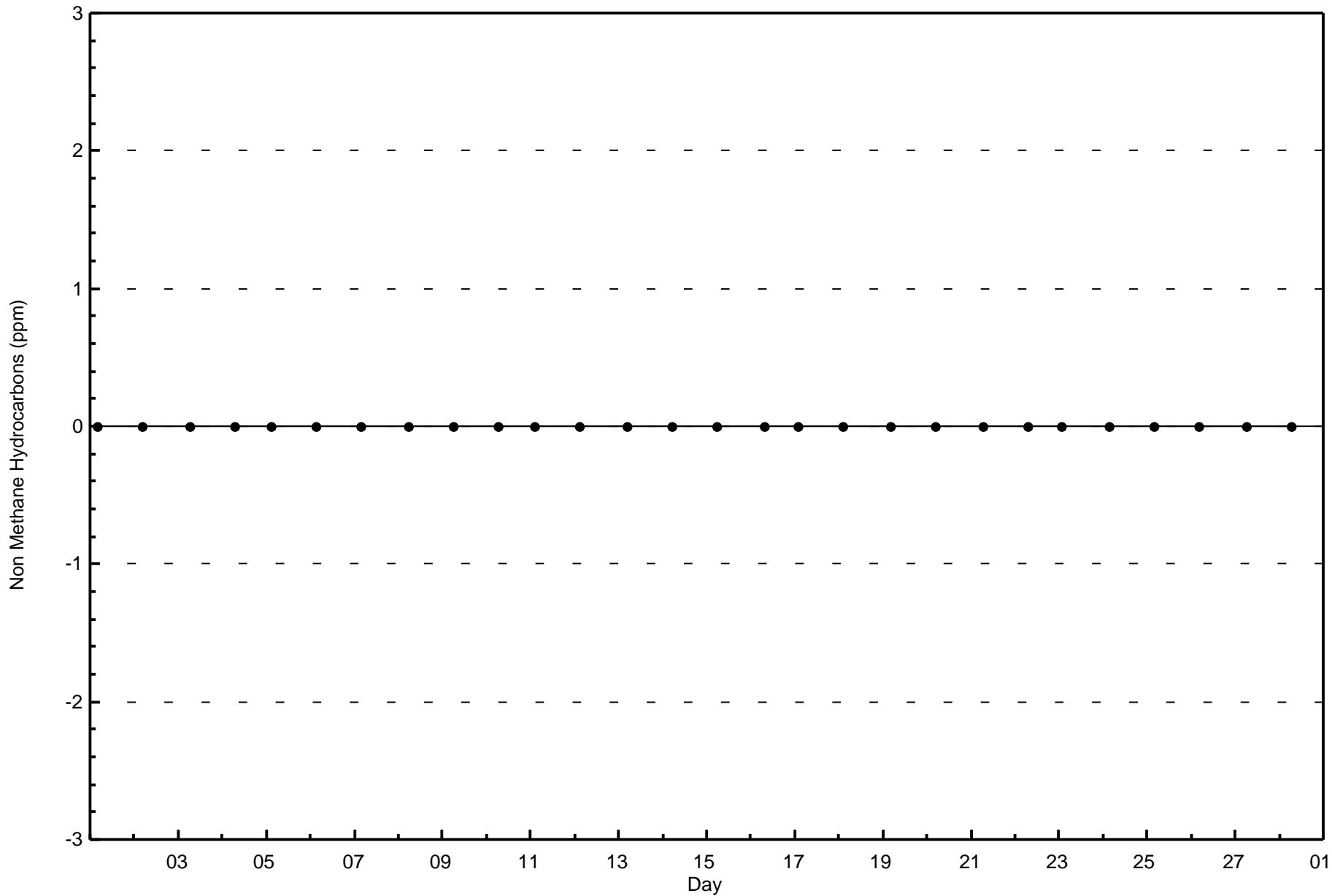
**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - February 2017**

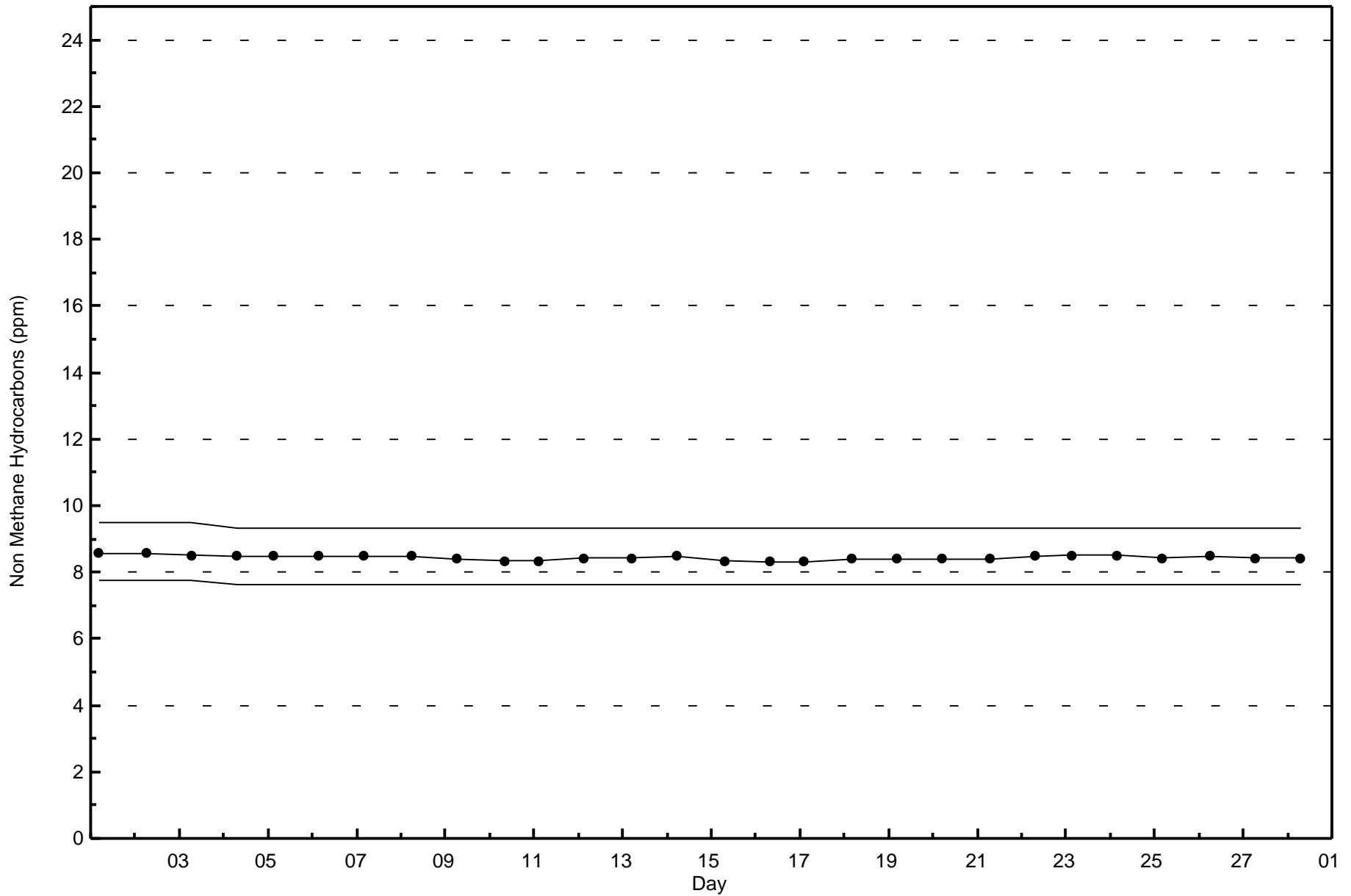
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	60	27	13	13	29	20	26	26	16	33	79	73	47	47	36	59	604
0.006 - 0.05	2	0	1	0	1	2	1	4	1	4	1	1	2	0	2	3	25
0.06 - 0.1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	4	8
> 0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3
Totals	63	27	14	13	30	23	27	31	18	37	80	74	49	47	39	68	640

Total Number of Valid Hours: 640

Total Number of Hours: 672









Wood Buffalo Environmental Association

Summary of Hour Averages

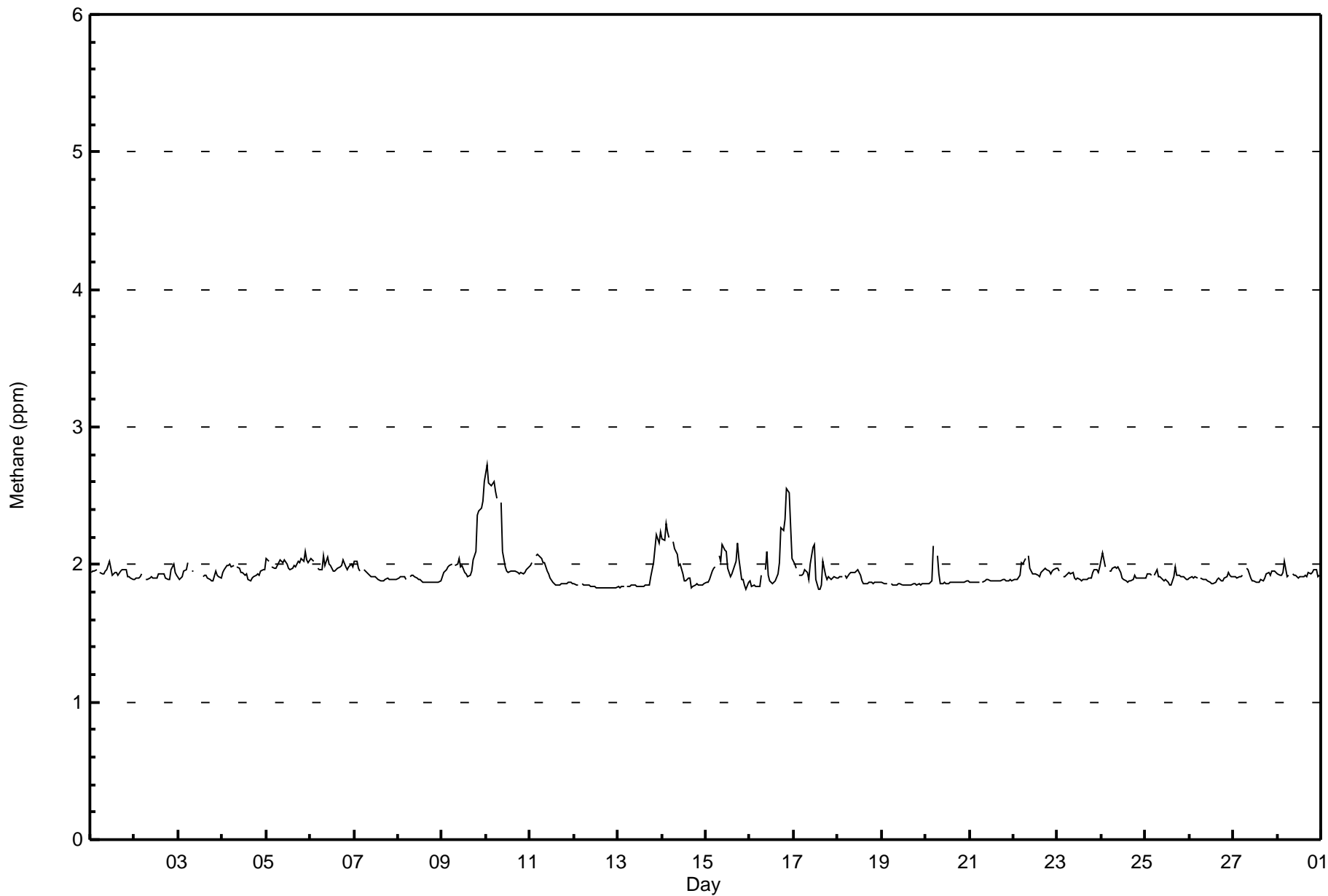
Methane (CH₄) - ppm

Patricia McInnes - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 2.7 ppm on Feb 10 01:00	Maximum Daily Average: 2.2 ppm on Feb 10		Hours of Data:	640
Minimum Value: 1.8 ppm on Feb 17 15:00	Minimum Daily Average: 1.8 ppm on Feb 12		Hours of Missing Data:	32
Maximum Diurnal Average: 2.0 ppm at hour 5	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	32
Monthly Average: 1.94 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.6		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	1.9	2.0	2.0	2.0	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
2-Feb	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	1.9	1.9	1.9	1.9
3-Feb	1.9	1.9	1.9	1.9	2.0	2.0	Z	2.0	2.0	C	C	C	C	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
4-Feb	1.9	2.0	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
5-Feb	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	2.1	2.0	2.0	2.0	2.0
6-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	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
7-Feb	2.0	2.0	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
9-Feb	1.9	1.9	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.4	2.4	2.4	2.5	2.6	2.6	2.1
10-Feb	2.7	2.6	2.6	2.6	2.6	2.5	2.5	Z	2.5	2.1	2.0	2.0	1.9	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.7
11-Feb	2.0	2.0	Z	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
12-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
13-Feb	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.1	2.2	2.2	2.2	2.2	1.9
14-Feb	2.2	2.2	2.3	2.2	2.2	Z	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.3
15-Feb	1.9	1.9	1.9	2.0	2.0	2.0	Z	2.1	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.2	2.0	1.9	1.9	1.9	1.8	1.9	2.0	2.2
16-Feb	1.9	1.8	1.8	1.8	1.8	1.8	1.8	Z	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3	2.2	2.3	2.6	2.5	2.3	2.0	2.0	2.6	
17-Feb	2.0	2.0	Z	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.1	2.2	1.9	1.8	1.8	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
18-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
19-Feb	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	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
20-Feb	1.9	1.9	1.9	1.9	2.1	Z	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-Feb	1.9	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
22-Feb	1.9	1.9	1.9	1.9	2.0	2.0	2.0	Z	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0
23-Feb	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0
24-Feb	2.1	2.0	2.0	Z	2.0	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
25-Feb	1.9	1.9	1.9	1.9	Z	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	1.9
26-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
27-Feb	1.9	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9
28-Feb	1.9	1.9	1.9	1.9	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0
Diurnal Average																								2.0	2.0		
Diurnal Maximum																								2.7	2.6		

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	589	92.03	92.03
2.1 - 3.0	51	7.97	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Patricia McInnes - February 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	58	27	12	13	30	23	26	23	15	31	78	71	48	46	34	54	589
2.1 - 3.0	5	0	2	0	0	0	1	8	3	6	2	3	1	1	5	14	51
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	63	27	14	13	30	23	27	31	18	37	80	74	49	47	39	68	640

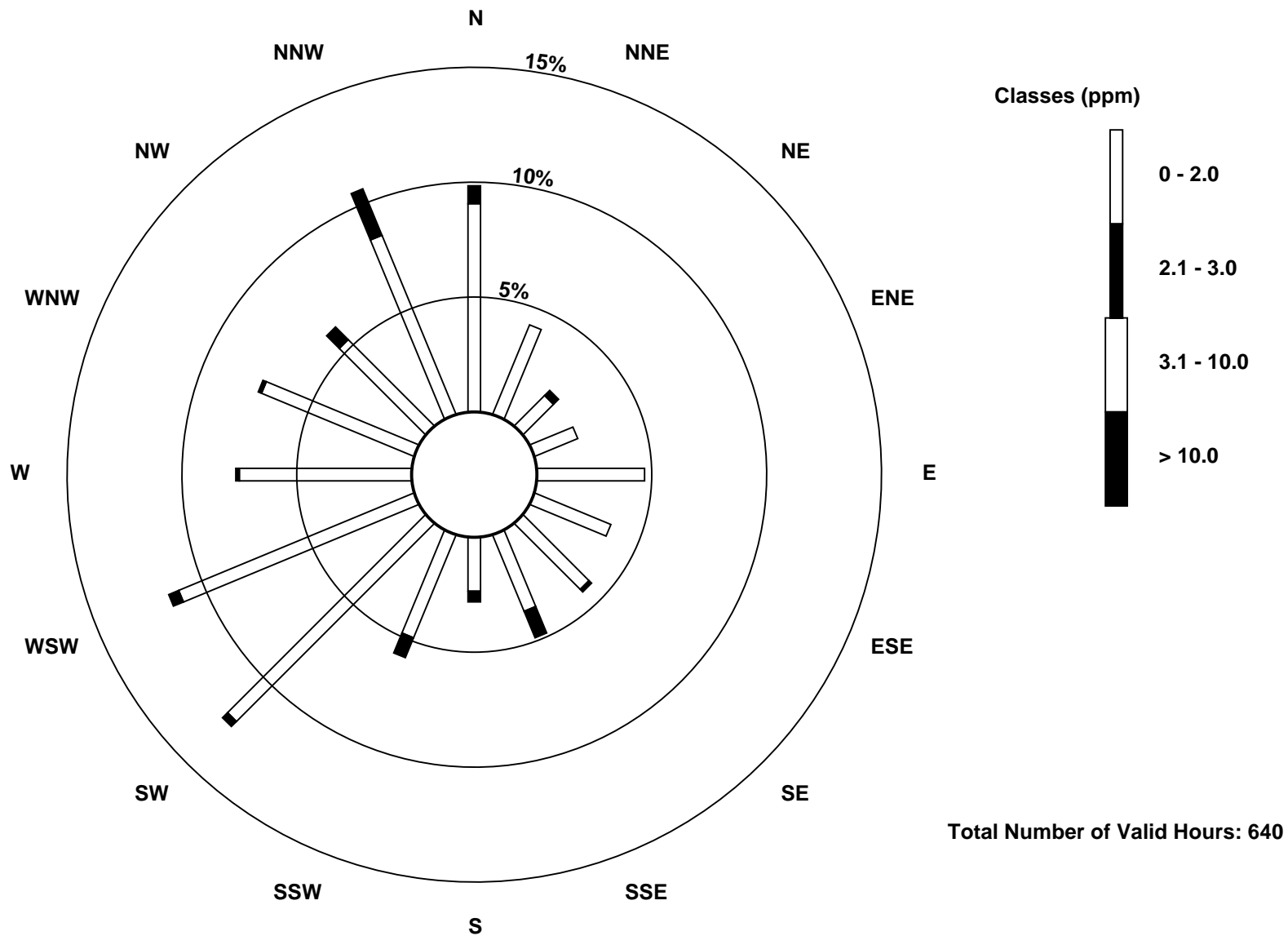
Total Number of Valid Hours: 640

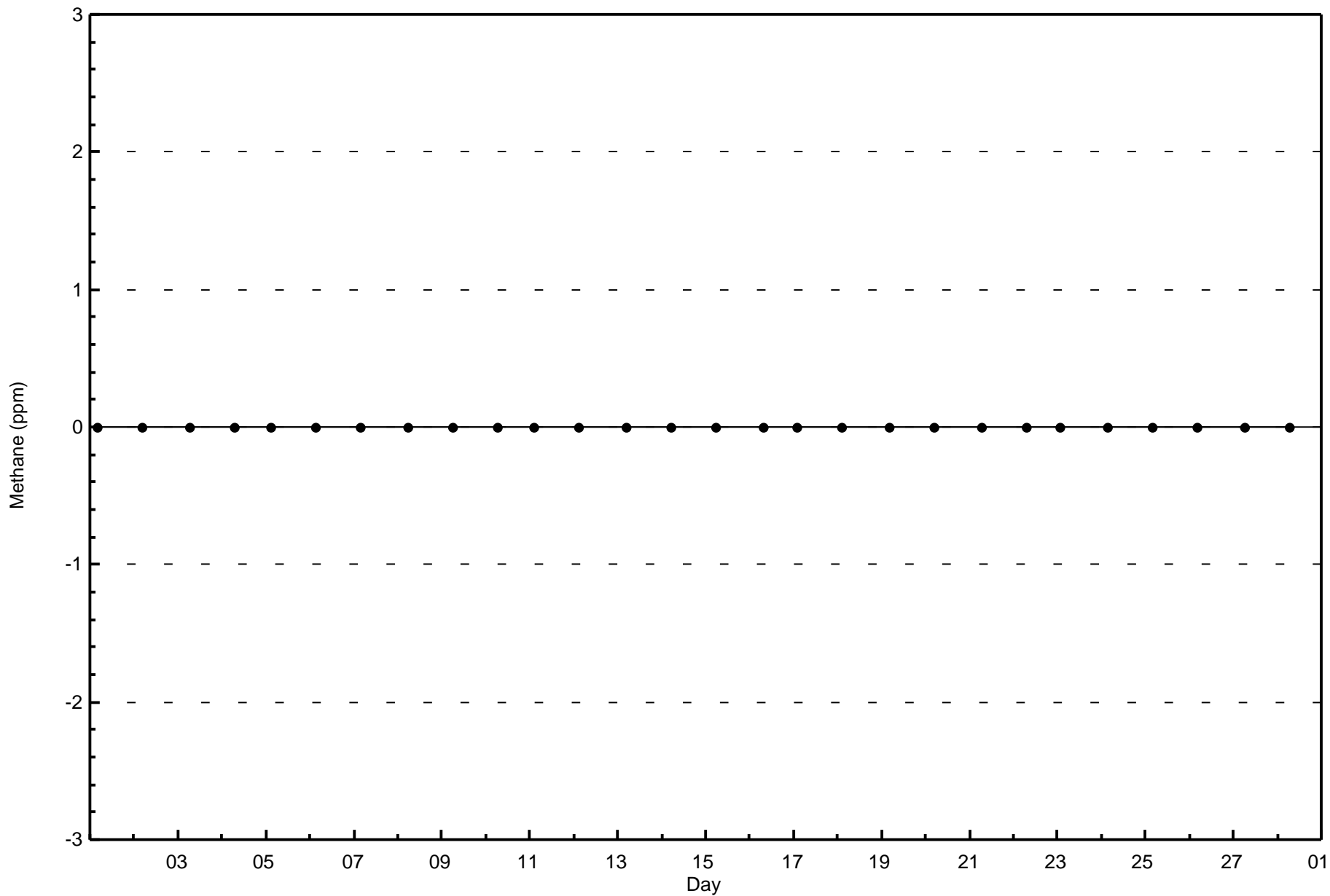
Total Number of Hours: 672

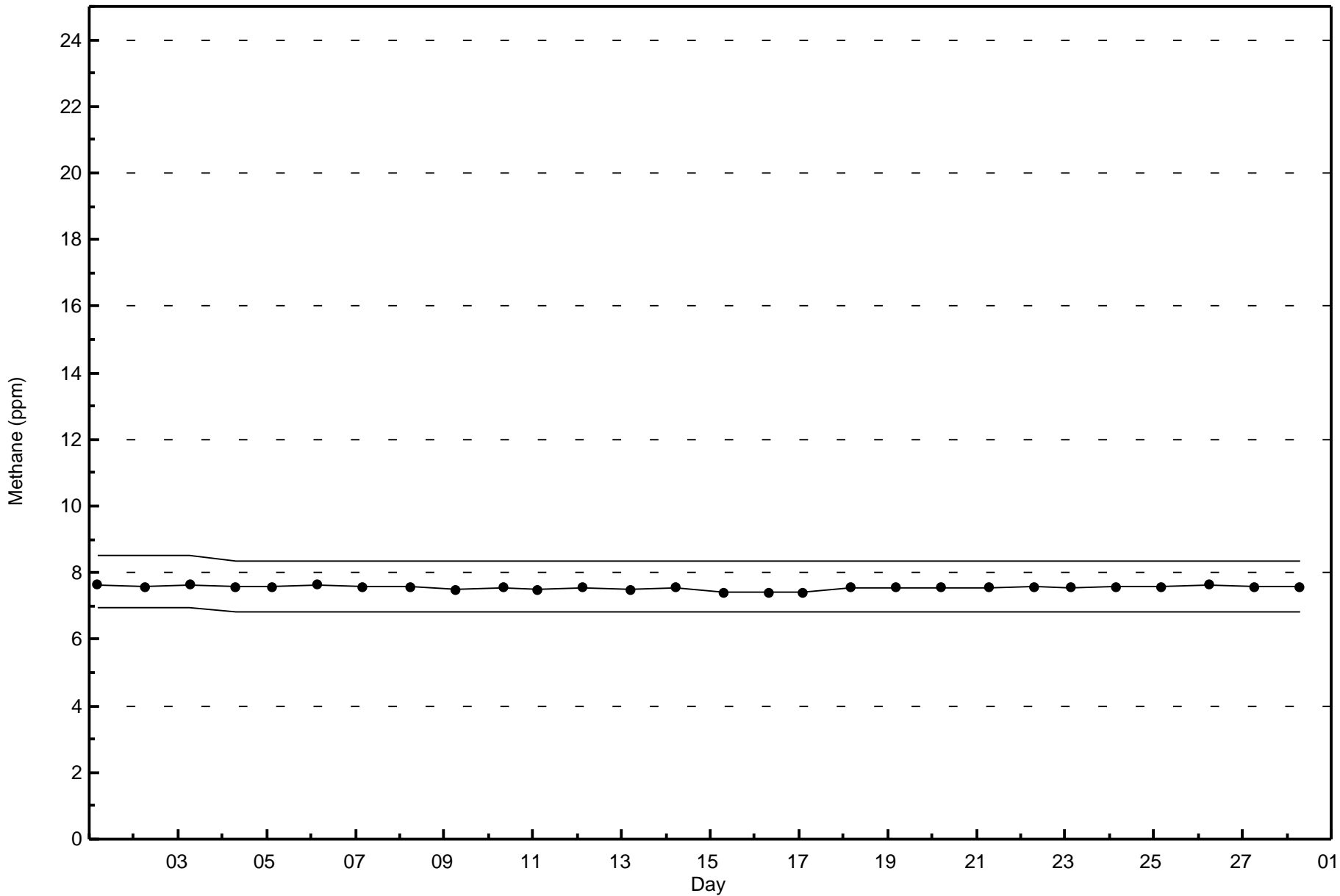


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

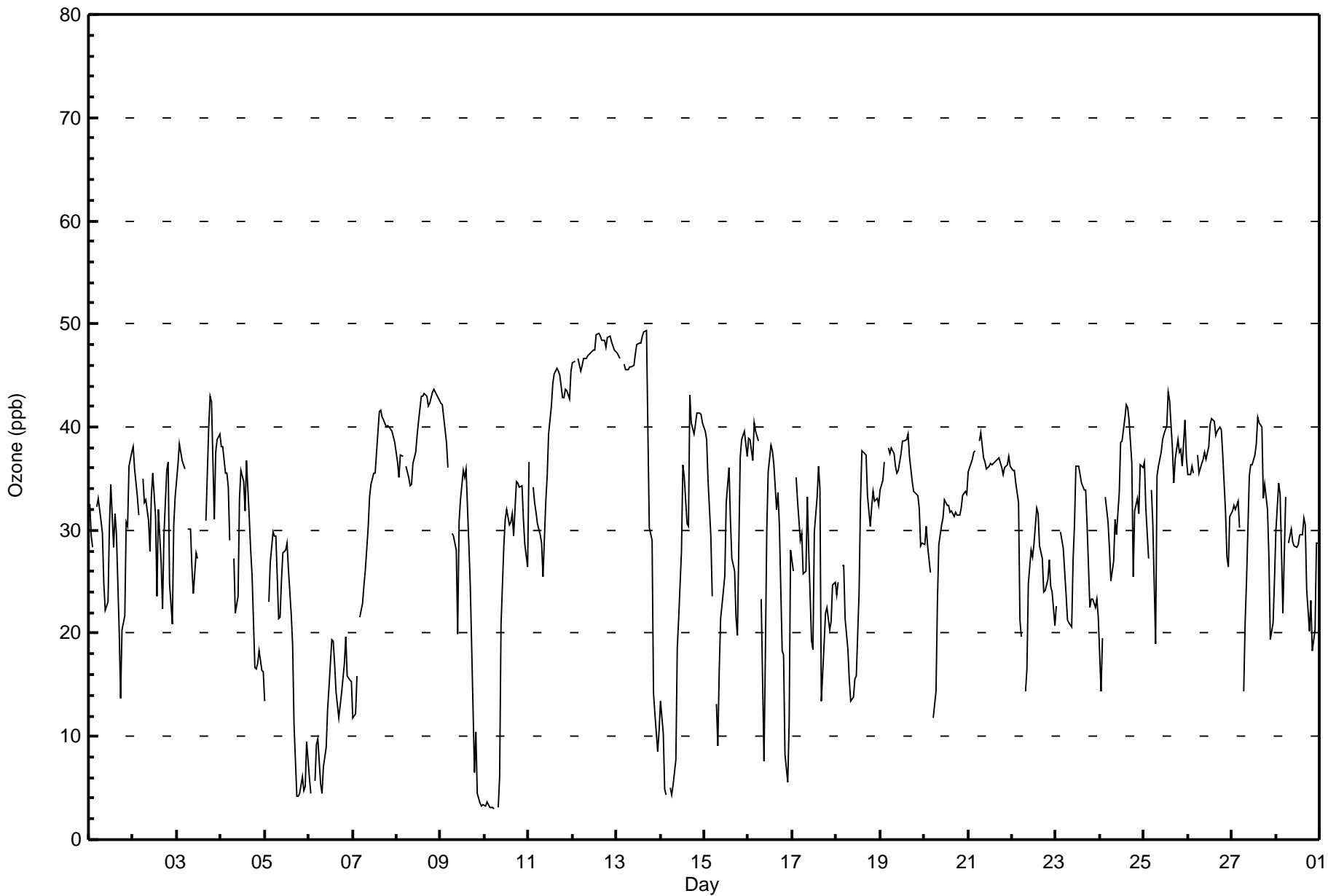
Patricia McInnes - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 49 ppb on Feb 13 17:00										Maximum Daily Average: 47.5 ppb on Feb 12										Hours of Data: 640						
Minimum Value: 3 ppb on Feb 10 06:00										Minimum Daily Average: 12.2 ppb on Feb 6										Hours of Missing Data: 32						
Maximum Diurnal Average: 36.1 ppb at hour 15										Minimum Diurnal Average: 25.8 ppb at hour 8										Hours of Calibration: 32						
Monthly Average: 30.3 ppb										Percentiles: P ₁ = 3 P ₁₀ = 14 Q ₁ = 25 Median = 32 Q ₃ = 37 P ₉₀ = 42 P ₉₉ = 49										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	33	29	28	Z	32	33	31	30	25	22	23	30	34	28	32	30	20	14	20	22	31	30	36	38	28.3	38
2-Feb	38	36	33	31	Z	35	33	33	31	28	33	36	31	24	32	27	22	30	36	37	25	21	31	33	31.1	38
3-Feb	36	38	38	37	36	Z	30	30	26	24	28	27	C	C	C	C	31	40	43	42	31	37	39	39	34.4	43
4-Feb	38	38	36	36	34	29	Z	27	22	24	33	36	35	32	37	31	28	26	17	17	17	18	16	16	27.9	38
5-Feb	13	Z	23	27	30	29	29	21	22	25	28	28	29	26	22	19	11	4	4	5	6	5	5	9	18.3	30
6-Feb	6	4	Z	6	9	10	5	5	7	9	13	15	19	19	17	14	12	13	14	17	20	16	15	15	12.2	20
7-Feb	12	12	16	Z	22	23	25	26	30	33	34	36	36	38	42	42	41	41	40	40	40	40	39	39	32.4	42
8-Feb	37	35	37	37	Z	36	35	34	34	36	38	39	41	43	43	43	43	42	42	43	44	43	43	43	39.7	44
9-Feb	42	42	40	39	36	Z	30	29	28	20	31	33	36	35	36	29	25	19	7	11	4	3	3	3	25.2	42
10-Feb	3	4	3	3	3	3	Z	3	6	21	28	31	32	31	31	32	29	35	35	34	34	31	29	26	21.2	35
11-Feb	37	Z	34	33	32	31	29	29	26	33	35	39	42	44	45	46	45	45	43	43	44	44	43	45	38.5	46
12-Feb	46	46	Z	47	45	46	47	47	47	47	47	47	47	49	49	49	48	48	48	49	49	48	48	48	47.5	49
13-Feb	47	47	47	Z	46	46	46	46	46	46	47	48	48	48	49	49	40	30	29	14	12	9	11	39.1	49	
14-Feb	13	10	5	4	Z	5	4	5	8	19	21	28	36	35	31	30	43	40	39	40	41	41	41	40	25.4	43
15-Feb	40	39	35	29	24	Z	13	9	16	21	24	26	33	36	31	27	26	22	20	37	39	39	40	37	28.8	40
16-Feb	39	39	37	40	40	39	Z	23	8	18	30	36	38	38	37	32	34	30	18	18	8	6	11	28	28.1	40
17-Feb	26	Z	35	33	29	30	26	26	33	28	19	18	30	33	36	34	13	19	22	23	20	21	25	25	26.3	36
18-Feb	24	25	Z	27	27	21	18	15	13	14	16	16	24	33	38	37	37	33	30	32	34	33	33	32	26.7	38
19-Feb	34	35	37	Z	38	37	38	37	36	36	36	37	39	39	39	39	37	35	34	34	33	32	28	29	35.6	39
20-Feb	29	30	28	26	Z	12	14	23	29	31	31	33	32	32	32	32	31	32	31	31	32	33	34	33	29.3	34
21-Feb	36	36	37	38	38	Z	39	40	37	37	36	36	37	36	37	37	37	37	36	35	36	36	37	36	36.8	40
22-Feb	36	36	35	33	21	20	Z	14	17	25	28	27	29	32	32	28	27	24	24	25	27	25	24	21	26.5	36
23-Feb	23	Z	30	29	28	24	21	21	21	27	31	36	36	35	35	34	34	30	23	23	23	22	23	22	27.4	36
24-Feb	14	19	Z	33	31	28	25	27	31	30	34	38	39	41	42	42	41	36	26	32	33	32	36	36	32.4	42
25-Feb	37	32	27	Z	34	31	19	35	36	38	39	39	40	43	43	38	35	37	39	38	38	36	41	37	36.1	43
26-Feb	35	35	36	36	Z	37	36	36	37	37	37	38	40	41	41	39	40	40	40	37	32	27	26	31	36.3	41
27-Feb	32	32	32	33	30	Z	14	21	25	35	36	36	37	38	41	40	40	33	34	32	27	19	21	25	31.2	41
28-Feb	30	35	34	28	22	33	Z	29	30	29	29	28	29	30	30	31	31	24	20	23	18	20	29	29	27.8	35
29.8 30.7 30.9 29.7 29.8 27.7 26.4 25.8 26.0 28.3 30.9 32.8 35.1 35.5 36.1 34.5 32.6 31.0 29.1 30.3 28.6 27.6 28.8 29.6																								Diurnal Average		
47 47 47 47 46 46 47 47 47 47 47 48 48 48 49 49 49 48 48 48 49 49 48 48 48																								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 - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	109	17.03	17.03
21 - 50	531	82.97	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Patricia McInnes - February 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	5	4	2	3	4	3	15	10	11	6	7	3	2	7	16	109
21 - 50	51	23	11	11	28	19	23	16	6	27	74	67	46	47	33	49	531
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	62	28	15	13	31	23	26	31	16	38	80	74	49	49	40	65	640

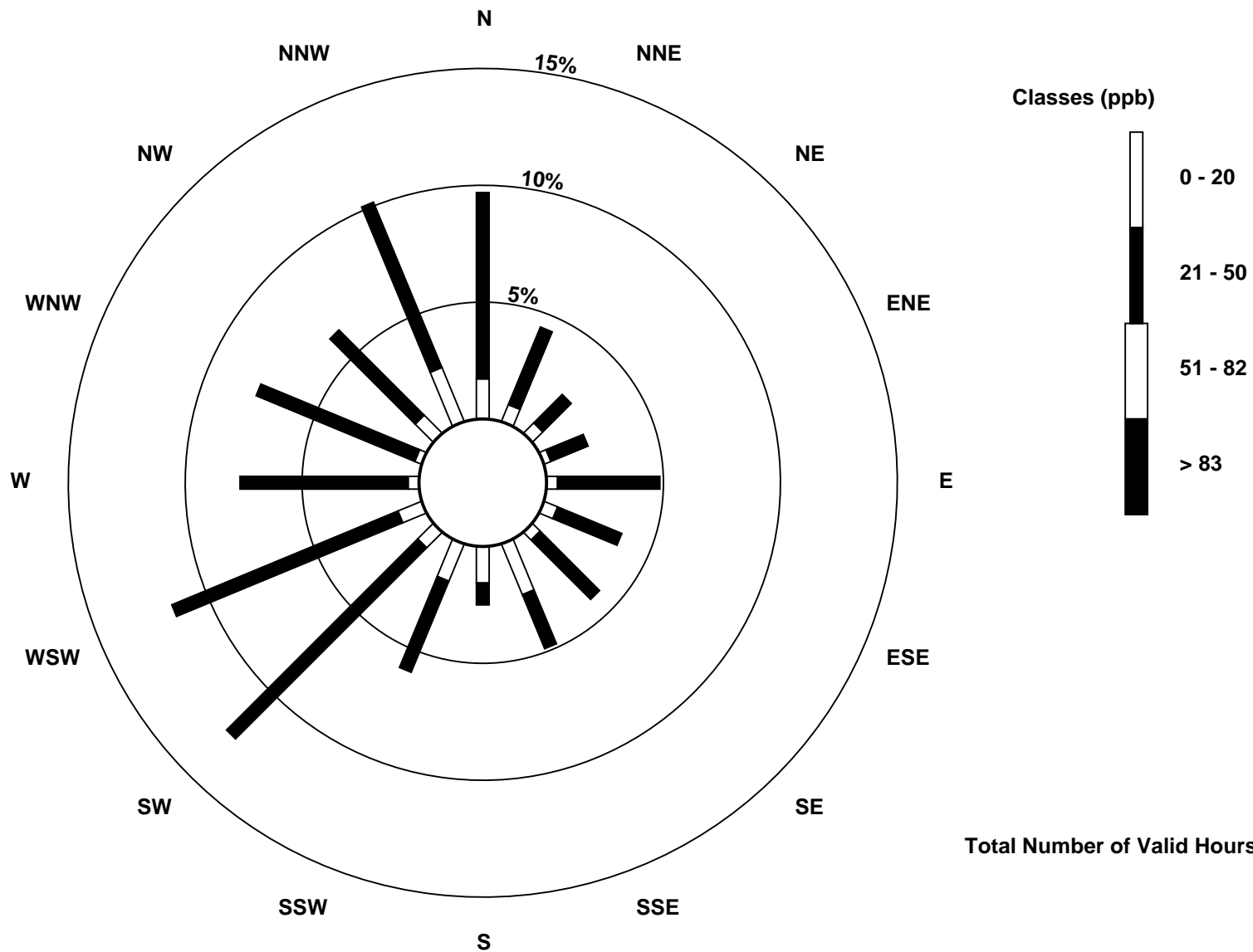
Total Number of Valid Hours: 640

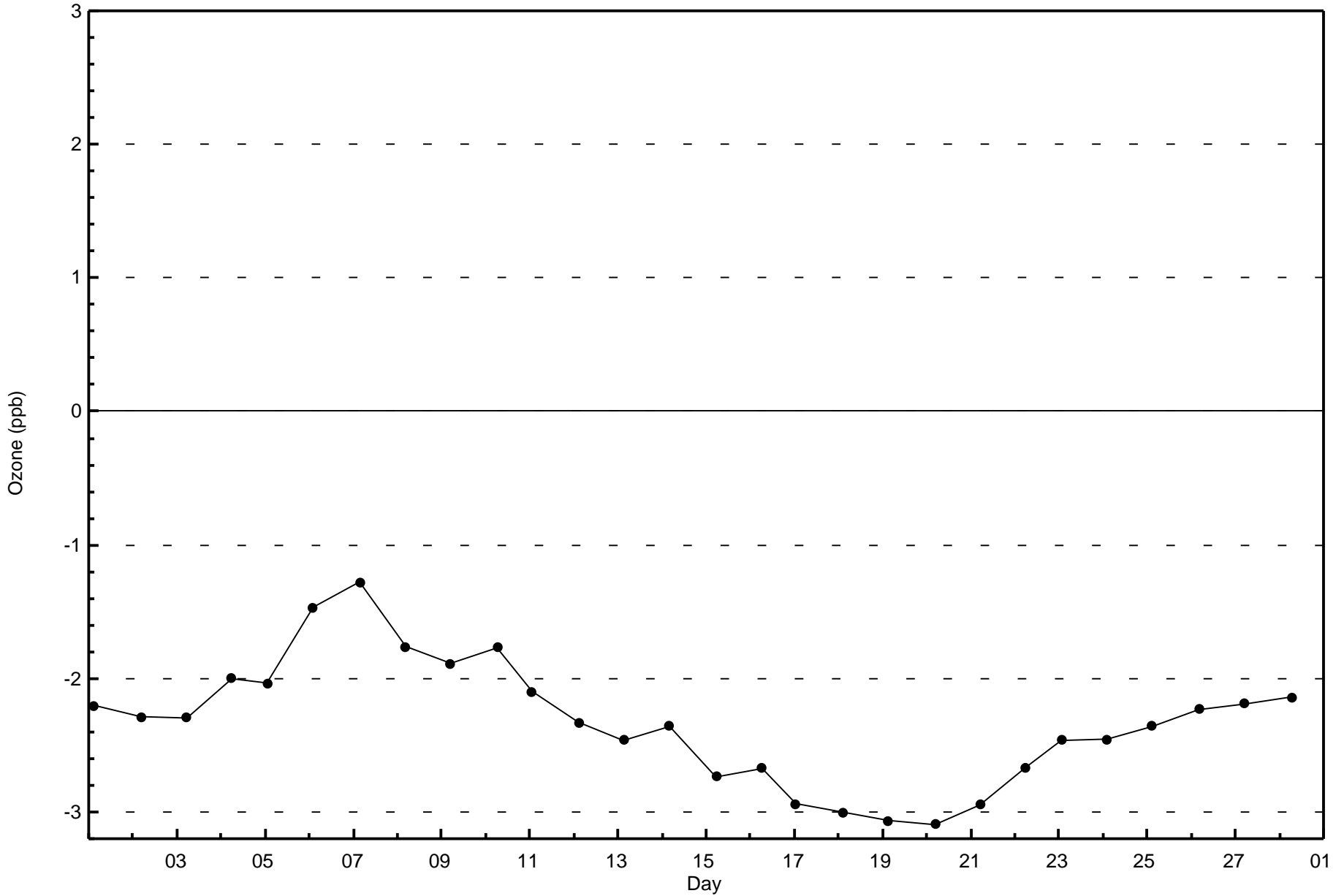
Total Number of Hours: 672

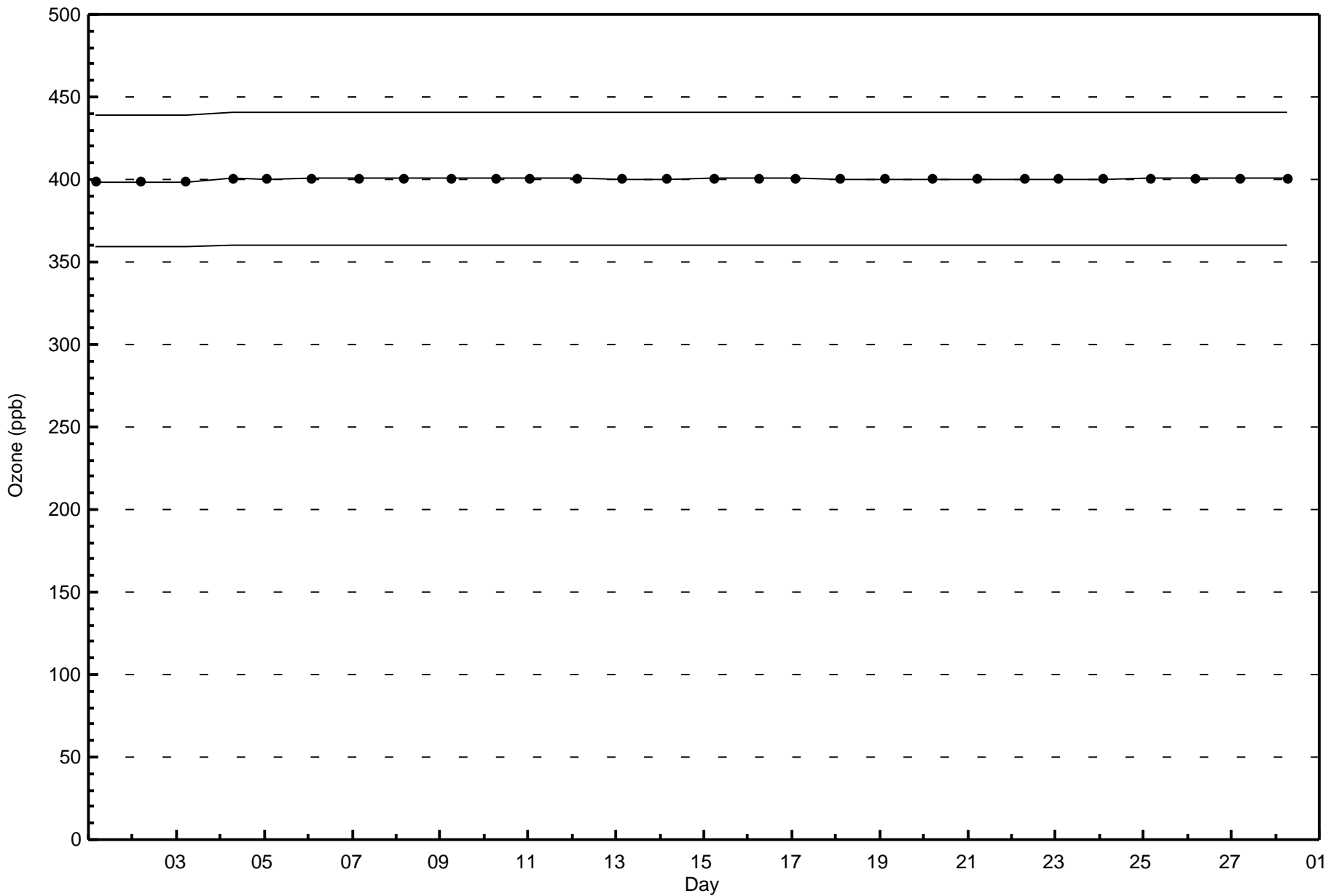


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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







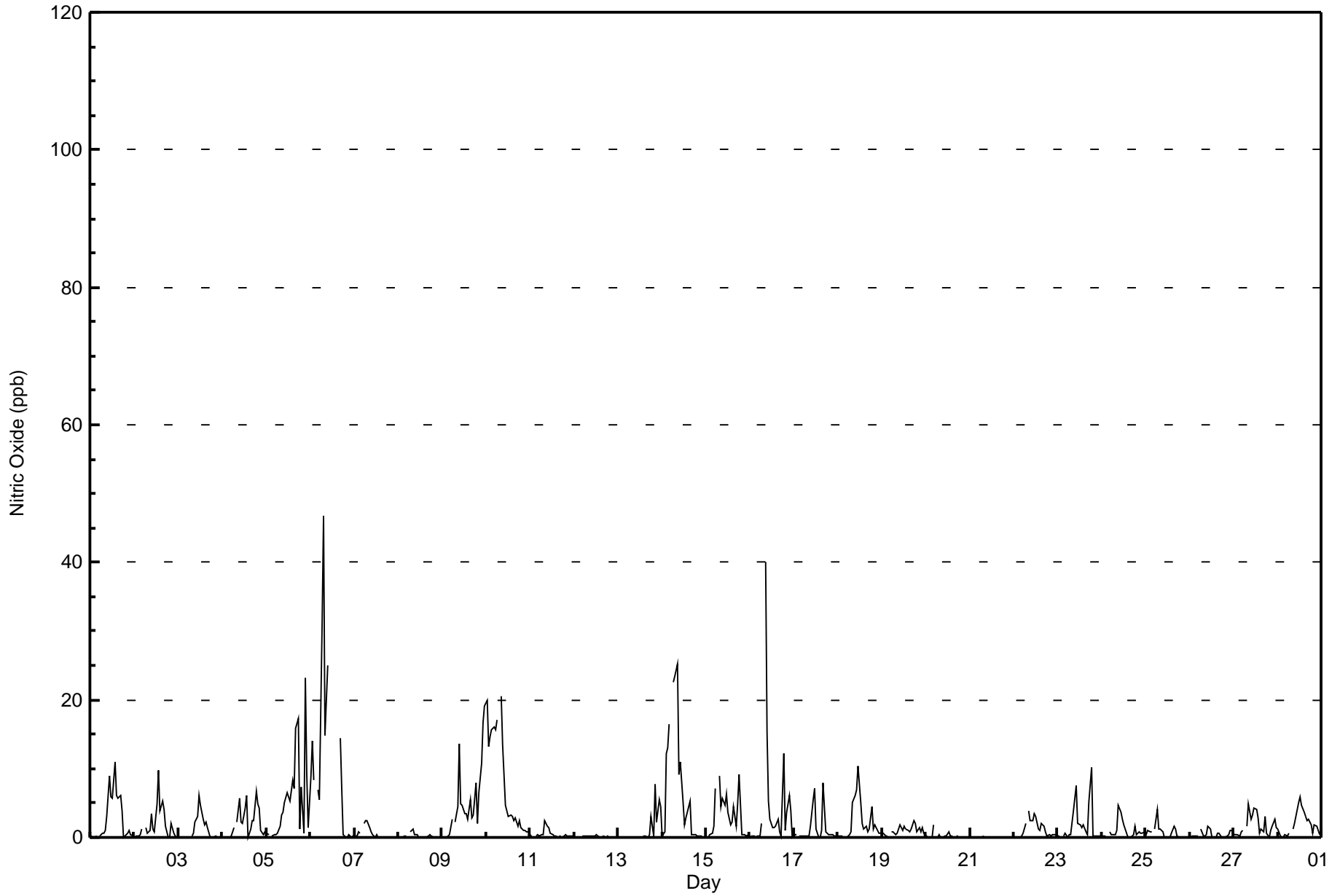


Maximum Value: 47 ppb on Feb 6 08:00																		Maximum Daily Average: 7.8 ppb on Feb 10						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 2 20:00																		Minimum Daily Average: 0.0 ppb on Feb 21						Hours of Data: 638		
Maximum Diurnal Average: 5.2 ppb at hour 9																		Minimum Diurnal Average: 0.8 ppb at hour 20						Hours of Missing Data: 34		
Monthly Average: 2.3 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 22						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-Feb	0	0	0	0	Z	0	1	1	1	3	9	6	6	11	6	6	6	4	0	0	1	1	0	0	2.7	11
2-Feb	0	0	0	0	1	Z	1	1	1	3	1	1	5	10	4	5	4	2	0	0	2	1	0	0	1.9	10
3-Feb	0	0	0	0	0	0	Z	0	1	2	3	6	5	3	2	2	1	0	0	0	0	0	0	1.1	6	
4-Feb	0	0	0	0	0	0	1	Z	2	6	2	2	4	6	0	1	2	3	7	5	4	1	0	1	2.1	7
5-Feb	1	0	Z	0	0	0	1	2	3	4	5	6	6	5	8	7	16	17	1	7	1	23	9	1	5.4	23
6-Feb	9	14	8	Z	7	5	31	47	15	25	C	C	C	C	C	C	15	7	0	0	0	0	0	0	--	47
7-Feb	0	0	1	1	Z	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
8-Feb	0	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
9-Feb	0	0	0	0	0	3	Z	2	4	14	5	5	3	3	3	6	3	3	8	2	6	11	17	19	5.1	19
10-Feb	20	13	15	16	16	16	17	Z	21	13	5	4	3	3	3	2	3	2	2	1	1	1	1	1	7.8	21
11-Feb	0	0	Z	0	0	0	0	0	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
12-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	8	2	5	4	1.1	8
14-Feb	0	1	12	13	16	Z	23	23	25	9	11	5	2	3	4	5	0	1	0	0	0	0	0	0	6.7	25
15-Feb	0	0	0	1	2	7	Z	9	5	6	5	6	4	2	2	5	2	5	9	0	0	0	0	0	3.0	9
16-Feb	0	0	0	0	0	0	2	Z	40	15	5	3	1	1	2	3	1	0	12	1	4	6	4	0	4.4	40
17-Feb	0	0	Z	0	0	0	0	0	0	2	5	7	1	0	0	1	8	1	1	0	0	0	0	0	1.3	8
18-Feb	0	0	0	Z	0	0	0	1	5	6	7	10	5	2	1	2	1	1	4	1	2	1	1	1	2.3	10
19-Feb	1	0	0	0	Z	1	1	0	1	1	2	1	2	1	1	1	1	2	2	1	1	1	1	1	1.0	2
20-Feb	0	0	0	0	2	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	2
21-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	0	0	0	0	0	1	2	Z	4	2	2	3	3	1	1	2	2	1	0	0	0	0	0	0	1.2	4
23-Feb	0	0	Z	0	1	0	0	0	4	6	8	2	2	1	2	1	0	5	10	0	0	0	0	0	1.9	10
24-Feb	0	0	0	Z	1	0	0	0	1	5	4	3	2	1	0	0	0	0	2	0	1	1	1	1	1.0	5
25-Feb	0	1	1	1	Z	1	4	1	1	1	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0.7	4
26-Feb	0	0	0	0	0	Z	1	0	0	0	2	1	0	0	0	1	1	0	0	0	0	0	1	1	0.4	2
27-Feb	0	0	0	0	1	1	Z	2	5	3	3	4	4	3	1	1	1	3	1	0	1	2	3	1	1.7	5
28-Feb	1	0	0	0	0	0	1	Z	1	2	3	5	6	5	4	3	2	3	2	1	2	2	1	0	1.9	6
																		Diurnal Average						Diurnal Maximum		
1.2 1.2 1.6 1.4 2.1 1.7 4.0 4.1 5.2 4.7 3.3 3.1 2.4 2.3 1.7 2.0 2.5 2.2 2.4 0.8 1.3 2.0 1.6 1.2																		20 14 15 16 16 16 31 47 40 25 11 10 6 11 8 7 16 17 12 7 8 23 17 19								
Z - zerospan																		C - Calibration								



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	629	98.59	98.59
21 - 40	8	1.25	99.84
41 - 80	1	0.16	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Patricia McInnes - February 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	63	27	15	12	29	21	26	26	17	34	80	74	50	48	39	68	629
21 - 40	0	0	0	0	0	1	0	2	2	3	0	0	0	0	0	0	8
11 - 80	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	27	15	12	29	22	26	29	19	37	80	74	50	48	39	68	638

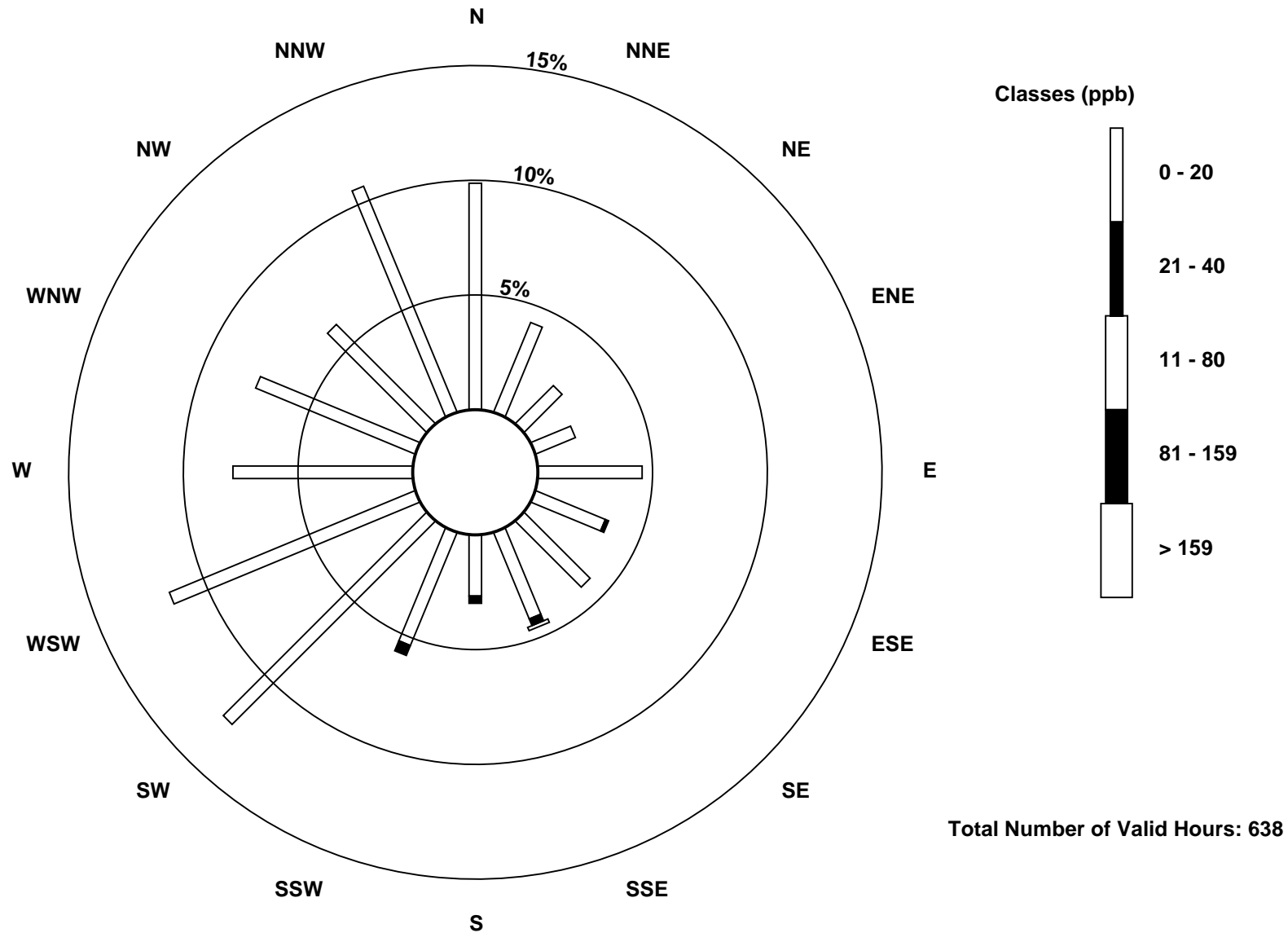
Total Number of Valid Hours: 638

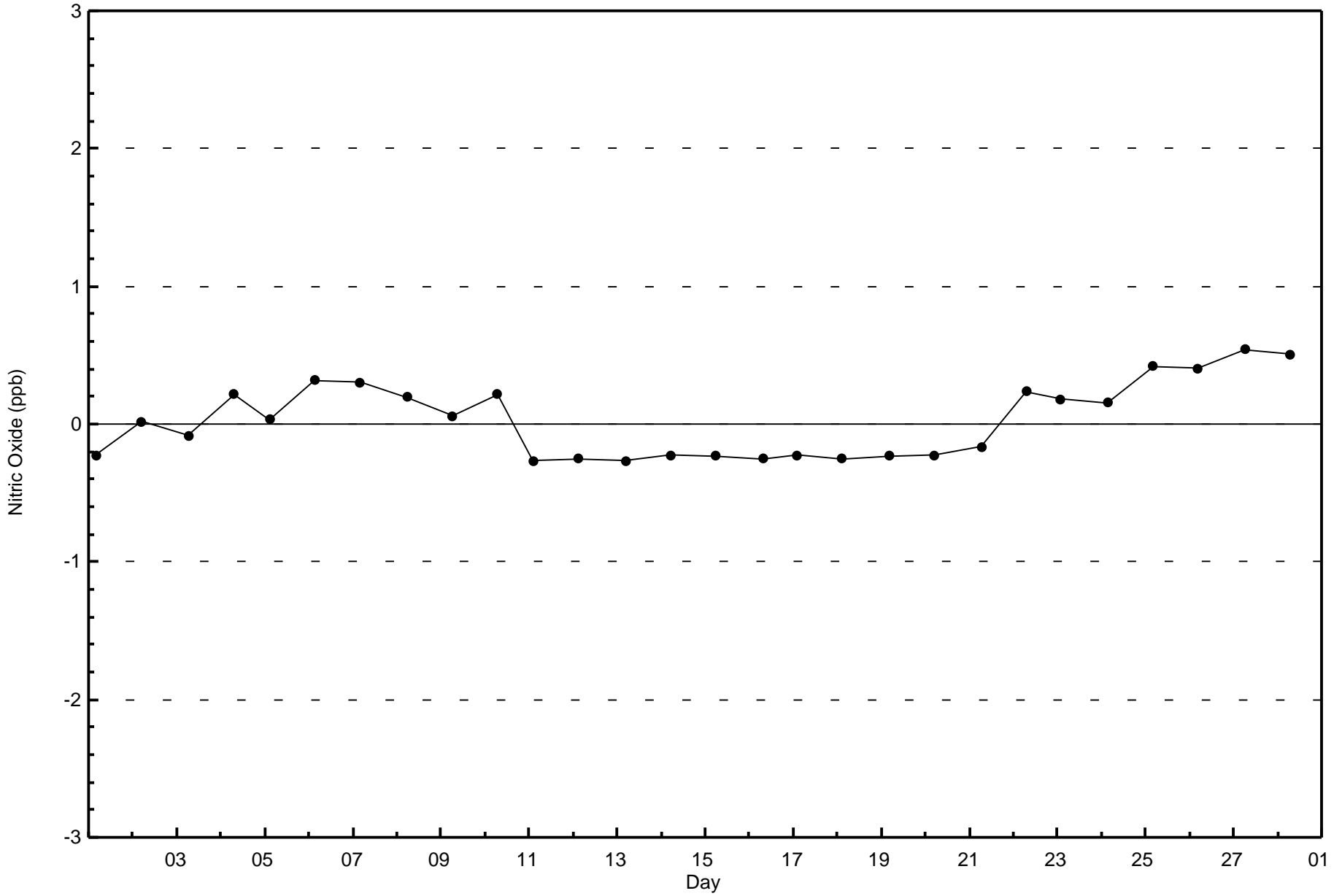
Total Number of Hours: 672

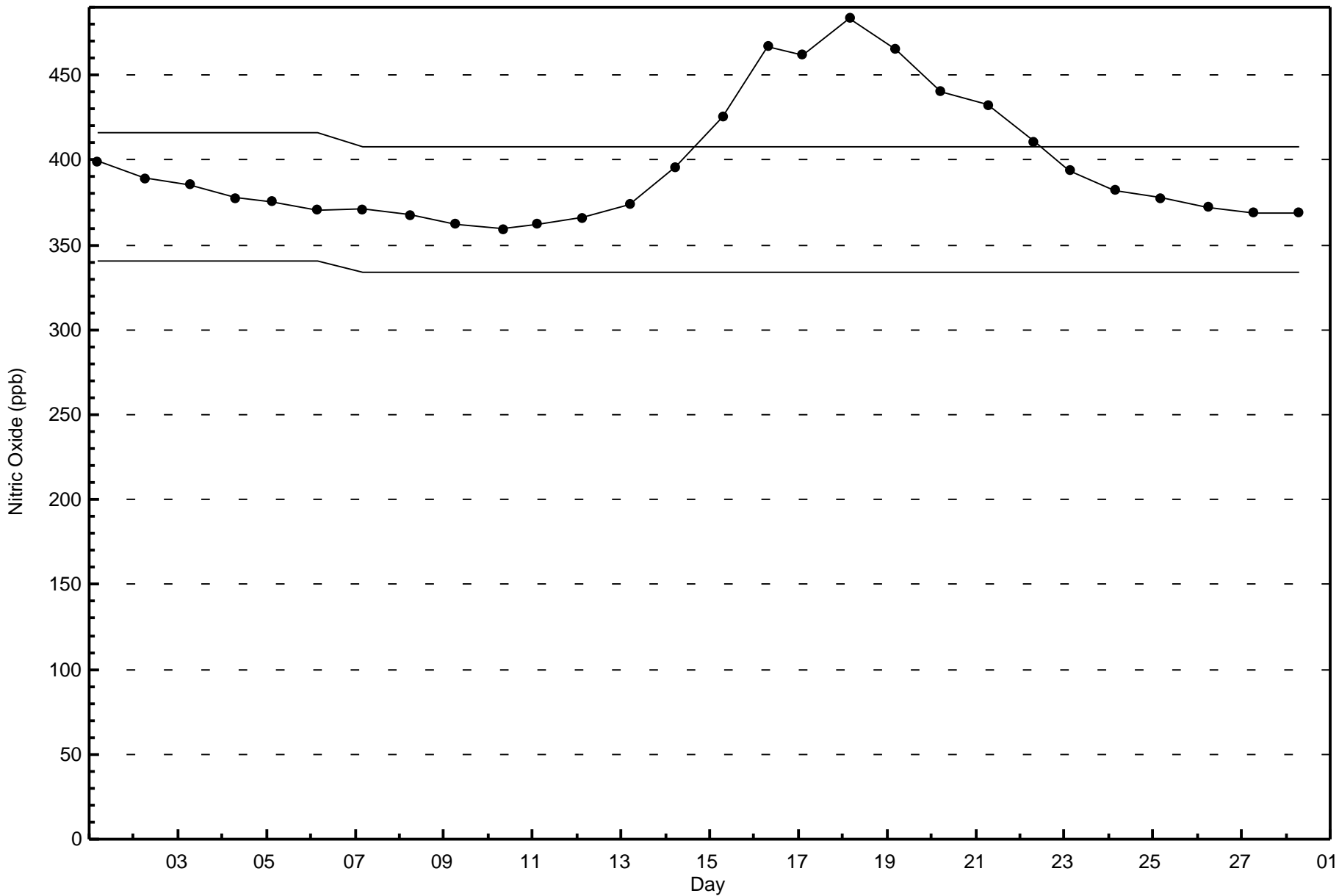


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

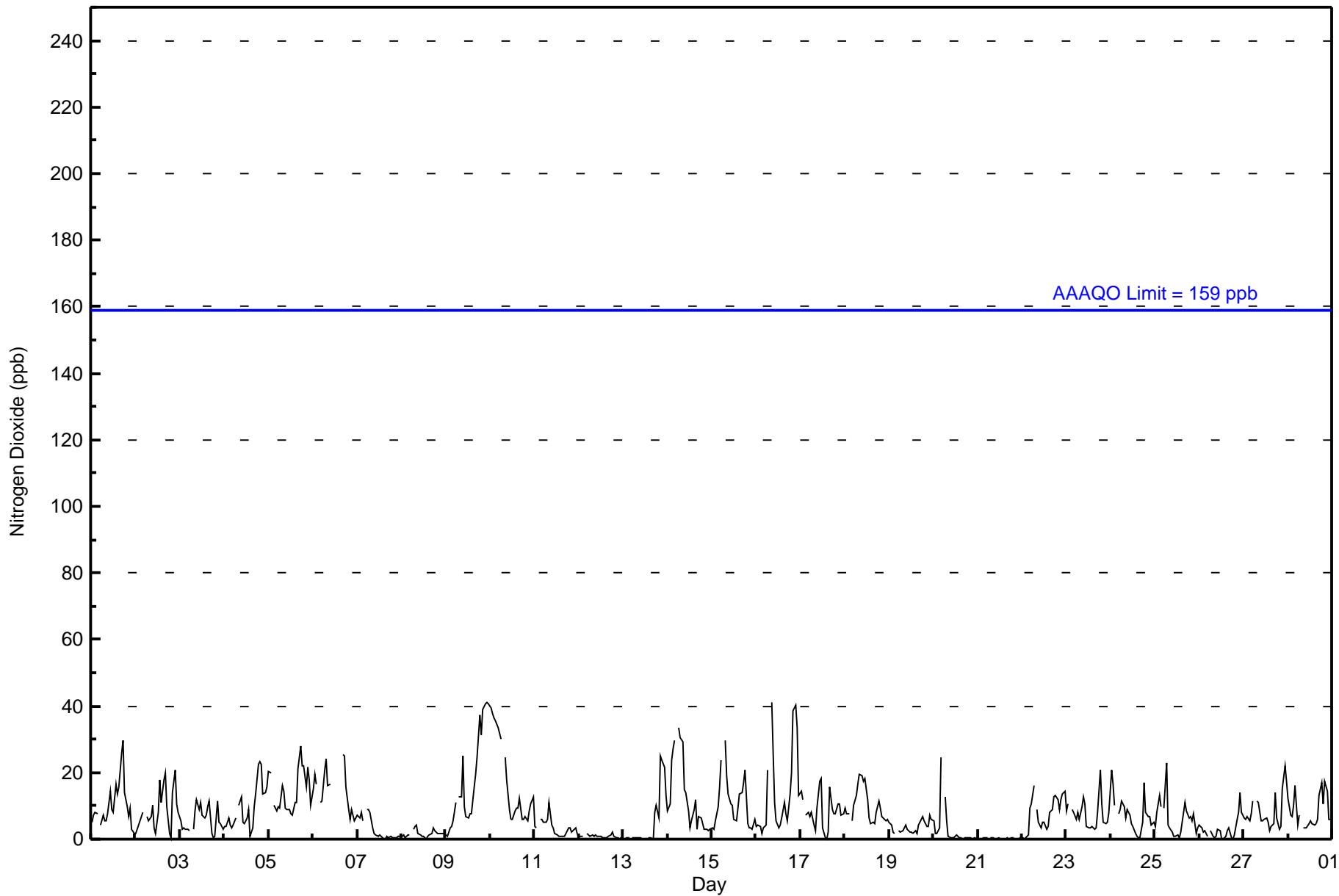
Patricia McInnes - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 41 ppb on Feb 9 23:00										Maximum Daily Average: 17.6 ppb on Feb 9										Hours of Data: 638						
Minimum Value: 0 ppb on Feb 7 15:00										Minimum Daily Average: 0.3 ppb on Feb 21										Hours of Missing Data: 34						
Maximum Diurnal Average: 11.2 ppb at hour 7										Minimum Diurnal Average: 4.1 ppb at hour 13										Hours of Calibration: 34						
Monthly Average: 7.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 6 Q ₃ = 11 P ₉₀ = 18 P ₉₉ = 39										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	5	7	8	8	Z	4	7	6	6	8	14	9	8	17	14	16	26	30	14	10	7	9	3	2	10.2	30
2-Feb	2	3	6	7	8	Z	7	6	7	10	3	2	8	18	11	18	20	10	2	1	14	21	11	8	8.7	21
3-Feb	6	3	3	3	3	3	Z	3	8	12	9	11	7	6	7	10	11	2	1	1	11	5	5	3	5.7	12
4-Feb	4	4	6	4	3	4	6	Z	10	13	5	5	6	9	1	3	10	13	22	23	22	14	14	16	9.5	23
5-Feb	20	20	Z	10	9	10	9	16	14	10	9	9	8	7	11	11	21	28	22	22	16	22	18	10	14.4	28
6-Feb	15	19	17	Z	11	11	21	24	16	17	C	C	C	C	C	C	25	25	16	9	6	9	6	6	--	25
7-Feb	7	7	8	6	Z	9	9	8	4	2	1	1	1	1	0	0	1	1	1	0	0	0	1	1	2.9	9
8-Feb	1	1	0	1	1	Z	3	4	4	2	1	1	1	0	1	1	2	3	3	2	2	2	2	2	1.7	4
9-Feb	1	1	3	4	6	11	Z	13	13	25	10	7	6	8	8	16	20	25	37	32	39	41	41	41	17.6	41
10-Feb	39	38	37	36	33	32	30	Z	24	18	9	6	6	9	9	10	12	6	6	7	5	8	11	13	17.5	39
11-Feb	4	4	Z	6	6	5	5	6	11	4	4	2	1	1	1	1	1	2	4	4	2	3	4	2	3.4	11
12-Feb	1	1	1	Z	2	1	1	1	1	1	1	1	1	1	0	1	1	1	2	1	0	0	0	0	0.9	2
13-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	8	10	6	25	24	22	13	4.9	25
14-Feb	8	11	24	27	30	Z	34	30	29	15	14	9	3	5	9	12	3	7	7	5	3	3	3	3	12.7	34
15-Feb	3	3	6	10	16	24	Z	30	19	14	11	10	6	6	9	14	14	17	21	5	4	3	3	6	10.9	30
16-Feb	4	4	4	2	4	4	21	Z	41	26	11	5	3	4	6	11	8	6	14	20	39	40	33	13	14.0	41
17-Feb	14	12	Z	7	8	7	8	4	2	9	17	18	4	0	0	2	16	9	8	8	11	11	7	8	8.3	18
18-Feb	9	8	8	Z	5	10	13	17	19	19	17	18	12	6	5	5	5	8	12	9	7	7	5	6	10.0	19
19-Feb	5	4	2	2	Z	3	2	3	4	4	3	2	2	2	3	2	4	6	7	5	4	4	7	6	3.7	7
20-Feb	6	2	2	4	24	Z	13	5	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	2.7	24
21-Feb	0	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Feb	0	0	1	1	9	10	16	Z	9	5	4	5	5	3	4	8	9	13	13	12	9	12	14	14	7.6	16
23-Feb	9	11	Z	9	8	6	8	6	10	13	11	4	3	4	4	3	4	8	21	11	5	5	5	8	7.5	21
24-Feb	21	16	10	Z	8	9	11	10	6	9	7	5	4	2	1	0	0	5	17	8	7	7	4	5	7.5	21
25-Feb	4	8	13	10	Z	9	23	4	4	2	1	1	1	0	2	8	11	9	6	7	6	8	2	3	6.2	23
26-Feb	4	3	2	3	1	Z	2	1	0	1	3	2	0	0	1	3	4	1	0	1	6	8	14	8	2.9	14
27-Feb	7	6	7	6	8	12	Z	11	11	5	5	6	6	5	3	4	5	14	6	3	4	15	22	17	8.1	22
28-Feb	12	7	7	10	16	4	7	Z	4	3	3	5	5	5	4	5	6	13	17	11	17	15	6	6	8.2	17
7.6 7.3 7.2 7.2 9.5 8.2 11.2 9.0 9.9 8.8 6.5 5.3 4.1 4.4 4.2 6.0 8.5 9.6 10.3 7.9 9.7 10.5 9.3 7.9																								Diurnal Average		
39 38 37 36 33 32 34 30 41 26 17 18 12 18 14 18 26 30 37 32 39 41 41 41																								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
Patricia McInnes - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	584	91.54	91.54
21 - 40	50	7.84	99.37
41 - 80	4	0.63	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - February 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	58	25	13	11	28	19	24	22	13	31	77	74	50	48	36	55	584
21 - 40	4	2	2	1	1	2	2	7	6	6	3	0	0	0	3	11	50
11 - 80	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	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	63	27	15	12	29	22	26	29	19	37	80	74	50	48	39	68	638

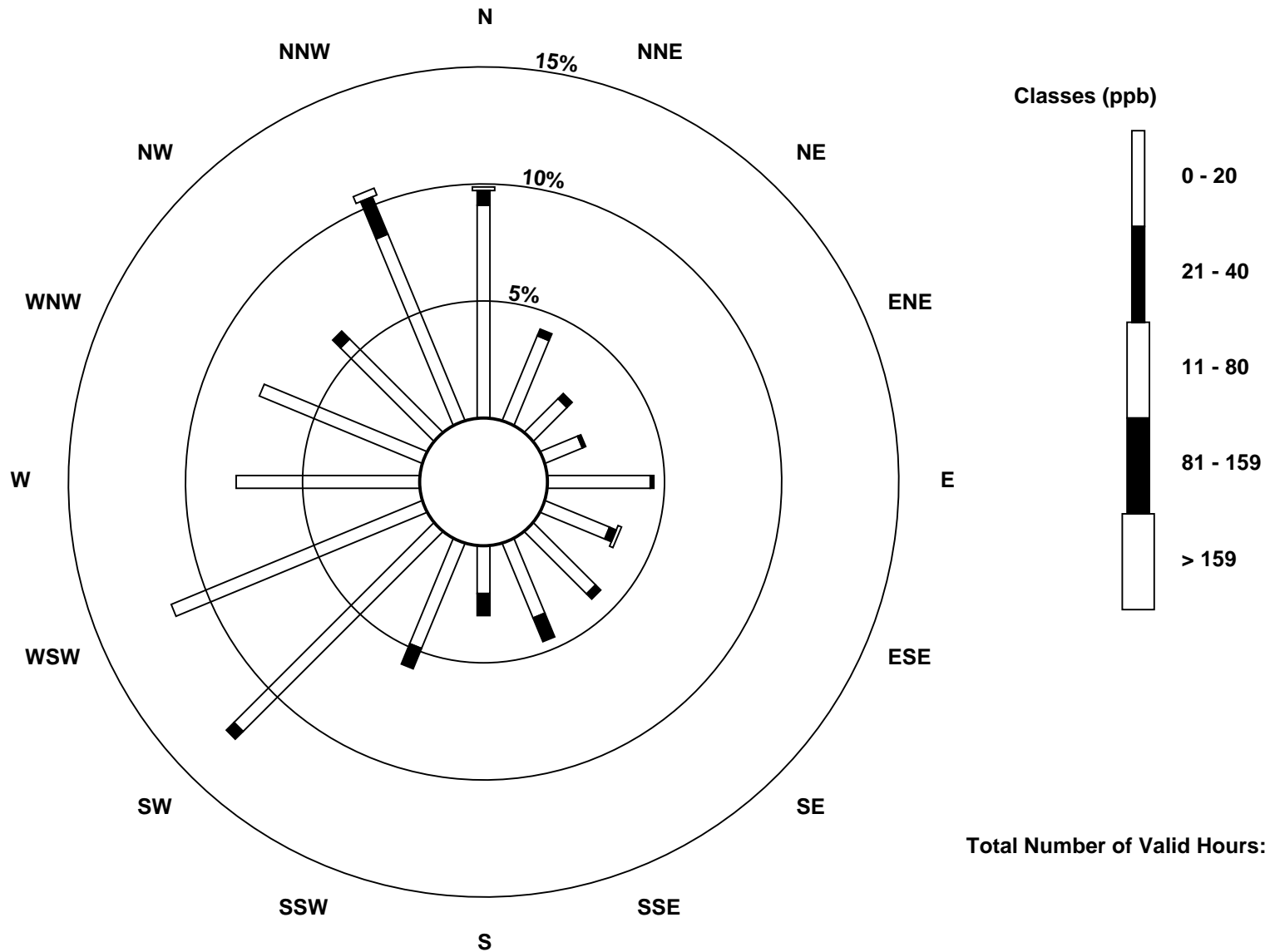
Total Number of Valid Hours: 638

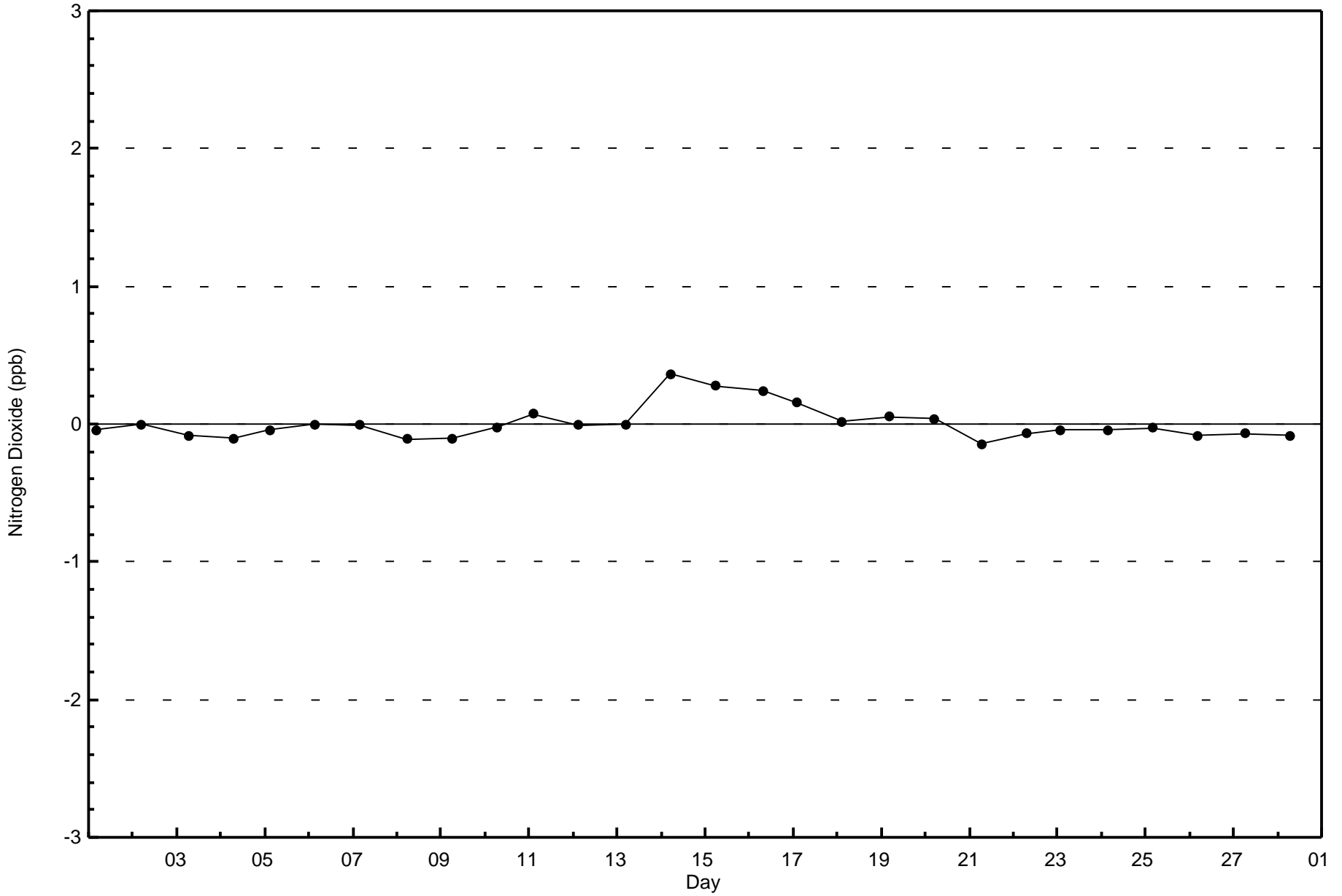
Total Number of Hours: 672

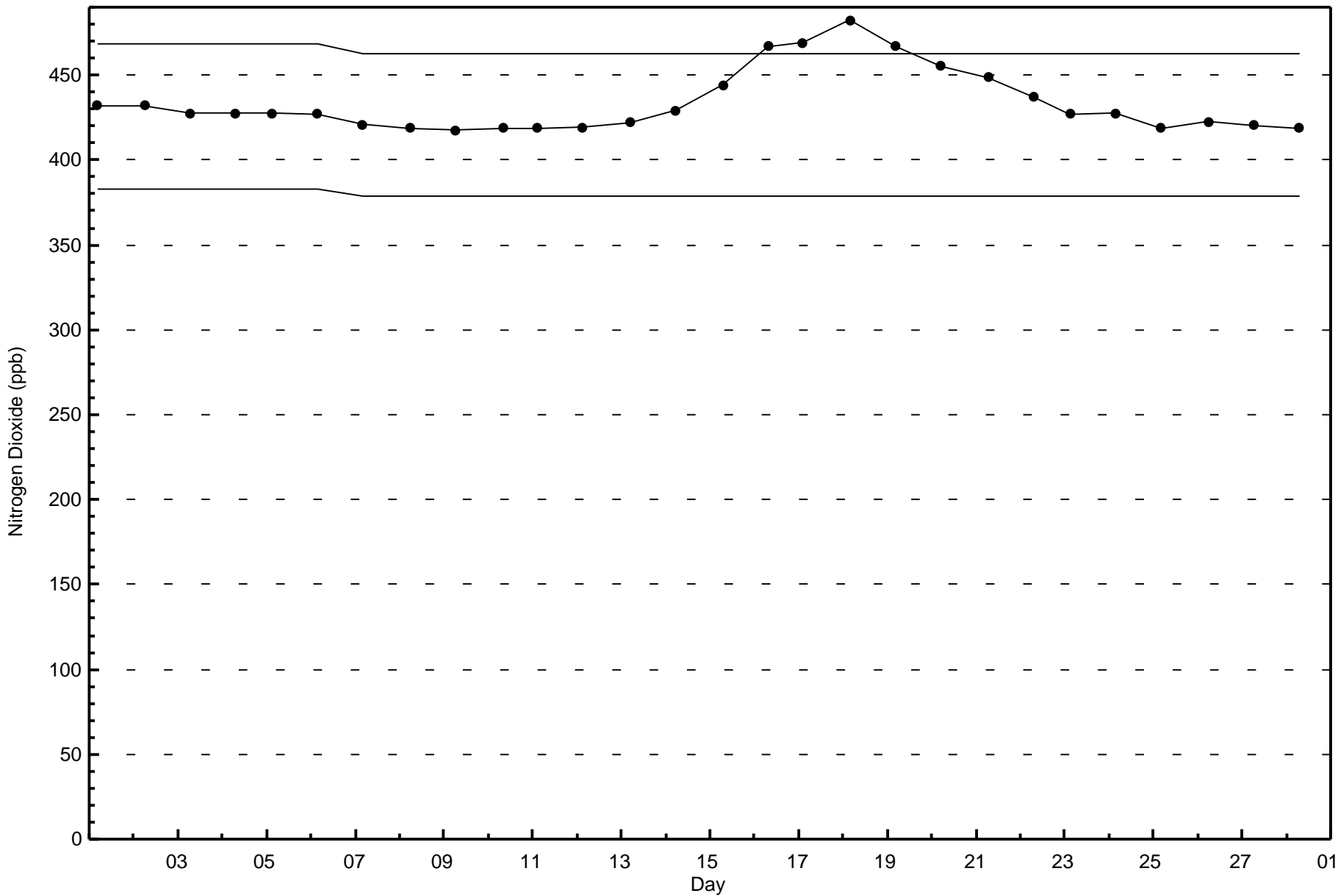


Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





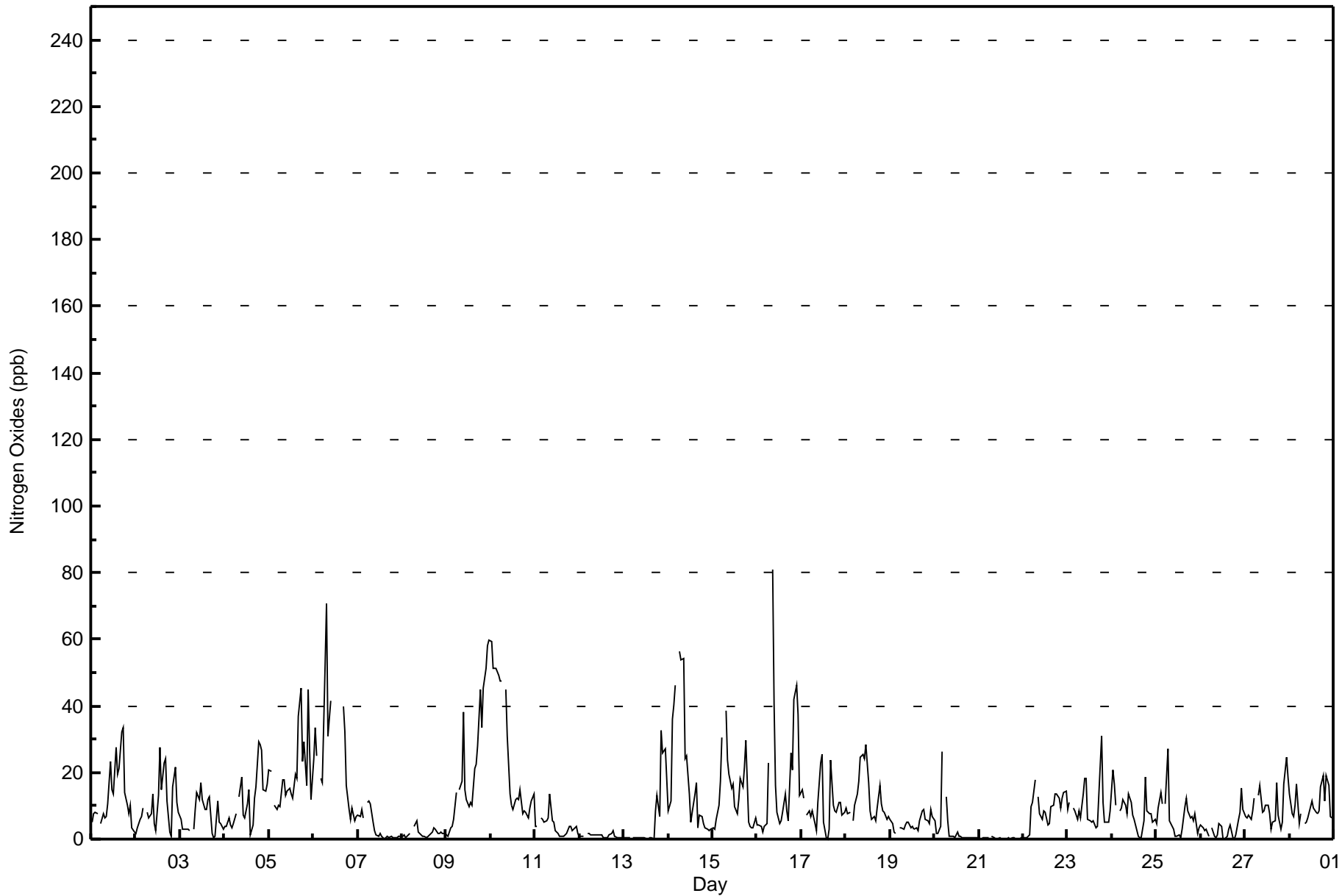




Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Value: 81 ppb on Feb 16 09:00																			Maximum Daily Average: 25.3 ppb on Feb 10						Hours in Service: 672	
Minimum Value: 0 ppb on Feb 26 13:00																			Minimum Daily Average: 0.3 ppb on Feb 21						Hours of Data: 638	
Maximum Diurnal Average: 15.2 ppb at hour 7																			Minimum Diurnal Average: 5.9 ppb at hour 15						Hours of Missing Data: 34	
Monthly Average: 10.2 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 7 Q ₃ = 13 P ₉₀ = 24 P ₉₉ = 55						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-Feb	5	7	8	8	Z	5	8	6	7	11	23	15	14	28	20	21	32	33	14	10	7	10	3	2	12.9	33
2-Feb	2	3	6	7	9	Z	8	6	8	14	5	3	13	27	15	23	24	11	2	1	16	21	11	8	10.5	27
3-Feb	6	3	3	3	3	2	Z	3	9	14	12	17	12	9	9	12	13	2	1	1	12	5	4	3	6.8	17
4-Feb	4	4	6	4	3	5	8	Z	13	19	7	6	11	15	1	4	12	16	29	28	27	15	14	16	11.6	29
5-Feb	21	20	Z	10	9	10	10	18	18	13	14	15	13	12	19	18	37	45	23	29	16	45	27	12	19.8	45
6-Feb	24	34	25	Z	18	17	52	71	31	42	C	C	C	C	C	C	40	32	16	9	6	9	6	7	--	71
7-Feb	7	7	9	6	Z	11	11	11	5	3	1	1	2	1	0	0	1	1	1	0	0	0	1	1	3.4	11
8-Feb	1	1	0	1	2	Z	4	5	5	2	1	1	1	0	1	1	2	4	3	2	2	2	2	1	1.9	5
9-Feb	1	1	3	4	6	14	Z	15	17	38	15	12	10	11	10	21	22	28	45	33	45	51	58	60	22.7	60
10-Feb	59	51	51	51	49	47	47	Z	45	31	14	10	9	12	12	12	15	8	8	8	6	9	11	14	25.3	59
11-Feb	4	4	Z	6	6	5	5	7	14	6	5	2	2	1	1	1	1	2	4	4	2	3	4	2	3.9	14
12-Feb	1	1	1	Z	2	2	1	1	1	1	1	1	1	1	0	1	1	1	2	1	0	0	0	0	1.0	2
13-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	8	13	7	33	26	27	18	5.9	33
14-Feb	9	12	36	40	46	Z	56	54	54	24	25	14	5	8	14	17	3	7	7	5	3	3	3	3	19.5	56
15-Feb	3	3	6	10	17	31	Z	39	24	19	15	16	10	8	12	18	16	22	30	5	4	4	3	6	14.0	39
16-Feb	4	4	4	2	4	5	23	Z	81	41	16	8	5	6	8	14	8	6	26	21	42	46	37	13	18.4	81
17-Feb	15	12	Z	7	9	7	8	5	3	11	23	25	5	0	0	3	24	10	8	8	11	11	7	8	9.6	25
18-Feb	9	8	8	Z	5	10	13	17	24	25	24	28	17	8	6	7	5	9	16	10	9	8	6	7	12.3	28
19-Feb	6	5	2	2	Z	3	3	3	4	5	5	3	4	3	4	3	5	8	9	6	5	5	9	7	4.7	9
20-Feb	6	2	2	4	26	Z	13	6	1	1	1	1	2	1	1	0	0	1	0	0	0	0	0	0	2.9	26
21-Feb	0	0	0	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
22-Feb	0	0	0	1	10	11	18	Z	13	8	6	9	8	4	5	10	10	14	13	12	9	12	14	14	8.8	18
23-Feb	9	11	Z	9	9	6	9	6	13	18	18	6	5	5	6	4	4	13	31	11	5	5	5	8	9.4	31
24-Feb	21	17	10	Z	8	9	12	10	8	14	11	7	6	3	1	0	0	6	19	8	8	8	5	6	8.5	21
25-Feb	4	9	14	11	Z	11	27	5	5	3	1	1	1	0	3	10	12	9	6	7	6	8	2	3	6.9	27
26-Feb	4	3	2	3	1	Z	4	1	1	1	5	4	0	0	1	3	4	1	0	1	6	8	15	9	3.3	15
27-Feb	7	6	7	6	9	12	Z	13	16	8	9	10	10	8	3	5	5	17	7	3	5	17	24	19	9.9	24
28-Feb	13	8	7	10	17	5	8	Z	5	5	6	10	11	9	8	8	8	16	19	11	19	16	7	6	10.1	19
																			8.8 8.5 8.9 8.6 11.6 9.9 15.2 13.1 15.1 13.5 9.8 8.4 6.5 6.7 5.9 8.0 11.0 11.7 12.6 8.7 10.9 12.4 10.9 9.1						Diurnal Average	
																			59 51 51 51 49 47 56 71 81 42 25 28 17 28 20 23 40 45 45 33 45 51 58 60						Diurnal Maximum	
Z - zerospan																			C - Calibration							





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	555	86.99	86.99
21 - 40	57	8.93	95.92
41 - 80	25	3.92	99.84
81 - 159	0	0.00	99.84
> 159	0	0.00	99.84

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - February 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	58	23	10	10	25	17	22	18	10	29	77	73	49	48	33	53	555
21 - 40	1	4	4	2	4	4	4	6	7	5	3	1	1	0	5	6	57
11 - 80	4	0	1	0	0	0	0	5	2	3	0	0	0	0	1	9	25
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	63	27	15	12	29	21	26	29	19	37	80	74	50	48	39	68	637

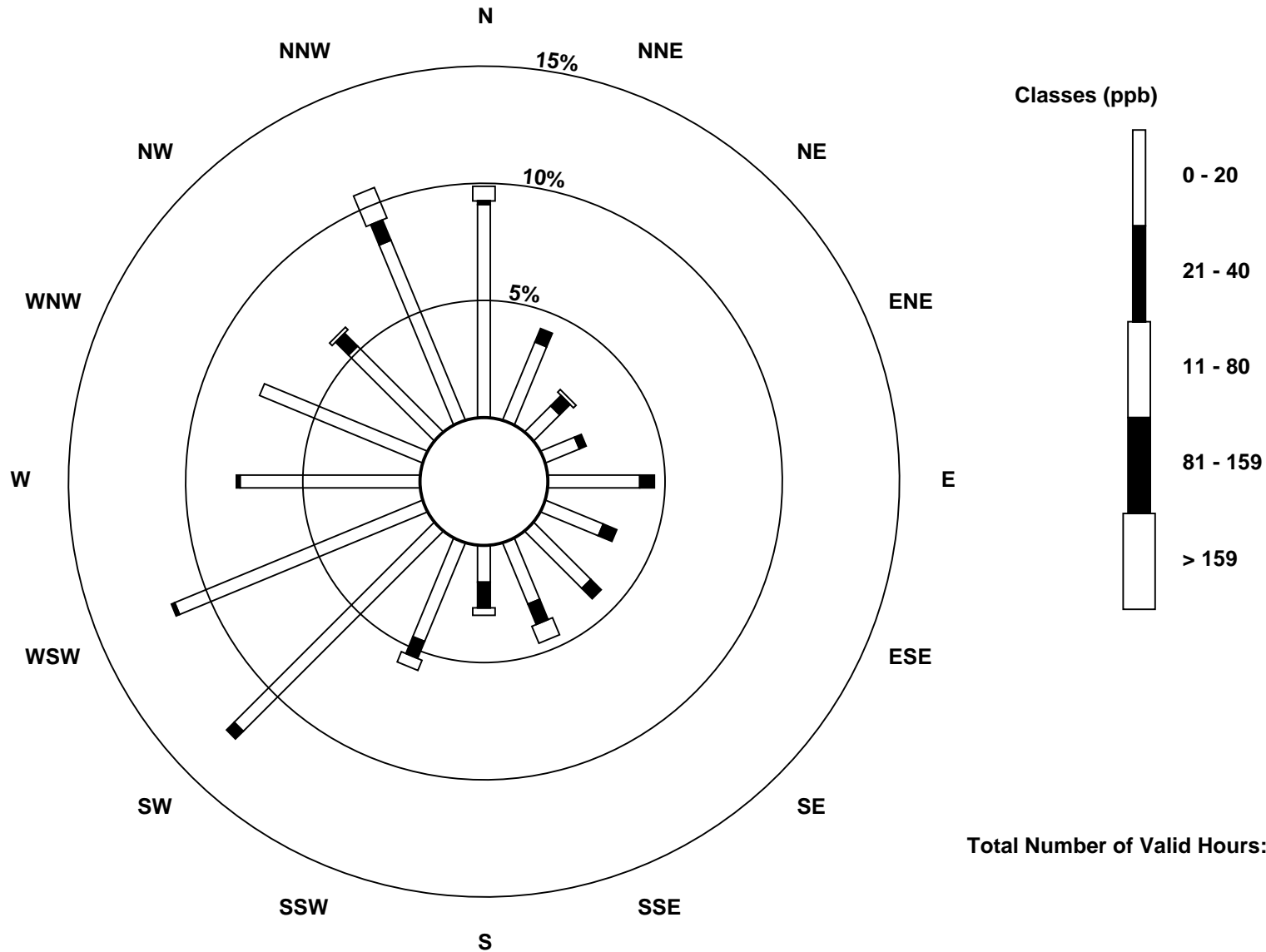
Total Number of Valid Hours: 638

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

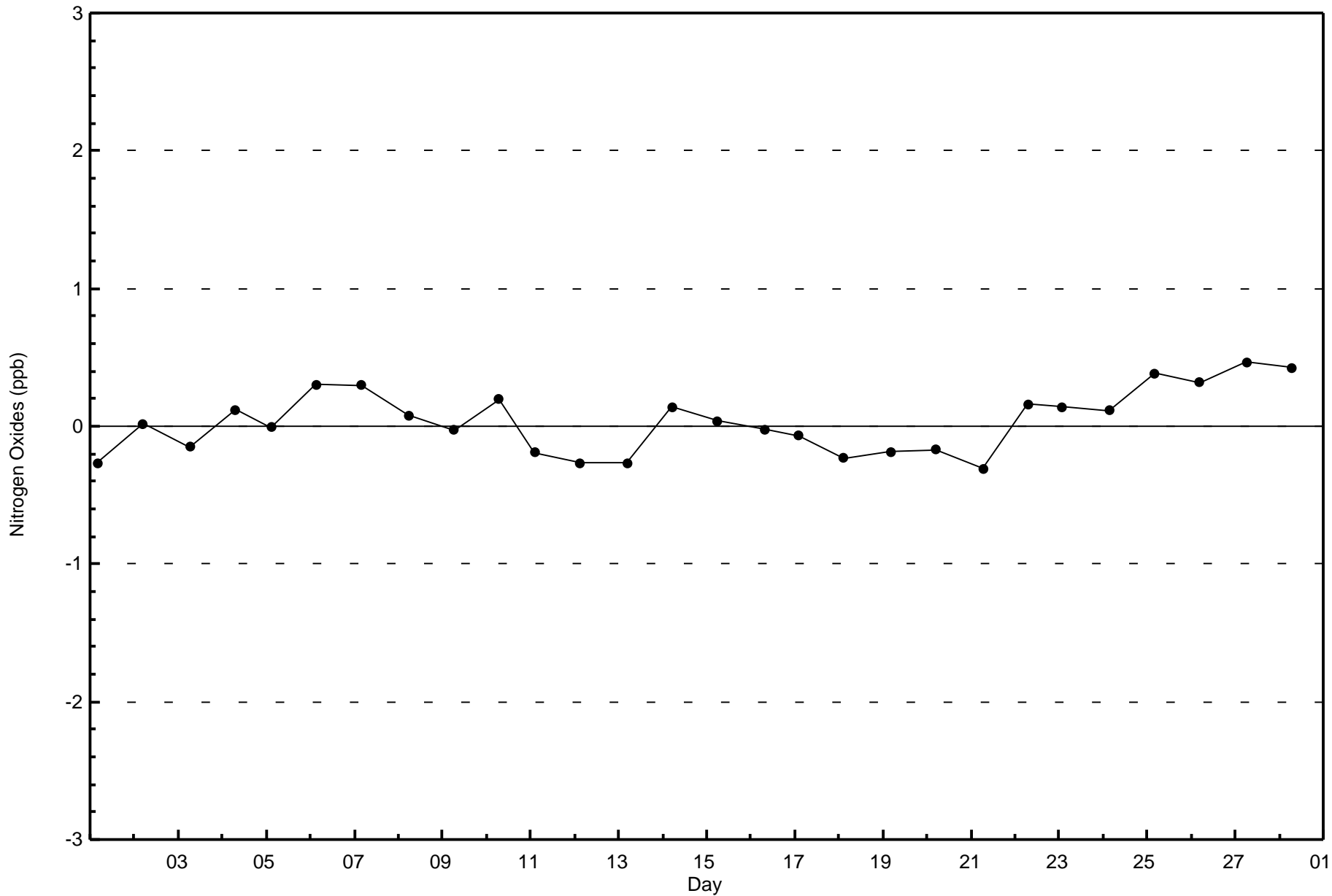
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes (AMS 6)

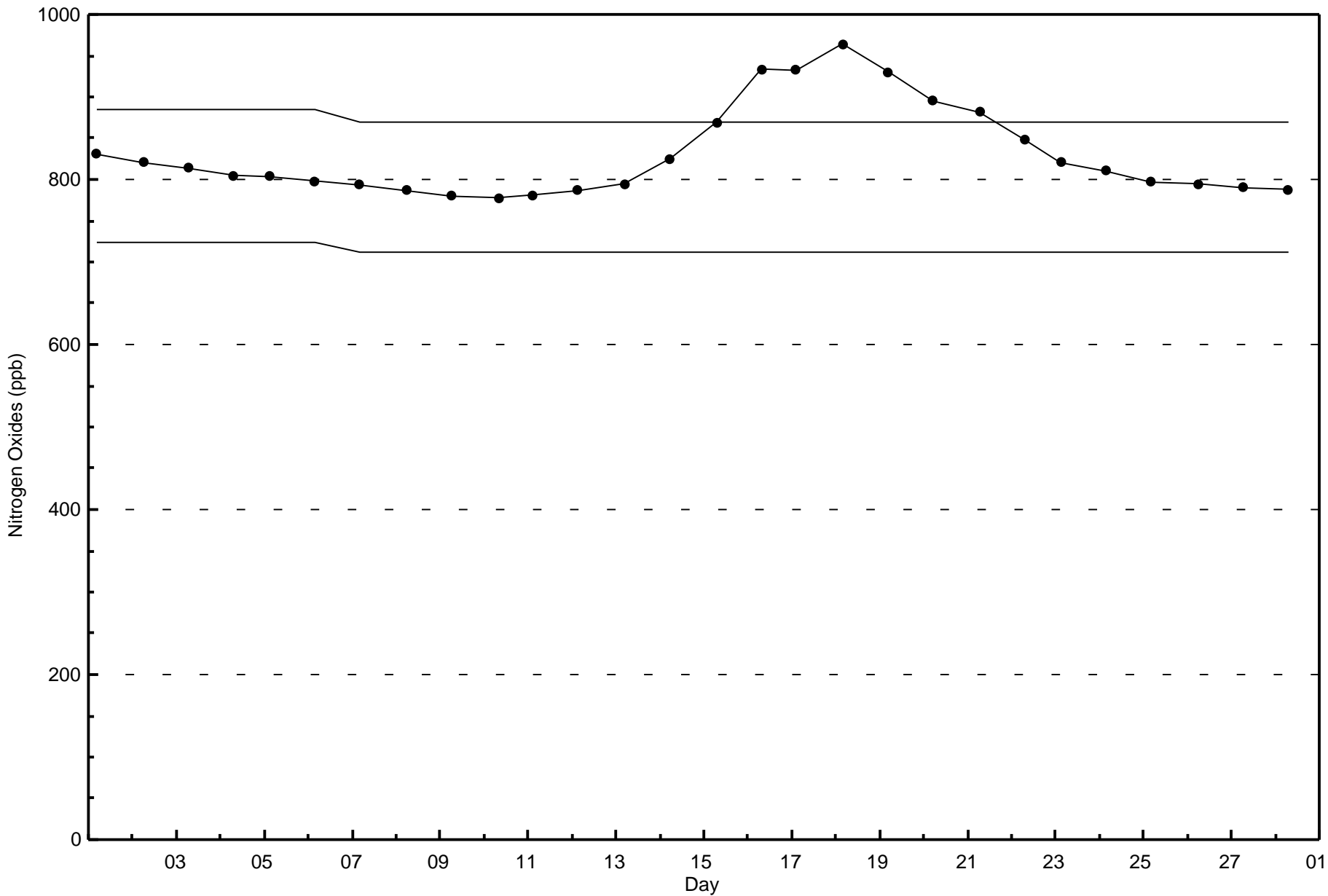




Wood Buffalo Environmental Association
Zero Responses

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







Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

Patricia McInnes - February 2017

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 11 ppb on Feb 16 08:00	Maximum Daily Average: 1.0 ppb on Feb 16	Hours in Service: 672
Minimum Value: 0 ppb on Feb 1 01:00	Maximum Diurnal Average: 0.4 ppb at hour 8	Minimum Daily Average: 0.0 ppb on Feb 1	Hours of Data: 588
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	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Missing Data: 84
			Hours of Calibration: 41
			Percent Operational Time: 93.6

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-Feb	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
2-Feb	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
3-Feb	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
4-Feb	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
5-Feb	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
6-Feb	0	Z	RE	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
7-Feb	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	--	0
8-Feb	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
9-Feb	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
10-Feb	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
11-Feb	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
12-Feb	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
13-Feb	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
14-Feb	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
15-Feb	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
16-Feb	0	0	0	0	0	Z	RE	11	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	11
17-Feb	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-Feb	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
19-Feb	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
20-Feb	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
21-Feb	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
22-Feb	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
23-Feb	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
24-Feb	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
25-Feb	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
26-Feb	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
27-Feb	0	0	0	0	Z	RE	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0	0	0	0	--	0
28-Feb	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
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
	0	0	0	0	0	0	0	11	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

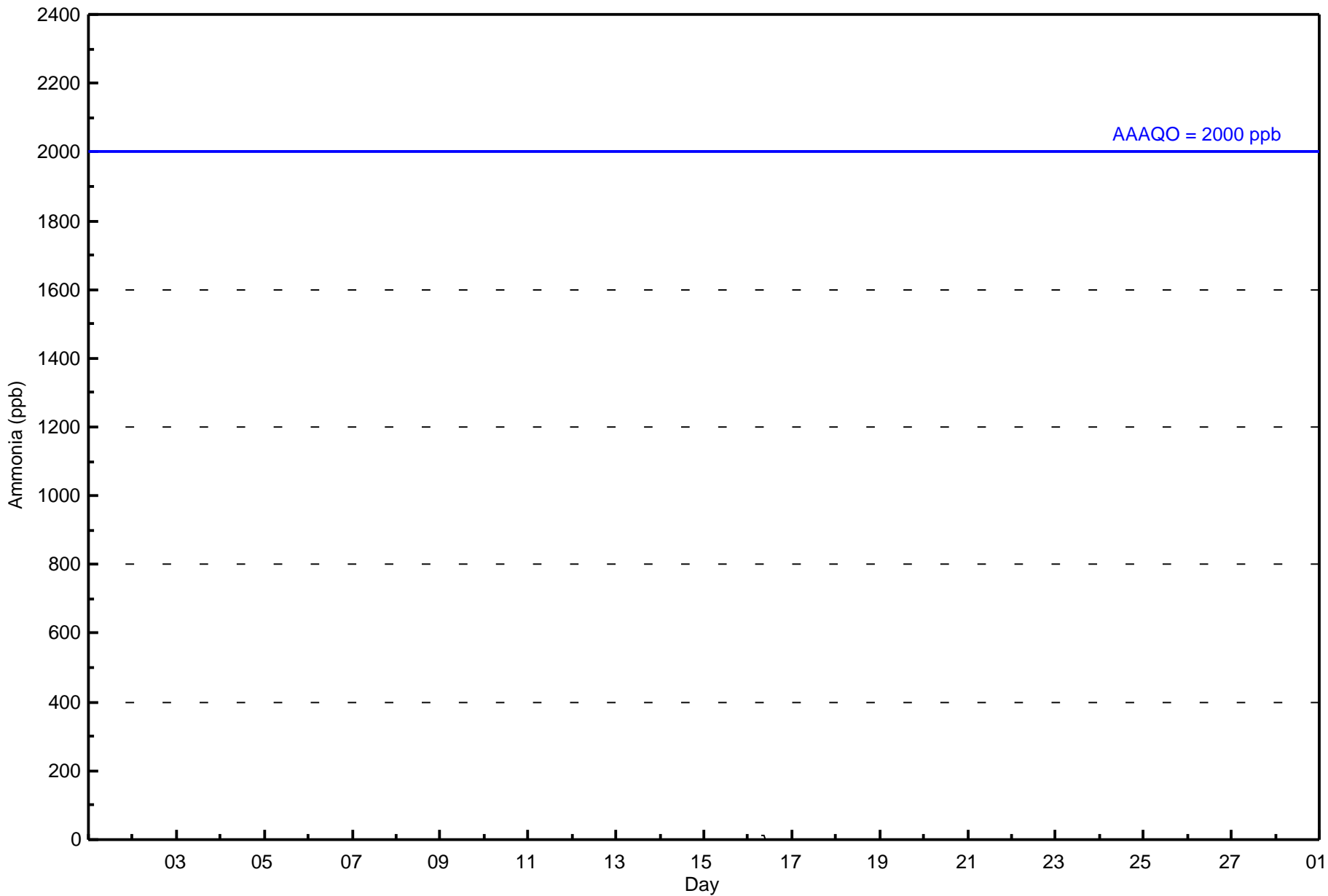
Z - zerospan C - Calibration AF - Analyzer Failure RE - Recovery

Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	586	99.66	99.66
6 - 10	1	0.17	99.83
11 - 15	1	0.17	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: 588

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Totals
0 - 5	57	25	15	11	28	21	26	26	18	35	73	66	47	45	34	59	586
6 - 10	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
11 - 15	0	0	0	0	0	0	0	0	0	1	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	57	25	15	11	28	22	26	26	18	36	73	66	47	45	34	59	588

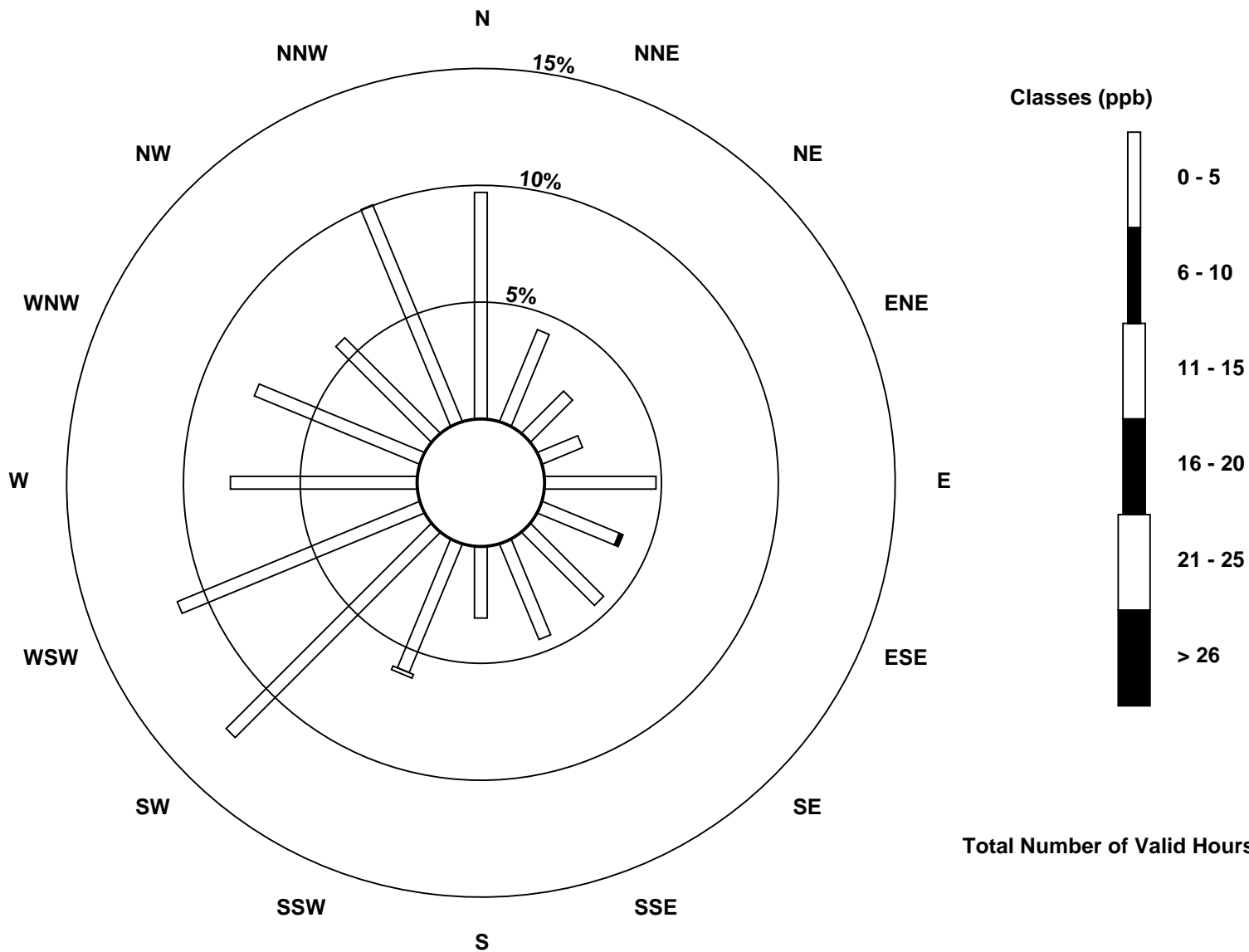
Total Number of Valid Hours: 588

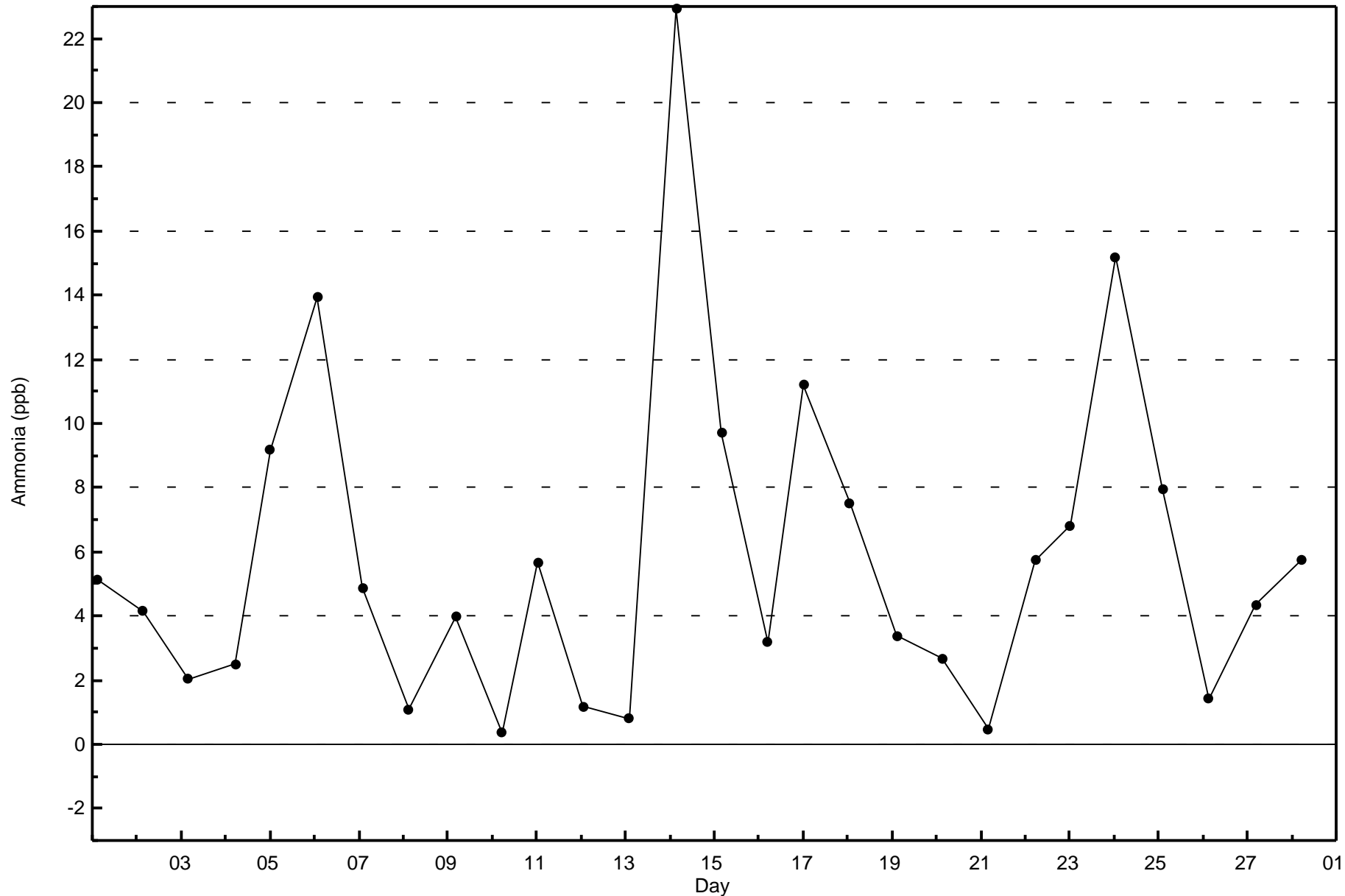
Total Number of Hours: 672

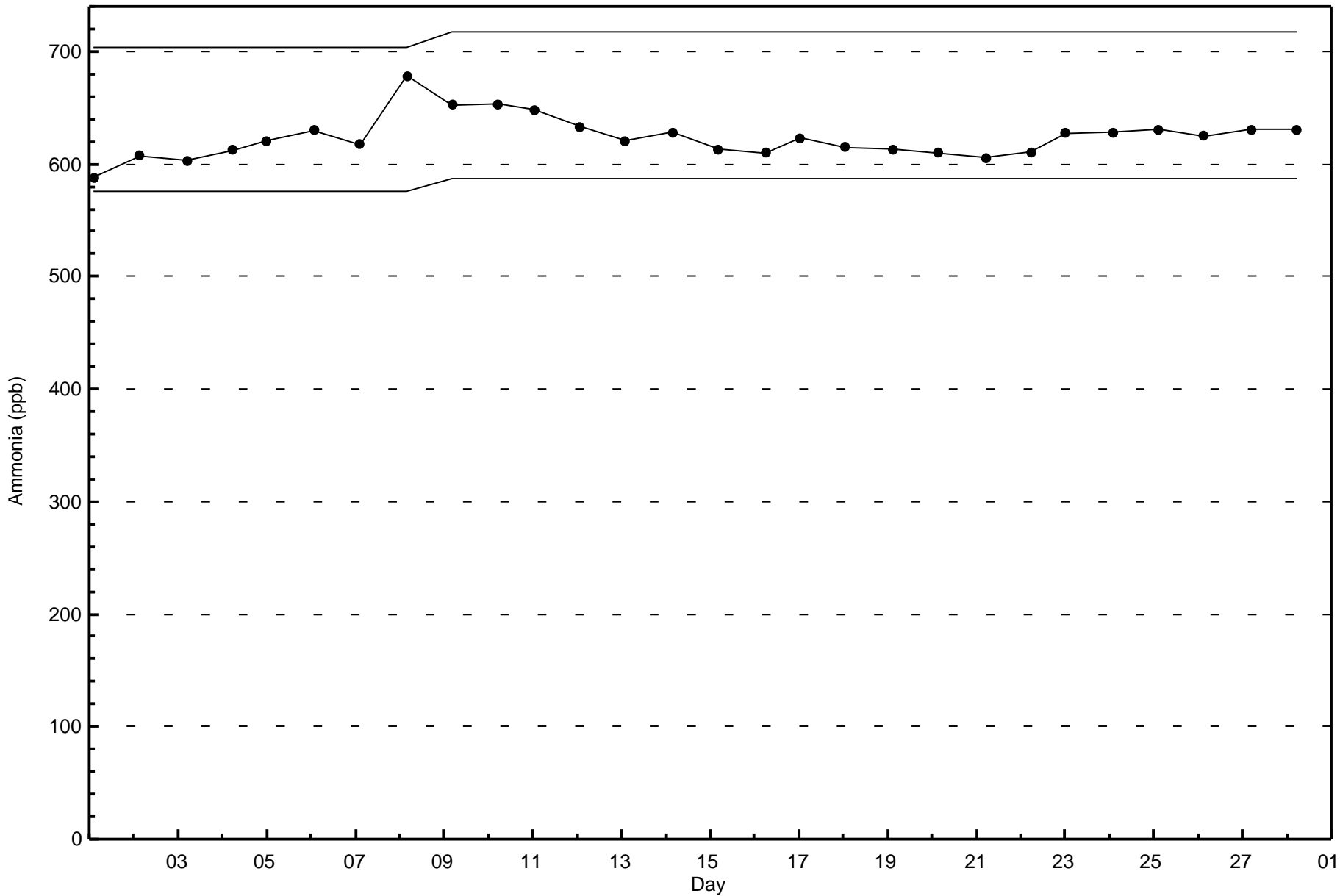


**Wood Buffalo Environmental Association
Wind Rose Feb 2017**

**Ammonia (NH₃) - ppb
Patricia McInnes (AMS 6)**









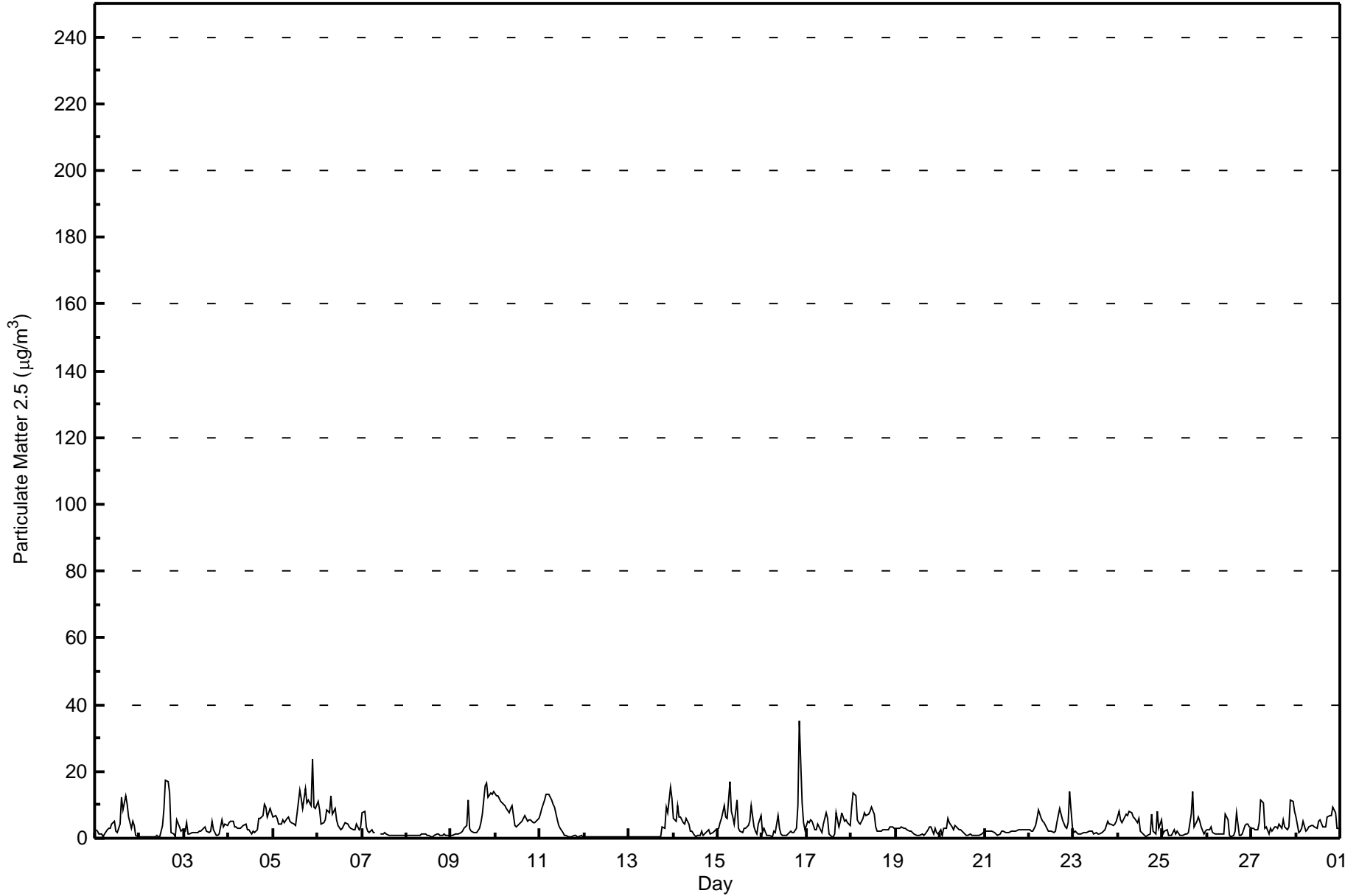
Wood Buffalo Environmental Association

Summary of Hour Averages

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

Patricia McInnes - February 2017

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																								
Maximum Value: 35.1 µg/m ³ on Feb 16 21:00		Maximum Daily Average: 8.3 µg/m ³ on Feb 5																								
Minimum Value: 0.2 µg/m ³ on Feb 12 22:00		Hours of Data: 670																								
Maximum Diurnal Average: 5.3 µg/m ³ at hour 21		Hours of Missing Data: 2																								
Monthly Average: 3.80 µg/m ³		Hours of Calibration: 2																								
Minimum Daily Average: 0.3 µg/m ³ on Feb 12		Percent Operational Time: 100.0																								
Minimum Diurnal Average: 2.1 µg/m ³ at hour 13		Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.2 Median = 2.7 Q ₃ = 5.1 P ₉₀ = 8.8 P ₉₉ = 15.6																								
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-Feb	2.7	2.1	1.3	1.2	0.6	1.3	2.5	3.0	3.1	4.4	5.1	2.2	1.8	4.2	12.4	8.7	12.7	10.0	6.4	2.8	5.0	4.0	1.0	0.5	4.1	12.7
2-Feb	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.7	0.4	0.3	3.8	8.8	17.2	17.1	13.4	1.8	1.3	0.5	5.4	3.6	2.0	2.6	3.4	17.2
3-Feb	2.2	4.5	1.4	1.1	1.8	1.9	1.6	1.8	2.2	2.0	2.9	3.5	1.9	1.5	2.2	5.2	2.4	1.0	0.9	1.1	5.4	3.5	4.3	4.0	2.5	5.4
4-Feb	4.6	5.0	5.2	3.5	3.2	2.8	3.0	3.2	3.7	4.0	2.6	2.4	1.4	2.1	1.5	2.3	6.1	5.9	6.9	10.1	9.2	6.2	8.9	7.7	4.6	10.1
5-Feb	6.5	6.8	5.7	4.1	4.3	5.6	4.5	6.1	6.4	5.3	4.6	4.2	3.9	7.1	14.6	11.9	8.8	14.9	10.5	11.5	9.9	23.6	9.4	8.7	8.3	23.6
6-Feb	10.9	8.6	4.4	4.5	5.6	8.3	7.8	12.8	7.2	8.8	5.7	3.7	2.7	3.1	3.8	4.5	4.4	3.4	3.1	2.5	2.3	4.4	2.7	3.3	5.4	12.8
7-Feb	7.5	8.2	3.3	1.9	1.8	2.6	1.9	1.7	C	C	1.2	1.1	1.5	1.1	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	1.9	8.2
8-Feb	0.9	0.9	0.8	0.8	0.7	0.6	0.8	1.0	1.3	1.1	1.2	0.9	0.7	0.4	0.4	0.6	1.3	1.3	0.9	0.7	1.3	0.7	0.7	0.8	0.9	1.3
9-Feb	0.9	1.0	1.1	1.2	1.4	1.7	2.1	3.0	3.6	11.7	3.1	2.1	1.5	1.5	1.7	3.0	4.6	7.3	15.7	16.4	12.3	13.5	13.2	13.8	5.7	16.4
10-Feb	12.9	12.7	11.8	10.9	10.1	9.9	8.8	7.8	9.1	9.8	4.0	3.5	3.8	4.8	5.1	5.9	6.6	5.1	5.3	5.3	4.8	4.7	5.2	6.1	7.2	12.9
11-Feb	7.0	8.8	11.5	13.2	13.0	13.3	11.6	10.2	9.3	5.7	3.8	3.0	1.8	0.8	0.6	0.6	0.6	0.6	0.7	0.8	0.6	0.6	1.0	0.5	5.0	13.3
12-Feb	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.4
13-Feb	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.6	3.6	3.0	9.4	7.7	15.2	11.8	2.3	15.2
14-Feb	5.9	5.1	9.7	6.2	6.3	4.7	4.3	5.8	4.2	2.0	2.1	0.9	0.4	0.6	0.9	2.2	0.8	1.2	2.0	2.5	1.5	1.5	2.0	2.4	3.1	9.7
15-Feb	3.1	4.5	5.9	9.8	6.5	5.8	16.9	8.2	6.3	4.1	11.5	2.9	2.1	1.9	2.8	2.8	3.9	4.9	9.7	3.4	2.3	1.3	4.1	6.9	5.5	16.9
16-Feb	1.7	3.1	0.7	0.9	0.8	0.5	2.1	1.9	6.7	3.2	1.3	0.7	0.9	0.8	1.2	1.9	1.8	1.9	2.8	9.6	35.1	10.4	4.8	2.6	4.1	35.1
17-Feb	4.9	4.7	5.6	5.0	2.7	2.7	4.2	2.6	1.8	4.3	7.5	5.9	1.3	0.4	0.4	1.1	7.6	3.5	5.1	7.7	4.9	5.3	4.8	3.9	4.1	7.7
18-Feb	9.2	13.5	12.9	5.4	4.5	4.4	5.8	7.5	6.8	7.3	8.2	9.2	7.2	3.3	2.3	2.0	1.9	2.6	2.6	2.6	2.7	3.2	3.3	2.8	5.5	13.5
19-Feb	2.9	3.1	3.1	3.4	3.0	2.8	2.7	2.3	2.2	1.8	1.1	0.8	0.8	1.0	1.1	1.0	1.2	2.5	3.2	3.4	1.4	2.9	1.9	1.3	2.1	3.4
20-Feb	2.3	1.0	2.9	2.9	6.0	4.7	3.3	2.5	3.8	2.8	2.4	2.4	1.8	1.2	1.0	0.9	1.1	1.0	1.0	0.9	0.7	1.0	1.4	1.8	2.1	6.0
21-Feb	1.9	2.1	2.1	2.1	2.2	1.8	1.4	0.8	1.4	1.9	2.0	1.7	1.5	1.7	1.9	2.1	2.1	2.2	2.4	2.4	2.4	2.6	2.5	2.5	2.0	2.6
22-Feb	2.4	2.0	2.3	3.9	5.7	8.4	6.1	5.2	4.6	3.6	1.9	2.0	2.1	1.6	2.3	4.6	8.9	7.1	5.5	3.4	2.9	4.8	13.8	3.5	4.5	13.8
23-Feb	1.9	2.1	1.1	1.3	1.3	1.8	1.8	1.8	2.3	2.1	2.1	1.4	1.6	1.4	1.6	2.3	2.7	5.1	4.4	4.1	3.7	4.0	5.2	2.4	5.2	
24-Feb	8.3	5.6	4.7	5.5	7.1	6.6	7.9	7.5	6.3	5.8	4.7	5.9	2.3	1.2	0.6	0.6	0.8	1.4	7.4	2.0	1.4	8.1	3.1	5.5	4.6	8.3
25-Feb	1.4	2.0	2.7	0.9	0.8	0.9	2.6	1.1	2.2	1.0	0.9	1.0	1.5	1.1	1.5	7.3	13.9	3.5	5.0	6.3	5.0	3.2	1.4	2.1	2.9	13.9
26-Feb	2.3	2.7	3.3	1.7	1.3	1.2	1.4	1.2	1.1	1.2	7.2	5.3	0.7	0.6	0.9	2.0	7.6	1.0	1.0	1.1	4.0	4.0	4.3	3.3	2.5	7.6
27-Feb	3.1	2.8	2.5	2.5	4.7	11.4	10.5	3.0	3.4	1.4	2.9	2.1	3.5	3.6	2.9	4.3	2.9	5.6	3.4	2.7	3.5	11.6	10.8	8.0	4.7	11.6
28-Feb	6.4	1.7	2.1	3.0	5.1	2.1	2.7	3.4	3.9	3.9	3.5	2.9	4.9	5.5	3.5	3.3	3.4	6.6	6.9	6.6	9.4	7.5	2.8	3.0	4.3	9.4
4.1 4.1 3.9 3.5 3.6 3.9 4.3 3.8 3.8 3.7 3.4 2.6 2.1 2.2 3.1 3.5 4.4 3.6 4.3 4.1 5.3 5.2 4.6 4.1																								Diurnal Average		
12.9 13.5 12.9 13.2 13.0 13.3 16.9 12.8 9.3 11.7 11.5 9.2 7.2 8.8 17.2 17.1 13.9 14.9 15.7 16.4 35.1 23.6 15.2 13.8																								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}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - February 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	383	57.16	57.16
6 - 15	143	21.34	78.51
16 - 25	6	0.90	79.40
26 - 80	1	0.15	79.55
> 81.0	0	0.00	79.55

Total Number of Valid Hours: 670

Total Number of Hours: 672



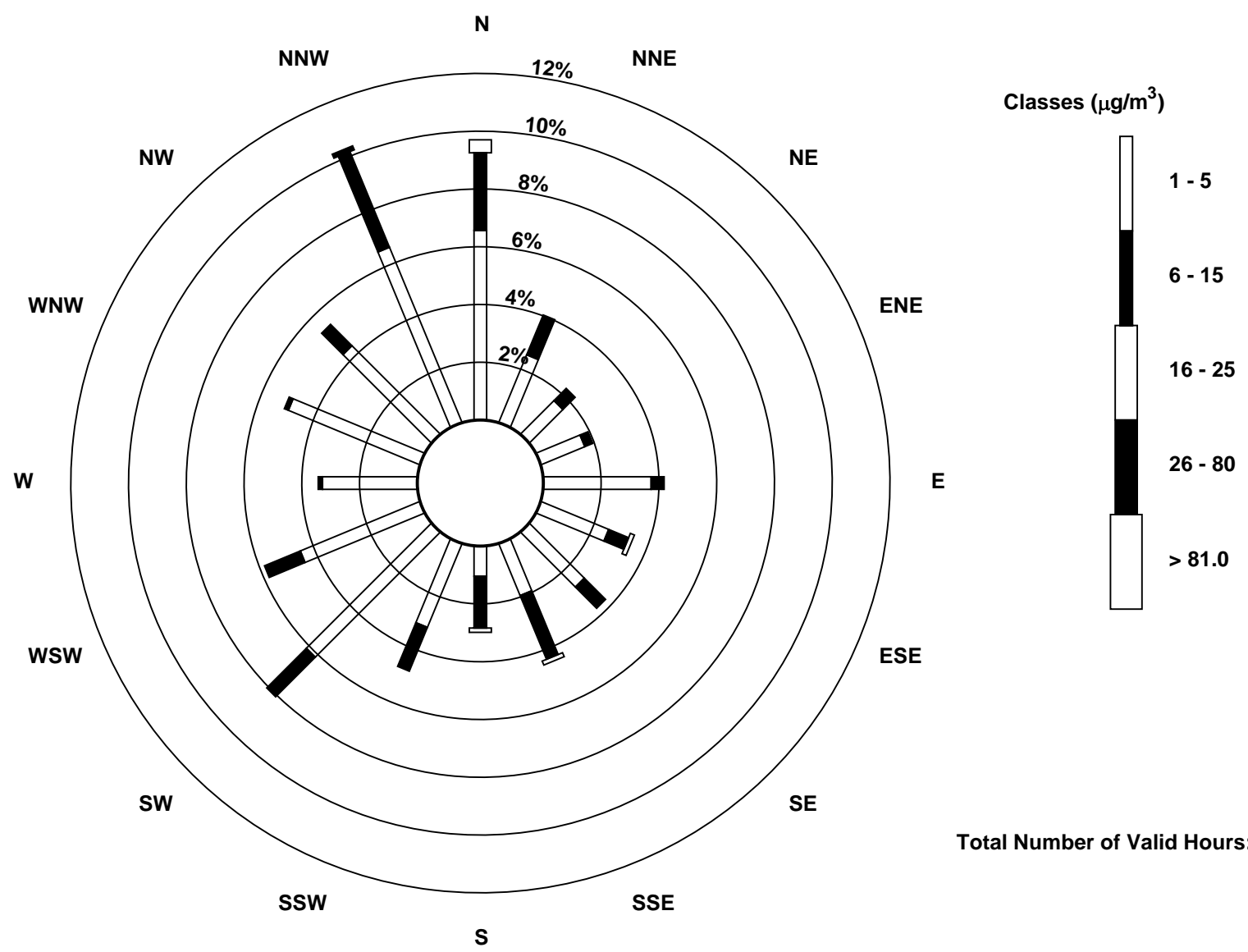
Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	44	17	11	11	25	17	18	13	7	21	41	30	22	33	29	44	383
6 - 15	18	10	4	2	3	5	7	16	12	11	13	9	1	1	7	24	143
16 - 25	3	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	6
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	27	15	13	28	23	25	30	20	32	54	39	23	34	36	69	533

Total Number of Valid Hours: 670

Total Number of Hours: 672



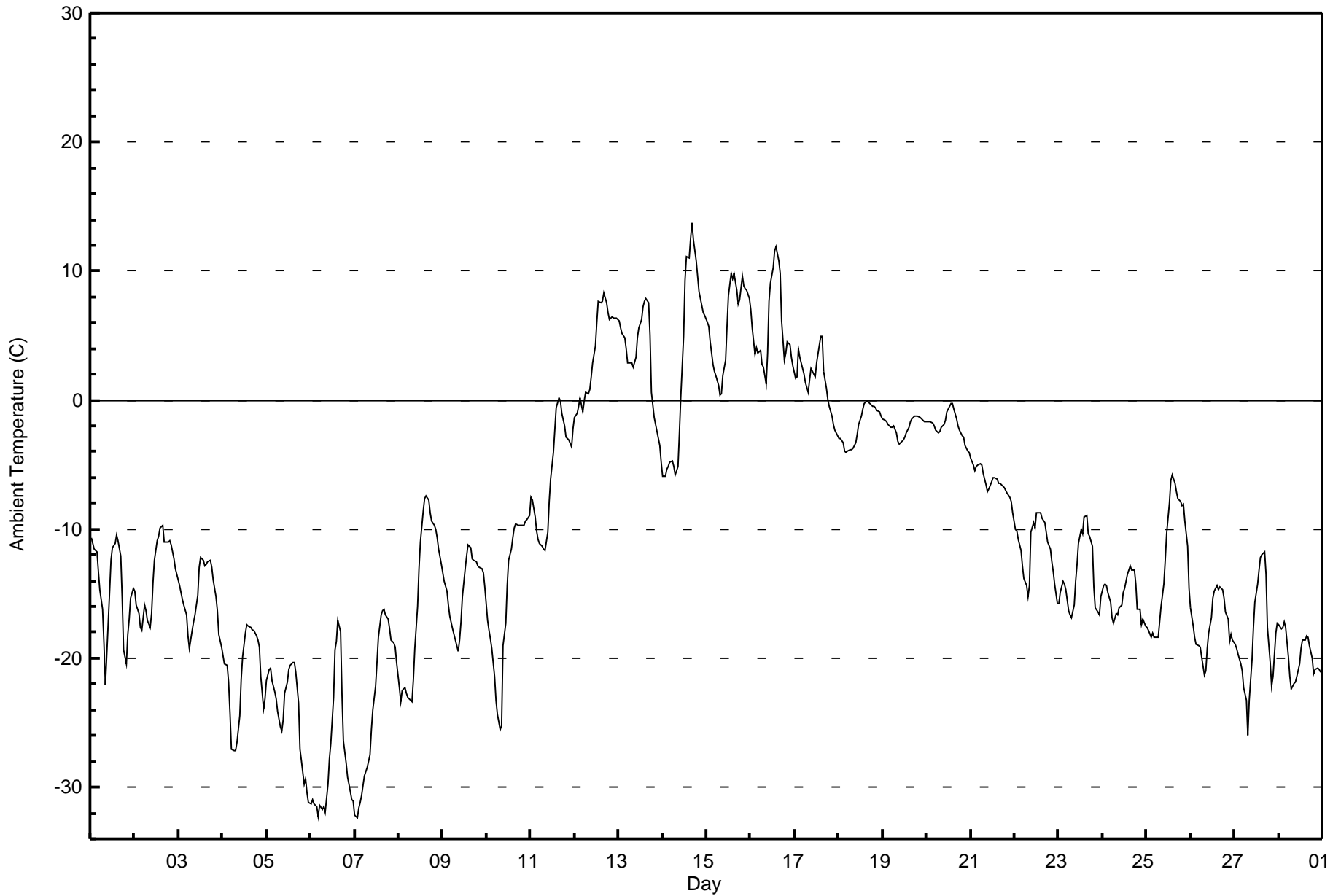
Total Number of Valid Hours: 670



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Value: 13.7 C on Feb 14 17:00 Maximum Daily Average: 5.9 C on Feb 15																						Hours in Service:	672			
Minimum Value: -32.4 C on Feb 7 02:00 Minimum Daily Average: -27.6 C on Feb 6																						Hours of Data:	672			
Maximum Diurnal Average: -6.1 C at hour 16 Minimum Diurnal Average: -14.1 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -10.30 C Percentiles: P ₁ = -31.7 P ₁₀ = -22.3 Q ₁ = -17.8 Median = -11.6 Q ₃ = -1.9 P ₉₀ = 4.2 P ₉₉ = 11.0																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-10.7	-11.1	-11.5	-11.8	-13.3	-14.7	-16.2	-18.9	-22.0	-19.7	-14.9	-12.4	-11.4	-11.1	-10.5	-10.8	-12.1	-15.4	-19.3	-20.4	-18.2	-17.0	-15.3	-14.6	-14.7	-10.5
2-Feb	-14.8	-15.9	-16.5	-17.6	-17.9	-15.9	-16.4	-17.0	-17.6	-16.6	-14.1	-12.4	-10.9	-10.5	-9.9	-9.8	-11.0	-11.0	-11.0	-10.9	-11.2	-12.3	-13.0	-13.5	-13.7	-9.8
3-Feb	-14.3	-14.9	-15.4	-15.9	-16.6	-18.3	-19.2	-17.8	-17.2	-16.7	-15.1	-13.0	-12.2	-12.4	-12.8	-12.7	-12.5	-12.4	-12.9	-13.9	-15.2	-16.3	-18.2	-19.1	-15.2	-12.2
4-Feb	-19.7	-20.5	-20.6	-21.9	-24.2	-27.1	-27.2	-27.2	-26.5	-24.4	-21.6	-19.9	-18.1	-17.4	-17.5	-17.6	-17.8	-17.8	-18.2	-18.6	-19.2	-21.4	-24.0	-23.2	-21.3	-17.4
5-Feb	-21.8	-20.9	-20.8	-21.7	-22.6	-23.2	-24.1	-25.3	-25.7	-24.8	-22.7	-21.8	-20.9	-20.5	-20.3	-20.3	-21.1	-23.4	-27.0	-28.0	-29.7	-29.3	-30.4	-31.2	-24.1	-20.3
6-Feb	-31.3	-30.9	-31.3	-31.5	-32.3	-31.3	-31.7	-31.5	-31.9	-29.7	-27.8	-26.7	-23.1	-19.4	-18.7	-17.1	-18.0	-22.8	-26.4	-28.1	-29.2	-29.8	-30.9	-31.1	-27.6	-17.1
7-Feb	-32.1	-32.4	-31.6	-31.2	-30.6	-29.2	-28.8	-28.4	-27.5	-25.6	-24.0	-22.1	-20.3	-18.4	-16.7	-16.3	-16.2	-16.7	-17.0	-17.7	-18.6	-18.8	-19.1	-20.3	-23.3	-16.2
8-Feb	-22.3	-23.4	-22.5	-22.3	-22.7	-23.1	-23.3	-23.4	-21.7	-19.3	-16.0	-13.1	-11.0	-8.6	-7.6	-7.4	-7.7	-8.7	-9.4	-9.7	-10.0	-10.7	-11.6	-12.7	-15.3	-7.4
9-Feb	-13.4	-14.1	-14.9	-15.9	-16.8	-17.7	-18.2	-18.6	-19.4	-18.6	-17.2	-15.2	-13.0	-12.1	-11.2	-11.5	-12.3	-12.4	-12.5	-12.8	-13.0	-13.1	-13.4	-14.4	-14.7	-11.2
10-Feb	-17.1	-17.8	-18.4	-19.3	-21.4	-23.3	-24.3	-25.5	-25.2	-19.0	-17.3	-14.4	-12.4	-11.5	-10.7	-9.9	-9.6	-9.7	-9.7	-9.7	-9.7	-9.4	-9.3	-9.0	-15.2	-9.0
11-Feb	-7.6	-7.7	-9.0	-10.1	-10.8	-11.1	-11.3	-11.6	-11.7	-10.3	-7.8	-6.1	-4.0	-2.3	-0.5	0.1	0.0	-1.0	-2.0	-2.8	-2.9	-3.1	-3.6	-2.2	-5.8	0.1
12-Feb	-1.4	-1.0	-0.5	0.1	-0.9	0.0	0.6	0.5	0.9	1.8	2.8	4.2	6.1	7.6	7.5	7.7	8.4	7.5	6.8	6.3	6.5	6.4	6.4	6.3	3.8	8.4
13-Feb	6.1	5.6	5.2	4.8	3.9	2.9	2.9	2.9	2.6	3.3	4.8	5.6	6.2	7.2	7.7	7.8	7.6	5.1	0.6	-1.4	-1.9	-2.4	-3.6	-4.8	3.3	7.8
14-Feb	-5.9	-5.9	-5.4	-5.1	-4.9	-4.7	-5.1	-5.8	-5.1	-2.6	0.3	4.9	9.3	11.1	11.0	12.5	13.7	12.4	10.8	9.6	8.4	7.3	6.8	6.5	3.1	13.7
15-Feb	6.1	5.7	4.6	2.8	2.2	1.9	1.2	0.4	0.5	1.9	3.1	5.7	8.1	9.9	9.4	9.9	8.6	7.5	7.8	9.6	8.9	8.7	8.5	7.8	5.9	9.9
16-Feb	7.0	5.6	3.5	4.0	3.6	3.8	2.7	2.6	1.2	3.6	7.7	9.0	10.3	11.6	11.9	10.7	9.9	6.1	3.1	3.7	4.5	4.3	3.3	2.7	5.7	11.9
17-Feb	1.7	1.8	4.0	3.3	2.4	2.0	1.4	0.6	1.6	2.4	2.1	1.8	2.9	4.3	5.0	4.9	2.3	0.9	0.1	-0.5	-1.2	-1.9	-2.4	-2.8	1.5	5.0
18-Feb	-3.0	-3.0	-3.3	-3.9	-4.0	-4.0	-3.9	-3.9	-3.8	-3.3	-2.7	-1.9	-1.2	-0.7	-0.2	-0.1	-0.1	-0.3	-0.5	-0.5	-0.6	-0.8	-1.0	-1.3	-2.0	-0.1
19-Feb	-1.4	-1.5	-1.6	-1.9	-2.1	-2.1	-2.0	-2.6	-3.2	-3.5	-3.3	-3.1	-2.9	-2.6	-2.1	-1.6	-1.5	-1.3	-1.2	-1.3	-1.4	-1.5	-1.6	-1.7	-2.0	-1.2
20-Feb	-1.6	-1.7	-1.7	-1.8	-2.0	-2.3	-2.6	-2.4	-2.1	-1.9	-1.6	-0.9	-0.5	-0.3	-0.2	-0.7	-1.4	-2.0	-2.3	-2.8	-2.9	-3.5	-3.9	-4.1	-2.0	-0.2
21-Feb	-4.5	-5.1	-5.4	-5.2	-5.0	-4.9	-5.1	-5.7	-6.5	-7.1	-6.9	-6.3	-6.1	-6.0	-6.2	-6.4	-6.5	-6.5	-6.8	-7.0	-7.2	-7.5	-7.9	-8.8	-6.3	-4.5
22-Feb	-10.0	-10.1	-10.8	-11.6	-12.9	-13.8	-14.4	-15.3	-14.4	-10.3	-9.5	-9.9	-8.8	-8.7	-8.8	-9.2	-9.5	-10.2	-11.0	-11.5	-12.5	-13.3	-14.2	-15.8	-11.5	-8.7
23-Feb	-15.8	-14.9	-14.1	-14.3	-14.7	-16.3	-16.7	-16.9	-15.9	-14.0	-12.8	-11.1	-10.1	-10.4	-9.0	-9.0	-10.4	-10.6	-11.3	-14.5	-16.1	-16.5	-16.6	-15.2	-13.6	-9.0
24-Feb	-14.3	-14.2	-14.4	-14.9	-15.7	-16.9	-17.3	-16.6	-16.6	-16.1	-15.9	-14.9	-14.6	-13.5	-13.2	-12.9	-13.2	-13.2	-14.3	-16.2	-16.2	-17.4	-17.0	-17.5	-15.3	-12.9
25-Feb	-17.6	-17.8	-18.4	-18.1	-18.4	-18.4	-18.3	-17.2	-16.0	-14.2	-12.4	-10.4	-8.0	-6.2	-5.8	-6.5	-7.1	-7.7	-7.9	-8.2	-8.1	-9.4	-11.4	-14.6	-12.4	-5.8
26-Feb	-16.1	-17.5	-18.4	-19.0	-19.0	-19.1	-19.9	-21.3	-20.9	-19.3	-18.1	-16.8	-15.4	-14.9	-14.4	-14.7	-14.4	-14.7	-15.3	-16.4	-16.9	-18.7	-18.1	-18.6	-17.4	-14.4
27-Feb	-19.0	-19.2	-19.7	-20.4	-20.9	-22.3	-23.3	-25.9	-23.2	-20.1	-17.6	-15.7	-14.2	-13.2	-12.2	-11.9	-11.8	-13.5	-17.6	-20.3	-22.2	-21.5	-18.1	-17.3	-18.4	-11.8
28-Feb	-17.4	-17.7	-17.6	-17.1	-17.6	-19.9	-21.5	-22.4	-22.0	-21.9	-21.4	-20.4	-19.2	-18.5	-18.6	-18.3	-18.4	-19.0	-20.0	-21.2	-20.9	-20.8	-20.9	-21.1	-19.7	-17.1
																						Diurnal Average				
																						Diurnal Maximum				





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	111	16.52	16.52
-20 - 0	441	65.63	82.14
0 - 10	110	16.37	98.51
10 - 20	10	1.49	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

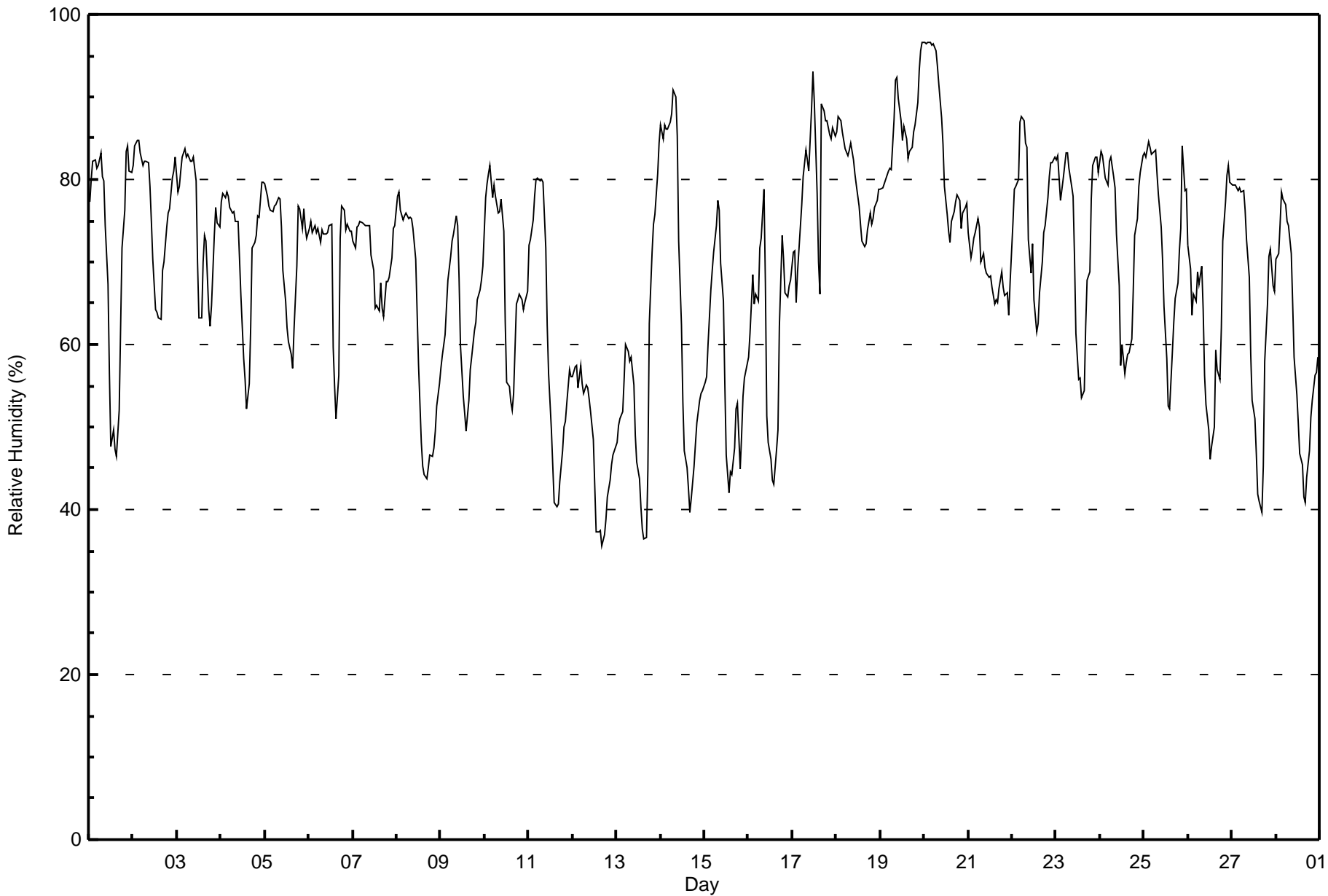
Patricia McInnes - February 2017

Maximum Value: 97 % on Feb 20 01:00																			Maximum Daily Average: 85.9 % on Feb 19						Hours in Service: 672	
Minimum Value: 36 % on Feb 12 17:00																			Minimum Daily Average: 47.8 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 77.6 % at hour 7																			Minimum Diurnal Average: 54.8 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 69.1 %																			Percentiles: P ₁ = 37 P ₁₀ = 48 Q ₁ = 59 Median = 72 Q ₃ = 79 P ₉₀ = 84 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-Feb	77	80	82	82	81	82	83	80	80	74	67	56	48	50	47	46	52	62	72	76	83	84	81	81	71.2	84
2-Feb	82	84	85	85	83	82	82	82	82	79	75	70	64	64	63	63	69	70	74	76	77	80	81	83	76.5	85
3-Feb	78	79	81	83	84	83	83	82	82	83	80	70	63	63	70	73	73	64	62	65	73	77	75	74	75.0	84
4-Feb	77	78	78	78	78	77	76	76	75	75	71	66	58	56	52	55	62	72	72	73	76	75	80	80	71.5	80
5-Feb	79	78	77	76	76	77	77	78	78	74	69	65	62	60	59	57	62	70	77	76	74	77	74	73	71.9	79
6-Feb	74	75	74	74	73	74	72	74	73	73	74	74	75	60	55	51	56	73	77	76	74	75	74	74	71.0	77
7-Feb	73	72	74	74	75	75	75	74	74	74	71	69	64	65	64	67	64	63	68	68	68	71	74	74	70.5	75
8-Feb	78	79	76	75	76	76	75	75	75	74	70	64	58	48	45	44	44	45	47	46	47	49	53	55	61.5	79
9-Feb	57	59	61	65	68	71	72	73	76	74	68	60	54	52	49	53	57	58	62	63	65	67	68	70	63.4	76
10-Feb	78	79	81	82	78	79	78	76	76	78	74	63	55	55	53	52	54	65	65	66	65	64	65	66	68.7	82
11-Feb	72	73	75	78	80	80	80	80	80	72	62	56	50	45	41	40	41	43	47	50	51	53	57	56	60.9	80
12-Feb	56	57	57	55	57	55	54	55	55	53	52	48	43	37	37	37	36	37	39	41	43	45	47	47	47.8	57
13-Feb	48	50	51	52	56	60	59	58	59	55	49	46	44	40	38	36	37	45	63	71	75	76	81	84	55.5	84
14-Feb	87	85	87	86	86	87	88	91	90	85	73	62	53	47	45	43	40	41	45	48	50	53	54	54	65.9	91
15-Feb	55	56	60	67	69	71	74	77	76	70	65	55	47	42	45	44	48	52	53	45	49	54	56	58	57.8	77
16-Feb	59	61	68	65	66	65	72	73	79	68	51	48	46	44	43	47	50	62	73	70	66	66	67	68	61.6	79
17-Feb	71	71	65	69	74	77	80	84	82	81	89	93	89	78	70	66	89	88	87	87	85	85	86	85	80.6	93
18-Feb	86	88	87	86	85	84	83	84	84	82	81	79	77	75	72	72	72	74	76	75	75	77	77	79	79.5	88
19-Feb	79	79	79	80	81	81	81	87	92	92	90	87	85	86	85	83	83	84	86	87	89	93	96	97	85.9	97
20-Feb	97	97	97	97	96	96	96	94	92	87	84	79	76	74	72	75	76	77	78	77	74	76	77	77	84.2	97
21-Feb	74	71	72	73	74	75	74	70	71	69	69	68	68	67	65	65	65	67	69	67	66	66	64	68	69.0	75
22-Feb	75	79	79	80	87	88	87	84	84	73	69	72	65	62	63	66	70	74	74	78	80	82	82	83	76.5	88
23-Feb	82	83	77	79	80	83	83	81	79	78	71	61	56	56	54	54	62	68	69	78	82	83	83	81	73.4	83
24-Feb	83	83	82	80	79	82	83	80	79	73	67	58	60	56	58	59	59	61	66	73	75	79	81	83	72.5	83
25-Feb	83	83	85	84	83	83	84	81	78	74	70	65	58	53	52	59	63	66	67	71	74	84	79	79	73.2	85
26-Feb	72	69	64	66	65	69	67	70	64	56	53	50	46	48	50	59	57	56	62	73	77	80	82	80	63.9	82
27-Feb	79	79	79	79	79	78	79	76	73	68	59	53	51	47	42	41	40	45	58	65	71	71	67	66	64.4	79
28-Feb	70	71	75	78	78	77	75	74	71	65	58	54	51	47	45	41	41	44	47	51	53	56	57	59	59.9	78
																			74.4 74.9 75.3 76.0 76.7 77.4 77.6 77.5 77.1 73.7 68.9 64.1 59.5 56.3 54.8 55.4 57.9 61.7 65.5 67.6 69.3 71.4 72.0 72.6						Diurnal Average	
																			97 97 97 97 96 96 96 94 92 92 90 93 89 86 85 83 89 88 87 87 89 93 96 97						Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Maximum Speed: 30 km/h on Feb 12 22:00	Maximum Daily Speed Average: 21.3 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 15 16:00	Minimum Daily Speed Average: 0.7 km/h on Feb 23	Hours of Data: 672
Maximum Diurnal Speed Average: 4.8 km/h at hour 1	Minimum Diurnal Speed Average: 2.4 km/h at hour 12	Hours of Missing Data: 0
Monthly Average Velocity: 3.5 km/h 276.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 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-Feb	N11	N8	NNW10	N11	N12	NNW9	NNW7	NNW2	WNW4	WNW3	WSW1	WNW1	NNE2	E5	E5	ESE5	SSE5	SSW3	SW4	WSW7	WSW8	SW7	SW11	WSW10	NW2.2	N12
2-Feb	WSW11	SW9	SW6	SW6	WSW8	WSW11	WSW9	SW8	SW5	SSW5	SSW4	SSW6	N2	NE3	N4	ESE3	S6	SSW6	WSW8	WNW8	NNW9	NNE12	N10	N9	WSW3.3	NNE12
3-Feb	N14	N9	NNW7	NW6	WNW4	NW6	NW7	NW4	WSW3	W5	WNW2	NE1	S3	SE4	S7	S9	SW5	WNW10	NNW17	NNW15	N10	N15	N14	N12	NNW5.0	NNW17
4-Feb	NNW11	NNW11	N8	NNW5	NNW5	WNW4	NW5	WNW4	SW1	SSW4	SSW4	SW5	NNW2	ENE1	SW7	SSW8	S6	SSE5	ESE5	SE5	ESE5	SSE2	NNW4	N8	WNW1.0	NNW11
5-Feb	NNW12	N15	N16	NNW18	N16	N11	NNW8	WNW5	NNW6	WNW6	N7	NE5	NE6	NNE7	NNE6	NNW8	E5	SSE3	SW4	SW4	SW5	S3	SSW4	S4	N5.0	NNW18
6-Feb	SSE4	SSE4	SSE4	S4	S4	SSW4	S3	SSE4	S3	SSE5	SE4	SSE5	SSE2	E2	ESE2	ENE2	NNW3	NW3	NW5	WNW3	W3	WSW3	W3	WSW3	S1.8	NW5
7-Feb	W3	SW2	SSW4	SW5	SW6	SW7	SSW8	SSW7	SW12	SW16	WSW15	WSW14	SW14	WSW14	W13	W12	W12	W13	W13	WNW13	WNW10	WNW8	NW9	WNW8	WSW8.7	SW16
8-Feb	WNW8	W8	W12	WSW13	WSW12	WSW15	WSW15	SW14	SW13	WSW15	WSW15	WSW19	WSW17	W19	WSW19	SW21	SW19	SW17	SW16	SW21	SW21	SW17	SW17	WSW14	WSW15.2	SW21
9-Feb	WSW15	WSW14	SW9	SW9	SW9	SSW7	SSW7	SW8	SSW4	SSE5	SSE8	SSE7	SE5	SE3	E3	E6	NNE8	NNE8	N7	N8	N8	N6	NNW5	NNW4	SW1.9	WSW15
10-Feb	NNW5	NNW6	NNW6	NW6	NNW5	N5	NNW3	WSW2	SSW2	SE8	SE9	SE6	SE5	SE8	SE9	SE10	ESE12	SE17	ESE14	SE13	SE11	SE6	SE6	S7	SE4.3	SE17
11-Feb	SW12	SW13	SSW8	SW10	SW12	WSW16	WSW15	WSW9	SW6	SW10	SW6	WSW9	WSW14	WSW19	WSW17	WSW25	WSW21	WSW16	SW11	SW14	SW15	SW14	SW10	SW16	WSW12.8	WSW25
12-Feb	WSW21	WSW21	WSW21	SW19	SW16	SW19	WSW21	WSW20	WSW22	SW20	WSW20	WSW24	WSW24	W27	WSW29	WSW24	WSW17	WSW16	SW12	WSW18	W27	W30	W26	W27	WSW21.3	W30
13-Feb	W26	W23	W22	W19	WSW19	WSW19	W21	W20	W20	W19	WNW20	NW19	NW17	NW12	NNW12	W11	W10	WSW6	WSW5	NW3	NE4	NNW3	SSW2	SSW1	W12.7	W26
14-Feb	WSW2	SSW3	S5	SSE6	SSE8	SSE7	SSW4	SSE5	SSW6	S6	SE6	SSE7	SSW10	SSE8	SE6	SSE7	SSW11	SW13	SW11	SW12	SW14	SW15	SW15	SW14	SSW7.2	SW15
15-Feb	SW13	SW12	SSW9	SSW8	S10	S7	SSE8	S7	SSW6	SSE5	SSE7	SSE8	SE6	SE7	SSW4	ENE0	NW2	W3	SW9	SW13	SW12	SW13	SW9	S7	SSW6.5	SW13
16-Feb	SSW10	SSW8	SSW10	SW11	SW11	SW8	SSW7	SSW4	ESE5	NE2	ESE4	ESE11	SE10	SSE3	NNW3	NNW3	WNW1	NNW4	NW6	NW8	NNW9	NNW10	NNW10	NW9	WSW2.0	SW11
17-Feb	WNW5	NNW7	NW10	W4	SW6	W3	W3	W4	WNW6	N8	NNW12	NW9	WNW9	WNW10	NW13	NNW15	NNE12	N12	N12	N10	N11	N11	N10	N9	NNW7.1	NNW15
18-Feb	NNW8	N6	N9	N10	NNW6	NNW5	N3	SSE2	ENE5	NE3	NE3	E5	ENE8	ENE8	E7	E7	NE6	NE6	NE6	E8	E8	E8	E8	E8	NE4.8	N10
19-Feb	E8	E8	E12	ESE14	ESE16	E15	E16	E15	E15	ENE13	E15	E15	E16	E12	ESE12	ESE14	ESE10	ESE9	ESE8	ESE7	ESE8	ESE7	E6	ENE5	E11.3	ESE16
20-Feb	NE3	NNW6	N8	NNW7	NW8	NW9	WNW7	WNW8	WNW10	WNW10	WNW10	NW13	NW11	WNW13	W14	W15	W16	W13	WNW12	WNW12	W15	WNW14	W12	W15	WNW10.0	W16
21-Feb	W18	W16	WSW14	WSW14	WSW14	WSW12	WNW16	NNW16	NW14	NNW13	NW11	WNW12	W15	W18	WNW17	NW14	WNW14	WNW11	WNW10	NW10	WNW11	WNW13	W11	WSW7	WNW12.3	W18
22-Feb	W10	W10	WNW8	NW7	NNW6	WSW3	WSW4	WSW1	WSW4	NW1	NNE6	NE9	N9	NNW11	NNE10	NNE11	NNE10	N13	NNW13	N11	N8	N8	N7	N4	NNW5.8	N13
23-Feb	N2	NNW3	E3	ESE3	SSE1	SW1	SW2	WSW3	ESE3	SE5	S5	SSE7	SSE6	SSE5	E3	W3	WSW3	NNE4	ENE5	W2	WSW1	NNW1	NW5	NNW6	SSE0.7	SSE7
24-Feb	NNW11	NNW13	NNW15	NNW14	NNW11	NW6	NW6	NNW7	NNW8	NNW8	NNW13	N16	N12	NNW6	NNW7	NW6	WSW9	SW6	SSW6	SW7	WSW8	WSW7	SW9	SW9	NW6.1	N16
25-Feb	SW9	SSW8	SSW5	SSW7	SSW8	SSW7	S5	SW10	SSW10	SW8	WSW13	WSW11	WSW8	NNW14	N14	N12	NNE13	N9	WNW9	WSW12	W10	NNE21	N26	NNE24	WNW3.8	N26
26-Feb	N23	N20	NNW21	NNW17	NNW15	NNW13	NW11	WNW9	NW11	NW10	NNW12	NNW12	WNW6	WNW8	NNE1	ENE5	SW2	W7	W5	WNW4	N5	ENE3	E5	ESE9	NNW7.4	N23
27-Feb	ESE7	E7	ENE7	NNE8	NNE7	N7	NNE7	NW5	N5	NNE6	ENE4	NNW2	NW2	E2	NW1	NW3	WSW2	SSE3	NW3	WNW4	WSW2	SE5	SE7	SSE5	NE1.9	NNE8
28-Feb	SE6	SE4	NW2	NNW5	N16	N15	NNW13	NNW13	N11	N13	NNE12	NNE11	N10	N10	NE10	NNE11	NNE12	NNE11	N7	NNW6	N9	NNE9	NE10	NNE7	N8.6	N16

WNW4.8	WNW4.6	WNW4.0	NNW3.9	W3.8	W4.3	W4.4	WSW4.5	W3.6	W3.2	W2.5	W2.4	W2.6	WNW3.2	NNW3.2	W2.6	W2.6	W3.0	W3.6	W4.5	W4.0	NNW3.4	NNW3.2	NNW3.3	Diurnal Average
W26	W23	W22	SW19	WSW19	SW19	W21	W20	WSW22	SW20	WNW20	WSW24	WSW24	W27	WSW29	WSW25	WSW21	SW17	NNW17	SW21	WSW27	W30	W26	W27	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

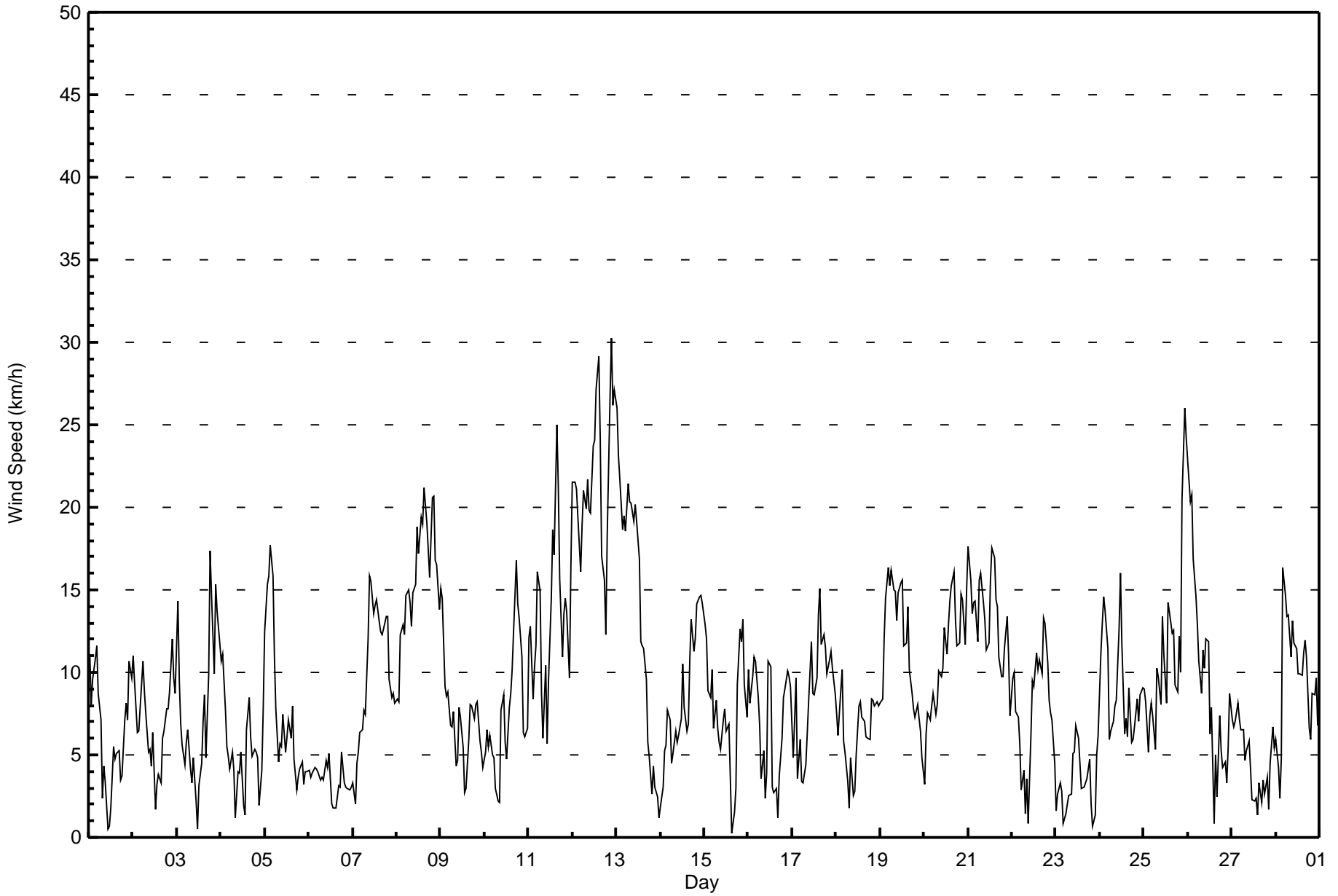
Wind Speed (WS) - km/h
Patricia McInnes - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 12 16:00 Minimum Value: 0 km/h on Feb 26 19:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 672 Hours of Data: 672 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-Feb	3	2	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3
2-Feb	1	1	1	1	3	2	1	1	2	1	2	1	2	2	3	1	1	2	1	1	3	2	2	3	3
3-Feb	3	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	4	3	3	3	3	2	4
4-Feb	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	2	2	1	2
5-Feb	2	3	3	3	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	2	1	1	1	1	3
6-Feb	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2
7-Feb	1	1	1	1	1	2	2	2	4	3	3	3	3	3	4	3	4	3	2	2	1	1	1	1	4
8-Feb	1	1	2	3	2	3	3	2	3	3	5	4	4	4	4	5	4	4	3	4	4	3	3	2	5
9-Feb	2	3	2	2	4	2	4	2	1	1	2	2	2	1	1	2	2	2	1	1	1	1	1	1	4
10-Feb	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	4	3	3	4	2	1	2	4
11-Feb	3	3	2	2	2	2	3	2	2	2	2	2	5	4	4	5	4	3	2	2	2	2	2	3	5
12-Feb	5	4	4	3	3	4	4	4	4	4	4	4	5	7	6	8	4	5	3	4	5	5	5	5	8
13-Feb	5	5	5	6	4	3	4	4	4	4	4	4	4	3	4	3	2	1	1	2	1	1	1	1	6
14-Feb	1	1	2	2	1	1	1	1	2	2	1	1	3	2	2	3	2	2	2	2	2	2	2	2	3
15-Feb	2	2	2	1	1	2	1	1	1	2	1	2	1	2	1	1	2	2	2	2	1	4	2	3	4
16-Feb	2	2	2	1	1	3	2	2	2	2	1	3	3	3	1	1	1	2	1	2	2	2	1	2	3
17-Feb	3	3	5	1	2	2	1	1	2	4	3	2	3	2	3	4	2	2	2	2	2	2	2	1	5
18-Feb	1	2	2	2	3	1	2	1	1	1	1	2	1	1	2	1	2	1	2	2	2	2	2	1	3
19-Feb	2	2	3	3	4	3	4	3	3	3	3	4	4	3	3	3	3	3	2	2	2	2	2	1	4
20-Feb	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	2	3	4	4	3	4	4
21-Feb	4	3	4	3	3	2	5	4	4	3	3	4	3	4	3	3	3	3	2	2	2	4	2	1	5
22-Feb	1	2	1	1	2	1	1	1	1	1	2	2	4	2	2	2	2	2	2	2	2	1	1	2	4
23-Feb	1	1	1	1	1	1	1	1	3	1	1	2	2	2	2	1	1	2	1	2	1	1	1	2	3
24-Feb	2	2	2	3	3	1	1	2	1	3	3	4	3	4	3	3	2	1	1	1	1	1	1	2	4
25-Feb	2	2	1	1	1	1	1	2	3	4	3	3	2	3	3	3	3	2	1	2	3	6	6	5	6
26-Feb	5	4	5	5	3	2	3	1	2	2	3	3	3	4	3	2	2	2	0	1	2	1	1	2	5
27-Feb	2	1	2	2	1	1	2	1	1	2	1	1	1	2	1	1	1	2	1	1	1	1	1	1	2
28-Feb	2	1	1	2	5	3	3	3	3	2	3	2	3	3	2	2	2	2	1	1	1	2	2	2	5
																	Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	191	28.42	28.42
6 - 11	282	41.96	70.39
12 - 19	164	24.40	94.79
20 - 28	33	4.91	99.70
29 - 38	2	0.30	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	3	8	9	10	9	9	20	10	17	13	16	12	13	14	20	191
6 - 11	37	18	7	3	12	9	16	13	10	24	33	17	8	24	21	30	282
12 - 19	18	5	0	1	9	6	2	0	0	0	32	32	20	12	7	20	164
20 - 28	3	2	0	0	0	0	0	0	0	0	4	13	9	1	0	1	33
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	28	15	13	31	24	27	33	20	41	82	79	50	50	42	71	672

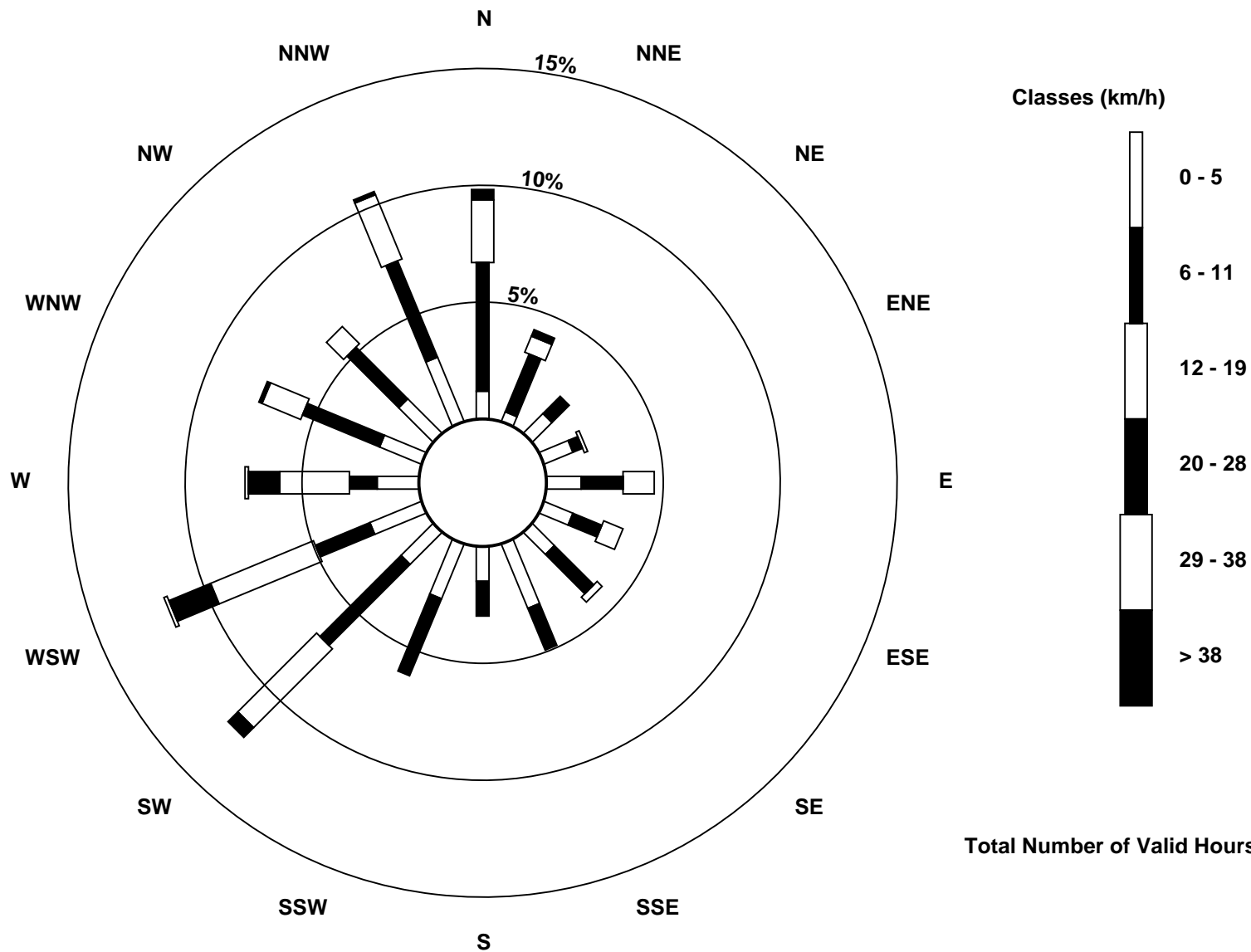
Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 261 deg on Feb 12 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 246.1 deg on Feb 12	Hours of Data: 672
Direction of Minimum Speed: 71 deg on Feb 15 16:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Feb 23	Percent Operational Time: 100.0
Monthly Average Direction: 278.9 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-Feb	2	2	341	353	9	345	346	347	285	295	244	303	23	88	88	104	150	201	226	242	241	230	232	242	316.5
2-Feb	244	226	220	225	237	240	240	235	235	211	199	212	4	50	7	123	175	203	256	282	348	17	3	2	252.3
3-Feb	354	355	341	322	293	304	306	304	257	261	283	47	179	133	172	185	217	302	329	332	354	0	354	351	328.5
4-Feb	348	346	1	333	346	285	306	293	229	210	199	224	338	75	223	198	185	154	121	124	121	156	341	354	301.9
5-Feb	346	349	350	345	349	353	334	302	335	296	356	36	45	19	13	19	85	163	235	217	229	181	194	173	349.1
6-Feb	163	168	164	172	187	195	182	164	188	161	136	168	157	95	103	71	337	321	305	289	265	239	267	249	190.8
7-Feb	279	225	209	223	227	217	203	206	220	235	246	251	232	242	267	270	275	278	280	294	298	302	306	292	256.3
8-Feb	282	278	274	258	248	246	246	232	234	246	247	251	246	261	243	234	223	225	220	230	228	231	233	242	241.6
9-Feb	243	248	226	220	218	206	211	217	210	168	163	147	141	137	101	91	18	12	357	351	3	353	347	335	235.5
10-Feb	345	331	341	321	335	349	334	247	200	139	146	139	130	138	143	126	117	124	119	126	127	134	142	182	126.2
11-Feb	220	220	209	219	232	246	247	237	214	236	215	251	257	257	247	253	252	251	231	231	236	232	216	232	238.6
12-Feb	240	240	238	232	220	231	237	237	237	235	240	243	248	260	257	252	246	246	232	249	259	261	261	263	246.1
13-Feb	265	261	270	265	255	256	267	270	277	292	306	314	319	289	280	270	258	240	317	34	345	193	204	275.8	
14-Feb	239	209	171	158	156	153	195	165	193	185	130	153	202	166	129	168	206	219	218	216	223	227	234	232	198.1
15-Feb	231	235	212	193	183	172	149	185	193	165	163	148	146	143	207	71	310	275	219	233	224	229	214	191	200.7
16-Feb	199	201	209	228	229	226	193	205	121	53	102	123	142	153	343	346	303	329	307	308	348	338	327	318	241.3
17-Feb	288	331	316	259	226	264	273	262	291	351	339	322	303	301	308	327	27	11	358	2	0	1	10	9	334.2
18-Feb	344	350	8	11	339	338	5	148	68	34	43	82	77	73	81	83	50	44	41	84	92	95	92	98	53.7
19-Feb	92	87	98	106	106	100	100	87	81	75	82	88	96	93	106	118	111	107	113	117	114	110	83	76	97.4
20-Feb	37	346	2	341	313	304	290	290	295	301	299	305	306	282	279	269	273	275	285	283	279	285	277	274	291.2
21-Feb	272	262	252	244	248	251	285	295	317	327	319	295	281	277	282	308	298	295	297	307	299	296	279	253	284.6
22-Feb	263	273	283	321	343	243	242	252	250	312	22	41	360	344	12	28	14	359	345	352	352	353	357	4	344.5
23-Feb	350	342	90	119	158	219	215	237	108	143	183	158	151	159	95	266	240	29	69	277	256	331	312	335	156.3
24-Feb	338	342	348	345	346	315	305	335	335	344	345	352	11	343	328	311	258	236	200	227	243	238	229	224	319.3
25-Feb	225	202	208	201	211	195	189	228	213	226	240	244	244	334	350	11	26	356	282	243	262	18	9	17	296.7
26-Feb	3	357	345	337	327	334	323	291	308	321	330	339	299	288	23	70	229	261	269	288	356	66	101	104	334.7
27-Feb	104	96	57	23	12	358	12	314	8	26	69	327	323	98	320	318	238	152	320	297	241	138	144	152	38.5
28-Feb	132	125	316	336	356	352	347	345	352	3	14	17	9	1	38	28	18	16	354	348	6	29	47	24	9.2
	283.7	285.1	291.7	281.5	273.5	265.4	265.4	257.7	261.9	267.6	277.9	273.9	268.6	284.0	281.5	276.5	265.5	275.3	275.2	269.3	276.0	294.0	292.3	283.5	
	Diurnal Average																								

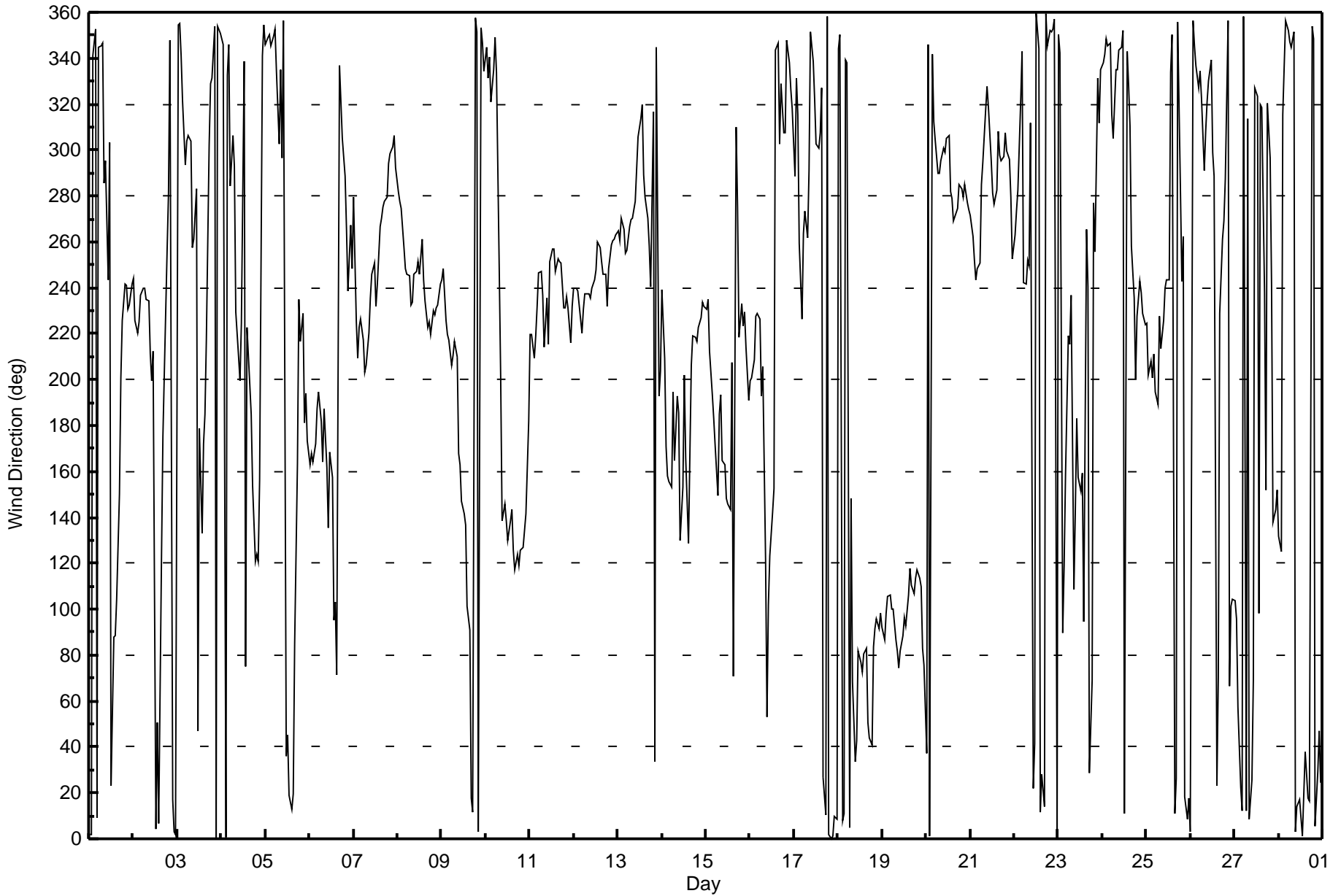
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Feb 26 15:00 Minimum Value: 5 deg on Feb 8 01:00 Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 11 Median = 14 Q ₃ = 21 P ₉₀ = 39 P ₉₉ = 85		Hours in Service: 672 Hours of Data: 672 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-Feb	13	14	10	17	13	12	13	30	20	9	77	97	68	17	15	23	12	26	18	7	5	10	10	8	97	
2-Feb	7	12	9	9	16	10	10	13	10	13	23	16	82	46	67	34	14	17	19	9	31	11	14	15	82	
3-Feb	14	13	12	7	21	12	7	7	34	23	54	89	47	34	20	11	18	20	15	10	15	14	13	12	89	
4-Feb	10	10	16	16	14	14	19	13	56	20	30	43	75	92	24	19	12	31	15	15	17	72	38	14	92	
5-Feb	9	12	12	8	11	12	11	36	14	14	24	28	19	23	29	17	24	34	10	9	11	52	20	29	52	
6-Feb	14	15	12	16	21	11	22	18	16	18	18	16	63	75	76	45	29	29	8	24	13	21	28	19	76	
7-Feb	39	31	11	13	11	15	15	13	11	12	13	12	13	14	16	16	13	13	11	11	8	7	7	11	39	
8-Feb	5	10	7	9	11	9	9	11	14	10	12	12	13	13	15	12	12	11	12	10	10	9	9	9	15	
9-Feb	9	11	14	11	25	20	21	19	36	14	14	19	26	53	35	28	10	14	12	12	12	15	16	12	53	
10-Feb	7	7	10	7	12	14	29	41	54	15	15	39	31	22	15	13	12	13	13	13	15	15	15	21	54	
11-Feb	11	13	13	10	12	9	11	11	18	14	29	21	19	13	13	13	10	10	10	9	9	11	11	10	29	
12-Feb	12	11	11	10	10	11	10	11	11	11	11	11	11	13	11	15	14	14	13	14	10	10	11	11	15	
13-Feb	10	11	14	16	13	10	10	10	10	11	11	12	15	15	19	13	11	13	23	56	25	35	43	54	56	
14-Feb	36	24	18	21	16	15	14	17	8	40	31	14	21	37	14	40	13	10	10	9	9	7	9	8	40	
15-Feb	8	8	17	10	8	26	18	10	11	18	13	13	17	18	51	90	82	56	34	8	9	13	18	21	90	
16-Feb	9	10	8	10	10	13	23	71	26	46	39	16	18	101	36	34	41	10	12	9	21	11	8	12	101	
17-Feb	62	29	29	35	19	51	24	19	30	17	12	12	11	12	12	25	14	12	13	13	15	13	14	14	62	
18-Feb	16	22	16	13	24	13	54	52	23	36	39	28	16	20	19	19	25	15	17	11	16	12	12	12	54	
19-Feb	11	14	15	13	12	13	13	12	11	13	12	13	12	12	16	15	16	13	14	14	13	14	14	15	16	
20-Feb	29	7	14	11	12	8	14	10	10	12	11	14	12	16	13	13	12	12	13	12	16	15	15	15	29	
21-Feb	16	13	15	12	13	12	16	14	13	11	14	21	16	19	21	14	14	11	12	11	12	13	11	10	21	
22-Feb	9	8	10	25	18	38	16	48	18	71	31	17	31	23	18	15	16	15	11	13	12	10	13	15	71	
23-Feb	53	42	32	32	78	57	42	27	66	19	24	28	36	41	69	50	37	51	25	70	86	58	9	11	86	
24-Feb	9	9	11	11	14	15	11	11	10	18	16	16	16	62	36	36	21	18	10	9	7	14	8	11	62	
25-Feb	13	15	22	11	14	16	22	10	17	20	13	17	29	18	16	26	13	30	22	11	45	16	14	12	45	
26-Feb	15	15	12	11	10	11	17	10	11	14	15	20	35	52	105	38	71	12	8	27	24	39	13	12	105	
27-Feb	12	12	27	11	9	10	12	14	23	18	33	47	48	78	85	40	59	29	39	12	36	15	10	18	85	
28-Feb	21	21	66	28	16	12	12	11	19	15	19	18	25	26	17	19	12	12	16	11	13	14	11	19	66	
		62	42	66	35	78	57	54	71	66	71	77	97	82	101	105	90	82	56	39	70	86	72	43	54	
		Diurnal Maximum																								





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 3, 2017	Last Calibration	January 10, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:25
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 701	Serial Number	260
DACS make/model	Campbell Scientific CR3000	DACS serial No.	10957

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-678
Analyzer IP address	192.168.1.43		Lamp voltage	762	764
Calculated slope	0.998083	0.997174	Chamber temp	45.2	44.9
Calculated intercept	1.224972	2.411377	Pressure	696.1	706.1
Analyzer Background	6.0	6.0	Flow	0.441	0.449
Analyzer Coefficient	1.137	1.141	Intensity	91	90

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	763.9	1.009
calibrator zero	5542	0.0	0.0	0.6	----
high point	5542	84.1	770.9	772.3	0.998
second point	5542	42.1	385.9	382.7	1.008
third point	5542	21.1	193.4	188.8	1.024
as left zero	5542	0.0	0.0	0.5	----
as left span	5542	84.1	770.9	774.6	0.995
Average Correction Factor					1.010

Corrected As found 763.7 Previous response 771.1 % change 1.0%

Notes:

Inlet filter changed after as founds.Span adjusted.

Calibration Performed By: Devin Russell



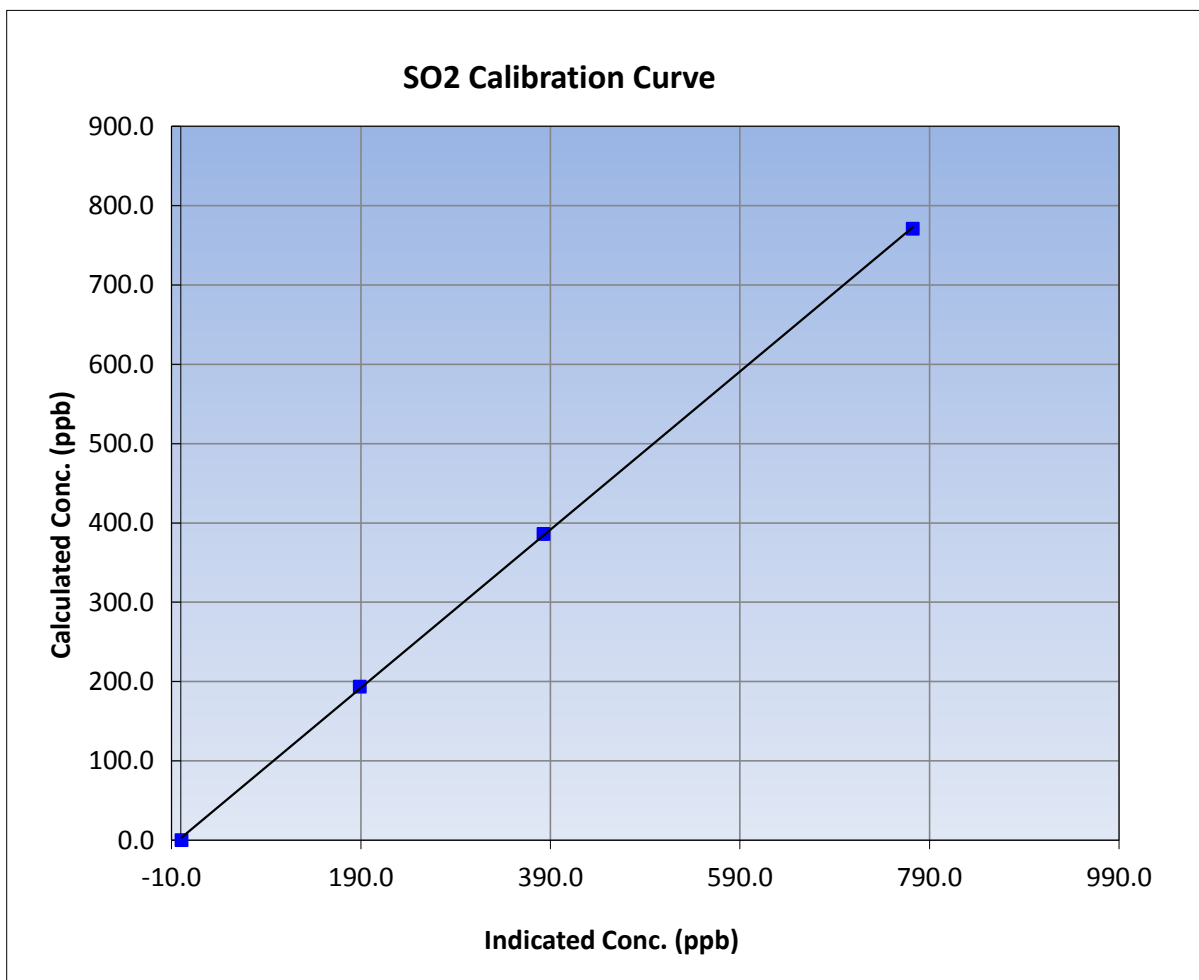
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 10, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:15	End Time (MST)	12:25
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

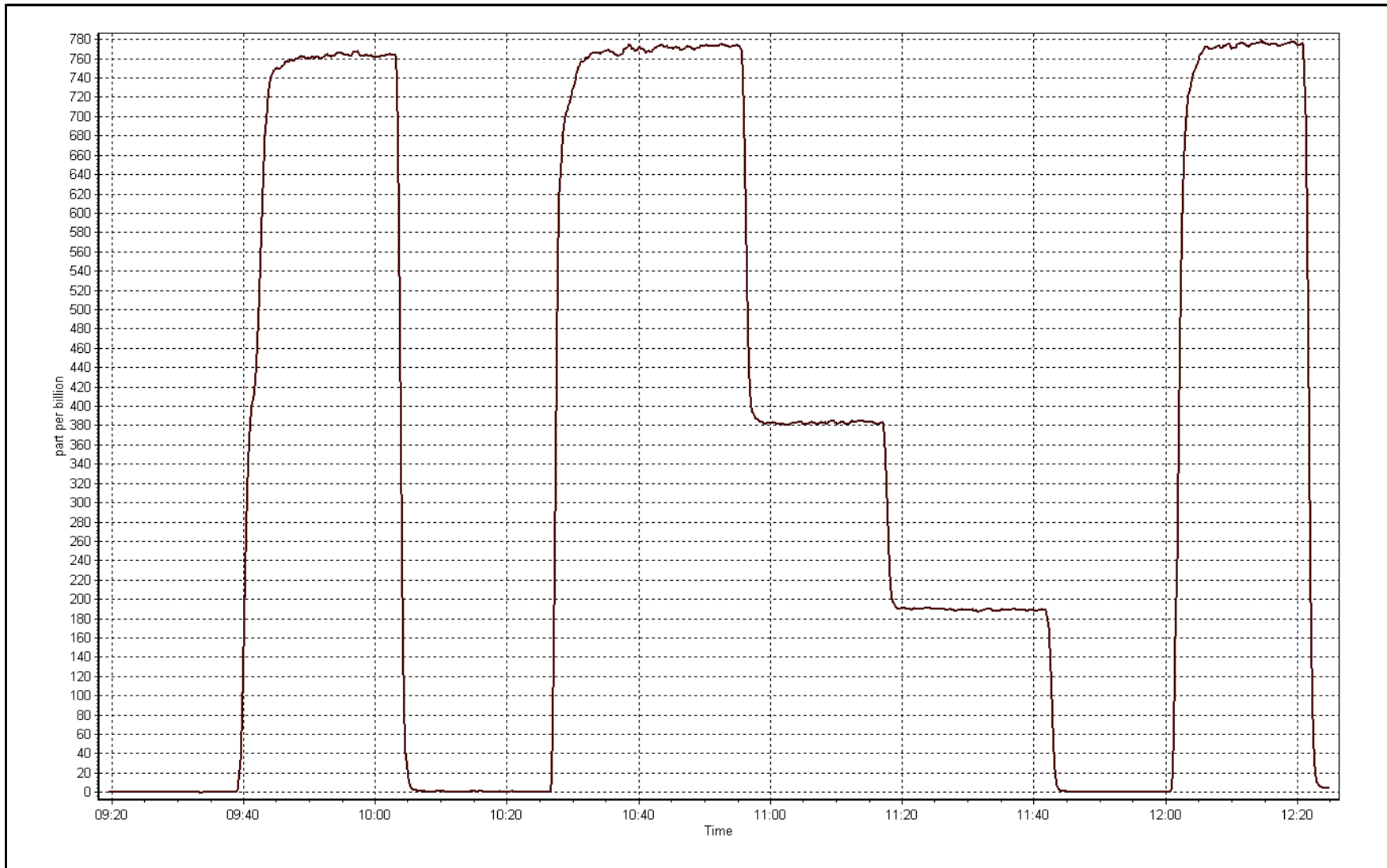
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999931
770.9	772.3	0.9982		
385.9	382.7	1.0084	Slope	0.997174
193.4	188.8	1.0243		
			Intercept	2.411377



SO2 Calibration Plot

Date: February 3, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 7, 2017	Last Calibration	January 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	12:05	End Time (MST)	15:35
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	1007	1005
Calculated slope	0.994731	0.986419	Chamber temp	45	45
Calculated intercept	0.155507	0.306123	Pressure	688.8	686.0
Analyzer Background	2.46	2.48	Flow	0.430	0.429
Analyzer Coefficient	1.118	1.124	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	69.2	1.007
SO2 scrubber check	5542	21.1	189.6	0.2	----
calibrator zero	5542	0.0	0.0	-0.3	----
high point	5542	73.1	69.6	70.2	0.992
second point	5542	41.8	39.8	40.3	0.989
third point	5542	20.9	19.9	19.7	1.010
as left zero	5542	0.0	0.0	0.0	----
as left span	5542	73.1	69.6	69.9	0.996
Average Correction Factor					0.997

Corrected As found	69.4	Previous response	69.9	% change	0.6%
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Notes:

Scrubber check completed after third point. Span adjusted slightly.

Calibration Performed By:

Devin Russell



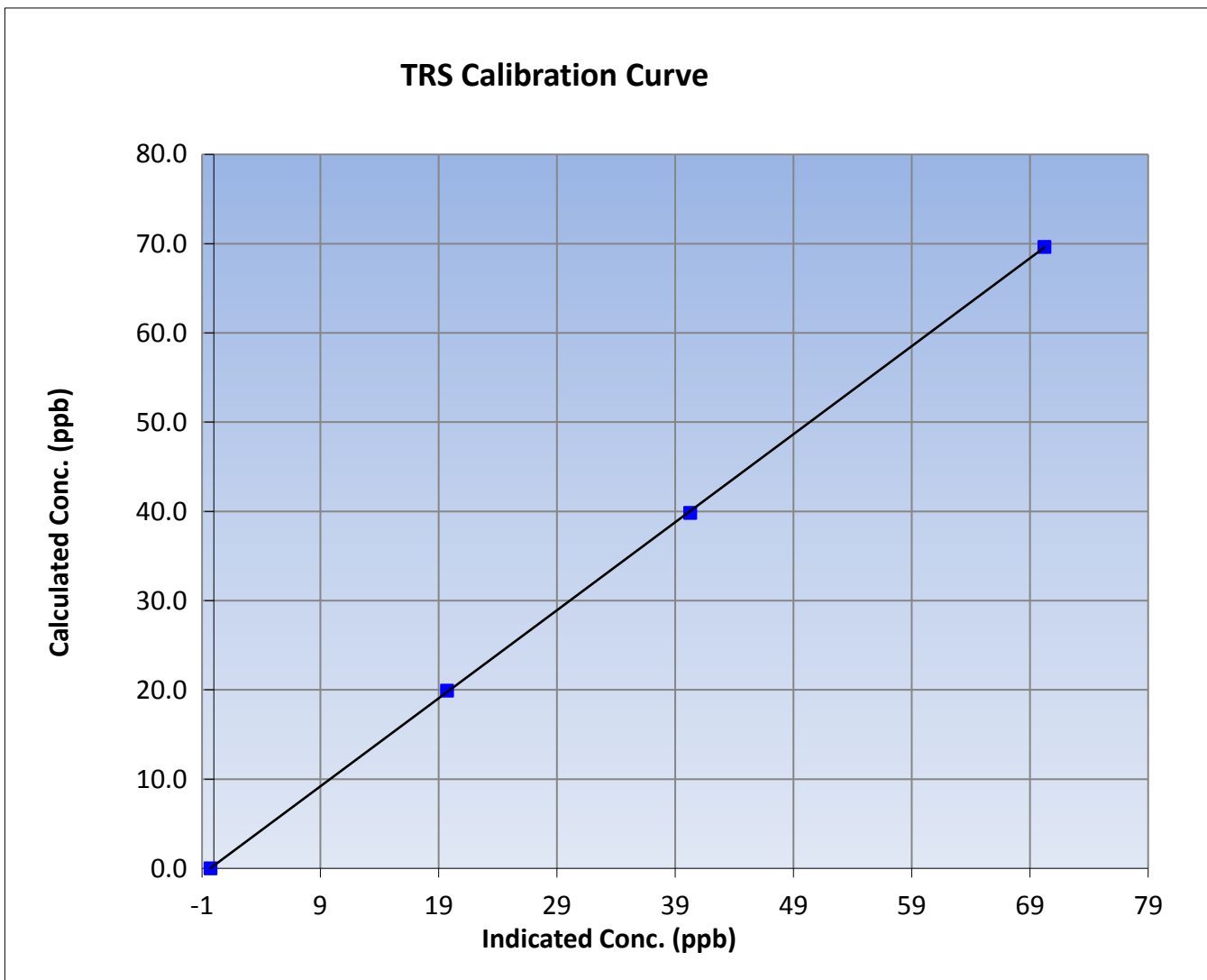
Wood Buffalo Environmental Association TRS Calibration Report

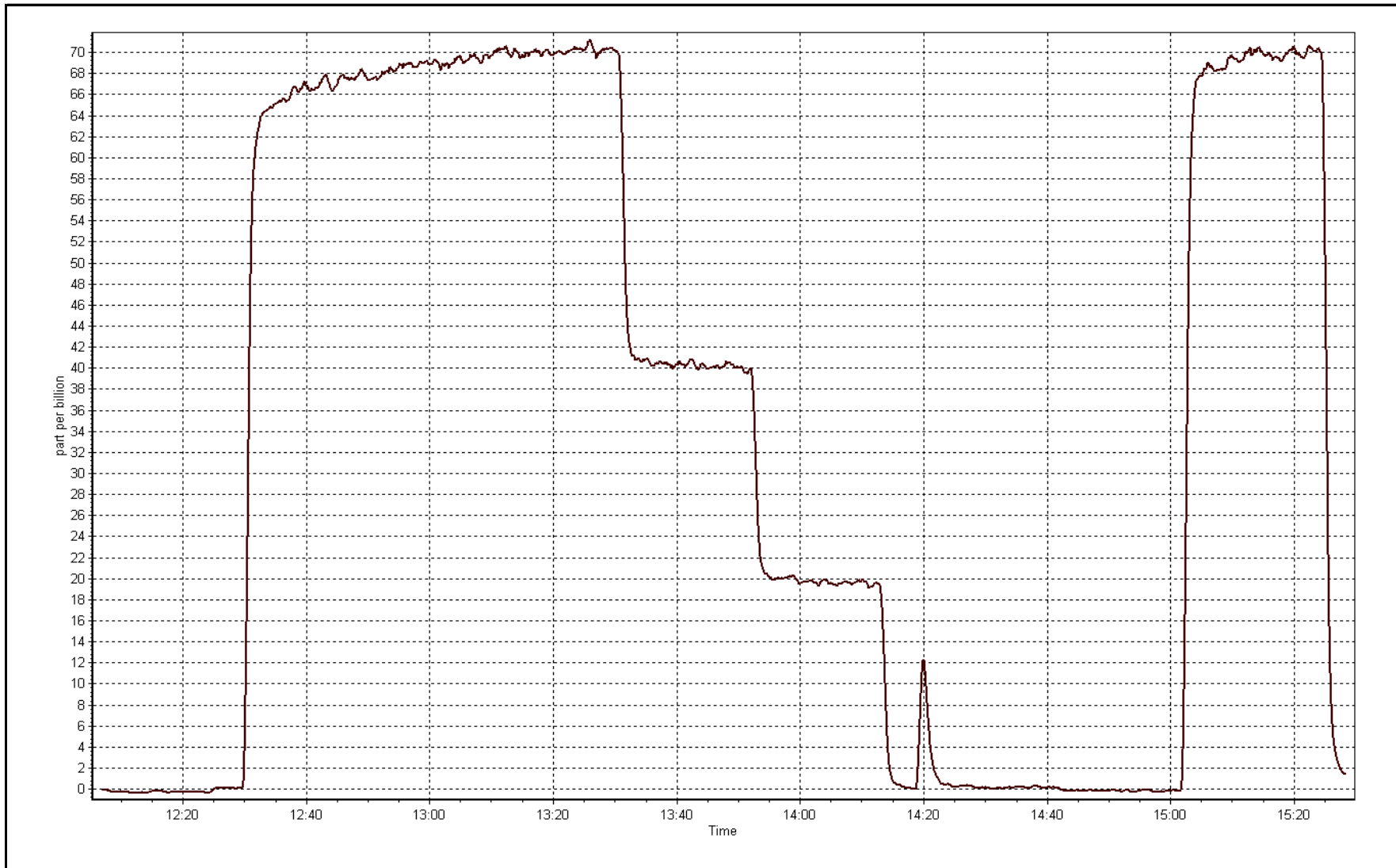
Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 3, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:05	End Time (MST)	15:35
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	-0.3	----	Correlation Coefficient	0.999972
69.6	70.2	0.9918		
39.8	40.3	0.9889	Slope	0.986419
19.9	19.7	1.0102		
			Intercept	0.306123







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 3, 2017	Last Calibration	January 23, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:25
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 701	Serial Number	260
DACS make/model	Campbell Scientific CR3000	Serial Number	10957

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.996835	1.004734	Carrier Pressure	35.8	35.8
THC Calc intercept	0.053914	0.058353	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.997544	1.003957	Air Pressure	32.4	32.4
NMHC Calc intercept	0.020128	0.026297			

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	16.13	1.005
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	16.22	16.12	1.006
second point	5542	42.1	8.12	7.97	1.019
third point	5542	21.1	4.07	3.95	1.030
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	16.22	16.13	1.005
Average Correction Factor					1.018

Corrected As found 16.13 Previous response 16.22 % change 0.5%

Notes:

Inlet filter changed after as founds. No adjustments made.

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	8.51	1.005
second point	5542	42.1	4.28	4.22	1.015
third point	5542	21.1	2.15	2.09	1.027
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	8.55	8.52	1.004
Average Correction Factor					1.016

Corrected As found 8.51 Previous response 8.56 % change 0.5%

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	7.62	1.006
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	7.66	7.62	1.006
second point	5542	42.1	3.84	3.75	1.023
third point	5542	21.1	1.92	1.86	1.034
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	7.66	7.61	1.007
Average Correction Factor					1.021

Corrected As found 7.62 Previous response 7.66 % change 0.5%



Wood Buffalo Environmental Association

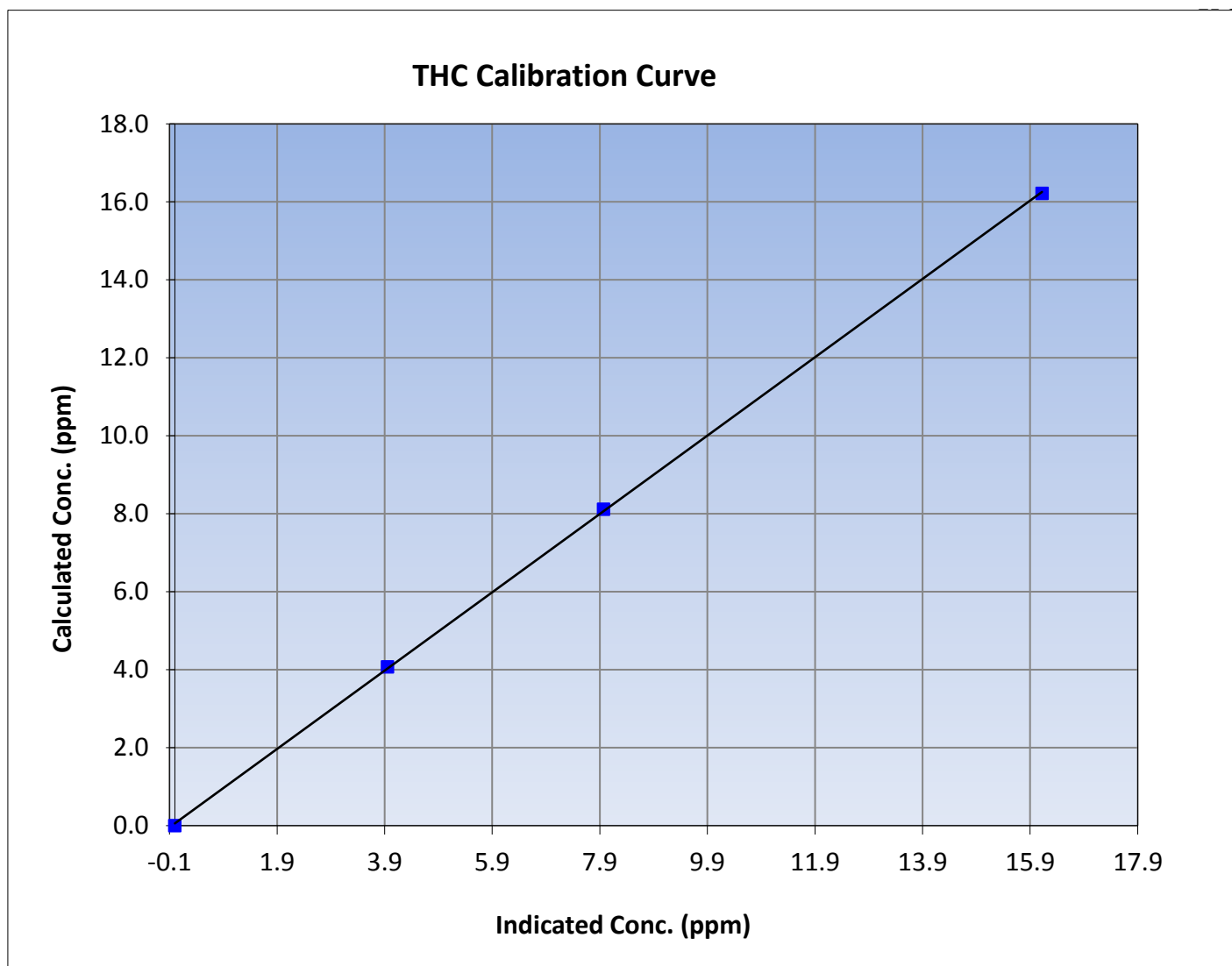
THC Calibration Summary

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 23, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:15	End Time (MST)	12:25
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	0.999936
16.22	16.12	1.0061		
8.12	7.97	1.0187	Slope	1.004734
4.07	3.95	1.0301		
			Intercept	0.058353





Wood Buffalo Environmental Association

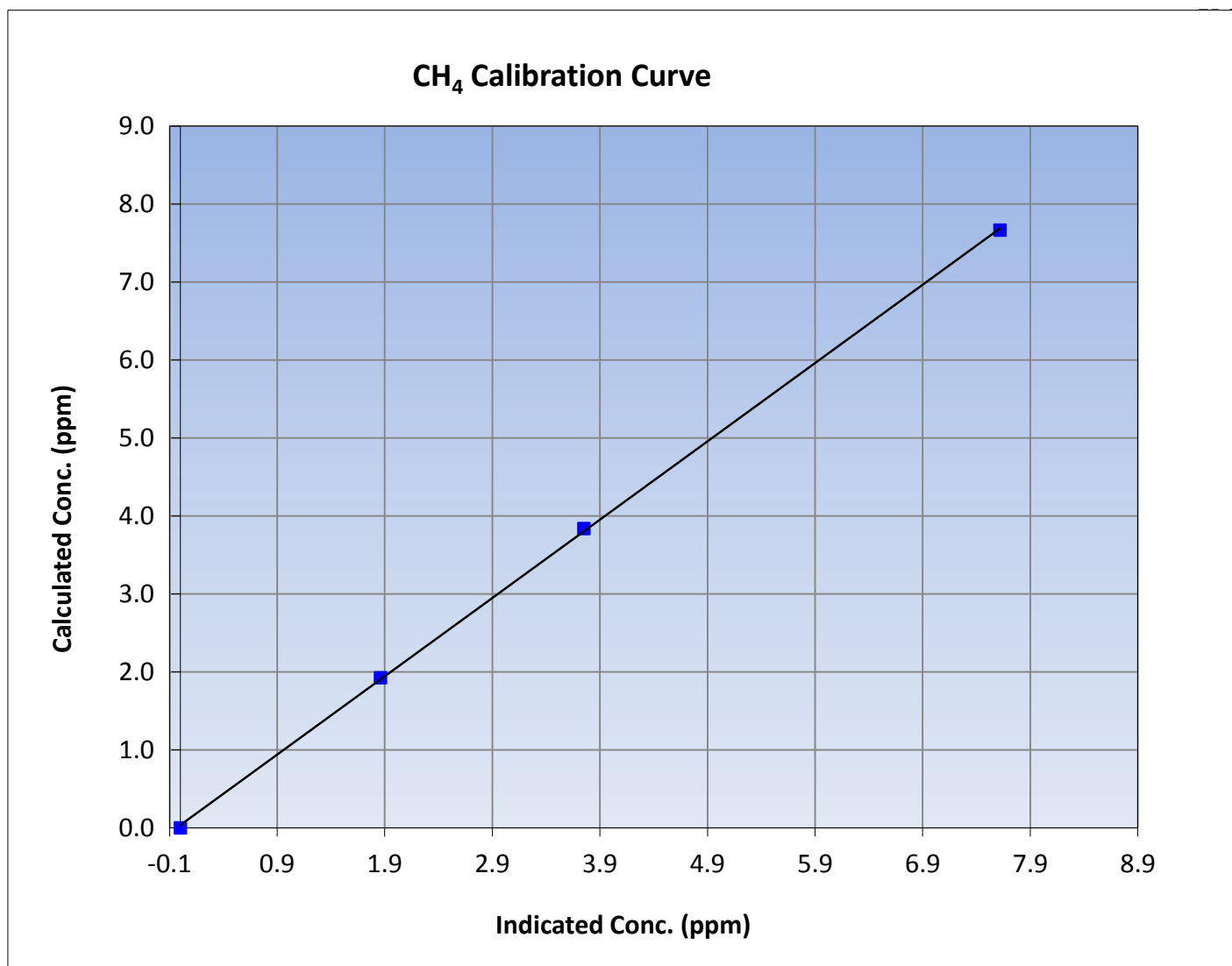
CH₄ Calibration Summary

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 23, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:15	End Time (MST)	12:25
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	0.999893
7.66	7.62	1.0057		
3.84	3.75	1.0230	Slope	1.004227
1.92	1.86	1.0337		
			Intercept	0.034098





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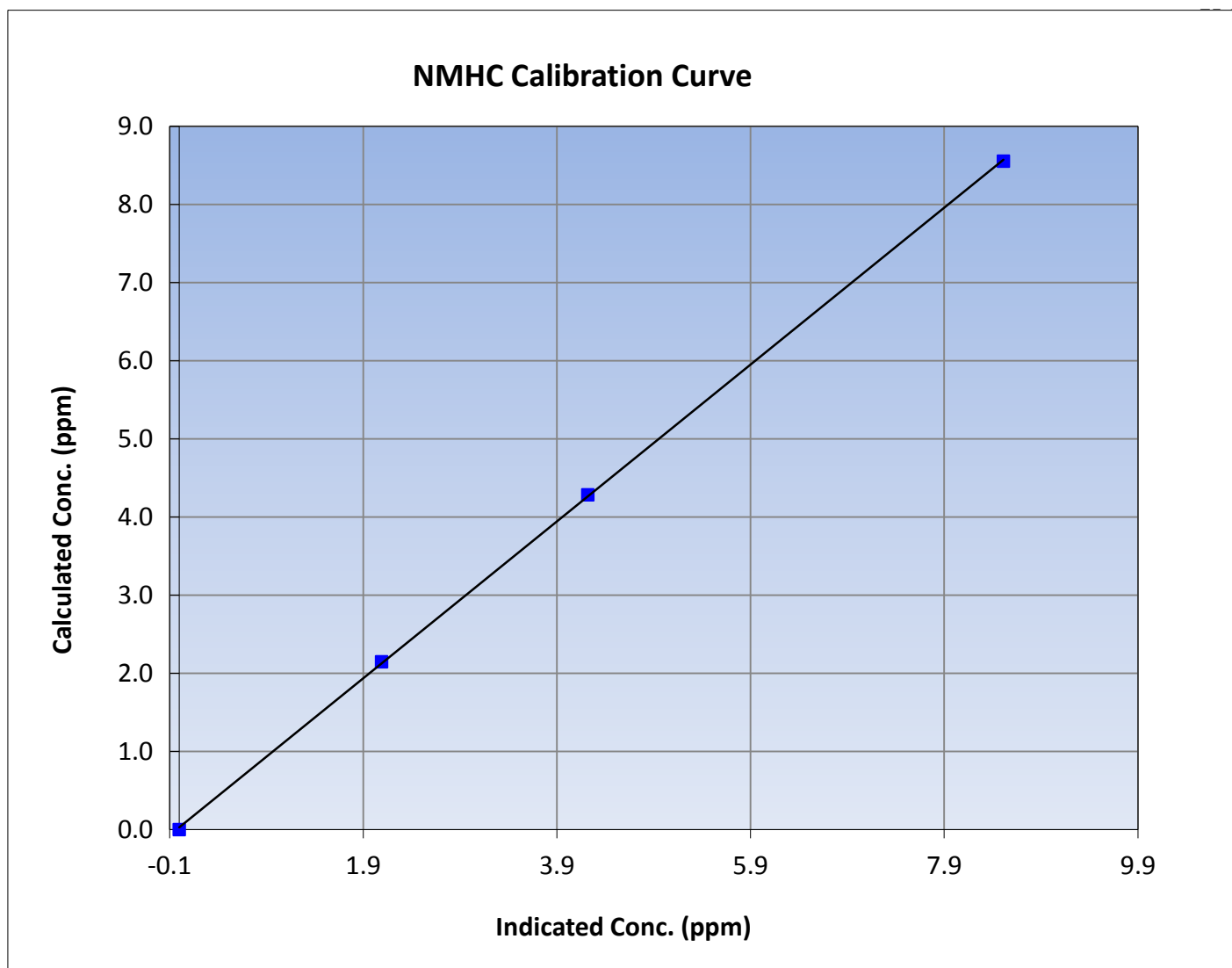
NMHC Calibration Summary

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 23, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:15	End Time (MST)	12:25
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

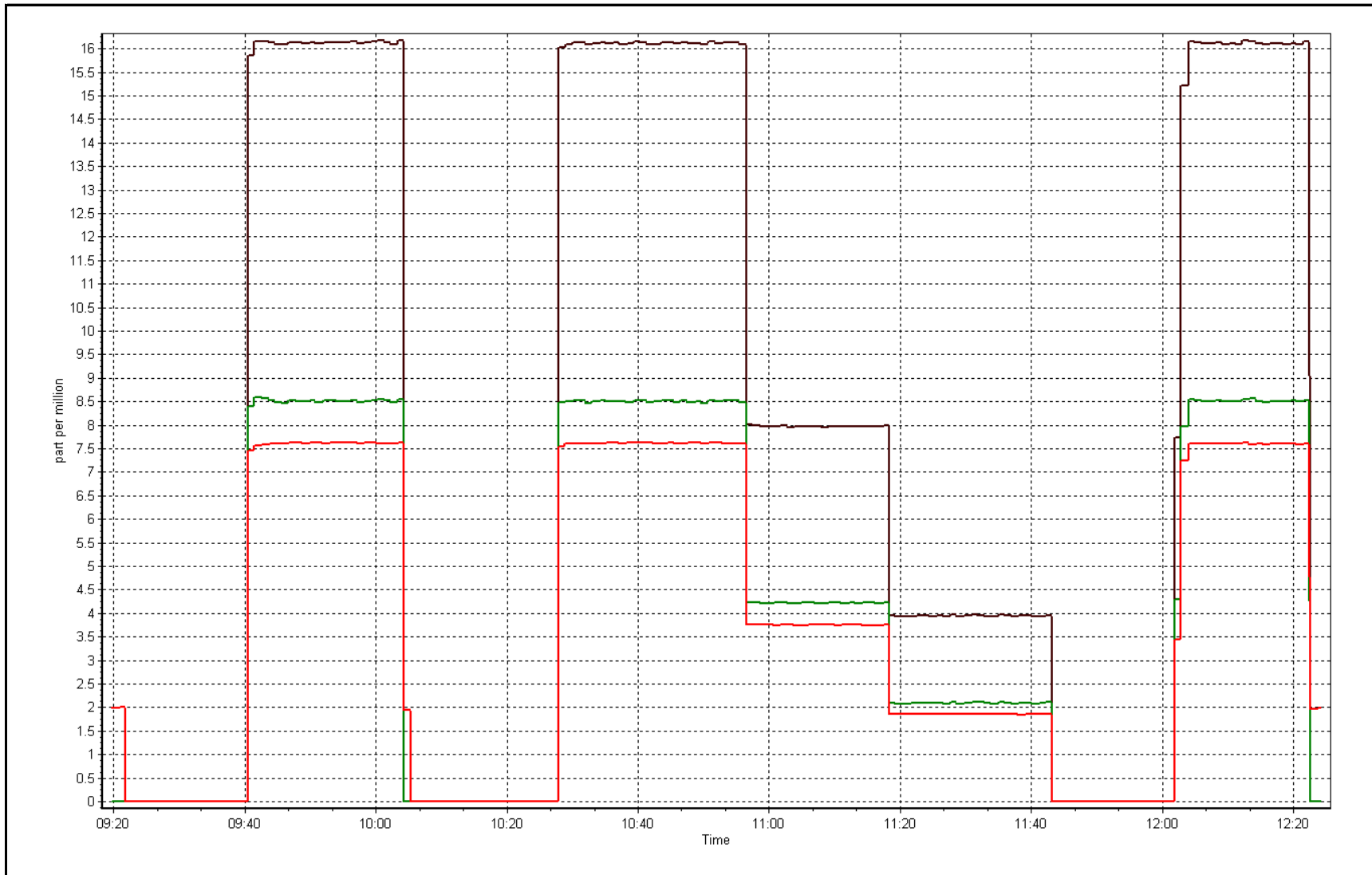
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999956
8.55	8.51	1.0053		
4.28	4.22	1.0148	Slope	1.003957
2.15	2.09	1.0270		
			Intercept	0.026297



THC Calibration Plot

Date: February 3, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 6, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	12:25	End Time (MST)	15:40
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 T701	Serial Number	2449
DACS make/model	Campbell Scientific CR3000	Serial Number	260
		Serial Number	10957

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	30.7	29.9
Analyzer IP address	192.168.1.49		Lamp temp.	53.6	53.6
Calculated slope	1.002663	1.000288	Pressure	683.7	673.3
Calculated intercept	-1.571451	-1.468309	Flow cell A	0.713	0.706
Analyzer Background	-0.7	-0.7	Flow cell B	0.739	0.733
Analyzer Coefficient	0.993	0.996	Cell A Intensity	79558	79011
			Cell B Intensity	79953	79333

Analyzer make Thermo 49i Analyzer serial # 1300156234

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	-0.4	----
as found span	5500	1107.7	400.0	398.2	1.005
calibrator zero	5500	800.0	0.0	-0.6	----
high point	5500	1110.7	400.0	400.2	0.999
second point	5500	929.1	200.0	202.6	0.987
third point	5500	823.4	100.0	103.5	0.967
as left zero	5500	800.0	0.0	0.0	----
as left span	5500	1121.5	400.0	400.8	0.998
Average Correction Factor					0.984

Corrected As found 398.6 Previous response 400.5 % change 0.5%

Notes:

Inlet filter changed after as founds. Span adjusted slightly.

Calibration Performed By: Devin Russell



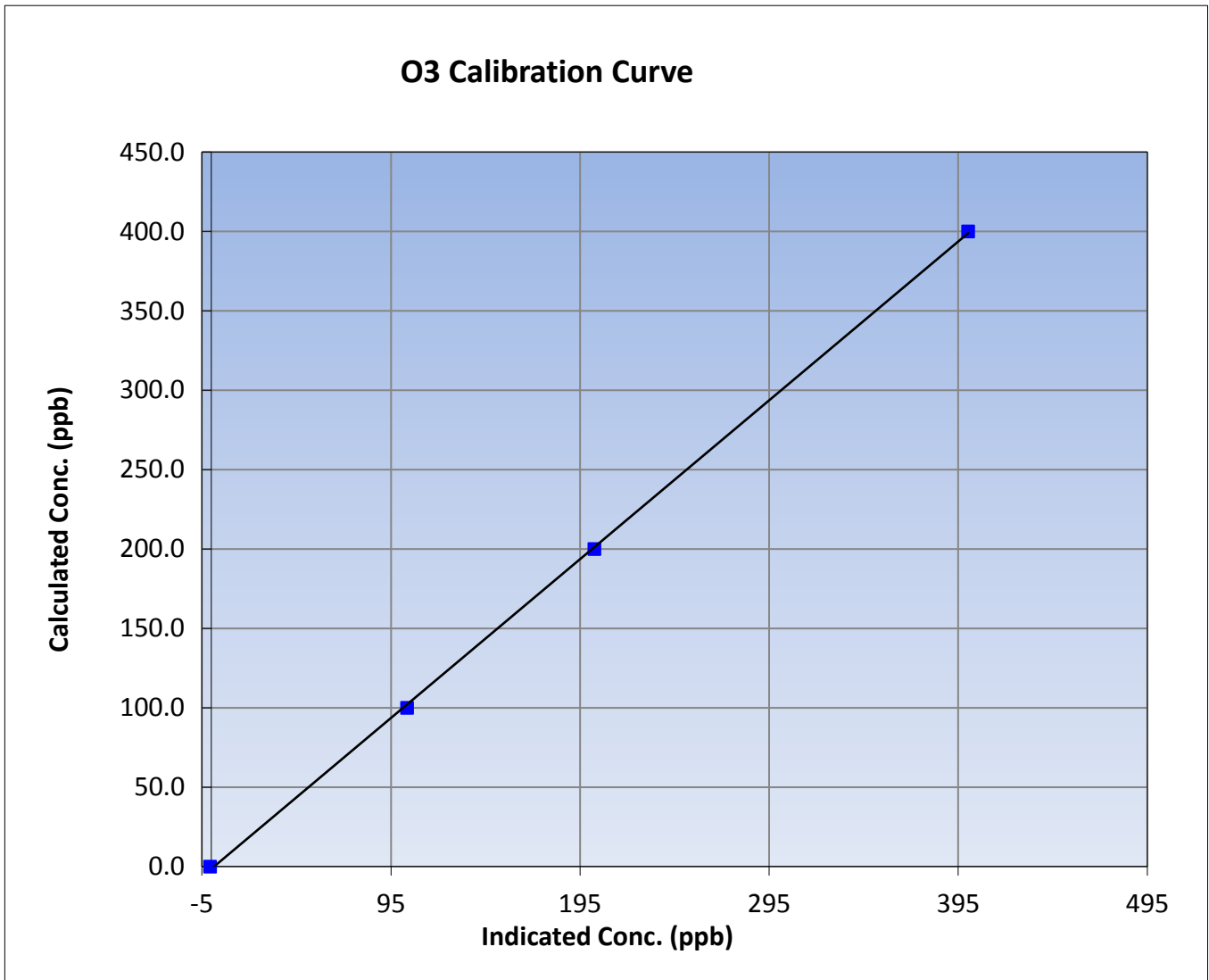
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-03-17	Previous Calibration	January-06-17
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:25	End Time (MST)	15:40
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

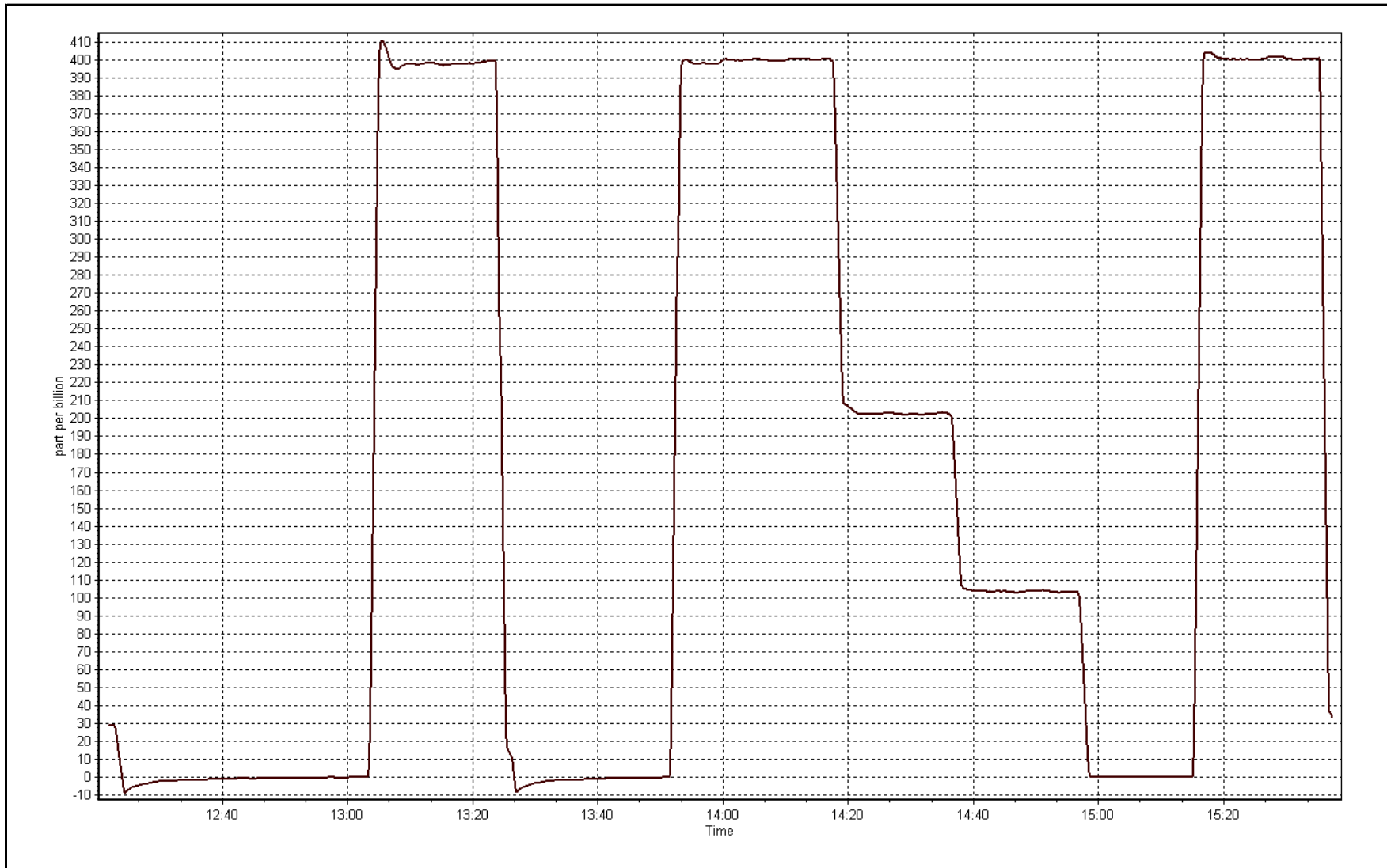
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	----	Correlation Coefficient	0.999874
400.0	400.2	0.9994		
200.0	202.6	0.9872	Slope	1.000288
100.0	103.5	0.9666		
			Intercept	-1.468309



O3 Calibration Plot

Date: February 3, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 6, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:20	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 701	Serial Number	260

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	0.989997	0.990444	1.000910
	Data Offset	2.688764	2.631211	0.024791
Current Calibration	Data Slope	0.997518	0.996584	0.999458
	Data Offset	1.842373	1.900004	-0.697427

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	1.044		1.033	
NOx coefficient	1.001		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.1		3.0	
NOx bkgrnd	3.3		3.3	
Chamber Temp	50.5	Deg C	50.3	Deg C
Moly Temp	324.7	Deg C	323.9	Deg C
PMT voltage	-772.6	V	-772.6	V
PMT Temp	-3.0	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	185.9	mmHg	187.1	mmHg
R Cell Press Nox	185.9	mmHg	187.1	mmHg
NO sample flow	0.771	lpm	0.77	lpm
Nox sample Flow	0.771	lpm	0.770	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 6, 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	5542	84.1	795.2	795.2	0.0	801.4	800.2	1.1	0.9923	0.9937
calibrator zero	5542	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
high point	5542	84.1	795.2	795.2	0.0	796.2	796.8	-0.7	0.9987	0.9979
second point	5542	42.1	398.1	398.1	0.0	396.5	396.9	-0.3	1.0039	1.0030
third point	5542	21.1	199.5	199.5	0.0	196.0	196.2	-0.2	1.0178	1.0166
as left zero	5542	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
as left span	5542	84.1	795.2	364.4	430.7	800.6	366.9	433.7	0.9932	0.9932
Average Correction Factor									1.0068	1.0059

Corrected As found NO_x= 801.3 NO= 800.3 Percent Change NO_x= -0.1% NO= 0.0%
 Previous Response NO_x= 800.5 NO= 800.2

GPT Calibration Data

Dilution Flow (total) 5542 ccm Source Gas Flow 84.10 ccm NOx ref calc conc = 795.2 ppb NO ref calc conc = 795.2 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	797.6	796.3	0.1	0.9970	0.9986	----	----
1st NO2 (400)	364.4	431.9	796.9	364.4	432.5	0.9978	----	0.9985	100.1%
2nd NO2 (200)	584.2	212.2	797.4	584.2	213.3	0.9972	----	0.9946	100.5%
3rd NO2 (100)	687.0	109.3	797.6	687.0	110.6	0.9970	----	0.9885	101.2%
2nd NO ref point	----	0.0	796.9	796.0	0.9	0.9978	0.9989	----	----
Average Correction Factor						0.9974		0.9939	100.6%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

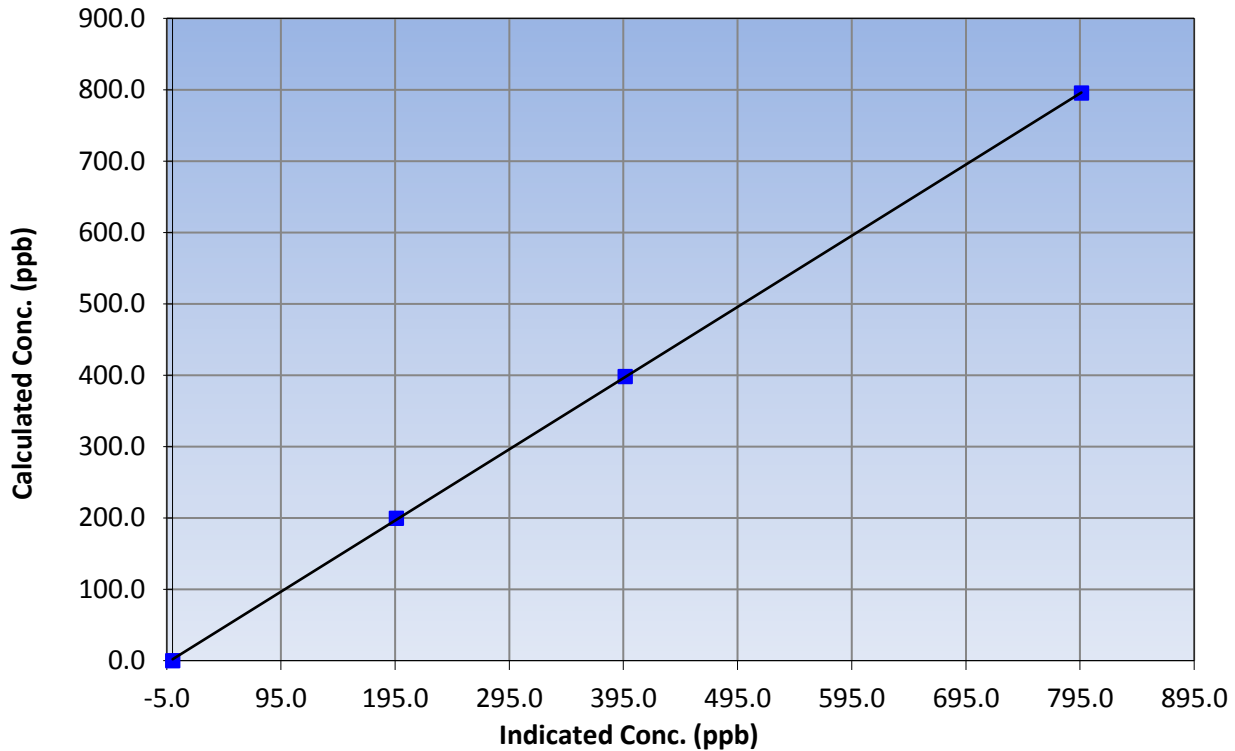
Station Information

Calibration Date	February 6, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:20	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	0.999972
795.2	796.2	0.9987		
398.1	396.5	1.0039	Slope	0.997518
199.5	196.0	1.0178		
			Intercept	1.842373

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

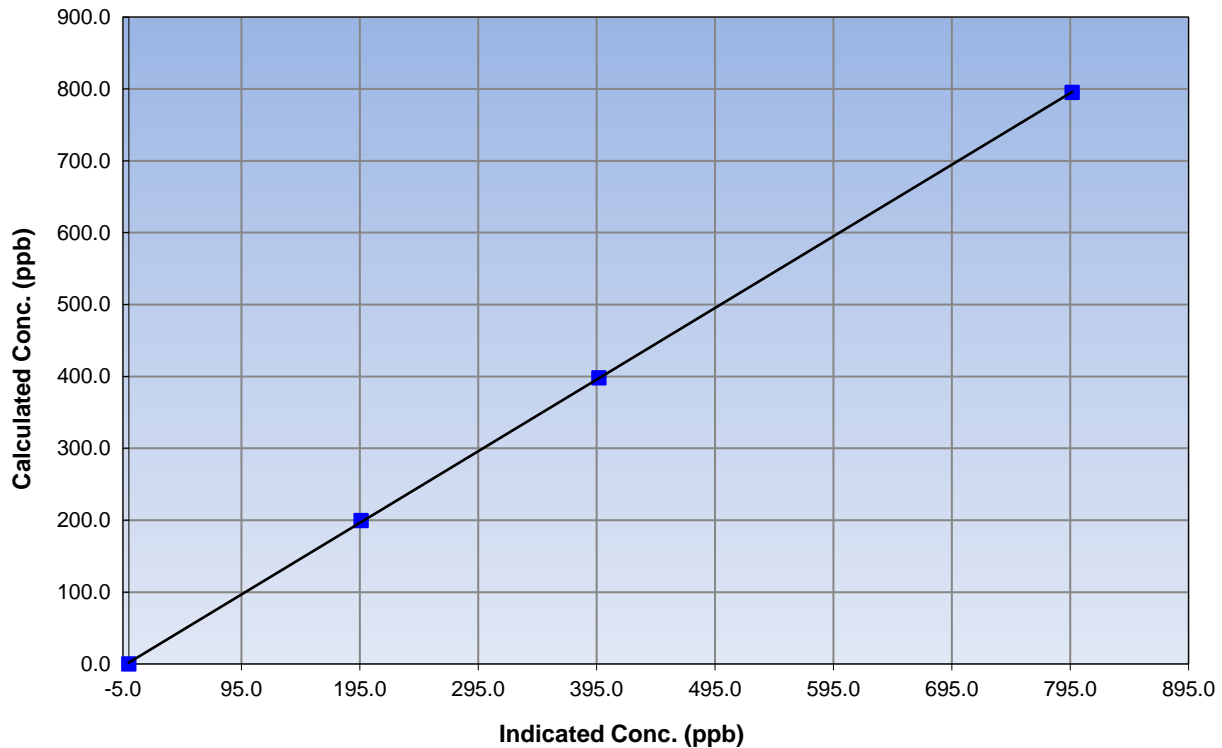
Station Information

Calibration Date	February 6, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:20	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	0.999975
795.2	796.8	0.9979		
398.1	396.9	1.0030	Slope	0.996584
199.5	196.2	1.0166		
			Intercept	1.900004

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

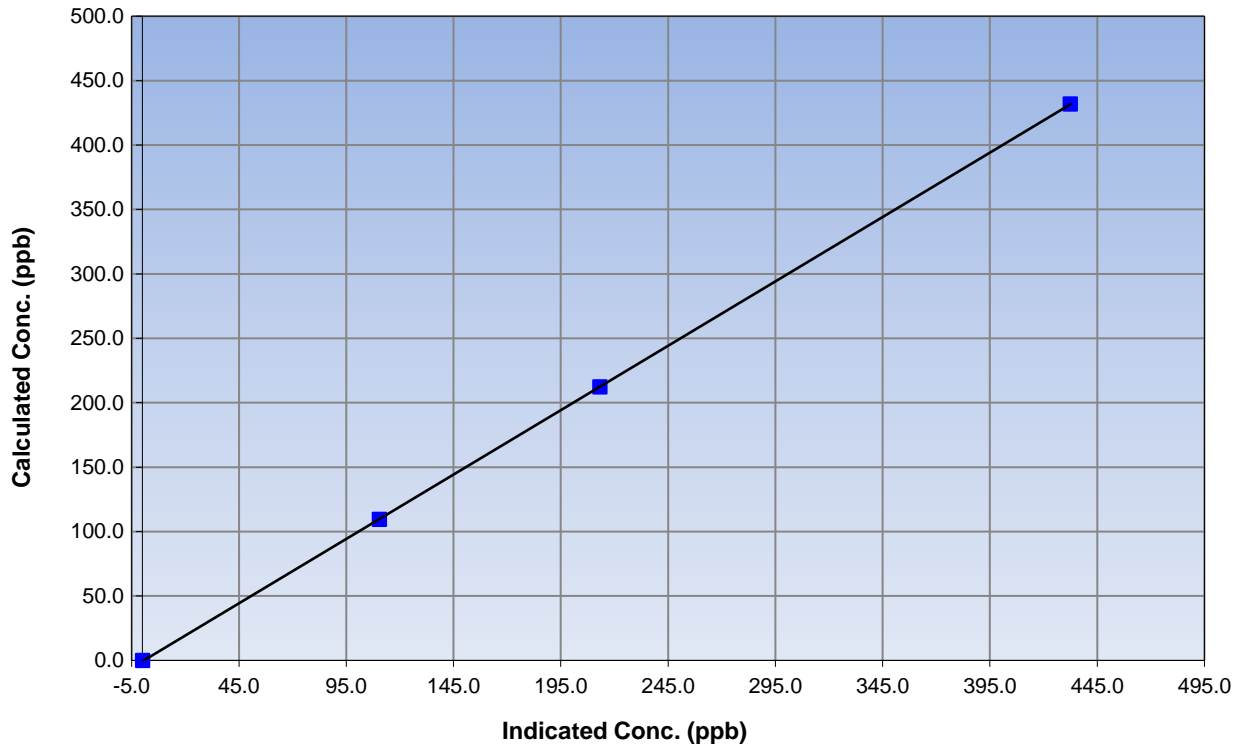
Station Information

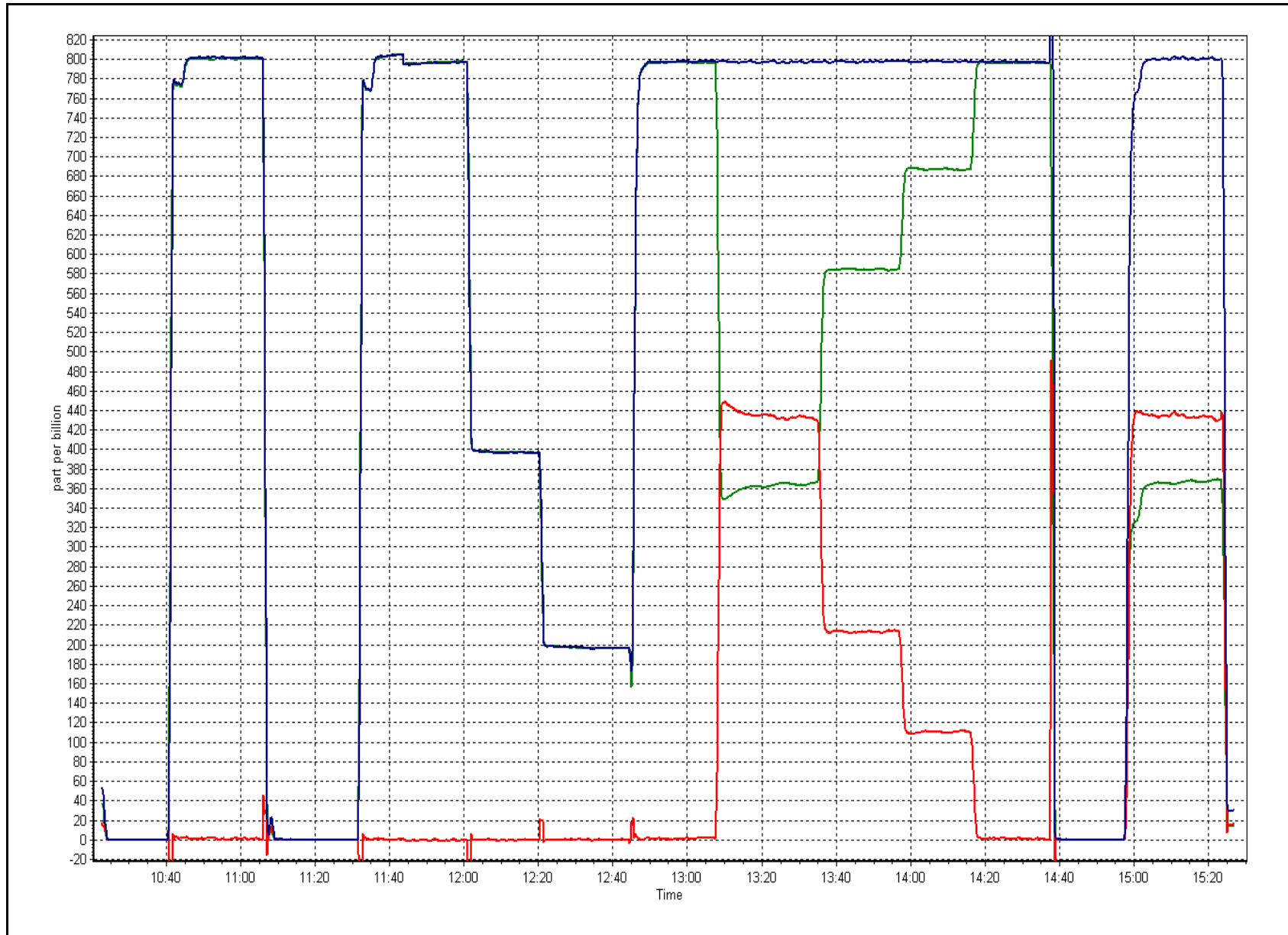
Calibration Date	February 6, 2017	Previous Calibration	January 9, 2017
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:20	End Time (MST)	15:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999992
431.9	432.5	0.9985		
212.2	213.3	0.9946	Slope	0.999458
109.3	110.6	0.9885		
			Intercept	-0.697427

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	February 6, 2017	NOX Previous Cal Date	January 9, 2017
NH3 Calibration Date	February 7, 2017	NH3 Previous Cal Date	January 10, 2017
Reason:	Routine		
Start Time (MST)	10:25	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	1.002487	0.974373	1.000629	0.999556	1.002084
	Data Offset	0.084183	-0.8556125	1.659831	0.814693	0.926895
Cal Stats After	Data Slope	0.995377	0.970104	0.999390	0.997832	1.012816
	Data Offset	0.385289	-0.20052618	2.139227	2.516484	0.234648
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		-2.6	ppb
NOx BKG	-2.5		-2.5	ppb
Nt BKG	-1.9		-1.9	
NO coefficient	1.066		1.062	
NO2 coefficient	1.000		1.000	ppb
NOx coefficient	1.088		1.080	
NH3 coefficient	1.000		0.965	
Nt coefficient	1.091		1.085	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.1	Deg C	316.0	Deg C
PMT Temp	7.1	Deg C	7.1	Deg C
O3 flow	86.0	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	561.0	ccm	557.0	ccm
Sample Flow 2 Nox	557.0	ccm	546.0	ccm
Sample Flow 3 Nt	570.0	ccm	560.0	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:

February 7, 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	5542	0.0	0.0	0.0	0.0	0.3	0.1	0.3	----	----
as found NO	5542	84.1	795.2	795.2	----	803.1	800.7	2.5	0.990	----
calibrator zero	5542	0.0	0.0	0.0	0.0	0.0	-0.4	0.4	----	----
high NO point	5542	84.1	795.2	795.2	----	792.7	794.3	-1.6	1.003	----
NO/O ₃ point	5542	84.1	795.2	795.2	----	791.0	790.6	0.3	1.005	----
as found NH ₃	5542	46.3	797.0	NA	797.0	789.4	21.4	768.0	1.010	1.038
first NH ₃	5542	46.3	797.0	NA	797.0	821.6	20.9	800.7	0.970	0.995
second NH ₃	5542	23.2	399.4	NA	399.4	412.2	11.6	400.6	0.969	0.997
third NH ₃	5542	11.7	201.4	NA	201.4	207.9	6.9	201.1	0.969	1.002
Average Correction Factor									1.0042	0.9980

Nt Corrected As Found Nt = 802.8 ppb
 NOx Corrected As Found NOx = 800.7 ppb
 NH₃ Previous Converter Efficiency = 100.0 %

Previous Response Nt = 816.9 ppb
 Previous Response NOx = 793.0 ppb
 NH₃ Current Converter Efficiency = 96.5 %

Nt percent change 1.8%
 NOx percent change -1.0%
 NH₃ percent change -3.5%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: February 6, 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	5542	0.0	0.0	0.0	0.0	0.1	0.2	0.5	----	----
as found span	5542	84.1	795.2	795.2	795.2	795.9	797.4	799.9	0.9991	0.9972
calibrator zero	5542	0.0	0.0	0.0	0.0	-0.4	-0.5	0.0	----	----
high point	5542	84.1	795.2	795.2	795.2	794.3	795.2	792.7	1.0010	0.9999
second point	5542	42.1	398.1	398.1	398.1	395.4	395.9	397.0	1.0067	1.0055
third point	5542	21.1	199.5	199.5	199.5	195.6	195.0	196.5	1.0197	1.0229
Average Correction Factor									1.0092	1.0094

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	799.4	795.7	797.3	----
Previous Response	816.9	793.0	794.7	----
Percent Change	2.2%	-0.3%	-0.3%	0.0%

GPT Calibration Data

Dilution Flow (total) 5542 ccm Source Gas Flow 84.1 ccm NO_x ref calc conc = 795.2 ppb NO ref calc conc = 795.2 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	790.6	792.2	-1.6	1.0058	1.0037	----	----
1st NO ₂ (400)	363.4	428.9	786.7	363.4	423.3	1.0108	----	1.0131	98.7%
2nd NO ₂ (200)	586.1	206.1	789.3	586.1	203.2	1.0074	----	1.0142	98.6%
3rd NO ₂ (100)	682.5	109.7	790.2	682.5	107.7	1.0063	----	1.0187	98.2%
2nd NO ref point	----	0.0	796.6	797.1	-0.6	0.9982	0.9975	----	----
Average Correction Factor						1.0057	1.0006	1.0153	98.5%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

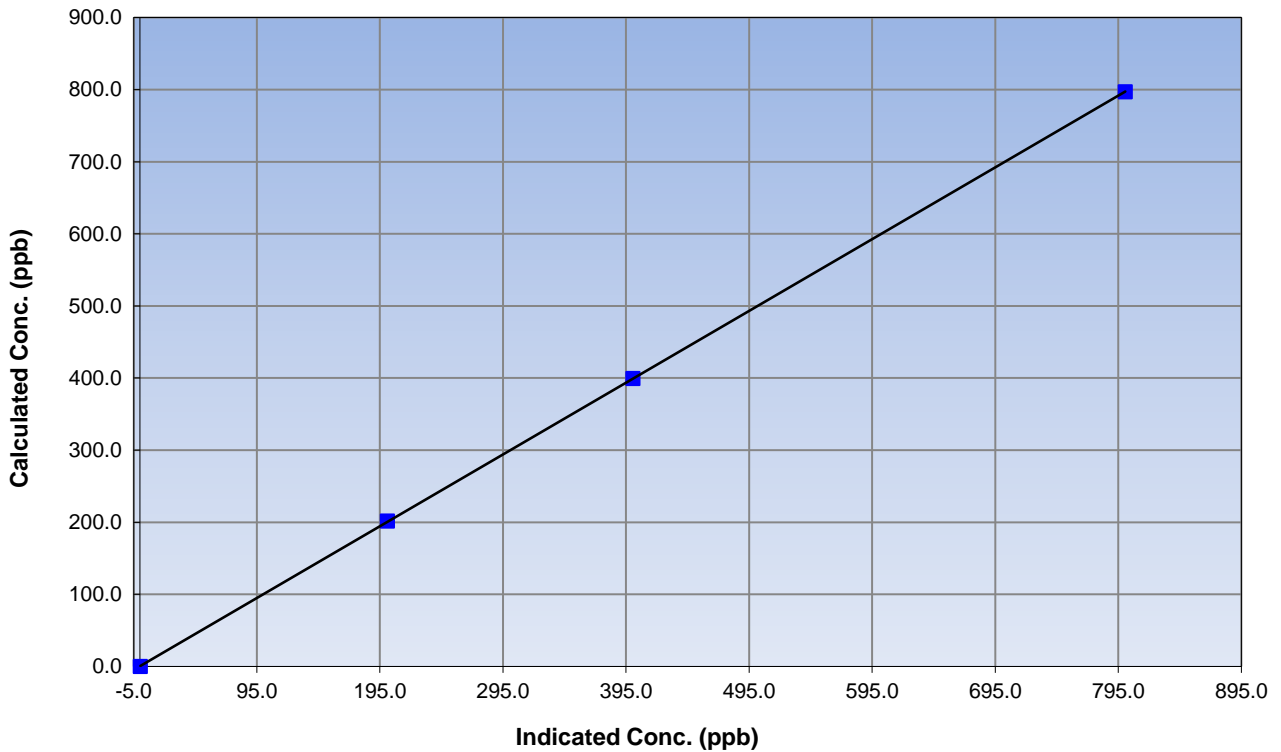
Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:25	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	0.4	----	Correlation Coefficient	0.999996
797.0	800.7	0.9955		
399.4	400.6	0.9968	Slope	0.995377
201.4	201.1	1.0018		
			Intercept	0.385289

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

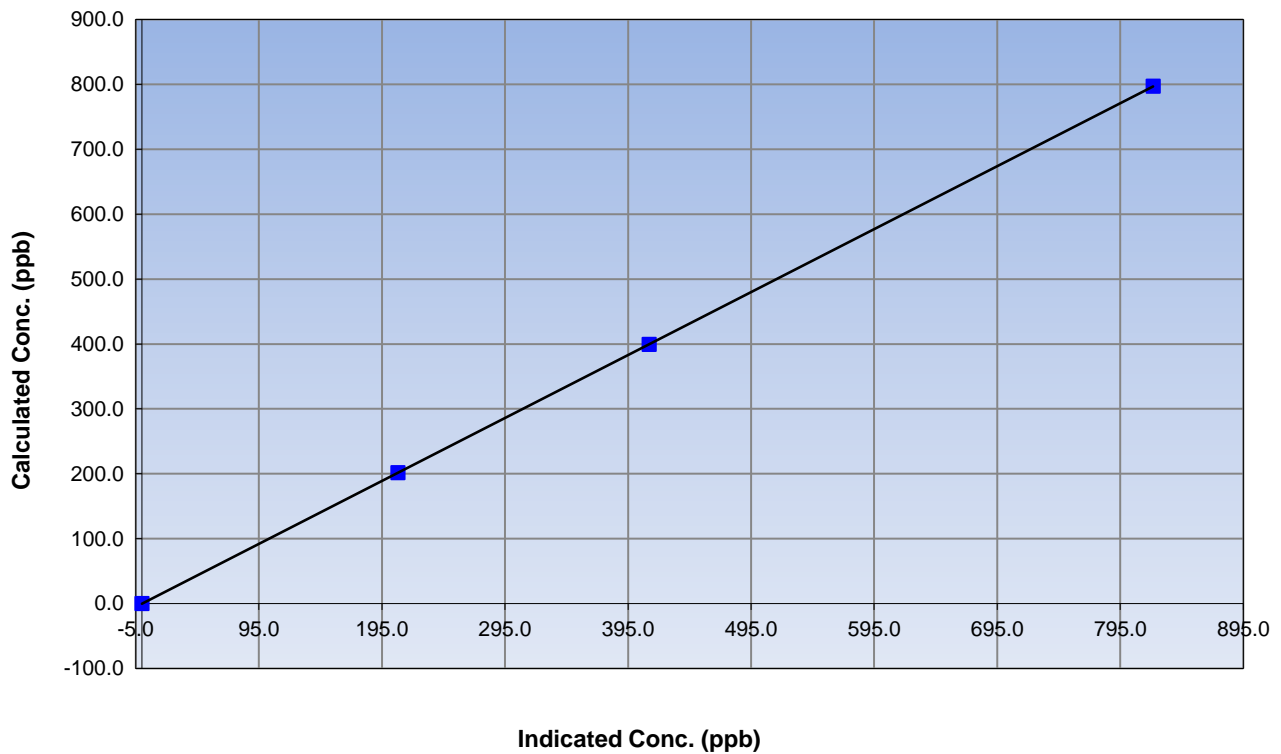
Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:25	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	0.0	----	Correlation Coefficient	1.000000
797.0	821.6	0.9701		
399.4	412.2	0.9689		
201.4	207.9	0.9688		
			Slope	0.970104
			Intercept	-0.200526

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

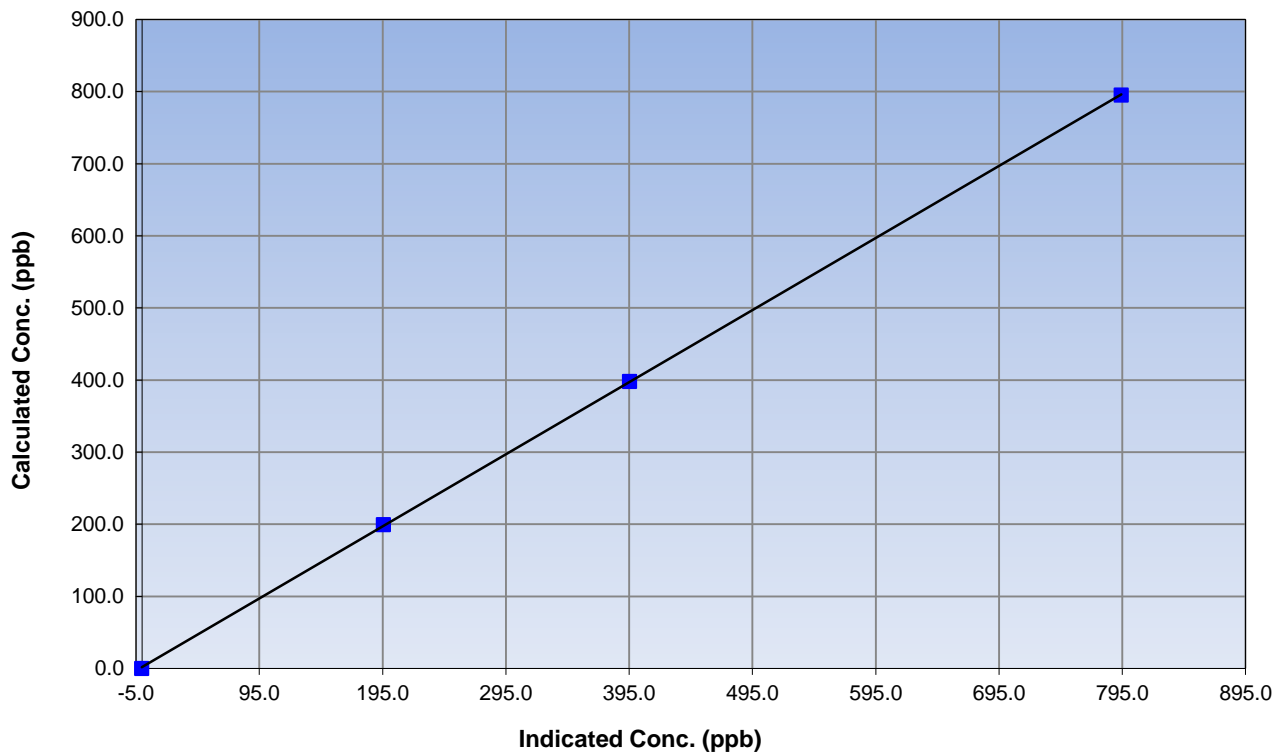
Station Information

Calibration Date	February 6, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:25	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	-0.4	----	Correlation Coefficient	0.999978
795.2	794.3	1.0010		
398.1	395.4	1.0067	Slope	0.999390
199.5	195.6	1.0197		
			Intercept	2.139227

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

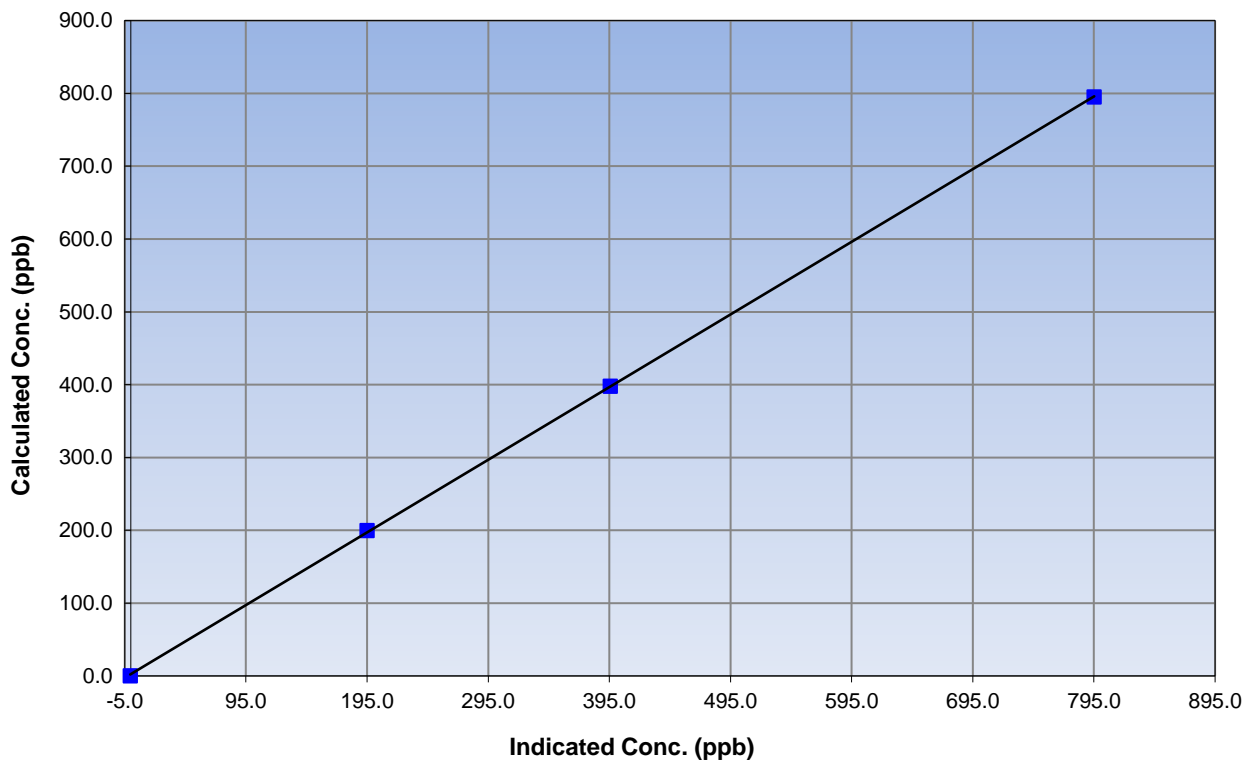
Station Information

Calibration Date	February 6, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:25	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	-0.5	----	Correlation Coefficient	0.999969
795.2	795.2	0.9999		
398.1	395.9	1.0055	Slope	0.997832
199.5	195.0	1.0229		
			Intercept	2.516484

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

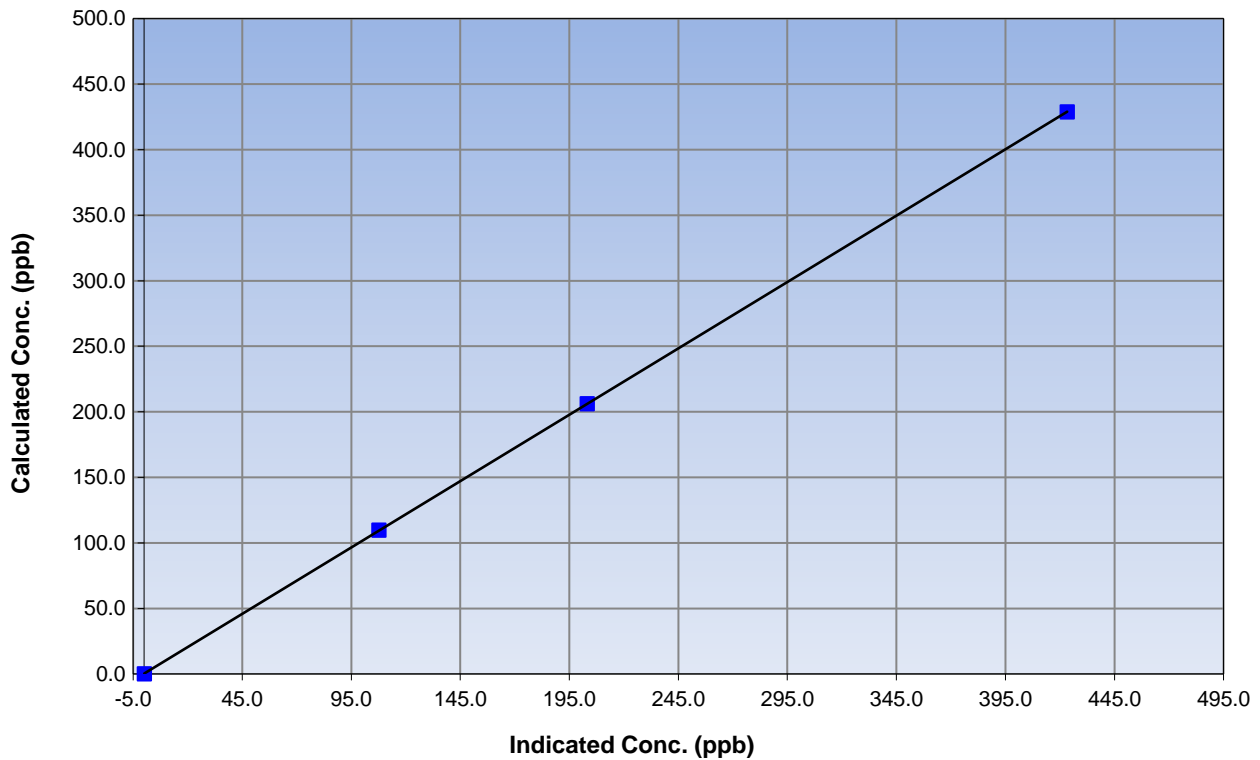
Station Information

Calibration Date	February 6, 2017	Previous Calibration	January 9, 2017
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:25	End Time (MST)	15:30
Analyzer make	Teledyne T201	Analyzer serial #	215

Calibration Information

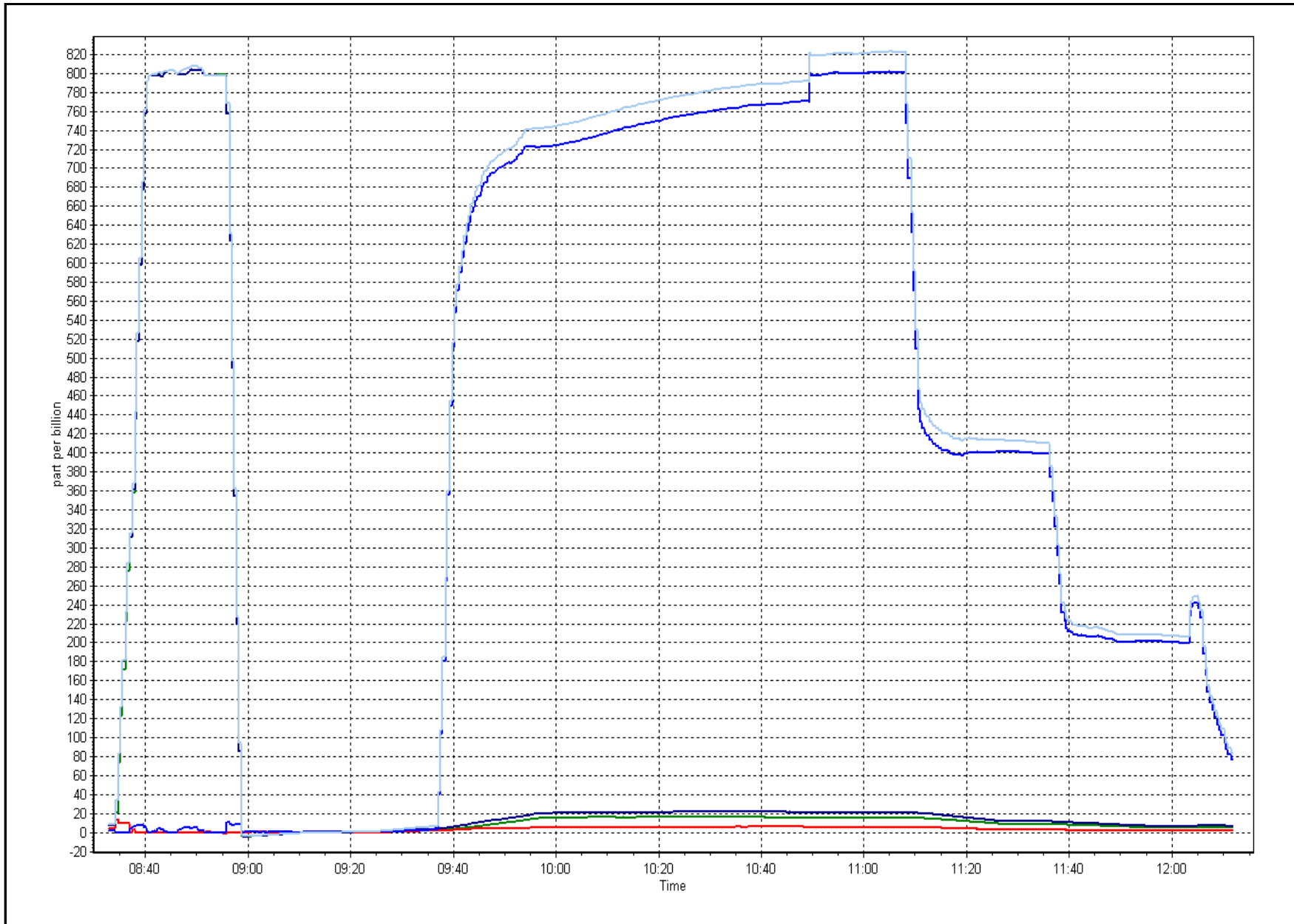
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999997
428.9	423.3	1.0131		
206.1	203.2	1.0142	Slope	1.012816
109.7	107.7	1.0187		
			Intercept	0.234648

NO₂ Calibration Curve



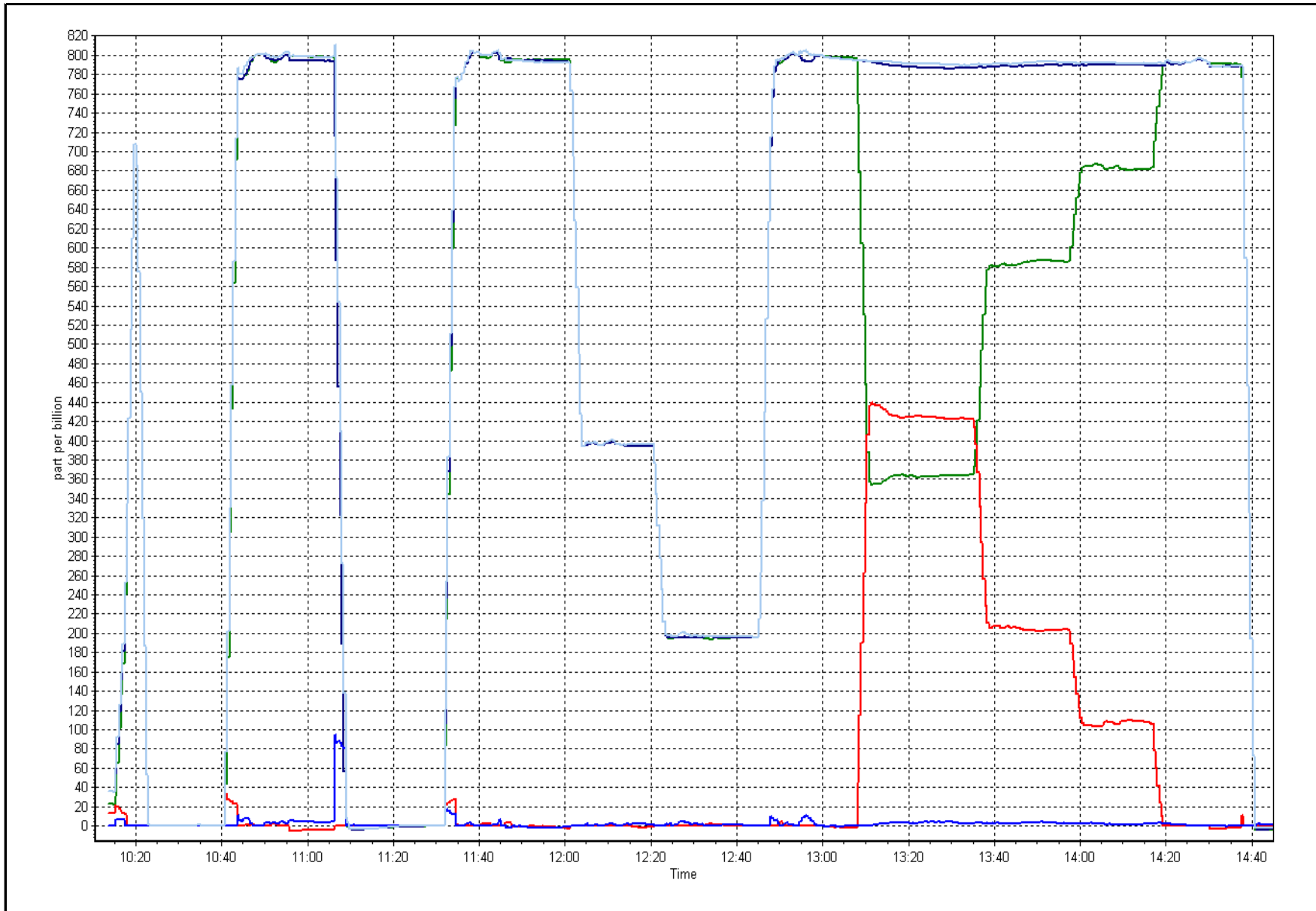
NH₃ Calibration Plot

Date: February 7, 2017



NOX Calibration Plot

Date: February 6, 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:	February 7, 2017	Last Cal Date:	January 17, 2017
Start time (MST):	8:35	End time (MST):	9:15
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)	26	-27.3	-26	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	974	968.58	974	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	993.6	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.1	-----	-0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
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 replaced with clean head. No adjustments made to temperature, pressure, or flow. 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
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 FEBRUARY 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	638	34	34	100	18	0	3	0
TRS (ppb) Average	640	32	32	100	2	0	1	0
THC (ppm) Average	596	31	76	93.3	4	-	2.7	-
NMHC (ppm) Average	596	31	76	93.3	0.321	-	0.111	-
CH4(ppm) Average	596	31	76	93.3	3.9	-	2.6	-
O3 (ppb) Average	641	31	31	100	47	0	46	-
NO2 (ppb) Average	639	33	33	100	44	0	25	-
NO (ppb) Average	639	33	33	100	50	-	21	-
NOX (ppb) Average	639	33	33	100	84	-	43	-
PM2.5 (ug/m3) Average	663	1	9	98.81	29.9	-	11.8	0
CO(ppm) Average	641	31	31	100	0.6	0	0.3	-
Temperature 2 m (C) Average	672	0	0	100	10.3	-	4.1	-
Barometric Pressure (inHg) Average	672	0	0	100	29.6	-	29.5	-
Relative Humidity (%) Average	672	0	0	100	97	-	88	-
Wind Speed 10 m (km/h) Average	671	0	1	99.85	27	-	18	-
Wind Direction 10 m (deg) Average	671	0	1	99.85	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 FEBRUARY 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	638	0.7	1	-	0	0	0	0	1	1	18
TRS (ppb) Average	640	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	596	2.07	0.3	-	1.9	1.9	2	2	2.1	2.2	4
NMHC (ppm) Average	596	0.016	0.051	-	0	0	0	0	0	0	0.321
CH4(ppm) Average	596	2.06	0.2	-	1.9	1.9	2	2	2	2.1	3.9
O3 (ppb) Average	641	24.5	11	-	3	8	16	26	34	38	47
NO2 (ppb) Average	639	12.2	9	-	1	2	5	10	17	26	44
NO (ppb) Average	639	5	8	-	0	0	0	2	6	14	50
NOX (ppb) Average	639	17.2	16	-	1	2	6	13	23	37	84
PM2.5 (ug/m3) Average	663	6.11	4.1	-	0	2.2	3.6	5.2	7.6	10.8	29.9
CO(ppm) Average	641	0.15	0.1	-	0.1	0.1	0.1	0.1	0.2	0.2	0.6
Temperature 2 m (C) Average	672	-10.91	10.2	-	-33.6	-23.1	-19	-12.2	-1.4	2	10.3
Barometric Pressure (inHg) Average	672	28.89	0.3	-	27.9	28.5	28.7	28.9	29.2	29.3	29.6
Relative Humidity (%) Average	672	71	13	-	35	52	63	74	80	85	97
Wind Speed 10 m (km/h) Average	671	7.3	6	-	0	2	3	6	11	16	27
Wind Direction 10 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	14 Feb 2017 18:00	15 Feb 2017 09:00	16	Analyzer Failure - failed interface board
NMHC, CH4, THC	15 Feb 2017 10:00	15 Feb 2017 12:00	3	Maintenance - replaced interface board
NMHC, CH4, THC	15 Feb 2017 13:00	16 Feb 2017 08:00	20	Analyzer Failure - failed interface board
NMHC, CH4, THC	16 Feb 2017 09:00	16 Feb 2017 14:00	6	Maintenance - replaced interface board
PM2.5	12 Feb 2017 09:00	12 Feb 2017 12:00	4	Unstable operation - excessive baseline drift
PM2.5	12 Feb 2017 23:00	13 Feb 2017 02:00	4	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	07 Feb 2017 22:00	07 Feb 2017 22:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

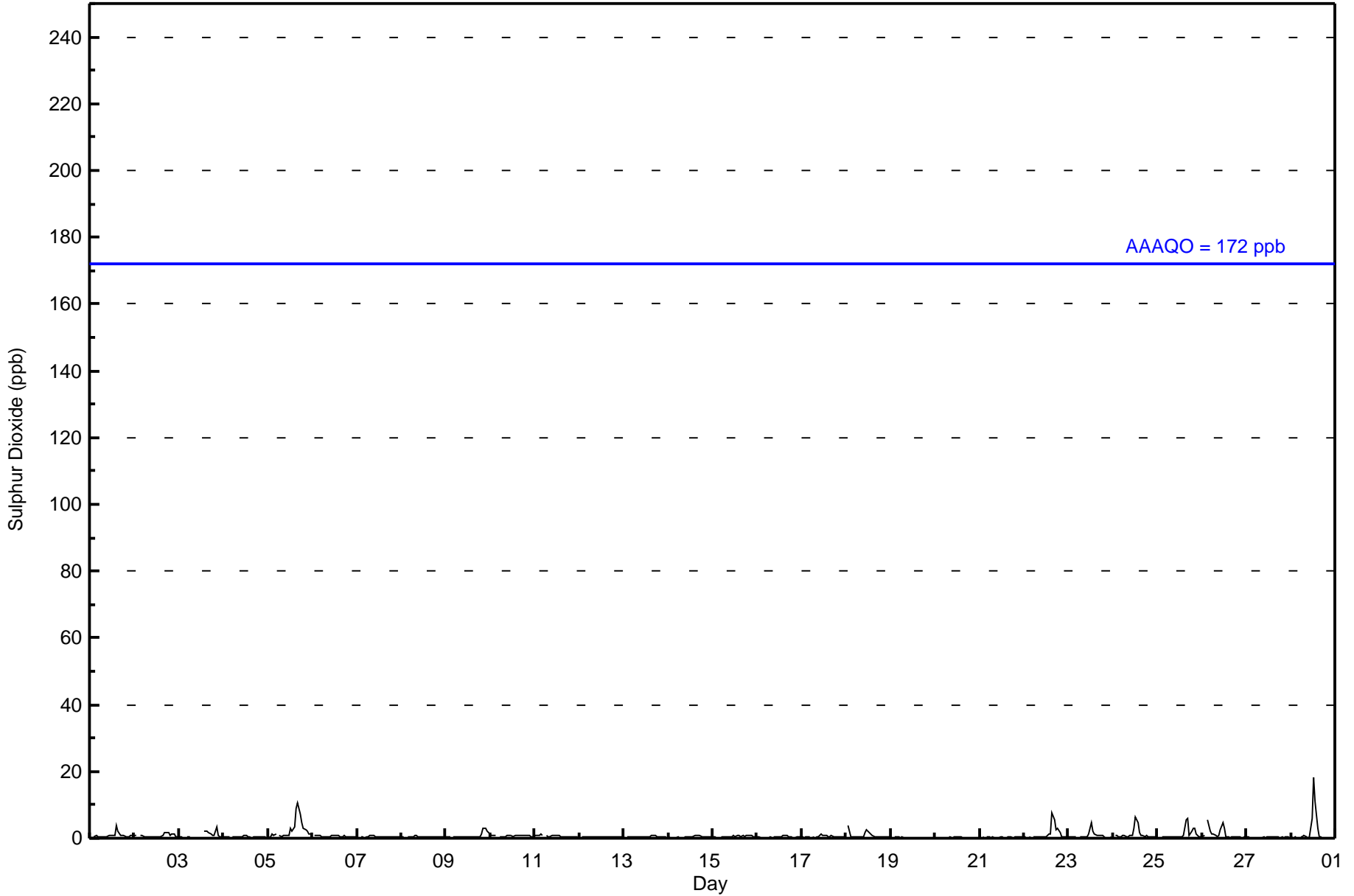
Athabasca Valley - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 18 ppb on Feb 28 13:00 Maximum Daily Average: 2.5 ppb on Feb 5														Hours in Service: 672 Hours of Data: 638 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0												
Minimum Value: 0 ppb on Feb 20 01:00 Minimum Daily Average: 0.1 ppb on Feb 19 Maximum Diurnal Average: 1.8 ppb at hour 13 Minimum Diurnal Average: 0.4 ppb at hour 6 Monthly Average: 0.7 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 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-Feb	3	Z	1	1	0	0	0	0	0	0	1	1	1	1	4	2	1	1	1	0	0	0	1	1	0.9	4
2-Feb	1	1	Z	1	1	0	1	0	1	1	1	1	1	1	1	1	2	2	2	1	1	1	0	0	0.8	2
3-Feb	0	0	0	Z	0	0	0	C	C	C	C	C	C	2	2	2	2	1	1	1	3	1	0	0	--	3
4-Feb	0	1	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Feb	0	0	1	1	1	Z	1	1	1	1	1	1	3	2	3	9	11	7	4	3	3	2	1	1	2.5	11
6-Feb	Z	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1
7-Feb	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Feb	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	2	2	0.7	3
10-Feb	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
11-Feb	1	1	1	1	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0.7	1
12-Feb	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0.4	1
14-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1
15-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1	1	1	0	0	0.5	1
16-Feb	1	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
17-Feb	0	0	0	0	1	Z	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0.5	1
18-Feb	Z	4	0	0	0	0	0	0	0	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0.8	4
19-Feb	0	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
20-Feb	0	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-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	8	5	3	3	2	0	0	0	0	1.2	8
23-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	5	2	1	1	1	1	1	0	0	0	0	0	0.7	5
24-Feb	Z	1	1	0	0	1	1	0	0	1	1	3	6	5	2	1	1	0	1	0	1	0	1	0	1.2	6
25-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	0	1	5	6	1	2	3	3	1	0	0	1.3	6	
26-Feb	0	1	Z	6	2	1	1	1	0	1	2	5	3	1	0	0	0	0	0	0	0	0	0	0	1.1	6
27-Feb	0	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-Feb	0	0	0	0	Z	0	0	1	0	0	0	6	18	11	3	0	0	0	0	0	0	0	0	0	1.8	18
0.5 0.6 0.5 0.6 0.5 0.4 0.4 0.4 0.4 0.4 0.6 1.1 1.8 1.2 0.9 1.4 1.3 0.9 0.7 0.6 0.8 0.6 0.4 0.4																								Diurnal Average		
3 4 1 6 2 1 1 1 1 1 2 6 18 11 4 9 11 7 4 3 3 3 2 2																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	635	99.53	99.53
11 - 20	3	0.47	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: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - February 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	17	8	18	31	37	76	33	25	16	39	60	45	29	29	102	634
11 - 20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	69	18	8	18	31	37	76	33	25	16	39	60	45	29	29	104	637

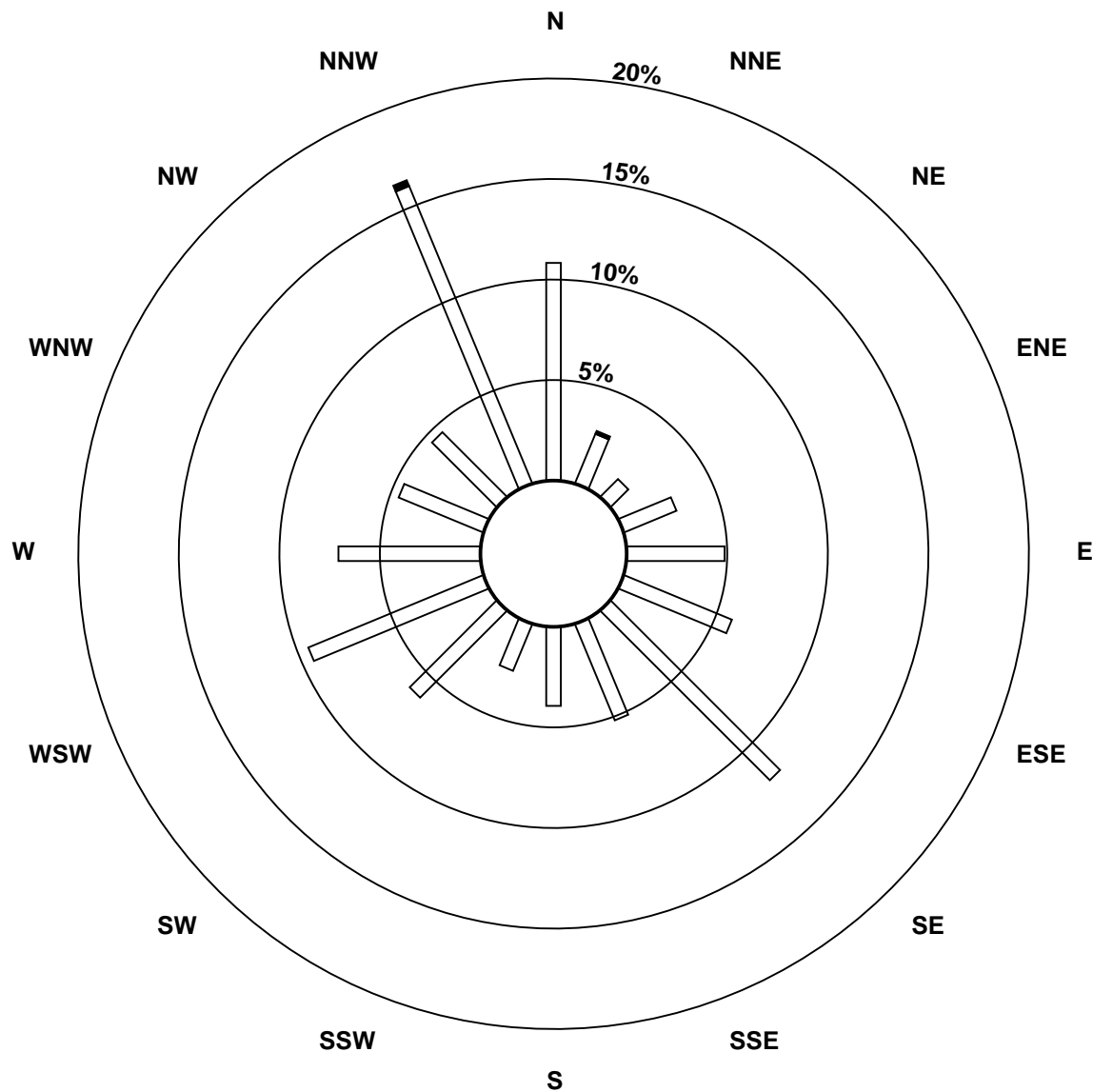
Total Number of Valid Hours: 637

Total Number of Hours: 672

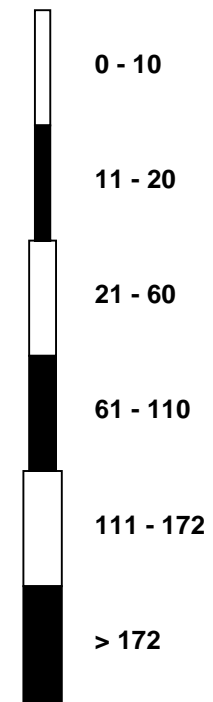


Wood Buffalo Environmental Association
Wind Rose Feb 2017

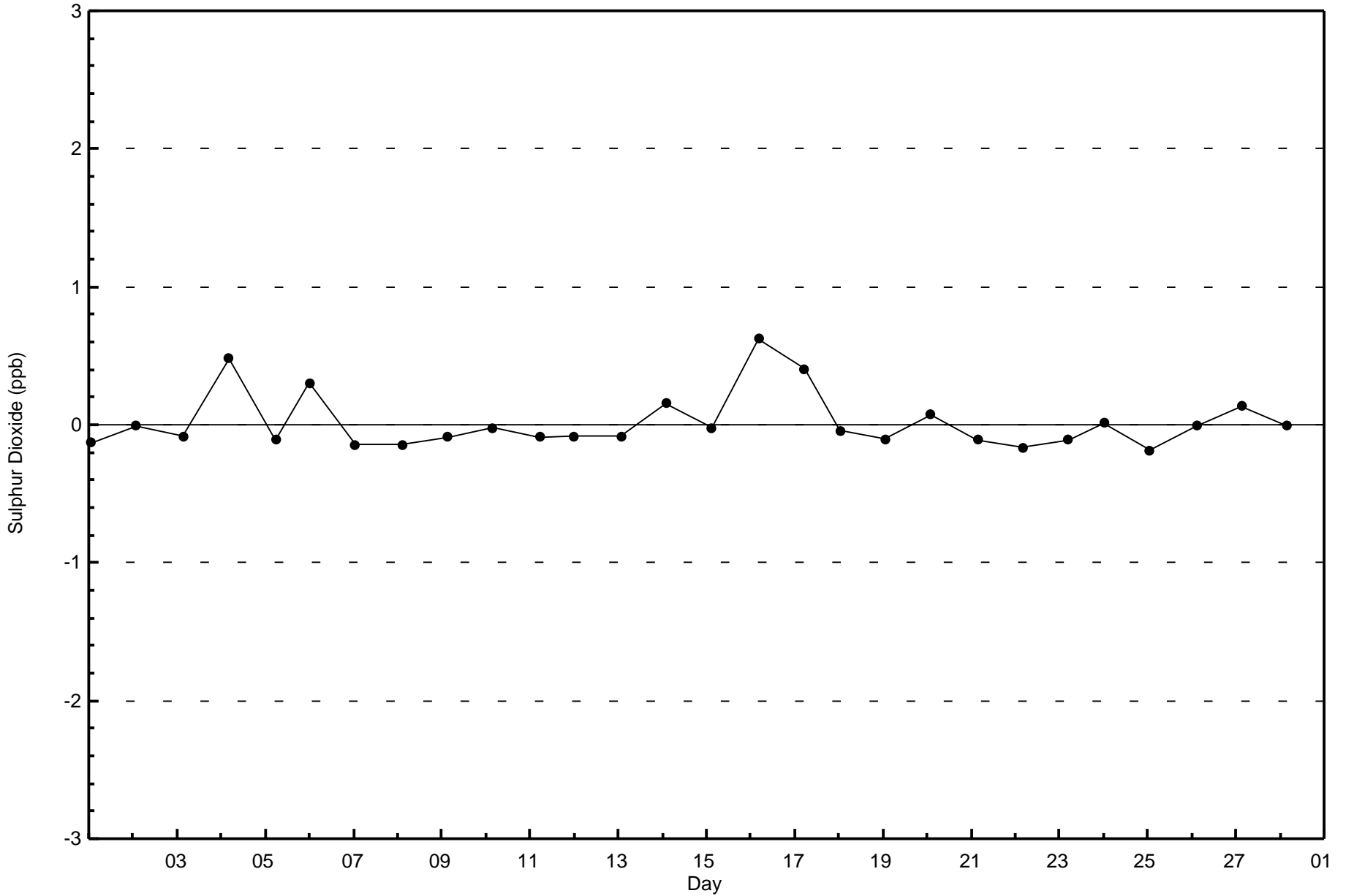
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)

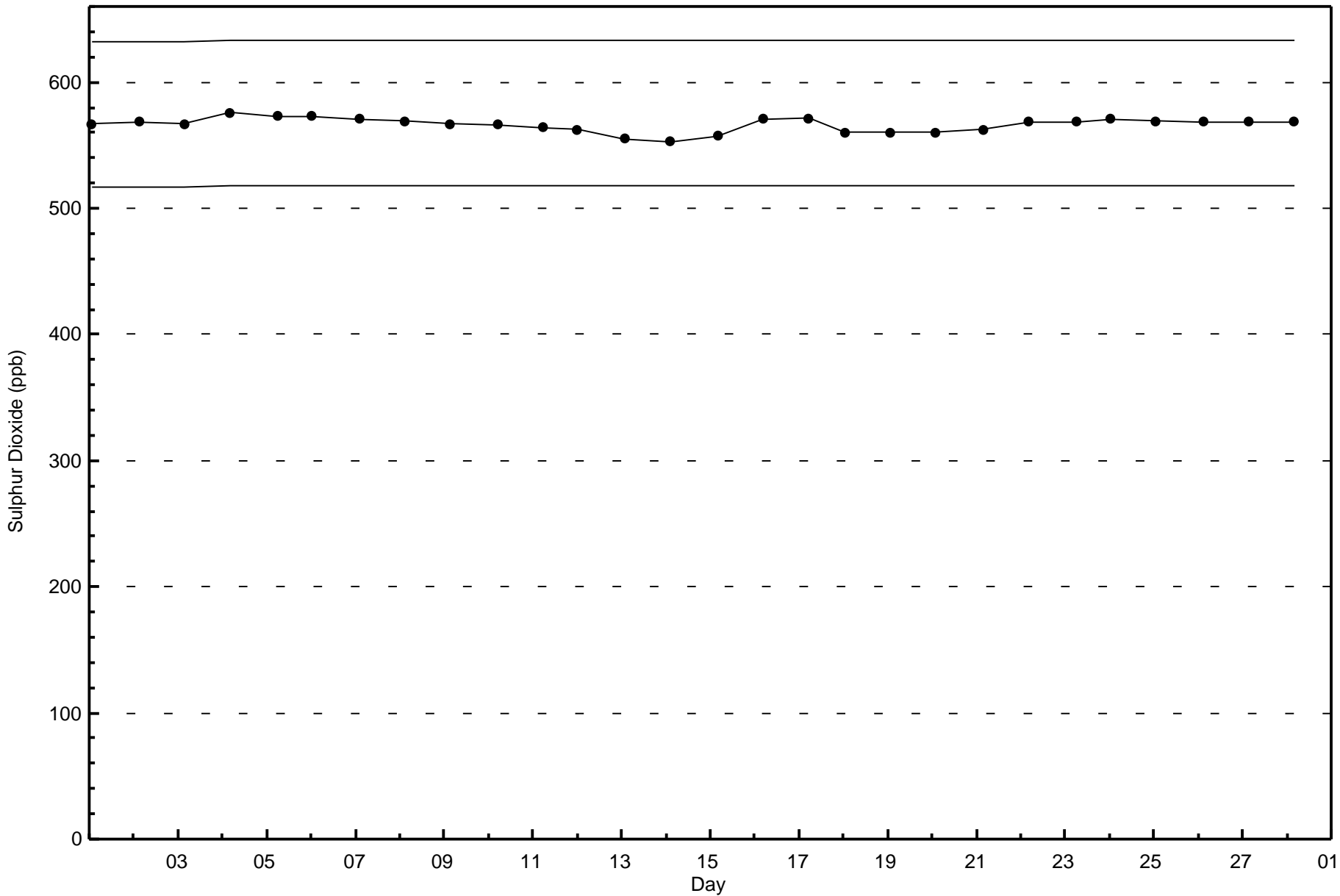


Classes (ppb)



Total Number of Valid Hours: 637







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

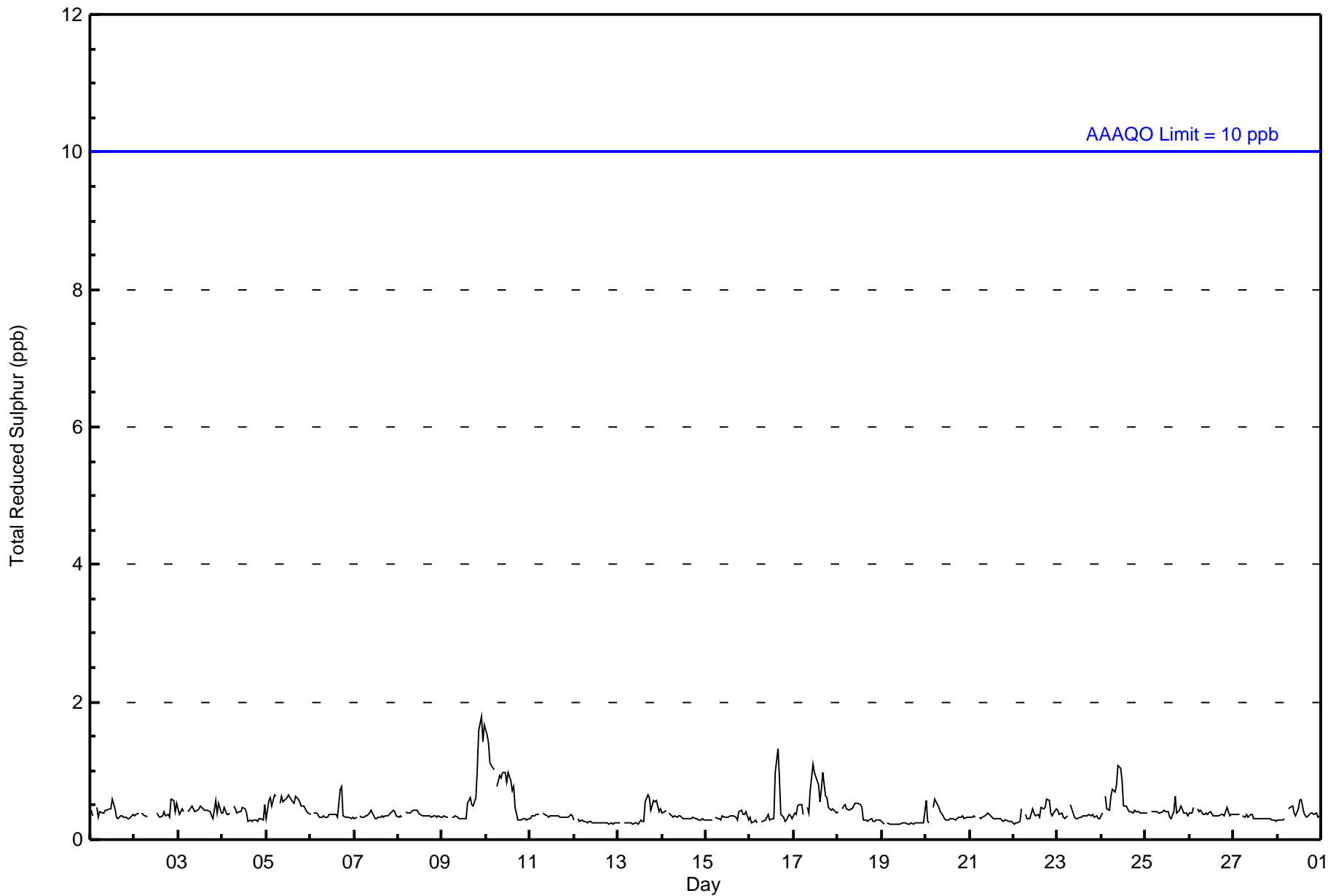
Athabasca Valley - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Feb 9 22:00 Maximum Daily Average: 0.8 ppb on Feb 10																	Hours in Service: 672 Hours of Data: 640									
Minimum Value: 0 ppb on Feb 19 11:00 Minimum Daily Average: 0.2 ppb on Feb 19 Maximum Diurnal Average: 0.4 ppb at hour 11 Minimum Diurnal Average: 0.4 ppb at hour 19 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																	Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
2-Feb	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	1	1	0	1	0.4	1
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.4	1
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
5-Feb	0	1	1	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
7-Feb	0	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
8-Feb	0	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
9-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	2	2	1	2	0.6	2
10-Feb	2	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.8	2
11-Feb	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-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0.4	1
14-Feb	0	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-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
17-Feb	0	0	0	1	1	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
18-Feb	0	Z	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-Feb	0	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
20-Feb	1	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1
23-Feb	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Feb	0	Z	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
26-Feb	0	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
27-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
0.4 0.4																								Diurnal Average		
2 1 2 2 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
Athabasca Valley - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	640	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 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	70	18	8	18	30	37	75	34	23	18	43	59	43	29	28	106	639
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	70	18	8	18	30	37	75	34	23	18	43	59	43	29	28	106	639

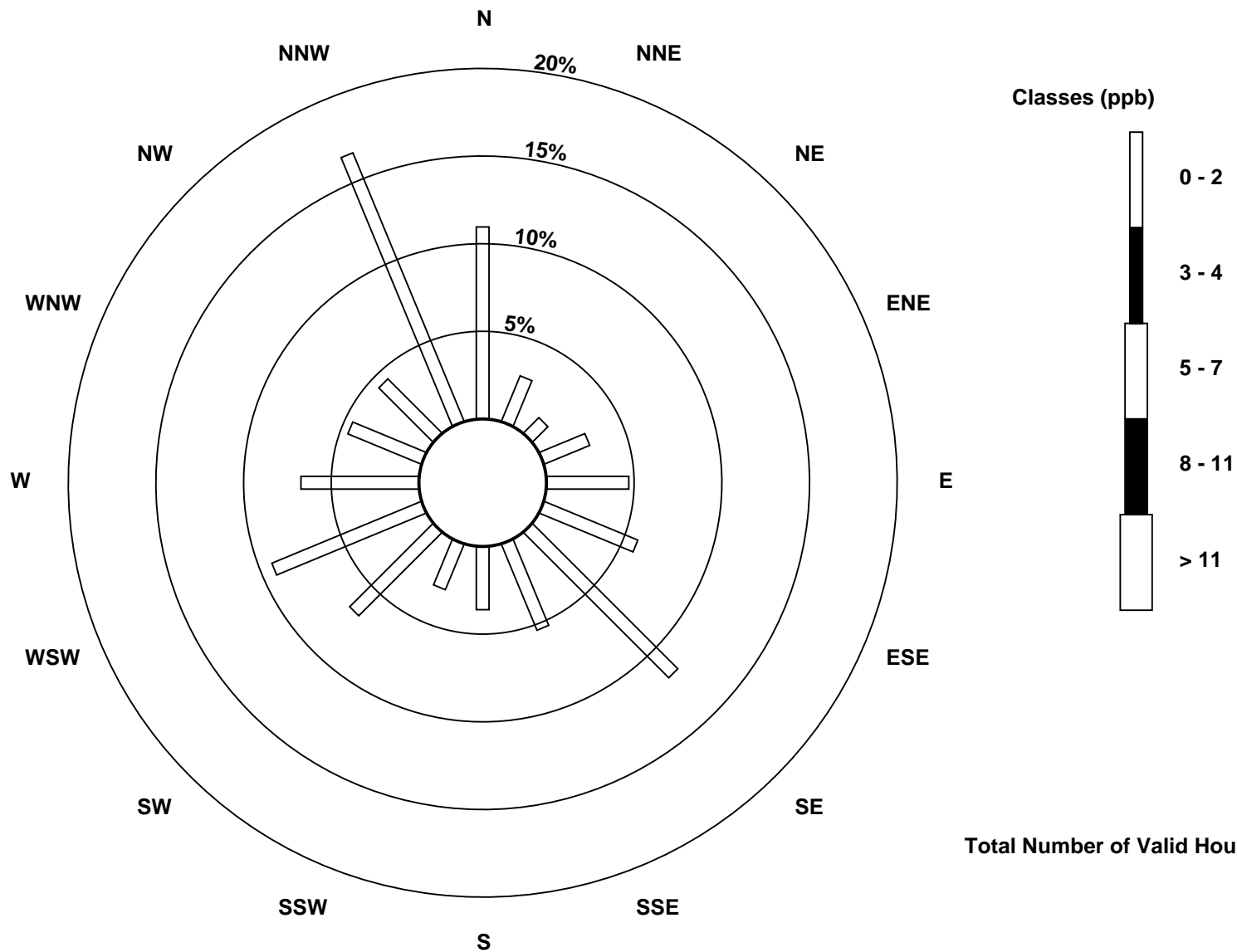
Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

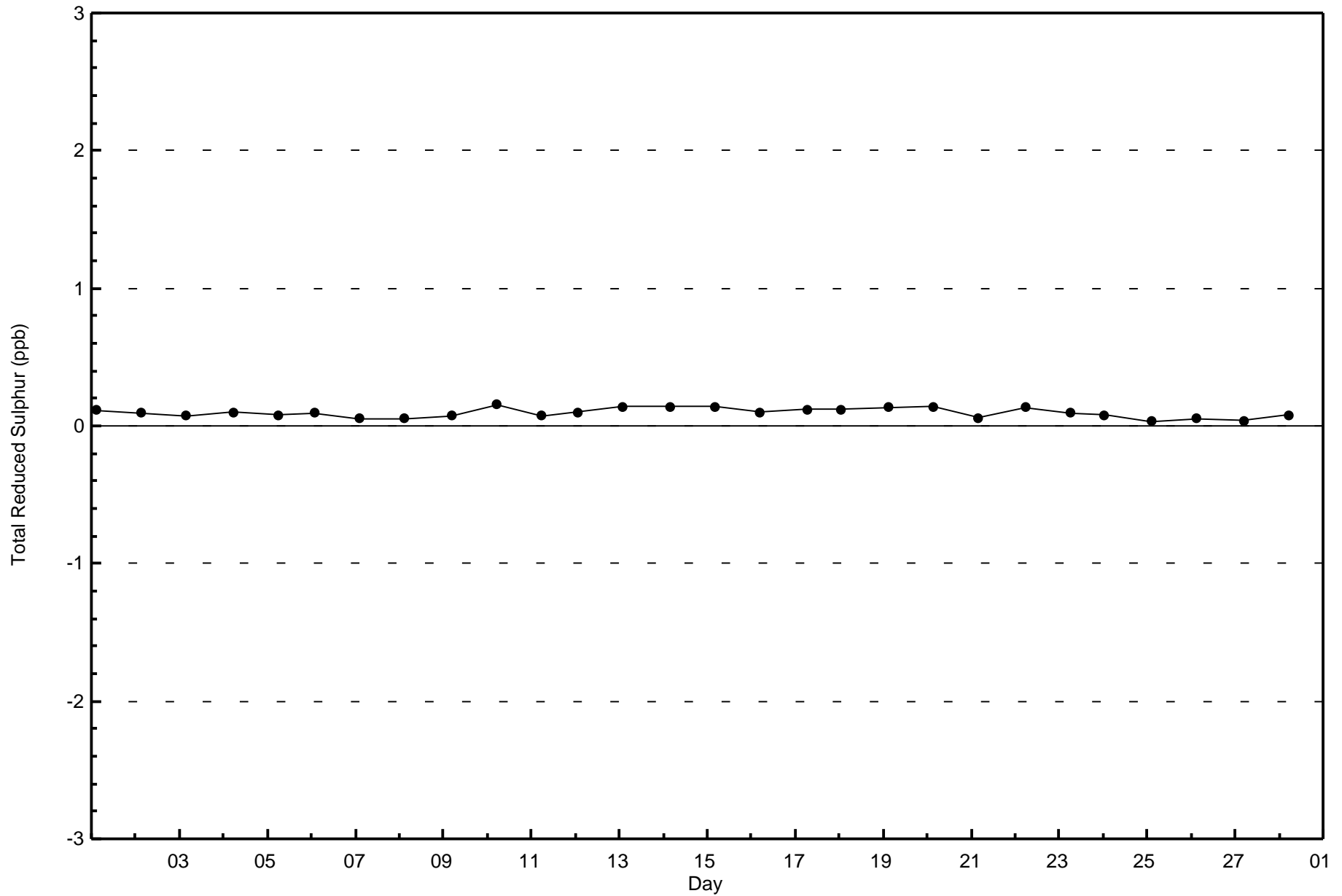
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)

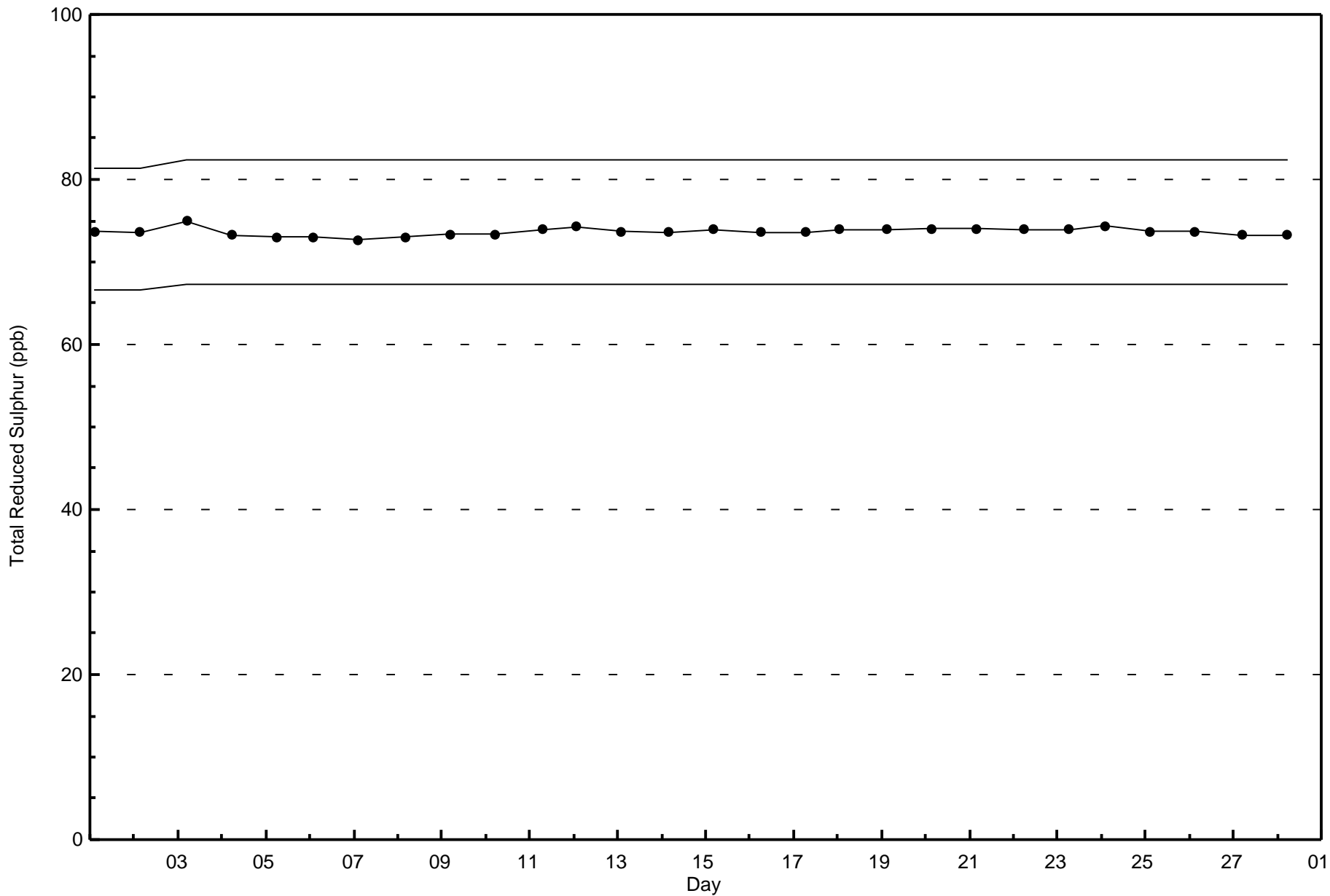




Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2017

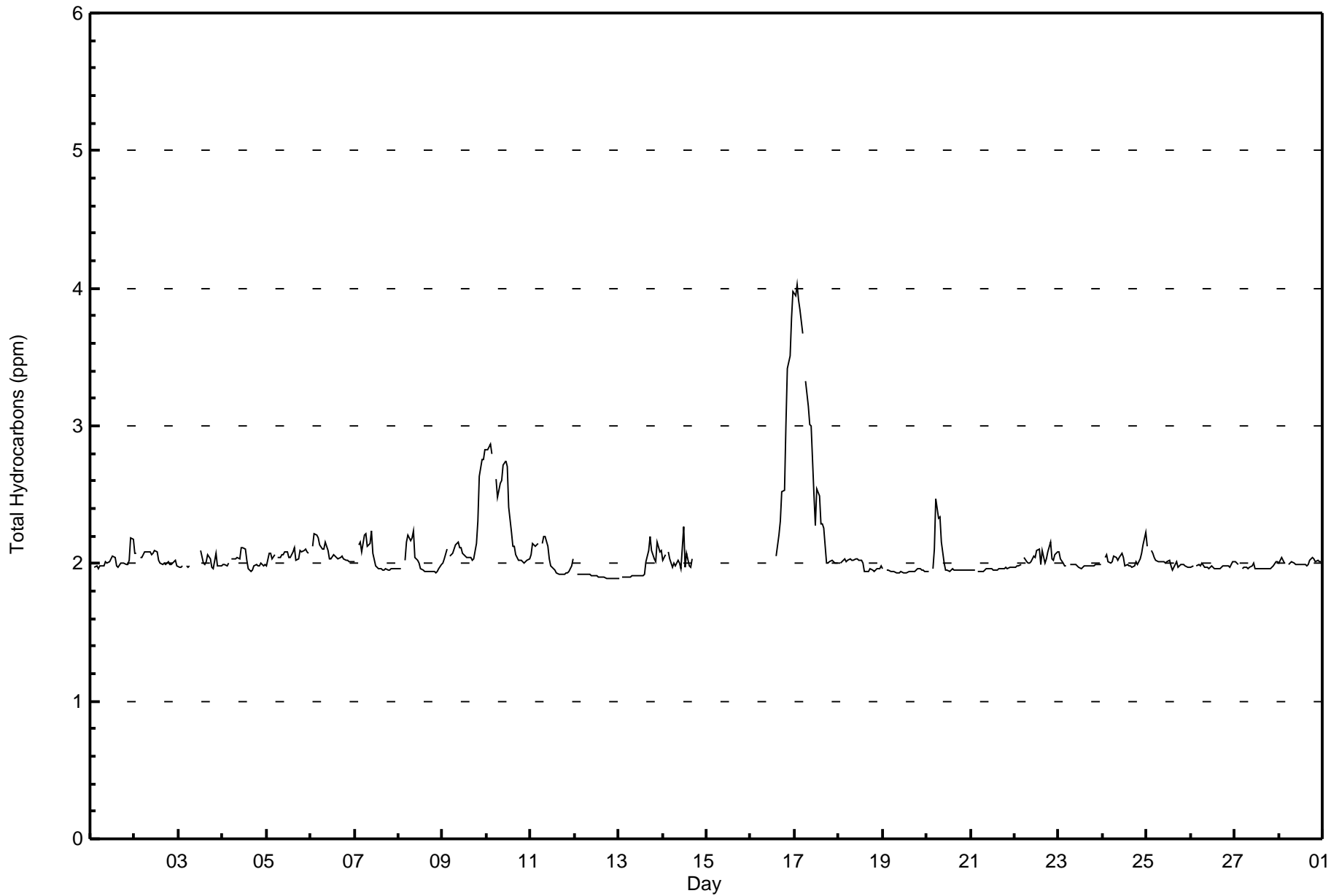
Maximum Value: 4.0 ppm on Feb 17 02:00		Maximum Daily Average: 2.7 ppm on Feb 17		Hours in Service: 672																							
Minimum Value: 1.9 ppm on Feb 12 21:00		Minimum Daily Average: 1.9 ppm on Feb 12		Hours of Data: 596																							
Maximum Diurnal Average: 2.2 ppm at hour 3		Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Missing Data: 76																							
Monthly Average: 2.07 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.2 P ₉₉ = 3.8		Hours of Calibration: 31																							
				Percent Operational Time: 93.3																							
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-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.0	2.2	
2-Feb	2.1	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
3-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	C	C	C	C	C	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	
4-Feb	2.0	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	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
5-Feb	2.0	2.1	2.1	2.0	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
6-Feb	Z	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
7-Feb	2.0	Z	2.1	2.2	2.1	2.2	2.2	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	2.0	
8-Feb	2.0	2.0	Z	2.0	2.2	2.2	2.2	2.2	2.2	2.2	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	
9-Feb	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.6	2.8	2.8	2.8	2.2	2.8	
10-Feb	2.8	2.8	2.9	2.8	Z	2.6	2.5	2.6	2.6	2.7	2.8	2.7	2.4	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.9	
11-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	
12-Feb	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	
13-Feb	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	2.1	2.2	2.1	2.0	2.0	2.2	2.1	2.1	2.0	2.2	
14-Feb	2.0	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.0	2.1	2.0	2.0	2.0	2.0	2.0	AF	AF	AF	AF	AF	AF	AF	2.3
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	2.1	2.2	2.3	2.5	2.5	3.0	3.4	3.5	3.8	4.0	--	4.0
17-Feb	3.9	4.0	3.9	3.8	3.7	Z	3.3	3.1	3.0	3.0	2.5	2.3	2.5	2.5	2.3	2.3	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.7	4.0	
18-Feb	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	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	
19-Feb	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	
20-Feb	1.9	1.9	Z	2.0	2.1	2.5	2.3	2.3	2.2	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.5	
21-Feb	2.0	1.9	2.0	Z	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	2.0	2.0	2.0	2.0	
22-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.2	2.0	2.0	2.1	2.1	2.0	2.2	
23-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
24-Feb	Z	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.0	2.2	
25-Feb	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
26-Feb	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	
27-Feb	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	
28-Feb	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	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.1 3.9			
																								2.2 4.0			
																								2.2 3.9			
																								2.1 3.8			
																								2.1 3.7			
																								2.1 2.6			
																								2.1 3.3			
																								2.1 3.1			
																								2.1 3.0			
																								2.1 3.0			
																								2.1 2.8			
																								2.1 2.7			
																								2.0 2.5			
																								2.0 2.5			
																								2.0 2.3			
																								2.0 2.3			
																								2.0 2.3			
																								2.0 2.5			
																								2.0 2.5			
																								2.0 3.0			
																								2.1 3.4			
																								2.1 3.5			
																								2.1 3.8			
																								2.1 4.0			

Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	436	73.15	73.15
2.1 - 3.0	149	25.00	98.15
3.1 - 10.0	11	1.85	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 596

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 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	47	16	6	8	19	22	47	12	8	11	29	45	39	25	22	79	435
2.1 - 3.0	19	2	1	9	8	11	15	12	11	4	8	12	4	2	7	24	149
3.1 - 10.0	0	0	0	0	0	0	1	2	0	0	2	2	2	2	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	18	7	17	27	33	63	26	19	15	39	59	45	29	29	103	595

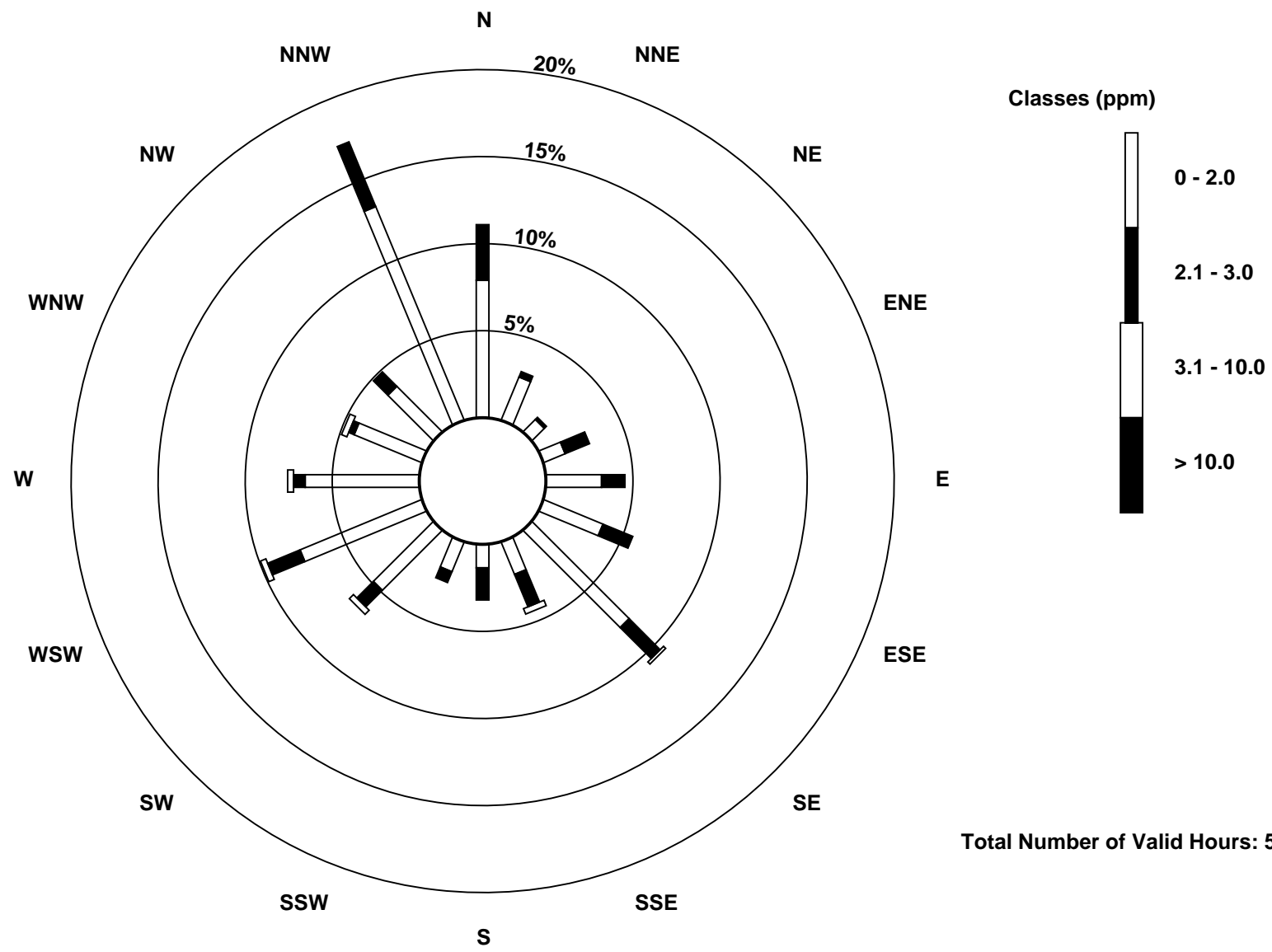
Total Number of Valid Hours: 595

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)

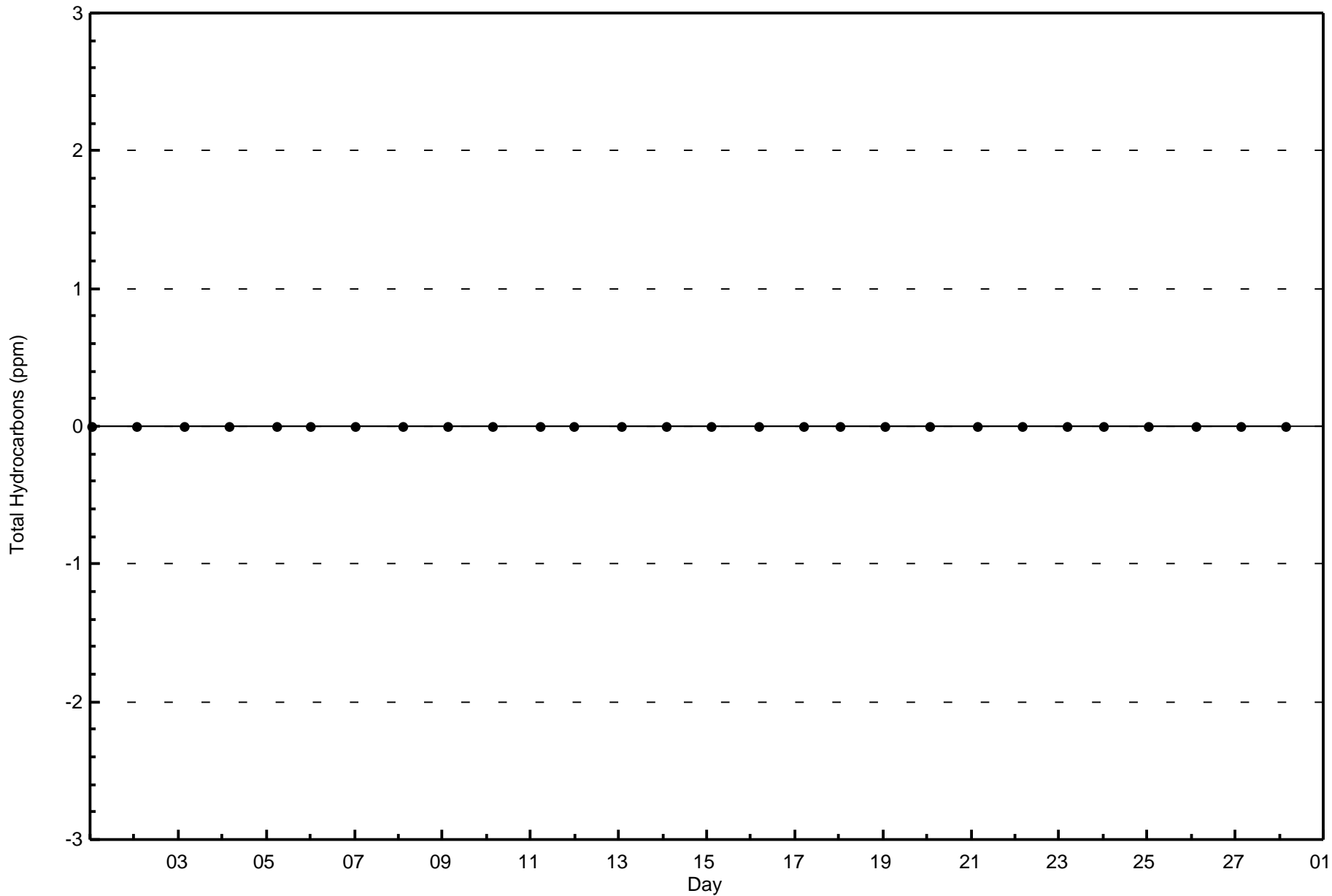


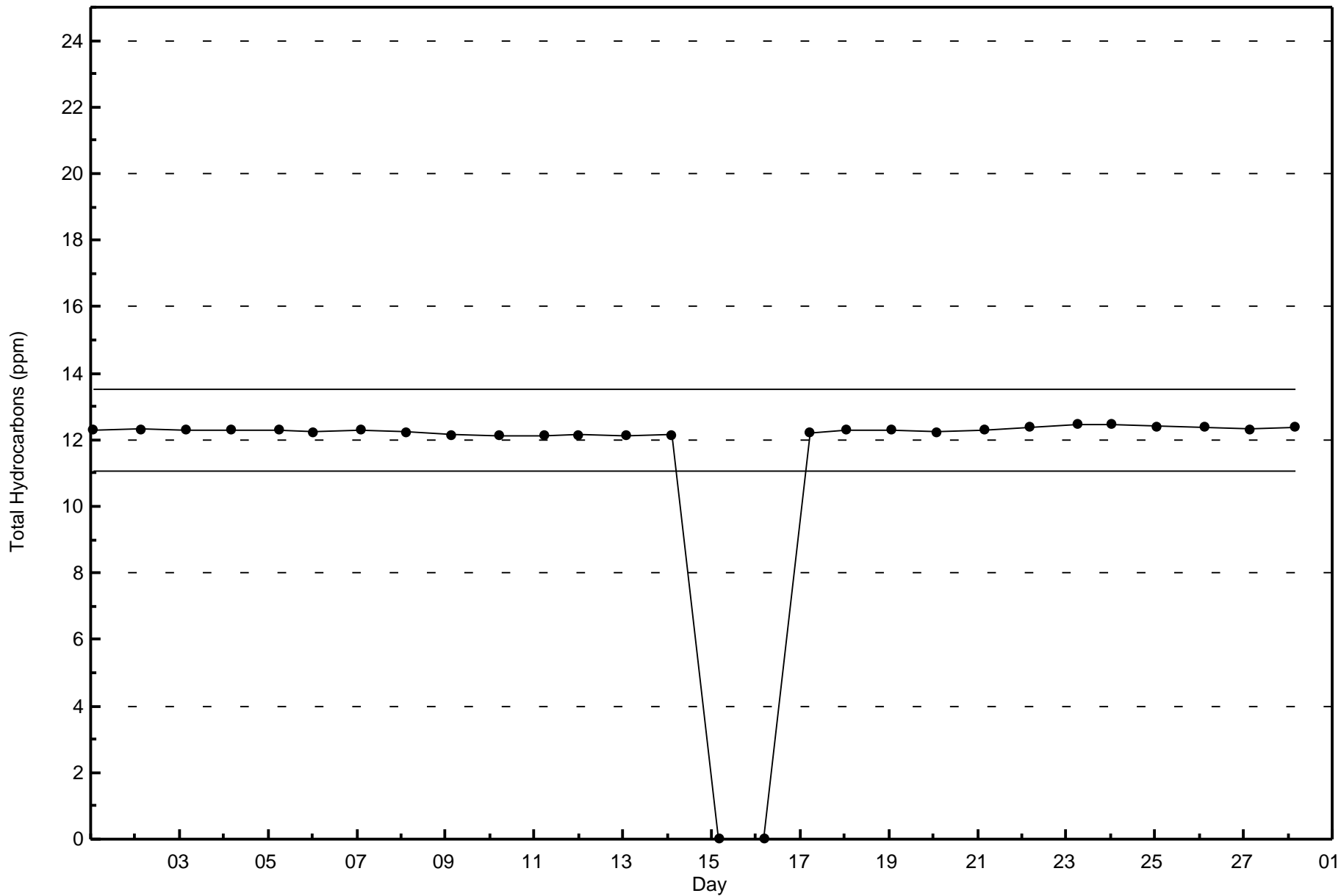
Total Number of Valid Hours: 595



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2017





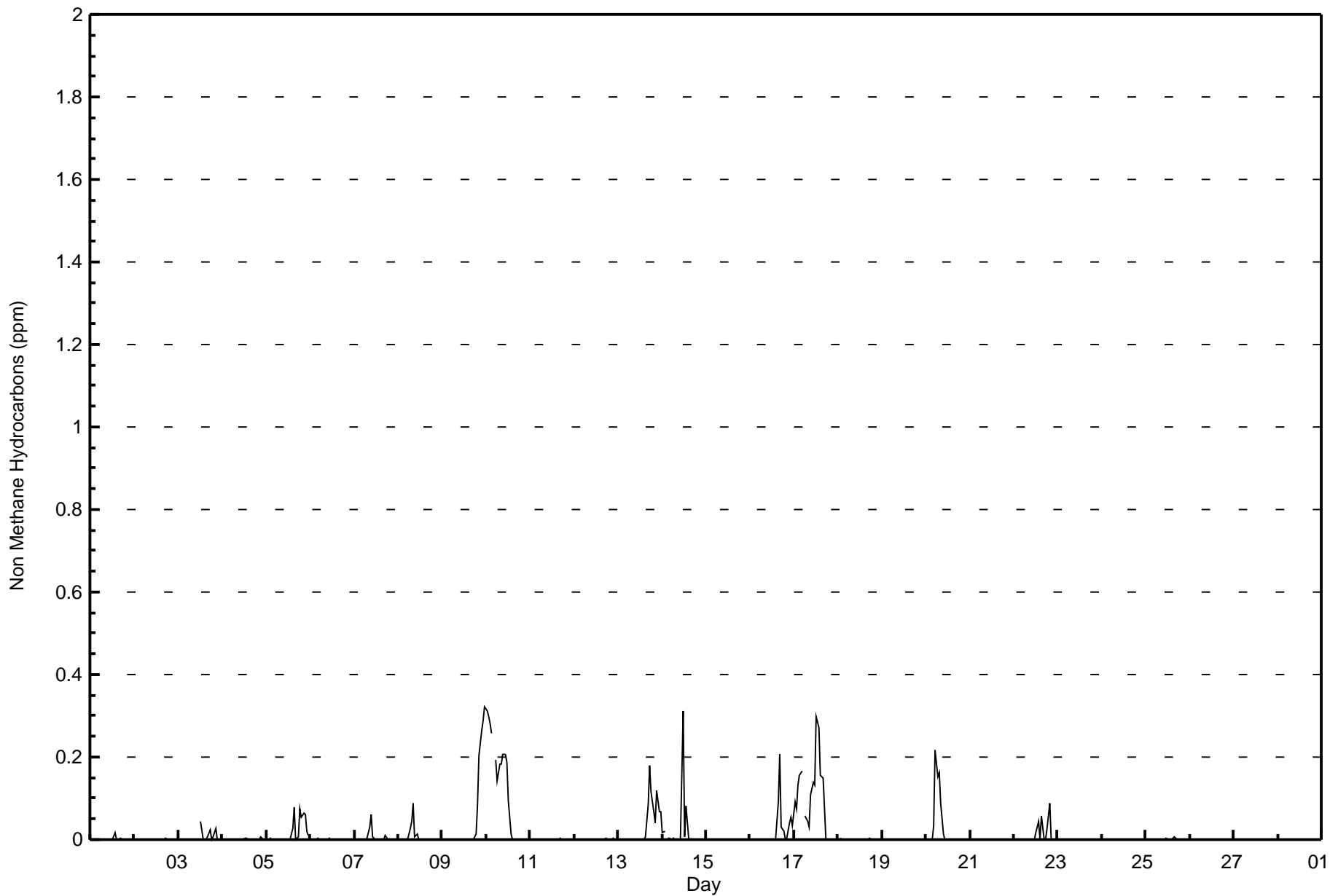


Maximum Value: 0.321 ppm on Feb 10 00:00		Maximum Daily Average: 0.111 ppm on Feb 10		Hours in Service:	672																						
Minimum Value: 0.000 ppm on Feb 1 01:00		Minimum Daily Average: 0.000 ppm on Feb 19		Hours of Data:	596																						
Maximum Diurnal Average: 0.025 ppm at hour 12		Minimum Diurnal Average: 0.007 ppm at hour 15		Hours of Missing Data:	76																						
Monthly Average: 0.016 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 = 0.3		Hours of Calibration:	31																						
				Percent Operational Time:	93.3																						
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-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.017	
2-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
3-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	C	C	C	C	C	0.044	0.000	0.000	0.000	0.007	0.022	0.000	0.006	0.028	0.000	0.000	0.000	0.006	0.044	
4-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.001	0.005	
5-Feb	0.000	0.000	0.002	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.029	0.077	0.001	0.008	0.075	0.054	0.064	0.061	0.019	0.009	0.017	0.077	
6-Feb	Z	0.000	0.000	0.000	0.004	0.001	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	
7-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.004	0.030	0.062	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.062	
8-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.026	0.043	0.087	0.006	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.087	
9-Feb	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	0.013	0.084	0.203	0.265	0.289	0.321	0.051	0.321	
10-Feb	0.311	0.300	0.281	0.257	Z	0.193	0.141	0.183	0.183	0.207	0.207	0.186	0.094	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111	0.311	
11-Feb	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	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
12-Feb	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	0.003	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.003	
13-Feb	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	0.006	0.083	0.179	0.115	0.066	0.039	0.120	0.068	0.068	0.032	0.179	
14-Feb	0.015	0.019	Z	0.002	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.313	0.005	0.082	0.000	0.002	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.313
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	0.000	0.092	0.208	0.031	0.021	0.000	0.002	0.040	0.054	0.035	--	0.208	
17-Feb	0.091	0.075	0.132	0.157	0.167	Z	0.058	0.044	0.030	0.108	0.140	0.132	0.300	0.272	0.157	0.154	0.148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.300	
18-Feb	Z	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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	
19-Feb	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	
20-Feb	0.000	0.000	Z	0.000	0.034	0.216	0.151	0.162	0.088	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.216	
21-Feb	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	
22-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.018	0.043	0.000	0.056	0.000	0.001	0.026	0.090	0.000	0.000	0.000	0.000	0.010	0.090	
23-Feb	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	
24-Feb	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	
25-Feb	0.000	Z	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	0.008	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.008	
26-Feb	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	
27-Feb	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-Feb	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	
																								Diurnal Average			
																								Diurnal Maximum			
0.019 0.019 0.020 0.019 0.009 0.019 0.015 0.017 0.017 0.016 0.015 0.025 0.018 0.017 0.007 0.015 0.017 0.010 0.010 0.012 0.013 0.019 0.017 0.017 0.017 0.017																											
0.311 0.300 0.281 0.257 0.167 0.216 0.151 0.183 0.183 0.207 0.207 0.313 0.300 0.272 0.157 0.154 0.208 0.179 0.115 0.090 0.203 0.265 0.289 0.321																											
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	505	84.73	84.73
0.006 - 0.05	37	6.21	90.94
0.06 - 0.1	28	4.70	95.64
> 0.1	26	4.36	100.00

Total Number of Valid Hours: 596

Total Number of Hours: 672



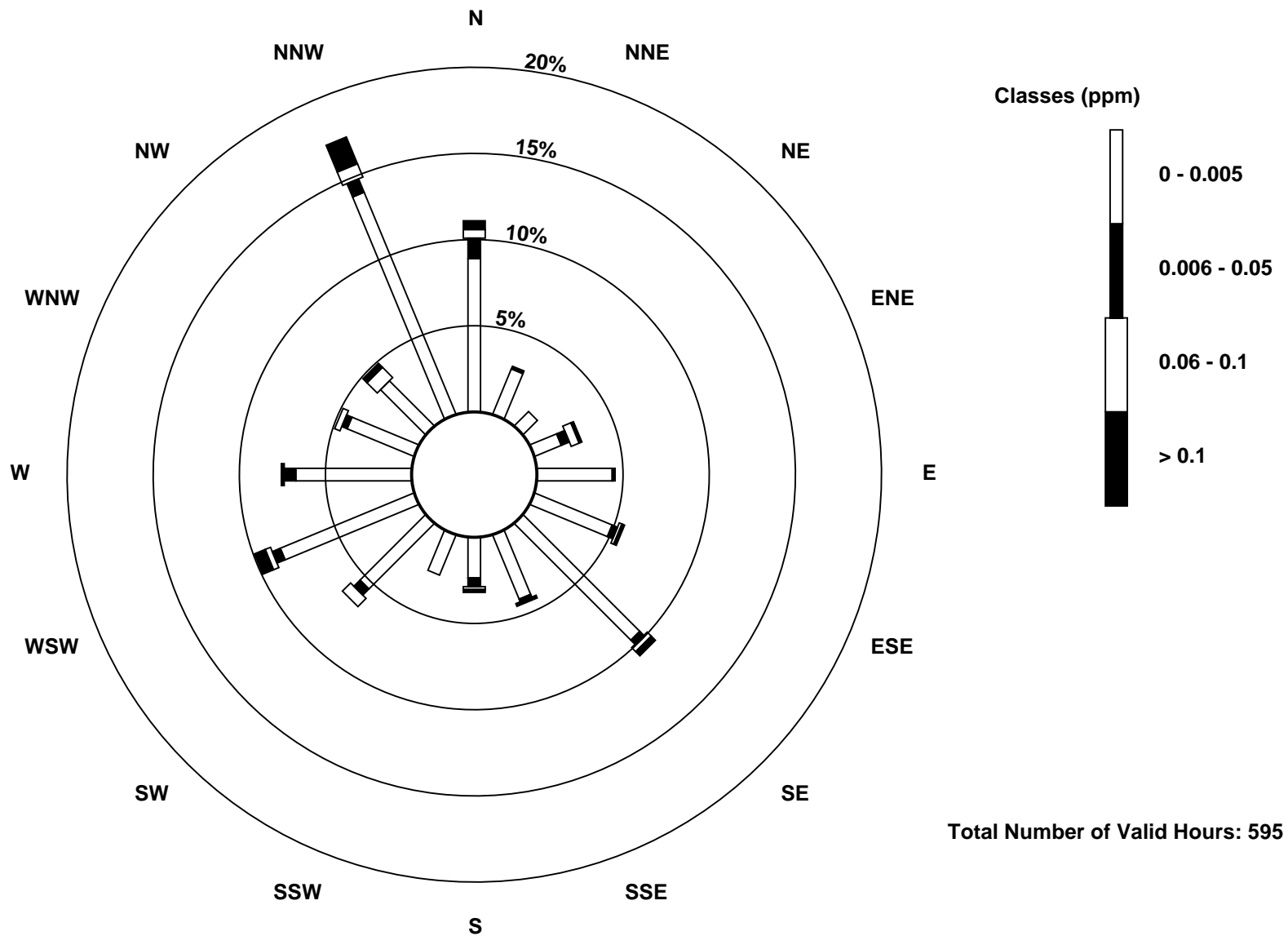
**Wood Buffalo Environmental Association
Frequency Distribution**

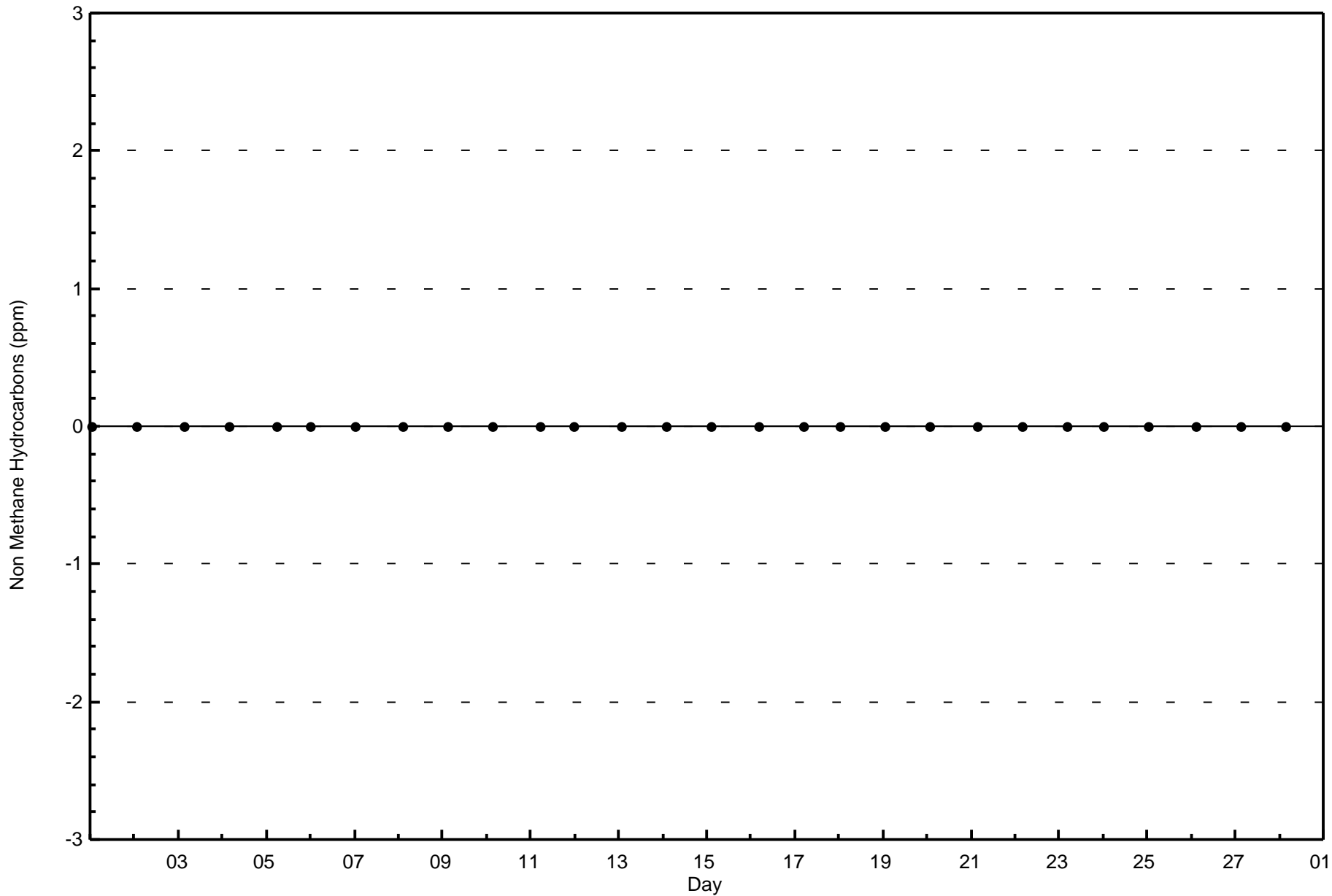
**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - February 2017**

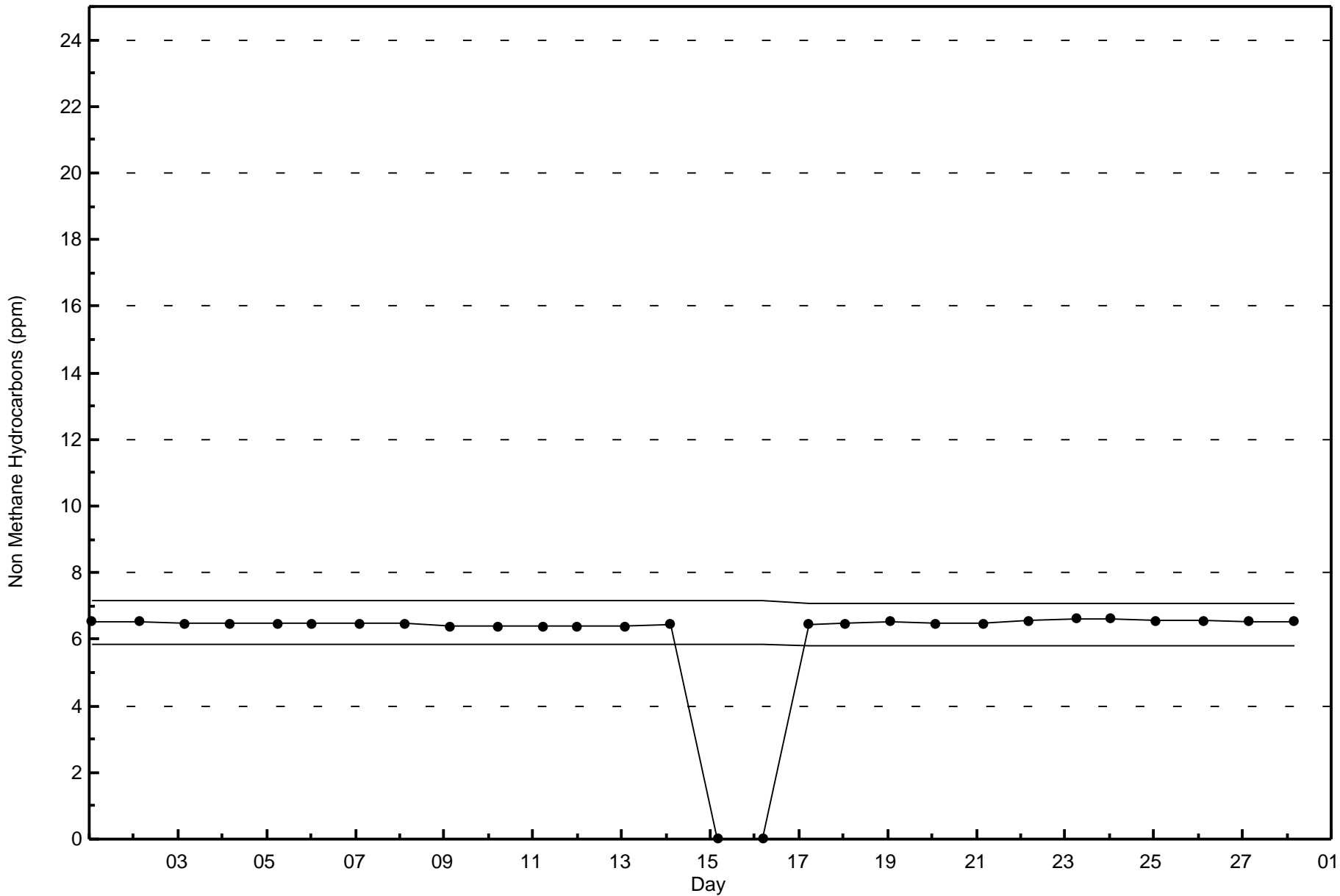
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	53	17	7	10	26	29	57	24	14	15	32	50	40	25	22	83	504
0.006 - 0.05	7	1	0	3	1	2	2	1	3	0	3	3	4	2	0	5	37
0.06 - 0.1	3	0	0	3	0	1	2	0	1	0	4	2	0	2	5	5	28
> 0.1	3	0	0	1	0	1	2	1	1	0	0	4	1	0	2	10	26
Totals	66	18	7	17	27	33	63	26	19	15	39	59	45	29	29	103	595

Total Number of Valid Hours: 595

Total Number of Hours: 672









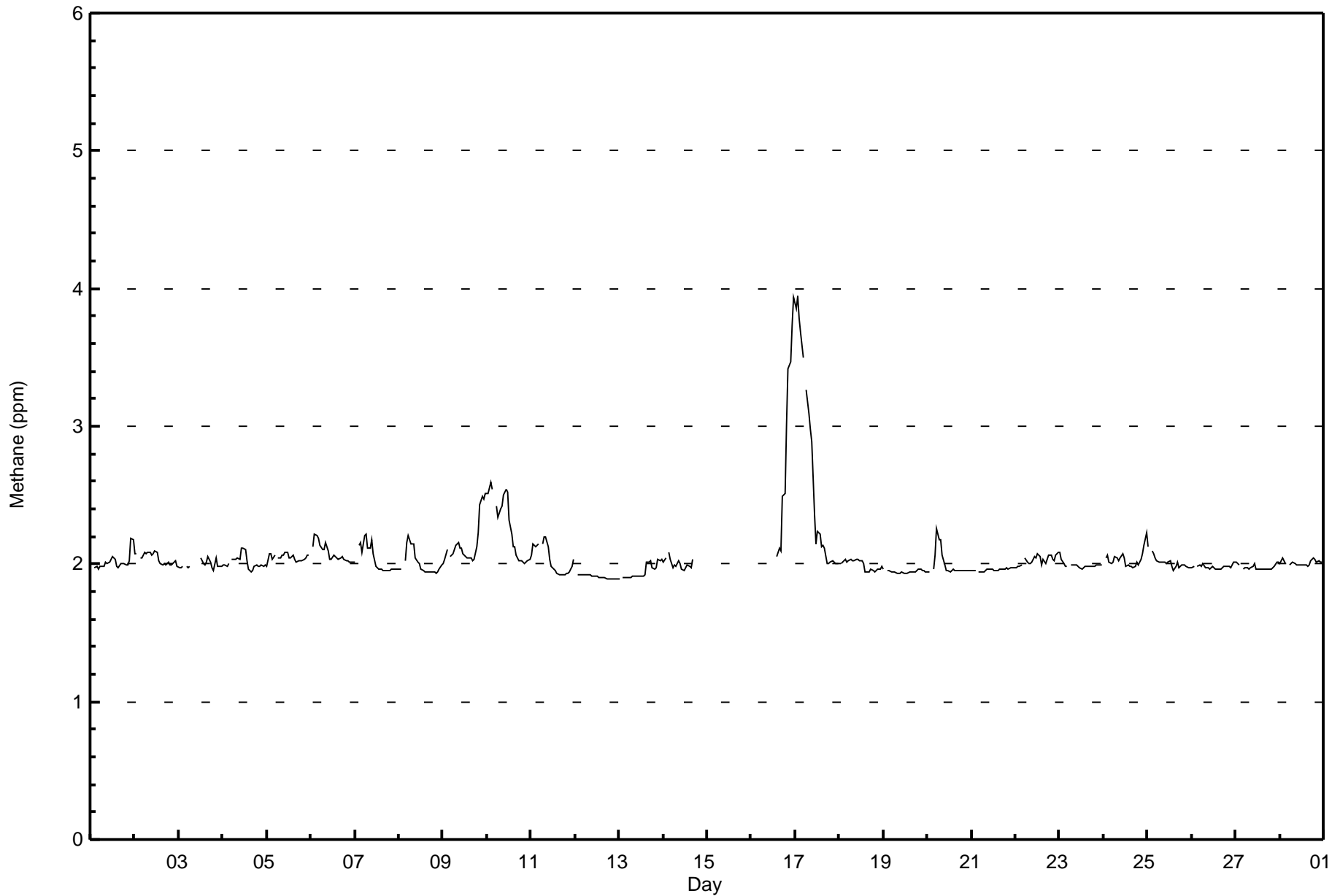
Summary of Hour Averages

Athabasca Valley - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 3.9 ppm on Feb 17 02:00	Maximum Daily Average: 2.6 ppm on Feb 17		Hours of Data:	596
Minimum Value: 1.9 ppm on Feb 12 21:00	Minimum Daily Average: 1.9 ppm on Feb 12		Hours of Missing Data:	76
Maximum Diurnal Average: 2.1 ppm at hour 3	Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Calibration:	31
Monthly Average: 2.06 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 3.7		Percent Operational Time:	93.3

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-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.0	2.2																							
2-Feb	2.1	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																						
3-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	C	C	C	C	C	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
4-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																							
5-Feb	2.0	2.1	2.1	2.0	2.1	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1																							
6-Feb	Z	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2																						
7-Feb	2.0	Z	2.1	2.2	2.1	2.2	2.2	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	2.0	2.2																						
8-Feb	2.0	2.0	Z	2.0	2.2	2.2	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	2.0	2.0	2.0	2.2																						
9-Feb	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.4	2.5	2.5	2.5	2.2	2.5	2.5																						
10-Feb	2.5	2.5	2.6	2.5	Z	2.4	2.3	2.4	2.4	2.5	2.5	2.5	2.3	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.6																						
11-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2																						
12-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9																						
13-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0																						
14-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																						
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--																						
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	2.1	2.1	2.1	2.5	2.5	3.0	3.4	3.5	3.7	3.9	--	3.9																						
17-Feb	3.9	3.9	3.8	3.7	3.5	Z	3.3	3.1	3.0	2.9	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.6	3.9																						
18-Feb	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	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0																						
19-Feb	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0																						
20-Feb	1.9	1.9	Z	2.0	2.1	2.3	2.2	2.2	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.3																						
21-Feb	2.0	1.9	2.0	Z	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	2.0	2.0	2.0	2.0	2.0																						
22-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.1																						
23-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																						
24-Feb	Z	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.2																						
25-Feb	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																						
26-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																						
27-Feb	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																						
28-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																						
																								2.1	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	2.0	2.0	2.1	2.1	2.1	2.1	2.1	Diurnal Average
																								3.9	3.9	3.8	3.7	3.5	2.4	3.3	3.1	3.0	2.9	2.5	2.5	2.3	2.2	2.1	2.1	2.1	2.5	2.5	3.0	3.4	3.5	3.7	3.9	3.9	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	453	76.01	76.01
2.1 - 3.0	132	22.15	98.15
3.1 - 10.0	11	1.85	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 596

Total Number of Hours: 672



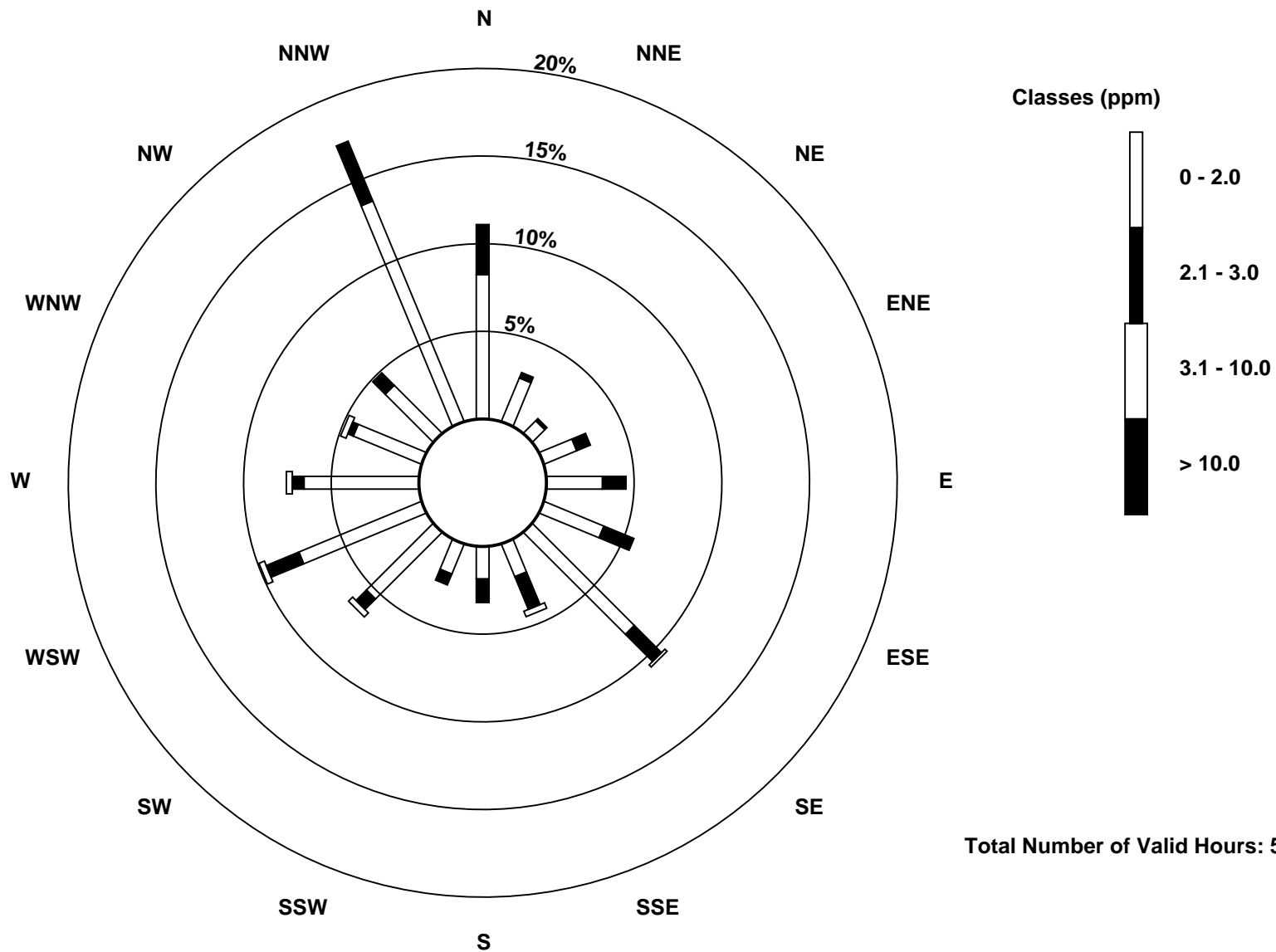
**Wood Buffalo Environmental Association
Frequency Distribution**

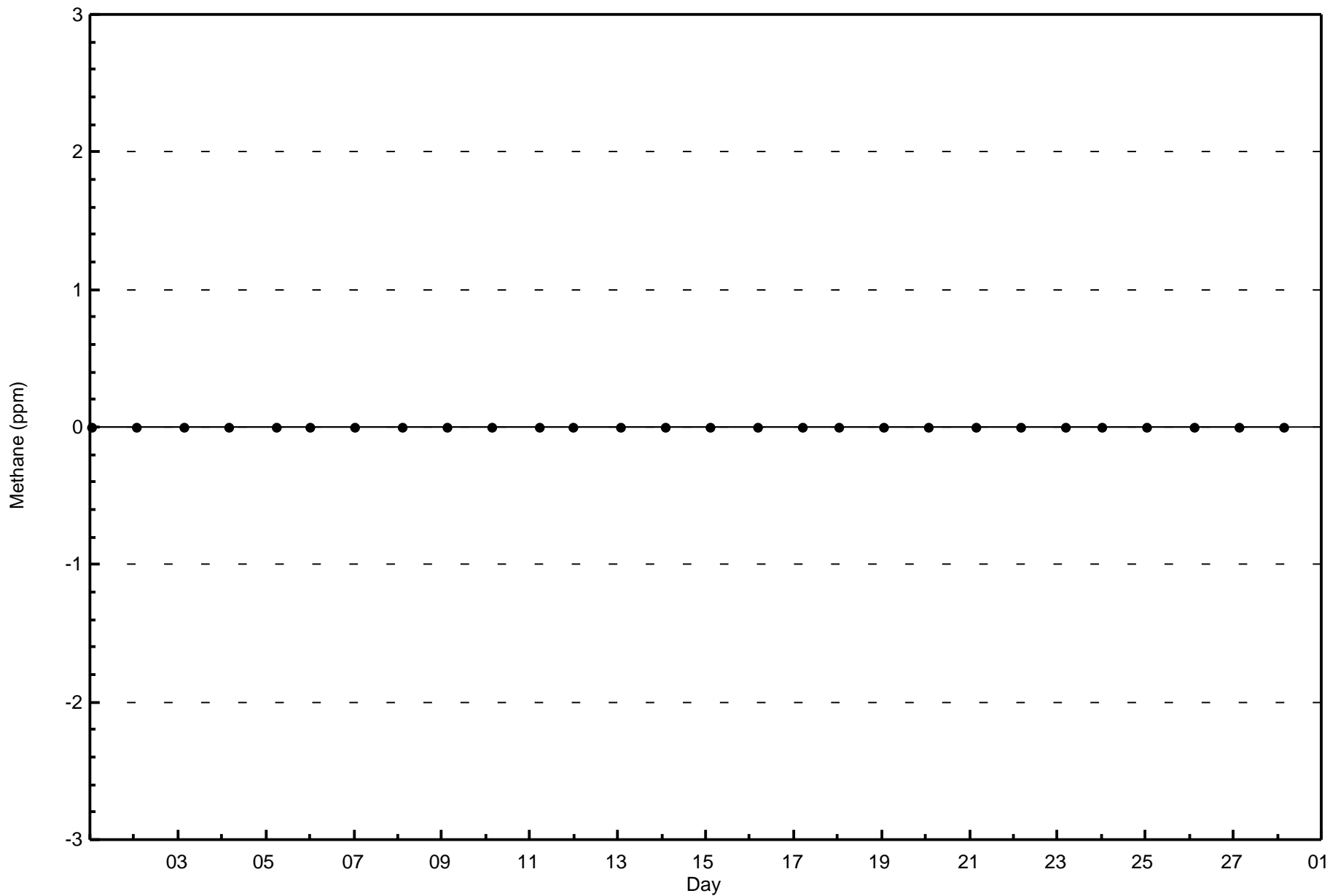
**Methane (CH₄) - ppm
Athabasca Valley - February 2017**

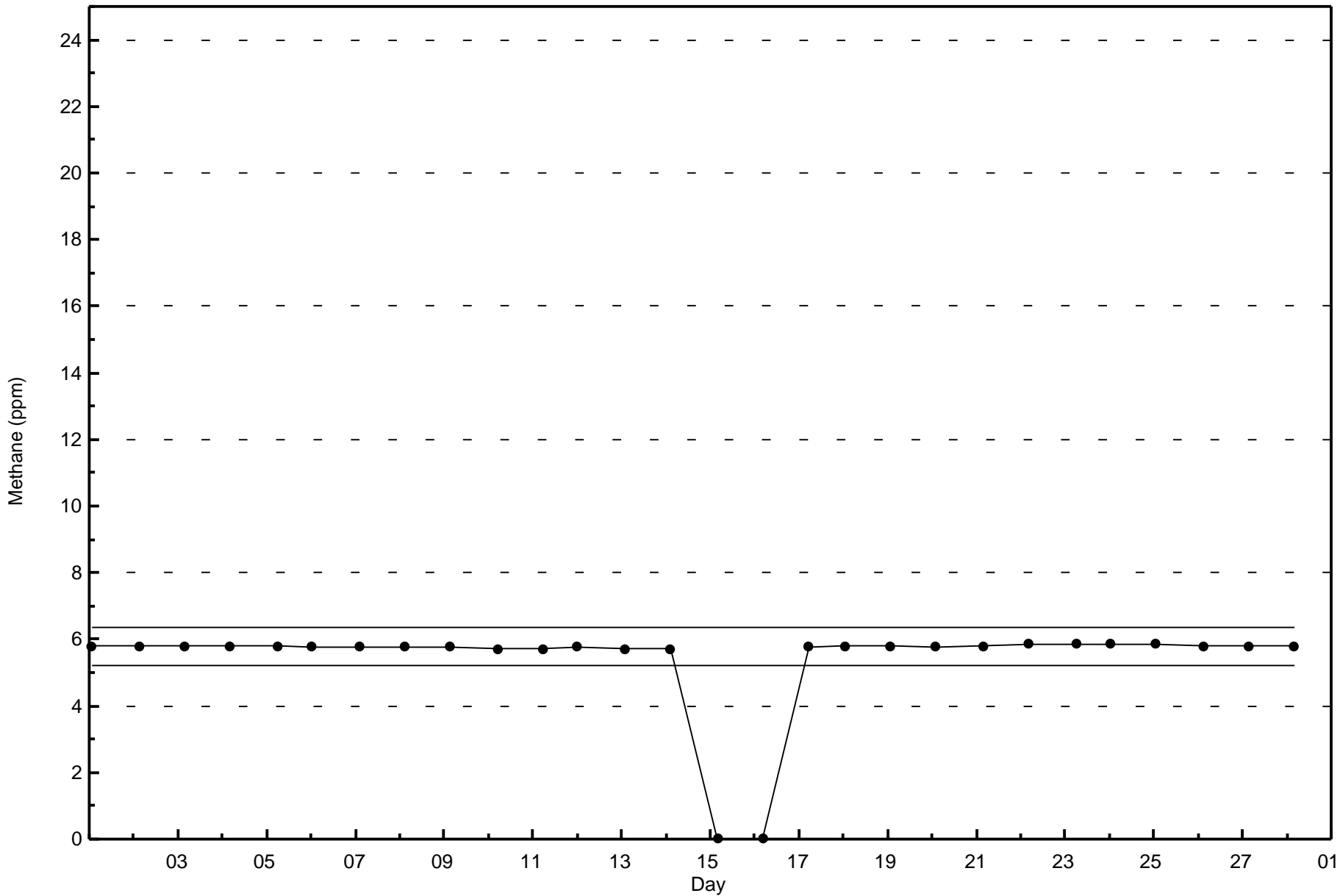
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	49	16	6	12	19	22	49	12	11	11	32	45	39	25	23	81	452
2.1 - 3.0	17	2	1	5	8	11	13	12	8	4	5	12	4	2	6	22	132
3.1 - 10.0	0	0	0	0	0	0	1	2	0	0	2	2	2	2	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	18	7	17	27	33	63	26	19	15	39	59	45	29	29	103	595

Total Number of Valid Hours: 595

Total Number of Hours: 672









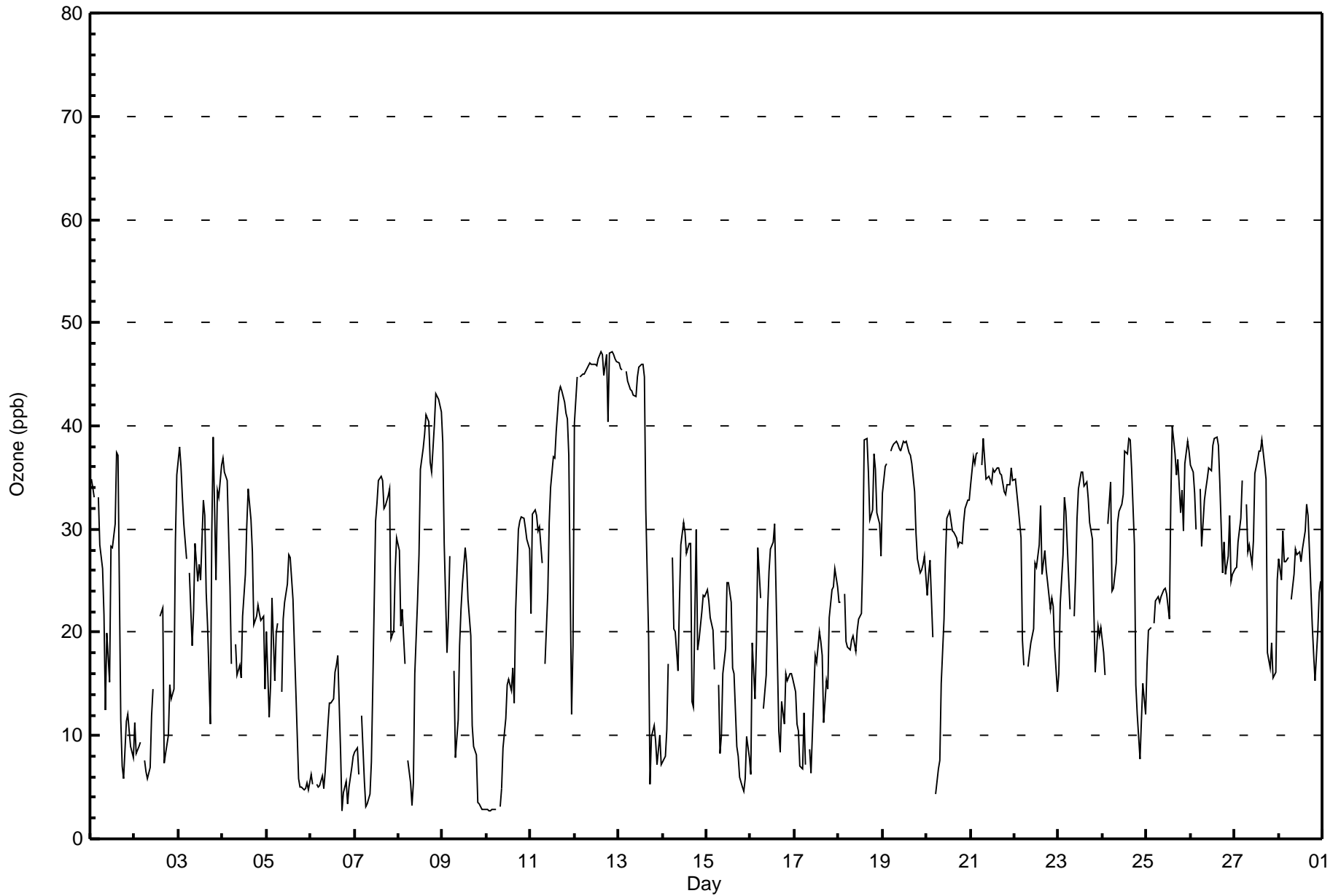
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Athabasca Valley - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 47 ppb on Feb 12 21:00										Maximum Daily Average: 45.5 ppb on Feb 12										Hours of Data: 641						
Minimum Value: 3 ppb on Feb 6 18:00										Minimum Daily Average: 8.3 ppb on Feb 6										Hours of Missing Data: 31						
Maximum Diurnal Average: 31.8 ppb at hour 15										Minimum Diurnal Average: 19.7 ppb at hour 9										Hours of Calibration: 31						
Monthly Average: 24.5 ppb										Percentiles: P ₁ = 3 P ₁₀ = 8 Q ₁ = 16 Median = 26 O ₃ = 34 P ₉₀ = 38 P ₉₉ = 47										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	35	34	33	Z	33	28	26	22	12	20	15	28	28	31	37	37	12	7	6	11	12	10	9	8	21.6	37
2-Feb	11	8	9	9	Z	8	7	6	7	12	15	C	C	C	22	22	7	8	10	15	14	14	29	35	13.4	35
3-Feb	38	36	33	30	27	Z	26	19	22	29	25	27	25	33	31	24	21	11	30	39	25	34	33	36	28.4	39
4-Feb	37	36	35	29	24	17	Z	19	16	17	16	22	26	30	34	31	28	21	22	23	22	21	22	14	24.3	37
5-Feb	20	12	15	23	15	20	21	Z	14	21	23	25	27	27	23	19	15	6	5	5	5	5	5	5	15.5	27
6-Feb	6	5	Z	5	5	5	6	5	7	11	13	13	14	16	17	18	8	3	4	6	3	5	7	8	8.3	18
7-Feb	8	9	6	Z	12	6	3	3	4	7	15	31	33	35	35	35	32	32	33	34	19	20	26	29	20.3	35
8-Feb	28	21	22	17	Z	8	5	3	5	16	23	28	36	38	39	41	40	36	35	40	43	43	43	41	28.4	43
9-Feb	38	29	18	21	27	Z	16	8	11	19	22	25	28	27	23	20	11	9	8	4	3	3	3	3	16.4	38
10-Feb	3	3	3	3	3	3	Z	3	5	9	12	15	15	14	17	13	22	30	31	31	31	30	29	28	15.3	31
11-Feb	22	31	32	31	30	30	27	Z	17	24	31	34	37	37	39	43	44	43	42	41	41	37	12	19	32.4	44
12-Feb	40	45	Z	45	45	45	45	46	46	46	46	46	46	47	47	47	45	47	40	47	47	47	47	46	45.5	47
13-Feb	46	46	45	Z	45	44	43	43	43	43	45	46	46	46	45	32	20	5	10	11	9	7	10	7	32.1	46
14-Feb	7	8	11	17	Z	27	20	20	16	23	29	31	30	28	29	29	13	13	30	18	19	22	24	23	21.1	31
15-Feb	24	23	21	20	16	Z	15	8	10	16	18	25	25	23	16	16	9	8	6	5	5	6	10	8	14.5	25
16-Feb	6	19	14	19	28	23	Z	13	16	22	26	28	29	31	24	10	8	13	11	16	15	16	16	15	18.2	31
17-Feb	14	11	10	7	7	12	7	Z	9	6	14	18	17	20	19	18	11	15	15	21	24	24	26	24	15.3	26
18-Feb	23	23	Z	24	19	19	18	19	20	18	20	21	22	27	39	39	36	31	32	37	36	32	31	27	26.6	39
19-Feb	33	36	36	Z	38	38	38	38	38	38	38	38	38	38	37	37	36	34	30	27	26	26	27	27	34.5	38
20-Feb	24	26	27	19	Z	4	7	8	15	21	27	31	32	31	30	30	29	28	29	29	31	32	33	33	25.0	33
21-Feb	34	37	36	37	37	Z	36	39	35	35	35	34	36	36	36	36	35	35	34	33	34	34	36	35	35.5	39
22-Feb	35	34	32	29	19	17	Z	17	18	19	20	27	26	28	32	26	28	26	25	22	23	23	19	14	24.3	35
23-Feb	16	23	28	33	32	25	22	Z	22	26	31	34	35	36	34	35	33	31	29	22	16	21	20	21	27.1	36
24-Feb	18	16	Z	31	35	24	24	27	31	32	32	33	37	37	39	39	36	28	15	12	8	12	15	12	25.7	39
25-Feb	17	20	21	Z	21	23	23	23	23	24	24	24	21	33	40	37	35	37	32	34	30	36	39	38	28.5	40
26-Feb	36	36	33	30	Z	34	28	33	34	35	36	36	38	39	39	38	34	26	29	26	27	31	25	26	32.6	39
27-Feb	26	26	29	31	35	Z	32	28	29	27	29	35	37	38	38	39	36	35	18	16	19	16	16	25	28.6	39
28-Feb	27	25	30	27	27	Z	23	26	28	27	28	27	28	30	32	31	28	21	18	15	20	24	25	25	25.8	32
24.1 24.1 24.1 23.5 25.2 21.2 21.7 19.7 19.7 23.0 25.2 28.9 30.0 31.6 31.8 30.0 25.6 23.1 22.5 23.0 21.6 22.4 22.6 22.6																								Diurnal Average		
46 46 45 45 45 45 45 45 46 46 46 46 46 47 47 47 45 47 47 47 47 47 47 47 46																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	233	36.35	36.35
21 - 50	408	63.65	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Athabasca Valley - February 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	21	3	4	8	7	14	27	23	21	4	16	18	10	7	13	36	232
21 - 50	51	13	4	10	24	24	46	11	4	13	28	40	31	24	17	68	408
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	72	16	8	18	31	38	73	34	25	17	44	58	41	31	30	104	640

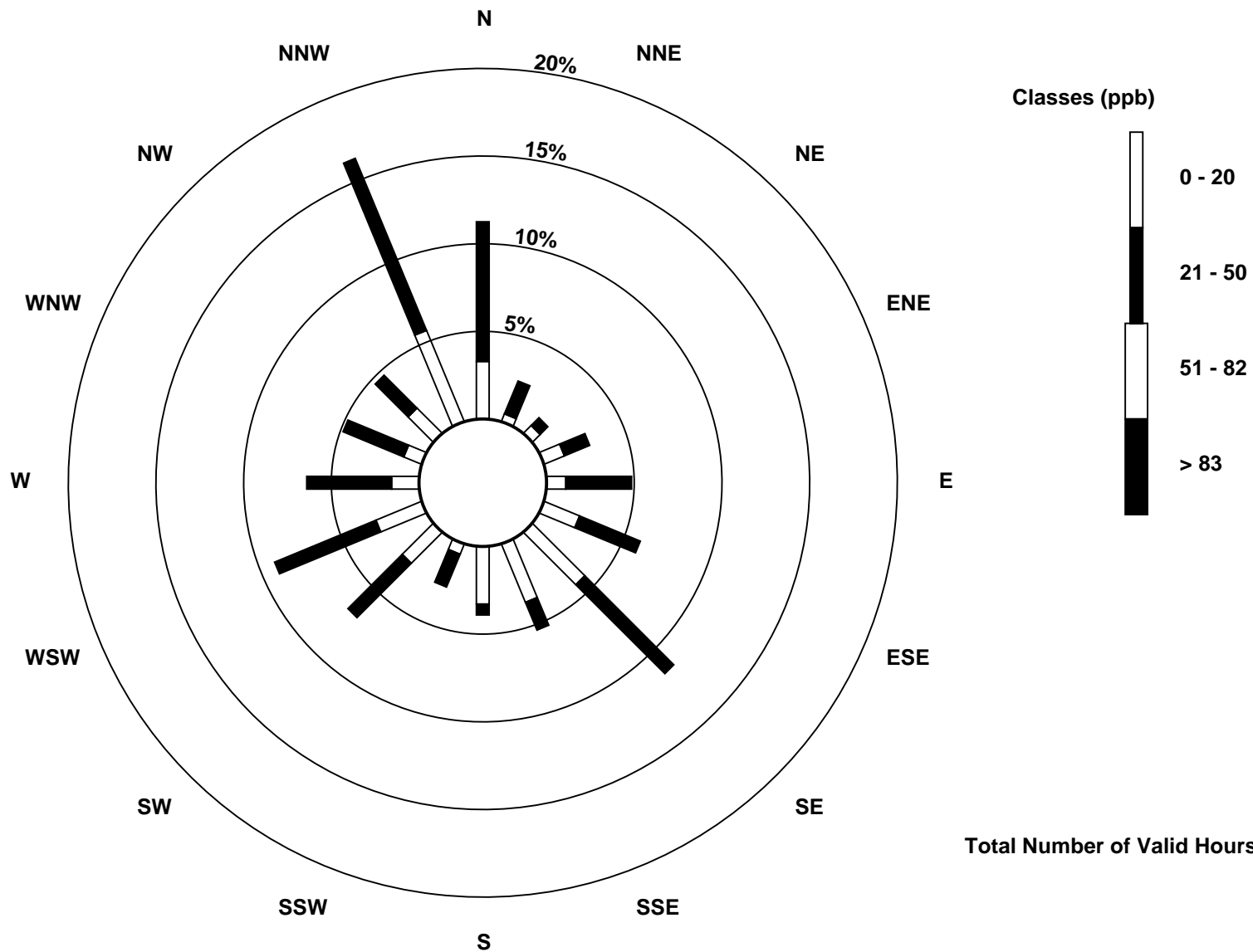
Total Number of Valid Hours: 640

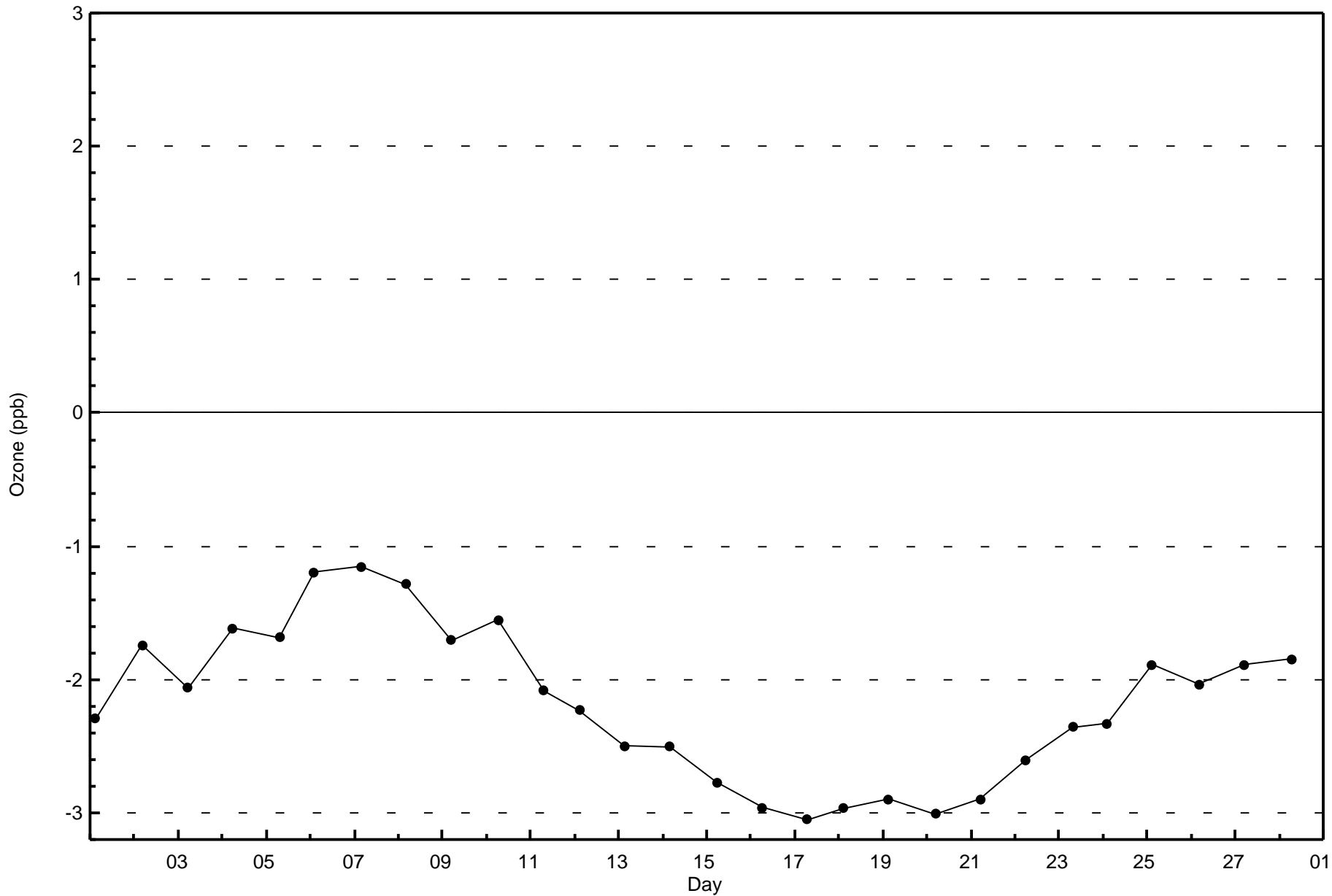
Total Number of Hours: 672

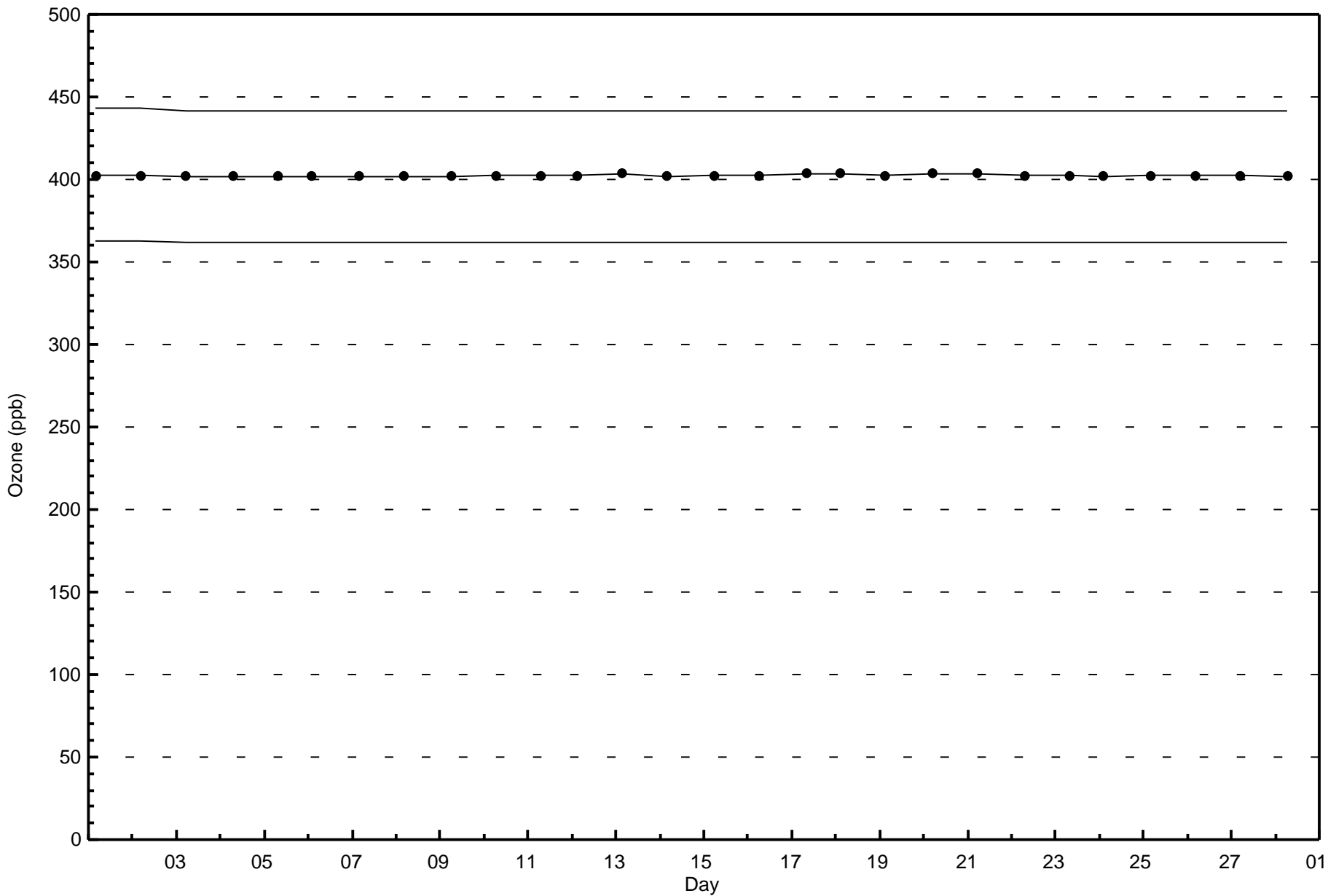


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Athabasca Valley (AMS 7)







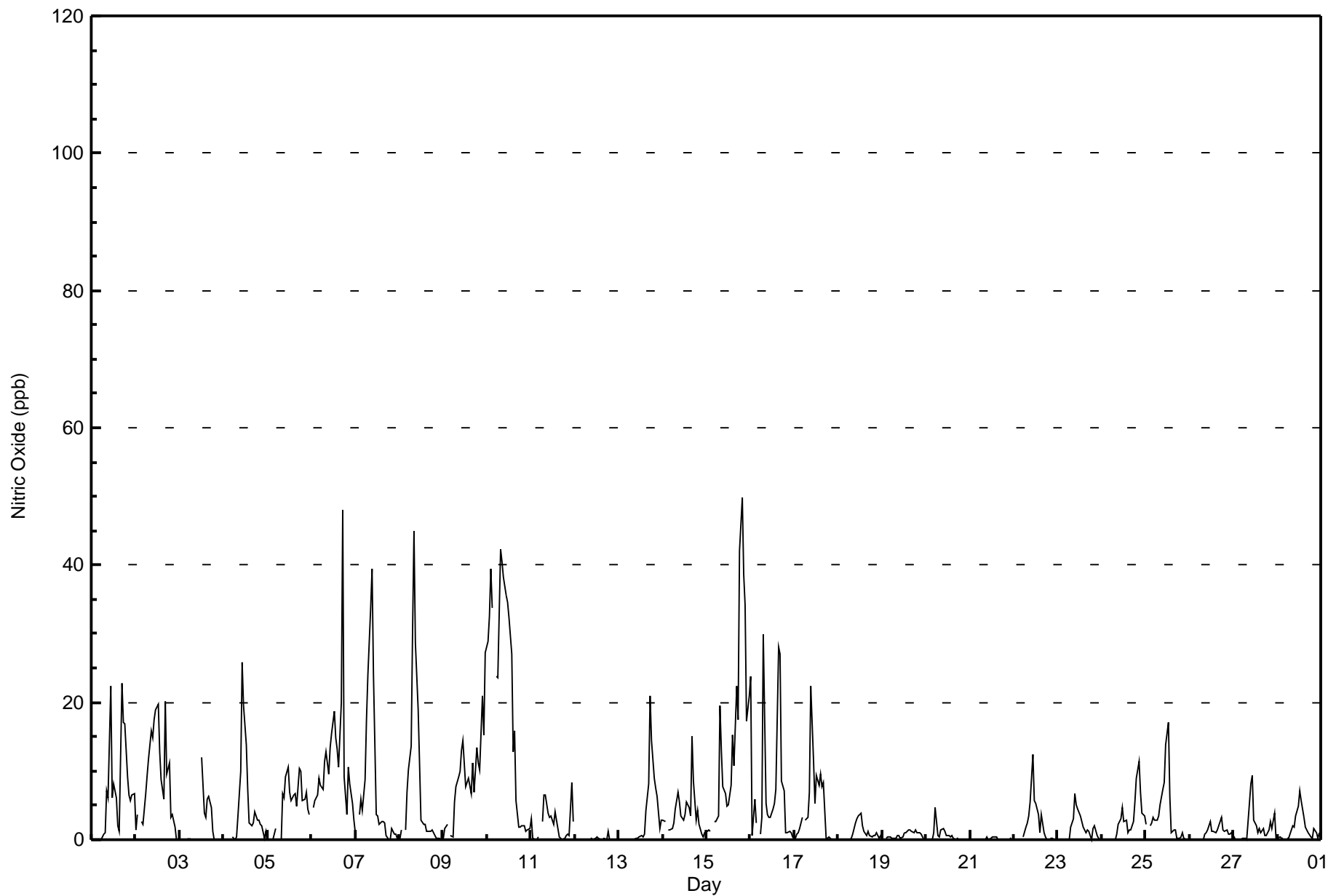


Maximum Value: 50 ppb on Feb 15 20:00																		Maximum Daily Average: 20.8 ppb on Feb 10						Hours in Service: 672			
Minimum Value: 0 ppb on Feb 1 06:00																		Minimum Daily Average: 0.1 ppb on Feb 21						Hours of Data: 639			
Maximum Diurnal Average: 9.5 ppb at hour 11																		Minimum Diurnal Average: 1.6 ppb at hour 5						Hours of Missing Data: 33			
Monthly Average: 5.0 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 2 Q ₃ = 6 P ₉₀ = 14 P ₉₉ = 39						Hours of Calibration: 33			
																								Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	Z	0	0	0	0	1	1	7	6	22	6	8	6	2	1	23	17	17	9	7	6	6	7	6.6	23	
2-Feb	1	4	Z	3	2	7	9	12	16	15	18	19	20	13	9	6	20	10	11	3	4	2	0	0	8.8	20	
3-Feb	0	0	0	Z	0	0	0	C	C	C	C	C	12	4	3	6	6	5	1	0	0	0	0	2.1	12		
4-Feb	0	0	0	0	Z	1	0	0	4	10	26	19	14	7	2	2	4	3	3	2	2	0	1	4.5	26		
5-Feb	0	0	0	0	2	Z	0	0	7	6	9	11	7	6	7	5	10	10	6	6	7	5	4	4.9	11		
6-Feb	Z	5	6	7	9	8	7	11	13	9	13	16	19	15	13	10	20	48	9	4	11	8	5	3	11.7	48	
7-Feb	1	Z	4	6	4	9	18	24	34	39	24	4	3	2	3	3	2	1	0	0	2	1	1	0	8.0	39	
8-Feb	0	2	Z	1	7	10	14	30	45	29	19	11	3	2	2	1	1	1	1	1	0	0	0	0	7.9	45	
9-Feb	0	2	2	Z	1	1	6	8	9	10	13	14	8	8	9	7	11	7	13	11	10	21	15	27	9.3	27	
10-Feb	29	33	39	34	Z	24	24	42	40	38	35	34	32	27	13	16	6	2	2	2	2	1	1	2	20.8	42	
11-Feb	3	0	0	0	0	Z	3	6	6	4	3	3	2	4	3	0	0	0	0	1	1	1	8	3	2.3	8	
12-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	1	
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	4	8	21	14	9	8	6	2	3	3.4	21		
14-Feb	3	3	Z	1	1	2	2	4	7	5	4	3	4	5	3	15	9	3	4	2	1	0	1	3.8	15		
15-Feb	1	1	1	Z	3	3	3	20	13	8	7	5	5	8	15	11	22	17	42	50	39	34	17	21	15.0	50	
16-Feb	24	1	6	2	Z	1	3	30	5	4	3	3	4	5	7	28	27	8	7	1	1	1	1	0	7.6	30	
17-Feb	0	1	1	2	3	Z	3	3	7	22	11	5	9	8	9	8	8	0	0	0	0	0	0	0	4.5	22	
18-Feb	Z	0	0	0	0	0	0	0	1	2	3	3	4	2	1	1	1	1	1	0	1	1	1	0	1	1.0	4
19-Feb	0	Z	0	0	0	0	0	0	1	1	0	0	1	1	2	1	1	1	1	1	1	1	0	0	0.7	2	
20-Feb	0	0	Z	0	1	5	1	0	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.6	5	
21-Feb	0	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-Feb	0	0	0	0	Z	0	2	3	4	6	12	6	5	4	1	4	1	0	0	0	0	0	0	0	2.1	12	
23-Feb	0	0	0	0	0	Z	0	2	3	7	5	4	3	3	2	1	1	1	0	2	2	1	0	0	1.6	7	
24-Feb	Z	0	0	0	0	0	0	0	1	2	3	5	3	3	1	1	2	3	5	9	11	7	4	3	2.8	11	
25-Feb	2	Z	2	3	3	3	3	4	5	7	8	14	17	6	1	1	1	0	0	1	0	0	0	0	3.6	17	
26-Feb	0	0	Z	0	0	0	0	0	1	1	1	3	1	1	1	2	2	3	2	1	1	1	1	1	1.0	3	
27-Feb	0	0	0	Z	0	0	0	0	3	8	9	3	2	1	2	1	2	1	1	1	3	2	4	0	1.8	9	
28-Feb	0	0	0	0	Z	0	0	1	2	2	3	5	7	6	3	2	1	1	0	0	2	1	0	1	1.7	7	
																		Diurnal Average						Diurnal Maximum			
2.7 2.2 2.7 2.6 1.6 3.0 3.5 7.5 8.7 9.0 9.5 7.3 7.0 5.3 4.2 4.6 6.8 6.1 5.2 4.3 4.1 3.7 2.6 2.8																		29 33 39 34 9 24 24 42 45 39 35 34 32 27 15 28 27 48 42 50 39 34 17 27									
Z - zerospan																		C - Calibration									



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	601	94.05	94.05
21 - 40	33	5.16	99.22
41 - 80	5	0.78	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Athabasca Valley - February 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	18	8	18	28	35	74	31	17	16	40	52	44	29	25	98	600
21 - 40	2	0	0	0	3	2	1	0	8	0	0	6	1	0	4	6	33
11 - 80	0	0	0	0	0	0	1	2	0	0	0	2	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	69	18	8	18	31	37	76	33	25	16	40	60	45	29	29	104	638

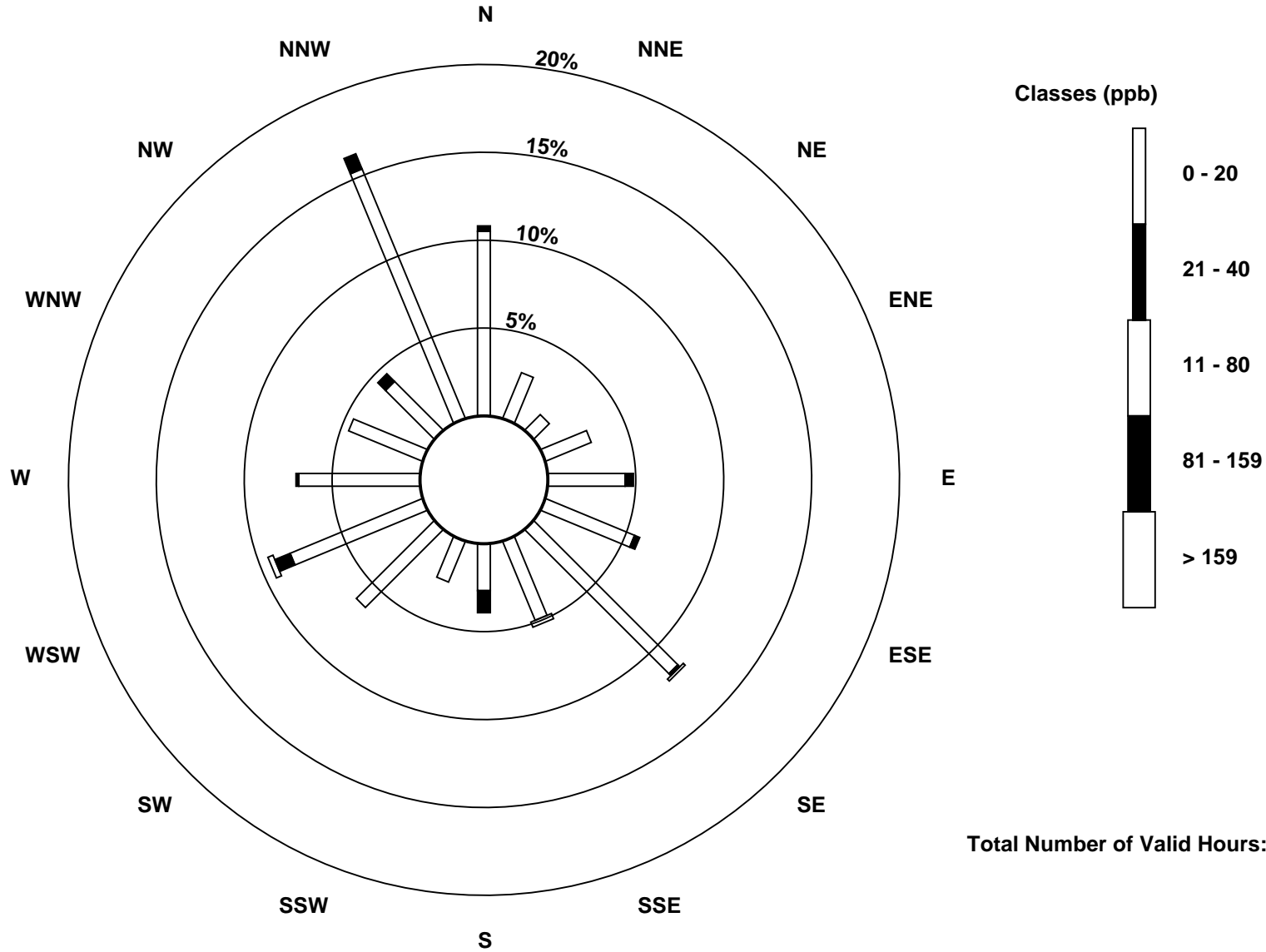
Total Number of Valid Hours: 638

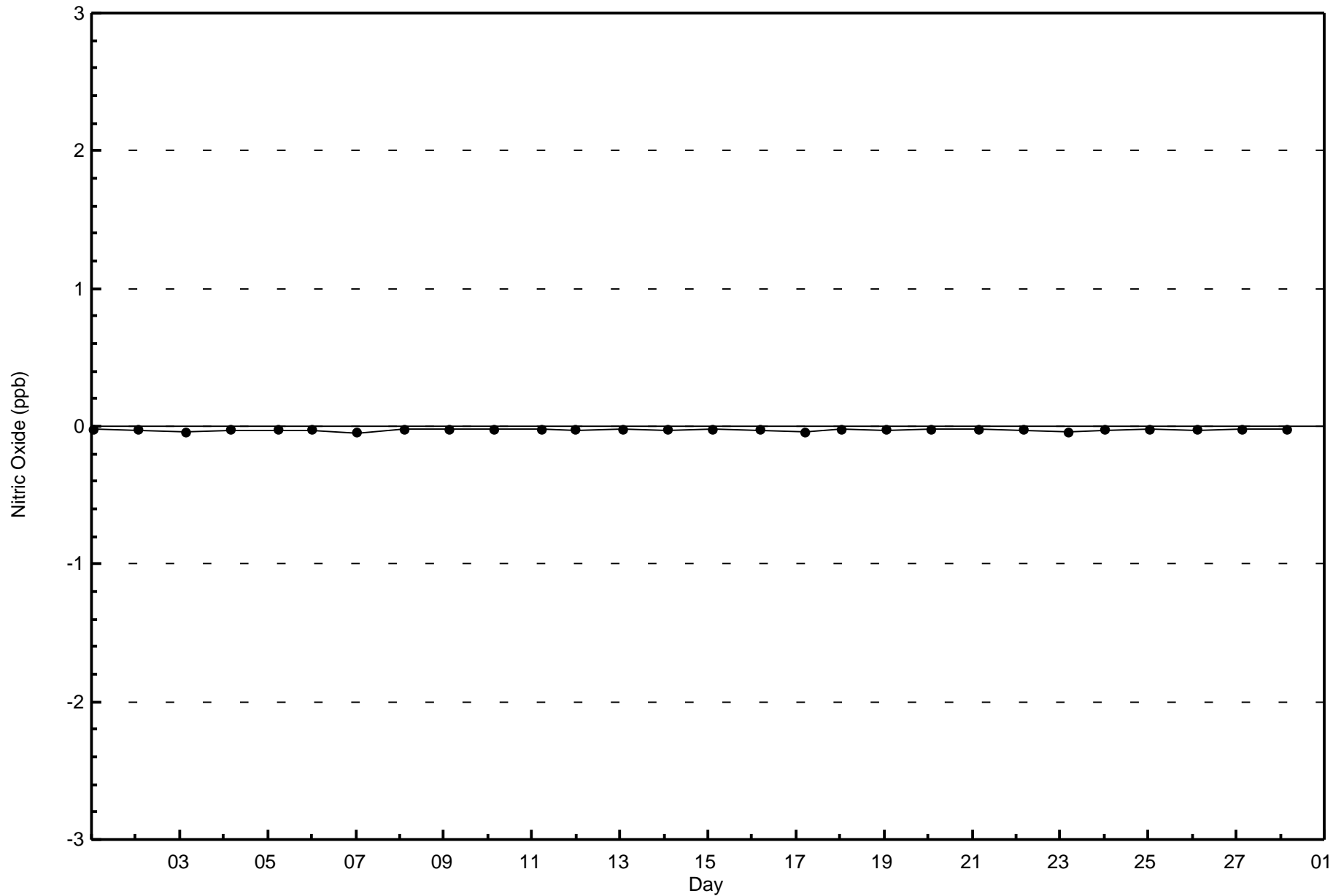
Total Number of Hours: 672

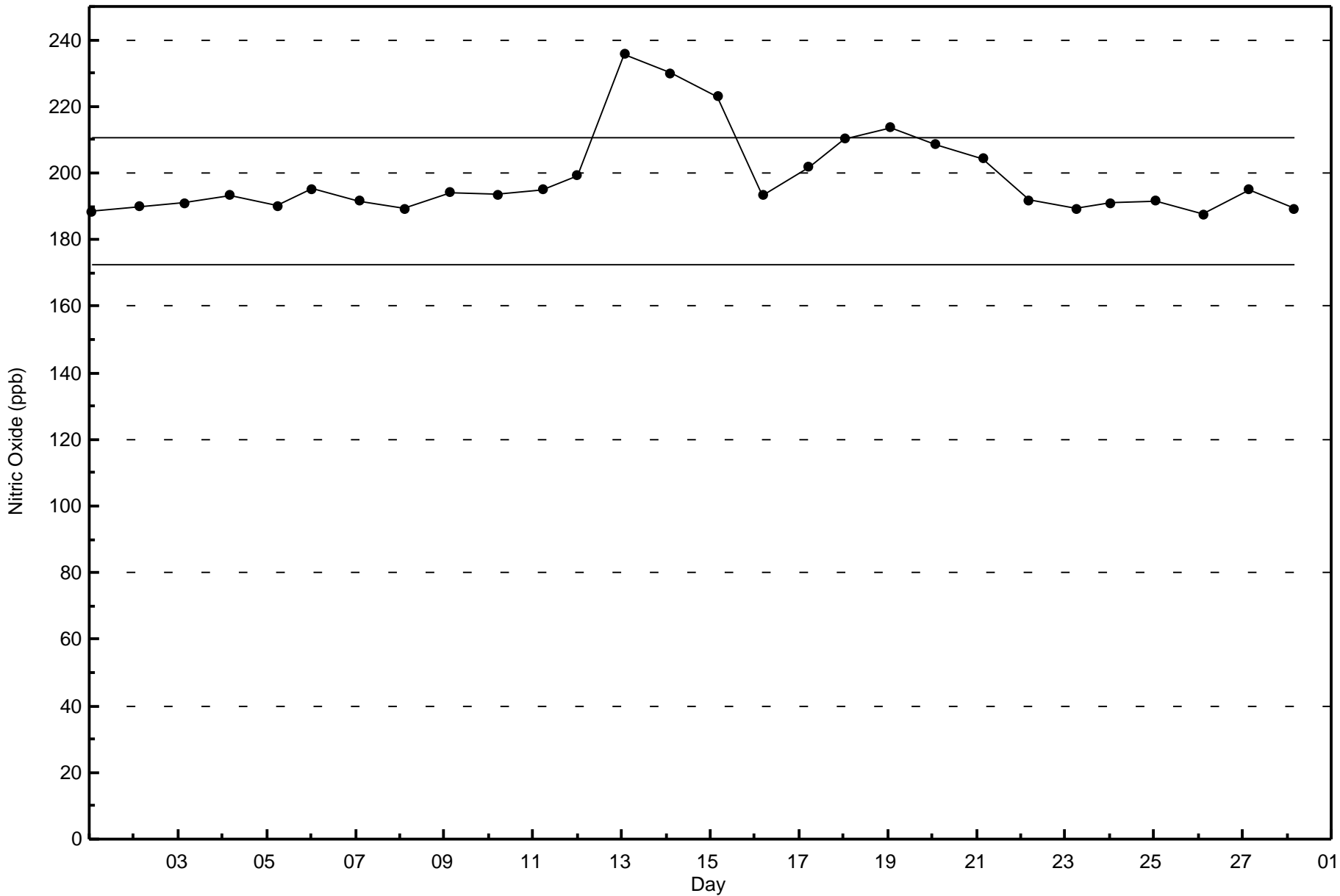


Wood Buffalo Environmental Association
 Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
 Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 44 ppb on Feb 13 18:00	Maximum Daily Average: 24.6 ppb on Feb 9
Minimum Value: 1 ppb on Feb 19 11:00	Hours of Data: 639
Maximum Diurnal Average: 17.0 ppb at hour 19	Hours of Missing Data: 33
Monthly Average: 12.2 ppb	Hours of Calibration: 33
Minimum Daily Average: 1.8 ppb on Feb 21	Percent Operational Time: 100.0
Minimum Diurnal Average: 7.6 ppb at hour 15	
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 10 Q ₃ = 17 P ₉₀ = 26 P ₉₉ = 40	

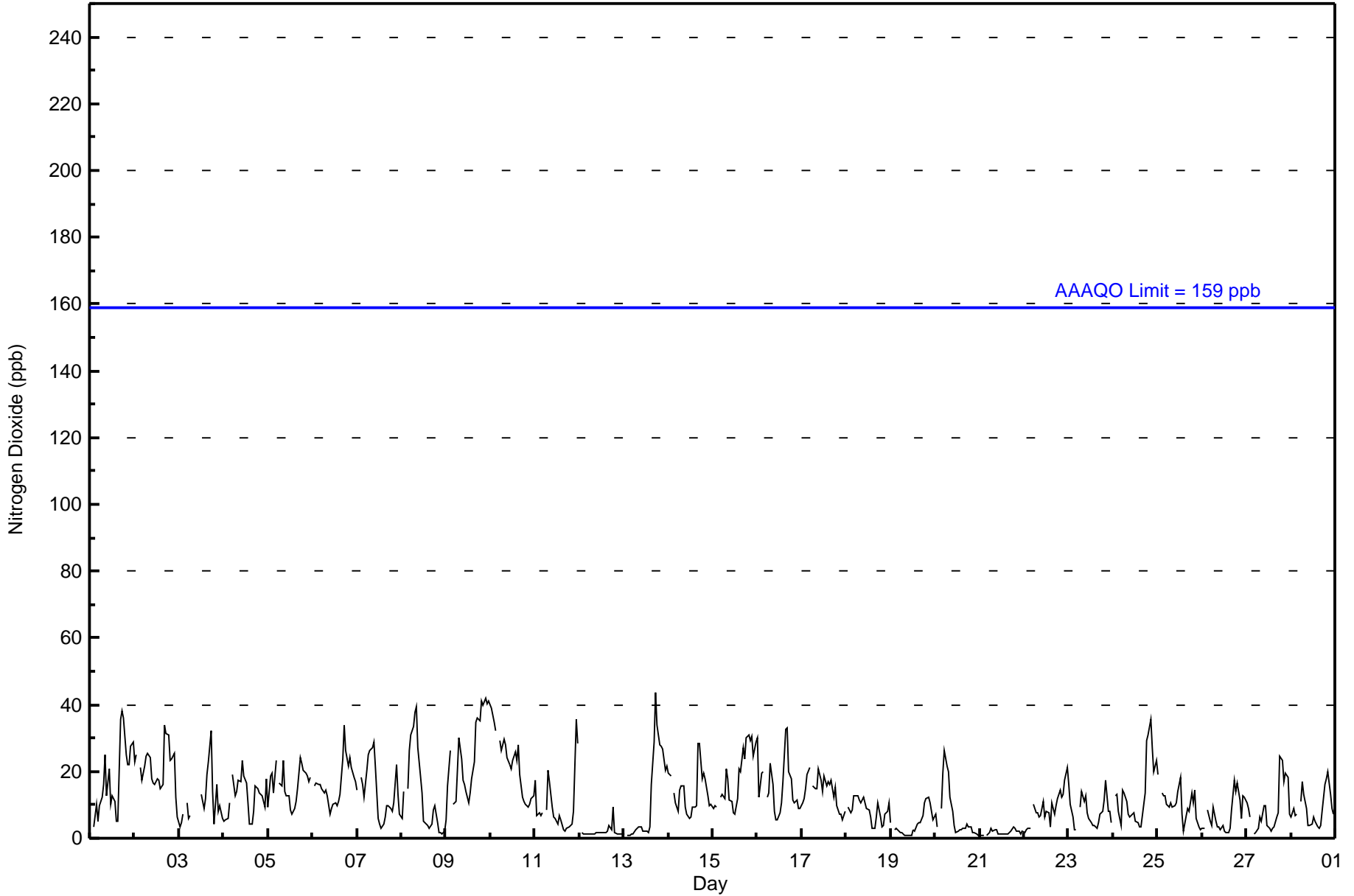
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	3	Z	3	10	5	10	12	16	25	13	21	10	13	11	5	5	36	38	36	25	22	22	28	29	17.3	38
2-Feb	23	25	Z	21	18	22	24	25	24	18	17	16	18	17	15	16	34	32	31	23	24	25	12	6	21.2	34
3-Feb	4	5	7	Z	11	6	7	C	C	C	C	C	13	9	12	19	23	32	14	4	16	8	10	6	11.4	32
4-Feb	5	6	6	11	Z	19	13	14	17	17	23	19	17	10	4	8	16	15	14	13	13	9	18	12.6	23	
5-Feb	9	19	20	14	23	Z	17	16	24	14	13	13	9	7	9	11	15	24	23	20	20	19	17	18	16.1	24
6-Feb	Z	16	17	16	16	15	14	14	13	7	9	10	11	10	11	13	24	34	26	21	24	21	18	17	16.4	34
7-Feb	15	Z	18	16	12	20	25	26	27	29	22	6	4	3	4	6	10	10	9	8	11	22	13	7	14.0	29
8-Feb	6	14	Z	15	26	31	33	38	39	27	18	14	5	4	4	3	4	8	10	5	2	2	1	2	13.5	39
9-Feb	5	16	26	Z	10	11	20	30	24	17	16	14	10	14	18	23	35	36	35	41	40	42	40	41	24.6	42
10-Feb	39	37	35	32	Z	29	26	30	28	24	22	21	23	26	23	28	19	12	11	10	9	10	12	13	22.6	39
11-Feb	17	7	8	7	8	Z	9	20	17	10	6	6	4	7	6	2	2	3	3	4	4	8	36	29	9.6	36
12-Feb	Z	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	4	2	9	2	1	1	1	1	1.9	9
13-Feb	1	Z	1	1	1	1	2	3	3	3	2	2	2	2	3	16	29	44	34	28	28	27	20	22	12.0	44
14-Feb	19	19	Z	14	11	8	15	16	16	9	7	6	7	9	9	10	28	29	18	19	18	13	10	10	13.8	29
15-Feb	9	10	9	Z	12	13	12	21	18	12	11	8	7	12	21	20	27	24	30	31	29	30	25	29	18.2	31
16-Feb	30	12	20	20	Z	12	13	23	16	8	6	6	8	11	17	33	33	20	18	12	11	12	9	9	15.4	33
17-Feb	11	12	15	19	21	Z	16	15	15	21	18	14	19	16	17	16	17	12	15	10	7	7	6	8	14.1	21
18-Feb	Z	9	8	8	13	13	13	12	11	12	11	9	8	7	3	3	6	11	6	3	4	7	8	11	8.5	13
19-Feb	5	Z	3	3	2	2	2	1	1	1	1	1	3	2	4	5	5	7	10	12	12	11	8	5	4.5	12
20-Feb	7	3	Z	9	20	26	22	20	12	8	4	2	2	2	3	3	3	4	3	3	2	2	1	1	7.0	26
21-Feb	1	1	1	Z	1	2	3	2	3	3	1	1	1	1	1	1	2	2	3	3	2	2	1	2	1.8	3
22-Feb	2	3	3	3	Z	10	8	8	6	7	11	6	8	8	3	11	7	10	12	14	12	13	18	21	8.8	21
23-Feb	16	10	6	2	3	Z	9	14	11	13	8	6	5	4	4	3	5	7	8	12	18	8	8	5	7.9	18
24-Feb	Z	13	13	8	4	15	14	11	7	6	7	8	5	5	3	3	7	14	29	31	35	27	20	23	13.4	35
25-Feb	19	Z	13	13	13	10	9	11	10	10	11	14	18	7	2	7	9	8	14	11	14	6	3	2	10.1	19
26-Feb	3	3	Z	8	5	4	9	5	3	3	3	4	2	2	2	3	8	17	14	17	11	6	13	12	6.9	17
27-Feb	11	9	6	Z	1	2	3	6	5	10	10	4	3	2	3	3	7	8	25	23	17	20	18	7	8.7	25
28-Feb	6	9	7	7	Z	11	17	13	9	4	4	4	6	5	4	3	4	8	16	18	20	13	9	7	8.9	20
11.0 11.1 10.7 11.3 10.2 12.2 13.1 15.1 14.3 11.3 10.4 8.3 8.3 7.7 7.6 9.7 14.6 16.8 17.0 15.1 15.2 14.2 13.4 12.9																								Diurnal Average		
39 37 35 32 26 31 33 38 39 29 23 21 23 26 23 33 36 44 36 41 40 42 40 41																								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
Athabasca Valley - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	527	82.47	82.47
21 - 40	108	16.90	99.37
41 - 80	4	0.63	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 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	60	18	7	17	28	28	61	21	11	15	35	50	42	27	22	85	527
21 - 40	9	0	1	1	3	9	15	12	13	1	5	10	3	2	7	16	107
11 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	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	69	18	8	18	31	37	76	33	25	16	40	60	45	29	29	104	638

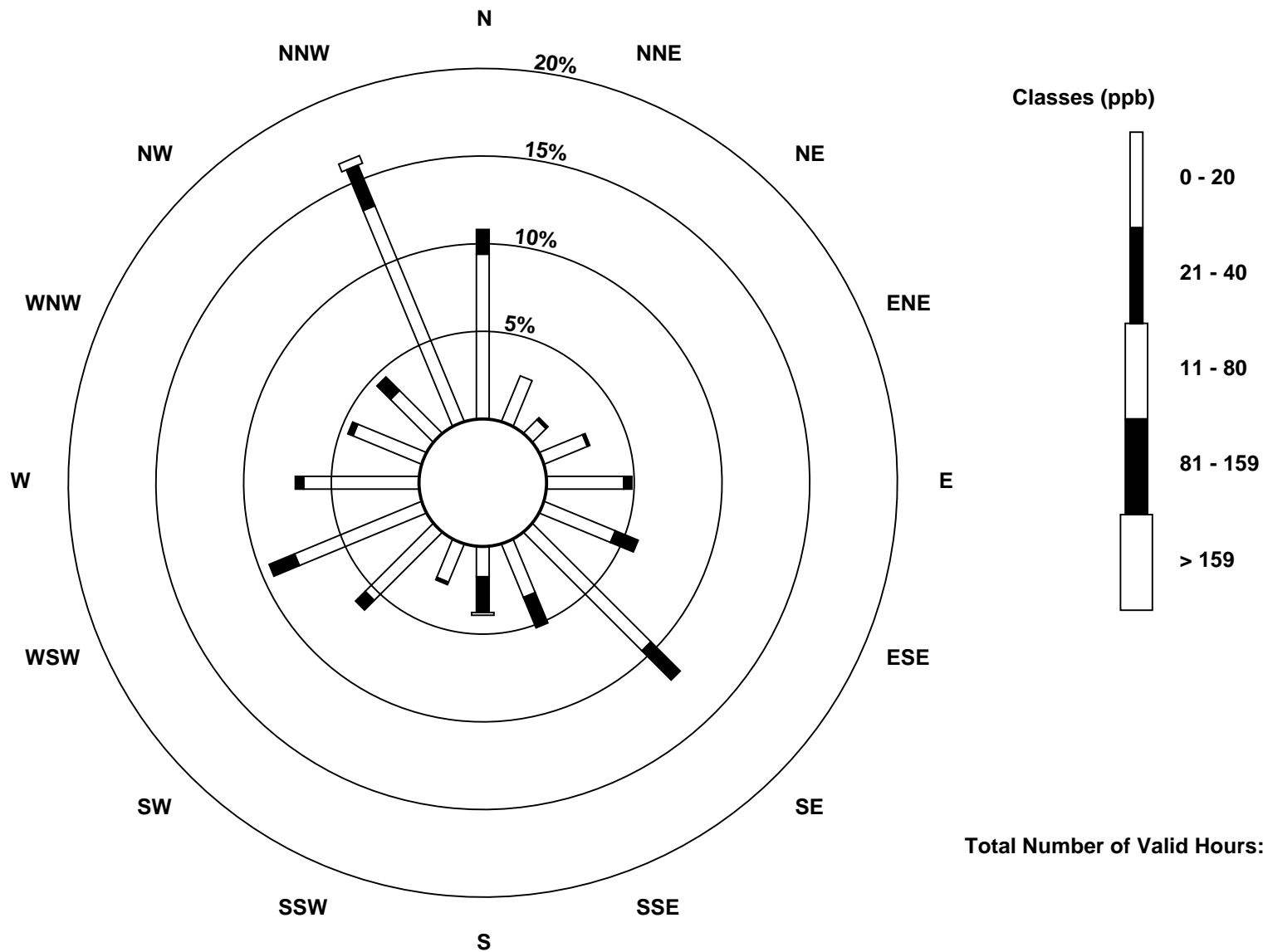
Total Number of Valid Hours: 638

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)

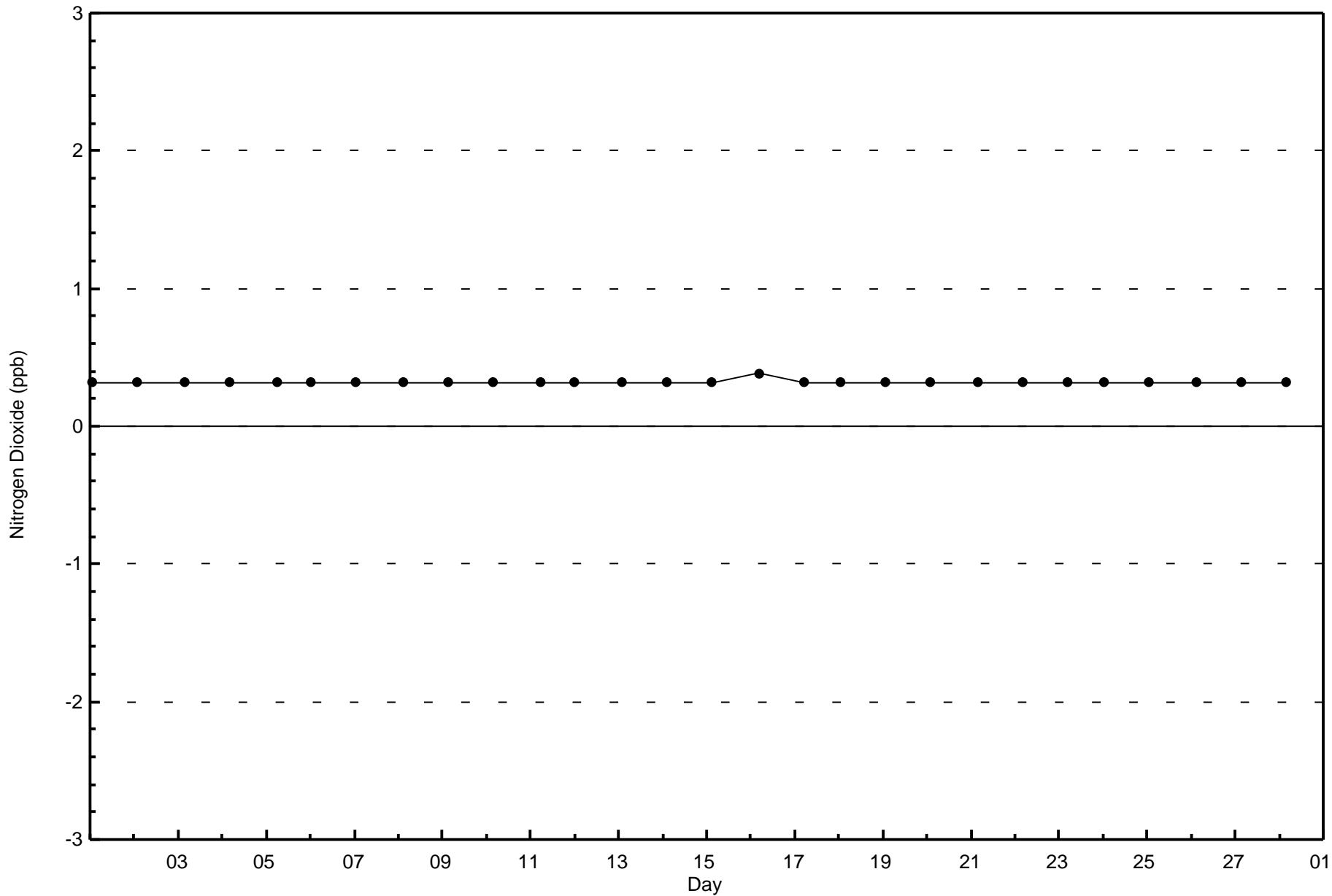


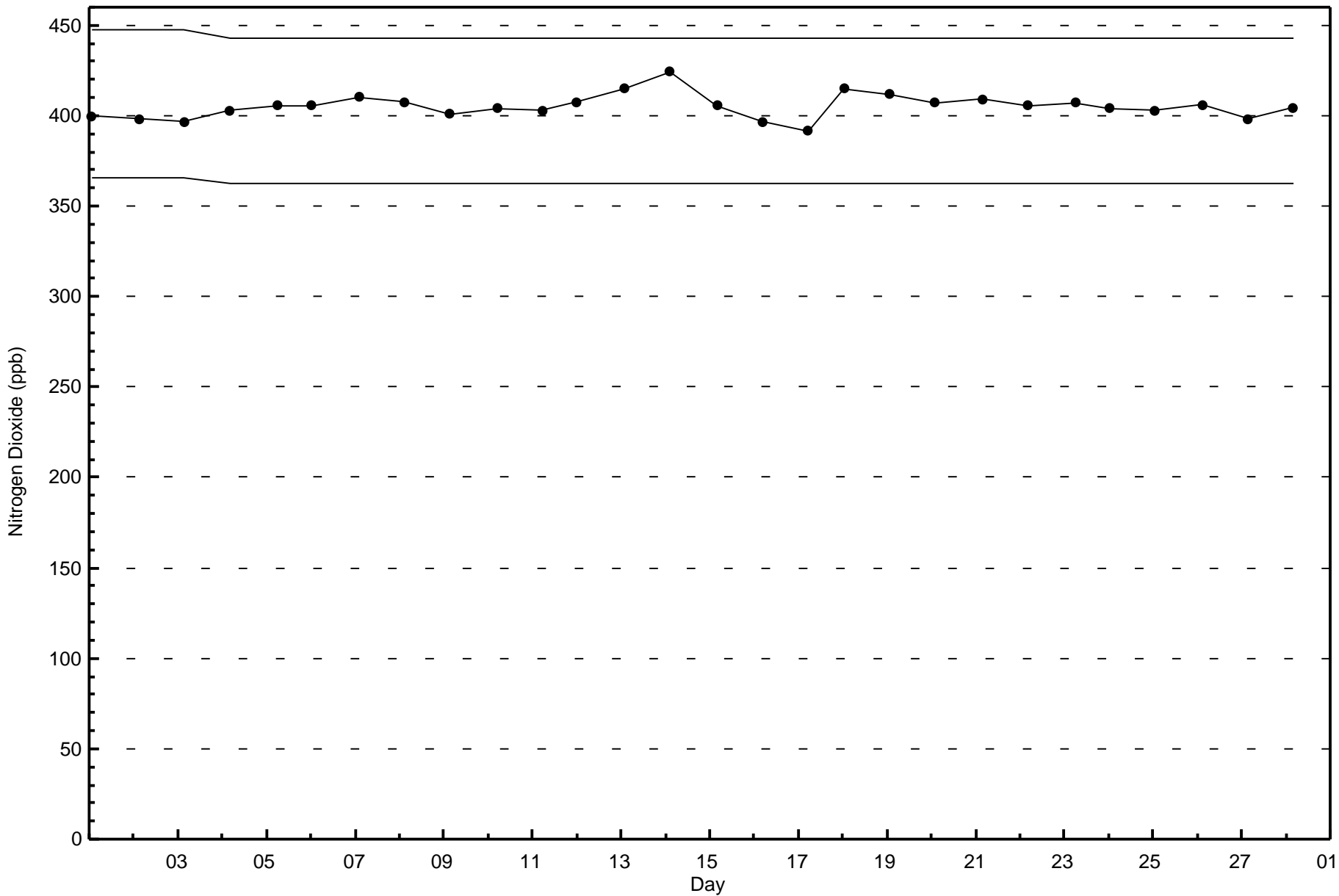
Total Number of Valid Hours: 638



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

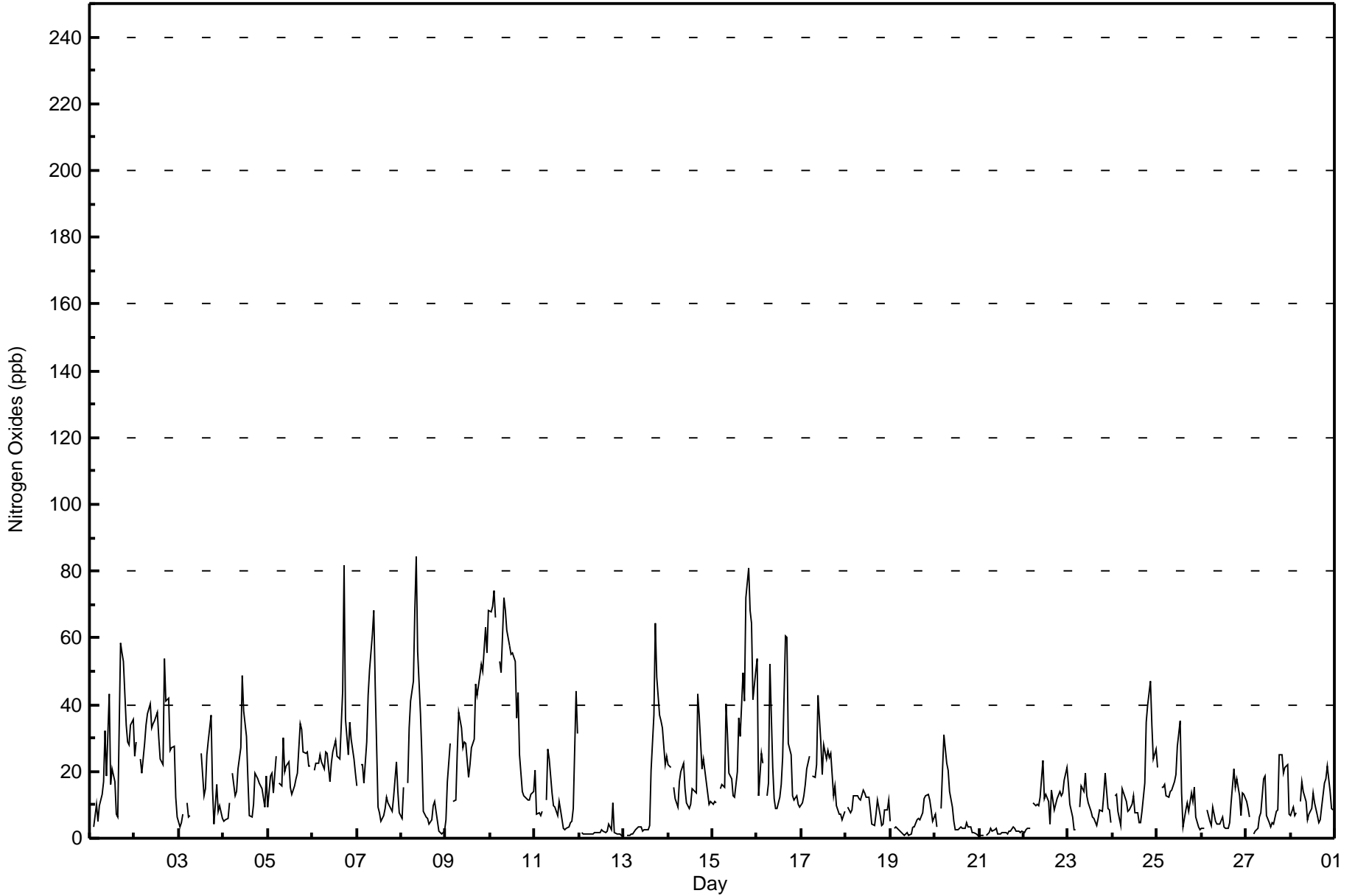
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 2017

Maximum Value: 84 ppb on Feb 8 09:00																		Maximum Daily Average: 43.4 ppb on Feb 10						Hours in Service: 672		
Minimum Value: 1 ppb on Feb 21 05:00																		Minimum Daily Average: 1.9 ppb on Feb 21						Hours of Data: 639		
Maximum Diurnal Average: 22.9 ppb at hour 18																		Minimum Diurnal Average: 11.8 ppb at hour 15						Hours of Missing Data: 33		
Monthly Average: 17.2 ppb																		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 6 Median = 13 Q ₃ = 23 P ₉₀ = 37 P ₉₉ = 72						Hours of Calibration: 33		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	3	Z	3	10	5	10	13	17	32	19	43	16	21	17	7	6	58	55	53	34	29	28	34	35	23.9	58
2-Feb	25	29	Z	24	20	28	34	37	40	33	34	35	38	30	24	22	54	41	42	26	27	27	12	6	30.0	54
3-Feb	4	5	7	Z	11	6	7	C	C	C	C	C	25	13	15	25	29	37	15	4	16	8	10	6	13.5	37
4-Feb	5	6	6	11	Z	20	13	14	21	27	49	38	31	18	7	6	10	20	18	16	15	15	9	19	17.1	49
5-Feb	9	18	20	14	25	Z	17	16	30	20	22	23	15	13	16	18	20	34	33	26	26	26	22	22	21.0	34
6-Feb	Z	20	22	23	25	23	21	26	25	17	22	26	29	24	24	24	44	82	35	25	35	29	24	20	28.1	82
7-Feb	16	Z	22	22	16	29	43	50	61	68	46	10	8	5	7	9	12	10	9	8	12	23	14	8	22.0	68
8-Feb	6	15	Z	16	33	41	47	68	84	56	37	25	8	6	6	4	5	10	11	5	2	2	1	2	21.4	84
9-Feb	5	17	29	Z	11	12	26	38	33	27	29	28	18	22	27	30	46	43	49	52	50	63	56	68	33.8	68
10-Feb	68	69	74	66	Z	53	50	72	68	62	58	55	56	53	36	44	25	14	13	12	11	11	13	14	43.4	74
11-Feb	20	7	8	7	8	Z	11	27	24	13	10	9	7	11	8	3	2	3	3	5	5	9	44	31	11.9	44
12-Feb	Z	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	4	2	10	2	1	1	1	1	2.1	10
13-Feb	1	Z	1	1	1	1	2	3	3	3	2	2	3	2	4	20	37	65	48	37	35	33	22	25	15.3	65
14-Feb	22	21	Z	15	12	10	17	20	22	15	10	9	10	15	14	13	43	37	21	24	20	14	10	11	17.6	43
15-Feb	10	11	11	Z	15	16	15	40	31	19	18	13	12	20	36	30	50	41	72	81	68	65	42	50	33.3	81
16-Feb	54	13	26	22	Z	13	17	52	21	12	9	9	12	16	24	61	60	28	25	13	11	13	10	9	23.0	61
17-Feb	11	13	16	21	24	Z	19	18	22	43	29	19	28	24	26	24	26	13	16	10	7	7	6	8	18.6	43
18-Feb	Z	9	8	8	13	13	13	12	11	15	14	12	12	8	4	4	7	11	7	4	4	8	8	11	9.5	15
19-Feb	5	Z	3	3	3	2	2	1	1	2	1	1	4	3	6	6	6	8	12	13	13	12	8	5	5.2	13
20-Feb	7	3	Z	9	20	31	23	20	14	9	5	2	3	3	3	3	3	5	3	3	2	2	1	1	7.6	31
21-Feb	1	1	1	Z	1	2	3	2	3	3	1	1	2	2	2	1	2	2	3	3	2	2	1	2	1.9	3
22-Feb	2	3	3	3	Z	11	10	10	10	12	23	12	13	11	4	15	8	10	12	14	13	13	17	21	10.9	23
23-Feb	16	10	6	2	3	Z	9	16	14	19	13	11	8	6	6	4	6	8	8	13	19	9	8	5	9.6	19
24-Feb	Z	13	13	8	4	15	14	11	8	9	10	13	8	8	4	5	8	16	35	40	47	34	24	27	16.2	47
25-Feb	21	Z	15	15	16	13	12	14	14	17	19	28	35	14	3	8	10	8	14	11	15	6	3	2	13.7	35
26-Feb	3	3	Z	8	5	4	9	5	4	4	4	6	3	3	3	5	10	21	15	18	13	7	14	13	7.9	21
27-Feb	11	9	6	Z	1	2	3	6	8	18	19	7	5	3	4	4	8	8	25	25	20	21	22	7	10.6	25
28-Feb	7	9	7	8	Z	11	17	14	11	6	7	9	13	11	7	5	5	9	16	18	22	14	9	8	10.6	22
13.8 13.3 13.4 13.9 11.9 15.2 16.6 22.6 22.9 20.4 19.8 15.6 15.3 13.0 11.8 14.3 21.5 22.9 22.3 19.4 19.4 17.9 16.0 15.7																		Diurnal Average								
68 69 74 66 33 53 50 72 84 68 58 55 56 53 36 61 60 82 72 81 68 65 56 68																		Diurnal Maximum								
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	447	69.95	69.95
21 - 40	132	20.66	90.61
41 - 80	57	8.92	99.53
81 - 159	2	0.31	99.84
> 159	0	0.00	99.84

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 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	51	17	6	9	20	22	49	13	5	13	29	48	38	26	21	80	447
21 - 40	13	1	2	9	8	13	23	15	8	2	8	4	6	3	4	12	131
11 - 80	5	0	0	0	3	2	3	4	12	1	3	7	1	0	4	12	57
81 - 159	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	18	8	18	31	37	76	32	25	16	40	60	45	29	29	104	637

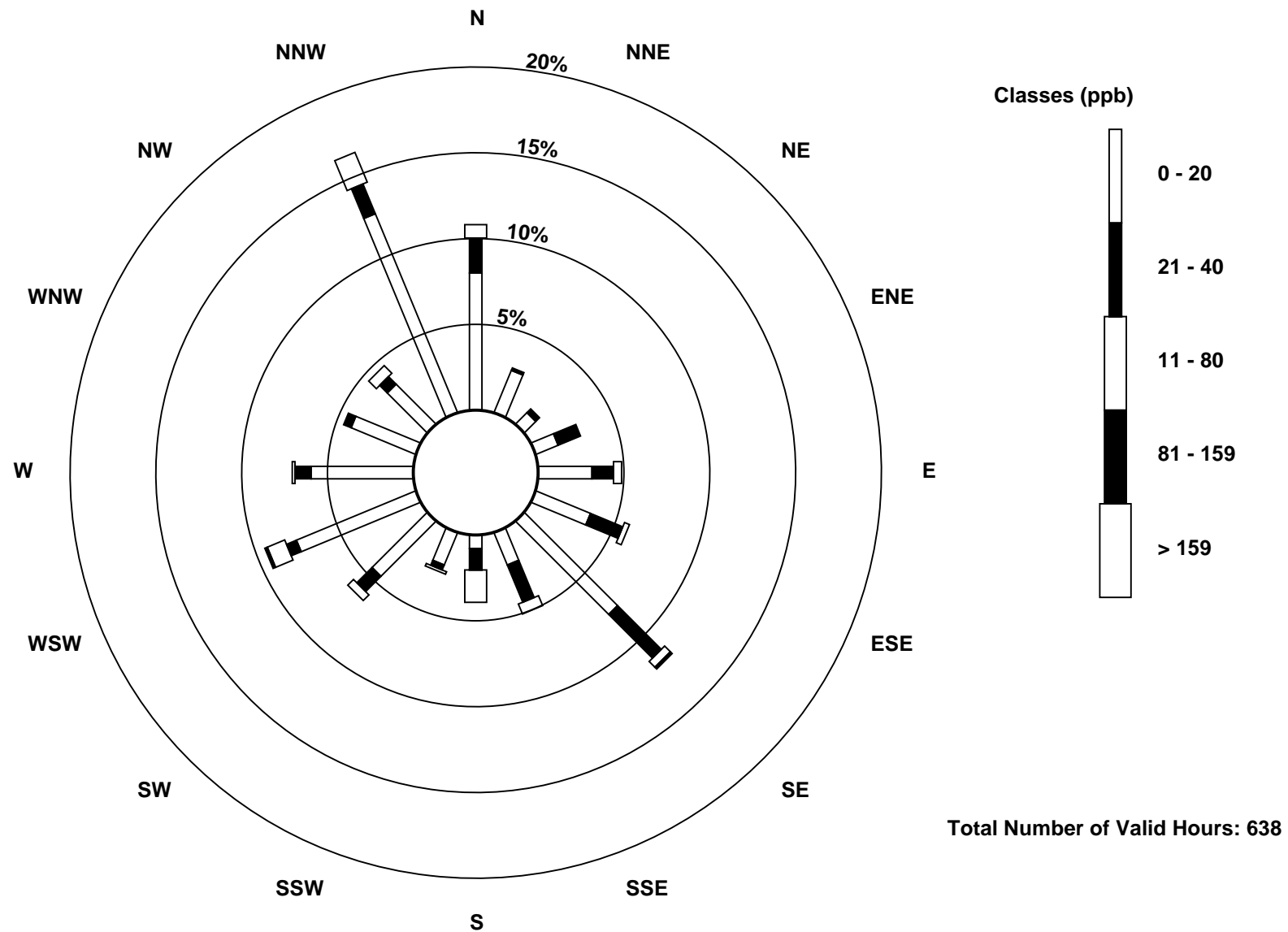
Total Number of Valid Hours: 638

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

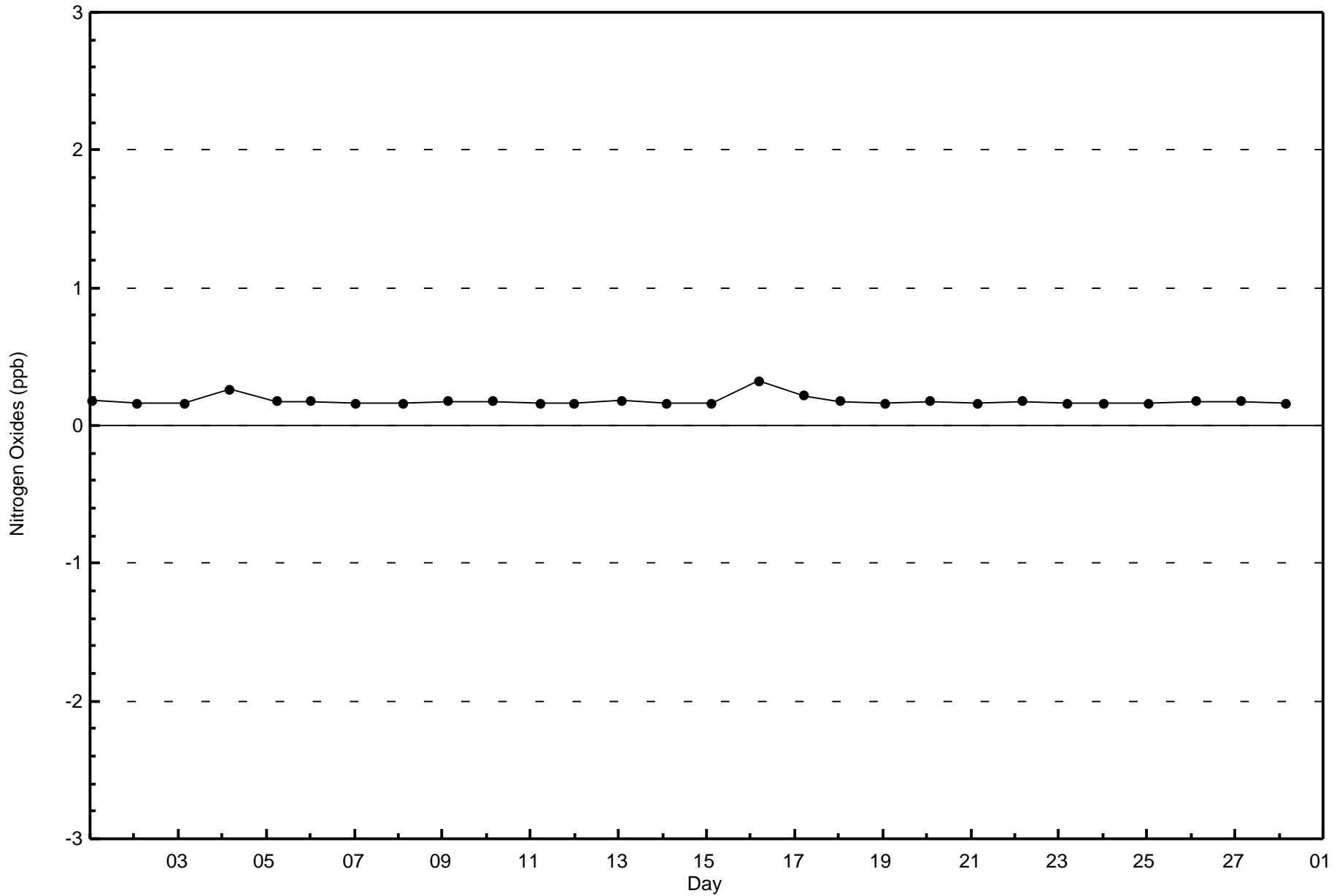
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)

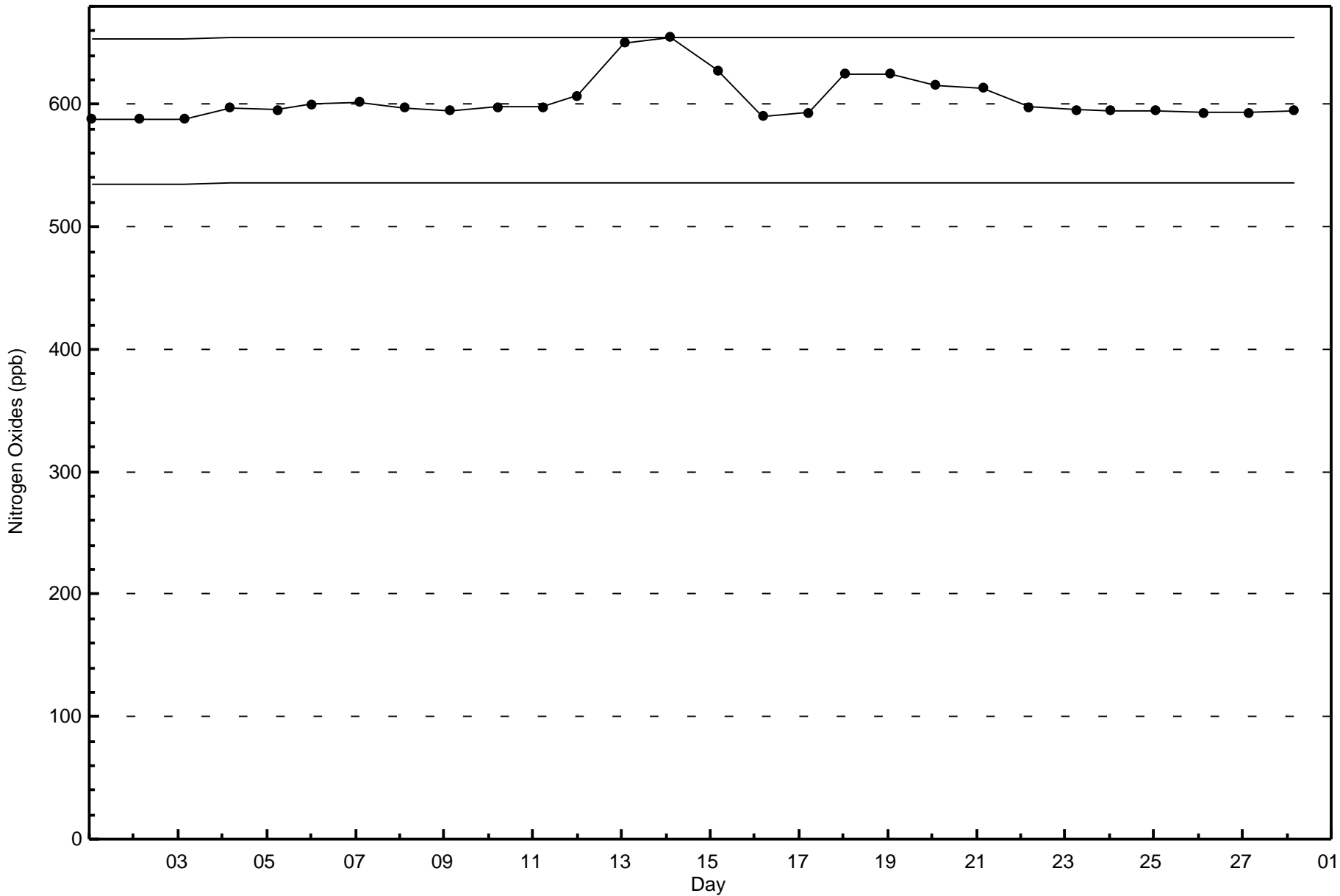




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 2017





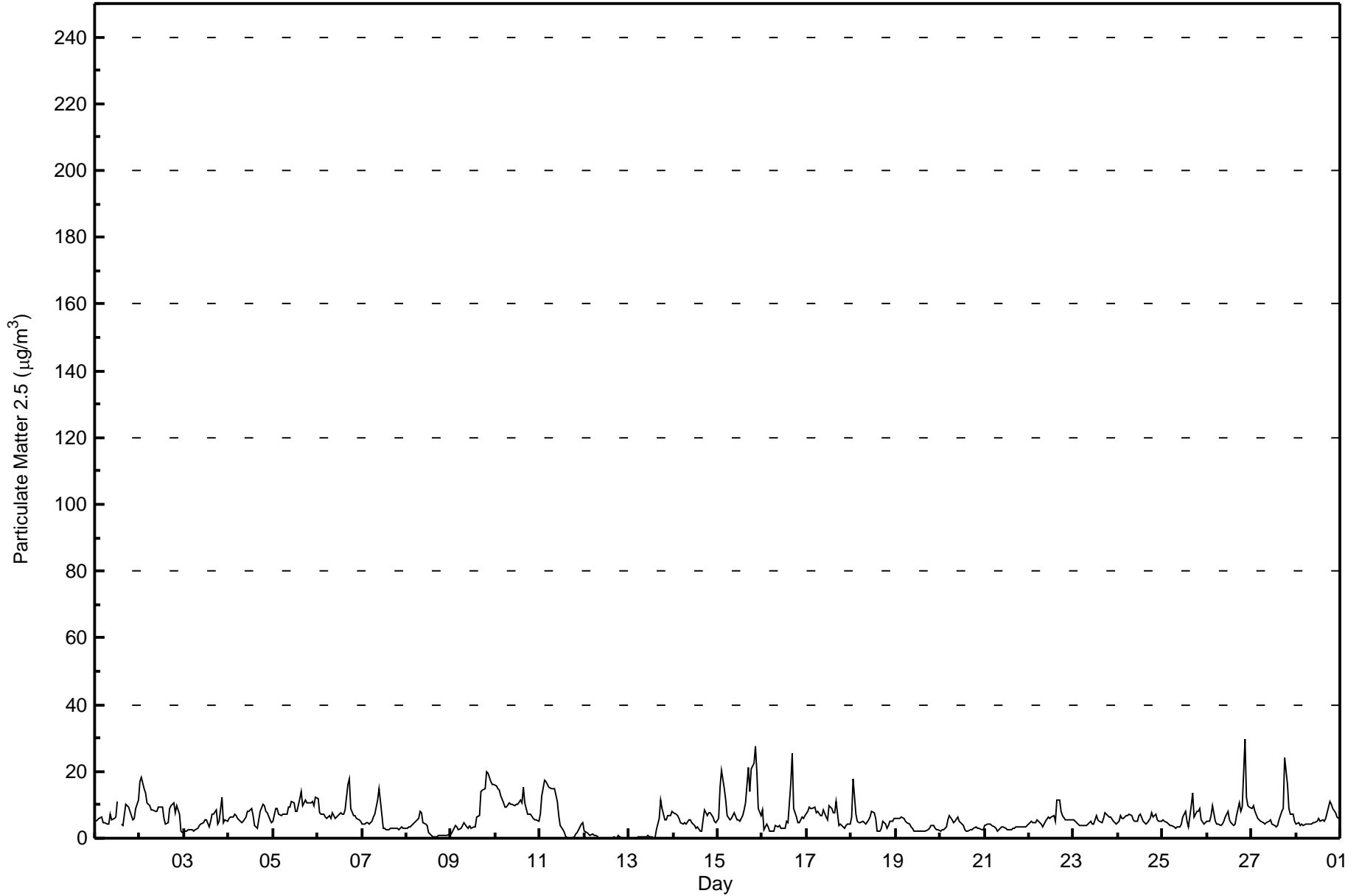


Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		672																				
Maximum Value: 29.9 µg/m ³ on Feb 26 21:00		Maximum Daily Average: 11.8 µg/m ³ on Feb 15		Hours of Data:		663																				
Minimum Value: 0.0 µg/m ³ on Feb 11 18:00		Minimum Daily Average: 0.6 µg/m ³ on Feb 12		Hours of Missing Data:		9																				
Maximum Diurnal Average: 7.9 µg/m ³ at hour 21		Minimum Diurnal Average: 4.3 µg/m ³ at hour 15		Hours of Calibration:		1																				
Monthly Average: 6.11 µg/m ³		Percentiles: P ₁ = 0.0 P ₁₀ = 2.2 Q ₁ = 3.6 Median = 5.2 Q ₃ = 7.6 P ₉₀ = 10.8 P ₉₉ = 20.7		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-Feb	5.2	5.5	5.9	6.4	4.7	4.7	4.4	4.1	7.3	5.3	5.9	6.3	11.1	C	4.2	3.7	10.0	9.8	9.3	6.7	5.6	5.9	9.1	11.2	6.6	11.2
2-Feb	17.0	18.3	14.9	13.5	10.4	9.6	8.4	8.6	8.1	8.1	9.5	9.2	9.4	6.1	4.1	4.6	8.8	9.7	10.4	7.5	9.8	7.4	2.0	1.5	9.0	18.3
3-Feb	2.1	2.3	2.4	2.5	2.6	2.3	2.4	2.8	3.6	4.1	4.8	5.3	5.5	3.3	5.0	7.3	7.2	8.6	4.2	5.1	12.3	4.9	5.4	5.2	4.6	12.3
4-Feb	5.9	6.2	6.5	7.0	6.9	6.1	5.2	4.8	5.2	6.3	7.9	7.9	8.9	6.7	3.9	3.1	5.4	8.0	10.0	9.9	7.9	7.6	5.6	4.7	6.6	10.0
5-Feb	5.0	9.1	9.0	7.0	6.7	7.2	7.2	7.4	9.4	9.4	10.8	10.5	8.1	8.3	11.9	14.2	9.7	11.6	10.8	10.5	10.4	10.9	9.8	12.2	9.5	14.2
6-Feb	11.7	7.5	7.1	7.2	6.5	6.0	7.0	5.9	7.8	5.9	6.3	6.8	7.5	7.1	7.3	8.4	16.2	17.9	9.0	7.0	6.7	5.7	5.3	4.9	7.9	17.9
7-Feb	4.3	4.3	4.8	4.7	4.1	5.1	6.3	7.4	11.4	14.7	11.0	2.8	2.8	2.5	2.7	2.8	2.9	2.9	2.9	3.2	2.7	3.4	3.0	2.9	4.8	14.7
8-Feb	2.9	3.4	3.2	4.1	4.7	5.2	5.7	7.9	7.6	4.9	4.1	3.6	1.6	0.9	0.5	0.3	0.4	0.7	1.0	0.9	0.8	0.8	0.9	1.1	2.8	7.9
9-Feb	1.3	2.2	3.8	3.4	2.6	2.9	3.7	4.6	3.6	2.9	3.7	3.1	3.4	3.5	6.3	6.8	13.9	14.3	14.7	19.9	19.6	17.1	16.1	15.9	7.9	19.9
10-Feb	15.6	14.8	14.3	12.5	10.5	9.4	9.5	10.8	10.1	10.2	10.0	10.2	10.0	11.6	10.7	15.4	10.7	7.0	7.0	7.3	5.7	5.5	5.5	5.1	10.0	15.6
11-Feb	7.3	12.6	17.4	16.8	16.2	15.4	14.6	14.8	14.7	10.9	6.6	4.0	2.4	1.5	0.5	0.1	0.0	0.0	0.4	1.4	1.9	2.5	4.2	4.7	7.1	17.4
12-Feb	2.2	1.7	1.2	1.0	1.1	1.0	0.9	0.6	UO	UO	UO	UO	0.0	0.0	0.0	0.1	0.4	0.0	0.9	0.3	0.1	0.0	UO	UO	0.6	2.2
13-Feb	UO	UO	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.5	0.4	0.0	0.1	2.4	5.9	11.4	8.8	5.6	5.7	6.9	6.6	8.1	3.0	11.4
14-Feb	7.8	7.4	6.7	5.7	4.8	4.2	4.5	4.4	5.5	5.3	4.6	4.0	3.1	3.3	2.0	2.0	5.6	8.3	6.8	7.7	7.6	6.4	4.9	4.6	5.3	8.3
15-Feb	5.7	15.5	20.4	14.7	11.6	6.9	5.4	6.1	6.7	7.6	5.3	5.3	5.2	6.6	8.5	10.7	21.2	14.1	20.7	22.5	27.4	20.0	8.8	6.9	11.8	27.4
16-Feb	8.6	2.7	4.3	3.5	2.3	2.1	2.2	4.0	3.5	3.8	2.9	3.0	2.9	4.9	4.8	16.6	25.4	9.0	6.2	4.5	4.7	6.3	6.0	6.9	5.9	25.4
17-Feb	8.2	9.1	9.0	9.0	9.2	7.6	7.8	6.7	6.6	8.6	6.2	5.6	9.7	8.8	7.7	7.5	11.1	3.7	4.1	3.8	3.0	3.7	4.1	4.4	6.9	11.1
18-Feb	6.4	17.7	7.1	5.0	4.8	4.7	5.0	4.9	4.3	5.4	6.2	7.9	7.6	5.9	2.3	2.3	2.9	5.1	4.4	2.9	3.9	5.0	5.0	5.8	5.5	17.7
19-Feb	5.8	5.9	5.9	6.5	5.7	5.2	4.6	4.1	3.3	2.9	2.3	2.0	2.0	1.9	2.0	2.1	2.0	2.5	3.2	3.7	3.8	3.0	2.7	2.5	3.6	6.5
20-Feb	2.2	2.4	2.4	3.2	5.4	6.6	5.5	4.7	5.2	6.2	5.1	4.6	3.8	2.7	2.2	1.9	2.6	2.7	2.8	3.3	3.2	2.9	2.6	2.7	3.6	6.6
21-Feb	3.7	4.3	4.2	4.2	3.8	3.3	3.1	2.2	2.9	3.4	3.4	3.1	2.4	2.6	2.7	3.0	2.9	3.2	3.6	3.6	3.5	3.5	3.6	3.7	3.3	4.3
22-Feb	4.7	5.1	4.8	4.6	5.5	5.1	4.1	3.6	4.4	5.1	6.2	5.8	6.2	6.8	5.0	11.4	11.3	8.2	6.6	5.5	5.7	5.6	5.5	5.4	5.9	11.4
23-Feb	5.6	5.0	4.4	4.0	3.7	3.8	3.8	3.8	4.5	5.1	4.4	4.2	6.7	5.6	5.2	4.6	5.8	7.7	6.8	6.2	6.5	5.1	4.9	4.2	5.1	7.7
24-Feb	5.2	6.6	5.8	5.9	6.7	7.0	7.1	6.6	5.6	5.2	5.2	6.6	7.4	5.1	4.5	4.2	4.5	5.8	7.5	6.5	7.1	5.5	4.9	4.9	5.9	7.5
25-Feb	5.3	4.9	4.6	4.2	4.0	3.8	3.4	3.2	3.5	3.5	4.2	6.2	8.1	5.1	3.3	9.9	13.6	6.3	7.9	7.9	8.9	5.3	4.3	4.4	5.7	13.6
26-Feb	5.2	5.3	6.8	9.8	5.1	4.1	4.2	3.9	4.1	5.0	6.2	7.9	5.5	4.7	3.7	4.3	6.6	10.4	8.1	9.4	29.9	12.2	9.9	9.3	7.6	29.9
27-Feb	8.9	9.7	8.0	5.9	5.5	5.2	4.8	4.3	4.5	5.1	5.7	4.3	3.6	3.6	4.0	5.3	7.9	9.0	24.0	16.3	9.0	7.1	7.1	5.1	7.3	24.0
28-Feb	4.3	4.5	3.9	4.2	3.9	4.3	4.4	4.2	4.4	4.5	4.8	4.9	6.0	5.3	5.4	5.0	5.8	7.5	10.9	10.0	8.8	7.4	6.2	5.9	5.7	10.9
																								Diurnal Average		
																								Diurnal Maximum		
6.2 7.2 6.7 6.3 5.7 5.3 5.2 5.2 5.9 5.9 5.7 5.4 5.4 4.6 4.3 5.7 7.9 7.3 7.6 7.1 7.9 6.3 5.7 5.7																										
17.0 18.3 20.4 16.8 16.2 15.4 14.6 14.8 14.7 14.7 11.0 10.5 11.1 11.6 11.9 16.6 25.4 17.9 24.0 22.5 29.9 20.0 16.1 15.9																										
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}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - February 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	317	47.81	47.81
6 - 15	280	42.23	90.05
16 - 25	23	3.47	93.51
26 - 80	2	0.30	93.82
> 81.0	0	0.00	93.82

Total Number of Valid Hours: 663

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - February 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	28	9	4	8	17	16	36	18	9	14	23	23	22	23	14	52	316
6 - 15	41	8	3	10	15	21	41	15	15	4	13	14	9	8	13	50	280
16 - 25	2	0	0	0	0	1	0	4	2	0	2	3	0	0	3	6	23
26 - 80	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	71	17	8	18	32	39	77	37	26	18	38	40	31	31	30	108	621

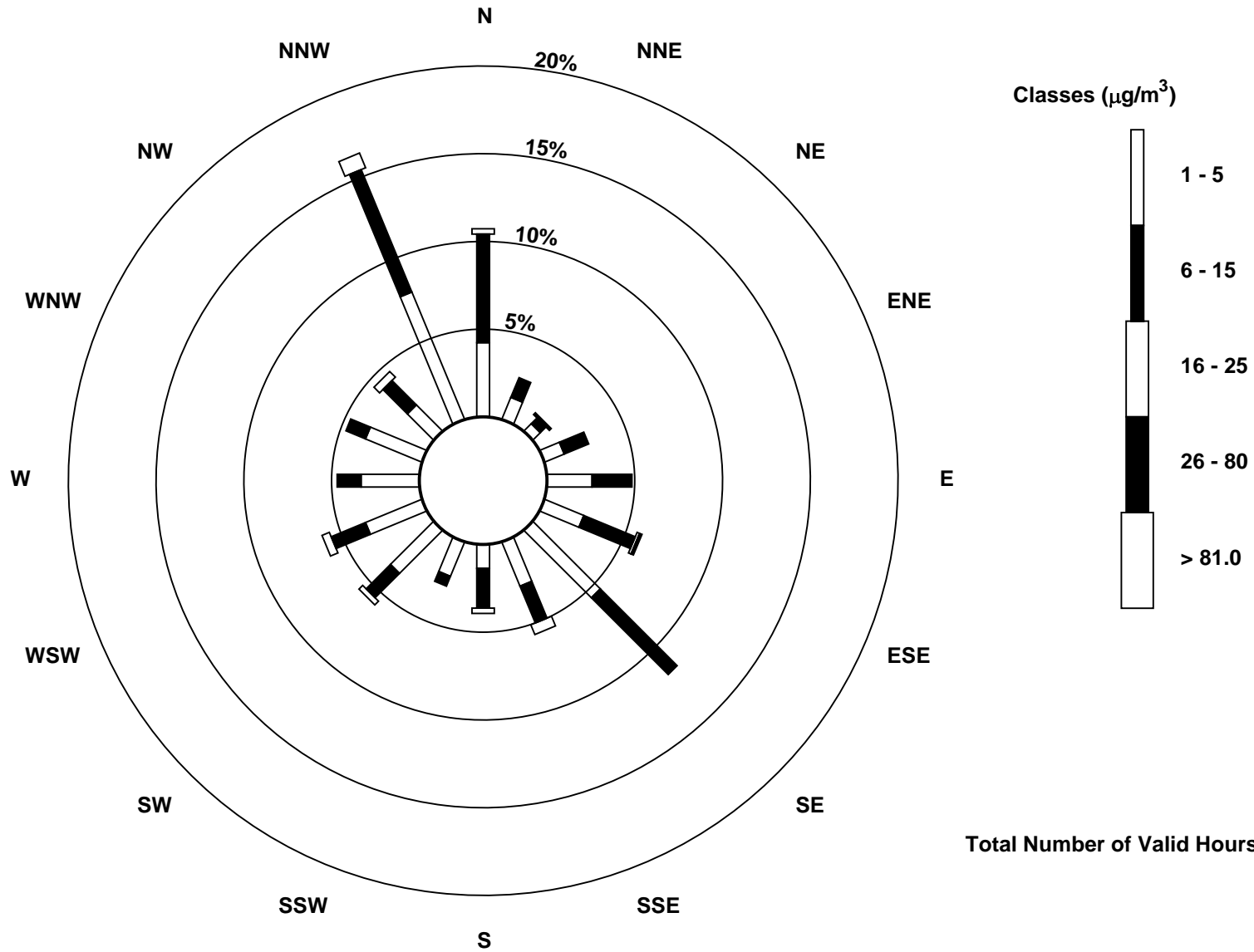
Total Number of Valid Hours: 662

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

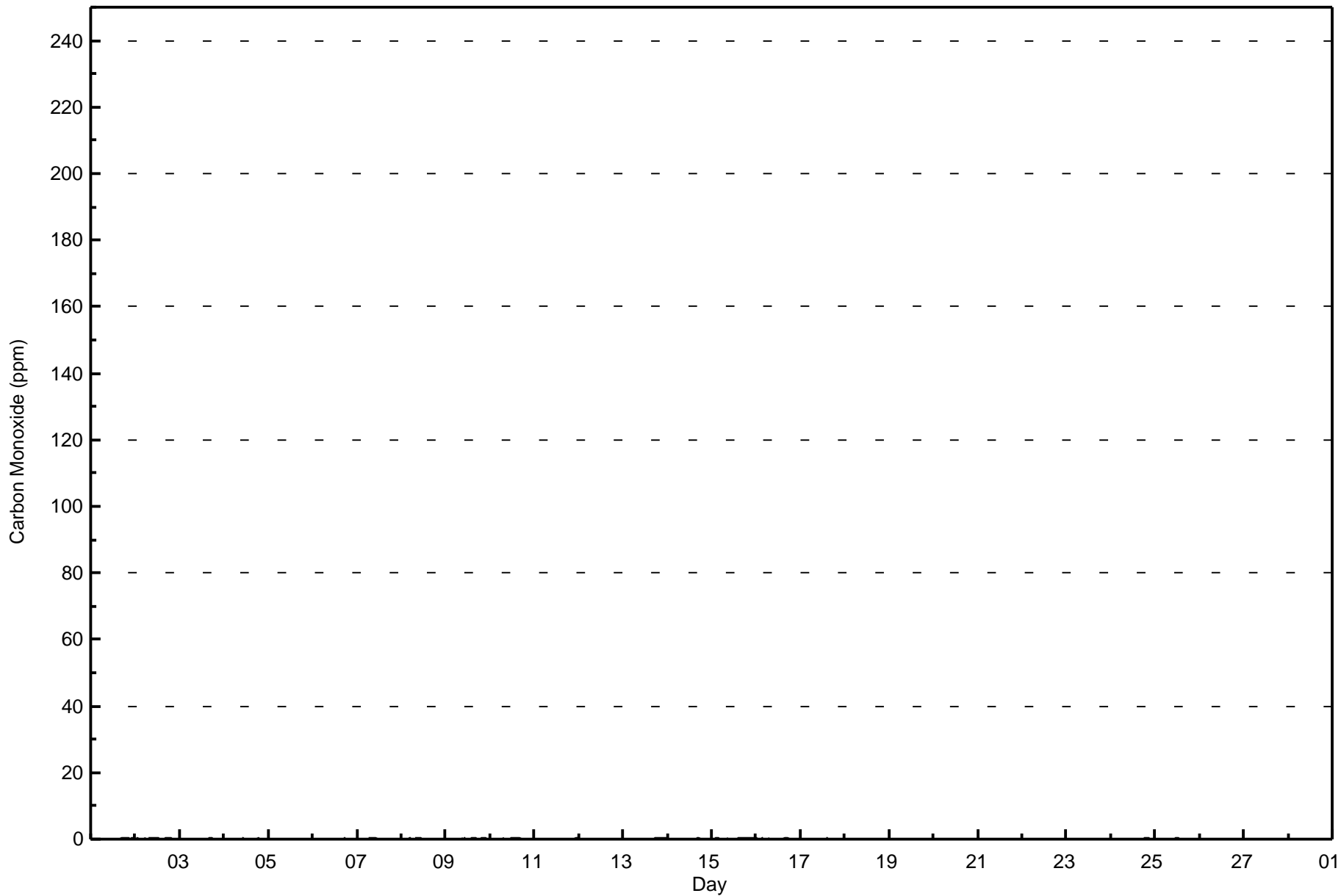
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	630	98.28	98.28
0.4 - 0.5	9	1.40	99.69
0.6 - 0.7	2	0.31	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: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - February 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	71	18	8	18	31	36	69	31	22	19	44	54	46	30	29	103	629
0.4 - 0.5	0	0	0	0	1	2	1	2	3	0	0	0	0	0	0	0	9
0.6 - 0.7	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
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	71	18	8	18	32	38	71	34	25	19	44	54	46	30	29	103	640

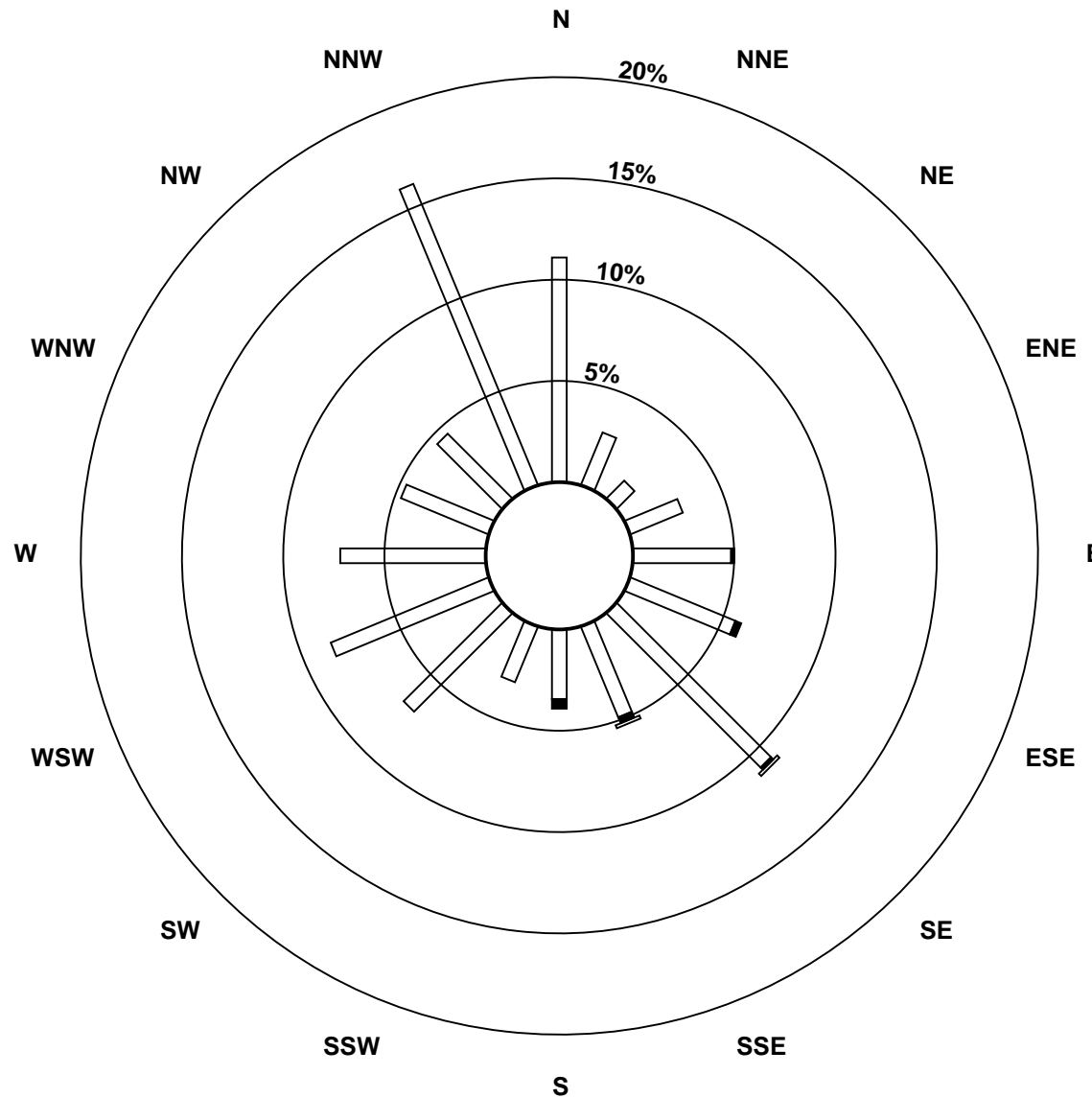
Total Number of Valid Hours: 640

Total Number of Hours: 672

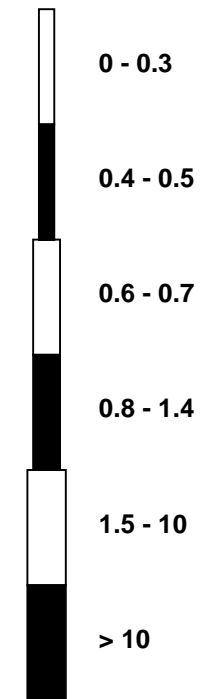


Wood Buffalo Environmental Association
Wind Rose Feb 2017

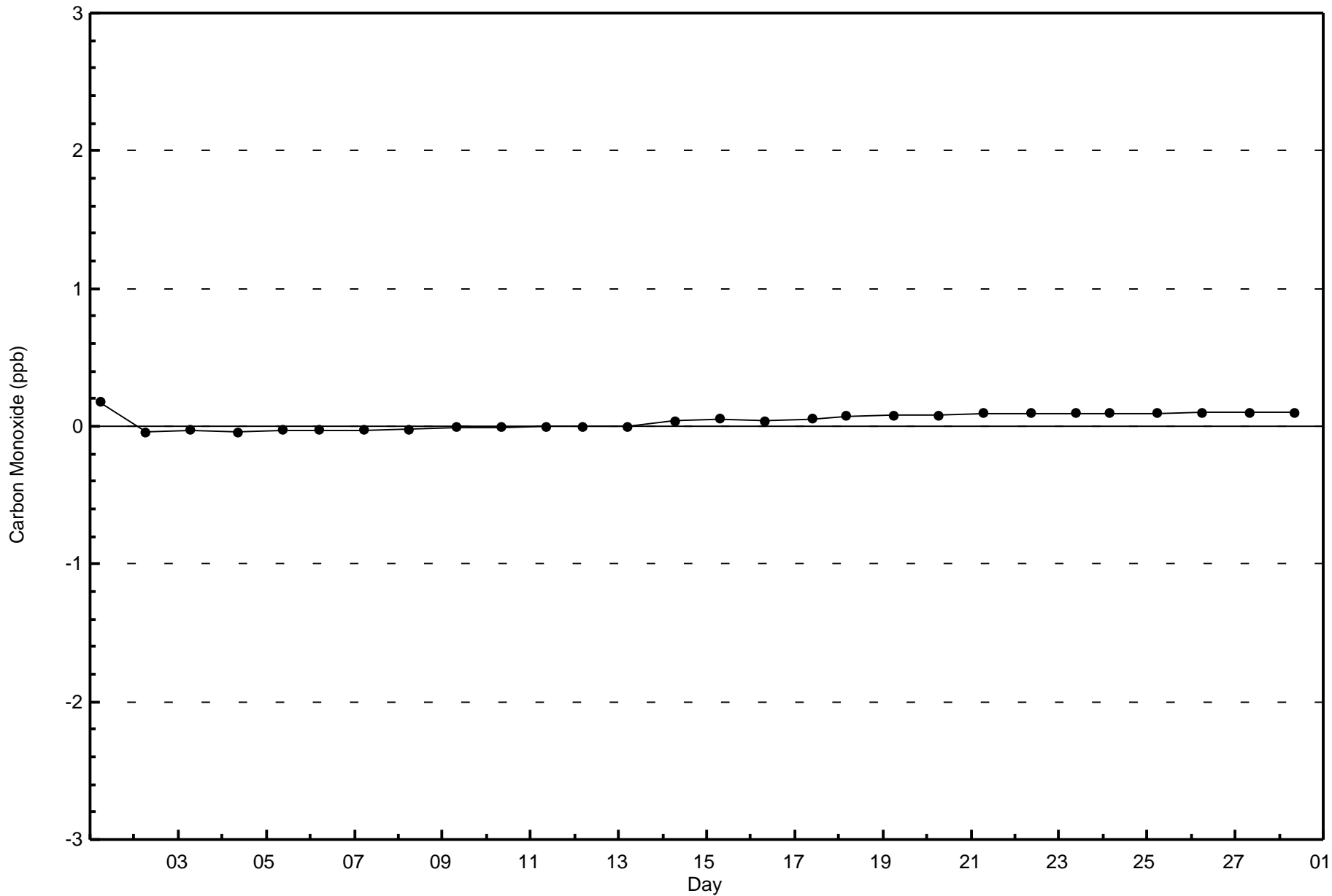
Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)

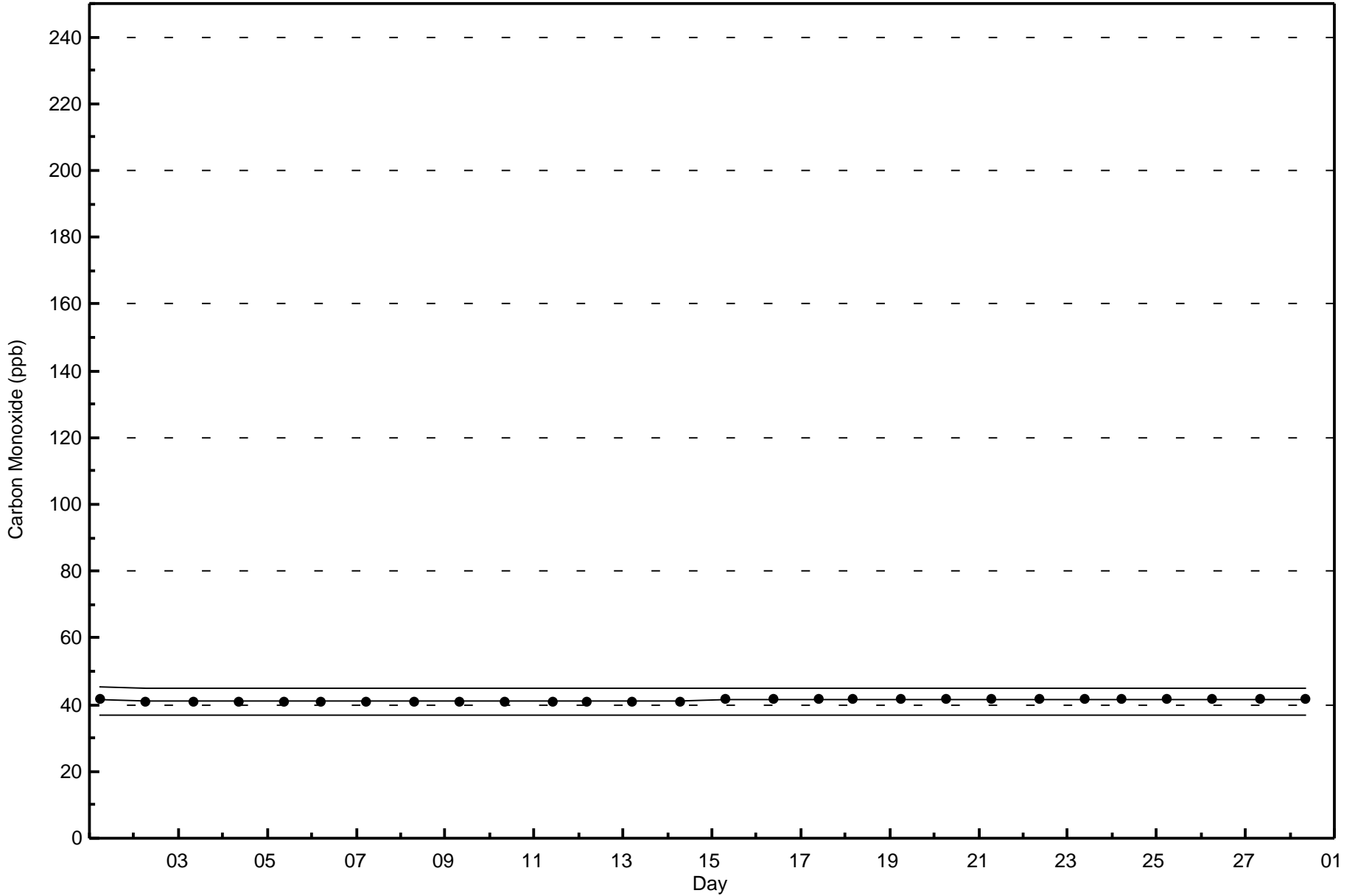


Classes (ppm)



Total Number of Valid Hours: 640



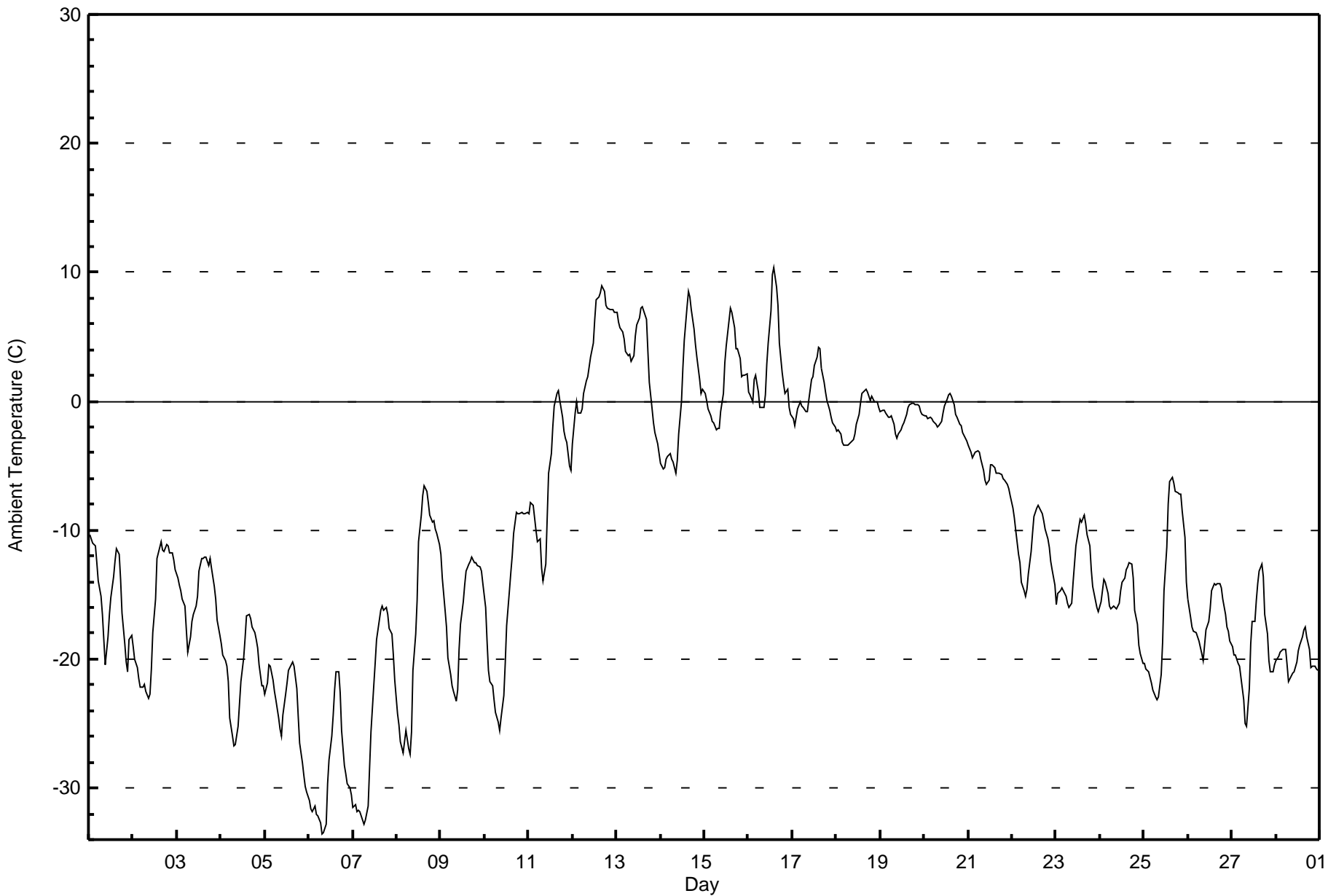




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Athabasca Valley - February 2017

Maximum Value: 10.3 C on Feb 16 15:00 Maximum Daily Average: 4.1 C on Feb 12																								Hours in Service:	672	
Minimum Value: -33.6 C on Feb 6 08:00 Minimum Daily Average: -28.8 C on Feb 6																								Hours of Data:	672	
Maximum Diurnal Average: -6.5 C at hour 16 Minimum Diurnal Average: -14.9 C at hour 9																								Hours of Missing Data:	0	
Monthly Average: -10.91 C Percentiles: P ₁ = -32.3 P ₁₀ = -23.1 Q ₁ = -19.0 Median = -12.2 Q ₃ = -1.4 P ₉₀ = 2.0 P ₉₉ = 8.4																								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-Feb	-10.3	-10.7	-11.0	-11.2	-12.5	-13.9	-15.1	-16.6	-18.5	-20.4	-18.3	-16.6	-15.2	-13.6	-12.4	-11.4	-11.9	-13.9	-16.4	-18.8	-20.2	-21.0	-18.5	-18.1	-15.3	-10.3
2-Feb	-19.0	-20.0	-20.7	-21.5	-22.2	-22.2	-22.0	-22.6	-23.0	-22.7	-20.8	-17.9	-15.4	-12.2	-11.7	-10.9	-11.5	-11.7	-11.1	-11.2	-11.7	-11.7	-12.3	-13.0	-16.6	-10.9
3-Feb	-13.7	-14.2	-14.7	-15.4	-15.9	-17.8	-19.4	-18.3	-17.1	-16.5	-15.8	-15.1	-13.2	-12.2	-12.2	-12.1	-12.1	-12.7	-12.2	-12.9	-14.4	-15.4	-17.0	-18.2	-14.9	-12.1
4-Feb	-18.8	-19.6	-20.2	-20.5	-21.7	-24.5	-26.0	-26.7	-26.6	-25.2	-23.5	-21.8	-18.3	-16.7	-16.5	-16.9	-17.5	-18.0	-18.5	-19.1	-20.4	-22.1	-22.0	-22.0	-20.9	-16.5
5-Feb	-22.7	-21.9	-20.5	-20.6	-21.6	-22.5	-23.2	-24.5	-25.4	-26.0	-24.3	-22.7	-21.8	-20.9	-20.5	-20.2	-20.6	-22.3	-24.5	-26.5	-28.0	-29.0	-29.8	-30.3	-23.8	-20.2
6-Feb	-31.0	-31.6	-31.9	-31.4	-32.0	-32.2	-32.8	-33.6	-33.4	-32.8	-29.7	-27.8	-26.0	-24.3	-22.4	-21.0	-21.0	-22.6	-25.5	-28.2	-28.8	-29.6	-30.0	-30.6	-28.8	-21.0
7-Feb	-31.5	-31.3	-31.8	-31.7	-31.8	-32.5	-32.8	-32.5	-31.4	-28.5	-25.7	-22.1	-20.3	-18.5	-17.0	-16.2	-15.8	-16.2	-16.0	-16.6	-17.7	-18.1	-19.7	-21.7	-24.1	-15.8
8-Feb	-24.3	-25.1	-26.4	-27.2	-26.5	-25.5	-27.0	-27.4	-25.7	-20.9	-18.0	-15.5	-10.9	-8.8	-7.3	-6.6	-7.0	-7.9	-8.9	-9.4	-9.3	-9.9	-10.2	-11.1	-16.5	-6.6
9-Feb	-11.8	-13.7	-16.2	-17.5	-19.9	-21.2	-22.1	-22.5	-23.3	-22.4	-19.2	-17.3	-15.5	-14.3	-13.2	-12.6	-12.4	-12.1	-12.5	-12.5	-12.7	-12.8	-13.2	-14.1	-16.0	-11.8
10-Feb	-16.0	-18.6	-20.9	-21.8	-22.1	-23.1	-24.1	-24.9	-25.6	-24.6	-22.8	-20.4	-17.4	-14.7	-13.3	-12.0	-10.2	-8.7	-8.7	-8.8	-8.6	-8.8	-8.8	-8.6	-16.4	-8.6
11-Feb	-8.7	-7.9	-8.1	-9.0	-10.0	-10.9	-10.6	-12.9	-14.0	-12.6	-9.1	-5.6	-4.1	-2.0	-0.3	0.6	0.9	0.0	-1.3	-2.3	-2.9	-3.2	-5.0	-5.4	-6.0	0.9
12-Feb	-3.3	-0.9	-0.1	-0.9	-0.9	-0.5	0.6	1.6	1.9	2.6	3.4	4.6	6.3	7.8	8.1	8.4	8.9	8.5	7.4	7.2	7.1	7.1	7.1	6.9	4.1	8.9
13-Feb	6.9	6.2	5.7	5.3	4.8	3.8	3.6	3.6	3.1	3.5	5.1	6.0	6.5	7.2	7.3	7.0	6.4	3.9	1.4	-0.6	-1.6	-2.5	-3.3	-4.1	3.5	7.3
14-Feb	-4.9	-5.3	-5.2	-4.5	-4.3	-4.1	-4.5	-4.7	-5.5	-4.7	-2.5	0.0	2.6	4.8	7.4	8.5	8.1	7.1	5.6	4.4	3.4	1.7	0.6	0.9	0.2	8.5
15-Feb	0.6	0.0	-0.6	-1.1	-1.6	-1.7	-2.2	-2.2	-2.1	-0.8	0.6	3.0	4.3	6.3	7.2	6.9	5.7	4.1	4.0	3.3	1.9	2.1	2.1	2.1	1.7	7.2
16-Feb	0.8	0.5	0.0	1.7	2.0	0.7	-0.5	-0.5	-0.5	0.5	2.9	4.5	7.0	9.8	10.3	8.9	7.5	4.5	2.2	1.4	0.7	1.0	-0.4	-1.0	2.7	10.3
17-Feb	-1.3	-1.9	-1.2	-0.6	-0.1	-0.4	-0.4	-0.8	-0.8	0.0	1.7	1.9	2.7	3.4	4.2	4.1	2.6	1.5	0.7	0.0	-0.7	-1.3	-1.7	-2.0	0.4	4.2
18-Feb	-2.3	-2.2	-2.5	-3.2	-3.4	-3.4	-3.4	-3.3	-3.2	-2.9	-2.5	-1.8	-1.0	-0.2	0.6	0.8	0.9	0.7	0.0	0.3	0.2	-0.1	-0.1	-0.5	-1.3	0.9
19-Feb	-0.8	-0.7	-0.7	-1.0	-1.2	-1.2	-1.1	-1.8	-2.5	-2.9	-2.6	-2.2	-1.9	-1.7	-1.1	-0.5	-0.3	-0.2	-0.2	-0.2	-0.3	-0.4	-0.8	-1.0	-1.1	-0.2
20-Feb	-1.1	-1.2	-1.3	-1.3	-1.3	-1.5	-1.8	-2.0	-1.9	-1.5	-0.9	-0.3	0.2	0.5	0.6	0.4	-0.3	-1.0	-1.3	-1.8	-1.9	-2.4	-2.8	-3.1	-1.2	0.6
21-Feb	-3.5	-3.9	-4.4	-4.2	-4.0	-3.9	-4.0	-4.5	-5.4	-6.2	-6.5	-6.1	-5.0	-4.9	-5.2	-5.5	-5.5	-5.5	-5.7	-6.0	-6.2	-6.4	-6.8	-7.3	-5.3	-3.5
22-Feb	-8.3	-9.0	-10.1	-11.9	-12.6	-14.0	-14.7	-15.2	-14.6	-13.4	-11.7	-10.2	-8.9	-8.3	-8.1	-8.3	-8.8	-9.3	-9.9	-10.6	-11.4	-12.4	-13.1	-14.3	-11.2	-8.1
23-Feb	-15.7	-14.9	-14.6	-14.5	-14.6	-15.1	-15.7	-16.0	-15.7	-14.0	-12.6	-11.2	-9.9	-9.2	-9.4	-8.9	-9.5	-10.3	-11.2	-13.1	-14.4	-15.5	-16.0	-16.3	-13.3	-8.9
24-Feb	-15.5	-14.7	-13.8	-14.0	-14.9	-15.8	-16.1	-15.9	-16.0	-16.1	-15.6	-14.7	-14.1	-13.7	-13.1	-12.9	-12.5	-12.7	-13.7	-16.2	-17.3	-18.9	-19.6	-20.3	-15.3	-12.5
25-Feb	-20.4	-20.8	-21.0	-21.4	-21.8	-22.4	-22.9	-23.2	-22.9	-21.2	-18.7	-14.7	-11.3	-8.0	-6.3	-5.9	-6.3	-7.0	-7.1	-7.2	-7.2	-8.5	-10.5	-14.1	-14.6	-5.9
26-Feb	-15.3	-16.7	-17.5	-17.9	-18.0	-18.2	-18.6	-19.6	-20.1	-19.0	-17.8	-17.1	-16.1	-14.7	-14.1	-14.3	-14.2	-14.2	-14.5	-15.4	-16.5	-17.6	-17.9	-18.6	-16.8	-14.1
27-Feb	-19.0	-19.6	-19.7	-20.4	-20.6	-21.4	-23.2	-25.0	-25.2	-22.3	-18.8	-17.1	-17.1	-15.4	-14.2	-13.2	-12.6	-13.6	-16.5	-18.1	-20.1	-21.0	-21.0	-20.5	-19.0	-12.6
28-Feb	-20.1	-19.8	-19.5	-19.4	-19.2	-19.2	-20.5	-21.8	-21.3	-21.1	-21.0	-20.2	-19.4	-18.9	-18.3	-17.7	-17.6	-18.3	-19.3	-20.6	-20.5	-20.6	-20.8	-20.9	-19.8	-17.6
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Athabasca Valley - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	148	22.02	22.02
-20 - 0	416	61.90	83.93
0 - 10	107	15.92	99.85
10 - 20	1	0.15	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Summary of Hour Averages

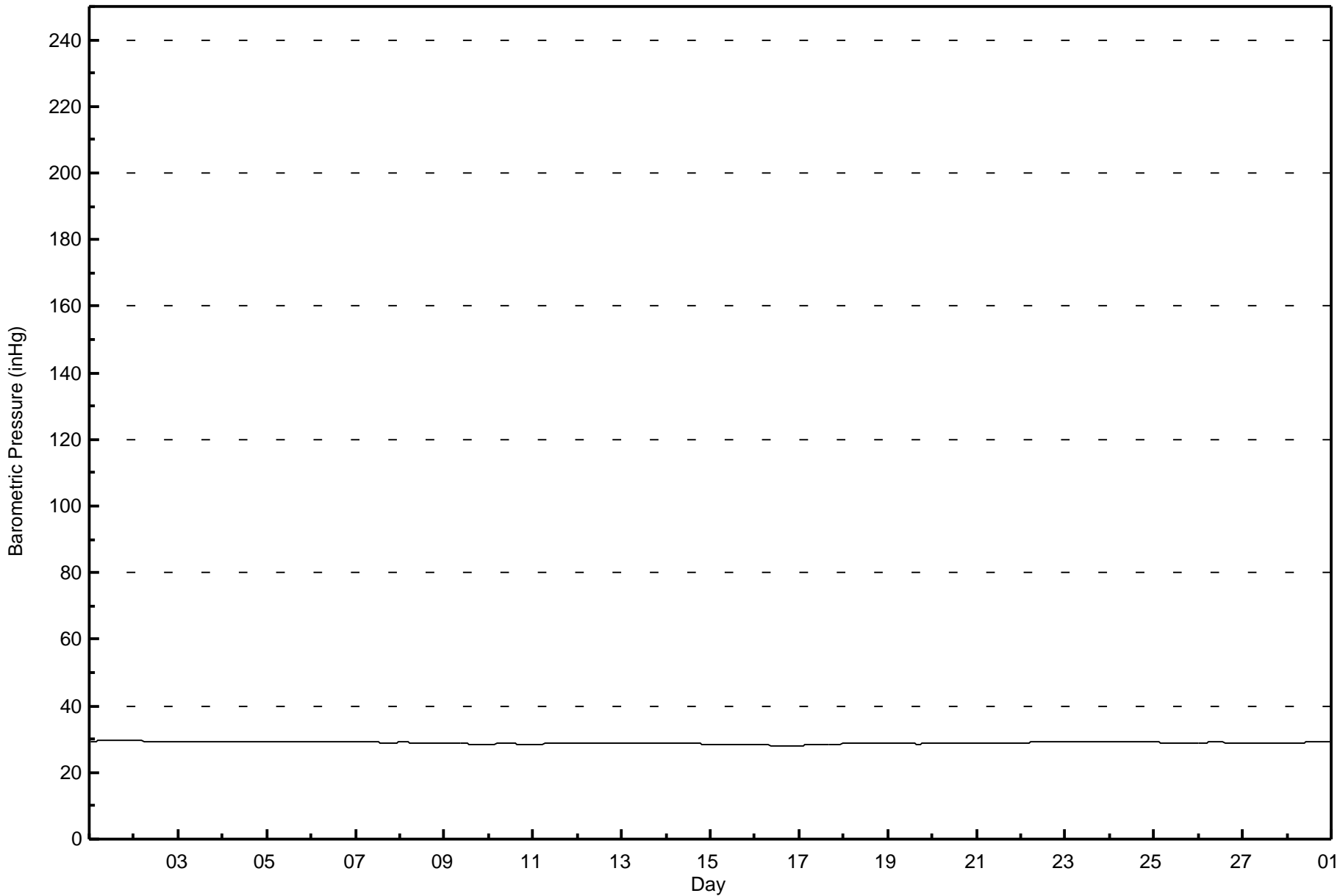
Barometric Pressure (BP) - inHg
Athabasca Valley - February 2017

Maximum Value: 29.6 inHg on Feb 1 13:00 Maximum Daily Average: 29.5 inHg on Feb 1																					Hours in Service: 672						
Minimum Value: 27.9 inHg on Feb 16 16:00 Minimum Daily Average: 28.1 inHg on Feb 16																					Hours of Data: 672						
Maximum Diurnal Average: 28.9 inHg at hour 10 Minimum Diurnal Average: 28.9 inHg at hour 16																					Hours of Missing Data: 0						
Monthly Average: 28.89 inHg Percentiles: P ₁ = 28.1 P ₁₀ = 28.5 Q ₁ = 28.7 Median = 28.9 O ₃ = 29.2 P ₉₀ = 29.3 P ₉₉ = 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-Feb	29.4	29.4	29.4	29.4	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	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.6
2-Feb	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.5
3-Feb	29.3	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	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3
4-Feb	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2
5-Feb	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	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
6-Feb	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	29.2	29.2	29.2	29.2
7-Feb	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.2
8-Feb	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	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	29.0
9-Feb	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.7
10-Feb	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6
11-Feb	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
12-Feb	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	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.8
13-Feb	28.7	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
14-Feb	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	29.0
15-Feb	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.5
16-Feb	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.0	28.0	27.9	28.0	28.0	28.0	28.0	28.1	28.1	28.1	28.1	28.1	28.1	28.3
17-Feb	28.1	28.1	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6
18-Feb	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	28.7	28.7	28.7	28.8	28.8	28.8	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8
19-Feb	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.8
20-Feb	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8
21-Feb	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	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
22-Feb	28.9	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	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
23-Feb	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	29.2	29.2	29.2	29.2
24-Feb	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	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	29.1	29.1	29.1	29.4
25-Feb	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.9	29.1
26-Feb	28.9	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.1
27-Feb	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
28-Feb	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2
	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	Diurnal Average
	29.5	29.5	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	29.6	29.6	29.6	29.6	29.6	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Athabasca Valley - February 2017





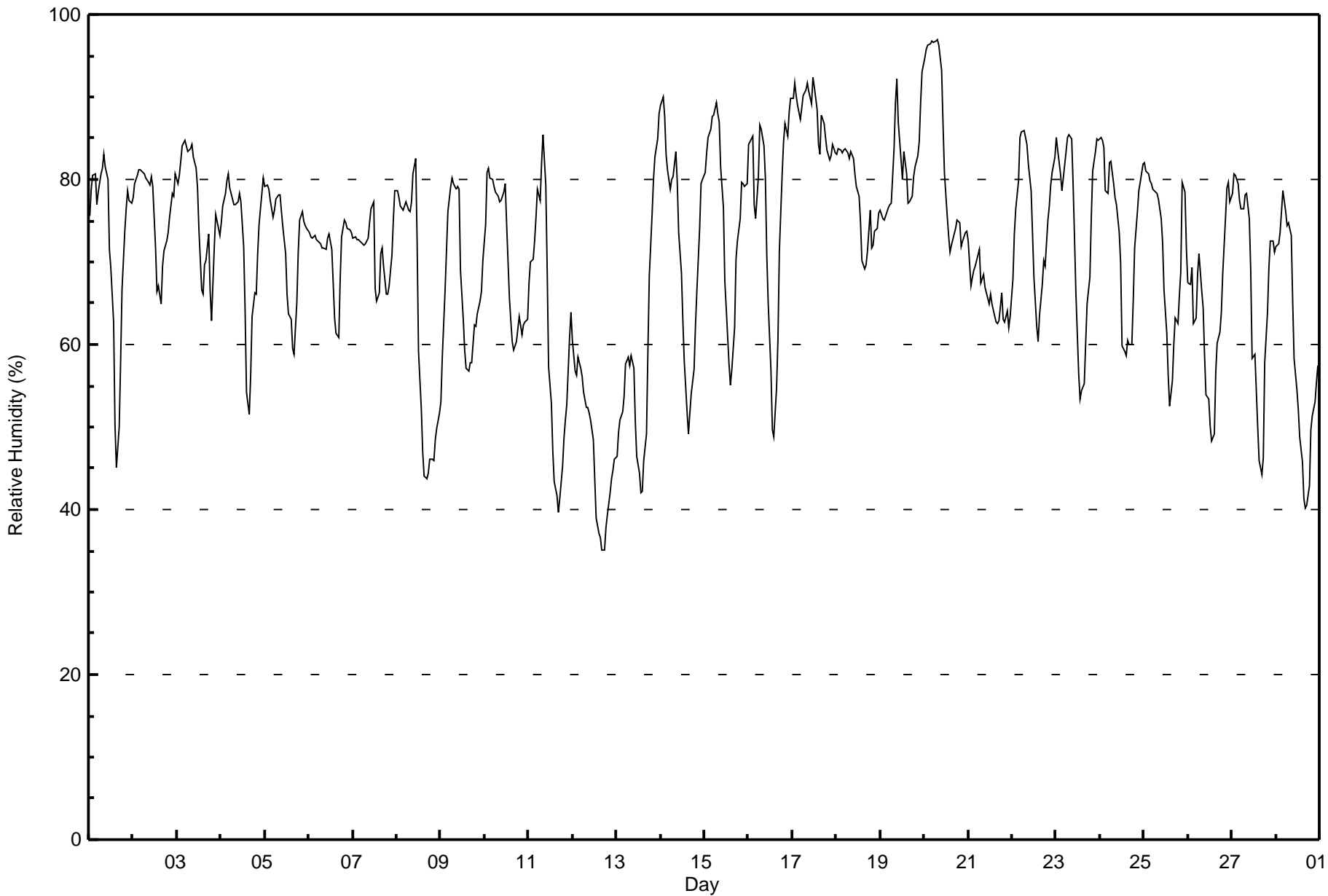
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Athabasca Valley - February 2017

Maximum Value: 97 % on Feb 20 08:00																			Maximum Daily Average: 87.7 % on Feb 17						Hours in Service: 672																			
Minimum Value: 35 % on Feb 12 18:00																			Minimum Daily Average: 47.3 % on Feb 12						Hours of Data: 672																			
Maximum Diurnal Average: 78.6 % at hour 9																			Minimum Diurnal Average: 57.6 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 71.0 %																			Percentiles: P ₁ = 39 P ₁₀ = 52 Q ₁ = 63 Median = 74 Q ₃ = 80 P ₉₀ = 85 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-Feb	76	79	81	81	77	78	81	81	83	82	80	72	69	63	50	45	50	58	67	74	76	79	77	77	72.3	83																		
2-Feb	78	80	80	81	81	81	81	80	80	79	80	79	72	66	67	65	69	71	73	74	75	78	78	81	76.2	81																		
3-Feb	80	81	82	84	85	84	83	84	84	83	81	79	74	67	66	70	73	67	63	72	76	75	73	76.4	85																			
4-Feb	75	77	78	80	81	79	78	77	77	77	78	77	72	64	54	52	56	63	66	66	71	75	78	80	72.1	81																		
5-Feb	79	79	79	77	75	76	78	78	78	76	74	71	66	64	63	60	59	65	71	75	76	75	74	74	72.7	79																		
6-Feb	73	73	73	73	73	73	72	72	72	72	73	73	71	67	63	61	61	68	73	75	75	74	74	74	71.2	75																		
7-Feb	73	73	73	73	73	72	72	72	73	75	76	77	67	65	66	71	72	69	66	66	67	71	75	79	71.5	79																		
8-Feb	79	78	77	76	77	77	76	76	77	81	83	72	59	52	47	44	44	44	46	46	46	49	50	52	62.8	83																		
9-Feb	53	59	67	71	76	79	80	79	79	79	79	69	63	59	57	57	58	58	62	62	64	65	66	70	67.2	80																		
10-Feb	75	81	81	80	80	79	78	78	77	77	79	79	75	66	63	60	59	60	62	63	61	62	63	63	71.0	81																		
11-Feb	68	70	70	73	75	79	77	82	85	79	69	57	53	47	43	42	40	41	45	49	51	53	61	64	61.4	85																		
12-Feb	60	57	56	59	57	56	54	52	52	52	51	48	44	39	37	37	35	35	38	39	42	44	45	46	47.3	60																		
13-Feb	46	49	51	52	54	58	58	58	59	57	51	46	44	42	42	46	49	59	68	76	80	83	85	88	58.4	88																		
14-Feb	89	90	88	83	81	79	80	80	83	80	74	69	63	58	52	49	52	54	57	62	67	74	80	80	71.8	90																		
15-Feb	81	83	85	86	88	88	89	88	87	81	77	68	64	58	55	57	62	70	73	75	80	80	79	79	76.4	89																		
16-Feb	84	85	85	77	75	80	87	86	84	80	71	65	57	50	49	55	61	71	81	85	87	85	88	90	75.7	90																		
17-Feb	90	92	90	89	87	89	90	91	92	91	89	92	91	89	84	83	88	87	85	84	82	83	84	83	87.7	92																		
18-Feb	83	84	83	83	84	84	83	83	83	83	81	79	78	75	70	69	70	71	76	72	72	74	74	76	77.9	84																		
19-Feb	76	75	75	76	77	77	77	84	89	92	87	82	80	83	81	77	77	78	80	82	83	85	89	93	81.5	93																		
20-Feb	95	96	96	96	97	97	97	97	96	93	87	81	76	73	71	72	73	74	75	75	72	72	74	74	83.7	97																		
21-Feb	73	67	68	69	70	71	72	67	68	67	66	65	66	65	63	63	63	63	66	63	63	64	62	63	66.1	73																		
22-Feb	68	73	76	80	85	86	86	85	84	82	79	73	68	62	60	64	67	70	69	75	77	79	81	83	75.6	86																		
23-Feb	85	84	81	79	80	83	85	85	85	80	73	66	56	53	54	55	60	65	68	75	81	83	85	85	74.5	85																		
24-Feb	85	85	84	79	78	82	82	80	78	77	74	70	60	59	59	60	60	60	65	72	76	79	80	82	73.5	85																		
25-Feb	82	81	81	80	79	79	79	78	78	75	72	67	61	56	52	56	60	63	62	66	69	80	79	72	71.1	82																		
26-Feb	67	67	69	63	63	68	71	66	64	59	54	53	50	48	49	57	60	62	64	69	75	79	80	77	64.0	80																		
27-Feb	78	81	81	79	77	76	76	78	78	75	69	58	59	54	50	46	44	46	58	64	69	73	73	71	67.3	81																		
28-Feb	72	72	74	76	79	76	74	75	73	65	58	55	52	49	46	41	40	40	43	50	51	53	55	57	59.5	79																		
																			75.8	76.7	77.3	76.9	77.3	78.1	78.5	78.3	78.6	76.7	73.7	69.5	64.7	60.5	57.7	57.6	59.3	62.2	65.3	67.7	70.0	72.3	73.7	74.5	Diurnal Average	
																			95	96	96	96	97	97	97	97	96	93	89	92	91	89	84	83	88	87	85	85	87	85	89	93	Diurnal Maximum	





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Athabasca Valley - February 2017

Maximum Speed: 27 km/h on Feb 13 01:00	Maximum Daily Speed Average: 17.5 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 2 15:00	Minimum Daily Speed Average: 0.8 km/h on Feb 23	Hours of Data: 671
Maximum Diurnal Speed Average: 2.8 km/h at hour 16	Minimum Diurnal Speed Average: 0.6 km/h at hour 11	Hours of Missing Data: 1
Monthly Average Velocity: 2.0 km/h 290.2 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 11 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-Feb	NNW13	NNW12	NNW10	NNW13	N12	NNW7	NNE6	NW2	W3	WSW5	WSW4	NNW4	N3	NNE2	NNW4	W2	S3	S2	NNW1	ESE0	SSE2	NE1	ESE3	ESE4	NNW3.1	NNW13
2-Feb	ESE5	SSE3	SE2	SE4	SE4	SE4	SE7	SE6	SE4	ESE3	E3	E3	NNE2	W0	SW0	E2	S1	SSW1	S3	SE1	NNW7	NNW8	NNW9	NNW14	E1.2	NNW14
3-Feb	NNW14	NNW9	NNW5	WNW3	WSW3	WSW3	WSW5	SW4	SSW5	SW6	SW4	WSW2	SW4	NE2	ENE4	SE4	ESE4	WNW4	NNW15	NNW20	NNW12	NNW14	NNW16	NNW13	NW4.7	NNW20
4-Feb	N9	NNW9	N7	N6	NNW7	W4	W3	W5	WSW3	ESE1	E3	ENE2	E7	ENE4	SSW2	SW6	SE3	SE6	SE9	SE9	SE7	ESE4	NNE4	N5	NE1.1	SE9
5-Feb	NNW5	NW4	NNW11	NNW14	NNW15	N9	N7	NNW6	WNW3	WSW5	WNW2	NNW6	N7	NNE6	N8	N7	NNE3	WSW3	S2	ENE2	ENE1	SW0	E2	ENE2	NNW4.4	NNW15
6-Feb	ESE0	SSW1	S3	SSE5	SSE5	SSE5	E2	E1	ESE3	ESE2	SE8	SE7	E2	N2	NNW3	NW3	NNW3	WSW3	W5	WSW6	SW1	SW2	SSW1	SW2	S1.3	SE8
7-Feb	SW1	SW2	S1	SSW3	SSW5	S2	SW1	S1	S2	ESE5	E5	SSW8	SSW11	SW14	SW12	SW9	SW7	W9	W18	W15	NNW4	AF	WSW2	WSW4	SW4.6	W18
8-Feb	SW3	S1	SSE2	S3	SE4	SE5	SE5	SE5	SE5	S4	E4	E5	SW7	SSW10	SW13	SW18	SW16	SW9	SW7	SW11	WSW20	WSW18	WSW20	SW9	SW6.9	WSW20
9-Feb	SSW6	SSE4	SE5	SSW1	SW2	SSE2	S2	SSE1	SSE1	ENE1	SSE7	ESE2	NE2	N3	N3	N2	NNW5	NNW6	N5	NNW7	NNW6	NNW7	N5	NNW4	N1.1	NNW7
10-Feb	N3	NNW3	NNW4	NNW3	NW2	NW2	WSW2	WSW1	WSW2	WSW4	W4	NW3	NNW4	N4	N3	N2	SE7	SE12	SE13	SE15	SE14	SSE9	SE10	SE9	SE2.2	SE15
11-Feb	S2	SSW4	S5	SW6	SW6	SW9	WSW8	W2	WSW3	WSW8	WSW8	SSW5	SSW8	SSW7	SW10	WSW19	WSW20	WSW16	WSW11	SW14	SW15	SW8	SSE3	SE5	SW7.6	WSW20
12-Feb	SSE3	SW14	SW19	SW11	WSW17	WSW20	WSW21	WSW24	WSW23	SW20	WSW18	WSW18	WSW16	W17	W23	WSW17	WSW10	WSW15	WSW9	WSW17	W22	W27	W27	W23	WSW17.5	W27
13-Feb	W27	W20	W19	W24	WSW21	WSW24	W24	W25	W26	W25	W21	NNW16	NNW14	NNW10	N6	NNW6	NNW2	S0	SW2	NW3	N2	ENE2	ENE1	NW1	W11.5	W27
14-Feb	SW1	S2	S4	SSE6	SSE8	SE12	SE7	SE8	SSE7	SSE9	SE13	SE16	SE15	SE13	SE12	SE15	SSE10	SSE11	SE14	SE9	SE8	E6	ESE6	SE10	SE9.0	SE16
15-Feb	SE12	SE12	SSE9	SSE8	SSE6	SE5	SE5	SSE6	SE5	SE6	SE7	SE9	E5	ESE4	ESE2	NNW1	W3	SW3	SSE5	SSE4	ESE5	S2	S2	S3	SE4.8	SE12
16-Feb	E2	NE1	SSE3	S2	SSW4	S3	SSW4	S2	SE5	E4	ENE4	N4	N1	N2	N3	NW2	WSW2	W3	SW2	WSW4	W5	W4	WSW6	WSW3	SW0.9	WSW6
17-Feb	SW3	WNW3	SW4	SSE1	SE2	NW3	WNW3	SSE0	W2	NW4	NNW11	NW7	N4	ENE2	ESE3	NNW9	N11	NNW12	NNW12	NNW12	NNW14	NNW12	NNW11	NNW10	NNW5.2	NNW14
18-Feb	NNW7	NW9	NNW9	NNW10	NNW7	N4	N5	NNE3	NNW3	NNW5	NNW4	N3	NNW2	N2	E6	E5	ESE2	SE3	ENE2	E5	E5	E5	ESE6	ESE5	NNE2.7	NNW10
19-Feb	E6	E7	ESE9	ESE11	ESE12	ESE12	ESE12	E11	E11	ENE8	E12	E12	ESE10	E8	ESE9	SE12	ESE10	ESE7	SE6	SE4	SSE4	SE3	E2	N3	ESE7.9	SE12
20-Feb	N4	N6	NNW8	NNW8	NNW7	NNW7	NNW4	NNW2	WSW2	WNW6	NW7	NNW11	WNW9	NNW12	W16	W17	W20	W17	NNW12	WNW10	WNW14	WNW16	WNW14	W19	WNW9.4	W20
21-Feb	WNW22	W18	W14	WSW12	WSW12	WSW12	W16	WNW19	NW18	NNW18	NNW14	N9	NNW14	W20	W21	NW17	NW15	WNW15	WNW11	NW13	NW14	WNW13	W16	WSW10	WNW13.5	WNW22
22-Feb	WSW9	W13	WSW8	NNW5	NNW6	W1	WSW3	WSW4	WSW4	W1	N4	NNW7	N8	N11	N10	N8	NNW10	N10	NNW11	NNW9	N7	N8	N8	N6	NNW5.5	W13
23-Feb	NNE2	N4	N5	N4	N4	ESE0	WNW1	W2	E2	SE5	E5	ENE5	SE7	SE2	WSW5	NNW2	NNE4	NNE2	NNW2	NW2	NE1	WSW3	WNW3	W3	NNE0.8	SE7
24-Feb	WNW3	NW4	NNW14	NNW16	NNW13	NNW6	NNW5	NNW9	N9	NNW9	NNW9	N7	N11	N8	N7	NNE4	E2	SSE3	SE5	S1	SSE3	ESE2	SE2	SSE3	N4.8	NNW16
25-Feb	SSE5	SSE6	SE7	SE11	SE12	SE14	SE16	SE15	SE15	SE12	SE11	SE10	SE8	NNE4	NNW9	N9	N10	NNW7	W4	SSW5	ESE2	NNE13	N20	N21	ESE4.1	N21
26-Feb	N16	NNW17	NNW17	NNW17	NW16	NW16	NW12	WNW12	NNW6	N6	NNW5	N8	N8	ENE3	ESE3	ENE5	E4	SE6	SE8	ESE6	NE4	E4	SE5	SE7	N5.0	NNW17
27-Feb	ESE4	E3	NNE4	N8	N8	NNE6	NE4	NNW3	NNE2	NNE5	ENE2	W2	NW4	WNW4	NW5	NW4	WNW3	NW3	NNW4	NW2	SW0	NE1	SW1	WNW2	N2.4	N8
28-Feb	NNE1	SSE3	ESE3	SW0	N5	NNW16	NNW12	NNW11	NNW11	NNW12	NNW12	NNW13	NNW12	NNW12	NNW10	NNW12	N10	N9	NNW6	NNW6	N8	N8	N8	N7	NNW8.0	NNW16
NNW2.4 NNW2.7 NNW2.3 NNW2.4 NNW2.1 W1.8 W1.9 W2.3 WSW1.6 W1.5 NW0.6 NNW1.1 NNW1.4 NW1.9 NNW2.5 NNW2.8 NNW2.1 W2.3 W1.8 W2.5 NNW2.1 NW2.8 NW2.8 NW2.2 W27 W20 W19 W24 WSW21 WSW24 W24 W25 W26 W25 W21 WSW18 WSW16 W20 W23 WSW19 WSW20 W17 W18 NNW20 W22 W27 W27 W23																								Diurnal Average		
NNW2.4 NNW2.7 NNW2.3 NNW2.4 NNW2.1 W1.8 W1.9 W2.3 WSW1.6 W1.5 NW0.6 NNW1.1 NNW1.4 NW1.9 NNW2.5 NNW2.8 NNW2.1 W2.3 W1.8 W2.5 NNW2.1 NW2.8 NW2.8 NW2.2 W27 W20 W19 W24 WSW21 WSW24 W24 W25 W26 W25 W21 WSW18 WSW16 W20 W23 WSW19 WSW20 W17 W18 NNW20 W22 W27 W27 W23																								Diurnal Maximum		

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



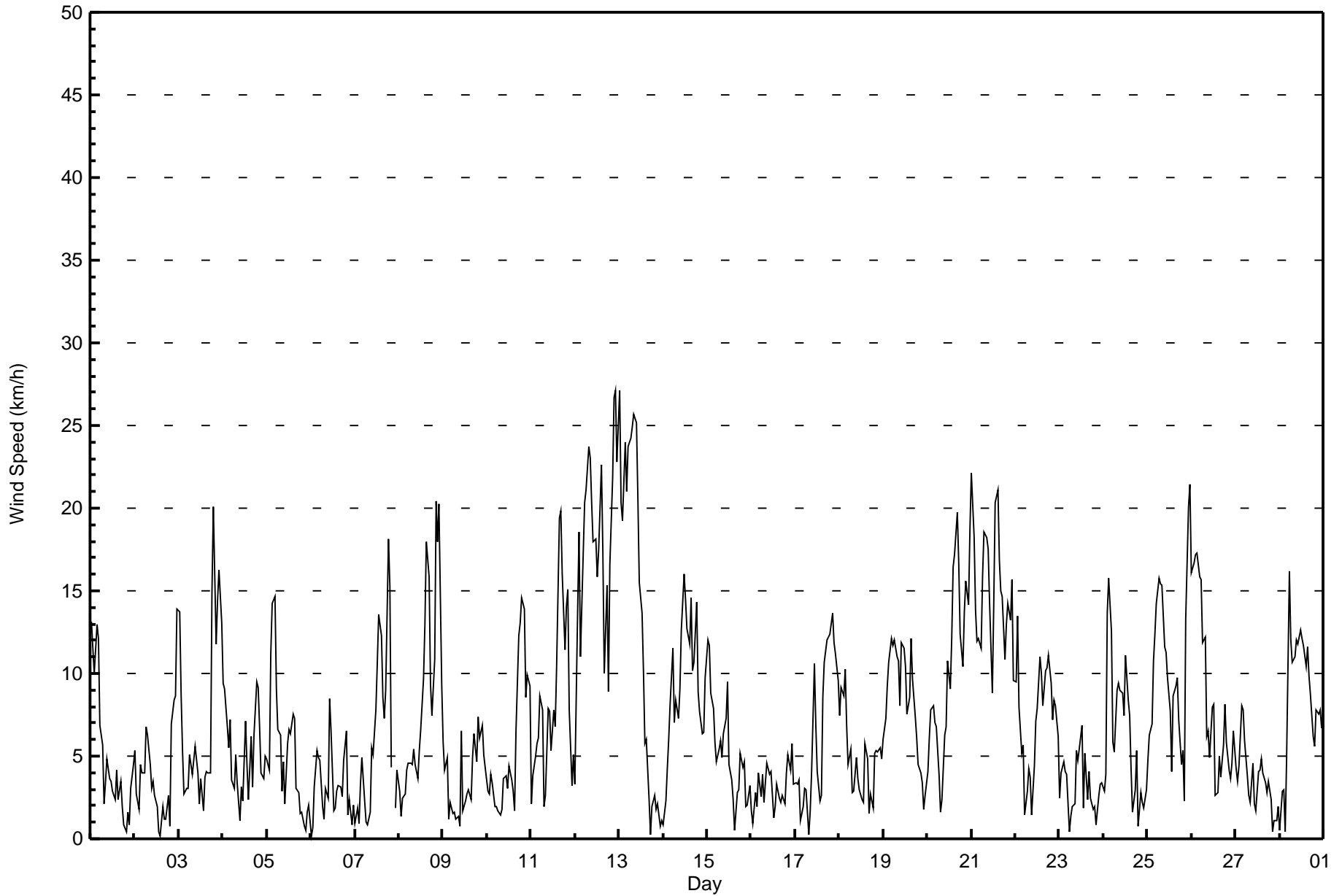
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Athabasca Valley - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 12 14:00	Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 0 km/h on Feb 3 04:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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-Feb	3	3	2	3	4	2	1	1	2	1	1	1	1	1	1	1	2	1	1	2	1	1	2	2	4
2-Feb	1	1	1	1	1	2	2	2	1	1	2	1	2	1	1	2	2	1	1	1	3	2	2	3	3
3-Feb	2	2	1	0	1	2	1	2	3	3	2	1	1	1	2	2	1	2	5	4	4	5	3	3	5
4-Feb	3	2	2	1	1	1	1	1	1	2	1	3	2	1	2	1	1	2	2	3	2	2	2	1	3
5-Feb	2	2	3	3	3	4	2	1	1	1	1	2	1	1	2	2	2	2	2	2	1	1	1	2	4
6-Feb	2	1	2	2	3	2	1	2	2	3	2	2	1	1	1	1	1	1	1	1	2	2	2	1	3
7-Feb	1	1	1	2	2	1	1	1	1	1	2	2	3	2	3	2	2	3	3	4	1	AF	2	2	4
8-Feb	2	1	1	2	2	2	1	1	2	3	2	2	3	2	3	5	4	4	2	4	4	3	3	4	5
9-Feb	3	1	2	2	2	1	2	2	2	1	3	2	1	1	1	2	1	3	3	2	2	2	3	2	3
10-Feb	2	1	2	1	1	1	1	1	2	2	1	1	1	1	1	1	6	3	3	3	4	2	2	2	6
11-Feb	2	2	3	4	2	2	3	1	2	3	2	1	2	2	4	7	5	3	2	2	3	5	2	2	7
12-Feb	3	5	6	2	5	3	4	4	4	4	3	4	4	7	6	6	3	4	4	5	5	6	6	5	7
13-Feb	6	4	4	5	4	4	4	4	4	3	4	3	4	3	1	2	1	1	2	2	1	1	1	1	6
14-Feb	1	1	1	3	2	3	2	2	4	4	3	3	2	2	3	3	2	3	3	3	3	2	2	3	4
15-Feb	2	2	2	3	2	2	2	2	2	2	2	3	1	2	2	1	2	2	2	2	1	2	2	1	3
16-Feb	1	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	1	2	2	2	1	1	2	2	2
17-Feb	2	3	4	2	2	1	1	2	1	2	3	2	1	1	1	5	2	2	2	2	2	3	2	2	5
18-Feb	2	2	3	2	3	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	1	2	2	3
19-Feb	1	2	3	3	3	3	3	3	2	2	3	4	3	3	2	3	3	2	2	2	1	2	2	1	4
20-Feb	2	2	2	2	1	1	1	1	1	2	2	3	3	3	4	3	4	3	4	2	4	4	3	5	5
21-Feb	6	5	4	3	3	3	5	4	3	2	3	2	4	4	4	3	3	4	2	2	2	3	3	2	6
22-Feb	2	3	3	3	4	1	2	1	1	1	1	2	3	3	2	2	2	3	3	2	1	2	2	2	4
23-Feb	1	2	1	1	2	1	1	1	2	1	2	2	2	2	2	1	2	1	1	1	1	1	1	1	2
24-Feb	1	2	4	3	2	2	2	3	2	2	2	4	3	2	2	2	1	2	2	1	1	1	1	1	4
25-Feb	2	2	2	2	3	2	3	3	3	3	2	2	2	2	2	3	3	2	3	3	2	5	6	6	6
26-Feb	5	5	4	4	3	4	3	2	2	2	1	3	3	2	2	2	2	2	1	2	1	1	3	2	5
27-Feb	1	2	2	1	1	1	2	1	2	2	1	1	1	0	1	1	1	1	0	1	1	1	1	1	2
28-Feb	1	2	2	1	3	3	3	2	3	2	2	2	2	3	2	2	2	2	2	1	2	2	1	2	3
	6	5	6	5	5	4	5	4	4	4	4	4	4	7	6	7	6	4	5	5	5	6	6	6	
Diurnal Maximum																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	335	49.93	49.93
6 - 11	189	28.17	78.09
12 - 19	117	17.44	95.53
20 - 28	30	4.47	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - February 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	30	14	8	17	23	26	28	23	26	13	22	27	17	14	18	29	335
6 - 11	38	3	0	1	7	10	28	14	0	6	14	12	1	5	3	47	189
12 - 19	2	1	0	0	2	3	21	0	0	0	8	14	12	11	10	33	117
20 - 28	2	0	0	0	0	0	0	0	0	0	1	9	16	1	0	1	30
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	72	18	8	18	32	39	77	37	26	19	45	62	46	31	31	110	671

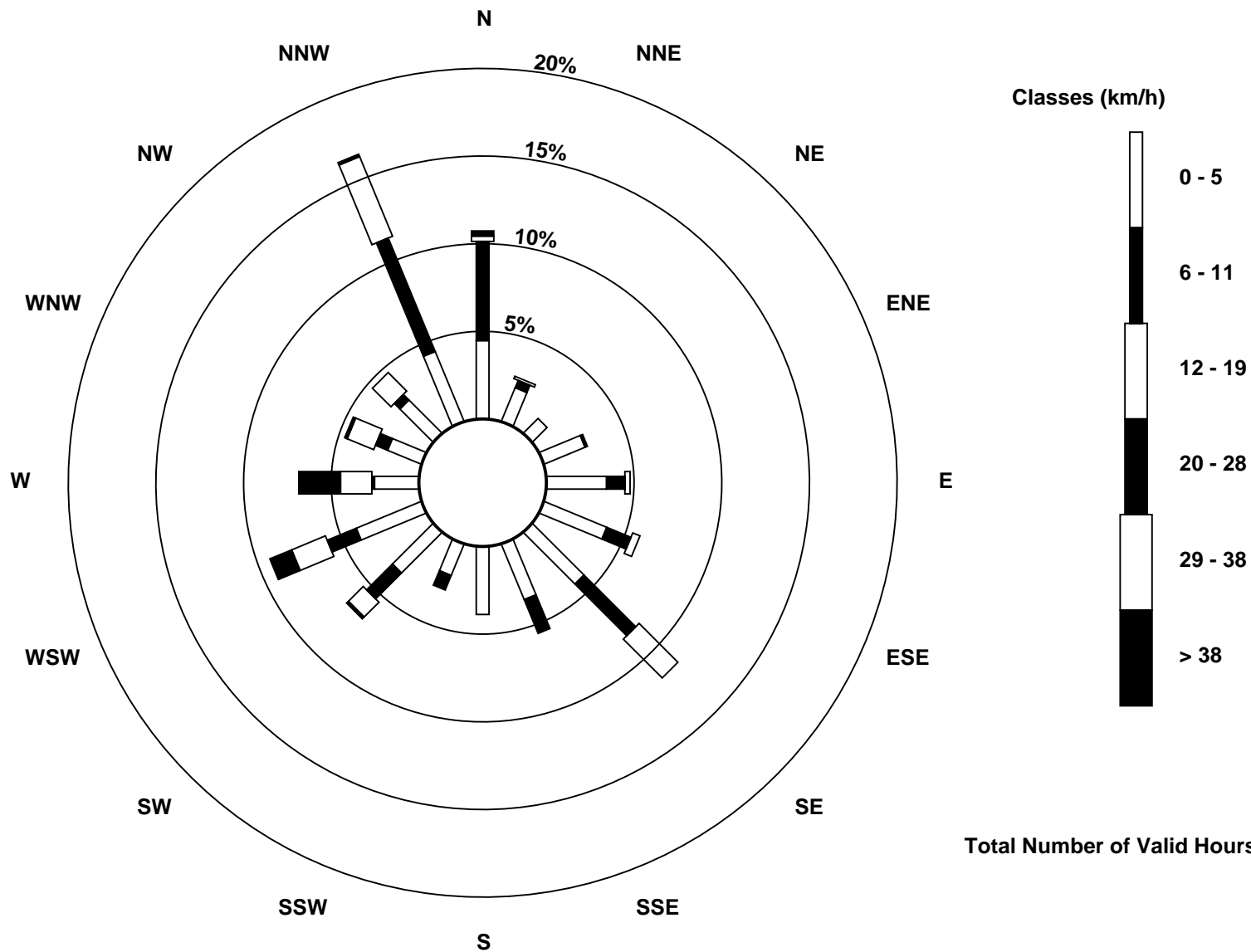
Total Number of Valid Hours: 671

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - February 2017

Direction of Maximum Speed: 266 deg on Feb 13 01:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 246.8 deg on Feb 12	Hours of Data: 671
Direction of Minimum Speed: 234 deg on Feb 2 15:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.8 deg on Feb 23	Percent Operational Time: 99.9
Monthly Average Direction: 299.8 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-Feb	344	343	343	340	3	338	18	315	270	241	251	342	1	12	333	278	178	169	328	108	155	49	110	117	341.8
2-Feb	119	151	134	135	133	133	128	133	139	112	89	95	19	279	234	91	176	204	172	132	343	346	347	335	81.5
3-Feb	340	342	332	298	254	252	257	233	209	218	235	254	225	54	69	130	120	282	323	330	336	340	339	344	321.3
4-Feb	349	345	352	357	346	265	264	271	257	110	86	78	82	68	210	220	134	124	133	134	126	116	28	4	54.7
5-Feb	342	307	348	345	343	353	358	345	288	254	294	348	359	21	2	1	13	240	189	70	69	233	79	78	347.7
6-Feb	123	204	176	159	148	161	96	93	116	120	146	142	83	357	332	325	340	254	263	255	216	230	192	217	174.2
7-Feb	231	219	175	207	209	187	217	169	177	115	101	210	211	224	222	223	236	261	274	278	327	AF	254	251	234.8
8-Feb	230	173	167	173	145	143	142	137	144	185	101	94	215	209	215	236	229	216	214	234	238	240	239	226	215.8
9-Feb	197	157	142	213	219	164	189	151	148	70	152	121	45	353	6	3	347	343	5	341	347	347	355	346	359.7
10-Feb	7	331	341	331	321	309	247	242	244	241	262	304	339	353	353	352	126	128	129	126	134	164	146	145	135.9
11-Feb	187	200	186	223	228	235	250	278	238	242	241	205	204	203	214	256	256	252	249	234	227	218	152	133	232.0
12-Feb	159	232	230	224	237	238	241	241	238	234	238	241	242	262	261	258	237	249	246	255	260	261	264	263	246.8
13-Feb	266	270	269	265	252	255	260	262	266	269	280	322	340	345	3	345	344	174	226	325	353	58	65	312	276.3
14-Feb	216	188	175	160	147	143	145	144	156	147	138	139	141	142	140	138	147	147	146	142	133	97	111	133	142.0
15-Feb	138	145	149	151	158	141	138	154	144	139	140	100	107	122	343	259	224	162	155	108	169	174	174	145.5	
16-Feb	90	35	165	169	204	172	206	173	128	97	60	2	355	0	1	325	246	263	225	253	264	259	256	258	236.1
17-Feb	229	285	227	157	133	304	292	159	261	304	331	310	356	65	102	346	349	344	339	338	339	345	338	334	333.9
18-Feb	342	321	345	343	331	5	356	19	343	346	342	351	343	351	93	90	113	129	60	83	95	100	111	119	18.1
19-Feb	93	98	109	111	108	103	104	91	88	78	91	96	104	101	117	127	120	123	135	143	150	127	79	359	105.7
20-Feb	353	353	344	339	337	338	340	330	243	292	311	300	302	282	274	278	274	272	288	282	293	289	294	279	294.1
21-Feb	282	271	268	244	252	252	281	296	326	335	347	351	288	273	278	313	313	302	300	312	307	296	279	254	292.5
22-Feb	256	268	256	330	331	266	245	244	237	281	356	342	352	7	351	6	347	356	347	348	353	354	356	355	332.3
23-Feb	12	356	358	356	349	112	293	273	99	146	99	76	136	133	250	327	23	33	346	322	44	256	291	277	11.6
24-Feb	287	316	342	342	342	340	347	345	352	347	353	1	5	10	18	91	156	133	171	151	116	135	155	353.1	
25-Feb	147	147	149	145	142	139	139	137	138	132	130	137	132	14	347	354	11	341	281	210	121	12	10	9	101.6
26-Feb	357	348	336	331	322	325	326	291	334	352	338	10	359	76	113	78	97	144	129	121	51	84	139	127	351.8
27-Feb	113	85	18	353	5	17	42	337	29	26	62	270	314	291	320	313	291	323	327	310	232	39	214	298	351.2
28-Feb	16	152	106	220	358	342	339	332	341	348	345	343	345	341	339	342	350	351	341	337	1	4	4	4	346.9
306.1 292.6 299.0 303.8 292.0 267.9 265.8 260.6 250.8 266.9 322.9 347.6 329.1 308.3 287.6 294.7 285.3 266.7 266.1 277.8 287.9 304.8 308.0 307.4																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

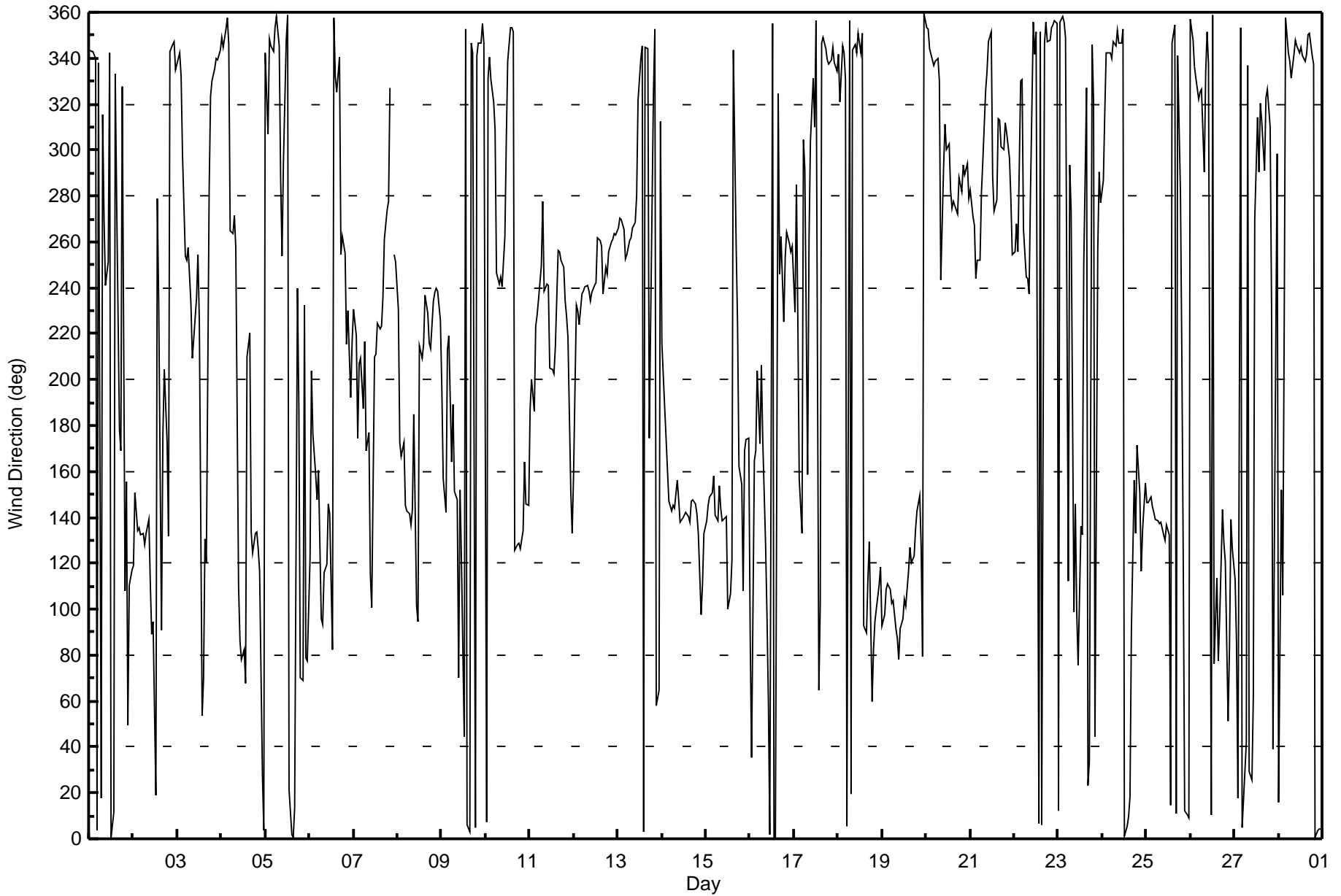
Wind Direction (WD) - deg
Athabasca Valley - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on Feb 9 10:00 Minimum Value: 8 deg on Feb 7 19:00 Percentiles: P ₁ = 9 P ₁₀ = 11 Q ₁ = 14 Median = 24 Q ₃ = 45 P ₉₀ = 76 P ₉₉ = 98		Hours in Service: 672 Hours of Data: 671 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-Feb	13	13	13	12	19	24	13	43	23	13	30	14	28	39	24	27	42	66	61	104	68	80	59	30	104
2-Feb	20	32	41	18	17	30	15	23	23	36	33	70	60	67	83	62	76	81	53	80	27	16	18	9	83
3-Feb	9	12	10	17	21	44	14	28	29	70	33	37	28	79	37	46	46	45	11	10	10	12	10	12	79
4-Feb	16	13	17	14	12	42	58	14	46	77	53	94	14	17	89	14	45	24	16	15	19	35	43	19	94
5-Feb	37	38	15	14	13	21	15	11	43	22	41	31	20	22	18	20	35	51	66	85	94	98	86	79	98
6-Feb	94	101	46	37	43	48	86	102	69	99	20	30	91	53	30	22	24	34	18	10	85	69	90	62	102
7-Feb	98	68	78	65	35	55	85	90	86	30	43	24	19	10	13	13	18	17	8	13	35	AF	61	29	98
8-Feb	72	79	64	67	45	30	31	31	32	82	31	36	35	18	15	14	17	20	27	17	10	11	10	34	82
9-Feb	42	37	29	86	83	74	73	69	83	106	31	90	53	36	35	29	23	20	39	17	28	17	29	27	106
10-Feb	39	47	34	27	39	39	36	82	84	58	13	28	14	29	36	47	93	16	13	14	16	23	13	15	93
11-Feb	58	59	44	44	28	17	24	69	58	15	16	26	18	21	25	23	11	11	11	11	14	59	40	64	69
12-Feb	79	23	14	16	11	9	11	10	9	11	11	12	16	17	13	17	23	13	22	13	12	12	12	11	79
13-Feb	10	12	11	10	13	10	10	9	9	8	13	14	11	14	28	16	40	93	73	73	60	28	56	71	93
14-Feb	84	44	39	41	28	14	27	20	33	38	13	10	11	10	13	12	10	25	11	26	37	36	24	13	84
15-Feb	11	10	22	20	23	29	30	24	29	20	19	19	44	47	67	97	52	57	46	37	28	92	84	49	97
16-Feb	77	93	64	94	62	63	62	77	31	41	42	35	83	71	47	64	26	66	72	48	25	36	23	57	94
17-Feb	89	81	82	93	64	49	37	93	90	29	15	19	28	19	48	29	15	13	10	9	9	14	16	12	93
18-Feb	12	16	25	12	23	19	24	35	29	17	24	41	61	48	23	23	74	54	78	22	21	23	22	27	78
19-Feb	19	19	21	20	19	20	20	16	14	16	16	19	23	26	22	18	20	21	19	29	29	41	76	18	76
20-Feb	14	14	17	10	8	9	18	41	27	22	30	19	16	14	11	10	9	10	13	12	19	23	15	15	41
21-Feb	13	12	17	15	15	14	17	16	11	10	15	25	20	13	17	15	13	12	20	11	12	13	10	12	25
22-Feb	9	8	33	45	42	51	28	34	21	62	26	14	19	16	17	22	14	18	15	14	15	14	13	17	62
23-Feb	46	20	18	13	35	91	58	46	69	24	54	52	42	98	32	69	34	42	44	59	95	49	21	20	98
24-Feb	36	35	13	11	11	13	20	16	16	13	14	24	18	20	22	44	70	54	20	96	44	53	81	36	96
25-Feb	31	29	18	12	11	10	10	10	10	13	16	12	17	55	14	19	22	31	43	64	67	25	18	17	67
26-Feb	19	17	12	11	10	10	12	16	23	21	34	35	29	78	69	20	42	30	10	42	38	32	45	24	78
27-Feb	35	35	27	13	12	16	24	41	47	25	58	70	23	13	14	14	23	26	19	45	98	65	93	55	98
28-Feb	102	48	61	95	46	12	11	9	13	15	13	11	15	13	11	11	18	16	16	14	14	12	13	25	102
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - February 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 3, 2017	Last Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:51	End Time (MST)	12:10
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	802	802
Calculated slope	0.994023	0.991807	Chamber temp	43.9	43.9
Calculated intercept	1.026180	1.045429	Pressure	701.6	701.6
Analyzer Background	18.5	18.5	Flow	0.477	0.477
Analyzer Coefficient	1.040	1.040	Intensity	43815	43815
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	-0.1	----
as found span	5000	59.1	581.5	581.3	1.000
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	59.1	581.5	585.8	0.993
second point	5000	29.5	290.3	291.2	0.997
third point	5000	14.8	145.6	144.4	1.009
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	59.1	581.5	584.5	0.995
Average Correction Factor					0.999

Corrected As found	581.4	Previous response	584.0	% change	0.4%
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Notes:

Pump changed out for preventative maintenance, filter changed out, no adjustments done

Calibration Performed By:

_____ Melissa Lemay



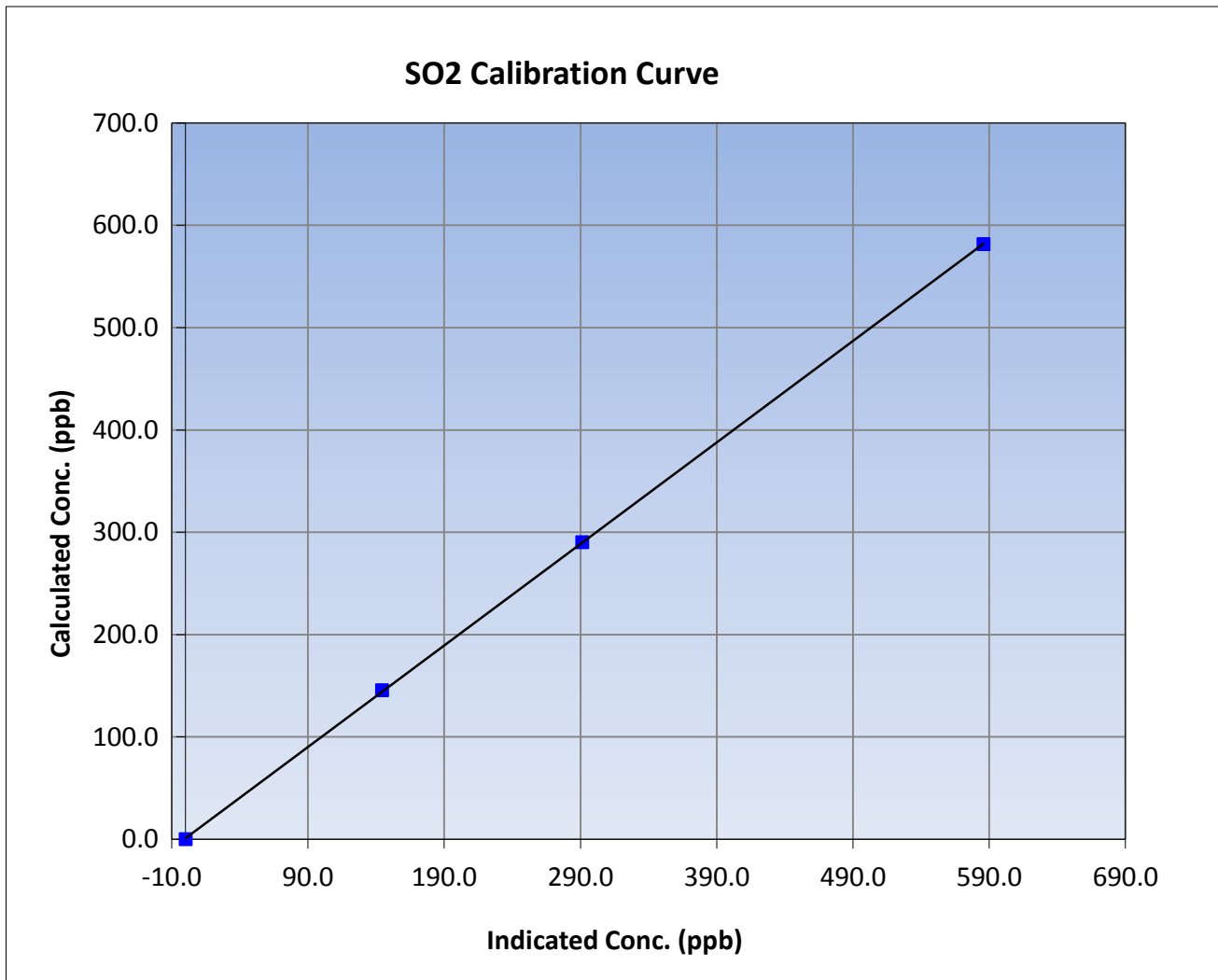
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:51	End Time (MST)	12:10
Analyzer make	Thermo 45C	Analyzer serial #	630718530

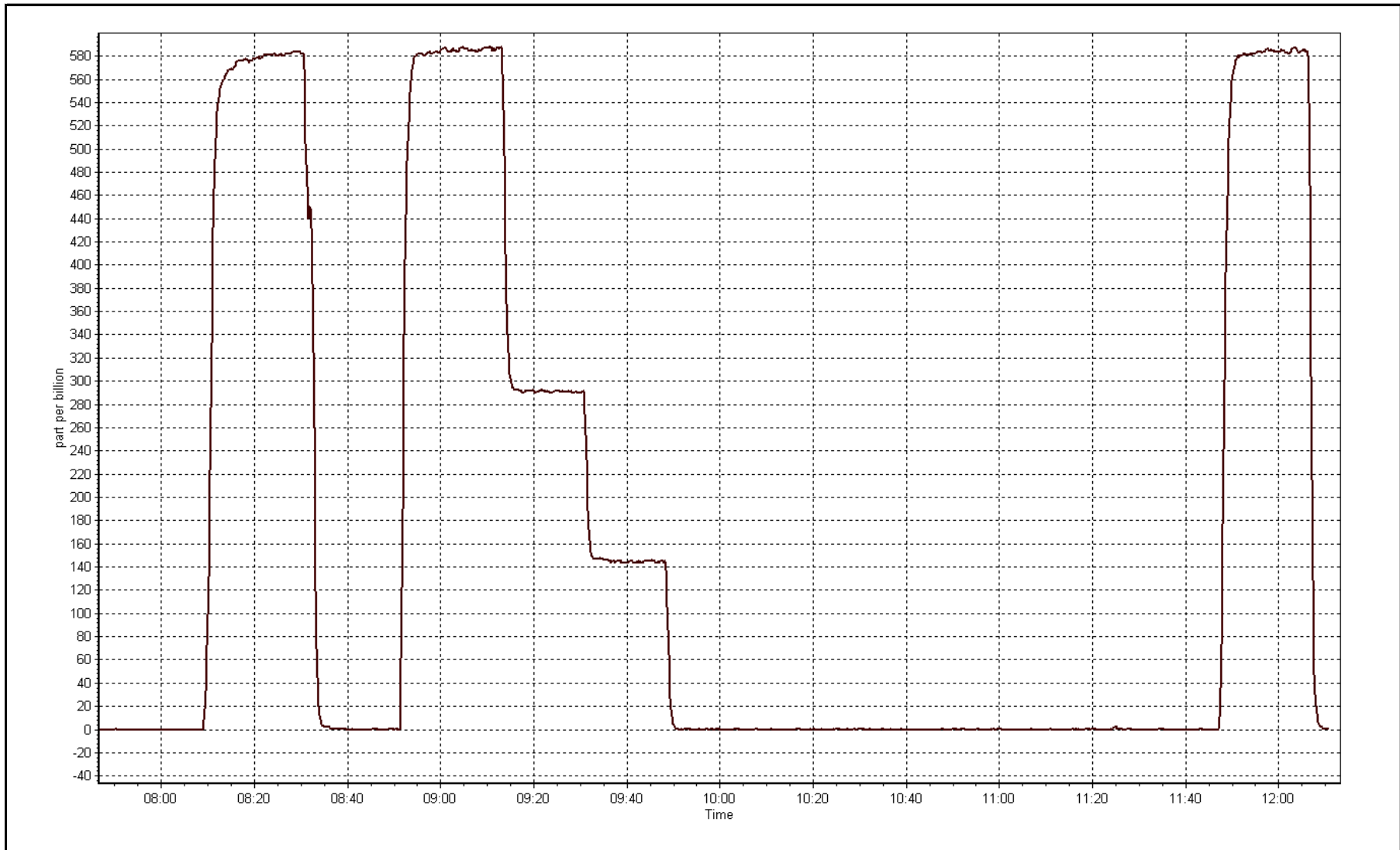
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999979
581.5	585.8	0.9927		
290.3	291.2	0.9968	Slope	0.991807
145.6	144.4	1.0085		
			Intercept	1.045429



SO2 Calibration Plot

Date: February 3, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 2, 2017	Last Calibration	January 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:58	End Time (MST)	11:09
Gas Cert Reference	ALM052589	Station temp.	3 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	-700.4	-700.4
Analyzer IP address	192.168.1.44		Lamp voltage	1147	1147
Calculated slope	1.002910	0.992305	Chamber temp	45	45
Calculated intercept	-0.113635	-0.126260	Pressure	713.2	713.5
Analyzer Background	2.5	2.5	Flow	0.452	0.454
Analyzer Coefficient	1.028	1.028	Intensity	71	71
			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	75.9	0.992
SO2 scrubber check	5000	14.8	148.0	0.4	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	75.0	75.3	76.0	0.991
second point	5000	40.0	40.2	40.7	0.987
third point	5000	20.0	20.1	20.2	0.994
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	75.0	75.3	75.9	0.992
Average Correction Factor					0.991

Corrected As found	75.8	Previous response	75.2	% change	-0.8%
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Notes:

pump changed out for preventative maintenance, no adjustments done, filter changed out, scrubber checked after the as founds

Calibration Performed By:

Melissa Lemay



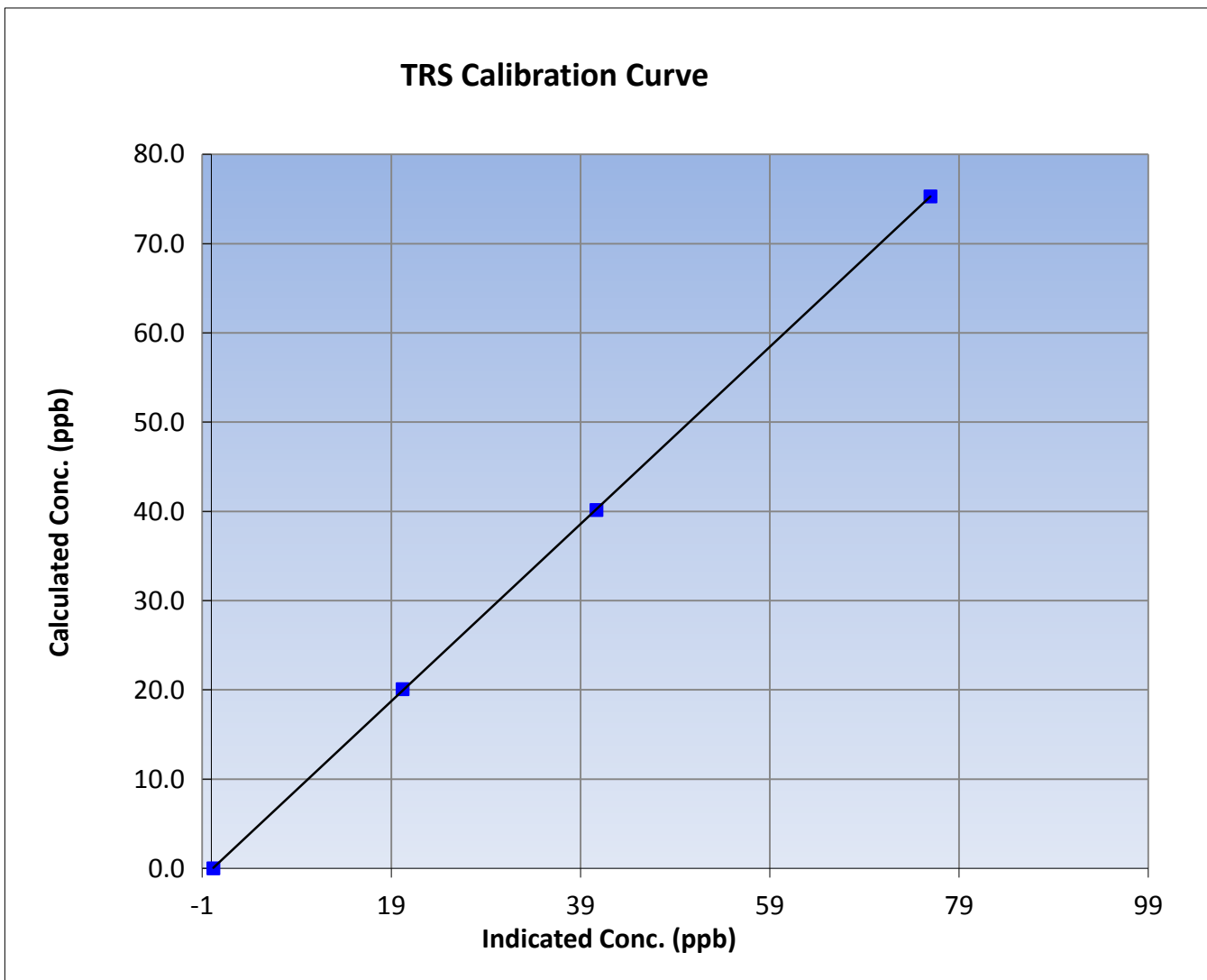
Wood Buffalo Environmental Association TRS Calibration Report

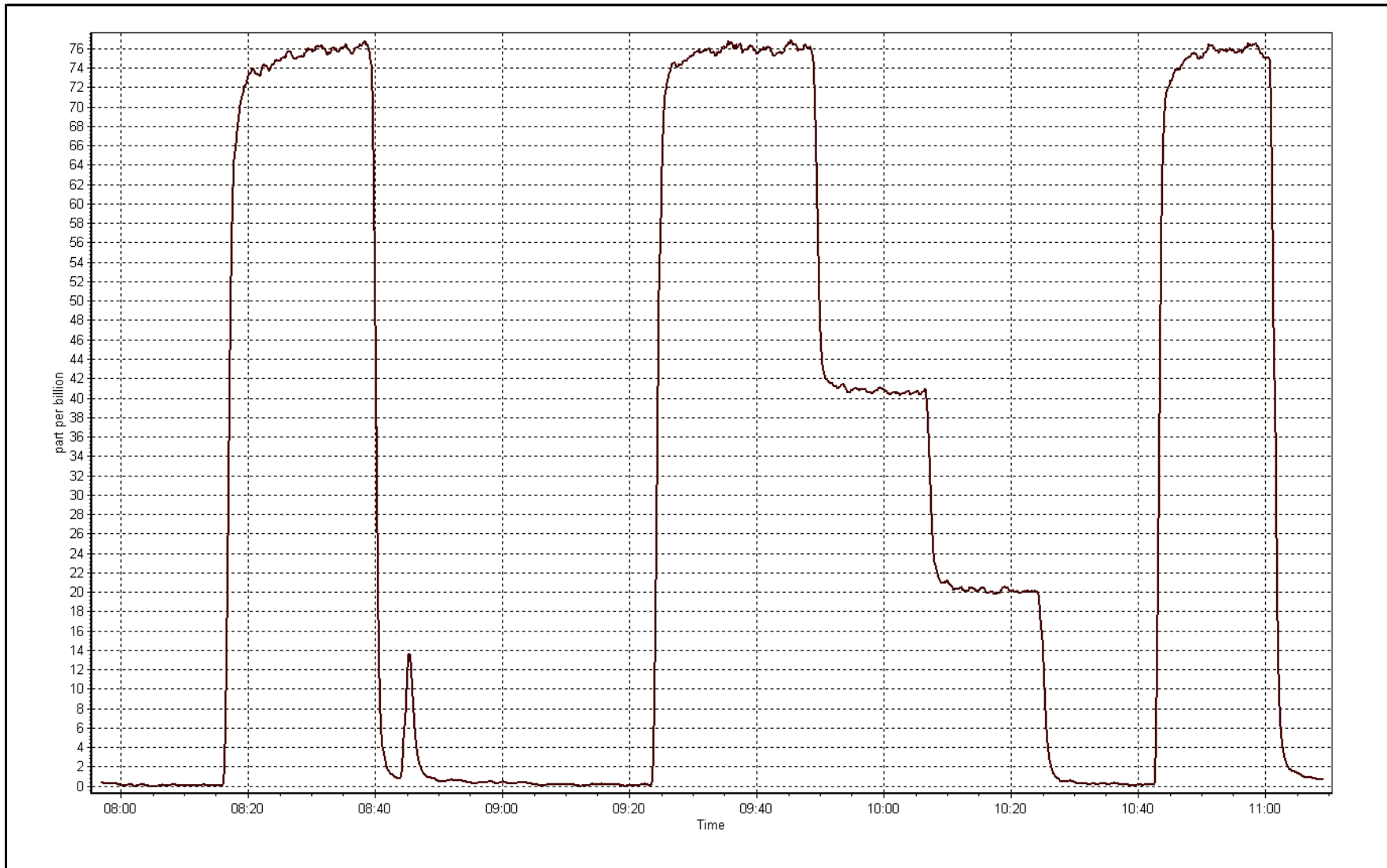
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:58	End Time (MST)	11:09
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	0.2	----	Correlation Coefficient	0.999987
75.3	76.0	0.9908		
40.2	40.7	0.9867	Slope	0.992305
20.1	20.2	0.9941		
			Intercept	-0.126260







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 3, 2017	Last Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7

Reason: Routine

Start Time (MST)	7:50	End Time (MST)	12:08
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	Teledyne API 700	Serial Number	2445
ZAG make/model	Teledyne API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.998358	0.998358	Carrier Pressure	35.9	35.9
THC Calc intercept	-0.003947	-0.003947	Fuel Pressure	44.7	44.7
NMHC Calc slope	0.999389	0.998854	Air Pressure	26.0	26.0
NMHC Calc intercept	-0.013978	-0.009959			

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	12.25	0.999
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 12.25 Previous response 12.26 % change 0.1%

Notes:

Filter changed out, No adjustments or maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	59.1	6.47	6.47	1.000
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	1.62	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	6.47	6.49	0.997
Average Correction Factor					0.998

Corrected As found 6.47 Previous response 6.49 % 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	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	5.79	0.996
second point	5000	29.5	2.88	2.87	1.003
third point	5000	14.8	1.44	1.44	1.003
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					1.001

Corrected As found 5.78 Previous response 5.77 % change -0.1%



Wood Buffalo Environmental Association

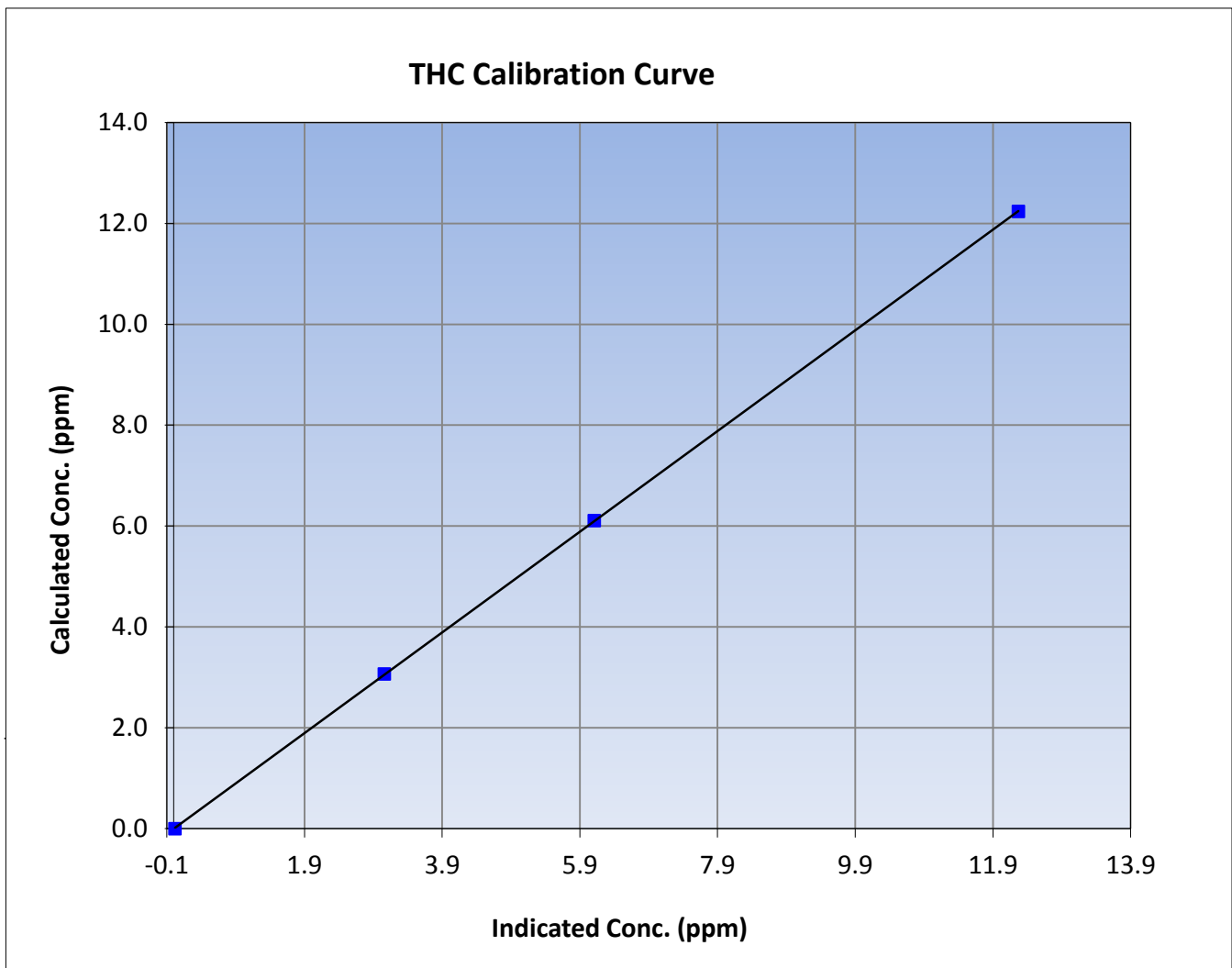
THC Calibration Summary

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:50	End Time (MST)	12:08
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

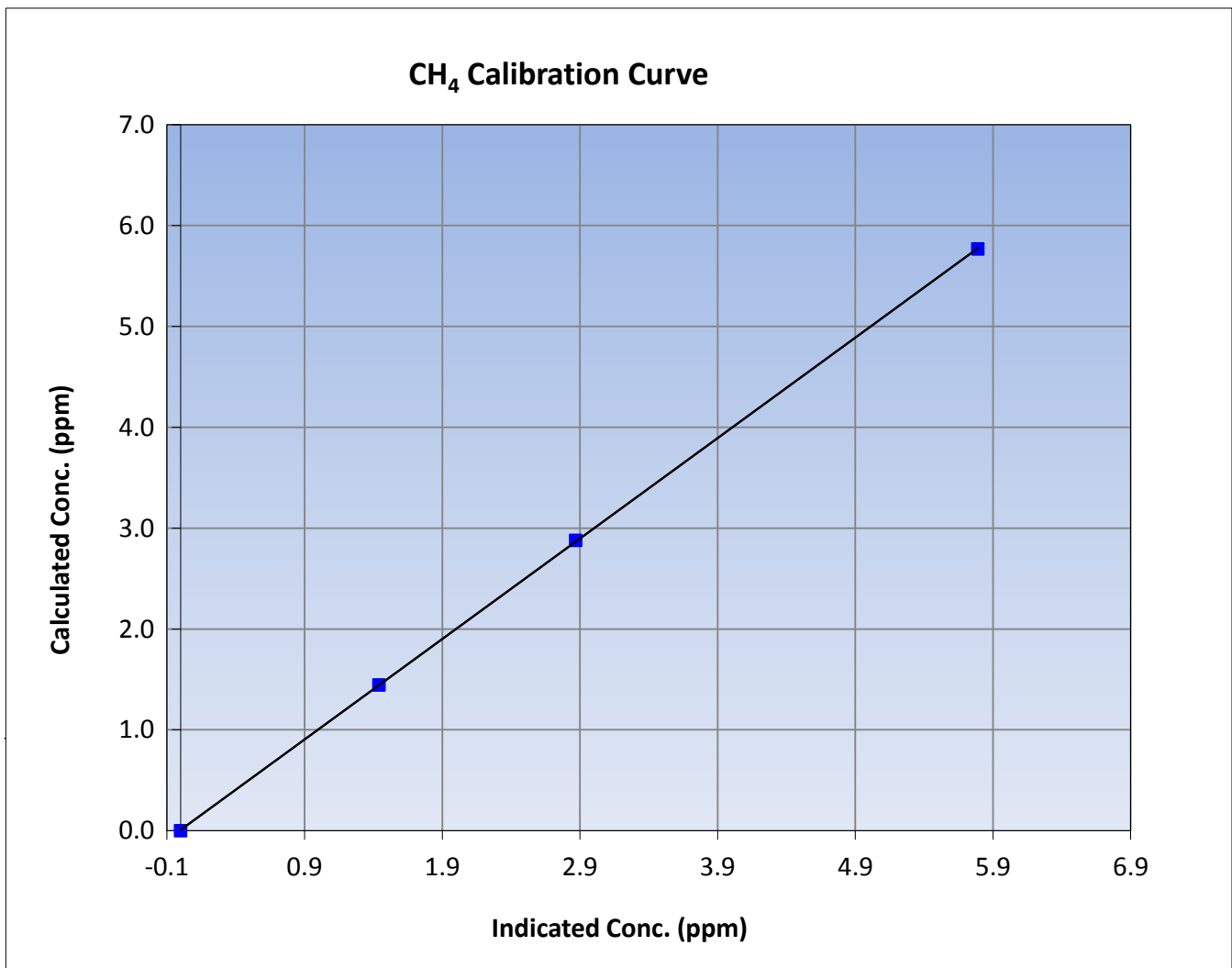
CH₄ Calibration Summary

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:50	End Time (MST)	12:08
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999985
5.77	5.79	0.9962		
2.88	2.87	1.0032	Slope	0.996018
1.44	1.44	1.0031		
			Intercept	0.008014





Wood Buffalo Environmental Association

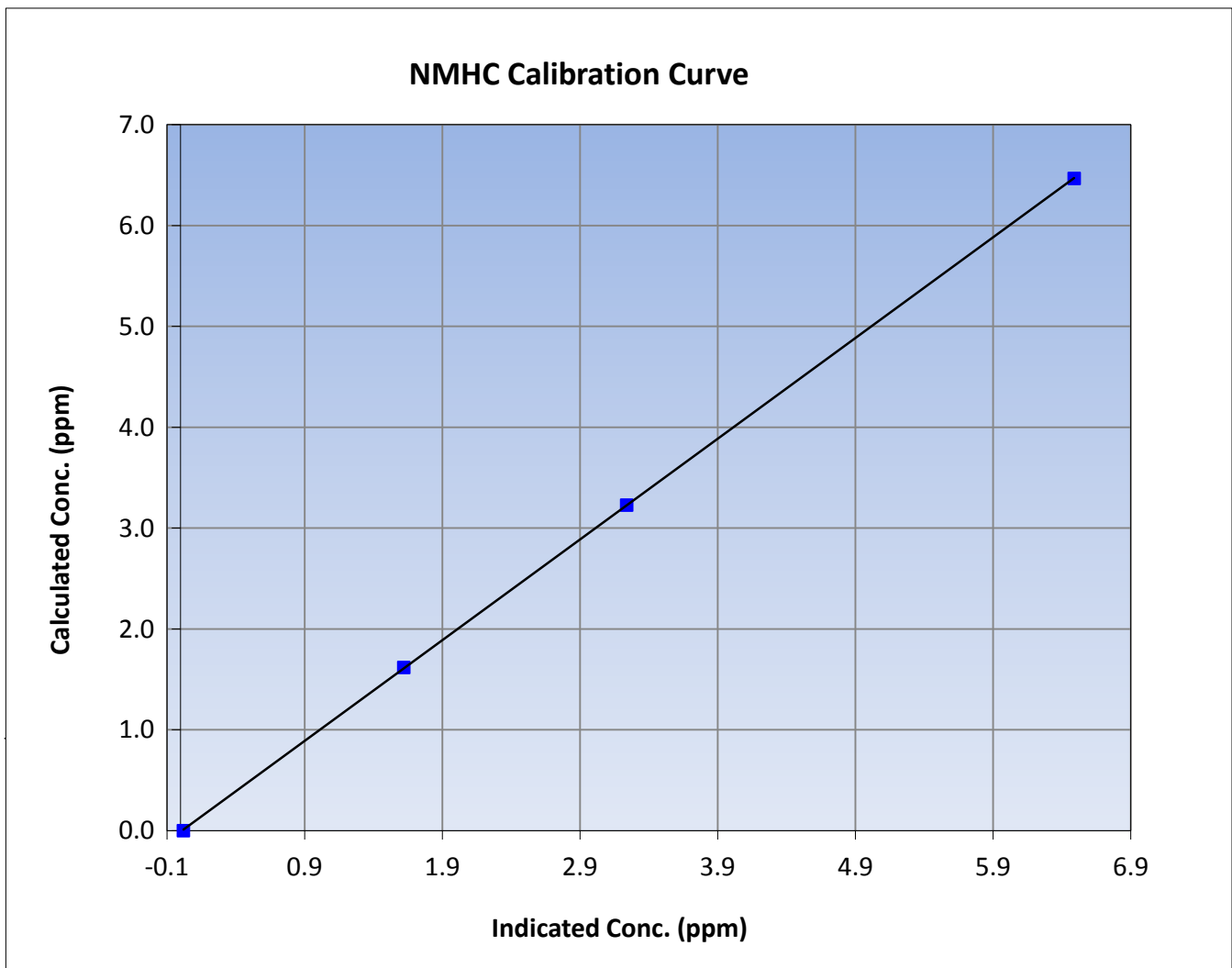
NMHC Calibration Summary

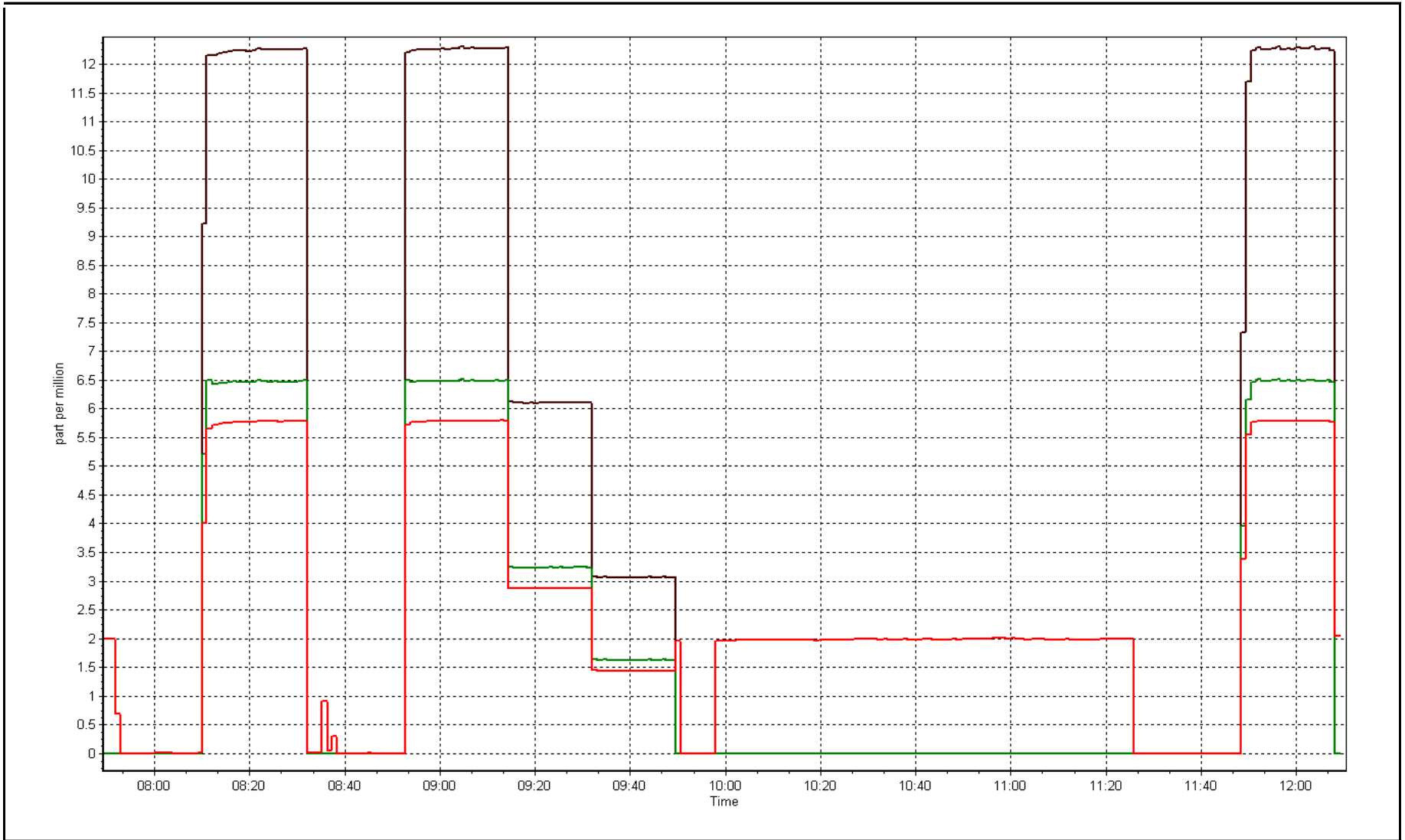
Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:50	End Time (MST)	12:08
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999989
6.47	6.49	0.9967		
3.23	3.24	0.9965	Slope	0.998854
1.62	1.62	0.9999		
			Intercept	-0.009959







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 15, 2017	Last Calibration	January 5, 2017		
Station Name	Athabasca Valley	Station Number	AMS 7		
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Other:</td> <td>Repair</td> </tr> </table>			Other:	Repair
Other:	Repair				
Start Time (MST)	8:15	End Time (MST)	11:20		
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	Teledyne API 700	Serial Number	2445		
ZAG make/model	Teledyne API 701	Serial Number	1864		
DACS make/model	Campbell Scientific CR3000	Serial Number	5564		

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.998358	0.997710	Carrier Pressure	35.9	35.9
THC Calc intercept	-0.003947	0.012001	Fuel Pressure	44.7	44.7
NMHC Calc slope	0.998854	0.998158	Air Pressure	26.0	26.0
NMHC Calc intercept	-0.009959	0.002000			

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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	59.1	12.24	12.26	0.998
second point	5000	29.5	6.11	6.10	1.001
third point	5000	14.8	3.06	3.05	1.005
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	12.24	12.24	1.000
Average Correction Factor					1.001

Corrected As found NA Previous response NA % change NA

Notes:

No as founds due to NMHC and CH4 both reading zero unable to get a response, Hydrogen changed out, Pump rebuilt, zero and span adjusted

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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	59.1	6.47	6.48	0.998
second point	5000	29.5	3.23	3.23	1.000
third point	5000	14.8	1.62	1.62	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	6.47	6.46	1.001
Average Correction Factor					0.999

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	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 NA Previous response NA % change NA



Wood Buffalo Environmental Association

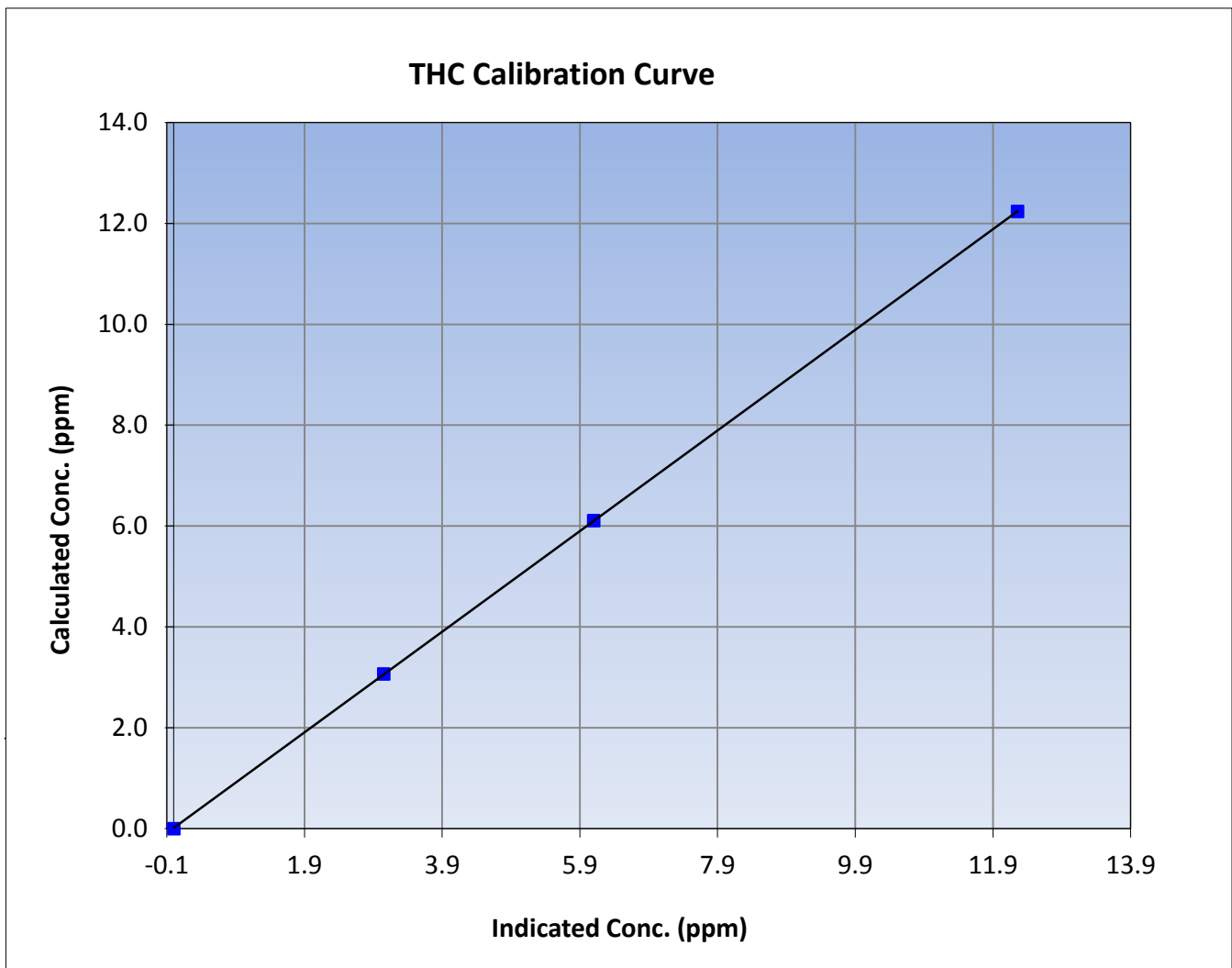
THC Calibration Summary

Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	12:08
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999995
12.24	12.26	0.9981		
6.11	6.10	1.0013	Slope	0.997710
3.06	3.05	1.0047		
			Intercept	0.012001





Wood Buffalo Environmental Association

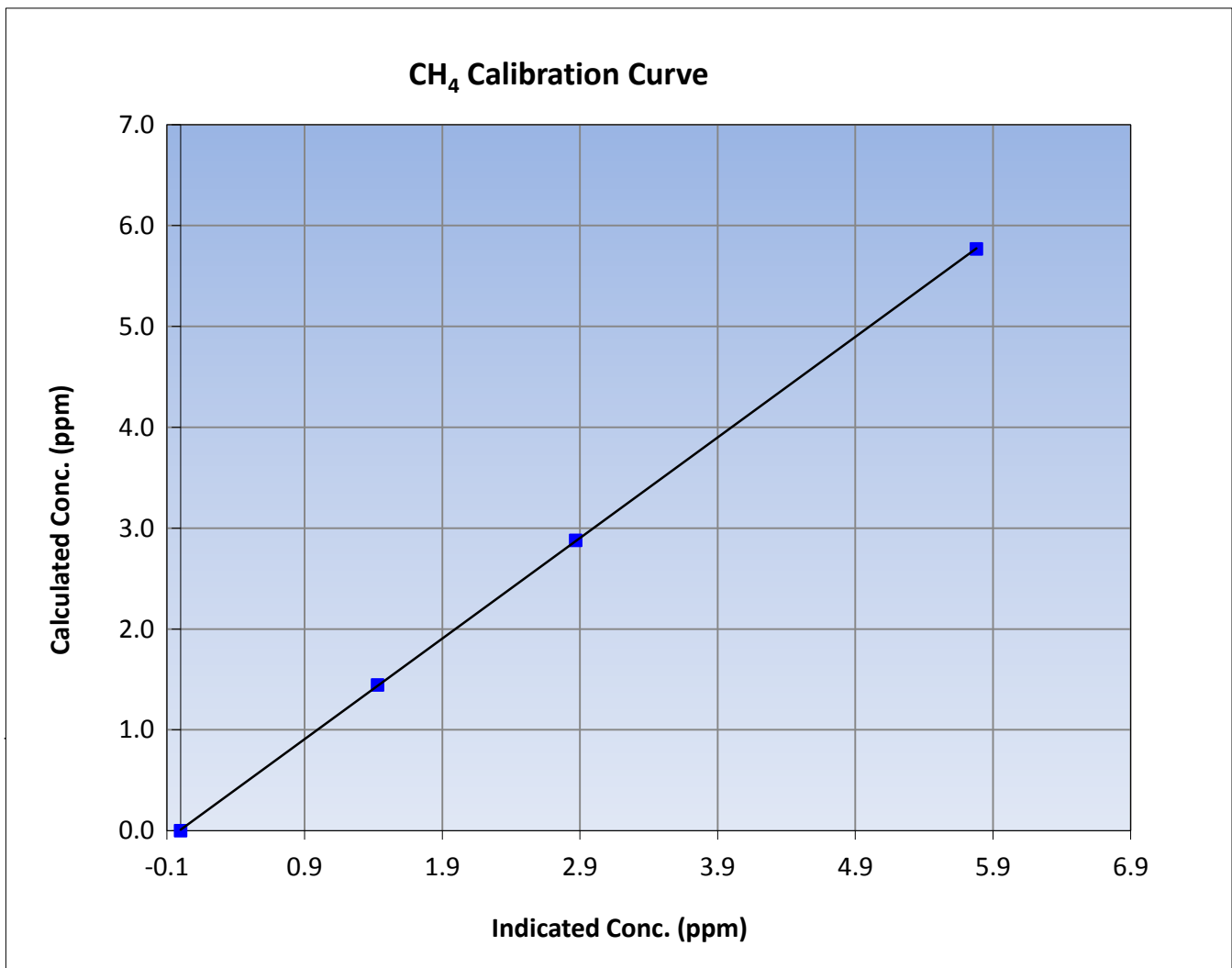
CH₄ Calibration Summary

Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	12:08
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999986
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

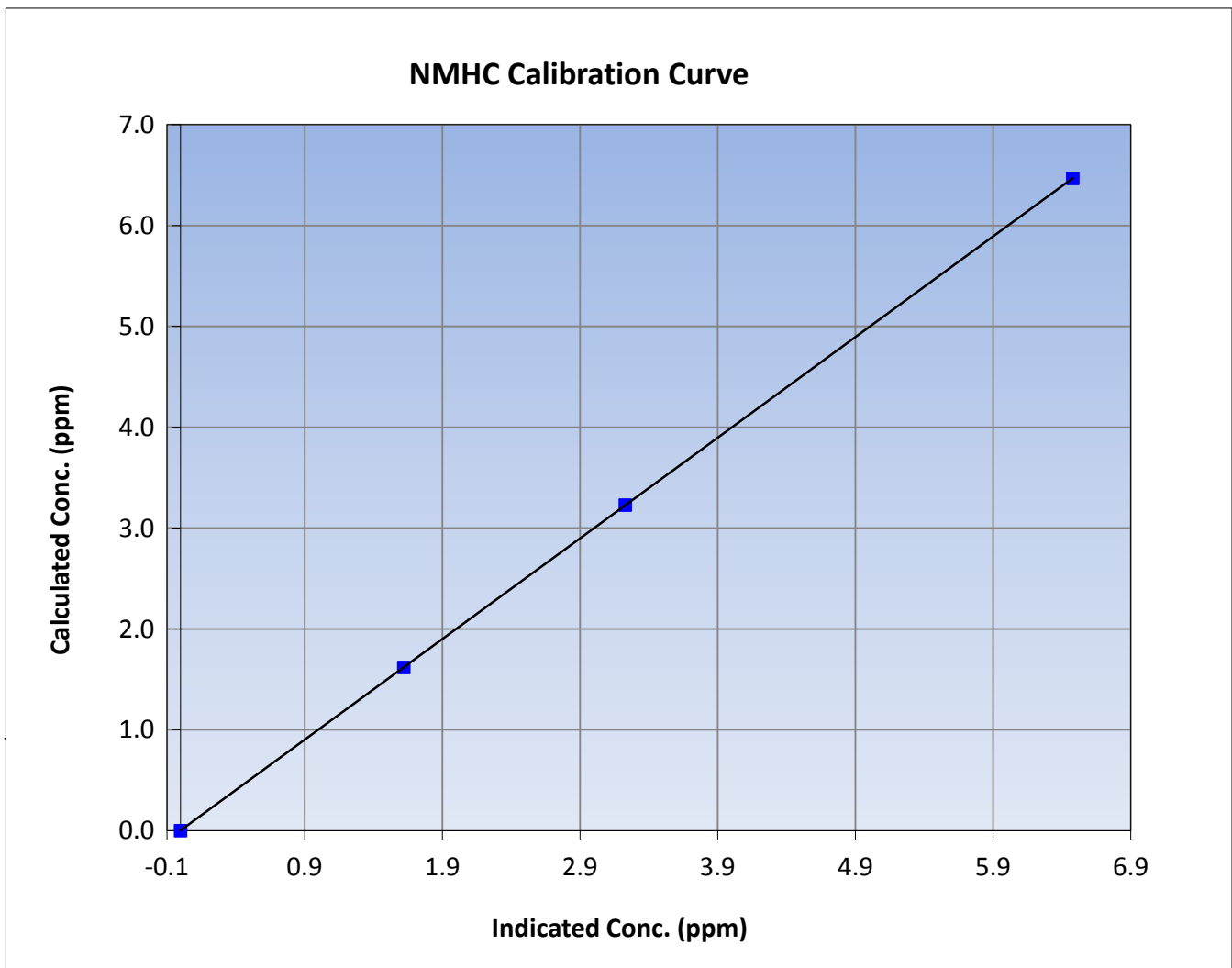
NMHC Calibration Summary

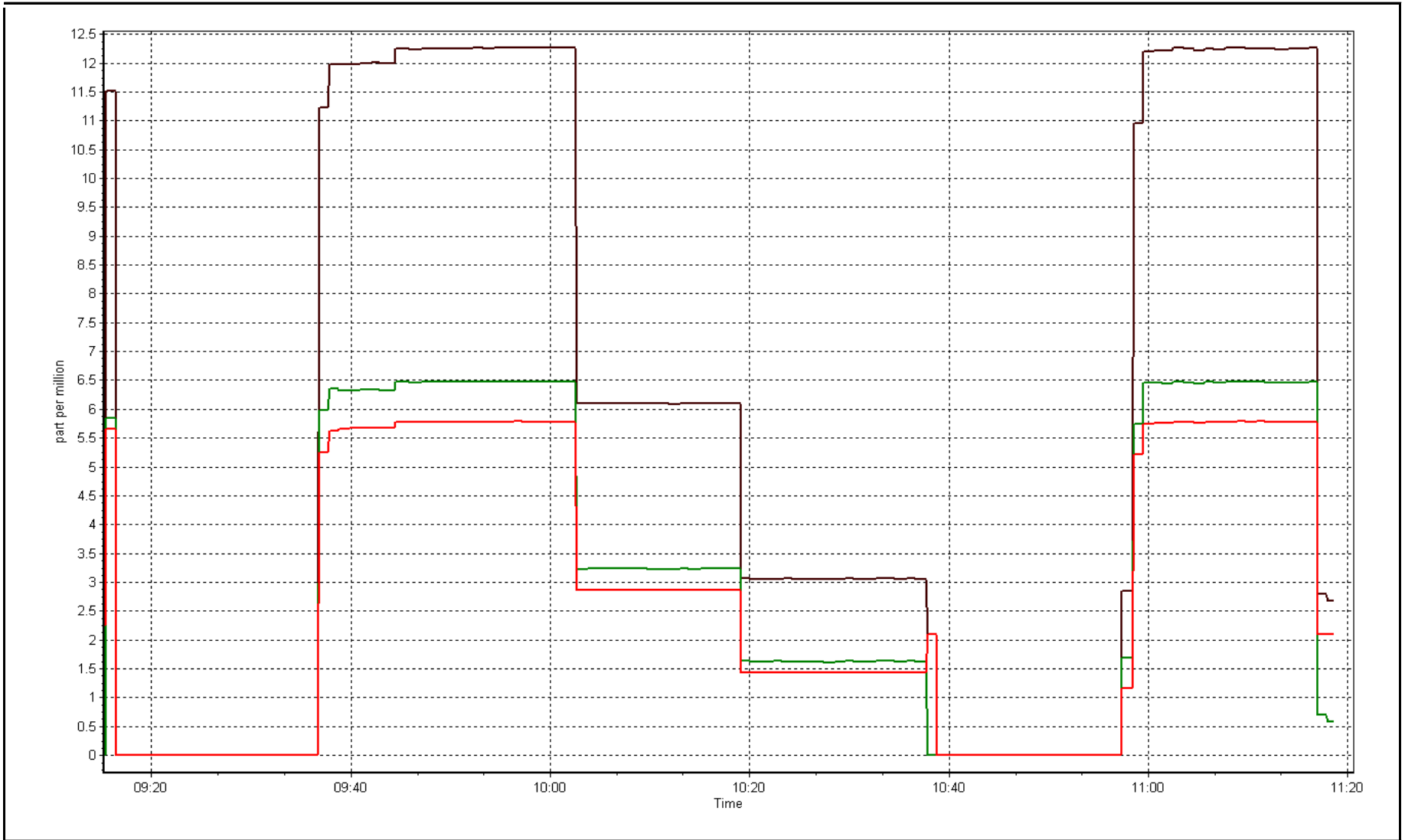
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	12:08
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999999
6.47	6.48	0.9982		
3.23	3.23	0.9996		
1.62	1.62	0.9999		
			Slope	0.998158
			Intercept	0.002000







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 16, 2017	Last Calibration	February 15, 2017		
Station Name	Athabasca Valley	Station Number	AMS 7		
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Other:</td> <td>Repair</td> </tr> </table>			Other:	Repair
Other:	Repair				
Start Time (MST)	8:15	End Time (MST)	13:16		
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	Teledyne API 700	Serial Number	2445		
ZAG make/model	Teledyne API 701	Serial Number	1864		
DACS make/model	Campbell Scientific CR3000	Serial Number	5564		

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.997710	1.007856	Carrier Pressure	35.9	35.9
THC Calc intercept	0.012001	0.008088	Fuel Pressure	44.7	44.7
NMHC Calc slope	0.998158	1.012266	Air Pressure	26.0	26.0
NMHC Calc intercept	0.002000	0.000000			

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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	59.1	12.24	12.14	1.008
second point	5000	29.5	6.11	6.04	1.011
third point	5000	14.8	3.06	3.03	1.011
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	12.24	12.15	1.007
Average Correction Factor					1.010

Corrected As found NA Previous response NA % change NA

Notes:

No as founds due to NMHC and CH4 both reading zero unable to get a response, interface board replaced, no adjustments done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	59.1	6.47	6.39	1.012
second point	5000	29.5	3.23	3.19	1.012
third point	5000	14.8	1.62	1.60	1.012
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	6.47	6.39	1.012
Average Correction Factor					1.012

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	59.1	5.77	5.75	1.003
second point	5000	29.5	2.88	2.86	1.007
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	5.76	1.001
Average Correction Factor					1.007

Corrected As found NA Previous response NA % change NA



Wood Buffalo Environmental Association

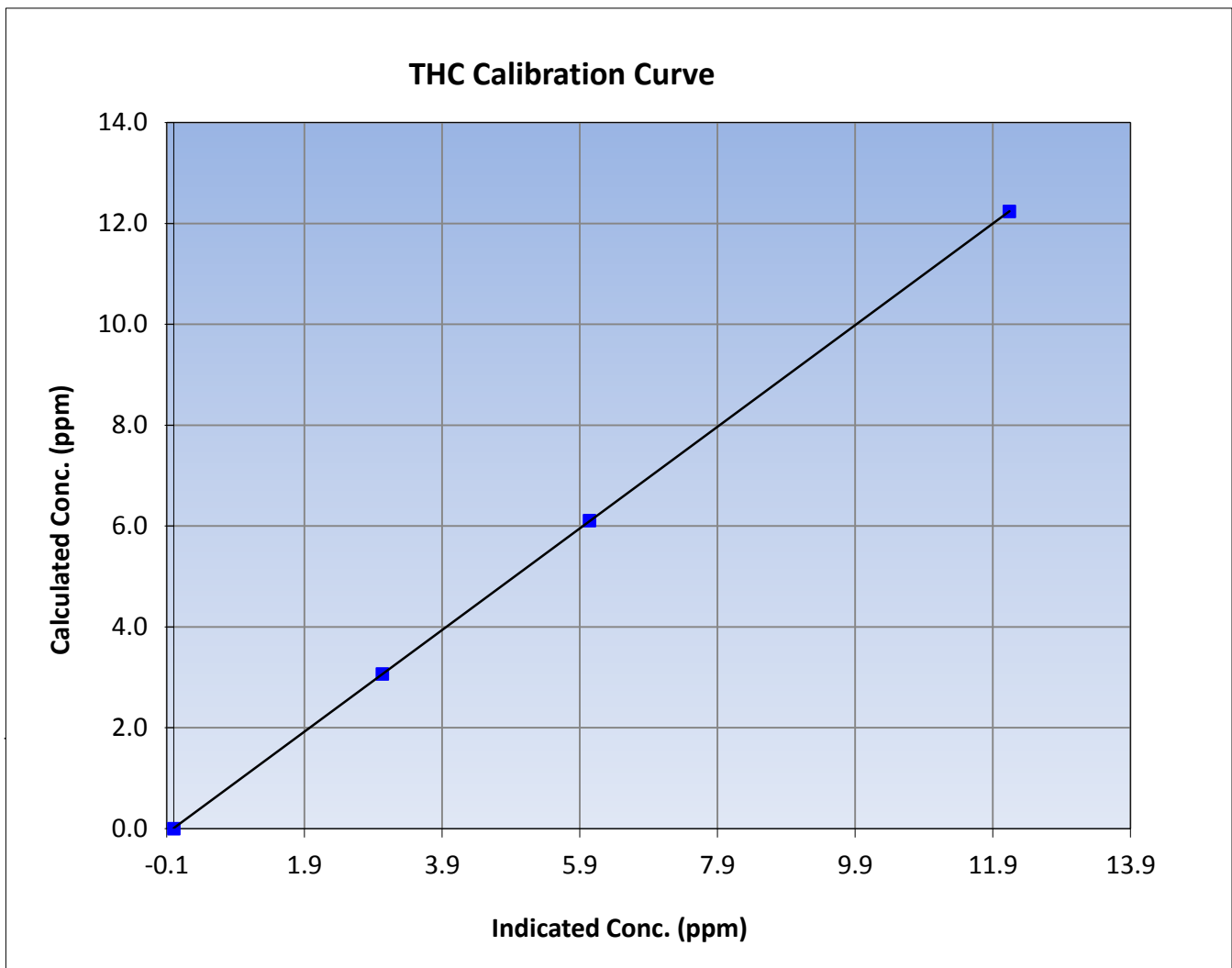
THC Calibration Summary

Station Information

Calibration Date	February 16, 2017	Previous Calibration	February 15, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	11:20
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999997
12.24	12.14	1.0080		
6.11	6.04	1.0113	Slope	1.007856
3.06	3.03	1.0113		
			Intercept	0.008088





Wood Buffalo Environmental Association

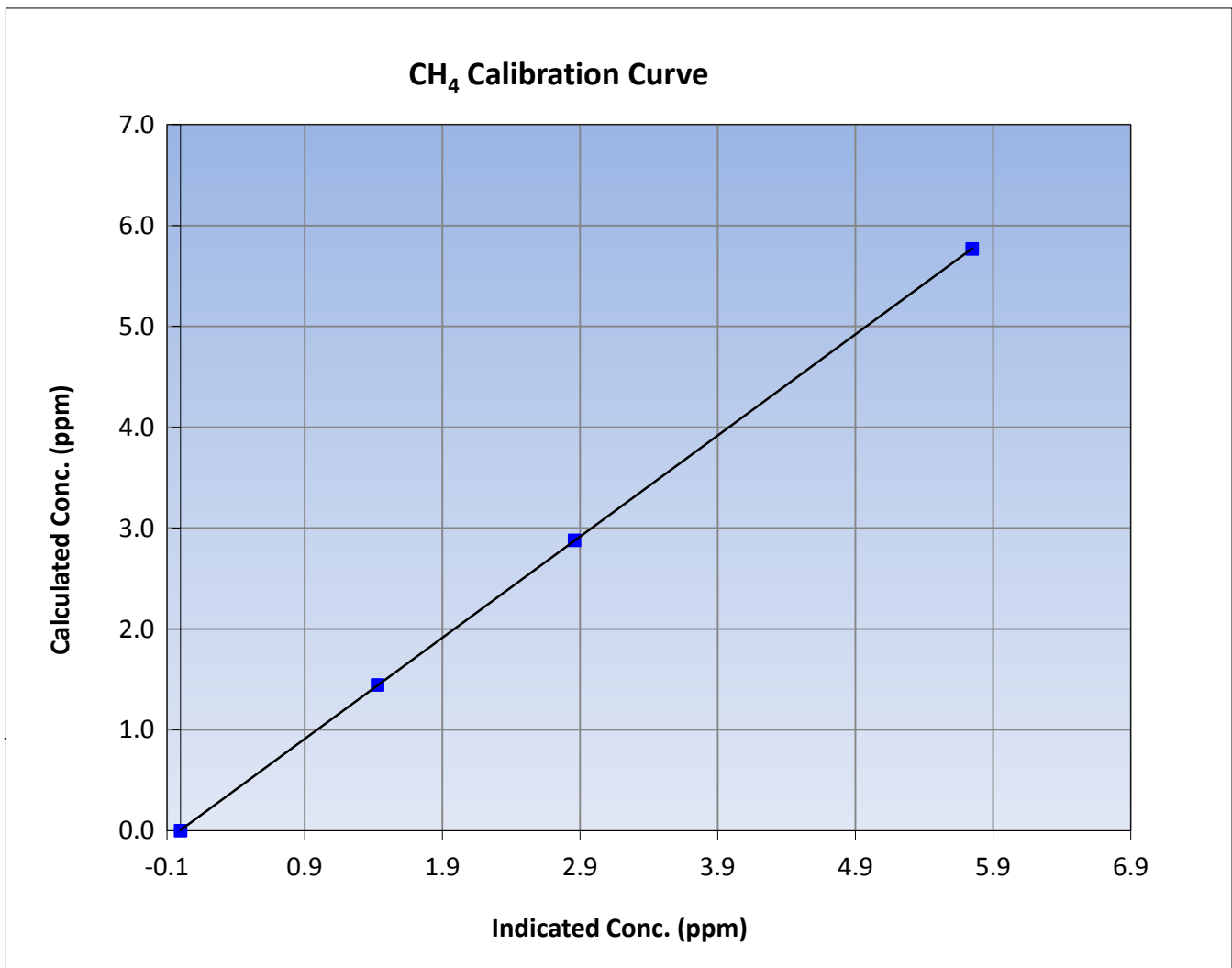
CH₄ Calibration Summary

Station Information

Calibration Date	February 16, 2017	Previous Calibration	February 15, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	11:20
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999995
5.77	5.75	1.0032		
2.88	2.86	1.0067	Slope	1.002760
1.44	1.43	1.0101		
			Intercept	0.006032





Wood Buffalo Environmental Association

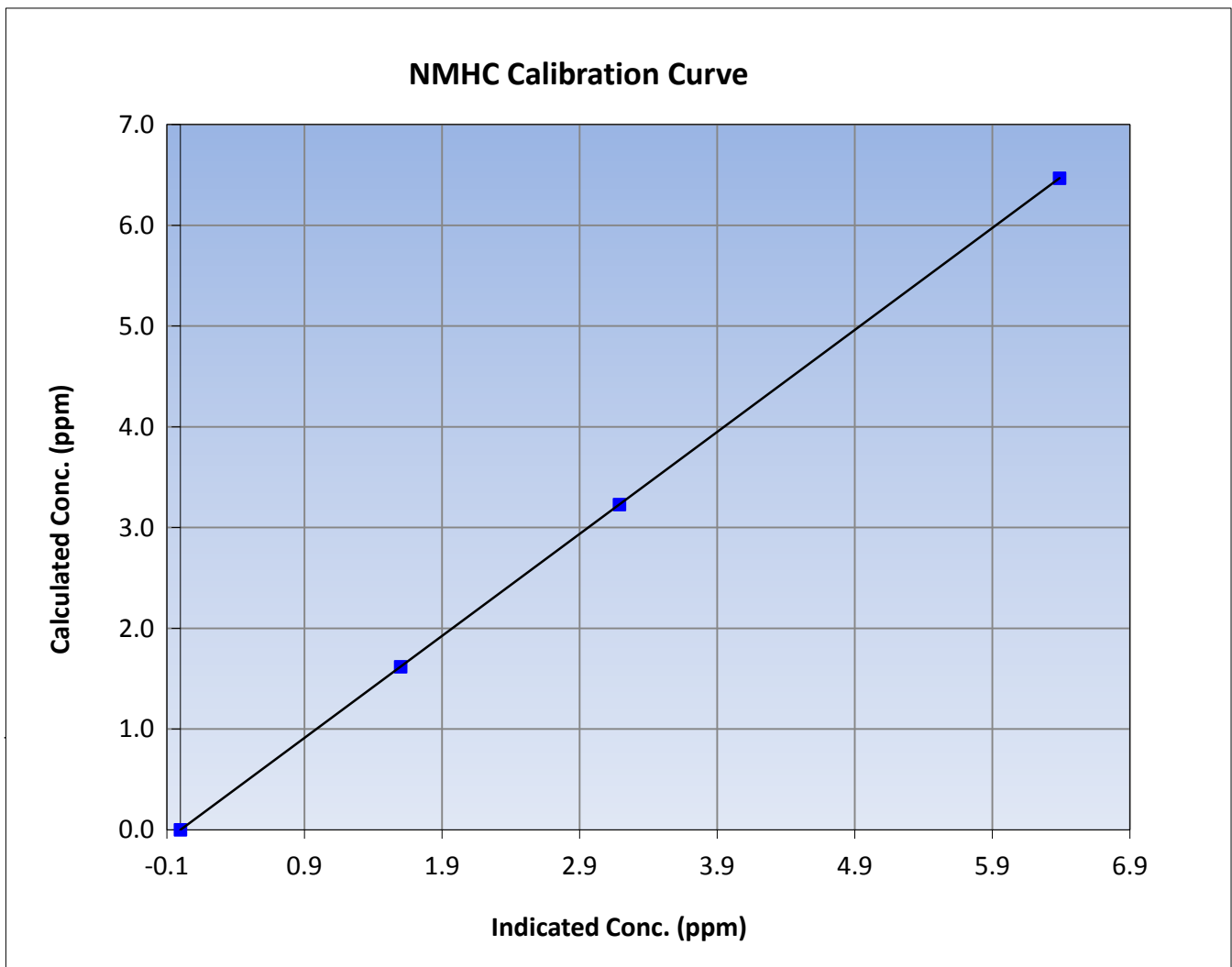
NMHC Calibration Summary

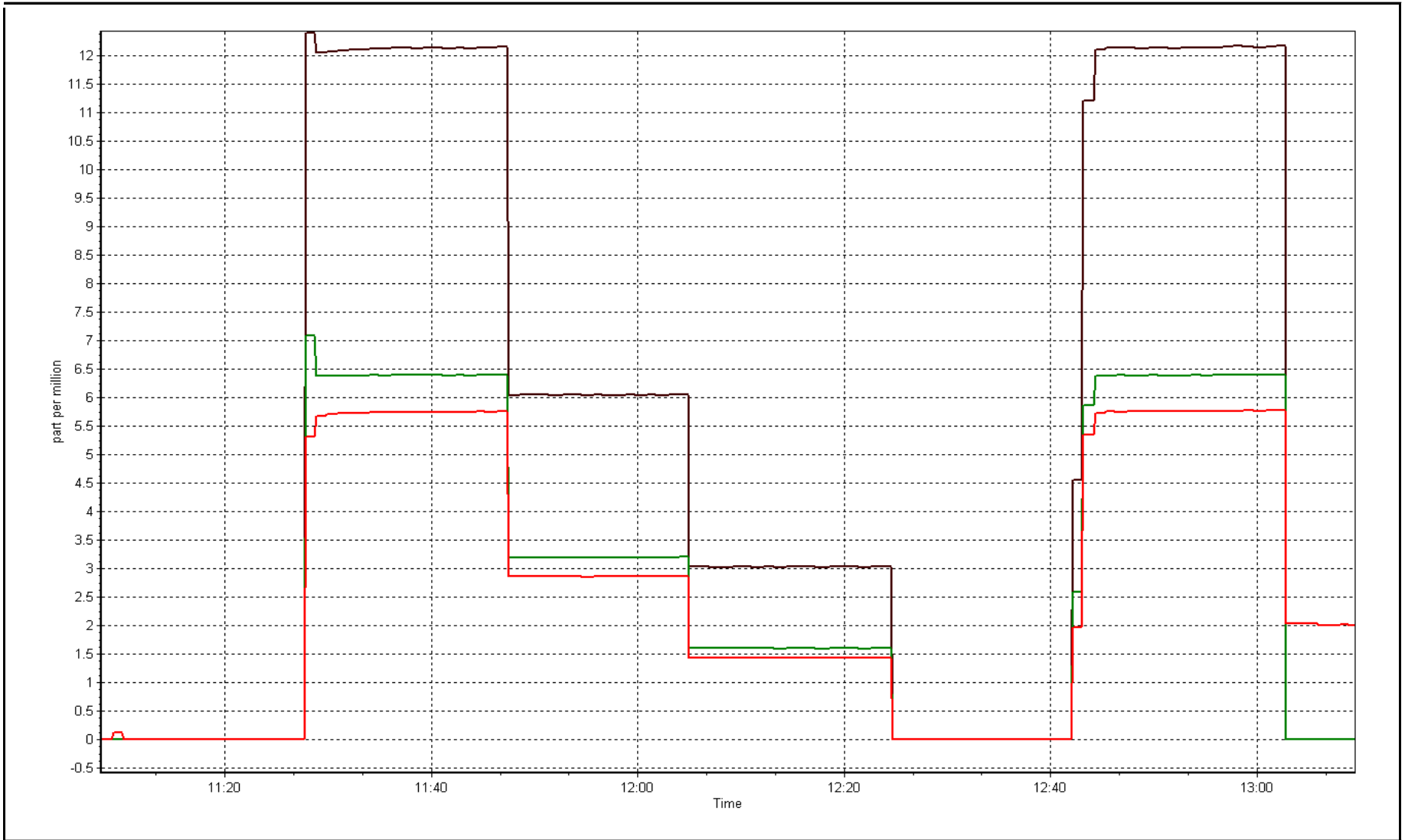
Station Information

Calibration Date	February 16, 2017	Previous Calibration	February 15, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:15	End Time (MST)	11:20
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
6.47	6.39	1.0123		
3.23	3.19	1.0122		
1.62	1.60	1.0124		
			Slope	1.012266
			Intercept	0.000000







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:02	End Time (MST)	13:45
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.	28.7	28.7
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	1.002169	0.996349	Pressure	723.4	725.8
Calculated intercept	-0.078994	-0.058491	Flow cell A	0.762	0.765
Analyzer Background	-0.8	-0.8	Flow cell B	0.780	0.783
Analyzer Coefficient	1.027	1.027	Cell A Intensity	109252	109252
			Cell B Intensity	96022	96022

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	399.7	1.001
calibrator zero	5000	0.00	0.0	-0.4	----
high point	5000	994.20	400.0	401.2	0.997
second point	5000	848.50	200.0	201.3	0.994
third point	5000	750.90	100.0	100.7	0.993
as left zero	5000	0.00	0.0	-0.7	----
as left span	5000	994.10	400.0	402.5	0.994
Average Correction Factor					0.995

Corrected As found	400.1	Previous response	399.2	% change	-0.2%
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Notes:

Pump changed out for prevenative maintenance, No adjustments done, filter changed out

Calibration Performed By: Melissa Lemay



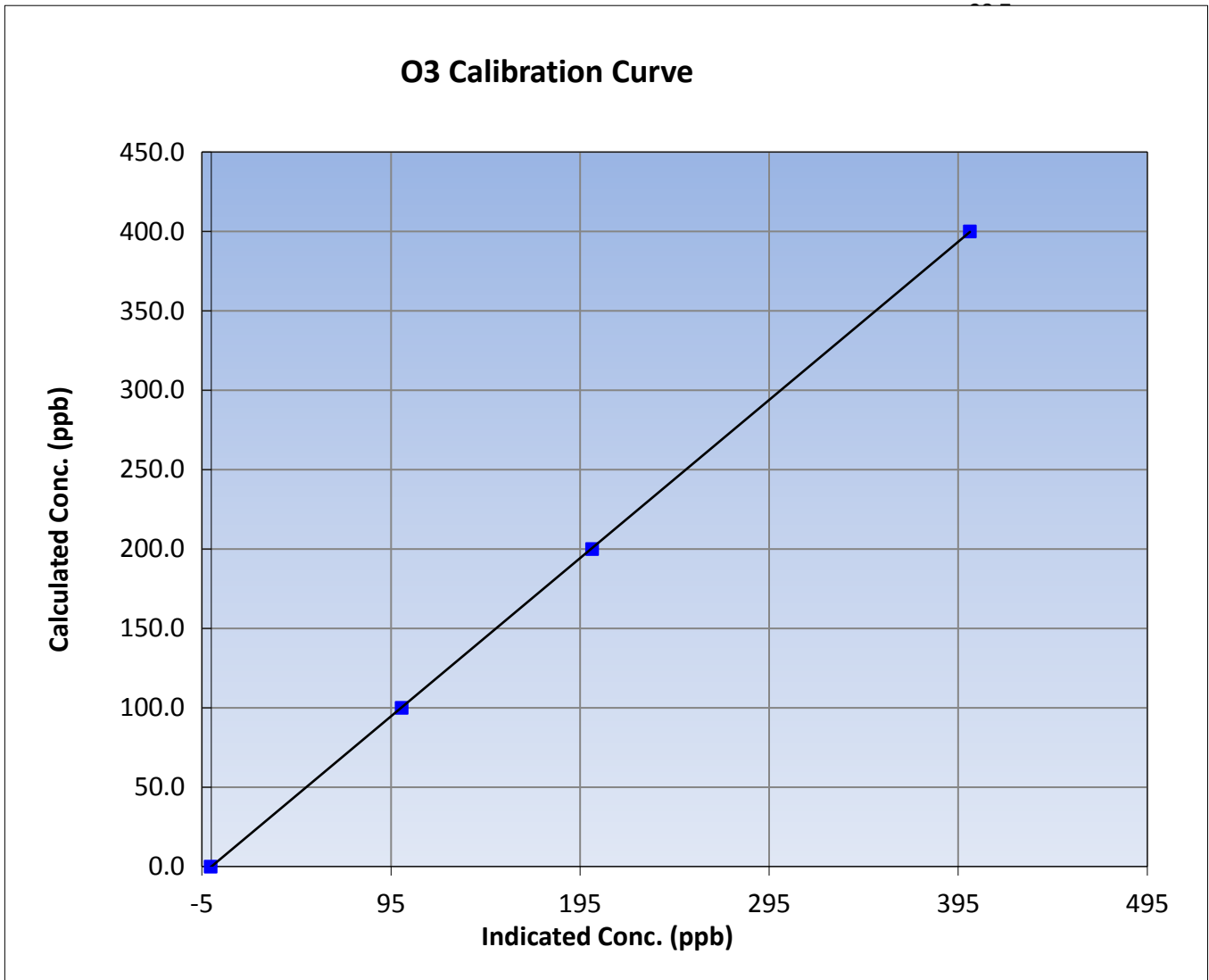
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:02	End Time (MST)	13:54
Analyzer make	TEI 49i	Analyzer serial #	1507964700

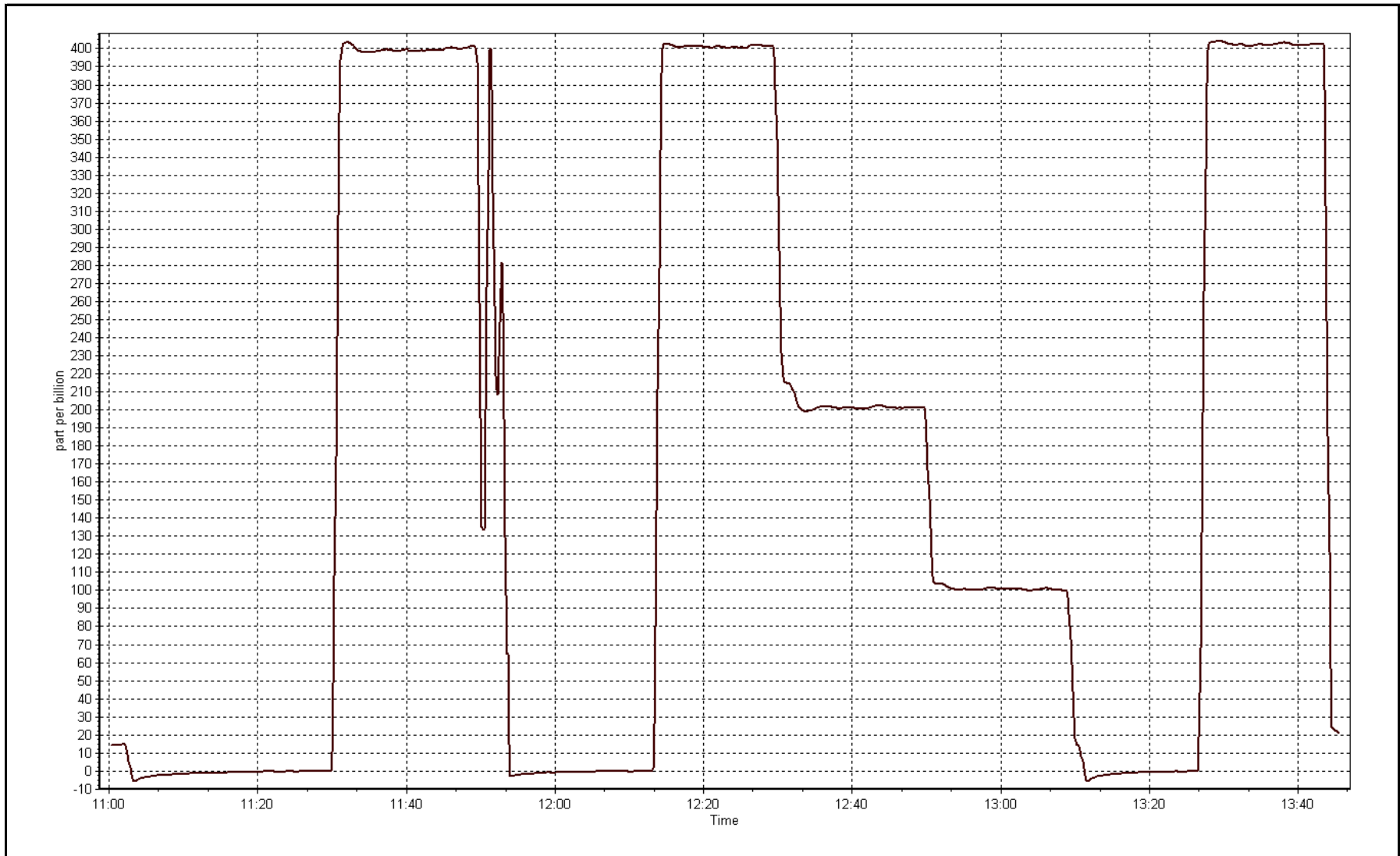
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999993
400.0	401.2	0.9970		
200.0	201.3	0.9935	Slope	0.996349
100.0	100.7	0.9930		
			Intercept	-0.058491



O3 Calibration Plot

Date: February 2, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	12:08
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	1.000301	1.004036	1.003918
	Data Offset	2.182532	2.164042	0.232137
Current Calibration	Data Slope	0.999223	0.997356	1.006252
	Data Offset	1.064515	1.204186	1.168518

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	1.135		1.159	
NOX coefficient	1.001		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.2		3.3	
NOX bkgrnd	3.3		3.4	
Chamber Temp	49.5	Deg C	49.5	Deg C
Moly Temp	324	Deg C	324	Deg C
PMT voltage	-784	V	-784	V
PMT Temp	-3.6	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	139.1	mmHg	139.1	mmHg
R Cell Press Nox	139.1	mmHg	139.1	mmHg
NO sample flow	0.891	lpm	0.891	lpm
Nox sample Flow	0.891	lpm	0.891	lpm

Notes:

No maintenance done, filter changed out, span adjusted



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 3, 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	591.6	590.0	1.7	1.0150	1.0177
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	0.0	----	----
high point	5000	59.1	600.5	600.5	0.0	600.5	601.5	-0.9	0.9999	0.9983
second point	5000	29.5	299.7	299.7	0.0	298.2	298.8	-0.4	1.0051	1.0031
third point	5000	14.8	150.4	150.4	0.0	148.2	147.9	0.2	1.0146	1.0167
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	192.1	408.4	593.2	188.3	404.7	1.0122	1.0202
Average Correction Factor									1.0066	1.0060

Corrcted As found NO_x= 591.4 NO= 590.1 Percent Change NO_x= 1.1% NO= 1.0%
 Previous Response NO_x= 598.1 NO= 595.9

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	599.3	601.0	0.0	1.0019	0.9991	----	----
1st NO2 (300)	192.1	408.9	597.8	192.1	405.7	1.0044	----	1.0079	99.2%
2nd NO2 (200)	396.0	205.0	598.0	396.0	202.2	1.0041	----	1.0138	98.6%
3rd NO2 (100)	497.9	103.1	597.8	497.9	100.0	1.0044	----	1.0310	97.0%
2nd NO ref point		0.0	598.7	600.1	-1.3	1.0029	1.0006	----	----
Average Correction Factor						1.0040		1.0176	98.3%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

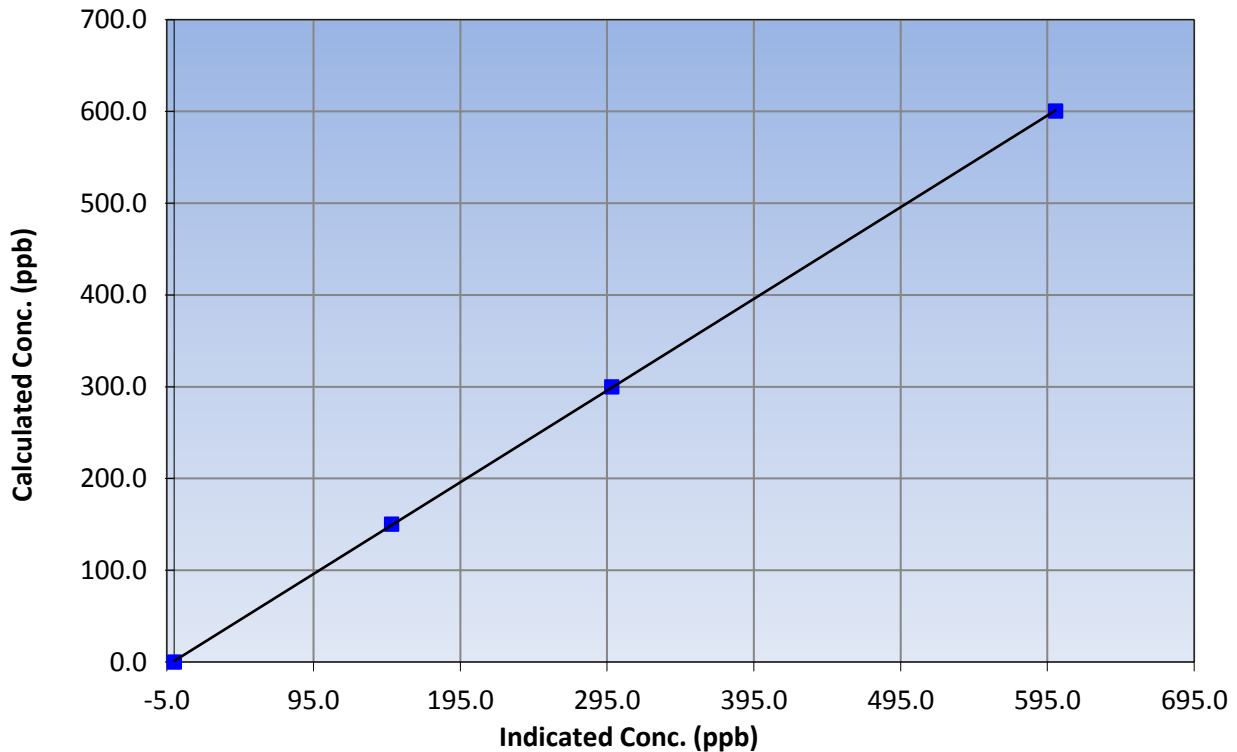
Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:50	End Time (MST)	12:08
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	0.999980
600.5	600.5	0.9999		
299.7	298.2	1.0051	Slope	0.999223
150.4	148.2	1.0146		
			Intercept	1.064515

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

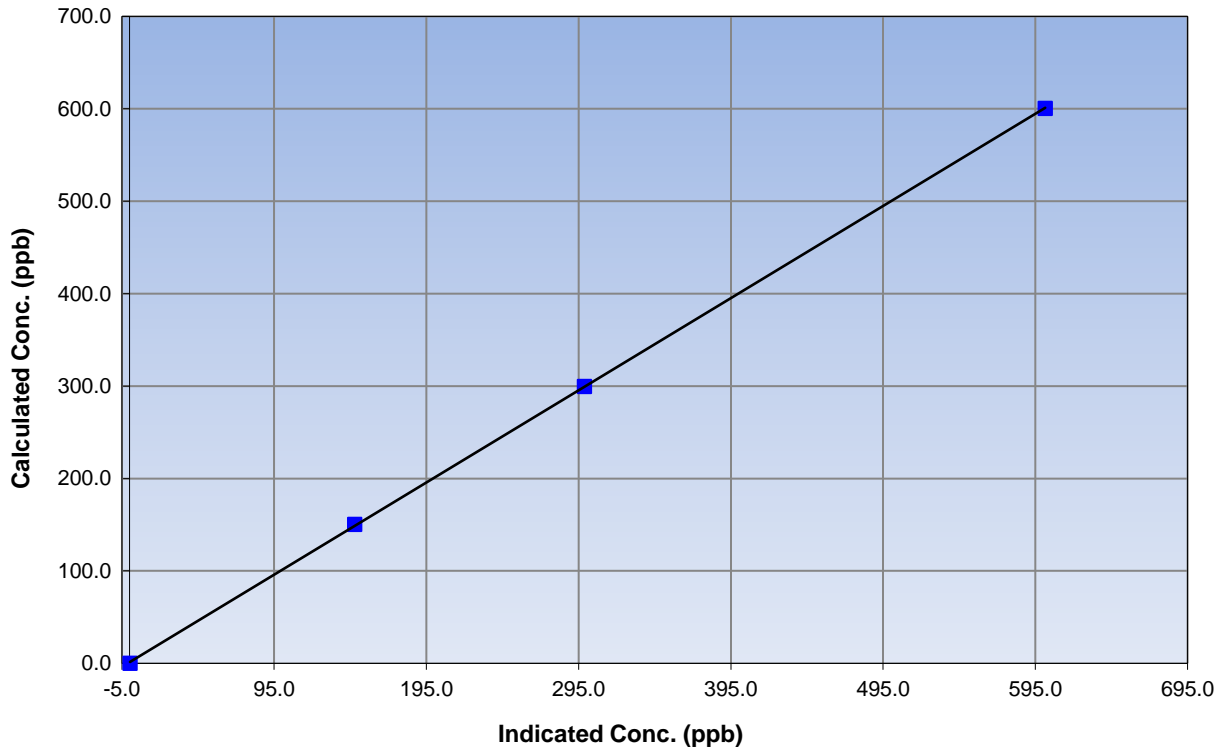
Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:50	End Time (MST)	12:08
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	0.999971
600.5	601.5	0.9983		
299.7	298.8	1.0031	Slope	0.997356
150.4	147.9	1.0167		
			Intercept	1.204186

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

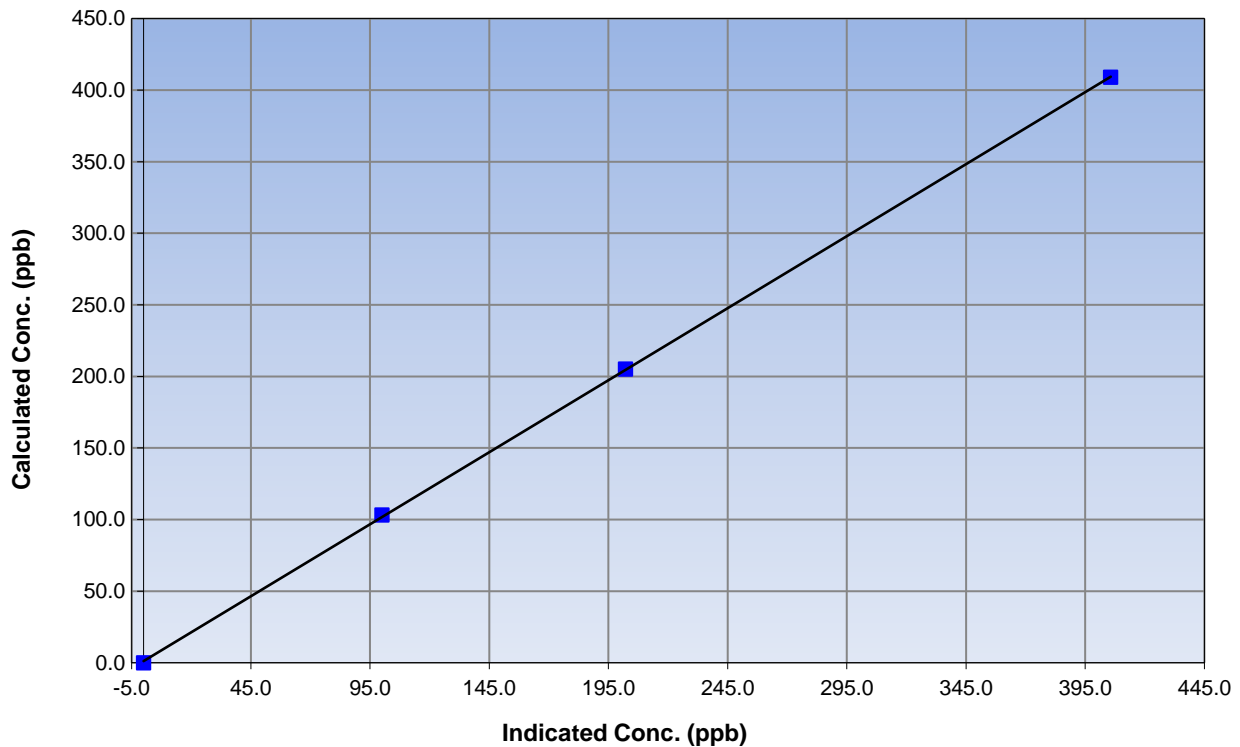
Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 5, 2017
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:50	End Time (MST)	12:08
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

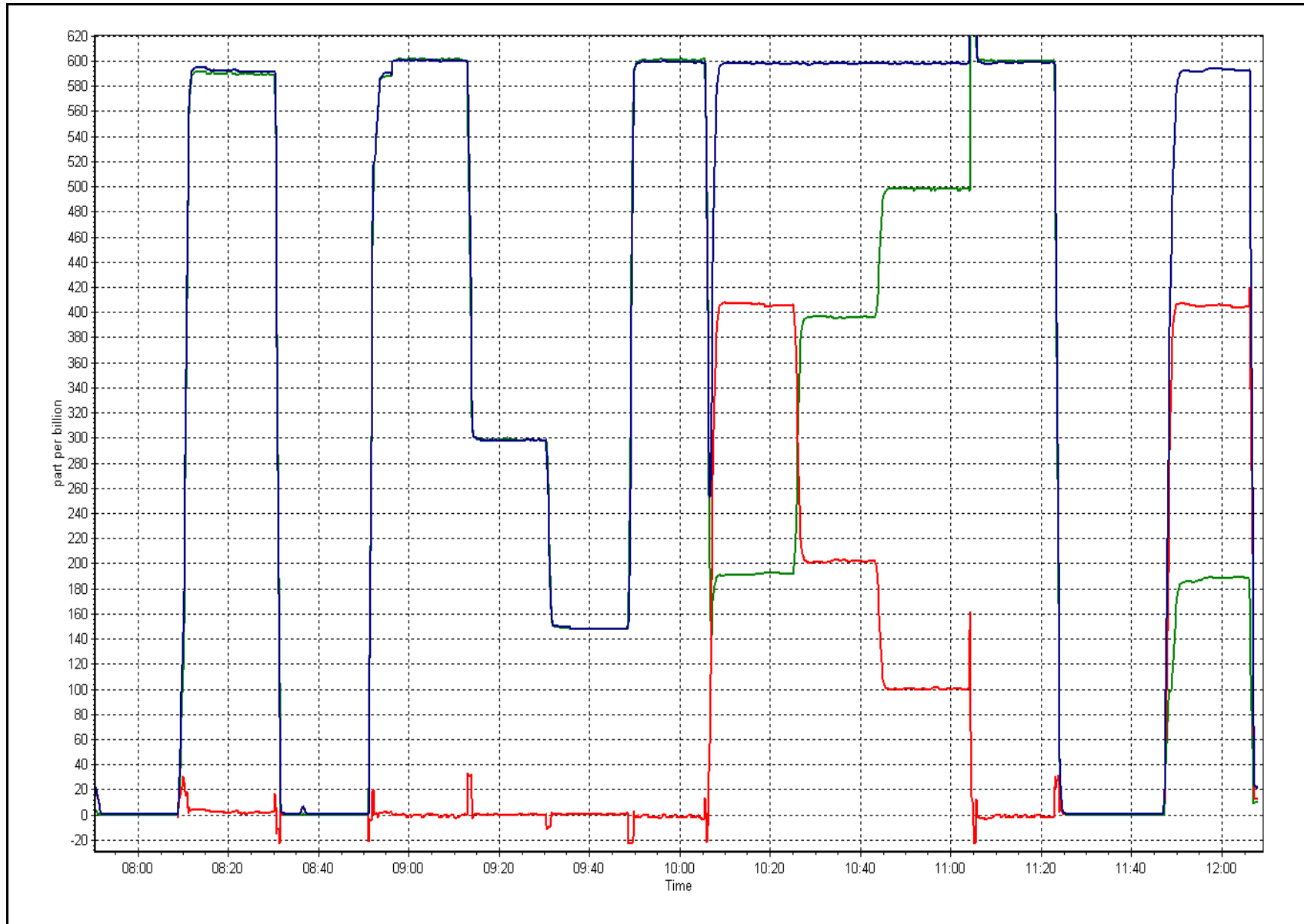
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999962
408.9	405.7	1.0079		
205.0	202.2	1.0138		
103.1	100.0	1.0310		
			Slope	1.006252
			Intercept	1.168518

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 3, 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:	February 1, 2017	Last Cal Date:	January 6, 2017
Start time (MST):	13:08	End time (MST):	14:03
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)	-10	-13.7	-13	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	1005	1000	1005	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	988	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.9	-----	-0.4	<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

Leak Test:	Date of check:	February 1, 2017	Last Cal Date:	November 19, 2016	Tolerance
	Flow w/o adaptor:	<u>16.55</u>	Flow w/ adaptor:	<u>16.15</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: cyclone head cleaned, T1 and Nephelometer adjusted,

Calibration by: Melissa Lemay



Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	February 1, 2017	Last Calibration	January 6, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	13:06
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.	48.3	48.3
Analyzer IP address	192.168.1.48		Pressure	746.2	753.1
Calculated slope	1.002238	1.005747	Flow	0.502	0.505
Calculated intercept	-0.047590	-0.054877	Intensity	199617	199617
Analyzer Background	6.862	7.032	S/R ratio	1.169487	1.169487
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	0.2	----
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	41.2	1.005
second point	5000	35.2	20.9	20.9	1.000
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	41.1	1.008
Average Correction Factor					1.001

Corrected As found 41.6 Previous response 41.4 % change -0.5%

Notes:

Inlet filter changed. Pump changed out for prevenative maintenance, Zero adjusted

Calibration Performed By:

Melissa Lemay



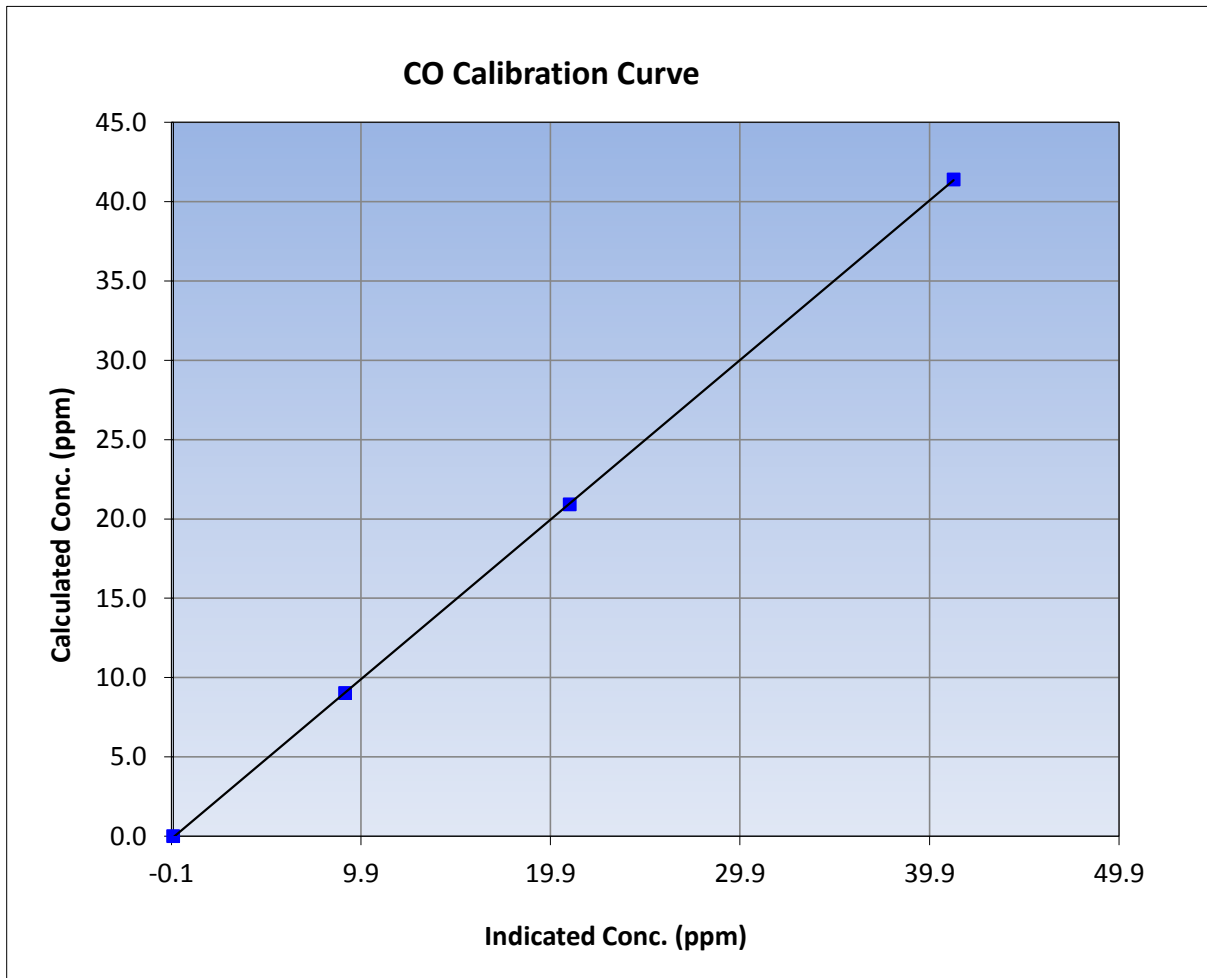
Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	February 1, 2017	Previous Calibration	January 6, 2017
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:25	End Time (MST)	13:06
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

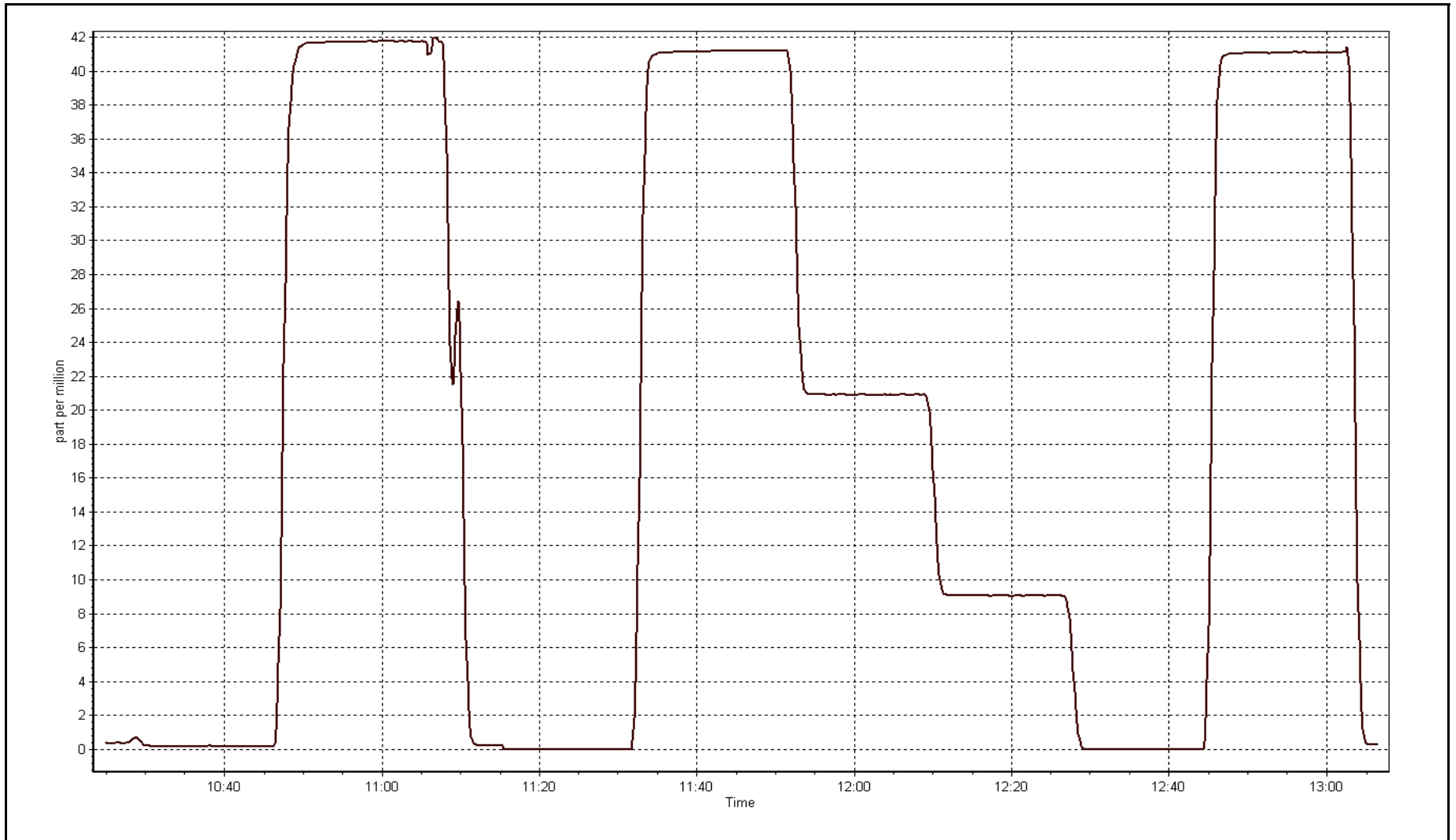
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999990
41.4	41.2	1.0054		
20.9	20.9	0.9999	Slope	1.005747
9.0	9.1	0.9966		
			Intercept	-0.054877



CO Calibration Plot

Date: February 1, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 8
FORT CHIPEWYAN
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 FEBRUARY 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	639	33	33	100	2	0	1	0
O3(ppb) Average	641	31	31	100	47	0	42	-
NO2(ppb) Average	639	33	33	100	15	0	4	-
NO(ppb) Average	639	33	33	100	3	-	0	-
NOX(ppb) Average	639	33	33	100	15	-	4	-
PM2.5(ug/m3) Average	668	4	4	100	55.4	-	6.3	0
Wind Speed 10 m (km/h) Average	670	0	2	99.7	35	-	26	-
Wind Direction 10 m (deg) Average	670	0	2	99.7	-	-	-	-
Temperature 2 m (C) Average	672	0	0	100	6.8	-	3.2	-
Relative Humidity (%) Average	672	0	0	100	100	-	93	-
Precipitation (mm) Total	465	0	207	69.2	0.5	-	2.5	-
Leaf Wetness (% of range) Average	672	0	0	100	15	-	10	-
Global Solar Radiation (W/m2) Average	672	0	0	100	561	-	146	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 FEBRUARY 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	639	0.1	0	-	0	0	0	0	0	0	0	2
O3(ppb) Average	641	35.5	4	-	20	30	33	36	39	40	40	47
NO2(ppb) Average	639	1	2	-	0	0	0	0	1	2	2	15
NO(ppb) Average	639	0.1	0	-	0	0	0	0	0	0	0	3
NOX(ppb) Average	639	1.1	2	-	0	0	0	1	1	2	2	15
PM2.5(ug/m3) Average	668	2.37	2.8	-	0.2	1	1.3	1.8	2.6	3.9	3.9	55.4
Wind Speed 10 m (km/h) Average	670	12.2	6	-	0	6	8	11	16	20	20	35
Wind Direction 10 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	672	-14.69	8.9	-	-31.2	-25.3	-21.4	-16.3	-8.8	-2.1	-2.1	6.8
Relative Humidity (%) Average	672	78.3	8	-	48	68	74	79	84	88	88	100
Precipitation (mm) Total	465	-	-	3.3	-	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	672	1.5	3	-	0	0	0	0	1	7	7	15
Global Solar Radiation (W/m2) Average	672	66.7	114	-	0	0	0	0	103	247	247	561

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Precipitation Collector	01 Feb 2017 01:00	09 Feb 2017 14:00	206	DAS collection error - data not recorded
Precipitation Collector	09 Feb 2017 15:00	09 Feb 2017 15:00	1	Maintenance - tipping bucket cleaned
Wind Speed, Wind Direction	16 Feb 2017 23:00	16 Feb 2017 23:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	23 Feb 2017 23:00	23 Feb 2017 23:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - February 2017**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 2 ppb on Feb 14 12:00	Maximum Daily Average: 0.6 ppb on Feb 15		Hours of Data:	639
Minimum Value: 0 ppb on Feb 1 16:00	Minimum Daily Average: 0.0 ppb on Feb 21		Hours of Missing Data:	33
Maximum Diurnal Average: 0.1 ppb at hour 12	Minimum Diurnal Average: 0.0 ppb at hour 1		Hours of Calibration:	33
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 = 1		Percent Operational Time:	100.0

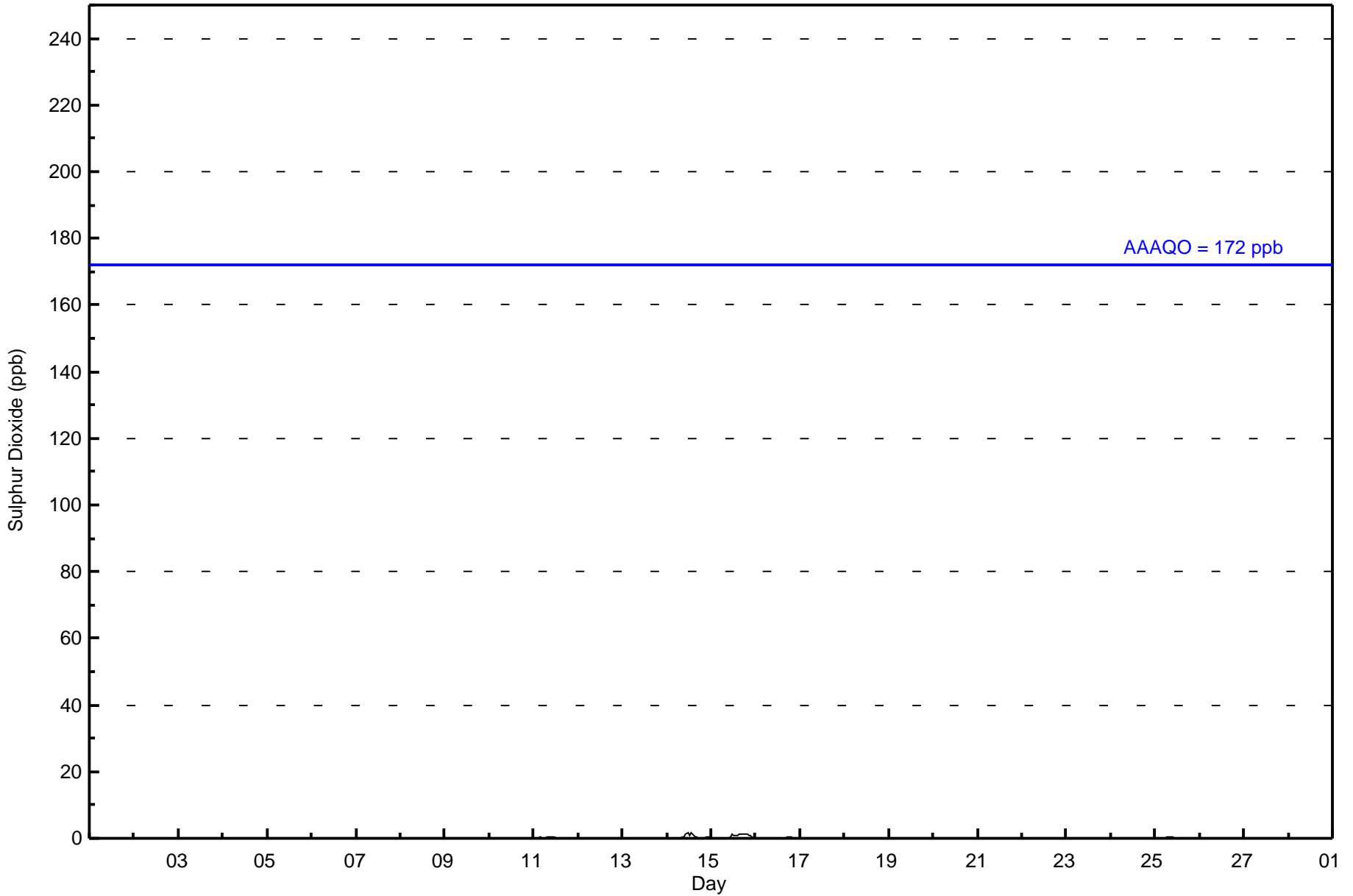
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Feb	0	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
5-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Feb	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
7-Feb	0	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
8-Feb	0	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0.0	0
10-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Feb	0	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Feb	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
13-Feb	0	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
14-Feb	0	0	Z	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.4	2
15-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
16-Feb	0	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-Feb	0	0	0	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-Feb	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
19-Feb	0	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
20-Feb	0	0	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
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Feb	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
25-Feb	0	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
26-Feb	0	0	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-Feb	0	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	Diurnal Average
	0	0	0	0	0	0	0	1	1	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	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 Chipewyan - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - February 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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637
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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637

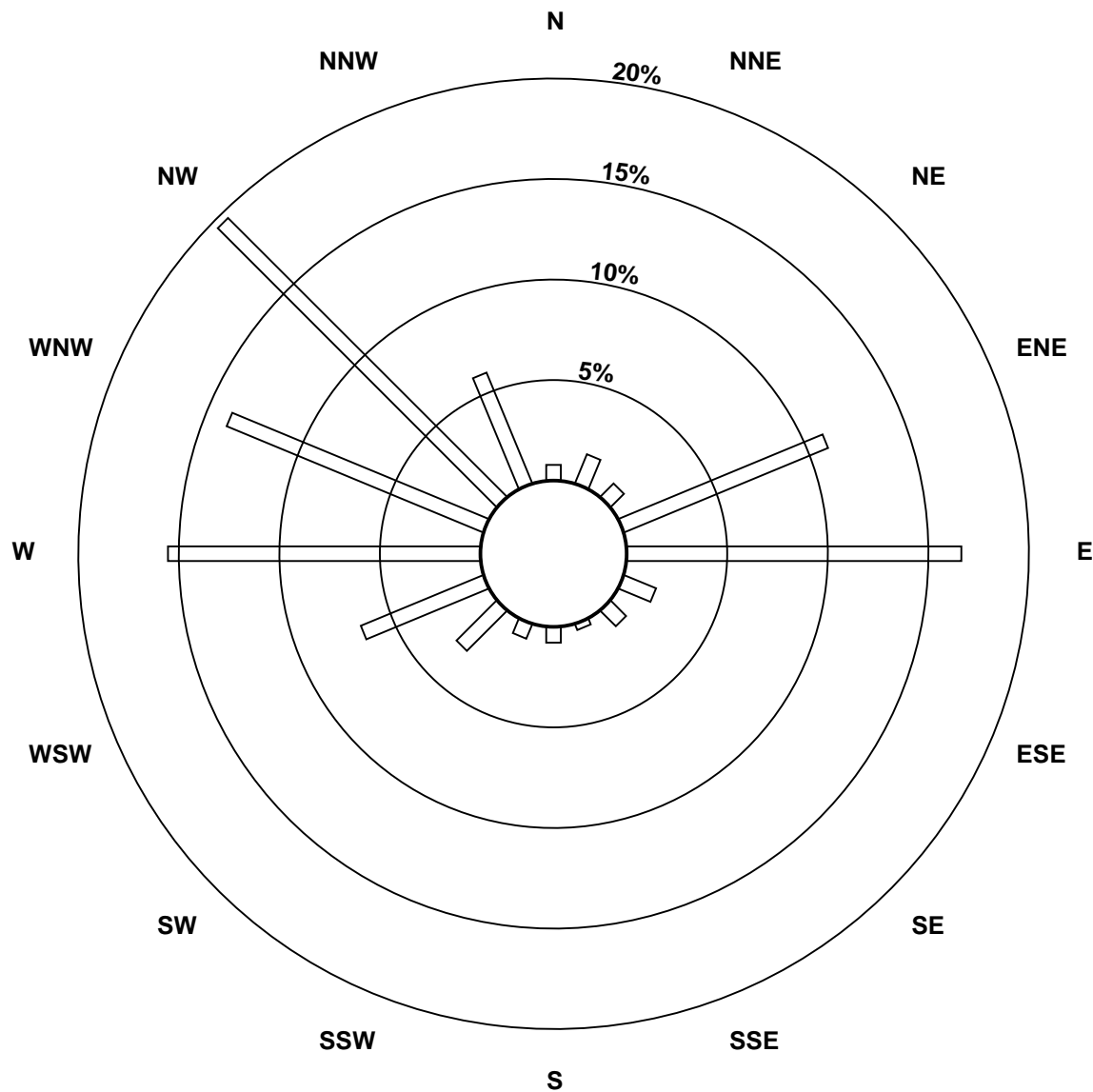
Total Number of Valid Hours: 637

Total Number of Hours: 672

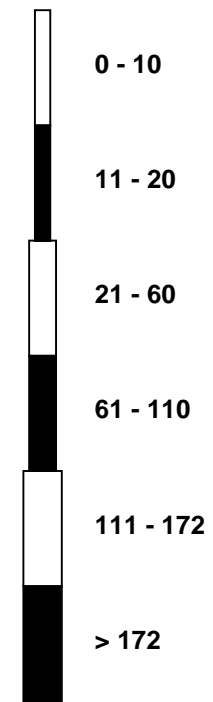


Wood Buffalo Environmental Association
Wind Rose Feb 2017

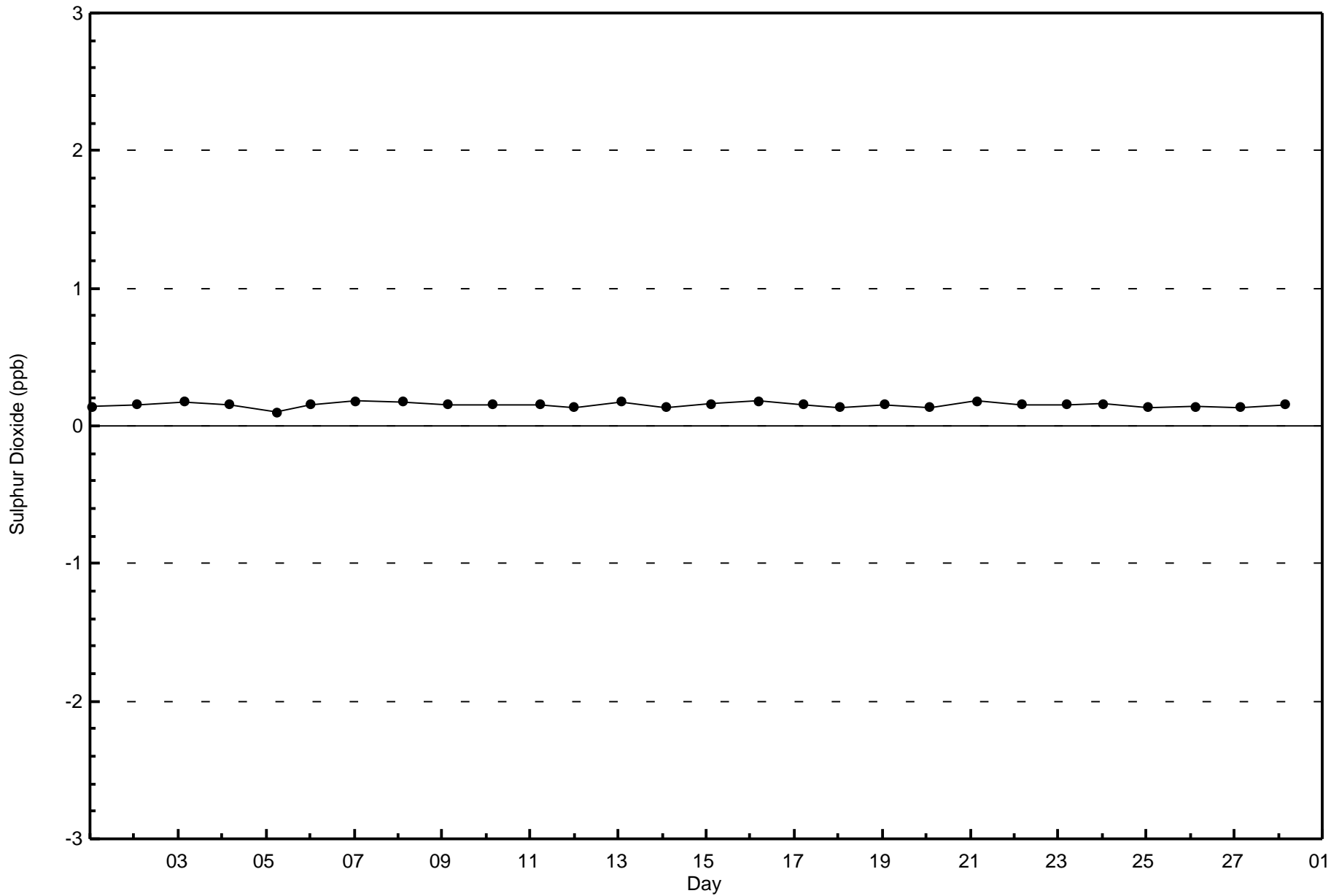
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)

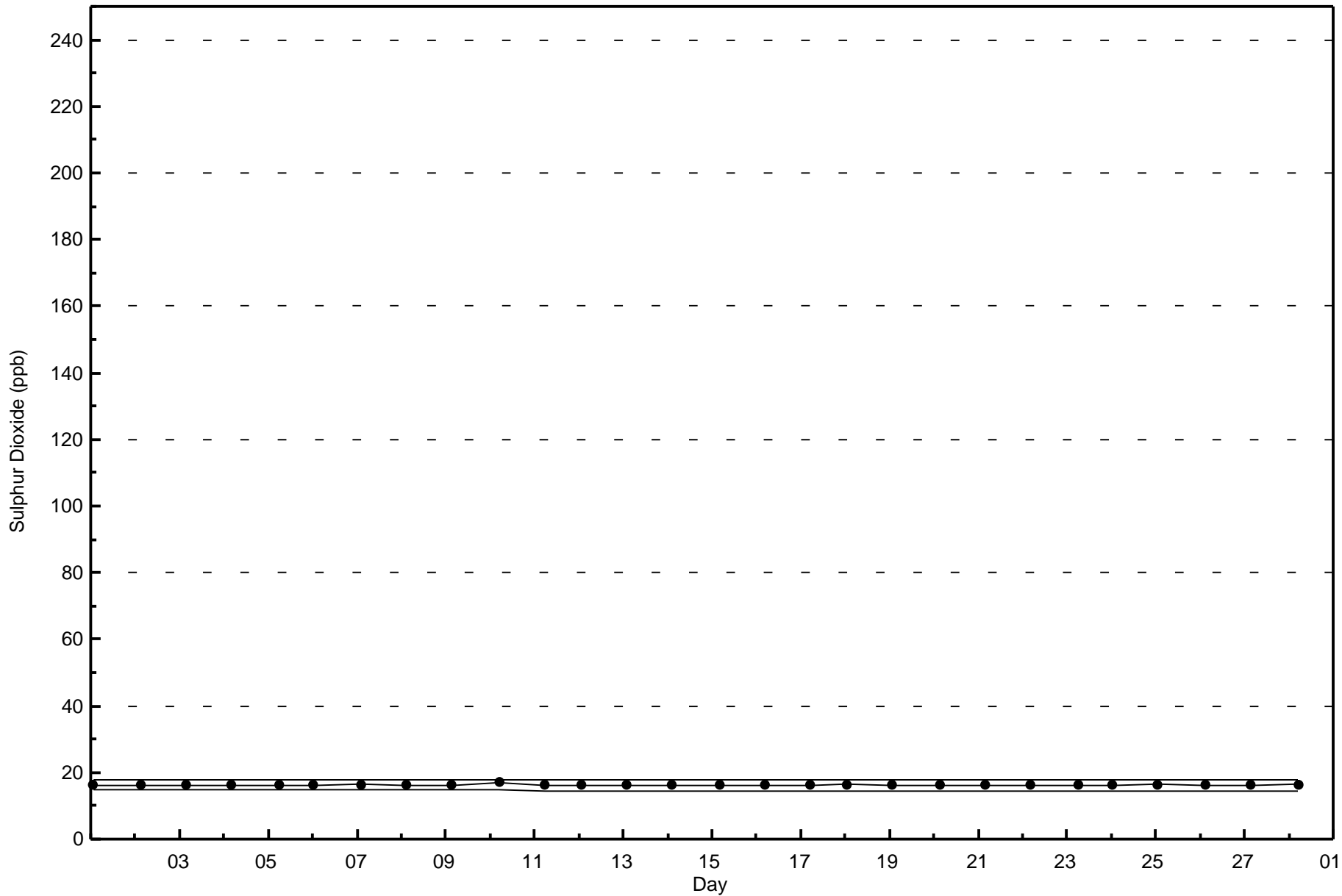


Classes (ppb)



Total Number of Valid Hours: 637





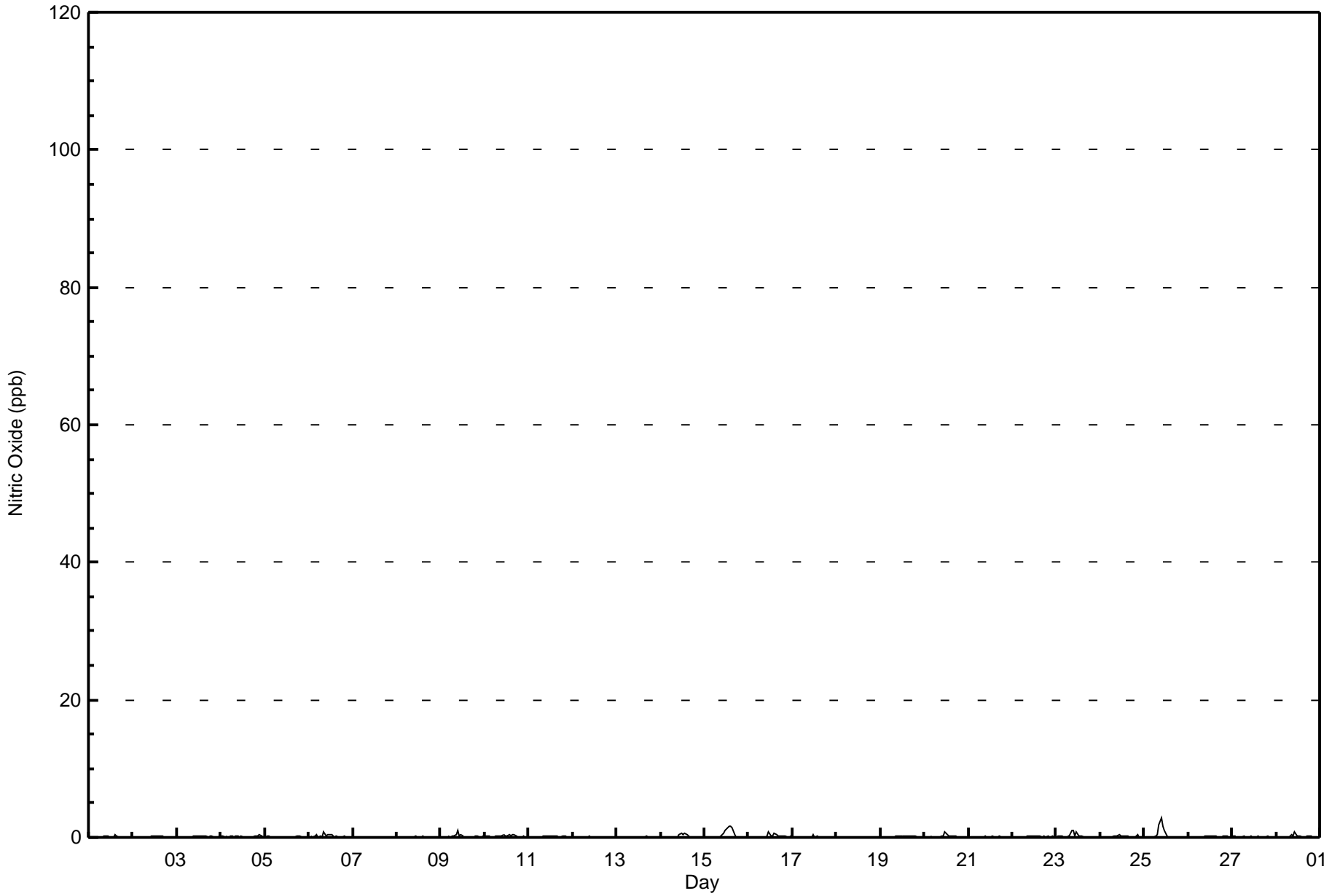


Maximum Value: 3 ppb on Feb 25 10:00														Maximum Daily Average: 0.4 ppb on Feb 25														Hours in Service: 672	
Minimum Value: 0 ppb on Feb 1 07:00														Minimum Daily Average: 0.0 ppb on Feb 7														Hours of Data: 639	
Maximum Diurnal Average: 0.3 ppb at hour 12														Minimum Diurnal Average: 0.0 ppb at hour 6														Hours of Missing Data: 33	
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 = 1														Hours of Calibration: 33	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	0	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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-Feb	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
7-Feb	0	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-Feb	0	0	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		
9-Feb	0	0	0	Z	0	0	0	0	1	1	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0.2	1		
10-Feb	0	0	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		
11-Feb	0	0	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-Feb	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		
13-Feb	0	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		
14-Feb	0	0	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1		
15-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0.4	2		
16-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
17-Feb	0	0	0	0	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-Feb	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		
19-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1		
21-Feb	0	0	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		
22-Feb	0	0	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-Feb	0	0	0	0	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
24-Feb	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		
25-Feb	0	Z	0	0	0	0	0	0	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3		
26-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1		
																												Diurnal Average	
0.0														0.1														0.0	
0														0														0	
																												Diurnal Maximum	
Z - zerospan														C - Calibration															



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - February 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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637
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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637

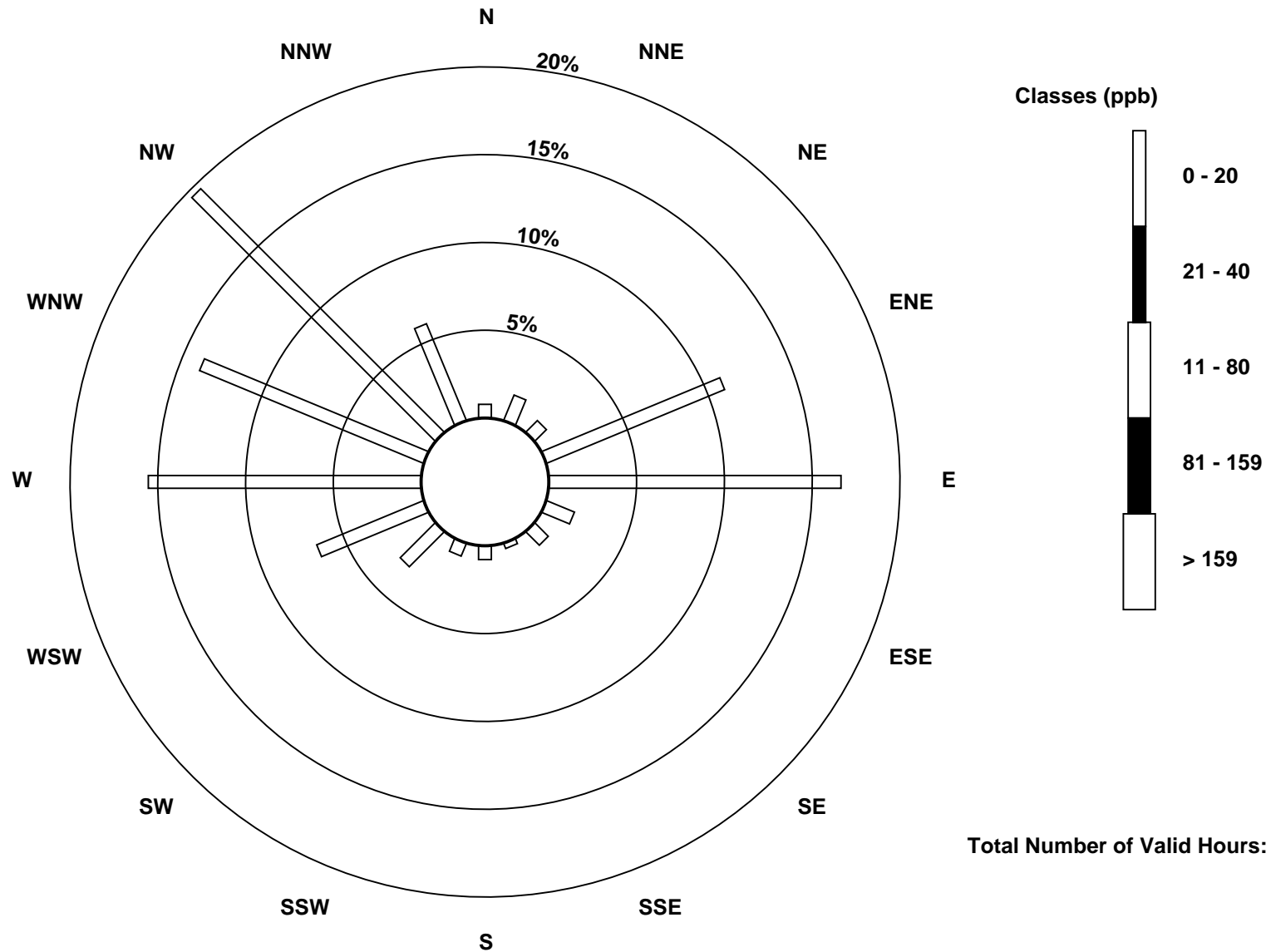
Total Number of Valid Hours: 637

Total Number of Hours: 672

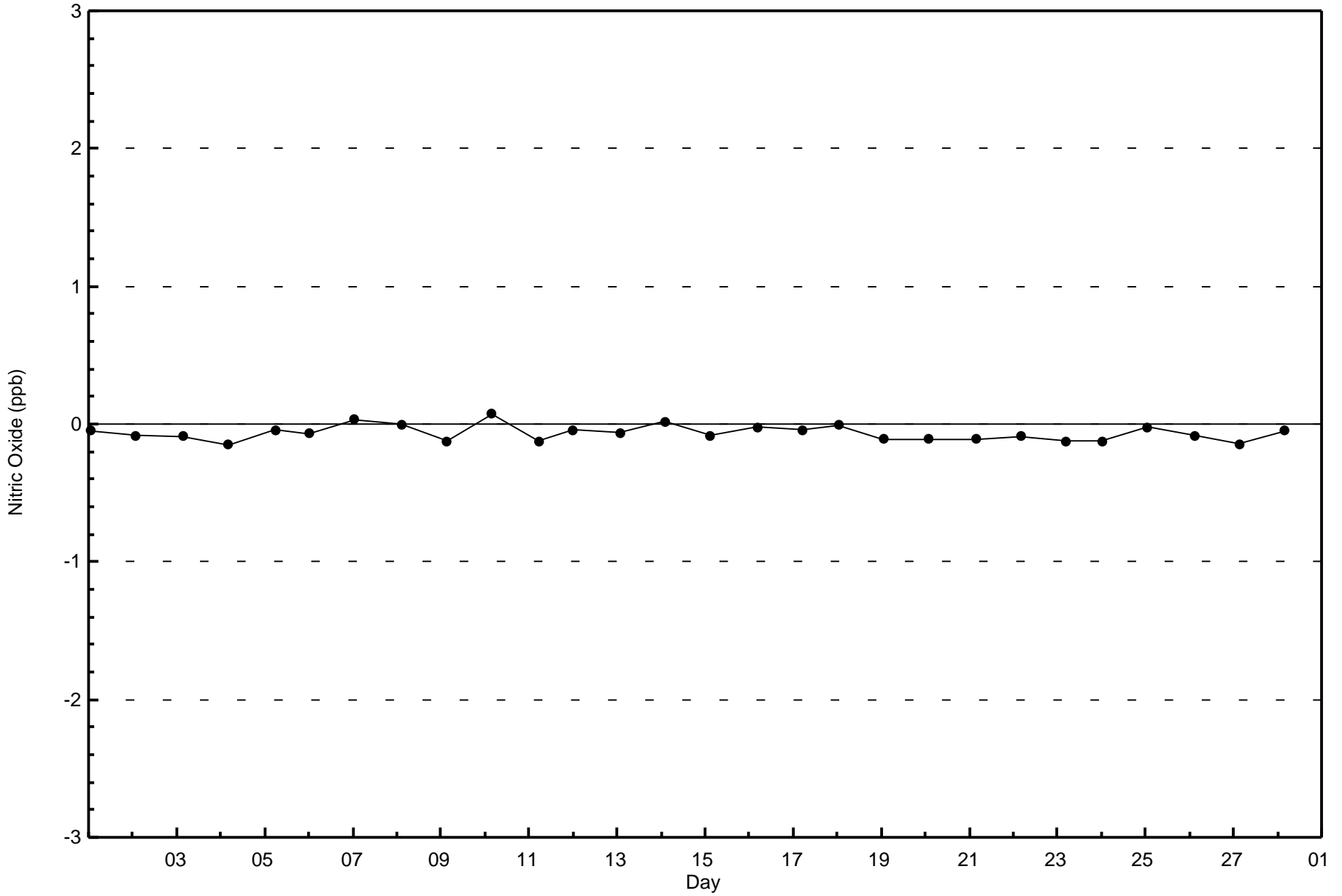


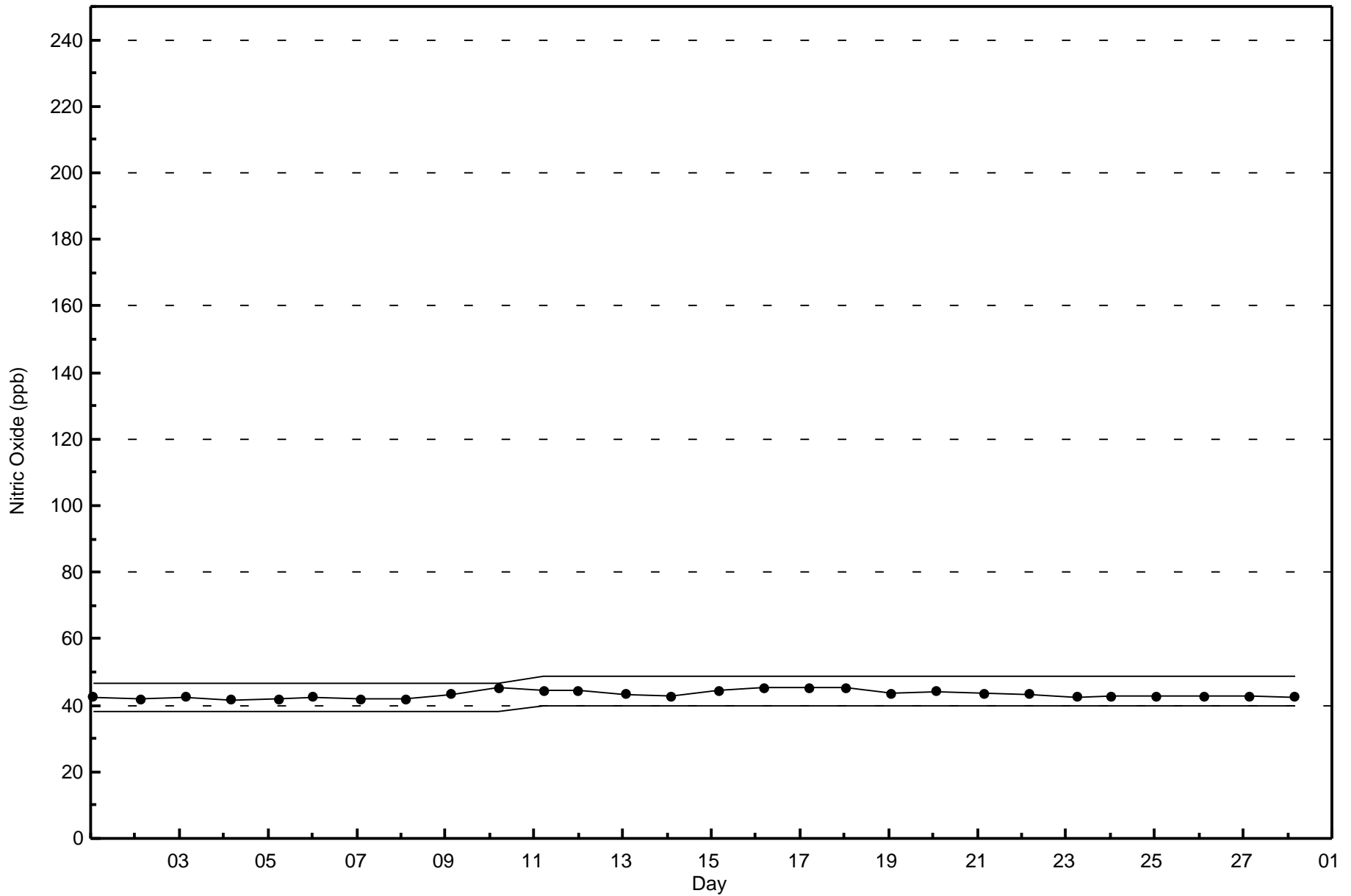
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 637







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 15 ppb on Feb 25 07:00	Maximum Daily Average: 4.1 ppb on Feb 15		Hours of Data:	639
Minimum Value: 0 ppb on Feb 7 05:00	Minimum Daily Average: 0.3 ppb on Feb 21		Hours of Missing Data:	33
Maximum Diurnal Average: 2.0 ppb at hour 21	Minimum Diurnal Average: 0.6 ppb at hour 13		Hours of Calibration:	33
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 = 10		Percent Operational Time:	100.0

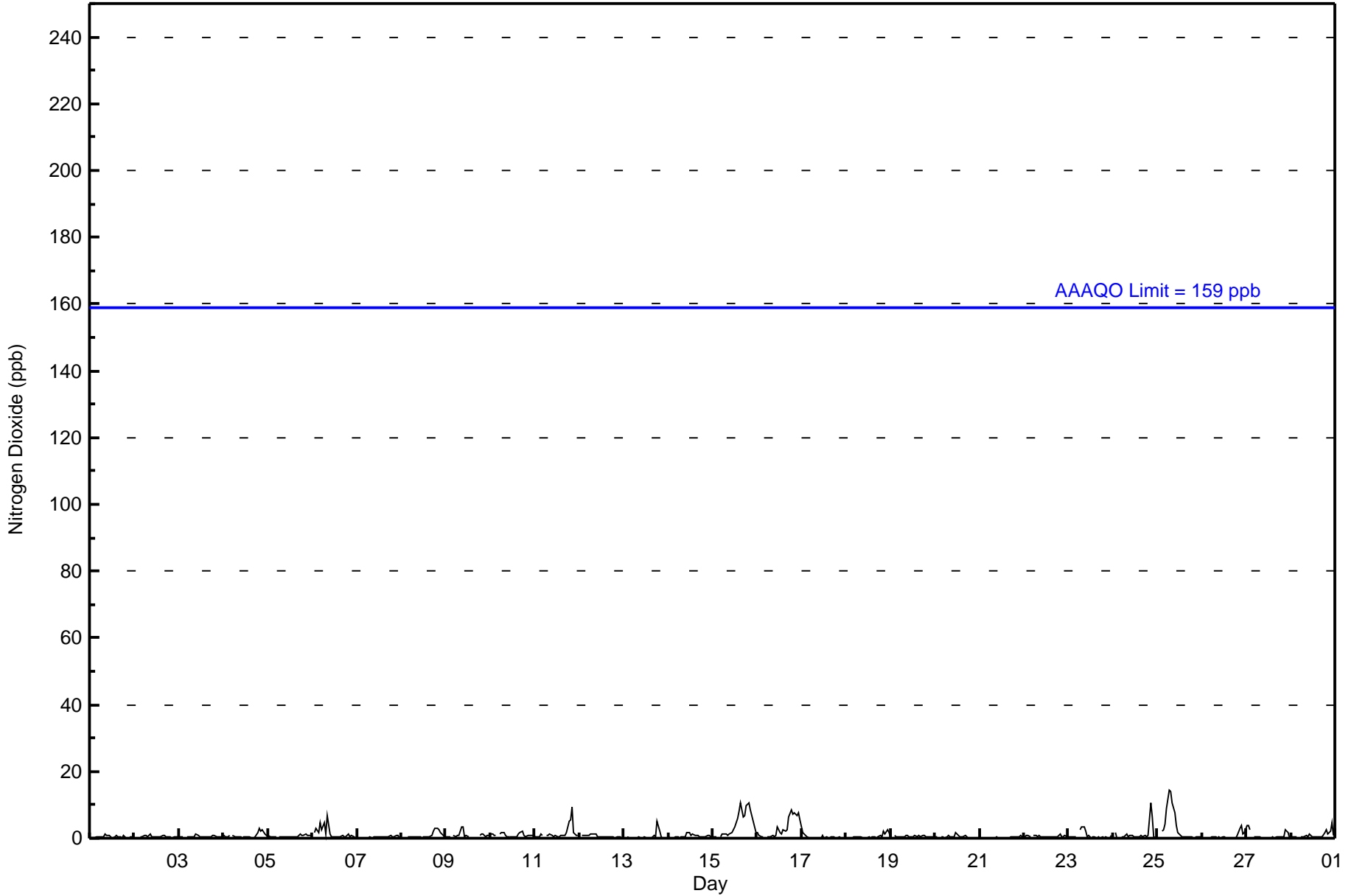
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0.4	1
2-Feb	0	0	Z	0	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0.5	1
3-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	0	0	1	0.5	1
4-Feb	1	1	0	1	Z	1	1	0	1	0	0	0	0	0	0	0	0	1	2	3	2	3	1	1	0.9	3
5-Feb	1	1	1	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.6	1
6-Feb	Z	2	3	2	5	2	5	1	7	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	1.6	7
7-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	0.4	1	
8-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	3	3	3	2	1	0	0.8	3
9-Feb	0	0	0	Z	1	0	1	1	3	3	0	1	0	C	C	C	C	C	1	1	1	1	1	1	1.0	3
10-Feb	1	1	1	1	Z	1	2	2	1	1	1	0	0	1	1	1	2	2	1	1	1	1	1	1	1.0	2
11-Feb	1	1	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	5	6	9	2	1	1	1	1.6	9
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	2	0	0	0	0	0	0.6	5
14-Feb	0	0	Z	0	0	0	0	1	1	1	2	2	1	1	1	1	1	1	1	0	1	1	1	1	0.7	2
15-Feb	1	0	1	Z	0	1	1	1	1	1	2	3	3	6	8	10	6	7	10	11	9	7	5	2	4.1	11
16-Feb	2	1	1	1	Z	0	0	0	1	0	1	4	2	1	2	2	2	6	9	7	8	7	8	6	3.1	9
17-Feb	2	1	1	1	0	Z	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.4	2
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	3	2	0	0.6	3
19-Feb	0	Z	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
20-Feb	0	0	Z	0	0	0	0	1	1	0	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0.4	2
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0.3	1
22-Feb	0	1	1	1	Z	1	1	0	1	0	0	0	1	0	0	1	0	0	1	1	0	1	1	1	0.6	1
23-Feb	1	1	0	0	1	Z	3	4	4	2	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.8	4
24-Feb	Z	2	0	0	0	0	1	1	1	1	1	0	0	0	1	0	1	1	1	11	6	0	0	1.2	11	
25-Feb	0	Z	2	2	4	9	15	14	11	8	4	2	1	0	0	0	0	0	0	0	0	0	0	0	3.2	15
26-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	1	2	0	0.6	4
27-Feb	4	4	3	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	3	2	0	0	0.9	4
28-Feb	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	0	1	0	1	2	3	1	2	5	1	1.0	5
	0.7	0.7	0.7	0.6	0.7	0.9	1.3	1.2	1.4	1.0	0.7	0.8	0.6	0.7	0.8	0.9	0.8	1.1	1.6	1.6	2.0	1.5	1.2	0.8		Diurnal Average
	4	4	3	2	5	9	15	14	11	8	4	4	3	6	8	10	6	7	10	11	11	7	8	6		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
Fort Chipewyan - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - February 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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637
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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637

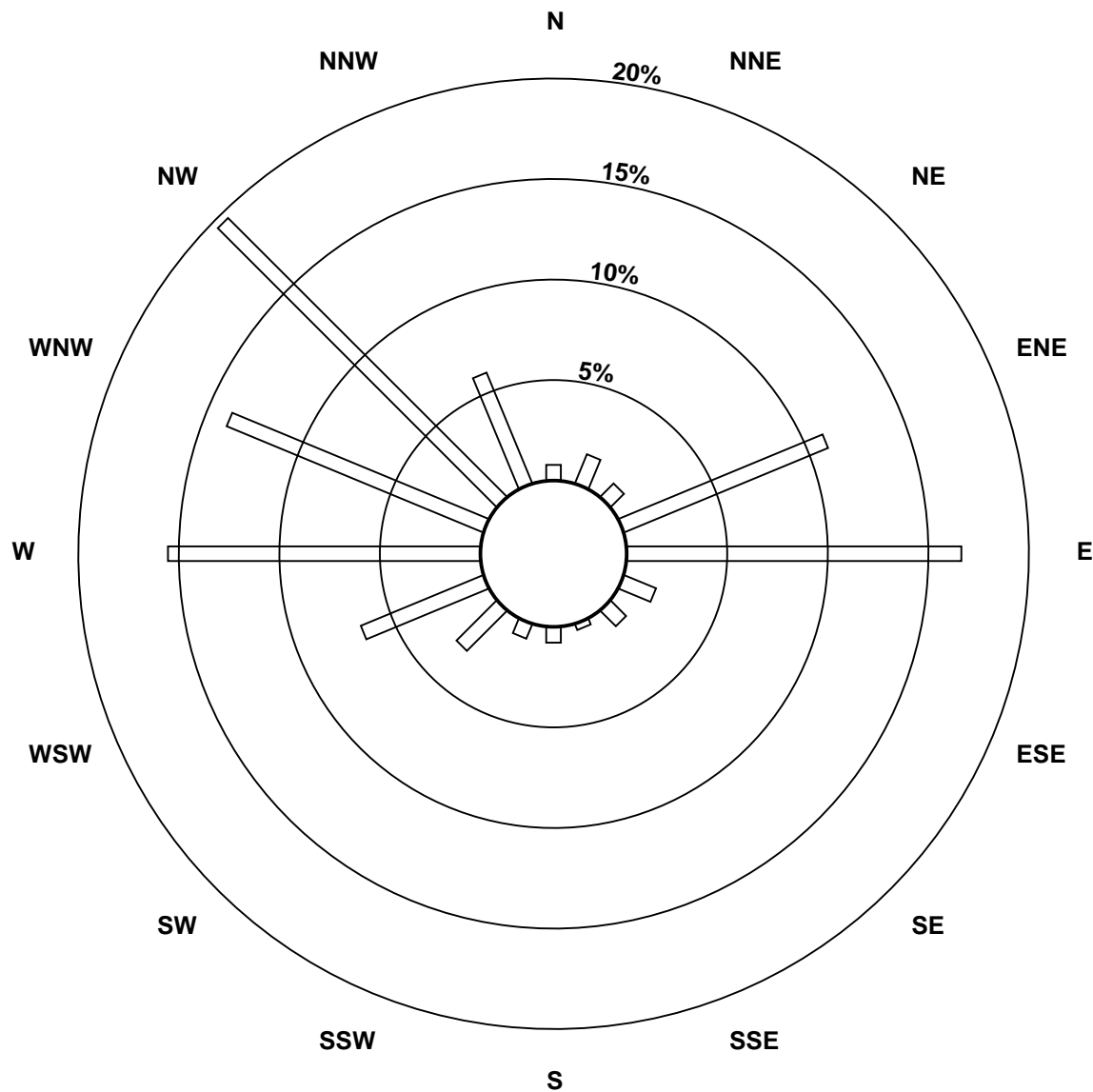
Total Number of Valid Hours: 637

Total Number of Hours: 672

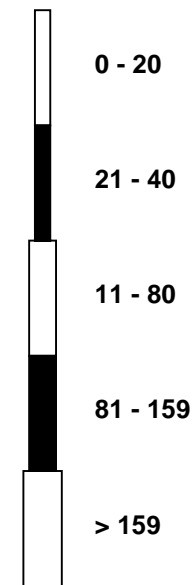


Wood Buffalo Environmental Association
Wind Rose Feb 2017

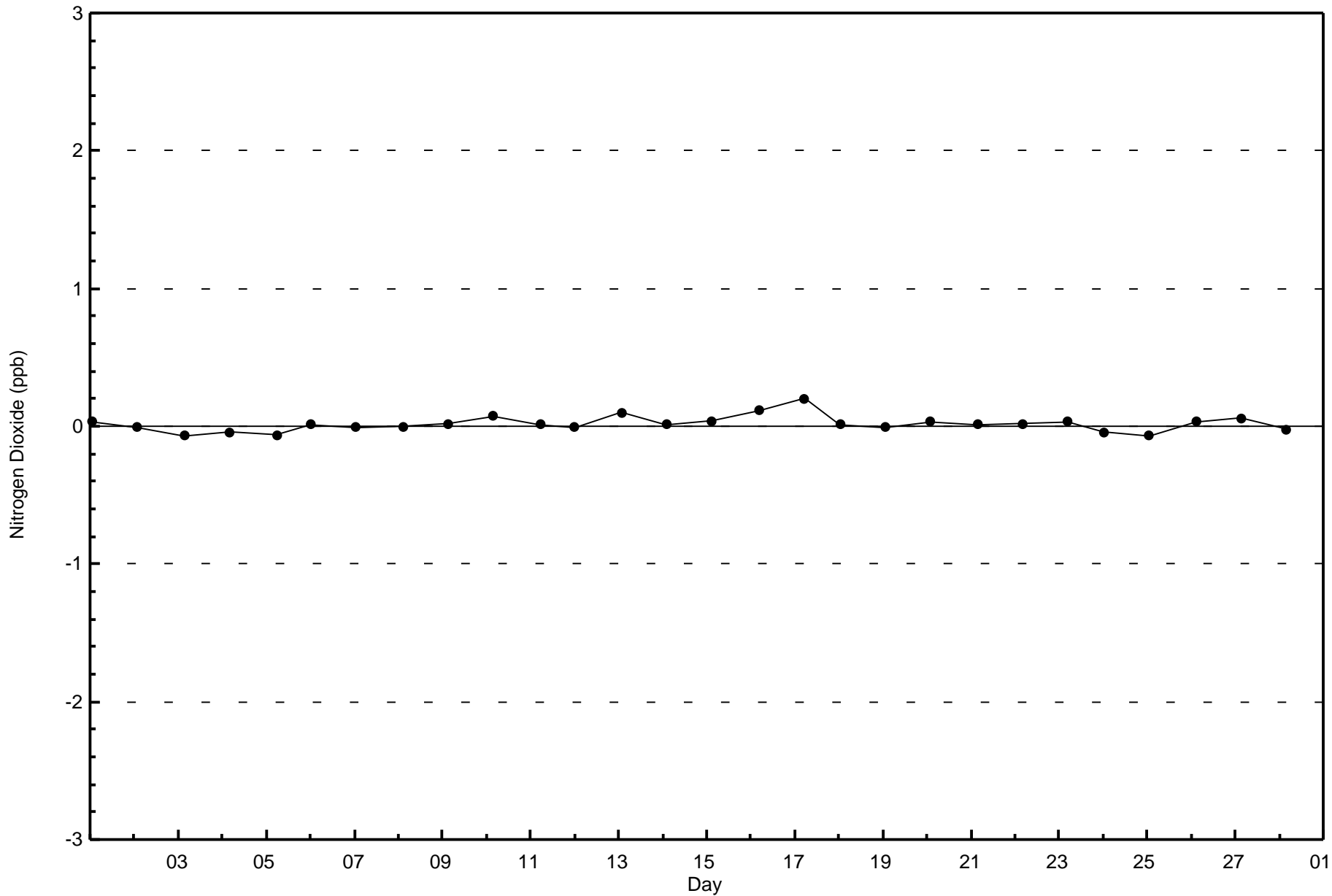
Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)

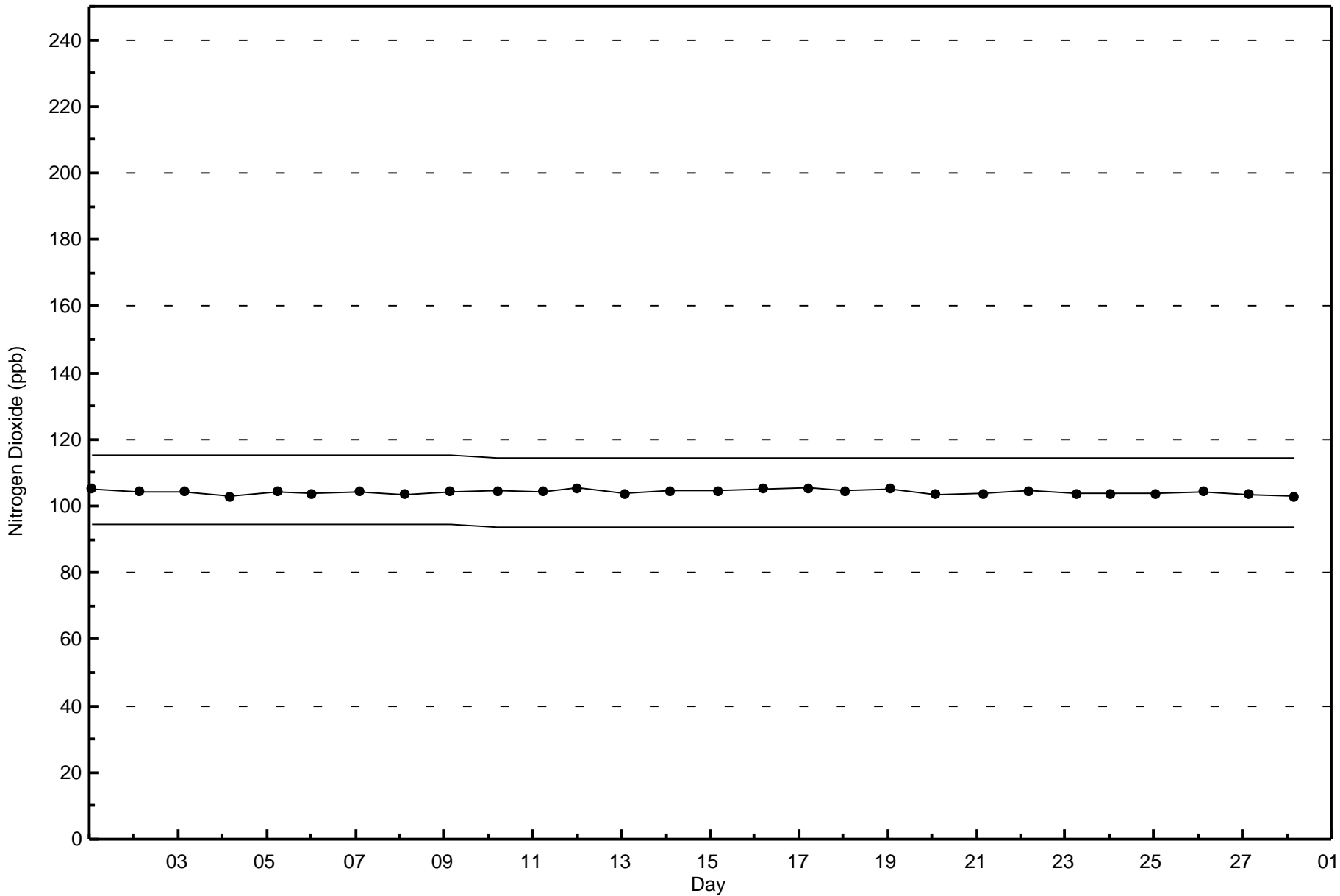


Classes (ppb)



Total Number of Valid Hours: 637







Wood Buffalo Environmental Association
Summary of Hour Averages

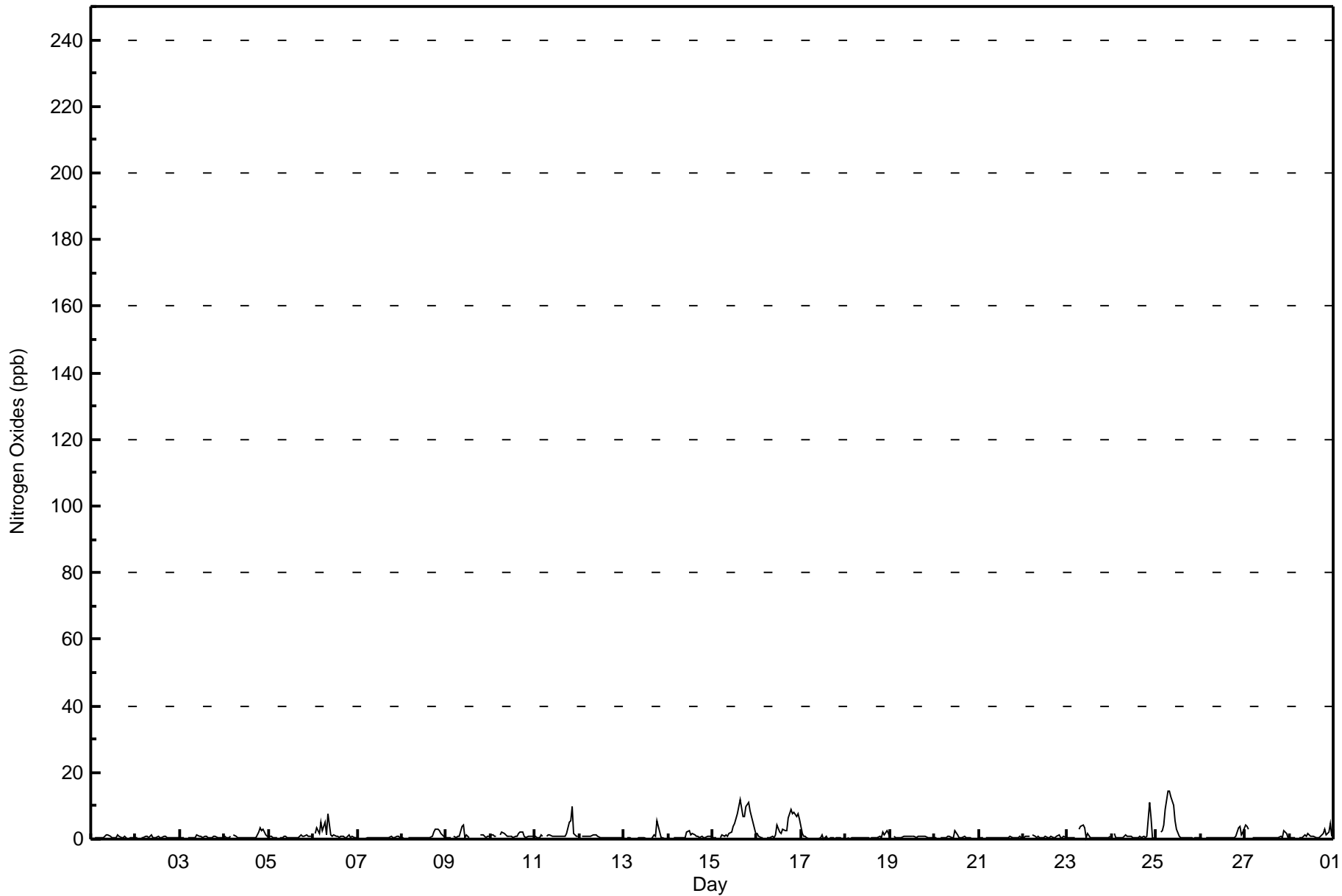
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2017

Maximum Value: 15 ppb on Feb 25 08:00		Maximum Daily Average: 4.5 ppb on Feb 15		Hours in Service: 672																						
Minimum Value: 0 ppb on Feb 7 05:00		Minimum Daily Average: 0.4 ppb on Feb 21		Hours of Data: 639																						
Maximum Diurnal Average: 2.1 ppb at hour 21		Minimum Diurnal Average: 0.7 ppb at hour 4		Hours of Missing Data: 33																						
Monthly Average: 1.1 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 11		Hours of Calibration: 33																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0.5	1
2-Feb	0	0	Z	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1
3-Feb	0	0	0	Z	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.6	1
4-Feb	1	1	0	1	Z	1	1	0	1	1	0	0	0	0	0	0	0	1	2	3	3	3	1	1	1.0	3
5-Feb	1	1	1	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.6	1
6-Feb	Z	2	3	2	5	2	5	1	8	1	1	1	1	0	1	1	0	1	1	0	1	0	1	0	1.7	8
7-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	0	0.4	1
8-Feb	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	1	0	1	2	3	3	3	2	1	1	0.9	3
9-Feb	0	0	0	Z	1	1	1	1	4	4	1	1	1	C	C	C	C	C	1	1	1	1	1	1	1.2	4
10-Feb	1	1	1	1	Z	1	2	2	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1.1	2
11-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	5	6	10	2	1	1	1.7	10
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	2	0	0	0	0	0	0.6	5
14-Feb	0	0	Z	0	0	0	0	1	0	1	2	2	1	2	1	1	1	1	1	0	1	1	1	1	0.8	2
15-Feb	0	0	1	Z	1	1	1	1	1	2	2	4	5	8	10	12	7	7	10	11	8	7	5	2	4.5	12
16-Feb	2	1	1	0	Z	0	0	0	1	0	1	4	2	2	3	2	3	7	9	7	8	7	8	6	3.2	9
17-Feb	2	1	1	1	0	Z	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0.4	2
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	3	2	0.6	3
19-Feb	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.7	1
20-Feb	0	1	Z	0	0	0	1	1	1	1	1	3	1	0	0	0	1	1	0	0	0	0	0	0	0.6	3
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0.4	1
22-Feb	1	1	1	1	Z	1	1	0	1	1	0	0	1	0	1	1	0	0	1	1	1	1	1	1	0.7	1
23-Feb	1	1	0	1	1	Z	3	4	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1.0	4
24-Feb	Z	2	0	0	0	0	1	1	1	1	1	0	1	1	1	0	1	0	1	11	6	0	0	0	1.3	11
25-Feb	0	Z	2	2	4	9	15	15	13	10	5	3	1	0	0	1	0	0	0	0	0	0	0	0	3.6	15
26-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	1	2	0.7	4	
27-Feb	4	4	3	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	2	0	1.0	4
28-Feb	0	0	0	0	Z	1	1	1	1	1	2	1	1	1	1	0	0	1	2	3	1	2	5	1	1.1	5
		0.7	0.8	0.8	0.7	0.8	1.0	1.3	1.3	1.7	1.3	0.9	1.1	0.8	0.8	0.9	1.1	0.9	1.2	1.7	1.7	2.1	1.6	1.3	0.8	Diurnal Average
		4	4	3	2	5	9	15	15	13	10	5	4	5	8	10	12	7	7	10	11	11	7	8	6	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637
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	5	10	6	70	106	11	7	2	5	5	18	42	99	88	125	38	637

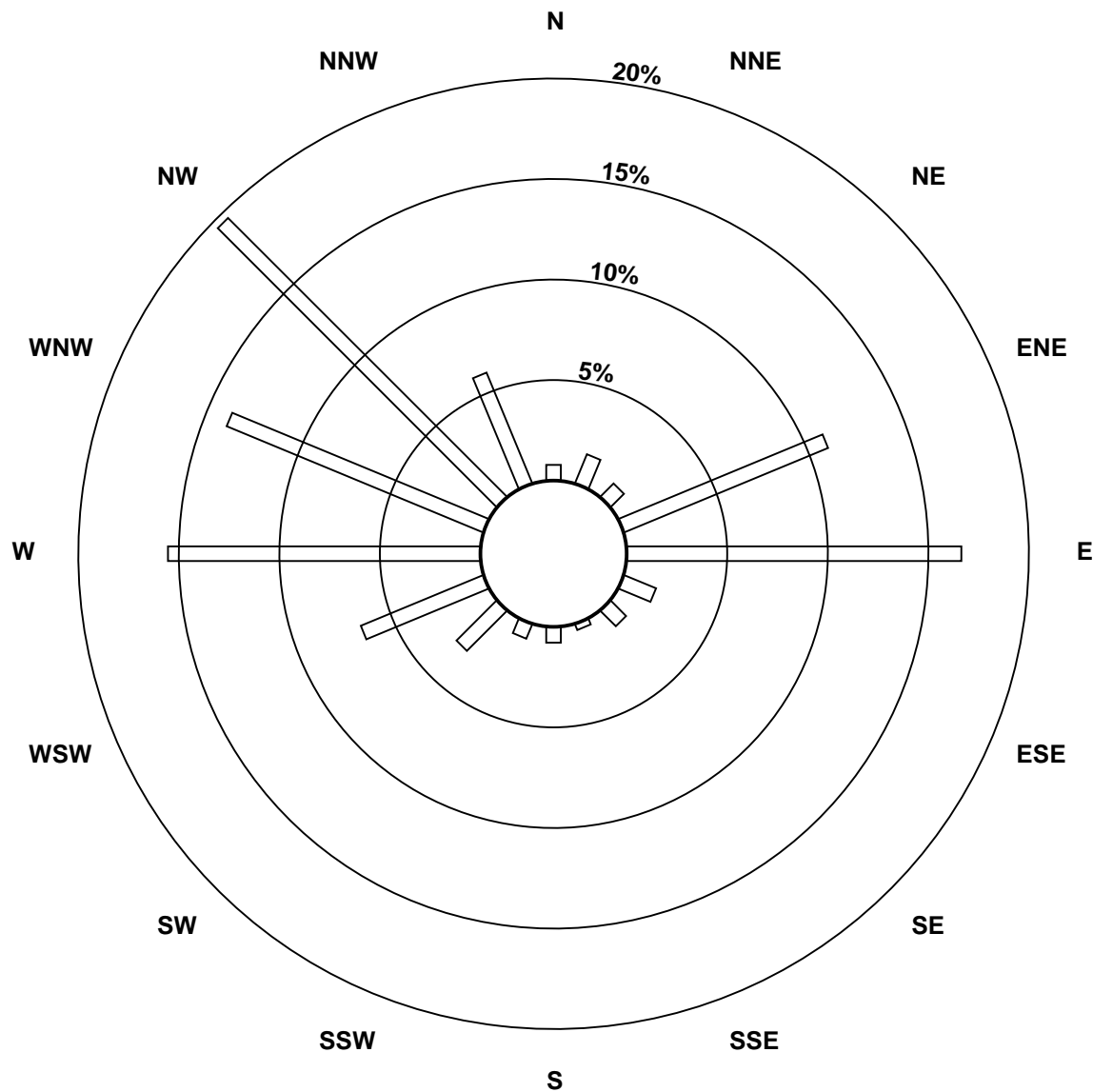
Total Number of Valid Hours: 637

Total Number of Hours: 672

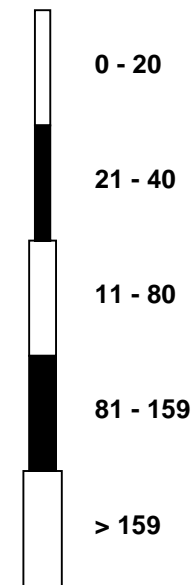


Wood Buffalo Environmental Association
Wind Rose Feb 2017

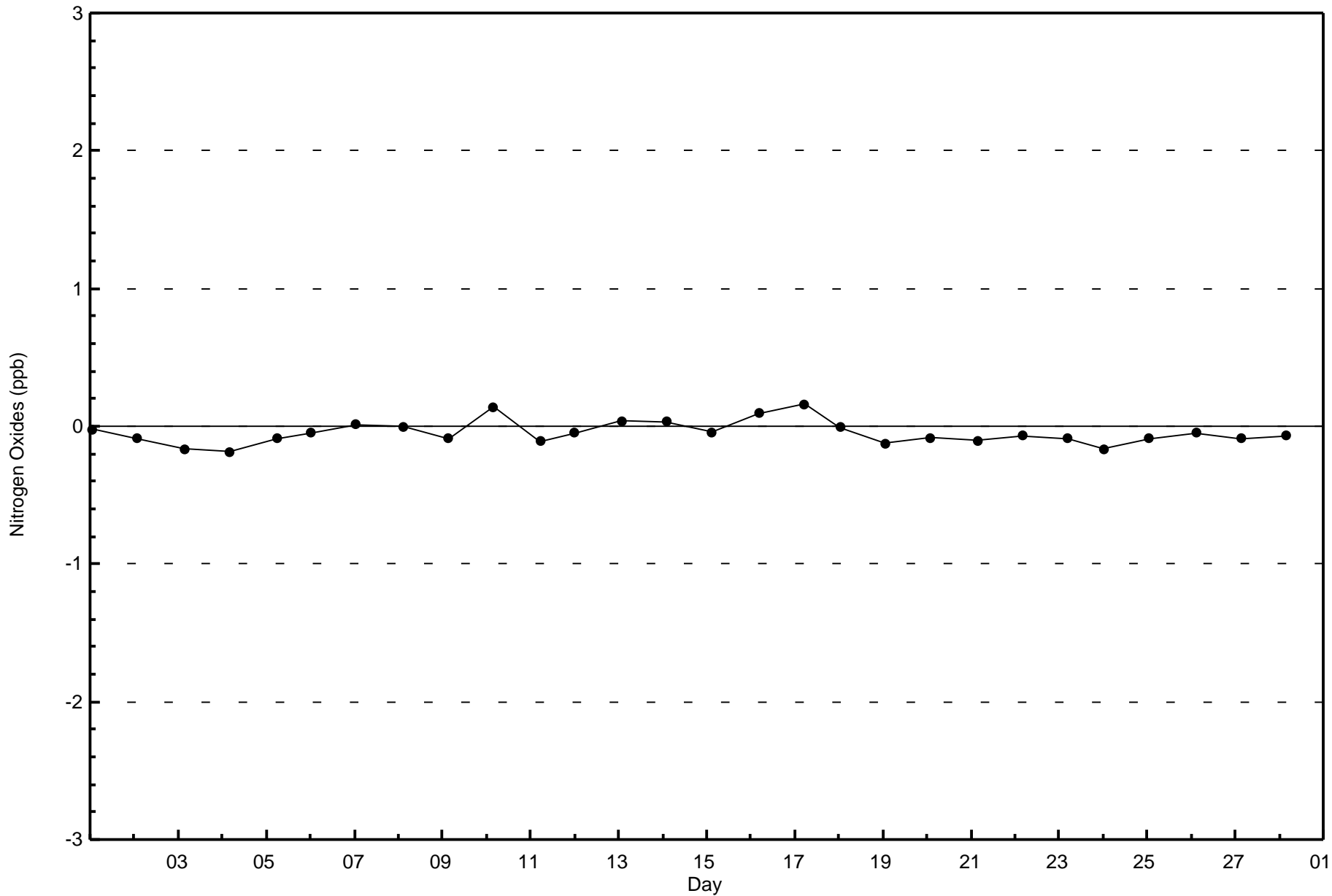
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)



Classes (ppb)



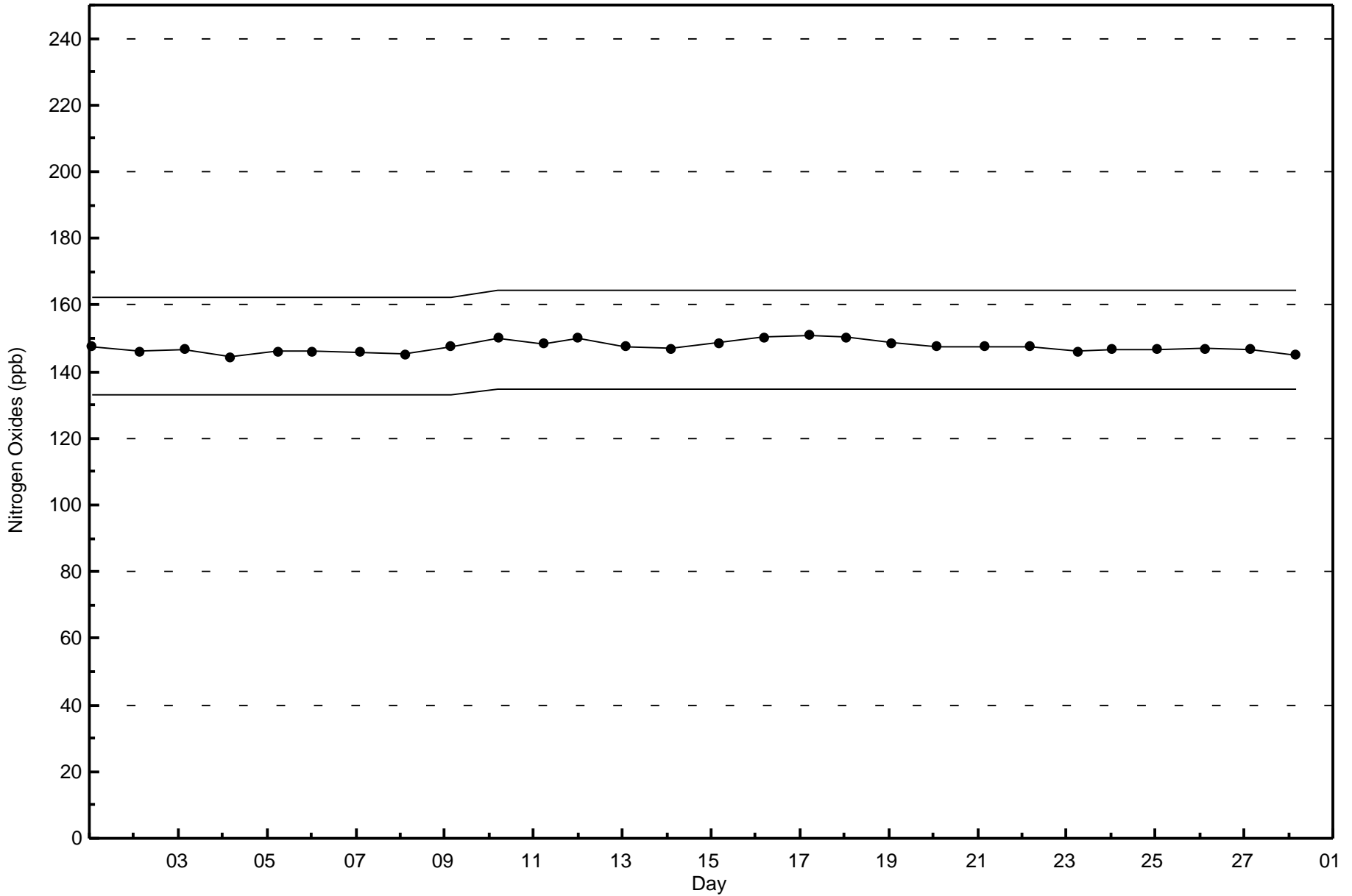
Total Number of Valid Hours: 637





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

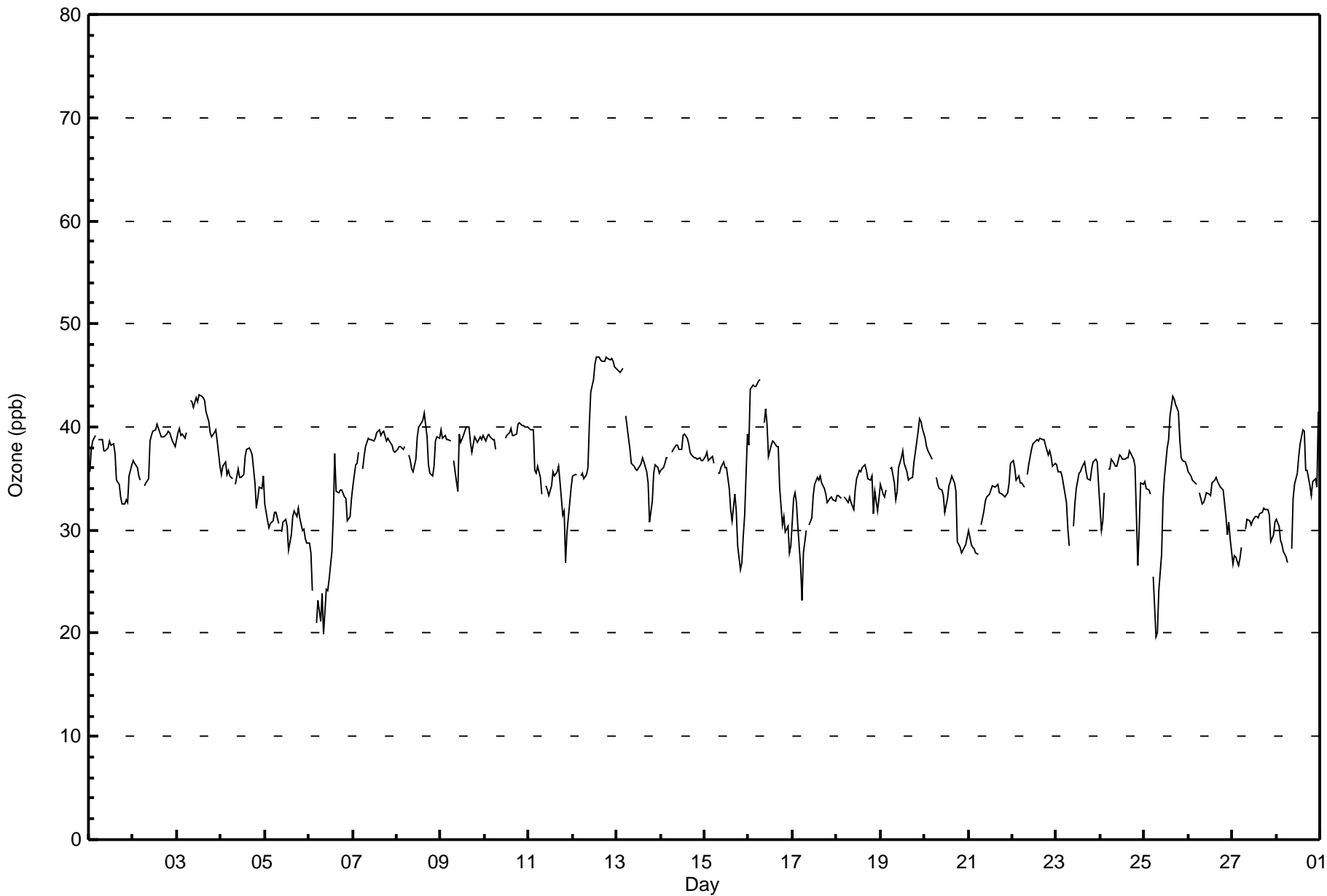
Fort Chipewyan - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 47 ppb on Feb 12 14:00										Maximum Daily Average: 42.1 ppb on Feb 12										Hours of Data: 641						
Minimum Value: 20 ppb on Feb 25 07:00										Minimum Daily Average: 28.6 ppb on Feb 6										Hours of Missing Data: 31						
Maximum Diurnal Average: 37.4 ppb at hour 15										Minimum Diurnal Average: 33.6 ppb at hour 8										Hours of Calibration: 31						
Monthly Average: 35.5 ppb										Percentiles: P ₁ = 23 P ₁₀ = 30 Q ₁ = 33 Median = 36 Q ₃ = 39 P ₉₀ = 40 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-Feb	36	38	39	39	Z	39	39	39	38	38	38	39	38	38	37	35	34	33	33	33	33	33	35	36	36.5	39
2-Feb	37	37	36	35	35	Z	34	35	35	39	39	40	40	40	40	39	39	39	39	40	39	39	38	38	37.9	40
3-Feb	40	40	39	39	39	39	Z	43	43	42	43	42	43	43	43	43	41	40	39	39	40	39	36	40.6	43	
4-Feb	35	36	37	35	36	35	35	Z	34	36	35	35	35	37	38	38	38	37	35	32	33	34	34	35	35.5	38
5-Feb	33	31	30	31	31	32	32	31	Z	30	31	31	30	28	30	31	32	31	32	31	30	30	29	29	30.7	33
6-Feb	29	28	24	Z	21	23	21	24	20	24	24	25	28	31	37	34	34	34	34	33	33	31	31	33	28.6	37
7-Feb	34	36	36	37	Z	36	37	38	39	39	39	39	39	40	40	39	39	40	39	39	39	38	38	38	38.1	40
8-Feb	38	38	38	38	38	Z	37	37	36	36	37	39	40	40	41	41	39	36	35	35	36	39	39	39	37.9	41
9-Feb	40	39	39	39	39	39	Z	37	35	34	39	39	39	40	40	40	39	38	39	39	39	39	39	39	38.5	40
10-Feb	39	39	39	39	39	39	38	Z	C	C	C	39	39	40	40	39	39	39	40	40	40	40	40	40	39.4	40
11-Feb	40	40	40	36	35	36	35	34	Z	34	34	33	34	36	35	36	36	35	31	32	27	30	33	34	34.6	40
12-Feb	35	35	35	Z	35	35	35	35	35	36	40	43	45	46	47	46	46	46	47	47	46	47	46	46	42.1	47
13-Feb	46	45	45	46	Z	41	39	38	36	36	36	36	36	37	37	37	36	35	31	33	36	36	35	35	37.7	46
14-Feb	36	36	36	37	37	Z	38	38	38	38	38	38	39	39	39	38	38	37	37	37	37	37	37	37	37.5	39
15-Feb	37	37	37	37	37	36	Z	36	35	36	37	36	36	34	32	31	33	32	29	26	27	29	31	39	34.0	39
16-Feb	38	44	44	44	44	44	45	Z	40	42	40	37	38	39	39	38	38	34	31	31	30	30	28	28	37.7	45
17-Feb	33	34	33	30	26	23	28	30	Z	31	31	33	34	35	35	35	35	34	33	33	33	33	33	33	32.1	35
18-Feb	33	33	33	Z	33	33	33	33	33	32	34	35	36	36	36	36	36	35	35	35	32	34	32	33	33.9	36
19-Feb	34	34	33	34	Z	36	36	35	33	34	36	37	38	36	36	35	35	35	37	38	40	41	41	40	36.1	41
20-Feb	39	38	38	37	37	Z	35	34	34	34	33	32	33	34	35	35	35	34	29	28	28	28	29	29	33.4	39
21-Feb	30	29	28	28	28	28	Z	31	32	33	33	33	34	34	34	34	34	34	34	33	33	34	35	37	32.3	37
22-Feb	37	36	35	35	35	35	34	Z	35	36	38	38	39	39	39	39	39	39	38	37	38	37	36	36	36.9	39
23-Feb	36	36	36	35	34	33	30	28	Z	30	33	34	35	36	36	37	36	35	35	36	37	37	37	34	34.6	37
24-Feb	30	31	34	Z	36	36	37	37	36	36	37	37	37	37	37	38	37	37	36	27	30	35	34	35.1	38	
25-Feb	35	34	34	34	Z	26	20	20	24	28	33	35	38	39	41	43	43	42	41	39	37	37	36	34.5	43	
26-Feb	36	35	35	35	34	Z	34	33	33	33	34	33	33	35	35	35	35	34	34	34	31	30	31	29	33.5	36
27-Feb	27	27	27	27	27	28	Z	30	31	31	31	31	31	31	31	32	32	32	32	32	31	29	30	31	30.0	32
28-Feb	31	30	29	29	28	27	Z	28	33	34	36	37	38	40	40	36	36	34	33	35	35	34	41	33.6	41	
35.4 35.6 35.4 35.7 34.1 33.9 33.8 33.6 34.1 34.6 35.5 36.0 36.7 37.1 37.4 37.3 36.9 36.2 35.3 35.1 34.4 34.9 35.0 35.6																								Diurnal Average		
46 45 45 46 44 44 45 43 43 42 43 45 46 47 47 46 46 46 47 47 46 47 46 46 46																								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 Chipewyan - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	3	0.47	0.47
21 - 50	638	99.53	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort Chipewyan - February 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	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	3
21 - 50	5	10	6	69	108	10	6	2	5	5	17	43	100	88	124	38	636
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	5	10	6	70	108	11	7	2	5	5	17	43	100	88	124	38	639

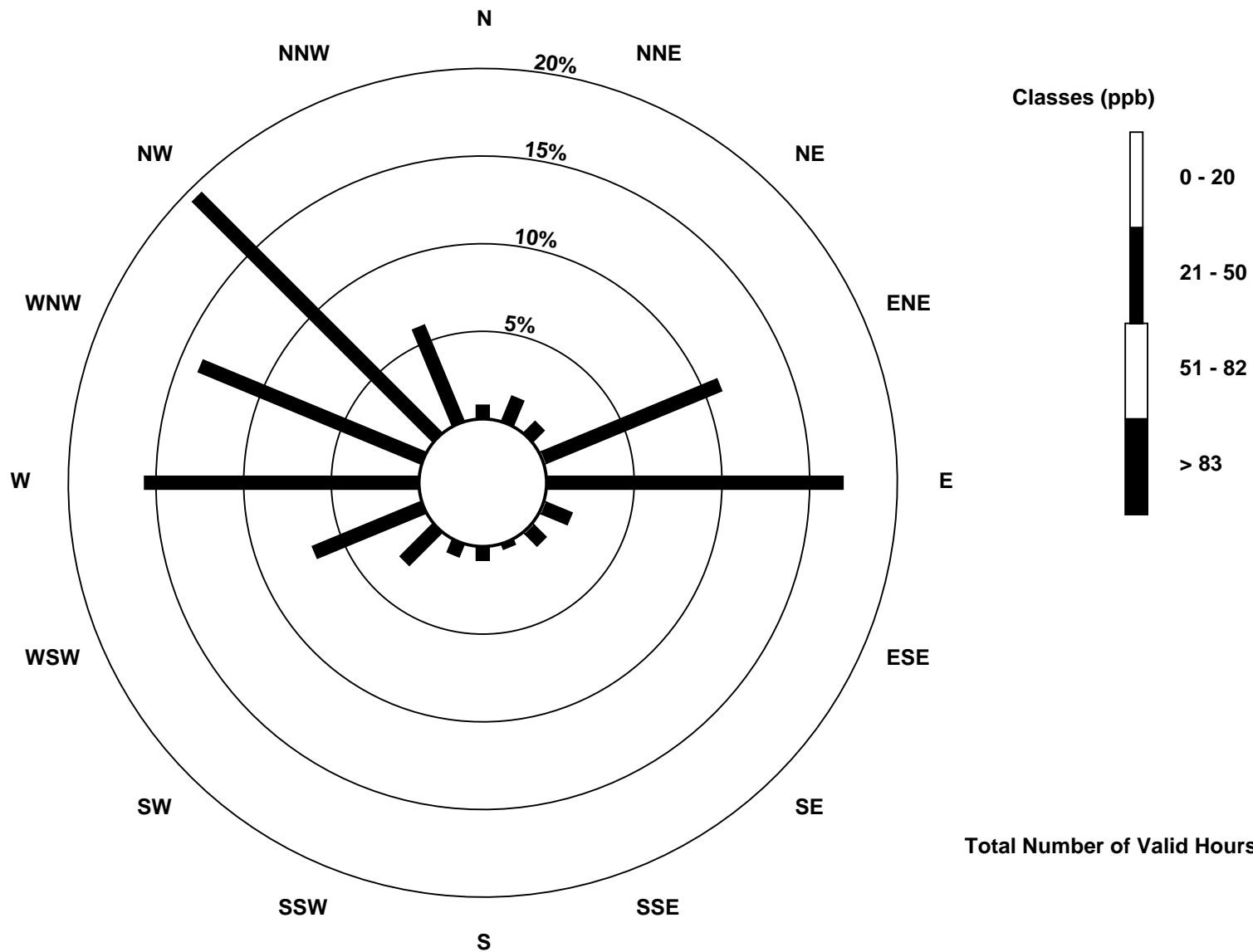
Total Number of Valid Hours: 639

Total Number of Hours: 672

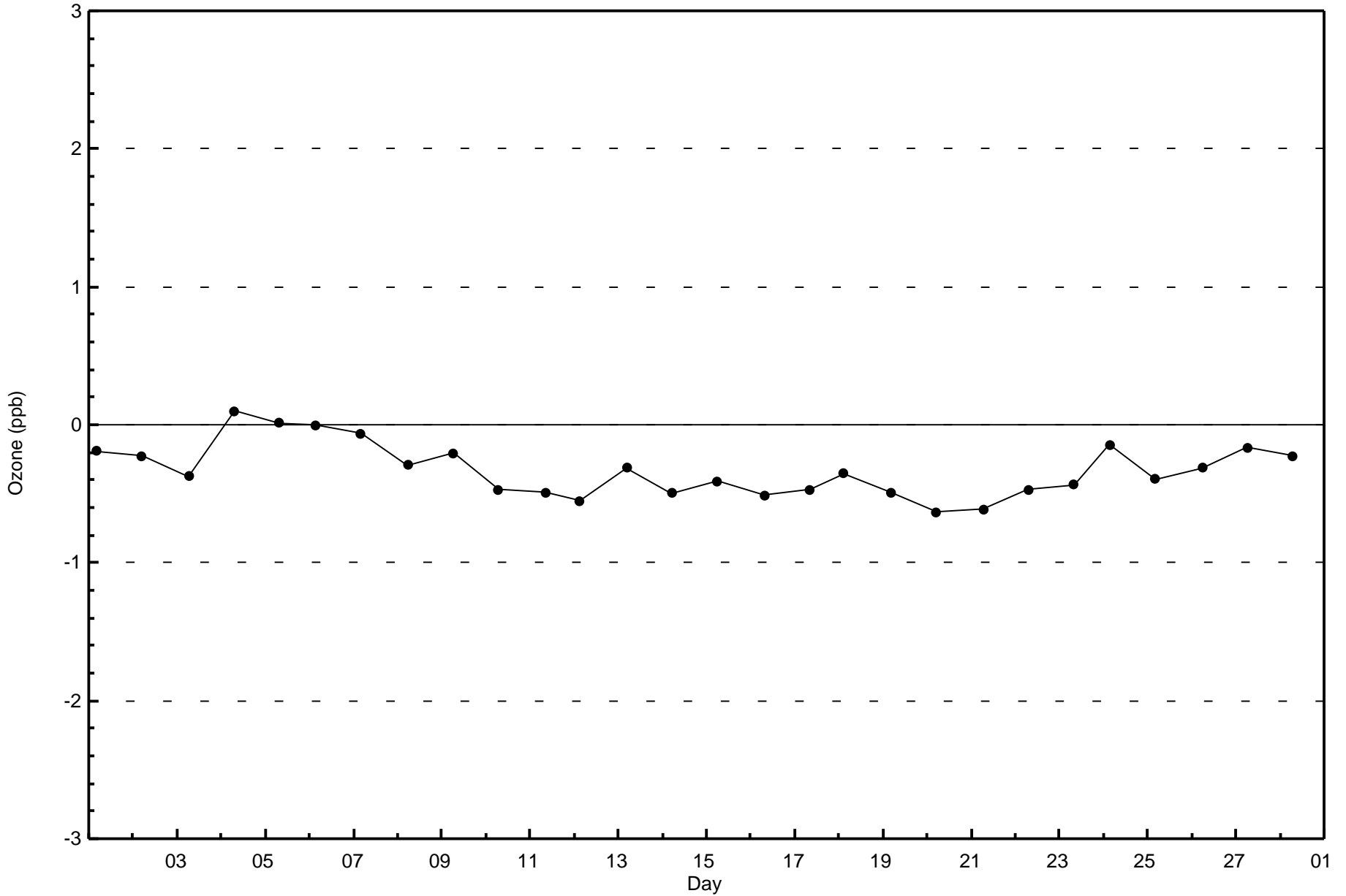


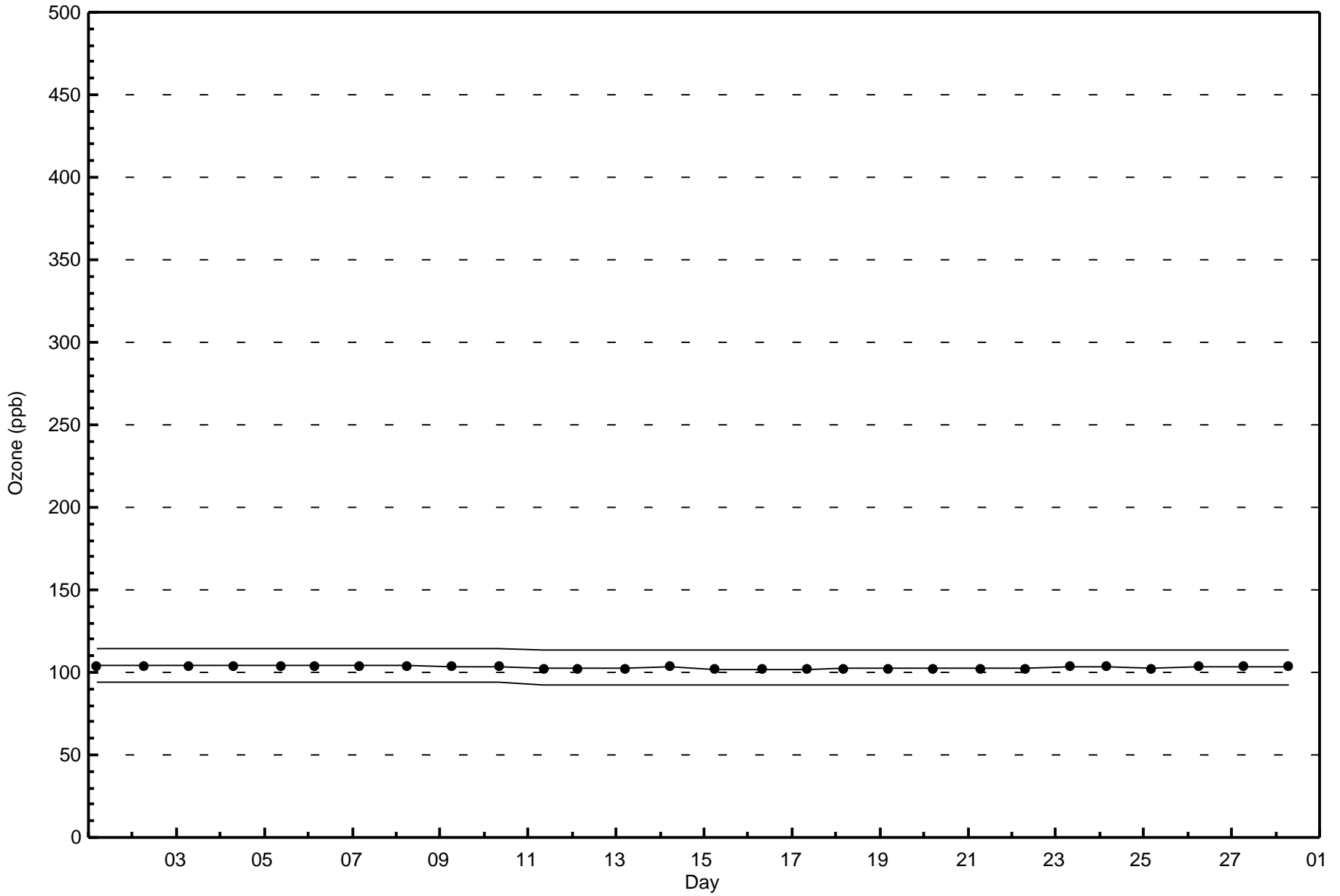
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 639





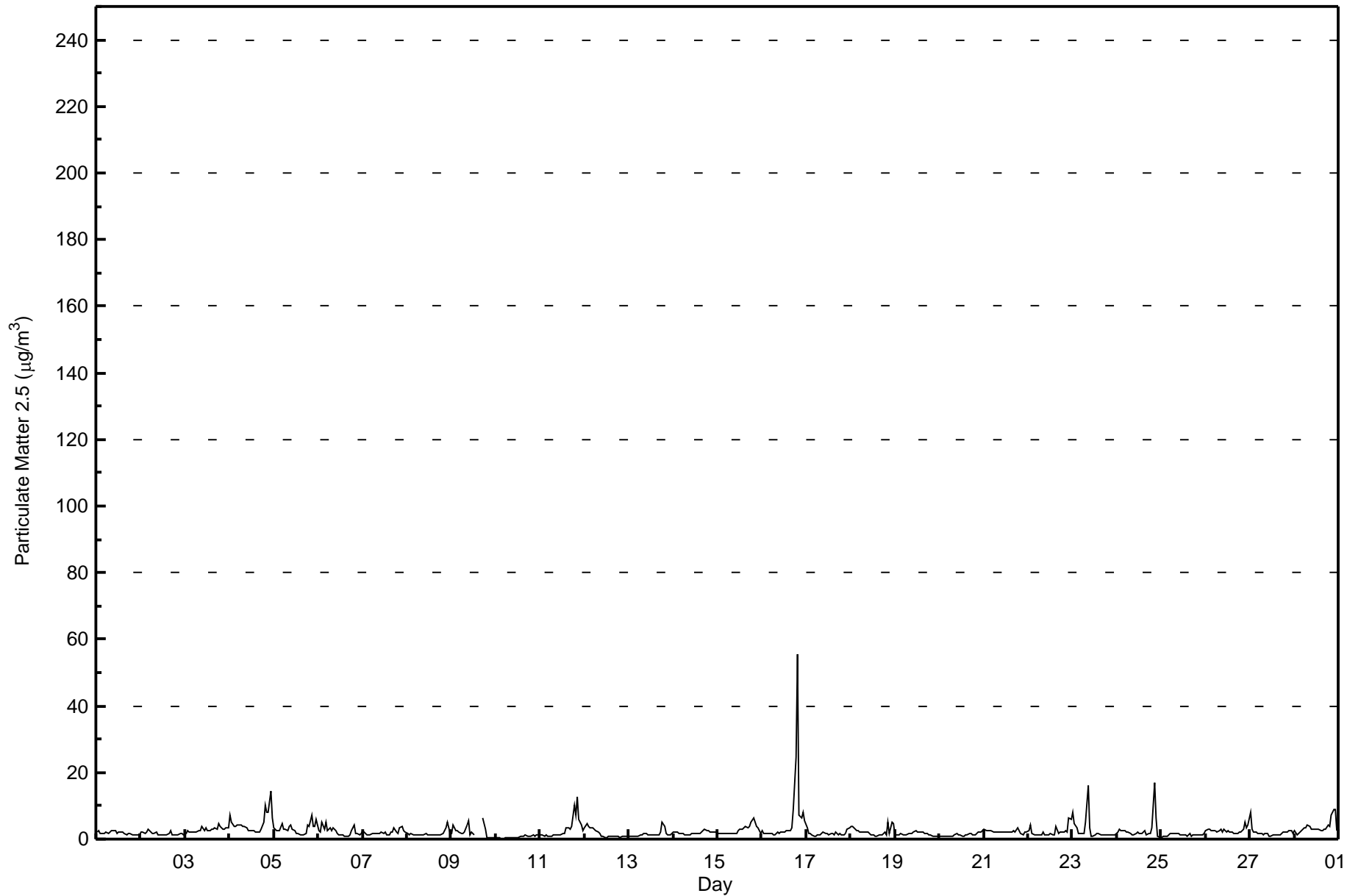


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 55.4 µg/m ³ on Feb 16 20:00 Maximum Daily Average: 6.3 µg/m ³ on Feb 16		Hours in Service: 672 Hours of Data: 668 Hours of Missing Data: 4 Hours of Calibration: 4 Percent Operational Time: 100.0																								
Minimum Value: 0.2 µg/m ³ on Feb 10 05:00 Maximum Diurnal Average: 4.6 µg/m ³ at hour 20 Monthly Average: 2.37 µg/m ³		Minimum Daily Average: 0.6 µg/m ³ on Feb 10 Minimum Diurnal Average: 1.6 µg/m ³ at hour 13 Percentiles: P ₁ = 0.3 P ₁₀ = 1.0 Q ₁ = 1.3 Median = 1.8 Q ₃ = 2.6 P ₉₀ = 3.9 P ₉₉ = 9.9																								
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-Feb	2.1	2.7	1.7	1.8	1.7	1.9	1.9	2.1	2.5	2.5	2.3	1.9	2.2	2.1	2.0	1.5	1.5	1.6	1.8	1.2	1.2	1.3	1.2	1.2	1.8	2.7
2-Feb	2.0	2.1	1.8	2.0	2.8	1.9	1.7	1.7	2.2	1.3	1.2	1.1	1.3	1.3	1.3	1.6	2.6	1.3	1.2	1.3	1.4	1.5	1.7	1.5	1.7	2.8
3-Feb	1.7	2.5	2.0	2.0	1.9	2.1	2.2	2.7	2.4	3.8	2.6	3.3	2.7	2.6	3.0	3.0	3.4	2.9	4.6	3.9	3.1	2.9	3.3	3.2	2.8	4.6
4-Feb	7.1	5.2	3.8	4.0	4.1	4.2	4.2	3.6	3.8	3.2	2.5	2.4	2.4	2.2	2.1	2.3	2.9	5.2	10.3	8.2	8.0	14.4	6.2	4.8	14.4	
5-Feb	3.2	2.5	2.5	2.5	4.5	3.0	2.8	2.6	4.0	4.2	3.1	2.4	1.7	1.6	1.4	1.4	1.3	1.7	4.0	3.8	7.2	3.6	3.6	6.1	3.1	7.2
6-Feb	2.6	2.0	5.2	2.8	5.2	2.4	3.2	2.4	3.5	2.4	1.9	1.2	1.4	1.2	1.0	1.1	1.0	1.1	2.7	4.2	1.6	1.6	1.4	1.9	2.3	5.2
7-Feb	2.7	1.6	1.3	1.3	1.4	1.5	1.8	1.7	1.6	1.7	2.0	1.8	1.9	1.4	1.2	1.9	2.0	3.2	2.0	1.7	3.4	3.8	2.5	2.0	2.0	3.8
8-Feb	1.8	1.5	1.7	1.4	1.3	1.2	1.2	1.2	1.3	1.3	1.6	1.4	1.4	1.3	1.3	1.2	1.2	1.3	1.3	1.5	2.7	3.3	5.0	1.8	1.7	5.0
9-Feb	1.7	4.3	2.4	2.5	2.3	1.8	1.8	2.1	4.0	5.6	1.1	2.0	1.2	C	C	C	C	6.4	3.0	0.4	0.4	0.3	0.4	0.3	2.2	6.4
10-Feb	0.3	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.5	0.2	0.2	0.3	0.5	0.7	0.7	1.1	1.1	1.0	0.9	1.0	1.2	1.0	1.1	1.4	0.6	1.4
11-Feb	1.2	1.4	0.9	1.1	0.9	0.9	0.9	1.1	1.1	1.1	1.1	1.4	1.6	1.7	3.2	3.5	3.0	3.7	10.3	7.1	12.9	6.0	4.1	2.5	3.0	12.9
12-Feb	3.5	4.5	3.7	3.5	3.2	2.8	2.5	2.3	1.9	1.0	0.6	0.5	0.6	0.7	0.9	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.8	0.8	1.6	4.5
13-Feb	0.7	0.8	0.7	0.8	0.8	1.0	1.1	1.3	1.5	1.6	1.3	1.3	1.2	1.2	1.2	1.2	1.2	2.2	5.0	3.8	1.6	1.5	1.4	1.5	1.5	5.0
14-Feb	2.1	2.1	2.0	1.7	1.7	1.7	1.4	1.3	1.3	1.4	1.8	1.9	1.5	1.7	1.8	2.1	2.5	2.8	2.7	2.4	2.2	2.1	2.0	1.9	1.9	2.8
15-Feb	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.7	1.5	1.5	1.7	2.6	2.9	3.1	3.4	3.9	3.3	4.0	4.9	6.4	4.9	3.8	3.3	1.8	2.8	6.4
16-Feb	2.5	1.9	1.8	1.8	1.7	1.6	1.5	1.5	2.0	1.7	2.0	2.3	2.0	2.5	2.5	2.4	3.2	8.9	24.5	55.4	7.1	6.5	8.0	5.7	6.3	55.4
17-Feb	3.2	1.7	1.6	1.4	1.0	0.9	1.1	1.4	1.8	2.0	1.7	1.5	1.4	1.6	1.6	1.4	2.1	1.3	1.5	1.3	1.4	1.5	2.9	3.3	1.7	3.3
18-Feb	3.6	3.9	2.9	2.6	2.4	2.3	2.3	2.2	2.3	2.2	1.6	1.3	1.1	1.0	1.0	1.2	1.2	1.2	2.3	1.3	5.3	1.6	5.2	4.9	2.4	5.3
19-Feb	1.3	1.4	1.4	1.7	1.4	1.2	1.1	1.6	1.7	1.8	2.3	2.3	2.1	2.0	2.1	1.9	1.8	1.6	1.2	1.1	0.9	0.8	0.9	0.9	1.5	2.3
20-Feb	0.8	0.8	0.7	0.8	0.8	0.7	0.8	1.0	1.2	1.5	1.4	1.3	1.1	1.0	1.2	1.1	1.5	1.7	1.3	1.4	1.7	2.0	2.3	2.7	1.3	2.7
21-Feb	2.9	2.7	2.7	2.6	2.5	2.3	2.3	2.3	2.2	2.3	2.1	2.0	1.9	1.9	2.1	2.2	2.4	2.3	3.5	2.7	1.6	1.2	2.0	2.2	2.3	3.5
22-Feb	2.7	4.1	1.6	1.4	1.3	1.2	1.3	1.3	2.1	1.3	1.2	1.3	1.6	1.3	1.3	4.0	1.6	2.1	2.3	2.1	2.5	2.0	6.3	5.9	2.2	6.3
23-Feb	8.0	4.7	3.4	1.8	1.8	1.8	1.9	5.0	16.1	3.2	0.8	0.8	1.2	1.6	1.6	1.2	1.2	1.1	1.2	1.3	1.2	1.2	1.3	2.7	16.1	16.1
24-Feb	2.3	3.0	2.7	2.5	2.4	2.1	2.3	1.6	1.1	1.4	1.7	2.3	1.7	1.5	2.2	2.5	1.5	1.7	1.5	3.4	16.8	6.5	0.8	0.5	2.7	16.8
25-Feb	0.4	0.6	1.0	0.9	1.2	1.6	1.9	1.7	1.6	1.6	1.3	1.1	1.3	1.1	1.0	1.7	1.0	1.2	1.1	1.2	1.2	1.2	1.2	1.9	1.3	1.9
26-Feb	2.4	3.1	3.0	2.7	2.7	2.7	2.1	2.4	2.8	2.1	3.1	2.2	2.4	2.2	2.1	1.8	1.7	1.8	1.9	2.2	2.9	5.1	3.5	4.2	2.6	5.1
27-Feb	8.1	3.0	2.1	2.1	1.5	1.8	1.8	1.4	1.7	1.5	1.0	0.8	1.2	1.4	1.2	1.3	1.3	1.9	2.3	2.0	2.1	2.5	2.7	1.6	2.0	8.1
28-Feb	2.6	1.4	1.6	2.1	2.8	3.5	3.3	4.1	3.9	3.0	3.0	2.8	2.8	3.0	2.7	2.6	3.1	2.8	4.4	3.8	7.2	8.9	9.1	2.7	3.6	9.1
																								Diurnal Average		
																								Diurnal Maximum		
2.7 2.4 2.1 1.9 2.0 1.9 1.9 2.0 2.6 2.1 1.7 1.7 1.6 1.7 1.8 1.9 1.9 2.4 3.5 4.6 3.7 2.9 3.3 2.6 8.1 5.2 5.2 4.0 5.2 4.2 4.2 5.0 16.1 5.6 3.1 3.3 2.9 3.1 3.4 4.0 3.4 8.9 24.5 55.4 16.8 8.9 14.4 6.2																										
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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - February 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	564	84.43	84.43
6 - 15	28	4.19	88.62
16 - 25	3	0.45	89.07
26 - 80	1	0.15	89.22
> 81.0	0	0.00	89.22

Total Number of Valid Hours: 668

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Chipewyan - February 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	4	6	4	42	93	10	4	2	4	4	17	37	92	88	119	37	563
6 - 15	1	3	1	2	5	1	0	0	0	0	0	1	2	3	8	0	27
16 - 25	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	3
26 - 80	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	5	10	5	45	99	11	4	2	4	4	17	38	94	92	127	37	594

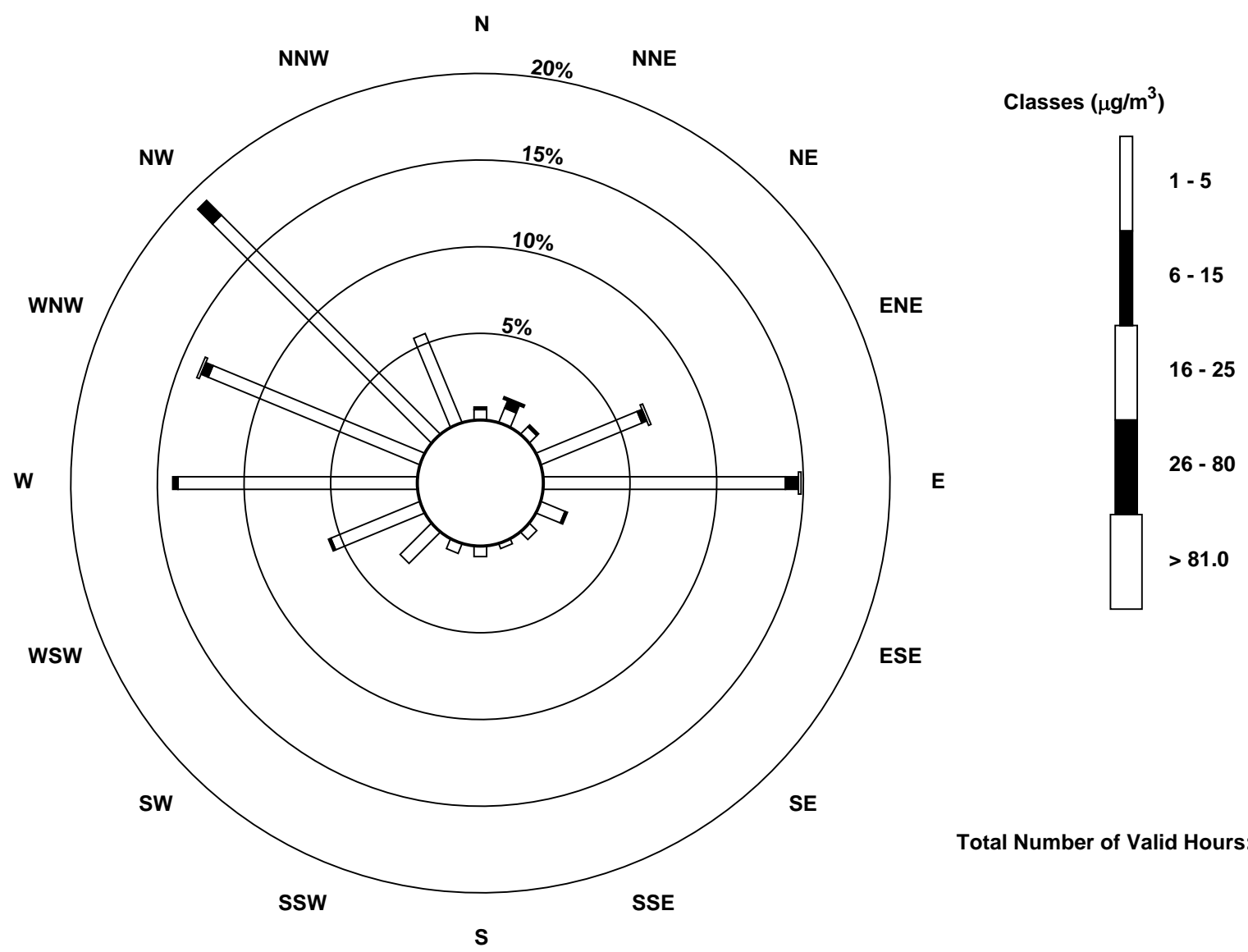
Total Number of Valid Hours: 666

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 666

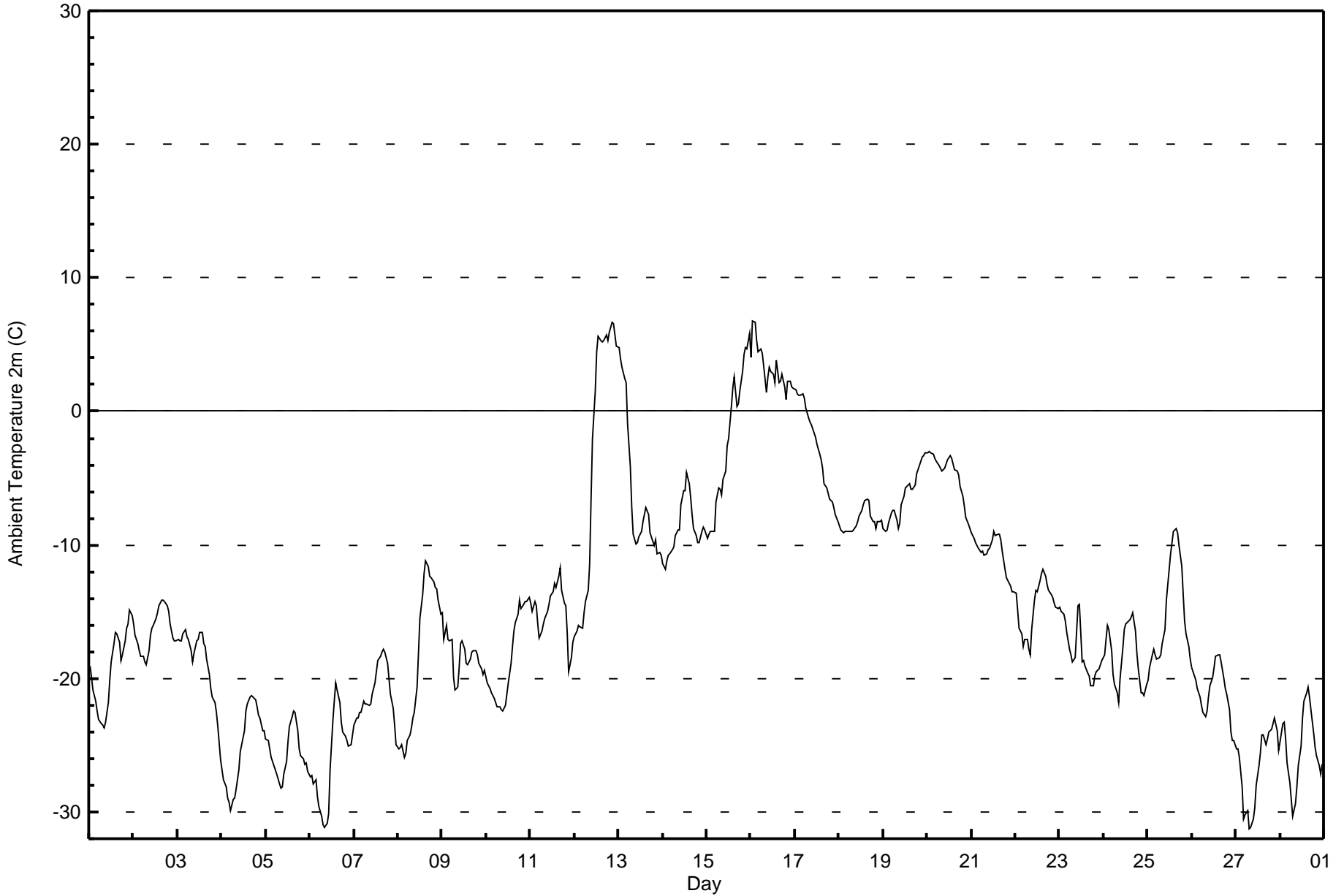


Maximum Value: 6.8 C on Feb 16 02:00		Maximum Daily Average: 3.2 C on Feb 16		Hours in Service: 672																							
Minimum Value: -31.2 C on Feb 27 08:00		Minimum Daily Average: -26.6 C on Feb 27		Hours of Data: 672																							
Maximum Diurnal Average: -12.2 C at hour 16		Minimum Diurnal Average: -17.1 C at hour 9		Hours of Missing Data: 0																							
Monthly Average: -14.69 C		Percentiles: P ₁ = -30.4 P ₁₀ = -25.3 Q ₁ = -21.4 Median = -16.3 Q ₃ = -8.8 P ₉₀ = -2.1 P ₉₉ = 5.7		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	-19.0	-19.9	-20.8	-21.7	-22.4	-23.0	-23.4	-23.4	-23.7	-23.3	-21.8	-20.1	-18.8	-17.4	-16.5	-16.7	-17.3	-18.7	-18.2	-17.1	-16.2	-15.9	-14.8	-15.3	-19.4	-14.8	
2-Feb	-15.9	-16.8	-17.3	-17.9	-18.3	-18.3	-18.8	-19.0	-17.9	-16.8	-16.2	-16.0	-15.5	-15.0	-14.5	-14.1	-14.1	-14.2	-14.5	-15.0	-15.9	-17.0	-17.1	-17.2	-16.4	-14.1	
3-Feb	-17.1	-17.2	-17.2	-16.6	-16.3	-16.9	-17.0	-18.0	-18.8	-18.1	-17.2	-17.1	-16.5	-16.5	-17.3	-17.6	-18.5	-19.7	-20.7	-21.4	-21.8	-22.5	-23.6	-26.1	-18.7	-16.3	
4-Feb	-26.9	-27.5	-28.1	-28.9	-29.3	-29.9	-29.1	-28.9	-28.3	-26.9	-25.5	-24.9	-23.9	-22.5	-21.9	-21.4	-21.3	-21.4	-21.5	-22.1	-22.7	-23.0	-23.9	-23.9	-25.2	-21.3	
5-Feb	-24.6	-24.6	-25.3	-25.9	-26.6	-26.8	-27.2	-27.9	-28.2	-28.2	-27.1	-26.2	-24.7	-23.6	-22.9	-22.5	-22.5	-23.9	-25.3	-25.8	-26.0	-26.4	-26.4	-27.0	-25.6	-22.5	
6-Feb	-27.4	-27.3	-27.9	-27.5	-28.8	-29.6	-30.3	-30.9	-31.2	-30.9	-30.1	-26.9	-23.1	-21.7	-20.4	-20.9	-21.8	-23.3	-24.0	-24.3	-24.7	-25.0	-24.9	-24.3	-26.1	-20.4	
7-Feb	-23.5	-22.9	-22.9	-22.5	-22.6	-21.7	-21.9	-22.0	-22.0	-21.2	-20.3	-19.5	-18.7	-18.3	-18.0	-17.8	-18.1	-18.8	-20.0	-21.2	-22.2	-23.4	-25.0	-21.1	-17.8		
8-Feb	-25.2	-25.1	-25.0	-25.9	-25.6	-24.6	-24.2	-23.7	-23.0	-22.6	-20.6	-18.1	-15.5	-13.7	-12.1	-11.2	-11.6	-12.4	-12.5	-12.7	-13.2	-13.3	-14.2	-15.2	-18.4	-11.2	
9-Feb	-15.1	-17.1	-16.0	-17.1	-17.2	-17.0	-19.9	-20.8	-20.7	-19.2	-17.4	-17.2	-17.8	-18.8	-19.0	-18.6	-18.0	-17.9	-17.9	-18.2	-18.8	-19.3	-19.8	-19.4	-18.3	-15.1	
10-Feb	-20.3	-20.6	-20.7	-21.0	-21.5	-21.8	-22.1	-22.2	-22.3	-22.4	-22.0	-21.2	-20.4	-18.9	-17.6	-16.4	-15.8	-15.2	-14.2	-14.7	-14.5	-14.3	-14.3	-13.9	-18.7	-13.9	
11-Feb	-14.3	-14.9	-14.3	-14.5	-15.9	-16.9	-16.5	-16.0	-15.5	-14.9	-14.5	-13.8	-13.5	-12.8	-13.1	-12.3	-11.7	-13.4	-14.3	-14.6	-16.6	-19.4	-18.4	-17.3	-15.0	-11.7	
12-Feb	-16.9	-16.4	-16.1	-16.1	-16.3	-15.0	-14.3	-13.4	-11.4	-6.5	-2.1	1.6	4.5	5.7	5.3	5.2	5.3	5.7	5.3	6.0	6.6	6.5	5.7	4.9	-3.2	6.6	
13-Feb	4.7	4.0	3.4	2.4	2.1	-0.9	-4.1	-7.2	-9.2	-9.9	-9.8	-9.4	-9.0	-8.3	-7.7	-7.2	-7.7	-9.1	-9.4	-10.0	-9.7	-10.6	-10.6	-10.8	-6.0	4.7	
14-Feb	-11.4	-11.9	-11.2	-10.8	-10.7	-10.3	-10.2	-9.3	-8.8	-8.9	-7.0	-6.0	-5.9	-4.6	-5.4	-6.5	-7.7	-8.8	-9.3	-9.8	-9.9	-9.0	-8.6	-8.9	-8.8	-4.6	
15-Feb	-9.5	-9.2	-9.0	-9.0	-9.0	-6.8	-5.7	-5.8	-6.3	-5.1	-4.4	-2.6	-2.0	0.4	1.8	2.5	0.3	0.6	1.5	2.9	4.2	4.8	4.6	5.8	-2.3	5.8	
16-Feb	4.0	6.8	6.7	5.3	4.4	4.6	4.4	3.4	1.4	2.6	3.3	3.0	2.8	2.2	3.8	2.2	2.3	2.8	1.8	0.9	2.3	2.2	1.9	1.7	3.2	6.8	
17-Feb	1.6	1.4	1.3	1.2	1.3	1.0	0.3	-0.4	-0.8	-1.0	-1.6	-2.0	-2.5	-3.2	-3.6	-4.3	-5.4	-5.7	-6.2	-6.5	-6.8	-7.2	-7.7	-8.2	-2.7	1.6	
18-Feb	-8.5	-8.8	-9.1	-9.0	-9.0	-9.0	-9.0	-9.0	-8.9	-8.6	-8.2	-7.8	-7.4	-7.0	-6.6	-6.5	-6.7	-7.8	-8.3	-8.3	-8.8	-8.2	-8.2	-8.1	-8.2	-6.5	
19-Feb	-8.8	-9.0	-8.9	-8.4	-7.7	-7.4	-7.4	-8.2	-8.8	-8.3	-7.0	-6.3	-5.7	-5.6	-5.4	-5.8	-5.9	-5.5	-4.7	-4.3	-3.7	-3.4	-3.3	-3.1	-6.4	-3.1	
20-Feb	-3.2	-3.0	-3.1	-3.2	-3.6	-3.7	-4.0	-4.3	-4.5	-4.2	-4.0	-3.6	-3.3	-3.5	-3.9	-4.4	-4.5	-4.7	-5.6	-6.4	-7.1	-8.0	-8.5	-8.8	-4.7	-3.0	
21-Feb	-9.1	-9.6	-9.8	-10.0	-10.3	-10.6	-10.5	-10.8	-10.7	-10.4	-10.3	-9.6	-9.0	-9.3	-9.2	-9.2	-9.6	-10.5	-11.8	-12.5	-12.7	-13.1	-13.5	-13.5	-10.6	-9.0	
22-Feb	-13.6	-14.8	-16.2	-16.7	-17.6	-17.1	-17.1	-17.8	-18.2	-16.3	-14.1	-13.4	-13.5	-12.7	-12.1	-11.8	-12.3	-13.0	-13.4	-13.7	-14.0	-14.3	-14.7	-14.7	-14.7	-11.8	
23-Feb	-14.7	-14.9	-15.2	-15.8	-16.5	-17.8	-18.3	-18.7	-18.5	-16.5	-14.5	-14.4	-18.8	-18.7	-19.1	-19.6	-19.8	-20.6	-20.5	-19.8	-19.5	-19.3	-19.0	-18.6	-17.9	-14.4	
24-Feb	-18.2	-17.1	-16.0	-16.3	-17.9	-20.5	-21.1	-21.8	-20.0	-17.7	-16.3	-16.0	-15.7	-15.6	-15.4	-15.1	-16.4	-18.1	-19.3	-21.1	-21.1	-21.3	-20.4	-18.3	-15.1		
25-Feb	-20.1	-19.2	-18.3	-17.8	-18.3	-18.6	-18.4	-18.3	-17.4	-16.4	-14.1	-12.9	-10.7	-9.8	-9.0	-8.8	-9.1	-10.0	-11.6	-13.7	-15.7	-16.7	-17.6	-18.5	-15.0	-8.8	
26-Feb	-19.2	-19.8	-20.1	-20.7	-21.4	-22.0	-22.5	-22.9	-22.5	-21.4	-20.6	-19.9	-19.2	-18.4	-18.2	-18.2	-18.8	-20.0	-20.7	-21.1	-22.3	-24.0	-24.6	-24.7	-21.0	-18.2	
27-Feb	-25.3	-25.2	-25.9	-28.1	-30.5	-30.2	-29.9	-31.2	-31.1	-30.6	-29.7	-28.0	-26.6	-25.6	-24.2	-24.2	-24.9	-24.6	-24.0	-23.8	-23.4	-22.9	-24.0	-25.4	-26.6	-22.9	
28-Feb	-24.8	-23.4	-23.3	-24.6	-26.3	-27.8	-29.0	-30.3	-29.4	-28.1	-26.5	-25.1	-23.0	-21.7	-21.0	-20.6	-21.4	-22.4	-24.1	-25.2	-25.8	-26.6	-27.2	-26.4	-25.2	-20.6	
		-15.1	-15.2	-15.2	-15.6	-16.1	-16.4	-16.7	-17.1	-17.1	-16.3	-15.1	-14.1	-13.4	-12.7	-12.3	-12.2	-12.6	-13.1	-13.6	-13.9	-14.2	-14.6	-14.9	-15.1	Diurnal Average	
		4.7	6.8	6.7	5.3	4.4	4.6	4.4	3.4	1.4	2.6	3.3	3.0	4.5	5.7	5.3	5.2	5.3	5.7	5.3	6.0	6.6	6.5	5.7	5.8	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	205	30.51	30.51
-20 - 0	407	60.57	91.07
0 - 10	60	8.93	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

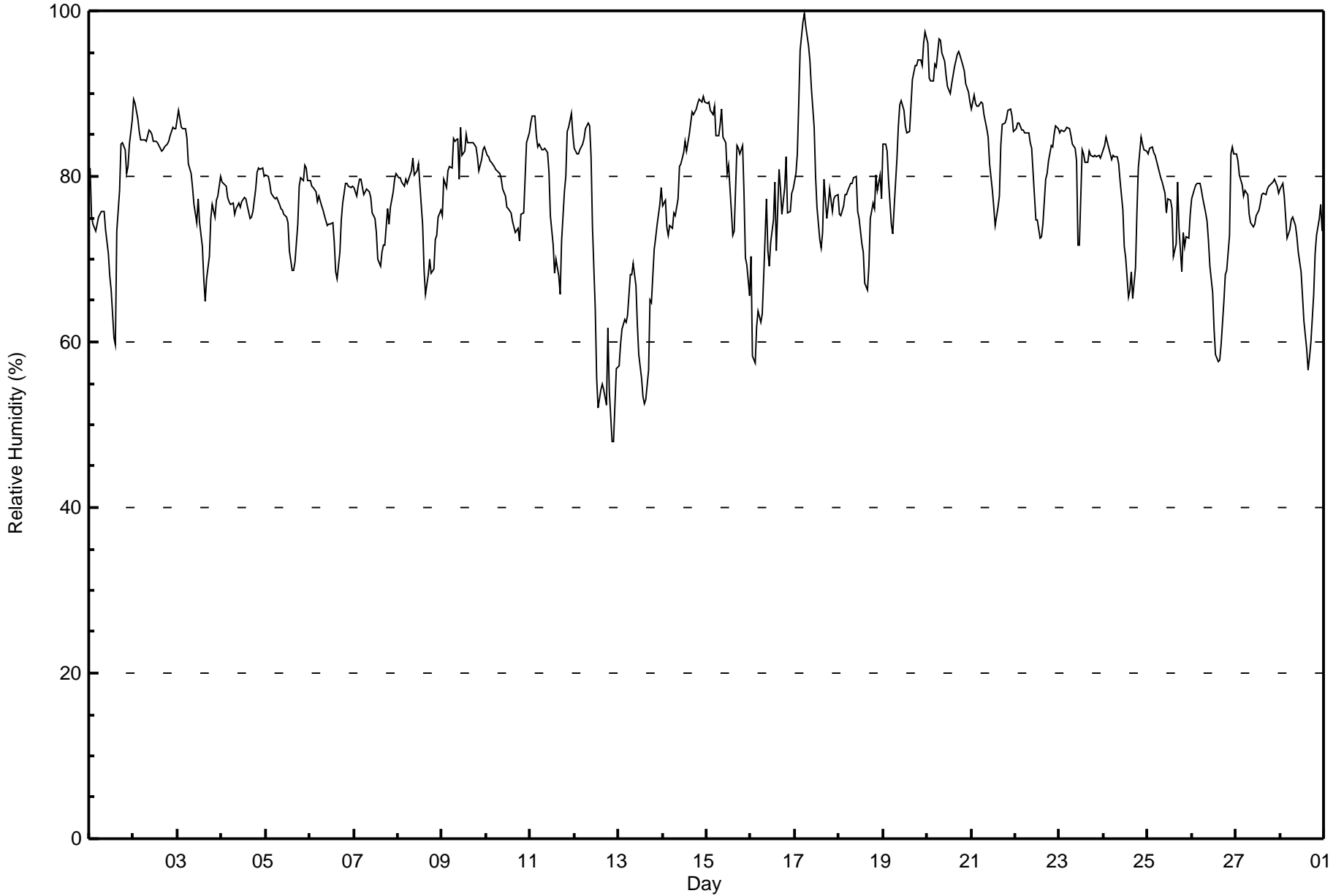
**Relative Humidity (RH) - %
Fort Chipewyan - February 2017**

Maximum Value: 100 % on Feb 17 06:00																			Maximum Daily Average: 92.9 % on Feb 20						Hours in Service: 672	
Minimum Value: 48 % on Feb 12 21:00																			Minimum Daily Average: 63.9 % on Feb 13						Hours of Data: 672	
Maximum Diurnal Average: 81.3 % at hour 1																			Minimum Diurnal Average: 71.6 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 78.3 %																			Percentiles: P ₁ = 53 P ₁₀ = 68 Q ₁ = 74 Median = 79 Q ₃ = 84 P ₉₀ = 88 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-Feb	81	75	74	73	74	75	76	76	76	74	71	68	66	61	60	73	78	84	84	83	80	81	84	87	75.6	87
2-Feb	89	89	87	85	84	84	84	84	86	85	85	84	84	84	83	83	84	84	84	84	85	86	86	86	85.0	89
3-Feb	88	87	86	86	86	85	82	80	79	77	74	77	74	72	68	65	68	70	75	77	75	77	78	80	77.7	88
4-Feb	79	79	79	78	77	77	77	75	76	77	76	77	77	77	76	75	75	76	78	81	81	81	81	80	77.7	81
5-Feb	80	80	79	78	77	77	77	77	76	76	75	75	74	71	69	69	70	74	79	80	80	81	81	80	76.5	81
6-Feb	79	79	79	78	77	78	76	76	75	74	74	74	74	72	68	68	71	75	77	79	79	79	79	79	75.8	79
7-Feb	79	78	79	80	80	78	78	79	78	77	76	75	73	70	69	71	72	72	76	74	76	78	80	80	76.1	80
8-Feb	80	80	79	79	80	79	80	81	82	80	81	81	79	74	69	66	68	70	68	69	72	73	75	76	75.9	82
9-Feb	75	80	79	81	81	81	85	84	85	80	86	83	83	85	84	84	84	84	84	82	81	82	83	84	82.4	86
10-Feb	82	82	82	82	81	81	81	80	80	79	78	76	76	76	74	74	73	74	72	75	76	80	84	85	78.5	85
11-Feb	86	87	87	85	84	84	83	83	83	83	80	75	72	68	70	68	66	72	78	80	85	86	88	85	80.0	88
12-Feb	83	83	83	83	84	84	86	86	86	82	74	64	56	52	54	55	54	52	62	54	48	48	52	57	67.6	86
13-Feb	57	60	62	63	62	63	68	68	69	67	62	58	56	53	53	53	57	65	65	71	73	74	77	79	63.9	79
14-Feb	77	77	74	73	74	74	76	75	77	81	82	83	84	83	85	86	88	88	88	89	89	89	90	89	82.1	90
15-Feb	89	89	88	87	89	85	85	86	88	85	84	80	81	76	73	73	84	83	83	84	78	70	69	66	81.5	89
16-Feb	70	58	57	62	64	62	63	68	77	71	69	72	75	79	71	81	79	75	79	82	76	76	78	79	71.8	82
17-Feb	80	83	89	95	99	100	98	96	94	91	86	80	76	72	71	73	80	75	76	79	76	77	78	78	83.4	100
18-Feb	75	75	76	78	78	78	79	79	80	80	76	75	72	71	67	66	69	75	77	76	80	78	80	77	75.8	80
19-Feb	84	84	83	80	74	73	76	82	86	89	89	88	86	85	85	89	92	93	93	94	94	93	96	97	87.0	97
20-Feb	96	92	91	91	94	93	97	96	95	94	92	91	90	91	92	93	95	95	95	93	93	91	90	89	92.9	97
21-Feb	88	90	89	88	89	89	89	87	86	85	82	78	76	74	76	78	84	86	86	87	88	88	87	86	84.8	90
22-Feb	86	86	86	86	86	85	85	85	84	83	78	75	75	72	73	74	80	80	82	84	84	85	86	86	81.9	86
23-Feb	85	86	85	86	86	86	85	84	83	82	72	72	83	83	82	82	83	83	82	83	82	82	82	83	82.5	86
24-Feb	84	85	84	83	82	83	82	82	82	80	76	72	70	65	66	69	65	69	76	81	85	84	83	83	77.9	85
25-Feb	83	83	84	83	83	82	81	80	79	78	76	77	77	76	70	72	79	74	68	73	72	73	72	75	77.1	84
26-Feb	77	78	79	79	79	78	77	76	75	72	69	66	61	58	58	58	60	65	68	69	73	83	84	83	71.9	84
27-Feb	83	82	80	79	78	78	78	75	74	74	74	75	76	77	78	78	78	79	79	79	79	80	79	78	77.9	83
28-Feb	79	79	78	75	72	74	75	75	74	73	71	68	66	63	59	57	58	60	66	71	73	75	77	73	70.4	79
	81.3	80.9	80.6	80.5	80.4	80.2	80.7	80.6	80.9	79.5	77.4	75.7	74.8	72.9	71.6	72.6	74.6	76.1	77.8	79.0	79.0	79.7	80.6	80.6	Diurnal Average	
	96	92	91	95	99	100	98	96	95	94	92	91	90	91	92	93	95	95	95	94	94	93	96	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipewyan - February 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	29	4.32	4.32
60 - 80	356	52.98	57.29
80 - 100	287	42.71	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

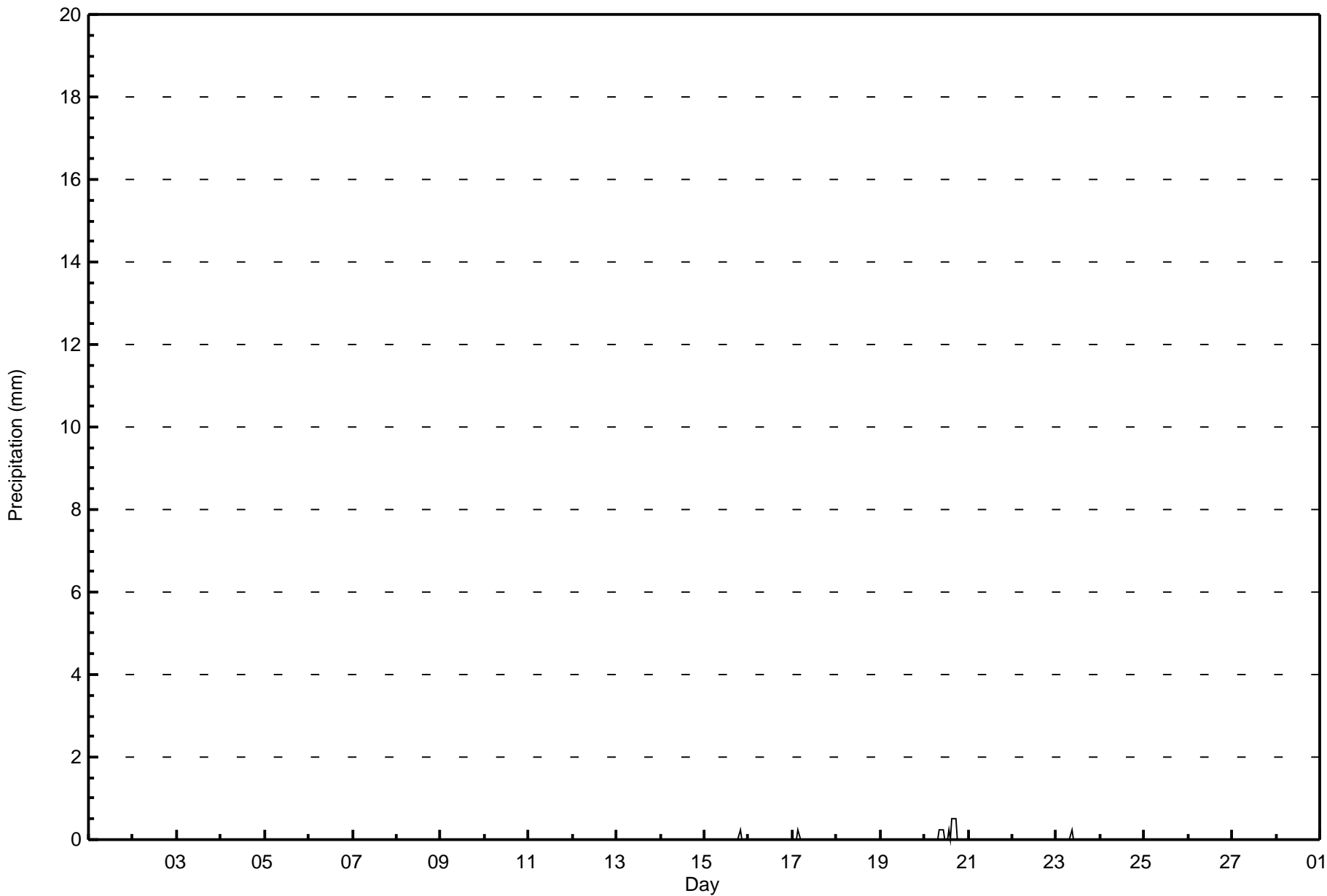


Maximum Value: 0.5 mm on Feb 20 16:00 Maximum Daily Total: 2.5 mm on Feb 20																								Hours in Service: 672			
Minimum Value: 0.0 mm on Feb 9 16:00 Minimum Daily Total: 0.0 mm on Feb 10																								Hours of Data: 465			
Maximum Diurnal Total: 0.5 mm at hour 9 Minimum Diurnal Total: 0.0 mm at hour 1																								Hours of Missing Data: 207			
Monthly Total: 3.30 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			
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																								Percent Operational Time: 69.2			
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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
2-Feb	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	--	--
3-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
4-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
5-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
6-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
8-Feb	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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	0.0
10-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3
16-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
18-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.3	0.0	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.5	
21-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
24-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 Average			
Diurnal Maximum																								Diurnal Maximum			
M - Maintenance AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - February 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	462	99.35	99.35
0.4 - 0.5	3	0.65	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: 465

Total Number of Hours: 672

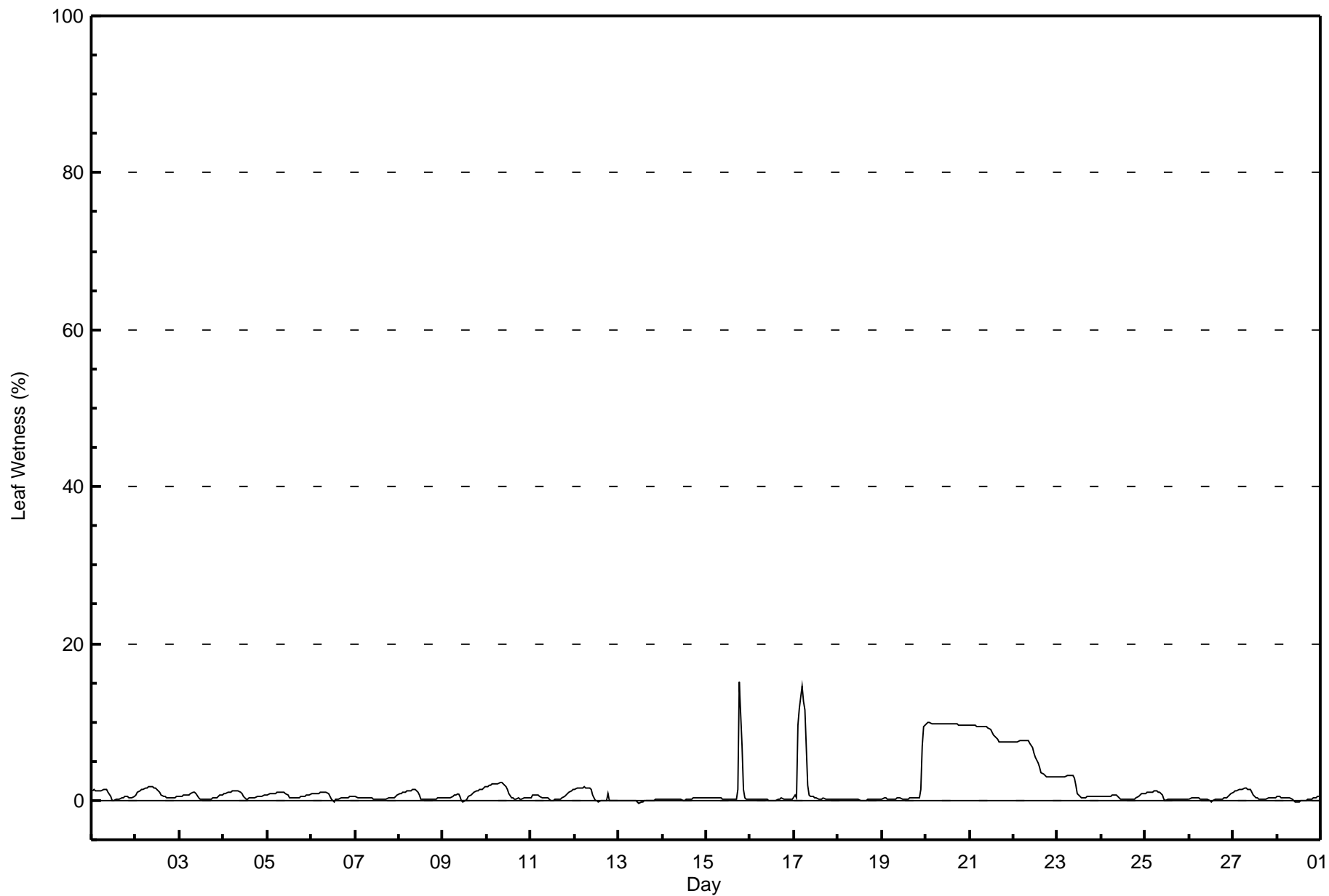


Maximum Value: 15 % on Feb 15 19:00														Maximum Daily Average: 9.7 % on Feb 20														Hours in Service: 672	
Minimum Value: 0 % on Feb 13 12:00														Minimum Daily Average: 0.0 % on Feb 13														Hours of Data: 672	
Maximum Diurnal Average: 2.2 % at hour 5														Minimum Diurnal Average: 0.9 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 1.5 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 7 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-Feb	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	1		
2-Feb	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	1.0	2		
3-Feb	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1			
4-Feb	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0.7	1			
5-Feb	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0.7	1			
6-Feb	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1			
7-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1			
8-Feb	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1			
9-Feb	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	0.7	2			
10-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1.2	2			
11-Feb	0	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			
12-Feb	1	2	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.7	2			
13-Feb	0	0	0	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-Feb	0	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			
15-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	7	1	0	0	0	1.2	15			
16-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0			
17-Feb	1	0	10	12	15	13	12	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.8	15			
18-Feb	0	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			
19-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	9	1.0	9			
20-Feb	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9.7	10			
21-Feb	10	10	10	10	9	9	9	9	9	9	9	9	8	8	8	7	7	7	7	7	7	7	7	7	8.6	10			
22-Feb	7	7	8	8	8	8	8	8	8	7	7	6	5	5	4	4	3	3	3	3	3	3	3	3	5.4	8			
23-Feb	3	3	3	3	3	3	3	3	3	2	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1.6	3			
24-Feb	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1			
25-Feb	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			
26-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1			
27-Feb	1	1	1	1	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	2			
28-Feb	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	1			
1.6														1.6														Diurnal Average	
10														10														Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Fort Chipewyan - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Fort Chipewyan - February 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	284	44.65	44.65
0.4 - 0.5	80	12.58	57.23
0.6 - 0.7	39	6.13	63.36
0.8 - 1.4	106	16.67	80.03
1.5 - 10	118	18.55	98.59
> 10	5	0.79	99.37

Total Number of Valid Hours: 636

Total Number of Hours: 672



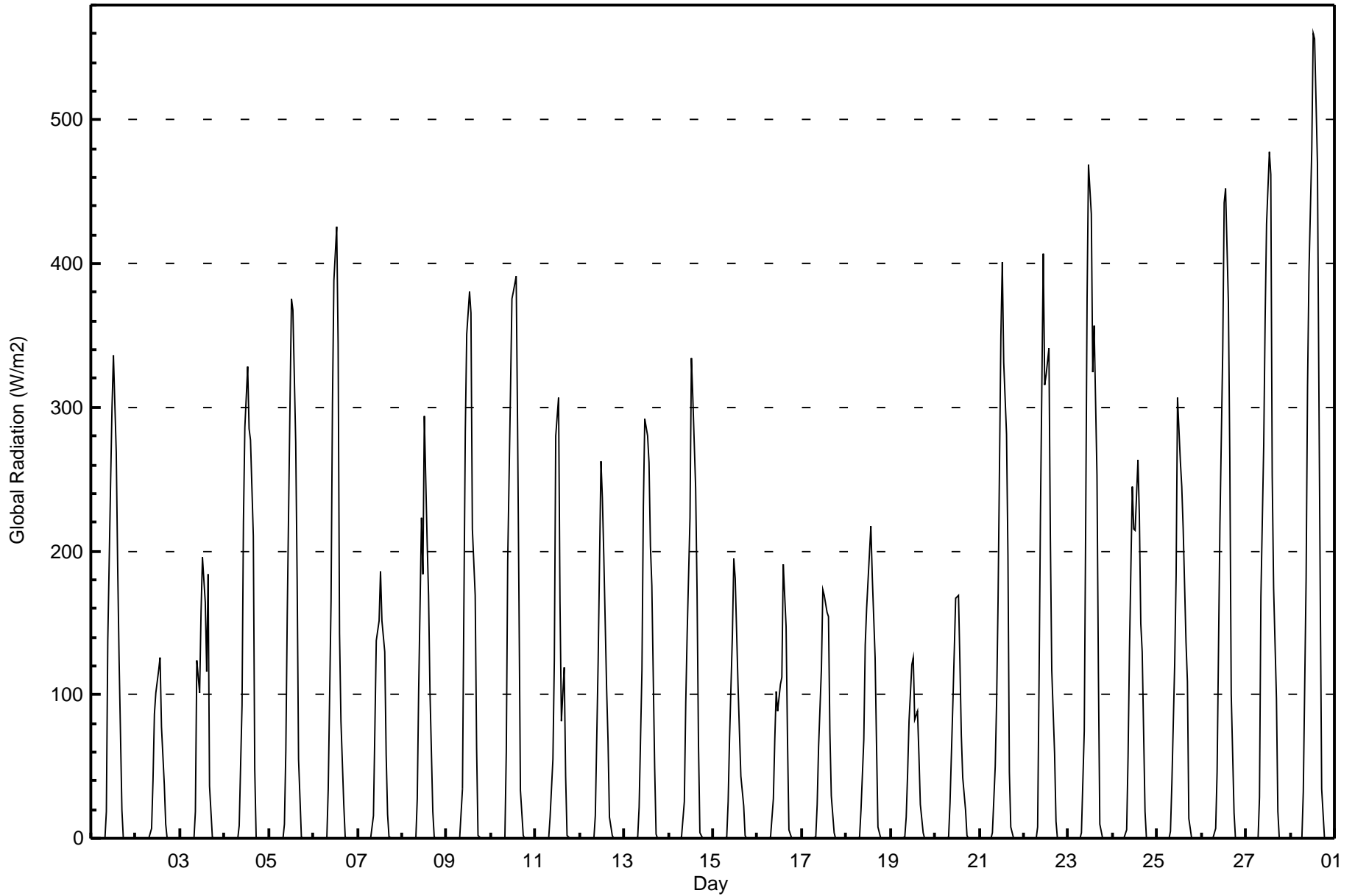
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Fort Chipewyan - February 2017

Maximum Value: 561 W/m2 on Feb 28 13:00		Maximum Daily Average: 146.3 W/m2 on Feb 28		Hours in Service: 672																						
Minimum Value: 0 W/m2 on Feb 1 19:00		Minimum Daily Average: 25.1 W/m2 on Feb 2		Hours of Data: 672																						
Maximum Diurnal Average: 294.3 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 3		Hours of Missing Data: 0																						
Monthly Average: 66.7 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 103 P ₉₀ = 247 P ₉₉ = 461		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-Feb	0	0	0	0	0	0	0	0	19	138	247	300	337	268	190	125	19	0	0	0	0	0	0	0	68.5	337
2-Feb	0	0	0	0	0	0	0	0	7	40	87	101	117	126	78	37	9	0	0	0	0	0	0	0	25.1	126
3-Feb	0	0	0	0	0	0	0	0	18	124	102	157	196	165	116	183	36	1	0	0	0	0	0	0	45.8	196
4-Feb	0	0	0	0	0	0	0	0	9	92	220	286	328	285	277	210	48	0	0	0	0	0	0	0	73.2	328
5-Feb	0	0	0	0	0	0	0	0	10	61	156	306	376	368	275	179	55	1	0	0	0	0	0	0	74.5	376
6-Feb	0	0	0	0	0	0	0	0	35	166	303	388	425	344	142	82	24	1	0	0	0	0	0	0	79.6	425
7-Feb	0	0	0	0	0	0	0	0	15	75	138	152	185	151	130	58	17	1	0	0	0	0	0	0	38.4	185
8-Feb	0	0	0	0	0	0	0	0	27	104	223	184	294	206	169	102	19	1	0	0	0	0	0	0	55.4	294
9-Feb	0	0	0	0	0	0	0	0	35	162	283	351	380	366	216	169	63	2	0	0	0	0	0	0	84.5	380
10-Feb	0	0	0	0	0	0	0	0	60	192	313	376	380	391	286	163	34	2	0	0	0	0	0	0	91.5	391
11-Feb	0	0	0	0	0	0	0	0	14	55	124	280	307	165	82	119	43	2	0	0	0	0	0	0	49.6	307
12-Feb	0	0	0	0	0	0	0	0	16	69	123	263	237	196	104	68	15	2	0	0	0	0	0	0	45.5	263
13-Feb	0	0	0	0	0	0	0	1	21	117	231	292	280	262	203	176	49	3	0	0	0	0	0	0	68.1	292
14-Feb	0	0	0	0	0	0	0	1	26	94	143	223	334	306	243	172	66	4	0	0	0	0	0	0	67.2	334
15-Feb	0	0	0	0	0	0	0	1	26	70	142	194	181	106	74	43	22	2	0	0	0	0	0	0	35.9	194
16-Feb	0	0	0	0	0	0	0	1	28	69	102	88	107	112	191	147	69	6	0	0	0	0	0	0	38.3	191
17-Feb	0	0	0	0	0	0	0	1	23	64	118	174	169	157	154	74	29	4	0	0	0	0	0	0	40.3	174
18-Feb	0	0	0	0	0	0	0	1	19	69	134	161	198	217	182	126	64	8	0	0	0	0	0	0	49.2	217
19-Feb	0	0	0	0	0	0	0	1	15	45	81	121	125	83	89	58	24	3	0	0	0	0	0	0	26.9	125
20-Feb	0	0	0	0	0	0	0	1	25	94	130	167	169	123	71	42	19	2	0	0	0	0	0	0	35.1	169
21-Feb	0	0	0	0	0	0	0	4	50	96	165	349	401	332	281	197	46	8	0	0	0	0	0	0	80.4	401
22-Feb	0	0	0	0	0	0	0	8	108	226	407	316	322	341	210	117	59	12	0	0	0	0	0	0	88.6	407
23-Feb	0	0	0	0	0	0	0	4	74	217	375	469	435	325	357	253	116	10	0	0	0	0	0	0	109.8	469
24-Feb	0	0	0	0	0	0	0	5	57	132	245	215	215	263	224	149	130	19	0	0	0	0	0	0	68.9	263
25-Feb	0	0	0	0	0	0	0	5	38	122	183	307	262	245	216	137	109	14	0	0	0	0	0	0	68.2	307
26-Feb	0	0	0	0	0	0	0	7	46	131	218	340	443	452	372	264	101	18	0	0	0	0	0	0	99.8	452
27-Feb	0	0	0	0	0	0	0	28	168	274	362	428	478	462	253	174	98	19	0	0	0	0	0	0	114.4	478
28-Feb	0	0	0	0	0	0	0	33	181	314	394	479	561	556	470	317	171	35	0	0	0	0	0	0	146.3	561
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	41.9	121.9	205.3	266.7	294.3	263.3	201.9	140.7	55.5	6.3	0.1	0.0	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	0	33	181	314	407	479	561	556	470	317	171	35	0	0	0	0	0	0	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - February 2017

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	433	64.43	64.43
21 - 100	66	9.82	74.26
101 - 300	126	18.75	93.01
301 - 600	47	6.99	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort Chipewyan - February 2017

Maximum Speed: 35 km/h on Feb 19 18:00	Maximum Daily Speed Average: 25.3 km/h on Feb 19	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 4 18:00	Minimum Daily Speed Average: 1.8 km/h on Feb 23	Hours of Data: 670
Maximum Diurnal Speed Average: 4.6 km/h at hour 14	Minimum Diurnal Speed Average: 2.5 km/h at hour 24	Hours of Missing Data: 2
Monthly Average Velocity: 3.6 km/h 335.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 16 P ₉₀ = 20 P ₉₉ = 30	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-Feb	NW13	NW15	NW15	NNW14	NW13	NW12	NW12	NW11	WNW11	WNW11	NW11	NW11	WNW14	WNW14	WNW12	W11	W8	W9	W6	SW8	SW6	WSW4	W9	W9	WNW9.5	NW15
2-Feb	W10	WNW13	WNW12	WNW12	WNW11	WNW11	WNW11	WNW10	WNW9	NW12	NW12	NW9	NW8	NW9	NW8	NW7	NW8	NW7	NNW7	NNW9	N11	N7	WSW4	WSW7	WNW8.5	WNW13
3-Feb	WSW7	WSW6	WSW7	WSW9	W10	WNW11	NW13	NW12	NNW12	NW11	NW12	NW10	NW9	NW13	NW12	NW13	NW12	NW11	NW9	NW10	NW11	NNW10	NW8	W7	WNW9.1	NW13
4-Feb	W9	W8	W9	WNW9	WNW8	WNW8	W7	W5	W6	WSW5	SSW4	ESE2	ESE6	ESE3	ESE4	ESE4	SE3	NW0	W2	WNW4	NW6	WNW7	WN9	WNW9	WNW3.8	NW9
5-Feb	NW11	NW12	NW11	NW11	NNW12	NNW11	NW11	WNW11	WNW8	WNW11	NW9	WNW10	WNW10	W11	W11	W10	W7	W7	WNW9	W7	W6	W7	WSW6	WSW4	WNW8.4	NW12
6-Feb	WSW5	WSW3	NW1	NW2	E4	ENE4	E6	ENE4	ENE4	ENE3	E2	SW3	SW3	SW6	W8	W8	W7	W8	WNW10	WNW10	W8	WNW9	WNW10	W8	W3.2	WNW10
7-Feb	NW8	WSW7	WSW8	SW7	SW10	WSW15	W18	W18	W18	W17	W18	W17	WNW17	NW15	NW15	WNW12	NW13	NW12	NW11	NW14	NW11	WNW10	WNW10	WNW12	WNW11.9	W18
8-Feb	WNW13	WNW13	W11	WSW9	WSW11	WSW11	WSW11	W11	W12	W14	W13	W16	W17	W14	WSW12	WSW11	SSW9	S7	SW10	WSW9	WNW11	WNW10	NW12	WNW13	W10.7	W17
9-Feb	WNW13	WNW12	WNW9	W9	WNW11	WNW8	WSW8	WSW7	WNW5	NW3	NNE6	E4	ESE10	E14	E13	E12	ENE10	ENE13	ENE17	ENE20	ENE20	ENE23	ENE16	ENE17	NE5.1	ENE23
10-Feb	ENE15	ENE14	ENE17	ENE14	ENE13	ENE16	ENE17	ENE19	ENE20	ENE23	ENE21	E20	E21	ENE25	ENE26	ENE23	ENE22	ENE22	E25	E23	E19	E20	E20	E19	ENE19.7	ENE26
11-Feb	E18	E16	E10	WSW10	WSW13	W11	W13	W16	W18	WNW17	W18	W16	W17	W15	W8	W8	W8	WNW1	ENE4	E6	E7	E10	E13	E13	W3.8	W18
12-Feb	E12	E16	E16	E16	E16	E15	E14	E12	E9	SSE7	SSW10	SW15	WSW20	WSW21	WSW20	WSW18	WSW20	W16	W20	WSW15	W19	W19	W22	W21	SW5.5	W22
13-Feb	W22	W20	W19	WNW17	NW18	NW23	NW21	NW23	NW18	NW15	WNW13	WNW11	WNW11	W11	W8	SW7	S2	ESE3	ENE6	E8	E17	E26	E28	E28	NW6.5	E28
14-Feb	ENE27	E30	E30	ENE31	E27	E25	E28	E23	E21	E22	E19	E17	E18	E18	E19	E19	E18	E20	E17	E16	E17	E15	E16	E21.1	ENE31	
15-Feb	E13	E15	E14	E14	E13	E14	E13	E12	E12	E13	E13	E12	E10	ENE7	E9	E8	E9	ENE8	E9	ESE9	SW13	SW12	SW11	SW13	E8.0	E15
16-Feb	SSW4	WSW17	WSW19	SW9	WSW12	WSW14	WSW12	WSW4	SSE5	SSW8	S3	ENE7	E8	E7	ENE5	E8	E7	NNE4	ENE4	NNE3	NE4	NNE4	AF	NW5	SW2.1	WSW19
17-Feb	NNW10	NNW10	NNW12	NNW14	NNW14	NNW16	NNW16	NNW19	NNW19	NNW19	NW20	NW20	NW20	NW18	NW14	NW15	NW14	NW14	NW15	NW13	NW13	NW14	NW13	NW10	NW14.7	NW20
18-Feb	NW13	NW11	NW9	WNW7	NW8	WNW5	WNW4	NW4	WSW5	WSW9	W10	WSW11	WSW10	WSW10	W9	WNW8	WSW8	SW9	W5	NNW4	NNE2	NNE6	E6	ENE7	WNW5.3	NW13
19-Feb	E17	ENE14	ENE13	NE15	ENE21	ENE26	ENE26	ENE25	ENE25	ENE23	ENE23	ENE27	ENE30	ENE30	NE30	ENE31	ENE34	ENE35	ENE33	ENE30	ENE29	ENE29	ENE25	ENE21	ENE25.3	ENE35
20-Feb	ENE20	ENE22	ENE23	ENE23	ENE23	ENE23	ENE21	NE17	ENE13	NE12	NE8	NNE5	NNW6	NNW6	NNW7	NNW6	NW6	WNW8	W14	W14	W14	W15	W17	W18	NNE5.9	ENE23
21-Feb	W19	W16	W16	W16	W16	W14	W14	W14	W15	W16	W17	W17	W18	W17	W16	W16	W13	WNW11	WNW11	WNW11	WNW9	WNW8	WNW8	WNW9	W14.0	W19
22-Feb	WNW10	WNW9	WNW10	WNW11	WNW10	WNW8	WNW7	W8	W7	W8	NW8	WNW10	WNW11	W9	WNW8	NW10	NNW9	NW9	WNW9	NW9	NW10	NW7	NW8	NW9	WNW8.6	WNW11
23-Feb	NW9	NW8	NW10	NW8	NW7	WNW5	WNW6	WNW4	WNW3	NNW4	S4	SE6	E13	E11	E10	E9	ESE11	ESE8	E5	E9	E7	SE3	AF	W6	ENE1.8	E13
24-Feb	WNW8	NNW8	NNW8	NW11	NNW12	NNW12	NW10	WNW9	W9	W7	NW11	NNW15	WNW17	NW14	WNW10	W13	W9	W6	SW3	E5	E8	E11	E10	NW6.7	WNW17	
25-Feb	E10	ESE7	SE6	SE7	ESE8	SE8	ESE8	SE6	S7	SW8	WSW9	W12	WNW13	NW15	NW13	NW16	NNW14	NNW17	NNW18	NNW21	NNW21	NNW19	NNW18	NW16	NW6.1	NNW21
26-Feb	NW13	NNW14	NW15	NW17	NW13	NW15	NW17	NW17	NW16	NW16	NW17	NW17	NW15	NW14	NW14	NW10	N7	N7	NE9	ENE9	ENE8	E9	E8	NW10.6	NW17	
27-Feb	E6	ENE7	ENE9	E8	E8	E7	E13	E9	E13	E18	E13	E13	E14	E15	E17	E18	E18	E17	E12	E9	ENE5	NNE5	NNW6	NNW7	E10.3	E18
28-Feb	NW7	NW10	NW11	NW15	NW13	NW10	WNW10	WNW13	NW15	NW17	NW12	WNW13	NW13	NW11	NW9	WNW9	W12	W10	WNW7	NW5	NW2	N4	NNE4	NNE7	NW9.1	NW17

NNW3.5	NNW3.6	NNW3.9	NNW3.9	NNW3.7	NNW4.2	NNW4.1	NW4.2	NW3.8	NW4.2	NW4.6	NW4.2	NW4.4	NW4.6	NNW3.9	NNW3.5	NNW2.6	N3.1	N3.2	N3.2	N3.4	N3.6	N3.0	NNW2.5	Diurnal Average
ENE27	E30	ENE30	ENE31	E27	ENE26	E28	ENE25	ENE25	ENE23	ENE23	ENE27	ENE30	ENE30	NE30	ENE31	ENE34	ENE35	ENE33	ENE30	ENE29	ENE29	E28	E28	Diurnal Maximum

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



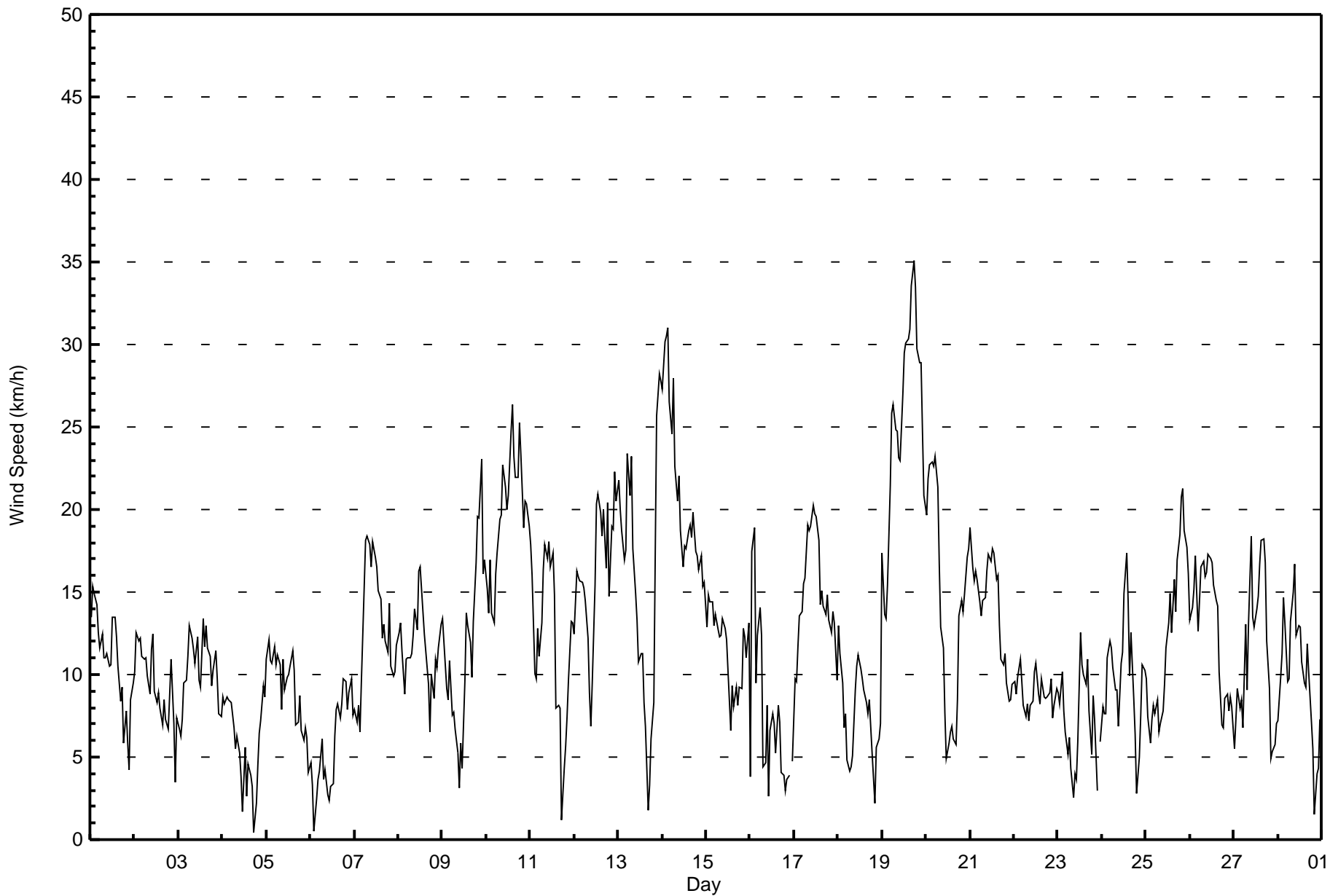
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Chipewyan - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 13 06:00	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 0 km/h on Feb 16 15:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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-Feb	4	4	4	4	3	3	3	2	3	2	3	3	3	3	3	2	2	2	2	2	2	1	2	2	4
2-Feb	2	3	2	2	2	2	2	2	2	4	4	4	3	3	2	2	2	2	2	3	3	3	1	1	4
3-Feb	2	1	2	2	2	3	3	3	3	3	3	4	3	4	4	4	4	3	2	3	3	3	3	1	4
4-Feb	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2
5-Feb	1	2	2	3	3	3	2	2	2	2	3	3	3	3	3	2	2	2	1	1	1	2	1	1	3
6-Feb	2	1	1	1	3	2	1	2	1	1	2	1	1	3	2	2	1	1	1	1	1	1	1	2	3
7-Feb	2	2	2	1	2	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	2	2	2	4
8-Feb	2	2	3	3	4	3	2	2	3	3	3	3	3	3	3	2	1	1	2	2	2	2	2	2	4
9-Feb	2	2	2	2	2	2	3	2	1	2	2	1	4	2	2	1	2	2	2	3	3	2	4	2	4
10-Feb	3	3	3	2	2	2	2	2	2	2	4	2	3	3	3	3	3	3	3	4	3	3	2	2	4
11-Feb	2	2	2	3	4	3	3	4	4	4	4	4	4	4	2	2	2	1	1	1	1	2	1	1	4
12-Feb	4	2	2	1	1	1	1	2	1	2	3	4	4	4	4	4	4	5	6	3	6	6	5	5	6
13-Feb	5	5	4	3	5	7	7	6	5	4	4	3	3	3	3	2	2	1	2	3	3	2	2	2	7
14-Feb	4	3	3	3	3	4	3	3	2	2	2	1	2	1	2	1	1	2	2	2	1	2	2	2	4
15-Feb	2	2	1	2	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	2	3	2	1	3	3
16-Feb	3	4	4	6	3	2	2	3	2	2	2	2	1	1	0	2	1	1	1	2	1	1	AF	2	6
17-Feb	2	2	3	3	4	5	5	6	6	6	6	6	6	5	5	5	4	4	4	3	4	4	4	4	6
18-Feb	4	3	3	2	2	2	1	1	2	2	2	3	3	2	2	2	2	2	1	1	1	2	2	3	4
19-Feb	2	2	2	2	4	3	3	3	3	3	3	4	4	4	4	5	5	5	5	4	3	3	3	2	5
20-Feb	2	2	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4	4	4
21-Feb	4	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	3	2	2	2	2	2	2	2	4
22-Feb	2	2	2	2	2	1	1	1	2	2	3	3	3	3	2	3	3	2	2	2	2	2	1	2	3
23-Feb	2	1	2	2	1	2	1	1	1	1	1	4	2	2	1	1	2	2	2	1	1	1	AF	1	4
24-Feb	1	1	2	3	4	3	2	2	2	2	3	4	4	5	5	3	3	2	1	1	1	2	1	1	5
25-Feb	1	1	1	1	1	2	2	1	2	1	3	3	4	4	4	5	5	6	7	7	7	6	6	5	7
26-Feb	4	5	4	5	4	4	5	5	4	5	5	5	5	5	5	4	3	1	1	1	1	1	1	1	5
27-Feb	1	1	1	1	2	2	3	2	3	3	1	2	1	1	1	2	2	2	3	1	2	1	2	3	3
28-Feb	2	2	4	4	4	3	2	2	3	5	4	4	4	4	3	3	2	2	1	2	2	2	2	3	5
	5	5	4	6	5	7	7	6	6	6	6	6	6	5	5	5	5	6	7	7	7	6	6	5	
Diurnal Maximum																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	67	10.00	10.00
6 - 11	287	42.84	52.84
12 - 19	241	35.97	88.81
20 - 28	62	9.25	98.06
29 - 38	13	1.94	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - February 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	7	1	8	5	5	2	1	3	2	3	8	2	9	8	2	67
6 - 11	4	3	2	12	33	7	5	1	2	3	11	23	49	62	55	15	287
12 - 19	0	0	2	16	57	0	0	0	0	0	4	11	48	22	61	20	241
20 - 28	0	0	0	29	16	0	0	0	0	0	0	4	5	0	5	3	62
29 - 38	0	0	1	11	1	0	0	0	0	0	0	0	0	0	0	0	13
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	5	10	6	76	112	12	7	2	5	5	18	46	104	93	129	40	670

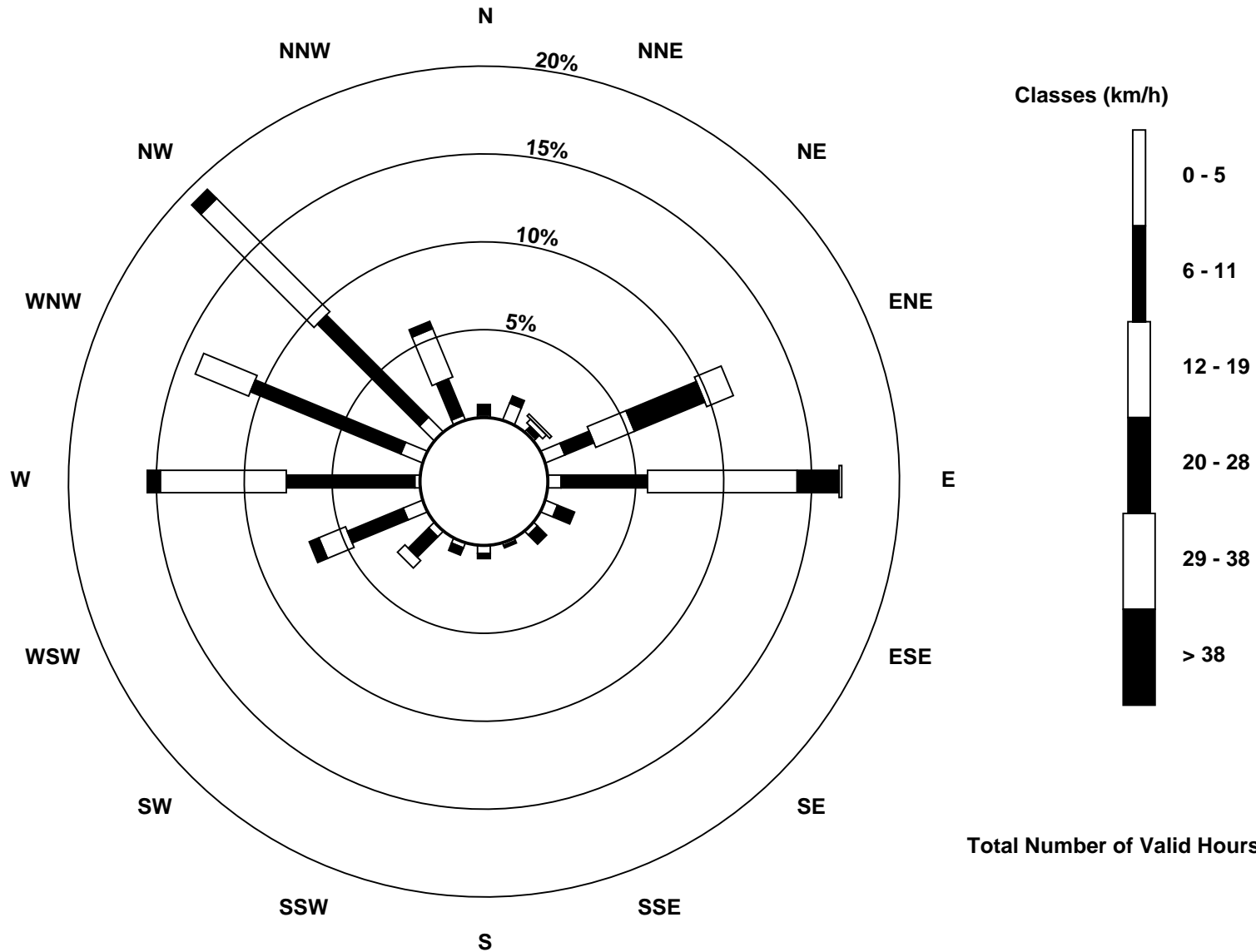
Total Number of Valid Hours: 670

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 670



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - February 2017

Direction of Maximum Speed: 59 deg on Feb 19 18:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 63.1 deg on Feb 19	Hours of Data: 670
Direction of Minimum Speed: 320 deg on Feb 4 18:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.8 deg on Feb 23	Percent Operational Time: 99.7
Monthly Average Direction: 298.3 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-Feb	321	323	326	327	323	320	312	311	301	303	315	321	288	288	282	277	269	271	267	220	230	243	263	265	298.0
2-Feb	277	285	284	293	289	289	287	284	286	316	315	325	323	320	319	312	311	323	340	339	353	355	256	255	305.1
3-Feb	250	242	242	253	259	293	326	313	327	305	309	324	324	315	323	311	326	324	307	315	322	334	320	263	306.4
4-Feb	281	278	280	295	296	285	279	264	264	252	210	120	61	107	107	123	143	320	271	288	308	295	306	295	283.6
5-Feb	307	320	319	325	328	331	315	297	293	303	322	303	287	280	263	275	266	269	285	278	265	262	257	258	296.1
6-Feb	248	244	325	315	81	71	83	78	73	74	80	215	232	234	263	279	260	271	284	291	277	285	288	280	276.8
7-Feb	309	253	244	230	228	254	267	266	266	263	265	276	286	308	309	303	307	309	306	316	309	303	292	287	282.2
8-Feb	285	283	281	256	258	251	256	259	267	271	273	267	266	261	248	238	204	190	222	237	287	297	305	286	263.7
9-Feb	286	290	282	280	296	289	252	257	299	311	25	85	110	89	95	93	74	61	57	62	66	72	72	71	53.6
10-Feb	68	63	64	67	74	73	69	74	76	77	76	84	81	75	73	68	69	71	79	83	81	82	83	82	75.1
11-Feb	87	87	90	252	246	270	271	268	281	284	275	265	269	266	270	276	280	290	77	79	84	88	87	91	273.3
12-Feb	94	89	88	89	90	90	87	90	93	159	200	219	238	249	247	246	250	259	262	255	264	272	272	271	233.7
13-Feb	272	274	280	285	310	318	323	318	316	313	303	301	282	277	278	233	176	119	72	88	83	80	85	83	320.7
14-Feb	78	80	79	78	84	82	87	84	88	89	90	93	92	90	94	94	98	95	99	95	93	91	94	94	87.9
15-Feb	92	93	94	92	86	86	90	89	91	92	92	91	87	74	79	94	85	77	88	108	216	236	228	236	99.1
16-Feb	197	246	249	236	237	252	256	257	161	205	176	78	83	91	69	88	85	32	61	12	40	15	AF	315	231.7
17-Feb	330	343	334	341	334	333	334	340	340	331	323	326	318	318	321	319	319	316	313	311	313	311	319	319	325.3
18-Feb	318	318	326	296	306	292	299	315	255	257	269	254	257	251	277	283	246	235	281	344	27	21	89	73	287.1
19-Feb	92	73	64	56	68	63	66	64	60	58	59	58	62	58	55	57	58	59	60	63	67	71	72	73	63.1
20-Feb	68	73	73	75	73	69	66	54	58	48	35	15	335	336	336	340	311	292	276	278	278	270	270	271	30.4
21-Feb	273	271	272	271	273	274	276	276	274	275	274	273	267	274	267	275	280	295	284	289	291	290	296	297	276.8
22-Feb	302	298	293	291	293	299	284	263	277	273	304	289	299	275	282	308	332	315	301	304	313	312	306	305	296.8
23-Feb	313	309	318	322	315	294	290	299	289	334	179	126	88	91	91	98	102	105	93	97	101	130	AF	275	56.7
24-Feb	298	329	337	326	328	327	313	292	281	276	306	319	294	292	322	303	272	279	265	217	84	80	85	93	310.4
25-Feb	91	112	139	137	118	128	119	145	187	221	256	280	299	310	313	315	338	328	332	334	341	333	331	326	324.7
26-Feb	325	327	325	322	318	306	307	307	306	308	308	310	313	318	314	313	323	350	360	46	61	75	79	80	324.7
27-Feb	80	69	66	84	93	85	87	94	94	87	98	95	96	94	91	90	93	86	89	91	69	20	343	340	84.9
28-Feb	323	319	320	316	314	304	290	292	311	322	310	290	305	308	315	295	261	259	284	308	323	3	17	14	307.3
341.2 339.9 340.9 335.0 336.0 336.6 338.9 326.2 326.1 320.7 315.6 312.7 312.5 316.2 330.1 328.4 339.1 351.4 349.8 4.0 4.9 11.3 2.2 342.6																									
Diurnal Average																									

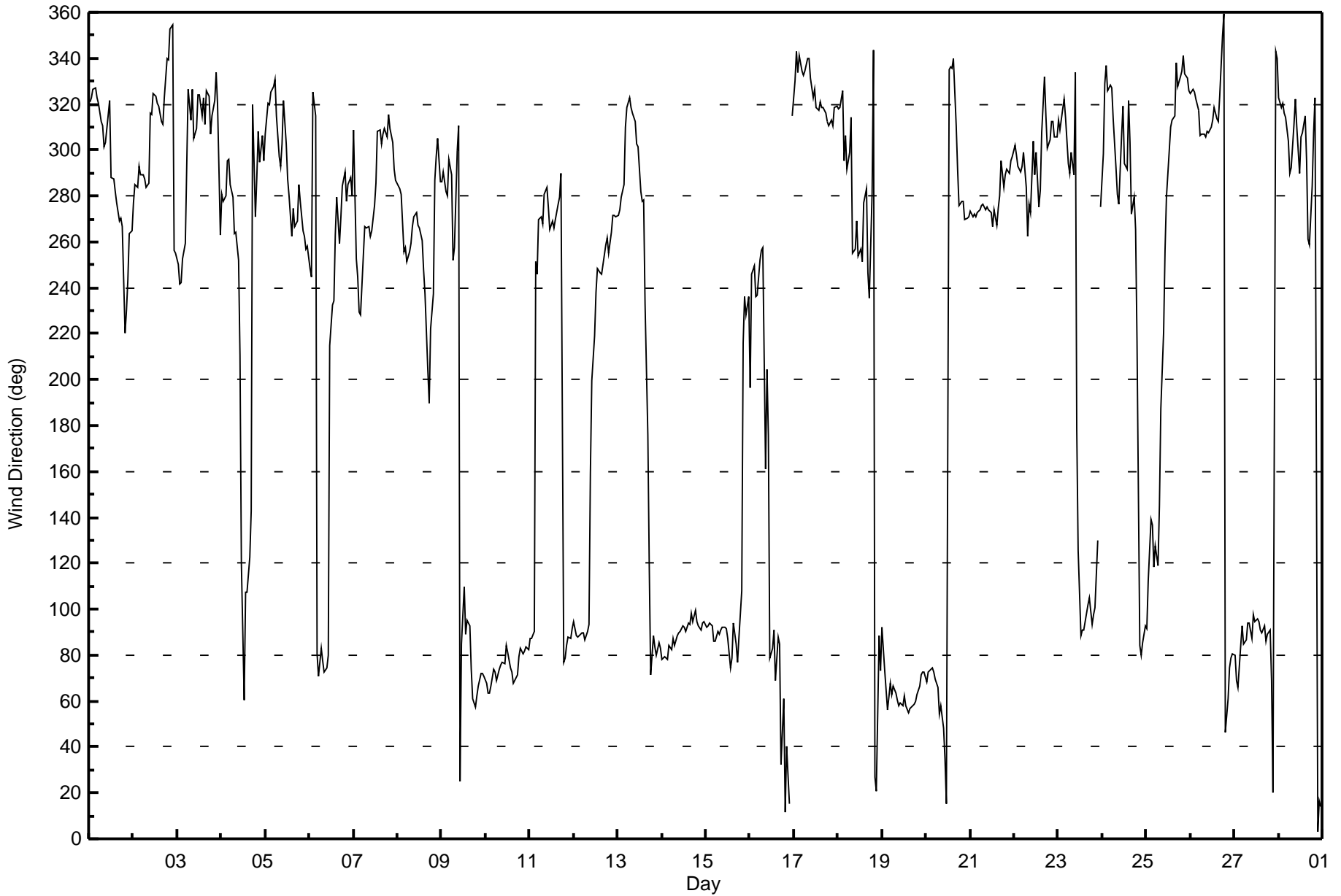
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort Chipewyan - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 89 deg on Feb 6 03:00 Minimum Value: 3 deg on Feb 15 10:00 Percentiles: P ₁ = 4 P ₁₀ = 6 Q ₁ = 10 Median = 14 Q ₃ = 19 P ₉₀ = 25 P ₉₉ = 73																	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																														
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Feb	17	16	16	17	16	17	13	12	12	12	16	23	15	15	14	14	14	10	31	23	14	16	13	13	31																						
2-Feb	13	14	13	12	12	13	11	12	15	21	20	26	25	26	21	20	15	20	24	22	22	27	35	16	35																						
3-Feb	18	16	16	14	12	18	19	15	17	17	15	23	24	18	20	17	20	18	12	14	16	19	39	17	39																						
4-Feb	12	9	10	9	7	8	10	14	17	17	18	73	19	49	25	15	32	63	43	27	7	10	6	11	73																						
5-Feb	11	11	14	16	15	19	12	13	14	15	22	22	21	16	16	18	15	14	8	14	17	16	13	26	26																						
6-Feb	22	18	89	58	49	28	18	30	21	34	58	29	30	22	18	17	17	15	13	12	11	9	10	14	89																						
7-Feb	28	21	16	21	11	15	13	14	13	13	13	15	14	19	17	18	19	17	15	16	15	14	13	12	28																						
8-Feb	11	11	14	18	15	13	12	14	12	12	14	12	13	17	15	11	18	15	9	34	11	13	14	11	34																						
9-Feb	13	17	14	26	13	35	23	16	30	62	36	40	14	8	7	6	13	7	7	9	9	7	8	7	62																						
10-Feb	10	11	9	10	7	8	6	6	6	6	7	6	8	6	6	8	8	8	6	6	7	7	7	6	11																						
11-Feb	7	8	9	27	19	16	14	14	14	14	14	15	14	14	16	14	13	87	12	18	15	7	5	5	87																						
12-Feb	14	5	4	4	4	3	4	7	15	27	19	9	14	14	13	13	13	18	18	17	19	15	14	14	27																						
13-Feb	14	14	14	13	19	18	19	17	17	17	19	24	17	18	18	22	73	39	10	14	6	5	6	5	73																						
14-Feb	6	6	6	6	7	10	5	6	7	4	6	5	4	4	4	4	5	4	3	6	4	4	4	4	10																						
15-Feb	5	3	4	5	5	6	4	4	5	3	4	7	9	19	9	9	8	9	12	25	22	11	10	12	25																						
16-Feb	77	12	12	32	16	11	11	76	52	11	58	14	7	13	16	7	7	42	34	48	41	45	AF	45	77																						
17-Feb	15	19	19	17	19	21	21	20	19	20	19	20	18	18	21	21	19	17	16	18	17	16	18	21	21																						
18-Feb	17	18	21	22	17	20	19	25	18	18	19	17	24	22	22	20	29	12	17	28	58	31	28	24	58																						
19-Feb	10	7	10	8	8	7	7	7	7	7	8	8	8	8	9	9	8	8	8	7	7	7	6	6	10																						
20-Feb	6	5	5	5	6	6	7	8	17	10	18	25	27	25	22	21	18	17	14	13	14	14	12	13	27																						
21-Feb	13	13	14	13	12	13	14	12	13	14	13	14	15	15	16	16	14	13	12	12	12	13	12	14	16																						
22-Feb	16	13	12	11	11	12	12	13	13	16	23	20	18	27	21	22	22	18	14	18	14	13	10	11	27																						
23-Feb	11	12	10	15	15	28	11	20	23	25	20	45	4	4	6	7	6	9	28	6	9	31	AF	14	45																						
24-Feb	11	13	17	18	18	17	14	14	13	20	20	21	19	20	21	22	14	15	18	46	20	13	4	5	46																						
25-Feb	5	10	18	16	16	12	13	20	16	15	22	17	19	17	19	19	25	23	23	23	21	21	22	20	25																						
26-Feb	19	19	20	18	21	17	15	17	15	15	16	17	19	22	22	19	21	15	15	10	7	8	7	7	22																						
27-Feb	8	4	4	10	7	14	5	5	6	5	5	9	6	5	5	4	4	5	9	14	48	20	28	56	56																						
28-Feb	23	16	19	17	17	18	12	11	12	16	20	20	22	23	27	26	13	12	19	20	79	53	35	23	79																						
Diurnal Maximum																								77	21	89	58	49	35	23	76	52	62	58	73	30	49	27	26	73	87	43	48	79	53	39	56
AF - Analyzer Failure																																															





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 4, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	17:55
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-826	-826
Analyzer IP address	192.168.1.43		Lamp voltage	1020	1023
Calculated slope	1.007654	1.000140	Chamber temp	44.9	44.9
Calculated intercept	-0.132090	-0.088118	Pressure	721.9	707.0
Analyzer Background	1.23	1.25	Flow	0.435	0.426
Analyzer Coefficient	1.109	1.119	Intensity	90	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	17.3	1.014
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	44.8	17.5	17.7	0.994
second point	6000	29.9	11.7	11.8	0.991
third point	6000	15.0	5.9	5.8	1.008
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	44.8	17.5	17.3	1.014
Average Correction Factor					0.997

Corrected As found 17.2 Previous response 17.5 % change 2.1%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



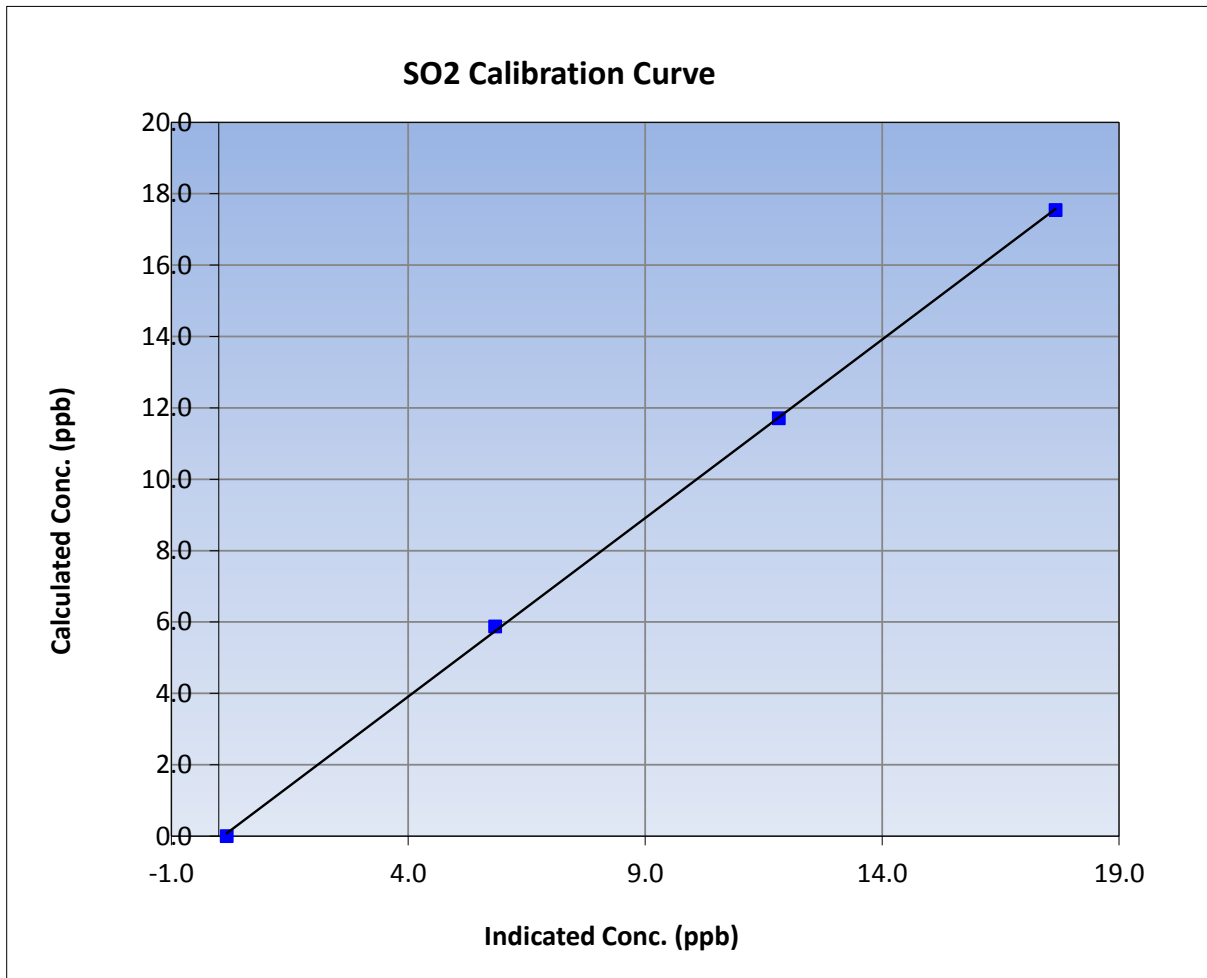
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 4, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:20	End Time (MST)	17:55
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

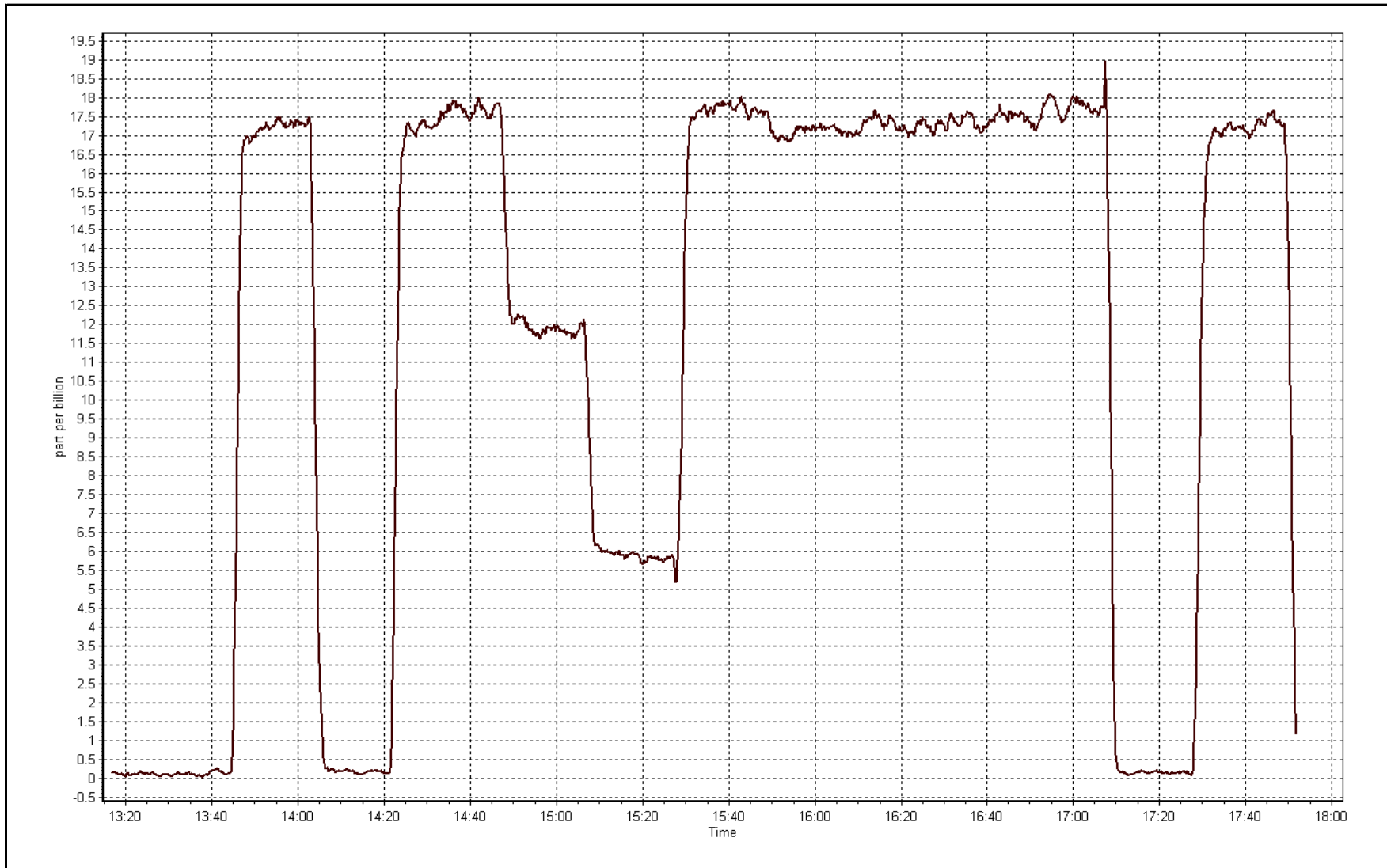
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999851
17.5	17.7	0.9936		
11.7	11.8	0.9908	Slope	1.000140
5.9	5.8	1.0077		
			Intercept	-0.088118



SO2 Calibration Plot

Date: February 9, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 10, 2017	Previous Calibration	January 5, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	8:00	End Time (MST)	11:00
NO2 GPT Ref date	February-09-17	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	35.7
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	0.994563	0.997350	Pressure	26.2	26.7
Calculated intercept	-0.102668	-0.209248	Flow cell A	781.000	739.000
Analyzer Background	-0.4	-0.4	Flow cell B	779.000	742.000
Analyzer Coefficient	1.024	1.019	O3 Measure	4038.1	3870.9
			O3 Reference	4042.3	3872.4

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	-0.1	----
As found span	6000	830.10	102.5	103.4	0.991
calibrator zero	6000	800.00	0.0	0.2	----
high point	6000	830.10	102.5	103.0	0.995
second point	6000	799.10	82.7	83.1	0.996
third point	6000	733.20	52.2	52.6	0.992
as left zero	6000	800.00	0.0	0.2	----
as left span	6000	830.10	102.5	103.2	0.994
Average Correction Factor					0.994

Corrected As found	103.5	Previous response	103.2	% change	-0.3%
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Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



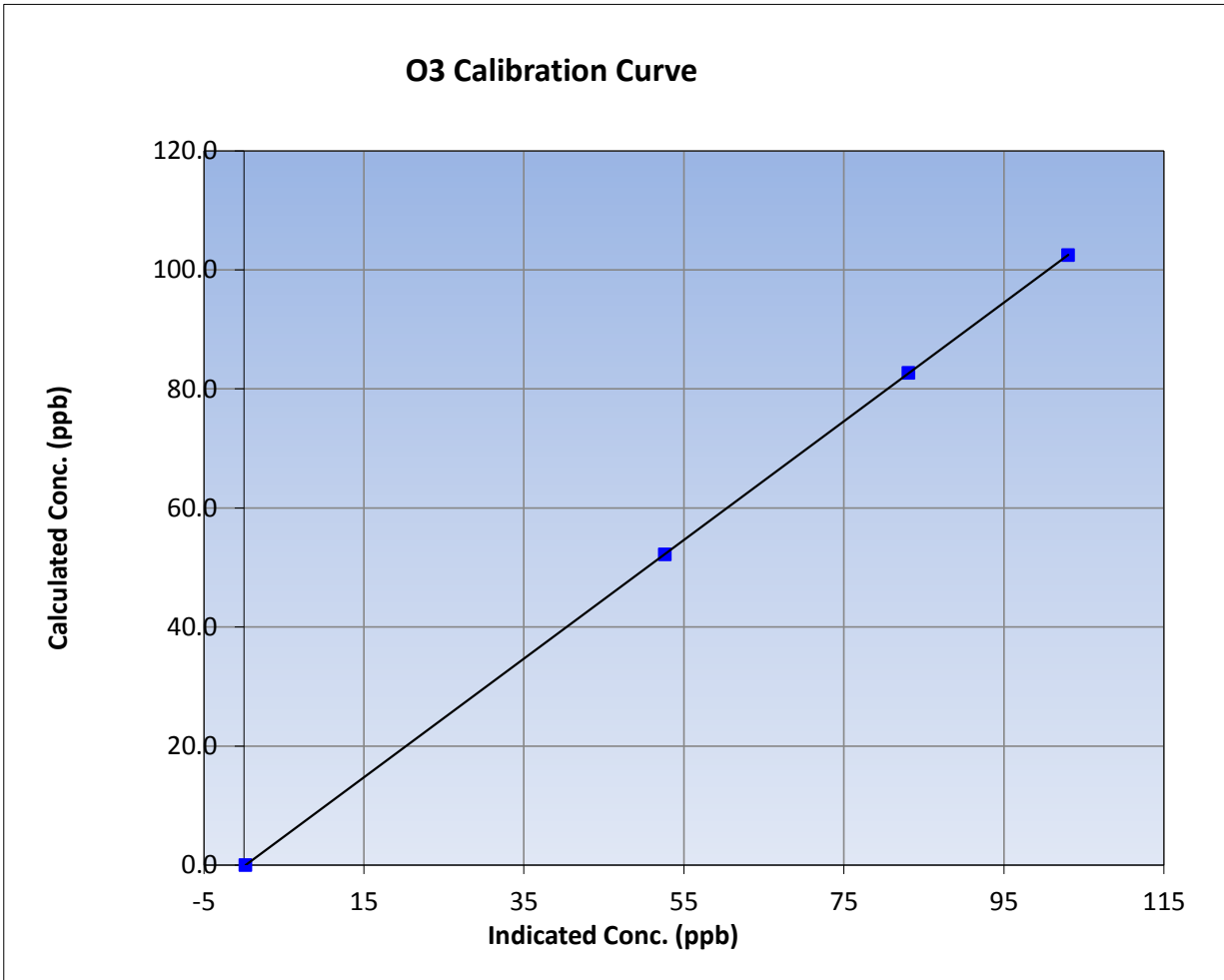
Wood Buffalo Environmental Association O3 Calibration Report

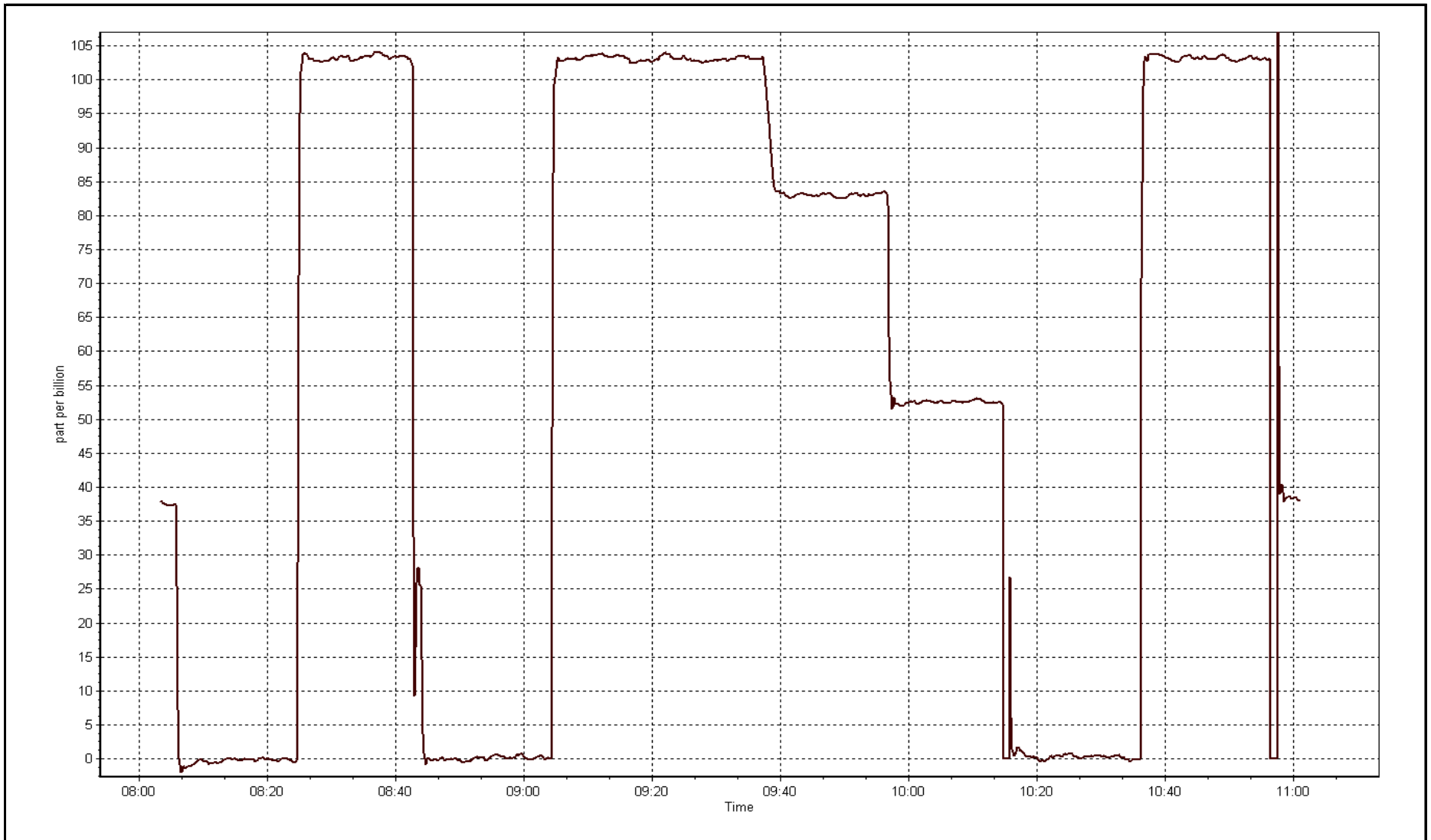
Station Information

Calibration Date	February-10-17	Previous Calibration	January-05-17
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:00	End Time (MST)	11:00
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	0.2	----	Correlation Coefficient	0.999998
102.5	103.0	0.9950		
82.7	83.1	0.9958		
52.2	52.6	0.9924		
			Slope	0.997350
			Intercept	-0.209248







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 4, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	17:55
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	1.002721	1.002774	1.000122
	Data Offset	0.451139	0.467943	0.037735

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	1.299		1.299	
NOX coefficient	1.313		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	316.7	Deg C	314.1	Deg C
PMT voltage	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	89	ccm	87	ccm
R Cell press NO	4	"Hg	4	"Hg
R Cell Press Nox	4	"Hg	4	"Hg
NO sample flow	1121	cc/min	1098	cc/min
Nox sample Flow	1099	cc/min	1074	cc/min

Notes:

Inlet filter changed after as founds. No adjustments made.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 9, 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	-0.1	0.0	----	----
as found span	6000	44.8	150.1	150.1	0.0	149.0	149.2	-0.2	1.0071	1.0056
calibrator zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	6000	44.8	150.1	150.1	0.0	149.5	149.5	0.0	1.0037	1.0038
second point	6000	29.9	100.2	100.2	0.0	99.2	99.3	0.0	1.0093	1.0092
third point	6000	15.0	50.3	50.3	0.0	49.1	49.0	0.1	1.0226	1.0247
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	47.1	103.0	150.0	47.5	102.4	1.0009	0.9899
Average Correction Factor									1.0119	1.0126

Corrced As found NO_x= 149.1 NO= 149.3 Percent Change NO_x= 0.7% NO= 0.8%
 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	149.6	149.6	0.0	1.0035	1.0033	----	----
1st NO2 (100)	47.1	102.5	149.6	47.1	102.5	1.0034	----	1.0001	100.0%
2nd NO2 (80)	66.9	82.7	149.5	66.9	82.7	1.0037	----	1.0006	99.9%
3rd NO2 (50)	97.4	52.2	149.5	97.4	52.1	1.0041	----	1.0023	99.8%
2nd NO ref point	----	0.0	149.5	149.7	-0.2	1.0041	1.0026	----	----
Average Correction Factor						1.0038		1.0010	99.9%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

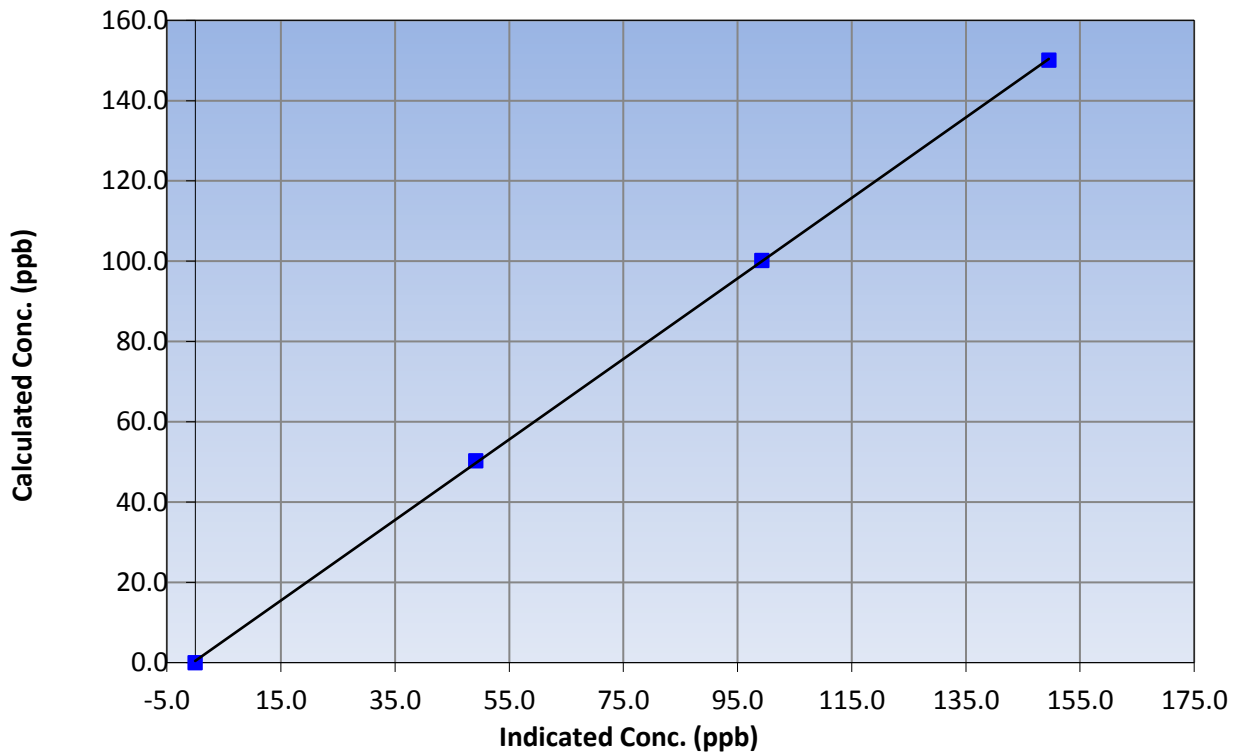
Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 4, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:20	End Time (MST)	17:55
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	----	Correlation Coefficient	0.999953
150.1	149.5	1.0037		
100.2	99.2	1.0093	Slope	1.002721
50.3	49.1	1.0226		
			Intercept	0.451139

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

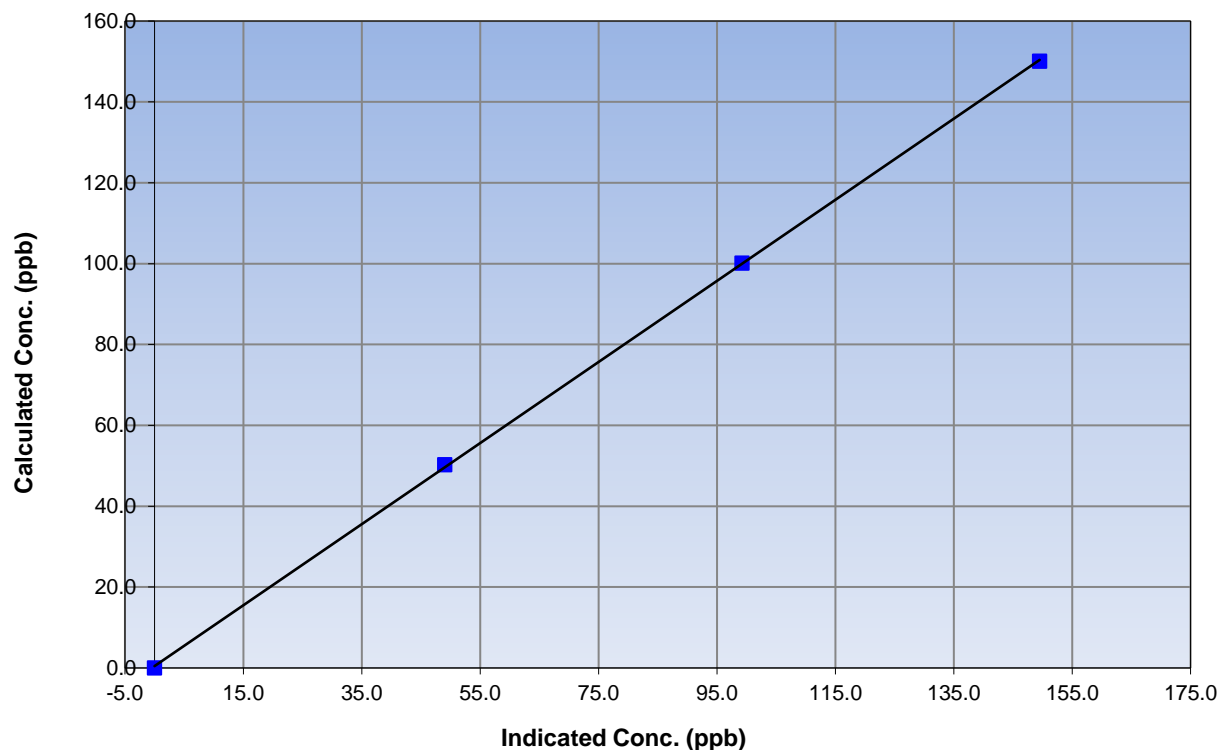
Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 4, 2017
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:20	End Time (MST)	17:55
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	0.999943
150.1	149.5	1.0038		
100.2	99.3	1.0092	Slope	1.002774
50.3	49.0	1.0247		
			Intercept	0.467943

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

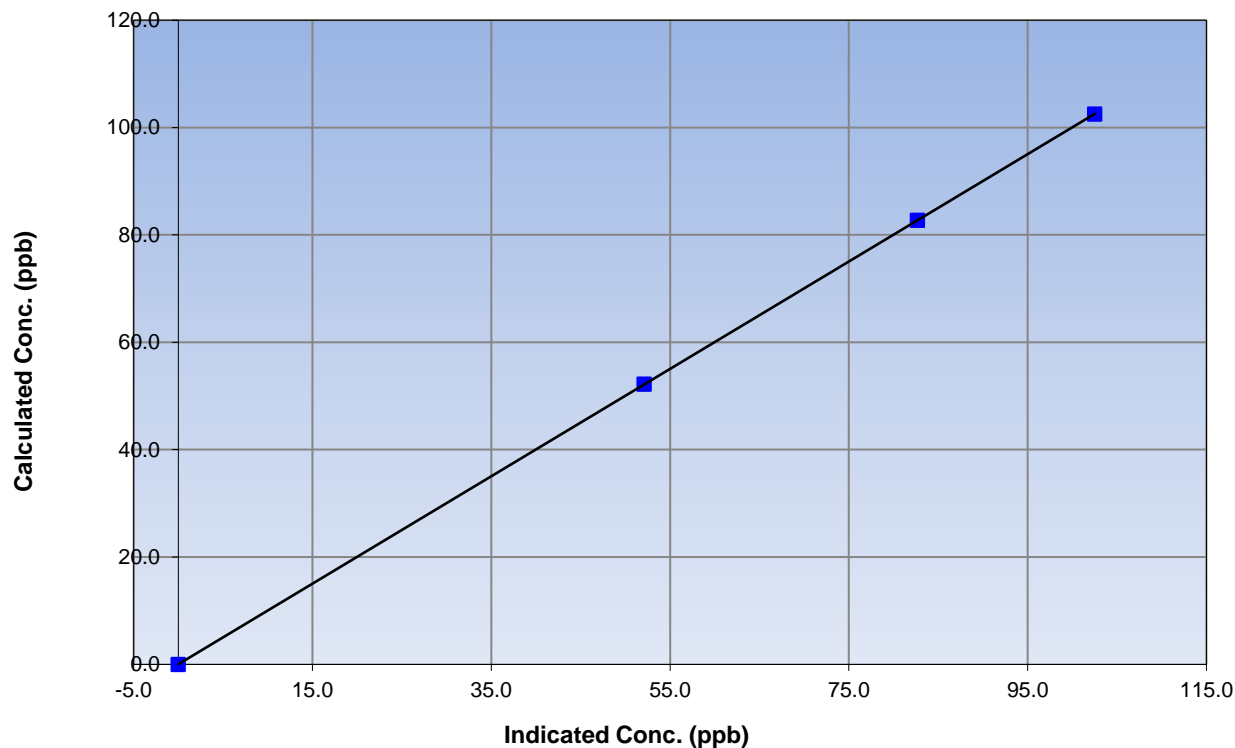
Station Information

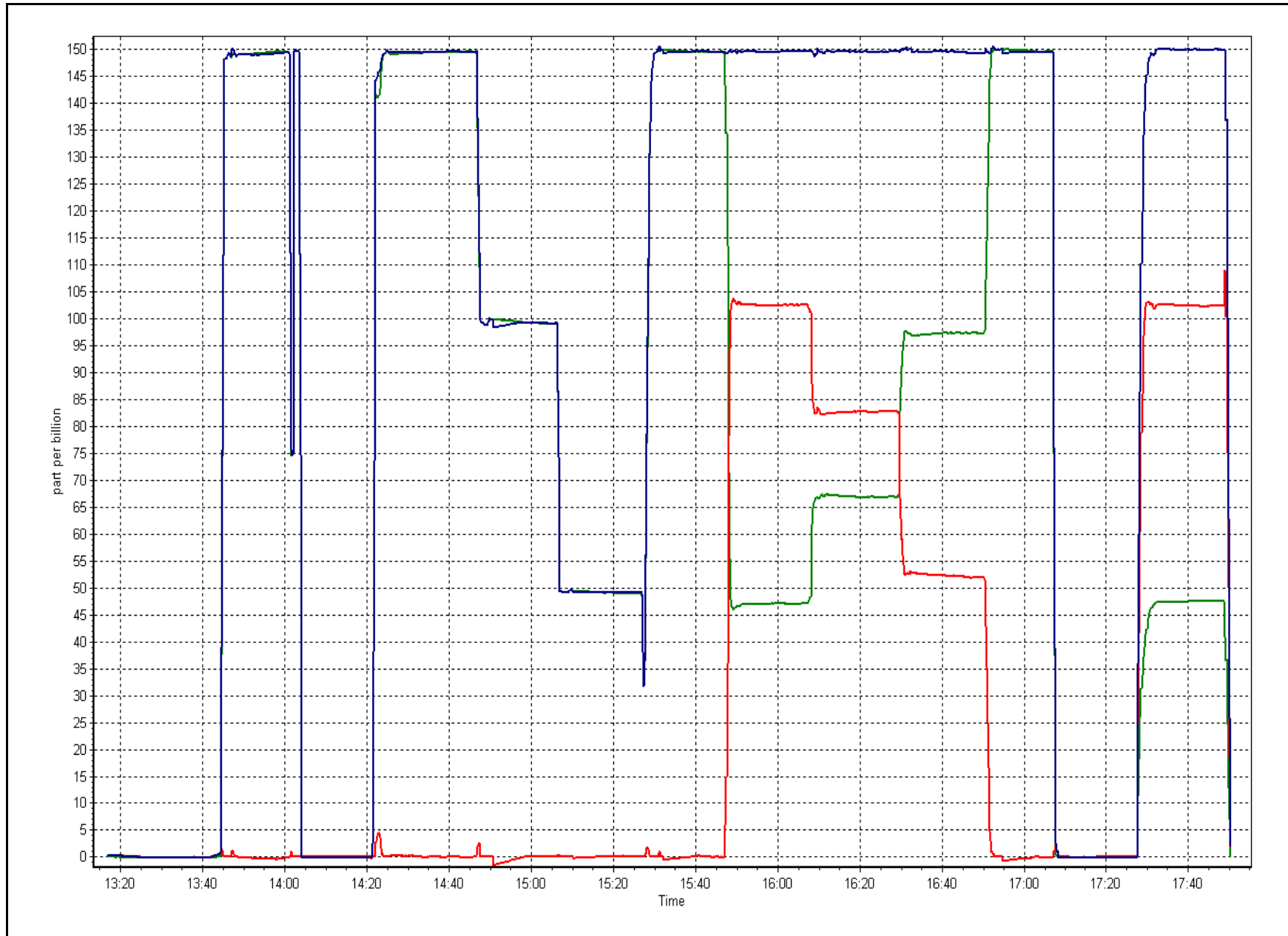
Calibration Date	February 9, 2017	Previous Calibration	January 4, 2017
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:20	End Time (MST)	17:55
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
102.5	102.5	1.0001		
82.7	82.7	1.0006	Slope	1.000122
52.2	52.1	1.0023		
			Intercept	0.037735

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:	February 9, 2017	Last Cal Date:	January 4, 2017
Start time (MST):	13:25	End time (MST):	16:30
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

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	-18	-18.6	-18	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	971	968.85	991	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	997.2	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.4	----	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: _____	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: _____

<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 did not require cleaning. No adjustments needed to temperature, pressure or flow. Nephelometer was adjusted.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 FEBRUARY 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	640	32	32	100	4	0	1	0
THC(ppm) Average	639	32	33	99.85	6.3	-	3.1	-
Temperature (C) Average	672	0	0	100	10.9	-	5.2	-
Relative Humidity (%) Average	672	0	0	100	98	-	92	-
Wind Speed 10 m (km/h) Average	666	0	6	99.11	21	-	11	-
Wind Direction 10 m (deg) Average	666	0	6	99.11	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 FEBRUARY 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	640	0.6	1	-	0	0	0	0	1	1	4
THC(ppm) Average	639	2.44	0.4	-	2	2.1	2.2	2.3	2.5	2.9	6.3
Temperature (C) Average	672	-11.26	10.1	-	-32.4	-23.1	-19	-12.8	-2.8	2.6	10.9
Relative Humidity (%) Average	672	72.1	13	-	39	54	63	75	82	85	98
Wind Speed 10 m (km/h) Average	666	5	3	-	0	2	3	5	6	9	21
Wind Direction 10 m (deg) Average	666	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	08 Feb 2017 10:00	08 Feb 2017 10:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	06 Feb 2017 21:00	06 Feb 2017 21:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Feb 2017 07:00	10 Feb 2017 08:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Feb 2017 18:00	16 Feb 2017 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Feb 2017 06:00	22 Feb 2017 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Feb 2017 09:00	22 Feb 2017 09:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

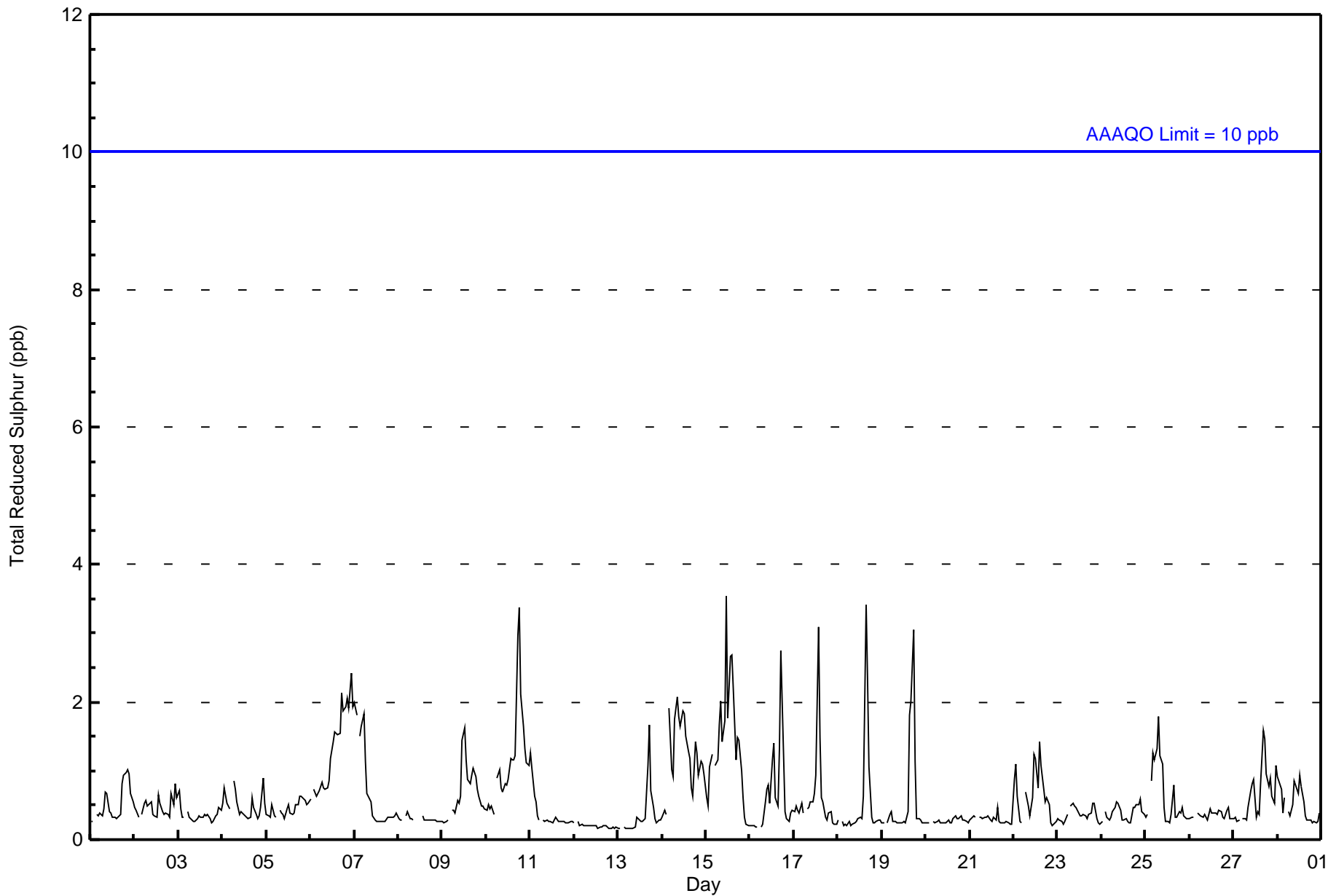
Barge Landing - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4 ppb on Feb 15 12:00 Maximum Daily Average: 1.4 ppb on Feb 15																	Hours in Service: 672 Hours of Data: 640									
Minimum Value: 0 ppb on Feb 13 01:00 Minimum Daily Average: 0.2 ppb on Feb 12 Maximum Diurnal Average: 0.9 ppb at hour 18 Minimum Diurnal Average: 0.4 ppb at hour 3 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 = 3																	Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1
2-Feb	0	0	0	Z	0	1	1	0	1	1	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0.5	1
3-Feb	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Feb	1	1	1	0	0	Z	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0.5	1
5-Feb	0	0	0	1	0	0	Z	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1	1	1	0.4	1
6-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1.3	2
7-Feb	2	2	Z	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
8-Feb	0	0	0	Z	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Feb	0	0	0	0	Z	0	0	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0.7	2
10-Feb	0	1	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	3	3	2	2	1	1	1	1.1	3
11-Feb	1	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Feb	0	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
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0.4	2
14-Feb	0	0	0	Z	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1.2	2
15-Feb	1	0	1	1	Z	1	1	2	2	1	2	4	2	3	3	2	1	1	1	1	1	0	0	0	1.4	4
16-Feb	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	0	1	3	1	0	0	0	0	0	0	0.6	3
17-Feb	0	0	0	0	1	0	Z	0	0	1	1	1	1	3	1	1	1	0	0	0	0	0	0	0	0.6	3
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	2	1	0	0	0	0	0	0	0	0.5	3
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	2	3	1	0	0	0	0	0	0	0.6	3
20-Feb	0	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-Feb	0	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-Feb	1	1	1	0	0	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
23-Feb	0	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1
24-Feb	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.4	1
25-Feb	0	0	Z	1	1	1	1	2	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.6	2
26-Feb	0	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
27-Feb	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	1	2	1	1	1	1	1	1	1	0.6	2
28-Feb	1	1	1	0	1	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.6 0.6 0.6 0.6 0.7 0.6 0.7 0.6 0.8 0.7 0.9 0.7 0.6 0.5 0.5 0.5 0.5 0.5																								Diurnal Average		
2 2 1 2 2 2 2 1 2 2 2 2 4 2 3 3 3 2 3 3 2 2 2 2 2 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
Barge Landing - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	631	98.59	98.59
3 - 4	9	1.41	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - February 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	51	46	43	45	24	10	36	59	56	31	38	53	26	26	13	70	627
3 - 4	0	3	0	2	0	0	0	0	1	2	0	0	0	0	0	0	8
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	51	49	43	47	24	10	36	59	57	33	38	53	26	26	13	70	635

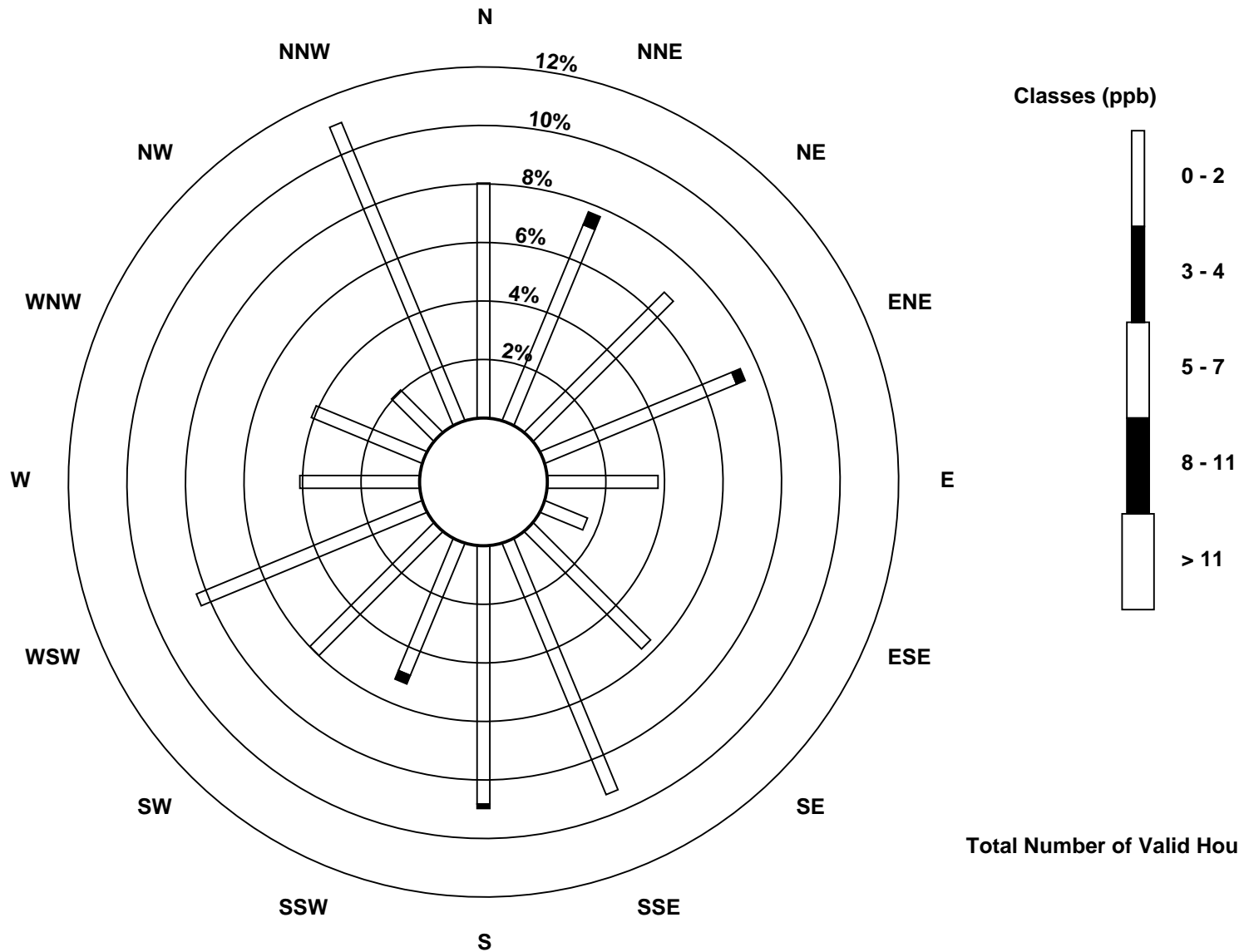
Total Number of Valid Hours: 635

Total Number of Hours: 672

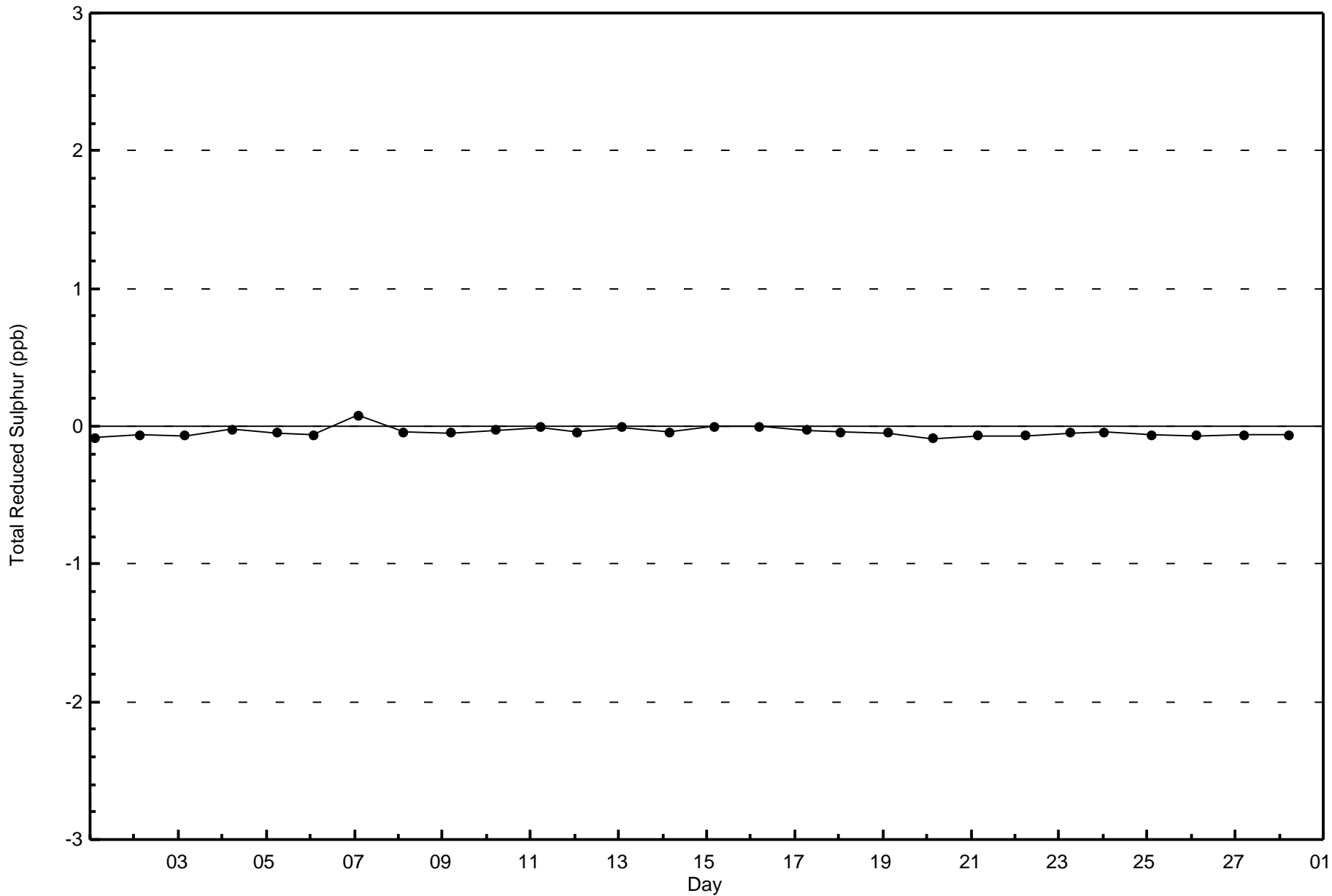


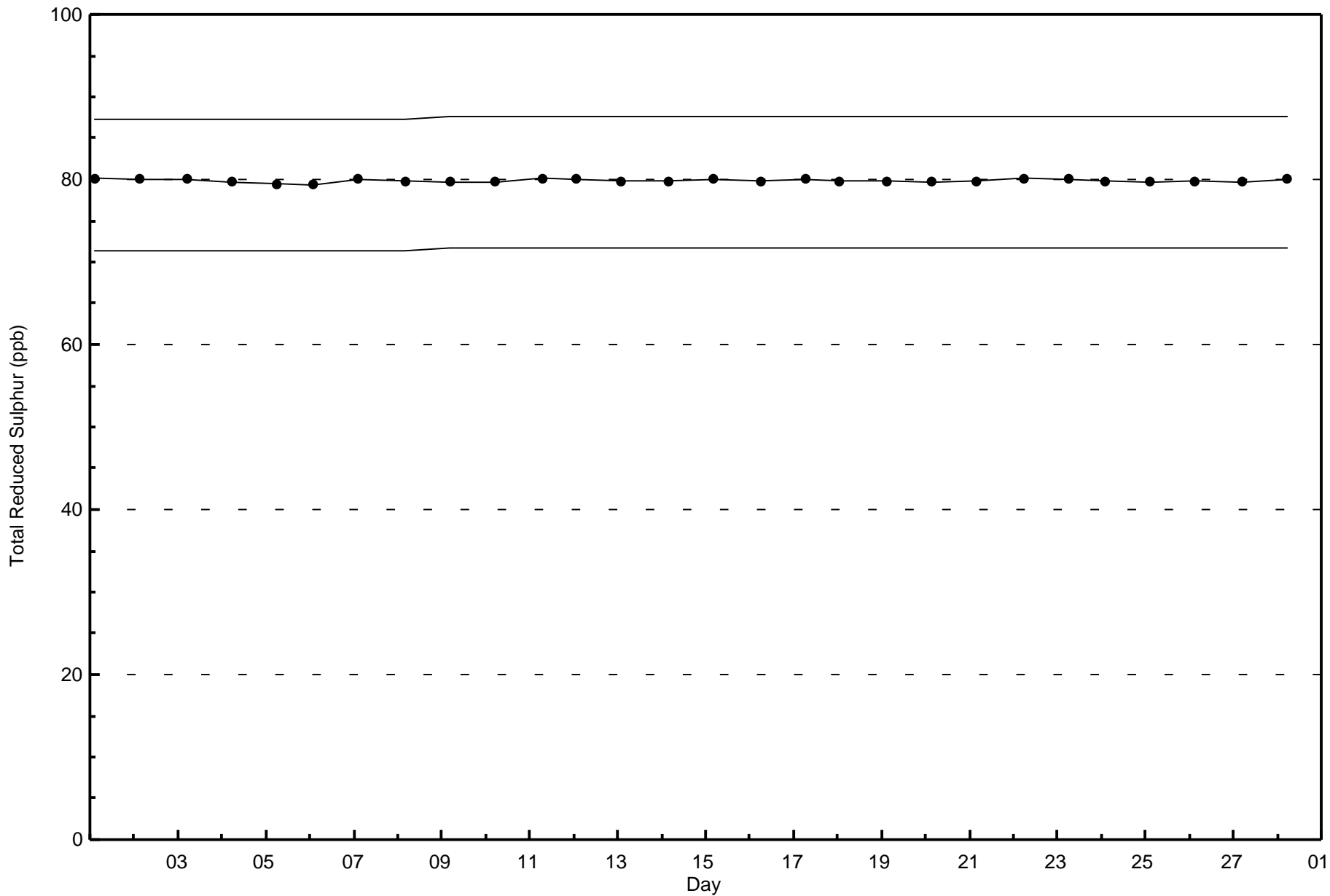
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)



Total Number of Valid Hours: 635



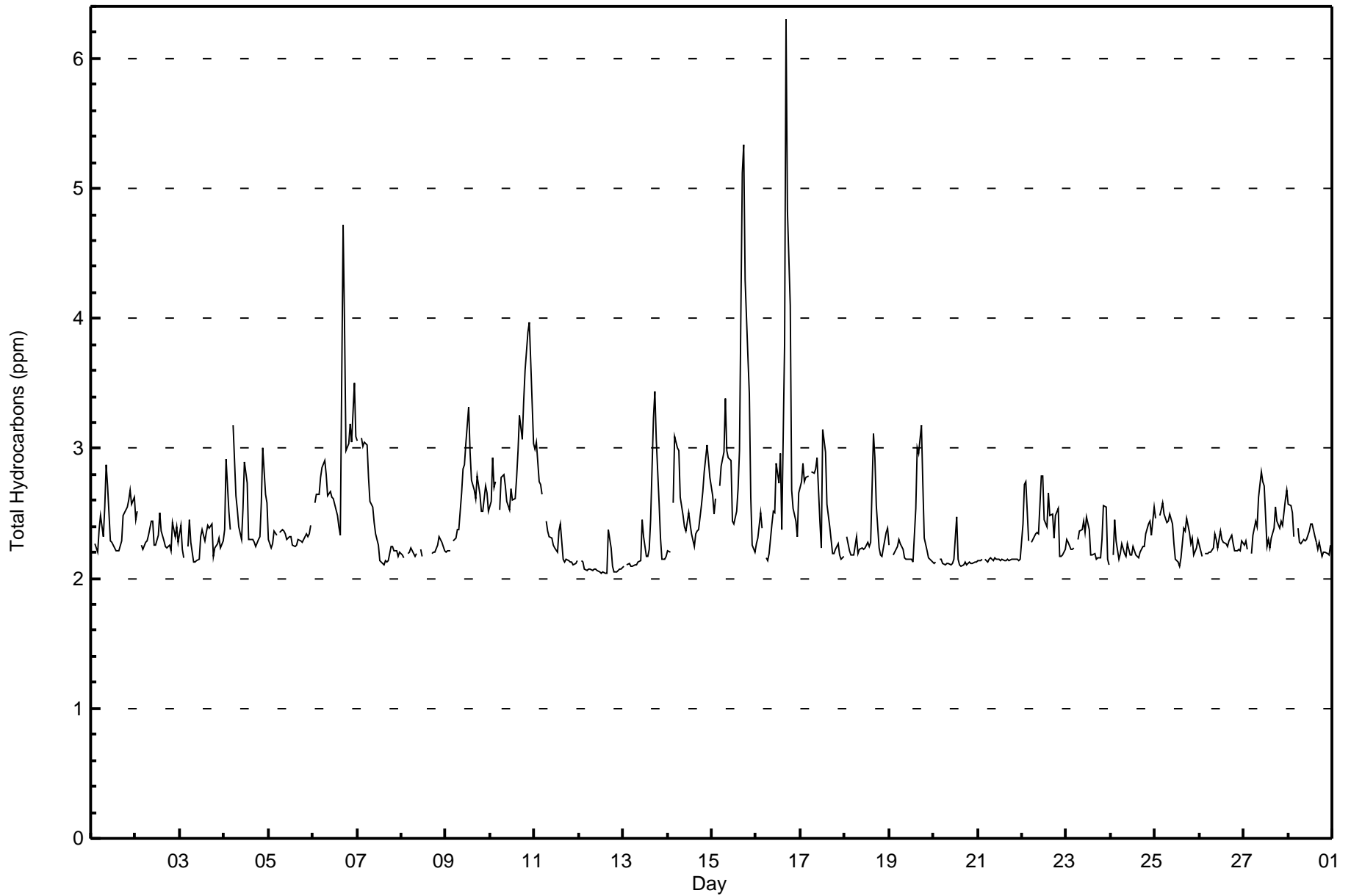




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - February 2017

Maximum Value: 6.3 ppm on Feb 16 17:00 Maximum Daily Average: 3.1 ppm on Feb 15																				Hours in Service: 672 Hours of Data: 639 Hours of Missing Data: 33 Hours of Calibration: 32 Percent Operational Time: 99.9						
Minimum Value: 2.0 ppm on Feb 12 13:00 Minimum Daily Average: 2.1 ppm on Feb 12 Maximum Diurnal Average: 2.7 ppm at hour 17 Minimum Diurnal Average: 2.3 ppm at hour 15 Monthly Average: 2.44 ppm Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.9 P ₉₉ = 3.9																										
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-Feb	2.2	Z	2.3	2.2	2.4	2.5	2.3	2.5	2.9	2.7	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.5	2.5	2.6	2.6	2.7	2.6	2.6	2.4	2.9
2-Feb	2.5	2.5	Z	2.3	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.5	2.4	2.3	2.2	2.2	2.3	2.2	2.4	2.3	2.4	2.3	2.3	2.5
3-Feb	2.4	2.2	2.2	Z	2.2	2.4	2.3	2.1	2.1	2.1	2.1	2.3	2.4	2.3	2.4	2.4	2.4	2.4	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.4
4-Feb	2.4	2.9	2.5	2.4	Z	3.2	2.6	2.5	2.4	2.3	2.5	2.9	2.7	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.6	3.0	2.6	2.6	2.5	3.2
5-Feb	2.3	2.2	2.3	2.4	2.3	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4
6-Feb	Z	2.6	2.6	2.6	2.8	2.8	2.9	2.8	2.6	2.7	2.6	2.6	2.5	2.5	2.4	2.3	4.7	3.9	3.0	3.0	3.2	3.1	3.5	3.1	2.9	4.7
7-Feb	3.1	Z	3.1	3.0	3.0	3.0	2.8	2.6	2.5	2.4	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.1
8-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	M	2.2	2.2	C	C	C	C	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.3
9-Feb	2.2	2.2	2.2	Z	2.3	2.3	2.4	2.4	2.7	2.8	2.9	3.0	3.3	3.0	2.8	2.7	2.6	2.8	2.7	2.5	2.5	2.7	2.7	2.5	2.6	3.3
10-Feb	2.6	2.9	2.7	2.7	Z	2.5	2.8	2.8	2.7	2.6	2.5	2.7	2.6	2.6	2.8	3.0	3.3	3.1	3.4	3.6	3.9	4.0	3.7	3.0	3.0	4.0
11-Feb	3.0	3.0	2.7	2.7	2.6	Z	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	3.0
12-Feb	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	2.1	2.0	2.0	2.4	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.4
13-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.3	2.2	2.2	2.2	2.5	3.2	3.4	3.1	2.6	2.3	2.1	2.1	2.2	2.3	3.4
14-Feb	2.2	2.2	Z	2.6	3.1	3.0	3.0	2.6	2.5	2.4	2.4	2.5	2.4	2.3	2.3	2.3	2.4	2.4	2.6	2.7	2.8	3.0	2.9	2.8	2.6	3.1
15-Feb	2.6	2.5	2.6	Z	2.7	2.9	3.0	3.4	3.0	2.9	2.9	2.4	2.4	2.5	2.7	3.0	5.1	5.3	4.3	3.7	3.4	2.6	2.3	2.2	3.1	5.3
16-Feb	2.3	2.3	2.5	2.4	Z	2.2	2.1	2.2	2.4	2.5	2.5	2.9	2.7	3.0	2.4	3.8	6.3	4.8	4.1	2.7	2.5	2.4	2.3	2.7	2.9	6.3
17-Feb	2.7	2.9	2.7	2.8	2.8	Z	2.8	2.8	2.8	2.9	2.4	2.2	3.1	3.0	2.6	2.5	2.4	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.6	3.1
18-Feb	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	3.1	2.9	2.6	2.2	2.2	2.2	2.2	2.4	2.4	2.3	3.1
19-Feb	2.3	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.5	3.0	3.0	3.2	2.7	2.3	2.2	2.2	2.1	2.1	2.3	3.2
20-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5
21-Feb	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2
22-Feb	2.4	2.7	2.7	2.3	Z	2.3	2.3	2.3	2.4	2.3	2.8	2.8	2.4	2.4	2.7	2.5	2.5	2.3	2.5	2.5	2.2	2.2	2.2	2.2	2.4	2.8
23-Feb	2.3	2.3	2.2	2.2	2.2	Z	2.3	2.4	2.4	2.4	2.4	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	2.5	2.2	2.1	2.3	2.6
24-Feb	Z	2.2	2.4	2.3	2.2	2.2	2.3	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	2.4	2.4	2.3	2.5	2.3	2.5
25-Feb	2.5	Z	2.5	2.5	2.6	2.5	2.4	2.4	2.5	2.4	2.3	2.2	2.1	2.1	2.2	2.4	2.4	2.5	2.4	2.3	2.3	2.2	2.2	2.3	2.3	2.6
26-Feb	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.4
27-Feb	2.3	2.3	2.2	Z	2.2	2.3	2.4	2.4	2.6	2.8	2.7	2.7	2.2	2.3	2.2	2.3	2.4	2.6	2.4	2.4	2.4	2.4	2.6	2.7	2.4	2.8
28-Feb	2.6	2.6	2.5	2.3	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.6
2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.3 2.5 2.7 2.7 2.5 2.4 2.5 2.4 2.4 2.4 2.4 2.4 2.4 2.4																								Diurnal Average		
3.1 3.0 3.1 3.0 3.1 3.2 3.0 3.4 3.0 2.9 2.9 3.0 3.3 3.0 2.8 3.8 6.3 5.3 4.3 3.7 3.9 4.0 3.7 3.1 3.1 3.1 3.1																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	5	0.78	0.78
2.1 - 3.0	600	93.90	94.68
3.1 - 10.0	34	5.32	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - February 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	1	3	1	0	0	0	5
2.1 - 3.0	49	41	42	44	22	10	35	54	53	33	37	46	25	25	13	67	596	
3.1 - 10.0	4	5	2	3	1	0	0	5	5	0	1	0	0	2	2	2	32	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	53	46	44	47	23	10	35	59	58	33	39	49	26	27	15	69	633	

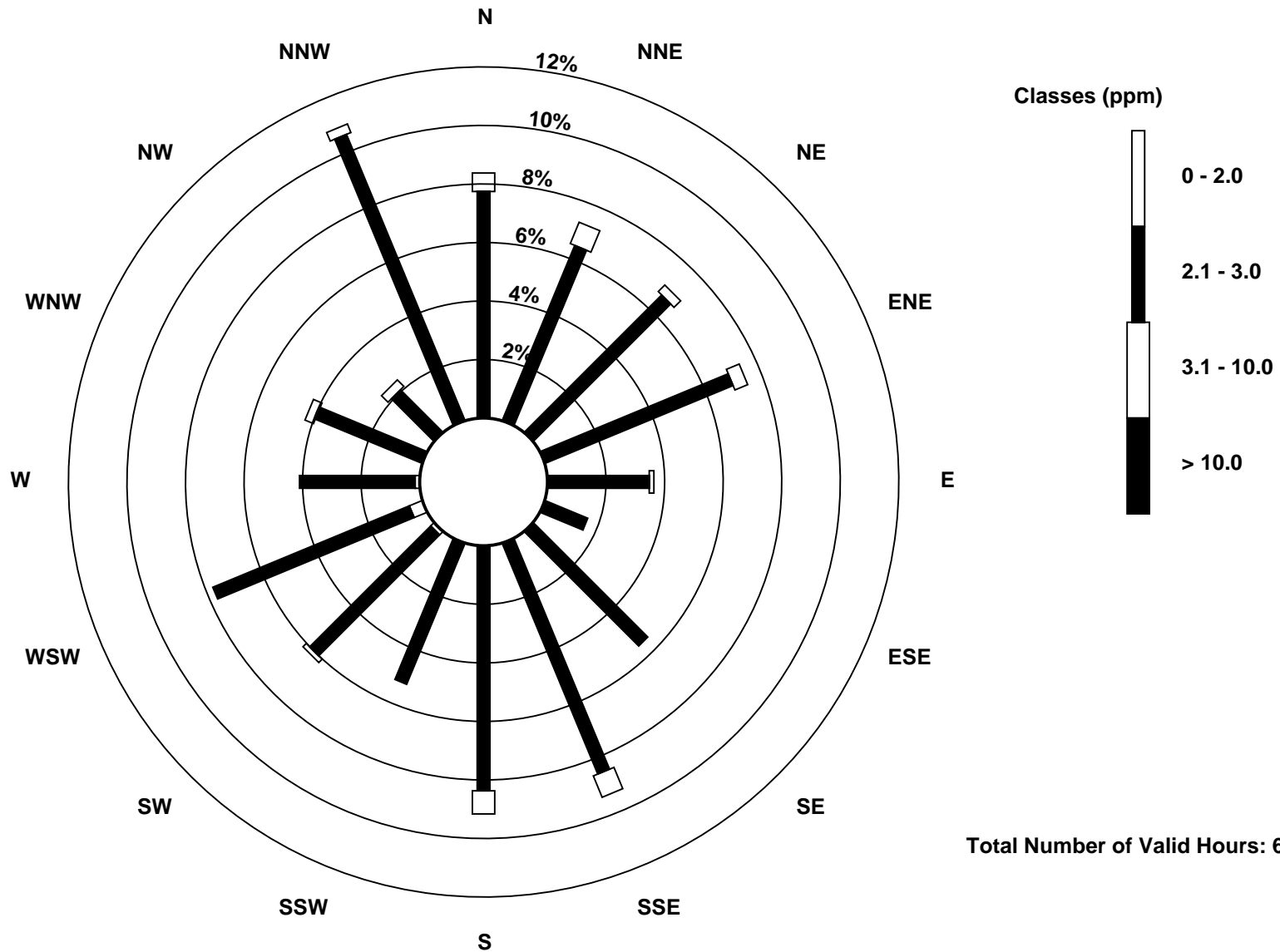
Total Number of Valid Hours: 633

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)

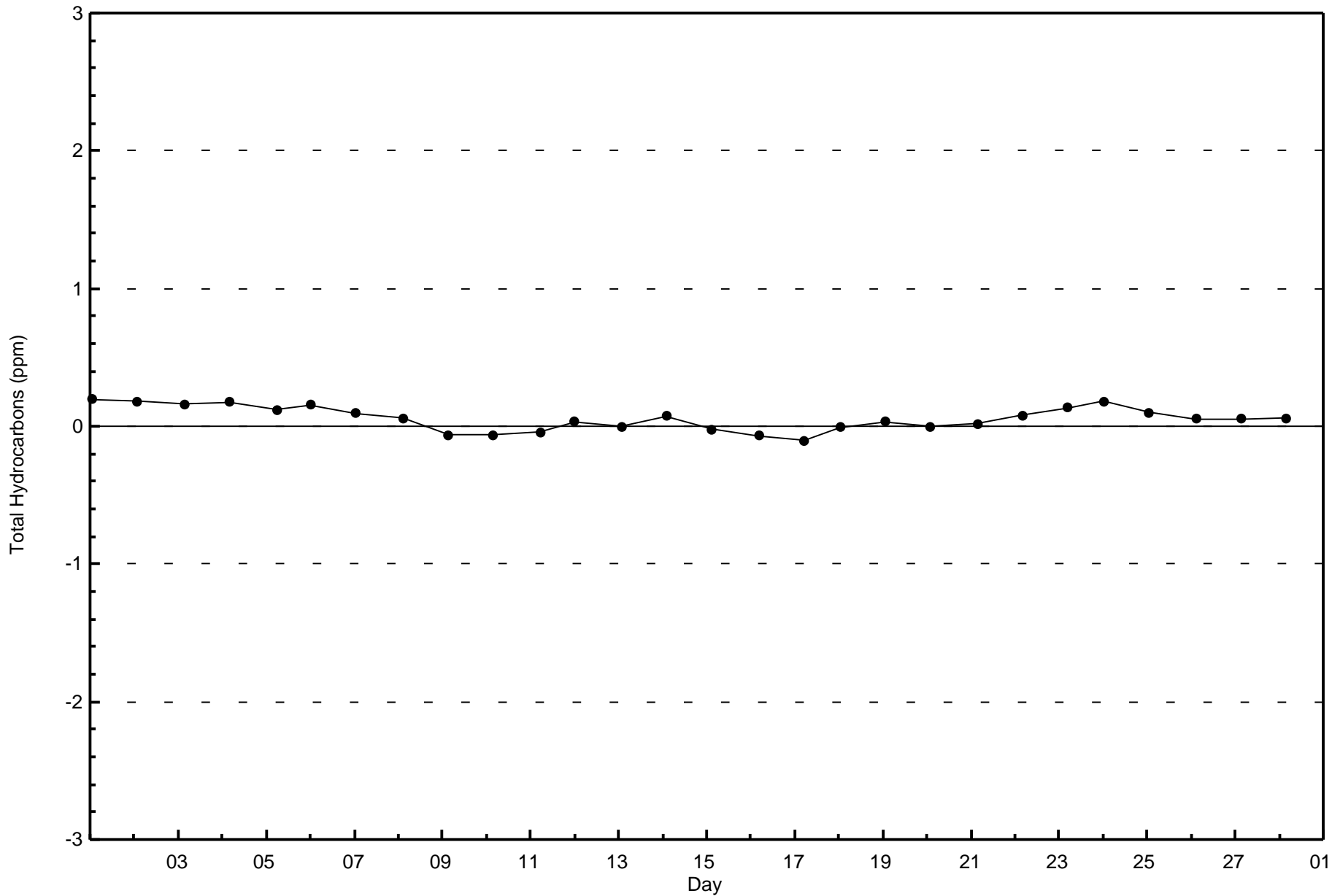


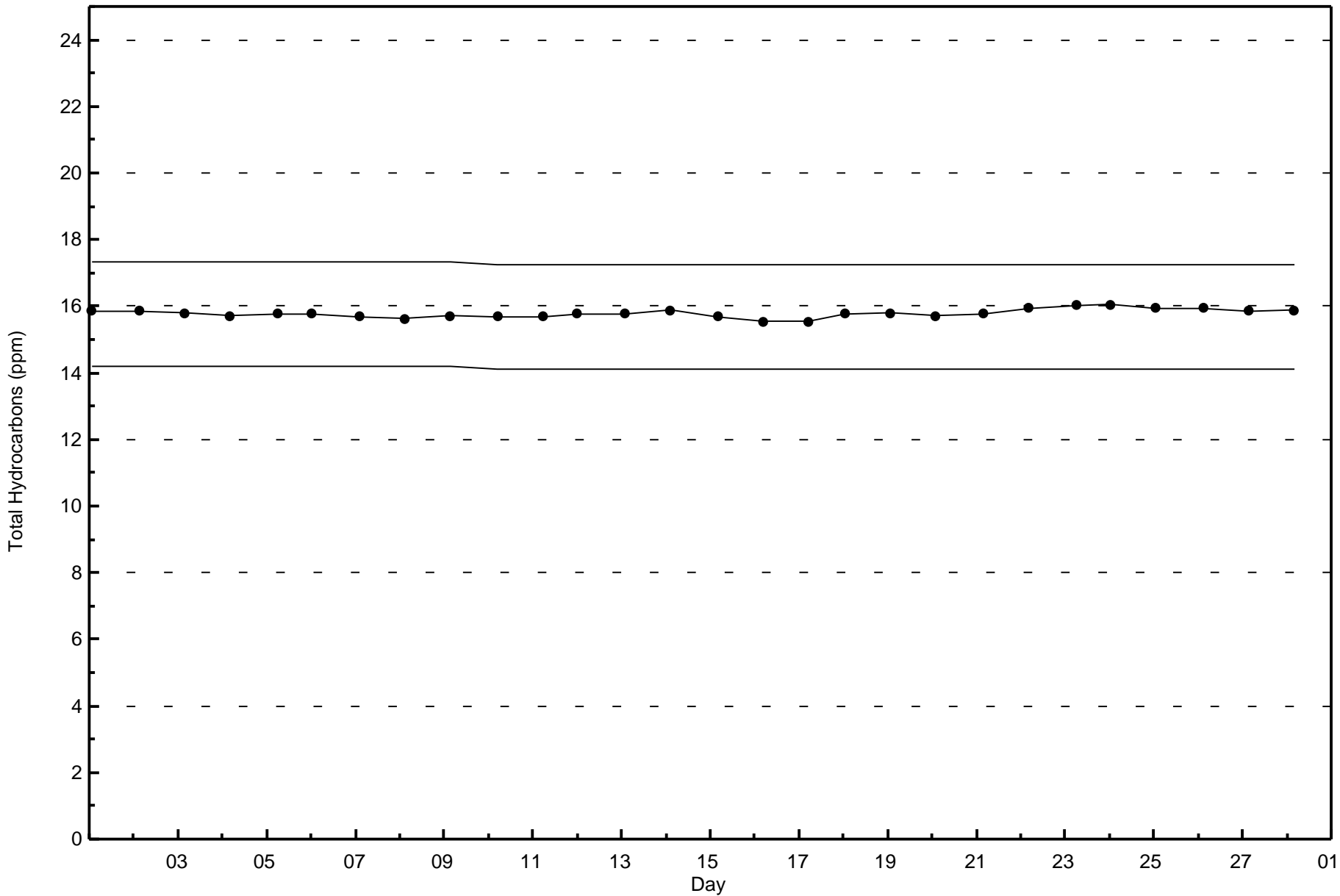
Total Number of Valid Hours: 633



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Barge Landing - February 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

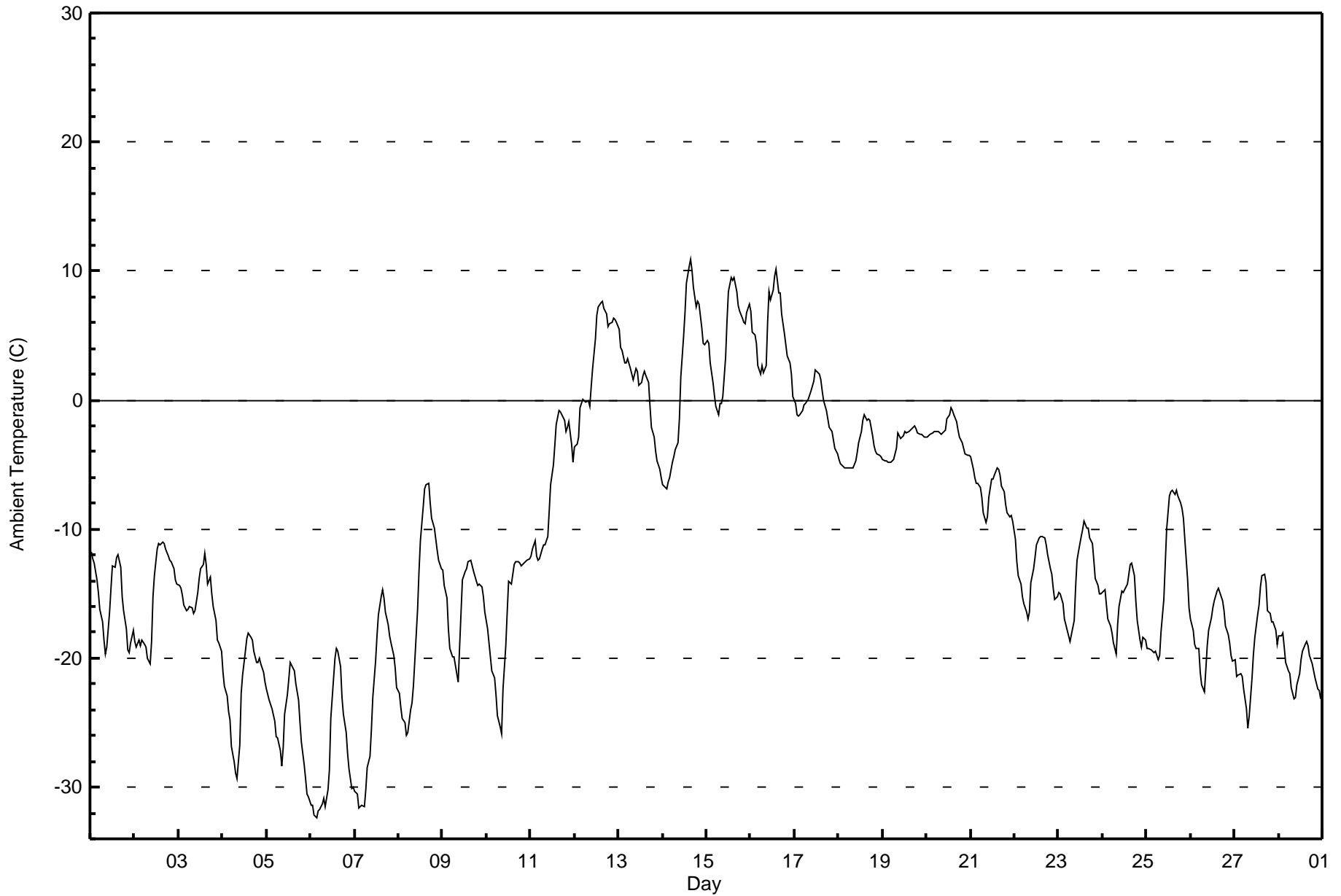
Ambient Temperature (AT) - C
Barge Landing - February 2017

Maximum Value: 10.9 C on Feb 14 16:00 Maximum Daily Average: 5.2 C on Feb 16 Minimum Value: -32.4 C on Feb 6 04:00 Minimum Daily Average: -27.4 C on Feb 6 Maximum Diurnal Average: -7.2 C at hour 16 Minimum Diurnal Average: -14.9 C at hour 8 Monthly Average: -11.26 C Percentiles: P ₁ = -31.5 P ₁₀ = -23.1 Q ₁ = -19.0 Median = -12.8 Q ₃ = -2.8 P ₉₀ = 2.6 P ₉₉ = 9.5																								Hours in Service:	672	
																								Hours of Data:	672	
																								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-Feb	-11.7	-12.3	-12.7	-13.9	-14.9	-16.2	-17.1	-18.6	-19.6	-19.1	-16.5	-14.6	-12.8	-13.0	-12.2	-12.0	-13.0	-15.2	-16.4	-17.7	-19.3	-19.5	-18.8	-17.8	-15.6	-11.7
2-Feb	-18.7	-19.1	-18.6	-19.0	-18.6	-19.0	-19.2	-20.1	-20.5	-18.7	-15.2	-13.7	-11.5	-11.1	-11.2	-11.0	-11.2	-11.5	-12.1	-12.4	-12.5	-13.1	-13.9	-14.3	-15.3	-11.0
3-Feb	-14.3	-14.6	-15.1	-15.9	-16.3	-16.2	-16.0	-16.1	-16.5	-16.4	-14.9	-13.9	-13.1	-12.7	-11.9	-12.7	-14.2	-13.8	-15.0	-16.0	-17.1	-18.6	-18.9	-19.5	-15.4	-11.9
4-Feb	-21.1	-22.2	-22.9	-24.1	-24.8	-26.8	-28.1	-28.8	-29.3	-26.7	-22.7	-21.3	-19.4	-18.5	-18.1	-18.3	-18.6	-19.5	-20.4	-20.3	-20.0	-20.4	-21.1	-21.8	-22.3	-18.1
5-Feb	-22.4	-23.3	-23.5	-23.9	-24.9	-26.1	-26.2	-27.2	-28.3	-26.9	-24.3	-22.9	-21.6	-20.3	-20.8	-20.9	-21.9	-23.3	-25.0	-26.5	-28.2	-29.3	-30.5	-30.7	-25.0	-20.3
6-Feb	-31.4	-31.4	-32.2	-32.4	-31.9	-31.8	-31.3	-30.9	-31.5	-30.2	-28.6	-24.7	-21.5	-20.0	-19.2	-19.5	-20.7	-23.0	-24.4	-25.7	-27.4	-28.6	-30.1	-30.0	-27.4	-19.2
7-Feb	-30.3	-30.6	-31.6	-31.5	-31.4	-31.5	-30.2	-28.4	-27.6	-25.6	-23.0	-20.2	-18.3	-16.6	-15.2	-14.7	-15.4	-16.4	-17.4	-18.2	-18.8	-19.8	-20.8	-22.3	-23.2	-14.7
8-Feb	-22.7	-23.8	-24.6	-25.0	-25.9	-25.7	-24.1	-23.4	-22.1	-20.2	-16.2	-13.3	-10.9	-8.2	-6.9	-6.5	-6.4	-7.9	-9.2	-9.9	-10.8	-11.7	-12.4	-13.1	-15.9	-6.4
9-Feb	-13.2	-14.4	-15.3	-17.7	-19.2	-19.9	-19.9	-20.6	-21.8	-19.1	-16.6	-13.9	-13.3	-13.0	-12.5	-12.4	-12.8	-13.3	-14.0	-14.4	-14.3	-14.5	-15.2	-16.4	-15.7	-12.4
10-Feb	-17.7	-18.9	-19.9	-21.0	-21.6	-22.8	-24.4	-25.3	-25.9	-22.4	-19.0	-16.4	-14.0	-14.3	-13.5	-12.7	-12.6	-12.6	-12.6	-12.9	-12.6	-12.5	-12.4	-12.3	-17.1	-12.3
11-Feb	-12.1	-11.5	-10.9	-12.1	-12.4	-12.3	-11.6	-11.2	-11.3	-10.6	-8.7	-6.5	-5.0	-3.5	-1.9	-0.8	-0.9	-1.2	-1.6	-2.4	-2.1	-1.7	-3.4	-4.8	-6.7	-0.8
12-Feb	-3.6	-3.4	-2.8	-0.6	0.1	0.0	-0.1	-0.1	-0.4	1.0	2.4	4.8	6.6	7.3	7.5	7.7	7.1	6.7	5.7	5.9	6.0	6.4	6.3	6.0	3.2	7.7
13-Feb	5.5	4.1	3.8	2.9	2.9	3.2	2.5	2.0	1.6	2.5	2.2	1.1	1.4	1.9	2.3	1.9	1.3	-0.4	-2.1	-2.8	-4.0	-4.7	-5.4	-6.1	0.7	5.5
14-Feb	-6.5	-6.8	-6.9	-6.4	-6.0	-4.8	-4.4	-3.8	-3.3	-1.5	1.8	5.0	6.8	9.1	10.3	10.9	10.1	8.7	7.2	7.7	7.4	5.6	4.4	4.3	2.0	10.9
15-Feb	4.6	4.4	2.8	1.3	0.4	-0.5	-1.2	-0.3	-0.2	0.3	3.3	6.2	8.4	9.5	9.3	9.5	8.5	7.3	6.9	6.4	6.1	5.9	6.8	7.5	4.7	9.5
16-Feb	6.8	5.2	5.1	4.4	2.7	2.0	2.6	2.1	2.7	6.1	8.4	7.7	8.6	9.6	10.2	8.3	8.3	6.6	5.2	4.3	3.4	2.9	2.0	0.3	5.2	10.2
17-Feb	-0.3	-1.1	-1.3	-1.2	-0.8	-0.4	-0.3	0.1	0.4	0.7	1.4	2.3	2.2	2.0	1.6	0.7	0.0	-0.8	-1.5	-2.1	-2.4	-3.1	-3.7	-4.2	-0.5	2.3
18-Feb	-4.6	-5.0	-5.1	-5.2	-5.3	-5.3	-5.2	-5.3	-5.2	-4.7	-4.0	-3.3	-2.5	-1.5	-1.2	-1.6	-1.5	-1.5	-2.8	-3.5	-4.0	-4.2	-4.2	-4.4	-3.8	-1.2
19-Feb	-4.6	-4.7	-4.8	-4.9	-4.8	-4.7	-4.6	-3.7	-2.6	-2.8	-3.0	-2.7	-2.4	-2.6	-2.4	-2.3	-2.2	-2.0	-2.3	-2.5	-2.6	-2.7	-2.8	-2.8	-3.2	-2.0
20-Feb	-2.9	-2.8	-2.7	-2.5	-2.5	-2.4	-2.4	-2.5	-2.6	-2.5	-2.3	-1.5	-1.2	-0.6	-0.8	-1.1	-1.7	-2.3	-2.9	-3.3	-3.8	-4.1	-4.2	-4.3	-2.5	-0.6
21-Feb	-4.4	-5.4	-6.0	-6.5	-6.4	-6.7	-7.5	-8.8	-9.5	-9.1	-7.5	-6.1	-6.1	-5.8	-5.3	-5.4	-5.8	-6.6	-7.2	-8.1	-8.7	-9.0	-8.9	-9.4	-7.1	-4.4
22-Feb	-10.8	-12.5	-13.6	-14.3	-15.2	-15.7	-16.5	-16.9	-16.5	-14.2	-13.0	-12.2	-11.2	-10.6	-10.5	-10.6	-10.7	-11.3	-11.9	-13.1	-13.5	-14.6	-15.4	-15.3	-13.3	-10.5
23-Feb	-14.9	-15.0	-15.8	-16.9	-17.4	-18.3	-18.7	-18.2	-17.1	-14.5	-12.4	-11.7	-10.6	-10.0	-9.4	-9.9	-9.9	-10.6	-11.1	-12.4	-13.9	-14.4	-15.1	-15.1	-13.9	-9.4
24-Feb	-14.8	-14.7	-15.9	-17.0	-17.6	-18.1	-18.8	-19.7	-17.4	-16.0	-14.8	-14.9	-14.6	-14.3	-13.5	-12.7	-12.7	-13.6	-15.6	-17.1	-18.6	-19.1	-18.4	-18.6	-16.2	-12.7
25-Feb	-19.3	-19.2	-19.4	-19.5	-19.6	-19.5	-20.1	-19.8	-17.9	-15.5	-12.7	-10.0	-7.5	-7.1	-7.0	-7.3	-7.0	-7.5	-8.0	-8.4	-9.2	-10.8	-14.0	-16.1	-13.4	-7.0
26-Feb	-17.0	-17.8	-18.9	-19.3	-19.2	-21.1	-22.1	-22.7	-20.9	-19.0	-17.8	-16.8	-16.1	-15.6	-14.8	-14.6	-14.9	-15.5	-16.3	-17.6	-18.1	-18.8	-19.8	-20.3	-18.1	-14.6
27-Feb	-20.1	-21.4	-21.3	-21.2	-21.4	-22.4	-24.0	-25.5	-24.5	-21.6	-19.6	-18.3	-16.7	-15.9	-14.5	-13.6	-13.5	-14.2	-16.3	-16.6	-17.2	-17.2	-17.8	-19.0	-18.9	-13.5
28-Feb	-18.2	-18.3	-18.1	-19.2	-20.4	-21.0	-21.2	-22.2	-23.1	-23.1	-22.1	-21.2	-20.1	-19.4	-19.0	-18.7	-19.0	-19.8	-20.4	-21.0	-21.6	-22.4	-22.5	-23.2	-20.6	-18.1
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	128	19.05	19.05
-20 - 0	444	66.07	85.12
0 - 10	96	14.29	99.40
10 - 20	4	0.60	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

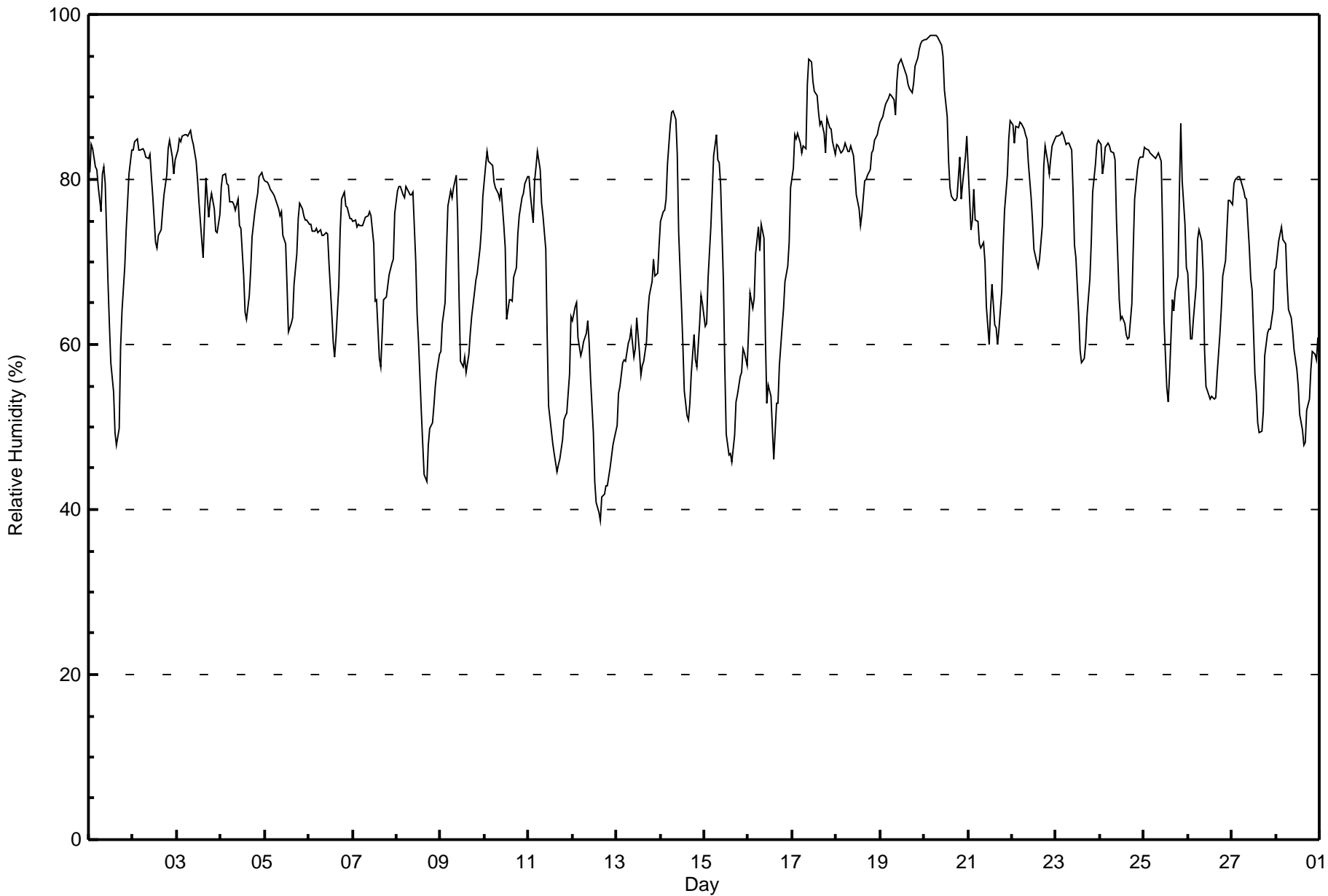


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Barge Landing - February 2017**

Maximum Value: 98 % on Feb 20 06:00 Maximum Daily Average: 91.8 % on Feb 19																			Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																																																																																																	
Minimum Value: 39 % on Feb 12 16:00 Minimum Daily Average: 51.7 % on Feb 12 Maximum Diurnal Average: 79.5 % at hour 6 Minimum Diurnal Average: 60.3 % at hour 15 Monthly Average: 72.1 % Percentiles: P ₁ = 43 P ₁₀ = 54 Q ₁ = 63 Median = 75 Q ₃ = 82 P ₉₀ = 85 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-Feb	81	84	84	82	81	79	76	81	81	80	68	62	58	54	49	48	50	60	64	69	74	77	81	83	71.1	84																																																																																										
2-Feb	84	85	85	84	84	84	83	83	82	83	80	78	72	72	73	74	76	78	80	84	85	83	81	82	80.6	85																																																																																										
3-Feb	84	85	85	85	85	85	85	86	85	84	82	80	77	73	71	75	80	75	77	78	76	74	74	76	79.9	86																																																																																										
4-Feb	79	81	81	80	79	77	77	77	76	78	74	74	68	64	63	66	69	73	76	77	78	80	81	80	75.4	81																																																																																										
5-Feb	80	80	79	79	78	78	78	76	76	76	73	72	67	61	63	63	67	71	75	77	76	76	75	75	73.8	80																																																																																										
6-Feb	74	75	74	74	74	74	74	73	73	74	73	70	64	60	58	61	67	74	78	78	77	77	75	75	71.9	78																																																																																										
7-Feb	75	75	74	75	74	74	75	75	76	76	76	72	65	65	58	57	61	65	66	67	68	70	70	76	70.3	76																																																																																										
8-Feb	79	79	79	78	78	79	78	78	78	78	70	64	60	52	48	44	43	48	50	50	53	55	57	59	64.1	79																																																																																										
9-Feb	59	63	65	71	77	79	78	79	80	75	66	58	57	58	57	59	61	63	66	68	69	72	74	78	68.0	80																																																																																										
10-Feb	82	83	82	82	82	80	79	78	78	79	74	72	63	65	65	65	68	69	73	76	78	80	80	80	75.5	83																																																																																										
11-Feb	80	78	75	80	81	83	81	77	76	72	61	53	50	48	47	44	45	46	48	51	51	52	56	63	62.5	83																																																																																										
12-Feb	63	65	65	61	59	59	60	61	63	60	56	49	43	41	40	39	42	42	43	43	45	46	48	49	51.7	65																																																																																										
13-Feb	50	54	55	58	58	58	60	61	62	59	60	63	59	56	58	58	60	64	66	68	70	68	69	72	61.0	72																																																																																										
14-Feb	75	76	76	78	82	87	88	88	87	83	73	65	60	54	51	51	53	56	61	58	57	63	66	65	68.9	88																																																																																										
15-Feb	62	63	68	74	78	83	85	82	82	79	68	57	49	47	46	49	53	54	56	57	59	59	57	57	63.1	85																																																																																										
16-Feb	62	66	64	66	71	74	71	74	73	61	53	55	54	50	46	53	53	57	62	64	68	69	72	79	63.3	79																																																																																										
17-Feb	81	85	85	86	84	83	84	84	92	95	94	92	91	90	88	87	87	86	83	88	86	86	85	83	86.9	95																																																																																										
18-Feb	84	84	83	83	84	84	83	83	84	83	81	78	76	74	76	80	80	81	81	83	84	85	85	86	82.0	86																																																																																										
19-Feb	87	88	88	89	90	90	90	90	88	92	94	95	94	94	93	92	91	90	92	94	95	96	96	97	91.8	97																																																																																										
20-Feb	97	97	97	97	97	98	97	97	97	96	95	91	88	82	79	78	77	78	78	83	78	79	83	85	88.5	98																																																																																										
21-Feb	81	74	75	79	75	75	72	72	72	70	65	60	64	67	62	62	60	62	66	72	76	81	85	87	71.5	87																																																																																										
22-Feb	87	84	87	86	87	87	86	85	85	82	78	75	71	70	69	70	74	81	84	82	81	83	84	85	81.0	87																																																																																										
23-Feb	85	85	85	86	85	84	84	84	84	78	72	70	64	59	58	58	60	64	68	72	79	82	84	85	75.7	86																																																																																										
24-Feb	84	81	82	84	84	84	83	83	82	75	65	63	63	62	61	61	65	72	78	81	82	83	83	83	75.1	84																																																																																										
25-Feb	84	84	83	83	83	83	83	83	83	82	74	63	55	53	56	66	64	66	68	78	87	80	75	69	74.4	87																																																																																										
26-Feb	69	61	61	63	67	73	74	72	69	59	55	54	53	54	53	53	56	61	64	68	70	74	77	77	64.1	77																																																																																										
27-Feb	77	79	80	80	80	80	79	78	78	72	68	67	56	54	50	49	50	52	59	61	62	62	64	69	66.9	80																																																																																										
28-Feb	69	73	73	74	73	72	67	64	63	62	59	57	55	51	50	48	48	52	53	57	59	58	61	61	60.8	74																																																																																										
																			76.9				77.3				77.5				78.4				79.0				79.5				79.1				78.8				78.7				76.5				71.7				68.2				64.2				61.9				60.3				60.9				62.7				65.5				68.2				70.8				72.1				73.1				74.2				75.6				Diurnal Average	
																			97				97				97				97				98				97				97				97				97				96				95				95				94				94				93				92				91				90				92				94				95				96				96				Diurnal Maximum					





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - February 2017

Maximum Speed: 21 km/h on Feb 12 13:00	Maximum Daily Speed Average: 9.7 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 3 07:00	Minimum Daily Speed Average: 0.6 km/h on Feb 16	Hours of Data: 666
Maximum Diurnal Speed Average: 1.5 km/h at hour 8	Minimum Diurnal Speed Average: 0.0 km/h at hour 18	Hours of Missing Data: 6
Monthly Average Velocity: 0.6 km/h 246.9 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 14	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-Feb	NNW3	N2	N6	N6	N6	N6	N5	N3	SW0	SE3	ESE4	SSW2	WSW4	ESE3	SSE5	SSE5	S3	SSE3	SSE3	SSE3	SSE3	SE5	SSE4	S3	ESE0.9	N6
2-Feb	SW2	SE4	SSW4	SW3	SW3	SE3	S4	SSE4	S4	SSE3	WSW2	WSW2	ENE2	ENE6	E6	ENE5	E5	E4	ENE3	ENE5	NNE4	NNE7	NNE6	NNE4	E1.6	NNE7
3-Feb	N4	N4	N4	NNE1	N1	E0	SE0	SE2	SSE3	WSW1	SSW2	SSW3	S2	SSE4	S5	SE2	E1	NNW7	N8	NE7	NE8	NE8	NNE8	NNE6	NNE1.8	NE8
4-Feb	N3	E1	ENE1	W2	NNE1	WNW1	S1	SSE1	S3	SW3	SSE2	SSE5	SSW6	S7	S7	SSE6	SSE5	ESE5	SE6	NE2	N3	N4	N5	NNW6	SSE1.2	S7
5-Feb	NNW5	N5	NNW4	NNW4	NNW1	W2	NW2	W1	SW2	SW1	NNW1	NE3	NE2	ESE1	E7	E5	E6	ESE5	ESE3	NE1	SE1	SSE1	S3	SE3	ENE1.0	E6
6-Feb	S3	S4	SE4	SE4	SE4	SE2	SSE2	SSW2	SSE0	W1	W2	WSW3	SW5	SW4	WNW3	NNW2	NE3	N2	N2	WNW1	AF	WNW1	SSE2	SW1	SSW1.0	SW5
7-Feb	S2	SSW3	S4	S5	SSE5	SSE6	SSE6	S9	SSW8	SSW8	SW10	SW9	SW11	WSW10	WSW10	WSW9	WSW7	WNW5	NW4	NNW2	NNW4	NNW4	WSW2	SW4.2	SW11	
8-Feb	W3	W3	WSW4	SW3	SE3	SSW4	SW6	SW6	SSW5	S6	SSW8	SSW8	SW9	WSW11	WSW13	WSW16	SW13	SW12	SW10	SW10	SSW9	SSW8	SSW6	SW6	SW7.1	WSW16
9-Feb	WSW6	SW3	SW4	SE1	SSE3	SW5	S4	SSW3	SE4	SE3	SSW3	WSW2	NW4	NE4	NNE3	NNE2	NNE5	N4	NW3	NNW3	N4	N5	N3	N3	NW0.6	WSW6
10-Feb	N4	N4	N3	NNW1	NNW1	NNW2	AF	AF	SE1	SSW1	NNW2	WNW3	W3	NNE3	ENE2	E3	E3	ENE3	NNE2	N3	NNW2	NW1	NNW3	NNW4	N1.6	NNW4
11-Feb	SW0	S4	SSW3	SW6	SW6	SW8	WSW9	WSW10	WSW12	WSW10	WSW10	WSW8	SW8	SSW9	SW8	WSW13	WSW14	WSW13	WSW13	WSW9	WSW10	WSW10	S4	SSE7	WSW7.8	WSW14
12-Feb	S8	S7	S6	SW11	WSW13	WSW9	WSW9	WSW8	SSE1	SW5	SW7	WSW13	WSW21	W21	WSW17	SW11	S9	SW8	SSW6	SW8	W14	W15	W12	WSW13	WSW9.7	WSW21
13-Feb	WSW13	SSE3	SSW6	WSW7	W9	W11	W9	W8	NNW5	NNW0	NNE5	ENE7	E7	ENE5	ENE4	NE5	NNE5	NNE5	N4	NNW4	NNW3	NNW5	NW3	SSE3	NW1.9	WSW13
14-Feb	SE4	SE4	SSE5	S5	SSE6	S7	S7	S8	S8	SSE8	S10	S9	S11	S9	S9	S9	S9	S8	SSE6	S8	S8	SSE6	SSE6	S7	S7.3	S11
15-Feb	S5	S6	SE5	SSE4	SSE3	S2	S3	S5	S4	SSW3	S4	S7	SSW7	SSW6	SSW5	S5	S6	SSE4	SSE5	S6	SE7	S6	SW5	S8	S4.8	S8
16-Feb	S8	S8	SSW7	SSW7	SSW3	SSW3	SE3	SSE5	SE2	SE4	WNW2	N4	NNW5	NNW5	NNW5	NE3	ENE2	AF	N5	NNW4	NNE2	N2	NW1	W3	SW0.6	S8
17-Feb	WNW1	W1	S1	SSE2	S2	SE2	NW1	NNE2	N3	WNW1	NW2	NNW2	ENE3	ENE4	NE5	NE7	ENE6	ENE6	ENE6	ENE5	NE6	ENE6	ENE7	ENE7	NE2.8	NE7
18-Feb	NE7	NE5	ENE5	ENE5	NE4	E1	NE2	ENE4	E3	NNE2	ENE3	ENE3	E3	ESE4	ENE4	NNE5	NNE5	NNE3	NNW5	NNW5	NNW7	NNW6	N5	NNW4	NNE3.2	NE7
19-Feb	NNW5	NNW6	NNW5	NW4	NNW4	NNW3	NNW4	NE4	ENE8	ENE7	NE7	NE6	ENE6	NE7	NE5	NNE5	NNE6	NNE5	NNW5	NNW4	NNW5	NNW4	N4	NNW4	NNE4.2	ENE8
20-Feb	NNW5	NNW4	NNW4	NNW3	NNW3	NW5	NNW5	NNW4	NNW2	NNW3	N1	WNW1	E1	WNW5	WNW7	WNW6	WNW6	NW6	WNW6	W6	WNW7	WSW5	WSW6	WSW7	WNW3.8	WNW7
21-Feb	WSW11	W13	WSW6	WSW6	W6	WNW5	W9	W9	WSW9	WSW10	WSW10	WNW8	WNW8	WNW6	WSW8	W8	WNW7	WNW7	NW5	NW6	WNW3	WNW4	WNW5	NW2	W6.7	WSW13
22-Feb	N5	NNE4	NE2	NNE2	E0	AF	ESE1	E1	AF	NNE3	NNE4	NNE6	NE5	NE5	NE5	NNE5	NNE4	NNE6	NE3	NNE3	ENE5	ENE4	W1	W1	NNE3.1	NNE6
23-Feb	W1	SE1	SSE1	SE3	SE2	SSW1	SE3	SE3	SSE1	W1	WSW3	S4	SSE7	SSE7	SW4	SSE5	S3	ESE3	ENE2	NE3	N4	N5	NNW6	NNW6	SE0.7	SSE7
24-Feb	N5	N6	N5	NNW3	NNW3	N3	NNW3	NNW2	NNW3	N3	NNW4	N5	ENE5	E5	SE6	SSE7	SSE6	SSE7	SE6	SE4	SE4	SSE6	S5	SSE6	E1.2	SSE7
25-Feb	SSE5	S4	SSE5	SSE5	SSE6	SSE6	SSE4	SSE7	SSE5	SSW8	SW9	SW6	WSW4	ENE3	NE6	NNE5	NNE2	SSE2	E3	ENE6	NNE9	NNE14	NNE13	NNE12	ESE1.4	NNE14
26-Feb	N9	NNW11	NNW8	NNW5	N5	NNW3	NNW4	NNW3	NW3	NNW4	NNW3	E5	ENE5	ENE6	ENE5	ENE5	ENE4	ENE4	E4	E5	E5	ENE5	NE4	NE4	NNE3.4	NNW11
27-Feb	NE3	N3	NNW3	NNW4	N5	N4	N4	N3	N3	NNW4	N4	NNE5	NE4	NE5	NE3	S4	SSW5	S3	ESE3	SE4	SE6	SSE2	SSW3	WSW1	NNE1.2	SE6
28-Feb	SW3	SSW2	N7	NNE11	NNE10	NE8	NNE8	NNE8	NNE7	NE8	NE6	NE6	ENE7	NE7	NE7	NE6	ENE5	NE6	NE6	NE5	ENE5	ENE6	NNE3	NE5.8	NNE11	

WNW1.2	W0.4	W0.3	WSW0.8	WSW0.8	WSW1.2	WSW1.4	SW1.5	SSW1.2	SSW1.2	WSW1.4	SW1.0	SW1.3	S0.7	SSW0.9	SSW0.8	S0.6	NW0.0	NNE0.5	N0.4	NNW0.9	NNW1.3	NNW1.1	WNW0.7	Diurnal Average
WSW13	WSW13	NNW8	SW11	WSW13	W11	W9	WSW10	WSW12	WSW10	WSW10	WSW13	WSW21	W21	WSW17	WSW16	WSW14	WSW13	WSW13	SW10	W14	W15	NNE13	WSW13	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

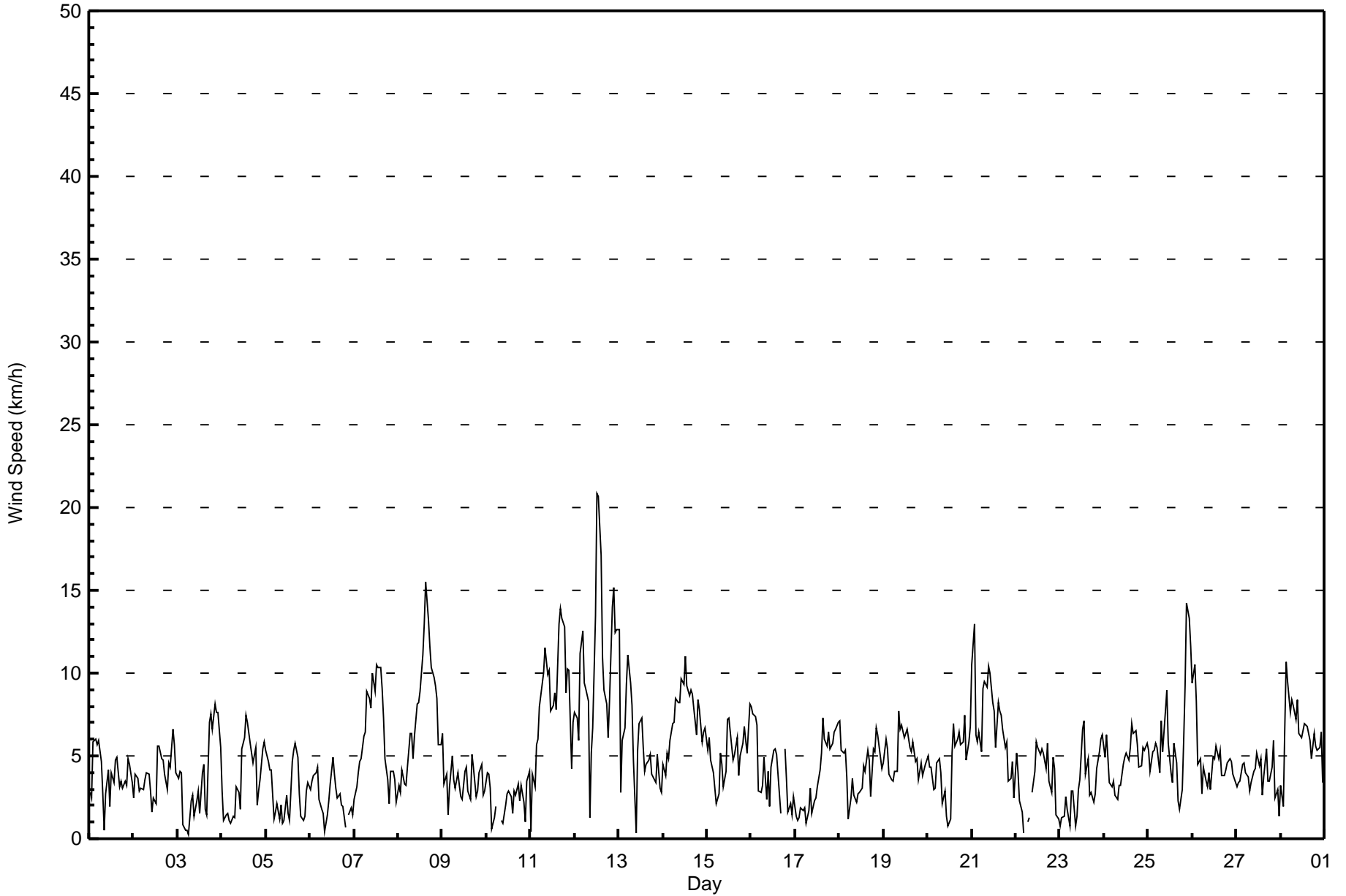
Wind Speed (WS) - km/h
Barge Landing - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 12 13:00 Minimum Value: 0 km/h on Feb 24 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5														Hours in Service: 672 Hours of Data: 666 Hours of Missing Data: 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-Feb	1	1	2	2	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	2	2
2-Feb	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1	2	2	1	2	2
3-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	3	2	2	3	2	2	3	3
4-Feb	1	1	1	1	1	1	1	2	1	1	2	2	2	3	3	2	1	1	1	1	1	1	1	1	1	3
5-Feb	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	2
6-Feb	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	AF	1	1	1	1	2
7-Feb	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	2	2	1	1	1	1	1	1	1	3
8-Feb	1	1	2	1	1	2	2	2	2	3	2	3	3	3	4	5	4	4	3	3	3	2	2	3	5	5
9-Feb	3	2	1	1	1	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	1	3	3
10-Feb	1	1	1	1	1	1	AF	AF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11-Feb	1	1	2	2	2	2	3	3	4	2	3	2	2	3	3	4	4	4	3	2	3	4	2	2	4	4
12-Feb	2	2	2	3	3	3	3	3	2	2	3	5	6	6	6	4	3	3	2	2	5	5	4	3	6	6
13-Feb	4	2	1	2	4	4	4	3	3	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	4	4
14-Feb	1	1	1	1	3	2	2	3	2	3	3	3	3	3	3	3	2	2	1	2	2	1	1	1	3	3
15-Feb	1	1	1	2	1	1	2	1	2	1	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2
16-Feb	3	3	2	2	1	2	2	1	1	1	1	1	2	2	2	2	1	AF	1	1	1	1	2	1	3	3
17-Feb	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
18-Feb	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2
19-Feb	1	2	1	1	1	1	1	2	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	3	3
20-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	2	2	3	3
21-Feb	3	4	2	2	3	2	3	3	2	3	3	3	3	2	3	3	3	3	2	2	1	2	2	1	4	4
22-Feb	3	1	1	1	1	AF	1	1	AF	1	1	2	1	1	1	1	1	2	1	1	2	1	1	1	3	3
23-Feb	1	1	1	1	1	1	0	1	1	1	1	2	2	3	2	2	1	1	1	1	1	1	1	1	3	3
24-Feb	1	2	1	1	0	1	1	1	1	1	2	2	2	1	2	2	2	2	1	1	0	1	1	1	2	2
25-Feb	1	1	1	1	1	1	2	1	2	3	3	2	2	2	2	2	2	2	2	2	3	5	4	4	5	5
26-Feb	3	3	3	2	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	2	1	1	1	3	3
27-Feb	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	2
28-Feb	1	1	3	3	3	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	3	3
														Diurnal Maximum												
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	435	65.32	65.32
6 - 11	208	31.23	96.55
12 - 19	21	3.15	99.70
20 - 28	2	0.30	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 666

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - February 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	47	32	26	32	21	10	33	42	32	20	18	13	14	16	14	65	435
6 - 11	8	14	19	15	3	0	4	20	30	17	21	27	9	11	1	9	208
12 - 19	0	3	0	0	0	0	0	0	0	0	2	13	3	0	0	0	21
20 - 28	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
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	55	49	45	47	24	10	37	62	62	37	41	54	27	27	15	74	666

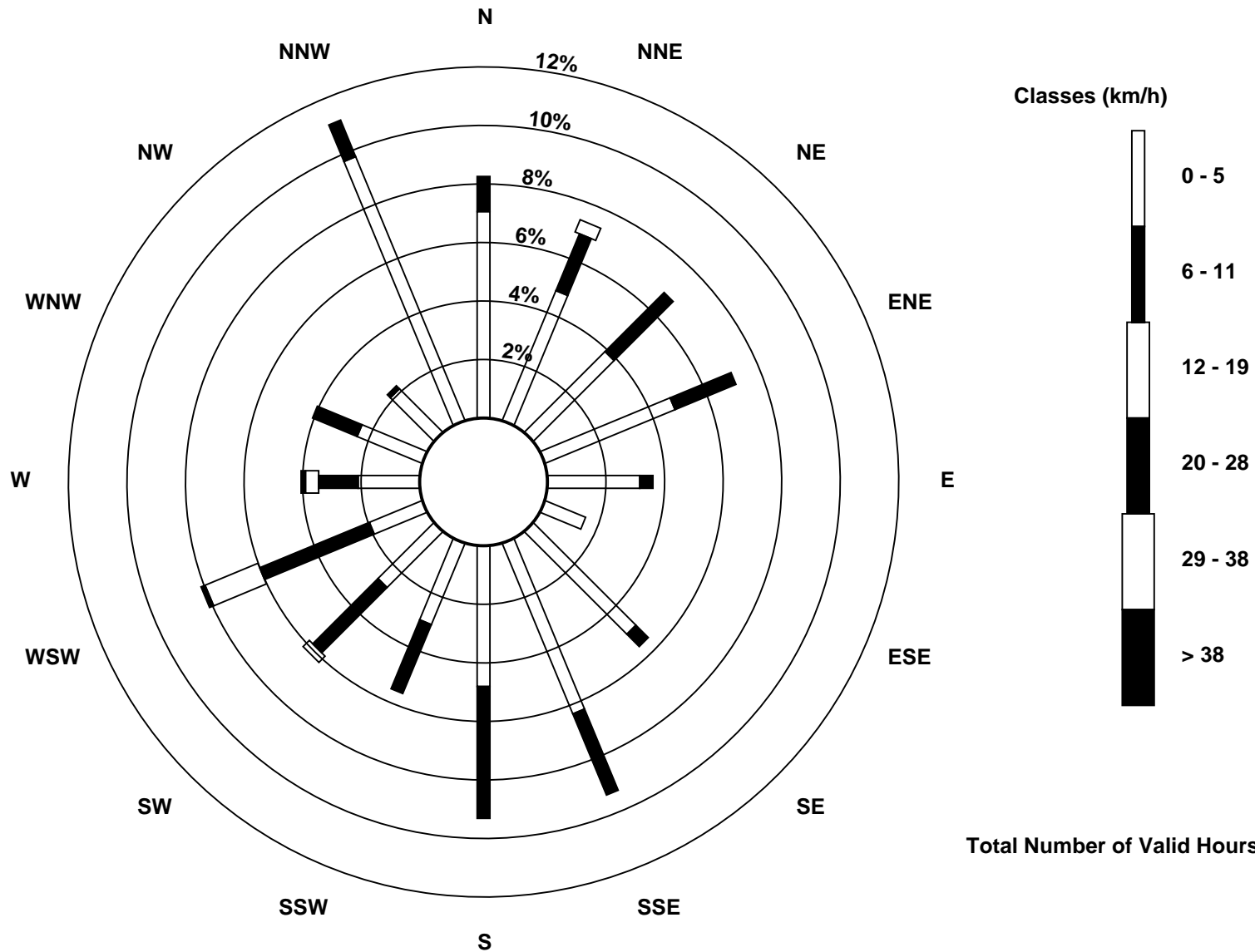
Total Number of Valid Hours: 666

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Barge Landing (AMS 9)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - February 2017

Direction of Maximum Speed: 256 deg on Feb 12 13:00 Direction of Maximum Daily Speed Average: 241.4 deg on Feb 12	Hours in Service: 672 Hours of Data: 666 Hours of Missing Data: 6
Direction of Minimum Speed: 137 deg on Feb 3 07:00 Direction of Minimum Daily Speed Average: 0.6 deg on Feb 16	Percent Operational Time: 99.1
Monthly Average Direction: 275.9 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-Feb	341	355	5	2	6	11	357	9	216	131	114	196	254	108	157	161	179	155	158	166	163	141	150	181	112.5
2-Feb	224	131	194	233	232	145	185	154	170	150	246	243	74	77	97	78	89	90	74	59	31	20	19	16	97.0
3-Feb	8	1	358	25	4	84	137	133	163	251	200	205	183	152	169	125	82	342	358	34	35	34	25	26	30.3
4-Feb	9	83	58	272	17	290	177	164	187	219	151	167	198	181	191	165	148	122	128	44	5	1	358	347	158.6
5-Feb	343	350	345	345	333	271	306	264	233	236	348	47	35	105	93	95	93	105	106	43	142	148	171	143	57.6
6-Feb	172	170	145	139	136	145	163	207	151	262	264	255	216	233	282	344	38	11	351	291	AF	290	159	221	197.4
7-Feb	179	195	191	180	160	152	168	191	195	205	228	229	236	247	243	248	256	297	322	339	328	334	343	238	226.6
8-Feb	280	271	252	216	142	210	234	227	208	179	198	203	226	245	238	239	233	220	220	214	209	204	213	233	222.7
9-Feb	243	219	230	135	150	225	172	195	124	129	202	240	322	35	28	31	12	354	318	339	356	357	356	355	314.4
10-Feb	359	3	4	330	342	341	AF	AF	140	202	328	301	262	28	62	87	82	75	13	350	342	305	346	333	0.0
11-Feb	221	178	210	228	227	228	244	249	250	248	250	243	223	201	217	249	253	258	257	245	252	251	176	168	238.4
12-Feb	190	183	187	235	240	246	253	250	156	222	229	246	256	259	252	236	191	229	205	226	259	268	262	257	241.4
13-Feb	257	158	197	252	264	267	274	281	286	345	30	73	83	71	61	36	29	12	0	345	340	335	321	160	308.7
14-Feb	131	143	152	175	159	177	184	181	178	160	176	185	183	175	179	182	174	169	166	177	189	168	161	173	173.3
15-Feb	177	172	135	162	158	177	184	184	176	196	173	175	193	213	200	185	191	158	156	174	160	172	228	188	179.3
16-Feb	191	183	192	205	211	193	141	154	135	144	289	358	340	343	344	41	77	AF	4	343	21	359	311	267	217.2
17-Feb	293	272	186	149	173	131	316	13	0	296	322	343	57	58	34	54	57	65	58	59	53	70	75	62	53.8
18-Feb	51	52	62	72	55	93	51	75	90	29	61	64	95	102	62	16	16	14	345	329	344	345	350	346	33.3
19-Feb	344	347	340	315	334	343	344	38	66	66	52	48	59	46	34	20	24	14	348	338	348	343	353	347	15.6
20-Feb	344	343	344	335	327	325	328	328	333	331	349	287	94	296	286	287	299	316	286	279	286	255	248	242	301.3
21-Feb	250	259	255	246	281	286	273	260	253	255	256	302	301	285	258	271	292	301	314	304	290	297	302	317	274.2
22-Feb	7	19	47	31	80	AF	115	88	AF	23	28	22	42	48	41	24	20	16	41	31	62	64	273	273	32.8
23-Feb	266	140	159	133	132	194	128	131	161	268	253	173	156	154	233	148	172	113	57	46	350	353	347	344	137.5
24-Feb	353	9	354	335	342	349	343	337	340	354	338	7	77	96	127	158	160	157	139	130	130	160	179	154	92.7
25-Feb	165	181	160	160	160	167	166	162	161	195	220	226	249	72	53	27	32	166	97	74	33	12	17	16	106.8
26-Feb	359	342	342	342	356	348	331	335	305	329	347	85	66	75	74	73	63	66	80	80	81	76	54	41	27.4
27-Feb	46	349	345	343	354	350	352	359	357	334	355	33	51	38	38	182	194	180	117	127	142	153	197	251	28.2
28-Feb	234	205	10	31	33	35	32	25	32	45	44	48	66	53	53	48	43	65	55	50	44	57	60	15	42.3
	282.6	271.0	274.5	244.1	249.4	245.9	253.0	221.9	200.6	211.6	241.1	229.2	216.8	174.3	211.0	196.7	184.5	319.9	23.6	11.2	345.6	346.1	342.5	300.9	
	Diurnal Average																								

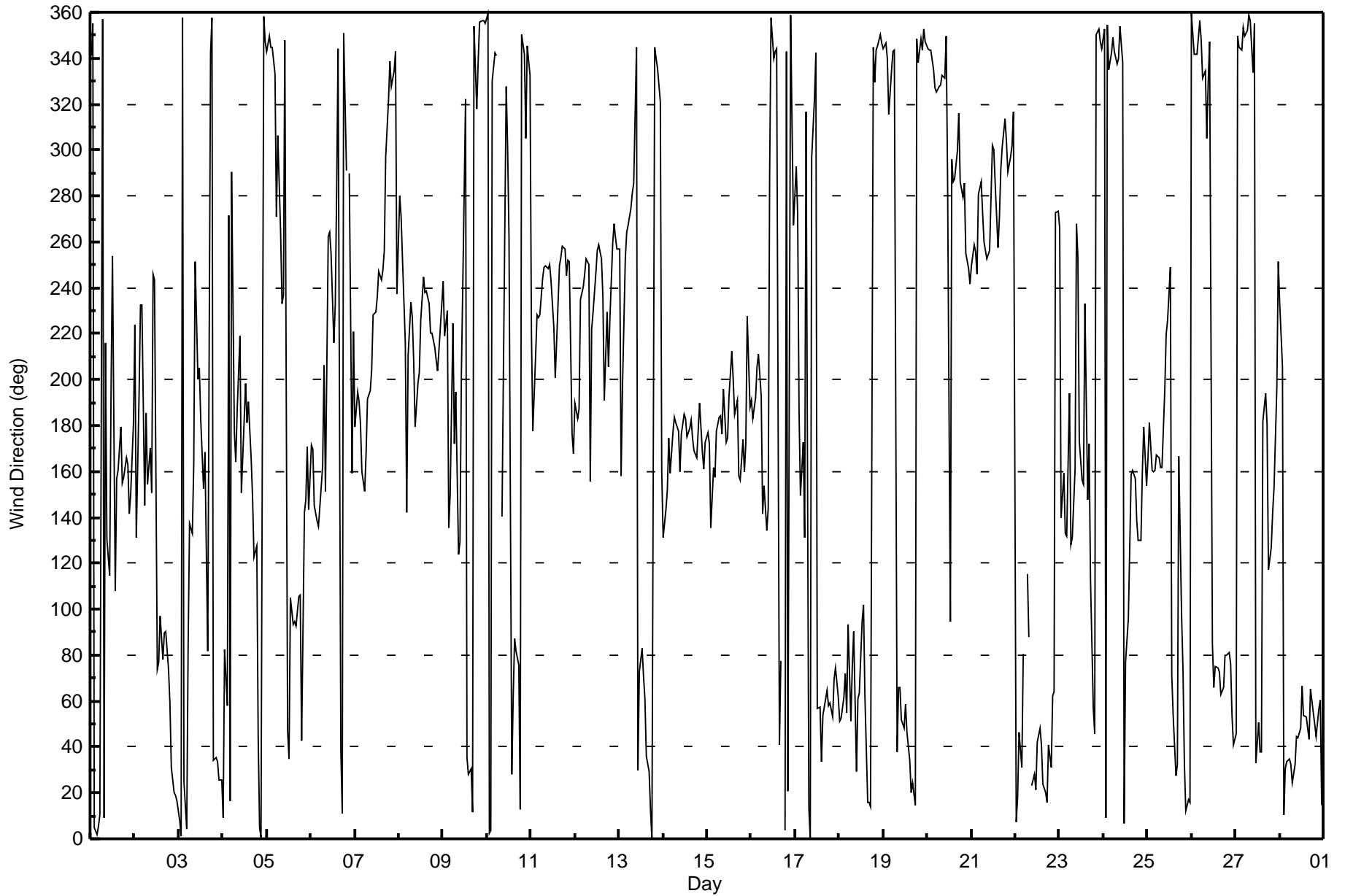
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Barge Landing - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Feb 3 07:00 Minimum Value: 7 deg on Feb 24 21:00 Percentiles: P ₁ = 10 P ₁₀ = 16 Q ₁ = 19 Median = 23 Q ₃ = 34 P ₉₀ = 56 P ₉₉ = 86																			Hours in Service: 672 Hours of Data: 666 Hours of Missing Data: 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-Feb	15	21	20	18	17	15	16	15	87	42	20	70	34	59	39	27	28	38	18	23	33	18	29	40	87
2-Feb	62	12	49	51	50	30	29	11	19	39	57	24	67	22	18	17	19	20	28	19	22	22	18	18	67
3-Feb	26	20	16	51	58	66	101	42	34	56	47	52	88	42	39	56	49	25	20	24	20	19	17	21	101
4-Feb	19	65	58	42	53	63	38	73	27	39	79	29	33	33	32	22	18	14	13	43	19	19	18	16	79
5-Feb	16	15	12	13	66	46	26	43	34	87	61	47	81	90	26	19	19	13	18	46	74	92	35	23	92
6-Feb	24	36	20	13	8	73	35	35	77	29	34	19	36	41	39	32	18	13	16	60	AF	37	51	39	77
7-Feb	30	26	17	18	16	14	18	21	23	27	20	19	20	17	19	18	19	25	16	32	12	17	11	40	40
8-Feb	26	31	28	42	27	41	17	19	32	28	23	23	23	18	19	19	20	21	22	23	23	22	28	41	42
9-Feb	28	58	32	74	46	22	43	47	16	23	62	63	31	23	23	23	17	12	33	18	12	15	33	13	74
10-Feb	11	10	10	74	24	14	AF	AF	75	82	42	48	38	29	61	29	26	32	52	22	24	27	23	22	82
11-Feb	95	28	54	29	23	22	22	20	16	16	17	24	27	29	28	16	17	16	17	15	17	22	44	21	95
12-Feb	20	20	31	19	17	18	20	20	79	32	22	19	19	19	18	23	23	24	31	23	20	21	18	17	79
13-Feb	17	74	24	20	27	22	31	34	79	96	35	26	21	25	31	17	20	23	18	14	19	14	23	35	96
14-Feb	12	21	17	24	28	23	22	23	25	22	25	26	23	25	23	24	20	18	13	16	19	19	18	16	28
15-Feb	25	16	17	37	50	52	46	21	48	41	36	27	24	34	32	32	23	51	30	18	17	31	49	24	52
16-Feb	29	30	22	23	39	81	57	14	58	30	54	23	26	22	31	25	32	AF	17	12	43	37	59	31	81
17-Feb	72	73	79	67	54	67	62	42	29	27	29	40	24	25	22	19	20	21	20	21	21	22	22	22	79
18-Feb	21	23	28	20	26	72	29	22	35	45	48	41	43	29	24	18	19	35	17	27	19	19	19	18	72
19-Feb	18	16	18	24	37	25	17	37	20	21	19	22	24	20	19	19	16	19	17	21	15	15	15	14	37
20-Feb	16	16	17	20	17	16	16	20	30	21	23	79	62	37	27	24	28	26	26	27	27	22	17	17	79
21-Feb	17	21	24	21	29	25	23	18	14	14	21	29	30	39	21	28	31	27	22	26	37	38	26	26	39
22-Feb	38	16	20	25	83	AF	49	40	AF	24	26	18	24	23	19	17	17	18	26	31	19	17	57	36	83
23-Feb	69	74	65	33	50	68	12	8	81	23	32	56	28	31	56	32	55	21	19	32	13	14	15	15	81
24-Feb	21	19	17	14	10	13	19	17	20	33	37	42	30	26	29	24	25	15	9	12	7	18	17	14	42
25-Feb	14	23	12	12	14	19	21	15	28	26	24	35	54	65	23	37	70	67	63	20	20	22	20	20	70
26-Feb	23	20	20	17	19	18	13	28	28	36	49	38	31	25	31	23	27	23	17	17	21	24	24	18	49
27-Feb	36	18	17	17	17	15	11	10	19	19	28	19	36	27	75	70	33	30	16	16	8	26	18	58	75
28-Feb	29	56	25	19	17	18	20	21	20	20	27	25	28	26	26	23	19	24	18	19	26	21	20	36	56
																			95 74 79 74 83 81 101 73 87 96 79 79 88 90 75 70 70 67 63 60 74 92 59 58						
Diurnal Maximum																									
AF - Analyzer Failure																									





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 8, 2017	Last Calibration	January 12, 2017
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:28	End Time (MST)	12:52
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	1042	1042
Calculated slope	0.999670	0.996760	Chamber temp	45	45
Calculated intercept	-0.149986	-0.189736	Pressure	685.4	684.2
Analyzer Background	2.09	2.09	Flow	0.432	0.433
Analyzer Coefficient	1.069	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	0.0	----
as found span	5000	77.2	80.0	80.1	0.999
SO2 scrubber check	5000	15.4	147.2	0.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	77.2	80.0	80.3	0.997
second point	5000	38.6	40.0	40.6	0.985
third point	5000	19.3	20.0	20.3	0.983
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	77.2	80.0	80.4	0.995
Average Correction Factor					0.988

Corrected As found	80.1	Previous response	80.2	% change	0.1%
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Notes:

Inlet filter changed and scrubber check done after as founds. Adjusted the span.

Calibration Performed By:

Jayme Marcoux



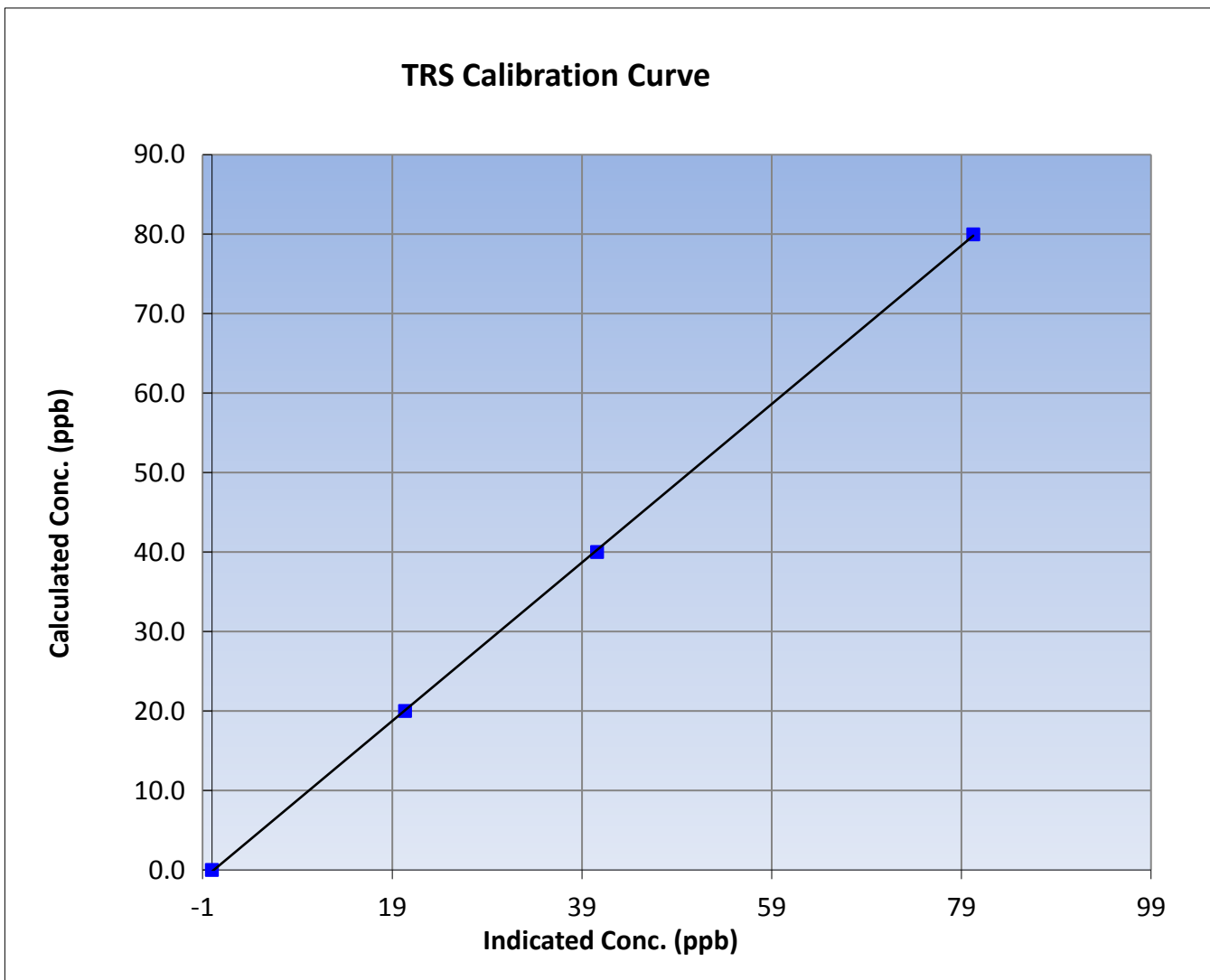
Wood Buffalo Environmental Association TRS Calibration Report

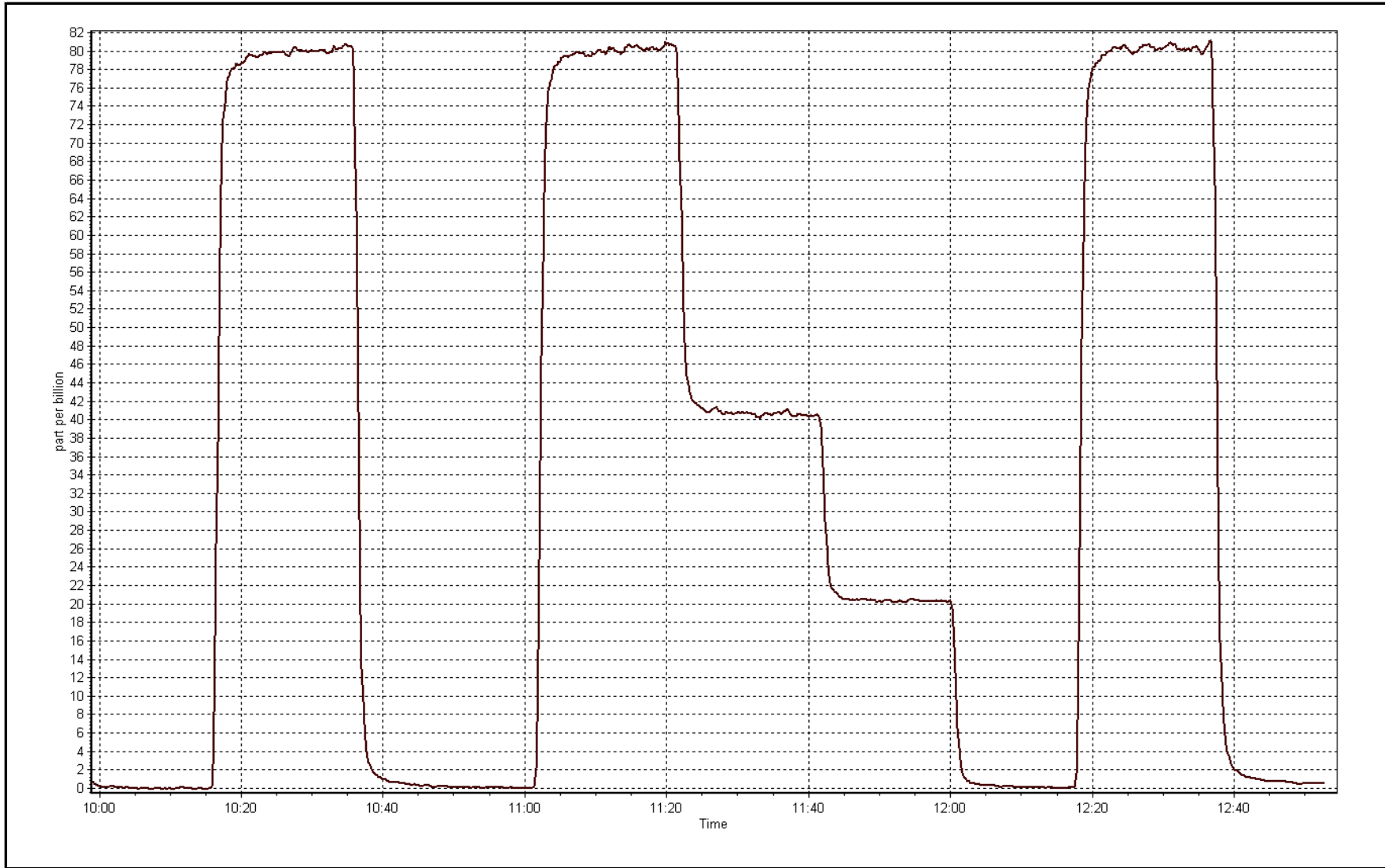
Station Information

Calibration Date	February 8, 2017	Previous Calibration	January 12, 2017
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:28	End Time (MST)	12:52
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	0.0	----	Correlation Coefficient	0.999953
80.0	80.3	0.9965		
40.0	40.6	0.9850	Slope	0.996760
20.0	20.3	0.9830		
			Intercept	-0.189736







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 8, 2017	Last Calibration	January 12, 2017
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	12:36	End Time (MST)	15:57
Gas Cert Reference	EY0000675	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	511 ppm	CH4 Equiv Conc.	1055.5 ppm
C3H8 Cal Gas Conc.	198 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	1.018190	0.998524	Fuel Pressure	24.1	24.1
Calculated intercept	-0.050910	0.011092	Analyzer Coeff	4.276	4.344
			Analyzer BKG	5.37	5.50

Analyzer make: Thermo 51i-LT Analyzer serial #: 1327059296

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.04	----
as found span	5000	74.4	15.71	15.50	1.013
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	74.4	15.71	15.72	0.999
second point	5000	39.9	8.42	8.42	1.000
third point	5000	14.9	3.15	3.14	1.002
as left zero	5000	0.0	0.00	-0.04	----
as left span	5000	74.4	15.71	15.72	0.999
Average Correction Factor					1.000

Corrected As found: 15.46 Previous response: 15.48 % change: 0.1%

Notes:

Changed out mix gas 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

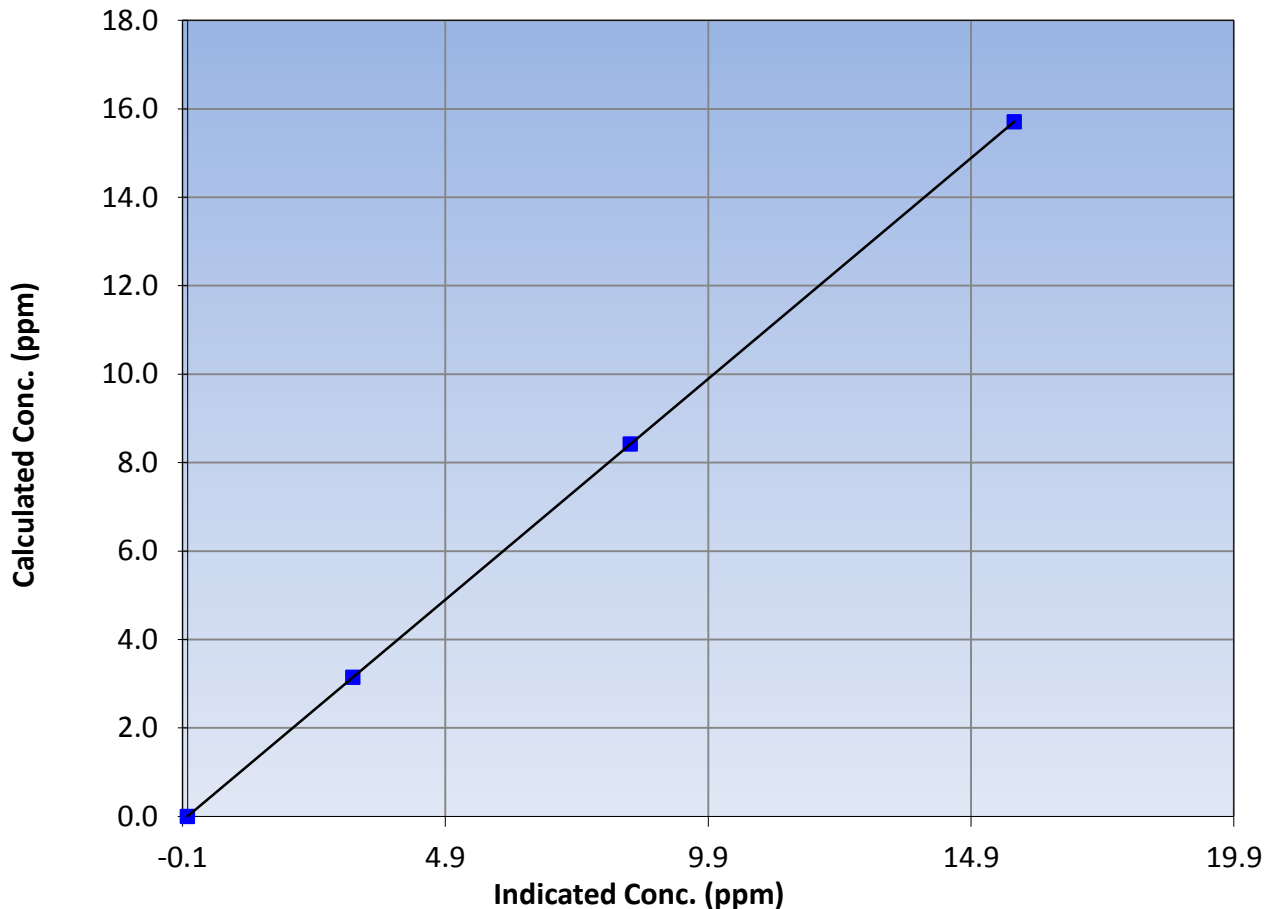
Station Information

Calibration Date	February 8, 2017	Previous Calibration	January 12, 2017
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:36	End Time (MST)	15:57
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

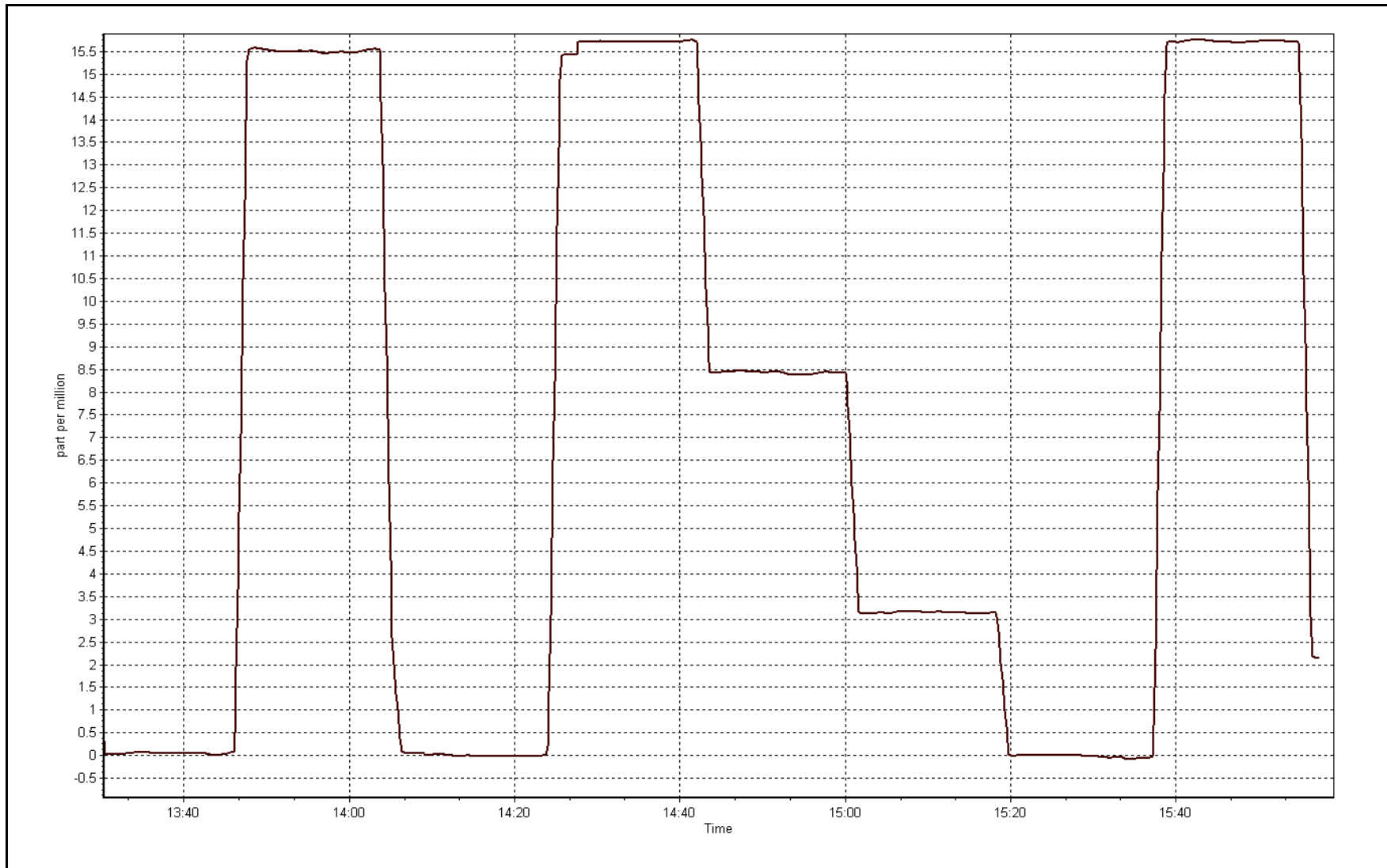
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	1.000000
15.71	15.72	0.9991		
8.42	8.42	1.0003	Slope	0.998524
3.15	3.14	1.0017		
			Intercept	0.011092

THC Calibration Curve



THC Calibration Plot

Date: February 8, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 8, 2017	Last Calibration	January 12, 2017
Station Name	Barge Landing	Station Number	AMS 9
Reason:	<input type="checkbox"/> Other: <input type="checkbox"/> Cylinder Removal		
Start Time (MST)	12:36	End Time (MST)	13:15
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

	Before	After		Before	After
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	1.003523	1.018190	Fuel Pressure	24.1	24.1
Calculated intercept	-0.035142	-0.050910	Analyzer Coeff	4.276	4.276
			Analyzer BKG	5.37	5.37

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	0.05	----
as found span	5000	76.7	15.70	15.47	1.015
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	76.7	15.70	15.47	1.015
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.015

Corrected As found	15.42	Previous response	15.68	% change	1.7%
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Notes:

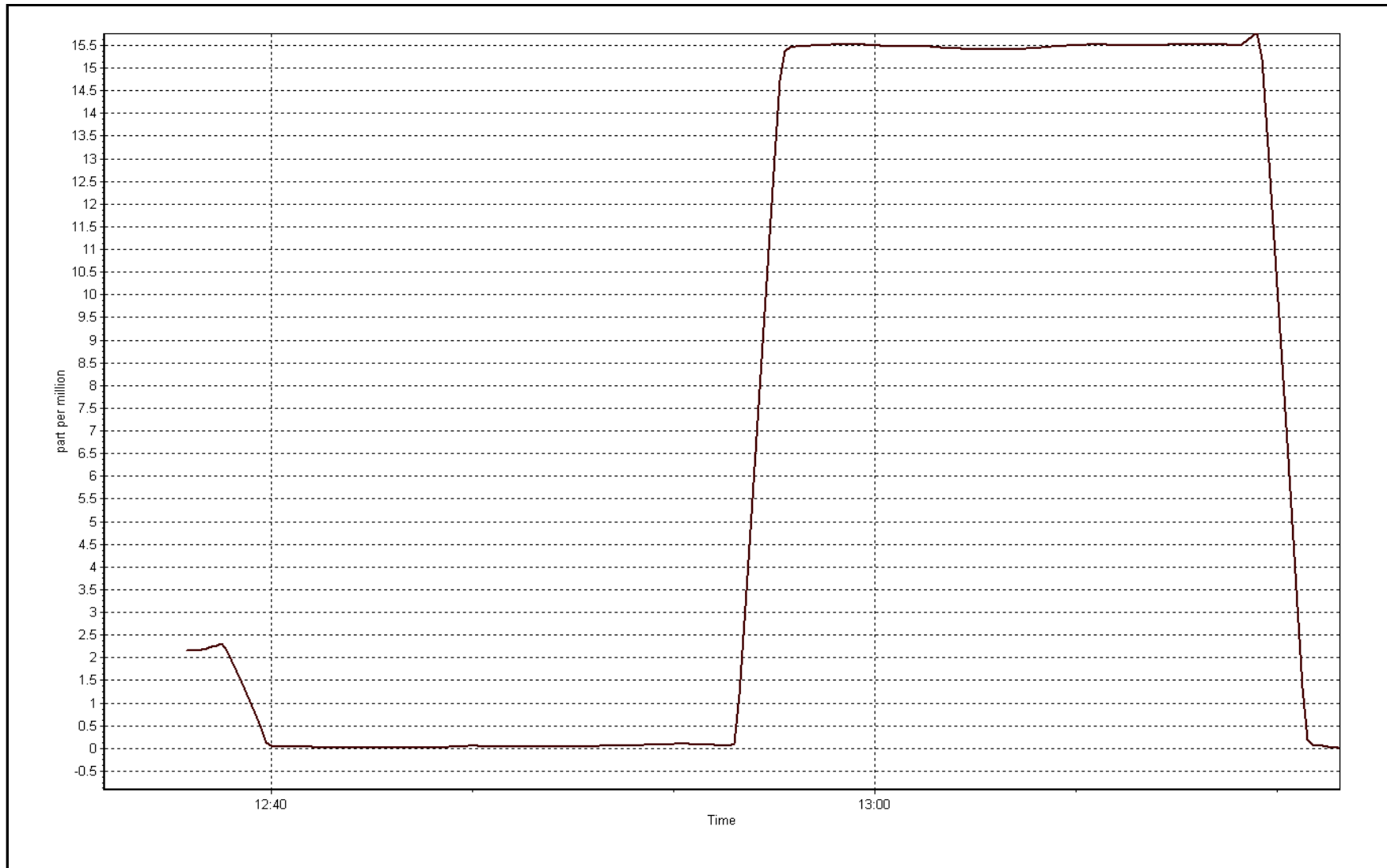
Cylinder removal

Calibration Performed By:

Jayme Marcoux

THC Calibration Plot

Date: February 8, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 11
LOWER CAMP
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 FEBRUARY 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	641	31	31	100	86	0	16	0
H2S (ppb) Average	640	32	32	100	11	4	2	0
THC (ppm) Average	610	31	62	95.39	5.5	-	3.1	-
Temperature (C) Average	672	0	0	100	10.6	-	4.4	-
Relative Humidity (%) Average	672	0	0	100	96	-	88	-
Wind Speed 10 m (km/h) Average	670	0	2	99.7	27	-	16	-
Wind Direction 10 m (deg) Average	670	0	2	99.7	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 FEBRUARY 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	641	3.3	9	-	0	0	0	1	2	7	86
H2S (ppb) Average	640	0.9	1	-	0	0	0	0	1	2	11
THC (ppm) Average	610	2.4	0.4	-	2	2.1	2.2	2.3	2.5	2.8	5.5
Temperature 2 m (C) Average	672	-11.5	10.5	-	-33.8	-24.8	-19.4	-12.7	-2.2	2.8	10.6
Relative Humidity (%) Average	672	71.8	12	-	40	54	64	74	80	84	96
Wind Speed 10 m (km/h) Average	670	7.5	5	-	0	2	3	6	11	16	27
Wind Direction 10 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	01 Feb 2017 10:00	01 Feb 2017 11:00	2	Flat line in sensor output signal -sensor frozen
THC	10 Feb 2017 06:00	11 Feb 2017 12:00	31	Analyzer Failure - sample pump replaced



Wood Buffalo Environmental Association
Summary of Hour Averages

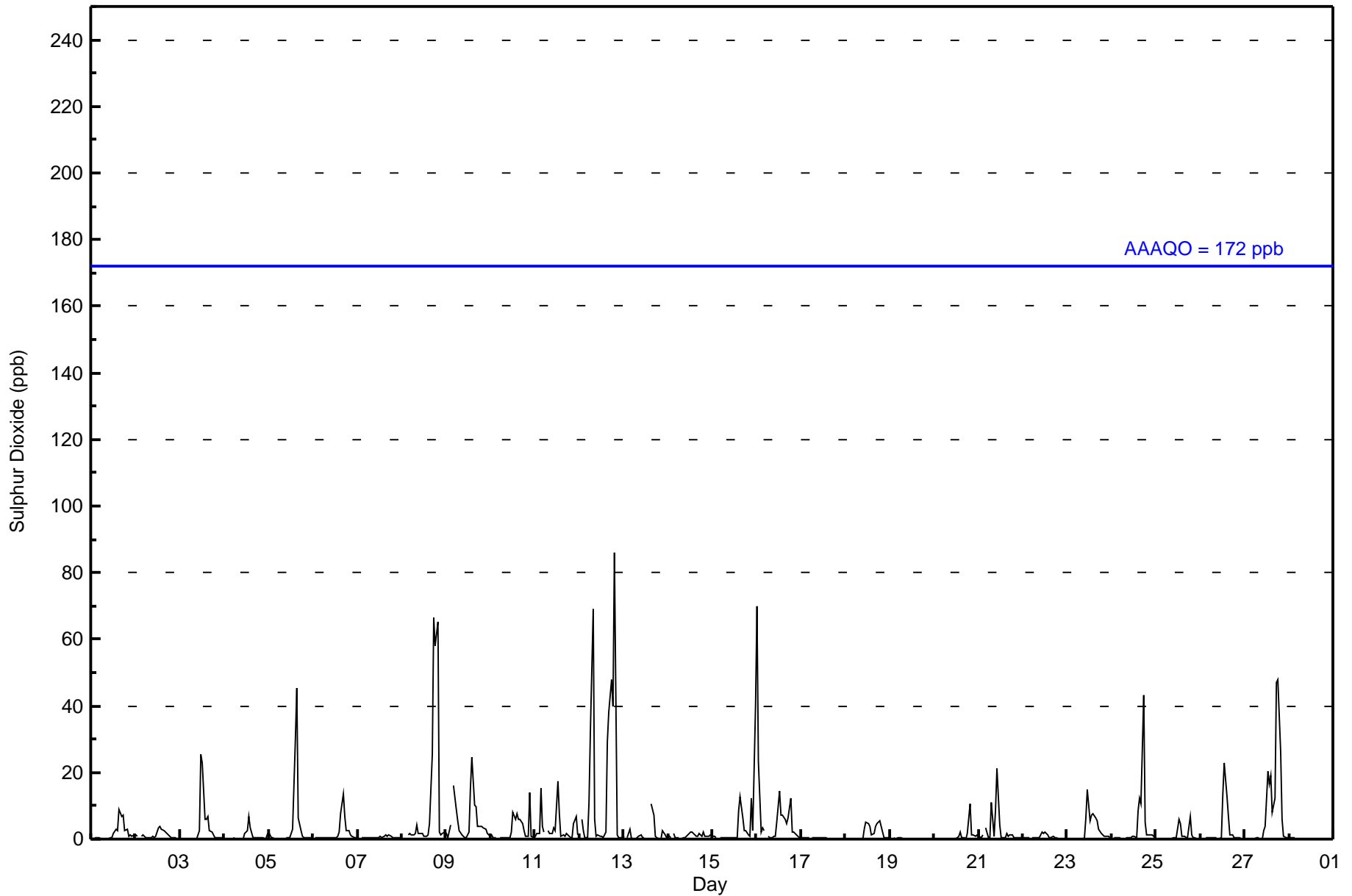
Sulphur Dioxide (SO₂) - ppb
Lower Camp - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																																							
Maximum Value: 86 ppb on Feb 12 20:00										Maximum Daily Average: 16.5 ppb on Feb 12										Hours of Data: 641																													
Minimum Value: 0 ppb on Feb 18 00:00										Minimum Daily Average: 0.1 ppb on Feb 19										Hours of Missing Data: 31																													
Maximum Diurnal Average: 9.3 ppb at hour 18										Minimum Diurnal Average: 0.7 ppb at hour 9										Hours of Calibration: 31																													
Monthly Average: 3.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 7 P ₉₉ = 51										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	2	3	2	9	7	7	3	3	1	1	1	1	1.8	9																							
2-Feb	1	1	Z	1	1	1	0	0	0	1	1	1	3	4	3	2	2	2	1	0	0	0	0	0	1.2	4																							
3-Feb	0	0	0	Z	0	0	0	0	0	0	3	25	23	6	6	7	2	2	1	0	0	0	0	0	3.4	25																							
4-Feb	0	0	0	0	Z	0	0	0	0	0	0	2	3	7	3	0	0	0	0	0	0	0	0	1	0.9	7																							
5-Feb	2	0	0	0	0	Z	0	0	0	0	0	1	2	3	30	45	6	3	1	0	0	0	0	0	4.2	45																							
6-Feb	Z	0	1	0	0	0	0	0	0	0	0	0	0	1	2	8	13	7	3	3	1	1	0	0	1.9	13																							
7-Feb	0	Z	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1																							
8-Feb	0	0	Z	1	2	1	1	2	4	2	2	2	1	1	1	4	25	66	58	65	2	1	2	2	10.8	66																							
9-Feb	2	0	4	Z	16	9	5	3	1	1	1	0	2	15	25	10	10	4	4	4	3	3	2	1	5.4	25																							
10-Feb	1	1	0	0	Z	0	0	0	0	0	0	2	8	6	8	6	6	5	3	1	1	14	1	1	2.8	14																							
11-Feb	1	2	2	15	4	2	Z	3	2	2	4	2	17	8	1	1	1	2	1	0	0	4	7	1	3.5	17																							
12-Feb	Z	6	3	1	0	11	33	69	6	1	1	1	1	0	2	29	38	48	40	86	1	0	0	0	16.5	86																							
13-Feb	1	Z	0	3	0	0	0	0	1	1	0	0	C	C	C	10	7	1	0	0	0	3	1	1	1.6	10																							
14-Feb	1	1	Z	2	0	0	0	0	0	0	1	2	2	1	1	1	2	1	2	1	1	1	1	1	1.0	2																							
15-Feb	1	1	0	Z	0	0	0	0	0	0	0	1	1	1	8	13	6	2	3	1	1	12	3	40	4.2	40																							
16-Feb	70	23	2	4	3	Z	1	1	1	1	1	5	14	7	7	6	5	7	12	2	2	1	1	0	7.6	70																							
17-Feb	0	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-Feb	Z	0	0	0	0	0	0	0	0	0	3	5	5	4	1	2	4	5	6	4	2	1	0	0	1.8	6																							
19-Feb	0	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																							
20-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	1	11	1	1	1	1	1.0	11																							
21-Feb	1	0	1	Z	3	0	0	11	1	9	21	4	1	0	0	2	1	1	1	0	0	0	0	0	2.7	21																							
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	2	2	2	1	0	0	1	1	0	0	0	0	0	0.6	2																							
23-Feb	0	0	0	0	0	Z	0	0	0	0	6	15	6	7	8	7	5	3	2	1	1	1	1	0	2.8	15																							
24-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	9	12	11	43	5	1	1	1	1	0	3.9	43																							
25-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	6	5	1	1	1	0	7	1	0	0	0	0	1.1	7																							
26-Feb	0	0	Z	1	0	0	0	0	0	0	0	0	13	23	13	7	1	1	0	0	1	0	0	0	2.7	23																							
27-Feb	0	0	0	Z	0	0	0	0	0	0	2	4	20	16	19	8	12	47	48	26	6	1	0	0	9.2	48																							
28-Feb	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
																								3.5	1.7	0.7	1.3	1.4	1.2	1.7	3.3	0.7	0.7	1.8	2.7	4.9	4.6	5.7	6.9	6.0	9.3	7.2	7.7	1.0	1.8	0.9	2.0	Diurnal Average	
																								70	23	4	15	16	11	33	69	6	9	21	25	23	23	30	45	38	66	66	58	86	6	14	7	40	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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	594	92.67	92.67
11 - 20	22	3.43	96.10
21 - 60	20	3.12	99.22
61 - 110	5	0.78	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - February 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	48	28	10	10	12	35	121	4	1	3	1	48	47	60	96	68	592
11 - 20	0	0	0	0	1	2	2	1	2	1	2	4	1	5	1	0	22
21 - 60	1	1	0	1	0	1	1	0	5	2	5	1	0	2	0	0	20
61 - 110	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	5
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	29	10	11	13	38	124	5	8	9	10	53	48	67	97	68	639

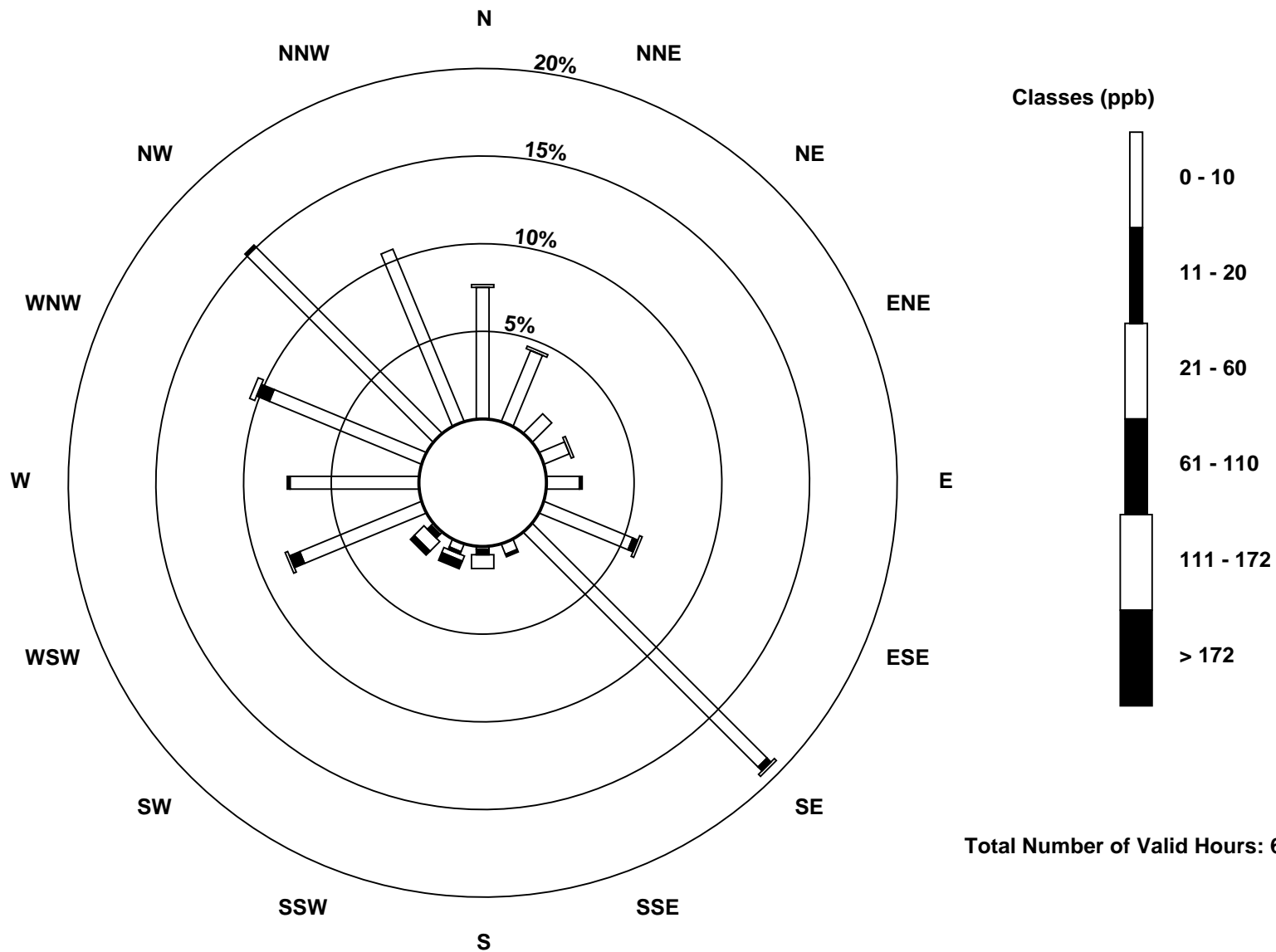
Total Number of Valid Hours: 639

Total Number of Hours: 672

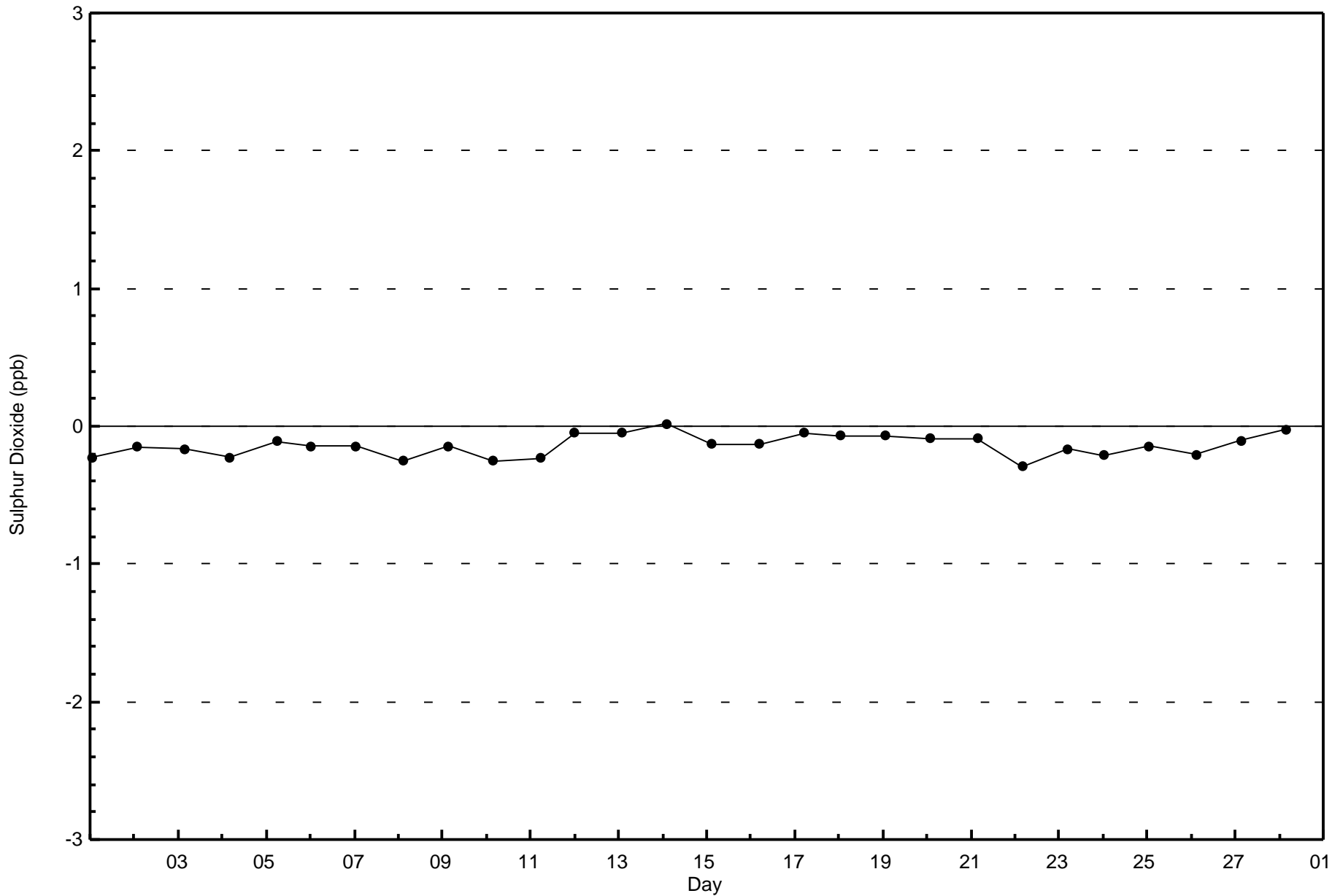


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)



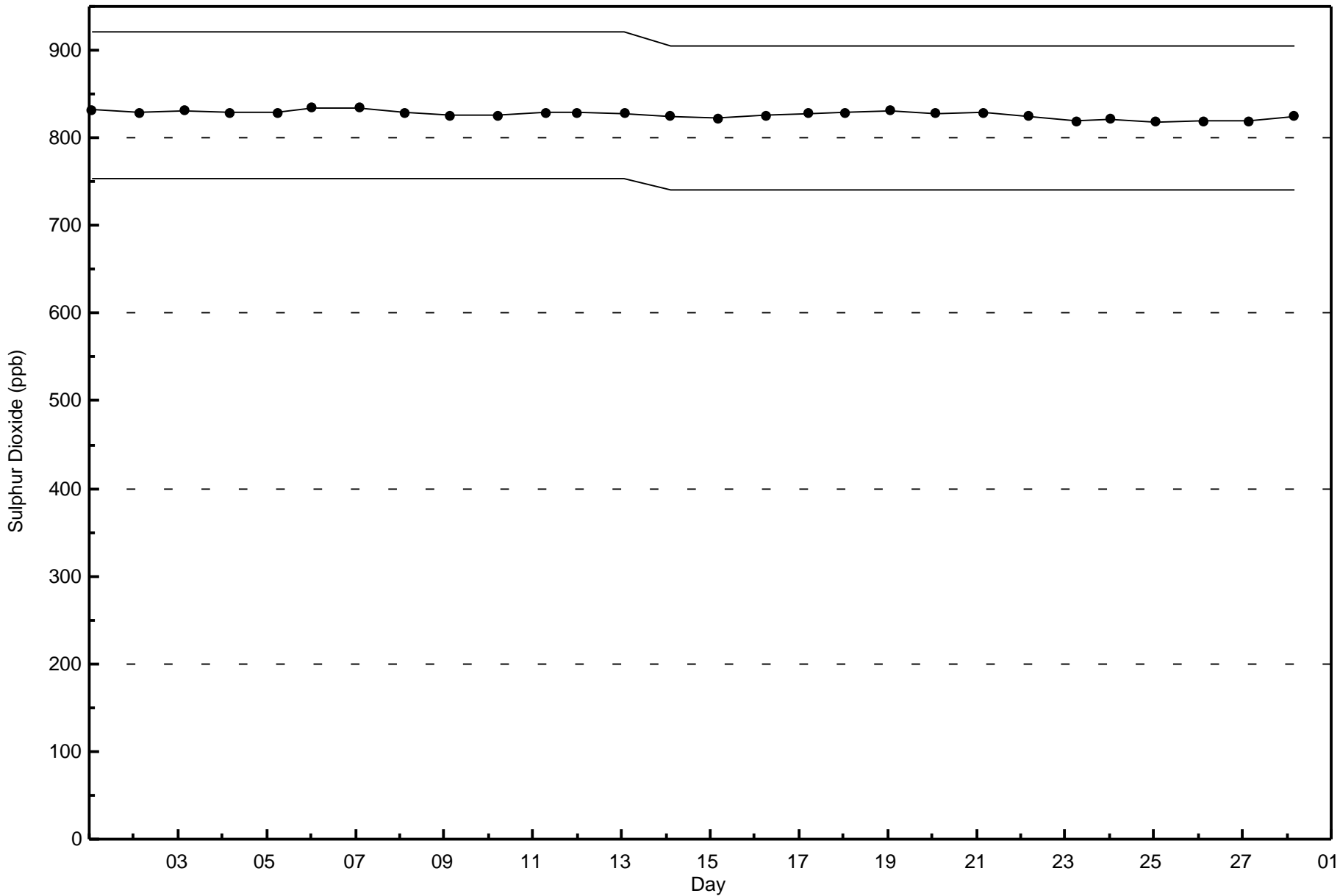
Total Number of Valid Hours: 639





Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - February 2017





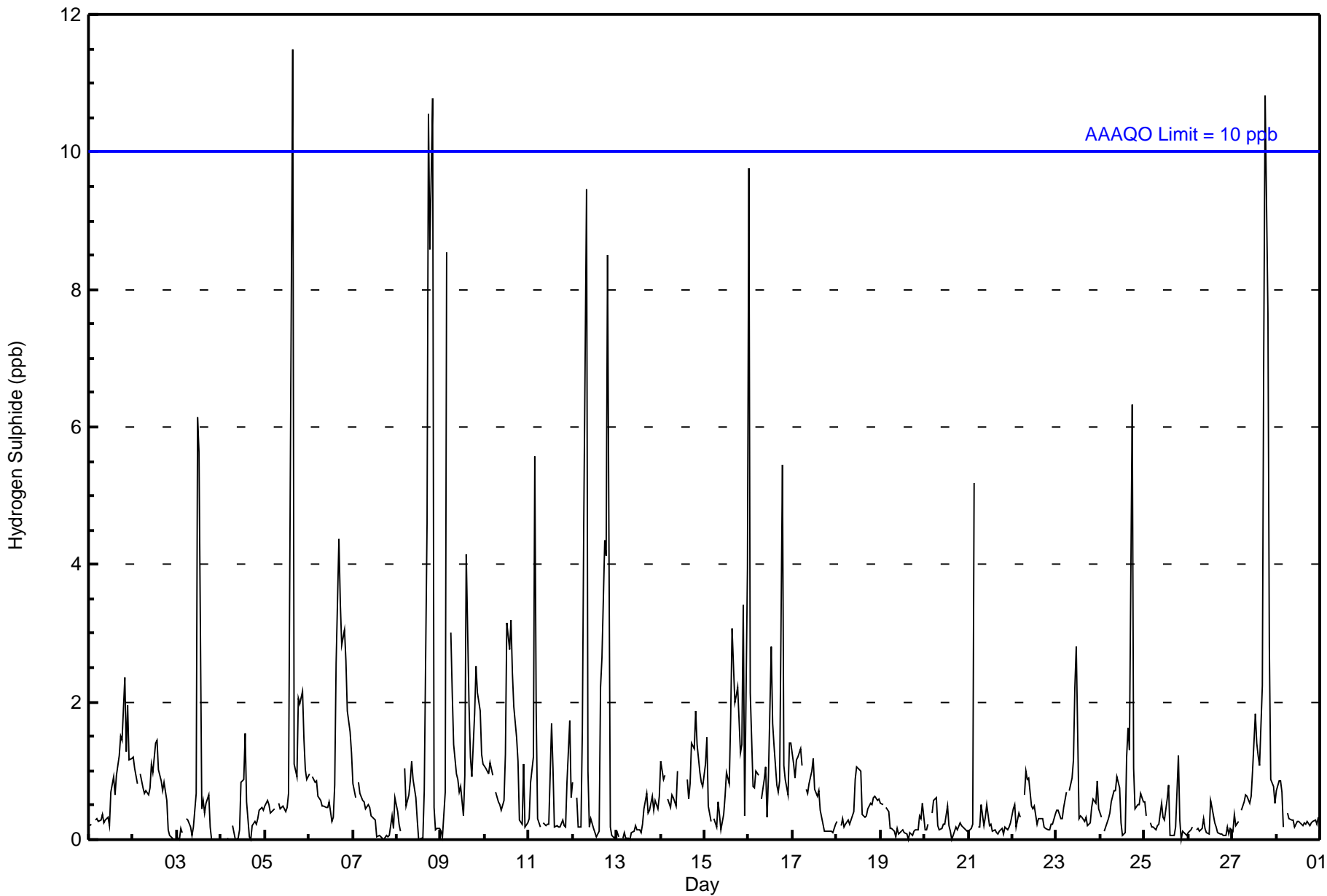
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Lower Camp - February 2017

Number of Exceedences (AAAQO): 1-hr: 4 24-hr: 0										Hours in Service: 672																
Maximum Value: 11 ppb on Feb 5 16:00										Maximum Daily Average: 1.9 ppb on Feb 27																
Minimum Value: 0 ppb on Feb 2 23:00										Minimum Daily Average: 0.2 ppb on Feb 26																
Maximum Diurnal Average: 1.7 ppb at hour 19										Minimum Diurnal Average: 0.5 ppb at hour 9																
Monthly Average: 0.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 9																
										Hours of Data: 640																
										Hours of Missing Data: 32																
										Hours of Calibration: 32																
										Percent Operational Time: 100.0																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	2	1	2	1	1	0.8	2	
2-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	1	
3-Feb	0	0	0	0	Z	0	0	0	0	0	1	6	6	0	1	0	1	1	0	0	0	0	0	0.7	6	
4-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0.3	2	
5-Feb	0	1	1	0	0	0	Z	1	0	0	0	0	0	1	8	11	1	1	2	2	2	1	1	1.6	11	
6-Feb	1	Z	1	1	1	1	1	0	0	0	0	1	0	0	1	3	4	3	3	3	3	2	2	1	1.4	4
7-Feb	1	1	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Feb	0	0	0	Z	1	0	1	1	1	1	1	0	0	0	0	1	5	11	9	11	0	0	0	1.9	11	
9-Feb	0	0	1	9	Z	3	2	1	1	1	1	1	0	1	4	2	1	1	2	3	2	2	1	1	1.7	9
10-Feb	1	1	1	1	1	Z	1	1	1	0	1	1	3	3	3	2	2	1	1	0	0	1	0	1.2	3	
11-Feb	0	1	1	6	2	0	0	Z	0	0	0	0	2	1	0	0	0	0	0	0	0	1	2	1	0.8	6
12-Feb	1	Z	1	0	0	2	5	9	1	0	0	0	0	0	0	2	3	4	4	8	0	0	0	1.8	9	
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0.3	1	
14-Feb	1	1	1	Z	1	0	1	1	0	1	0	C	C	C	C	1	1	1	1	2	1	1	1	0.9	2	
15-Feb	1	1	0	0	Z	0	0	1	0	0	0	1	1	1	2	3	2	2	2	1	1	3	0	1.3	4	
16-Feb	10	2	1	1	1	1	Z	1	1	1	0	1	3	2	1	1	1	1	5	1	1	1	1	1.7	10	
17-Feb	1	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	1	
18-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	0.5	1	
19-Feb	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
20-Feb	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
21-Feb	0	0	0	5	Z	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	5	
22-Feb	0	1	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
23-Feb	0	0	0	0	0	1	Z	1	1	1	2	3	0	0	0	0	0	0	0	0	1	1	1	0.7	3	
24-Feb	0	Z	0	0	0	0	1	1	1	1	0	0	0	1	2	1	6	1	0	1	1	1	1	0.8	6	
25-Feb	1	0	Z	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0.3	1	
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
27-Feb	0	0	0	0	Z	0	1	1	1	1	1	1	2	1	1	1	2	7	11	8	3	1	1	1.9	11	
28-Feb	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
0.8 0.6 0.5 1.2 0.6 0.6 0.6 0.8 0.5 0.5 0.5 0.8 0.9 0.7 1.0 1.2 1.0 1.6 1.7 1.6 0.7 0.7 0.5 0.6																								Diurnal Average		
10 2 1 9 2 3 5 9 1 1 2 6 6 3 8 11 5 11 11 11 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
Lower Camp - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	599	93.59	93.59
3 - 4	21	3.28	96.88
5 - 7	9	1.41	98.28
8 - 11	7	1.09	99.38
> 11	4	0.63	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - February 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	46	28	11	10	14	34	118	4	4	4	3	50	47	65	91	68	597
3 - 4	2	0	0	0	0	2	1	0	2	1	2	2	2	5	0	2	21
5 - 7	0	0	0	1	0	1	0	0	2	0	3	0	0	1	1	0	9
8 - 11	0	0	0	0	0	0	2	0	1	1	3	0	0	0	0	0	7
> 11	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	4
Totals	48	29	11	11	14	37	121	4	9	9	11	52	49	71	92	70	638

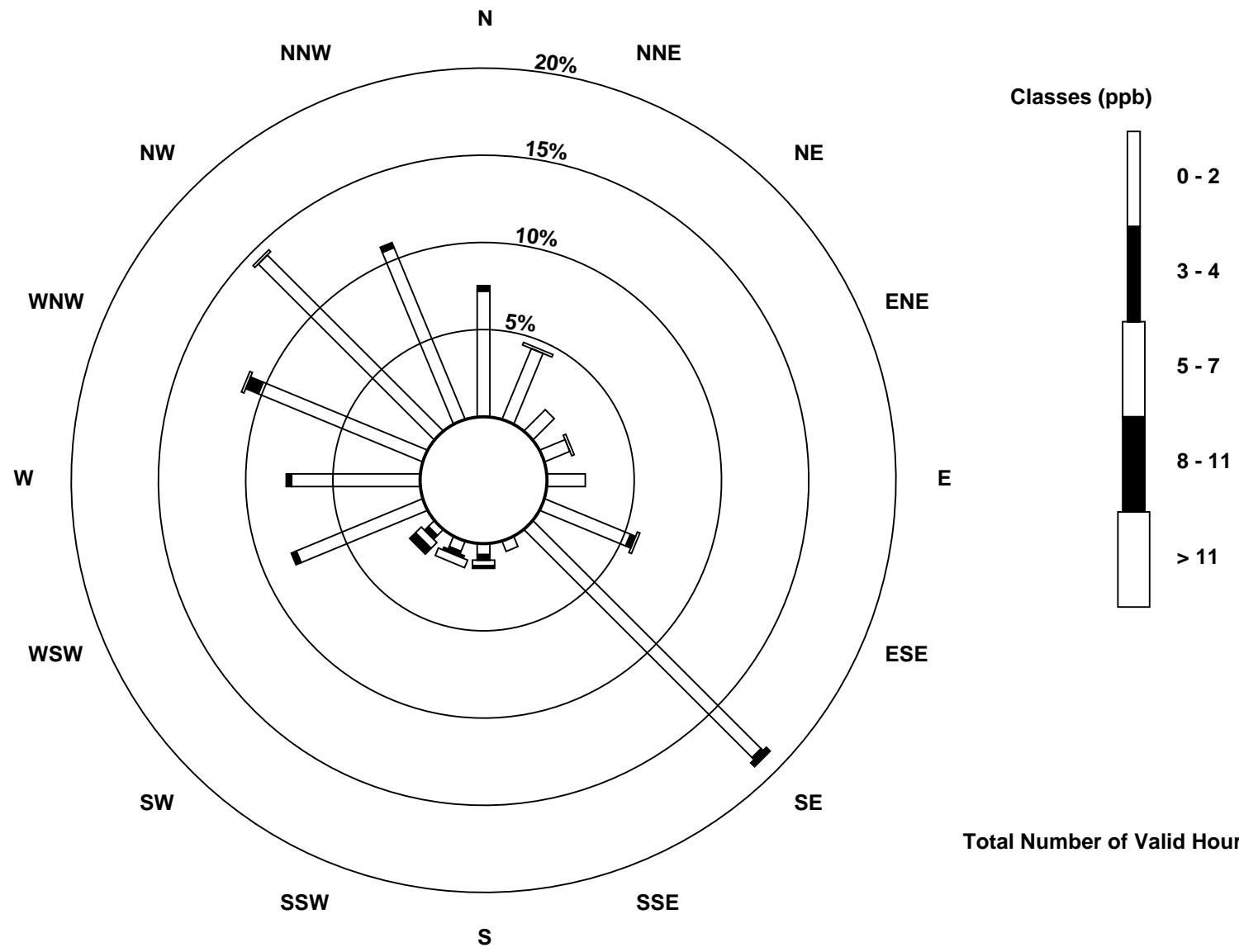
Total Number of Valid Hours: 638

Total Number of Hours: 672

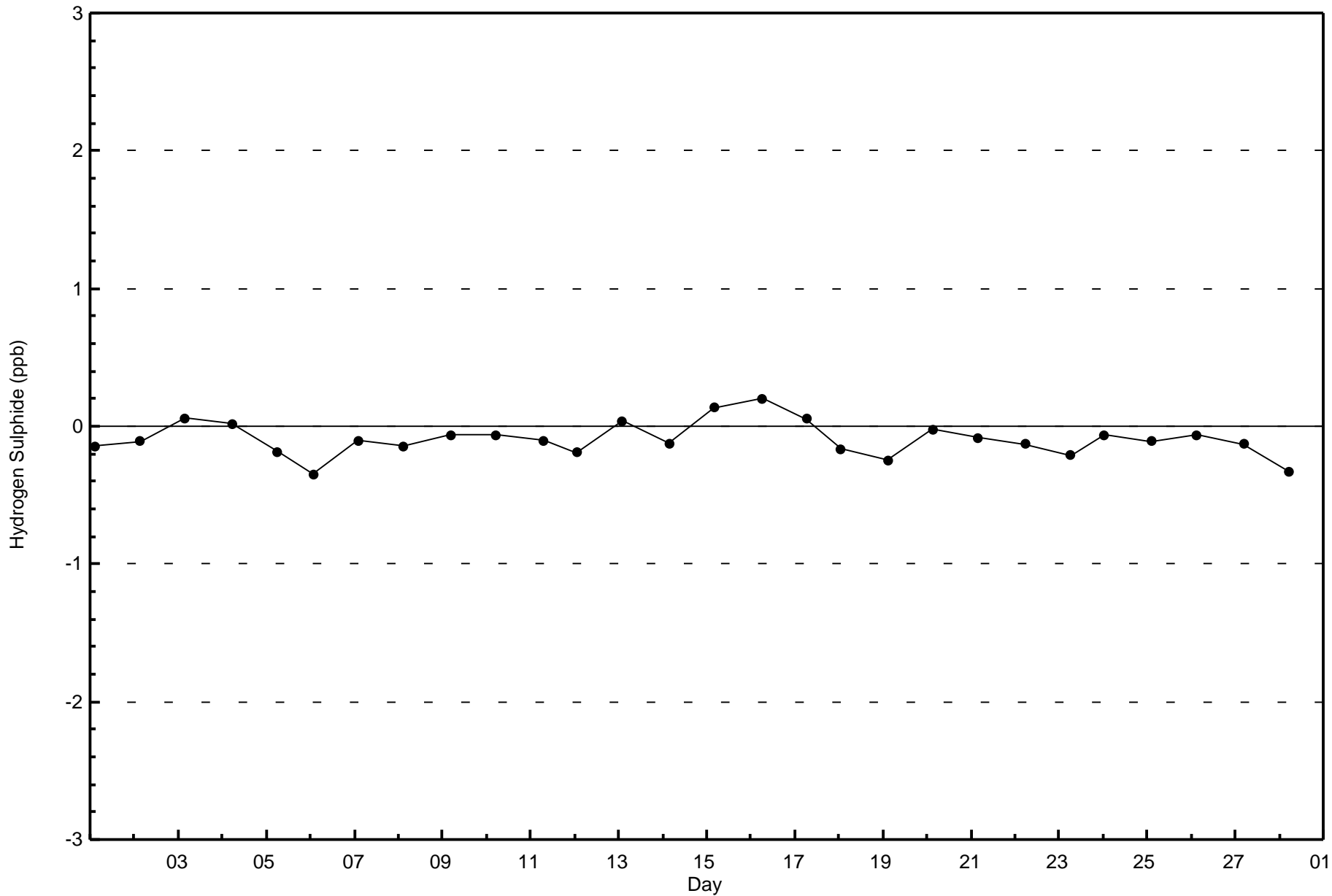


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)



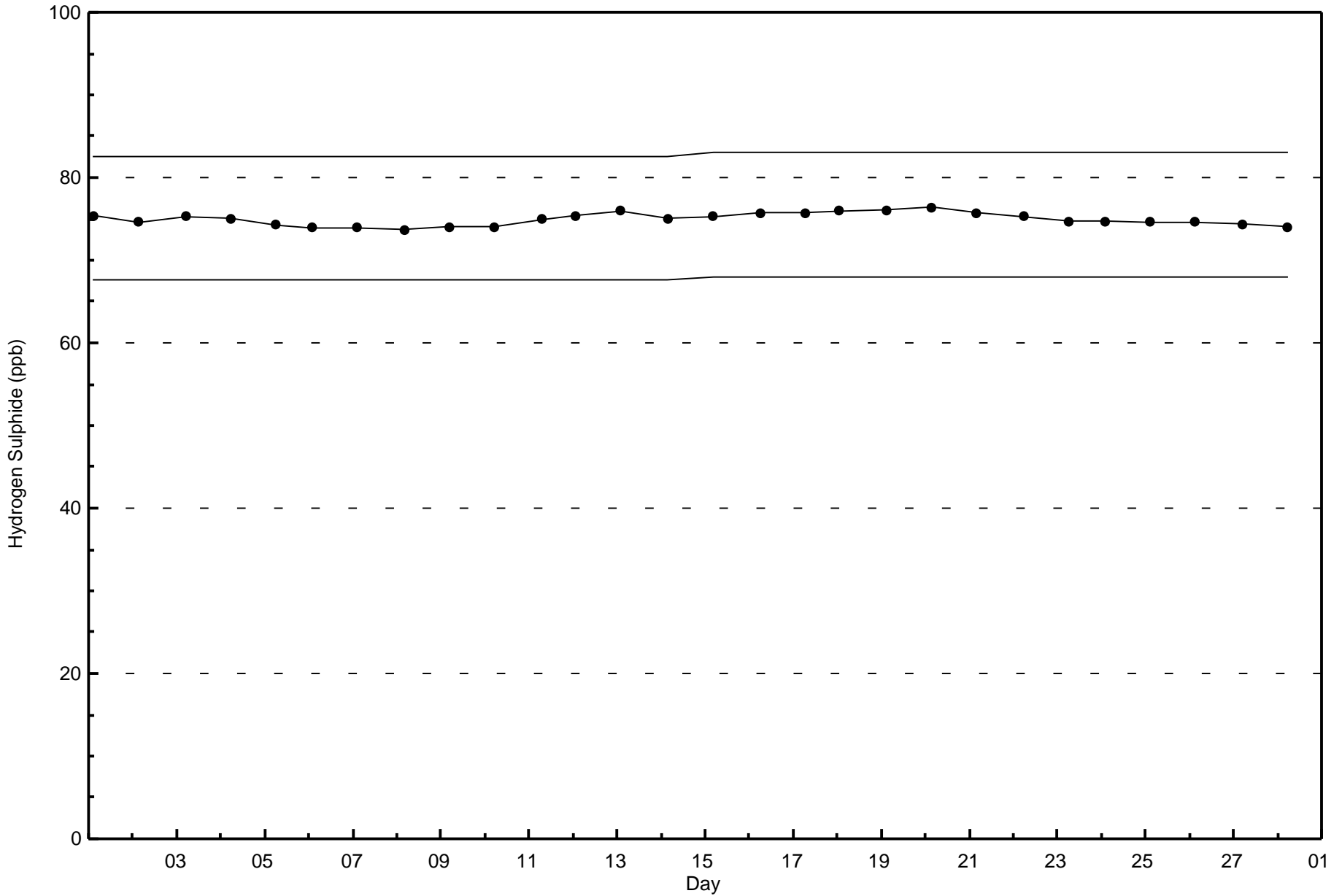
Total Number of Valid Hours: 638





Wood Buffalo Environmental Association
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

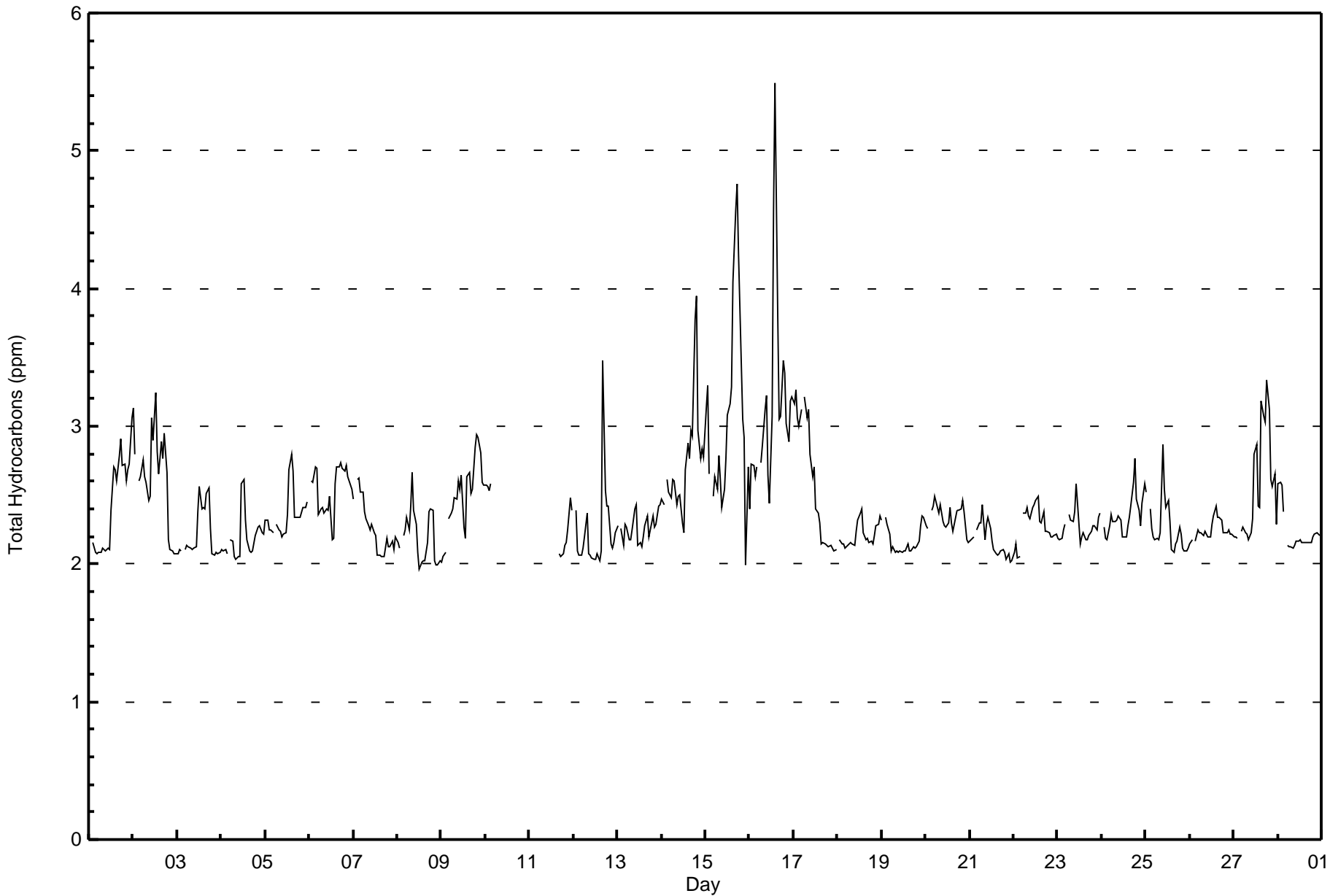
Lower Camp - February 2017

Maximum Value: 5.5 ppm on Feb 16 15:00																				Maximum Daily Average: 3.1 ppm on Feb 16					Hours in Service: 672	
Minimum Value: 2.0 ppm on Feb 8 13:00																				Minimum Daily Average: 2.2 ppm on Feb 21					Hours of Data: 610	
Maximum Diurnal Average: 2.5 ppm at hour 19																				Minimum Diurnal Average: 2.3 ppm at hour 6					Hours of Missing Data: 62	
Monthly Average: 2.40 ppm																				Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.8 P ₉₉ = 3.9					Hours of Calibration: 31	
																									Percent Operational Time: 95.4	
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-Feb	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.7	2.7	2.6	2.8	2.9	2.7	2.7	2.6	2.7	2.7	3.1	2.4	3.1
2-Feb	3.1	2.8	Z	2.6	2.6	2.8	2.6	2.6	2.5	2.5	3.1	2.9	3.2	2.8	2.7	2.9	2.8	2.9	2.7	2.2	2.1	2.1	2.1	2.1	2.6	3.2
3-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.6	2.4	2.4	2.4	2.5	2.6	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.6
4-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.1	2.0	2.1	2.1	2.6	2.6	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.6
5-Feb	2.3	2.3	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.7	2.8	2.7	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.4	2.8
6-Feb	Z	2.6	2.6	2.7	2.7	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.2	2.2	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.5	2.5	2.7
7-Feb	2.5	Z	2.6	2.6	2.5	2.5	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.6
8-Feb	2.2	2.1	Z	2.2	2.2	2.3	2.2	2.4	2.7	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.2	2.4	2.4	2.4	2.0	2.0	2.0	2.0	2.2	2.7
9-Feb	2.0	2.1	2.1	Z	2.3	2.4	2.4	2.5	2.5	2.6	2.5	2.6	2.3	2.2	2.6	2.7	2.5	2.5	2.8	2.9	2.9	2.8	2.6	2.6	2.5	2.9
10-Feb	2.6	2.6	2.5	2.6	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2.6
11-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.4	--	2.5
12-Feb	Z	2.4	2.1	2.1	2.1	2.1	2.2	2.4	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	3.5	2.5	2.4	2.4	2.1	2.1	2.2	2.2	2.2	3.5
13-Feb	2.3	Z	2.3	2.1	2.3	2.3	2.2	2.2	2.2	2.4	2.4	2.1	2.2	2.1	2.2	2.3	2.4	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.4
14-Feb	2.5	2.4	Z	2.6	2.5	2.5	2.6	2.6	2.4	2.5	2.5	2.3	2.2	2.7	2.9	2.8	3.0	2.9	3.8	3.9	3.0	2.8	2.8	2.8	2.7	3.9
15-Feb	3.1	3.3	2.7	Z	2.5	2.6	2.5	2.8	2.6	2.4	2.5	2.8	3.1	3.2	3.3	4.1	4.6	4.8	4.3	3.4	3.1	2.9	2.0	2.7	3.1	4.8
16-Feb	2.4	2.7	2.7	2.6	2.7	Z	2.7	2.9	3.1	3.2	2.6	2.4	3.1	4.6	5.5	3.8	3.1	3.1	3.5	3.4	3.0	2.9	3.2	3.2	3.1	5.5
17-Feb	3.2	3.3	3.1	3.0	3.1	Z	3.2	3.1	3.1	2.8	2.6	2.7	2.4	2.4	2.3	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.6	3.3
18-Feb	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.4
19-Feb	2.3	Z	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.3	2.2	2.4
20-Feb	2.3	2.3	Z	2.4	2.4	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.3	2.4	2.4	2.4	2.5	2.4	2.2	2.2	2.3	2.5
21-Feb	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.4	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.2	2.4
22-Feb	2.1	2.2	2.0	2.1	Z	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.5	2.5	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
23-Feb	2.2	2.2	2.2	2.2	2.3	Z	2.4	2.3	2.3	2.4	2.6	2.4	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.4	2.3	2.6
24-Feb	Z	2.3	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.6	2.8	2.5	2.4	2.3	2.4	2.6	2.3	2.8
25-Feb	2.5	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.9	2.5	2.4	2.5	2.3	2.1	2.1	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.3	2.9
26-Feb	2.1	2.2	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
27-Feb	2.2	2.2	2.2	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.8	2.9	2.4	2.4	3.2	3.1	3.0	3.3	3.1	2.6	2.6	2.7	2.3	2.5	3.3
28-Feb	2.6	2.6	2.6	2.4	Z	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	2.2	2.2	2.2	2.2	2.2	2.6
																								Diurnal Average		
																								Diurnal Maximum		
2.4 2.4 2.3 2.3 2.4 2.3 2.3 2.4 2.3 2.4 2.4 2.4 2.4 2.4 2.5 2.5 2.5 2.5 2.5 2.5 2.4 2.3 2.3 2.4																										
3.2 3.3 3.1 3.0 3.1 2.8 3.2 3.1 3.1 3.2 3.1 2.9 3.2 4.6 5.5 4.1 4.6 4.8 4.3 3.9 3.1 2.9 3.2 3.2																										
Z - zerspan C - Calibration AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	21	3.44	3.44
2.1 - 3.0	548	89.84	93.28
3.1 - 10.0	41	6.72	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 610

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Lower Camp - February 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	1	0	0	0	0	0	1	14	1	0	1	3	21
2.1 - 3.0	48	28	10	11	13	33	106	5	5	7	9	27	40	57	84	63	546	
3.1 - 10.0	0	1	0	0	0	3	15	0	2	0	0	5	3	7	3	2	41	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	48	29	10	11	13	37	121	5	7	7	10	46	44	64	88	68	608	

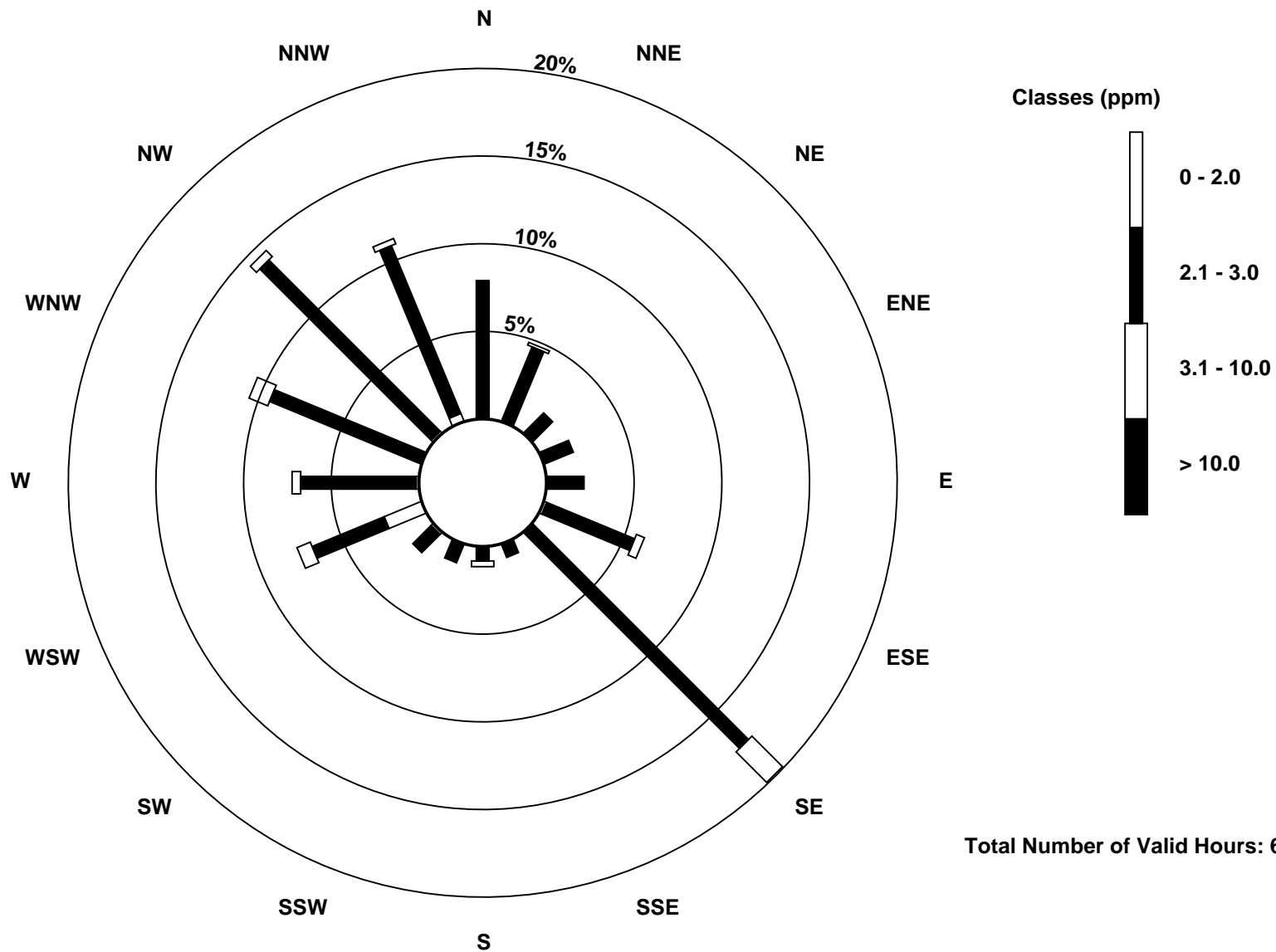
Total Number of Valid Hours: 608

Total Number of Hours: 672

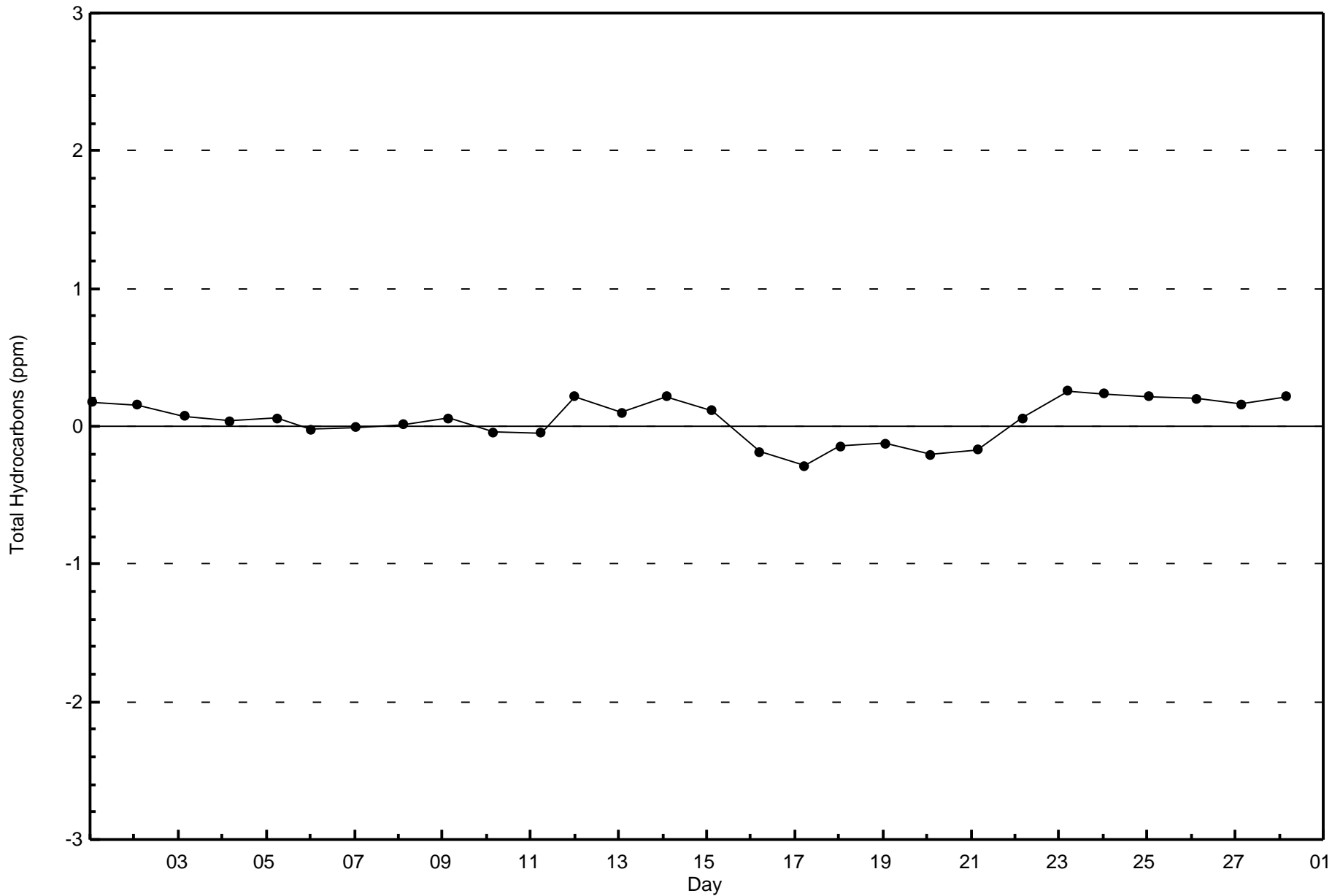


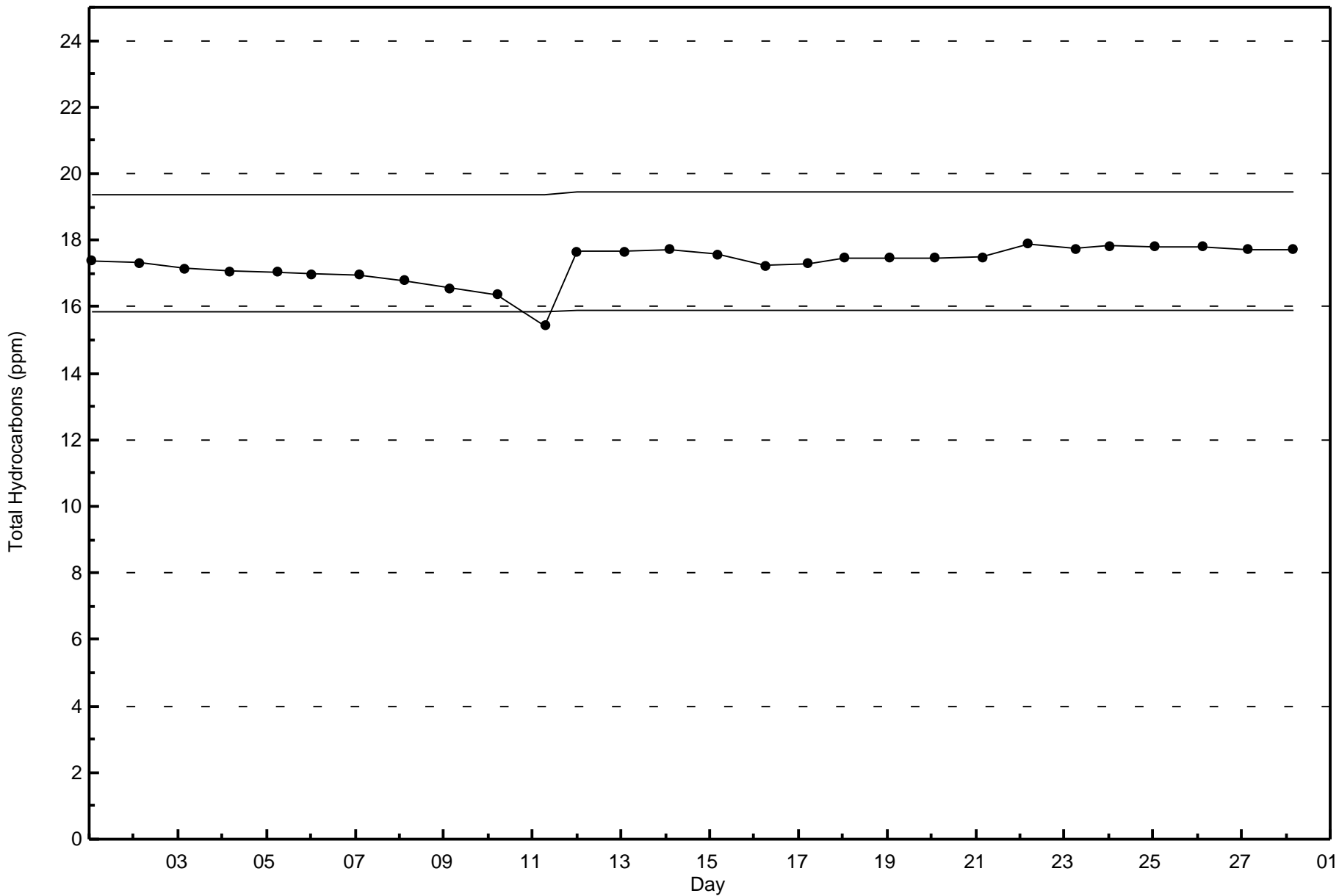
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)



Total Number of Valid Hours: 608







Wood Buffalo Environmental Association
Summary of Hour Averages

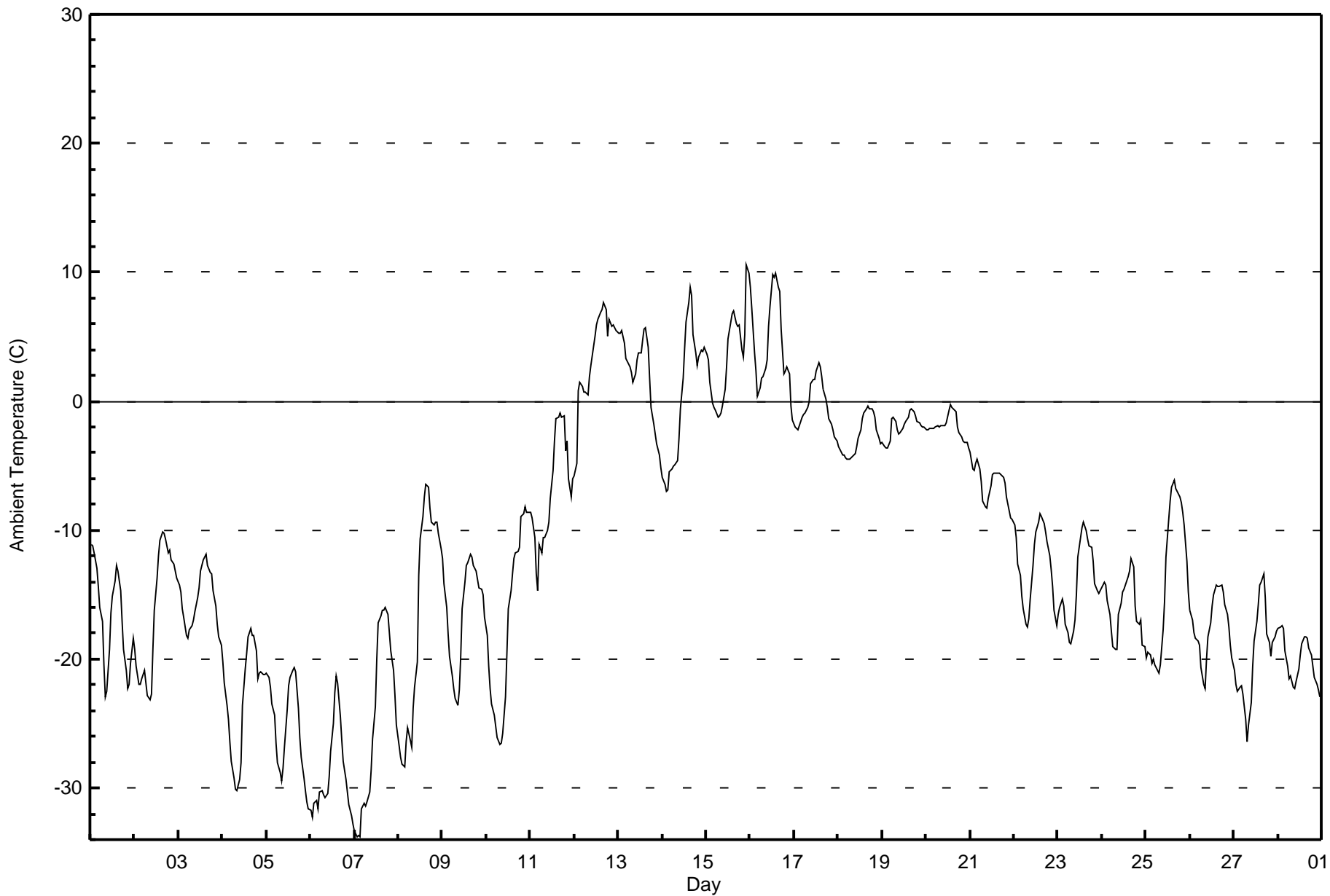
Ambient Temperature (AT) - C
Lower Camp - February 2017

Maximum Value: 10.6 C on Feb 15 23:00 Maximum Daily Average: 4.4 C on Feb 16																								Hours in Service: 672		
Minimum Value: -33.8 C on Feb 7 04:00 Minimum Daily Average: -28.8 C on Feb 6																								Hours of Data: 672		
Maximum Diurnal Average: -7.0 C at hour 16 Minimum Diurnal Average: -15.4 C at hour 8																								Hours of Missing Data: 0		
Monthly Average: -11.50 C Percentiles: P₁ = -31.8 P₁₀ = -24.8 Q₁ = -19.4 Median = -12.7 Q₃ = -2.2 P₉₀ = 2.8 P₉₉ = 8.8																								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-Feb	-11.1	-11.2	-11.8	-13.0	-14.4	-16.0	-17.1	-20.4	-22.9	-22.5	-19.2	-16.4	-15.1	-13.9	-12.7	-13.1	-14.7	-17.1	-19.2	-20.9	-22.3	-22.0	-20.3	-18.4	-16.9	-11.1
2-Feb	-19.2	-20.6	-22.0	-22.0	-21.5	-20.8	-21.9	-22.8	-23.1	-22.7	-19.2	-16.2	-13.8	-12.0	-10.7	-10.1	-10.3	-10.7	-11.7	-11.6	-12.3	-12.6	-13.1	-13.7	-16.4	-10.1
3-Feb	-14.3	-14.8	-16.1	-16.7	-18.1	-18.3	-17.8	-17.4	-17.0	-16.4	-15.2	-14.5	-13.2	-12.3	-12.1	-11.9	-12.7	-13.2	-13.4	-14.7	-15.9	-17.3	-18.3	-18.9	-15.4	-11.9
4-Feb	-20.2	-21.9	-23.6	-24.7	-26.4	-27.9	-29.2	-30.1	-30.2	-29.3	-28.0	-23.6	-20.8	-19.6	-18.3	-17.7	-18.1	-18.1	-19.4	-21.5	-21.1	-20.9	-21.2	-21.2	-23.0	-17.7
5-Feb	-21.1	-21.4	-22.2	-23.5	-24.4	-26.5	-28.0	-28.8	-29.5	-28.4	-26.8	-24.0	-22.1	-21.4	-20.8	-20.6	-21.0	-23.8	-26.1	-27.6	-29.2	-30.3	-31.0	-31.6	-25.4	-20.6
6-Feb	-31.7	-32.3	-31.2	-31.0	-31.6	-30.3	-30.2	-30.5	-30.7	-30.5	-29.1	-27.2	-25.0	-22.6	-21.3	-21.9	-24.4	-26.3	-27.9	-29.3	-30.3	-31.3	-32.2	-32.8	-28.8	-21.3
7-Feb	-33.3	-33.7	-33.7	-33.8	-31.6	-31.2	-31.3	-31.1	-30.3	-28.6	-26.2	-23.7	-20.1	-17.2	-16.7	-16.2	-16.2	-16.0	-16.5	-17.9	-19.4	-20.8	-22.8	-25.1	-24.7	-16.0
8-Feb	-26.8	-27.6	-28.1	-28.3	-26.4	-25.3	-26.3	-26.9	-23.8	-22.2	-20.2	-13.5	-10.7	-8.9	-7.4	-6.4	-6.6	-8.3	-9.4	-9.6	-9.4	-9.4	-10.2	-11.4	-16.8	-6.4
9-Feb	-12.2	-14.2	-16.0	-18.1	-19.7	-21.3	-22.3	-23.1	-23.5	-22.4	-19.8	-16.1	-14.0	-12.7	-12.5	-11.8	-12.1	-12.7	-13.1	-13.8	-14.4	-14.6	-15.0	-16.8	-16.3	-11.8
10-Feb	-18.2	-20.5	-22.3	-23.5	-24.3	-25.2	-26.0	-26.7	-26.5	-25.7	-23.0	-19.5	-16.1	-14.7	-13.4	-12.2	-11.8	-11.6	-11.3	-9.0	-8.7	-8.2	-8.6	-8.6	-17.3	-8.2
11-Feb	-8.7	-9.0	-10.6	-13.4	-14.7	-11.1	-11.7	-10.5	-10.6	-10.0	-9.3	-7.5	-5.4	-3.1	-1.3	-1.3	-0.9	-1.3	-1.1	-3.8	-3.1	-6.0	-7.5	-6.0	-7.0	-0.9
12-Feb	-5.8	-4.8	0.8	1.4	1.2	0.7	0.7	0.5	1.9	2.8	3.5	5.1	5.9	6.3	6.9	7.1	7.7	7.2	5.1	6.4	5.8	5.9	5.7	5.5	3.5	7.7
13-Feb	5.3	5.2	5.4	4.5	3.3	3.1	2.7	2.2	1.5	2.1	3.2	3.8	3.7	4.7	5.6	5.7	4.2	1.8	-0.5	-1.8	-2.6	-3.3	-4.1	-5.2	2.1	5.7
14-Feb	-5.9	-6.5	-7.0	-6.9	-5.5	-5.2	-5.0	-4.9	-4.6	-2.8	-0.6	1.8	4.1	6.1	7.6	8.8	8.2	5.1	3.8	2.8	3.4	3.9	3.9	4.2	0.4	8.8
15-Feb	3.6	3.2	1.5	-0.1	-0.5	-0.7	-1.2	-1.2	-0.9	-0.4	0.9	2.6	4.8	6.2	6.8	7.0	6.0	5.9	5.9	4.0	3.4	5.2	10.6	10.0	3.4	10.6
16-Feb	8.8	7.3	3.8	2.4	0.4	1.0	1.8	1.9	2.5	3.2	5.8	7.4	9.8	9.6	10.0	8.9	8.5	5.6	2.2	2.3	2.7	2.1	-0.4	-1.5	4.4	10.0
17-Feb	-2.0	-2.2	-2.2	-1.9	-1.2	-1.0	-0.9	-0.5	-0.1	1.4	1.7	1.7	2.4	3.0	2.6	1.9	1.0	0.1	-0.5	-1.3	-1.8	-2.3	-2.7	-3.1	-0.3	3.0
18-Feb	-3.5	-3.8	-4.2	-4.2	-4.3	-4.5	-4.5	-4.4	-4.3	-4.1	-3.6	-2.9	-2.2	-1.4	-0.9	-0.6	-0.4	-0.5	-0.6	-0.8	-1.2	-2.2	-2.9	-3.3	-2.7	-0.4
19-Feb	-3.2	-3.5	-3.7	-3.6	-3.1	-1.3	-1.3	-1.5	-2.2	-2.5	-2.4	-2.2	-1.8	-1.6	-1.2	-0.7	-0.6	-0.8	-1.1	-1.5	-1.7	-1.9	-2.0	-2.0	-2.0	-0.6
20-Feb	-2.2	-2.2	-2.1	-2.1	-2.1	-2.0	-1.9	-2.0	-1.9	-1.9	-1.9	-1.7	-0.7	-0.2	-0.5	-0.6	-0.8	-2.0	-2.4	-2.8	-3.0	-3.1	-3.2	-3.6	-2.0	-0.2
21-Feb	-4.0	-5.3	-5.4	-4.8	-4.5	-5.3	-6.2	-7.7	-8.2	-8.3	-7.5	-6.5	-5.7	-5.5	-5.6	-5.6	-5.6	-5.7	-5.9	-6.3	-7.4	-8.5	-9.1	-9.1	-6.4	-4.0
22-Feb	-9.6	-10.6	-12.6	-13.5	-15.1	-16.1	-17.3	-17.5	-16.8	-15.4	-12.8	-11.2	-10.2	-9.4	-8.8	-9.0	-9.4	-10.2	-10.9	-11.9	-13.1	-14.4	-16.3	-17.4	-12.9	-8.8
23-Feb	-16.6	-15.9	-15.3	-15.8	-17.3	-18.0	-18.7	-18.8	-17.8	-17.0	-15.0	-12.1	-10.5	-9.8	-9.3	-10.0	-10.7	-11.2	-11.4	-12.4	-14.2	-14.7	-14.9	-14.7	-14.3	-9.3
24-Feb	-14.3	-14.0	-14.2	-15.4	-16.5	-17.8	-19.1	-19.2	-19.2	-16.5	-15.7	-14.8	-14.6	-13.9	-13.6	-13.1	-12.2	-12.9	-15.9	-17.1	-17.3	-17.0	-18.9	-19.0	-15.9	-12.2
25-Feb	-19.9	-19.5	-19.7	-20.3	-20.0	-20.4	-20.9	-21.0	-20.5	-17.7	-15.6	-12.1	-9.1	-7.8	-6.6	-6.2	-6.7	-6.9	-7.5	-7.9	-8.6	-9.6	-12.5	-14.8	-13.8	-6.2
26-Feb	-16.2	-17.0	-17.9	-18.4	-18.6	-18.9	-20.7	-21.9	-22.3	-20.0	-18.3	-17.1	-15.9	-15.0	-14.3	-14.4	-14.4	-14.3	-14.8	-15.8	-16.5	-17.5	-18.9	-19.9	-17.5	-14.3
27-Feb	-20.9	-21.9	-22.5	-22.2	-22.1	-22.7	-24.7	-26.4	-25.1	-23.4	-20.5	-18.6	-17.1	-15.8	-14.2	-14.0	-13.4	-15.2	-18.1	-18.7	-19.8	-18.7	-18.3	-17.9	-19.7	-13.4
28-Feb	-17.7	-17.5	-17.4	-17.6	-19.3	-20.6	-21.5	-21.4	-22.1	-22.2	-21.7	-20.8	-19.6	-18.8	-18.3	-18.2	-18.4	-19.1	-19.7	-20.5	-21.4	-21.9	-22.3	-23.0	-20.0	-17.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	155	23.07	23.07
-20 - 0	416	61.90	84.97
0 - 10	100	14.88	99.85
10 - 20	1	0.15	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

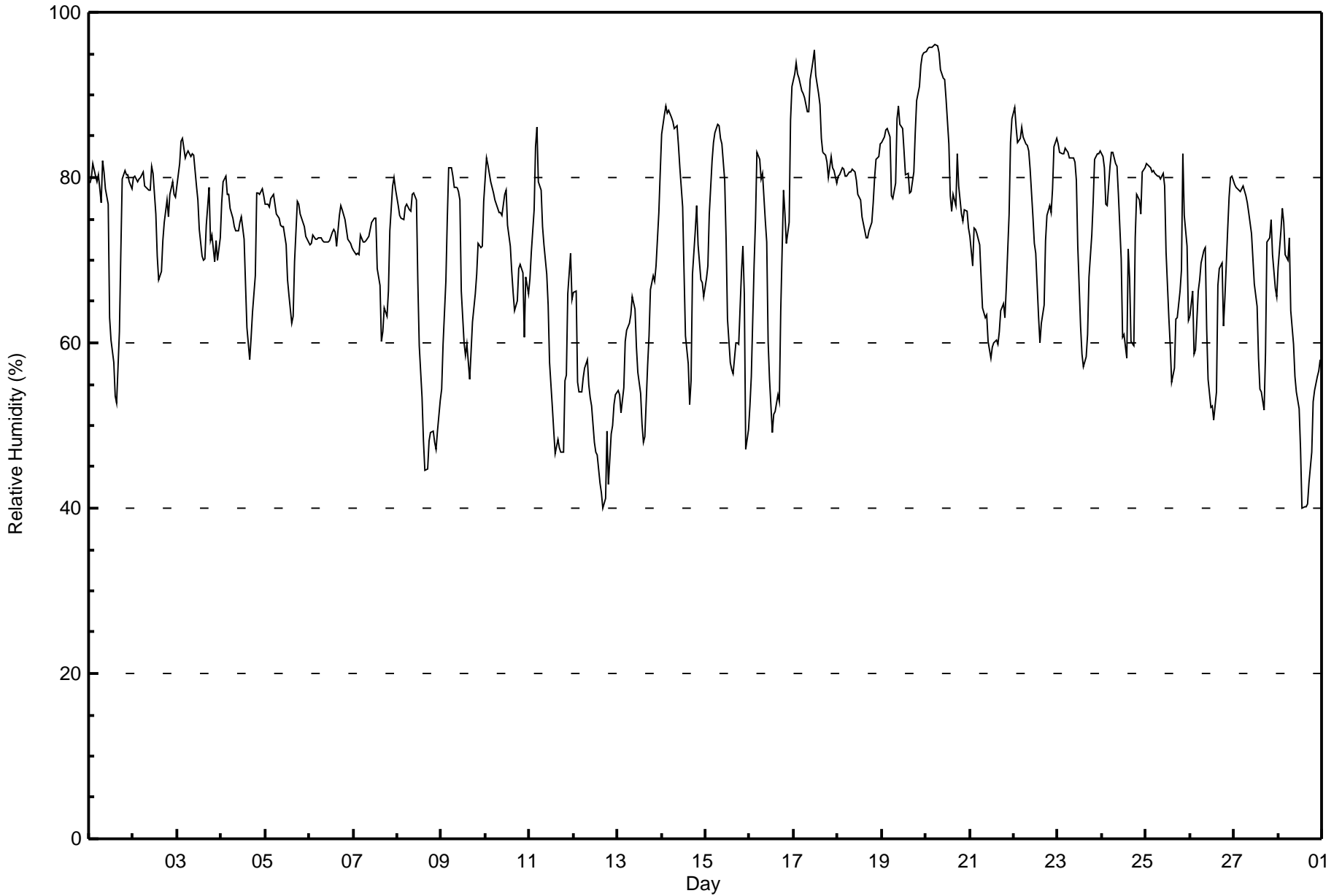
Lower Camp - February 2017

Maximum Value: 96 % on Feb 20 06:00																			Maximum Daily Average: 87.8 % on Feb 17						Hours in Service: 672	
Minimum Value: 40 % on Feb 12 17:00																			Minimum Daily Average: 51.3 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 78.8 % at hour 5																			Minimum Diurnal Average: 60.4 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 71.8 %																			Percentiles: P ₁ = 43 P ₁₀ = 54 Q ₁ = 64 Median = 74 Q ₃ = 80 P ₉₀ = 84 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-Feb	79	80	82	80	79	80	77	82	81	79	77	63	60	58	54	53	61	71	80	81	80	80	80	79	74.0	82
2-Feb	80	80	80	80	80	81	79	79	79	78	81	81	76	70	68	69	72	75	77	75	78	80	78	78	77.2	81
3-Feb	80	82	84	85	82	83	83	83	83	79	77	74	71	70	70	74	79	72	73	70	72	70	73	77.2	85	
4-Feb	77	80	80	78	78	76	75	74	74	74	75	72	67	62	58	61	64	68	78	78	78	79	78	73.2	80	
5-Feb	77	77	77	77	78	77	76	75	74	74	74	72	68	66	62	63	70	77	77	76	75	74	73	73	73.3	78
6-Feb	72	72	73	72	73	73	73	72	72	72	72	72	73	74	73	72	76	77	76	75	74	73	72	72	73.1	77
7-Feb	71	71	71	71	73	72	72	72	73	74	75	75	75	69	67	60	61	64	63	66	74	79	80	79	71.1	80
8-Feb	77	75	75	75	76	77	76	76	78	78	77	67	60	53	48	45	45	48	49	49	48	47	49	53	62.6	78
9-Feb	54	60	67	75	81	81	80	79	79	78	77	66	60	58	60	56	59	63	66	68	72	72	72	77	69.2	81
10-Feb	82	82	81	79	78	77	77	76	76	75	78	78	74	72	69	66	64	65	69	69	68	61	68	66	72.9	82
11-Feb	68	71	76	84	86	79	78	74	72	68	65	58	52	49	47	48	47	47	47	55	56	66	71	65	63.8	86
12-Feb	66	66	55	54	54	56	57	58	55	53	52	48	47	46	43	42	40	41	49	43	49	50	53	54	51.3	66
13-Feb	54	54	52	55	60	62	62	63	66	64	60	56	54	50	48	49	57	61	67	68	67	69	76	81	60.6	81
14-Feb	85	88	89	88	88	87	87	86	86	84	81	76	68	61	58	53	55	68	74	77	72	68	67	66	75.5	89
15-Feb	68	69	76	82	84	85	86	86	85	84	80	73	63	58	57	56	60	60	60	69	72	66	47	50	69.8	86
16-Feb	52	56	69	75	83	82	80	80	75	72	60	56	49	51	52	54	53	64	79	76	72	75	87	91	68.4	91
17-Feb	93	94	92	92	90	90	90	88	88	92	94	96	92	90	89	85	83	83	82	80	83	81	81	79	87.8	96
18-Feb	80	80	81	81	80	80	81	81	81	81	80	78	77	75	74	73	73	74	75	77	80	82	82	84	78.7	84
19-Feb	84	85	86	86	85	78	77	79	87	89	86	86	83	80	81	78	78	81	85	89	91	93	95	95	84.9	95
20-Feb	95	96	96	96	96	96	96	95	93	92	92	90	84	78	76	78	77	83	79	76	75	76	74	74	85.9	96
21-Feb	73	69	74	74	73	72	68	64	63	63	60	58	59	60	60	60	61	64	65	63	67	76	84	87	67.4	87
22-Feb	89	86	84	85	86	85	84	84	83	81	75	72	71	63	60	62	65	72	75	77	76	79	84	85	77.6	89
23-Feb	84	83	83	83	84	83	82	82	82	82	80	72	62	59	57	58	61	68	73	77	82	83	83	83	76.1	84
24-Feb	83	81	77	77	81	83	83	82	81	78	70	61	61	58	71	68	60	73	78	77	76	81	81	81	74.2	83
25-Feb	82	82	81	81	81	80	80	80	80	81	79	71	63	60	55	57	63	63	66	69	83	75	72	63	72.7	83
26-Feb	63	66	59	59	66	68	70	71	72	62	56	52	52	51	54	67	69	70	62	65	74	78	80	80	65.2	80
27-Feb	79	79	79	78	79	79	78	77	76	73	70	67	64	58	54	54	52	59	72	73	75	71	67	66	69.9	79
28-Feb	69	74	76	75	71	70	73	64	60	56	54	52	47	40	40	40	40	43	47	53	54	56	57	58	57.0	76
																			75.6 76.3 76.9 77.7 78.8 78.3 77.9 77.3 76.9 75.7 73.5 69.6 65.8 62.3 61.0 60.4 62.1 65.8 68.8 70.5 72.2 72.6 73.6 73.8						Diurnal Average	
																			95 96 96 96 96 96 96 95 93 92 94 96 92 90 89 85 83 83 85 89 91 93 95 95						Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - February 2017





Maximum Speed: 27 km/h on Feb 8 22:00	Maximum Daily Speed Average: 15.1 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 9 06:00	Minimum Daily Speed Average: 0.4 km/h on Feb 4	Hours of Data: 670
Maximum Diurnal Speed Average: 2.9 km/h at hour 22	Minimum Diurnal Speed Average: 1.0 km/h at hour 10	Hours of Missing Data: 2
Monthly Average Velocity: 1.2 km/h 266.7 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 24	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-Feb	WNW6	WNW5	NW7	NNW7	NW9	NW7	WNW7	NNW2	NNE1	AF	AF	SE4	SE5	SE6	SE9	SE9	SE8	SSE0	NNW1	NNW1	ESE2	ESE4	ESE7	SE10	ESE0.5	SE10
2-Feb	SE9	SE9	ESE8	SE10	SE10	SE11	SE7	SE7	SE6	SE5	SE8	SE10	SE7	SE7	SE8	SE7	SE5	NE1	NNW3	N4	NNW6	NNW6	NNW8	NW7	ESE4.4	SE11
3-Feb	WNW5	WNW5	WNW3	WNW3	NNW1	WNW2	W1	E1	NE1	N2	E0	ENE2	ESE3	ESE4	ESE7	SE10	ENE3	NW5	NW14	N12	NNE12	N10	NNW9	N8	N2.8	NW14
4-Feb	NNW6	WNW3	NW1	NNW2	WNW4	NW2	WNW3	N1	ESE2	NE0	W1	ESE2	E1	E3	SE9	SE8	SE7	SE8	ESE4	N1	NW4	NW6	NW4	NNW6	NE0.4	SE9
5-Feb	NNW8	NW7	NW7	NW6	WNW4	NW3	WNW4	NW2	NW3	WNW3	NW3	W4	WSW8	WSW10	SW7	SSW2	SE4	ESE2	N1	NNW1	NW2	NW1	NW2	NNW1	WNW2.8	WSW10
6-Feb	N1	NNE2	ESE4	SE4	SE4	SE12	SE11	SE10	SE12	SE12	SE10	SE8	SE9	SE3	SE3	WSW2	WNW3	NW2	NNW2	NNW2	WNW2	N1	N1	NE1	SE3.7	SE12
7-Feb	NNE1	NE1	NW1	SE3	SE9	SE13	SE14	SE13	SE16	SE13	SE12	SE12	SSW7	WSW14	WSW16	WSW18	WSW14	WSW17	WNW11	NW6	WNW3	WNW4	WNW2	NW2	SSW4.2	WSW18
8-Feb	NNW3	ENE1	E2	SE3	SE6	SE9	SE9	SE10	SE11	SE14	SE13	WSW10	WSW14	WSW12	WSW14	WSW14	SW13	SSW9	S6	SSW11	WSW19	WSW27	WSW23	WSW20	SW7.4	WSW27
9-Feb	W15	NW2	E1	SE3	SE2	W0	ESE3	NE0	ESE5	W0	SE7	SE10	SE7	ESE2	N5	NNW5	NW6	WNW4	NW4	WNW3	WNW3	NW4	NW4	NW4	WNW0.5	WSW15
10-Feb	NW4	NW3	WNW3	NW3	NW1	NW2	NW1	N1	NW2	NW2	WNW3	W5	W4	WNW3	N3	WNW2	NW4	NW3	WNW5	ESE19	SE14	S9	SE11	SE10	S0.6	ESE19
11-Feb	SE7	NW2	NW2	NW2	W3	WSW13	W13	WSW21	WSW19	WSW18	WSW14	W7	SSW4	SSW5	WSW9	WSW17	W17	W14	WSW15	W10	W9	ESE4	SE10	SE12	WSW7.9	WSW21
12-Feb	SE10	SSE3	WSW17	WSW19	WSW19	SW15	SW12	SW12	WSW21	WSW19	SW19	WSW22	W25	W22	WSW24	WSW16	S7	SW10	SW5	SW11	W20	W25	W22	W20	WSW15.1	W25
13-Feb	W21	W20	W21	WSW13	W19	W24	W23	W19	W16	W14	NNW11	NNW9	N7	WNW4	SE5	SE5	NW3	WNW5	WNW5	NW5	WNW5	WNW4	WNW3	WSW1	W9.1	W24
14-Feb	ESE1	N1	S0	ESE0	SE13	SE18	SE14	SE16	SE15	SE15	SE19	SE17	SE15	SE16	SE15	SE13	SE12	SE9	WSW5	SE4	S5	SE7	SE9	ESE7	SE11.1	SE19
15-Feb	SE10	SE13	SE15	SE16	SE13	SE13	SE17	SE17	SE16	SE18	SE15	SE11	SE12	SE9	WSW5	SE4	S5	SE7	SE9	ESE7	ESE10	S7	WSW17	SSW11	SE9.9	SE18
16-Feb	SSW11	S7	ENE5	E2	ESE1	SE8	ESE4	SE11	SE9	SE6	SSE2	WNW3	WSW3	WNW6	WSW5	W4	W4	W3	WNW1	WNW6	W5	W4	NNW2	NNW3	SSW1.5	SE11
17-Feb	NW2	WNW4	NW3	N1	WNW2	NW1	NW3	WNW4	WNW3	WNW7	W6	NW5	NW3	NW2	NNE7	N12	NNE11	N11	NNE8	NNE12	N10	NE11	NNE10	NNE10	N4.8	NNE12
18-Feb	NNE9	N10	NNE10	NNE9	N7	NNW5	NNW6	NNE5	N4	NNW3	NNW2	NW2	NW3	NNW4	NNE7	ENE8	ENE5	NNE3	NNE4	NNW3	N7	NNW7	NNW7	NW7	N5.0	N10
19-Feb	NW5	NW7	NW6	NW6	NNE3	ESE13	E9	E11	E8	E11	E9	ESE9	ESE14	ESE13	ESE7	ENE5	ENE7	NE7	NNW4	NW6	NW3	NNW4	NNW5	NW3	ENE4.1	ESE14
20-Feb	NNW5	NNW4	NNW4	NW3	NW4	NW4	NW3	WNW5	NW7	NW5	NNW5	N5	NW1	WNW7	WNW10	WNW5	WNW7	WNW16	WNW14	WNW9	NW10	WNW9	WSW12	WSW16	WNW6.4	WSW16
21-Feb	WSW18	W16	W7	SW8	W11	NW13	NW17	NNW16	W15	W15	NNW16	NNW14	W15	W17	W17	W14	W13	W12	WNW12	NW14	NNW10	NW5	NNW3	NNW2	W11.4	WSW18
22-Feb	NW2	NNW7	NW4	NW4	NNW2	N2	NNW2	NW3	NW3	WNW3	W4	WSW8	WSW11	W5	NNW8	N9	N10	N10	NNW7	N5	NNW5	NNW3	NNE1	NW2	NW4.0	WSW11
23-Feb	NNW2	NW3	NE1	N1	NW2	W1	NW2	WNW2	NNW3	NNW3	NNE0	ESE4	ESE5	ESE7	ESE7	NE5	NNE2	ESE3	NW0	NW2	W3	WNW5	NW5	NNW6	N0.9	ESE7
24-Feb	NNW7	N9	N14	NNW9	WNW4	NW4	NW3	NW3	WNW3	WNW5	N6	NNW11	N10	NNE3	ESE6	E5	SSE6	S3	E3	ESE2	WSW5	SSW2	SE8	SE8	N2.0	N14
25-Feb	SE9	SE15	SE12	SE14	SE16	SE14	SE16	SE14	SE17	SE13	SE15	SE13	SE7	NNE5	NNW6	N8	NNW9	WNW5	ESE1	ENE6	NE11	N24	N25	N19	E5.6	N25
26-Feb	N17	NNW13	NW15	NW13	NW10	NW9	WNW5	NW5	NW3	N8	NNW9	NNW7	SW6	WNW4	WNW4	NE4	NNE5	WSW2	NNE4	ENE4	N3	NW4	NW4	WNW3	NNW5.5	N17
27-Feb	WNW4	WNW3	W4	WNW4	NW5	NW5	NW3	WNW4	NW4	NNW4	W8	WSW11	WSW10	WSW7	W6	WSW7	W4	S2	NNE0	SE0	ESE3	SE8	ESE5	SE8	W2.5	WSW11
28-Feb	SE5	NNW1	NNW1	N14	N11	N11	NNW9	NNE17	N17	N18	N13	N9	NNW10	N12	NNE9	NNE10	NNE10	N9	N8	N8	N6	NNW4	NNW4	NW5	N8.6	N18

WNW2.2	WNW2.1	NW2.0	NNW1.3	WSW1.1	SSW1.4	SSW1.3	S1.3	S1.5	SSW1.0	S1.2	SW1.4	SW2.3	WSW2.2	WSW2.1	WSW1.3	W1.1	NNW2.1	NW2.6	NNW1.9	NW2.5	NNW2.9	NNW2.3	NNW1.7	Diurnal Average
W21	W20	W21	WSW19	WSW19	W24	W23	WSW21	WSW21	WSW19	SE19	WSW22	W25	W22	WSW24	WSW18	W17	WSW17	WSW15	ESE19	W20	WSW27	N25	W20	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

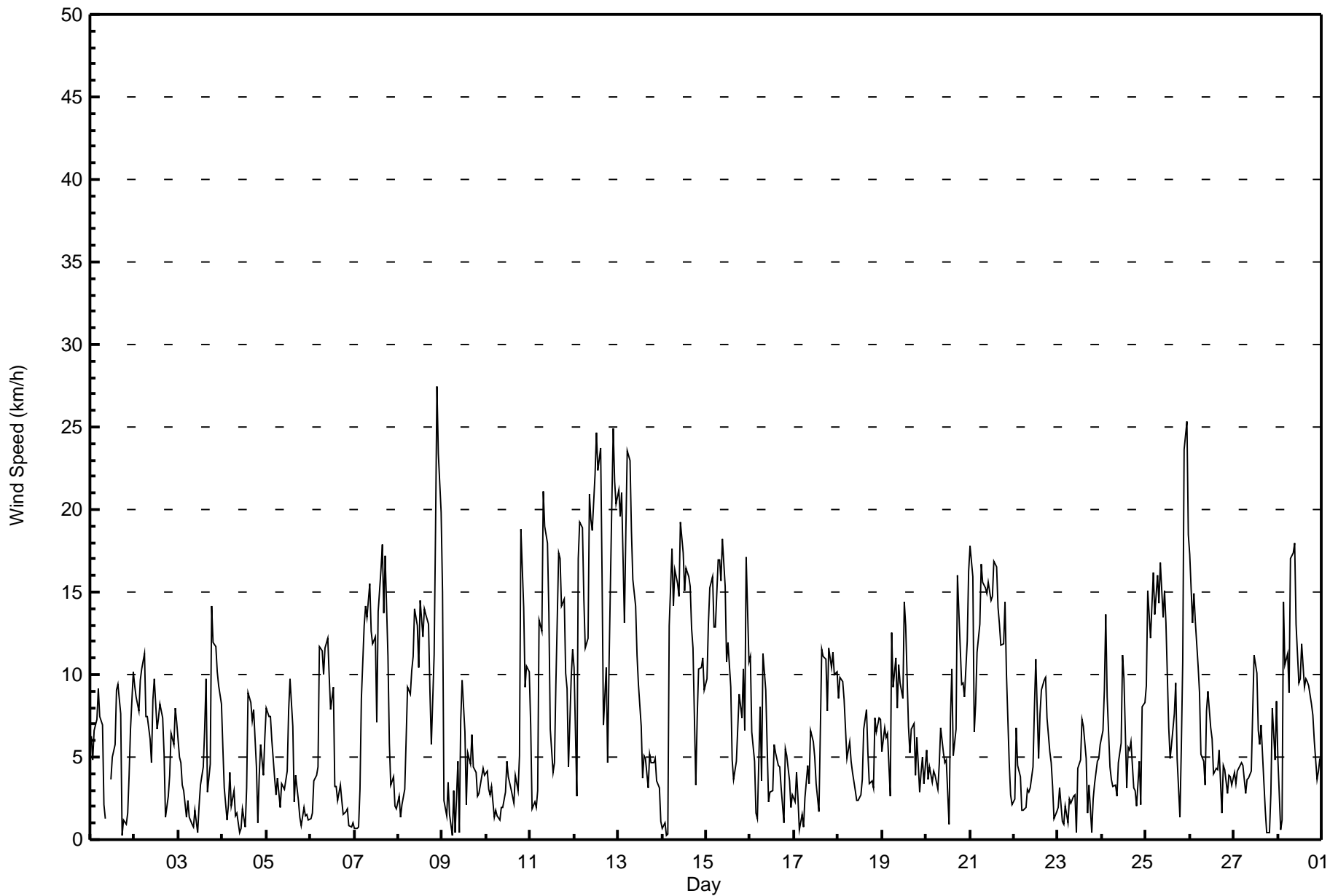
Wind Speed (WS) - km/h
Lower Camp - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 12 16:00 Minimum Value: 1 km/h on Feb 22 10:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	1	1	2	2	1	3	2	2	1	AF	AF	3	1	1	1	1	2	1	1	1	2	2	3	2	3
2-Feb	2	2	2	1	1	1	2	2	2	2	1	2	3	3	1	1	2	1	2	1	2	1	2	2	3
3-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	2	2	2	5	3	2	3	2	2	5
4-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	1	2	2	1	1	2
5-Feb	2	2	2	1	1	2	1	1	1	1	1	2	2	1	3	1	1	1	1	1	1	1	1	1	3
6-Feb	1	1	2	2	3	2	2	2	2	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	3
7-Feb	1	1	1	3	2	2	2	2	2	2	1	3	3	3	3	3	3	4	3	2	1	1	1	2	4
8-Feb	1	1	1	1	2	2	2	2	4	2	3	5	3	3	3	4	4	4	2	4	4	5	5	3	5
9-Feb	4	3	1	1	1	1	1	1	2	1	4	2	2	1	1	1	1	2	1	1	1	1	1	1	4
10-Feb	1	2	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	2	2	6	7	3	2	2	7
11-Feb	3	2	1	1	1	4	5	4	4	4	3	2	2	3	2	4	3	3	4	2	4	1	4	3	5
12-Feb	3	3	6	4	4	3	3	4	4	4	4	4	5	5	5	7	2	5	4	4	4	5	4	4	7
13-Feb	4	4	5	3	4	4	4	4	3	5	2	3	2	2	3	3	2	2	1	1	1	1	1	1	5
14-Feb	1	1	1	2	3	2	3	3	2	3	3	3	3	3	3	2	2	2	2	3	2	1	1	2	3
15-Feb	2	2	2	3	3	2	2	2	2	2	2	3	2	4	2	1	3	4	3	3	2	4	5	3	5
16-Feb	3	3	2	1	1	3	3	2	2	1	2	1	2	1	1	2	1	2	3	2	1	2	2	1	3
17-Feb	1	2	2	1	2	1	1	2	1	1	2	1	1	1	4	3	2	3	3	3	2	2	2	2	4
18-Feb	2	2	2	1	2	2	2	1	1	1	1	1	1	1	2	2	3	1	1	2	2	2	2	1	3
19-Feb	1	2	3	2	3	2	2	3	2	3	3	3	4	5	2	2	1	1	2	2	2	2	2	1	5
20-Feb	1	1	2	1	1	1	1	1	2	2	1	1	1	3	2	1	2	4	3	2	2	4	4	3	4
21-Feb	4	6	2	2	3	3	4	4	3	4	4	3	3	3	3	3	3	2	2	2	2	2	1	1	6
22-Feb	2	2	1	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	2
23-Feb	1	1	1	2	1	1	1	1	1	1	1	2	3	2	2	2	1	1	1	1	1	1	2	2	3
24-Feb	2	2	3	3	1	1	1	2	1	1	2	2	2	2	1	2	2	1	1	2	4	4	2	4	4
25-Feb	2	2	4	2	2	2	2	3	2	2	2	1	3	2	2	5	2	1	2	3	3	7	6	4	7
26-Feb	5	3	4	3	2	2	1	1	1	3	3	3	3	2	1	2	2	1	3	1	2	1	1	1	5
27-Feb	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1	1	1	1	3	3	2	3
28-Feb	2	1	2	6	4	4	2	3	4	3	3	3	2	4	3	3	2	2	1	2	1	1	2	1	6
5 6 6 6 4 4 5 4 4 5 4 5 5 5 5 7 4 5 5 6 7 7 6 4																								Diurnal Maximum	
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	312	46.57	46.57
6 - 11	210	31.34	77.91
12 - 19	128	19.10	97.02
20 - 28	20	2.99	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - February 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	15	9	7	9	25	18	3	4	4	1	8	17	55	77	43	312
6 - 11	23	12	2	4	5	10	62	2	5	5	5	11	7	11	19	27	210
12 - 19	10	3	0	0	0	4	50	0	0	0	5	27	16	6	6	1	128
20 - 28	2	0	0	0	0	0	0	0	0	0	0	7	11	0	0	0	20
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	52	30	11	11	14	39	130	5	9	9	11	53	51	72	102	71	670

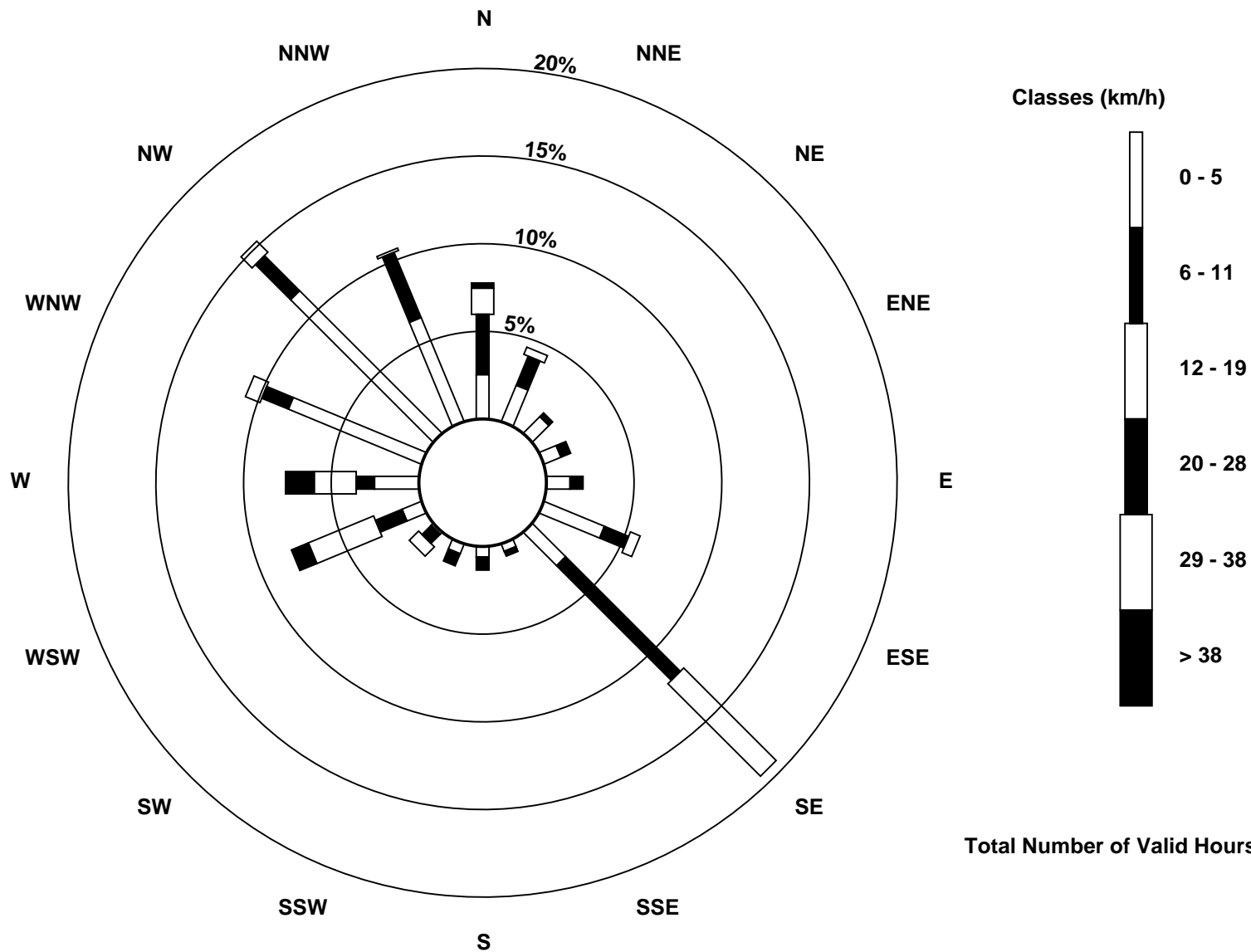
Total Number of Valid Hours: 670

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Lower Camp (AMS 11)



Total Number of Valid Hours: 670



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - February 2017

Direction of Maximum Speed: 250 deg on Feb 8 22:00 Direction of Maximum Daily Speed Average: 244.2 deg on Feb 12	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Percent Operational Time: 99.7
Direction of Minimum Speed: 269 deg on Feb 9 06:00 Direction of Minimum Daily Speed Average: 0.4 deg on Feb 4	
Monthly Average Direction: 303.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	301	296	309	338	316	314	302	344	14	AF	AF	133	133	137	138	137	133	148	339	343	123	114	123	133	117.4
2-Feb	135	129	123	127	129	137	124	126	125	128	133	130	136	139	135	138	132	41	344	349	341	328	329	325	123.3
3-Feb	299	287	295	288	347	300	271	81	48	4	86	66	109	104	119	130	63	307	321	360	13	5	347	349	356.7
4-Feb	330	295	312	336	300	315	306	8	110	44	278	122	85	94	124	132	137	139	117	349	306	325	309	335	49.0
5-Feb	333	316	319	319	298	321	294	325	310	299	306	279	254	249	232	198	135	102	2	338	308	321	320	341	294.2
6-Feb	356	18	118	132	133	137	136	138	137	136	136	141	134	139	141	255	283	304	348	342	301	353	6	55	135.4
7-Feb	21	49	321	126	142	143	142	139	138	138	138	139	206	250	253	249	249	257	299	308	294	294	294	326	199.6
8-Feb	348	77	91	132	139	142	138	137	141	140	138	256	255	255	253	240	223	210	188	212	243	250	254	255	219.7
9-Feb	259	324	100	141	128	269	123	54	118	280	131	135	129	111	4	332	309	296	305	298	289	312	317	322	285.9
10-Feb	308	312	299	319	324	318	314	355	321	319	296	275	269	298	354	285	316	323	298	122	137	170	135	141	179.3
11-Feb	137	321	309	310	273	252	260	255	258	258	254	260	195	193	247	257	260	261	255	278	273	123	133	139	249.4
12-Feb	135	159	237	238	240	230	226	220	242	239	236	247	259	260	256	247	170	226	225	227	263	266	265	266	244.2
13-Feb	261	264	270	256	267	264	268	277	267	278	342	340	357	297	134	136	317	301	292	304	292	284	299	249	276.5
14-Feb	116	7	191	114	133	137	135	136	126	126	134	134	137	139	138	140	139	134	105	133	132	144	143	149	135.3
15-Feb	140	141	139	138	137	134	140	137	135	132	130	133	139	136	255	141	172	137	140	112	119	181	244	198	144.0
16-Feb	204	171	62	90	112	137	113	133	139	127	148	289	245	283	258	272	262	273	298	293	279	280	332	333	200.6
17-Feb	317	302	315	353	301	308	305	285	300	284	277	312	313	312	20	0	13	8	23	24	5	34	26	30	356.6
18-Feb	15	9	17	26	7	333	341	33	351	340	333	309	326	334	22	59	58	28	17	337	349	339	340	324	3.1
19-Feb	310	323	325	314	24	106	91	86	80	89	86	106	106	104	109	67	65	56	347	318	314	336	340	314	66.9
20-Feb	327	328	334	317	316	312	308	283	313	324	341	4	305	287	295	300	299	295	292	288	307	287	250	249	296.0
21-Feb	251	263	259	229	265	315	309	292	274	277	295	289	264	264	264	269	266	276	292	317	329	319	340	341	280.8
22-Feb	309	328	321	313	328	353	338	312	305	302	265	253	256	278	334	350	349	5	348	351	348	334	33	320	322.3
23-Feb	348	308	50	5	308	278	311	303	329	332	19	109	107	112	121	51	33	110	321	309	281	291	319	336	7.6
24-Feb	334	349	357	336	298	307	309	317	296	292	2	337	5	21	123	91	164	176	91	118	250	211	141	140	350.9
25-Feb	134	137	141	135	131	133	135	134	131	135	133	135	133	16	331	349	348	307	114	59	37	1	8	358	96.5
26-Feb	352	341	325	316	315	314	283	304	318	359	336	339	227	285	285	43	17	238	26	62	4	305	316	299	329.1
27-Feb	303	295	279	302	326	306	323	292	306	337	259	246	252	252	267	258	259	182	15	127	119	137	105	129	264.3
28-Feb	141	337	344	359	353	358	339	12	8	9	356	349	343	356	25	20	26	5	5	357	4	330	344	316	1.7
	281.5	301.3	304.8	295.1	250.8	195.6	205.8	175.2	182.9	191.6	169.1	214.7	215.2	239.4	240.9	247.1	272.5	281.8	313.4	331.6	310.7	299.0	300.6	283.8	
	Diurnal Average																								

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Lower Camp - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Feb 14 04:00	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 4 deg on Feb 1 15:00	
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 13 Median = 20 Q ₃ = 37 P ₉₀ = 58 P ₉₉ = 92	

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-Feb	17	15	15	17	15	15	19	58	70	AF	AF	14	6	5	4	6	10	92	22	69	66	21	16	10	92
2-Feb	16	13	8	9	7	7	11	10	11	21	10	7	13	15	8	9	15	34	51	36	23	20	16	15	51
3-Feb	19	12	22	31	52	39	54	42	84	77	66	26	34	32	13	9	66	19	20	17	21	23	17	19	84
4-Feb	22	28	56	50	34	44	20	24	43	92	62	72	83	39	11	13	10	12	48	90	56	19	21	15	92
5-Feb	15	12	11	9	21	51	31	27	28	37	22	38	13	11	20	37	13	38	47	40	54	49	39	64	64
6-Feb	29	53	45	43	62	9	8	8	7	7	8	11	9	44	34	51	17	37	42	31	40	72	65	41	72
7-Feb	66	64	44	43	12	8	8	7	6	8	6	11	54	13	13	11	12	15	28	29	32	27	46	40	66
8-Feb	43	70	68	51	24	9	12	9	12	8	9	46	13	14	14	18	17	23	25	23	14	10	11	11	70
9-Feb	14	81	87	22	54	95	23	72	28	83	32	9	14	43	15	22	19	14	33	37	27	24	16	16	95
10-Feb	26	33	33	32	31	29	41	46	55	43	25	16	37	41	34	51	28	46	35	17	33	29	11	8	55
11-Feb	14	85	67	61	51	14	12	10	11	11	10	24	46	50	26	11	12	13	14	22	35	42	12	13	85
12-Feb	11	90	16	13	11	12	14	18	14	12	12	12	13	12	25	23	33	59	25	12	11	12	11	11	90
13-Feb	12	12	11	13	11	11	11	14	13	16	25	34	20	32	49	37	59	26	22	29	25	31	32	73	73
14-Feb	83	53	92	105	8	5	7	7	9	11	8	8	12	8	8	8	7	6	54	9	8	8	7	11	105
15-Feb	11	9	6	6	10	7	8	6	9	6	6	11	7	23	24	33	57	48	24	20	12	43	18	24	57
16-Feb	21	48	38	88	76	20	73	11	8	16	82	31	69	31	16	19	10	45	94	28	21	35	28	30	94
17-Feb	42	31	69	90	57	86	46	42	30	10	22	15	25	43	41	17	16	15	16	17	16	14	16	17	90
18-Feb	21	19	15	18	27	22	19	25	32	42	64	53	36	30	20	15	50	37	43	54	18	26	20	15	64
19-Feb	29	18	20	21	71	12	15	16	18	12	16	20	14	14	27	27	19	11	55	20	36	26	29	27	71
20-Feb	14	19	22	31	24	24	17	13	18	16	23	13	72	46	17	15	18	11	11	10	16	23	13	11	72
21-Feb	12	11	17	20	25	12	13	13	11	14	17	17	13	12	11	12	14	13	16	11	13	32	55	52	55
22-Feb	38	20	37	23	35	49	33	15	36	15	17	12	18	44	25	20	18	13	16	26	28	36	54	65	65
23-Feb	33	31	82	93	36	82	40	27	31	17	77	20	37	22	20	30	51	18	87	45	23	18	21	20	93
24-Feb	20	18	14	18	17	24	31	38	26	18	24	22	13	58	13	32	41	54	33	81	80	85	12	14	85
25-Feb	12	6	12	8	7	9	7	10	6	7	6	7	22	38	27	52	26	36	84	58	21	18	17	17	84
26-Feb	20	19	12	11	10	11	13	21	35	14	26	44	58	32	38	37	17	68	66	26	24	19	27	26	68
27-Feb	28	44	16	28	21	18	31	23	25	19	20	8	12	13	13	12	51	49	91	99	27	17	38	19	99
28-Feb	19	88	84	22	25	20	18	18	15	15	17	29	24	23	27	20	28	12	13	17	14	40	34	12	88
	83	90	92	105	76	95	73	72	84	92	82	72	83	58	49	52	66	92	94	99	80	85	65	73	

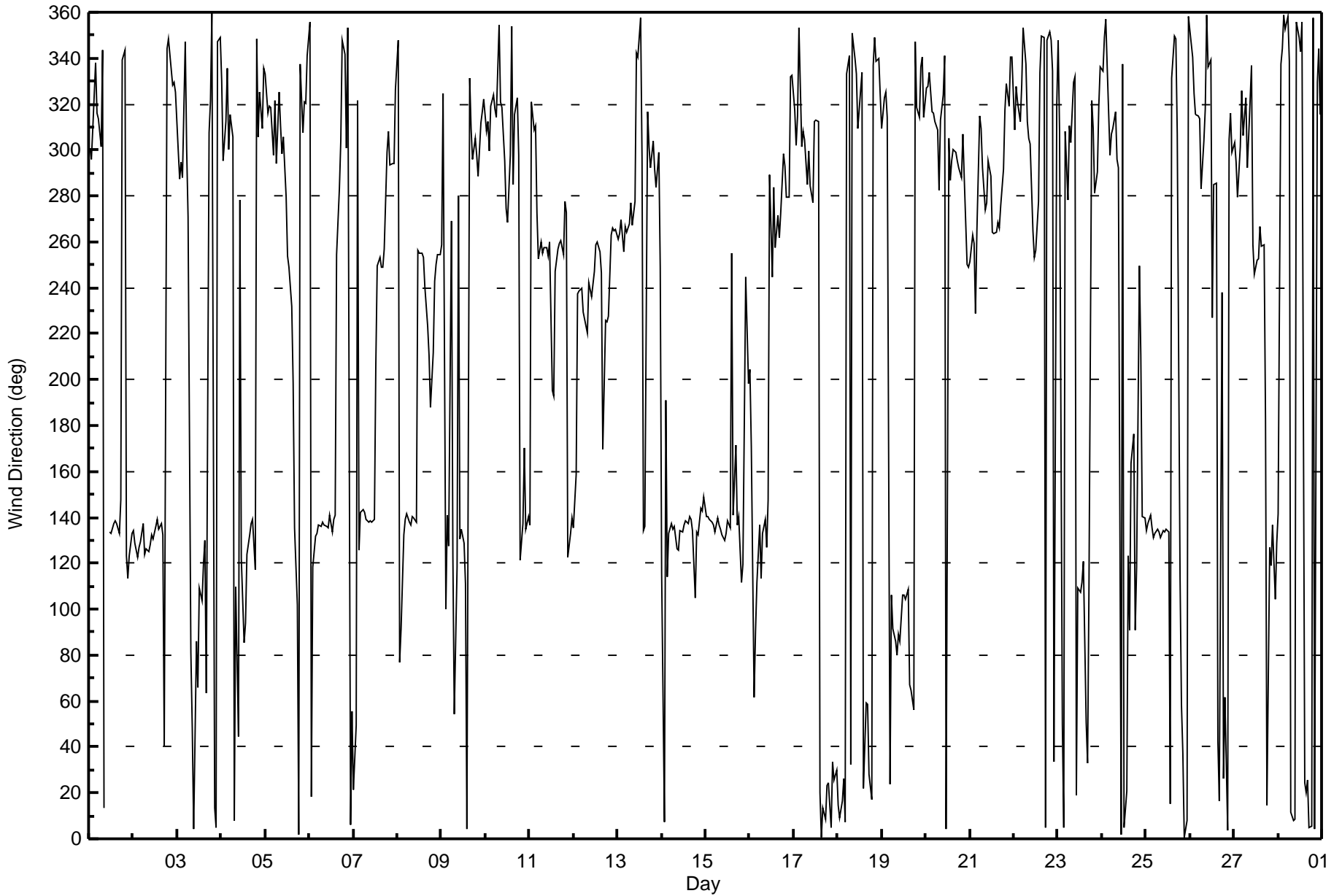
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - February 2017





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 13, 2017	Last Calibration	January 9, 2017
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	11:52	End Time (MST)	14:43
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	805	804
Calculated slope	1.001456	0.999602	Chamber temp	45.1	45.0
Calculated intercept	0.011958	1.034929	Pressure	711.7	719.0
Analyzer Background	11.9	11.8	Flow	0.599	0.569
Analyzer Coefficient	1.044	1.038	Intensity	91	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	-0.1	----
as found span	5000	83.8	829.6	834.4	0.994
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.8	829.6	829.3	1.000
second point	5000	42.4	419.8	418.7	1.003
third point	5000	21.2	209.9	207.8	1.010
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	83.8	829.6	831.2	0.998
Average Correction Factor					1.004

Corrected As found 834.5 Previous response 828.4 % change -0.7%

Notes:

As founds were done through RTMC calibrator screen. Calibration line connected after as founds. Changed inlet filter after as founds. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



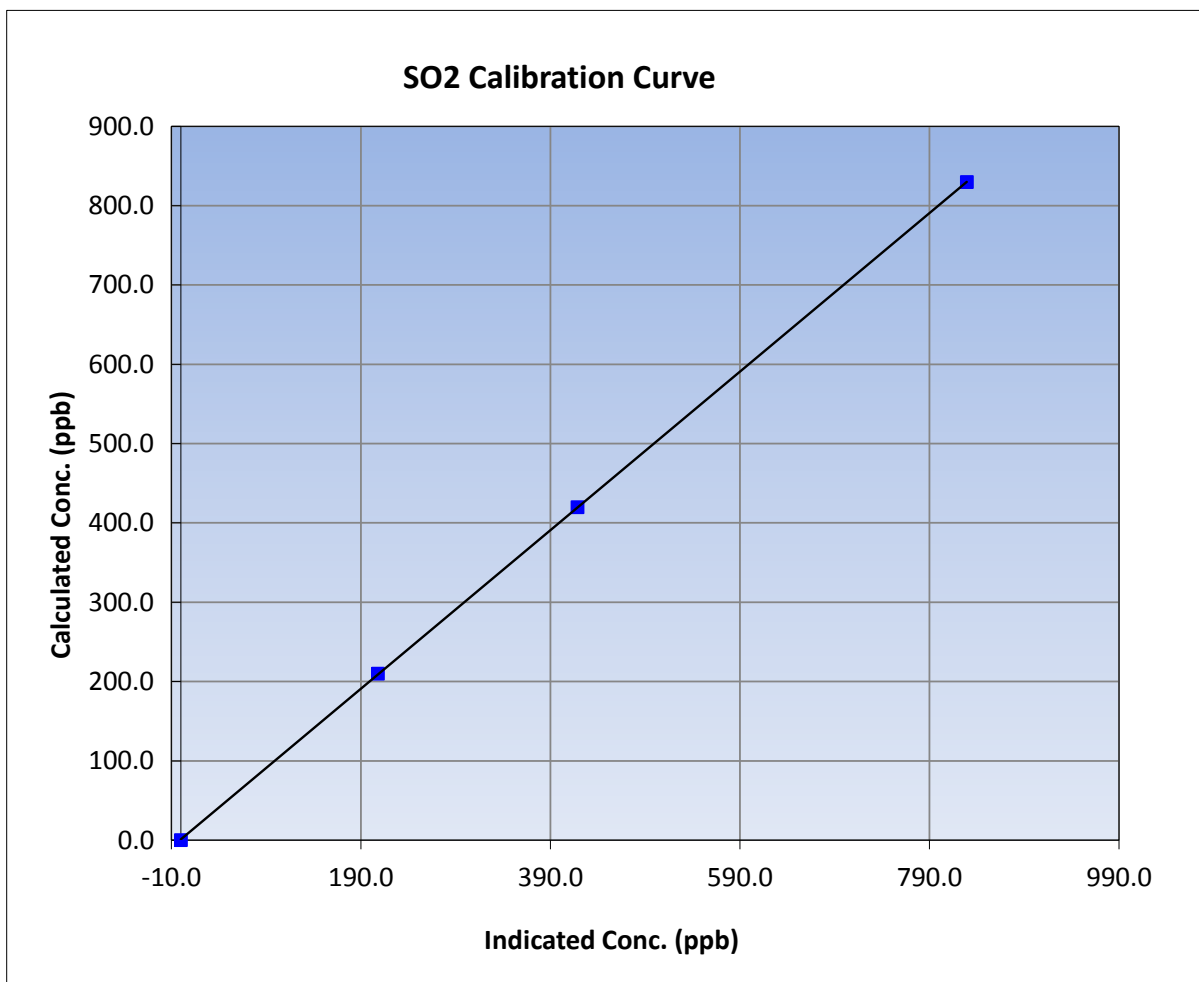
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 13, 2017	Previous Calibration	January 9, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:52	End Time (MST)	16:19
Analyzer make	TEI 43i	Analyzer serial #	100841398

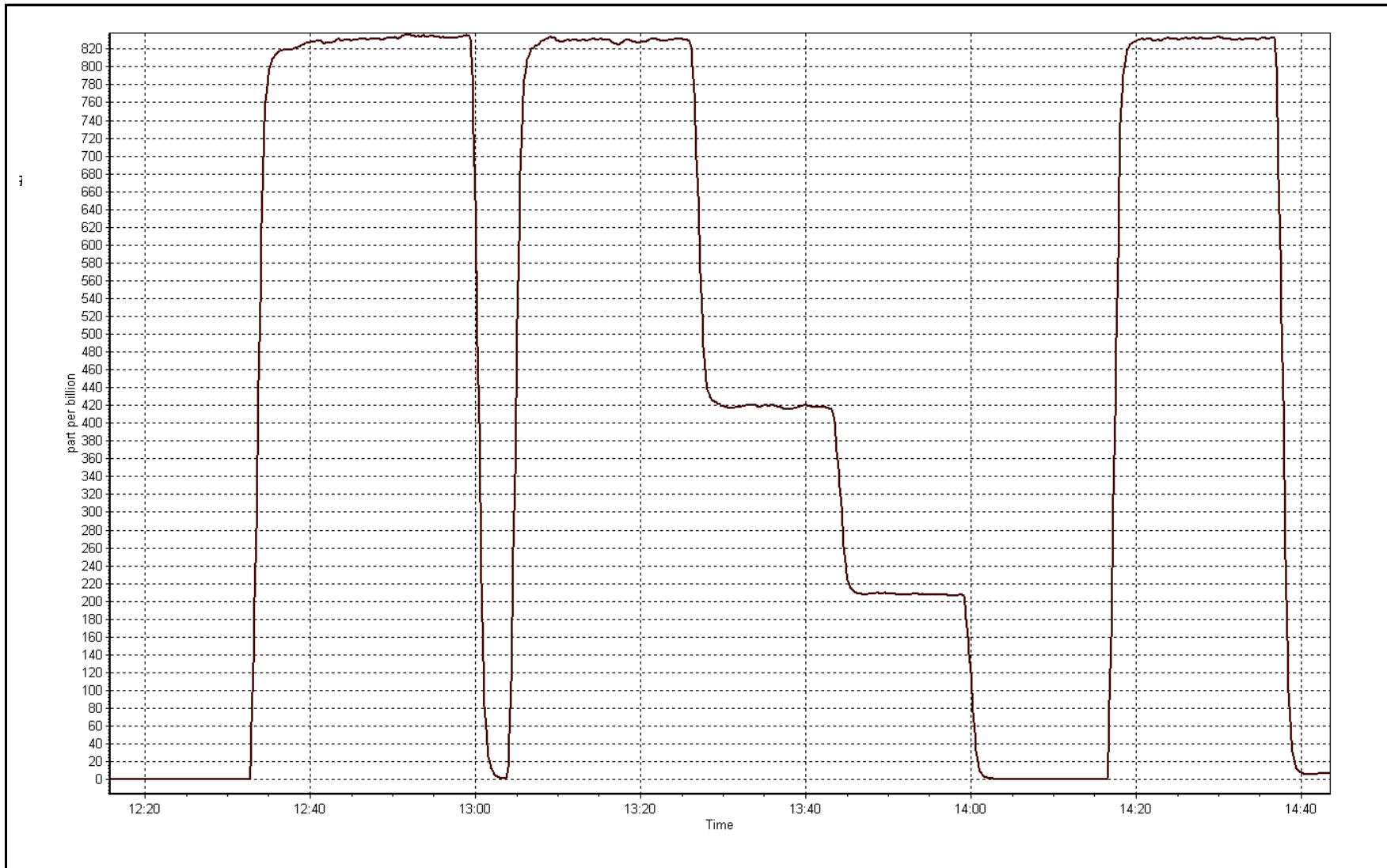
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999994
829.6	829.3	1.0004		
419.8	418.7	1.0026	Slope	0.999602
209.9	207.8	1.0100		
			Intercept	1.034929



SO2 Calibration Plot

Date: February 13, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 9, 2017
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:06	End Time (MST)	13:35
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	-672	-672
Analyzer IP address	192.168.1.42		Lamp voltage	800	799
Calculated slope	1.001115	0.997129	Chamber temp	45	45
Calculated intercept	-0.227832	0.022055	Pressure	479.7	461.0
Analyzer Background	13	13.3	Flow	0.887	0.855
Analyzer Coefficient	1.271	1.271	Intensity	90	91
			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	-0.1	----
as found span	5000	72.8	75.0	75.0	0.999
SO2 scrubber check	5000	21.2	209.9	1.7	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	72.8	75.0	75.0	0.999
second point	5000	38.8	40.0	40.3	0.991
third point	5000	19.4	20.0	20.0	0.999
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	72.8	75.0	75.6	0.991
Average Correction Factor					0.996

Corrected As found	75.2	Previous response	75.1	% change	-0.1%
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Notes:

Previous filter had a small tear, changed inlet filter and scrubber check done after as founds. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



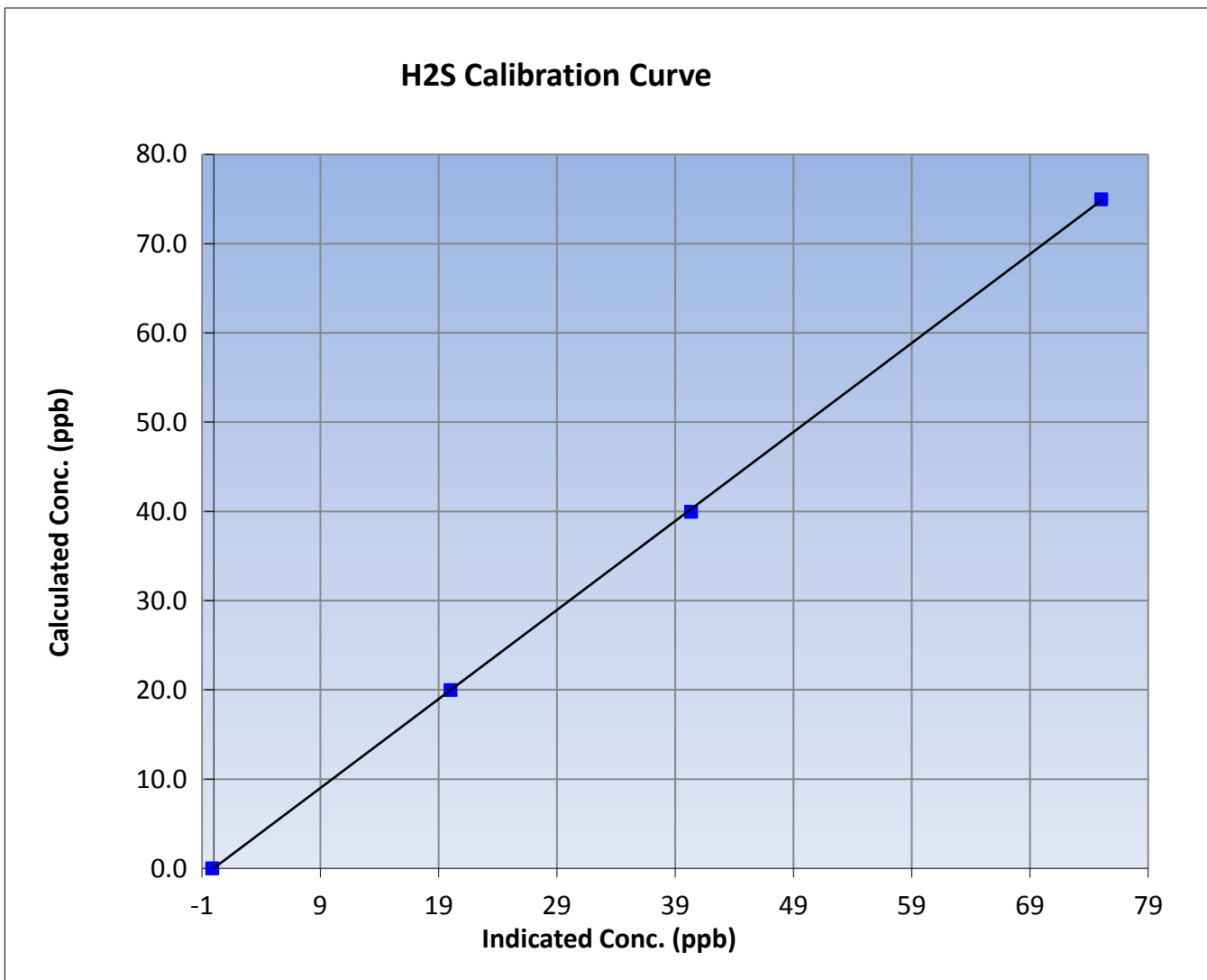
Wood Buffalo Environmental Association H2S Calibration Report

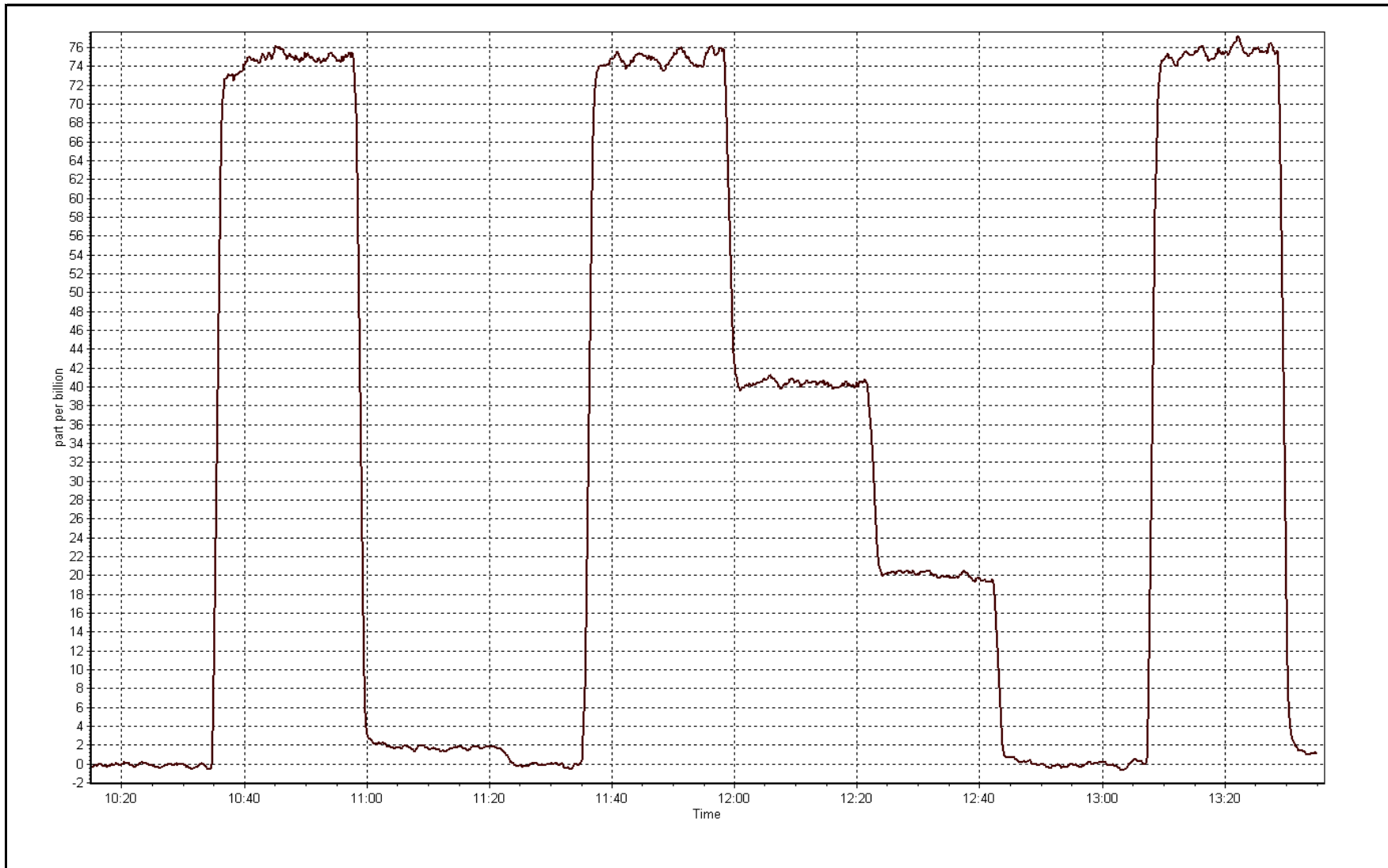
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 9, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:06	End Time (MST)	13:35
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	0.999962
75.0	75.0	0.9994		
40.0	40.3	0.9907	Slope	0.997129
20.0	20.0	0.9991		
			Intercept	0.022055







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 11, 2017	Last Calibration	January 9, 2017
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Other: <input type="checkbox"/>	Repair	
Start Time (MST)	11:45	End Time (MST)	15:12
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	1.000135	1.004288	Fuel Pressure	25.1	25.1
Calculated intercept	0.045878	-0.098830	Analyzer Coeff	4.490	4.565
			Analyzer BKG	3.29	3.18

Analyzer make	51i-LT	Analyzer serial #	1218153353
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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	-0.06	----
as found span	5000	83.8	17.48	15.07	1.160
calibrator zero	5000	0.0	0.00	0.09	----
high point	5000	83.8	17.48	17.50	0.999
second point	5000	42.4	8.84	8.91	0.993
third point	5000	21.2	4.42	4.51	0.981
as left zero					
as left span					
Average Correction Factor					0.991

Corrected As found	15.13	Previous response	17.43	% change	15.2%
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Notes:

Routine daily span was 12.4% low from today. Conducted 3-point cal to verify the linearity prior to doing any repairs; appeared to be linear. Suspected sample pump to be main issue that caused low span response. Pump replaced after as found zero and three point check. Sample inlet filter and hydrogen cylinder also replaced after doing the repairs. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

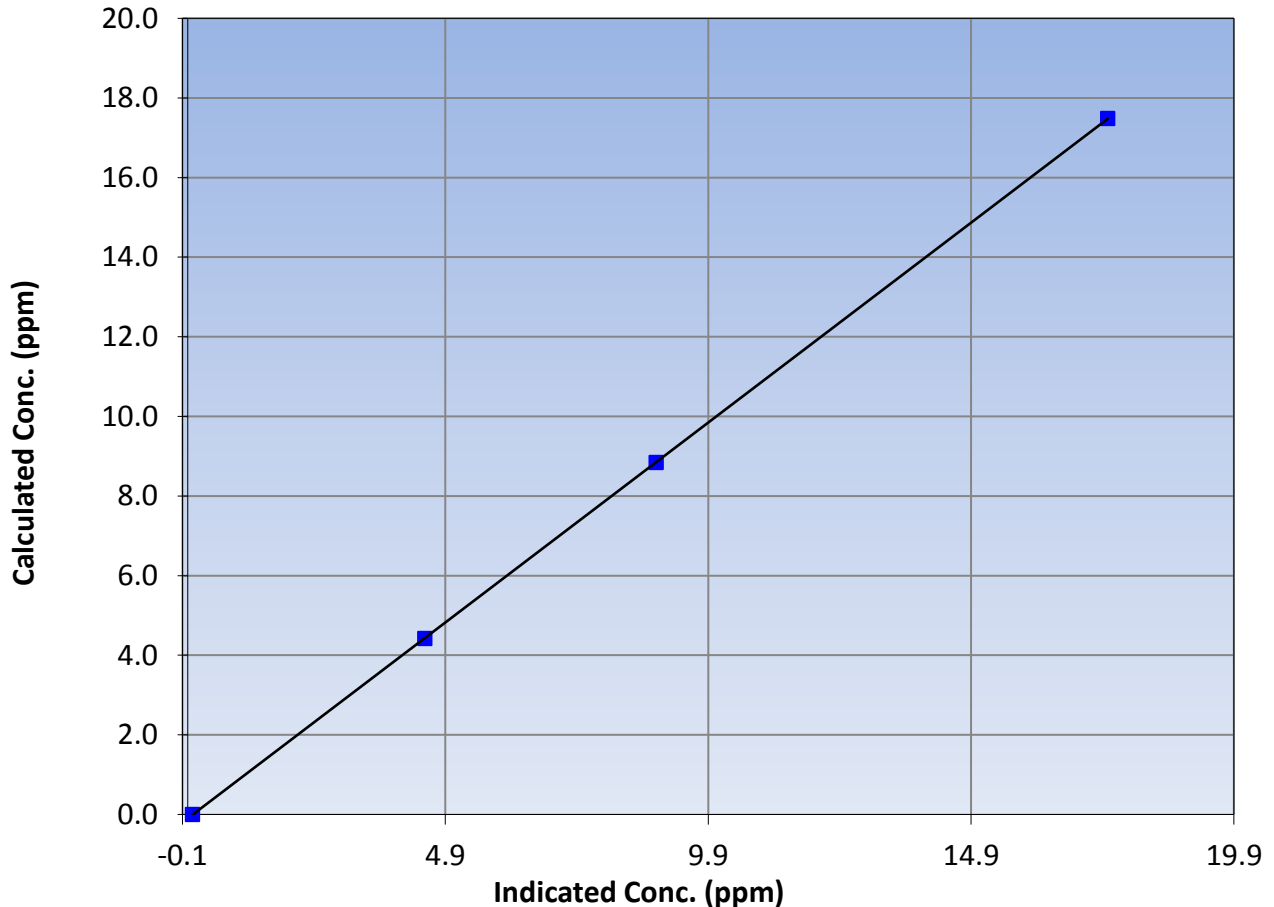
Station Information

Calibration Date	February 11, 2017	Previous Calibration	January 9, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:45	End Time (MST)	15:12
Analyzer make	51i-LT	Analyzer serial #	1218153353

Calibration Data

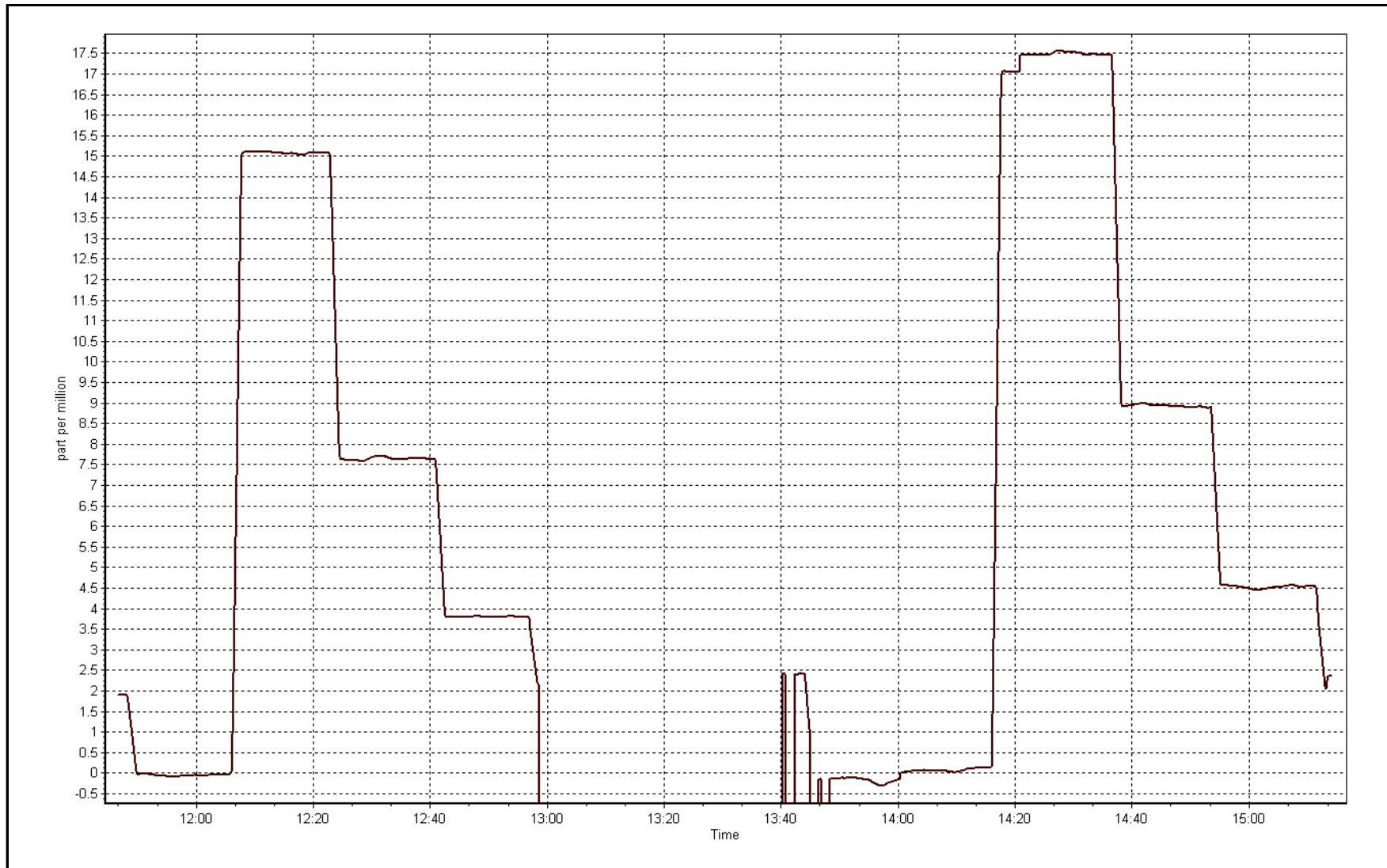
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.09	----	Correlation Coefficient	0.999999
17.48	17.50	0.9989		
8.84	8.91	0.9927	Slope	1.004288
4.42	4.51	0.9806		
			Intercept	-0.098830

THC Calibration Curve



THC Calibration Plot

Date: February 11, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 13
FORT MCKAY SOUTH
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 FEBRUARY 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	639	33	33	100	66	0	9	0
TRS(ppb) Average	641	31	31	100	4	0	1	0
THC(ppm) Average	639	33	33	100	7.5	-	3.4	-
O3(ppb) Average	641	31	31	100	46	0	40	-
NO2(ppb) Average	639	33	33	100	40	0	22	-
NO(ppb) Average	639	33	33	100	105	-	16	-
NOX(ppb) Average	639	33	33	100	142	-	37	-
PM2.5(ug/m3) Average	666	1	6	99.26	24	-	8.9	0
ET(C) Average	672	0	0	100	10.4	-	4.5	-
RH(%) Average	672	0	0	100	96	-	91	-
WS(km/h) Average	672	0	0	100	25	-	12	-
WD(deg) Average	672	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 FEBRUARY 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	639	1.2	4	-	0	0	0	0	1	2	66
TRS(ppb) Average	641	0.4	0	-	0	0	0	0	0	1	4
THC(ppm) Average	639	2.43	0.4	-	2.1	2.2	2.2	2.3	2.5	2.8	7.5
O3(ppb) Average	641	20.6	12	-	0	4	11	21	30	36	46
NO2(ppb) Average	639	11.5	9	-	0	1	4	10	18	25	40
NO(ppb) Average	639	4.4	9	-	0	0	0	0	5	15	105
NOX(ppb) Average	639	15.9	16	-	0	1	4	11	22	37	142
PM2.5(ug/m3) Average	666	4.17	3.3	-	0.3	1.2	2.2	3.2	5.1	8.5	24
Temperature 2 m (C) Average	672	-12.07	10.7	-	-35.4	-24.9	-20.5	-12.9	-2.6	2.5	10.4
Relative Humidity (%) Average	672	72.3	12	-	37	54	63	74	81	86	96
Wind Speed 10 m (km/h) Average	672	5.8	4	-	0	2	3	5	8	10	25
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	08 Feb 2017 15:00	08 Feb 2017 16:00	2	Unstable operation - baseline drift
PM2.5	12 Feb 2017 14:00	12 Feb 2017 16:00	3	Unstable operation - baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

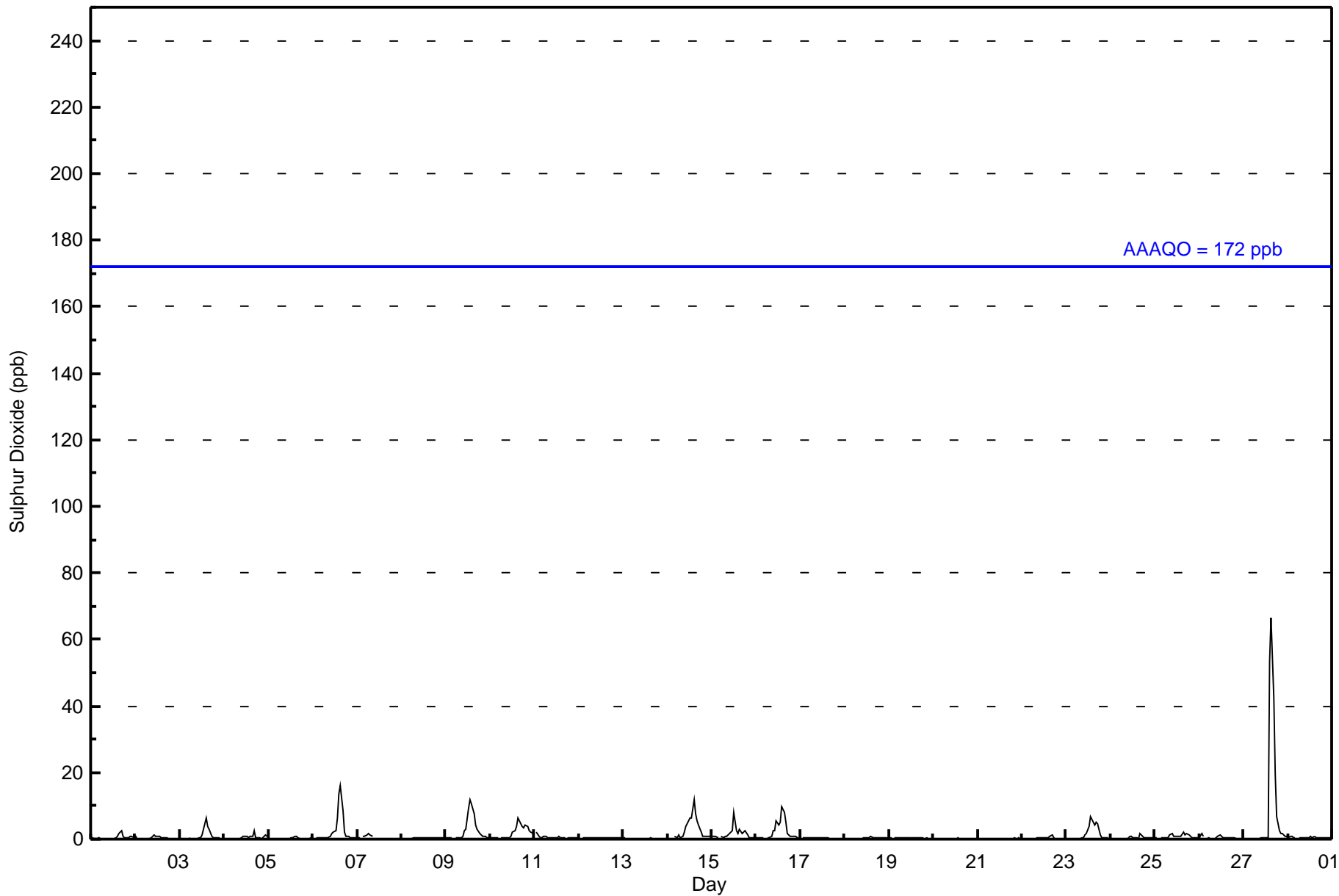
Fort McKay South - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 66 ppb on Feb 27 16:00 Maximum Daily Average: 8.7 ppb on Feb 27														Hours in Service: 672 Hours of Data: 639 Hours of Missing Data: 33 Hours of Calibration: 33 Percent Operational Time: 100.0												
Minimum Value: 0 ppb on Feb 7 20:00 Minimum Daily Average: 0.1 ppb on Feb 13 Maximum Diurnal Average: 4.8 ppb at hour 16 Minimum Diurnal Average: 0.3 ppb at hour 4 Monthly Average: 1.2 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 11																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	3	1	0	0	1	1	1	1	0.5	3
2-Feb	1	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	
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	1	5	6	4	3	1	0	0	0	0	0	1.0	6	
4-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	1	1	3	1	0	0	0	1	1	0.5	3	
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.2	1	
6-Feb	0	Z	1	0	0	0	0	1	1	1	2	2	3	6	14	16	9	2	1	1	1	1	1	2.7	16	
7-Feb	0	0	Z	1	1	1	2	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.4	2	
8-Feb	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	
9-Feb	0	0	0	0	Z	0	0	0	0	1	2	3	9	12	11	8	4	3	2	1	1	1	1	2.7	12	
10-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	2	3	4	6	5	4	3	4	4	3	2	2.0	6	
11-Feb	Z	2	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	2	
12-Feb	0	Z	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
13-Feb	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-Feb	0	0	0	Z	1	1	1	1	1	2	4	6	6	6	12	7	6	4	2	1	1	1	1	2.8	12	
15-Feb	1	1	1	1	Z	1	1	1	1	1	2	2	8	3	1	3	2	2	3	1	1	0	0	1.6	8	
16-Feb	0	0	0	0	0	Z	0	1	1	3	3	5	4	5	10	8	5	2	1	1	1	1	0	2.3	10	
17-Feb	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	
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0.3	1	
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-Feb	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	
23-Feb	Z	0	0	0	0	0	0	0	0	1	1	2	4	7	6	4	5	5	1	0	0	0	0	1.6	7	
24-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	2	1	0	0	0	0	0	0.4	2	
25-Feb	0	0	Z	0	0	0	0	1	1	2	1	1	1	1	1	2	1	2	1	1	1	0	0	0.8	2	
26-Feb	0	2	1	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	54	66	42	19	7	3	2	2	1	8.7	66	
28-Feb	1	1	1	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1	
0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.6 0.9 1.1 1.7 2.0 4.5 4.8 3.4 1.8 0.9 0.6 0.5 0.5 0.4 0.4 1 2 1 1 1 1 1 2 1 1 3 4 6 9 12 54 66 42 19 7 4 4 3 2 2																								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
Fort McKay South - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	630	98.59	98.59
11 - 20	6	0.94	99.53
21 - 60	2	0.31	99.84
61 - 110	1	0.16	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South - February 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	96	68	26	4	4	9	16	38	61	53	51	57	37	31	35	44	630
11 - 20	0	0	2	0	1	0	0	2	0	1	0	0	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	68	28	4	5	9	16	40	63	55	51	57	37	31	35	44	639

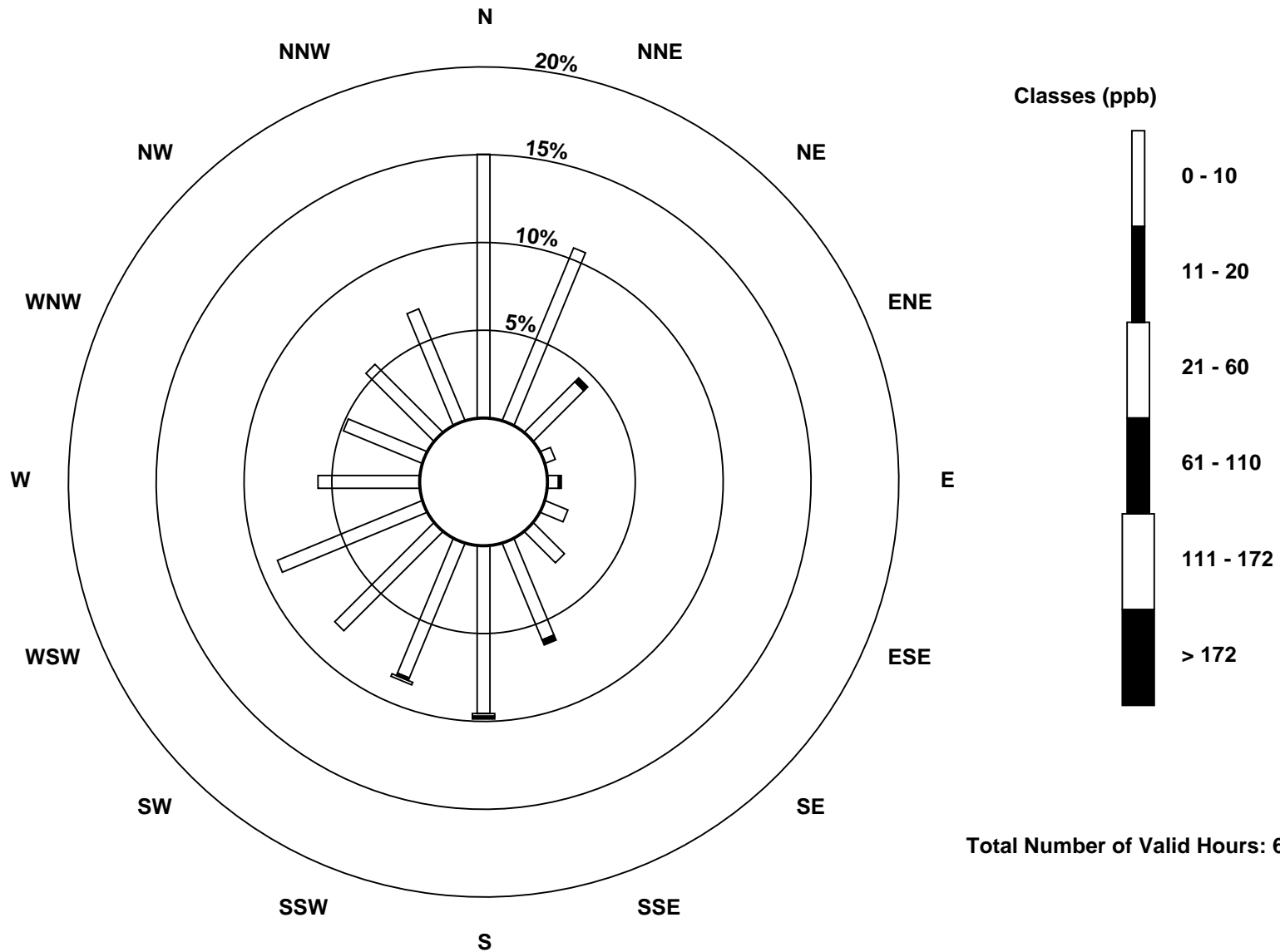
Total Number of Valid Hours: 639

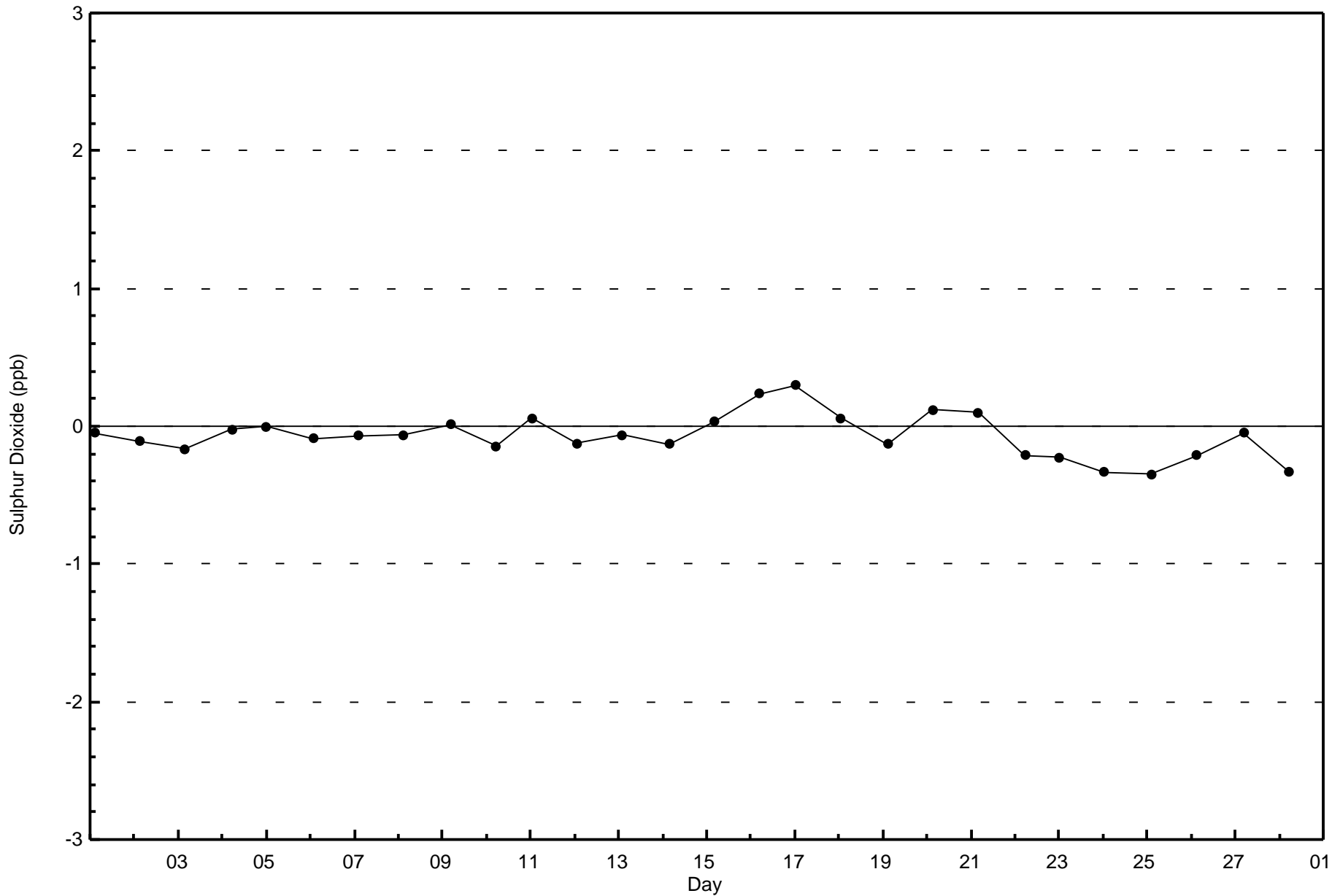
Total Number of Hours: 672

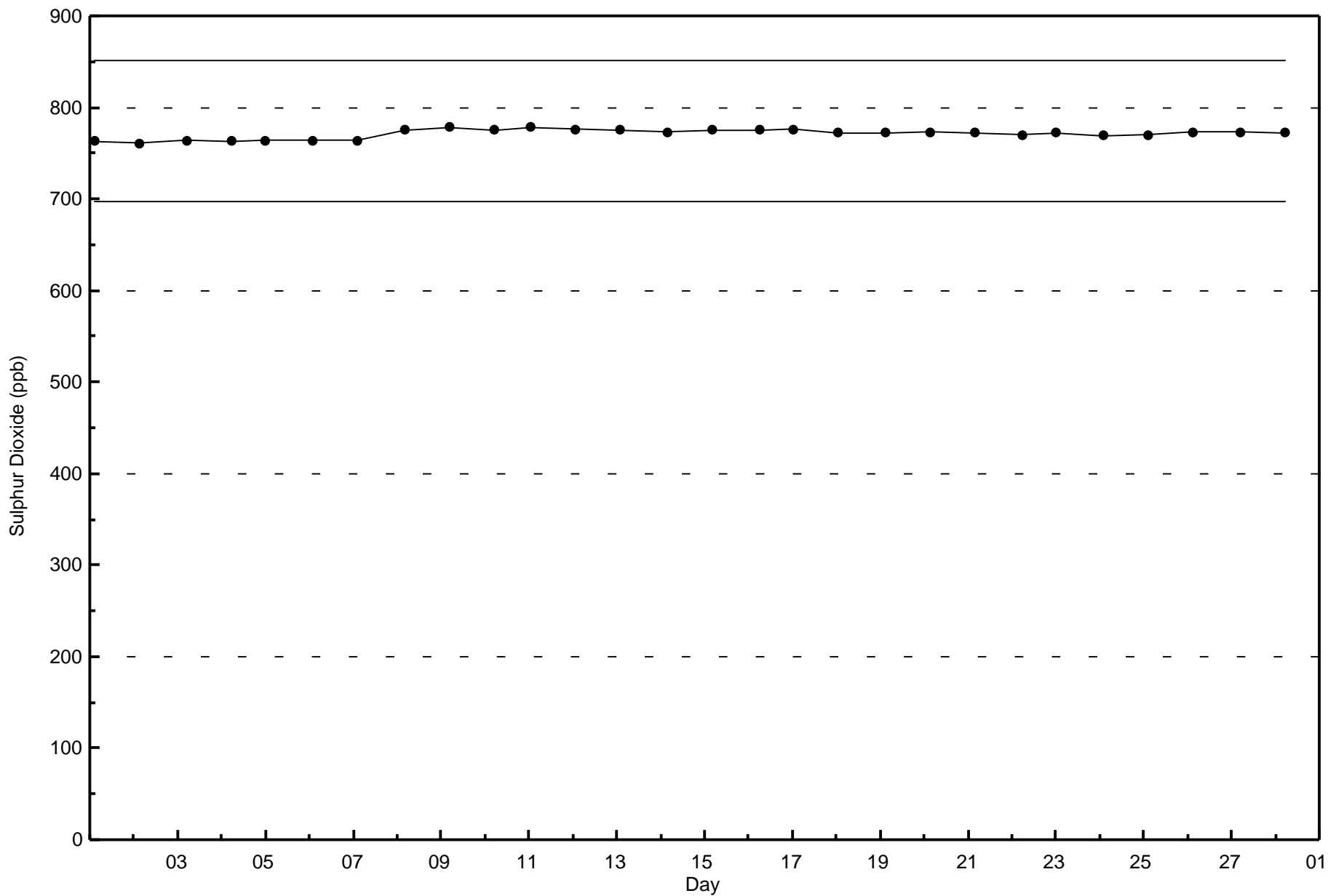


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

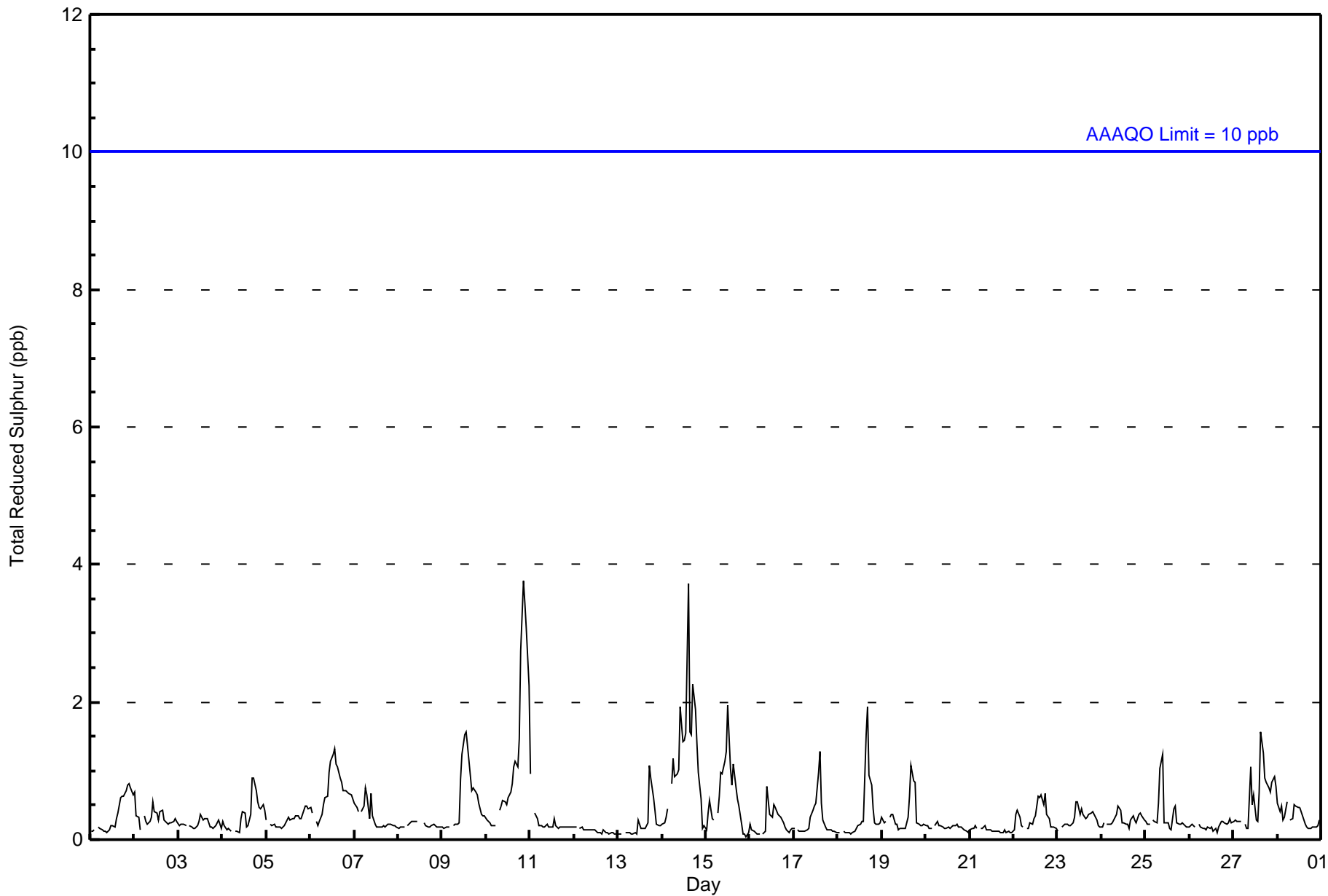
Fort McKay South - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																	
Maximum Value: 4 ppb on Feb 10 21:00										Maximum Daily Average: 1.2 ppb on Feb 14										Hours of Data: 641							
Minimum Value: 0 ppb on Feb 15 23:00										Minimum Daily Average: 0.1 ppb on Feb 12										Hours of Missing Data: 31							
Maximum Diurnal Average: 0.6 ppb at hour 17										Minimum Diurnal Average: 0.2 ppb at hour 5										Hours of Calibration: 31							
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										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1	
2-Feb	1	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
3-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
4-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0.4	1	
5-Feb	0	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	
6-Feb	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
7-Feb	1	0	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Feb	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0	
9-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	2	2	1	1	1	1	1	1	1	1	0	0	0.6	2	
10-Feb	0	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	3	4	3	3	2	1.1	4	
11-Feb	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.2	1	
14-Feb	0	0	0	0	Z	1	1	1	1	1	2	1	1	2	4	2	2	2	2	1	1	1	0	0	1.2	4	
15-Feb	0	0	1	0	0	Z	0	1	1	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0.6	2	
16-Feb	0	0	0	0	0	0	Z	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
17-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1	
18-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	0	0	0	0.4	2	
19-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.3	1	
20-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
21-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.3	1	
23-Feb	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	
24-Feb	0	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	
25-Feb	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
26-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	1	2	1	1	1	1	1	1	1	1	0.6	2	
28-Feb	1	0	0	0	0	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	Diurnal Average		
	1	0	1	0	0	1	1	1	1	1	2	1	2	2	4	2	2	2	2	2	3	4	3	3	2	Diurnal Maximum	
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	636	99.22	99.22
3 - 4	5	0.78	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: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	93	68	28	4	5	9	16	39	62	58	52	56	37	31	35	43	636
3 - 4	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	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	96	68	28	4	5	9	16	40	62	58	52	56	37	31	35	44	641

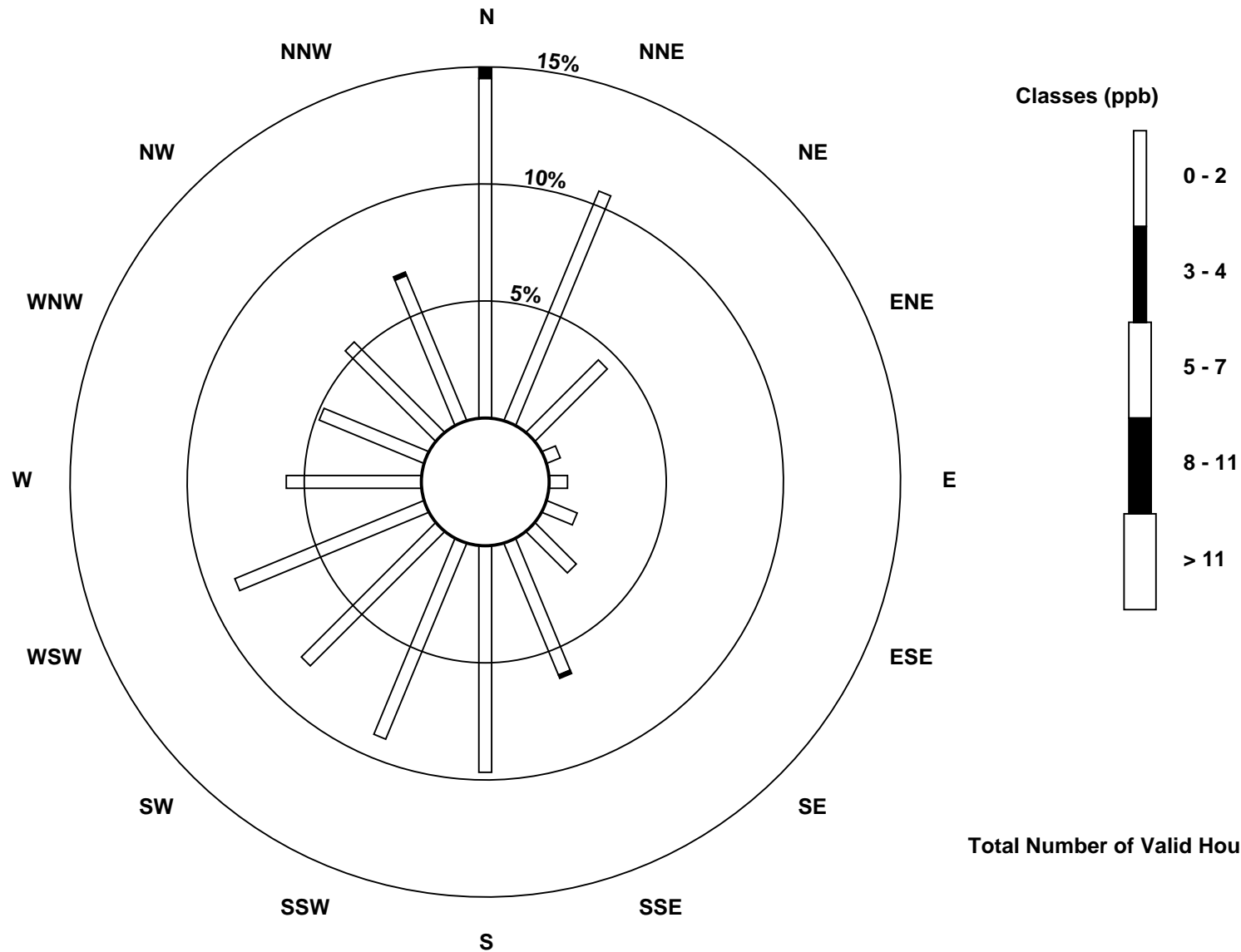
Total Number of Valid Hours: 641

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

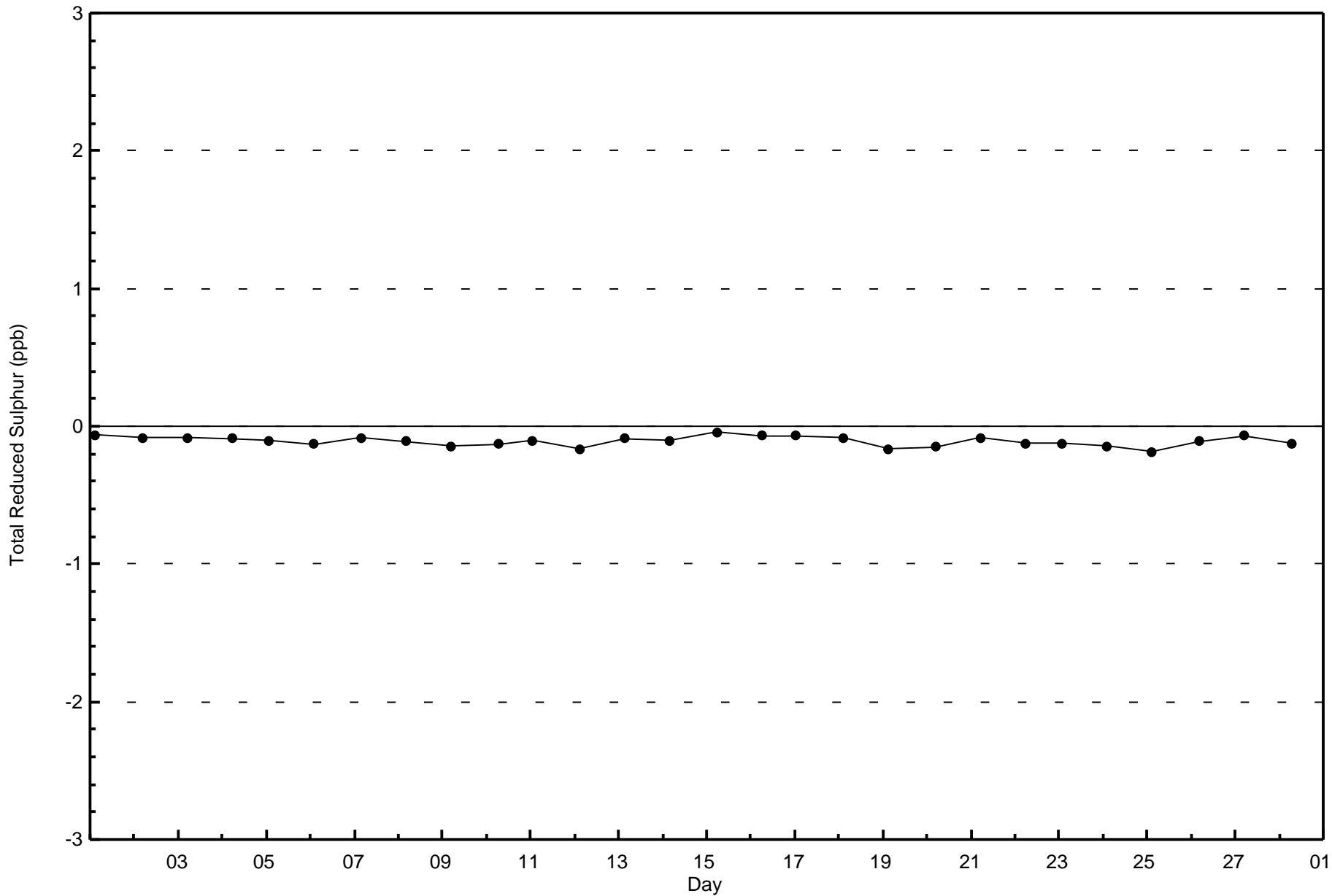
Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)

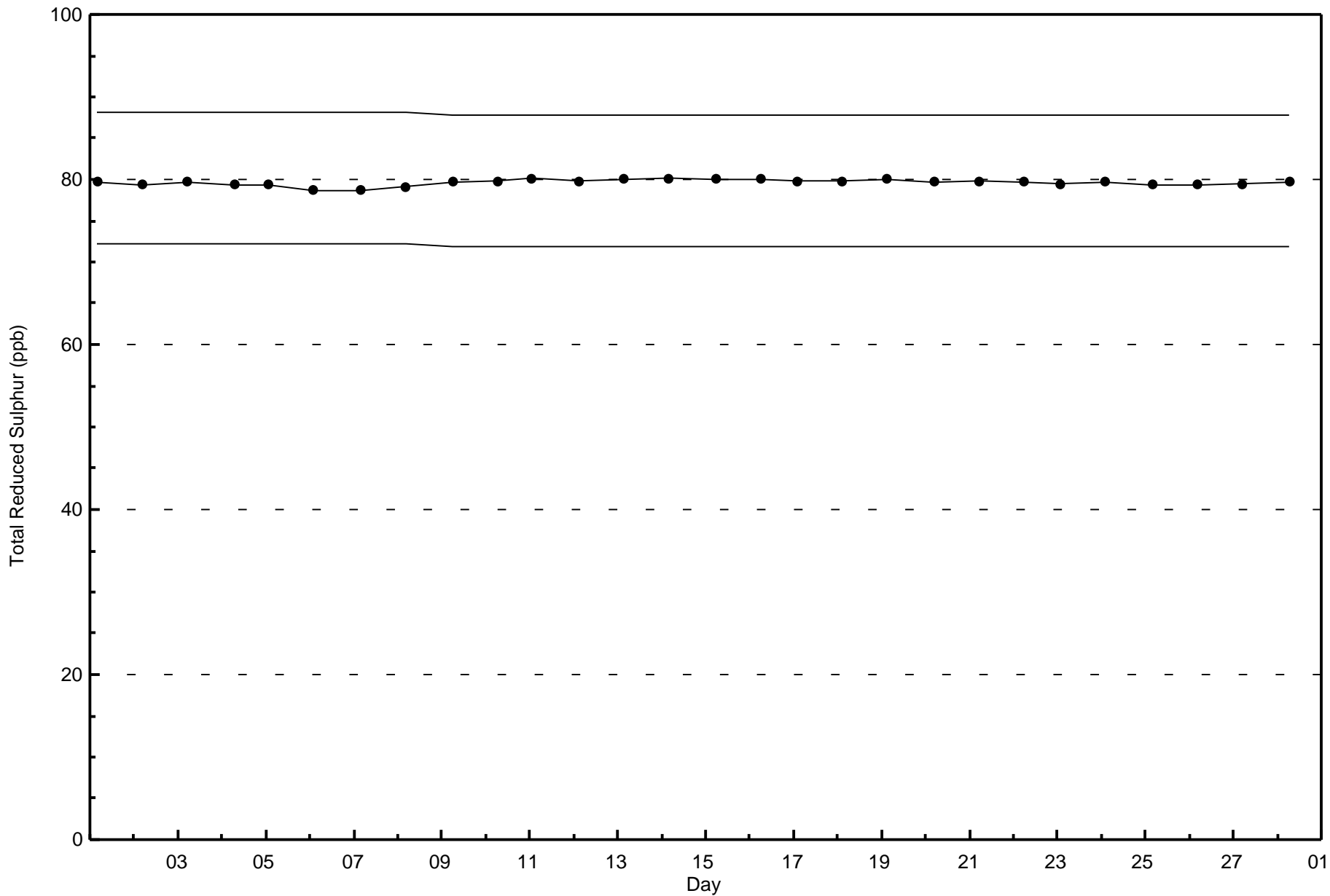




Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

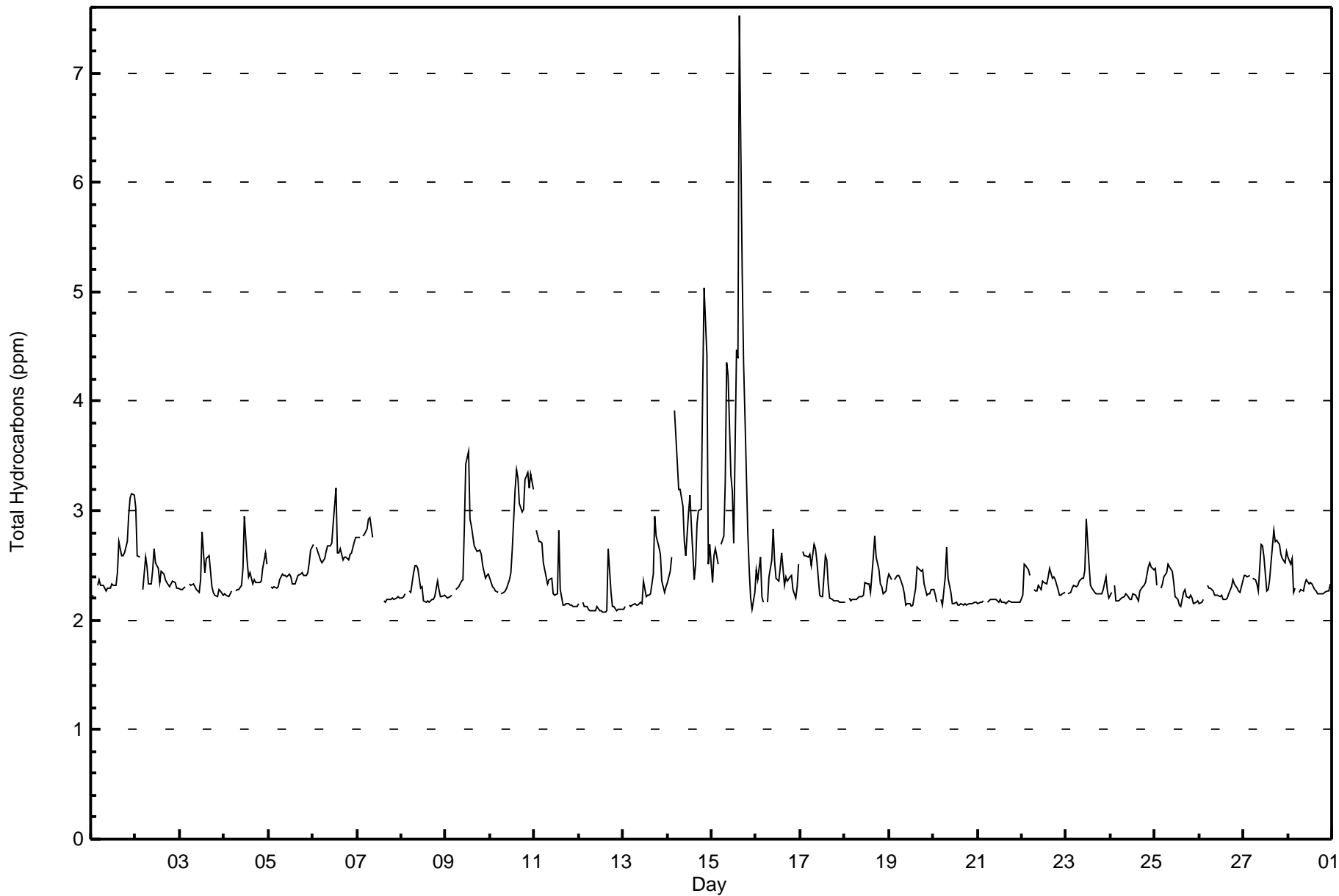
Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2017

Maximum Value: 7.5 ppm on Feb 15 16:00																				Maximum Daily Average: 3.4 ppm on Feb 15					Hours in Service: 672				
Minimum Value: 2.1 ppm on Feb 12 14:00																				Minimum Daily Average: 2.1 ppm on Feb 12					Hours of Data: 639				
Maximum Diurnal Average: 2.6 ppm at hour 16																				Minimum Diurnal Average: 2.3 ppm at hour 4					Hours of Missing Data: 33				
Monthly Average: 2.43 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.8 P ₉₉ = 4.4					Hours of Calibration: 33				
																				Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	2.2	2.2	Z	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.7	2.6	2.6	2.6	2.7	3.0	3.1	3.2	3.1	2.5	3.2			
2-Feb	3.0	2.6	2.6	Z	2.3	2.6	2.5	2.3	2.3	2.5	2.7	2.5	2.5	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	3.0			
3-Feb	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.4	2.8	2.4	2.6	2.6	2.6	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.4	2.8			
4-Feb	2.2	2.2	2.2	2.2	2.3	Z	2.3	2.3	2.3	2.3	2.5	3.0	2.5	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.4	2.5	2.6	2.5	2.4	3.0			
5-Feb	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.6	2.4	2.4	2.6			
6-Feb	2.7	Z	2.7	2.6	2.5	2.5	2.6	2.6	2.7	2.7	2.7	2.9	3.2	2.6	2.6	2.7	2.5	2.6	2.6	2.6	2.6	2.6	2.7	2.8	2.7	3.2			
7-Feb	2.8	2.8	Z	2.8	2.8	2.8	2.9	2.9	2.8	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.9			
8-Feb	2.2	2.2	2.2	Z	2.3	2.3	2.4	2.5	2.5	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.2	2.3	2.5			
9-Feb	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.4	2.4	2.8	3.4	3.5	2.9	2.9	2.7	2.7	2.6	2.6	2.6	2.5	2.4	2.4	2.4	2.6	3.5			
10-Feb	2.3	2.3	2.3	2.3	2.2	Z	2.2	2.2	2.3	2.3	2.4	2.4	2.6	3.2	3.4	3.3	3.1	3.0	3.0	3.3	3.3	3.2	3.3	3.2	2.8	3.4			
11-Feb	Z	2.8	2.7	2.7	2.7	2.5	2.4	2.3	2.4	2.4	2.2	2.2	2.2	2.8	2.3	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.4	2.8			
12-Feb	2.1	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	2.7	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7			
13-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.4	2.9	2.8	2.7	2.6	2.4	2.3	2.3	2.3	2.9			
14-Feb	2.3	2.5	2.6	Z	3.9	3.4	3.2	3.2	3.0	2.7	2.6	3.0	3.1	2.9	2.4	2.5	2.9	3.0	3.0	4.1	5.0	4.4	2.5	2.7	3.1	5.0			
15-Feb	2.3	2.6	2.6	2.5	Z	2.7	2.8	3.3	4.4	4.2	3.3	3.2	2.7	4.5	4.4	7.5	5.2	4.4	3.9	2.8	2.5	2.2	2.1	2.3	3.4	7.5			
16-Feb	2.5	2.4	2.6	2.2	2.2	Z	2.2	2.4	2.6	2.8	2.5	2.4	2.4	2.5	2.6	2.3	2.4	2.4	2.4	2.4	2.3	2.2	2.3	2.5	2.4	2.8			
17-Feb	Z	2.6	2.6	2.6	2.6	2.6	2.5	2.7	2.7	2.5	2.2	2.2	2.2	2.2	2.6	2.6	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.7			
18-Feb	2.2	Z	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	2.6	2.8	2.6	2.5	2.3	2.3	2.2	2.3	2.4	2.3	2.8			
19-Feb	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.3	2.2	2.1	2.1	2.2	2.1	2.1	2.3	2.5	2.5	2.4	2.5	2.3	2.2	2.2	2.2	2.3	2.3	2.5			
20-Feb	2.3	2.2	2.2	Z	2.2	2.1	2.4	2.7	2.4	2.3	2.1	2.1	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	2.7			
21-Feb	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	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2			
22-Feb	2.2	2.5	2.5	2.5	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.4	2.5	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.5			
23-Feb	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.9	2.5	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.3	2.9			
24-Feb	2.3	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	2.3	2.3	2.3	2.3	2.5	2.5	2.5	2.5	2.3	2.5			
25-Feb	2.5	2.3	Z	2.3	2.3	2.4	2.4	2.5	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5			
26-Feb	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.4			
27-Feb	2.4	2.4	2.4	2.4	Z	2.4	2.4	2.3	2.3	2.7	2.7	2.6	2.3	2.3	2.4	2.5	2.8	2.7	2.7	2.7	2.6	2.6	2.5	2.6	2.5	2.8			
28-Feb	2.6	2.5	2.6	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.3	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	2.6			
																								Diurnal Average					
																								Diurnal Maximum					
2.4 2.4 2.4 2.3 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.5 2.4 2.5 2.5 2.6 2.5 2.5 2.5 2.5 2.5 2.4 2.4 2.4 2.4 2.4																													
3.0 2.8 2.7 2.8 3.9 3.4 3.2 3.3 4.4 4.2 3.3 3.4 3.5 4.5 4.4 7.5 5.2 4.4 3.9 4.1 5.0 4.4 3.3 3.2																													
Z - zerospan C - Calibration																													



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	605	94.68	94.68
3.1 - 10.0	34	5.32	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay South - February 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	92	66	26	4	4	9	14	37	50	50	51	57	37	31	34	43	605
3.1 - 10.0	4	2	2	0	1	0	2	3	13	5	0	0	0	0	1	1	34
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	68	28	4	5	9	16	40	63	55	51	57	37	31	35	44	639

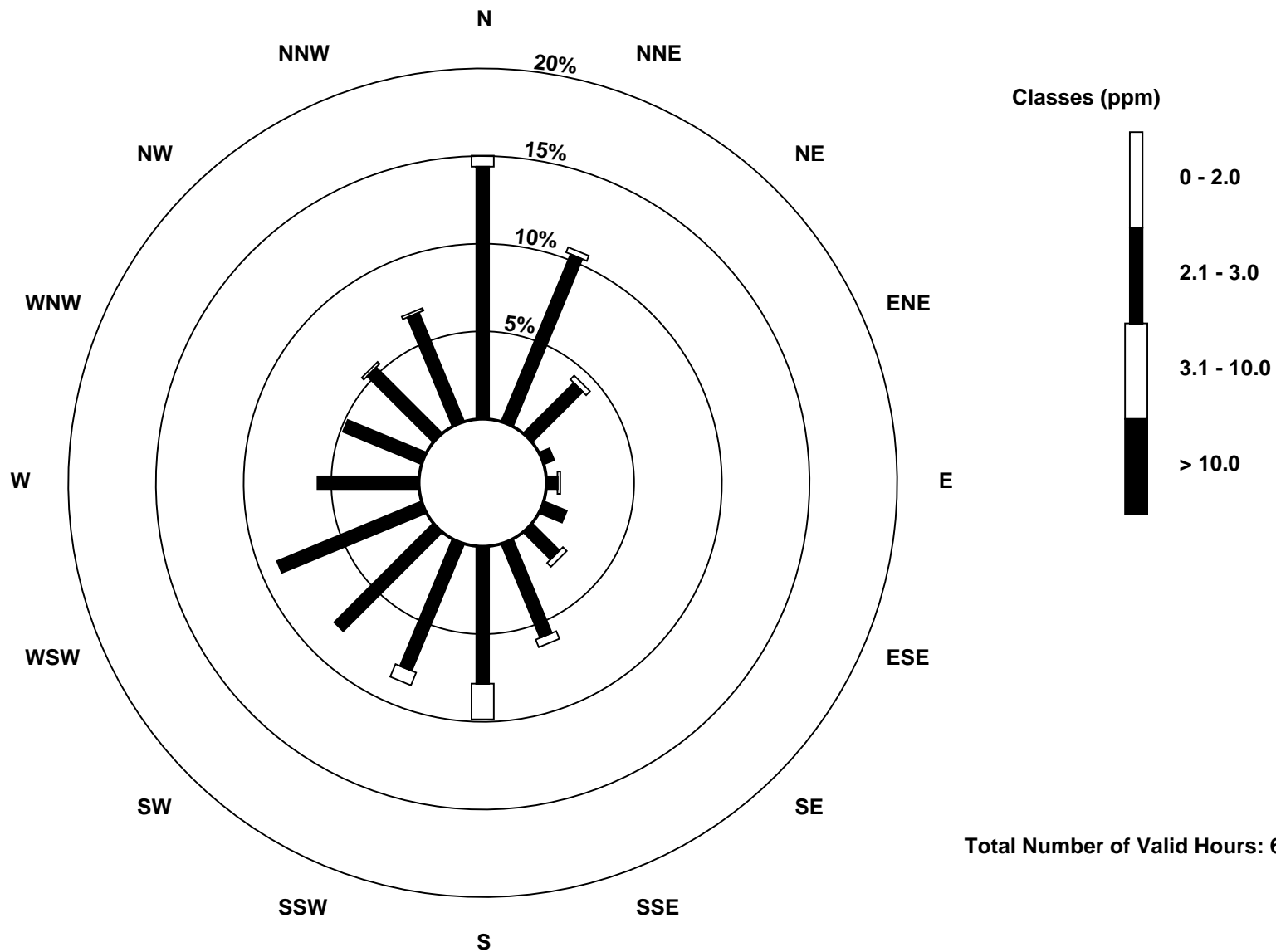
Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)

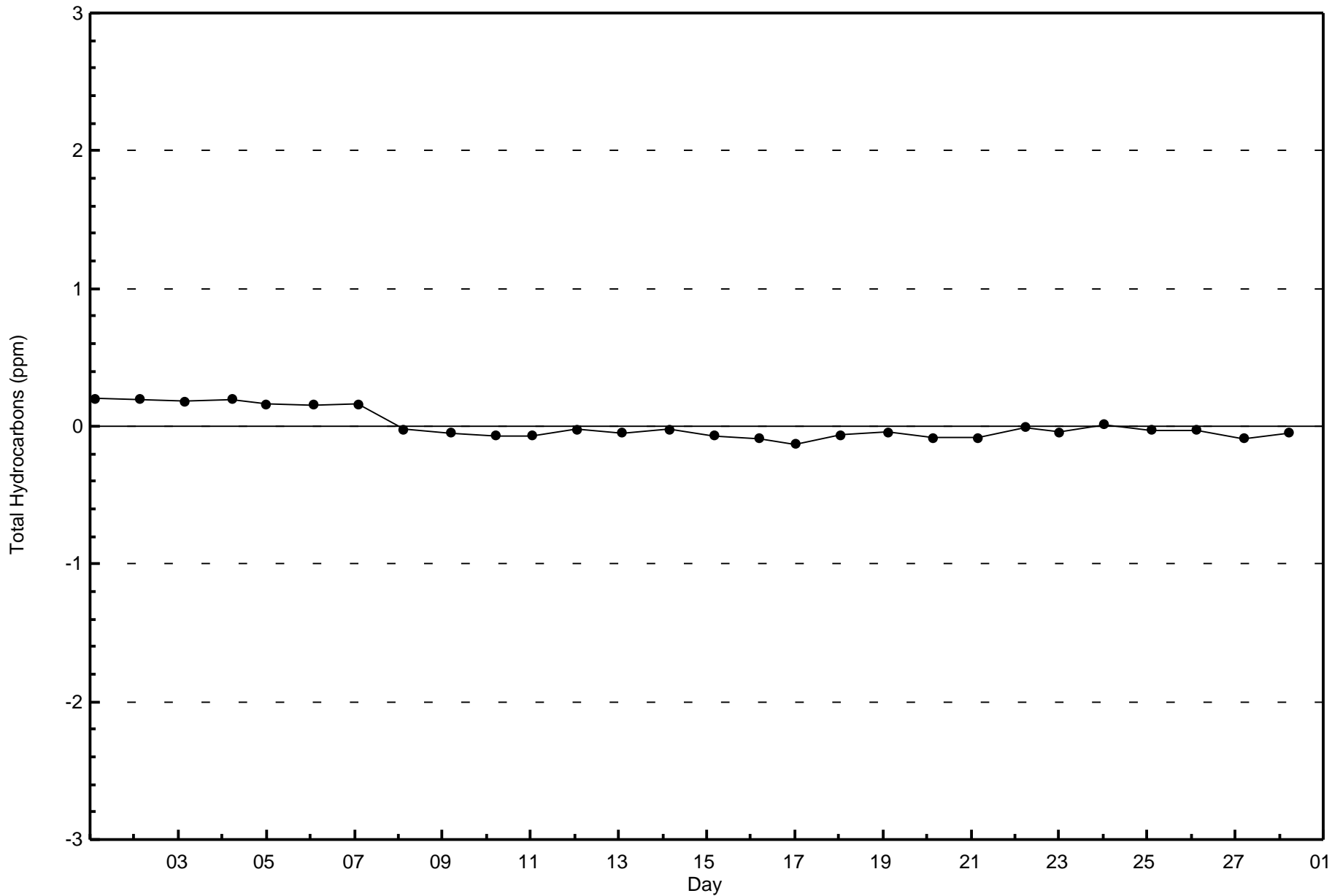


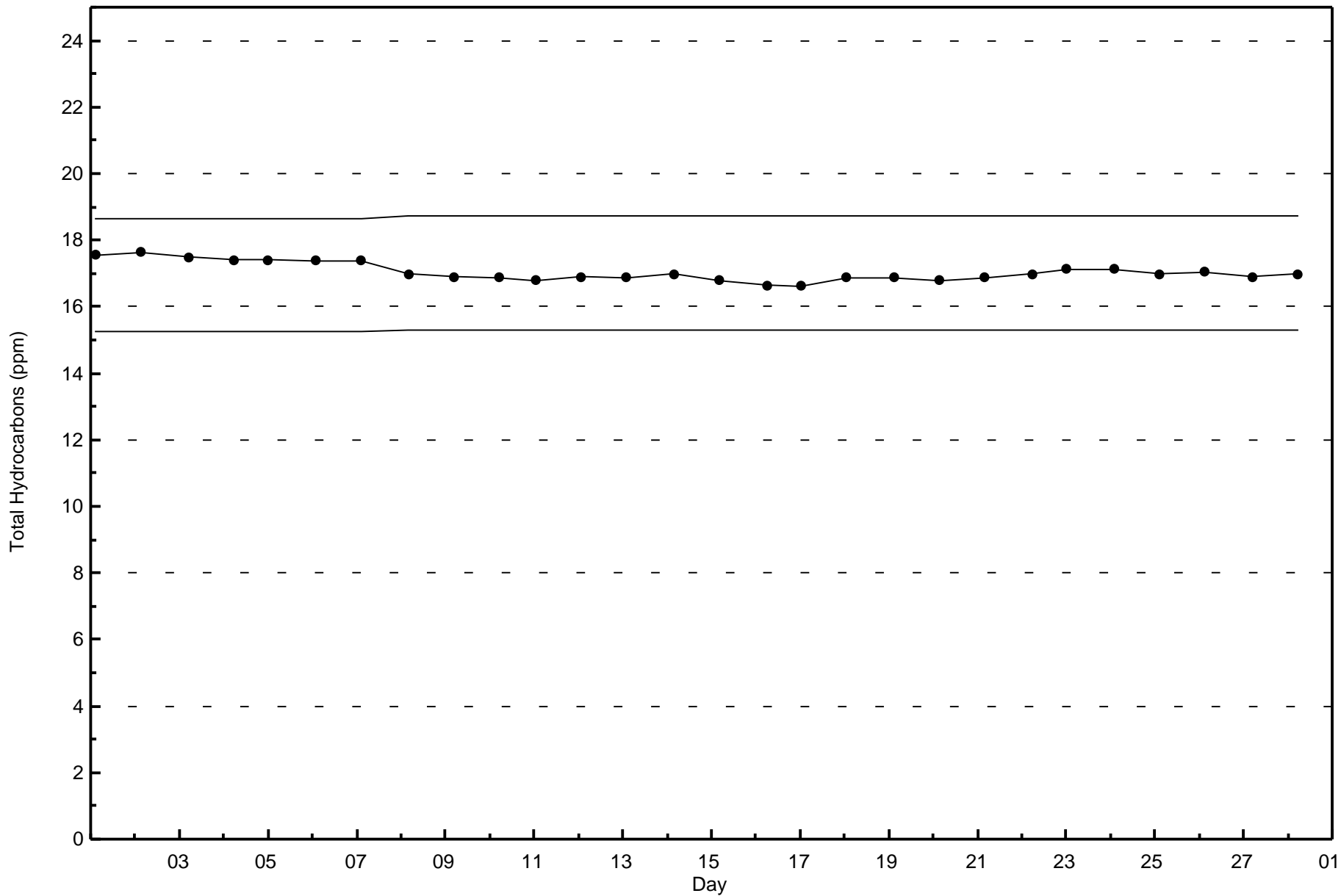
Total Number of Valid Hours: 639



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

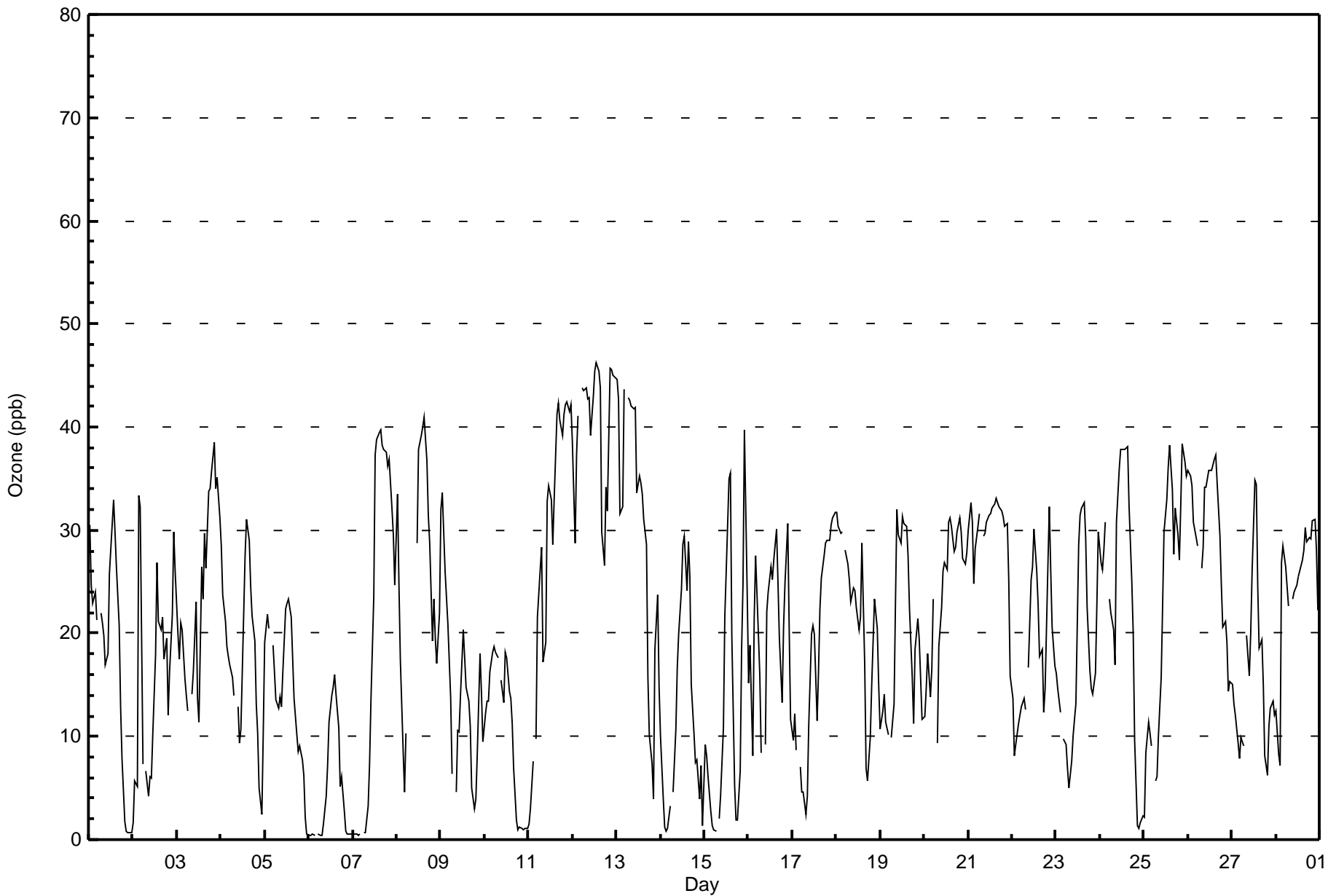
Fort McKay South - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 672													
Maximum Value: 46 ppb on Feb 12 14:00														Maximum Daily Average: 40.4 ppb on Feb 12													
Minimum Value: 0 ppb on Feb 7 04:00														Minimum Daily Average: 4.9 ppb on Feb 6													
Maximum Diurnal Average: 29.1 ppb at hour 14														Minimum Diurnal Average: 15.0 ppb at hour 8													
Monthly Average: 20.6 ppb														Percentiles: P ₁ = 0 P ₁₀ = 4 Q ₁ = 11 Median = 21 O ₃ = 30 P ₉₀ = 36 P ₉₉ = 45													
														Hours of Data: 641													
														Hours of Missing Data: 31													
														Hours of Calibration: 31													
														Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	31	25	23	24	21	Z	22	21	20	17	18	26	28	33	30	26	21	13	8	2	1	1	1	1	17.8	33	
2-Feb	2	6	5	33	32	7	Z	7	4	6	6	10	18	27	21	20	22	17	20	12	16	22	30	26	16.1	33	
3-Feb	20	17	21	20	16	14	12	Z	14	16	23	14	11	26	23	30	26	34	34	36	39	34	35	31	23.8	39	
4-Feb	29	24	21	19	18	17	16	14	Z	13	9	11	22	28	31	29	25	22	19	13	10	5	2	10	17.7	31	
5-Feb	19	22	20	Z	19	16	13	13	14	13	16	22	23	23	22	18	14	10	9	9	8	6	2	0	14.4	23	
6-Feb	0	0	1	0	Z	1	0	0	1	4	7	11	14	15	16	14	11	5	6	3	1	1	1	0	4.9	16	
7-Feb	1	1	1	0	0	Z	1	1	3	7	14	23	37	39	40	40	38	38	38	36	37	32	30	25	20.9	40	
8-Feb	33	25	18	9	5	10	Z	1	C	C	C	29	38	39	40	41	37	31	29	19	23	20	17	22	24.3	41	
9-Feb	32	34	26	23	21	14	6	Z	5	11	10	14	20	18	15	13	11	5	3	4	8	18	14	10	14.6	34	
10-Feb	12	13	13	16	18	19	18	18	Z	15	13	18	18	14	14	11	7	2	1	1	1	1	1	1	10.8	19	
11-Feb	1	3	8	Z	10	22	26	28	17	19	33	34	33	29	33	41	42	41	39	41	42	42	42	42	29.1	42	
12-Feb	39	29	37	41	Z	44	43	44	43	43	39	43	45	46	45	44	30	27	34	32	46	46	45	45	40.4	46	
13-Feb	45	43	32	32	44	Z	43	43	42	42	42	34	35	35	33	31	29	16	10	7	4	18	24	15	30.3	45	
14-Feb	10	4	1	1	1	3	Z	5	11	17	20	24	29	29	24	29	25	15	10	7	8	4	7	1	12.4	29	
15-Feb	9	8	6	3	1	1	1	Z	2	4	11	22	26	35	36	20	5	2	2	7	18	25	40	24	13.4	40	
16-Feb	15	19	8	21	28	20	16	8	Z	9	22	24	26	25	27	30	25	20	13	21	25	31	21	12	20.3	31	
17-Feb	10	12	9	Z	7	5	5	2	4	11	20	21	20	11	16	22	25	28	29	29	29	31	31	32	17.8	32	
18-Feb	32	30	30	30	Z	28	27	25	23	24	24	22	20	22	29	17	7	6	10	15	19	23	20	15	21.7	32	
19-Feb	11	12	14	11	10	Z	10	13	23	32	30	29	31	31	30	27	22	16	11	18	21	19	16	12	19.6	32	
20-Feb	12	15	18	14	17	23	Z	9	19	23	26	27	26	31	31	30	28	28	30	31	30	27	27	28	23.9	31	
21-Feb	30	33	31	25	28	30	32	Z	29	30	31	31	32	32	33	33	33	32	32	31	30	31	25	16	30.0	33	
22-Feb	14	8	9	11	12	13	14	13	Z	17	25	26	30	26	23	18	18	12	15	27	32	26	21	17	18.5	32	
23-Feb	16	15	12	Z	10	9	7	5	8	10	12	13	29	31	32	33	29	23	16	15	14	16	23	30	17.7	33	
24-Feb	27	26	28	31	Z	23	22	20	17	31	36	38	38	38	38	38	38	32	25	20	10	1	2	2	23.7	38	
25-Feb	2	8	11	10	9	Z	6	6	10	16	23	30	33	36	38	34	28	32	30	27	33	38	37	35	23.1	38	
26-Feb	36	35	34	31	29	29	Z	26	28	34	34	36	36	36	37	37	35	29	25	21	21	19	14	15	29.5	37	
27-Feb	15	13	12	9	8	10	9	Z	20	16	20	26	35	34	25	19	19	15	8	6	11	13	13	12	16.0	35	
28-Feb	12	8	7	27	28	26	25	23	Z	23	24	25	25	26	27	28	30	29	29	29	31	31	28	22	24.6	31	
18.3 17.4 16.3 18.5 16.3 16.7 16.2 15.0 16.2 18.6 21.8 24.4 27.8 29.1 28.9 27.6 24.1 20.4 18.9 18.2 20.0 20.7 20.2 17.9														Diurnal Average													
45 43 37 41 44 44 43 44 43 44 43 42 43 45 46 44 42 41 39 41 46 46 45 45														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 - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	318	49.61	49.61
21 - 50	323	50.39	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - February 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	54	16	8	1	3	3	8	14	47	37	23	34	15	13	15	27	318
21 - 50	45	51	21	3	2	6	8	26	15	19	30	25	23	18	14	17	323
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	99	67	29	4	5	9	16	40	62	56	53	59	38	31	29	44	641

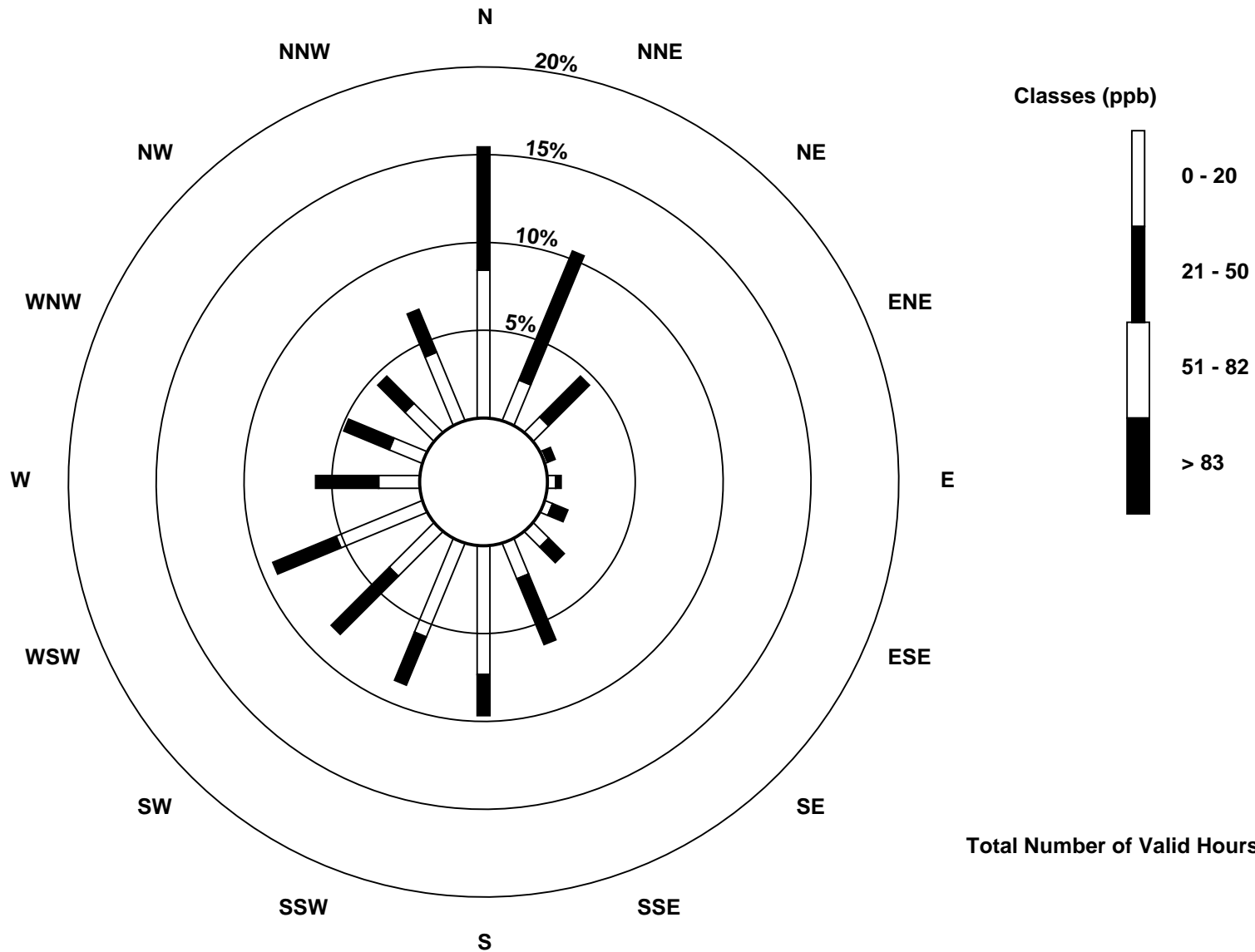
Total Number of Valid Hours: 641

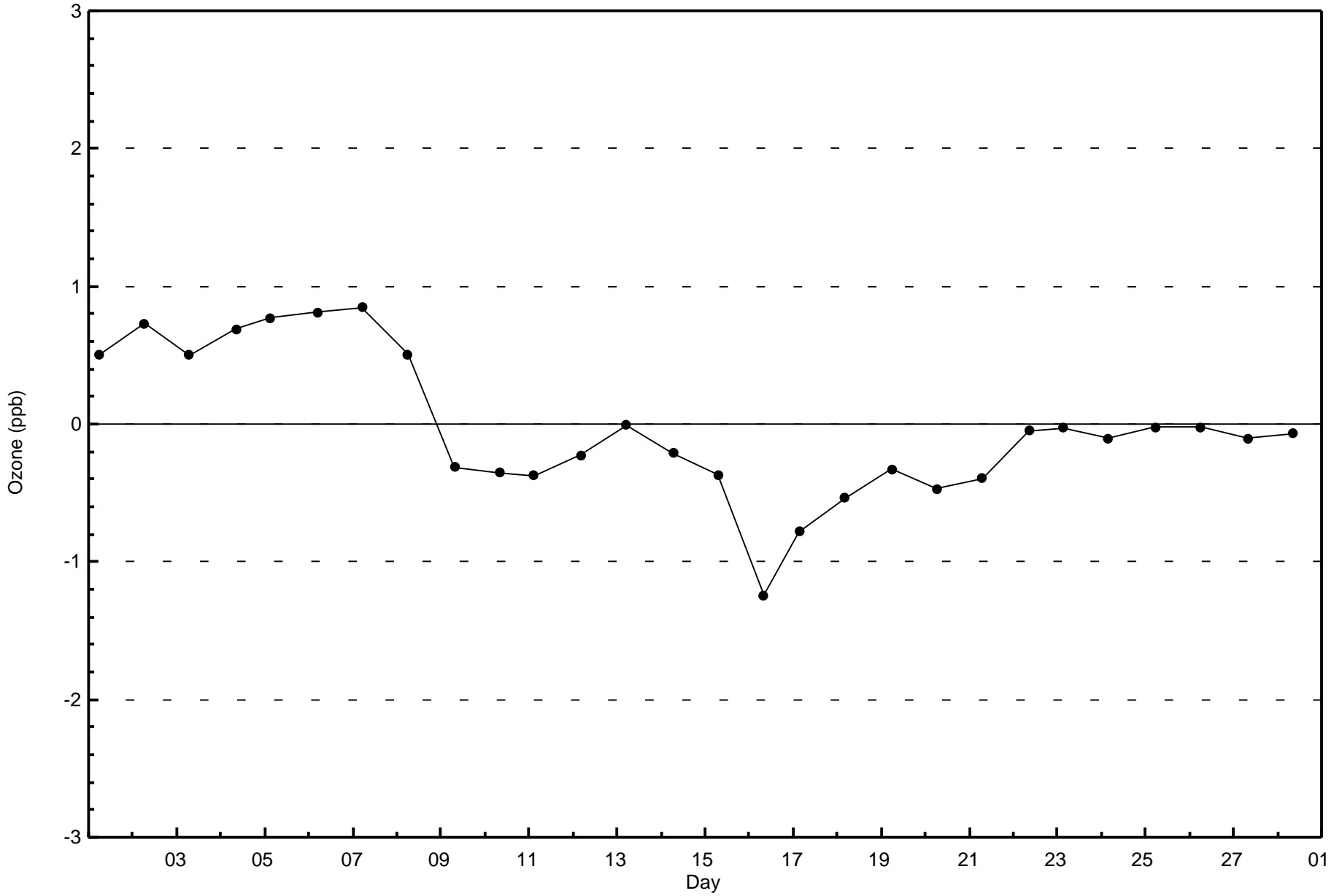
Total Number of Hours: 672

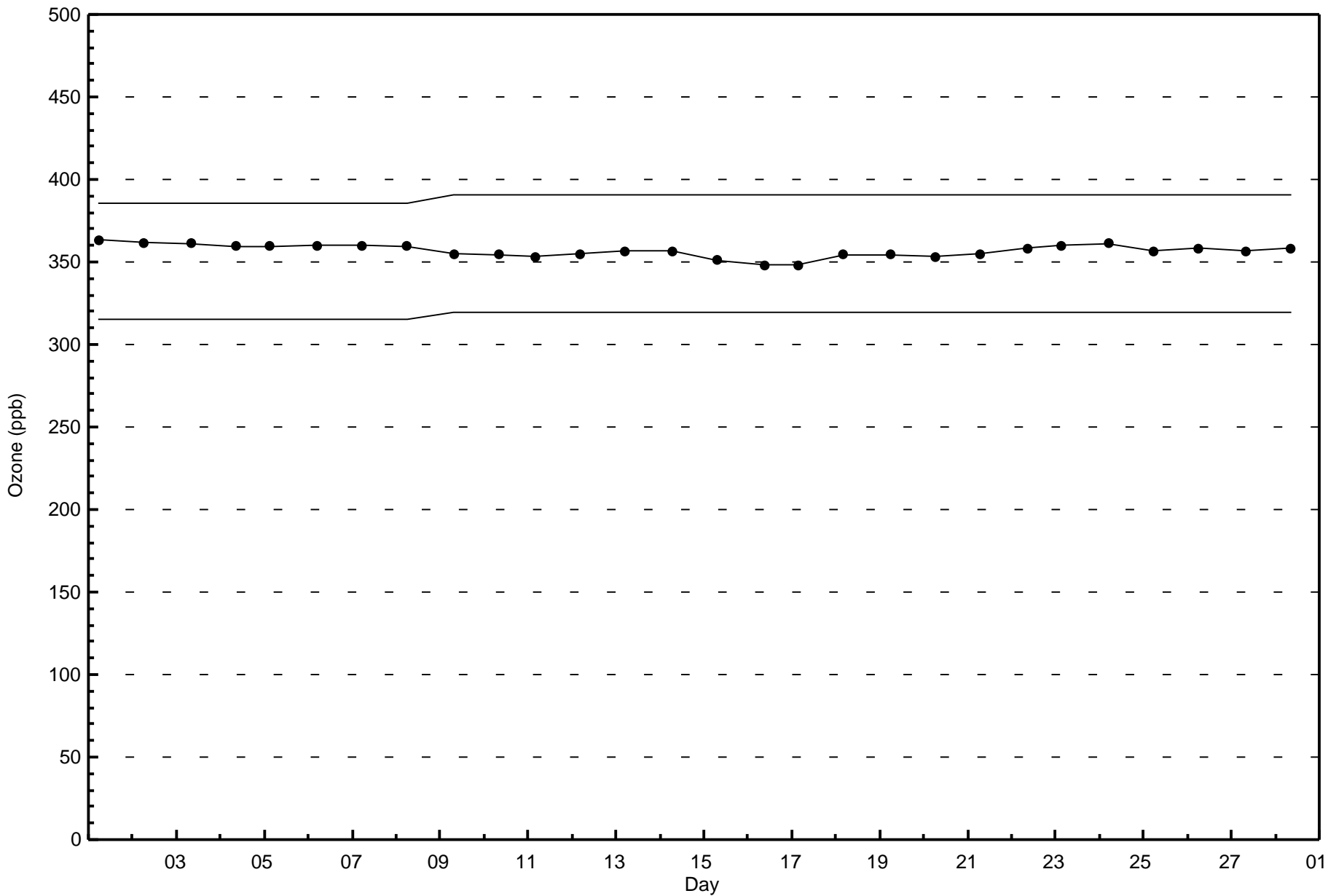


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Fort McKay South (AMS 13)







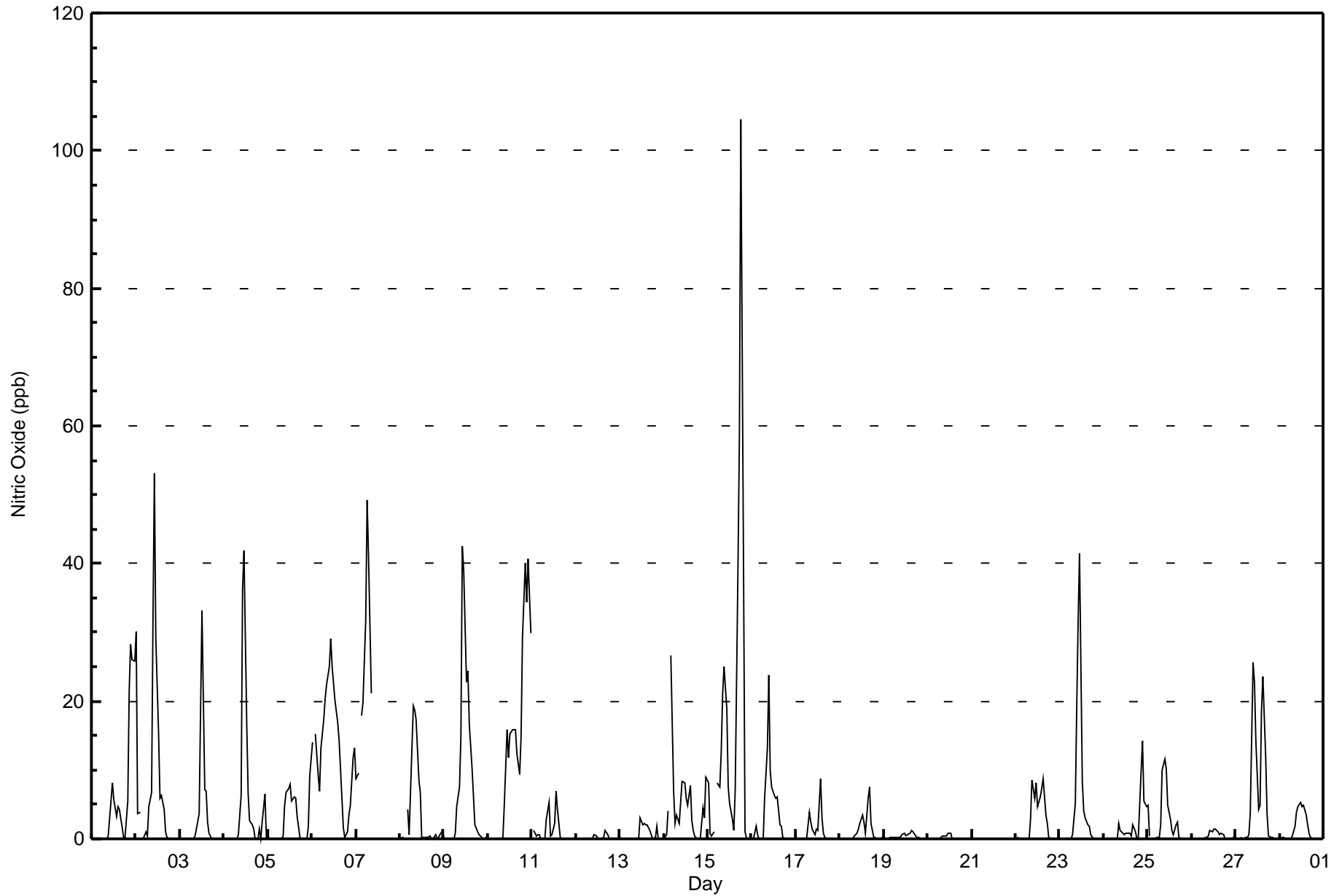


Maximum Value: 105 ppb on Feb 15 19:00																		Maximum Daily Average: 16.1 ppb on Feb 15																		Hours in Service: 672	
Minimum Value: 0 ppb on Feb 1 02:00																		Minimum Daily Average: 0.0 ppb on Feb 21																		Hours of Data: 639	
Maximum Diurnal Average: 11.8 ppb at hour 11																		Minimum Diurnal Average: 0.7 ppb at hour 2																		Hours of Missing Data: 33	
Monthly Average: 4.4 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 5 P ₉₀ = 15 P ₉₉ = 41																		Hours of Calibration: 33	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Feb	0	0	Z	0	0	0	0	0	0	0	6	8	6	3	5	4	2	0	0	5	21	28	26	26	6.1	28											
2-Feb	30	4	4	Z	0	1	0	5	7	32	53	29	15	6	6	4	1	0	0	0	0	0	0	8.6	53												
3-Feb	0	0	0	0	Z	0	0	0	0	1	4	19	33	7	7	2	1	0	0	0	0	0	0	3.3	33												
4-Feb	0	0	0	0	0	Z	0	0	0	1	6	36	42	17	6	3	2	1	0	1	0	3	7	0	5.4	42											
5-Feb	Z	0	0	0	0	0	0	0	0	0	5	7	7	8	5	6	6	3	0	0	0	0	2	9	2.6	9											
6-Feb	14	Z	15	9	7	13	17	20	22	25	29	25	20	19	17	14	6	2	0	1	4	5	12	13	13.5	29											
7-Feb	9	10	Z	18	20	32	49	41	21	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	11.1	49											
8-Feb	0	0	0	Z	4	1	13	19	19	17	9	7	0	0	0	0	0	0	0	1	0	0	1	1	4.0	19											
9-Feb	0	0	0	0	Z	0	1	5	8	15	43	39	23	24	17	10	6	2	1	1	0	0	0	0	8.4	43											
10-Feb	0	0	0	0	0	Z	0	0	0	0	5	16	12	15	16	16	16	12	9	15	29	40	34	41	30	13.3	41										
11-Feb	Z	1	0	1	1	0	0	0	0	3	5	0	1	2	7	4	0	0	0	0	0	0	0	0	0	1.1	7										
12-Feb	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.1	1										
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	3	2	2	2	2	1	1	0	0	2	0	0	0	0	0.7	3										
14-Feb	0	1	4	Z	27	7	2	3	2	5	8	8	6	5	8	3	1	0	0	0	0	4	3	9	9	4.7	27										
15-Feb	8	1	0	1	Z	8	8	13	21	25	19	7	5	3	1	7	40	59	105	37	1	0	0	0	0	16.1	105										
16-Feb	0	0	2	1	0	Z	0	6	13	24	10	7	6	6	6	2	2	0	0	0	0	0	0	0	0	3.7	24										
17-Feb	Z	0	0	0	0	0	0	4	2	1	1	1	1	9	3	1	0	0	0	0	0	0	0	0	0	1.0	9										
18-Feb	0	Z	0	0	0	0	0	0	0	1	2	2	3	2	1	6	8	2	0	0	0	0	0	0	0	1.2	8										
19-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1										
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1										
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0										
22-Feb	0	0	0	0	0	Z	0	0	3	9	6	8	5	6	7	9	3	2	0	0	0	0	0	0	0	2.5	9										
23-Feb	Z	0	0	0	0	0	1	5	19	32	42	8	4	3	2	2	1	0	0	0	0	0	0	0	0	5.1	42										
24-Feb	0	Z	0	0	0	0	0	0	2	1	1	1	1	1	1	0	2	1	0	0	10	14	5	5	5	2.0	14										
25-Feb	5	0	Z	0	0	0	0	2	10	12	10	5	3	1	1	2	2	0	0	0	0	0	0	0	0	2.4	12										
26-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.4	2										
27-Feb	0	0	0	0	Z	0	0	1	4	26	23	14	4	5	19	24	12	4	0	0	0	0	0	0	0	5.9	26										
28-Feb	0	0	0	0	0	Z	0	0	2	4	5	5	5	5	3	2	1	0	0	0	0	0	0	0	0	1.4	5										
2.8 0.7 1.2 1.3 2.6 2.7 3.3 4.3 5.2 8.9 11.8 11.0 7.1 5.4 4.9 4.3 3.9 3.1 4.4 2.7 2.8 3.2 3.5 3.3																								Diurnal Average													
30 10 15 18 27 32 49 41 22 32 53 42 33 24 19 24 40 59 105 37 40 34 41 30																								Diurnal Maximum													
Z - zerospan C - Calibration																																					



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	598	93.58	93.58
21 - 40	32	5.01	98.59
41 - 80	8	1.25	99.84
81 - 159	1	0.16	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - February 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	92	66	26	4	4	6	12	36	51	52	49	56	36	31	34	43	598
21 - 40	3	2	2	0	1	2	3	1	10	2	2	1	1	0	1	1	32
11 - 80	1	0	0	0	0	1	1	3	2	0	0	0	0	0	0	0	8
81 - 159	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	68	28	4	5	9	16	40	63	55	51	57	37	31	35	44	639

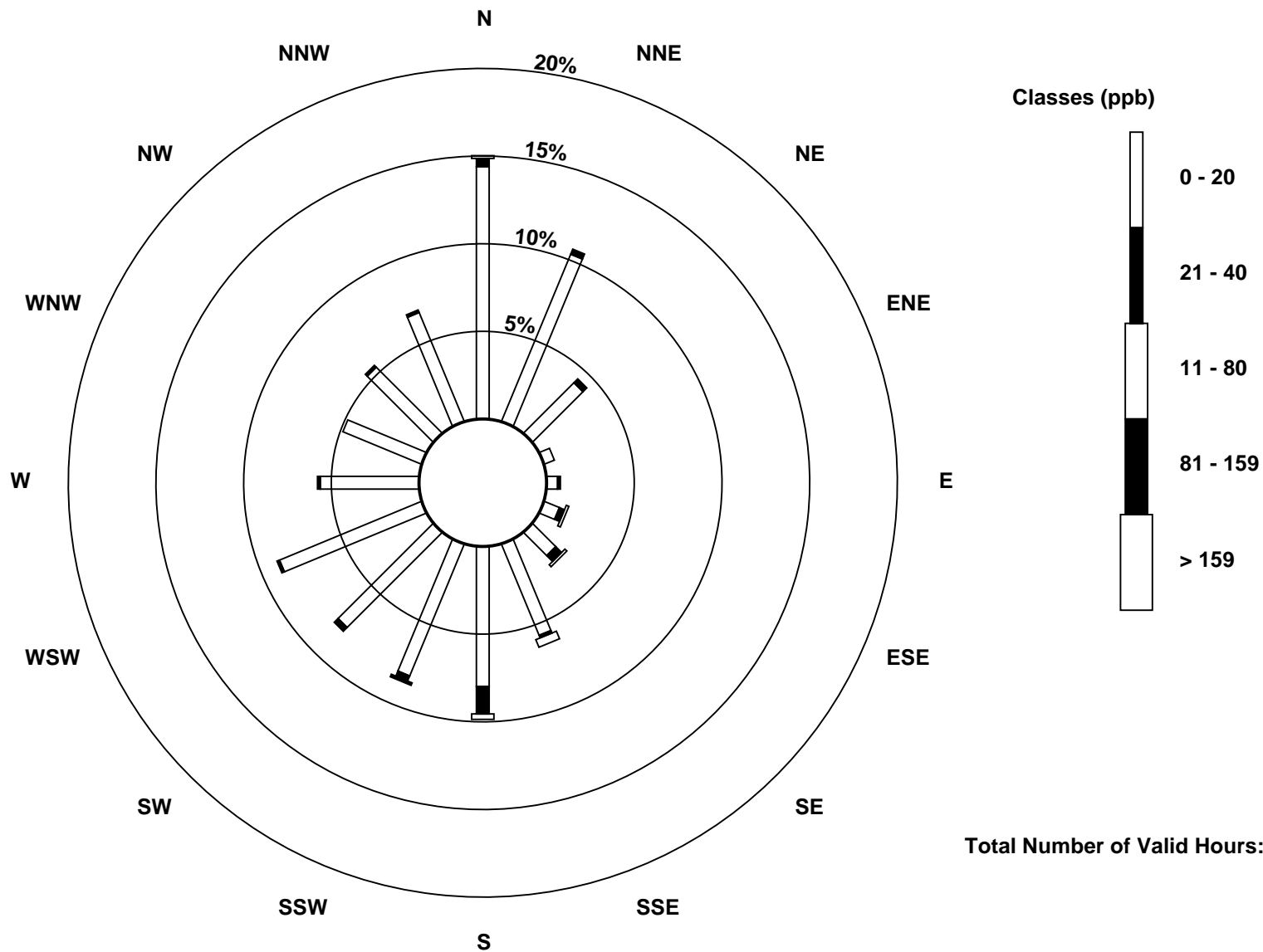
Total Number of Valid Hours: 639

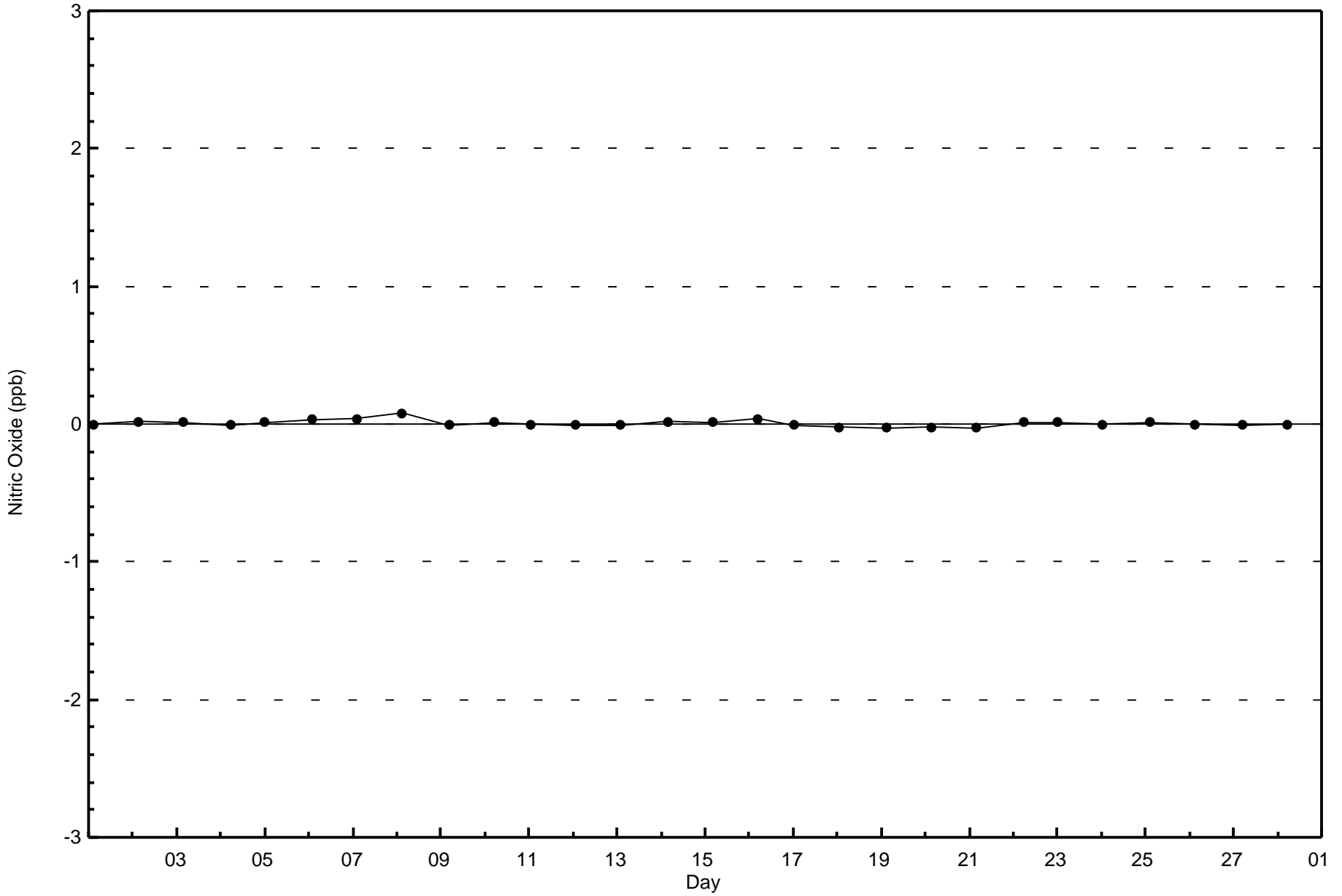
Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)





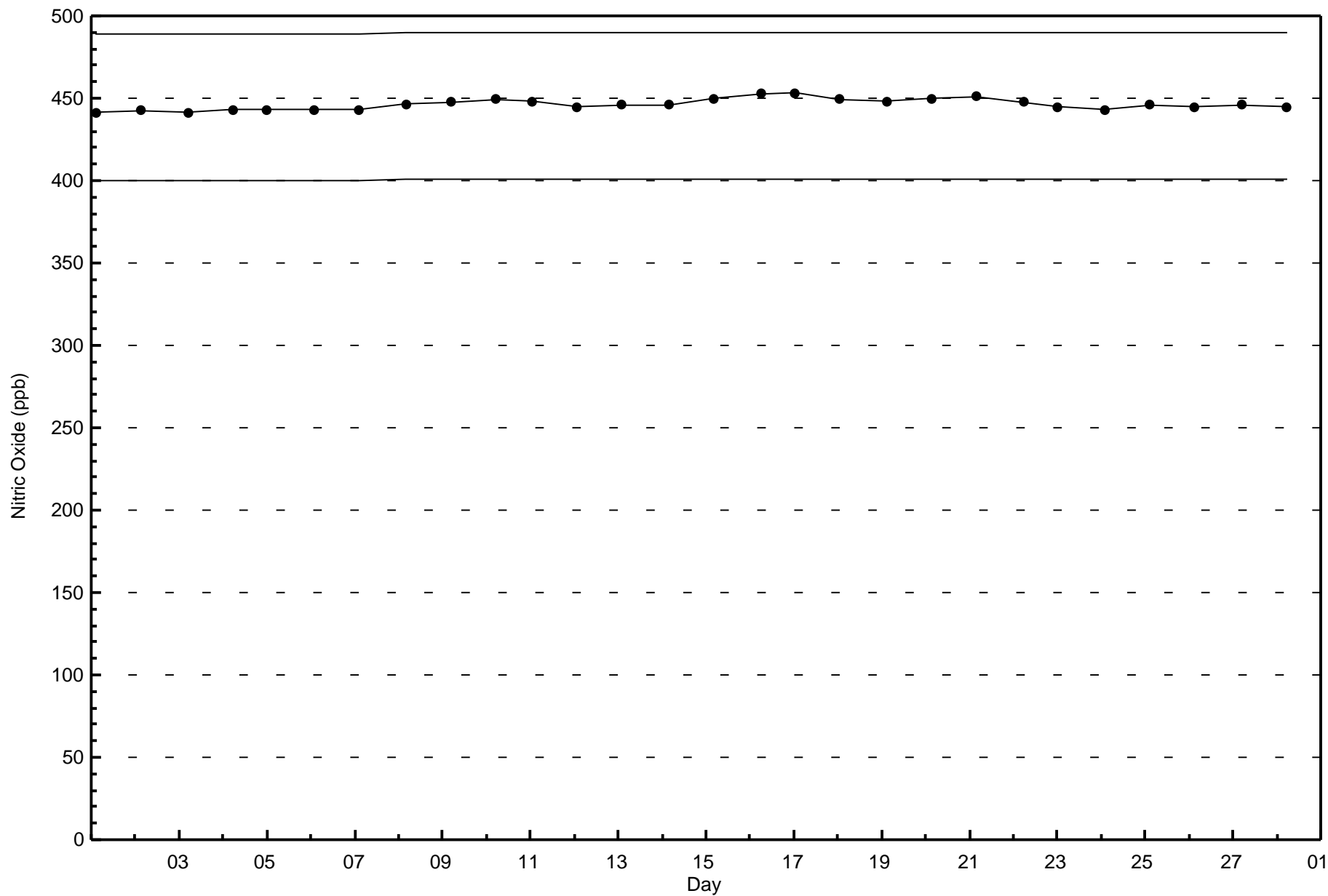


Wood Buffalo Environmental Association

Span Responses

Nitric Oxide (NO) - ppb

Fort McKay South - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

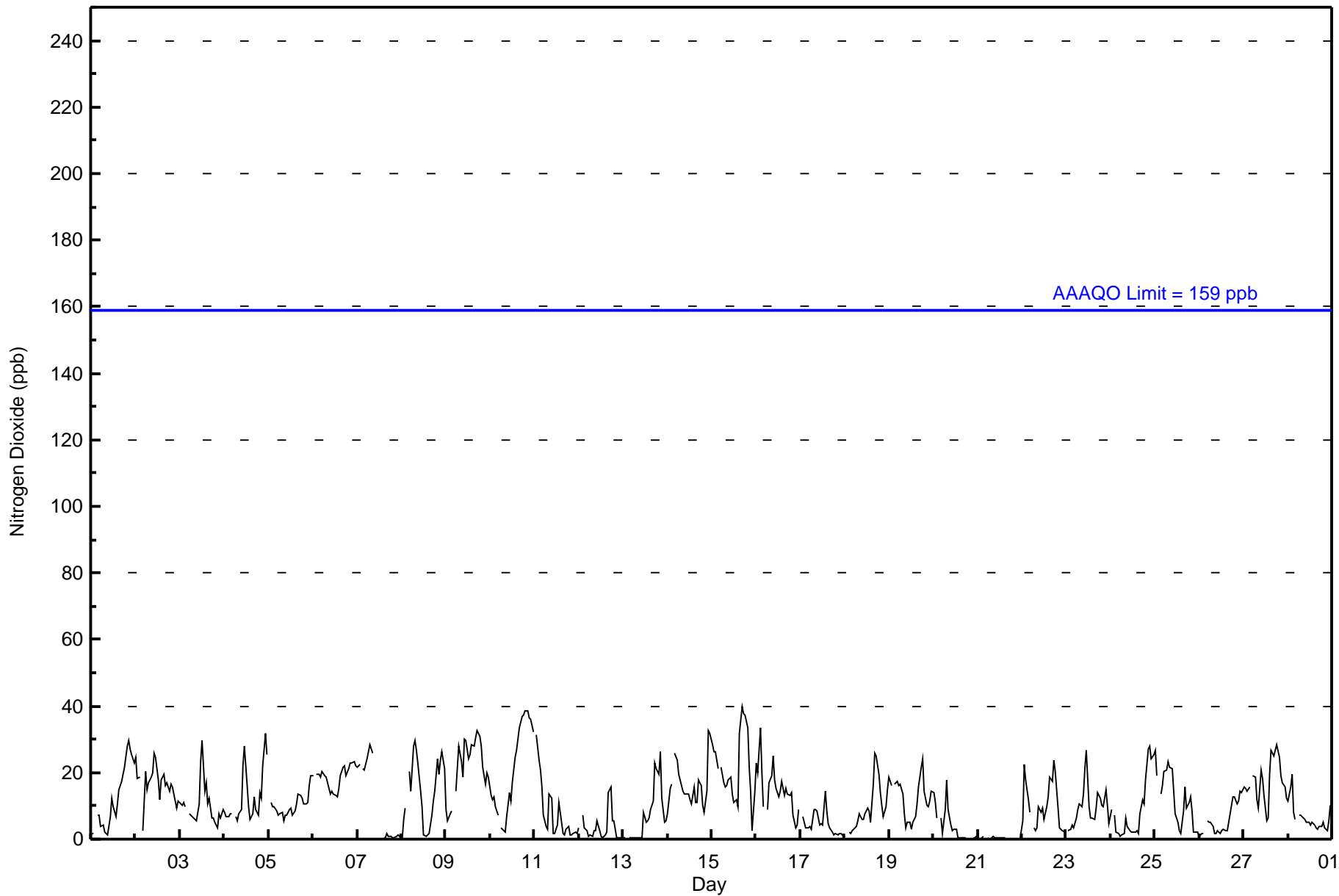
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																	
Maximum Value: 40 ppb on Feb 15 17:00										Maximum Daily Average: 21.8 ppb on Feb 9																	
Minimum Value: 0 ppb on Feb 20 19:00										Minimum Daily Average: 0.3 ppb on Feb 21																	
Maximum Diurnal Average: 15.3 ppb at hour 18										Minimum Diurnal Average: 8.6 ppb at hour 14																	
Monthly Average: 11.5 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 10 Q ₃ = 18 P ₉₀ = 25 P ₉₉ = 37																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2	2	Z	7	7	4	4	2	2	1	7	12	10	7	11	15	17	19	21	28	30	27	25	23	12.3	30	
2-Feb	25	18	19	Z	3	20	15	17	19	20	26	25	18	12	18	19	16	17	14	17	16	11	9	11	16.7	26	
3-Feb	11	10	11	10	Z	8	7	6	6	5	10	23	30	14	17	11	12	6	6	5	3	8	6	9	10.2	30	
4-Feb	8	7	7	8	8	Z	7	6	8	8	9	22	28	16	10	6	8	13	9	7	14	12	22	32	25	12.6	32
5-Feb	Z	11	10	10	9	7	8	8	6	7	7	9	9	7	8	11	14	13	12	11	11	11	16	19	10.1	19	
6-Feb	19	Z	19	20	19	20	19	19	17	14	15	14	13	13	15	19	22	22	19	21	23	23	23	22	18.6	23	
7-Feb	22	22	Z	21	21	24	26	28	26	C	C	C	C	C	1	1	2	1	1	1	0	1	1	1	11.1	28	
8-Feb	0	6	9	Z	20	14	28	30	27	23	15	10	1	1	1	2	7	11	14	24	20	24	26	21	14.5	30	
9-Feb	9	6	8	8	Z	14	21	28	24	19	30	30	24	26	28	28	31	33	31	28	22	17	20	19	21.8	33	
10-Feb	13	12	13	10	7	Z	3	3	2	7	14	11	17	25	27	30	33	37	37	39	38	36	36	32	21.0	39	
11-Feb	Z	32	24	21	16	7	4	3	13	12	2	2	4	11	8	2	1	3	4	1	1	2	2	2	7.6	32	
12-Feb	3	Z	7	4	3	1	1	1	2	2	6	3	1	1	1	2	14	16	5	6	0	0	0	0	3.4	16	
13-Feb	0	0	Z	1	0	0	0	0	0	0	1	8	5	6	6	9	11	23	21	20	26	12	5	5	7.0	26	
14-Feb	8	15	16	Z	26	24	20	18	15	14	14	14	12	11	16	11	18	16	10	8	14	33	32	16.2	33		
15-Feb	28	26	26	21	Z	22	17	16	16	18	19	14	11	12	10	32	40	38	37	33	21	15	2	14	21.2	40	
16-Feb	23	20	33	20	10	Z	9	17	19	25	18	15	13	14	17	13	15	14	13	14	7	4	4	9	15.0	33	
17-Feb	Z	7	5	3	3	4	3	9	9	8	4	5	4	14	9	5	3	2	1	2	1	2	2	1	4.6	14	
18-Feb	1	Z	2	2	3	3	4	6	8	6	6	8	9	9	5	17	26	25	20	14	10	7	10	15	9.3	26	
19-Feb	19	16	Z	17	18	16	16	13	8	3	5	5	3	5	7	10	16	22	24	15	10	10	11	15	12.3	24	
20-Feb	14	11	6	Z	7	2	9	18	9	4	3	3	3	0	0	0	1	0	0	0	0	0	1	1	4.0	18	
21-Feb	1	0	0	1	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Feb	6	22	18	12	8	Z	4	3	4	10	8	9	6	10	13	19	17	24	20	10	3	3	2	2	10.1	24	
23-Feb	Z	3	3	4	4	7	9	11	10	14	21	27	10	7	6	6	9	14	12	10	10	15	10	5	9.7	27	
24-Feb	9	Z	7	2	2	1	1	2	6	4	2	2	2	2	3	2	8	12	11	18	27	28	24	26	8.7	28	
25-Feb	27	19	Z	14	16	21	21	24	22	21	15	8	5	3	2	9	16	9	11	13	8	2	2	2	12.4	27	
26-Feb	1	2	2	Z	6	5	5	4	2	2	3	2	3	3	3	2	5	10	13	13	11	11	14	14	5.8	14	
27-Feb	16	15	14	16	Z	19	19	12	10	21	18	13	5	6	20	27	25	27	29	25	19	17	16	12	17.3	29	
28-Feb	12	16	19	8	6	Z	7	7	6	6	5	5	4	5	4	4	3	4	4	5	3	3	6	10	6.6	19	
11.4 12.4 12.1 10.3 9.5 10.6 10.3 11.0 10.5 10.2 10.9 11.2 8.8 8.6 9.3 11.1 13.8 15.3 14.5 14.1 12.3 11.5 12.1 12.4																								Diurnal Average			
28 32 33 21 26 24 28 30 27 25 30 30 30 26 28 32 40 38 37 39 38 36 36 32																								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
Fort McKay South - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	527	82.47	82.47
21 - 40	112	17.53	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - February 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	81	63	24	4	4	6	12	33	39	33	45	48	36	30	33	36	527
21 - 40	15	5	4	0	1	3	4	7	24	22	6	9	1	1	2	8	112
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	96	68	28	4	5	9	16	40	63	55	51	57	37	31	35	44	639

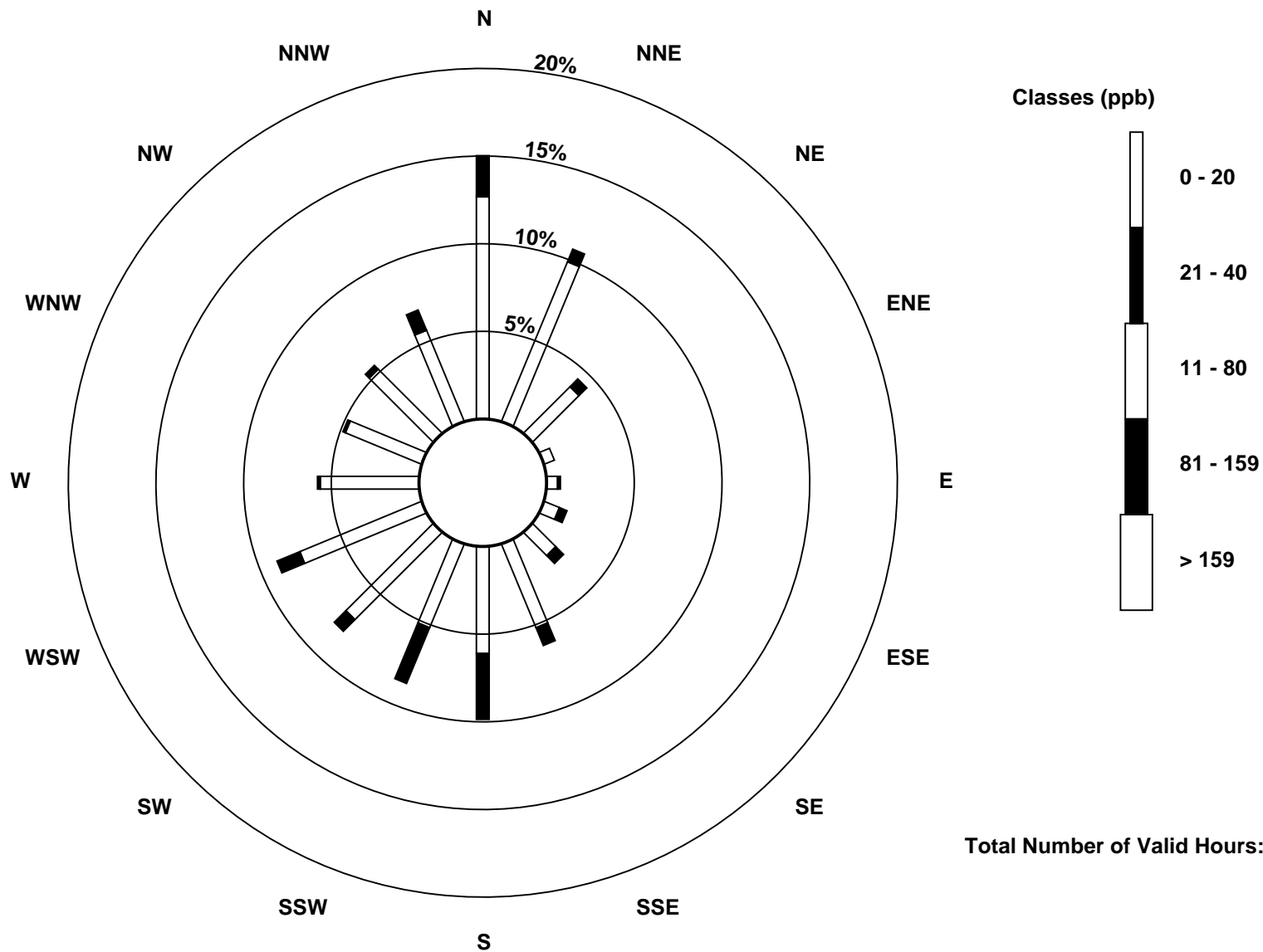
Total Number of Valid Hours: 639

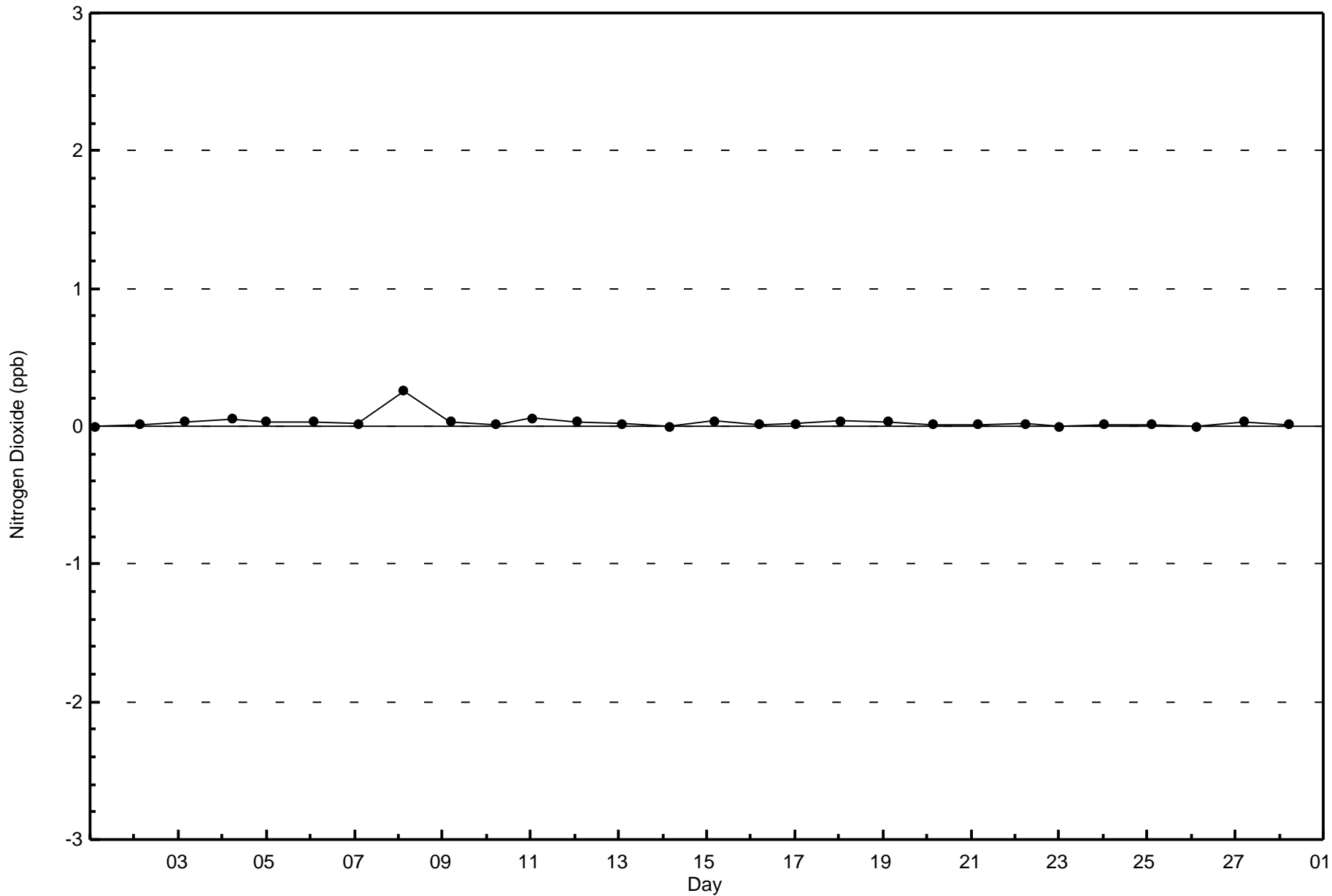
Total Number of Hours: 672

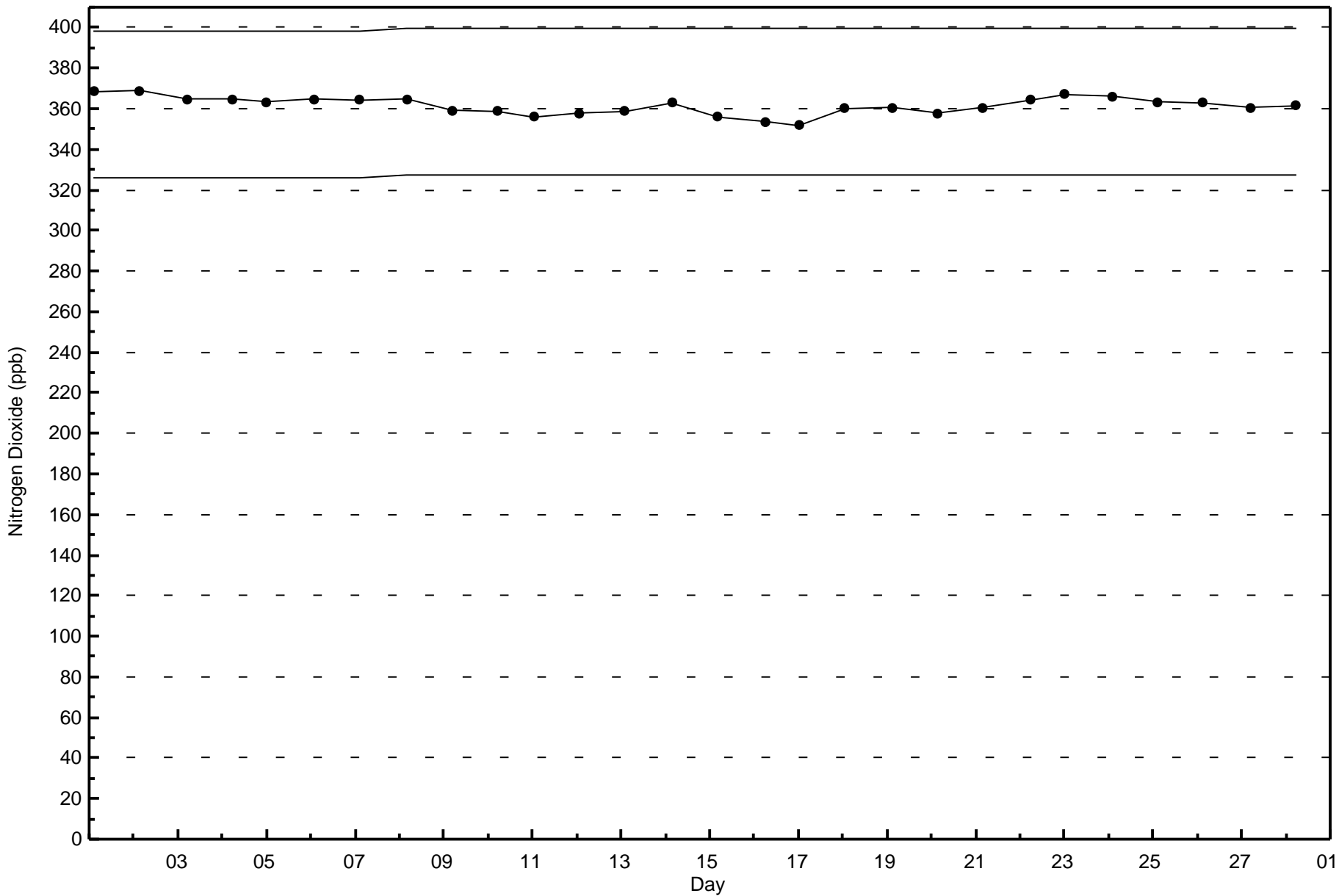


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

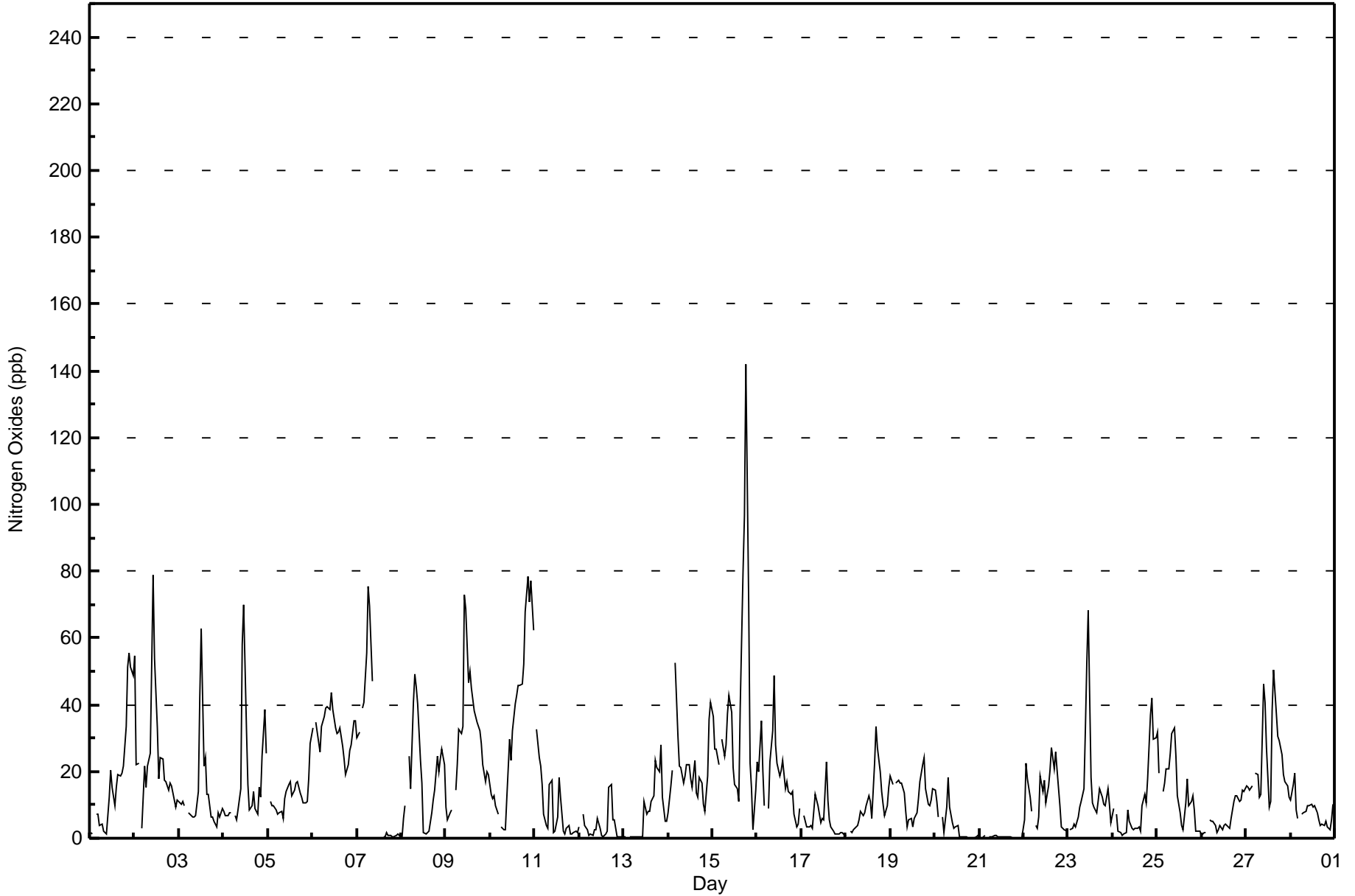
Fort McKay South - February 2017

Maximum Value: 142 ppb on Feb 15 19:00		Maximum Daily Average: 37.3 ppb on Feb 15		Hours in Service: 672																																												
Minimum Value: 0 ppb on Feb 21 21:00		Minimum Daily Average: 0.3 ppb on Feb 21		Hours of Data: 639																																												
Maximum Diurnal Average: 22.7 ppb at hour 11		Minimum Diurnal Average: 11.6 ppb at hour 4		Hours of Missing Data: 33																																												
Monthly Average: 15.9 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 11 Q ₃ = 22 P ₉₀ = 37 P ₉₉ = 76		Hours of Calibration: 33																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	2	1	Z	7	7	4	4	2	2	1	12	20	15	10	15	19	19	20	22	33	51	55	51	49	18.4	55																						
2-Feb	55	22	Z	Z	3	22	15	22	25	52	79	54	33	18	24	24	17	17	14	17	16	11	9	11	25.3	79																						
3-Feb	11	10	11	10	Z	8	7	6	6	7	14	42	63	22	24	13	13	6	6	5	3	7	6	9	13.5	63																						
4-Feb	8	7	7	8	8	Z	7	6	8	15	58	70	32	16	9	10	14	9	7	15	12	25	38	26	18.0	70																						
5-Feb	Z	11	10	10	9	7	8	8	6	12	14	16	17	13	14	17	17	14	12	11	11	11	18	28	12.7	28																						
6-Feb	33	Z	35	29	26	34	36	39	39	39	44	39	33	31	32	33	27	24	19	22	26	28	35	35	32.1	44																						
7-Feb	30	32	Z	39	41	56	75	69	47	C	C	C	C	C	1	1	2	1	1	1	0	1	1	1	22.1	75																						
8-Feb	0	6	10	Z	25	15	41	49	45	40	23	17	2	1	2	2	7	12	14	25	20	24	27	22	18.6	49																						
9-Feb	9	6	8	8	Z	14	22	33	31	33	73	69	47	50	45	38	36	35	32	28	22	17	20	19	30.3	73																						
10-Feb	13	12	13	10	7	Z	3	3	2	12	30	23	32	40	43	46	46	46	52	68	78	71	77	62	34.3	78																						
11-Feb	Z	33	24	21	16	7	4	3	16	17	2	2	6	18	12	2	1	3	4	1	1	1	2	2	8.7	33																						
12-Feb	3	Z	7	4	3	1	1	1	2	2	6	3	1	0	1	2	15	16	5	6	0	0	0	0	3.6	16																						
13-Feb	0	0	Z	1	0	0	0	0	0	0	1	11	7	8	8	11	13	23	21	20	28	12	5	5	7.7	28																						
14-Feb	8	16	21	Z	53	31	22	21	17	19	22	22	18	15	23	14	12	18	16	10	8	19	36	41	20.9	53																						
15-Feb	37	27	27	22	Z	30	25	28	37	43	38	21	16	15	11	39	80	96	142	71	23	15	2	14	37.3	142																						
16-Feb	23	20	35	20	10	Z	9	23	32	49	28	22	19	20	23	15	17	14	13	14	7	4	4	9	18.7	49																						
17-Feb	Z	7	5	3	3	4	3	13	11	10	5	6	6	23	12	5	3	2	1	1	1	2	2	1	5.6	23																						
18-Feb	1	Z	2	2	3	3	4	6	8	7	8	10	13	11	6	23	33	27	20	14	10	7	10	15	10.5	33																						
19-Feb	19	16	Z	17	18	16	16	14	8	4	6	6	4	6	8	12	17	22	24	15	10	10	11	15	12.6	24																						
20-Feb	14	11	6	Z	7	2	9	18	9	5	3	4	4	0	0	0	0	0	0	0	0	0	1	1	4.2	18																						
21-Feb	1	0	0	1	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
22-Feb	5	23	18	12	8	Z	4	3	6	19	14	18	10	16	20	27	21	26	20	10	3	3	2	2	12.6	27																						
23-Feb	Z	2	3	4	4	6	9	11	15	33	53	68	18	11	9	8	11	15	12	10	10	15	10	5	14.8	68																						
24-Feb	9	Z	7	2	2	1	1	2	9	5	3	3	3	3	2	10	13	11	18	37	42	30	30	10.7	42																							
25-Feb	32	19	Z	14	16	21	21	25	31	33	25	13	8	4	3	11	18	10	11	13	8	2	2	2	14.8	33																						
26-Feb	1	2	2	Z	6	5	5	4	2	2	4	3	4	4	3	3	6	11	13	13	11	11	15	14	6.2	15																						
27-Feb	16	15	15	16	Z	19	19	12	13	46	41	27	9	11	38	50	37	30	29	25	19	17	16	12	23.2	50																						
28-Feb	12	16	20	8	6	Z	7	8	8	10	10	10	9	10	8	5	4	4	4	5	3	3	5	10	8.0	20																						
																								14.2	13.1	13.3	11.6	12.0	13.3	13.5	15.3	15.7	19.1	22.7	22.1	15.9	13.9	14.2	15.4	17.8	18.4	18.9	16.8	15.1	14.7	15.6	15.8	Diurnal Average
																								55	33	35	39	53	56	75	69	47	52	79	70	63	50	45	50	80	96	142	71	78	71	77	62	Diurnal Maximum
Z - zerospan																								C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	467	73.08	73.08
21 - 40	122	19.09	92.18
41 - 80	48	7.51	99.69
81 - 159	2	0.31	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 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	78	56	21	3	2	6	7	25	26	28	38	47	34	29	32	35	467
21 - 40	14	7	3	1	2	0	5	11	22	22	12	9	3	2	2	7	122
11 - 80	4	5	4	0	1	3	4	3	15	4	1	1	0	0	1	2	48
81 - 159	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	68	28	4	5	9	16	40	63	55	51	57	37	31	35	44	639

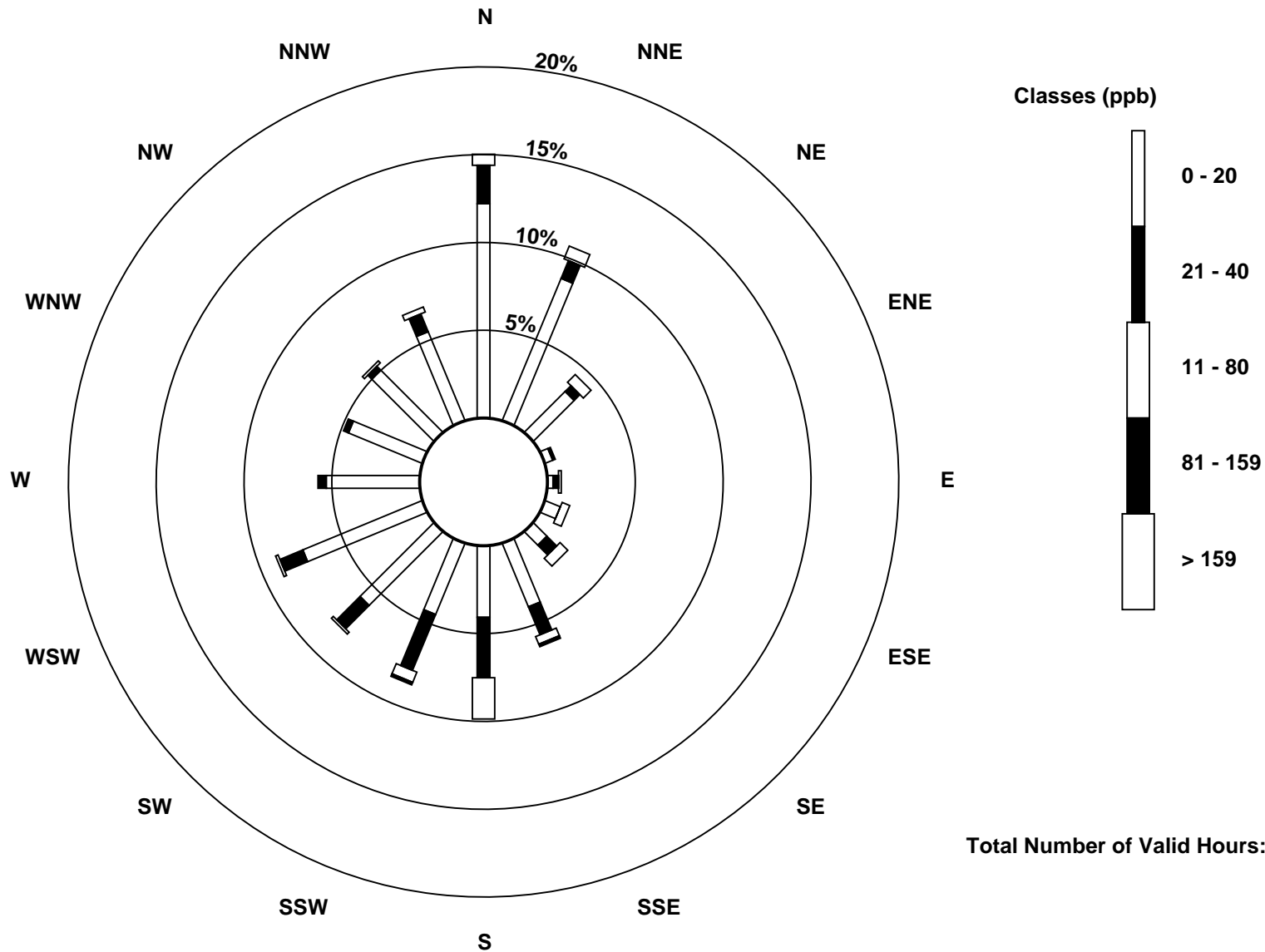
Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

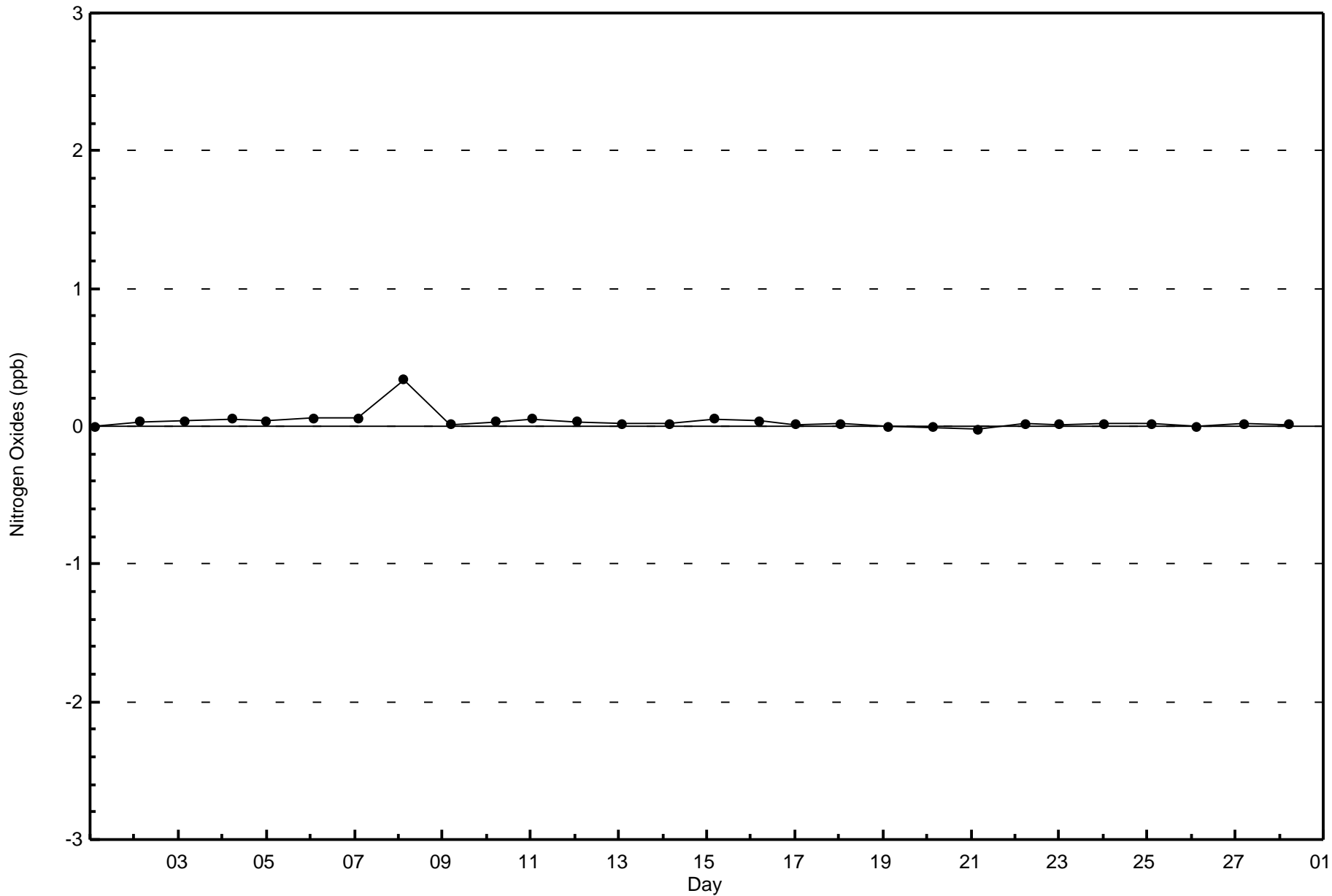
Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)

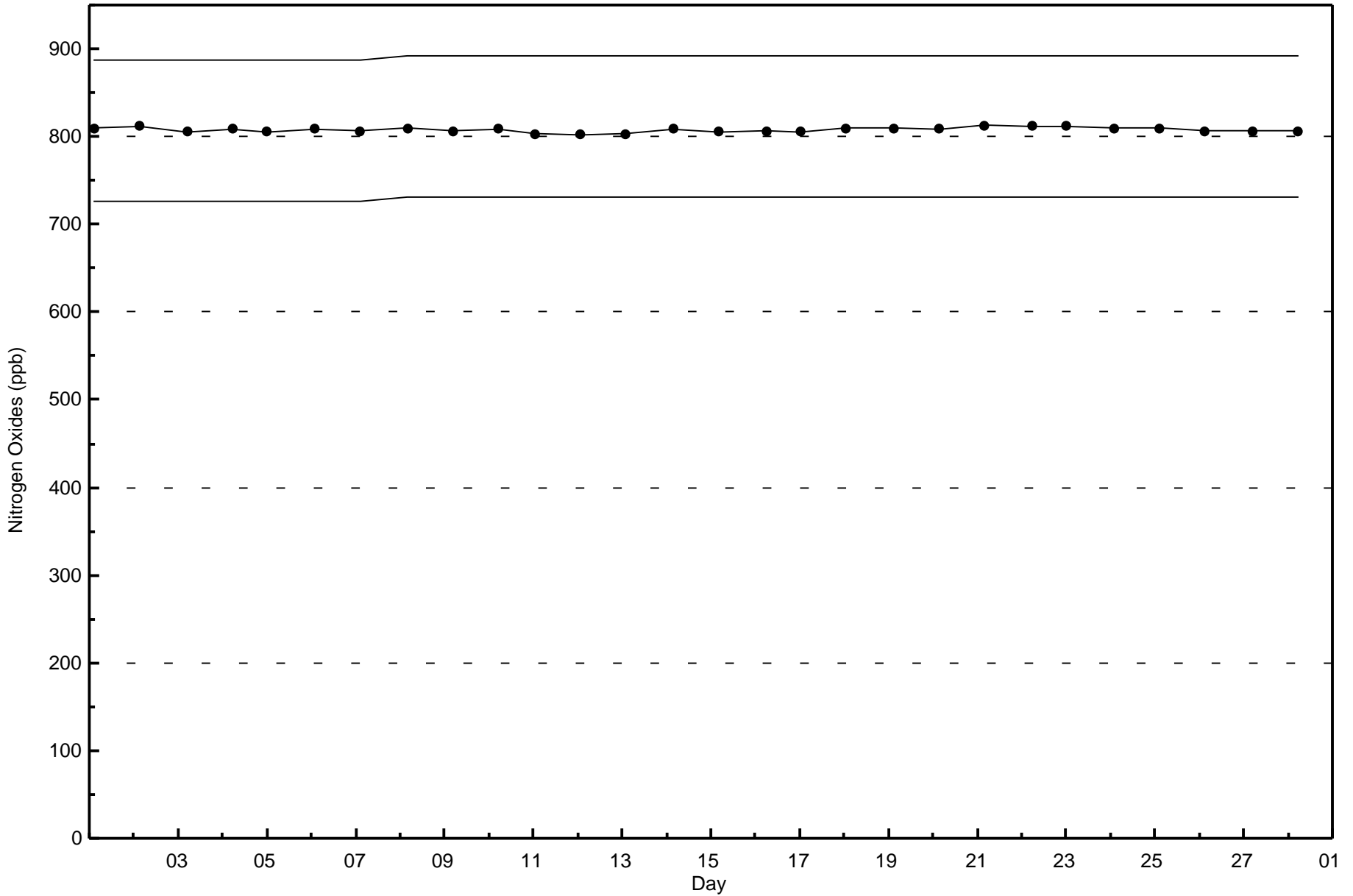




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 2017





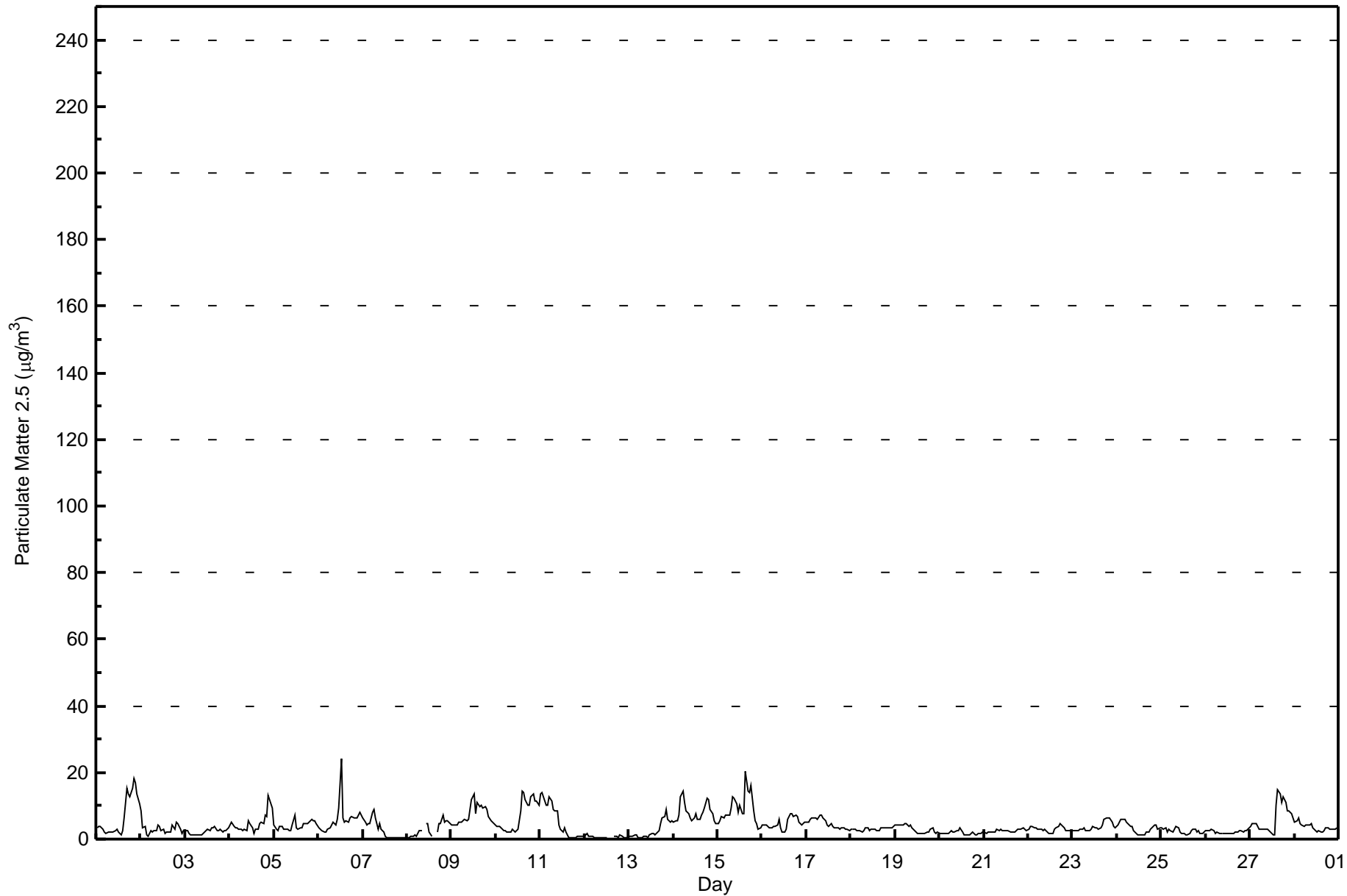


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 24.0 µg/m ³ on Feb 6 13:00 Minimum Value: 0.3 µg/m ³ on Feb 12 13:00 Maximum Diurnal Average: 5.5 µg/m ³ at hour 20 Monthly Average: 4.17 µg/m ³		Maximum Daily Average: 8.9 µg/m ³ on Feb 15 Minimum Daily Average: 0.7 µg/m ³ on Feb 12 Minimum Diurnal Average: 3.0 µg/m ³ at hour 14 Percentiles: P ₁ = 0.4 P ₁₀ = 1.2 Q ₁ = 2.2 Median = 3.2 Q ₃ = 5.1 P ₉₀ = 8.5 P ₉₉ = 15.1		Hours in Service: 672 Hours of Data: 666 Hours of Missing Data: 6 Hours of Calibration: 1 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-Feb	3.2	3.7	3.6	2.8	2.2	1.9	2.3	2.1	1.9	2.2	2.7	2.9	2.1	1.5	2.5	6.6	15.2	13.4	12.8	15.4	18.4	16.7	13.7	10.4	6.7	18.4	
2-Feb	8.5	3.6	3.6	1.3	1.1	2.4	2.2	2.5	2.5	4.1	3.9	2.6	2.8	1.7	1.9	2.0	2.3	4.0	3.0	5.2	4.5	3.1	1.9	2.5	3.1	8.5	
3-Feb	2.4	2.4	1.8	1.4	1.1	1.1	1.1	1.1	1.2	1.2	1.9	2.4	3.0	2.7	3.6	3.3	3.7	2.5	2.7	2.8	2.0	2.5	2.4	3.3	2.2	3.7	
4-Feb	4.4	4.9	3.7	3.5	3.2	3.0	3.1	2.6	2.8	2.4	5.3	4.7	3.6	1.7	3.1	2.8	4.6	5.1	4.8	7.2	6.6	13.3	10.5	9.5	4.8	13.3	
5-Feb	4.2	3.2	2.6	3.8	3.7	3.0	3.0	2.8	2.5	2.5	4.3	7.3	3.5	3.2	3.6	3.6	4.7	4.7	4.7	5.1	5.9	5.5	5.5	4.8	4.1	7.3	
6-Feb	3.4	2.8	2.5	2.3	2.1	2.9	3.3	4.1	4.9	4.0	6.1	9.1	24.0	6.4	5.1	5.6	5.1	6.3	6.6	6.3	6.3	6.4	8.0	7.1	5.9	24.0	
7-Feb	6.2	5.0	4.4	4.8	4.5	8.0	8.9	6.1	3.2	4.5	3.0	2.0	0.9	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	2.8	8.9	
8-Feb	0.4	0.5	0.7	0.9	1.2	1.1	2.7	2.7	2.4	C	4.6	4.6	1.9	0.8	UO	UO	2.0	4.6	4.7	7.4	5.2	5.6	5.6	4.8	3.1	7.4	
9-Feb	4.0	4.3	4.4	4.2	5.0	5.0	5.4	5.8	5.5	5.9	9.0	11.8	13.5	7.6	10.9	9.6	10.0	9.5	9.6	8.7	6.8	5.4	5.0	4.5	7.1	13.5	
10-Feb	3.8	4.0	3.9	3.2	2.7	2.4	2.3	2.2	2.3	2.8	2.3	2.6	2.8	8.4	14.3	14.0	11.7	10.2	10.2	12.6	13.8	11.5	11.5	10.1	6.9	14.3	
11-Feb	13.3	14.0	11.5	10.4	10.4	12.6	11.6	8.8	8.6	8.3	4.4	2.9	2.1	3.5	2.0	0.5	0.4	0.4	0.5	0.4	0.8	0.9	1.0	1.0	5.4	14.0	
12-Feb	1.0	1.5	0.9	0.7	0.8	0.5	0.4	0.4	0.5	0.6	0.6	0.4	0.3	UO	UO	UO	0.8	0.8	0.5	1.1	0.8	0.6	0.6	0.6	0.7	1.5	
13-Feb	0.7	0.7	0.9	1.3	1.1	0.6	0.6	0.6	1.0	0.9	0.5	1.2	1.6	1.6	1.3	1.7	2.6	4.7	6.3	6.9	8.8	6.1	4.9	5.5	2.6	8.8	
14-Feb	5.3	5.4	5.5	7.1	12.7	14.4	11.0	8.3	7.7	6.2	5.3	6.3	7.5	5.8	5.9	7.1	7.9	9.1	12.4	11.9	8.8	7.7	5.4	4.7	7.9	14.4	
15-Feb	4.6	5.5	6.8	6.5	7.1	7.4	7.1	9.2	12.9	12.4	10.6	8.2	10.2	7.8	7.5	20.5	14.5	14.1	16.0	8.4	5.4	4.6	3.1	3.3	8.9	20.5	
16-Feb	4.4	4.4	4.4	3.8	3.2	3.4	3.7	4.0	4.0	5.8	3.3	1.9	2.1	2.8	6.1	7.5	7.8	6.6	7.1	6.9	5.0	4.1	4.5	5.3	4.7	7.8	
17-Feb	4.9	5.2	6.1	6.5	6.4	6.2	6.0	7.2	7.3	6.5	5.3	4.3	3.9	4.7	4.0	3.2	3.6	3.3	3.0	3.2	3.4	3.1	2.8	2.7	4.7	7.3	
18-Feb	3.0	2.8	2.9	2.5	2.6	2.4	2.2	2.5	3.4	3.5	2.6	3.1	2.9	3.0	2.5	2.7	3.6	3.5	3.3	3.4	3.3	3.5	3.4	3.6	3.0	3.6	
19-Feb	4.2	4.4	4.1	4.1	4.4	4.6	4.5	4.0	4.1	3.5	2.9	2.0	1.6	1.6	1.6	1.7	1.8	1.9	2.2	3.1	3.2	2.2	1.9	2.1	3.0	4.6	
20-Feb	1.6	1.5	1.5	1.6	1.6	1.7	2.5	2.3	2.1	2.4	2.5	3.3	2.1	1.4	1.2	1.3	1.4	1.7	2.0	1.5	1.4	1.5	1.7	2.2	1.8	3.3	
21-Feb	2.2	1.9	2.0	2.2	2.0	2.0	2.1	3.0	2.7	2.9	2.6	2.7	2.7	2.5	2.3	2.2	2.1	2.3	3.1	3.1	3.0	3.3	3.0	2.7	2.5	3.3	
22-Feb	2.9	3.9	3.8	3.4	3.2	2.9	2.8	2.9	2.4	2.9	1.9	1.7	1.6	1.7	2.8	3.4	3.7	4.5	4.2	3.3	2.7	2.6	2.6	2.7	2.9	4.5	
23-Feb	2.5	2.4	2.4	2.5	3.1	3.1	3.5	2.7	2.5	2.5	3.2	3.8	3.5	3.4	2.9	3.4	4.3	6.0	6.4	6.5	6.6	5.2	3.8	3.4	3.7	6.6	
24-Feb	4.4	5.1	6.0	5.7	5.9	5.2	4.5	4.0	4.0	2.7	1.6	1.2	1.4	1.2	1.3	1.3	2.0	2.3	3.1	3.6	4.3	4.1	3.1	3.4	3.4	6.0	
25-Feb	3.5	3.1	3.4	2.3	2.8	2.4	2.3	3.0	3.7	3.4	2.2	1.7	1.7	1.3	1.2	1.7	2.5	2.8	2.8	2.2	2.4	1.7	1.9	2.1	2.4	3.7	
26-Feb	2.4	2.4	2.6	2.9	2.7	1.9	1.9	1.8	1.9	1.8	1.8	1.7	1.6	1.5	1.5	1.7	1.9	2.2	2.3	2.5	2.3	2.5	2.5	2.9	2.1	2.9	
27-Feb	3.8	4.5	4.6	4.6	3.8	2.8	2.8	3.0	3.1	3.0	2.3	2.0	1.4	1.4	10.3	15.0	13.7	11.2	12.6	11.2	8.6	8.4	7.5	6.2	6.2	15.0	
28-Feb	5.2	5.3	6.5	4.7	4.2	4.0	4.2	4.2	4.4	4.5	3.5	2.6	2.1	2.4	2.2	2.3	2.5	3.2	3.2	3.1	3.0	2.9	3.1	3.4	3.6	6.5	
		3.9	3.9	3.8	3.6	3.7	3.9	3.9	3.7	3.8	3.8	3.6	3.6	3.9	3.0	3.9	4.8	4.9	5.1	5.4	5.5	5.1	4.8	4.3	4.1	Diurnal Average	
		13.3	14.0	11.5	10.4	12.7	14.4	11.6	9.2	12.9	12.4	10.6	11.8	24.0	8.4	14.3	20.5	15.2	14.1	16.0	15.4	18.4	16.7	13.7	10.4	Diurnal Maximum	
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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	468	70.27	70.27
6 - 15	141	21.17	91.44
16 - 25	5	0.75	92.19
26 - 80	0	0.00	92.19
> 81.0	0	0.00	92.19

Total Number of Valid Hours: 666

Total Number of Hours: 672



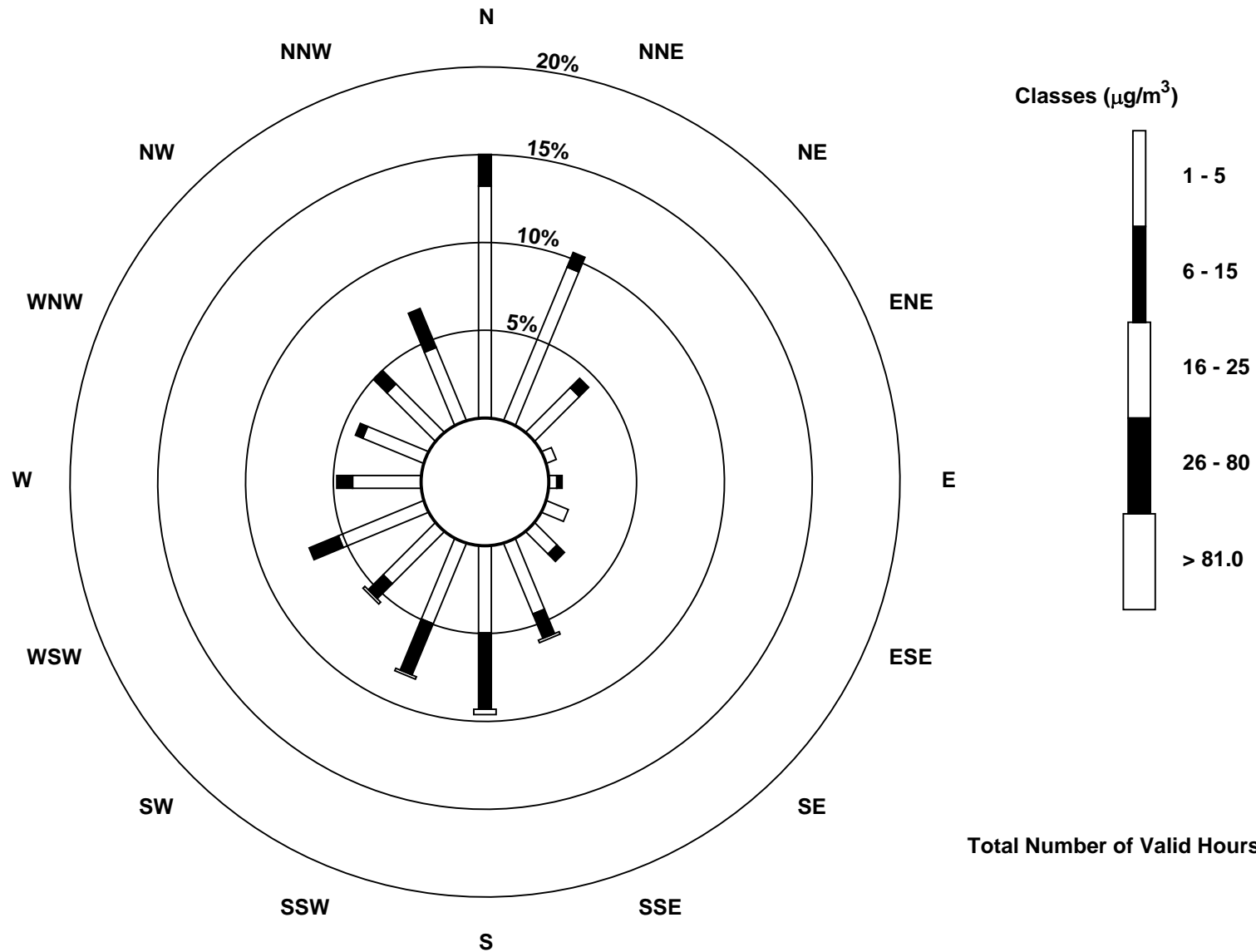
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - February 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	88	63	24	4	3	9	12	29	33	33	28	35	26	25	26	30	468
6 - 15	12	6	5	0	2	0	4	10	29	21	8	12	6	3	7	16	141
16 - 25	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	5
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	100	69	29	4	5	9	16	40	64	55	37	47	32	28	33	46	614

Total Number of Valid Hours: 666

Total Number of Hours: 672



Total Number of Valid Hours: 666



Wood Buffalo Environmental Association
Summary of Hour Averages

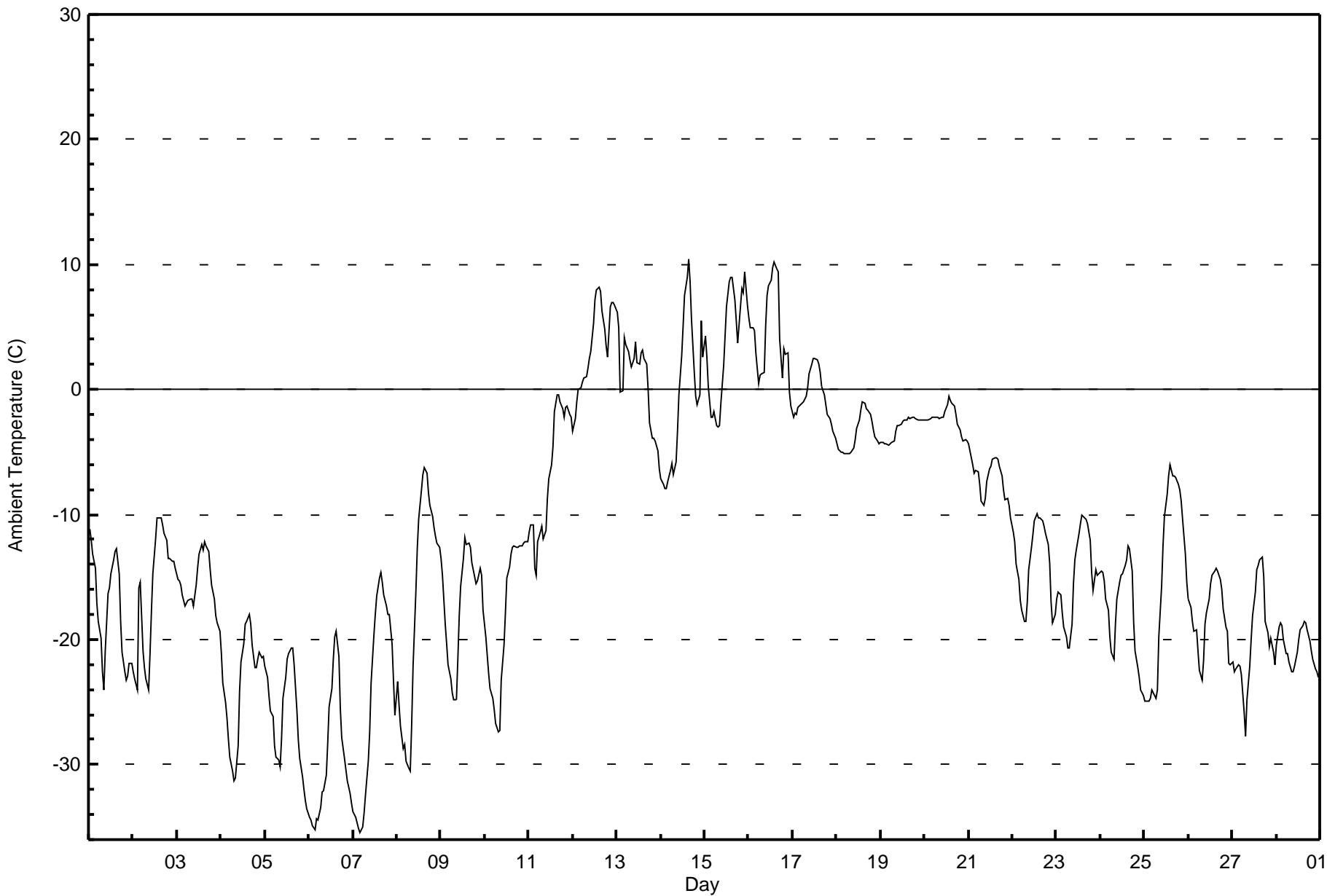
Ambient Temperature (AT) - C
Fort McKay South - February 2017

Maximum Value: 10.4 C on Feb 14 16:00 Maximum Daily Average: 4.5 C on Feb 16																							Hours in Service:	672		
Minimum Value: -35.4 C on Feb 7 05:00 Minimum Daily Average: -29.4 C on Feb 6																							Hours of Data:	672		
Maximum Diurnal Average: -7.0 C at hour 16 Minimum Diurnal Average: -16.6 C at hour 8																							Hours of Missing Data:	0		
Monthly Average: -12.07 C Percentiles: P ₁ = -34.4 P ₁₀ = -24.9 Q ₁ = -20.5 Median = -12.9 Q ₃ = -2.6 P ₉₀ = 2.5 P ₉₉ = 8.9																							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-Feb	-11.1	-12.1	-13.2	-14.2	-17.1	-18.5	-19.9	-22.6	-24.0	-20.9	-16.3	-15.9	-14.7	-13.6	-12.9	-12.7	-14.7	-18.5	-21.0	-22.6	-23.3	-22.9	-21.9	-21.9	-17.8	-11.1
2-Feb	-22.6	-23.1	-24.0	-15.8	-15.5	-20.9	-22.2	-23.2	-24.0	-21.2	-17.8	-14.7	-11.9	-10.2	-10.3	-10.3	-10.8	-11.5	-12.1	-13.5	-13.5	-13.7	-13.8	-14.3	-16.3	-10.2
3-Feb	-15.2	-15.3	-15.6	-16.4	-17.3	-17.1	-16.9	-16.7	-16.7	-17.3	-15.6	-14.3	-13.2	-12.4	-12.8	-12.1	-12.5	-12.9	-14.4	-15.6	-16.8	-18.1	-18.7	-19.3	-15.6	-12.1
4-Feb	-21.2	-23.5	-25.0	-26.2	-27.9	-29.4	-30.5	-31.3	-31.1	-28.5	-24.2	-21.8	-20.4	-18.8	-18.5	-18.0	-18.7	-20.5	-22.3	-22.2	-21.6	-21.4	-21.4	-21.4	-23.6	-18.0
5-Feb	-22.1	-23.0	-24.5	-25.7	-26.2	-28.5	-29.4	-29.7	-30.2	-27.9	-24.7	-23.0	-21.6	-21.1	-20.7	-20.6	-22.0	-25.7	-28.0	-29.5	-31.0	-32.0	-32.8	-33.6	-26.4	-20.6
6-Feb	-34.2	-34.5	-34.9	-35.2	-34.4	-34.4	-33.4	-32.2	-32.1	-30.8	-28.3	-25.4	-23.9	-21.5	-19.8	-19.3	-21.3	-25.5	-27.9	-29.5	-30.4	-31.4	-32.3	-33.0	-29.4	-19.3
7-Feb	-33.7	-34.2	-34.7	-35.1	-35.4	-35.0	-33.9	-32.4	-29.7	-27.4	-23.4	-19.7	-17.9	-16.5	-15.1	-14.6	-15.4	-16.4	-17.3	-18.0	-18.0	-20.3	-23.2	-26.0	-24.7	-14.6
8-Feb	-23.3	-25.3	-27.0	-28.7	-28.3	-29.7	-30.2	-30.5	-26.9	-22.1	-16.2	-12.8	-10.4	-8.1	-6.8	-6.2	-6.6	-8.3	-9.2	-10.2	-11.1	-11.8	-12.3	-12.6	-17.3	-6.2
9-Feb	-13.5	-14.9	-18.8	-20.4	-22.1	-23.1	-24.3	-24.8	-24.8	-21.6	-18.2	-15.8	-13.5	-11.8	-12.4	-12.3	-12.7	-13.8	-15.0	-15.6	-15.3	-14.4	-14.9	-17.7	-17.1	-11.8
10-Feb	-19.8	-21.3	-22.7	-23.9	-24.7	-25.6	-26.7	-27.4	-27.3	-23.2	-20.4	-17.9	-15.1	-14.2	-13.1	-12.6	-12.5	-12.6	-12.7	-12.5	-12.5	-12.3	-12.2	-12.1	-18.1	-12.1
11-Feb	-11.4	-10.9	-10.9	-14.4	-14.9	-12.2	-11.4	-10.9	-12.0	-11.2	-8.6	-7.1	-6.1	-4.5	-1.7	-0.5	-0.4	-1.0	-1.5	-2.3	-1.5	-1.3	-2.0	-2.2	-6.7	-0.4
12-Feb	-3.4	-2.4	-1.0	0.0	0.2	0.6	0.9	1.0	1.7	2.5	3.1	5.3	7.2	8.0	8.2	7.8	6.3	4.9	3.5	2.6	6.6	7.0	6.9	6.7	3.5	8.2
13-Feb	6.2	5.0	-0.2	-0.1	4.1	3.6	3.1	2.4	1.8	2.5	3.8	2.1	2.0	2.9	3.2	2.5	2.1	0.1	-2.7	-3.9	-3.9	-4.1	-4.9	-6.4	0.9	6.2
14-Feb	-7.1	-7.6	-7.9	-7.9	-7.4	-6.5	-5.9	-6.8	-5.7	-3.3	-0.4	2.7	5.0	7.5	9.0	10.4	8.6	5.6	1.4	-0.5	-1.2	-0.4	5.5	2.5	-0.4	10.4
15-Feb	4.3	2.6	0.2	-2.2	-2.2	-1.8	-2.9	-3.1	-2.9	-1.1	1.9	4.3	6.7	8.7	9.0	9.0	7.2	5.5	3.7	6.6	8.0	7.7	9.4	6.7	3.5	9.4
16-Feb	5.7	5.0	4.9	4.7	2.9	0.4	1.1	1.2	1.3	5.1	7.6	8.3	8.8	9.8	10.2	9.7	9.4	4.1	0.9	3.3	2.8	2.9	-0.2	-1.3	4.5	10.2
17-Feb	-2.2	-1.9	-1.9	-1.4	-1.2	-1.1	-1.0	-0.5	0.1	1.3	2.0	2.5	2.5	2.4	2.1	1.3	0.3	-0.4	-1.2	-2.0	-2.3	-2.8	-3.4	-3.9	-0.5	2.5
18-Feb	-4.4	-4.8	-5.0	-5.0	-5.1	-5.2	-5.1	-5.1	-5.0	-4.6	-4.0	-3.1	-2.4	-1.7	-1.0	-1.1	-1.5	-1.7	-2.0	-2.5	-3.3	-3.8	-4.1	-4.3	-3.6	-1.0
19-Feb	-4.2	-4.2	-4.3	-4.4	-4.4	-4.3	-4.3	-4.1	-3.4	-2.9	-2.9	-2.8	-2.5	-2.5	-2.4	-2.3	-2.3	-2.2	-2.2	-2.3	-2.4	-2.4	-2.4	-2.4	-3.1	-2.2
20-Feb	-2.4	-2.4	-2.4	-2.3	-2.3	-2.2	-2.2	-2.2	-2.3	-2.2	-2.2	-1.8	-1.2	-0.5	-0.9	-1.1	-1.3	-2.0	-2.8	-3.2	-3.8	-4.1	-4.0	-4.1	-2.3	-0.5
21-Feb	-4.4	-5.5	-6.0	-6.7	-6.5	-6.6	-7.5	-8.9	-9.2	-8.8	-7.4	-6.4	-6.1	-5.5	-5.4	-5.5	-5.6	-6.1	-6.9	-8.1	-8.8	-8.7	-9.2	-10.2	-7.1	-4.4
22-Feb	-11.3	-12.2	-13.9	-15.2	-16.8	-17.6	-18.6	-18.5	-17.0	-14.4	-12.6	-11.6	-10.5	-9.9	-10.3	-10.3	-10.5	-11.0	-11.5	-12.4	-13.9	-17.0	-18.7	-18.0	-13.9	-9.9
23-Feb	-16.8	-16.2	-16.4	-17.9	-19.0	-19.8	-20.6	-20.7	-18.8	-15.6	-13.6	-12.9	-11.5	-10.7	-10.1	-10.3	-10.4	-10.7	-12.0	-14.7	-16.1	-14.4	-14.8	-14.7	-14.9	-10.1
24-Feb	-14.5	-14.6	-15.4	-16.8	-17.7	-19.8	-21.0	-21.6	-18.8	-16.7	-15.4	-14.9	-14.7	-14.1	-13.7	-12.5	-12.7	-14.5	-18.6	-20.9	-22.3	-23.0	-24.0	-24.5	-17.6	-12.5
25-Feb	-24.9	-25.0	-24.9	-24.7	-24.0	-24.2	-24.7	-24.0	-19.8	-15.7	-12.5	-10.1	-8.4	-6.9	-6.0	-7.0	-6.9	-7.0	-7.6	-8.1	-8.9	-10.4	-13.2	-15.5	-15.0	-6.0
26-Feb	-16.7	-17.5	-18.6	-19.3	-19.2	-20.9	-22.4	-23.2	-21.6	-18.8	-17.9	-16.8	-15.6	-14.9	-14.5	-14.3	-14.6	-15.2	-16.0	-17.5	-19.0	-19.3	-21.9	-22.0	-18.2	-14.3
27-Feb	-21.8	-22.6	-22.3	-22.0	-22.1	-22.8	-25.8	-27.7	-24.8	-22.2	-19.9	-18.1	-16.2	-14.4	-14.1	-13.7	-13.4	-15.0	-18.6	-19.4	-20.5	-19.9	-21.1	-22.0	-20.0	-13.4
28-Feb	-20.5	-19.0	-18.7	-18.9	-20.0	-21.1	-21.1	-21.8	-22.6	-22.6	-22.1	-21.0	-20.0	-19.2	-18.9	-18.6	-18.7	-19.3	-20.1	-20.9	-21.6	-22.4	-22.6	-23.0	-20.6	-18.6
																							Diurnal Average			
																							Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort McKay South - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	176	26.19	26.19
-20 - 0	401	59.67	85.86
0 - 10	93	13.84	99.70
10 - 20	2	0.30	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



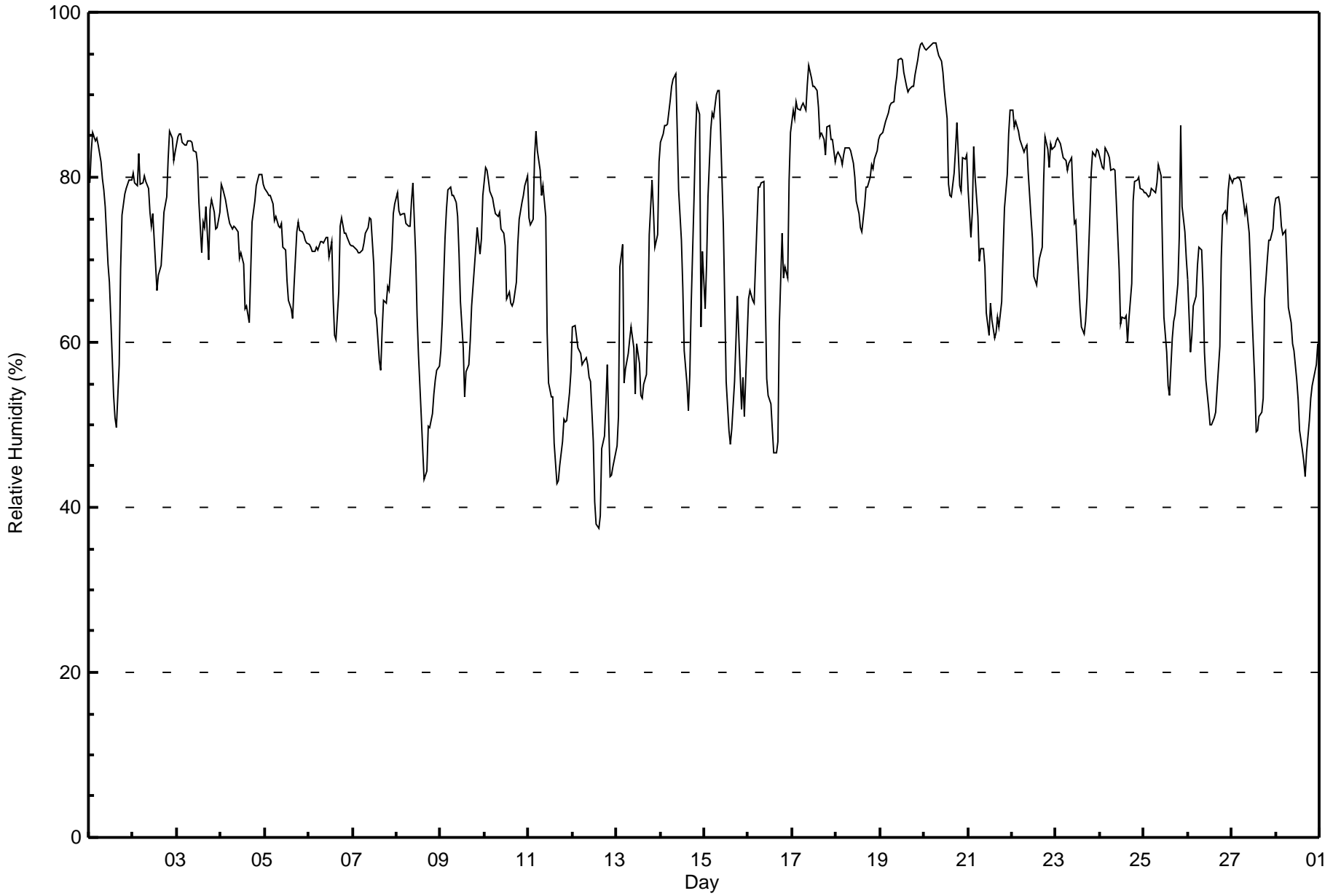
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort McKay South - February 2017

Maximum Value: 96 % on Feb 20 07:00																			Maximum Daily Average: 91.1 % on Feb 19						Hours in Service: 672			
Minimum Value: 37 % on Feb 12 15:00																			Minimum Daily Average: 51.3 % on Feb 12						Hours of Data: 672			
Maximum Diurnal Average: 79.0 % at hour 4																			Minimum Diurnal Average: 59.8 % at hour 16						Hours of Missing Data: 0			
Monthly Average: 72.3 %																			Percentiles: P ₁ = 44 P ₁₀ = 54 Q ₁ = 63 Median = 74 Q ₃ = 81 P ₉₀ = 86 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-Feb	79	83	85	84	85	84	82	80	78	76	70	67	63	54	51	50	57	69	75	78	79	79	80	80	73.7	85		
2-Feb	81	79	79	83	79	79	80	80	79	76	74	76	70	66	68	69	72	76	78	82	86	85	82	83	77.5	86		
3-Feb	85	85	85	84	84	84	84	84	84	83	83	82	77	71	75	74	77	70	76	77	76	74	74	76	79.3	85		
4-Feb	79	79	77	76	75	74	74	74	74	73	70	71	70	64	64	62	68	75	77	79	80	80	80	79	74.0	80		
5-Feb	79	78	78	78	77	75	75	74	74	74	71	71	68	65	64	63	67	73	75	74	73	73	72	72	72.6	79		
6-Feb	72	72	71	71	72	71	72	72	72	73	73	70	72	65	61	60	66	74	75	73	73	73	72	72	70.7	75		
7-Feb	72	71	71	71	71	71	72	73	74	75	75	70	64	63	58	57	61	65	65	67	66	71	76	77	68.9	77		
8-Feb	78	76	75	76	76	74	74	74	77	79	71	63	58	51	47	43	44	50	50	51	54	55	57	57	63.0	79		
9-Feb	59	63	73	76	78	79	78	78	77	75	71	65	59	53	56	57	60	64	69	72	74	71	73	78	69.1	79		
10-Feb	81	81	80	78	78	77	76	75	76	74	73	72	65	66	65	64	65	67	72	75	77	78	79	80	73.9	81		
11-Feb	75	74	75	83	86	83	81	78	79	75	61	55	53	53	48	43	43	45	48	51	50	51	54	56	62.5	86		
12-Feb	62	62	61	59	59	57	58	58	57	56	55	48	41	38	37	39	47	49	52	57	44	44	45	46	51.3	62		
13-Feb	47	51	69	72	55	57	59	60	62	59	54	60	57	54	53	55	56	63	73	80	76	72	73	82	62.4	82		
14-Feb	84	85	86	86	86	89	91	92	93	86	79	72	67	59	55	52	56	65	77	85	89	88	62	71	77.3	93		
15-Feb	64	70	78	86	88	87	90	91	90	86	74	65	55	49	48	49	55	60	66	56	52	56	51	61	67.7	91		
16-Feb	65	66	65	65	69	79	79	79	80	65	56	53	52	49	47	47	48	62	73	68	69	68	80	85	65.4	85		
17-Feb	88	87	89	88	88	89	89	88	91	94	92	91	91	91	88	85	85	85	83	86	86	85	85	82	87.7	94		
18-Feb	83	83	82	82	83	84	84	84	83	82	80	77	76	74	73	77	79	79	80	81	81	82	83	85	80.6	85		
19-Feb	85	85	86	87	88	89	89	89	91	92	94	94	94	93	91	90	91	91	91	92	94	95	96	96	91.1	96		
20-Feb	96	95	96	96	96	96	96	95	95	94	93	90	87	79	78	78	81	83	87	79	78	82	82	83	88.1	96		
21-Feb	78	73	76	84	80	75	70	71	71	69	63	61	65	63	61	61	63	62	65	71	76	80	85	88	71.3	88		
22-Feb	88	86	87	86	85	84	83	84	84	81	75	73	68	67	69	70	72	79	85	83	81	84	83	84	80.0	88		
23-Feb	84	85	84	83	82	82	81	82	82	78	74	75	68	64	62	61	62	65	75	80	83	82	83	83	76.8	85		
24-Feb	82	81	81	84	83	82	81	81	81	77	69	62	63	63	60	63	67	77	79	80	80	80	79	78	74.8	84		
25-Feb	78	78	78	78	79	78	78	79	82	80	71	63	59	55	54	61	63	63	67	73	86	76	73	70	71.7	86		
26-Feb	68	59	61	64	66	69	72	71	67	59	55	52	50	50	51	52	54	60	70	75	76	75	78	80	63.9	80		
27-Feb	79	80	80	80	80	79	77	76	76	73	69	63	55	49	49	51	51	53	65	70	72	72	74	76	68.8	80		
28-Feb	77	78	77	74	73	74	69	64	62	60	59	55	53	49	47	46	44	47	50	53	55	57	57	60	60.0	78		
	76.8	76.6	78.0	79.0	78.5	78.7	78.3	78.1	78.3	75.9	71.6	68.4	65.0	61.4	60.1	59.8	62.6	66.5	71.3	73.2	73.8	73.8	73.9	75.7	Diurnal Average			
	96	95	96	96	96	96	96	95	95	94	94	94	94	93	91	90	91	91	91	92	94	95	96	96	Diurnal Maximum			





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort McKay South - February 2017

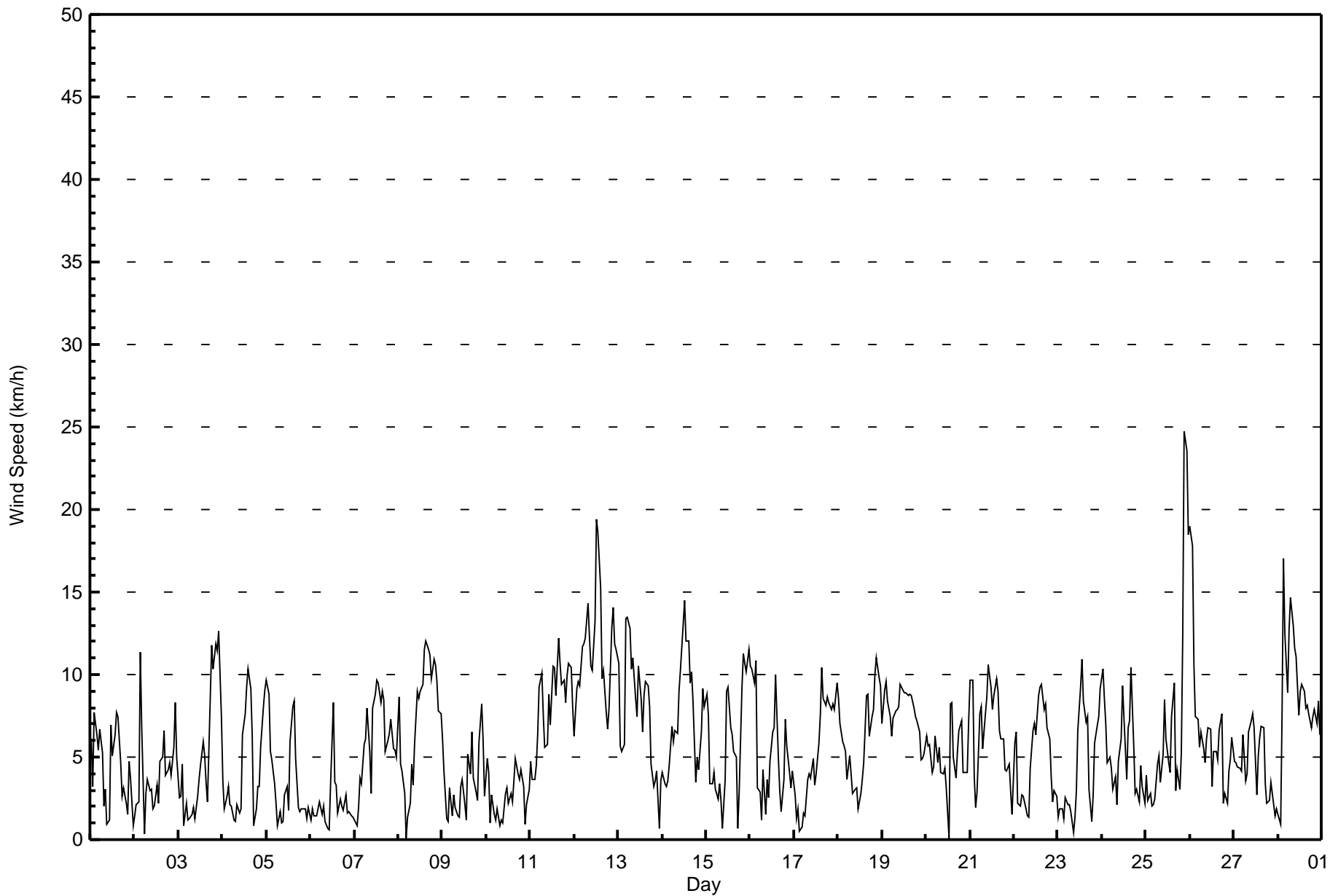
Maximum Speed: 25 km/h on Feb 25 22:00		Maximum Daily Speed Average: 10.7 km/h on Feb 12		Hours in Service: 672																							
Minimum Speed Value: 0 km/h on Feb 8 05:00		Minimum Daily Speed Average: 0.5 km/h on Feb 1		Hours of Data: 672																							
Maximum Diurnal Speed Average: 2.7 km/h at hour 23		Minimum Diurnal Speed Average: 0.1 km/h at hour 16		Hours of Missing Data: 0																							
Monthly Average Velocity: 1.1 km/h 293.9 deg		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 10 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-Feb	NNW6	NNW3	N8	N6	NNW5	NNW7	NNW5	W2	WSW3	SW1	SE1	SE7	ESE5	SSE6	SSE8	SSE7	S5	SW3	WSW3	SW2	SW2	S5	S4	S1	SSW0.5	N8	
2-Feb	WSW1	S2	SW2	W11	WSW7	WNW0	S3	S4	S3	S3	ESE2	ESE2	SSE3	NE2	NNE5	NNE5	N7	N4	N4	N5	N4	N6	N8	N5	NNW1.3	W11	
3-Feb	NNW3	N3	NNW5	NW1	NNW2	SSW1	NW1	SSW2	SSW2	W1	SE3	SE4	SE4	S6	SSE5	E3	N2	NNW9	N12	N10	NNE12	N11	N13	N7	NNE2.6	N13	
4-Feb	NNW4	W2	W3	W3	WSW2	SW2	WSW1	SSE1	WSW2	S2	ESE2	SSE6	S8	SSE9	SSE10	SSE9	SSE6	SE1	SW2	NNW3	NNW3	N6	N8	NNW9	S1.0	SSE10	
5-Feb	NNW10	NNW9	NW5	NW5	WNW3	WSW2	N1	SW2	WSW1	N1	NE3	NNE3	ENE2	SSE6	SSE8	SSE8	S5	SW2	WNW2	WSW2	WSW2	SSW2	WSW1	SSW2	W0.6	NNW10	
6-Feb	WSW1	SW2	SW1	SW1	SW2	SW2	W2	SW2	SW1	W1	NE1	SE3	SSE8	SE3	SSE3	E2	N2	NNW2	W2	WSW3	WSW2	WSW2	W1	SW1	SSW1.0	SSE8	
7-Feb	SSW1	WSW1	SSW2	S4	S3	S6	S6	S8	S5	S3	S8	SSW9	SW10	WSW9	WSW8	WSW9	WSW8	W5	NW6	NW6	NW7	WNW5	WNW5	WSW5	SSW4.2	SW10	
8-Feb	W9	W5	W4	SW3	S0	WNW1	SSW2	S5	S3	S6	SSW9	SSW9	SW9	SW9	SW12	SW12	SSW12	SSW11	SSW10	SSW11	S11	SSW10	SSW8	SW8	SSW6.7	SW12	
9-Feb	SW6	SW4	SSE1	ESE1	SW3	WSW1	SSW3	WSW2	WSW1	NNW1	SSE3	E4	N2	NE1	NE5	NNE4	N7	NNW4	WNW3	NW2	NNW6	N8	N6	NW3	NNW1.3	N8	
10-Feb	NNW5	NNW4	WNW1	WSW3	W1	WSW1	WSW2	SW1	WNW1	NNE1	NE3	NE3	E2	NE3	NE2	NNE4	NNE5	NNE4	NNW4	N4	N3	NNW1	N2	NW3	N1.8	NNE5	
11-Feb	WSW5	SSW4	SSW4	SW4	SW6	SW9	WSW10	WSW8	SW6	SSW6	WSW9	SW7	S11	SSE10	SSW9	WSW12	WSW11	SW9	SW10	SW8	SW10	SW11	SW10	SSW8	SSW7.6	WSW12	
12-Feb	S6	SSW9	SSW10	SSW9	SW12	SW12	SW12	SW14	SW12	SW10	SSW10	SW13	WSW19	WSW19	SW15	SSW10	S10	SSW8	S7	SSW8	WSW13	WSW14	WSW12	WSW12	SSW10.7	WSW19	
13-Feb	WSW11	SW6	SSW5	WSW6	W13	W14	W13	W10	W11	WNW9	NW7	NNE10	NNE8	N7	N9	N10	N9	N8	NNW5	NW3	NNW4	NNW4	NW1	S4	WNW4.3	WSW14	
14-Feb	S4	SSW3	S3	S4	S4	S7	SSW6	S7	S6	S9	SSE10	SSE13	SSE14	SSE12	SSE12	SSE12	S9	S10	S8	S3	S5	SSW4	SSW7	SSW9	SSW8	S7.2	SSE14
15-Feb	SSW9	SSE8	S3	SSW3	SSW4	S3	SSW2	S3	S2	S1	SE4	SE9	SSE9	S7	S6	S5	SSW5	SSE1	SW3	SSW9	SSW11	SSW11	SSW10	S11	S5.5	S11	
16-Feb	SSW11	SSW10	SSW9	SW11	WSW3	SSW3	W1	S4	NW2	SSE4	SE3	NNE5	NNE6	NNE7	N10	NNE5	N3	W2	NW4	NNW7	NNW6	NW4	WNW3	WNW4	W1.2	SW11	
17-Feb	WSW3	WSW1	W2	SSW1	W1	SSW2	WSW1	N4	NNW4	NW4	NW5	N3	NNE4	NNE6	NNE8	NNE10	NE9	NNE8	NE9	NNE8	NNE8	NE8	NE8	NNE9	NNE4.2	NNE10	
18-Feb	NNE9	NE7	NE6	NE6	NNE5	N4	N5	NNE4	N3	NNE3	NNE3	N2	NNE3	SE4	ENE5	N9	N9	N6	N7	N8	N10	N11	N10	N9	NNE5.6	N11	
19-Feb	N7	N9	N10	N8	N7	N6	NNE7	N8	NNE8	NE8	NNE9	NNE9	NNE9	NNE9	N9	N9	N9	N8	N7	N7	N7	N5	N5	NNW5	N7.5	N10	
20-Feb	NNW6	NNW6	NNW6	NNW4	NW4	NW6	NW5	NW6	NNW4	NNW4	NNE4	NE3	N0	NW8	WNW8	WNW5	WNW4	W5	W7	WNW7	W4	WSW4	SW4	SW7	NW3.9	WNW8	
21-Feb	WSW10	WSW10	SSW4	SW2	W3	WNW8	WNW8	W6	WSW8	WSW9	W11	WNW9	W8	W9	W10	W9	W7	NW6	WNW6	WNW4	W4	WNW5	WNW3	WNW2	W6.1	W11	
22-Feb	N6	N7	NNE2	NW2	WNW3	WSW3	W2	NW1	NW1	N4	N7	N7	NNE6	NNE9	N9	N9	N8	N8	N7	NNE6	NNE4	NW2	W3	WSW3	N4.1	NNE9	
23-Feb	S1	S2	SW2	NNW1	WSW3	W2	WSW2	WSW2	WSW0	ENE1	SE3	SE7	SE9	SSE11	SE8	SSE7	SSE7	SSE3	WNW1	NW3	NNW6	NNW7	NNW9	SSW10	SSE1.0	SSE11	
24-Feb	N10	N9	N7	NNW5	NW5	NW4	WNW3	WNW4	NNE2	NNE5	NNE6	N9	NE7	ENE4	SE7	SSE7	SSE10	S6	S3	WSW3	WSW2	S5	S3	SSW2	N1.1	SSE10	
25-Feb	S4	SSW2	SSW3	SW2	SSW2	SSW2	S5	S5	SSE4	SSE5	S9	SSE6	ESE5	E4	NNE7	NNE9	NE3	SW4	SSE3	NE5	NNE12	N25	N24	N18	NNE2.2	N25	
26-Feb	N19	NNW18	NNW11	NW7	NNW7	WNW6	NW7	NW6	NW5	NNW6	NNE7	NE7	ESE3	ESE5	NE5	NNE5	NNE7	N8	NNE2	NE3	NE2	N4	NNW5	N6	N5.3	N19	
27-Feb	N5	N5	N4	N4	N4	N6	NNW4	NW4	N7	NNE7	NNE8	NNE7	NE3	S5	SSW6	S7	S7	SSW3	SW2	SW2	S3	S3	W1	WNW2	N1.1	NNE8	
28-Feb	WSW2	SW1	N8	N17	NNE12	NNE9	N13	NNE15	NNE13	NNE12	N11	NNE8	NNE9	NE9	NE9	NNE8	NNE8	NE8	NNE7	NNE7	NNE8	N7	N8	N6	NNE8.5	N17	
WNW2.5WNW1.7WNW1.4WNW1.9 W2.2 W2.3 W2.3WSW1.9 W1.5WNW0.6 N0.2 E1.1 SE1.6 SSE1.5 SSE0.7WNW0.1WNW0.2 NW1.5 NW1.8 NW1.8 NW2.2 NW2.6 NW2.7 NW2.2																								Diurnal Average			
N19 NNW18 NNW11 N17 W13WSW14 W13 NNE15 NNE13 NNE12 N11 SW13WSW19WSW19 SW15WSW12 SSW12 SSW11 N12 SSW11WSW13 N25 N24 N18																								Diurnal Maximum			
All monthly, daily, and diurnal averages have been calculated using vector methods																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort McKay South - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 12 13:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 0 km/h on Feb 2 20:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	1	1	3	2	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	3
2-Feb	2	1	2	3	4	1	1	1	1	1	2	1	1	1	1	1	2	1	1	0	1	3	2	1	4
3-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	3	4	2	3	3	2	3	4
4-Feb	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	2	2	1	1	2	2	1	2	2	3
5-Feb	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	2
6-Feb	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	3
7-Feb	1	1	1	1	2	1	1	1	3	1	2	3	3	4	3	3	3	2	2	2	2	1	1	2	4
8-Feb	2	2	2	2	2	1	1	1	1	2	2	3	3	3	4	4	3	3	2	2	2	2	2	2	4
9-Feb	3	4	1	1	1	1	2	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	2	1	4
10-Feb	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	2
11-Feb	2	1	2	2	2	2	3	2	1	2	3	2	2	2	3	4	4	3	3	2	3	3	3	2	4
12-Feb	2	2	3	3	4	3	3	4	4	3	3	5	8	7	5	3	2	2	2	2	5	5	4	4	8
13-Feb	3	3	1	4	5	4	4	3	3	3	2	3	2	2	1	1	2	1	1	1	1	1	1	1	5
14-Feb	1	1	1	2	2	1	2	2	2	3	2	2	2	2	2	3	2	2	1	1	1	1	2	1	3
15-Feb	2	1	1	2	1	1	1	2	1	1	1	1	2	2	2	2	2	1	2	2	2	3	2	2	3
16-Feb	2	2	2	3	2	2	2	2	1	2	2	1	2	1	3	1	1	1	1	2	1	2	1	2	3
17-Feb	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	2	2	2	2	3
18-Feb	3	2	2	1	1	1	1	1	1	1	2	2	1	2	1	2	2	2	2	2	2	2	2	1	3
19-Feb	1	2	2	1	1	1	1	1	1	2	2	2	2	2	1	1	2	2	1	1	1	1	1	1	2
20-Feb	1	1	1	1	1	2	1	1	2	1	1	1	2	3	3	2	2	2	2	2	2	1	1	2	3
21-Feb	4	4	1	1	2	4	3	2	2	3	4	3	3	4	3	3	2	2	2	1	2	1	1	1	4
22-Feb	4	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1	1	2	2	1	1	1	4
23-Feb	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	1	1	1	1	1	2	1	1	2	2
24-Feb	2	3	2	1	1	1	1	1	1	1	3	3	2	2	2	3	2	1	1	1	1	1	0	1	3
25-Feb	1	1	1	1	1	2	1	1	1	2	2	2	1	2	4	3	2	1	2	2	5	6	6	4	6
26-Feb	7	5	4	2	2	1	1	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	7
27-Feb	1	1	1	1	0	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2
28-Feb	1	1	5	3	3	3	4	3	3	3	3	2	2	2	3	3	2	2	2	2	1	1	2	1	5
														Diurnal Maximum											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - February 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	350	52.08	52.08
6 - 11	283	42.11	94.20
12 - 19	37	5.51	99.70
20 - 28	2	0.30	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - February 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	30	24	16	4	5	9	10	14	41	30	28	39	25	23	25	27	350
6 - 11	63	38	13	0	0	0	6	22	26	31	19	15	12	9	11	18	283
12 - 19	5	7	0	0	0	0	0	4	0	1	9	8	2	0	0	1	37
20 - 28	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
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	100	69	29	4	5	9	16	40	67	62	56	62	39	32	36	46	672

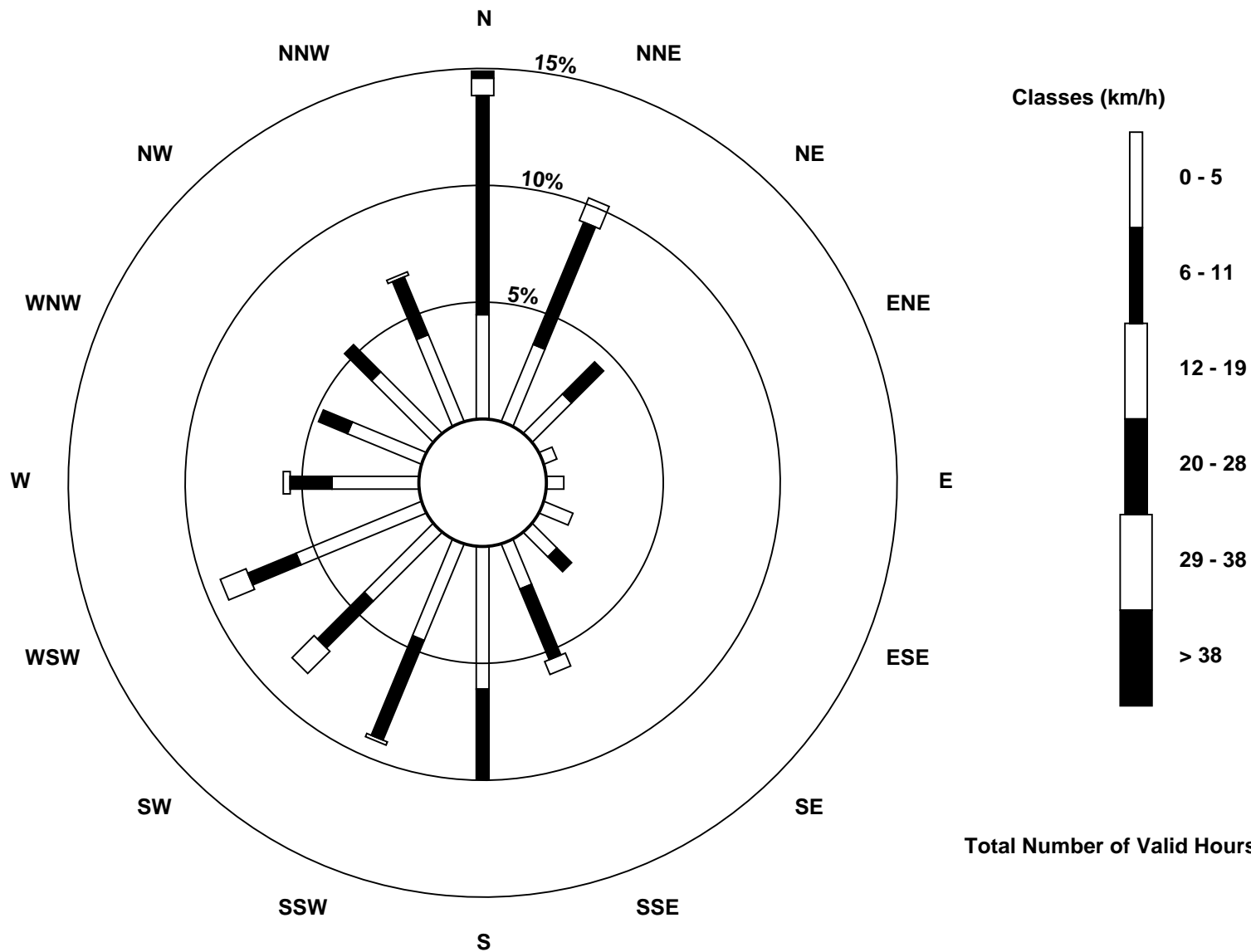
Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 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 - February 2017

Direction of Maximum Speed: 6 deg on Feb 25 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 223.4 deg on Feb 12	Hours of Data: 672
Direction of Minimum Speed: 179 deg on Feb 8 05:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.5 deg on Feb 1	Percent Operational Time: 100.0
Monthly Average Direction: 266.1 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-Feb	335	333	4	359	336	338	332	275	242	236	131	144	108	148	157	157	183	219	246	233	225	173	176	186	201.9
2-Feb	243	169	217	259	257	294	182	175	190	176	110	113	150	41	14	12	2	2	5	350	349	8	4	351	337.4
3-Feb	336	355	339	309	284	203	325	213	194	260	136	133	136	172	148	85	359	319	360	7	32	11	11	8	11.7
4-Feb	347	266	271	259	251	234	258	151	247	179	107	150	170	165	161	158	157	144	226	345	341	358	352	344	188.7
5-Feb	338	335	324	317	294	239	354	235	243	4	38	16	57	154	151	151	169	233	284	252	245	210	237	212	274.6
6-Feb	250	234	236	227	229	224	264	233	232	281	49	135	150	139	151	92	349	337	278	242	254	253	264	217	206.6
7-Feb	201	254	211	185	191	185	183	186	179	178	179	206	226	254	246	250	243	276	318	317	304	300	285	256	235.6
8-Feb	265	279	261	233	179	289	201	189	186	184	199	203	219	225	229	225	209	201	199	192	189	196	211	233	213.1
9-Feb	235	231	151	122	228	250	203	252	243	345	148	81	9	56	34	28	9	343	292	309	344	355	0	325	338.6
10-Feb	334	336	296	246	267	243	239	222	289	12	36	46	98	47	43	20	17	21	333	6	354	346	6	313	356.2
11-Feb	256	203	210	226	219	236	241	240	214	209	254	219	185	164	198	237	238	234	229	218	225	235	233	210	223.2
12-Feb	181	200	212	207	218	218	224	225	223	215	211	225	245	248	235	207	173	196	188	192	248	255	249	245	223.4
13-Feb	242	215	200	245	264	259	264	278	264	288	321	22	30	7	9	6	1	4	342	325	347	328	326	183	302.6
14-Feb	178	192	185	175	175	185	192	189	184	173	156	147	160	152	157	174	183	186	189	191	207	207	196	193	175.7
15-Feb	200	160	176	200	196	186	196	187	188	188	145	146	153	173	187	190	198	167	214	197	197	197	210	183	185.1
16-Feb	193	195	204	217	243	205	262	186	325	154	146	16	14	25	11	12	9	264	326	330	330	321	289	286	277.7
17-Feb	252	241	278	206	277	211	253	0	333	319	321	10	32	33	23	22	34	29	35	30	31	34	37	31	19.1
18-Feb	22	37	44	48	28	7	9	32	356	14	23	4	13	124	75	7	4	352	359	6	353	355	359	358	13.3
19-Feb	350	4	5	1	5	4	12	8	15	41	27	19	27	20	1	357	2	358	359	2	359	353	357	347	7.4
20-Feb	342	344	343	335	315	311	314	325	334	340	15	46	11	308	300	300	284	269	266	289	259	240	231	230	304.8
21-Feb	243	253	211	222	266	286	283	261	244	257	259	289	278	261	264	271	280	315	303	292	272	284	295	283	269.5
22-Feb	352	358	33	326	289	254	269	315	325	10	360	5	31	20	4	11	8	6	9	22	31	310	265	240	0.4
23-Feb	187	187	219	328	256	262	249	247	240	69	129	145	146	148	144	159	152	159	296	322	336	338	337	341	164.8
24-Feb	355	355	355	327	325	304	298	298	16	27	14	359	41	60	134	164	157	172	186	238	242	189	190	204	358.9
25-Feb	185	201	197	214	199	197	187	171	157	162	187	165	123	81	23	19	37	233	147	36	16	6	5	8	29.9
26-Feb	359	340	336	320	330	301	306	309	316	328	29	44	110	121	39	22	15	9	21	37	42	2	348	9	354.5
27-Feb	7	7	355	353	355	4	329	323	8	19	17	18	40	169	192	186	185	198	235	214	183	185	262	290	351.8
28-Feb	247	220	3	11	23	21	11	16	14	21	3	22	25	42	45	33	33	37	28	12	14	7	7	350	18.3
298.3 298.7 302.7 287.8 280.9 267.3 270.7 256.9 265.9 293.8 0.8 97.0 141.5 155.7 156.1 283.5 289.6 307.2 314.7 320.3 320.5 320.5 321.7 307.2																									
Diurnal Average																									

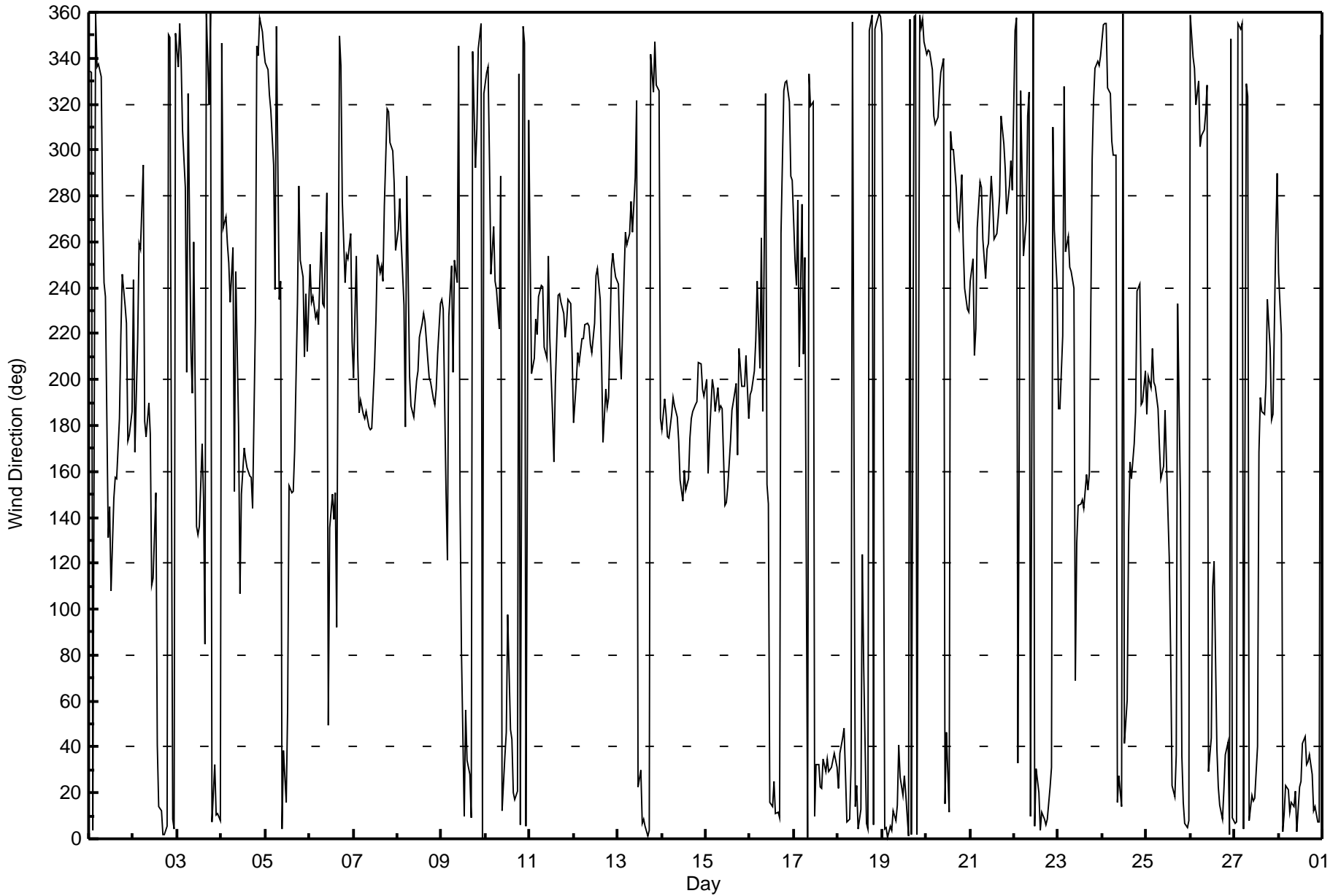
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay South - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on Feb 2 06:00 Minimum Value: 8 deg on Feb 15 12:00 Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 15 Median = 22 Q ₃ = 36 P ₉₀ = 59 P ₉₉ = 92																		Hours in Service: 672 Hours of Data: 672 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-Feb	13	18	14	13	13	11	15	35	32	66	72	10	24	23	11	9	17	22	25	69	69	14	22	92	92
2-Feb	104	33	86	17	55	108	39	19	54	21	71	55	31	61	13	14	12	14	13	11	18	24	15	13	108
3-Feb	25	17	15	88	22	48	36	26	33	55	59	38	36	38	26	44	52	17	20	16	18	18	12	16	88
4-Feb	22	38	25	13	33	32	58	79	33	59	35	19	22	24	16	15	12	84	18	50	23	9	12	12	84
5-Feb	11	10	14	17	35	41	81	30	72	78	38	36	65	14	11	12	13	26	28	34	43	58	60	42	81
6-Feb	52	47	46	49	50	31	46	22	43	58	87	67	16	43	12	58	19	46	26	29	38	35	52	57	87
7-Feb	70	58	20	9	40	13	8	8	36	65	14	29	26	35	40	33	22	25	25	19	13	15	18	32	70
8-Feb	15	33	75	78	95	58	40	13	44	20	18	28	30	31	29	27	21	17	17	11	11	12	18	18	95
9-Feb	37	66	82	76	35	67	24	53	39	66	68	42	85	90	20	17	9	19	22	40	13	12	13	21	90
10-Feb	9	15	56	12	19	50	35	76	59	80	13	36	50	44	61	21	15	20	23	18	41	54	60	43	80
11-Feb	32	24	16	25	17	17	19	20	20	31	28	41	23	17	34	25	23	21	21	23	25	22	23	28	41
12-Feb	31	15	26	24	23	21	21	21	22	22	24	24	24	24	23	25	14	18	21	18	28	26	26	24	31
13-Feb	20	41	25	33	26	22	23	26	22	36	35	18	16	18	12	11	12	11	22	33	34	24	88	14	88
14-Feb	19	15	27	37	22	12	13	12	20	20	10	10	12	11	10	12	9	9	18	11	23	12	13	10	37
15-Feb	15	22	25	30	23	23	39	32	62	79	45	8	11	21	19	20	25	90	59	12	12	17	23	11	90
16-Feb	9	10	13	18	77	54	81	33	66	67	72	12	13	12	14	14	18	45	47	11	13	14	42	42	81
17-Feb	50	99	49	96	78	57	27	24	16	20	21	31	23	16	17	17	18	16	15	16	16	16	21	17	99
18-Feb	16	22	18	22	21	18	12	22	31	28	62	88	71	55	40	10	12	13	13	15	13	12	15	13	88
19-Feb	15	12	11	11	9	10	9	10	14	17	14	13	14	14	14	13	12	11	11	10	10	11	12	11	17
20-Feb	11	12	10	19	16	19	18	17	22	20	22	29	94	28	22	25	27	27	26	27	36	28	24	22	94
21-Feb	24	24	28	66	44	30	28	31	20	30	32	36	41	40	31	30	32	20	19	26	20	20	13	52	66
22-Feb	35	12	45	35	31	13	40	44	54	15	16	20	24	22	12	13	13	11	12	17	44	31	14	30	54
23-Feb	38	55	69	59	17	45	12	44	81	44	37	13	12	14	24	16	9	15	63	9	11	10	9	13	81
24-Feb	14	15	15	15	15	9	16	15	59	17	31	27	24	50	30	36	17	18	22	19	31	31	15	41	59
25-Feb	12	26	17	24	18	30	10	11	27	22	29	35	47	51	38	19	71	20	70	24	15	18	15	14	71
26-Feb	17	15	15	16	20	14	12	27	35	39	29	32	81	40	47	30	23	11	40	20	49	19	12	13	81
27-Feb	14	16	11	12	10	14	28	14	13	10	13	18	73	34	38	30	17	19	24	20	13	26	54	44	73
28-Feb	61	77	34	14	15	14	14	15	15	19	17	30	26	31	36	29	23	19	21	16	13	14	13	12	77
	104	99	86	96	95	108	81	79	81	80	87	88	94	90	61	58	71	90	70	69	69	58	88	92	
Diurnal Maximum																									





Wood Buffalo Environmental Association

SO2 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	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

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	524	524
Analyzer IP address	192.168.1.73		Lamp voltage	2755	2755
Calculated slope	1.002504	1.000837	Box temp	32.2	32.2
Calculated intercept	1.590705	0.683170	Pressure	26.2	26.2
Analyzer Background	32.2	32.9	Flow	683	686
Analyzer Coefficient	1.026	1.052	Lamp Ratio	93	93

Analyzer make API T100 Analyzer serial # 599

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	78.9	785.8	774.2	1.015
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	78.9	785.8	784.9	1.001
second point	5000	39.4	392.4	390.9	1.004
third point	5000	19.7	196.2	194.8	1.007
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	78.9	785.8	779.5	1.008
Average Correction Factor					1.004

Corrected As found 774.1 Previous response 782.3 % change 1.1%

Notes:

pump changed out for preventative maintenance, filter changed out, zero and span adjusted

Calibration Performed By: Melissa Lemay



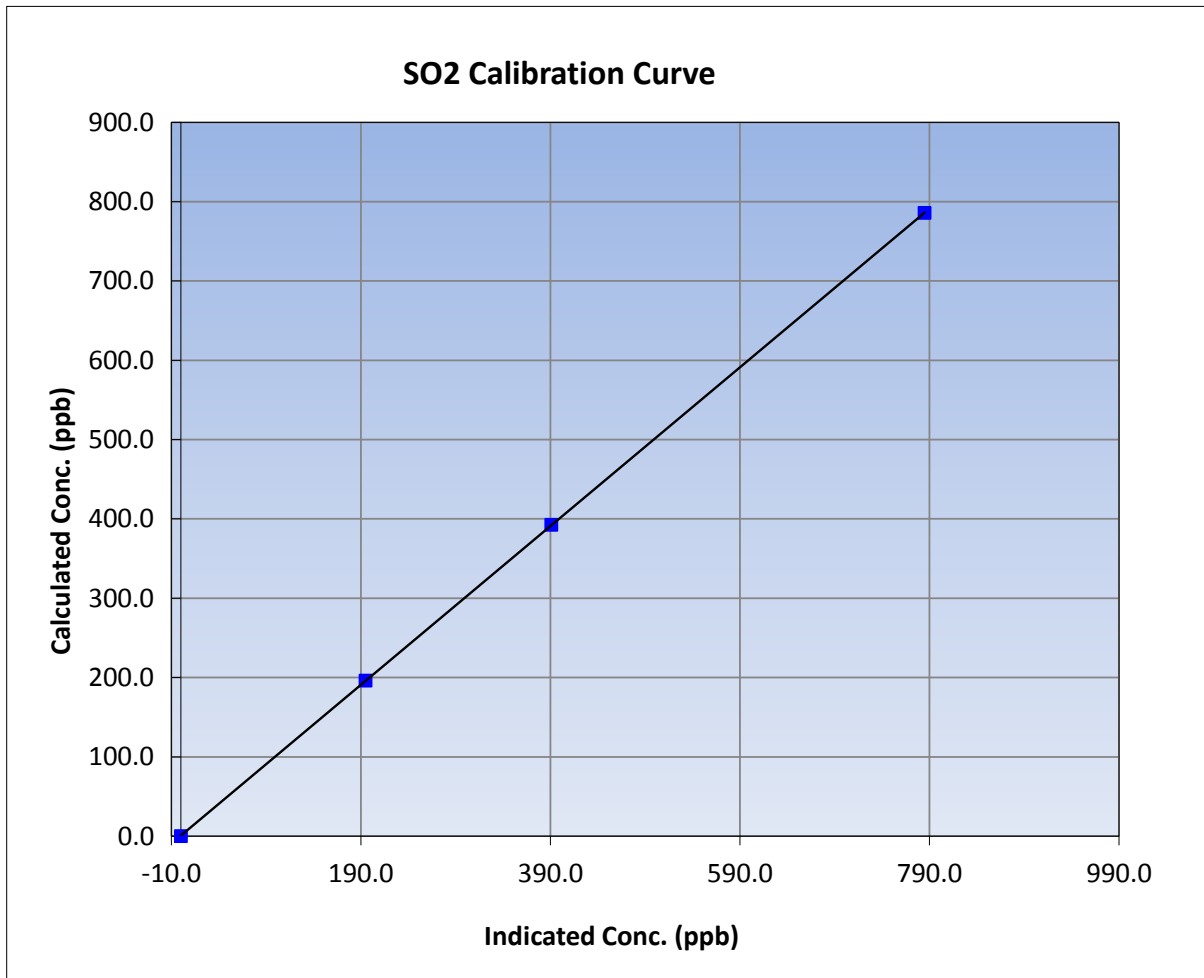
Wood Buffalo Environmental Association SO2 Calibration Report

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	API T100	Analyzer serial #	599

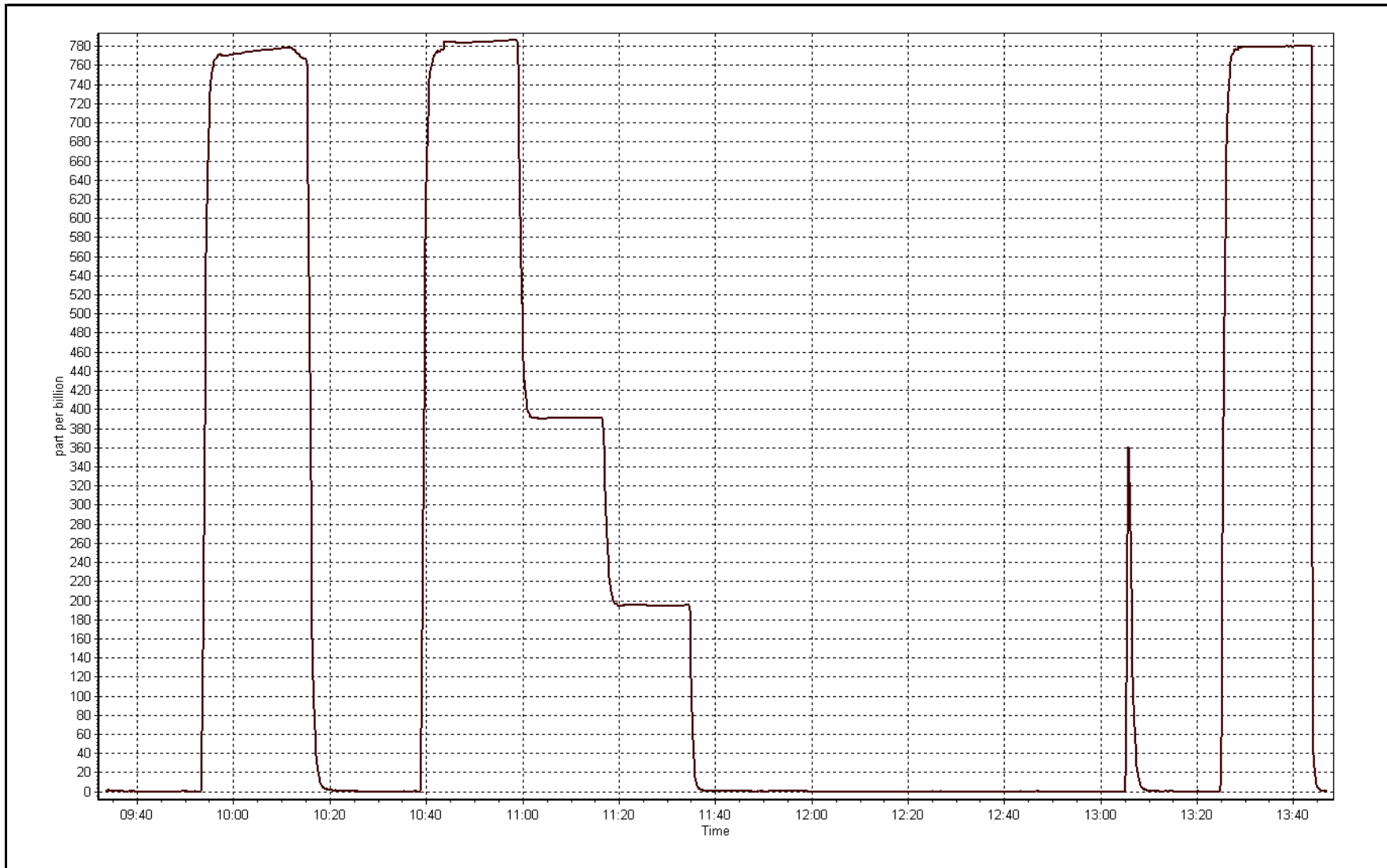
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
785.8	784.9	1.0012		
392.4	390.9	1.0039	Slope	1.000837
196.2	194.8	1.0072		
			Intercept	0.683170



SO2 Calibration Plot

Date: February 7, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 8, 2017	Last Calibration	January 17, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	13:36
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	1014	1014
Calculated slope	0.996231	1.000860	Chamber temp	45	45
Calculated intercept	0.239437	0.403271	Pressure	687.8	688.4
Analyzer Background	2.07	2.07	Flow	0.447	0.442
Analyzer Coefficient	1.016	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	79.6	1.005
SO2 scrubber check	5000	17.6	175.3	0.3	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.9	80.0	79.6	1.005
second point	5000	39.4	40.0	39.6	1.009
third point	5000	19.7	20.0	19.1	1.046
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	78.9	80.0	80.2	0.998
Average Correction Factor					1.020

Corrected As found	79.7	Previous response	80.1	% change	0.5%
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Notes:

Scrubber check done after as founds. Inlet filter changed. No maintenance or adjustments done

Calibration Performed By:

Melissa Lemay



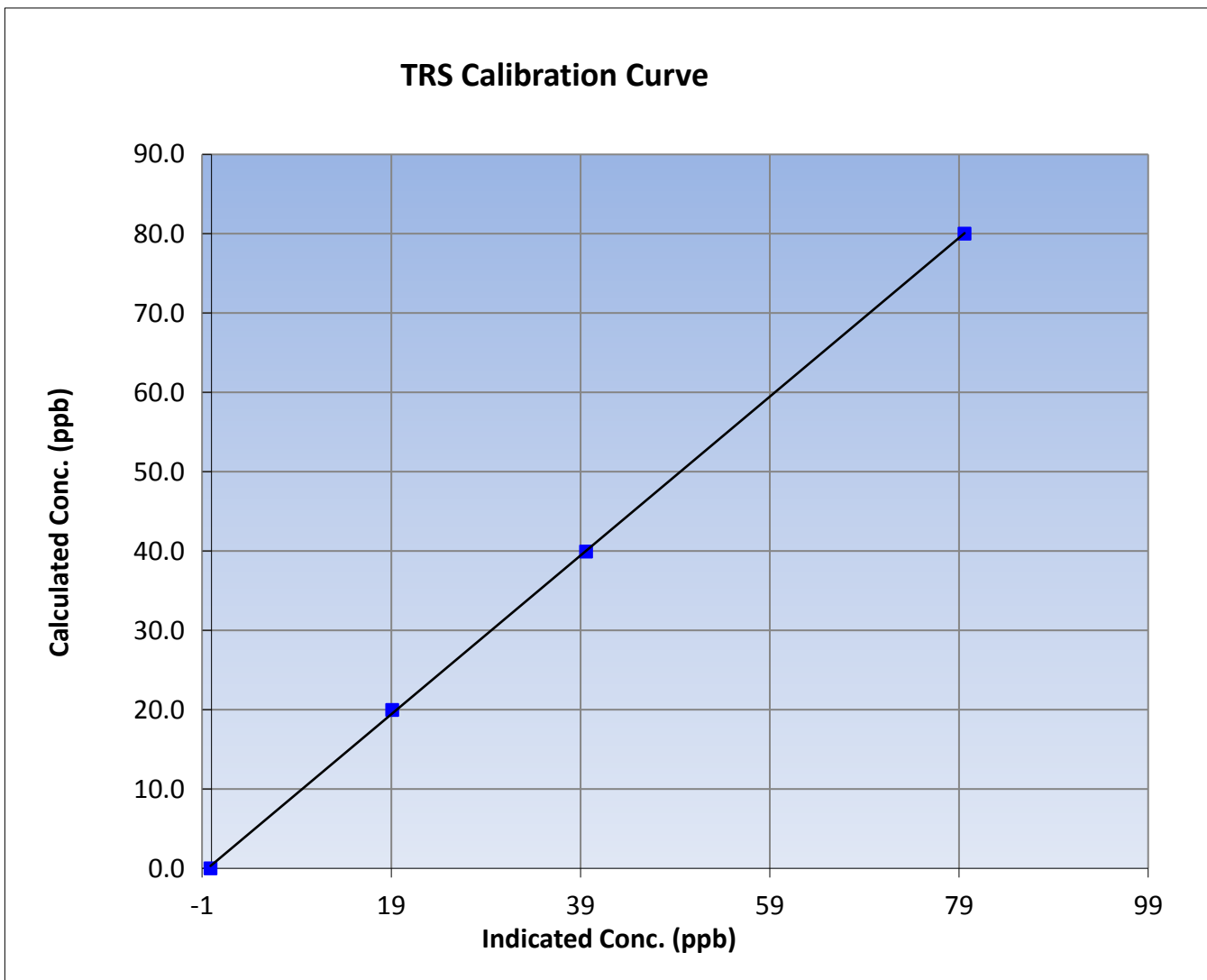
Wood Buffalo Environmental Association TRS Calibration Report

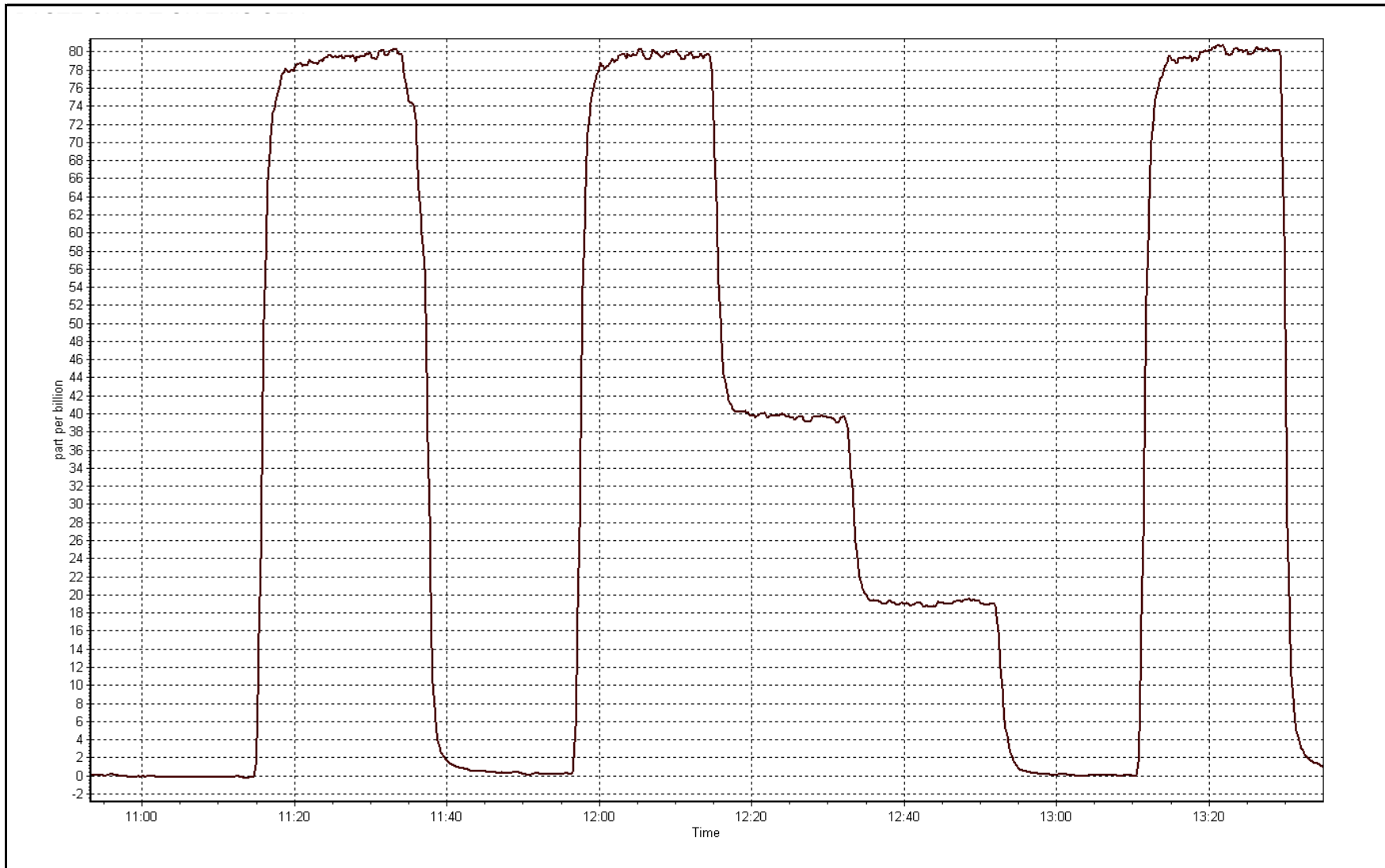
Station Information

Calibration Date	February 8, 2017	Previous Calibration	January 17, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:55	End Time (MST)	13:36
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	0.999911
80.0	79.6	1.0051		
40.0	39.6	1.0089	Slope	1.000860
20.0	19.1	1.0459		
			Intercept	0.403271







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

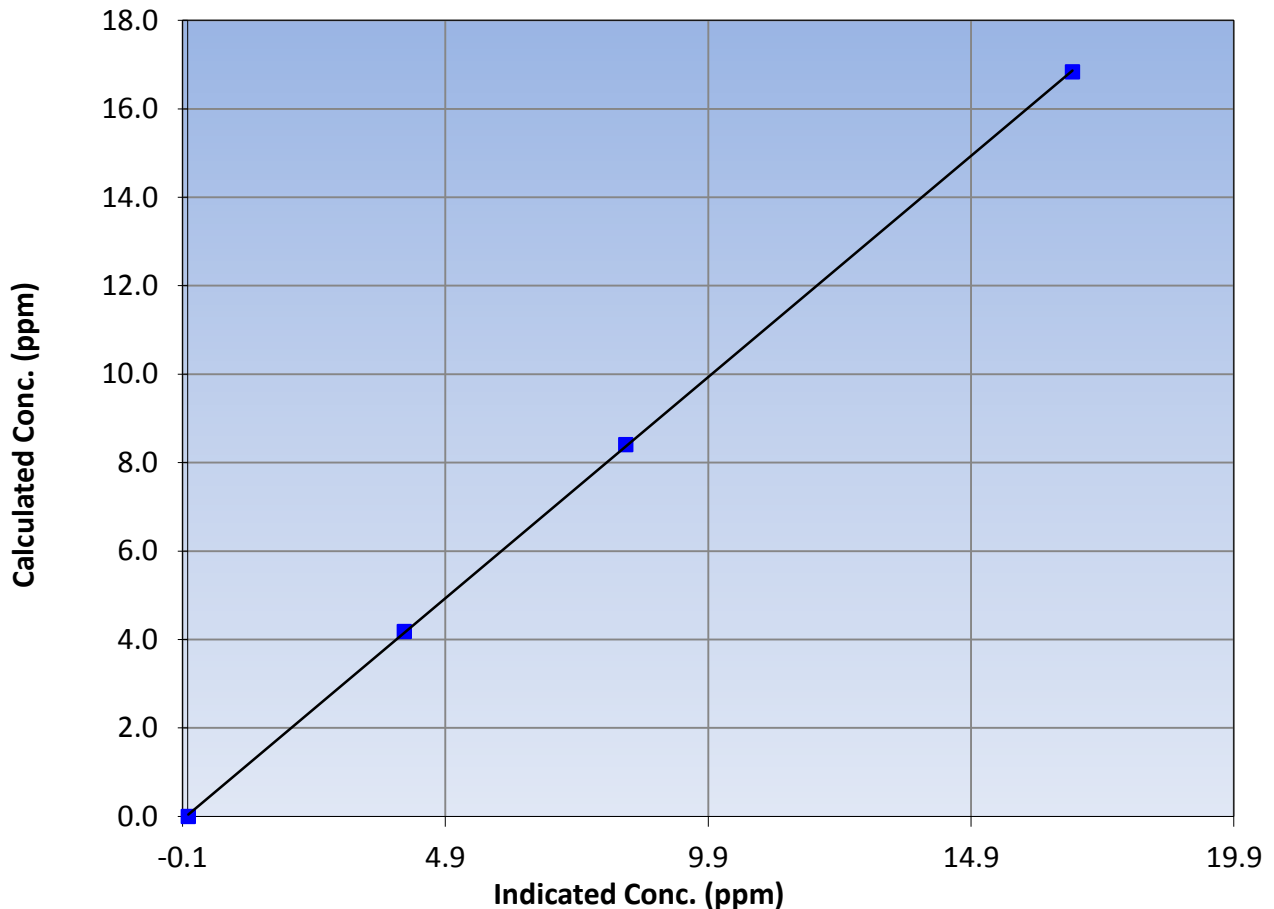
Station Information

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

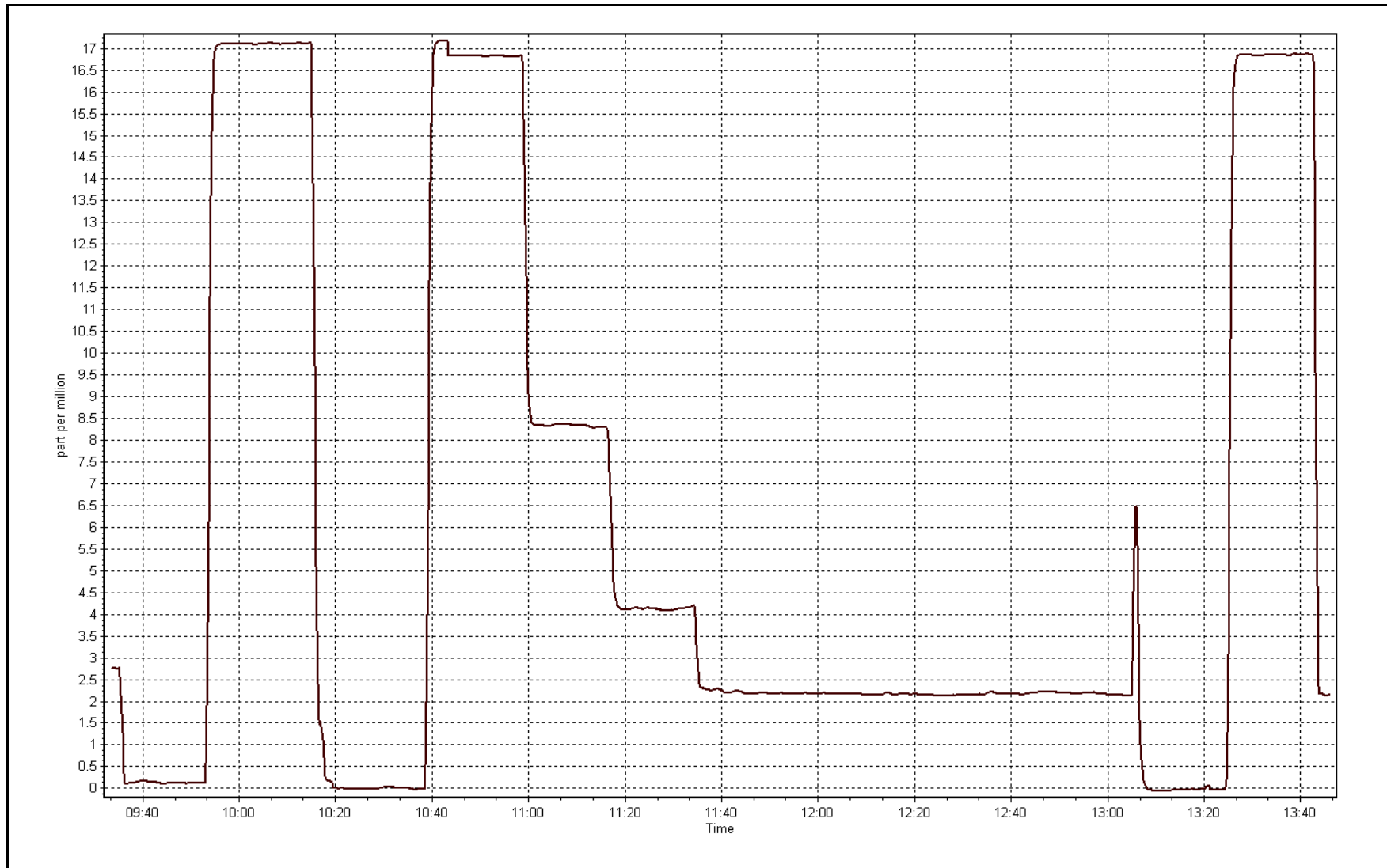
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999965
16.84	16.83	1.0004		
8.41	8.33	1.0094		
4.18	4.12	1.0152		
			Slope	1.000129
			Intercept	0.033517

THC Calibration Curve



THC Calibration Plot

Date: February 7, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 8, 2017	Previous Calibration	January 18, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	10:58
NO2 GPT Ref date	February 7, 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.	25.3	25.3
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.035269	1.011937	Pressure	26.5	26.6
Calculated intercept	-2.400209	0.408936	Flow	755.0	761.0
Analyzer Background	1.2	2.0	Intensity	4284.5	4284.5
Analyzer Coefficient	1.002	1.004			

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	0.8	----
as found span	5000	0.89	354.1	348.6	1.016
calibrator zero	5000	0.00	0.0	0.2	----
high point	5000	0.89	354.1	350.0	1.012
second point	5000	0.47	211.0	207.6	1.016
third point	5000	0.36	111.7	109.4	1.021
as left zero	5000	0.00	0.0	0.2	----
as left span	5000	0.89	354.1	357.5	0.990
Average Correction Factor					1.016

Corrected As found	347.8	Previous response	344.4	% change	-1.0%
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Notes:

zero adjusted, pump changed out for preventative maintenance, filter changed out

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

O3 Calibration Report

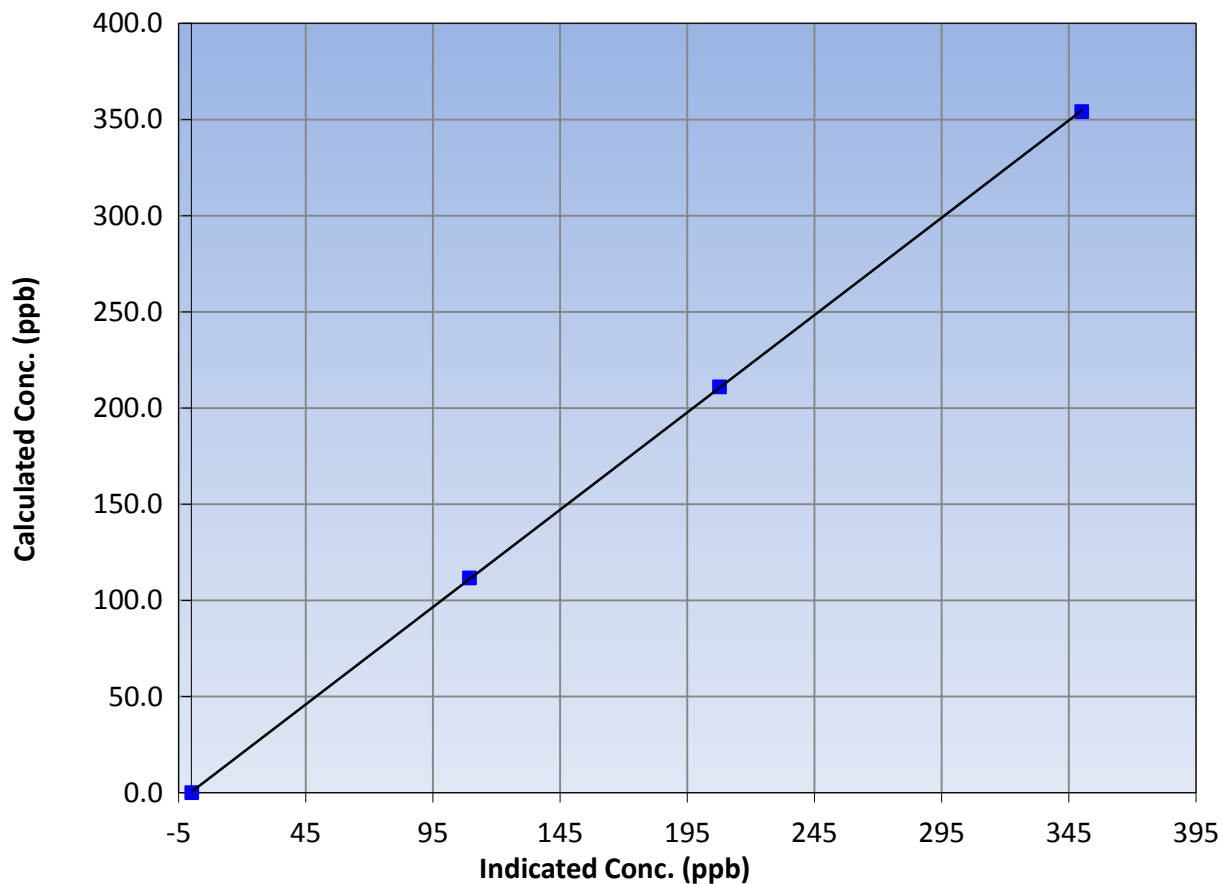
Station Information

Calibration Date	February-08-17	Previous Calibration	January 18, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:15	End Time (MST)	10:58
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

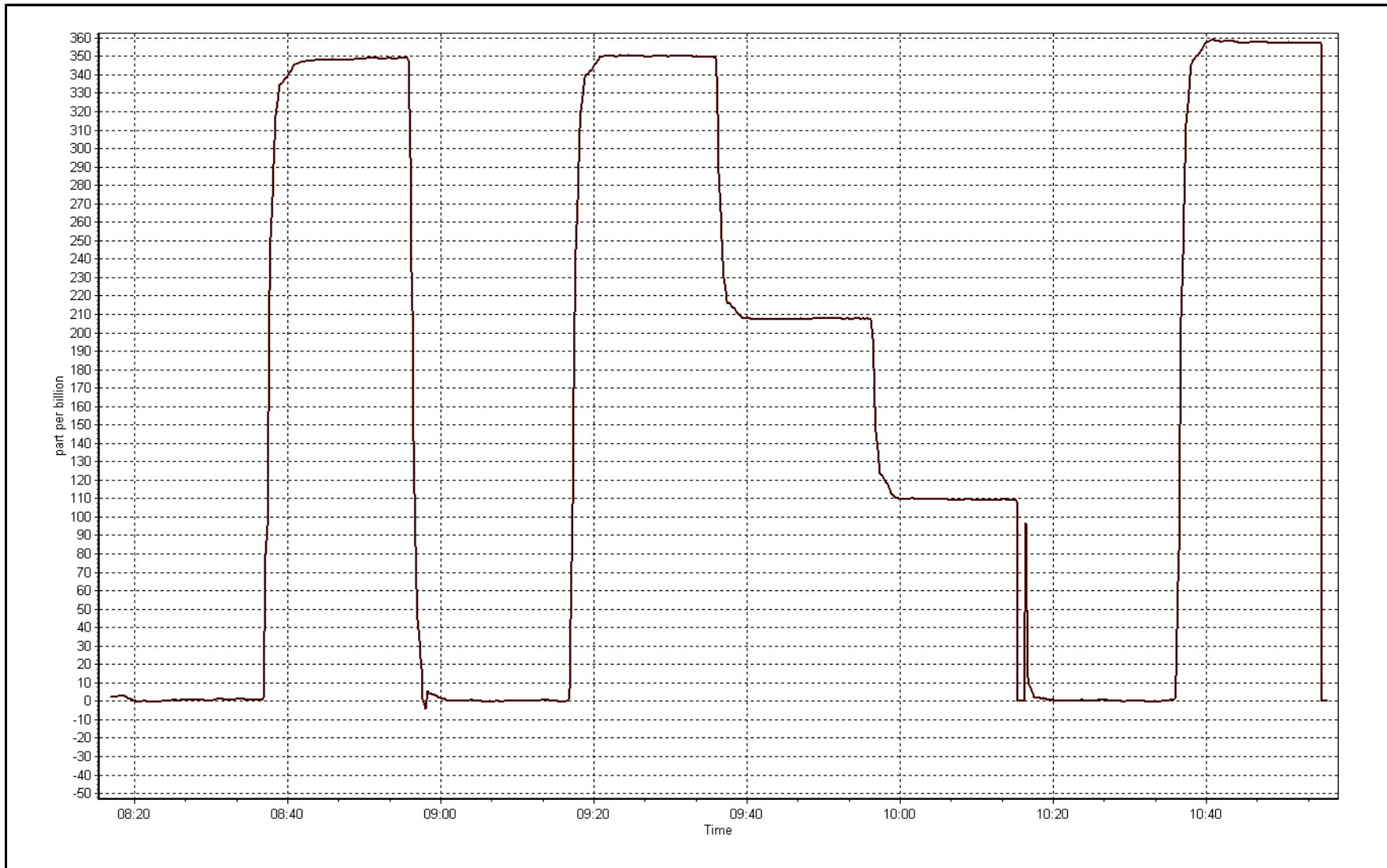
Calculated concentration (ppb) (Cc)	2/07/17	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999982
354.1	350.0	1.0117		
211.0	207.6	1.0164	Slope	1.011937
111.7	109.4	1.0210		
			Intercept	0.408936

O3 Calibration Curve



O3 Calibration Plot

Date: February 8, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 13, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:35	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	1.000624	1.000283	1.001089
	Data Offset	0.941527	0.881312	-0.820706
Current Calibration	Data Slope	0.999980	1.000279	1.002246
	Data Offset	1.142033	1.082643	0.508636

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		1.024	
NOx coefficient	1.003		1.003	
NO2 coefficient	1.000		1.000	
NO bkgrnd	7.5		7.6	
NOx bkgrnd	7.6		7.7	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	323.9	Deg C	323.9	Deg C
PMT voltage	-828.1	V	-828.1	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	174.9	mmHg	174.9	mmHg
R Cell Press Nox	174.9	mmHg	174.9	mmHg
NO sample flow	0.865	lpm	0.865	lpm
Nox sample Flow	0.863	lpm	0.863	lpm

Notes:

no maintenance done, filter changed out, span adjusted



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 7, 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	0.1	0.0	0.1	----	----
as found span	5000	78.9	803.2	800.0	3.2	795.5	791.8	3.7	1.0097	1.0104
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.1	----	----
high point	5000	78.9	803.2	800.0	3.2	802.9	799.5	3.4	1.0004	1.0007
second point	5000	39.4	401.1	399.5	1.6	398.8	397.3	1.5	1.0057	1.0056
third point	5000	19.7	200.5	199.8	0.8	198.4	197.6	0.8	1.0108	1.0109
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
as left span	5000	78.9	803.2	442.0	361.2	804.8	444.3	360.5	0.9980	0.9948
Average Correction Factor									1.0056	1.0057

Corrced As found NO_x= 795.4 NO= 791.8 Percent Change NO_x= 0.8% NO= 0.9%
 Previous Response NO_x= 801.8 NO= 798.9

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	799.1	796.1	0.1	1.0051	1.0050	----	----
1st NO2 (300)	442.0	357.3	798.3	442.0	356.3	1.0061	----	1.0027	99.7%
2nd NO2 (200)	585.1	214.2	798.0	585.1	213.0	1.0065	----	1.0054	99.5%
3rd NO2 (100)	684.4	114.9	797.7	684.4	113.3	1.0069	----	1.0137	98.6%
2nd NO ref point		3.2	797.5	794.4	3.1	1.0071	1.0071	----	----
Average Correction Factor						1.0067		1.0073	99.3%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

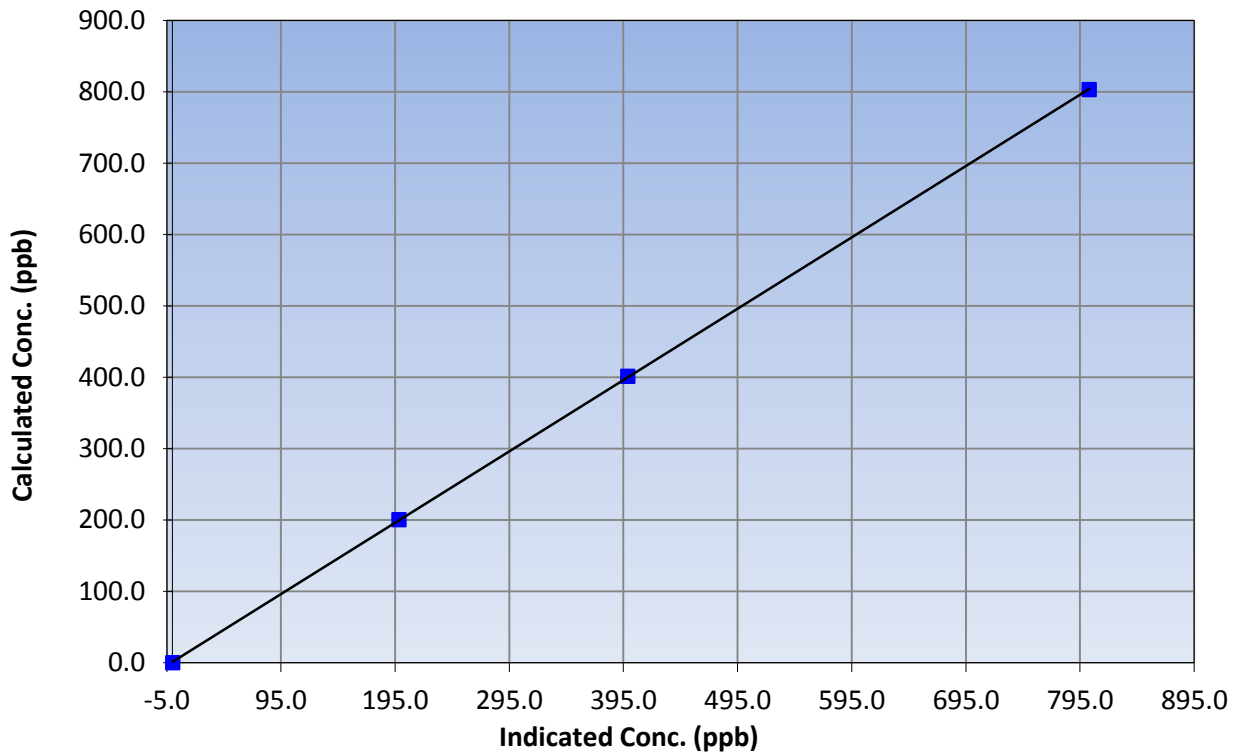
Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 13, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:35	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	0.999986
803.2	802.9	1.0004		
401.1	398.8	1.0057	Slope	0.999980
200.5	198.4	1.0108		
			Intercept	1.142033

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

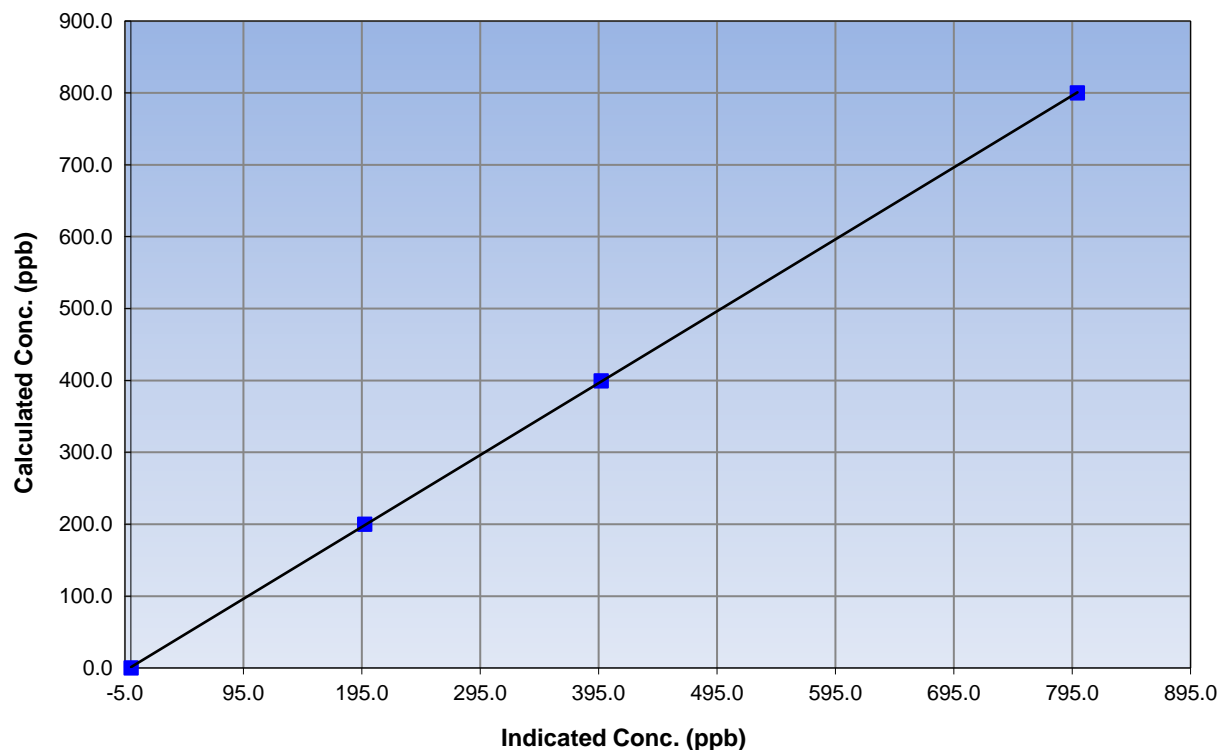
Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 13, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:35	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	0.999988
800.0	799.5	1.0007		
399.5	397.3	1.0056	Slope	1.000279
199.8	197.6	1.0109		
			Intercept	1.082643

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

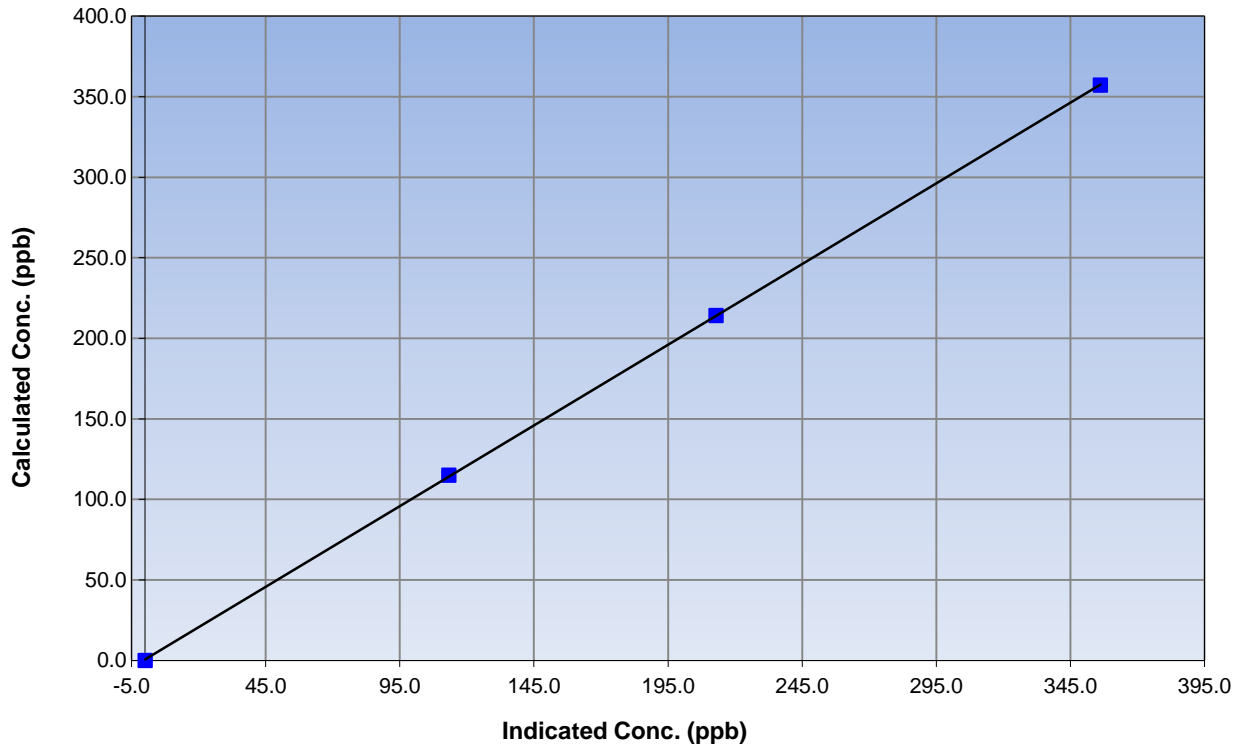
Station Information

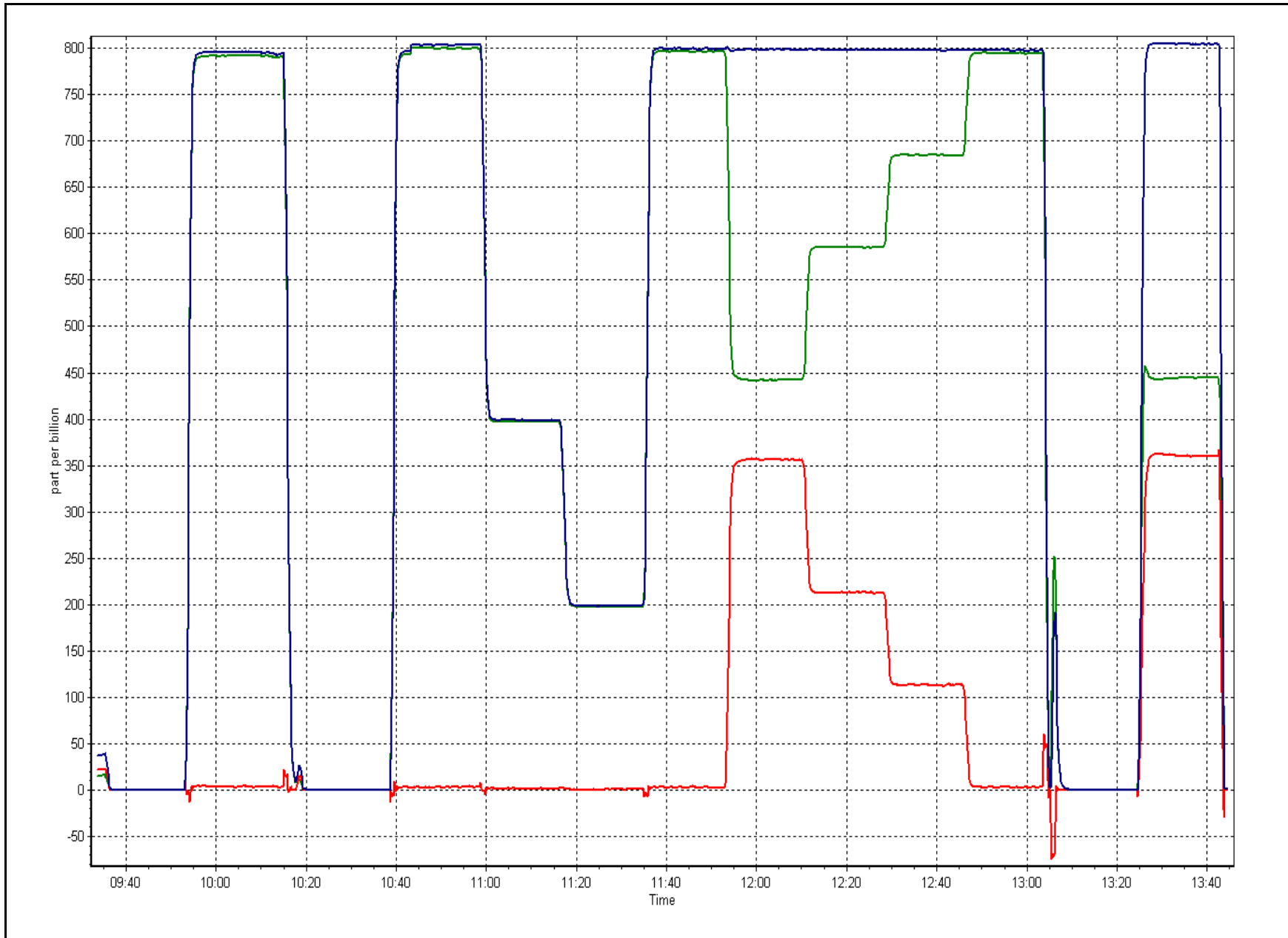
Calibration Date	February 7, 2017	Previous Calibration	January 13, 2017
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:35	End Time (MST)	13:44
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999983
357.3	356.3	1.0027		
214.2	213.0	1.0054	Slope	1.002246
114.9	113.3	1.0137		
			Intercept	0.508636

NO₂ Calibration Curve







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:	February 8, 2017	Last Cal Date:	January 18, 2017
Start time (MST):	9:01	End time (MST):	9:38
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)	-23	-24	-23	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	978	974	978	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1000	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.1	-----	0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	February 8, 2017	Last Cal Date:	November 18, 2016	Tolerance
	Flow w/o adaptor:	<u>16.7</u>	Flow w/ adaptor:	<u>16.4</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>1337</u>	S/N: <u>NA</u>
	Date of check: _____	Last Cal Date: <u>June 9, 2016</u>
	New Correction Factor: _____	Previous Correction Factor: <u>7150</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, No adjustments done

Calibration by: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 14
ANZAC
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
FEBRUARY 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	636	35	36	99.85	13	0	4	0
TRS(ppb) Average	640	31	32	99.85	2	0	0	0
THC(ppm) Average	639	32	33	99.85	2.4	-	2	-
NMHC(ppm) Average	639	32	33	99.85	0.184	-	0.032	-
CH4(ppm) Average	639	32	33	99.85	2.3	-	2	-
NO2(ppb) Average	639	32	33	99.85	27	0	7	-
NO(ppb) Average	639	32	33	99.85	29	-	2	-
NOX(ppb) Average	639	32	33	99.85	56	-	8	-
O3(ppb) Average	640	31	32	99.85	48	0	48	-
PM2.5(ug/m3) Average	628	2	44	93.75	34.8	-	5.8	0
AT 2m(C) Average	672	0	0	100	15.2	-	8.3	-
RH(%) Average	672	0	0	100	97	-	90	-
Leaf Wetness (% of range) Average	672	0	0	100	44	-	9	-
WS(km/h) Average	668	0	4	99.4	24	-	20	-
WD(deg) Average	668	0	4	99.4	-	-	-	-
PC(mm) Total	672	0	0	100	0.5	-	2	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 FEBRUARY 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	636	0.9	2	-	0	0	0	0	1	2	13
TRS(ppb) Average	640	0.3	0	-	0	0	0	0	0	0	2
THC(ppm) Average	639	1.94	0.1	-	1.9	1.9	1.9	1.9	2	2	2.4
NMHC (ppm) Average	639	0.003	0.014	-	0	0	0	0	0	0	0.184
CH4(ppm) Average	639	1.94	0.1	-	1.9	1.9	1.9	1.9	2	2	2.3
NO2(ppb) Average	639	3.2	3	-	0	1	1	2	4	7	27
NO(ppb) Average	639	0.6	1	-	0	0	0	0	1	1	29
NOX(ppb) Average	639	3.8	4	-	0	1	1	2	5	8	56
O3(ppb) Average	640	34.1	8	-	6	23	30	35	39	44	48
PM2.5(ug/m3) Average	628	2.9	3.1	-	0	0.6	1.3	2	3.6	5.9	34.8
Temperature 2 m (C) Average	672	-10.21	10.4	-	-32.4	-21.9	-18.6	-12.1	-2	4.5	15.2
Relative Humidity (%) Average	672	70.5	14	-	30	49	61	75	81	85	97
Leaf Wetness (% of range) Average	672	1.1	3	-	0	0	0	0	1	3	44
Wind Speed 20 m (km/h) Average	668	8.5	5	-	0	3	5	8	11	15	24
Wind Direction 20 m (deg) Average	668	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	672	-	-	2.79	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	03 Feb 2017 14:00	03 Feb 2017 14:00	1	Maintenance - cleaned glass manifold
PM2.5	12 Feb 2017 02:00	12 Feb 2017 08:00	7	Unstable operation - excessive baseline drift
PM2.5	12 Feb 2017 23:00	13 Feb 2017 15:00	17	Unstable operation - excessive baseline drift
PM2.5	14 Feb 2017 13:00	14 Feb 2017 13:00	1	Unstable operation - excessive baseline drift
PM2.5	14 Feb 2017 15:00	14 Feb 2017 17:00	3	Unstable operation - excessive baseline drift
PM2.5	15 Feb 2017 22:00	16 Feb 2017 09:00	12	Unstable operation - excessive baseline drift
PM2.5	17 Feb 2017 17:00	17 Feb 2017 17:00	1	Unstable operation - excessive baseline drift
PM2.5	22 Feb 2017 07:00	22 Feb 2017 07:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	06 Feb 2017 09:00	06 Feb 2017 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	06 Feb 2017 20:00	06 Feb 2017 21:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Feb 2017 17:00	16 Feb 2017 17:00	1	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 13 ppb on Feb 18 03:00	Maximum Daily Average: 3.8 ppb on Feb 18		Hours of Data:	636
Minimum Value: 0 ppb on Feb 8 05:00	Minimum Daily Average: 0.1 ppb on Feb 8		Hours of Missing Data:	36
Maximum Diurnal Average: 1.6 ppb at hour 13	Minimum Diurnal Average: 0.5 ppb at hour 1		Hours of Calibration:	35
Monthly Average: 0.9 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

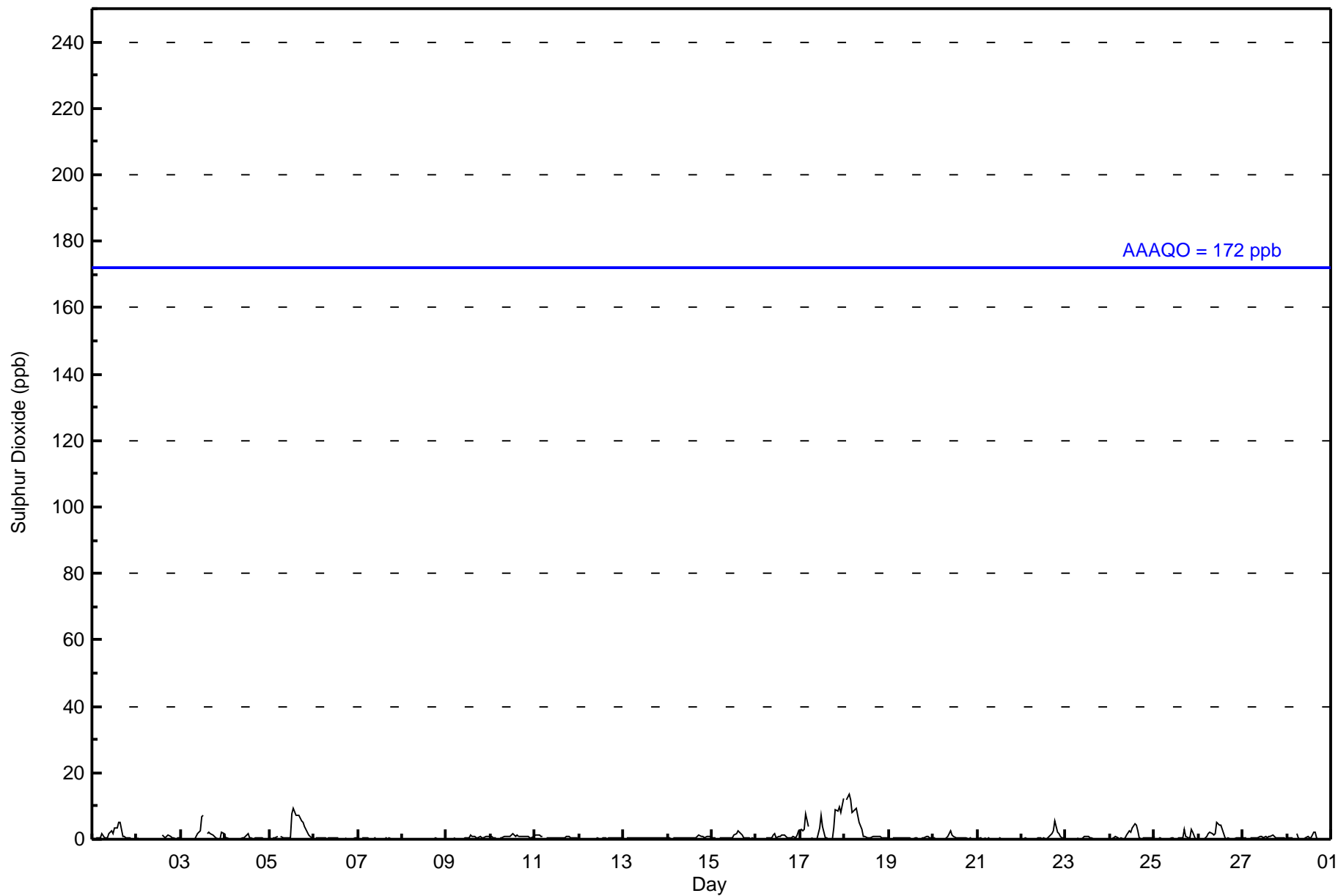
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	Z	0	0	0	2	0	0	0	2	3	2	4	3	5	5	1	1	1	0	0	0	0	0	1.4	5
2-Feb	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	1	0	1	1	1	0	0	0	1	0	0.4	1
3-Feb	0	0	0	Z	0	0	0	0	1	2	3	7	7	M	2	2	2	1	1	0	0	0	2	2	1.5	7
4-Feb	1	0	0	0	Z	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0.4	2
5-Feb	0	0	0	0	1	Z	1	0	0	0	0	0	8	9	7	7	7	6	5	4	2	1	1	1	2.7	9
6-Feb	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	C	C	C	0	0	0	0	0	0	0	0.3	1
7-Feb	0	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-Feb	0	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
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
10-Feb	1	1	0	1	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	1	0.8	2
11-Feb	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.5	1
12-Feb	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
13-Feb	0	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
14-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
15-Feb	1	1	1	Z	1	0	0	0	0	0	1	1	1	2	2	2	1	1	0	0	0	0	0	0	0.7	2
16-Feb	0	0	0	0	Z	0	0	0	0	1	2	1	1	1	1	1	1	1	1	0	1	1	1	3	0.7	3
17-Feb	3	2	3	7	4	Z	0	0	0	0	3	7	4	0	0	0	0	0	3	9	8	10	8	12	3.8	12
18-Feb	Z	12	13	12	8	8	9	7	5	3	1	1	1	0	0	1	1	1	1	1	1	1	1	1	3.8	13
19-Feb	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
20-Feb	0	0	Z	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
21-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	3	6	2	2	1	0	0	0.8	6
23-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Feb	Z	0	0	1	0	0	0	0	0	1	3	2	3	5	4	3	1	0	0	0	0	0	0	0	1.2	5
25-Feb	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	3	2	0	0	0.6	3
26-Feb	0	0	Z	0	1	2	2	2	1	2	5	4	4	3	0	0	0	0	0	0	0	0	0	0	1.2	5
27-Feb	0	0	0	Z	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1
28-Feb	0	0	0	0	Z	2	0	0	0	0	0	1	0	1	2	2	0	0	0	0	0	0	0	0	0.5	2
	0.5	0.9	1.0	1.1	0.8	0.8	0.7	0.5	0.5	0.7	1.0	1.2	1.6	1.2	1.2	1.1	0.9	0.8	0.9	0.8	0.8	0.8	0.7	0.9	Diurnal Average	
	3	12	13	12	8	8	9	7	5	3	5	7	8	9	7	7	7	6	6	9	8	10	8	12	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
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Anzac - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	632	99.37	99.37
11 - 20	4	0.63	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: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Anzac - February 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	37	5	5	11	12	40	52	24	22	19	32	29	47	125	95	73	628
11 - 20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	5	5	11	12	40	52	24	22	19	32	29	47	125	96	75	632

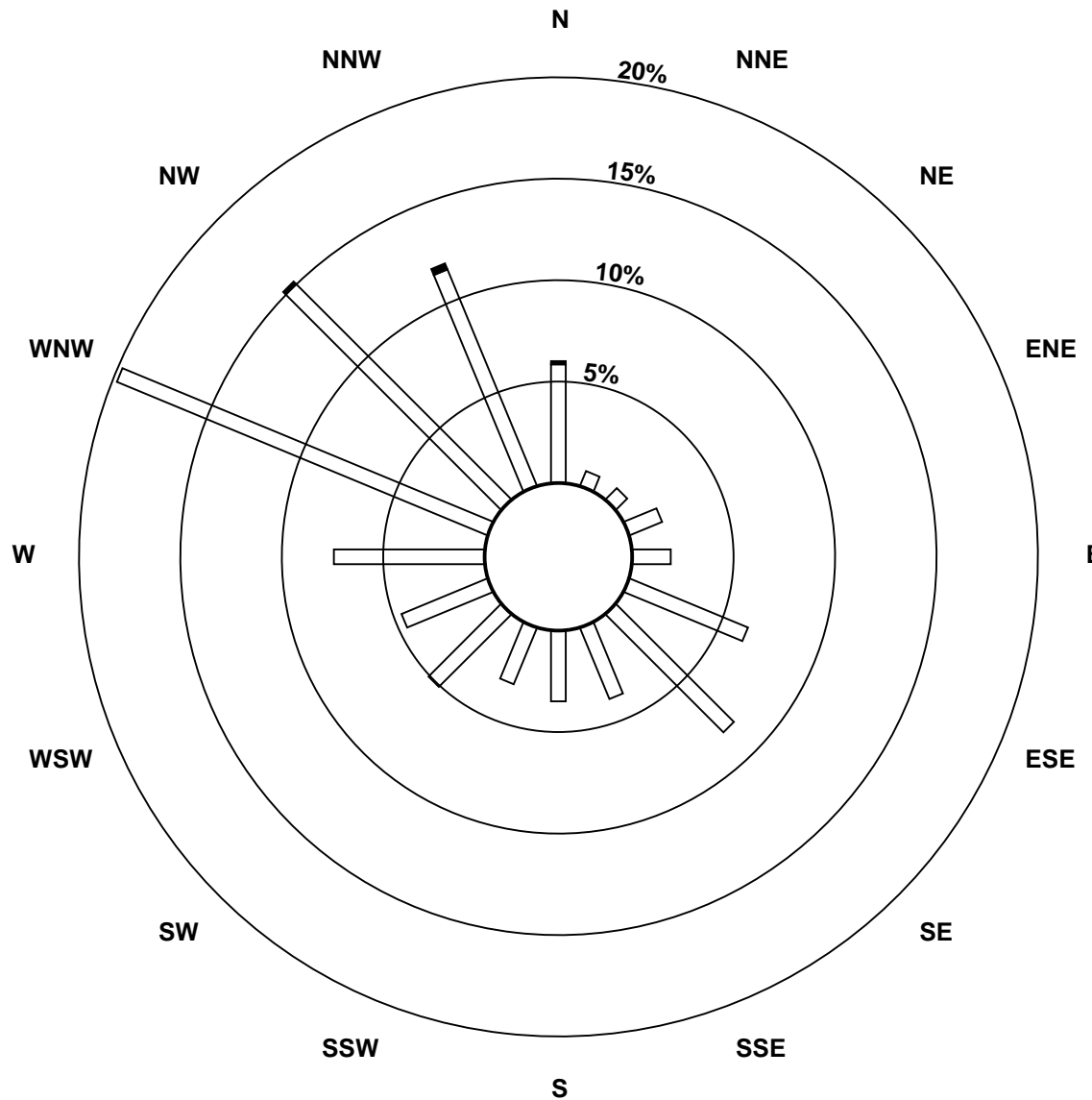
Total Number of Valid Hours: 632

Total Number of Hours: 672

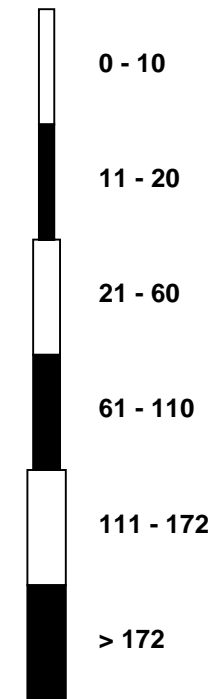


Wood Buffalo Environmental Association
Wind Rose Feb 2017

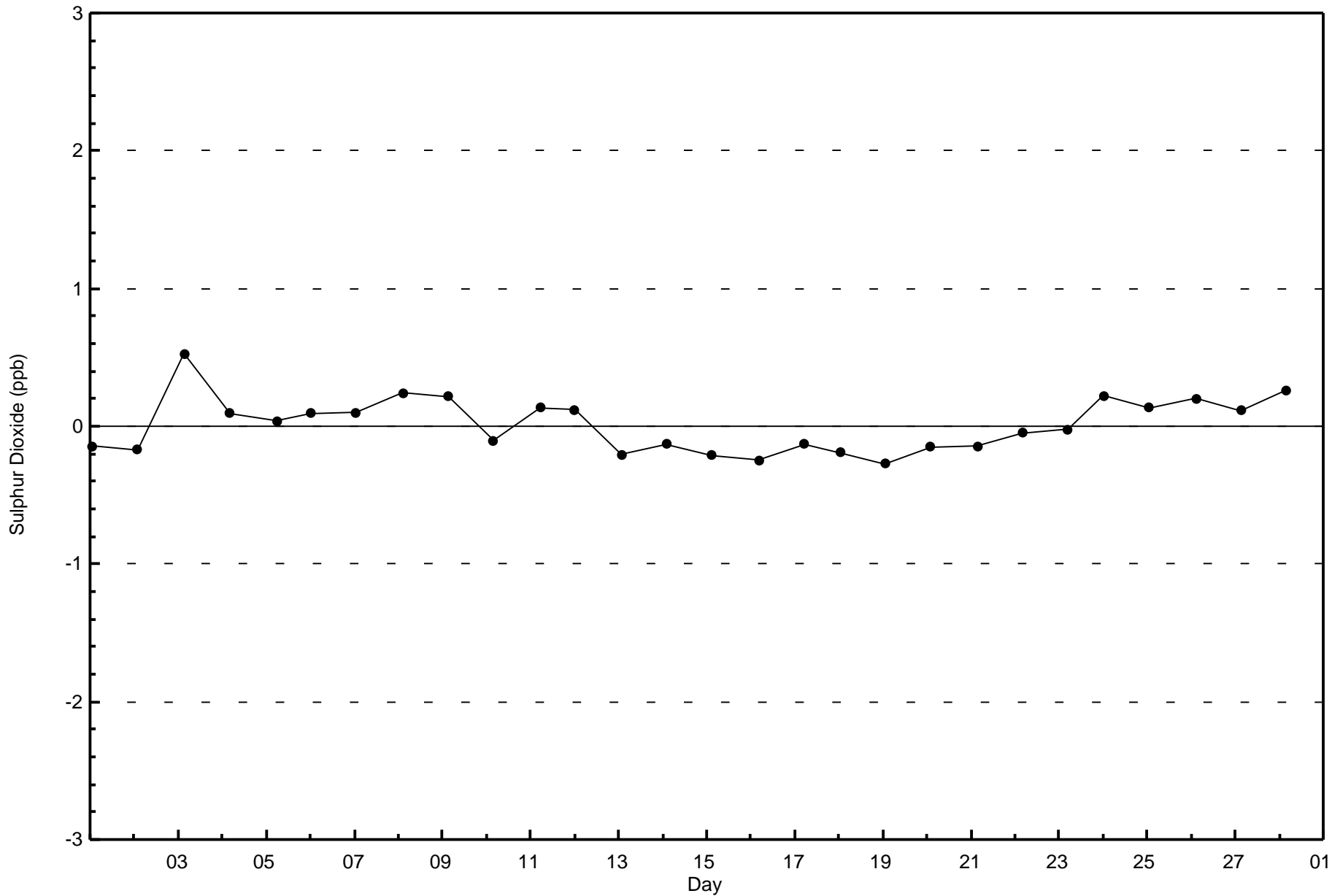
Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)

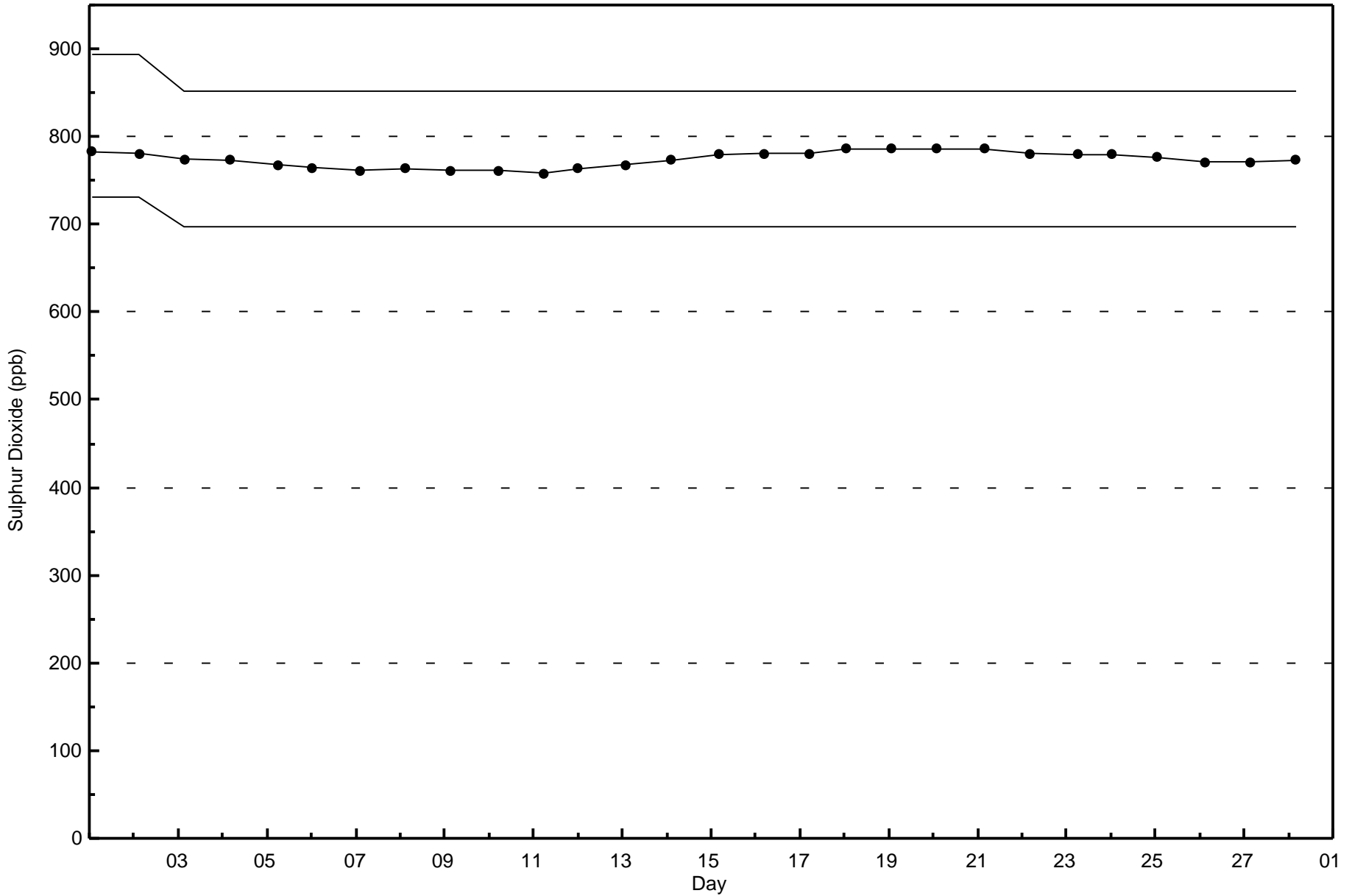


Classes (ppb)



Total Number of Valid Hours: 632







Summary of Hour Averages

Anzac - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 2 ppb on Feb 20 10:00	Maximum Daily Average: 0.5 ppb on Feb 17		Hours of Data:	640
Minimum Value: 0 ppb on Feb 12 20:00	Minimum Daily Average: 0.2 ppb on Feb 12		Hours of Missing Data:	32
Maximum Diurnal Average: 0.3 ppb at hour 10	Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Calibration:	31
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:	99.9

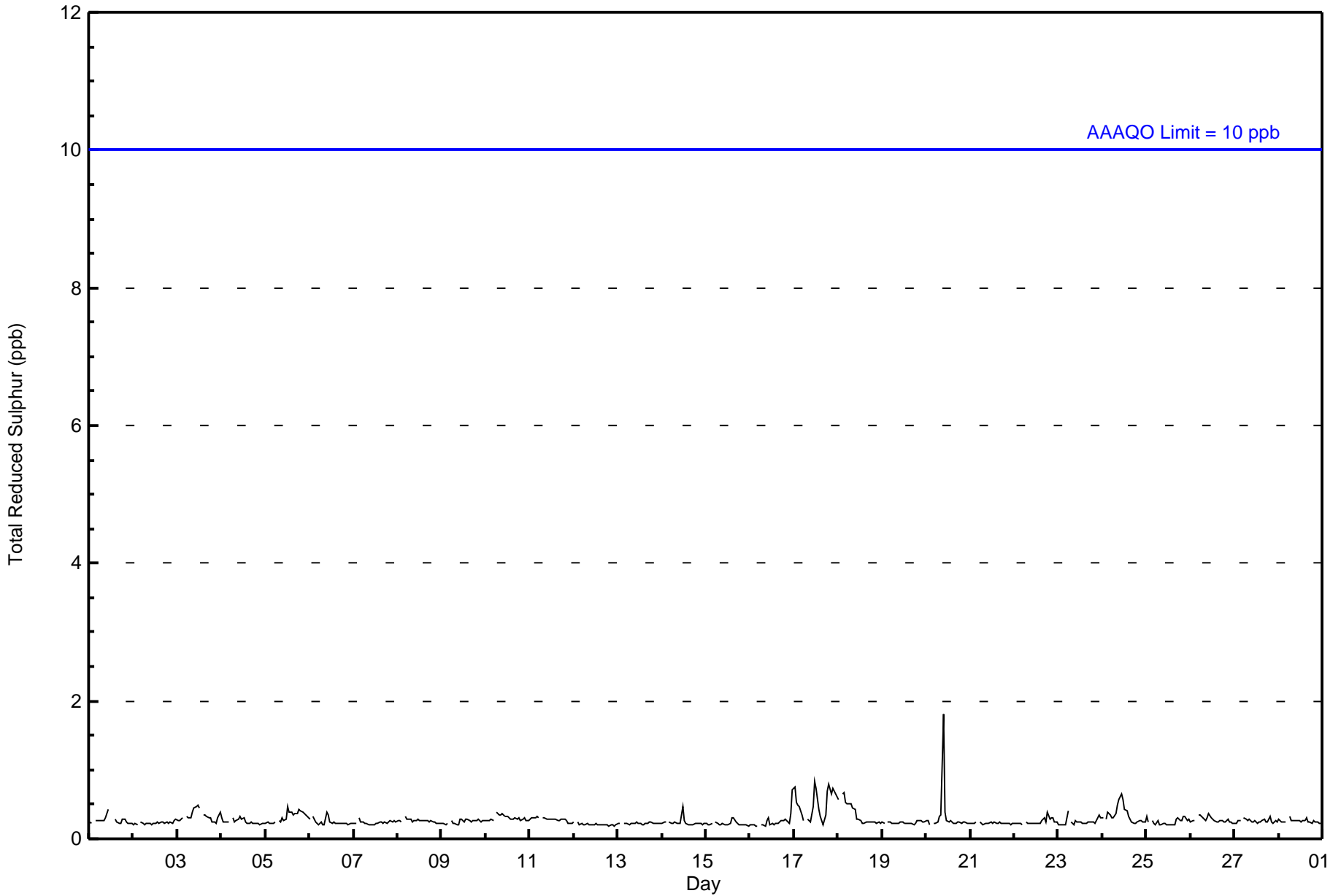
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Feb	0	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-Feb	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-Feb	0	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
7-Feb	0	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
8-Feb	0	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-Feb	0	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-Feb	0	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
11-Feb	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-Feb	0	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
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Feb	0	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-Feb	0	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-Feb	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
17-Feb	1	1	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0.5	1
18-Feb	1	Z	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
19-Feb	0	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
20-Feb	0	0	0	Z	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
21-Feb	0	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
22-Feb	0	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-Feb	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
24-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Feb	0	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-Feb	0	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
27-Feb	0	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-Feb	0	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

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
Anzac - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	640	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: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - February 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	38	5	5	13	12	41	51	24	21	19	32	32	46	124	99	74	636
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	38	5	5	13	12	41	51	24	21	19	32	32	46	124	99	74	636

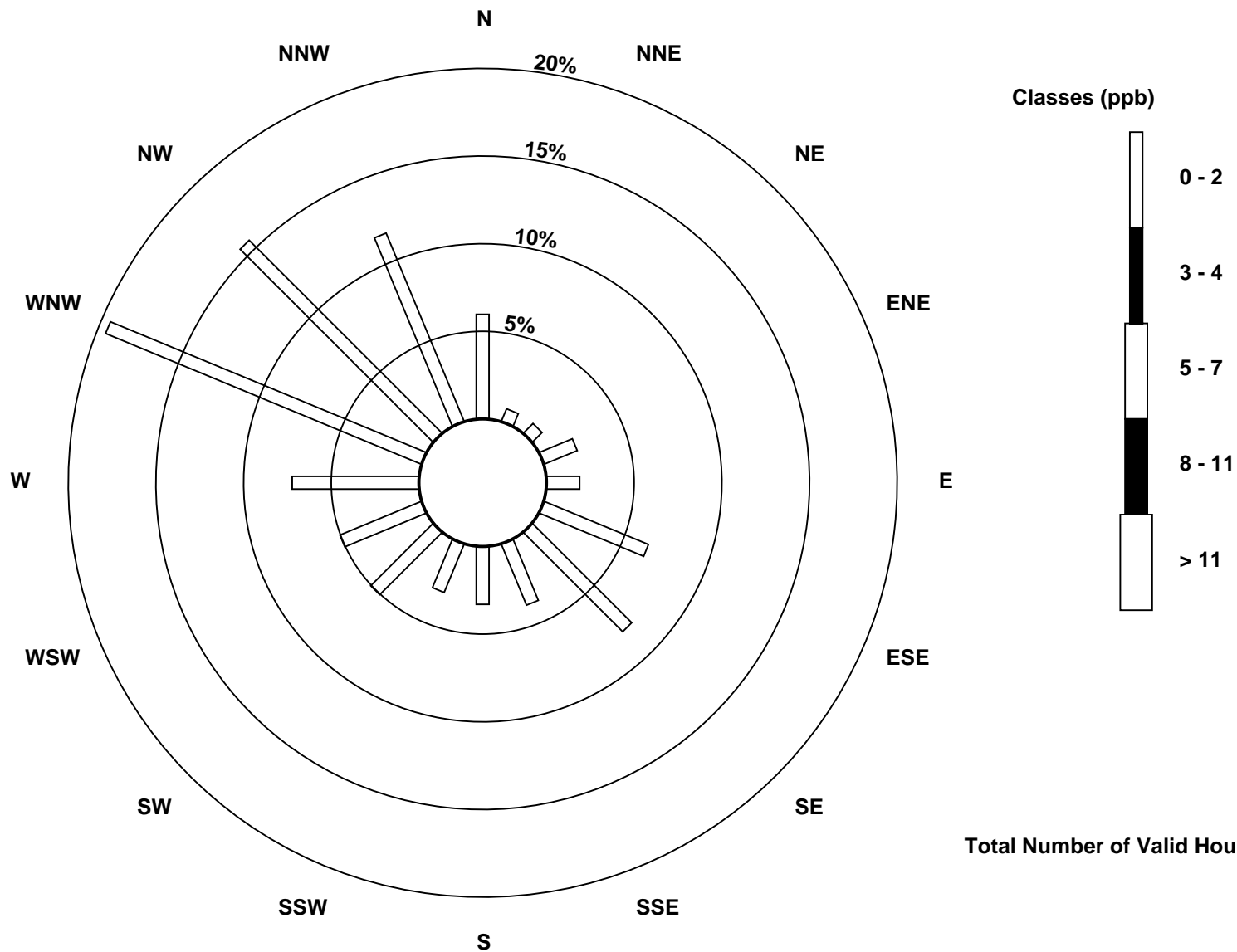
Total Number of Valid Hours: 636

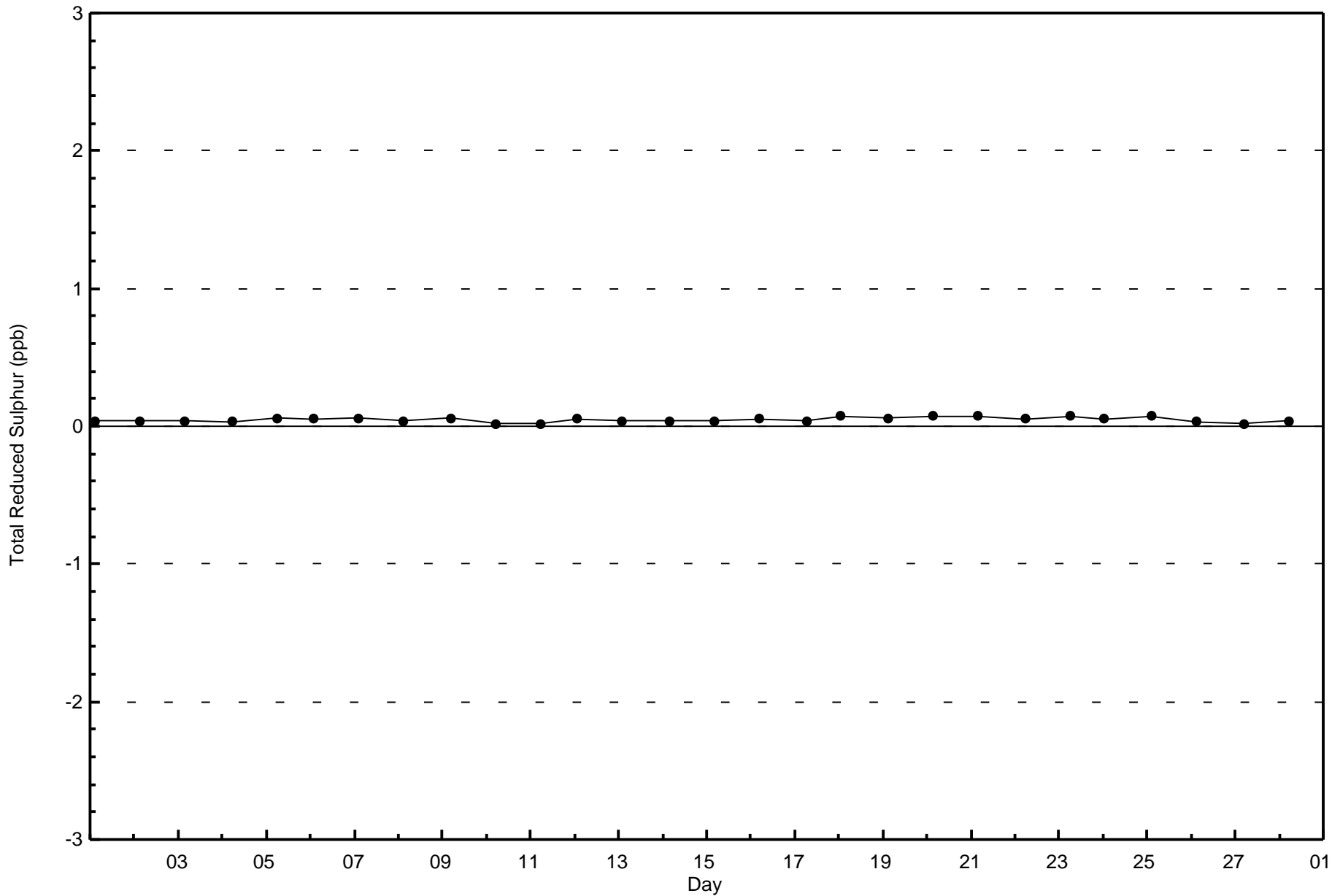
Total Number of Hours: 672

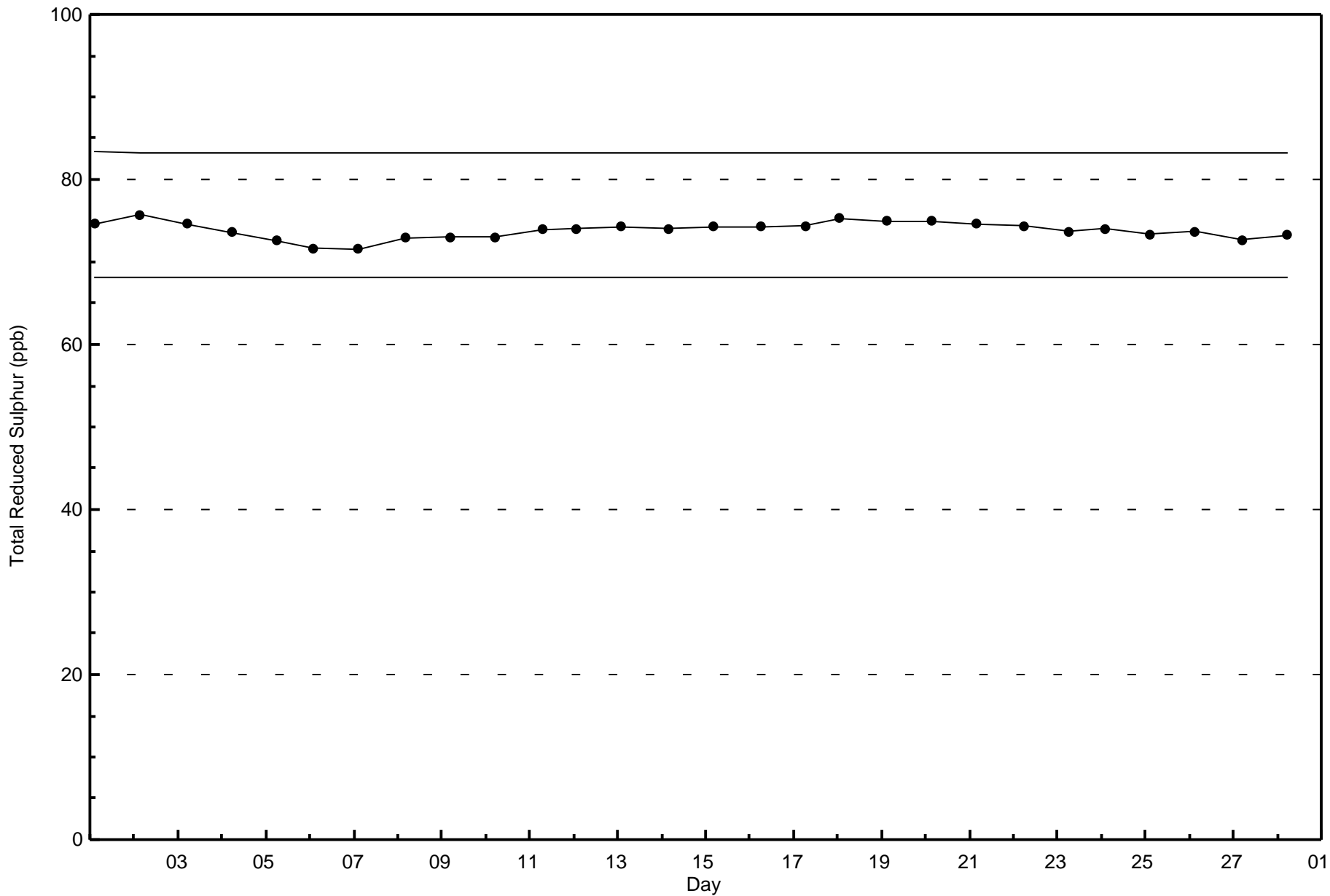


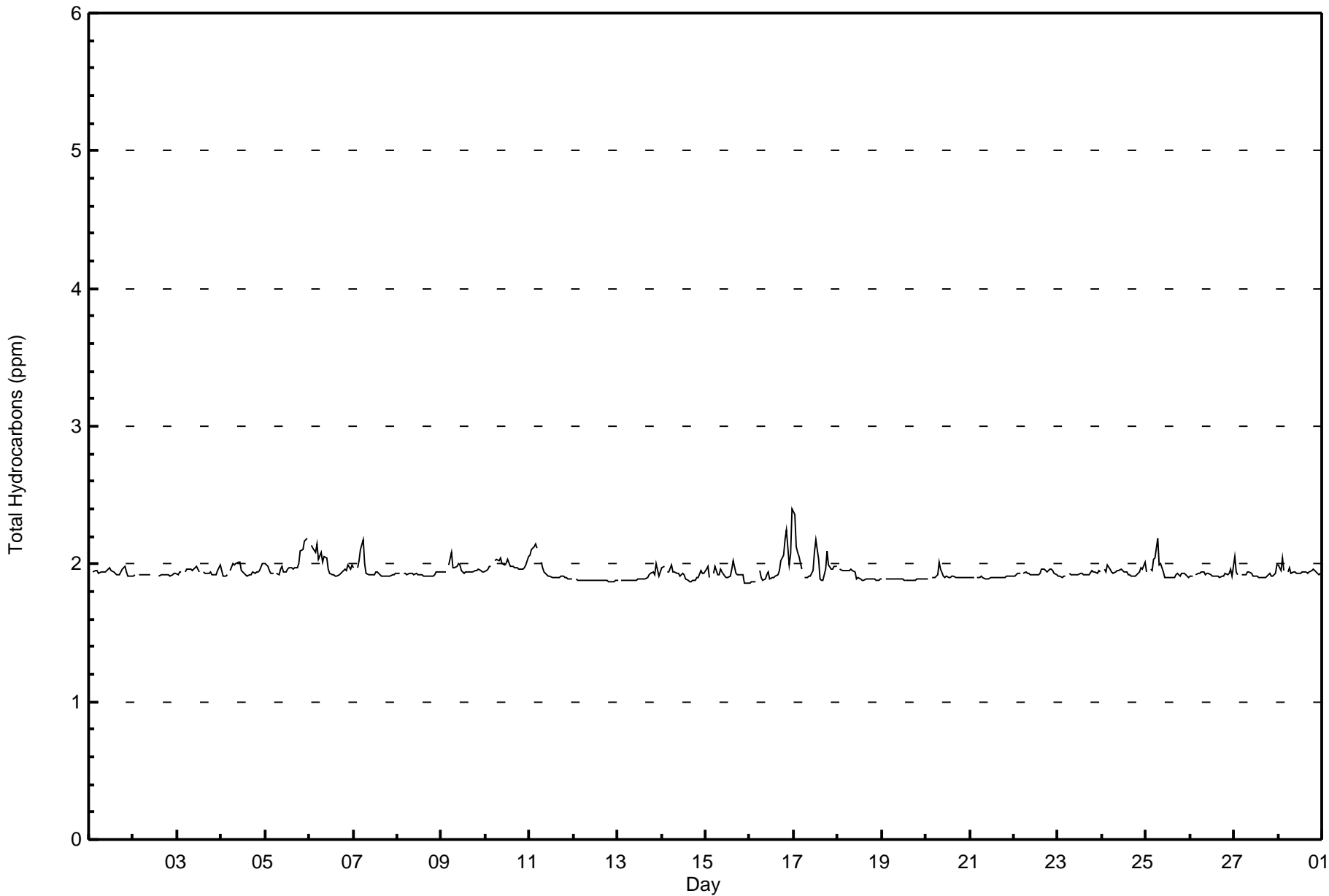
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	605	94.68	94.68
2.1 - 3.0	34	5.32	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - February 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	5	5	12	12	40	52	24	21	17	23	23	44	120	92	74	602
2.1 - 3.0	1	0	0	0	0	0	0	0	1	2	9	7	3	5	4	1	33
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	5	5	12	12	40	52	24	22	19	32	30	47	125	96	75	635

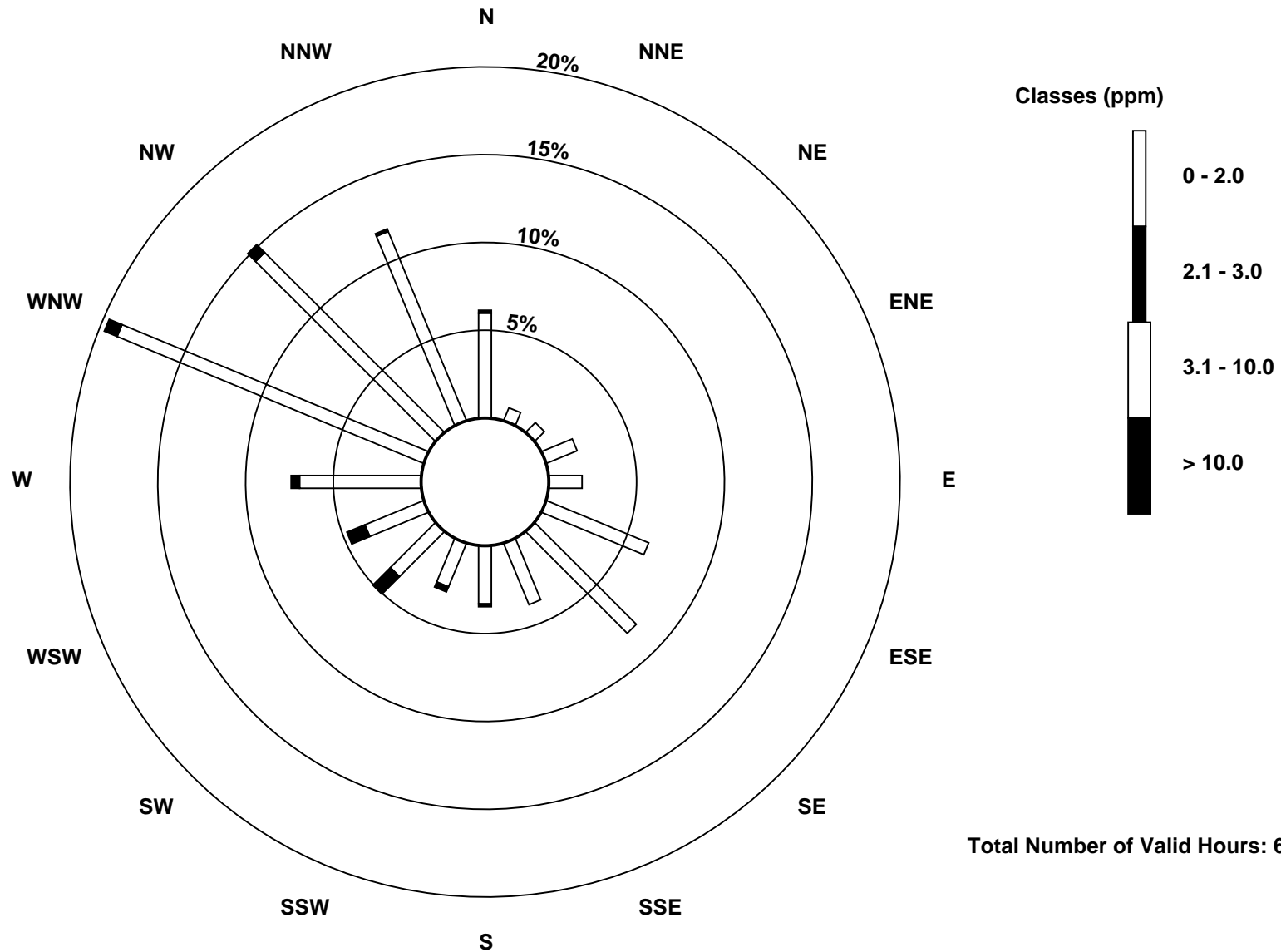
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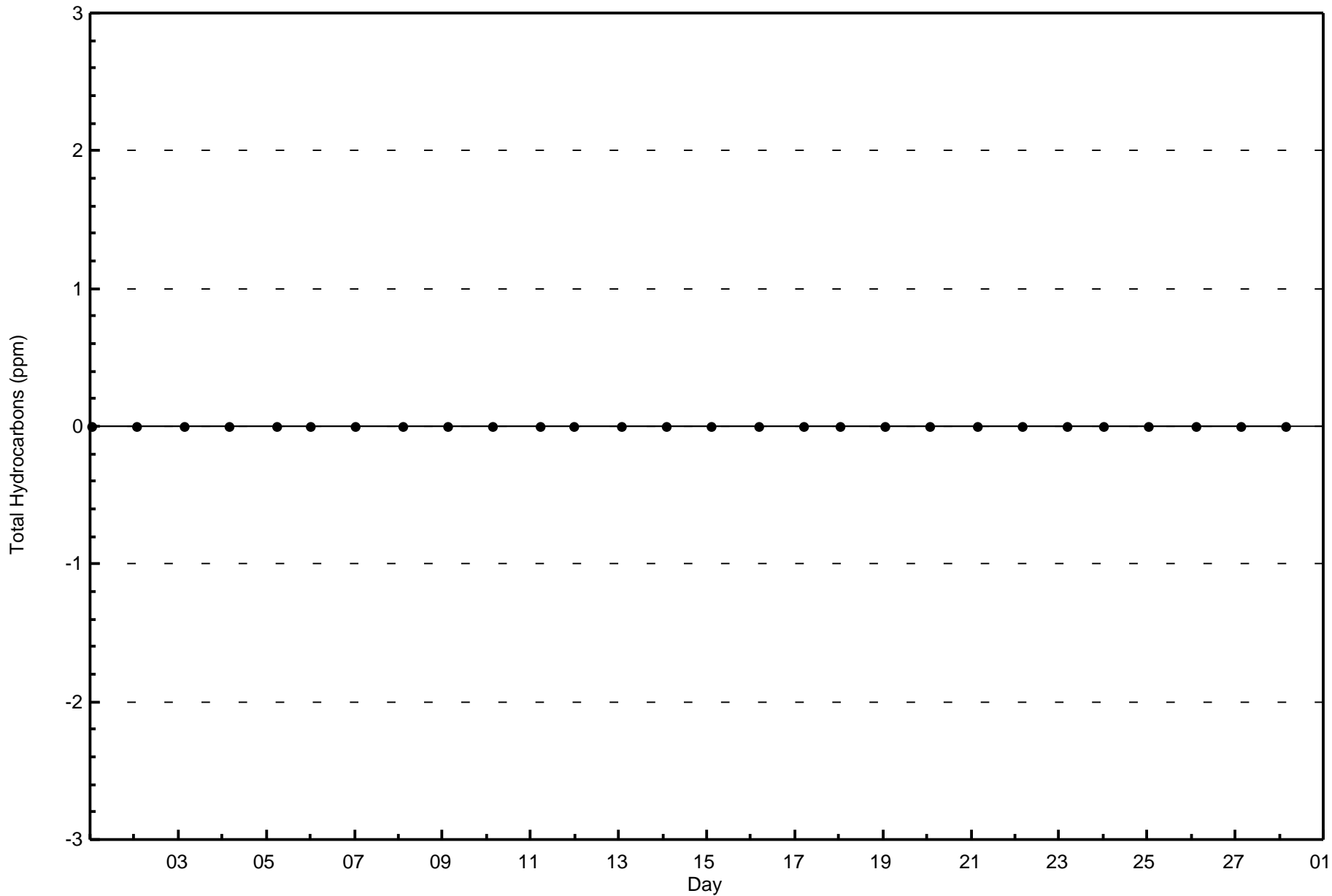
Total Number of Hours: 672

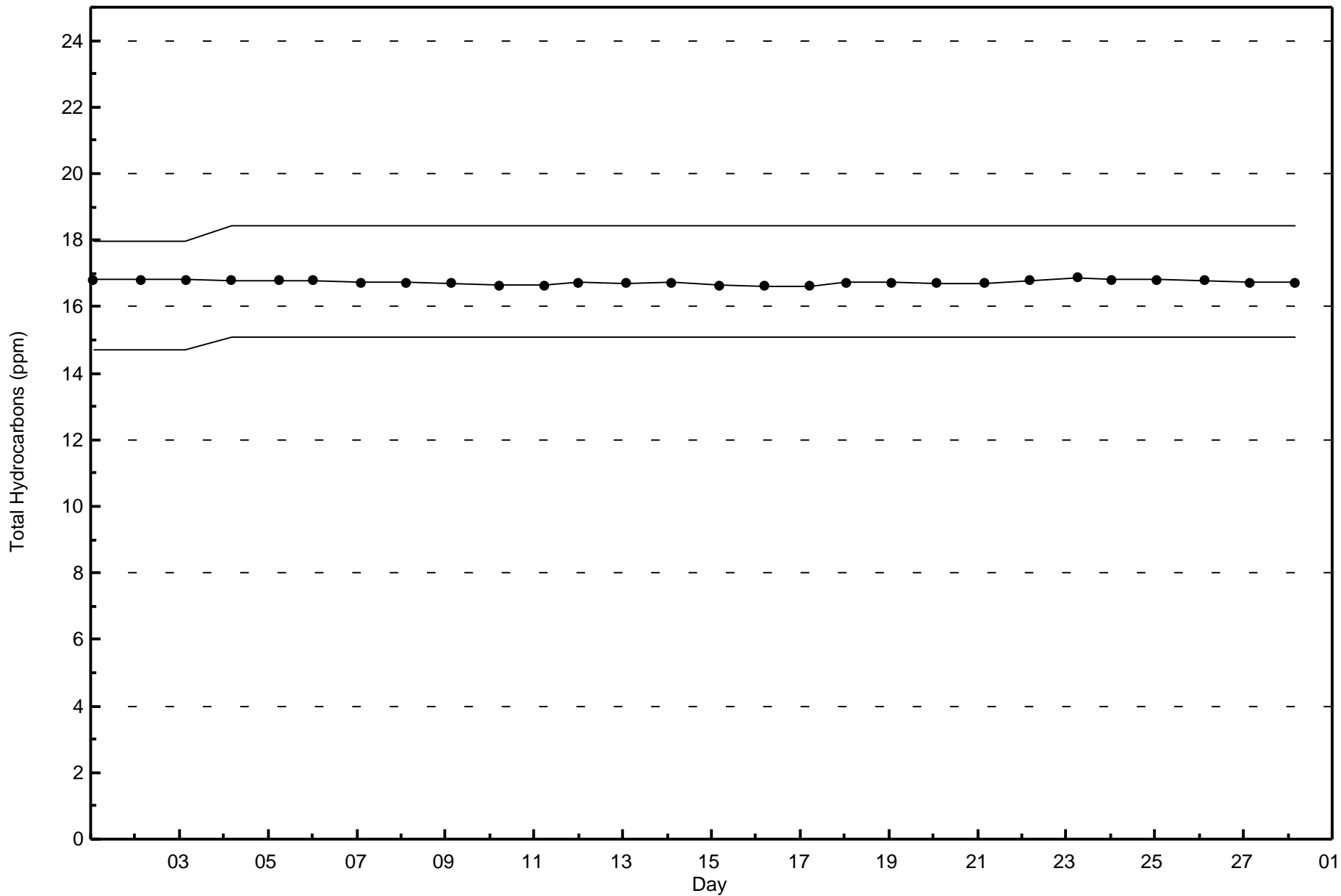


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)

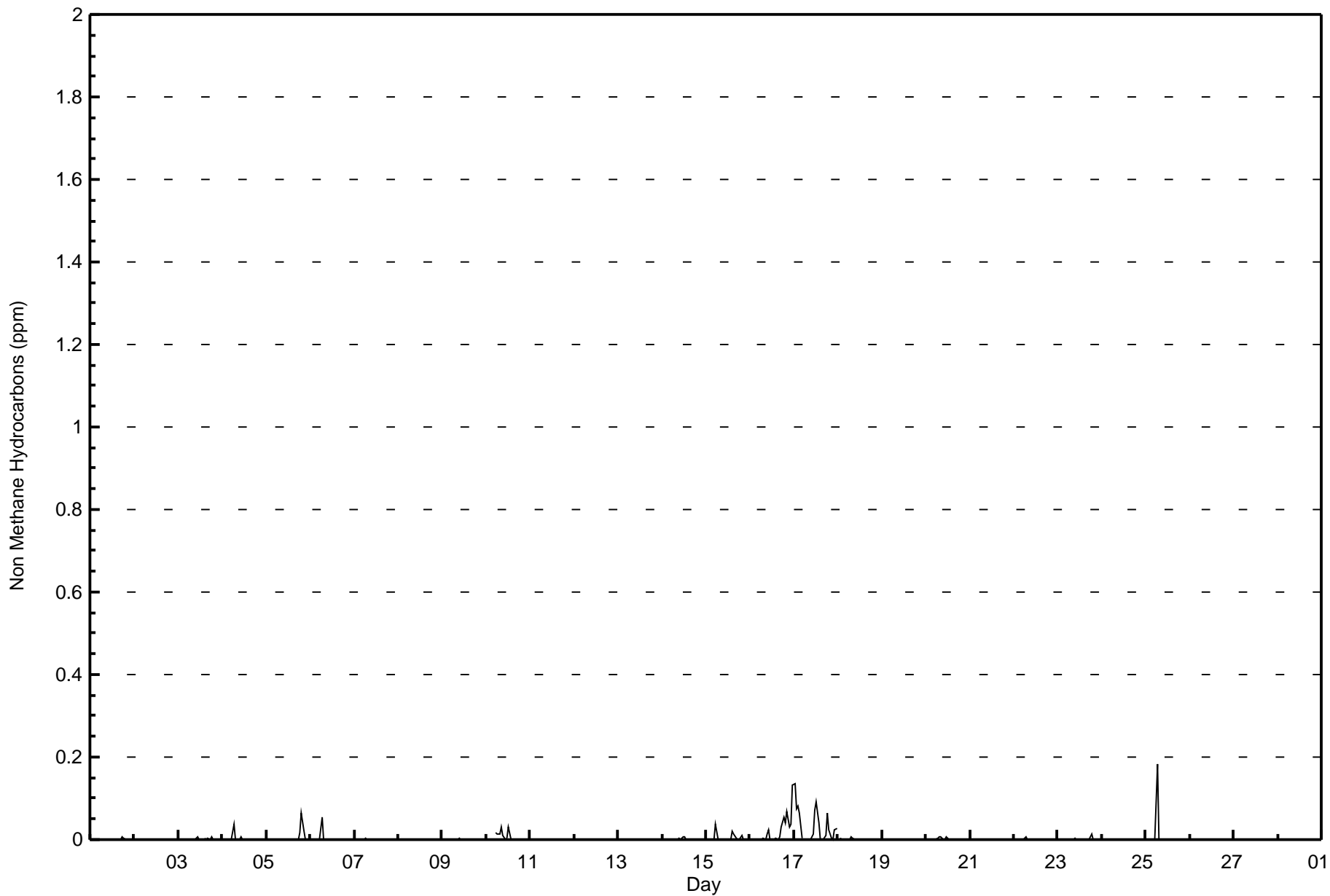








Maximum Value: 0.184 ppm on Feb 25 07:00		Maximum Daily Average: 0.032 ppm on Feb 17		Hours in Service:	672																						
Minimum Value: 0.000 ppm on Feb 1 01:00		Minimum Daily Average: 0.000 ppm on Feb 2		Hours of Data:	639																						
Maximum Diurnal Average: 0.011 ppm at hour 7		Minimum Diurnal Average: 0.000 ppm at hour 5		Hours of Missing Data:	33																						
Monthly Average: 0.003 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:	32																						
				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-Feb	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	0.006	0.005	0.001	0.000	0.000	0.000	0.000	0.001	0.006	
2-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.008	0.000	0.000	M	0.004	0.000	0.002	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.001	0.008	
4-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.037	0.000	0.001	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.037	
5-Feb	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	0.002	0.000	0.000	0.000	0.000	0.017	0.065	0.021	0.000	0.000	0.000	0.005	0.065	
6-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.054	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	0.002	0.054	
7-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	
8-Feb	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	
9-Feb	0.000	0.000	0.000	Z	0.000	0.001	0.000	0.001	0.001	0.002	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	0.002	
10-Feb	0.000	0.000	0.000	0.000	Z	0.017	0.015	0.014	0.032	0.009	0.000	0.004	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.005	0.032	
11-Feb	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-Feb	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	
13-Feb	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	0.001	0.000	0.000	0.000	0.001	
14-Feb	0.000	0.000	Z	0.000	0.001	0.000	0.002	0.001	0.000	0.003	0.001	0.008	0.007	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.008	
15-Feb	0.000	0.000	0.000	Z	0.001	0.038	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.021	0.013	0.003	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.004	0.038	
16-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.003	0.000	0.013	0.022	0.000	0.000	0.001	0.003	0.002	0.007	0.030	0.054	0.041	0.069	0.030	0.037	0.134	0.019	0.134	
17-Feb	0.135	0.076	0.082	0.066	0.005	Z	0.000	0.000	0.000	0.000	0.014	0.070	0.092	0.040	0.000	0.000	0.000	0.011	0.065	0.024	0.004	0.001	0.024	0.028	0.032	0.135	
18-Feb	Z	0.002	0.001	0.002	0.000	0.001	0.000	0.008	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.008	
19-Feb	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	
20-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.003	0.006	0.007	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	0.000	0.001	0.007	
21-Feb	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	
22-Feb	0.000	0.000	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	0.005	
23-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.001	0.013	
24-Feb	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	
25-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.184	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.184	
26-Feb	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	
27-Feb	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-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		0.006	0.003	0.004	0.003	0.000	0.002	0.011	0.001	0.002	0.001	0.002	0.003	0.005	0.002	0.001	0.001	0.000	0.002	0.006	0.005	0.003	0.001	0.002	0.006	Diurnal Average	
		0.135	0.076	0.082	0.066	0.005	0.038	0.184	0.014	0.032	0.013	0.022	0.070	0.092	0.040	0.021	0.013	0.007	0.030	0.065	0.065	0.069	0.030	0.037	0.134	Diurnal Maximum	
Z - zerspan		C - Calibration				M - Maintenance																					





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	589	92.18	92.18
0.006 - 0.05	39	6.10	98.28
0.06 - 0.1	10	1.56	99.84
> 0.1	1	0.16	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - February 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	4	5	12	12	40	42	23	20	18	28	27	47	115	86	70	586
0.006 - 0.05	1	1	0	0	0	0	10	1	2	1	3	2	0	7	6	4	38
0.06 - 0.1	1	0	0	0	0	0	0	0	0	0	0	1	0	3	4	1	10
> 0.1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Totals	39	5	5	12	12	40	52	24	22	19	32	30	47	125	96	75	635

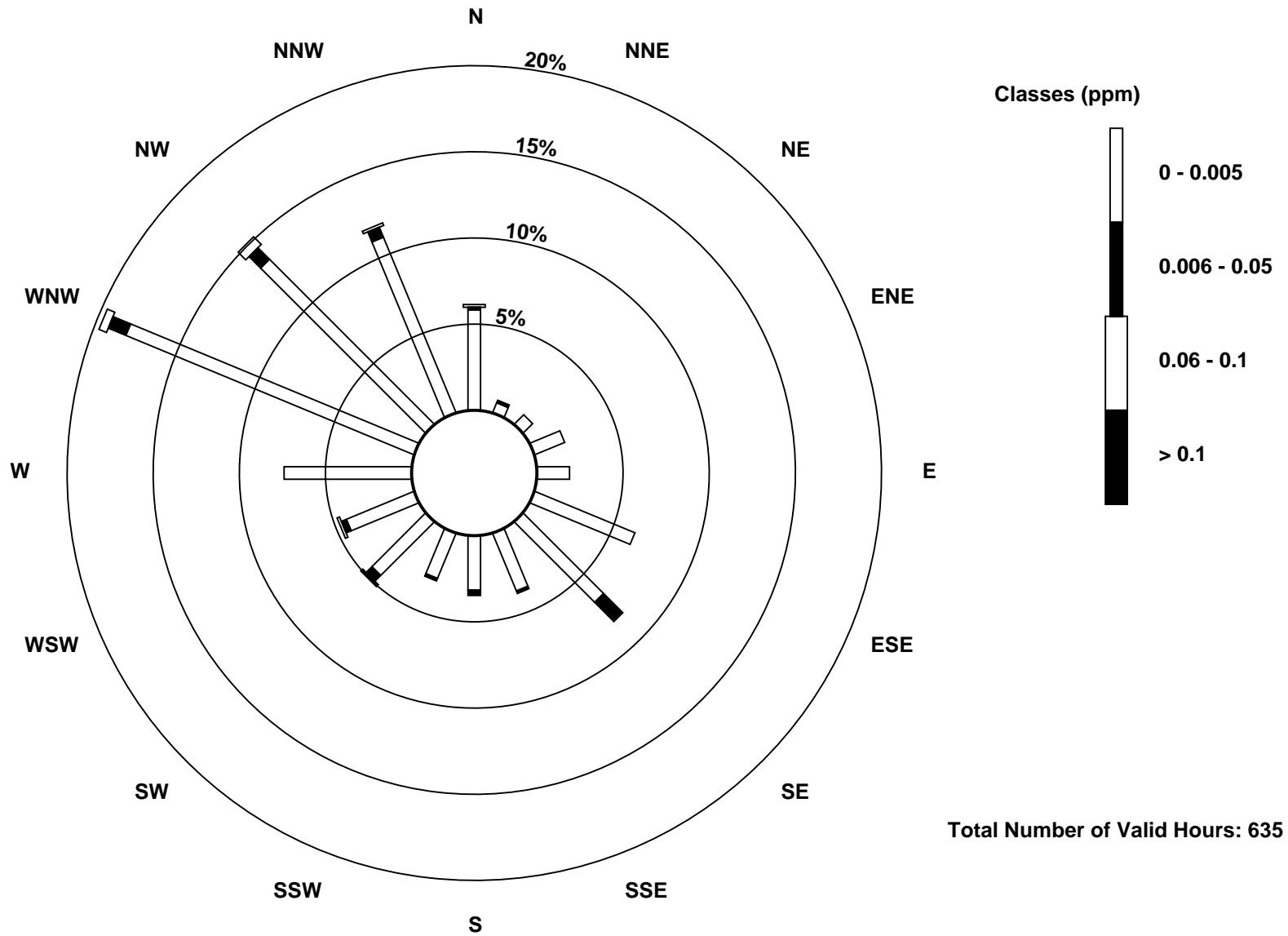
Total Number of Valid Hours: 635

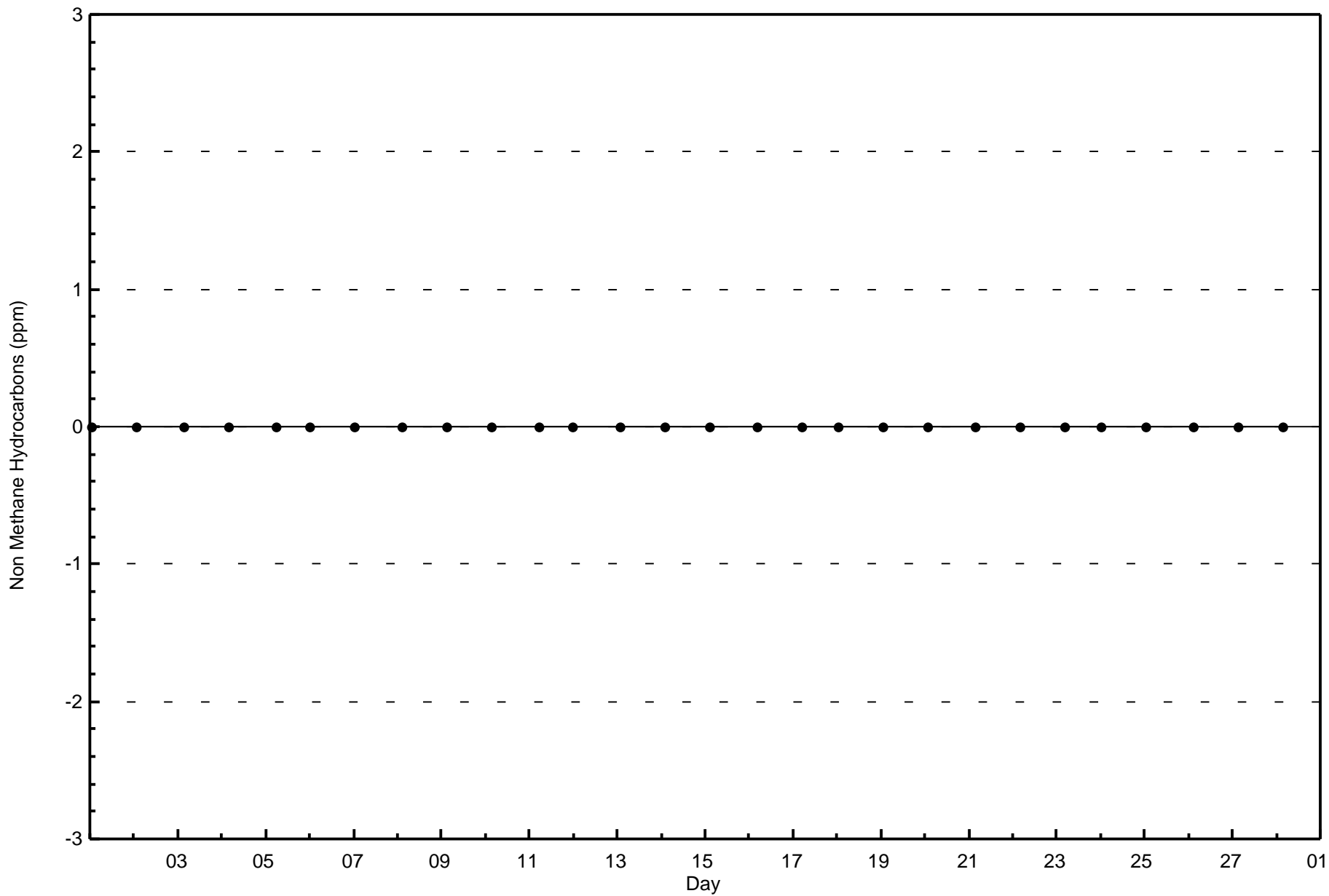
Total Number of Hours: 672

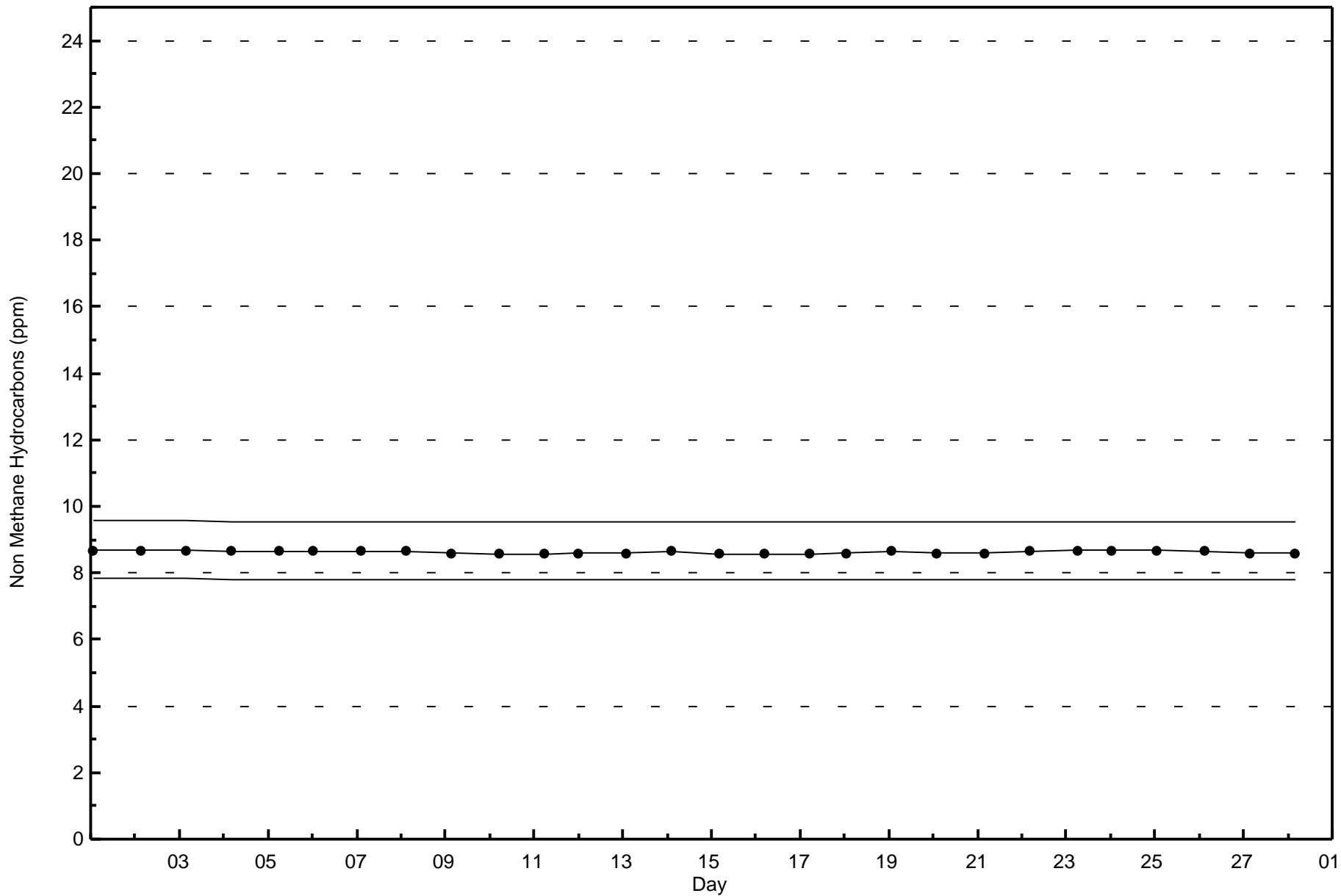


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)



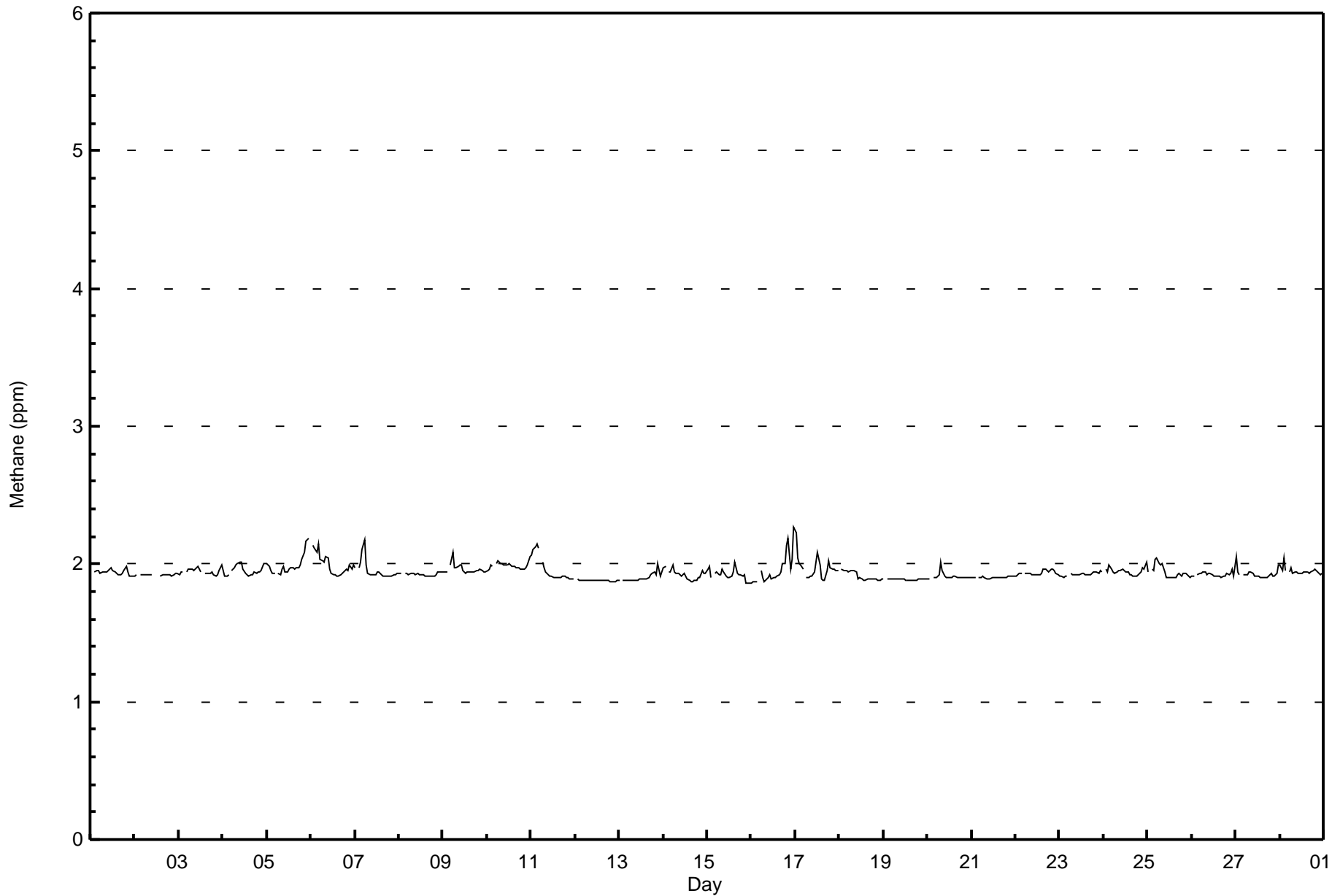






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	615	96.24	96.24
2.1 - 3.0	24	3.76	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - February 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	39	5	5	12	12	40	52	24	21	17	26	24	44	122	94	75	612
2.1 - 3.0	0	0	0	0	0	0	0	0	1	2	6	6	3	3	2	0	23
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	5	5	12	12	40	52	24	22	19	32	30	47	125	96	75	635

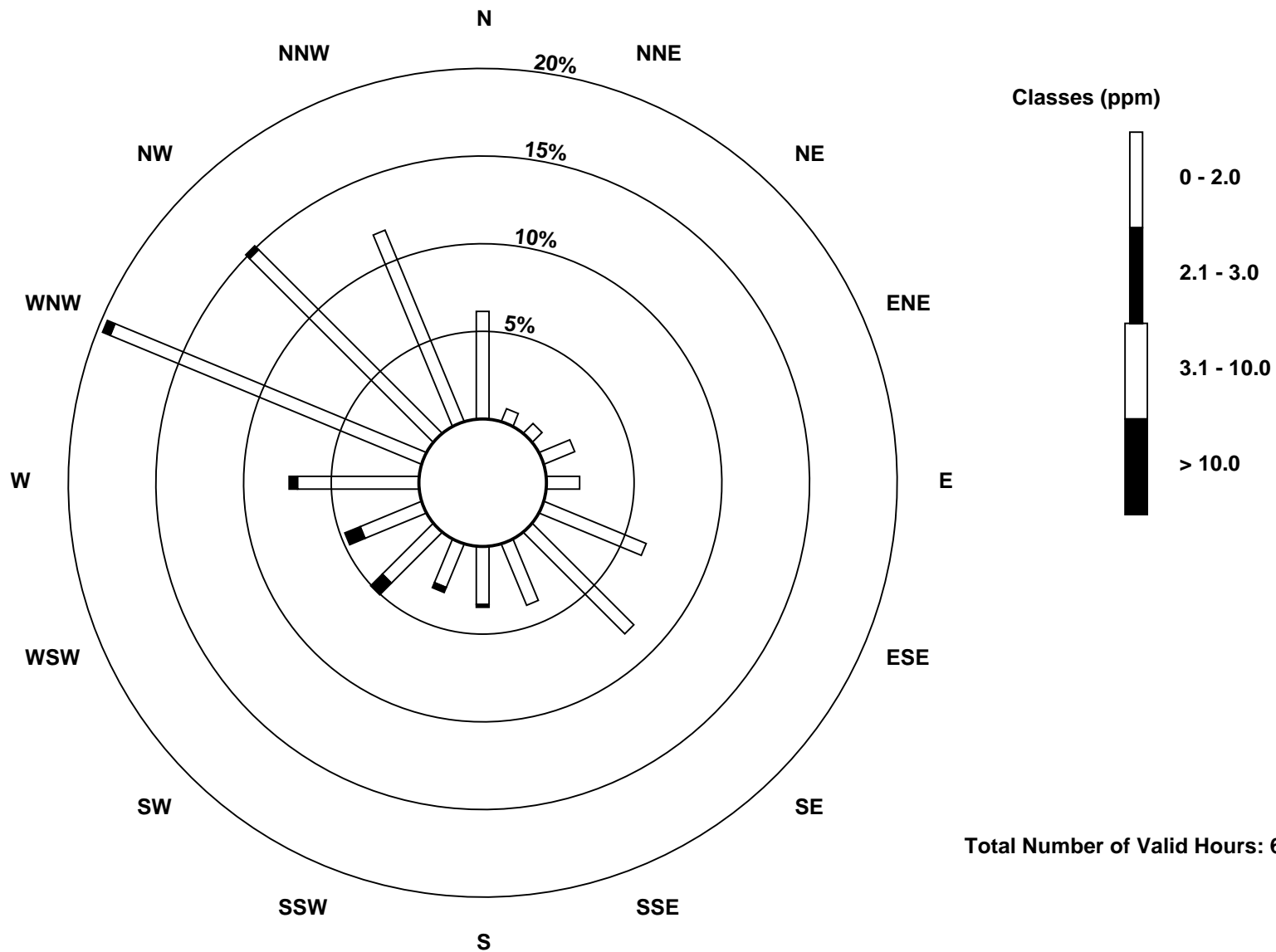
Total Number of Valid Hours: 635

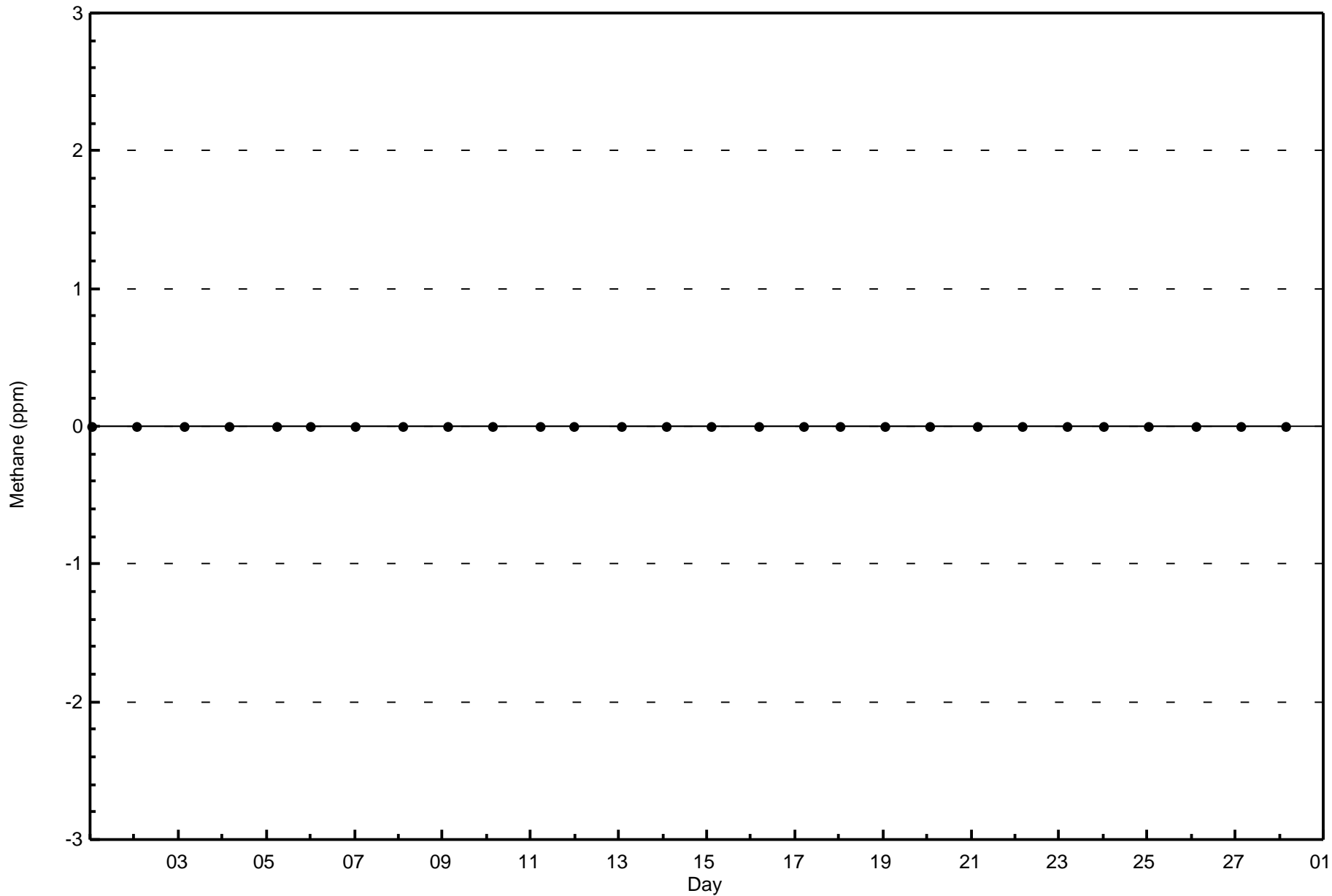
Total Number of Hours: 672

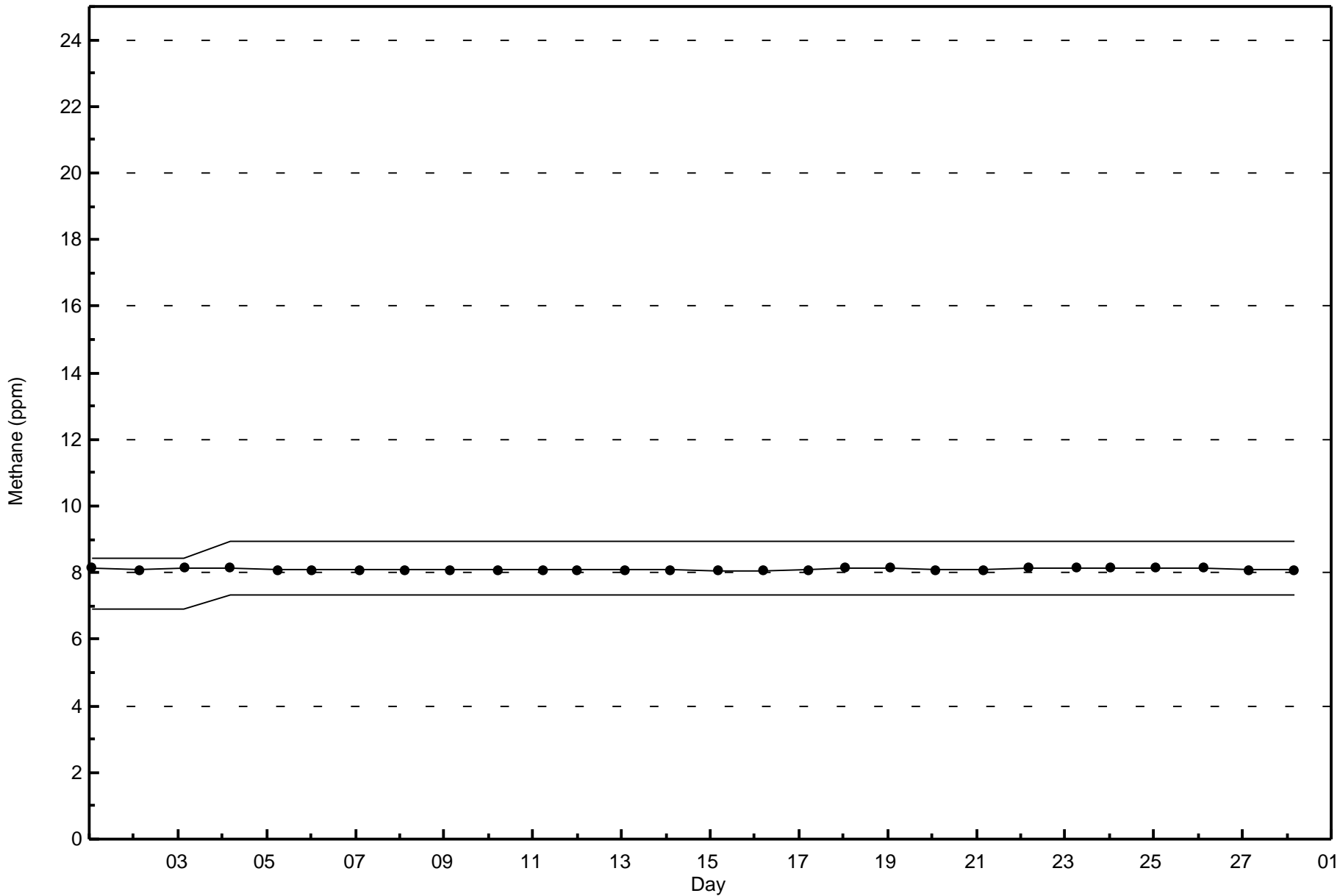


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Methane (CH₄) - ppm
Anzac (AMS 14)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

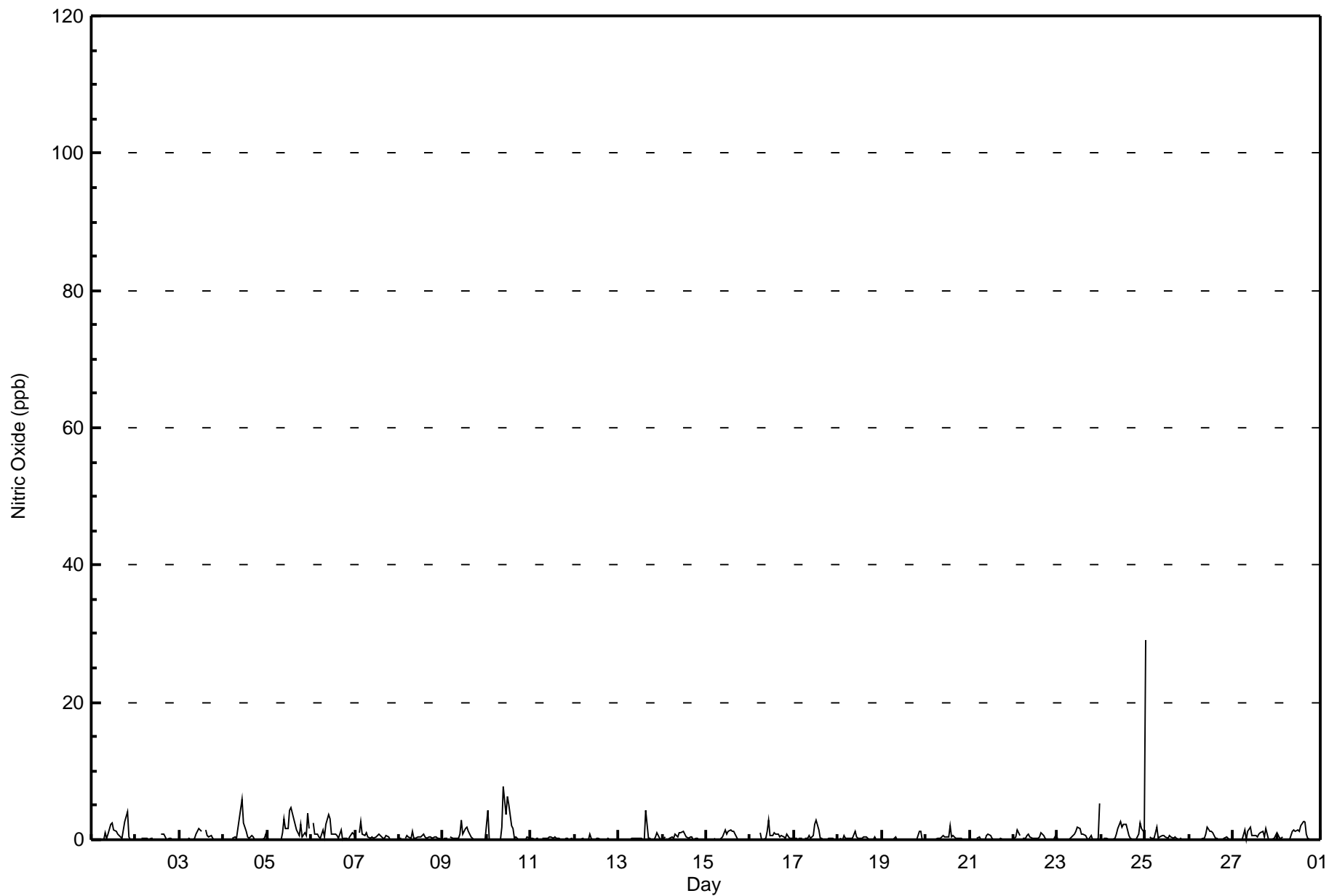
Anzac - February 2017

Maximum Value: 29 ppb on Feb 25 01:00																		Maximum Daily Average: 1.6 ppb on Feb 25																		Hours in Service: 672					
Minimum Value: 0 ppb on Feb 6 21:00																		Minimum Daily Average: 0.1 ppb on Feb 12																		Hours of Data: 639					
Maximum Diurnal Average: 1.5 ppb at hour 1																		Minimum Diurnal Average: 0.2 ppb at hour 5																		Hours of Missing Data: 33					
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 = 5																		Hours of Calibration: 32					
																																				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-Feb	0	Z	0	0	0	0	0	1	0	1	2	2	1	1	1	1	0	2	3	4	0	0	0	0	0.9	4															
2-Feb	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0.2	1															
3-Feb	0	0	0	Z	0	0	0	0	0	1	2	1	1	M	1	1	0	1	0	0	0	0	0	0	0.4	2															
4-Feb	0	0	0	0	Z	0	1	0	2	5	6	2	Z	1	0	0	1	0	0	0	0	0	0	1	0.9	6															
5-Feb	0	0	0	0	0	Z	0	0	1	3	2	2	4	5	3	2	1	1	2	0	1	1	4	2	1.5	5															
6-Feb	Z	2	1	1	0	0	1	0	2	4	3	1	1	1	1	0	1	0	0	0	0	0	1	1	1.0	4															
7-Feb	0	Z	1	3	1	1	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0.5	3															
8-Feb	0	0	Z	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1															
9-Feb	0	0	0	Z	0	0	0	0	0	1	3	1	2	2	1	0	0	0	0	0	0	0	0	0	0.5	3															
10-Feb	4	0	0	0	Z	0	0	0	2	8	4	6	5	2	2	0	0	0	0	0	0	0	0	0	1.5	8															
11-Feb	0	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-Feb	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1															
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0.3	4															
14-Feb	0	0	Z	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1															
15-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1															
16-Feb	0	0	0	0	Z	1	0	0	0	1	3	1	1	1	1	1	0	1	0	0	1	0	0	0	0.5	3															
17-Feb	0	0	0	0	0	Z	0	0	1	0	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0.4	3															
18-Feb	Z	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1															
19-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1															
20-Feb	0	0	Z	0	0	0	0	0	0	1	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0.3	2															
21-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1															
22-Feb	0	0	1	1	Z	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0.4	1															
23-Feb	0	0	0	0	0	Z	0	0	1	1	1	2	2	1	1	1	0	0	1	0	0	0	0	5	0.7	5															
24-Feb	Z	0	0	0	0	0	0	0	1	2	3	2	2	2	1	1	0	0	0	0	1	2	2	1	0.9	3															
25-Feb	29	Z	0	0	0	0	2	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1.6	29															
26-Feb	0	0	Z	0	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	2															
27-Feb	0	0	0	Z	0	0	1	0	1	2	1	1	1	0	1	1	1	0	2	0	0	0	0	1	0.6	2															
28-Feb	1	0	0	0	Z	0	0	0	1	1	1	1	1	2	3	3	1	0	0	0	0	0	0	0	0.7	3															
1.5																		0.2																		Diurnal Average					
29																		2																		Diurnal Maximum					
0.2																		0.2																							
0.3																		0.3																							
0.6																		1.3																							
8																		6																							
5																		1.1																							
5																		1.2																							
3																		1.0																							
4																		0.8																							
1																		0.7																							
2																		0.4																							
3																		0.2																							
4																		0.4																							
1																		0.3																							
2																		0.2																							
4																		0.3																							
5																		0.3																							
5																		0.5																							
Z - zerospan																								C - Calibration								M - Maintenance									



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	99.84	99.84
21 - 40	1	0.16	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - February 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	5	5	12	12	40	52	24	22	19	32	30	46	125	96	75	634
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	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	39	5	5	12	12	40	52	24	22	19	32	30	47	125	96	75	635

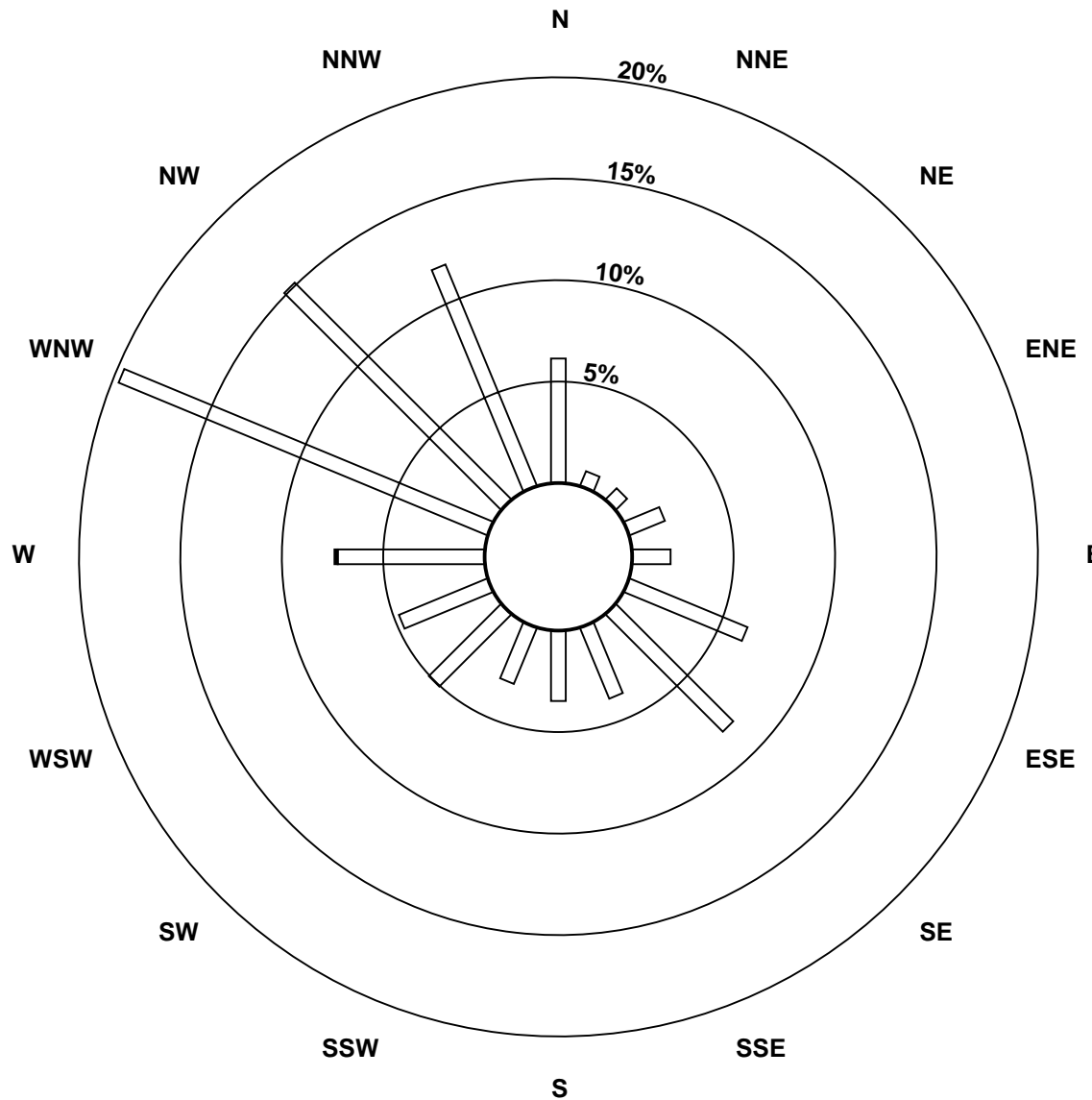
Total Number of Valid Hours: 635

Total Number of Hours: 672

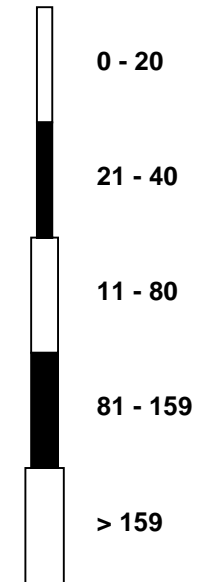


Wood Buffalo Environmental Association
Wind Rose Feb 2017

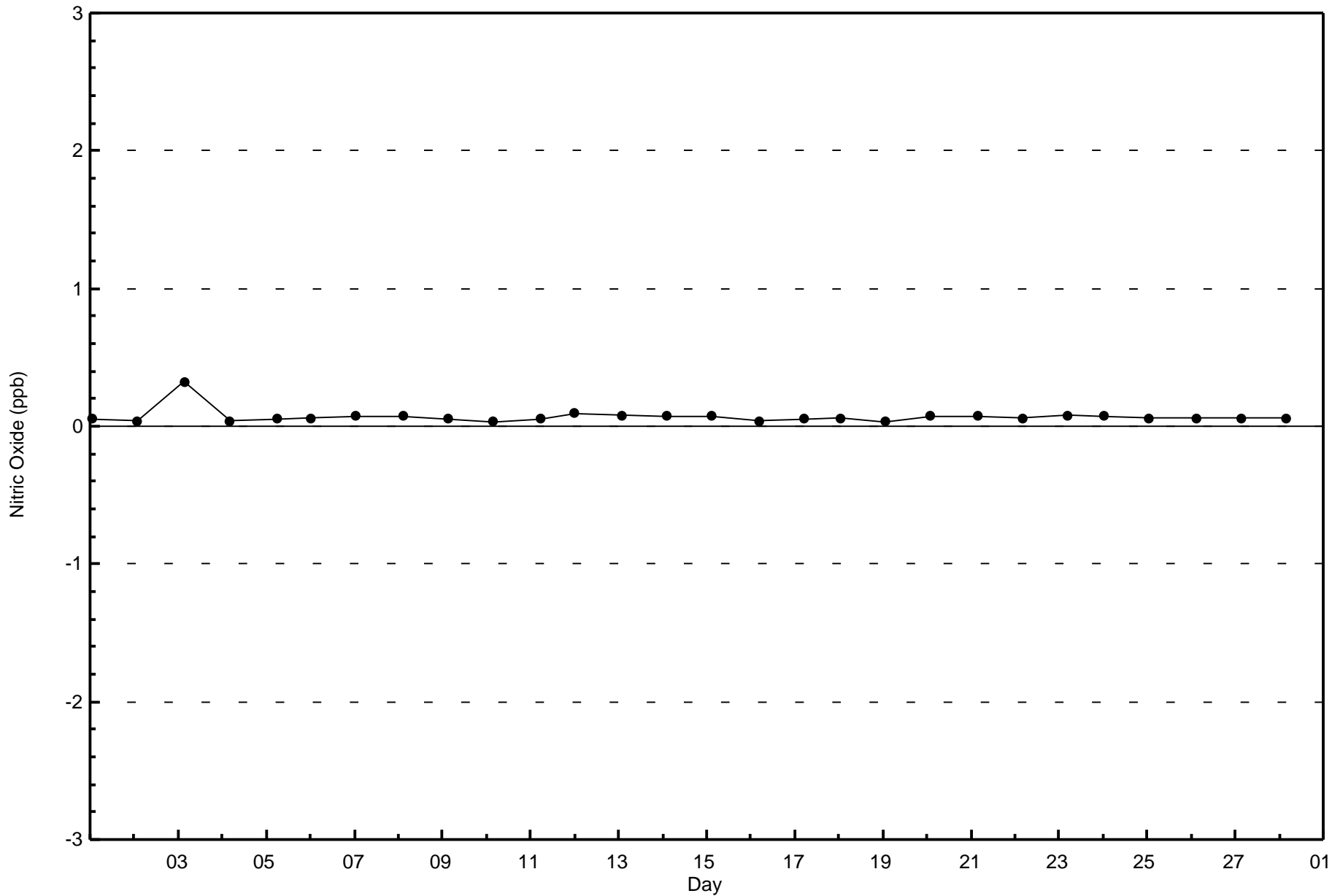
Nitric Oxide (NO) - ppb
Anzac (AMS 14)



Classes (ppb)



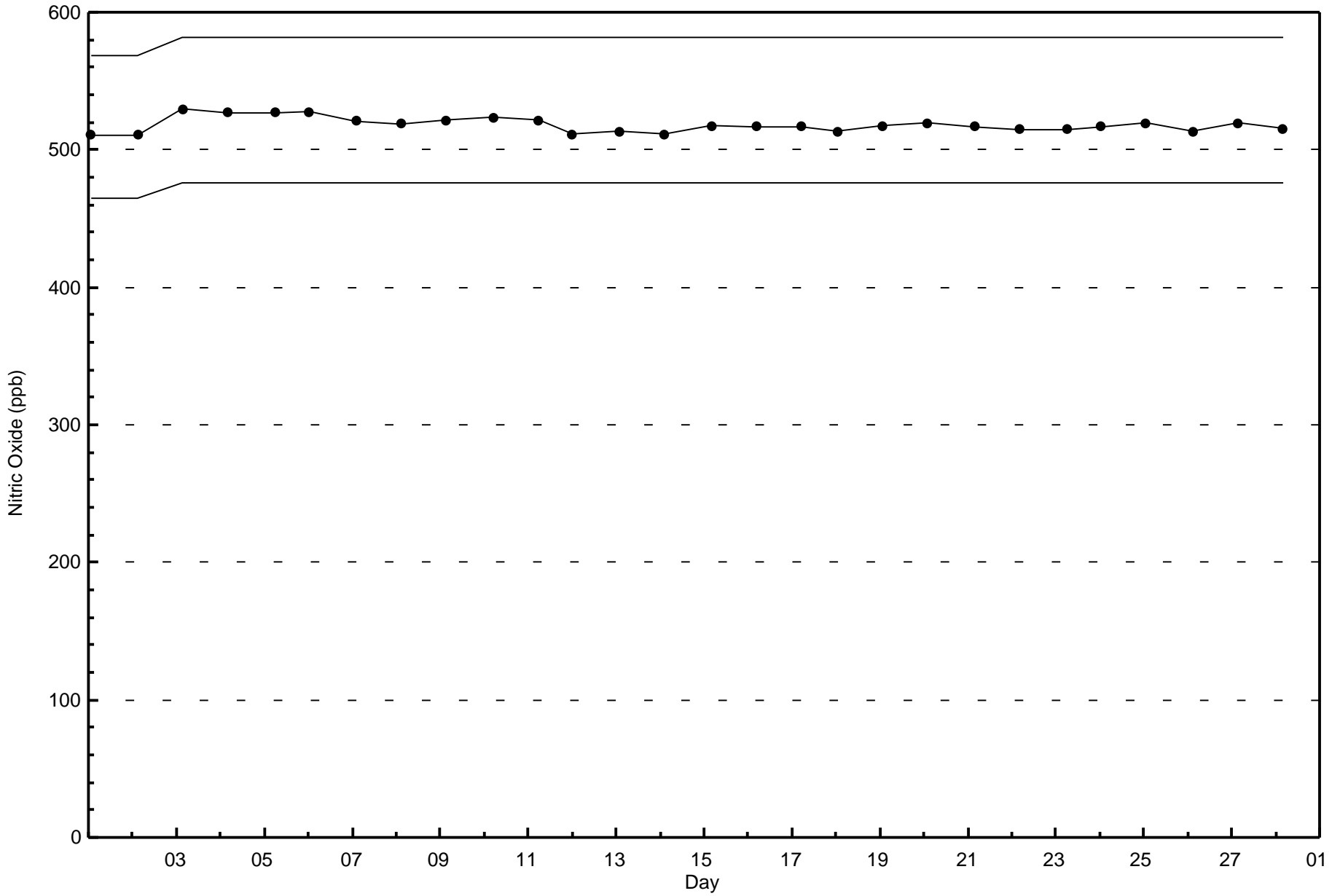
Total Number of Valid Hours: 635





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Anzac - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

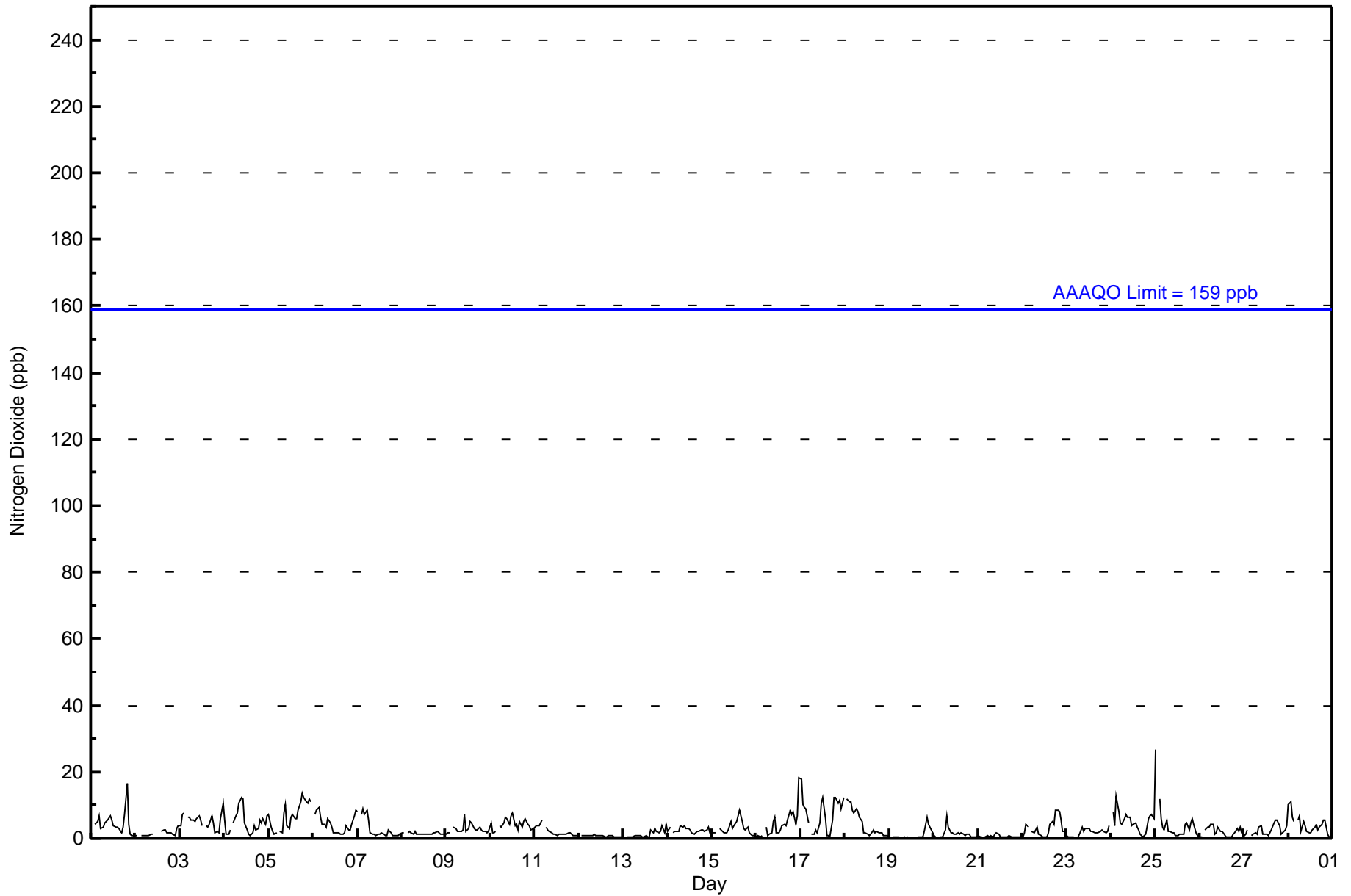
Anzac - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 27 ppb on Feb 25 01:00										Maximum Daily Average: 7.3 ppb on Feb 17										Hours of Data: 639						
Minimum Value: 0 ppb on Feb 19 08:00										Minimum Daily Average: 0.6 ppb on Feb 21										Hours of Missing Data: 33						
Maximum Diurnal Average: 4.3 ppb at hour 1										Minimum Diurnal Average: 2.2 ppb at hour 15										Hours of Calibration: 32						
Monthly Average: 3.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 12										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-Feb	2	Z	4	5	7	3	3	5	5	5	7	6	4	3	3	3	2	4	7	16	4	1	1	1	4.4	16
2-Feb	1	1	Z	1	1	1	1	1	1	1	C	C	C	C	2	3	3	2	2	2	1	1	3	4	1.6	4
3-Feb	4	7	8	Z	6	6	6	6	5	6	7	5	4	M	4	4	4	7	5	2	2	2	6	11	5.2	11
4-Feb	6	1	1	3	Z	5	7	8	11	12	12	5	3	1	1	2	4	3	3	6	5	6	4	7	4.9	12
5-Feb	7	4	2	1	2	Z	2	2	8	10	4	3	6	7	6	6	8	11	14	12	11	11	12	11	6.9	14
6-Feb	Z	7	9	10	6	4	4	3	6	5	4	2	2	2	2	1	1	2	4	3	2	4	7	8	4.2	10
7-Feb	8	Z	7	9	7	9	6	2	1	1	1	1	2	1	1	1	3	2	1	1	1	1	1	1	2.9	9
8-Feb	2	2	Z	2	2	2	1	2	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1.5	2
9-Feb	1	2	2	Z	4	3	2	2	2	3	7	2	3	5	5	3	2	3	3	3	2	2	2	2	2.8	7
10-Feb	5	2	2	2	Z	4	4	5	6	6	4	7	8	4	4	3	5	4	5	6	4	4	3	3	4.2	8
11-Feb	3	4	4	5	6	Z	3	3	2	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2.1	6
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
13-Feb	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	0	2	2	3	2	2	2	4	2	4	1.4	4
14-Feb	2	3	Z	2	2	2	2	4	4	4	3	3	2	2	1	2	2	2	3	3	2	3	4	2	2.5	4
15-Feb	2	2	2	Z	3	3	2	2	2	2	5	3	4	5	7	9	5	3	3	3	2	1	1	1	3.0	9
16-Feb	1	1	1	1	Z	3	1	1	2	5	6	2	2	3	4	4	4	6	9	7	8	4	7	18	4.3	18
17-Feb	18	10	9	9	5	Z	1	1	3	2	5	11	12	6	1	1	1	5	12	12	11	11	9	12	7.3	18
18-Feb	Z	12	11	11	8	8	9	8	6	5	2	2	1	1	1	2	2	2	2	2	2	1	1	1	4.3	12
19-Feb	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	7	4	3	2	1.1	7
20-Feb	1	0	Z	0	0	1	3	7	3	2	2	1	1	2	1	2	1	1	1	1	1	1	0	1	1.4	7
21-Feb	1	0	0	Z	1	1	1	1	1	1	2	1	1	0	0	0	0	1	0	0	0	0	1	0	0.6	2
22-Feb	1	2	4	3	Z	2	2	2	3	1	1	1	0	1	2	4	5	4	9	8	8	5	2	2	3.1	9
23-Feb	1	0	0	0	0	Z	1	1	3	2	3	3	3	2	2	2	2	2	2	2	2	2	2	4	1.8	4
24-Feb	Z	8	4	13	8	5	4	6	7	6	6	4	4	5	4	3	1	1	1	1	6	7	7	6	5.0	13
25-Feb	27	Z	12	6	3	2	5	2	2	2	2	1	1	1	1	1	4	5	3	5	6	4	1	1	4.2	27
26-Feb	0	1	Z	2	3	3	4	4	1	2	3	2	2	2	1	1	1	1	1	2	3	2	4	2	2.0	4
27-Feb	1	1	3	Z	1	1	2	1	4	4	1	1	1	1	2	3	5	5	6	4	1	2	3	4	2.4	6
28-Feb	10	11	6	5	Z	5	7	2	5	4	2	2	2	3	3	4	3	3	4	5	6	1	0	0	4.1	11
4.3 3.5 4.0 3.9 3.3 3.1 3.0 2.9 3.4 3.4 3.4 2.6 2.6 2.3 2.2 2.4 2.5 3.0 3.8 4.0 3.7 3.1 3.1 3.9																								Diurnal Average		
27 12 12 13 8 9 9 8 11 12 12 11 12 7 7 9 8 11 14 16 11 11 12 18																								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
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	99.84	99.84
21 - 40	1	0.16	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - February 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	5	5	12	12	40	52	24	22	19	32	30	46	125	96	75	634
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	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	39	5	5	12	12	40	52	24	22	19	32	30	47	125	96	75	635

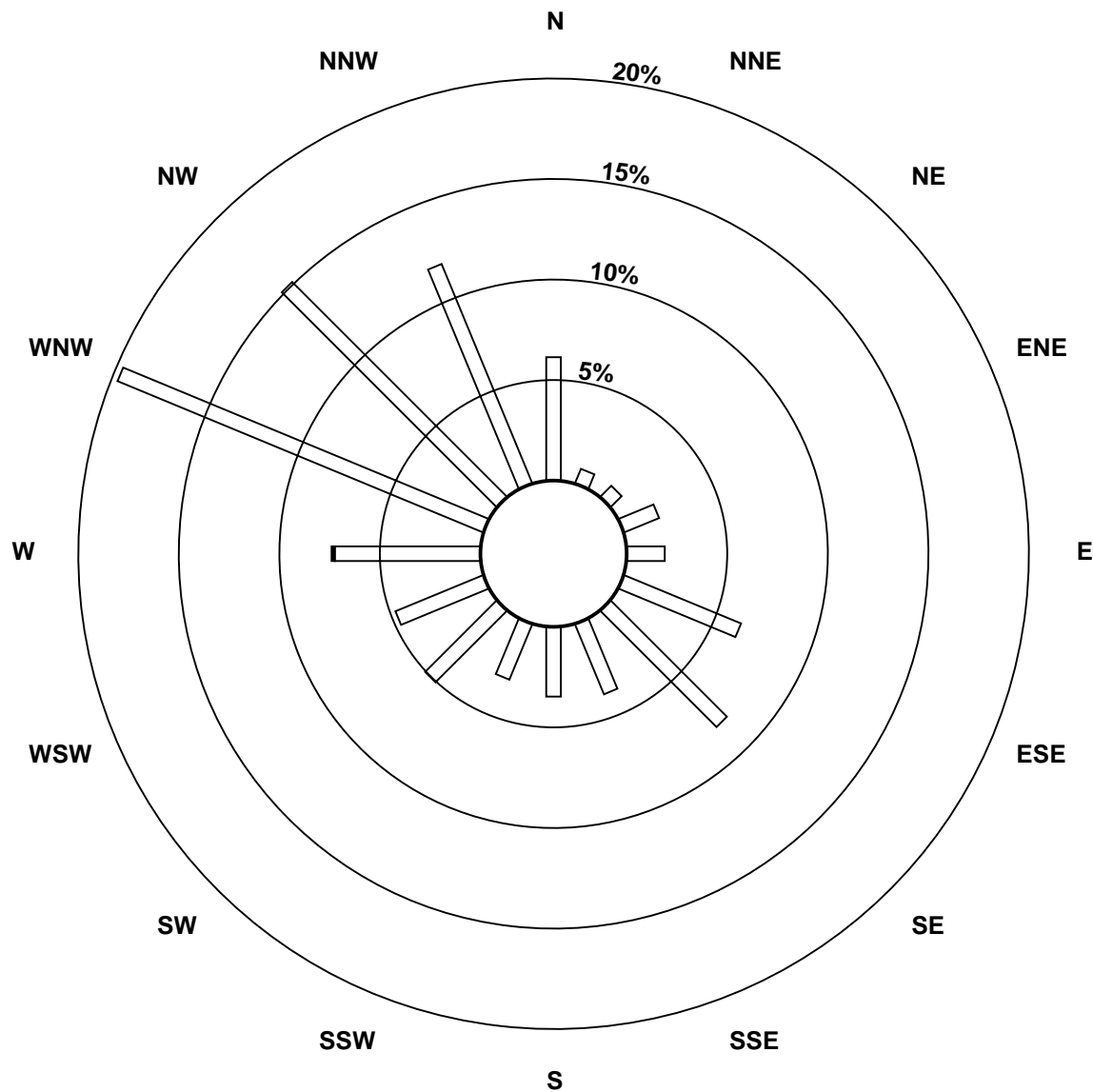
Total Number of Valid Hours: 635

Total Number of Hours: 672

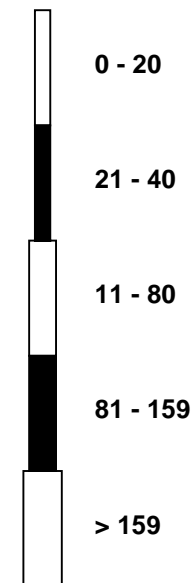


Wood Buffalo Environmental Association
Wind Rose Feb 2017

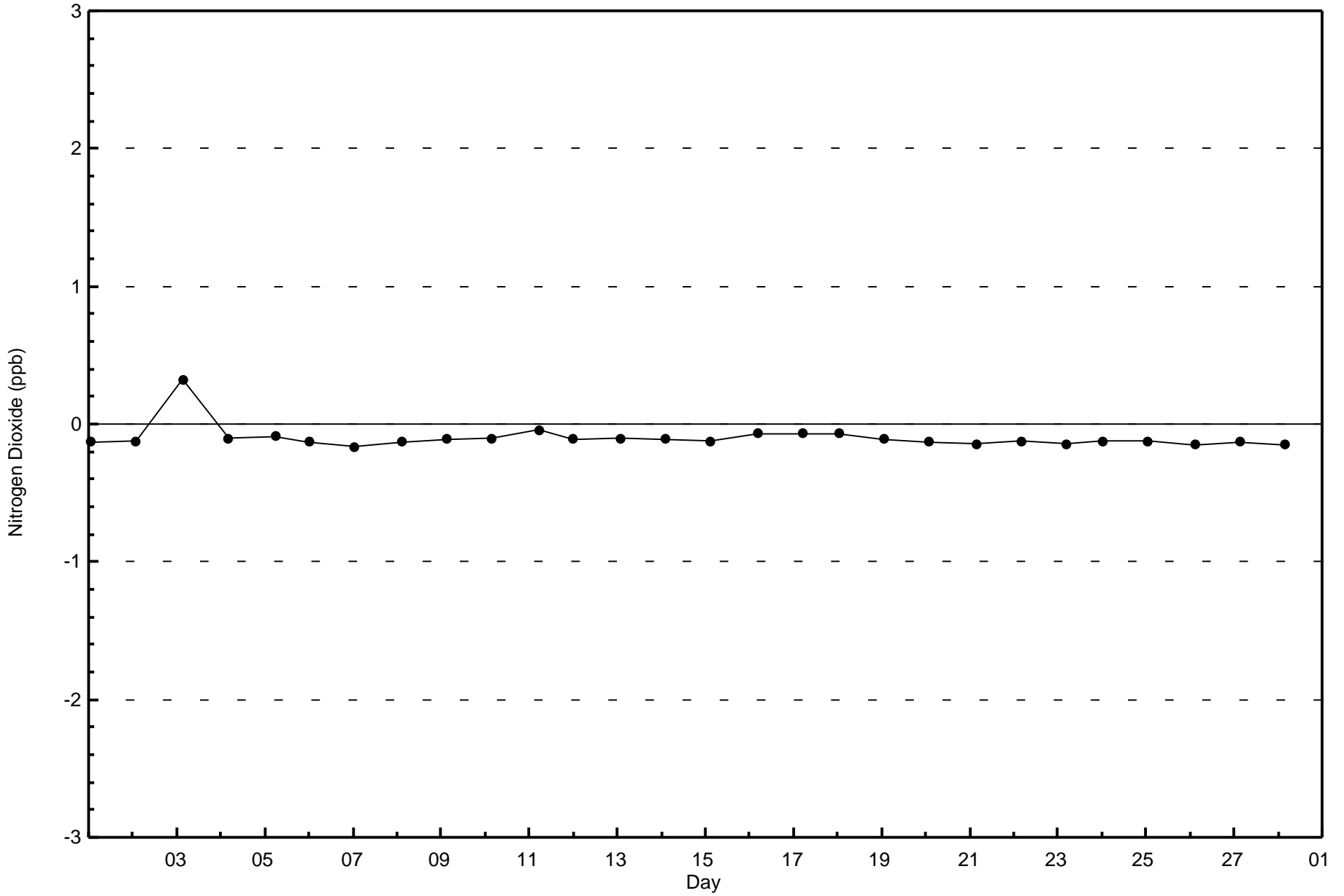
Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)

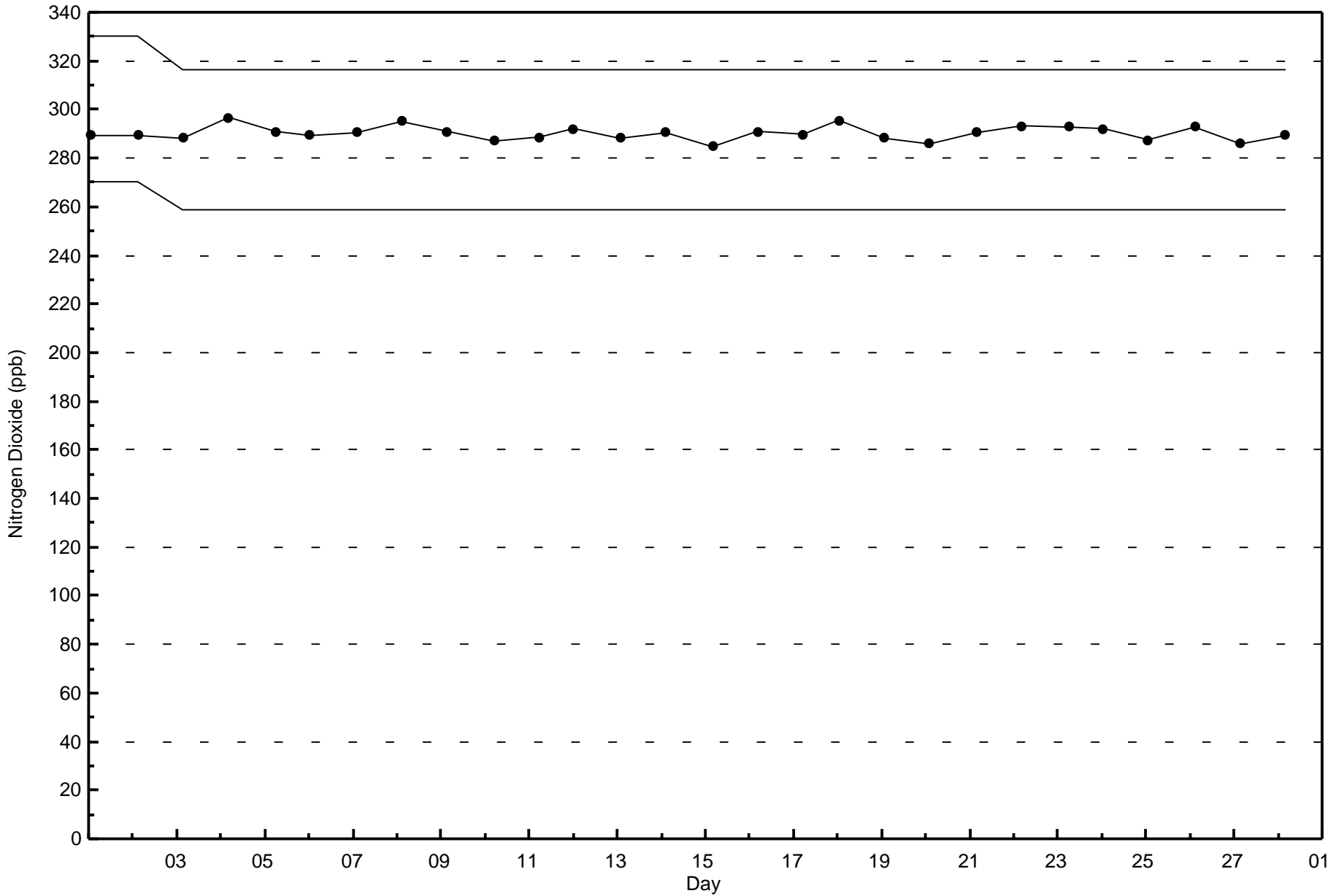


Classes (ppb)



Total Number of Valid Hours: 635





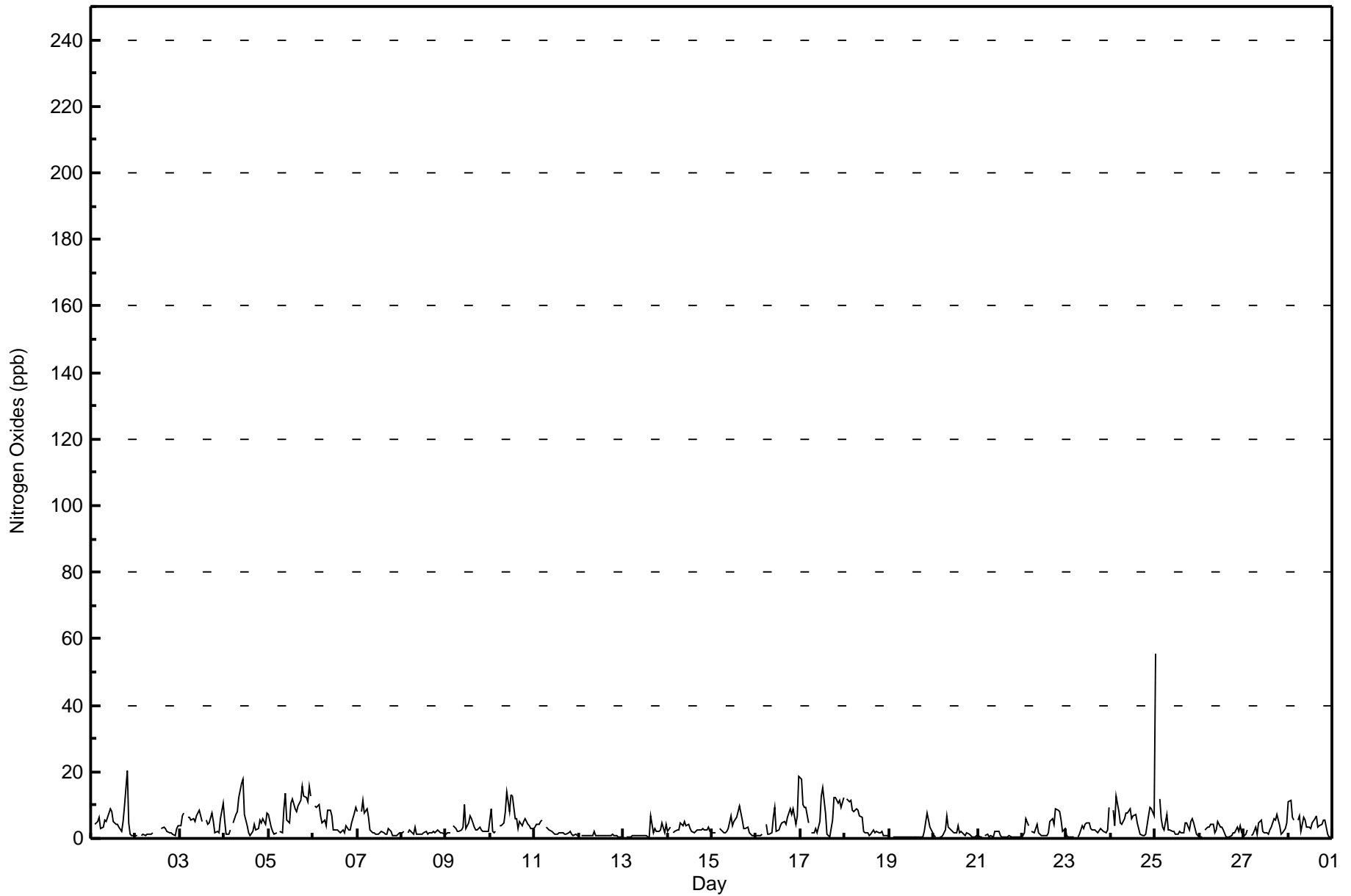


Maximum Value: 56 ppb on Feb 25 01:00		Maximum Daily Average: 8.4 ppb on Feb 5		Hours in Service: 672																						
Minimum Value: 0 ppb on Feb 19 13:00		Minimum Daily Average: 0.8 ppb on Feb 21		Hours of Data: 639																						
Maximum Diurnal Average: 5.8 ppb at hour 1		Minimum Diurnal Average: 2.9 ppb at hour 17		Hours of Missing Data: 33																						
Monthly Average: 3.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 8 P ₉₉ = 16		Hours of Calibration: 32																						
				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-Feb	2	Z	4	5	7	3	3	6	5	6	9	8	5	4	4	3	2	5	10	20	5	1	1	1	5.3	20
2-Feb	1	1	Z	1	1	1	1	1	1	2	C	C	C	C	3	3	3	2	2	2	1	1	3	4	1.8	4
3-Feb	4	7	8	Z	6	7	6	6	5	7	8	7	5	M	6	4	5	7	5	2	2	2	6	11	5.6	11
4-Feb	6	1	1	3	Z	5	7	8	12	17	18	7	4	2	1	2	4	3	3	6	5	6	4	7	5.7	18
5-Feb	7	4	2	1	2	Z	2	2	9	13	5	5	11	12	9	8	10	12	16	13	12	11	16	13	8.4	16
6-Feb	Z	10	9	10	7	5	6	4	8	8	7	2	2	2	2	2	3	2	4	3	2	5	8	9	5.2	10
7-Feb	8	Z	8	11	8	9	6	2	2	2	1	1	2	2	2	1	1	3	2	1	1	1	1	2	3.4	11
8-Feb	2	2	Z	2	3	2	1	3	1	1	1	1	1	2	1	1	2	2	2	2	2	2	2	1	1.8	3
9-Feb	1	2	2	Z	4	3	2	2	3	4	10	3	5	7	6	3	2	3	3	3	2	2	2	2	3.3	10
10-Feb	9	2	2	2	Z	4	4	5	8	14	8	13	13	6	6	3	5	4	5	6	4	4	3	3	5.7	14
11-Feb	3	4	4	5	6	Z	4	3	2	2	2	1	1	2	2	2	1	1	2	2	1	1	1	1	2.3	6
12-Feb	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
13-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	7	2	3	2	2	3	5	2	4	4	1.7	7
14-Feb	2	4	Z	2	2	3	2	5	4	5	4	3	2	2	2	3	2	3	3	2	3	4	2	2	2.9	5
15-Feb	2	2	2	Z	3	3	2	2	2	3	7	4	5	6	8	10	6	3	3	3	2	1	1	1	3.4	10
16-Feb	1	1	1	1	Z	4	1	1	2	6	9	2	2	4	5	5	4	6	9	7	9	4	7	19	4.8	19
17-Feb	18	10	9	9	5	Z	2	2	3	2	5	13	15	8	1	1	1	5	12	12	11	11	9	12	7.7	18
18-Feb	Z	12	11	12	9	8	9	8	7	6	2	2	1	1	1	3	2	2	2	2	2	1	1	1	4.5	12
19-Feb	1	Z	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	8	5	3	2	1.2	8
20-Feb	1	0	Z	0	0	1	3	7	3	2	2	2	4	2	2	1	1	2	1	1	1	1	0	1	1.7	7
21-Feb	1	1	1	Z	1	1	1	1	1	2	2	2	1	1	1	0	1	1	0	0	1	0	0	0	0.8	2
22-Feb	1	2	6	4	Z	2	2	3	4	2	1	1	1	1	2	5	6	4	9	8	8	5	2	3	3.5	9
23-Feb	1	0	0	0	0	Z	1	1	4	3	4	5	5	3	3	2	2	2	3	2	2	2	9	9	2.5	9
24-Feb	Z	8	4	13	8	4	4	6	8	8	9	6	7	7	5	3	1	1	1	1	7	9	9	7	5.9	13
25-Feb	56	Z	12	6	3	3	7	3	3	2	2	1	1	2	1	2	5	5	3	5	6	5	1	1	5.8	56
26-Feb	0	0	Z	2	3	3	4	4	2	3	5	3	3	3	1	1	1	1	1	2	3	2	4	2	2.3	5
27-Feb	1	1	3	Z	1	1	3	1	5	6	2	2	2	1	2	4	6	6	7	4	1	2	3	4	2.9	7
28-Feb	11	11	6	5	Z	5	7	2	6	5	3	3	3	5	6	7	3	4	4	5	6	1	0	0	4.9	11
5.8		3.7	4.2	4.2	3.5	3.3	3.3	3.2	4.0	4.7	4.8	3.7	3.8	3.3	2.9	3.1	2.9	3.2	4.1	4.3	3.9	3.3	3.4	4.4	Diurnal Average	
56		12	12	13	9	9	9	8	12	17	18	13	15	12	9	10	10	12	16	20	12	11	16	19	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																				



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	99.84	99.84
21 - 40	0	0.00	99.84
41 - 80	1	0.16	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Anzac - February 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	5	5	12	12	40	52	24	22	19	32	30	46	125	96	75	634
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	1	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	5	5	12	12	40	52	24	22	19	32	30	47	125	96	75	635

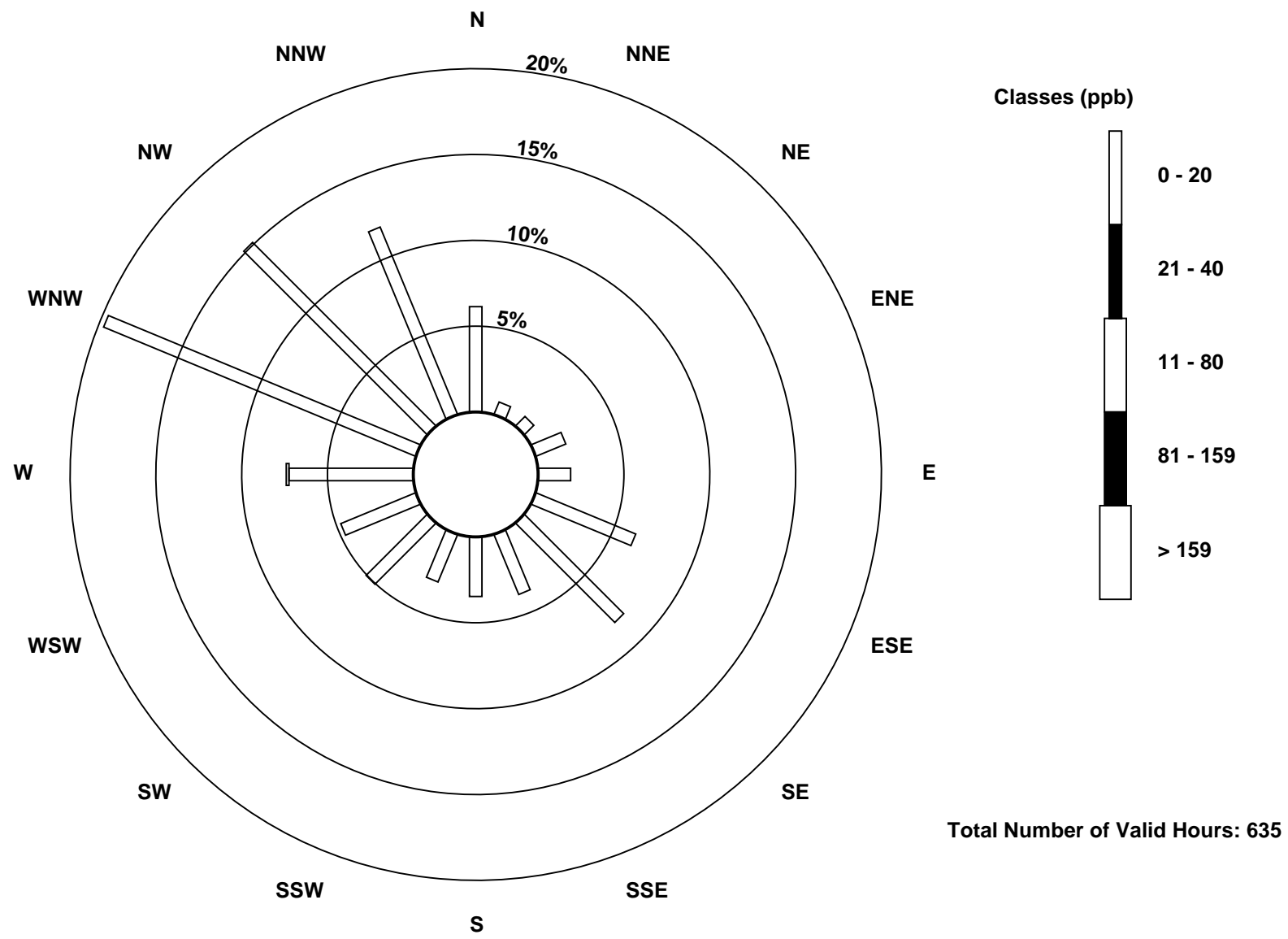
Total Number of Valid Hours: 635

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

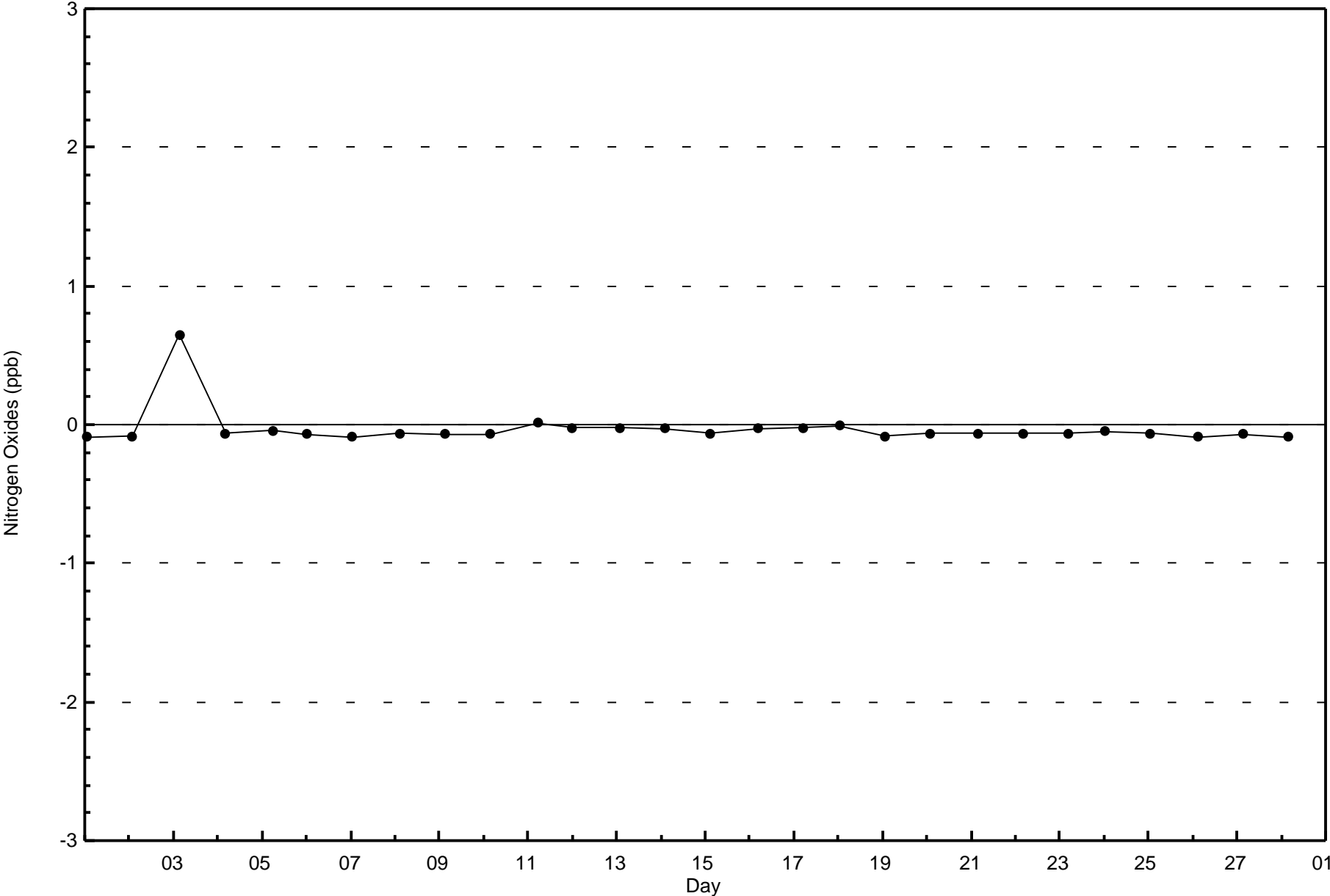
Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)

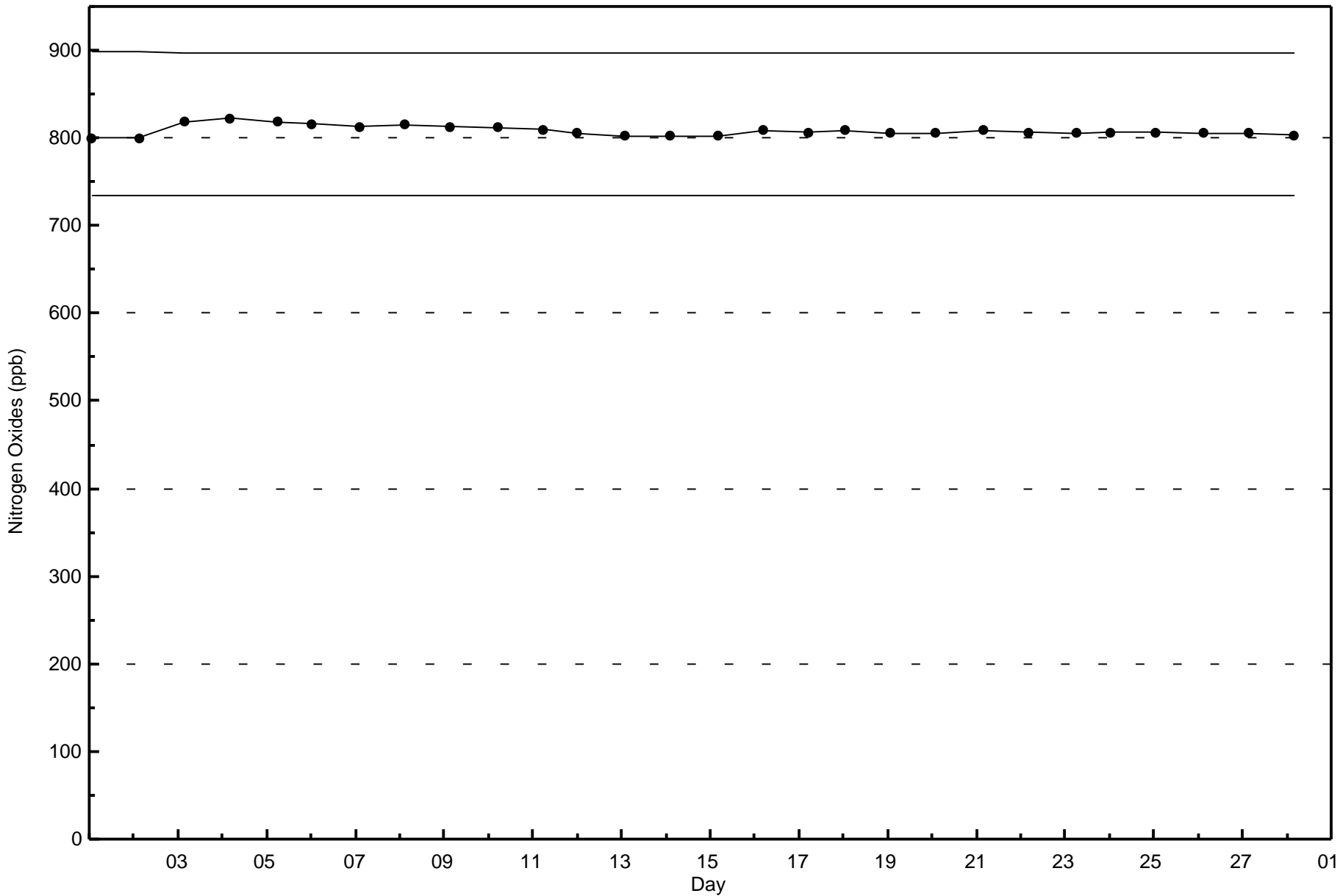




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - February 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

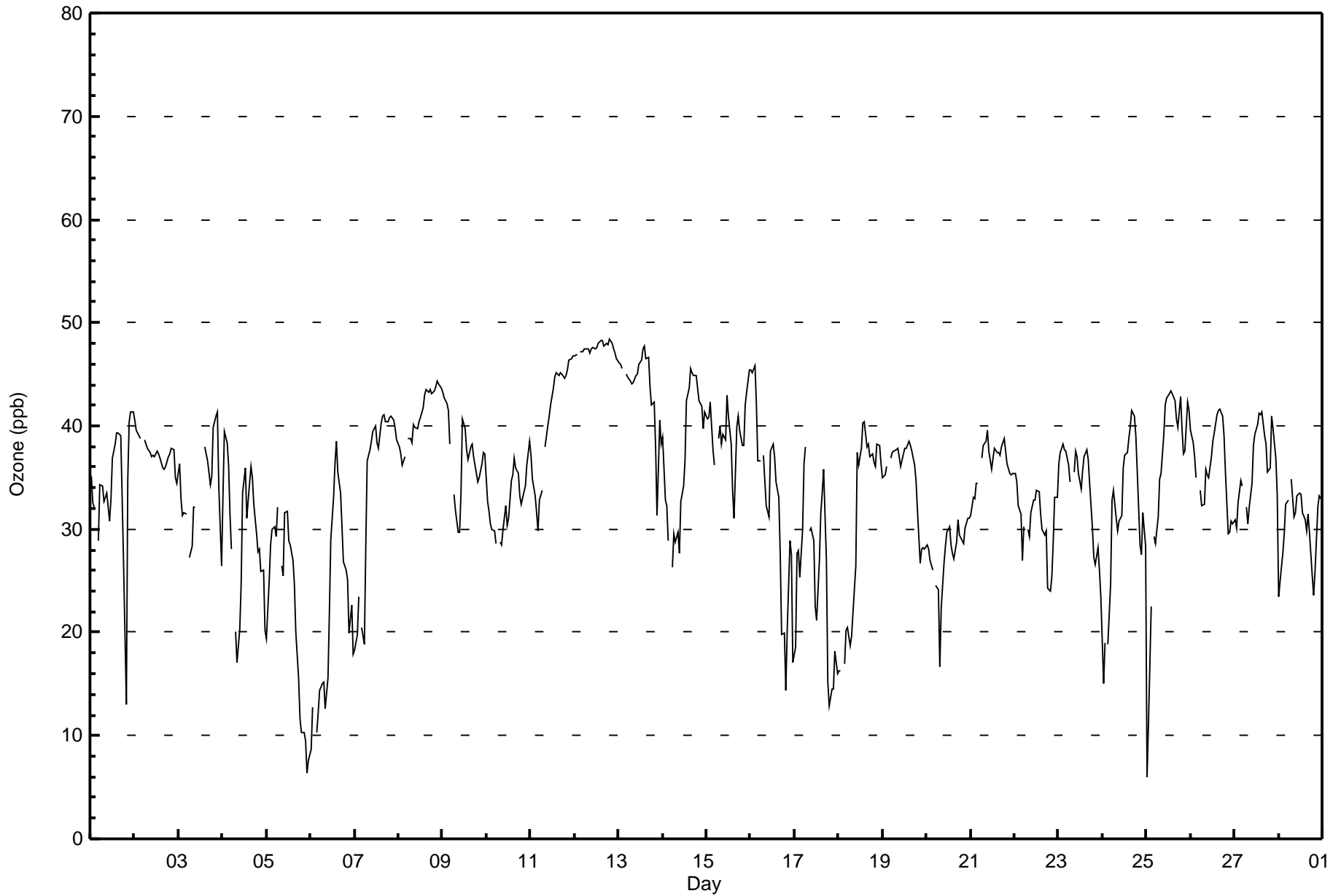
Anzac - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 48 ppb on Feb 12 20:00										Maximum Daily Average: 47.5 ppb on Feb 12																
Minimum Value: 6 ppb on Feb 25 01:00										Hours of Data: 640																
Maximum Diurnal Average: 37.9 ppb at hour 15										Hours of Missing Data: 32																
Monthly Average: 34.1 ppb										Hours of Calibration: 31																
Minimum Daily Average: 22.2 ppb on Feb 5										Percent Operational Time: 99.9																
Minimum Diurnal Average: 31.3 ppb at hour 1										Percentiles: P ₁ = 10 P ₁₀ = 23 Q ₁ = 30 Median = 35 Q ₃ = 39 P ₉₀ = 44 P ₉₉ = 48																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	35	33	32	Z	29	34	34	33	33	33	31	33	37	38	39	39	39	33	27	13	35	40	41	41	34.1	41
2-Feb	41	40	39	Z	39	38	38	38	37	37	37	37	38	37	37	36	36	36	37	37	38	38	35	34	37.4	41
3-Feb	36	33	31	32	31	Z	27	28	32	32	C	C	C	M	38	37	37	34	35	40	41	41	34	26	34.1	41
4-Feb	33	39	38	36	31	28	Z	20	17	20	25	34	36	31	33	36	35	32	30	28	28	26	26	20	29.7	39
5-Feb	19	25	28	30	30	29	32	Z	26	25	32	32	29	28	27	25	20	16	12	10	10	10	6	8	22.2	32
6-Feb	9	13	Z	10	12	14	15	15	13	16	22	29	33	36	39	35	33	30	27	26	25	20	23	18	22.3	39
7-Feb	18	20	23	Z	21	19	28	37	38	39	39	40	38	38	40	41	41	40	40	41	41	40	40	39	34.8	41
8-Feb	38	37	36	37	Z	39	39	38	40	40	40	40	41	42	43	44	43	43	43	43	44	44	44	44	41.0	44
9-Feb	43	43	42	41	38	Z	33	32	30	30	33	41	40	38	37	38	38	37	35	35	35	36	37	37	37.0	43
10-Feb	33	32	30	30	30	29	Z	29	28	30	32	30	31	35	35	37	36	35	33	32	34	34	36	38	32.6	38
11-Feb	37	35	33	32	30	33	34	Z	38	40	41	42	44	45	45	45	45	45	45	45	45	46	46	47	40.8	47
12-Feb	47	47	Z	47	47	47	48	47	47	47	48	48	48	48	48	48	48	48	48	48	48	47	47	47	47.5	48
13-Feb	46	46	46	Z	45	45	44	44	44	45	45	46	46	48	48	46	47	44	42	42	38	31	41	38	43.8	48
14-Feb	39	33	32	29	Z	26	30	29	30	28	33	34	37	42	44	46	45	45	45	44	42	42	40	41	37.1	46
15-Feb	41	41	42	38	36	Z	39	40	38	39	39	43	41	38	34	31	40	41	40	38	38	42	43	45	39.4	45
16-Feb	45	45	46	42	37	37	Z	37	32	32	31	38	38	37	35	33	28	20	20	14	20	29	27	17	32.2	46
17-Feb	19	28	28	25	30	36	38	Z	30	30	29	23	21	27	32	34	36	27	15	13	14	14	18	16	25.3	38
18-Feb	16	16	Z	17	20	20	19	20	22	26	37	36	38	40	40	38	38	37	37	36	36	38	38	36	30.6	40
19-Feb	35	35	36	Z	37	37	38	38	38	37	36	37	38	38	38	38	38	38	36	35	32	27	28	28	35.1	38
20-Feb	28	28	27	26	Z	25	24	17	22	27	28	30	30	28	28	27	29	31	29	29	29	30	31	31	27.6	31
21-Feb	31	33	33	34	34	Z	37	38	39	40	38	36	37	38	37	37	37	38	39	37	36	35	35	35	36.4	40
22-Feb	35	35	32	31	27	30	Z	30	29	32	33	33	34	34	32	30	29	30	24	24	25	29	33	33	30.6	35
23-Feb	36	37	38	38	38	36	35	Z	35	38	37	35	34	36	37	38	37	34	30	27	27	28	26	23	33.9	38
24-Feb	15	19	Z	19	25	33	34	31	30	31	31	36	37	37	39	40	41	41	39	36	29	27	32	28	31.7	41
25-Feb	6	11	22	Z	29	29	31	35	35	39	42	43	43	43	43	42	41	40	43	40	37	38	42	41	35.5	43
26-Feb	40	38	37	35	Z	34	32	32	36	35	35	37	38	39	41	41	42	41	39	36	30	30	31	30	36.1	42
27-Feb	31	30	33	35	34	Z	32	31	32	34	38	39	40	41	41	41	39	38	36	36	41	40	37	33	36.2	41
28-Feb	23	26	28	30	32	33	Z	35	31	32	33	34	33	32	31	30	31	30	26	24	26	32	33	33	30.3	35
31.3 32.0 34.0 31.8 31.5 31.8 33.1 32.2 32.3 33.3 35.0 36.4 37.0 37.6 37.9 37.7 37.5 35.8 33.9 32.4 32.8 33.5 34.0 32.6																								Diurnal Average		
47 47 46 47 47 47 48 47 47 47 47 48 48 48 48 48 48 48 48 48 48 48 47 47 47																								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
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	53	8.28	8.28
21 - 50	587	91.72	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - February 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	5	0	1	0	0	0	0	0	0	2	8	7	6	8	9	6	52
21 - 50	34	5	4	13	12	41	52	23	20	18	24	23	41	115	92	67	584
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	39	5	5	13	12	41	52	23	20	20	32	30	47	123	101	73	636

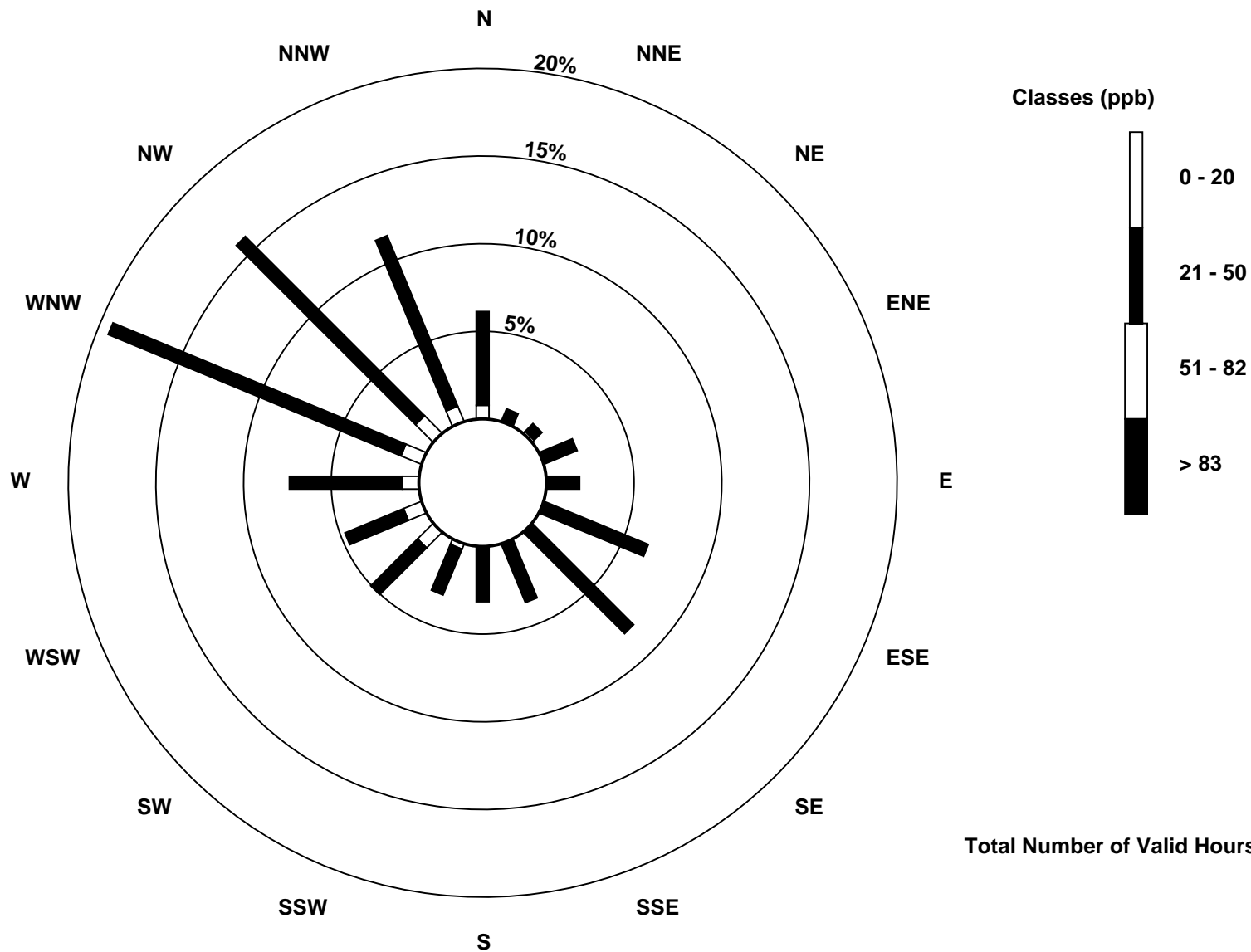
Total Number of Valid Hours: 636

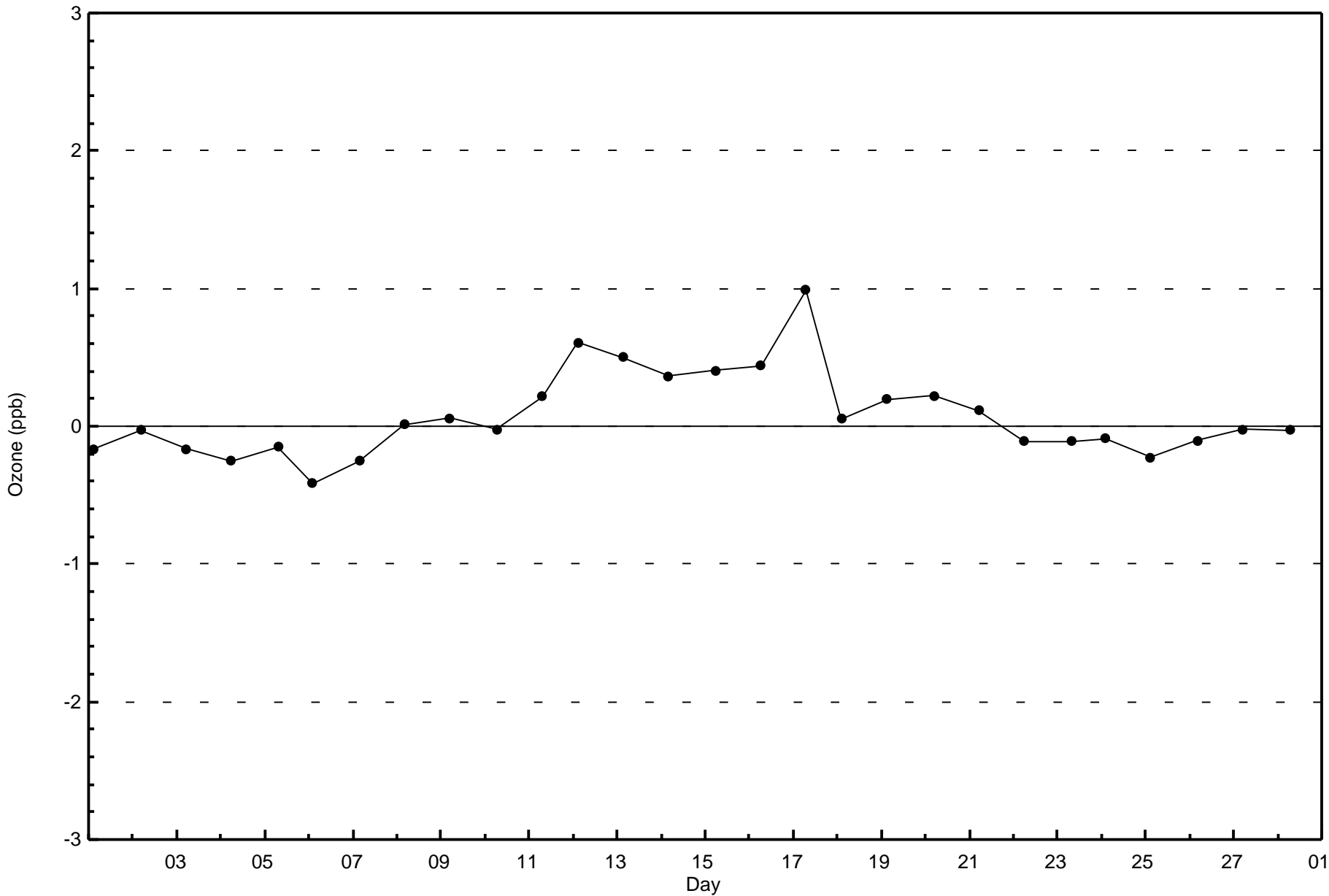
Total Number of Hours: 672

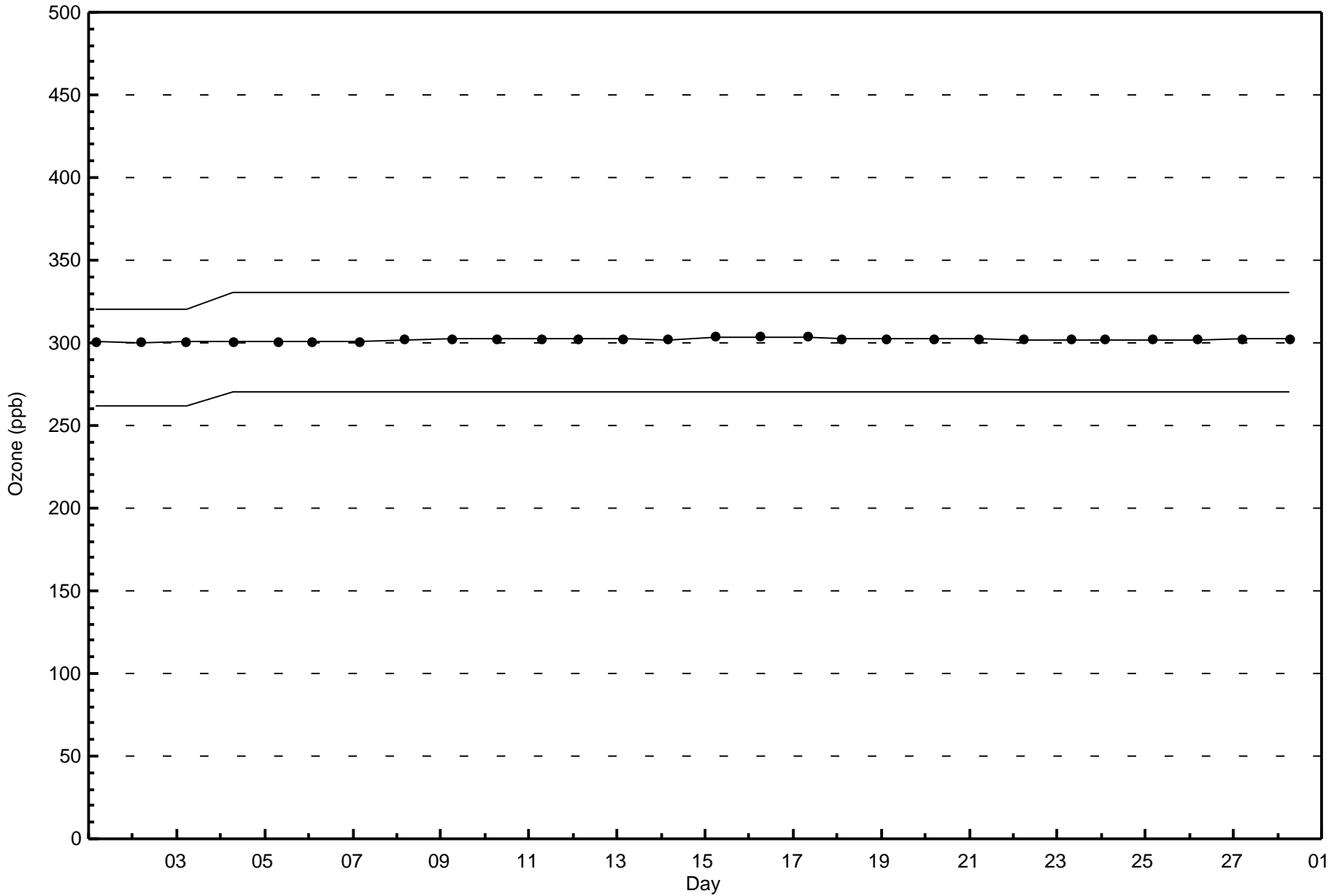


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Anzac (AMS 14)









Summary of Hour Averages

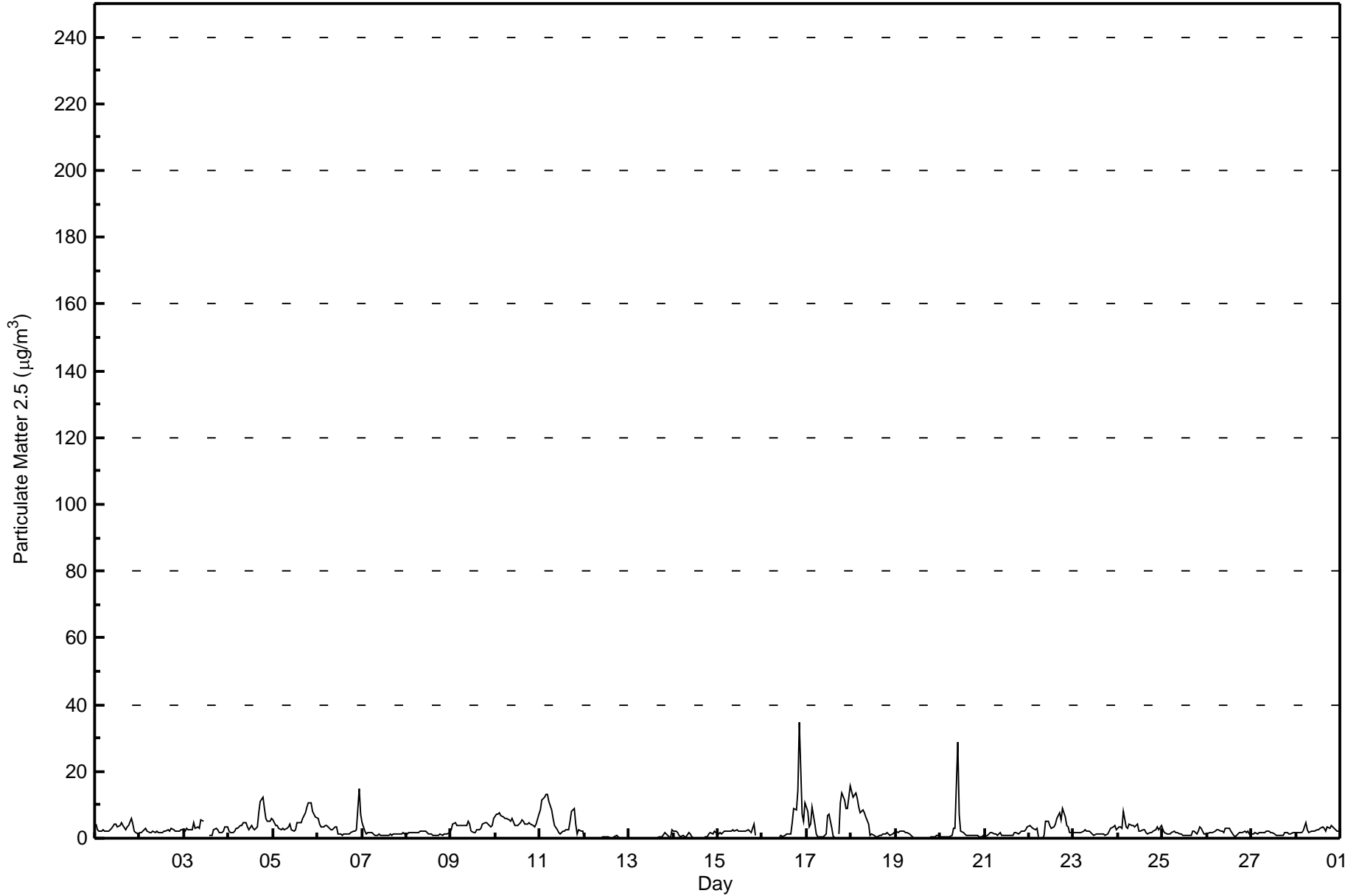
Anzac - February 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 34.8 µg/m ³ on Feb 16 21:00 Minimum Value: 0.0 µg/m ³ on Feb 12 09:00 Maximum Diurnal Average: 4.0 µg/m ³ at hour 21 Monthly Average: 2.90 µg/m ³		Maximum Daily Average: 5.8 µg/m ³ on Feb 11 Minimum Daily Average: 0.8 µg/m ³ on Feb 19 Minimum Diurnal Average: 1.8 µg/m ³ at hour 14 Percentiles: P ₁ = 0.0 P ₁₀ = 0.6 Q ₁ = 1.3 Median = 2.0 Q ₃ = 3.6 P ₉₀ = 5.9 P ₉₉ = 14.0		Hours in Service: 672 Hours of Data: 628 Hours of Missing Data: 44 Hours of Calibration: 2 Percent Operational Time: 93.8																						
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-Feb	4.1	2.7	2.3	2.1	2.4	2.1	2.1	2.2	2.5	2.9	4.0	4.3	3.4	3.7	4.7	3.8	2.5	3.6	3.7	5.9	4.4	2.2	1.6	1.4	3.1	5.9
2-Feb	1.7	1.8	2.5	3.0	2.1	1.9	1.8	2.0	1.9	2.0	1.8	1.7	1.7	2.2	2.2	2.5	2.2	2.9	2.7	2.1	2.1	2.0	2.5	2.4	2.2	3.0
3-Feb	2.1	2.9	2.4	2.4	2.4	4.6	2.9	3.4	3.1	5.4	5.3	C	C	0.8	0.8	1.0	2.4	3.1	2.6	1.7	1.7	2.2	3.5	3.2	2.7	5.4
4-Feb	2.0	1.9	1.9	2.3	3.1	2.9	3.9	3.6	4.6	4.6	3.3	2.5	3.7	2.8	2.5	3.2	7.7	11.0	12.3	9.0	5.8	5.2	5.1	6.0	4.6	12.3
5-Feb	5.4	3.7	3.8	2.9	2.7	2.9	2.5	3.2	3.2	4.2	2.6	2.2	2.7	4.7	4.6	4.7	6.1	7.6	9.3	10.8	10.6	7.9	7.1	6.6	5.1	10.8
6-Feb	5.9	4.0	3.4	3.4	3.7	3.6	2.9	2.4	2.4	3.6	3.4	1.3	1.2	1.0	1.1	1.3	1.4	1.3	1.8	1.9	2.1	2.7	14.8	7.0	3.2	14.8
7-Feb	4.6	2.1	1.5	1.6	1.7	1.6	1.4	1.0	0.9	1.4	0.9	0.8	0.9	1.0	1.0	1.1	0.9	1.3	1.5	1.3	1.3	1.2	1.5	1.4	1.4	4.6
8-Feb	1.4	1.5	1.7	1.6	1.6	1.6	1.6	2.0	2.1	2.2	2.0	1.6	1.2	1.2	0.7	1.0	0.9	0.8	1.2	0.8	1.3	1.2	1.4	1.5	1.4	2.2
9-Feb	2.4	4.3	4.5	4.0	3.8	3.9	3.7	3.6	3.6	5.0	4.1	2.2	1.6	1.7	2.4	2.5	3.1	4.3	4.8	4.7	4.1	3.6	3.8	5.8	3.6	5.8
10-Feb	7.3	7.0	7.5	6.6	6.3	5.9	6.0	5.7	5.0	5.7	3.8	3.8	3.9	4.8	5.5	5.2	4.4	4.3	4.7	4.4	3.7	3.5	4.4	7.4	5.3	7.5
11-Feb	8.7	11.3	12.4	13.3	13.2	11.2	8.6	5.9	3.9	2.6	1.9	1.3	1.9	2.3	2.6	2.6	5.1	8.2	9.1	4.3	1.3	2.6	2.2	2.2	5.8	13.3
12-Feb	0.1	UO	UO	UO	UO	UO	UO	UO	UO	0.0	0.0	0.4	0.3	0.3	0.2	0.2	0.6	0.7	0.5	0.1	0.2	0.1	UO	UO	--	0.7
13-Feb	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.0	0.4	0.4	0.6	1.7	1.3	0.7	0.1	2.6	--	2.6
14-Feb	2.2	2.1	1.6	0.9	0.6	0.9	0.3	0.4	1.8	1.3	0.3	0.2	UO	0.4	UO	UO	UO	0.3	0.4	1.2	1.8	1.4	2.2	1.6	1.1	2.2
15-Feb	1.3	1.5	1.1	2.2	2.1	2.0	2.1	2.1	2.5	2.3	2.5	2.0	2.0	2.0	2.2	2.4	2.0	2.0	1.8	4.3	1.0	UO	UO	UO	2.1	4.3
16-Feb	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.3	0.7	0.5	0.9	1.1	1.3	1.4	4.6	9.1	8.5	14.3	34.8	7.0	5.2	10.8	--	34.8
17-Feb	8.1	3.3	4.1	9.1	4.1	1.3	0.5	0.4	0.4	0.3	1.1	6.8	7.0	2.8	0.3	0.3	UO	1.4	10.6	13.5	11.5	8.9	8.8	15.6	5.2	15.6
18-Feb	14.1	12.3	13.6	12.0	9.2	7.7	8.5	7.6	6.3	4.4	1.0	1.2	1.0	0.4	0.4	0.7	1.0	1.3	1.3	1.5	1.2	0.9	1.3	1.7	4.6	14.1
19-Feb	1.9	1.7	1.9	2.3	2.0	1.8	1.7	1.2	0.8	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.8	2.3
20-Feb	0.6	0.5	0.4	0.4	0.5	0.3	0.7	3.1	2.9	28.6	7.1	2.0	1.8	1.3	1.1	1.0	1.0	0.7	0.8	0.9	0.8	0.6	0.6	0.8	2.4	28.6
21-Feb	0.6	1.0	1.4	1.7	1.7	1.4	1.4	1.0	1.5	0.7	0.9	0.9	0.9	0.8	0.7	1.0	1.7	1.5	1.2	1.6	1.9	2.2	2.7	3.3	1.4	3.3
22-Feb	3.6	3.6	2.8	2.7	3.0	0.4	UO	0.2	0.6	5.1	5.2	3.7	3.0	3.2	4.4	5.9	7.5	5.6	9.0	6.2	4.0	3.4	1.6	1.5	3.8	9.0
23-Feb	1.6	1.7	1.6	1.6	1.6	2.3	2.4	1.9	2.1	1.9	1.2	1.0	1.2	1.1	1.2	1.3	1.2	1.0	1.3	1.9	3.1	3.2	3.7	2.4	1.8	3.7
24-Feb	3.4	3.5	3.1	8.2	3.2	3.0	4.2	3.8	3.9	3.6	4.1	2.3	2.1	2.5	2.4	1.7	1.3	1.6	1.6	2.0	2.5	3.2	2.5	3.6	3.1	8.2
25-Feb	2.7	1.8	1.4	1.3	1.3	1.7	1.9	1.9	1.9	1.4	1.1	0.9	0.8	0.8	0.7	1.0	1.9	2.0	1.1	2.1	3.4	2.9	1.2	1.1	1.6	3.4
26-Feb	1.3	1.9	1.7	1.5	2.1	2.6	2.4	2.3	2.1	1.7	2.8	3.1	3.1	2.0	0.7	0.6	0.7	1.6	1.6	1.5	1.9	1.8	2.0	1.3	1.9	3.1
27-Feb	1.3	1.2	1.6	1.4	1.6	1.8	1.9	1.8	2.2	2.2	1.8	1.6	1.4	1.0	0.9	0.8	0.8	1.0	1.6	1.6	1.4	1.4	1.7	1.8	1.5	2.2
28-Feb	1.7	1.7	1.5	1.8	2.3	4.8	2.4	1.7	2.2	2.2	2.2	2.6	2.4	2.9	3.2	2.8	2.3	3.3	2.9	3.8	3.5	2.4	2.2	2.1	2.5	4.8
3.5 3.2 3.3 3.6 3.1 3.0 2.8 2.6 2.5 3.6 2.4 2.0 2.0 1.8 1.8 1.8 2.5 2.9 3.5 3.8 4.0 2.8 3.2 3.7 14.1 12.3 13.6 13.3 13.2 11.2 8.6 7.6 6.3 28.6 7.1 6.8 7.0 4.8 5.5 5.9 7.7 11.0 12.3 14.3 34.8 8.9 14.8 15.6																								Diurnal Average Diurnal Maximum		
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}) - $\mu\text{g}/\text{m}^3$
Anzac - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - February 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	438	69.75	69.75
6 - 15	70	11.15	80.89
16 - 25	1	0.16	81.05
26 - 80	2	0.32	81.37
> 81.0	0	0.00	81.37

Total Number of Valid Hours: 628

Total Number of Hours: 672



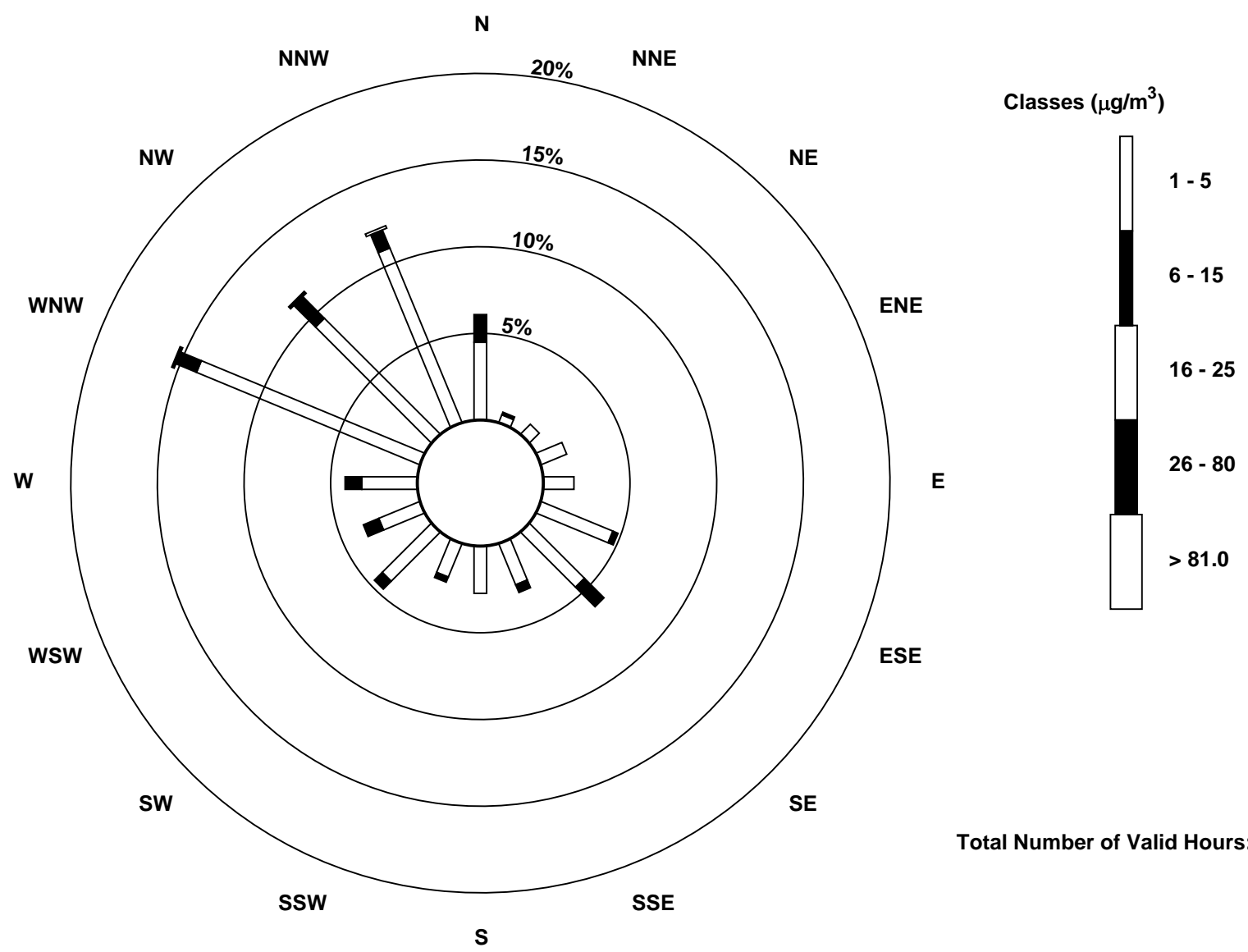
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - February 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	28	3	5	10	11	28	28	16	17	13	25	16	20	87	59	68	434
6 - 15	10	1	0	0	0	2	10	3	0	2	4	6	6	8	11	7	70
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	4	5	10	11	30	38	19	17	15	29	22	26	96	71	76	507

Total Number of Valid Hours: 624

Total Number of Hours: 672



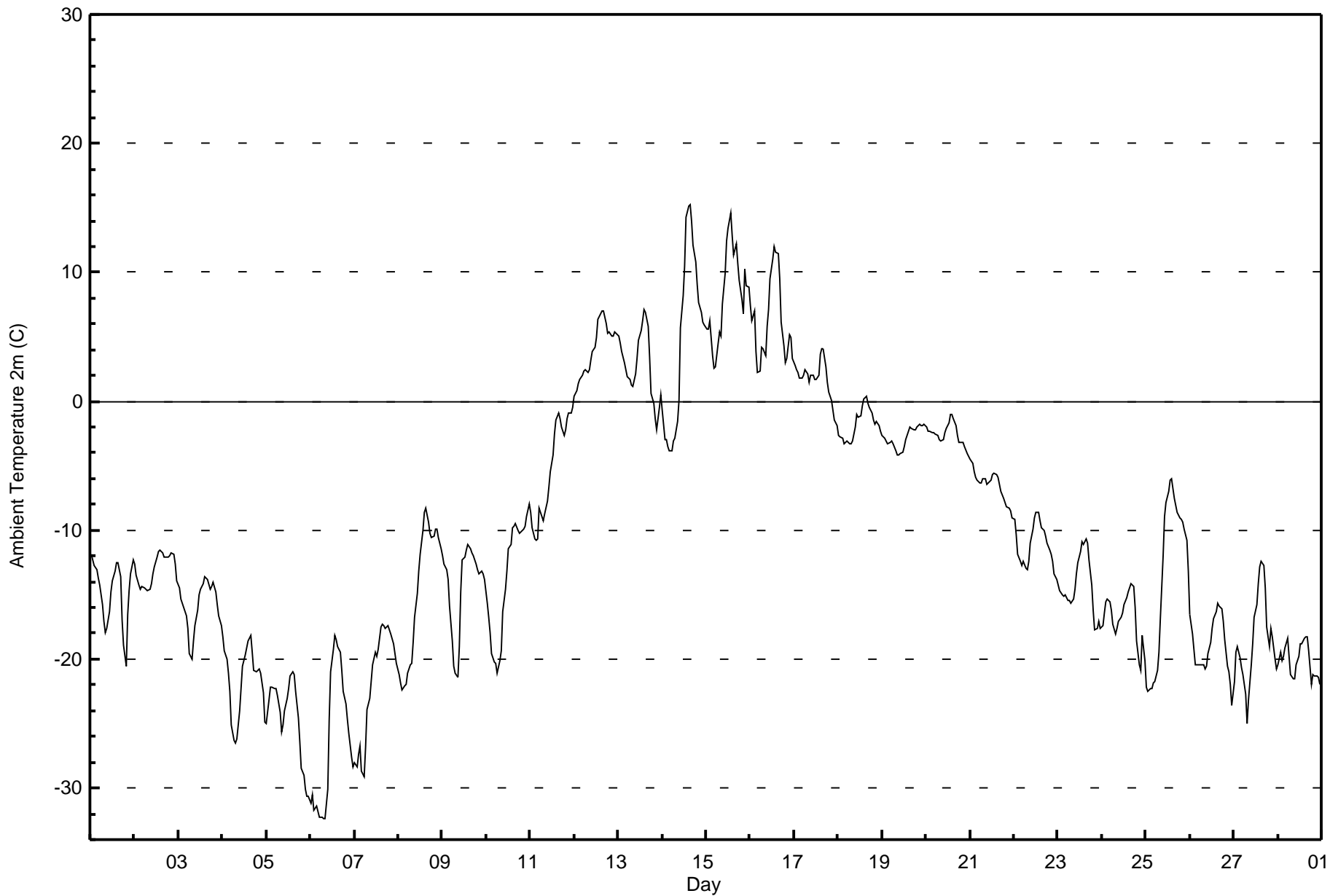


Maximum Value: 15.2 C on Feb 14 16:00 Maximum Daily Average: 8.3 C on Feb 15																						Hours in Service:	672			
Minimum Value: -32.4 C on Feb 6 09:00 Minimum Daily Average: -26.2 C on Feb 6																						Hours of Data:	672			
Maximum Diurnal Average: -6.6 C at hour 15 Minimum Diurnal Average: -13.1 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -10.21 C Percentiles: P ₁ = -31.6 P ₁₀ = -21.9 Q ₁ = -18.6 Median = -12.1 Q ₃ = -2.0 P ₉₀ = 4.5 P ₉₉ = 12.7																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-11.9	-12.3	-12.7	-13.0	-13.7	-14.3	-15.7	-17.1	-17.9	-17.6	-16.3	-14.8	-13.9	-13.2	-12.6	-12.5	-13.6	-16.9	-18.9	-20.5	-16.5	-14.7	-13.4	-12.3	-14.8	-11.9
2-Feb	-12.6	-13.5	-14.2	-14.6	-14.4	-14.4	-14.6	-14.7	-14.5	-14.1	-13.3	-12.8	-12.1	-11.7	-11.5	-11.7	-12.0	-12.1	-12.1	-12.0	-11.8	-11.9	-12.6	-13.9	-13.1	-11.5
3-Feb	-14.5	-15.3	-15.7	-16.0	-16.7	-17.7	-19.6	-20.1	-18.6	-17.4	-16.2	-15.1	-14.6	-14.1	-13.6	-13.7	-13.8	-14.6	-14.3	-14.1	-14.8	-15.8	-16.7	-17.4	-15.8	-13.6
4-Feb	-18.2	-19.3	-20.0	-21.1	-22.5	-25.1	-26.3	-26.6	-26.2	-24.0	-22.2	-20.5	-19.7	-19.1	-18.6	-18.1	-19.4	-20.9	-21.0	-20.8	-20.7	-21.1	-22.6	-24.9	-21.6	-18.1
5-Feb	-25.0	-23.2	-22.1	-22.2	-22.2	-22.3	-22.8	-24.1	-25.7	-25.1	-24.0	-23.0	-22.3	-21.3	-21.0	-21.2	-22.5	-24.6	-26.4	-28.5	-29.0	-30.1	-30.7	-30.6	-24.6	-21.0
6-Feb	-31.2	-30.5	-31.8	-31.4	-31.8	-32.3	-32.3	-32.3	-32.4	-30.1	-24.6	-21.0	-19.3	-18.2	-18.5	-19.0	-19.4	-20.8	-22.5	-23.5	-24.7	-25.8	-27.7	-28.3	-26.2	-18.2
7-Feb	-28.0	-28.3	-27.3	-26.8	-28.7	-29.1	-26.9	-24.0	-23.1	-21.7	-20.5	-19.5	-19.8	-19.3	-17.5	-17.3	-17.5	-17.6	-17.4	-17.8	-18.0	-18.8	-19.6	-20.3	-21.9	-17.3
8-Feb	-21.2	-21.9	-22.4	-22.1	-21.9	-21.1	-20.4	-20.4	-18.7	-16.8	-14.9	-13.1	-11.9	-10.0	-8.6	-8.3	-9.3	-10.2	-10.6	-10.5	-9.9	-9.9	-10.6	-11.4	-14.8	-8.3
9-Feb	-12.0	-12.6	-13.1	-13.9	-15.9	-18.6	-20.5	-21.1	-21.4	-19.0	-14.8	-12.4	-12.1	-11.6	-11.1	-11.5	-11.8	-12.0	-12.6	-13.1	-13.4	-13.2	-13.4	-13.8	-14.4	-11.1
10-Feb	-15.7	-16.8	-18.0	-19.6	-20.2	-20.3	-21.1	-20.1	-19.4	-16.4	-14.6	-13.2	-11.4	-11.1	-9.9	-9.7	-9.5	-10.1	-10.2	-10.1	-10.0	-9.7	-9.0	-7.9	-13.9	-7.9
11-Feb	-8.6	-9.8	-10.7	-10.8	-10.7	-8.3	-9.0	-9.3	-8.7	-7.7	-6.7	-5.4	-4.1	-2.6	-1.4	-0.9	-1.3	-2.0	-2.6	-2.2	-1.4	-0.9	-0.9	-0.5	-5.3	-0.5
12-Feb	0.3	0.8	1.4	1.7	2.0	2.4	2.4	2.3	2.4	3.2	3.8	4.1	4.9	6.3	6.7	7.0	7.0	6.1	5.3	5.4	5.1	5.1	5.4	5.2	4.0	7.0
13-Feb	5.1	4.5	3.9	3.0	2.4	1.9	1.7	1.3	1.1	2.1	3.3	4.7	5.5	6.2	7.1	6.9	5.8	3.4	0.6	-0.2	-1.4	-2.2	-0.5	0.5	2.8	7.1
14-Feb	-0.7	-3.0	-2.9	-3.5	-3.9	-3.8	-3.0	-2.8	-1.6	0.0	5.7	8.2	10.5	14.3	15.2	15.2	14.0	12.1	10.8	9.0	7.7	6.9	6.2	6.0	4.9	15.2
15-Feb	5.6	5.6	6.3	3.5	2.5	2.7	4.5	5.4	5.1	7.5	9.9	12.4	13.4	14.6	12.8	11.3	12.2	10.7	9.4	7.9	6.8	10.3	9.0	8.9	8.3	14.6
16-Feb	7.5	6.2	7.0	3.9	2.3	2.3	4.2	4.0	3.5	5.8	7.1	9.5	11.0	12.0	11.6	11.4	9.5	6.1	4.3	3.0	3.4	5.1	4.9	3.3	6.2	12.0
17-Feb	2.8	2.4	2.3	1.8	1.8	2.0	2.5	2.1	1.5	2.0	2.0	1.7	1.7	2.0	3.6	4.1	4.0	2.7	1.5	0.7	0.1	-0.7	-1.4	-1.9	1.7	4.1
18-Feb	-2.6	-2.7	-2.9	-3.3	-3.2	-3.1	-3.3	-3.3	-3.1	-2.0	-1.0	-1.3	-1.1	-0.3	0.1	0.3	-0.1	-0.4	-0.9	-1.5	-1.8	-1.6	-1.9	-2.3	-1.8	0.3
19-Feb	-2.7	-2.9	-3.1	-3.3	-3.2	-3.1	-3.3	-3.8	-4.2	-4.2	-4.1	-3.9	-3.6	-3.0	-2.3	-2.0	-2.1	-2.3	-2.2	-2.0	-1.8	-1.9	-1.9	-1.8	-2.9	-1.8
20-Feb	-2.0	-2.3	-2.4	-2.4	-2.4	-2.5	-2.6	-2.9	-3.1	-2.9	-2.5	-2.1	-1.6	-1.0	-1.1	-1.4	-1.8	-2.6	-3.2	-3.2	-3.2	-3.5	-4.0	-4.3	-2.6	-1.0
21-Feb	-4.5	-4.8	-5.4	-5.9	-6.1	-6.4	-6.3	-6.0	-6.1	-6.5	-6.4	-6.1	-5.7	-5.6	-5.7	-5.9	-6.5	-7.0	-7.5	-7.9	-8.1	-8.3	-8.5	-9.0	-6.5	-4.5
22-Feb	-9.2	-10.4	-11.9	-12.5	-12.7	-12.4	-13.0	-13.0	-12.4	-11.0	-10.0	-9.0	-8.7	-8.7	-9.2	-9.8	-10.0	-10.5	-11.0	-11.5	-11.9	-12.4	-13.3	-13.9	-11.2	-8.7
23-Feb	-14.2	-14.7	-15.0	-15.1	-15.0	-15.5	-15.5	-15.6	-15.3	-14.6	-13.4	-12.6	-11.6	-10.9	-11.1	-10.6	-11.0	-12.4	-14.3	-16.2	-17.8	-17.7	-17.1	-17.6	-14.4	-10.6
24-Feb	-17.4	-16.4	-15.6	-15.3	-15.6	-16.2	-17.3	-18.1	-17.6	-17.1	-16.8	-16.4	-15.8	-15.2	-14.8	-14.4	-14.2	-14.4	-15.9	-18.6	-20.5	-20.9	-18.1	-20.1	-16.8	-14.2
25-Feb	-22.2	-22.5	-22.3	-22.3	-21.8	-21.8	-20.8	-19.5	-16.9	-12.0	-9.0	-7.8	-7.0	-6.2	-6.0	-7.5	-8.1	-8.7	-9.0	-9.2	-9.4	-9.9	-10.8	-13.2	-13.5	-6.0
26-Feb	-16.6	-18.1	-19.2	-20.5	-20.5	-20.5	-20.5	-20.5	-20.8	-20.6	-19.6	-18.8	-17.6	-16.8	-16.4	-15.7	-15.9	-16.2	-17.1	-18.5	-20.5	-20.9	-22.0	-23.6	-19.0	-15.7
27-Feb	-21.8	-19.5	-19.0	-19.9	-20.6	-21.2	-22.8	-25.0	-23.2	-20.4	-18.8	-16.8	-15.8	-14.1	-12.9	-12.5	-12.7	-14.5	-17.5	-19.0	-17.6	-18.3	-20.0	-20.8	-18.5	-12.5
28-Feb	-20.4	-19.5	-20.2	-19.7	-19.1	-18.4	-19.8	-21.2	-21.5	-21.6	-20.5	-19.8	-18.9	-18.9	-18.4	-18.2	-18.3	-19.3	-21.9	-21.3	-21.3	-21.3	-21.5	-21.9	-20.1	-18.2
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Anzac - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	131	19.49	19.49
-20 - 0	411	61.16	80.65
0 - 10	111	16.52	97.17
10 - 20	19	2.83	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

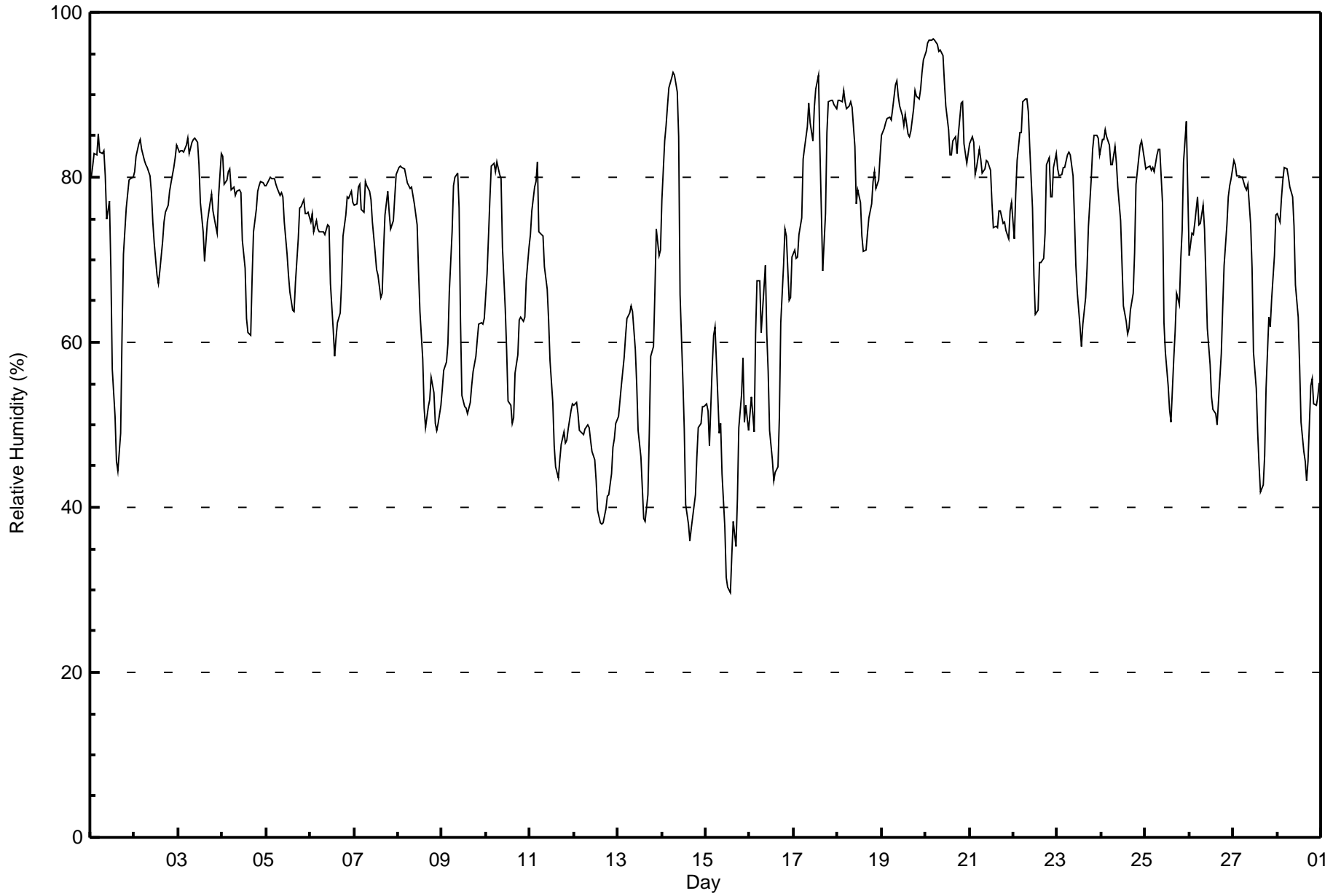
Anzac - February 2017

Maximum Value: 97 % on Feb 20 05:00																			Maximum Daily Average: 89.8 % on Feb 20						Hours in Service: 672	
Minimum Value: 30 % on Feb 15 14:00																			Minimum Daily Average: 45.9 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 78.7 % at hour 8																			Minimum Diurnal Average: 57.5 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 70.5 %																			Percentiles: P ₁ = 37 P ₁₀ = 49 Q ₁ = 61 Median = 75 Q ₃ = 81 P ₉₀ = 85 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-Feb	80	81	83	83	85	83	83	83	80	75	77	69	57	51	46	44	49	61	71	76	78	80	80	80	72.3	85
2-Feb	81	83	84	85	83	82	82	81	80	78	75	72	68	67	69	72	75	76	77	78	79	81	82	84	78.1	85
3-Feb	83	83	83	83	84	85	83	84	85	85	84	81	77	73	70	72	75	77	78	76	74	73	78	83	79.5	85
4-Feb	83	79	80	81	81	78	79	78	78	79	78	72	69	63	61	61	68	73	76	78	79	79	79	79	75.5	83
5-Feb	79	80	80	80	80	79	79	78	78	78	75	71	68	66	64	64	67	72	76	76	77	76	76	76	74.7	80
6-Feb	75	76	73	75	74	73	73	73	73	74	74	67	62	58	60	62	64	67	73	75	78	78	77	77	71.4	78
7-Feb	77	77	79	79	76	76	79	79	78	77	75	71	69	68	65	66	71	75	78	76	74	75	78	80	74.9	80
8-Feb	81	81	81	81	80	79	79	79	78	77	74	69	64	58	52	50	52	53	56	54	50	49	50	52	65.8	81
9-Feb	54	57	58	60	66	73	79	80	80	76	63	53	52	52	51	53	55	56	58	60	62	62	62	63	62.0	80
10-Feb	68	73	77	81	82	81	82	80	80	72	64	59	53	52	50	51	56	58	63	63	63	63	68	72	67.1	82
11-Feb	73	76	79	79	82	73	73	73	69	67	63	58	53	47	45	44	46	48	49	48	48	49	52	53	60.2	82
12-Feb	52	53	51	49	49	49	49	50	50	48	47	46	43	40	38	38	38	40	41	41	44	47	48	50	45.9	53
13-Feb	51	53	55	58	61	63	64	64	64	59	55	49	46	42	39	38	42	49	58	59	66	74	71	71	56.3	74
14-Feb	77	84	86	89	91	92	93	92	90	85	66	55	49	40	38	36	37	39	42	46	50	50	52	52	63.9	93
15-Feb	53	52	48	57	61	62	53	49	50	44	38	31	30	30	34	38	35	41	50	54	58	50	52	49	46.6	62
16-Feb	51	53	49	61	68	67	61	64	69	61	56	49	46	43	44	45	51	62	69	74	73	65	65	70	59.1	74
17-Feb	71	70	70	73	75	82	84	86	89	87	84	88	91	92	83	76	69	76	85	89	89	89	89	88	82.4	92
18-Feb	89	89	89	90	89	88	89	89	88	84	77	78	77	73	71	71	73	75	77	79	81	79	80	83	81.6	90
19-Feb	85	86	87	87	87	87	88	91	92	90	89	87	86	88	85	85	86	88	90	90	89	91	93	94	88.4	94
20-Feb	95	96	97	97	97	97	96	95	95	95	92	89	86	83	83	84	85	83	85	89	89	84	82	83	89.8	97
21-Feb	84	85	84	80	81	83	82	80	81	82	82	81	77	74	74	74	76	76	74	75	74	72	76	77	78.5	85
22-Feb	72	78	82	85	86	89	90	90	88	84	76	68	63	64	70	70	70	73	82	82	78	78	81	83	78.4	90
23-Feb	81	80	80	81	81	83	83	83	80	75	69	66	62	59	62	65	69	74	80	83	85	85	85	83	76.5	85
24-Feb	85	85	86	85	84	82	82	84	82	79	75	69	64	62	61	62	64	66	71	79	82	84	84	82	76.6	86
25-Feb	81	81	81	81	81	81	83	83	83	77	62	59	55	52	50	58	61	66	65	70	74	82	87	79	72.1	87
26-Feb	71	73	73	74	78	74	74	77	74	68	62	57	53	52	51	50	53	59	64	69	74	78	79	80	67.4	80
27-Feb	82	82	80	80	80	80	79	79	79	74	69	59	54	49	45	42	43	46	54	63	62	65	70	75	66.3	82
28-Feb	76	75	77	80	81	81	80	79	78	74	67	63	57	50	47	46	43	46	55	56	53	52	53	55	63.5	81
																			74.7 75.7 76.2 77.7 78.6 78.7 78.5 78.7 78.3 75.1 70.2 65.7 61.9 58.9 57.5 57.7 59.7 63.4 67.8 70.0 70.8 71.1 72.5 73.3						Diurnal Average	
																			95 96 97 97 97 97 96 95 95 95 92 89 91 92 85 85 86 88 90 90 89 91 93 94						Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Anzac - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - February 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	18	2.68	2.68
40 - 60	148	22.02	24.70
60 - 80	304	45.24	69.94
80 - 100	202	30.06	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

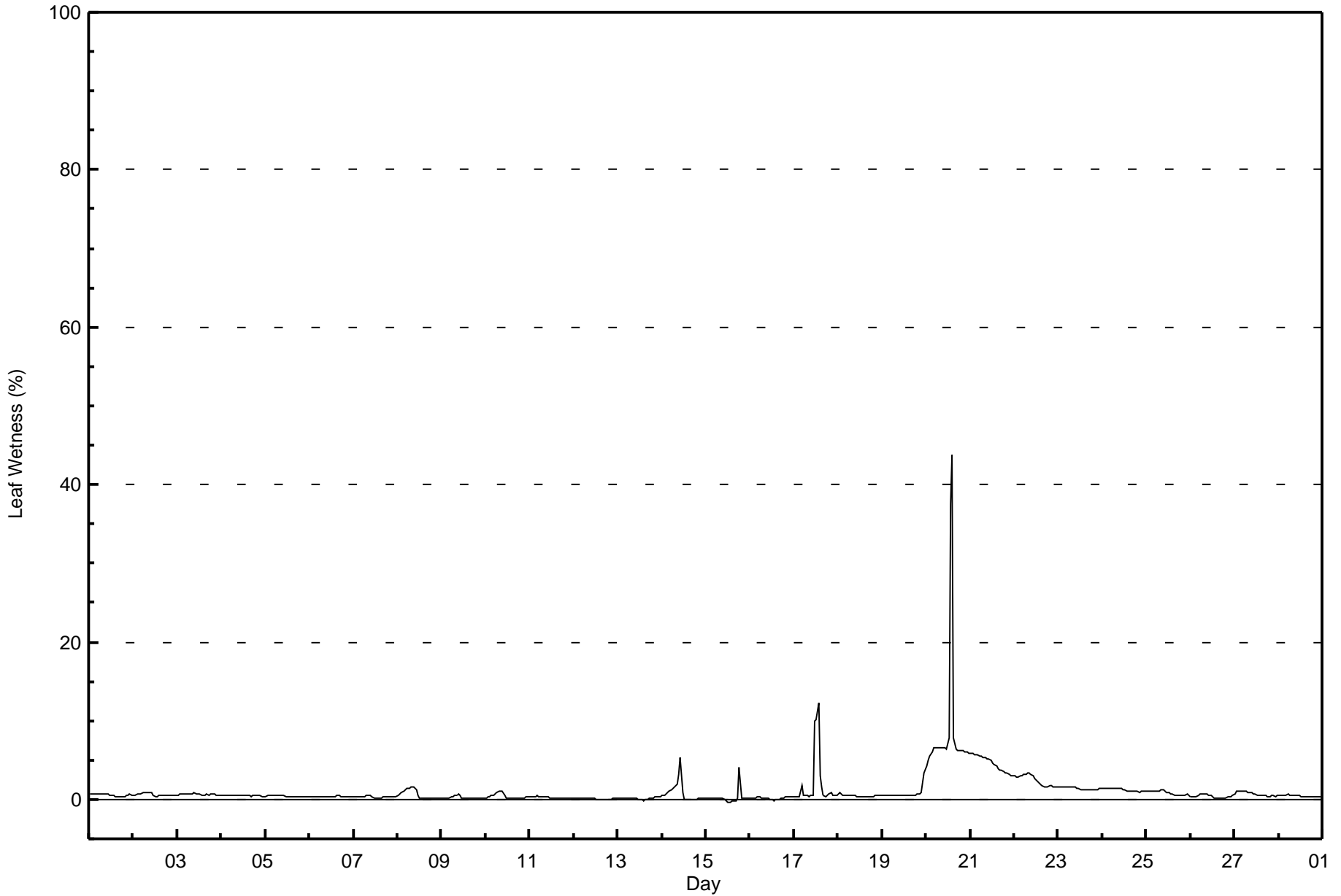
Anzac - February 2017

Maximum Value: 44 % on Feb 20 15:00														Maximum Daily Average: 9.1 % on Feb 20														Hours in Service: 672	
Minimum Value: 0 % on Feb 15 14:00														Minimum Daily Average: 0.1 % on Feb 12														Hours of Data: 672	
Maximum Diurnal Average: 2.3 % at hour 14														Minimum Diurnal Average: 0.7 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 1.1 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 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-Feb	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.6	1			
2-Feb	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0.6	1			
3-Feb	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			
4-Feb	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1			
5-Feb	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1			
6-Feb	0	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			
7-Feb	0	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-Feb	1	1	1	1	1	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2			
9-Feb	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			
10-Feb	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1			
11-Feb	0	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			
12-Feb	0	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-Feb	0	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-Feb	0	1	1	1	1	1	1	2	2	3	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5			
15-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0.2	4			
16-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0			
17-Feb	0	0	0	0	2	1	0	0	0	1	0	10	10	12	3	2	0	0	0	1	1	1	1	1	2.0	12			
18-Feb	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1			
19-Feb	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	0.7	3			
20-Feb	4	5	6	6	6	7	7	7	7	7	7	6	8	37	44	8	6	6	6	6	6	6	6	6	9.1	44			
21-Feb	6	6	6	6	6	6	5	5	5	5	5	5	5	4	4	4	4	4	4	3	3	3	3	3	4.6	6			
22-Feb	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2.4	3			
23-Feb	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2			
24-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1			
25-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0.8	1			
26-Feb	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1			
27-Feb	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			
28-Feb	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1			
0.9														1.0														Diurnal Average	
6														6														Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %
Anzac - February 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	217	33.49	33.49
0.4 - 0.5	162	25.00	58.49
0.6 - 0.7	79	12.19	70.68
0.8 - 1.4	87	13.43	84.11
1.5 - 10	94	14.51	98.61
> 10	4	0.62	99.23

Total Number of Valid Hours: 648

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Anzac - February 2017

Maximum Speed: 24 km/h on Feb 12 06:00	Maximum Daily Speed Average: 19.6 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 6 19:00	Minimum Daily Speed Average: 1.3 km/h on Feb 6	Hours of Data: 668
Maximum Diurnal Speed Average: 5.0 km/h at hour 13	Minimum Diurnal Speed Average: 2.7 km/h at hour 19	Hours of Missing Data: 4
Monthly Average Velocity: 4.0 km/h 294.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 22	Percent Operational Time: 99.4

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-Feb	NNW13	NNW11	NNW12	NNW11	NNW10	NNW13	NNW11	NNW11	NNW10	NNW9	NNW10	NW10	NNW11	NNW10	NW9	NNW7	NNW4	S1	SW4	W4	WNW9	WNW10	WNW10	WNW13	NW8.6	NNW13
2-Feb	NW13	WNW11	WNW10	WNW10	WNW10	WNW10	WNW11	WNW11	WNW12	WNW12	NW12	NW11	NW10	WNW6	NW9	WNW8	NW8	NW6	WNW5	WNW6	NW7	NW6	N8	NNW6	NW8.7	NW13
3-Feb	NNW9	NNW9	NNW8	NNW6	NW6	NW5	NW5	NW6	WNW6	NW5	WNW5	NW6	NNW7	WNW6	WNW5	NW4	WNW4	WNW4	WNW6	NNW9	NNW12	NNW9	NNW6	N6	NW6.0	NNW12
4-Feb	N5	NNE4	N5	N5	NW3	NW3	WNW3	W3	WNW3	WSW4	WSW3	WNW5	WNW9	WNW8	WNW8	WNW5	WNW3	ESE2	SSE4	SSE5	SSE5	SE4	S4	SSW4	WNW1.9	WNW9
5-Feb	NE3	ENE3	N4	NNW5	NNW5	NNW5	N6	N5	NW5	NW7	NNW8	NNW8	NNW9	NNW8	NNW9	NNW10	N7	N5	N1	SW3	SW4	WSW4	W5	WSW5	NNW4.3	NNW10
6-Feb	WSW4	SW6	SW2	SW3	SSW3	SW4	SW2	SW3	AF	WSW2	ENE1	ENE2	SE2	WSW3	WSW2	N3	ENE2	NE1	NNW0	AF	AF	WNW2	NW1	W3	SW1.3	SW6
7-Feb	WNW4	NW4	WNW6	W4	WSW4	W5	WNW8	WNW11	WNW13	WNW11	WNW12	WNW14	WNW16	WNW14	WNW14	WNW13	NW10	NW9	NW11	NW11	NW9	NW7	WNW8	WNW9.2	WNW16	
8-Feb	WNW7	WNW7	WNW6	WNW7	WNW9	WNW8	WNW12	WNW13	NW15	NW13	WNW14	WNW16	WNW17	W15	W13	W16	WSW16	WSW15	WSW14	WSW15	W19	W22	WNW21	WNW18	W13.1	W22
9-Feb	WNW14	WNW11	WNW10	WNW8	W6	WSW4	S2	S2	SSE2	SSE2	SSE5	SE9	SE8	SE9	SE7	ESE8	ESE7	SE5	ESE4	ESE4	E4	ESE6	ESE6	SE6	SSE2.0	WNW14
10-Feb	ESE4	SE4	SE4	SE5	SE5	SE7	SE8	SE8	SE10	SE12	SE12	SE10	SE10	SE13	SE11	SE11	SE10	SE12	SE12	SE8	SE8	SSE7	SSW6	SW12	SE8.0	SE13
11-Feb	WSW9	WSW7	SW7	SSW7	W7	WNW15	WNW17	WNW17	WNW19	WNW19	WNW18	WNW16	WNW14	WNW15	W15	W16	W14	W13	W11	W12	W14	W17	W15	W15	W12.9	WNW19
12-Feb	W19	W18	WSW21	WSW20	W22	W24	W24	W23	W20	W21	W23	W20	W21	WNW21	W19	W18	W13	WNW15	W15	W20	WNW20	WNW23	WNW20	WNW19	W19.6	W24
13-Feb	WNW20	WNW21	WNW22	WNW17	WNW16	WNW17	WNW19	NW18	NW16	NW17	NW15	NW12	NW11	NW12	NNW9	WNW11	WNW6	W5	SW5	SW5	S6	SSW6	SW8	WSW8	WNW11.1	WNW22
14-Feb	SW6	SW4	SSW5	S3	SW4	SSW5	S8	S8	S8	S7	ESE5	SE7	SSE6	SW4	SSW8	SW15	SW12	WSW9	WSW13	WSW9	WSW10	WSW8	SW9	SSW8	SSW6.5	SW15
15-Feb	SSW9	SW8	SSW7	SW5	SSW4	S7	S8	SW6	SW9	SW10	SSE7	SSE7	SSE7	SE5	SE7	SSW6	W10	WNW14	WNW9	WSW7	WSW7	W14	WNW12	W9	SW5.5	W14
16-Feb	W6	WSW7	WSW9	SSW5	SSW6	SW5	S9	SSE6	ESE7	SE10	SE11	SSE11	SSE11	SSE9	SSE6	SE5	AF	WNW3	SW2	WNW4	WNW7	NW9	WNW10	WNW9	SSW3.3	SSE11
17-Feb	NW9	NW8	NW10	WNW10	WNW12	NW10	NW10	NW8	WNW7	NW8	NW10	NNW10	NW10	NW10	NW9	NW8	NW12	NNW8	N9	NNW7	NW6	NNW7	NNW8	NNW8	NW8.6	NW12
18-Feb	NNW7	NW5	NNW6	N4	NW4	NW4	NW4	NW2	NNE0	SW1	NW7	N7	NNE5	ENE3	SE4	ESE6	E7	ESE6	E7	E8	ESE7	ESE9	ESE10	ESE11	ENE2.2	ESE11
19-Feb	ESE11	ESE13	ESE14	ESE14	ESE14	ESE14	ESE13	E15	E15	E16	ESE17	ESE14	ESE13	ESE13	SE17	SE14	SE13	SE10	SE10	SE10	SSE11	SE9	SE7	SE5	ESE12.3	SE17
20-Feb	ESE4	ENE3	ENE3	N3	NNW5	NW5	NW8	NW10	NW10	NW11	NW9	WNW11	WNW12	WNW12	WNW10	WNW9	WNW9	WNW11	W7	WNW8	NW7	NW8	NW5	NW6	NW6.9	WNW12
21-Feb	NW7	NW12	NW10	NW8	WNW8	WNW12	WNW13	WNW14	NW12	NW13	NW11	NW10	NW12	NW13	NW12	NW11	NW10	NW11	NNW11	NNW10	NW11	NW9	NW9	NNW9	NW10.5	WNW14
22-Feb	NW8	WNW7	WNW5	WNW5	NW5	WNW5	WNW6	WNW5	WNW5	WNW6	WNW10	NW10	NW10	NNW9	N9	N9	N6	N5	N5	N6	N6	N6	NNE6	NE4	NNW5.5	NW10
23-Feb	ENE4	ENE5	ENE4	ENE3	ESE3	ESE3	SE3	SSE5	SE6	SE7	SSE6	SE5	ESE3	S3	NW0	W3	NW3	N3	NNE2	E2	ESE4	SE5	SSE4	SE2	ESE2.4	SE7
24-Feb	WSW2	WNW3	WNW4	WNW7	NNW9	NNW9	NNW9	NNW7	NNW8	NNW9	NNW11	NNW13	NNW12	NNW10	NNW10	NNW7	NW7	NW8	NW1	SSW4	SW3	WNW5	WNW6	W5	NNW6.2	NNW13
25-Feb	W3	SW4	SW4	SSW3	SSW4	SW4	SW5	SW6	SW8	SW8	SW8	WNW11	WNW10	WNW9	NNW14	NNW14	N11	N12	N8	WNW7	WNW3	NE7	N11	N17	NW4.7	N17
26-Feb	N15	N11	N14	NNW11	NNW13	NNW13	NNW13	NNW13	NNW13	NNW13	NNW13	NNW12	NNW14	WNW10	NW9	NW7	NW5	NW4	WSW1	S3	S3	SW3	S4	S4	NNW7.7	N15
27-Feb	S4	ESE4	E7	E6	ENE5	ENE6	ESE4	ESE5	ESE8	ESE8	E5	ESE1	S6	ESE6	SE5	SE5	SE5	SE5	SE7	SSE8	SSE8	SSE8	S5	SE4.7	SSE8	
28-Feb	S5	SSW4	NW2	NW5	WNW7	NNW10	NNW8	NNW9	NNW7	N8	N8	N9	NNW10	N10	N9	N7	N6	NNW4	NNW3	N3	NE6	E8	E5	ESE6	N4.5	NNW10

WNW4.3	WNW4.0	WNW4.0	WNW3.4	WNW4.1	WNW4.5	WNW4.8	WNW4.8	WNW4.9	WNW4.5	NW4.5	NW4.4	NW5.0	WNW4.9	WNW4.3	WNW4.0	WNW3.8	WNW3.4	W2.7	W3.1	W3.2	WNW3.5	WNW3.6	WNW3.8	Diurnal Average
WNW20	WNW21	WNW22	WSW20	W22	W24	W24	W23	W20	W21	W23	W20	W21	WNW21	W19	W18	WSW16	WNW15	W15	W20	WNW20	WNW23	WNW21	WNW19	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

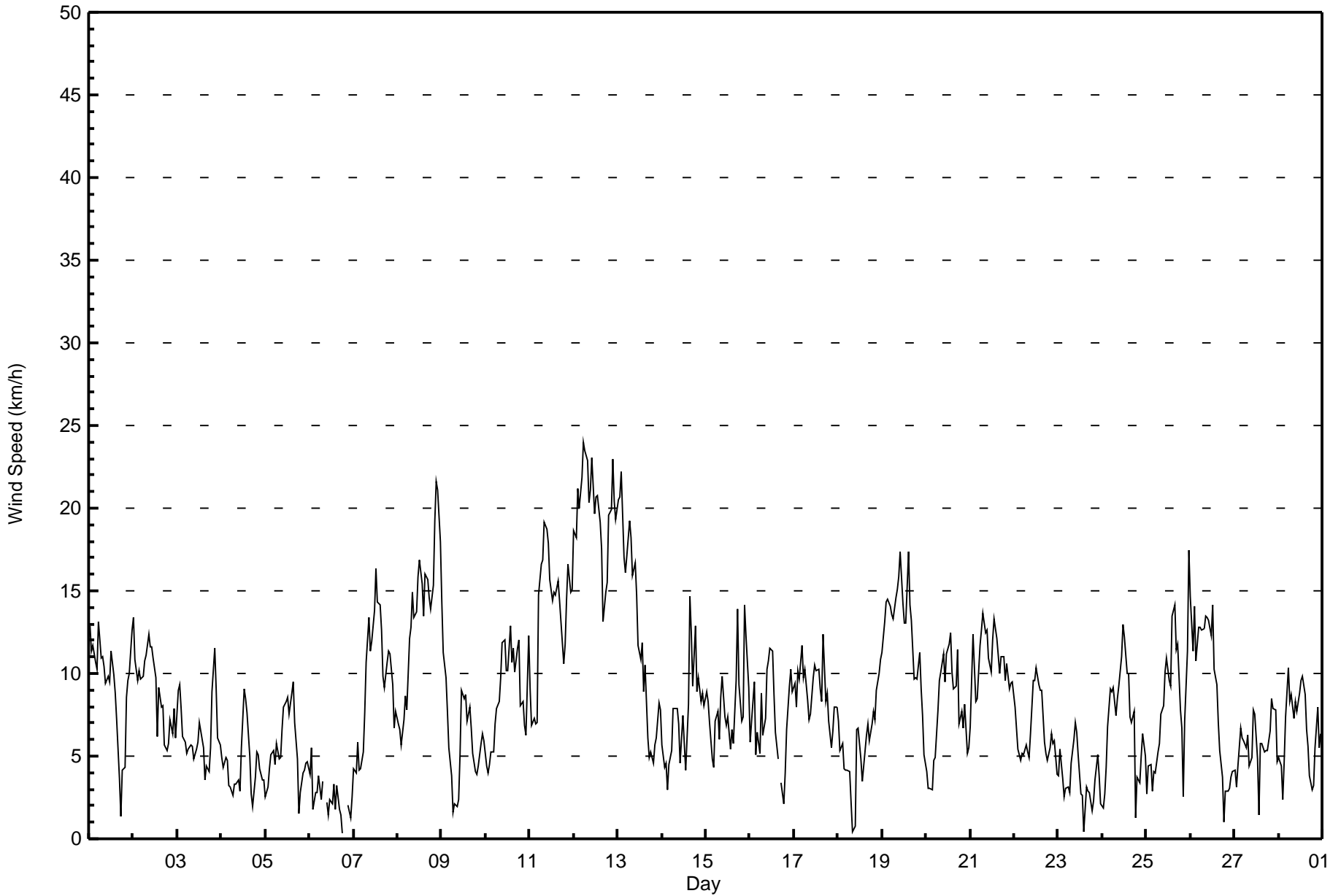
Wind Speed (WS) - km/h
Anzac - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 12 11:00 Minimum Value: 1 km/h on Feb 25 04:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7																	Hours in Service: 672 Hours of Data: 668 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.4								
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-Feb	4	4	4	3	3	4	3	3	3	3	3	4	4	3	2	2	1	1	2	2	3	3	5		
2-Feb	4	3	3	3	3	3	3	3	4	3	4	3	4	3	2	3	2	2	2	2	2	3	2	4	
3-Feb	3	2	2	2	2	1	1	2	1	1	2	2	2	2	1	1	1	2	3	3	3	2	3		
4-Feb	1	1	1	1	2	1	1	1	1	1	1	2	3	3	2	1	1	1	1	1	1	1	1		
5-Feb	1	1	2	1	1	1	1	2	1	2	3	3	2	3	3	3	2	2	1	1	1	1	1		
6-Feb	1	1	1	2	1	2	2	1	AF	2	1	1	1	1	1	1	1	1	AF	AF	1	1	1		
7-Feb	1	1	2	1	1	1	3	4	4	4	4	5	6	6	5	4	3	3	3	4	4	3	2		
8-Feb	2	2	2	3	3	3	5	4	5	4	5	5	5	5	6	4	5	4	5	6	8	7	6		
9-Feb	5	4	3	2	2	2	1	2	1	1	2	3	2	2	2	2	2	1	1	1	1	2	2		
10-Feb	1	1	2	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	4	3	2	2	3		
11-Feb	3	2	1	2	4	5	5	5	6	6	6	5	5	5	5	5	5	4	4	4	5	5	6		
12-Feb	7	7	7	7	7	8	7	8	7	8	8	7	8	7	6	6	5	6	5	6	7	8	7		
13-Feb	7	7	6	6	5	5	6	6	5	5	5	4	4	4	3	4	2	1	1	1	1	2	2		
14-Feb	1	1	1	2	1	1	1	1	2	1	1	2	3	2	4	4	4	4	3	3	2	1	2		
15-Feb	2	1	3	1	2	2	2	2	4	3	3	2	2	2	2	3	5	4	2	4	5	5	4		
16-Feb	3	3	2	2	1	1	2	2	2	3	3	3	3	2	3	1	AF	1	1	2	2	2	3		
17-Feb	3	2	2	3	4	3	3	3	2	2	3	3	3	3	3	3	4	2	3	2	2	2	2		
18-Feb	2	2	2	2	1	1	1	1	1	1	2	2	1	2	2	2	2	2	2	2	3	3	3		
19-Feb	3	4	4	5	4	4	4	5	5	5	5	5	4	4	6	4	4	3	3	3	3	3	2		
20-Feb	1	1	1	1	1	1	3	3	3	3	3	4	4	4	4	3	3	4	2	2	2	3	2		
21-Feb	3	5	4	3	5	5	4	5	4	5	4	4	4	4	4	4	4	4	3	3	4	3	3		
22-Feb	3	2	2	1	1	1	2	1	1	3	3	4	4	3	2	2	2	2	2	2	2	2	2		
23-Feb	1	2	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	2	1	1		
24-Feb	1	1	2	3	2	3	3	2	2	3	3	4	4	3	3	3	3	2	1	1	2	2	2		
25-Feb	1	1	1	1	1	1	1	1	2	3	4	4	3	3	5	4	4	4	3	2	2	4	3		
26-Feb	4	3	5	4	4	4	4	4	4	4	4	4	4	4	3	3	2	2	1	2	1	1	1		
27-Feb	1	1	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	1	2	2	2	3		
28-Feb	2	3	2	1	2	3	3	3	2	2	2	3	3	3	2	2	2	2	1	1	3	2	2		
																	Diurnal Maximum								
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Anzac - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	201	30.09	30.09
6 - 11	319	47.75	77.84
12 - 19	127	19.01	96.86
20 - 28	21	3.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 668

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - February 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	4	3	12	4	14	19	8	13	12	19	14	10	24	23	8	201
6 - 11	22	1	2	1	6	17	28	15	9	9	12	11	7	60	64	55	319
12 - 19	4	0	0	0	3	11	6	1	0	0	3	5	20	41	17	16	127
20 - 28	0	0	0	0	0	0	0	0	0	0	0	2	11	8	0	0	21
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	5	5	13	13	42	53	24	22	21	34	32	48	133	104	79	668

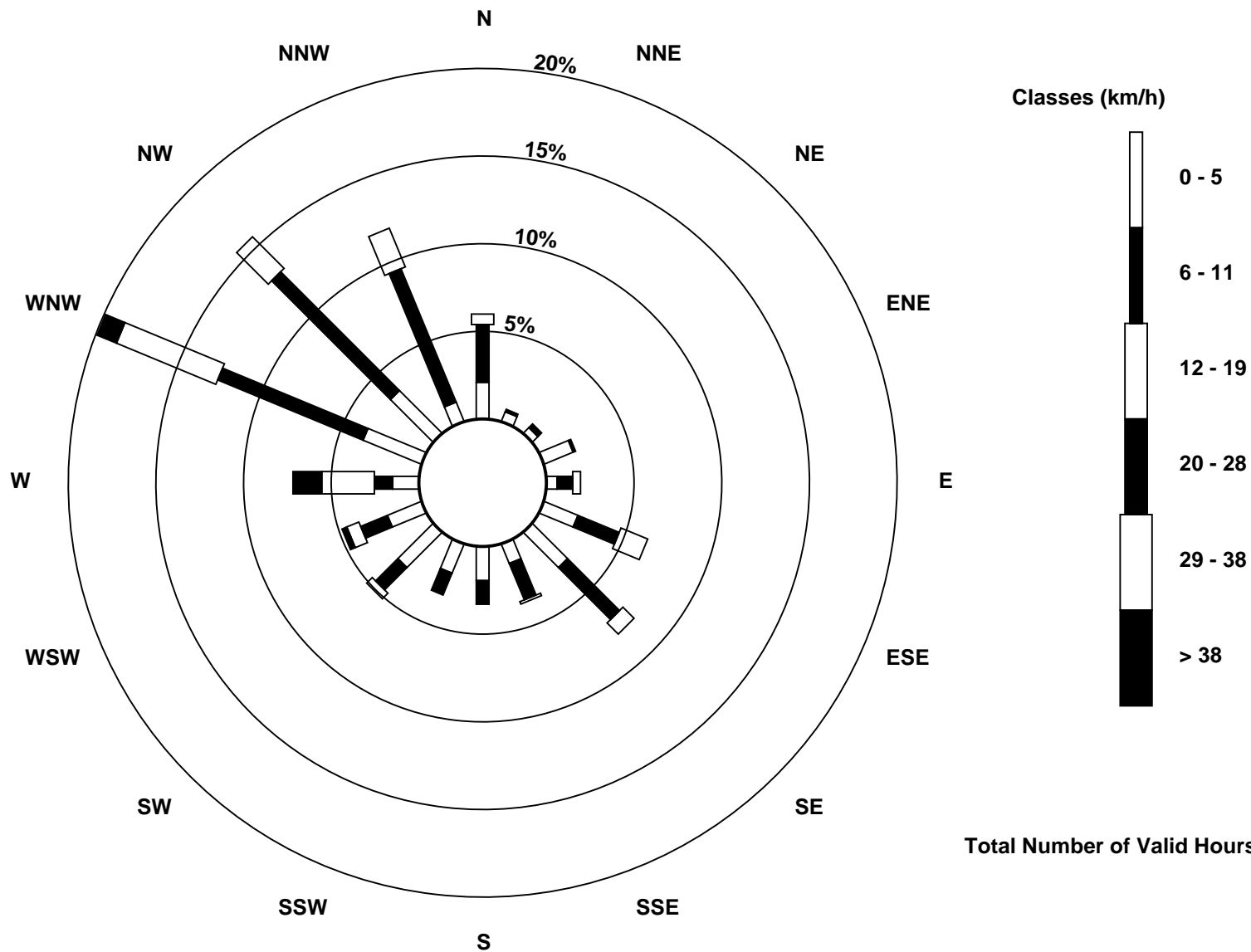
Total Number of Valid Hours: 668

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Anzac (AMS 14)



Total Number of Valid Hours: 668



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - February 2017

Direction of Maximum Speed: 265 deg on Feb 12 06:00 Direction of Maximum Daily Speed Average: 273.1 deg on Feb 12	Hours in Service: 672 Hours of Data: 668 Hours of Missing Data: 4 Percent Operational Time: 99.4
Direction of Minimum Speed: 336 deg on Feb 6 19:00 Direction of Minimum Daily Speed Average: 1.3 deg on Feb 6	
Monthly Average Direction: 298.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	340	346	341	337	334	344	332	339	331	336	329	323	332	329	326	331	335	184	230	274	299	297	295	303	325.9
2-Feb	304	303	295	292	294	297	301	302	303	299	305	307	313	293	311	283	306	312	295	293	310	322	8	348	305.0
3-Feb	333	338	335	327	324	307	315	317	301	304	302	324	345	292	288	323	286	293	285	329	345	338	343	349	322.4
4-Feb	7	16	4	354	320	314	295	279	285	251	248	300	299	301	301	285	292	115	162	160	159	141	170	199	291.9
5-Feb	42	62	350	345	348	347	357	351	308	324	347	344	348	333	323	331	349	353	350	236	217	238	261	255	332.8
6-Feb	245	219	229	221	203	221	222	231	AF	253	66	75	142	242	241	9	58	54	336	AF	AF	288	319	270	235.3
7-Feb	298	325	302	269	237	262	298	290	287	287	296	295	292	286	286	293	308	306	306	318	321	322	306	300	296.7
8-Feb	303	296	288	287	283	285	296	295	305	308	298	289	286	281	276	268	255	252	252	258	264	272	283	286	279.9
9-Feb	289	286	288	290	269	247	173	186	151	154	157	129	126	125	128	107	108	140	122	102	90	116	116	139	149.4
10-Feb	119	125	128	132	140	136	136	133	135	143	146	128	129	127	145	144	139	134	142	131	131	158	208	236	141.9
11-Feb	240	237	214	208	278	288	288	289	288	292	294	296	291	288	278	265	276	276	276	267	266	274	276	275	277.3
12-Feb	260	261	257	257	259	265	264	267	270	271	273	276	276	284	279	278	272	288	278	279	283	290	288	288	273.1
13-Feb	290	292	290	291	294	300	302	306	306	304	306	309	312	325	309	300	295	267	236	217	191	194	216	238	292.3
14-Feb	229	232	196	187	215	192	181	181	181	182	123	144	164	223	197	225	231	243	246	252	238	238	225	213	212.5
15-Feb	209	216	203	220	206	184	188	217	220	216	168	155	156	124	140	204	270	293	292	255	250	271	283	280	228.9
16-Feb	277	254	244	200	212	214	186	152	121	143	145	149	157	148	157	140	AF	303	219	284	303	310	302	301	199.1
17-Feb	308	317	317	300	296	304	306	308	292	304	322	329	318	312	310	314	318	348	352	336	313	327	340	343	317.3
18-Feb	342	309	346	354	322	321	311	321	13	227	309	1	14	65	130	114	101	105	81	91	115	122	120	121	66.2
19-Feb	118	121	123	123	116	115	108	100	95	99	107	111	116	116	126	126	124	126	128	136	147	142	140	134	118.6
20-Feb	122	72	72	357	333	320	310	307	306	305	307	301	299	298	298	294	298	300	278	288	313	314	318	320	306.2
21-Feb	307	305	310	313	287	282	288	285	312	314	311	311	310	309	316	317	316	321	327	332	325	318	311	327	310.1
22-Feb	310	291	290	283	316	301	303	301	288	300	303	308	306	328	0	4	5	8	357	357	349	7	27	51	327.2
23-Feb	77	69	68	72	103	106	140	156	146	141	153	146	118	182	320	264	321	8	25	81	119	137	168	129	123.0
24-Feb	246	295	289	335	346	343	343	336	342	347	346	341	334	347	339	337	307	319	308	197	227	294	287	273	328.4
25-Feb	272	230	224	212	205	217	224	230	225	232	284	294	301	300	329	339	351	2	349	285	292	53	11	8	311.4
26-Feb	356	353	352	347	335	335	331	329	326	330	335	338	335	308	312	312	317	312	253	179	191	214	178	171	331.0
27-Feb	180	142	103	89	81	81	75	73	102	114	106	114	97	105	179	116	131	127	132	142	162	168	166	180	124.1
28-Feb	176	208	307	322	298	327	337	348	344	352	359	356	337	354	351	359	358	346	334	354	44	80	101	111	352.8
	294.6	292.2	294.2	295.2	291.5	293.6	293.9	295.5	295.2	293.4	304.7	311.9	308.4	303.6	296.8	295.0	298.2	302.3	280.5	275.2	275.3	283.3	285.7	287.5	
	Diurnal Average																								

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

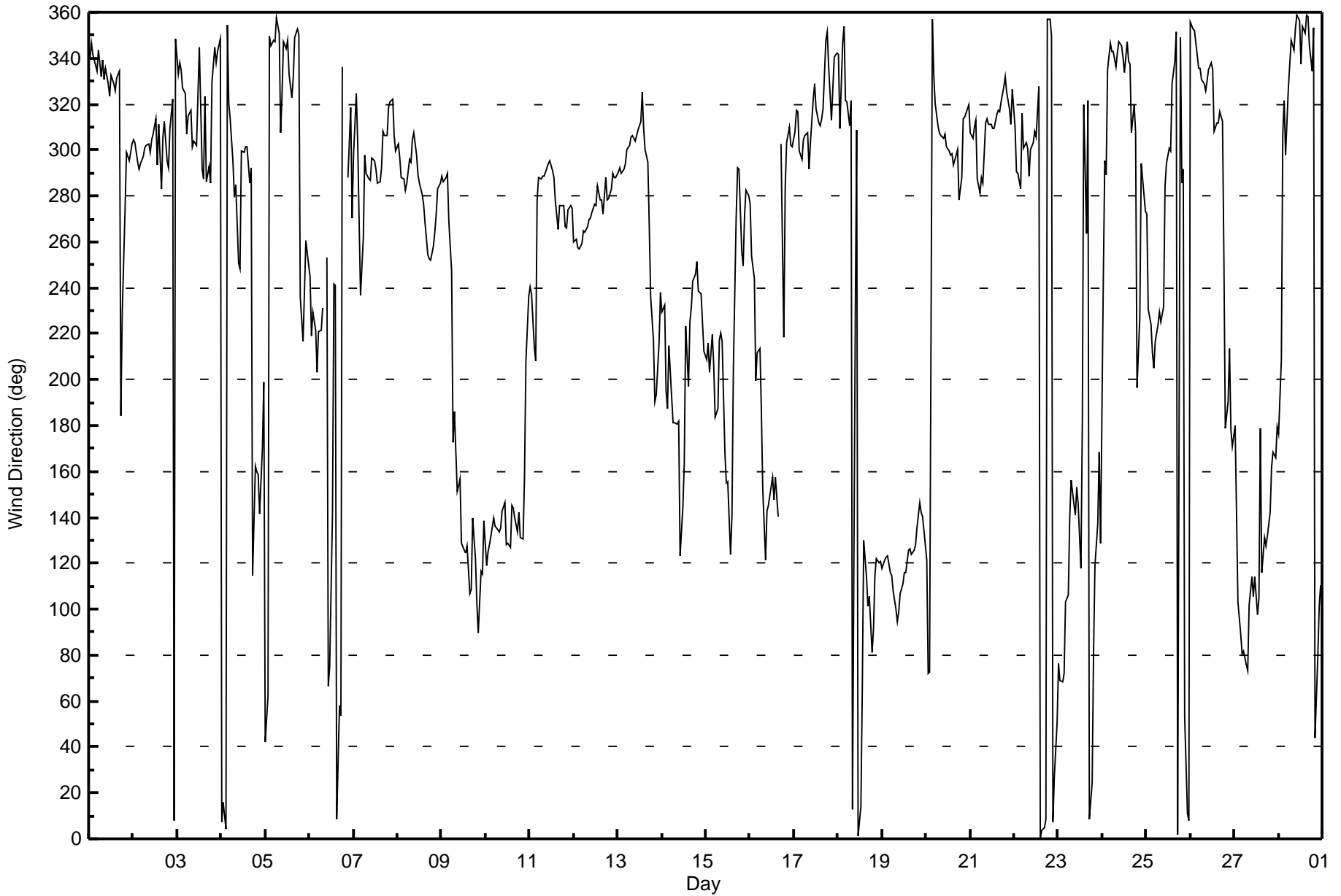
Wind Direction (WD) - deg
Anzac - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Feb 23 15:00 Minimum Value: 7 deg on Feb 5 20:00 Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 17 Median = 20 Q ₃ = 23 P ₉₀ = 30 P ₉₉ = 64																			Hours in Service: 672 Hours of Data: 668 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.4						
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-Feb	15	16	15	15	14	16	15	16	14	14	16	21	18	24	19	14	17	41	11	30	17	18	21	20	41
2-Feb	18	18	20	18	18	19	16	17	18	18	18	20	23	29	22	23	18	19	23	21	18	17	21	20	29
3-Feb	17	14	15	13	14	16	15	13	16	20	20	21	19	27	30	35	24	20	23	17	15	14	16	15	35
4-Feb	21	17	19	14	35	13	15	26	21	31	36	35	21	22	22	36	40	50	15	12	14	23	19	18	50
5-Feb	59	44	32	16	14	17	14	23	23	22	16	19	19	24	23	18	15	11	54	7	9	16	9	15	59
6-Feb	13	11	34	25	17	15	55	17	AF	37	35	37	52	48	66	36	27	40	79	AF	AF	24	18	28	79
7-Feb	16	12	15	27	9	17	18	20	21	21	21	21	22	25	23	22	19	19	18	17	16	16	20	17	27
8-Feb	17	15	17	21	21	22	21	21	20	20	22	22	22	23	24	23	20	20	20	20	22	24	23	23	24
9-Feb	22	22	20	21	21	29	59	53	36	38	23	18	23	20	24	18	19	22	24	24	20	17	19	21	59
10-Feb	19	22	17	14	17	14	12	12	14	15	16	16	17	14	21	17	20	18	20	20	18	22	29	20	29
11-Feb	20	17	13	16	28	22	20	21	21	22	22	21	21	23	23	22	24	21	24	24	25	24	25	26	28
12-Feb	23	23	22	23	23	22	22	23	23	24	23	25	24	23	24	25	23	25	24	23	23	22	23	22	25
13-Feb	23	22	21	21	20	19	19	19	19	19	20	21	23	22	25	21	21	29	18	18	8	14	16	11	29
14-Feb	13	24	20	39	26	13	12	12	13	22	23	17	32	45	28	19	19	27	16	26	10	17	12	14	45
15-Feb	13	12	26	30	37	16	19	34	19	25	27	23	23	23	29	29	24	23	27	20	22	23	30	32	37
16-Feb	42	26	22	23	20	13	16	24	17	17	20	19	22	24	29	22	AF	23	32	39	12	17	14	16	42
17-Feb	17	22	15	18	20	22	19	19	19	19	21	15	18	18	20	19	21	16	15	17	20	17	15	16	22
18-Feb	20	24	20	31	24	28	28	38	91	92	31	26	24	52	33	29	24	21	19	19	22	20	20	18	92
19-Feb	18	17	16	17	19	19	20	21	21	22	20	21	22	19	18	20	15	17	17	19	19	20	20	21	22
20-Feb	27	31	27	20	12	16	17	18	19	18	19	19	21	23	22	23	22	19	26	26	20	20	26	20	31
21-Feb	22	19	23	20	25	24	23	25	21	20	22	22	21	20	19	21	22	18	17	15	18	19	18	17	25
22-Feb	22	19	18	15	15	16	15	15	20	20	24	25	29	26	16	17	16	17	15	16	14	21	13	17	29
23-Feb	16	15	16	23	19	18	20	17	17	19	29	43	55	53	98	42	43	21	19	37	19	13	23	28	98
24-Feb	46	28	17	20	16	15	14	14	14	16	18	17	19	19	20	23	21	64	10	29	20	16	15	64	
25-Feb	21	14	18	22	14	9	9	10	14	17	27	24	21	20	20	17	18	18	21	29	62	15	18	17	62
26-Feb	19	15	15	16	15	16	15	14	15	17	19	21	22	33	23	30	26	22	73	52	21	21	11	9	73
27-Feb	12	17	16	16	16	13	12	13	18	27	22	23	41	95	42	34	28	17	11	16	14	12	13	16	95
28-Feb	11	19	60	27	15	17	13	16	15	18	20	23	24	19	22	22	22	17	10	15	23	16	23	19	60
59 44 60 39 37 29 59 53 91 92 36 43 55 95 98 42 43 50 79 52 62 24 30 32																								Diurnal Maximum	
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Anzac - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

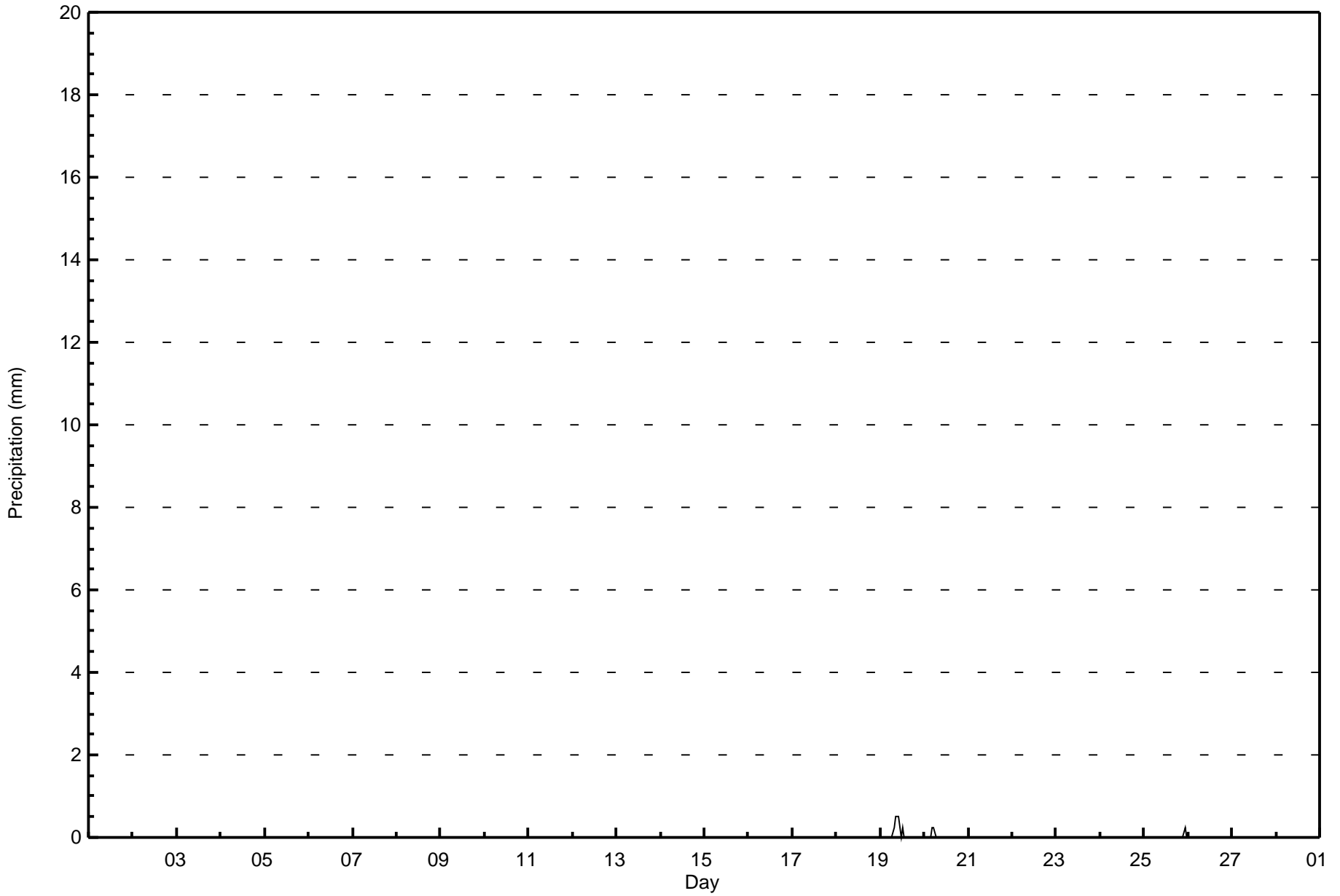
Anzac - February 2017

Maximum Value: 0.5 mm on Feb 19 09:00 Maximum Daily Total: 2.0 mm on Feb 19		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Minimum Value: 0.0 mm on Feb 1 01:00 Maximum Diurnal Total: 0.5 mm at hour 9 Monthly Total: 2.79 mm		Minimum Daily Total: 0.0 mm on Feb 1 Minimum Diurnal Total: 0.0 mm at hour 1 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																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.5	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Feb	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
26-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																								Diurnal Average				
																								Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - February 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 2, 2017	Last Calibration	January 6, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:50
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	791	792
Calculated slope	0.999165	0.993583	Chamber temp	45.3	45.3
Calculated intercept	1.401295	2.037531	Pressure	705.1	703.3
Analyzer Background	13.8	13.6	Flow	0.436	0.433
Analyzer Coefficient	0.962	0.948	Intensity	84	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	-0.1	----
as found span	5000	79.2	777.7	786.8	0.988
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	79.2	777.7	782.1	0.994
second point	5000	39.6	388.9	387.1	1.005
third point	5000	19.8	194.4	192.5	1.010
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	79.2	777.7	779.2	0.998
Average Correction Factor					1.003

Corrected As found 786.9 Previous response 777.0 % change -1.3%

Notes:

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

Calibration Performed By: Asad Hidayat



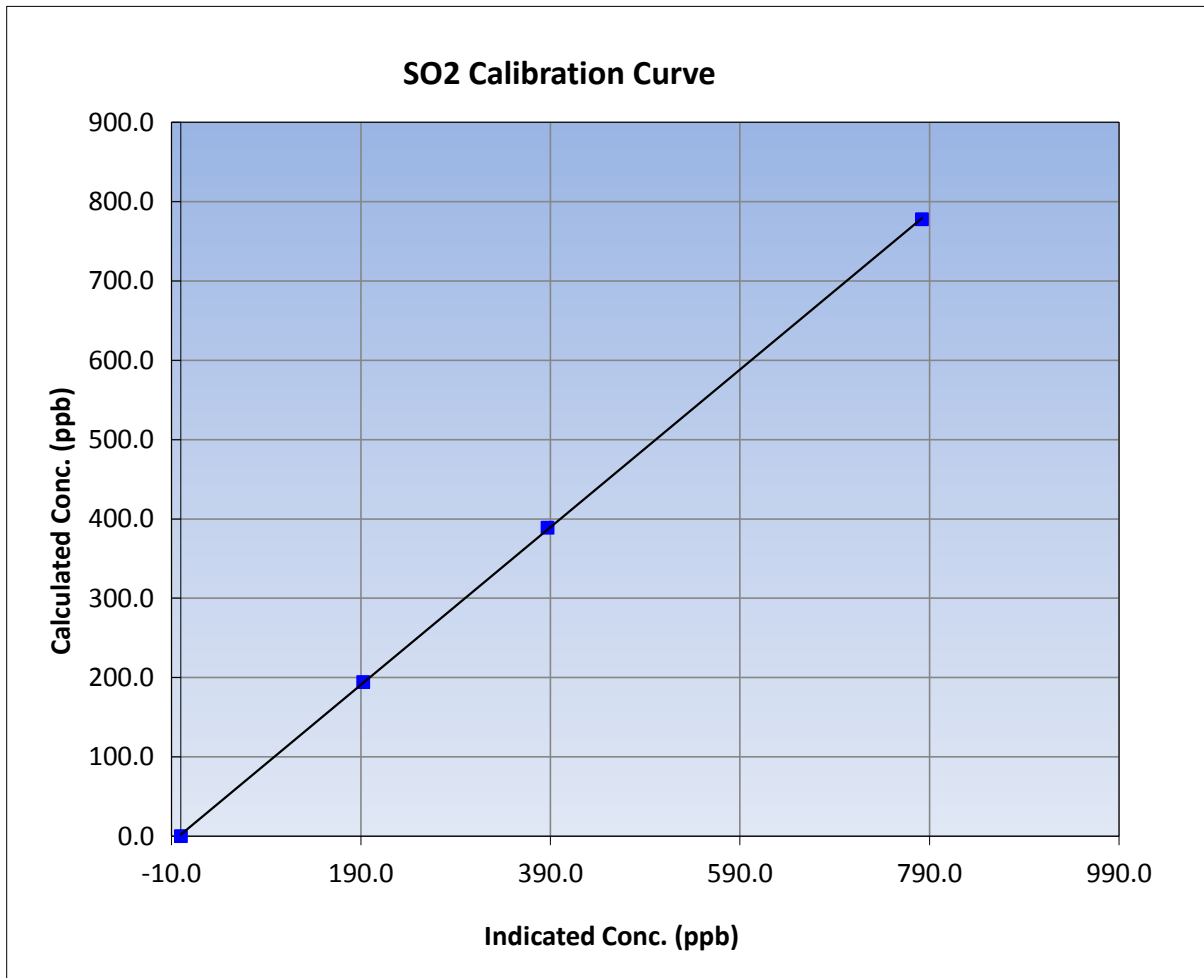
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 6, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 43i	Analyzer serial #	1152430005

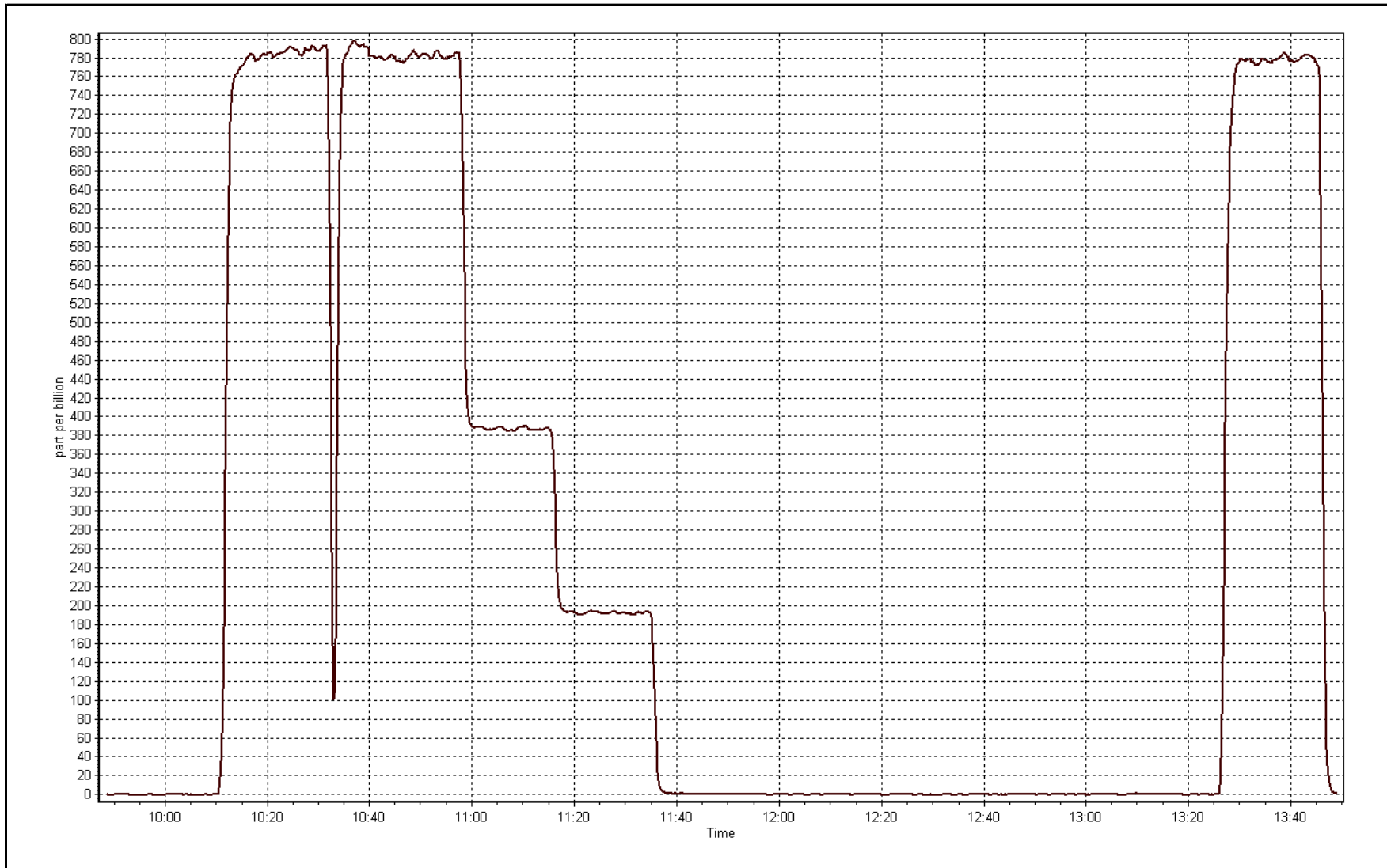
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999963
777.7	782.1	0.9944		
388.9	387.1	1.0047	Slope	0.993583
194.4	192.5	1.0100		
			Intercept	2.037531



SO2 Calibration Plot

Date: February 2, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 1, 2017	Last Calibration	January 13, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	13:38
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	192.168.1.44		Lamp voltage	1007	1005
Calculated slope	0.994873	1.001172	Chamber temp	45	45
Calculated intercept	-0.036580	-0.115404	Pressure	657.8	688.6
Analyzer Background	1.71	1.7	Flow	0.407	0.423
Analyzer Coefficient	1.198	1.198	Intensity	98	97
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	74.3	75.0	75.0	1.001
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	75.0	1.001
second point	5000	39.6	40.0	40.2	0.994
third point	5000	19.8	20.0	20.2	0.992
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.3	75.0	75.3	0.997
Average Correction Factor					0.996

Corrected As found	75.0	Previous response	75.5	% change	0.7%
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Notes:

Sample inlet filter replaced after as founds. No adjustments. Sox scrubber test completed after 3rd point.

Calibration Performed By:

Asad Hidayat



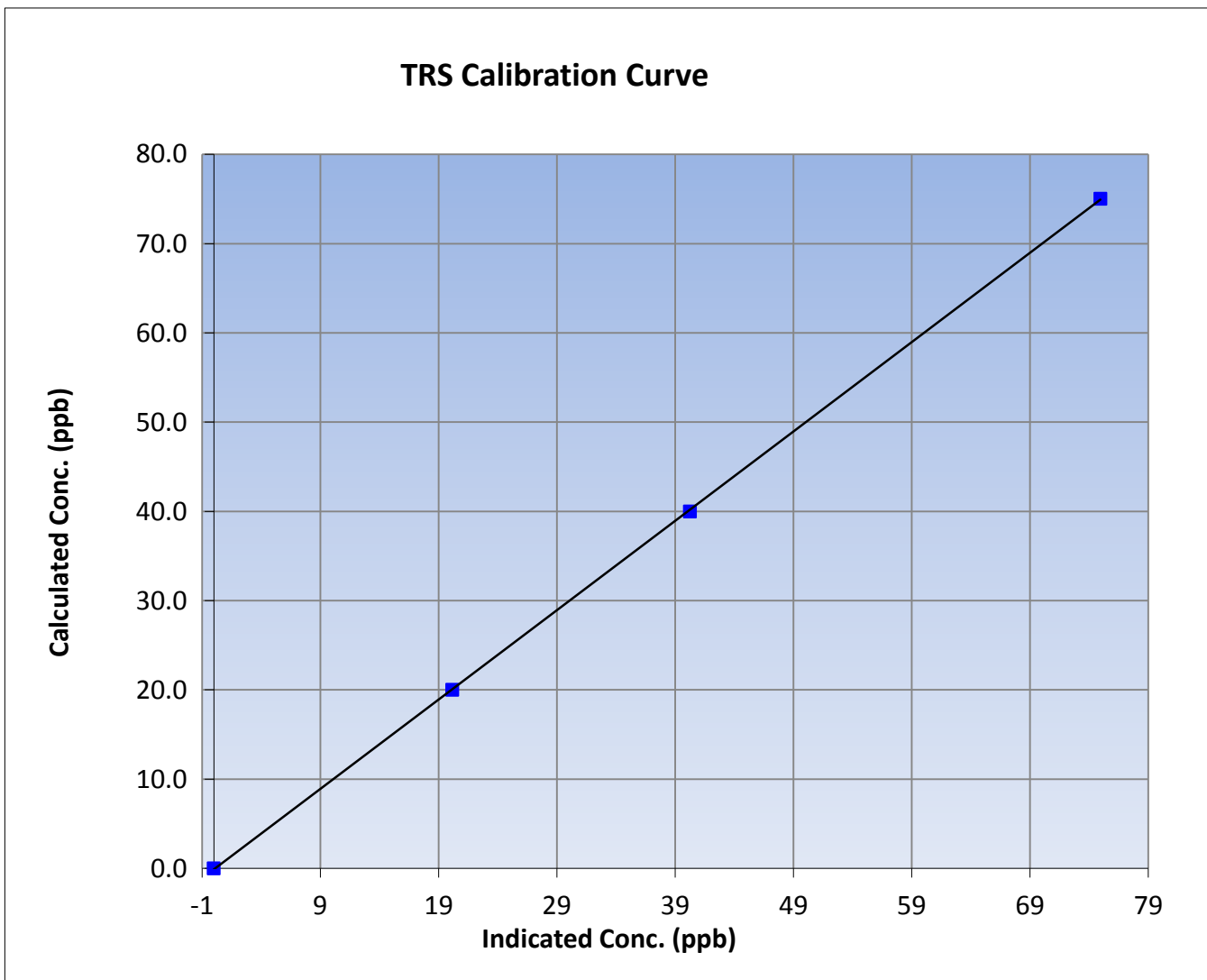
Wood Buffalo Environmental Association TRS Calibration Report

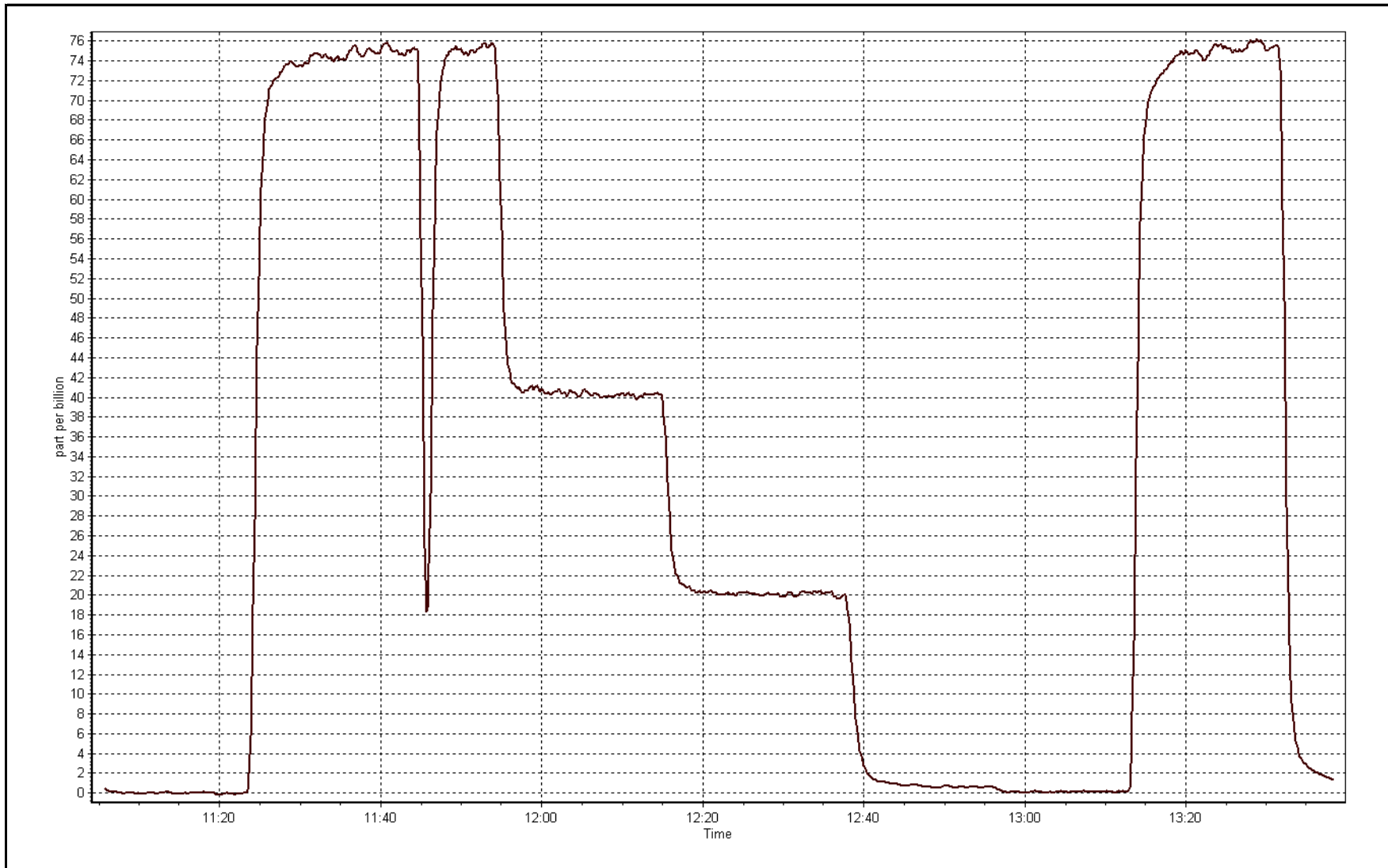
Station Information

Calibration Date	February 1, 2017	Previous Calibration	January 13, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	11:05	End Time (MST)	13:38
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999980
75.0	75.0	1.0011		
40.0	40.2	0.9939	Slope	1.001172
20.0	20.2	0.9925		
			Intercept	-0.115404







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 2, 2017	Last Calibration	January 5, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:50
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	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.998987	0.995854	Carrier Pressure	33.3	33.3
THC Calc intercept	0.052433	0.060371	Fuel Pressure	47.9	47.9
NMHC Calc slope	0.998774	0.993800	Air Pressure	36.6	36.6
NMHC Calc intercept	0.012084	0.016001			

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	79.2	16.79	16.85	0.997
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	79.2	16.79	16.85	0.997
second point	5000	39.6	8.40	8.29	1.013
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	16.82	0.998
Average Correction Factor					1.009

Corrected As found 16.85 Previous response 16.76 % change -0.5%

Notes:

Sample inlet filter replaced after as founds. No adjustments.

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	79.2	8.67	8.72	0.994
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	79.2	8.67	8.72	0.994
second point	5000	39.6	4.33	4.32	1.003
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	8.68	0.999
Average Correction Factor					1.000

Corrected As found 8.72 Previous response 8.67 % change -0.6%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	79.2	8.13	8.13	0.999
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	8.14	0.998
Average Correction Factor					1.017

Corrected As found 8.13 Previous response 8.09 % change -0.5%



Wood Buffalo Environmental Association

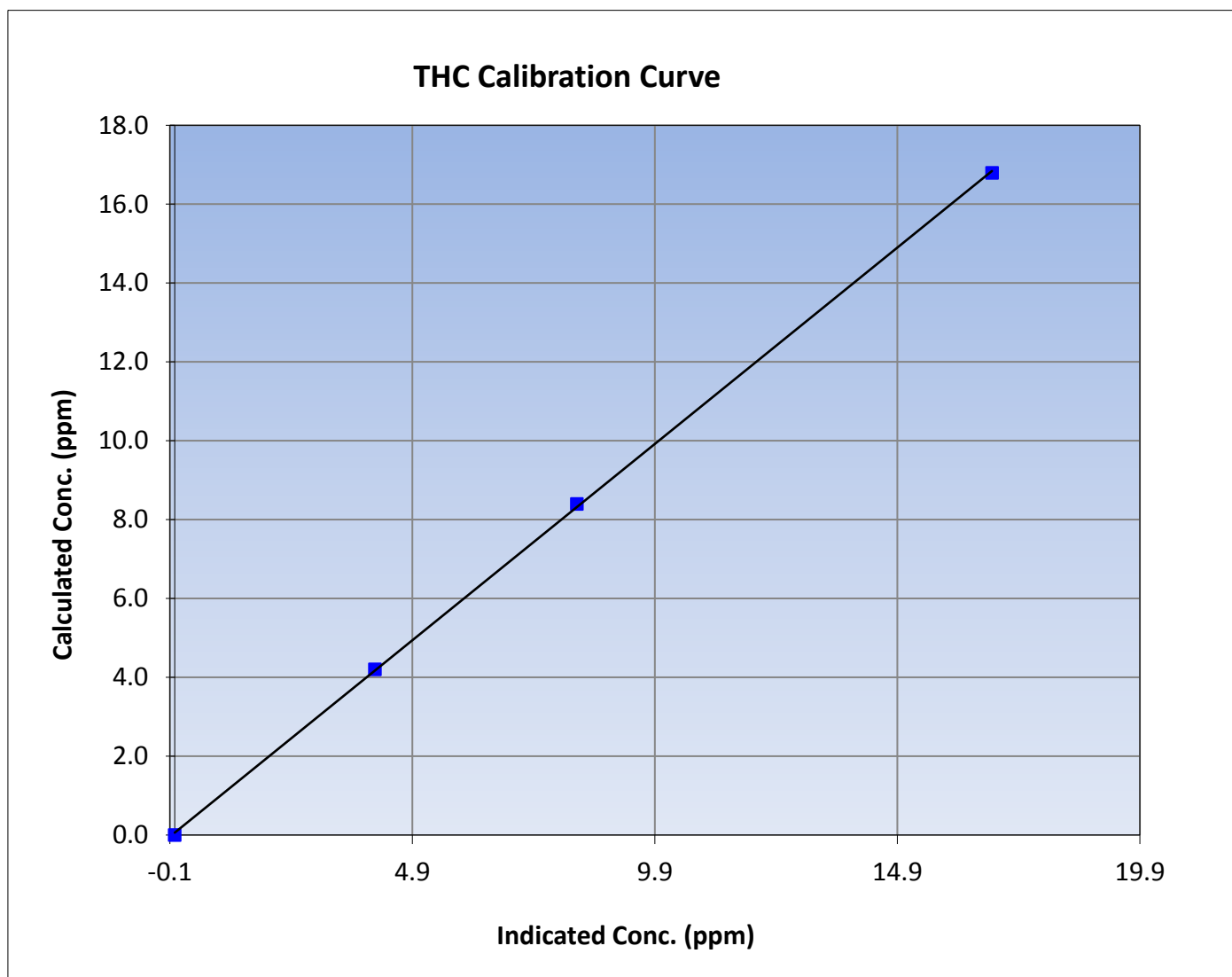
THC Calibration Summary

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 5, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:50
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	0.999916
16.79	16.85	0.9967		
8.40	8.29	1.0129	Slope	0.995854
4.20	4.13	1.0166		
			Intercept	0.060371





Wood Buffalo Environmental Association

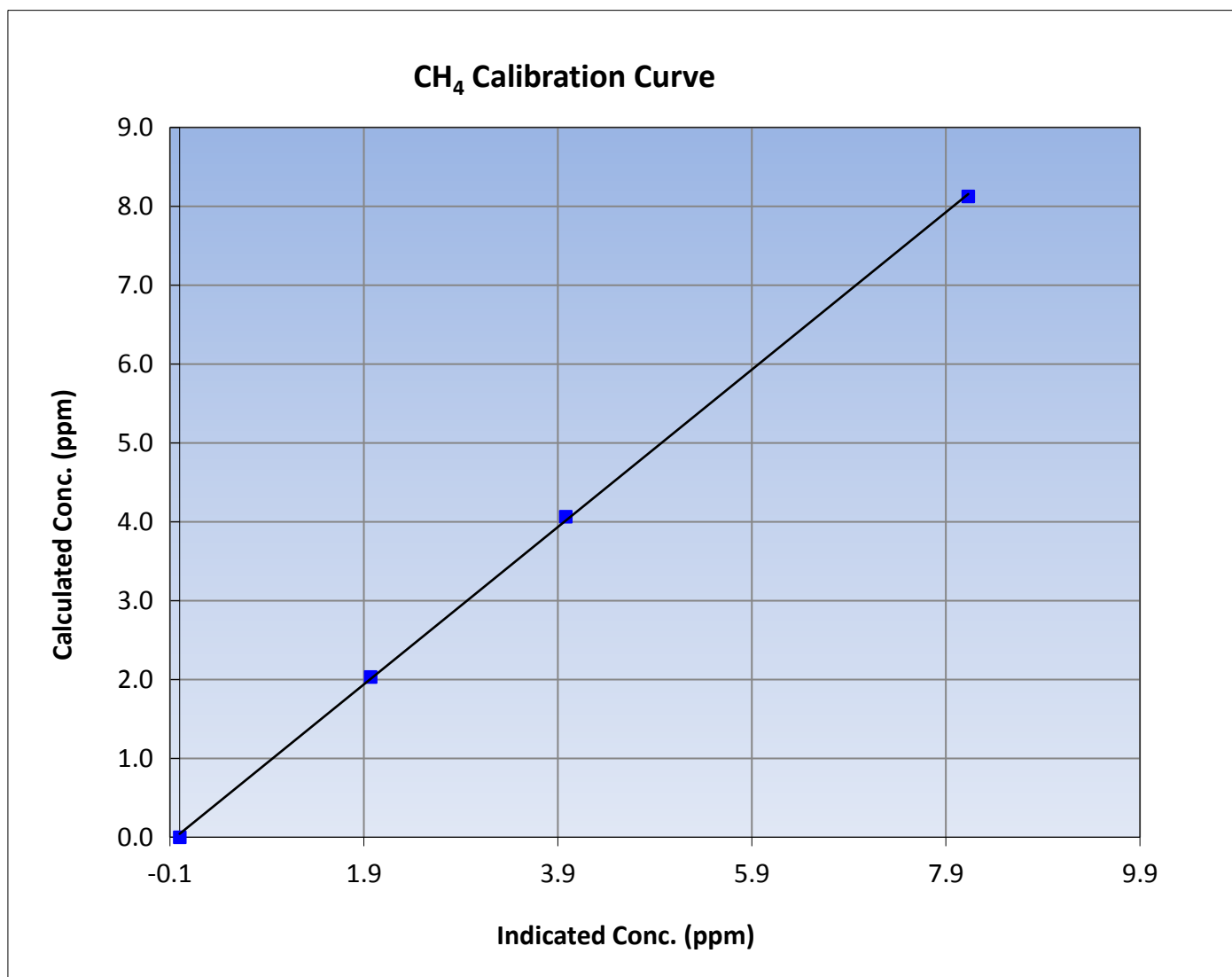
CH₄ Calibration Summary

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 5, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:50
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

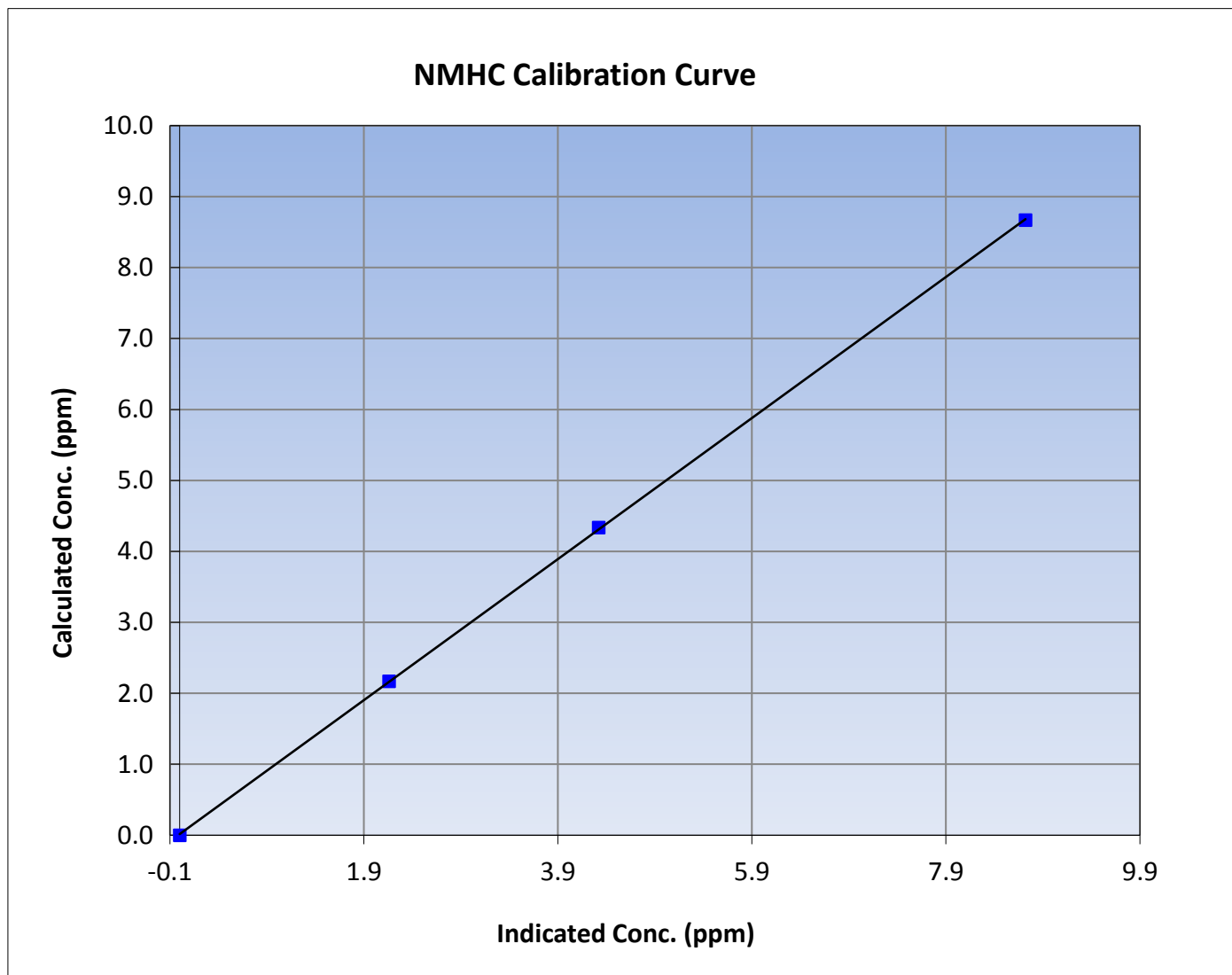
NMHC Calibration Summary

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 5, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

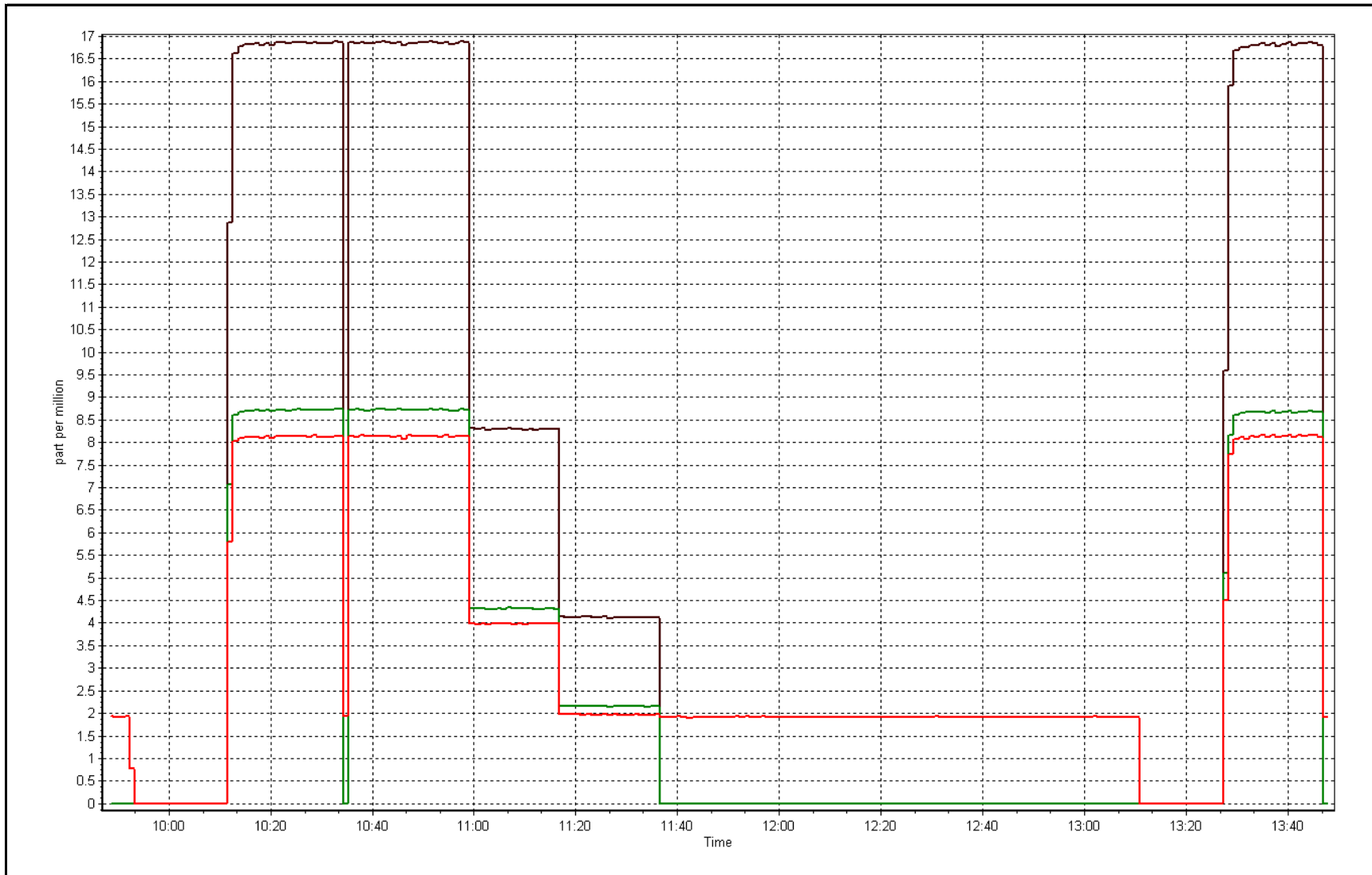
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999974
8.67	8.72	0.9941		
4.33	4.32	1.0033	Slope	0.993800
2.17	2.16	1.0033		
			Intercept	0.016001



THC Calibration Plot

Date: February 2, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 6, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	12:50
NO2 GPT Ref date	N/A	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.	27.4	26.7
Analyzer IP address	192.168.1.49		Lamp temp.	53.8	53.8
Calculated slope	0.999735	1.000891	Pressure	668.8	665.9
Calculated intercept	-1.679734	-1.992790	Flow cell A	0.713	0.713
Analyzer Background	-1.8	-1.8	Flow cell B	0.723	0.722
Analyzer Coefficient	1.017	1.017	Cell A Intensity	94517	94302
			Cell B Intensity	107160	107505

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	0.5	----
as found span	5000	901.50	300.0	300.6	0.998
calibrator zero	5000	800.00	0.0	0.5	----
high point	5000	902.10	300.0	300.6	0.998
second point	5000	808.20	200.0	202.5	0.988
third point	5000	698.00	100.0	103.9	0.962
as left zero	5000	800.00	0.0	1.7	----
as left span	5000	901.70	300.0	301.7	0.994
Average Correction Factor					0.983

Corrected As found	300.1	Previous response	301.8	% change	0.5%
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Notes:

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



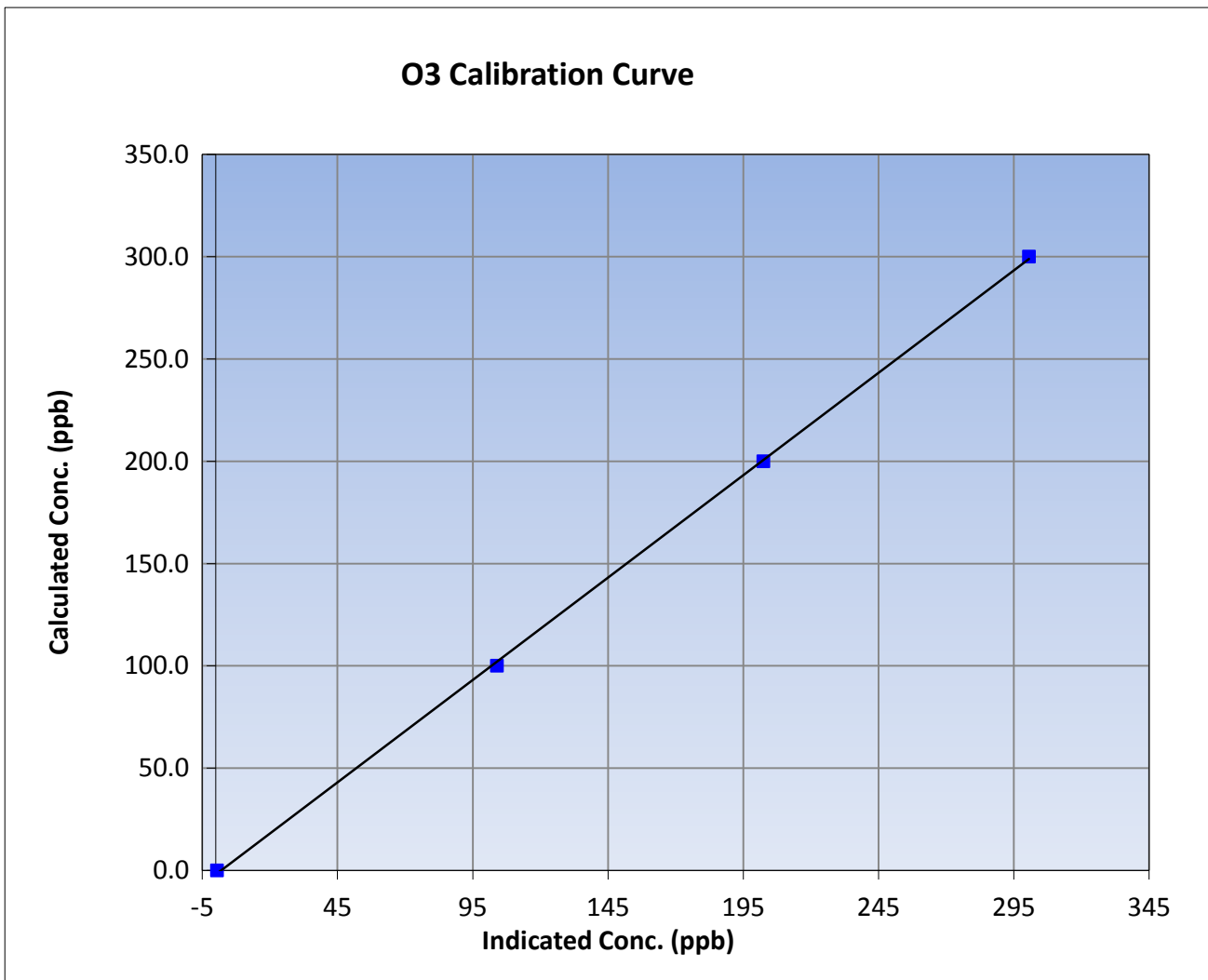
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 6, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:25	End Time (MST)	12:50
Analyzer make	Thermo 49i	Analyzer serial #	1426262595

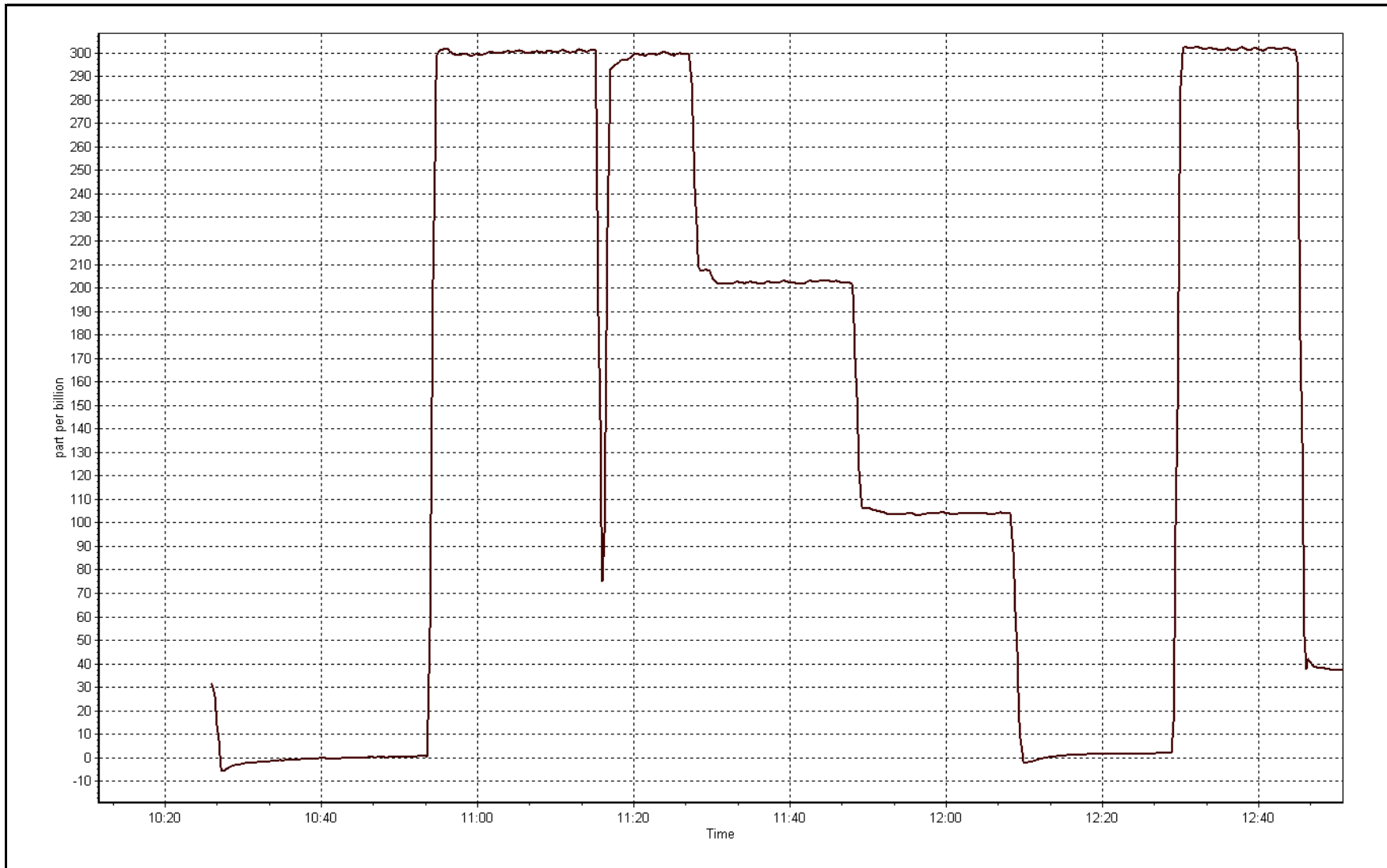
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999840
300.0	300.6	0.9980		
200.0	202.5	0.9878	Slope	1.000891
100.0	103.9	0.9625		
			Intercept	-1.992790



O3 Calibration Plot

Date: February 3, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 5, 2017
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:50
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	1.001275	1.001915	0.999745
	Data Offset	1.416241	1.361116	-0.247898
Current Calibration	Data Slope	0.998842	0.998085	1.022480
	Data Offset	1.738554	1.725532	-1.071201

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	1.048		1.067	
NOx coefficient	1.002		1.001	
NO2 coefficient	1.000		1.000	
NO bkgnd	3.9		4.0	
NOx bkgnd	4.1		4.2	
Chamber Temp	50.1	Deg C	49.9	Deg C
Moly Temp	327.1	Deg C	326.6	Deg C
PMT voltage	-808.1	V	-808.1	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	171.2	mmHg	176.5	mmHg
R Cell Press Nox	171.2	mmHg	176.4	mmHg
NO sample flow	0.776	lpm	0.761	lpm
Nox sample Flow	0.774	lpm	0.762	lpm

Notes:

Sample inlet filter replaced after as founds. Used "2nd high GPT point" to determine converter efficiency test since NO response had slightly drifted up throughout the test. Adjusted span only.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 2, 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	0.0	0.1	-0.1	----	----
as found span	5000	79.2	799.9	799.9	0.0	785.6	784.6	1.0	1.0183	1.0195
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
high point	5000	79.2	799.9	799.9	0.0	800.3	800.9	-0.6	0.9996	0.9988
second point	5000	39.6	400.0	400.0	0.0	396.9	397.3	-0.4	1.0078	1.0067
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	0.1	0.2	-0.1	----	----
as left span	5000	79.2	799.9	509.9	290.0	820.4	528.0	292.2	0.9751	0.9658
									1.0068	1.0062

Corrected As found NO_x= 785.6 NO= 784.6 Percent Change NO_x= 1.5% NO= 1.6%
 Previous Response NO_x= 797.5 NO= 797.0

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	804.2	802.7	-0.1	0.9947	0.9966	----	----
1st NO2 (300)	509.9	292.7	796.7	509.9	286.8	1.0041	----	1.0208	98.0%
2nd NO2 (200)	597.2	205.5	799.0	597.2	201.9	1.0011	----	1.0177	98.3%
3rd NO2 (100)	700.0	102.7	803.2	700.0	103.3	0.9959	----	0.9940	100.6%
2nd NO ref point		0.0	804.2	802.7	1.5	0.9947	0.9966	----	----
Average Correction Factor						0.9989		1.0108	98.9%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

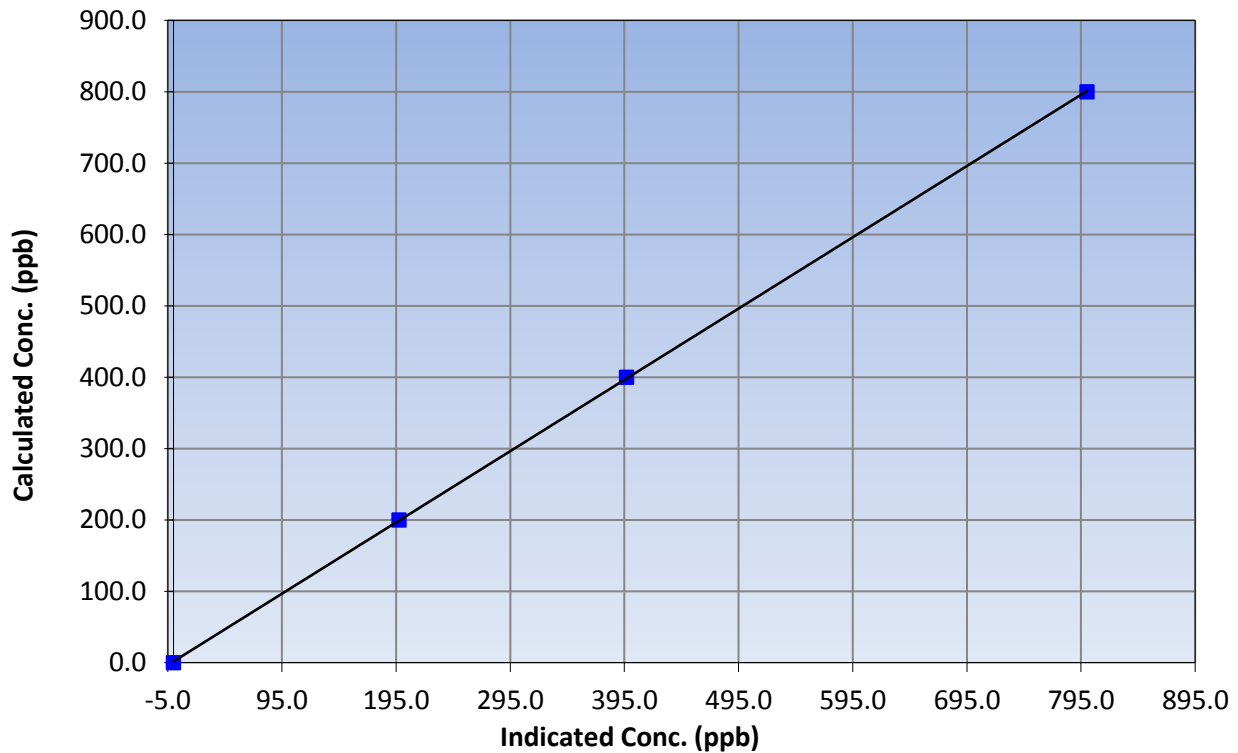
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 5, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:50
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	----	Correlation Coefficient	0.999976
799.9	800.3	0.9996		
400.0	396.9	1.0078	Slope	0.998842
200.0	197.4	1.0130		
			Intercept	1.738554

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

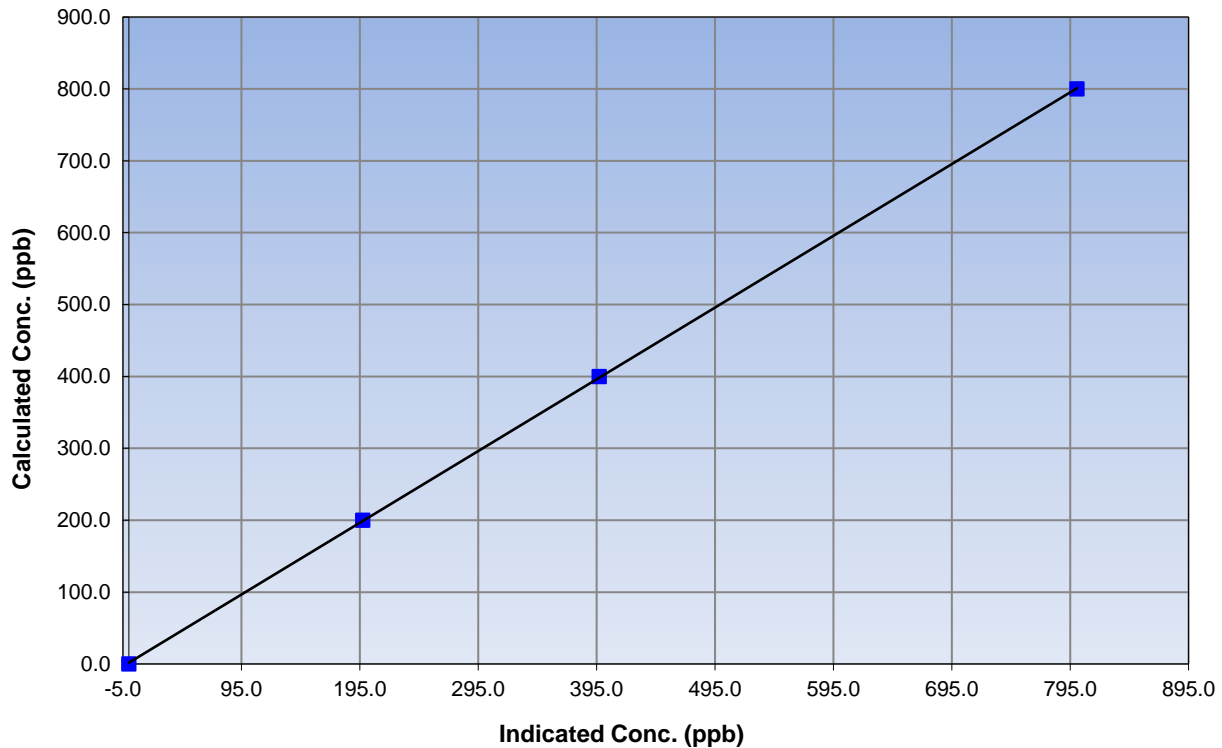
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 5, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:50
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	0.999975
799.9	800.9	0.9988		
400.0	397.3	1.0067	Slope	0.998085
200.0	197.4	1.0130		
			Intercept	1.725532

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

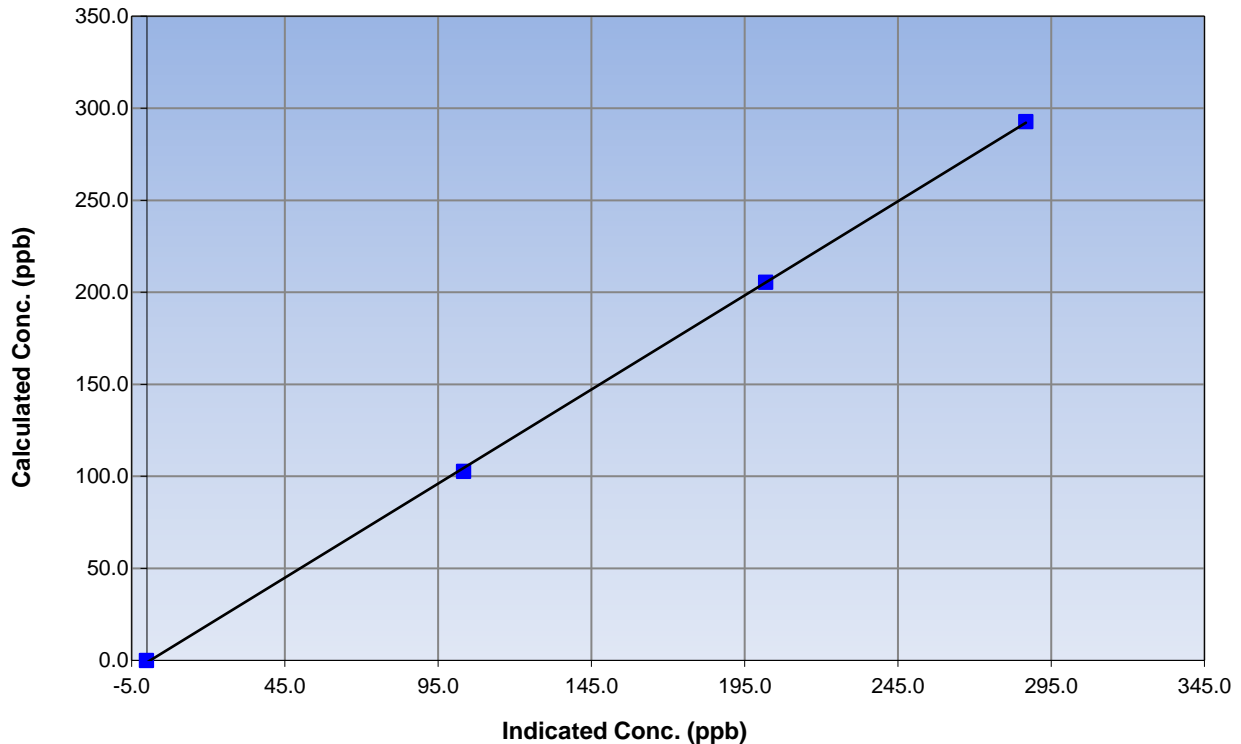
Station Information

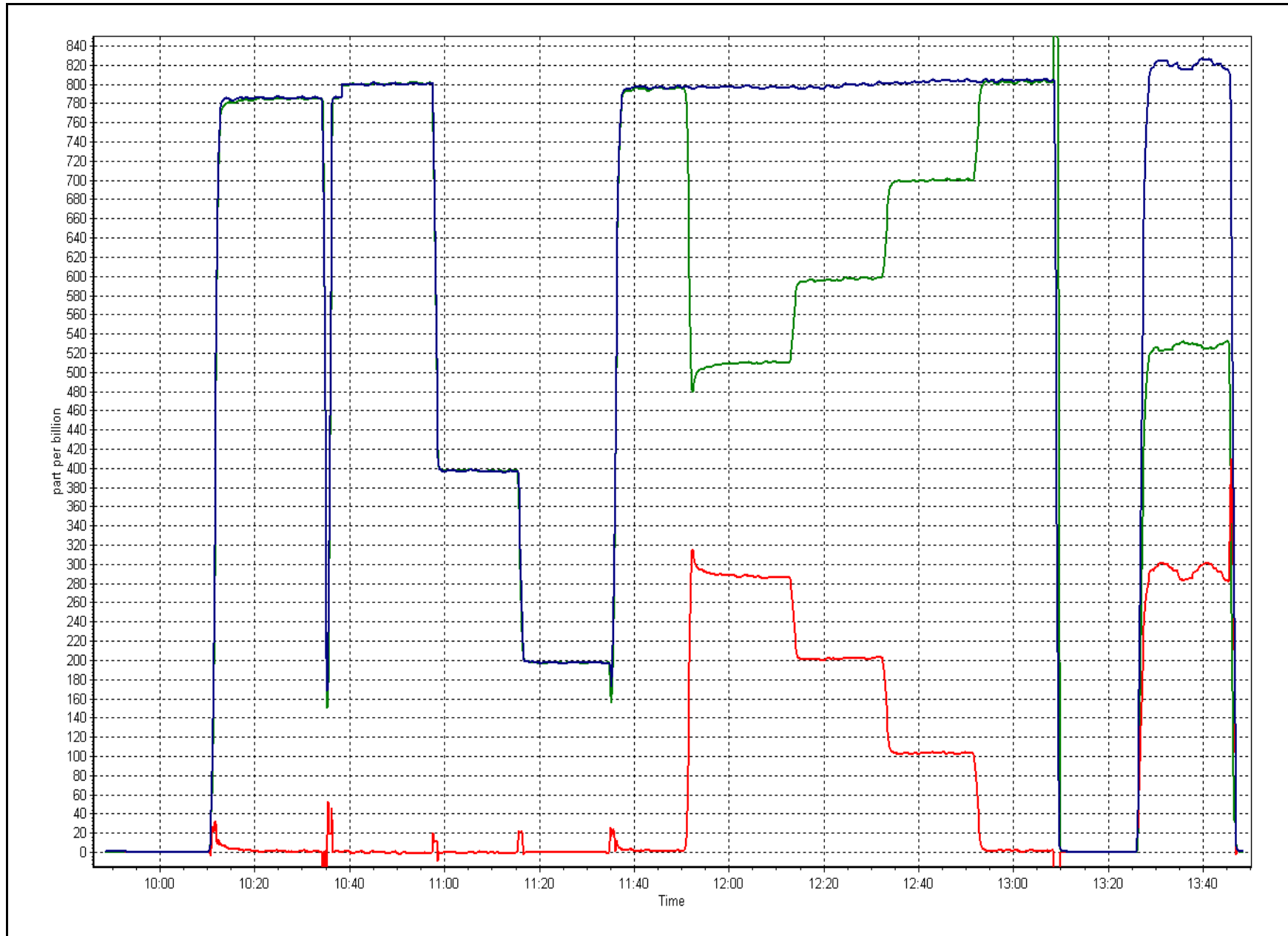
Calibration Date	February 2, 2017	Previous Calibration	January 5, 2017
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:50	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999892
292.7	286.8	1.0208		
205.5	201.9	1.0177	Slope	1.022480
102.7	103.3	0.9940		
			Intercept	-1.071201

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:	February 3, 2017	Last Cal Date:	January 13, 2017
Start time (MST):	11:00	End time (MST):	12:15
Sharp Model:	5030	S/N:	E1093
Particulate Fraction:	PM2.5	C14 Source S/N:	4933
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)	-13	-13.5	-13	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	959	956	959	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1000	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.1	-----	-0.3	<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:	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)	17		17	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	21		21	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	18		18	<input type="checkbox"/>	+/- 2 °C
RH (%)	8		8	<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. Adjusted neph zero.

Calibration by: Asad Hidayat



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 FEBRUARY 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	640	32	32	100	48	0	7	0
TRS (ppb) Average	640	32	32	100	11	1	3	0
THC (ppm) Average	640	32	32	100	7	-	3.2	-
NO2 (ppb) Average	640	32	32	100	39	0	21	-
NO (ppb) Average	640	32	32	100	97	-	15	-
NOX (ppb) Average	640	32	32	100	132	-	29	-
PM2.5 (ug/m3) Average	669	3	3	100	23.7	-	11.2	0
Temperature 2 m (C) Average	672	0	0	100	10.8	-	4.7	-
Wind Speed 10 m (km/h) Average	664	0	8	98.81	26	-	13	-
Wind Direction 10 m (deg) Average	664	0	8	98.81	-	-	-	-
Precipitation (mm) Total	672	0	0	100	1.5	-	5.3	-
Relative Humidity (%) Average	672	0	0	100	97	-	93	-
Global Solar Radiation (W/m2) Average	672	0	0	100	529	-	131	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 FEBRUARY 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	640	1.2	3	-	0	0	0	0	1	2	48
TRS (ppb) Average	640	0.5	1	-	0	0	0	0	0	1	11
THC (ppm) Average	640	2.34	0.4	-	2	2.1	2.1	2.2	2.4	2.7	7
NO2 (ppb) Average	640	8.1	9	-	0	1	1	4	12	23	39
NO (ppb) Average	640	2.8	8	-	0	0	0	0	2	8	97
NOX (ppb) Average	640	10.9	15	-	0	0	1	5	13	30	132
PM2.5 (ug/m3) Average	669	4.51	3.3	-	1.1	1.9	2.4	3.4	5.2	9.1	23.7
Temperature 2 m (C) Average	672	-11.79	10.1	-	-35.1	-24	-19.3	-13	-3.9	2.2	10.8
Wind Speed 10 m (km/h) Average	664	7.8	4	-	0	3	5	7	10	14	26
Wind Direction 10 m (deg) Average	664	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	672	-	-	5.59	-	-	-	-	-	-	-
Relative Humidity (%) Average	672	72.2	12	-	42	55	63	74	82	86	97
Global Solar Radiation (W/m2) Average	672	56.3	98	-	0	0	0	0	88	199	529

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	01 Feb 2017 08:00	01 Feb 2017 08:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	03 Feb 2017 05:00	03 Feb 2017 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	03 Feb 2017 08:00	03 Feb 2017 08:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	05 Feb 2017 19:00	05 Feb 2017 19:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Feb 2017 00:00	07 Feb 2017 00:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Feb 2017 22:00	10 Feb 2017 22:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Feb 2017 09:00	22 Feb 2017 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Feb 2017 05:00	23 Feb 2017 05:00	1	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 48 ppb on Feb 27 18:00	Maximum Daily Average: 7.0 ppb on Feb 10		Hours of Data:	640
Minimum Value: 0 ppb on Feb 25 06:00	Minimum Daily Average: 0.2 ppb on Feb 21		Hours of Missing Data:	32
Maximum Diurnal Average: 3.2 ppb at hour 18	Minimum Diurnal Average: 0.4 ppb at hour 8		Hours of Calibration:	32
Monthly Average: 1.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 17		Percent Operational Time:	100.0

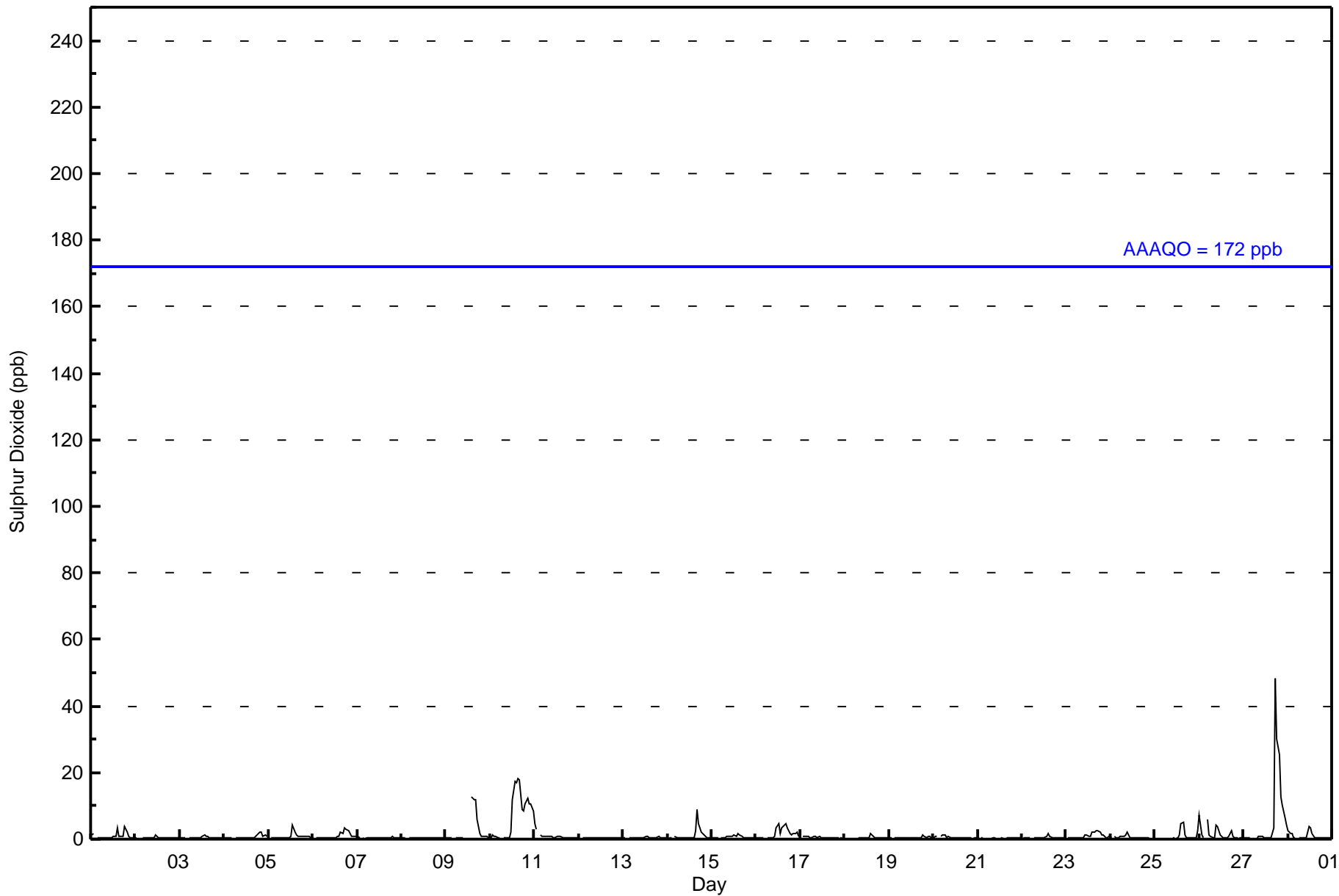
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	2	Z	0	0	0	0	0	0	0	0	0	1	1	4	1	1	1	4	2	1	0	0	0	0.9	4
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	1	0.7	2
5-Feb	Z	1	1	0	0	0	0	0	0	0	0	0	1	4	2	1	1	1	1	1	1	1	1	1	0.8	4
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	2	4	3	3	2	1	1	1	1	1.0	4
7-Feb	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
8-Feb	0	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
9-Feb	0	0	1	0	Z	0	0	0	0	0	C	C	C	Z	13	12	12	6	2	1	1	1	1	0	2.7	13
10-Feb	0	1	1	1	1	1	Z	0	0	0	1	2	12	17	17	18	18	9	8	10	12	11	11	8	7.0	18
11-Feb	5	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0.9	5
12-Feb	0	Z	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0.4	1
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0.4	1
14-Feb	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	2	9	5	2	2	1	1	0	1	1.2	9
15-Feb	1	0	1	0	Z	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0.7	2
16-Feb	0	0	0	0	0	Z	0	0	0	0	1	3	5	2	3	4	5	3	2	1	2	2	2	1	1.7	5
17-Feb	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0	1	1	0	0	0	0.4	2
19-Feb	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1
20-Feb	0	1	1	Z	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
21-Feb	0	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
22-Feb	0	0	0	0	0	Z	0	0	0	0	1	0	1	1	2	1	1	0	0	0	0	0	0	0	0.4	2
23-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	3	2	1	1	1	0	1	1.0	3
24-Feb	0	Z	1	1	0	1	1	1	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	5	5	1	0	0	0	0	0	1	3	0.8	5
26-Feb	7	1	0	Z	6	1	1	0	0	4	4	1	1	1	1	1	1	3	1	0	0	0	0	0	1.5	7
27-Feb	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	3	48	30	26	13	10	6	4	6.4	48
28-Feb	2	2	2	0	0	Z	0	1	0	0	1	4	4	2	0	0	0	0	0	0	0	0	0	0	0.9	4
	0.9	0.7	0.5	0.4	0.7	0.5	0.4	0.4	0.4	0.6	0.6	0.8	1.2	1.4	2.1	2.1	2.2	3.2	2.3	2.0	1.5	1.2	1.1	0.9	Diurnal Average	
	7	3	2	1	6	1	1	1	1	4	4	4	12	17	17	18	18	48	30	26	13	11	11	8	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
CNRL Horizon - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	625	97.66	97.66
11 - 20	12	1.88	99.53
21 - 60	3	0.47	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - February 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	27	95	56	28	24	9	20	11	46	100	82	34	30	23	15	19	619
11 - 20	0	4	0	1	0	0	0	0	0	3	1	0	0	0	0	2	11
21 - 60	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3
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	27	99	56	29	24	9	20	13	47	103	83	34	30	23	15	21	633

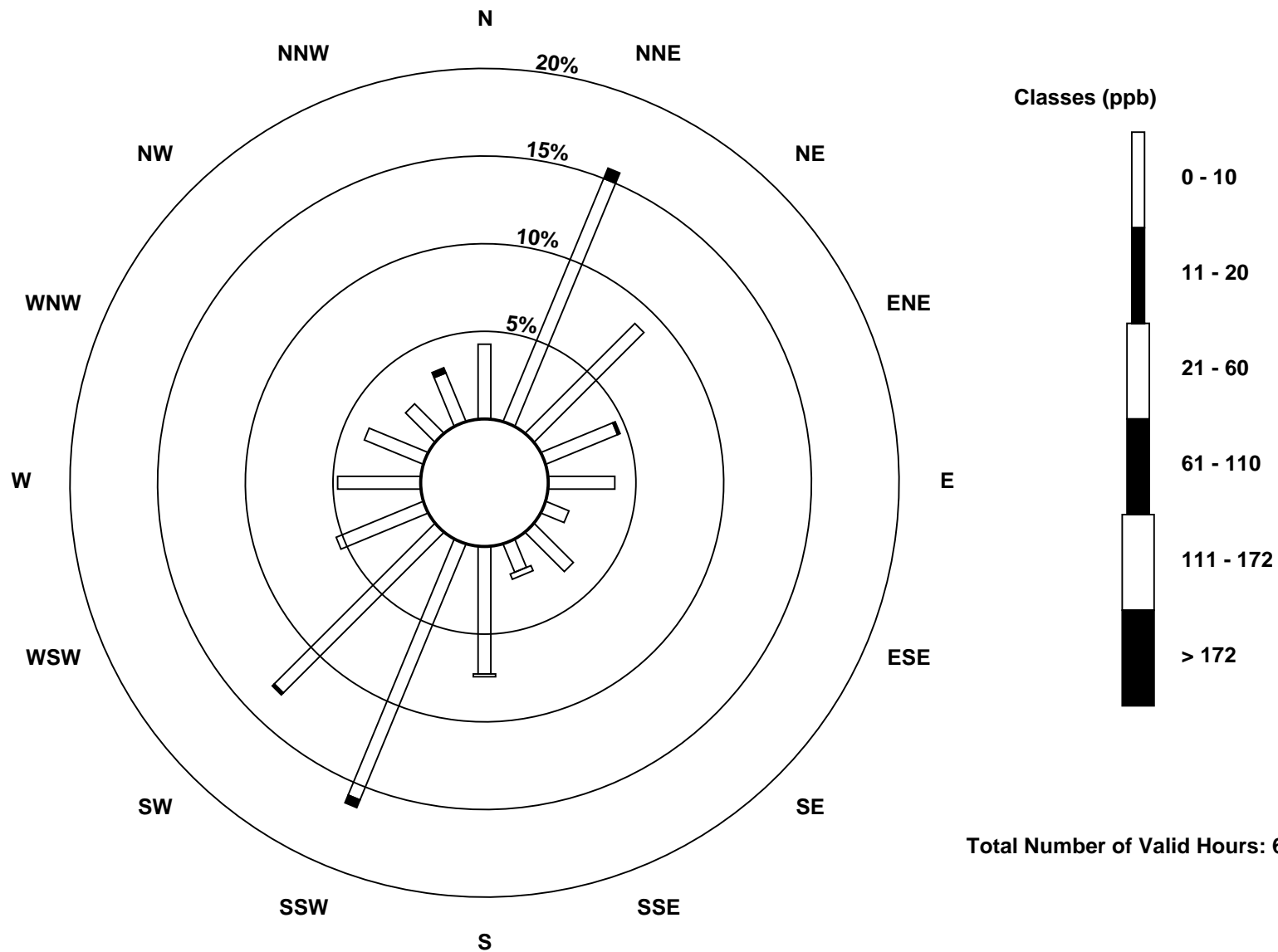
Total Number of Valid Hours: 633

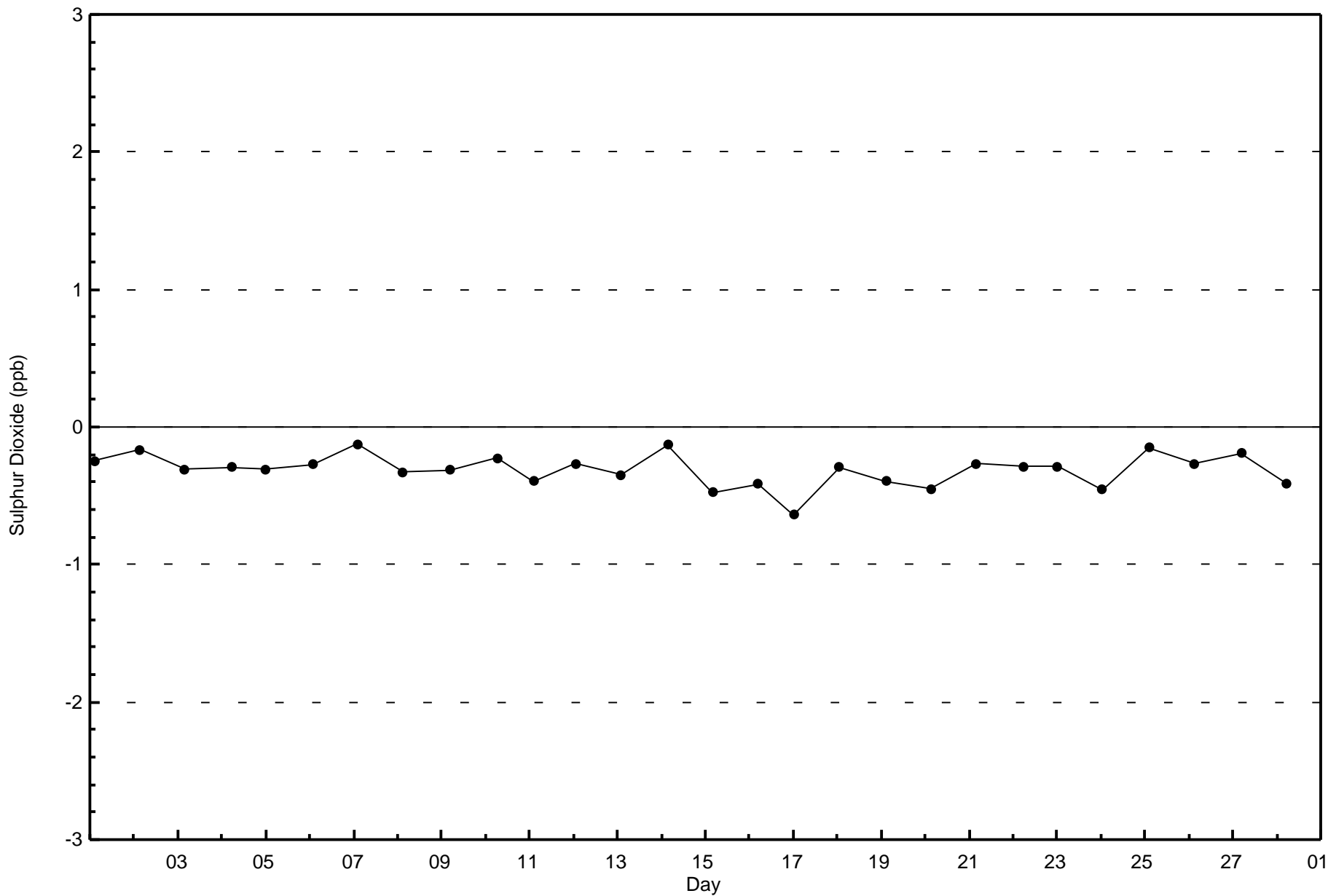
Total Number of Hours: 672

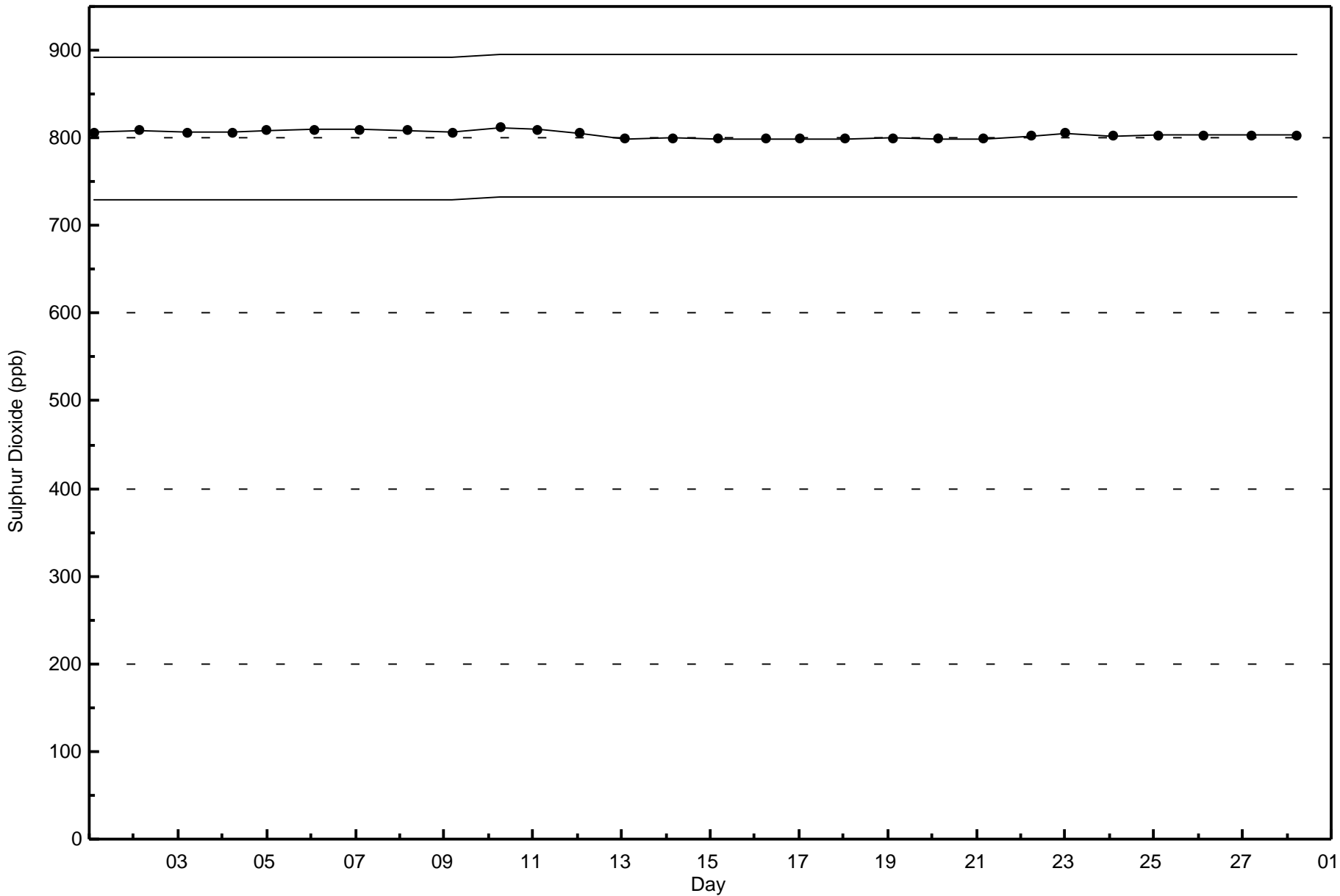


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)

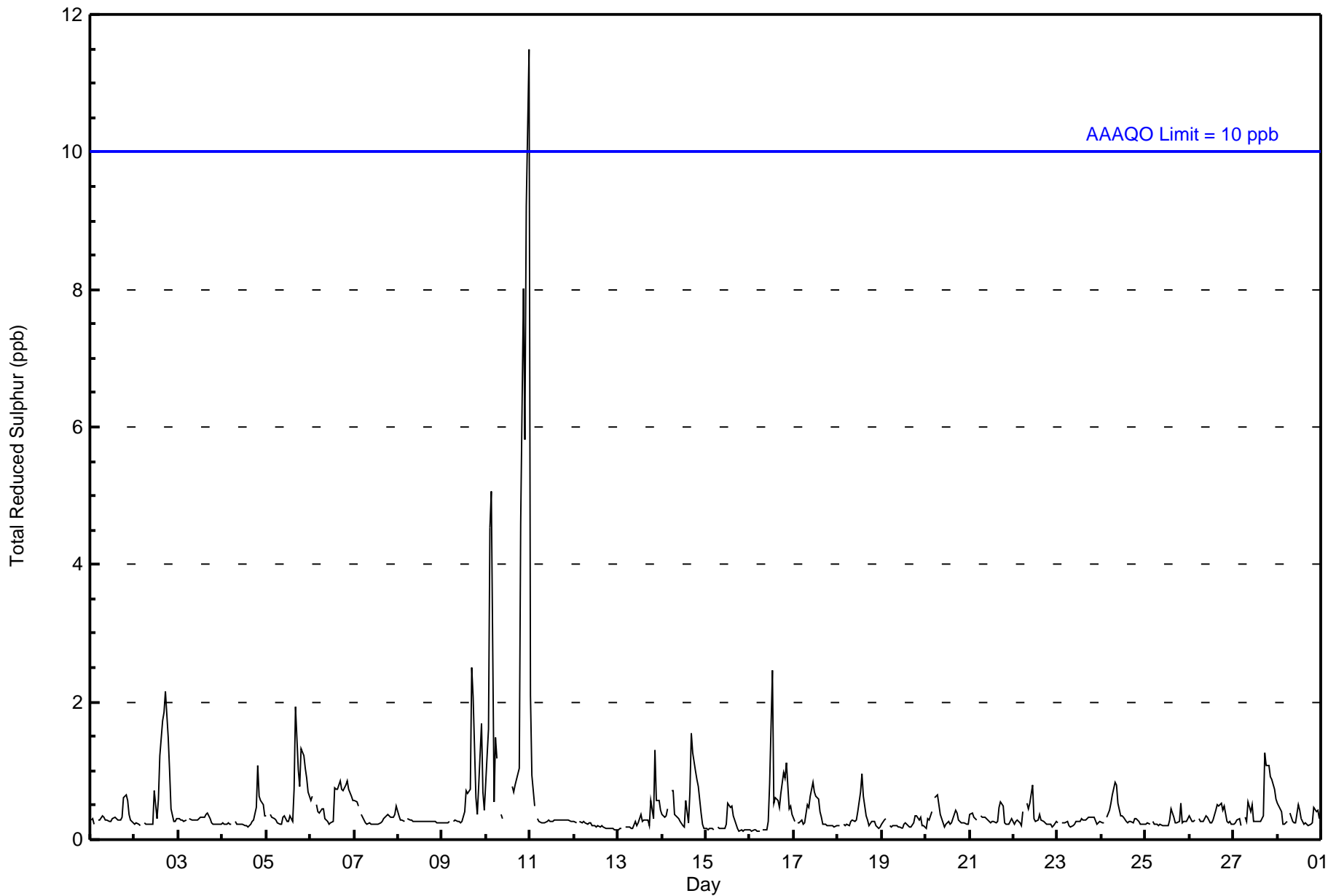








Number of Exceedences (AAAQO): 1-hr: 1 24-hr: 0 Maximum Value: 11 ppb on Feb 11 00:00 Maximum Daily Average: 3.1 ppb on Feb 10										Hours in Service: 672 Hours of Data: 640 Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0																
Minimum Value: 0 ppb on Feb 15 21:00 Maximum Diurnal Average: 0.8 ppb at hour 21 Monthly Average: 0.5 ppb										Minimum Daily Average: 0.2 ppb on Feb 12 Minimum Diurnal Average: 0.3 ppb at hour 5 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.3	1
2-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	1	2	2	2	1	1	0	0	0	0	0.6	2
3-Feb	0	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
4-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.3	1
5-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	0.6	2
6-Feb	1	1	Z	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1
7-Feb	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Feb	0	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
9-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	3	2	1	0	1	2	1	0	0.6	3
10-Feb	1	2	5	5	1	1	1	Z	0	0	C	C	C	C	1	1	1	1	1	5	8	6	9	11	3.1	11
11-Feb	2	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
12-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0.3	1
14-Feb	0	0	0	0	Z	1	1	0	0	0	0	0	0	1	0	1	2	1	1	1	1	0	0	0	0.5	2
15-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Feb	0	0	0	0	0	0	Z	0	0	0	0	1	2	1	1	1	0	1	1	1	1	0	0	0	0.5	2
17-Feb	0	Z	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
19-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Feb	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
22-Feb	0	0	0	0	0	0	Z	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Feb	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
26-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.3	1
27-Feb	0	0	0	0	0	Z	0	0	1	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1
28-Feb	1	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
0.4 0.4 0.5 0.5 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.6 0.6 0.5 0.6 0.8 0.6 0.7 0.7																								Diurnal Average		
2 2 5 5 1 1 1 1 1 1 1 1 1 1 1 1 2 2 3 2 1 5 8 6 9 11																								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 - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	632	98.75	98.75
3 - 4	1	0.16	98.91
5 - 7	4	0.63	99.53
8 - 11	2	0.31	99.84
> 11	1	0.16	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - February 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	26	96	58	28	24	9	20	13	46	101	82	34	31	22	16	19	625
3 - 4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5 - 7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8 - 11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
> 11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Totals	28	99	58	28	24	9	20	13	46	101	83	34	31	22	16	20	632

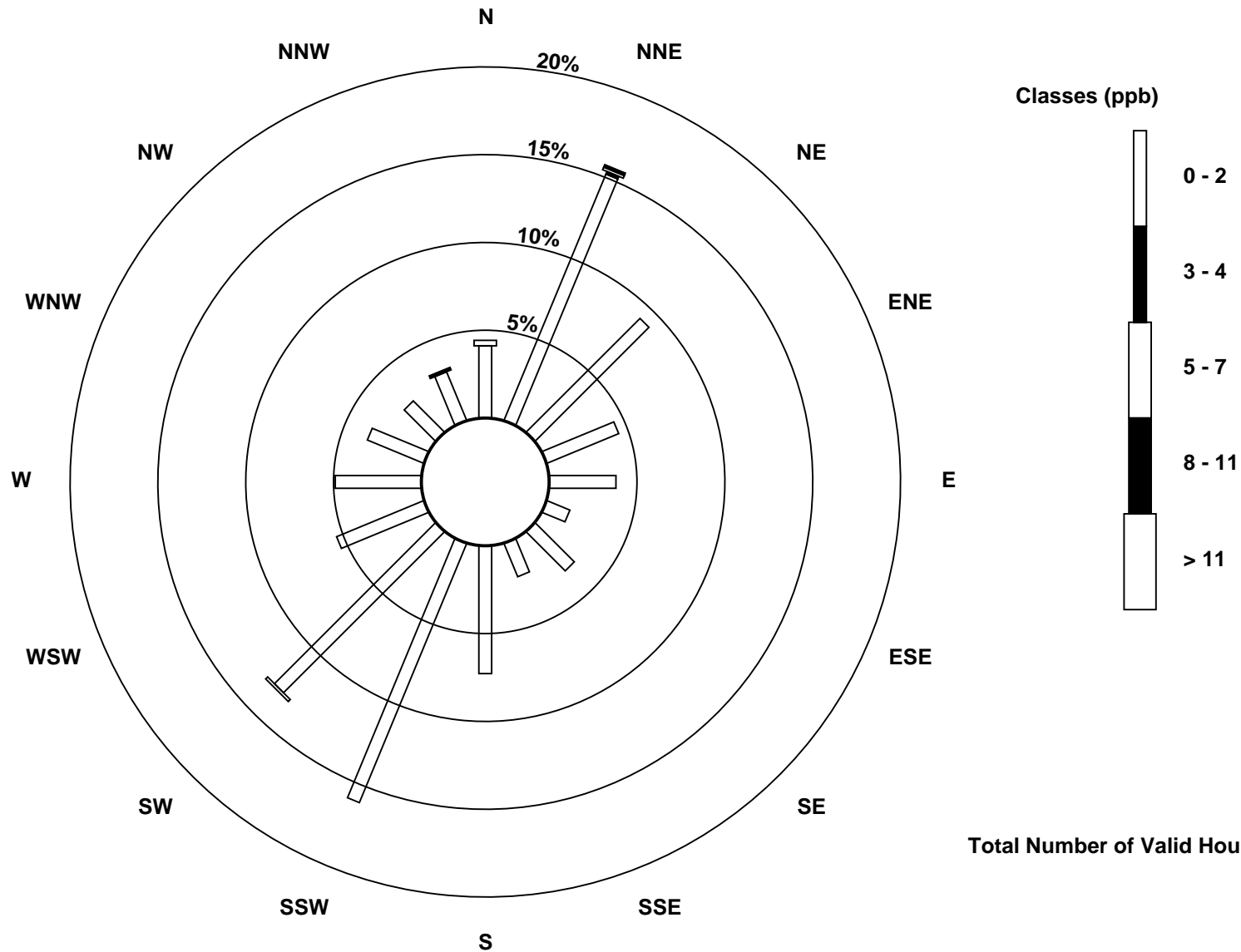
Total Number of Valid Hours: 632

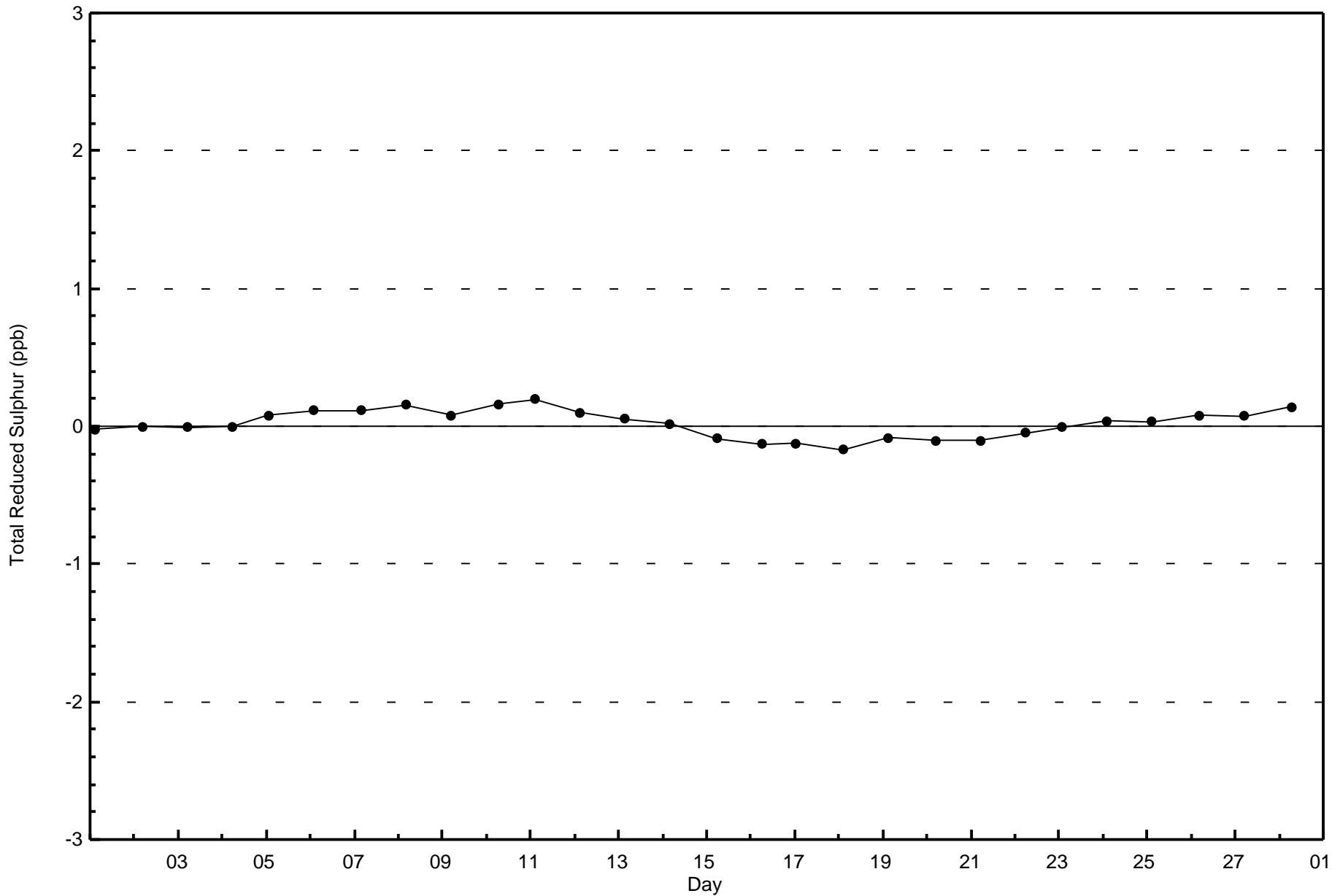
Total Number of Hours: 672

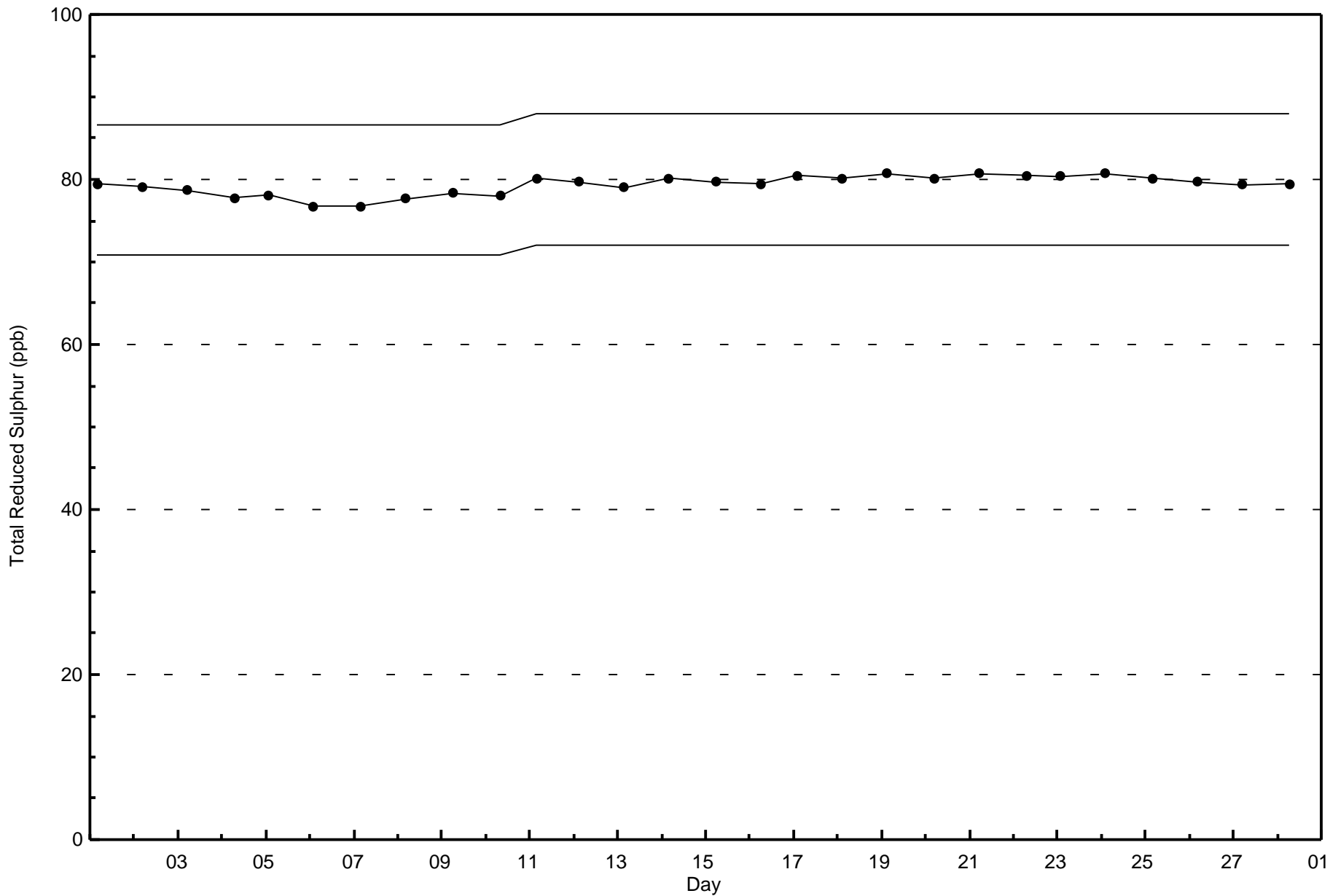


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)







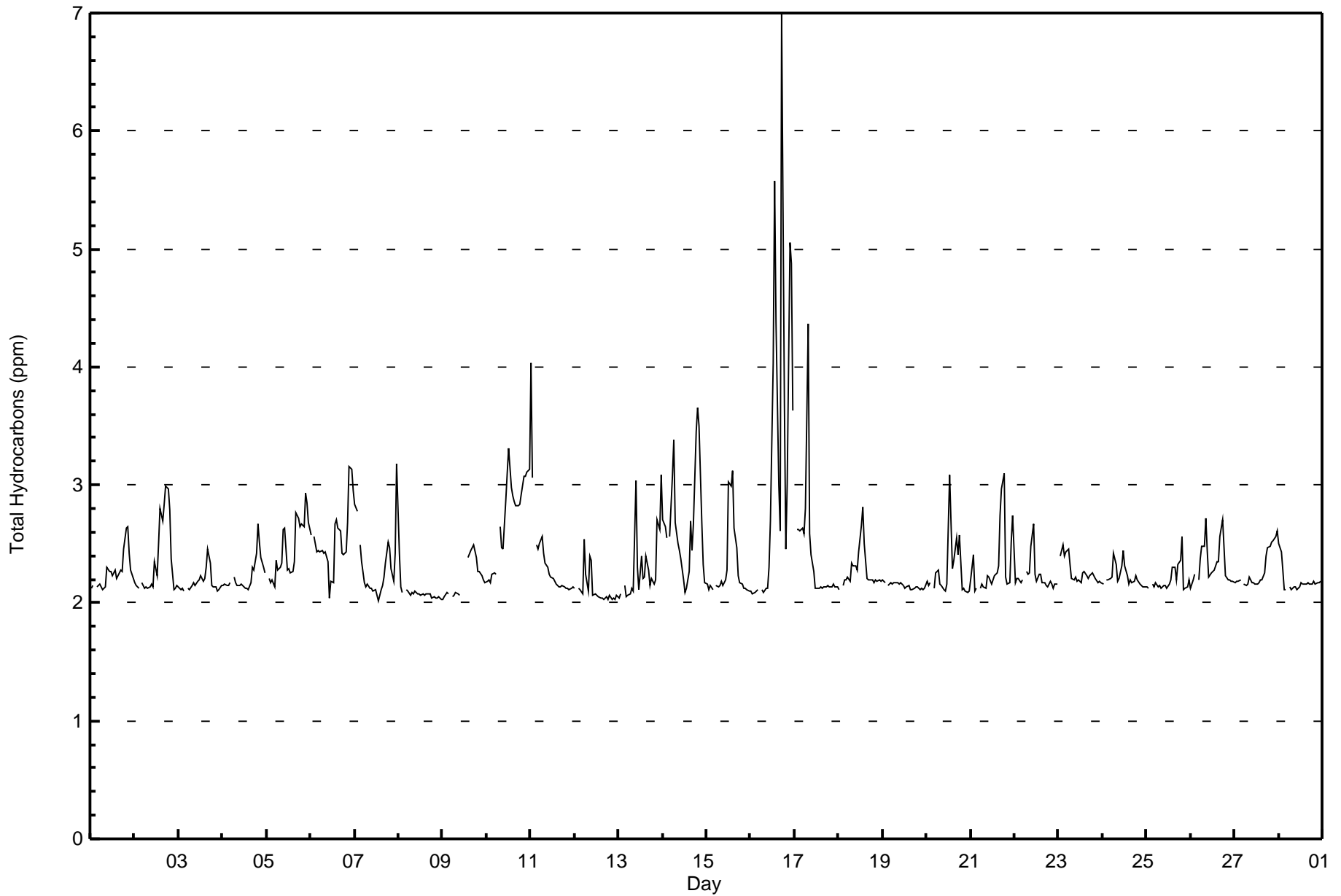


Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
CNRL Horizon - February 2017

Maximum Value: 7.0 ppm on Feb 16 18:00		Maximum Daily Average: 3.2 ppm on Feb 16		Hours in Service: 672																							
Minimum Value: 2.0 ppm on Feb 7 14:00		Minimum Daily Average: 2.1 ppm on Feb 8		Hours of Data: 640																							
Maximum Diurnal Average: 2.5 ppm at hour 18		Minimum Diurnal Average: 2.2 ppm at hour 4		Hours of Missing Data: 32																							
Monthly Average: 2.34 ppm		Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 4.4		Hours of Calibration: 32																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2.1	2.1	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.5	2.6	2.7	2.4	2.3	2.2	2.3	2.7	
2-Feb	2.2	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.3	2.2	2.5	2.8	2.7	2.8	3.0	3.0	2.8	2.4	2.1	2.1	2.1	2.4	3.0	
3-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	
4-Feb	2.1	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.7	2.5	2.4	2.3	2.3	2.2	2.7	
5-Feb	Z	2.2	2.2	2.2	2.1	2.4	2.3	2.3	2.3	2.3	2.6	2.6	2.3	2.3	2.3	2.4	2.8	2.7	2.6	2.7	2.6	2.9	2.8	2.7	2.5	2.9	
6-Feb	2.6	Z	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.0	2.2	2.2	2.7	2.7	2.6	2.6	2.4	2.4	2.4	2.7	3.2	3.1	3.0	2.5	3.2	
7-Feb	2.8	2.8	Z	2.5	2.4	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.3	2.5	2.5	2.3	2.2	2.4	3.2	2.3	3.2	
8-Feb	2.4	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	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.4
9-Feb	2.0	2.0	2.1	2.1	Z	2.0	2.1	2.1	2.1	2.1	2.1	C	C	C	C	2.4	2.4	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.5
10-Feb	2.2	2.2	2.2	2.2	2.3	2.2	Z	2.6	2.5	2.5	2.9	3.1	3.3	3.0	2.9	2.9	2.8	2.8	2.8	2.9	3.1	3.1	3.1	3.1	2.7	3.3	
11-Feb	4.0	3.1	Z	2.5	2.5	2.5	2.6	2.4	2.3	2.3	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	2.4	4.0	
12-Feb	2.1	Z	2.1	2.1	2.1	2.5	2.2	2.1	2.4	2.4	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.5	
13-Feb	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	3.0	2.3	2.1	2.4	2.2	2.2	2.4	2.3	2.1	2.2	2.2	2.2	2.7	2.6	3.1	2.3	3.1	
14-Feb	2.7	2.6	2.6	Z	2.6	3.1	3.4	2.7	2.5	2.4	2.4	2.2	2.1	2.1	2.3	2.7	2.4	2.7	3.5	3.7	3.5	2.7	2.3	2.2	2.7	3.7	
15-Feb	2.2	2.1	2.2	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.3	3.0	3.0	3.1	2.6	2.5	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.3	3.1	
16-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.3	2.7	4.0	5.6	4.4	3.0	2.6	7.0	3.7	2.5	3.0	5.0	4.9	3.6	3.2	7.0	
17-Feb	Z	2.6	2.6	2.6	2.6	2.6	2.8	4.4	2.6	2.4	2.3	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	2.4	4.4	
18-Feb	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.7	2.8	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.8	
19-Feb	2.2	2.2	Z	2.1	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	2.2	
20-Feb	2.2	2.2	2.2	Z	2.1	2.3	2.3	2.2	2.1	2.1	2.1	2.2	3.1	2.7	2.3	2.4	2.5	2.4	2.6	2.1	2.1	2.1	2.1	2.1	2.3	3.1	
21-Feb	2.2	2.4	2.1	2.1	Z	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.7	3.0	3.1	2.2	2.2	2.2	2.5	2.7	2.3	3.1	
22-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.3	2.5	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.7	
23-Feb	Z	2.4	2.5	2.4	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	
24-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.4	
25-Feb	2.1	2.1	Z	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.3	2.4	2.6	2.1	2.1	2.1	2.2	2.6	
26-Feb	2.1	2.2	2.2	Z	2.2	2.4	2.5	2.5	2.7	2.4	2.2	2.3	2.3	2.3	2.3	2.4	2.6	2.7	2.5	2.2	2.2	2.2	2.2	2.2	2.3	2.7	
27-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.3	2.6	
28-Feb	2.5	2.4	2.3	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.3 4.0			
																								2.3 3.1			
																								2.2 2.6			
																								2.2 2.6			
																								2.2 2.6			
																								2.2 3.1			
																								2.3 3.4			
																								2.3 4.4			
																								2.2 2.7			
																								2.3 3.0			
																								2.3 2.9			
																								2.3 3.1			
																								2.3 4.0			
																								2.4 5.6			
																								2.4 4.4			
																								2.3 3.0			
																								2.4 2.8			
																								2.5 7.0			
																								2.5 3.7			
																								2.4 3.7			
																								2.4 3.5			
																								2.4 5.0			
																								2.4 4.9			
																								2.4 3.6			

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	18	2.81	2.81
2.1 - 3.0	593	92.66	95.47
3.1 - 10.0	29	4.53	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
CNRL Horizon - February 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	6	8	2	0	0	0	0	18
2.1 - 3.0	26	98	56	27	24	9	20	13	41	89	72	31	27	23	12	19	587
3.1 - 10.0	1	1	0	2	0	0	0	0	4	8	3	1	3	0	3	2	28
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	99	56	29	24	9	20	13	47	103	83	34	30	23	15	21	633

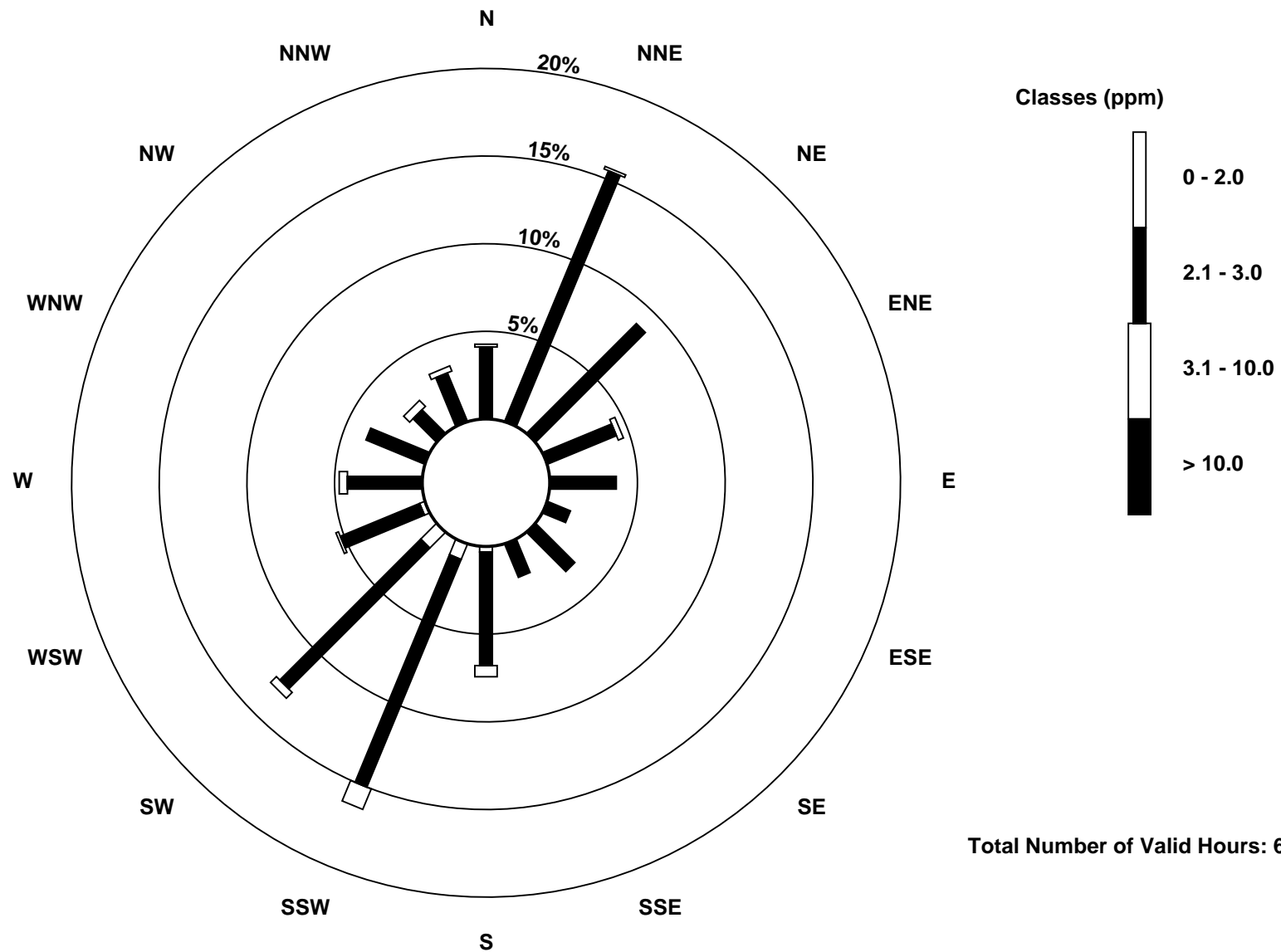
Total Number of Valid Hours: 633

Total Number of Hours: 672

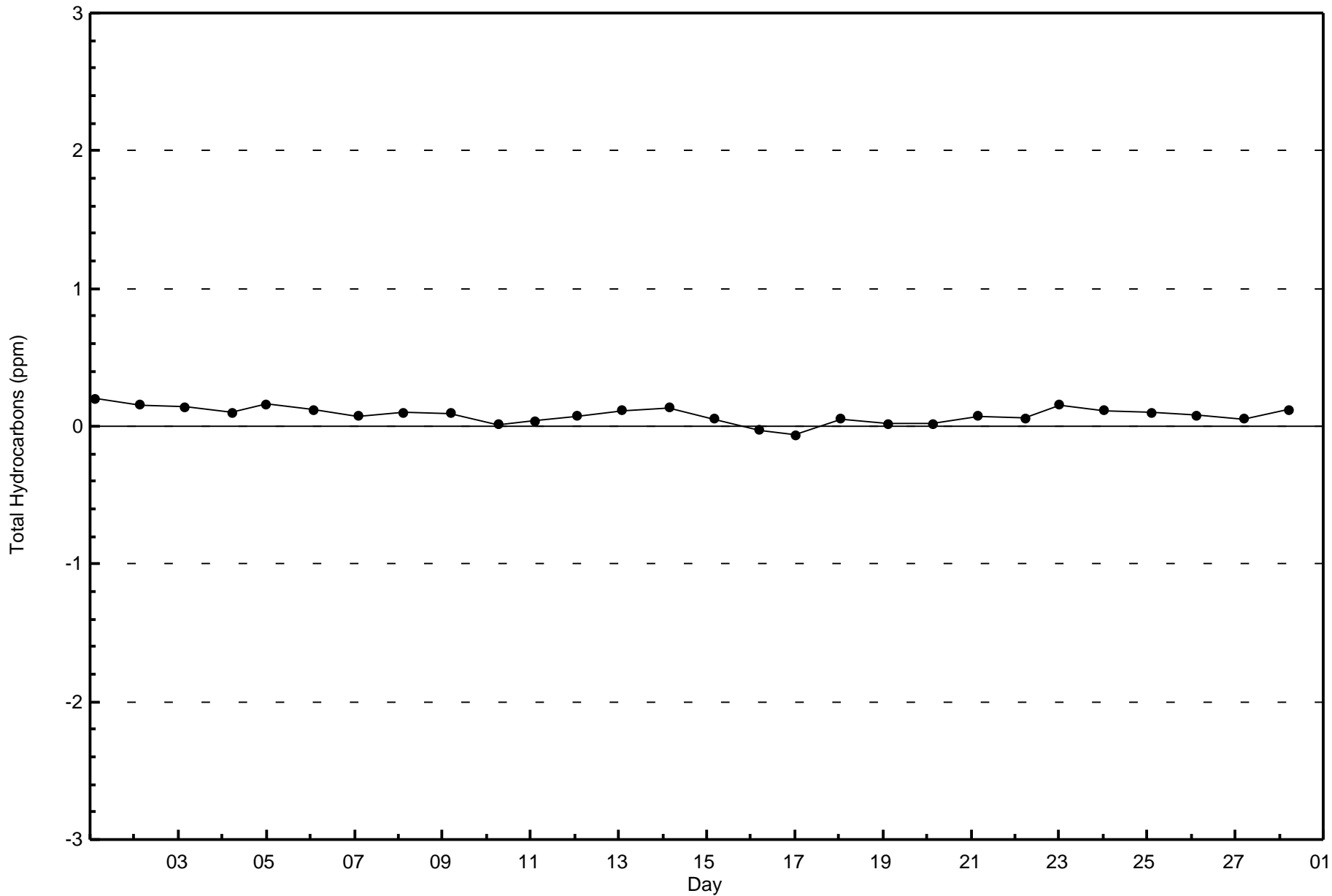


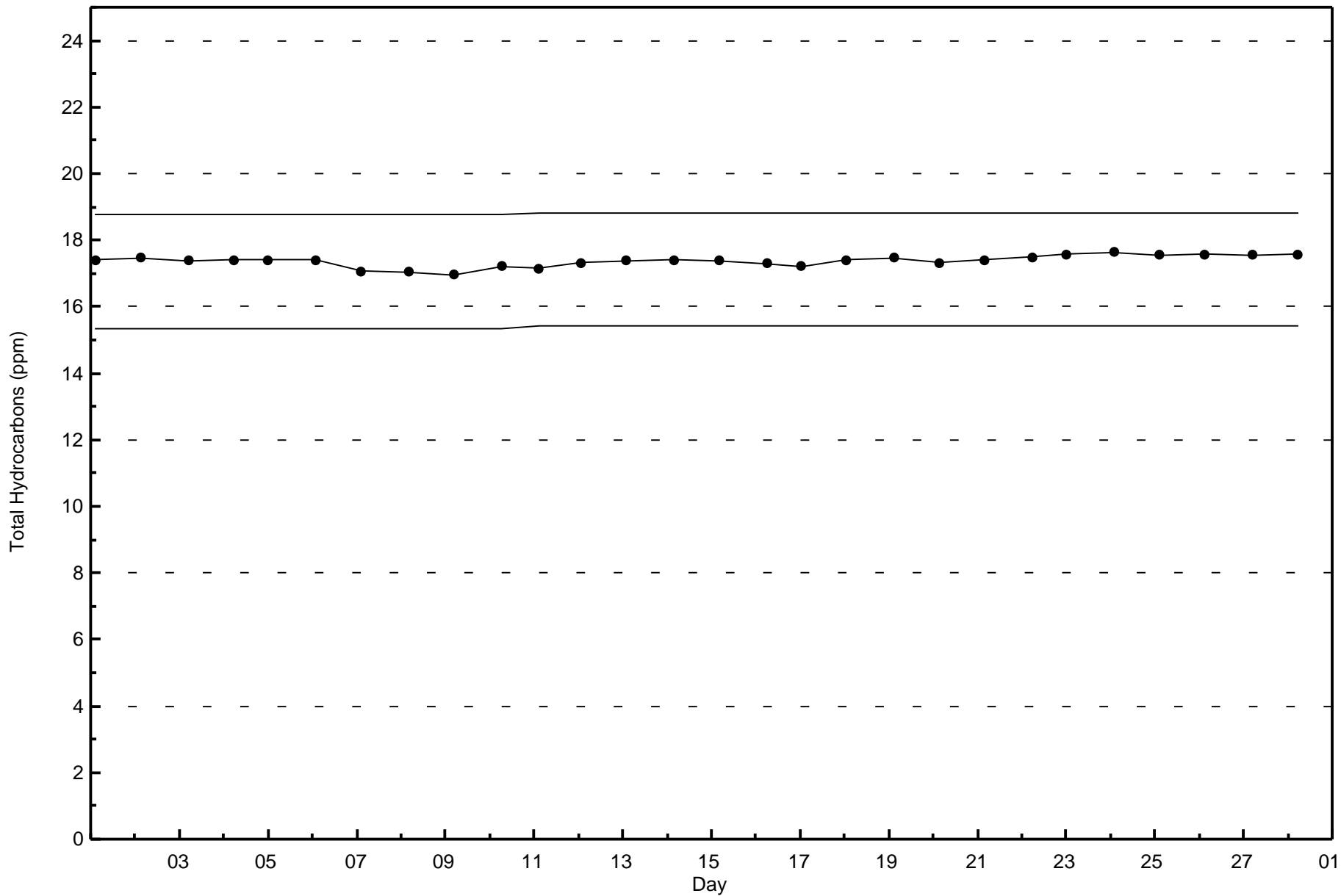
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)



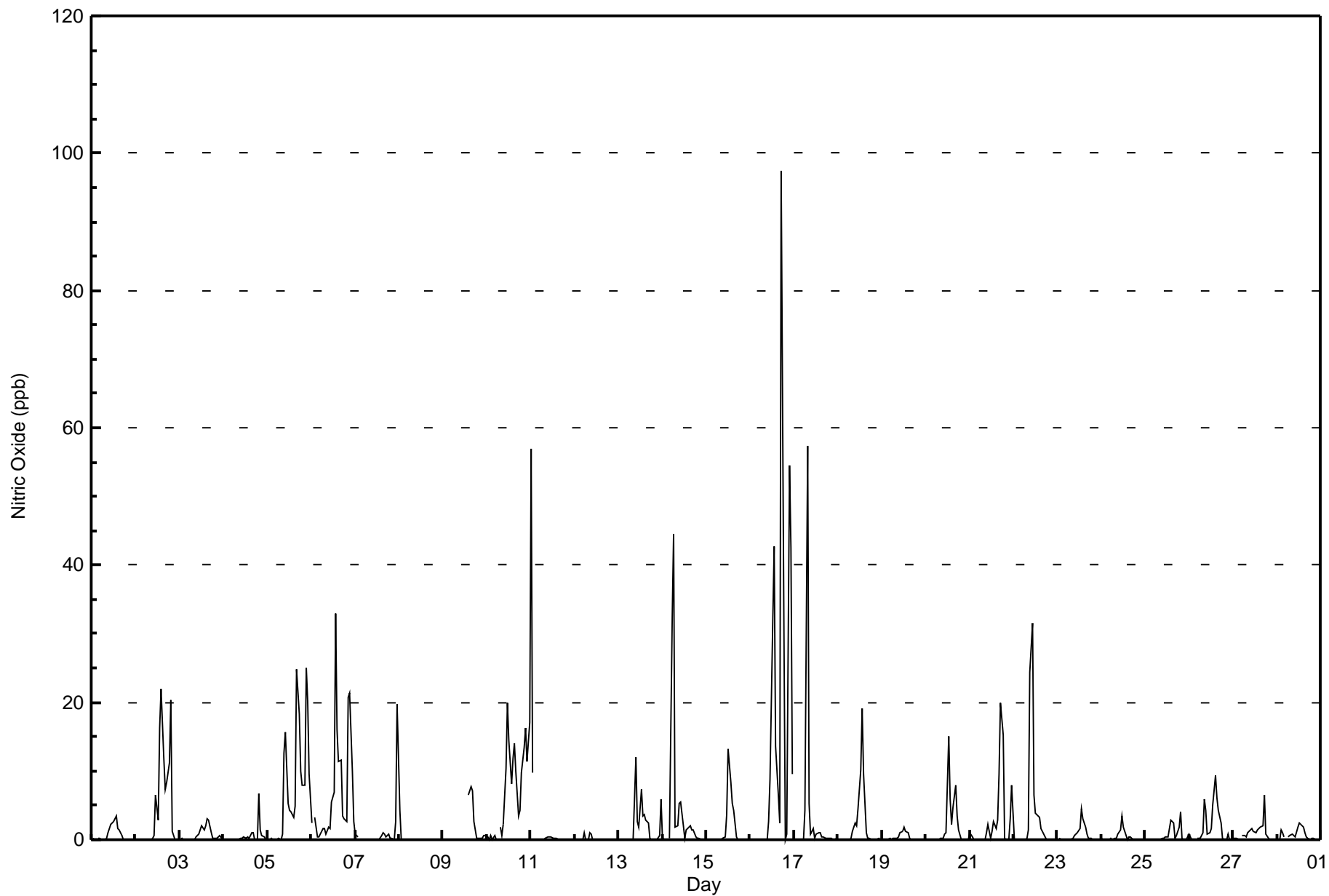
Total Number of Valid Hours: 633







Maximum Value: 97 ppb on Feb 16 18:00																		Maximum Daily Average: 14.9 ppb on Feb 16						Hours in Service: 672																									
Minimum Value: 0 ppb on Feb 3 03:00																		Minimum Daily Average: 0.1 ppb on Feb 12						Hours of Data: 640																									
Maximum Diurnal Average: 6.4 ppb at hour 14																		Minimum Diurnal Average: 0.1 ppb at hour 4						Hours of Missing Data: 32																									
Monthly Average: 2.8 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 8 P ₉₉ = 41						Hours of Calibration: 32																									
																		Percent Operational Time: 100.0																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	0	0	Z	0	0	0	0	0	0	1	2	2	3	3	2	1	1	0	0	0	0	0	0	0	0.7	3																							
2-Feb	0	0	0	Z	0	0	0	0	0	0	1	7	3	16	22	12	7	8	11	20	1	0	0	0	4.8	22																							
3-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	2	3	3	1	0	0	0	0	1	0	0.7	3																							
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	7	1	1	0	0	0.6	7																							
5-Feb	Z	0	0	0	0	0	0	0	1	13	16	5	4	4	3	5	25	18	10	8	8	25	20	10	7.6	25																							
6-Feb	2	Z	3	0	0	1	2	2	1	2	2	6	7	33	16	11	12	3	3	3	21	21	10	3	7.1	33																							
7-Feb	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	3	20	1.2	20																							
8-Feb	4	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	4																							
9-Feb	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	7	8	7	3	0	0	0	0	1	1	1.4	8																							
10-Feb	0	0	1	0	1	0	Z	2	1	2	10	20	14	8	12	14	10	4	4	10	13	16	11	17	7.4	20																							
11-Feb	57	10	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.0	57																							
12-Feb	0	Z	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
13-Feb	0	0	Z	0	0	0	0	0	0	12	3	2	7	3	4	3	3	0	0	0	0	0	1	6	1.9	12																							
14-Feb	0	0	0	Z	0	32	44	2	2	5	5	2	0	1	2	2	2	1	0	0	0	0	0	0	4.5	44																							
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	4	13	8	5	4	1	0	0	0	0	0	0	0	1.6	13																							
16-Feb	0	0	0	0	0	Z	0	0	0	0	3	9	32	43	14	6	2	97	30	0	1	54	43	10	14.9	97																							
17-Feb	Z	0	0	0	0	0	4	57	5	1	2	0	1	1	1	0	0	0	0	0	0	0	0	0	3.3	57																							
18-Feb	0	Z	0	0	0	0	0	0	1	2	2	4	10	19	10	1	0	0	0	0	0	0	0	0	2.2	19																							
19-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.3	2																							
20-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	15	6	2	5	8	4	2	0	0	0	0	0	1.9	15																							
21-Feb	1	1	0	0	Z	0	0	0	0	1	2	0	1	3	2	3	10	20	15	0	0	0	3	8	3.0	20																							
22-Feb	0	0	0	0	0	Z	0	0	1	24	31	7	4	3	3	2	1	0	0	0	0	0	0	0	3.4	31																							
23-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	2	5	3	2	1	0	0	0	0	0	0	0	0.7	5																							
24-Feb	0	Z	0	0	0	0	0	0	0	1	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0.4	3																							
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	3	2	0	1	2	4	0	0	0	0	0.7	4																							
26-Feb	1	0	0	Z	0	0	0	1	6	4	1	1	2	5	9	6	4	3	0	0	0	1	0	0	1.9	9																							
27-Feb	0	0	0	0	Z	1	1	1	1	1	2	1	1	1	2	2	2	7	1	0	0	0	0	0	1.0	7																							
28-Feb	0	0	1	1	0	Z	0	1	1	1	0	2	3	2	2	1	0	0	0	0	0	0	0	0	0.7	3																							
																								Diurnal Average	Diurnal Maximum																								
2.7 0.5 0.3 0.1 0.1 1.5 1.9 2.4 0.8 2.7 3.3 3.0 4.7 6.4 4.5 3.5 3.6 6.1 2.9 1.9 1.7 4.3 3.3 2.6																								57	10	3	1	1	32	44	57	6	24	31	20	32	43	22	14	25	97	30	20	21	54	43	20		
Z - zerospan C - Calibration																																																	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
CNRL Horizon - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	622	97.19	97.19
21 - 40	11	1.72	98.91
41 - 80	6	0.94	99.84
81 - 159	1	0.16	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
CNRL Horizon - February 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	96	56	28	23	8	20	13	45	102	81	33	30	22	12	20	615
21 - 40	1	3	0	0	1	1	0	0	1	0	1	1	0	1	1	0	11
11 - 80	0	0	0	1	0	0	0	0	1	1	1	0	0	0	1	1	6
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	99	56	29	24	9	20	13	47	103	83	34	30	23	15	21	633

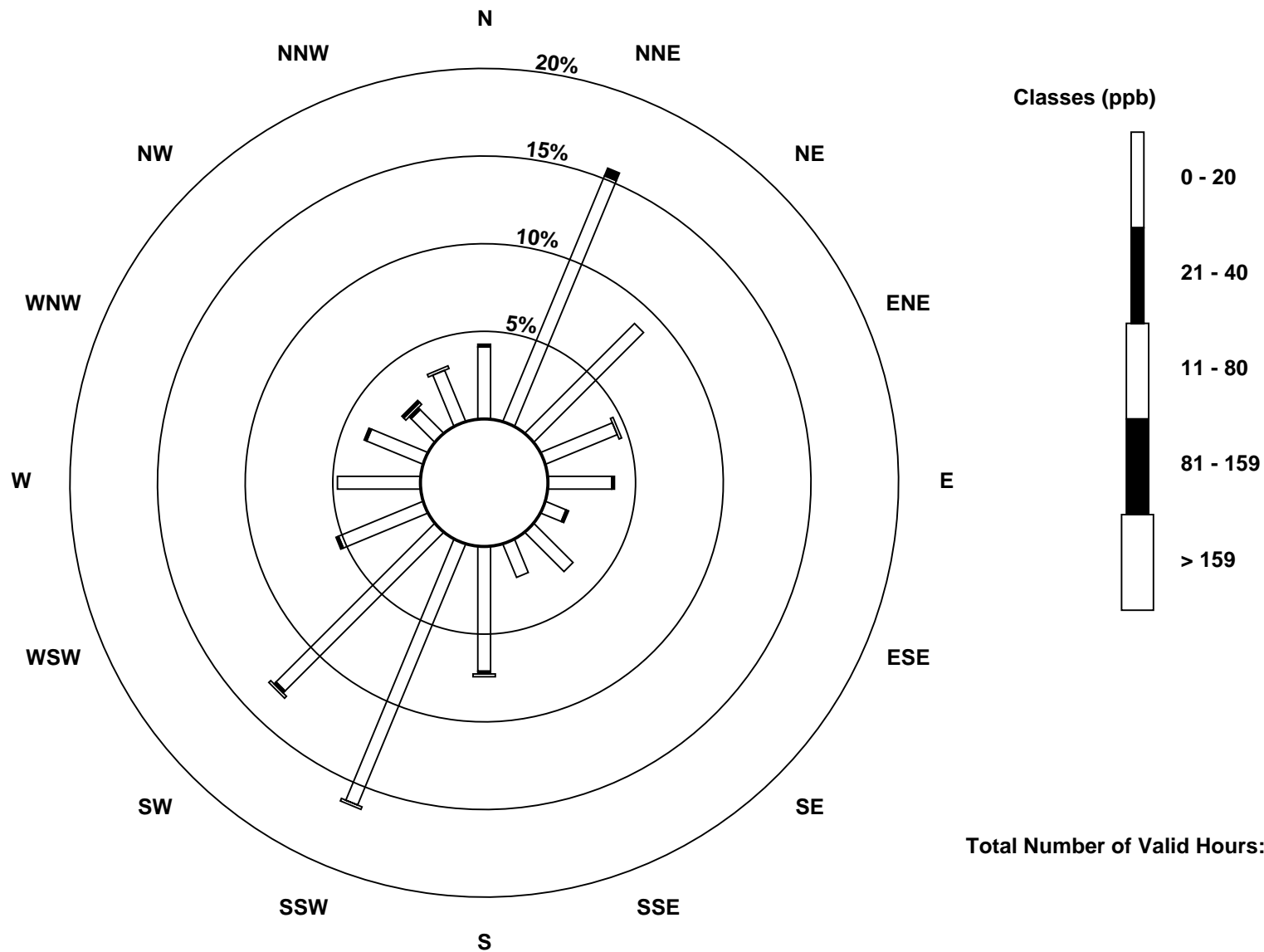
Total Number of Valid Hours: 633

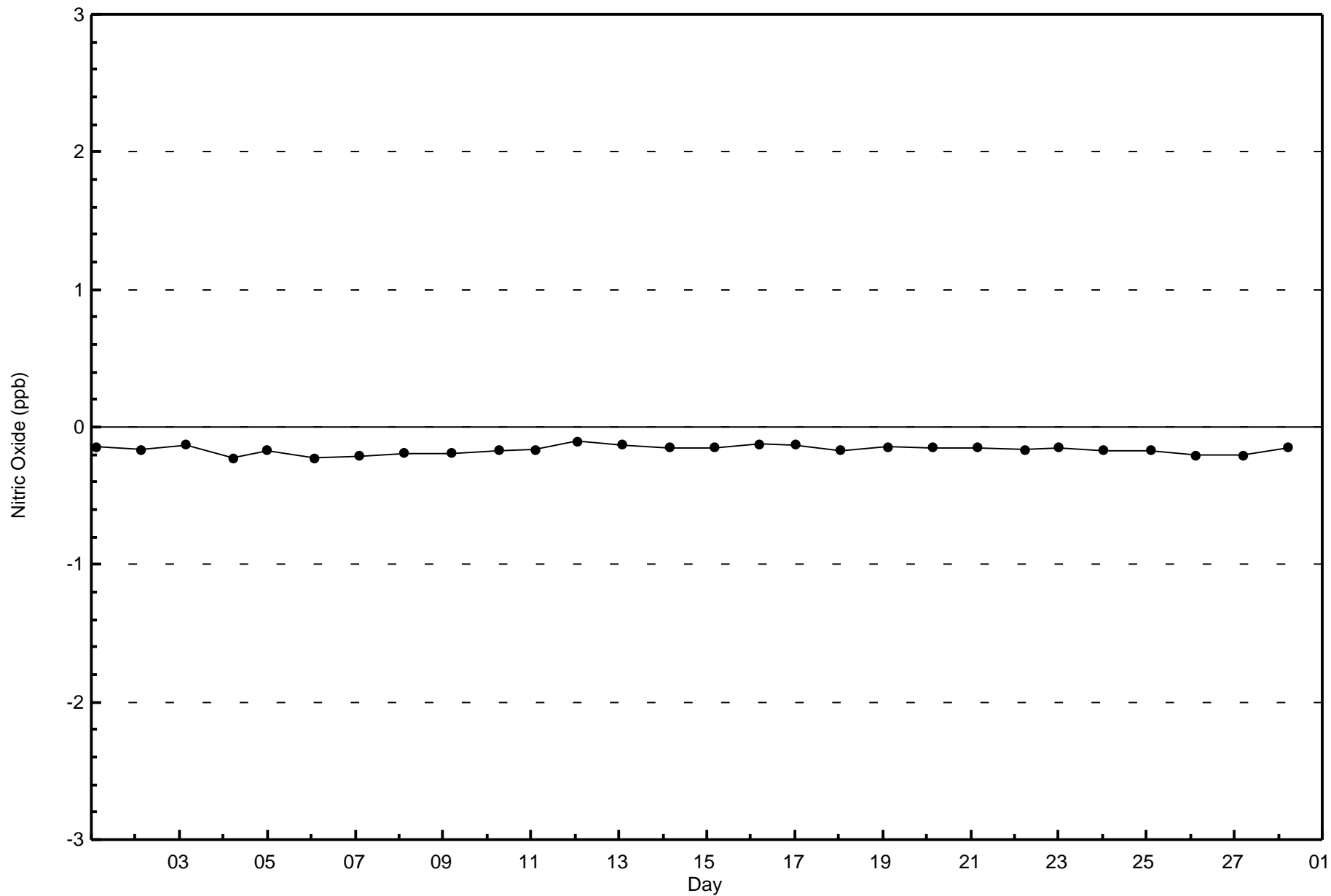
Total Number of Hours: 672

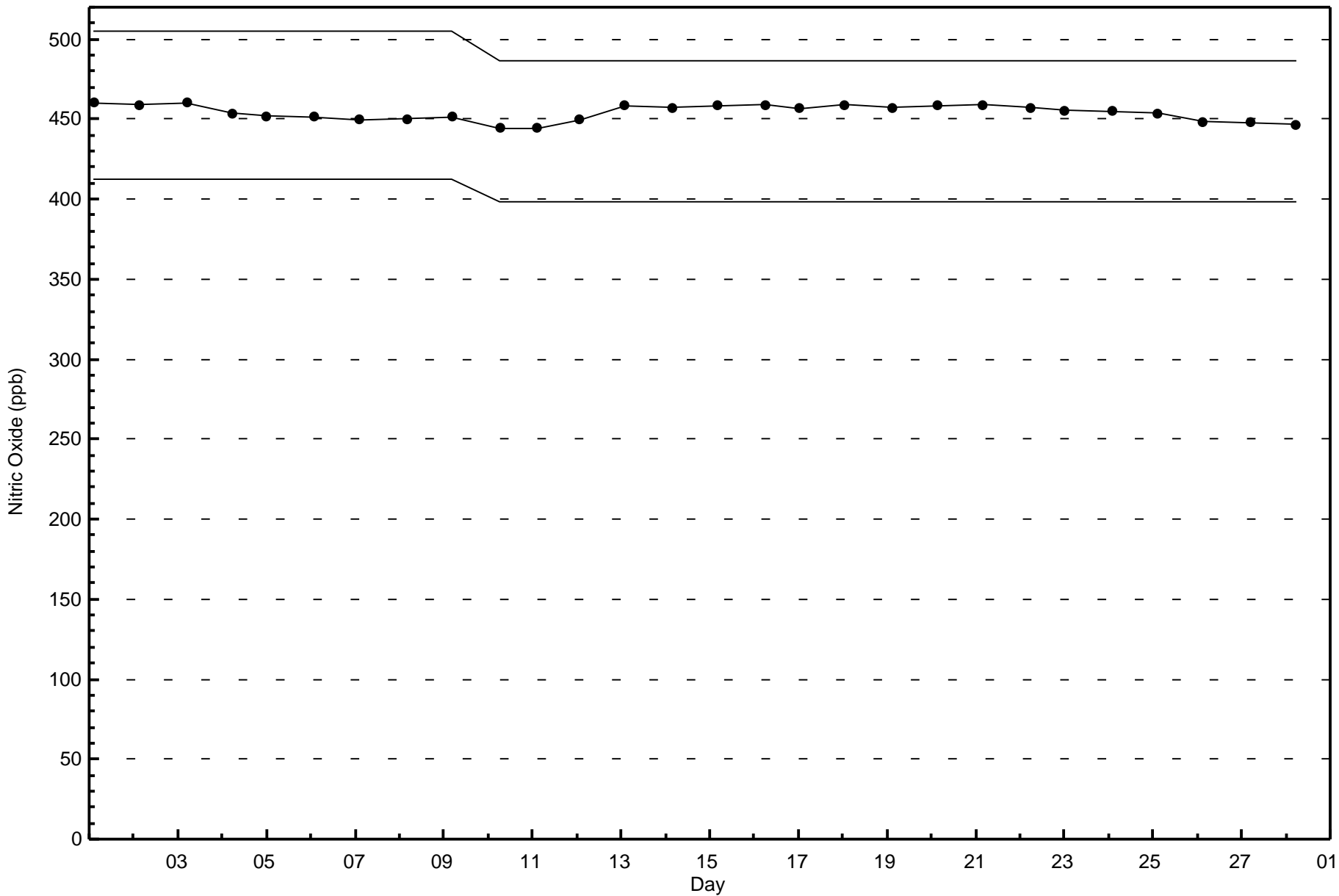


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)







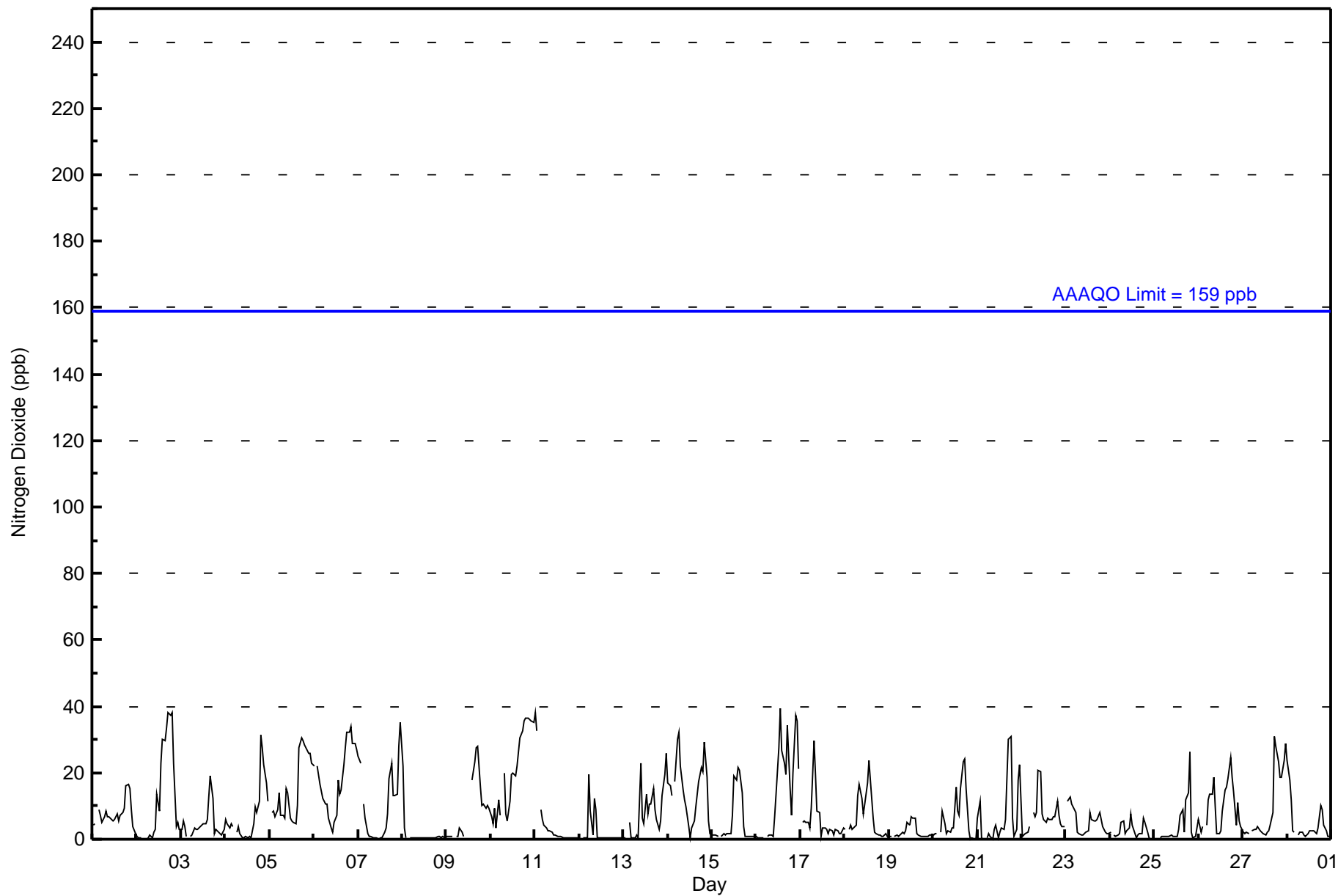


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 39 ppb on Feb 16 14:00										Maximum Daily Average: 20.6 ppb on Feb 10										Hours of Data: 640						
Minimum Value: 0 ppb on Feb 20 21:00										Minimum Daily Average: 1.5 ppb on Feb 8										Hours of Missing Data: 32						
Maximum Diurnal Average: 14.8 ppb at hour 18										Minimum Diurnal Average: 4.2 ppb at hour 4										Hours of Calibration: 32						
Monthly Average: 8.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 4 Q ₃ = 12 P ₉₀ = 23 P ₉₉ = 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-Feb	4	5	Z	9	7	5	7	9	7	7	6	5	6	8	5	7	8	10	16	17	15	9	4	2	7.7	17
2-Feb	1	0	0	Z	0	0	0	1	1	2	3	13	8	23	30	30	33	38	37	38	23	4	5	3	12.8	38
3-Feb	3	5	4	1	Z	1	1	3	3	3	4	4	5	5	6	13	19	12	2	3	2	2	1	3	4.5	19
4-Feb	6	5	3	5	4	Z	2	4	2	1	0	1	0	1	5	10	8	11	31	27	22	17	11	7.7	31	
5-Feb	Z	8	8	7	9	14	7	7	7	15	14	7	5	5	1	10	28	31	30	28	27	26	26	23	15.0	31
6-Feb	22	Z	22	17	14	12	11	11	7	4	2	5	7	18	14	15	23	28	32	32	34	29	29	27	17.9	34
7-Feb	25	23	Z	11	6	2	1	1	1	0	0	0	0	0	2	4	8	18	23	13	13	13	28	35	9.9	35
8-Feb	22	3	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1.5	22
9-Feb	1	1	1	1	Z	1	1	3	2	1	C	C	C	C	18	23	28	28	16	10	11	9	10	10	9.1	28
10-Feb	7	5	10	3	12	7	Z	20	8	6	12	19	20	19	22	26	30	33	36	37	36	36	35	35	20.6	37
11-Feb	38	33	Z	9	6	4	4	3	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	1	4.8	38
12-Feb	1	Z	1	1	1	19	8	1	12	9	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2.5	19
13-Feb	0	0	Z	5	1	0	0	1	0	23	6	5	14	8	10	11	15	9	6	3	6	13	20	26	7.9	26
14-Feb	17	16	13	Z	17	30	32	22	15	12	10	4	1	3	5	10	14	17	22	21	29	19	5	2	14.6	32
15-Feb	1	1	1	1	Z	1	2	1	2	2	2	7	19	18	22	21	14	4	1	1	1	1	1	1	5.3	22
16-Feb	1	1	1	1	1	Z	1	1	1	1	7	14	28	39	27	23	19	34	15	7	20	37	36	21	14.5	39
17-Feb	Z	5	5	5	5	4	10	30	20	9	8	1	3	3	3	2	3	2	1	3	3	2	2	4	5.7	30
18-Feb	3	Z	3	4	3	3	4	13	17	12	8	11	17	24	18	6	2	2	1	1	1	1	2	1	6.8	24
19-Feb	1	1	Z	1	1	1	1	2	2	3	5	4	7	7	6	2	1	1	1	1	1	1	1	1	2.2	7
20-Feb	1	2	2	Z	2	9	5	2	3	2	4	3	16	8	7	15	23	24	15	3	0	0	0	0	6.3	24
21-Feb	6	11	1	0	Z	0	2	1	0	3	4	1	2	3	3	6	18	30	31	7	1	3	18	23	7.6	31
22-Feb	1	1	2	2	4	Z	8	7	8	21	20	8	6	5	6	6	6	7	7	12	7	5	4	4	6.8	21
23-Feb	Z	12	13	11	10	8	2	2	1	1	2	2	3	8	6	6	6	6	8	6	4	2	2	2	5.2	13
24-Feb	2	Z	1	1	1	2	5	5	2	2	3	8	4	2	0	1	2	2	6	5	2	0	0	0	2.5	8
25-Feb	0	0	Z	0	1	1	1	1	1	1	1	1	1	3	7	9	2	12	14	26	2	1	1	3	3.9	26
26-Feb	6	2	4	Z	4	12	13	14	19	10	2	2	3	8	15	16	18	24	19	14	4	11	5	4	9.9	24
27-Feb	2	2	2	2	Z	3	3	3	4	3	2	2	1	2	3	4	8	31	28	23	19	19	24	29	9.4	31
28-Feb	24	18	12	3	2	Z	1	2	2	1	1	2	3	3	2	2	2	3	10	9	4	2	1	1	4.8	24
7.7 6.6 4.9 4.2 4.8 5.8 4.9 6.1 5.2 5.5 4.7 4.8 6.7 8.3 8.8 9.8 12.2 14.8 13.9 12.6 10.5 9.6 9.9 9.7																								Diurnal Average		
38 33 22 17 17 30 32 30 20 23 20 19 28 39 30 30 30 33 38 37 38 36 37 36 35																								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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	556	86.88	86.88
21 - 40	84	13.13	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - February 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	24	88	50	25	18	7	20	11	42	91	75	30	27	16	11	17	552
21 - 40	3	11	6	4	6	2	0	2	5	12	8	4	3	7	4	4	81
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	27	99	56	29	24	9	20	13	47	103	83	34	30	23	15	21	633

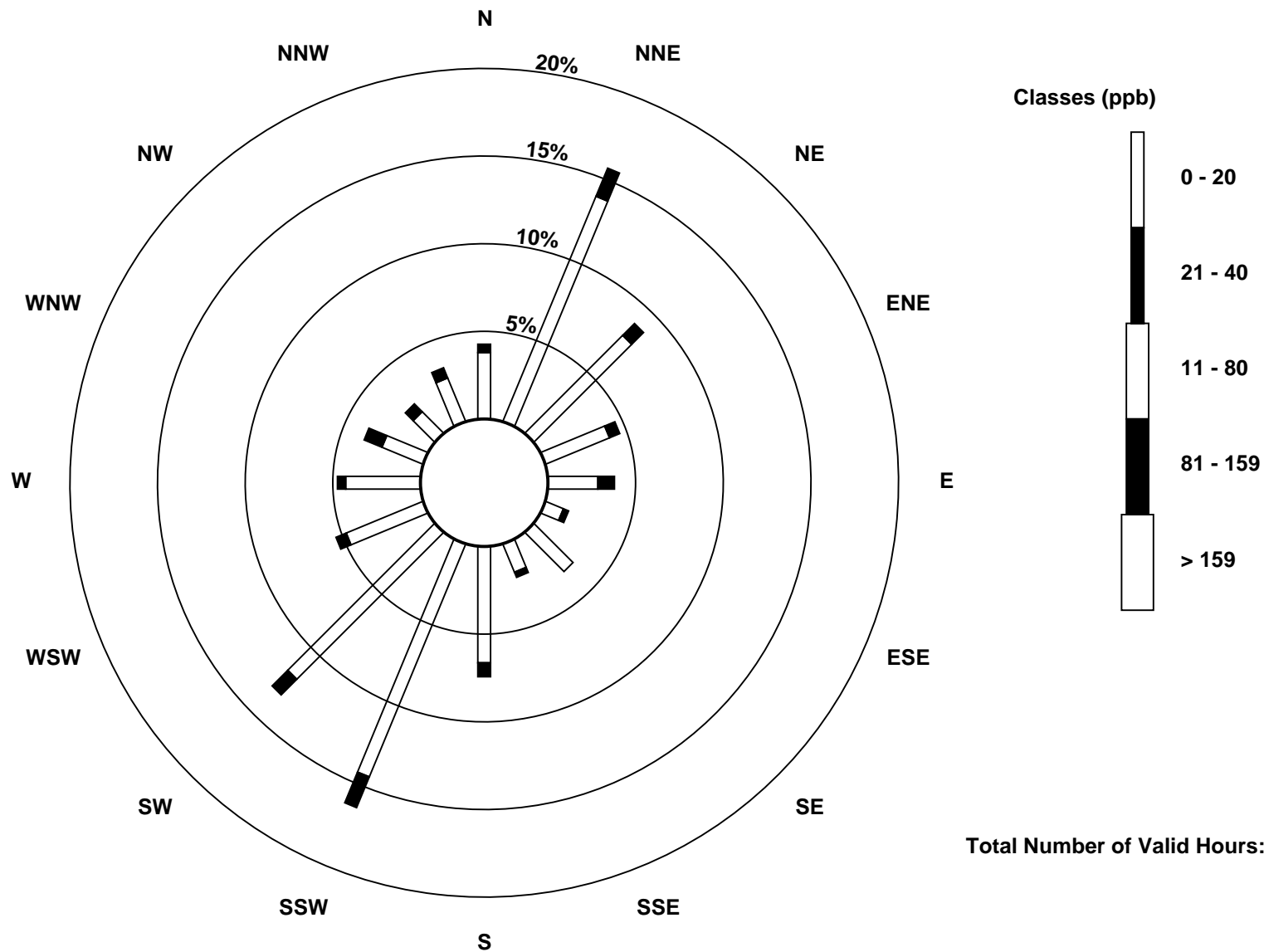
Total Number of Valid Hours: 633

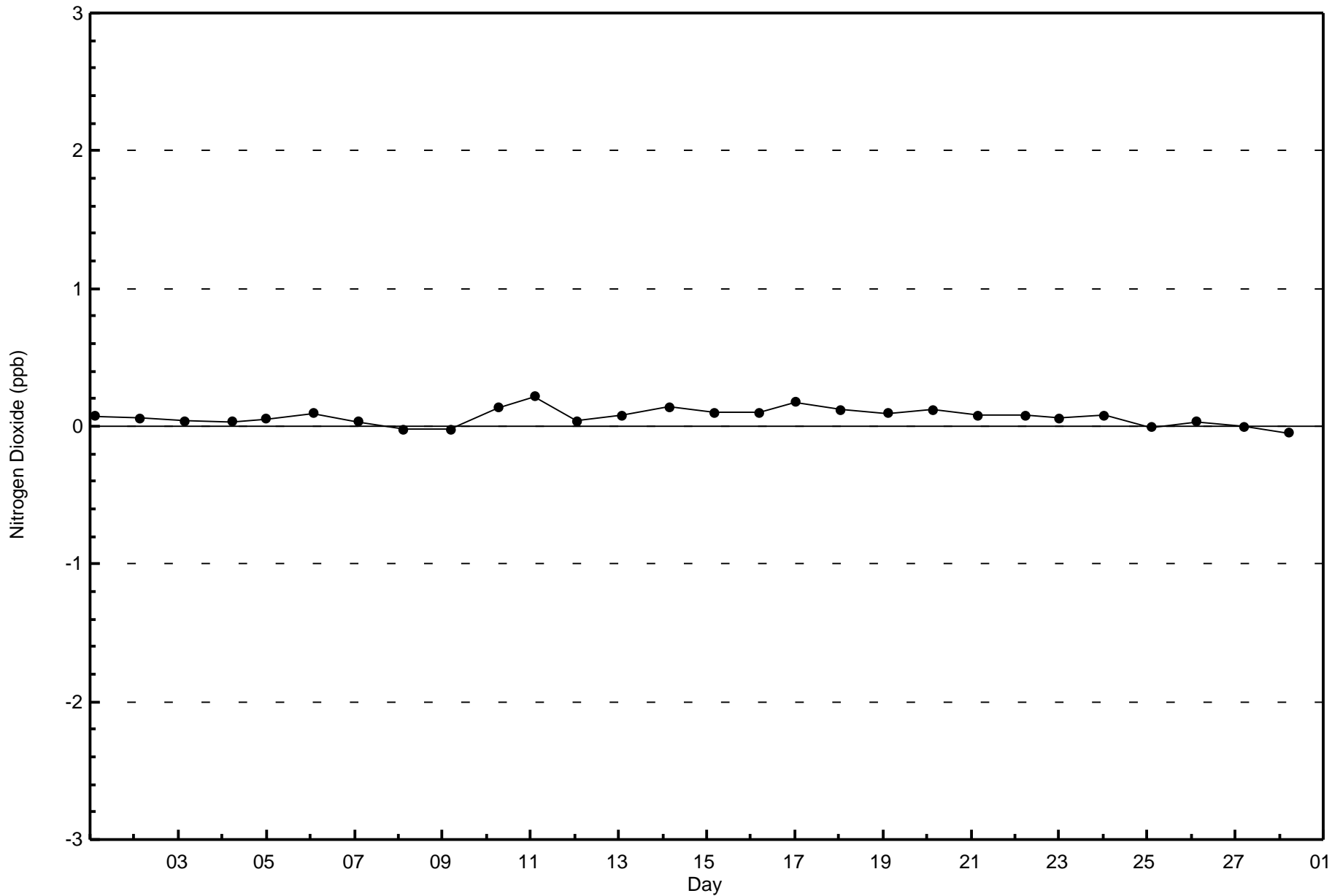
Total Number of Hours: 672

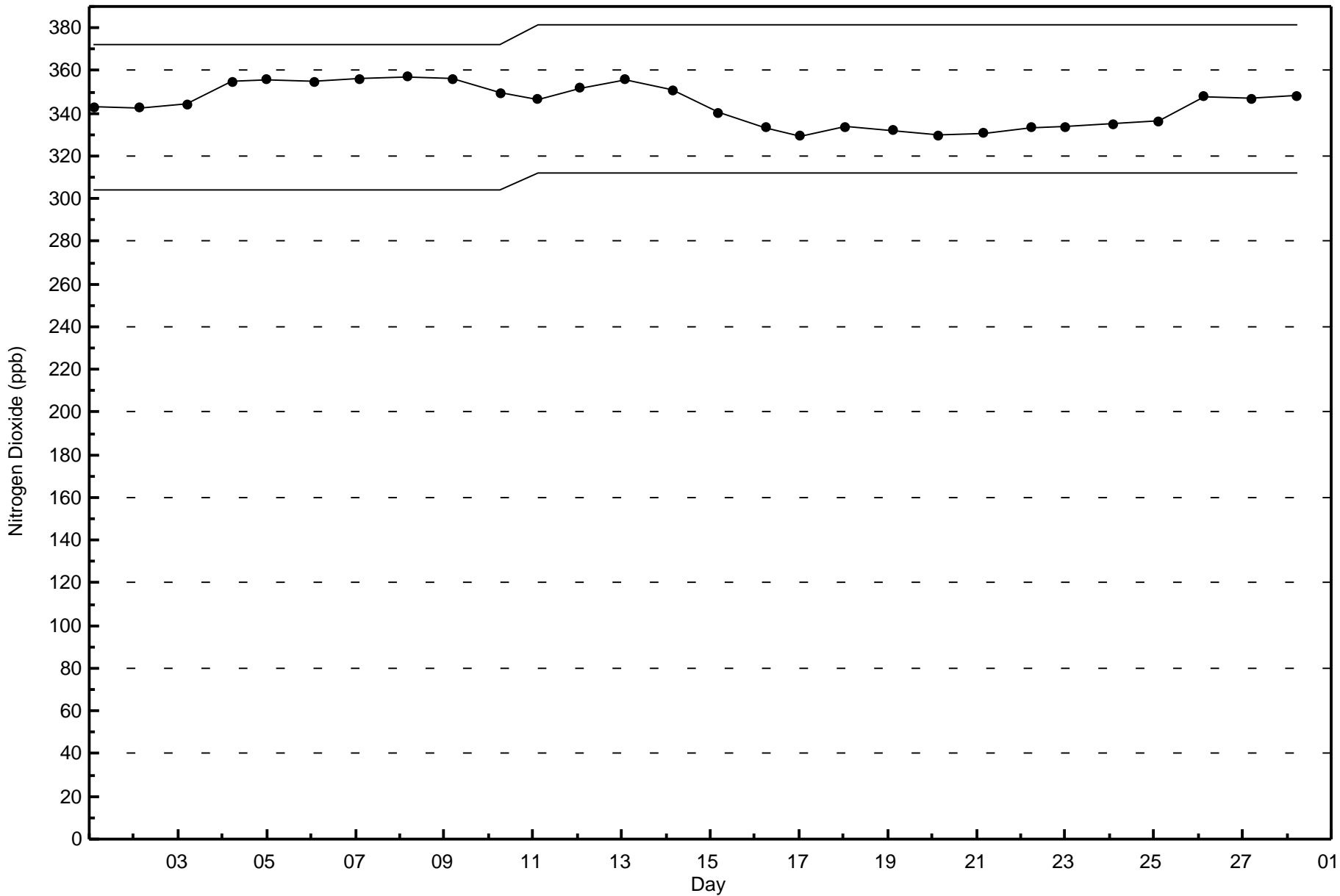


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association
Summary of Hour Averages

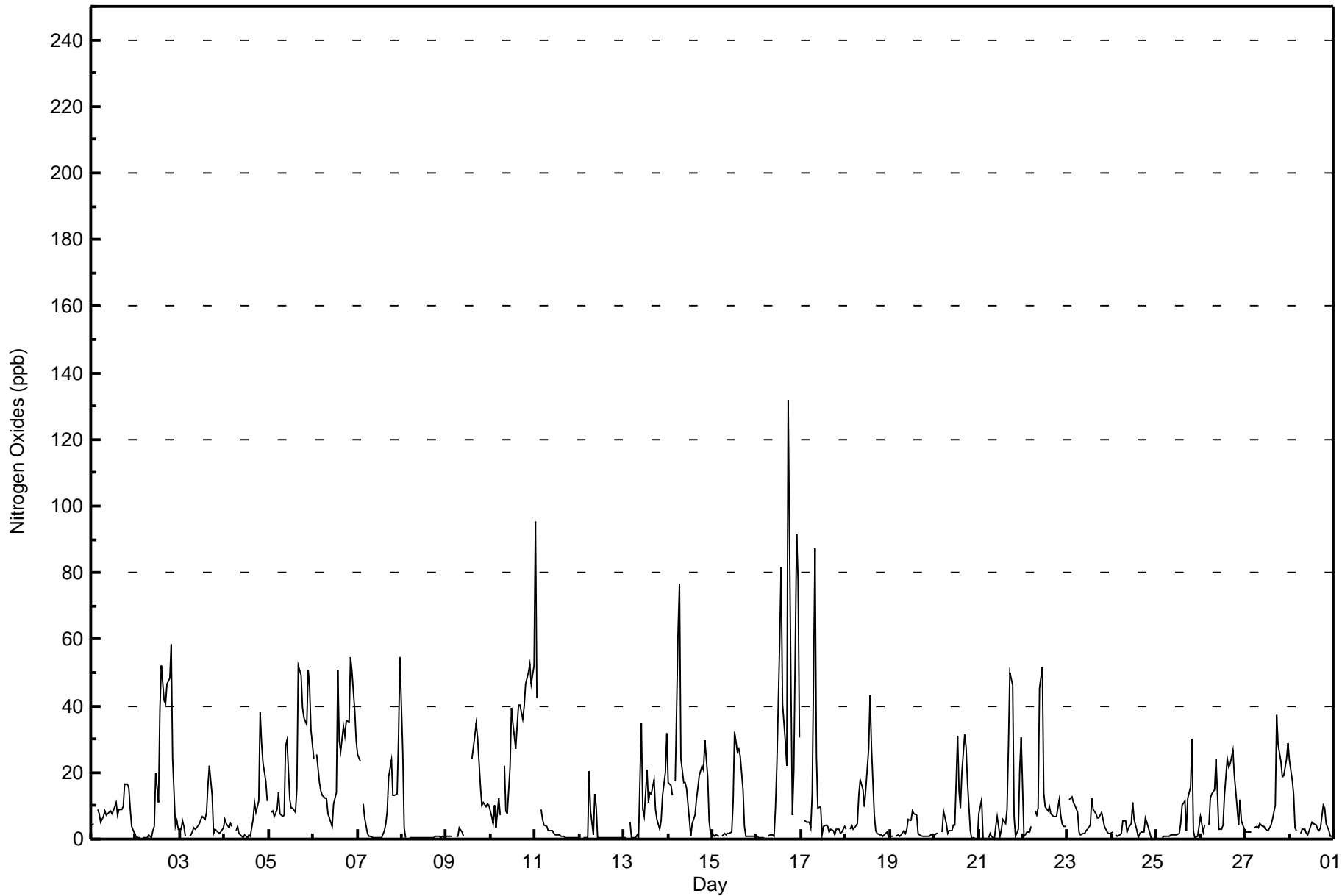
Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 2017

Maximum Value: 132 ppb on Feb 16 18:00																			Maximum Daily Average: 29.4 ppb on Feb 16						Hours in Service: 672																		
Minimum Value: 0 ppb on Feb 21 00:00																			Minimum Daily Average: 1.7 ppb on Feb 8						Hours of Data: 640																		
Maximum Diurnal Average: 20.9 ppb at hour 18																			Minimum Diurnal Average: 4.3 ppb at hour 4						Hours of Missing Data: 32																		
Monthly Average: 10.9 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 5 Q ₃ = 13 P ₉₀ = 30 P ₉₉ = 75						Hours of Calibration: 32																		
																			Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-Feb	4	5	Z	9	8	5	7	9	7	7	8	8	9	11	7	9	9	10	16	17	15	9	4	2	8.4	17																	
2-Feb	1	0	0	Z	0	0	0	1	1	2	4	20	11	39	52	42	41	46	48	59	24	4	5	3	17.6	59																	
3-Feb	3	6	4	1	Z	1	1	3	3	3	5	6	7	6	8	16	22	13	2	3	2	2	3	5.3	22																		
4-Feb	6	5	3	5	4	Z	2	4	2	1	0	1	0	1	1	6	11	8	11	38	29	23	17	11	8.3	38																	
5-Feb	Z	8	8	7	9	14	7	7	7	28	29	12	9	9	8	15	52	49	39	36	34	51	46	32	22.6	52																	
6-Feb	24	Z	25	17	15	13	12	12	7	5	4	11	14	51	30	26	34	31	35	35	55	50	39	30	25.0	55																	
7-Feb	26	23	Z	11	6	2	1	1	1	0	0	0	0	0	2	5	9	19	24	13	13	14	30	55	11.1	55																	
8-Feb	26	3	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1.7	26																	
9-Feb	1	1	1	1	Z	1	1	3	2	1	C	C	C	C	24	31	35	30	16	10	11	10	11	10	10.5	35																	
10-Feb	7	5	10	3	12	7	Z	22	8	8	22	39	35	27	34	40	40	36	40	46	50	52	47	52	28.0	52																	
11-Feb	95	42	Z	9	6	4	4	3	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	7.8	95																	
12-Feb	0	Z	1	1	1	21	8	1	13	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2.6	21																	
13-Feb	0	0	Z	5	0	0	0	1	0	35	9	7	21	11	14	14	18	9	6	3	6	13	20	32	9.7	35																	
14-Feb	17	16	13	Z	17	62	77	24	17	17	15	6	1	5	7	12	15	19	22	21	30	19	5	2	19.1	77																	
15-Feb	1	1	1	1	Z	1	2	1	2	2	2	11	32	26	27	25	15	4	1	1	1	1	1	1	6.9	32																	
16-Feb	1	1	1	1	1	Z	1	1	1	1	9	22	59	82	40	29	22	132	45	7	21	92	78	31	29.4	132																	
17-Feb	Z	5	6	5	5	4	14	87	25	9	10	1	4	4	4	2	3	3	1	3	3	2	2	4	8.9	87																	
18-Feb	3	Z	3	4	3	3	5	13	18	15	10	15	27	43	28	7	3	2	1	1	1	1	2	1	9.1	43																	
19-Feb	1	1	Z	1	1	1	1	2	2	3	6	5	9	8	7	2	1	1	1	1	1	1	1	1	2.5	9																	
20-Feb	1	2	2	Z	2	9	5	2	3	3	4	4	31	14	9	20	31	28	17	2	0	0	0	0	8.2	31																	
21-Feb	7	12	0	0	Z	0	2	1	0	4	7	1	3	6	5	9	28	50	46	7	1	3	21	31	10.6	50																	
22-Feb	1	1	2	2	4	Z	8	7	9	45	52	14	10	8	10	8	7	7	7	12	7	5	4	4	10.1	52																	
23-Feb	Z	12	13	11	10	8	2	1	2	2	3	4	12	9	8	6	6	8	6	4	2	2	2	2	5.9	13																	
24-Feb	2	Z	1	1	1	2	5	5	2	3	5	11	6	2	0	2	2	2	6	5	2	0	0	0	2.9	11																	
25-Feb	0	0	Z	0	1	1	1	1	1	1	1	1	2	4	10	11	3	12	16	30	3	0	1	4	4.5	30																	
26-Feb	7	2	4	Z	4	12	13	15	24	14	3	3	4	13	24	22	22	27	19	15	4	12	5	4	11.9	27																	
27-Feb	2	2	2	2	Z	3	4	4	5	4	4	3	3	3	4	6	10	37	29	23	19	19	24	29	10.4	37																	
28-Feb	24	18	13	3	3	Z	2	3	3	2	1	4	5	5	4	3	2	4	10	9	5	2	1	1	5.5	24																	
																			10.4	7.1	5.2	4.3	4.9	7.3	6.8	8.4	6.0	8.1	8.0	7.8	11.4	14.6	13.3	13.2	15.8	20.9	16.8	14.4	12.2	13.8	13.2	12.3	Diurnal Average
																			95	42	25	17	17	62	77	87	25	45	52	39	59	82	52	42	52	132	48	59	55	92	78	55	Diurnal Maximum
Z - zerospan																			C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	525	82.03	82.03
21 - 40	80	12.50	94.53
41 - 80	30	4.69	99.22
81 - 159	5	0.78	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 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	21	84	49	22	15	7	19	11	39	86	74	30	24	14	10	16	521
21 - 40	4	10	4	5	7	0	1	2	5	16	5	3	4	7	2	3	78
11 - 80	2	5	3	1	2	2	0	0	2	1	3	1	2	2	1	2	29
81 - 159	0	0	0	1	0	0	0	0	1	0	1	0	0	0	2	0	5
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	99	56	29	24	9	20	13	47	103	83	34	30	23	15	21	633

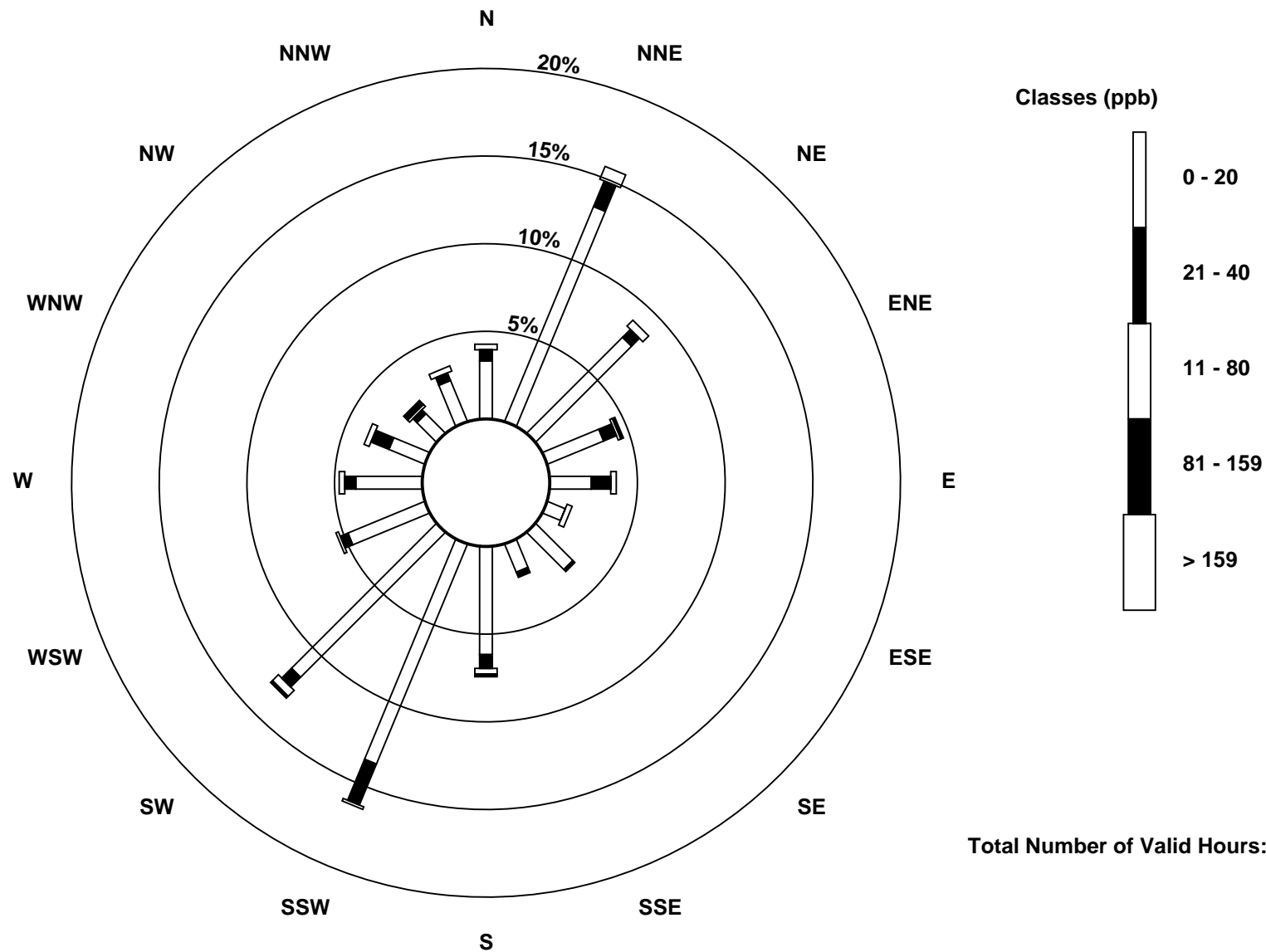
Total Number of Valid Hours: 633

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

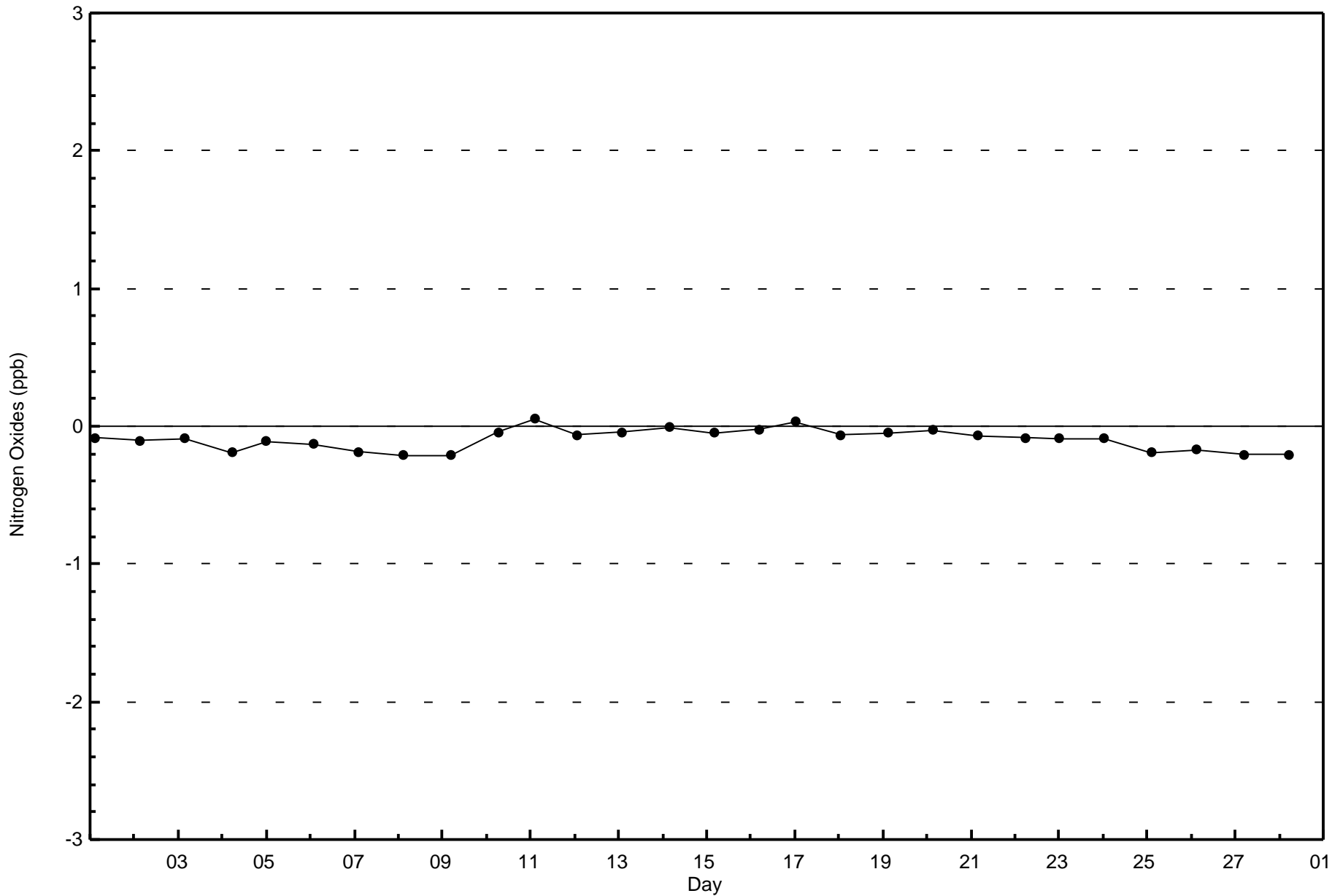
Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)

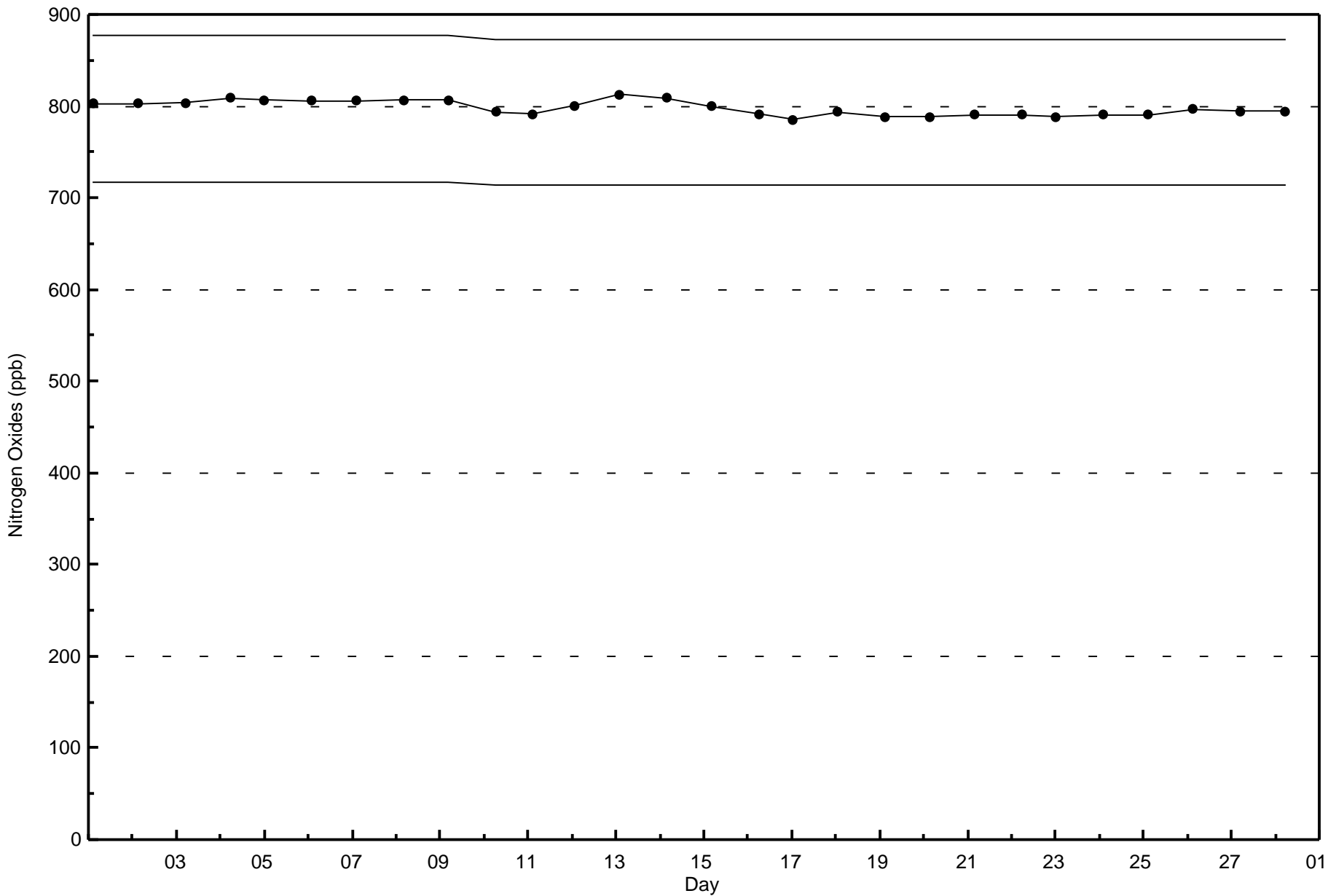




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 2017



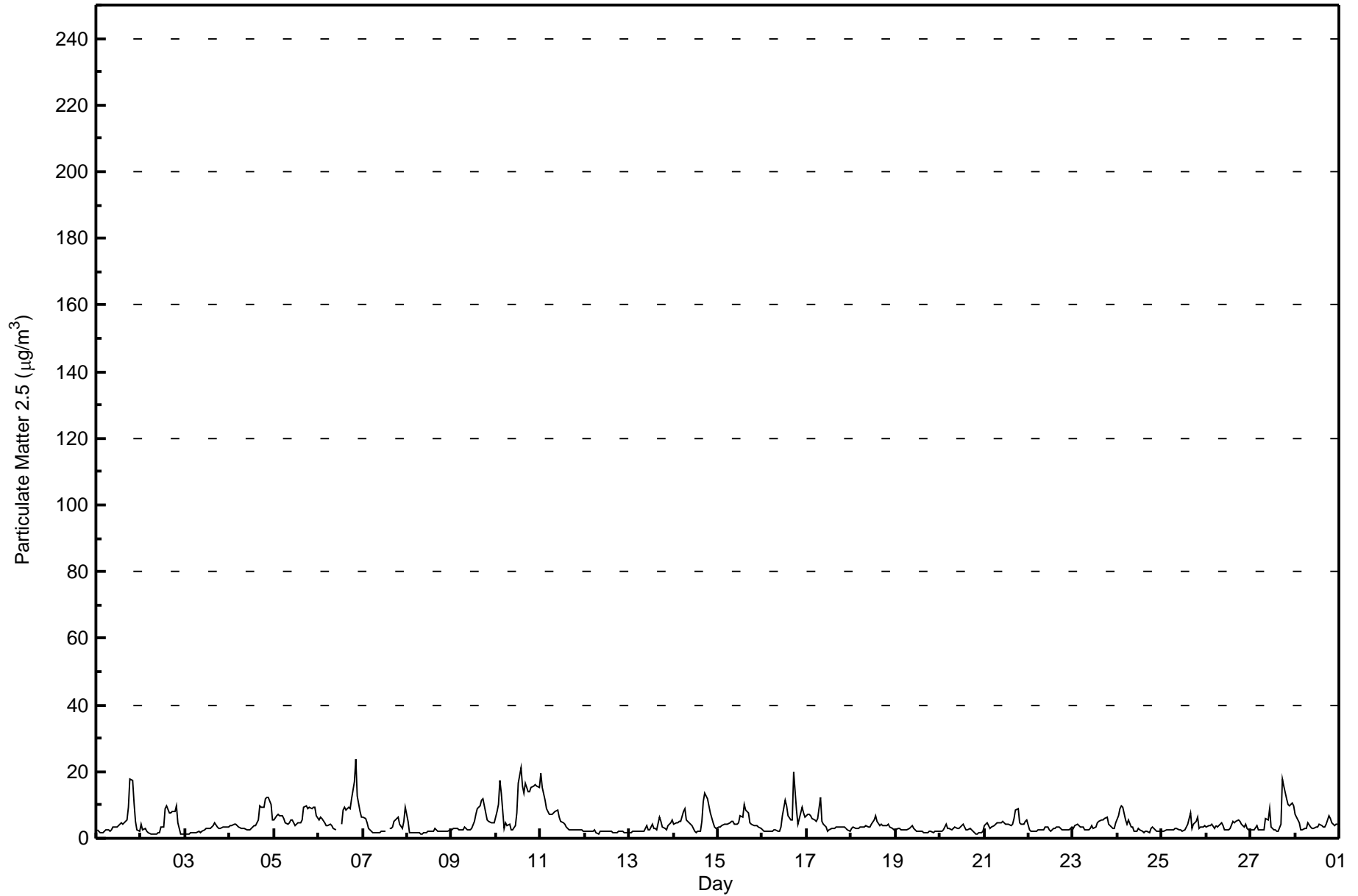




Summary of Hour Averages

CNRL Horizon - February 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 23.7 µg/m ³ on Feb 6 21:00 Maximum Daily Average: 11.2 µg/m ³ on Feb 10		Hours in Service: 672 Hours of Data: 669 Hours of Missing Data: 3 Hours of Calibration: 3 Percent Operational Time: 100.0																								
Minimum Value: 1.1 µg/m ³ on Feb 2 09:00 Maximum Diurnal Average: 6.9 µg/m ³ at hour 18 Monthly Average: 4.51 µg/m ³		Minimum Daily Average: 2.0 µg/m ³ on Feb 12 Minimum Diurnal Average: 3.3 µg/m ³ at hour 5 Percentiles: P ₁ = 1.3 P ₁₀ = 1.9 Q ₁ = 2.4 Median = 3.4 Q ₃ = 5.2 P ₉₀ = 9.1 P ₉₉ = 17.2																								
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-Feb	2.5	2.0	1.6	1.7	2.1	2.6	2.4	2.3	2.3	3.2	3.3	3.4	3.6	4.5	4.4	4.5	5.4	9.4	17.8	17.2	10.7	5.0	2.4	1.9	4.8	17.8
2-Feb	4.2	2.4	2.8	2.3	1.5	1.3	1.3	1.2	1.1	1.5	1.7	3.4	3.3	9.1	9.8	7.5	7.7	8.1	7.9	9.8	4.8	1.5	1.2	1.3	4.0	9.8
3-Feb	1.2	1.4	1.4	1.5	1.6	1.6	1.8	2.1	1.9	1.9	2.5	2.9	2.9	2.9	3.3	3.7	4.5	3.6	2.8	2.9	3.3	3.3	3.2	3.4	2.6	4.5
4-Feb	4.0	3.9	4.1	4.3	3.8	3.4	3.1	3.1	2.8	2.5	2.6	2.8	3.3	3.8	3.9	5.6	9.6	9.3	9.5	12.1	12.3	12.5	10.3	5.6	5.7	12.5
5-Feb	5.5	6.8	7.3	6.8	6.9	5.9	4.6	4.3	4.5	5.7	5.5	3.8	4.4	4.8	4.8	5.4	9.3	9.8	9.0	9.2	8.9	9.2	9.5	6.7	6.6	9.8
6-Feb	5.5	6.3	5.8	4.5	4.0	3.9	4.2	3.9	3.0	2.4	C	C	4.1	8.3	9.1	8.4	9.3	9.0	12.0	17.0	23.7	12.9	8.0	6.4	7.8	23.7
7-Feb	6.2	6.0	4.8	3.2	2.5	1.6	1.6	1.8	1.8	1.8	2.0	2.1	2.3	C	2.8	3.1	3.6	5.2	6.1	6.5	4.4	3.0	5.0	9.4	3.8	9.4
8-Feb	5.2	1.8	1.6	1.5	1.6	1.5	1.6	1.4	1.5	1.7	1.9	2.0	2.1	1.9	2.2	2.9	2.0	2.0	2.1	2.2	2.2	2.2	2.3	2.5	2.1	5.2
9-Feb	2.6	2.8	2.8	2.8	2.7	2.7	2.6	3.3	2.5	2.5	2.5	2.9	5.2	7.3	8.7	9.9	11.6	12.0	7.6	5.3	5.3	4.8	4.7	4.6	5.0	12.0
10-Feb	8.1	10.0	17.3	13.6	2.9	4.6	3.9	4.3	2.5	2.4	3.8	7.8	16.5	21.1	15.6	13.5	16.4	13.9	13.8	15.1	15.5	16.1	15.5	15.3	11.2	21.1
11-Feb	19.3	15.2	11.4	9.1	7.9	7.2	7.2	7.5	8.2	8.4	6.5	4.9	4.6	4.1	3.5	2.6	2.5	2.6	2.6	2.5	2.5	2.4	2.3	2.3	6.1	19.3
12-Feb	2.2	2.2	2.2	2.0	2.0	2.4	1.7	1.5	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.4
13-Feb	1.9	1.9	2.2	2.3	1.9	1.9	1.9	2.0	2.0	3.7	2.4	2.6	4.1	3.0	2.8	2.6	6.5	4.9	3.5	2.8	2.4	3.8	4.7	5.3	3.1	6.5
14-Feb	4.3	4.5	4.5	5.0	5.3	8.2	9.0	5.3	4.8	4.4	3.7	2.2	1.8	2.0	2.2	5.2	11.0	13.6	12.1	9.8	7.7	4.5	3.3	3.0	5.7	13.6
15-Feb	3.3	3.6	3.9	4.2	4.2	4.4	4.8	5.2	5.0	4.4	4.4	4.6	6.7	6.4	10.2	8.7	7.7	4.8	4.1	4.0	3.7	3.8	3.3	2.9	4.9	10.2
16-Feb	2.5	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	3.4	6.7	11.5	9.8	7.0	5.6	5.5	19.9	8.6	4.1	5.8	9.3	7.8	6.1	5.6	19.9
17-Feb	7.0	7.2	6.6	5.9	5.5	5.1	6.1	12.2	5.3	4.1	3.4	2.2	2.5	2.9	2.8	3.0	3.4	3.3	3.2	3.3	3.0	2.6	2.2	4.4	4.4	12.2
18-Feb	3.1	3.3	2.9	3.0	2.9	3.4	3.2	3.2	3.6	3.4	3.5	4.4	5.4	6.8	5.1	4.0	4.1	3.8	3.9	3.8	4.1	3.2	2.8	2.6	3.7	6.8
19-Feb	2.5	2.9	3.0	2.5	2.5	2.5	2.5	2.9	3.3	3.9	3.1	2.1	2.2	2.1	2.0	1.9	1.8	1.9	2.0	1.9	1.9	2.0	2.1	2.4	3.9	3.9
20-Feb	2.0	2.3	2.4	4.1	2.8	2.9	2.6	2.9	3.3	3.0	3.0	3.5	4.4	3.3	2.6	2.6	2.8	2.6	1.9	1.3	1.3	1.6	1.6	2.2	2.6	4.4
21-Feb	3.7	4.5	3.8	3.1	3.2	3.7	4.3	4.6	4.6	4.7	4.9	4.4	4.2	4.2	3.8	4.1	5.9	8.7	8.8	4.7	4.3	4.3	5.0	5.7	4.7	8.8
22-Feb	2.5	2.1	2.1	2.1	2.2	2.5	2.6	2.6	2.5	3.5	3.5	2.4	2.2	2.9	3.1	3.5	3.2	3.0	2.7	2.7	2.4	2.3	2.4	3.2	2.7	3.5
23-Feb	3.2	3.6	4.1	4.0	3.6	3.4	2.5	2.5	2.5	2.8	3.7	3.1	3.5	4.6	5.3	5.3	6.0	6.3	4.2	3.6	3.0	2.9	4.6	3.9	6.3	6.3
24-Feb	6.6	8.7	9.8	9.2	5.7	4.3	5.5	3.4	3.5	2.3	2.3	2.9	2.8	1.9	1.7	2.0	2.0	1.9	2.8	3.4	2.6	2.3	2.3	2.2	3.8	9.8
25-Feb	2.2	2.3	2.4	2.4	2.5	2.6	2.6	2.9	2.8	2.7	2.4	2.3	2.7	3.5	4.3	7.5	3.1	4.1	5.1	6.3	2.9	3.4	3.4	3.8	3.3	7.5
26-Feb	3.6	3.8	3.6	4.2	3.2	3.6	3.3	4.2	4.9	3.8	2.3	2.6	2.4	3.1	5.1	4.6	5.0	5.3	5.2	4.3	3.2	4.1	3.0	2.6	3.8	5.3
27-Feb	2.6	2.7	2.5	3.8	2.4	2.6	2.6	2.7	5.9	5.3	9.0	3.2	2.8	2.4	2.2	2.2	4.3	17.6	15.8	12.1	10.2	9.6	10.4	9.9	6.0	17.6
28-Feb	7.1	5.6	4.7	2.7	2.7	2.9	3.0	4.6	3.4	3.1	3.0	3.4	3.4	4.1	3.9	3.5	3.5	4.4	6.7	5.9	4.5	3.9	4.4	4.1	4.1	7.1
	4.5	4.4	4.4	4.1	3.3	3.4	3.4	3.6	3.3	3.3	3.4	3.4	4.2	4.9	4.8	4.8	5.7	6.9	6.6	6.3	5.7	5.0	4.6	4.4	Diurnal Average	
	19.3	15.2	17.3	13.6	7.9	8.2	9.0	12.2	8.2	8.4	9.0	7.8	16.5	21.1	15.6	13.5	16.4	19.9	17.8	17.2	23.7	16.1	15.5	15.3	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 - February 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	523	78.18	78.18
6 - 15	130	19.43	97.61
16 - 25	16	2.39	100.00
26 - 80	0	0.00	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - February 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	80	50	24	19	5	18	8	41	89	66	30	27	18	13	11	518
6 - 15	11	21	9	5	5	4	2	3	7	17	19	6	5	3	3	8	128
16 - 25	0	2	0	1	0	0	0	2	1	1	3	0	0	2	1	2	15
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	30	103	59	30	24	9	20	13	49	107	88	36	32	23	17	21	661

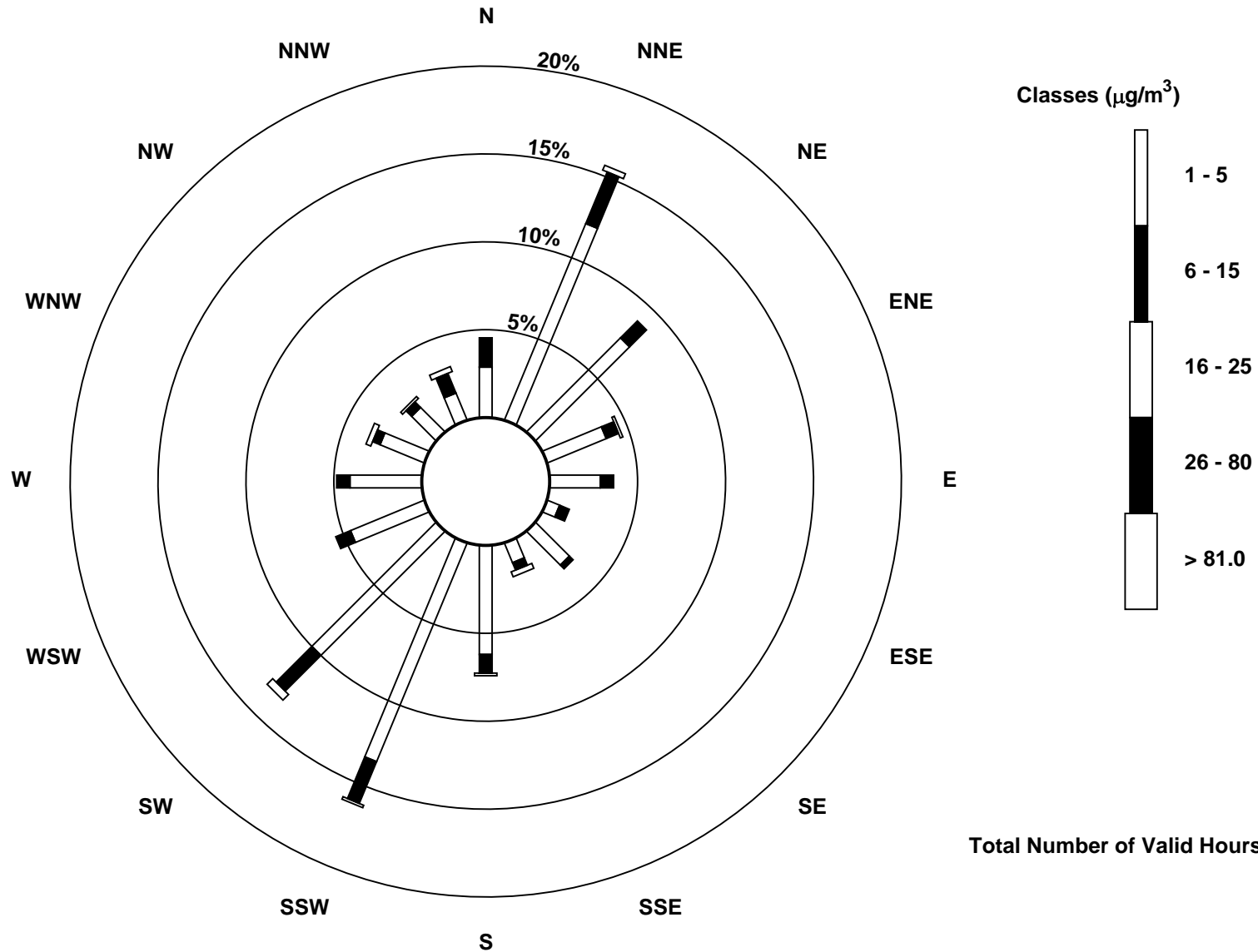
Total Number of Valid Hours: 661

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)



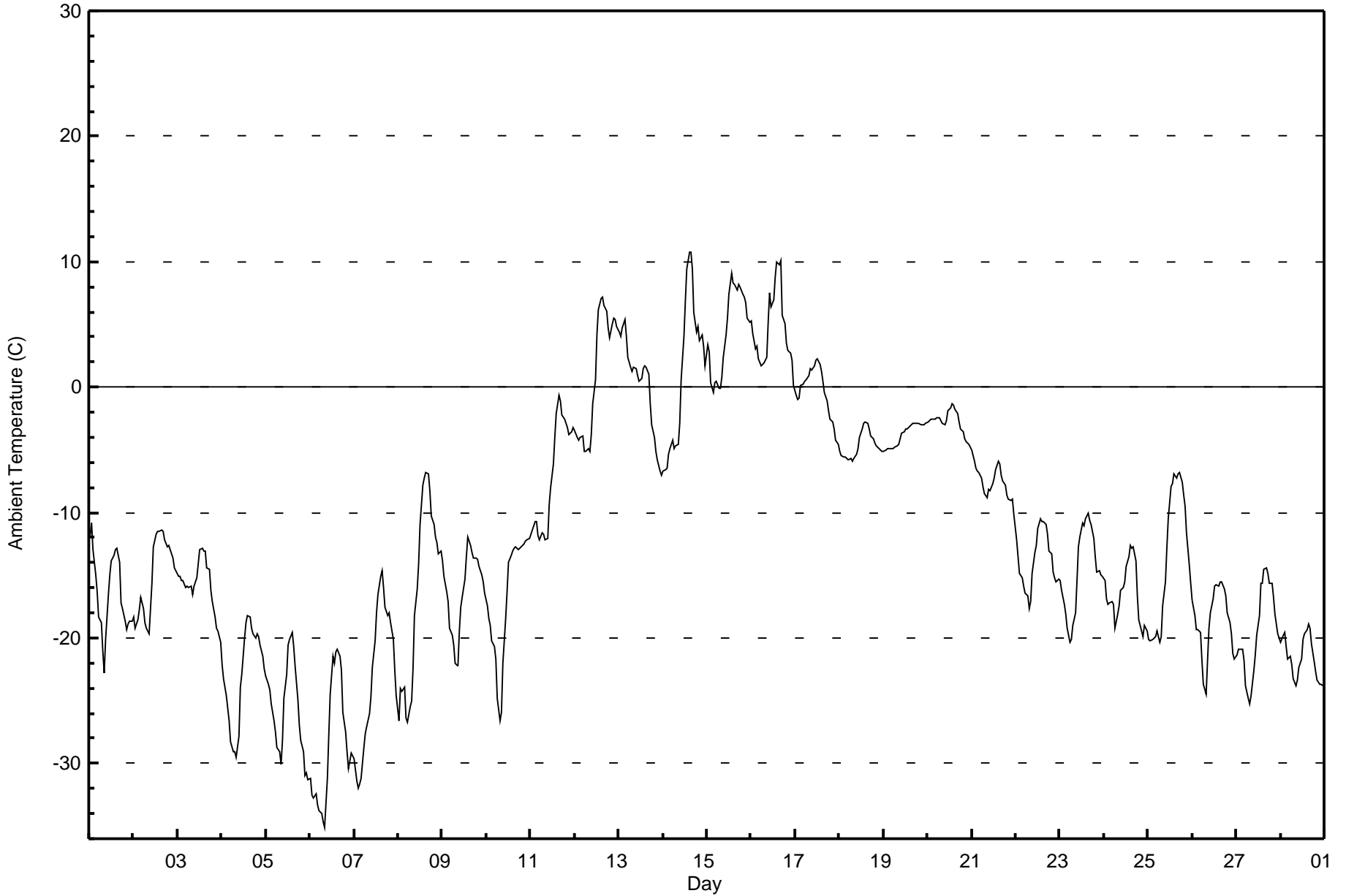
Total Number of Valid Hours: 661



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
CNRL Horizon - February 2017

Maximum Value: 10.8 C on Feb 14 15:00 Maximum Daily Average: 4.7 C on Feb 16																								Hours in Service: 672		
Minimum Value: -35.1 C on Feb 6 09:00 Minimum Daily Average: -28.5 C on Feb 6																								Hours of Data: 672		
Maximum Diurnal Average: -7.5 C at hour 16 Minimum Diurnal Average: -15.6 C at hour 8																								Hours of Missing Data: 0		
Monthly Average: -11.79 C Percentiles: P₁ = -32.8 P₁₀ = -24.0 Q₁ = -19.3 Median = -13.0 Q₃ = -3.9 P₉₀ = 2.2 P₉₉ = 9.3																								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-Feb	-11.9	-10.9	-12.9	-15.0	-16.3	-18.4	-18.8	-21.0	-22.8	-20.1	-16.5	-15.0	-13.9	-13.4	-12.9	-12.9	-14.0	-17.2	-17.6	-18.7	-19.4	-18.9	-18.7	-18.7	-16.5	-10.9
2-Feb	-18.3	-19.2	-18.6	-17.8	-16.7	-17.7	-18.8	-19.3	-19.6	-17.6	-15.6	-12.7	-11.7	-11.4	-11.6	-11.4	-11.4	-12.2	-12.7	-12.6	-13.0	-13.7	-14.4	-14.6	-15.1	-11.4
3-Feb	-15.1	-15.1	-15.4	-15.4	-16.0	-15.8	-15.9	-15.9	-16.6	-15.8	-15.2	-14.1	-13.0	-12.8	-13.1	-13.0	-14.4	-14.6	-16.2	-17.0	-18.3	-19.2	-19.4	-20.3	-15.7	-12.8
4-Feb	-22.1	-23.2	-24.6	-25.6	-26.6	-28.3	-29.0	-29.1	-29.5	-27.8	-24.0	-22.9	-20.0	-18.7	-18.2	-18.3	-19.2	-19.7	-20.0	-19.7	-19.9	-20.6	-21.4	-22.5	-23.0	-18.2
5-Feb	-23.0	-23.7	-24.2	-25.2	-26.6	-27.5	-28.7	-29.0	-30.1	-28.2	-24.8	-22.9	-20.6	-20.1	-19.5	-20.6	-22.2	-24.9	-26.9	-28.1	-29.1	-31.0	-30.8	-31.2	-25.8	-19.5
6-Feb	-31.2	-32.5	-32.8	-32.4	-33.3	-33.7	-34.0	-34.6	-35.1	-31.2	-27.7	-24.5	-21.5	-22.0	-21.2	-20.9	-21.5	-22.6	-25.9	-27.5	-29.0	-30.5	-29.2	-29.4	-28.5	-20.9
7-Feb	-29.6	-31.4	-32.0	-31.6	-31.2	-28.7	-27.6	-27.0	-26.1	-24.7	-22.4	-20.2	-18.0	-16.6	-15.1	-14.6	-16.0	-17.6	-18.2	-18.0	-18.8	-20.1	-22.6	-24.6	-23.0	-14.6
8-Feb	-26.6	-24.0	-24.2	-23.9	-26.4	-26.7	-25.5	-25.1	-22.4	-18.2	-16.0	-14.0	-10.9	-7.8	-7.3	-6.8	-6.9	-8.3	-10.3	-11.0	-12.0	-12.4	-13.2	-13.1	-16.4	-6.8
9-Feb	-13.8	-15.1	-16.3	-17.1	-19.2	-19.8	-20.6	-22.1	-22.3	-19.5	-17.5	-16.7	-15.4	-13.5	-11.9	-12.6	-13.2	-13.6	-13.6	-13.8	-14.3	-15.0	-15.5	-16.5	-16.2	-11.9
10-Feb	-17.5	-18.4	-19.0	-20.2	-20.7	-21.6	-24.8	-26.6	-25.9	-22.0	-18.4	-16.4	-14.0	-13.4	-13.0	-12.8	-12.7	-12.9	-12.9	-12.7	-12.5	-12.2	-12.2	-12.0	-16.9	-12.0
11-Feb	-11.7	-11.3	-10.8	-10.8	-11.8	-12.1	-11.7	-11.7	-12.2	-12.1	-9.4	-8.1	-6.2	-4.1	-2.1	-0.6	-1.2	-2.2	-2.6	-2.8	-3.2	-3.8	-3.6	-3.2	-7.1	-0.6
12-Feb	-3.5	-4.0	-4.3	-4.0	-3.9	-5.1	-5.1	-4.9	-5.1	-3.8	-1.4	0.6	4.2	6.2	7.1	7.2	6.5	6.1	4.8	4.0	5.1	5.5	5.4	4.9	0.9	7.2
13-Feb	4.4	4.1	4.8	5.4	4.1	2.3	1.5	1.3	1.6	1.5	1.0	0.4	0.7	1.4	1.7	1.6	1.0	-1.3	-3.0	-4.0	-5.1	-5.8	-6.7	-7.0	0.2	5.4
14-Feb	-6.7	-6.5	-6.4	-5.4	-4.9	-4.2	-4.9	-4.7	-4.6	-2.8	0.5	4.0	6.8	9.4	10.8	10.7	9.4	6.0	4.3	4.9	3.7	4.2	3.2	1.7	1.2	10.8
15-Feb	3.3	2.8	0.4	-0.4	0.4	0.5	-0.1	-0.1	0.8	2.3	4.1	5.5	7.4	9.1	8.3	8.1	7.7	8.2	7.9	7.4	7.1	6.7	5.5	5.2	4.5	9.1
16-Feb	5.2	4.3	3.1	3.2	2.2	1.7	1.8	1.9	2.4	5.2	7.5	6.3	6.9	8.8	10.0	9.7	10.1	5.7	5.0	3.5	2.9	2.8	2.1	0.1	4.7	10.1
17-Feb	-0.6	-0.9	-0.9	0.1	0.2	0.5	0.6	0.9	1.5	1.4	1.7	2.2	2.2	1.8	1.3	0.4	-0.4	-1.0	-1.9	-2.5	-2.7	-3.3	-4.2	-4.6	-0.3	2.2
18-Feb	-5.1	-5.5	-5.6	-5.6	-5.7	-5.8	-5.7	-5.9	-5.7	-5.4	-4.9	-4.0	-3.3	-2.9	-2.8	-2.9	-3.4	-3.9	-4.1	-4.4	-4.7	-4.8	-5.0	-5.1	-4.7	-2.8
19-Feb	-5.1	-5.0	-4.9	-4.9	-4.9	-4.9	-4.8	-4.7	-4.5	-4.1	-3.6	-3.6	-3.4	-3.3	-3.1	-3.0	-2.8	-2.9	-2.9	-2.9	-3.0	-3.0	-3.0	-2.9	-3.8	-2.8
20-Feb	-2.8	-2.7	-2.6	-2.6	-2.6	-2.4	-2.5	-2.6	-2.9	-3.0	-2.7	-1.9	-1.6	-1.3	-1.5	-1.7	-2.1	-2.8	-3.3	-3.6	-4.1	-4.3	-4.6	-4.8	-2.8	-1.3
21-Feb	-5.0	-5.9	-6.5	-6.7	-6.8	-7.3	-7.9	-8.5	-8.8	-8.2	-8.3	-7.7	-7.2	-6.6	-5.9	-6.2	-7.0	-7.5	-7.9	-8.6	-9.0	-9.1	-9.0	-10.1	-7.6	-5.0
22-Feb	-12.2	-13.6	-14.9	-15.2	-15.8	-16.4	-16.7	-17.6	-17.1	-14.8	-13.2	-12.6	-11.3	-10.5	-10.7	-10.7	-11.0	-11.7	-13.0	-13.3	-14.7	-15.2	-15.5	-15.3	-13.9	-10.5
23-Feb	-15.4	-16.2	-17.3	-18.1	-19.2	-20.3	-20.1	-19.0	-18.0	-15.4	-12.7	-12.0	-10.8	-11.1	-10.5	-10.0	-10.6	-11.0	-12.0	-13.5	-14.7	-14.7	-15.0	-15.1	-14.7	-10.0
24-Feb	-15.4	-16.9	-17.3	-17.2	-17.1	-17.3	-19.2	-18.1	-17.4	-16.2	-16.0	-15.5	-14.3	-13.5	-12.6	-12.9	-12.8	-13.8	-16.7	-18.6	-19.5	-19.8	-19.1	-19.5	-16.5	-12.6
25-Feb	-20.2	-20.2	-20.2	-20.0	-19.9	-19.5	-20.4	-19.9	-17.5	-15.5	-12.8	-10.5	-7.9	-7.7	-6.9	-7.3	-6.9	-6.8	-7.6	-8.6	-9.5	-11.6	-14.2	-15.7	-13.6	-6.8
26-Feb	-17.0	-18.2	-19.3	-19.3	-19.5	-21.7	-23.7	-24.5	-21.8	-19.2	-18.0	-16.8	-15.9	-15.8	-15.8	-15.6	-15.5	-16.0	-16.7	-18.0	-18.7	-19.7	-21.3	-21.6	-18.7	-15.5
27-Feb	-21.3	-20.9	-20.9	-20.9	-21.8	-23.8	-24.8	-25.2	-24.6	-22.6	-21.3	-19.8	-18.2	-15.6	-15.7	-14.5	-14.5	-14.9	-15.6	-15.7	-16.8	-18.1	-19.7	-20.0	-19.5	-14.5
28-Feb	-20.3	-19.8	-19.5	-20.7	-21.7	-21.5	-22.2	-23.2	-23.8	-23.4	-22.4	-21.6	-20.1	-19.6	-19.4	-18.9	-19.3	-20.5	-21.9	-22.6	-23.4	-23.7	-23.7	-23.8	-21.5	-18.9
Diurnal Average																								Diurnal Average		
Diurnal Maximum																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
CNRL Horizon - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	144	21.43	21.43
-20 - 0	426	63.39	84.82
0 - 10	99	14.73	99.55
10 - 20	3	0.45	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

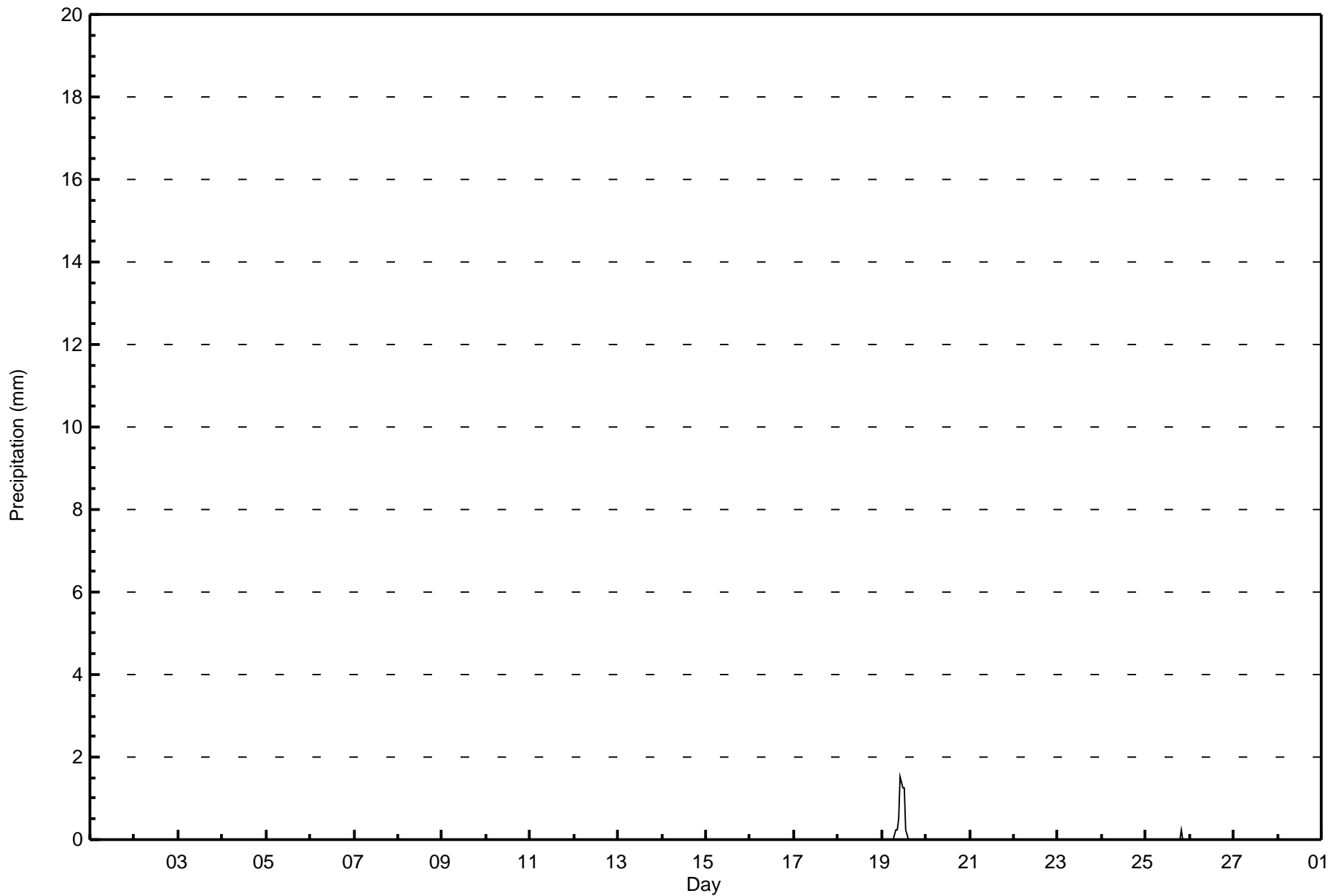


Maximum Value: 1.5 mm on Feb 19 11:00 Maximum Daily Total: 5.3 mm on Feb 19		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																										
Minimum Value: 0.0 mm on Feb 1 01:00 Maximum Diurnal Total: 1.5 mm at hour 11 Monthly Total: 5.59 mm		Minimum Daily Total: 0.0 mm on Feb 1 Minimum Diurnal Total: 0.0 mm at hour 1 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																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.5	1.5	1.3	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

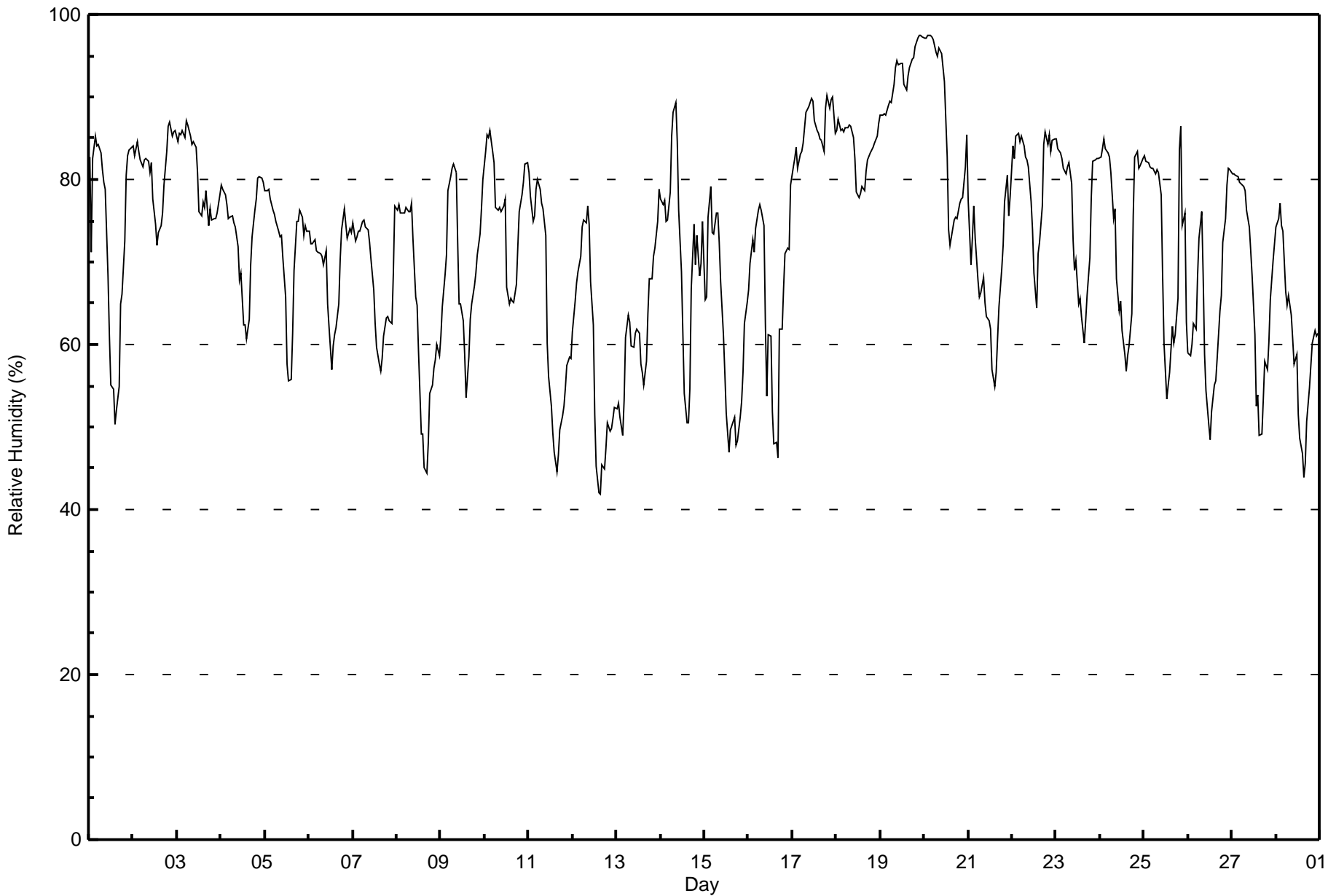
**Relative Humidity (RH) - %
CNRL Horizon - February 2017**

Maximum Value: 97 % on Feb 19 23:00																			Maximum Daily Average: 92.7 % on Feb 19						Hours in Service: 672	
Minimum Value: 42 % on Feb 12 16:00																			Minimum Daily Average: 58.8 % on Feb 12						Hours of Data: 672	
Maximum Diurnal Average: 78.7 % at hour 7																			Minimum Diurnal Average: 60.2 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 72.2 %																			Percentiles: P ₁ = 45 P ₁₀ = 55 Q ₁ = 63 Median = 74 Q ₃ = 82 P ₉₀ = 86 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-Feb	83	71	82	85	84	84	83	81	80	79	68	61	55	55	50	52	55	65	66	73	81	83	84	84	72.6	85
2-Feb	84	83	85	83	82	81	82	83	82	81	82	78	75	72	74	74	76	79	83	86	87	85	86	86	81.2	87
3-Feb	85	86	85	86	85	87	87	85	84	85	84	81	76	76	77	77	79	74	76	75	75	75	76	78	80.6	87
4-Feb	79	79	78	77	75	75	76	75	74	72	68	69	62	62	61	63	70	73	76	78	80	80	80	80	73.4	80
5-Feb	79	79	79	78	76	76	75	74	73	73	71	66	58	56	56	61	69	75	75	76	75	73	74	74	71.6	79
6-Feb	74	72	72	73	71	71	71	71	70	71	65	62	57	60	61	62	65	70	74	76	75	73	74	74	69.3	76
7-Feb	75	72	73	74	74	75	75	74	74	72	70	67	62	60	58	57	58	61	63	63	63	62	69	77	67.9	77
8-Feb	76	77	76	76	76	77	76	76	77	73	66	65	59	49	49	45	44	48	54	55	57	58	60	59	63.7	77
9-Feb	61	65	69	71	79	80	81	82	81	72	65	65	63	59	53	58	63	65	67	69	71	73	76	80	69.5	82
10-Feb	83	85	85	86	83	82	77	76	77	76	77	78	67	65	66	65	65	67	72	76	78	80	82	82	76.3	86
11-Feb	81	78	75	76	79	80	79	77	76	73	60	56	53	49	47	45	47	50	51	53	55	58	58	58	63.0	81
12-Feb	62	65	67	69	71	74	75	75	77	75	68	62	52	45	42	42	45	45	47	50	49	50	51	52	58.8	77
13-Feb	52	53	51	49	53	61	64	63	60	60	61	62	61	58	57	55	58	64	68	68	71	72	75	79	61.4	79
14-Feb	78	77	78	75	75	78	85	88	89	85	76	69	61	54	51	51	55	67	75	70	73	68	70	75	71.7	89
15-Feb	65	66	75	79	74	73	76	76	72	68	61	57	52	47	50	50	51	48	48	51	53	57	62	65	61.5	79
16-Feb	67	70	73	71	74	76	77	76	74	63	54	61	61	52	48	48	46	62	62	67	71	72	72	79	65.6	79
17-Feb	82	82	84	81	83	83	84	88	88	89	90	89	87	86	86	85	85	83	89	90	89	90	90	86	86.2	90
18-Feb	86	87	86	86	86	86	86	87	86	85	82	79	78	78	79	79	81	82	83	83	84	84	85	87	83.6	87
19-Feb	88	88	88	88	89	89	89	91	94	94	94	94	94	92	91	93	94	95	95	96	97	97	97	97	92.7	97
20-Feb	97	97	97	97	97	97	96	95	96	95	94	92	83	74	72	73	75	75	75	77	78	78	82	85	86.6	97
21-Feb	77	70	73	77	73	68	66	66	68	65	63	63	62	57	55	57	61	65	69	72	77	80	76	78	68.2	80
22-Feb	84	83	85	86	85	85	84	83	82	82	77	74	69	64	71	72	77	84	86	84	85	83	85	85	80.6	86
23-Feb	85	84	83	83	81	81	82	82	79	73	69	70	65	66	63	60	63	66	71	78	82	82	83	83	75.5	85
24-Feb	83	84	85	84	83	83	81	75	76	68	64	65	62	59	57	59	60	64	76	83	83	81	82	83	74.1	85
25-Feb	83	82	82	81	81	81	81	81	81	78	69	60	53	55	57	62	60	61	66	83	86	74	76	63	72.4	86
26-Feb	59	59	60	62	62	68	73	76	68	59	54	50	48	52	55	56	58	64	66	72	75	79	81	81	64.2	81
27-Feb	81	81	80	80	80	79	79	79	76	74	71	68	61	53	54	49	49	53	58	57	60	66	70	72	68.0	81
28-Feb	74	75	77	74	74	67	65	66	64	61	58	59	51	49	47	44	46	51	55	57	60	62	61	61	60.7	77
																			77.2 76.8 78.0 78.1 78.1 78.6 78.7 78.6 77.9 75.0 70.8 68.6 63.8 60.7 60.2 60.5 62.6 66.3 69.5 72.2 74.0 74.2 75.6 76.5						Diurnal Average	
																			97 97 97 97 97 97 96 95 96 95 94 94 94 92 91 93 94 95 95 96 97 97 97 97 97						Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - February 2017

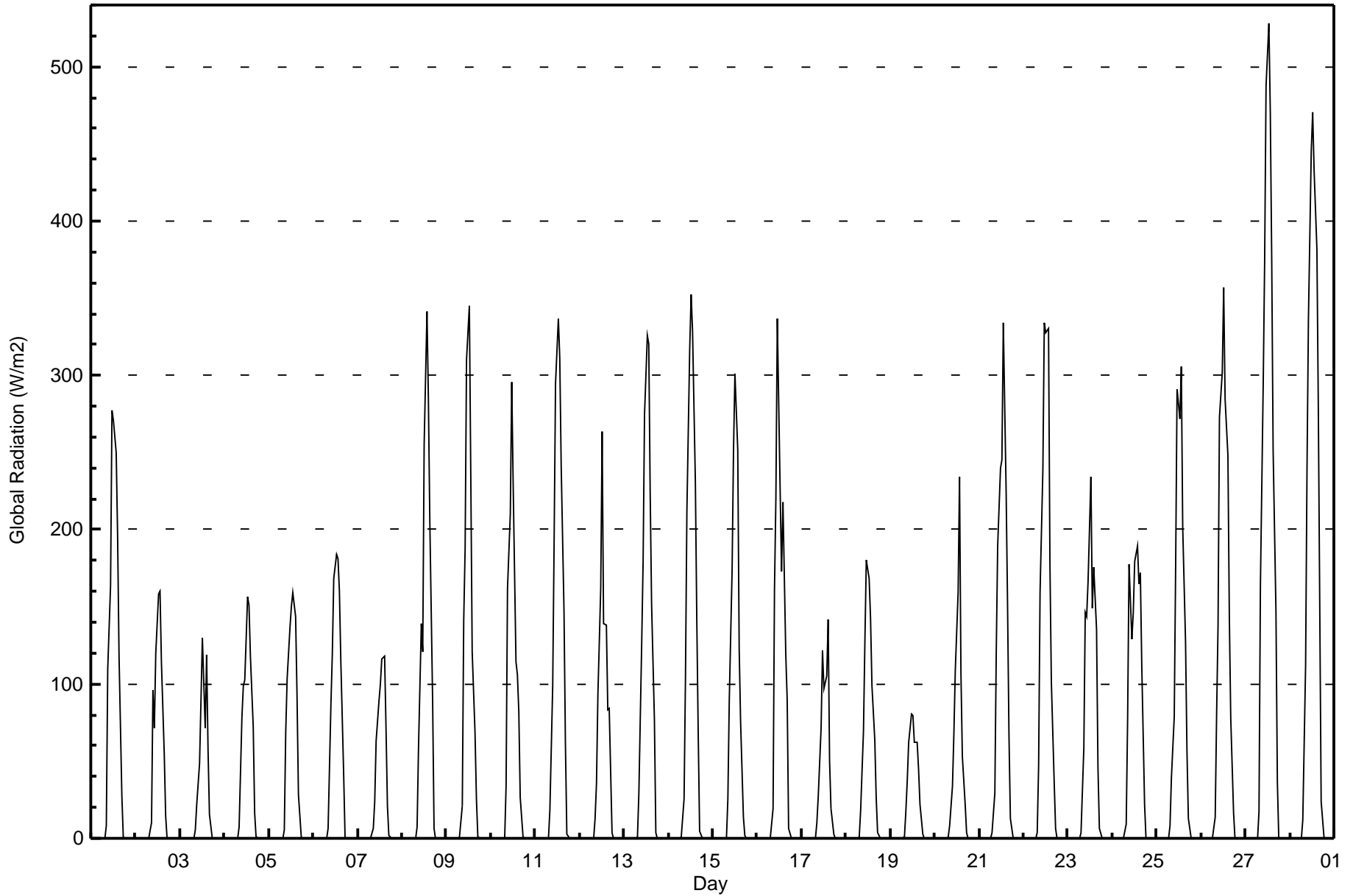
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	122	18.15	18.15
60 - 80	347	51.64	69.79
80 - 100	203	30.21	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Value: 529 W/m2 on Feb 27 13:00		Maximum Daily Average: 131.2 W/m2 on Feb 27		Hours in Service: 672																						
Minimum Value: 0 W/m2 on Feb 1 01:00		Minimum Daily Average: 19.7 W/m2 on Feb 19		Hours of Data: 672																						
Maximum Diurnal Average: 246.6 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 22		Hours of Missing Data: 0																						
Monthly Average: 56.3 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 88 P ₉₀ = 199 P ₉₉ = 370		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-Feb	0	0	0	0	0	0	0	0	8	110	164	278	271	250	195	118	28	1	0	0	0	0	0	0	59.3	278
2-Feb	0	0	0	0	0	0	0	0	10	96	71	120	158	161	114	55	15	0	0	0	0	0	0	0	33.4	161
3-Feb	0	0	0	0	0	0	0	0	6	22	49	89	130	71	119	58	16	0	0	0	0	0	0	0	23.3	130
4-Feb	0	0	0	0	0	0	0	0	8	79	99	102	156	151	118	72	16	1	0	0	0	0	0	0	33.4	156
5-Feb	0	0	0	0	0	0	0	0	6	68	103	137	150	159	144	92	28	1	0	0	0	0	0	0	37.0	159
6-Feb	0	0	0	0	0	0	0	0	6	87	120	169	184	181	160	115	42	1	0	0	0	0	0	0	44.4	184
7-Feb	0	0	0	0	0	0	0	0	7	24	63	89	100	116	118	71	21	2	0	0	0	0	0	0	25.4	118
8-Feb	0	0	0	0	0	0	0	0	7	59	139	121	256	342	284	206	88	6	0	0	0	0	0	0	62.8	342
9-Feb	0	0	0	0	0	0	0	1	21	141	187	310	345	236	121	69	26	1	0	0	0	0	0	0	60.7	345
10-Feb	0	0	0	0	0	0	0	0	34	162	210	295	229	114	106	82	27	1	0	0	0	0	0	0	52.5	295
11-Feb	0	0	0	0	0	0	0	0	18	99	192	295	337	311	241	148	62	3	0	0	0	0	0	0	71.1	337
12-Feb	0	0	0	0	0	0	0	0	13	35	94	162	264	139	138	83	85	4	0	0	0	0	0	0	42.4	264
13-Feb	0	0	0	0	0	0	0	1	29	126	179	274	326	320	224	152	77	4	0	0	0	0	0	0	71.3	326
14-Feb	0	0	0	0	0	0	0	1	26	105	212	317	352	329	231	142	69	4	0	0	0	0	0	0	74.5	352
15-Feb	0	0	0	0	0	0	0	0	25	90	174	252	301	252	124	76	13	2	0	0	0	0	0	0	54.6	301
16-Feb	0	0	0	0	0	0	0	0	19	161	220	337	227	173	217	119	89	6	0	0	0	0	0	0	65.4	337
17-Feb	0	0	0	0	0	0	0	0	10	28	71	122	97	105	142	51	20	2	0	0	0	0	0	0	27.0	142
18-Feb	0	0	0	0	0	0	0	1	18	70	128	181	168	142	99	64	27	3	0	0	0	0	0	0	37.6	181
19-Feb	0	0	0	0	0	0	0	1	17	38	62	81	80	63	62	45	22	3	0	0	0	0	0	0	19.7	81
20-Feb	0	0	0	0	0	0	0	1	8	33	68	109	159	234	107	53	22	4	0	0	0	0	0	0	33.3	234
21-Feb	0	0	0	0	0	0	0	4	30	120	190	240	245	334	224	151	67	13	0	0	0	0	0	0	67.4	334
22-Feb	0	0	0	0	0	0	0	4	47	159	239	334	327	330	177	101	37	6	0	0	0	0	0	0	73.4	334
23-Feb	0	0	0	0	0	0	0	3	59	146	144	167	235	149	176	135	45	6	0	0	0	0	0	0	52.7	235
24-Feb	0	0	0	0	0	0	0	9	78	178	129	147	180	190	164	172	113	22	0	0	0	0	0	0	57.5	190
25-Feb	0	0	0	0	0	0	0	8	39	79	177	291	272	305	202	127	57	13	0	0	0	0	0	0	65.4	305
26-Feb	0	0	0	0	0	0	0	14	81	137	272	302	357	285	248	144	78	16	0	0	0	0	0	0	80.6	357
27-Feb	0	0	0	0	0	0	0	17	164	296	374	488	529	470	375	251	148	37	0	0	0	0	0	0	131.2	529
28-Feb	0	0	0	0	0	0	0	12	113	241	337	445	470	433	381	278	151	24	1	0	0	0	0	0	120.3	470
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	32.3	106.8	159.6	223.3	246.6	226.6	179.0	115.5	53.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	0	17	164	296	374	488	529	470	381	278	151	37	1	0	0	0	0	0	Diurnal Maximum





Maximum Speed: 26 km/h on Feb 13 04:00	Maximum Daily Speed Average: 13.1 km/h on Feb 11	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 23 00:00	Minimum Daily Speed Average: 0.8 km/h on Feb 24	Hours of Data: 664
Maximum Diurnal Speed Average: 4.2 km/h at hour 9	Minimum Diurnal Speed Average: 0.4 km/h at hour 19	Hours of Missing Data: 8
Monthly Average Velocity: 1.7 km/h 235.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 14 P ₉₉ = 22	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-Feb	N3	N11	NE9	NNE6	NNE4	NNE3	NE4	AF	SW5	SSW5	SE2	S4	SSE4	SE7	SE7	SE6	SE5	SSW5	SW9	SW7	SW9	SW11	SW10	SW11	S2.1	N11
2-Feb	SSW9	SW8	SW12	SW11	WSW12	SW8	SW7	SW6	SSW8	SW4	SW2	N5	E6	E8	ESE6	ESE5	E3	NE3	NNE4	NE6	NE4	NE7	NE6	NNE3	SSW1.6	WSW12
3-Feb	ENE3	NE5	NE5	ENE3	AF	ENE5	ENE5	AF	SSW4	SW4	SSW5	SSW5	SSE4	SE3	SE5	SE4	W3	N13	NNE11	NE12	NE11	NE12	NE10	NE6	NE3.3	N13
4-Feb	ENE4	SE3	SSW3	SW4	WSW4	WSW5	SW7	SSW5	SW7	S5	SSW5	SSE1	SSW7	S8	S6	SSE6	SE5	ESE4	NE3	NNE5	NNE8	NNE10	NNE12	N9	SSE0.9	NNE12
5-Feb	N7	NNE5	NNE4	NNW4	WNW3	SW5	SW6	SW5	WSW4	SE3	ENE2	WNW0	SSW4	S6	S6	ESE8	E7	ENE2	AF	WSW2	WSW4	SW5	SW6	WSW5	SW1.3	ESE8
6-Feb	SSW7	SSW6	SSW6	SSW7	S3	S4	SSW6	SSW6	SSW5	SSW5	SSW5	SSW4	SSW4	NNE5	NNE5	N4	NNE4	NE7	N1	WNW4	WNW5	WSW4	SW4	AF	SSW2.2	SSW7
7-Feb	SW6	SSW6	SSW8	SW8	SW10	SSW10	SSW16	SW19	SSW18	SW16	SSW16	SW15	SW13	W9	WSW5	NW14	NW11	NW5	NNW9	NW9	NW11	WNW8	W7	WSW7.7	SW19	
8-Feb	W7	W11	WSW10	WSW10	SSW10	SW12	SW13	SW15	SSW15	SW16	SSW15	SSW15	SW14	SW12	SSW15	SW20	SW17	SW13	SSW11	SSW10	SSW10	S10	SSW12	SW11	SW12.1	SW20
9-Feb	SW12	SW12	WSW11	WSW9	SSW6	SSW7	SSW7	S5	SSW6	S4	SW2	N2	N5	NNE2	SSW2	NNE3	NNE6	NNE6	N5	NNE6	NNE6	NNE7	NNE7	NNE8	W1.2	SW12
10-Feb	NNE8	NNE8	NNE8	N6	NNE5	NNE5	NW1	SSW3	SSW3	S1	NW2	SSW1	SSW6	SW4	NNW2	NNE3	ENE3	E4	N1	N3	NNW3	AF	NNE3	SW3	N1.7	NNE8
11-Feb	S7	S9	SSW12	SW14	SW14	SW15	SW15	WSW16	SW14	SW13	SW12	SSW12	SSW13	SW17	SSW12	SW12	SSW10	SW11	SW14	SW14	SW14	SW15	WSW18	WSW19	SW13.1	WSW19
12-Feb	WSW18	SW15	WSW10	WSW10	W10	W12	WSW13	W8	NNW4	WSW8	WSW14	WSW17	WSW24	WSW22	SW18	SW16	SSW12	SW11	SSW10	SSW10	WSW14	WSW13	SW8	SW12	WSW12.1	WSW24
13-Feb	S7	WSW8	W12	WNW26	W19	WSW17	WSW17	W16	W13	WNW8	NE8	ENE9	E9	E7	ENE8	E6	NE6	NE7	NNE6	NNE7	N6	NW5	W3	SSW5	WNW3.6	WNW26
14-Feb	S7	S9	S8	S11	S12	S13	SSW18	SSW15	SSW12	S12	S13	SSW13	SSW15	S13	S10	SSE7	SSE5	SW3	SSW8	SSW9	SSW11	SSW11	SW9	SSW5	SSW10.1	SSW18
15-Feb	SSW11	S6	SSW5	SSW8	SSW10	SSW8	SSW9	SSW10	S11	SSW13	S12	S11	S10	S9	S9	SSW8	SSW8	SW9	SW10	SSW12	SSW14	SSW12	SSW13	S9	SSW9.4	SSW14
16-Feb	S10	SSW10	SW10	SW15	SW12	SW9	S4	S8	S10	SSW6	SSW1	N6	NW6	SW3	ENE2	E4	S2	NW4	N7	NNW6	NNW9	NW10	NNW5	SSW6	WSW3.2	SW15
17-Feb	SW5	SW6	SSE2	SSW6	S4	SW3	W3	ENE3	NNE4	N2	NW1	E3	ENE6	NE8	NE8	NE9	NE9	NE8	NE10	NE8	NE8	NE9	NE10	NE9	NE3.6	NE10
18-Feb	NE9	ENE6	ENE6	E6	ENE4	ENE3	E4	ENE5	NE2	NNE4	NNE4	E3	ENE4	NE6	NE7	NNE8	NNE10	NNE9	NNE9	NNE10	NNE10	NNE9	NNE10	NNE10	NE6.1	NNE10
19-Feb	NNE9	NNE9	NNE9	NNE10	NNE9	NNE9	NNE9	NE9	NNE10	NE10	NE13	NE12	NE14	NE13	NE12	NNE9	NNE10	NNE10	NNE9	NNE7	NNE7	NNE6	NNE6	NNE6	NE9.3	NE14
20-Feb	NNE6	NNE5	N4	NNE6	N4	NNW5	NNW6	N5	NNE3	NE4	ENE1	SSW5	W8	WNW13	WNW13	WNW10	WNW12	WNW11	W9	W6	WSW9	WSW6	SW5	WSW7	WNW4.5	WNW13
21-Feb	W9	W14	WSW8	SW7	W10	W14	W13	W11	WSW6	W10	WNW16	W15	WNW14	WNW16	WNW16	WNW15	WNW11	WNW7	W6	W8	W7	W7	WNW8	NNW5	W10.1	WNW16
22-Feb	NNE7	NNE5	SE1	SSE4	SSW5	SW5	SW5	ESE1	AF	NNE3	NE4	N6	NNE5	ENE4	N5	NE5	NE7	ENE3	ENE4	ENE2	ESE1	ENE2	NW2	WNW0	NE1.8	NNE7
23-Feb	S4	S3	SSW4	SW4	AF	SW4	SSW5	S5	SSW5	S5	S5	S6	SSE6	SE6	SE8	SE6	ESE7	ESE4	NE5	NNE8	NNE7	N7	N8	NNE5	SSE1.8	NNE8
24-Feb	NE6	NNE4	NNW4	NNW4	N4	NNE5	N3	NNW7	NNE5	N4	NW10	NE3	SSE4	S6	S6	SE8	SE8	SE6	S5	SW5	SW5	SSW9	SSW10	SSW11	SSW0.8	SSW11
25-Feb	SSW13	SSW12	SSW13	SSW12	SSW12	S13	SSW15	SSW14	SSW12	SSW16	SSW10	S7	SSW5	NNE4	NE8	NNE7	N8	W7	E5	NE8	NNE22	NNE16	NNW23	SSW2.0	NNW23	
26-Feb	N25	NNW24	NW13	NW14	N11	NNW5	WNW5	WNW3	SSW4	NNW4	NE5	E1	SE3	E8	E8	ENE7	E6	E5	E4	E5	ENE6	NE6	NNE7	NNE6	N4.8	N25
27-Feb	NNE6	NNE7	NNE7	NNE7	NE7	NE7	NNE7	NNE8	NNE6	NNE4	NNW5	NNW5	NNW5	SW2	NNE3	ESE4	SE6	SSE7	SSE7	S7	SSW8	W3	SW5	SW7	NE1.5	SSW8
28-Feb	SSW6	W2	NE13	NE13	NE8	NE11	NNE11	NNE9	NE8	NE8	NNE5	NW4	NNE4	E7	E9	E9	E10	ENE8	ENE6	NE7	NNE6	NNE7	NNE8	NNE8	NE6.6	NE13
WSW1.5 W2.3WSW2.1WSW3.4WSW3.5 SW3.6 SW4.0 SW4.1 SW4.2 SW3.4 SW2.4SSW2.5SSW2.9 S2.2 S1.4 SE1.4 E0.9NNW0.8 NO.4NNW1.1 NW1.6 NW1.9WNW1.7 W1.8																								Diurnal Average		
N25 NNW24 NE13WNW26 W19WSW17 SSW18 SSW16 SW19 SSW18WNW16WSW17WSW24WSW22 SW18 SW20 SW17 SW13 SW14 SW14WSW14 NNE22 WSW18NNW23																								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

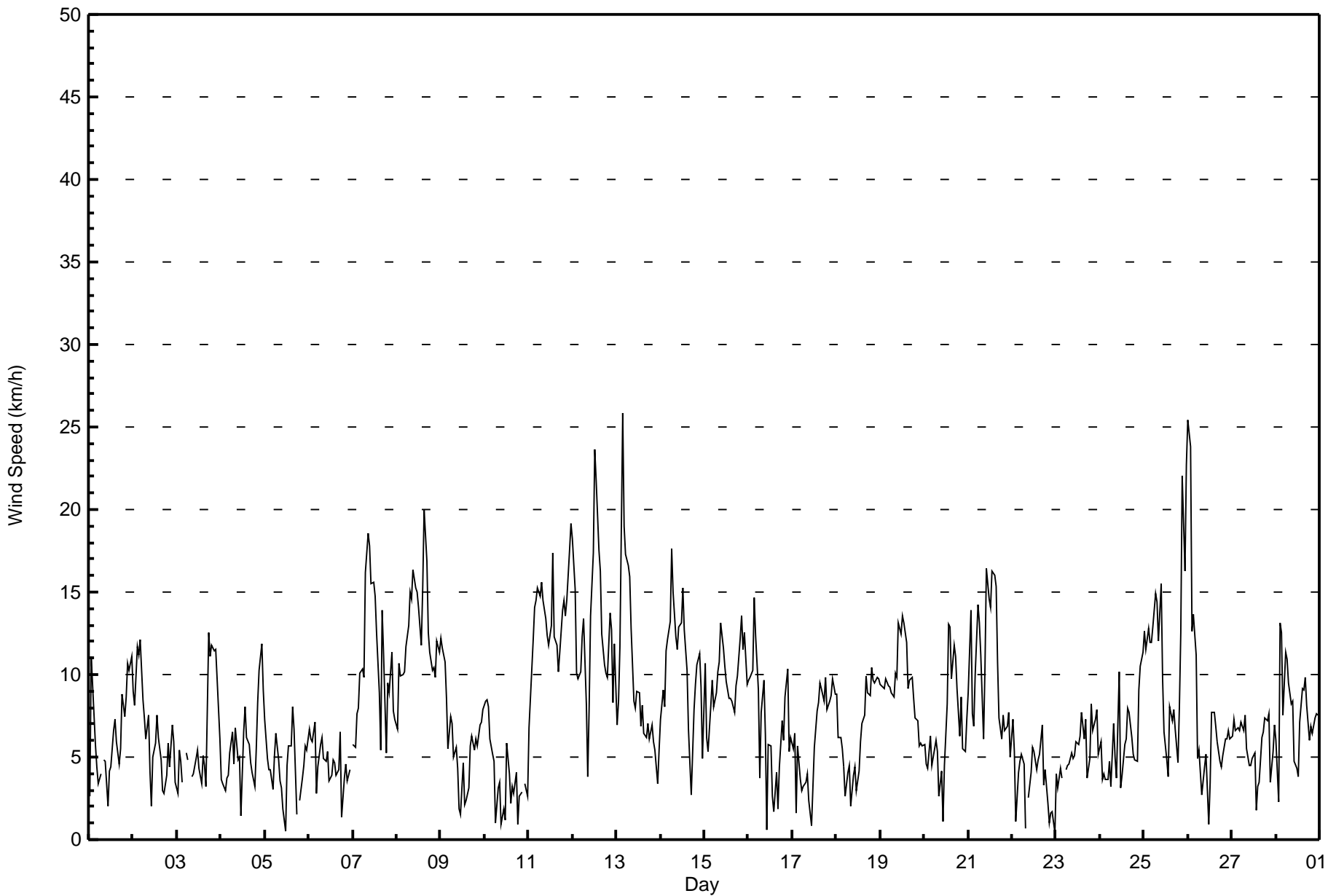
Wind Speed (WS) - km/h
CNRL Horizon - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 26 00:00 Minimum Value: 0 km/h on Feb 22 06:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 672 Hours of Data: 664 Hours of Missing Data: 8 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-Feb	3	5	2	2	2	1	2	AF	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	5
2-Feb	2	1	1	3	2	2	2	1	1	3	2	2	2	2	2	1	1	1	1	1	1	2	1	1	1	3
3-Feb	1	1	1	1	AF	1	1	AF	1	1	1	1	1	2	1	1	2	4	3	3	3	3	2	2	4	
4-Feb	2	1	1	1	1	1	2	2	1	2	1	1	2	2	2	1	1	1	1	2	2	2	3	2	3	
5-Feb	2	1	1	1	1	1	1	1	1	1	2	1	1	2	2	2	2	1	AF	1	1	1	1	2	2	
6-Feb	2	1	1	1	2	1	1	1	1	2	2	1	1	1	1	1	2	1	2	1	1	1	1	AF	2	
7-Feb	1	1	1	1	2	2	3	3	3	3	3	4	3	3	3	2	3	2	2	4	2	2	2	1	4	
8-Feb	2	2	2	2	1	2	2	2	2	3	3	3	3	3	4	5	4	4	3	2	2	1	4	2	5	
9-Feb	3	2	2	2	2	2	1	1	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	3	
10-Feb	1	1	1	1	1	2	1	1	1	1	2	3	1	1	1	1	2	1	1	2	2	AF	1	2	3	
11-Feb	3	3	2	2	3	3	3	3	3	2	3	2	3	4	3	3	2	2	3	3	3	3	3	4	4	
12-Feb	4	3	2	2	2	2	2	2	1	2	3	4	6	5	5	4	2	2	2	2	3	3	3	3	6	
13-Feb	3	3	3	5	4	3	3	3	3	2	2	2	2	2	1	1	2	1	1	1	1	1	1	1	5	
14-Feb	1	1	2	2	2	4	3	2	3	2	3	3	3	3	3	2	1	2	2	1	2	2	2	2	4	
15-Feb	2	2	1	2	2	1	2	2	2	2	3	2	3	2	2	2	1	2	2	2	3	2	2	3	3	
16-Feb	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	2	1	3	
17-Feb	1	1	2	1	1	2	2	2	2	2	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	
18-Feb	2	2	1	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	2	3	2	2	2	2	3	
19-Feb	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	1	1	2	3	
20-Feb	1	1	1	2	1	2	2	2	1	1	2	1	2	2	2	2	2	2	2	2	1	1	1	1	2	
21-Feb	2	5	1	2	3	4	4	3	2	4	4	3	3	3	3	3	3	1	1	1	1	1	2	3	5	
22-Feb	2	2	1	1	0	0	1	1	AF	1	2	1	1	2	2	1	2	3	1	2	1	1	2	1	3	
23-Feb	1	1	1	2	AF	1	1	1	1	1	1	2	2	2	2	2	2	1	1	2	1	1	2	1	2	
24-Feb	1	1	1	1	1	1	2	5	1	2	3	2	1	2	2	2	2	2	1	1	1	1	2	2	5	
25-Feb	1	2	3	2	2	2	2	2	3	3	4	2	1	1	2	5	4	1	3	2	4	7	4	8	8	
26-Feb	6	5	4	3	4	2	1	2	1	2	2	2	3	3	2	2	1	1	1	1	1	1	1	1	6	
27-Feb	1	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	
28-Feb	1	1	4	3	3	4	3	3	3	2	1	1	2	3	3	3	2	2	1	2	1	2	2	2	4	
	6	5	4	5	4	4	4	5	3	4	4	4	6	5	5	5	4	4	3	4	4	7	4	8		
Diurnal Maximum																										
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	229	34.49	34.49
6 - 11	309	46.54	81.02
12 - 19	118	17.77	98.80
20 - 28	8	1.20	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - February 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	35	11	21	10	6	10	7	16	29	25	8	5	7	8	14	229
6 - 11	11	65	38	9	14	3	10	6	26	46	32	13	18	7	6	5	309
12 - 19	1	2	10	0	0	0	0	0	7	34	31	13	9	8	3	0	118
20 - 28	1	1	0	0	0	0	0	0	0	0	1	2	0	1	0	2	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	30	103	59	30	24	9	20	13	49	109	89	36	32	23	17	21	664

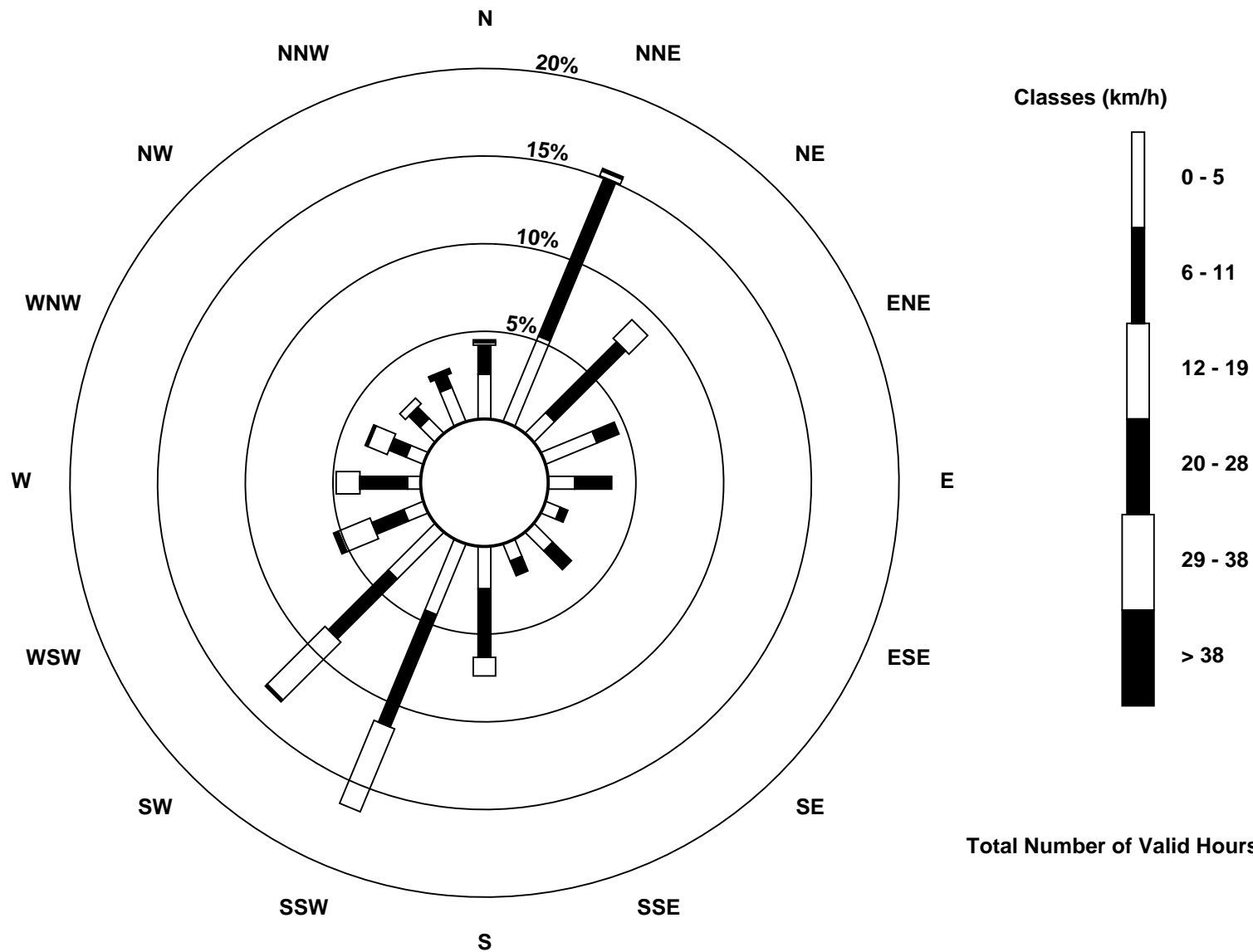
Total Number of Valid Hours: 664

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - February 2017

Direction of Maximum Speed: 283 deg on Feb 13 04:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 220.6 deg on Feb 11	Hours of Data: 664
Direction of Minimum Speed: 295 deg on Feb 23 00:00	Direction of Minimum Daily Speed Average: 0.8 deg on Feb 24
Direction of Minimum Speed: 295 deg on Feb 23 00:00	Hours of Missing Data: 8
Monthly Average Direction: 236.2 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-Feb	10	356	42	33	20	27	39	AF	219	203	130	173	149	135	135	126	144	193	219	236	219	217	222	219	188.9
2-Feb	210	215	227	228	240	232	226	222	213	223	216	2	87	97	118	102	83	56	24	42	49	42	41	25	199.6
3-Feb	61	40	56	75	AF	57	63	AF	207	215	196	200	166	145	131	142	278	353	28	35	44	50	50	53	55.6
4-Feb	70	140	196	216	243	241	234	211	229	190	192	160	197	176	180	148	128	104	45	18	28	22	23	7	159.9
5-Feb	3	19	13	336	284	215	215	233	247	145	74	283	210	186	188	105	95	66	AF	238	256	226	226	246	217.6
6-Feb	202	195	201	204	190	191	192	206	209	198	192	198	204	29	13	10	22	48	354	283	284	253	229	AF	211.6
7-Feb	214	213	209	218	215	216	198	209	215	211	216	210	230	216	262	247	324	312	316	335	318	310	292	272	239.8
8-Feb	260	264	245	241	203	220	219	214	211	219	205	208	220	218	203	218	222	216	195	202	195	181	213	214	215.6
9-Feb	226	226	239	245	204	202	201	179	200	190	217	352	351	17	206	20	31	20	357	13	19	19	31	32	260.5
10-Feb	25	19	24	356	17	13	322	208	210	185	315	211	202	215	340	20	57	86	352	5	330	AF	21	217	9.7
11-Feb	178	188	213	219	222	227	236	237	229	229	217	201	199	214	209	214	209	216	222	228	225	223	237	239	220.6
12-Feb	241	234	253	252	262	271	257	268	331	249	245	238	242	246	226	221	202	224	197	209	246	249	233	214	238.9
13-Feb	185	244	281	283	262	249	244	260	265	300	45	70	82	81	77	80	50	36	18	15	349	326	266	205	285.3
14-Feb	178	187	178	182	184	182	198	199	194	182	190	197	200	191	190	161	147	215	202	193	202	208	228	205	192.1
15-Feb	203	180	196	207	204	202	200	195	191	197	190	177	171	169	179	195	213	227	223	211	210	208	201	175	197.5
16-Feb	191	209	215	228	234	226	170	175	191	198	207	352	319	232	71	85	188	314	7	336	328	319	328	210	239.0
17-Feb	222	218	166	207	186	234	280	62	28	352	314	79	73	52	42	51	50	40	39	38	34	47	51	55	48.9
18-Feb	56	62	73	79	71	65	89	75	34	32	28	91	74	38	40	33	21	25	23	22	23	28	33	27	41.2
19-Feb	24	25	28	28	29	30	32	36	32	38	47	41	51	54	47	29	29	27	25	28	28	23	17	14	33.8
20-Feb	15	15	2	31	2	347	340	360	17	44	66	195	281	289	290	291	291	292	275	260	252	255	217	238	298.3
21-Feb	270	274	244	231	260	265	278	262	238	273	292	280	286	297	283	288	291	286	278	270	267	262	284	329	276.6
22-Feb	29	13	128	149	199	224	233	113	AF	27	34	350	24	72	356	44	56	62	58	68	109	61	304	295	39.5
23-Feb	169	179	210	228	AF	215	211	190	198	190	189	187	168	134	137	143	123	117	40	19	16	11	10	19	146.6
24-Feb	34	28	346	348	360	21	6	345	27	7	316	37	158	175	188	137	143	142	180	229	224	210	220	207	201.8
25-Feb	206	203	198	199	192	187	198	197	199	209	201	169	204	17	41	12	10	263	81	51	36	21	21	348	200.1
26-Feb	357	337	322	317	353	334	303	282	208	339	35	101	131	88	79	77	84	93	80	83	57	36	20	17	9.7
27-Feb	25	26	25	21	40	38	32	25	12	15	343	327	338	233	13	109	129	162	166	177	198	272	228	214	34.2
28-Feb	206	280	35	38	43	36	28	30	43	45	21	323	23	85	80	79	84	67	65	47	26	27	27	20	44.0
240.8 260.3 248.6 248.8 237.5 234.4 230.8 223.8 217.1 218.9 223.6 212.3 210.0 188.1 172.1 135.3 79.5 340.2 350.8 332.1 306.5 319.1 300.2 270.5																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

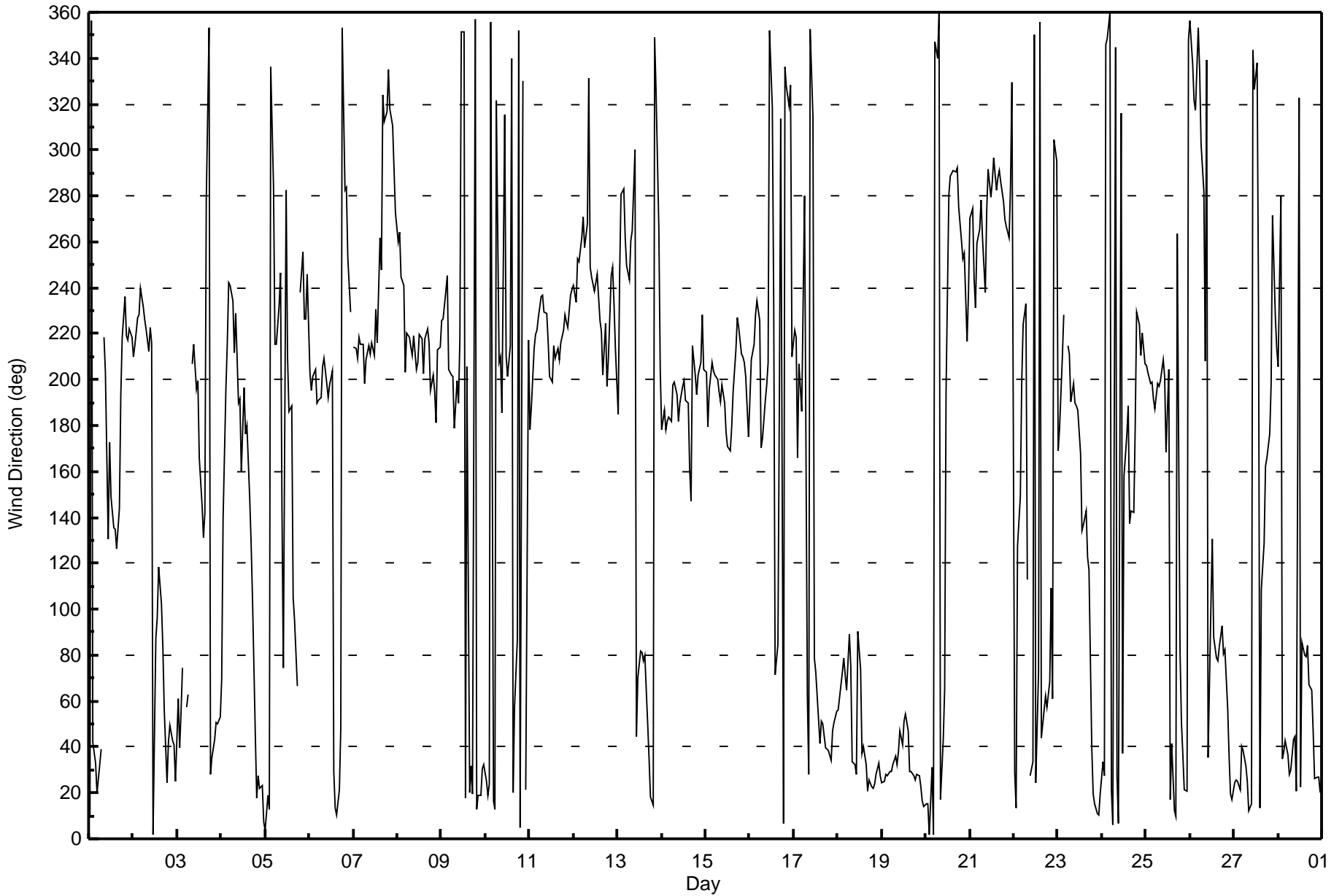
Wind Direction (WD) - deg
CNRL Horizon - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 94 deg on Feb 26 12:00	Hours of Data: 664
Minimum Value: 6 deg on Feb 22 07:00	Hours of Missing Data: 8
Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 14 Median = 17 Q ₃ = 24 P ₉₀ = 43 P ₉₉ = 87	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-Feb	60	28	16	16	33	20	34	AF	12	16	52	28	33	21	18	18	27	25	14	19	10	9	8	9	60
2-Feb	10	9	8	14	11	12	21	17	13	76	61	39	28	21	20	22	22	27	11	16	16	14	15	25	76
3-Feb	19	13	16	16	AF	14	27	AF	31	24	16	24	31	55	32	20	74	39	18	17	16	16	14	14	74
4-Feb	43	36	22	27	12	16	11	28	18	17	20	67	22	23	30	21	17	32	55	14	16	17	17	18	67
5-Feb	15	13	30	14	37	14	18	20	35	45	69	88	24	23	24	22	15	57	AF	42	37	29	18	27	88
6-Feb	19	17	11	13	81	19	11	8	9	18	17	36	39	21	20	20	16	9	51	12	14	20	14	AF	81
7-Feb	12	10	9	10	13	14	17	14	11	13	14	15	16	17	32	43	10	16	20	14	16	9	22	13	43
8-Feb	15	11	12	21	10	8	11	10	12	13	14	15	18	20	18	16	15	16	13	13	12	9	28	21	28
9-Feb	16	14	12	17	25	14	12	22	19	21	57	88	30	58	54	22	16	14	15	14	10	11	12	11	88
10-Feb	18	10	11	13	14	8	46	10	25	61	65	86	19	19	65	26	32	20	62	49	30	AF	27	24	86
11-Feb	19	30	14	11	13	12	15	14	13	12	16	18	16	14	17	16	17	12	13	12	13	12	12	12	30
12-Feb	13	14	18	17	12	12	10	20	36	20	12	13	14	15	16	15	14	14	14	20	15	16	18	15	36
13-Feb	35	28	15	12	17	12	13	14	14	20	39	24	20	29	18	19	17	17	13	13	16	20	36	14	39
14-Feb	14	9	18	12	14	15	11	12	14	14	14	15	14	18	16	29	30	64	8	8	8	13	12	23	64
15-Feb	11	26	30	11	13	12	11	12	12	13	17	15	16	16	22	11	21	18	13	10	14	13	14	31	31
16-Feb	18	10	12	13	14	15	53	21	15	18	87	18	31	55	77	23	58	47	13	19	9	10	50	11	87
17-Feb	20	16	86	13	47	44	18	68	17	42	72	39	21	15	20	15	14	17	18	17	18	18	14	20	86
18-Feb	18	25	16	18	21	21	19	16	23	28	31	50	41	20	20	20	18	18	17	18	15	17	17	17	50
19-Feb	17	15	17	16	17	18	18	18	17	17	14	16	14	15	14	18	17	18	18	19	17	17	17	19	19
20-Feb	21	19	18	19	35	18	19	23	33	18	86	18	29	12	10	11	9	12	14	19	16	18	17	16	86
21-Feb	15	15	16	14	19	19	18	16	20	26	13	18	17	12	16	14	9	12	13	12	13	15	16	45	45
22-Feb	17	11	66	12	15	7	6	91	AF	22	29	23	31	65	29	23	20	33	27	29	68	72	62	89	91
23-Feb	21	40	10	43	AF	17	20	8	13	15	20	23	44	26	24	34	21	24	14	17	14	17	17	16	44
24-Feb	15	37	26	18	34	22	37	28	28	53	18	64	48	35	28	25	17	17	26	17	25	15	11	9	64
25-Feb	9	14	13	13	11	11	11	11	15	13	23	34	31	56	23	43	40	28	78	17	18	18	18	21	78
26-Feb	22	12	19	15	20	23	22	44	27	56	34	94	65	37	24	18	23	16	18	14	12	11	8	15	94
27-Feb	15	17	18	16	13	12	10	14	17	23	26	10	21	92	80	74	20	14	11	12	20	37	16	11	92
28-Feb	14	65	17	17	18	20	18	19	21	20	46	32	57	39	26	27	17	15	12	16	19	17	16	15	65
	60	65	86	43	81	44	53	91	36	76	87	94	65	92	80	74	74	64	78	49	68	72	62	89	

Diurnal Maximum

AF - Analyzer Failure





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 16, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	14:09
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	869	868
Calculated slope	0.997802	1.002689	Chamber temp	45.1	44.8
Calculated intercept	0.144423	-0.669533	Pressure	700.8	701.4
Analyzer Background	20.0	19.9	Flow	0.350	0.350
Analyzer Coefficient	1.017	1.017	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 710321322

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	81.6	816.0	813.8	1.003
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	81.6	816.0	813.8	1.003
second point	5000	40.6	406.0	406.6	0.999
third point	5000	20.3	203.0	203.7	0.996
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	81.6	816.0	817.9	0.998
Average Correction Factor					0.999

Corrected As found 814.1 Previous response 817.7 % change 0.4%

Notes:

Changed inlet filter after as founds. Adjusted the span.

Calibration Performed By: Jayne Marcoux



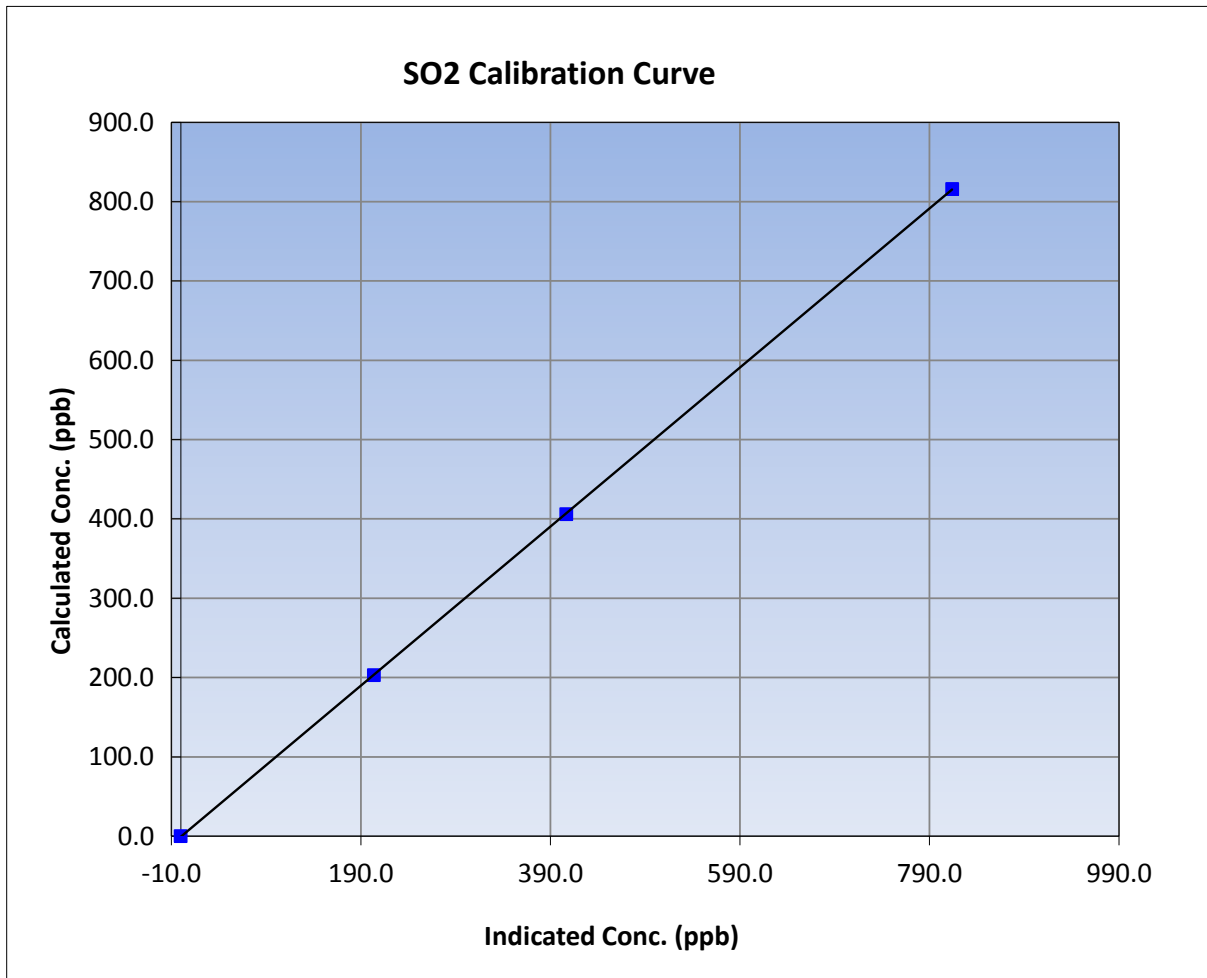
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 16, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	14:09
Analyzer make	Thermo 43i	Analyzer serial #	710321322

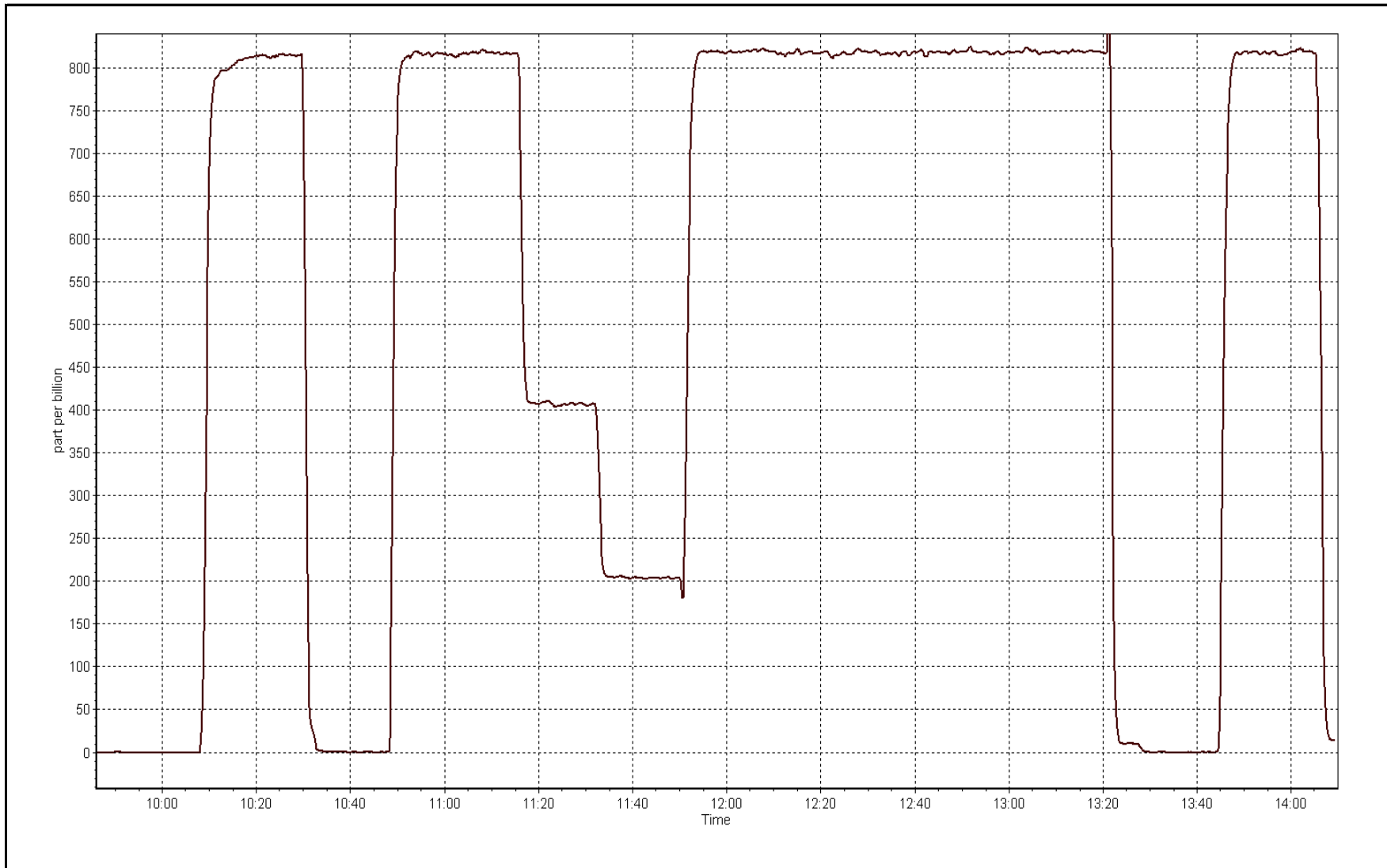
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999992
816.0	813.8	1.0027		
406.0	406.6	0.9985	Slope	1.002689
203.0	203.7	0.9965		
			Intercept	-0.669533



SO2 Calibration Plot

Date: February 9, 2017





Wood Buffalo Environmental Association TRS Calibration Report

W B E A

Station Information

Calibration Date	February 10, 2017	Last Calibration	January 27, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:11	End Time (MST)	13:26
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	-685	-685
Analyzer IP address	192.168.1.44		Lamp voltage	992	993
Calculated slope	0.994430	1.005438	Chamber temp	45	45
Calculated intercept	-0.137055	-0.331875	Pressure	630.7	627.9
Analyzer Background	2.46	2.5	Flow	0.401	0.400
Analyzer Coefficient	1.158	1.167	Intensity	90	89
			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	0.1	----
as found span	5000	80.5	79.7	78.6	1.014
SO2 scrubber check	5000	20.2	202.0	1.5	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	80.5	79.7	79.5	1.003
second point	5000	40.2	39.8	40.2	0.991
third point	5000	20.0	19.8	20.1	0.984
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	80.5	79.7	79.8	0.999
Average Correction Factor					0.993

Corrected As found	78.4	Previous response	80.3	% change	2.4%
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Notes:

Changed inlet filter after as founds. Completed scrubber check. Generated 80ppb of SO2 instead of 80PPB of H2S after scrubber check. Corrected and continued Adjusted the span.

Calibration Performed By:

Jayme Marcoux



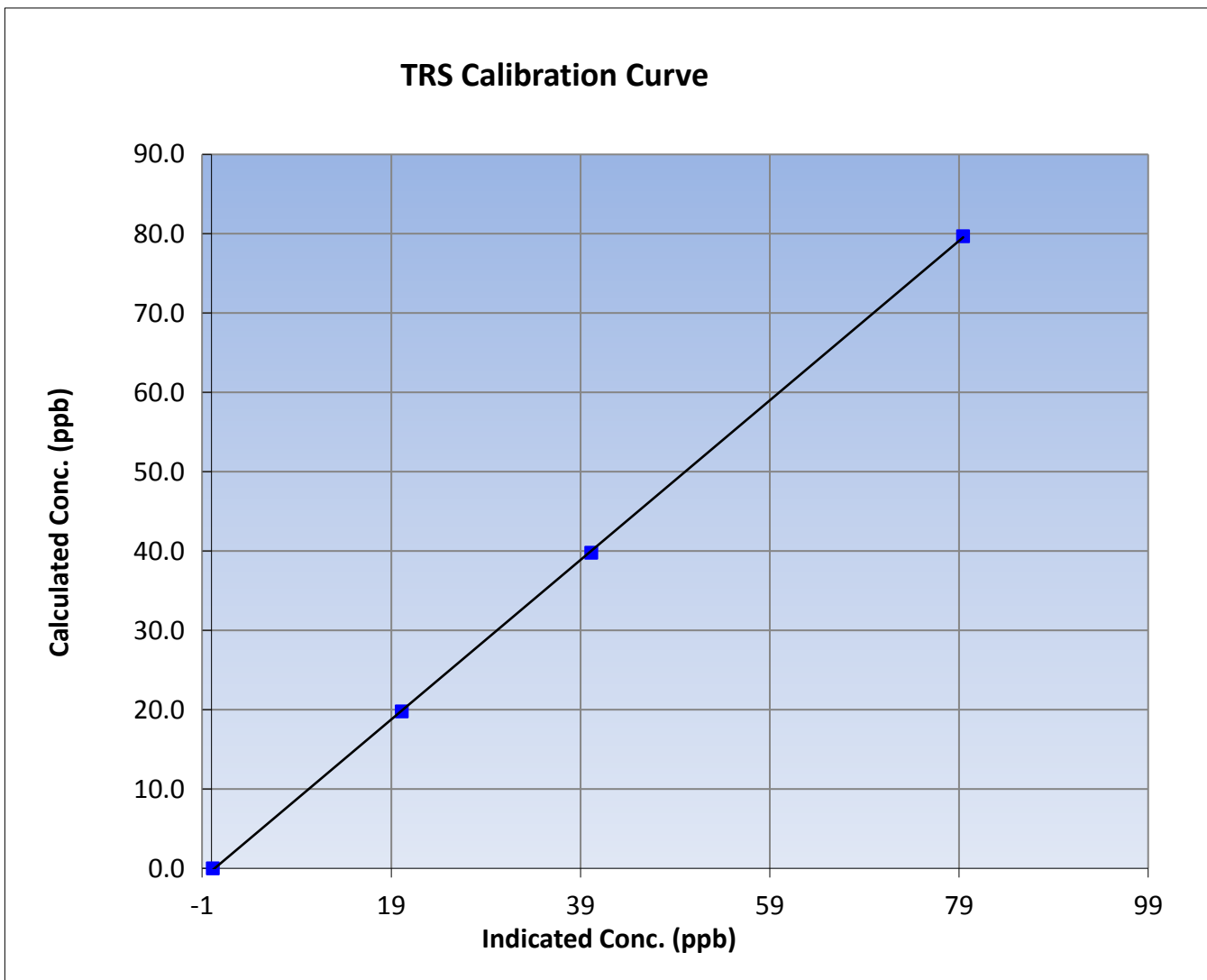
Wood Buffalo Environmental Association TRS Calibration Report

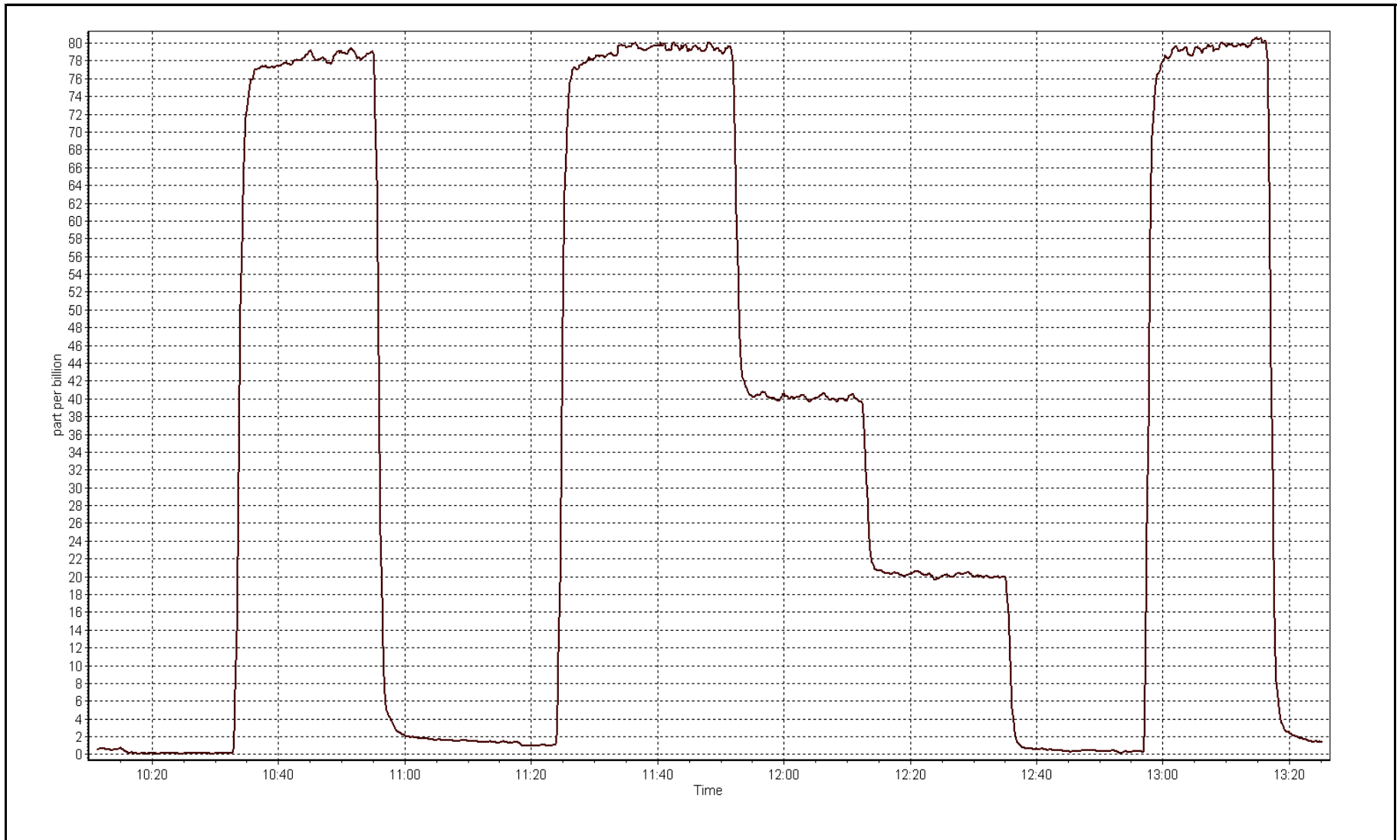
Station Information

Calibration Date	February 10, 2017	Previous Calibration	January 27, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:11	End Time (MST)	13:26
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	0.999964
79.7	79.5	1.0031		
39.8	40.2	0.9912	Slope	1.005438
19.8	20.1	0.9841		
			Intercept	-0.331875







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 9, 2017	Last Calibration	January 16, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	14:08
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	0.999325	0.999507	Fuel Pressure	26.3	26.3
Calculated intercept	-0.024353	-0.010486	Analyzer Coeff	3.216	3.258
			Analyzer BKG	2.28	2.31

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	-0.02	----
as found span	5000	81.6	17.08	16.87	1.013
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	81.6	17.08	17.09	1.000
second point	5000	40.7	8.52	8.54	0.998
third point	5000	20.3	4.25	4.30	0.988
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	81.6	17.08	17.09	1.000
Average Correction Factor					0.995

Corrected As found 16.89 Previous response 17.12 % change 1.4%

Notes:

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

Calibration Performed By:

Jayne Marcoux



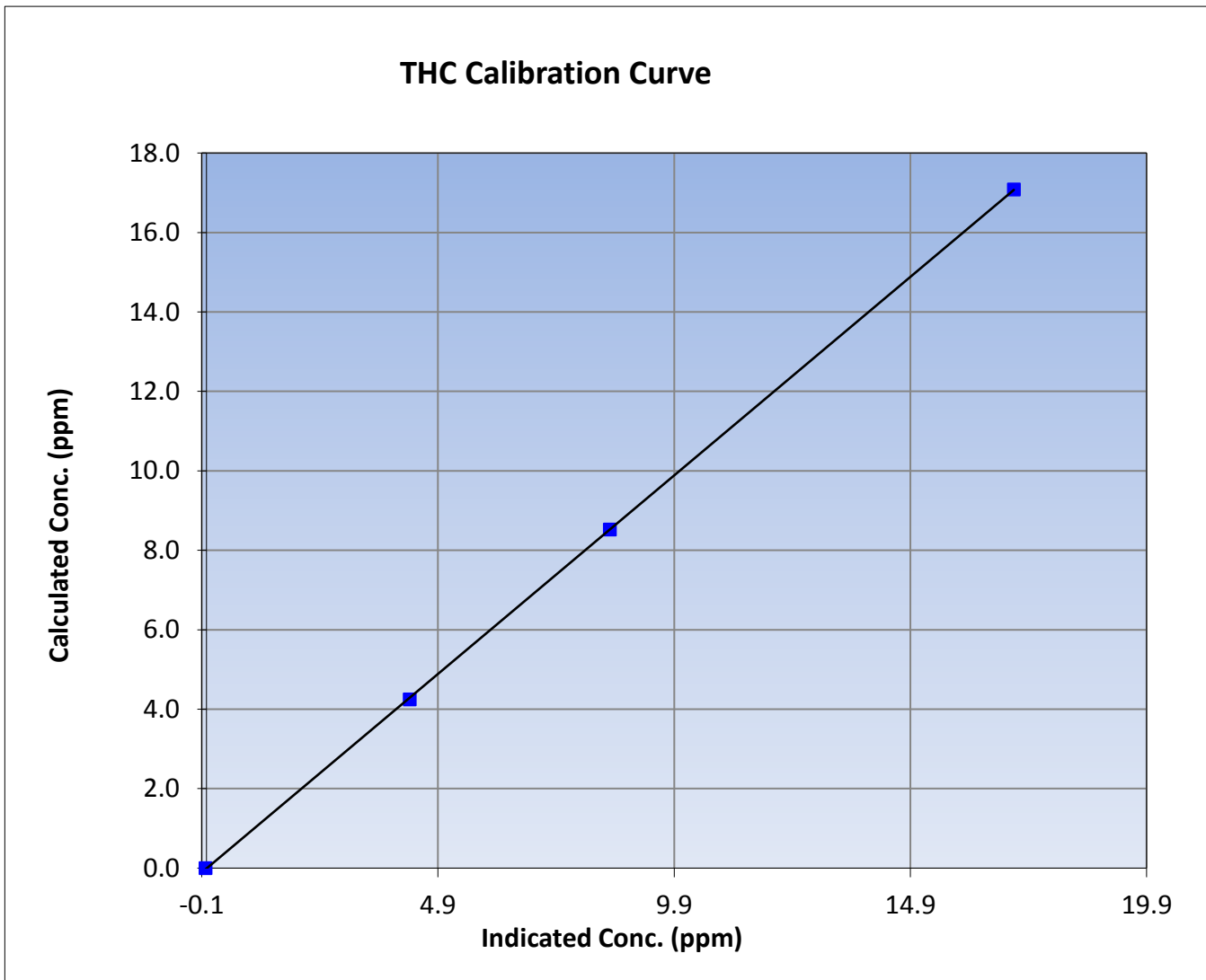
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 16, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	14:08
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

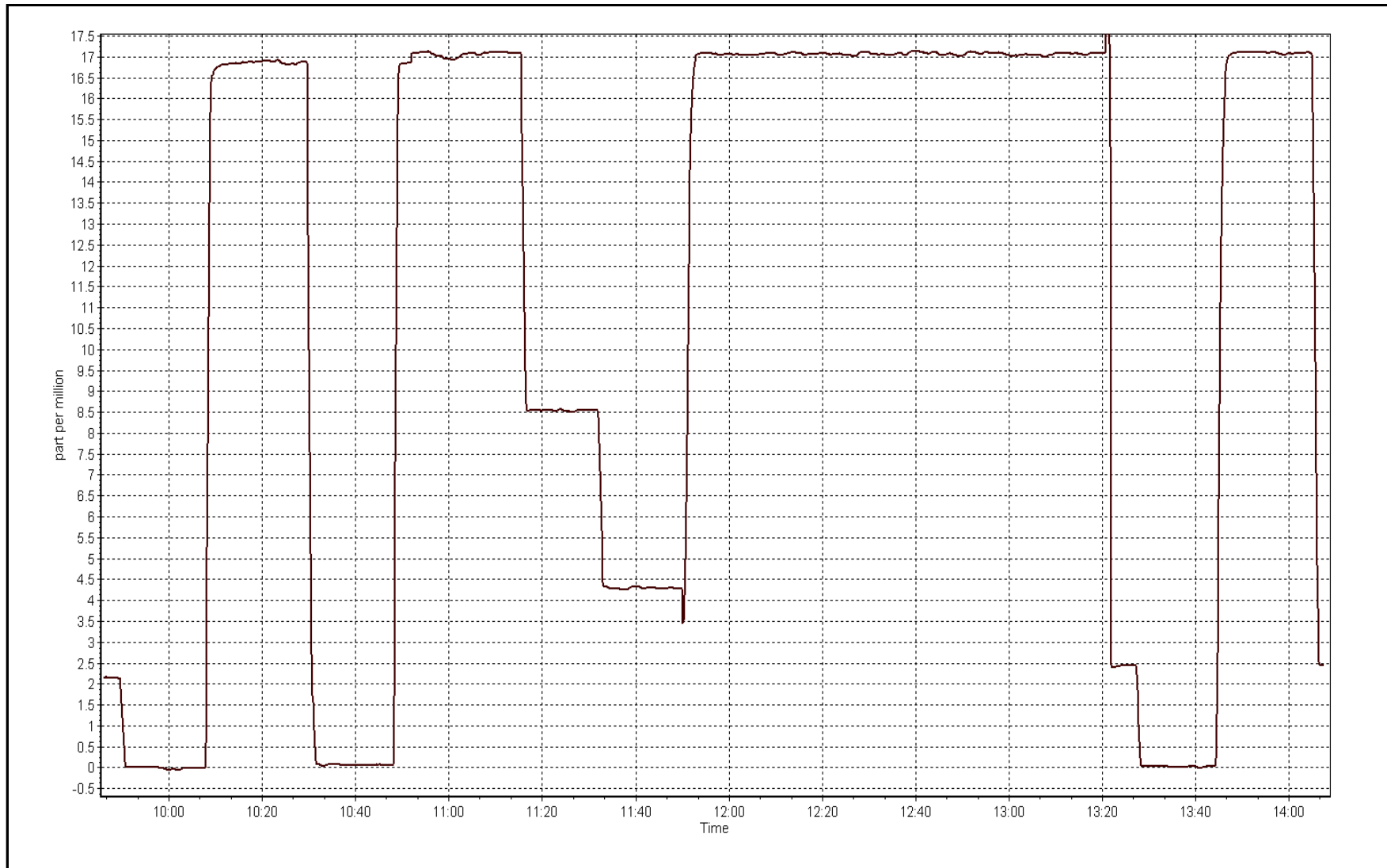
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	----	Correlation Coefficient	0.999984
17.08	17.09	0.9996		
8.52	8.54	0.9977	Slope	0.999507
4.25	4.30	0.9883		
			Intercept	-0.010486



THC Calibration Plot

Date: February 9, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 16, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	14:08
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	0.994621	0.995108	0.993809
	Data Offset	0.081238	0.117082	-0.451370
Current Calibration	Data Slope	0.999174	0.999575	0.993084
	Data Offset	0.045023	-0.004608	-0.317545

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	0.734		0.725	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.2		9.1	
NOX bkgrnd	9.3		9.2	
Chamber Temp	49.9	Deg C	49.8	Deg C
Moly Temp	326	Deg C	326.3	Deg C
PMT voltage	-778.1	V	-778.1	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	148.8	mmHg	147.9	mmHg
R Cell Press Nox	148.2	mmHg	147.6	mmHg
NO sample flow	0.766	lpm	0.758	lpm
Nox sample Flow	0.767	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: February 9, 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	-0.2	-0.2	0.0	----	----
as found span	5000	81.6	798.0	798.0	0.0	811.9	811.4	0.6	0.9829	0.9836
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	81.6	798.0	798.0	0.0	798.7	798.5	0.3	0.9991	0.9995
second point	5000	40.7	398.0	398.0	0.0	397.9	397.8	0.2	1.0003	1.0007
third point	5000	20.3	198.5	198.5	0.0	199.1	199.2	-0.1	0.9970	0.9967
as left zero	5000	0.0	0.0	0.0	0.0	3.3	3.2	0.1	----	----
as left span	5000	81.6	798.0	448.7	349.4	793.8	446.7	347.1	1.0054	1.0043
Average Correction Factor									0.9988	0.9989

Corrcted As found NO_x= 812.1 NO= 811.6 Percent Change NO_x= -1.2% NO= -1.2%
 Previous Response NO_x= 802.3 NO= 801.9

GPT Calibration Data

Dilution Flow (total) 5000 ccm 0.999911 81.60 ccm NOx ref calc conc = 798.0 ppb NO ref calc conc = 798.0 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	796.8	794.7	0.0	1.0016	1.0042	----	----
1st NO2 (300)	448.7	346.1	797.3	448.7	348.6	1.0010	----	0.9927	100.7%
2nd NO2 (200)	560.9	233.8	796.7	560.9	235.7	1.0017	----	0.9918	100.8%
3rd NO2 (100)	673.8	121.0	796.4	673.8	122.7	1.0021	----	0.9863	101.4%
2nd NO ref point		0.0	795.9	793.6	2.3	1.0028	1.0056	----	----
Average Correction Factor						1.0019		0.9903	101.0%

Calibration Performed By: Jayne Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

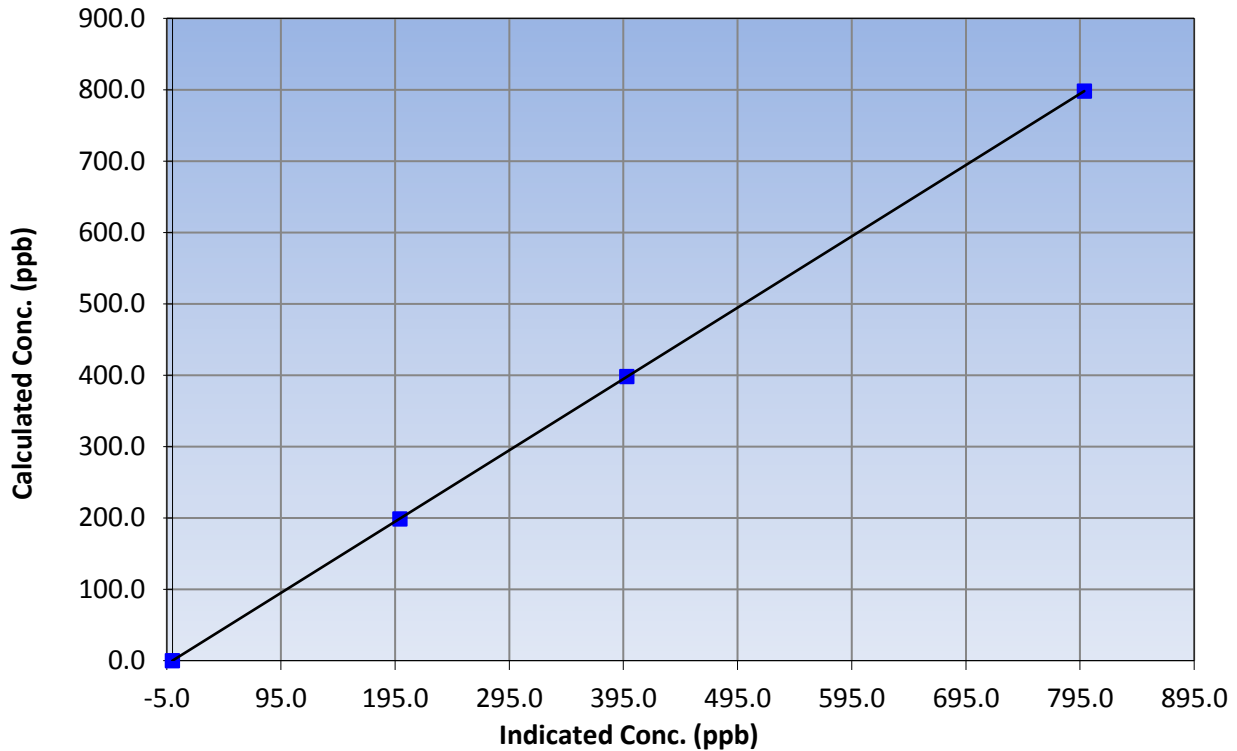
Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 16, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	14:08
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999999
798.0	798.7	0.9991		
398.0	397.9	1.0003	Slope	0.999174
198.5	199.1	0.9970		
			Intercept	0.045023

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

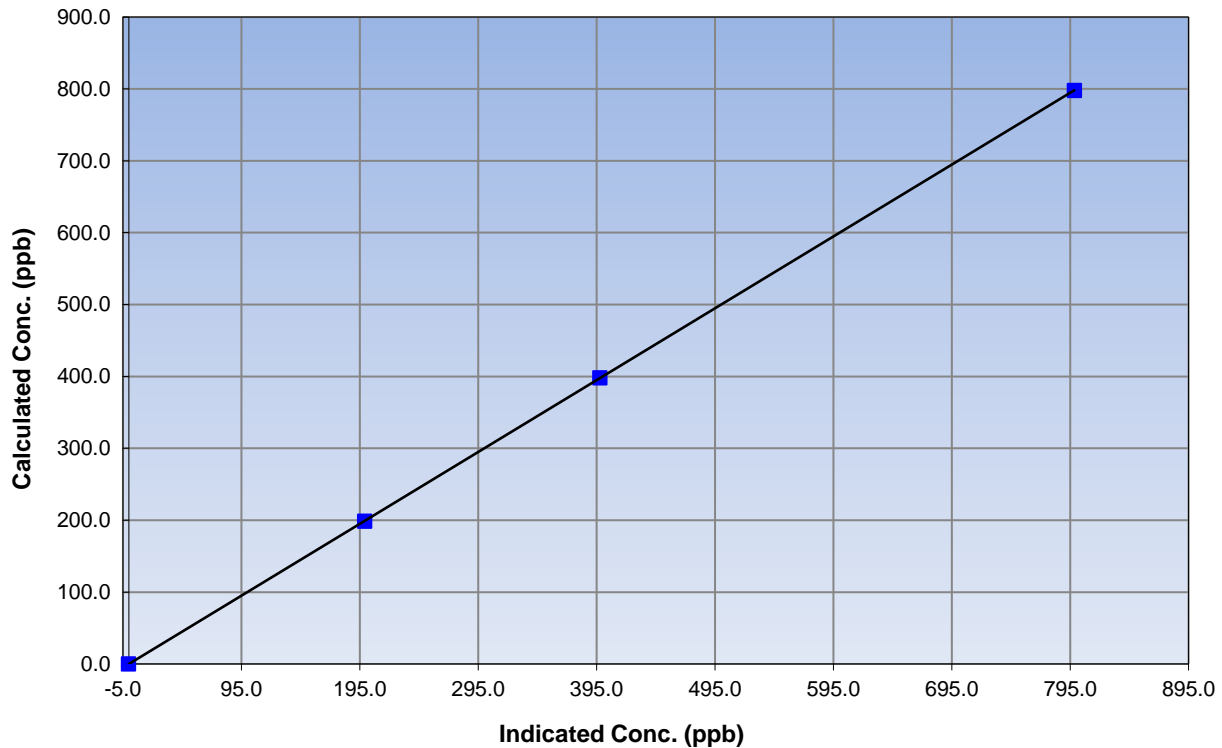
Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 16, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	14:08
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999998
798.0	798.5	0.9995		
398.0	397.8	1.0007	Slope	0.999575
198.5	199.2	0.9967		
			Intercept	-0.004608

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

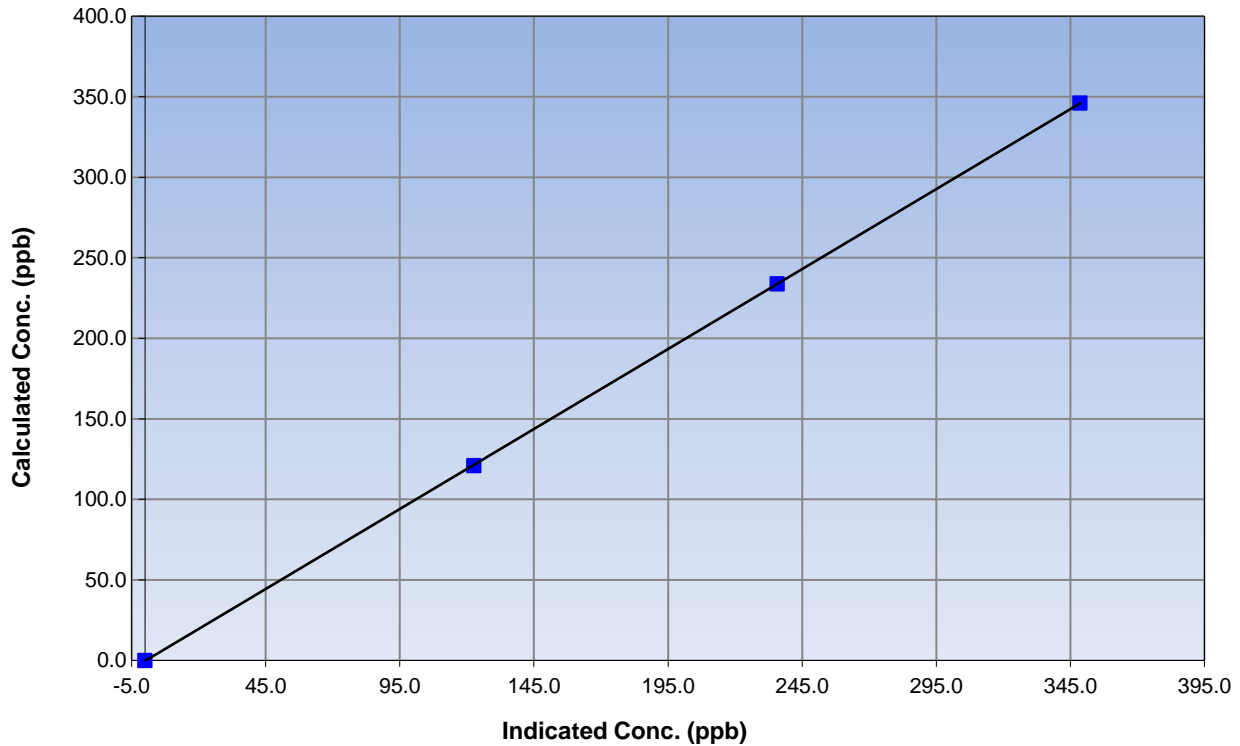
Station Information

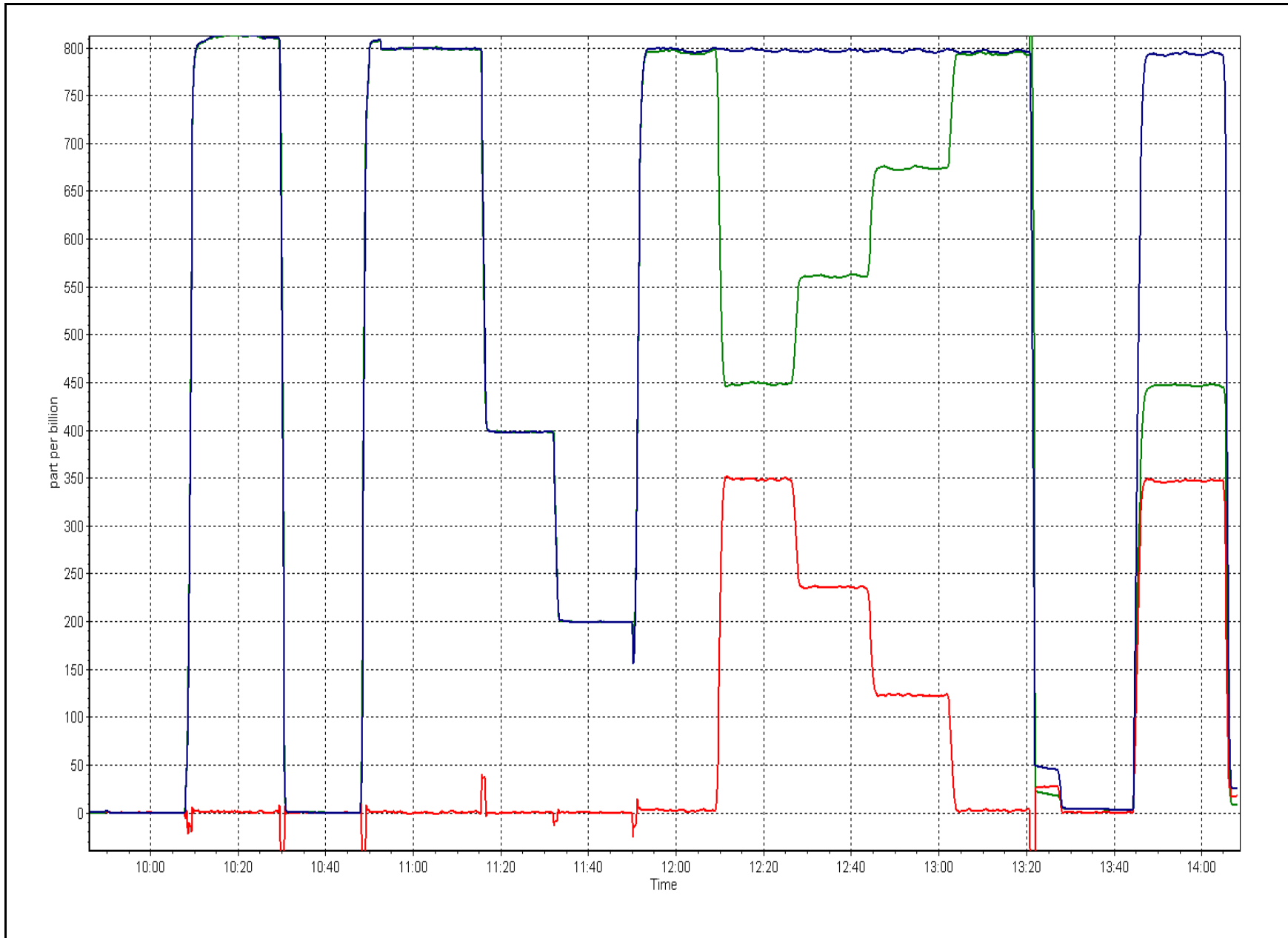
Calibration Date	February 9, 2017	Previous Calibration	January 16, 2017
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	14:08
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999994
346.1	348.6	0.9927		
233.8	235.7	0.9918	Slope	0.993084
121.0	122.7	0.9863		
			Intercept	-0.317545

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:	February 6, 2017	Last Cal Date:	January 16, 2017
Start time (MST):	10:20	End time (MST):	11:45
Sharp Model:	5030	S/N:	E-2020
Particulate Fraction:	PM2.5	C14 Source S/N:	7409
Flow Standard Model:	DeltaCal	S/N:	1450
Temp/RH standard:	NA	S/N:	NA

Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	-26	-27	-26	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	970	973	970	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1102	1000	<input checked="" 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>February 6, 2017</u>	Last Cal Date:	<u>January 16, 2017</u>
	Flow w/o adaptor:	<u>16.8</u>	Flow w/ adaptor:	<u>16.76</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>2395</u>	S/N:	<u>2022</u>
	Date of check:	<u>February 6, 2017</u>	Last Cal Date:	<u>November 7, 2016</u>
	New Correction Factor:	<u>7127</u>	Previous Correction Factor:	<u>7041</u>
Foil Calibration	Foil Mass:	<u>2574</u>	S/N:	<u>5872</u>
	Date of check:	<u>February 6, 2017</u>	Last Cal Date:	<u>November 7, 2016</u>
	New Correction Factor:	<u>7086</u>	Previous Correction Factor:	<u>7041</u>

Notes:

Foil checked with 2 sets, both around 1% difference in correction factor, Foil was not adjusted just checked; Flow was high, adjusted; cyclone head cleaned

Calibration by: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 16 SHELL MUSKEG RIVER FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 FEBRUARY 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	603	32	69	94.49	29	0	7	0
THC (ppm) Average	635	33	37	99.4	7.9	-	3.7	-
NO2 (ppb) Average	636	33	36	99.55	64	0	29	-
NO (ppb) Average	636	33	36	99.55	268	-	66	-
NOX (ppb) Average	636	33	36	99.55	332	-	94	-
PM2.5 (ug/m3) Average	669	3	3	100	29.9	-	13.7	0
Temperature 2 m (C) Average	672	0	0	100	10.6	-	3.9	-
Relative Humidity (%) Average	672	0	0	100	98	-	89	-
Barometric Pressure (inHg) Average	672	0	0	100	29.5	-	29.4	-
Wind Speed 10 m (km/h) Average	672	0	0	100	29	-	16	-
Wind Direction 10 m (deg) Average	672	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 FEBRUARY 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	603	1.3	3	-	0	0	0	0	1	4	29
THC (ppm) Average	635	2.56	0.5	-	2	2.2	2.3	2.4	2.7	3	7.9
NO2 (ppb) Average	636	15.3	12	-	0	2	6	13	24	32	64
NO (ppb) Average	636	11.5	24	-	0	0	0	3	11	30	268
NOX (ppb) Average	636	26.7	33	-	0	2	7	16	34	64	332
PM2.5 (ug/m3) Average	669	5.48	4.7	-	0.2	1.2	2.2	4	7.3	12.2	29.9
Temperature 2 m (C) Average	672	-12.09	10	-	-35.3	-23.9	-20.2	-13.3	-3.1	1.7	10.6
Relative Humidity (%) Average	672	74	11	-	44	57	66	76	82	86	98
Barometric Pressure (inHg) Average	672	28.79	0.3	-	28	28.4	28.6	28.8	29.1	29.2	29.5
Wind Speed 10 m (km/h) Average	672	8.8	5	-	0	3	5	8	12	16	29
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	09 Feb 2017 12:00	09 Feb 2017 14:00	3	Maintenance - WBEA audit
SO2	09 Feb 2017 14:00	09 Feb 2017 15:00	2	Maintenance - WBEA audit
SO2	12 Feb 2017 03:00	13 Feb 2017 11:00	33	Analyzer Failure - sample pump replaced
SO2	13 Feb 2017 12:00	13 Feb 2017 12:00	2	Maintenance - replaced sample pump
THC	09 Feb 2017 16:00	09 Feb 2017 18:00	3	Maintenance - WBEA audit
THC	24 Feb 2017 10:00	24 Feb 2017 10:00	1	Power Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

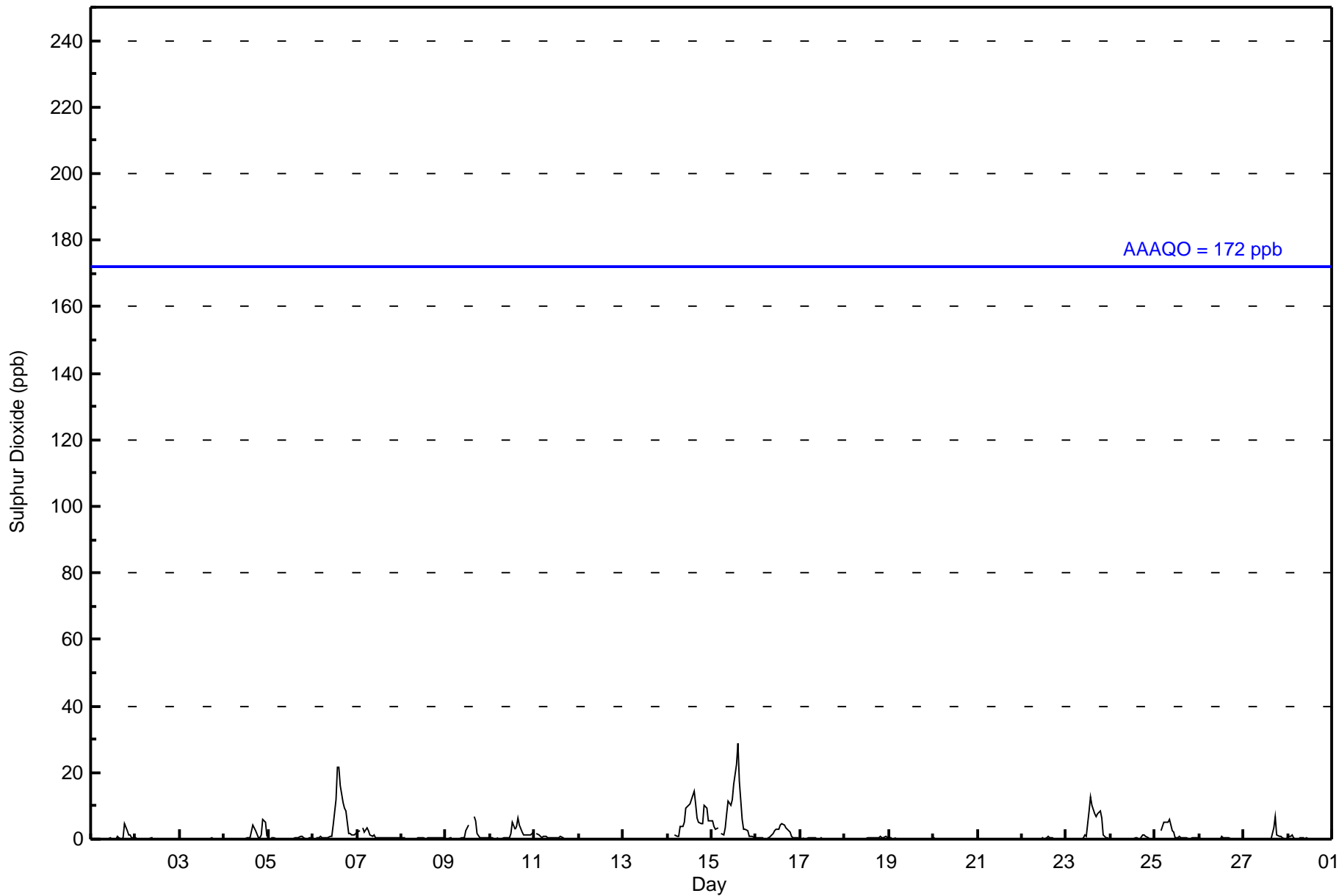
Shell Muskeg River - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 29 ppb on Feb 15 15:00										Maximum Daily Average: 7.2 ppb on Feb 15										Hours of Data: 603						
Minimum Value: 0 ppb on Feb 3 03:00										Minimum Daily Average: 0.0 ppb on Feb 21										Hours of Missing Data: 69						
Maximum Diurnal Average: 3.5 ppb at hour 15										Minimum Diurnal Average: 0.4 ppb at hour 3										Hours of Calibration: 32						
Monthly Average: 1.3 ppb										Percentiles: P ₁ =0 P ₁₀ =0 Q ₁ =0 Median=0 Q ₃ =1 P ₉₀ =4 P ₉₉ =16										Percent Operational Time: 94.5						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	5	2	1	1	1	0	0.6	5
2-Feb	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.1	0
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	4	3	2	1	0	1	6	5	1	1.1	6
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.3	1
6-Feb	0	Z	0	1	1	1	1	0	0	1	1	4	12	22	22	16	11	9	8	2	2	1	1	1	5.1	22
7-Feb	2	2	Z	4	2	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	4
8-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	3	4	M	M	7	5	2	1	0	0	0	0	0	1.2	7
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	2	5	3	4	6	4	2	1	1	1	1	1	2	1.6	6
11-Feb	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.5	2
12-Feb	0	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0
13-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	0	0	0	0	0	0	0	0	0	0	0	--	0
14-Feb	0	0	0	Z	1	1	1	4	4	5	9	10	11	12	14	11	6	5	5	5	10	9	6	6	5.8	14
15-Feb	6	4	3	4	Z	2	1	3	8	11	10	12	16	23	29	17	6	3	3	2	1	1	1	0	7.2	29
16-Feb	0	0	1	1	0	Z	0	1	1	2	3	3	3	4	5	4	3	3	2	1	1	1	0	0	1.7	5
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0.2	1
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	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
23-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	8	13	10	8	7	7	8	6	1	0	0	0	3.1	13
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.3	1
25-Feb	0	0	Z	3	4	5	5	5	6	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	1.6	6
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.1	1
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	3	7	1	1	1	0	0	0	0.6	7
28-Feb	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
0.5 0.5 0.4 0.7 0.5 0.6 0.5 0.7 0.9 1.0 1.2 1.5 2.5 3.2 3.5 2.9 2.0 1.7 1.4 0.9 0.8 0.9 0.7 0.5																								Diurnal Average		
6 4 3 4 4 5 5 5 8 11 10 12 16 23 29 17 11 9 8 6 10 9 6 6																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	587	97.35	97.35
11 - 20	12	1.99	99.34
21 - 60	4	0.66	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: 603

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - February 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	26	30	85	49	21	9	21	33	72	72	48	31	21	26	16	27	587
11 - 20	0	0	1	0	0	0	0	0	5	3	1	0	1	0	1	0	12
21 - 60	0	0	0	0	0	0	0	0	0	0	2	0	1	0	1	0	4
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	30	86	49	21	9	21	33	77	75	51	31	23	26	18	27	603

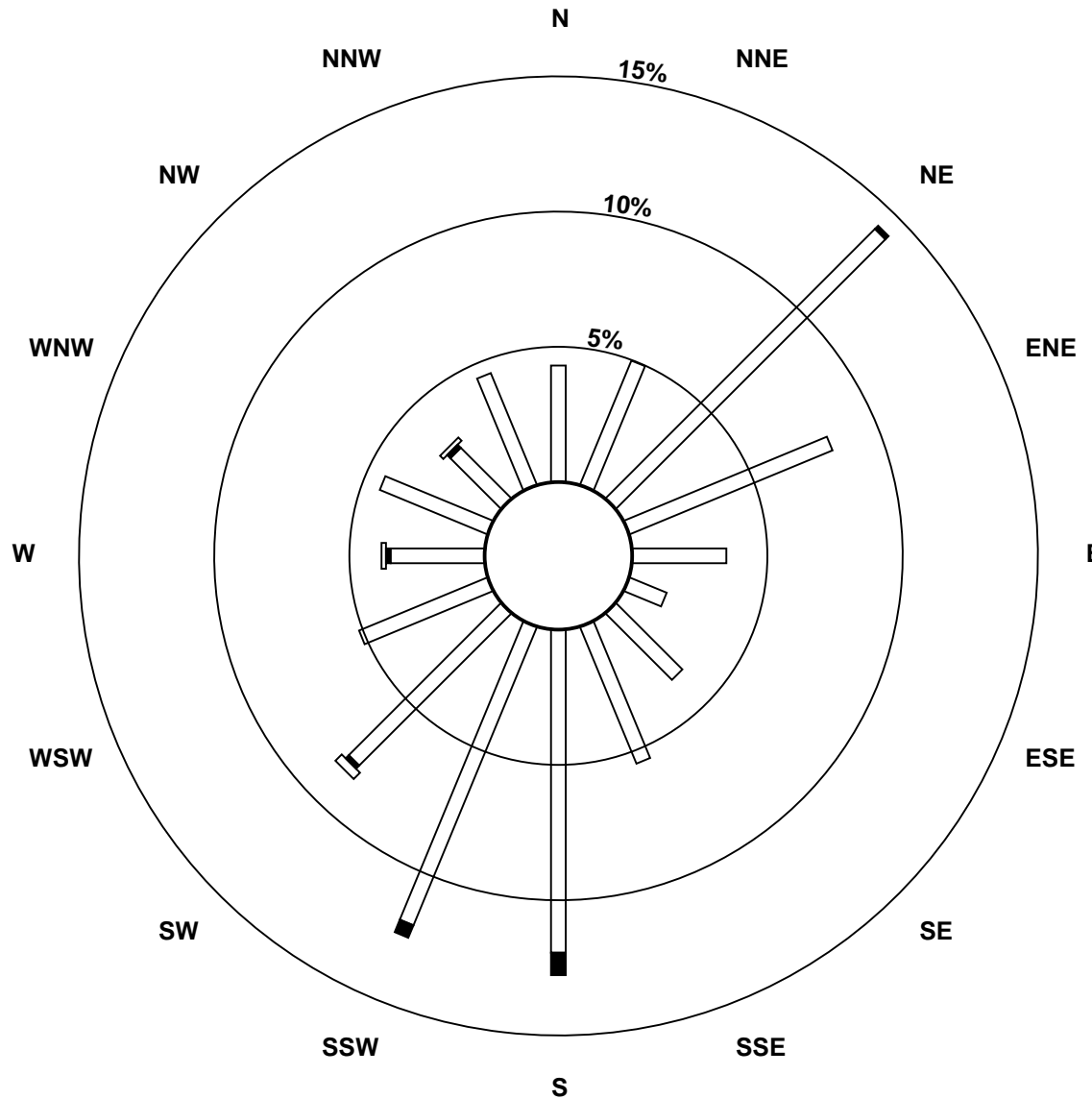
Total Number of Valid Hours: 603

Total Number of Hours: 672

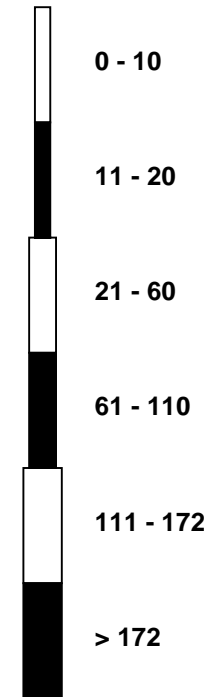


Wood Buffalo Environmental Association
Wind Rose Feb 2017

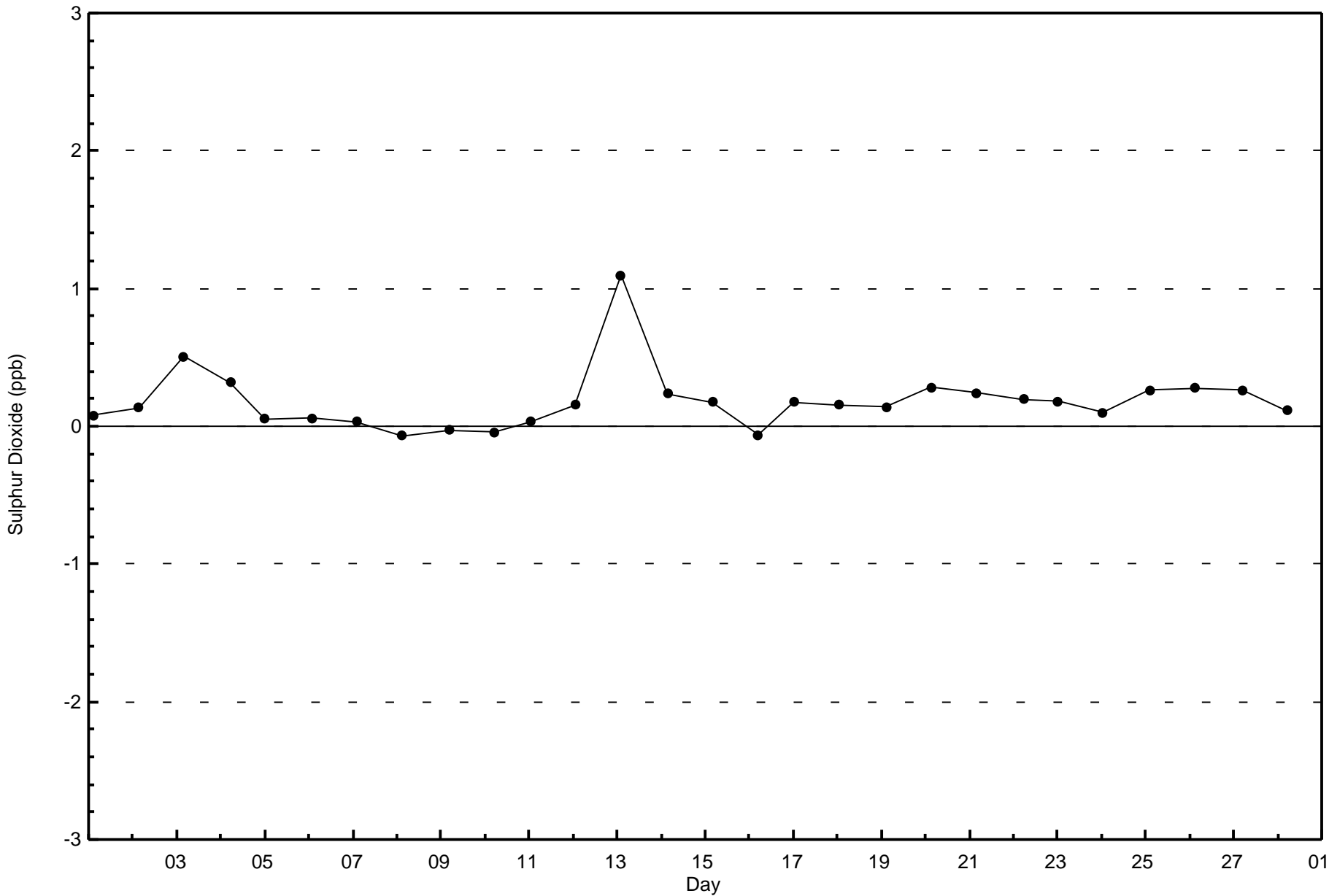
Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)

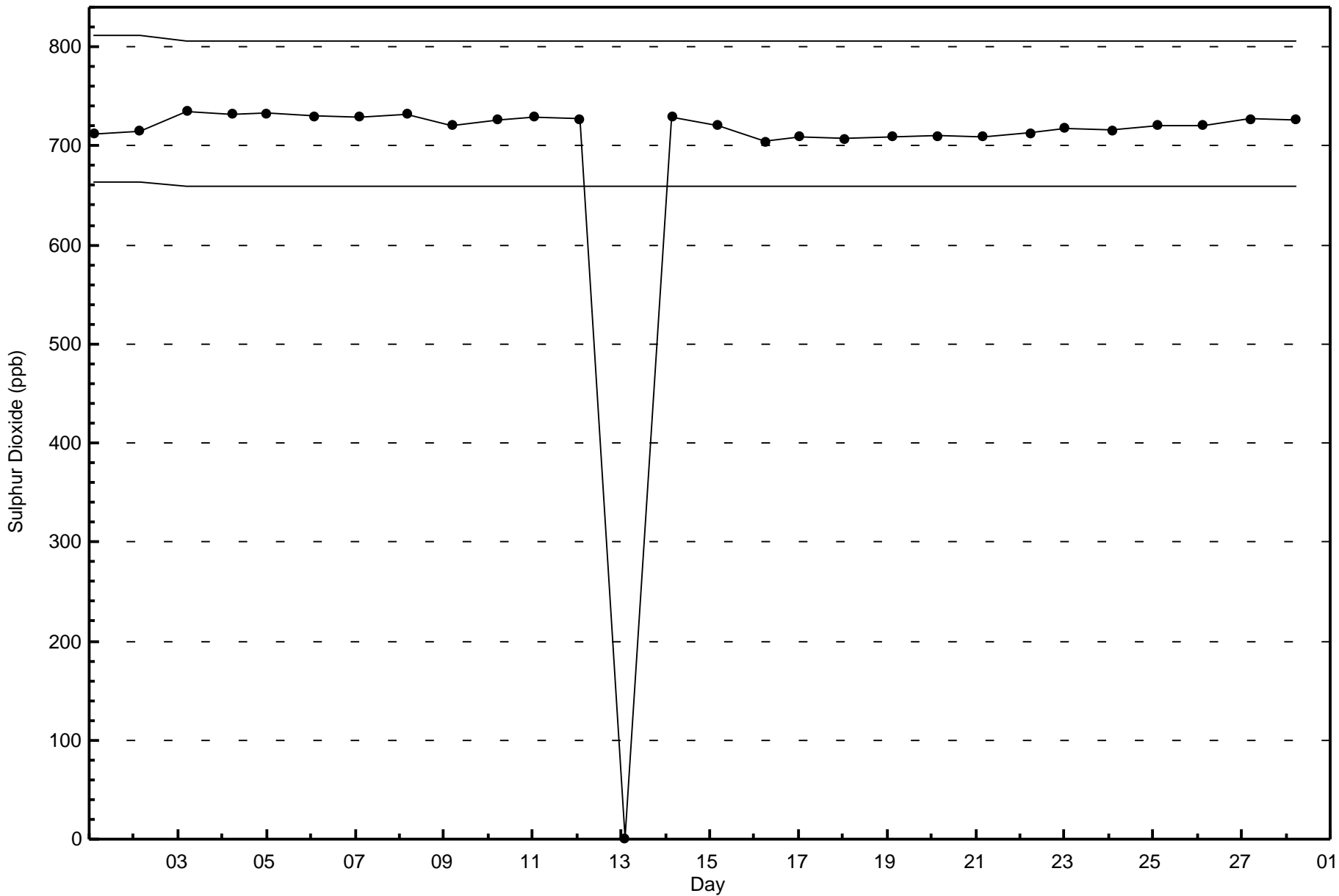


Classes (ppb)



Total Number of Valid Hours: 603







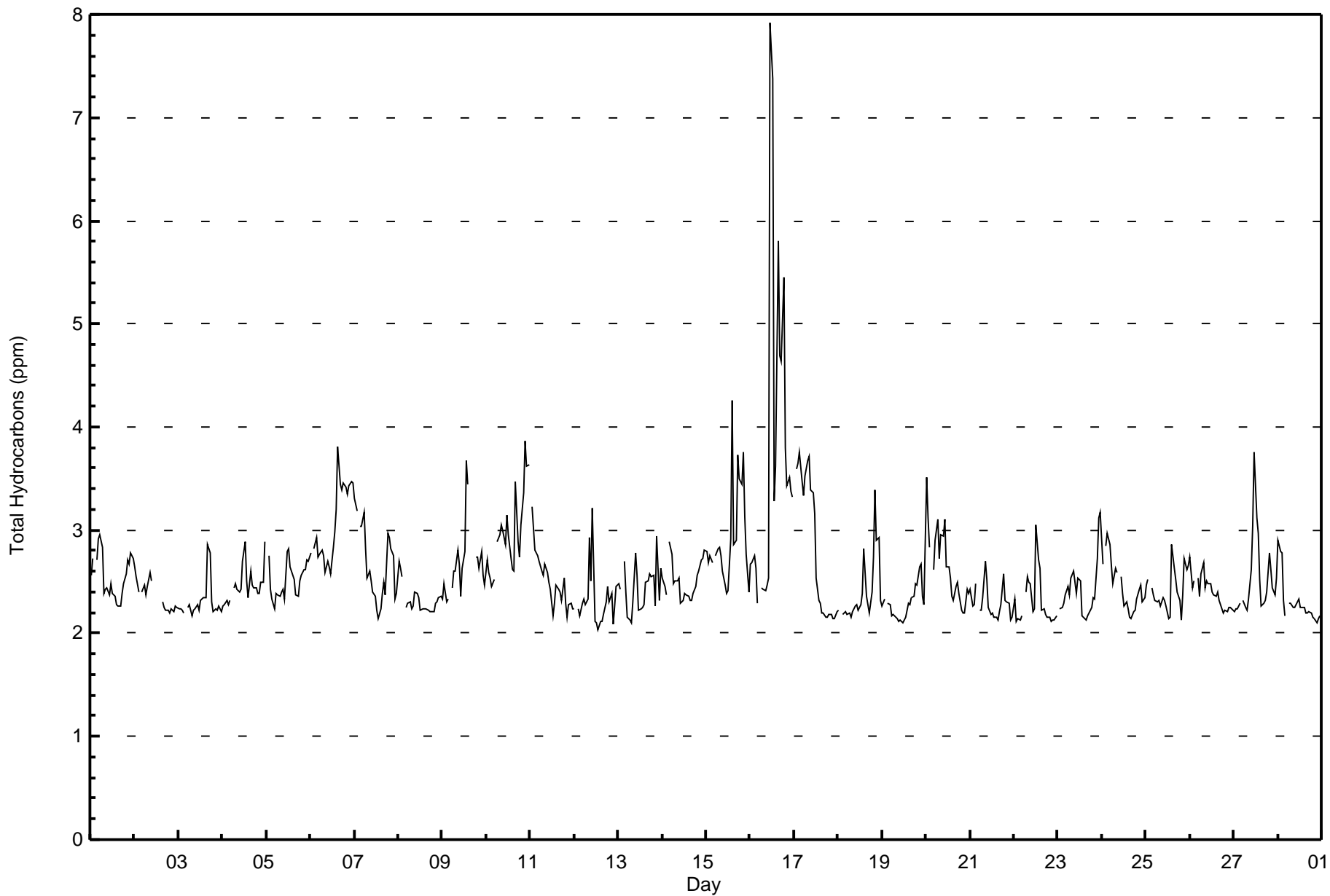
Maximum Value: 7.9 ppm on Feb 16 12:00																				Maximum Daily Average: 3.7 ppm on Feb 16					Hours in Service: 672		
Minimum Value: 2.0 ppm on Feb 12 14:00																				Minimum Daily Average: 2.3 ppm on Feb 19					Hours of Data: 635		
Maximum Diurnal Average: 2.7 ppm at hour 12																				Minimum Diurnal Average: 2.5 ppm at hour 14					Hours of Missing Data: 37		
Monthly Average: 2.56 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.4 Q ₃ = 2.7 P ₉₀ = 3.0 P ₉₉ = 4.6					Hours of Calibration: 33		
																									Percent Operational Time: 99.4		
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-Feb	2.6	2.7	Z	2.7	2.9	3.0	2.8	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.5	2.6	2.7	2.7	2.8	2.7	2.6	3.0	
2-Feb	2.6	2.6	2.4	Z	2.4	2.5	2.4	2.4	2.6	2.5	C	C	C	C	C	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.6	
3-Feb	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.9	2.8	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.9	
4-Feb	2.3	2.3	2.3	2.3	2.3	Z	2.4	2.4	2.5	2.4	2.4	2.7	2.9	2.5	2.3	2.6	2.5	2.4	2.4	2.4	2.4	2.5	2.5	2.9	2.5	2.9	
5-Feb	Z	2.7	2.4	2.3	2.2	2.4	2.4	2.4	2.4	2.4	2.3	2.8	2.8	2.6	2.6	2.5	2.4	2.4	2.5	2.6	2.6	2.6	2.7	2.7	2.5	2.8	
6-Feb	2.8	Z	2.8	2.9	2.7	2.8	2.8	2.7	2.6	2.7	2.6	2.6	2.8	3.0	3.2	3.8	3.4	3.4	3.5	3.4	3.4	3.4	3.5	3.5	3.1	3.8	
7-Feb	3.3	3.2	Z	3.0	3.0	3.2	2.8	2.5	2.6	2.5	2.4	2.4	2.2	2.1	2.2	2.4	2.5	2.4	3.0	2.9	2.8	2.8	2.3	2.4	2.7	3.3	
8-Feb	2.7	2.6	2.6	Z	2.3	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.7	
9-Feb	2.3	2.5	2.3	2.3	Z	2.4	2.6	2.6	2.8	2.7	2.4	2.6	2.8	3.7	3.4	M	M	M	2.7	2.7	2.6	2.8	2.6	2.5	2.7	3.7	
10-Feb	2.7	2.6	2.5	2.5	2.5	Z	2.9	3.0	3.0	3.0	2.9	3.1	3.0	2.7	2.6	2.6	3.5	2.9	2.7	3.0	3.4	3.9	3.6	3.6	3.0	3.9	
11-Feb	Z	3.2	2.8	2.8	2.7	2.7	2.6	2.6	2.7	2.6	2.5	2.4	2.2	2.3	2.5	2.4	2.4	2.3	2.5	2.3	2.2	2.3	2.3	2.2	2.5	3.2	
12-Feb	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.9	2.5	3.2	2.1	2.1	2.0	2.1	2.1	2.2	2.3	2.5	2.3	2.4	2.1	2.3	2.5	2.3	3.2	
13-Feb	2.5	2.4	Z	2.7	2.4	2.2	2.1	2.1	2.3	2.8	2.6	2.2	2.2	2.2	2.3	2.5	2.5	2.6	2.6	2.6	2.3	2.9	2.3	2.6	2.4	2.9	
14-Feb	2.5	2.5	2.4	Z	2.9	2.8	2.5	2.5	2.5	2.5	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.6	2.6	2.7	2.7	2.8	2.5	2.9	
15-Feb	2.8	2.7	2.7	2.7	Z	2.7	2.8	2.8	2.8	2.6	2.5	2.4	2.4	2.9	4.3	2.9	2.9	3.7	3.5	3.4	3.8	3.1	2.8	2.4	2.9	4.3	
16-Feb	2.7	2.7	2.8	2.6	2.3	Z	2.4	2.4	2.4	2.5	2.5	7.9	7.4	3.3	3.6	5.8	4.7	4.6	5.4	3.8	3.4	3.5	3.4	3.3	3.7	7.9	
17-Feb	Z	3.6	3.6	3.7	3.5	3.3	3.5	3.7	3.7	3.4	3.4	3.2	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.8	3.7	
18-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.4	2.8	2.4	2.3	2.2	2.4	2.7	3.4	2.9	2.9	2.3	2.4	3.4	
19-Feb	2.3	2.3	Z	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.4	2.5	2.5	2.6	2.7	2.4	2.3	2.7	
20-Feb	3.5	3.1	2.8	Z	2.6	2.9	3.1	2.7	3.0	2.9	3.1	2.6	2.6	2.5	2.4	2.3	2.4	2.5	2.4	2.2	2.2	2.2	2.4	2.4	2.7	3.5	
21-Feb	2.4	2.3	2.3	2.5	Z	2.2	2.2	2.3	2.7	2.5	2.3	2.2	2.2	2.1	2.2	2.1	2.2	2.3	2.6	2.3	2.3	2.3	2.1	2.2	2.3	2.7	
22-Feb	2.3	2.1	2.1	2.1	2.2	Z	2.4	2.6	2.5	2.5	2.2	2.2	3.0	2.7	2.6	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3	3.0	
23-Feb	Z	2.2	2.2	2.3	2.4	2.5	2.4	2.5	2.6	2.5	2.4	2.5	2.5	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.7	3.1	3.2	2.4	3.2	
24-Feb	2.7	Z	2.9	3.0	2.9	2.7	2.5	2.6	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.4	2.5	2.3	2.3	2.5	3.0
25-Feb	2.5	2.5	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.1	2.2	2.2	2.9	2.6	2.5	2.4	2.3	2.1	2.4	2.7	2.6	2.7	2.4	2.9	
26-Feb	2.7	2.4	2.5	Z	2.5	2.4	2.6	2.7	2.4	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4	2.7	
27-Feb	2.2	2.2	2.2	2.3	Z	2.3	2.3	2.2	2.3	2.6	3.0	3.8	3.1	3.0	2.5	2.3	2.3	2.3	2.4	2.8	2.6	2.4	2.4	2.5	2.5	3.8	
28-Feb	2.9	2.8	2.8	2.3	2.2	Z	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	2.2	2.1	2.1	2.1	2.2	2.3	2.9	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.6			
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																								3.6			
																								3.6			

Z - zerospan C - Calibration M - Maintenance PF - Power Failure



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.16	0.16
2.1 - 3.0	572	90.08	90.24
3.1 - 10.0	62	9.76	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 635

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River - February 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	1	0	0	0	0	1
2.1 - 3.0	18	28	86	48	22	9	19	32	70	69	54	42	25	22	13	15	572
3.1 - 10.0	6	2	2	1	0	0	2	1	7	10	4	2	2	5	7	11	62
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	30	88	49	22	9	21	33	77	79	58	45	27	27	20	26	635

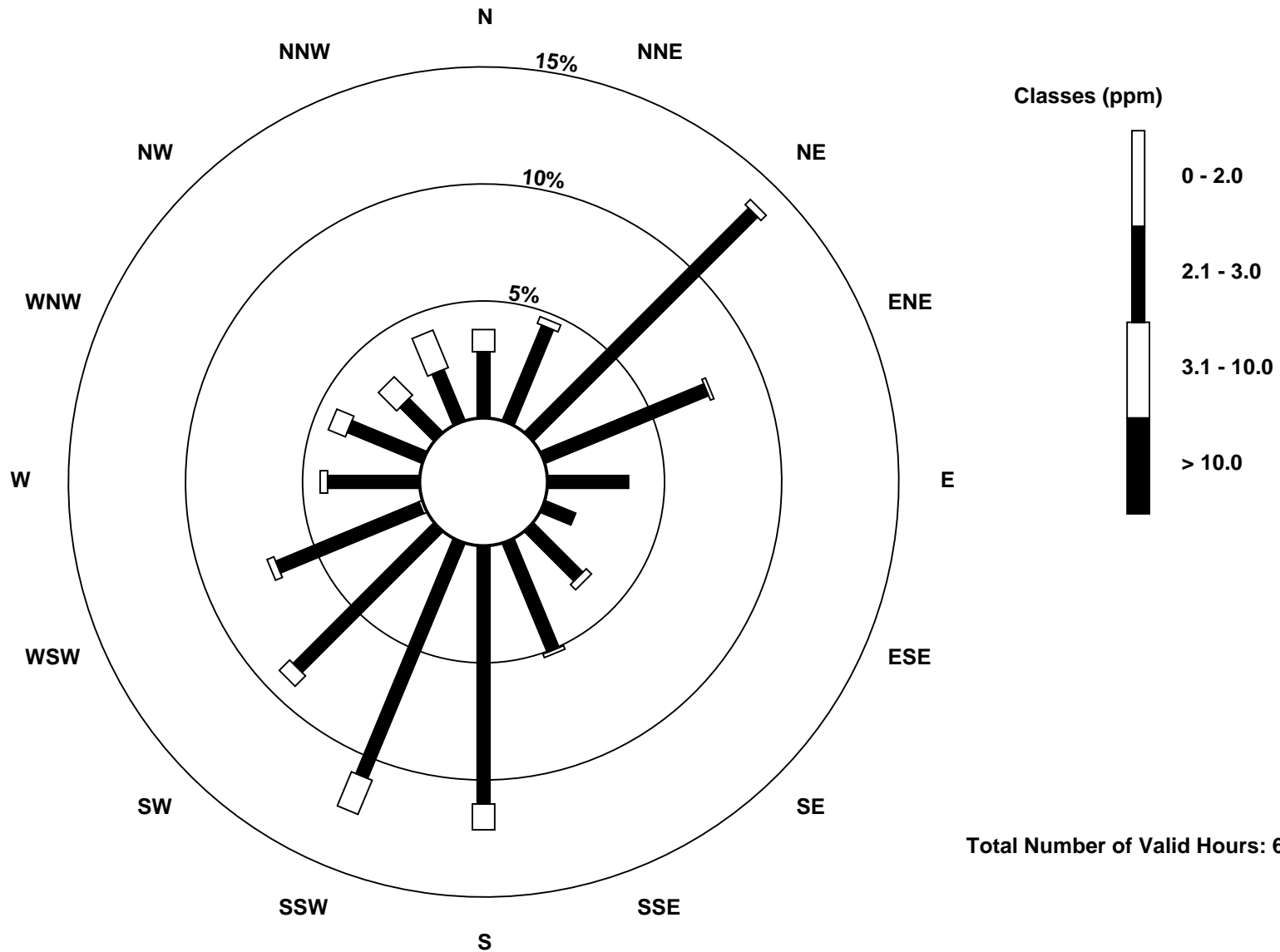
Total Number of Valid Hours: 635

Total Number of Hours: 672

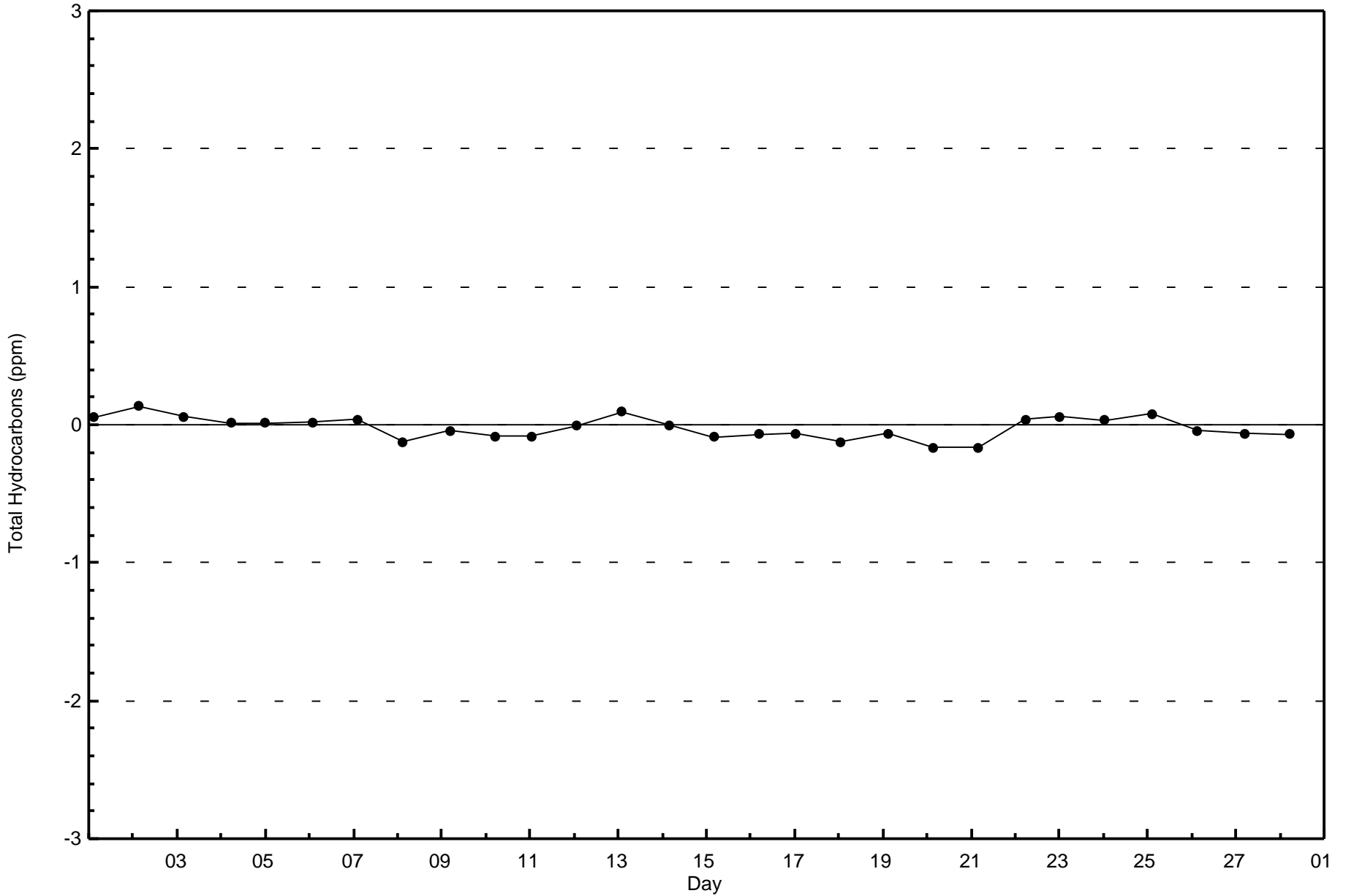


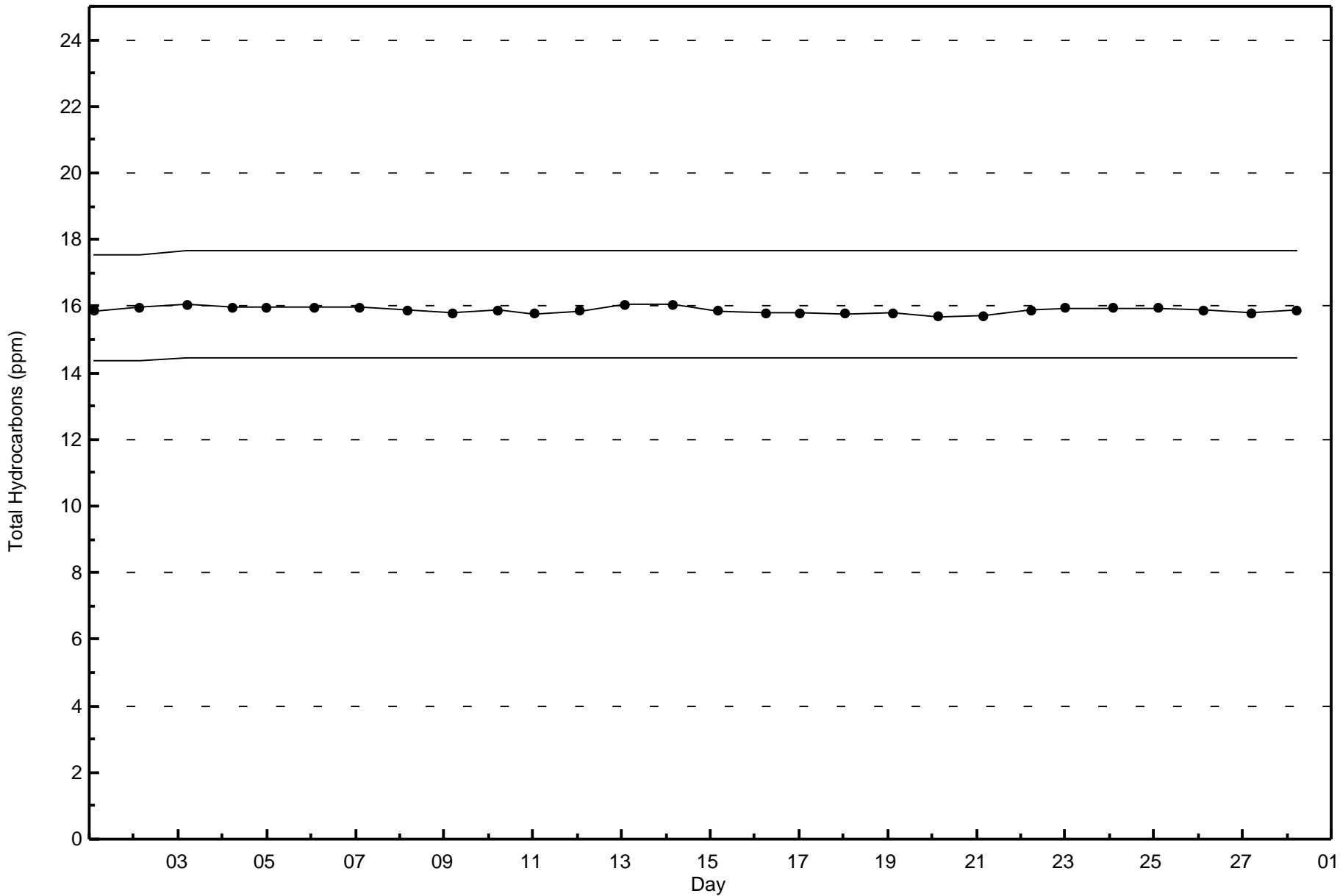
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)



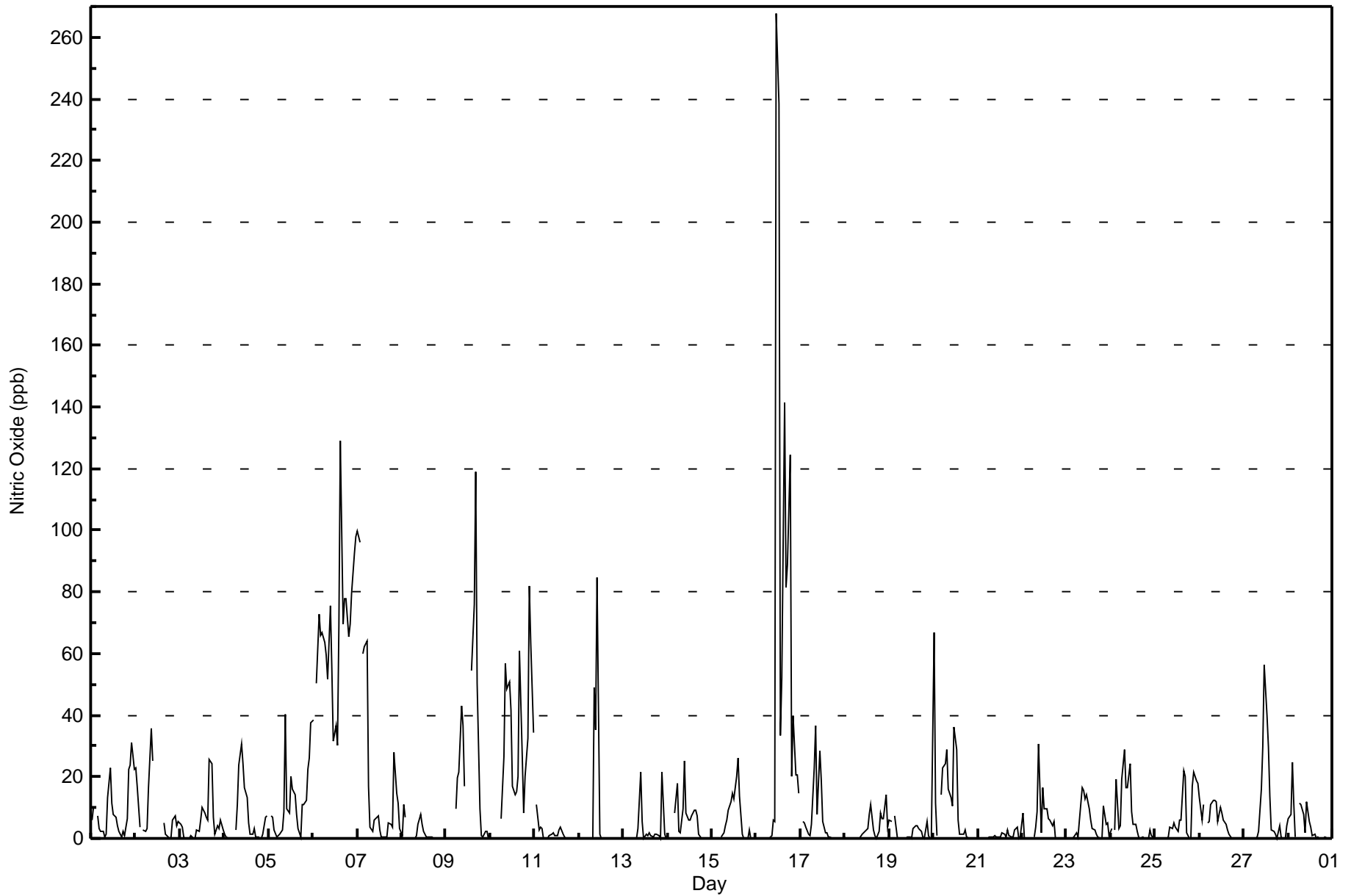
Total Number of Valid Hours: 635







Maximum Value: 268 ppb on Feb 16 12:00																				Maximum Daily Average: 66.3 ppb on Feb 6					Hours in Service: 672	
Minimum Value: 0 ppb on Feb 2 19:00																				Minimum Daily Average: 0.8 ppb on Feb 21					Hours of Data: 636	
Maximum Diurnal Average: 22.8 ppb at hour 12																				Minimum Diurnal Average: 5.0 ppb at hour 3					Hours of Missing Data: 36	
Monthly Average: 11.5 ppb																				Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 3 Q ₃ = 11 P ₉₀ = 30 P ₉₉ = 115					Hours of Calibration: 33	
																									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-Feb	6	10	Z	7	3	2	2	0	2	13	23	11	8	7	4	2	1	2	1	7	22	24	31	23	9.2	31
2-Feb	23	17	4	Z	3	2	3	16	36	25	C	C	C	C	C	5	1	1	0	1	6	8	4	6	8.9	36
3-Feb	5	4	1	0	Z	0	1	0	0	3	2	6	10	8	7	6	26	24	7	1	4	3	6	3	5.5	26
4-Feb	1	0	0	0	0	Z	3	11	24	30	24	16	13	Z	5	1	3	1	1	0	0	2	7	7	6.6	30
5-Feb	Z	7	7	3	0	1	1	3	9	40	9	8	20	16	14	8	3	0	11	11	12	22	26	37	11.8	40
6-Feb	38	Z	50	73	66	67	63	60	52	75	55	32	37	30	69	129	69	78	78	65	69	80	92	98	66.3	129
7-Feb	100	96	Z	60	62	64	17	4	2	6	7	7	3	1	0	1	0	5	4	3	28	15	11	3	21.7	100
8-Feb	1	11	7	Z	0	0	0	0	1	5	8	5	2	0	0	0	0	0	0	0	0	0	0	0	1.8	11
9-Feb	0	0	0	0	Z	10	20	21	43	37	17	M	M	M	54	76	119	50	10	1	1	2	2	0	23.1	119
10-Feb	0	0	0	0	0	Z	7	27	57	48	51	42	17	14	15	20	61	26	8	20	33	82	64	34	27.2	82
11-Feb	Z	11	3	4	3	0	0	0	1	1	2	1	1	3	3	1	0	0	0	0	0	0	0	0	1.5	11
12-Feb	0	Z	0	0	0	0	0	0	49	35	85	1	0	0	0	0	0	0	0	0	0	0	0	0	7.4	85
13-Feb	0	0	Z	0	0	0	0	0	3	21	6	0	1	1	2	1	1	1	1	1	0	22	1	0	2.7	22
14-Feb	0	0	0	Z	8	18	2	2	9	25	8	6	6	7	9	9	7	1	0	0	0	0	0	0	5.2	25
15-Feb	0	0	0	0	Z	0	2	4	6	9	12	15	13	20	26	14	1	0	0	0	3	0	0	0	5.5	26
16-Feb	0	0	0	0	0	Z	0	0	1	6	6	268	238	33	52	141	81	89	124	20	40	20	21	15	50.3	268
17-Feb	Z	6	5	3	1	1	5	23	37	8	28	19	5	2	2	1	0	0	0	0	0	0	0	0	6.4	37
18-Feb	0	Z	0	0	0	0	0	0	0	1	2	2	3	8	11	3	1	0	2	8	6	6	14	4	3.2	14
19-Feb	6	5	Z	7	0	0	0	0	0	0	0	1	0	3	4	4	3	2	0	0	5	1	0	0	1.9	7
20-Feb	67	11	1	Z	14	23	24	29	16	13	10	36	29	6	1	2	1	3	0	0	0	0	0	0	12.5	67
21-Feb	0	0	0	0	Z	0	0	0	0	1	1	0	1	2	1	1	3	1	1	0	3	4	0	0	0.8	4
22-Feb	8	0	0	0	0	Z	0	4	9	30	2	17	10	10	6	6	4	6	0	0	0	0	0	0	4.9	30
23-Feb	Z	0	0	0	1	2	0	6	16	15	13	14	10	6	3	3	1	0	0	0	11	5	5	1	4.9	16
24-Feb	3	Z	3	19	3	4	19	29	16	16	24	9	4	5	2	0	0	0	0	0	0	3	1	0	7.1	29
25-Feb	0	0	Z	0	0	0	0	0	3	3	5	4	2	6	6	22	20	2	0	0	17	22	19	18	6.5	22
26-Feb	13	6	11	Z	5	5	11	12	12	12	6	10	8	6	5	3	1	0	0	0	0	0	0	0	5.5	13
27-Feb	0	0	0	0	Z	0	0	0	2	16	30	56	40	30	14	3	2	1	0	4	0	0	0	4	8.9	56
28-Feb	6	8	25	11	1	Z	12	11	8	2	12	5	4	1	1	0	0	0	0	0	0	0	0	0	4.7	25
																								Diurnal Average	Diurnal Maximum	
11.6 8.0 5.0 8.1 7.4 8.7 6.9 9.4 14.9 17.9 16.5 22.8 18.7 8.9 11.7 16.5 14.8 10.6 8.9 5.1 9.3 11.4 10.9 9.1 100 96 50 73 66 67 63 60 57 75 85 268 238 33 69 141 119 89 124 65 69 82 92 98																										
Z - zerospan C - Calibration M - Maintenance																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Shell Muskeg River - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	536	84.28	84.28
21 - 40	53	8.33	92.61
41 - 80	33	5.19	97.80
81 - 159	11	1.73	99.53
> 159	2	0.31	99.84

Total Number of Valid Hours: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Shell Muskeg River - February 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	20	28	86	47	21	9	17	27	57	67	53	39	22	20	9	14	536
21 - 40	3	2	0	1	1	0	2	4	11	2	3	3	4	3	6	8	53
11 - 80	1	0	1	1	0	0	1	2	6	9	1	3	0	2	4	2	33
81 - 159	2	0	0	0	0	0	1	0	3	1	1	0	0	1	1	1	11
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Totals	26	30	87	49	22	9	21	33	77	79	58	45	26	26	20	27	635

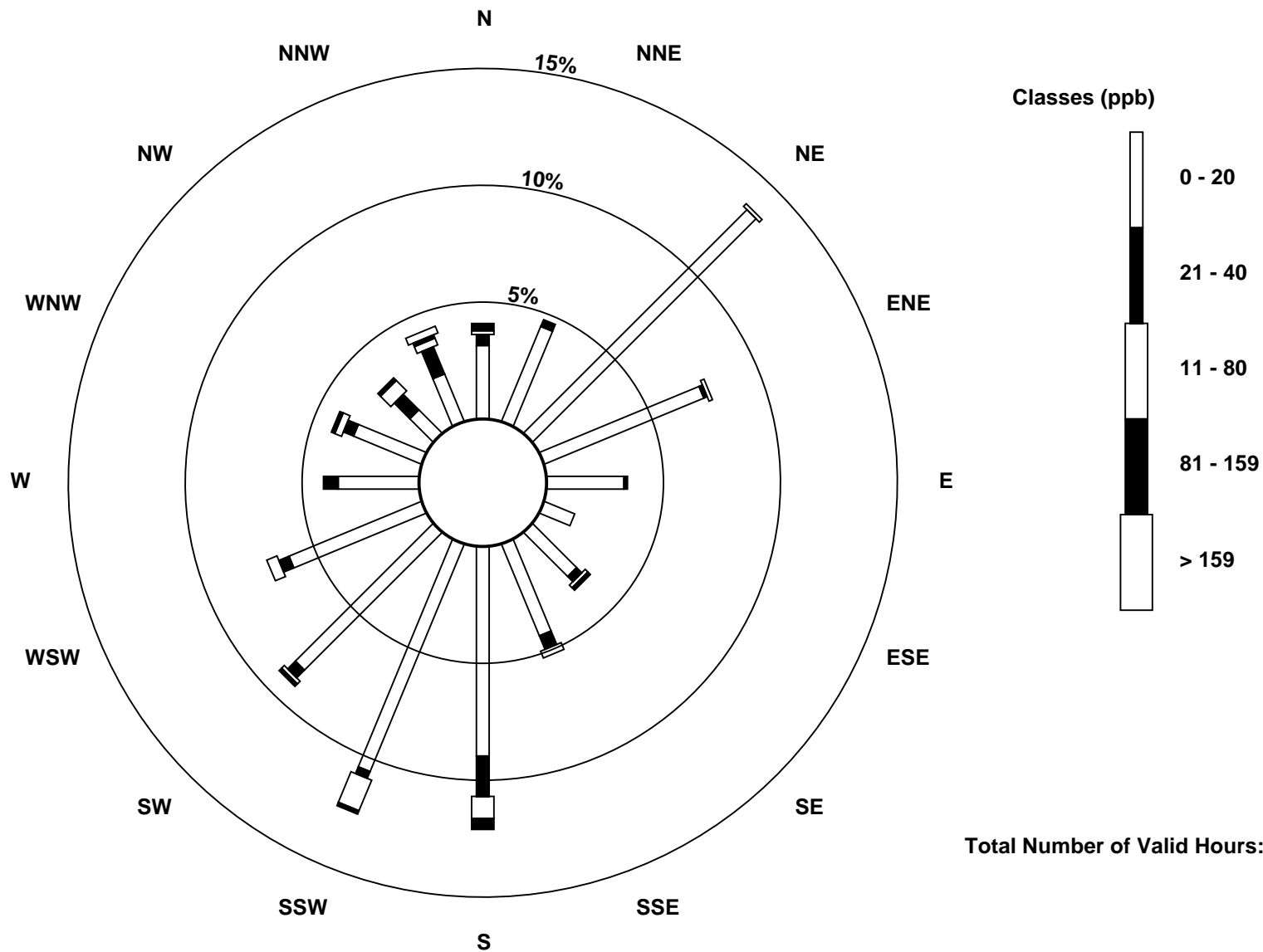
Total Number of Valid Hours: 636

Total Number of Hours: 672

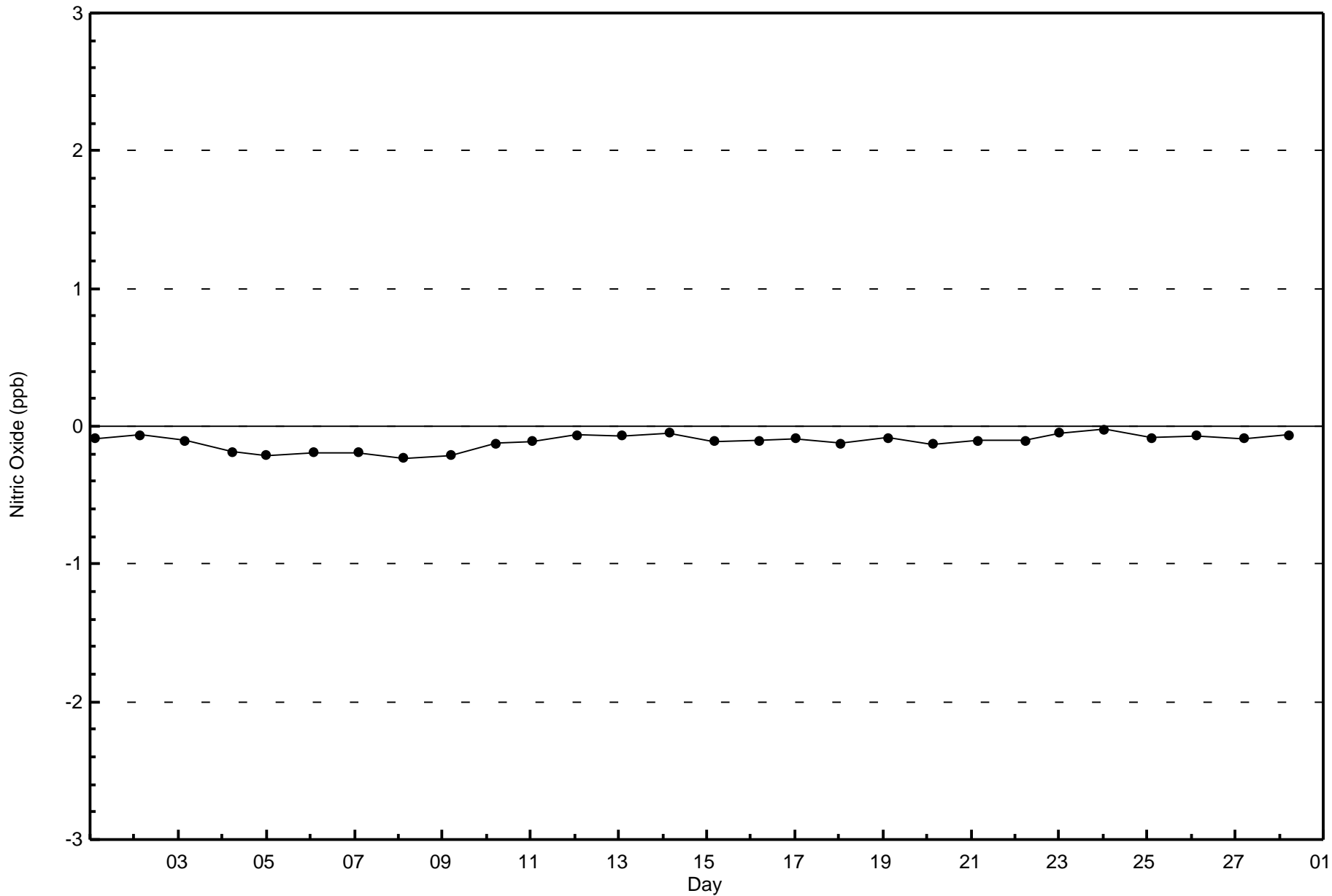


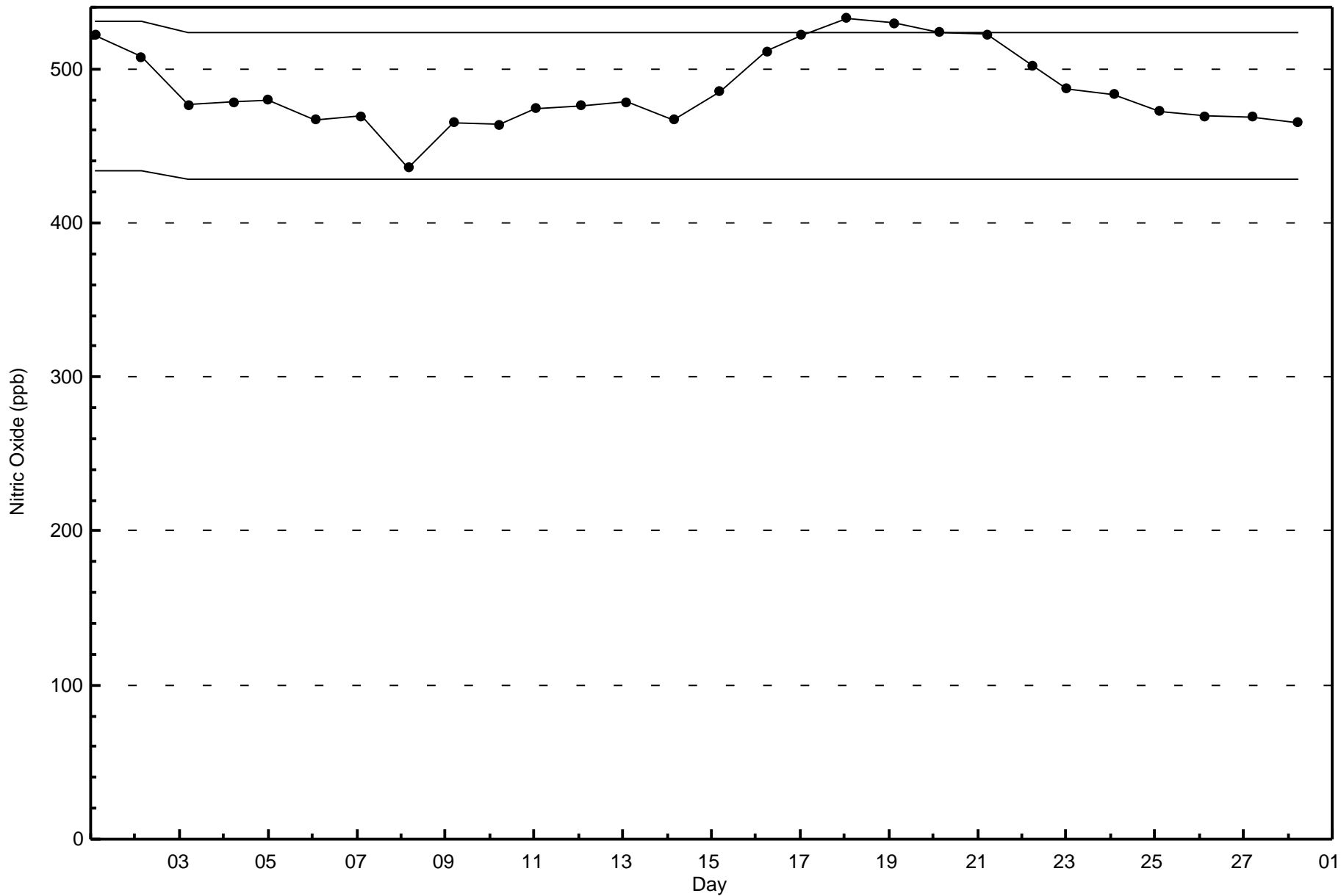
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 636







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

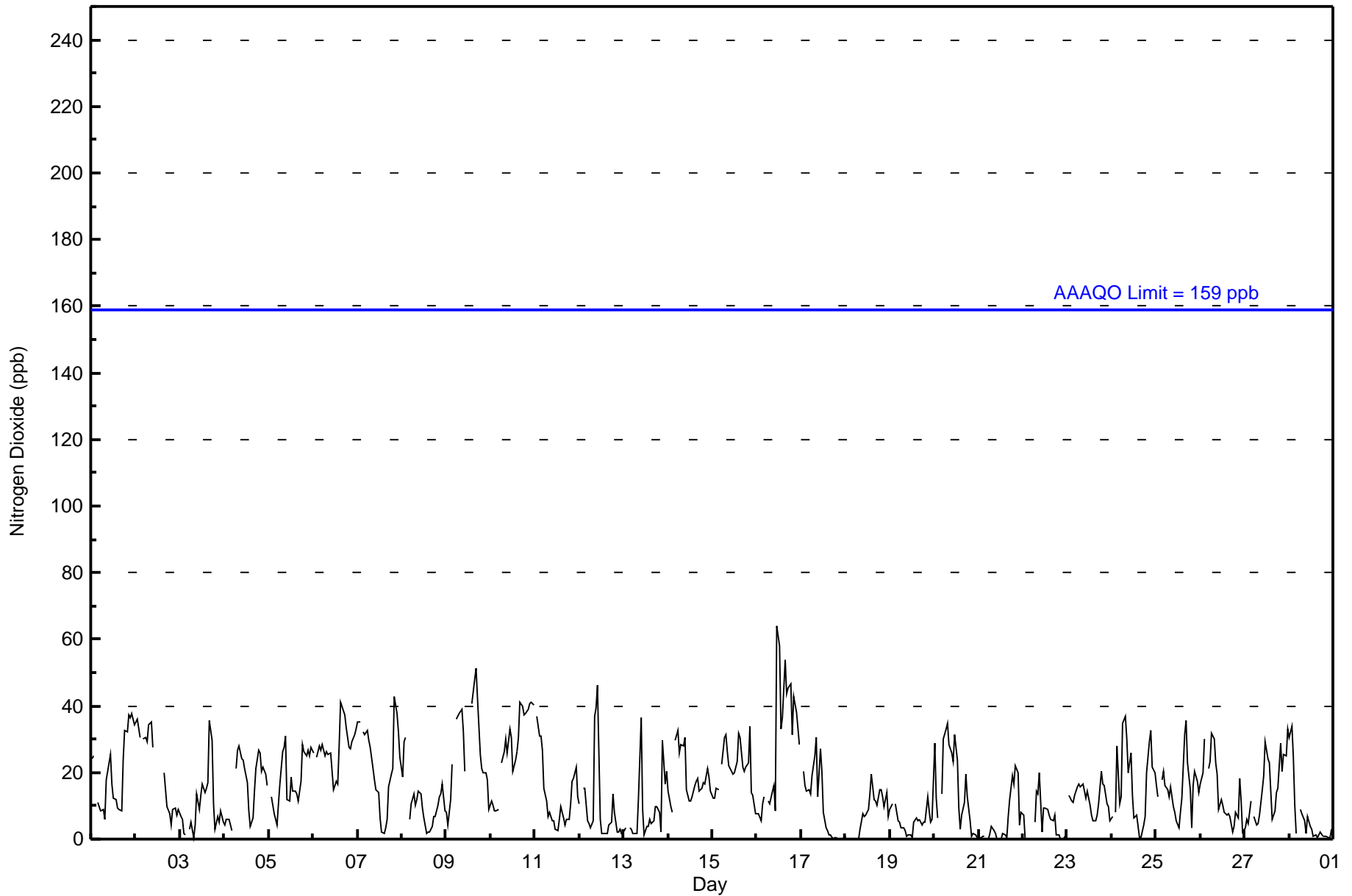
Shell Muskeg River - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 64 ppb on Feb 16 12:00 Maximum Daily Average: 28.7 ppb on Feb 16										Hours in Service: 672 Hours of Data: 636 Hours of Missing Data: 36 Hours of Calibration: 33 Percent Operational Time: 99.6																
Minimum Value: 0 ppb on Feb 18 03:00 Maximum Diurnal Average: 19.4 ppb at hour 9 Monthly Average: 15.3 ppb										Minimum Daily Average: 5.2 ppb on Feb 22 Minimum Diurnal Average: 10.3 ppb at hour 14 Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 6 Median = 13 Q ₃ = 24 P ₉₀ = 32 P ₉₉ = 45																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	24	25	Z	11	10	8	9	6	18	20	25	16	12	12	9	9	9	24	33	32	37	37	38	35	20.0	38
2-Feb	35	36	30	Z	30	31	29	35	35	27	C	C	C	C	C	20	15	10	8	4	9	9	7	9	21.1	36
3-Feb	7	6	2	1	Z	3	5	1	4	14	9	13	16	14	15	17	36	30	11	3	7	5	8	5	10.0	36
4-Feb	4	6	6	4	3	Z	21	27	28	24	24	21	17	9	4	6	15	21	27	26	20	22	19	16	16.1	28
5-Feb	Z	13	10	8	4	11	17	26	27	31	12	12	19	14	14	14	12	17	28	26	25	27	25	27	18.2	31
6-Feb	26	Z	24	28	27	28	25	26	25	26	20	15	17	17	28	41	39	37	34	28	27	29	31	33	27.5	41
7-Feb	35	35	Z	32	31	33	30	28	21	18	15	14	6	2	2	3	6	16	20	21	43	38	32	25	21.9	43
8-Feb	19	29	30	Z	6	11	13	10	12	14	14	9	6	2	2	2	4	7	7	10	13	13	16	9	11.2	30
9-Feb	8	4	12	22	Z	36	37	38	39	32	20	M	M	M	41	48	51	42	26	21	20	20	18	9	27.2	51
10-Feb	11	10	9	9	9	Z	23	26	30	26	33	31	21	24	26	30	41	40	38	38	39	41	41	40	27.6	41
11-Feb	Z	37	31	31	27	15	12	7	8	5	6	3	3	6	10	6	4	6	6	10	17	18	21	13	13.1	37
12-Feb	11	Z	15	15	6	5	4	5	37	40	46	6	2	2	2	2	4	5	14	8	2	2	3	2	10.2	46
13-Feb	2	3	Z	3	3	2	2	2	12	37	9	1	4	4	6	5	6	10	10	8	2	30	17	20	8.5	37
14-Feb	14	10	8	Z	30	33	26	28	28	30	15	11	11	13	16	17	18	15	15	17	17	21	19	14	18.5	33
15-Feb	12	12	15	15	Z	23	30	31	26	22	20	20	20	24	32	30	22	21	22	23	34	14	13	8	21.2	34
16-Feb	8	8	5	10	13	Z	12	11	15	16	9	64	58	33	37	54	44	46	47	31	43	38	33	29	28.7	64
17-Feb	Z	20	16	15	15	13	19	25	31	13	27	21	8	3	3	1	1	0	0	0	0	0	0	1	10.1	31
18-Feb	1	Z	0	0	0	0	0	0	3	8	7	7	9	13	20	12	11	10	15	15	13	10	14	7	7.6	20
19-Feb	9	10	Z	11	6	5	3	4	3	1	1	1	0	5	6	5	6	4	5	5	13	8	5	6	5.3	13
20-Feb	29	12	6	Z	13	30	33	35	28	26	23	31	24	9	3	7	11	20	13	6	1	2	1	1	15.8	35
21-Feb	1	1	1	1	Z	0	2	4	2	2	0	0	0	2	1	1	7	12	19	17	22	20	4	8	5.5	22
22-Feb	7	0	0	0	0	Z	5	14	13	20	2	10	9	9	7	6	5	7	1	1	0	0	0	1	5.2	20
23-Feb	Z	13	11	11	13	16	16	16	17	14	12	14	10	7	6	6	7	11	21	16	16	10	10	6	12.1	21
24-Feb	7	Z	8	28	11	13	35	37	30	20	26	13	6	7	4	1	1	4	7	20	29	33	22	20	16.5	37
25-Feb	16	13	Z	18	20	16	15	13	16	10	8	5	3	8	12	32	36	23	15	3	16	21	17	14	15.1	36
26-Feb	17	20	30	Z	21	23	32	30	23	20	9	12	10	8	7	8	7	2	4	8	6	18	11	2	14.3	32
27-Feb	4	6	5	12	Z	7	4	5	7	15	19	29	24	23	14	6	9	14	15	29	20	25	25	33	15.2	33
28-Feb	31	34	25	10	2	Z	9	8	5	2	7	4	3	1	1	0	1	2	1	1	1	1	0	3	6.5	34
14.0 15.1 13.1 12.8 13.0 15.7 16.6 17.7 19.4 18.9 15.4 14.7 12.3 10.3 12.1 13.9 15.2 16.3 16.3 15.3 17.6 18.3 16.2 14.1																								Diurnal Average		
35 37 31 32 31 36 37 38 39 40 46 64 58 33 41 54 51 46 47 38 43 41 41 40																								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
Shell Muskeg River - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	446	70.13	70.13
21 - 40	173	27.20	97.33
41 - 80	17	2.67	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - February 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	15	28	83	46	21	9	11	19	42	41	49	36	22	19	2	3	446
21 - 40	8	2	4	2	1	0	9	14	35	38	8	8	4	6	15	19	173
41 - 80	3	0	1	1	0	0	1	0	0	0	1	1	0	1	3	5	17
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	30	88	49	22	9	21	33	77	79	58	45	26	26	20	27	636

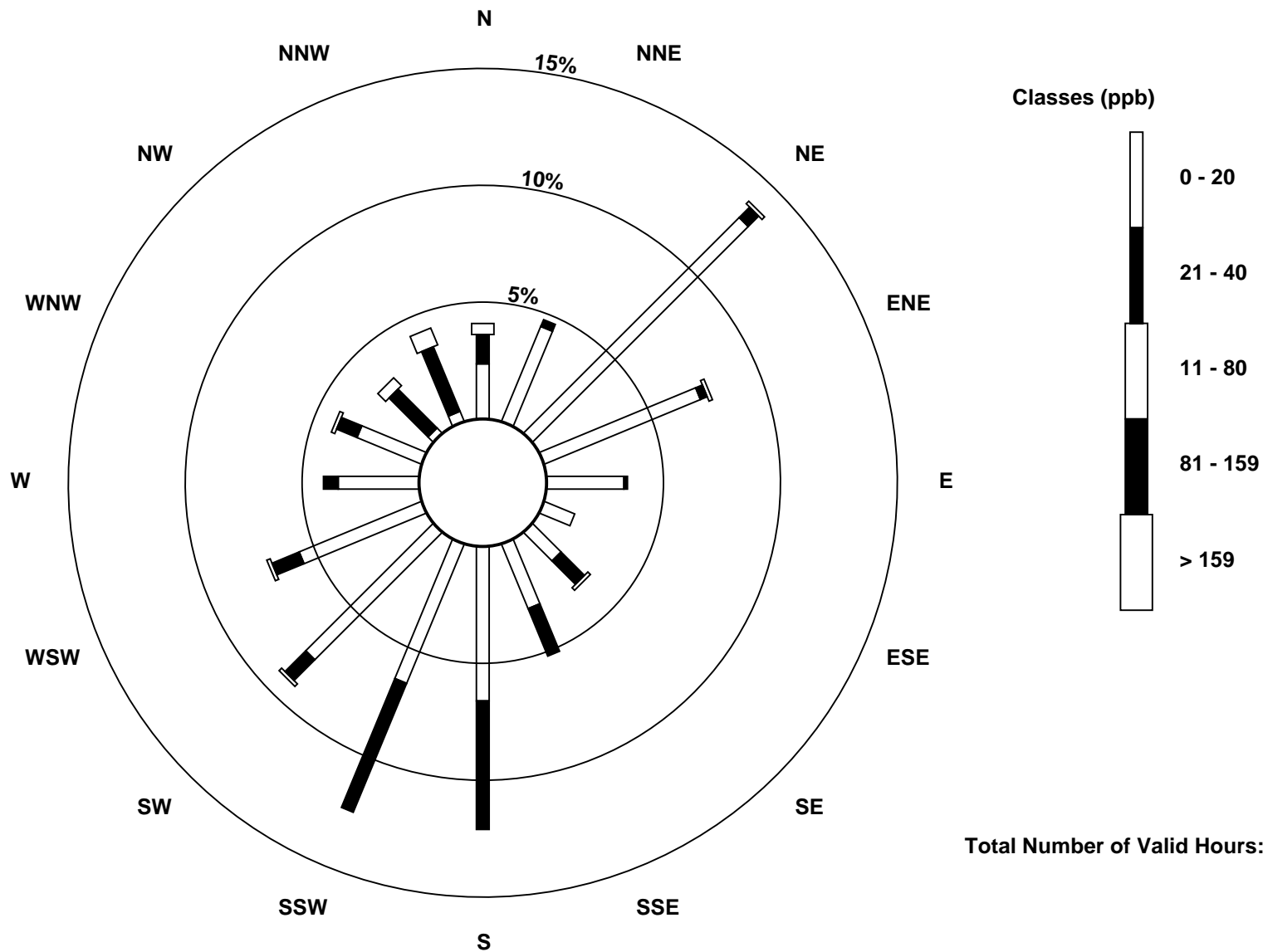
Total Number of Valid Hours: 636

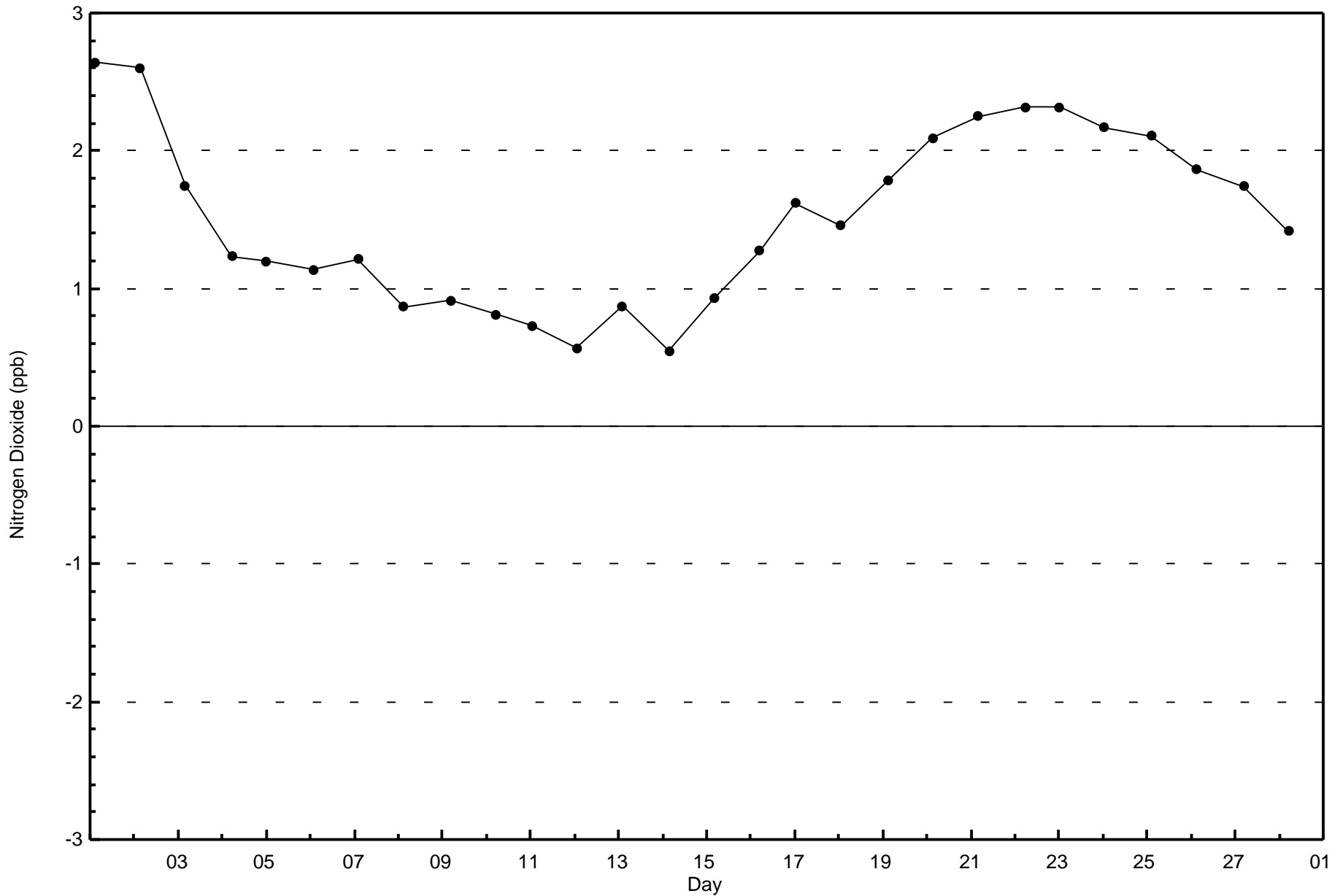
Total Number of Hours: 672

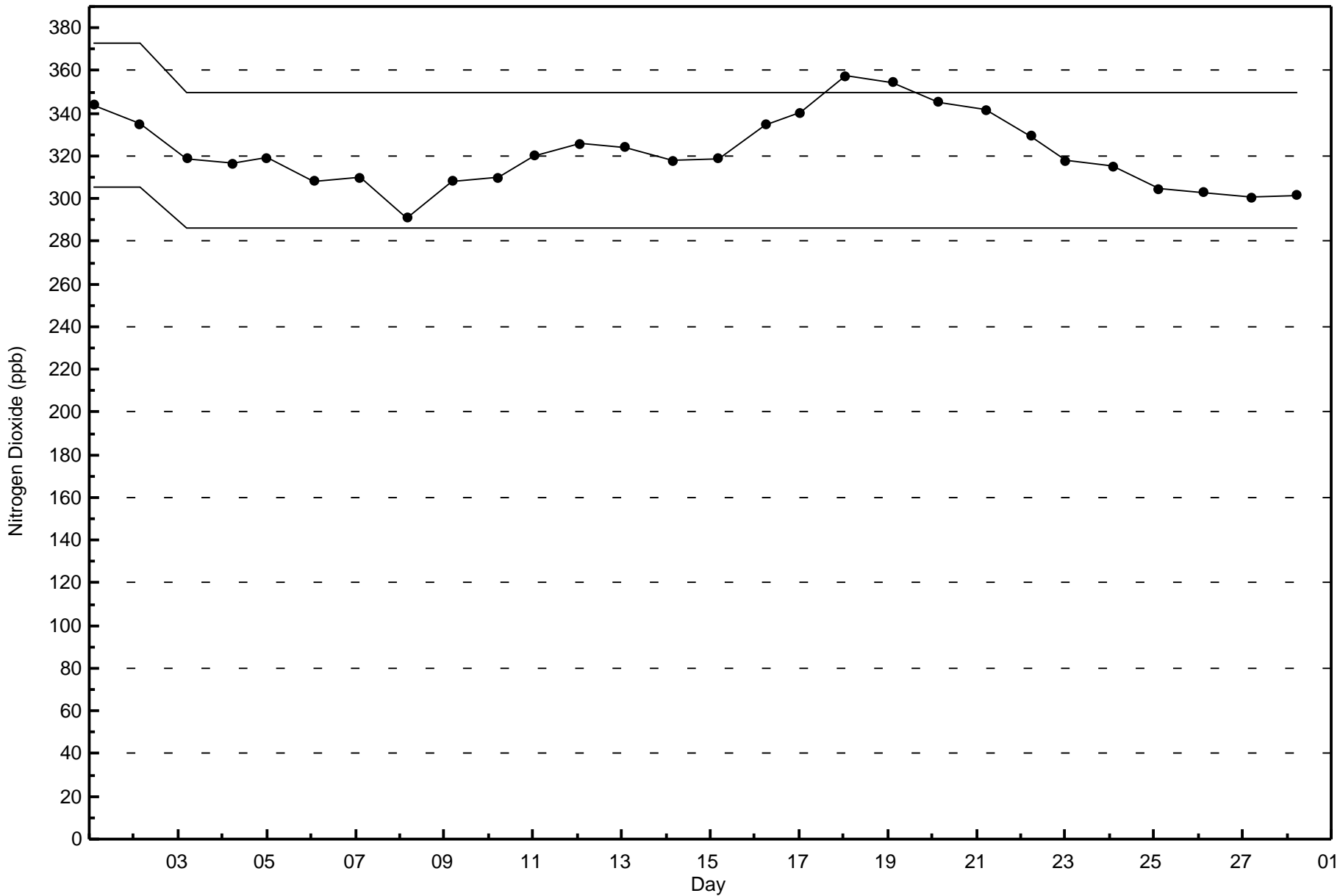


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)





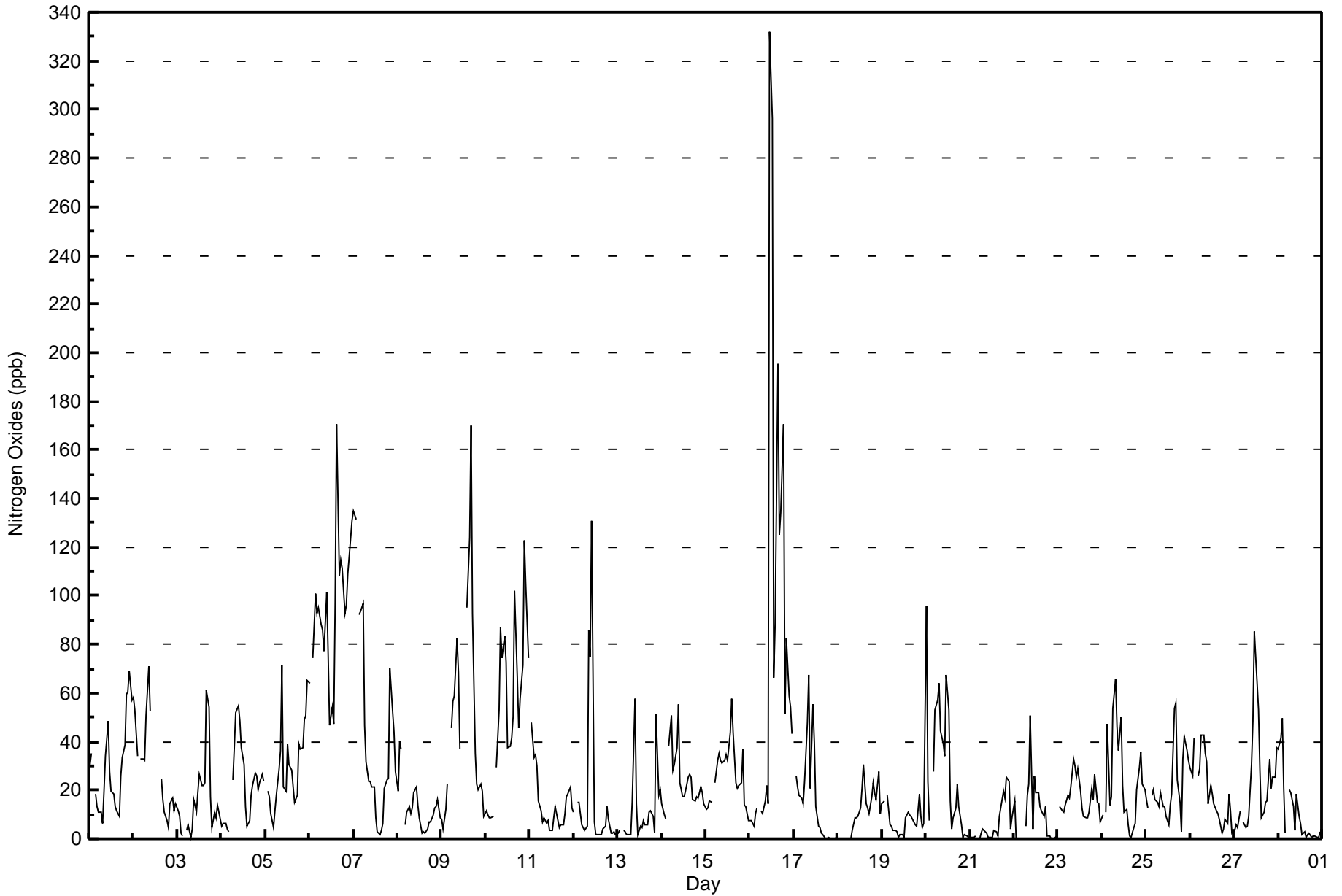




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - February 2017

Maximum Value: 332 ppb on Feb 16 12:00		Maximum Daily Average: 93.8 ppb on Feb 6		Hours in Service: 672																																												
Minimum Value: 0 ppb on Feb 22 04:00		Minimum Daily Average: 6.2 ppb on Feb 21		Hours of Data: 636																																												
Maximum Diurnal Average: 37.5 ppb at hour 12		Minimum Diurnal Average: 18.1 ppb at hour 3		Hours of Missing Data: 36																																												
Monthly Average: 26.7 ppb		Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 7 Median = 16 Q ₃ = 34 P ₉₀ = 64 P ₉₉ = 170		Hours of Calibration: 33																																												
				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-Feb	30	35	Z	18	13	11	11	6	19	34	48	28	20	19	13	11	9	26	33	39	59	61	69	57	29.2	69																						
2-Feb	58	53	34	Z	33	33	32	51	71	52	C	C	C	C	C	25	16	11	8	5	15	17	11	15	30.0	71																						
3-Feb	11	9	2	1	Z	3	6	1	4	16	11	19	27	22	22	23	61	54	17	4	11	8	14	8	15.5	61																						
4-Feb	5	6	6	4	3	Z	24	37	52	55	48	38	30	13	5	8	18	22	27	26	20	23	26	23	22.7	55																						
5-Feb	Z	20	17	11	5	12	18	29	36	71	21	20	39	30	28	21	15	18	39	37	37	49	51	65	30.0	71																						
6-Feb	64	Z	75	101	93	95	88	86	77	101	75	47	54	47	97	170	108	115	111	93	96	109	124	131	93.8	170																						
7-Feb	135	131	Z	92	94	97	47	32	24	24	21	21	9	3	2	4	6	21	24	25	70	53	44	28	43.7	135																						
8-Feb	20	40	37	Z	6	11	13	10	13	19	21	14	9	2	3	2	4	7	7	10	13	13	16	8	13.0	40																						
9-Feb	8	4	12	22	Z	46	56	59	82	69	37	M	M	M	95	124	170	93	35	22	20	22	20	9	50.3	170																						
10-Feb	12	10	9	9	9	Z	29	53	87	74	84	72	38	38	42	50	102	66	46	58	72	123	105	75	54.8	123																						
11-Feb	Z	48	33	34	30	15	12	7	9	7	7	4	3	8	13	8	5	6	6	10	17	18	21	13	14.6	48																						
12-Feb	11	Z	15	15	6	5	4	5	86	75	131	7	2	2	2	2	4	5	13	8	2	2	3	2	17.7	131																						
13-Feb	2	3	Z	3	3	2	2	2	15	58	14	1	5	5	7	6	6	11	11	9	2	51	18	20	11.2	58																						
14-Feb	14	10	8	Z	38	50	28	30	37	56	23	17	17	20	25	26	25	16	15	17	17	21	19	14	23.7	56																						
15-Feb	12	12	15	15	Z	23	32	35	32	31	32	34	32	44	58	44	23	21	22	23	37	14	13	8	26.7	58																						
16-Feb	8	8	5	10	13	Z	12	11	16	22	14	332	296	66	89	195	125	134	171	52	82	59	54	43	79.0	332																						
17-Feb	Z	26	21	18	17	14	24	48	67	20	55	39	13	5	4	2	2	0	0	0	0	0	0	1	16.4	67																						
18-Feb	1	Z	0	0	0	0	0	0	3	9	8	9	12	21	31	14	12	10	17	23	19	16	28	10	10.7	31																						
19-Feb	15	16	Z	18	6	5	3	4	3	1	2	2	1	8	11	10	9	7	6	5	18	9	5	6	7.3	18																						
20-Feb	96	24	7	Z	27	53	57	64	44	39	34	68	53	16	4	9	12	22	13	6	1	2	1	1	28.3	96																						
21-Feb	1	0	1	1	Z	0	2	4	3	2	1	0	1	3	3	1	9	13	20	17	25	24	4	8	6.2	25																						
22-Feb	16	0	0	0	0	Z	5	18	22	51	4	26	19	19	13	12	9	13	1	1	0	0	0	1	10.0	51																						
23-Feb	Z	13	11	11	14	18	17	22	33	30	25	29	20	13	9	8	9	11	21	16	27	15	15	7	17.0	33																						
24-Feb	10	Z	11	47	14	17	54	66	46	36	50	22	11	12	6	1	1	5	7	20	29	36	22	20	23.6	66																						
25-Feb	16	13	Z	18	20	16	15	13	19	13	13	9	6	14	18	53	56	24	15	3	33	42	36	32	21.7	56																						
26-Feb	30	26	41	Z	26	29	43	42	35	32	14	22	18	14	12	11	8	2	4	8	6	18	11	2	19.8	43																						
27-Feb	4	6	5	12	Z	7	4	5	9	31	49	85	64	53	28	9	11	15	15	33	21	26	25	37	24.1	85																						
28-Feb	37	41	49	21	2	Z	20	19	13	3	18	9	6	2	3	1	2	2	1	1	1	1	0	3	11.2	49																						
																								25.6	23.1	18.1	20.9	20.4	24.4	23.5	27.1	34.3	36.8	32.0	37.5	31.0	19.2	23.9	30.3	30.0	26.8	25.2	20.4	26.9	29.7	27.0	23.1	Diurnal Average
																								135	131	75	101	94	97	88	86	87	101	131	332	296	66	97	195	170	134	171	93	96	123	124	131	Diurnal Maximum
Z - zerspan																								C - Calibration				M - Maintenance																				





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	377	59.28	59.28
21 - 40	132	20.75	80.03
41 - 80	84	13.21	93.24
81 - 159	37	5.82	99.06
> 159	6	0.94	100.00

Total Number of Valid Hours: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - February 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	20	77	45	20	9	6	13	34	38	42	31	16	15	0	1	377
21 - 40	8	8	7	2	1	0	11	14	19	23	10	8	4	5	5	7	132
11 - 80	5	2	2	1	1	0	3	4	16	9	5	4	6	3	10	13	84
81 - 159	1	0	2	1	0	0	1	2	8	9	1	2	0	3	4	3	37
> 159	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	6
Totals	26	30	88	49	22	9	21	33	77	79	58	45	26	26	20	27	636

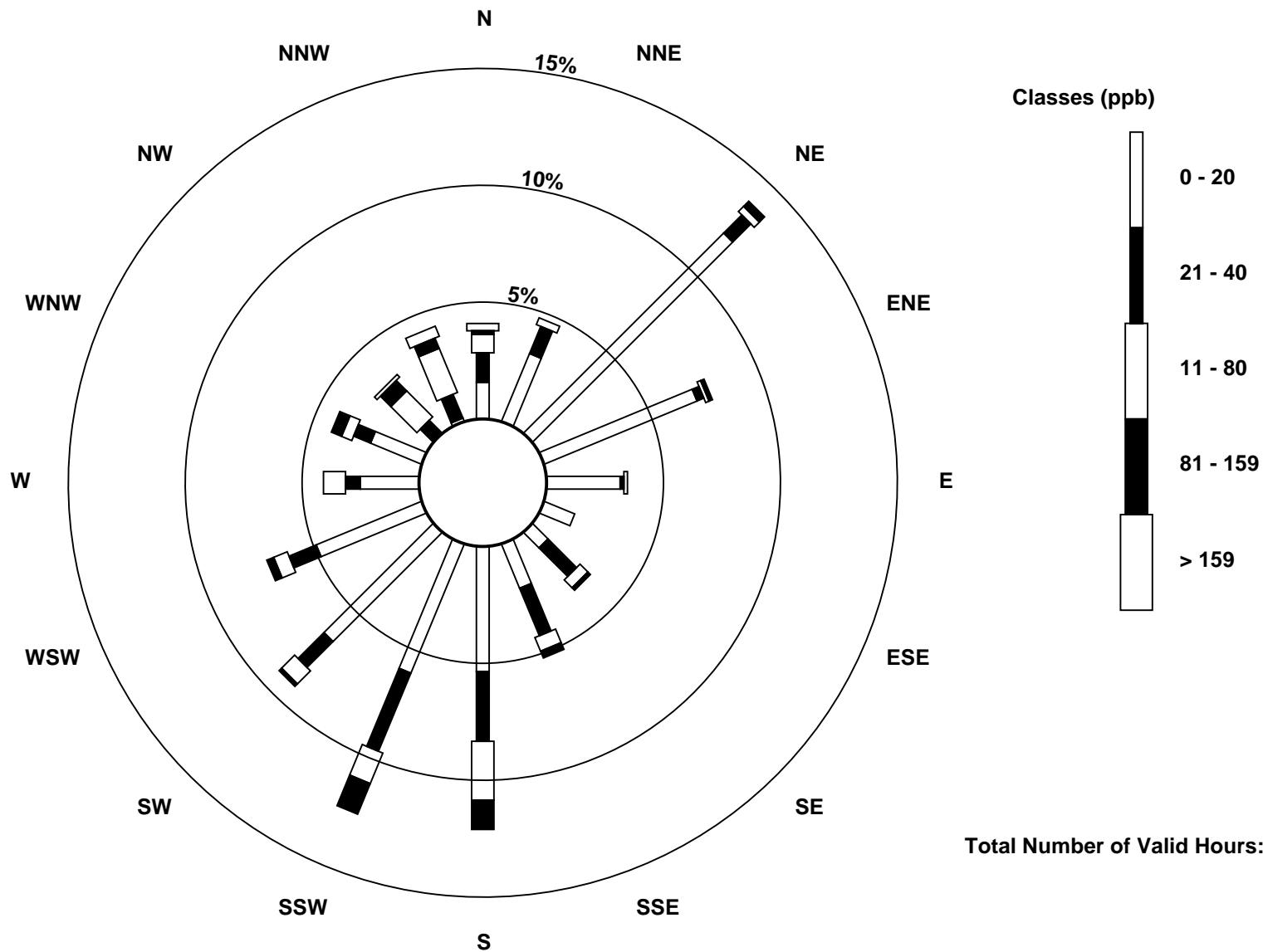
Total Number of Valid Hours: 636

Total Number of Hours: 672

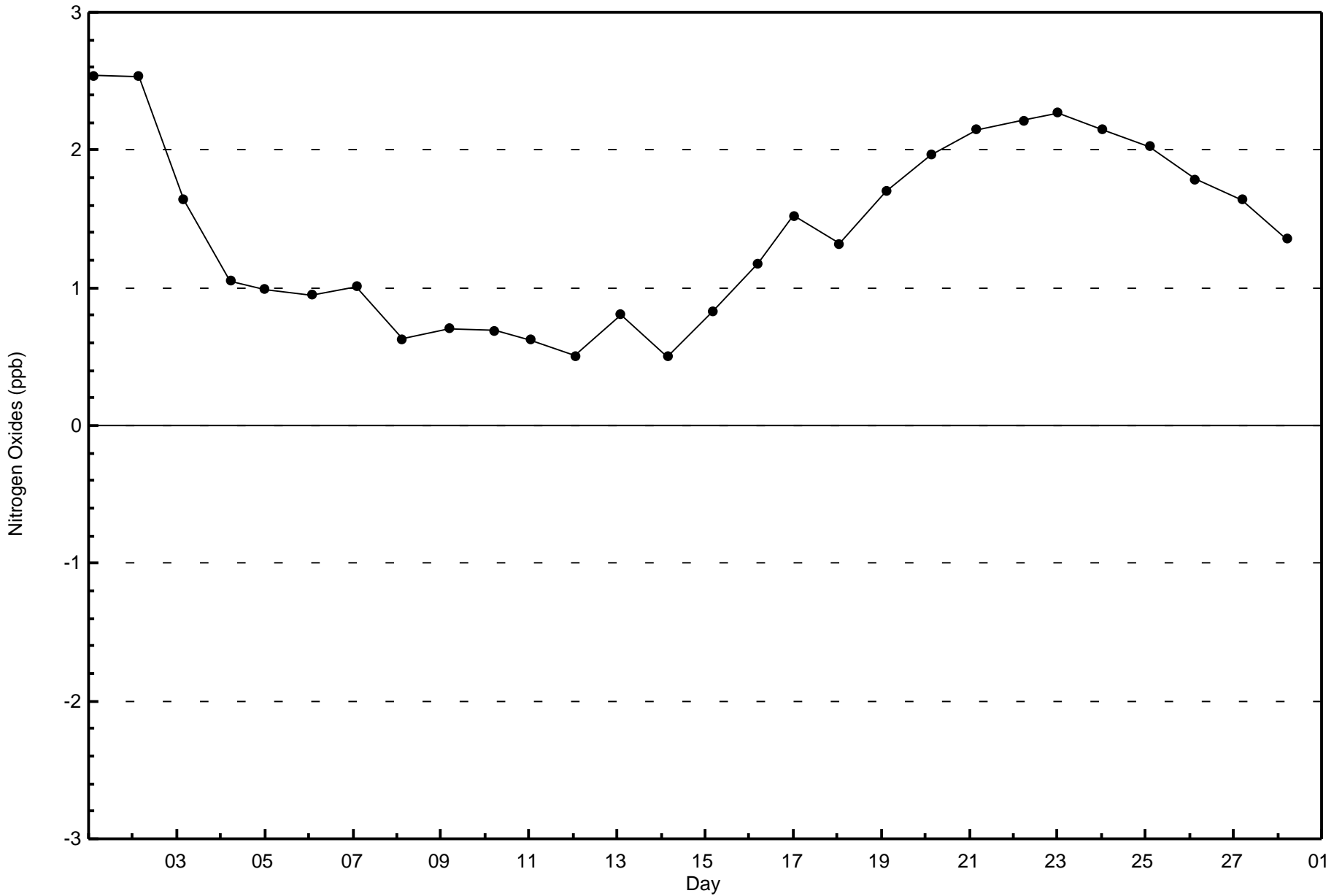


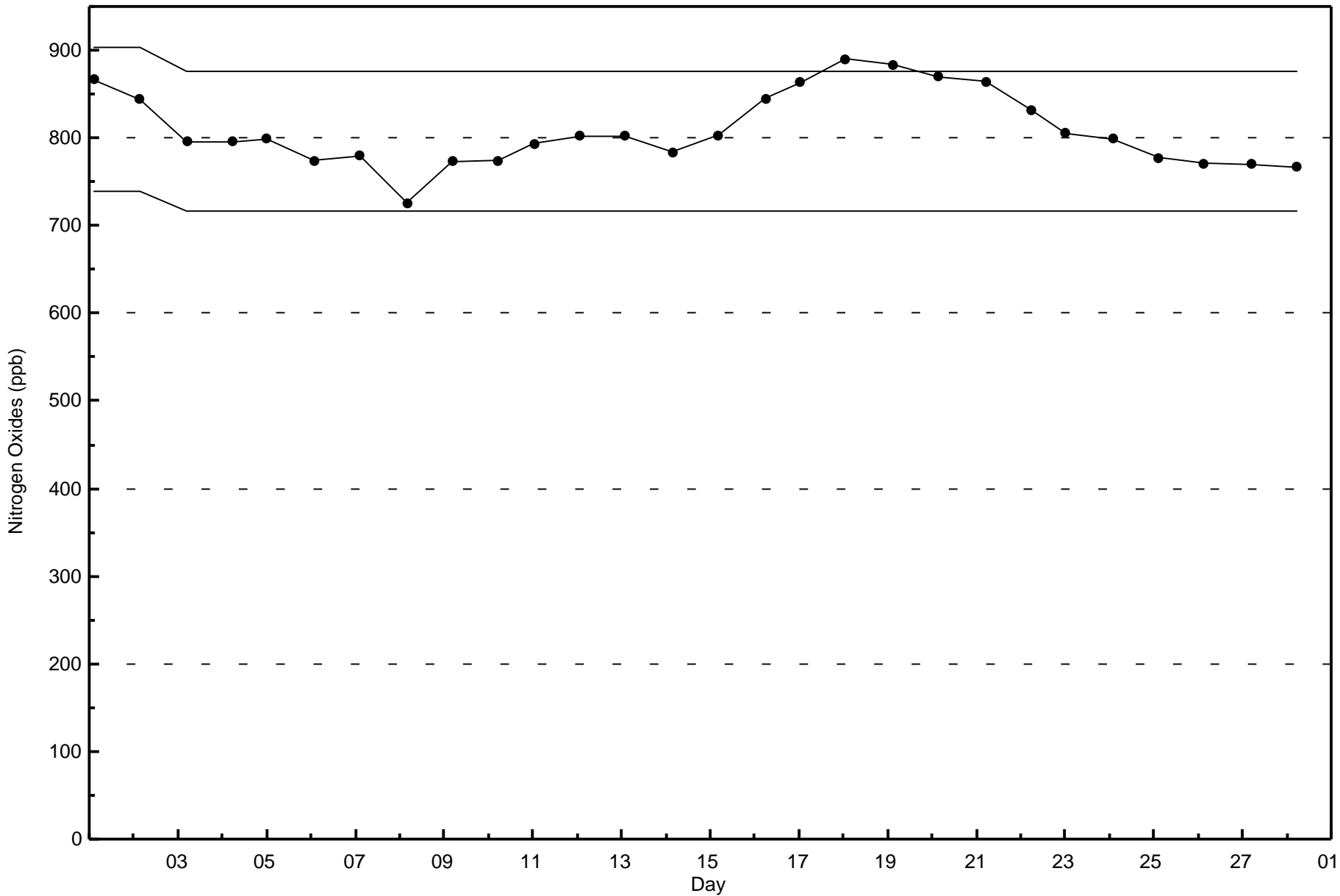
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 636





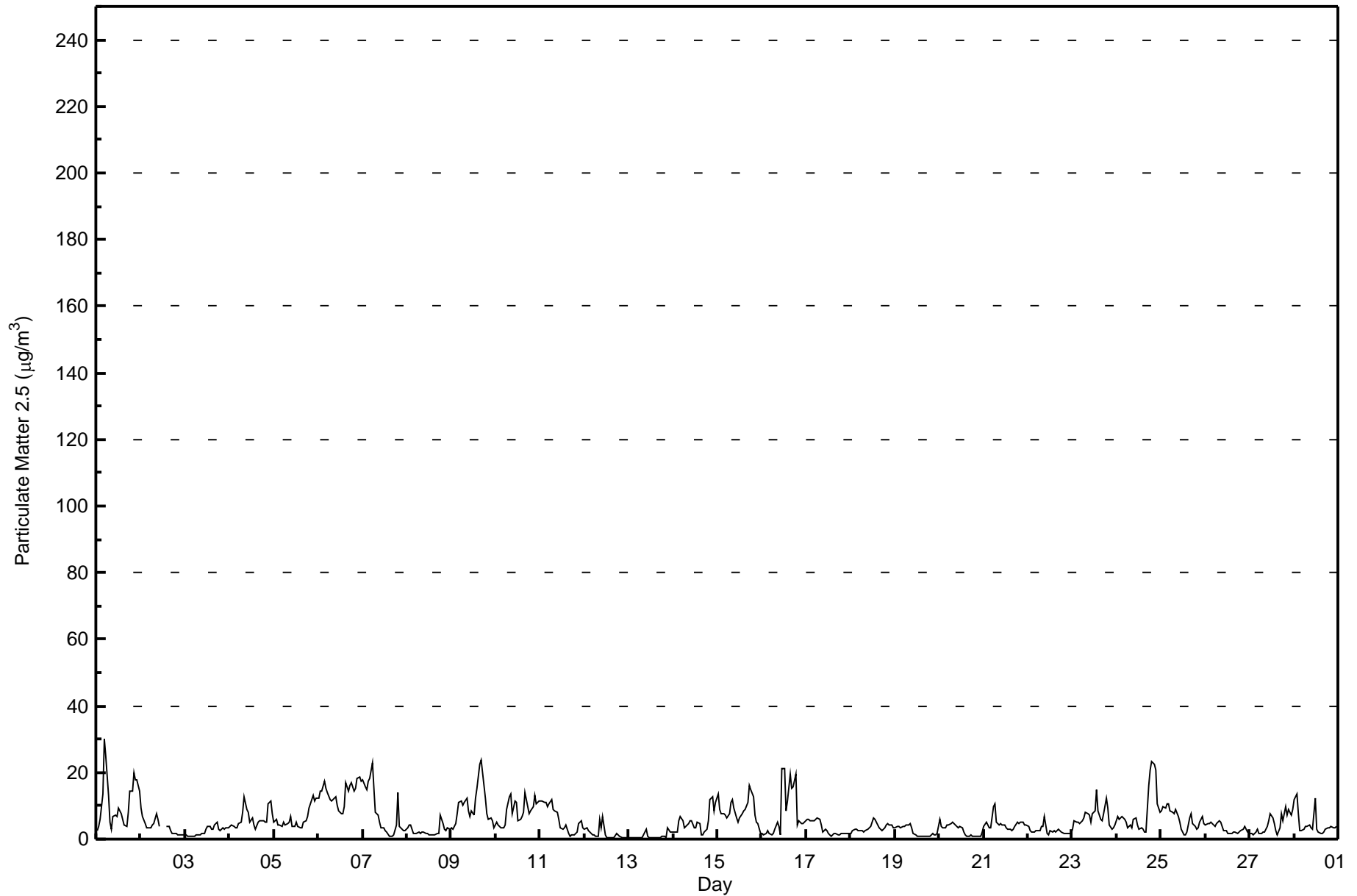


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 29.9 µg/m ³ on Feb 1 05:00 Minimum Value: 0.2 µg/m ³ on Feb 13 00:00 Maximum Diurnal Average: 6.5 µg/m ³ at hour 19 Monthly Average: 5.48 µg/m ³		Maximum Daily Average: 13.7 µg/m ³ on Feb 6 Minimum Daily Average: 0.9 µg/m ³ on Feb 13 Minimum Diurnal Average: 4.1 µg/m ³ at hour 15 Percentiles: P ₁ = 0.3 P ₁₀ = 1.2 Q ₁ = 2.2 Median = 4.0 Q ₃ = 7.3 P ₉₀ = 12.2 P ₉₉ = 22.2		Hours in Service: 672 Hours of Data: 669 Hours of Missing Data: 3 Hours of Calibration: 3 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.5	3.8	6.0	13.6	29.9	24.8	13.0	5.2	3.1	6.7	7.0	6.7	9.4	7.5	5.8	4.3	3.8	8.1	14.4	14.3	19.9	18.0	17.9	14.4	10.8	29.9
2-Feb	9.2	6.8	4.8	3.5	3.5	3.4	4.4	4.8	7.8	5.8	3.9	C	C	C	4.0	3.8	2.5	1.9	1.8	1.9	1.3	1.2	1.2	1.3	3.8	9.2
3-Feb	1.1	1.0	0.8	0.9	1.0	1.0	1.5	1.1	1.2	1.7	1.9	2.8	3.7	3.8	2.8	3.0	4.3	5.1	2.8	2.4	3.2	3.1	3.6	3.4	2.4	5.1
4-Feb	3.9	4.1	3.8	3.6	3.2	4.7	5.1	8.1	12.6	9.0	8.2	5.0	6.6	4.2	2.8	4.9	5.5	5.7	5.3	4.9	5.2	10.6	11.4	7.4	6.1	12.6
5-Feb	5.0	5.8	4.1	4.2	3.9	4.9	4.4	4.7	5.1	6.9	3.6	3.8	4.9	3.8	3.6	3.5	4.9	5.7	6.8	9.1	11.9	13.2	11.4	12.2	6.1	13.2
6-Feb	12.2	14.3	14.5	17.4	15.4	13.9	11.8	11.3	11.8	12.9	10.3	8.5	7.8	7.5	9.8	17.2	14.6	15.9	17.0	14.5	15.4	18.3	18.7	17.2	13.7	18.7
7-Feb	17.7	15.8	15.0	17.5	18.1	23.0	15.3	8.1	7.3	5.3	3.3	3.2	2.4	2.1	0.9	0.9	1.0	1.3	4.3	13.9	3.6	3.0	2.5	2.7	7.8	23.0
8-Feb	3.2	4.3	4.3	1.9	1.8	1.9	2.2	1.7	2.0	2.3	1.9	1.7	1.4	1.1	1.4	1.3	1.7	1.5	7.2	4.6	2.8	2.7	3.5	2.9	2.6	7.2
9-Feb	3.4	3.1	4.6	7.5	11.0	11.3	10.3	11.1	12.1	8.3	6.8	8.5	7.1	12.5	15.2	22.3	23.8	19.8	12.4	7.6	6.1	6.3	5.4	3.6	10.0	23.8
10-Feb	5.1	4.1	3.8	3.5	3.6	4.4	8.9	12.5	13.7	7.5	11.3	10.9	5.7	5.7	6.8	8.1	14.1	9.6	7.6	8.5	9.9	13.3	10.8	11.5	8.4	14.1
11-Feb	11.3	11.5	10.9	10.9	9.8	10.7	11.7	9.0	8.5	8.1	6.0	3.5	2.9	3.2	4.2	1.8	1.0	1.1	1.2	1.5	2.2	4.6	5.4	3.4	6.0	11.7
12-Feb	3.0	3.4	2.6	2.0	1.5	1.1	0.8	0.8	6.1	3.5	6.8	1.1	0.6	0.4	0.3	0.2	0.2	1.5	1.4	0.7	0.3	0.3	0.3	0.2	1.6	6.8
13-Feb	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.5	1.2	2.8	1.0	0.4	0.6	0.4	0.4	0.4	0.6	0.8	0.7	0.6	0.6	3.4	2.3	2.3	0.9	3.4
14-Feb	2.2	2.1	2.1	5.7	6.7	5.3	3.3	3.9	4.7	5.5	5.4	3.2	3.5	5.2	4.6	1.3	1.3	2.0	3.1	5.3	11.8	12.6	8.3	11.0	5.0	12.6
15-Feb	13.4	8.9	7.8	7.7	7.4	6.5	7.5	11.2	11.7	9.3	6.4	5.1	6.3	7.4	8.6	9.0	11.2	16.2	15.0	12.6	7.0	5.1	4.4	1.9	8.7	16.2
16-Feb	1.7	1.4	1.6	2.6	1.8	1.5	1.9	3.0	5.2	3.8	1.3	21.4	21.2	8.4	11.6	19.7	15.1	15.5	19.7	4.4	5.3	4.8	4.5	5.0	7.6	21.4
17-Feb	5.9	5.9	5.7	5.5	5.6	5.8	6.2	6.0	4.4	2.2	2.9	2.6	1.6	1.0	1.3	1.7	1.9	1.3	1.3	1.7	1.6	1.6	1.6	1.6	3.2	6.2
18-Feb	1.9	2.4	2.9	3.0	2.7	2.6	2.3	2.0	2.5	3.0	3.2	3.6	6.3	5.7	5.1	3.3	2.8	2.6	3.4	4.4	4.5	4.2	4.1	3.2	3.4	6.3
19-Feb	3.2	3.7	3.6	3.3	3.9	3.7	4.2	4.4	4.6	3.5	1.6	1.1	0.9	0.8	0.8	0.8	0.8	0.7	0.9	1.0	1.5	1.3	1.2	1.7	2.2	4.6
20-Feb	5.8	4.0	3.4	3.4	4.1	4.3	4.8	4.9	4.8	3.7	3.5	4.0	3.3	2.2	1.1	0.7	0.9	1.2	0.9	0.7	0.7	0.8	1.0	2.0	2.8	5.8
21-Feb	4.0	5.0	4.3	3.5	3.5	9.9	10.7	5.3	4.4	4.6	4.3	4.1	3.5	2.9	2.9	2.6	2.9	3.8	5.1	4.7	4.9	5.0	4.0	4.3	4.6	10.7
22-Feb	3.7	2.3	2.1	2.2	2.5	2.3	2.6	3.7	3.9	6.6	1.5	1.2	2.6	2.2	2.5	2.1	2.8	2.4	1.9	1.8	1.5	1.5	1.5	1.6	2.5	6.6
23-Feb	3.0	5.5	5.1	4.9	4.8	5.4	6.4	7.9	7.6	7.3	4.9	7.7	8.4	14.8	8.5	6.0	5.6	7.7	12.2	9.5	4.1	2.9	3.5	4.1	6.6	14.8
24-Feb	7.0	6.0	6.5	7.0	6.1	5.0	3.6	4.1	3.5	5.9	6.5	4.3	3.0	3.4	2.8	2.1	1.9	16.1	20.8	23.4	22.5	20.9	10.6	8.0	8.4	23.4
25-Feb	8.3	9.6	9.2	10.6	10.7	8.4	7.9	7.6	8.7	6.8	5.2	2.8	1.4	1.3	2.2	6.6	7.5	4.5	4.0	2.9	3.2	4.9	6.6	4.8	6.1	10.7
26-Feb	4.3	4.8	4.8	5.3	4.2	3.7	4.7	5.3	5.3	3.7	2.7	2.6	1.8	1.6	1.8	2.0	2.0	1.7	2.0	2.8	2.8	3.8	3.0	2.0	3.3	5.3
27-Feb	1.8	1.8	1.5	2.2	2.9	1.7	1.7	2.2	2.0	3.8	5.6	7.5	6.1	4.5	2.4	1.2	3.4	7.4	5.7	9.6	7.3	8.9	7.2	8.8	4.5	9.6
28-Feb	12.0	13.5	7.5	2.7	2.4	2.9	3.7	4.0	4.2	3.3	3.1	12.4	3.0	2.1	1.8	1.7	2.1	3.1	3.4	3.5	3.7	3.4	3.4	3.7	4.4	13.5
5.6 5.5 5.1 5.6 6.2 6.2 5.8 5.5 6.1 5.5 4.6 5.2 4.7 4.3 4.1 4.7 5.0 5.9 6.5 6.2 5.9 6.4 5.7 5.2																								Diurnal Average		
17.7 15.8 15.0 17.5 29.9 24.8 15.3 12.5 13.7 12.9 11.3 21.4 21.2 14.8 15.2 22.3 23.8 19.8 20.8 23.4 22.5 20.9 18.7 17.2																								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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - February 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	390	58.30	58.30
6 - 15	198	29.60	87.89
16 - 25	29	4.33	92.23
26 - 80	1	0.15	92.38
> 81.0	0	0.00	92.38

Total Number of Valid Hours: 669

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - February 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	13	24	68	43	19	8	9	10	38	37	37	23	13	17	12	19	390
6 - 15	8	8	11	4	1	2	11	23	33	43	17	11	6	7	7	6	198
16 - 25	4	0	0	0	0	0	1	2	8	7	0	0	0	2	2	3	29
26 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	32	79	47	20	10	21	35	79	87	54	34	19	26	21	28	618

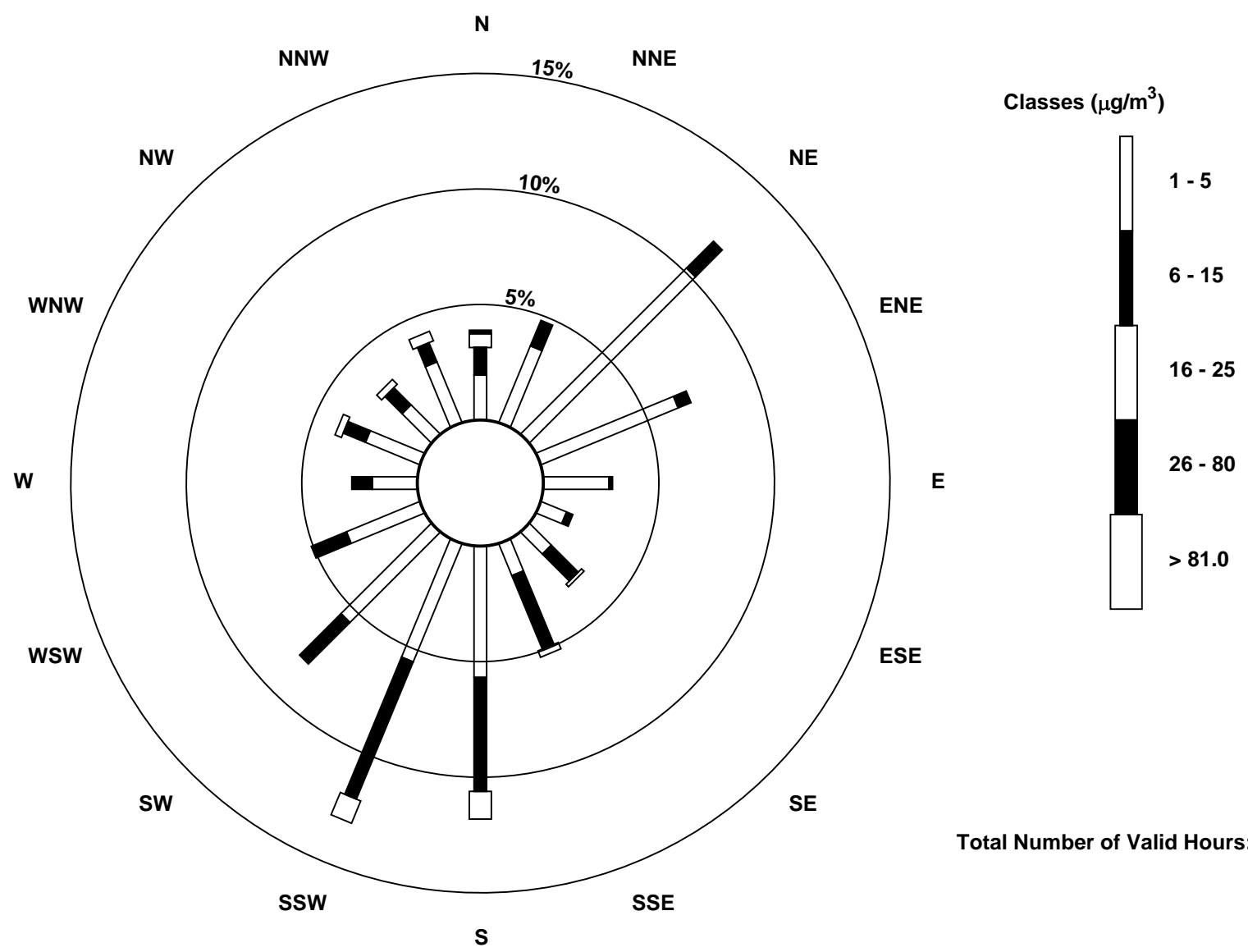
Total Number of Valid Hours: 669

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 669



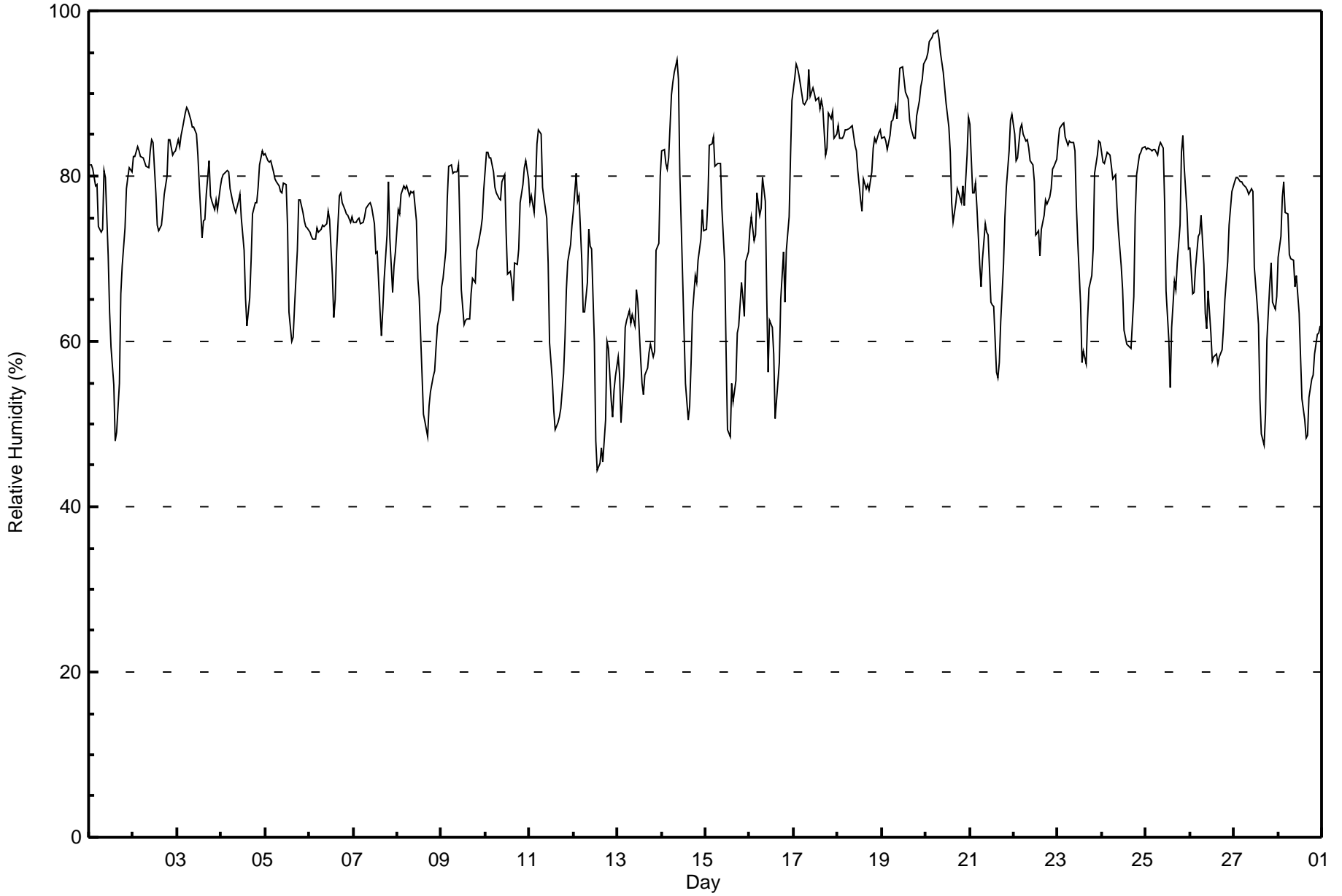
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Shell Muskeg River - February 2017

Maximum Value: 98 % on Feb 20 07:00																			Maximum Daily Average: 88.9 % on Feb 17						Hours in Service: 672																			
Minimum Value: 44 % on Feb 12 14:00																			Minimum Daily Average: 61.0 % on Feb 13						Hours of Data: 672																			
Maximum Diurnal Average: 80.6 % at hour 5																			Minimum Diurnal Average: 61.9 % at hour 15						Hours of Missing Data: 0																			
Monthly Average: 74.0 %																			Percentiles: P ₁ = 48 P ₁₀ = 57 Q ₁ = 66 Median = 76 Q ₃ = 82 P ₉₀ = 86 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-Feb	81	81	81	79	79	74	73	74	81	80	70	64	59	55	48	49	55	66	69	74	78	80	81	81	71.3	81																		
2-Feb	82	82	83	83	82	82	82	81	81	83	84	84	78	74	73	74	76	78	80	84	84	82	83	83	80.9	84																		
3-Feb	84	84	85	86	88	88	88	87	86	86	85	83	79	73	75	75	78	82	78	77	76	77	76	79	81.3	88																		
4-Feb	80	80	80	81	80	79	77	76	76	77	78	75	71	65	62	65	70	75	77	77	79	81	83	83	76.1	83																		
5-Feb	83	82	82	82	80	80	79	79	78	78	79	79	74	64	60	60	64	71	77	77	76	75	74	74	75.2	83																		
6-Feb	73	73	72	72	74	73	74	74	74	74	76	75	68	63	65	71	78	78	77	76	75	75	74	75	73.3	78																		
7-Feb	74	74	75	75	74	74	75	76	77	77	76	74	71	71	64	61	64	68	73	79	73	66	69	71	72.1	79																		
8-Feb	76	75	78	79	78	79	78	78	78	78	75	68	65	56	51	50	48	52	54	56	57	59	62	64	66.4	79																		
9-Feb	67	68	71	77	81	81	80	80	81	81	74	66	62	62	63	63	66	68	67	71	72	74	75	78	72.0	81																		
10-Feb	83	83	82	82	81	79	78	77	77	79	80	73	68	69	67	65	70	69	71	77	79	81	82	80	76.3	83																		
11-Feb	77	78	76	79	84	86	85	79	77	75	70	60	55	52	49	50	51	52	56	60	66	70	72	74	68.0	86																		
12-Feb	76	80	77	78	70	64	64	67	74	71	71	60	48	44	45	47	45	51	60	59	53	51	54	56	61.0	80																		
13-Feb	58	56	50	56	62	62	64	62	63	62	66	65	58	55	53	56	57	59	60	58	59	71	72	80	61.0	80																		
14-Feb	83	83	81	81	82	90	91	93	94	92	80	68	61	55	50	52	57	63	68	67	70	72	76	73	74.3	94																		
15-Feb	74	77	84	84	85	81	82	82	82	76	69	59	49	48	55	53	55	61	62	67	65	63	70	71	68.9	85																		
16-Feb	73	75	72	73	78	75	76	80	77	65	56	63	62	58	51	55	57	65	71	65	71	75	82	89	69.4	89																		
17-Feb	92	94	93	92	90	89	89	89	93	90	91	90	89	89	88	89	88	82	83	88	87	88	85	85	88.9	94																		
18-Feb	86	85	85	85	86	86	86	86	86	84	83	81	77	76	80	79	79	78	81	83	85	84	85	86	82.9	86																		
19-Feb	85	85	84	83	85	87	87	89	87	90	93	93	92	90	89	87	86	85	85	87	89	91	92	94	88.0	94																		
20-Feb	94	95	96	97	97	97	98	97	95	93	91	89	86	83	77	74	77	79	78	77	79	76	83	87	87.2	98																		
21-Feb	86	78	78	79	76	69	67	70	74	73	73	65	64	64	56	56	57	62	69	75	79	83	87	88	72.1	88																		
22-Feb	85	82	82	86	86	85	84	84	83	82	81	79	73	73	70	74	75	77	77	77	79	81	81	82	80.0	86																		
23-Feb	84	86	86	86	85	84	84	84	84	83	76	72	65	58	59	57	63	66	68	71	80	83	84	84	76.4	86																		
24-Feb	82	81	82	83	82	81	80	80	76	73	69	66	61	60	59	59	65	75	80	83	83	83	84	84	74.6	84																		
25-Feb	83	83	83	83	83	83	83	84	84	83	77	66	60	54	62	67	66	70	74	83	85	81	76	71	76.0	85																		
26-Feb	71	66	66	69	73	73	75	69	63	62	66	61	58	58	59	57	58	59	62	65	70	74	76	78	66.2	78																		
27-Feb	79	80	80	79	79	79	79	78	78	79	78	69	65	62	53	49	47	51	60	67	69	65	64	65	68.9	80																		
28-Feb	70	73	77	79	76	75	71	70	70	67	68	63	58	53	51	48	49	53	55	56	58	61	61	62	63.5	79																		
																			79.4	79.2	79.4	80.3	80.6	79.8	79.5	79.5	79.6	78.3	76.3	71.7	67.0	63.7	61.9	62.2	64.1	67.3	70.2	72.6	74.1	75.1	76.5	77.7	Diurnal Average	
																			94	95	96	97	97	97	98	97	95	93	93	93	92	90	89	89	88	85	85	88	89	91	92	94	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Shell Muskeg River - February 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	93	13.84	13.84
60 - 80	353	52.53	66.37
80 - 100	226	33.63	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Summary of Hour Averages

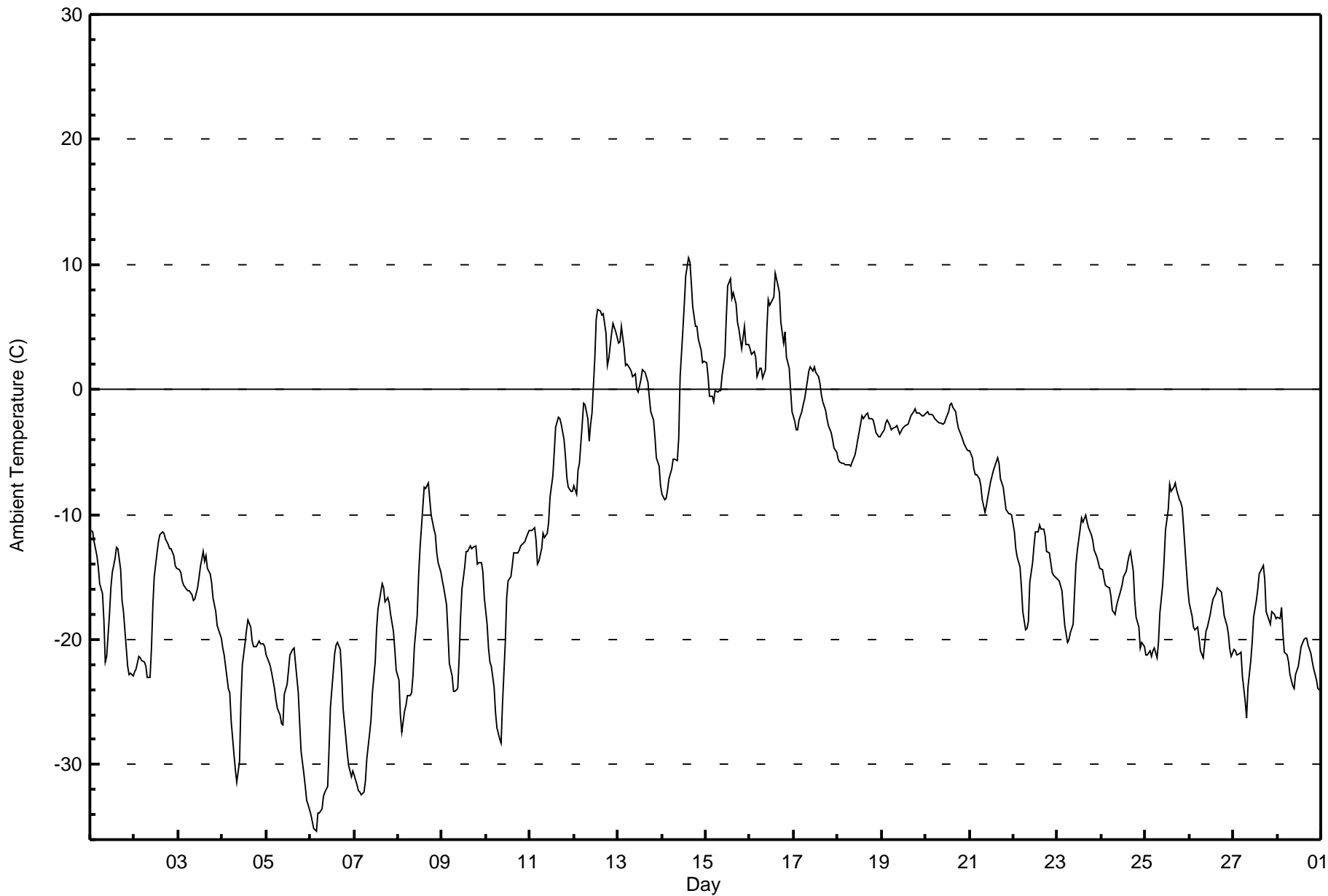
Ambient Temperature (AT) - C
Shell Muskeg River - February 2017

Maximum Value: 10.6 C on Feb 14 15:00 Maximum Daily Average: 3.9 C on Feb 16																						Hours in Service: 672 Hours of Data: 672				
Minimum Value: -35.3 C on Feb 6 04:00 Minimum Daily Average: -28.9 C on Feb 6 Maximum Diurnal Average: -7.8 C at hour 16 Minimum Diurnal Average: -15.6 C at hour 8 Monthly Average: -12.09 C Percentiles: P ₁ = -33.5 P ₁₀ = -23.9 Q ₁ = -20.2 Median = -13.3 Q ₃ = -3.1 P ₉₀ = 1.7 P ₉₉ = 8.3																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-11.2	-11.4	-12.2	-13.3	-14.2	-15.5	-16.4	-18.4	-21.7	-21.4	-18.0	-15.8	-14.6	-13.5	-12.6	-12.7	-14.4	-16.9	-17.8	-20.6	-22.1	-22.8	-22.7	-22.9	-16.8	-11.2
2-Feb	-22.6	-22.3	-21.4	-21.5	-21.7	-21.8	-22.1	-23.0	-23.1	-20.8	-17.3	-15.0	-13.1	-12.1	-11.6	-11.4	-11.5	-11.9	-12.3	-12.7	-12.7	-13.3	-14.0	-14.3	-16.8	-11.4
3-Feb	-14.4	-14.6	-15.3	-15.6	-15.9	-16.1	-16.1	-16.5	-16.9	-16.7	-15.9	-15.0	-14.2	-13.0	-13.7	-13.3	-14.4	-14.7	-15.4	-16.6	-17.8	-18.8	-19.2	-19.9	-15.8	-13.0
4-Feb	-20.7	-21.3	-23.0	-24.0	-24.3	-26.5	-29.2	-30.5	-31.4	-29.7	-24.9	-22.0	-20.3	-19.2	-18.4	-19.0	-20.1	-20.6	-20.4	-20.1	-20.4	-20.4	-20.6	-20.6	-22.8	-18.4
5-Feb	-21.3	-21.8	-22.1	-22.7	-23.9	-24.8	-25.4	-26.0	-26.7	-26.9	-24.3	-23.6	-22.4	-21.3	-20.8	-20.7	-21.9	-24.2	-26.7	-28.9	-30.7	-31.8	-32.8	-33.2	-25.2	-20.7
6-Feb	-34.0	-34.5	-35.1	-35.3	-33.9	-33.9	-33.5	-32.5	-32.2	-31.7	-28.8	-25.4	-22.6	-21.1	-20.4	-20.2	-20.8	-22.7	-25.4	-27.8	-29.1	-30.1	-31.0	-30.5	-28.9	-20.2
7-Feb	-30.8	-31.7	-32.1	-32.1	-32.4	-32.2	-31.2	-29.5	-27.5	-26.4	-24.2	-21.8	-19.1	-17.6	-16.2	-15.5	-15.9	-17.0	-16.7	-17.1	-18.0	-19.3	-20.8	-22.5	-23.7	-15.5
8-Feb	-23.2	-26.1	-27.4	-25.7	-25.2	-24.5	-24.4	-24.2	-23.0	-20.5	-18.1	-14.9	-12.8	-9.4	-7.8	-7.9	-7.5	-8.8	-10.1	-11.2	-11.7	-13.1	-13.8	-14.6	-16.9	-7.5
9-Feb	-15.3	-15.8	-17.2	-19.4	-21.9	-23.0	-24.2	-24.1	-23.9	-21.4	-18.2	-16.0	-14.2	-13.0	-12.9	-12.5	-12.8	-12.6	-12.5	-13.9	-13.8	-13.8	-14.6	-16.6	-16.8	-12.5
10-Feb	-18.7	-20.7	-21.8	-22.1	-23.8	-25.8	-27.1	-28.0	-28.3	-25.2	-20.2	-16.6	-15.3	-15.0	-14.1	-13.1	-13.1	-13.1	-12.9	-12.5	-12.3	-12.1	-11.9	-11.3	-18.1	-11.3
11-Feb	-11.3	-11.3	-11.1	-12.1	-13.9	-13.8	-12.7	-11.5	-11.8	-11.6	-10.6	-8.6	-6.9	-5.0	-3.0	-2.2	-2.3	-2.7	-4.0	-5.3	-7.0	-7.8	-8.1	-8.2	-8.4	-2.2
12-Feb	-7.7	-8.4	-6.4	-5.9	-2.7	-1.1	-1.2	-2.4	-4.1	-2.8	-1.9	2.5	5.6	6.4	6.2	5.9	6.1	4.4	1.9	2.5	4.4	5.3	4.9	4.6	0.7	6.4
13-Feb	3.7	3.8	5.0	3.3	1.9	2.0	1.6	1.5	1.0	1.3	0.1	-0.2	0.8	1.6	1.5	1.4	0.6	-0.6	-1.8	-2.5	-3.7	-5.4	-6.1	-7.7	0.1	5.0
14-Feb	-8.3	-8.8	-8.7	-8.1	-7.2	-6.4	-5.5	-5.6	-5.7	-3.9	1.0	4.9	6.9	9.1	10.6	10.2	8.5	6.6	5.0	5.0	4.0	3.2	2.1	2.3	0.5	10.6
15-Feb	2.1	1.0	-0.6	-0.5	-0.9	-0.1	-0.2	-0.1	-0.1	1.1	2.7	5.7	8.3	8.8	7.3	7.8	6.8	5.4	4.8	3.3	4.1	5.1	3.6	3.6	3.3	8.8
16-Feb	3.3	2.9	3.1	2.6	1.1	1.7	1.7	0.9	1.5	4.8	7.2	6.7	7.2	7.4	9.3	8.3	7.8	5.4	3.7	4.6	2.6	1.8	-0.1	-1.7	3.9	9.3
17-Feb	-2.6	-3.2	-3.2	-2.5	-1.7	-1.2	-0.8	0.7	1.5	1.8	1.5	1.8	1.4	1.1	0.5	-0.4	-1.0	-1.6	-2.3	-2.9	-3.5	-4.0	-4.6	-5.0	-1.3	1.8
18-Feb	-5.6	-5.8	-5.9	-6.0	-6.0	-6.0	-6.0	-6.2	-5.8	-5.2	-4.7	-4.0	-2.8	-2.1	-2.3	-2.0	-1.9	-2.3	-2.3	-2.4	-2.9	-3.5	-3.8	-3.8	-4.1	-1.9
19-Feb	-3.6	-3.3	-2.7	-2.5	-2.9	-3.2	-3.1	-3.0	-2.9	-3.2	-3.6	-3.2	-3.0	-2.9	-2.8	-2.4	-2.1	-1.8	-1.6	-1.8	-1.8	-2.0	-2.1	-2.2	-2.6	-1.6
20-Feb	-1.9	-1.8	-2.0	-2.0	-2.1	-2.3	-2.6	-2.7	-2.7	-2.8	-2.7	-2.3	-1.7	-1.2	-1.1	-1.5	-1.8	-2.5	-3.1	-3.6	-4.0	-4.4	-4.8	-4.9	-2.6	-1.1
21-Feb	-4.9	-5.5	-6.4	-6.8	-6.8	-7.1	-7.7	-8.9	-9.8	-9.3	-8.6	-7.3	-6.9	-6.4	-5.8	-5.4	-6.0	-7.1	-7.8	-8.7	-9.5	-9.9	-9.9	-10.1	-7.6	-4.9
22-Feb	-11.4	-12.7	-13.4	-14.2	-15.8	-17.8	-19.3	-19.1	-18.6	-15.4	-13.8	-12.5	-11.4	-11.4	-10.9	-11.2	-11.2	-11.7	-12.9	-13.1	-13.9	-14.7	-14.9	-15.1	-14.0	-10.9
23-Feb	-15.2	-15.3	-16.1	-17.5	-18.9	-20.2	-20.0	-19.5	-18.8	-16.3	-13.9	-12.8	-11.1	-10.3	-10.6	-10.1	-10.6	-11.1	-11.6	-12.1	-12.8	-13.4	-13.8	-14.3	-14.4	-10.1
24-Feb	-14.4	-15.0	-15.6	-15.8	-15.9	-16.5	-17.6	-18.0	-17.4	-16.8	-16.1	-15.6	-15.0	-14.5	-13.8	-13.3	-13.0	-14.5	-16.8	-18.2	-19.0	-20.7	-20.2	-20.5	-16.4	-13.0
25-Feb	-21.3	-21.3	-20.9	-21.3	-20.9	-20.7	-21.4	-20.3	-17.9	-15.7	-13.8	-11.2	-9.6	-7.6	-8.2	-7.8	-7.5	-8.0	-8.8	-9.1	-9.4	-11.1	-14.4	-16.0	-14.3	-7.5
26-Feb	-17.1	-18.1	-19.0	-19.3	-19.0	-19.9	-20.9	-21.4	-20.3	-19.3	-19.0	-18.0	-17.4	-16.8	-16.4	-15.9	-15.9	-16.2	-17.1	-18.2	-18.9	-19.6	-20.8	-21.4	-18.6	-15.9
27-Feb	-20.8	-20.9	-21.3	-21.1	-21.0	-22.9	-25.0	-26.2	-23.8	-21.7	-20.2	-18.2	-16.9	-16.0	-14.7	-14.5	-14.1	-15.2	-17.8	-18.4	-18.8	-17.8	-18.0	-18.4	-19.3	-14.1
28-Feb	-18.2	-18.3	-17.4	-19.6	-21.0	-21.2	-21.7	-22.8	-23.7	-23.9	-22.8	-22.1	-21.3	-20.6	-20.0	-19.9	-19.9	-20.5	-21.1	-21.7	-22.3	-23.2	-23.9	-24.1	-21.3	-17.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Shell Muskeg River - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Shell Muskeg River - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	171	25.45	25.45
-20 - 0	411	61.16	86.61
0 - 10	88	13.10	99.70
10 - 20	2	0.30	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

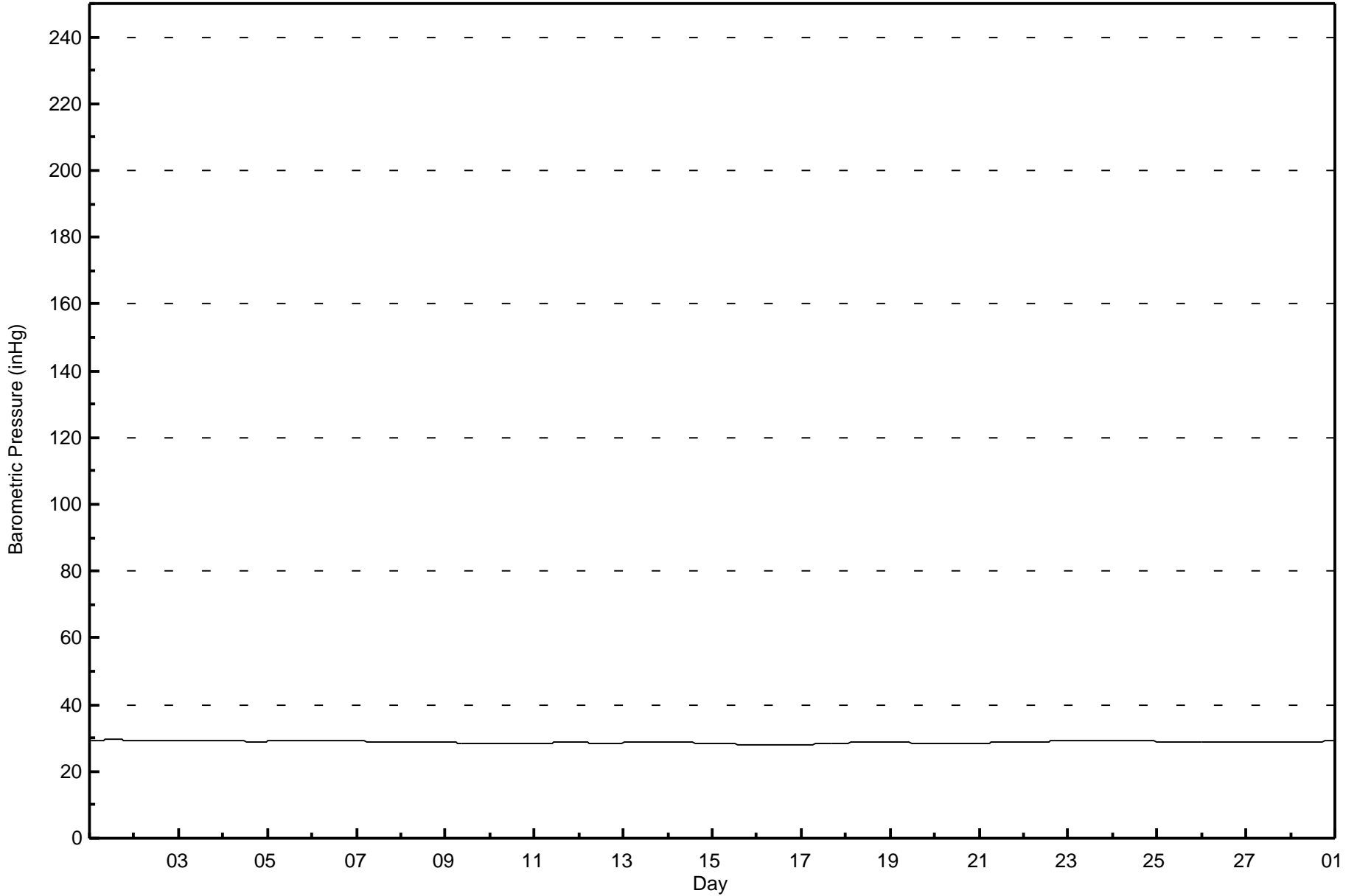


Maximum Value: 29.5 inHg on Feb 1 13:00																						Maximum Daily Average: 29.4 inHg on Feb 1																						Hours in Service: 672						
Minimum Value: 28.0 inHg on Feb 16 16:00																						Minimum Daily Average: 28.0 inHg on Feb 16																						Hours of Data: 672						
Maximum Diurnal Average: 28.8 inHg at hour 11																						Minimum Diurnal Average: 28.8 inHg at hour 17																						Hours of Missing Data: 0						
Monthly Average: 28.79 inHg																						Percentiles: P ₁ = 28.0 P ₁₀ = 28.4 Q ₁ = 28.6 Median = 28.8 O ₃ = 29.1 P ₉₀ = 29.2 P ₉₉ = 29.5																						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-Feb	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	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	29.4	29.4	29.4	29.5																						
2-Feb	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.4																					
3-Feb	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2																					
4-Feb	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	29.0	29.0	29.0	29.0	29.0	29.1																					
5-Feb	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	29.1	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																					
6-Feb	29.1	29.0	29.1	29.1	29.1	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1																					
7-Feb	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	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																					
8-Feb	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	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	28.8	28.9																					
9-Feb	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.6	28.6																					
10-Feb	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.6	28.6																					
11-Feb	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7																					
12-Feb	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.7																					
13-Feb	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																					
14-Feb	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.7	28.9																					
15-Feb	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.1	28.1	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.2	28.4																					
16-Feb	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.1																					
17-Feb	28.0	28.1	28.1	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5																					
18-Feb	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7																					
19-Feb	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.7																					
20-Feb	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6																					
21-Feb	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8																					
22-Feb	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	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																					
23-Feb	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1																					
24-Feb	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	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1																					
25-Feb	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.7	29.0																					
26-Feb	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	29.0																					
27-Feb	28.8	28.8	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	28.7	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-Feb	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	28.9	29.1																					
																						28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	Diurnal Average	
																						29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	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	29.4	29.4	29.4	29.4	29.4	29.4	29.4	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Shell Muskeg River - February 2017

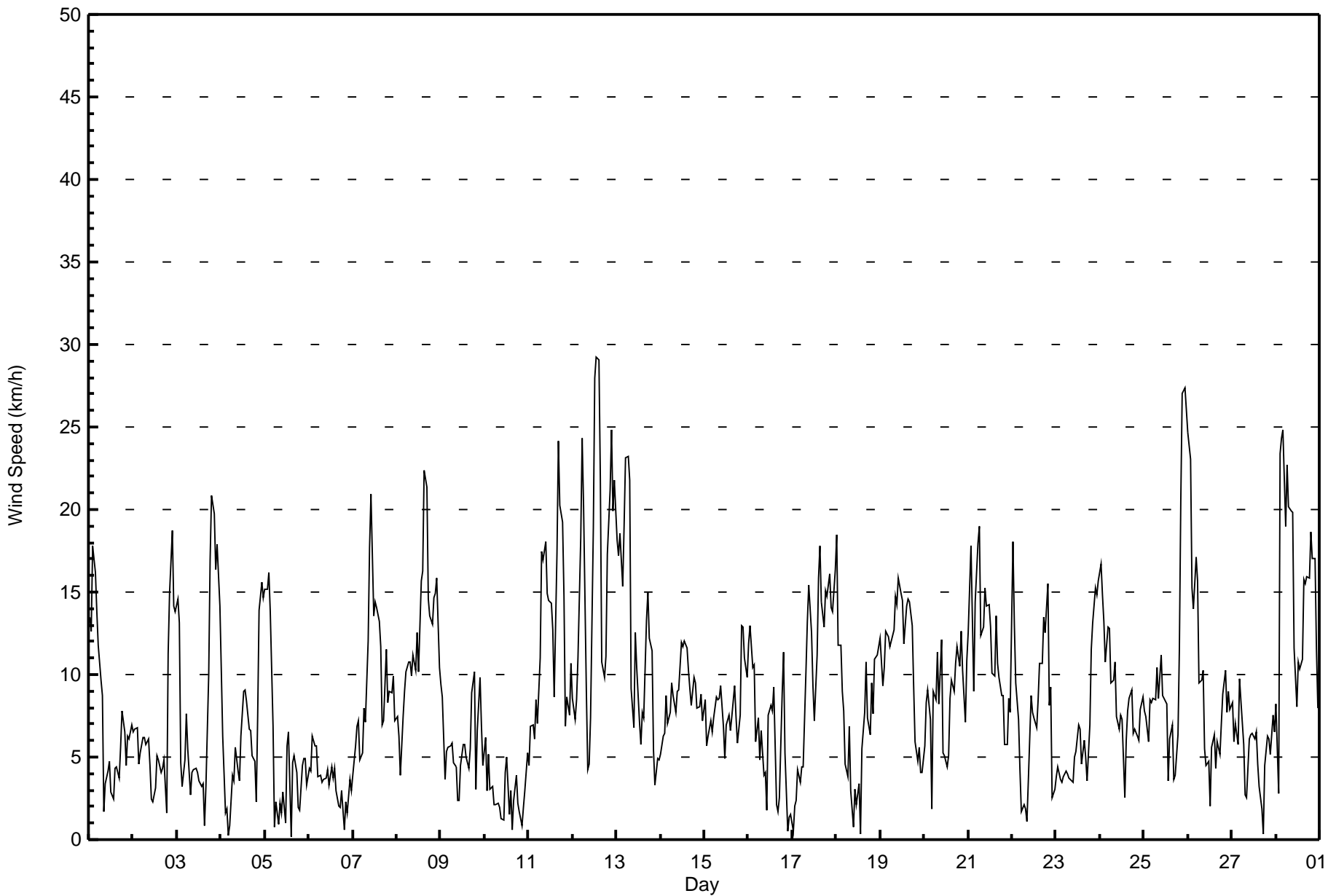
Maximum Speed: 29 km/h on Feb 12 14:00		Maximum Daily Speed Average: 15.3 km/h on Feb 12		Hours in Service: 672																							
Minimum Speed Value: 0 km/h on Feb 5 15:00		Minimum Daily Speed Average: 0.4 km/h on Feb 9		Hours of Data: 672																							
Maximum Diurnal Speed Average: 3.6 km/h at hour 13		Minimum Diurnal Speed Average: 0.2 km/h at hour 5		Hours of Missing Data: 0																							
Monthly Average Velocity: 0.4 km/h 289.4 deg		Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 25		Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	N13	N13	NNE18	NNE16	N14	N12	N10	NE9	ESE2	SSE3	SE4	SE5	SSW3	SW2	SSE4	ESE4	ESE4	SSW6	SSW8	SSW6	SE4	SSE6	SSE6	SSW7	NE1.9	NNE18	
2-Feb	SSW7	SSW7	SW7	SSW5	SSW5	S6	SSW6	S6	S6	S5	SSW2	S2	ESE3	E5	ESE5	SE4	ESE4	E5	E2	ENE11	NE15	NNE19	NE14	NE14	ESE2.4	NNE19	
3-Feb	NE15	NNE13	NE5	ENE3	NE5	NE8	NE6	SE3	SSE4	SW4	SW4	SSW4	WSW4	S3	SSE3	SSW1	WSW3	N10	NNE17	NE21	NE20	NE16	NNE18	NE14	NE5.8	NE21	
4-Feb	NE10	ENE6	SE2	ESE2	SW0	SSE1	SSW4	S4	S6	S4	S4	SSW6	SW9	S9	SSW8	SSW7	SSE7	SE5	SE5	SE2	ENE7	NE14	NE16	NNE15	ESE2.2	NE16	
5-Feb	NNE15	NNE15	NNE16	NE14	ENE7	WSW1	S2	SSE1	S2	S2	E3	WNW1	WSW6	W7	W0	SE5	E5	ESE4	SE2	SSE2	SSE4	S5	S5	S3	ENE1.9	NNE16	
6-Feb	S4	SSE4	S6	S6	S6	S4	S4	SSW3	SSW4	SSW4	SW4	WSW3	W4	W4	NW4	NW3	NE2	WNW2	WNW3	SSW1	SSW2	S2	S4	S3	SSW2.5	S6	
7-Feb	S4	SSW6	SSW7	SSW7	SSW5	S5	S8	S7	SSW12	SW18	SW21	SW14	SW14	SW14	SW13	SW12	WSW7	NW7	N12	N8	NNW9	NW9	NW10	NW7	SSW6.3	SW21	
8-Feb	WNW7	WSW6	WSW4	SW7	SSW9	SSW10	S11	S11	SSW10	SW11	S10	SSW13	SSW10	SW16	SW16	SW22	SW21	SW15	SSW14	SW13	SW15	SW15	SW16	SW10	SW11.6	SW22	
9-Feb	SW9	SW9	SSW4	SSE5	S6	S6	S6	SSE5	SSE4	SW2	SW2	W4	WNW6	NW6	NW5	NW4	N5	N9	NNE10	ENE3	NE7	NE10	NE7	NE4	NNW0.4	NNE10	
10-Feb	NE6	ENE3	ENE5	E3	E3	E2	SSE2	SSE2	SSE2	SE1	WSW1	WSW4	WSW5	WNW2	W3	N1	E2	E4	NE2	NE2	WNW1	SE2	WSW3	W5	E0.5	NE6	
11-Feb	WSW4	SSW7	SSW7	S6	SSE8	SSW7	SW11	WSW17	WSW17	WSW18	SW15	SW14	SW14	S13	SSW9	SW17	WSW24	WSW20	WSW19	SW15	SSW7	SSE9	SE8	SSE11	SW10.8	WSW24	
12-Feb	S9	SSW7	SW8	SW11	SW18	WSW24	WSW20	WSW9	SSW4	WSW5	SW7	SW19	WSW28	WSW29	WSW29	SW22	SSW11	SSW10	SSW11	SW17	WSW21	WSW25	WSW20	WSW22	SW15.3	WSW29	
13-Feb	WSW18	W17	W19	WSW15	WSW19	W23	W23	W22	WNW9	NW7	NE13	NE10	E7	E6	E8	NE7	NE13	NE15	NE12	NE11	NE5	WNW3	WNW5	SSW5	WNW4.4	W23	
14-Feb	S5	S6	S6	SSW9	SSW7	SSW8	S10	S9	S8	S9	S9	SSW12	SSW12	S12	S12	S10	S9	S8	S10	S9	SSW8	S8	S9	S7	S8.7	S12	
15-Feb	SSE8	SE6	SSE6	SSW7	SSW6	SSW7	SW9	SSW8	SW9	SSW9	SSW7	S5	S7	SW8	SW7	SSW7	SSW9	S7	SSE6	SSW8	SSW13	SSW13	SW11	SSW10	SSW7.7	SSW13	
16-Feb	SSW12	SSW13	SSW10	SSW11	S6	SSW7	SSE5	S7	SSW4	SSE4	E2	NNW8	NNW8	NW8	NNW9	NNW2	NE2	WNW3	N9	N11	NNW5	SSW1	SW1	W2	WSW2.1	SSW13	
17-Feb	WNW0	SSW2	SE2	S4	SW4	SSW4	NW4	N10	NNW13	N15	NNW13	NNW9	NNE7	NE11	NE16	NE18	NE14	ENE13	NE15	NE15	NE16	NE14	ENE14	NE16	NE7.9	NE18	
18-Feb	NE18	ENE12	ENE12	ENE9	ENE8	E5	E4	ENE7	ESE3	ENE1	ENE3	E2	SE3	NNE0	NNE6	NE8	NE11	ENE7	NNE6	NNE9	NNE8	NNE11	NNE11	NE12	NE6.7	NE18	
19-Feb	NE12	NE9	NE10	NE13	NE12	NE12	ENE12	ENE13	ENE15	ENE14	NE16	ENE15	ENE15	NE12	NE14	NE15	NE14	NE13	NE9	ENE6	NE5	ENE6	E4	ENE4	NE11.0	NE16	
20-Feb	NNW6	NNE8	NNE9	NE7	WNW2	NW9	NNW9	NNW11	NNW8	NNW12	NNW5	NW5	W4	W5	W9	WNW10	W9	WNW11	WNW12	W11	W13	W10	SW7	SW11	WNW5.9	W13	
21-Feb	WSW13	WSW18	WSW13	SW9	WSW14	W18	WNW19	WSW12	WSW13	WSW15	WSW14	W14	W13	WNW10	W10	WNW14	WNW11	WNW10	WNW9	WNW9	NW6	W6	W9	WNW8	W11.2	WNW19	
22-Feb	NNE18	NE13	NE10	E7	ESE4	S2	S2	SE2	SE1	ENE4	ENE9	NE8	NNW7	NNE7	NE8	NE11	NE11	NE13	NE13	NE16	E8	ENE9	ENE3	S3	NE6.7	NNE18	
23-Feb	SSW4	S4	SSW4	S3	S4	SSE4	SSW4	SSE4	SSE4	SW4	WSW5	WSW5	SSW7	SW7	SW5	SSE6	SSE5	ESE4	ENE7	NE12	NE13	NNE15	N15	N16	ESE0.8	N16	
24-Feb	N17	NE15	N13	NNW11	N13	N13	NNW9	NNW10	NNW11	NNW7	NW7	WNW8	WNW7	SW3	S6	S8	S9	S9	SSW6	SSW7	SSW6	SSW6	SSW8	S9	NNW2.4	N17	
25-Feb	S8	S7	SSW6	S8	S8	S9	S8	S10	SSW9	SSW11	SSW9	SW9	WSW8	W4	NNE6	NNW7	NNW4	SSE4	E6	ENE12	NNE21	N27	N27	N26	NNE0.5	N27	
26-Feb	N25	N23	NNW15	NNW14	NNW17	NNW16	NW10	NW10	NNW5	NNE4	NW5	NNE2	ENE6	NE6	ENE4	ENE6	E5	ENE7	ENE9	ENE10	E8	ENE9	ENE8		NNE7.2	N25	
27-Feb	NE8	NE6	ENE7	ENE6	NE10	ENE8	ENE6	E3	ENE3	NE6	NNE6	ENE6	NW6	WNW6	NW7	W5	WSW3	WSW2	SE0	SE5	NW6	SE6	SSW5	S8	SW7	ENE1.6	NE10
28-Feb	WSW8	SSW3	NNE23	NE24	NE25	NE19	NNE23	NNE20	NE20	NE20	NE12	NE8	NE11	ENE10	NE11	NE16	NE16	NE16	NE16	NE19	NE17	NE17	ENE11	E8	NE14.4	NE25	
													N2.0 N0.8 NNE1.6 E0.5 S0.2 WSW1.7 WSW2.2 WSW1.5 SW1.7 WSW1.8 WSW1.2 WSW2.8 WSW3.6 WSW2.6 WSW1.5 SW1.2 ESE0.4 ENE1.0 NE1.8 NE2.4 NE2.4 NNE2.5 NNE1.7 NNE1.0											Diurnal Average			
													N25 N23 NNE23 NE24 NE25 WSW24 W23 W22 NE20 NE20 SW21 SW19 WSW28 WSW29 WSW29 SW22 WSW24 WSW20 WSW19 NE21 WSW21 N27 N27 N26											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 - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 3 18:00 Minimum Value: 0 km/h on Feb 23 09:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 672 Hours of Data: 672 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-Feb	3	4	4	4	4	3	3	3	1	1	1	1	1	2	1	1	1	2	1	2	2	1	1	2	4
2-Feb	2	1	2	2	2	2	1	1	1	2	2	1	1	2	1	1	1	2	2	3	5	4	2	2	5
3-Feb	2	3	4	3	3	2	3	1	1	1	1	1	1	2	1	1	1	9	5	3	4	4	3	3	9
4-Feb	3	2	2	2	1	1	1	1	1	2	2	2	3	3	2	1	1	2	1	3	2	2	2	4	4
5-Feb	3	3	4	2	4	1	1	1	1	1	3	1	2	1	1	2	1	1	1	1	1	1	1	1	4
6-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	1	1	1	1	1	3
7-Feb	1	1	1	2	1	2	1	2	3	3	3	3	4	3	2	3	2	2	3	3	3	3	3	2	4
8-Feb	2	1	2	2	2	2	2	2	2	3	3	5	4	4	4	4	4	4	3	3	3	2	2	3	5
9-Feb	2	2	4	1	2	2	2	1	1	1	2	1	2	2	2	2	2	3	2	2	4	1	4	3	4
10-Feb	2	2	2	1	1	1	1	2	1	1	1	3	1	1	2	1	2	2	1	1	1	1	2	1	3
11-Feb	1	2	2	2	3	2	5	3	3	4	2	2	3	4	3	5	3	2	2	4	4	2	2	2	5
12-Feb	1	1	1	4	2	4	3	8	2	2	3	4	5	5	5	4	3	2	3	3	3	5	3	3	8
13-Feb	3	4	4	2	4	3	4	3	7	2	2	2	3	2	2	2	2	2	2	2	4	2	2	1	7
14-Feb	1	1	1	1	1	1	2	2	2	1	2	4	4	4	3	2	2	2	2	2	2	1	1	2	4
15-Feb	1	1	1	1	2	2	1	2	2	2	2	2	3	1	2	2	2	2	2	2	2	4	3	2	4
16-Feb	2	2	2	3	2	2	2	2	2	1	1	1	2	2	2	2	1	3	5	3	4	2	1	1	5
17-Feb	2	2	2	1	2	2	2	5	3	5	2	2	2	4	2	2	3	3	3	2	2	3	3	2	5
18-Feb	2	3	3	3	4	2	2	2	1	1	1	1	1	2	1	2	2	2	2	4	2	2	2	3	4
19-Feb	1	1	2	2	2	2	2	2	3	2	3	3	3	3	1	2	1	2	2	1	1	2	1	1	3
20-Feb	2	2	2	3	1	2	2	3	4	3	2	1	1	2	3	2	2	2	2	3	2	2	2	2	4
21-Feb	2	5	4	1	4	4	4	3	2	3	4	4	3	3	3	3	3	2	1	2	1	2	2	2	5
22-Feb	3	4	4	1	1	1	1	1	1	3	2	2	2	3	2	2	3	3	4	5	2	2	2	1	5
23-Feb	1	1	1	1	1	1	1	1	0	1	1	1	2	2	2	2	2	1	3	2	2	3	3	3	3
24-Feb	3	3	3	4	3	3	3	2	3	3	2	2	3	2	2	3	2	2	2	1	1	1	2	2	4
25-Feb	2	2	2	1	1	2	2	2	3	4	3	3	2	1	2	2	2	1	2	4	5	6	6	6	6
26-Feb	6	6	6	5	5	3	3	3	2	2	3	2	2	2	1	2	2	2	1	2	3	2	1	2	6
27-Feb	1	1	1	1	3	4	2	1	1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	4
28-Feb	1	2	7	4	3	5	5	3	4	3	4	3	2	2	3	2	2	2	3	2	3	2	3	3	7
																	Diurnal Maximum								





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Shell Muskeg River - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	208	30.95	30.95
6 - 11	283	42.11	73.07
12 - 19	148	22.02	95.09
20 - 28	31	4.61	99.70
29 - 38	2	0.30	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Shell Muskeg River - February 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	3	9	12	16	11	18	23	28	26	12	15	11	10	7	5	208
6 - 11	7	13	30	27	8	0	3	12	49	53	22	6	8	15	14	16	283
12 - 19	12	12	49	11	0	0	0	0	3	9	21	15	6	3	0	7	148
20 - 28	5	4	6	0	0	0	0	0	0	0	4	9	3	0	0	0	31
29 - 38	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	32	94	50	24	11	21	35	80	88	59	47	28	28	21	28	672

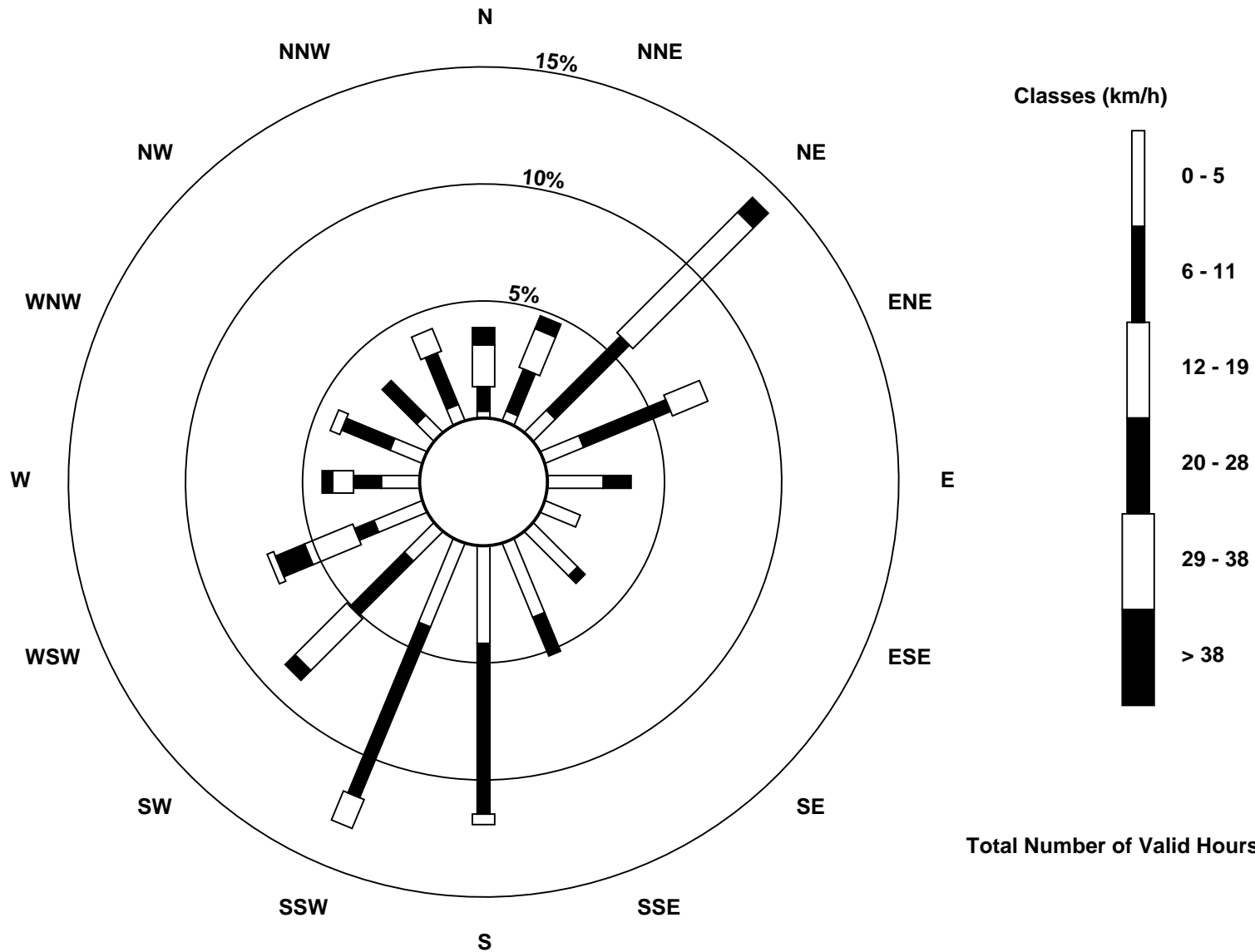
Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 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 - February 2017

Direction of Maximum Speed: 251 deg on Feb 12 14:00																				Hours in Service: 672					
Direction of Maximum Daily Speed Average: 234.2 deg on Feb 12																				Hours of Data: 672					
Direction of Minimum Speed: 275 deg on Feb 5 15:00										Direction of Minimum Daily Speed Average: 0.4 deg on Feb 9										Hours of Missing Data: 0					
Monthly Average Direction: 231.7 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-Feb	350	2	21	12	4	2	9	34	118	163	146	132	198	217	151	121	109	200	208	205	146	167	167	197	35.2
2-Feb	206	194	218	206	203	186	193	182	181	186	205	185	113	86	123	127	107	92	96	61	38	32	41	37	102.4
3-Feb	46	33	38	70	45	40	47	129	165	233	220	208	257	177	166	201	240	1	24	47	39	43	29	49	40.5
4-Feb	45	67	132	116	220	155	210	181	186	190	183	199	220	189	195	195	148	126	134	146	69	53	42	19	121.0
5-Feb	19	20	25	49	66	240	173	163	175	170	86	291	247	276	275	131	99	120	145	167	157	185	175	175	62.6
6-Feb	184	167	179	188	188	191	185	203	199	205	224	239	265	259	315	315	47	289	302	211	195	183	182	174	209.2
7-Feb	190	193	198	201	194	179	174	182	209	221	227	218	218	219	223	229	255	304	354	349	327	322	316	309	234.2
8-Feb	285	251	238	227	203	200	185	187	192	215	184	206	206	222	219	226	225	216	213	216	218	218	223	218	215.4
9-Feb	216	216	199	159	188	184	172	152	149	219	235	272	301	319	308	324	350	7	27	61	38	38	44	56	341.3
10-Feb	47	66	70	85	87	94	155	165	168	135	255	246	240	290	261	9	79	80	37	45	287	131	252	266	97.7
11-Feb	244	203	197	179	156	193	228	247	242	245	232	230	220	189	202	232	242	245	239	224	207	159	146	151	220.9
12-Feb	174	192	214	223	232	237	240	240	203	238	221	231	246	251	244	228	196	192	209	224	243	257	253	245	234.2
13-Feb	248	260	275	257	257	262	265	272	284	306	35	49	97	97	80	54	42	44	39	46	51	296	293	195	296.1
14-Feb	173	180	171	198	197	194	190	189	184	174	178	202	198	187	183	170	173	180	190	189	195	181	169	169	184.5
15-Feb	166	146	168	196	193	202	215	209	220	202	200	184	187	229	215	208	207	191	168	202	205	209	218	198	200.1
16-Feb	211	211	209	210	172	199	165	188	194	150	79	333	330	313	331	330	45	293	360	353	339	196	224	274	251.5
17-Feb	287	192	145	180	217	212	317	351	346	0	346	339	17	46	43	42	51	67	55	49	52	54	63	49	35.4
18-Feb	47	62	63	77	64	89	95	71	110	57	62	88	144	17	30	41	49	57	33	28	17	25	24	44	51.1
19-Feb	44	36	35	39	50	53	57	57	61	60	45	58	65	44	36	38	41	38	43	57	34	65	84	71	49.1
20-Feb	342	30	33	37	296	315	327	338	348	345	340	311	264	261	275	284	278	303	286	279	264	267	221	227	303.6
21-Feb	244	252	258	229	256	271	282	257	239	241	249	270	274	289	281	282	301	292	285	283	308	277	272	287	267.4
22-Feb	29	50	56	82	108	175	183	133	124	72	58	42	344	32	36	49	42	43	48	48	83	77	67	183	52.0
23-Feb	210	182	198	173	173	164	193	158	163	214	239	241	201	220	225	163	151	115	76	51	41	14	10	2	101.4
24-Feb	5	39	9	344	10	6	336	338	334	331	309	302	293	219	173	186	174	172	192	196	203	203	197	189	326.9
25-Feb	191	189	192	177	176	182	188	183	193	205	204	218	243	263	27	330	328	167	91	65	28	10	6	7	22.2
26-Feb	3	349	343	340	347	345	326	325	316	344	29	320	28	70	54	70	71	90	76	72	70	79	69	66	11.3
27-Feb	56	55	63	60	55	58	59	79	65	45	19	320	302	310	276	251	252	146	135	143	161	201	184	223	60.1
28-Feb	240	200	22	38	45	38	31	33	42	45	40	47	51	66	55	42	44	43	44	40	44	45	65	80	42.4
1.1	10.8	14.7	93.4	172.1	251.1	247.1	243.8	223.3	238.3	236.3	248.0	242.9	239.0	242.7	233.6	108.4	57.4	40.9	51.6	39.7	28.4	25.7	23.9	Diurnal Average	
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

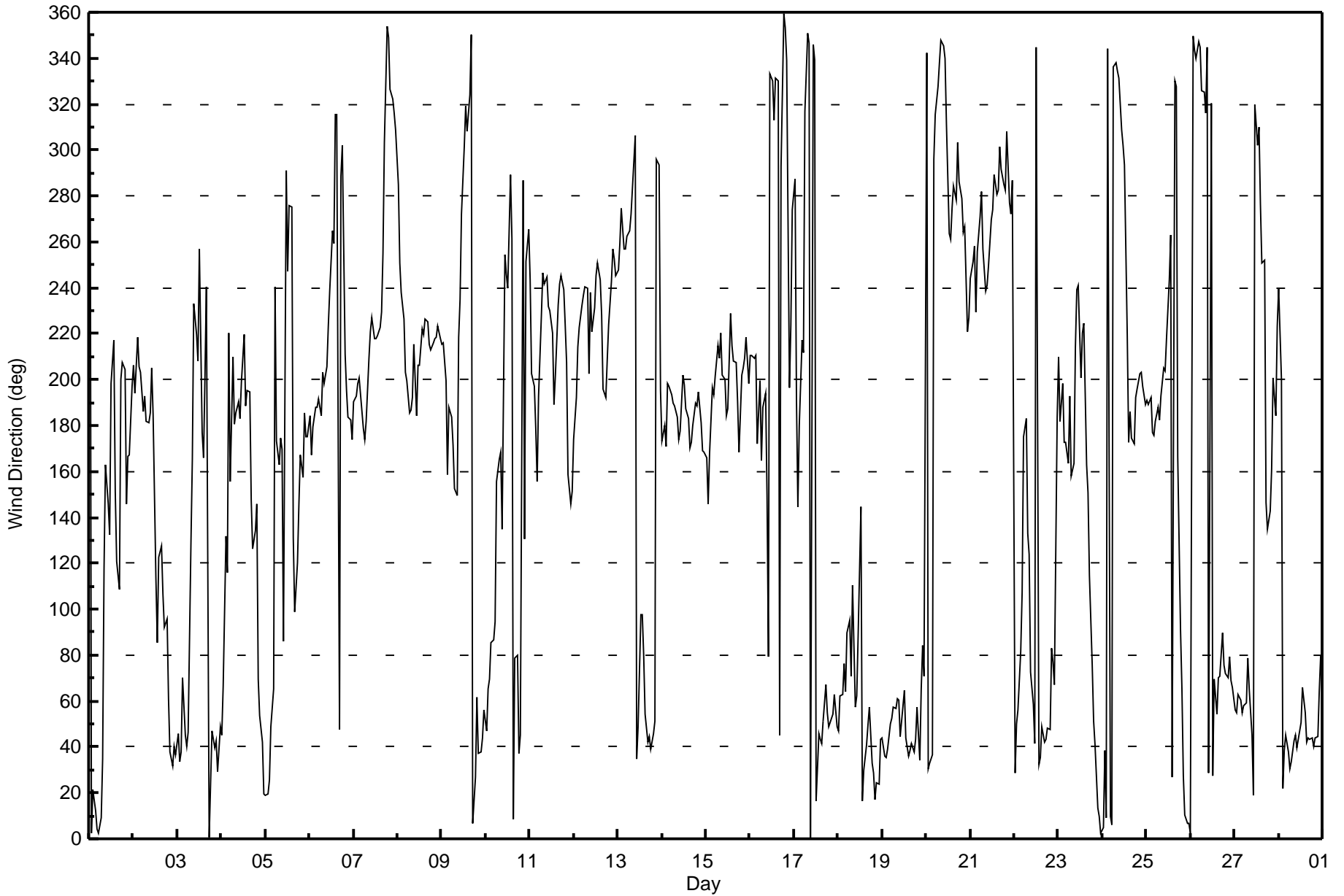
Wind Direction (WD) - deg
Shell Muskeg River - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Feb 17 01:00 Minimum Value: 5 deg on Feb 13 17:00 Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 17 Q ₃ = 25 P ₉₀ = 46 P ₉₉ = 89																		Hours in Service: 672 Hours of Data: 672 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-Feb	17	24	18	17	19	24	25	29	52	20	21	22	48	81	31	22	21	18	11	16	35	14	10	13	81
2-Feb	15	14	12	25	21	14	13	9	8	14	25	34	45	34	22	26	23	20	92	18	17	12	11	13	92
3-Feb	9	18	77	77	43	21	39	29	20	17	14	27	26	53	41	82	25	52	17	9	16	14	15	15	82
4-Feb	17	30	60	65	85	74	8	19	12	21	31	24	19	26	21	24	13	11	34	57	13	11	10	20	85
5-Feb	12	13	13	9	44	89	15	61	21	28	49	76	20	20	96	21	19	14	35	29	9	17	13	11	96
6-Feb	25	10	9	10	11	23	16	12	9	11	16	16	22	41	28	59	44	60	43	74	15	68	11	13	74
7-Feb	15	11	12	13	15	16	12	22	16	9	7	14	13	12	11	9	20	22	19	20	19	17	10	16	22
8-Feb	15	15	32	33	16	15	23	16	21	18	22	22	21	13	13	9	10	16	16	13	12	9	8	14	33
9-Feb	12	31	60	20	16	18	17	12	20	29	57	22	28	24	20	26	27	19	14	76	25	8	30	20	76
10-Feb	15	51	21	23	12	27	32	64	31	48	42	34	14	59	54	70	47	25	51	50	80	52	43	21	80
11-Feb	28	17	19	19	18	31	30	9	8	8	10	9	11	22	25	13	7	6	5	10	55	18	13	9	55
12-Feb	14	18	13	12	7	7	8	76	66	32	14	9	10	10	8	9	18	14	13	7	10	9	8	8	76
13-Feb	10	11	12	11	10	9	10	10	60	26	21	19	31	36	17	17	5	6	10	11	38	47	16	24	60
14-Feb	34	17	19	16	19	14	15	13	15	10	20	22	24	19	16	12	14	16	13	15	14	13	15	9	34
15-Feb	6	29	25	17	16	17	9	12	18	17	21	30	21	24	21	16	13	23	23	17	14	13	14	21	30
16-Feb	11	12	16	17	31	21	45	16	26	22	66	14	20	25	21	80	83	71	40	16	44	98	88	76	98
17-Feb	101	70	52	32	26	28	47	41	14	18	12	16	26	17	10	6	14	12	14	14	14	14	14	10	101
18-Feb	5	19	18	15	29	21	27	12	31	89	42	71	30	89	38	14	13	19	19	31	24	10	11	9	89
19-Feb	7	9	9	7	11	9	9	9	10	11	12	13	12	18	8	6	6	6	7	11	17	21	11	15	21
20-Feb	17	19	12	38	59	14	16	14	25	14	30	22	22	28	30	12	10	15	13	13	10	12	13	11	59
21-Feb	18	14	12	8	15	13	13	19	9	9	12	15	18	21	26	19	14	10	9	10	18	25	10	23	26
22-Feb	15	19	22	8	16	46	39	29	60	23	18	14	27	30	30	10	21	11	16	12	19	12	60	44	60
23-Feb	14	16	14	20	22	24	9	15	14	22	12	20	33	38	37	24	34	18	15	10	13	17	15	13	38
24-Feb	15	12	22	18	22	20	16	15	18	29	19	23	25	61	31	22	16	11	15	14	11	15	13	13	61
25-Feb	12	13	18	9	11	14	14	12	17	23	26	27	16	47	32	24	45	27	19	16	20	16	16	18	47
26-Feb	16	16	18	17	16	11	23	17	13	47	59	40	79	32	18	20	13	25	12	8	12	14	8	8	79
27-Feb	11	11	12	12	14	21	16	16	58	20	43	33	38	24	43	41	37	94	10	9	12	13	14	21	94
28-Feb	19	75	21	12	7	15	13	13	12	8	21	44	22	19	19	8	8	8	10	5	7	7	14	17	75
	101	75	77	77	85	89	47	76	66	89	66	76	79	89	96	82	83	94	92	76	80	98	88	76	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Shell Muskeg River - February 2017





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 2, 2017	Last Calibration	January 3, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:47	End Time (MST)	14:22
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

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	830	830
Calculated slope	0.996637	1.000016	Chamber temp	45.0	45.1
Calculated intercept	2.061891	1.867349	Pressure	721.3	720.4
Analyzer Background	8.4	8.4	Flow	0.458	0.458
Analyzer Coefficient	1.021	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	0.2	----
as found span	5000	76.6	738.4	733.3	1.007
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	76.6	738.4	737.7	1.001
second point	5000	38.5	371.1	368.0	1.009
third point	5000	19.4	187.0	183.3	1.020
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	76.6	738.4	742.6	0.994
Average Correction Factor					1.010

Corrected As found 733.2 Previous response 738.9 % change 0.8%

Notes:

Changed inlet filter after as founds. No adjustments made. Used new value for high point.

Calibration Performed By: Jayne Marcoux



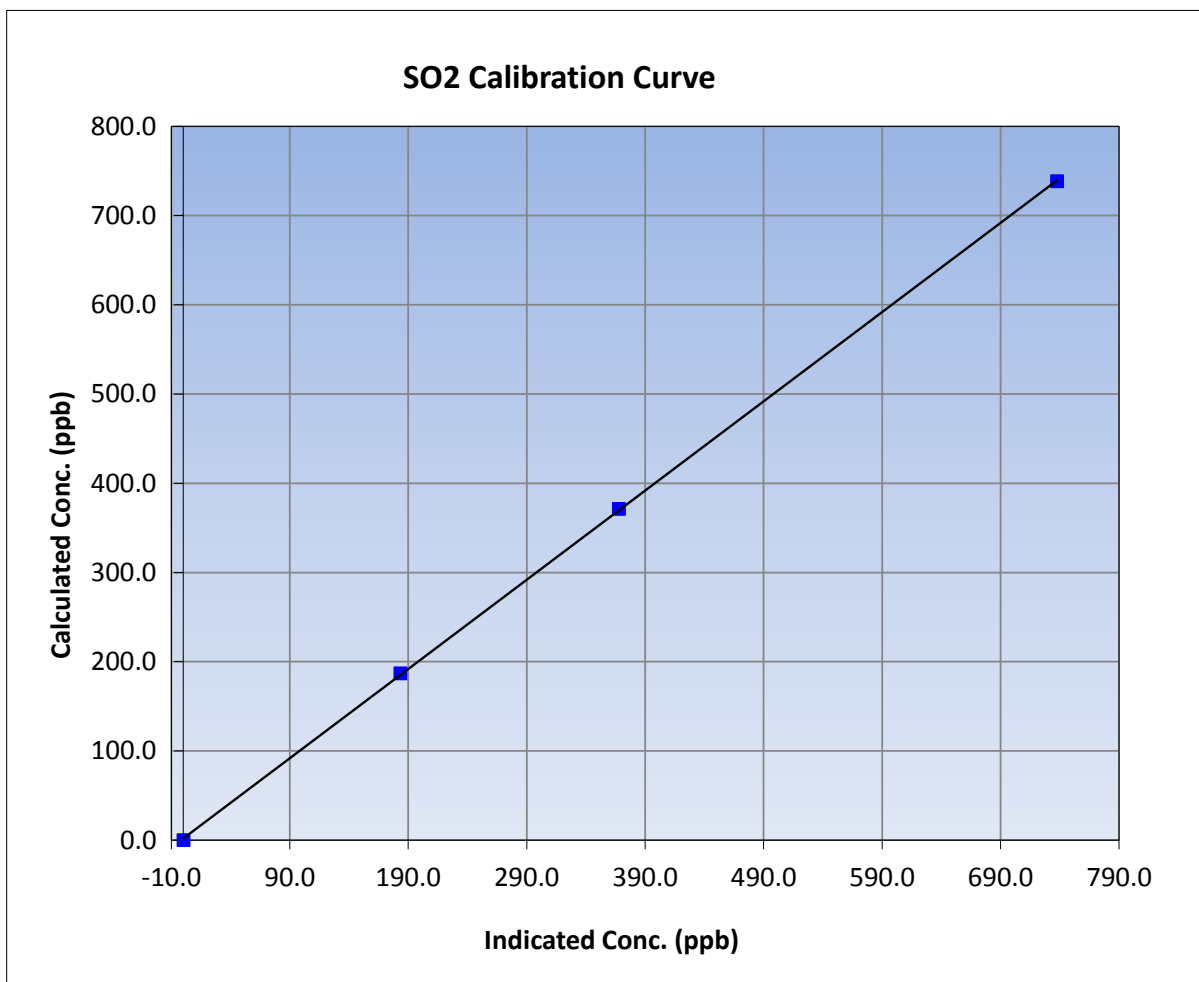
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:47	End Time (MST)	14:22
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

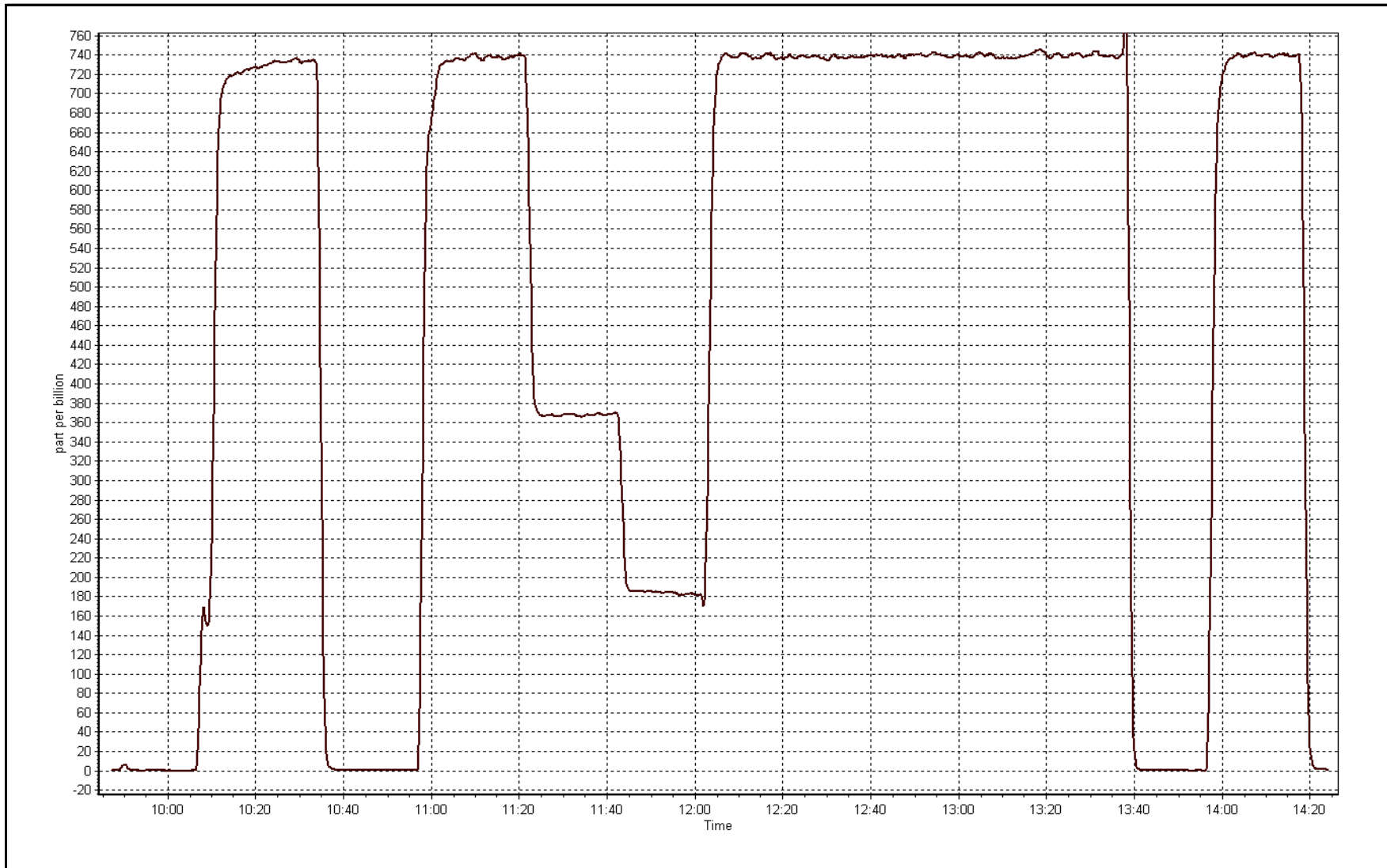
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999965
738.4	737.7	1.0010		
371.1	368.0	1.0086	Slope	1.000016
187.0	183.3	1.0202		
			Intercept	1.867349



SO2 Calibration Plot

Date: February 2, 2017





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 13, 2017	Last Calibration	February 2, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Other: <input type="text" value="Repair"/>		
Start Time (MST)	10:35	End Time (MST)	12:58
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

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-709
Analyzer IP address	192.168.1.43		Lamp voltage	830	829
Calculated slope	1.002078		Chamber temp	45.1	44.9
Calculated intercept	2.708587		Pressure	720.4	715.9
Analyzer Background	8.4	8.4	Flow	0.458	0.440
Analyzer Coefficient	1.021	1.021	Intensity	91	90

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					
as found span					
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	76.6	738.4	735.6	1.004
second point	5000	38.5	371.1	366.3	1.013
third point	5000	19.4	187.0	181.0	1.033
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	76.6	738.4	729.1	1.013
Average Correction Factor					1.017

Corrected As found NA Previous response NA % change NA

Notes:

Daily zero/span did not occur last night; AQM data showed sudden drop in sample flow. Pump was dead upon arrival; replaced pump right away. Did not adjust zero or span. Did not replace sample inlet filter because it looked fairly clean and was replaced earlier this month, during routine calibration.

Calibration Performed By: Asad Hidayat



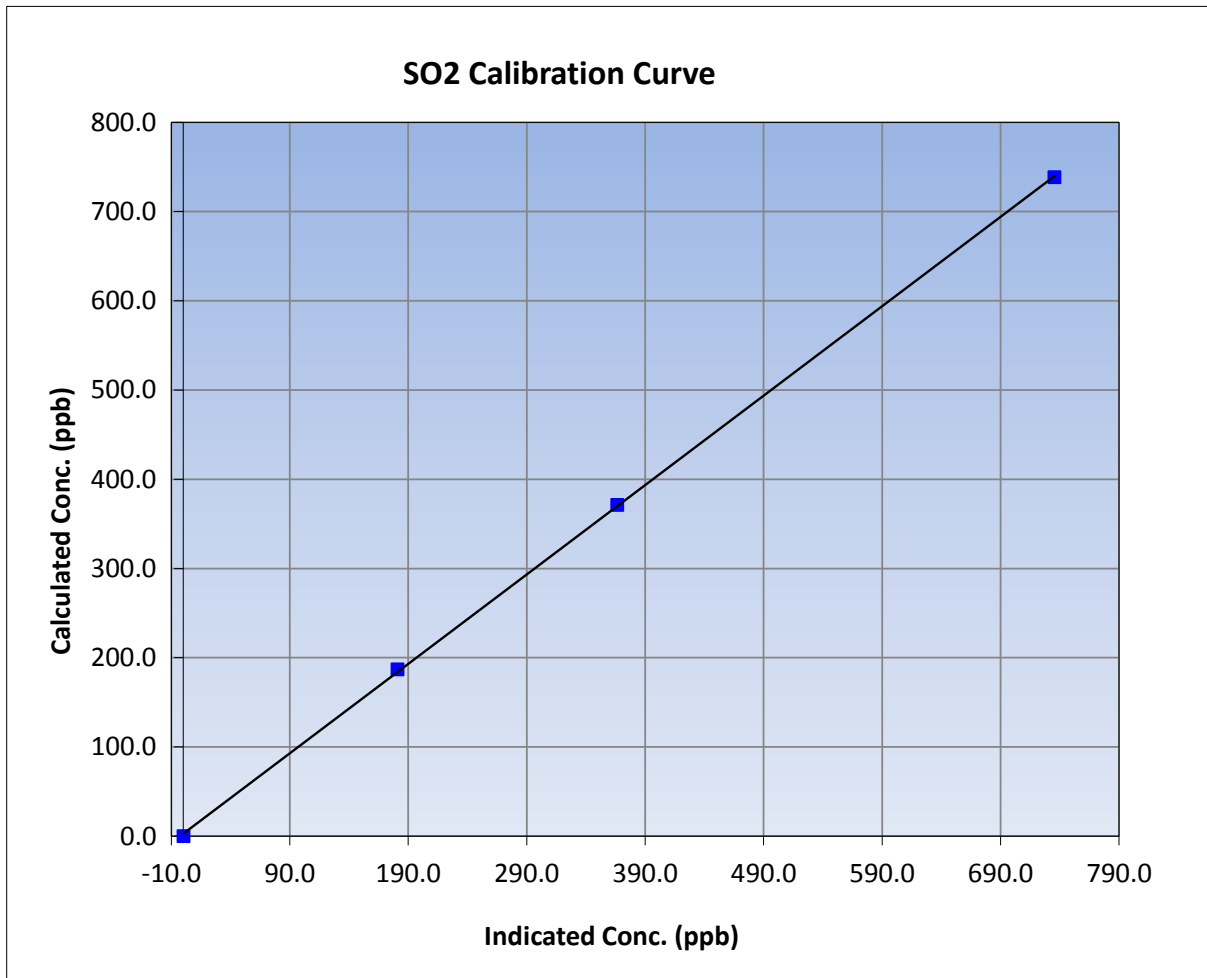
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 13, 2017	Previous Calibration	February 2, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:35	End Time (MST)	12:58
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

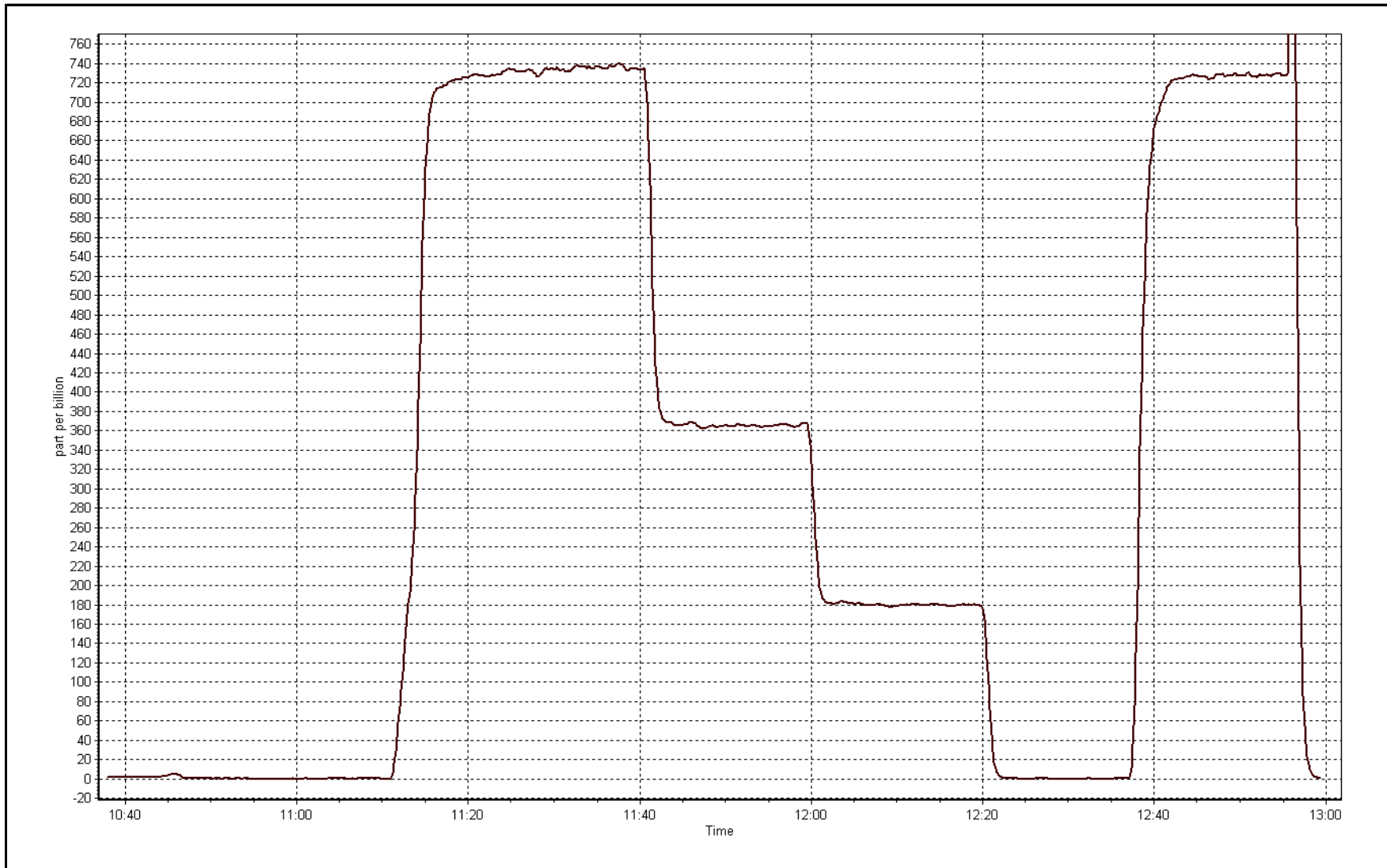
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999929
738.4	735.6	1.0039		
371.1	366.3	1.0132	Slope	1.002078
187.0	181.0	1.0334		
			Intercept	2.708587



SO2 Calibration Plot

Date: February 13, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 2, 2017	Last Calibration	January 3, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:47	End Time (MST)	14:21
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

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.010273	1.010232	Fuel Pressure	24.2	24.2
Calculated intercept	-0.047555	-0.070003	Analyzer Coeff	4.508	4.550
			Analyzer BKG	2.30	2.32

Analyzer make Thermo 51i-LT Analyzer serial # 1218153458

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.07	----
as found span	5000	76.6	15.86	15.72	1.009
calibrator zero	5000	0.0	0.00	0.07	----
high point	5000	76.6	15.86	15.77	1.006
second point	5000	38.5	7.97	7.97	1.000
third point	5000	19.4	4.02	4.04	0.994
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	76.6	15.86	15.81	1.003
Average Correction Factor					1.000

Corrected As found 15.65 Previous response 15.75 % change 0.6%

Notes:

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

Calibration Performed By:

Jayne Marcoux



Wood Buffalo Environmental Association THC Calibration Report

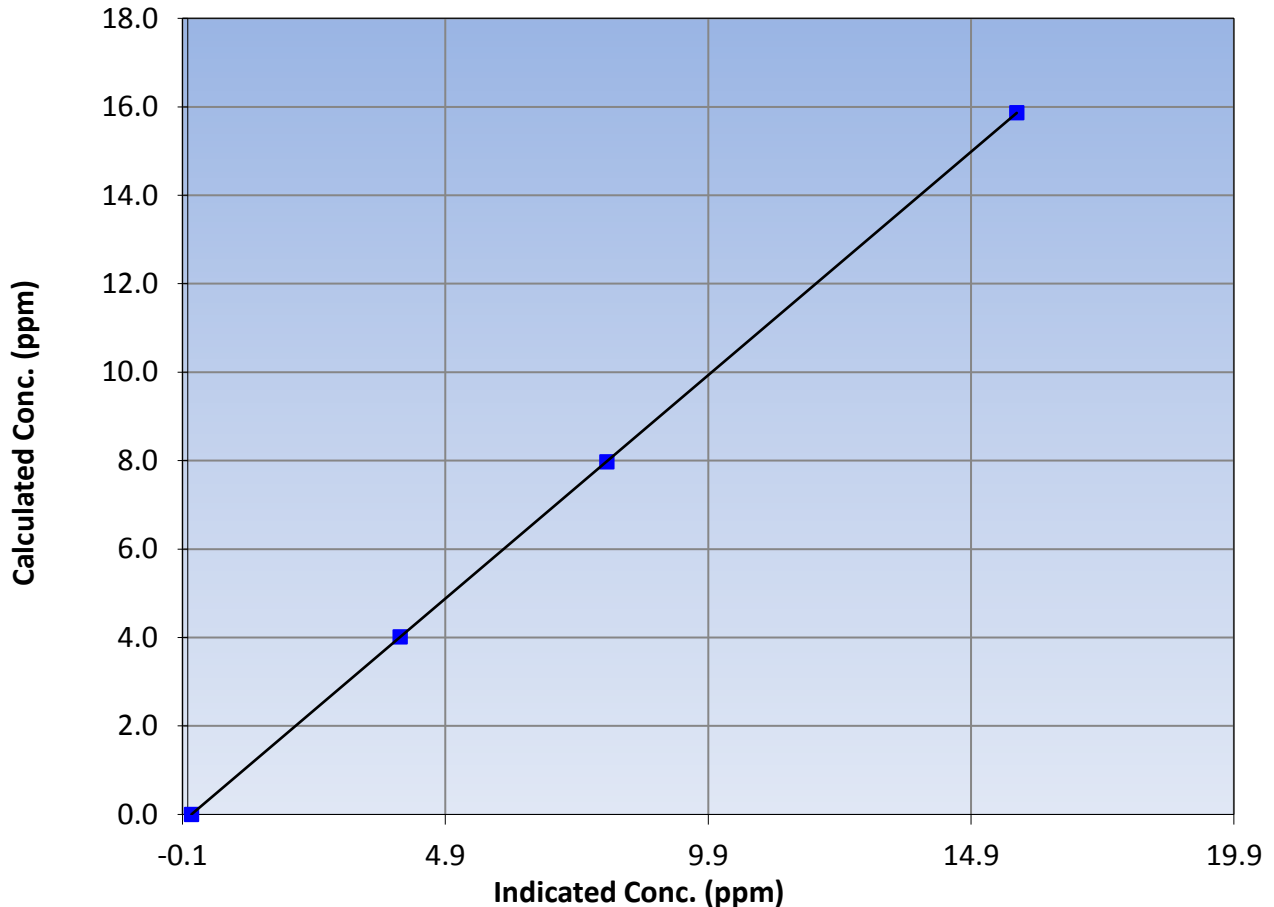
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:47	End Time (MST)	14:21
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

Calibration Data

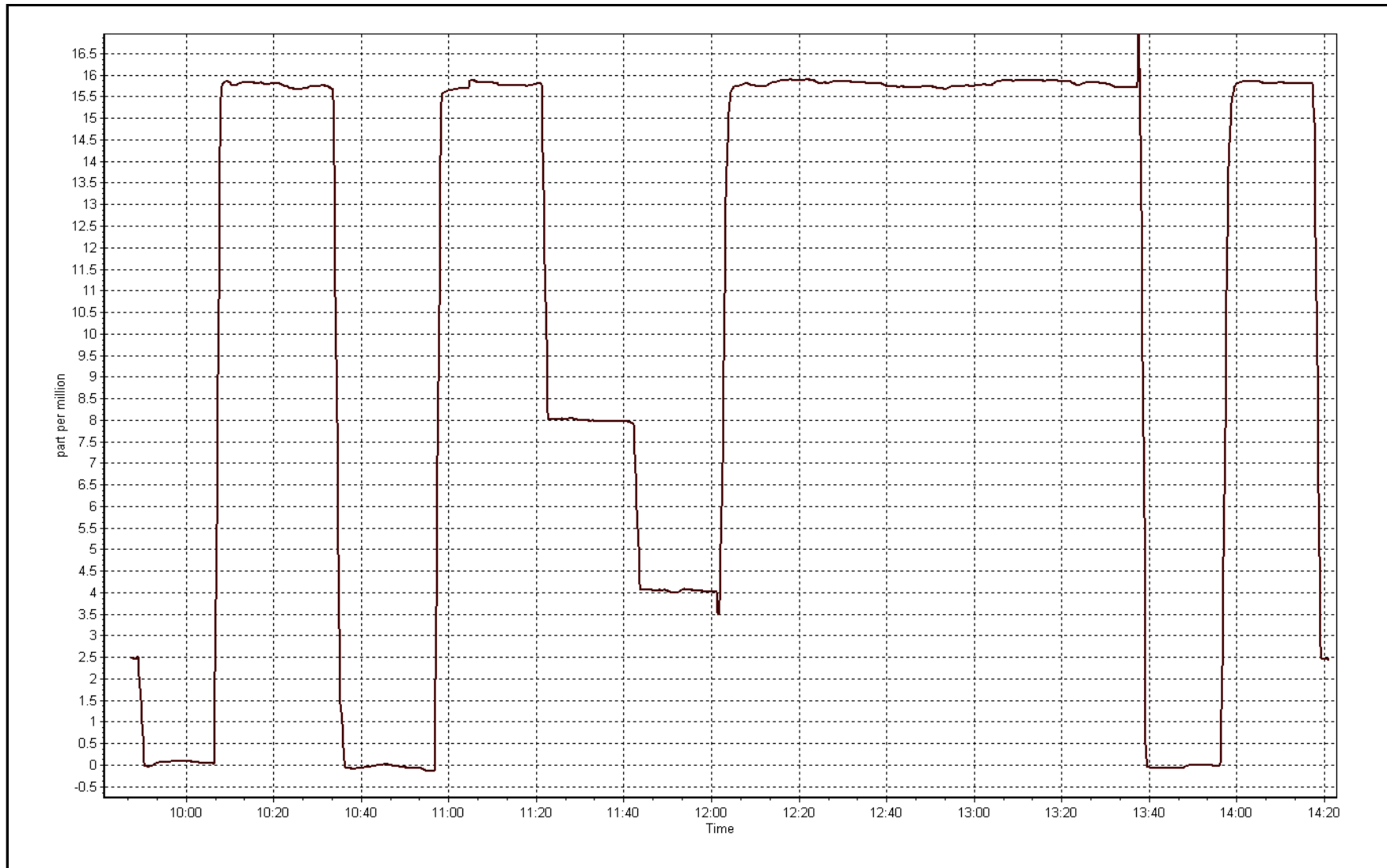
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.07	----	Correlation Coefficient	0.999999
15.86	15.77	1.0060		
7.97	7.97	1.0004	Slope	1.010232
4.02	4.04	0.9945		
			Intercept	-0.070003

THC Calibration Curve



THC Calibration Plot

Date: February 2, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:47	End Time (MST)	14:22
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	1.004968	1.003820	0.984477
	Data Offset	-1.200540	-0.573308	0.531172
Current Calibration	Data Slope	1.000381	0.998925	0.992910
	Data Offset	0.040964	0.421368	-0.185212

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.098		1.071	
NOx coefficient	0.996		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.0		8.9	
NOx bkgrnd	9.2		9.3	
Chamber Temp	50.2	Deg C	50	Deg C
Moly Temp	326.8	Deg C	325.8	Deg C
PMT voltage	-744.8	V	-744.8	V
PMT Temp	-2.7	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	168.9	mmHg	166.5	mmHg
R Cell Press Nox	169.2	mmHg	166.5	mmHg
NO sample flow	0.94	lpm	0.948	lpm
Nox sample Flow	0.938	lpm	0.947	lpm

Notes:

Changed the inlet filter after as founds. Adjusted the zero and span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 2, 2017

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.5	-0.1	0.6	----	----
as found span	5000	76.6	802.8	802.8	0.0	814.7	813.4	1.3	0.9854	0.9870
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	76.6	802.8	802.8	0.0	802.5	803.4	-0.9	1.0003	0.9992
second point	5000	38.5	403.5	403.5	0.0	403.0	403.2	-0.2	1.0012	1.0008
third point	5000	19.4	203.3	203.3	0.0	203.5	202.9	0.6	0.9992	1.0021
as left zero	5000	0.0	0.0	0.0	0.0	1.3	-0.1	1.4	----	----
as left span	5000	76.6	802.8	483.0	319.8	808.2	474.6	333.7	0.9932	1.0177
Average Correction Factor									1.0002	1.0007

Corrected As found
Previous Response

NO_x= 814.1
NO_x= 800.0

NO= 813.4
NO= 800.3

Percent Change

NO_x= -1.7%

NO= -1.6%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

76.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	483.0	315.2	800.3	483.0	317.4	0.9879	1.0000	0.9933	100.7%
2nd NO2 (200)	----	584.1	214.1	800.3	584.1	216.2	0.9879	1.0000	0.9902	101.0%
3rd NO2 (100)	----	688.4	109.8	799.3	688.4	110.9	0.9892	1.0000	0.9902	101.0%
4th NO2 (0)	798.2	----	2.5	800.7	800.3	0.4	0.9874	0.9974	N/A	----
Average Correction Factor							0.9881	0.9993	0.9912	100.9%

Calibration Performed By:

Jayne Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

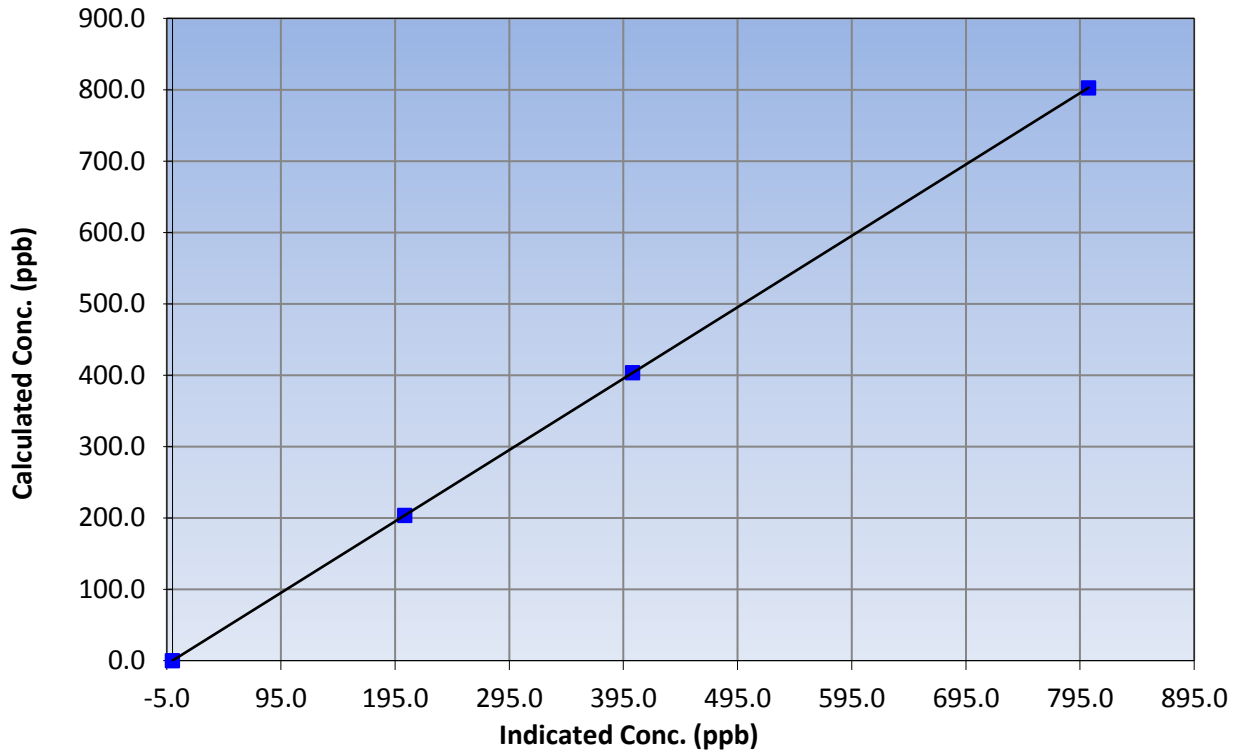
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:47	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	1.000000
802.8	802.5	1.0003		
403.5	403.0	1.0012	Slope	1.000381
203.3	203.5	0.9992		
			Intercept	0.040964

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

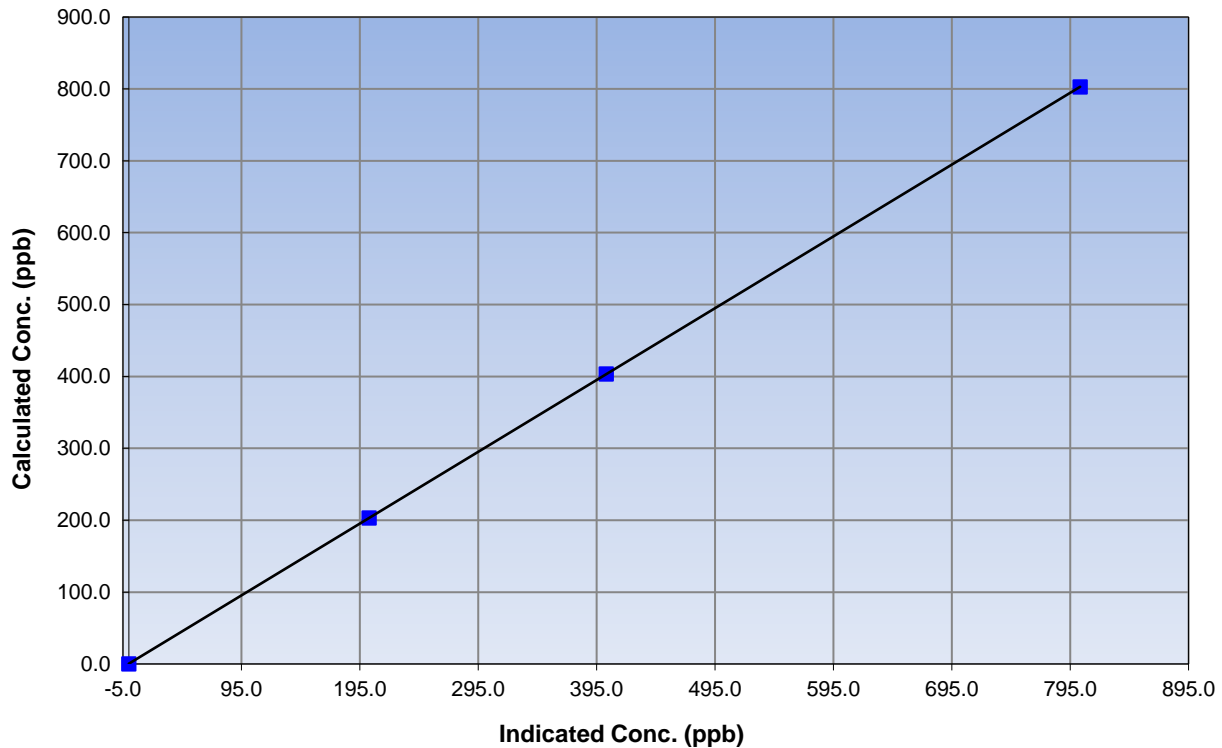
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:47	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	0.999999
802.8	803.4	0.9992		
403.5	403.2	1.0008	Slope	0.998925
203.3	202.9	1.0021		
			Intercept	0.421368

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

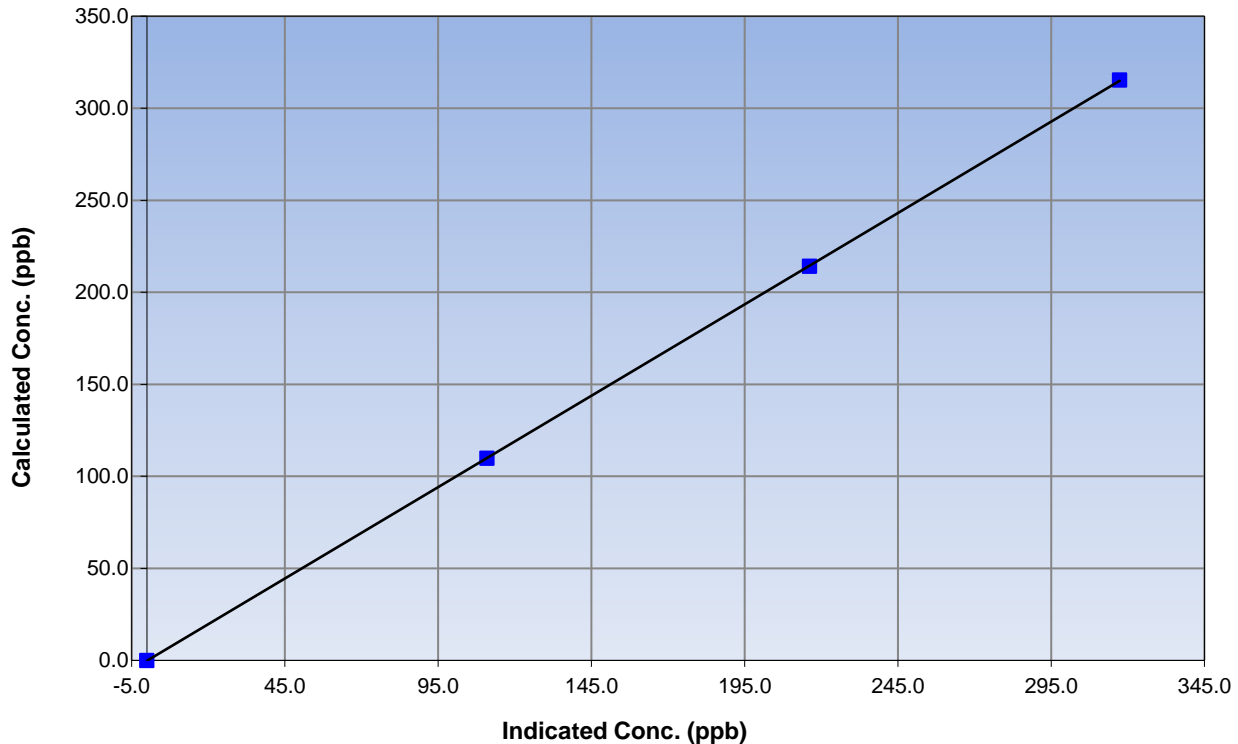
Station Information

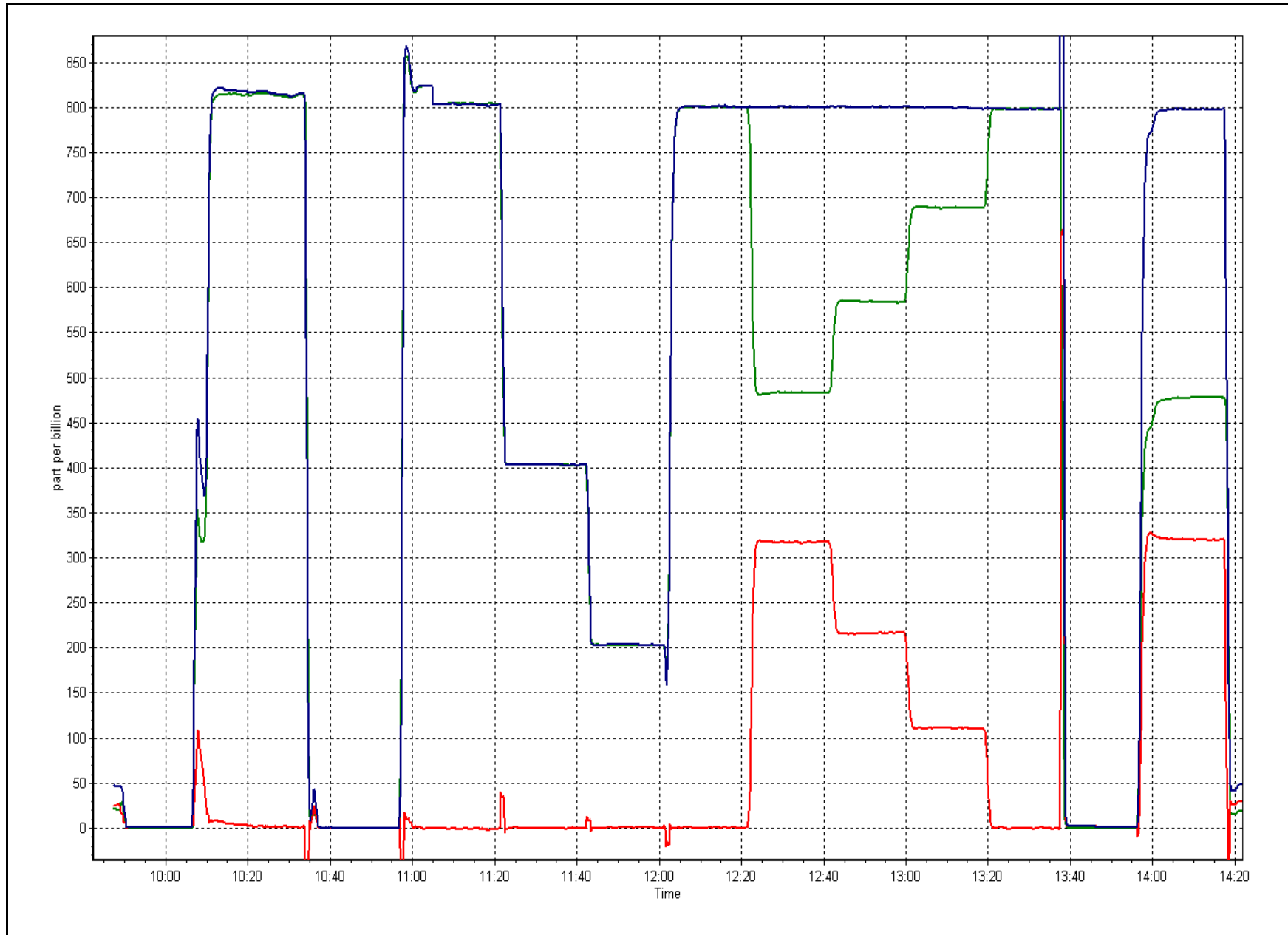
Calibration Date	February 2, 2017	Previous Calibration	January 3, 2017
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:47	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999994
315.2	317.4	0.9933		
214.1	216.2	0.9902	Slope	0.992910
109.8	110.9	0.9902		
			Intercept	-0.185212

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:	February 2, 2017	Last Cal Date:	January 3, 2017
Start time (MST):	11:00	End time (MST):	12:01
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

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	-15	-15.1	-15	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	978	978	978	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	986	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.6	-----	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

Leak Test:	Date of check: _____	Last Cal Date: <u>December 12, 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>

<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: Cleaned cyclone head. Adjusted nephelometer and flow.

Calibration by: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 17
WAPASU
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 FEBRUARY 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	640	32	32	100	20	0	5	0
H2S (ppb) Average	641	31	31	100	2	0	0	0
THC (ppm) Average	640	32	32	100	2.8	-	2.3	-
O3 (ppb) Average	642	30	30	100	48	0	40	-
NO2 (ppb) Average	640	32	32	100	33	0	10	-
NO (ppb) Average	640	32	32	100	17	-	3	-
NOX (ppb) Average	640	32	32	100	51	-	13	-
PM2.5 (ug/m3) Average	670	1	2	99.85	21.6	-	7.5	0
Temperature 2 m (C) Average	672	0	0	100	12.6	-	7.8	-
Relative Humidity (%) Average	672	0	0	100	99	-	94	-
Precipitation (mm) Total	672	0	0	100	0	-	0	-
Wind Speed 10 m (km/h) Average	669	0	3	99.55	22	-	13	-
Wind Direction 10 m (deg) Average	669	0	3	99.55	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 FEBRUARY 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	640	1.4	3	-	0	0	0	0	1	4	20
H2S (ppb) Average	641	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	640	2.23	0.1	-	2	2.2	2.2	2.2	2.2	2.3	2.8
O3 (ppb) Average	642	31.7	8	-	1	22	28	33	37	40	48
NO2 (ppb) Average	640	4	5	-	0	0	1	3	6	9	33
NO (ppb) Average	640	0.5	1	-	0	0	0	0	0	1	17
NOX (ppb) Average	640	4.5	5	-	0	0	1	3	6	10	51
PM2.5 (ug/m3) Average	670	3.53	2.5	-	0.1	1.6	2.1	2.8	4.2	6.2	21.6
Temperature 2 m (C) Average	672	-12.23	10.7	-	-34.1	-24.5	-20.2	-14.1	-3.5	3.7	12.6
Relative Humidity (%) Average	672	74.7	13	-	34	54	68	78	84	89	99
Precipitation (mm) Total	672	-	-	0	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	669	7.8	4	-	1	3	5	7	10	13	22
Wind Direction 10 m (deg) Average	669	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	02 Feb 2017 23:00	02 Feb 2017 23:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	03 Feb 2017 09:00	03 Feb 2017 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Feb 2017 18:00	16 Feb 2017 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Feb 2017 07:00	20 Feb 2017 07:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Wapasu - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 20 ppb on Feb 4 16:00	Maximum Daily Average: 5.1 ppb on Feb 15		Hours of Data:	640
Minimum Value: 0 ppb on Feb 21 15:00	Minimum Daily Average: 0.0 ppb on Feb 22		Hours of Missing Data:	32
Maximum Diurnal Average: 2.1 ppb at hour 6	Minimum Diurnal Average: 1.1 ppb at hour 22		Hours of Calibration:	32
Monthly Average: 1.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 13		Percent Operational Time:	100.0

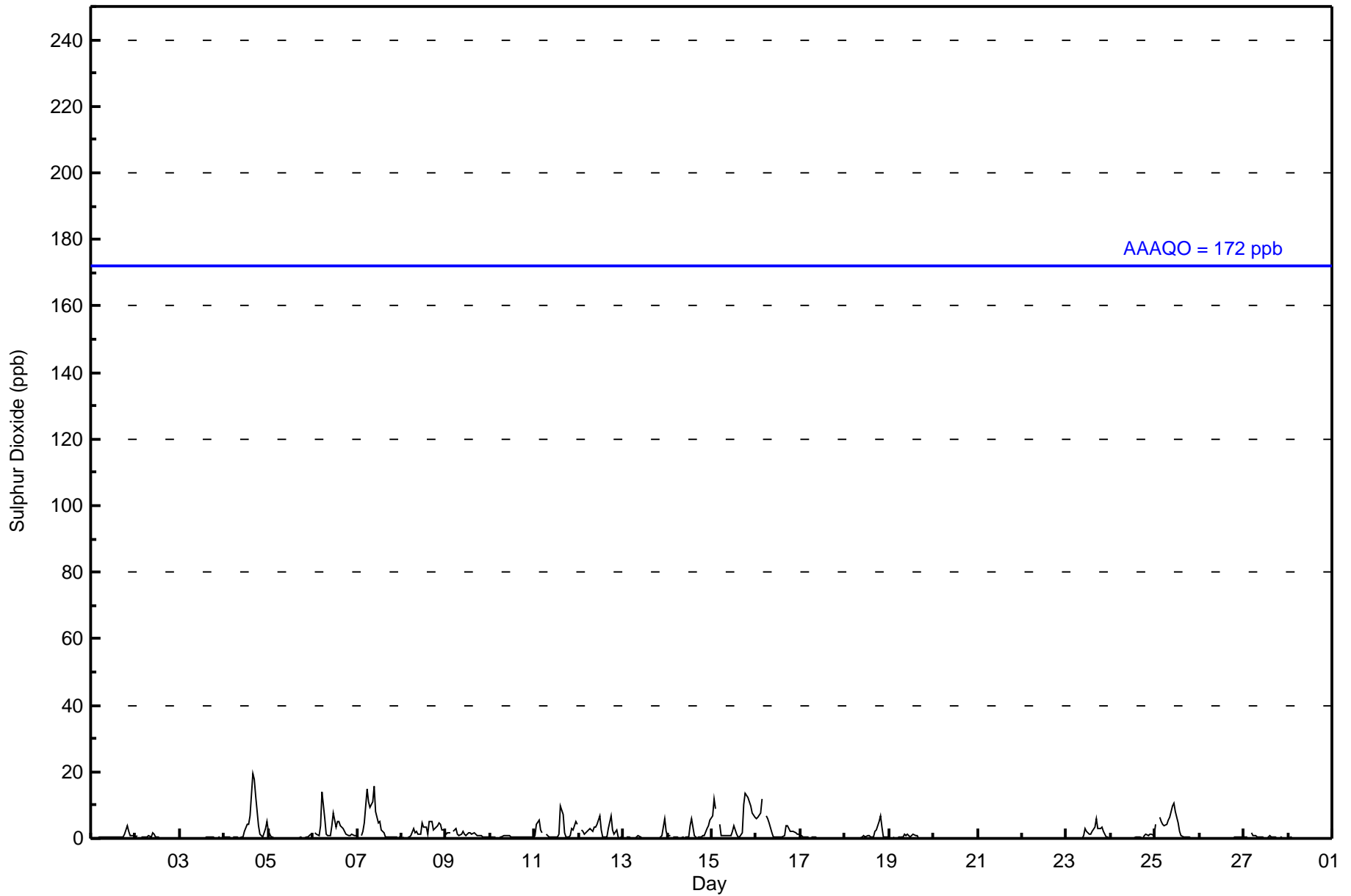
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2	1	1	1	0.7	4
2-Feb	1	1	Z	1	1	0	1	1	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Feb	0	0	0	0	Z	0	0	0	0	0	0	2	4	4	7	20	18	13	4	1	1	1	3	5	3.7	20
5-Feb	2	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	2
6-Feb	Z	2	1	1	4	14	6	1	1	1	4	7	3	5	5	4	3	2	1	1	1	1	1	1	3.0	14
7-Feb	1	Z	1	2	5	15	11	9	11	16	8	5	5	2	2	1	1	1	0	0	0	0	0	0	4.2	16
8-Feb	0	0	Z	0	1	1	3	2	2	1	1	5	3	3	1	5	5	3	3	4	5	4	2	3	2.5	5
9-Feb	1	2	2	Z	2	3	1	1	1	2	1	1	2	2	1	1	1	1	1	1	0	0	0	0	1.3	3
10-Feb	0	0	0	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
11-Feb	1	4	5	3	2	Z	1	1	1	0	0	1	0	1	10	7	2	0	0	1	3	3	5	4	2.4	10
12-Feb	Z	2	2	1	2	3	3	2	3	3	4	7	3	0	0	0	3	7	3	1	3	0	0	0	2.3	7
13-Feb	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	6	2	0.6	6
14-Feb	1	1	Z	0	0	0	0	0	0	0	0	1	4	6	1	0	0	0	0	1	1	3	4	5	1.3	6
15-Feb	7	12	9	Z	4	1	1	1	1	1	2	4	1	0	0	1	10	14	12	11	10	8	6	5.1	14	
16-Feb	6	6	8	12	Z	7	6	5	2	1	0	0	0	0	1	4	4	2	2	2	2	1	1	3.2	12	
17-Feb	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
18-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	2	2	5	7	3	1	0	0	1.1	7
19-Feb	0	Z	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
20-Feb	0	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
21-Feb	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Feb	0	0	0	0	0	Z	0	0	0	1	3	2	1	1	2	3	6	3	3	3	2	1	0	0	1.4	6
24-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.4	1
25-Feb	4	Z	6	5	4	4	4	6	6	10	11	8	5	2	1	0	0	0	0	0	0	0	0	0	3.4	11
26-Feb	0	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-Feb	0	0	0	Z	2	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	2
28-Feb	0	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
	1.1	1.4	1.6	1.2	1.2	2.1	1.4	1.1	1.2	1.5	1.5	1.6	1.4	1.2	1.2	1.7	1.8	1.7	1.5	1.5	1.3	1.1	1.3	1.2	Diurnal Average	
	7	12	9	12	5	15	11	9	11	16	11	8	5	6	10	20	18	13	14	12	11	10	8	6	Diurnal Maximum	

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wapasu - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	626	97.81	97.81
11 - 20	14	2.19	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Wapasu - February 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	81	31	14	13	22	42	48	76	59	14	61	41	18	15	18	70	623
11 - 20	0	0	0	0	0	0	0	2	2	7	3	0	0	0	0	0	14
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	81	31	14	13	22	42	48	78	61	21	64	41	18	15	18	70	637

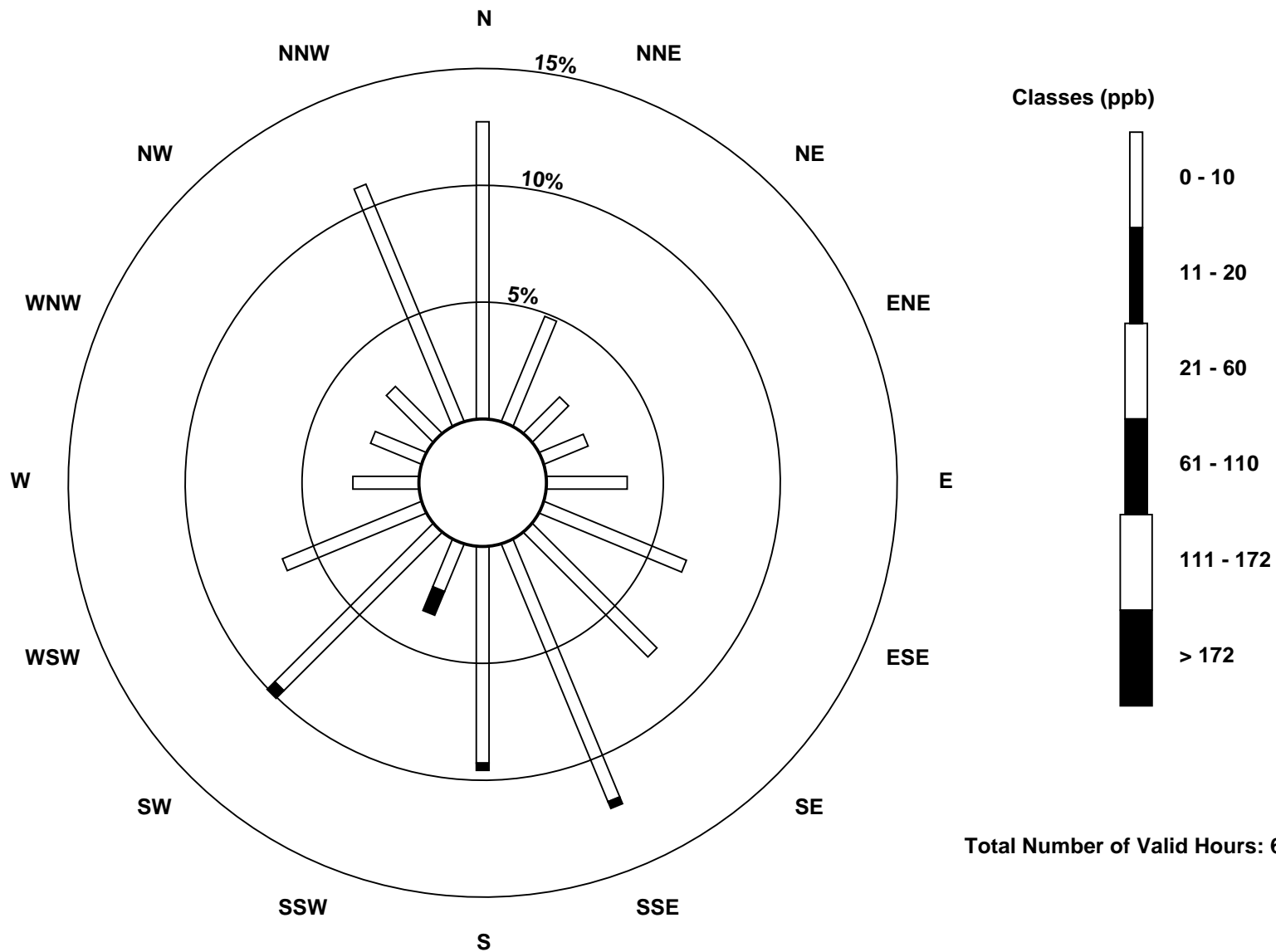
Total Number of Valid Hours: 637

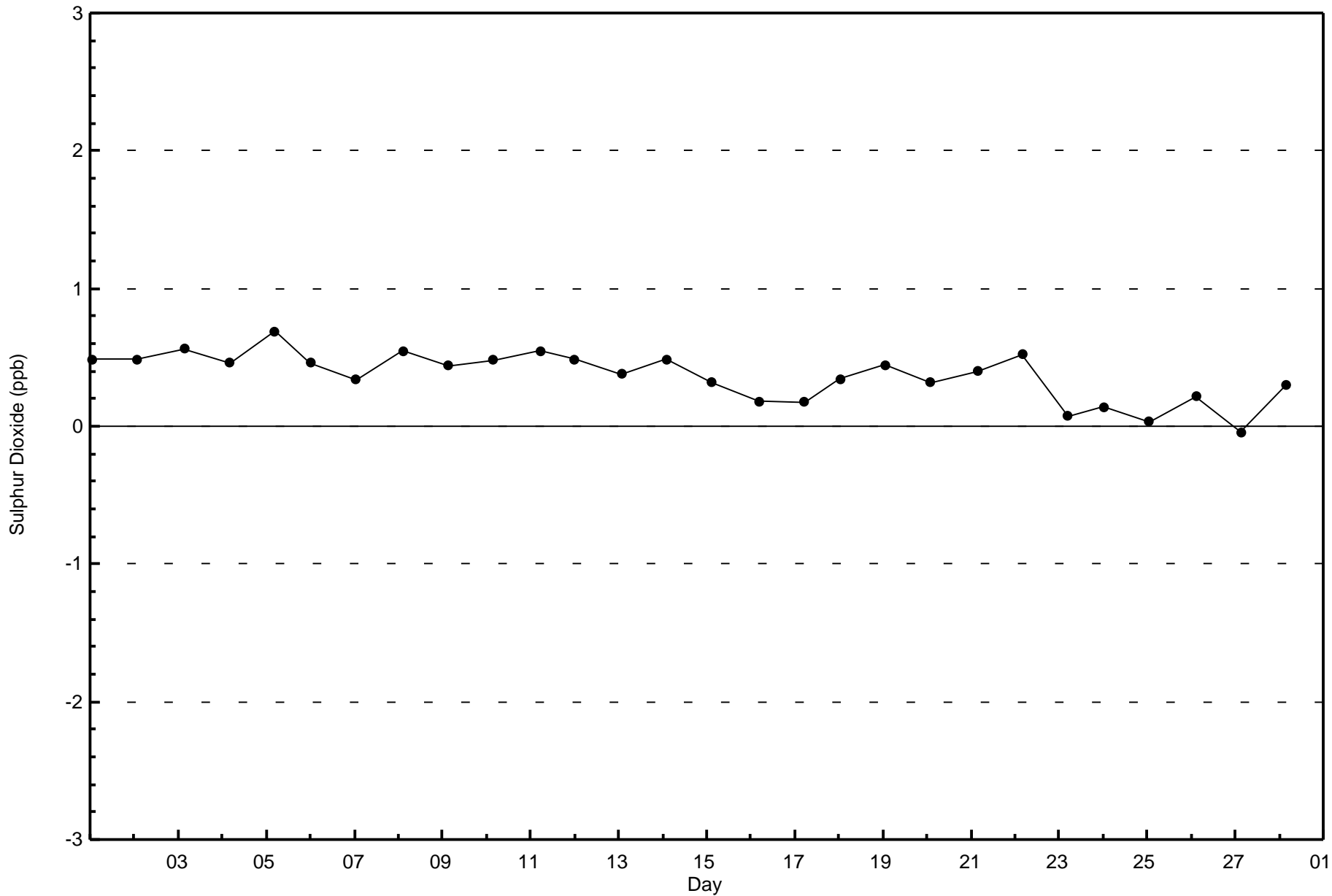
Total Number of Hours: 672

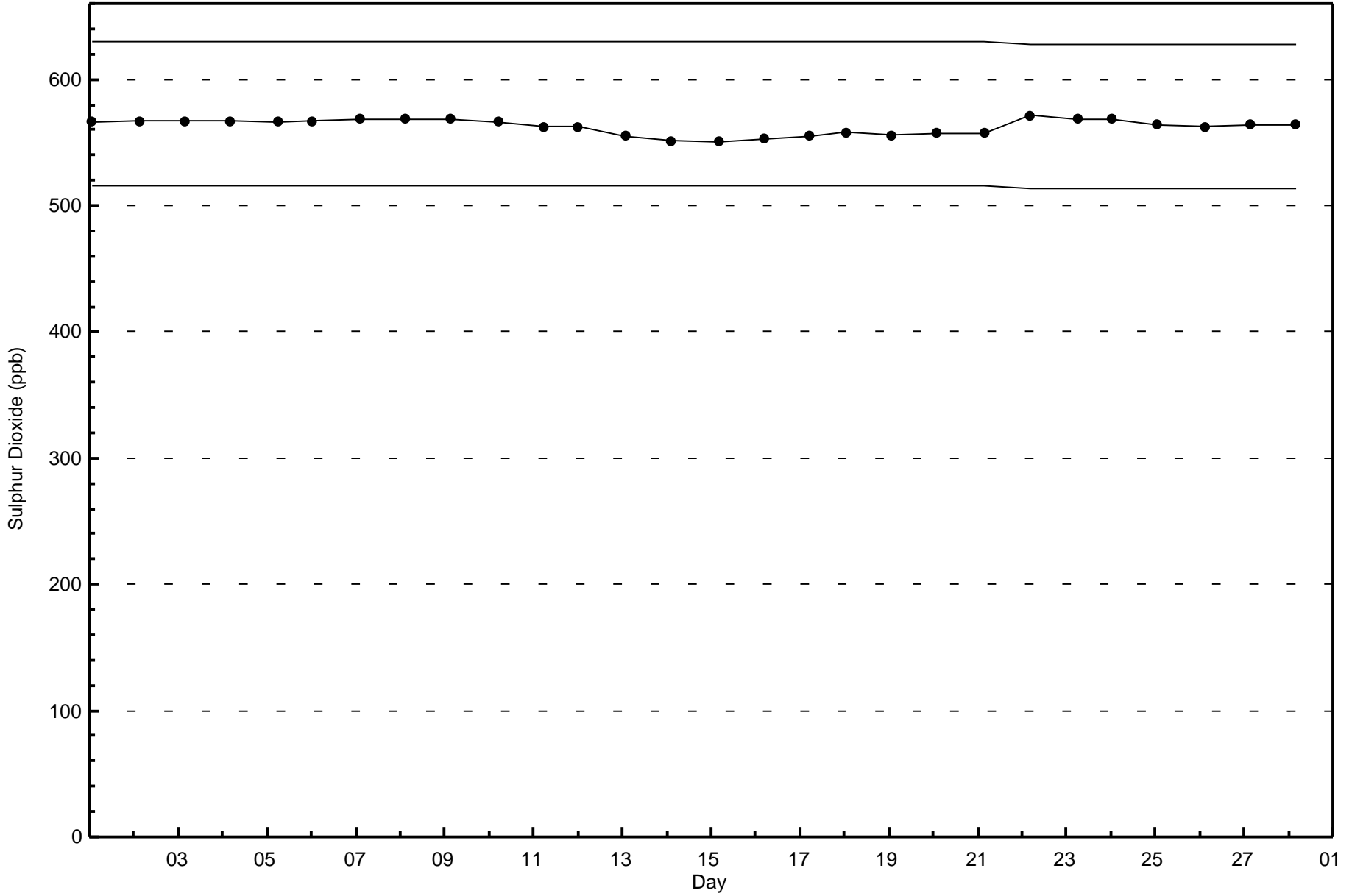


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 2 ppb on Feb 7 06:00	Maximum Daily Average: 0.5 ppb on Feb 7		Hours of Data:	641
Minimum Value: 0 ppb on Feb 10 15:00	Minimum Daily Average: 0.0 ppb on Feb 14		Hours of Missing Data:	31
Maximum Diurnal Average: 0.3 ppb at hour 6	Minimum Diurnal Average: 0.2 ppb at hour 24		Hours of Calibration:	31
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:	100.0

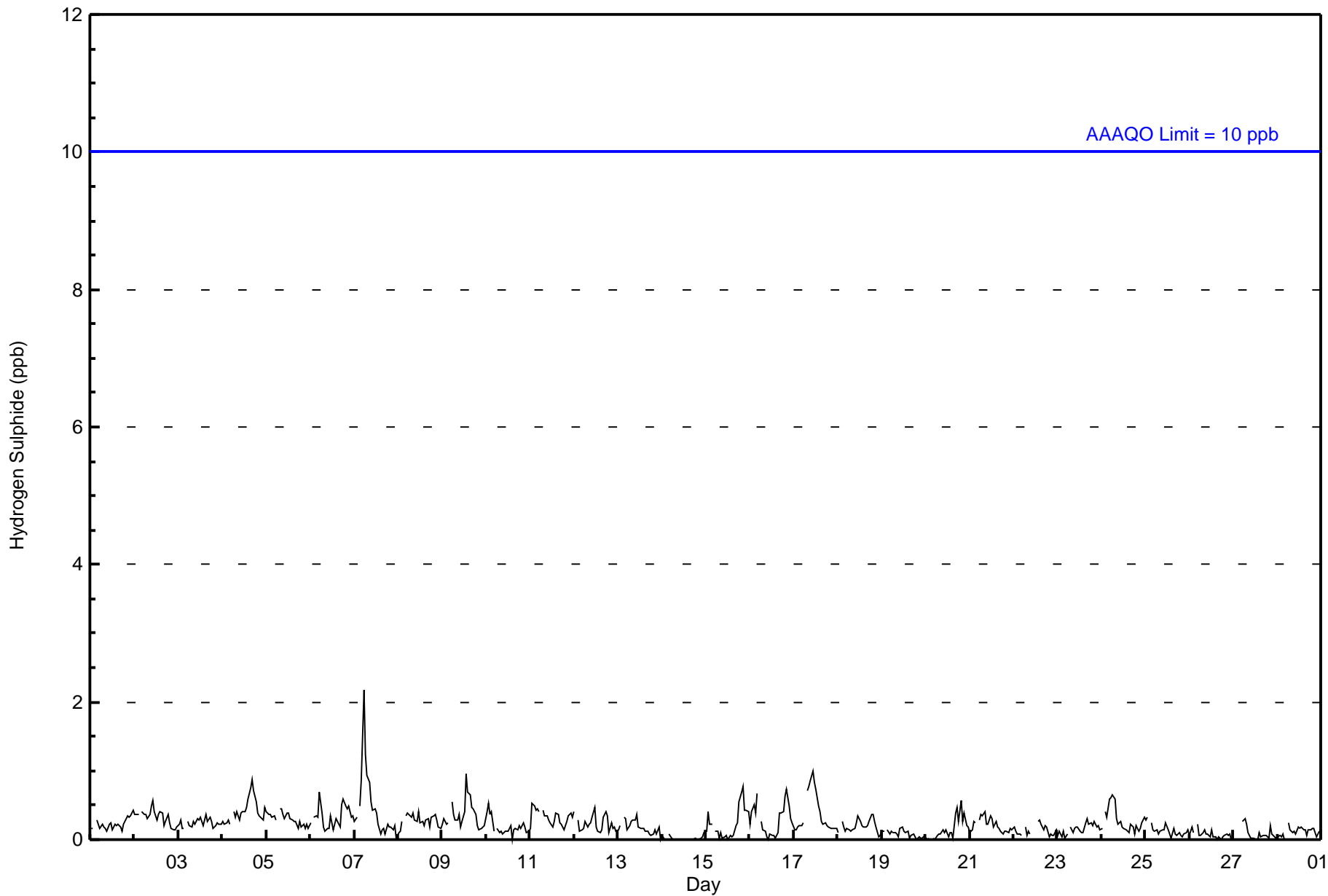
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Feb	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.4	1
5-Feb	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-Feb	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
7-Feb	0	0	Z	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
8-Feb	0	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-Feb	0	0	0	0	Z	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1
10-Feb	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Feb	0	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Feb	0	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
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.2	1
16-Feb	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
17-Feb	0	0	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Feb	0	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
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Feb	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
21-Feb	0	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
22-Feb	0	0	0	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Feb	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
24-Feb	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Feb	0	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
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
	0	1	0	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Wapasu - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	641	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: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Wapasu - February 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	83	28	17	12	22	41	50	75	60	22	65	42	21	15	18	67	638
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	83	28	17	12	22	41	50	75	60	22	65	42	21	15	18	67	638

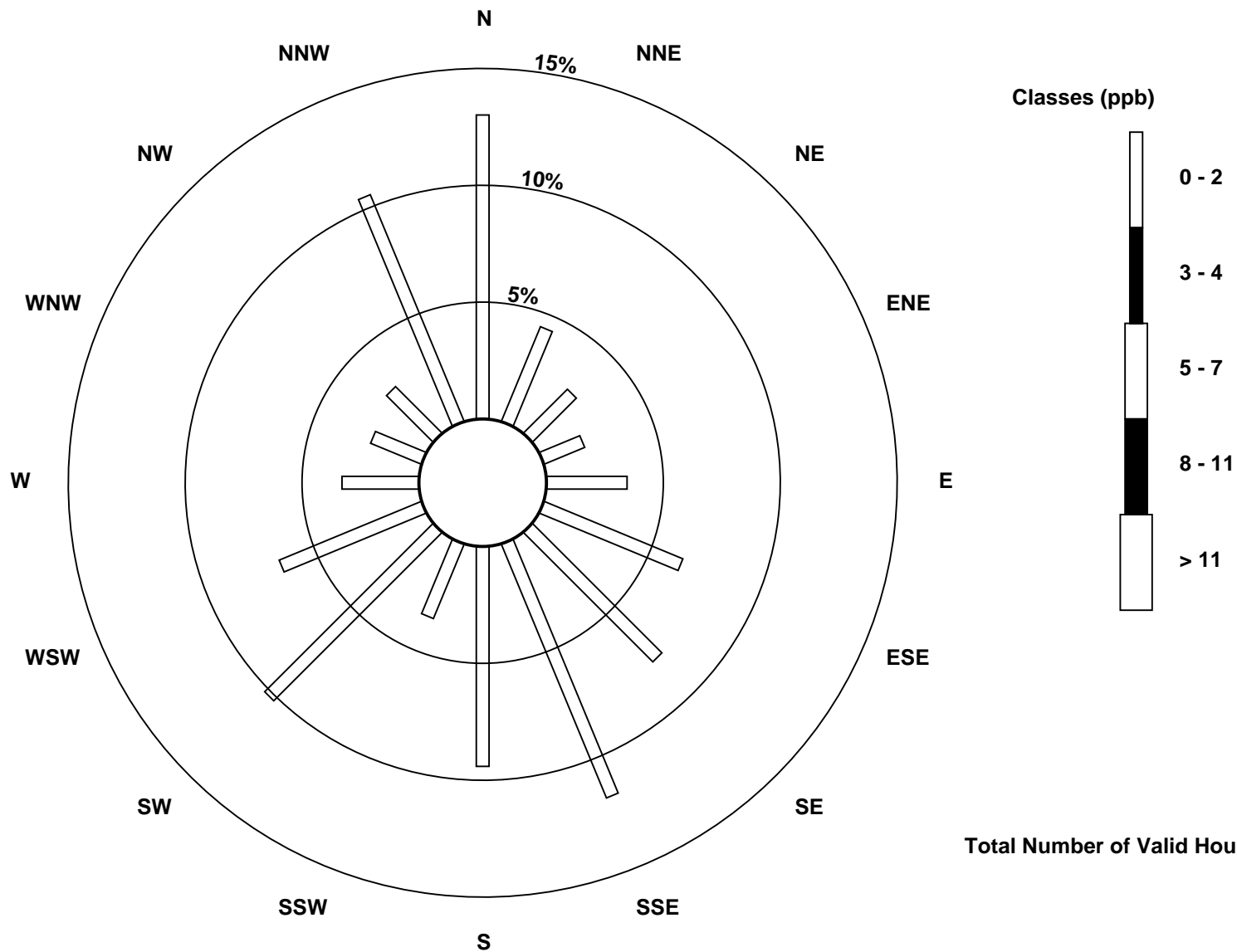
Total Number of Valid Hours: 638

Total Number of Hours: 672

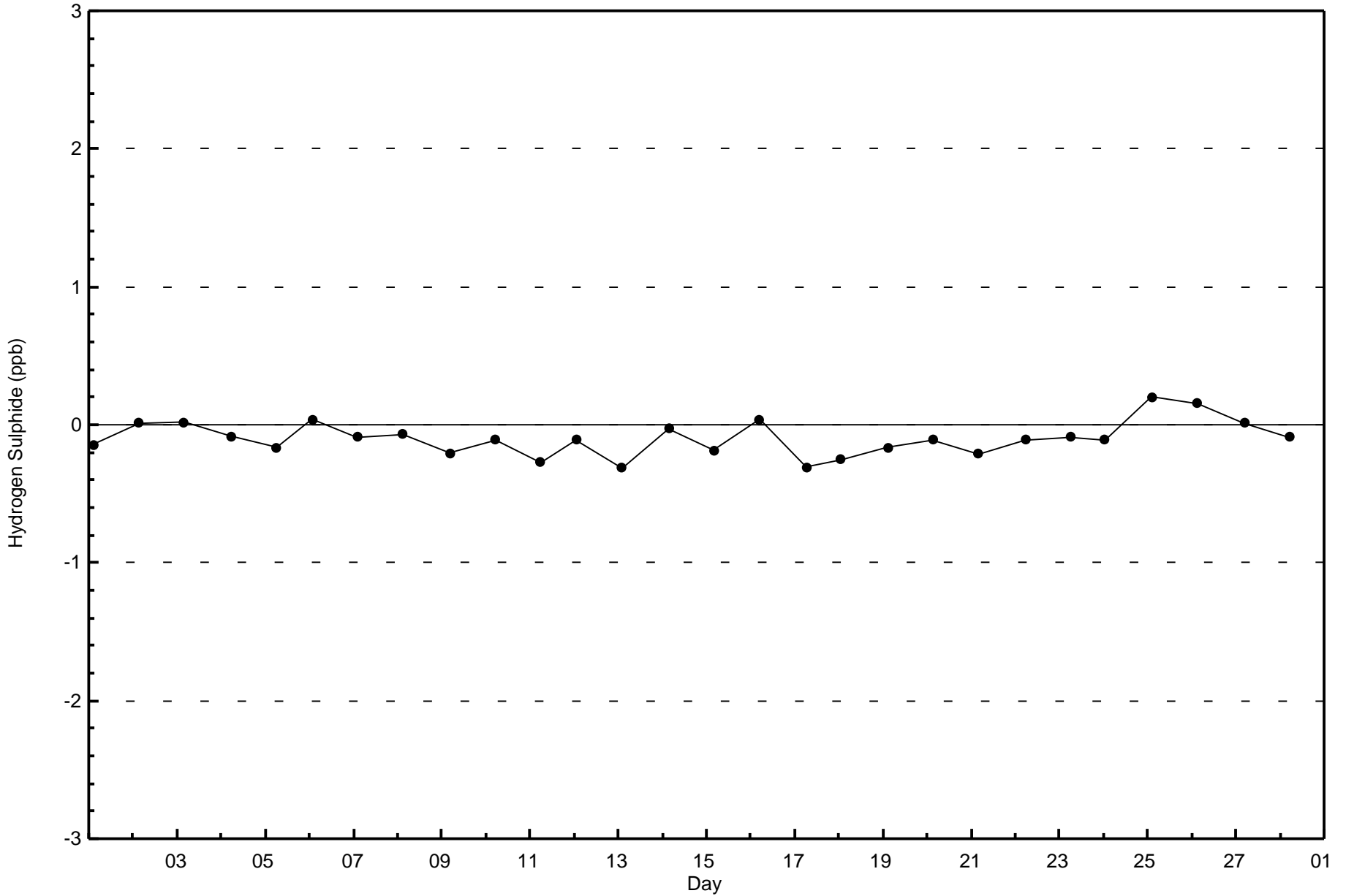


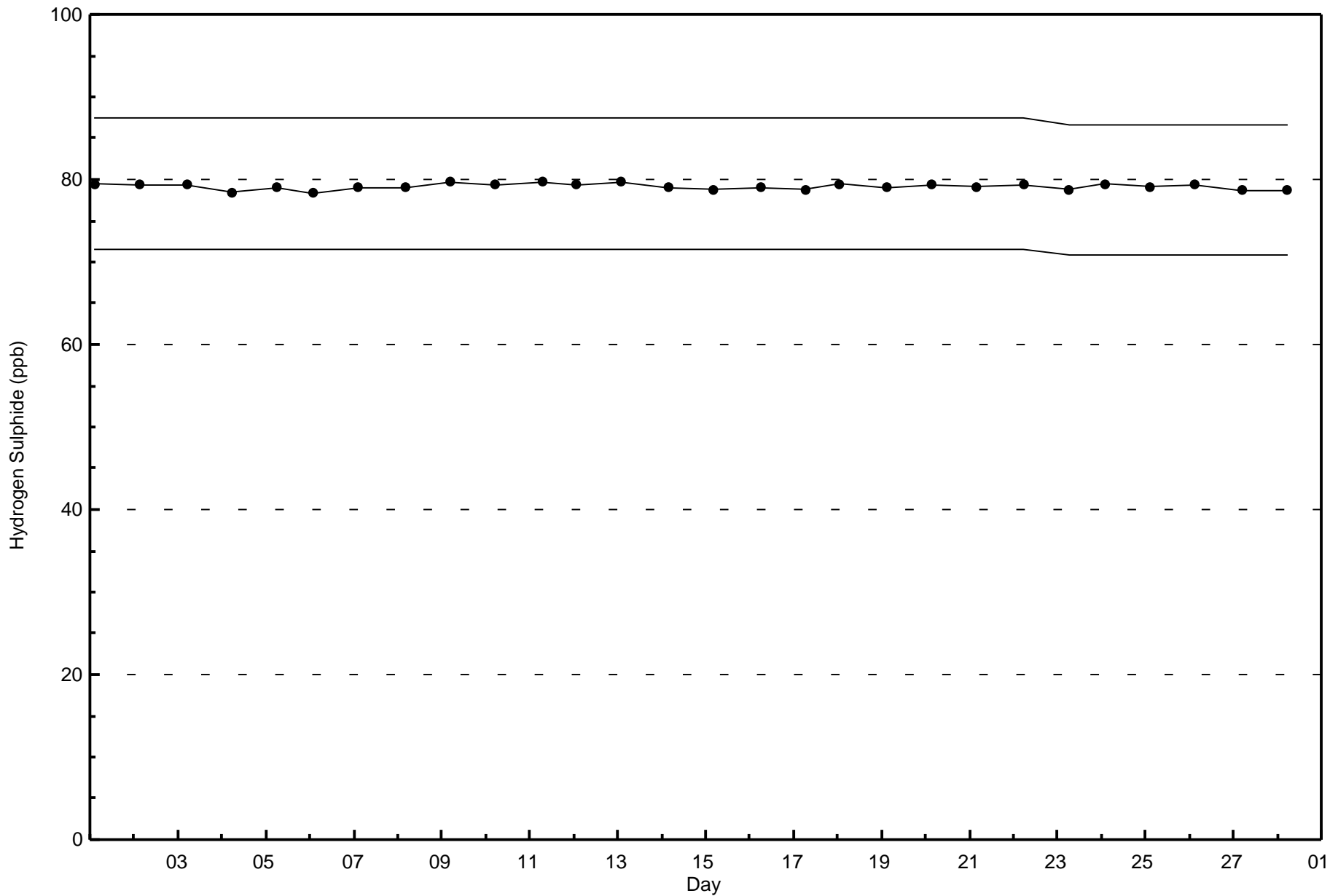
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 638







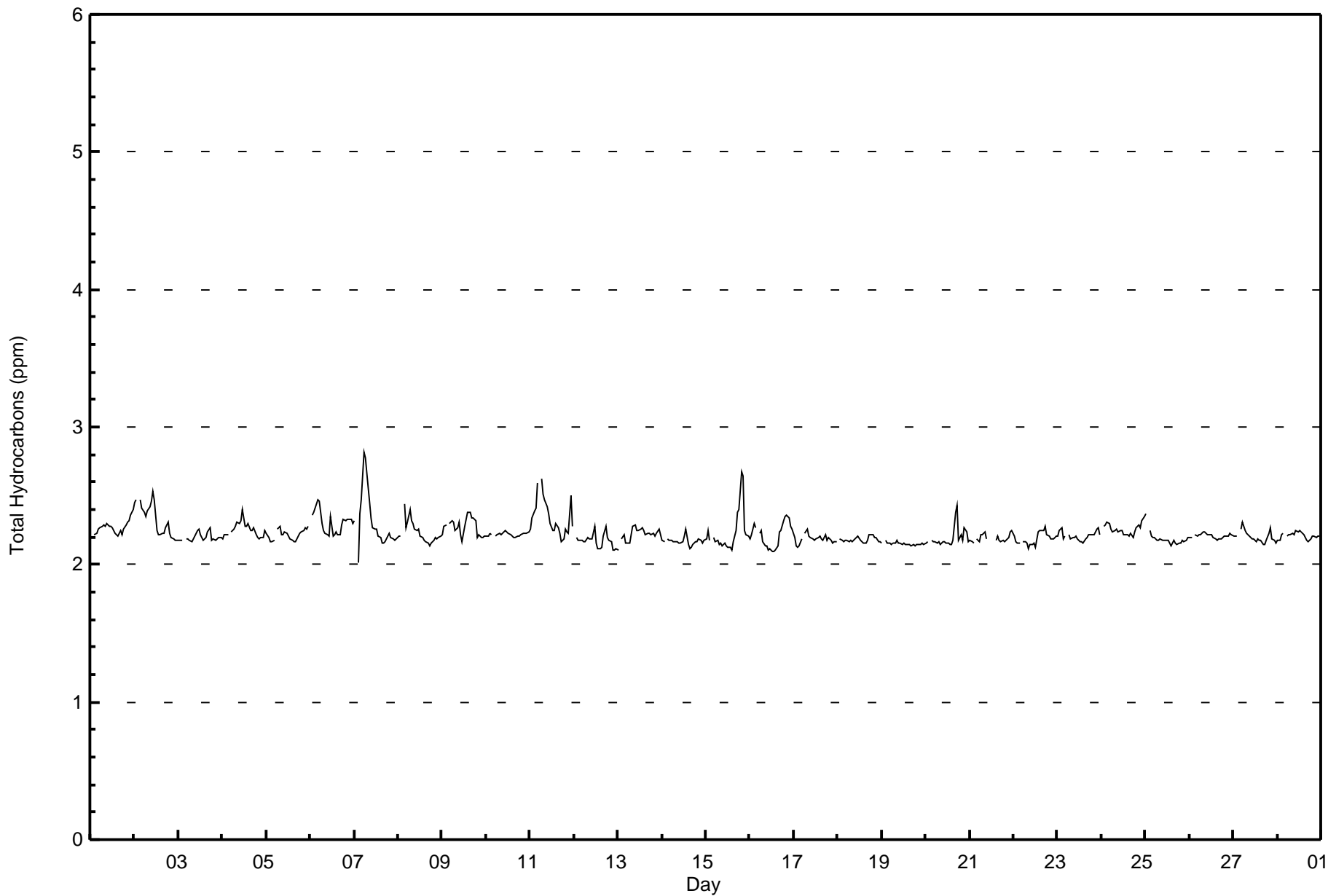
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Wapasu - February 2017

Maximum Value: 2.8 ppm on Feb 7 06:00																			Maximum Daily Average: 2.3 ppm on Feb 11						Hours in Service: 672			
Minimum Value: 2.0 ppm on Feb 7 03:00																			Minimum Daily Average: 2.2 ppm on Feb 19						Hours of Data: 640			
Maximum Diurnal Average: 2.3 ppm at hour 7																			Minimum Diurnal Average: 2.2 ppm at hour 16						Hours of Missing Data: 32			
Monthly Average: 2.23 ppm																			Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.6						Hours of Calibration: 32			
																									Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Feb	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4		
2-Feb	2.5	2.5	Z	2.5	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.5		
3-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3		
4-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4		
5-Feb	2.2	2.2	2.2	2.2	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	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3		
6-Feb	Z	2.4	2.4	2.4	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5		
7-Feb	2.3	Z	2.0	2.4	2.5	2.8	2.8	2.7	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.8		
8-Feb	2.2	2.2	Z	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4		
9-Feb	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4		
10-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3		
11-Feb	2.3	2.3	2.4	2.4	2.6	Z	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.5	2.3	2.3	2.6		
12-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3		
13-Feb	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	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	2.3		
14-Feb	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	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3		
15-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.7	2.6	2.2	2.2	2.2	2.2	2.7		
16-Feb	2.2	2.2	2.3	2.3	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.4		
17-Feb	2.2	2.1	2.1	2.1	2.2	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3		
18-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
19-Feb	2.2	Z	2.2	2.2	2.2	2.1	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	2.1	2.2	2.1	2.2	2.2		
20-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.4	2.4	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.4		
21-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	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-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3		
23-Feb	2.2	2.2	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3		
24-Feb	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3		
25-Feb	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	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.4		
26-Feb	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	2.2	2.2		
27-Feb	2.2	2.2	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	2.2	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3		
28-Feb	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		
																								Diurnal Average				
																								Diurnal Maximum				
2.2 2.2 2.2 2.3 2.3 2.3 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2																								2.5 2.5 2.4 2.5 2.6 2.8 2.8 2.7 2.5 2.5 2.5 2.5 2.3 2.3 2.4 2.4 2.4 2.4 2.4 2.4 2.7 2.6 2.3 2.5 2.4				
Z - zerospan		C - Calibration																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.16	0.16
2.1 - 3.0	639	99.84	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Wapasu - February 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	0	0	0	0	0	0	0	1
2.1 - 3.0	81	31	14	13	22	42	48	77	61	21	64	41	18	15	18	70	636
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	81	31	14	13	22	42	48	78	61	21	64	41	18	15	18	70	637

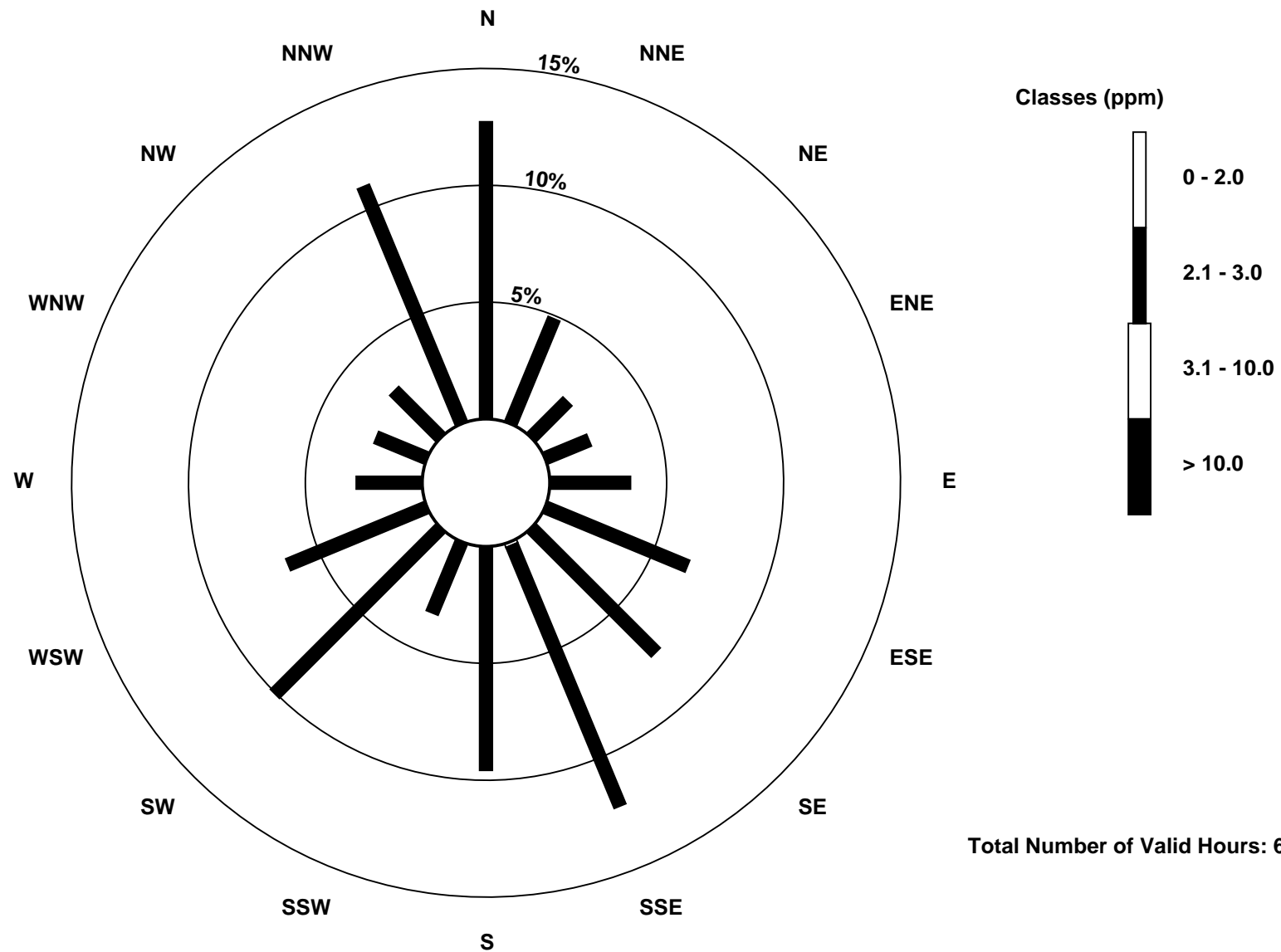
Total Number of Valid Hours: 637

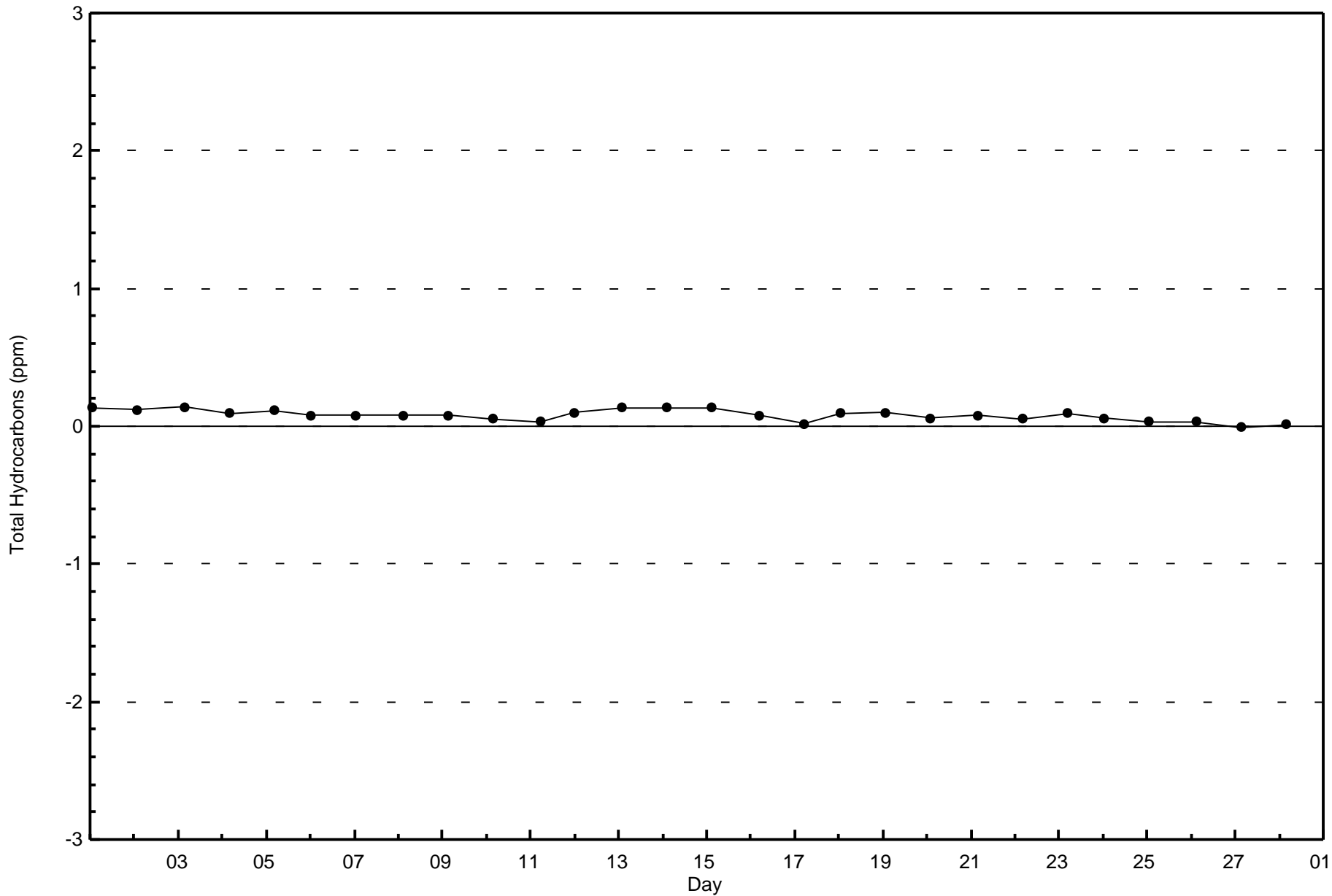
Total Number of Hours: 672

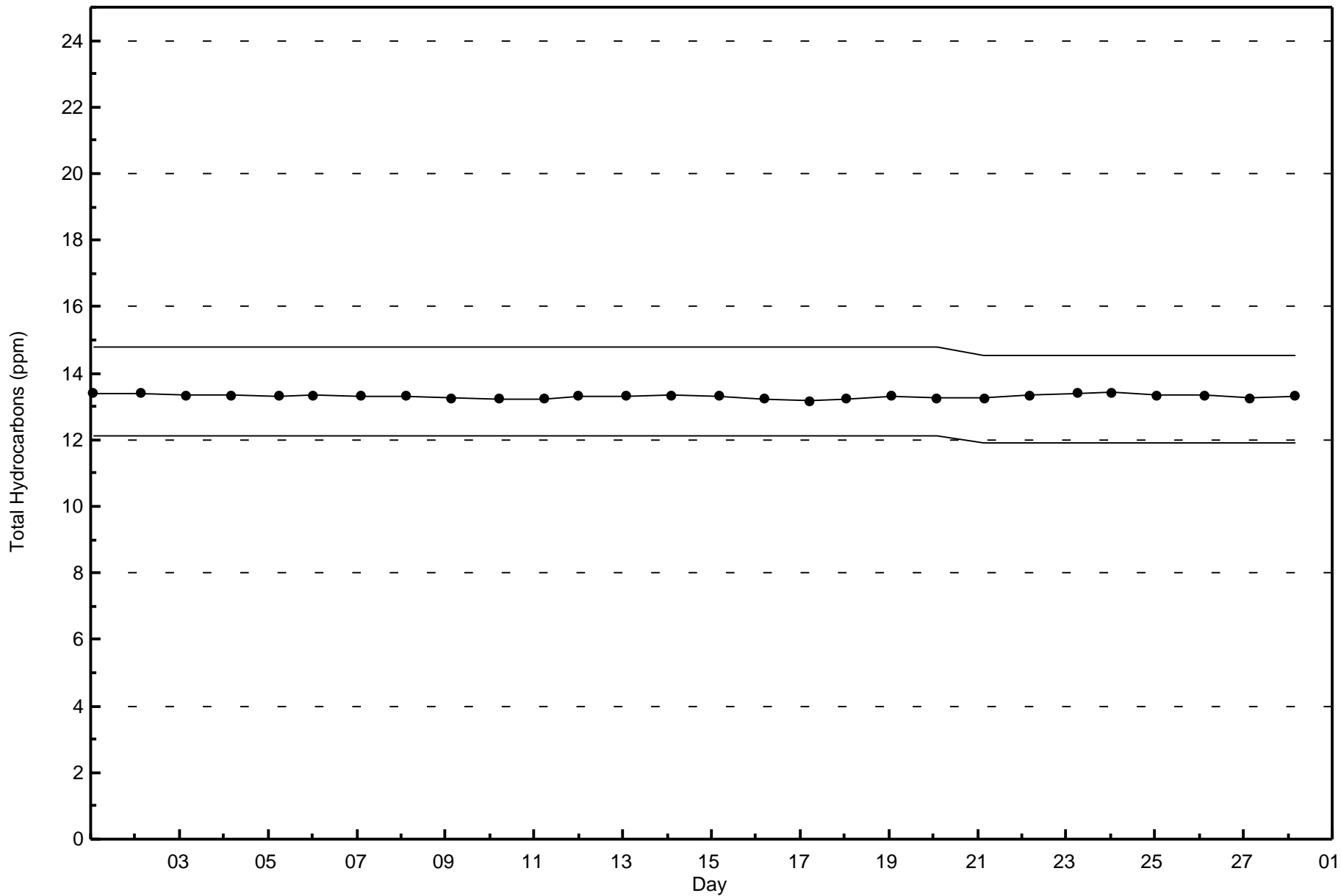


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

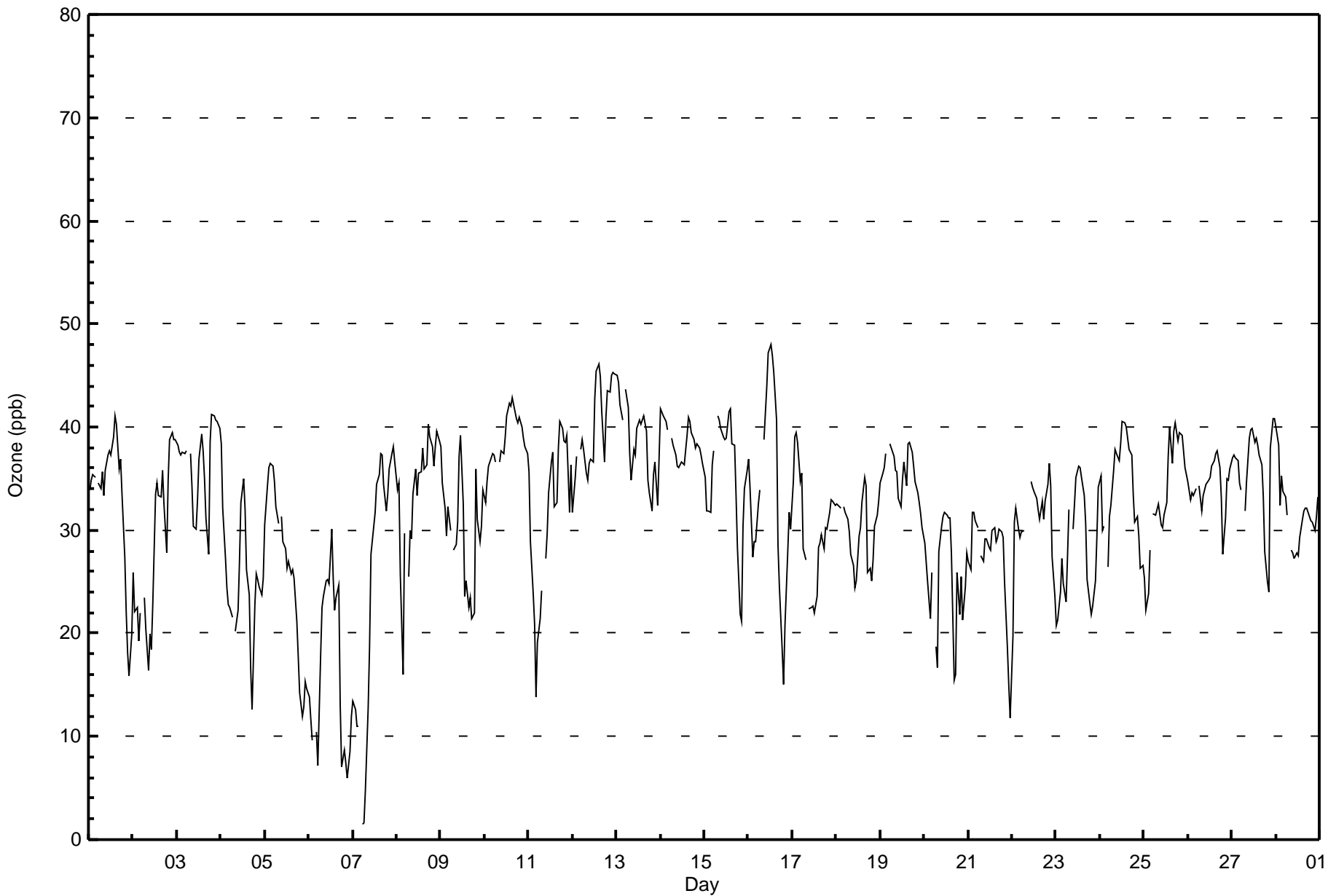
Wapasu - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																	
Maximum Value: 48 ppb on Feb 16 13:00										Maximum Daily Average: 40.0 ppb on Feb 12										Hours of Data: 642							
Minimum Value: 1 ppb on Feb 7 06:00										Minimum Daily Average: 16.5 ppb on Feb 6										Hours of Missing Data: 30							
Maximum Diurnal Average: 35.1 ppb at hour 14										Minimum Diurnal Average: 29.1 ppb at hour 7										Hours of Calibration: 30							
Monthly Average: 31.7 ppb										Percentiles: P ₁ = 7 P ₁₀ = 22 Q ₁ = 28 Median = 33 Q ₃ = 37 P ₉₀ = 40 P ₉₉ = 45										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	34	35	35	35	Z	35	34	36	33	36	37	38	37	39	41	40	36	37	34	27	22	18	16	20	32.9	41	
2-Feb	26	22	22	19	22	Z	23	21	16	20	18	23	33	35	33	33	36	33	28	35	39	39	39	39	28.5	39	
3-Feb	38	38	37	38	37	38	Z	37	34	30	30	33	37	39	38	35	31	28	39	41	41	41	41	40	36.6	41	
4-Feb	38	32	27	24	23	22	Z	27	20	22	27	33	35	32	26	24	17	13	23	26	25	24	24	25	25.4	38	
5-Feb	30	34	36	37	36	35	32	31	Z	31	29	28	26	27	26	26	25	21	18	14	12	13	15	15	26.0	37	
6-Feb	14	12	10	Z	10	7	18	23	24	25	25	25	30	25	22	23	25	13	7	9	7	6	9	12	16.5	30	
7-Feb	13	13	11	11	Z	1	2	5	13	19	28	30	32	34	35	37	37	34	32	34	36	37	38	37	24.8	38	
8-Feb	34	35	26	16	30	Z	26	30	29	34	36	33	36	36	38	36	36	40	39	38	36	38	40	39	33.8	40	
9-Feb	38	35	32	29	32	30	Z	28	29	31	37	39	32	24	25	23	23	21	22	36	31	29	30	34	30.0	39	
10-Feb	33	35	36	37	37	37	37	Z	37	38	37	39	41	42	42	43	42	41	40	41	40	39	38	37	38.7	43	
11-Feb	36	29	24	21	14	19	21	24	Z	27	30	34	37	37	32	33	38	40	40	39	39	39	39	32	36	31.3	40
12-Feb	32	35	37	Z	38	39	38	35	35	36	37	37	43	45	46	45	42	37	41	44	43	45	45	45	40.0	46	
13-Feb	45	44	42	41	Z	44	42	37	35	38	37	40	41	40	41	41	40	35	34	32	35	37	32	37	38.7	45	
14-Feb	42	41	41	41	40	Z	39	38	37	36	36	37	36	36	39	41	41	39	39	38	38	38	37	37	38.6	42	
15-Feb	35	32	32	32	36	38	Z	41	41	40	39	39	39	41	42	38	38	33	28	22	21	30	34	36	35.1	42	
16-Feb	37	34	27	29	29	33	34	Z	39	41	44	47	48	47	45	41	29	25	18	15	21	28	32	30	33.6	48	
17-Feb	35	39	39	38	35	36	28	27	Z	22	22	23	22	24	28	29	30	28	30	30	32	33	33	32	30.2	39	
18-Feb	33	32	32	Z	32	32	31	30	28	27	24	25	29	30	33	35	34	26	26	25	27	30	31	33	29.8	35	
19-Feb	35	36	36	37	Z	38	38	37	36	36	33	32	35	37	34	38	38	38	36	35	34	33	32	30	35.4	38	
20-Feb	29	27	25	21	26	Z	19	17	28	30	31	32	32	31	31	28	15	16	26	22	25	21	25	28	25.4	32	
21-Feb	27	26	32	32	31	30	Z	28	27	29	29	28	28	30	30	29	29	30	30	29	25	19	15	12	27.2	32	
22-Feb	20	31	32	30	29	30	30	Z	C	C	35	34	34	33	32	31	33	31	33	34	36	34	27	24	31.1	36	
23-Feb	21	21	24	27	25	23	27	32	Z	30	33	35	36	36	35	33	31	25	23	22	23	25	29	34	28.3	36	
24-Feb	35	30	30	Z	26	31	32	36	38	37	37	38	41	40	40	39	38	37	33	31	31	29	26	27	34.1	41	
25-Feb	25	22	24	28	Z	32	32	32	33	31	30	31	33	37	40	36	40	40	39	39	39	39	36	35	33.7	40	
26-Feb	35	33	34	33	34	Z	34	32	33	34	34	35	35	36	37	37	38	36	33	28	31	35	35	36	34.3	38	
27-Feb	37	37	37	37	35	34	Z	32	35	39	40	40	39	39	38	37	36	33	28	25	24	38	41	41	35.7	41	
28-Feb	40	38	32	35	34	33	31	Z	28	28	27	28	28	29	31	32	32	32	31	31	31	30	31	33	31.6	40	
32.0 31.3 30.5 30.3 30.1 30.3 29.1 29.9 30.7 31.4 32.3 33.4 34.8 35.1 35.1 34.4 33.2 30.8 30.3 30.0 30.2 31.0 30.8 31.5																								Diurnal Average			
45 44 42 41 40 44 42 41 41 41 44 47 48 47 46 45 45 42 41 41 44 43 45 45 45																								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 - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	51	7.94	7.94
21 - 50	591	92.06	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 642

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - February 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	0	0	1	1	1	10	19	5	4	1	1	2	0	2	0	50
21 - 50	82	29	15	11	21	42	39	56	54	19	64	40	19	14	16	68	589
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	85	29	15	12	22	43	49	75	59	23	65	41	21	14	18	68	639

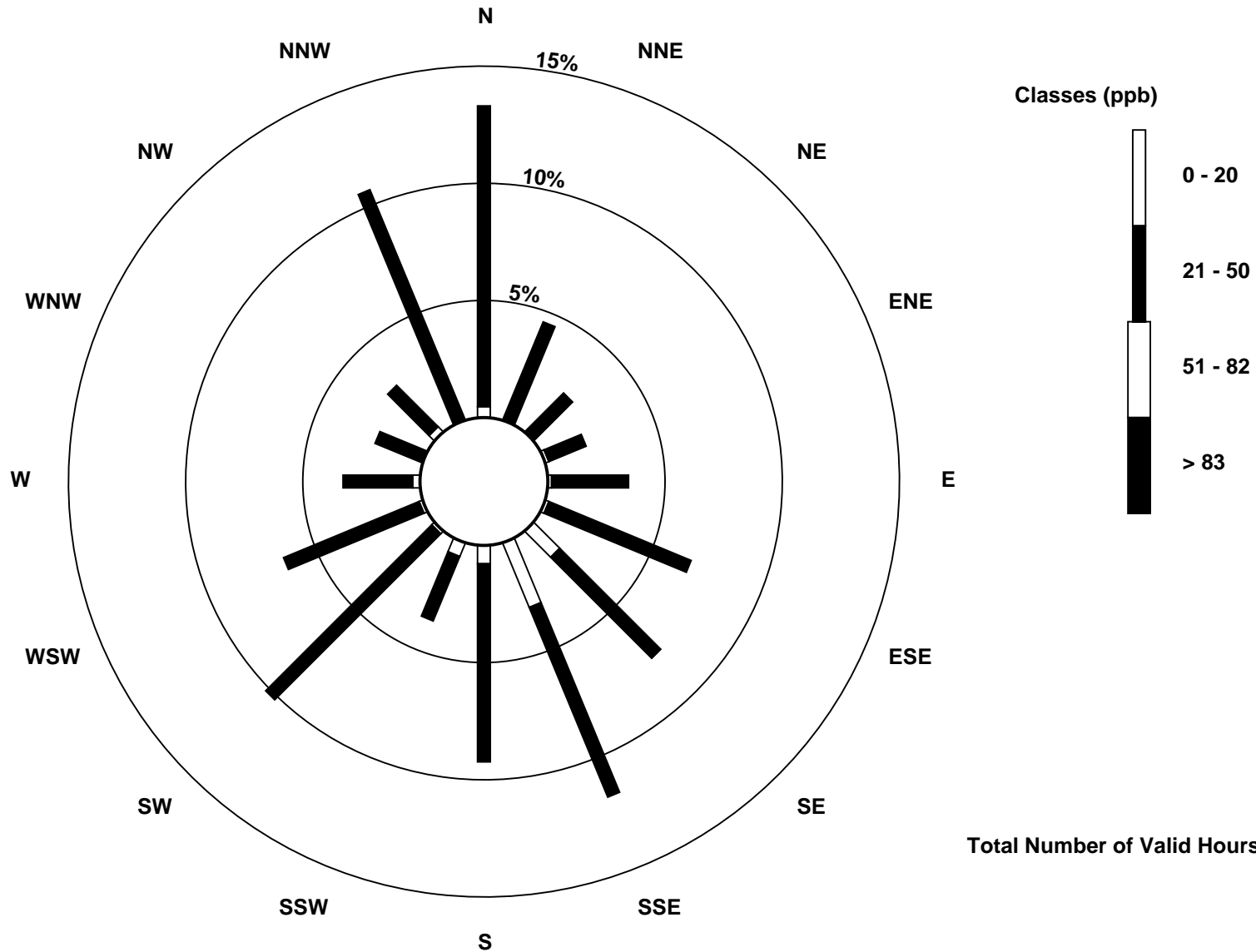
Total Number of Valid Hours: 639

Total Number of Hours: 672

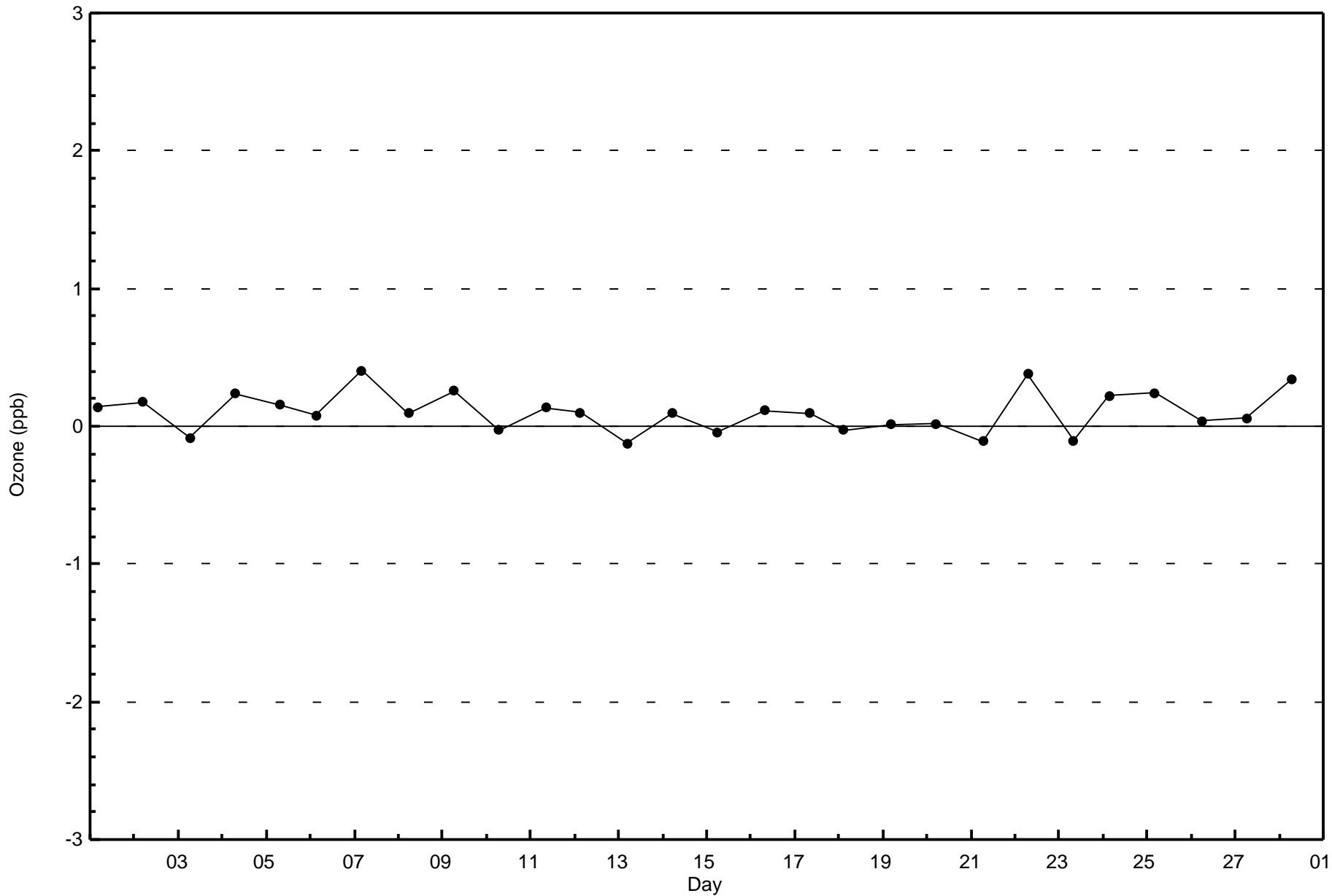


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Wapasu (AMS 17)



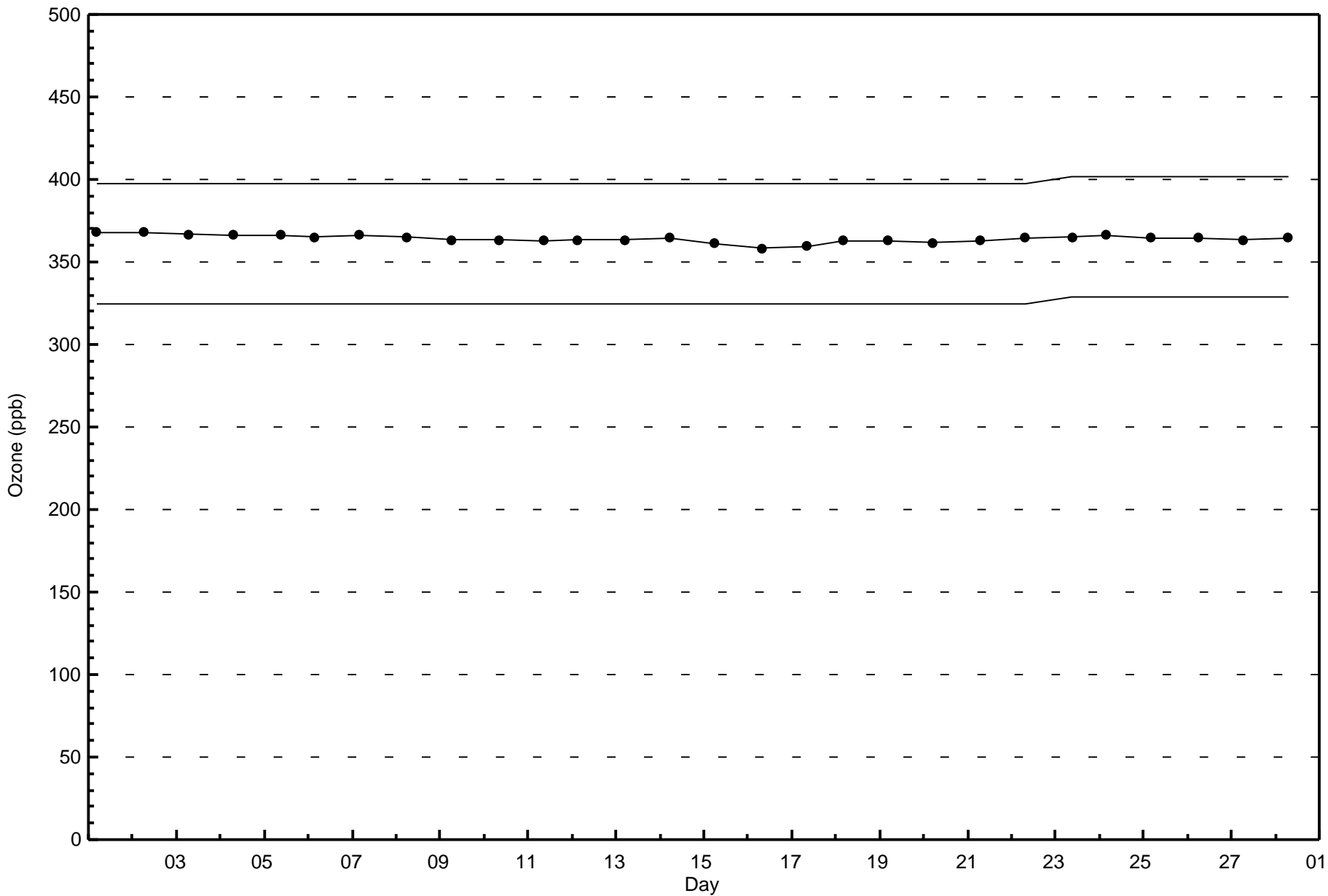
Total Number of Valid Hours: 639





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Wapasu - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

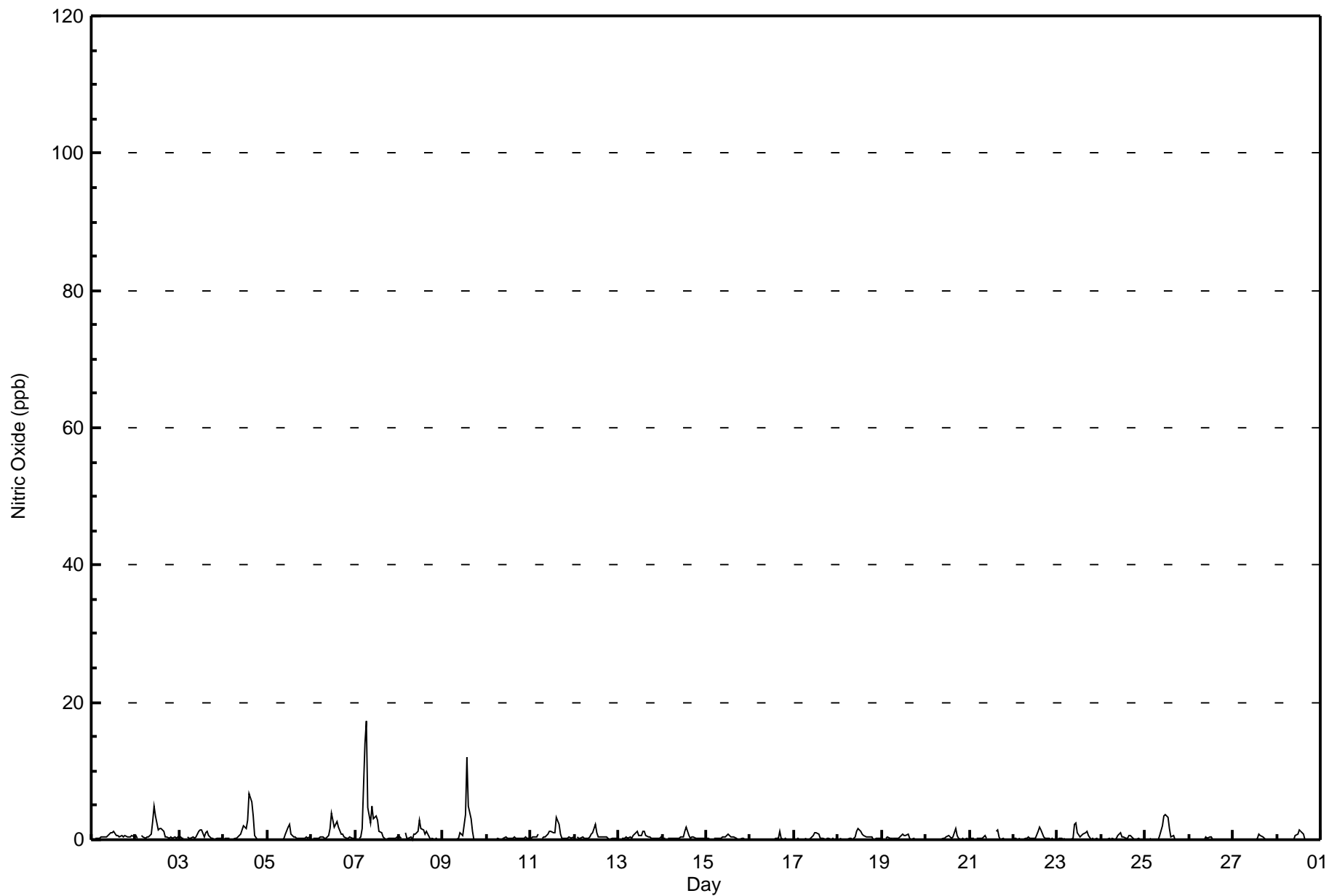
Wapasu - February 2017

Maximum Value: 17 ppb on Feb 7 07:00																	Maximum Daily Average: 2.6 ppb on Feb 7																	Hours in Service: 672								
Minimum Value: 0 ppb on Feb 4 20:00																	Minimum Daily Average: 0.1 ppb on Feb 26																	Hours of Data: 640								
Maximum Diurnal Average: 1.3 ppb at hour 14																	Minimum Diurnal Average: 0.1 ppb at hour 20																	Hours of Missing Data: 32								
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 = 5																	Hours of Calibration: 32								
																	Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																		
1-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	1	0	0	0	1	0	0.5	1																
2-Feb	1	0	Z	1	0	0	0	0	1	3	5	4	2	2	2	1	0	0	0	0	0	0	0	0	1.0	5																
3-Feb	0	0	0	Z	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.5	2																
4-Feb	0	0	0	0	Z	0	0	0	0	1	1	2	2	3	7	5	3	1	0	0	0	0	0	0	1.1	7																
5-Feb	0	0	0	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0.4	2																
6-Feb	Z	0	0	0	0	0	0	0	0	1	2	4	2	2	3	2	1	1	0	0	0	0	0	0	0.9	4																
7-Feb	0	Z	0	0	2	14	17	5	2	5	3	4	3	1	1	0	0	0	0	0	0	0	0	0	2.6	17																
8-Feb	0	0	Z	1	0	0	0	0	1	1	1	3	2	1	1	1	0	0	0	0	0	0	0	0	0.6	3																
9-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	4	12	5	3	1	0	0	0	0	0	0	0	1.2	12																
10-Feb	0	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-Feb	0	0	0	0	1	Z	0	0	0	1	1	1	1	1	3	2	1	0	0	0	0	0	0	0	0.7	3																
12-Feb	Z	0	0	0	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2																
13-Feb	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1																
14-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0.4	2																
15-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																
16-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1																
17-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1																
18-Feb	Z	0	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																
19-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1																
20-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	2	1	0	0	0	0	0	0	0.2	2																
21-Feb	0	0	0	Z	0	0	0	0	1	0	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0.3	1																
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0.4	2																
23-Feb	0	0	0	0	0	Z	0	0	0	2	2	1	0	1	1	1	1	1	0	0	0	0	0	0	0.5	2																
24-Feb	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1																
25-Feb	0	Z	0	0	0	0	0	0	1	2	4	4	3	2	0	1	0	0	0	0	0	0	0	0	0.7	4																
26-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.1	1																
28-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.2	2																
																	0.1	0.1	0.1	0.2	0.3	0.7	0.8	0.3	0.4	0.8	1.1	1.3	1.2	1.3	1.2	0.9	0.6	0.2	0.2	0.1	0.1	0.2	0.1	0.1	Diurnal Average	
																	1	0	0	1	2	14	17	5	2	5	5	4	4	12	7	5	3	1	1	0	0	0	0	1	0	Diurnal Maximum
Z - zerospan		C - Calibration																																								



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	640	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - February 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	81	31	14	13	22	42	48	78	61	21	64	41	18	15	18	70	637
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	81	31	14	13	22	42	48	78	61	21	64	41	18	15	18	70	637

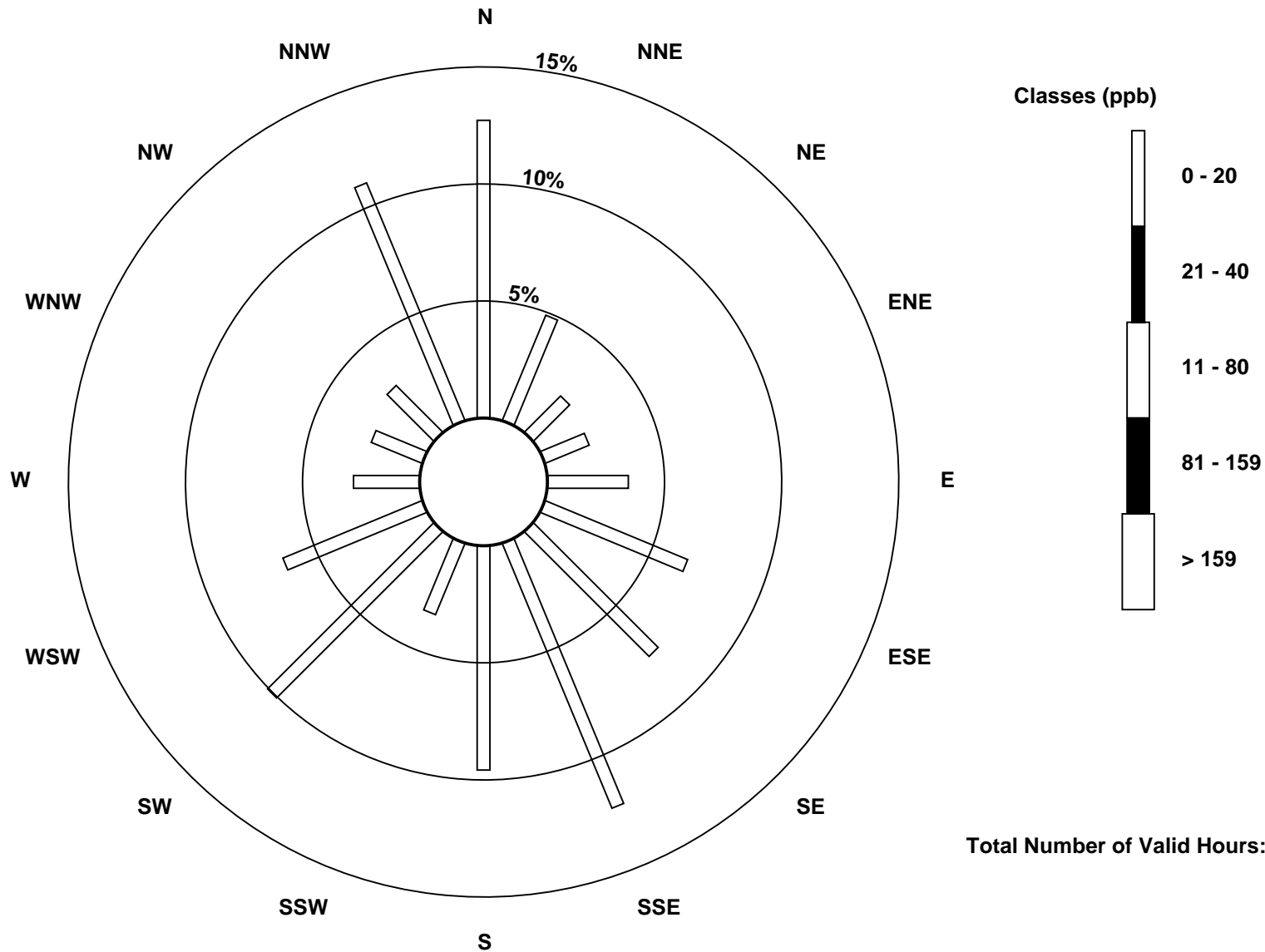
Total Number of Valid Hours: 637

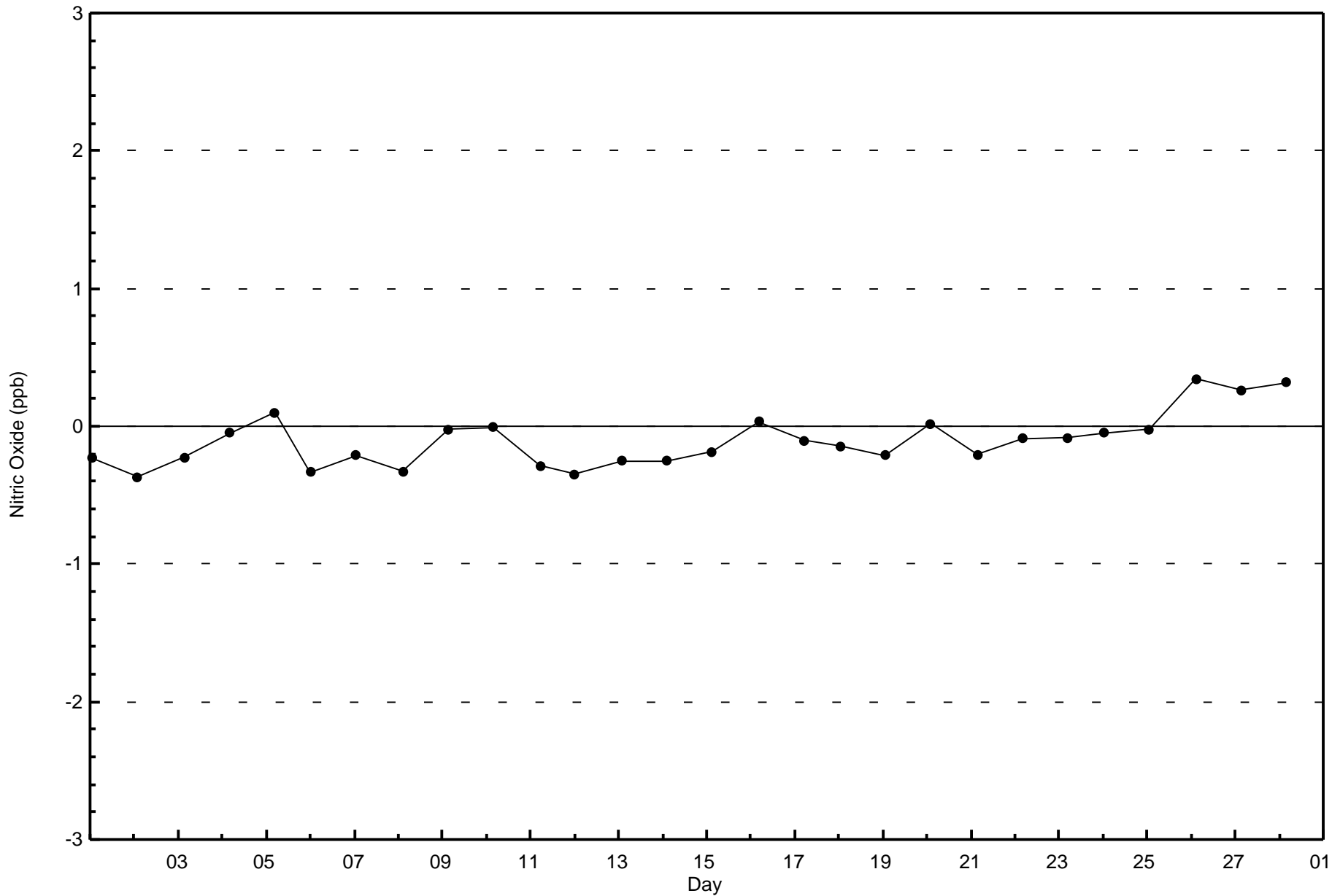
Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)

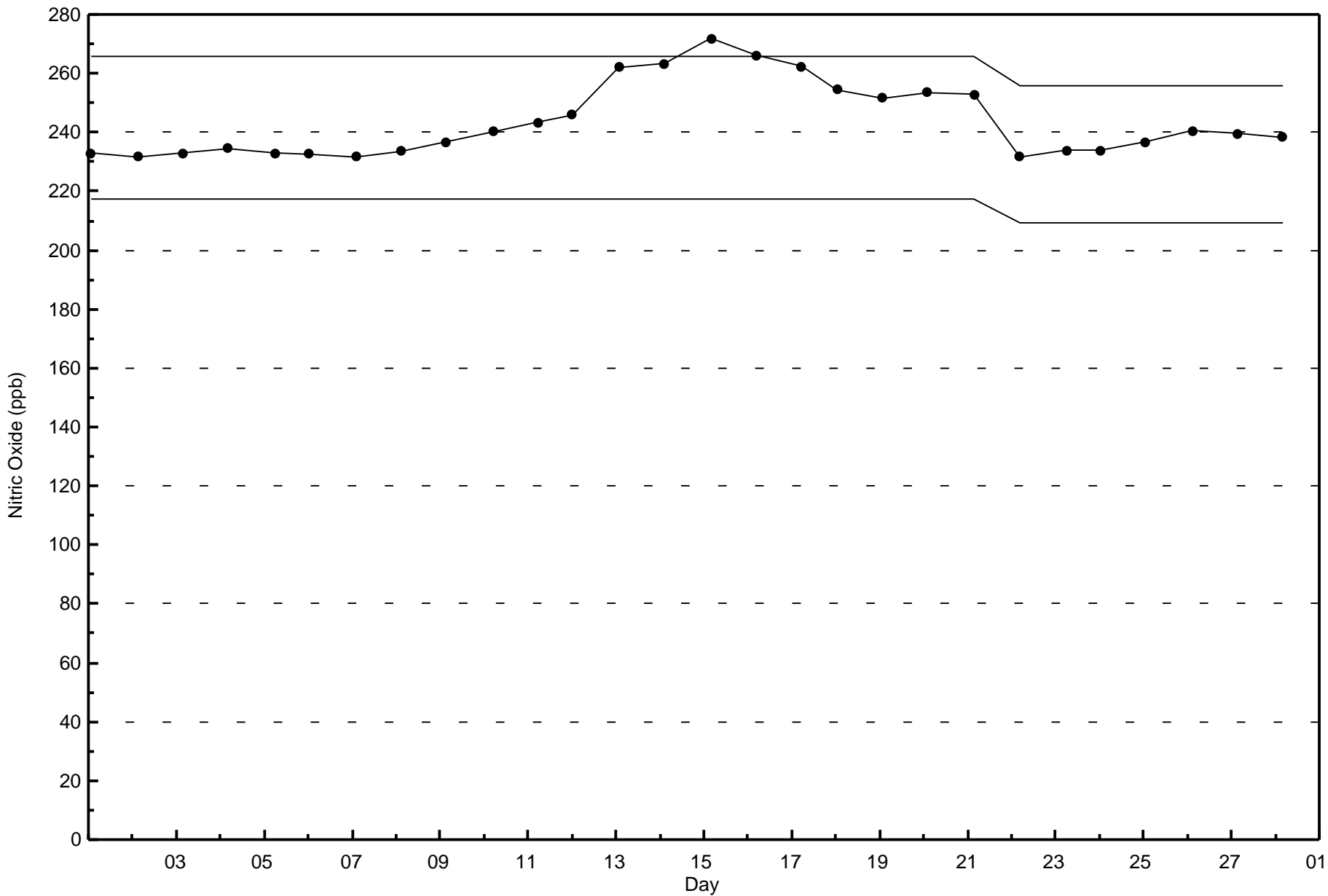






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Wapasu - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 33 ppb on Feb 7 07:00	Maximum Daily Average: 10.3 ppb on Feb 7
Minimum Value: 0 ppb on Feb 3 22:00	Hours of Data: 640
Maximum Diurnal Average: 5.8 ppb at hour 18	Hours of Missing Data: 32
Monthly Average: 4.0 ppb	Hours of Calibration: 32
Minimum Daily Average: 0.7 ppb on Feb 10	Percent Operational Time: 100.0
Minimum Diurnal Average: 2.6 ppb at hour 1	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 20	

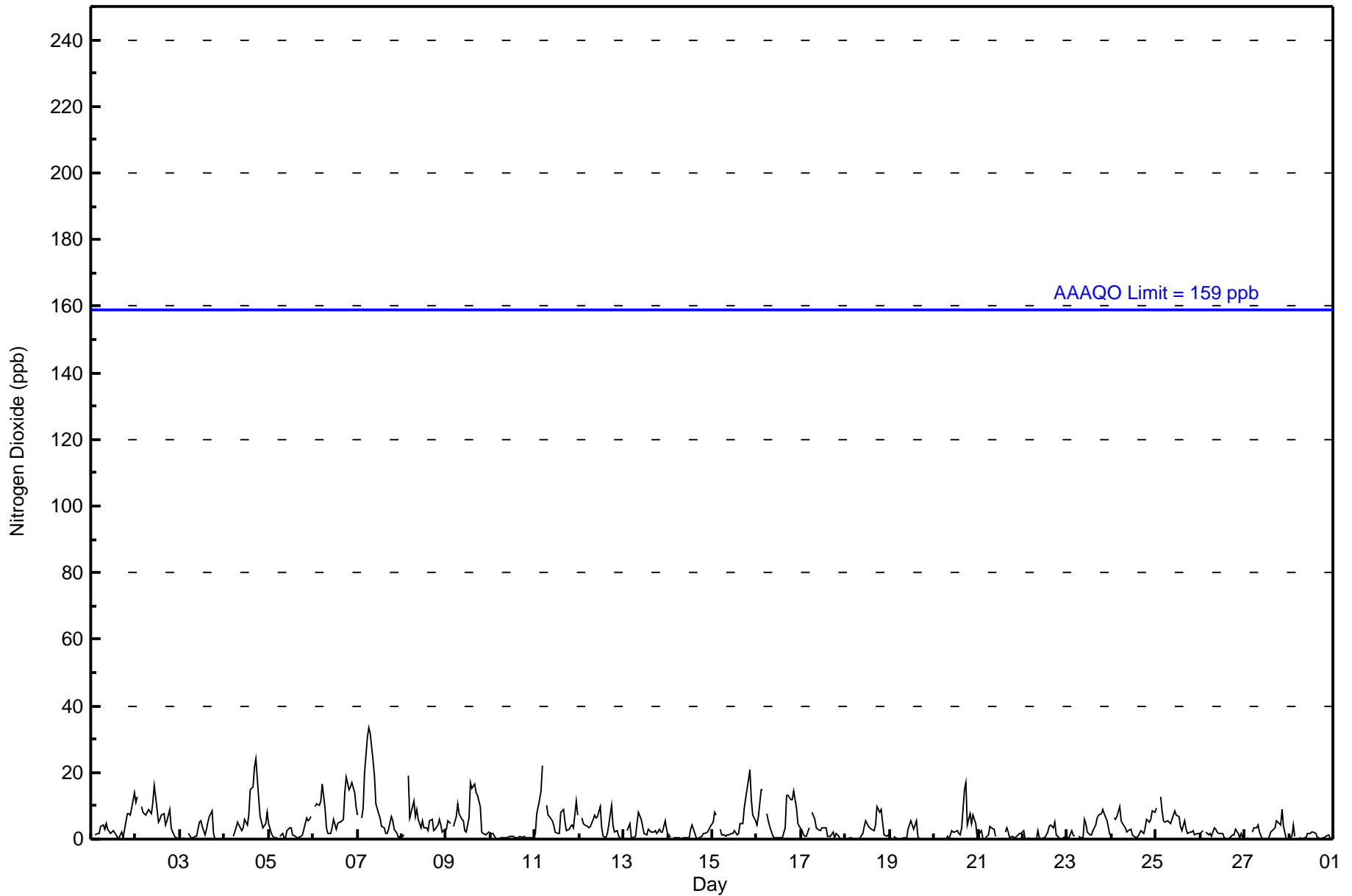
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2	Z	1	2	2	4	4	3	5	3	2	2	3	1	0	1	2	1	3	8	8	7	9	14	3.7	14
2-Feb	11	13	Z	10	8	7	8	9	8	11	16	13	5	6	7	8	4	6	9	4	2	1	0	0	7.2	16
3-Feb	0	0	0	Z	2	1	0	1	1	1	5	6	4	1	3	5	7	8	2	0	0	0	0	2.0	8	
4-Feb	0	0	0	0	Z	1	4	5	4	3	3	6	4	7	15	16	22	24	12	7	5	4	5	8	6.7	24
5-Feb	5	2	1	0	0	Z	1	2	1	1	2	4	3	1	1	1	1	1	1	3	6	6	6	7	2.3	7
6-Feb	Z	10	11	10	11	17	9	3	2	2	3	6	3	5	5	5	6	14	19	15	16	17	14	10	9.2	19
7-Feb	7	Z	6	10	20	31	33	32	24	19	11	8	6	4	3	2	2	3	7	6	3	2	1	1	10.3	33
8-Feb	1	1	Z	19	6	8	12	7	9	6	4	6	4	4	2	5	6	3	3	4	6	4	2	3	5.3	19
9-Feb	3	6	5	Z	4	7	10	8	6	6	3	2	6	17	15	17	14	13	10	2	2	1	2	2	6.9	17
10-Feb	2	2	1	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.7	2
11-Feb	2	8	12	14	22	Z	10	7	7	6	4	2	2	2	8	9	5	2	3	4	4	4	12	7	6.7	22
12-Feb	Z	6	5	4	4	4	4	6	7	7	7	10	4	1	0	2	4	10	4	2	3	1	0	0	4.1	10
13-Feb	0	Z	3	5	1	1	1	5	8	6	4	2	1	3	3	2	2	2	2	3	2	2	6	3	2.8	8
14-Feb	1	1	Z	0	1	0	0	0	0	0	1	1	3	4	2	0	0	0	1	2	2	2	3	4	1.2	4
15-Feb	5	8	7	Z	3	1	1	1	1	1	2	2	2	1	2	5	5	10	12	18	21	12	7	6	5.7	21
16-Feb	4	7	15	15	Z	8	6	4	1	1	0	0	0	0	1	3	13	13	12	12	15	9	5	4	6.4	15
17-Feb	3	1	1	1	4	Z	8	6	3	3	3	4	4	3	1	1	1	2	1	2	1	0	0	0	2.2	8
18-Feb	Z	0	0	0	0	0	0	0	0	2	4	5	4	3	3	3	4	10	8	9	5	1	1	1	2.8	10
19-Feb	1	Z	1	0	0	0	0	0	1	0	3	6	4	3	6	1	0	0	0	0	0	0	0	0	1.1	6
20-Feb	0	0	Z	0	0	0	0	1	0	3	2	2	2	2	1	3	15	17	4	8	5	7	5	1	3.3	17
21-Feb	1	3	0	Z	0	1	4	3	3	1	C	C	C	C	2	4	2	0	1	0	1	1	2	2	1.6	4
22-Feb	2	0	0	1	Z	0	0	0	3	1	0	0	0	2	4	4	3	5	1	1	0	0	1	1	1.3	5
23-Feb	0	1	3	1	1	Z	1	1	1	6	5	2	1	1	2	4	6	7	8	9	8	5	3	1	3.4	9
24-Feb	Z	6	6	7	10	5	5	3	2	3	3	1	1	1	1	2	3	2	3	6	5	6	8	8	4.2	10
25-Feb	10	Z	13	9	6	5	5	5	5	7	9	7	7	4	2	6	3	2	2	2	3	1	2	2	5.0	13
26-Feb	2	3	Z	2	1	2	1	3	3	2	2	2	2	0	0	0	1	1	1	3	2	0	2	0	1.4	3
27-Feb	0	0	0	Z	2	3	4	4	2	0	0	0	0	1	2	3	3	5	5	4	9	4	0	0	2.2	9
28-Feb	0	1	4	1	Z	0	0	0	0	0	2	2	2	2	2	1	1	0	1	0	1	1	1	0	1.0	4
	2.6	3.3	4.0	4.8	4.6	4.4	4.7	4.2	3.8	3.5	3.6	3.7	2.9	3.0	3.4	3.9	4.8	5.8	4.8	4.7	4.7	3.5	3.4	3.0	Diurnal Average	
	11	13	15	19	22	31	33	32	24	19	16	13	7	17	15	17	22	24	19	18	21	17	14	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
Wapasu - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	632	98.75	98.75
21 - 40	8	1.25	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - February 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	81	31	14	13	22	42	48	77	58	18	64	40	18	15	18	70	629
21 - 40	0	0	0	0	0	0	0	1	3	3	0	1	0	0	0	0	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	81	31	14	13	22	42	48	78	61	21	64	41	18	15	18	70	637

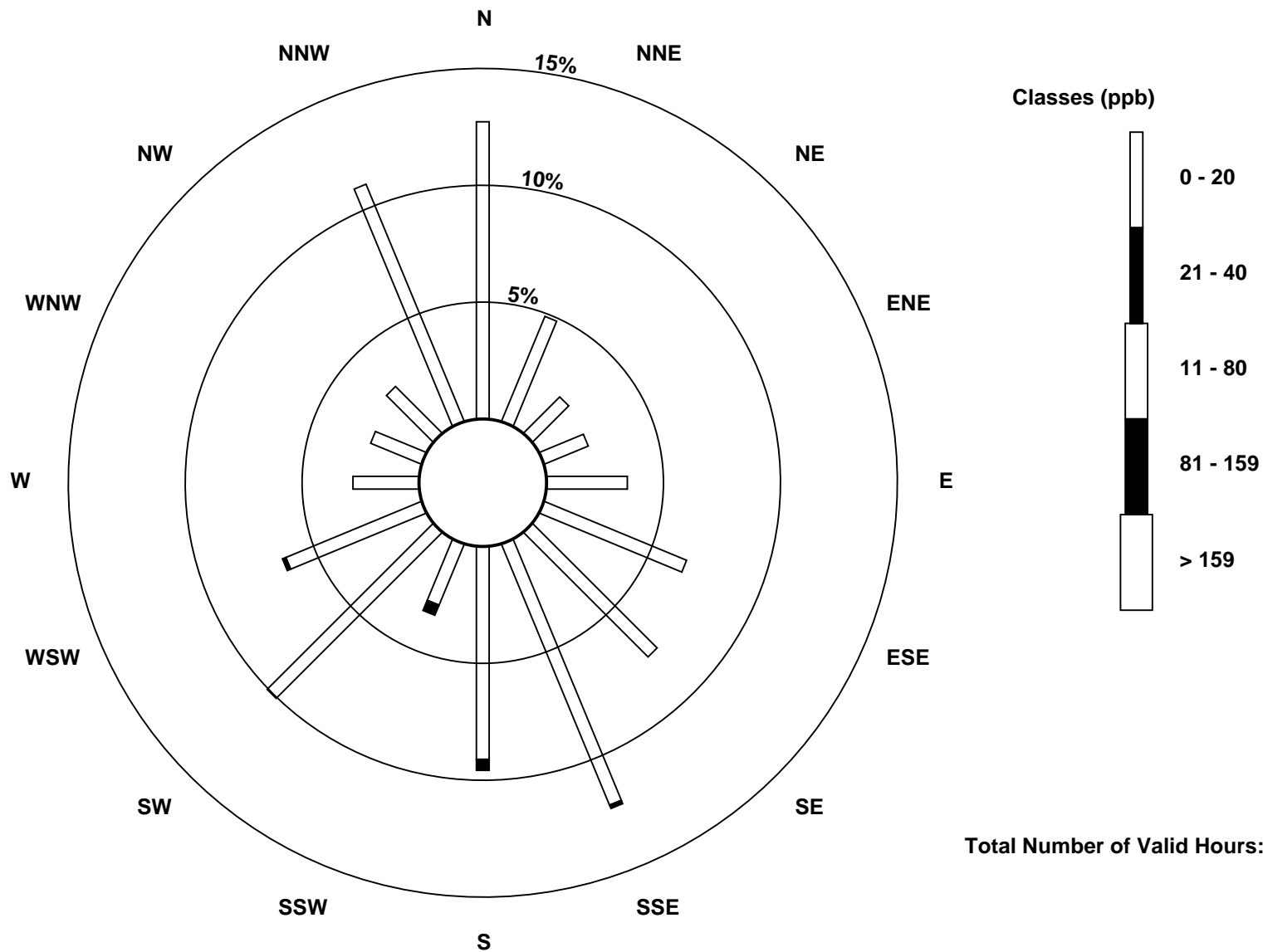
Total Number of Valid Hours: 637

Total Number of Hours: 672

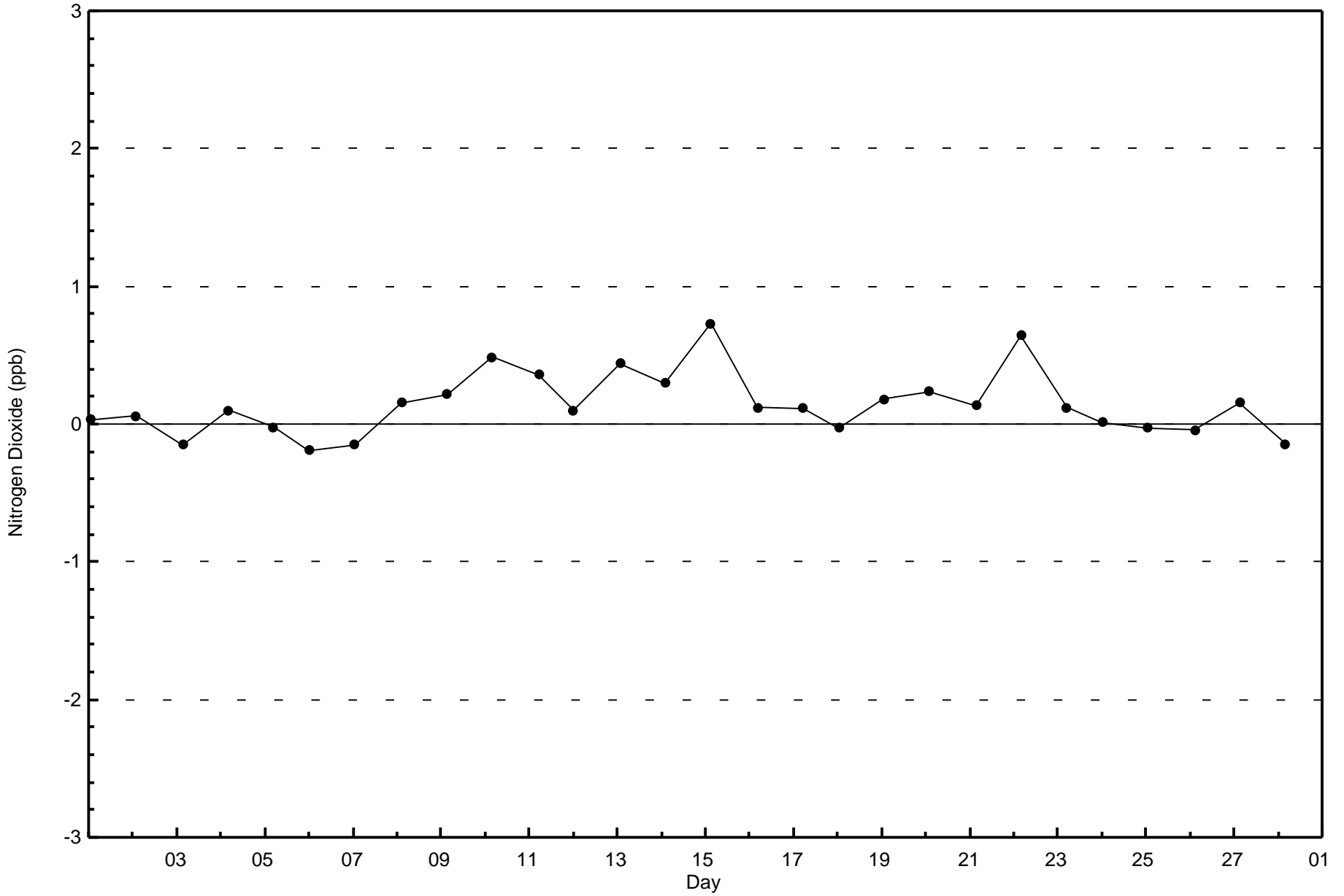


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)



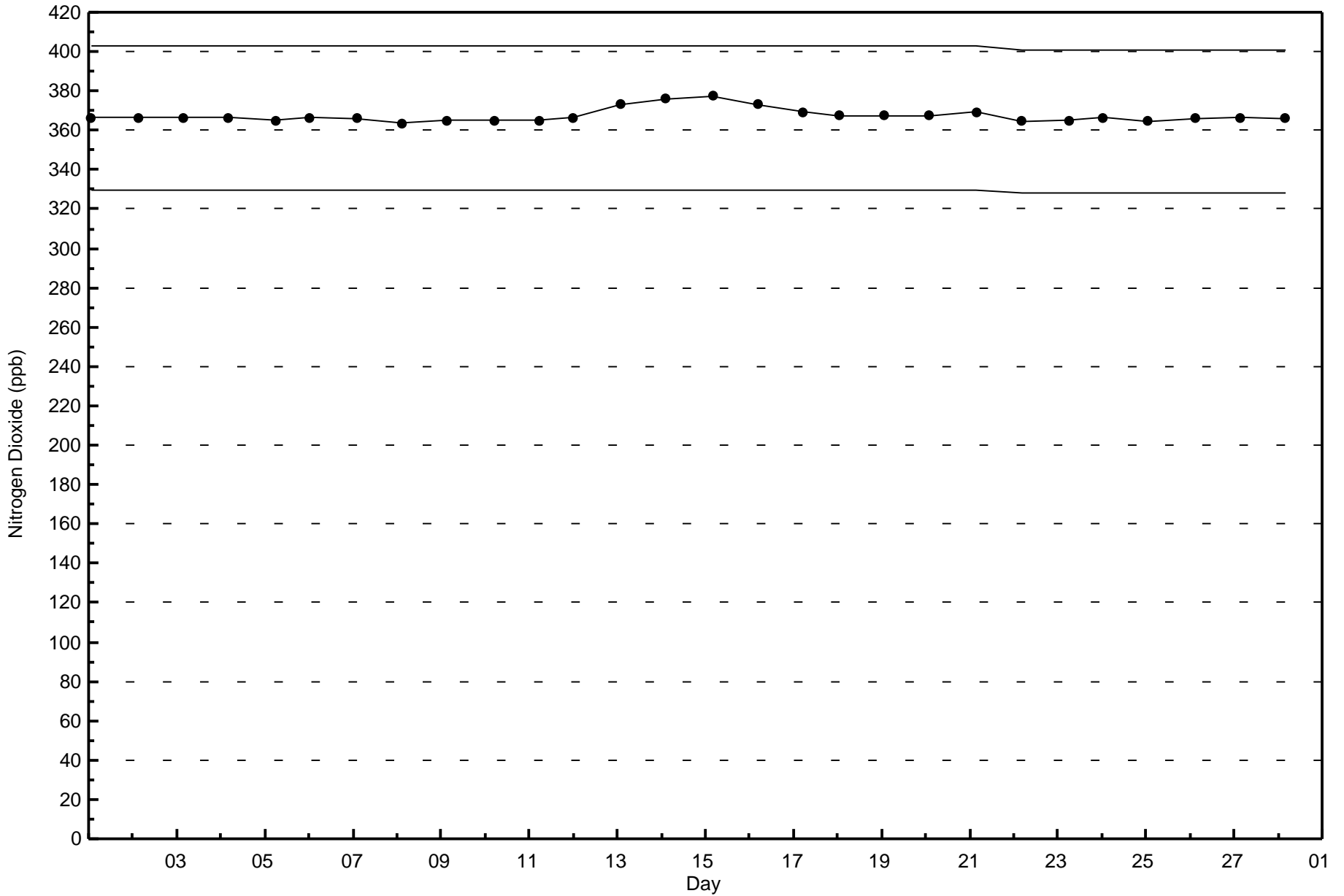
Total Number of Valid Hours: 637





Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Wapasu - February 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

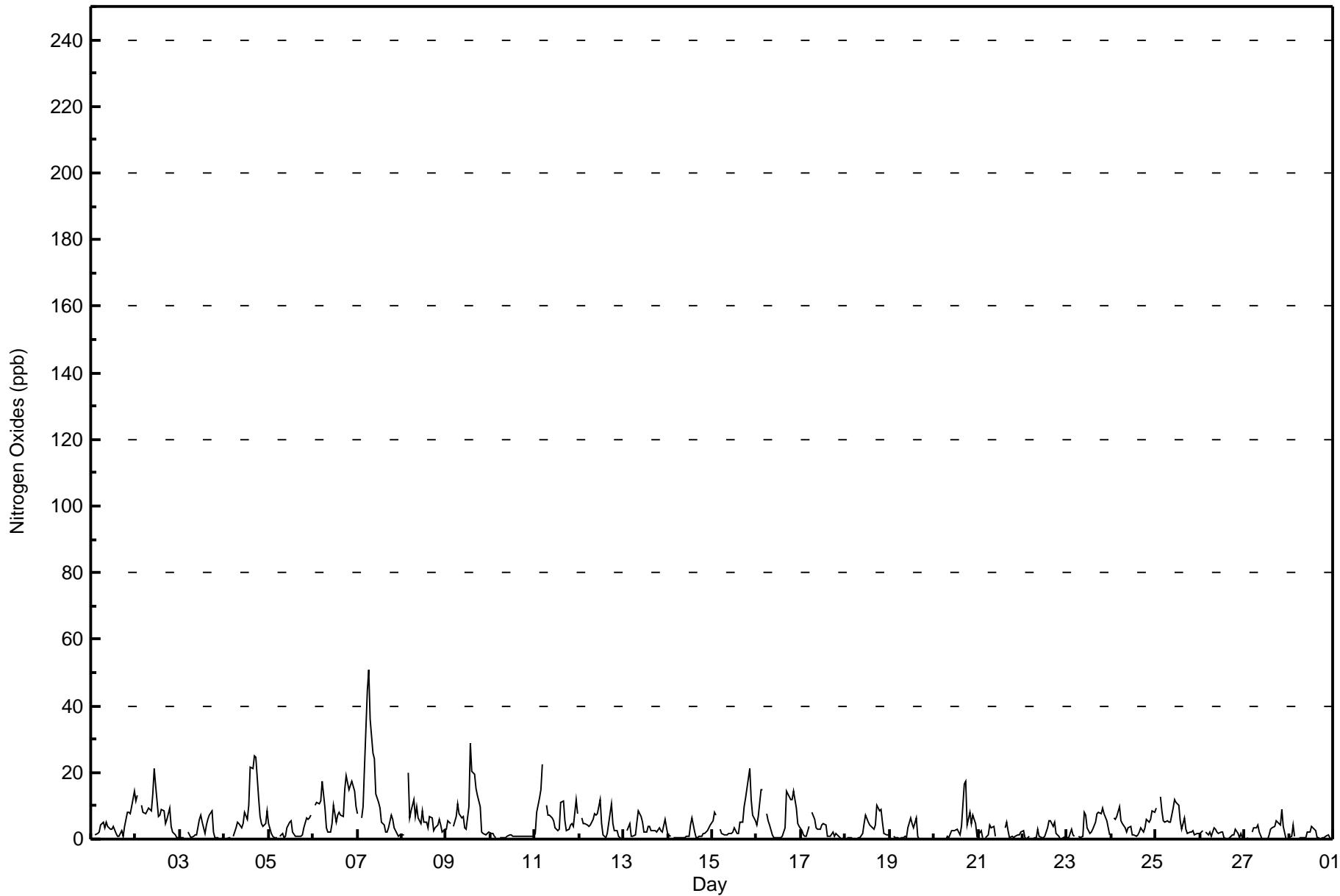
Nitrogen Oxides (NO_x) - ppb
Wapasu - February 2017

Maximum Value: 51 ppb on Feb 7 07:00		Maximum Daily Average: 12.9 ppb on Feb 7		Hours in Service: 672																							
Minimum Value: 0 ppb on Feb 18 06:00		Minimum Daily Average: 0.9 ppb on Feb 10		Hours of Data: 640																							
Maximum Diurnal Average: 6.0 ppb at hour 18		Minimum Diurnal Average: 2.7 ppb at hour 1		Hours of Missing Data: 32																							
Monthly Average: 4.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 10 P ₉₉ = 24		Hours of Calibration: 32																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2	Z	1	2	2	4	5	3	5	4	3	3	4	2	1	1	3	1	4	8	8	7	10	14	4.2	14	
2-Feb	11	13	Z	10	8	8	8	9	8	14	21	16	7	7	9	9	5	6	9	4	2	1	1	0	8.2	21	
3-Feb	0	0	1	Z	2	1	1	1	1	1	6	7	5	2	4	6	7	9	2	0	0	0	0	0	2.5	9	
4-Feb	0	0	0	0	Z	1	4	5	5	3	5	8	6	10	22	21	25	25	12	7	5	4	5	8	7.8	25	
5-Feb	5	2	1	0	0	Z	1	2	1	1	3	5	6	2	1	1	1	1	1	3	6	6	6	7	2.7	7	
6-Feb	Z	10	11	10	12	17	10	3	2	2	5	10	5	7	8	7	7	15	19	15	16	17	14	10	10.1	19	
7-Feb	7	Z	6	10	22	45	51	36	26	24	14	11	9	5	4	2	2	3	7	6	3	2	1	1	12.9	51	
8-Feb	1	1	Z	20	6	8	12	7	10	7	5	8	5	5	3	7	6	3	3	4	6	4	2	3	6.0	20	
9-Feb	3	6	5	Z	4	7	10	7	6	7	4	3	10	29	20	20	15	13	10	2	2	1	2	2	8.1	29	
10-Feb	1	2	1	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
11-Feb	2	8	12	15	23	Z	10	7	7	6	5	3	3	3	11	11	6	3	3	4	5	4	12	7	7.4	23	
12-Feb	Z	6	5	5	4	4	4	6	8	7	8	12	5	1	1	2	5	11	5	2	3	1	0	0	4.5	12	
13-Feb	0	Z	3	5	1	1	1	5	9	7	5	2	2	4	4	3	2	3	2	3	3	2	6	3	3.3	9	
14-Feb	1	1	Z	1	1	1	0	1	1	1	1	1	4	6	2	1	1	1	1	2	2	3	3	4	1.6	6	
15-Feb	5	8	7	Z	3	2	1	1	1	1	2	2	3	2	2	5	5	10	12	18	21	12	7	6	5.9	21	
16-Feb	4	7	15	15	Z	8	6	4	1	1	0	0	0	0	1	3	14	14	12	12	14	9	5	4	6.5	15	
17-Feb	3	1	1	1	4	Z	8	6	3	3	3	4	5	4	1	1	1	2	1	2	1	0	0	0	2.4	8	
18-Feb	Z	0	0	0	0	0	0	0	0	2	5	7	5	4	4	3	4	10	8	9	5	2	1	1	3.1	10	
19-Feb	1	Z	1	1	0	0	0	1	1	0	3	6	5	3	6	1	0	0	0	0	0	0	0	0	1.3	6	
20-Feb	0	0	Z	0	0	0	0	1	0	3	2	3	3	2	1	4	16	18	4	8	5	7	5	1	3.6	18	
21-Feb	1	3	0	Z	1	1	4	3	4	1	C	C	C	C	3	5	3	0	1	0	1	1	1	2	2.0	5	
22-Feb	3	0	0	1	Z	0	0	0	3	1	0	1	1	4	6	5	4	5	2	1	0	0	1	1	1.6	6	
23-Feb	0	1	3	1	1	Z	1	1	1	8	7	3	2	2	3	5	8	8	8	9	8	5	3	1	3.9	9	
24-Feb	Z	6	6	7	10	6	5	3	2	3	4	1	1	1	1	2	3	2	3	6	5	6	8	8	4.4	10	
25-Feb	10	Z	13	9	6	5	5	5	5	9	12	11	10	5	3	6	3	2	2	2	3	1	2	2	5.7	13	
26-Feb	2	3	Z	2	1	2	1	3	3	2	2	2	2	0	0	0	1	1	1	3	2	0	2	0	1.5	3	
27-Feb	0	0	0	Z	2	3	4	4	2	0	0	0	0	1	3	3	4	6	5	4	9	4	0	0	2.3	9	
28-Feb	0	1	4	1	Z	0	0	0	0	0	2	2	4	3	3	0	0	0	1	0	1	1	1	0	1.2	4	
2.7		3.5	4.2	5.0	4.9	5.1	5.5	4.5	4.2	4.3	4.7	5.0	4.1	4.4	4.6	4.8	5.4	6.0	5.0	4.9	4.8	3.7	3.5	3.1	Diurnal Average		
11		13	15	20	23	45	51	36	26	24	21	16	10	29	22	21	25	25	19	18	21	17	14	14	Diurnal Maximum		
Z - zerospan		C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	626	97.81	97.81
21 - 40	12	1.88	99.69
41 - 80	2	0.31	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - February 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	81	31	14	13	22	42	48	77	56	17	62	40	18	15	18	69	623
21 - 40	0	0	0	0	0	0	0	1	3	4	2	1	0	0	0	1	12
41 - 80	0	0	0	0	0	0	0	0	2	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	81	31	14	13	22	42	48	78	61	21	64	41	18	15	18	70	637

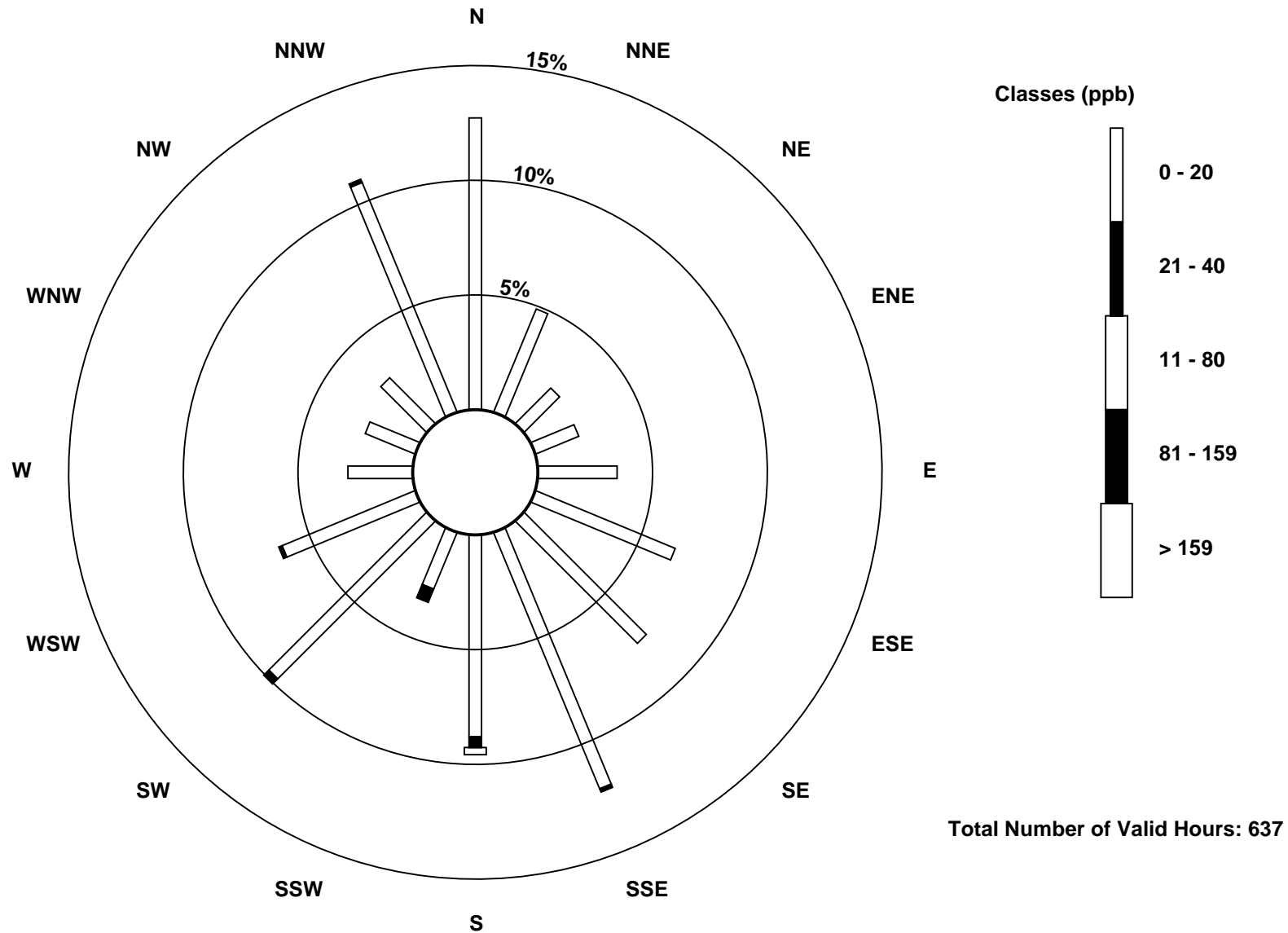
Total Number of Valid Hours: 637

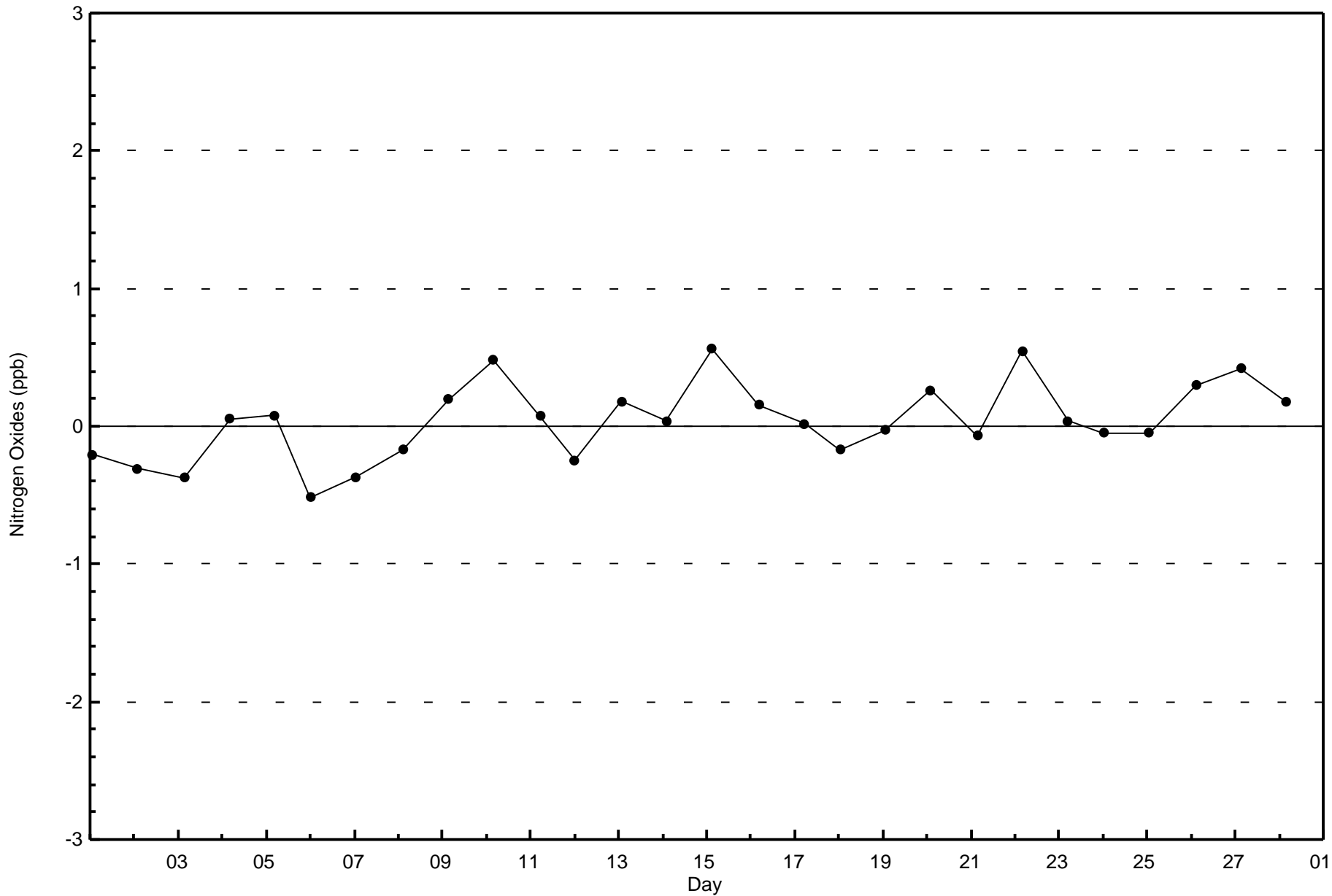
Total Number of Hours: 672

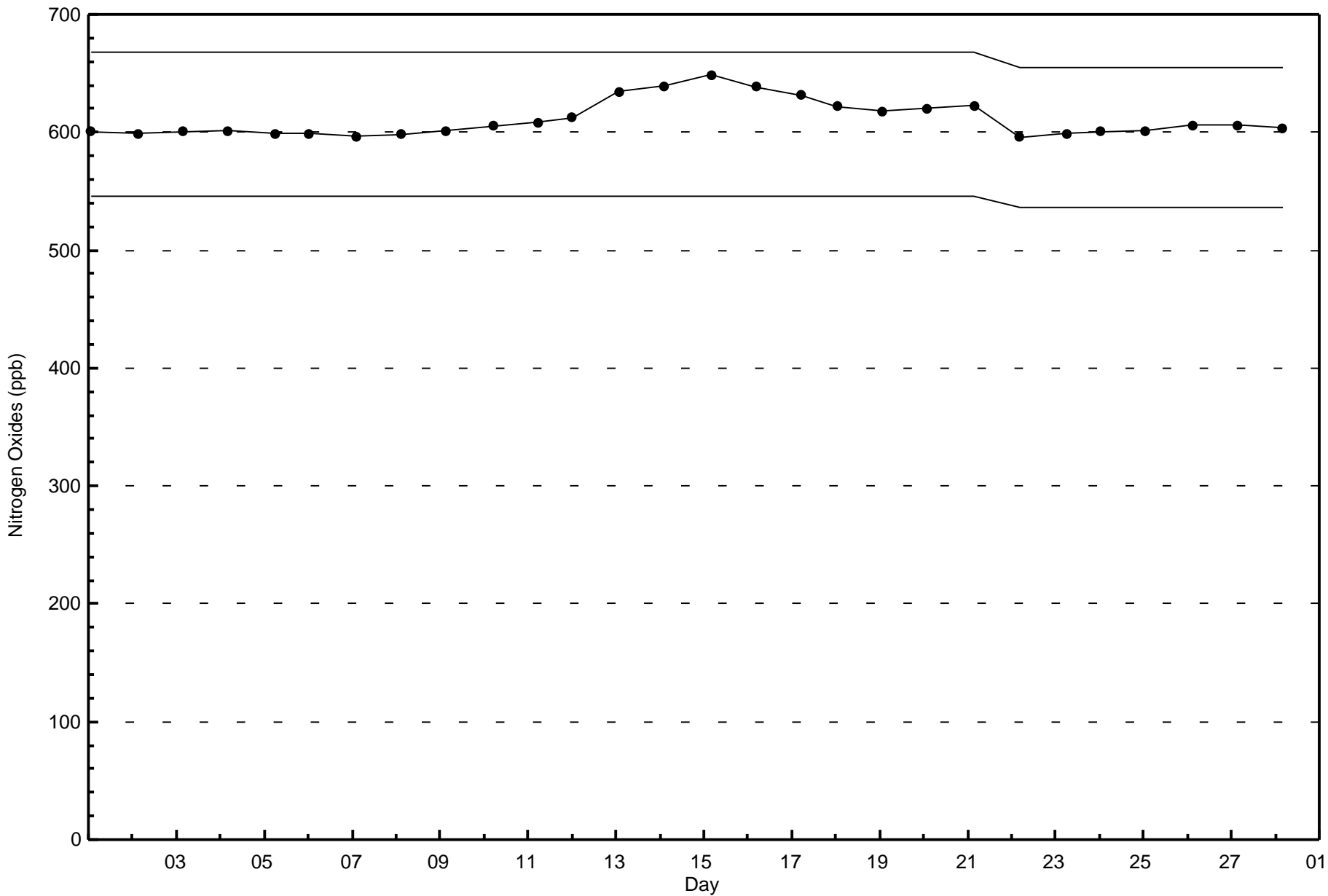


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)









Summary of Hour Averages

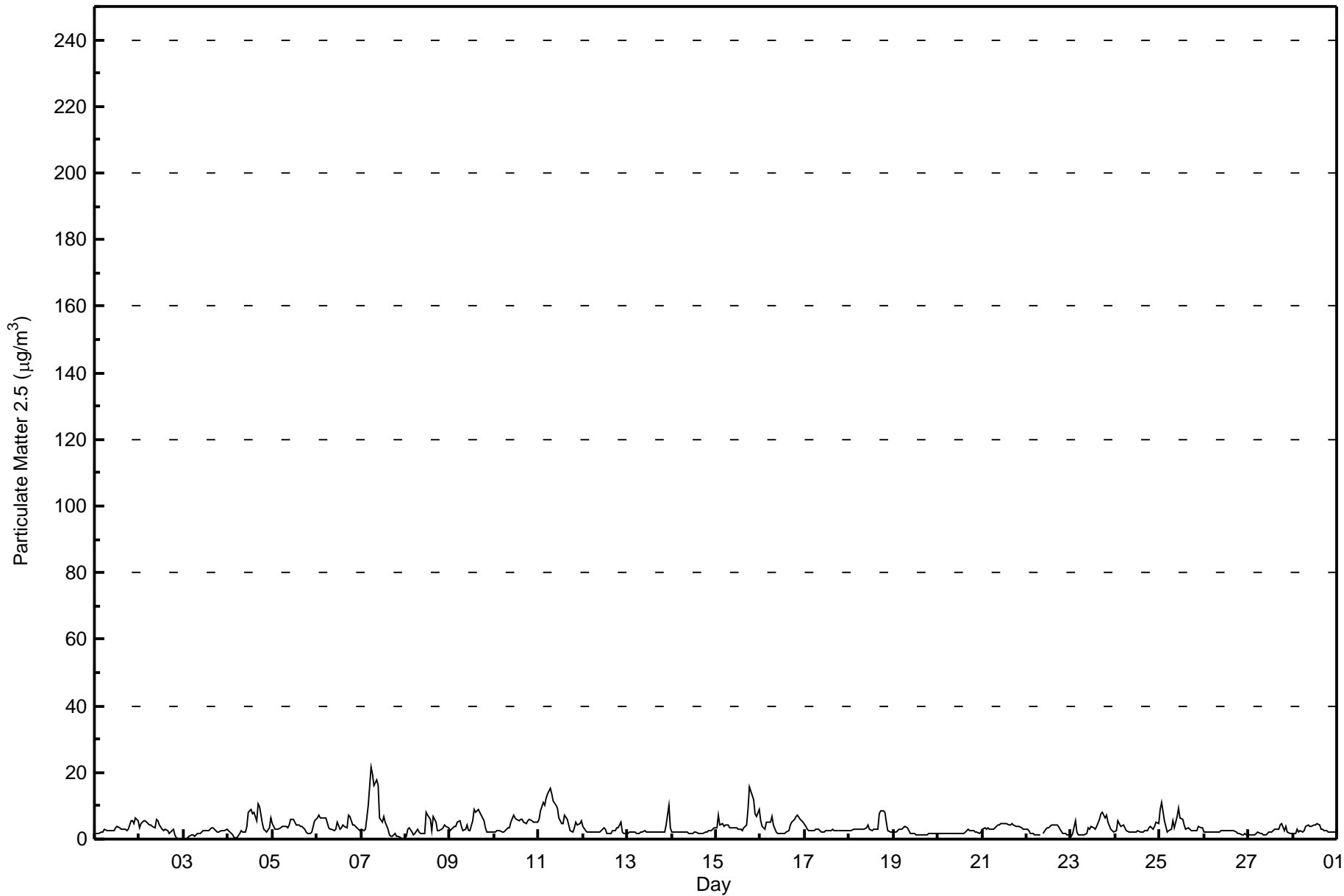
Wapasu - February 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 21.6 µg/m ³ on Feb 7 06:00 Minimum Value: 0.1 µg/m ³ on Feb 8 00:00 Maximum Diurnal Average: 4.0 µg/m ³ at hour 19 Monthly Average: 3.53 µg/m ³		Maximum Daily Average: 7.5 µg/m ³ on Feb 11 Minimum Daily Average: 1.9 µg/m ³ on Feb 20 Minimum Diurnal Average: 3.0 µg/m ³ at hour 22 Percentiles: P ₁ = 0.3 P ₁₀ = 1.6 Q ₁ = 2.1 Median = 2.8 Q ₃ = 4.2 P ₉₀ = 6.2 P ₉₉ = 14.9		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 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-Feb	1.5	1.5	1.7	1.9	2.1	2.9	2.5	2.5	2.5	2.5	2.5	3.4	4.0	3.3	2.9	2.8	3.0	2.4	3.0	5.5	5.4	4.5	6.5	5.5	3.2	6.5
2-Feb	3.6	4.7	5.4	5.5	4.9	4.3	4.1	3.9	3.2	5.8	5.4	4.2	3.0	2.6	2.8	2.5	1.7	2.2	2.9	1.2	0.4	0.1	AF	0.1	3.2	5.8
3-Feb	0.2	0.2	0.4	1.1	1.2	1.4	0.7	1.6	1.9	1.5	2.5	2.5	2.7	2.9	3.3	3.5	2.6	2.1	2.0	2.5	2.6	2.5	2.9	2.0	3.5	
4-Feb	2.6	1.9	1.3	0.6	0.2	0.3	1.5	2.6	2.0	2.0	3.9	8.1	8.8	7.5	8.2	5.4	10.4	9.5	4.7	2.9	2.4	2.1	3.5	6.2	4.1	10.4
5-Feb	4.7	3.0	3.1	3.1	3.5	3.9	4.0	3.9	3.2	4.1	5.9	5.9	5.3	4.3	4.2	4.0	3.8	3.0	2.3	1.8	1.8	2.2	3.9	5.4	3.8	5.9
6-Feb	6.4	7.4	6.5	6.2	6.2	6.2	3.4	3.1	2.9	2.6	3.1	5.0	2.9	3.6	4.3	4.0	3.6	7.0	6.6	4.4	4.1	3.6	3.0	2.6	4.5	7.4
7-Feb	2.8	2.6	2.8	6.5	10.1	21.6	19.5	16.3	17.6	16.0	6.2	5.1	6.7	5.0	2.8	1.2	1.0	1.0	1.5	1.0	0.7	0.3	0.1	0.1	6.2	21.6
8-Feb	0.8	3.0	3.3	2.1	1.2	1.7	2.8	2.2	1.8	1.5	1.6	7.9	7.3	5.7	2.6	6.6	5.0	2.3	2.6	3.0	3.3	4.4	3.8	3.4	3.3	7.9
9-Feb	2.4	2.9	3.9	4.0	5.2	5.5	3.9	2.5	3.0	4.2	2.6	2.4	5.3	8.9	8.2	8.9	8.1	7.3	5.7	3.3	2.2	1.9	2.1	2.1	4.4	8.9
10-Feb	2.1	2.4	2.4	2.4	2.0	2.1	2.7	3.3	3.5	4.9	7.2	6.5	6.0	5.6	5.8	5.9	5.2	4.8	5.7	5.7	5.3	5.1	5.1	5.0	4.4	7.2
11-Feb	5.7	8.4	11.1	10.3	12.4	13.6	15.0	13.6	11.2	10.3	9.2	6.3	4.7	4.7	7.3	5.8	4.0	2.3	2.3	3.3	5.1	4.3	4.5	5.6	7.5	15.0
12-Feb	3.8	2.4	2.2	2.0	2.0	2.3	2.1	2.1	2.1	2.1	2.4	3.3	2.9	1.8	1.7	1.8	2.6	2.6	3.3	3.5	5.0	2.1	1.9	1.8	2.5	5.0
13-Feb	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.0	2.2	2.4	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	4.1	10.0	3.2	2.6	10.0
14-Feb	2.0	2.1	2.2	2.1	2.2	2.2	2.1	2.0	1.9	1.9	1.8	1.8	2.0	2.0	1.8	1.7	1.8	1.8	1.9	2.2	2.5	2.6	2.8	3.3	2.1	3.3
15-Feb	3.5	7.1	4.1	4.7	4.0	4.3	4.2	3.5	3.4	3.3	3.3	3.3	3.0	2.9	2.7	3.3	4.2	9.0	15.8	13.2	11.8	7.6	6.9	9.0	5.7	15.8
16-Feb	5.6	3.9	3.1	5.0	5.1	5.2	6.7	4.0	2.0	1.8	1.7	1.7	1.7	1.8	2.0	2.4	4.3	5.0	5.8	7.0	7.1	6.0	5.3	4.9	4.1	7.1
17-Feb	4.0	2.9	2.6	2.5	2.7	2.6	3.1	2.8	2.5	2.1	2.1	2.4	2.5	2.6	2.7	2.8	2.6	2.5	2.6	2.6	2.6	2.5	2.5	2.5	2.6	4.0
18-Feb	2.5	2.7	2.8	2.9	3.0	2.8	3.0	3.1	2.9	3.5	4.1	3.2	2.5	2.9	2.9	2.9	7.6	8.6	8.5	7.9	4.9	2.7	2.2	2.2	3.8	8.6
19-Feb	2.2	2.2	2.6	3.1	3.1	3.4	3.7	3.2	2.4	1.6	1.6	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.7	1.7	1.7	1.6	2.0	3.7
20-Feb	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.9	1.8	1.7	1.8	1.8	1.9	2.1	3.1	2.7	2.4	2.6	2.1	2.0	1.9	2.1	1.9	3.1
21-Feb	2.9	3.3	3.1	3.2	2.9	2.9	2.9	3.6	4.0	4.1	4.5	4.7	4.9	4.8	4.2	4.3	4.8	4.1	4.0	3.8	3.6	3.4	3.1	2.9	3.7	4.9
22-Feb	2.9	2.6	1.9	1.5	1.3	1.2	1.4	1.2	C	1.8	2.8	3.3	3.5	4.2	4.2	4.4	4.1	4.0	3.0	1.7	1.6	1.6	1.4	1.1	2.5	4.4
23-Feb	0.9	1.7	5.5	2.0	1.4	1.3	1.3	1.4	1.5	3.5	3.1	3.7	3.4	3.2	3.7	5.8	7.6	7.9	6.5	7.1	5.1	3.0	2.4	2.1	3.6	7.9
24-Feb	2.7	5.3	4.5	3.6	4.1	3.2	2.6	2.2	2.0	2.1	2.2	2.2	2.4	2.2	2.1	2.3	2.5	2.7	3.3	3.9	3.1	3.6	5.1	4.6	3.1	5.3
25-Feb	8.7	11.1	5.5	3.8	2.3	2.6	2.8	5.4	3.4	7.0	9.5	6.2	5.7	4.3	3.1	3.4	2.8	2.6	2.7	2.6	2.6	3.7	3.6	3.3	4.5	11.1
26-Feb	2.2	1.9	2.0	2.1	2.2	2.1	1.9	2.3	2.3	2.5	2.5	2.4	2.4	2.8	2.6	2.6	2.5	2.1	1.7	1.7	1.4	1.4	1.6	1.3	2.1	2.8
27-Feb	1.3	1.3	1.4	1.3	1.9	2.3	1.6	1.7	1.4	1.2	1.8	2.0	2.3	2.5	2.9	2.8	2.8	4.2	4.5	2.4	3.7	2.1	1.5	1.6	2.2	4.5
28-Feb	1.6	1.8	2.9	2.3	2.4	2.3	2.7	3.7	4.1	4.0	3.7	4.3	4.4	4.5	4.1	3.0	3.1	2.4	2.4	2.2	2.1	1.9	2.0	2.3	2.9	4.5
																								Diurnal Average		
																								Diurnal Maximum		
3.0 3.4 3.3 3.2 3.3 3.8 3.8 3.6 3.4 3.7 3.6 3.8 3.8 3.6 3.5 3.5 3.9 3.9 4.0 3.7 3.4 3.0 3.4 3.2 8.7 11.1 11.1 10.3 12.4 21.6 19.5 16.3 17.6 16.0 9.5 8.1 8.8 8.9 8.2 8.9 10.4 9.5 15.8 13.2 11.8 7.6 10.0 9.0																										
C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³		AF - Analyzer Failure																								



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - February 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	557	83.13	83.13
6 - 15	91	13.58	96.72
16 - 25	6	0.90	97.61
26 - 80	0	0.00	97.61
> 81.0	0	0.00	97.61

Total Number of Valid Hours: 670

Total Number of Hours: 672



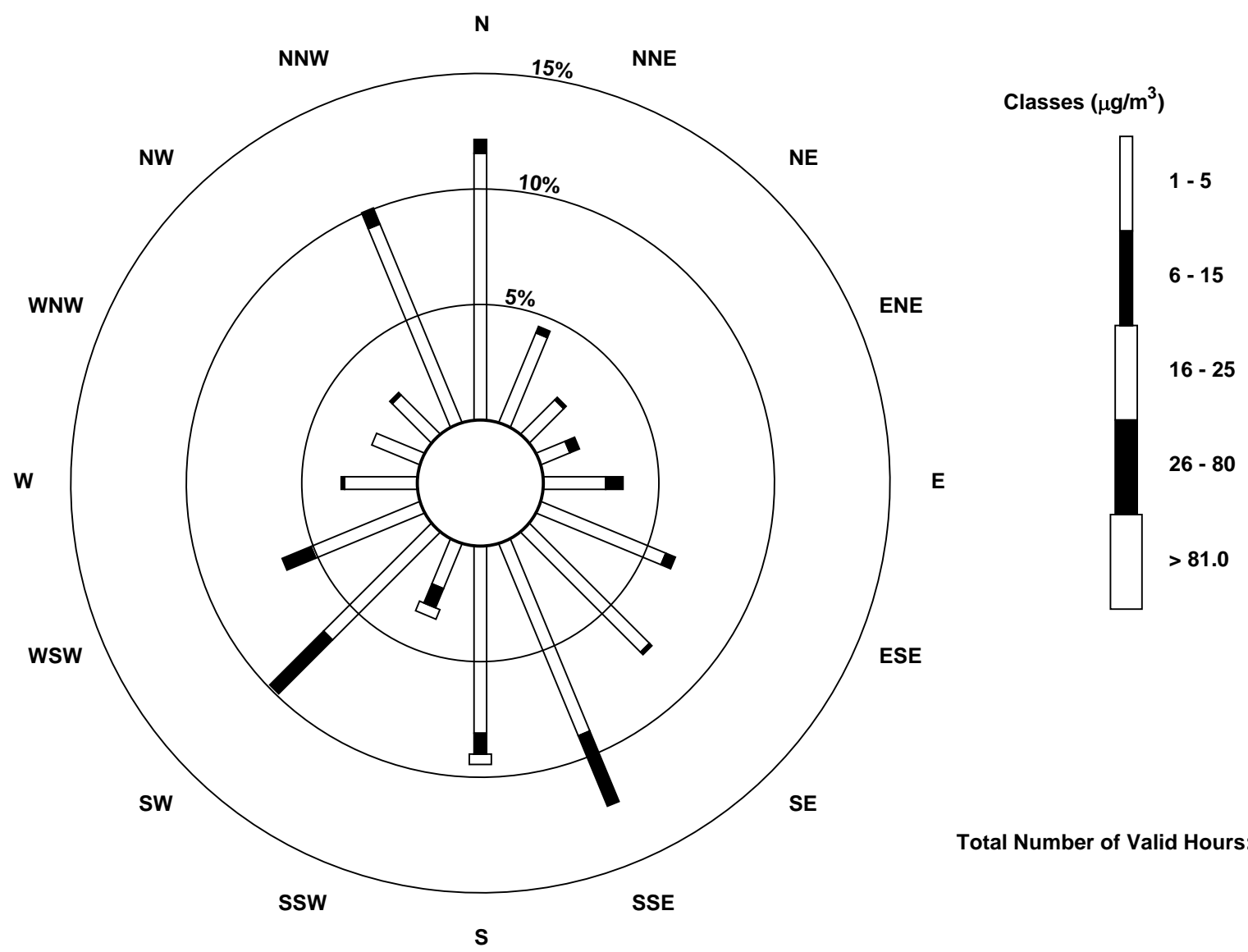
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - February 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	77	28	14	9	18	39	49	60	54	14	44	34	21	15	16	62	554
6 - 15	4	2	1	3	5	3	1	22	6	6	22	9	1	0	1	5	91
16 - 25	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	6
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	81	30	15	12	23	42	50	82	63	23	66	43	22	15	17	67	651

Total Number of Valid Hours: 667

Total Number of Hours: 672



Total Number of Valid Hours: 667



Wood Buffalo Environmental Association
Summary of Hour Averages

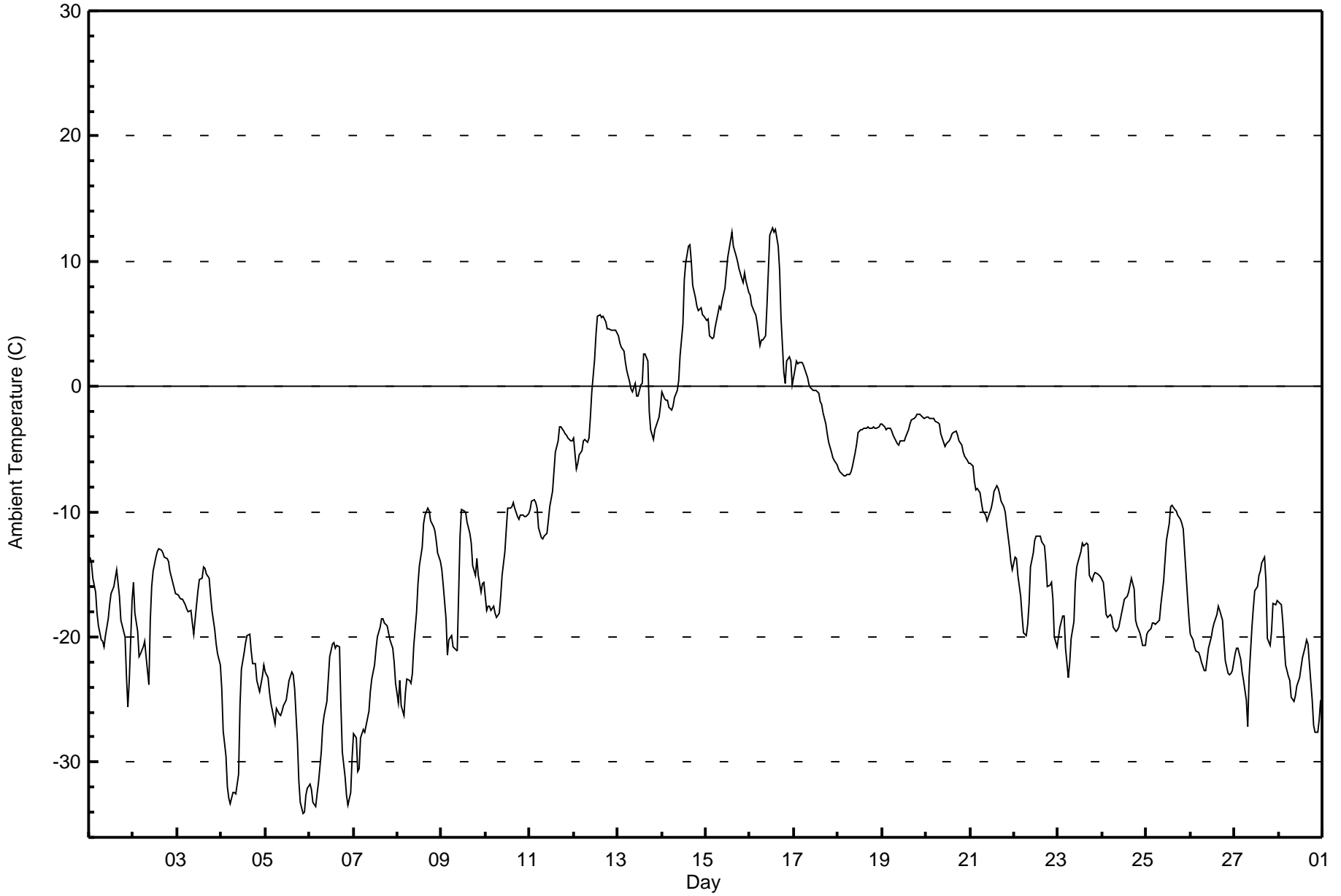
Ambient Temperature (AT) - C
Wapasu - February 2017

Maximum Value: 12.6 C on Feb 16 13:00 Maximum Daily Average: 7.8 C on Feb 15																								Hours in Service: 672		
Minimum Value: -34.1 C on Feb 5 21:00 Minimum Daily Average: -27.7 C on Feb 6																								Hours of Data: 672		
Maximum Diurnal Average: -8.6 C at hour 16 Minimum Diurnal Average: -14.9 C at hour 8																								Hours of Missing Data: 0		
Monthly Average: -12.23 C Percentiles: P₁ = -33.1 P₁₀ = -24.5 Q₁ = -20.2 Median = -14.1 Q₃ = -3.5 P₉₀ = 3.7 P₉₉ = 11.2																								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-Feb	-13.6	-14.1	-15.3	-16.4	-18.1	-19.1	-20.2	-20.3	-20.8	-19.9	-18.5	-17.4	-16.5	-16.0	-15.3	-14.6	-16.8	-18.6	-19.1	-20.0	-23.1	-25.6	-23.5	-17.1	-18.3	-13.6
2-Feb	-15.7	-18.1	-19.6	-21.5	-21.3	-20.8	-20.4	-21.5	-23.8	-18.6	-16.0	-14.7	-13.6	-13.2	-12.9	-13.0	-13.3	-13.6	-13.7	-13.9	-14.8	-15.6	-16.1	-16.5	-16.8	-12.9
3-Feb	-16.7	-16.8	-17.0	-17.0	-17.5	-17.8	-18.0	-17.8	-18.9	-19.8	-17.4	-16.3	-15.4	-15.3	-14.4	-14.5	-15.0	-15.4	-16.6	-17.9	-19.4	-20.6	-21.3	-22.3	-17.5	-14.4
4-Feb	-24.1	-27.5	-29.5	-32.0	-32.9	-33.3	-32.4	-32.4	-32.5	-30.9	-25.5	-22.6	-21.3	-20.5	-19.8	-19.8	-21.2	-22.2	-22.2	-23.5	-23.9	-24.3	-23.2	-22.3	-25.8	-19.8
5-Feb	-22.8	-23.2	-24.3	-25.3	-26.4	-26.9	-25.8	-26.2	-26.3	-25.9	-25.5	-25.0	-24.2	-23.4	-22.8	-23.0	-24.1	-28.4	-31.5	-33.2	-34.1	-34.0	-32.6	-32.1	-27.0	-22.8
6-Feb	-31.8	-32.2	-33.2	-33.6	-32.5	-31.7	-29.1	-27.2	-26.2	-25.2	-23.4	-21.5	-20.6	-20.5	-20.9	-20.7	-20.8	-25.5	-29.2	-31.2	-32.6	-33.4	-32.4	-29.7	-27.7	-20.5
7-Feb	-27.7	-28.0	-30.7	-30.6	-28.1	-27.4	-27.7	-27.1	-25.9	-24.4	-23.3	-22.2	-21.0	-20.0	-19.3	-18.6	-18.6	-18.9	-19.2	-19.7	-20.2	-20.9	-22.0	-23.7	-23.5	-18.6
8-Feb	-25.3	-23.5	-25.4	-26.3	-24.5	-23.3	-23.5	-23.7	-22.9	-20.7	-18.0	-15.8	-14.3	-12.9	-11.0	-10.2	-9.7	-9.9	-10.7	-11.2	-11.5	-12.3	-13.3	-14.0	-17.3	-9.7
9-Feb	-14.6	-15.9	-18.6	-21.5	-20.2	-19.9	-20.8	-20.9	-21.2	-16.6	-12.0	-9.9	-9.9	-10.1	-10.8	-11.7	-12.5	-14.3	-15.0	-13.8	-15.1	-16.4	-15.8	-15.6	-15.5	-9.9
10-Feb	-17.9	-17.5	-17.5	-17.9	-17.6	-18.1	-18.4	-18.1	-16.8	-15.1	-13.1	-11.4	-9.7	-9.7	-9.6	-9.2	-9.7	-10.4	-10.7	-10.3	-10.3	-10.4	-10.4	-10.2	-13.3	-9.2
11-Feb	-9.8	-9.2	-9.0	-9.3	-9.8	-11.2	-12.1	-12.2	-11.9	-11.7	-10.8	-9.6	-8.3	-6.8	-5.2	-4.3	-3.2	-3.3	-3.5	-3.8	-3.9	-4.1	-4.3	-4.3	-7.6	-3.2
12-Feb	-4.1	-6.6	-6.2	-5.5	-5.1	-4.3	-4.2	-4.4	-4.1	-2.4	-0.5	2.1	4.2	5.6	5.7	5.5	5.6	5.2	4.6	4.6	4.5	4.5	4.5	4.4	0.6	5.7
13-Feb	4.0	3.5	3.2	2.8	1.9	1.2	0.4	-0.2	-0.4	0.2	-0.7	-0.8	0.2	0.2	2.6	2.6	2.0	-2.0	-3.4	-4.2	-3.5	-3.1	-2.5	-1.5	0.1	4.0
14-Feb	-0.4	-1.0	-1.1	-1.1	-1.6	-1.9	-1.6	-0.9	-0.3	0.4	2.5	5.0	8.5	9.8	11.2	11.3	10.0	8.1	7.1	6.3	6.1	6.3	5.8	5.6	3.9	11.3
15-Feb	5.2	5.4	4.1	3.8	3.9	4.8	5.8	6.4	6.2	6.9	7.8	9.1	10.3	11.7	12.3	11.2	10.4	10.0	9.4	8.6	8.3	9.1	8.4	7.5	7.8	12.3
16-Feb	7.2	6.5	5.9	5.7	5.1	3.2	3.8	3.7	4.1	6.5	9.3	12.1	12.6	12.3	12.5	11.2	9.3	5.4	1.1	0.2	2.0	2.4	2.0	0.1	6.0	12.6
17-Feb	1.4	2.0	1.8	1.9	2.0	1.7	1.4	0.7	0.2	-0.1	-0.3	-0.4	-0.4	-0.6	-1.2	-1.4	-2.1	-3.0	-3.7	-4.4	-5.2	-5.6	-5.9	-6.3	-1.2	2.0
18-Feb	-6.6	-6.9	-7.0	-7.1	-7.1	-7.0	-7.0	-6.9	-6.3	-5.2	-4.6	-3.7	-3.5	-3.4	-3.3	-3.3	-3.2	-3.3	-3.3	-3.2	-3.3	-3.3	-3.2	-3.1	-4.8	-3.1
19-Feb	-3.0	-3.2	-3.4	-3.3	-3.3	-3.5	-3.9	-4.3	-4.6	-4.6	-4.3	-4.4	-4.4	-4.0	-3.4	-3.0	-2.7	-2.6	-2.5	-2.2	-2.2	-2.3	-2.5	-2.5	-3.3	-2.2
20-Feb	-2.4	-2.4	-2.5	-2.6	-2.6	-2.7	-2.8	-3.1	-3.7	-4.5	-4.8	-4.6	-4.4	-4.1	-3.8	-3.6	-3.5	-3.9	-4.4	-4.7	-5.2	-5.6	-5.9	-6.1	-3.9	-2.4
21-Feb	-6.2	-6.4	-7.5	-8.2	-8.1	-8.5	-9.3	-9.9	-10.2	-10.8	-10.3	-9.7	-9.1	-8.4	-7.9	-8.2	-8.5	-9.2	-9.6	-10.1	-11.1	-12.8	-14.0	-14.6	-9.5	-6.2
22-Feb	-13.6	-13.8	-15.0	-16.8	-18.4	-19.7	-19.9	-19.0	-17.3	-14.5	-13.3	-12.3	-12.0	-11.9	-11.9	-12.4	-12.8	-14.0	-16.0	-15.8	-15.6	-17.0	-20.0	-20.8	-15.6	-11.9
23-Feb	-20.0	-19.2	-18.3	-18.3	-20.9	-23.2	-22.0	-20.1	-18.8	-15.6	-14.4	-14.0	-13.2	-12.5	-12.7	-12.5	-12.6	-15.1	-15.5	-15.1	-14.9	-14.9	-15.0	-15.2	-16.4	-12.5
24-Feb	-15.6	-16.9	-18.2	-18.4	-18.2	-18.4	-19.2	-19.5	-19.4	-19.2	-18.1	-17.6	-17.0	-16.7	-16.4	-15.9	-15.3	-16.2	-18.7	-19.2	-19.6	-20.1	-20.6	-20.6	-18.1	-15.3
25-Feb	-19.8	-19.6	-19.4	-18.9	-18.8	-19.0	-18.7	-18.7	-17.5	-15.5	-13.8	-12.2	-11.0	-9.6	-9.5	-9.8	-9.9	-10.3	-10.6	-11.0	-11.4	-13.2	-16.8	-18.4	-14.7	-9.5
26-Feb	-19.8	-20.3	-20.8	-21.1	-21.3	-21.5	-22.1	-22.7	-22.7	-21.8	-20.8	-20.1	-19.4	-18.8	-18.2	-17.5	-17.9	-18.7	-20.4	-21.9	-22.9	-23.0	-22.9	-22.7	-20.8	-17.5
27-Feb	-21.3	-20.9	-20.8	-21.8	-22.8	-23.5	-25.0	-27.2	-23.1	-19.2	-17.6	-16.3	-15.9	-15.1	-14.8	-14.1	-13.6	-15.5	-20.1	-20.7	-19.5	-17.4	-17.4	-17.1	-19.2	-13.6
28-Feb	-17.2	-17.5	-18.7	-20.6	-22.2	-23.1	-23.5	-24.8	-25.2	-24.7	-23.9	-23.2	-22.4	-21.6	-20.8	-20.3	-20.5	-22.1	-25.0	-27.1	-27.6	-27.6	-26.7	-25.0	-23.0	-17.2
Diurnal Average																										
Diurnal Maximum																										



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Wapasu - February 2017

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	176	26.19	26.19
-20 - 0	398	59.23	85.42
0 - 10	85	12.65	98.07
10 - 20	13	1.93	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



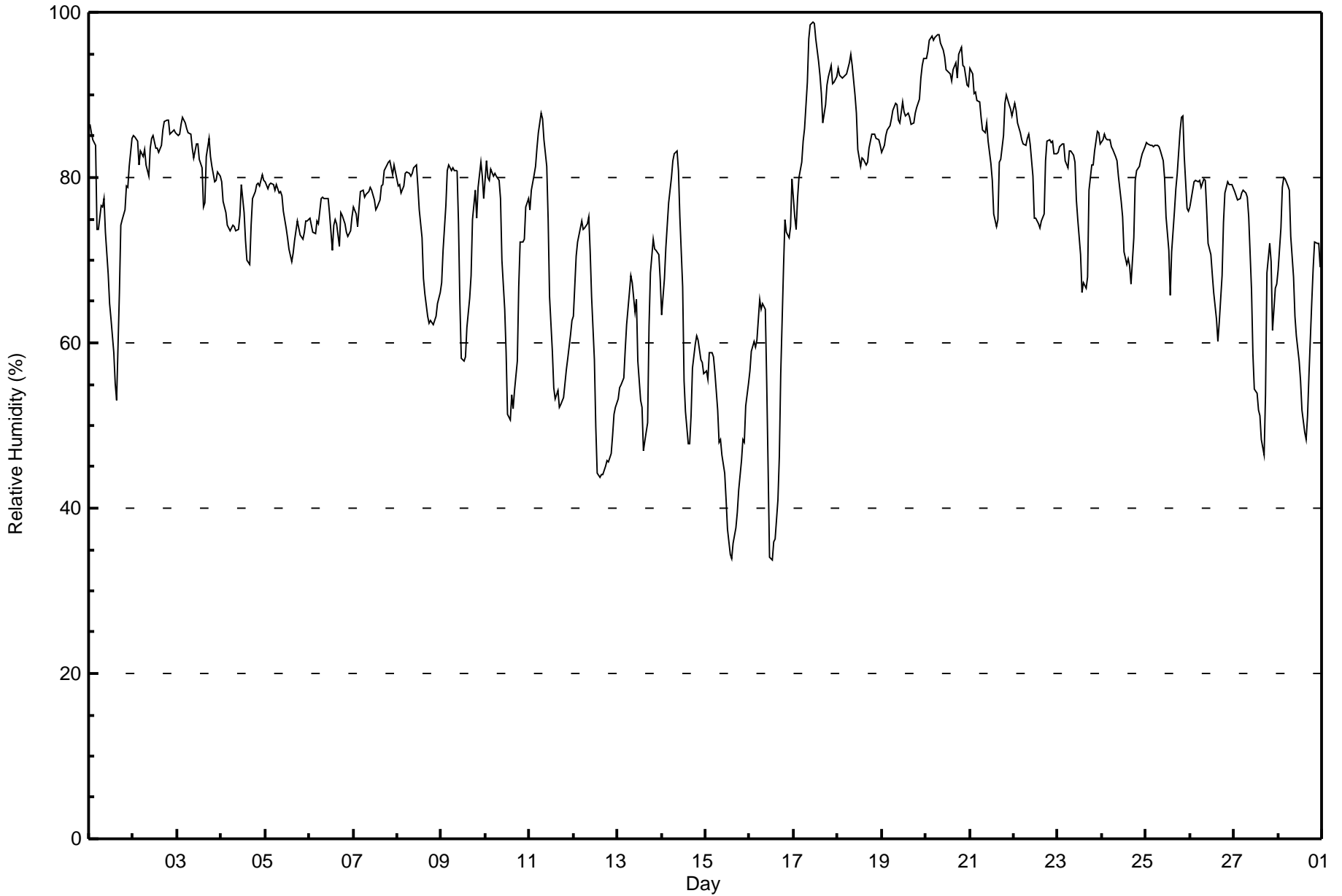
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Wapasu - February 2017

Maximum Value: 99 % on Feb 17 11:00 Maximum Daily Average: 94.4 % on Feb 20																		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 34 % on Feb 16 13:00 Minimum Daily Average: 47.3 % on Feb 15 Maximum Diurnal Average: 80.2 % at hour 7 Minimum Diurnal Average: 65.2 % at hour 15 Monthly Average: 74.7 % Percentiles: P ₁ = 37 P ₁₀ = 54 Q ₁ = 68 Median = 78 Q ₃ = 84 P ₉₀ = 89 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-Feb	86	85	85	84	74	74	77	76	77	73	68	65	63	59	55	53	66	74	75	76	79	79	81	85	73.7	86
2-Feb	85	85	84	81	83	83	83	82	80	84	85	85	84	84	83	84	86	87	87	87	85	86	86	85	84.3	87
3-Feb	85	85	86	87	87	86	85	85	84	82	84	84	82	81	77	77	82	85	83	81	80	80	81	80	82.9	87
4-Feb	79	77	76	74	74	74	74	74	74	74	75	79	76	72	70	69	74	77	78	79	79	79	80	80	75.8	80
5-Feb	79	79	79	79	79	79	79	79	78	78	78	76	74	73	71	70	71	72	75	74	73	73	75	75	75.5	79
6-Feb	75	74	73	73	75	74	77	78	77	78	77	76	71	74	75	74	72	76	75	74	73	73	74	75	74.8	78
7-Feb	76	76	74	76	78	79	78	78	78	79	79	77	76	76	77	79	79	81	82	82	82	80	81	81	78.5	82
8-Feb	79	79	78	79	81	81	80	80	81	81	81	79	76	73	68	66	63	62	63	62	63	63	65	66	72.9	81
9-Feb	67	71	77	81	81	81	81	81	81	75	65	58	58	58	62	65	68	75	79	75	79	82	80	77	73.2	82
10-Feb	82	80	80	81	80	80	80	80	78	70	64	59	51	51	54	52	54	58	67	72	72	73	76	77	69.6	82
11-Feb	76	79	80	81	84	85	88	87	85	81	75	66	59	55	53	54	52	53	53	55	57	58	61	63	68.3	88
12-Feb	63	71	72	73	75	74	74	74	75	71	66	58	50	44	44	44	44	45	46	46	47	49	51	52	58.6	75
13-Feb	53	55	55	56	59	62	66	68	67	64	65	58	53	52	47	48	50	62	68	73	71	71	71	68	60.9	73
14-Feb	63	68	72	74	77	80	82	83	83	81	75	67	55	52	48	48	51	57	60	61	60	58	58	56	65.4	83
15-Feb	57	56	59	59	58	56	52	48	48	46	44	41	37	34	34	36	38	40	42	46	48	48	52	55	47.3	59
16-Feb	57	59	60	60	60	65	64	65	64	55	45	34	34	36	36	41	46	56	69	75	73	73	74	80	57.6	80
17-Feb	75	74	78	80	82	84	86	91	97	98	99	99	97	94	92	90	87	89	91	92	94	91	92	92	89.3	99
18-Feb	93	92	92	92	92	93	94	95	94	90	88	83	81	82	82	81	82	84	85	85	85	85	85	84	87.5	95
19-Feb	83	84	85	86	86	87	88	89	89	87	87	89	88	87	88	87	86	87	88	88	89	92	94	94	87.9	94
20-Feb	94	95	97	97	97	97	97	97	96	96	95	93	93	93	92	93	94	92	95	96	94	93	91	91	94.4	97
21-Feb	93	93	90	90	89	89	87	86	85	87	84	82	80	76	74	75	82	82	85	89	90	89	88	87	85.5	93
22-Feb	89	88	87	85	85	84	84	85	85	84	80	75	75	74	74	75	76	82	84	85	84	84	83	83	82.1	89
23-Feb	83	84	84	84	82	81	83	83	83	82	77	75	71	66	67	67	68	79	81	82	83	86	85	84	79.2	86
24-Feb	85	85	85	85	85	84	83	83	82	80	77	75	71	70	70	69	67	73	80	81	81	82	83	84	79.1	85
25-Feb	84	84	84	84	84	84	84	84	83	82	80	75	71	66	71	76	79	81	86	87	88	82	76	76	80.4	88
26-Feb	76	78	79	80	80	80	79	80	80	76	72	71	68	66	63	60	63	68	75	78	80	79	79	79	74.5	80
27-Feb	78	78	77	78	78	78	78	78	75	66	59	54	54	52	51	48	46	54	69	72	70	62	67	67	66.2	78
28-Feb	69	74	79	80	80	79	78	73	68	63	61	58	55	52	49	48	51	56	65	69	72	72	72	69	66.4	80
	77.4	78.1	78.8	79.3	79.4	79.7	80.2	80.0	79.6	77.2	74.4	71.0	67.9	66.1	65.2	65.4	67.1	71.0	74.4	75.8	76.1	75.8	76.5	76.7	Diurnal Average	
	94	95	97	97	97	97	97	97	97	98	99	99	97	94	92	93	94	92	95	96	94	93	94	94	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - February 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	10	1.49	1.49
40 - 60	98	14.58	16.07
60 - 80	297	44.20	60.27
80 - 100	267	39.73	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

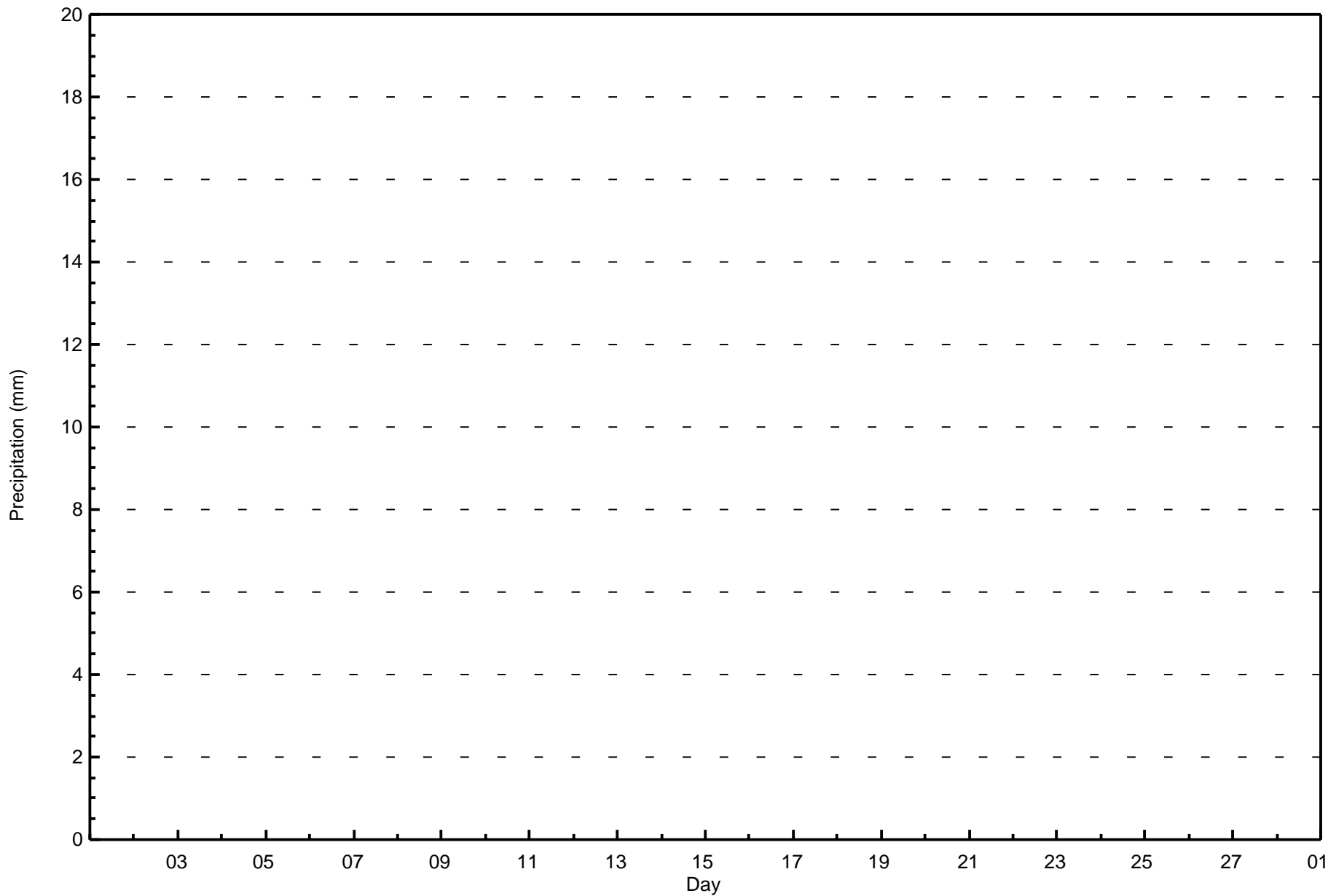
Wapasu - February 2017

Maximum Value: 0.0 mm on Feb 1 01:00 Maximum Daily Total: 0.0 mm on Feb 1		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Minimum Value: 0.0 mm on Feb 1 01:00 Maximum Diurnal Total: 0.0 mm at hour 1 Monthly Total: 0.00 mm		Minimum Daily Total: 0.0 mm on Feb 1 Minimum Diurnal Total: 0.0 mm at hour 1 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																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Wapasu - February 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Wapasu - February 2017

Maximum Speed: 22 km/h on Feb 25 22:00	Maximum Daily Speed Average: 12.6 km/h on Feb 19	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 20 06:00	Minimum Daily Speed Average: 1.5 km/h on Feb 23	Hours of Data: 669
Maximum Diurnal Speed Average: 3.6 km/h at hour 14	Minimum Diurnal Speed Average: 0.5 km/h at hour 3	Hours of Missing Data: 3
Monthly Average Velocity: 1.0 km/h 223.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 17	Percent Operational Time: 99.6

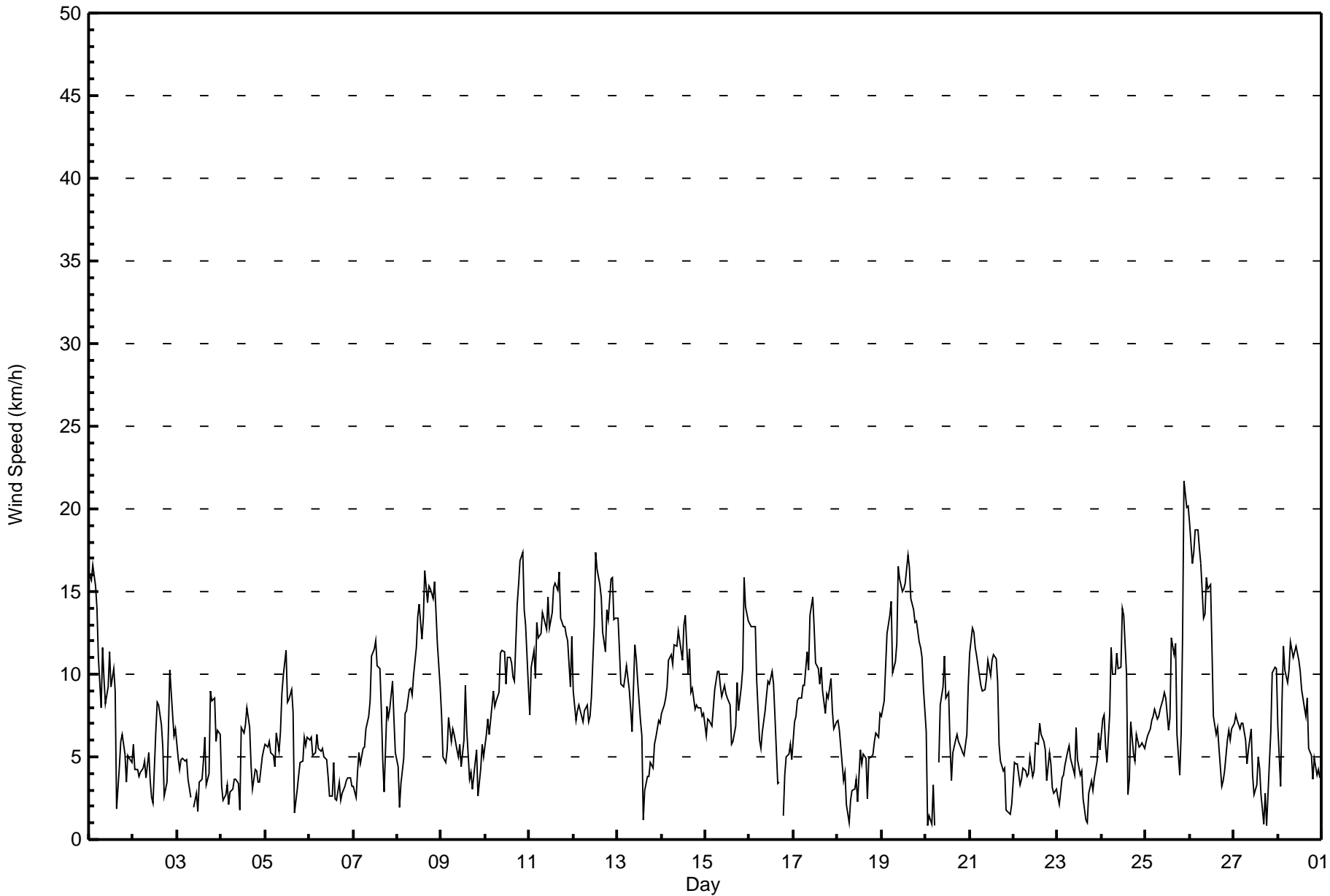
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	N16	N16	N17	N15	NNW14	N11	N8	NNW12	N10	N8	N9	N11	NNW9	NNW10	NNW9	W2	SSE4	SSE6	SSE6	S5	SSE3	SSE5	SSE5	S5	N5.7	N17
2-Feb	SW6	S4	S4	SSE4	SSE4	SSE4	SSE5	SSE4	SSE5	SSE4	S3	NW2	N7	N8	N8	N7	N6	N3	NNE3	N7	N10	N8	N6	N7	N1.6	N10
3-Feb	NNE5	N4	N5	N5	NNE5	NNE5	NE4	NNE3	AF	ESE2	W3	NW2	N3	WNW4	WSW5	WSW6	WSW3	NW4	N9	N8	NNE9	NNE6	NE7	NNE6	N3.3	N9
4-Feb	NNE3	ESE2	ESE3	ESE3	NE2	ESE3	ESE3	SSE4	SE4	SE3	S2	WSW7	WSW6	WSW7	SW8	SW7	SSW5	SSE3	SSE4	ESE4	SE3	E4	NE5	NE5	SSE1.6	SW8
5-Feb	NNE6	NE6	NNE6	NNE5	NNE5	NE4	N6	NNE5	NNE7	N9	N10	NNW11	NNW8	NNW8	NNW9	NNW8	WNW2	ESE3	SE4	SSE5	SE5	SE6	SSE6	SSE6	NNE3.4	NNW11
6-Feb	SSE6	SSE6	SSE5	SSE5	SSE6	SSE5	SSE5	SSE5	SSE5	SSE5	SSE4	SW3	WSW3	NW5	NNW2	E2	NNE3	ENE2	E3	SE3	SE4	SE4	SE4	ESE3	SE2.8	SSE6
7-Feb	SSE3	SE3	SSE4	SSE5	S5	S5	S6	S7	SSW7	SSW8	SW11	SW12	SW12	WSW10	WSW10	WSW8	WSW5	WNW3	N8	N7	NNW8	NNW10	NNW7	NNW5	WSW3.4	SW12
8-Feb	NW4	WSW2	SSW3	SSW5	SW8	SW8	SW9	SW9	SW9	SW10	SW12	SW13	SW14	SW12	SW13	SW16	SW14	SW15	SW15	SW15	SW16	SW14	SW12	SW9	SW10.5	SW16
9-Feb	SW8	SSW5	S5	SE5	SSE7	SSE6	SSE7	SE6	SSE5	SE5	ESE6	SE4	NNW6	NNW9	NW7	NNW4	NNE4	ENE3	ESE5	SE5	SE3	E4	ESE6	SE5	SE2.4	NNW9
10-Feb	ESE6	ESE7	SE6	SE7	SE9	SE8	SE8	SE9	SE11	SE11	SSE11	SSE9	SSE11	SSE11	SSE11	SSE10	SSE10	SE14	SE15	SSE17	SSE17	SSE14	SSE13	S9	SSE10.5	SSE17
11-Feb	SSW8	SW10	SW11	SW10	WSW13	SW12	SW12	WSW14	WSW13	WSW13	WSW15	WSW13	SW14	SW15	SW15	SW15	SW16	WSW13	SW13	SW13	SW12	SW12	SW9	SW12	SW12.5	SW16
12-Feb	SSW9	S7	SSE8	SSE8	S7	S7	SSE8	S8	S7	S7	SSW9	SW13	SW17	WSW16	WSW15	SW15	SW13	SW11	SW14	SW13	SW16	WSW16	WSW13	WSW13	SW10.0	SW17
13-Feb	WSW13	W11	W9	W9	WSW10	WSW10	WSW9	W8	W7	NNW12	N11	N10	N7	N6	WNW1	N3	ENE4	ENE4	ESE5	ESE4	SE6	SSE6	SSE7	SSE7	W2.6	WSW13
14-Feb	S8	SSE8	SSE9	SSE9	S11	S11	S11	S12	SSE12	S13	S12	SSW11	SSW13	SSW14	SSW10	SSW12	S9	S9	SSE8	S8	S8	S8	S7	S8	S9.6	SSW14
15-Feb	S6	SSW7	SSE7	SSE7	S8	SSE9	SSE10	S10	S9	S9	S9	S9	S9	S8	S6	SSW6	SSW7	SW9	SSW8	SSW9	SSW10	SW16	SW14	SW13	SSW8.3	SW16
16-Feb	SW13	SW13	SW13	SW10	S6	SSE6	S7	SSE8	SSE9	SSE10	SE9	SE10	SSE9	S7	S3	WNW3	AF	N1	N4	N5	NNE5	N6	NNE5	S4.0	SW13	
17-Feb	NNE7	NNE7	NNE8	NNE9	N9	N9	NNW9	NNW11	NNW10	NNW14	NNW15	NNW13	NNW11	N10	N9	N10	N9	N8	N9	N9	N10	N8	N7	N7	N9.2	NNW15
18-Feb	N7	N7	N5	NNE4	NNE4	ENE2	N1	ENE2	SE3	SW3	WNW4	NNW2	NW5	NW5	WNW5	W5	NNW2	E5	ESE5	E5	ESE6	ESE6	ESE6	ESE8	NE1.6	ESE8
19-Feb	ESE7	ESE8	ESE10	ESE12	SE14	SE14	ESE10	ESE11	ESE12	ESE17	ESE16	E15	ESE15	ESE15	ESE17	ESE16	SE15	SE14	SE13	SE13	SE12	SE12	SE11	SE9	ESE12.6	ESE17
20-Feb	SE7	NNE1	NE1	ENE1	SE3	WNW1	AF	NW5	NNW8	NNW9	NNW11	N9	NNW9	NW6	WNW4	WNW5	W6	W6	NW6	WNW6	WNW5	W5	WSW6	WSW9	NW3.7	NNW11
21-Feb	WSW11	WSW13	WSW13	WSW12	WSW11	W10	W9	W9	W9	WSW10	WSW11	W10	W11	W11	WNW11	WSW10	W6	NNW5	NW4	NNW4	WNW2	NW2	SSE2	SE2	W7.4	WSW13
22-Feb	N5	NNE5	ENE5	ENE3	E4	E4	E4	E4	ENE4	NE5	NNE4	NNW4	N6	N6	N7	N6	N6	NNE5	N4	NE5	NE5	ENE3	ESE3	SSE3	NNE3.5	N7
23-Feb	SE3	S2	SSE4	SSE4	SSE4	SSE5	SSE6	SSE5	SSE4	S4	SW7	WSW5	WSW4	WSW4	SW2	NNW1	E1	ENE3	ESE4	E3	NE4	NE5	NE6	NNE5	SE1.5	SW7
24-Feb	N7	NNW8	NNW6	N5	N8	NNW12	N10	NNW10	NNW11	NNW10	NNW14	NNW14	NNW10	NNW3	WSW4	WSW7	SSW5	S5	S6	S6	S6	SSE6	S6	NNW4.1	NNW14	
25-Feb	S6	S6	S7	S7	S7	S8	S7	S7	S8	SSW8	SW9	SW9	W7	NW7	N12	NNW11	NNW12	NNW6	N4	N6	N12	N22	N20	NNW20	NW2.6	N22
26-Feb	NNW19	NNW17	NNW17	NNW19	NNW19	NNW18	N17	NNW13	NNW14	NNW16	NNW15	NNW15	NNW11	NNW7	NW6	NNW7	N5	NE3	ESE4	E4	E6	ESE7	SE6	SE7	N9.1	NNW19
27-Feb	SE7	ESE8	ESE7	ESE7	ESE7	ESE7	ESE6	E5	E5	E7	NE4	N3	W3	NW5	WNW4	W3	NW1	SSW3	SE1	SE5	SSE7	SSE10	SSE10	S10	SE3.4	SSE10
28-Feb	S7	NW3	N8	N12	N10	NNE9	N10	N12	N11	N11	N12	NNW11	NNW10	NNW9	N8	N7	NNW9	NE6	E5	E4	ENE5	E4	E4	E4	N6.3	N12
SW0.9 SW0.7 SSE0.5 SSE0.8 S1.2 SSE1.3 S1.2SSW0.9 S0.9 SW0.6 W1.6 W2.6WNW3.2WNW3.6 W3.0WSW2.8WSW2.1 S1.4 SSE1.6 SSE1.7 S1.4 S1.5 SSE1.7 S1.8																								Diurnal Average		
NNW19 NNW17 NNW17 NNW19 NNW19 NNW18 N17 WSW14NNW14 ESE17 ESE16NNW15 SW17WSW16 ESE17 ESE16 SW16 SW15 SE15 SSE17 SSE17 N22 N20 NNW20																								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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	229	34.23	34.23
6 - 11	319	47.68	81.91
12 - 19	118	17.64	99.55
20 - 28	3	0.45	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - February 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	20	13	13	20	16	22	35	13	6	3	9	6	13	13	10	229
6 - 11	59	11	4	0	2	20	19	42	47	14	22	18	16	2	5	38	319
12 - 19	9	0	0	0	1	8	10	5	3	3	41	16	0	0	0	22	118
20 - 28	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	87	31	17	13	23	44	51	82	63	23	66	43	22	15	18	71	669

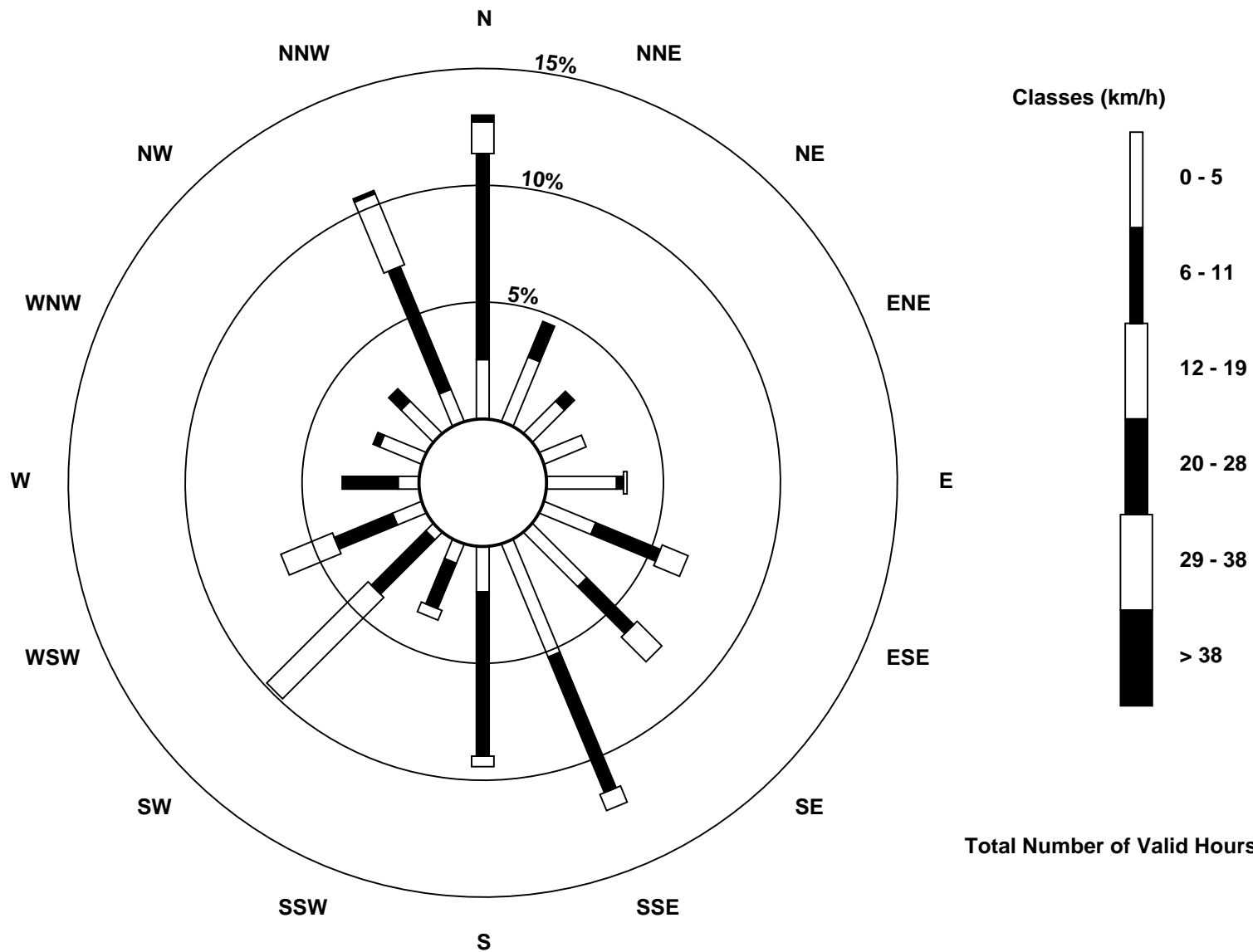
Total Number of Valid Hours: 669

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Wapasu (AMS 17)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 25 22:00 Minimum Value: 0 km/h on Feb 23 06:00 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 672 Hours of Data: 669 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-Feb	4	5	5	4	4	3	3	3	3	2	2	3	3	3	2	3	1	1	1	1	1	0	0	1	5
2-Feb	1	1	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2	1	1	2	3	2	2	2	3
3-Feb	2	1	1	2	2	2	1	1	AF	1	1	1	2	2	2	2	1	3	3	3	3	2	2	2	3
4-Feb	2	1	0	1	1	1	1	1	1	0	1	2	2	2	2	2	1	1	1	1	1	1	1	1	2
5-Feb	2	2	2	1	1	1	2	2	2	2	3	3	2	2	3	3	2	1	1	1	1	1	1	1	3
6-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0	0	1	1	0	2
7-Feb	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	2	2	1	2	2	2	2	2	2	3
8-Feb	2	1	1	1	2	2	3	2	2	2	3	3	3	3	4	4	4	4	4	4	4	3	2	2	4
9-Feb	2	2	1	1	1	1	1	1	2	2	1	2	2	2	2	1	1	1	1	1	1	1	1	1	2
10-Feb	1	1	1	1	2	1	1	2	3	3	4	3	3	3	3	3	3	4	4	4	4	5	4	4	5
11-Feb	3	4	3	4	4	3	3	3	3	3	4	3	3	4	4	4	4	3	3	3	3	2	3	6	6
12-Feb	4	2	2	2	2	2	2	2	2	2	3	4	5	5	5	4	3	4	3	3	4	4	4	3	5
13-Feb	3	3	3	3	2	3	2	2	2	4	3	3	2	2	1	1	1	1	1	1	1	1	1	2	4
14-Feb	2	2	2	3	3	3	3	3	3	4	4	3	4	4	3	4	3	3	2	1	2	2	2	2	4
15-Feb	2	2	1	1	1	2	3	3	3	2	2	3	3	3	2	2	3	3	3	4	3	4	3	3	4
16-Feb	3	3	4	4	4	2	2	2	2	2	3	2	4	5	3	1	2	AF	1	1	1	1	2	1	5
17-Feb	2	2	3	3	2	3	2	3	2	3	3	4	3	3	3	3	2	2	3	3	3	2	2	2	4
18-Feb	2	2	2	1	1	1	1	1	1	1	2	1	2	2	2	1	1	1	1	1	2	1	2	2	2
19-Feb	2	2	3	3	4	4	3	3	4	5	5	5	5	5	5	5	4	4	3	3	3	3	3	3	5
20-Feb	2	1	1	1	2	1	AF	2	2	2	3	3	3	2	1	2	2	2	2	2	2	2	2	3	3
21-Feb	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	3
22-Feb	3	1	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	0	0	3
23-Feb	1	1	1	1	0	0	0	1	1	2	1	1	2	2	1	1	1	1	2	1	1	1	2	2	2
24-Feb	2	2	1	2	2	3	3	2	3	3	3	4	3	3	2	2	2	2	1	1	1	1	1	1	4
25-Feb	1	1	2	2	2	2	2	2	2	2	3	3	2	3	3	3	3	2	1	3	4	7	6	6	7
26-Feb	5	4	5	5	5	4	4	4	3	4	4	4	3	3	2	2	2	1	1	1	1	1	1	2	5
27-Feb	2	2	2	2	1	2	1	1	1	2	2	2	3	2	2	2	1	1	1	1	1	3	3	3	3
28-Feb	3	2	4	3	3	3	4	4	4	3	3	3	3	4	3	3	2	2	1	1	1	1	1	1	4
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Wapasu - February 2017

Direction of Maximum Speed: 352 deg on Feb 25 22:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 121.9 deg on Feb 19	Hours of Data: 669
Direction of Minimum Speed: 284 deg on Feb 20 06:00	Hours of Missing Data: 3
Direction of Minimum Daily Speed Average: 1.5 deg on Feb 23	Percent Operational Time: 99.6
Monthly Average Direction: 264.2 deg	

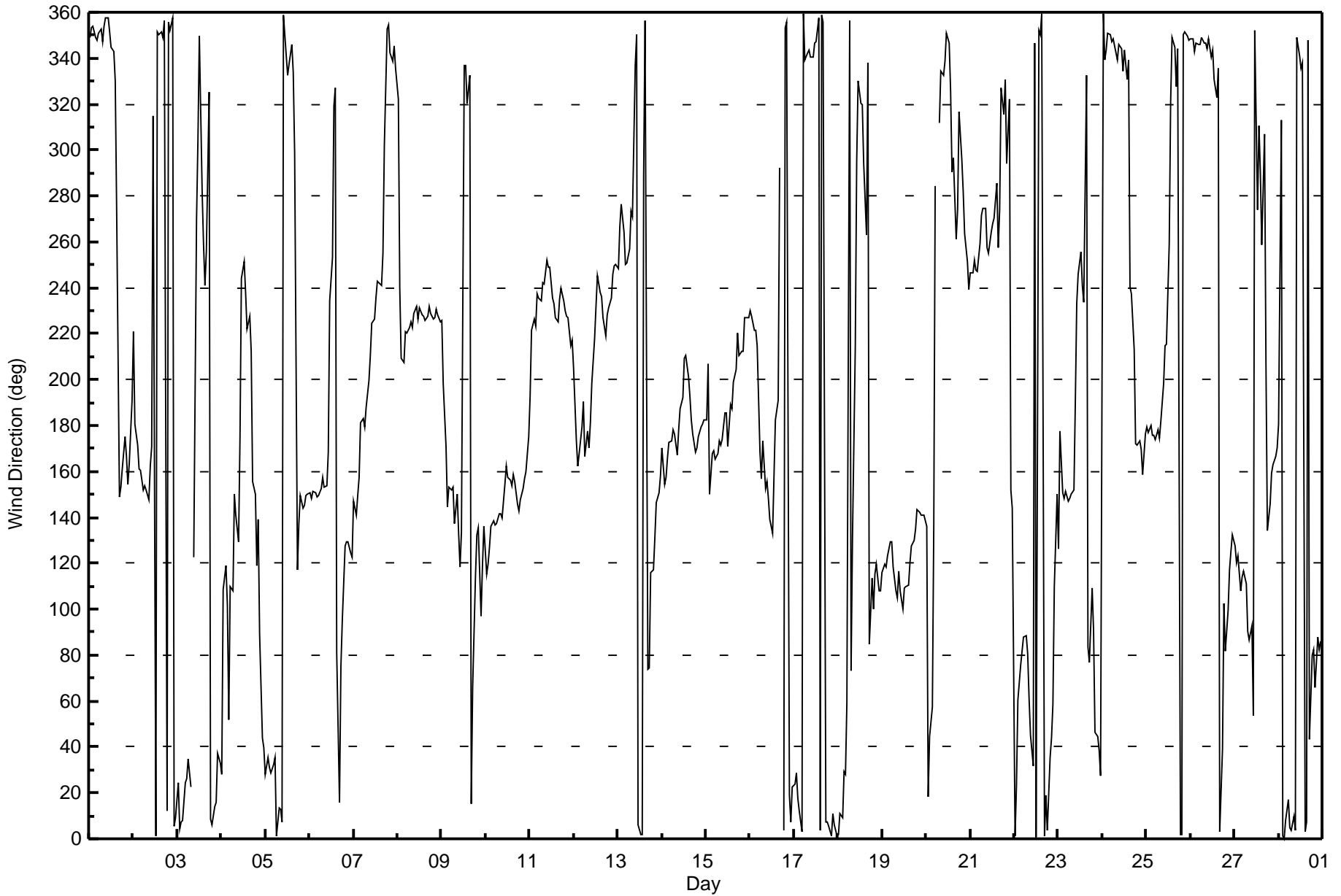
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	349	354	354	349	348	351	353	347	354	357	358	352	345	343	330	274	149	153	161	175	166	154	163	191	350.7
2-Feb	221	181	171	161	160	152	153	152	148	162	171	315	1	351	350	351	349	356	12	356	352	357	6	9	5.2
3-Feb	24	4	7	8	24	26	35	23	AF	123	270	304	349	282	258	241	255	325	8	6	14	16	37	33	1.4
4-Feb	28	109	119	102	52	110	108	150	141	130	174	244	251	238	222	227	212	156	150	119	139	89	44	40	161.4
5-Feb	28	36	31	29	32	36	1	13	13	7	359	341	332	337	346	334	299	117	138	150	144	145	150	150	16.1
6-Feb	151	148	151	150	149	150	153	157	153	154	168	234	253	319	327	81	16	75	95	128	129	129	125	122	143.9
7-Feb	147	141	149	157	181	183	179	188	199	210	224	226	236	243	242	241	255	302	353	355	342	339	345	336	239.3
8-Feb	322	240	209	207	221	221	223	225	223	229	232	226	231	228	228	226	227	232	229	226	227	231	228	225	227.8
9-Feb	226	198	171	144	153	152	153	137	150	133	118	134	337	337	320	332	15	66	114	133	136	97	119	136	136.7
10-Feb	115	120	127	136	138	137	137	142	141	140	154	162	158	156	154	159	156	146	143	148	152	157	160	175	148.0
11-Feb	193	221	227	223	237	235	234	242	242	252	249	249	235	233	227	225	235	240	235	230	227	227	215	217	232.6
12-Feb	205	173	162	168	179	190	167	177	170	181	198	218	232	245	238	236	227	219	229	231	236	246	250	250	218.9
13-Feb	248	267	277	264	250	251	257	273	271	337	350	6	2	2	289	356	74	75	116	117	131	147	151	158	279.6
14-Feb	170	154	157	166	172	173	178	176	167	178	187	192	209	211	202	193	183	176	168	171	175	179	181	183	180.7
15-Feb	183	207	150	168	169	166	168	173	171	174	186	185	171	189	187	199	204	220	210	212	212	227	227	227	194.1
16-Feb	230	227	221	222	215	169	157	173	153	156	148	139	133	158	182	191	292	AF	3	353	356	19	8	23	185.7
17-Feb	24	29	18	12	3	359	339	342	343	341	340	347	347	358	4	359	356	7	7	6	1	11	6	1	357.8
18-Feb	2	11	9	29	28	59	357	73	131	214	295	330	320	320	294	263	338	85	114	100	115	119	108	108	47.1
19-Feb	116	120	119	123	129	129	118	108	105	116	108	100	109	110	110	120	128	130	135	144	142	141	141	141	121.9
20-Feb	136	18	44	58	136	284	AF	312	335	332	338	351	346	326	290	297	261	274	317	296	282	263	252	239	306.4
21-Feb	247	247	252	248	247	259	271	275	275	257	255	264	268	270	285	257	274	327	315	330	294	322	152	144	264.3
22-Feb	1	23	60	75	82	88	88	80	61	45	32	347	1	352	350	360	1	19	4	35	44	59	110	150	33.0
23-Feb	126	178	151	148	152	147	149	150	152	190	233	246	255	241	234	333	83	77	109	91	47	45	39	27	145.2
24-Feb	359	339	343	351	350	347	349	342	339	346	344	335	344	331	339	241	237	213	172	172	173	170	159	176	332.5
25-Feb	180	177	180	176	176	174	178	175	182	198	215	215	259	321	349	345	328	344	2	2	350	352	350	348	310.8
26-Feb	348	348	343	346	346	346	349	347	346	344	348	340	343	331	322	335	3	39	103	82	99	117	125	133	352.3
27-Feb	127	120	123	108	114	117	111	90	87	93	54	352	274	310	290	259	307	207	134	146	159	163	166	170	133.0
28-Feb	181	313	1	0	8	17	5	4	10	4	349	341	336	338	3	7	348	44	80	82	66	88	82	86	8.0
224.2 226.2 164.2 160.9 175.1 164.2 173.5 194.7 172.9 214.4 269.1 280.8 283.0 283.6 273.0 255.6 253.3 188.7 160.4 161.6 171.7 173.9 160.7 180.0																									
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 - February 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Feb 27 17:00		Hours in Service: 672 Hours of Data: 669 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6																									
Minimum Value: 4 deg on Feb 23 06:00																											
Percentiles: P ₁ = 6 P ₁₀ = 13 Q ₁ = 17 Median = 22 Q ₃ = 27 P ₉₀ = 36 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-Feb	20	23	24	19	16	20	24	15	18	21	25	20	23	18	19	65	27	9	12	13	27	6	7	25	65		
2-Feb	22	16	12	13	11	10	9	9	5	26	28	77	27	22	21	22	22	33	27	21	22	22	26	30	77		
3-Feb	26	25	27	27	29	29	30	39	AF	31	36	78	66	43	37	22	32	37	29	26	28	30	26	24	78		
4-Feb	45	41	27	22	38	30	15	10	19	14	41	20	28	20	24	20	19	24	12	18	13	31	22	20	45		
5-Feb	25	26	26	27	21	26	25	28	29	25	24	17	22	24	24	24	65	23	27	10	6	4	7	6	65		
6-Feb	8	5	6	11	6	5	8	13	13	17	27	36	44	32	52	22	28	40	28	9	8	9	14	10	52		
7-Feb	17	12	10	8	17	23	24	27	27	26	17	17	18	21	17	18	23	41	20	23	16	14	15	14	41		
8-Feb	19	48	22	20	19	19	20	15	18	15	16	16	15	16	15	15	16	16	15	16	16	16	14	18	48		
9-Feb	16	24	23	17	10	11	12	17	22	20	25	37	58	19	27	32	24	28	15	13	23	19	17	12	58		
10-Feb	11	12	12	12	13	12	11	13	19	19	26	28	23	20	22	25	22	17	19	18	19	20	22	29	29		
11-Feb	27	21	16	18	18	16	16	16	17	22	22	23	18	18	17	17	16	17	16	16	15	14	24	28	28		
12-Feb	30	25	17	22	22	25	18	24	21	28	28	22	19	21	18	17	20	21	15	16	16	19	21	20	30		
13-Feb	20	26	26	27	21	21	24	26	31	27	26	28	28	31	85	49	23	18	24	15	16	13	12	15	85		
14-Feb	22	15	18	24	26	25	27	26	24	29	29	29	25	26	29	28	27	23	18	15	19	27	26	26	29		
15-Feb	23	29	15	14	16	20	21	27	23	28	29	28	23	29	28	26	23	21	31	25	25	16	16	15	31		
16-Feb	15	15	19	20	25	21	38	25	18	19	20	22	23	34	31	55	57	AF	78	26	31	26	26	20	78		
17-Feb	25	25	27	30	27	25	15	16	16	15	16	18	20	25	26	24	23	27	32	29	26	30	28	25	32		
18-Feb	25	30	35	37	29	43	90	30	35	42	45	73	35	37	31	27	46	26	22	25	20	18	19	20	90		
19-Feb	18	19	19	20	18	19	24	24	25	22	23	24	22	22	22	20	21	21	19	18	19	18	18	17	25		
20-Feb	17	82	46	41	17	69	AF	49	19	17	16	23	20	27	39	27	26	30	23	27	29	26	20	16	82		
21-Feb	19	19	22	19	20	23	27	28	25	24	24	28	27	29	31	22	34	22	28	14	40	29	68	29	68		
22-Feb	37	27	22	26	24	9	10	10	19	24	49	56	36	34	24	25	25	26	22	25	24	19	22	13	56		
23-Feb	26	35	13	14	7	4	6	6	11	32	19	31	61	51	68	76	83	36	31	20	23	21	29	31	83		
24-Feb	25	13	16	29	21	19	20	17	16	19	25	21	22	23	94	76	21	25	17	14	17	13	14	18	94		
25-Feb	18	19	23	23	23	23	26	28	27	29	23	25	39	36	20	22	19	18	31	26	20	21	21	20	39		
26-Feb	18	19	17	18	17	18	19	17	18	19	21	19	23	37	32	23	26	28	14	14	13	19	13	17	37		
27-Feb	19	19	20	20	15	15	13	10	18	26	65	85	80	56	66	76	102	34	89	17	14	21	22	27	102		
28-Feb	29	58	29	24	28	30	27	25	28	26	26	28	31	35	37	34	21	26	19	22	13	20	16	22	58		
	45	82	46	41	38	69	90	49	35	42	65	85	80	56	94	76	102	41	89	29	40	31	68	31			
Diurnal Maximum																											
AF - Analyzer Failure																											



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 21, 2017	Last Calibration	January 25, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:12
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	996	996
Calculated slope	1.001116	0.997701	Chamber temp	45.1	45.1
Calculated intercept	0.219122	1.655314	Pressure	684.1	683.8
Analyzer Background	8.8	9.2	Flow	0.449	0.449
Analyzer Coefficient	1.047	1.047	Intensity	93	93

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	0.5	----
as found span	5000	60.5	578.4	572.4	1.010
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.5	578.4	578.4	1.000
second point	5000	30.2	288.7	288.1	1.002
third point	5000	15.2	145.3	141.8	1.025
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	60.5	578.4	581.5	0.995
Average Correction Factor					1.009

Corrected As found 571.9 Previous response 577.5 % change 1.0%

Notes:

Inlet filter changed after as founds. Pump changed out for preventative maintenance, zero adjusted

Calibration Performed By: Melissa Lemay



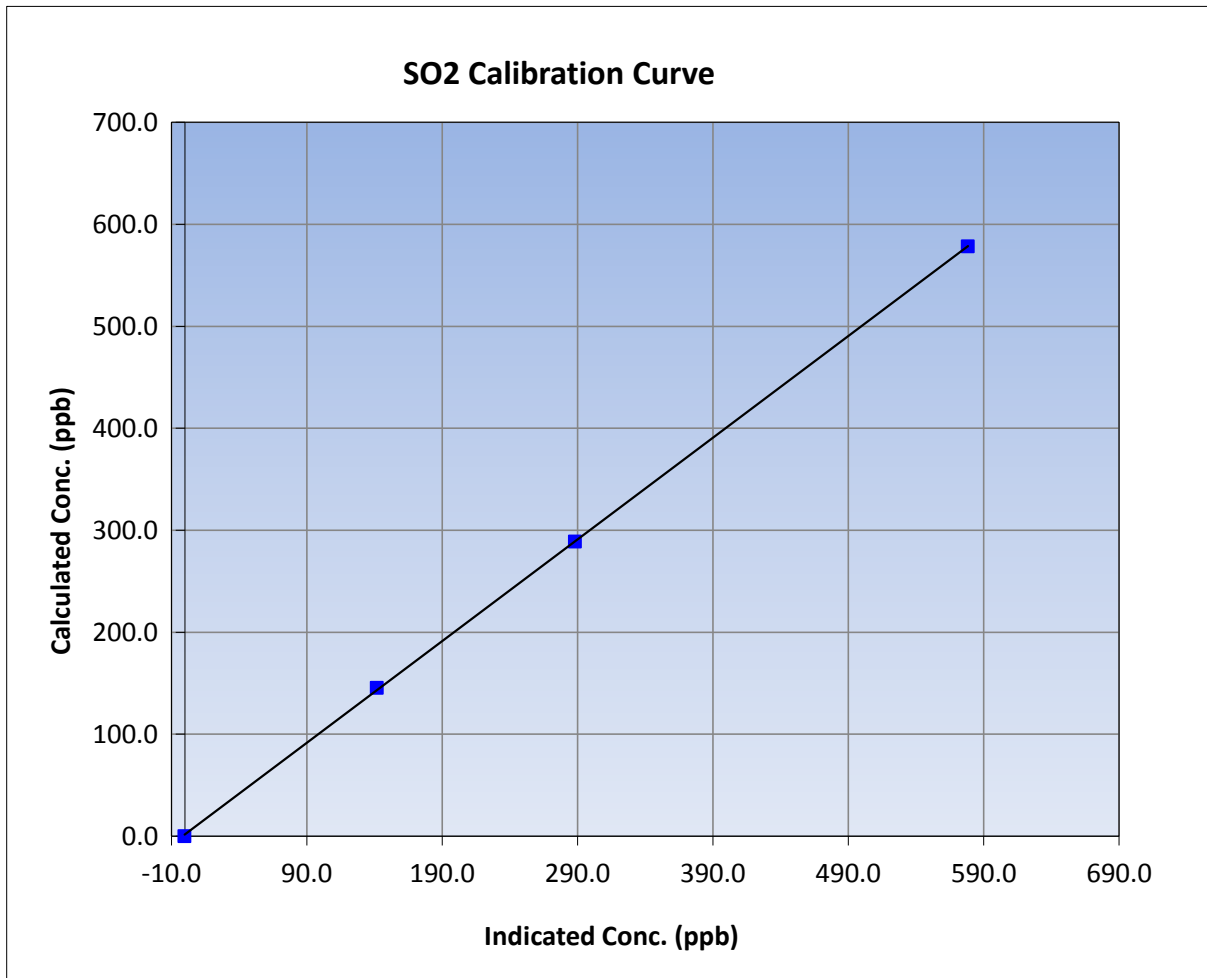
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 25, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:15	End Time (MST)	14:12
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

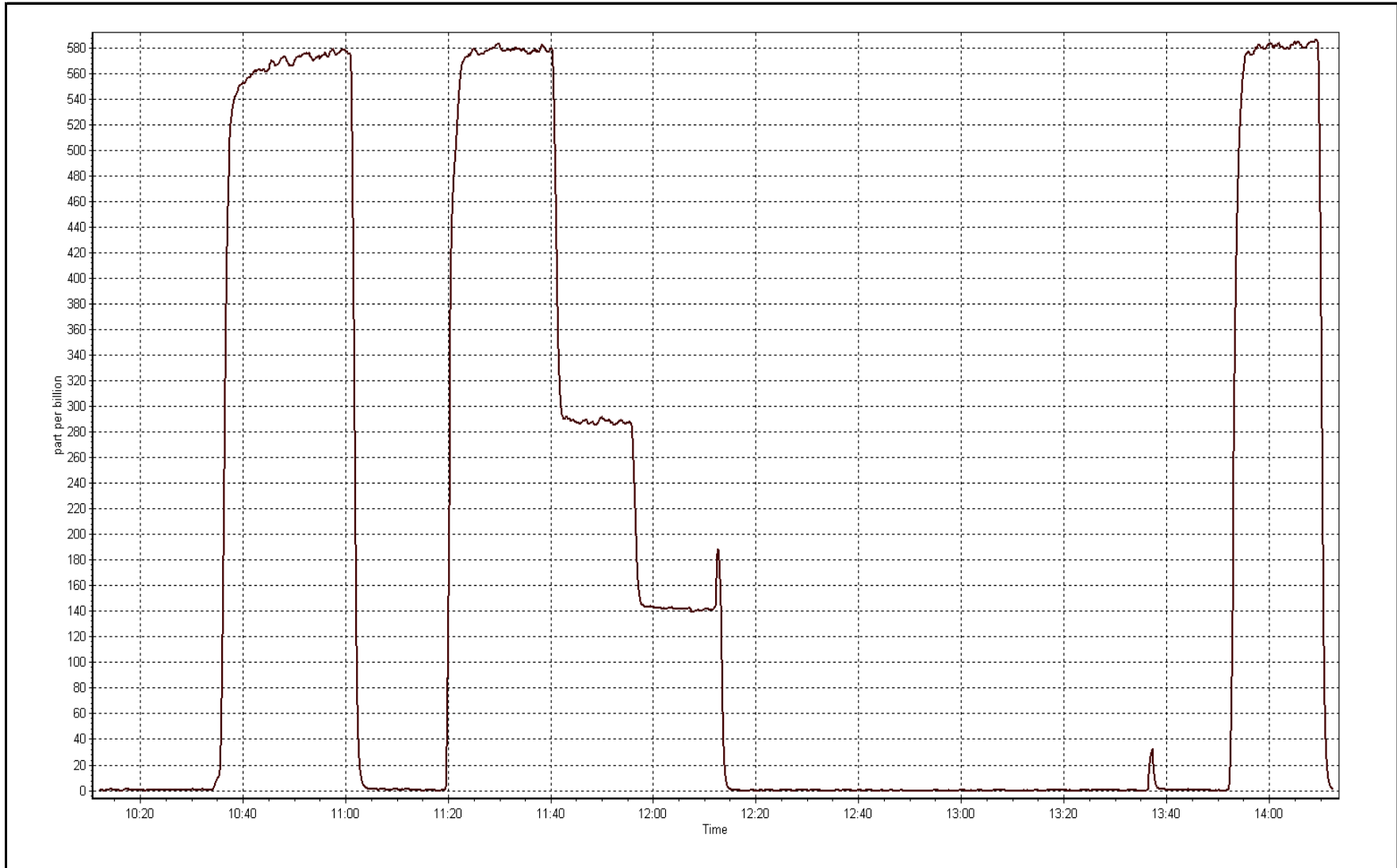
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999961
578.4	578.4	1.0000		
288.7	288.1	1.0021	Slope	0.997701
145.3	141.8	1.0248		
			Intercept	1.655314



SO2 Calibration Plot

Date: February 21, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 22, 2017	Last Calibration	January 19, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:02	End Time (MST)	12:28
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	0.996339	1.000203	Chamber temp	45	45
Calculated intercept	0.051175	-0.208027	Pressure	557.3	536.9
Analyzer Background	15	15	Flow	0.970	0.970
Analyzer Coefficient	1.055	1.055	Intensity	100	100
			Converter temp.	340	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	0.1	----
as found span	5018	78.2	79.5	80.0	0.993
SO2 scrubber check	5081	14.8	139.2	1.9	----
calibrator zero	5000	0.0	0.0	0.1	----
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	19.9	0.985
as left zero	5019	0.0	0.0	0.4	----
as left span	5020	78.2	79.4	80.5	0.987
Average Correction Factor					0.992

Corrected As found	79.9	Previous response	79.7	% change	-0.2%
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Notes:

filter changed out, no maintenance or adjustments done

Calibration Performed By: Melissa Lemay



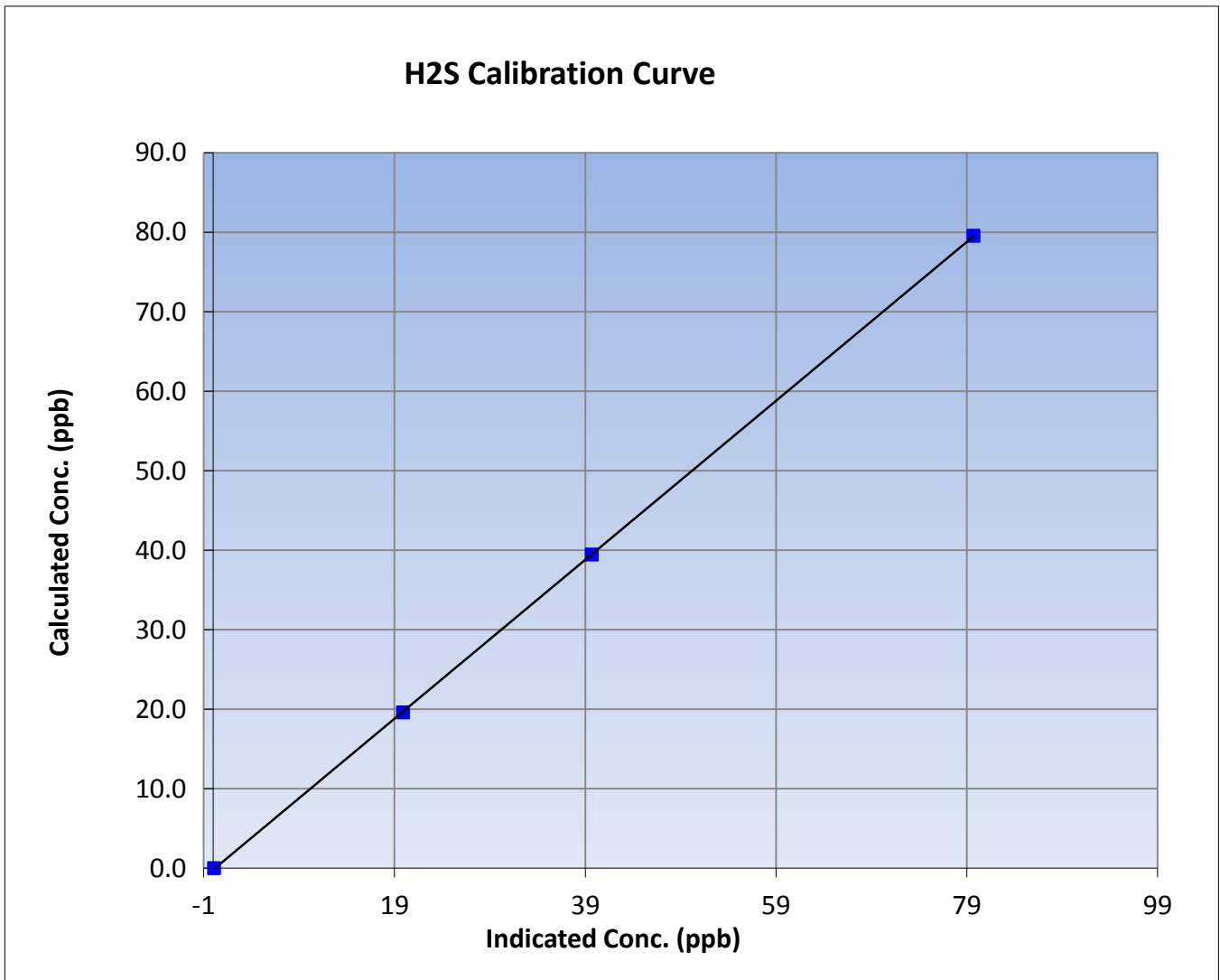
Wood Buffalo Environmental Association H2S Calibration Report

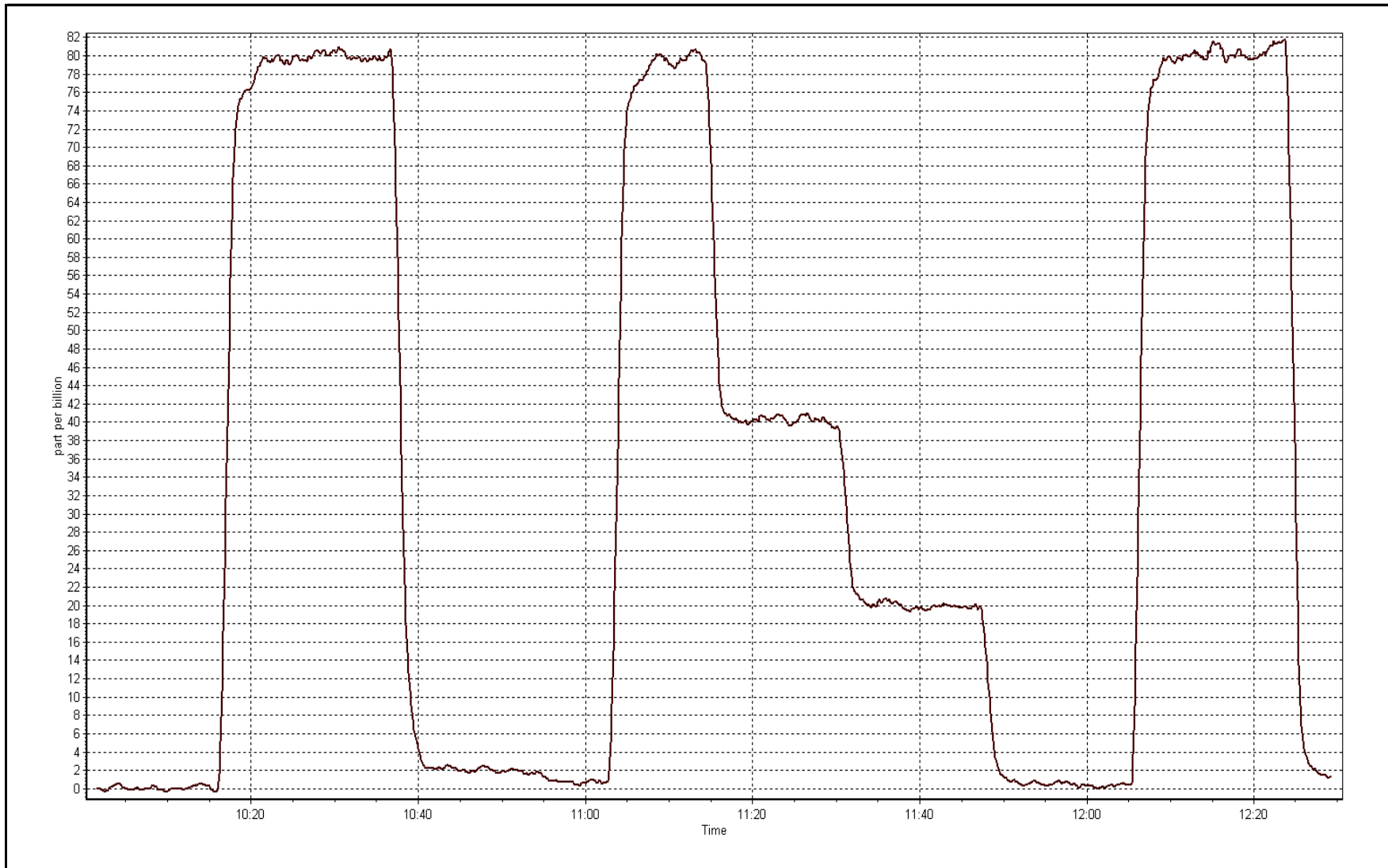
Station Information

Calibration Date	February 22, 2017	Previous Calibration	January 19, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:02	End Time (MST)	12:28
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	0.1	----	Correlation Coefficient	0.999992
79.6	79.7	0.9983		
39.4	39.7	0.9935	Slope	1.000203
19.6	19.9	0.9845		
			Intercept	-0.208027







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 21, 2017	Last Calibration	January 25, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:10
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	0.997649	1.004004	Fuel Pressure	24.8	24.8
Calculated intercept	-0.025346	-0.019681	Analyzer Coeff	4.466	4.500
			Analyzer BKG	2.920	3.010

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	0.01	----
as found span	5000	60.5	13.22	13.20	1.001
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	60.5	13.22	13.19	1.002
second point	5000	30.2	6.60	6.59	1.001
third point	5000	15.2	3.32	3.30	1.006
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	60.5	13.22	13.21	1.000
Average Correction Factor					1.003

Corrected As found 13.19 Previous response 13.27 % change 0.6%

Notes:

Inlet filter changed after as founds. Adjusted zero and span adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

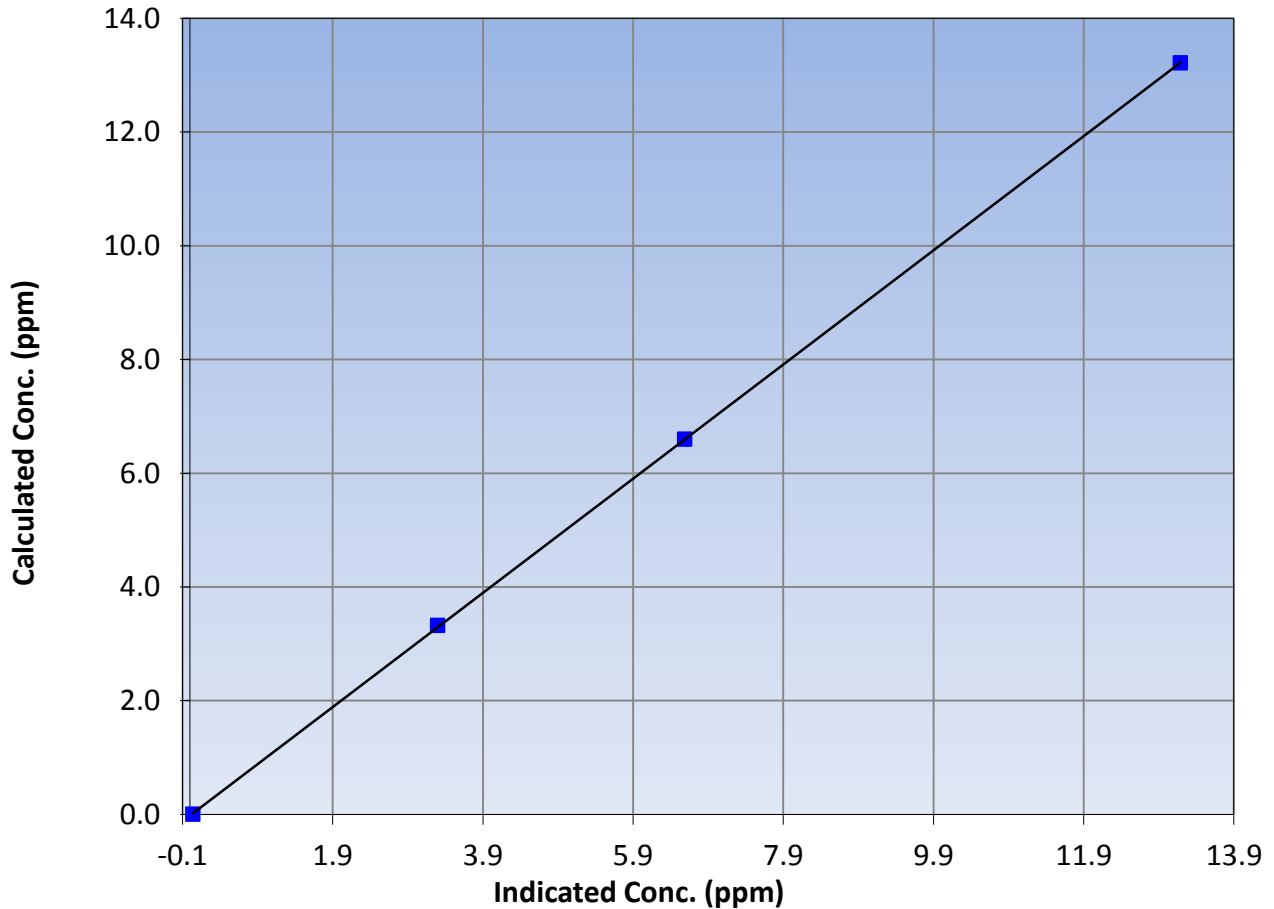
Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 25, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:15	End Time (MST)	11:37
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

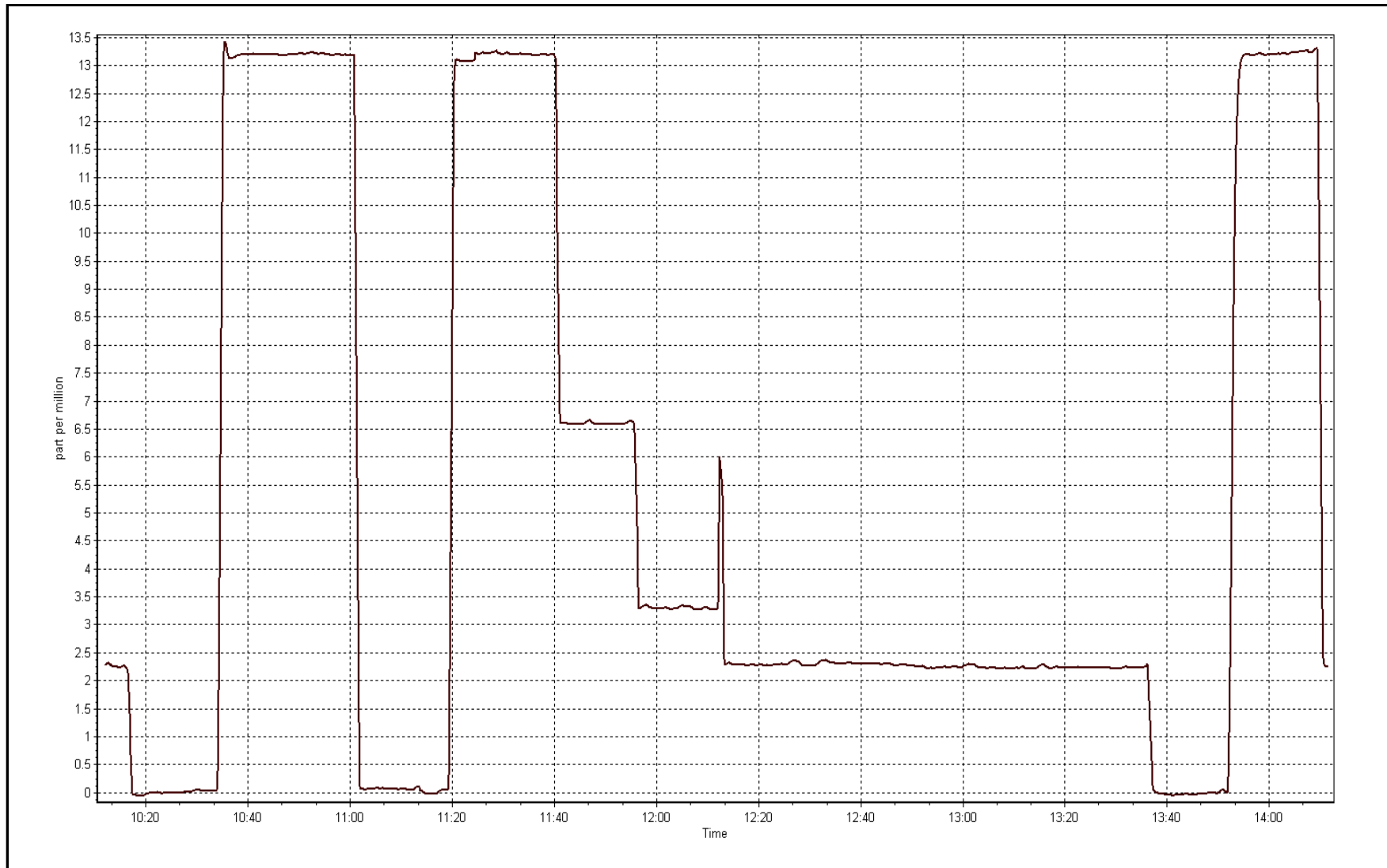
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999988
13.22	13.19	1.0020		
6.60	6.59	1.0011	Slope	1.004004
3.32	3.30	1.0062		
			Intercept	-0.019681

THC Calibration Curve



THC Calibration Plot

Date: February 21, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 22, 2017	Previous Calibration	January 19, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	10:04
NO2 GPT Ref date	February 21, 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.	26.9	25.8
Analyzer IP address	192.168.1.72		Lamp temp.	58.0	58.0
Calculated slope	1.005907	0.994368	Pressure	26.4	26.1
Calculated intercept	0.279809	-0.134295	Flow cell A	703	703
Analyzer Background	6.327	6.327	Flow cell B	703	703
Analyzer Coefficient	0.992	0.992	O3 measure	4538.2	4579.6
			O3 reference	4538.2	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	0.5	----
as found span	5000	713.2/1079.8	363.1	365.1	0.995
calibrator zero	5000	197.7/800	0.0	0.8	----
high point	5000	713.2/1079.8	363.1	365.3	0.994
second point	5000	494.7/971.3	244.2	246.4	0.991
third point	5000	260.9/844.3	127.1	126.6	1.004
as left zero	5000	197.7/800	0.0	1.0	----
as left span	5000	713.2/1079.8	363.1	364.7	0.996
Average Correction Factor					0.996

Corrected As found	364.6	Previous response	360.7	% change	-1.1%
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Notes:

Inlet filter changed after as founds. No adjustments done, pump changed out for preventative maintenance

Calibration Performed By:

Melissa Lemay



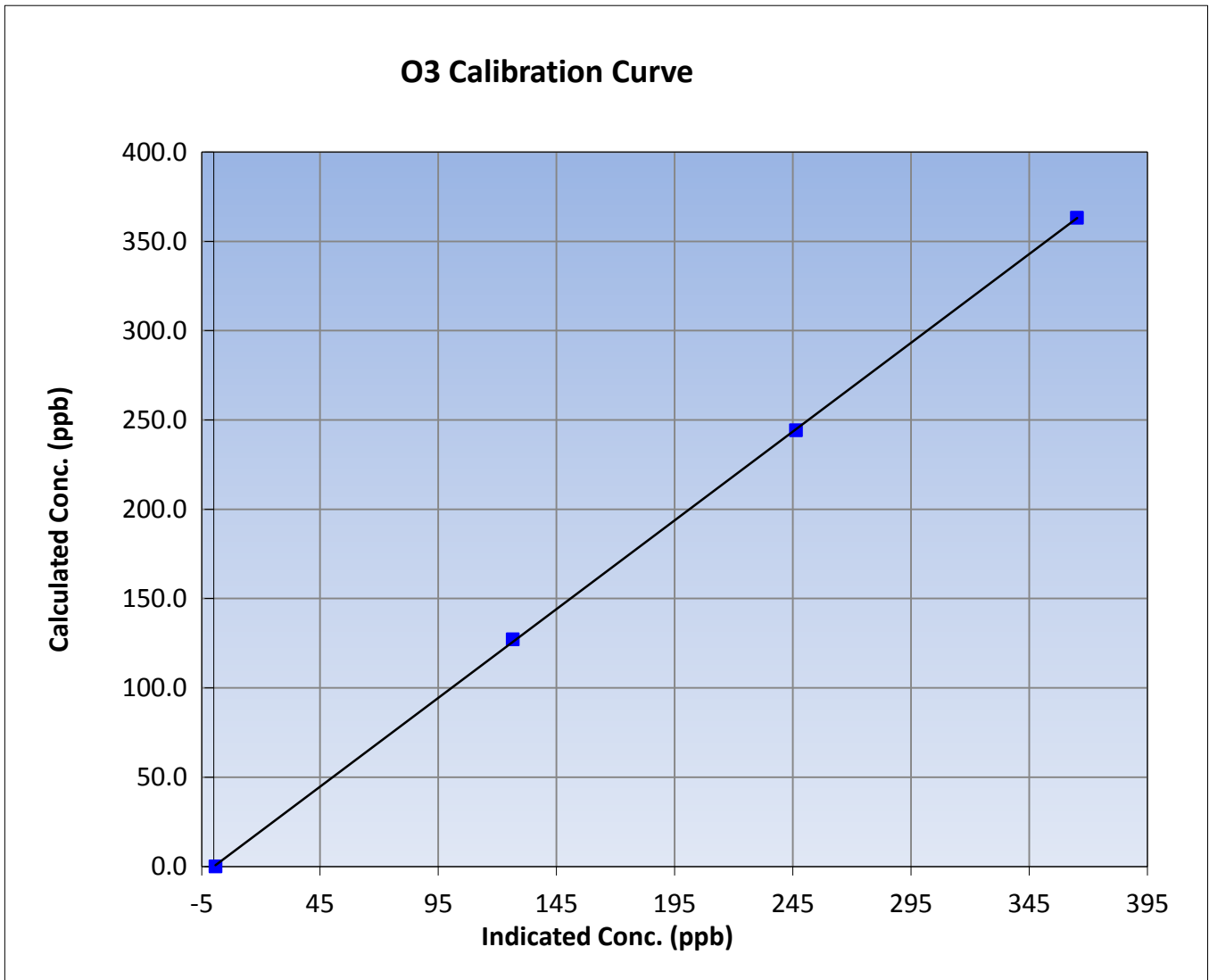
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February 22, 2017	Previous Calibration	January 19, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	10:04
Analyzer make	Teledyne T400	Analyzer serial #	824

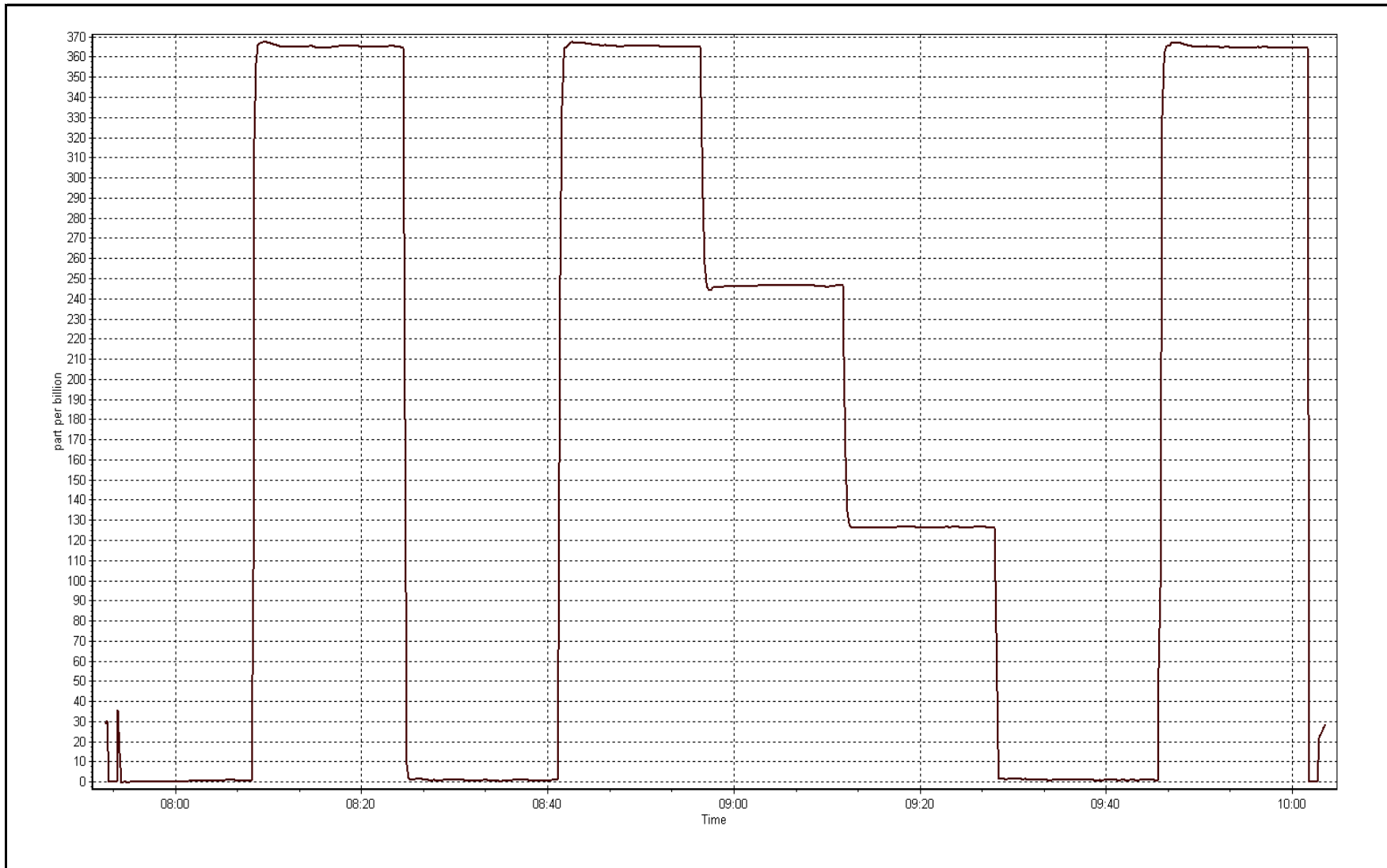
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	----	Correlation Coefficient	0.999963
363.1	365.3	0.9940		
244.2	246.4	0.9911	Slope	0.994368
127.1	126.6	1.0039		
			Intercept	-0.134295



O3 Calibration Plot

Date: February 22, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 16, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:10
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	0.991072	0.996100	1.011795
	Data Offset	-0.170732	-0.464759	-0.230493
Current Calibration	Data Slope	0.988925	0.989094	1.013574
	Data Offset	-0.251953	-0.370690	-0.160893

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	0.933		0.933	
NOx coefficient	0.933		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	314.4	Deg C	314.4	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	3.1	mmHg	3.1	mmHg
R Cell Press Nox	3.1	mmHg	3.1	mmHg
NO sample flow	436	lpm	436	lpm
Nox sample Flow	436	lpm	436	lpm

Notes:

filter changed out, no maintenance or adjustments done



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 21, 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	-0.1	-0.1	0.0	----	----
as found span	5036	60.3	595.1	595.1	0.0	606.8	604.6	2.2	0.9807	0.984
calibrator zero	5091	0.0	0.0	0.0	0.0	0.5	0.4	0.1	----	----
high point	5036	60.3	595.1	595.1	0.0	601.9	601.6	0.4	0.9887	0.989
second point	5067	30.0	294.3	294.3	0.0	298.4	299.2	-0.8	0.9861	0.983
third point	5081	15.0	146.7	146.7	0.0	147.9	147.8	0.0	0.9920	0.993
as left zero	5000	0.0	0.0	0.0	0.0	0.5	0.7	-0.3	----	----
as left span	5000	60.5	601.4	237.8	363.6	590.1	235.8	354.3	1.0191	1.008
Average Correction Factor									0.9890	0.9885

Corrected As found

NO_x= 606.9

NO= 604.7

Percent Change

NO_x= -1.0%

NO= -1.1%

Previous Response

NO_x= 600.6

NO= 597.9

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	601.4	600.9	0.1	0.9895	0.9903	----	----
1st NO2 (300)	237.8	363.1	596.7	237.8	358.8	0.9973	----	1.0120	98.8%
2nd NO2 (200)	356.7	244.2	597.0	356.7	240.2	0.9968	----	1.0167	98.4%
3rd NO2 (100)	473.8	127.1	599.8	473.8	126.1	0.9922	----	1.0079	99.2%
2nd NO ref point	----	0.0	597.1	598.2	-1.1	0.9966	0.9948	----	----
Average Correction Factor						0.9957		1.0122	98.8%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

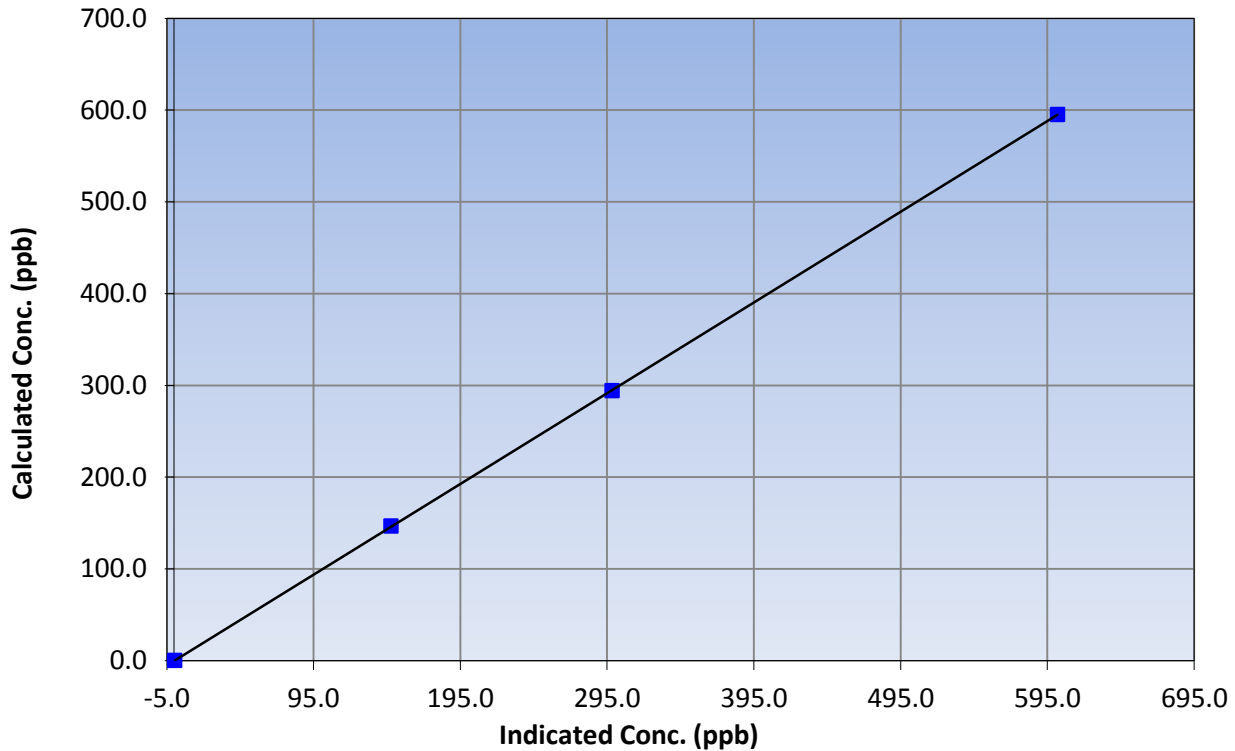
Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 16, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:15	End Time (MST)	14:10
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	0.5	----	Correlation Coefficient	0.999995
595.1	601.9	0.9887		
294.3	298.4	0.9861	Slope	0.988925
146.7	147.9	0.9920		
			Intercept	-0.251953

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

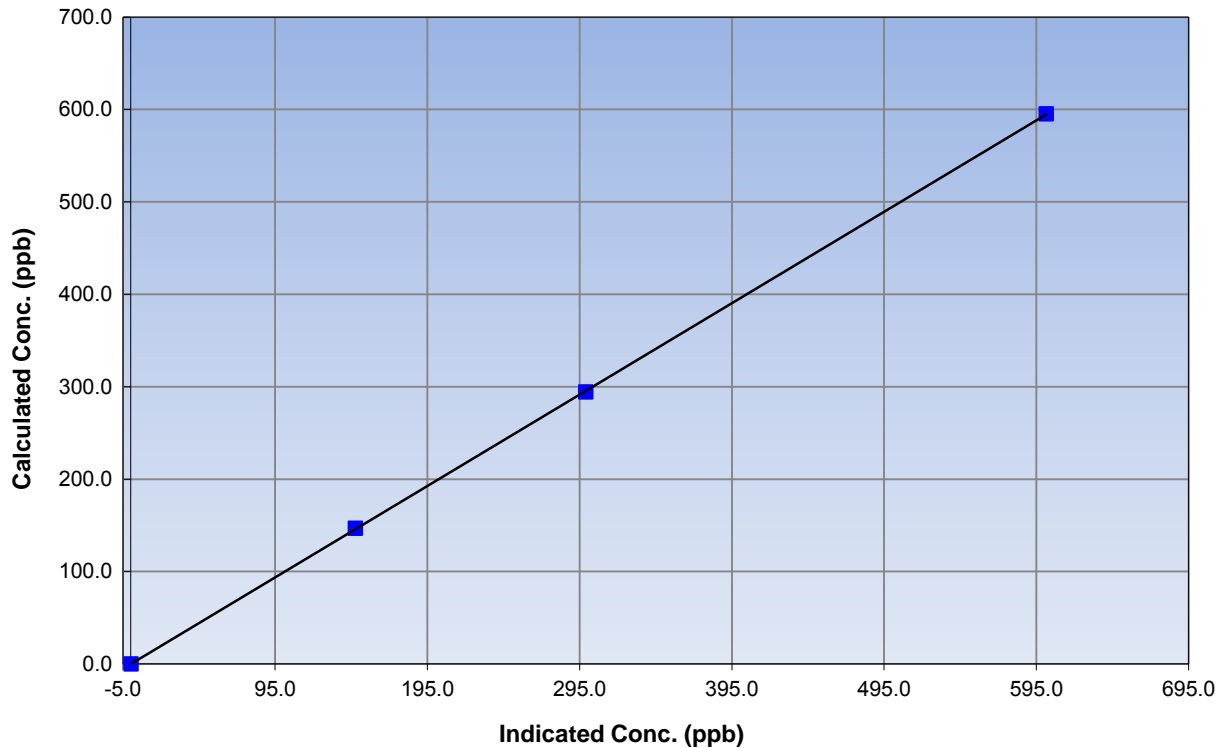
Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 16, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:15	End Time (MST)	14:10
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	0.4	N/A	Correlation Coefficient	0.999986
595.1	601.6	0.9892		
294.3	299.2	0.9835	Slope	0.989094
146.7	147.8	0.9927		
			Intercept	-0.370690

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

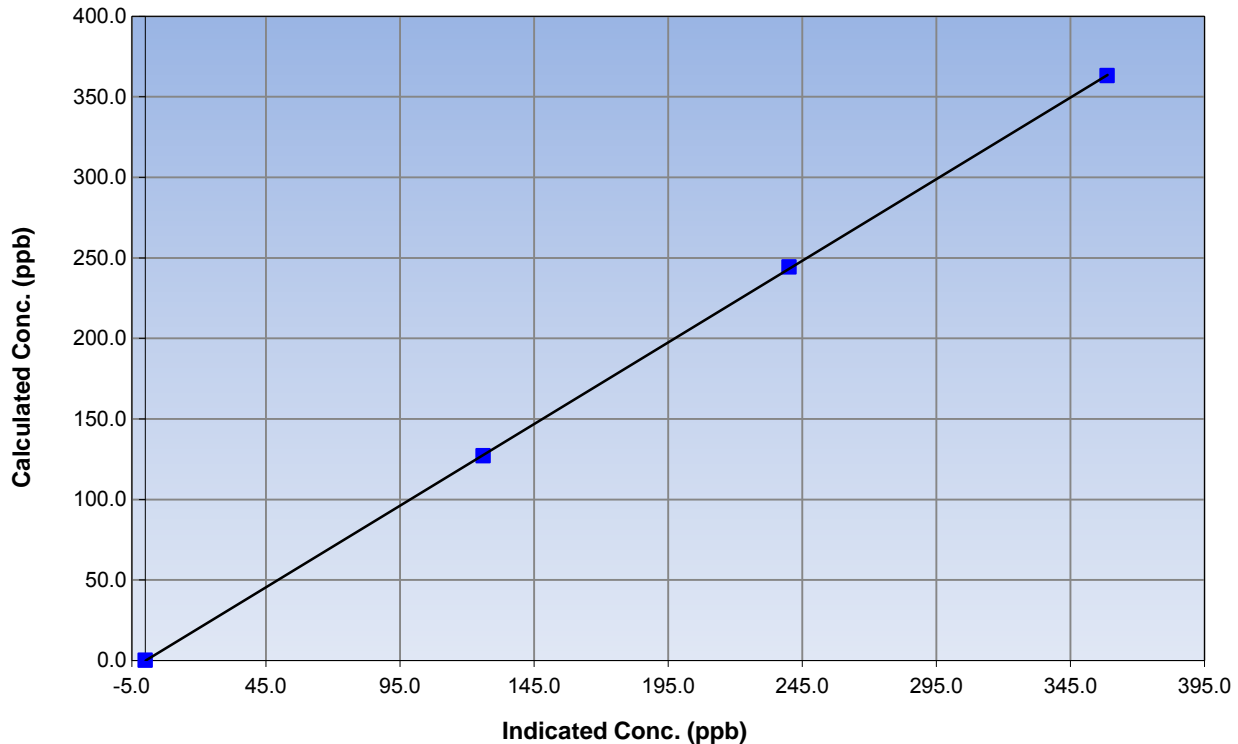
Station Information

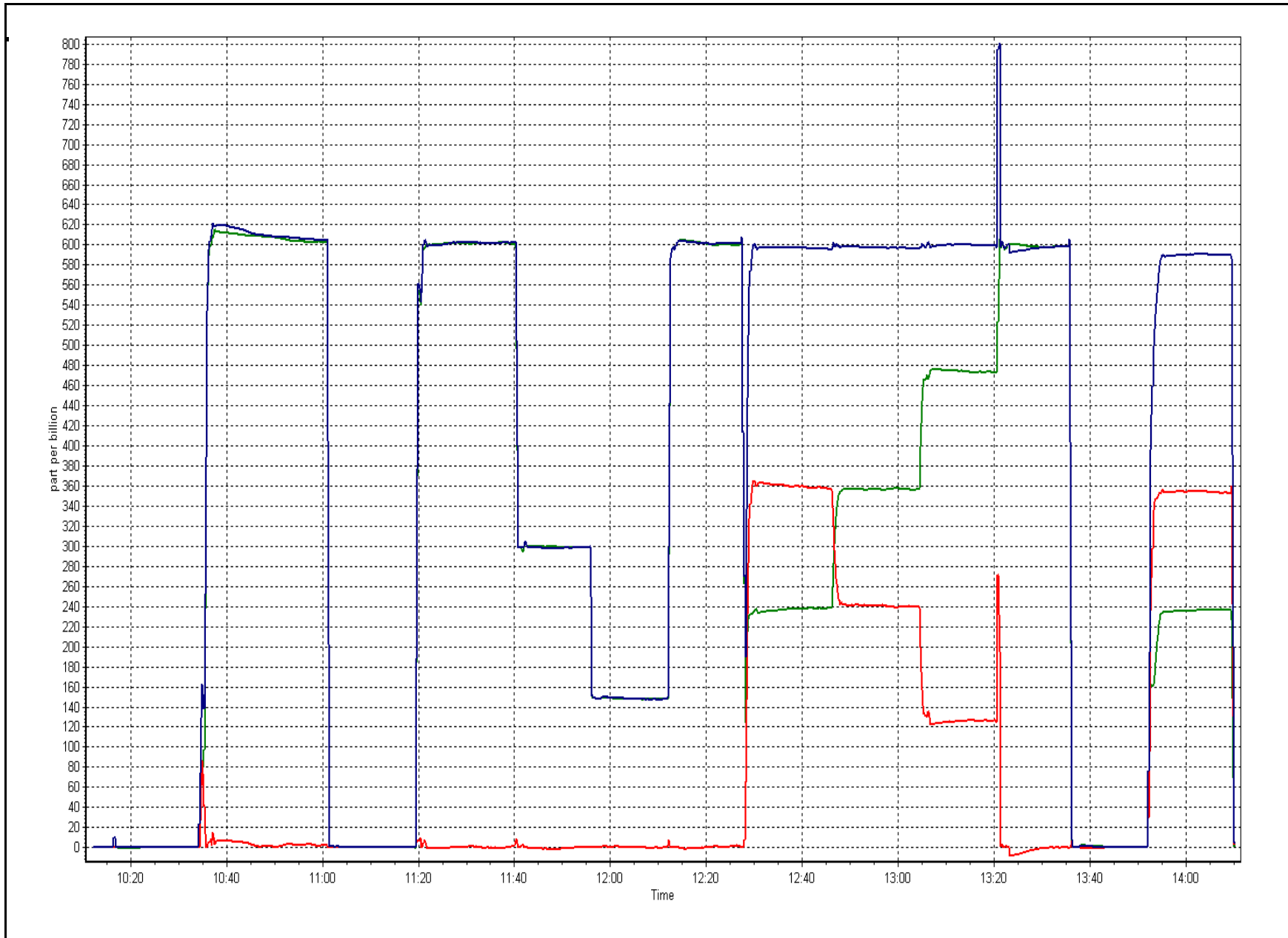
Calibration Date	February 21, 2017	Previous Calibration	January 16, 2017
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	10:15	End Time (MST)	14:10
Analyzer make	API T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999982
363.1	358.8	1.0120		
244.2	240.2	1.0167	Slope	1.013574
127.1	126.1	1.0079		
			Intercept	-0.160893

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:	February 22, 2017	Last Cal Date:	January 23, 2017
Start time (MST):	8:02	End time (MST):	8:42
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)	-17	-18.5	-17	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	951	952	951	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1000	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.2	-----	-0.2	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input type="checkbox"/>				
Cyclone cleaning:	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	<u>December 8, 2016</u>	Last Cal Date:	<u>October 28, 2016</u>	Tolerance
	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: no adjustments done, cyclone head cleaned

Calibration by: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 18
STONY MOUNTAIN
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
 FEBRUARY 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	639	33	33	100	5	0	2	0
TRS(ppb) Average	640	32	32	100	1	0	0	0
THC(ppm) Average	629	31	43	98.21	2.2	-	2	-
NMHC(ppm) Average	629	31	43	98.21	0.063	-	0.022	-
CH4(ppm) Average	629	31	43	98.21	2.2	-	2	-
O3 (ppb) Average	640	32	32	100	54	0	51	-
NO2 (ppb) Average	639	33	33	100	12	0	6	-
NO (ppb) Average	639	33	33	100	4	-	1	-
NOX (ppb) Average	639	33	33	100	12	-	7	-
PM2.5 (ug/m3) Average	669	1	3	99.7	10.4	-	6.6	0
Wind Speed 10 m (km/h) Average	656	0	16	97.62	22	-	16	-
Wind Direction 10 m (deg) Average	656	0	16	97.62	-	-	-	-
Temperature 2 m (C) Average	672	0	0	100	12.7	-	7.2	-
Relative Humidity (%) Average	672	0	0	100	99	-	95.0	-
Precipitation (mm) Total	672	0	0	100	2.1	-	11.8	-
Leaf Wetness (% of range) Average	672	0	0	100	33	-	7.0	-
Global Solar Radiation (W/m2) Average	672	0	0	100	619	-	154.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
 FEBRUARY 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	639	0.5	1	-	0	0	0	0	1	1	5
TRS (ppb) Average	640	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	629	1.92	0.1	-	1.8	1.9	1.9	1.9	1.9	2	2.2
NMHC(ppm) Average	629	0.003	0.007	-	0	0	0	0	0	0	0.063
CH4(ppm) Average	629	1.91	0	-	1.8	1.9	1.9	1.9	1.9	2	2.2
O3 (ppb) Average	640	40.1	6	-	21	33	36	40	44	48	54
NO2 (ppb) Average	639	1.7	2	-	0	0	1	1	3	4	12
NO (ppb) Average	639	0.1	0	-	0	0	0	0	0	0	4
NOX (ppb) Average	639	1.8	2	-	0	0	1	1	3	4	12
PM2.5 (ug/m3) Average	669	3.09	1.4	-	1.3	2	2.2	2.6	3.4	4.7	10.4
Wind Speed 10 m (km/h) Average	656	8.9	4	-	0	4	5	8	12	15	22
Wind Direction 10 m (deg) Average	656	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	672	-9.22	9.5	-	-28.1	-20.1	-16.7	-11.5	-1.8	4.4	12.7
Relative Humidity (%) Average	672	72.7	15	-	32	51	62	77	84	89	99
Precipitation (mm) Total	672	-	-	18.61	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	672	2.6	2	-	1	1	2	2	3	4	33
Global Solar Radiation (W/m2) Average	672	67.2	123	-	0	0	0	0	74	247	619

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	08 Feb 2017 02:00	08 Feb 2017 02:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	08 Feb 2017 05:00	08 Feb 2017 09:00	5	Analyzer Failure - inconsistent response
NMHC, CH4, THC	08 Feb 2017 10:00	08 Feb 2017 15:00	6	Maintenance - replaced actuator
PM2.5	22 Feb 2017 13:00	22 Feb 2017 14:00	2	Maintenance - Station operator on site
Wind Speed, Wind Direction	20 Feb 2017 00:00	20 Feb 2017 15:00	16	Flat line in sensor output signal - Sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 5 ppb on Feb 3 12:00	Maximum Daily Average: 1.7 ppb on Feb 3		Hours of Data:	639
Minimum Value: 0 ppb on Feb 4 19:00	Minimum Daily Average: 0.1 ppb on Feb 12		Hours of Missing Data:	33
Maximum Diurnal Average: 0.7 ppb at hour 12	Minimum Diurnal Average: 0.3 ppb at hour 1		Hours of Calibration:	33
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 = 4		Percent Operational Time:	100.0

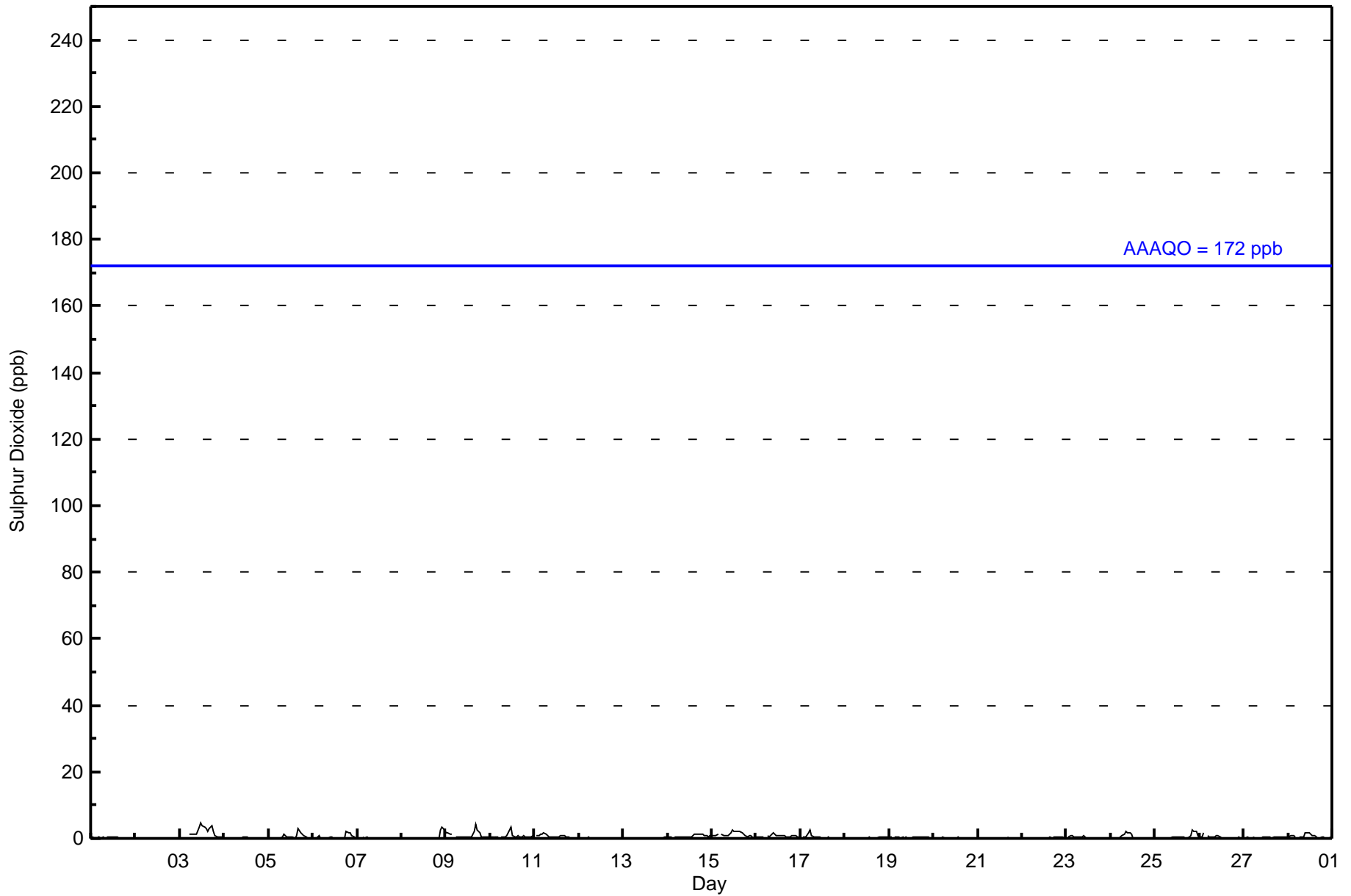
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
3-Feb	0	0	0	0	Z	1	1	1	1	1	4	5	4	3	3	2	3	4	2	1	1	0	0	0	1.7	5	
4-Feb	0	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	
5-Feb	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	3	2	1	1	0	0	0	0	0.6	3	
6-Feb	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	0	0	0.4	2	
7-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0.4	3	
9-Feb	2	2	1	1	Z	0	0	0	1	0	0	0	0	0	2	4	3	2	1	0	1	1	0	0	1.0	4	
10-Feb	0	0	0	0	0	Z	0	0	0	1	2	4	1	0	1	1	1	0	1	0	0	1	1	1	0.8	4	
11-Feb	Z	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.6	1	
12-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-Feb	0	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	
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
15-Feb	1	1	1	1	Z	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	0	0	1.2	2	
16-Feb	0	0	0	0	0	Z	1	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	2	
17-Feb	Z	0	0	0	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3	
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0.2	1	
19-Feb	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1	
20-Feb	0	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	
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.1	0	
22-Feb	0	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-Feb	Z	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
24-Feb	0	Z	0	0	0	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
25-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	2	2	2	1	0.5	2
26-Feb	0	0	2	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
27-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1	
28-Feb	1	1	1	1	0	Z	0	0	0	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0.6	2	
	0.3	0.3	0.4	0.4	0.3	0.5	0.3	0.3	0.4	0.5	0.7	0.7	0.5	0.4	0.4	0.5	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	Diurnal Average		
	2	2	2	1	1	3	1	1	2	2	4	5	4	3	3	2	4	4	4	2	2	3	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
Stony Mountain - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Stony Mountain - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Stony Mountain - February 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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624
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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624

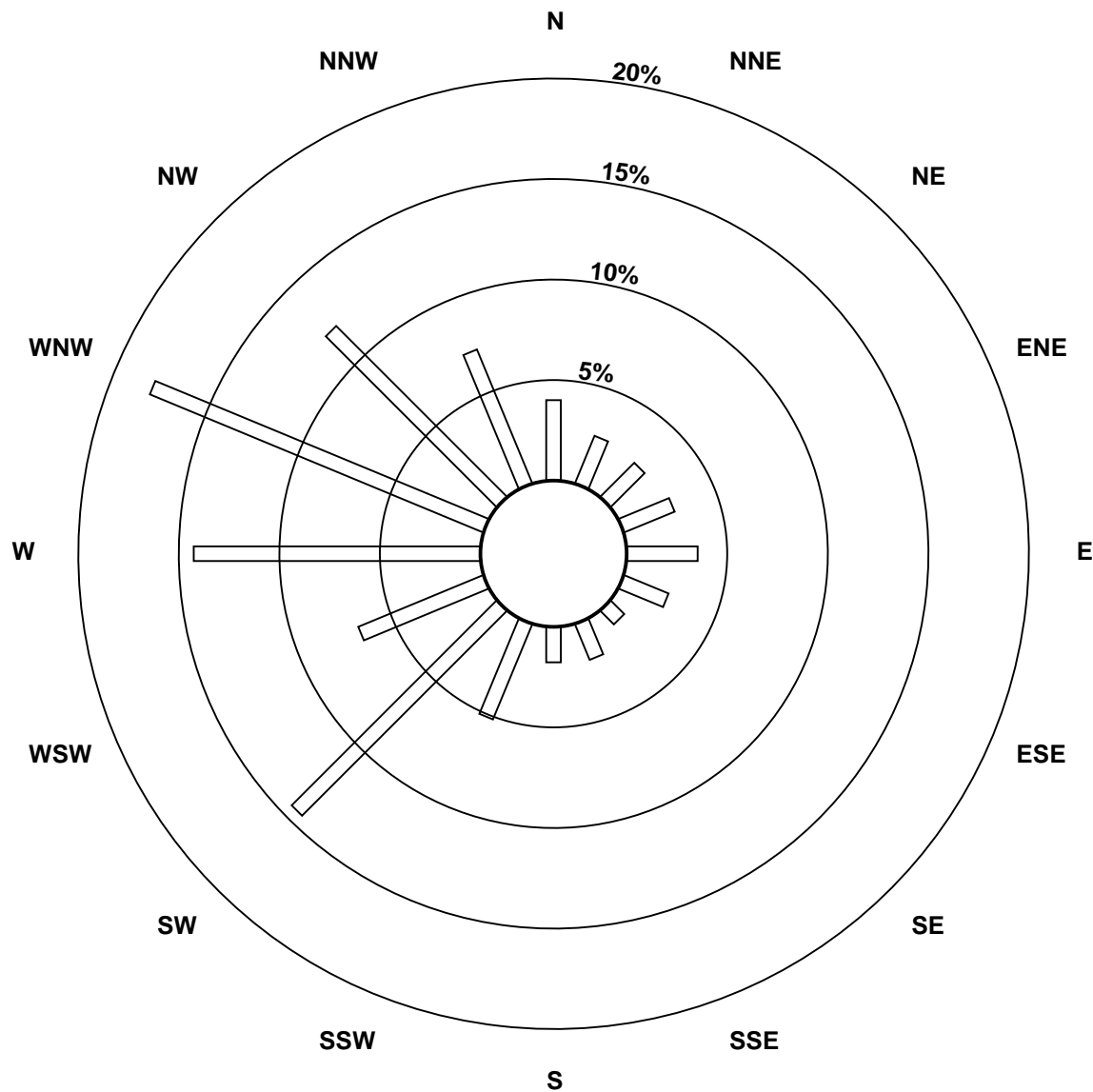
Total Number of Valid Hours: 624

Total Number of Hours: 672

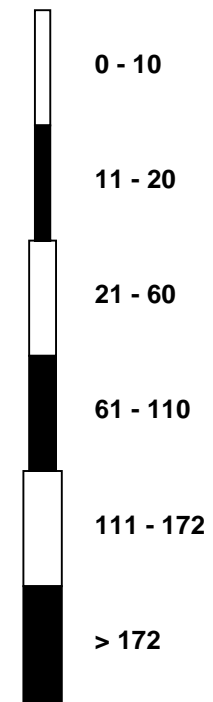


Wood Buffalo Environmental Association
Wind Rose Feb 2017

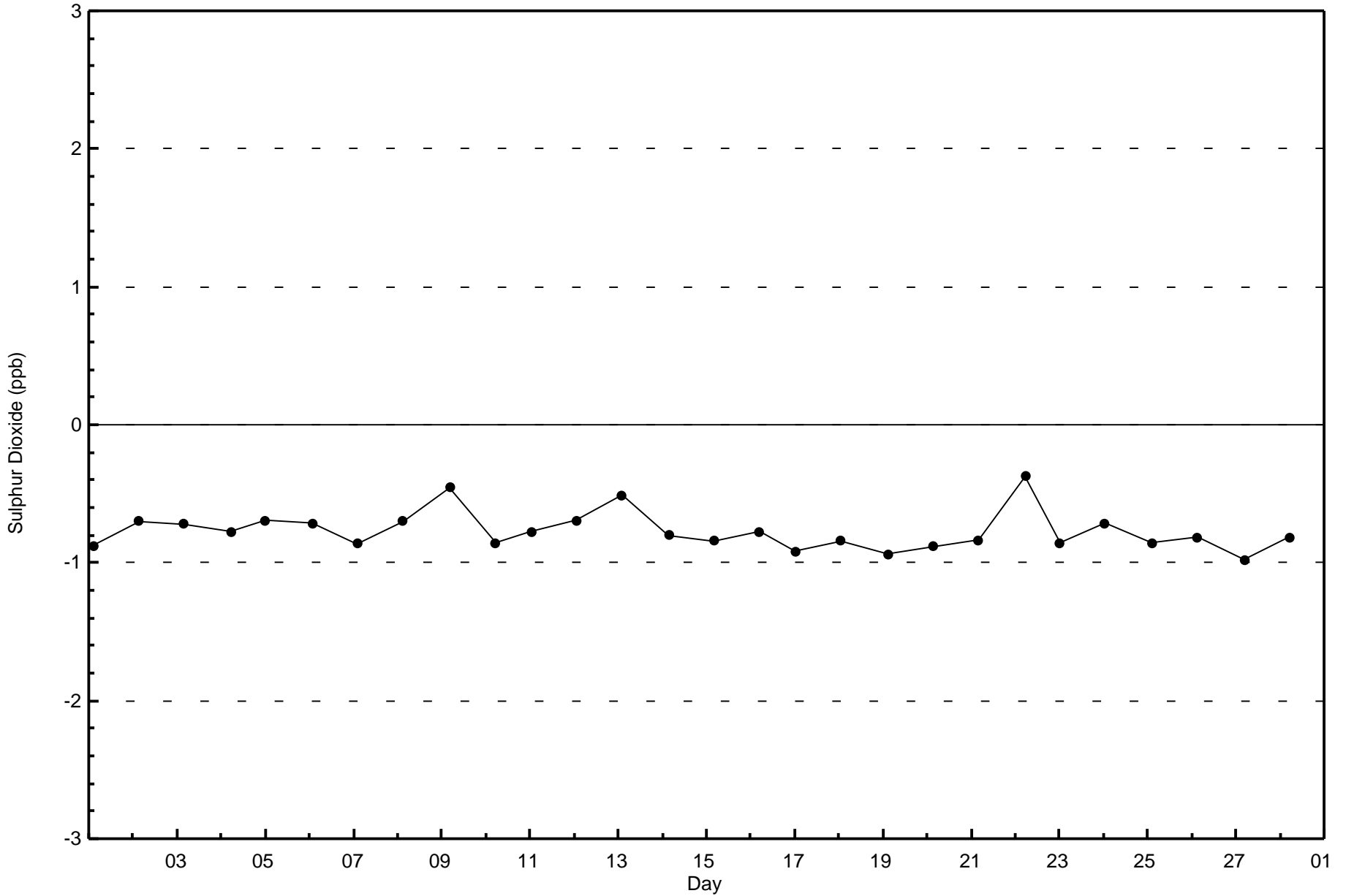
Sulphur Dioxide (SO₂) - ppb
Stony Mountain (AMS 18)

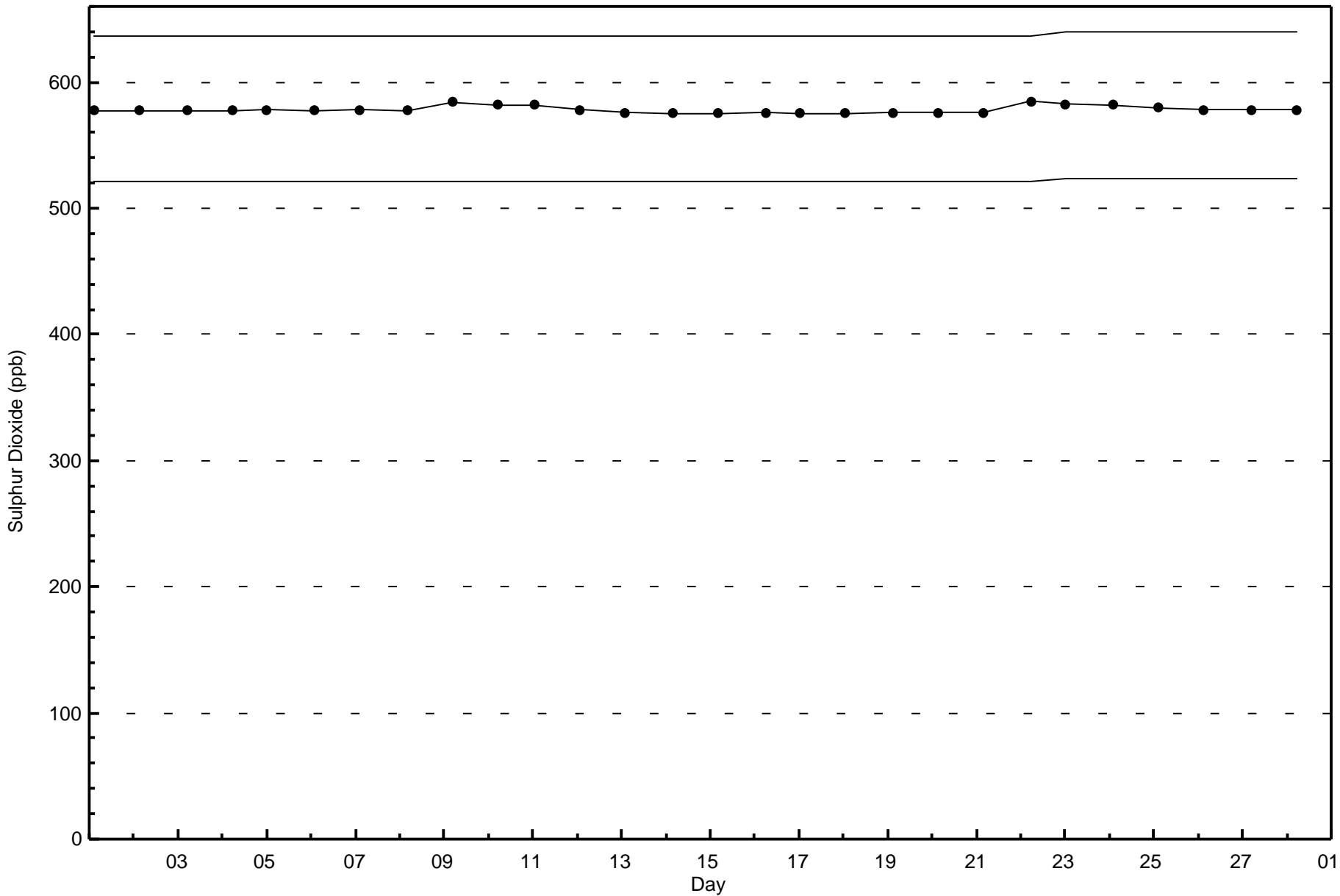


Classes (ppb)



Total Number of Valid Hours: 624





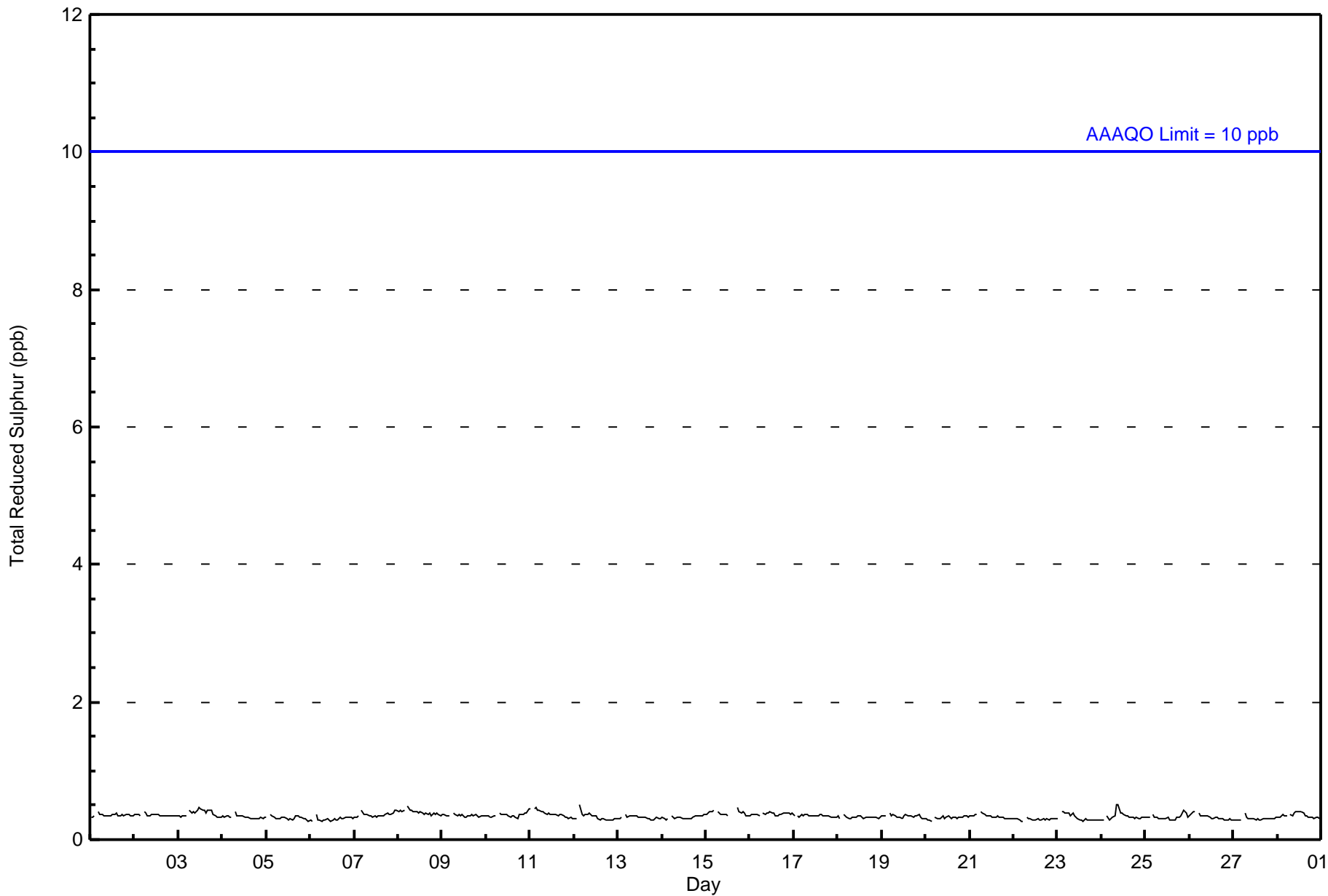


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Feb 24 09:00 Maximum Daily Average: 0.4 ppb on Feb 8										Hours in Service: 672 Hours of Data: 640 Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0																
Minimum Value: 0 ppb on Feb 6 02:00 Minimum Daily Average: 0.3 ppb on Feb 22 Maximum Diurnal Average: 0.4 ppb at hour 4 Minimum Diurnal Average: 0.3 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 = 0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	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
2-Feb	0	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
3-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
4-Feb	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
5-Feb	0	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
6-Feb	0	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
7-Feb	0	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
8-Feb	0	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
9-Feb	0	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
10-Feb	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
11-Feb	0	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
12-Feb	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Feb	0	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
14-Feb	0	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
15-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.4	0
16-Feb	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
17-Feb	0	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
18-Feb	0	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-Feb	0	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
20-Feb	0	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
21-Feb	0	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
22-Feb	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
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Feb	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Feb	0	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
28-Feb	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
0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3																								Diurnal Average		
0 0 0 1 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	640	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Stony Mountain - February 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	24	17	14	17	22	15	6	11	12	30	89	40	89	119	75	45	625
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	24	17	14	17	22	15	6	11	12	30	89	40	89	119	75	45	625

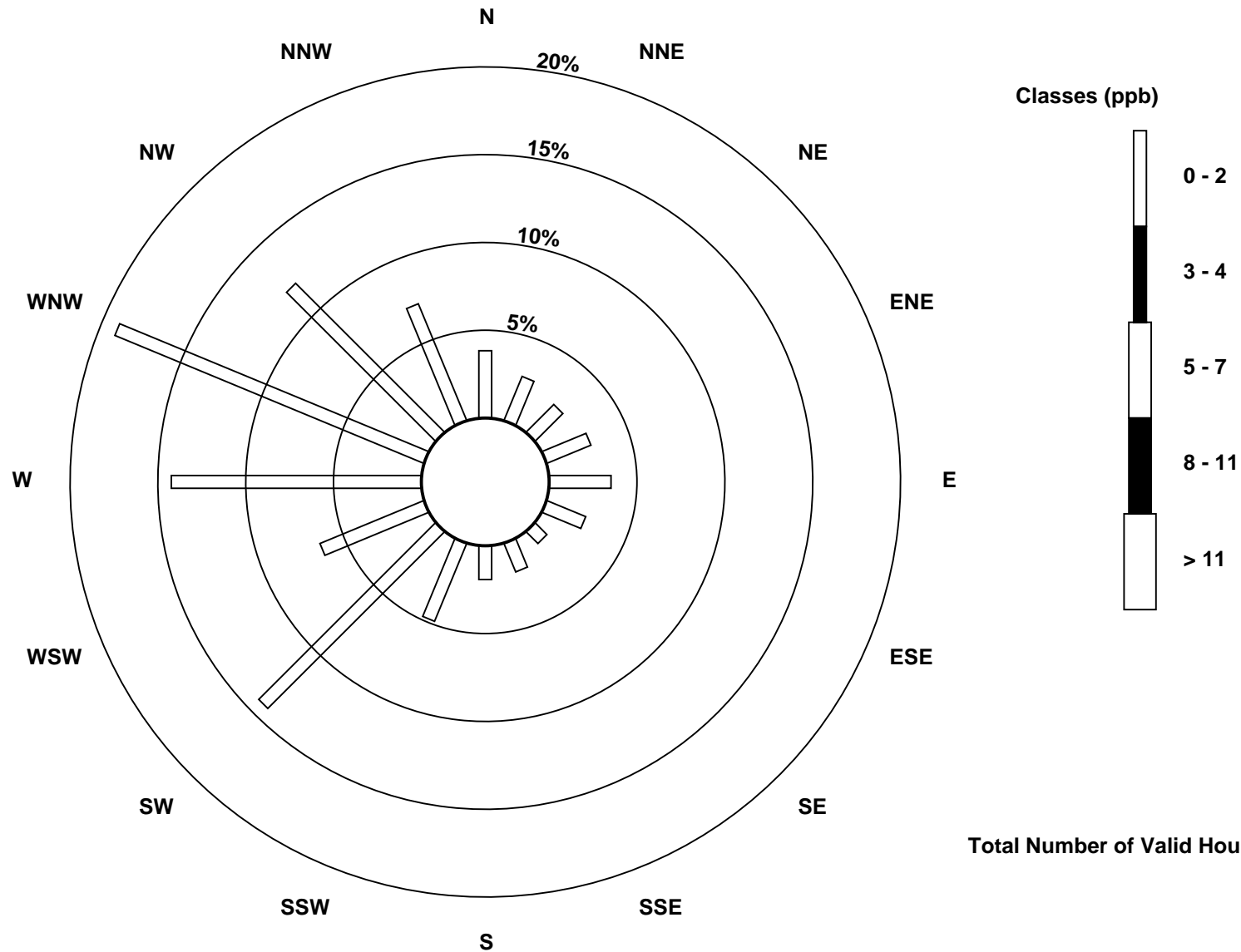
Total Number of Valid Hours: 625

Total Number of Hours: 672

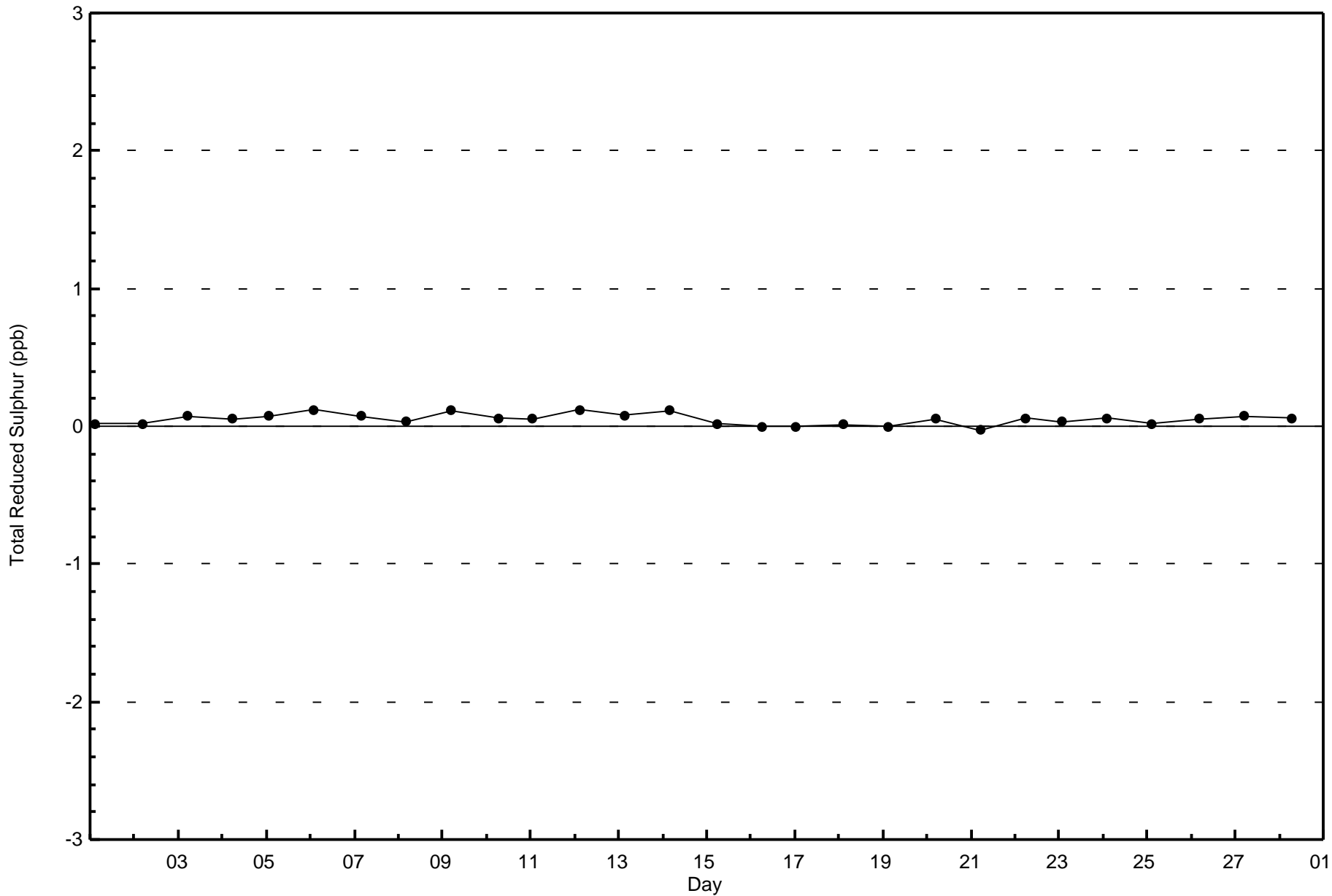


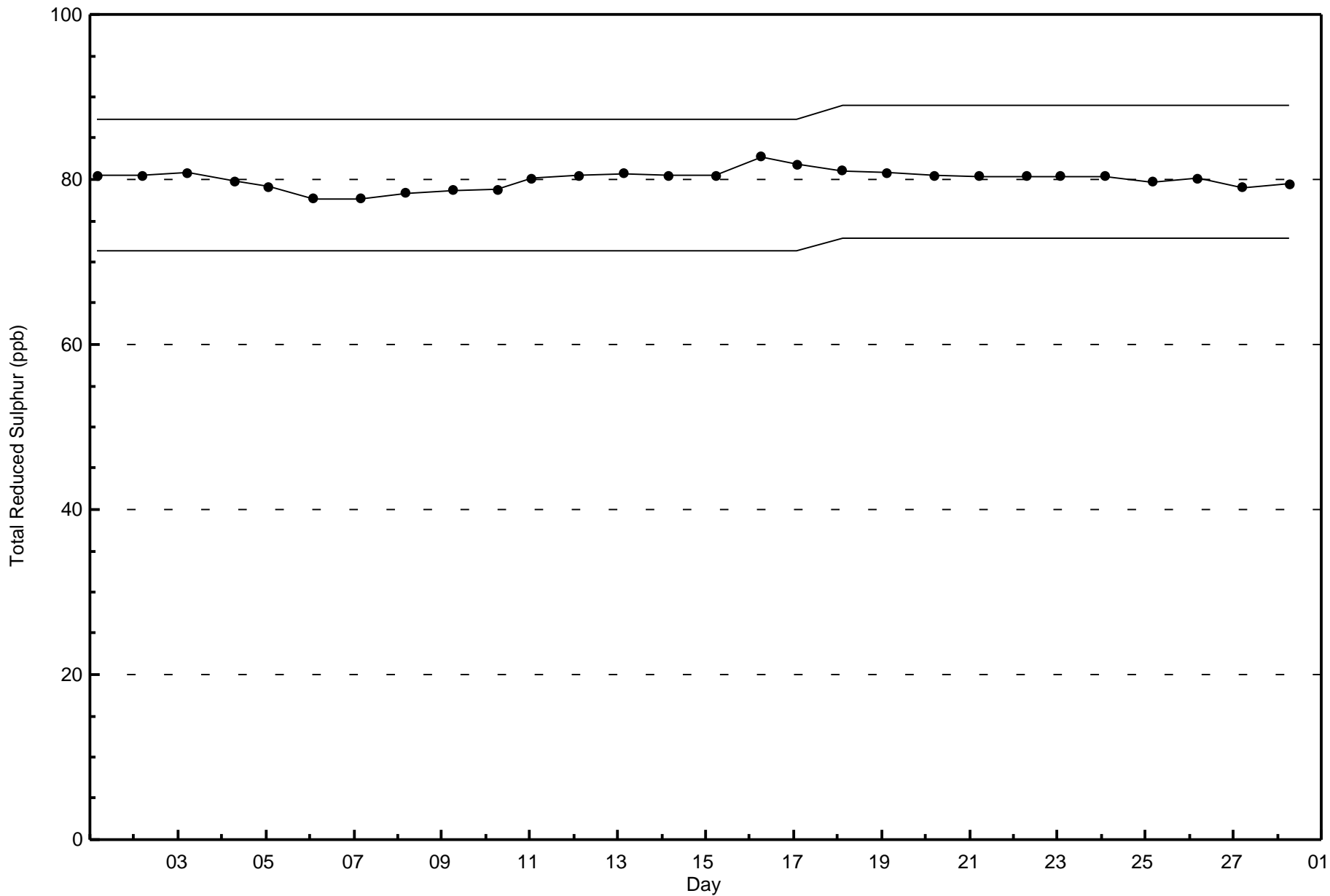
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Reduced Sulphur (TRS) - ppb
Stony Mountain (AMS 18)



Total Number of Valid Hours: 625

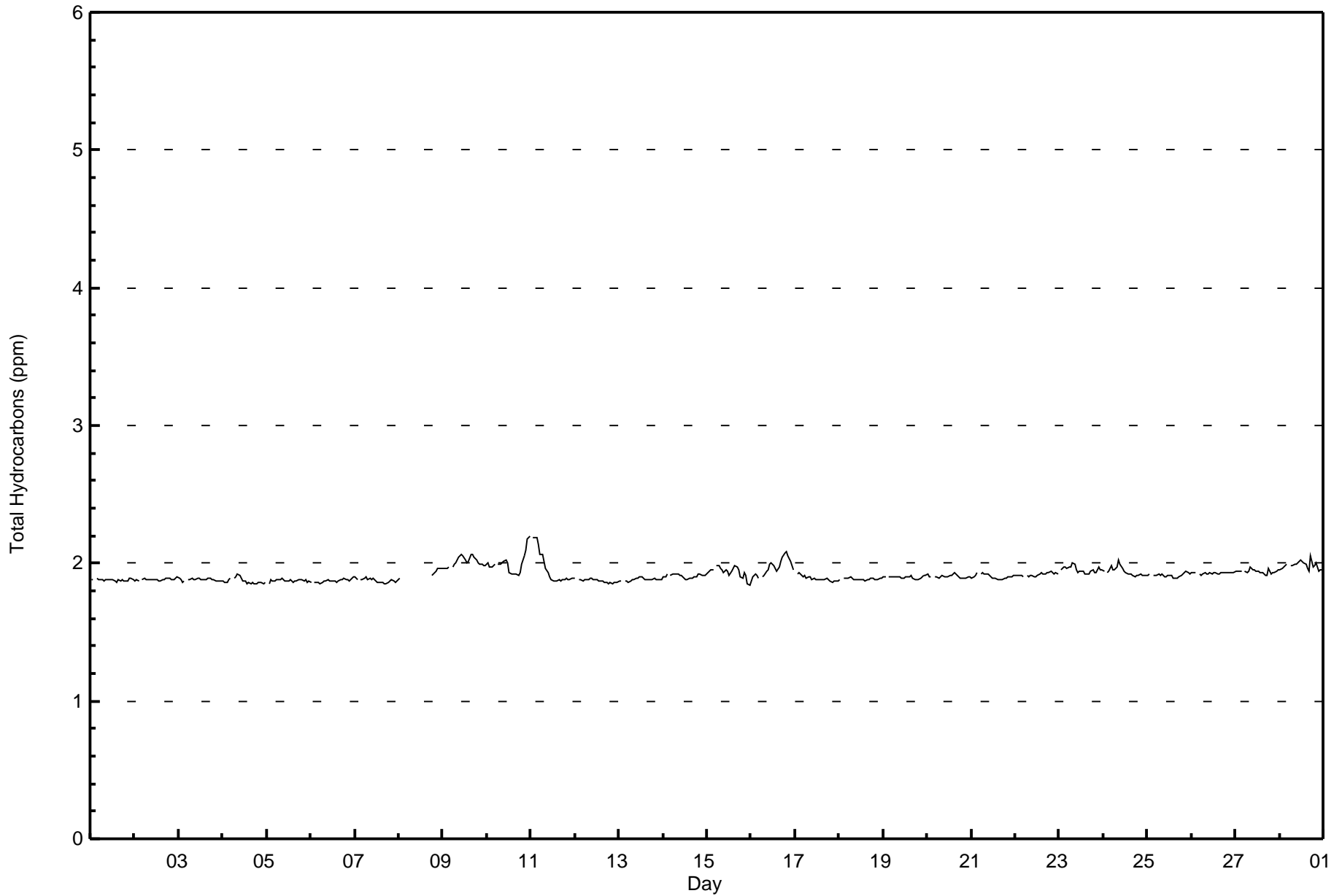






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Stony Mountain - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	610	96.98	96.98
2.1 - 3.0	19	3.02	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 629

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Stony Mountain - February 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	25	16	15	16	21	14	6	12	9	28	82	38	78	115	75	45	595
2.1 - 3.0	0	0	0	1	1	1	0	0	2	4	7	2	1	0	0	0	19
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	25	16	15	17	22	15	6	12	11	32	89	40	79	115	75	45	614

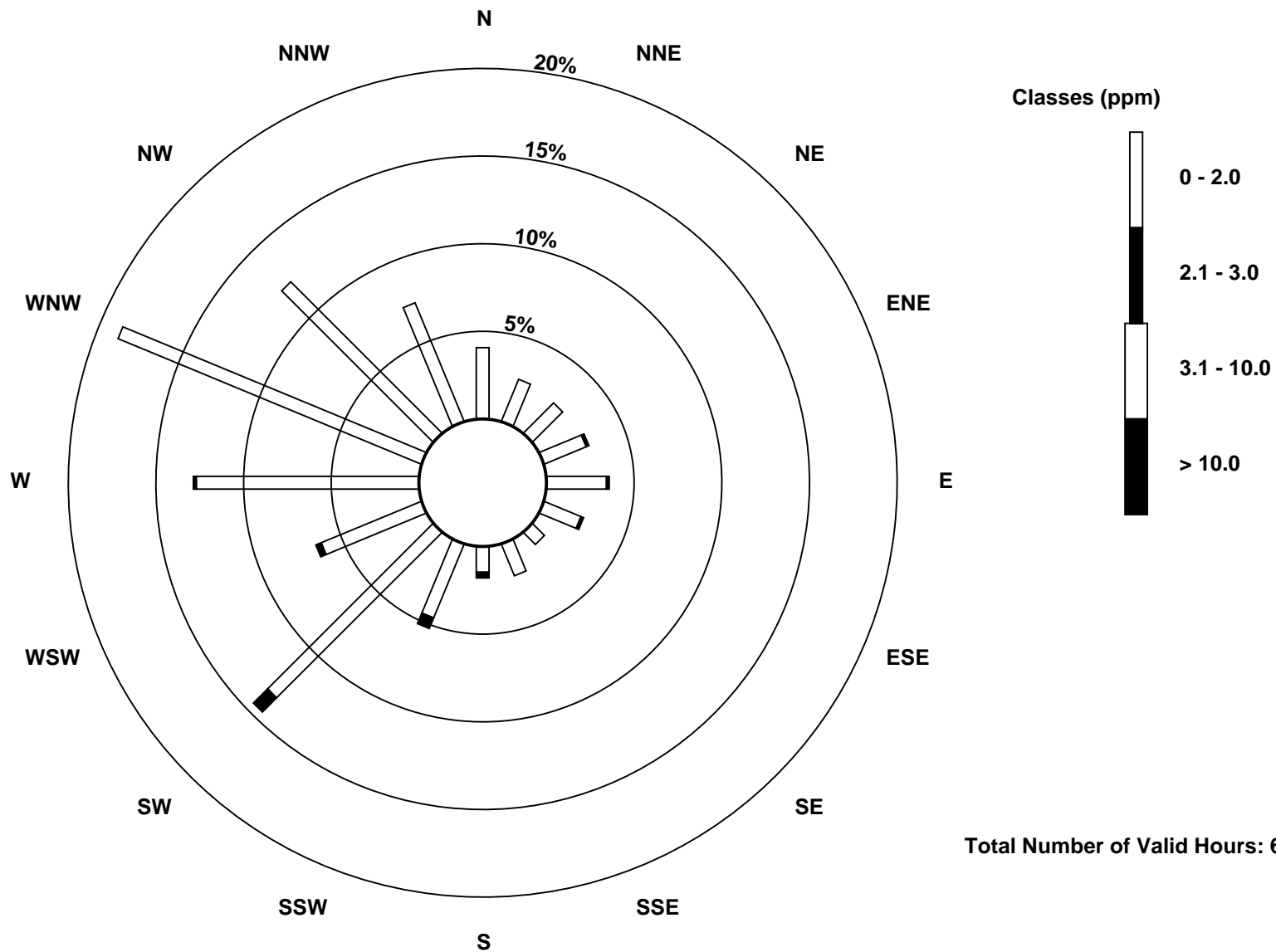
Total Number of Valid Hours: 614

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

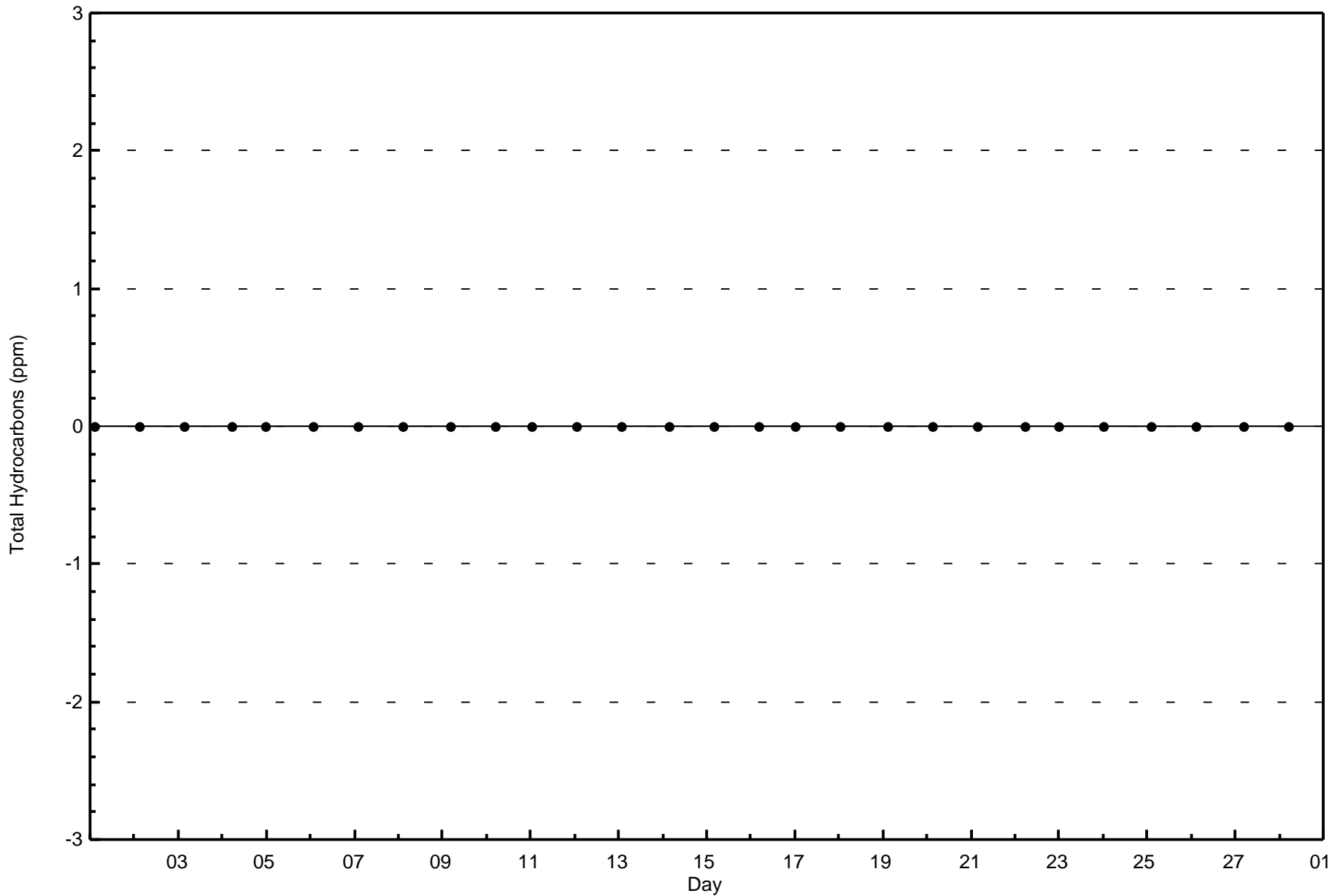
Total Hydrocarbons (THC) - ppm
Stony Mountain (AMS 18)





Wood Buffalo Environmental Association
Zero Responses

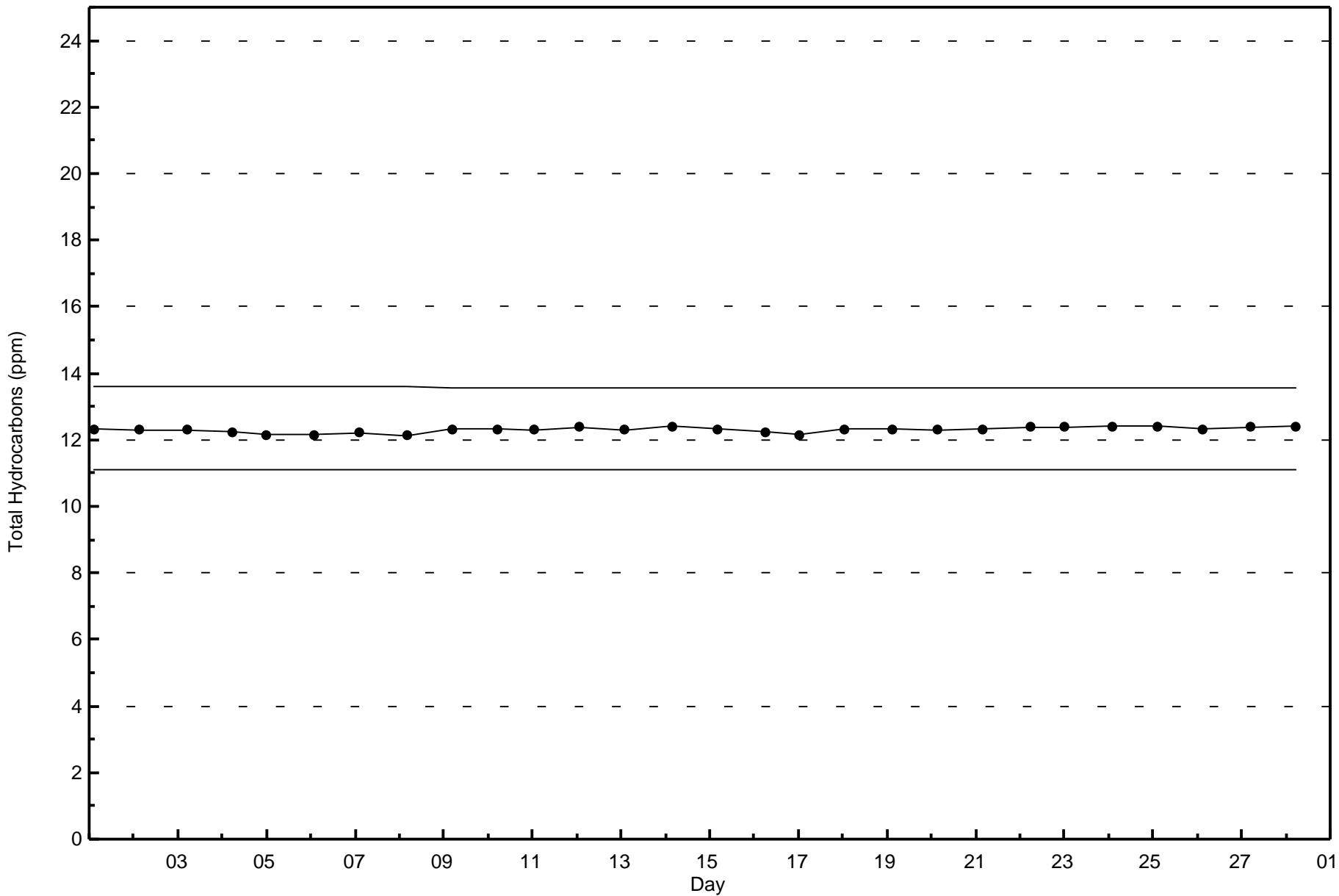
Total Hydrocarbons (THC) - ppm
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Span Responses

Total Hydrocarbons (THC) - ppm
Stony Mountain - February 2017

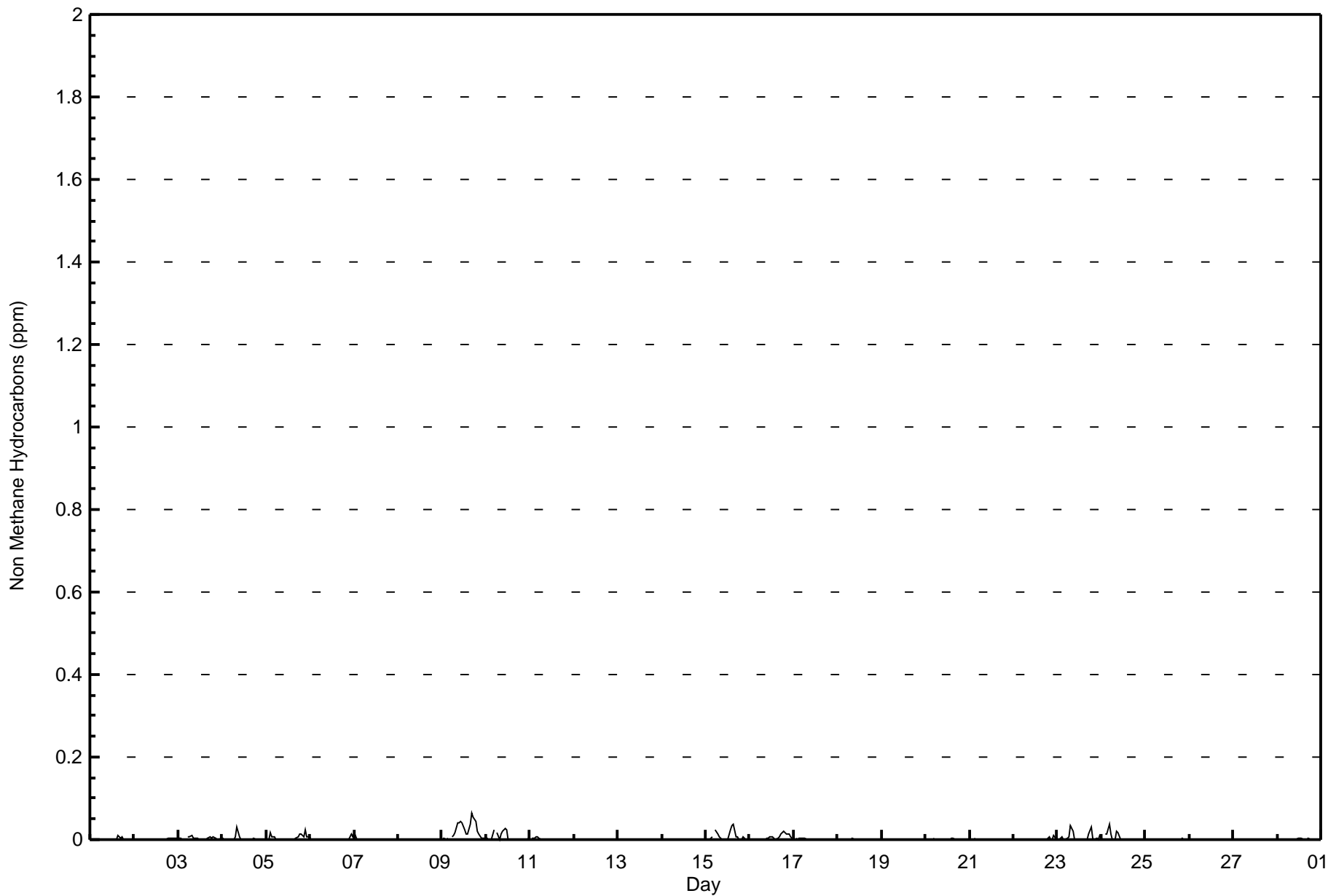




Summary of Hour Averages

Stony Mountain - February 2017

Maximum Value: 0.063 ppm on Feb 9 17:00		Maximum Daily Average: 0.022 ppm on Feb 9		Hours in Service: 672																						
Minimum Value: 0.000 ppm on Feb 1 01:00		Minimum Daily Average: 0.000 ppm on Feb 12		Hours of Data: 629																						
Maximum Diurnal Average: 0.005 ppm at hour 9		Minimum Diurnal Average: 0.000 ppm at hour 2		Hours of Missing Data: 43																						
Monthly Average: 0.003 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 = 0.0		Hours of Calibration: 31																						
				Percent Operational Time: 98.2																						
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-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.009	0.004	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.009
2-Feb	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	0.000	0.000	0.000	0.002	0.003	0.002	0.002	0.003	0.003	0.005	0.001	0.005	
3-Feb	0.003	0.003	0.001	0.001	Z	0.005	0.006	0.012	0.002	0.004	0.002	0.001	0.001	0.000	0.000	0.001	0.004	0.008	0.003	0.007	0.003	0.002	0.000	0.005	0.003	0.012
4-Feb	0.002	0.000	0.000	0.000	0.000	Z	0.000	0.006	0.032	0.008	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.032	
5-Feb	Z	0.000	0.017	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.007	0.013	0.012	0.007	0.022	0.008	0.008	0.005	0.022
6-Feb	0.004	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.012	0.006	0.001	0.012	
7-Feb	0.017	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	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.017	
8-Feb	0.000	UO	0.000	Z	AF	AF	AF	AF	AF	M	M	M	M	M	M	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000
9-Feb	0.000	0.002	0.000	0.002	Z	0.006	0.010	0.017	0.039	0.041	0.043	0.040	0.024	0.015	0.013	0.038	0.063	0.055	0.043	0.021	0.014	0.004	0.003	0.005	0.022	0.063
10-Feb	0.005	0.001	0.001	0.001	0.022	Z	0.016	0.000	0.013	0.021	0.029	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.006	0.029
11-Feb	Z	0.002	0.002	0.007	0.007	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.007
12-Feb	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
13-Feb	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
14-Feb	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
15-Feb	0.000	0.000	0.000	0.006	Z	0.023	0.015	0.007	0.002	0.000	0.001	0.001	0.023	0.034	0.037	0.007	0.006	0.001	0.000	0.008	0.005	0.000	0.000	0.008	0.008	0.037
16-Feb	0.000	0.000	0.000	0.000	0.001	Z	0.000	0.000	0.002	0.004	0.002	0.008	0.006	0.003	0.001	0.003	0.007	0.015	0.020	0.019	0.013	0.013	0.006	0.004	0.006	0.020
17-Feb	Z	0.002	0.001	0.003	0.003	0.003	0.003	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	0.000	0.000	0.000	0.001	0.001	0.003
18-Feb	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
19-Feb	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
20-Feb	0.001	0.000	0.001	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.003
21-Feb	0.000	0.000	0.000	0.003	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	0.003
22-Feb	0.000	0.000	0.002	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	0.001	0.001	0.006	0.001	0.000	0.011	0.000	0.001	0.011
23-Feb	Z	0.000	0.007	0.001	0.000	0.002	0.005	0.035	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.031	0.004	0.000	0.003	0.000	0.012	0.006	0.035	
24-Feb	0.001	Z	0.014	0.012	0.036	0.014	0.001	0.001	0.021	0.015	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	0.005	0.036	
25-Feb	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	0.000	0.000	0.000	0.002
26-Feb	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
27-Feb	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
28-Feb	0.000	0.000	0.000	0.000	0.001	Z	0.000	0.001	0.000	0.000	0.000	0.003	0.005	0.003	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan																								C - Calibration		
M - Maintenance																								AF - Analyzer Failure		
UO - Unstable Operation																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	550	87.44	87.44
0.006 - 0.05	78	12.40	99.84
0.06 - 0.1	1	0.16	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 629

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - February 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	18	14	12	16	21	13	5	8	10	24	75	38	76	109	64	32	535
0.006 - 0.05	7	2	3	1	1	1	1	4	1	8	14	2	3	6	11	13	78
0.06 - 0.1	0	0	0	0	0	1	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
Totals	25	16	15	17	22	15	6	12	11	32	89	40	79	115	75	45	614

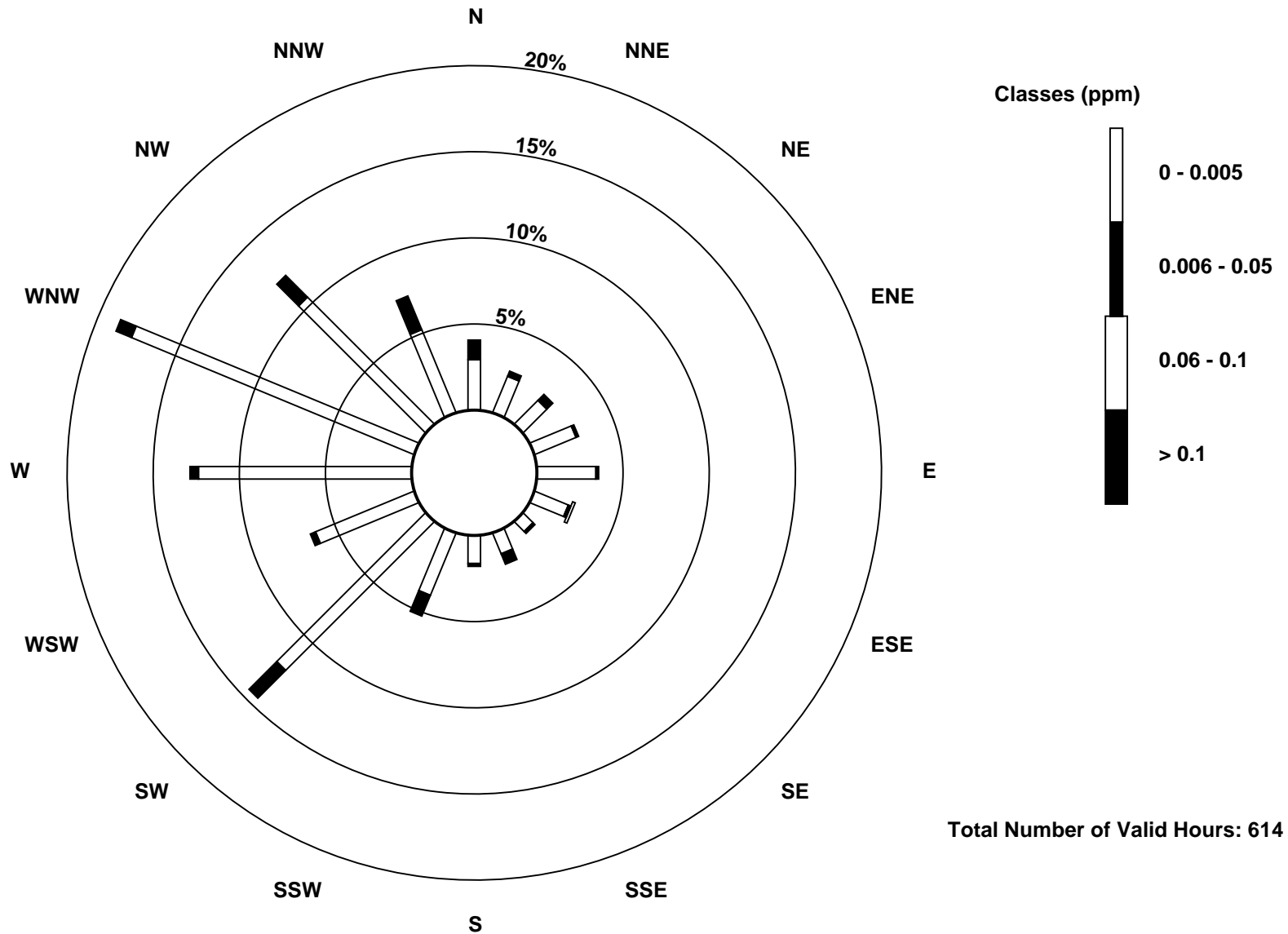
Total Number of Valid Hours: 614

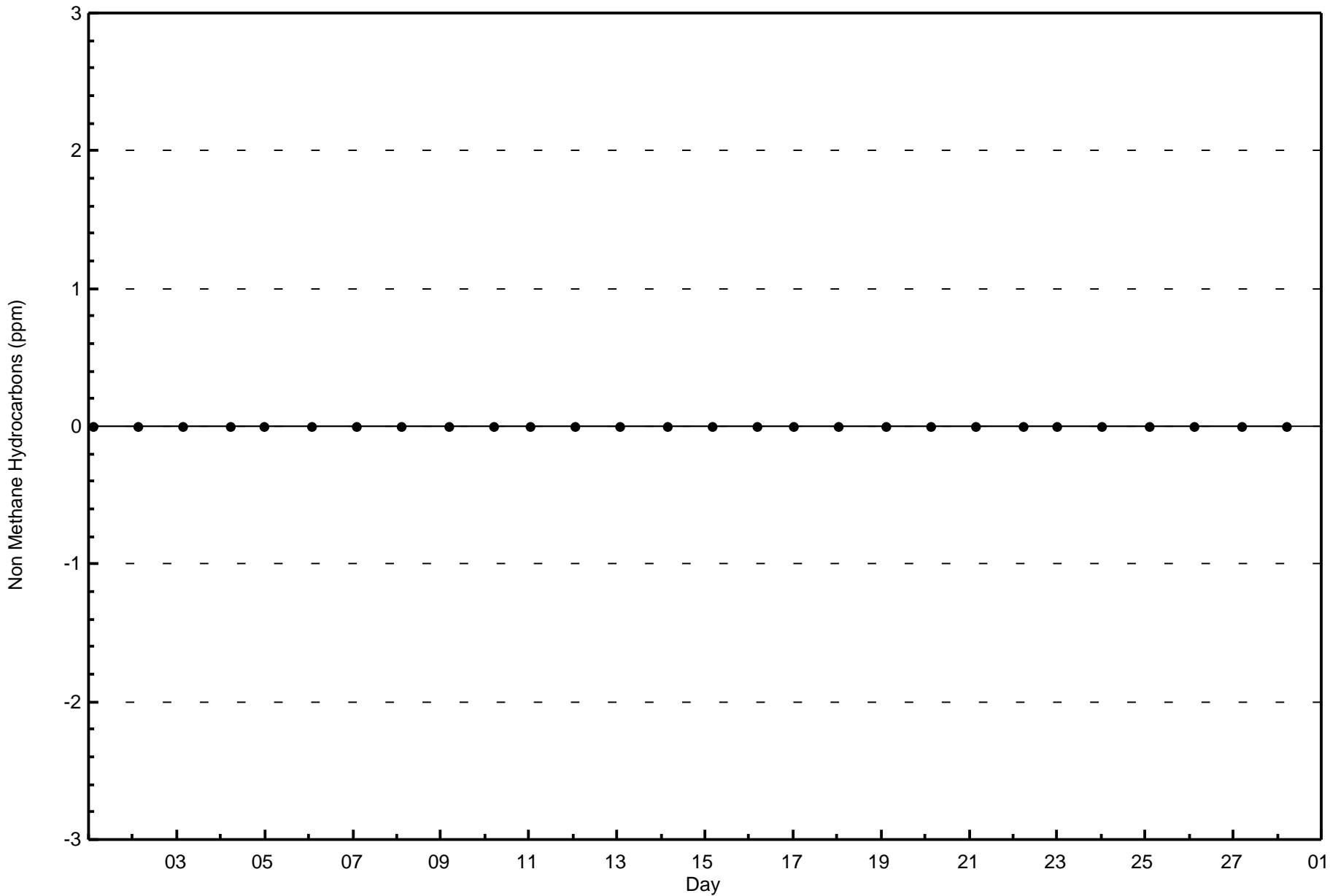
Total Number of Hours: 672

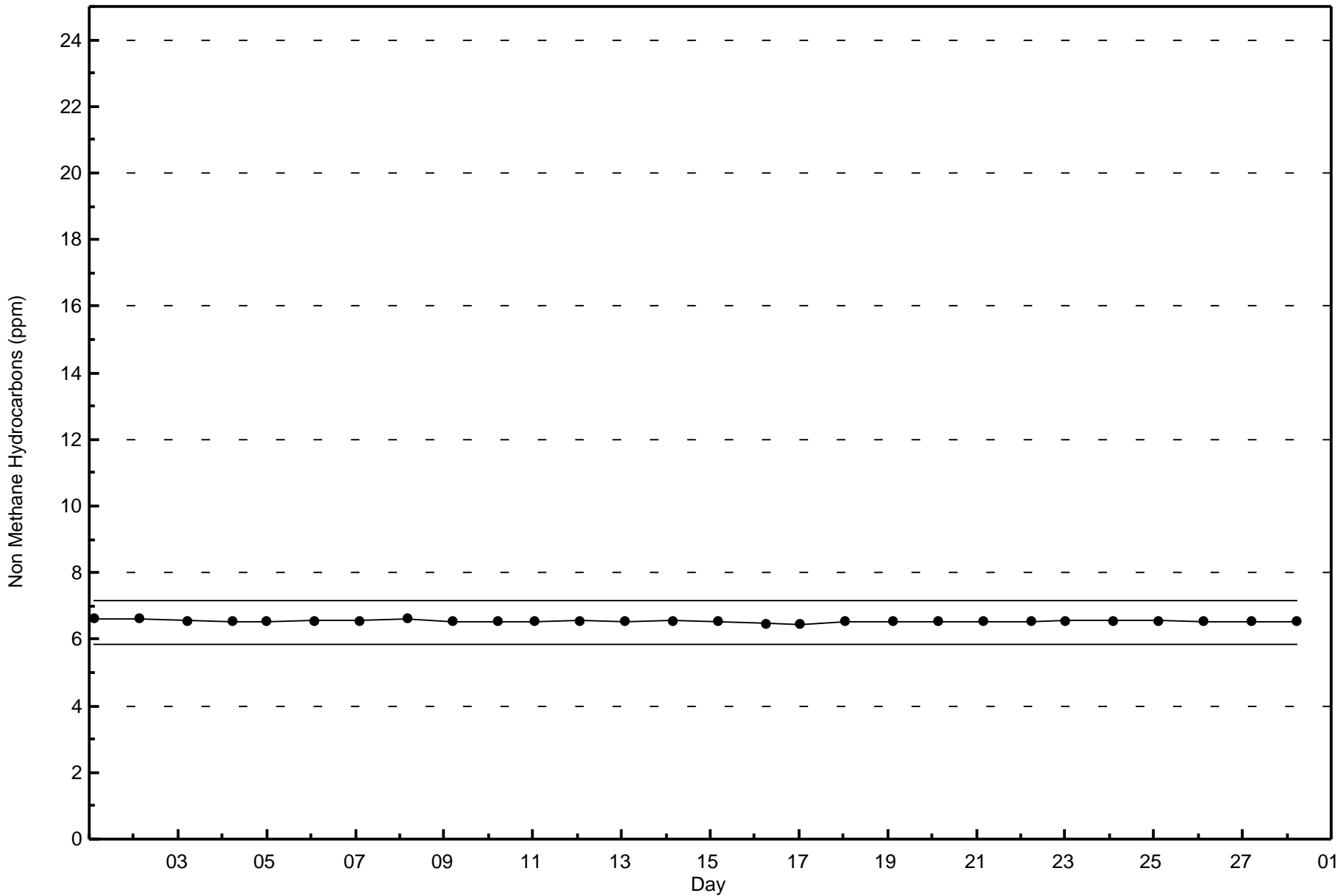


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain (AMS 18)



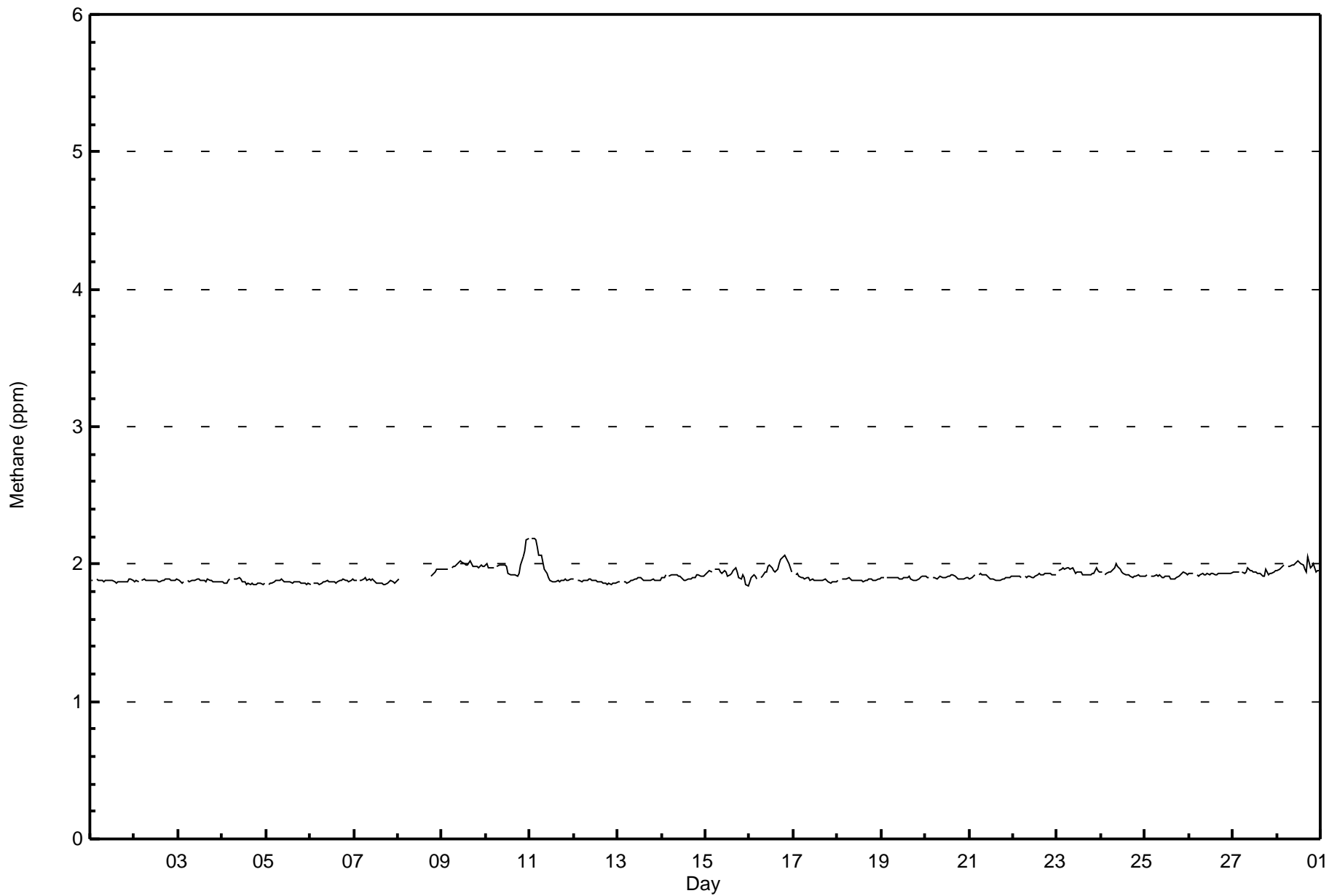






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Stony Mountain - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	616	97.93	97.93
2.1 - 3.0	13	2.07	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 629

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Stony Mountain - February 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	25	16	15	17	21	15	6	12	10	29	83	38	79	115	75	45	601
2.1 - 3.0	0	0	0	0	1	0	0	0	1	3	6	2	0	0	0	0	13
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	25	16	15	17	22	15	6	12	11	32	89	40	79	115	75	45	614

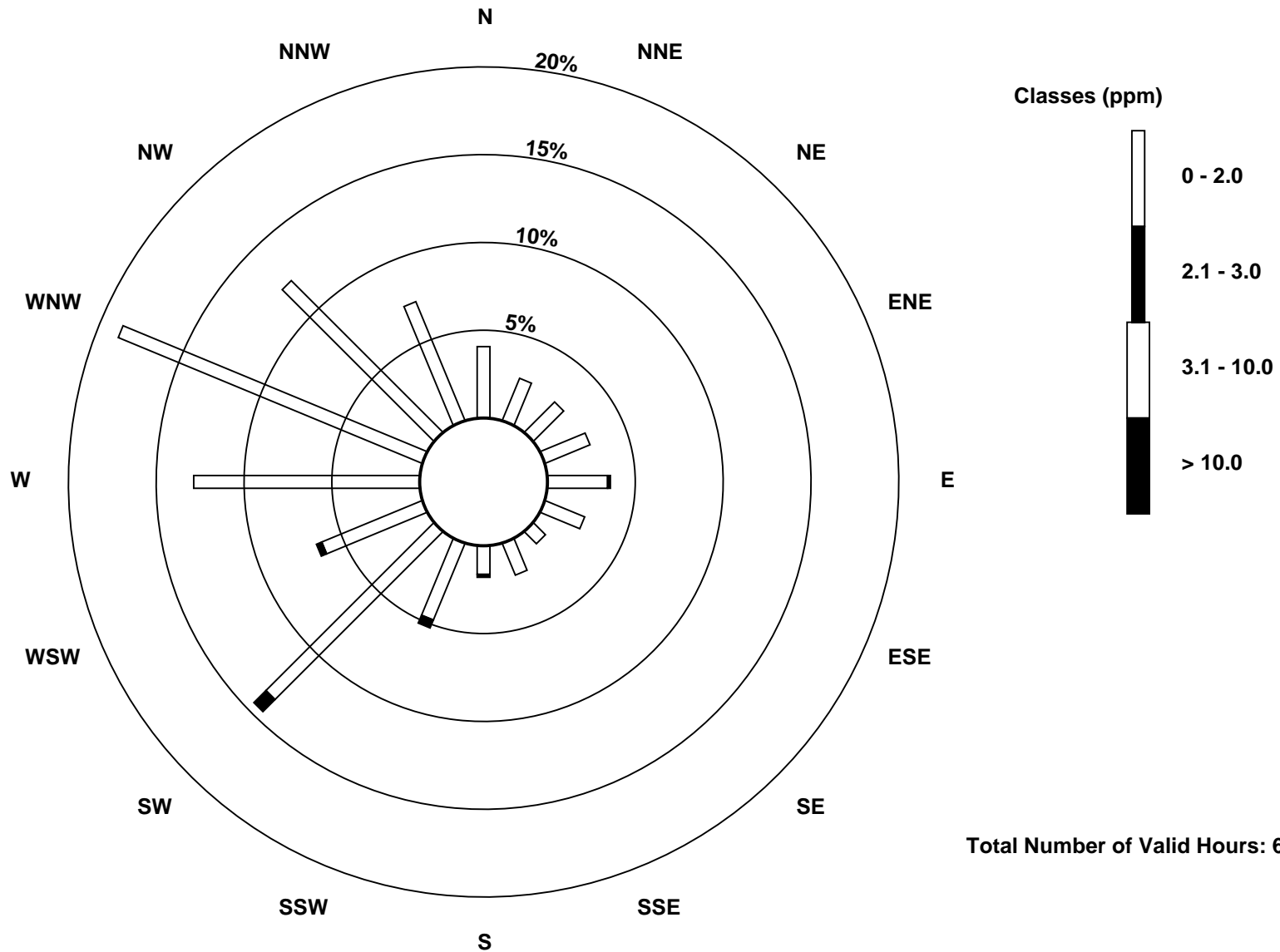
Total Number of Valid Hours: 614

Total Number of Hours: 672

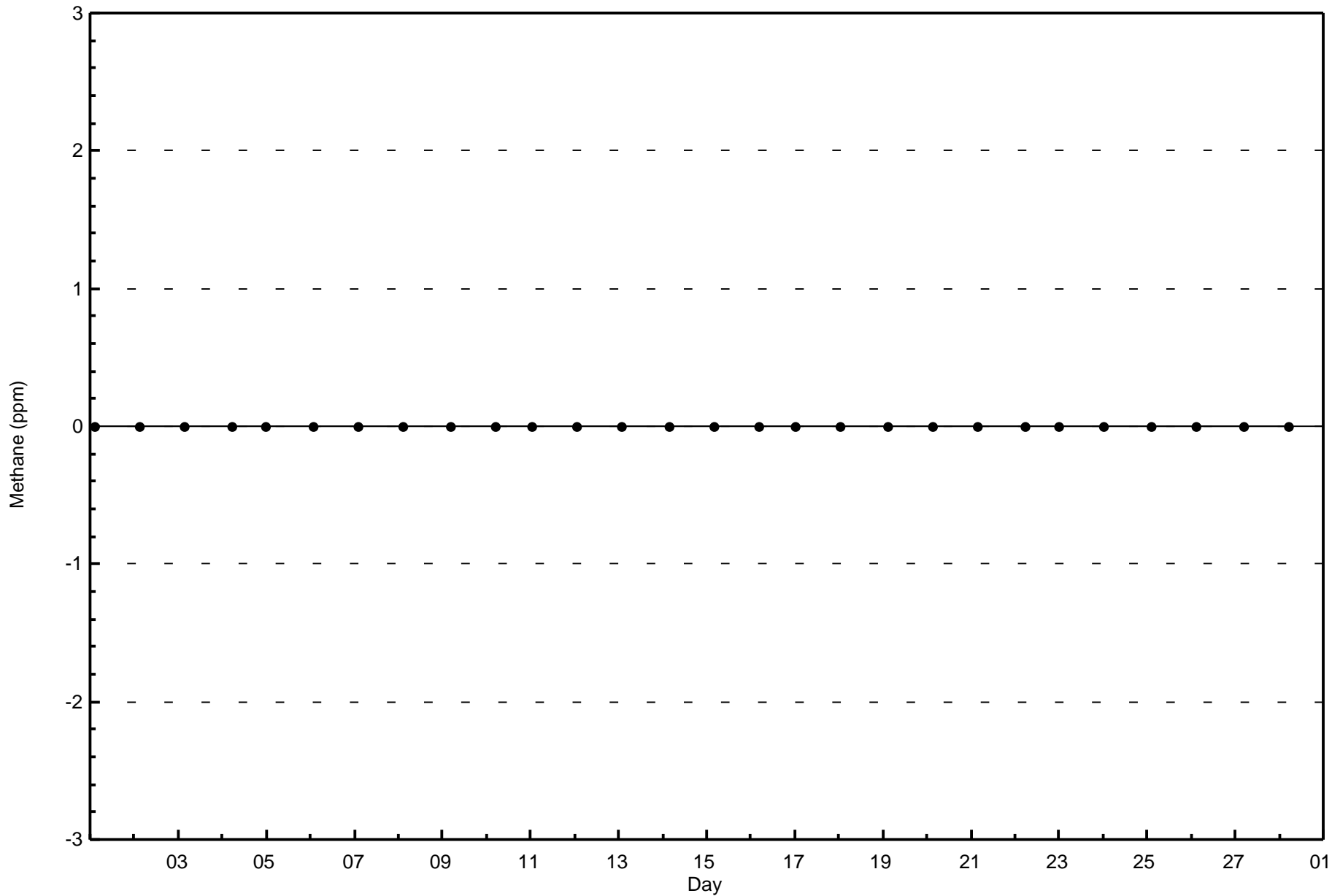


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Methane (CH₄) - ppm
Stony Mountain (AMS 18)



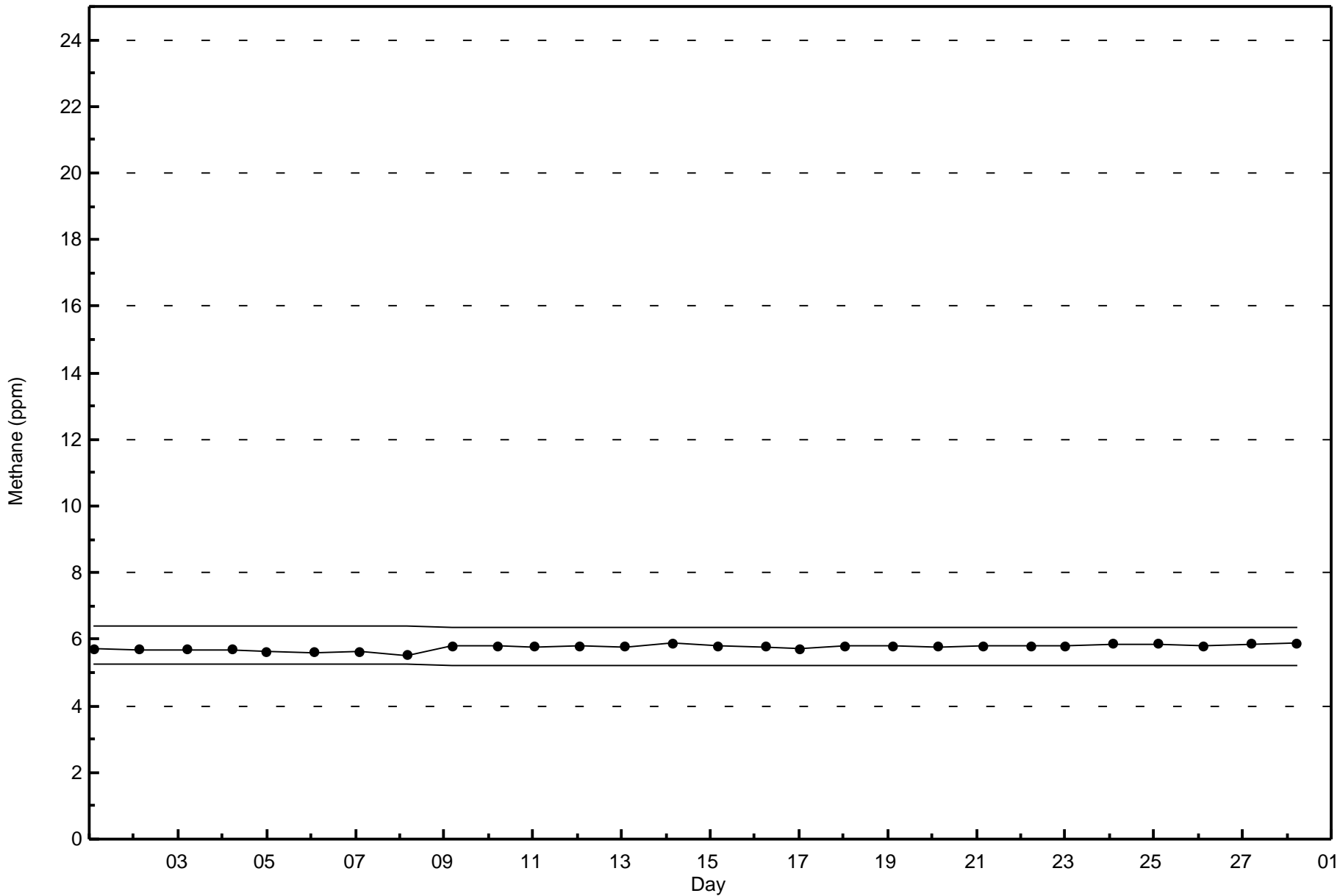
Total Number of Valid Hours: 614





Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Stony Mountain - February 2017



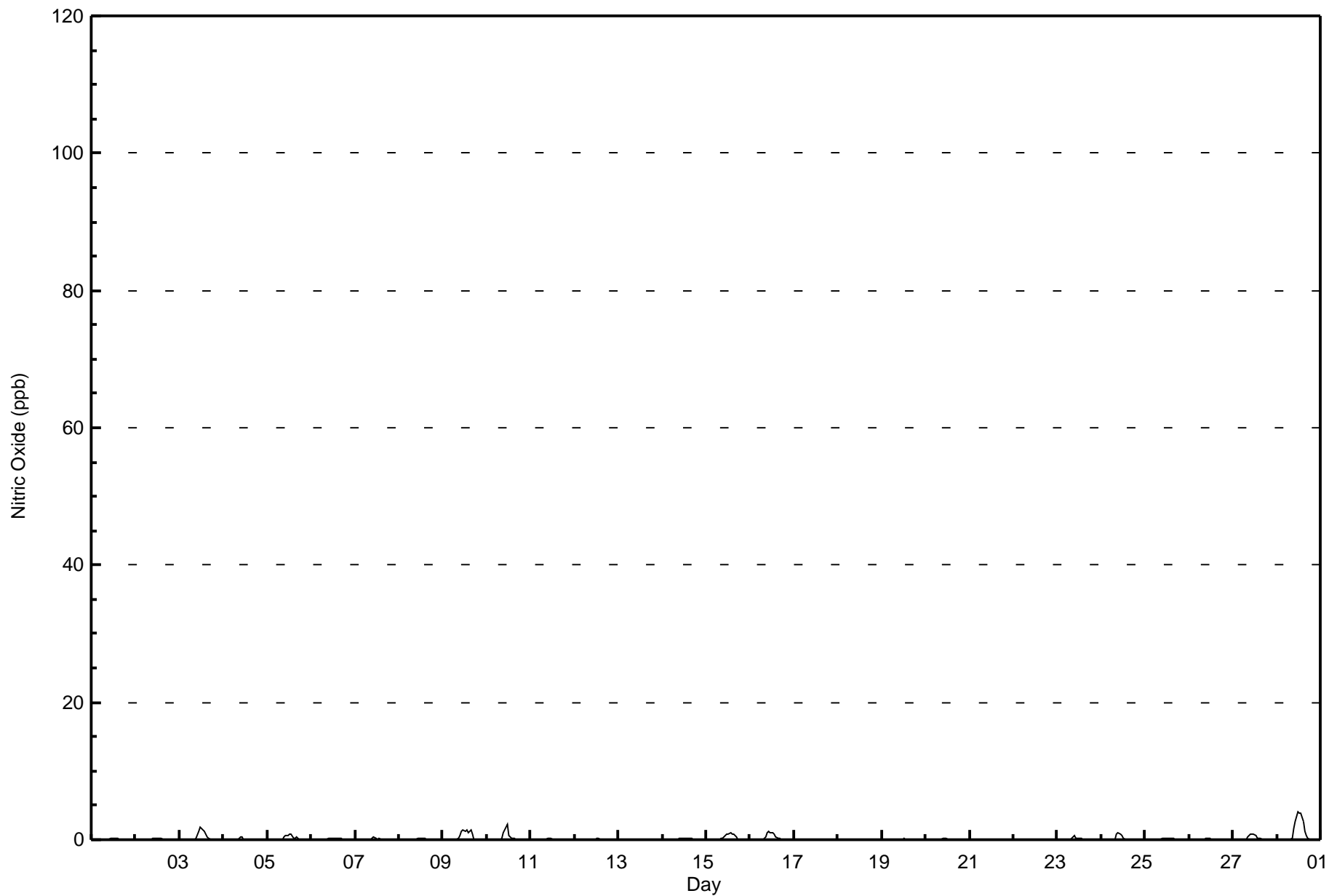


Maximum Value: 4 ppb on Feb 28 12:00																	Maximum Daily Average: 0.9 ppb on Feb 28																	Hours in Service: 672	
Minimum Value: 0 ppb on Feb 1 19:00																	Minimum Daily Average: 0.0 ppb on Feb 18																	Hours of Data: 639	
Maximum Diurnal Average: 0.6 ppb at hour 12																	Minimum Diurnal Average: 0.0 ppb at hour 21																	Hours of Missing Data: 33	
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: 33	
																	Percent Operational Time: 100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Feb	0	0	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								
2-Feb	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.3	2								
4-Feb	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1								
5-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1								
6-Feb	0	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								
7-Feb	0	0	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-Feb	0	0	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								
9-Feb	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1								
10-Feb	0	0	0	0	0	Z	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2								
11-Feb	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								
12-Feb	0	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								
13-Feb	0	0	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								
14-Feb	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1								
16-Feb	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	0.3	1								
17-Feb	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								
18-Feb	0	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								
19-Feb	0	0	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								
20-Feb	0	0	0	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								
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.0	0								
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0								
23-Feb	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1								
24-Feb	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1								
25-Feb	0	0	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								
26-Feb	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1								
28-Feb	0	0	0	0	0	Z	0	0	0	2	3	4	4	4	3	1	1	0	0	0	0	0	0	0	0	0.9	4								
																	Diurnal Average																		
																	Diurnal Maximum																		
Z - zerospan																	C - Calibration																		



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Stony Mountain - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - February 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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624
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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624

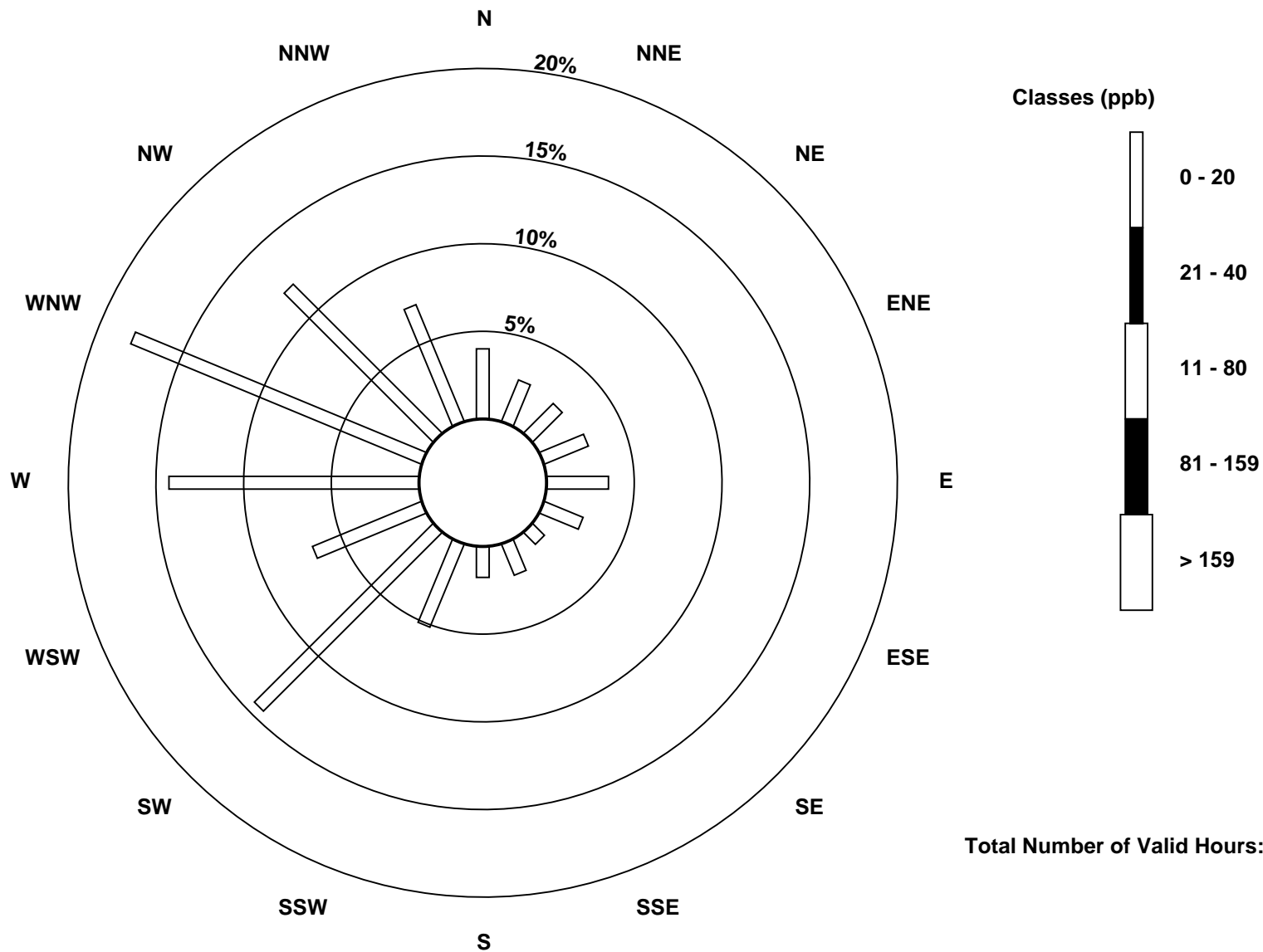
Total Number of Valid Hours: 624

Total Number of Hours: 672

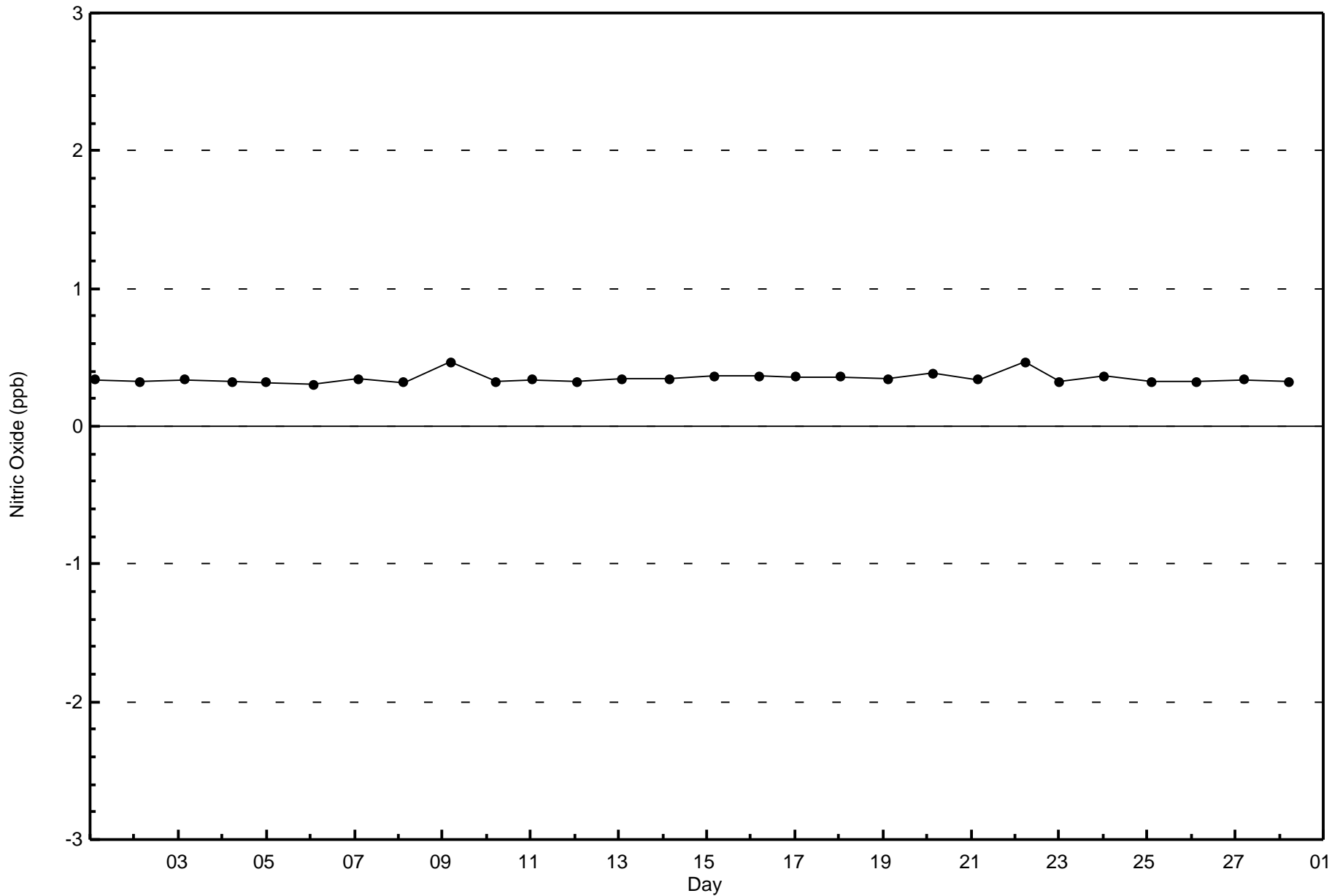


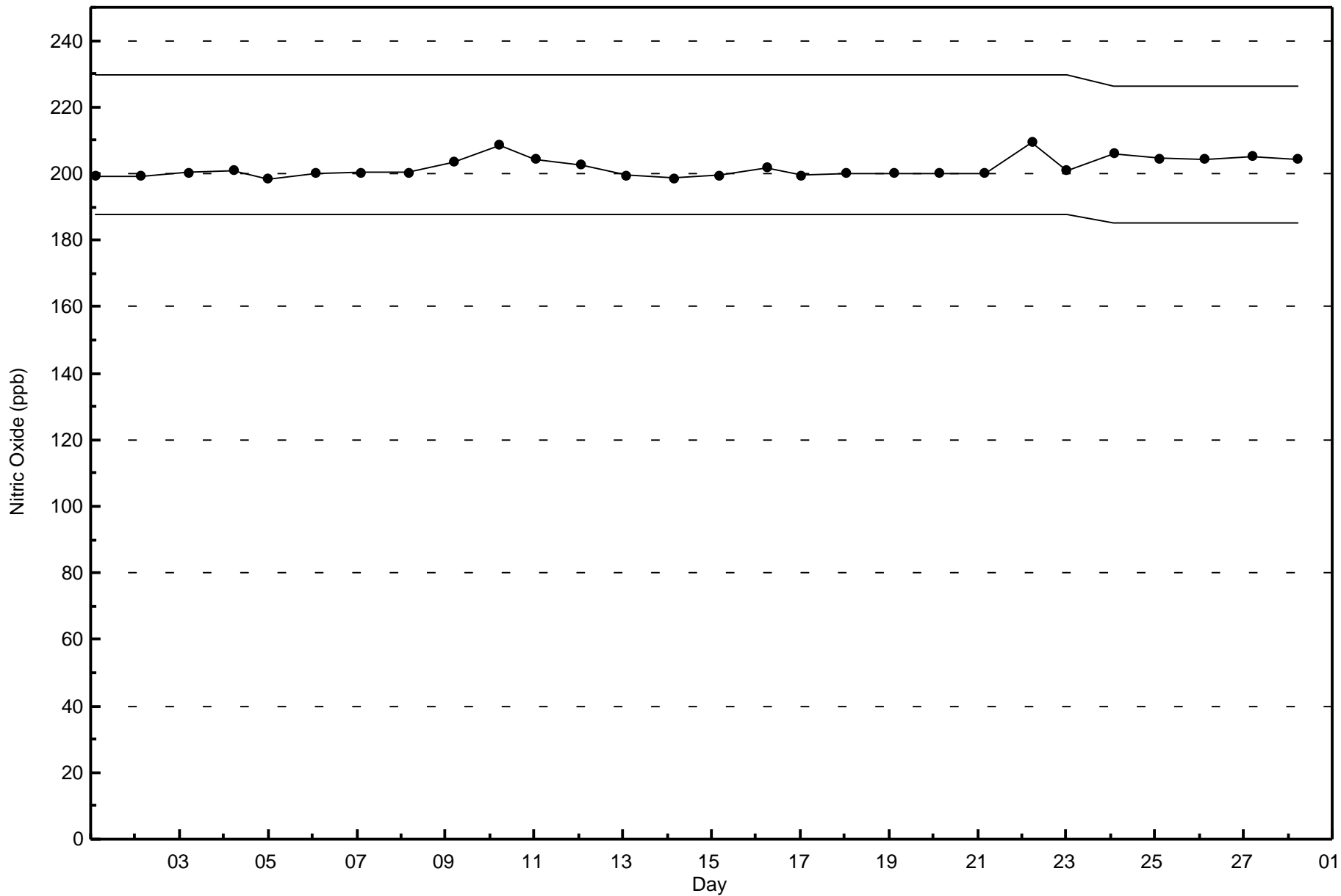
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
Stony Mountain (AMS 18)



Total Number of Valid Hours: 624







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Stony Mountain - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 12 ppb on Feb 9 17:00	Maximum Daily Average: 6.2 ppb on Feb 9		Hours of Data:	639
Minimum Value: 0 ppb on Feb 6 06:00	Minimum Daily Average: 0.5 ppb on Feb 22		Hours of Missing Data:	33
Maximum Diurnal Average: 2.1 ppb at hour 9	Minimum Diurnal Average: 1.4 ppb at hour 13		Hours of Calibration:	33
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 8		Percent Operational Time:	100.0

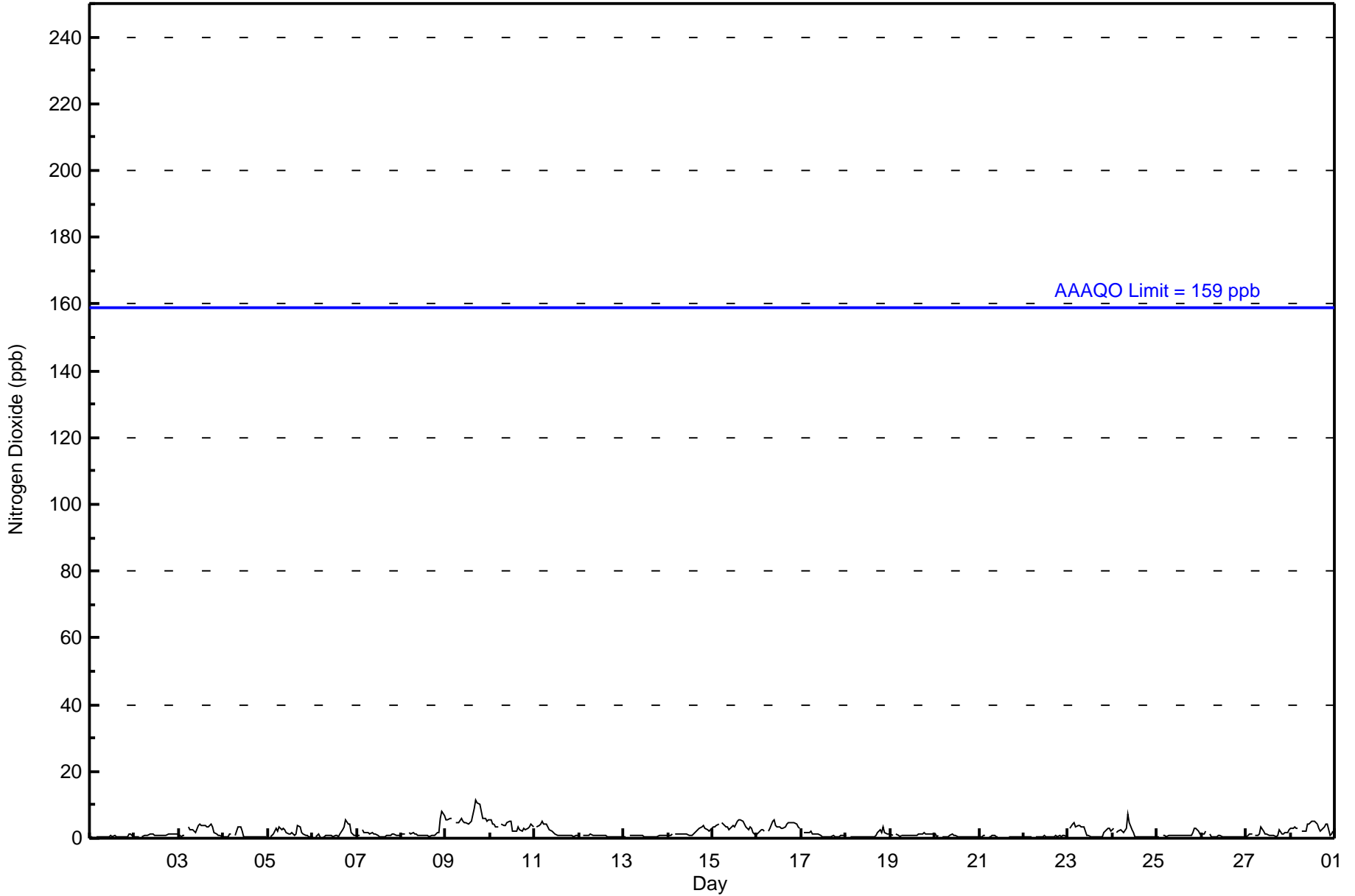
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	1	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0.5	1	
2-Feb	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	
3-Feb	1	1	1	1	Z	4	3	3	2	2	4	4	4	4	4	3	3	4	3	2	1	1	1	1	2.4	4	
4-Feb	0	0	1	1	1	Z	4	1	2	3	3	2	1	1	1	0	1	0	0	0	0	0	1	1	0.9	3	
5-Feb	Z	1	1	1	3	2	3	3	3	3	2	1	1	2	1	1	4	3	2	1	1	1	0	1.7	4		
6-Feb	0	Z	0	1	1	0	1	1	1	1	1	1	1	1	1	3	3	6	4	4	4	2	1	1	1.5	6	
7-Feb	1	1	Z	3	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	3	
8-Feb	1	1	1	Z	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	6	8	7	1.9	8	
9-Feb	5	6	6	6	Z	5	5	5	6	5	5	5	4	5	5	9	12	11	10	8	6	6	5	6	6.2	12	
10-Feb	6	4	4	3	4	Z	4	4	4	5	5	5	2	2	2	4	3	2	3	3	3	4	4	4	3.6	6	
11-Feb	Z	3	4	4	5	4	4	4	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.9	5	
12-Feb	1	Z	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	
13-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
14-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	3	3	4	4	3	2	2	3	1.8	4	
15-Feb	3	3	4	4	Z	5	4	3	3	3	3	4	3	5	6	6	5	4	3	3	4	3	2	1	3.6	6	
16-Feb	1	2	2	2	2	Z	2	3	5	5	4	4	3	3	3	3	4	5	5	5	5	4	4	3	3.5	5	
17-Feb	Z	2	2	2	2	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1.0	2	
18-Feb	1	Z	1	1	1	0	1	1	0	0	0	0	0	1	1	1	1	2	2	2	4	2	1	1	0.9	4	
19-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1.0	2	
20-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0.6	1	
21-Feb	1	1	1	1	Z	1	1	1	1	1	1	C	C	C	C	C	1	1	1	1	0	0	0	0	0.6	1	
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1	1	1	1	0.5	1	
23-Feb	Z	3	4	5	4	4	4	4	3	2	1	1	1	1	1	1	1	1	1	2	2	3	3	2	2.1	5	
24-Feb	3	Z	2	2	3	2	2	3	7	5	3	2	1	1	0	0	0	1	1	1	1	1	1	0	1.6	7	
25-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	2	1	1.1	3	
26-Feb	1	1	2	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	2	
27-Feb	0	1	1	1	Z	1	1	1	3	2	1	1	1	1	1	1	1	1	3	1	1	2	2	2	1.3	3	
28-Feb	3	3	3	3	3	Z	2	2	2	4	4	5	5	5	4	3	2	3	3	4	4	1	1	2	3.2	5	
	1.4	1.6	1.8	2.0	1.6	1.7	1.7	1.7	2.1	1.9	1.7	1.6	1.4	1.4	1.4	1.6	1.8	1.9	2.0	1.8	1.9	1.7	1.6	1.5	Diurnal Average		
	6	6	6	6	5	5	5	5	7	5	5	5	5	5	5	6	9	12	11	10	8	6	6	8	7	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - February 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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624
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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624

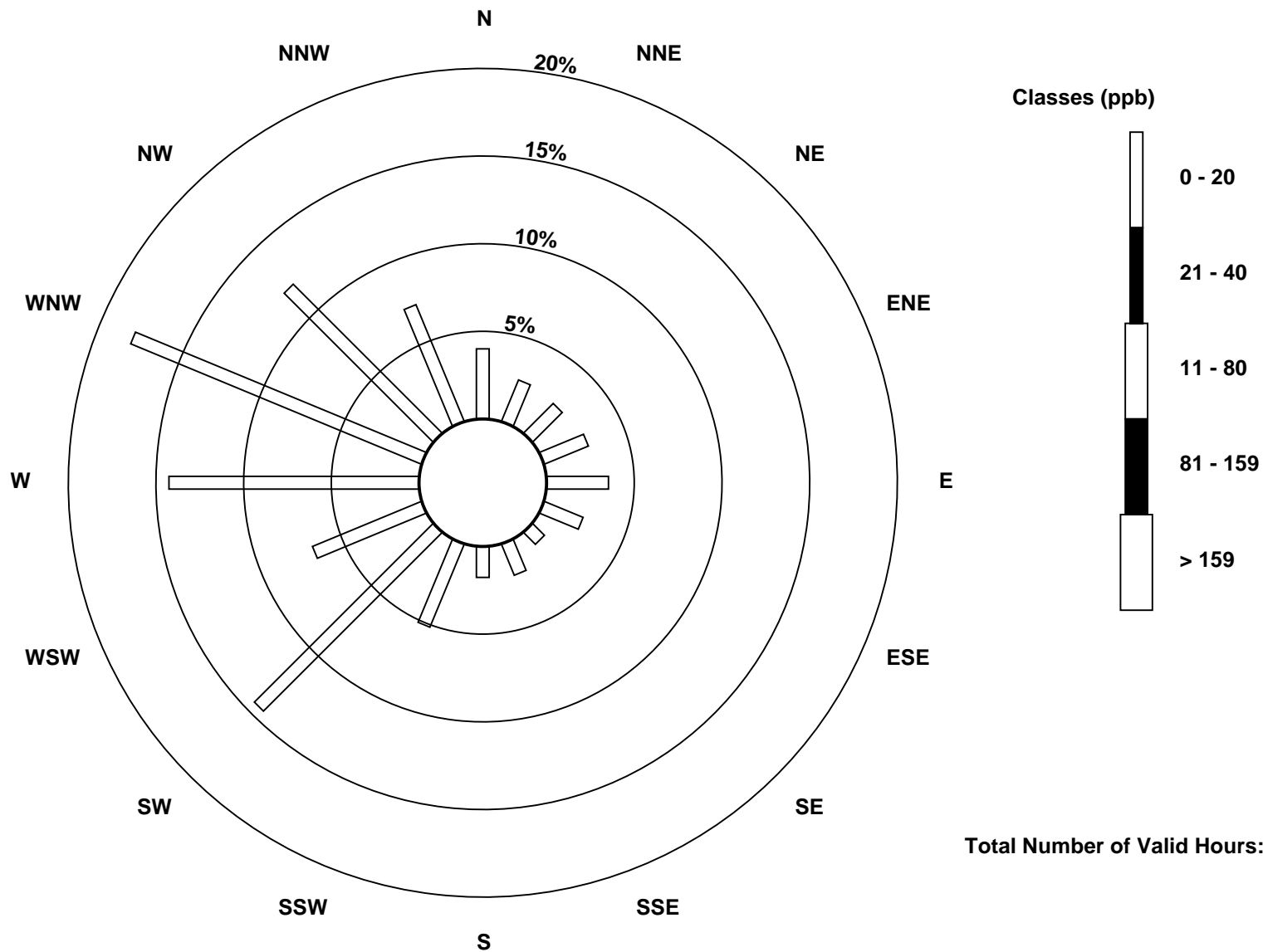
Total Number of Valid Hours: 624

Total Number of Hours: 672

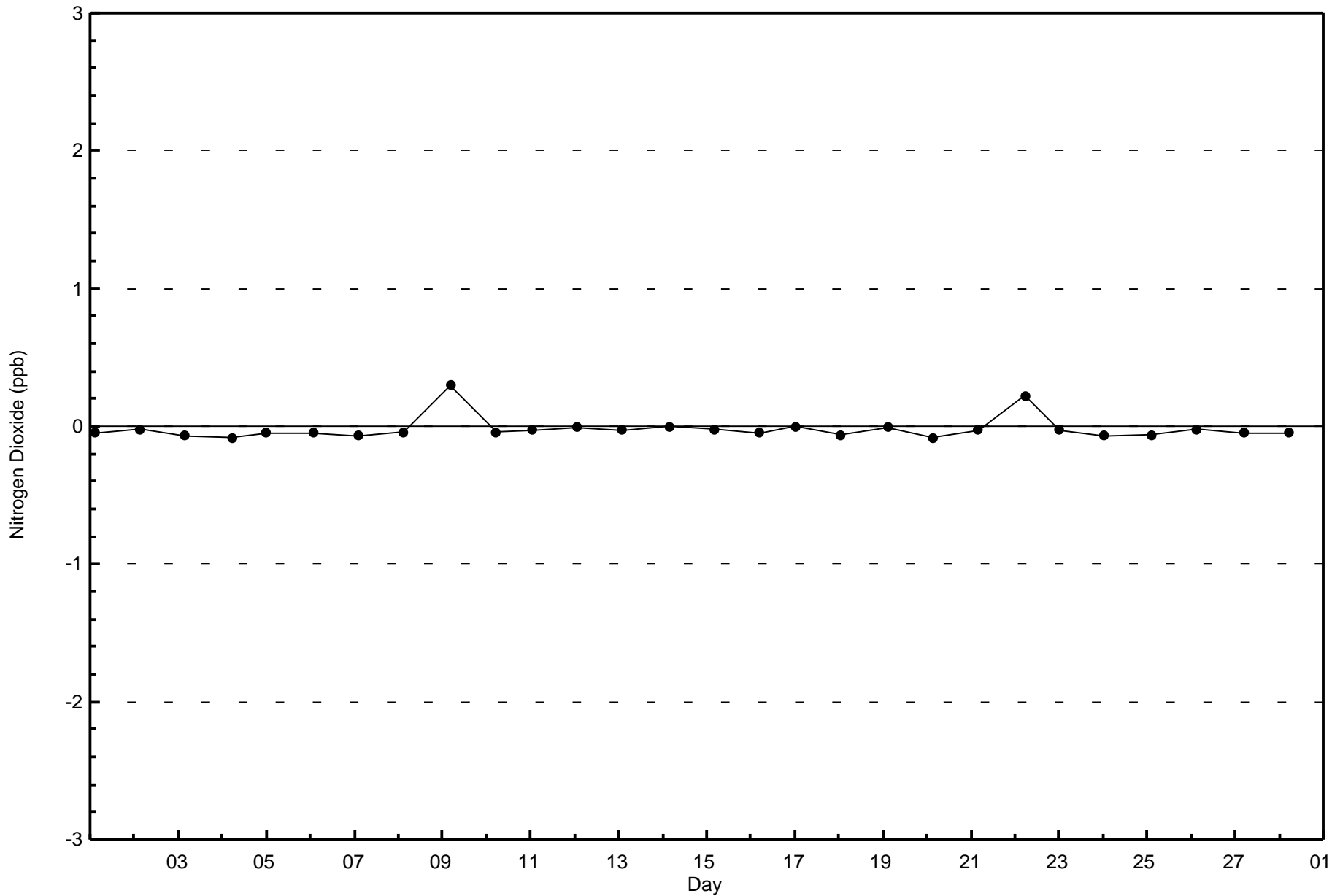


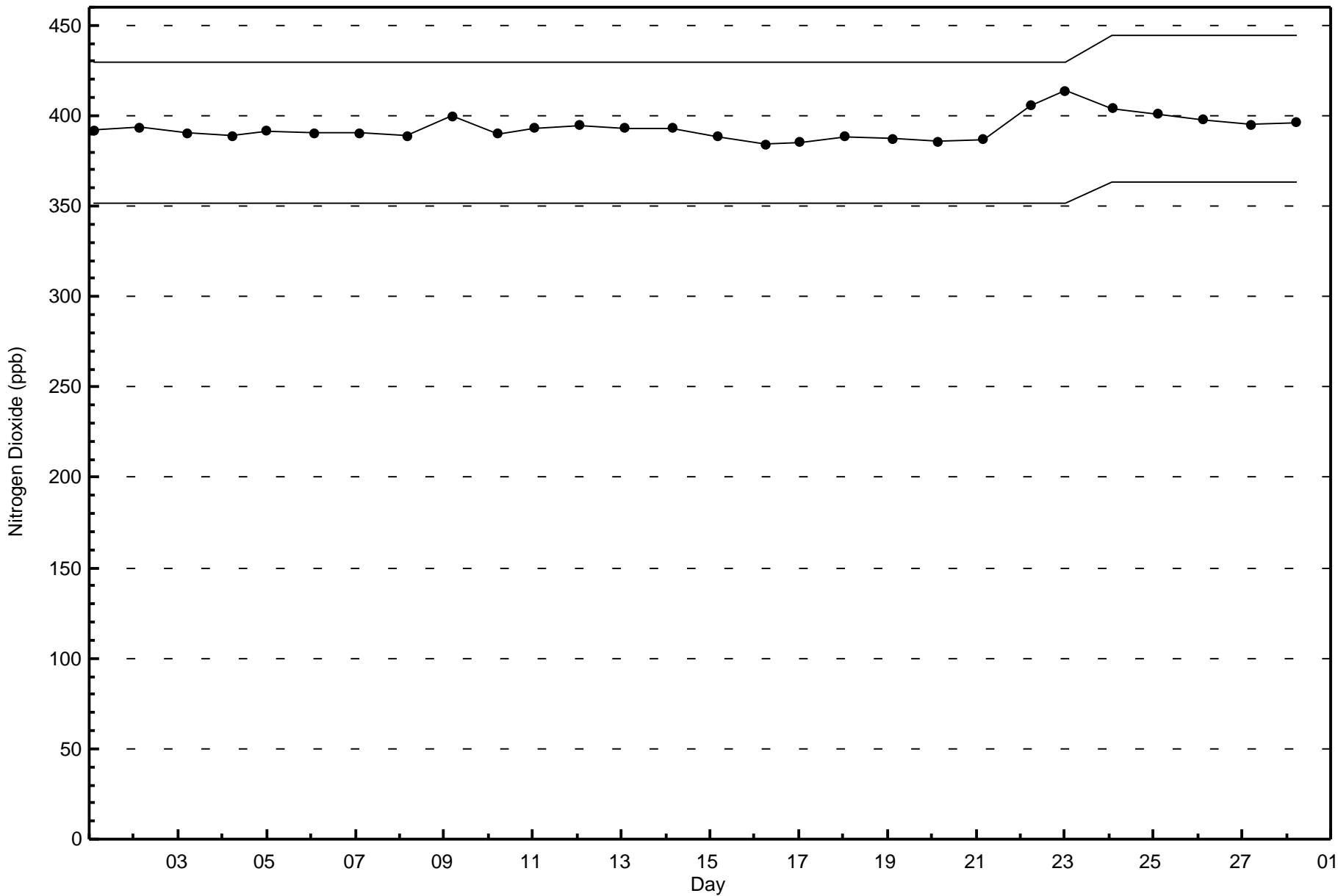
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain (AMS 18)



Total Number of Valid Hours: 624







Wood Buffalo Environmental Association
Summary of Hour Averages

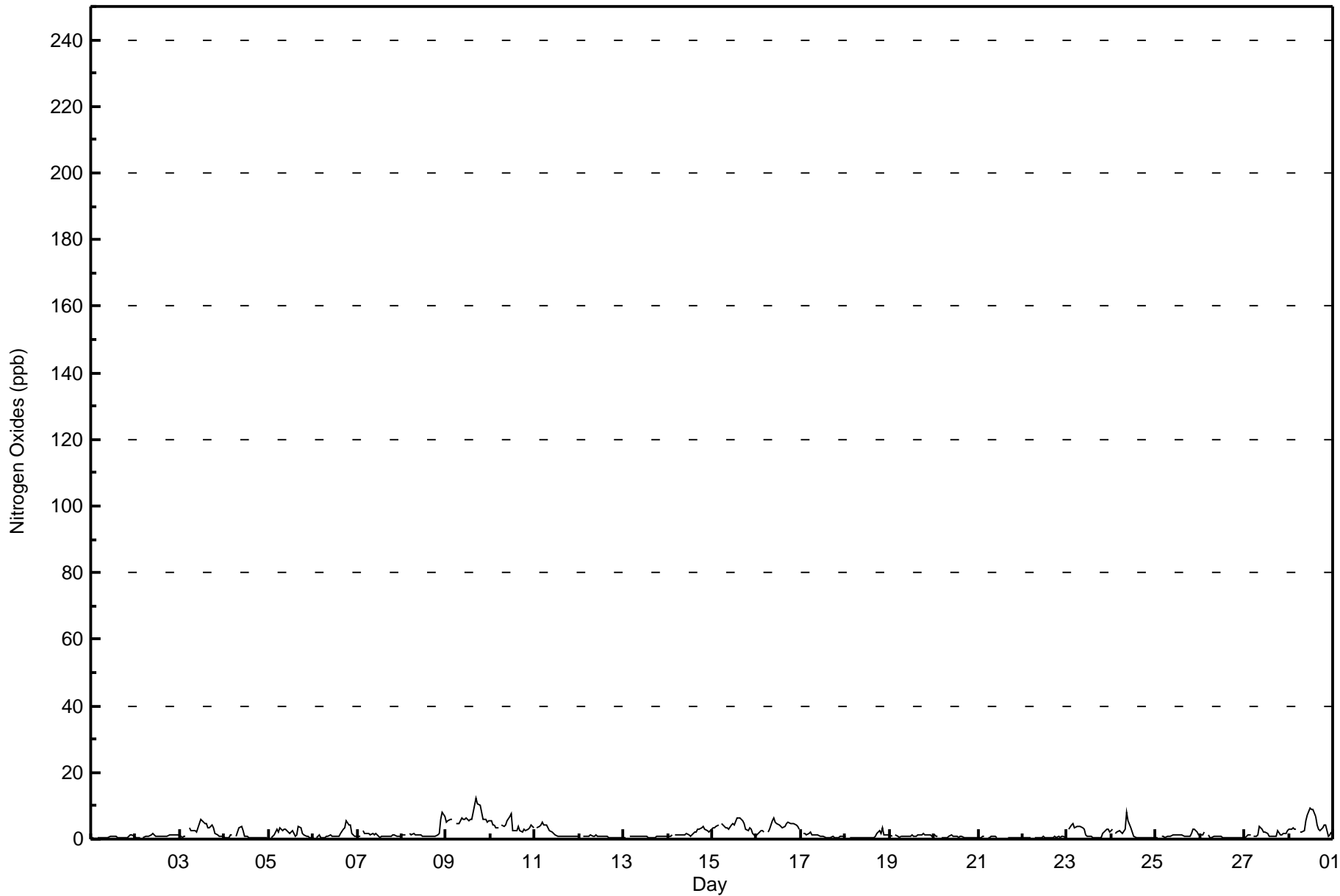
Nitrogen Oxides (NO_x) - ppb
Stony Mountain - February 2017

Maximum Value: 12 ppb on Feb 9 17:00		Maximum Daily Average: 6.6 ppb on Feb 9		Hours in Service: 672																						
Minimum Value: 0 ppb on Feb 6 06:00		Minimum Daily Average: 0.5 ppb on Feb 22		Hours of Data: 639																						
Maximum Diurnal Average: 2.3 ppb at hour 10		Minimum Diurnal Average: 1.4 ppb at hour 1		Hours of Missing Data: 33																						
Monthly Average: 1.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 9		Hours of Calibration: 33																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	1	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0.5	1
2-Feb	0	0	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
3-Feb	1	1	1	1	Z	3	3	2	2	2	5	6	5	5	5	4	3	4	3	2	1	1	1	1	2.7	6
4-Feb	0	0	0	1	1	Z	3	1	2	3	4	3	1	1	1	0	0	0	0	0	0	1	1	1	1.0	4
5-Feb	Z	0	1	1	3	2	3	3	3	3	2	2	2	2	1	1	4	3	2	1	1	1	1	0	1.9	4
6-Feb	0	Z	0	1	0	0	1	1	1	1	1	1	1	1	1	2	3	3	5	4	4	2	1	1	1.5	5
7-Feb	1	1	Z	2	2	2	2	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
8-Feb	1	1	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	6	8	7	1.9	8
9-Feb	5	6	6	6	Z	5	5	5	6	6	6	6	6	6	6	10	12	11	10	8	6	6	5	6	6.6	12
10-Feb	6	4	4	3	3	Z	4	4	4	6	7	7	3	2	2	4	3	2	3	3	3	4	4	4	3.9	7
11-Feb	Z	3	4	4	5	4	4	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2.0	5
12-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0.8	1
13-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0.7	1
14-Feb	1	1	1	Z	1	1	1	1	1	1	2	1	1	1	2	2	3	3	4	4	3	2	2	3	1.9	4
15-Feb	3	3	4	4	Z	5	4	3	3	3	4	4	4	6	6	6	5	5	3	2	3	3	2	1	3.9	6
16-Feb	1	2	2	2	2	Z	2	3	5	6	5	5	4	4	3	4	4	5	5	5	4	4	4	3	3.8	6
17-Feb	Z	2	2	1	2	2	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1.0	2
18-Feb	1	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	2	2	2	4	1	1	1	0.9	4
19-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1
20-Feb	1	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	1
21-Feb	1	1	1	1	Z	1	1	1	1	1	1	C	C	C	C	C	1	1	1	0	0	0	0	0	0.6	1
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0.5	1
23-Feb	Z	3	4	5	4	4	4	4	4	3	1	1	1	1	1	1	1	1	0	2	2	3	3	2	2.2	5
24-Feb	3	Z	2	2	3	2	2	3	8	5	3	2	1	0	0	0	0	0	0	0	0	0	1	0	1.8	8
25-Feb	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	2	1	1.2	3
26-Feb	1	1	2	Z	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2
27-Feb	0	1	1	1	Z	1	1	1	4	3	2	2	2	1	1	1	1	1	2	1	1	2	2	2	1.5	4
28-Feb	3	3	3	3	3	Z	2	2	2	6	7	9	9	9	7	4	3	3	3	4	4	1	1	2	4.1	9
		1.4	1.6	1.8	2.0	1.6	1.7	1.7	1.7	2.2	2.3	2.2	2.2	1.9	1.9	1.7	1.8	1.9	1.9	2.0	1.8	1.9	1.7	1.6	1.5	Diurnal Average
		6	6	6	6	5	5	5	5	8	6	7	9	9	9	7	10	12	11	10	8	6	6	8	7	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - February 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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624
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	25	16	15	17	22	15	6	12	11	32	90	42	89	112	75	45	624

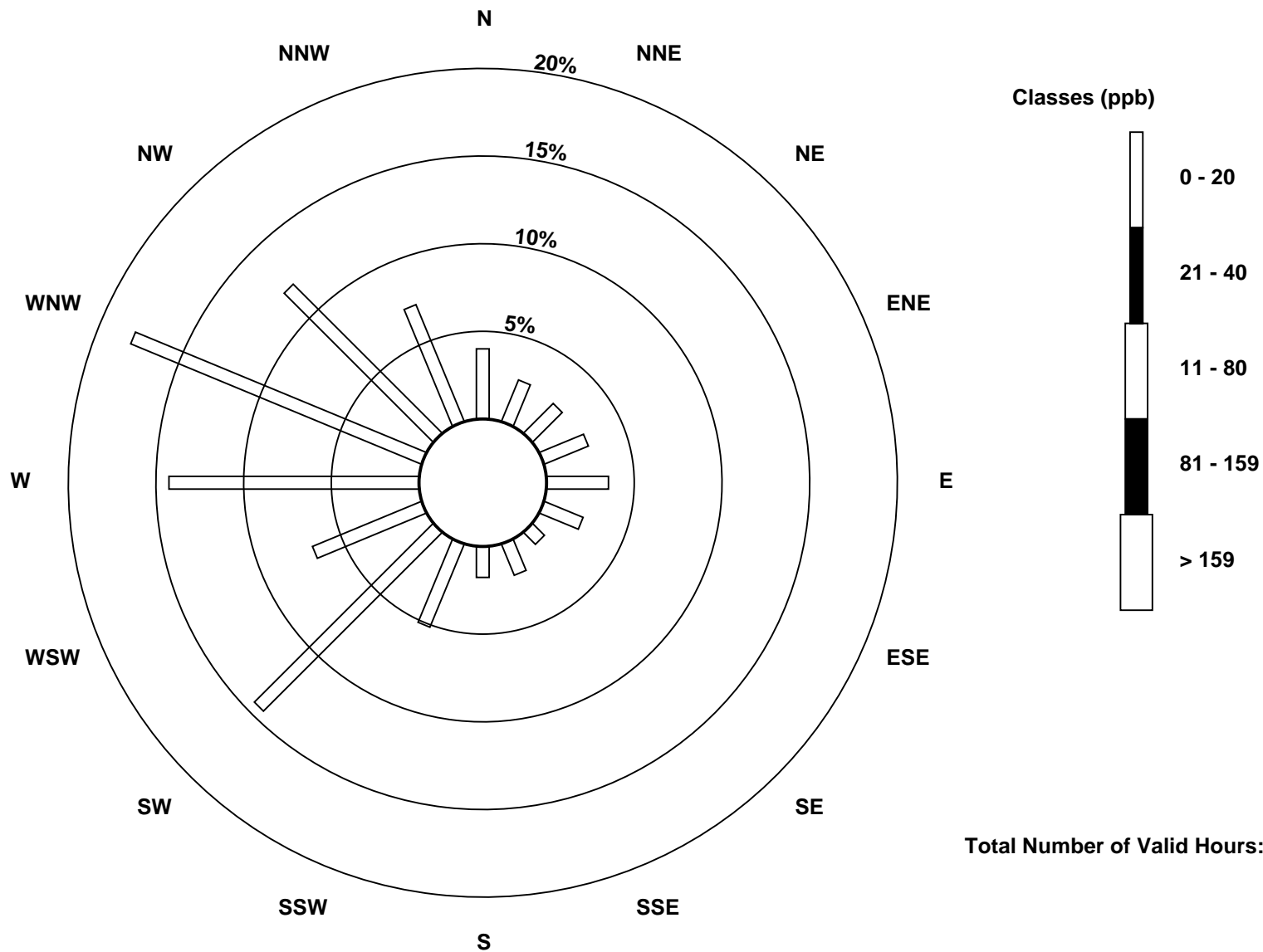
Total Number of Valid Hours: 624

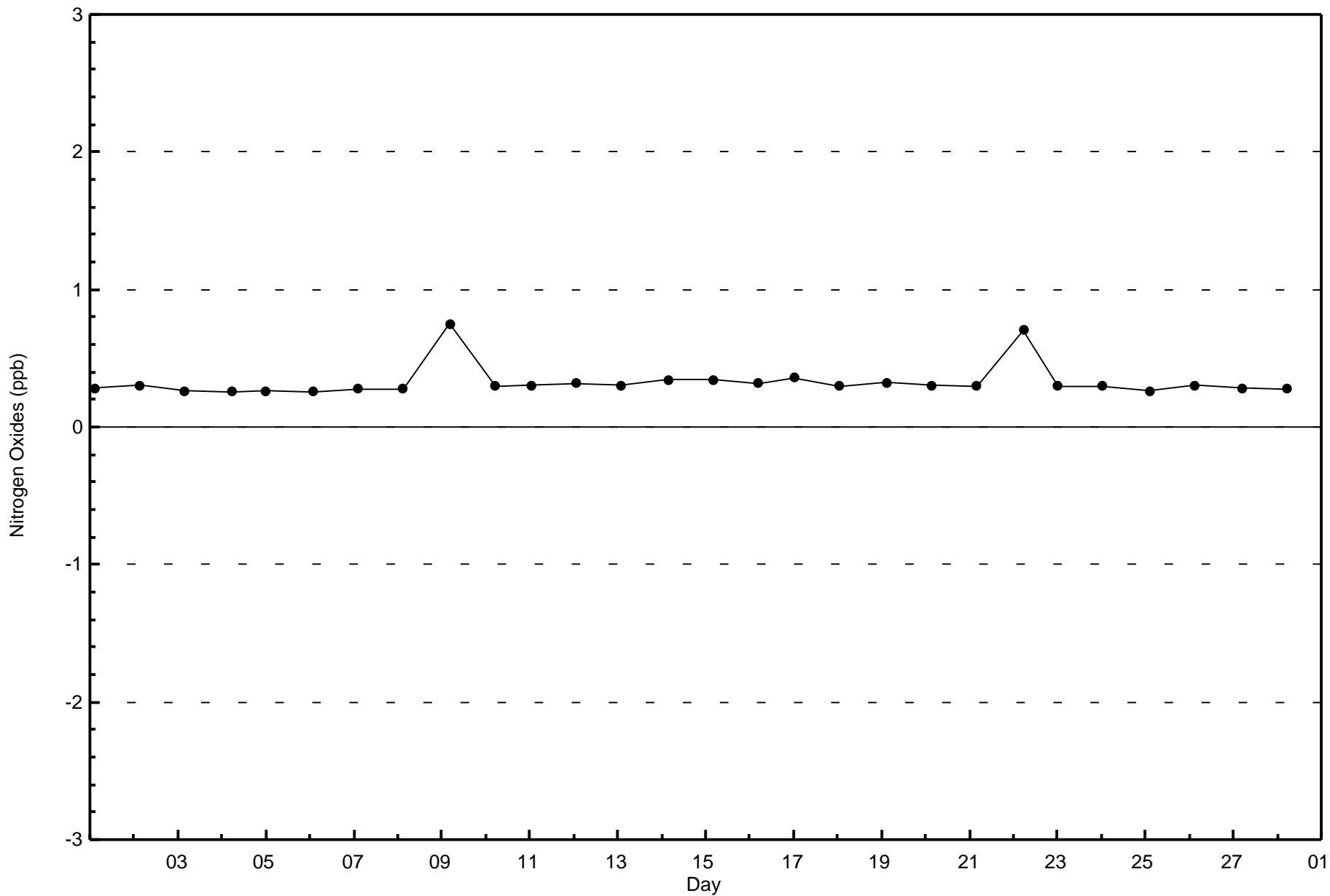
Total Number of Hours: 672

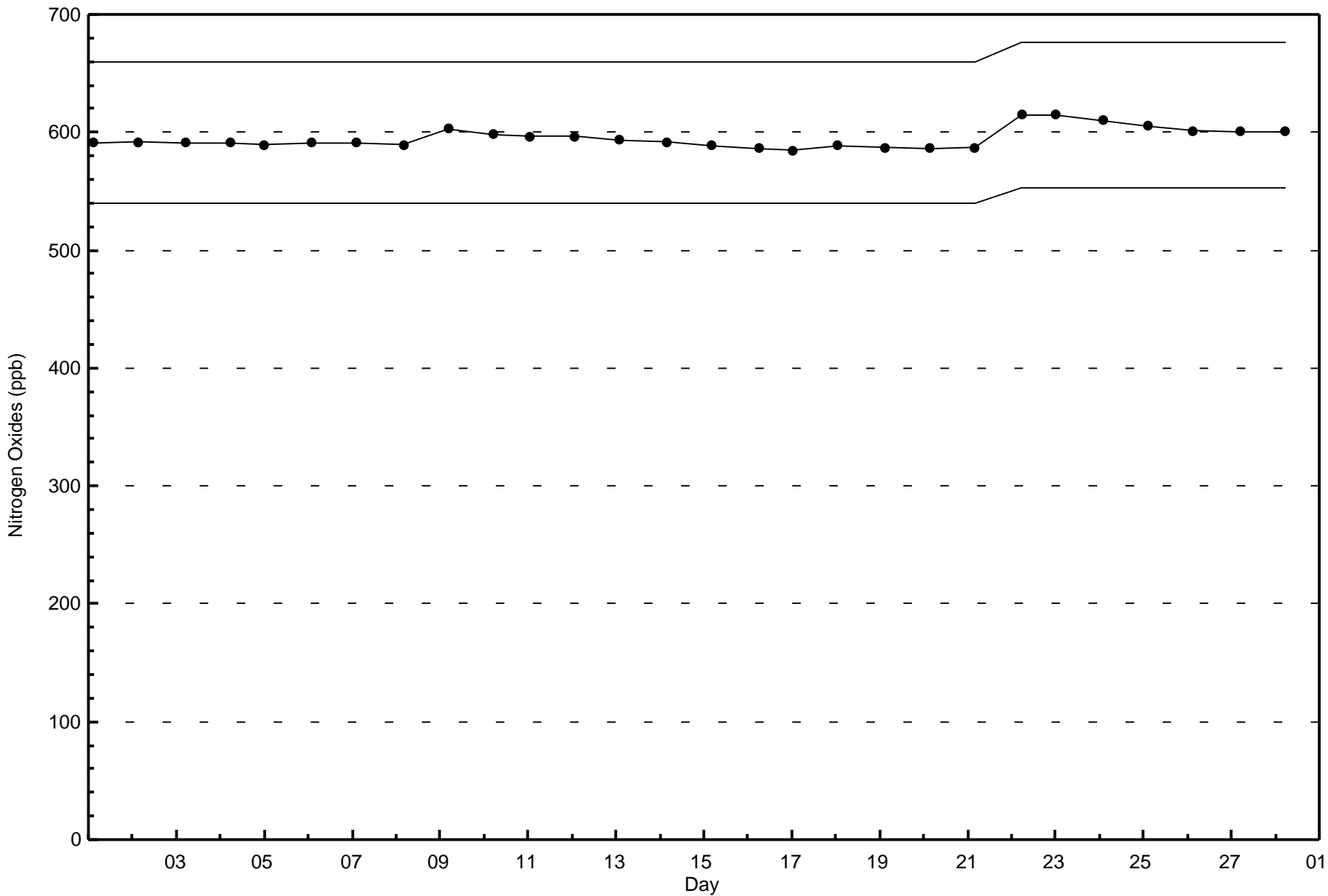


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxides (NO_x) - ppb
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

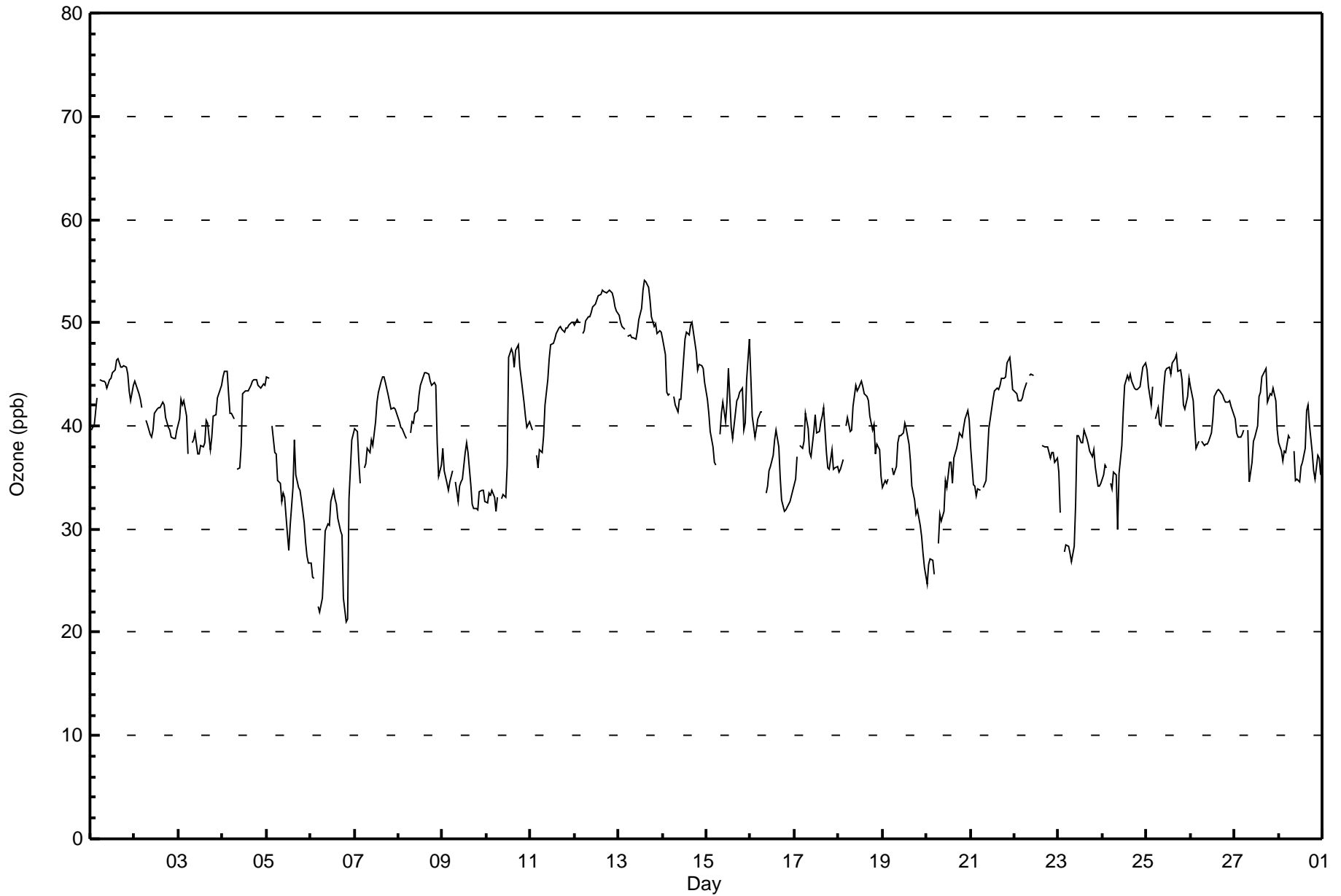
Stony Mountain - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 54 ppb on Feb 13 15:00										Maximum Daily Average: 51.5 ppb on Feb 12										Hours of Data: 640						
Minimum Value: 21 ppb on Feb 6 20:00										Minimum Daily Average: 28.7 ppb on Feb 6										Hours of Missing Data: 32						
Maximum Diurnal Average: 42.7 ppb at hour 16										Minimum Diurnal Average: 37.1 ppb at hour 5										Hours of Calibration: 32						
Monthly Average: 40.1 ppb										Percentiles: P ₁ = 25 P ₁₀ = 33 Q ₁ = 36 Median = 40 Q ₃ = 44 P ₉₀ = 48 P ₉₉ = 53										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	40	40	40	43	Z	44	44	44	44	44	45	45	45	45	46	47	46	46	46	46	45	43	42	44	44.1	47
2-Feb	44	44	43	43	42	Z	41	40	39	39	40	41	42	42	42	42	42	41	40	40	39	39	39	40	40.9	44
3-Feb	41	43	42	42	41	37	Z	38	39	39	37	37	38	38	38	40	40	38	39	41	41	43	43	44	40.0	44
4-Feb	45	45	45	43	41	41	41	Z	38	36	36	38	43	43	43	44	44	44	44	44	44	44	44	44	42.7	45
5-Feb	45	45	Z	40	37	37	35	34	33	34	33	30	28	30	34	39	35	34	34	33	31	29	27	27	34.0	45
6-Feb	27	25	25	Z	23	22	23	27	30	31	30	33	34	33	32	31	30	29	23	21	21	33	39	39	28.7	39
7-Feb	40	39	37	34	Z	36	36	38	37	39	38	40	42	43	44	45	45	44	43	42	42	42	42	41	40.4	45
8-Feb	40	40	40	39	39	Z	39	40	40	41	41	43	44	45	45	45	45	44	44	44	44	38	35	36	41.5	45
9-Feb	38	36	34	34	35	36	Z	35	33	34	35	35	37	38	37	34	32	32	32	32	34	34	34	33	34.5	38
10-Feb	33	33	33	34	33	32	33	Z	33	33	33	36	47	48	47	46	47	48	46	45	42	41	40	40	39.2	48
11-Feb	40	40	Z	37	36	38	37	39	42	44	47	48	48	48	49	50	50	49	49	49	49	50	50	50	45.2	50
12-Feb	50	50	50	Z	49	49	50	51	51	51	52	52	52	53	53	53	53	53	53	53	53	52	51	51	51.5	53
13-Feb	51	50	50	49	Z	49	49	49	49	48	49	50	51	53	54	54	53	52	51	50	50	49	49	49	50.3	54
14-Feb	48	47	43	43	43	Z	43	42	41	43	43	46	48	49	49	50	50	49	47	45	46	46	46	44	45.7	50
15-Feb	43	41	39	38	36	36	Z	39	41	42	40	42	46	40	39	40	42	43	43	44	40	40	44	48	41.2	48
16-Feb	45	41	39	40	41	41	41	Z	34	34	36	36	37	39	40	38	35	33	32	32	32	33	33	34	36.7	45
17-Feb	35	37	Z	38	38	38	41	40	37	37	40	41	39	39	40	41	42	37	36	36	38	36	36	36	38.2	42
18-Feb	35	36	37	Z	40	41	39	40	42	44	43	44	44	44	43	43	42	41	40	40	37	38	38	35	40.3	44
19-Feb	34	35	34	35	Z	36	35	36	38	39	39	39	40	40	38	37	34	33	32	32	30	29	28	26	34.8	40
20-Feb	25	27	27	27	26	Z	29	31	31	32	35	34	37	36	34	37	38	39	39	39	40	41	41	41	34.1	41
21-Feb	38	34	34	33	34	34	Z	34	35	37	40	42	43	43	44	43	44	45	45	45	46	47	45	44	40.3	47
22-Feb	43	43	42	43	43	43	44	Z	45	45	45	C	C	C	C	38	38	38	38	37	37	37	36	37	40.7	45
23-Feb	35	32	Z	28	28	28	28	27	28	32	39	39	38	38	40	39	38	38	37	38	36	34	34	34	34.3	40
24-Feb	35	36	36	Z	34	34	36	35	30	35	38	41	44	45	45	45	44	44	44	44	44	45	46	46	40.2	46
25-Feb	45	44	42	44	Z	41	42	40	40	44	45	46	46	45	46	46	47	45	45	44	42	42	43	45	43.9	47
26-Feb	44	42	40	38	38	Z	39	38	38	38	38	39	41	43	43	44	43	43	43	42	42	42	42	41	41.0	44
27-Feb	41	39	39	39	39	40	Z	40	35	36	39	39	40	43	43	45	45	46	42	43	43	44	43	40	40.9	46
28-Feb	38	38	37	38	37	39	Z	38	35	35	35	36	36	38	41	42	40	37	36	35	37	37	35	35	37.3	42
39.9 39.4 38.7 38.4 37.1 38.0 38.4 38.1 37.8 38.8 39.7 40.6 41.9 42.2 42.5 42.7 42.5 41.7 40.8 40.5 40.1 40.2 40.3 40.2																								Diurnal Average		
51 50 50 49 49 49 50 51 51 51 52 52 52 53 54 54 54 53 53 53 53 53 52 51 51																								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
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Stony Mountain - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
21 - 50	615	96.09	96.09
51 - 82	25	3.91	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Stony Mountain - February 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 50	25	17	15	17	22	15	5	11	12	32	86	36	80	114	72	41	600
51 - 82	0	0	0	0	0	0	0	0	0	0	3	7	8	7	0	0	25
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	17	15	17	22	15	5	11	12	32	89	43	88	121	72	41	625

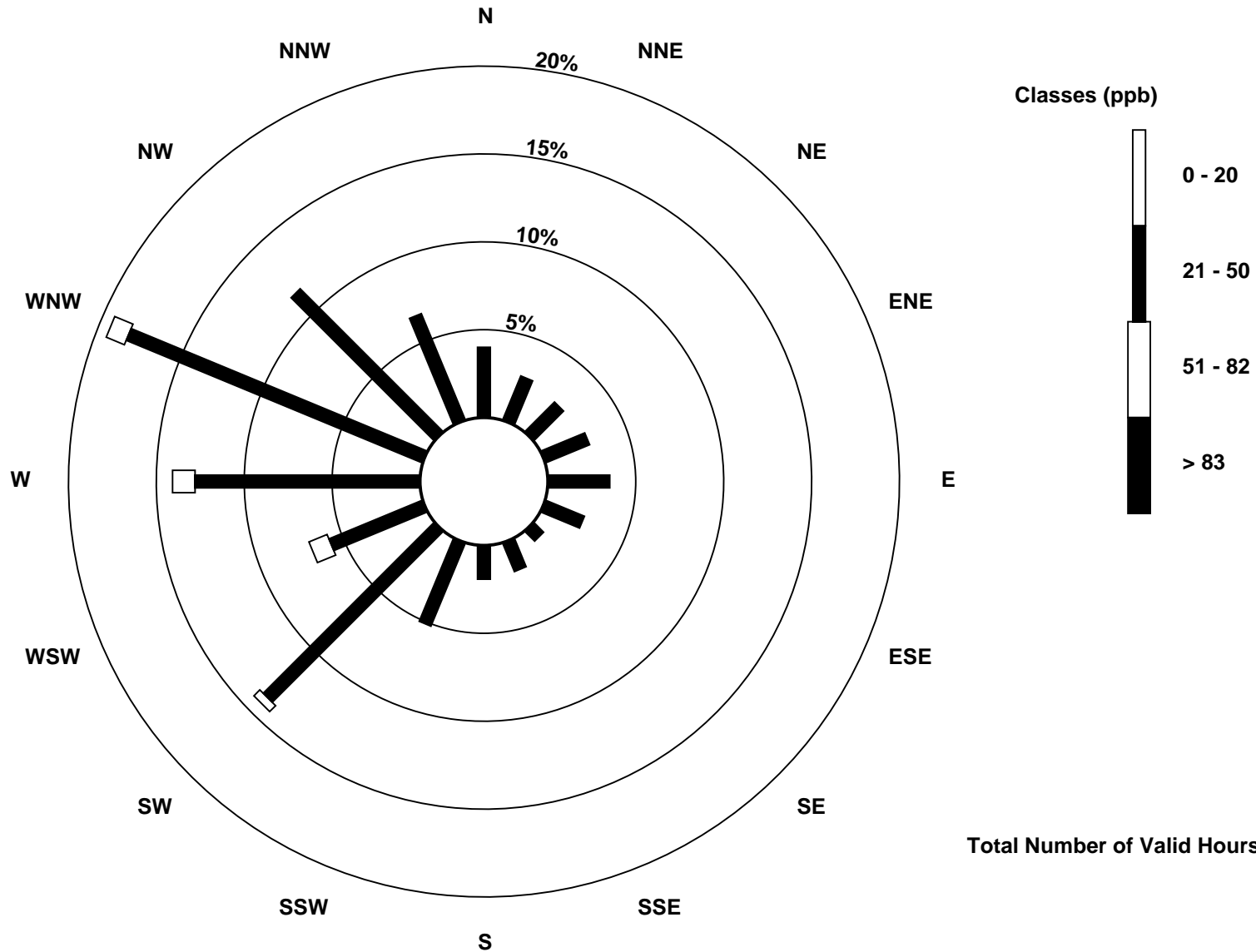
Total Number of Valid Hours: 625

Total Number of Hours: 672

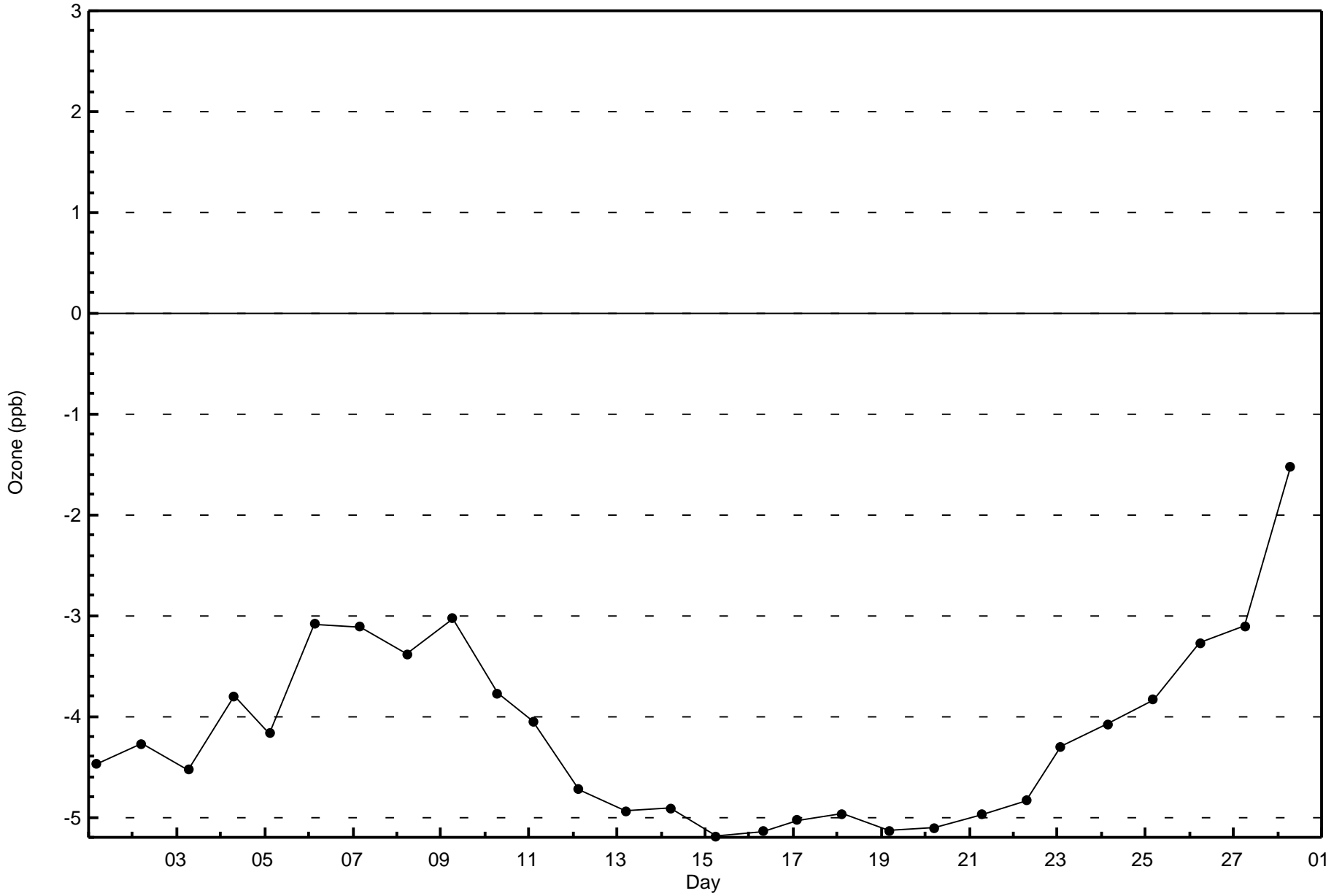


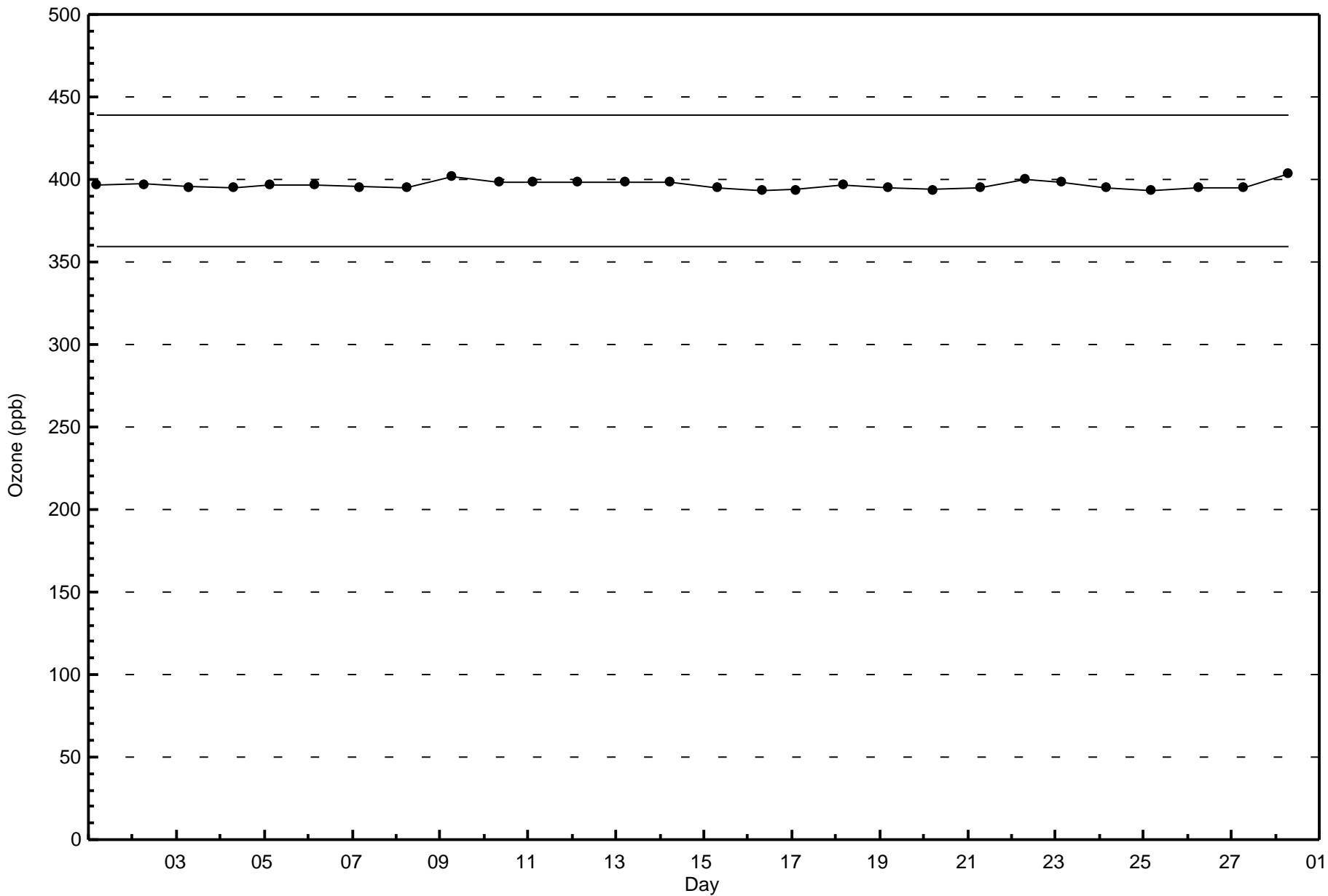
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Stony Mountain (AMS 18)



Total Number of Valid Hours: 625





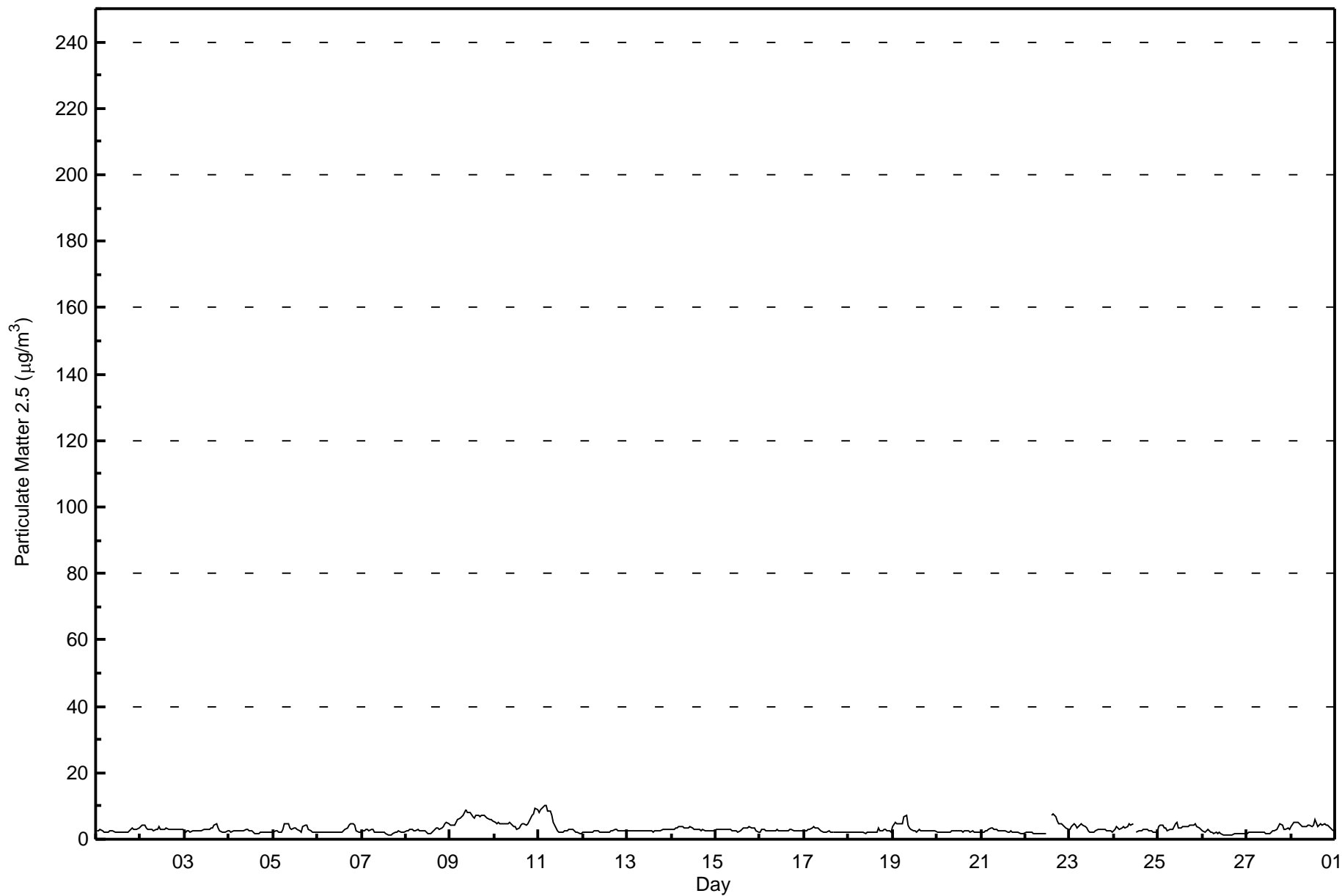


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																																														
Maximum Value: 10.4 µg/m ³ on Feb 11 04:00		Maximum Daily Average: 6.6 µg/m ³ on Feb 9																																														
Minimum Value: 1.3 µg/m ³ on Feb 26 14:00		Hours of Data: 669																																														
Maximum Diurnal Average: 3.4 µg/m ³ at hour 7		Hours of Missing Data: 3																																														
Monthly Average: 3.09 µg/m ³		Hours of Calibration: 1																																														
Minimum Daily Average: 1.9 µg/m ³ on Feb 26		Percent Operational Time: 99.7																																														
Minimum Diurnal Average: 2.6 µg/m ³ at hour 13		Percentiles: P ₁ = 1.4 P ₁₀ = 2.0 Q ₁ = 2.2 Median = 2.6 Q ₃ = 3.4 P ₉₀ = 4.7 P ₉₉ = 8.7																																														
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-Feb	2.5	2.6	2.8	2.5	2.3	2.2	2.2	2.5	2.6	2.4	2.0	2.0	2.1	2.1	2.2	2.1	2.2	2.2	2.5	3.4	2.9	2.9	2.9	3.4	2.5	3.4																						
2-Feb	3.8	4.4	4.1	3.4	3.0	2.9	2.8	2.6	2.8	3.1	4.0	3.0	2.9	2.9	3.2	2.9	2.9	2.9	2.8	3.0	2.9	2.9	2.9	2.8	3.1	4.4																						
3-Feb	2.3	2.4	2.5	2.3	2.4	2.5	2.5	2.4	2.6	2.5	2.9	3.1	3.0	3.1	3.6	3.3	4.0	4.8	3.3	2.4	2.1	1.9	2.0	2.4	2.8	4.8																						
4-Feb	2.4	2.3	2.4	2.5	2.6	2.6	2.7	2.6	2.7	3.0	2.9	2.5	2.7	2.0	1.8	1.7	1.8	1.9	2.2	2.3	2.2	2.2	2.3	2.3	2.4	3.0																						
5-Feb	2.3	2.4	2.4	2.3	2.3	2.9	4.5	4.8	4.8	3.5	3.0	3.3	3.3	2.8	2.6	2.2	3.9	4.3	4.0	3.1	2.4	2.2	2.1	2.1	3.1	4.8																						
6-Feb	2.2	2.1	2.1	2.3	2.1	2.2	2.1	2.0	2.2	2.2	2.2	2.1	2.0	2.3	2.7	3.0	3.2	4.3	4.5	4.8	4.4	2.6	2.0	1.9	2.6	4.8																						
7-Feb	2.4	2.6	2.8	2.8	2.6	2.8	3.0	2.3	2.3	2.2	2.1	2.0	1.9	1.6	1.4	1.4	1.4	1.8	2.2	2.2	2.3	2.2	2.1	2.1	2.2	3.0																						
8-Feb	2.3	2.6	2.9	2.8	2.7	2.6	2.8	2.7	2.5	2.4	2.5	2.3	1.9	1.9	2.0	2.4	3.2	3.3	3.1	3.2	3.9	4.7	5.2	4.5	2.9	5.2																						
9-Feb	4.1	4.4	4.3	5.3	5.9	6.3	7.0	7.3	8.7	8.3	8.1	8.1	6.8	6.5	7.0	7.3	6.8	7.4	7.3	6.7	6.4	6.1	5.9	5.6	6.6	8.7																						
10-Feb	5.0	4.6	4.9	4.8	4.7	4.6	4.6	4.6	5.2	4.9	3.7	3.7	2.8	3.2	4.4	4.9	4.5	4.2	4.8	5.6	7.2	7.6	9.1	8.9	5.1	9.1																						
11-Feb	8.2	8.7	9.7	10.4	10.3	8.6	8.6	7.2	5.0	3.4	2.5	2.1	2.1	2.3	2.4	2.5	2.8	3.0	2.9	2.5	2.1	2.0	1.8	1.9	4.7	10.4																						
12-Feb	1.9	2.0	1.9	2.0	2.0	2.2	2.5	2.6	2.4	2.2	2.1	2.2	2.1	2.1	2.3	2.3	2.4	2.9	2.8	2.5	2.5	2.5	2.5	2.6	2.3	2.9																						
13-Feb	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.5	2.5	2.4	2.3	2.4	2.5	2.6	2.7	2.8	2.8	2.8	2.9	3.0	2.6	3.0																						
14-Feb	2.9	3.1	3.2	3.5	3.7	3.7	3.7	3.6	3.6	3.5	3.7	3.2	3.0	3.0	3.1	3.0	2.7	2.8	2.5	2.5	2.5	2.4	2.5	2.7	3.1	3.7																						
15-Feb	2.9	3.0	2.9	3.1	3.1	3.1	2.8	2.9	2.8	2.6	2.7	2.5	2.3	2.5	3.2	3.4	3.4	3.5	3.6	3.4	3.4	3.3	2.6	2.1	3.0	3.6																						
16-Feb	2.3	2.8	2.9	2.7	2.6	2.4	2.4	2.5	2.7	2.8	2.7	2.5	2.4	2.4	2.4	2.7	2.9	2.8	2.7	2.5	2.5	2.6	2.7	2.7	2.6	2.9																						
17-Feb	2.6	2.7	3.0	3.0	3.3	3.7	3.4	3.3	3.0	2.5	2.2	2.2	2.3	2.4	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	3.7																						
18-Feb	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2	3.2	2.4	2.4	2.8	2.8	2.5	2.4	2.3	2.2	3.2																						
19-Feb	3.8	4.9	4.6	4.7	4.8	4.6	7.0	7.1	4.3	3.3	2.8	2.6	2.5	2.2	2.9	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	3.5	7.1																						
20-Feb	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.1	2.4	2.5	2.4	2.4	2.5	2.3	2.3	2.4	2.4	2.4	2.3	2.4	2.3	2.1	2.0	2.1	2.3	2.5																						
21-Feb	2.2	2.3	2.7	2.6	3.0	3.4	3.2	3.1	3.1	2.7	2.6	2.5	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.1	1.9	1.8	1.9	2.5	3.4																						
22-Feb	2.1	2.1	2.1	2.0	1.9	1.7	1.7	1.7	1.7	1.7	1.7	1.8	M	M	7.2	7.8	6.9	5.6	4.8	4.6	4.2	3.6	3.4	3.1	3.3	7.8																						
23-Feb	2.8	3.7	4.5	4.3	3.6	4.1	4.5	4.3	3.8	3.4	2.5	2.0	2.2	2.2	2.4	2.8	3.1	3.0	2.9	2.9	2.8	2.5	2.4	2.3	3.1	4.5																						
24-Feb	2.9	3.7	3.2	3.1	3.3	3.7	3.2	3.8	4.6	4.4	4.5	C	2.2	2.4	2.7	2.7	3.0	3.1	3.0	2.6	2.6	2.3	2.0	2.1	3.1	4.6																						
25-Feb	3.7	4.3	4.1	3.4	3.2	2.7	2.8	2.8	2.9	4.9	5.0	3.5	3.2	3.7	4.0	3.9	3.9	4.3	4.2	4.2	4.5	3.9	3.5	3.0	3.7	5.0																						
26-Feb	2.4	2.1	2.7	3.1	2.2	1.9	1.9	1.9	1.9	2.0	1.7	1.4	1.4	1.3	1.3	1.4	1.5	1.7	1.8	1.9	1.8	1.8	1.8	1.8	1.9	3.1																						
27-Feb	1.8	1.9	2.0	2.1	2.1	2.2	2.2	2.3	2.1	2.0	1.9	1.7	1.7	2.1	2.5	2.7	2.8	3.6	4.6	4.0	2.9	2.8	3.3	3.0	2.5	4.6																						
28-Feb	3.7	5.2	5.0	5.3	5.0	4.4	4.0	3.7	3.6	4.1	4.3	4.0	4.1	5.7	3.7	4.1	4.7	4.3	4.8	4.1	4.1	3.4	2.9	2.6	4.2	5.7																						
																								2.9	3.2	3.3	3.3	3.3	3.3	3.4	3.3	3.2	3.1	3.0	2.7	2.6	2.7	2.9	3.0	3.2	3.3	3.3	3.2	3.1	2.9	2.9	2.8	Diurnal Average
																								8.2	8.7	9.7	10.4	10.3	8.6	8.6	7.3	8.7	8.3	8.1	8.1	6.8	6.5	7.2	7.8	6.9	7.4	7.3	6.7	7.2	7.6	9.1	8.9	Diurnal Maximum
C - Calibration M - Maintenance																																																
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}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - February 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	629	94.02	94.02
6 - 15	40	5.98	100.00
16 - 25	0	0.00	100.00
26 - 80	0	0.00	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Stony Mountain - February 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	26	12	12	16	20	13	5	12	9	29	85	41	90	126	70	47	613
6 - 15	0	5	3	1	3	2	1	0	3	4	11	2	1	0	3	1	40
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	17	15	17	23	15	6	12	12	33	96	43	91	126	73	48	653

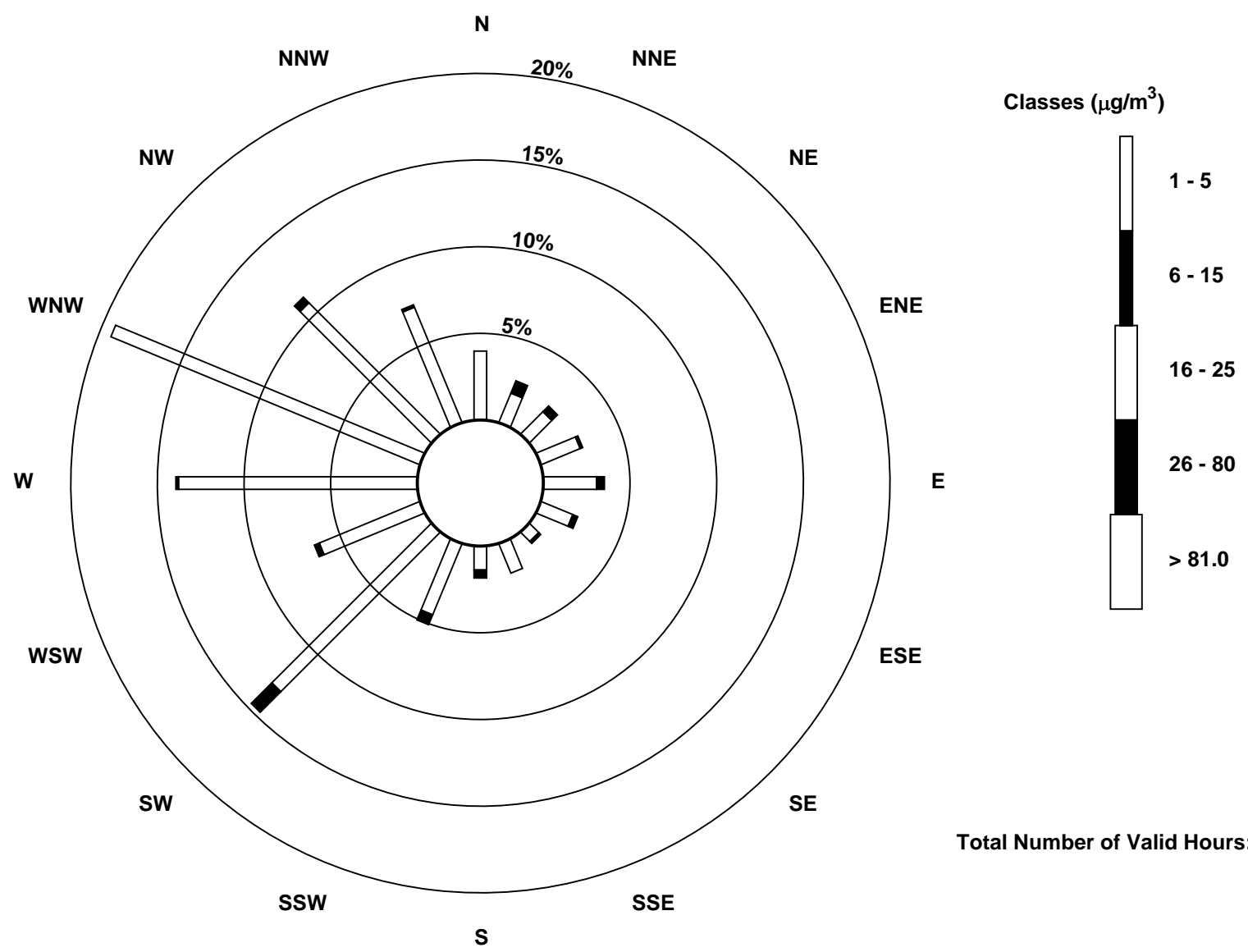
Total Number of Valid Hours: 653

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain (AMS 18)



Total Number of Valid Hours: 653

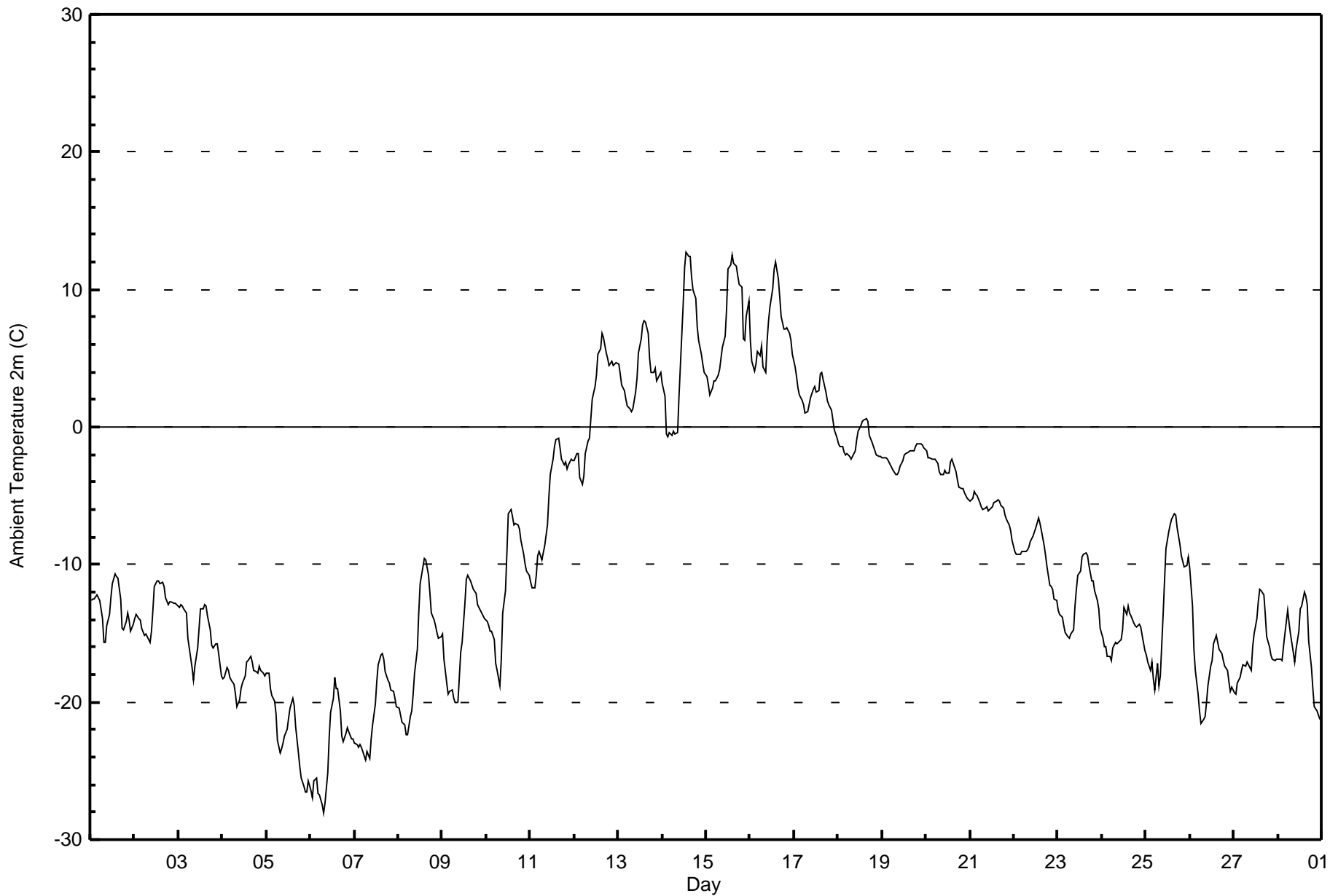


Maximum Value: 12.7 C on Feb 14 14:00 Maximum Daily Average: 7.2 C on Feb 15																								Hours in Service:	672	
Minimum Value: -28.1 C on Feb 6 08:00 Minimum Daily Average: -23.5 C on Feb 6																								Hours of Data:	672	
Maximum Diurnal Average: -5.9 C at hour 15 Minimum Diurnal Average: -11.8 C at hour 8																								Hours of Missing Data:	0	
Monthly Average: -9.22 C Percentiles: P ₁ = -26.6 P ₁₀ = -20.1 Q ₁ = -16.7 Median = -11.5 Q ₃ = -1.8 P ₉₀ = 4.4 P ₉₉ = 11.8																								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-Feb	-12.6	-12.5	-12.5	-12.2	-12.4	-12.6	-13.9	-15.6	-15.6	-14.4	-13.6	-12.4	-11.3	-10.6	-10.9	-11.0	-12.5	-14.6	-14.8	-14.1	-13.6	-14.0	-14.8	-14.4	-13.2	-10.6
2-Feb	-14.0	-13.6	-13.9	-14.0	-14.7	-15.1	-15.1	-15.2	-15.7	-14.8	-13.4	-11.5	-11.2	-11.2	-11.4	-11.3	-11.6	-12.4	-12.9	-12.8	-12.8	-12.8	-12.8	-13.0	-13.2	-11.2
3-Feb	-13.1	-13.0	-13.1	-13.2	-13.5	-15.3	-16.1	-17.5	-18.4	-17.4	-16.1	-14.6	-13.2	-13.2	-13.0	-13.0	-13.8	-14.7	-15.8	-16.1	-15.8	-15.7	-16.5	-18.1	-15.0	-13.0
4-Feb	-18.3	-18.2	-17.5	-17.7	-18.2	-18.4	-18.7	-19.4	-20.3	-19.9	-19.0	-18.6	-18.1	-17.1	-17.0	-16.6	-17.1	-17.7	-17.8	-17.9	-17.4	-17.7	-17.9	-18.1	-18.1	-16.6
5-Feb	-17.9	-17.9	-19.0	-19.5	-19.9	-20.8	-22.7	-23.7	-23.3	-23.0	-22.5	-22.0	-21.1	-20.5	-19.8	-20.2	-21.8	-23.6	-24.7	-25.6	-26.1	-26.5	-26.6	-25.8	-22.3	-17.9
6-Feb	-26.4	-26.9	-25.8	-25.5	-26.6	-26.7	-27.5	-28.1	-27.4	-25.1	-22.6	-20.8	-19.7	-18.2	-19.0	-19.1	-20.7	-22.5	-22.9	-22.3	-21.8	-22.2	-22.6	-22.6	-23.5	-18.2
7-Feb	-23.0	-23.1	-23.3	-23.0	-23.3	-23.9	-24.2	-23.6	-24.1	-22.7	-21.7	-20.1	-18.5	-17.2	-16.5	-16.5	-16.9	-17.8	-18.5	-18.7	-19.1	-19.2	-19.7	-20.3	-20.6	-16.5
8-Feb	-20.4	-21.0	-21.4	-21.7	-22.4	-22.3	-21.1	-20.6	-19.4	-17.9	-16.1	-13.5	-11.4	-10.1	-9.6	-9.6	-10.8	-12.1	-13.6	-14.0	-14.5	-15.0	-15.3	-15.3	-16.2	-9.6
9-Feb	-15.0	-16.8	-18.6	-19.4	-19.3	-19.1	-19.7	-20.1	-20.0	-18.2	-16.4	-15.6	-12.8	-11.1	-10.8	-11.2	-11.5	-11.8	-12.1	-12.9	-13.1	-13.5	-13.8	-14.0	-15.3	-10.8
10-Feb	-14.1	-14.5	-14.8	-14.9	-15.5	-17.2	-17.7	-18.8	-16.9	-13.6	-11.9	-9.1	-6.3	-6.0	-6.5	-7.1	-7.0	-7.1	-7.4	-8.2	-9.3	-9.9	-10.4	-10.8	-11.5	-6.0
11-Feb	-11.3	-11.7	-11.7	-10.8	-9.4	-9.1	-9.6	-9.2	-8.7	-7.1	-5.1	-3.4	-2.3	-1.4	-0.9	-0.9	-1.5	-2.4	-2.7	-2.6	-3.1	-2.7	-2.3	-2.4	-5.5	-0.9
12-Feb	-2.4	-2.0	-1.9	-3.6	-4.2	-3.6	-2.0	-1.0	-0.8	0.6	2.0	2.9	3.8	5.3	5.6	6.9	6.5	5.4	5.0	4.5	4.7	4.5	4.6	4.6	1.9	6.9
13-Feb	4.5	3.9	3.0	2.6	2.0	1.5	1.3	1.1	1.3	2.6	3.6	5.3	6.4	7.4	7.7	7.6	6.8	4.9	4.0	4.0	4.3	3.4	3.8	4.0	4.1	7.7
14-Feb	3.1	2.3	-0.5	-0.7	-0.4	-0.6	-0.3	-0.5	-0.4	2.2	4.4	8.9	11.6	12.7	12.4	12.4	10.9	10.0	9.3	7.4	6.3	5.3	4.5	3.9	5.2	12.7
15-Feb	3.7	3.1	2.3	2.9	3.3	3.4	3.8	4.1	5.0	5.8	6.6	8.6	11.5	11.8	12.5	11.9	11.7	11.0	10.3	10.2	6.4	6.3	8.0	9.2	7.2	12.5
16-Feb	6.3	4.7	4.0	4.6	5.5	5.1	5.9	4.4	4.0	6.3	7.7	8.7	10.1	11.5	12.0	10.8	9.4	8.1	7.1	7.1	7.3	6.8	6.3	5.3	7.1	12.0
17-Feb	4.3	3.7	2.9	2.3	2.0	1.7	1.0	1.1	1.6	2.2	2.7	3.0	2.6	2.7	3.8	3.9	3.5	2.6	1.9	1.6	1.2	0.5	-0.2	-0.8	2.2	4.3
18-Feb	-1.2	-1.4	-1.4	-1.8	-2.0	-1.9	-2.1	-2.3	-2.1	-1.7	-0.9	-0.3	0.1	0.4	0.5	0.6	0.4	-0.6	-1.1	-1.4	-1.7	-2.1	-2.2	-2.2	-1.2	0.6
19-Feb	-2.2	-2.2	-2.2	-2.4	-2.8	-3.0	-3.2	-3.4	-3.5	-3.2	-2.8	-2.5	-2.1	-1.9	-1.8	-1.7	-1.8	-1.7	-1.4	-1.2	-1.2	-1.2	-1.3	-1.6	-2.2	-1.2
20-Feb	-1.8	-2.2	-2.2	-2.3	-2.4	-2.3	-2.7	-3.2	-3.5	-3.4	-3.2	-3.3	-3.3	-2.6	-2.3	-2.7	-3.3	-3.9	-4.3	-4.5	-4.5	-4.8	-5.2	-5.2	-3.3	-1.8
21-Feb	-5.4	-5.1	-4.6	-4.8	-5.0	-5.5	-5.8	-6.0	-5.9	-5.8	-6.1	-5.9	-5.8	-5.5	-5.4	-5.3	-5.4	-5.7	-5.9	-6.4	-6.7	-7.2	-7.5	-8.3	-5.9	-4.6
22-Feb	-9.0	-9.2	-9.3	-9.3	-9.1	-9.0	-9.1	-9.0	-8.8	-8.3	-7.9	-7.6	-7.3	-6.6	-7.0	-7.6	-8.7	-9.3	-10.2	-11.5	-11.6	-11.8	-12.5	-12.6	-9.3	-6.6
23-Feb	-13.4	-13.6	-13.8	-14.4	-15.0	-15.3	-15.3	-15.0	-14.7	-13.0	-11.8	-10.8	-10.5	-9.5	-9.3	-9.2	-9.3	-10.1	-11.2	-11.2	-11.9	-12.6	-13.2	-14.6	-12.4	-9.2
24-Feb	-15.3	-16.0	-16.0	-16.7	-16.7	-16.9	-16.1	-15.6	-15.7	-15.4	-14.8	-13.1	-13.6	-13.0	-13.5	-13.8	-14.2	-14.5	-14.5	-14.4	-14.5	-15.1	-16.3	-16.3	-15.1	-13.0
25-Feb	-16.6	-17.1	-17.7	-17.1	-18.3	-19.1	-17.2	-18.8	-18.1	-13.7	-11.2	-8.9	-7.6	-7.1	-6.7	-6.3	-6.4	-7.4	-8.5	-9.3	-9.8	-10.2	-10.0	-9.5	-12.2	-6.3
26-Feb	-10.3	-13.0	-16.1	-17.7	-19.4	-20.7	-21.5	-21.3	-21.0	-18.8	-17.4	-17.0	-15.7	-15.2	-15.7	-16.2	-16.5	-17.0	-17.4	-17.7	-18.5	-19.2	-18.9	-18.9	-17.6	-10.3
27-Feb	-19.4	-19.4	-18.6	-18.2	-17.7	-17.3	-17.4	-17.1	-17.3	-17.7	-15.9	-15.0	-13.9	-12.7	-11.8	-11.9	-12.2	-13.6	-15.3	-16.0	-16.6	-16.9	-17.0	-16.9	-16.1	-11.8
28-Feb	-16.9	-16.9	-16.9	-15.9	-15.1	-13.3	-14.2	-15.0	-16.4	-17.1	-16.1	-14.8	-13.3	-13.0	-12.0	-12.3	-12.9	-15.5	-17.5	-19.1	-20.3	-20.7	-21.0	-21.2	-16.1	-12.0
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Stony Mountain - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Stony Mountain - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	71	10.57	10.57
-20 - 0	470	69.94	80.51
0 - 10	114	16.96	97.47
10 - 20	17	2.53	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

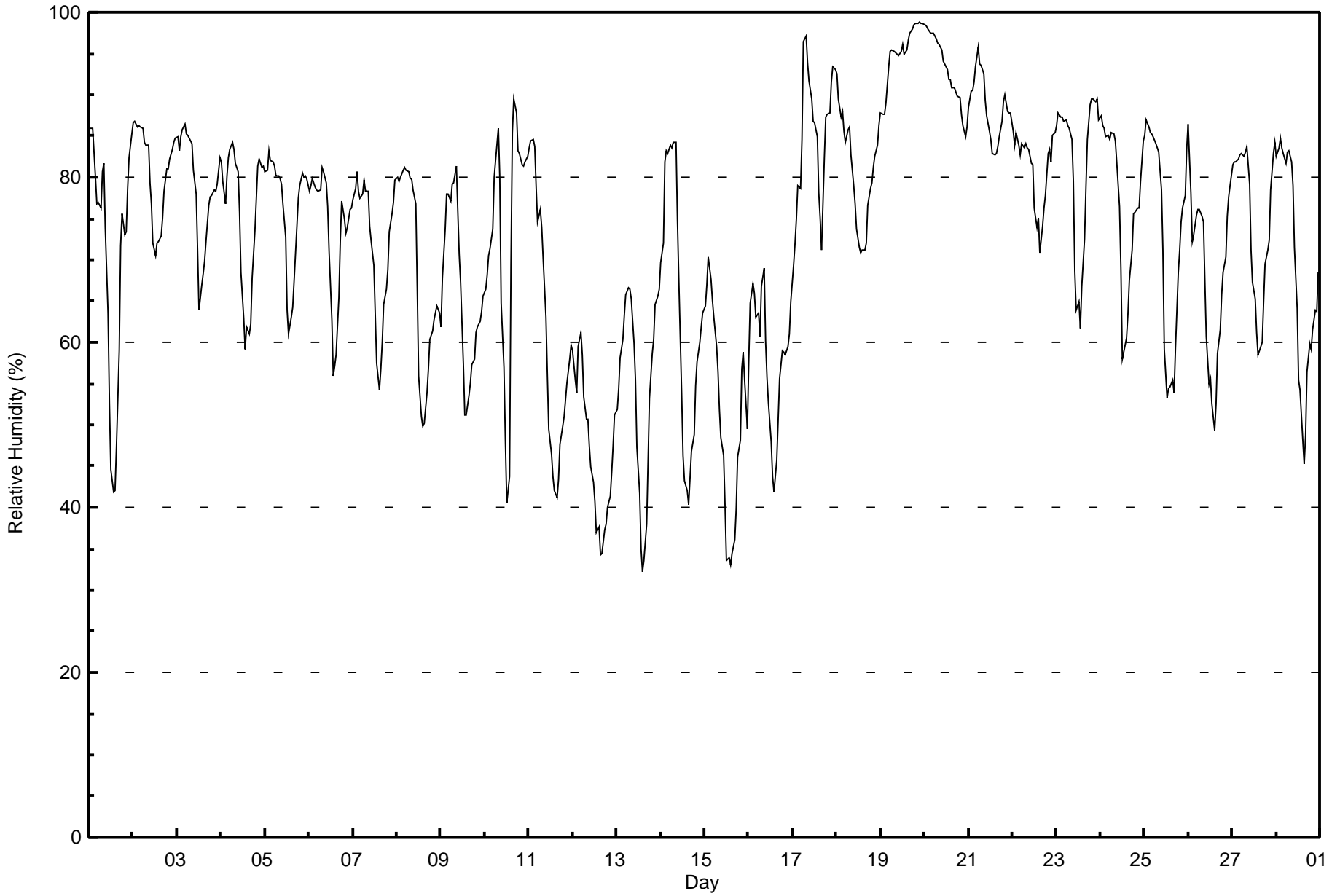
**Relative Humidity (RH) - %
Stony Mountain - February 2017**

Maximum Value: 99 % on Feb 19 22:00																			Maximum Daily Average: 95.1 % on Feb 19																			Hours in Service: 672							
Minimum Value: 32 % on Feb 13 15:00																			Minimum Daily Average: 46.7 % on Feb 12																			Hours of Data: 672							
Maximum Diurnal Average: 80.9 % at hour 8																			Minimum Diurnal Average: 58.5 % at hour 14																			Hours of Missing Data: 0							
Monthly Average: 72.7 %																			Percentiles: P ₁ = 34 P ₁₀ = 51 Q ₁ = 62 Median = 77 Q ₃ = 84 P ₉₀ = 89 P ₉₉ = 99																			Hours of Calibration: 0							
																																						Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Feb	86	86	86	80	77	77	76	81	82	74	63	53	45	42	42	47	59	72	76	73	73	79	82	85	70.6	86																			
2-Feb	87	87	86	86	86	86	84	84	84	79	77	72	71	72	72	73	75	78	81	81	82	83	84	85	80.7	87																			
3-Feb	85	83	85	86	86	85	85	84	84	81	78	71	64	67	68	70	72	77	78	78	78	78	79	82	78.6	86																			
4-Feb	82	79	77	80	82	83	84	83	82	81	76	68	63	59	62	61	62	68	73	77	81	82	81	81	75.4	84																			
5-Feb	81	81	83	82	82	81	80	80	80	79	77	73	64	61	63	64	67	74	77	79	80	80	80	80	76.2	83																			
6-Feb	78	79	80	79	79	78	79	81	81	79	76	71	63	56	57	59	65	72	77	75	73	74	76	76	73.5	81																			
7-Feb	77	79	81	78	77	78	80	78	78	74	72	69	63	57	54	57	60	65	66	69	73	76	77	80	71.7	81																			
8-Feb	80	80	80	81	81	81	81	80	80	78	77	67	56	51	50	50	54	57	60	61	63	64	64	64	68.3	81																			
9-Feb	62	68	74	78	78	77	79	79	81	76	71	67	57	51	51	54	55	57	58	61	62	63	64	66	66.2	81																			
10-Feb	66	68	71	71	74	80	82	86	80	65	57	48	40	44	69	85	89	88	83	83	82	81	82	83	73.2	89																			
11-Feb	84	84	84	84	79	75	76	74	70	63	56	49	46	44	42	41	43	48	50	51	53	55	58	60	61.2	84																			
12-Feb	59	55	54	59	61	59	53	51	51	47	45	43	41	37	38	34	34	37	38	40	41	44	47	51	46.7	61																			
13-Feb	52	54	58	60	63	66	67	66	65	60	55	47	42	35	32	34	38	46	53	59	60	65	66	67	54.6	67																			
14-Feb	70	72	82	83	83	84	84	84	84	75	67	54	46	43	42	40	44	47	49	55	58	60	62	64	63.8	84																			
15-Feb	64	67	70	68	65	63	59	56	52	48	46	40	34	34	33	34	36	40	46	48	57	59	55	49	51.1	70																			
16-Feb	58	65	67	66	63	64	61	67	69	60	56	53	48	44	42	46	51	56	59	59	58	60	61	65	58.1	69																			
17-Feb	69	72	75	79	79	85	96	97	94	92	90	87	87	85	78	75	71	82	87	88	88	92	93	93	84.7	97																			
18-Feb	93	89	87	88	86	84	86	86	83	79	77	74	71	71	71	71	72	77	79	79	81	83	84	86	80.7	93																			
19-Feb	88	88	88	89	93	95	95	95	95	95	95	95	96	95	96	97	97	98	99	99	99	99	99	99	95.1	99																			
20-Feb	99	98	98	98	98	97	97	96	96	95	94	94	93	92	92	91	91	90	90	90	88	86	85	86	93.1	99																			
21-Feb	88	91	91	92	93	96	94	94	93	89	87	86	85	83	83	83	84	85	87	89	90	88	88	88	88.5	96																			
22-Feb	86	84	85	84	83	84	83	84	84	83	82	82	76	74	75	71	74	76	78	83	83	82	85	85	81.1	86																			
23-Feb	86	88	87	87	87	87	86	86	85	79	69	64	65	62	67	73	79	85	89	90	90	89	89	87	81.4	90																			
24-Feb	87	86	86	85	85	85	85	84	82	76	69	58	60	61	63	67	71	76	76	76	76	79	84	76.8	87																				
25-Feb	85	87	86	86	85	85	84	84	83	78	71	59	53	54	55	55	54	59	69	71	75	76	83	73.2	87																				
26-Feb	86	78	72	73	75	76	76	75	75	67	61	55	56	53	49	53	59	62	66	69	70	75	78	79	68.2	86																			
27-Feb	81	82	82	82	83	83	83	83	84	79	71	67	65	61	58	59	60	65	69	71	72	79	83	84	74.5	84																			
28-Feb	83	84	85	84	83	82	83	83	82	79	72	64	55	54	48	45	49	56	60	59	62	64	64	69	68.6	85																			
																			78.6	79.1	80.0	80.3	80.2	80.5	80.7	80.9	80.0	75.7	71.2	65.7	60.8	58.5	58.9	60.2	63.0	67.4	70.4	71.8	73.2	74.7	75.9	77.2	Diurnal Average		
																			99	98	98	98	98	97	97	97	96	95	95	95	96	95	96	97	97	98	99	99	99	99	99	99	99	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Stony Mountain - February 2017



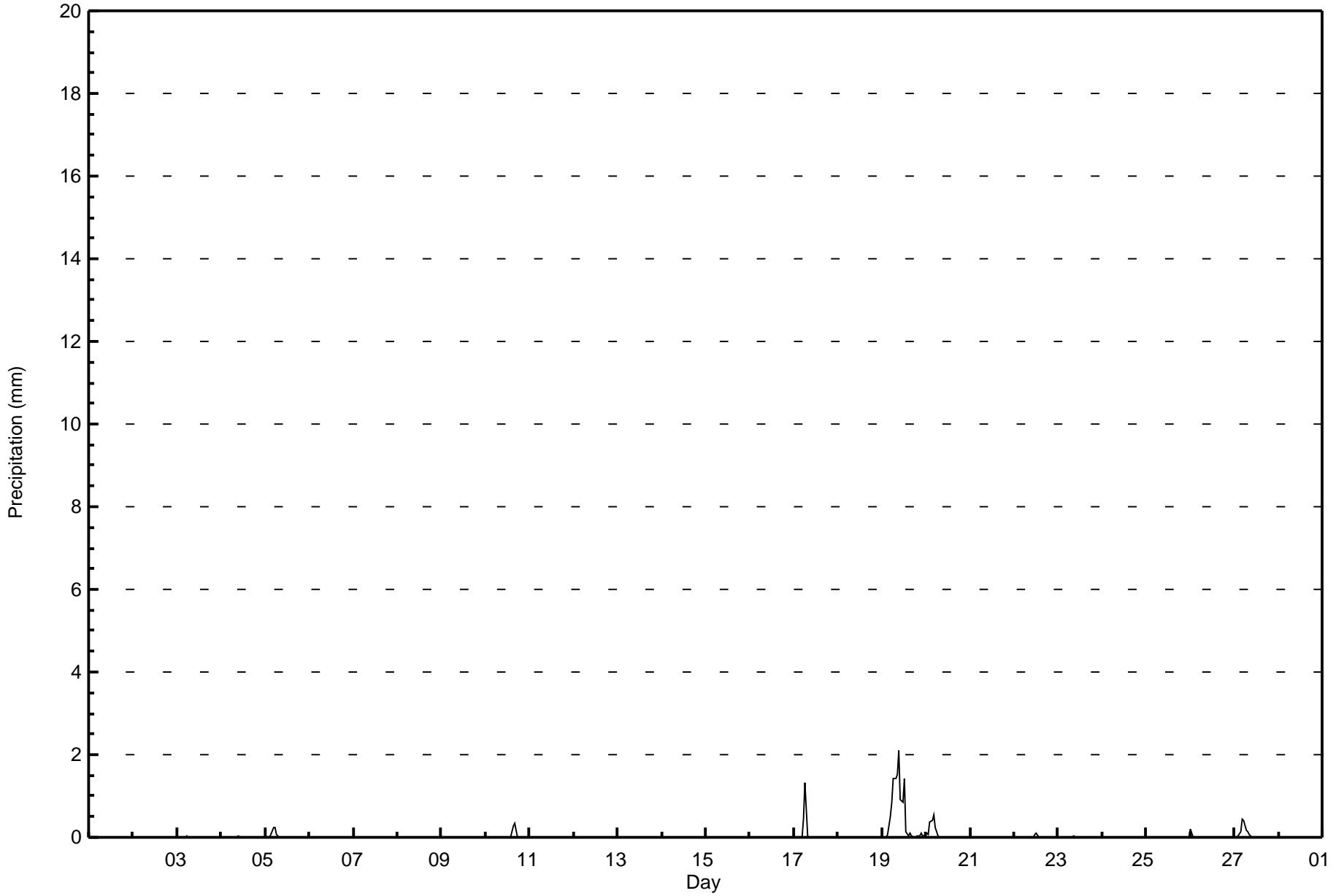


Maximum Value: 2.1 mm on Feb 19 10:00		Maximum Daily Total: 11.8 mm on Feb 19		Hours in Service: 672																																													
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1		Hours of Data: 672																																													
Maximum Diurnal Total: 3.0 mm at hour 7		Minimum Diurnal Total: 0.0 mm at hour 18		Hours of Missing Data: 0																																													
Monthly Total: 18.61 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 = 0.8		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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
4-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
5-Feb	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
6-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
11-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.5	1.3	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																					
18-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.1	0.5	0.8	1.4	1.4	1.5	2.1	0.9	0.9	1.4	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1																					
20-Feb	0.1	0.1	0.4	0.4	0.5	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																					
21-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	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	0.0	0.0																					
23-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
24-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	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	0.0																					
27-Feb	0.0	0.0	0.1	0.2	0.5	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
28-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
																								0.3	0.1	0.4	0.7	1.7	2.2	3.0	1.6	1.7	2.1	0.9	0.9	1.5	0.1	0.2	0.4	0.4	0.0	0.0	0.1	0.1	0.1	0.1	0.1	Diurnal Average	
																								0.2	0.1	0.4	0.4	0.5	0.8	1.4	1.4	1.5	2.1	0.9	0.9	1.4	0.1	0.1	0.3	0.4	0.0	0.0	0.1	0.1	0.1	0.1	0.1	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Stony Mountain - February 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	656	97.62	97.62
0.4 - 0.5	7	1.04	98.66
0.6 - 0.7	0	0.00	98.66
0.8 - 1.4	7	1.04	99.70
1.5 - 10	2	0.30	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

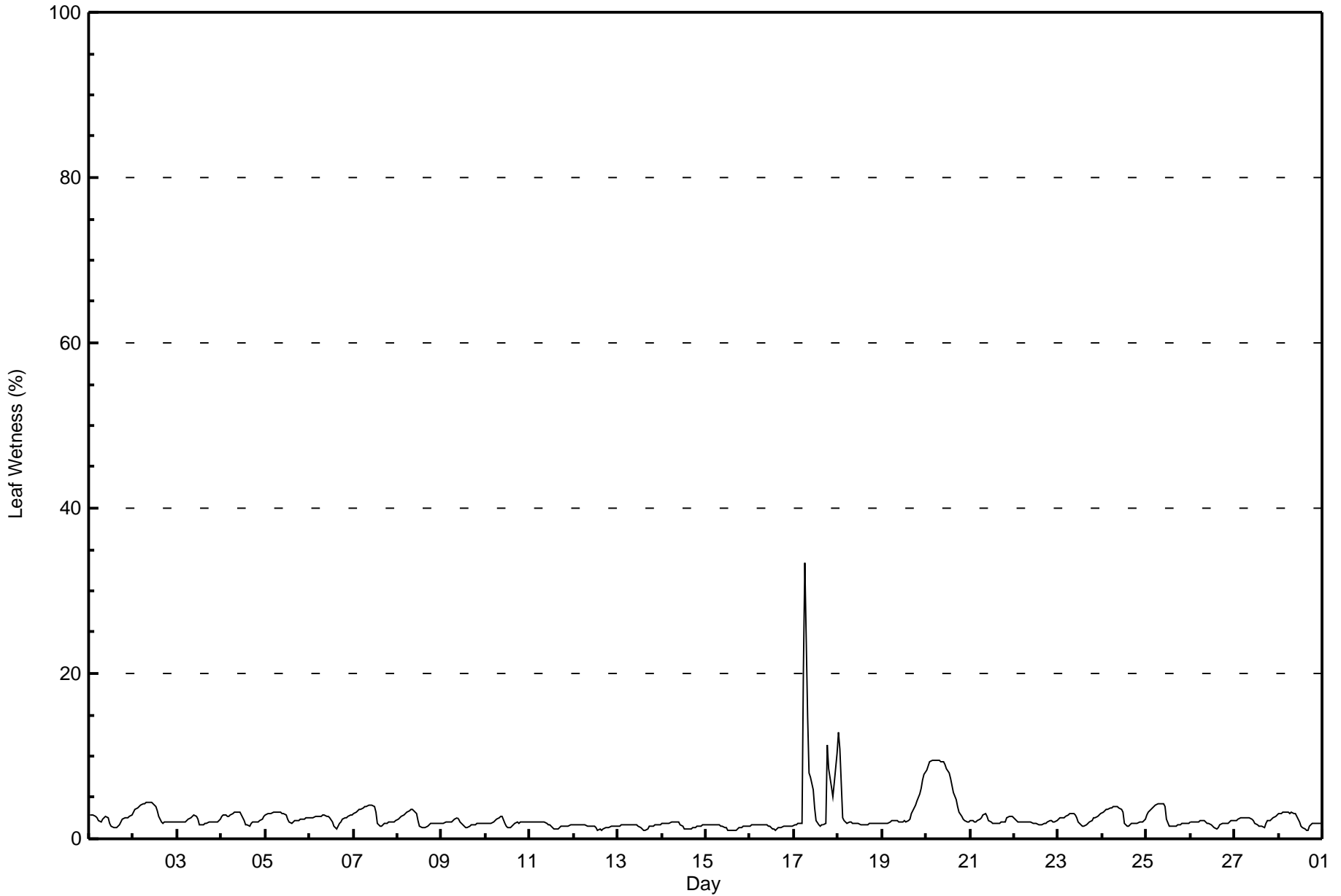


Maximum Value: 33 % on Feb 17 07:00														Maximum Daily Average: 6.8 % on Feb 17														Hours in Service: 672			
Minimum Value: 1 % on Feb 15 14:00														Minimum Daily Average: 1.4 % on Feb 15														Hours of Data: 672			
Maximum Diurnal Average: 4.0 % at hour 7														Minimum Diurnal Average: 1.7 % at hour 16														Hours of Missing Data: 0			
Monthly Average: 2.6 %														Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 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-Feb	3	3	3	3	2	2	2	2	3	3	3	2	1	1	1	1	2	2	2	3	2	2	3	3	2.3	3					
2-Feb	3	4	4	4	4	4	4	4	4	4	4	4	4	3	3	2	2	2	2	2	2	2	2	2	3.2	4					
3-Feb	2	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	3					
4-Feb	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	3	2.5	3					
5-Feb	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	3	2.7	3						
6-Feb	3	3	3	3	3	3	3	3	3	3	3	3	2	2	1	1	2	2	2	3	3	3	3	2.4	3						
7-Feb	3	3	3	4	4	4	4	4	4	4	4	4	3	2	1	2	2	2	2	2	2	2	2	2.9	4						
8-Feb	2	3	3	3	3	3	3	4	4	3	3	2	2	1	1	1	2	2	2	2	2	2	2	2.4	4						
9-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1.9	2						
10-Feb	2	2	2	2	2	2	2	3	3	3	2	1	1	1	2	2	2	2	2	2	2	2	2	2.0	3						
11-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	1.7	2						
12-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.5	2						
13-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	2	1.5	2						
14-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	1.6	2						
15-Feb	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1.4	2						
16-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	1.5	2						
17-Feb	2	2	2	2	2	21	33	15	8	8	6	4	2	2	2	2	2	2	11	9	6	5	7	10	6.8	33					
18-Feb	13	11	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.7	13					
19-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4	4	4	5	5	6	7	8	3.1	8					
20-Feb	8	9	9	9	9	10	10	9	9	9	9	9	8	7	7	6	5	4	3	3	2	2	2	2	6.7	10					
21-Feb	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2.3	3					
22-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2					
23-Feb	2	2	3	3	3	3	3	3	3	3	3	2	2	1	2	2	2	2	2	2	3	3	3	3	2.4	3					
24-Feb	3	3	4	4	4	4	4	4	4	4	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2.7	4					
25-Feb	3	3	3	4	4	4	4	4	4	4	4	2	1	1	2	1	2	2	2	2	2	2	2	2	2.7	4					
26-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1.9	2					
27-Feb	2	2	2	2	3	3	3	3	2	2	2	2	2	1	2	1	1	2	2	2	2	3	3	3	2.2	3					
28-Feb	3	3	3	3	3	3	3	3	3	3	3	2	2	1	1	1	1	2	2	2	2	2	2	2	2.3	3					
2.9														2.9														Diurnal Average			
13														11														Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (LW) - %
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Stony Mountain - February 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	62	9.23	9.23
1.5 - 10	580	86.31	95.54
> 10	7	1.04	96.58

Total Number of Valid Hours: 672

Total Number of Hours: 672



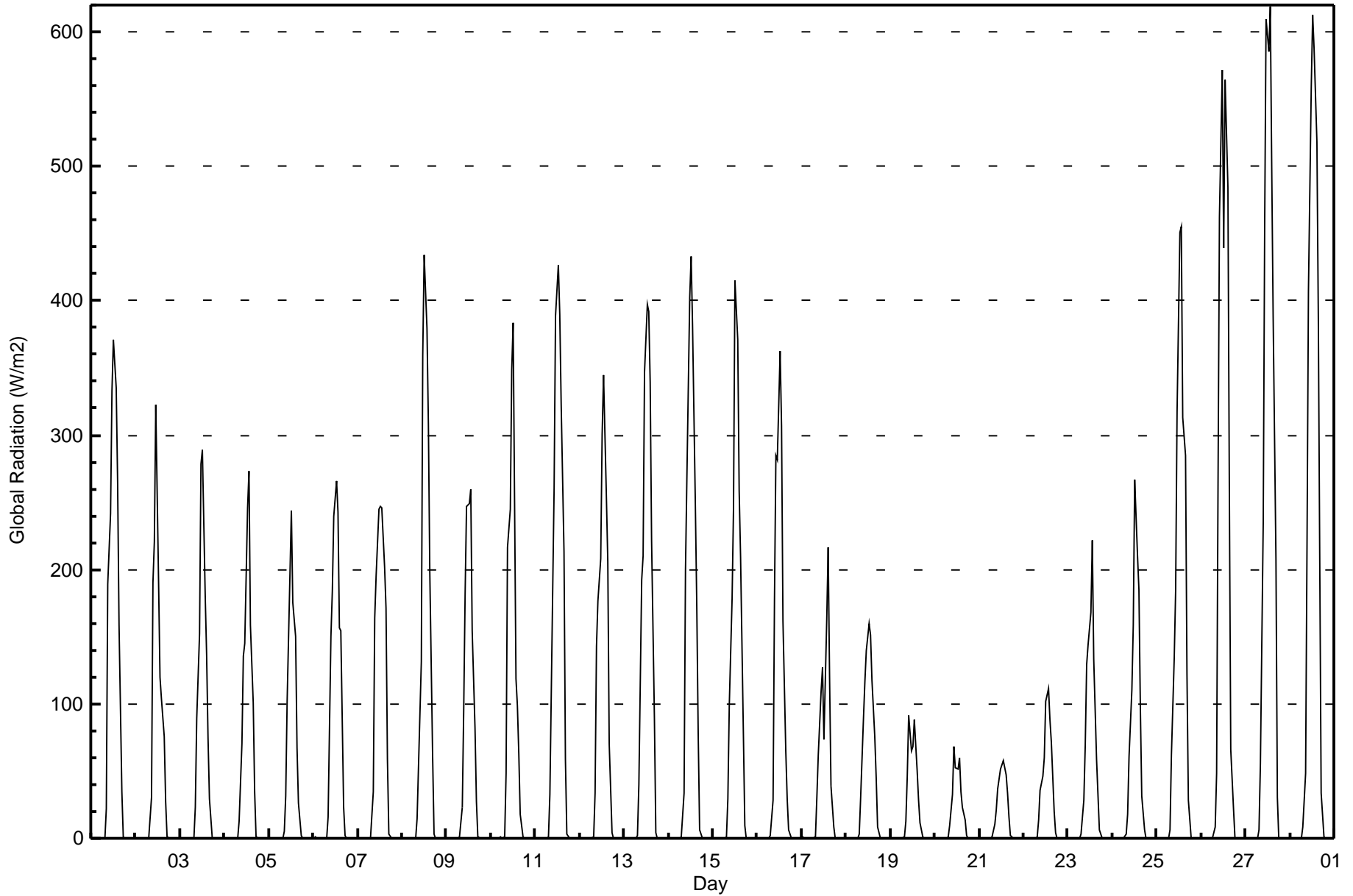
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Stony Mountain - February 2017

Maximum Value: 619 W/m2 on Feb 27 14:00		Maximum Daily Average: 153.8 W/m2 on Feb 27		Hours in Service: 672																						
Minimum Value: 0 W/m2 on Feb 1 01:00		Minimum Daily Average: 13.9 W/m2 on Feb 21		Hours of Data: 672																						
Maximum Diurnal Average: 295.9 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 20		Hours of Missing Data: 0																						
Monthly Average: 67.2 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 74 P ₉₀ = 247 P ₉₉ = 563		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-Feb	0	0	0	0	0	0	0	0	23	189	241	333	371	335	264	159	35	1	0	0	0	0	0	0	81.3	371
2-Feb	0	0	0	0	0	0	0	0	30	190	220	323	190	120	104	76	27	1	0	0	0	0	0	0	53.4	323
3-Feb	0	0	0	0	0	0	0	0	23	89	152	279	289	181	137	75	30	0	0	0	0	0	0	0	52.3	289
4-Feb	0	0	0	0	0	0	0	0	12	71	135	145	246	274	159	101	34	1	0	0	0	0	0	0	49.1	274
5-Feb	0	0	0	0	0	0	0	0	6	32	102	197	243	175	150	67	26	2	0	0	0	0	0	0	41.8	243
6-Feb	0	1	0	0	0	0	0	0	16	150	184	240	265	243	157	155	23	2	0	0	0	0	0	0	60.0	265
7-Feb	0	0	0	0	0	0	0	0	34	164	196	245	247	246	202	171	59	3	0	0	0	0	0	0	65.3	247
8-Feb	0	0	0	0	0	0	0	1	15	54	132	360	434	379	308	198	61	3	0	0	0	0	0	0	81.0	434
9-Feb	0	0	0	0	0	0	0	1	23	95	182	247	249	260	154	82	27	2	0	0	0	0	0	0	55.1	260
10-Feb	0	0	0	0	0	1	0	1	48	217	244	349	384	118	99	63	18	1	0	0	0	0	0	0	64.4	384
11-Feb	0	0	0	0	0	0	0	1	33	185	261	389	427	390	323	213	59	3	0	0	0	0	0	0	95.2	427
12-Feb	0	0	0	0	0	0	0	1	33	143	176	209	301	345	254	206	70	4	0	0	0	0	0	0	72.7	345
13-Feb	0	0	1	0	0	0	0	2	40	192	210	347	397	392	340	221	90	5	0	0	0	0	0	0	93.2	397
14-Feb	0	0	0	0	0	0	0	1	33	200	269	402	433	381	247	172	78	6	0	0	0	0	0	0	92.7	433
15-Feb	0	0	0	0	0	0	0	2	29	99	179	246	415	370	259	209	77	9	0	0	0	0	0	0	79.0	415
16-Feb	0	0	0	0	0	0	0	2	28	178	285	282	362	307	161	66	30	6	0	0	0	0	0	0	71.1	362
17-Feb	1	0	0	0	0	0	0	1	31	62	110	128	73	163	216	120	39	8	0	0	0	0	0	0	39.7	216
18-Feb	0	0	0	1	0	0	0	3	30	89	117	140	160	151	118	76	45	9	0	0	0	0	0	0	39.1	160
19-Feb	0	0	0	0	0	0	0	1	13	46	91	65	69	89	50	28	11	1	0	0	0	0	0	0	19.4	91
20-Feb	0	0	0	0	0	0	0	1	10	32	68	53	52	60	35	24	13	2	0	0	0	0	0	0	14.5	68
21-Feb	0	0	0	0	0	0	0	1	11	21	37	51	55	58	47	34	16	2	0	0	0	0	0	0	13.9	58
22-Feb	0	0	0	0	0	0	0	1	14	35	46	59	102	111	88	72	20	4	0	0	0	0	0	0	23.0	111
23-Feb	0	0	0	0	0	0	0	4	28	69	130	144	168	222	134	58	32	7	0	0	0	0	0	0	41.5	222
24-Feb	0	0	0	0	0	0	0	3	18	61	110	158	266	210	185	98	32	7	0	0	0	0	0	0	47.9	266
25-Feb	0	0	0	0	0	0	0	7	62	135	185	318	451	456	313	285	123	28	0	0	0	0	0	0	98.4	456
26-Feb	0	0	0	0	0	0	0	8	49	264	463	571	439	564	485	261	67	21	0	0	0	0	0	0	133.0	571
27-Feb	0	0	0	0	0	0	0	7	56	235	451	610	586	619	500	390	208	30	0	0	0	0	0	0	153.8	619
28-Feb	0	0	0	0	0	0	0	8	48	220	407	559	613	588	518	387	208	34	1	0	0	0	0	0	149.6	613
		0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.0	28.5	125.6	192.2	266.0	295.9	278.8	214.6	145.2	55.7	7.2	0.1	0.0	0.1	0.1	0.1	0.1	Diurnal Average
		1	1	1	1	0	1	0	8	62	264	463	610	613	619	518	390	208	34	1	0	0	0	0	0	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Stony Mountain - February 2017

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	430	63.99	63.99
21 - 100	90	13.39	77.38
101 - 300	104	15.48	92.86
301 - 600	45	6.70	99.55
601 - 900	3	0.45	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Stony Mountain - February 2017

Maximum Speed: 22 km/h on Feb 8 20:00	Maximum Daily Speed Average: 15.2 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 23 05:00	Minimum Daily Speed Average: 1.1 km/h on Feb 18	Hours of Data: 656
Maximum Diurnal Speed Average: 6.2 km/h at hour 1	Minimum Diurnal Speed Average: 4.0 km/h at hour 18	Hours of Missing Data: 16
Monthly Average Velocity: 5.2 km/h 265.9 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 15 P ₉₉ = 19	Percent Operational Time: 97.6

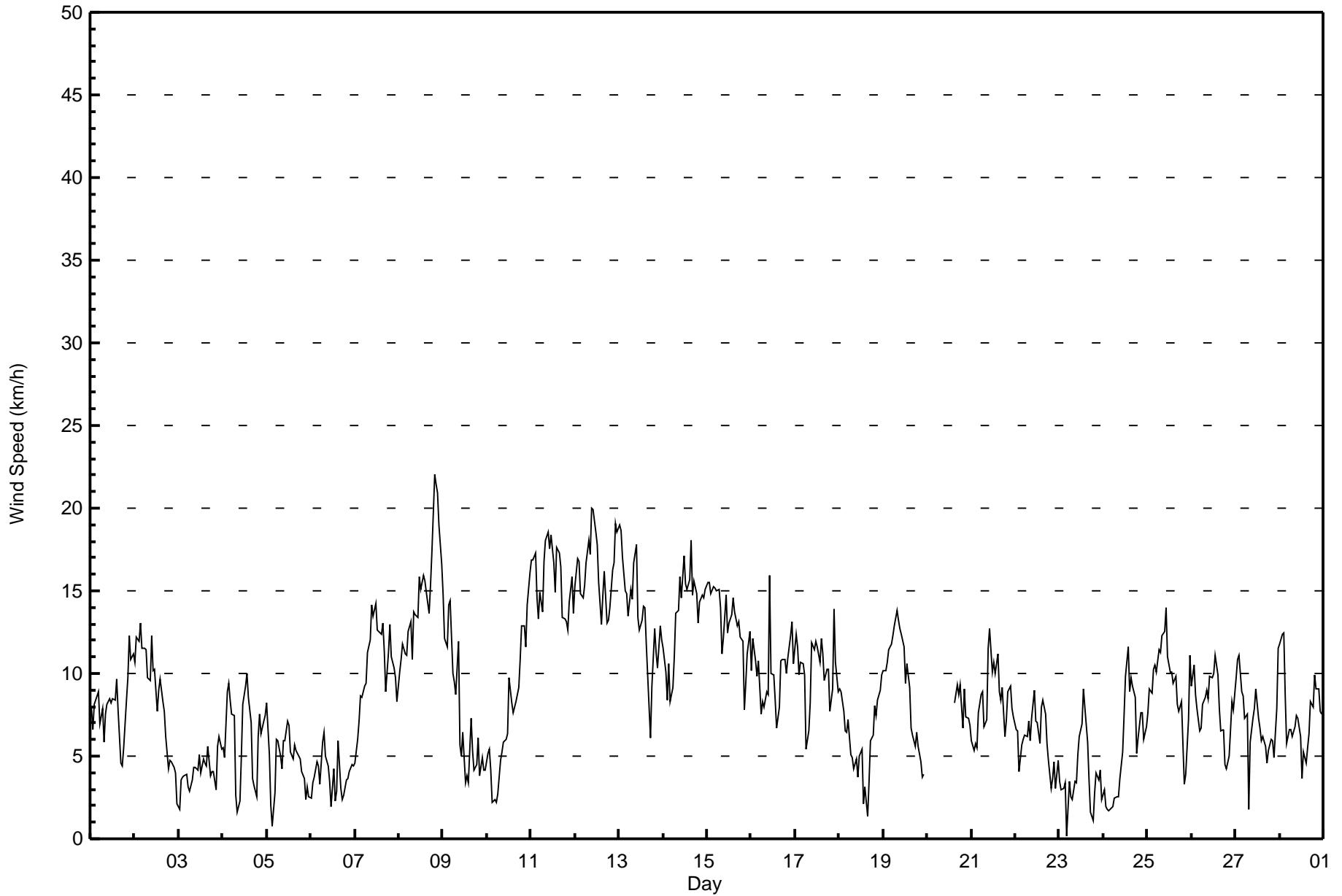
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	NW8	NW7	NW8	NNW9	NNW9	NNW7	NNW8	NNW6	NNW8	NNW8	NNW8	NNW8	NNW8	NW8	NW10	NW8	NW5	WNW4	W6	WNW8	WNW10	WNW12	WNW11	WNW11	NW7.6	WNW12	
2-Feb	W11	WNW12	WNW12	WNW13	WNW12	WNW12	WNW11	W10	W10	WNW12	WNW10	WNW10	WNW8	W9	WNW10	WNW8	WNW8	NW6	NW4	WNW5	WNW5	WNW4	NW4	NNW2	WNW8.5	WNW13	
3-Feb	WNW2	WNW4	WNW4	NW4	NNW4	NNW3	NNW3	NNW4	NNW4	NW4	NNW4	N5	NNW4	NNW5	N5	N4	NW6	NNW4	NW4	NW4	WNW3	NW6	NW6	NW5	NNW4.0	NW6	
4-Feb	WNW6	W5	W9	WNW9	WNW8	WNW8	WNW7	NNW3	NW2	NNW2	NW5	NW8	WNW9	WNW10	NW9	NW7	WNW4	W3	WSW3	SW6	SW8	SW6	W7	WSW7	WNW5.7	WNW10	
5-Feb	W8	WSW5	NNW2	NNW1	N3	N6	N6	N5	N4	NNE6	NNE6	NE7	N7	N5	NNW5	NNW6	NW5	NW5	NW5	NNW4	NNW4	NW2	W3	NW3	NNW3.7	W8	
6-Feb	W2	WSW3	SW4	SW5	SW4	WSW3	SW6	SW6	SW5	SSW4	S3	ESE2	ESE4	S2	ESE3	NE6	NNE3	NE2	S3	SW4	WSW4	W4	WNW5	W4	SW2.0	SW6	
7-Feb	WNW5	WNW6	WNW7	W9	W9	W9	W9	W11	W12	W14	WNW13	W14	W13	W13	W12	W13	WNW11	WNW9	W11	WNW13	WNW11	NW10	NW10	NW8	WNW10.3	W14	
8-Feb	WNW10	WNW11	WNW12	WNW11	W11	W13	W13	W11	W14	W14	W13	W16	W15	W16	W16	WSW15	WSW14	SW15	SW17	SW22	SW21	SW21	SW19	SW17	WSW13.7	SW22	
9-Feb	WSW15	SW12	SW12	SW14	SW14	SW10	SW10	SW9	SW12	SW6	SSW5	S6	SE3	E4	NE3	ENE7	ESE5	ESE4	NNE4	NNE6	NE4	NE5	NNE4	NNE4	SW3.3	WSW15	
10-Feb	NE5	NNE5	N4	NNE2	N2	N2	NE3	SSE5	SSE5	SSE6	SSE6	SSE6	S10	SSE8	SSE8	SE8	SSE8	SSE9	S11	S13	S13	SSW12	SSW14	SSW16	S5.1	SSW16	
11-Feb	SW17	SW17	SW17	SW15	SW13	WSW15	WSW14	W17	W18	W19	WNW18	WNW18	WNW17	W15	WNW18	WNW17	W16	W13	W13	WSW13	WSW13	WSW14	WSW16	SW14	WSW14.4	W19	
12-Feb	SW15	SW17	SW17	SW15	SSW15	SSW15	SW17	SW18	SW17	SW20	WSW20	WSW19	WSW18	WSW16	WSW13	W15	W16	W13	W13	W14	W16	W17	WNW19	WNW19	WSW15.2	SW20	
13-Feb	WNW19	WNW19	WNW17	WNW15	WNW15	W13	W15	W14	W17	W18	WNW13	WNW13	WNW13	WNW14	WNW14	WNW12	W8	WSW6	WSW9	WSW13	W11	WSW10	WSW13	W12	W13.0	WNW19	
14-Feb	WSW12	SW10	SSW8	SW11	SW8	SW9	SW11	SW14	SW14	SW16	SW15	SW17	SW15	SSW15	SW16	SW18	SSW15	SSW16	SSW15	SW13	SW14	SW15	SW15	SW15	SW13.4	SW18	
15-Feb	SW16	SW16	SW15	SW15	SSW15	SSW15	SSW14	SSW11	SSW12	SSW15	SSW12	SSW13	SSW14	SSW15	SSW15	SW14	WSW13	WSW13	W12	W12	SSW8	WSW9	WSW11	W13	SW12.3	SW16	
16-Feb	SW10	SW12	SW11	SW10	SW11	S8	SSE8	SE8	SSE9	S9	SSW16	SW10	SW10	SSW8	SSW7	SSW8	SSW11	SSW11	SW11	SW10	W11	WNW12	W13	WNW11	SW8.3	SSW16	
17-Feb	WNW12	WNW12	WNW10	WNW11	NW11	NW10	NW5	W7	W8	WNW12	WNW11	NW12	NW12	NW11	NW12	WNW11	WNW10	W10	W10	WNW8	WNW9	W14	WNW11	WNW9	WNW10.0	W14	
18-Feb	WNW9	WNW9	NW8	NW7	WNW6	W7	WNW5	NW5	WNW4	WNW5	WNW4	WNW5	WNW5	WSW2	S3	E1	ENE3	ENE6	ESE6	ESE8	ESE7	E8	ESE9	E10	NW1.1	E10	
19-Feb	ESE10	ESE10	E11	E11	E12	E12	E13	E14	E13	E13	E12	E12	E9	ESE11	ESE9	E7	ENE6	E6	SE6	SE6	ESE5	E4	ENE4	AF	E9.2	E14	
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WNW8	WNW9	W9	W9	WNW7	WNW9	WNW7	WNW7	----	WNW9
21-Feb	WSW6	SW5	W6	WNW6	WNW8	WNW9	WNW9	WNW7	WNW7	WNW11	WNW13	WNW10	W11	WNW10	WNW11	W9	WNW8	WNW9	NW6	NW7	NW9	NW9	NW8	NNW7	WNW7.9	WNW13	
22-Feb	NW7	NW6	NW4	NW6	WNW6	WNW6	WNW6	W7	WSW6	W7	W9	WNW7	NW7	NW6	NW8	NW8	NW8	NNW6	NW5	NNW3	NNW4	NW5	NW3	WNW5	WNW5.6	W9	
23-Feb	NNW4	N3	N3	ENE0	SW3	WSW3	NW2	WNW4	WNW3	W5	W6	W7	WSW9	W8	W6	WNW4	NNW2	NNW1	NNE3	NNE4	NE4	NE4	N2	WNW2.3	WSW9		
24-Feb	NNE3	NNE2	N2	NNW2	NW2	NNW2	NNW2	NNW3	N3	N4	NNW5	NW7	NW10	NW12	NW9	NW10	NW9	WNW5	W6	WNW8	WNW8	W6	W7	WNW5.0	NW12		
25-Feb	WSW8	SW9	SW9	WSW10	SW10	SW10	SW11	SW12	SW13	SW14	WSW11	WSW10	W10	W9	WSW10	WNW8	WNW8	N8	NNE6	NNW3	W4	W7	WNW11	WSW7.5	SW14		
26-Feb	N9	N11	N9	NNW8	NNW7	NNW7	NNW8	NNW9	NNW9	NNW8	NW10	NW10	NW10	NW11	NW10	NW8	WNW7	W7	WSW4	WSW4	WSW5	SW7	SW8	SW8	NW6.1	NW11	
27-Feb	SSW10	SW11	SW11	SW9	SW9	SSW7	SW8	NW2	NNE6	NNE7	NE8	ENE9	ENE7	ENE7	ENE6	NE6	E6	ENE5	E5	SE6	SSE6	S5	SSW8	SSW12	SSE2.0	SSW12	
28-Feb	SW12	SW12	SW12	SW9	W6	WNW7	WNW7	NNW6	N7	NE7	NE7	ENE6	N4	NNE5	N5	NE6	ENE6	E8	ENE8	ENE10	ENE9	E9	E8	E8	NE2.0	SW12	
W6.2WSW6.1WSW5.8WSW5.5 W5.4 W5.3 W5.3 W4.9 W5.0 W5.5 W5.3 W5.4 W5.6 W5.4 W5.6WNW5.2 W4.6 W4.0 W4.0WSW4.4WSW4.6 W5.2 W5.7 W6.0																											
WNW19WNW19 SW17 SW15 SSW15 SSW15 SW17 SW18 W18 SW20WSW20WSW19WSW18 W16WNW18 SW18 W16 SSW16 SW17 SW22 SW21 SW21WNW19WNW19																											
Diurnal Average																											
Diurnal Maximum																											

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Stony Mountain - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Stony Mountain - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	161	24.54	24.54
6 - 11	316	48.17	72.71
12 - 19	174	26.52	99.24
20 - 28	5	0.76	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Stony Mountain - February 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	18	11	8	5	4	6	1	2	5	2	7	10	8	22	25	27	161
6 - 11	8	6	7	12	11	9	5	10	5	11	37	14	43	70	47	21	316
12 - 19	0	0	0	0	8	0	0	0	2	20	48	18	40	34	4	0	174
20 - 28	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	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	26	17	15	17	23	15	6	12	12	33	96	43	91	126	76	48	656

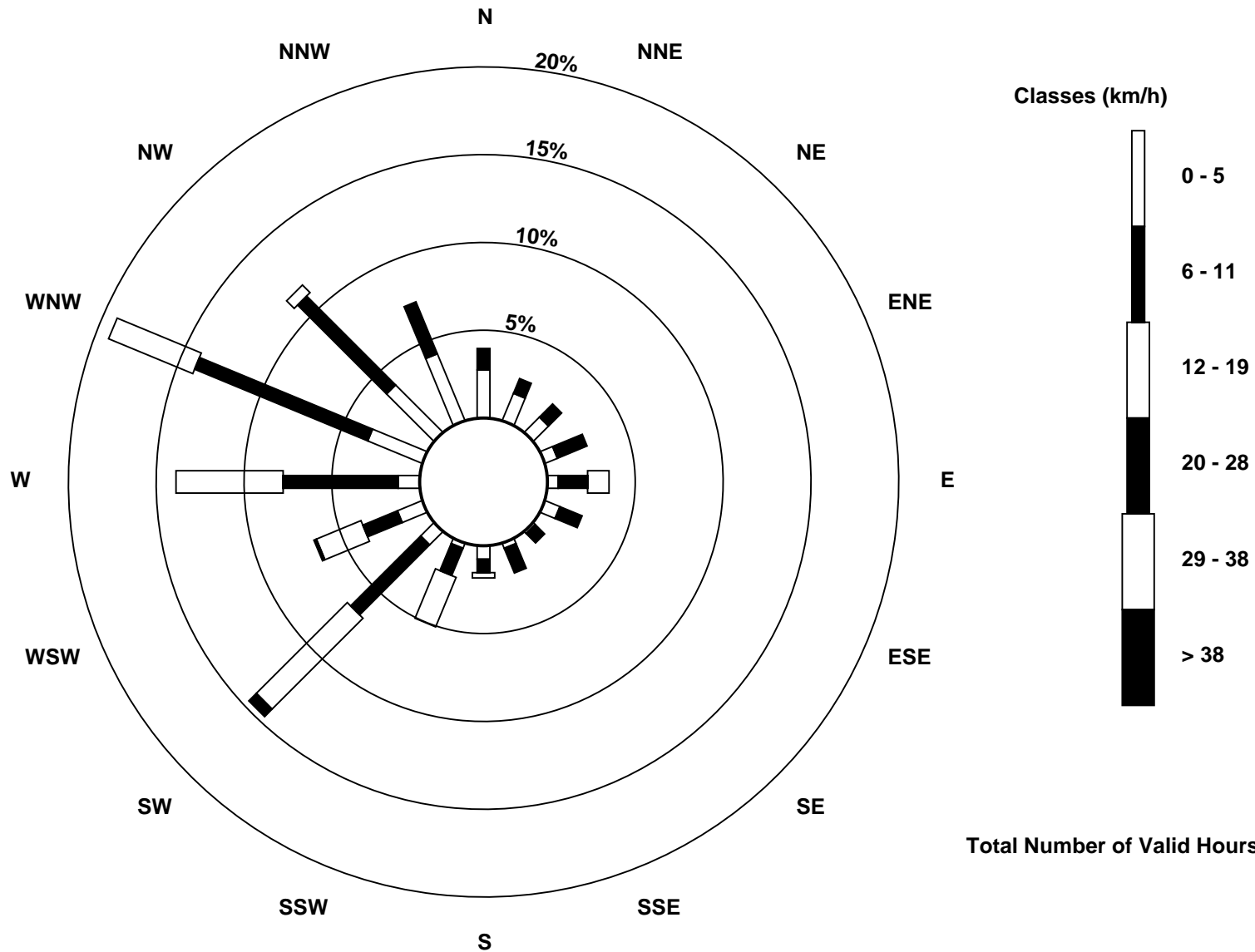
Total Number of Valid Hours: 656

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Stony Mountain (AMS 18)



Total Number of Valid Hours: 656



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Stony Mountain - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 13 01:00														Hours in Service: 672 Hours of Data: 656 Hours of Missing Data: 16 Hours of Calibration: 0 Percent Operational Time: 97.6												
Minimum Value: 0 km/h on Feb 6 19:00																										
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 4 P 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-Feb	2	2	3	4	4	3	3	2	3	3	3	3	3	3	4	3	1	1	1	2	3	4	3	3	4	
2-Feb	3	4	3	4	4	3	4	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	4
3-Feb	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2
4-Feb	1	1	3	3	2	2	2	3	1	1	2	3	3	4	3	3	2	1	1	2	2	1	2	2	2	4
5-Feb	2	2	1	1	1	2	2	1	1	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	3
6-Feb	1	1	1	1	1	1	1	1	2	2	1	1	2	2	2	2	1	1	0	1	1	1	1	1	1	2
7-Feb	1	2	2	2	3	2	3	3	4	4	4	5	4	4	4	5	4	3	4	4	3	4	3	4	3	5
8-Feb	3	3	4	4	3	4	4	4	4	4	4	5	5	6	5	5	4	4	5	6	6	6	6	5	5	6
9-Feb	4	4	3	4	3	3	3	2	3	2	1	3	1	1	1	2	2	1	2	2	2	1	1	1	2	4
10-Feb	1	2	2	1	1	1	1	1	1	2	2	2	3	3	3	2	2	3	4	4	5	3	4	4	4	5
11-Feb	5	4	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	5	4	6
12-Feb	4	5	5	4	3	4	5	5	5	6	6	6	6	6	4	6	6	5	4	4	6	5	7	7	7	7
13-Feb	7	6	5	5	5	4	5	4	5	6	4	4	4	5	5	4	3	2	3	4	4	3	4	4	4	7
14-Feb	3	3	2	2	1	2	3	3	3	4	4	5	5	4	5	6	4	4	4	3	3	3	3	3	4	6
15-Feb	3	3	3	4	4	4	3	3	3	4	4	3	4	5	5	4	4	4	5	4	2	3	4	4	4	5
16-Feb	3	3	3	2	3	2	2	2	3	4	5	4	3	3	3	2	3	3	3	2	3	3	4	3	3	5
17-Feb	4	3	3	3	3	3	2	2	3	4	3	4	4	4	4	4	3	3	4	2	3	4	3	2	2	4
18-Feb	3	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1	1	2	2	2	2	2	2	2	3	3
19-Feb	3	3	3	3	3	3	4	4	4	4	4	3	3	3	3	2	2	2	2	2	1	1	1	1	1	4
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	3	3	3	2	3	2	3	3	3	3
21-Feb	1	1	2	2	3	3	3	2	2	4	4	4	4	4	4	3	3	3	2	3	3	4	3	3	3	4
22-Feb	3	2	1	2	2	2	2	3	2	2	3	2	2	2	3	3	3	2	2	1	1	2	1	1	1	3
23-Feb	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3	2	1	1	1	1	1	1	1	1	1	3
24-Feb	1	1	0	0	1	1	1	1	1	2	2	3	4	4	3	4	4	3	2	2	2	3	2	2	2	4
25-Feb	2	2	2	3	2	2	3	3	3	4	4	4	3	4	3	3	3	3	4	2	1	1	2	4	4	4
26-Feb	5	4	4	3	3	3	3	3	4	3	4	4	4	4	4	3	3	2	1	1	1	1	2	2	5	
27-Feb	2	3	3	2	2	2	2	2	2	2	2	3	2	2	2	2	2	1	1	1	1	1	2	3	3	
28-Feb	3	3	3	2	2	2	2	2	3	2	3	2	2	2	2	2	3	2	2	3	3	3	2	2	3	3
	7	6	5	5	5	4	5	5	6	6	6	6	6	6	6	6	6	5	5	6	6	6	7	7		
Diurnal Maximum																										
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Stony Mountain - February 2017

Direction of Maximum Speed: 226 deg on Feb 8 20:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 248.1 deg on Feb 12	Hours of Data: 656
Direction of Minimum Speed: 61 deg on Feb 23 05:00	Hours of Missing Data: 16
Direction of Minimum Daily Speed Average: 1.1 deg on Feb 18	Percent Operational Time: 97.6
Monthly Average Direction: 281.3 deg	

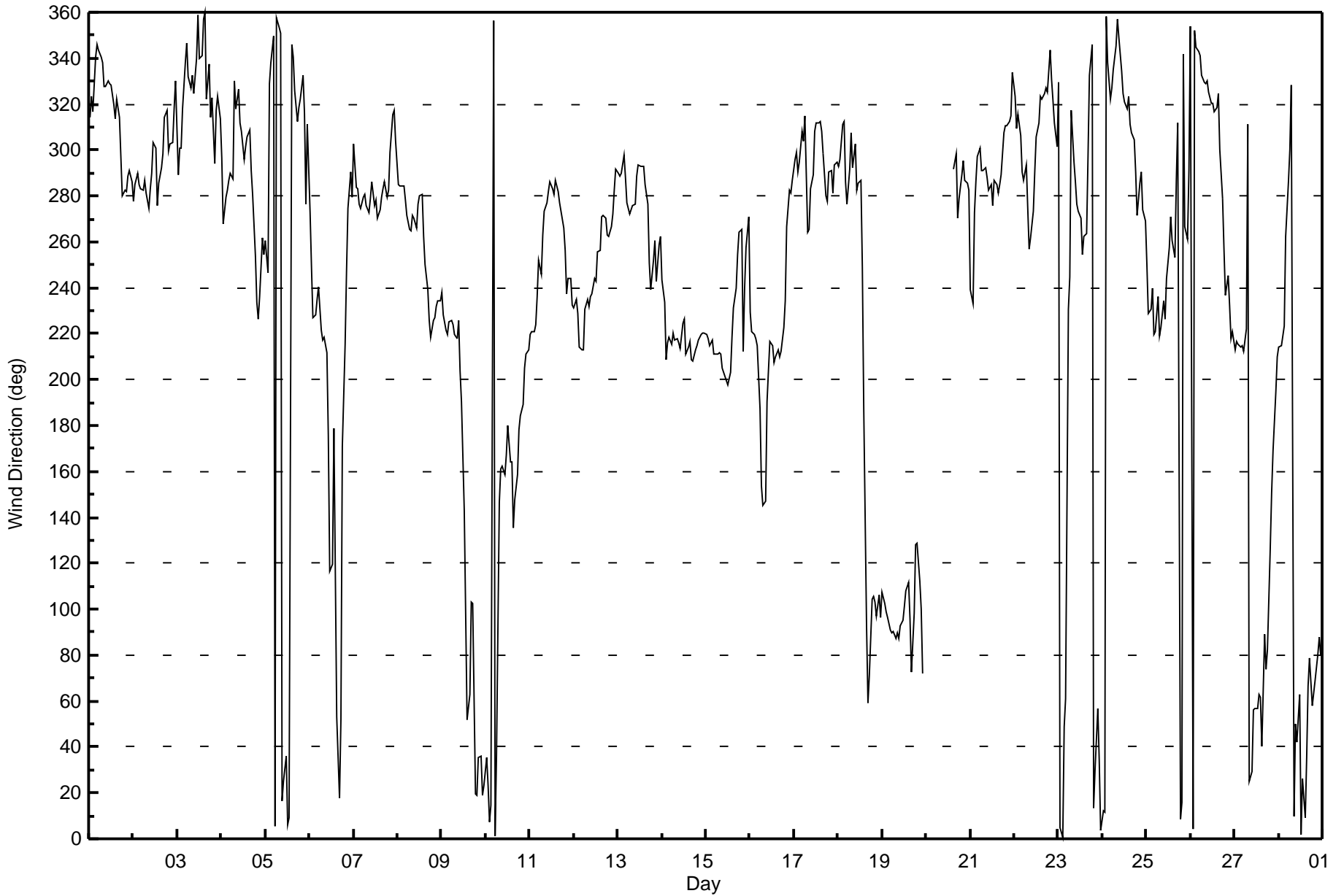
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	314	323	317	341	346	344	341	338	327	328	330	329	328	320	313	322	314	297	280	283	282	289	291	286	314.9
2-Feb	278	285	290	285	283	283	287	281	275	283	290	303	301	276	285	292	299	314	317	300	303	303	318	330	289.8
3-Feb	289	301	301	318	338	347	332	327	332	325	340	359	340	341	357	360	322	338	314	323	294	317	323	314	328.5
4-Feb	296	268	279	283	287	290	288	330	318	327	312	308	296	301	306	309	291	281	254	234	226	236	262	254	283.2
5-Feb	261	247	329	338	350	6	358	354	351	17	25	36	6	9	346	340	326	312	318	322	333	316	276	311	340.7
6-Feb	273	249	227	228	235	240	221	217	218	212	176	117	119	179	117	53	17	52	171	215	247	274	290	279	224.1
7-Feb	303	284	283	276	274	279	280	276	273	279	286	276	278	270	274	279	283	286	279	283	299	315	317	304	283.7
8-Feb	285	284	284	284	278	271	266	265	271	270	266	276	280	280	262	250	239	225	218	226	227	232	234	234	255.0
9-Feb	238	228	222	220	225	226	224	220	218	226	204	191	143	97	52	63	103	102	20	19	35	36	19	23	215.5
10-Feb	35	23	7	15	356	1	36	147	161	162	159	167	180	164	164	136	148	159	178	184	189	205	211	213	174.7
11-Feb	219	221	221	224	236	252	246	263	273	277	282	286	283	281	287	282	277	273	266	256	238	244	244	232	258.1
12-Feb	231	235	229	214	213	213	231	235	232	236	237	244	243	256	256	271	271	270	263	262	267	272	282	292	248.1
13-Feb	290	289	290	298	288	277	272	274	276	277	288	293	293	293	285	276	251	239	252	260	243	258	262	262	278.2
14-Feb	243	234	209	216	218	215	220	217	218	216	214	225	227	211	214	216	209	208	213	215	217	220	220	221	217.9
15-Feb	220	218	215	217	211	211	211	212	211	205	202	199	198	203	219	231	240	255	264	265	213	240	258	271	223.0
16-Feb	229	221	219	218	215	187	154	145	147	190	204	217	215	208	210	213	210	213	223	235	267	282	281	287	219.5
17-Feb	296	299	290	295	308	304	315	264	266	283	289	308	312	312	313	308	298	280	278	290	291	281	293	294	295.1
18-Feb	293	296	311	312	286	277	292	308	292	303	283	286	287	249	187	93	59	71	104	106	103	97	106	97	325.5
19-Feb	108	102	99	97	91	90	90	87	89	88	93	95	101	108	112	96	73	98	128	129	112	100	72	AF	96.9
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	291	299	270	279	289	295	287	285	282	--
21-Feb	239	233	272	286	297	301	291	291	292	288	283	285	276	287	285	281	285	289	307	311	311	312	315	334	290.6
22-Feb	323	309	315	306	290	287	294	275	257	262	273	290	305	312	323	322	325	327	325	344	331	322	312	301	303.4
23-Feb	330	5	0	49	61	230	245	317	295	286	277	273	270	255	262	264	297	332	346	13	30	56	34	4	299.4
24-Feb	12	12	358	338	322	327	335	346	357	349	334	324	321	318	323	311	307	304	290	271	286	290	274	269	311.6
25-Feb	250	229	231	240	220	221	236	219	223	234	227	244	258	271	261	254	287	312	8	16	342	267	261	291	250.5
26-Feb	354	4	352	345	343	341	332	330	329	330	325	320	320	316	319	325	300	279	257	237	246	232	218	221	316.2
27-Feb	213	216	216	214	215	212	222	311	25	29	56	57	57	63	62	41	89	74	82	126	151	169	194	210	156.7
28-Feb	214	215	219	224	263	286	300	328	10	50	42	63	2	26	9	35	66	79	58	63	69	81	88	80	51.1
260.8 256.9 257.3 258.2 259.8 261.6 261.9 259.8 261.6 267.8 266.1 277.2 277.1 277.2 279.0 283.9 278.1 268.1 259.8 256.7 257.7 263.3 264.8 265.7																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Stony Mountain - February 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Stony Mountain - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 89 deg on Feb 23 05:00 Minimum Value: 6 deg on Feb 23 19:00 Percentiles: P ₁ = 13 P ₁₀ = 16 Q ₁ = 18 Median = 22 Q ₃ = 25 P ₉₀ = 31 P ₉₉ = 72																			Hours in Service: 672 Hours of Data: 656 Hours of Missing Data: 16 Hours of Calibration: 0 Percent Operational Time: 97.6							
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	20	20	22	32	31	29	28	27	21	22	23	26	28	28	26	23	17	13	14	16	20	19	21	20	32	
2-Feb	21	20	20	20	21	20	21	23	23	22	21	20	29	23	23	22	22	20	21	21	21	21	22	34	34	
3-Feb	35	25	22	21	38	23	19	15	16	17	32	33	51	34	39	29	22	27	28	17	23	21	21	17	51	
4-Feb	23	18	18	20	20	20	20	54	37	31	31	26	29	27	28	27	23	29	47	16	16	16	20	20	54	
5-Feb	21	29	41	76	15	19	16	15	17	22	27	28	30	42	39	31	23	17	12	12	13	20	24	19	76	
6-Feb	29	28	11	14	14	13	13	12	21	14	29	72	41	69	59	21	15	32	23	14	18	14	15	18	72	
7-Feb	14	16	16	19	17	18	19	20	24	21	22	24	24	25	25	24	23	20	21	19	21	21	18	20	25	
8-Feb	19	20	21	21	20	23	24	24	21	24	25	23	24	24	23	25	22	20	19	20	19	21	21	19	25	
9-Feb	19	19	17	16	16	18	17	14	14	23	22	27	38	38	30	14	29	24	30	17	41	22	21	41	41	
10-Feb	25	19	22	25	13	24	18	18	14	19	26	27	30	26	28	20	20	21	23	23	24	21	19	19	30	
11-Feb	19	17	17	21	21	23	20	24	22	22	23	22	24	28	23	23	23	22	23	23	21	23	22	20	28	
12-Feb	20	21	21	17	17	18	22	22	20	22	22	24	24	27	27	25	22	24	25	23	22	22	23	26	27	
13-Feb	23	22	23	25	21	22	21	21	20	21	23	24	24	24	23	23	20	20	17	22	23	19	22	24	25	
14-Feb	19	18	13	14	14	14	15	15	16	17	19	20	21	20	21	20	17	18	18	17	16	15	15	15	21	
15-Feb	15	15	15	16	17	17	17	16	16	17	17	19	21	24	22	21	21	22	26	26	15	28	24	23	28	
16-Feb	23	15	15	14	17	20	19	17	16	25	19	25	22	27	33	20	19	18	17	19	21	20	19	18	33	
17-Feb	18	19	23	22	19	20	20	23	24	20	21	21	22	23	21	23	23	22	22	20	20	20	19	19	24	
18-Feb	20	19	20	17	25	21	25	21	33	31	42	36	39	72	81	82	39	18	18	17	17	17	17	17	82	
19-Feb	19	18	19	17	18	18	18	18	18	17	17	17	18	18	18	19	18	21	18	19	16	22	15	AF	22	
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	23	22	27	24	25	21	24	22	21	27	
21-Feb	18	21	26	25	23	21	23	25	24	25	23	26	22	25	23	24	23	23	28	26	23	26	26	30	30	
22-Feb	30	22	25	25	26	25	25	25	24	26	24	29	30	40	29	27	27	26	31	24	22	24	20	20	40	
23-Feb	21	24	27	29	89	20	26	29	20	31	32	45	45	34	32	31	28	17	6	16	24	24	19	17	89	
24-Feb	18	15	17	28	23	28	41	49	53	47	38	32	29	29	26	27	24	22	23	23	21	21	25	20	53	
25-Feb	19	16	16	18	15	15	19	17	18	21	22	29	28	27	27	25	28	23	29	25	36	29	23	24	36	
26-Feb	34	26	28	32	30	26	25	25	24	28	26	27	28	28	28	27	31	23	24	15	22	14	14	17	34	
27-Feb	16	16	16	16	16	16	16	64	20	21	23	24	25	36	27	29	30	19	15	19	10	13	14	15	64	
28-Feb	17	16	17	17	29	28	21	20	29	23	28	39	74	52	52	44	33	15	14	14	15	16	16	17	74	
	35	29	41	76	89	29	41	64	53	47	42	72	74	72	81	82	39	32	47	26	41	29	26	41		
Diurnal Maximum																										
AF - Analyzer Failure																										



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 21, 2017	Last Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	11:17	End Time (MST)	15:47
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	-601
Analyzer IP address	192.168.1.43		Lamp voltage	902	900
Calculated slope	0.992142	0.996849	Chamber temp	45.0	45.2
Calculated intercept	1.933714	1.474791	Pressure	656.0	651.7
Analyzer Background	21.7	21.6	Flow	0.377	0.374
Analyzer Coefficient	0.902	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	-1.0	----
as found span	5000	58.9	581.9	582.4	0.999
calibrator zero	5000	0.0	0.0	-1.0	----
high point	5000	58.9	581.9	582.4	0.999
second point	5000	29.5	291.5	291.1	1.001
third point	5000	14.7	145.2	143.5	1.012
as left zero	5000	0.0	0.0	-0.6	----
as left span	5000	58.9	581.9	588.4	0.989
Average Correction Factor					1.004

Corrected As found 583.3 Previous response 584.6 % change 0.2%

Notes:

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



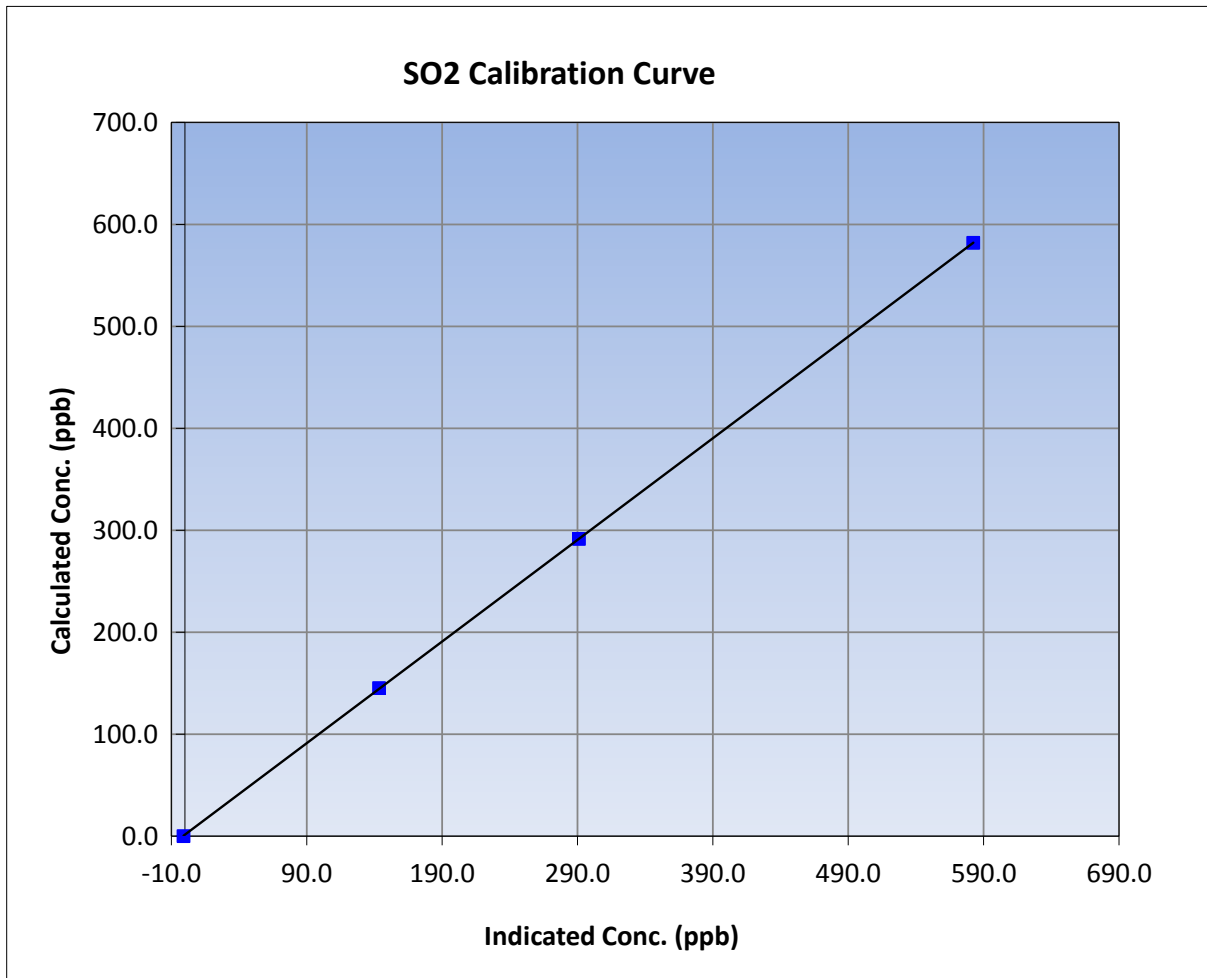
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:17	End Time (MST)	15:47
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

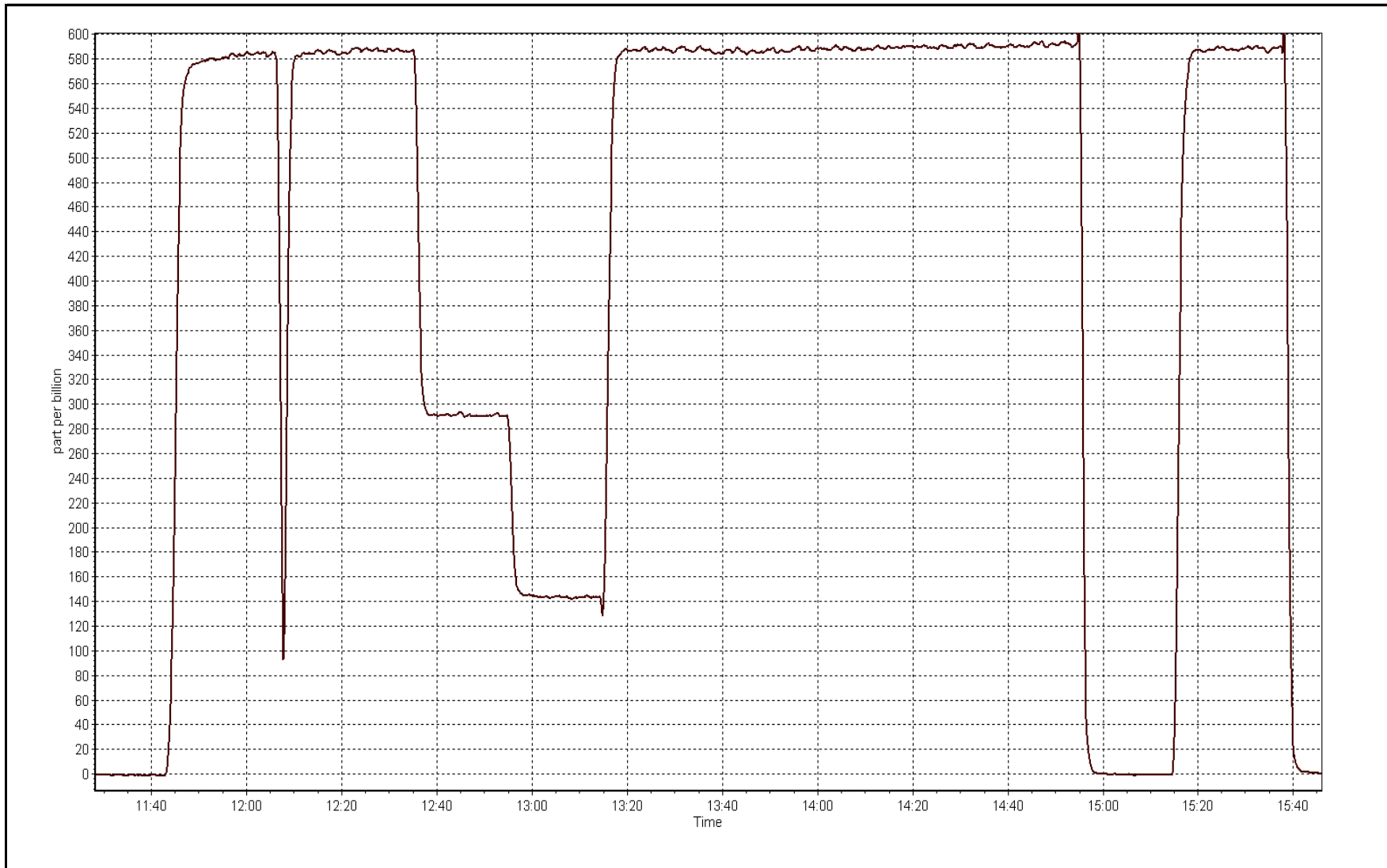
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	----	Correlation Coefficient	0.999996
581.9	582.4	0.9992		
291.5	291.1	1.0014	Slope	0.996849
145.2	143.5	1.0122		
			Intercept	1.474791



SO2 Calibration Plot

Date: February 21, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 15, 2017	Last Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	13:12	End Time (MST)	16:27
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	-699
Analyzer IP address	192.168.1.44		Lamp voltage	1024	1020
Calculated slope	0.998161	0.989967	Chamber temp	45	45
Calculated intercept	-0.172269	-0.170136	Pressure	630.0	620.9
Analyzer Background	2.91	2.93	Flow	0.408	0.402
Analyzer Coefficient	1.103	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	80.9	0.989
SO2 scrubber check	5000	10.0	98.8	0.6	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.0	80.0	80.9	0.989
second point	5000	41.1	40.1	40.9	0.981
third point	5000	20.6	20.1	20.5	0.980
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	82.0	80.0	81.9	0.977
Average Correction Factor					0.983

Corrected As found	80.9	Previous response	80.4	% change	-0.7%
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Notes:

Inlet filter changed and scrubber check done after as founds. No adjustments made.

Calibration Performed By:

Aswin Sasi Kumar



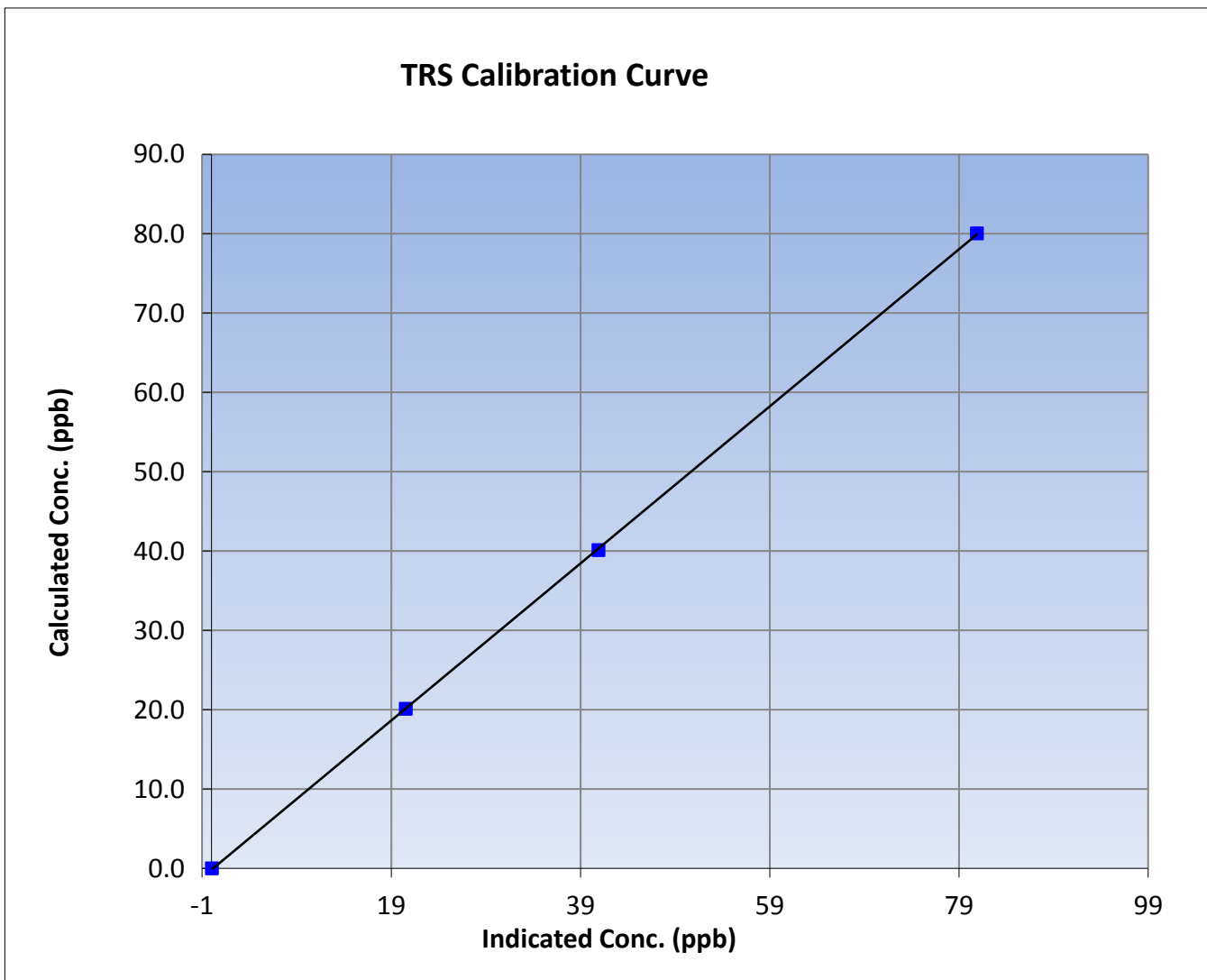
Wood Buffalo Environmental Association TRS Calibration Report

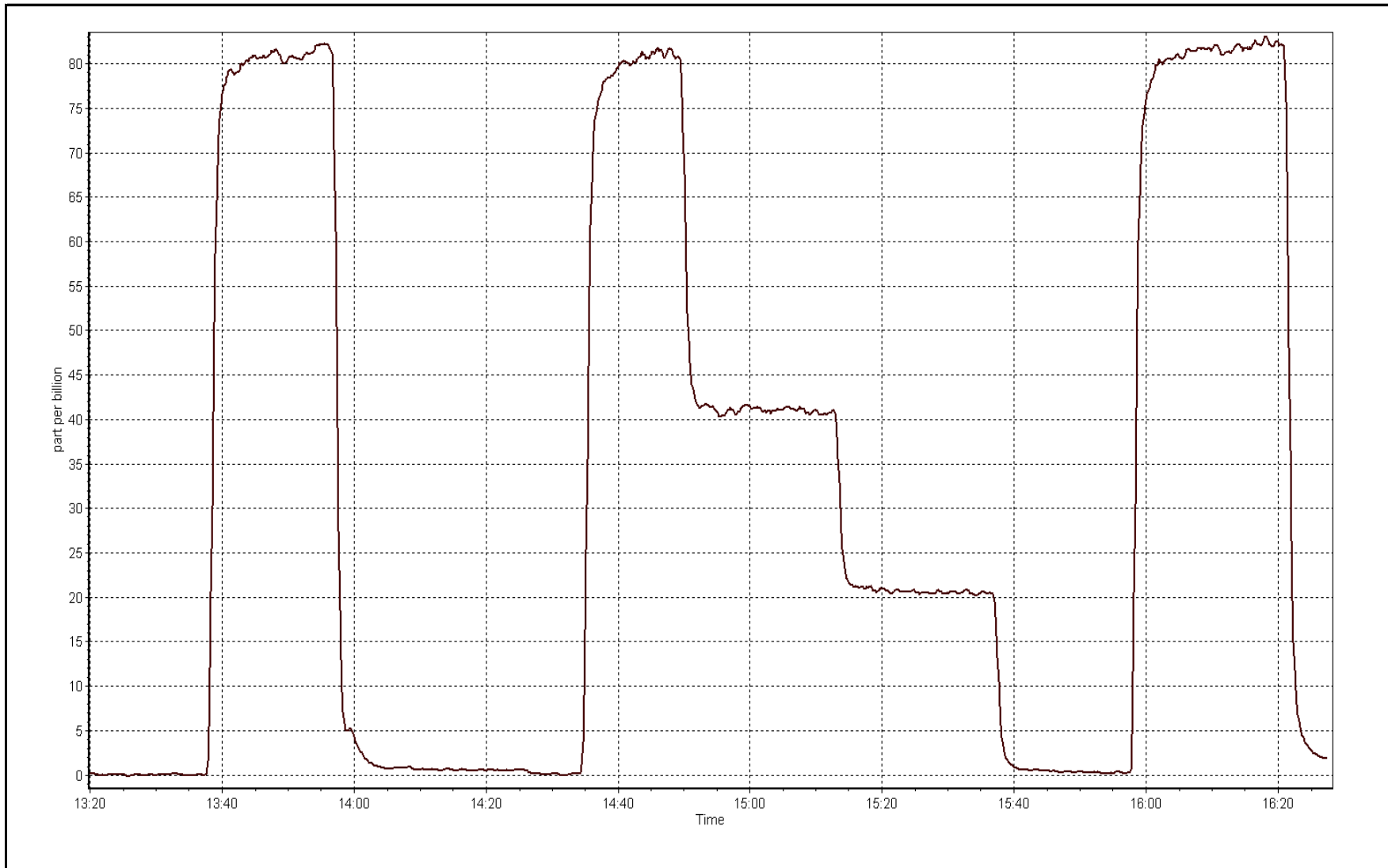
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	13:12	End Time (MST)	16:27
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	0.999979
80.0	80.9	0.9893		
40.1	40.9	0.9808	Slope	0.989967
20.1	20.5	0.9798		
			Intercept	-0.170136







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 8, 2017	Last Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Other:	Repair	
Start Time (MST)	8:25	End Time (MST)	17:43
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	174.8
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope		0.997612	Carrier Pressure	30.9	31.5
THC Calc intercept		0.034116	Fuel Pressure	44.3	44.2
NMHC Calc slope		0.997238	Air Pressure	34.4	34.4
NMHC Calc intercept		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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.9	12.26	12.28	0.999
second point	5000	29.5	6.14	6.09	1.009
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	12.30	0.997
Average Correction Factor					1.008

Corrected As found NA Previous response NA % change NA

Notes:

Noted baseline dips in the morning during DSC. Remotely tried to adjusting carrier pressure because the CH4 peak 13.3 sec, did not appear to help the dipping issue. Arrived at site to further investigate into the issue. Replaced N2 cylinder prior to calibration. Replaced the actuator which seemed to be the main problem. CH4 peak went to 11.3 secs, ended up re-adjusting the carrier pressure back to 31.6 psi. Sample inlet filter replaced prior to the three point calibration.

Calibration Performed By: Aswin Sasi Kumar



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	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	6.51	0.995
Average Correction Factor					1.008

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	58.9	5.78	5.79	0.999
second point	5000	29.5	2.90	2.87	1.009
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	5.79	0.999
Average Correction Factor					1.008

Corrected As found NA Previous response NA % change NA



Wood Buffalo Environmental Association

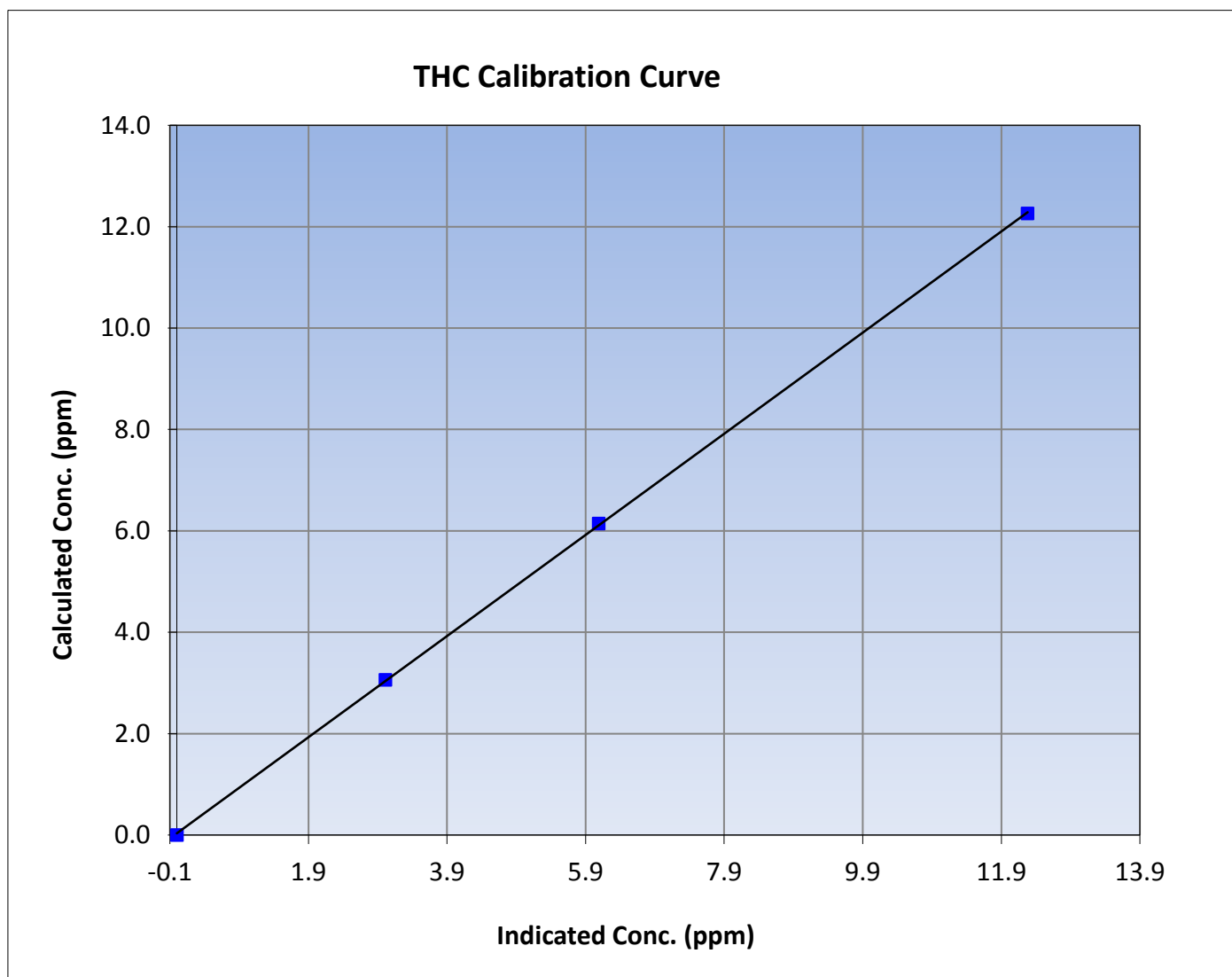
THC Calibration Summary

Station Information

Calibration Date	February 8, 2017	Previous Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	8:25	End Time (MST)	17:43
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	0.999961
12.26	12.28	0.9986		
6.14	6.09	1.0085	Slope	0.997612
3.06	3.01	1.0168		
			Intercept	0.034116





Wood Buffalo Environmental Association

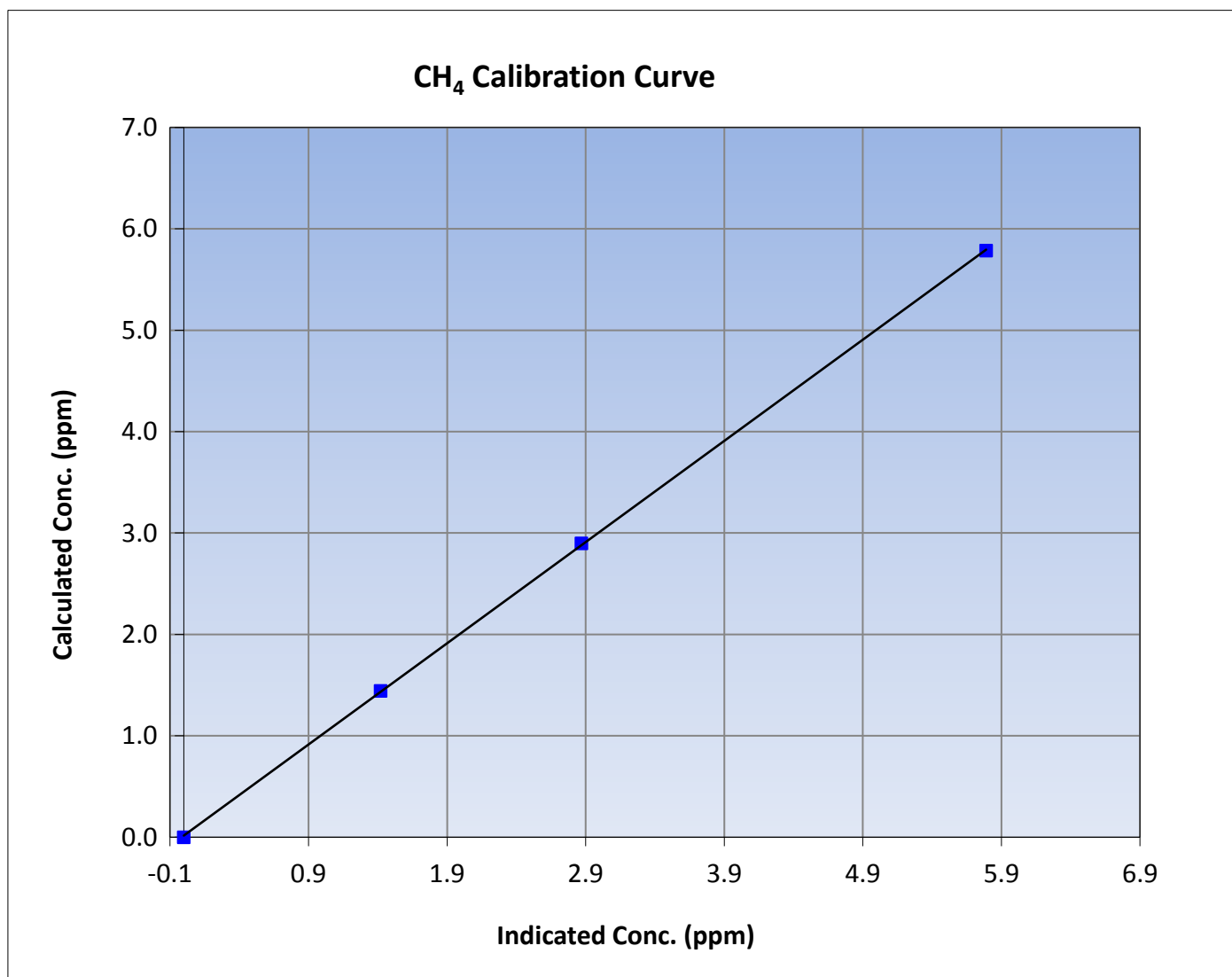
CH₄ Calibration Summary

Station Information

Calibration Date	February 8, 2017	Previous Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	8:25	End Time (MST)	17:43
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	0.999959
5.78	5.79	0.9990		
2.90	2.87	1.0094	Slope	0.998032
1.44	1.42	1.0166		
			Intercept	0.016064





Wood Buffalo Environmental Association

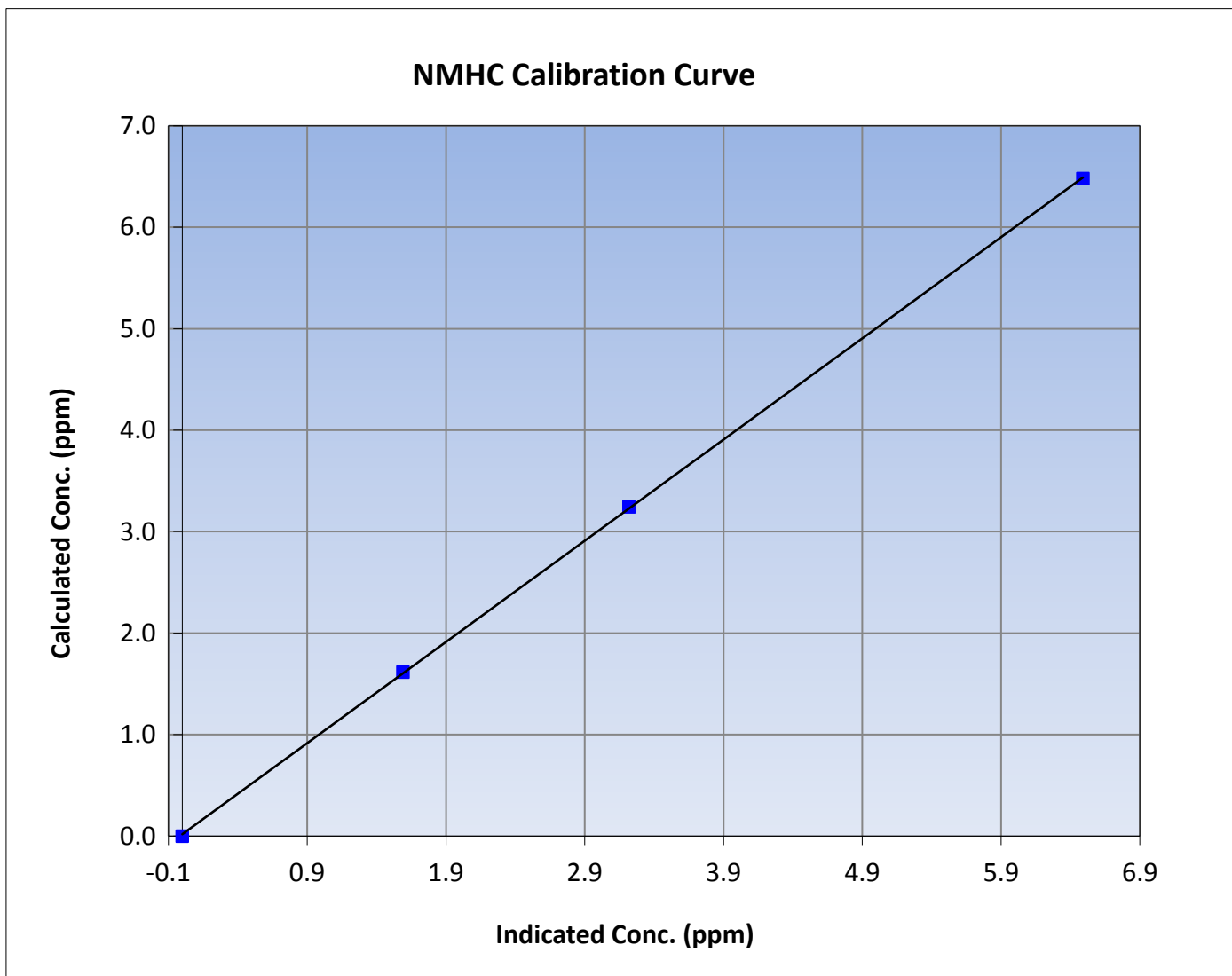
NMHC Calibration Summary

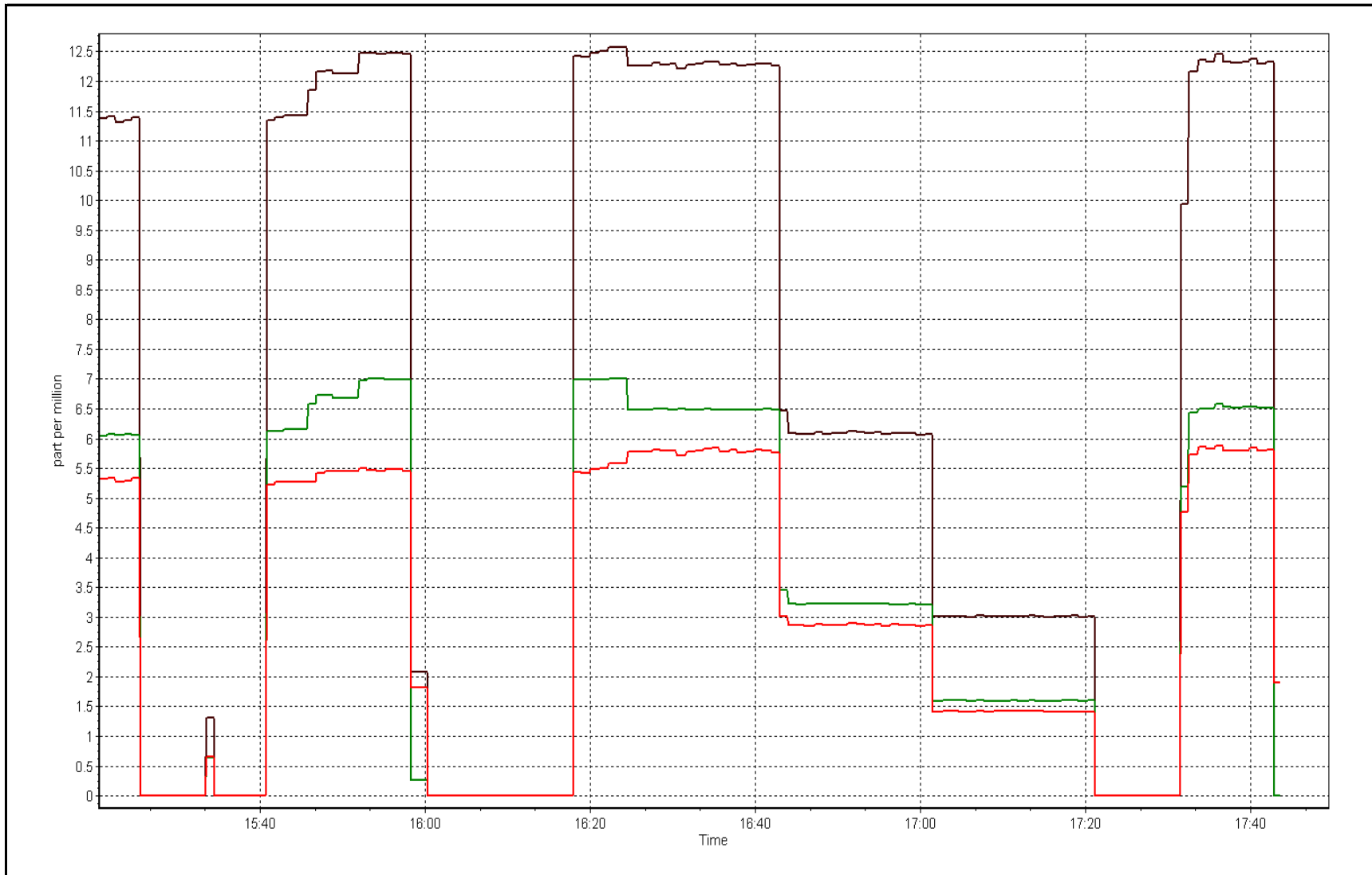
Station Information

Calibration Date	February 8, 2017	Previous Calibration	January 9, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	8:25	End Time (MST)	17:43
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







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 22, 2017	Previous Calibration	January 10, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	14:56
NO2 GPT Ref date	February 21, 2017	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	27.5
Analyzer IP address	192.168.1.48		Lamp temp.	53.0	53.2
Calculated slope	0.994364	0.998392	Pressure	609.0	612.5
Calculated intercept	-0.963417	-1.909793	Flow cell A	0.684	0.686
Analyzer Background	-0.7	-2.2	Flow cell B	0.685	0.691
Analyzer Coefficient	1.371	1.368	Cell A Intensity	647xx	63222
			Cell B Intensity	657xx	64231

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	400.00	0.0	-0.1	----
as found span	5000	1085	397.2	400.5	0.992
calibrator zero	5000	400.00	0.0	-0.1	----
high point	5000	1085	397.2	398.7	0.996
second point	5000	975	268.4	270.6	0.992
third point	5000	847	134.4	139.6	0.962
as left zero	5000	400.00	0.0	-0.4	----
as left span	5000	1086	397.2	401.8	0.989
Average Correction Factor					0.983

Corrected As found	400.6	Previous response	400.4	% change	0.0%
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Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

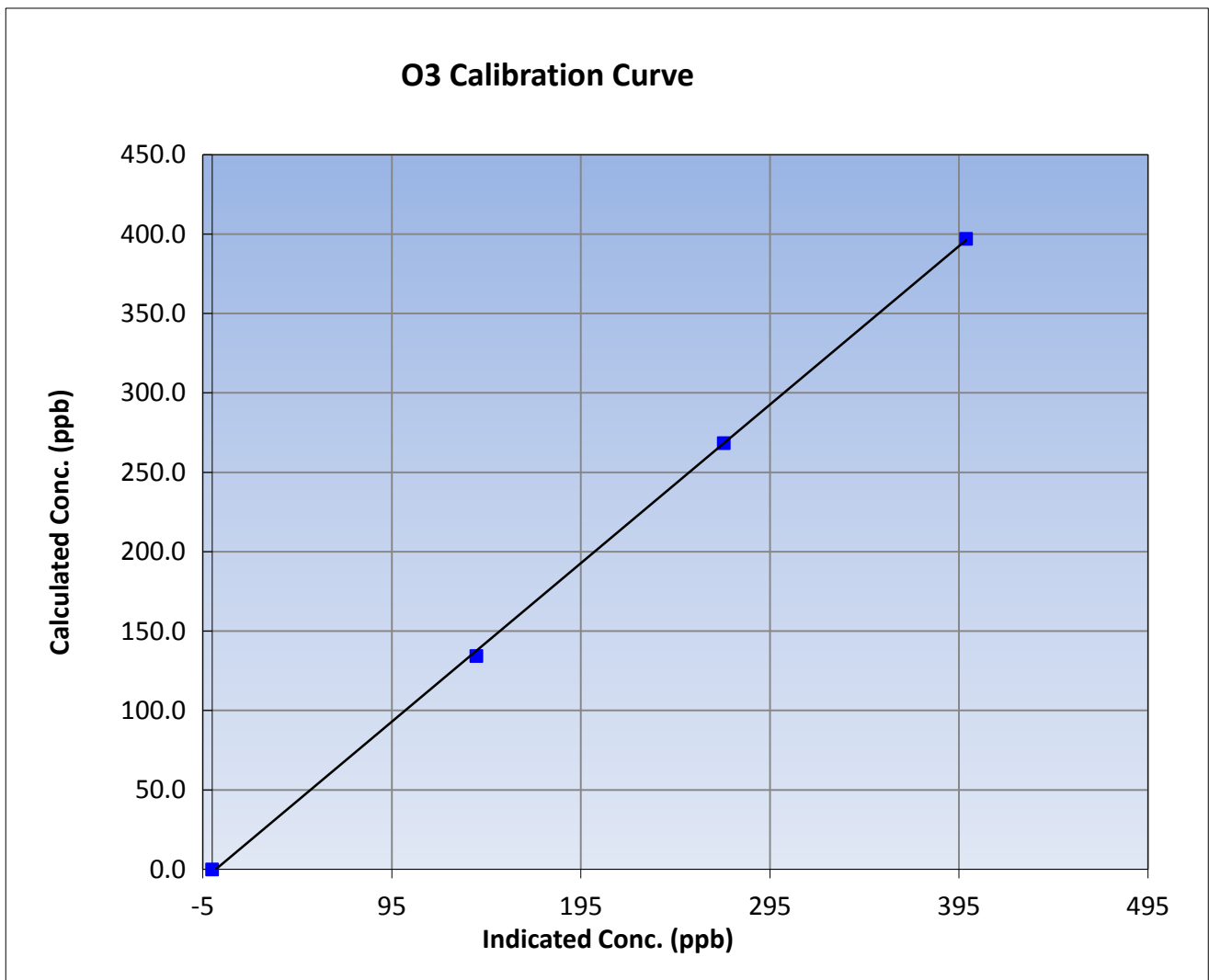
O3 Calibration Report

Station Information

Calibration Date	February 22, 2017	Previous Calibration	January 10, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:50	End Time (MST)	14:56
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

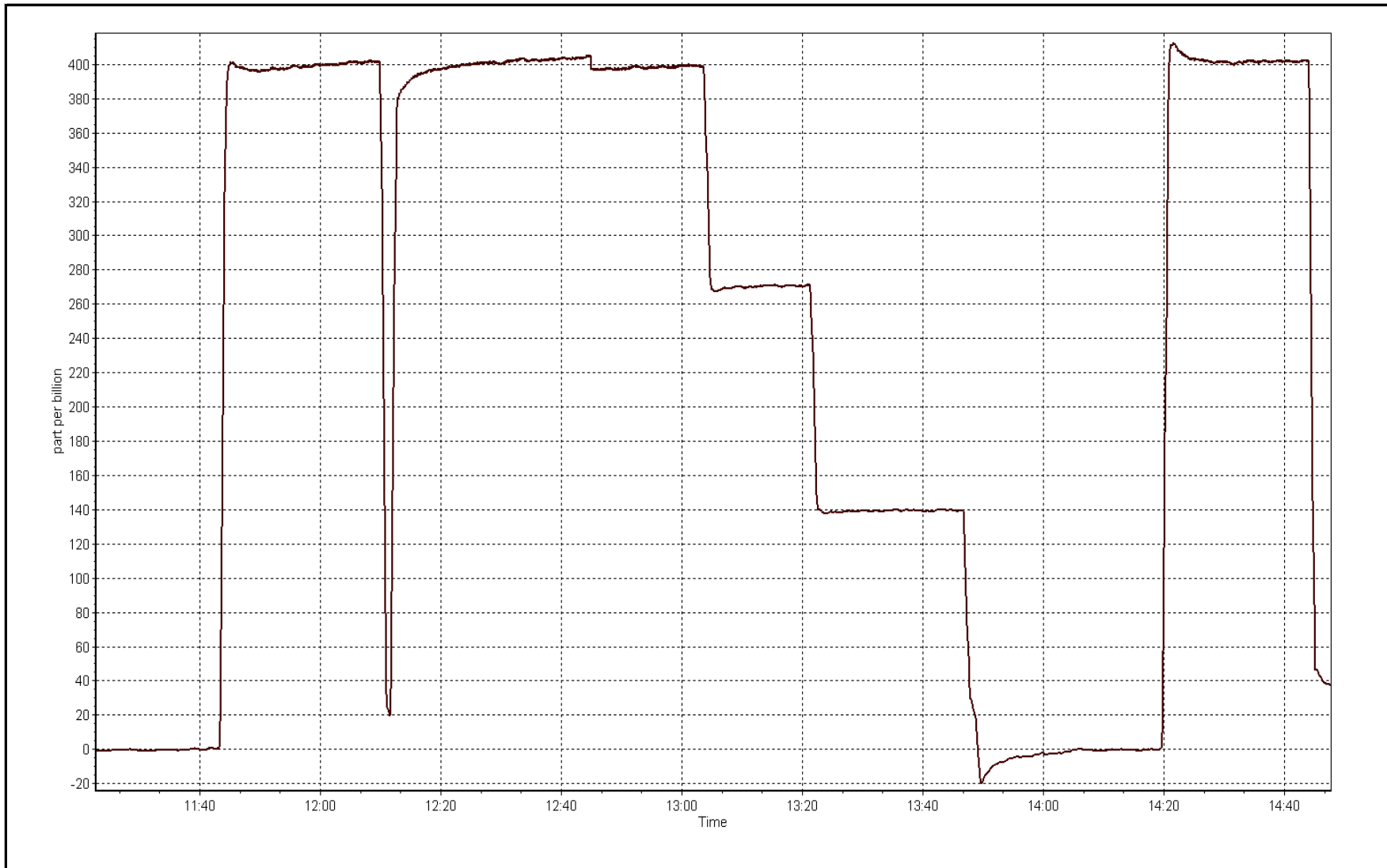
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999830
397.2	398.7	0.9962		
268.4	270.6	0.9916	Slope	0.998392
134.4	139.6	0.9623		
			Intercept	-1.909793



O3 Calibration Plot

Date: February 22, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 10, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	11:17	End Time (MST)	15:47
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	0.999710	1.001389	0.997751
	Data Offset	1.127763	1.154762	-1.052906
Current Calibration	Data Slope	0.996255	0.993841	0.993630
	Data Offset	0.638424	0.567009	-1.940570

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		0.986	
NOx coefficient	0.999		0.996	
NO2 coefficient	1.000		0.999	
NO bkgnd	1.7		1.8	
NOx bkgnd	1.8		1.9	
Chamber Temp	50	Deg C	50.3	Deg C
Moly Temp	323	Deg C	327.4	Deg C
PMT voltage	-813.6	V	-850.3	V
PMT Temp	-2.9	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	204	mmHg	196.3	mmHg
R Cell Press Nox	204	mmHg	195	mmHg
NO sample flow	0.732	lpm	0.707	lpm
Nox sample Flow	0.732	lpm	0.708	lpm

Notes:

Changed inlet filter after as founds. Adjusted span. During the GPT cal, the NOX increased steadily at every point. Will monitor closely and discuss with senior techs about the issue.



Wood Buffalo Environmental Association

NO_x Calibration Summary

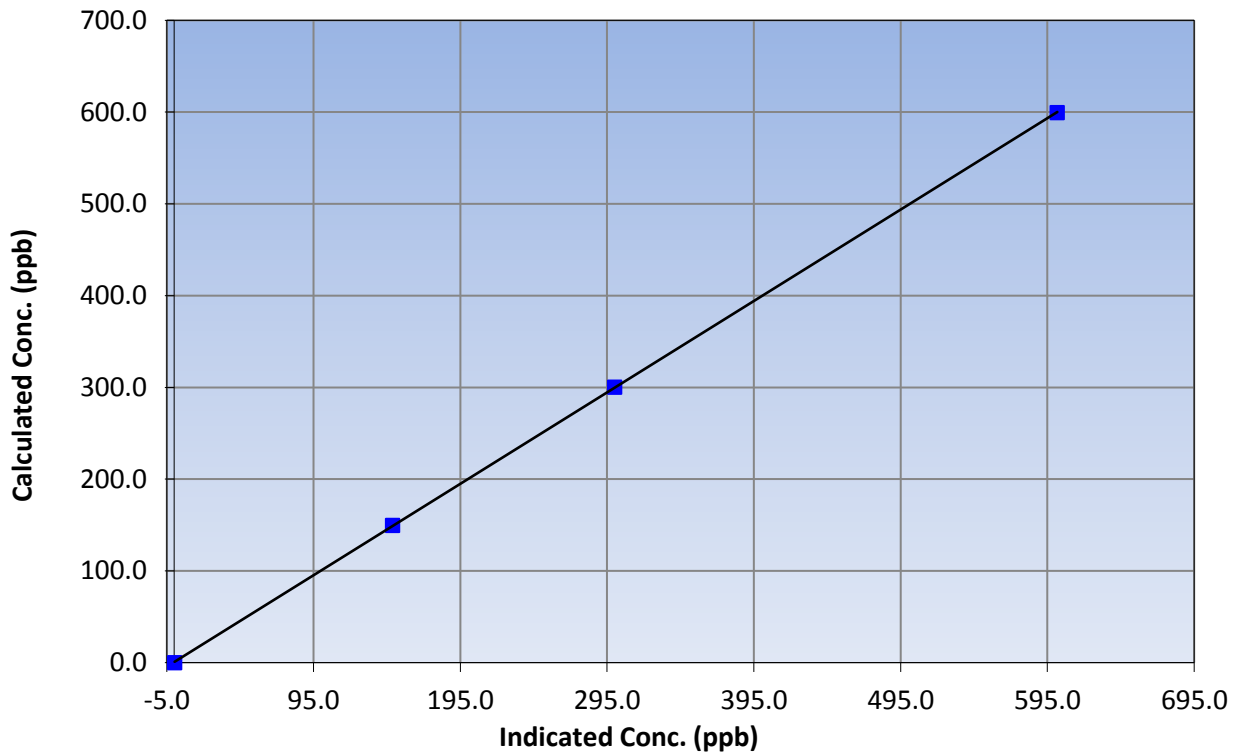
Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 10, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:17	End Time (MST)	15:47
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	----	Correlation Coefficient	0.999989
599.6	601.8	0.9964		
300.3	300.1	1.0006	Slope	0.996255
149.6	148.8	1.0059		
			Intercept	0.638424

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

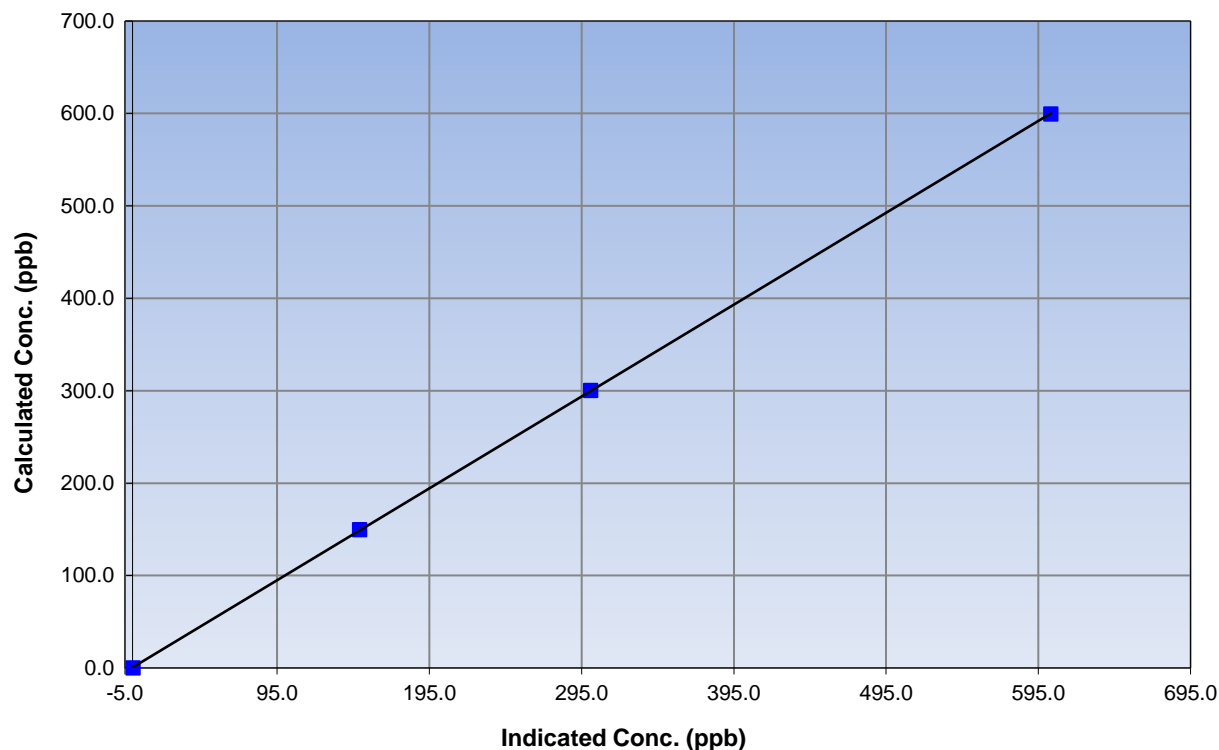
Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 10, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:17	End Time (MST)	15:47
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	0.999990
599.6	603.2	0.9940		
300.3	301.0	0.9977	Slope	0.993841
149.6	149.2	1.0029		
			Intercept	0.567009

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

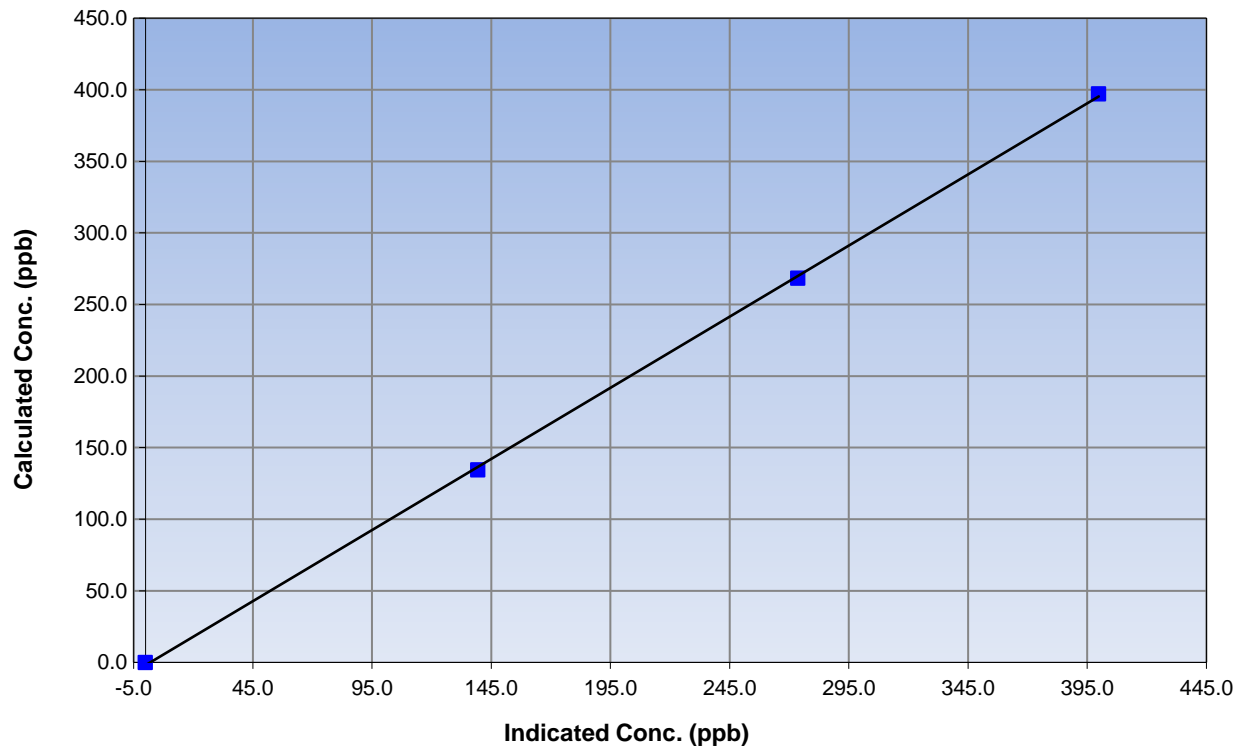
Station Information

Calibration Date	February 21, 2017	Previous Calibration	January 10, 2017
Station Number	Stony Mountain	Station Number	AMS 18
Start Time (MST)	11:17	End Time (MST)	15:47
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

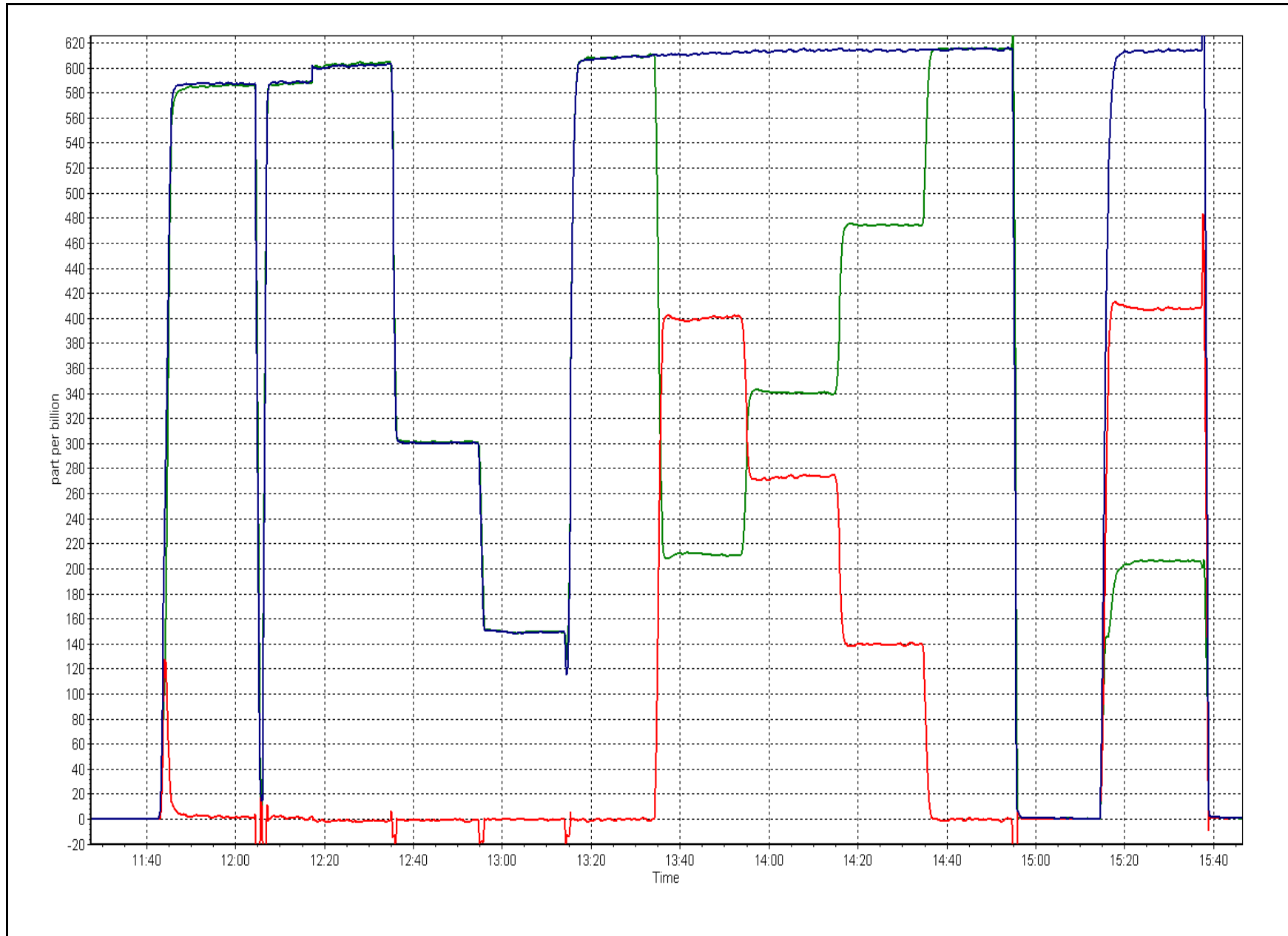
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999831
397.2	399.8	0.9934		
268.4	273.6	0.9808	Slope	0.993630
134.4	139.5	0.9636		
			Intercept	-1.940570

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 21, 2017





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	February 22, 2017	Last Cal Date:	January 12, 2017
Start time (MST):	12:17	End time (MST):	13:41
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

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	-8	-6	-8	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	931	930.8	931	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	993.6	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.3	-----	0.3	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

			<u>Tolerance</u>
Leak Test:	Date of check: <u>Jan 10 2016</u>	Last Cal Date: <u>Oct 18 2016</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>

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
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: All parameters are within tolerance. Could not perform Neph zero check since there was no HEPA filter attachment at site. Will bring one out next time and leave it at site.

Calibration by: Aswin Sasi Kumar



Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	February 24, 2017	Last Cal Date:	January 12, 2017
Start time (MST):	11:21	End time (MST):	12:05
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:	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)	-15	-14.6	-15	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	938	935	938	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	994	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

			<u>Tolerance</u>
Leak Test:	Date of check: <u>Jan 10 2016</u>	Last Cal Date: <u>Oct 18 2016</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>

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
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: Re-calibrating since nephelometer zero was not checked during the cal on Feb 22, due to no HEPA filter at site. No adjustments made. Cyclone head was cleaned on Feb 22; looked clean.

Calibration by: Asad Hidayat



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 19
FIREBAG
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 FEBRUARY 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	638	33	34	99.85	36	0	6	0
H2S (ppb) Average	639	32	33	99.85	6	0	1	0
THC (ppm) Average	638	33	34	99.85	2.8	-	2.3	-
NO2 (ppb) Average	638	33	34	99.85	54	0	19	-
NO (ppb) Average	638	33	34	99.85	77	-	12	-
NOX (ppb) Average	638	33	34	99.85	131	-	31	-
Temperature 2 m (C) Average	671	0	1	99.85	11.3	-	7	-
Relative Humidity (%) Average	671	0	1	99.85	99	-	94	-
Wind Speed 10 m (km/h) Average	670	0	2	99.7	32	-	20	-
Wind Direction 10 m (deg) Average	670	0	2	99.7	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 FEBRUARY 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	638	1.5	3	-	0	0	0	0	2	4	36
H2S (ppb) Average	639	0.3	0	-	0	0	0	0	0	0	6
THC (ppm) Average	638	2.13	0.1	-	2	2	2.1	2.1	2.2	2.3	2.8
NO2 (ppb) Average	638	5.1	6	-	0	0	1	3	7	12	54
NO (ppb) Average	638	1.2	5	-	0	0	0	0	1	2	77
NOX (ppb) Average	638	6.3	10	-	0	0	1	4	7	14	131
Temperature 2 m (C) Average	671	-12.62	10.2	-	-31.4	-24.9	-20.1	-14.7	-4.3	2.8	11.3
Relative Humidity (%) Average	671	75.9	13	-	34	55	68	79	85	90	99
Wind Speed 10 m (km/h) Average	670	11.9	6	-	1	4	7	11	16	20	32
Wind Direction 10 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	19 Feb 2017 09:00	19 Feb 2017 09:00	1	Data logger program uploaded - data not recorded
Wind Speed, Wind Direction	18 Feb 2017 08:00	18 Feb 2017 08:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	19 Feb 2017 09:00	19 Feb 2017 09:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Firebag - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 36 ppb on Feb 7 06:00	Maximum Daily Average: 6.4 ppb on Feb 7		Hours of Data:	638
Minimum Value: 0 ppb on Feb 4 03:00	Minimum Daily Average: 0.0 ppb on Feb 20		Hours of Missing Data:	34
Maximum Diurnal Average: 2.5 ppb at hour 6	Minimum Diurnal Average: 0.9 ppb at hour 5		Hours of Calibration:	33
Monthly Average: 1.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 12		Percent Operational Time:	99.9

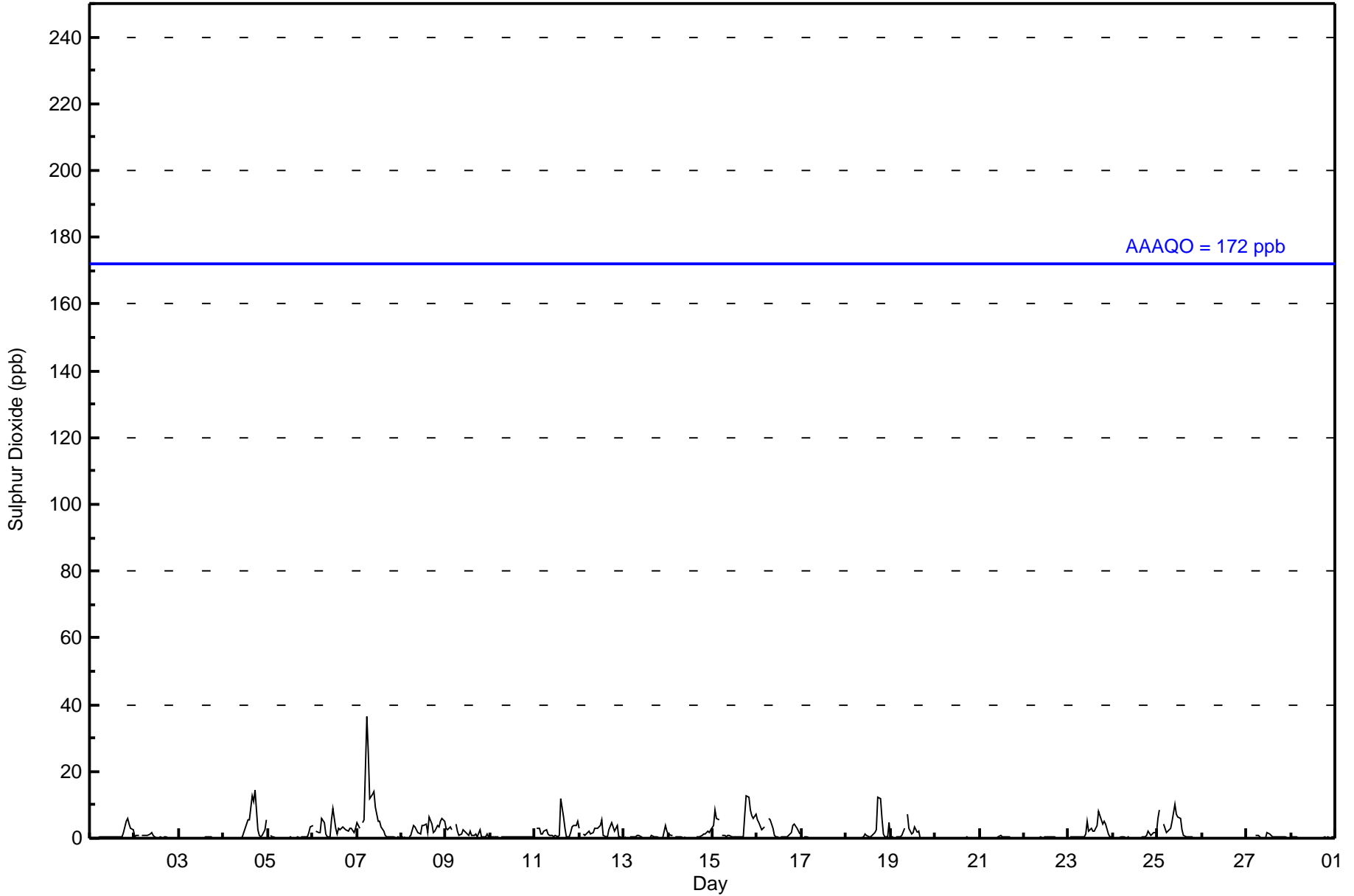
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	6	4	3	2	1.2	6
2-Feb	0	1	1	Z	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	1
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	2	4	6	5	13	11	14	3	1	1	1	2	6	3.0	14
5-Feb	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0.4	3
6-Feb	4	Z	2	2	2	6	5	1	0	0	5	9	3	1	3	3	3	3	2	2	3	3	2	3	2.9	9
7-Feb	5	3	Z	5	5	36	26	12	13	14	9	5	5	4	2	1	0	0	0	0	0	0	0	0	6.4	36
8-Feb	0	0	0	Z	0	1	4	3	2	2	1	4	4	4	2	6	4	2	2	4	3	5	6	5	2.9	6
9-Feb	3	3	3	3	Z	4	2	1	1	3	2	2	1	2	1	1	1	1	2	0	1	1	1	0	1.7	4
10-Feb	0	1	0	0	0	Z	0	0	1	1	1	1	1	1	0	1	0	0	1	1	1	1	0	1	0.5	1
11-Feb	Z	3	3	1	1	2	2	1	1	1	1	1	1	1	12	6	3	1	1	2	4	4	4	5	2.6	12
12-Feb	3	Z	1	1	2	2	1	2	3	3	3	4	5	1	0	0	2	5	3	2	4	1	0	0	2.1	5
13-Feb	0	0	Z	1	0	0	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	4	2	0.5	4
14-Feb	1	1	1	Z	0	0	0	0	0	0	C	C	C	C	C	1	0	0	1	1	1	2	2	2	0.9	2
15-Feb	4	9	6	6	Z	1	1	1	1	1	1	1	0	0	0	0	7	13	12	9	7	6	7	3.9	13	
16-Feb	6	5	3	3	3	Z	6	5	3	1	0	0	0	0	0	0	0	1	1	4	4	3	2	1	2.3	6
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	2	3	12	12	6	1	0	0	4	2.0	12
19-Feb	1	0	Z	0	0	0	1	3	M	7	3	1	2	3	2	2	0	0	0	0	0	0	0	0	1.2	7
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Feb	0	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-Feb	Z	0	0	0	0	0	0	0	0	1	5	2	3	2	2	4	8	7	4	5	4	1	0	0	2.3	8
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	2	2	0.5	2
25-Feb	6	8	Z	4	3	2	3	3	5	10	7	6	6	3	1	1	0	0	0	0	0	0	0	0	3.0	10
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Feb	0	0	0	0	Z	1	1	1	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0.4	2
28-Feb	0	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
	1.4	1.5	1.0	1.2	0.9	2.5	1.9	1.3	1.3	1.7	1.5	1.6	1.4	1.1	1.3	1.6	1.5	2.0	1.8	1.8	1.6	1.3	1.3	1.6	Diurnal Average	
	6	9	6	6	5	36	26	12	13	14	9	9	6	6	12	13	11	14	13	12	9	7	6	7	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Firebag - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	625	97.96	97.96
11 - 20	11	1.72	99.69
21 - 60	2	0.31	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: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Firebag - February 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	58	26	8	10	13	37	32	22	24	55	64	75	40	23	34	103	624
11 - 20	0	0	1	0	0	1	0	0	0	1	6	2	0	0	0	0	11
21 - 60	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	58	26	9	10	13	38	32	22	24	56	72	77	40	23	34	103	637

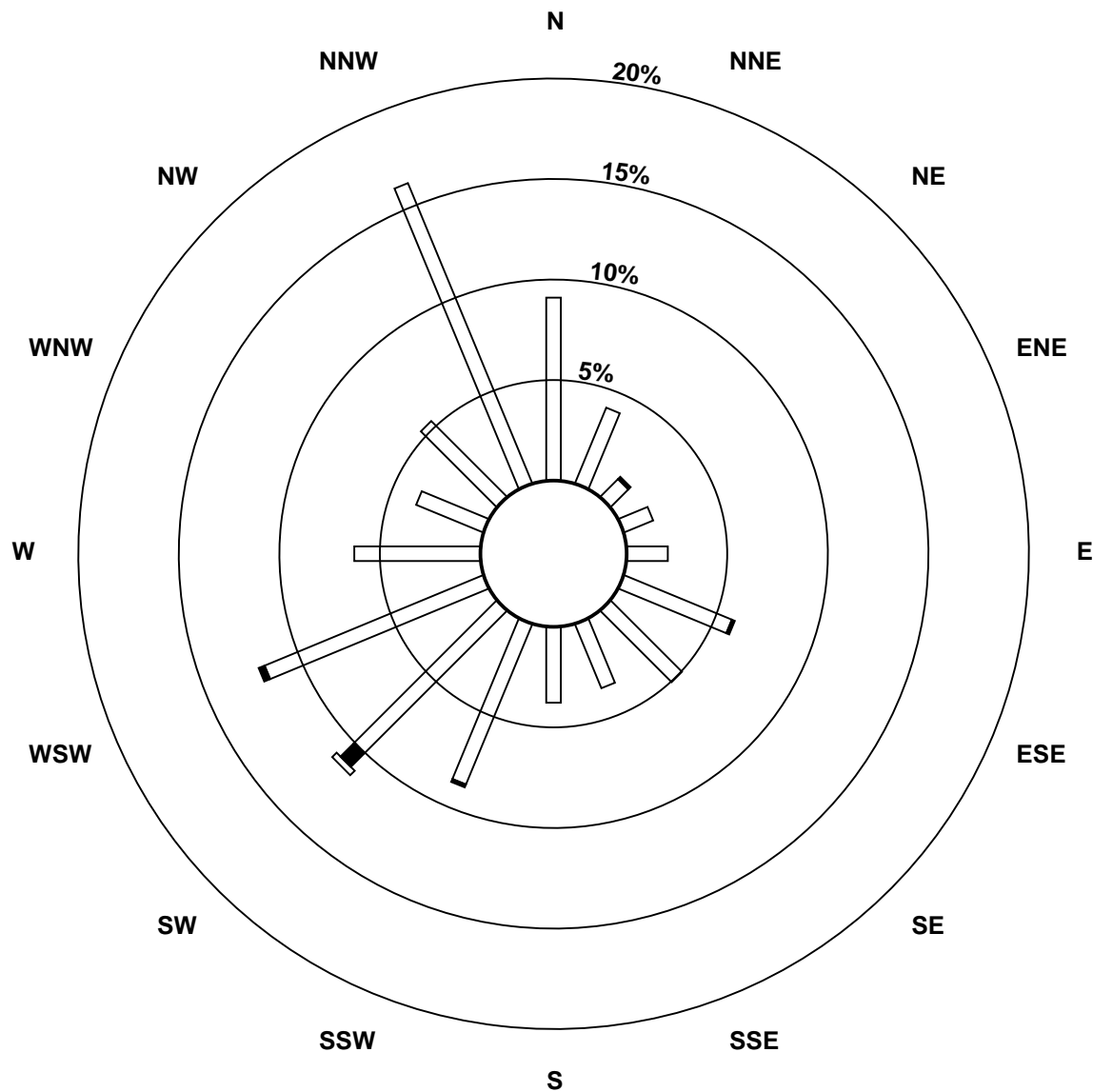
Total Number of Valid Hours: 637

Total Number of Hours: 672

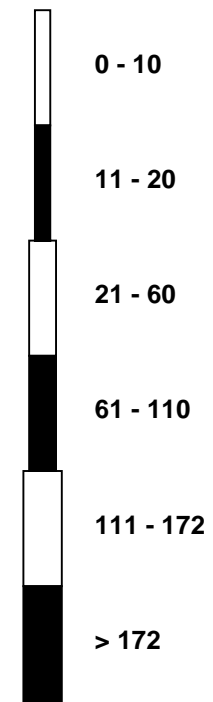


Wood Buffalo Environmental Association
Wind Rose Feb 2017

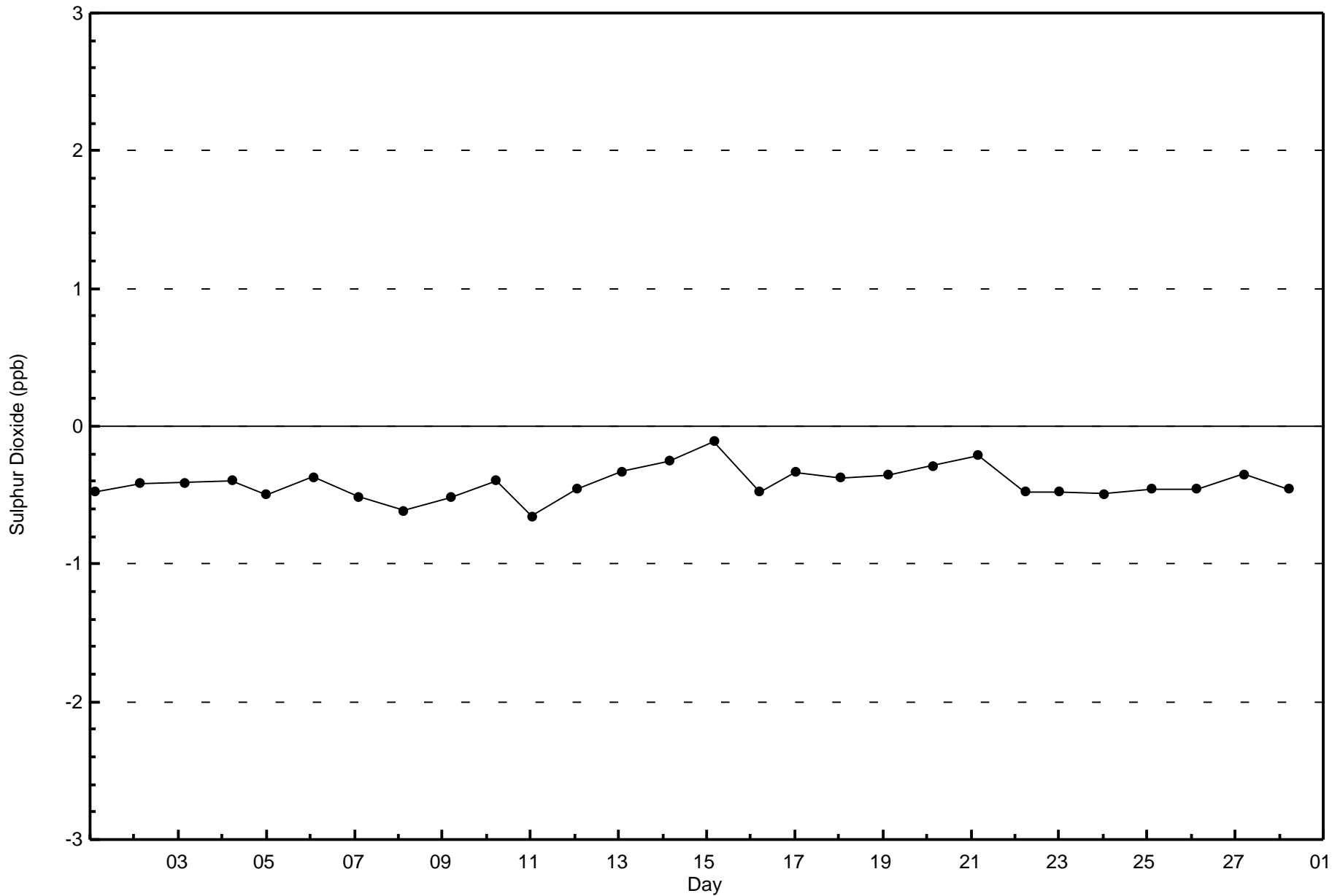
Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)

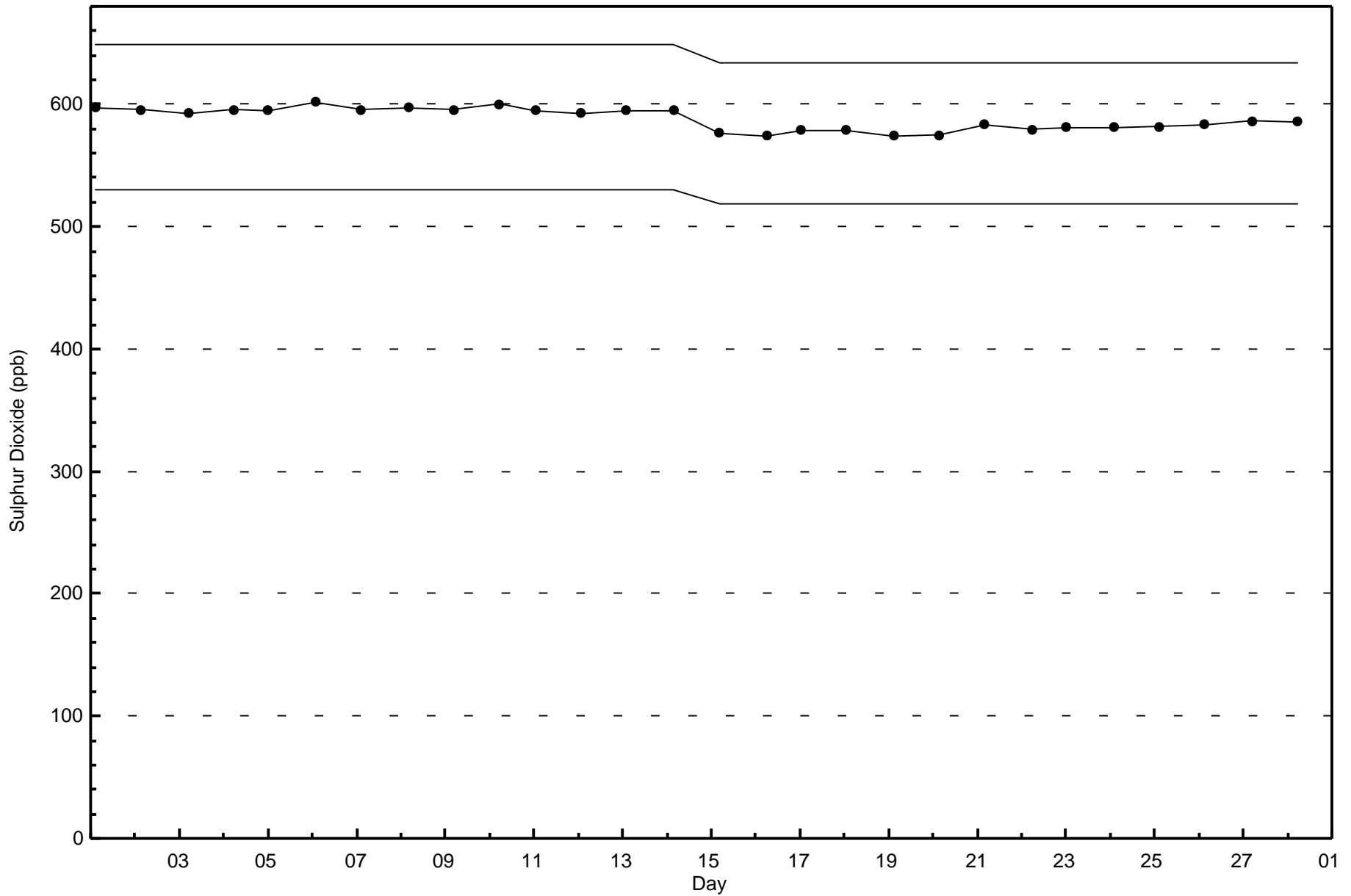


Classes (ppb)



Total Number of Valid Hours: 637





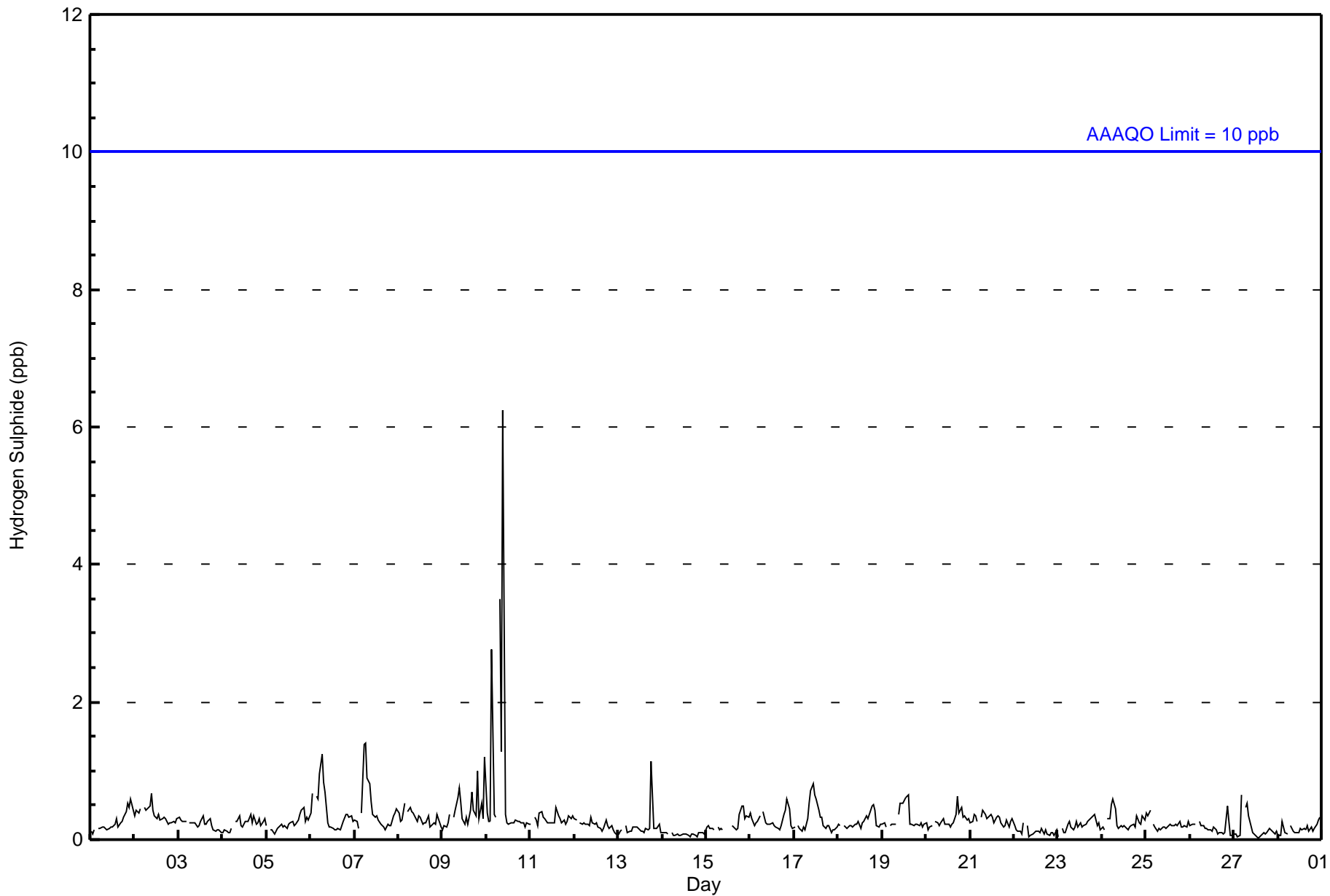


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																		
Maximum Value: 6 ppb on Feb 10 10:00										Maximum Daily Average: 0.8 ppb on Feb 10										Hours of Data: 639								
Minimum Value: 0 ppb on Feb 27 14:00										Minimum Daily Average: 0.1 ppb on Feb 14										Hours of Missing Data: 33								
Maximum Diurnal Average: 0.5 ppb at hour 10										Minimum Diurnal Average: 0.2 ppb at hour 3										Hours of Calibration: 32								
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: 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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.3	1		
2-Feb	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1		
3-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0		
4-Feb	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-Feb	0	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-Feb	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1		
7-Feb	0	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1		
8-Feb	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1		
9-Feb	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	1	0	0	1	0	1	0	1	0.4	1		
10-Feb	0	0	0	3	0	0	Z	3	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	6		
11-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0		
12-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1		
14-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0		
16-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1		
17-Feb	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1		
18-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1		
19-Feb	0	0	0	Z	0	0	0	0	M	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1		
20-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1		
21-Feb	0	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		
22-Feb	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		
23-Feb	0	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-Feb	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1		
25-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0		
26-Feb	0	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-Feb	0	0	0	0	1	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
28-Feb	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		
	0.2	0.2	0.2	0.4	0.2	0.3	0.4	0.4	0.3	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	Diurnal Average		
	0	1	0	3	1	1	1	3	1	6	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	Diurnal Maximum		
Z - zerospan	C - Calibration	M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO):	1-hr	10 ppb	24-hr	3 ppb																								



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Firebag - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	636	99.53	99.53
3 - 4	2	0.31	99.84
5 - 7	1	0.16	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - February 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	27	9	10	14	37	29	23	23	55	73	77	41	23	33	103	635
3 - 4	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	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	58	27	9	10	14	37	32	23	23	55	73	77	41	23	33	103	638

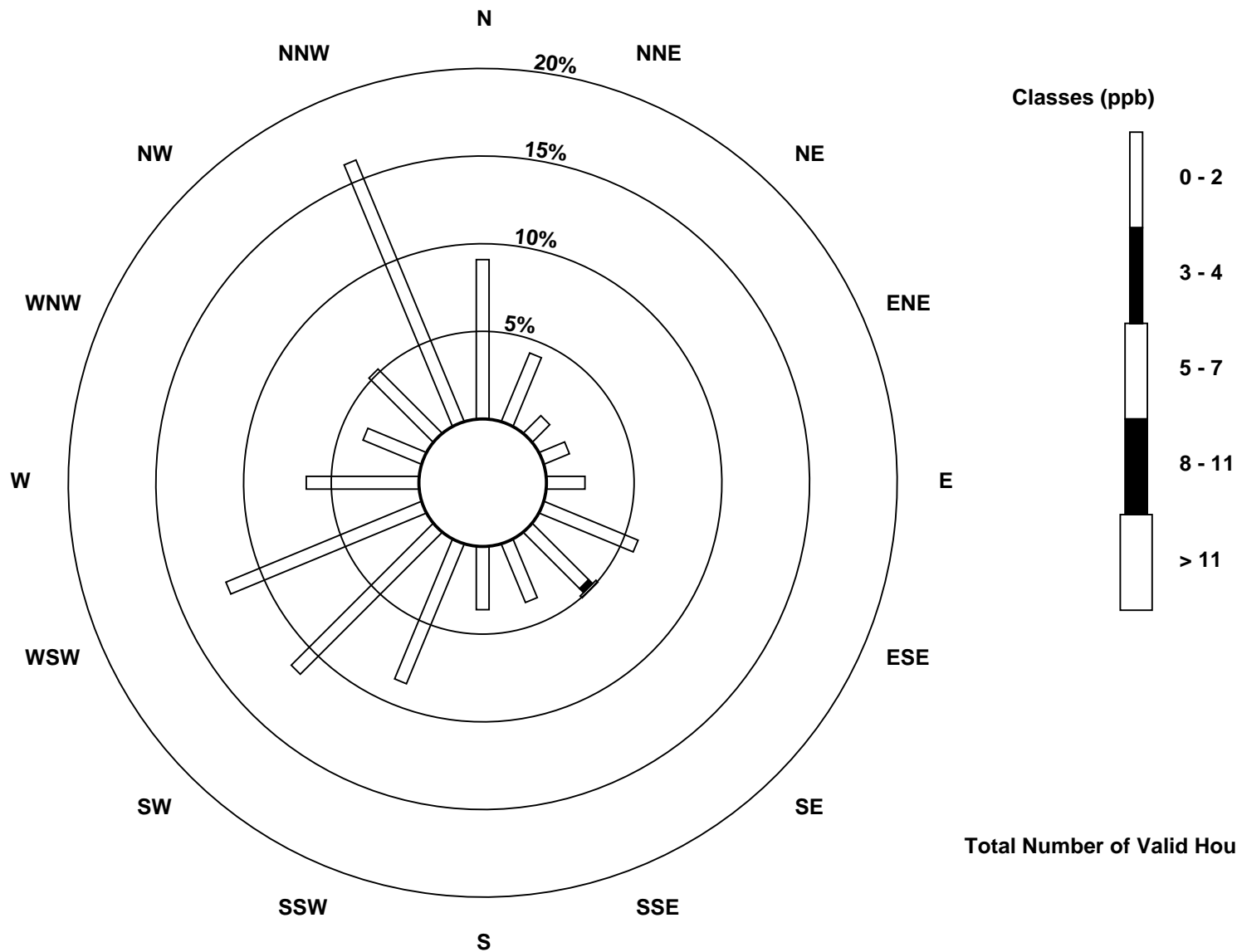
Total Number of Valid Hours: 638

Total Number of Hours: 672

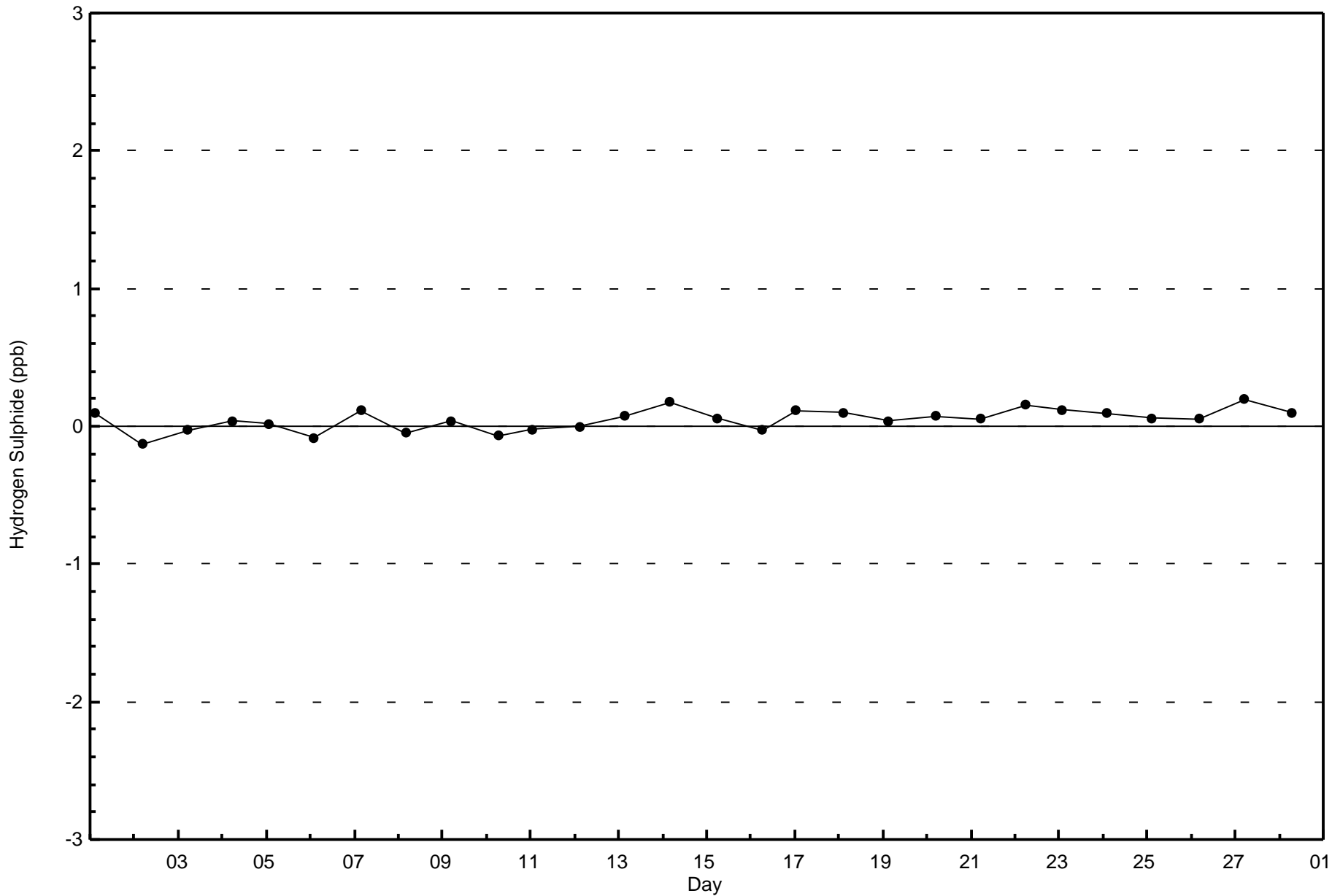


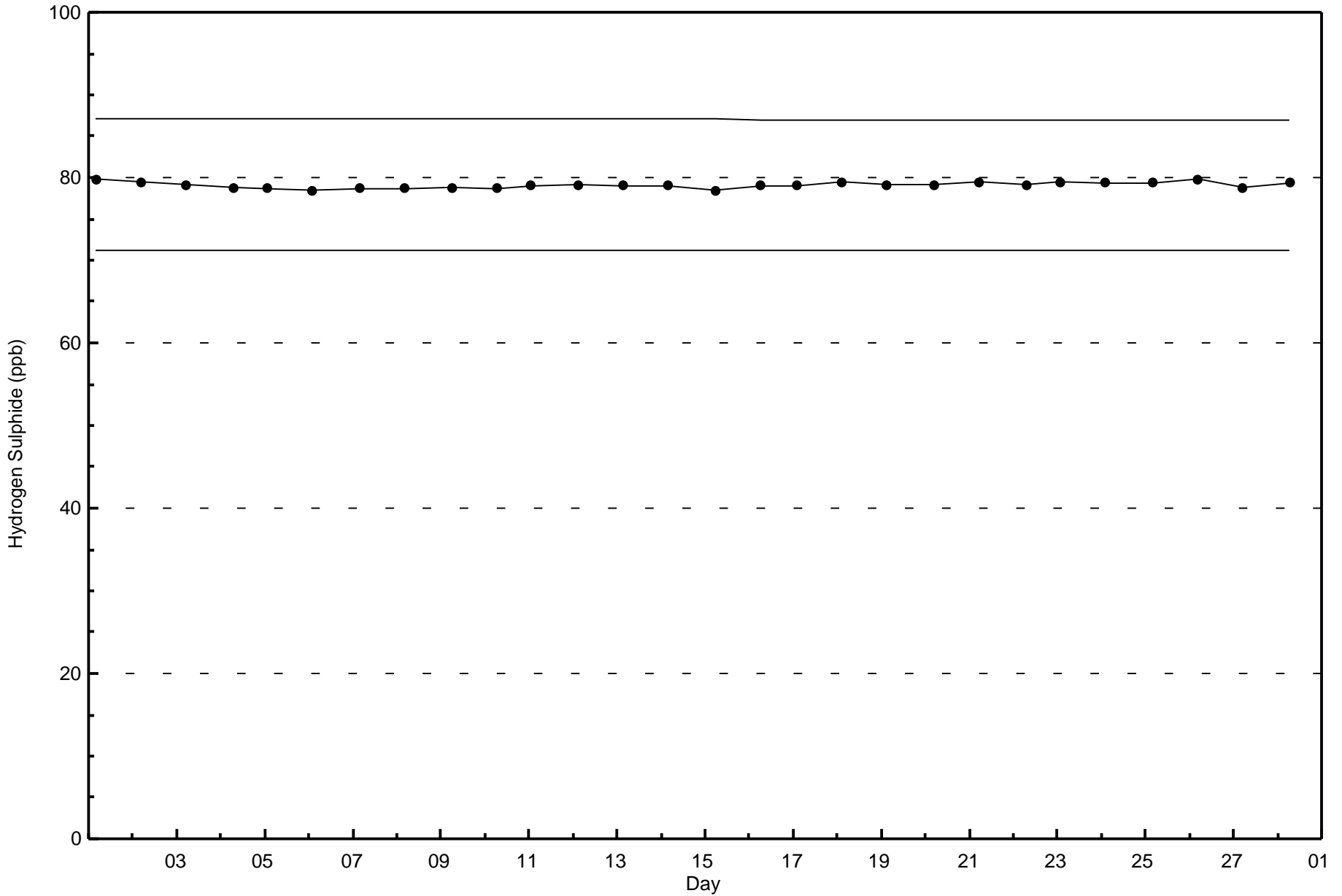
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)



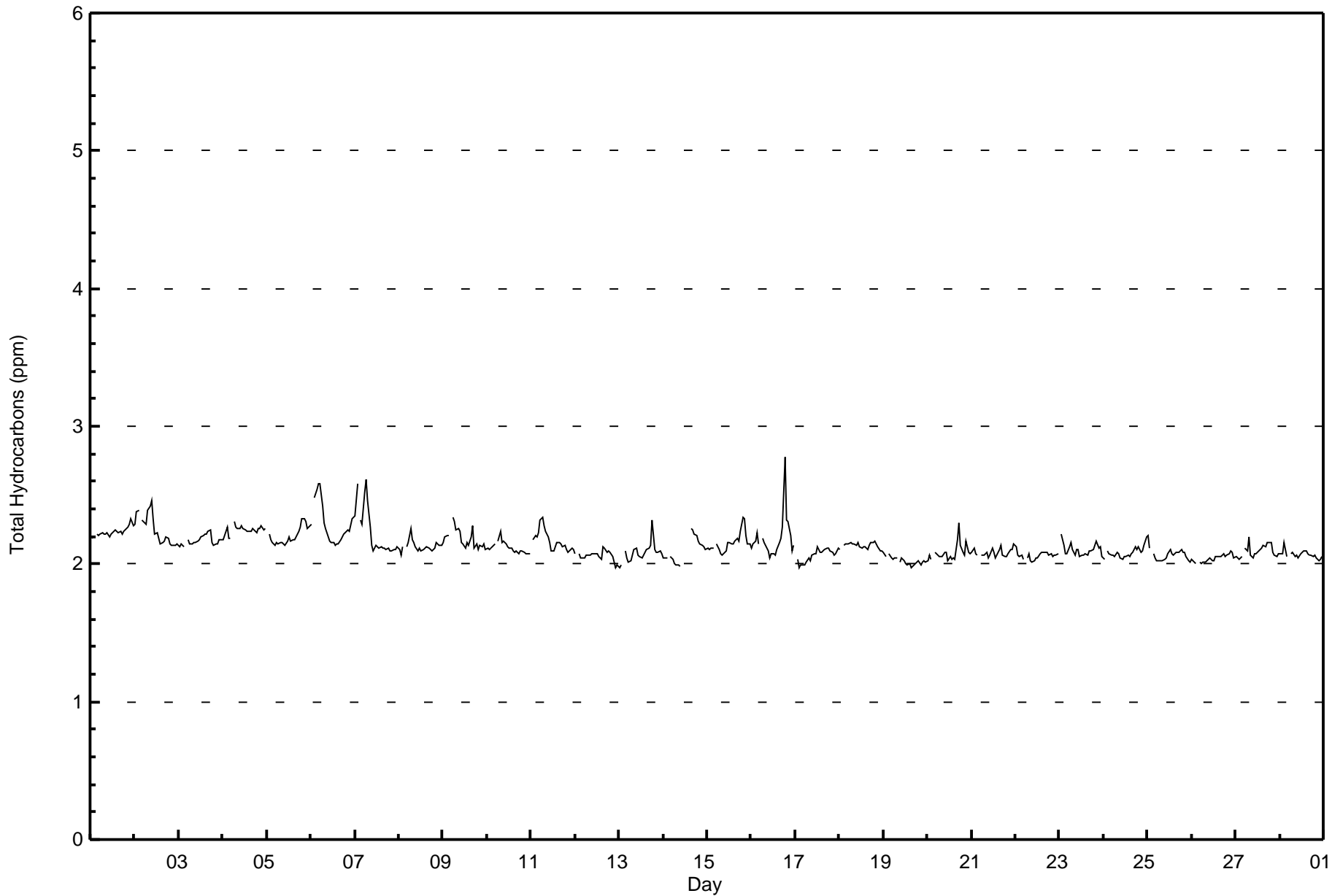
Total Number of Valid Hours: 638







Maximum Value: 2.8 ppm on Feb 16 19:00																				Maximum Daily Average: 2.3 ppm on Feb 6					Hours in Service: 672			
Minimum Value: 2.0 ppm on Feb 12 23:00																				Minimum Daily Average: 2.0 ppm on Feb 19					Hours of Data: 638			
Maximum Diurnal Average: 2.2 ppm at hour 19																				Minimum Diurnal Average: 2.1 ppm at hour 12					Hours of Missing Data: 34			
Monthly Average: 2.13 ppm																				Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.5					Hours of Calibration: 33			
																									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-Feb	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	2.3	2.3	2.3	2.3	2.3	2.2	2.3		
2-Feb	2.3	2.4	2.4	Z	2.3	2.3	2.3	2.4	2.4	2.5	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.5		
3-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2		
4-Feb	2.2	2.2	2.3	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3		
5-Feb	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3		
6-Feb	2.3	Z	2.5	2.5	2.6	2.6	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.6		
7-Feb	2.3	2.6	Z	2.3	2.3	2.5	2.6	2.5	2.3	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	2.6		
8-Feb	2.1	2.1	2.1	Z	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	2.2	2.1	2.1	2.1	2.1	2.3		
9-Feb	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3		
10-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2		
11-Feb	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	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	2.3		
12-Feb	2.1	Z	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1		
13-Feb	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.3		
14-Feb	2.0	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3		
15-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.2	2.3		
16-Feb	2.1	2.1	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.8	2.3	2.3	2.2	2.1	2.1	2.2	2.8		
17-Feb	Z	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1		
18-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2		
19-Feb	2.1	2.1	Z	2.1	2.0	2.0	2.0	2.0	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
20-Feb	2.0	2.1	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	2.2	2.3	2.1	2.1	2.1	2.2	2.1	2.1	2.3		
21-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	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		
22-Feb	2.1	2.1	2.1	2.1	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1		
23-Feb	Z	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2		
24-Feb	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2		
25-Feb	2.2	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1		
26-Feb	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1		
27-Feb	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2		
28-Feb	2.1	2.1	2.2	2.1	2.1	Z	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	2.0	2.0	2.0	2.1	2.1	2.2		
																								Diurnal Average				
																								Diurnal Maximum				
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 2.1 2.1 2.1 2.1 2.2 2.1 2.1 2.1 2.1 2.1 2.1																												
2.3 2.6 2.5 2.5 2.6 2.6 2.6 2.5 2.4 2.5 2.3 2.3 2.3 2.2 2.2 2.3 2.3 2.3 2.8 2.3 2.3 2.3 2.3 2.3 2.3 2.3																												
Z - zerospan			C - Calibration			M - Maintenance																						





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	98	15.36	15.36
2.1 - 3.0	540	84.64	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - February 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	6	2	2	5	3	15	7	2	3	12	2	6	5	2	2	24	98
2.1 - 3.0	52	24	7	5	10	23	25	20	21	44	70	71	35	21	32	79	539
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	58	26	9	10	13	38	32	22	24	56	72	77	40	23	34	103	637

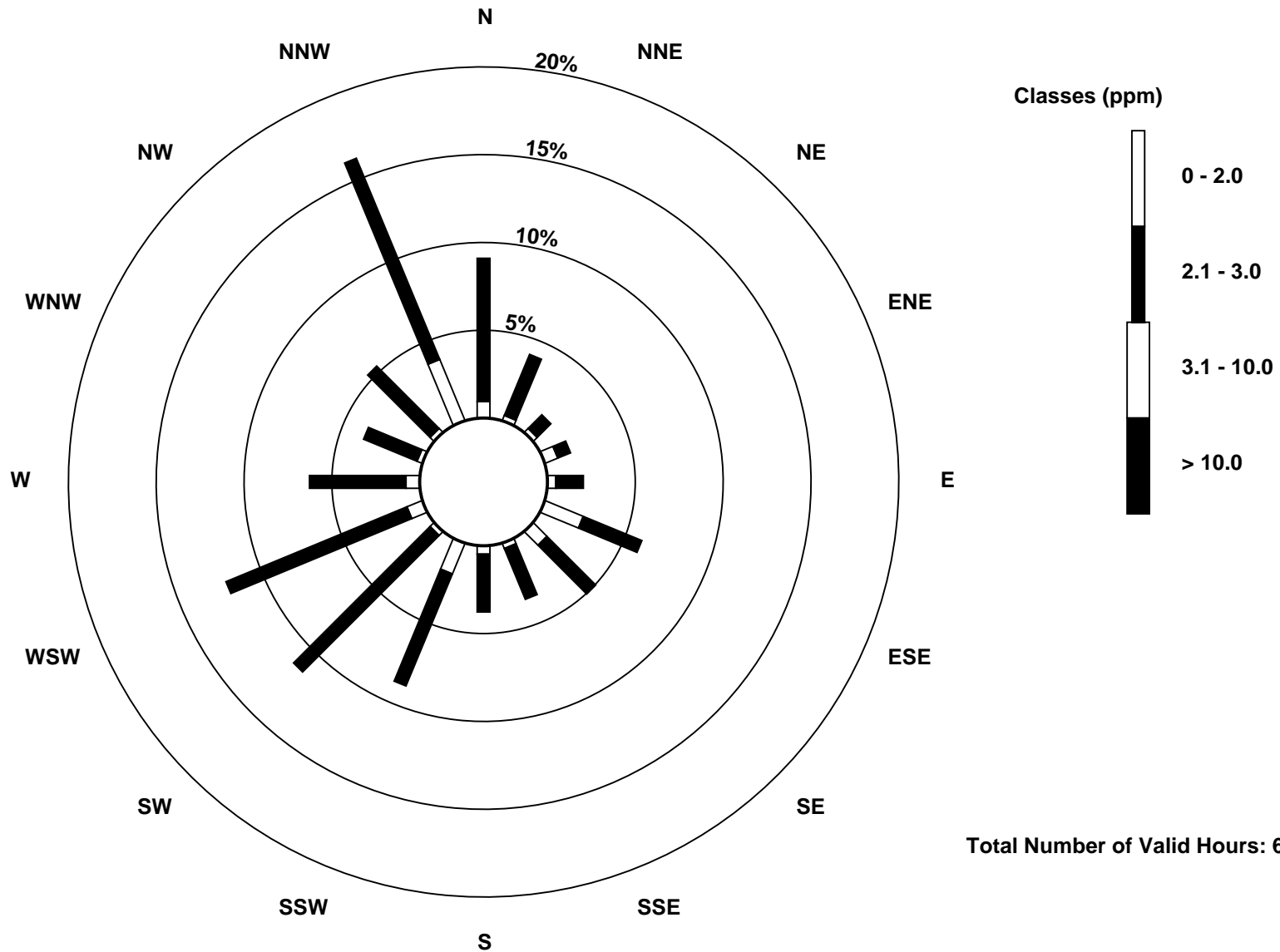
Total Number of Valid Hours: 637

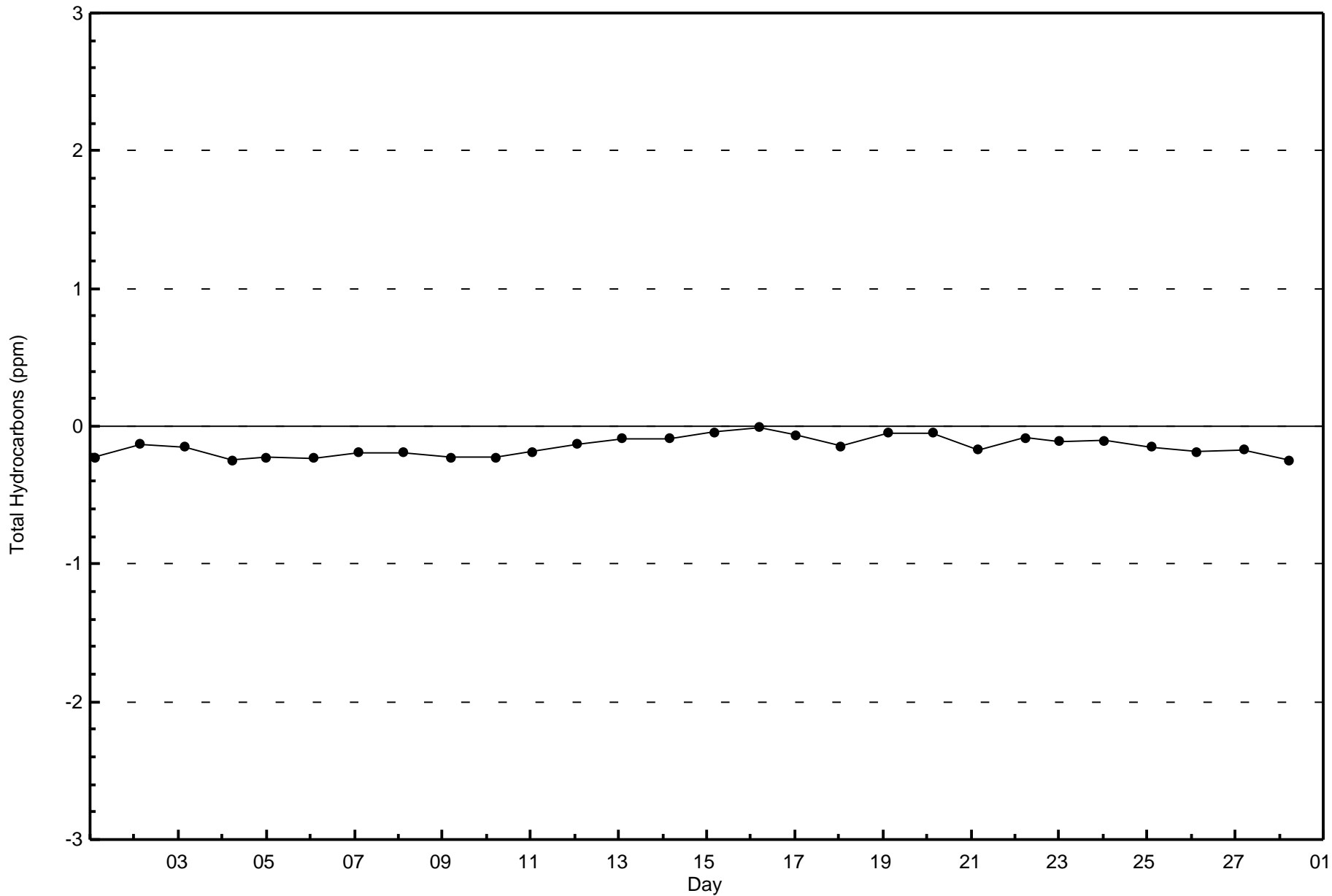
Total Number of Hours: 672

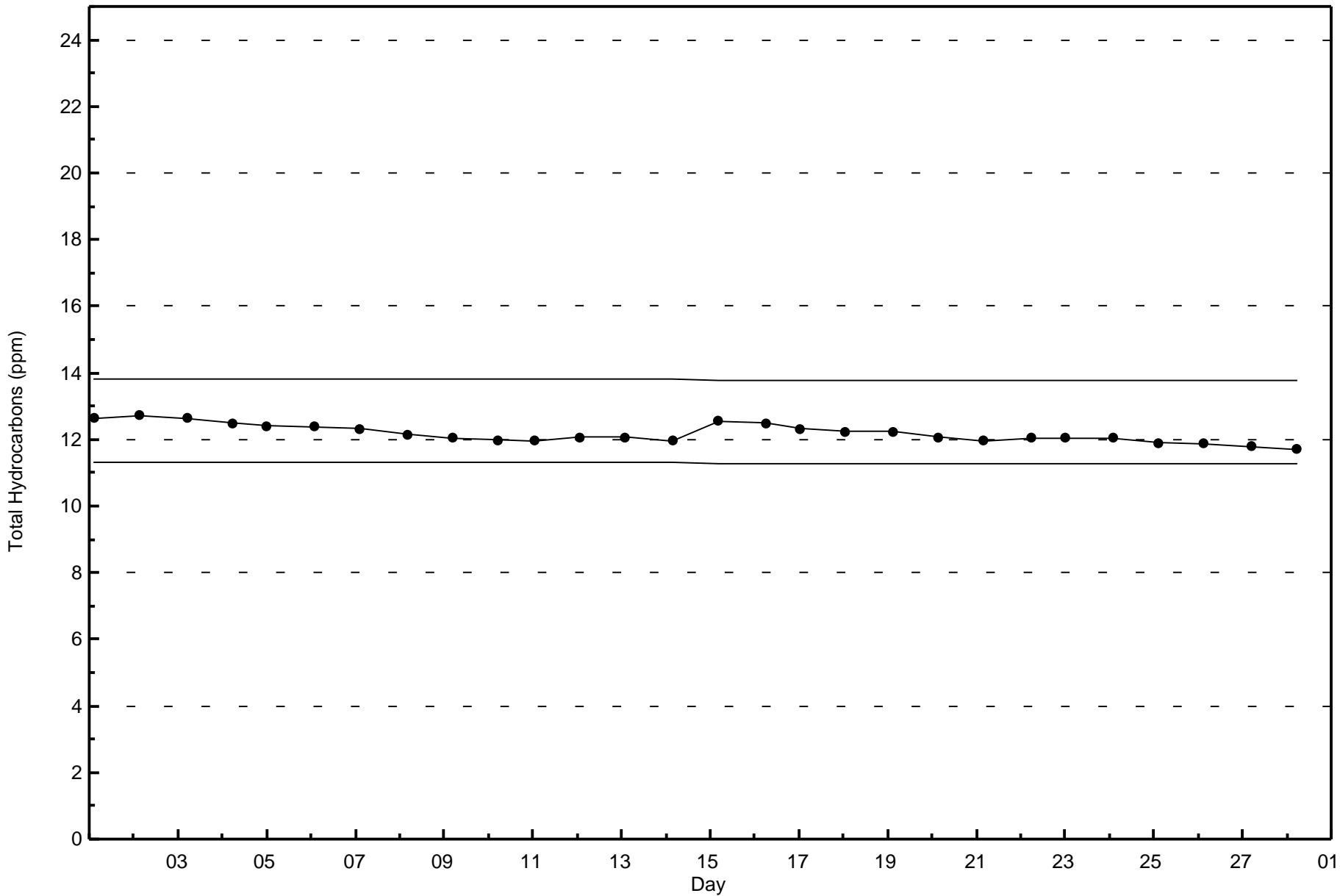


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)









Wood Buffalo Environmental Association
Summary of Hour Averages

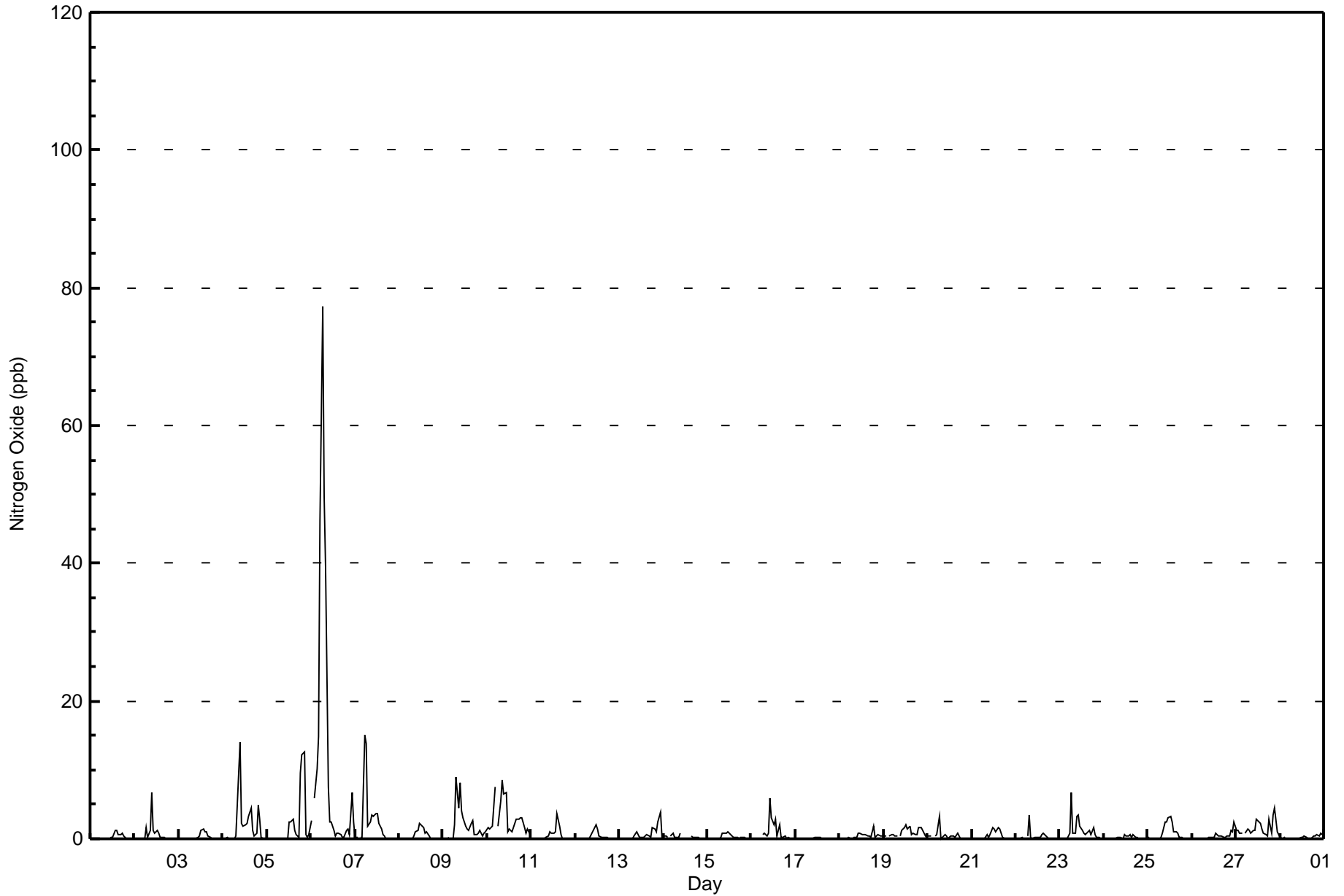
Nitrogen Oxide (NO) - ppb
Firebag - February 2017

Maximum Value: 77 ppb on Feb 6 07:00																		Maximum Daily Average: 12.0 ppb on Feb 6						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 22 05:00																		Minimum Daily Average: 0.1 ppb on Feb 17						Hours of Data: 638		
Maximum Diurnal Average: 4.0 ppb at hour 7																		Minimum Diurnal Average: 0.2 ppb at hour 2						Hours of Missing Data: 34		
Monthly Average: 1.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 15						Hours of Calibration: 33		
																								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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.3	1
2-Feb	0	0	0	Z	0	0	2	0	1	7	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	7
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1	
4-Feb	0	0	0	0	0	Z	0	0	5	14	2	2	2	2	3	4	1	0	1	5	3	0	0	2.0	14	
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	2	2	2	3	1	1	0	10	12	13	1	0	2.0	13	
6-Feb	3	Z	6	10	15	46	77	50	40	8	2	3	1	0	1	1	1	0	0	1	1	1	7	2	12.0	77
7-Feb	0	0	Z	0	0	15	14	2	2	3	3	4	4	2	1	1	0	0	0	0	0	0	0	2.3	15	
8-Feb	0	0	0	Z	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0.5	2	
9-Feb	0	0	0	0	Z	0	2	9	4	8	4	3	2	1	1	2	3	1	1	1	1	0	1	2.0	9	
10-Feb	2	1	2	2	7	Z	2	5	8	6	7	1	2	1	2	2	3	3	3	3	2	1	1	2.9	8	
11-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	4	2	1	0	0	0	0	0	0	0.5	4	
12-Feb	0	Z	0	0	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2	
13-Feb	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	2	1	1	3	4	0.7	4	
14-Feb	0	0	0	Z	0	1	0	0	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0.3	1	
15-Feb	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
16-Feb	0	0	0	0	0	Z	1	1	0	1	6	3	2	3	1	2	0	0	0	0	0	0	0	0.9	6	
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
18-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	2	0	1	1	1	0.4	2	
19-Feb	1	0	Z	0	1	1	0	0	M	0	1	2	2	1	2	1	1	1	1	2	2	1	1	0.9	2	
20-Feb	0	0	0	Z	0	1	3	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	3	
21-Feb	0	0	0	0	Z	0	0	0	1	0	1	2	2	1	2	2	1	0	0	0	0	0	0	0.4	2	
22-Feb	0	0	0	0	0	Z	0	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	3	
23-Feb	Z	0	0	0	0	1	7	1	1	3	3	2	1	1	1	1	1	1	2	1	0	0	0	1.1	7	
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	0.2	1	
25-Feb	0	0	Z	0	0	0	0	0	1	2	2	3	3	2	1	1	1	0	0	0	0	0	0	0.8	3	
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	2	0.4	2
27-Feb	1	1	1	1	Z	1	1	1	1	1	1	3	2	2	2	1	1	0	3	1	4	4	1	1.5	4	
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.2	1	
																		Diurnal Average						Diurnal Maximum		
0.4 0.2 0.4 0.6 1.1 2.9 4.0 2.7 2.5 2.2 1.5 1.3 1.3 1.1 1.1 1.0 0.7 0.3 0.9 1.0 1.0 0.5 0.7 0.4																		3 1 6 10 15 46 77 50 40 14 7 4 4 3 4 4 3 3 10 12 13 4 7 2								
Z - zerospan																		C - Calibration						M - Maintenance		



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	634	99.37	99.37
21 - 40	1	0.16	99.53
41 - 80	3	0.47	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - February 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	58	26	9	10	13	38	32	22	20	56	72	77	40	23	34	103	633
21 - 40	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	3	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	58	26	9	10	13	38	32	22	24	56	72	77	40	23	34	103	637

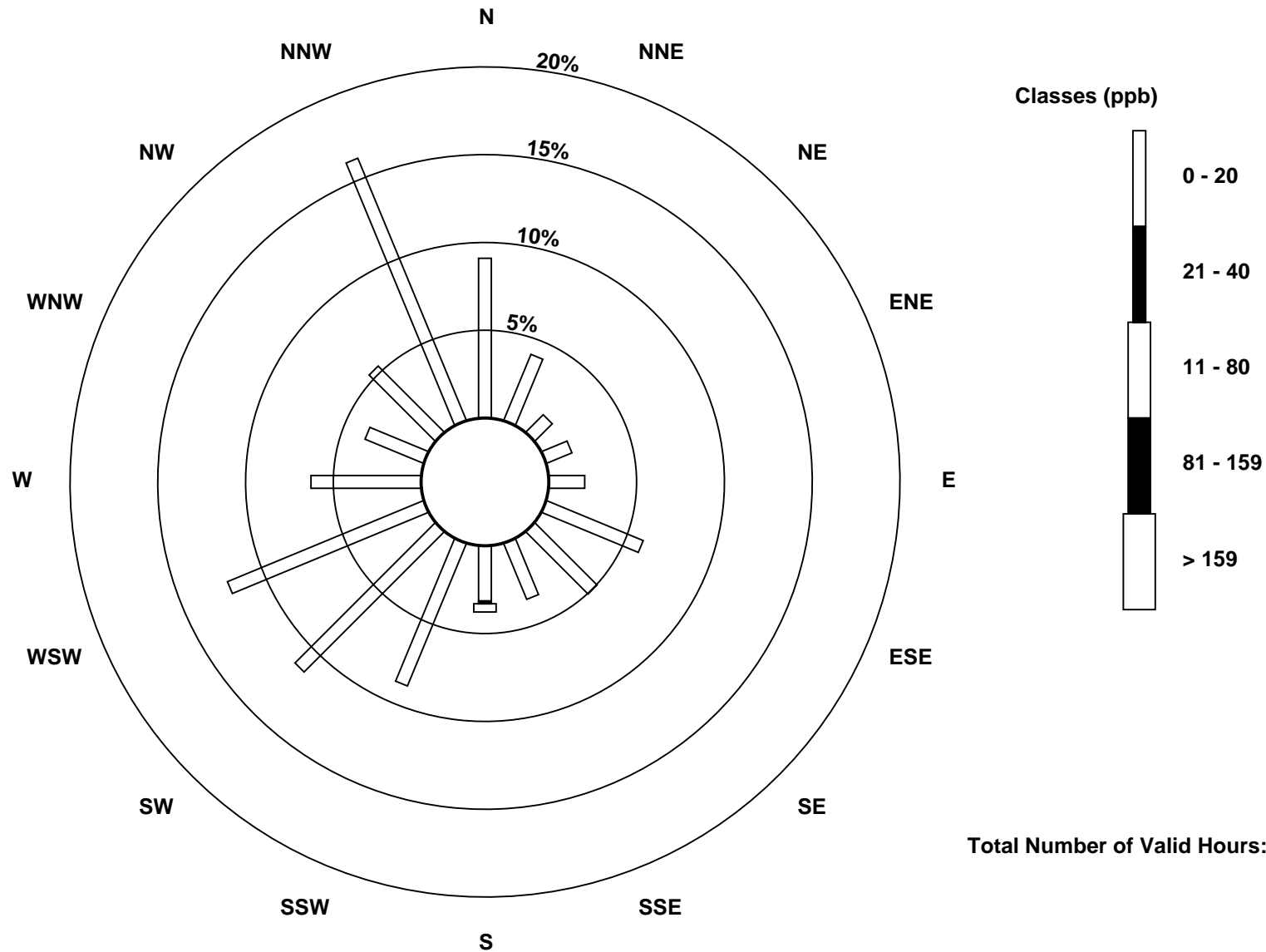
Total Number of Valid Hours: 637

Total Number of Hours: 672

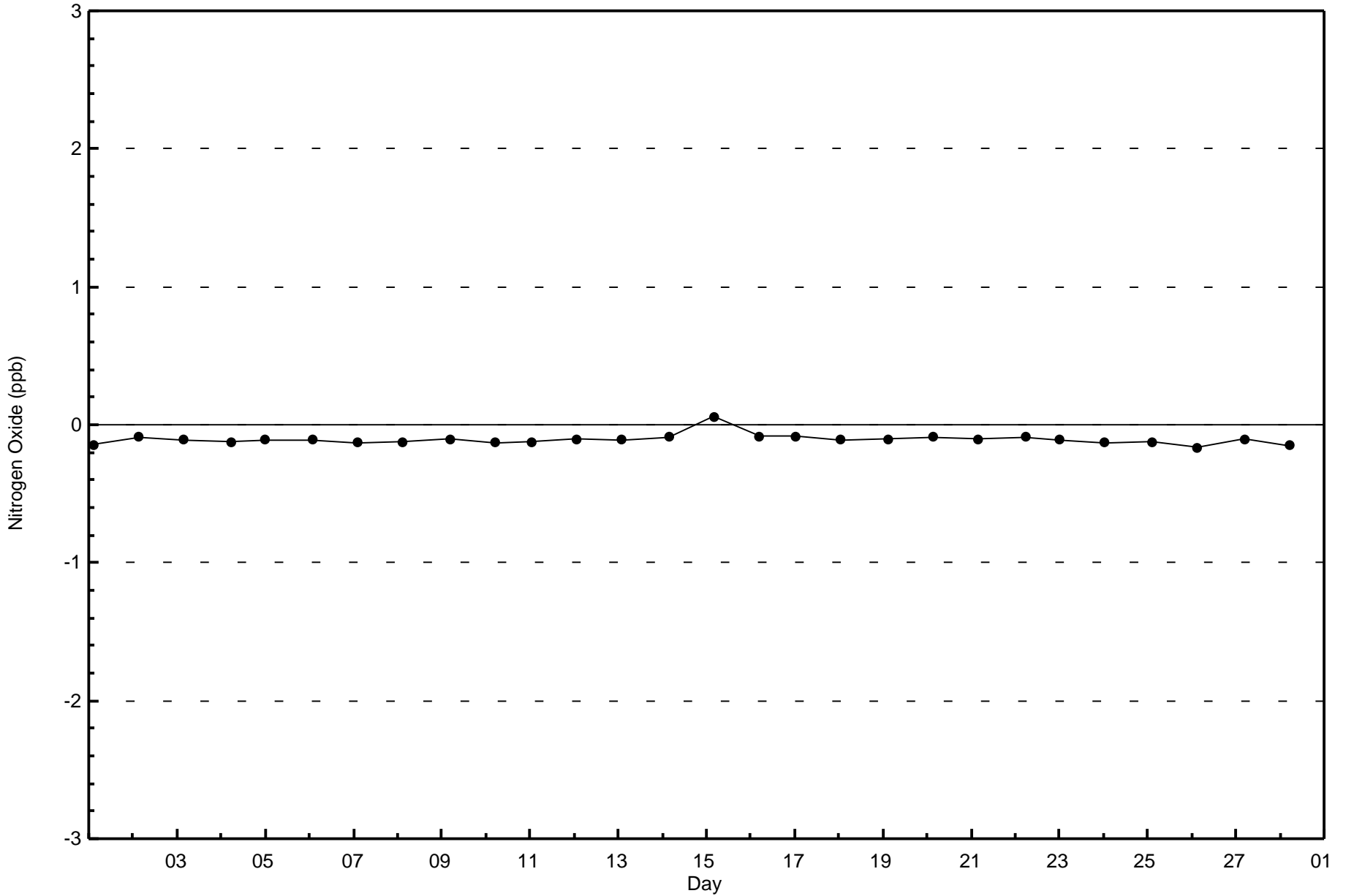


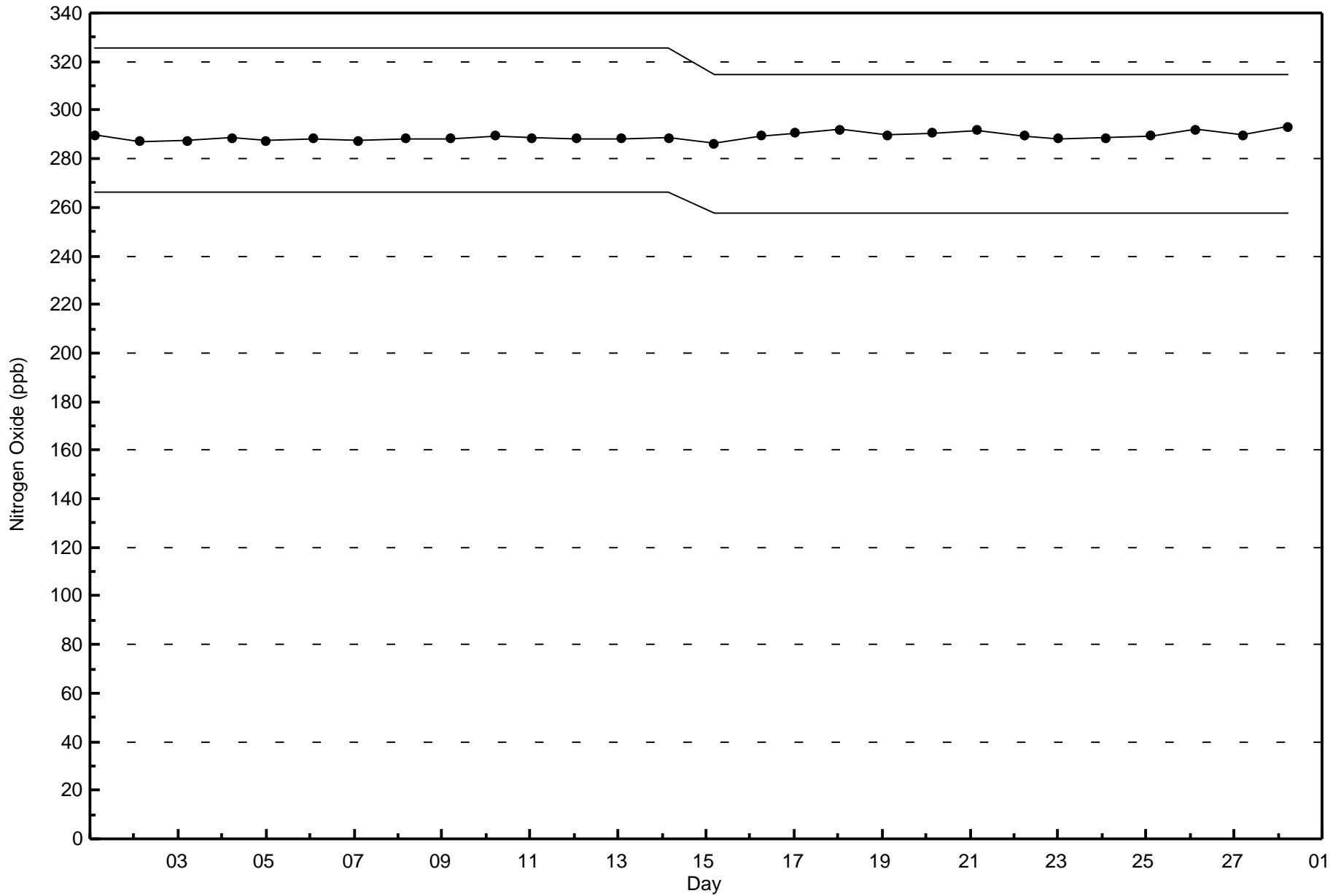
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 637







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

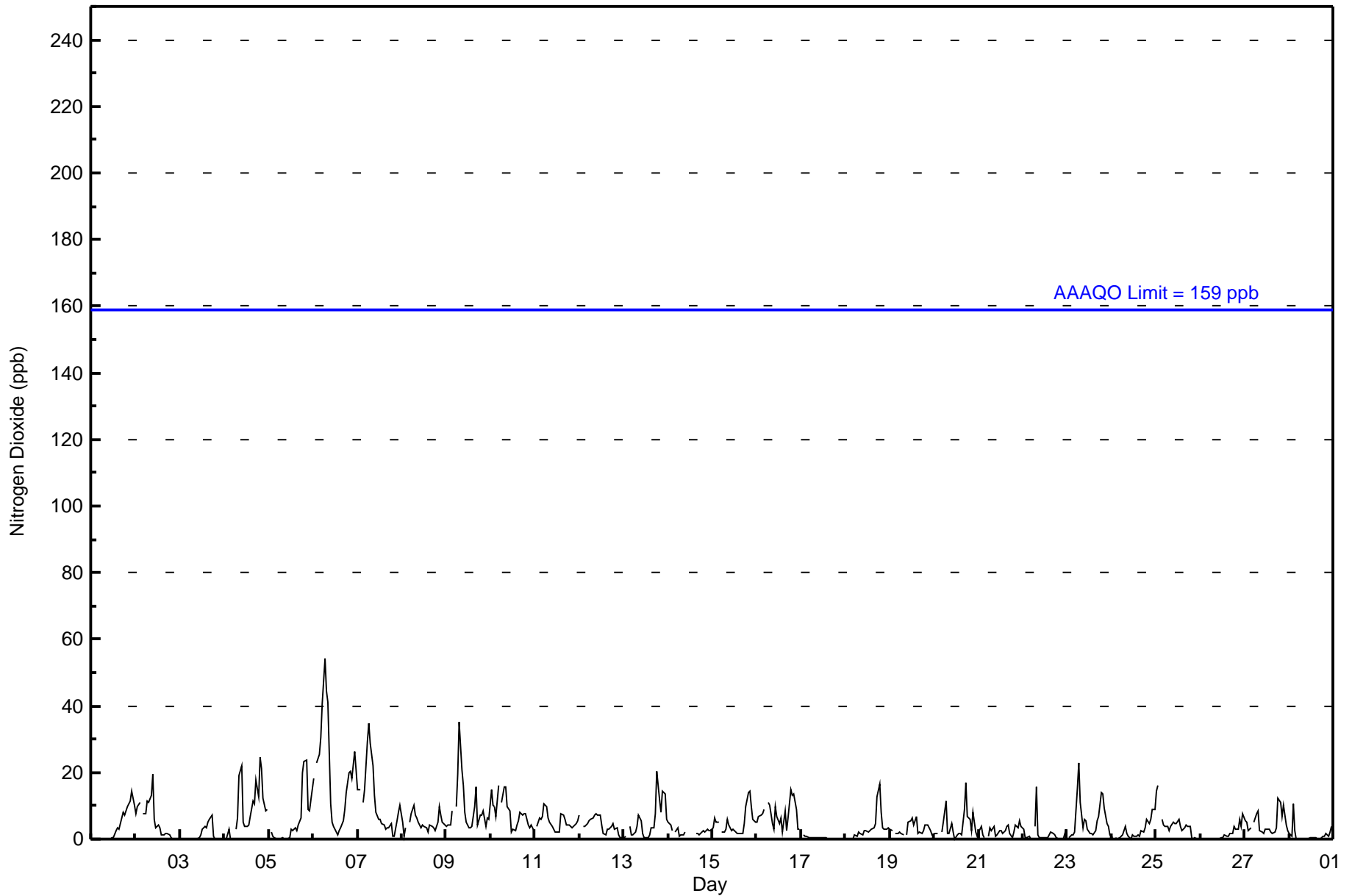
Firebag - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 54 ppb on Feb 6 07:00										Maximum Daily Average: 19.1 ppb on Feb 6										Hours of Data: 638						
Minimum Value: 0 ppb on Feb 1 02:00										Minimum Daily Average: 0.4 ppb on Feb 17										Hours of Missing Data: 34						
Maximum Diurnal Average: 8.4 ppb at hour 7										Minimum Diurnal Average: 2.5 ppb at hour 14										Hours of Calibration: 33						
Monthly Average: 5.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 12 P ₉₉ = 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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	3	3	3	6	8	7	10	11	12	15	10	3.9	15	
2-Feb	8	10	11	Z	8	8	11	11	13	20	6	3	4	3	1	1	2	2	1	1	0	0	0	5.4	20	
3-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	3	4	3	5	6	7	1	0	0	0	0	1.4	7	
4-Feb	0	0	3	0	0	Z	3	7	19	22	5	4	4	4	7	11	11	18	13	25	21	12	8	9.0	25	
5-Feb	Z	2	1	0	0	0	0	0	0	0	0	0	3	2	3	3	4	6	20	23	24	9	8	5.3	24	
6-Feb	18	Z	23	26	30	41	54	44	41	11	5	4	2	1	3	3	6	9	14	20	20	18	26	21	19.1	54
7-Feb	15	15	Z	11	15	29	35	29	22	13	8	6	6	5	4	3	3	3	5	1	1	5	8	10	10.9	35
8-Feb	5	1	4	Z	5	8	10	7	6	5	4	4	4	3	2	4	4	3	3	5	10	7	5	4	4.9	10
9-Feb	4	4	4	8	Z	10	20	35	21	16	8	5	4	3	4	10	16	4	7	7	9	4	6	6	9.4	35
10-Feb	15	10	10	7	16	Z	11	16	16	10	8	2	3	3	4	6	8	7	8	8	4	3	4	3	7.8	16
11-Feb	Z	4	6	6	7	11	10	6	5	4	3	2	2	2	8	7	6	4	4	4	4	4	5	6	5.2	11
12-Feb	7	Z	4	4	5	6	6	6	7	8	7	7	4	2	1	3	3	4	5	3	3	1	0	0	4.2	8
13-Feb	0	1	Z	4	1	1	2	4	7	5	2	0	0	1	1	3	4	8	20	12	8	15	14	6	5.2	20
14-Feb	5	4	3	Z	2	3	1	1	1	2	C	C	C	C	C	2	2	2	1	2	3	2	3	2	2.4	5
15-Feb	4	6	5	5	Z	2	2	3	6	4	3	3	2	2	2	2	2	5	10	14	14	10	6	5	5.0	14
16-Feb	5	7	7	8	9	Z	11	10	5	3	10	7	5	7	2	8	3	7	15	13	13	9	3	3	7.3	15
17-Feb	Z	1	1	1	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Feb	0	Z	0	0	0	1	1	2	2	1	3	2	2	2	3	3	5	13	16	8	4	3	3	3	3.4	16
19-Feb	3	3	Z	2	2	2	2	1	M	1	5	6	6	4	7	2	2	2	3	4	4	3	3	1	3.1	7
20-Feb	2	2	2	Z	2	5	12	2	2	5	2	0	1	2	2	1	9	17	7	6	2	8	2	1	4.0	17
21-Feb	2	4	1	0	Z	1	3	2	4	1	1	3	3	2	2	4	4	2	1	2	4	4	5	4	2.5	5
22-Feb	3	0	0	1	0	Z	4	16	1	0	0	1	1	1	1	2	2	1	0	0	0	0	0	3	1.6	16
23-Feb	Z	1	1	1	2	15	23	11	3	6	5	3	2	2	1	2	6	7	14	14	9	5	4	1	6.0	23
24-Feb	0	Z	0	0	0	1	1	4	2	1	0	1	1	1	1	1	3	2	3	6	5	6	9	9	2.5	9
25-Feb	14	16	Z	6	4	4	4	3	4	5	5	5	6	4	3	4	4	4	4	0	0	0	0	0	4.3	16
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	2	4	3	3	6	4	8	1.6	8
27-Feb	5	5	3	4	Z	5	8	9	2	2	2	3	3	3	2	2	2	4	12	11	7	10	4	3	4.8	12
28-Feb	2	1	11	3	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	1	2	4	1.3	11
4.9 4.0 4.3 4.2 4.8 6.6 8.4 8.2 7.0 5.3 3.5 2.8 2.6 2.5 2.7 3.4 4.3 5.3 7.1 7.3 6.6 5.7 5.3 4.8																								Diurnal Average		
18 16 23 26 30 41 54 44 41 22 10 7 6 7 8 11 16 18 20 25 24 18 26 21																								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
Firebag - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	617	96.71	96.71
21 - 40	17	2.66	99.37
41 - 80	4	0.63	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - February 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	58	26	9	10	13	37	32	19	17	55	66	76	40	23	33	102	616
21 - 40	0	0	0	0	0	1	0	3	3	1	6	1	0	0	1	1	17
11 - 80	0	0	0	0	0	0	0	0	4	0	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	58	26	9	10	13	38	32	22	24	56	72	77	40	23	34	103	637

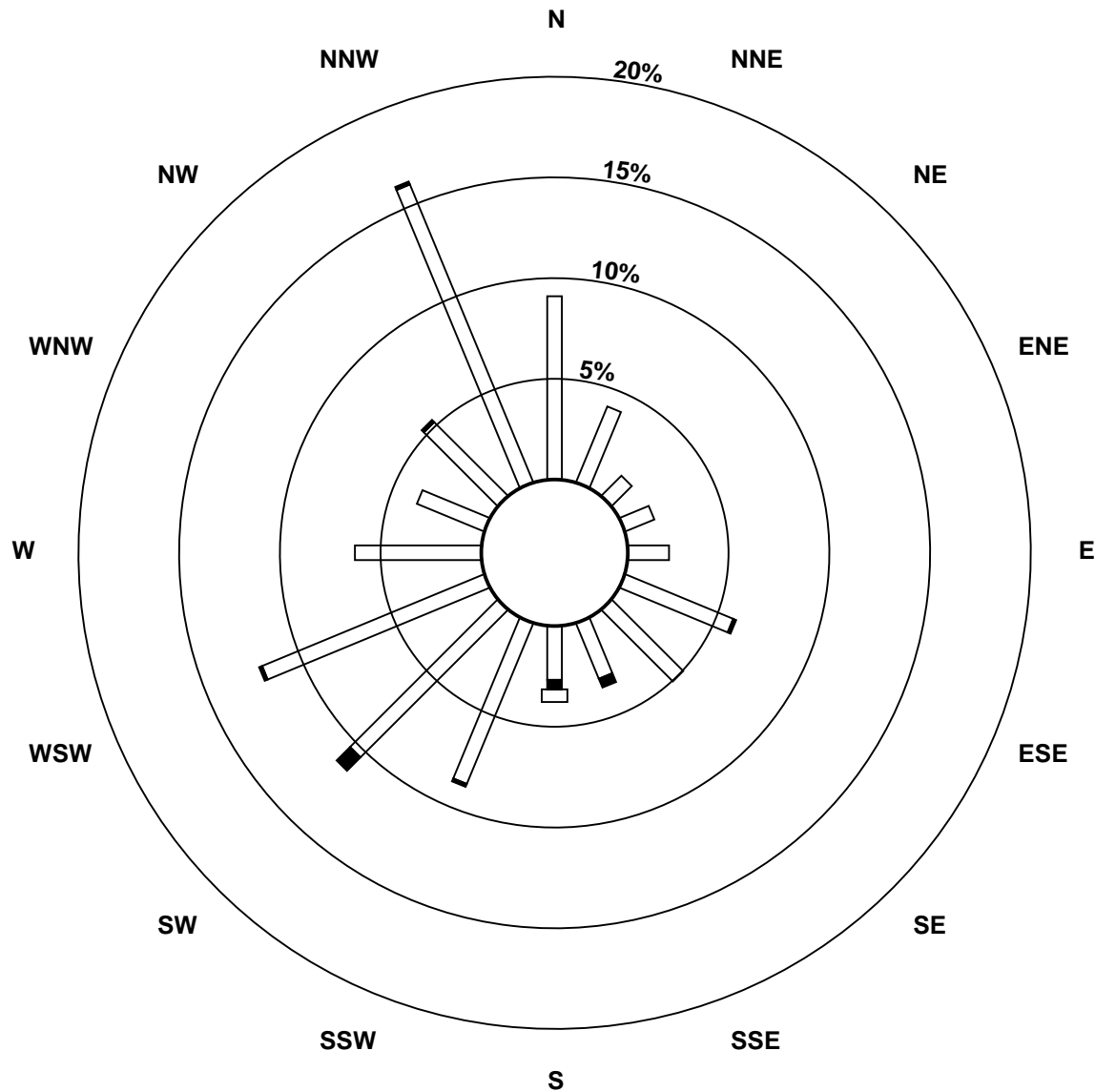
Total Number of Valid Hours: 637

Total Number of Hours: 672

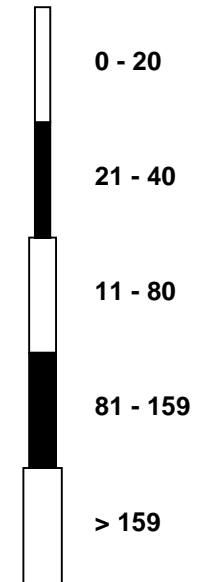


Wood Buffalo Environmental Association
Wind Rose Feb 2017

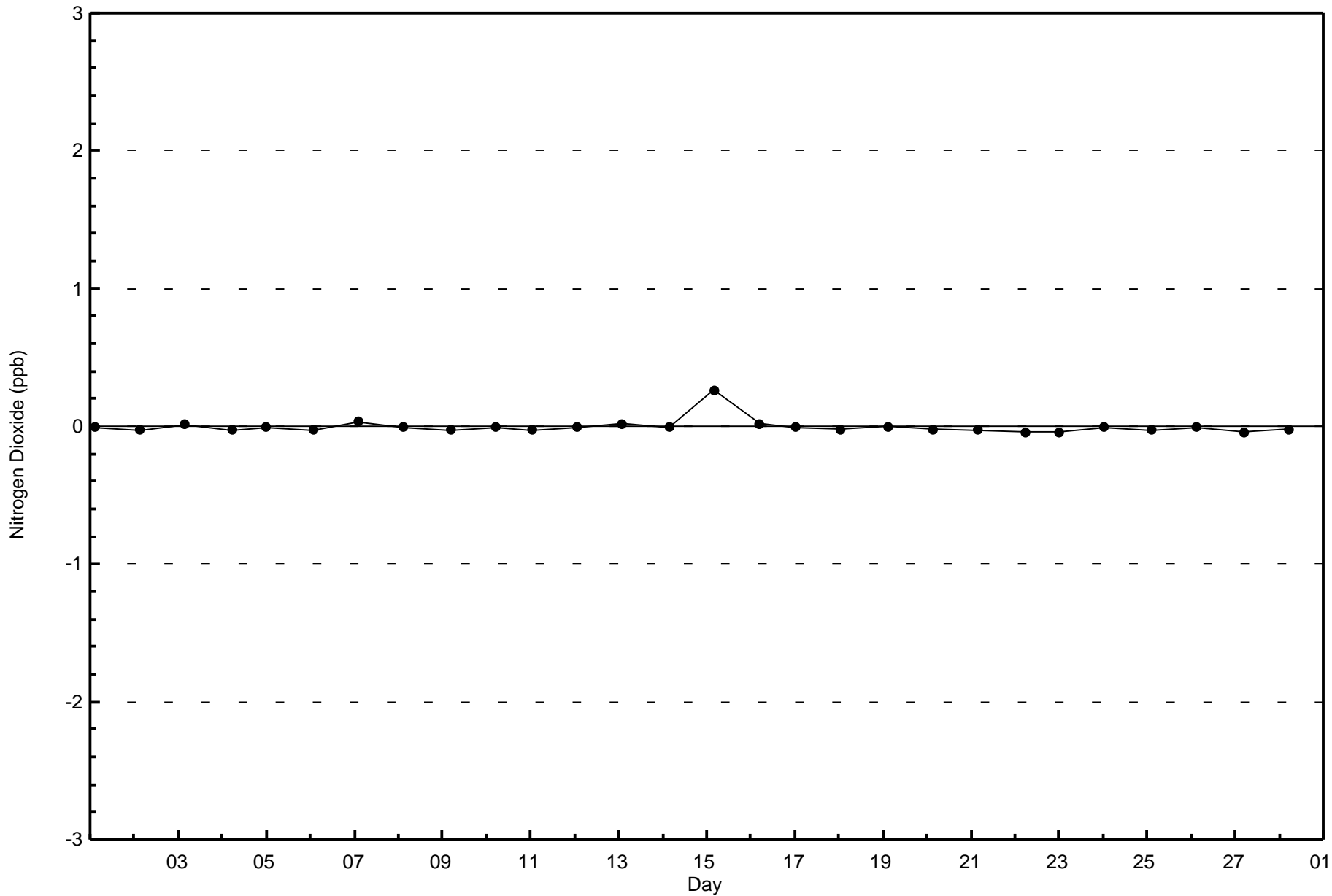
Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)

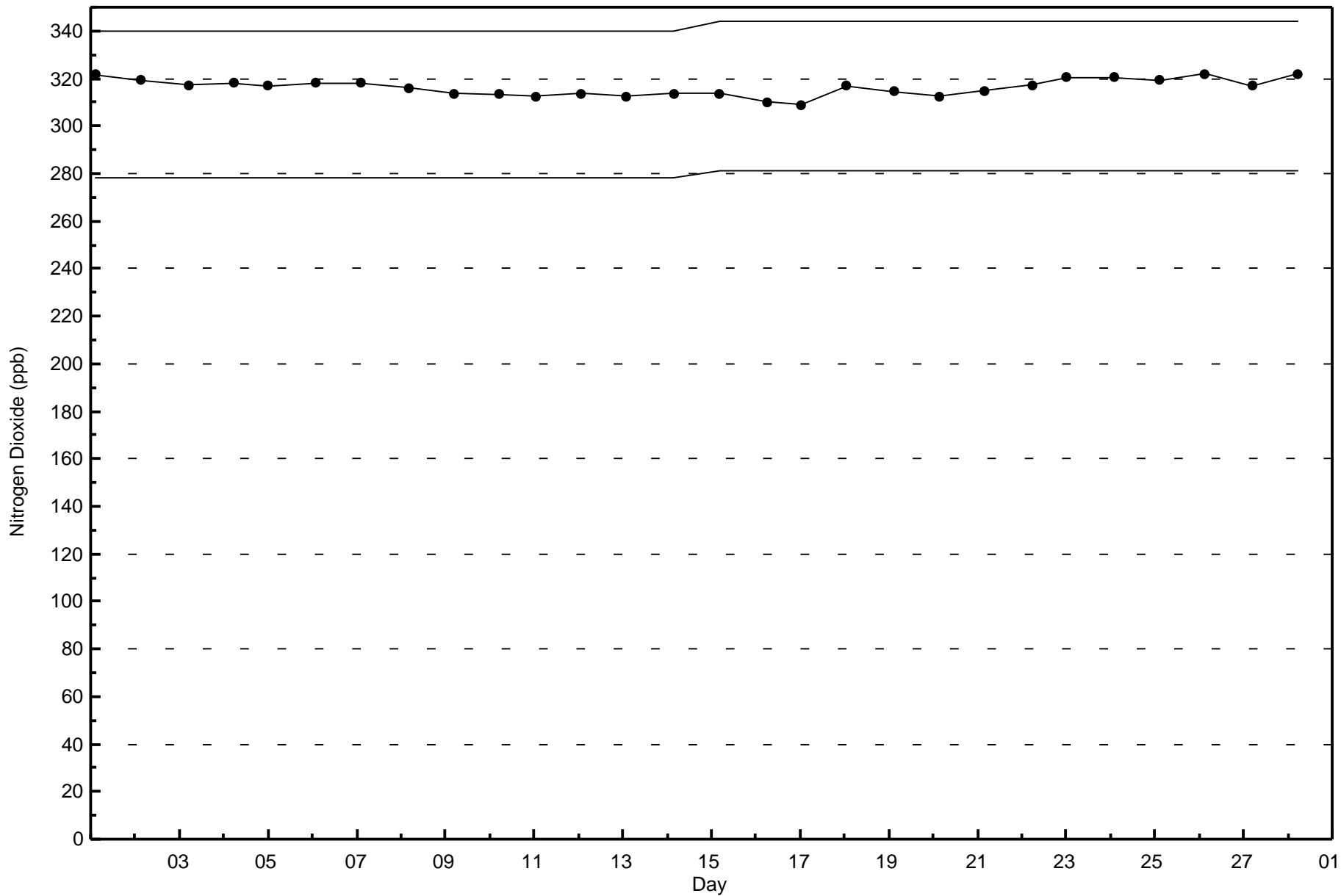


Classes (ppb)



Total Number of Valid Hours: 637







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

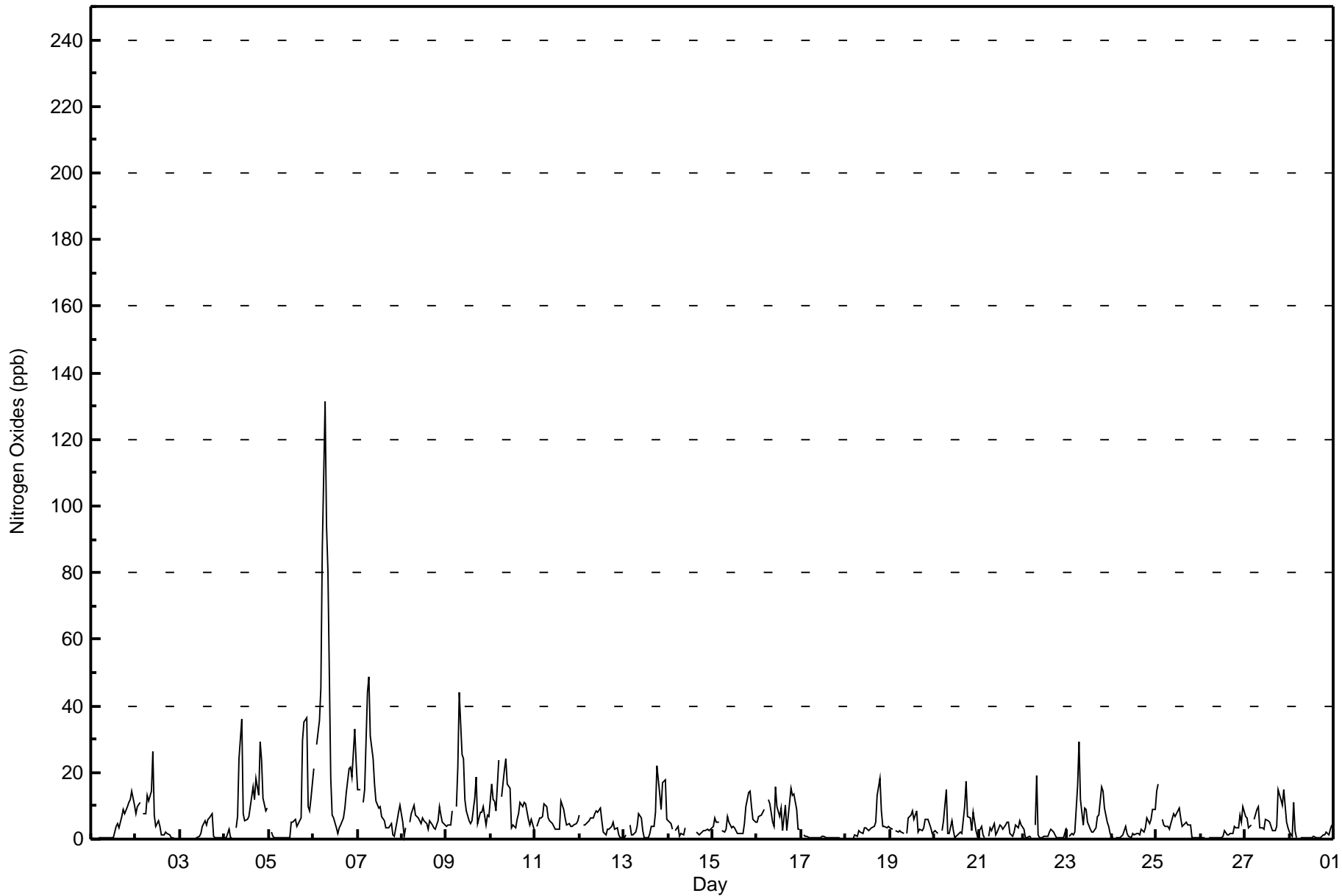
Firebag - February 2017

Maximum Value: 131 ppb on Feb 6 07:00																		Maximum Daily Average: 31.1 ppb on Feb 6						Hours in Service: 672			
Minimum Value: 0 ppb on Feb 3 04:00																		Minimum Daily Average: 0.5 ppb on Feb 17						Hours of Data: 638			
Maximum Diurnal Average: 12.3 ppb at hour 7																		Minimum Diurnal Average: 3.6 ppb at hour 14						Hours of Missing Data: 34			
Monthly Average: 6.3 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 7 P ₉₀ = 14 P ₉₉ = 42						Hours of Calibration: 33			
																		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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	4	5	4	7	9	8	10	11	12	15	10	4.2	15	
2-Feb	8	10	11	Z	8	8	13	11	14	26	7	4	5	4	1	1	2	2	1	1	0	0	0	0	6.0	26	
3-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	4	5	4	6	7	7	1	0	0	0	0	0	1.7	7	
4-Feb	0	0	3	0	0	Z	3	7	24	36	7	6	6	7	10	16	12	18	13	29	24	12	8	9	11.0	36	
5-Feb	Z	2	1	0	0	0	0	0	0	0	0	5	5	6	4	5	6	30	35	36	10	9	12	7.3	36		
6-Feb	21	Z	29	36	45	87	131	94	80	18	7	6	4	2	3	4	6	9	14	21	22	19	33	23	31.1	131	
7-Feb	15	15	Z	11	15	44	49	31	24	17	11	10	10	7	5	3	4	3	5	1	1	5	8	10	13.2	49	
8-Feb	5	1	4	Z	5	8	10	7	7	6	5	7	6	5	3	6	4	3	3	5	10	7	5	4	5.4	10	
9-Feb	4	4	4	9	Z	10	22	44	25	24	12	8	5	5	5	12	18	5	8	8	10	4	7	7	11.4	44	
10-Feb	16	12	12	9	24	Z	13	21	24	16	15	3	4	4	6	8	11	10	11	11	6	4	6	3	10.7	24	
11-Feb	Z	4	6	6	7	11	10	6	5	5	4	3	3	3	11	9	6	4	4	4	4	4	5	6	5.7	11	
12-Feb	7	Z	4	4	5	6	6	6	8	8	8	9	5	2	1	3	3	4	5	3	3	1	1	0	4.5	9	
13-Feb	0	1	Z	4	1	1	2	4	8	6	2	1	0	1	2	4	4	8	22	13	9	17	18	6	5.8	22	
14-Feb	6	5	3	Z	3	4	1	2	1	3	C	C	C	C	C	2	2	2	1	2	3	2	3	2	3	2.6	6
15-Feb	4	6	5	5	Z	2	2	3	7	5	3	4	3	2	2	2	2	5	10	14	14	10	6	5	5.2	14	
16-Feb	5	7	7	8	9	Z	12	11	5	4	16	10	7	9	3	10	3	7	15	13	13	9	3	3	8.2	16	
17-Feb	Z	1	1	1	1	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
18-Feb	0	Z	0	0	0	1	1	2	2	2	3	3	3	3	3	4	5	13	18	8	4	4	3	4	3.8	18	
19-Feb	3	3	Z	2	2	3	2	2	M	2	6	7	8	6	9	2	3	2	3	6	6	4	3	2	4.0	9	
20-Feb	2	2	2	Z	2	5	15	2	2	5	3	0	1	2	2	2	10	17	7	6	2	8	2	1	4.4	17	
21-Feb	2	4	1	0	Z	1	3	3	5	1	2	4	4	3	4	5	5	2	1	2	4	3	5	4	3.0	5	
22-Feb	3	0	1	1	0	Z	4	19	1	0	0	1	1	1	2	3	2	1	0	0	0	0	3	2.0	19		
23-Feb	Z	1	2	1	2	16	29	12	4	9	9	5	3	2	2	3	7	7	16	14	9	5	4	2	7.2	29	
24-Feb	0	Z	0	0	0	1	1	4	2	1	0	2	1	2	2	1	3	2	4	6	5	6	9	9	2.7	9	
25-Feb	14	16	Z	6	4	4	4	3	5	8	7	8	9	6	4	5	5	4	4	1	0	0	0	0	5.1	16	
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	2	2	4	4	3	7	5	10	2.0	10	
27-Feb	7	6	3	4	Z	6	9	10	3	3	3	6	5	5	4	2	3	4	15	12	10	15	5	3	6.3	15	
28-Feb	2	1	11	3	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	1	1	2	1	3	4	1.5	11	
																		5.3 4.3 4.8 4.9 5.9 9.5 12.3 10.9 9.5 7.5 5.0 4.1 4.0 3.6 3.8 4.4 5.0 5.6 8.0 8.3 7.6 6.2 6.0 5.2						Diurnal Average			
																		21 16 29 36 45 87 131 94 80 36 16 10 10 9 11 16 18 18 30 35 36 19 33 23						Diurnal Maximum			
Z - zerospan			C - Calibration						M - Maintenance																		



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	605	94.83	94.83
21 - 40	25	3.92	98.75
41 - 80	5	0.78	99.53
81 - 159	3	0.47	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - February 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	58	24	9	10	13	36	28	19	17	53	63	76	40	23	33	102	604
21 - 40	0	2	0	0	0	2	4	2	2	3	7	1	0	0	1	1	25
11 - 80	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	3	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	58	26	9	10	13	38	32	22	24	56	72	77	40	23	34	103	637

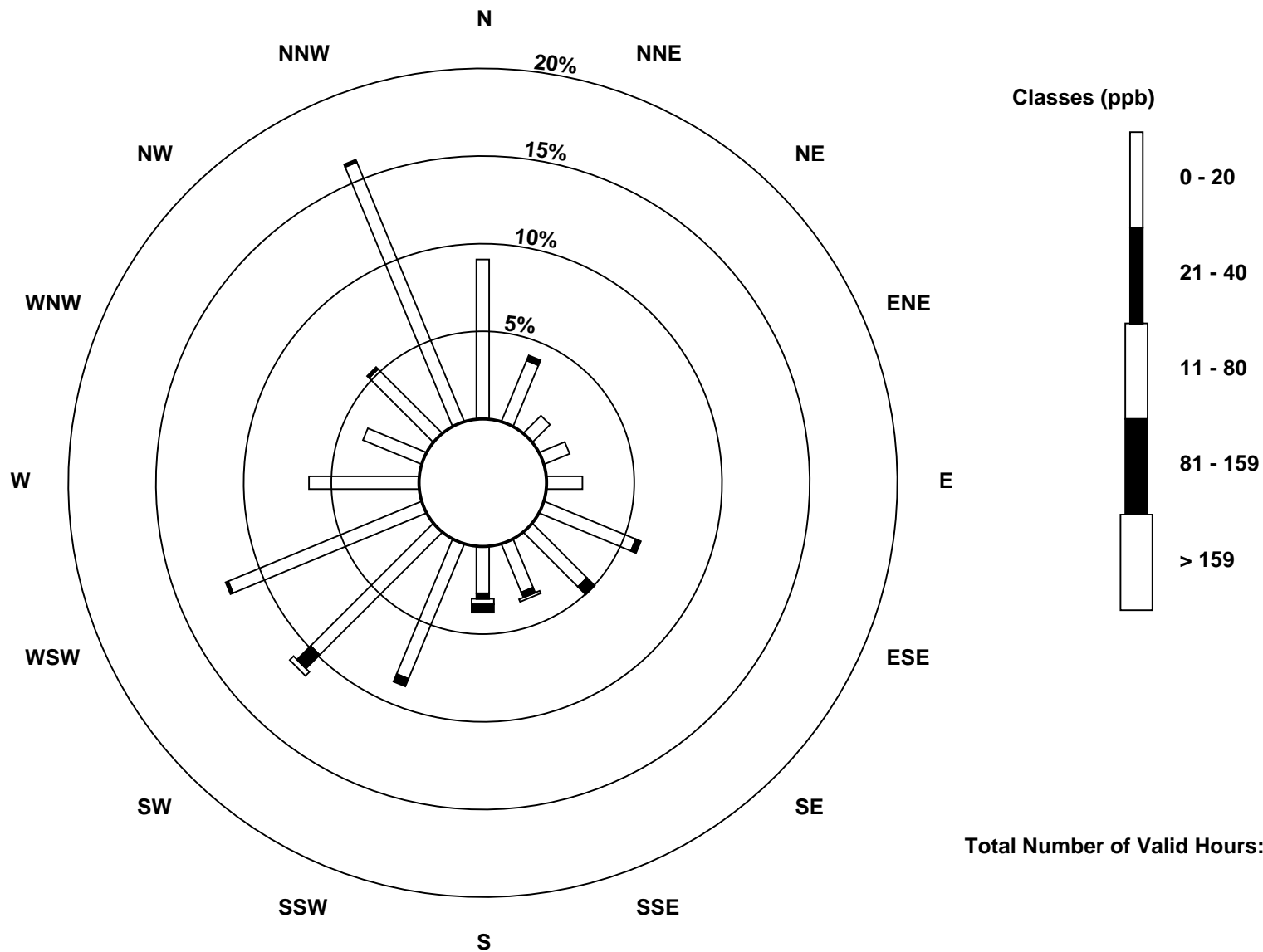
Total Number of Valid Hours: 637

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

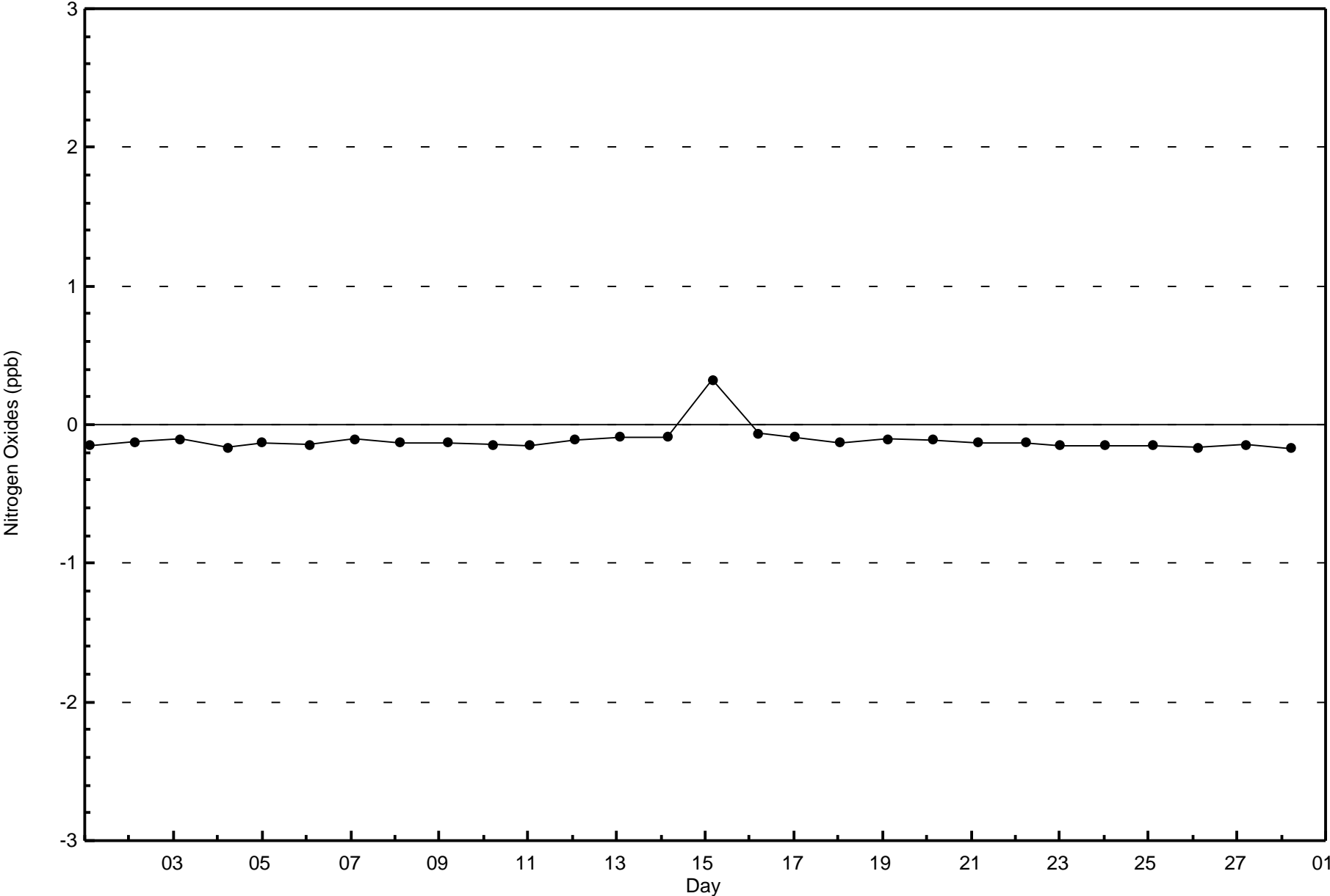
Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)

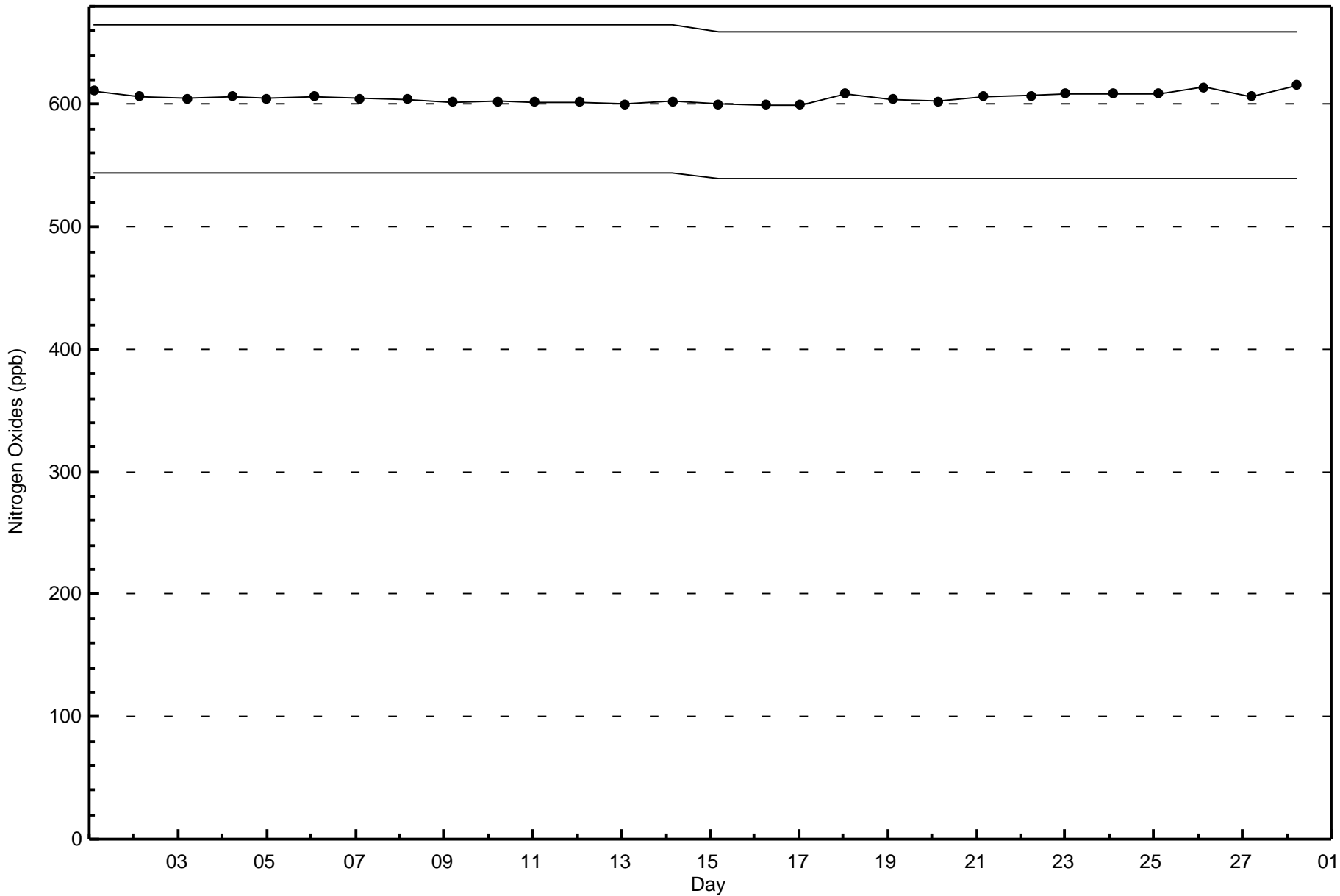




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Firebag - February 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

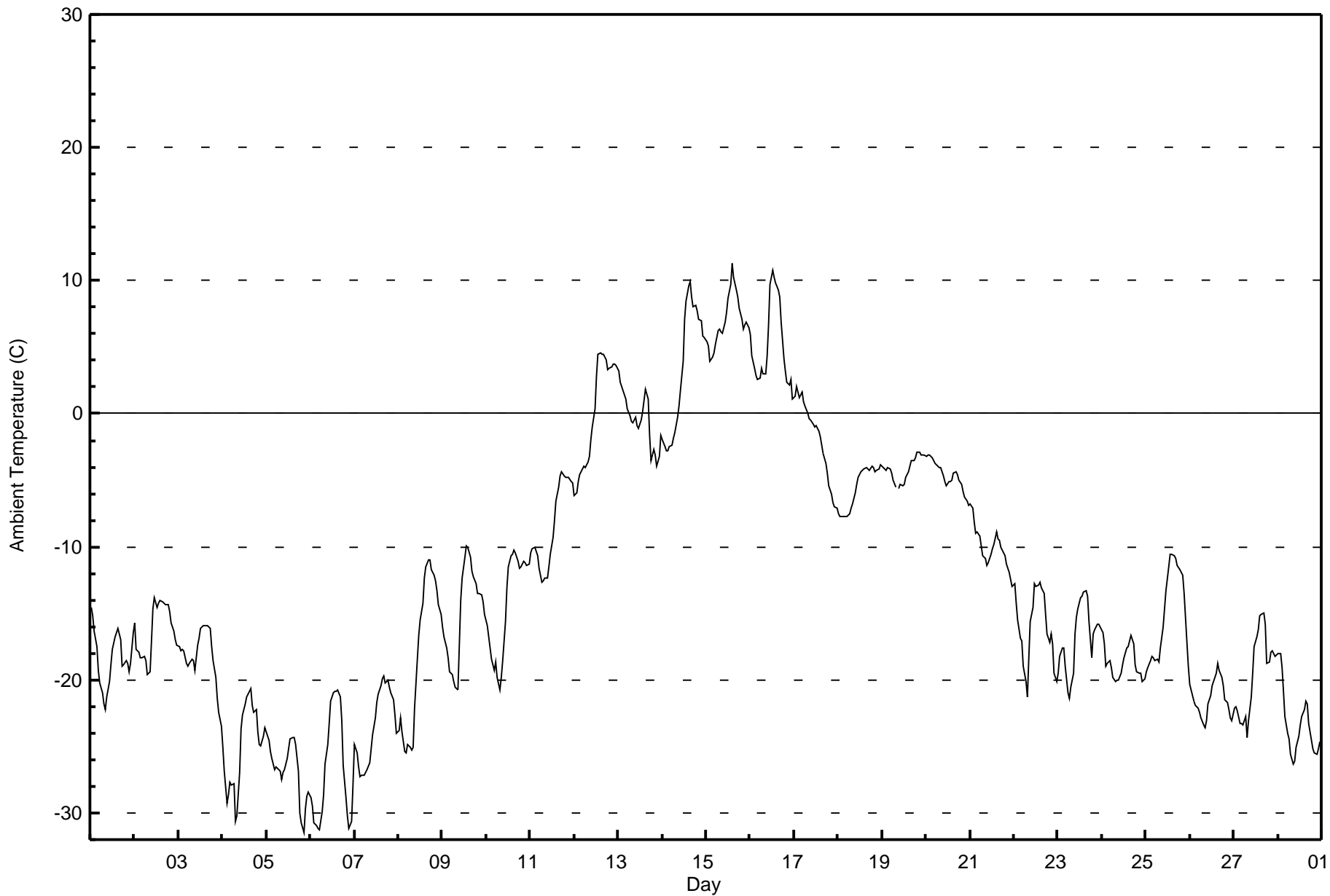
Ambient Temperature (AT) - C
Firebag - February 2017

Maximum Value: 11.3 C on Feb 15 15:00 Maximum Daily Average: 7.0 C on Feb 15 Minimum Value: -31.4 C on Feb 5 21:00 Minimum Daily Average: -26.8 C on Feb 5 Maximum Diurnal Average: -9.6 C at hour 16 Minimum Diurnal Average: -15.3 C at hour 8 Monthly Average: -12.62 C Percentiles: P ₁ = -30.8 P ₁₀ = -24.9 Q ₁ = -20.1 Median = -14.7 Q ₃ = -4.3 P ₉₀ = 2.8 P ₉₉ = 9.7																								Hours in Service: 672	Hours of Data: 671	Hours of Missing Data: 1	Hours of Calibration: 0	Percent Operational Time: 99.9																																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																															
1-Feb	-14.6	-15.2	-16.4	-17.5	-19.3	-20.2	-21.0	-21.8	-22.2	-21.3	-20.1	-18.9	-17.7	-16.8	-16.4	-16.2	-16.9	-19.0	-18.9	-18.5	-18.8	-19.4	-18.7	-16.4	-18.4	-14.6																																													
2-Feb	-15.7	-17.7	-18.0	-18.3	-18.4	-18.2	-18.6	-19.6	-19.3	-17.1	-14.6	-13.9	-14.6	-14.2	-14.1	-14.1	-14.2	-14.3	-14.3	-14.8	-15.7	-16.4	-16.9	-17.4	-16.3	-13.9																																													
3-Feb	-17.5	-17.8	-17.8	-17.8	-18.7	-18.9	-18.8	-18.5	-18.5	-19.3	-17.4	-16.9	-16.1	-15.9	-15.9	-16.0	-15.9	-16.2	-17.5	-18.6	-19.8	-21.4	-22.4	-23.5	-18.2	-15.9																																													
4-Feb	-25.1	-26.8	-29.3	-28.7	-27.7	-27.9	-27.8	-30.7	-30.2	-27.0	-23.7	-22.6	-21.8	-21.3	-21.0	-20.7	-21.9	-22.5	-22.2	-23.9	-24.8	-25.0	-24.2	-23.6	-25.0	-20.7																																													
5-Feb	-23.9	-24.5	-25.4	-25.9	-26.7	-26.5	-26.6	-26.8	-27.5	-27.0	-26.7	-25.9	-25.2	-24.4	-24.3	-24.4	-24.8	-26.9	-30.0	-30.7	-31.4	-29.7	-28.7	-28.4	-26.8	-23.9																																													
6-Feb	-28.9	-29.5	-30.7	-31.0	-31.2	-31.3	-29.9	-28.6	-26.3	-24.8	-23.3	-21.6	-21.0	-20.9	-20.9	-20.8	-21.3	-23.0	-26.5	-28.8	-30.2	-31.1	-30.6	-27.9	-26.7	-20.8																																													
7-Feb	-24.9	-25.5	-26.5	-27.2	-27.2	-27.2	-26.9	-26.7	-26.2	-25.2	-24.1	-22.8	-21.7	-21.1	-20.4	-19.9	-19.7	-20.2	-20.0	-20.6	-21.0	-21.5	-22.6	-24.0	-23.5	-19.7																																													
8-Feb	-23.9	-22.8	-24.0	-25.4	-25.5	-24.8	-25.0	-25.3	-25.1	-22.1	-18.5	-16.7	-15.5	-14.2	-12.4	-11.6	-11.0	-11.0	-11.7	-12.1	-12.6	-13.3	-14.3	-15.0	-18.1	-11.0																																													
9-Feb	-16.1	-16.8	-17.6	-18.3	-19.4	-19.6	-20.1	-20.5	-20.7	-17.4	-14.1	-12.4	-10.7	-9.9	-10.0	-10.8	-11.8	-12.2	-12.8	-13.5	-13.5	-13.7	-14.1	-15.1	-15.0	-9.9																																													
10-Feb	-15.9	-16.8	-17.6	-18.5	-19.3	-18.6	-19.9	-20.8	-19.8	-18.5	-15.6	-13.1	-11.5	-10.7	-10.6	-10.2	-10.5	-11.1	-11.6	-11.5	-11.1	-11.2	-11.4	-11.3	-14.5	-10.2																																													
11-Feb	-10.4	-10.1	-10.1	-10.3	-10.6	-11.6	-12.7	-12.5	-12.4	-12.3	-11.5	-10.5	-9.3	-8.1	-6.6	-5.5	-4.7	-4.4	-4.7	-4.7	-4.7	-4.8	-5.1	-5.2	-8.5	-4.4																																													
12-Feb	-6.2	-6.0	-5.1	-4.5	-4.2	-3.9	-4.1	-3.6	-3.2	-1.9	-1.0	0.4	2.8	4.4	4.5	4.5	4.5	4.0	3.4	3.4	3.5	3.7	3.8	3.6	0.1	4.5																																													
13-Feb	3.2	2.4	2.1	1.4	1.1	0.4	-0.2	-0.5	-0.7	-0.2	-0.9	-1.1	-0.5	0.1	1.0	1.9	1.1	-1.7	-3.5	-2.7	-3.1	-3.9	-3.2	-1.6	-0.4	3.2																																													
14-Feb	-2.0	-2.5	-2.8	-2.8	-2.5	-2.3	-1.8	-1.4	-0.3	0.6	1.7	3.9	7.1	8.4	9.6	9.9	8.8	8.0	8.2	7.7	7.1	7.0	5.8	5.8	3.4	9.9																																													
15-Feb	5.4	5.1	3.9	4.2	4.6	5.2	6.3	6.3	6.1	6.0	6.8	7.6	8.7	9.7	11.3	10.3	9.3	8.8	8.0	7.1	6.4	6.7	6.9	6.4	7.0	11.3																																													
16-Feb	5.9	4.3	3.4	2.9	2.6	2.6	3.4	3.0	3.0	4.4	6.7	9.7	10.7	10.2	9.8	9.2	8.8	6.8	4.1	3.2	2.3	2.1	2.6	1.1	5.1	10.7																																													
17-Feb	1.3	2.0	1.6	1.2	1.6	0.9	0.5	0.0	-0.4	-0.5	-0.8	-1.0	-0.9	-1.3	-1.8	-2.4	-3.0	-3.8	-4.4	-5.4	-6.1	-6.7	-7.0	-7.1	-1.8	2.0																																													
18-Feb	-7.5	-7.7	-7.7	-7.7	-7.8	-7.7	-7.5	-7.1	-6.8	-5.9	-5.3	-4.8	-4.4	-4.2	-4.2	-4.1	-4.1	-4.2	-4.0	-4.0	-4.3	-4.2	-4.2	-3.9	-5.6	-3.9																																													
19-Feb	-4.0	-4.2	-4.3	-4.1	-4.1	-4.5	-5.0	-5.5	M	-5.6	-5.3	-5.5	-5.3	-4.8	-4.3	-3.9	-3.5	-3.5	-3.3	-2.9	-2.9	-3.1	-3.1	-3.1	-4.2	-2.9																																													
20-Feb	-3.2	-3.1	-3.1	-3.3	-3.5	-3.7	-3.9	-4.1	-4.1	-4.6	-5.1	-5.4	-5.1	-5.1	-4.9	-4.5	-4.4	-4.6	-5.0	-5.3	-5.8	-6.2	-6.6	-6.9	-4.7	-3.1																																													
21-Feb	-6.8	-7.1	-8.1	-8.9	-8.9	-9.2	-10.0	-10.7	-10.9	-11.4	-11.2	-10.6	-10.2	-9.9	-8.9	-9.5	-9.5	-10.0	-10.4	-10.7	-11.3	-11.9	-12.4	-13.0	-10.1	-6.8																																													
22-Feb	-12.8	-14.3	-15.5	-16.9	-17.1	-19.0	-20.1	-21.3	-18.4	-15.6	-14.6	-12.8	-13.0	-12.9	-12.7	-13.1	-13.6	-15.0	-16.6	-17.2	-16.6	-17.2	-19.5	-20.1	-16.1	-12.7																																													
23-Feb	-19.5	-18.2	-17.6	-17.6	-18.9	-20.9	-21.4	-20.6	-19.5	-16.5	-15.2	-14.6	-13.8	-13.7	-13.4	-13.3	-13.7	-15.6	-18.3	-16.6	-16.3	-15.8	-15.8	-16.0	-16.8	-13.3																																													
24-Feb	-16.5	-17.3	-18.9	-18.7	-18.6	-19.0	-19.8	-20.1	-20.0	-19.5	-18.9	-18.3	-17.6	-17.5	-17.5	-17.1	-16.7	-17.3	-18.9	-19.4	-19.5	-19.5	-20.1	-19.9	-18.7	-16.5																																													
25-Feb	-19.4	-19.1	-18.6	-18.2	-18.3	-18.6	-18.5	-18.7	-17.6	-16.0	-14.7	-13.3	-11.6	-10.5	-10.5	-10.7	-10.9	-11.4	-11.7	-11.9	-12.1	-13.5	-17.2	-19.0	-15.1	-10.5																																													
26-Feb	-20.4	-21.1	-21.6	-21.9	-22.1	-22.5	-22.9	-23.4	-23.5	-23.0	-21.9	-21.2	-20.4	-20.1	-19.5	-18.8	-19.3	-19.8	-20.5	-21.5	-21.7	-22.3	-22.9	-23.0	-21.5	-18.8																																													
27-Feb	-22.2	-22.0	-22.4	-23.3	-23.3	-23.4	-22.8	-24.3	-23.1	-21.3	-19.5	-17.5	-16.8	-16.2	-15.2	-15.1	-15.0	-15.8	-18.8	-18.7	-18.0	-17.8	-18.3	-18.2	-19.5	-15.0																																													
28-Feb	-18.0	-18.0	-19.1	-20.9	-22.8	-24.0	-24.4	-25.5	-26.3	-26.1	-25.1	-24.2	-23.4	-22.8	-22.2	-21.6	-21.8	-23.2	-24.5	-25.2	-25.5	-25.6	-25.1	-24.7	-23.3	-18.0																																													
																								Diurnal Average		Diurnal Maximum																																													
																								-12.8		-13.2		-13.8		-14.2		-14.5		-14.8		-15.0		-15.3		-15.3		-13.9		-12.7		-11.6		-10.7		-10.1		-9.7		-9.6		-9.9		-10.7		-11.7		-12.1		-12.4		-12.7		-13.1		-13.1	
																								5.9		5.1		3.9		4.2		4.6		5.2		6.3		6.3		6.1		6.0		6.8		9.7		10.7		10.2		11.3		10.3		9.3		8.8		8.2		7.7		7.1		7.0		6.9		6.4	
M - Maintenance																																																																							



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Firebag - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Firebag - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	177	26.38	26.38
-20 - 0	400	59.61	85.99
0 - 10	90	13.41	99.40
10 - 20	4	0.60	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

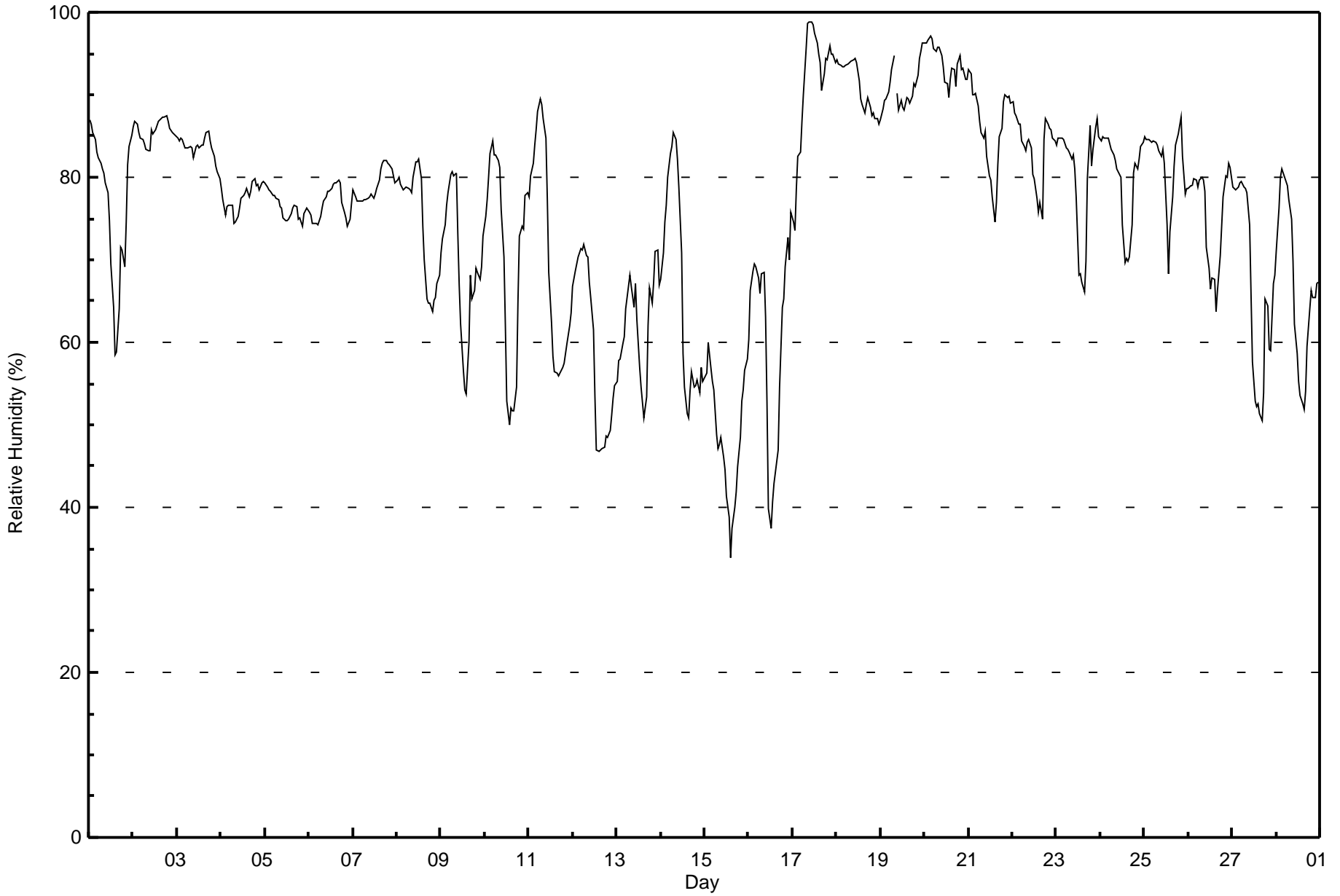
Firebag - February 2017

Maximum Value: 99 % on Feb 17 10:00																		Maximum Daily Average: 93.9 % on Feb 20																		Hours in Service: 672	
Minimum Value: 34 % on Feb 15 15:00																		Minimum Daily Average: 48.7 % on Feb 15																		Hours of Data: 671	
Maximum Diurnal Average: 80.6 % at hour 6																		Minimum Diurnal Average: 68.1 % at hour 15																		Hours of Missing Data: 1	
Monthly Average: 75.9 %																		Percentiles: P ₁ = 41 P ₁₀ = 55 Q ₁ = 68 Median = 79 Q ₃ = 85 P ₉₀ = 90 P ₉₉ = 97																		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-Feb	87	86	86	85	83	82	82	81	80	79	78	75	69	64	59	59	64	71	71	69	75	81	84	85	76.5	87											
2-Feb	86	87	86	85	85	85	84	83	83	83	86	85	86	86	87	87	87	87	87	87	86	85	85	85	85.6	87											
3-Feb	85	84	85	85	84	83	84	84	84	82	84	84	84	84	85	85	86	84	84	82	81	81	80	83.6	86												
4-Feb	79	77	75	76	77	77	77	74	75	75	76	78	78	78	79	78	78	79	80	79	79	78	79	79	77.5	80											
5-Feb	79	79	78	78	78	78	77	77	77	76	75	75	75	75	76	76	77	77	75	75	74	76	76	76	76.4	79											
6-Feb	76	75	74	74	74	74	75	76	77	78	78	78	79	79	79	79	80	79	77	76	75	74	75	77	76.7	80											
7-Feb	78	78	77	77	77	77	77	77	77	78	78	77	78	79	80	81	82	82	82	82	81	81	80	79	79.0	82											
8-Feb	80	80	79	78	79	79	79	78	78	80	82	82	82	80	74	70	65	65	65	64	65	65	67	68	74.3	82											
9-Feb	71	73	74	77	78	80	81	80	81	73	67	62	57	54	54	60	68	65	66	69	68	68	69	73	69.5	81											
10-Feb	75	77	80	83	84	83	83	82	81	76	70	62	53	50	52	52	52	55	65	73	74	74	78	78	70.5	84											
11-Feb	78	80	82	84	86	88	90	89	87	85	77	68	62	58	57	56	56	56	57	58	59	60	62	64	70.7	90											
12-Feb	67	69	69	70	71	71	72	71	70	67	65	62	53	47	47	47	47	47	49	48	49	51	53	55	59.1	72											
13-Feb	55	58	58	60	61	64	67	68	67	64	67	63	57	55	53	51	53	62	67	65	67	71	71	67	62.1	71											
14-Feb	68	71	75	77	80	83	84	85	85	82	79	71	59	55	51	51	54	56	55	55	55	54	57	55	66.5	85											
15-Feb	56	56	60	57	55	54	49	47	48	49	46	45	41	39	34	37	40	42	45	48	53	54	57	58	48.7	60											
16-Feb	60	66	69	70	69	68	66	68	69	63	53	40	37	41	43	46	47	55	64	65	69	73	70	76	60.2	76											
17-Feb	75	73	79	83	83	87	90	96	99	99	99	99	98	96	95	94	91	93	94	94	96	95	95	94	91.4	99											
18-Feb	94	94	93	93	93	93	94	94	94	94	94	94	92	89	89	88	89	90	88	87	88	87	87	86	91.1	94											
19-Feb	87	88	89	89	90	92	93	95	M	90	88	89	88	88	90	90	89	90	91	91	92	94	95	96	90.7	96											
20-Feb	96	96	97	97	97	96	95	96	96	95	93	91	91	90	92	93	93	91	94	95	93	93	92	92	93.9	97											
21-Feb	93	93	90	90	90	89	87	85	85	86	82	80	80	78	75	77	81	85	86	89	90	90	90	89	85.8	93											
22-Feb	89	88	87	86	86	84	84	83	84	85	84	80	80	77	76	77	75	84	87	86	86	86	85	84	83.5	89											
23-Feb	84	85	85	85	85	83	83	83	82	83	81	78	68	68	67	66	70	80	86	81	83	86	87	85	80.2	87											
24-Feb	84	85	85	85	85	84	83	83	82	81	80	80	74	70	70	70	74	81	82	81	82	84	84	84	80.0	85											
25-Feb	85	85	85	84	84	84	84	84	83	82	83	82	74	68	73	78	81	84	85	86	87	83	78	79	81.8	87											
26-Feb	79	79	79	80	80	79	80	80	80	78	72	69	67	68	68	64	66	71	74	78	80	80	82	81	75.4	82											
27-Feb	79	79	78	79	79	80	79	79	78	74	66	58	53	52	53	51	50	54	65	64	59	59	67	68	66.8	80											
28-Feb	71	76	80	81	81	79	79	77	75	70	62	59	55	54	53	52	54	60	64	66	65	65	67	67	67.2	81											
78.4																		79.2																		Diurnal Average	
96																		97																		Diurnal Maximum	
M - Maintenance																																					



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Firebag - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - February 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	5	0.75	0.75
40 - 60	96	14.31	15.05
60 - 80	284	42.32	57.38
80 - 100	286	42.62	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Firebag - February 2017

Maximum Speed: 32 km/h on Feb 25 23:00	Maximum Daily Speed Average: 18.9 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 6 23:00	Minimum Daily Speed Average: 1.0 km/h on Feb 18	Hours of Data: 670
Maximum Diurnal Speed Average: 5.7 km/h at hour 14	Minimum Diurnal Speed Average: 1.9 km/h at hour 20	Hours of Missing Data: 2
Monthly Average Velocity: 3.5 km/h 264.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 7 Median = 11 Q ₃ = 16 P ₉₀ = 20 P ₉₉ = 27	Percent Operational Time: 99.7

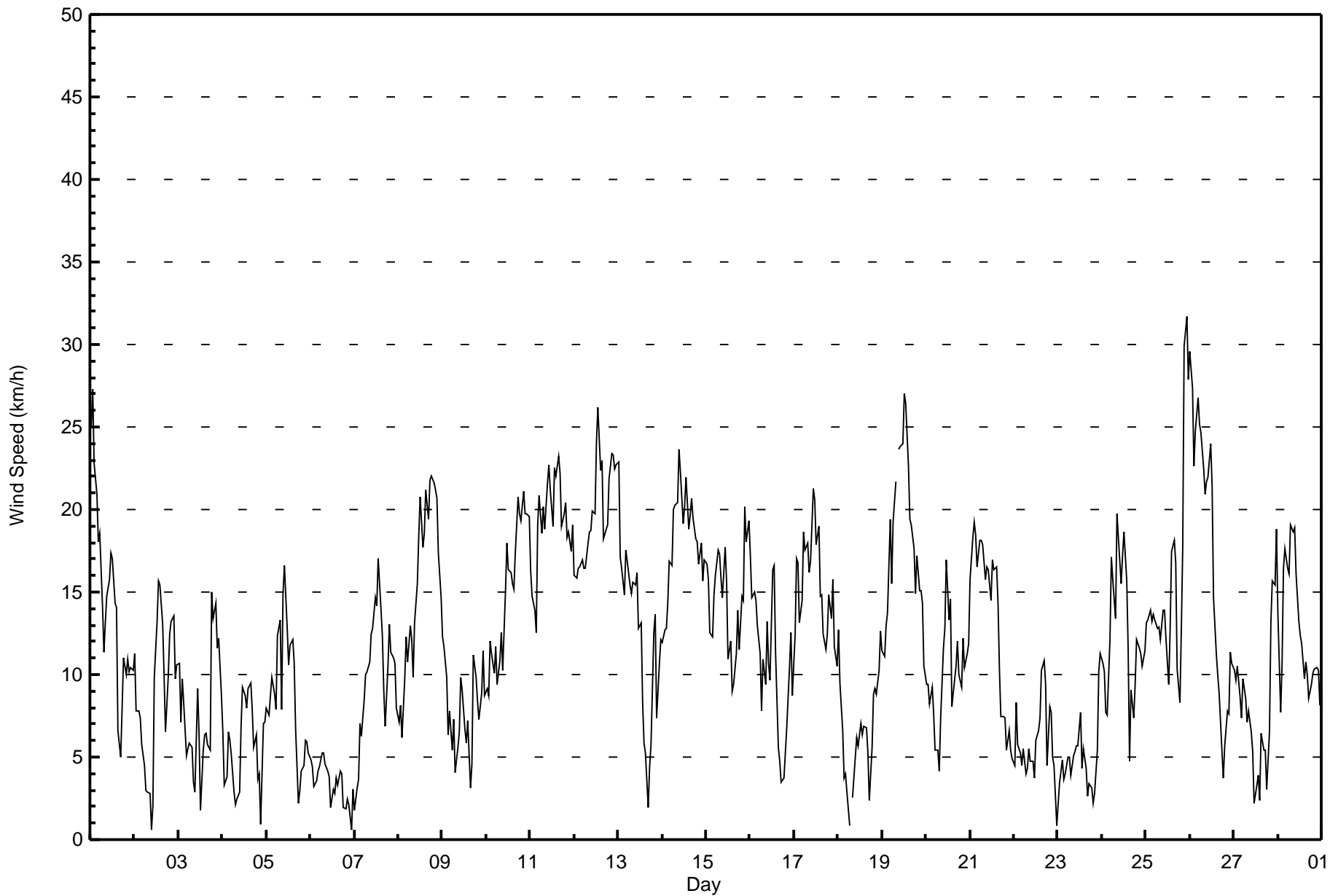
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	NNW25	NNW27	NNW23	NNW21	NNW18	NNW19	NNW14	NW11	NNW13	NNW15	NNW16	NNW17	NNW17	NNW14	NW14	WNW7	SW5	SSW8	SSW11	SW10	WSW11	W10	WSW10	WSW10	NW11.0	NNW27
2-Feb	WSW11	WSW8	WSW8	WSW7	WSW6	WSW4	SW3	WSW3	WSW3	SW1	NW2	NNW10	NNW13	NNW16	NNW15	NNW13	NNW10	NNW6	NNW10	N12	NNW13	N14	N10	N11	NW6.4	NNW16
3-Feb	N11	N7	N10	N8	N5	N6	N6	NNW6	N3	N3	NNW9	N6	NNW2	WNW5	W6	WNW6	W6	WNW5	N15	NNE13	N14	N12	NNE12	NNE9	N6.8	N15
4-Feb	NNE7	N3	NNW4	NNW6	NNW6	NNW5	NNW3	N2	SW2	SW3	W7	W9	WSW9	SW8	SW9	SW9	WSW8	SSW6	SSW6	SSE4	SSE4	E1	NNE7	NNE7	W2.4	SW9
5-Feb	NNE8	NNE8	NNE9	NNE10	N9	N8	N12	N13	N8	N15	NNW17	NNW13	NW11	NW12	NNW12	NNW11	WNW7	WNW2	SW3	SW4	WSW5	SW6	SSW6	SSW5	NNW6.4	NNW17
6-Feb	SSW5	S4	S3	S4	S4	S4	S5	S5	S5	SSW4	SSW4	SW2	WSW3	W3	NNW4	WNW3	NNW4	NNW4	NNE2	NNE2	NNE2	N2	NNW1	NW3	SSW1.3	S5
7-Feb	W2	WNW3	W4	SSW7	SW6	SW8	SW10	SW10	SW11	SW12	WSW13	WSW15	WSW14	WSW17	WSW14	WSW12	WSW9	WNW7	NNW11	NNW13	NNW11	NW11	NW11	NW8	W7.4	WSW17
8-Feb	NW7	NW8	WSW6	WSW10	WSW12	SW11	SW13	WSW12	SW10	WSW13	WSW16	WSW18	WSW21	WSW18	WSW19	SW21	SW19	SW22	WSW22	SW22	SW21	WSW21	WSW17	WSW15	WSW15.1	WSW22
9-Feb	SW12	SW12	SW10	SW6	SSW8	SW5	SSW7	SSE4	ESE6	SE7	ESE10	SE9	SE7	E6	SE7	SSE3	NE5	E11	ESE10	SE8	SE7	ESE9	ESE11	ESE9	SSE5.0	SW12
10-Feb	ESE9	ESE9	ESE12	SE11	SE10	SE12	SE9	SE11	SE13	SE10	SSE15	SSE18	SSE16	SSE16	SSE15	SSE15	SE17	SE21	SE20	SE19	SSE21	SSE20	S20	S20	SSE14.3	SSE21
11-Feb	SSW16	SW15	SW14	SW13	SW19	WSW21	WSW19	WSW20	WSW19	W22	W23	W21	WSW19	WSW23	WSW22	SW23	WSW22	WSW19	WSW20	WSW20	WSW18	WSW19	WSW17	SW19	WSW18.7	SW23
12-Feb	SSW16	SSW16	SSW16	SSW17	SSW17	SSW16	SSW16	SSW18	SW19	SW19	SW20	SW20	SW24	WSW26	WSW22	WSW23	SW18	SW19	WSW19	WSW22	WSW23	WSW23	WSW22	WSW23	SW18.9	WSW26
13-Feb	WSW23	W17	W16	W15	W18	W17	W15	NNW15	NNW16	NNW13	NNW13	NW8	WNW6	NW5	NNE2	ENE4	ESE6	SE13	SE14	SE7	SSE11	S12		W6.4	WSW23	
14-Feb	S12	S13	SSE13	SSE14	S17	S17	SSW20	SSW20	SSW20	SSW24	SSW22	SSW19	SSW20	SW22	SW19	SSW20	SSW21	SSW20	SSW18	SSW18	SSW17	SW18	SSW16	SSW17	SSW17.6	SSW24
15-Feb	SW17	SW16	SSW13	SSW12	SSW15	SSW16	SSW18	S17	S16	SSW15	SSW18	SSW16	SSW11	SW12	SW9	SW9	SW11	SW14	SW12	SW15	SW14	SW20	WSW18	WSW19	SSW14.0	SW20
16-Feb	WSW17	SW15	SSW15	SSW14	SW13	SW11	SSW8	S11	SSE9	SSE13	SSE11	SE10	SE16	SSE17	S11	SSE6	SW5	W4	W4	NNW5	NNW7	N10	N13	N9	SSW5.5	WSW17
17-Feb	N12	N17	N17	N13	NNW14	NNW19	NNW18	NNW18	NNW16	NNW17	NNW21	NNW21	NNW18	NNW19	N15	N15	NNW12	NNW12	N12	N15	N13	NNE16	N12	N11	N15.1	NNW21
18-Feb	N13	NNE10	N7	NNW4	NNE4	ENE3	NNW1	AF	S3	WSW5	W6	WNW6	W7	W6	WNW7	W7	NW5	NE2	ESE6	E9	ESE9	ESE9	ESE10	ESE13	NNE1.0	N13
19-Feb	ESE11	ESE11	ESE13	ESE14	ESE19	ESE16	ESE19	ESE22	M	ESE24	ESE24	E24	E27	ESE26	E23	ESE19	ESE19	ESE18	ESE15	SE17	SE15	SE15	SE14	SE11	ESE17.6	E27
20-Feb	ESE9	SE9	ESE8	ESE9	ESE8	SE5	S5	SW4	NW7	NW12	NW13	NNW17	NNW13	NW15	NW8	WNW9	NNW11	W12	WNW10	WNW9	WNW12	W10	W11	WSW12	WNW4.7	NNW17
21-Feb	WSW16	WSW18	WSW19	W19	W17	W18	W18	W18	W16	W17	W16	W14	W17	NNW16	W16	W14	W10	NW7	WNW7	NW7	NW5	NW7	NW5	W5	W12.9	WSW19
22-Feb	NW5	NNE8	NE6	NE5	NE4	ENE6	ENE4	ENE4	NNE5	NNE5	NE5	NNW4	N6	NNW7	NNW7	NNW10	NNW11	N9	N5	NNE8	NNE8	NNE5	NNE5	NW1	NNE5.2	NNW11
23-Feb	N2	NW3	W5	WSW4	SSW4	S5	SSW5	SSW4	SSW5	SW5	WSW6	WNW6	SW8	SW4	WSW6	WSW4	NNW3	N3	NE3	E2	N3	NNE5	NNE10	NNE11	W1.6	NNE11
24-Feb	N11	NNW10	NNW8	N8	NNW12	NNW17	NNW16	NNW13	NNW20	NNW18	NNW16	NNW17	NNW19	NNW16	NW12	WNW5	WSW9	SW7	SSW9	SSW12	SW12	SW11	SW10	SW11	NW8.0	NNW20
25-Feb	SW13	SW13	SSW13	SSW14	SSW13	SSW13	SSW13	SSW12	SW14	SW14	WSW12	W9	NW13	NNW17	NNW18	NW17	NNW10	NNW8	N13	NNW18	NNW30	NNW32	NNW28		WNW7.8	NNW32
26-Feb	NNW30	N27	NNW23	NNW25	NNW27	NNW25	NNW25	NNW21	NNW22	NNW22	NNW24	NNW21	NW15	NW11	NW10	NNW9	NNW5	NE4	ENE6	E8	ESE8	SE11	SE11		NNW14.0	NNW30
27-Feb	SE10	ESE10	ESE11	ESE9	E7	ESE10	ESE9	E7	E8	ENE7	E5	SSE2	SSE3	SE4	SSW2	W6	WSW5	WSW5	WSW3	SSW7	S13	S16	S15	S19	SSE5.1	S19
28-Feb	SSW14	SW8	NNW11	N16	N18	N16	N16	N19	N19	N19	NNW16	NNW13	NNW12	N12	N10	N11	N10	NNE9	NE9	ENE10	ENE10	ENE10	ENE10	E8	N9.5	N19
W3.6 W3.1 W2.7 W2.3WSW3.0 W3.0WSW3.3WSW3.6 W3.9 W3.6 W4.7WNW5.4 W5.5 W5.7 W5.6 W5.2 W4.7WSW3.1 SW2.3 SW1.9 SW2.5WSW2.6WSW2.2 SW3.2																										
NNW30 N27 NNW23 NNW25 NNW27 NNW25 NNW25 NNW22 NNW21 NNW22 NNW24 NNW21 NNW15 NNW11 NNW10 NNW9 NNW5 NE4 ENE6 E8 ESE8 SE11 SE11																										
Diurnal Average																										
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
Firebag - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	122	18.21	18.21
6 - 11	220	32.84	51.04
12 - 19	251	37.46	88.51
20 - 28	74	11.04	99.55
29 - 38	3	0.45	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - February 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	10	7	4	3	0	2	6	11	9	13	11	7	6	9	14	122
6 - 11	23	15	2	7	8	25	18	4	2	12	23	17	14	13	15	22	220
12 - 19	28	3	0	0	0	11	11	11	10	34	30	31	19	4	10	49	251
20 - 28	1	0	0	0	3	4	2	2	2	9	9	20	3	0	0	19	74
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	62	28	9	11	14	40	33	23	25	64	75	79	43	23	34	107	670

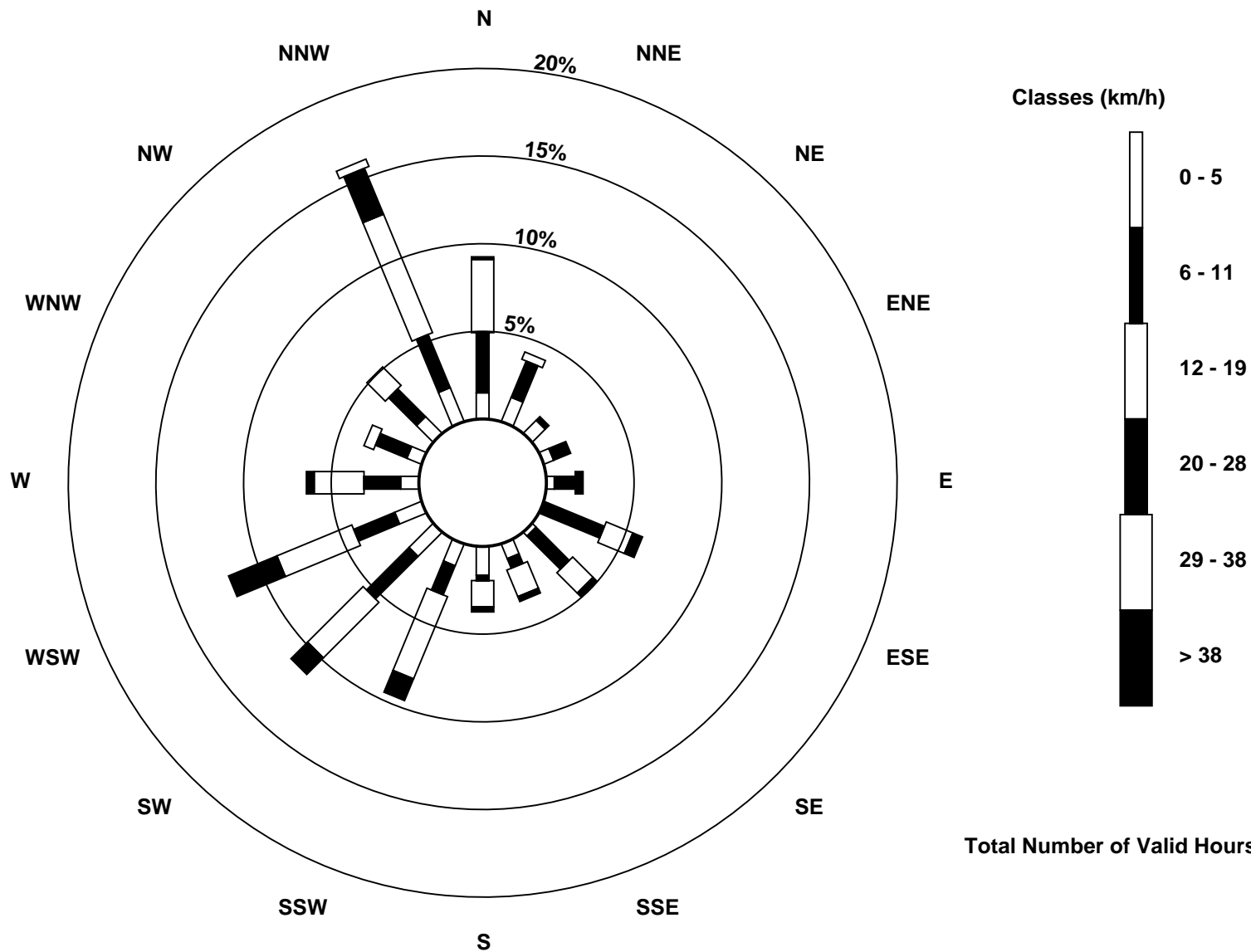
Total Number of Valid Hours: 670

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Firebag (AMS 19)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 25 22:00	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 0 km/h on Feb 23 08:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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-Feb	5	6	5	5	4	3	3	2	2	2	3	3	3	3	3	2	1	1	2	1	1	1	1	1	6		
2-Feb	2	1	1	1	1	1	1	1	0	1	1	5	3	4	3	3	3	1	2	3	3	3	2	2	5		
3-Feb	2	2	2	3	1	1	1	1	1	1	3	1	1	1	2	2	1	2	3	3	3	3	3	2	3		
4-Feb	1	1	1	1	1	1	1	0	1	1	2	2	2	2	2	1	1	1	1	1	1	2	1	1	2		
5-Feb	1	1	1	1	1	2	3	3	2	4	4	2	2	2	2	3	1	1	1	1	1	1	1	1	4		
6-Feb	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
7-Feb	1	1	0	1	1	1	1	1	1	2	2	2	2	3	2	2	2	1	2	3	2	3	2	1	3		
8-Feb	1	3	1	1	1	1	2	2	1	2	3	3	4	3	3	4	3	3	3	3	3	3	2	2	4		
9-Feb	2	1	2	2	2	3	3	1	2	2	2	1	2	2	1	2	3	3	3	2	2	2	2	2	3		
10-Feb	1	1	2	2	1	1	2	2	2	3	3	2	3	3	2	3	4	4	3	3	3	3	3	3	4		
11-Feb	3	2	3	2	3	4	3	3	3	5	5	5	3	4	4	4	4	3	3	3	3	3	2	2	5		
12-Feb	2	2	2	2	2	3	2	2	2	3	3	3	5	6	4	4	4	3	3	3	4	5	4	4	6		
13-Feb	4	3	3	2	3	3	3	3	3	3	3	3	2	2	2	2	1	2	2	3	2	4	3	1	4		
14-Feb	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	2	2	2	2	3	2	2	3		
15-Feb	2	2	2	1	2	2	2	2	2	2	2	2	3	2	2	1	2	2	2	3	2	3	3	3	3		
16-Feb	3	2	3	2	2	1	4	2	1	3	4	2	5	4	3	3	1	1	2	2	2	2	2	1	5		
17-Feb	2	4	3	3	3	4	4	3	3	4	4	4	3	4	3	3	3	2	3	3	2	3	3	3	4		
18-Feb	2	3	2	1	1	1	2	AF	1	1	1	1	2	2	2	2	1	2	1	2	2	2	2	2	3		
19-Feb	2	2	2	3	4	3	4	4	M	4	4	4	5	5	5	3	4	3	3	3	3	3	3	2	5		
20-Feb	2	2	1	2	1	2	1	1	3	2	2	4	3	3	2	2	2	2	2	2	3	2	2	3	4		
21-Feb	3	4	4	4	3	4	4	4	3	3	3	3	4	3	4	4	3	2	1	1	1	1	1	1	4		
22-Feb	2	2	1	1	2	0	1	1	1	1	2	2	2	2	2	2	3	1	2	1	1	1	1	1	3		
23-Feb	1	1	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2	1	1	2	3	2	2	2	3		
24-Feb	2	2	1	2	3	3	4	3	4	4	3	4	4	4	3	3	2	1	1	1	2	1	1	1	4		
25-Feb	1	2	2	2	2	2	1	1	1	2	2	3	2	3	4	4	4	2	2	3	4	9	6	6	9		
26-Feb	6	7	5	6	5	5	4	5	4	5	5	5	5	3	2	3	2	1	1	2	1	1	2	2	7		
27-Feb	1	1	2	2	1	3	2	1	1	1	2	2	1	1	2	2	2	1	2	2	3	3	2	2	3		
28-Feb	2	3	3	3	3	3	4	4	4	4	3	4	4	3	3	3	2	3	2	1	2	2	2	1	4		
	6	7	5	6	5	5	4	5	4	5	5	5	5	6	5	4	4	4	4	3	3	4	9	6	6		
Diurnal Maximum																											

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - February 2017

Direction of Maximum Speed: 345 deg on Feb 25 23:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 230.3 deg on Feb 12	Hours of Data: 670
Direction of Minimum Speed: 327 deg on Feb 6 23:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.0 deg on Feb 18	Percent Operational Time: 99.7
Monthly Average Direction: 281.9 deg	

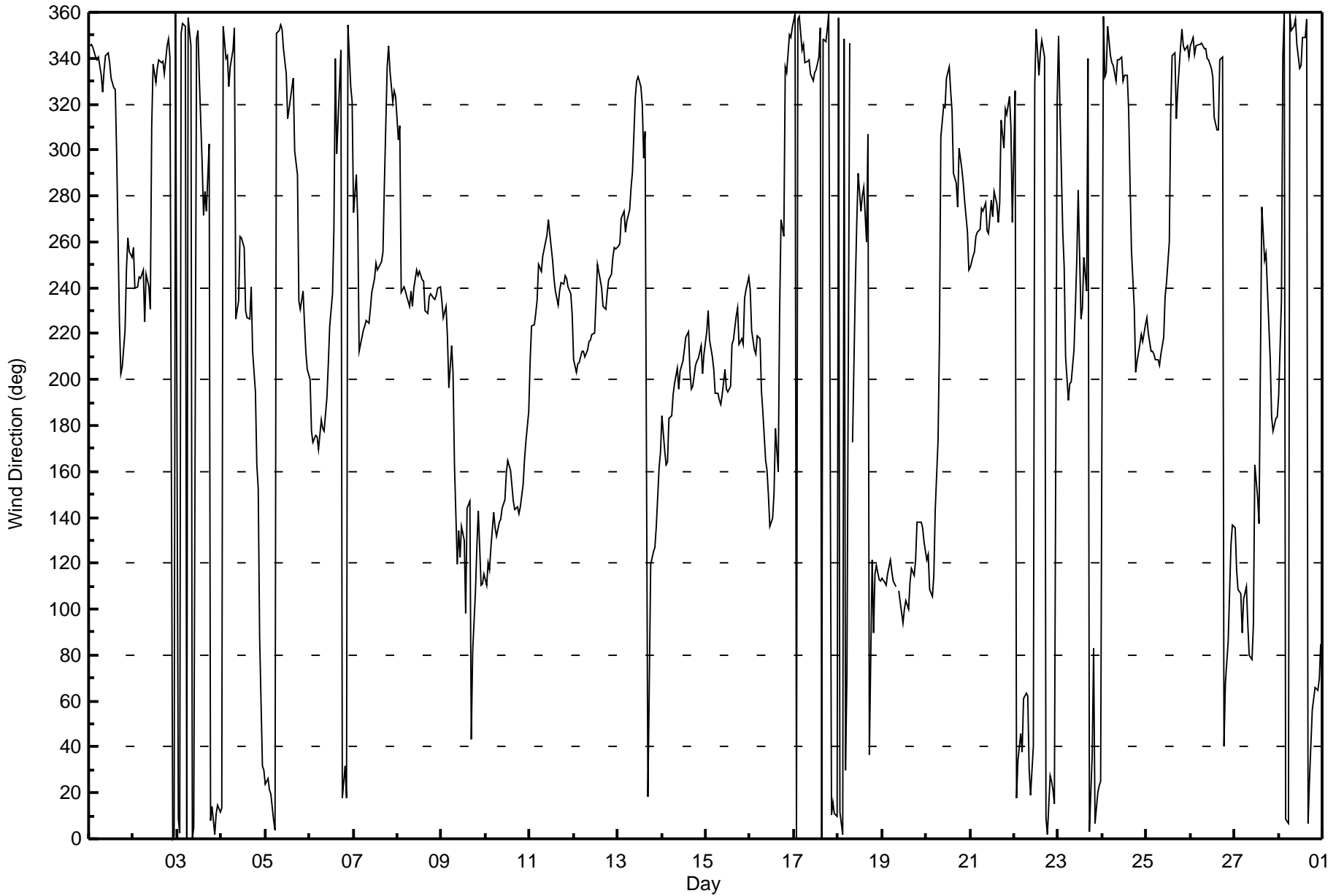
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	345	346	345	341	339	341	333	325	335	341	342	338	332	327	326	298	224	203	206	222	248	262	256	254	322.3
2-Feb	257	240	240	245	244	248	225	246	241	231	310	337	329	335	339	338	338	333	345	349	341	0	1	360	323.0
3-Feb	8	2	351	355	354	0	358	345	0	5	348	352	331	294	272	282	273	302	8	14	2	11	15	12	352.5
4-Feb	13	354	340	341	328	336	343	353	226	235	263	261	258	230	227	226	241	213	194	163	153	88	32	30	269.2
5-Feb	24	26	21	19	8	4	351	352	355	353	344	333	314	318	327	331	300	289	234	231	239	225	212	205	338.4
6-Feb	200	177	173	176	175	170	182	179	178	192	207	223	237	266	340	299	328	344	18	32	18	355	327	321	211.8
7-Feb	272	289	269	212	216	222	223	226	224	231	238	244	251	247	250	251	255	285	336	345	334	321	326	323	262.4
8-Feb	304	311	238	241	239	236	232	239	232	240	248	245	247	244	243	230	229	236	237	235	235	237	240	240	240.5
9-Feb	235	227	232	219	196	215	202	163	120	134	123	136	130	98	144	147	44	82	108	128	143	111	111	115	147.2
10-Feb	111	120	117	127	142	135	132	138	139	144	148	159	165	161	154	147	143	144	141	144	155	165	173	186	148.9
11-Feb	208	224	224	229	235	250	247	254	257	263	270	264	252	244	239	233	239	242	242	245	244	240	237	228	243.1
12-Feb	209	203	207	208	212	212	210	213	217	217	220	220	235	250	243	240	232	231	238	243	246	253	258	257	230.3
13-Feb	258	259	270	273	264	269	274	283	290	323	330	332	328	320	296	308	18	67	119	125	127	136	162	169	277.6
14-Feb	184	169	163	164	183	184	193	198	205	196	204	208	213	219	221	204	196	197	206	208	209	215	203	211	199.8
15-Feb	221	230	217	210	205	194	194	191	189	194	204	196	194	197	215	217	228	231	215	218	215	236	239	244	212.8
16-Feb	239	222	213	211	219	218	195	186	165	161	150	136	140	151	179	160	231	269	262	336	334	350	349	353	197.6
17-Feb	359	1	357	358	343	346	338	339	339	333	330	333	335	340	353	0	348	347	353	360	10	16	11	10	349.2
18-Feb	357	12	2	348	30	71	347	AF	173	241	268	290	273	280	283	260	307	36	121	90	115	119	113	112	27.3
19-Feb	113	112	111	116	121	117	113	110	M	108	103	94	100	104	100	112	118	114	122	138	138	138	136	129	113.7
20-Feb	121	124	109	105	115	143	173	216	306	319	319	331	336	326	317	290	285	275	301	292	286	278	264	248	296.8
21-Feb	249	254	255	263	264	265	274	273	277	265	263	278	271	282	277	268	277	313	301	318	316	323	310	269	272.8
22-Feb	326	18	34	45	38	61	63	62	30	19	40	328	352	332	343	348	341	9	2	27	25	21	15	322	12.2
23-Feb	350	318	264	249	210	191	198	199	213	232	253	283	226	231	253	238	340	3	37	83	7	20	23	25	273.6
24-Feb	358	332	334	354	341	338	337	330	339	339	341	330	332	332	317	285	256	231	203	208	216	220	217	224	313.3
25-Feb	227	220	213	212	211	209	209	206	211	218	236	242	260	316	341	342	314	327	344	353	346	344	345	340	289.4
26-Feb	345	349	342	346	346	346	347	344	344	340	340	335	332	314	309	309	339	340	40	68	86	107	128	137	345.4
27-Feb	136	117	108	107	90	104	110	94	80	78	94	163	149	137	207	275	252	255	239	209	184	178	183	184	148.1
28-Feb	193	234	341	360	9	6	360	352	354	357	346	336	337	349	349	357	7	26	56	61	66	65	70	85	6.4
266.7 274.3 270.8 268.1 256.8 262.4 255.4 257.6 269.8 272.3 280.6 284.9 276.7 276.9 275.2 265.2 261.7 249.3 234.5 230.3 235.1 255.8 248.7 236.0																									
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
Firebag - February 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Firebag - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 78 deg on Feb 23 17:00	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 5 deg on Feb 23 09:00	
Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 9 Median = 11 Q ₃ = 14 P ₉₀ = 22 P ₉₉ = 65	

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-Feb	12	12	12	10	10	10	10	11	8	9	9	10	10	12	11	21	31	6	6	8	11	5	6	8	31
2-Feb	13	7	6	5	8	8	10	19	16	53	20	17	11	12	12	11	12	11	11	11	11	12	12	12	53
3-Feb	13	12	11	12	13	10	12	12	15	18	12	12	65	22	19	20	15	21	13	12	12	11	15	11	65
4-Feb	23	16	10	5	5	17	16	13	21	20	13	13	15	19	22	16	5	10	7	16	14	71	6	6	71
5-Feb	8	10	7	7	11	11	11	12	12	12	11	12	20	15	12	15	12	35	14	19	9	5	6	9	35
6-Feb	9	8	6	6	8	5	6	5	7	12	15	55	45	43	35	35	27	11	15	11	9	13	20	9	55
7-Feb	29	10	23	9	7	7	7	7	8	9	10	8	9	10	10	9	8	22	12	10	13	12	9	8	29
8-Feb	13	27	11	6	7	10	8	7	10	8	8	9	8	8	9	9	8	7	7	8	8	7	7	7	27
9-Feb	5	6	7	15	9	12	8	30	18	22	19	18	22	32	25	76	55	13	14	14	14	15	8	11	76
10-Feb	8	9	8	13	7	8	9	9	11	11	10	8	9	9	10	11	10	10	10	10	10	9	7	8	13
11-Feb	13	9	11	9	13	9	8	9	10	10	11	11	12	9	9	9	10	8	7	7	8	7	6	8	13
12-Feb	9	9	7	8	8	7	7	7	7	8	8	9	11	10	9	8	11	8	8	7	9	10	10	9	11
13-Feb	9	10	10	9	9	10	11	10	10	13	12	11	13	20	31	21	14	19	25	7	7	27	14	6	31
14-Feb	9	6	6	10	6	5	5	6	7	6	8	9	9	9	10	7	6	7	7	8	8	8	7	9	10
15-Feb	8	7	8	8	7	5	5	6	6	9	7	6	8	8	9	7	8	8	15	8	8	9	7	8	15
16-Feb	8	8	7	8	7	9	50	13	10	8	11	12	14	14	10	21	20	22	44	16	11	11	12	16	50
17-Feb	16	15	14	14	12	12	10	10	10	10	10	10	12	11	13	13	15	18	14	12	10	11	11	11	18
18-Feb	12	11	15	21	29	27	66	AF	25	23	25	22	18	30	24	17	25	56	28	15	11	13	11	10	66
19-Feb	9	9	9	11	11	13	12	9	M	9	10	10	10	9	10	10	10	10	11	10	11	10	10	11	13
20-Feb	12	11	14	13	14	18	12	24	20	10	12	11	13	12	20	13	12	10	17	19	13	11	11	10	24
21-Feb	10	10	10	11	10	10	10	11	11	10	11	16	14	14	15	14	12	17	11	9	7	10	13	13	17
22-Feb	36	11	24	24	11	5	10	9	12	17	24	56	18	23	20	13	13	8	18	7	9	10	6	34	56
23-Feb	12	22	20	33	9	10	8	8	5	15	20	21	22	33	28	44	78	25	37	69	50	18	9	14	78
24-Feb	12	12	10	11	10	11	10	11	11	11	12	15	14	18	16	44	15	9	6	6	7	6	6	7	44
25-Feb	6	8	7	7	7	6	7	7	8	9	10	11	25	21	15	17	15	13	15	12	11	12	12	12	25
26-Feb	12	12	12	11	11	10	11	10	11	12	12	11	14	16	15	18	11	11	27	11	11	11	10	10	27
27-Feb	9	10	10	14	10	15	10	15	10	14	38	51	23	29	72	31	21	15	41	12	7	8	6	5	72
28-Feb	7	43	11	13	11	13	13	12	13	13	15	17	19	23	18	22	18	8	11	6	9	9	10	13	43
	36	43	24	33	29	27	66	30	25	53	38	56	65	43	72	76	78	56	44	69	50	71	20	34	

Diurnal Maximum

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 18, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	14:59
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	-606
Analyzer IP address	192.168.1.43		Lamp voltage	809	808
Calculated slope	0.998444	0.998546	Chamber temp	44.9	45.1
Calculated intercept	-1.499750	-0.981910	Pressure	693.5	678.0
Analyzer Background	8.7	8.4	Flow	0.453	0.445
Analyzer Coefficient	0.994	0.973	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	-0.3	----
as found span	5000	59.8	586.0	598.0	0.980
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	59.8	586.0	587.4	0.998
second point	5000	30.0	294.0	295.6	0.995
third point	5000	15.1	148.0	150.8	0.981
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	59.8	586.0	579.0	1.012
Average Correction Factor					0.991

Corrected As found 598.3 Previous response 588.5 % change -1.6%

Notes:

Inlet filter changed after as founds. Noticed a fitting on the calibration line was not overly tight. Tightened it but there was no change in the values given. Adjusted the span.

Calibration Performed By: Jayne Marcoux



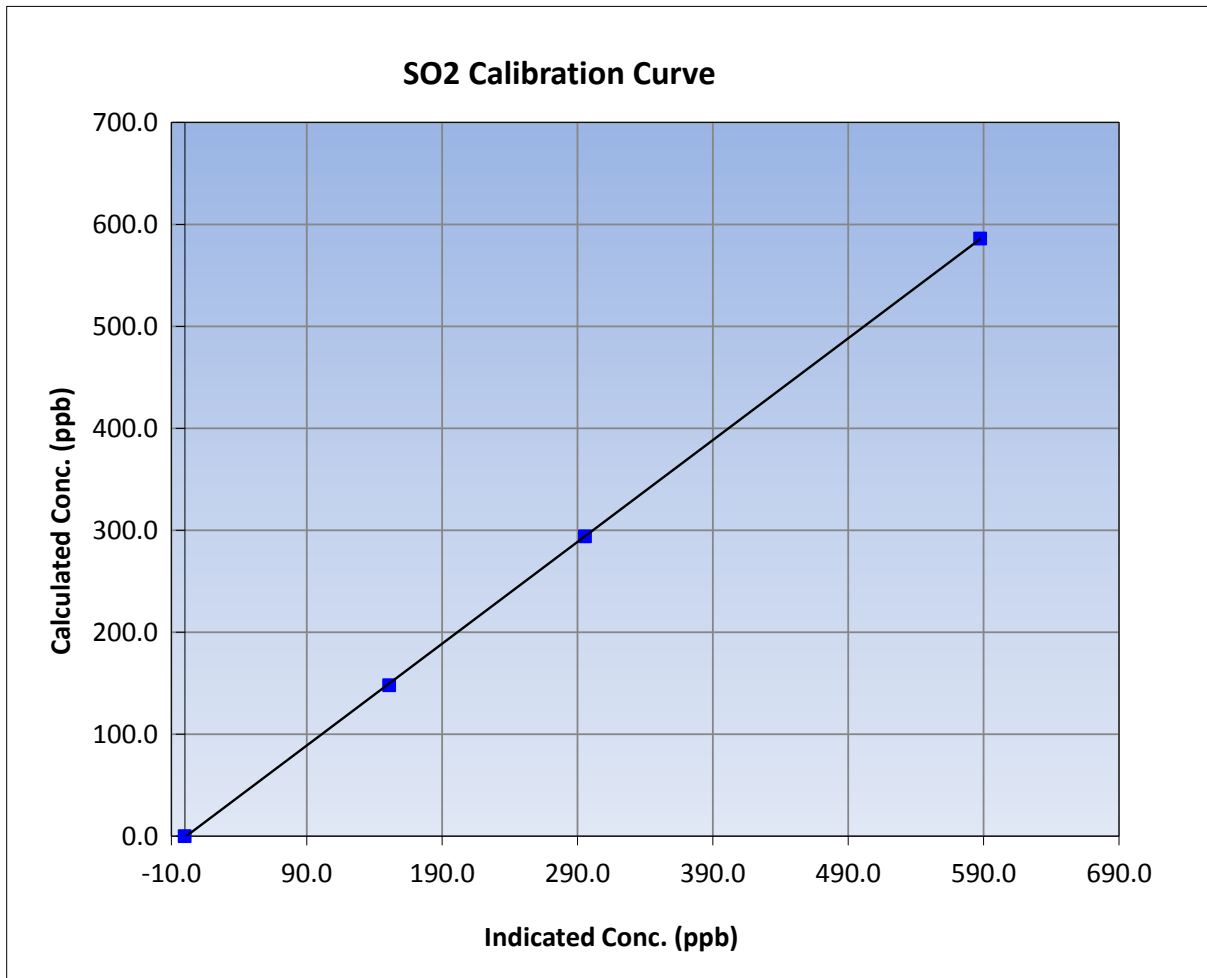
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 18, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	14:59
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

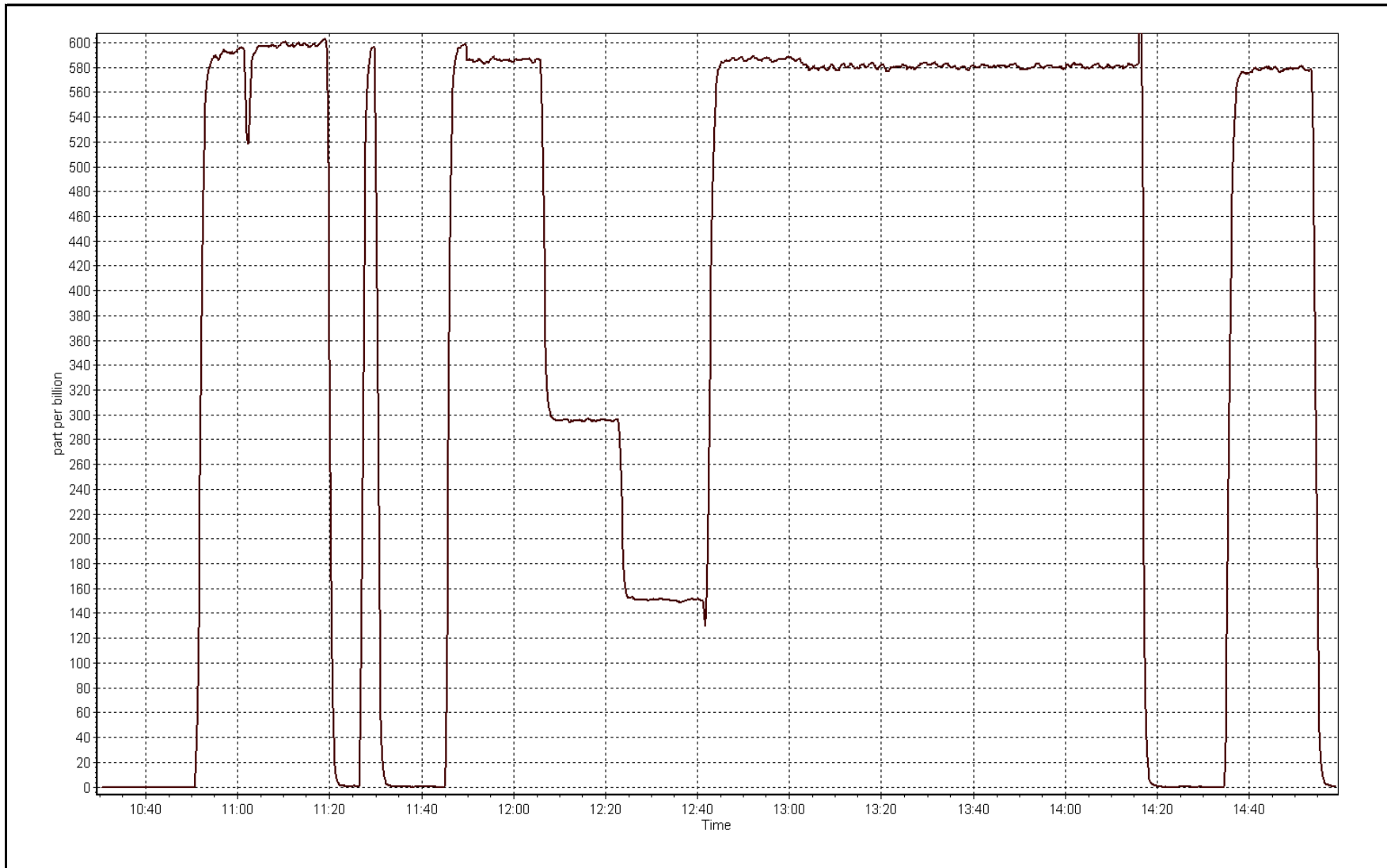
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999976
586.0	587.4	0.9977		
294.0	295.6	0.9947	Slope	0.998546
148.0	150.8	0.9814		
			Intercept	-0.981910



SO2 Calibration Plot

Date: February 14, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 17, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:17	End Time (MST)	13:18
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 ppm	SO2 gas cert/exp	EY0000652 February-14-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-573	-574
Analyzer IP address	192.168.1.45		Lamp voltage	933	932
Calculated slope	0.996984	1.004780	Chamber temp	45	45
Calculated intercept	-0.304440	-0.402816	Pressure	524.4	522.6
Analyzer Background	13.7	13.7	Flow	0.929	0.923
Analyzer Coefficient	1.159	1.157	Intensity	85	86
			Converter temp.	337	337

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	0.1	----
as found span	5000	75.6	80.1	79.6	1.007
SO2 scrubber check	5000	15.1	148.0	1.3	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	75.6	80.1	80.0	1.002
second point	5000	37.8	40.1	40.5	0.988
third point	5000	19.0	20.1	20.7	0.973
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	75.6	80.1	79.6	1.007
Average Correction Factor					0.988

Corrected As found	79.5	Previous response	80.7	% change	1.5%
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Notes:

Changed inlet filter after as founds. Slightly adjusted the span.

Calibration Performed By: Jayme Marcoux



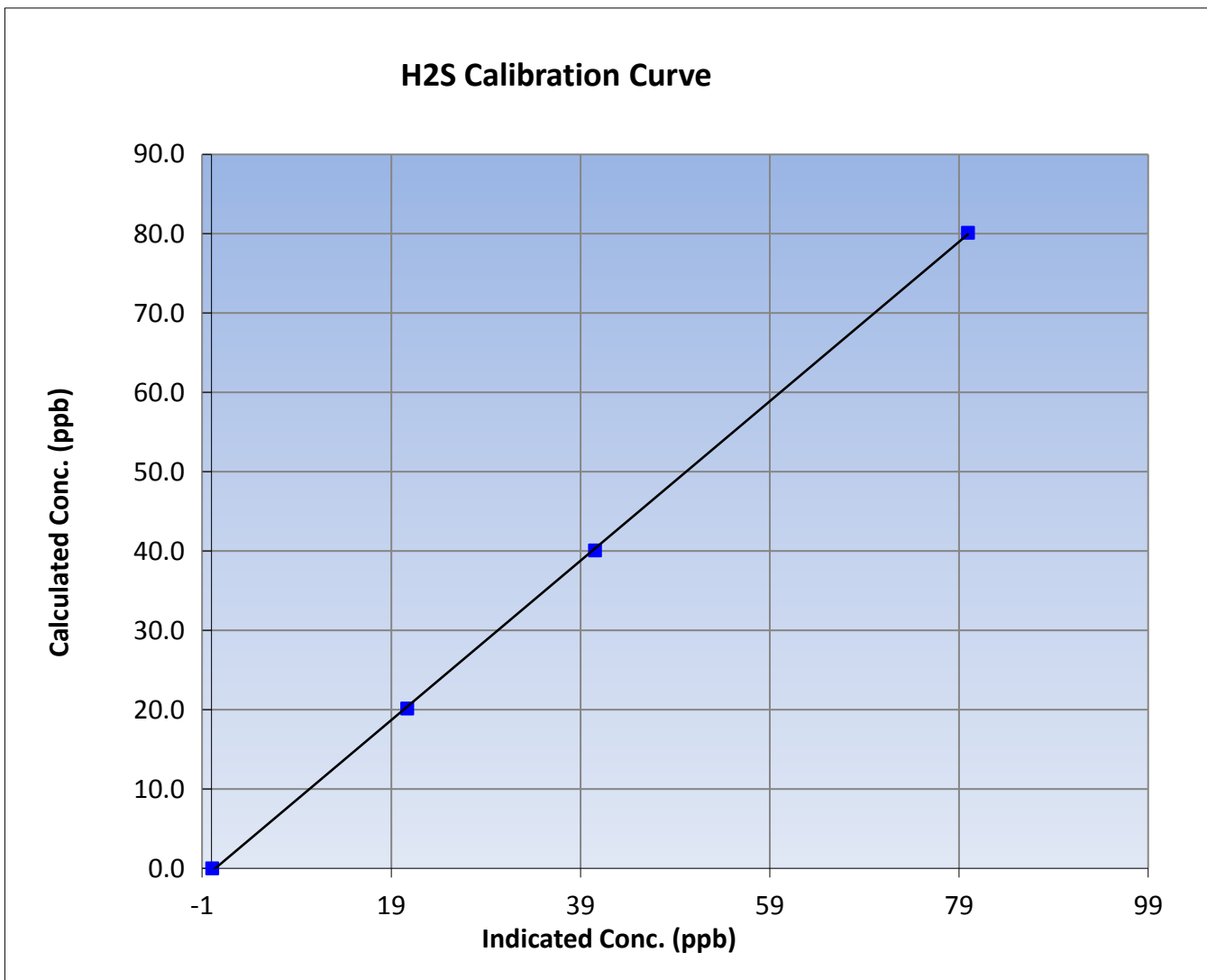
Wood Buffalo Environmental Association H2S Calibration Report

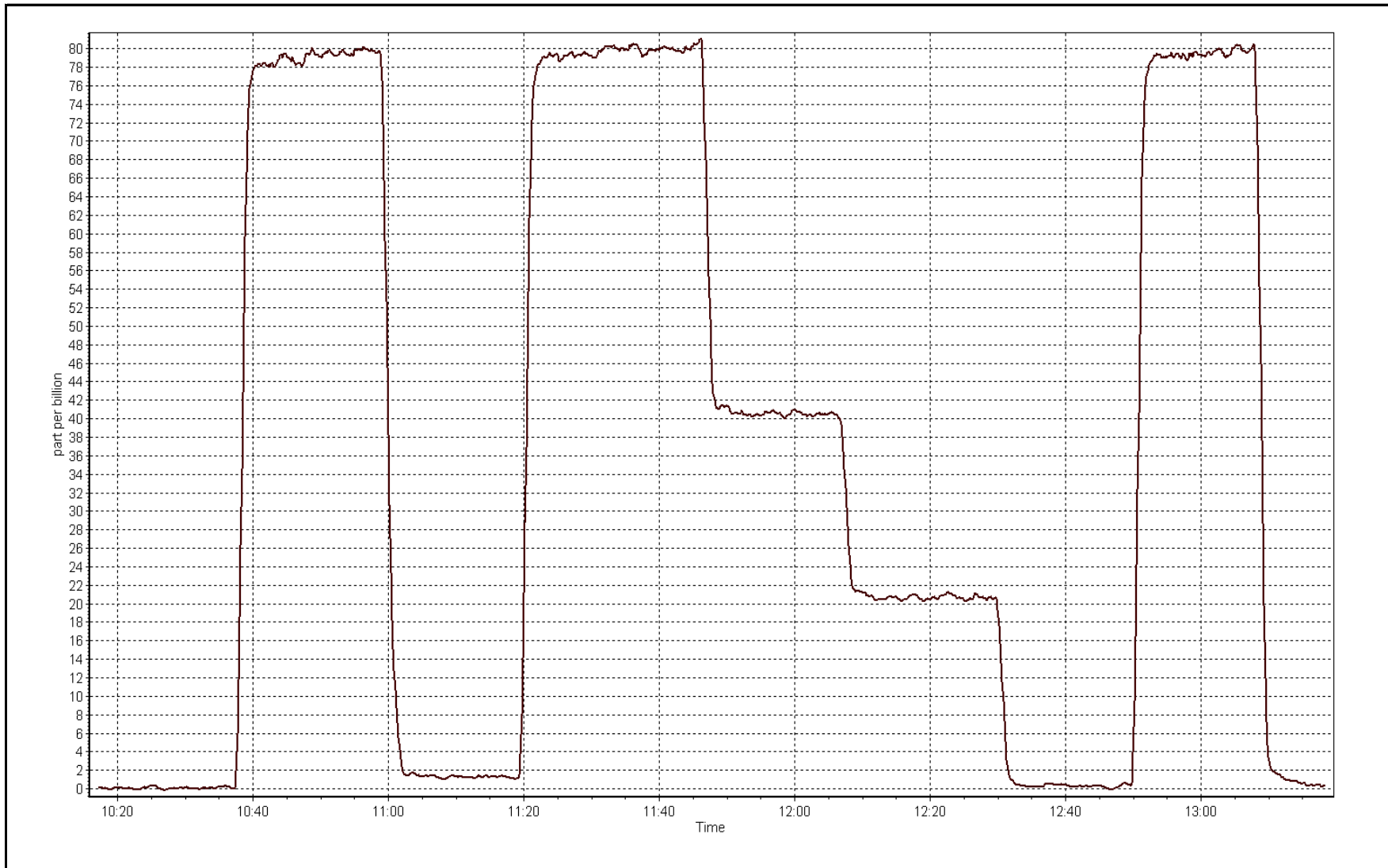
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 17, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:17	End Time (MST)	13:18
Analyzer make	Thermo 450i	Analyzer serial #	815129098

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999924
80.1	80.0	1.0022		
40.1	40.5	0.9884	Slope	1.004780
20.1	20.7	0.9734		
			Intercept	-0.402816







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 18, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:56
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

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	0.998873	0.997099	Fuel Pressure	23.0	23.0
Calculated intercept	0.005337	-0.039658	Analyzer Coeff	3.532	3.723
			Analyzer BKG	4.95	5.22

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	-0.04	----
as found span	5000	59.8	12.65	11.92	1.061
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	59.8	12.65	12.68	0.997
second point	5000	30.0	6.35	6.45	0.984
third point	5000	15.1	3.19	3.32	0.962
as left zero	5000	0.0	0.00	0.09	----
as left span	5000	59.8	12.65	12.74	0.993
Average Correction Factor					0.981

Corrected As found 11.96 Previous response 12.66 % change 5.8%

Notes:

Inlet filter changed after as founds. Span was low. Noticed a fitting on the calibration line was not overly tight. Tightened it but there was no change in the span value. Adjusted the span.

Calibration Performed By:

Jayne Marcoux



Wood Buffalo Environmental Association THC Calibration Report

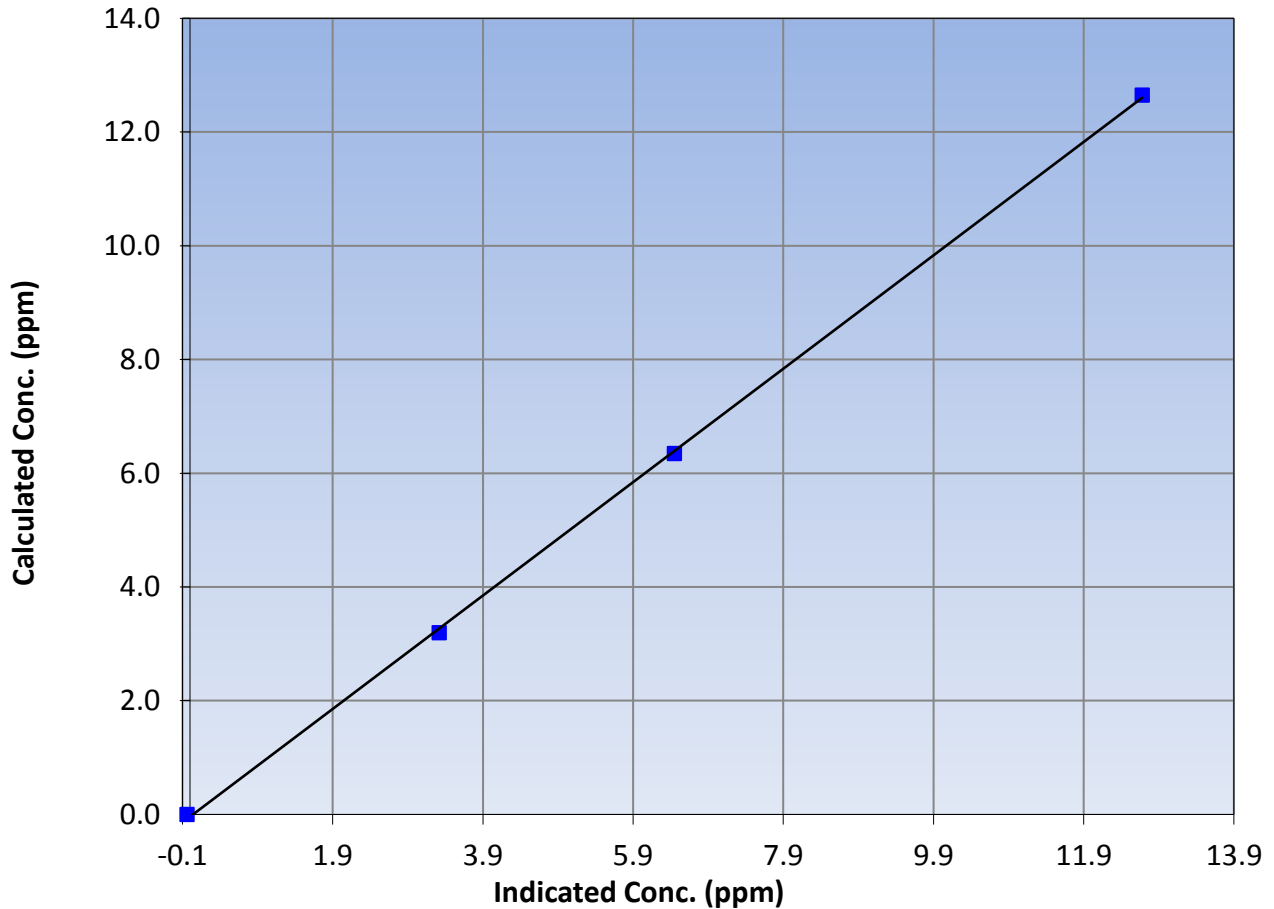
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 18, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	14:56
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

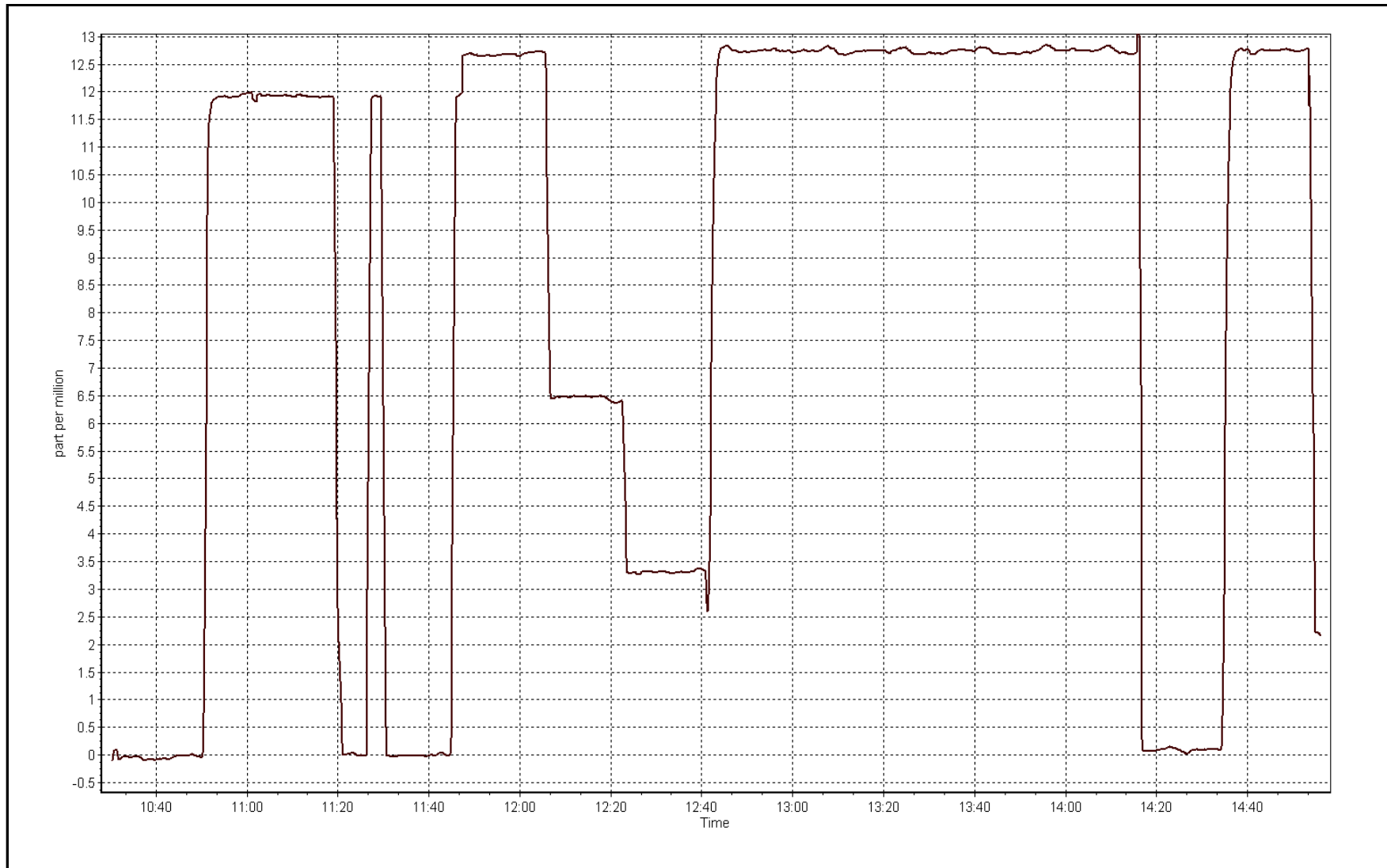
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	0.999812
12.65	12.68	0.9975		
6.35	6.45	0.9837	Slope	0.997099
3.19	3.32	0.9619		
			Intercept	-0.039658

THC Calibration Curve



THC Calibration Plot

Date: February 14, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 18, 2017
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:30	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	1.003446	1.004006	0.988380
	Data Offset	-1.392416	-1.397119	-0.070345
Current Calibration	Data Slope	1.001447	1.000470	0.996683
	Data Offset	-1.513527	-1.370273	-0.255995

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.912		0.933	
NOx coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgnd	4.0		4.1	
NOx bkgnd	4.1		4.1	
Chamber Temp	50.77	Deg C	50.6	Deg C
Moly Temp	326.8	Deg C	325.3	Deg C
PMT voltage	-780.3	V	-780.3	V
PMT Temp	-2.6	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	159.9	mmHg	159.9	mmHg
R Cell Press Nox	160.2	mmHg	159.3	mmHg
NO sample flow	0.657	lpm	0.627	lpm
Nox sample Flow	0.658	lpm	0.629	lpm

Notes:

Inlet filter changed after as founds. Noticed a fitting on the calibration line was not overly tight. Tightened it but there was no change in the values given. Adjusted the span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 14, 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	0.1	----	----
as found span	5000	59.8	600.4	600.4	0.0	597.9	597.7	0.2	1.0041	1.0045
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	----	----
high point	5000	59.8	600.4	600.4	0.0	600.2	600.7	-0.5	1.0003	0.9994
second point	5000	30.0	301.2	301.2	0.0	303.0	303.1	-0.1	0.9940	0.9937
third point	5000	15.1	151.6	151.6	0.0	154.5	154.5	0.1	0.9812	0.9815
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.0	----	----
as left span	5000	59.8	600.4	290.0	310.4	596.9	283.9	313.0	1.0059	1.0215
Average Correction Factor									0.9918	0.9916

Corrced As found NO_x= 598.0 NO= 597.9 Percent Change NO_x= 0.3% NO= 0.3%
 Previous Response NO_x= 599.7 NO= 599.4

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	600.8	599.9	0.1	0.9994	1.0008	----	----
1st NO2 (300)	290.0	309.9	601.1	290.0	311.2	0.9988	----	0.9960	100.4%
2nd NO2 (200)	390.9	209.0	600.9	390.9	209.8	0.9992	----	0.9959	100.4%
3rd NO2 (100)	493.1	106.9	600.9	493.1	107.8	0.9992	----	0.9909	100.9%
2nd NO ref point	----	0.0	601.2	600.2	1.0	0.9987	1.0003	----	----
Average Correction Factor						0.9990		0.9943	100.6%

Calibration Performed By: Jayne Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

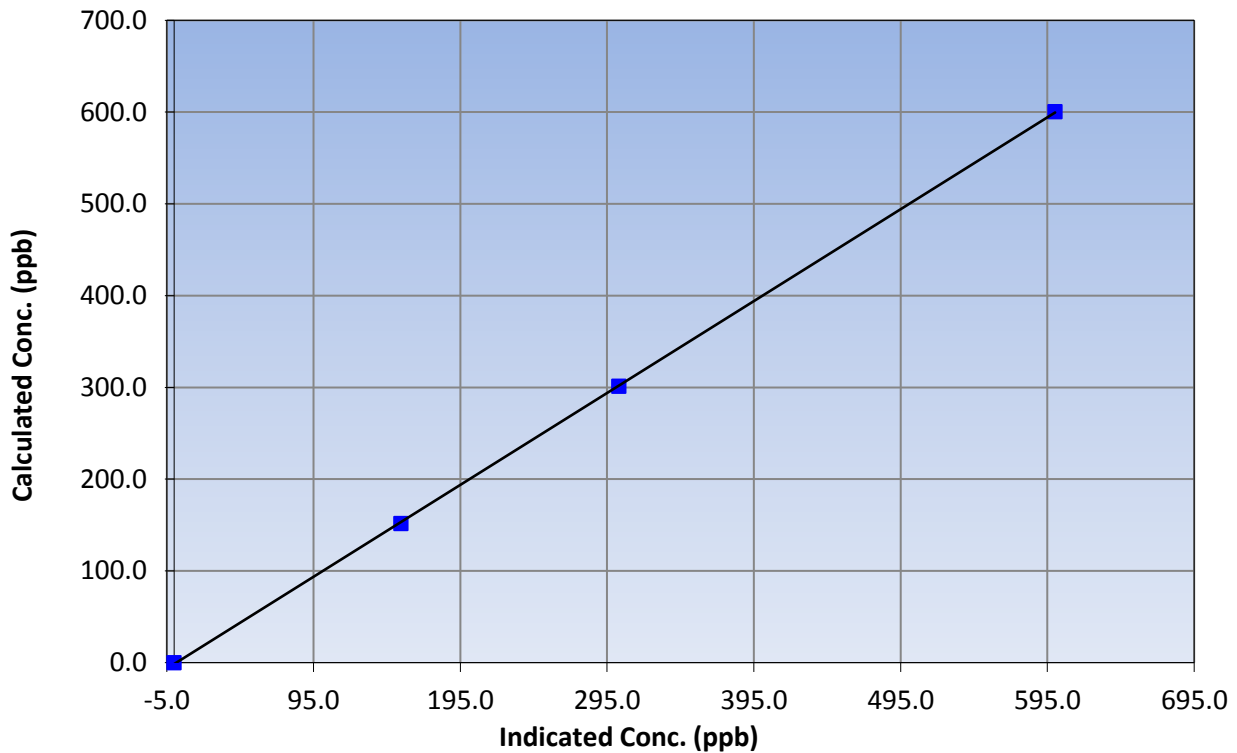
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 18, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	14:56
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999968
600.4	600.2	1.0003		
301.2	303.0	0.9940	Slope	1.001447
151.6	154.5	0.9812		
			Intercept	-1.513527

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

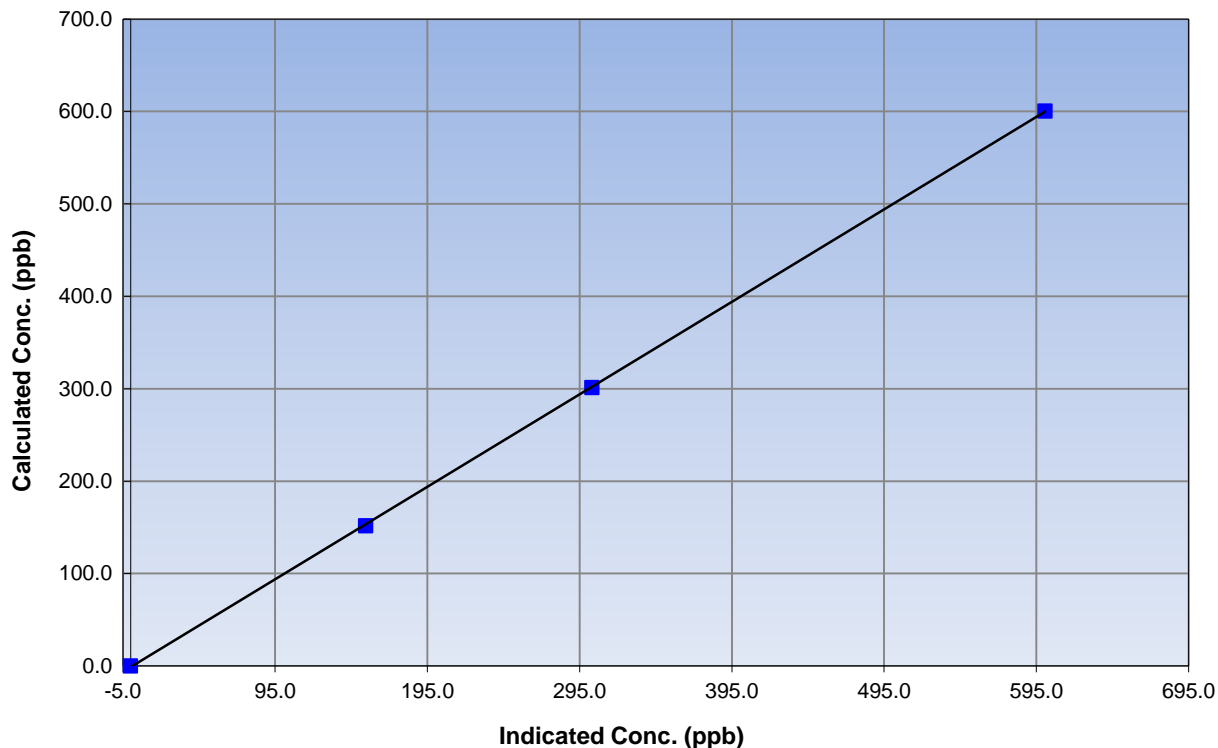
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 18, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	14:56
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999971
600.4	600.7	0.9994		
301.2	303.1	0.9937	Slope	1.000470
151.6	154.5	0.9815		
			Intercept	-1.370273

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

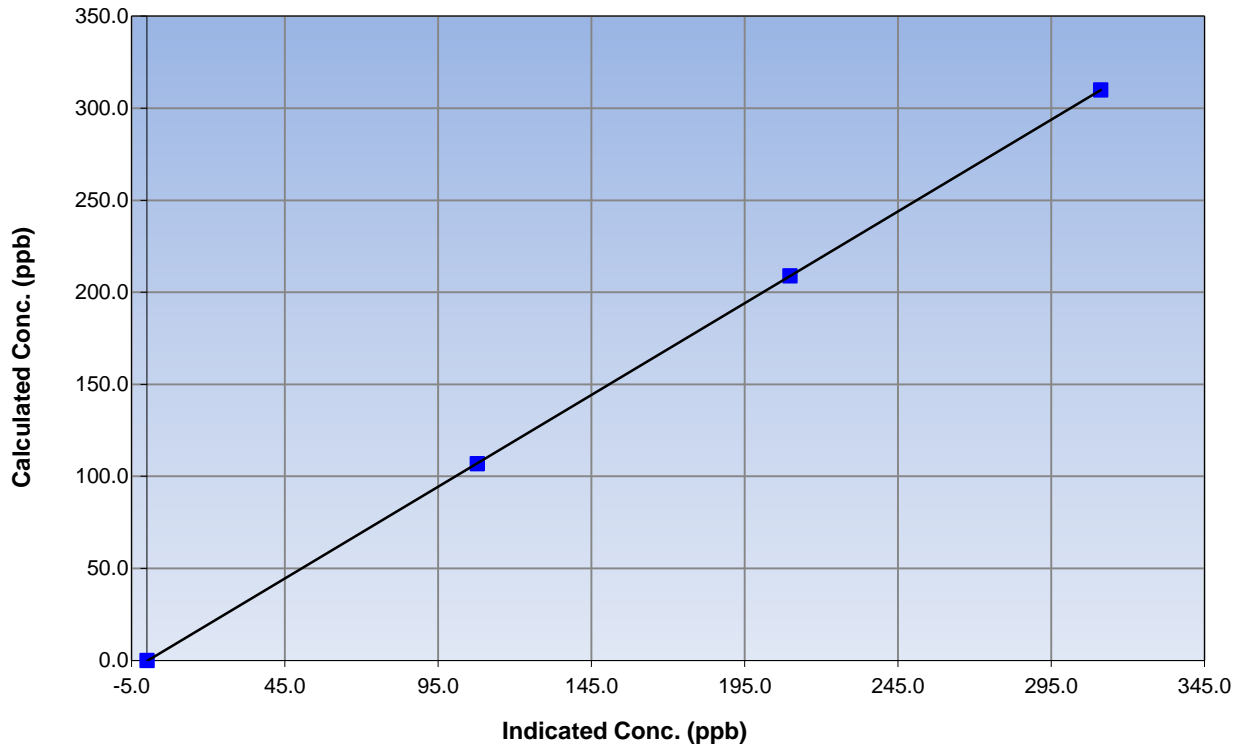
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 18, 2017
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	10:30	End Time (MST)	14:56
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

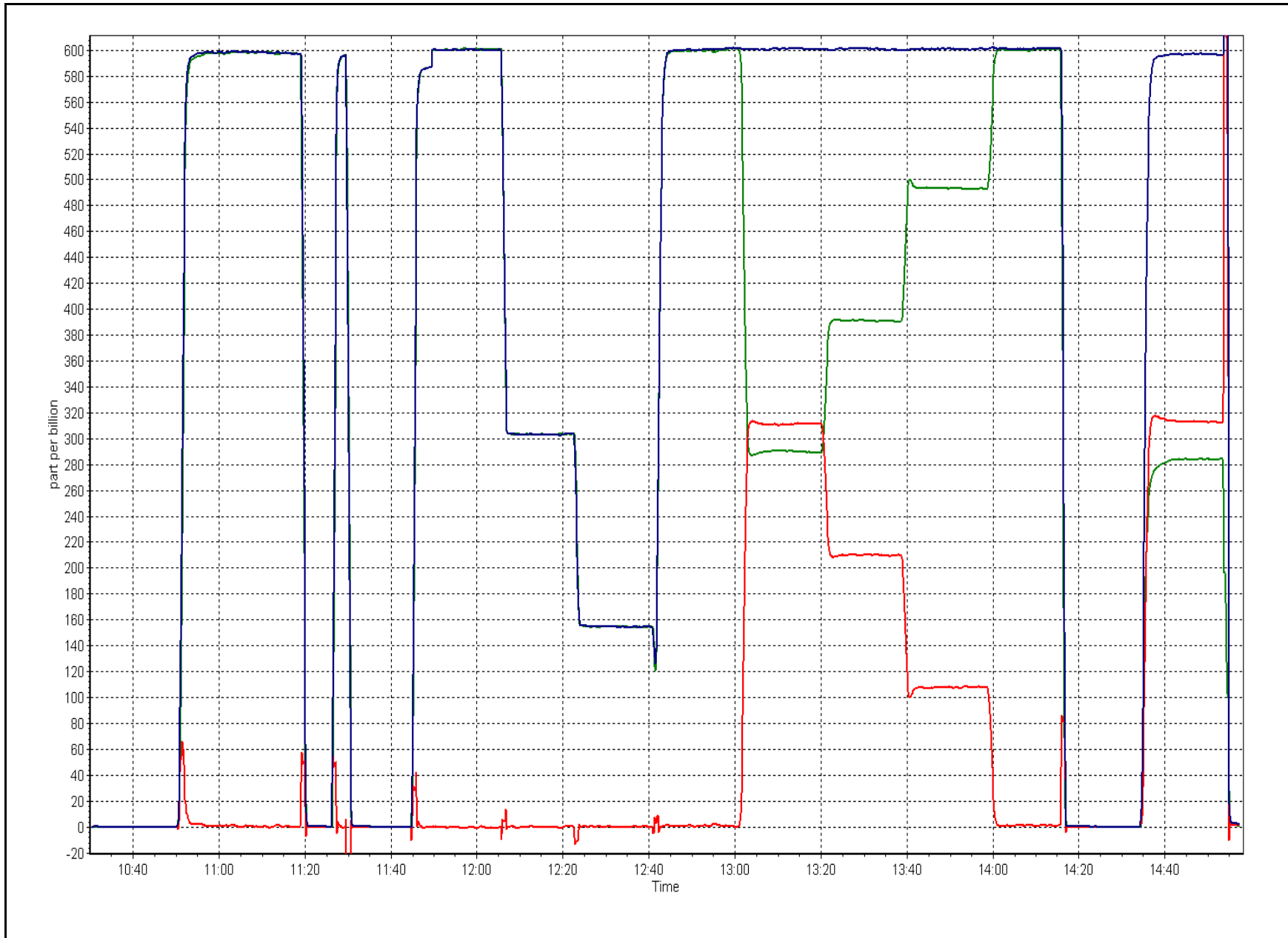
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999996
309.9	311.2	0.9960		
209.0	209.8	0.9959	Slope	0.996683
106.9	107.8	0.9909		
			Intercept	-0.255995

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 14, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 20
BRION MACKAY RIVER
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
FEBRUARY 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	636	34	36	99.7	12	0	2	0
H2S (ppb) Average	639	31	33	99.7	2	0	0	0
THC (ppm) Average	639	33	33	100	3.1	-	2.4	-
NO2 (ppb) Average	633	34	39	99.26	41	0	10	-
NO (ppb) Average	633	34	39	99.26	18	-	2	-
NOX (ppb) Average	633	34	39	99.26	52	-	11	-
Temperature 2 m (C) Average	672	0	0	100	13.8	-	7.1	-
Relative Humidity (%) Average	672	0	0	100	98	-	90	-
Precipitation (mm) Total	672	0	0	100	0.2	-	0.4	-
Wind Speed 10 m (km/h) Average	666	2	6	99.4	18	-	12	-
Wind Direction 10 m (deg) Average	666	2	6	99.4	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
 FEBRUARY 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	636	0.2	1	-	0	0	0	0	0	0	0	12
H2S (ppb) Average	639	0.2	0	-	0	0	0	0	0	0	0	2
THC (ppm) Average	639	2.25	0.1	-	2	2.1	2.2	2.2	2.3	2.4	2.4	3.1
NO2 (ppb) Average	633	2.6	5	-	0	0	0	1	2	6	41	
NO (ppb) Average	633	0.3	1	-	0	0	0	0	0	0	18	
NOX (ppb) Average	633	2.9	6	-	0	0	0	1	3	7	52	
Temperature 2 m (C) Average	672	-11.05	10.7	-	-34.3	-24.1	-18.4	-12.4	-2.7	3.9	13.8	
Relative Humidity (%) Average	672	72.2	14	-	31	52	64	75	83	86	98	
Precipitation (mm) Total	672	-	-	0.9	-	-	-	-	-	-	-	
Wind Speed 10 m (km/h) Average	666	6.1	3	-	0	2	4	6	8	11	18	
Wind Direction 10 m (deg) Average	666	-	-	-	-	-	-	-	-	-	-	

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	16 Feb 2017 15:00	16 Feb 2017 16:00	2	Maintenance - WBEA audit
SO2	17 Feb 2017 10:00	17 Feb 2017 11:00	2	Maintenance - WBEA audit
NO2, NO, NOX	16 Feb 2017 12:00	16 Feb 2017 16:00	5	Maintenance - WBEA audit
Wind Speed, Wind Direction	03 Feb 2017 06:00	03 Feb 2017 06:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	07 Feb 2017 01:00	07 Feb 2017 01:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	22 Feb 2017 22:00	22 Feb 2017 22:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	23 Feb 2017 23:00	23 Feb 2017 23:00	1	Flat line in sensor output signal - sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Brion MacKay River - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 12 ppb on Feb 28 18:00	Maximum Daily Average: 2.1 ppb on Feb 28		Hours of Data:	636
Minimum Value: 0 ppb on Feb 1 01:00	Minimum Daily Average: 0.0 ppb on Feb 6		Hours of Missing Data:	36
Maximum Diurnal Average: 0.6 ppb at hour 18	Minimum Diurnal Average: 0.1 ppb at hour 10		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 = 2		Percent Operational Time:	99.7

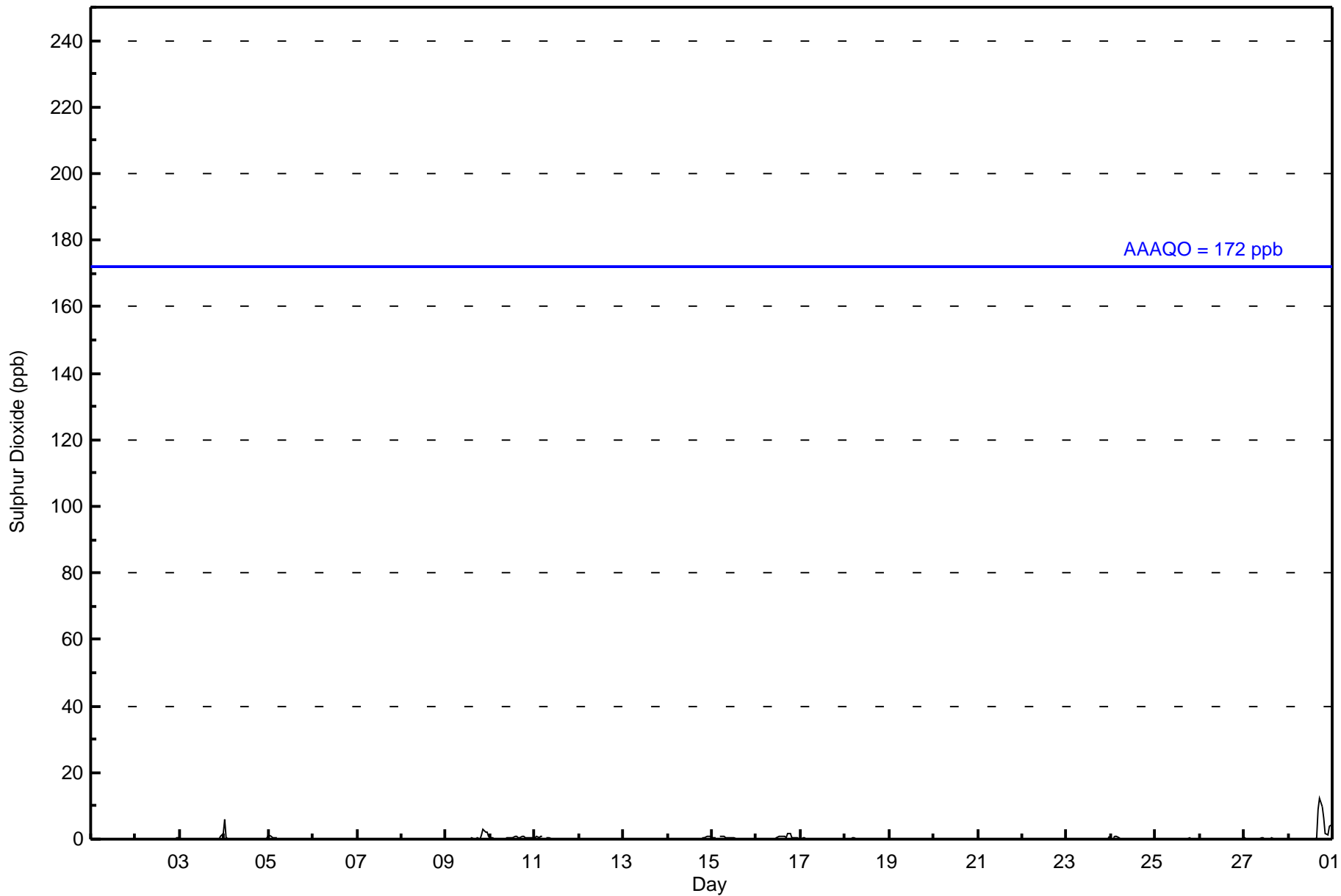
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.1	2
4-Feb	6	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	6
5-Feb	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Feb	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
7-Feb	0	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
8-Feb	0	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
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	2	1	0.5	3
10-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.4	1
11-Feb	0	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Feb	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
13-Feb	0	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
14-Feb	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	1	1	1	1	1	1	--	1
15-Feb	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	2	1	0	1	0	0	0.4	2
17-Feb	0	1	0	0	0	Z	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
18-Feb	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
19-Feb	0	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
20-Feb	0	0	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
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0	1
24-Feb	Z	0	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
25-Feb	0	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
26-Feb	0	0	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-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	9	12	10	6	2	1	4	4	2.1	12
	0.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.6	0.5	0.3	0.2	0.2	0.3	0.4	Diurnal Average	
	6	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	9	12	10	6	3	2	4	4	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
Brion MacKay River - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	635	99.84	99.84
11 - 20	1	0.16	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: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - February 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	19	28	24	12	29	21	38	42	39	48	30	71	86	60	43	41	631
11 - 20	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	28	24	13	29	21	38	42	39	48	30	71	86	60	43	41	632

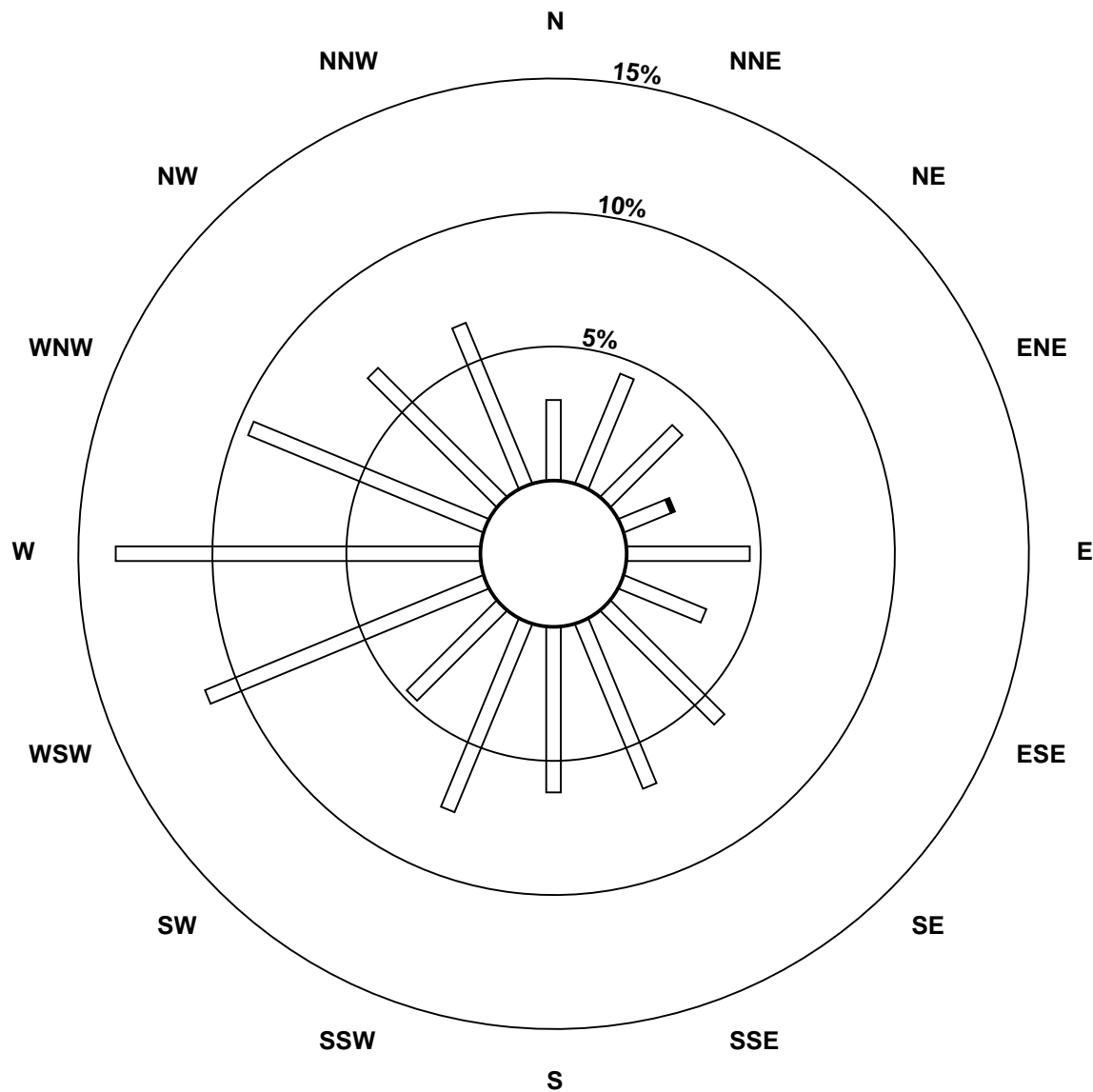
Total Number of Valid Hours: 632

Total Number of Hours: 672

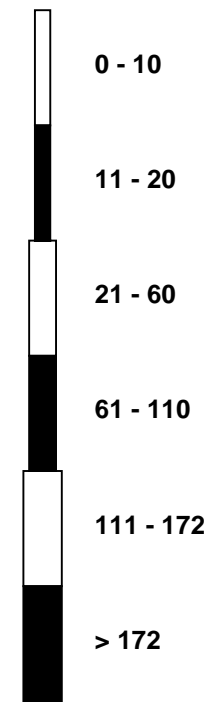


Wood Buffalo Environmental Association
Wind Rose Feb 2017

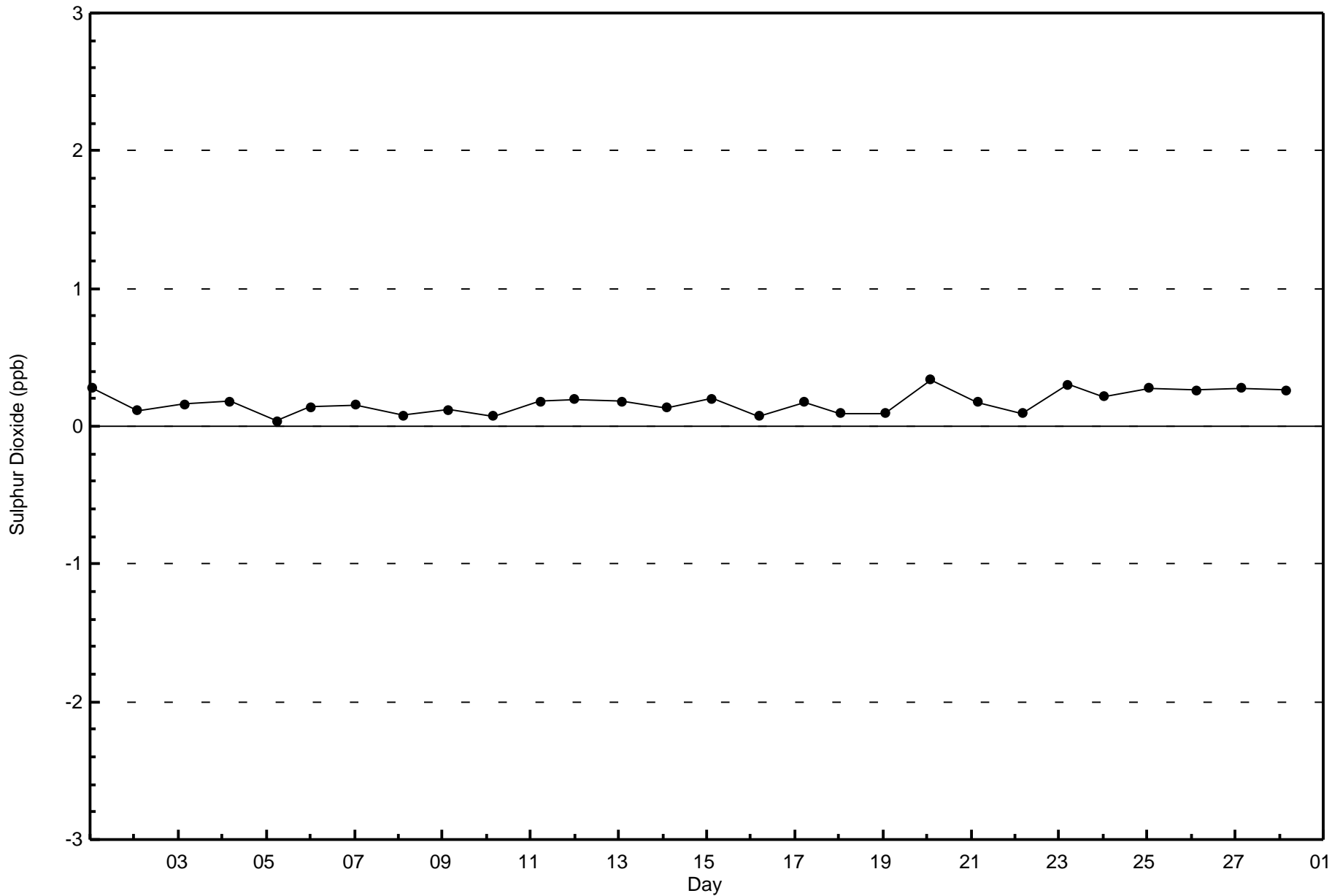
Sulphur Dioxide (SO₂) - ppb
Brion MacKay River (AMS 20)

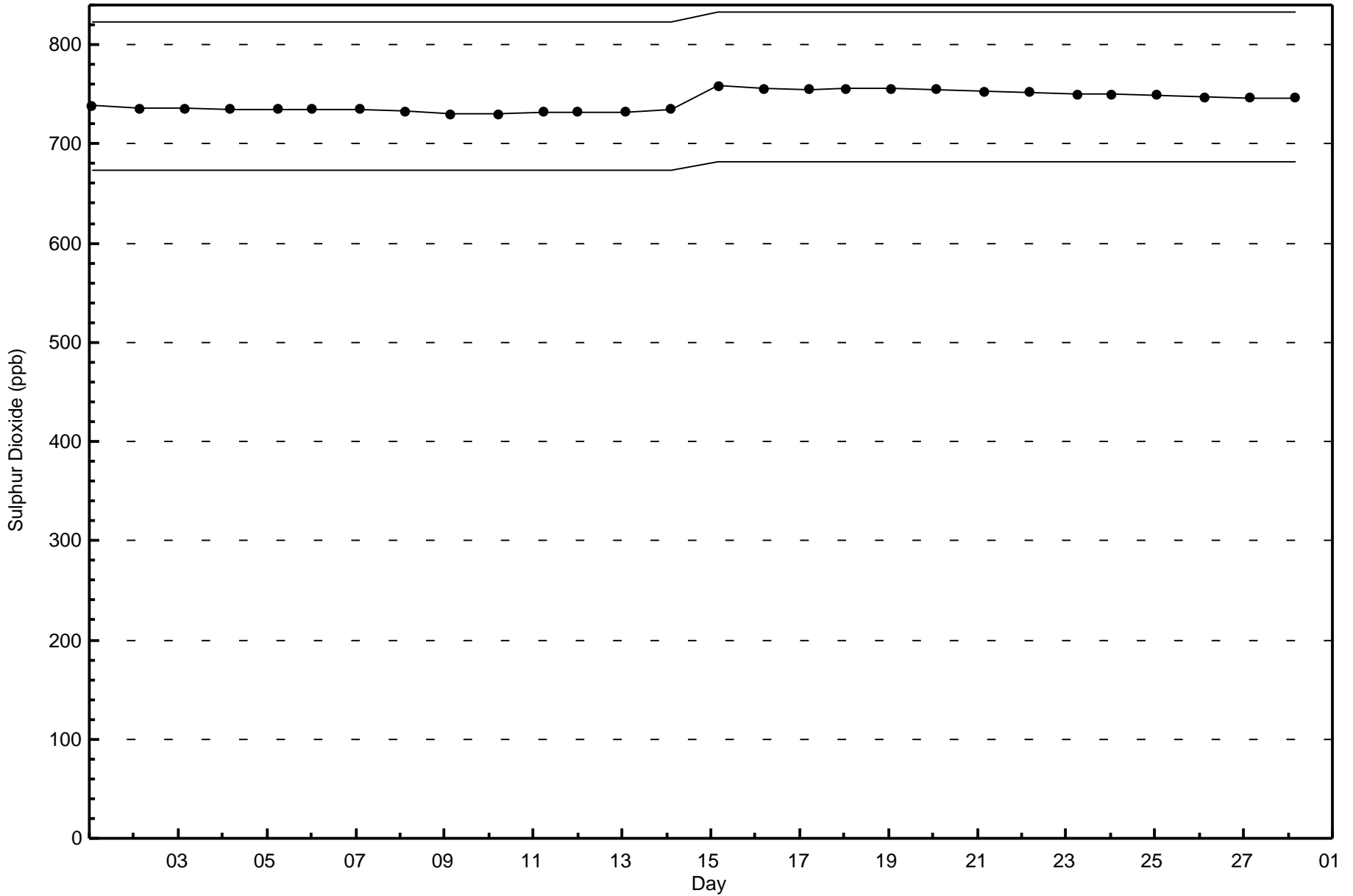


Classes (ppb)



Total Number of Valid Hours: 632





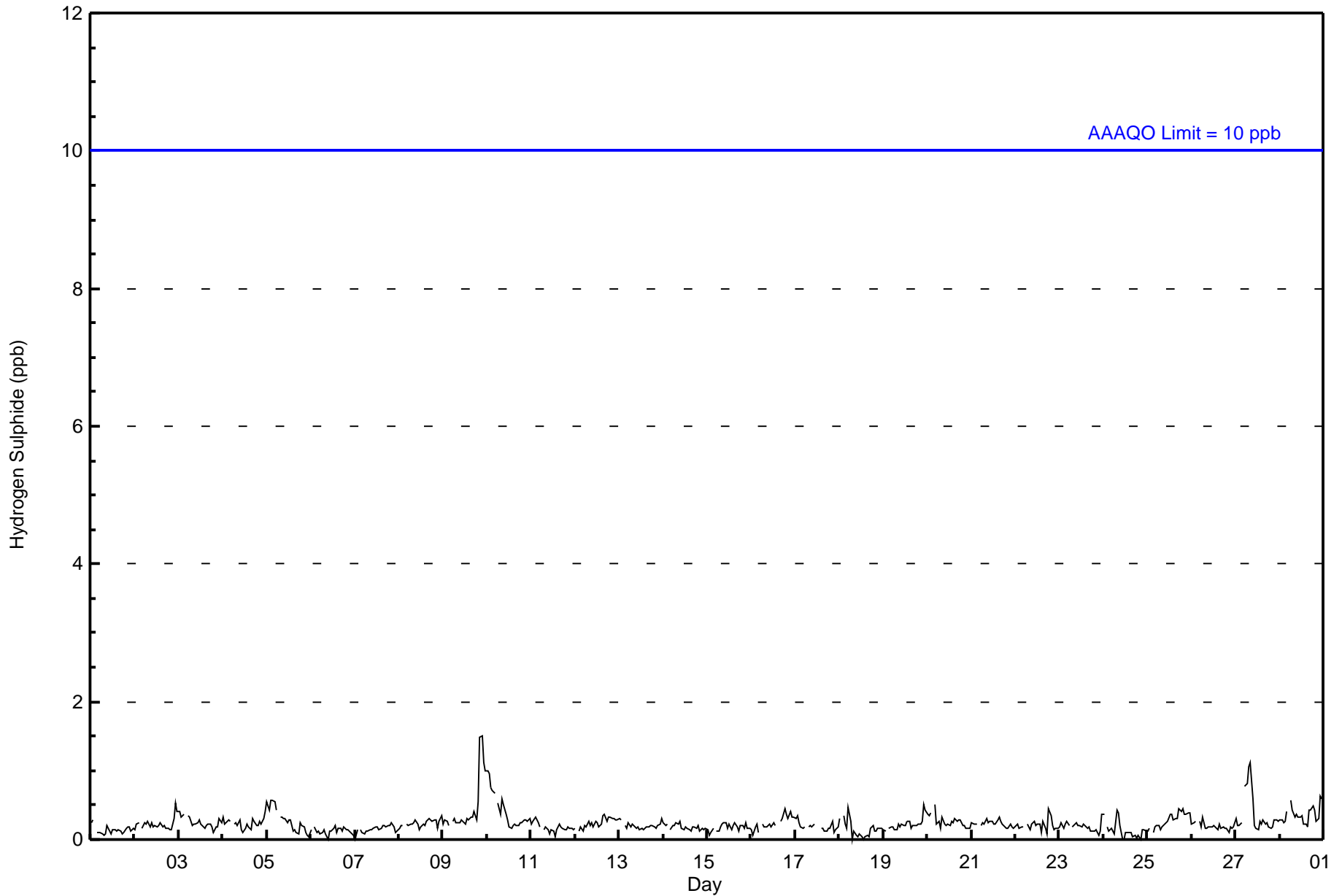


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																		
Maximum Value: 2 ppb on Feb 9 22:00										Maximum Daily Average: 0.5 ppb on Feb 9										Hours of Data: 639								
Minimum Value: 0 ppb on Feb 6 10:00										Minimum Daily Average: 0.1 ppb on Feb 6										Hours of Missing Data: 33								
Maximum Diurnal Average: 0.3 ppb at hour 24										Minimum Diurnal Average: 0.2 ppb at hour 15										Hours of Calibration: 31								
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: 99.7								
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-Feb	0	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1	
3-Feb	0	0	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-Feb	0	0	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-Feb	1	0	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
6-Feb	0	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	
7-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	0.5	2		
10-Feb	1	1	1	1	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
11-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Feb	0	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	
13-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0.2	0	
17-Feb	0	0	0	0	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Feb	0	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	
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1	
20-Feb	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	0.3	1	
21-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-Feb	0	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	
25-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
28-Feb	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1		
	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	Diurnal Average		
	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	Diurnal Maximum	
Z - zerospan	C - Calibration	M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO):	1-hr 10 ppb	24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - February 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	19	29	24	13	29	21	36	44	39	52	29	71	85	57	43	42	633
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	19	29	24	13	29	21	36	44	39	52	29	71	85	57	43	42	633

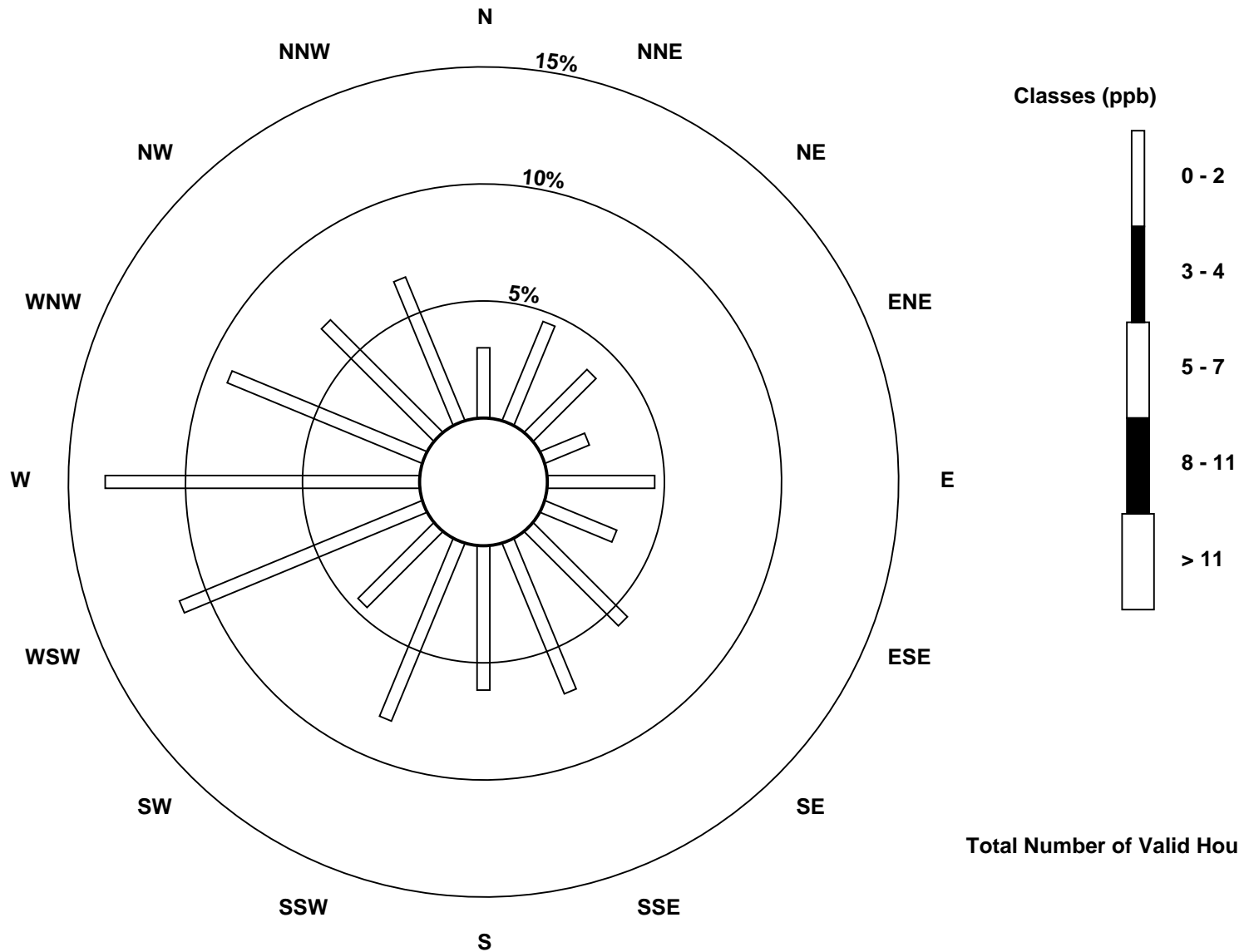
Total Number of Valid Hours: 633

Total Number of Hours: 672

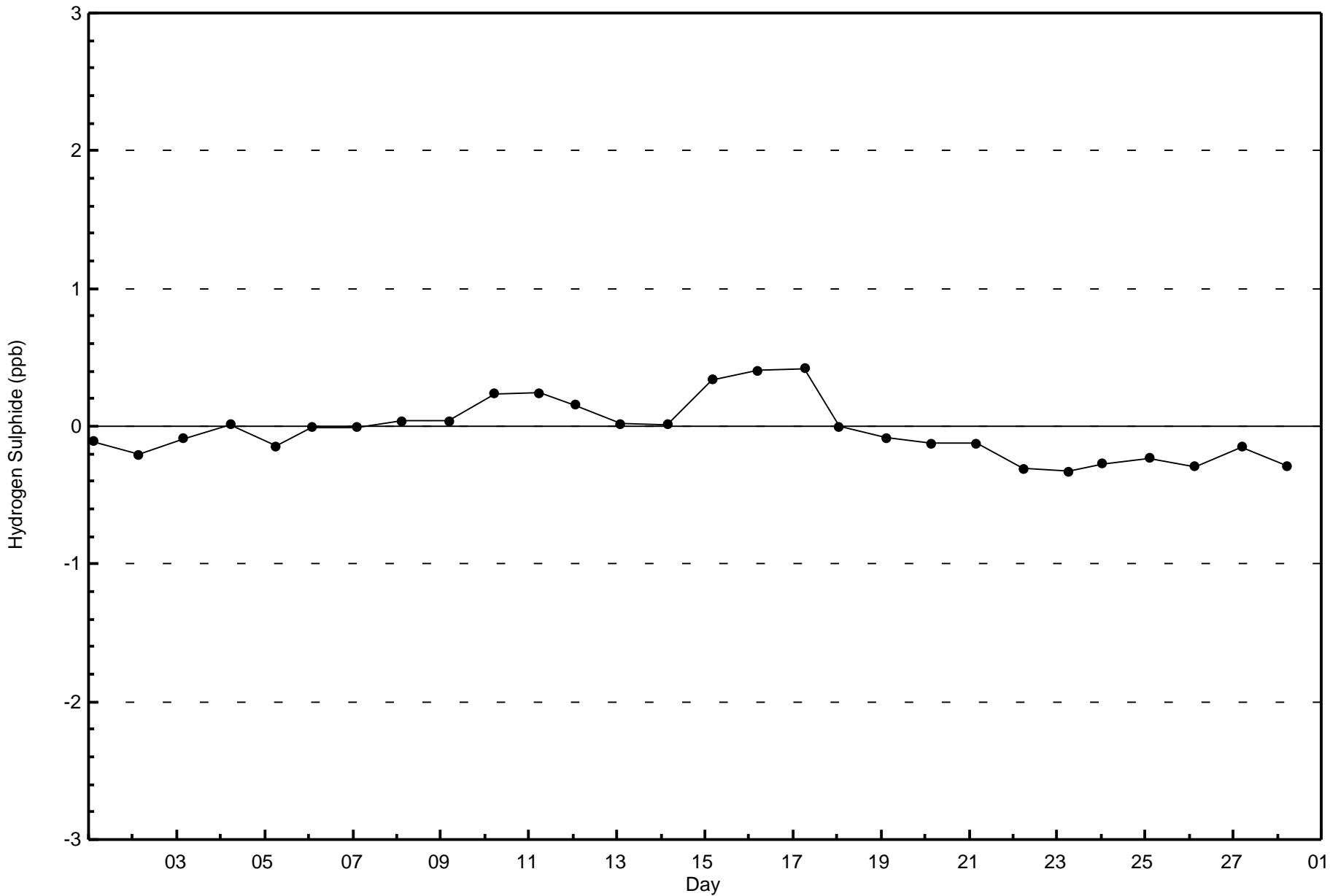


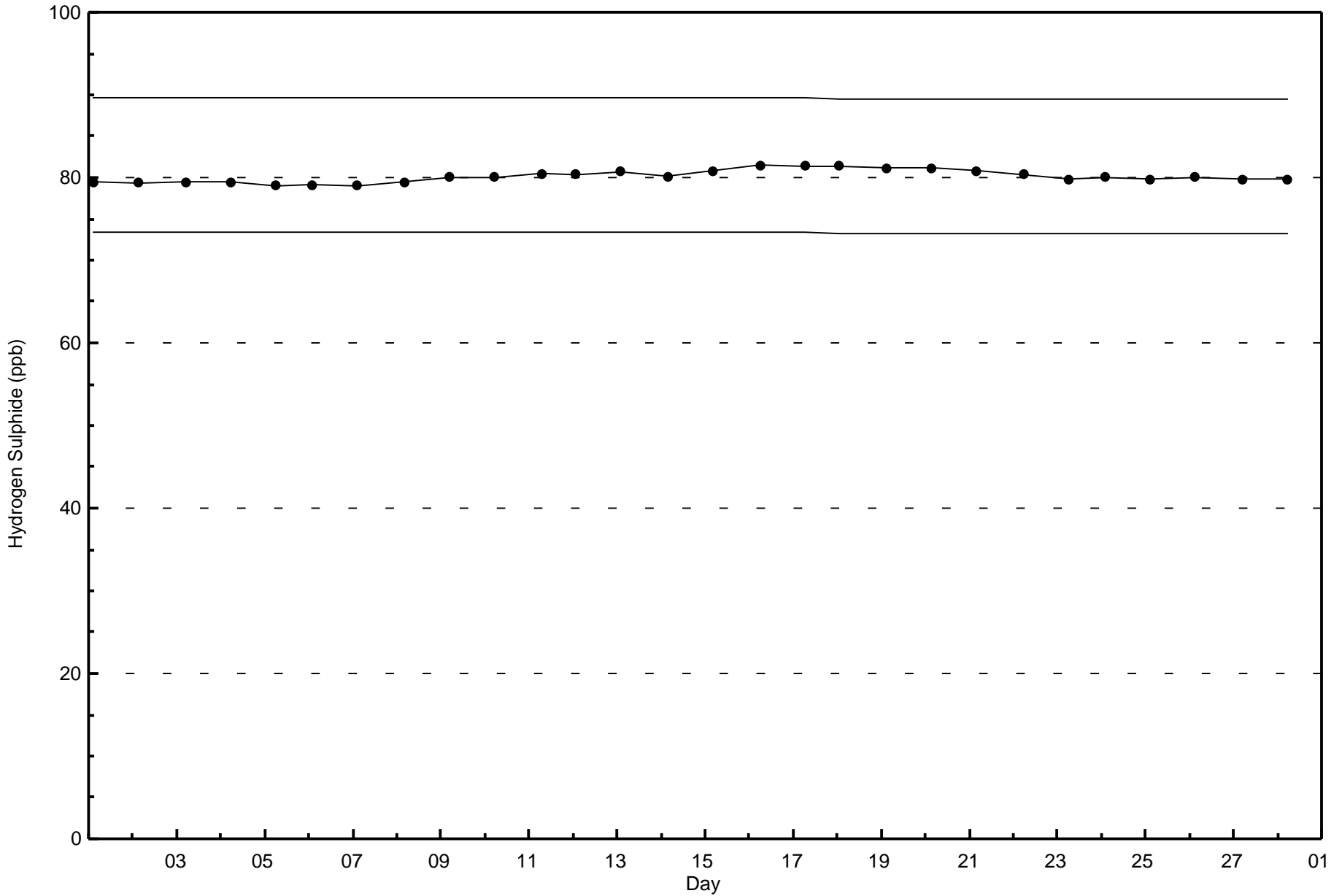
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 633







Wood Buffalo Environmental Association

Summary of Hour Averages

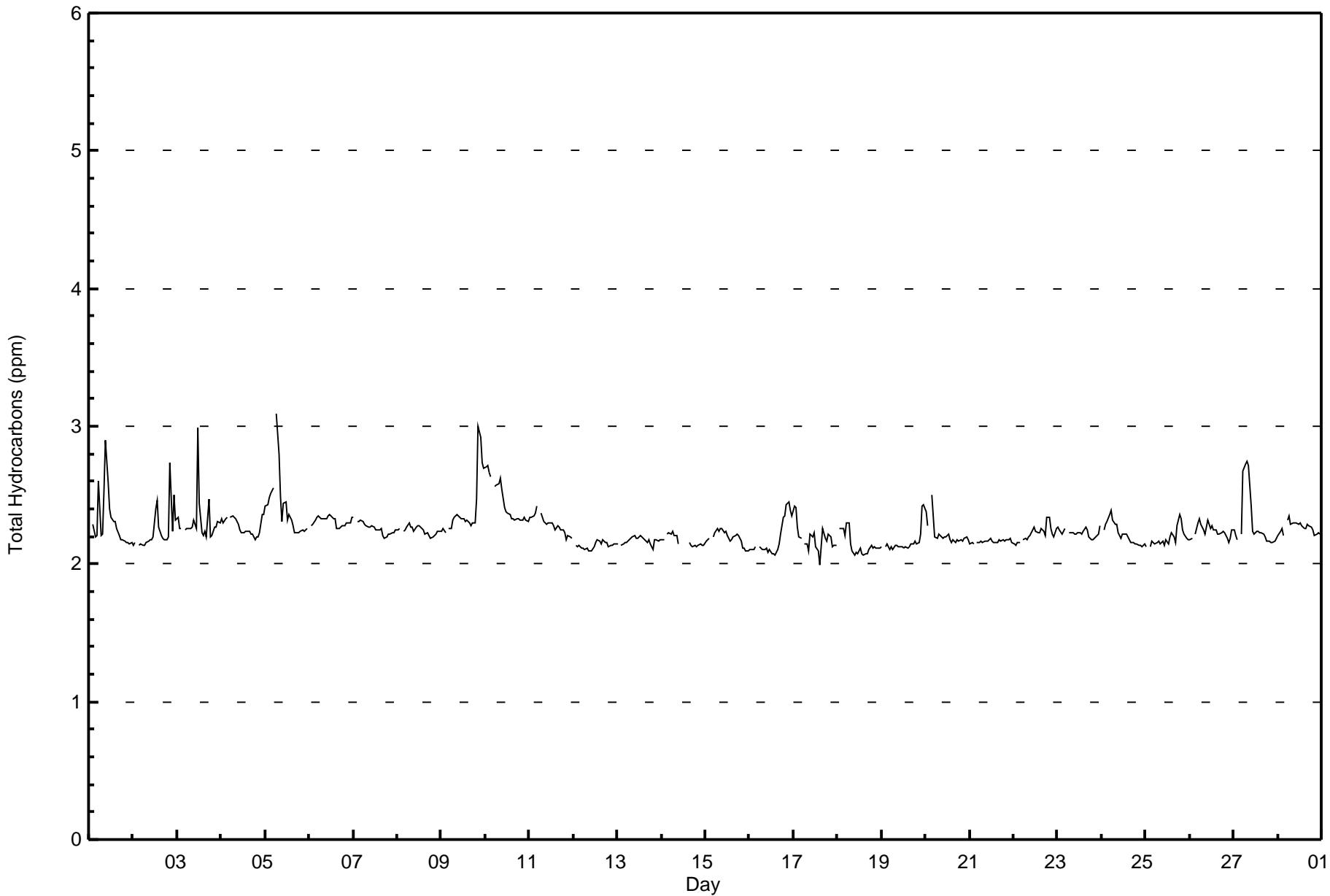
Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 2017

Maximum Value: 3.1 ppm on Feb 5 07:00																				Maximum Daily Average: 2.4 ppm on Feb 10					Hours in Service: 672		
Minimum Value: 2.0 ppm on Feb 17 15:00																				Minimum Daily Average: 2.1 ppm on Feb 12					Hours of Data: 639		
Maximum Diurnal Average: 2.3 ppm at hour 7																				Minimum Diurnal Average: 2.2 ppm at hour 17					Hours of Missing Data: 33		
Monthly Average: 2.25 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 2.7					Hours of Calibration: 33		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2.2	Z	2.3	2.2	2.2	2.6	2.2	2.2	2.5	2.9	2.6	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.9	
2-Feb	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.7	2.2	2.5	2.3	2.2	2.7
3-Feb	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	3.0	2.4	2.2	2.2	2.2	2.2	2.5	2.2	2.2	2.3	2.3	2.3	2.3	2.3	3.0	
4-Feb	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.4	2.3	2.4
5-Feb	2.4	2.4	2.5	2.5	2.5	Z	3.1	2.8	2.5	2.3	2.4	2.5	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	3.1	
6-Feb	Z	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	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	
7-Feb	2.3	Z	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
8-Feb	2.2	2.3	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
9-Feb	2.2	2.3	2.2	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	3.0	2.9	2.7	2.7	2.4	3.0	
10-Feb	2.7	2.7	2.7	2.6	Z	2.6	2.6	2.6	2.6	2.5	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	2.3	2.3	2.7	
11-Feb	2.3	2.3	2.3	2.4	2.4	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
12-Feb	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	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
13-Feb	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	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	
14-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	C	C	C	C	C	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
15-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	
16-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.5	2.4	2.3	2.2	2.5	
17-Feb	2.4	2.4	2.3	2.2	2.2	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.4	
18-Feb	Z	2.3	2.3	2.3	2.2	2.3	2.3	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	2.3	
19-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.4	2.2	2.4	
20-Feb	2.4	2.3	Z	2.5	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	2.2	2.2	2.2	2.2	2.5	
21-Feb	2.1	2.2	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
22-Feb	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.3	
23-Feb	2.3	2.3	2.2	2.2	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	
24-Feb	Z	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.4	
25-Feb	2.1	Z	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.4	
26-Feb	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.2	2.2	2.3	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	2.2	2.3	
27-Feb	2.2	2.2	2.2	Z	2.2	2.7	2.7	2.7	2.7	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	2.7	
28-Feb	2.2	2.2	2.3	2.2	Z	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
																								Diurnal Average			
																								Diurnal Maximum			
2.3 2.3 2.3 2.3 2.2 2.3 2.3 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 2.2 2.2 2.2 2.2 2.2																											
2.7 2.7 2.7 2.6 2.5 2.7 3.1 2.8 2.7 2.9 2.6 3.0 2.4 2.5 2.3 2.3 2.3 2.5 2.4 2.5 3.0 2.9 2.7 2.7																											
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.16	0.16
2.1 - 3.0	637	99.69	99.84
3.1 - 10.0	1	0.16	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 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	1	0	0	1
2.1 - 3.0	19	28	24	13	29	21	38	42	39	49	30	71	86	59	44	41	633
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	28	24	13	29	21	38	42	39	49	30	71	86	60	45	41	635

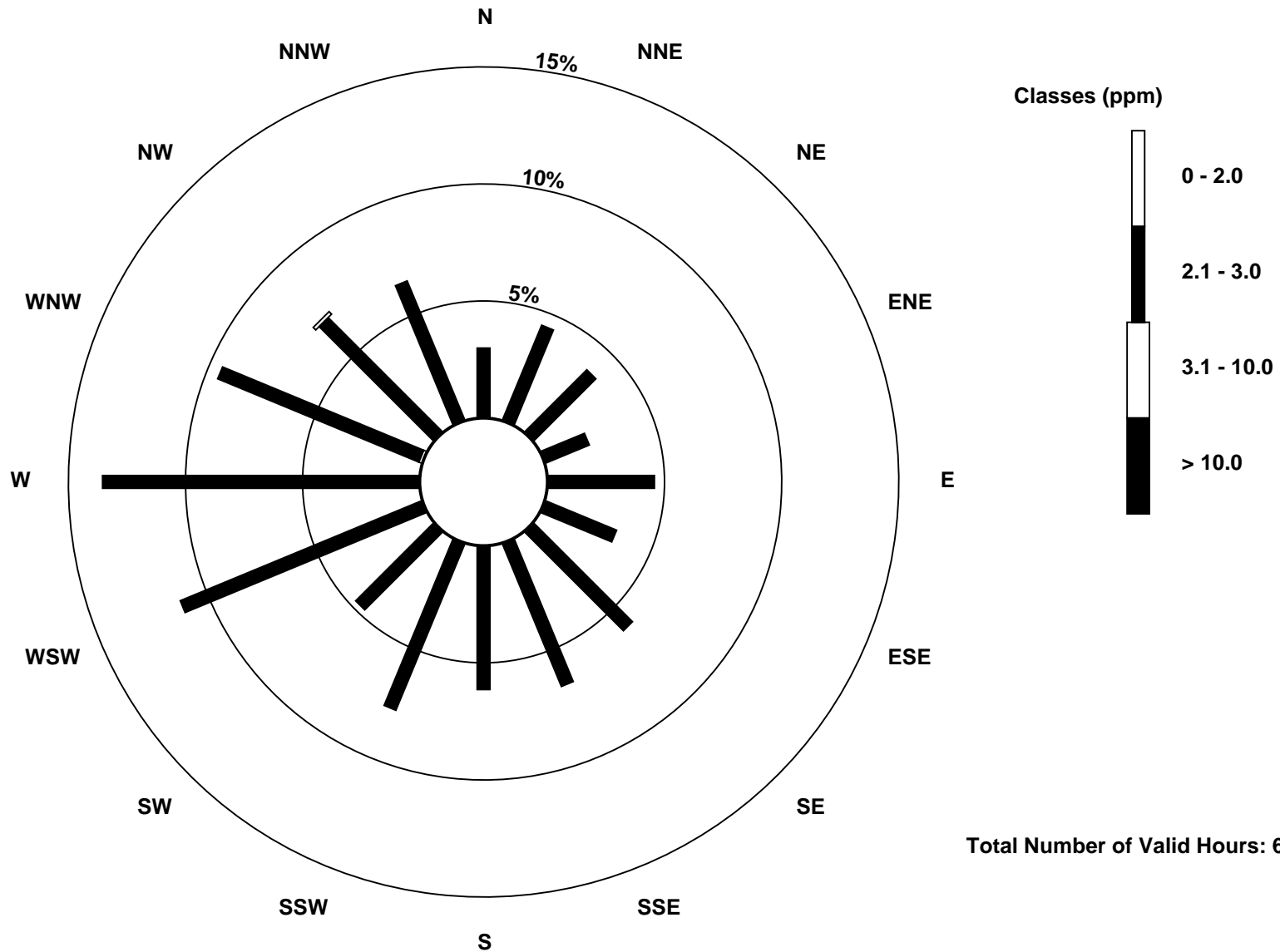
Total Number of Valid Hours: 635

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

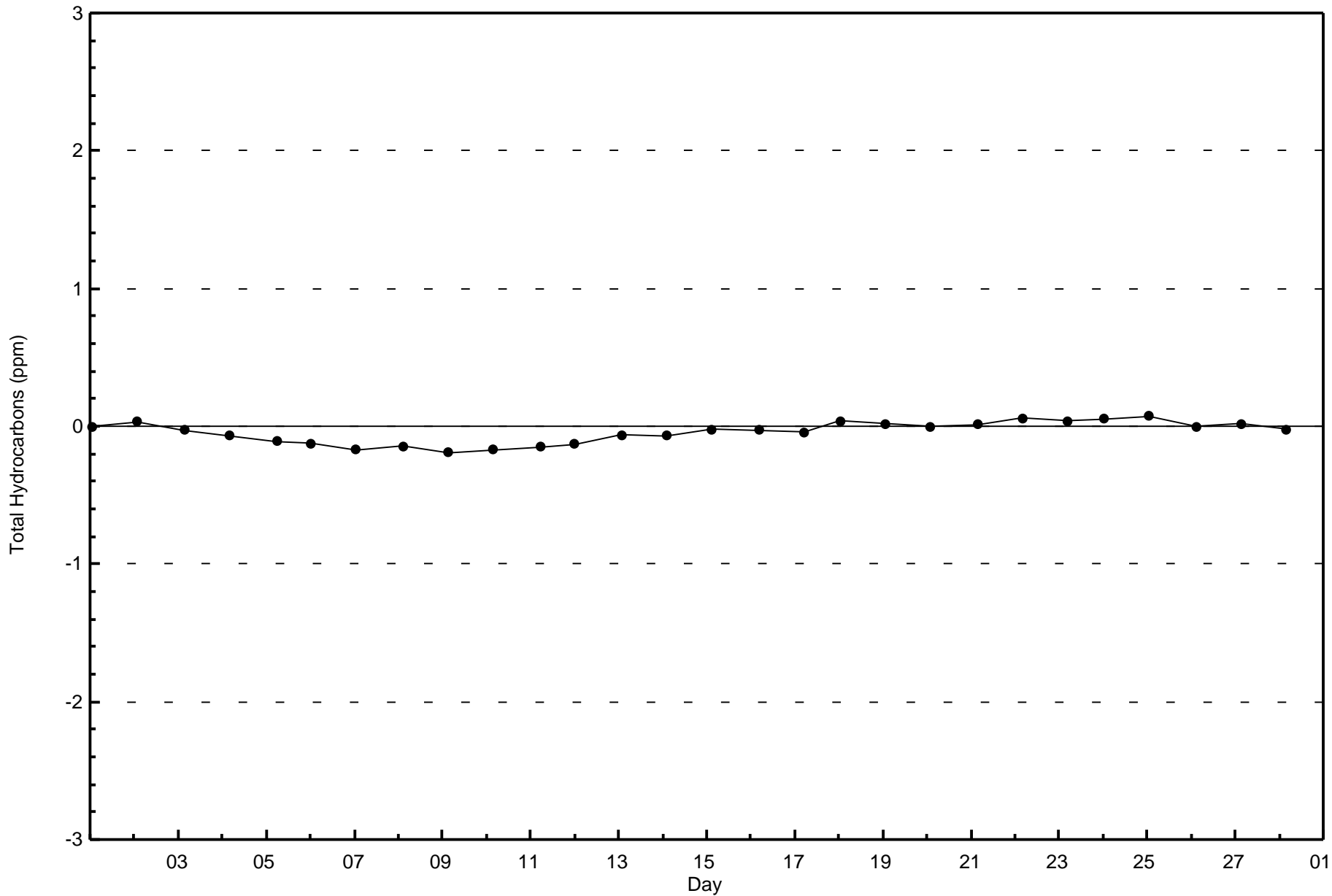
Total Hydrocarbons (THC) - ppm
Brion MacKay River (AMS 20)

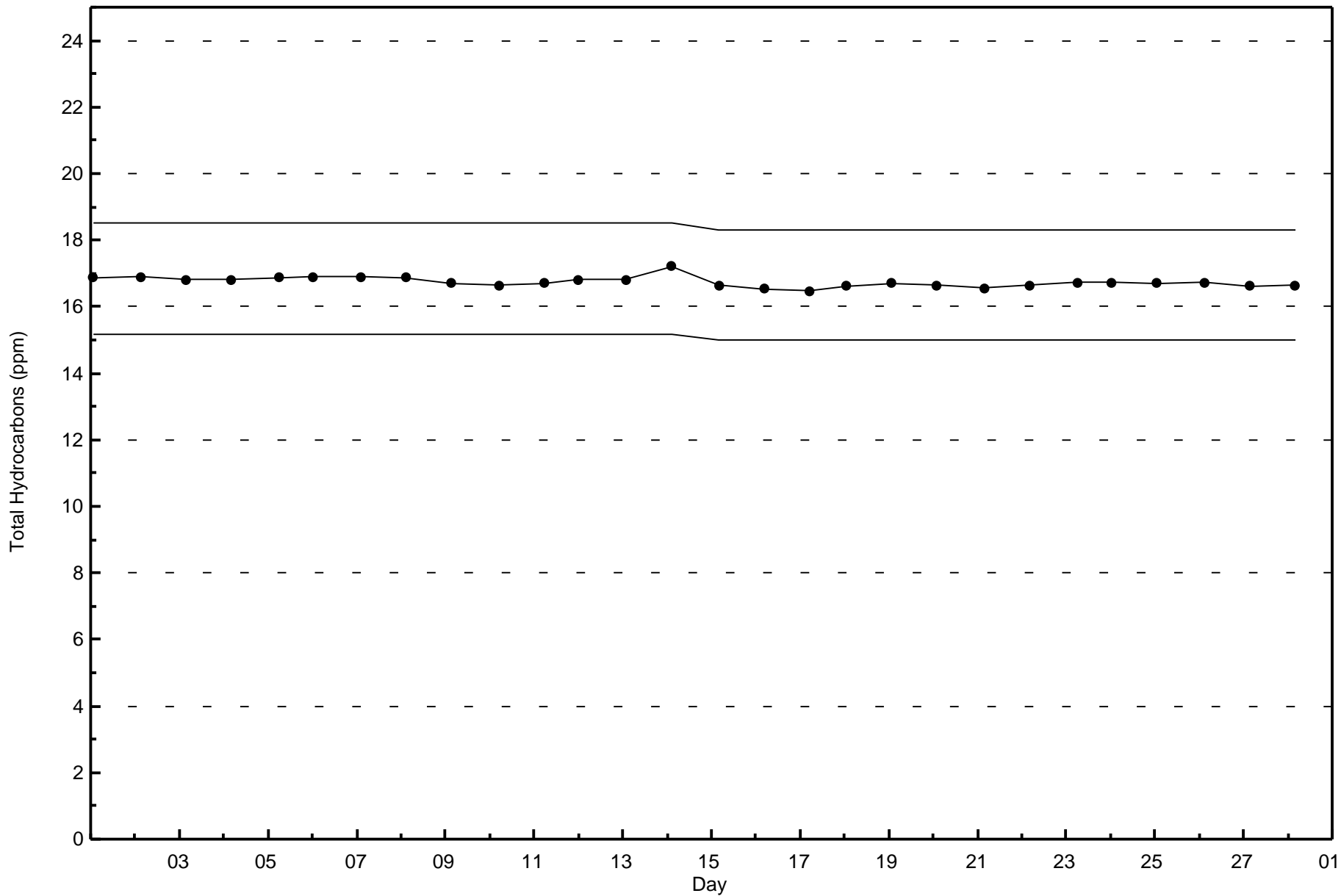




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Brion MacKay River - February 2017

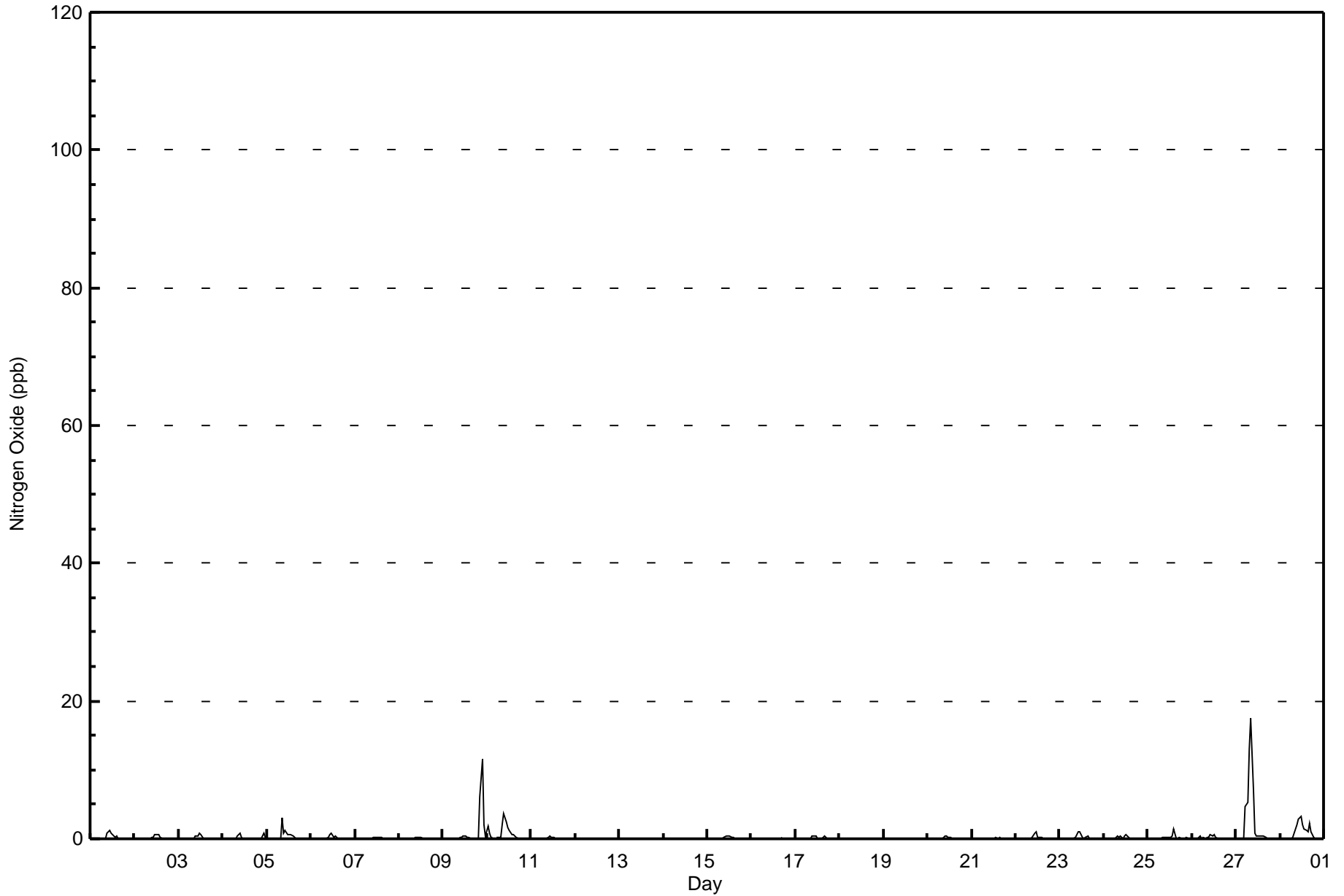
Maximum Value: 18 ppb on Feb 27 09:00																		Maximum Daily Average: 2.2 ppb on Feb 27																		Hours in Service: 672	
Minimum Value: 0 ppb on Feb 1 23:00																		Minimum Daily Average: 0.0 ppb on Feb 13																		Hours of Data: 633	
Maximum Diurnal Average: 0.9 ppb at hour 9																		Minimum Diurnal Average: 0.0 ppb at hour 20																		Hours of Missing Data: 39	
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 = 4																		Hours of Calibration: 34	
																																				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-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1										
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1										
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1										
4-Feb	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1										
5-Feb	0	0	0	0	0	Z	0	0	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	3										
6-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1										
7-Feb	0	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-Feb	0	0	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										
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	11	2	0	1.0	11										
10-Feb	2	1	0	0	Z	0	0	0	2	4	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	4										
11-Feb	0	0	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-Feb	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										
13-Feb	0	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										
14-Feb	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0										
15-Feb	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	M	M	M	M	M	0	0	0	0	0	0	0	0	0	0.0	0										
17-Feb	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	0.1	1										
18-Feb	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										
19-Feb	0	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										
20-Feb	0	0	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										
21-Feb	0	0	0	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-Feb	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	0.1	1										
23-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1										
24-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1										
25-Feb	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	0.1	1										
26-Feb	0	0	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1										
27-Feb	0	0	0	Z	0	5	5	13	18	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2	18										
28-Feb	0	0	0	0	Z	0	0	0	1	2	3	3	2	1	1	1	2	1	0	0	0	0	0	0	0	0.8	3										
																		Diurnal Average		Diurnal Maximum																	
																		2		0																	
																		0.1		0.0																	
																		0.0		0.0																	
																		0.0		0.0																	
																		0.0		0.0																	
																		0.2		0.2																	
																		0.5		0.9																	
																		0.7		0.7																	
																		0.6		0.6																	
																		0.6		0.4																	
																		0.3		0.3																	
																		0.2		0.2																	
																		0.1		0.1																	
																		0.1		0.1																	
																		0.0		0.0																	
																		0.0		0.0																	
																		0.2		0.4																	
																		0.1		0.1																	
																		0.0		0.0																	

Z - zerospan C - Calibration M - Maintenance



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Brion MacKay River - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Brion MacKay River - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	633	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: 633

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Brion MacKay River - February 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	28	24	13	29	20	38	41	39	48	29	71	84	60	45	41	629
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	19	28	24	13	29	20	38	41	39	48	29	71	84	60	45	41	629

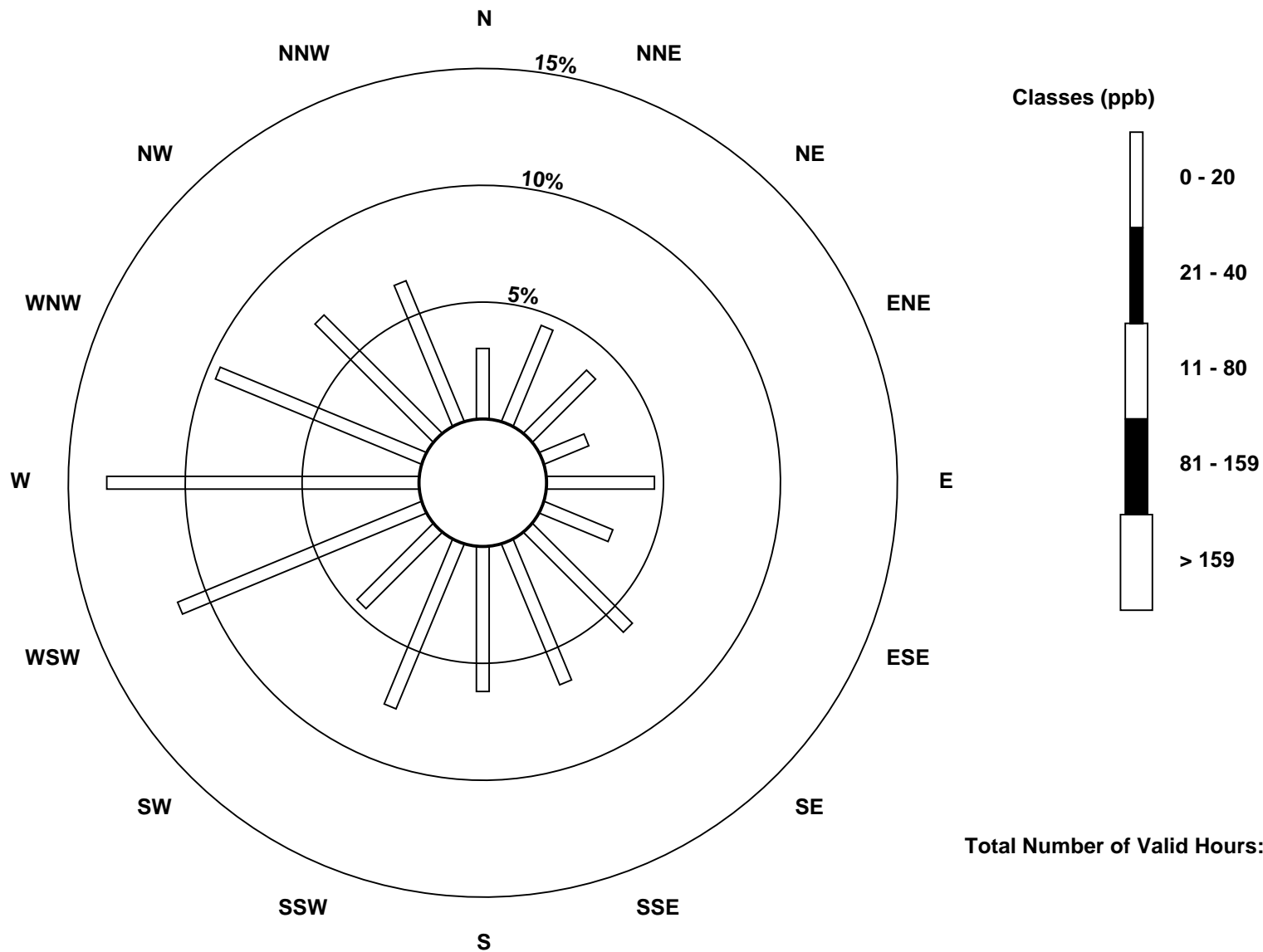
Total Number of Valid Hours: 629

Total Number of Hours: 672

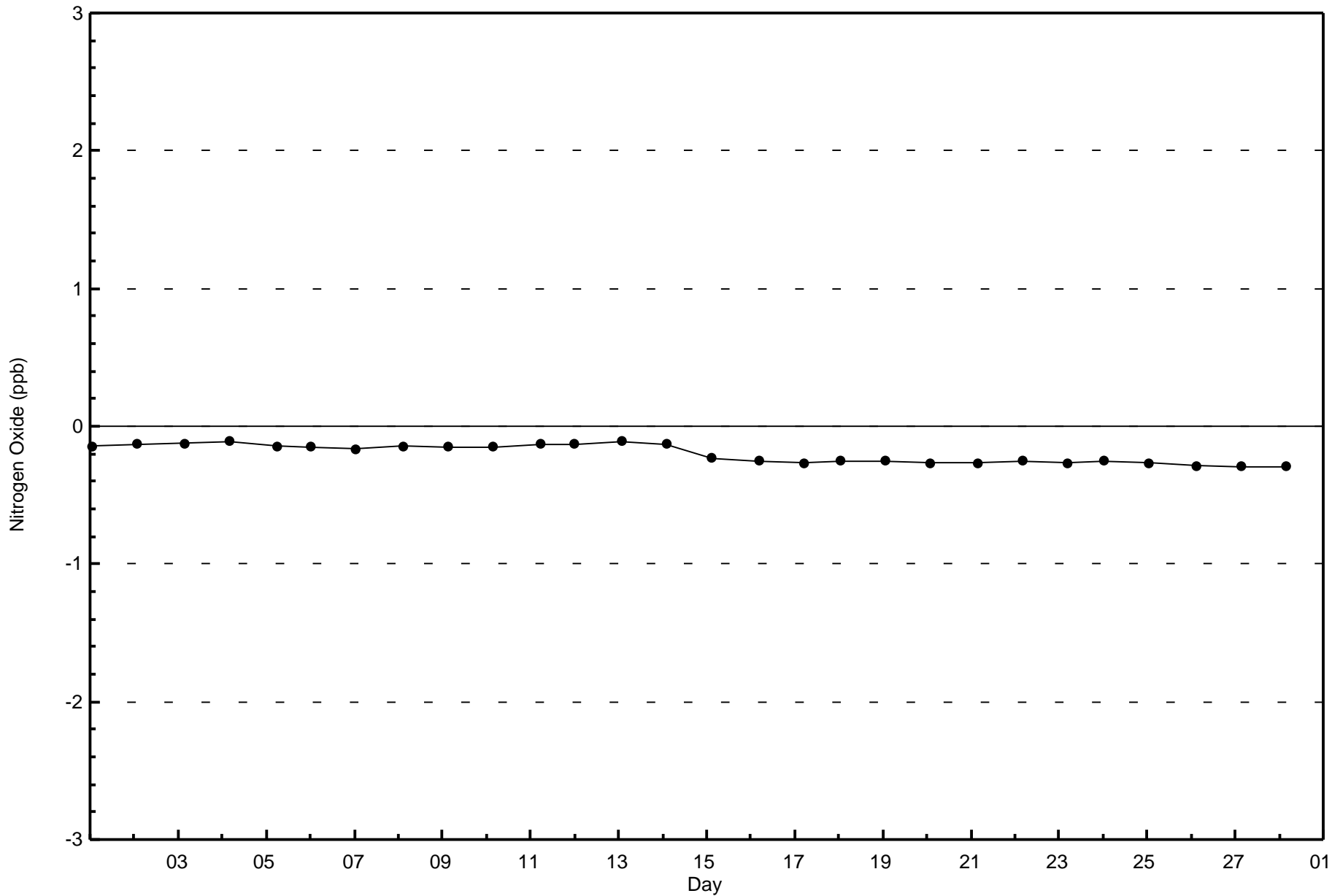


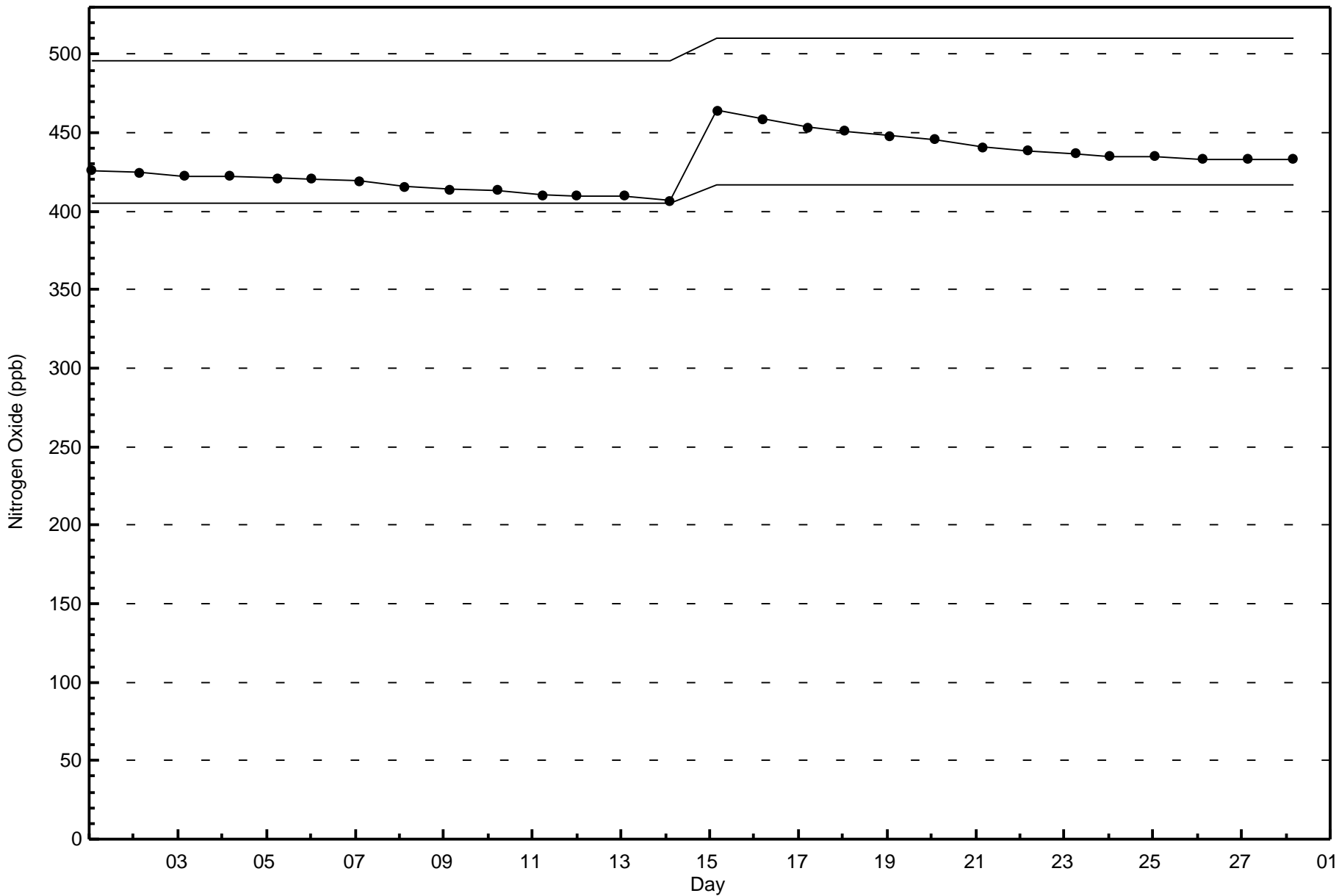
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxide (NO) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 629







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Brion MacKay River - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 41 ppb on Feb 9 22:00	Maximum Daily Average: 9.8 ppb on Feb 10		Hours of Data:	633
Minimum Value: 0 ppb on Feb 4 21:00	Minimum Daily Average: 0.3 ppb on Feb 13		Hours of Missing Data:	39
Maximum Diurnal Average: 4.4 ppb at hour 1	Minimum Diurnal Average: 0.8 ppb at hour 16		Hours of Calibration:	34
Monthly Average: 2.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 33		Percent Operational Time:	99.3

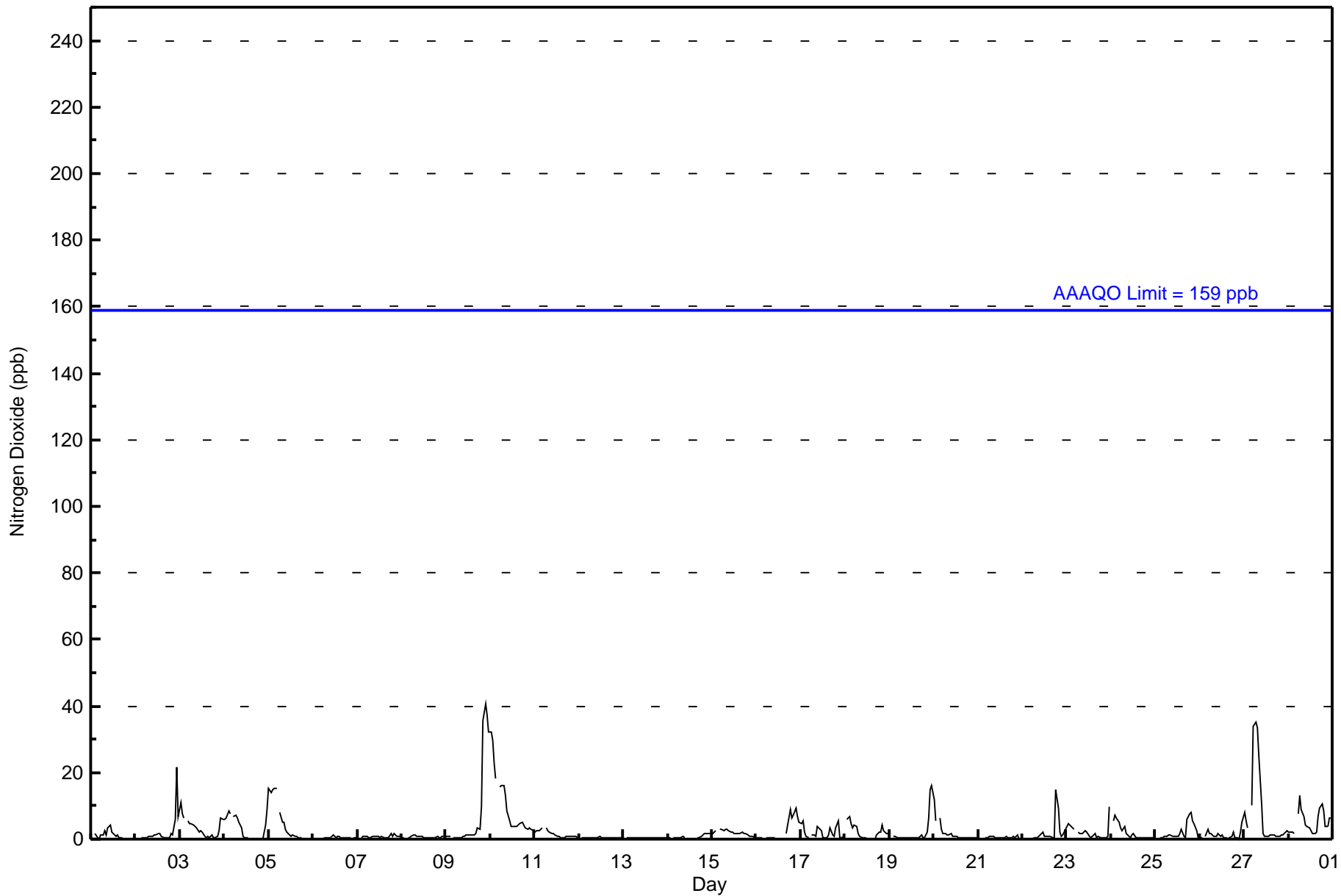
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2	Z	2	0	0	1	1	3	1	3	4	2	2	1	1	1	1	0	0	0	0	0	0	0	1.2	4	
2-Feb	0	0	Z	0	0	0	0	1	1	1	1	1	2	2	1	0	0	0	0	2	1	6	21	7	2.2	21	
3-Feb	11	8	6	Z	5	5	5	4	4	4	2	2	2	1	1	1	0	1	0	0	1	3	6	6	3.4	11	
4-Feb	6	6	9	8	Z	7	7	7	5	3	1	0	0	0	0	0	0	0	0	0	0	0	4	9	3.2	9	
5-Feb	15	14	15	15	15	Z	8	5	5	3	2	1	1	1	1	1	1	0	0	0	0	0	0	0	4.5	15	
6-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0.4	1	
7-Feb	0	Z	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	2	1	2	1	1	1	0.7	2	
8-Feb	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
9-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	4	3	10	36	41	37	32	7.7	41		
10-Feb	32	30	23	18	Z	16	16	16	13	8	5	4	4	4	4	4	5	5	4	3	3	3	3	2	9.8	32	
11-Feb	2	3	3	3	4	Z	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	4	
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1	
13-Feb	0	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	1	
14-Feb	0	0	Z	1	1	1	1	1	1	1	1	C	C	C	C	C	C	1	1	1	2	2	2	2	--	2	
15-Feb	2	2	2	Z	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	1	1	1	1	1.9	3	
16-Feb	1	1	1	1	Z	1	1	1	1	1	1	M	M	M	M	M	2	4	9	7	7	9	7	5	3.1	9	
17-Feb	5	6	2	1	1	Z	1	1	1	4	3	2	0	0	0	0	1	4	1	1	3	6	0	0	1	1.9	6
18-Feb	Z	6	7	5	3	4	4	2	1	0	0	0	0	0	0	0	0	0	1	2	2	4	3	2	2	2.1	7
19-Feb	1	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	2	6	15	16	2.2	16
20-Feb	12	6	Z	6	3	2	2	1	1	2	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1.8	12
21-Feb	0	0	0	Z	0	1	1	1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	0	0	0	0.5	1
22-Feb	0	0	0	0	Z	0	0	0	0	1	2	2	1	1	1	1	1	0	15	9	2	1	1	3	1.8	15	
23-Feb	4	5	4	3	3	Z	2	2	2	2	2	1	0	1	2	1	1	1	1	1	1	1	1	10	2.1	10	
24-Feb	Z	6	7	6	5	3	3	4	2	1	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	1.9	7
25-Feb	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	2	3	1	0	6	8	8	6	5	2	0	2.2	8
26-Feb	0	1	Z	1	3	2	2	1	1	1	2	1	1	0	0	0	0	0	1	2	0	0	0	2	5	1.2	5
27-Feb	8	6	3	Z	10	34	35	34	25	11	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	7.9	35
28-Feb	2	2	2	2	Z	8	13	9	7	4	4	4	3	2	2	2	7	10	10	9	4	4	6	7	5.2	13	
	4.4	4.4	3.9	3.2	2.6	3.8	4.0	3.6	2.9	2.1	1.5	1.4	1.0	0.9	0.9	0.8	1.1	1.6	2.3	2.3	2.9	3.2	4.2	4.0	Diurnal Average		
	32	30	23	18	15	34	35	34	25	11	5	4	4	4	4	4	7	10	15	10	36	41	37	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
Brion MacKay River - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	621	98.10	98.10
21 - 40	11	1.74	99.84
41 - 80	1	0.16	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 633

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - February 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	21	20	12	29	20	38	41	39	48	29	71	84	60	45	41	617
21 - 40	0	7	3	1	0	0	0	0	0	0	0	0	0	0	0	0	11
11 - 80	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	19	28	24	13	29	20	38	41	39	48	29	71	84	60	45	41	629

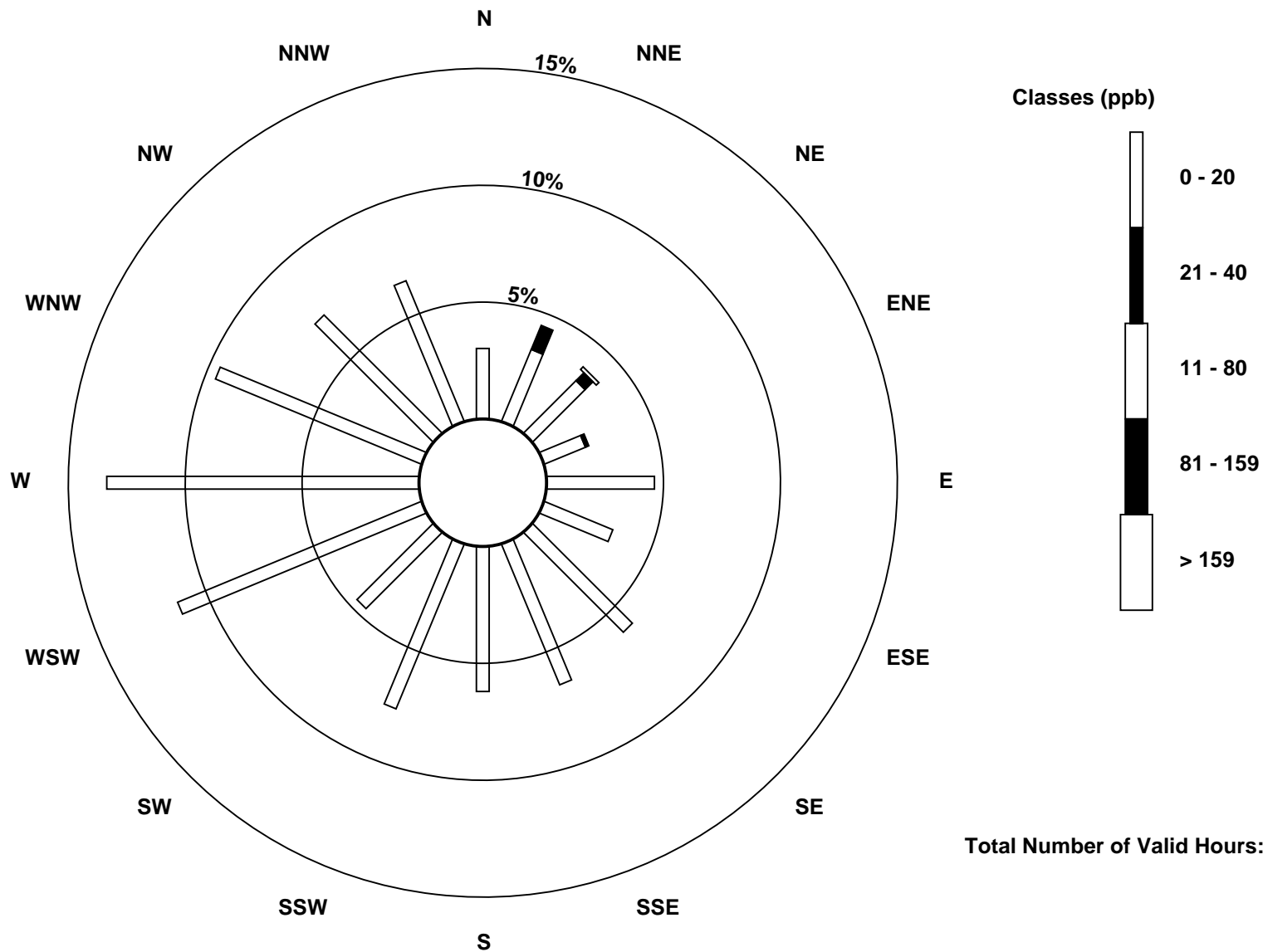
Total Number of Valid Hours: 629

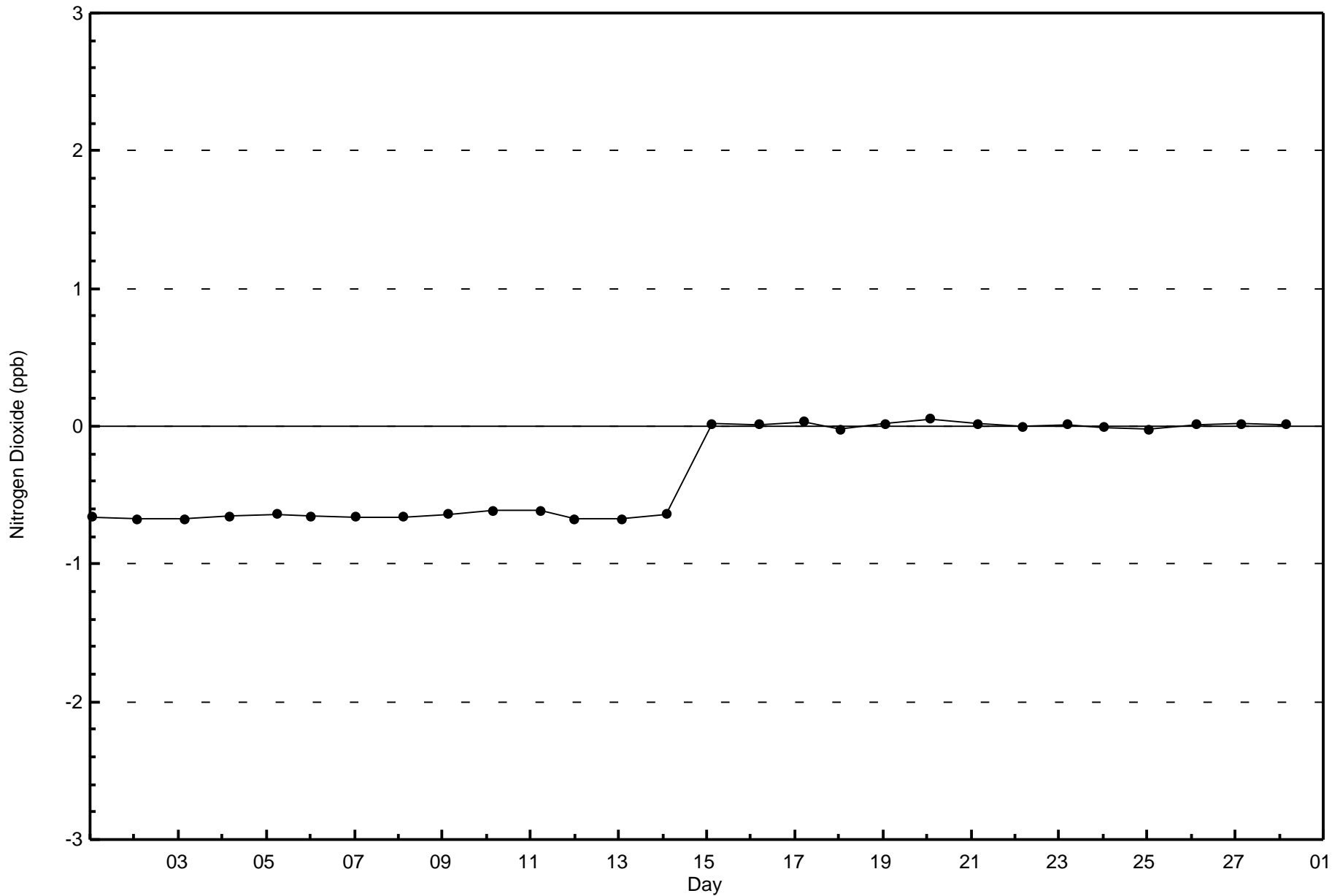
Total Number of Hours: 672

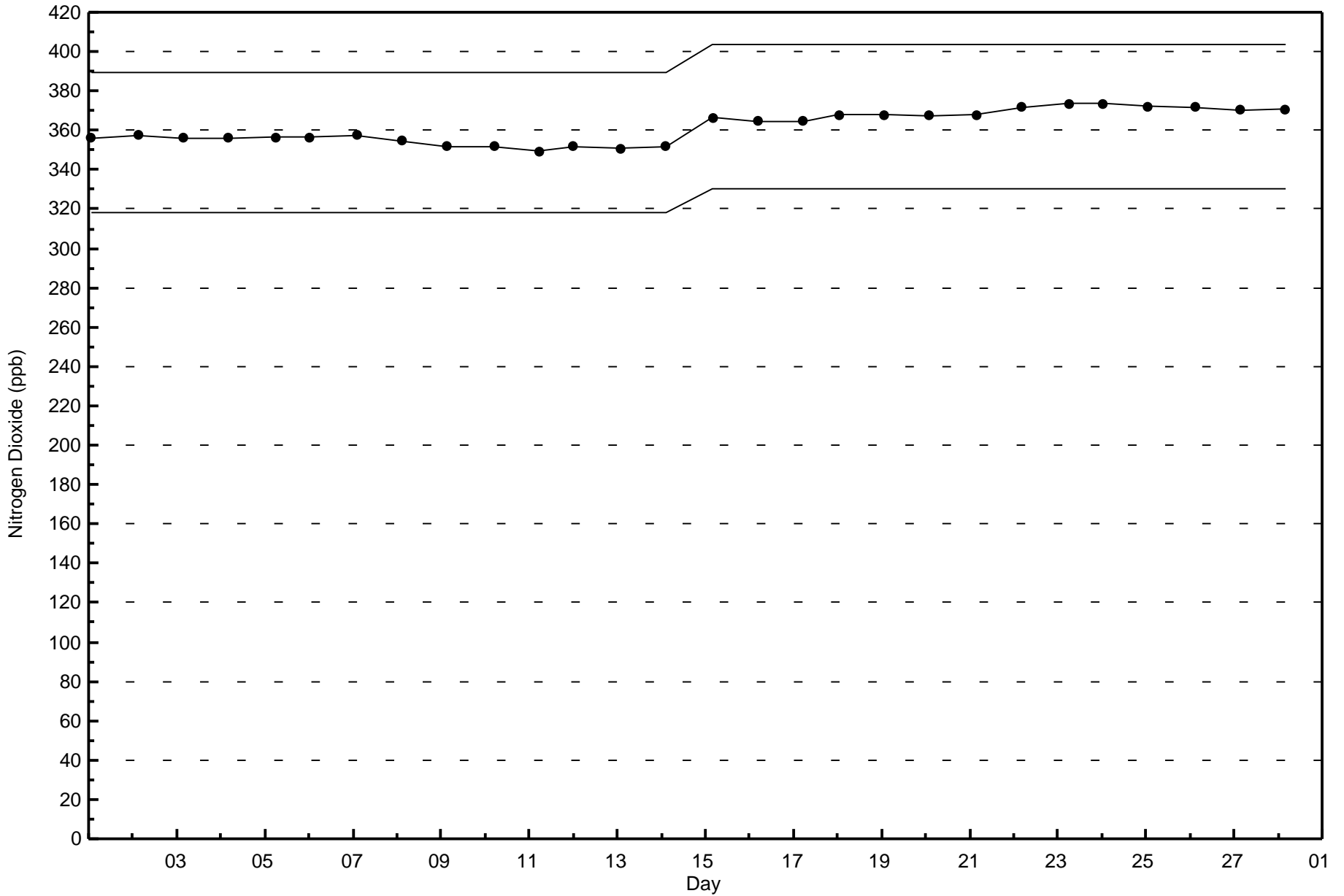


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

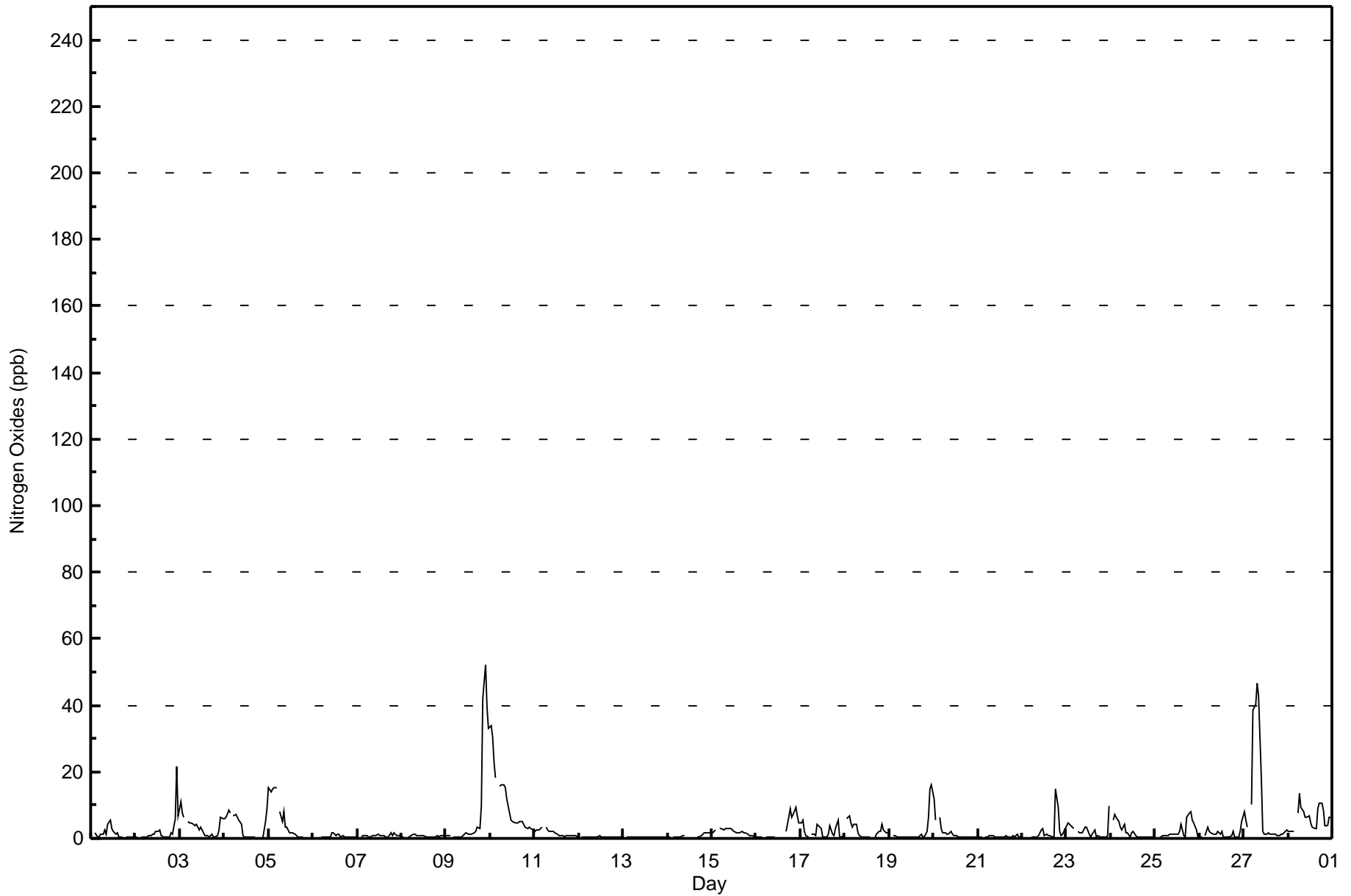
Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 2017

Maximum Value: 52 ppb on Feb 9 22:00																		Maximum Daily Average: 10.5 ppb on Feb 10						Hours in Service: 672			
Minimum Value: 0 ppb on Feb 4 22:00																		Minimum Daily Average: 0.3 ppb on Feb 13						Hours of Data: 633			
Maximum Diurnal Average: 4.5 ppb at hour 1																		Minimum Diurnal Average: 1.0 ppb at hour 16						Hours of Missing Data: 39			
Monthly Average: 2.9 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 39						Hours of Calibration: 34			
																		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-Feb	2	Z	2	0	0	1	1	3	1	4	5	3	2	1	2	1	1	0	0	0	0	0	0	0	1.3	5	
2-Feb	0	0	Z	0	0	0	0	1	1	1	1	2	2	2	1	0	0	0	0	2	1	6	21	7	2.3	21	
3-Feb	11	8	6	Z	5	5	5	4	4	4	3	3	3	1	1	1	0	1	0	0	1	3	6	6	3.5	11	
4-Feb	6	6	8	8	Z	7	7	7	5	4	1	0	0	0	0	0	0	0	0	0	0	0	5	9	3.3	9	
5-Feb	15	14	15	15	15	Z	8	5	8	4	3	2	2	2	1	1	0	0	0	0	0	0	0	0	4.9	15	
6-Feb	Z	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0.5	2	
7-Feb	0	Z	0	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	2	1	2	1	1	1	0.8	2	
8-Feb	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0.7	1	
9-Feb	1	1	1	Z	1	1	1	1	1	1	1	2	1	1	1	2	2	4	3	10	42	52	39	33	8.7	52	
10-Feb	34	30	23	18	Z	16	16	16	15	12	8	6	5	4	5	5	5	5	4	3	3	3	3	2	10.5	34	
11-Feb	2	2	3	3	4	Z	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.6	4	
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1	
13-Feb	0	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	
14-Feb	0	0	Z	1	1	1	1	1	1	1	C	C	C	C	C	C	C	1	1	1	2	2	2	2	--	2	
15-Feb	2	2	2	Z	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	2.0	3	
16-Feb	1	1	1	1	Z	1	0	0	0	1	1	M	M	M	M	M	2	4	9	7	7	9	7	5	3.1	9	
17-Feb	5	5	2	1	1	Z	1	1	1	4	3	3	0	0	0	0	1	4	1	1	3	6	0	0	1	2.0	6
18-Feb	Z	6	7	4	3	4	4	2	1	0	0	0	0	0	0	0	0	0	1	2	2	4	3	2	2	2.1	7
19-Feb	1	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	2	6	15	16	2.2	16
20-Feb	12	6	Z	6	3	2	2	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	1.8	12
21-Feb	0	0	0	Z	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	1	1	1	0	0	0.5	1	
22-Feb	0	0	0	0	Z	0	0	0	0	1	3	3	1	1	1	1	1	0	15	9	2	1	1	3	2.0	15	
23-Feb	4	5	4	3	3	Z	2	2	2	3	3	3	1	0	1	2	0	1	0	0	1	1	1	10	2.2	10	
24-Feb	Z	6	7	6	5	3	2	4	2	2	0	2	2	1	0	0	0	0	0	0	0	0	0	0	2.0	7	
25-Feb	0	Z	0	0	1	1	1	1	1	1	1	1	1	2	4	1	0	6	7	8	6	5	2	0	2.3	8	
26-Feb	0	1	Z	1	3	2	2	1	1	1	2	1	2	1	0	0	0	1	2	0	0	0	2	5	1.3	5	
27-Feb	8	6	3	Z	10	39	40	47	43	18	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	10.1	47
28-Feb	2	2	2	2	Z	8	13	9	8	6	6	7	5	3	3	3	9	11	10	9	4	4	6	7	6.0	13	
																		Diurnal Average						Diurnal Maximum			
																		34						4.1			
Z - zerspan																		C - Calibration						M - Maintenance			



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	621	98.10	98.10
21 - 40	8	1.26	99.37
41 - 80	4	0.63	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 633

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 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	21	20	12	29	20	38	41	39	48	29	71	84	60	45	41	617
21 - 40	0	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	8
11 - 80	0	3	1	0	0	0	0	0	0	0	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	19	28	24	13	29	20	38	41	39	48	29	71	84	60	45	41	629

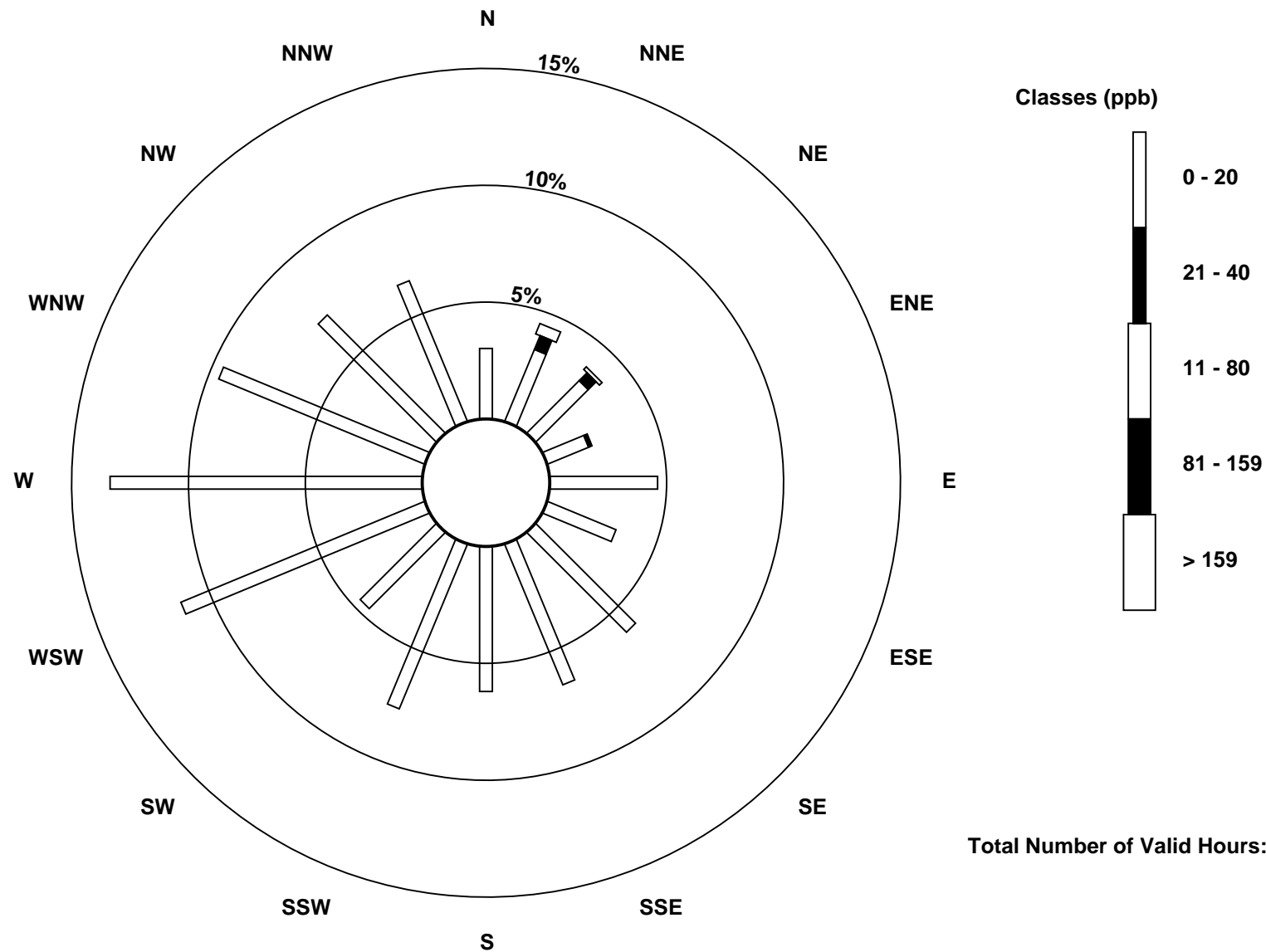
Total Number of Valid Hours: 629

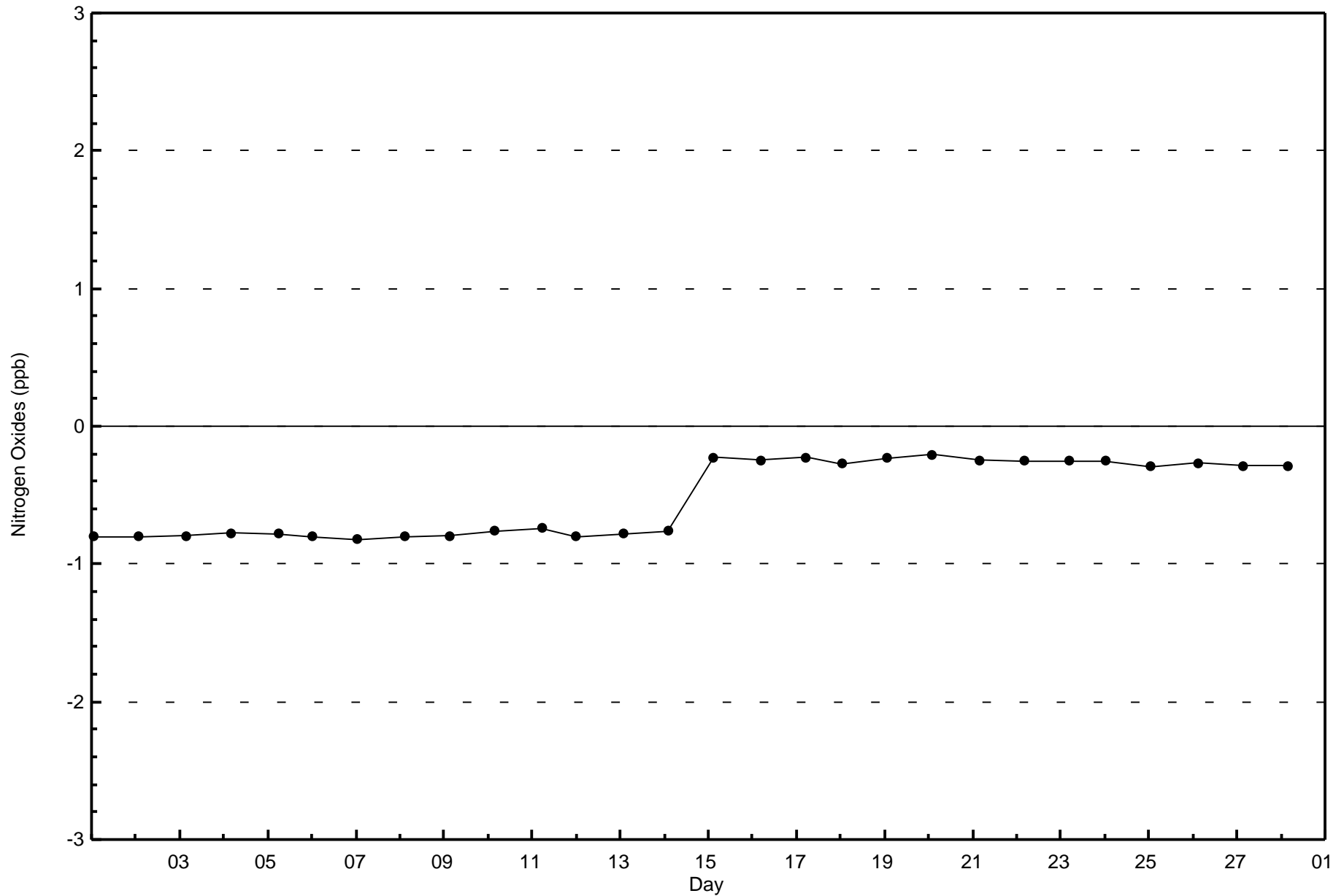
Total Number of Hours: 672

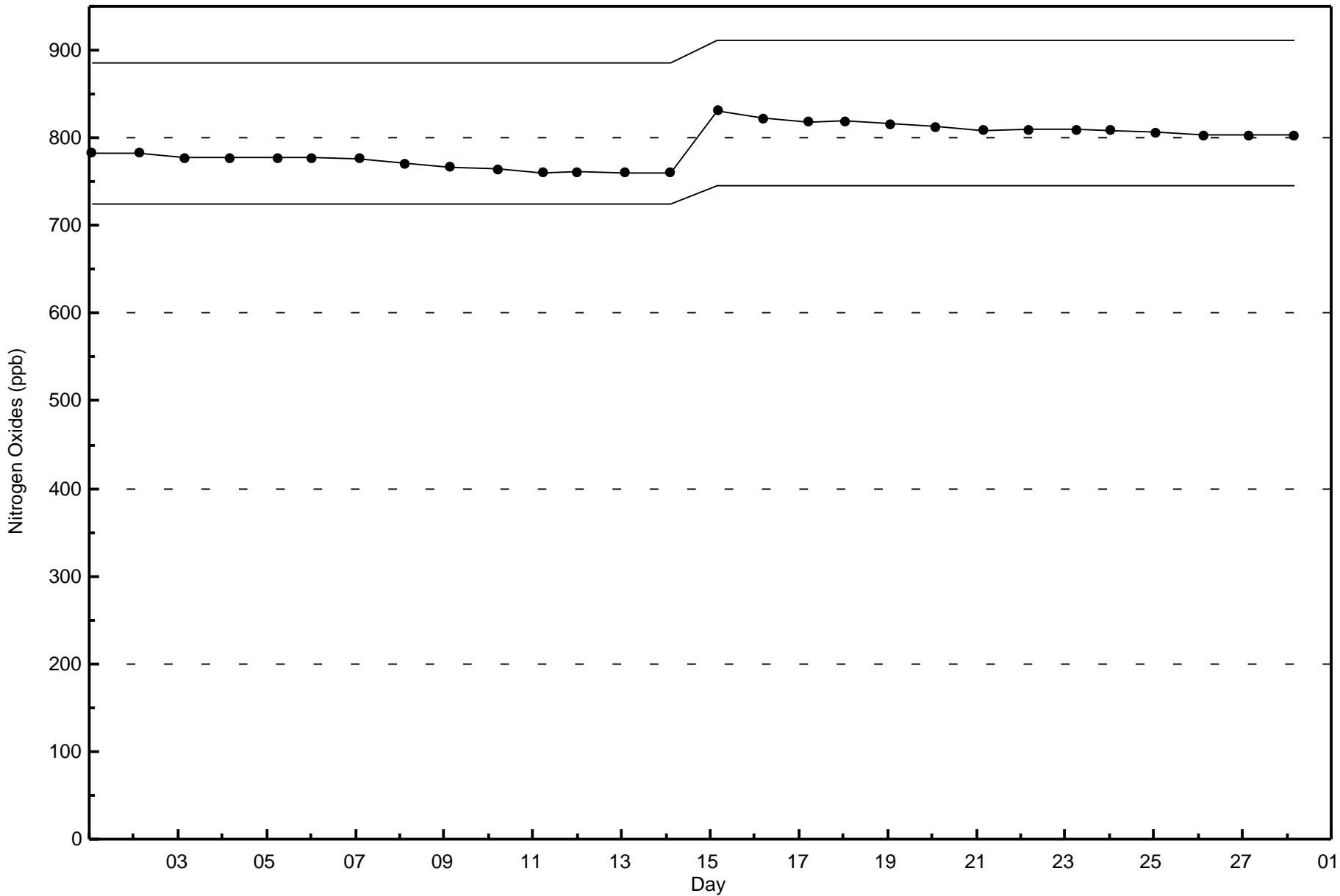


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River (AMS 20)









Wood Buffalo Environmental Association
Summary of Hour Averages

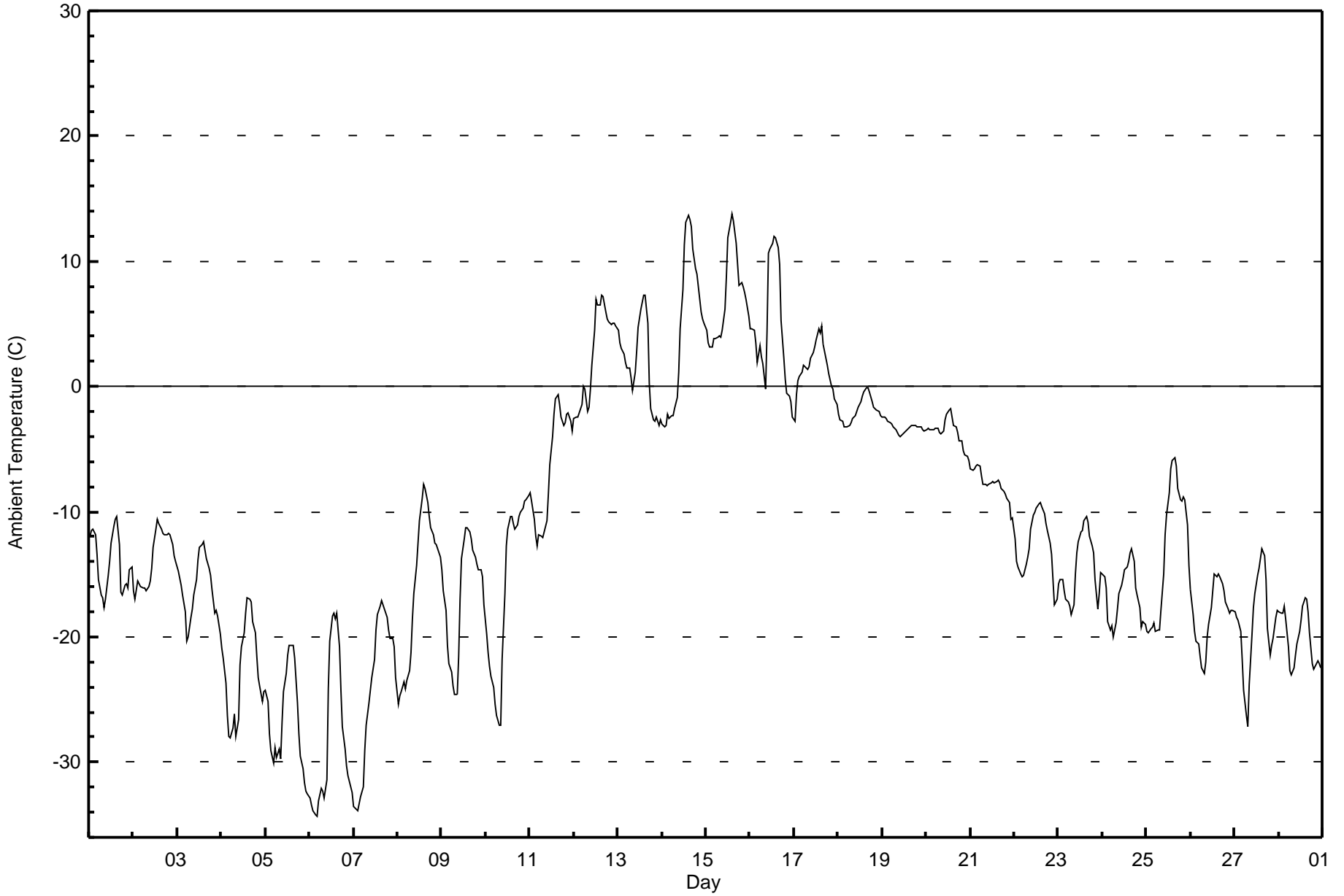
Ambient Temperature (AT) - C
Brion MacKay River - February 2017

Maximum Value: 13.8 C on Feb 15 15:00 Maximum Daily Average: 7.1 C on Feb 15																								Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0		
Minimum Value: -34.3 C on Feb 6 05:00 Minimum Daily Average: -28.1 C on Feb 6 Maximum Diurnal Average: -6.4 C at hour 16 Minimum Diurnal Average: -14.6 C at hour 7 Monthly Average: -11.05 C Percentiles: P₁ = -33.6 P₁₀ = -24.1 Q₁ = -18.4 Median = -12.4 Q₃ = -2.7 P₉₀ = 3.9 P₉₉ = 12.7																										
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-Feb	-11.9	-11.5	-11.4	-11.9	-13.3	-15.5	-16.6	-16.9	-17.7	-17.0	-15.1	-14.0	-12.5	-11.1	-10.7	-10.4	-12.7	-16.4	-16.6	-15.9	-15.7	-16.0	-14.6	-14.4	-14.2	-10.4
2-Feb	-16.3	-16.9	-15.6	-15.7	-16.0	-16.1	-16.0	-16.3	-16.0	-15.6	-14.5	-12.8	-11.4	-10.6	-10.9	-11.4	-11.7	-11.9	-11.8	-11.7	-11.9	-12.7	-13.5	-14.0	-13.8	-10.6
3-Feb	-14.7	-15.4	-15.9	-16.7	-18.0	-20.3	-20.0	-18.4	-17.8	-16.7	-15.4	-13.8	-12.9	-12.6	-12.4	-13.0	-13.7	-14.5	-15.0	-16.2	-18.1	-17.9	-18.3	-19.8	-16.1	-12.4
4-Feb	-20.9	-21.7	-23.7	-26.3	-28.0	-28.0	-27.3	-26.2	-27.9	-26.6	-22.2	-20.8	-19.7	-18.1	-16.9	-16.9	-17.2	-18.8	-19.7	-21.6	-23.3	-24.0	-25.1	-24.4	-22.7	-16.9
5-Feb	-24.2	-25.1	-27.7	-29.1	-30.1	-28.8	-29.6	-28.9	-29.7	-26.8	-24.3	-22.9	-21.5	-20.6	-20.6	-20.7	-21.7	-25.3	-27.7	-29.5	-30.5	-31.6	-32.3	-32.5	-26.8	-20.6
6-Feb	-32.9	-33.4	-33.9	-34.2	-34.3	-33.1	-32.1	-32.3	-32.9	-31.4	-24.1	-20.3	-18.3	-18.1	-18.6	-18.0	-20.8	-24.3	-27.2	-29.0	-30.3	-31.1	-32.0	-32.4	-28.1	-18.0
7-Feb	-33.5	-33.8	-33.8	-33.4	-32.7	-32.0	-29.1	-27.0	-25.3	-24.2	-23.2	-21.8	-19.5	-18.2	-17.5	-17.1	-17.4	-17.8	-18.4	-19.5	-20.2	-20.1	-20.8	-23.2	-24.1	-17.1
8-Feb	-25.4	-24.7	-24.3	-23.6	-24.1	-23.4	-22.7	-21.2	-18.5	-16.6	-14.3	-12.6	-10.7	-9.0	-7.8	-8.1	-9.3	-10.4	-11.3	-11.9	-12.5	-12.6	-12.9	-13.6	-15.9	-7.8
9-Feb	-14.6	-16.3	-17.9	-20.6	-22.2	-22.8	-23.9	-24.6	-24.6	-21.5	-17.0	-13.7	-12.1	-11.3	-11.3	-11.6	-12.1	-13.1	-13.6	-14.2	-14.6	-14.7	-15.2	-17.4	-16.7	-11.3
10-Feb	-19.8	-21.2	-22.3	-23.2	-24.0	-25.4	-26.3	-27.0	-27.1	-21.8	-16.6	-12.8	-11.4	-10.4	-10.4	-11.0	-11.4	-11.0	-10.3	-10.0	-9.7	-9.1	-9.1	-8.7	-16.2	-8.7
11-Feb	-8.4	-9.1	-10.6	-11.9	-12.7	-11.9	-12.0	-12.1	-11.7	-10.7	-8.6	-6.2	-4.0	-2.3	-1.0	-0.7	-1.4	-2.5	-3.1	-2.9	-2.3	-2.1	-2.8	-3.6	-6.4	-0.7
12-Feb	-2.6	-2.5	-2.4	-2.1	-1.4	0.0	-0.2	-1.9	-1.6	-0.3	1.7	4.5	6.9	6.5	6.5	7.3	7.2	6.0	5.4	5.1	4.9	5.1	5.0	4.8	2.6	7.3
13-Feb	4.5	3.5	3.1	2.5	1.9	1.5	1.4	0.7	-0.3	1.1	2.8	4.7	6.2	6.7	7.2	7.3	5.1	0.3	-1.7	-2.7	-2.7	-2.4	-3.1	-2.7	1.9	7.3
14-Feb	-3.0	-3.3	-3.1	-2.2	-2.6	-2.4	-2.3	-1.8	-0.9	1.1	4.7	7.7	11.3	13.1	13.6	13.4	12.8	11.0	9.4	9.0	8.0	6.0	5.3	5.0	4.6	13.6
15-Feb	4.6	3.5	3.1	3.2	3.8	3.8	4.0	4.1	4.0	4.5	6.1	8.8	11.9	13.1	13.8	13.2	11.5	9.7	8.1	8.4	8.0	7.5	7.0	5.7	7.1	13.8
16-Feb	4.6	4.7	4.5	3.5	1.9	3.2	2.4	1.8	-0.2	4.3	10.7	11.0	11.5	12.0	11.8	11.1	9.8	5.3	2.2	0.6	-0.5	-0.7	-1.2	-2.5	4.7	12.0
17-Feb	-2.7	-0.7	0.4	0.8	1.1	1.7	1.6	1.3	1.6	2.3	2.8	3.1	3.7	4.6	4.3	4.8	3.4	2.3	1.7	1.0	0.0	-0.2	-0.9	-1.5	1.5	4.8
18-Feb	-2.2	-2.6	-2.8	-3.2	-3.3	-3.2	-3.1	-2.9	-2.6	-2.3	-2.0	-1.7	-1.2	-0.7	-0.4	-0.1	-0.1	-0.4	-1.3	-1.7	-1.8	-1.9	-2.0	-2.3	-1.9	-0.1
19-Feb	-2.4	-2.4	-2.5	-2.7	-2.9	-3.0	-3.2	-3.5	-3.7	-3.9	-4.0	-3.8	-3.6	-3.6	-3.4	-3.2	-3.1	-3.1	-3.1	-3.2	-3.2	-3.2	-3.4	-3.5	-3.2	-2.4
20-Feb	-3.5	-3.3	-3.4	-3.5	-3.4	-3.3	-3.4	-3.7	-3.8	-3.6	-2.7	-2.2	-1.9	-1.8	-2.5	-3.1	-3.2	-3.6	-4.3	-4.4	-5.1	-5.4	-5.6	-5.9	-3.6	-1.8
21-Feb	-6.5	-6.7	-6.6	-6.4	-6.3	-6.4	-7.1	-7.8	-7.8	-7.9	-7.8	-7.7	-7.6	-7.7	-7.6	-7.4	-7.7	-8.1	-8.4	-8.6	-8.9	-9.3	-10.6	-10.5	-7.8	-6.3
22-Feb	-12.2	-13.9	-14.4	-15.0	-15.2	-15.1	-14.1	-13.6	-12.9	-11.4	-10.3	-10.0	-9.7	-9.4	-9.2	-9.6	-10.2	-11.0	-11.6	-12.6	-13.4	-15.4	-17.4	-17.0	-12.7	-9.2
23-Feb	-15.7	-15.4	-15.4	-16.3	-17.0	-17.2	-17.6	-18.2	-17.4	-15.0	-13.3	-12.4	-11.7	-11.5	-10.8	-10.4	-10.8	-12.0	-12.8	-13.3	-15.5	-17.8	-16.6	-14.8	-14.5	-10.4
24-Feb	-15.0	-15.2	-16.0	-18.8	-19.5	-19.2	-20.0	-18.9	-17.7	-16.5	-15.8	-15.3	-14.7	-14.5	-14.0	-13.3	-12.9	-13.9	-16.1	-16.7	-17.6	-19.2	-18.8	-19.0	-16.6	-12.9
25-Feb	-19.5	-19.7	-19.3	-19.2	-18.9	-19.6	-19.5	-19.4	-17.9	-15.0	-11.8	-10.3	-8.5	-6.6	-5.9	-5.7	-6.3	-8.1	-9.0	-9.1	-8.8	-9.0	-11.0	-14.3	-13.0	-5.7
26-Feb	-16.3	-18.2	-19.6	-20.3	-20.6	-21.5	-22.5	-23.0	-22.1	-20.1	-19.0	-17.7	-16.3	-15.0	-15.2	-15.0	-15.2	-15.7	-16.4	-17.3	-17.8	-18.1	-17.9	-17.9	-18.3	-15.0
27-Feb	-18.0	-18.5	-18.7	-19.6	-21.8	-24.3	-26.2	-27.1	-23.8	-19.8	-17.7	-16.5	-15.0	-14.6	-13.8	-13.0	-13.5	-15.4	-19.3	-21.4	-20.6	-20.1	-18.4	-17.9	-19.0	-13.0
28-Feb	-18.0	-18.1	-18.2	-17.5	-18.6	-20.8	-22.7	-23.0	-22.5	-21.4	-20.5	-19.5	-18.7	-17.6	-16.9	-17.0	-18.0	-19.7	-22.2	-22.6	-22.3	-21.9	-22.1	-22.4	-20.1	-16.9
	-12.4	-12.8	-13.2	-13.7	-14.2	-14.4	-14.6	-14.6	-14.2	-12.6	-10.4	-8.9	-7.5	-6.8	-6.4	-6.4	-7.2	-8.7	-9.8	-10.4	-10.9	-11.4	-11.7	-12.2	Diurnal Average	
	4.6	4.7	4.5	3.5	3.8	3.8	4.0	4.1	4.0	4.5	10.7	11.0	11.9	13.1	13.8	13.4	12.8	11.0	9.4	9.0	8.0	7.5	7.0	5.7	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Brion MacKay River - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Brion MacKay River - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	130	19.35	19.35
-20 - 0	433	64.43	83.78
0 - 10	92	13.69	97.47
10 - 20	17	2.53	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



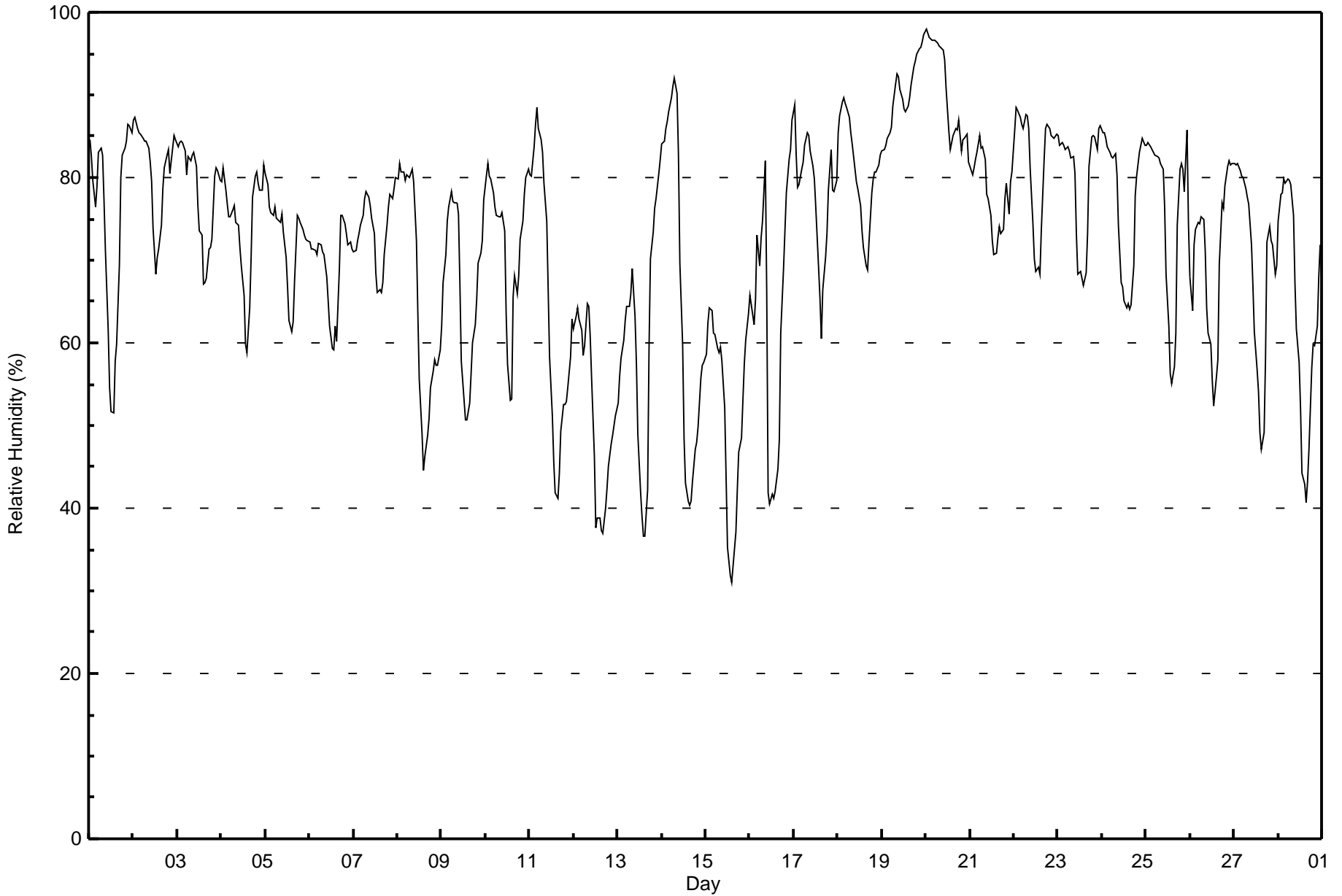
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Brion MacKay River - February 2017

Maximum Value: 98 % on Feb 20 01:00																			Maximum Daily Average: 90.3 % on Feb 20						Hours in Service: 672																			
Minimum Value: 31 % on Feb 15 15:00																			Minimum Daily Average: 51.6 % on Feb 12						Hours of Data: 672																			
Maximum Diurnal Average: 79.7 % at hour 8																			Minimum Diurnal Average: 57.4 % at hour 15						Hours of Missing Data: 0																			
Monthly Average: 72.2 %																			Percentiles: P ₁ = 37 P ₁₀ = 52 Q ₁ = 64 Median = 75 Q ₃ = 83 P ₉₀ = 86 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-Feb	85	83	80	76	79	83	84	83	77	71	61	55	52	52	58	60	69	80	83	84	84	86	86	85	74.8	86																		
2-Feb	87	87	86	85	85	85	84	84	84	82	79	74	68	70	71	74	79	81	83	83	81	84	85	85	81.1	87																		
3-Feb	84	84	84	84	83	80	83	82	83	83	81	77	74	73	67	67	68	71	71	73	80	81	81	80	78.1	84																		
4-Feb	79	81	78	77	75	75	76	77	75	74	72	69	66	60	59	64	70	78	80	81	79	78	78	81	74.3	81																		
5-Feb	80	79	76	76	75	76	75	75	75	76	73	70	67	63	61	63	67	75	75	75	74	73	73	72	72.7	80																		
6-Feb	72	71	71	71	71	72	72	71	71	68	65	62	59	59	62	60	69	75	75	74	73	72	72	71	69.2	75																		
7-Feb	71	71	72	73	74	75	77	78	78	77	75	73	68	66	66	66	67	71	74	76	78	77	79	80	73.6	80																		
8-Feb	80	82	81	81	80	80	80	81	81	79	72	64	56	49	45	46	49	51	55	57	58	57	57	59	65.7	82																		
9-Feb	62	67	71	75	76	78	77	77	77	76	67	58	53	51	51	53	56	60	62	65	70	71	72	77	66.8	78																		
10-Feb	80	82	80	80	78	77	75	75	75	76	74	64	58	53	53	66	68	66	68	72	75	78	80	81	72.2	82																		
11-Feb	80	80	84	86	88	86	85	83	79	75	67	58	51	46	42	41	44	49	53	52	53	55	58	63	64.9	88																		
12-Feb	62	63	64	63	62	58	60	65	64	61	56	46	38	39	39	37	37	40	42	45	48	49	50	51	51.6	65																		
13-Feb	53	56	58	60	63	64	64	66	69	63	57	49	42	39	37	37	42	59	70	73	76	77	81	82	60.0	82																		
14-Feb	84	84	86	87	88	90	91	92	90	83	70	60	49	43	41	40	41	43	47	48	50	56	57	58	65.7	92																		
15-Feb	59	62	64	64	61	61	59	59	60	58	52	44	35	32	31	33	37	42	47	48	53	57	60	64	51.8	64																		
16-Feb	66	65	62	65	73	69	73	75	82	66	42	40	42	41	42	45	48	61	69	74	78	82	83	87	63.8	87																		
17-Feb	89	83	79	79	81	82	84	85	85	83	81	80	76	69	65	61	66	70	73	79	83	78	78	80	78.0	89																		
18-Feb	85	88	89	90	89	89	87	85	84	81	79	79	77	74	72	69	69	72	78	80	81	81	82	83	80.9	90																		
19-Feb	83	83	84	85	85	86	89	91	93	92	91	89	88	88	89	90	91	93	94	95	96	96	96	97	90.2	97																		
20-Feb	98	98	97	97	97	97	96	96	96	95	94	91	86	83	84	85	86	86	87	83	85	85	85	82	90.3	98																		
21-Feb	81	80	81	82	83	85	84	84	82	78	77	75	72	71	71	73	74	73	74	77	79	76	79	81	78.1	85																		
22-Feb	86	88	88	87	86	86	88	87	86	81	74	70	69	69	68	74	82	86	87	86	85	85	85	85	82.1	88																		
23-Feb	85	84	84	84	83	84	83	82	83	80	73	68	69	68	67	69	73	81	85	85	85	83	86	86	79.6	86																		
24-Feb	85	85	85	84	83	83	82	83	80	74	67	67	65	64	65	64	65	69	78	80	83	84	85	84	76.8	85																		
25-Feb	84	84	84	83	83	83	83	82	82	81	76	68	62	56	55	57	61	74	81	82	81	78	86	74	75.9	86																		
26-Feb	68	64	72	74	75	74	75	75	71	64	61	60	56	52	56	58	70	77	76	79	81	82	81	82	70.1	82																		
27-Feb	82	81	82	81	80	80	79	78	77	72	67	61	57	54	49	47	49	58	72	74	72	72	68	69	69.2	82																		
28-Feb	75	78	78	80	79	80	80	79	75	67	62	58	52	44	43	41	43	47	57	60	60	62	68	72	64.1	80																		
																			78.0	78.4	78.6	78.9	79.2	79.2	79.4	79.7	79.0	75.6	70.3	65.3	60.9	58.1	57.4	58.5	62.2	67.6	71.3	72.9	74.3	74.9	76.2	76.8	Diurnal Average	
																			98	98	97	97	97	97	96	96	96	95	94	91	88	88	89	90	91	93	94	95	96	96	96	97	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Brion MacKay River - February 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	14	2.08	2.08
40 - 60	116	17.26	19.35
60 - 80	304	45.24	64.58
80 - 100	238	35.42	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

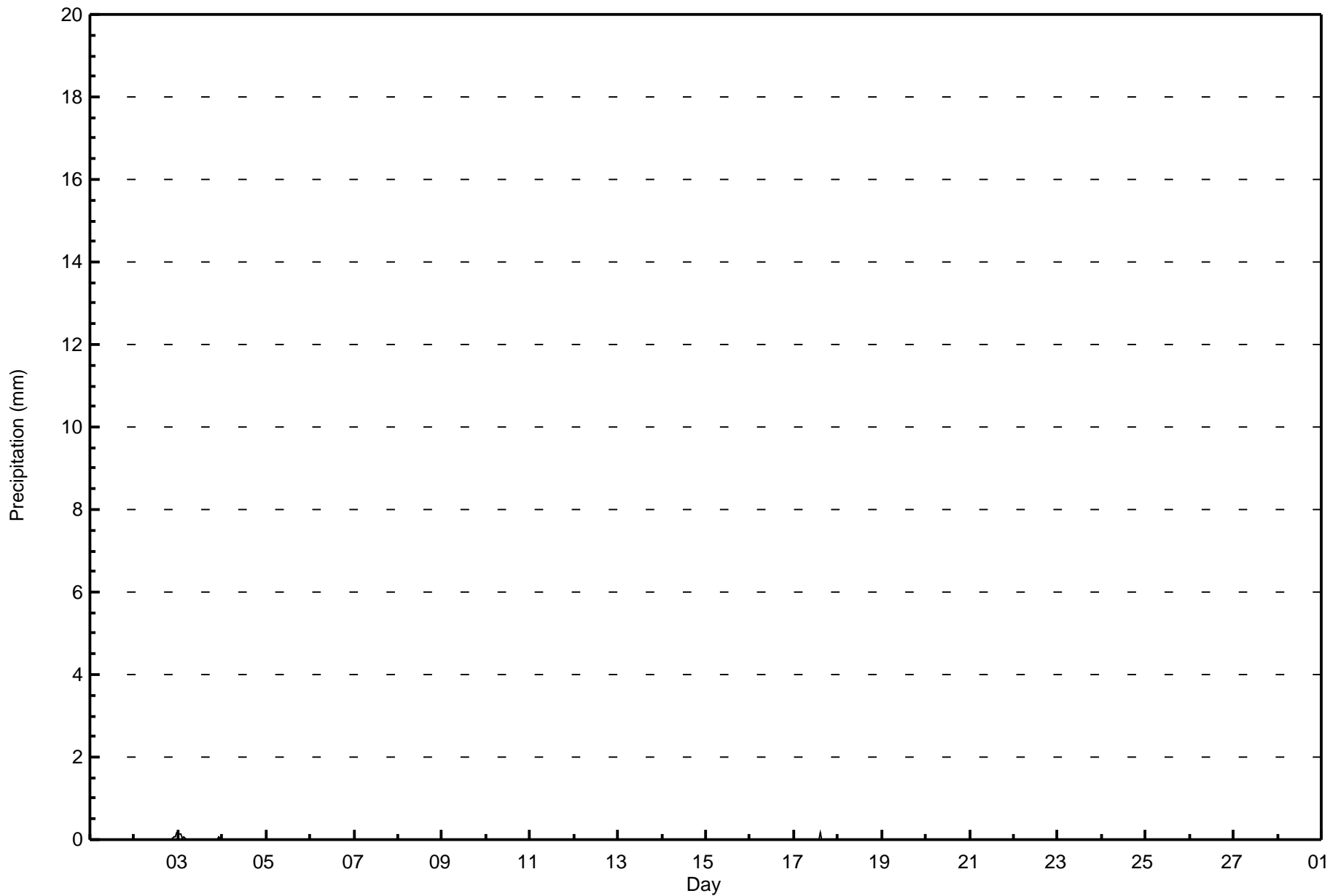


Maximum Value: 0.2 mm on Feb 3 00:00		Maximum Daily Total: 0.4 mm on Feb 3		Hours in Service: 672																							
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1		Hours of Data: 672																							
Maximum Diurnal Total: 0.2 mm at hour 24		Minimum Diurnal Total: 0.0 mm at hour 5		Hours of Missing Data: 0																							
Monthly Total: 0.90 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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.2	0.3	0.2	0.0
3-Feb	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.1	0.0
4-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
18-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	Diurnal Average	
		0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Brion MacKay River - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Brion MacKay River - February 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	672	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: 672

Total Number of Hours: 672



Maximum Speed: 18 km/h on Feb 12 13:00	Maximum Daily Speed Average: 10.9 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 4 03:00	Minimum Daily Speed Average: 0.6 km/h on Feb 18	Hours of Data: 666
Maximum Diurnal Speed Average: 4.5 km/h at hour 14	Minimum Diurnal Speed Average: 1.0 km/h at hour 24	Hours of Missing Data: 6
Monthly Average Velocity: 2.3 km/h 259.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 14	Percent Operational Time: 99.4

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-Feb	NW8	NW8	NNW10	NNW11	NNW7	NNW6	NNW6	NNW7	NW8	NW6	NW8	NW8	NW9	NW8	NW8	WNW7	W2	SW3	WSW5	W5	WSW4	WSW5	W6	W5	NW5.9	NNW11
2-Feb	WSW4	W5	W6	W5	WSW5	WSW5	W5	W7	W6	WNW6	WNW6	WNW6	NNW8	NW8	NW5	W6	WSW5	WSW4	WSW4	WNW5	NNW7	N5	NE4	NNE5	WNW4.3	NW8
3-Feb	NE5	NE3	NE2	N2	S1	AF	SE1	SE1	SSE2	NNW1	NW3	NNW2	WSW2	W6	W6	WNW7	NW6	NW7	NNW12	NNW4	WSW2	NE3	NE8	NE7	NNW2.4	NNW12
4-Feb	NE4	NNE3	SW0	SE2	SSE1	SE2	SSE1	SSW1	S2	WSW3	W4	WNW7	WNW5	SW4	W4	WSW5	S2	SSE3	SSE4	SSE5	SSE3	SE1	NNW4	N6	WSW1.0	WNW7
5-Feb	NNE7	N5	N4	NNW3	NNW4	NNW5	NW3	WSW1	W2	WNW4	NNW5	NNW6	NNW6	NW6	NW5	W3	SSE2	SSE3	S3	S3	SSE3	S4	SSE3	NW1.8	NNE7	
6-Feb	SSE3	SSE3	SE2	SSE2	SE2	SE3	SE2	SE2	SE2	SSE3	N1	ESE2	E2	NNW5	N2	NE4	NE2	SE2	SE2	SE2	SSE2	SSE3	SSE3	SSE3	SE1.5	NNW5
7-Feb	AF	SSE2	WSW2	W3	WSW3	WSW4	WSW5	WSW6	WSW8	WSW9	WSW9	W9	W10	W10	W8	W9	W8	W6	WNW7	WNW7	WNW6	WNW5	WNW6	W4	W6.0	W10
8-Feb	W4	W4	WSW5	WSW5	SW5	WSW6	W7	WSW7	WSW7	SW8	WSW11	WSW12	W13	WSW12	WSW13	SW12	SW12	SW11	SW10	SW11	SW9	SW9	WSW9	SW8	WSW8.5	W13
9-Feb	SW5	SW5	SSW5	S4	S4	S4	SSE3	SE3	SSE4	SSE4	SSE4	SE7	ESE6	SE6	ESE5	E4	E5	E3	NE5	NNE4	NNE4	NE5	NNE5	ENE2	SE2.4	SE7
10-Feb	NNE2	NE2	NE2	NE1	S1	SE1	SSE1	SE2	SSE3	SE3	ESE3	SSE4	ESE5	SE4	SE6	ESE9	ESE10	ESE9	SE7	SSE5	SSE4	S6	SSW8	SSW7	SE3.4	ESE10
11-Feb	SSW8	SSW9	SSW8	SW8	SW6	WSW7	W6	WSW7	W7	W8	W8	W10	W11	W11	WSW11	WSW11	WSW10	WSW8	WSW7	SW9	WSW11	SW9	SSW8	SSW8	WSW7.8	W11
12-Feb	SSW11	SSW11	SSW12	SSW10	SW10	SW11	SSW10	SSW10	SSW11	SSW11	SW10	WSW12	W18	WSW15	WSW13	WSW13	WSW14	WSW11	WSW12	W14	W12	W12	W12	W12	WSW10.9	W18
13-Feb	W13	W13	W14	W12	W11	W10	W9	W7	WSW6	W10	W9	NNW10	NNW10	NNW9	W9	W7	WSW2	SSE3	SSE3	SSE4	S4	S6	SSW4	SSW5	W6.6	W14
14-Feb	SSW4	S5	S5	S6	S6	S7	S7	S8	SSW11	SSW10	SSW8	SSW8	SSW10	C	C	SSW11	SSW10	SSW8	SSW8	SSW10	S10	S8	S10	S11	SSW8.1	SSW11
15-Feb	S10	S8	S8	S9	S9	S10	S11	S11	S10	S7	S8	S7	S7	SW6	SSW5	W5	SW4	SSW7	SSW9	SSW10	SSW10	SSW10	SSW10	SSW9	SSW7.9	S11
16-Feb	SSW11	SSW11	SSW8	SSW8	S6	SSE5	SSE7	SSE5	SE4	E4	E6	ESE10	SSE7	SW6	W3	W3	WNW3	NNW2	SSE1	SSE1	NNW1	NNE2	NNW1	SSW1	S3.0	SSW11
17-Feb	WSW2	W4	WSW4	WSW3	WSW4	W4	WNW4	W4	WNW7	NW8	NW9	NW8	WNW9	WNW12	WNW11	NW13	NW10	NW7	NW7	NNW7	NNW5	NNW8	NW7	NNW5	NW6.1	NW13
18-Feb	NNE4	N3	N4	NNE5	NW1	NNW2	W3	SW3	W4	WNW7	W7	W5	WNW5	SSW5	S4	NNW0	ESE1	ESE5	E5	E5	E5	E7	E7	E7	ENE0.6	E7
19-Feb	E8	E8	E9	E8	E10	E12	E11	E10	ENE10	ENE11	ENE10	E11	E12	E10	E9	E6	ENE6	ENE5	NE4	NE4	NNE4	NNE3	N4	N4	E7.3	E12
20-Feb	NNW5	NNW6	NNW6	NW5	WNW5	WNW6	W6	W5	W5	WNW5	WNW6	WNW8	WNW8	W7	WSW8	W8	W6	WNW7	W5	W8	WNW9	W8	W9	W9	WNW6.1	W9
21-Feb	W8	WSW8	WSW9	WSW9	WSW8	W9	WNW12	WNW9	WNW9	WNW13	WNW10	W10	W10	WNW11	WNW12	WNW9	WNW8	W7	WNW7	WNW5	WNW8	WNW8	W4	WSW3	W8.1	WNW13
22-Feb	WSW3	WSW3	W2	WSW2	WSW2	SW2	WSW3	WSW3	W3	WNW6	NW9	NW9	NW8	NW7	WNW8	NW7	NNW7	NNW6	NNE5	NNE5	NE4	AF	NE2	SW0	NW3.5	NW9
23-Feb	ESE2	SE3	ESE2	ESE1	ESE2	SSE2	S2	SSE2	S3	SSW3	SSE1	NNW1	W3	WSW3	NW1	NNE4	N3	E2	SE3	SE3	SE3	SE1	AF	NNE5	SE0.9	NNE5
24-Feb	NNE6	N6	N7	NNW3	NW2	NNW1	WNW2	NW6	NW8	NW11	NNW10	NNW8	NW7	WNW9	WNW8	W5	W5	WSW4	WSW4	WSW5	WSW4	SSW5	SSW6	SSW7	WNW4.0	NW11
25-Feb	S6	S7	S7	SSW8	SSW8	S8	S9	SSW9	S7	S5	WSW7	W7	W7	NW8	NW7	N6	N11	NNE6	SSW2	SSW5	W7	N12	NNE12	N14	W2.3	N14
26-Feb	NNW15	NW14	NW14	NW12	NW12	NW9	WNW7	WNW8	WNW6	NW9	NW8	WNW8	WNW9	W9	W7	W6	WSW4	WNW4	NW3	ENE2	ESE3	SE3	ESE5	ESE4	NW5.8	NNW15
27-Feb	ESE4	ENE3	NE4	NNE6	NNE6	NNE5	NE3	NNE4	NNE4	ENE5	ESE8	ESE8	SE4	SE7	SE3	SE3	SSE5	SE4	SE4	SE4	SSE5	SE5	SSE5	SSE5	ESE3.3	ESE8
28-Feb	E0	NNW2	NNW2	NNW7	N8	NNE7	NNE4	NNE5	NNE7	NNE8	NNE6	N6	N6	NE4	E7	ENE7	ENE8	ENE6	E3	E3	NE4	NE7	ENE8	NE7	NE4.6	NNE8

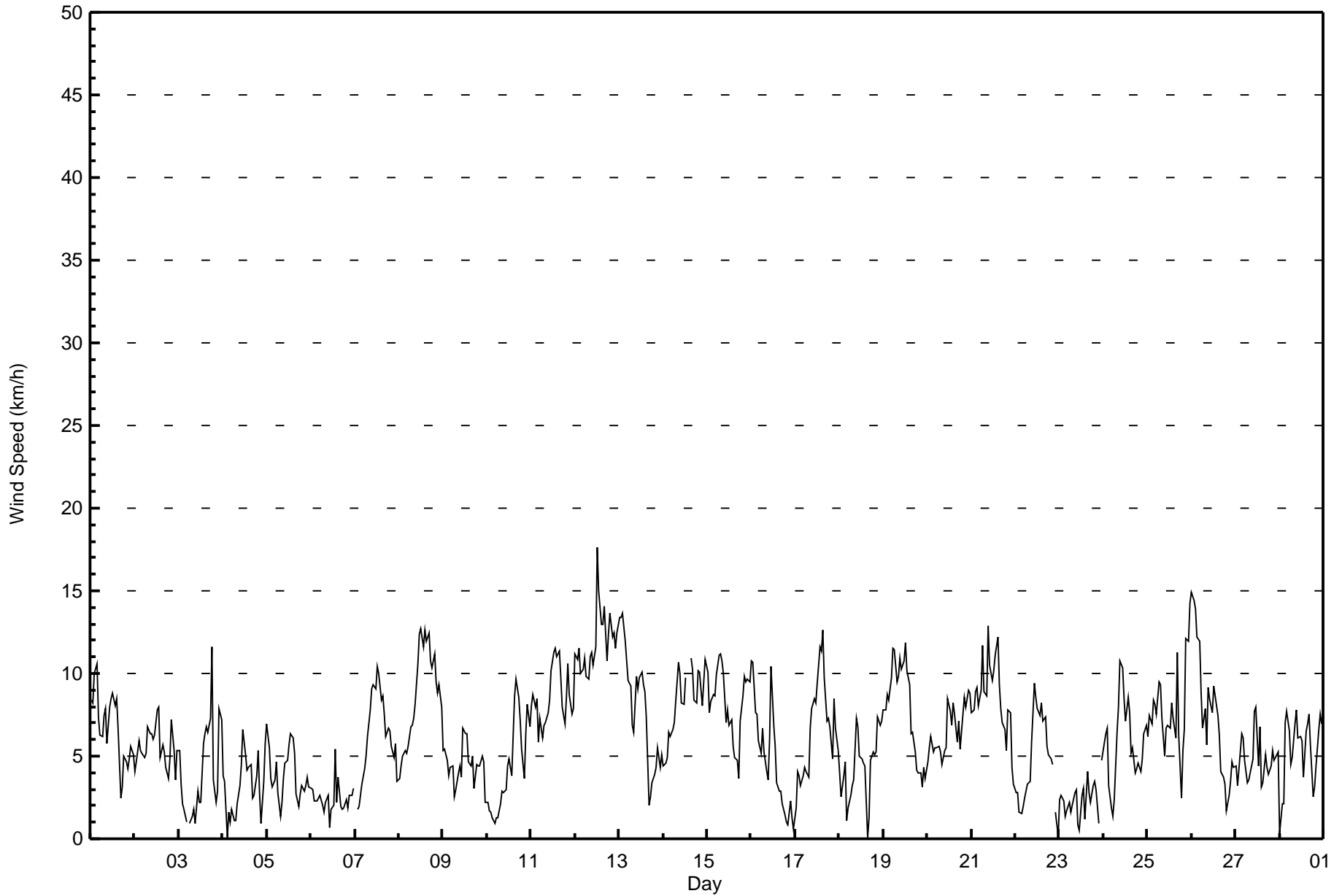
WSW1.5	WSW1.9	WSW1.9	WSW1.9	WSW2.0	WSW2.1	WSW2.3	WSW2.4	WSW2.5	W2.9	NNW3.1	W3.3	W4.2	W4.5	W4.2	W3.5	W2.4	WSW1.4	WSW1.6	SW2.0	WSW1.9	WSW1.3	SW1.1	SW1.0	Diurnal Average
NNW15	NW14	NW14	NW12	NW12	E12	WNW12	S11	SSW11	WNW13	WSW11	WSW12	W18	WSW15	WSW13	WSW13	WSW14	SW11	WSW12	W14	W12	W12	NNE12	N14	Diurnal Maximum

C - Calibration 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 - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Brion MacKay River - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	312	46.85	46.85
6 - 11	315	47.30	94.14
12 - 19	39	5.86	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: 666

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Brion MacKay River - February 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	21	20	5	12	14	33	44	15	11	12	38	32	14	8	22	312
6 - 11	8	9	4	8	16	7	5	2	30	41	16	28	46	42	34	19	315
12 - 19	2	1	0	0	2	0	0	0	0	1	2	9	11	4	5	2	39
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	21	31	24	13	30	21	38	46	45	53	30	75	89	60	47	43	666

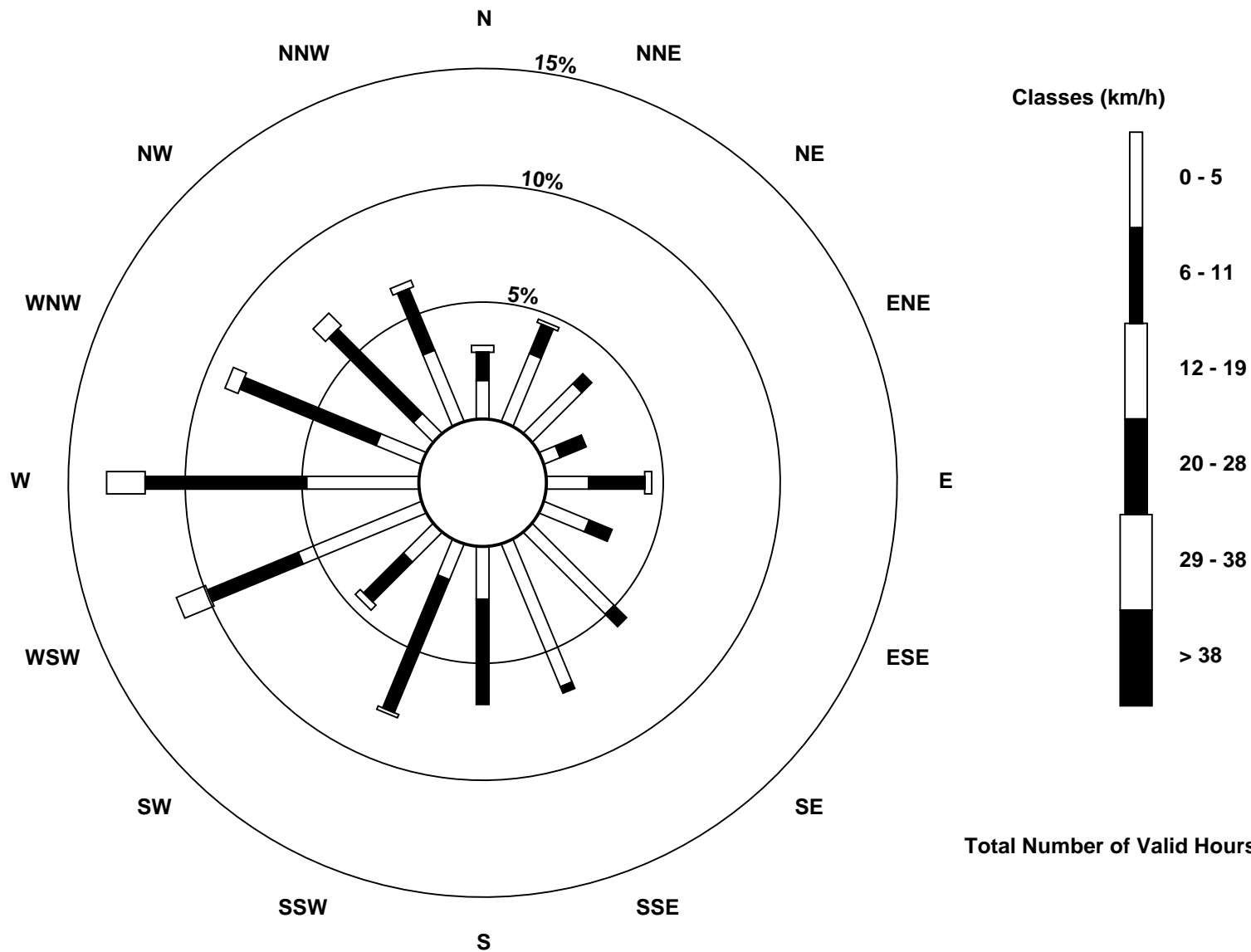
Total Number of Valid Hours: 666

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Brion MacKay River (AMS 20)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Brion MacKay River - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 12 13:00	Hours in Service: 672 Hours of Data: 666 Hours of Missing Data: 6 Hours of Calibration: 2 Percent Operational Time: 99.4
Minimum Value: 0 km/h on Feb 5 18:00	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	2	2	3	4	2	2	2	2	2	2	2	3	3	3	3	2	1	1	2	1	2	2	2	2	4
2-Feb	1	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	3
3-Feb	2	2	1	1	1	AF	1	1	1	2	1	1	1	2	2	2	2	2	4	4	1	3	3	2	4
4-Feb	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	2	1	2	2	2
5-Feb	2	2	1	1	1	1	1	1	1	1	2	2	2	2	3	2	1	0	0	1	1	1	1	1	3
6-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0	0	0	1	1	1	1	2
7-Feb	AF	1	1	1	1	1	2	2	3	4	4	4	5	5	4	4	3	3	2	2	2	2	2	1	5
8-Feb	1	1	2	2	1	2	3	3	3	3	5	5	5	5	5	5	5	4	3	4	3	3	3	3	5
9-Feb	2	2	1	1	1	2	1	1	1	1	1	2	2	2	1	2	2	1	1	1	1	1	1	1	2
10-Feb	1	1	1	1	1	1	1	0	1	1	2	1	2	2	2	2	3	3	2	2	1	2	2	2	3
11-Feb	3	3	2	3	2	3	3	3	3	3	4	4	5	5	5	5	4	3	3	3	4	4	2	2	5
12-Feb	3	4	4	3	4	4	3	2	3	3	3	5	8	6	5	6	6	5	5	6	5	5	5	5	8
13-Feb	5	5	5	4	4	4	4	3	3	4	4	4	4	4	3	2	1	1	1	1	1	2	1	1	5
14-Feb	1	1	2	1	1	1	1	2	2	3	2	3	3	C	C	4	3	2	2	3	2	2	3	2	4
15-Feb	2	2	2	2	2	3	2	2	2	3	2	3	2	3	2	2	1	2	2	3	3	2	2	2	3
16-Feb	3	3	2	2	2	2	2	1	1	1	2	3	3	2	2	1	1	1	1	1	1	1	1	1	3
17-Feb	1	1	2	1	1	1	1	1	2	2	2	3	3	4	4	4	3	2	2	2	1	2	2	1	4
18-Feb	1	1	1	2	1	1	1	1	2	3	3	2	2	3	2	2	2	3	2	2	2	2	2	3	3
19-Feb	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	2	2	2	1	1	1	1	1	1	4
20-Feb	1	2	2	1	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	3	3	3	4	4	4
21-Feb	3	4	4	4	3	4	5	4	3	4	4	4	4	5	4	3	3	3	3	2	3	3	2	1	5
22-Feb	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	2	2	2	2	1	2	AF	1	1	3
23-Feb	1	1	1	1	1	1	1	0	1	1	1	1	2	2	1	1	1	1	1	1	1	1	AF	2	2
24-Feb	2	2	2	1	1	1	2	2	2	3	3	2	3	3	3	2	2	2	1	2	1	1	2	1	3
25-Feb	1	2	1	2	2	2	2	2	2	2	3	3	3	3	3	4	4	4	2	4	4	5	5	5	5
26-Feb	5	4	4	3	3	2	2	2	2	3	3	3	3	4	3	3	2	2	1	1	1	1	1	1	5
27-Feb	1	1	1	2	2	1	1	1	1	2	3	3	2	2	2	2	2	1	1	1	1	1	1	1	3
28-Feb	1	1	2	2	3	2	2	2	2	2	2	2	2	2	3	2	2	3	1	1	2	2	3	2	3
	5	5	5	4	4	4	5	4	4	4	5	5	8	6	5	6	6	5	5	6	5	5	5	5	
Diurnal Maximum																									

C - Calibration AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Brion MacKay River - February 2017

Direction of Maximum Speed: 262 deg on Feb 12 13:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 239.1 deg on Feb 12	Hours of Data: 666
Direction of Minimum Speed: 222 deg on Feb 4 03:00	Direction of Minimum Daily Speed Average: 0.6 deg on Feb 18
Direction of Minimum Speed: 222 deg on Feb 4 03:00	Hours of Missing Data: 6
Monthly Average Direction: 265.9 deg	Percent Operational Time: 99.4

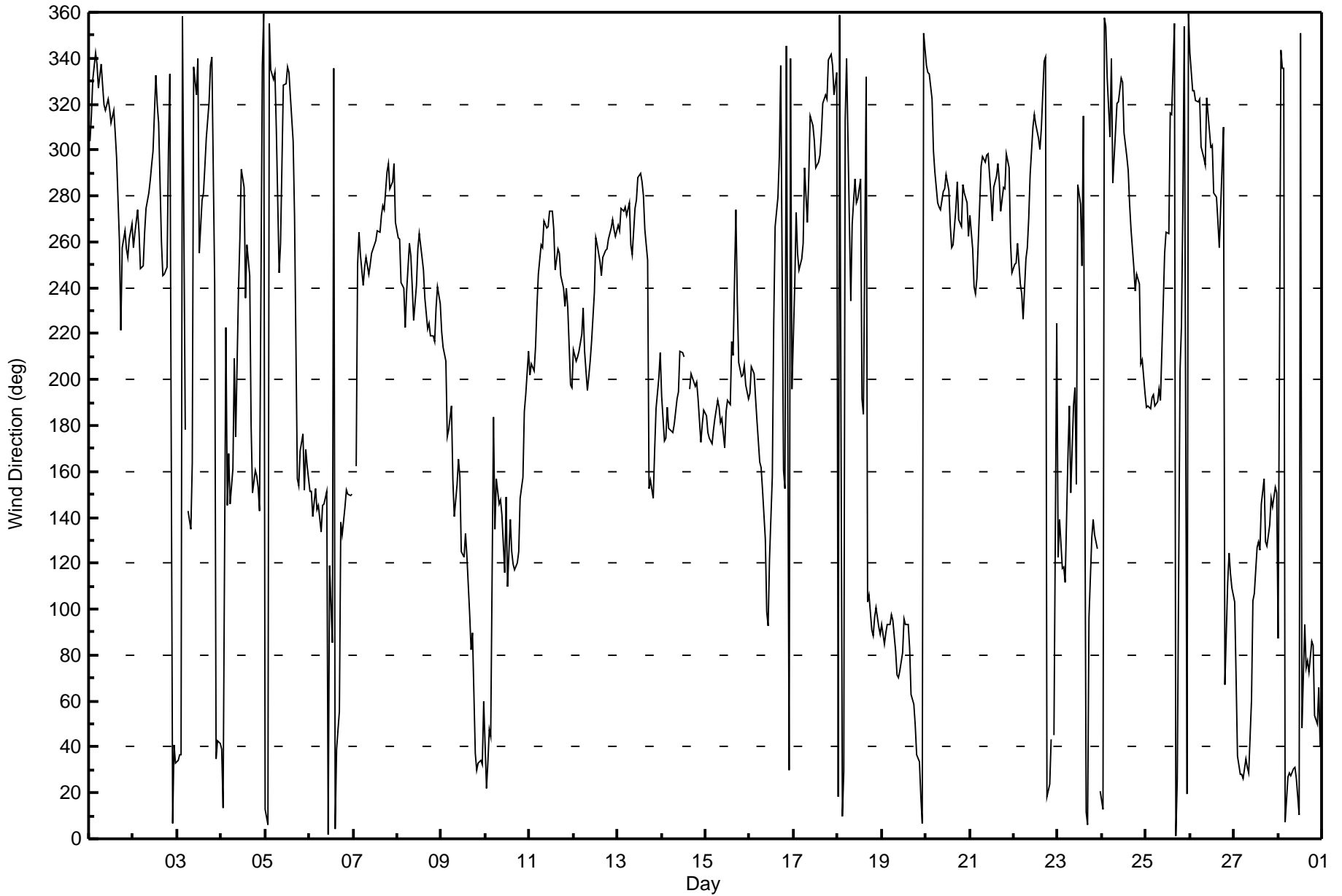
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	304	315	331	342	338	327	338	328	320	317	322	318	312	317	307	297	260	221	258	265	257	253	261	268	308.6
2-Feb	257	263	274	264	248	250	264	274	281	287	294	300	333	320	312	260	245	246	249	300	333	7	41	33	289.8
3-Feb	34	36	36	358	178	AF	143	135	163	336	324	340	255	278	281	293	305	321	337	340	242	35	43	42	338.0
4-Feb	39	13	222	145	168	146	161	209	175	239	262	292	284	235	259	245	180	150	161	158	153	143	337	359	237.5
5-Feb	13	6	355	335	331	334	309	246	259	294	328	329	336	334	313	304	271	157	154	169	177	152	169	163	321.2
6-Feb	151	151	140	153	143	145	134	145	146	152	2	119	85	335	4	39	56	138	133	144	152	150	150	150	128.8
7-Feb	AF	162	250	264	254	241	249	253	246	250	255	259	260	265	264	271	276	274	290	294	283	286	294	269	265.2
8-Feb	262	261	242	240	223	238	259	254	241	226	241	257	263	253	248	235	222	224	219	219	217	232	240	233	238.6
9-Feb	221	214	208	175	178	189	156	141	154	165	157	125	122	133	123	98	82	90	37	30	33	34	33	60	127.9
10-Feb	22	34	48	44	184	135	157	146	148	141	116	149	110	139	125	120	117	120	125	148	157	186	194	212	139.0
11-Feb	202	207	204	214	232	246	259	258	269	266	267	273	273	266	248	257	255	245	240	232	240	231	198	196	242.5
12-Feb	213	208	210	212	220	231	212	195	201	208	217	238	262	258	251	246	253	256	257	261	266	270	265	263	239.1
13-Feb	267	265	274	273	275	271	277	259	254	274	278	288	290	286	280	265	252	153	156	148	169	187	201	212	264.2
14-Feb	193	174	174	188	179	177	177	181	192	195	212	211	210	C	C	196	203	201	197	199	191	173	181	187	191.8
15-Feb	184	177	174	172	178	183	191	188	181	183	170	186	191	189	217	210	274	235	208	201	202	206	198	192	191.6
16-Feb	194	206	203	192	183	164	162	152	131	99	93	122	158	225	267	279	297	337	161	153	345	30	340	196	175.3
17-Feb	241	273	255	248	252	259	292	269	288	315	311	304	292	295	298	307	321	324	322	339	342	337	324	334	304.7
18-Feb	18	359	10	30	313	340	269	235	268	288	277	279	287	192	185	332	103	106	91	89	96	101	92	89	58.0
19-Feb	93	85	90	93	93	98	95	82	72	70	73	81	96	93	94	83	63	59	49	36	33	18	7	351	78.8
20-Feb	337	334	333	322	299	290	277	275	274	282	283	289	282	267	258	259	275	286	270	267	285	281	277	263	283.4
21-Feb	272	257	241	237	244	276	293	297	295	298	298	280	269	283	289	294	286	273	284	283	298	292	260	247	279.4
22-Feb	250	251	260	241	237	227	252	257	270	289	310	316	311	305	300	310	339	340	18	24	44	AF	45	225	309.2
23-Feb	122	139	118	119	112	167	189	151	189	196	154	285	277	250	315	12	6	96	131	139	133	126	AF	21	132.9
24-Feb	13	357	354	332	306	340	285	309	320	321	331	330	308	297	291	276	266	249	238	246	242	207	209	194	298.8
25-Feb	188	188	187	192	194	188	191	196	191	233	255	264	264	316	316	355	1	25	204	224	275	354	19	359	260.2
26-Feb	342	326	326	321	321	322	302	297	293	323	316	301	302	281	279	269	257	293	310	67	111	124	115	110	312.9
27-Feb	103	70	36	28	28	26	35	31	29	60	104	107	127	130	125	146	157	129	127	137	148	145	153	151	101.3
28-Feb	87	343	336	335	7	27	29	28	31	31	26	10	351	48	94	75	77	73	86	84	54	50	66	40	39.1
252.6 255.0 258.4 252.9 243.4 240.9 241.7 240.1 243.4 269.1 282.3 278.8 276.4 275.8 273.3 269.5 271.7 252.4 241.6 228.8 239.8 249.6 232.6 235.7																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Brion MacKay River - February 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Brion MacKay River - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 104 deg on Feb 23 12:00	Hours of Data: 666
Minimum Value: 6 deg on Feb 6 23:00	Hours of Missing Data: 6
Percentiles: P ₁ = 11 P ₁₀ = 17 Q ₁ = 22 Median = 29 Q ₃ = 41 P ₉₀ = 48 P ₉₉ = 88	Hours of Calibration: 2
	Percent Operational Time: 99.4

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-Feb	22	21	24	22	18	17	20	20	16	21	20	23	24	28	29	28	34	17	28	35	47	34	45	44	47
2-Feb	34	45	47	51	41	37	44	38	33	30	28	30	24	25	35	44	34	38	40	35	21	26	26	23	51
3-Feb	23	36	29	51	65	AF	40	36	49	84	43	75	66	43	47	27	21	22	20	75	34	86	23	25	86
4-Feb	47	33	79	30	72	19	75	63	25	35	52	35	51	55	53	49	43	19	13	8	29	29	33	21	79
5-Feb	23	20	21	23	11	14	16	38	41	26	29	51	36	32	45	41	41	19	10	17	25	15	22	26	51
6-Feb	15	15	17	45	12	25	22	29	21	20	89	59	74	31	53	34	51	22	11	15	15	9	6	9	89
7-Feb	AF	30	41	28	31	31	40	44	41	41	44	48	48	45	47	44	44	43	29	22	24	30	22	23	48
8-Feb	25	36	35	41	19	41	45	42	34	29	40	46	44	44	43	37	31	26	24	25	26	29	36	31	46
9-Feb	29	19	18	26	23	26	31	29	23	18	24	23	27	29	27	33	33	31	22	18	20	21	21	32	33
10-Feb	14	28	37	32	66	16	48	19	24	28	46	37	38	34	25	19	18	19	19	31	26	21	18	31	66
11-Feb	21	23	21	24	33	43	44	47	44	52	49	43	45	48	45	45	50	41	38	33	36	35	19	21	52
12-Feb	23	23	24	24	26	33	29	17	20	22	27	39	44	44	46	42	43	50	46	45	46	43	45	46	50
13-Feb	42	46	39	37	44	46	39	43	44	41	41	33	32	39	40	47	68	17	14	15	23	17	21	15	68
14-Feb	18	21	26	15	16	16	14	16	16	18	26	25	26	C	C	22	22	20	18	19	17	18	17	16	26
15-Feb	15	17	17	18	18	18	16	16	17	18	23	22	24	24	34	24	37	43	18	19	20	21	18	15	43
16-Feb	17	22	21	16	16	45	19	17	12	21	31	24	47	50	41	38	22	45	71	77	89	37	76	69	89
17-Feb	45	26	48	40	40	39	28	46	26	22	20	25	27	30	29	25	20	18	18	26	25	21	20	21	48
18-Feb	30	22	26	25	77	48	37	30	49	38	45	54	49	63	53	97	88	38	28	33	30	24	31	30	97
19-Feb	33	34	31	30	32	29	31	36	34	31	36	33	29	33	32	36	26	29	29	26	22	27	20	28	36
20-Feb	21	19	19	20	25	28	35	37	39	32	39	33	36	43	47	48	49	33	42	44	33	39	41	47	49
21-Feb	44	46	38	38	43	40	29	26	29	26	28	41	40	36	34	31	37	43	36	38	23	31	44	35	46
22-Feb	17	16	63	40	29	23	40	44	46	37	26	29	27	34	29	28	23	24	27	25	23	AF	27	92	92
23-Feb	30	36	22	23	22	23	27	18	19	38	77	104	76	64	98	34	32	33	20	16	20	76	AF	24	104
24-Feb	24	23	20	21	25	42	44	22	19	20	22	27	37	29	40	48	43	43	29	34	29	18	22	15	48
25-Feb	14	14	14	15	17	17	16	17	22	34	46	49	43	34	31	46	25	33	86	26	38	38	23	24	86
26-Feb	23	19	18	18	19	17	23	21	27	24	30	42	32	45	40	46	56	40	38	27	21	17	14	17	56
27-Feb	20	31	20	22	21	17	17	15	20	33	27	33	68	39	81	59	32	22	11	10	14	14	16	11	81
28-Feb	82	38	67	20	27	23	28	23	23	29	37	45	42	72	46	37	30	32	29	30	27	25	31	23	82
	82	46	79	51	77	48	75	63	49	84	89	104	76	72	98	97	88	50	86	77	89	86	76	92	

Diurnal Maximum

C - Calibration AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	15:05
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	844
Calculated slope	0.995803	0.999654	Chamber temp	45	45.2
Calculated intercept	0.667880	0.339064	Pressure	665.3	662.9
Analyzer Background	12.4	12.4	Flow	0.483	0.481
Analyzer Coefficient	0.912	0.922	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	742.1	1.017
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	78.6	754.6	754.9	1.000
second point	5000	39.3	377.3	376.2	1.003
third point	5000	19.6	188.2	187.8	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	78.6	754.6	763.9	0.988
Average Correction Factor					1.001

Corrected As found 742.0 Previous response 757.1 % change 2.0%

Notes:

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

Calibration Performed By: Asad Hidayat



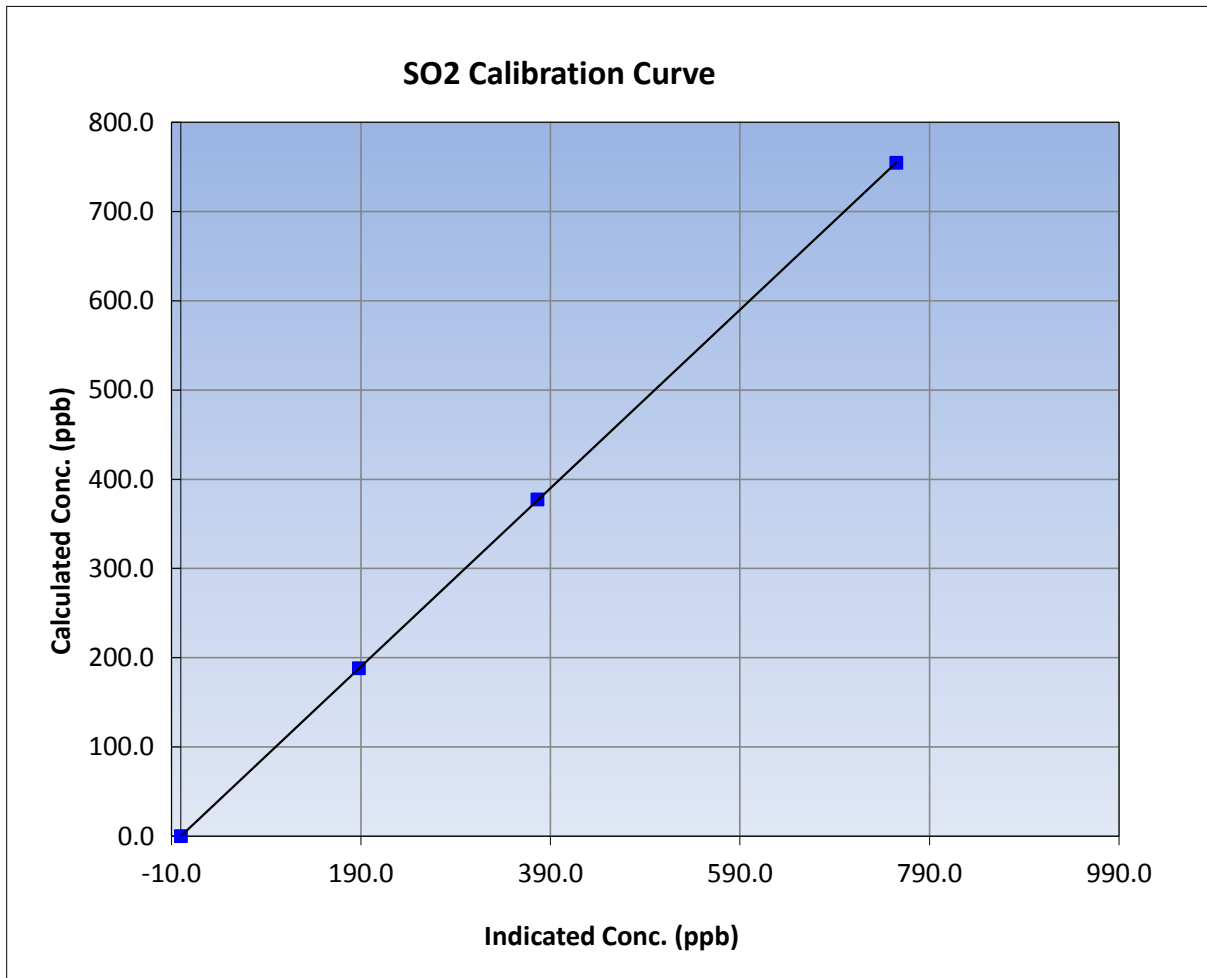
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:30	End Time (MST)	15:05
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

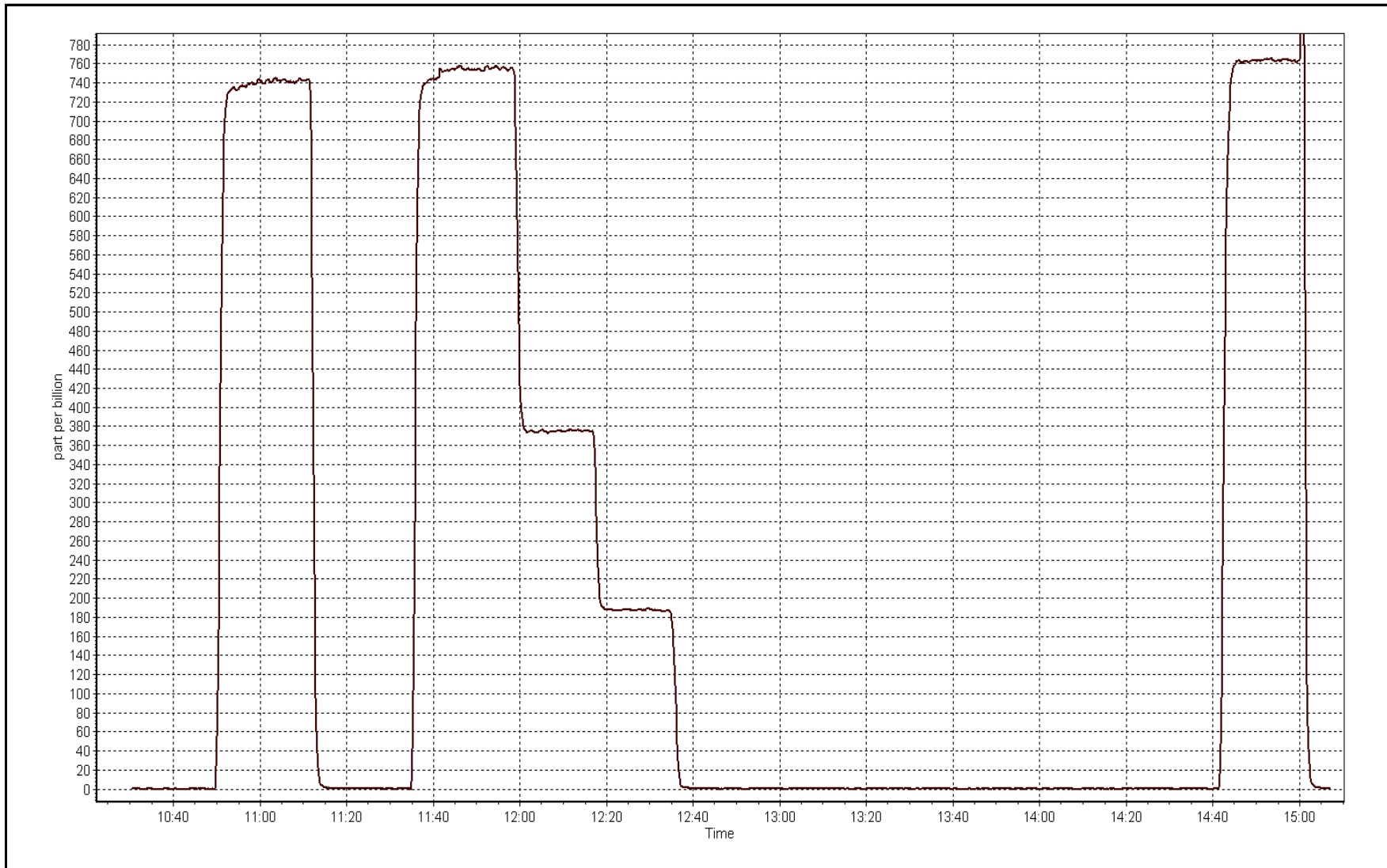
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
754.6	754.9	0.9995		
377.3	376.2	1.0028	Slope	0.999654
188.2	187.8	1.0020		
			Intercept	0.339064



SO2 Calibration Plot

Date: February 14, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 17, 2017	Last Calibration	January 16, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:00	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 ppm	SO2 gas cert/exp	96-K-53

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	2528	2492
Calculated slope	0.999356	0.995621	Chamber temp	50	50
Calculated intercept	-0.071887	0.028264	Pressure	22.6	22.3
Analyzer Background	24.8	25.4	Flow	0.595	0.587
Analyzer Coefficient	0.986	0.99	Intensity	63	62
			Converter temp.	316	314

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	0.3	----
as found span	5000	75.6	80.9	81.3	0.995
SO2 scrubber check	5000	20.0	200.0	0.5	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	75.6	80.9	81.3	0.995
second point	5000	37.8	40.4	40.5	1.000
third point	5000	18.9	20.2	20.2	1.000
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	75.6	80.9	81.0	0.999
Average Correction Factor					0.998

Corrected As found	81.0	Previous response	81.0	% change	0.1%
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Notes:

Sample inlet filter replaced after as founds. Used just the SO2 audit cylinder to capture the SO2 scrubber check, after as founds. Adjusted zero only.

Calibration Performed By: Asad Hidayat



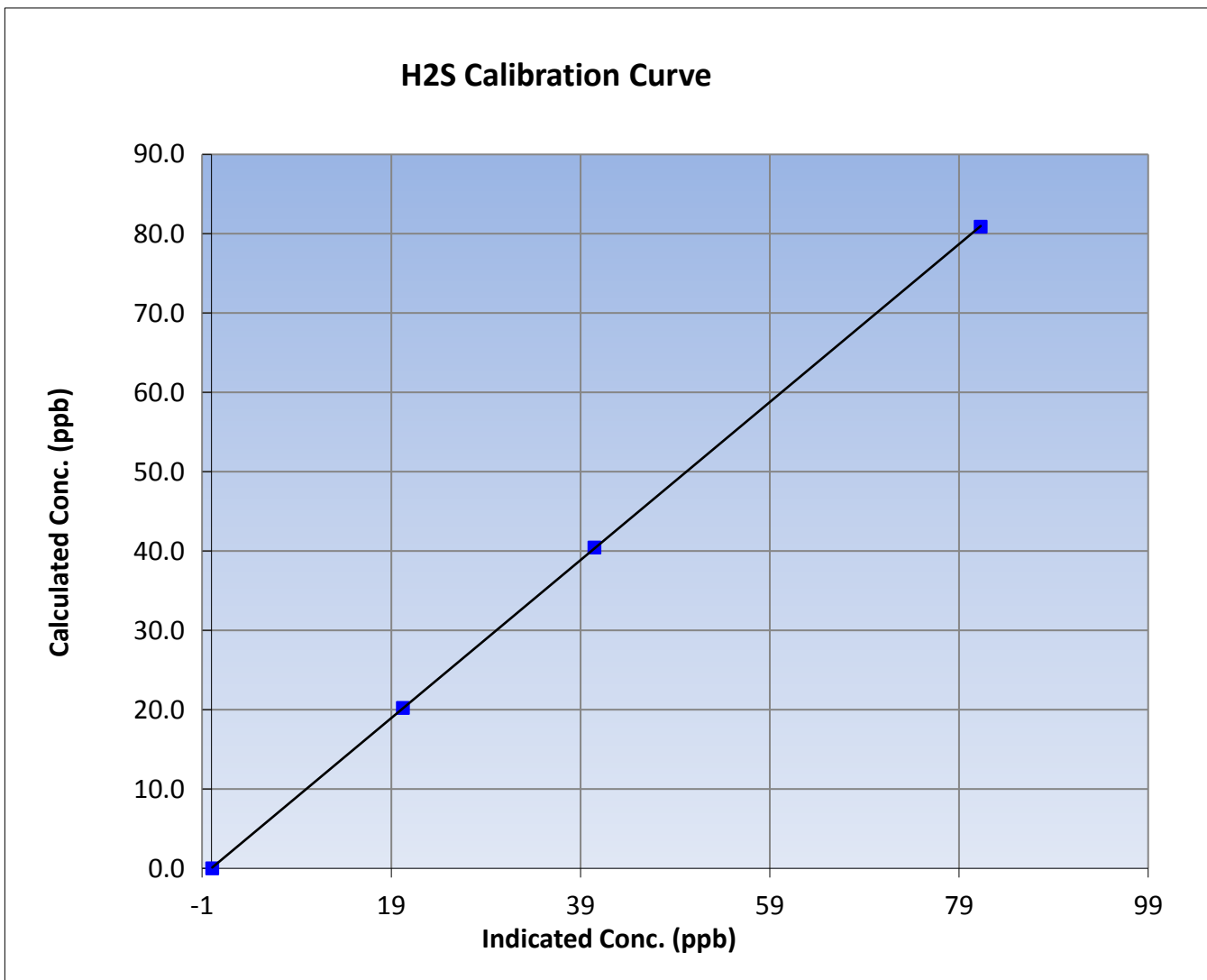
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 17, 2017	Previous Calibration	January 16, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:00	End Time (MST)	13:55
Analyzer make	API T101	Analyzer serial #	196

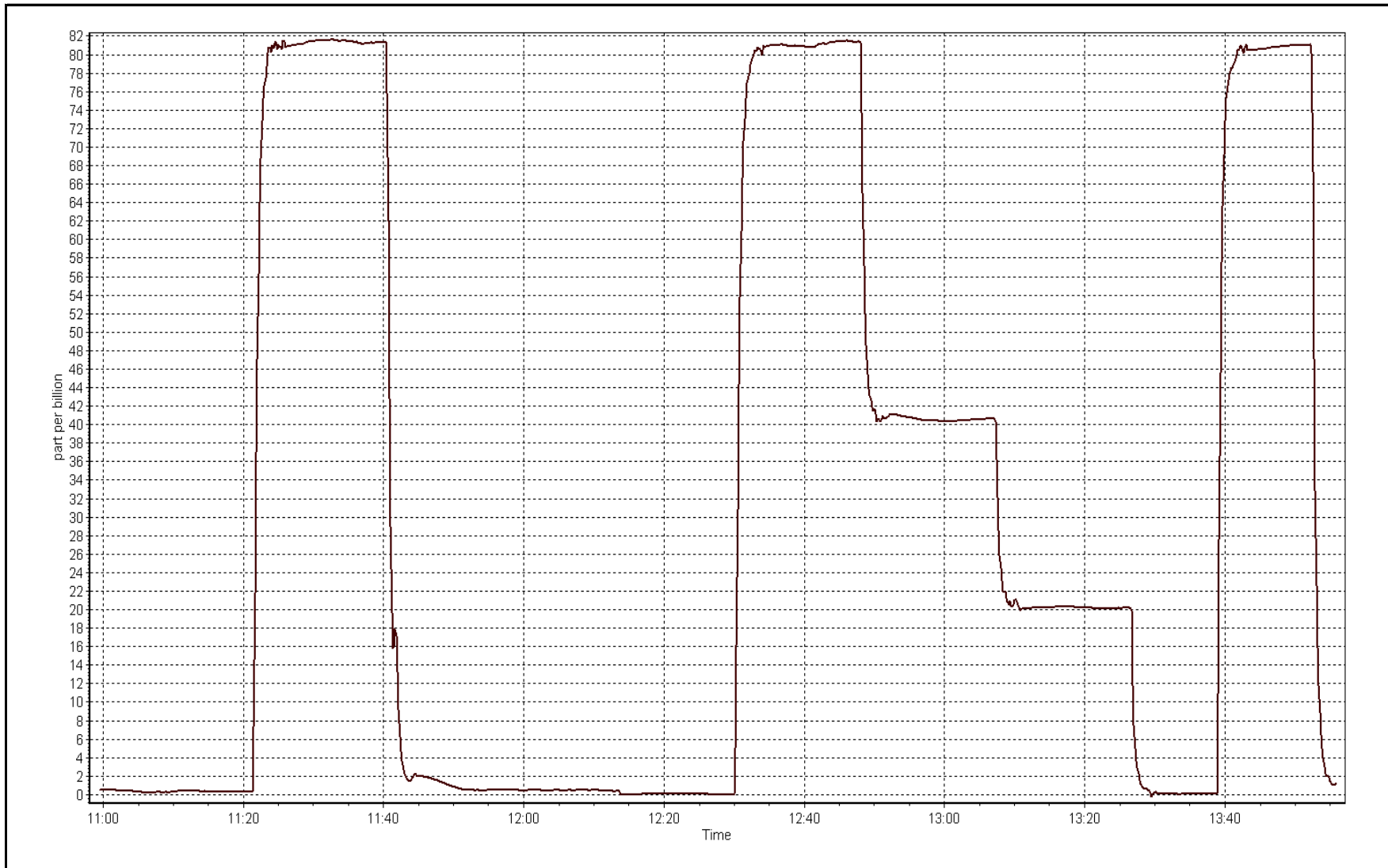
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999989
80.9	81.3	0.9950		
40.4	40.5	0.9997	Slope	0.995621
20.2	20.2	0.9997		
			Intercept	0.028264



H2S Calibration Plot

Date: February 17, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 14, 2017	Last Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	15:00
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	1.001431	0.994795	Fuel Pressure	23.9	23.9
Calculated intercept	0.013820	0.049598	Analyzer Coeff	4.4	4.3
			Analyzer BKG	2.100	2.000

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	-0.08	----
as found span	5000	78.6	16.67	16.88	0.987
calibrator zero	5000	0.0	0.00	-0.02	----
high point	5000	78.6	16.67	16.72	0.997
second point	5000	39.3	8.33	8.31	1.003
third point	5000	19.6	4.16	4.10	1.014
as left zero	5000	0.0	0.00	-0.07	----
as left span	5000	78.6	16.67	16.76	0.994
Average Correction Factor					1.004

Corrected As found	16.96	Previous response	16.63	% change	-1.9%
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Notes:

Sample inlet filter replaced after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



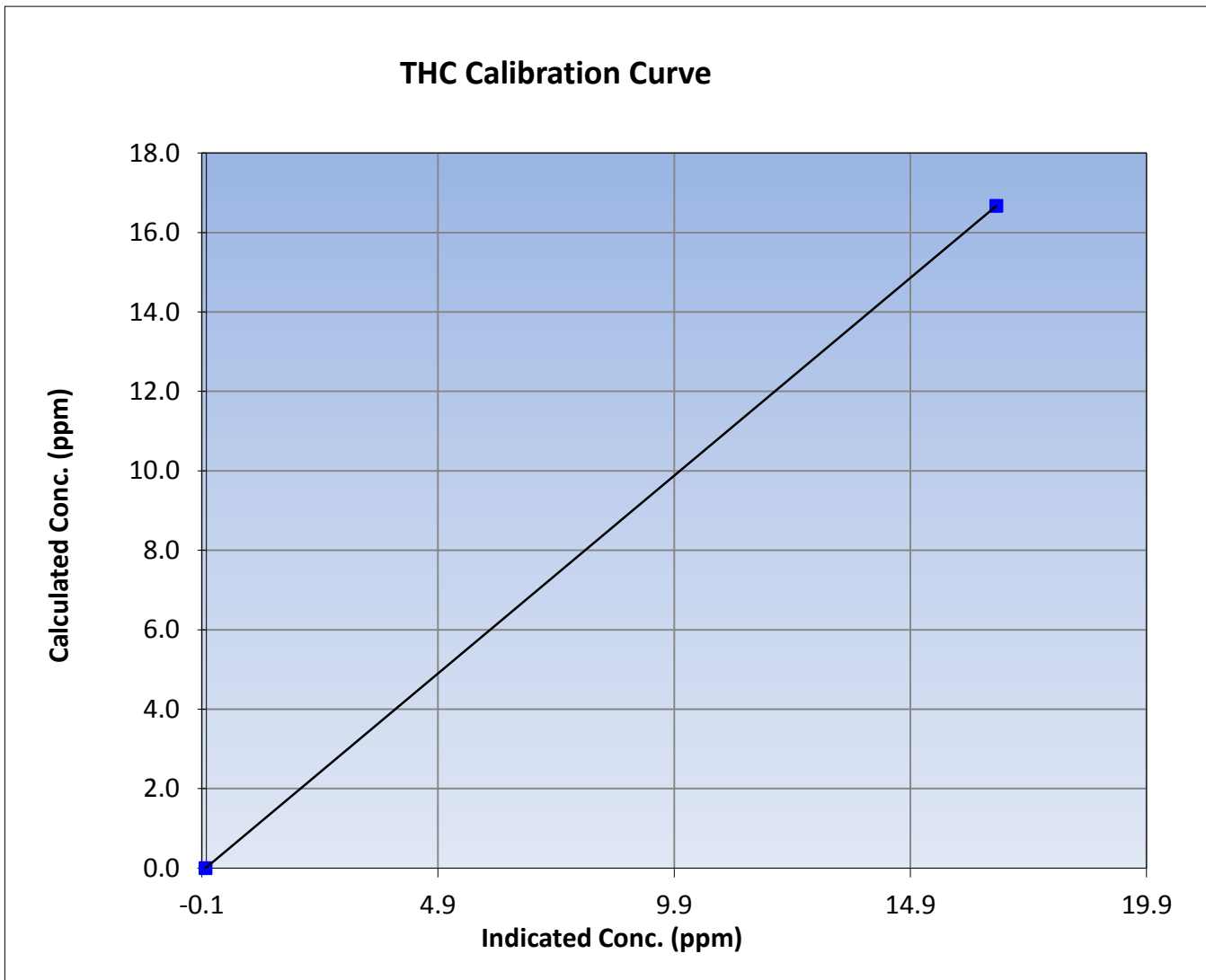
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:30	End Time (MST)	15:00
Analyzer make	51i-LT	Analyzer serial #	1501663727

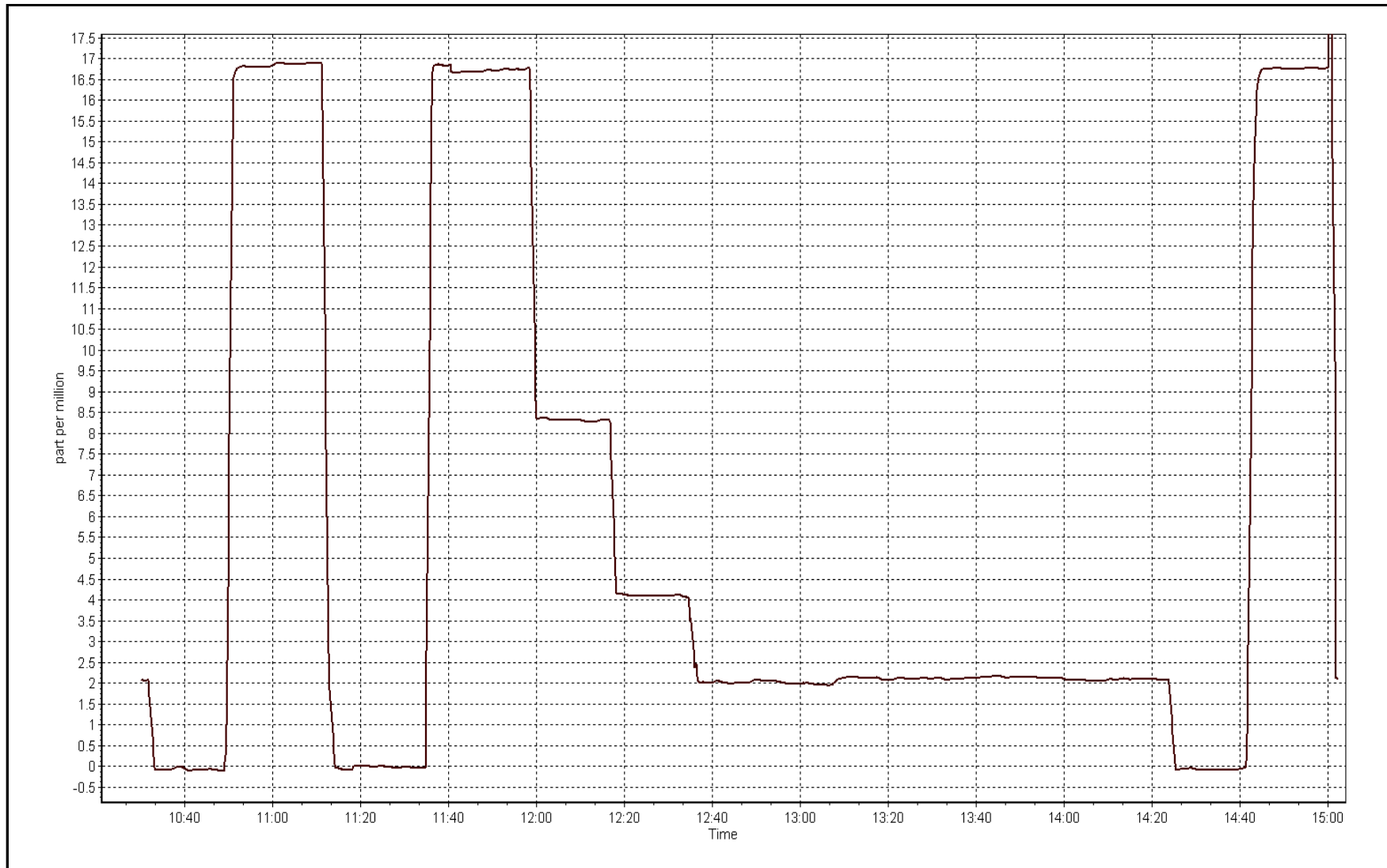
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	----	Correlation Coefficient	0.999986
16.67	16.72	0.9968		
8.33	8.31	1.0028	Slope	0.994795
4.16	4.10	1.0137		
			Intercept	0.049598



THC Calibration Plot

Date: February 14, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:30	End Time (MST)	15:40
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	EY0000372
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	November 4, 2019
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	0.999281	0.999369	0.989632
	Data Offset	1.388385	1.350169	-0.143243
Current Calibration	Data Slope	0.999728	0.998970	0.981201
	Data Offset	0.192770	0.532811	-2.899586

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		1.099	
NOX coefficient	1.003		0.998	
NO2 coefficient	0.995		0.995	
NO bkgnd	3.2		3.2	
NOX bkgnd	3.2		3.2	
Chamber Temp	50.6	Deg C	50.6	Deg C
Moly Temp	322.6	Deg C	324.7	Deg C
PMT voltage	-767	V	-767.4	V
PMT Temp	-3.1	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	170.2	mmHg	165.1	mmHg
R Cell Press Nox	170.2	mmHg	165.1	mmHg
NO sample flow	0.801	lpm	0.816	lpm
Nox sample Flow	0.801	lpm	0.813	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted both zero and span. NOx response had drifted quite a lot during the GPT, causing 3rd point to be 7.2% higher than expected. Suspecting calibrator to be the problem at this point. Will monitor the daily zero/spans for next few days and decide what repairs/changes should be made before possibly re-calibrating Nox again this month. Generated a high NO point just for a reference and to trouble shoot at the end of the calibration.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 14, 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	-0.8	-0.1	-0.6	----	----
as found span	5000	78.6	800.1	800.1	0.0	759.7	759.0	0.8	1.0533	1.0543
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	800.4	800.9	-0.5	0.9996	0.9991
second point	5000	39.3	400.1	400.1	0.0	399.3	399.0	0.3	1.0019	1.0026
third point	5000	19.6	199.5	199.5	0.0	199.7	199.3	0.5	0.9990	1.0013
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	----	----
as left span	5000	78.6	800.1	444.3	355.9	833.1	467.2	366.0	0.9604	0.9510
Average Correction Factor									1.0002	1.0010

Corrected As found
Previous Response

NO_x= 760.4
NO_x= 799.3

NO= 759.1
NO= 799.3

Percent Change

NO_x= 5.1%

NO= 5.3%

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	804.2	802.7	0.0	0.9949	0.9968	----	----
1st NO2 (300)	444.3	358.5	809.7	444.3	365.4	0.9882	----	0.9810	101.9%
2nd NO2 (200)	563.4	239.4	812.7	563.4	249.4	0.9845	----	0.9597	104.2%
3rd NO2 (100)	683.5	119.3	821.3	683.5	127.8	0.9743	----	0.9333	107.2%
2nd NO ref point		0.0	826.8	825.6	1.2	0.9677	0.9691	----	----
Average Correction Factor						0.9787		0.9580	104.4%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

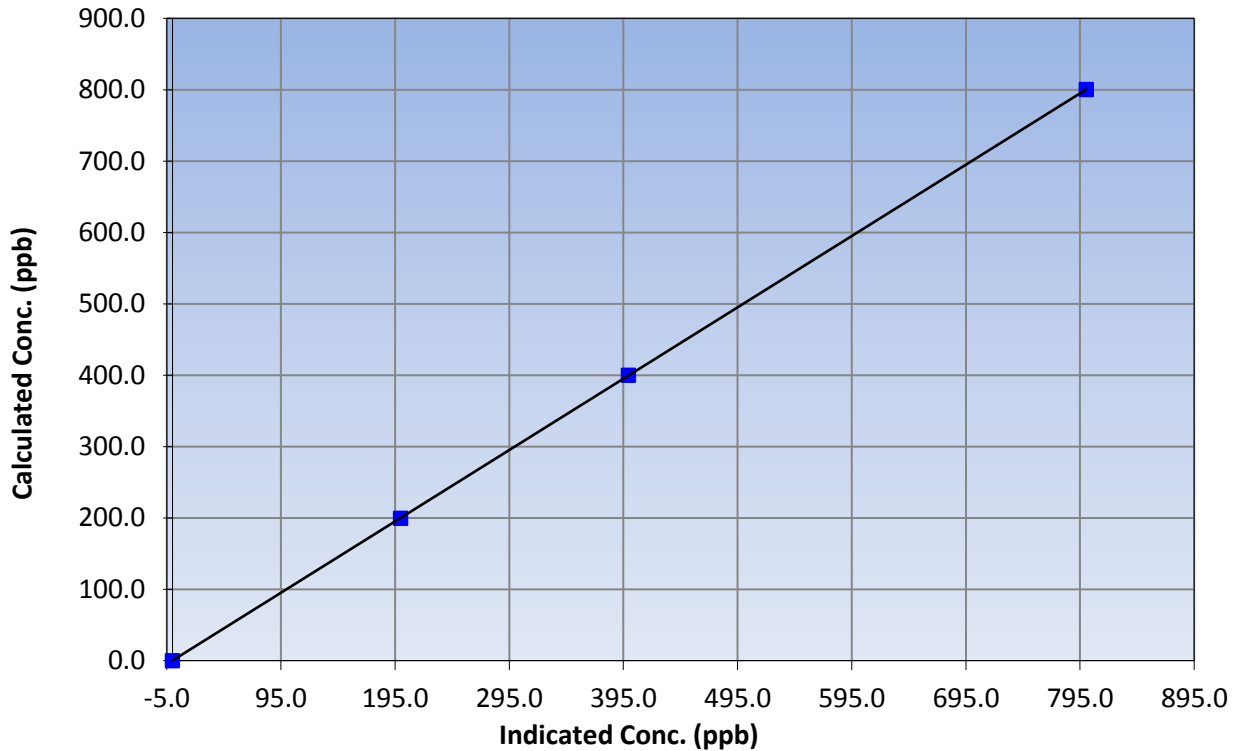
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:30	End Time (MST)	15:40
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	----	Correlation Coefficient	0.999998
800.1	800.4	0.9996		
400.1	399.3	1.0019	Slope	0.999728
199.5	199.7	0.9990		
			Intercept	0.192770

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

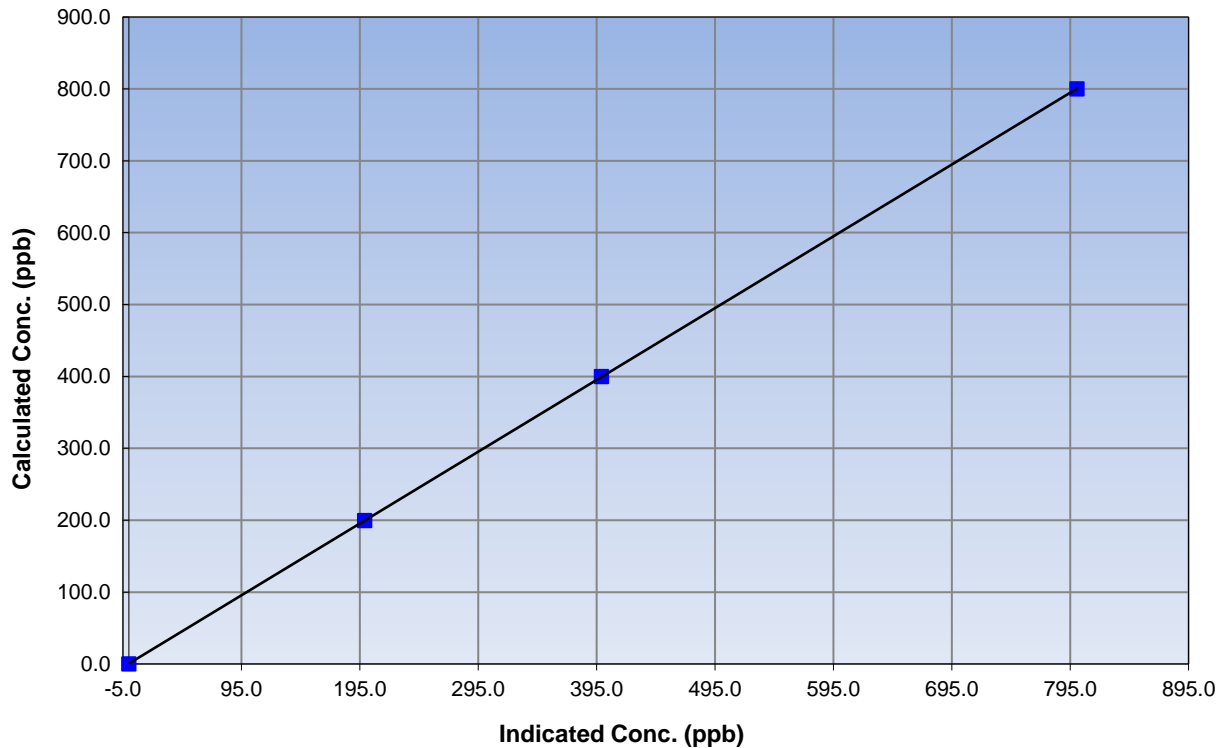
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:30	End Time (MST)	15:40
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	0.999997
800.1	800.9	0.9991		
400.1	399.0	1.0026	Slope	0.998970
199.5	199.3	1.0013		
			Intercept	0.532811

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

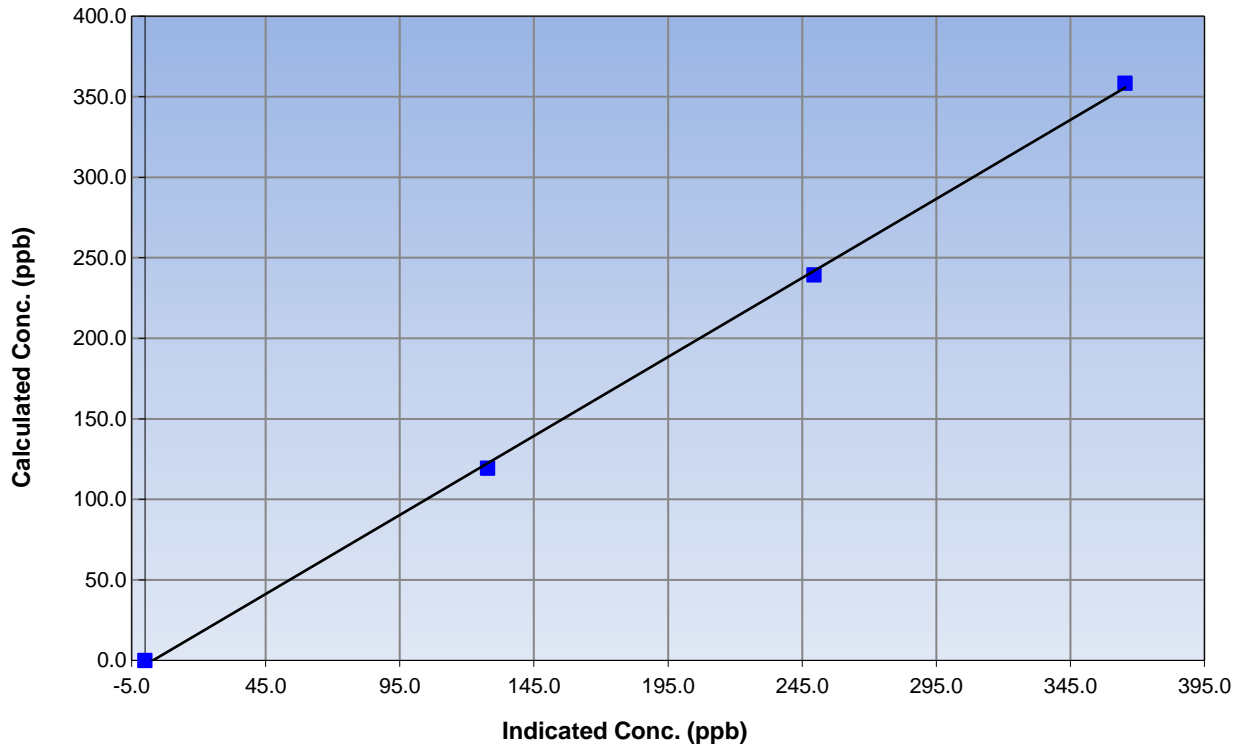
Station Information

Calibration Date	February 14, 2017	Previous Calibration	January 23, 2017
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:30	End Time (MST)	15:40
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	0.0	N/A	Correlation Coefficient	0.999543
358.5	365.4	0.9810		
239.4	249.4	0.9597	Slope	0.981201
119.3	127.8	0.9333		
			Intercept	-2.899586

NO₂ Calibration Curve





Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	Tuesday, February 14, 2017	Previous Calibration	Tuesday, January 05, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine	Removal	
Start Time (MST)	13:10	End Time (MST)	14:35
Barometric Press	n/a	Station Temp	21 Deg C
WS Calibrator	MetOne 053	Serial Number	P15103

WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	A3111
DACS make	Campbel Scientific CR3000	DACS serial No.	9627
DACS voltage range	5000	DACS channel #	P2
	<u>Before</u>		<u>After</u>
Calculated slope	1.000537276	Calculated slope	0.999173
Calculated intercept	-0.044886338	Calculated intercept	-0.019749

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.3	0.9954
400	39.4	39.4	0.9989
600	58.6	58.6	1.0001
800	77.8	77.9	0.9983
900	87.4	87.5	0.9985
Average Correction Factor			0.9982

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	N9937
DACS make	Campbel Scientific CR3000	DACS serial No.	9627
DACS voltage range	5000	DACS channel #	SE 24
	<u>Before</u>		<u>After</u>
Calculated slope	1.013405769	Calculated slope	1.006039
Calculated intercept	0.514986093	Calculated intercept	-1.131606

As Found Declination (west of North) 16 As Left Declination (west of North) 16

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	1.8	n/a
90	90.0	1.0006
180	179.4	1.0033
270	270.0	1.0000
357	356.1	1.0026
Average Correction Factor		1.0016

Notes:

WS sensor bearings appeared to be functioning fine. Cal passed

Calibration Performed By: Asad Hidayat



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 21
CONKLIN COMMUNITY
FEBRUARY 2017

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
 FEBRUARY 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	639	33	33	100	6	0	2	0
TRS(ppb) Average	640	32	32	100	1	0	0	0
THC(ppm) Average	637	33	35	99.7	2.2	-	2.1	-
NMHC(ppm) Average	637	33	35	99.7	0.017	-	0.001	-
CH4(ppm) Average	637	33	35	99.7	2.2	-	2.1	-
O3 (ppb) Average	641	31	31	100	52	0	50	-
NO2 (ppb) Average	639	33	33	100	18	0	7	-
NO (ppb) Average	639	33	33	100	18	-	2	-
NOX (ppb) Average	639	33	33	100	26	-	8	-
PM2.5 (ug/m3) Average	667	2	5	99.55	16.7	-	8.5	0
Wind Speed 10 m (km/h) Average	664	0	8	98.81	21	-	15	-
Wind Direction 10 m (deg) Average	664	0	8	98.81	-	-	-	-
Temperature 2 m (C) Average	672	0	0	100	13.1	-	6.0	-
Relative Humidity (%) Average	672	0	0	100	98	-	93.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
 FEBRUARY 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	639	0.4	1	-	0	0	0	0	0	1	6
TRS (ppb) Average	640	0.4	0	-	0	0	0	0	0	0	1
THC (ppm) Average	637	1.98	0.1	-	1.9	1.9	1.9	2	2	2.1	2.2
NMHC(ppm) Average	637	0	0.001	-	0	0	0	0	0	0	0.017
CH4(ppm) Average	637	1.98	0.1	-	1.9	1.9	1.9	2	2	2	2.2
O3 (ppb) Average	641	35.8	9	-	3	23	32	37	42	46	52
NO2 (ppb) Average	639	2.9	3	-	0	1	1	2	4	6	18
NO (ppb) Average	639	0.6	1	-	0	0	0	0	1	2	18
NOX (ppb) Average	639	3.5	3	-	0	1	1	2	4	7	26
PM2.5 (ug/m3) Average	667	2.72	2.3	-	0.3	0.9	1.3	1.9	3.2	5.3	16.7
Wind Speed 10 m (km/h) Average	664	6.8	4	-	0	2	4	6	9	12	21
Wind Direction 10 m (deg) Average	664	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	672	-9.92	10.4	-	-35.6	-21.9	-17.9	-11.3	-1.4	3.6	13.1
Relative Humidity (%) Average	672	71.4	14	-	31	51	63	74	81	86	98

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	24 Feb 2017 13:00	24 Feb 2017 14:00	2	Intermittent unstable operation
Wind Speed, Wind Direction	02 Feb 2017 21:00	02 Feb 2017 21:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	10 Feb 2017 09:00	10 Feb 2017 09:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	23 Feb 2017 06:00	23 Feb 2017 08:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	23 Feb 2017 19:00	23 Feb 2017 19:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	24 Feb 2017 06:00	24 Feb 2017 06:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	27 Feb 2017 19:00	27 Feb 2017 19:00	1	Flat line in sensor output signal - Sensor frozen
PM2.5	28 Feb 2017 00:00	28 Feb 2017 00:00	1	Unstable operation - excessive baseline drift
PM2.5	28 Feb 2017 02:00	28 Feb 2017 03:00	2	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

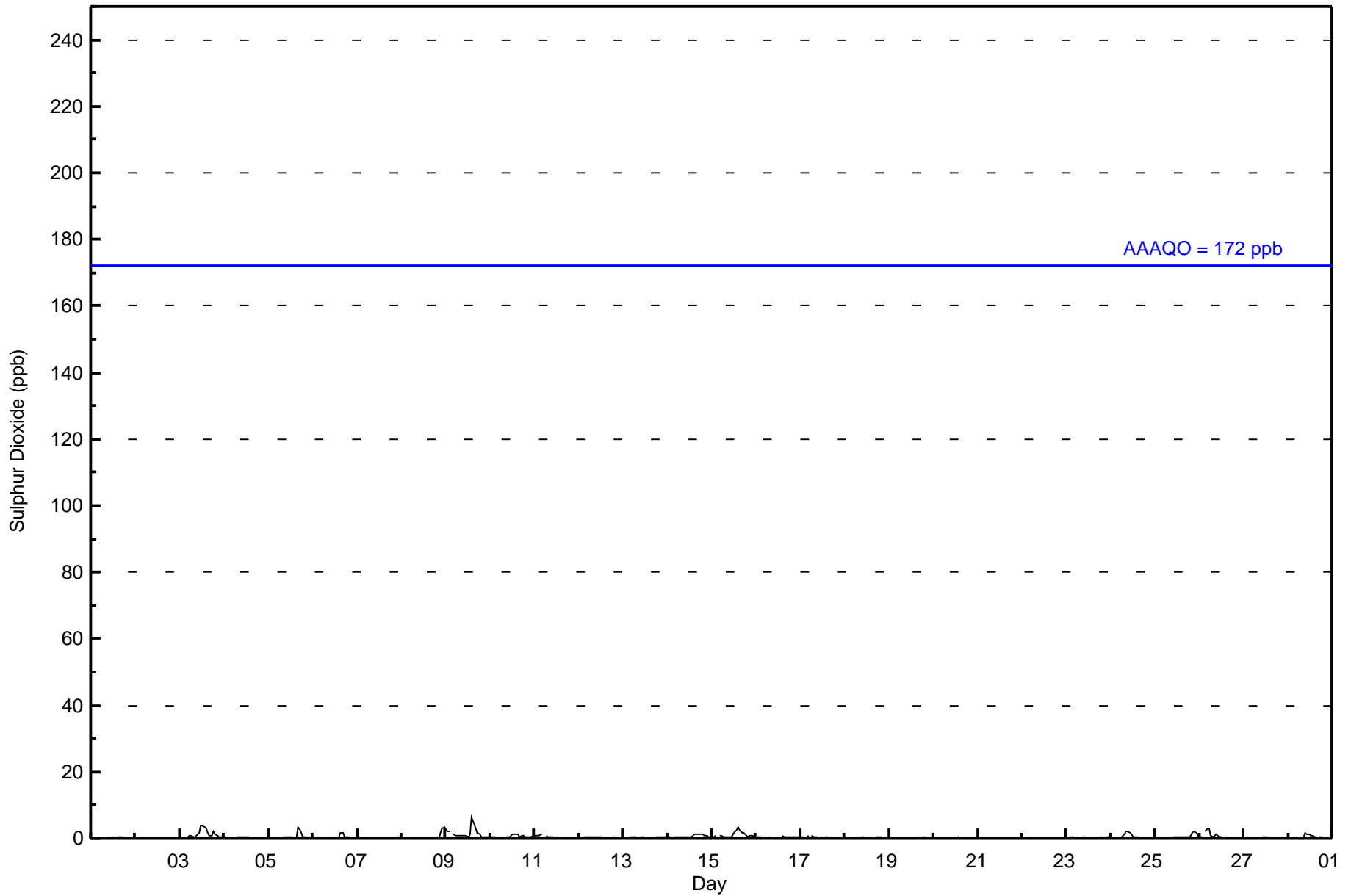
Conklin Community - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 ppb on Feb 9 15:00 Maximum Daily Average: 1.5 ppb on Feb 9										Hours in Service: 672 Hours of Data: 639 Hours of Missing Data: 33 Hours of Calibration: 33 Percent Operational Time: 100.0																	
Minimum Value: 0 ppb on Feb 25 07:00 Maximum Diurnal Average: 0.7 ppb at hour 15 Monthly Average: 0.4 ppb										Minimum Daily Average: 0.1 ppb on Feb 21 Minimum Diurnal Average: 0.3 ppb at hour 8 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 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-Feb	0	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-Feb	0	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-Feb	0	0	0	Z	0	1	1	1	0	1	2	4	4	4	3	2	1	1	2	1	1	0	1	0	1.3	4	
4-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
5-Feb	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	3	2	1	0	0	0	0	0	0.4	3	
6-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0.3	2	
7-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	0.5	3	
9-Feb	3	2	2	Z	1	1	1	1	1	1	1	1	1	1	6	4	3	2	1	1	1	0	0	0	1.5	6	
10-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.6	1	
11-Feb	1	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-Feb	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	
13-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
15-Feb	1	1	1	Z	1	1	1	1	0	0	1	2	2	3	3	2	2	1	1	1	1	1	0	1	1.1	3	
16-Feb	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	1	1	1	0	0	0	0	0	1	0	0.4	1	
17-Feb	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
18-Feb	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	
19-Feb	0	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-Feb	0	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	
21-Feb	0	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-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
24-Feb	Z	0	0	0	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
25-Feb	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0.5	2
26-Feb	0	0	Z	2	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
27-Feb	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
28-Feb	0	0	0	0	Z	0	0	0	0	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2	
0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.5 0.5 0.5 0.7 0.6 0.6 0.4 0.4 0.3 0.3 0.3 0.4 0.4																								Diurnal Average			
3 2 2 2 3 3 1 1 2 2 2 4 4 4 6 4 3 2 2 1 1 2 3 3																								Diurnal Maximum			
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Conklin Community - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Conklin Community - February 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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	104	66	632
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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	104	66	632

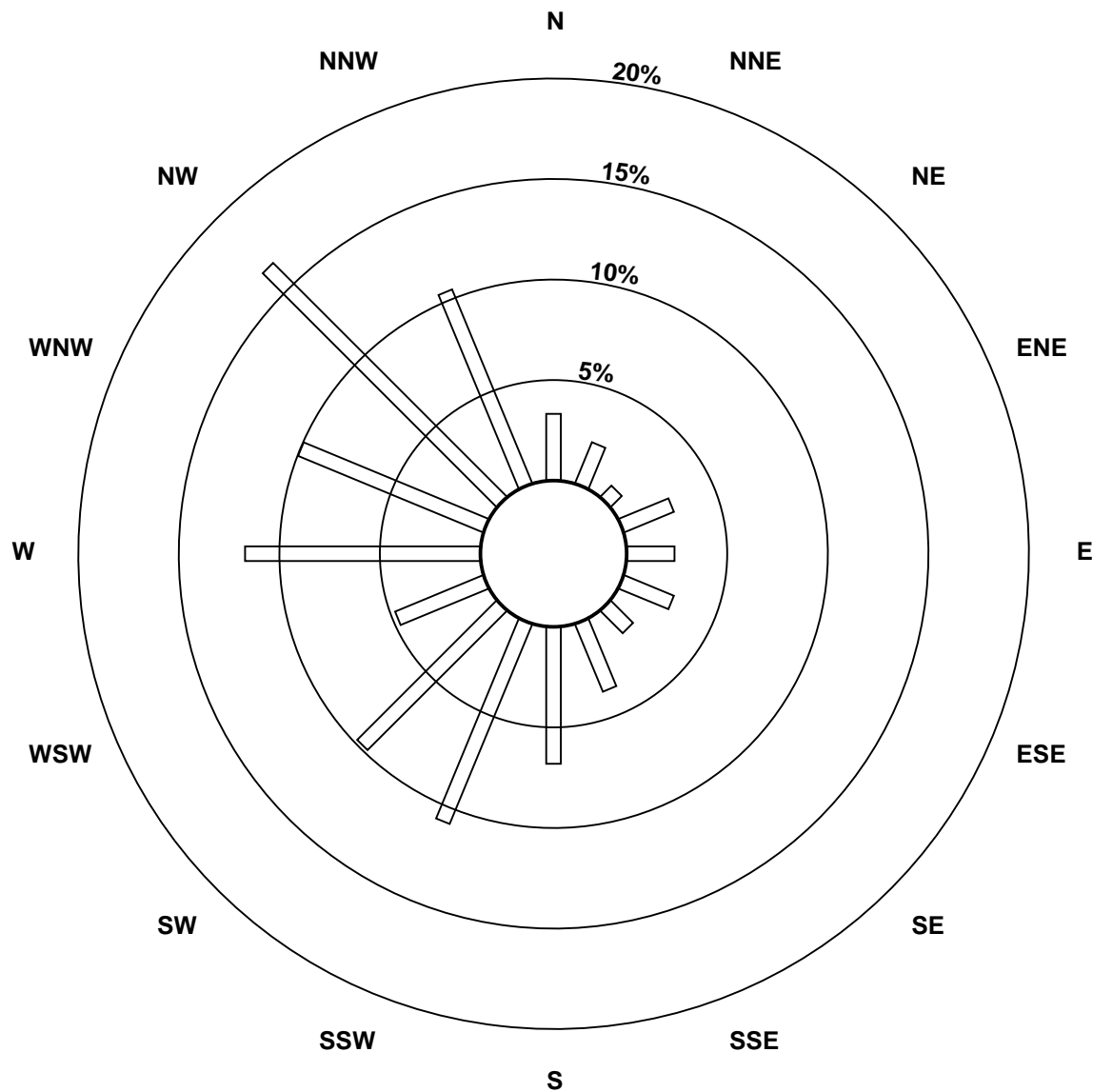
Total Number of Valid Hours: 632

Total Number of Hours: 672

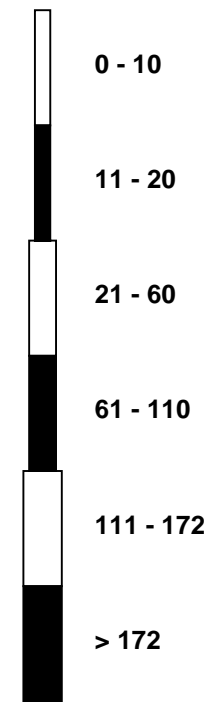


Wood Buffalo Environmental Association
Wind Rose Feb 2017

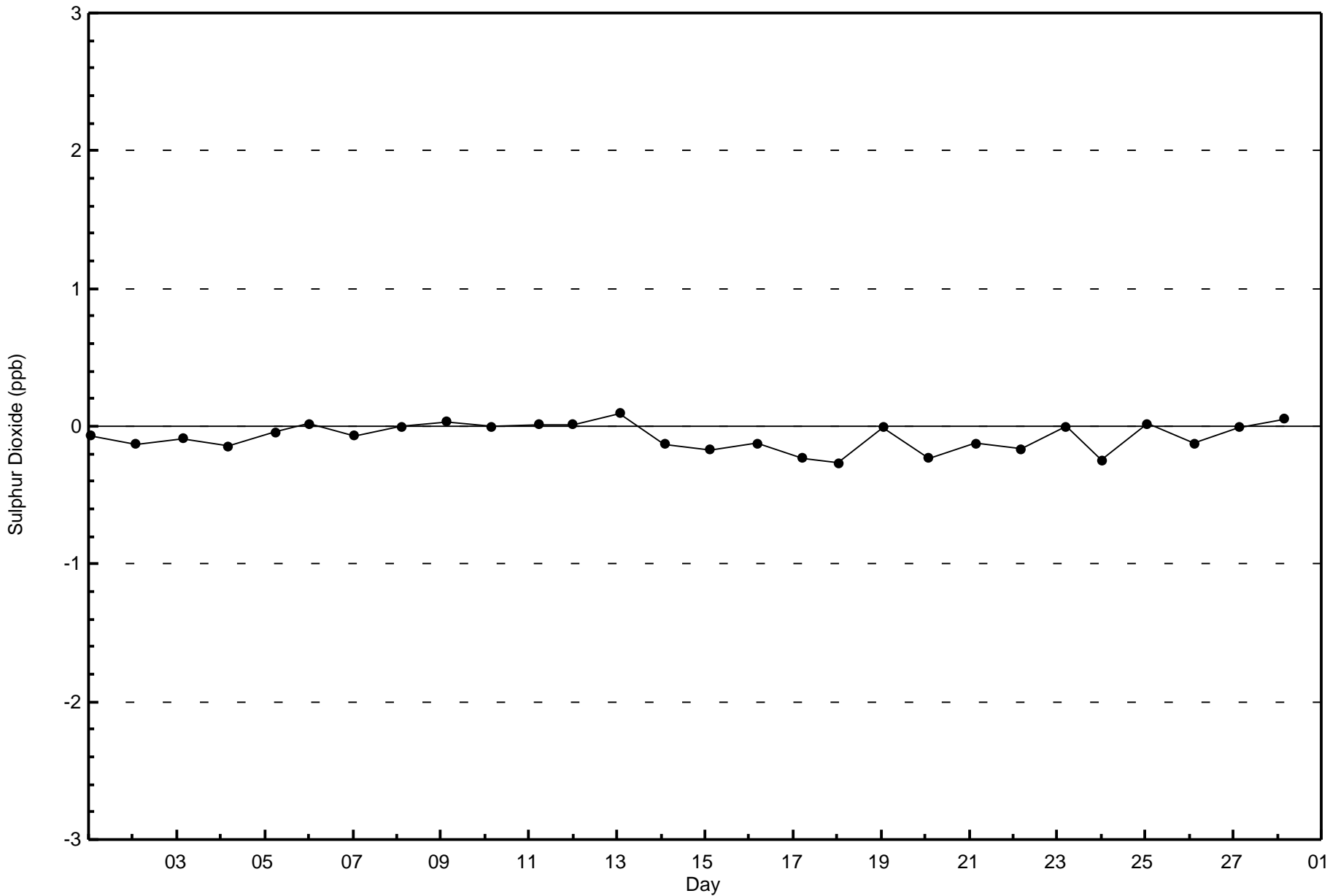
Sulphur Dioxide (SO₂) - ppb
Conklin Community (AMS 21)

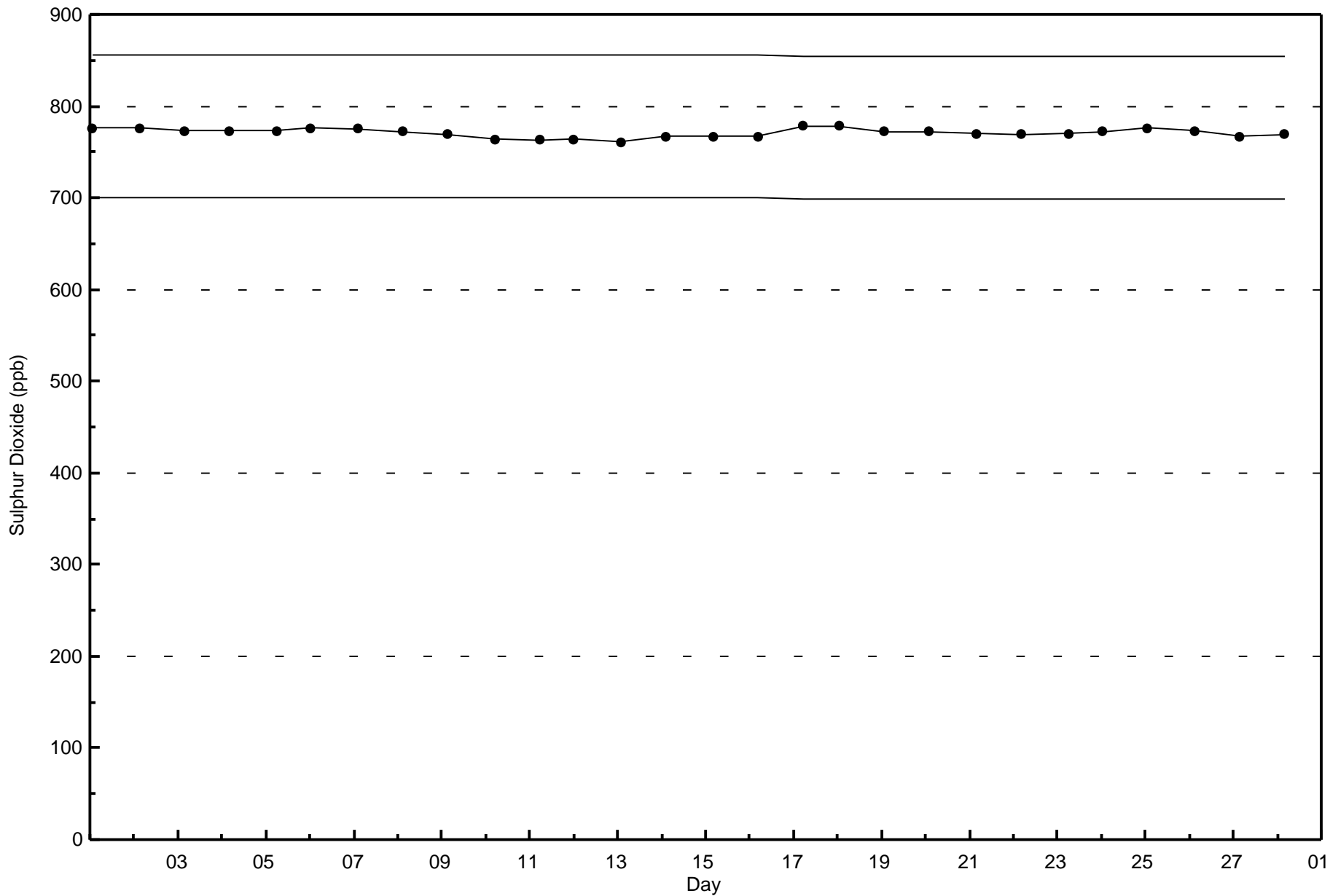


Classes (ppb)



Total Number of Valid Hours: 632







Wood Buffalo Environmental Association
Summary of Hour Averages

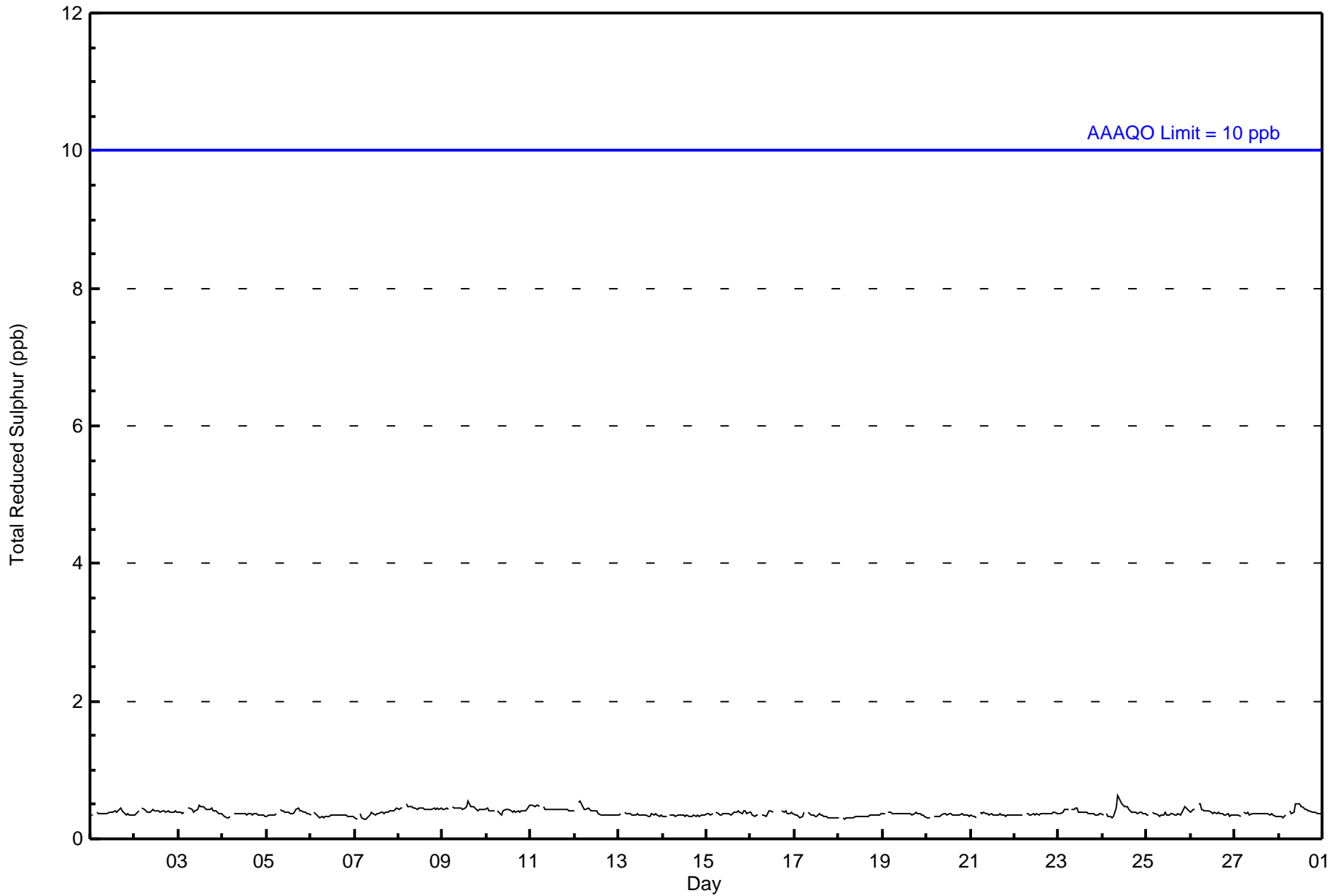
Total Reduced Sulphur (TRS) - ppb
Conklin Community - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Feb 24 09:00 Maximum Daily Average: 0.4 ppb on Feb 9														Hours in Service: 672 Hours of Data: 640 Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0													
Minimum Value: 0 ppb on Feb 7 07:00 Minimum Daily Average: 0.3 ppb on Feb 18 Maximum Diurnal Average: 0.4 ppb at hour 11 Minimum Diurnal Average: 0.4 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 = 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-Feb	0	0	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
2-Feb	0	0	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
3-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
6-Feb	0	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
7-Feb	0	0	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-Feb	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	0.4	1
9-Feb	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	0.4	1
10-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
12-Feb	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.4	0
17-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Feb	0	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
19-Feb	0	0	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
20-Feb	0	0	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
21-Feb	0	0	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
22-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
24-Feb	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Feb	0	0	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-Feb	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Feb	0	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
0.4 0.4																								Diurnal Average			
0 0 1 1 1 1 0 0 0 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0																								Diurnal Maximum			
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin Community - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	640	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin Community - February 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	22	14	5	17	15	16	8	25	46	65	62	29	75	64	103	67	633
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	22	14	5	17	15	16	8	25	46	65	62	29	75	64	103	67	633

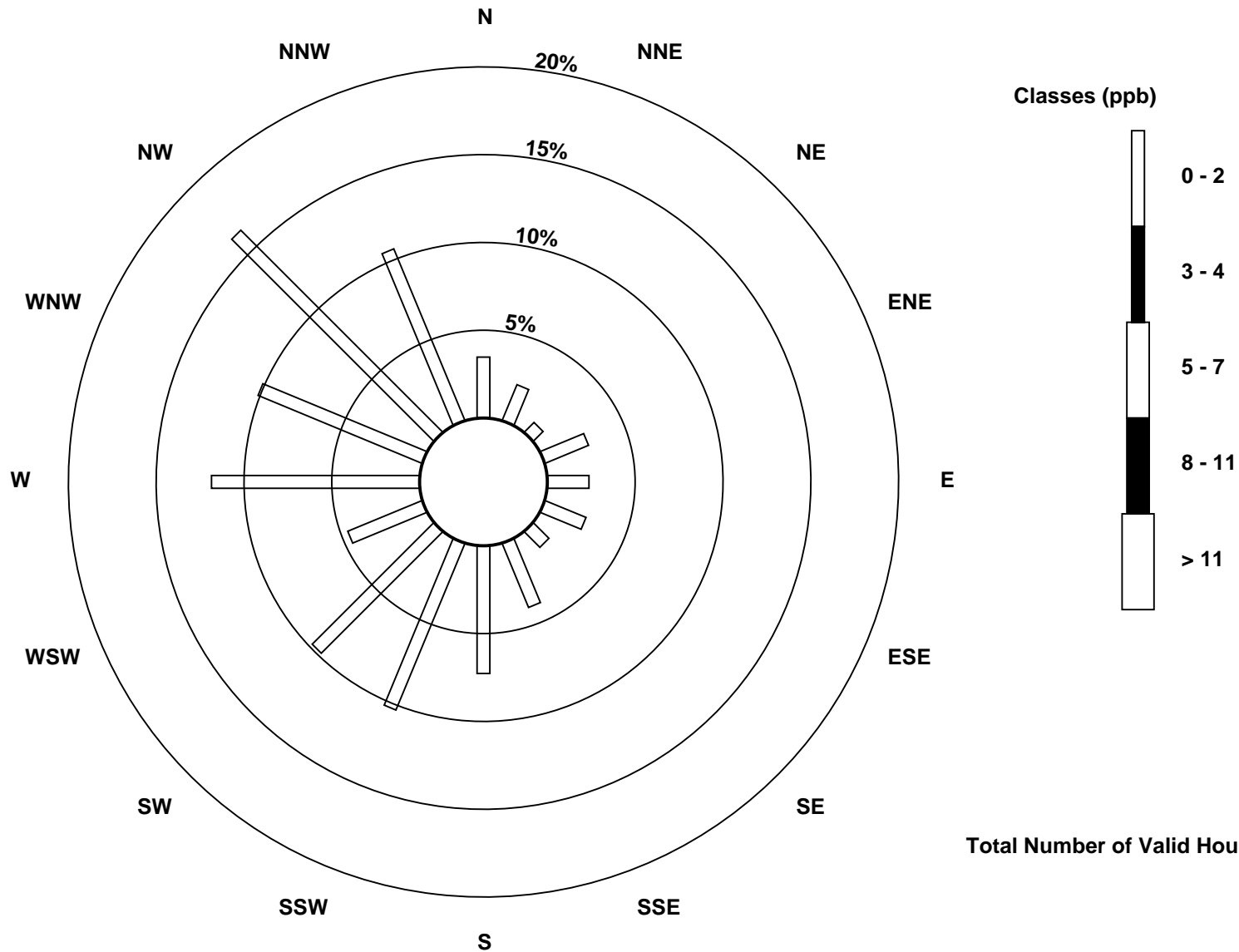
Total Number of Valid Hours: 633

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Reduced Sulphur (TRS) - ppb
Conklin Community (AMS 21)

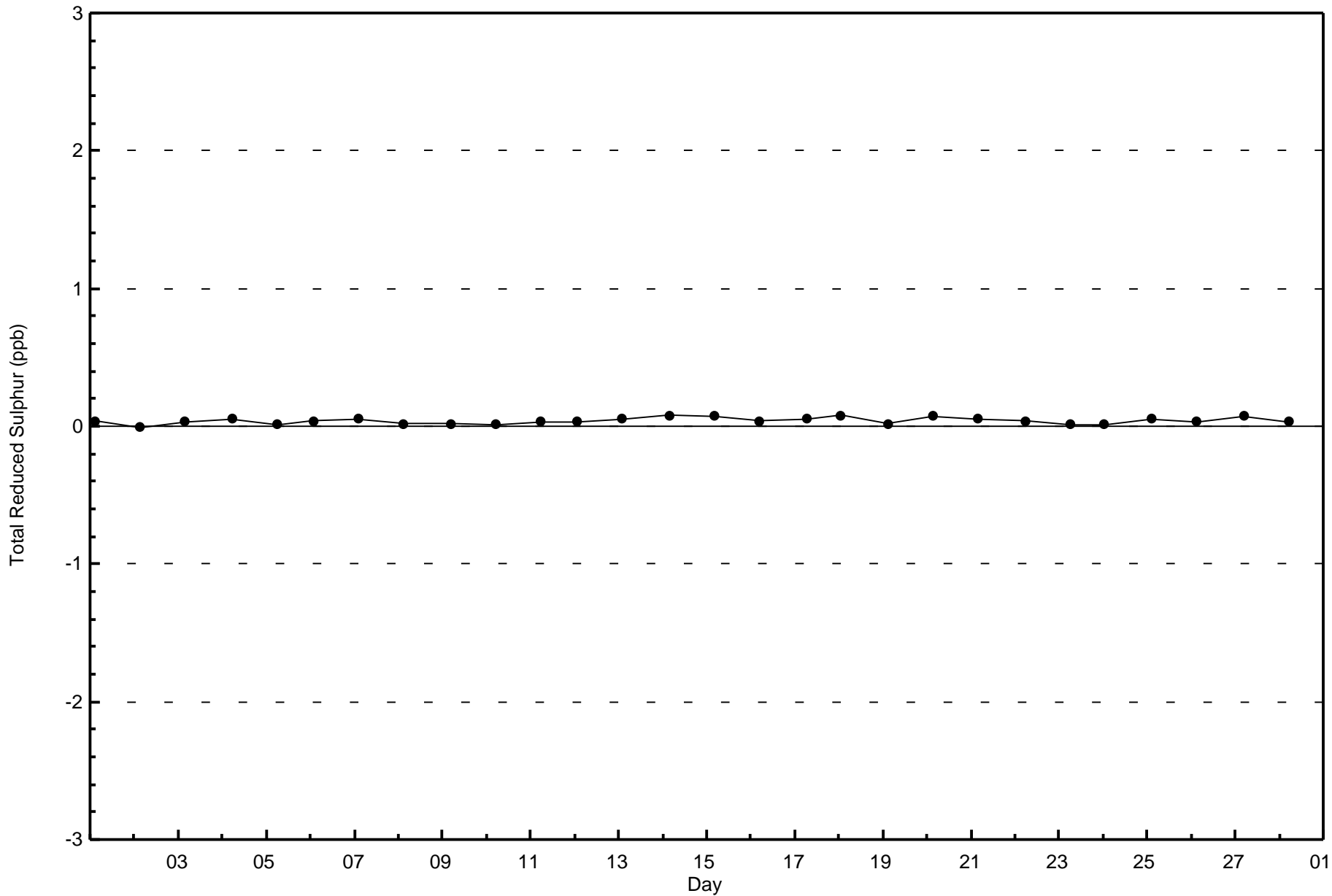


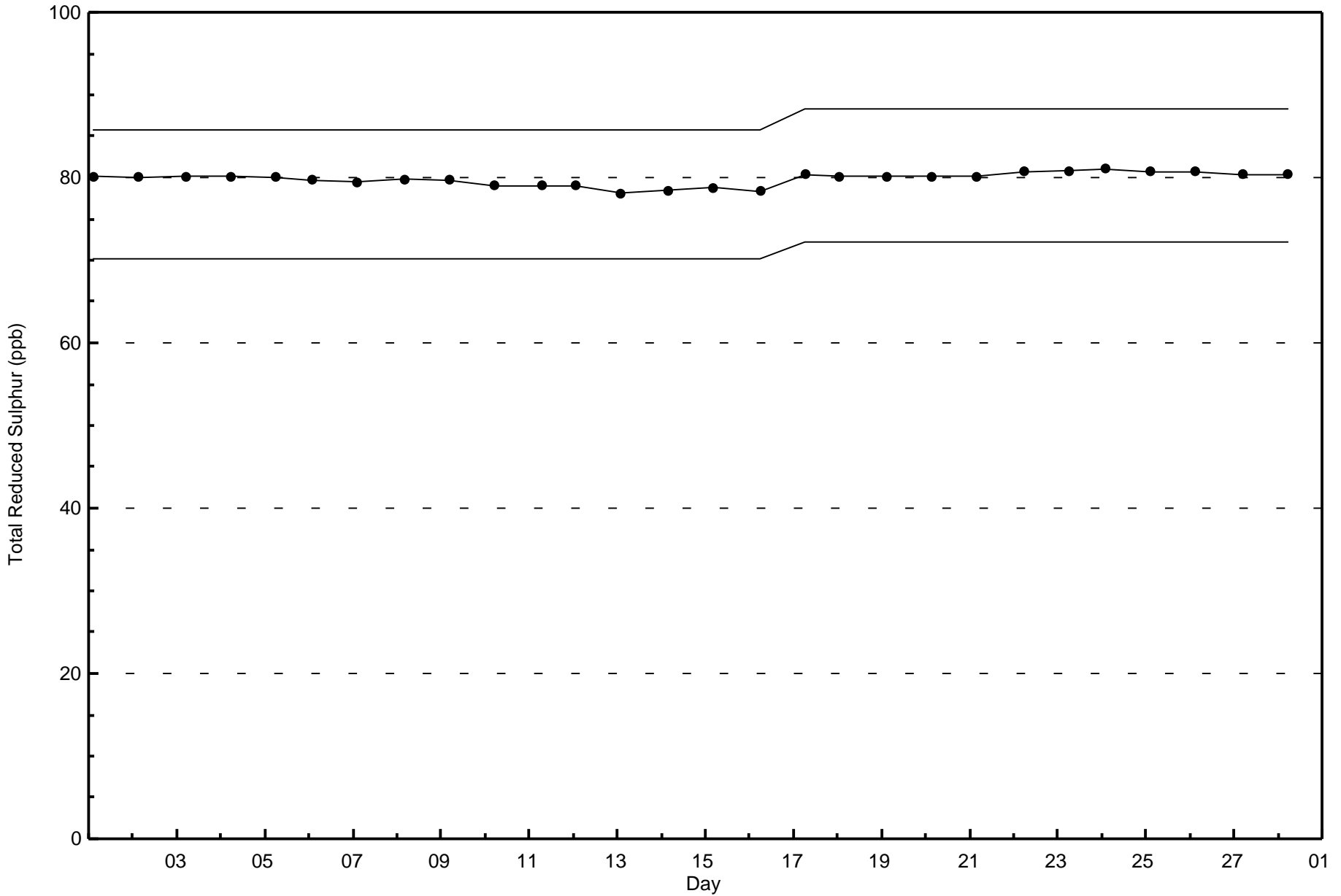
Total Number of Valid Hours: 633



Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Conklin Community - February 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

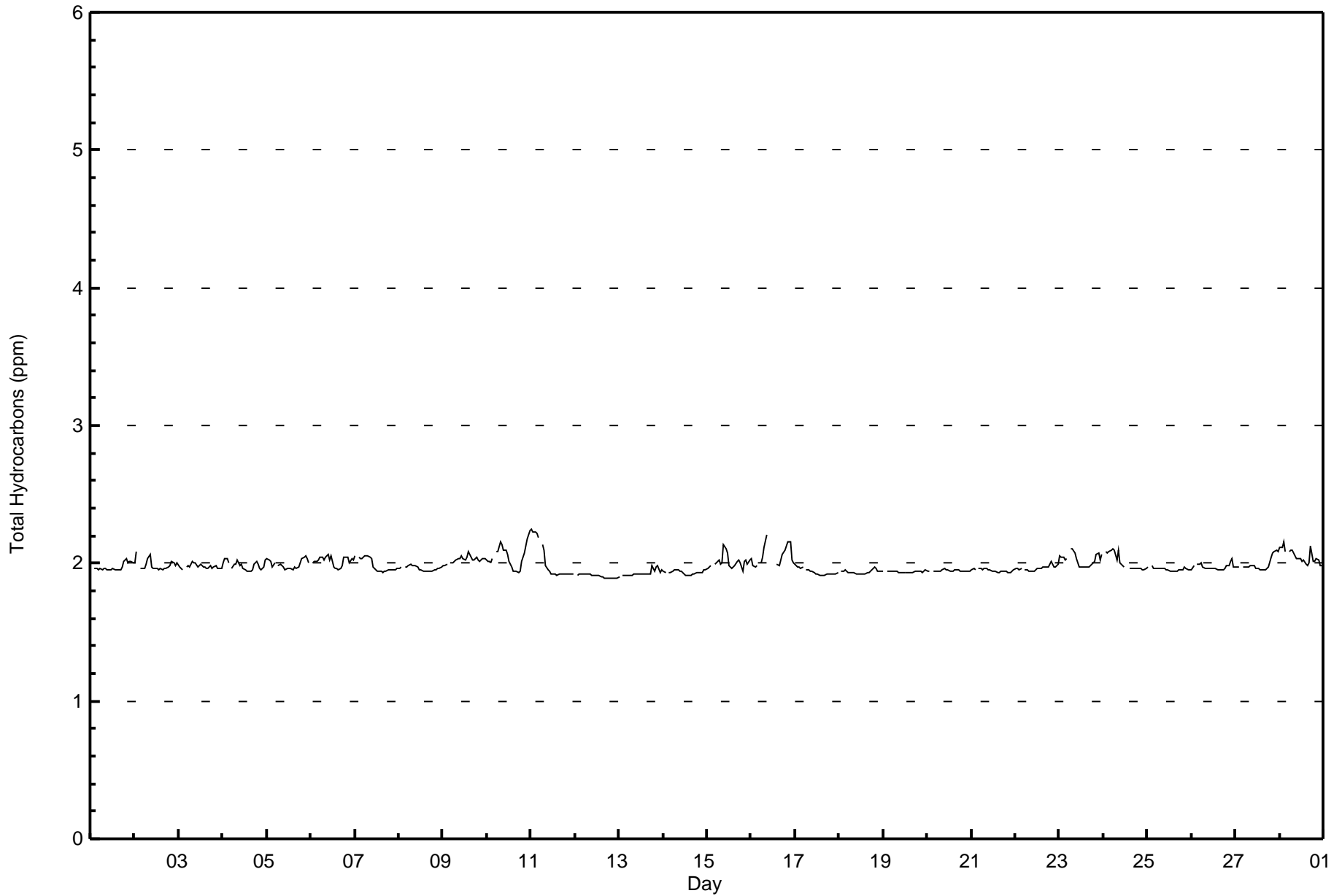
Total Hydrocarbons (THC) - ppm Conklin Community - February 2017

Maximum Value: 2.2 ppm on Feb 11 01:00 Maximum Daily Average: 2.1 ppm on Feb 16																				Hours in Service: 672											
Minimum Value: 1.9 ppm on Feb 12 23:00 Minimum Daily Average: 1.9 ppm on Feb 12																				Hours of Data: 637											
Maximum Diurnal Average: 2.0 ppm at hour 2 Minimum Diurnal Average: 2.0 ppm at hour 16																				Hours of Missing Data: 35											
Monthly Average: 1.98 ppm Percentiles: $P_1 = 1.9$ $P_{10} = 1.9$ $Q_1 = 1.9$ Median = 2.0 $Q_3 = 2.0$ $P_{90} = 2.1$ $P_{99} = 2.2$																				Hours of Calibration: 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-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
2-Feb	2.0	2.1	Z	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	2.0	2.0	2.0	2.0	2.0			
3-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
4-Feb	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	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
5-Feb	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	2.1	2.0	2.0	2.0	2.0	2.0	2.0			
6-Feb	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
7-Feb	2.0	Z	2.0	2.0	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
8-Feb	2.0	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
9-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
10-Feb	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.2	2.2	2.2	2.0	2.0	2.0	2.2		
11-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	
12-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
13-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	2.0	1.9	2.0	1.9	2.0		
14-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0		
15-Feb	2.0	2.0	2.0	Z	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	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
16-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.2	C	C	C	C	C	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.0	2.0	2.1	2.2	2.0	2.0	2.1	2.2	
17-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
18-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
19-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	
20-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
21-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	
22-Feb	2.0	2.0	2.0	2.0	Z	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	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-Feb	2.1	2.0	2.0	2.0	2.0	Z	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	2.1	2.0	2.1	2.0	2.1	2.0	2.1	
24-Feb	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	M	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
25-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	
26-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
27-Feb	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	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1
28-Feb	2.1	2.1	2.2	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	2.1	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
																								Diurnal Average							
																								Diurnal Maximum							
Z - zerospan C - Calibration M - Maintenance																															



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin Community - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	573	89.95	89.95
2.1 - 3.0	64	10.05	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin Community - February 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	20	13	4	17	14	13	5	17	33	63	55	28	72	62	97	57	570
2.1 - 3.0	1	1	1	0	1	4	5	6	10	5	7	2	2	1	5	9	60
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	14	5	17	15	17	10	23	43	68	62	30	74	63	102	66	630

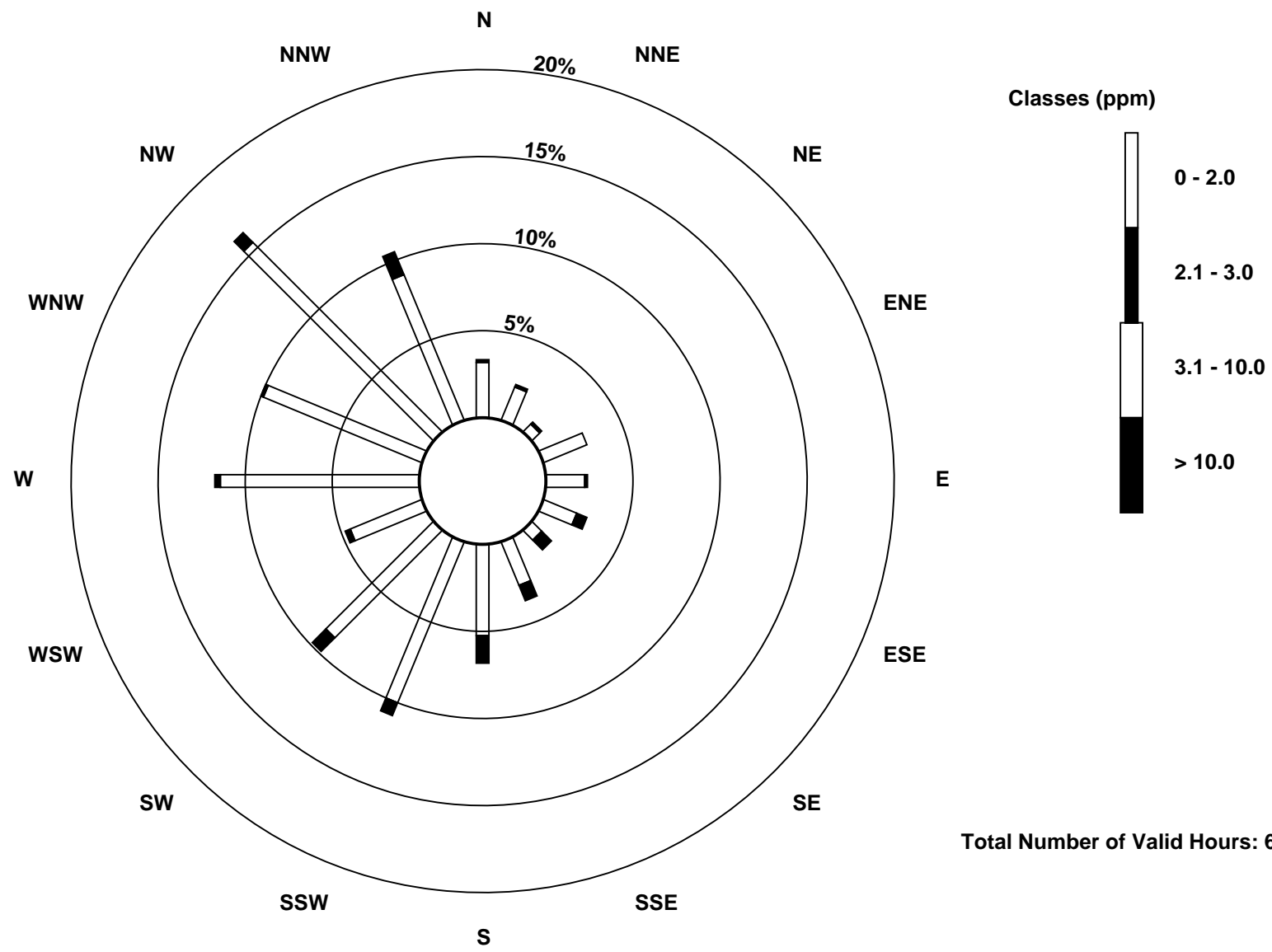
Total Number of Valid Hours: 630

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

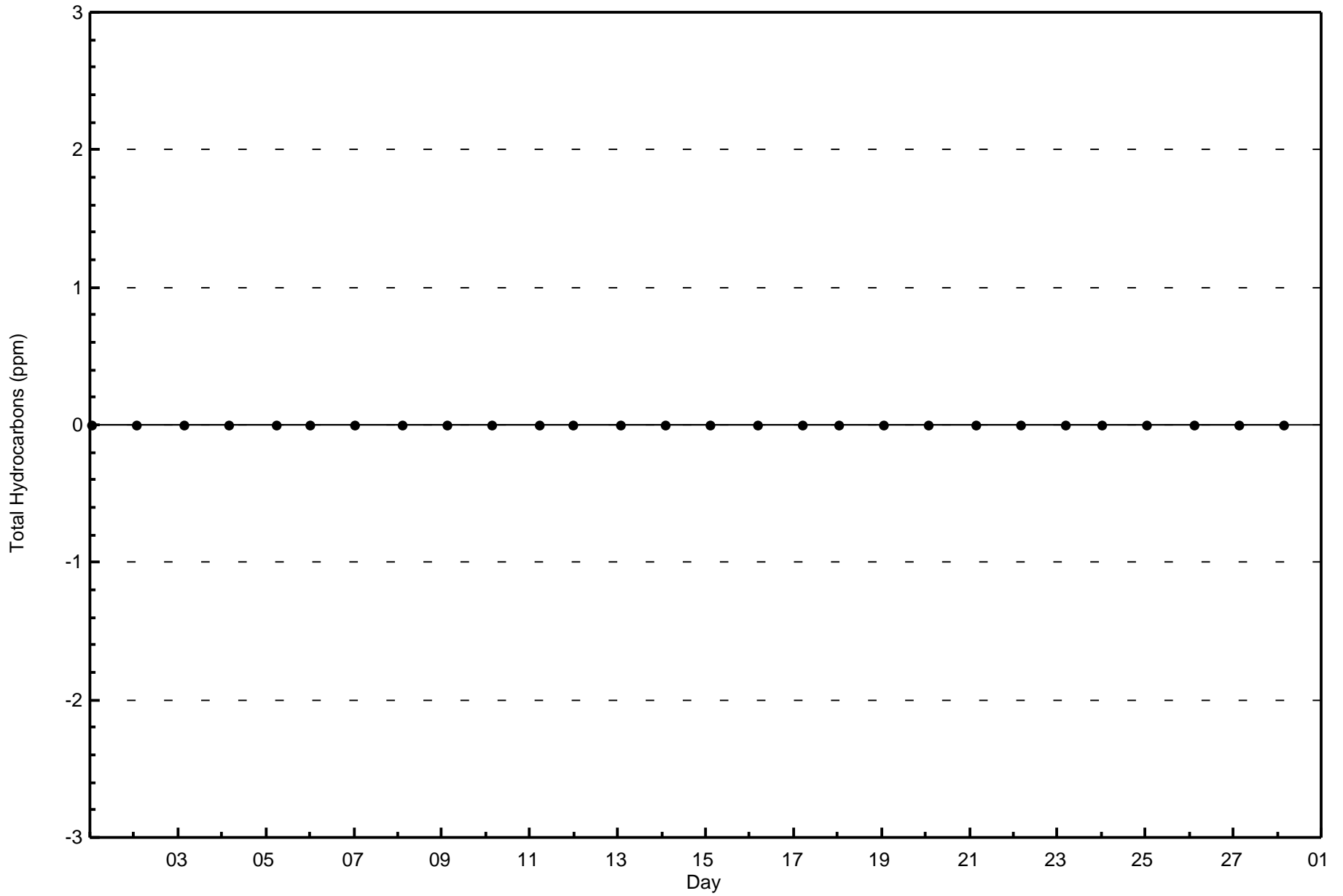
Total Hydrocarbons (THC) - ppm
Conklin Community (AMS 21)

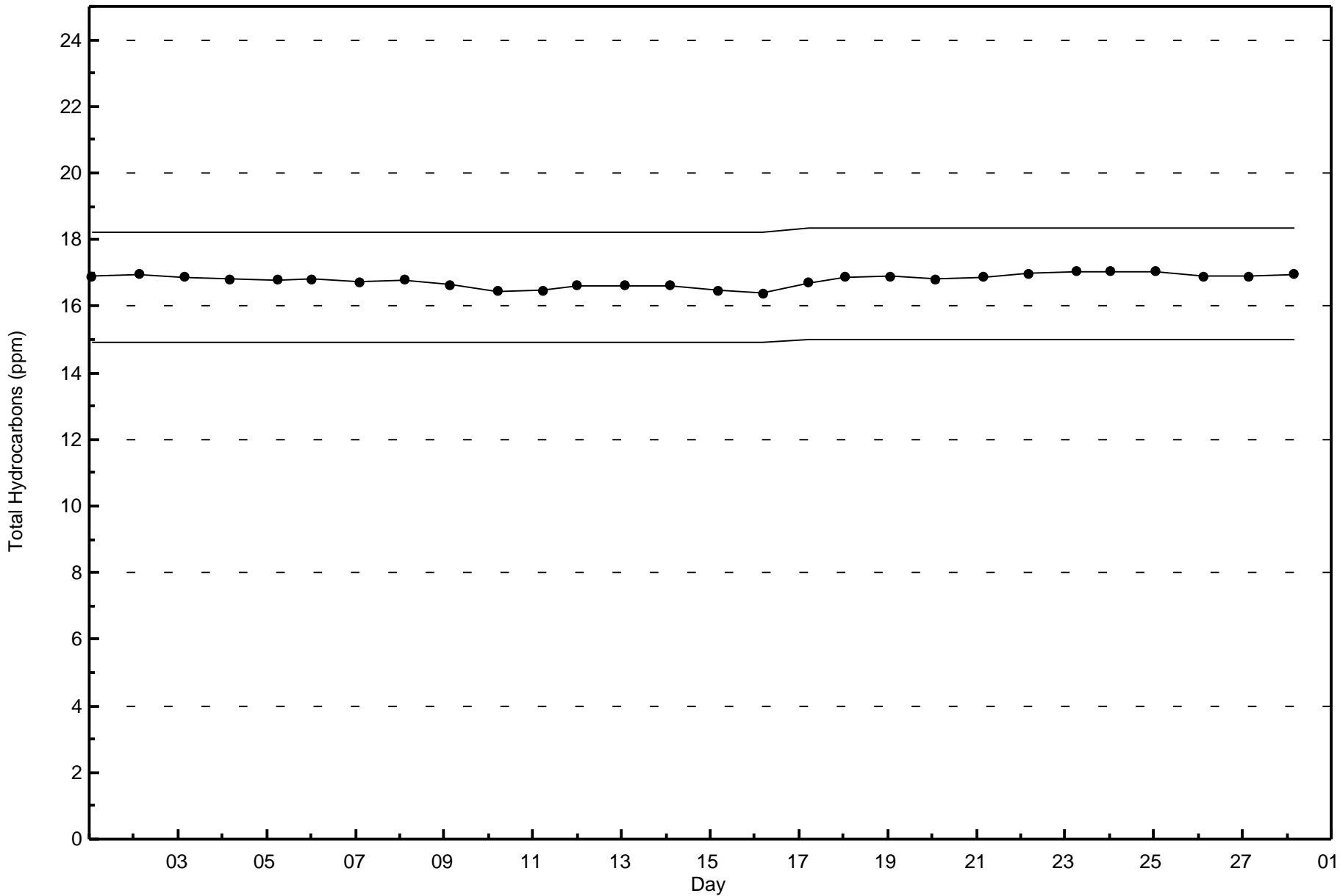




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Conklin Community - February 2017





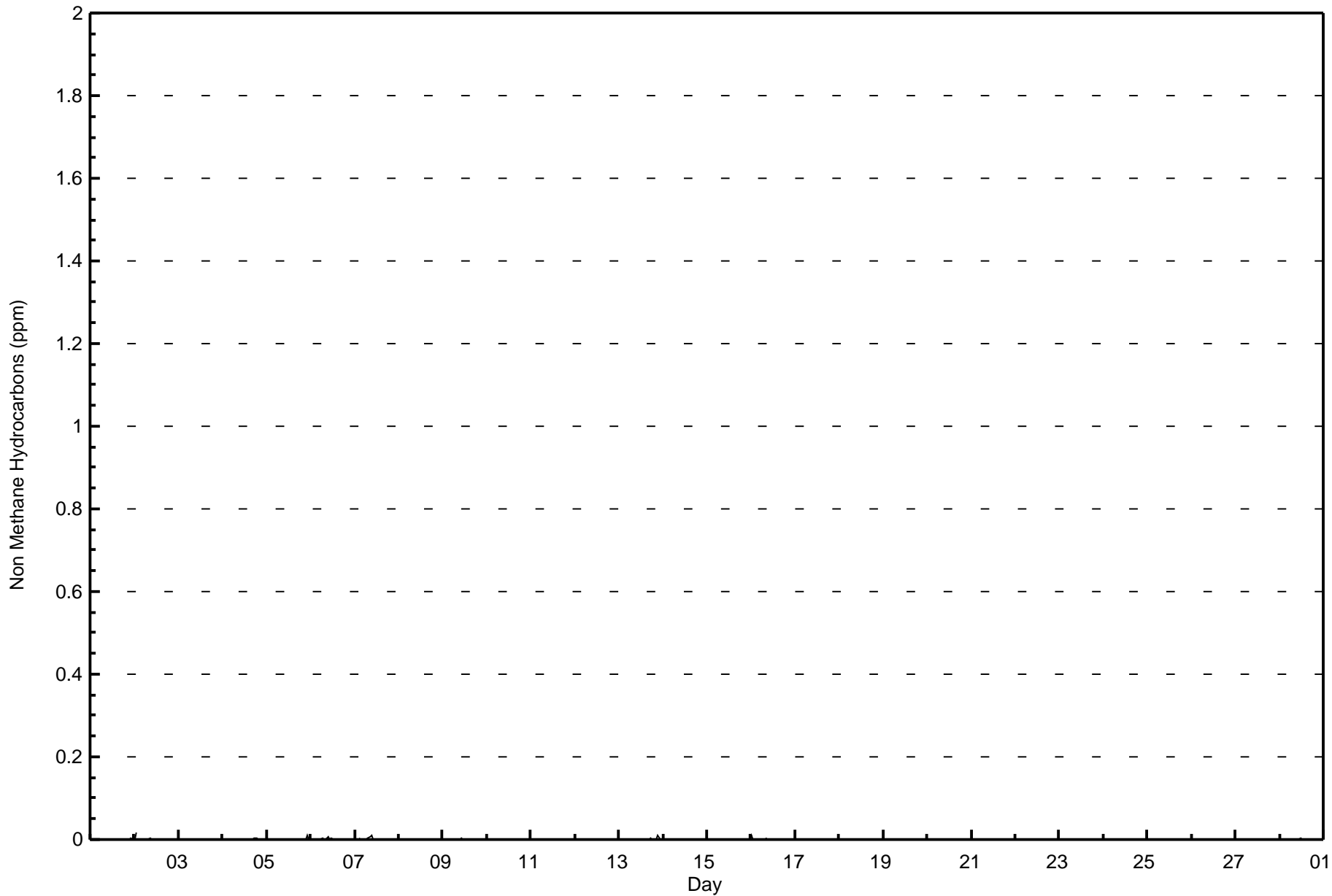


Maximum Value: 0.017 ppm on Feb 2 02:00		Maximum Daily Average: 0.001 ppm on Feb 7		Hours in Service: 672																							
Minimum Value: 0.000 ppm on Feb 1 01:00		Minimum Daily Average: 0.000 ppm on Feb 3		Hours of Data: 637																							
Maximum Diurnal Average: 0.001 ppm at hour 2		Minimum Diurnal Average: 0.000 ppm at hour 6		Hours of Missing Data: 35																							
Monthly Average: 0.000 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 = 0.0		Hours of Calibration: 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-Feb	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	0.003	0.000	0.000	0.003	
2-Feb	0.000	0.017	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.017
3-Feb	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
4-Feb	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	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
5-Feb	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	0.012	0.000	0.000	0.001	0.012	
6-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.001	0.007	0.000	0.005	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.007
7-Feb	0.000	Z	0.004	0.001	0.000	0.000	0.000	0.002	0.008	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.009
8-Feb	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
9-Feb	0.000	0.000	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
10-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13-Feb	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	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.009
14-Feb	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
15-Feb	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	0.002	0.000	0.000	0.002
16-Feb	0.009	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.009	0.001
17-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
18-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20-Feb	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
21-Feb	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
22-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-Feb	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	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26-Feb	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
27-Feb	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
28-Feb	0.000	0.000	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
																								Diurnal Average			
																								Diurnal Maximum			
																								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 0.000 0.000 0.000 0.000 0.001 0.000			
																								0.009 0.017 0.004 0.001 0.000 0.000 0.003 0.002 0.008 0.009 0.003 0.005 0.000 0.000 0.000 0.001 0.001 0.005 0.003 0.000 0.000 0.009 0.012 0.002			
																								Z - zerospan C - Calibration M - Maintenance			



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	630	98.90	98.90
0.006 - 0.05	7	1.10	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - February 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	21	14	5	17	15	17	10	22	40	66	61	30	74	63	102	66	623
0.006 - 0.05	0	0	0	0	0	0	0	1	3	2	1	0	0	0	0	0	7
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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	102	66	630

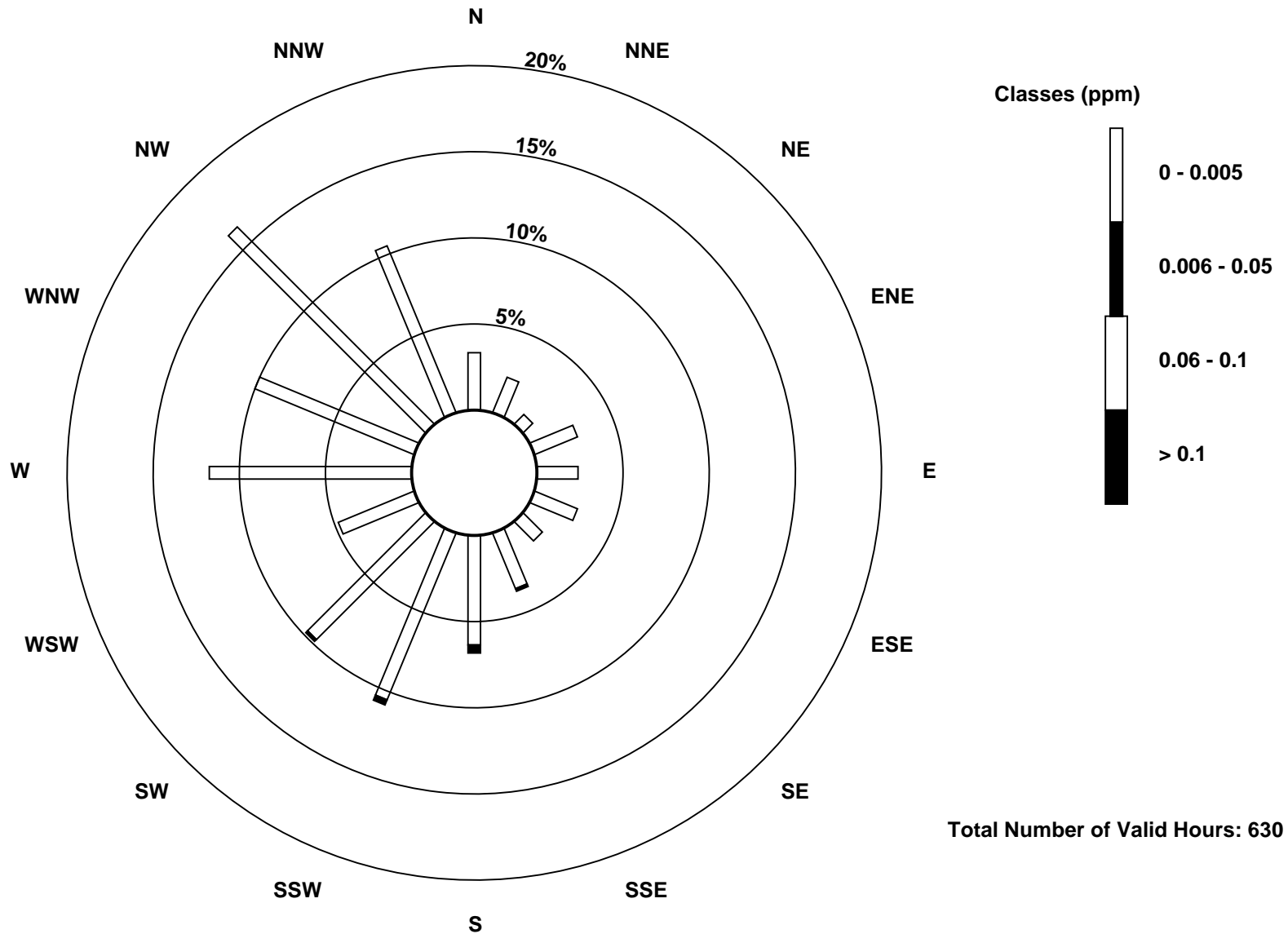
Total Number of Valid Hours: 630

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community (AMS 21)

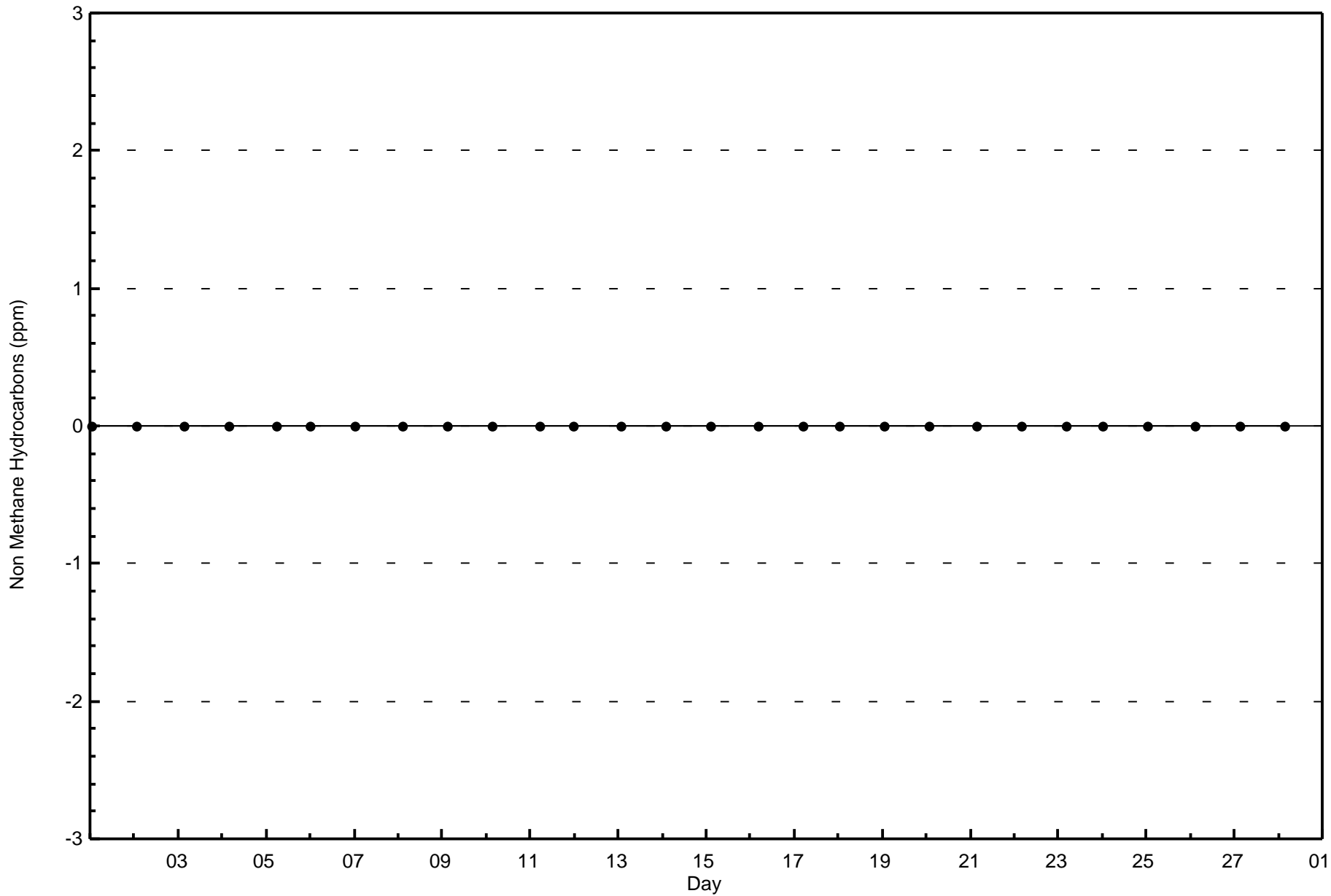


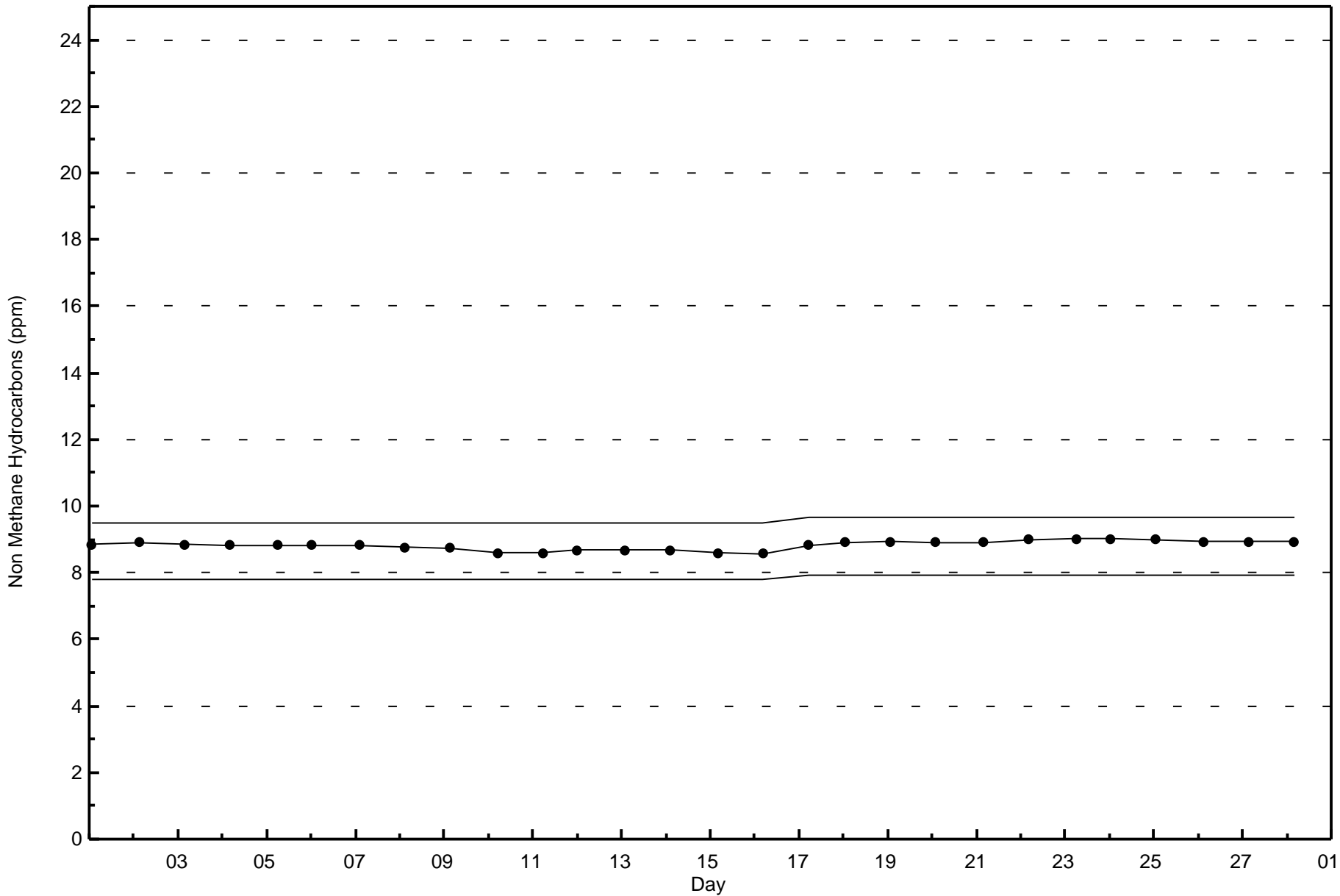
Total Number of Valid Hours: 630



Wood Buffalo Environmental Association
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - February 2017

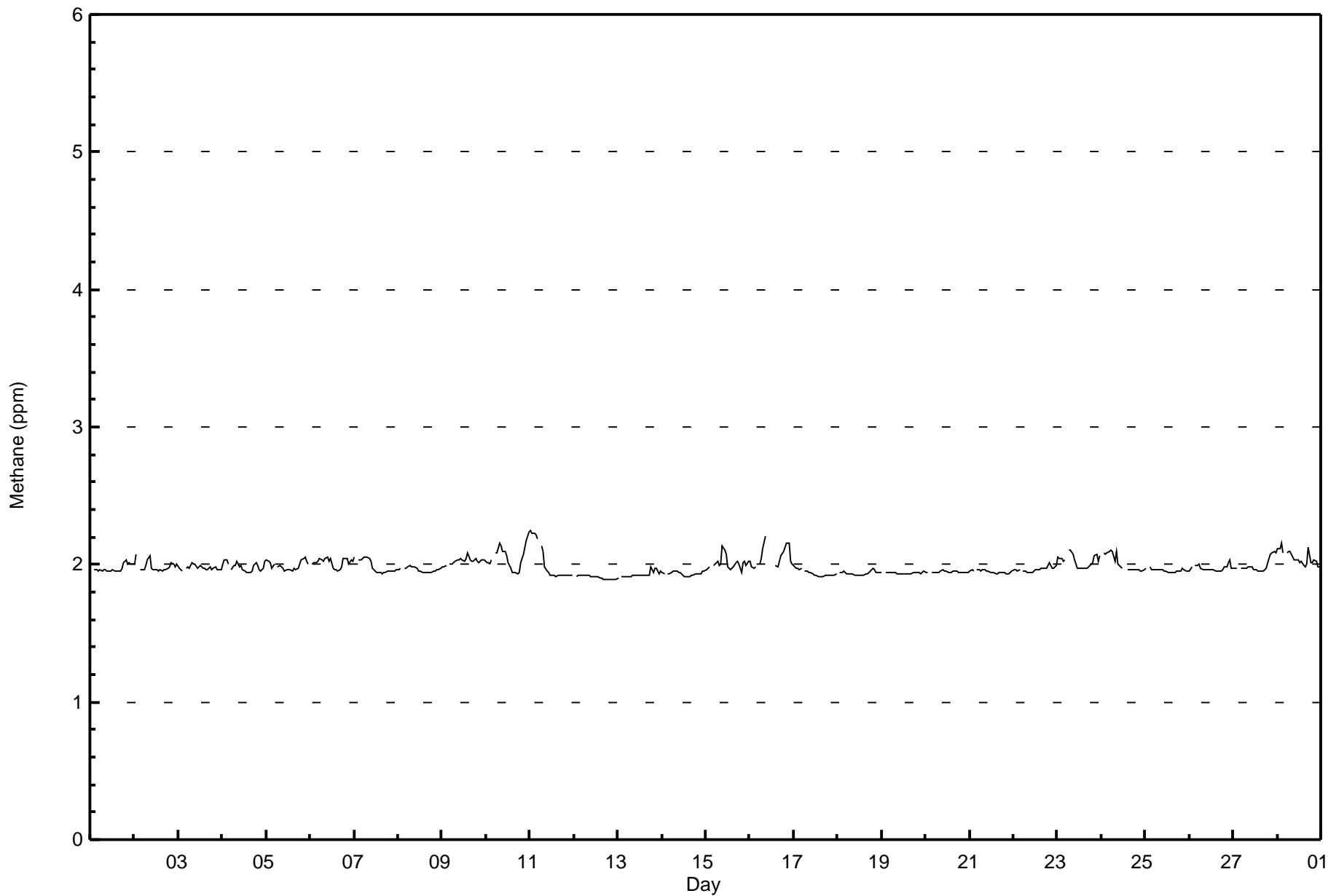






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Conklin Community - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	574	90.11	90.11
2.1 - 3.0	63	9.89	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Conklin Community - February 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	20	13	4	17	14	13	5	18	33	63	55	28	72	62	97	57	571
2.1 - 3.0	1	1	1	0	1	4	5	5	10	5	7	2	2	1	5	9	59
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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	102	66	630

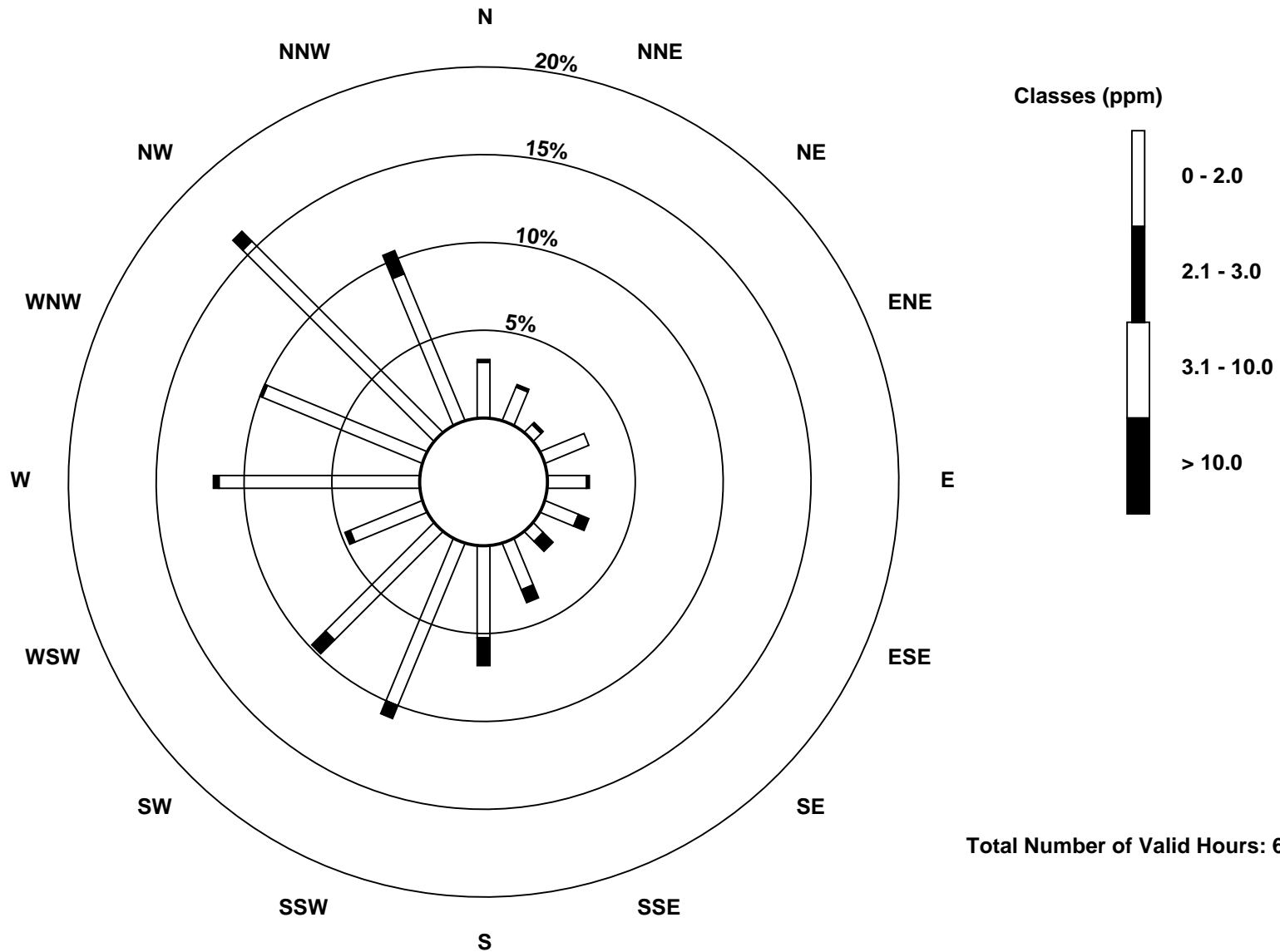
Total Number of Valid Hours: 630

Total Number of Hours: 672

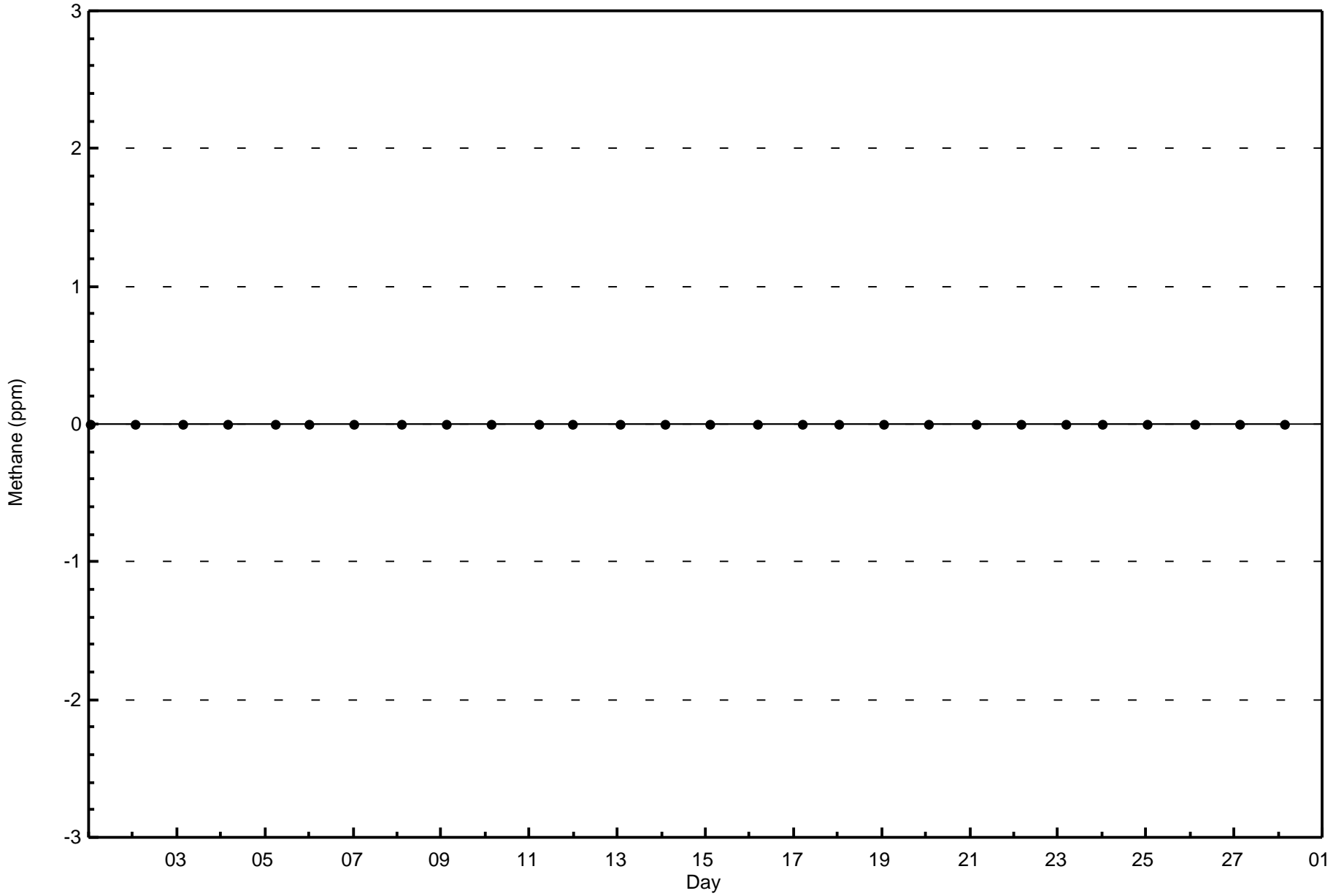


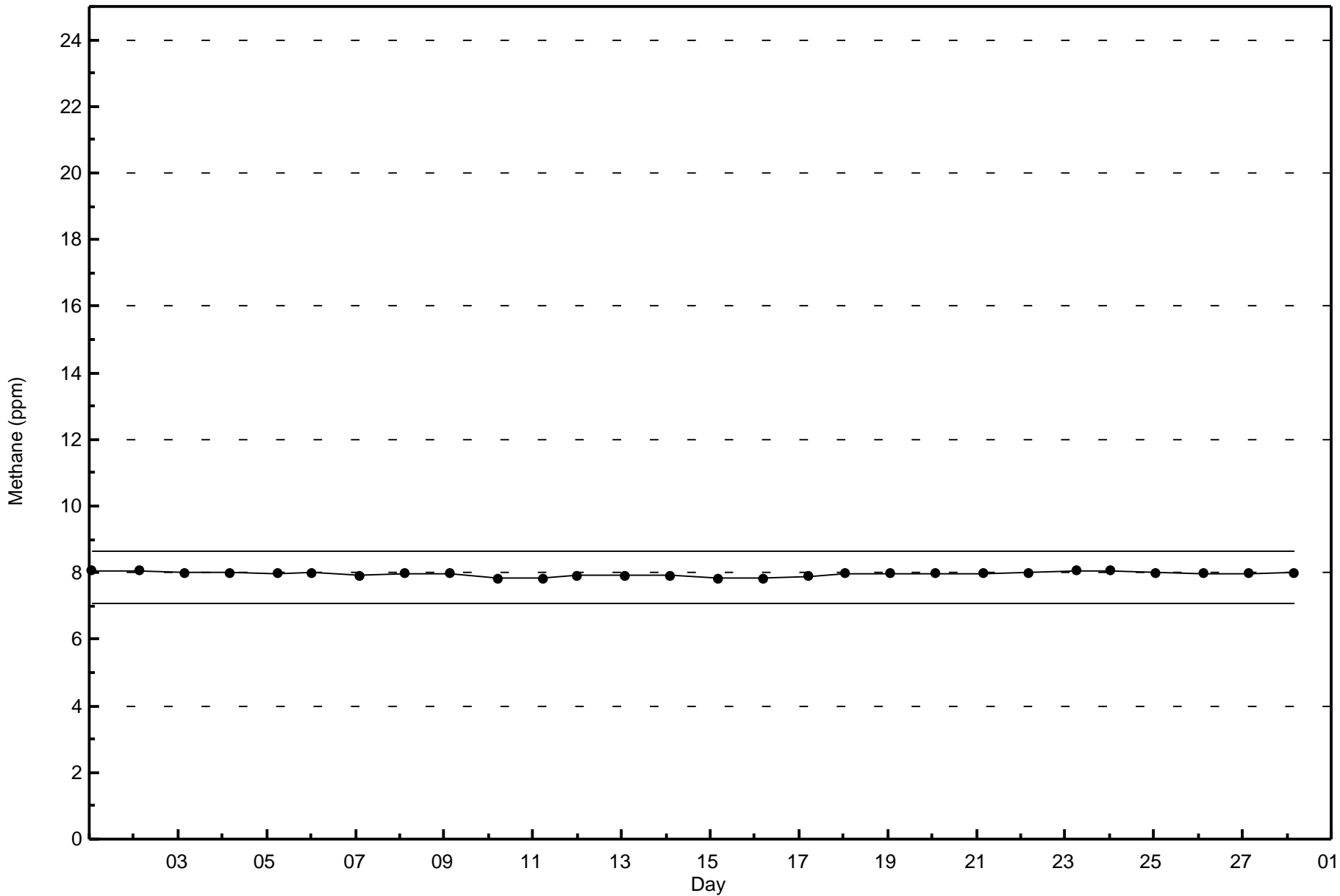
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Methane (CH₄) - ppm
Conklin Community (AMS 21)



Total Number of Valid Hours: 630





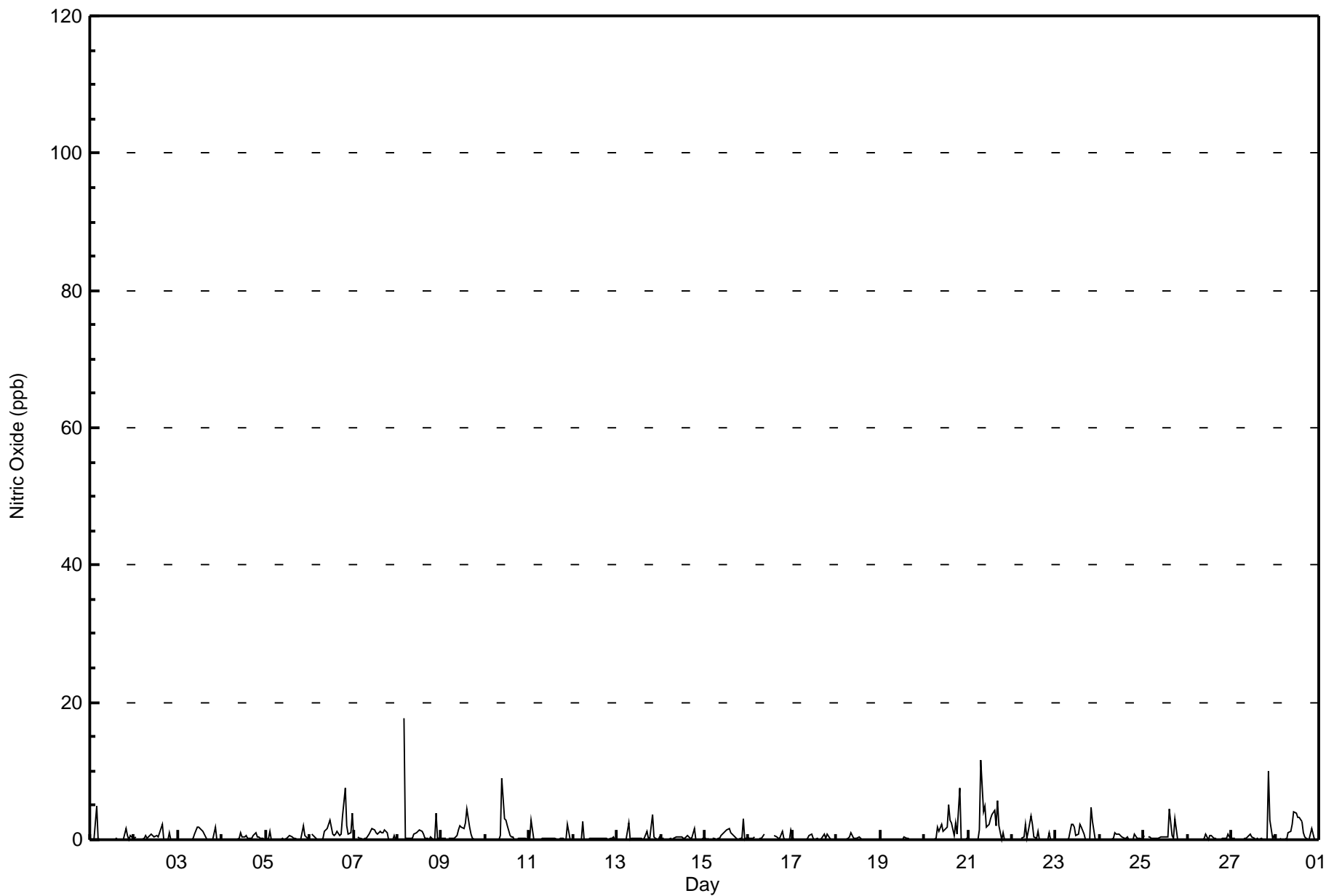


Maximum Value: 18 ppb on Feb 8 04:00																	Maximum Daily Average: 2.1 ppb on Feb 21																	Hours in Service: 672	
Minimum Value: 0 ppb on Feb 1 01:00																	Minimum Daily Average: 0.0 ppb on Feb 19																	Hours of Data: 639	
Maximum Diurnal Average: 1.2 ppb at hour 10																	Minimum Diurnal Average: 0.0 ppb at hour 5																	Hours of Missing Data: 33	
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 = 7																	Hours of Calibration: 33	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Feb	0	Z	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0.4	5									
2-Feb	0	0	Z	0	0	0	1	0	1	1	1	0	1	0	1	2	0	0	0	1	0	0	0	0	0.4	2									
3-Feb	0	0	0	Z	0	0	0	0	0	1	2	2	2	1	1	0	0	0	0	0	2	0	0	0	0.5	2									
4-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0.3	1									
5-Feb	0	0	1	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1	0	0	0.3	2									
6-Feb	Z	1	1	0	0	0	0	0	1	2	2	3	1	1	1	1	1	1	3	8	2	1	1	4	1.4	8									
7-Feb	0	Z	0	0	0	0	0	0	1	1	2	1	1	1	1	1	1	1	1	0	0	0	1	0	0.6	2									
8-Feb	0	0	Z	18	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	4	0	0	1.3	18									
9-Feb	0	0	0	Z	0	0	0	0	1	1	2	2	2	3	5	2	1	0	0	0	0	0	0	0	0.8	5									
10-Feb	0	0	0	0	Z	0	0	0	1	9	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0.9	9									
11-Feb	0	3	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.3	3									
12-Feb	Z	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3									
13-Feb	0	Z	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0.4	4									
14-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0.3	2									
15-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	1	2	1	1	0	0	0	0	0	3	0	0	0.6	3									
16-Feb	0	0	0	0	Z	0	0	0	1	C	C	C	C	C	1	0	0	0	1	0	0	0	0	1	0.4	1									
17-Feb	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0.2	1									
18-Feb	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
19-Feb	0	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									
20-Feb	0	0	Z	0	0	0	0	2	1	2	1	1	2	5	3	3	1	2	1	8	0	0	0	0	1.4	8									
21-Feb	0	0	0	Z	0	0	1	12	4	5	2	2	3	4	4	2	6	2	0	1	0	0	0	0	2.1	12									
22-Feb	0	0	0	0	Z	0	0	2	0	1	3	2	0	0	1	0	0	0	0	0	1	0	0	0	0.6	3									
23-Feb	0	0	0	0	0	Z	0	0	2	2	2	1	1	2	2	1	0	0	0	5	3	0	0	0	0.9	5									
24-Feb	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1									
25-Feb	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	3	0	0	0	0	0	0.6	5									
26-Feb	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0.2	1									
27-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	10	3	0	1	0.8	10									
28-Feb	0	0	0	0	Z	0	0	1	1	2	4	4	3	3	3	1	0	0	0	1	2	0	0	0	1.1	4									
																	0.1 0.2 0.2 1.0 0.0 0.2 0.2 0.7 0.6 1.2 1.2 1.0 0.9 1.0 1.1 0.6 0.5 0.5 0.4 1.1 0.9 0.5 0.2 0.3																	Diurnal Average	
																	1 3 1 18 0 3 2 12 4 9 4 4 4 3 5 5 3 6 3 3 8 10 4 1 4																	Diurnal Maximum	
Z - zerospan C - Calibration																																			



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin Community - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin Community - February 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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	104	66	632
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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	104	66	632

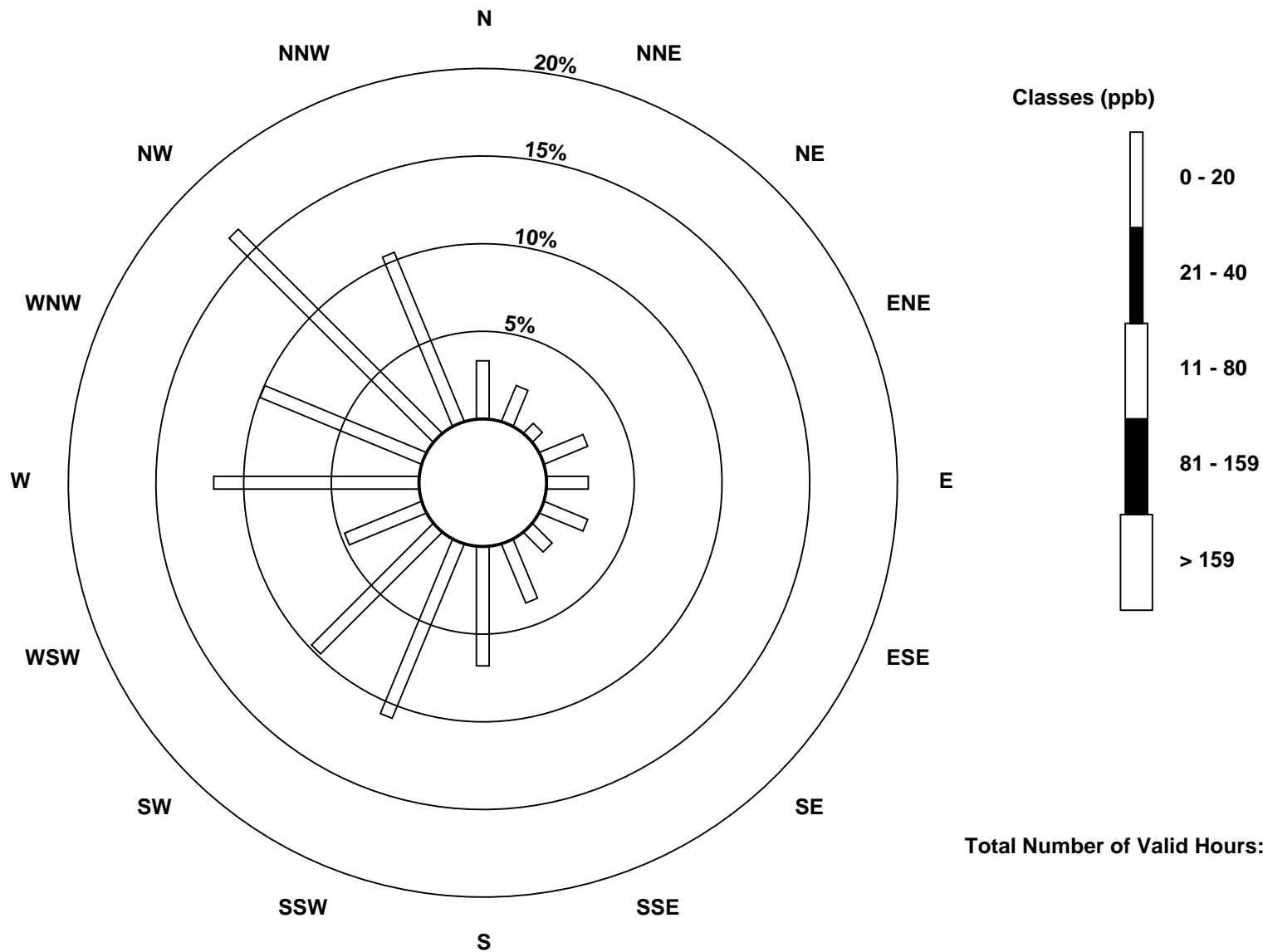
Total Number of Valid Hours: 632

Total Number of Hours: 672

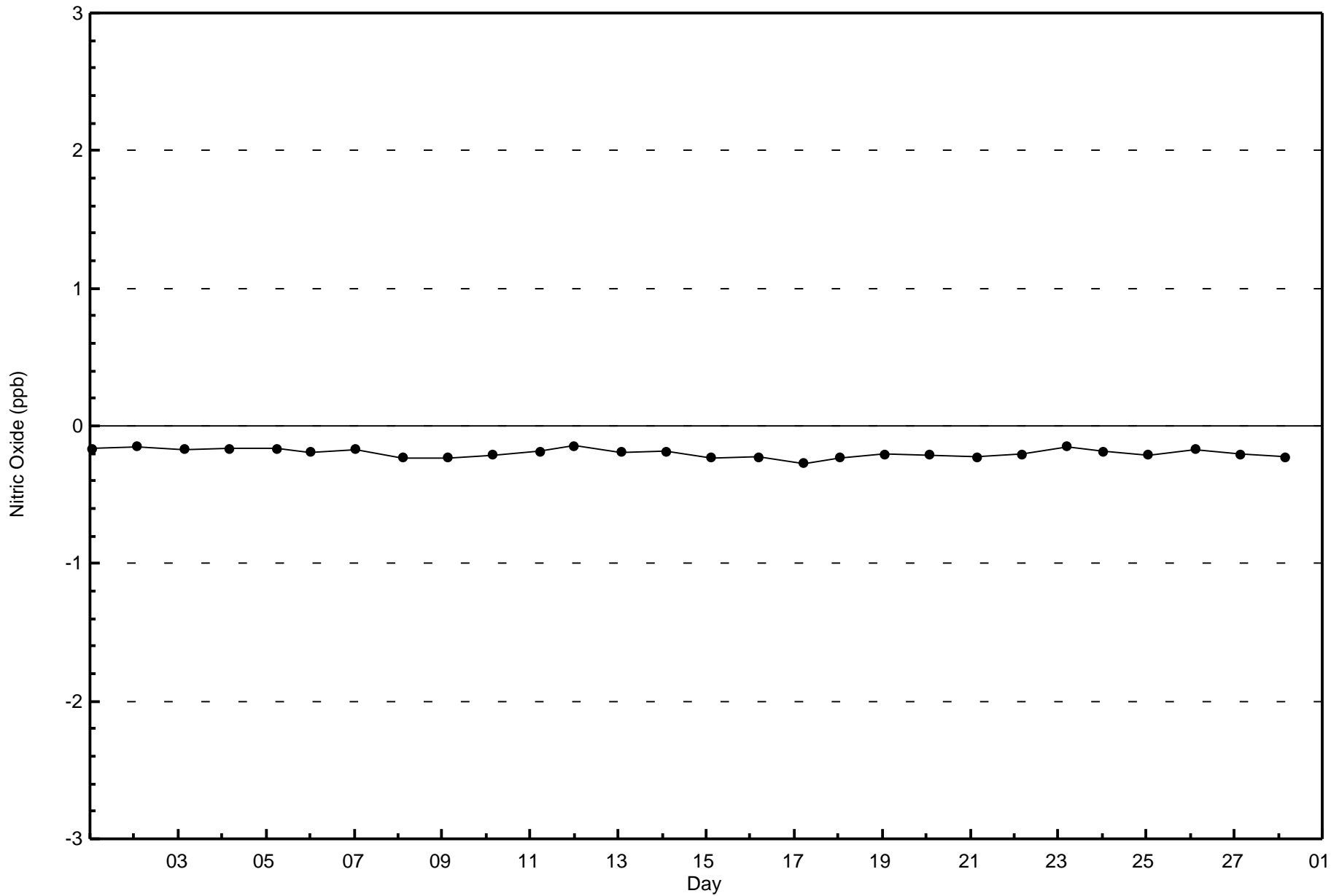


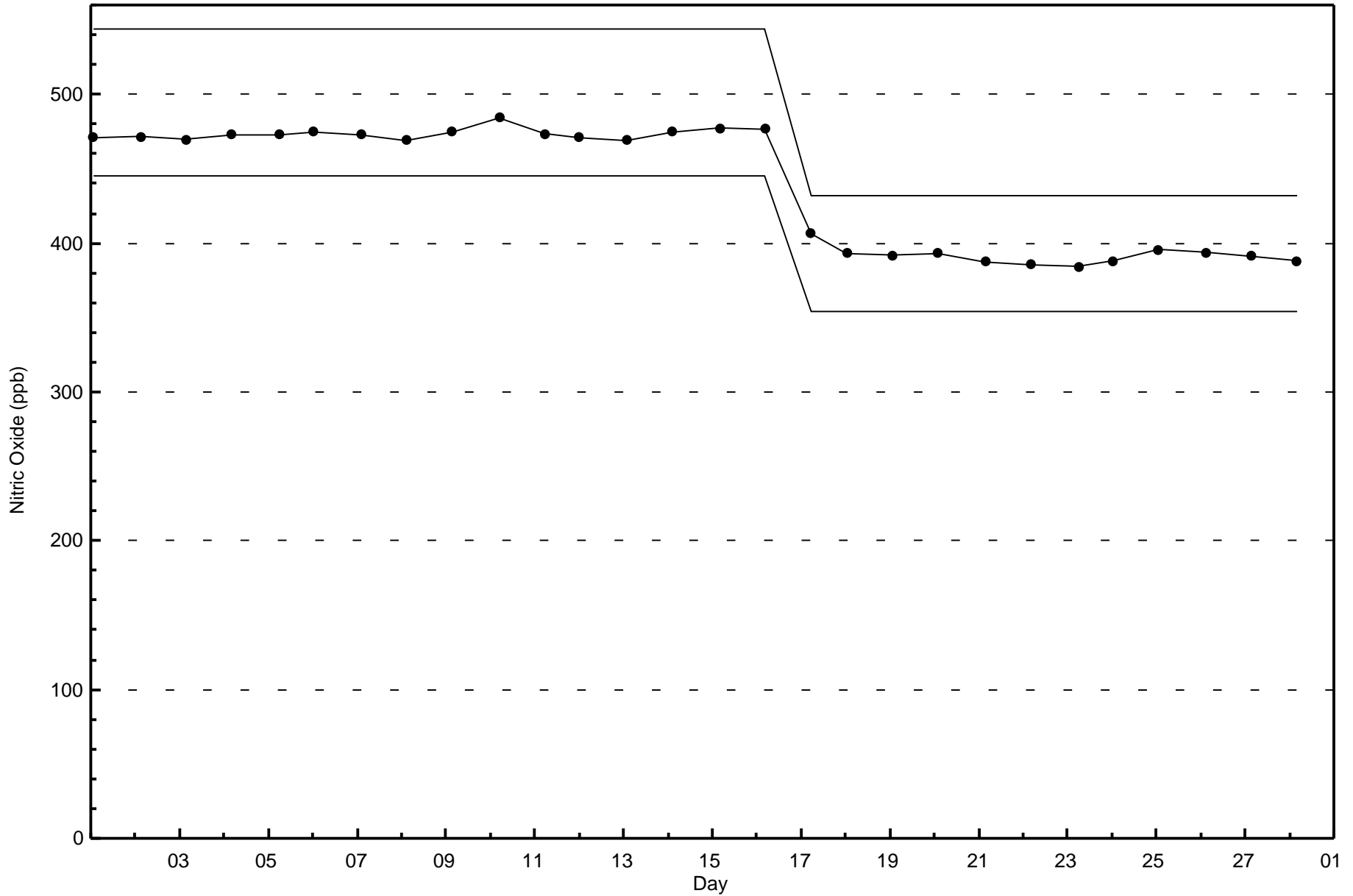
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitric Oxide (NO) - ppb
Conklin Community (AMS 21)



Total Number of Valid Hours: 632







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

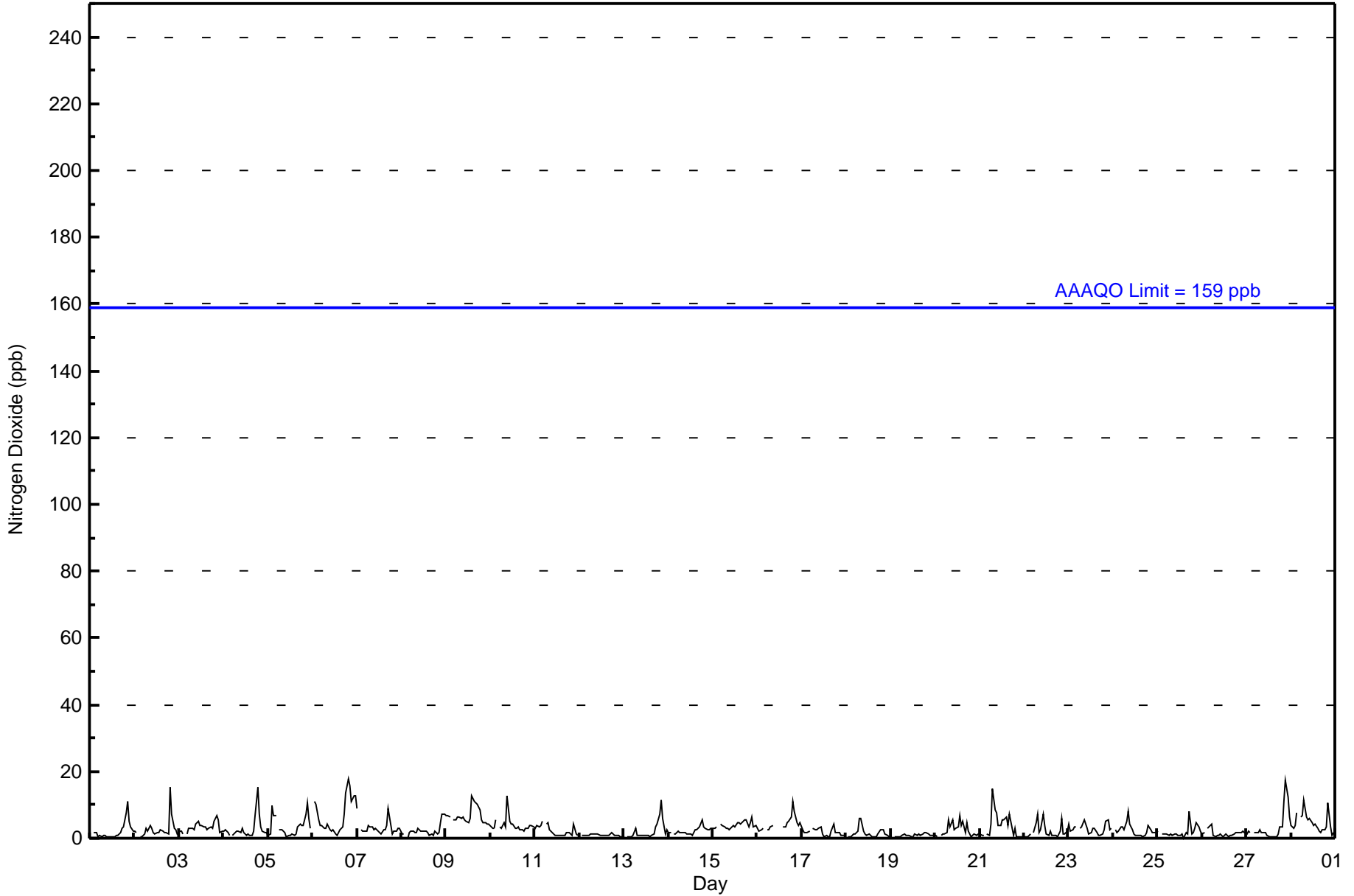
Conklin Community - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 18 ppb on Feb 6 20:00										Maximum Daily Average: 6.7 ppb on Feb 9										Hours of Data: 639						
Minimum Value: 0 ppb on Feb 8 04:00										Minimum Daily Average: 0.9 ppb on Feb 19										Hours of Missing Data: 33						
Maximum Diurnal Average: 5.0 ppb at hour 21										Minimum Diurnal Average: 1.8 ppb at hour 13										Hours of Calibration: 33						
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 = 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-Feb	1	Z	2	2	1	1	1	1	1	1	0	0	0	0	1	1	2	3	3	8	11	5	4	2	2.1	11
2-Feb	2	2	Z	1	1	1	3	2	4	3	2	1	2	2	3	2	2	2	1	15	7	3	3	1	2.8	15
3-Feb	2	2	1	Z	1	3	3	3	3	4	5	4	4	4	3	3	3	3	5	7	6	2	2	3.3	7	
4-Feb	2	3	2	1	Z	1	2	2	2	2	3	2	1	1	1	1	2	7	15	7	3	2	2	2.8	15	
5-Feb	1	1	10	7	7	Z	3	3	2	2	1	1	1	1	1	1	3	4	4	4	7	11	6	3	3.6	11
6-Feb	Z	11	10	6	4	4	3	3	4	2	2	2	1	1	2	3	4	7	14	18	16	11	13	13	6.6	18
7-Feb	9	Z	3	2	2	2	4	3	3	3	3	2	2	1	3	3	4	9	4	1	2	2	3	3	3.1	9
8-Feb	1	1	Z	0	2	2	2	2	2	3	2	2	2	2	1	1	1	2	1	2	5	7	7	2.3	7	
9-Feb	7	7	6	Z	6	6	6	6	6	6	5	5	5	6	13	11	10	10	9	6	5	5	4	4	6.7	13
10-Feb	4	3	3	5	Z	4	3	5	4	13	5	4	4	3	3	4	3	3	2	3	3	4	4	4	3.9	13
11-Feb	3	4	4	4	5	Z	4	5	3	2	1	1	1	1	1	1	1	2	2	1	1	4	1	1	2.2	5
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0	1.0	2
13-Feb	1	Z	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	3	4	7	11	6	1	2	2.2	11
14-Feb	2	2	Z	1	1	2	2	2	2	2	1	1	1	1	3	2	3	3	6	4	3	3	3	3	2.2	6
15-Feb	3	3	3	Z	4	4	3	3	3	3	3	4	3	5	5	4	5	6	5	3	5	6	4	4	4.0	6
16-Feb	3	2	3	3	Z	2	3	3	4	C	C	C	C	C	3	4	5	5	6	11	8	5	4	5	4.3	11
17-Feb	3	2	2	2	2	Z	3	2	3	3	3	1	1	1	1	1	1	2	4	2	2	1	1	1	1.8	4
18-Feb	Z	1	1	1	1	1	2	6	6	2	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1.6	6
19-Feb	1	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	0.9	2
20-Feb	1	1	Z	1	1	1	2	5	3	6	3	3	4	7	4	5	2	5	2	1	1	1	1	1	2.5	7
21-Feb	1	1	1	Z	1	1	4	15	8	8	4	4	5	6	7	4	7	5	1	3	1	1	1	1	3.8	15
22-Feb	0	1	1	1	Z	2	5	7	2	3	7	4	1	1	2	1	1	1	1	2	6	1	1	2	2.2	7
23-Feb	4	2	3	3	3	Z	3	3	6	4	3	1	2	3	3	2	1	1	1	3	5	6	3	3	2.9	6
24-Feb	Z	2	2	2	3	4	3	5	8	4	2	1	1	1	1	1	1	1	2	4	3	2	2	2	2.4	8
25-Feb	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	2	1	8	1	2	3	5	4	2	1.9	8
26-Feb	1	2	Z	3	4	4	1	1	1	1	1	0	1	1	1	1	1	1	2	2	2	2	2	2	1.5	4
27-Feb	1	2	2	Z	2	2	2	3	2	2	2	1	1	0	1	1	1	1	3	3	11	18	12	6	3.3	18
28-Feb	4	3	4	8	Z	7	7	12	6	6	6	5	4	4	3	2	2	2	2	3	11	3	1	2	4.6	12
2.4 2.5 2.7 2.4 2.3 2.3 2.7 3.8 3.2 3.2 2.6 2.0 1.8 2.1 2.3 2.2 2.4 3.6 3.6 4.4 5.0 4.2 3.1 2.8																								Diurnal Average		
9 11 10 8 7 7 7 15 8 13 7 5 5 7 13 11 10 10 10 15 18 16 18 13 13																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin Community - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin Community - February 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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	104	66	632
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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	104	66	632

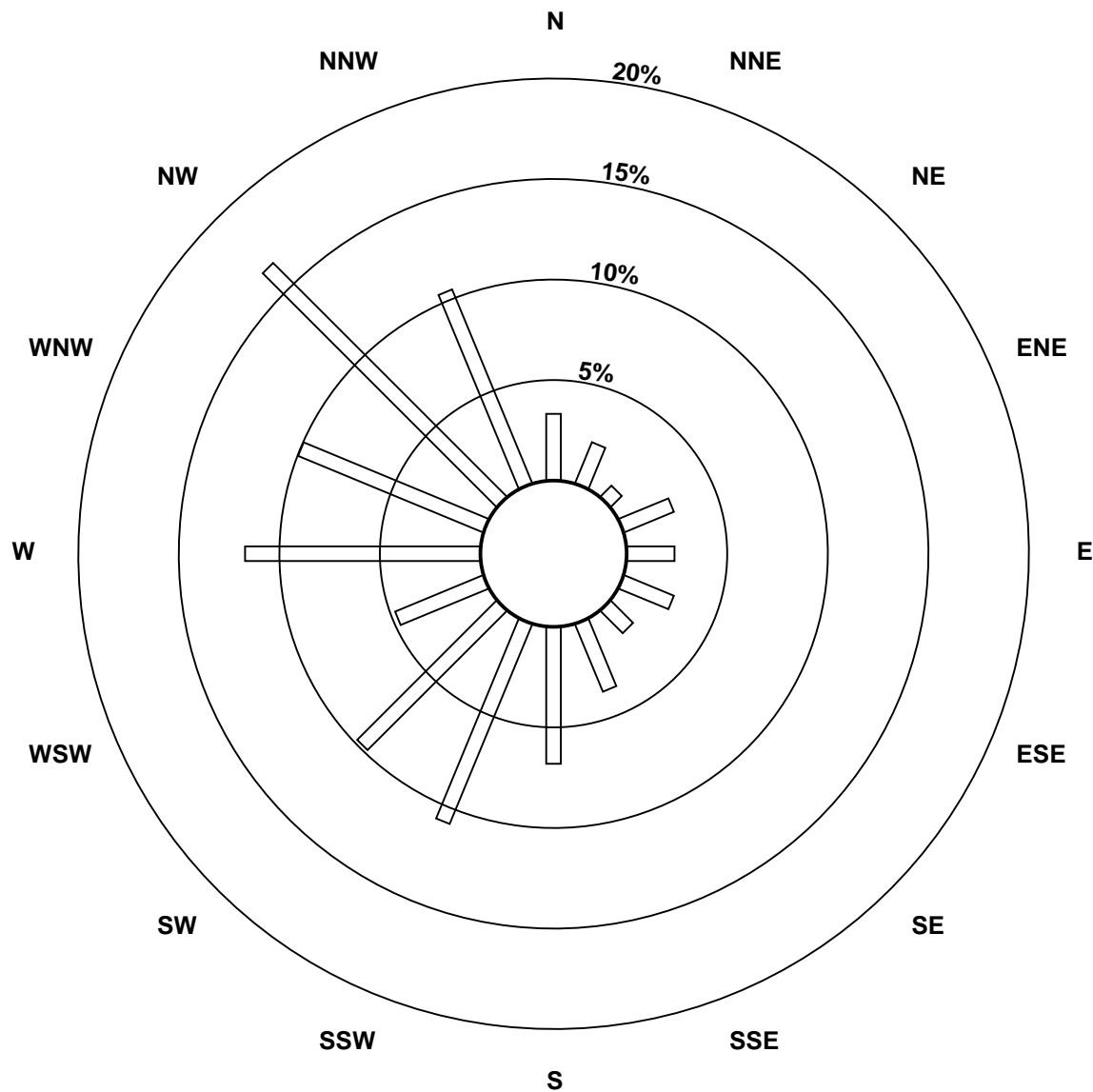
Total Number of Valid Hours: 632

Total Number of Hours: 672

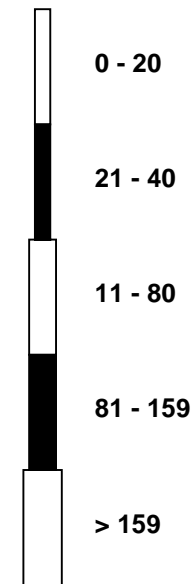


Wood Buffalo Environmental Association
Wind Rose Feb 2017

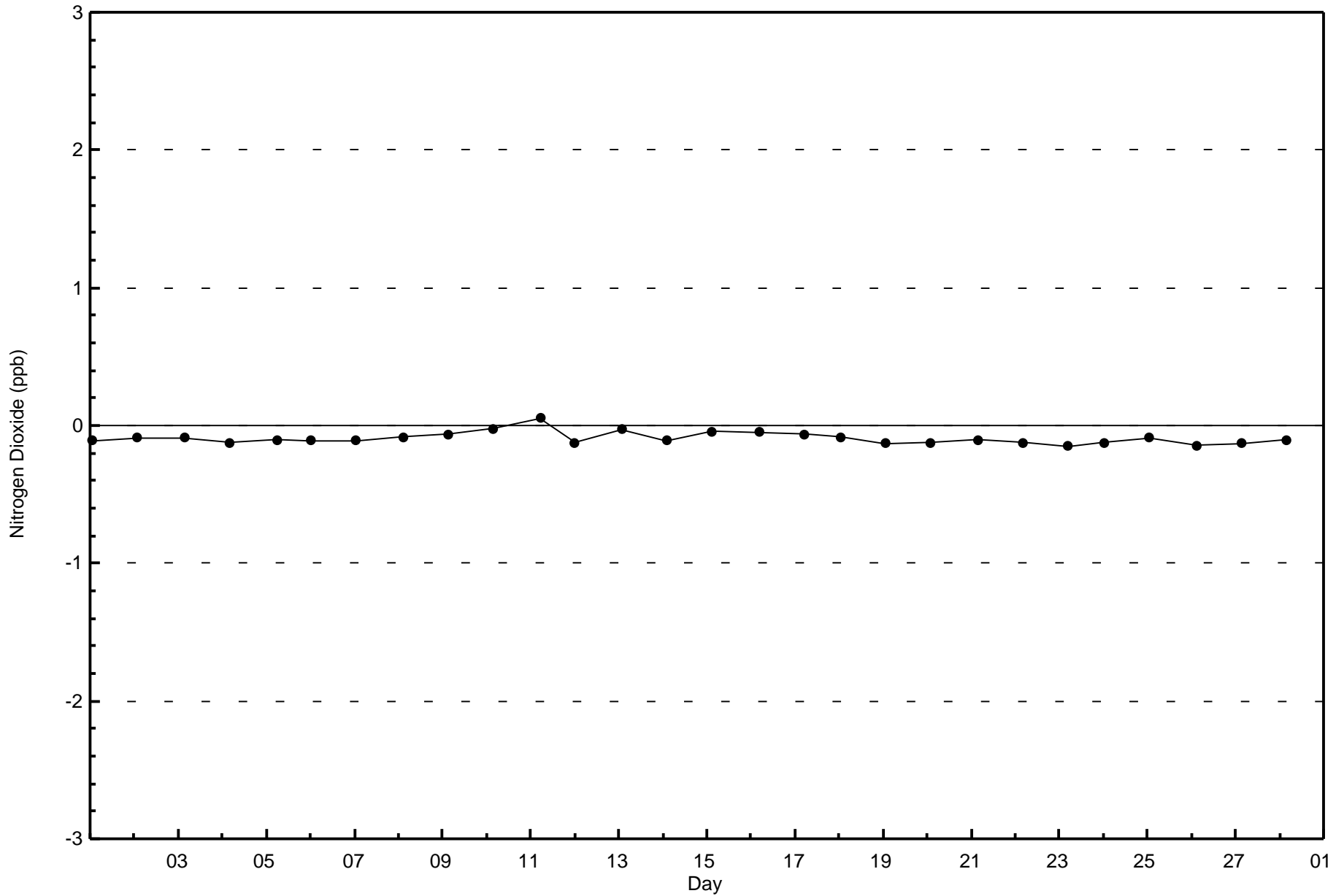
Nitrogen Dioxide (NO₂) - ppb
Conklin Community (AMS 21)

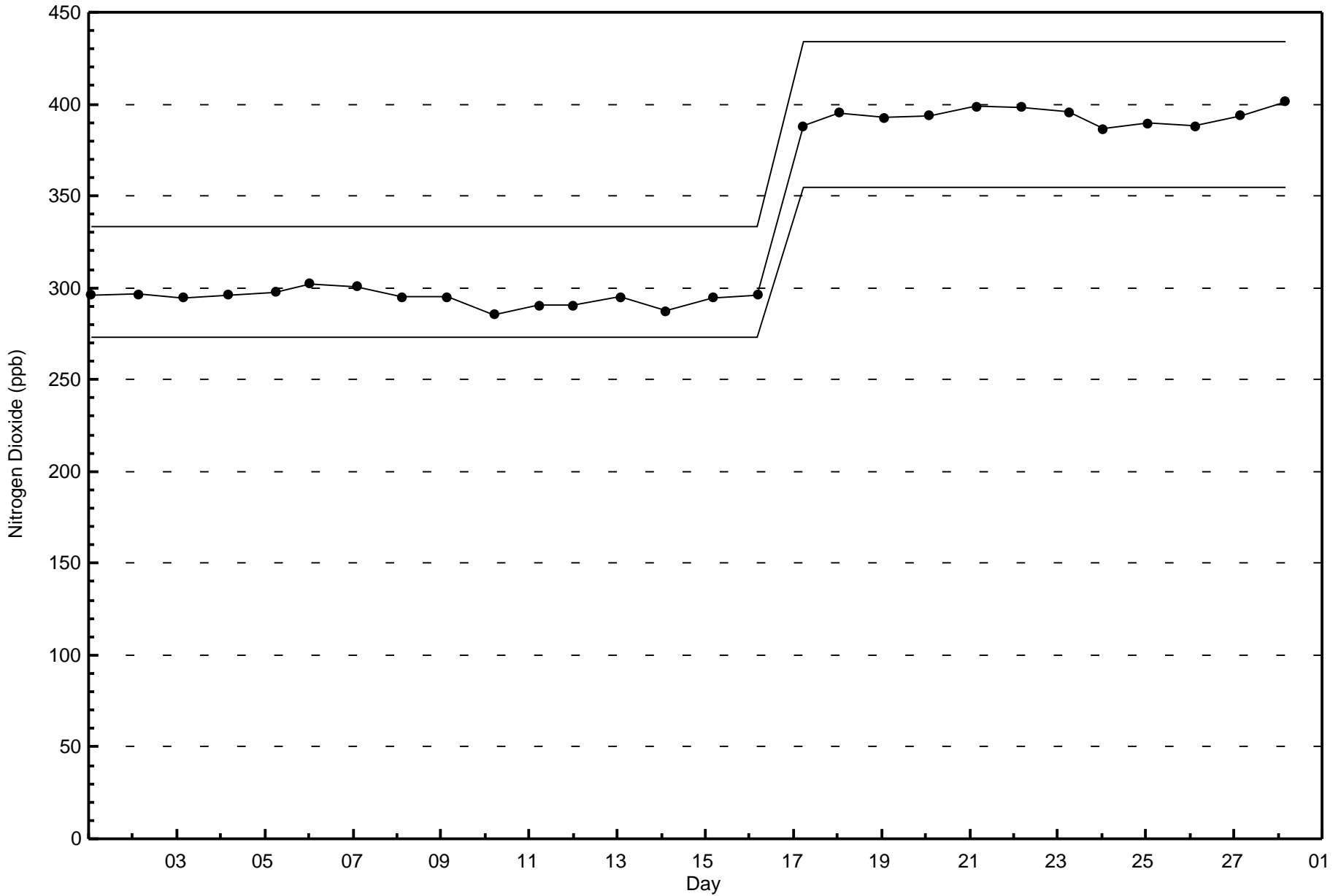


Classes (ppb)



Total Number of Valid Hours: 632







Wood Buffalo Environmental Association
Summary of Hour Averages

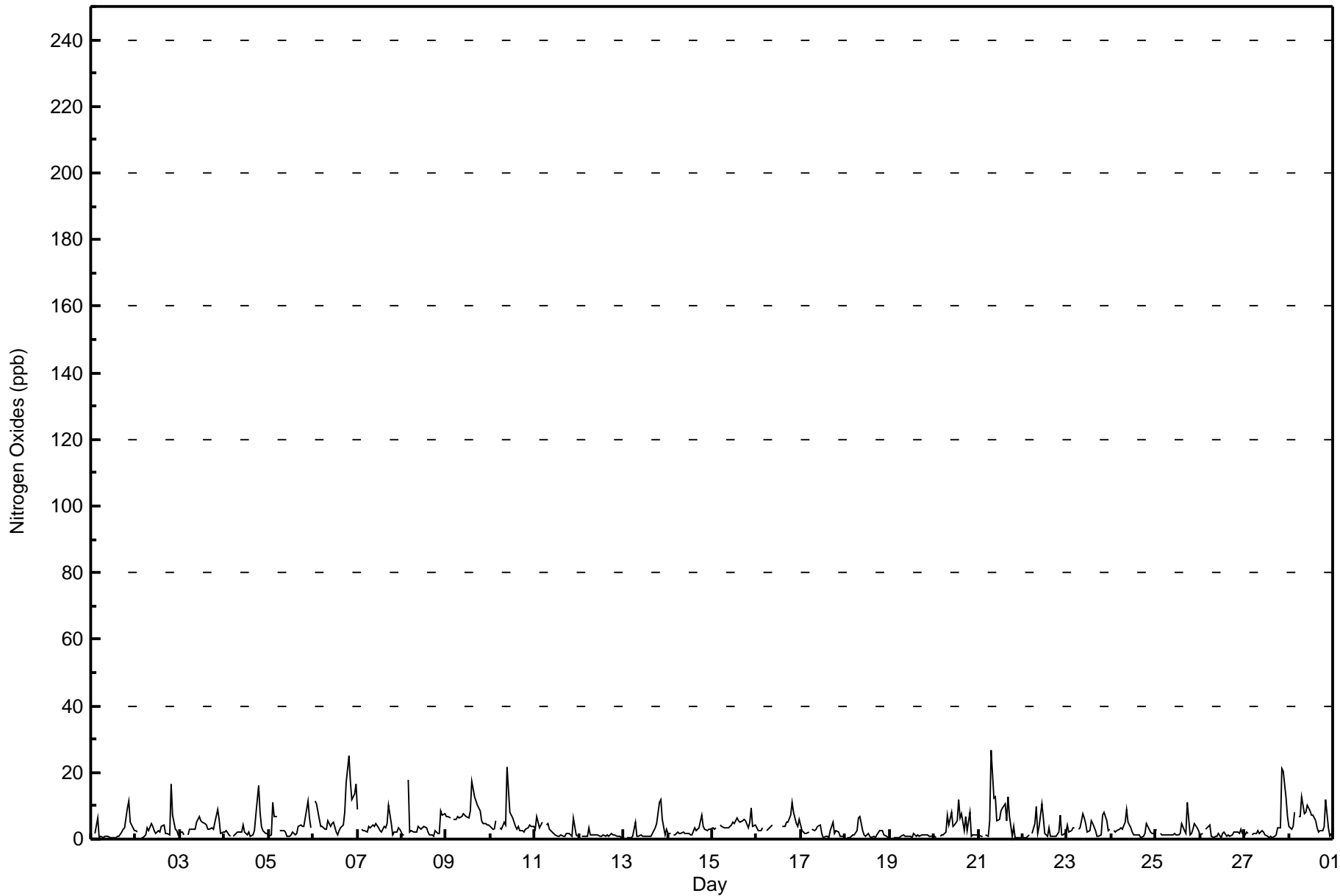
Nitrogen Oxides (NO_x) - ppb
Conklin Community - February 2017

Maximum Value: 26 ppb on Feb 21 08:00		Maximum Daily Average: 8.0 ppb on Feb 6		Hours in Service: 672																						
Minimum Value: 0 ppb on Feb 1 14:00		Minimum Daily Average: 0.9 ppb on Feb 19		Hours of Data: 639																						
Maximum Diurnal Average: 5.8 ppb at hour 21		Minimum Diurnal Average: 2.4 ppb at hour 5		Hours of Missing Data: 33																						
Monthly Average: 3.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 15		Hours of Calibration: 33																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	Z	2	6	1	1	0	1	1	1	0	0	0	0	1	1	2	3	3	9	12	5	4	2	2.5	12
2-Feb	3	2	Z	1	1	1	4	2	5	4	3	2	2	2	4	4	2	2	1	16	7	3	3	1	3.2	16
3-Feb	2	2	1	Z	1	3	3	3	3	5	7	6	5	5	4	3	3	3	3	5	9	6	2	2	3.7	9
4-Feb	2	3	1	1	Z	1	2	2	2	2	4	2	1	2	1	1	2	7	16	8	4	2	2	2	3.1	16
5-Feb	1	1	11	7	7	Z	3	2	2	2	1	1	1	2	1	2	4	4	4	9	11	6	3	3.9	11	
6-Feb	Z	12	11	6	4	4	3	3	6	4	5	5	2	1	2	4	4	8	17	25	17	12	14	16	8.0	25
7-Feb	9	Z	3	2	2	2	4	3	4	4	5	4	2	2	4	4	5	10	5	1	2	2	4	3	3.7	10
8-Feb	1	1	Z	18	2	2	2	2	2	4	3	3	4	3	2	1	1	1	3	1	2	9	7	8	3.6	18
9-Feb	7	7	7	Z	6	6	7	7	7	8	7	7	6	8	17	13	11	10	9	5	5	5	4	4	7.5	17
10-Feb	4	3	3	5	Z	4	3	5	4	21	8	7	6	4	3	4	3	3	2	3	3	4	4	4	4.8	21
11-Feb	3	7	4	4	5	Z	4	5	3	2	1	1	1	1	1	1	1	2	2	1	1	7	1	1	2.5	7
12-Feb	Z	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1.2	3
13-Feb	1	Z	1	1	1	1	5	1	1	1	1	1	1	1	1	1	3	4	5	11	12	6	1	3	2.6	12
14-Feb	2	2	Z	1	1	2	2	2	2	2	2	1	1	3	3	3	3	3	7	4	3	3	3	3	2.5	7
15-Feb	3	3	3	Z	4	4	3	3	3	3	4	5	5	6	6	5	5	6	5	3	5	10	4	4	4.5	10
16-Feb	3	2	3	3	Z	2	3	4	4	C	C	C	C	C	4	4	5	5	7	11	8	5	4	6	4.6	11
17-Feb	3	2	2	2	2	Z	3	2	3	4	4	2	1	1	1	1	2	5	2	2	2	1	1	1	2.0	5
18-Feb	Z	1	1	1	1	1	2	6	7	2	1	1	2	1	1	1	0	1	2	3	2	1	1	1	1.7	7
19-Feb	0	Z	1	0	0	0	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0.9	2
20-Feb	1	1	Z	1	1	1	2	7	4	8	4	4	5	12	6	7	3	7	3	8	1	1	1	1	3.9	12
21-Feb	1	1	1	Z	1	1	5	26	12	13	6	6	9	9	11	6	13	7	1	4	1	1	1	1	5.8	26
22-Feb	0	1	1	1	Z	2	5	10	2	4	10	6	2	1	3	1	1	1	1	2	7	1	1	2	2.8	10
23-Feb	4	2	3	3	3	Z	3	4	8	6	5	2	2	5	5	3	1	1	1	7	8	6	3	3	3.8	8
24-Feb	Z	2	2	2	3	4	3	5	9	5	3	2	1	1	1	1	1	1	2	5	3	2	2	2	2.7	9
25-Feb	3	Z	2	1	1	1	1	1	1	1	1	1	1	2	5	2	2	11	1	2	3	5	4	2	2.4	11
26-Feb	1	2	Z	3	4	4	1	1	1	1	2	0	1	2	1	1	1	1	2	2	2	2	3	2	1.7	4
27-Feb	1	2	2	Z	1	2	2	3	2	3	2	1	1	1	1	1	1	1	3	3	21	20	12	7	4.0	21
28-Feb	4	3	4	8	Z	7	7	13	8	8	10	9	7	7	6	3	2	3	2	4	12	3	1	2	5.7	13
		2.5	2.7	2.8	3.4	2.4	2.5	3.0	4.4	3.9	4.4	3.8	3.0	2.7	3.1	3.4	2.8	2.9	4.0	4.0	5.5	5.8	4.7	3.3	3.1	Diurnal Average
		9	12	11	18	7	7	7	26	12	21	10	9	9	12	17	13	13	11	17	25	21	20	14	16	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin Community - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	635	99.37	99.37
21 - 40	4	0.63	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: 639

Total Number of Hours: 672



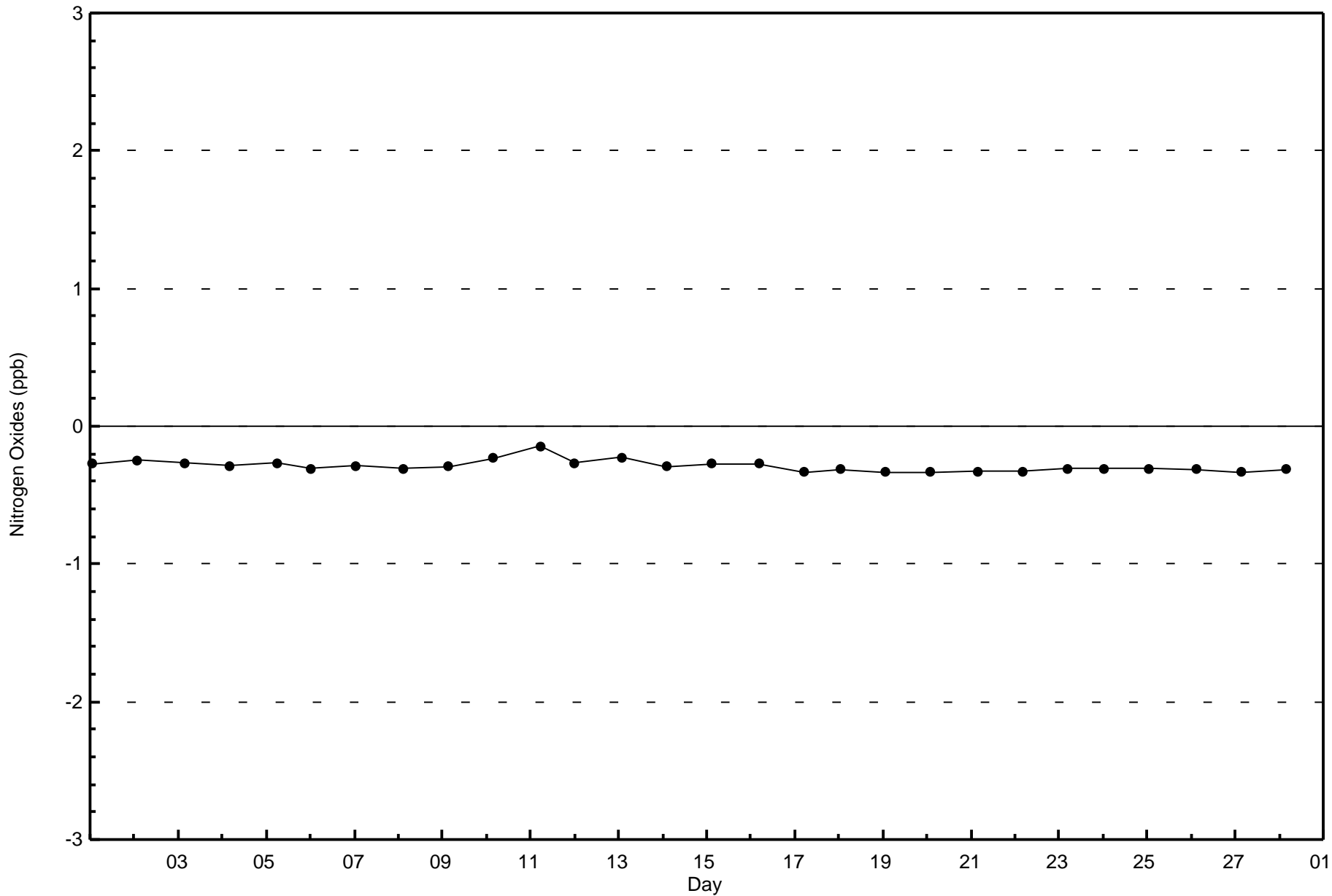
**Wood Buffalo Environmental Association
Frequency Distribution**

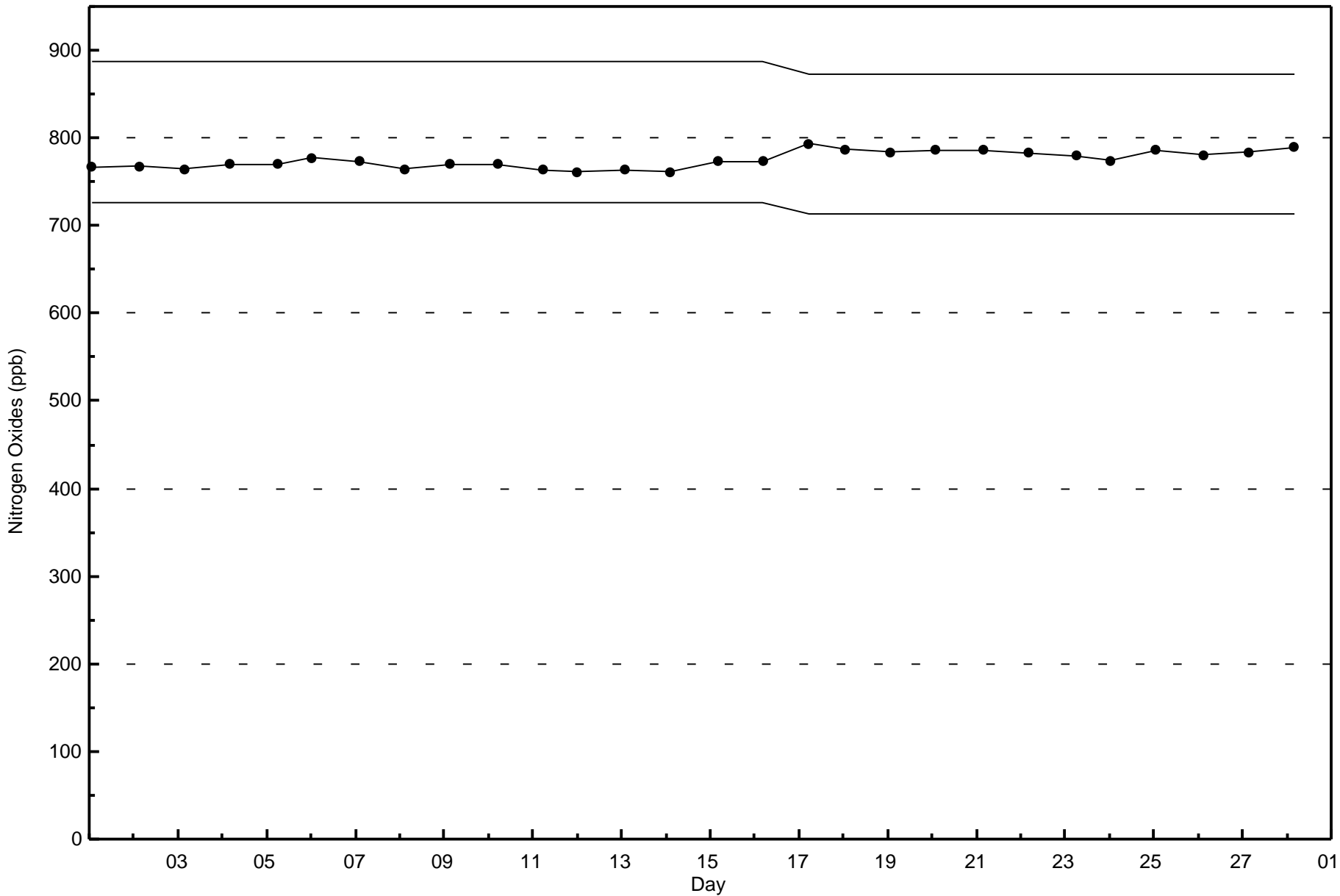
**Nitrogen Oxides (NO_x) - ppb
Conklin Community - February 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	14	5	17	15	17	10	23	41	68	62	30	73	62	104	66	628
21 - 40	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	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	21	14	5	17	15	17	10	23	43	68	62	30	74	63	104	66	632

Total Number of Valid Hours: 632

Total Number of Hours: 672







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

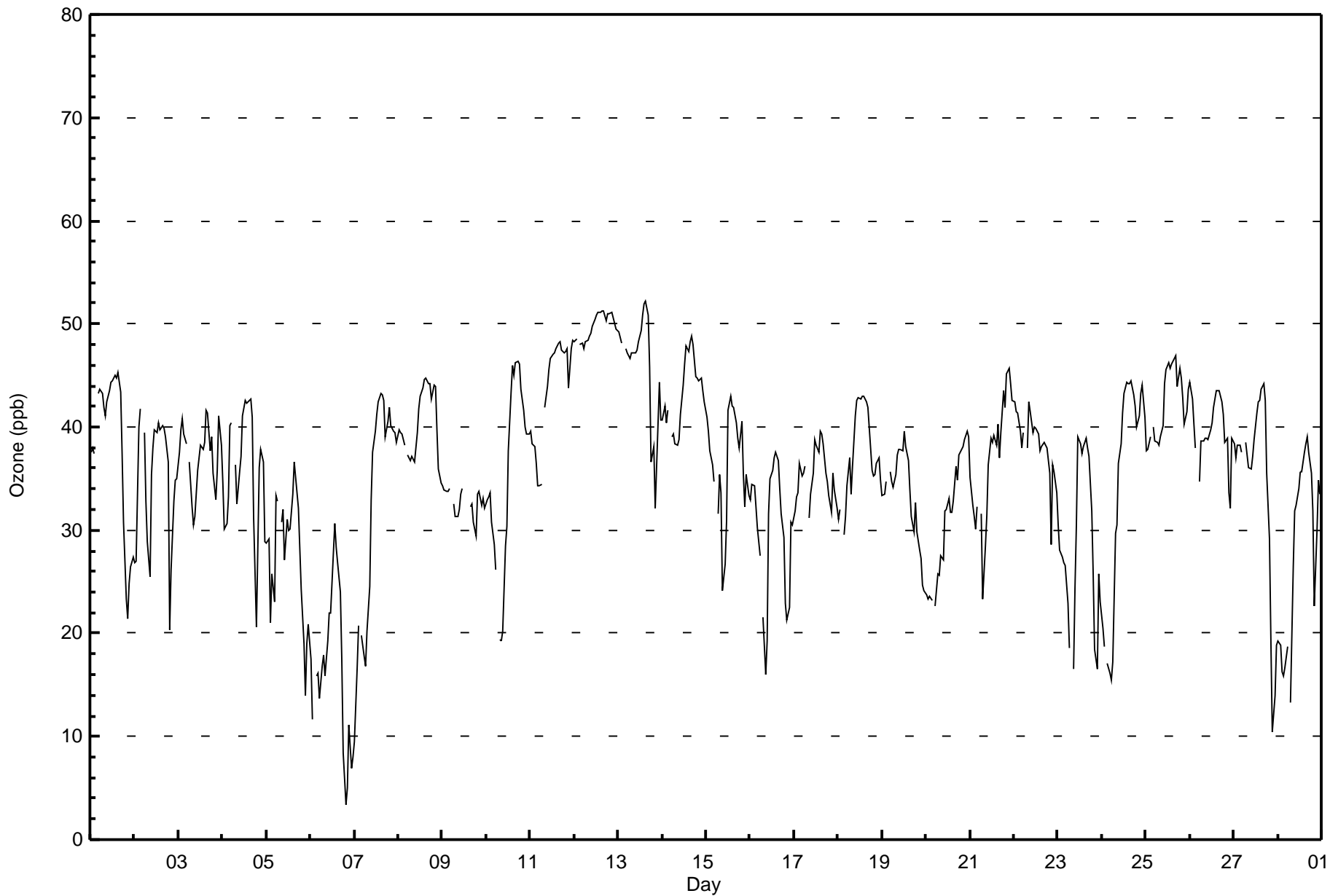
Conklin Community - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 52 ppb on Feb 13 16:00										Maximum Daily Average: 49.8 ppb on Feb 12										Hours of Data: 641						
Minimum Value: 3 ppb on Feb 6 20:00										Minimum Daily Average: 16.8 ppb on Feb 6										Hours of Missing Data: 31						
Maximum Diurnal Average: 41.4 ppb at hour 15										Minimum Diurnal Average: 32.1 ppb at hour 8										Hours of Calibration: 31						
Monthly Average: 35.8 ppb										Percentiles: P ₁ = 10 P ₁₀ = 23 Q ₁ = 32 Median = 37 Q ₃ = 42 P ₉₀ = 46 P ₉₉ = 51										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	38	38	37	Z	43	44	43	42	41	42	44	44	45	45	45	45	43	37	31	23	21	25	26	27	37.9	45
2-Feb	27	27	40	42	Z	39	33	29	26	35	38	40	40	40	40	40	40	39	37	20	26	33	35	35	34.8	42
3-Feb	38	40	41	39	38	Z	37	32	31	31	36	37	38	38	39	42	41	38	39	35	33	36	41	38	37.3	42
4-Feb	35	30	31	33	40	40	Z	36	33	36	37	41	43	42	42	43	41	31	21	28	36	38	37	29	35.8	43
5-Feb	29	29	21	26	23	33	33	Z	31	32	27	31	30	30	33	37	35	32	28	24	19	14	19	21	27.7	37
6-Feb	17	12	Z	16	16	14	17	18	16	19	22	22	28	31	28	27	24	17	8	3	5	11	7	8	16.8	31
7-Feb	9	17	21	Z	20	18	17	20	24	33	38	40	41	42	43	43	43	39	41	42	40	40	39	39	32.5	43
8-Feb	40	39	39	38	Z	37	37	37	37	37	39	42	43	44	45	45	44	44	43	44	44	40	36	35	40.4	45
9-Feb	34	34	34	34	34	Z	33	31	31	32	33	34	C	C	C	32	33	31	29	34	34	32	33	32	32.7	34
10-Feb	33	33	34	31	29	26	Z	19	19	20	28	30	38	43	46	45	46	46	46	44	42	40	39	39	35.6	46
11-Feb	40	38	38	37	34	34	34	Z	42	44	46	47	47	47	48	48	48	47	47	47	48	44	48	48	43.5	48
12-Feb	48	49	Z	48	48	48	48	48	49	49	50	51	51	51	51	51	51	50	51	51	51	51	50	50	49.8	51
13-Feb	49	49	48	Z	48	47	47	47	47	47	47	48	49	51	52	52	51	46	37	38	32	36	44	41	45.8	52
14-Feb	41	42	40	42	Z	39	39	38	38	39	41	44	46	48	47	48	49	48	45	45	44	45	43	42	43.3	49
15-Feb	41	40	38	36	35	Z	32	35	34	24	27	31	42	43	42	42	40	39	38	41	35	32	35	33	36.3	43
16-Feb	33	34	34	32	30	28	Z	22	16	19	32	35	36	37	38	37	34	32	29	23	21	23	31	31	29.8	38
17-Feb	32	33	34	37	35	36	36	Z	31	33	36	39	38	37	40	39	38	36	35	33	32	36	34	32	35.3	40
18-Feb	31	32	Z	29	31	34	37	33	36	41	43	43	43	43	43	42	42	40	36	35	35	36	37	35	37.3	43
19-Feb	33	33	35	Z	36	35	34	35	37	38	38	38	40	38	37	34	31	30	33	30	28	27	25	24	33.4	40
20-Feb	24	23	24	23	Z	23	26	26	27	27	32	32	33	32	32	33	36	35	37	38	38	39	40	39	31.2	40
21-Feb	35	32	31	30	32	Z	32	23	28	32	36	39	38	39	38	40	37	39	43	42	45	46	44	43	36.8	46
22-Feb	42	42	41	40	38	40	Z	38	42	42	39	40	40	39	38	38	38	38	38	36	29	36	36	34	38.4	42
23-Feb	30	28	27	27	27	23	19	Z	16	24	31	39	38	37	38	39	38	37	32	26	18	17	26	23	28.7	39
24-Feb	21	19	Z	17	16	15	17	30	31	36	38	41	43	44	44	44	45	43	42	40	41	43	44	41	34.6	45
25-Feb	38	38	39	Z	40	39	39	38	39	40	44	46	46	46	46	47	47	44	46	45	43	40	42	44	42.3	47
26-Feb	44	43	40	38	Z	35	39	39	39	39	39	40	40	42	44	44	44	43	41	39	39	34	32	39	39.7	44
27-Feb	38	37	38	38	38	Z	39	37	36	36	37	39	41	42	43	44	44	43	36	29	19	11	14	19	34.7	44
28-Feb	19	19	16	16	17	19	Z	13	26	32	32	34	36	36	37	38	39	37	36	32	23	30	35	34	28.5	39
33.5 33.2 34.3 32.5 32.5 32.4 33.3 32.1 32.3 34.3 36.8 38.8 40.5 41.1 41.4 41.4 40.8 38.6 36.5 34.5 32.9 33.3 34.7 34.1																								Diurnal Average		
49 49 48 48 48 48 48 48 48 49 49 50 51 51 51 52 52 51 50 51 51 51 51 50 50																								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
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Conklin Community - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	51	7.96	7.96
21 - 50	576	89.86	97.82
51 - 82	14	2.18	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Conklin Community - February 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	0	0	0	1	0	3	10	15	1	3	2	3	1	5	4	48
21 - 50	20	14	5	17	14	14	7	13	31	66	61	21	68	62	98	61	572
51 - 82	0	0	0	0	0	0	0	0	0	0	0	6	4	4	0	0	14
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	14	5	17	15	14	10	23	46	67	64	29	75	67	103	65	634

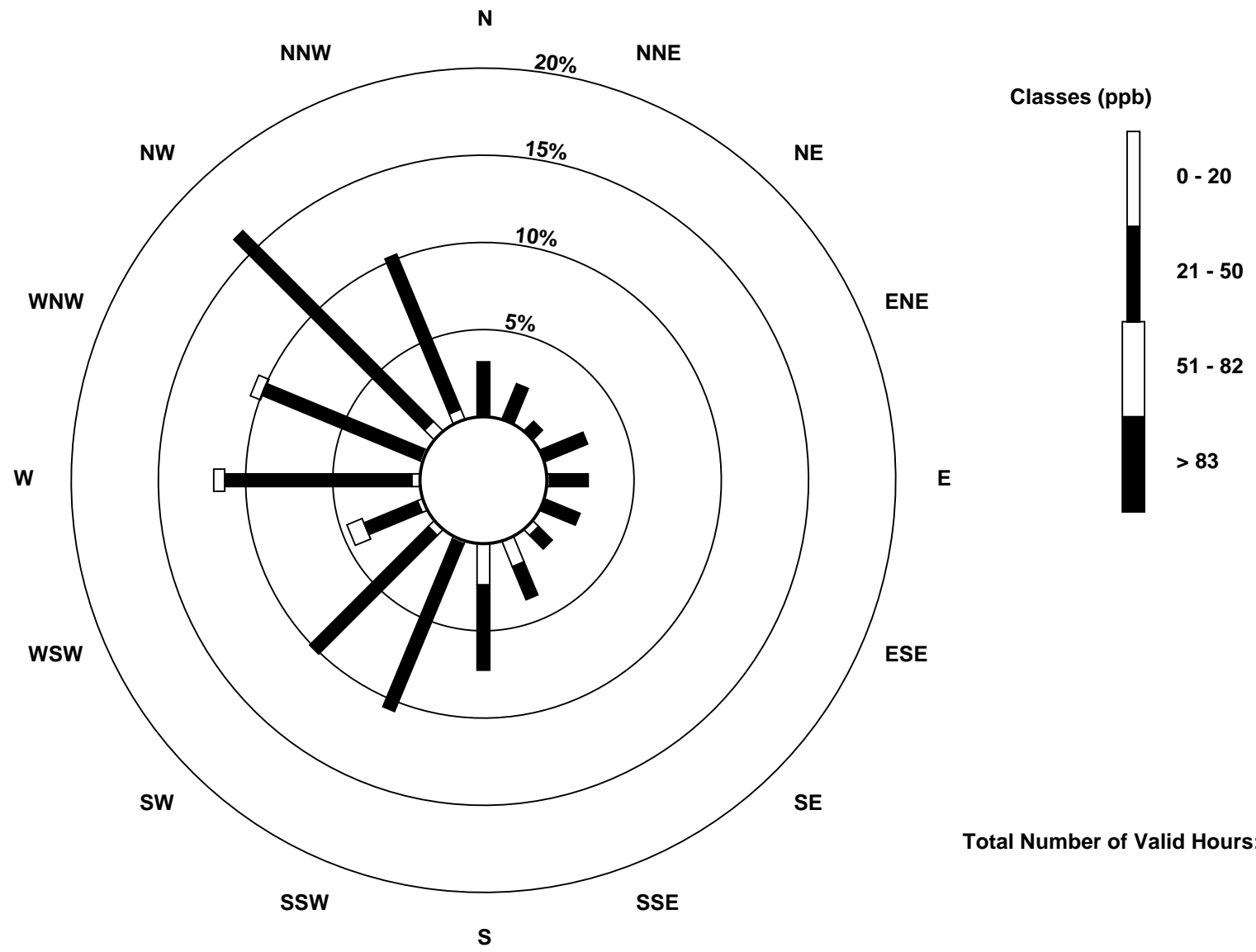
Total Number of Valid Hours: 634

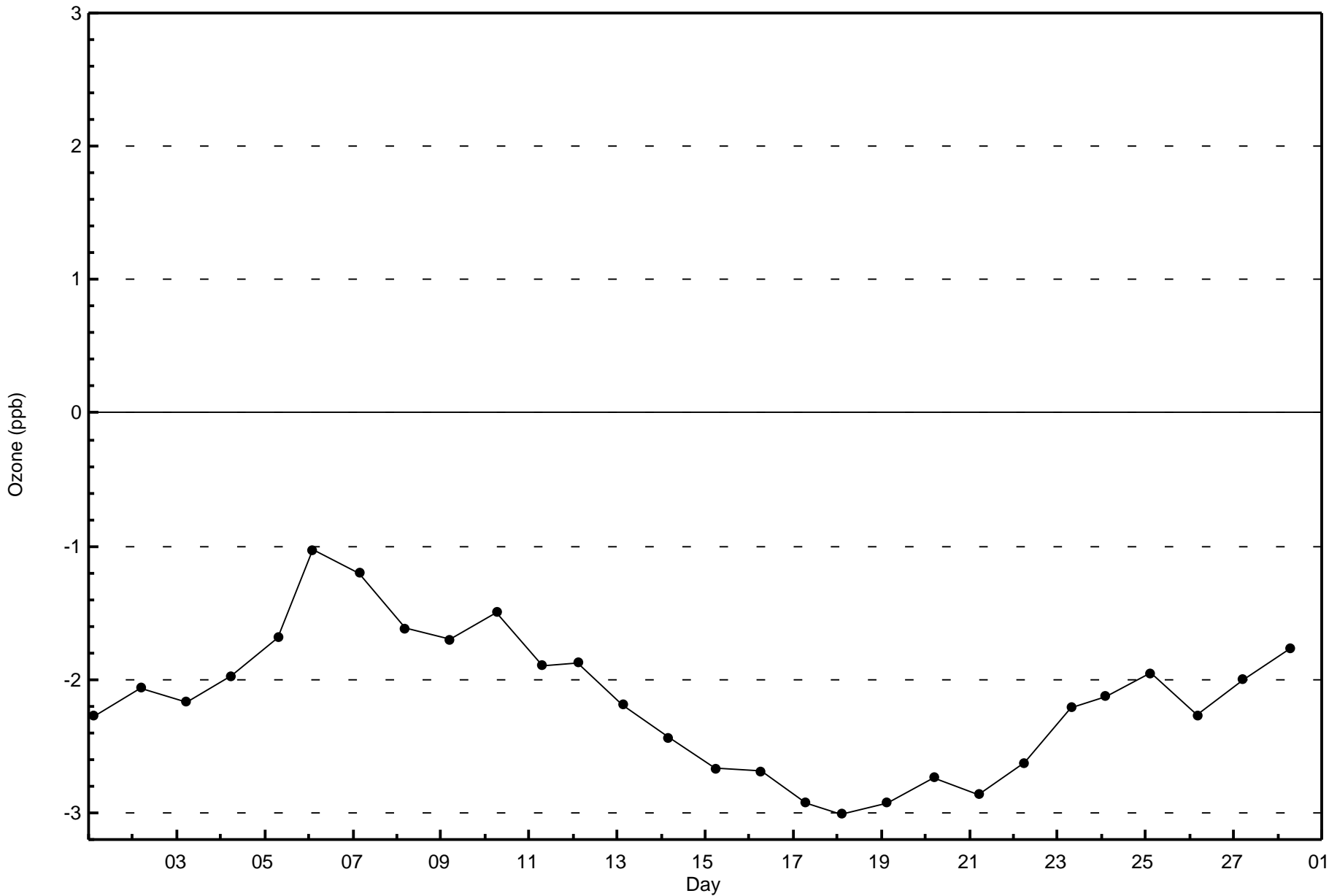
Total Number of Hours: 672

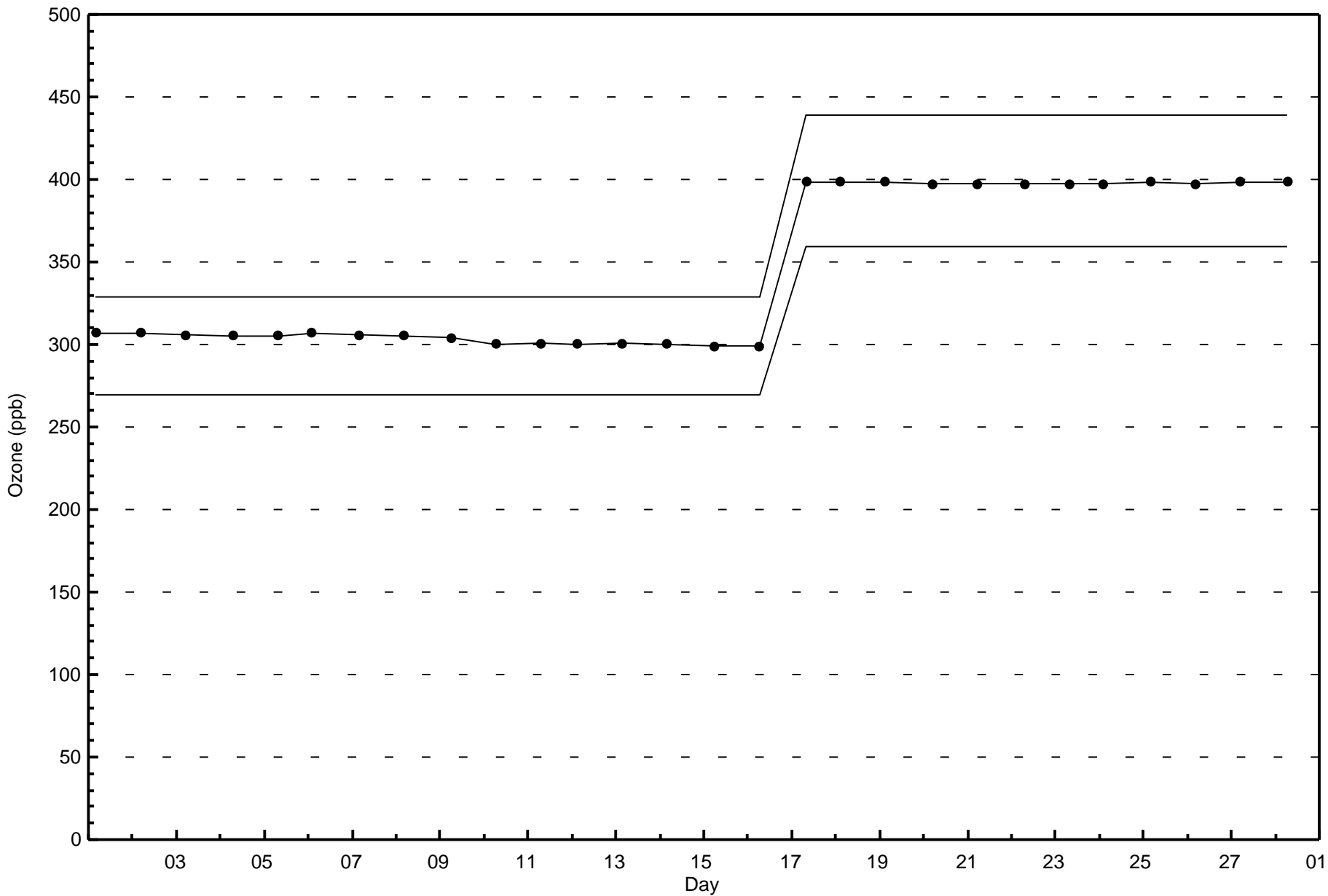


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Conklin Community (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

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

Conklin Community - February 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 16.7 µg/m ³ on Feb 16 04:00 Minimum Value: 0.3 µg/m ³ on Feb 26 12:00 Maximum Diurnal Average: 3.5 µg/m ³ at hour 4 Monthly Average: 2.72 µg/m ³		Maximum Daily Average: 8.5 µg/m ³ on Feb 9 Minimum Daily Average: 1.3 µg/m ³ on Feb 24 Minimum Diurnal Average: 1.9 µg/m ³ at hour 16 Percentiles: P ₁ = 0.5 P ₁₀ = 0.9 Q ₁ = 1.3 Median = 1.9 Q ₃ = 3.2 P ₉₀ = 5.3 P ₉₉ = 11.2		Hours in Service: 672 Hours of Data: 667 Hours of Missing Data: 5 Hours of Calibration: 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-Feb	2.6	2.6	2.8	3.1	2.2	2.2	1.9	1.7	1.6	1.6	1.8	1.9	2.0	2.0	2.0	2.0	1.9	1.9	4.9	2.3	2.0	2.4	2.2	1.3	2.2	4.9
2-Feb	1.2	1.7	1.5	1.2	1.3	1.5	1.5	1.6	1.3	1.8	1.8	1.8	1.9	1.8	1.9	2.0	1.9	2.0	1.9	2.3	1.9	1.9	2.0	1.9	1.7	2.3
3-Feb	2.7	2.1	1.7	1.8	1.9	2.1	1.9	1.7	1.6	1.5	2.1	2.8	3.1	3.4	3.2	2.4	3.6	6.9	2.9	2.6	2.8	2.4	2.2	2.7	2.6	6.9
4-Feb	3.3	3.4	2.8	9.4	2.9	2.7	2.8	3.3	3.4	3.3	3.0	2.2	2.2	1.9	1.7	1.5	1.5	2.2	6.7	2.8	2.2	1.7	1.4	1.0	2.9	9.4
5-Feb	1.3	3.5	2.5	1.9	2.8	4.2	6.1	4.6	3.9	3.2	4.3	3.5	3.4	3.2	2.7	2.0	3.7	4.1	3.8	3.1	4.4	3.6	3.5	2.0	3.4	6.1
6-Feb	2.7	4.1	14.3	4.5	2.7	2.8	3.2	2.4	2.8	2.4	2.1	1.8	1.6	1.8	2.3	2.7	3.1	7.9	7.5	3.2	3.2	2.8	3.3	2.1	3.7	14.3
7-Feb	4.7	1.4	1.3	1.3	1.3	1.3	1.7	4.0	2.0	1.5	1.3	1.5	1.6	1.7	1.8	1.7	1.7	1.8	2.3	1.9	1.9	1.7	1.5	1.5	1.8	4.7
8-Feb	1.6	1.8	1.9	2.1	2.2	2.3	2.0	2.2	2.1	2.0	1.8	1.5	1.6	1.6	1.8	2.0	2.1	2.3	2.5	2.6	2.9	3.2	3.7	7.4	2.4	7.4
9-Feb	10.8	9.9	9.8	9.3	10.1	10.7	11.4	11.6	11.2	11.1	10.3	9.6	8.2	7.1	7.3	7.3	7.2	6.8	6.3	6.0	5.9	5.6	5.6	5.6	8.5	11.6
10-Feb	5.9	5.2	4.9	4.8	4.5	4.2	3.9	5.2	4.7	6.2	5.1	4.6	4.3	3.9	3.7	3.4	3.2	3.0	3.3	4.9	6.8	8.6	8.7	10.3	5.1	10.3
11-Feb	9.2	9.4	11.1	11.2	11.9	10.5	9.9	8.8	4.2	2.8	1.9	1.6	1.7	1.6	1.3	1.5	1.5	1.6	1.8	1.4	1.3	1.6	1.3	1.3	4.6	11.9
12-Feb	1.3	1.3	1.3	1.3	1.4	1.6	1.8	2.0	1.8	1.6	1.5	1.5	1.4	1.4	1.5	1.4	1.1	1.2	1.5	1.6	1.5	1.4	1.4	1.4	1.5	2.0
13-Feb	1.4	1.4	1.4	1.3	1.2	1.3	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.1	1.2	2.2	7.5	2.9	5.3	6.6	1.5	3.3	2.1	7.5	
14-Feb	4.1	2.3	2.2	3.2	2.7	2.8	3.6	3.9	3.7	2.9	2.5	2.0	1.8	1.8	2.3	2.2	3.8	5.2	4.3	4.1	4.6	4.2	5.0	5.0	3.3	5.2
15-Feb	3.0	3.0	3.3	4.2	3.9	3.2	3.0	3.0	3.6	3.4	3.2	3.2	2.7	2.4	3.3	3.2	3.0	3.0	3.2	3.8	5.9	4.3	3.0	10.9	3.7	10.9
16-Feb	15.6	9.5	8.4	16.7	6.1	5.1	5.1	4.8	6.1	6.4	4.4	3.7	C	C	0.9	1.1	1.2	1.3	2.6	2.3	1.7	1.6	2.0	2.2	5.0	16.7
17-Feb	2.0	1.8	1.7	1.5	2.0	3.9	2.8	2.7	3.1	1.8	1.2	0.8	1.0	1.2	0.8	0.5	0.6	0.8	0.6	0.6	0.9	0.5	0.6	0.5	1.4	3.9
18-Feb	0.5	0.4	0.4	0.4	0.7	0.6	0.5	0.5	0.6	0.4	0.8	0.5	0.6	0.6	0.7	1.3	2.2	2.9	4.0	5.6	5.3	3.0	1.7	1.6	1.5	5.6
19-Feb	1.8	2.3	2.2	1.8	1.9	2.7	7.0	5.7	2.5	1.7	1.6	1.0	0.8	0.9	1.0	1.6	1.0	1.8	1.0	2.0	2.1	1.7	1.1	1.8	2.0	7.0
20-Feb	1.5	0.9	0.9	0.9	0.8	0.9	0.8	0.7	1.1	1.8	1.6	1.6	2.3	1.7	1.6	2.0	1.7	2.0	1.7	1.9	1.5	1.2	0.9	1.1	1.4	2.3
21-Feb	2.1	2.5	1.9	1.7	2.1	3.1	3.5	3.8	3.0	3.3	2.7	2.7	3.1	2.1	1.8	1.7	1.7	1.5	1.3	1.3	0.9	0.6	0.5	0.7	2.1	3.8
22-Feb	1.3	1.4	1.3	1.3	1.3	1.9	0.7	1.5	0.8	0.8	0.8	1.0	1.1	1.3	1.5	1.7	1.5	1.5	1.4	1.4	1.5	1.3	1.4	1.4	1.3	1.9
23-Feb	1.7	1.7	2.8	3.3	3.0	3.0	2.8	2.7	4.2	3.1	2.5	1.3	1.3	1.4	1.2	1.3	1.3	1.3	1.1	1.2	1.2	1.0	1.1	0.9	1.9	4.2
24-Feb	0.7	1.0	0.4	0.4	0.5	0.5	1.0	1.9	2.8	4.2	4.1	2.4	0.9	0.6	0.8	0.5	0.5	0.6	0.7	1.2	1.4	0.5	0.5	2.6	1.3	4.2
25-Feb	0.9	2.8	1.4	0.7	1.3	0.9	1.2	1.6	1.8	3.3	4.8	2.4	2.1	2.5	3.1	2.7	2.7	4.6	1.8	1.9	2.3	7.4	3.0	1.9	2.5	7.4
26-Feb	2.4	1.4	2.2	3.1	3.2	4.6	0.9	0.8	1.1	1.4	0.7	0.3	0.6	0.6	0.5	0.8	0.8	0.8	1.0	1.0	1.3	0.6	1.6	1.2	1.4	4.6
27-Feb	1.1	1.4	1.7	1.3	1.6	1.7	2.4	1.6	1.1	1.4	1.9	1.0	0.8	0.9	1.0	1.1	1.1	2.4	1.5	4.1	4.0	2.4	1.3	UO	1.7	4.1
28-Feb	1.5	UO	UO	3.2	8.7	2.7	2.8	5.8	2.8	2.2	2.4	2.2	1.7	2.5	2.1	1.8	1.5	3.2	5.2	7.4	8.7	2.9	1.1	0.9	3.3	8.7
																								Diurnal Average		
																								Diurnal Maximum		
3.2 3.0 3.3 3.5 3.1 3.0 3.1 3.3 2.9 2.8 2.6 2.2 2.0 2.0 2.0 1.9 2.1 2.7 3.0 2.8 3.0 2.7 2.3 2.8																								15.6 9.9 14.3 16.7 11.9 10.7 11.4 11.6 11.2 11.1 10.3 9.6 8.2 7.1 7.3 7.3 7.2 7.9 7.5 7.4 8.7 8.6 8.7 10.9		
C - Calibration																								UO - Unstable Operation		
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										

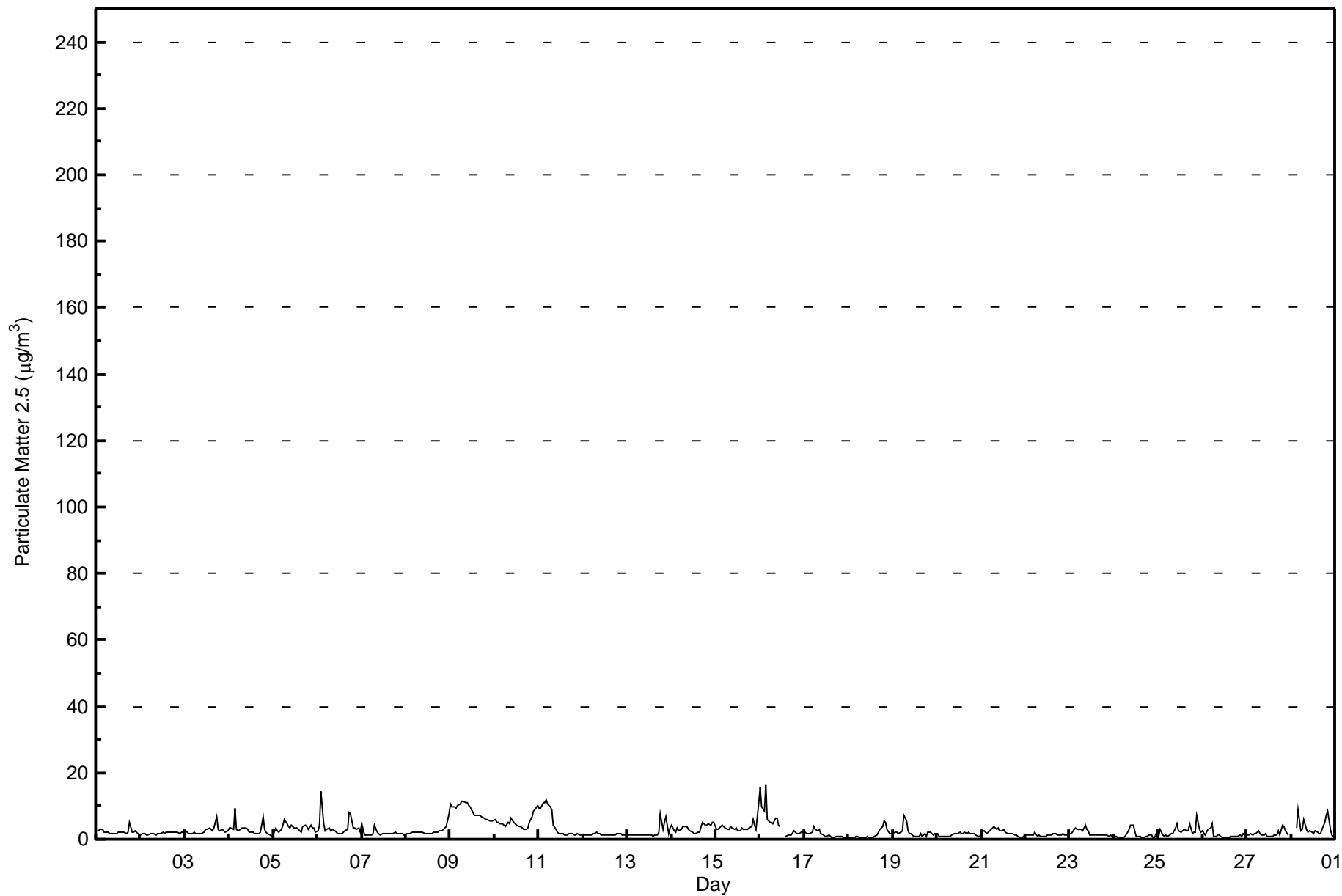


Wood Buffalo Environmental Association

Hourly Averages

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

Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community - February 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	518	77.66	77.66
6 - 15	63	9.45	87.11
16 - 25	2	0.30	87.41
26 - 80	0	0.00	87.41
> 81.0	0	0.00	87.41

Total Number of Valid Hours: 667

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Conklin Community - February 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	17	12	4	12	13	10	8	20	44	50	51	24	63	58	72	53	511
6 - 15	4	0	0	4	0	4	1	3	3	14	13	3	1	1	1	11	63
16 - 25	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
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	21	12	4	16	13	14	9	23	47	66	64	27	64	59	73	64	576

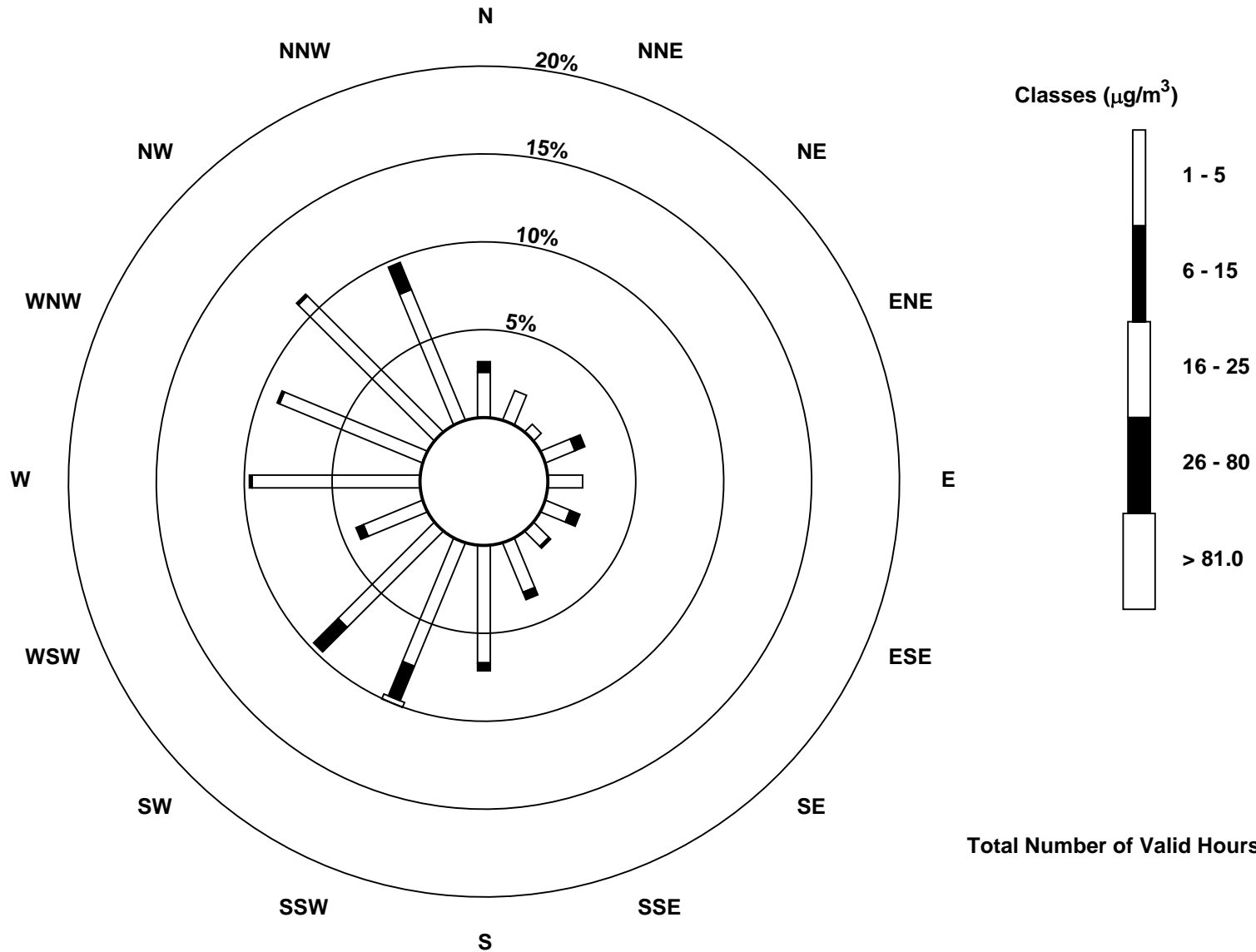
Total Number of Valid Hours: 659

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community (AMS 21)



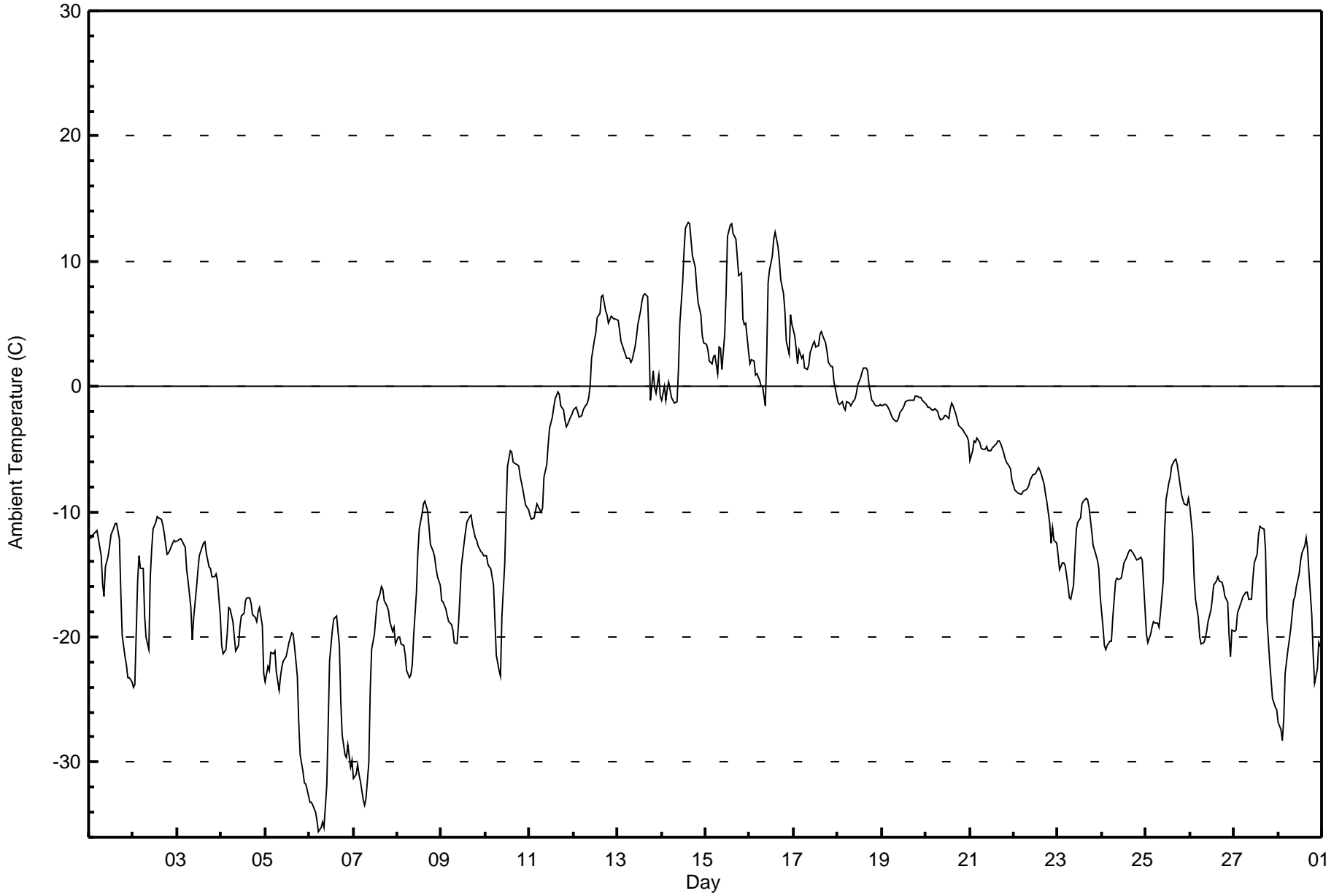
Total Number of Valid Hours: 659



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Conklin Community - February 2017

Maximum Value: 13.1 C on Feb 14 15:00 Maximum Daily Average: 6.0 C on Feb 15 Minimum Value: -35.6 C on Feb 6 06:00 Minimum Daily Average: -28.6 C on Feb 6 Maximum Diurnal Average: -5.5 C at hour 16 Minimum Diurnal Average: -13.0 C at hour 8 Monthly Average: -9.92 C Percentiles: P ₁ = -33.6 P ₁₀ = -21.9 Q ₁ = -17.9 Median = -11.3 Q ₃ = -1.4 P ₉₀ = 3.6 P ₉₉ = 12.2																						Hours in Service: 672 Hours of Data: 672 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-Feb	-12.2	-12.0	-11.8	-11.6	-11.5	-12.2	-13.5	-15.8	-16.8	-14.4	-13.5	-12.7	-11.9	-11.3	-11.0	-11.0	-12.2	-16.4	-19.9	-21.6	-22.2	-23.2	-23.2	-23.6	-15.2	-11.0
2-Feb	-24.1	-23.8	-15.5	-13.6	-14.6	-14.5	-18.3	-20.0	-21.0	-15.4	-13.1	-11.4	-10.9	-10.4	-10.4	-10.6	-11.0	-11.8	-13.4	-13.3	-13.0	-12.5	-12.3	-12.5	-14.5	-10.4
3-Feb	-12.3	-12.1	-12.2	-12.4	-12.8	-14.6	-15.5	-17.6	-20.3	-18.4	-16.1	-14.8	-13.5	-12.9	-12.5	-12.4	-13.3	-14.4	-14.5	-15.2	-15.2	-15.0	-15.5	-18.3	-14.7	-12.1
4-Feb	-20.7	-21.3	-21.0	-19.7	-17.6	-17.7	-18.8	-20.0	-21.2	-20.7	-19.3	-18.4	-18.0	-17.1	-16.9	-16.8	-17.3	-18.2	-18.4	-18.8	-18.0	-17.7	-19.2	-22.9	-19.0	-16.8
5-Feb	-23.6	-22.3	-22.7	-21.2	-21.4	-21.1	-22.8	-24.2	-23.1	-22.4	-21.9	-21.6	-21.0	-20.5	-19.7	-19.8	-20.8	-23.1	-26.8	-29.5	-30.8	-31.6	-31.8	-32.1	-24.0	-19.7
6-Feb	-33.2	-33.2	-33.4	-34.0	-34.6	-35.6	-35.3	-34.7	-35.2	-31.9	-27.1	-21.9	-19.5	-18.6	-18.4	-18.3	-20.7	-25.2	-27.9	-29.5	-29.6	-28.6	-30.4	-29.8	-28.6	-18.3
7-Feb	-31.3	-30.9	-30.2	-30.9	-31.5	-33.0	-33.4	-32.8	-30.0	-24.4	-21.0	-19.7	-18.5	-17.2	-16.6	-16.0	-16.2	-17.1	-17.6	-17.9	-18.7	-19.5	-19.2	-20.5	-23.5	-16.0
8-Feb	-20.0	-20.0	-20.6	-20.7	-21.4	-22.7	-23.3	-23.0	-22.3	-19.8	-16.5	-13.3	-11.4	-10.1	-9.4	-9.1	-10.0	-11.3	-12.6	-13.2	-13.6	-14.6	-15.2	-15.9	-16.3	-9.1
9-Feb	-17.1	-17.2	-17.8	-18.3	-18.7	-19.0	-19.4	-20.5	-20.5	-19.0	-16.8	-14.4	-12.5	-11.6	-10.8	-10.3	-10.3	-11.1	-12.1	-12.3	-12.8	-13.1	-13.3	-13.5	-15.1	-10.3
10-Feb	-13.6	-14.1	-14.5	-14.5	-15.9	-18.7	-21.4	-22.7	-23.1	-18.4	-14.2	-10.0	-6.3	-5.1	-5.3	-6.1	-6.1	-6.2	-6.4	-7.1	-8.2	-9.0	-9.5	-9.8	-11.9	-5.1
11-Feb	-10.3	-10.6	-10.5	-9.9	-9.4	-9.6	-10.1	-9.8	-7.2	-6.2	-4.7	-3.3	-2.4	-1.6	-0.9	-0.5	-0.7	-1.6	-1.9	-2.7	-3.2	-3.0	-2.5	-2.2	-5.2	-0.5
12-Feb	-1.9	-1.6	-2.0	-2.4	-2.3	-1.8	-1.6	-1.4	-0.9	0.2	2.2	3.8	4.3	5.6	5.8	7.2	7.2	6.0	5.7	5.0	5.6	5.6	5.4	5.4	2.5	7.2
13-Feb	5.3	4.5	3.6	3.0	2.6	2.3	2.2	2.0	2.1	3.2	3.9	4.9	6.0	6.9	7.3	7.5	7.1	3.6	-1.1	1.3	-0.1	-0.5	0.9	-0.8	3.2	7.5
14-Feb	-1.1	0.0	-1.1	-0.2	0.3	-0.9	-1.1	-1.3	-1.2	1.4	5.0	8.3	10.8	12.7	13.1	13.0	11.6	10.4	9.6	8.0	6.8	5.7	4.1	3.5	4.9	13.1
15-Feb	3.4	3.0	2.1	1.9	2.4	2.4	1.0	3.1	3.0	1.3	4.2	7.4	12.0	12.9	13.0	12.2	11.7	10.4	8.8	9.1	5.4	4.9	5.0	2.8	6.0	13.0
16-Feb	1.8	2.1	2.0	0.9	1.0	0.5	0.0	0.1	-1.6	2.5	8.3	9.3	10.4	11.8	12.3	11.2	10.1	8.6	7.4	6.0	3.6	2.6	5.7	4.9	5.1	12.3
17-Feb	4.0	3.0	1.8	3.0	2.3	2.4	1.5	1.4	1.7	2.7	3.3	3.6	3.1	3.2	4.2	4.4	4.0	3.5	2.8	1.9	1.6	1.6	0.4	-0.7	2.5	4.4
18-Feb	-1.3	-1.5	-1.2	-1.7	-1.9	-1.2	-1.3	-1.5	-1.4	-0.9	-0.6	0.1	0.7	1.2	1.5	1.5	1.2	0.1	-1.1	-1.2	-1.5	-1.5	-1.5	-1.5	-0.7	1.5
19-Feb	-1.5	-1.4	-1.4	-1.5	-2.0	-2.3	-2.5	-2.8	-2.8	-2.6	-2.1	-1.7	-1.5	-1.2	-1.1	-1.1	-1.1	-1.1	-0.7	-0.7	-0.8	-0.9	-1.1	-1.2	-1.6	-0.7
20-Feb	-1.4	-1.7	-1.7	-1.8	-1.9	-1.8	-2.0	-2.4	-2.6	-2.5	-2.3	-2.4	-2.5	-1.8	-1.4	-1.6	-2.2	-2.7	-3.1	-3.4	-3.4	-3.7	-4.0	-4.3	-2.4	-1.4
21-Feb	-5.9	-5.1	-4.4	-4.4	-4.1	-4.5	-4.9	-5.0	-5.0	-4.8	-5.1	-5.1	-4.9	-4.7	-4.5	-4.4	-4.4	-4.6	-5.2	-5.7	-6.0	-6.3	-6.6	-7.5	-5.1	-4.1
22-Feb	-8.3	-8.4	-8.5	-8.6	-8.6	-8.4	-8.3	-8.2	-7.9	-7.5	-7.0	-7.0	-6.9	-6.5	-6.7	-7.1	-7.9	-8.6	-9.3	-11.0	-12.5	-11.3	-12.3	-12.5	-8.7	-6.5
23-Feb	-13.5	-14.6	-14.0	-14.0	-14.3	-15.9	-16.9	-17.0	-15.9	-13.4	-11.4	-10.9	-10.5	-9.4	-9.2	-8.9	-9.1	-9.6	-11.6	-12.7	-13.1	-13.9	-14.5	-16.8	-13.0	-8.9
24-Feb	-19.2	-20.6	-21.0	-20.6	-20.4	-20.3	-18.4	-15.6	-15.3	-15.4	-14.8	-14.1	-13.6	-13.3	-13.1	-13.1	-13.4	-13.6	-13.9	-13.8	-13.7	-13.9	-17.8	-16.0	-13.1	
25-Feb	-19.8	-20.5	-19.8	-19.3	-18.7	-18.9	-18.9	-19.3	-18.1	-15.5	-11.5	-9.1	-7.7	-7.2	-6.4	-5.9	-5.8	-6.3	-7.8	-8.6	-9.0	-9.4	-9.5	-8.9	-12.6	-5.8
26-Feb	-9.6	-11.9	-15.2	-17.0	-18.4	-20.0	-20.6	-20.4	-20.1	-19.6	-18.8	-17.8	-17.0	-15.9	-15.6	-15.2	-15.6	-15.7	-16.1	-16.8	-17.3	-19.8	-21.6	-19.4	-17.3	-9.6
27-Feb	-19.5	-19.5	-18.1	-17.4	-17.0	-16.8	-16.4	-16.4	-17.0	-17.0	-15.3	-14.1	-13.4	-11.8	-11.2	-11.3	-11.4	-13.1	-18.6	-22.0	-23.4	-24.9	-25.6	-25.8	-17.4	-11.2
28-Feb	-26.9	-27.4	-28.3	-26.6	-23.0	-21.0	-20.2	-19.3	-17.1	-16.7	-16.0	-15.0	-14.0	-13.3	-12.7	-12.0	-13.0	-14.9	-18.2	-21.3	-23.6	-22.5	-20.5	-20.8	-19.3	-12.0
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Conklin Community - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	110	16.37	16.37
-20 - 0	435	64.73	81.10
0 - 10	110	16.37	97.47
10 - 20	17	2.53	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



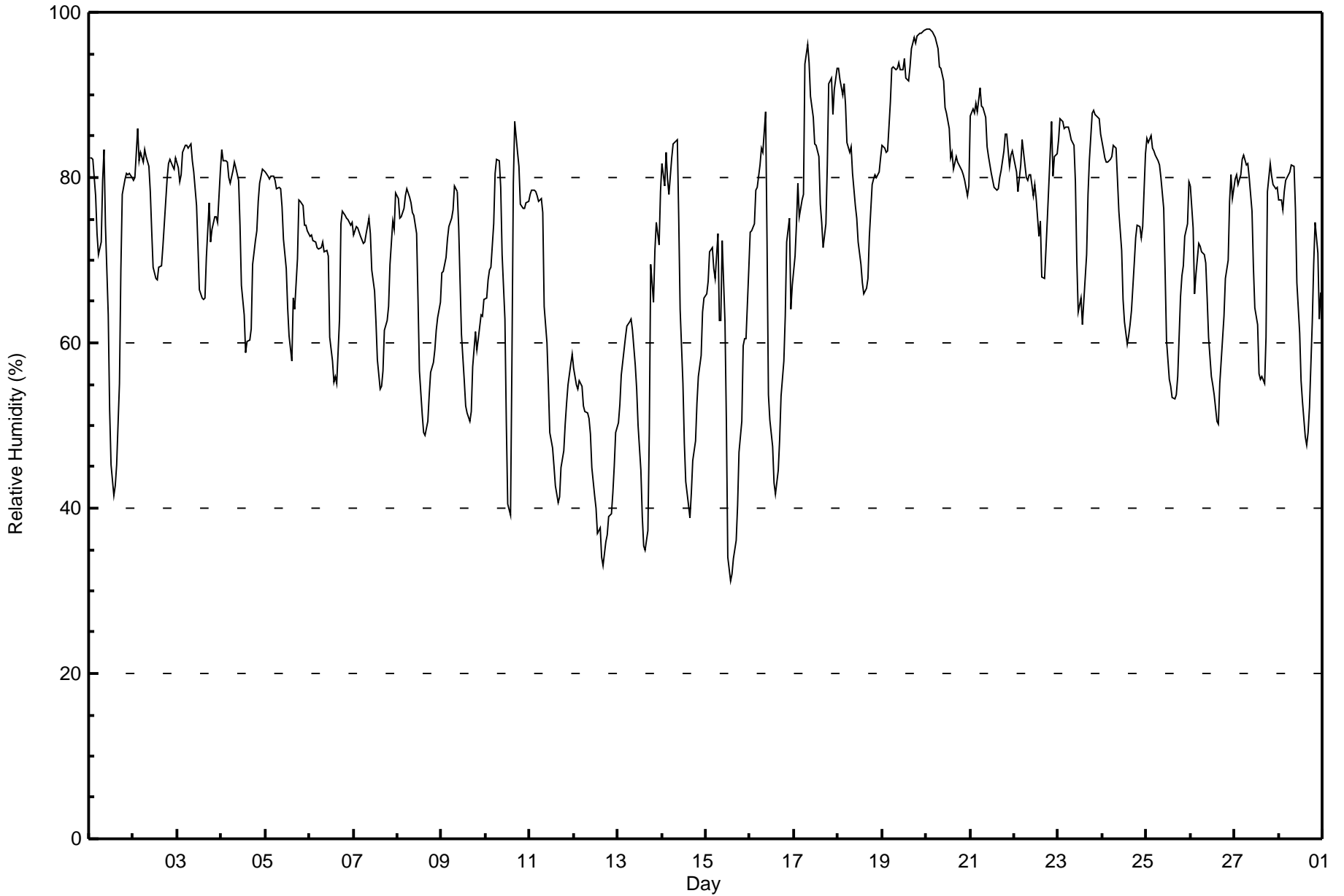
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Conklin Community - February 2017

Maximum Value: 98 % on Feb 20 02:00 Maximum Daily Average: 92.6 % on Feb 19																			Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 31 % on Feb 15 14:00 Minimum Daily Average: 45.3 % on Feb 12 Maximum Diurnal Average: 79.6 % at hour 7 Minimum Diurnal Average: 57.1 % at hour 15 Monthly Average: 71.4 % Percentiles: P ₁ = 35 P ₁₀ = 51 Q ₁ = 63 Median = 74 Q ₃ = 81 P ₉₀ = 86 P ₉₉ = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	82	82	82	78	73	71	72	80	83	74	63	52	45	42	43	45	55	69	78	80	80	80	80	80	69.6	83
2-Feb	80	80	86	82	83	82	83	83	81	78	74	69	68	68	69	69	72	74	80	82	82	81	81	82	77.9	86
3-Feb	81	80	80	83	84	84	84	84	82	81	77	72	66	65	65	65	70	77	72	74	75	75	75	81	76.4	84
4-Feb	83	82	82	82	80	79	81	82	81	80	74	67	63	59	60	60	62	70	72	74	77	79	81	81	74.6	83
5-Feb	81	80	80	80	80	80	79	79	79	76	72	69	64	61	58	65	64	70	77	77	77	74	74	74	73.8	81
6-Feb	73	73	72	72	72	71	71	72	71	71	71	61	58	55	56	55	63	74	76	75	75	75	74	75	69.3	76
7-Feb	73	74	74	73	73	72	72	73	75	73	69	66	63	58	54	55	57	62	63	64	69	75	74	78	68.3	78
8-Feb	77	75	75	76	78	79	78	77	76	75	73	65	57	51	49	49	51	54	56	58	59	61	63	65	65.7	79
9-Feb	69	69	70	73	74	75	76	79	78	74	67	61	55	52	52	51	52	57	61	59	60	63	63	65	64.9	79
10-Feb	65	68	69	69	74	80	82	82	79	71	63	50	40	39	58	79	87	83	81	77	76	76	77	77	71.0	87
11-Feb	78	79	78	78	78	77	77	76	64	60	55	49	47	45	43	41	41	45	47	50	53	55	57	59	59.7	79
12-Feb	57	55	54	55	55	52	52	52	51	49	45	41	40	37	38	34	33	36	37	39	39	42	45	49	45.3	57
13-Feb	50	52	56	59	61	62	63	63	62	57	54	50	45	39	35	35	37	49	69	65	71	75	72	78	56.7	78
14-Feb	82	79	83	80	78	82	84	84	85	75	64	55	48	43	40	39	42	46	48	53	56	58	64	65	63.9	85
15-Feb	66	67	71	72	69	68	73	63	63	72	63	50	34	31	32	34	36	40	47	51	60	60	61	69	56.3	73
16-Feb	73	74	74	79	79	81	84	83	88	72	54	51	47	43	42	45	48	54	58	63	72	75	64	67	65.4	88
17-Feb	70	74	79	75	77	78	94	96	94	90	87	84	84	83	77	75	72	74	82	91	92	88	91	93	83.3	96
18-Feb	93	92	90	91	89	84	83	84	81	77	75	72	70	67	66	67	68	73	79	80	80	80	81	82	79.3	93
19-Feb	84	84	83	83	89	93	93	93	93	94	93	93	94	92	92	93	96	97	96	97	97	98	98	98	92.6	98
20-Feb	98	98	98	98	97	97	96	93	93	92	89	88	86	82	83	81	83	82	82	81	80	80	78	79	88.0	98
21-Feb	87	88	88	89	88	91	89	88	87	84	83	80	80	79	79	79	80	81	83	85	85	81	83	83	84.2	91
22-Feb	82	81	78	82	85	83	80	80	80	80	78	79	77	73	75	68	68	71	75	83	87	80	83	83	78.8	87
23-Feb	85	87	87	86	86	86	85	85	84	79	70	64	65	62	65	71	78	82	88	88	88	87	87	85	80.4	88
24-Feb	83	82	82	82	83	84	84	84	80	76	71	65	63	60	61	62	64	70	73	74	74	73	74	83	74.3	84
25-Feb	85	84	85	84	83	83	82	81	80	76	69	60	56	55	53	53	54	56	66	68	69	73	74	80	71.2	85
26-Feb	79	74	66	68	72	72	71	71	70	65	61	56	55	54	50	50	55	60	63	68	70	77	80	78	66.0	80
27-Feb	80	80	79	80	82	83	82	82	80	76	69	64	62	56	56	56	55	61	78	82	80	79	79	79	73.3	83
28-Feb	77	77	76	78	80	80	81	82	81	76	67	61	55	53	49	48	49	52	62	69	75	71	63	66	67.9	82
	77.6	77.5	77.8	78.1	78.6	78.9	79.6	79.6	78.6	75.2	69.6	64.1	60.3	57.3	57.1	58.0	60.3	65.0	69.7	71.7	73.6	74.0	74.1	76.2	Diurnal Average	
	98	98	98	98	97	97	96	96	94	94	93	93	94	92	92	93	96	97	96	97	97	98	98	98	Diurnal Maximum	





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Conklin Community - February 2017

Maximum Speed: 21 km/h on Feb 12 12:00	Maximum Daily Speed Average: 14.3 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 24 07:00	Minimum Daily Speed Average: 1.4 km/h on Feb 18	Hours of Data: 664
Maximum Diurnal Speed Average: 5.6 km/h at hour 12	Minimum Diurnal Speed Average: 2.6 km/h at hour 1	Hours of Missing Data: 8
Monthly Average Velocity: 3.5 km/h 266.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 17	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-Feb	NW6	NW6	NW5	NNW12	NNW14	NNW15	NNW12	NW6	NW6	NW11	NW13	NNW11	NNW11	NW12	NW10	NW8	NW5	W1	SSW2	SSW3	S4	S3	S4	S4	NW6.1	NNW15
2-Feb	S4	S4	WNW6	WNW7	NW5	W3	SW1	S2	SSW5	W5	WNW6	NW8	WNW6	WNW7	W9	WNW7	NW7	NW7	NW2	NW1	AF	NW3	NW4	NNW2	WNW3.7	W9
3-Feb	WSW4	W4	NW3	NW4	NNW4	NNW5	NNW5	NNW3	NNW2	NNW3	NW3	NNW5	N6	NNW7	N6	NNE5	NE4	NNW3	NW6	NNW3	SW2	NW5	NW7	NW2	NNW3.7	NW7
4-Feb	WNW1	S2	SSE2	N2	WNW5	WNW5	NNW4	N2	NNW3	NNW4	NW4	NW8	NW9	WNW9	NW9	NW7	NW2	W0	SSE2	S4	SSW5	SW4	SW5	S4	WNW2.5	NW9
5-Feb	SE3	SW1	WNW1	SSW1	NNW3	N9	NNW7	N3	N6	N6	NNE8	N8	N8	NNW6	NNW8	NNW8	NW9	NW4	NNW2	NW1	WSW1	S2	S2	S3	NNW3.5	NW9
6-Feb	S2	S3	SSE2	S1	SSE1	SSE2	SSE3	SSE4	S2	SSE4	WSW1	SSE3	SSE2	SSE4	SSW2	S3	E1	W1	SW1	S2	WSW1	S2	SW1	SSE3	S1.9	SSE4
7-Feb	SSW1	S3	SSW3	SSW3	S3	S1	S2	S4	S4	SW4	W9	W12	W12	W12	W13	W10	W10	W6	W10	W8	WNW5	NW6	NW8	WNW4	W5.2	W13
8-Feb	W6	WNW8	WNW8	W8	W7	SW6	SSW8	SW9	SW9	SW8	WSW9	W14	W14	W14	W16	WSW15	SW12	SW11	SSW14	SW17	SW19	SW17	SW14	SSW12	WSW10.4	SW19
9-Feb	SW8	SW12	SW9	SW11	SSW14	SSW12	SSW9	S5	SSW6	WSW4	SW4	S2	ESE4	ESE5	ESE4	ENE4	ESE3	N2	N5	NNW6	NNW3	NNW4	NNW4	NNW3	SW2.9	SSW14
10-Feb	NNW4	NNW4	NNW6	NNW3	NNW3	NNW1	NNW1	S1	AF	WNW1	SE4	ESE1	ESE4	E4	SSE8	SE6	SE7	SSE10	SSE10	S14	S11	SSW7	SSW8	SSW9	SSE2.9	S14
11-Feb	SW10	SW12	SW13	SW13	SW11	SW10	SW13	WSW12	W16	W16	WNW13	WNW14	W14	WNW12	WNW14	W14	W14	W12	WSW12	SW11	SW11	SSW12	SW12	SW12	WSW11.2	W16
12-Feb	SW14	SW14	SW14	SW13	SSW13	SW16	SW15	SW15	SW16	SW15	SW17	WSW21	WSW20	WSW19	WSW15	W14	W14	W12	W13	WSW14	W16	W16	W15	WNW14	WSW14.3	WSW21
13-Feb	WNW13	WNW12	WNW11	WNW9	WNW9	W12	W13	W11	W14	W15	WNW9	WNW10	WNW10	WNW10	WNW11	WNW9	WNW6	WSW5	SSW5	SW7	SSW7	SSW6	SW8	SSW7	W8.2	W15
14-Feb	SSW8	SSW8	SSE5	SW8	SW8	SSW7	SSW8	SSW10	S9	SSW10	WSW12	SW12	SSW14	SSW10	SSW14	SSW11	SSW9	SSW11	SSW11	SSW14	SSW11	S9	SSW10	SSW10	SSW9.6	SSW14
15-Feb	SSW7	SSW7	S8	S6	SSW8	SSE5	SE6	S7	SSE5	SE5	ESE4	ESE3	S8	SSW11	SW7	WSW11	SW12	SW13	SW7	WSW9	SSW8	SW8	SW10	SSW9	SSW6.6	SW13
16-Feb	SSW8	SSW9	SSW9	SSW6	SSE5	SE5	S2	SSE2	SE2	NW2	S10	SSW9	SW8	SW7	SSW5	SW6	SSW8	S8	SSW5	WSW3	NNE1	NW4	NW7	NW5	SSW4.2	S10
17-Feb	WNW4	NW4	WNW4	WNW8	NW6	WNW7	WNW3	SW3	SW6	W7	WNW6	NW10	NW13	NW10	NW11	NW9	NW7	W8	W9	WNW5	W5	W10	WNW6	NW4	WNW6.4	NW13
18-Feb	WNW4	NW4	NW4	WNW2	WSW4	SW4	W3	WNW3	WNW4	NW4	NW4	NW4	NW5	NW3	E3	NW1	NNE4	ENE3	ESE3	ENE3	ENE3	E4	E5	ENE5	NNW1.4	NW5
19-Feb	E6	E6	E8	E9	E9	ENE8	ENE9	ENE9	ENE8	ENE8	ENE8	E7	ESE10	ESE9	E6	ENE5	NNE4	E3	ESE6	ENE3	E3	ENE3	NNE3	NE3	E6.0	ESE10
20-Feb	N5	N5	NNW5	NW3	NW3	NW4	WNW5	WNW5	NW6	WNW5	WNW7	WNW8	WNW8	W6	W5	WNW7	NW8	W10	W10	WNW7	WNW6	W6	W7	W6	WNW5.6	W10
21-Feb	SW4	SW5	W3	W3	WNW4	NW6	W7	W6	WNW5	WNW9	WNW9	WNW9	W9	W10	W10	W8	W7	W7	NW8	NW8	NW10	NW10	NNW9	NNW10	WNW6.5	NNW10
22-Feb	NNW9	WNW5	NW7	NW3	W2	WSW5	WNW4	W6	WSW7	WSW7	W7	WNW8	NW7	NW7	NW8	NW10	NW10	NNW7	NNW5	NNW4	WNW2	NW6	NW3	NW4	WNW5.2	NW10
23-Feb	NNW4	NW3	NNW3	NNW1	WNW1	AF	AF	AF	SW1	ESE2	NW1	NW5	WNW6	W6	WNW5	NW5	NW4	NNW2	AF	NW1	NNW2	NNW3	NNW3	NW2	NW2.7	WNW6
24-Feb	NNW2	NW1	NNW2	NW1	W1	AF	SSE0	NNW8	NNW9	NNW11	NW10	NW11	NW11	NW11	NW10	NW10	NW9	NW7	WNW3	WSW4	W5	W5	W6	SSW5	NW5.4	NW11
25-Feb	SSW6	S5	S7	SSW7	SSW9	SSW10	SSW11	SSW9	SW11	SW9	SW12	SW12	WSW10	W10	W10	WSW10	WNW7	NW10	N12	N6	NNW5	WSW5	W4	WNW7	WSW6.0	SW12
26-Feb	NNW11	N15	NNW18	NNW14	N13	NNW10	NNW12	NW12	NNW12	NNW12	NW12	NNW12	NW11	NW10	NW12	NW8	NW7	W5	WSW4	SSW4	SSW4	S4	S6	SSW6	NW7.6	NNW18
27-Feb	S4	S6	SSW9	SSW5	ESE1	S3	WSW3	NW3	NNE8	NNE6	NNE6	NE7	NNE7	ENE4	SE6	ESE7	ESE5	ENE2	AF	SSW1	S2	S1	SSE2	SE5	ESE1.5	SSW9
28-Feb	E1	SSE2	W1	NW1	NNW0	SE2	NNW1	NNW2	N6	NNE8	NNE8	NNE4	NNW5	N6	NW6	ESE4	E8	NE5	N3	N2	N1	NNE3	ENE4	NE4	NNE2.5	E8

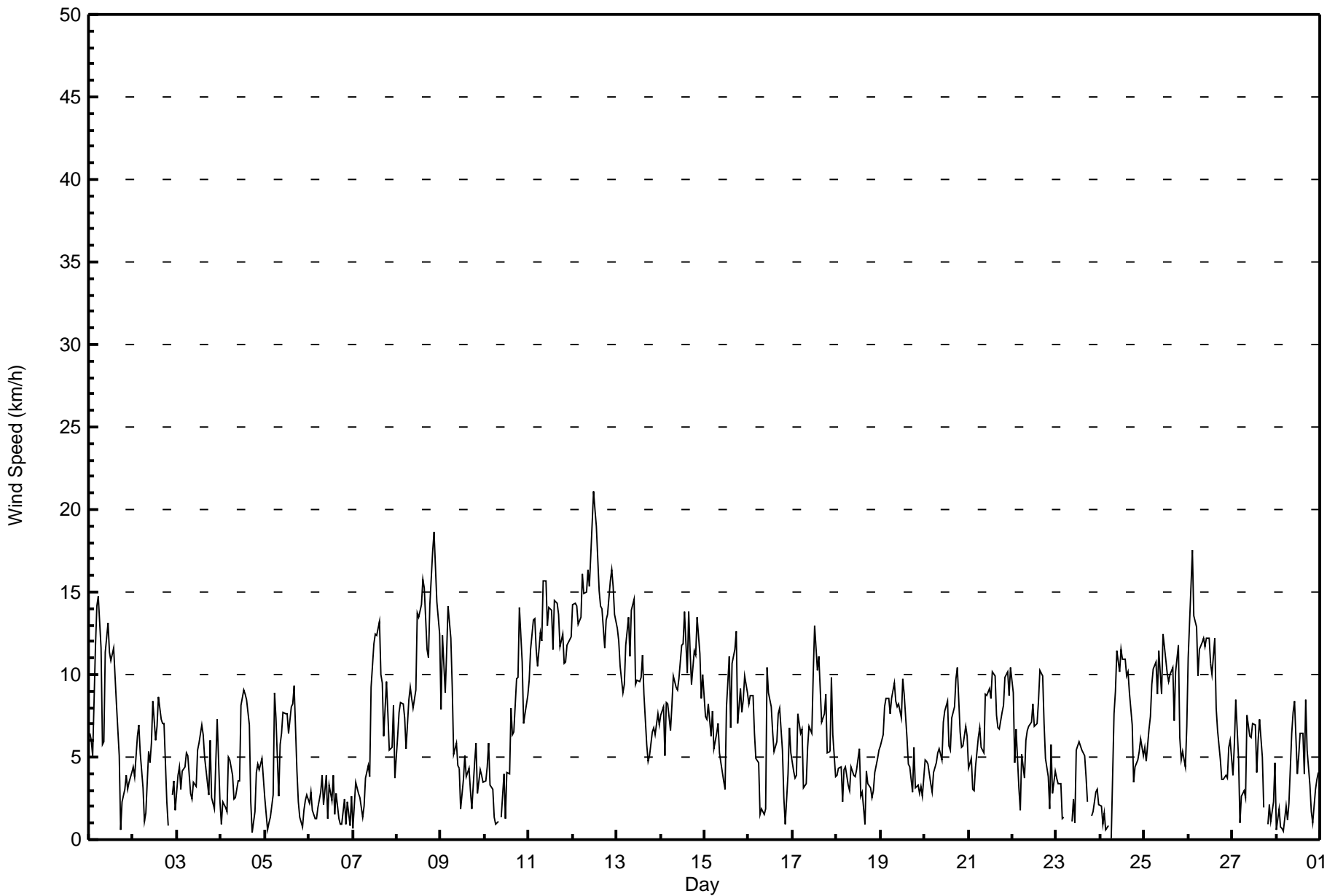
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SW14	N15	NNW18	NNW14	NNW14	SW16	SW15	SW15	SW16	W16	SW17	WSW21	WSW20	WSW19	W16	WSW15	W14	SW13	SSW14	SW17	SW19	SW17	W15	WNW14	Diurnal Maximum

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
Conklin Community - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin Community - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	292	43.98	43.98
6 - 11	275	41.42	85.39
12 - 19	95	14.31	99.70
20 - 28	2	0.30	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin Community - February 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	9	7	4	11	8	13	7	21	35	18	13	13	18	25	47	43	292
6 - 11	10	7	1	6	8	4	3	4	12	43	27	7	35	36	54	18	275
12 - 19	3	0	0	0	0	0	0	0	1	9	27	8	23	8	6	10	95
20 - 28	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
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	22	14	5	17	16	17	10	25	48	70	67	30	76	69	107	71	664

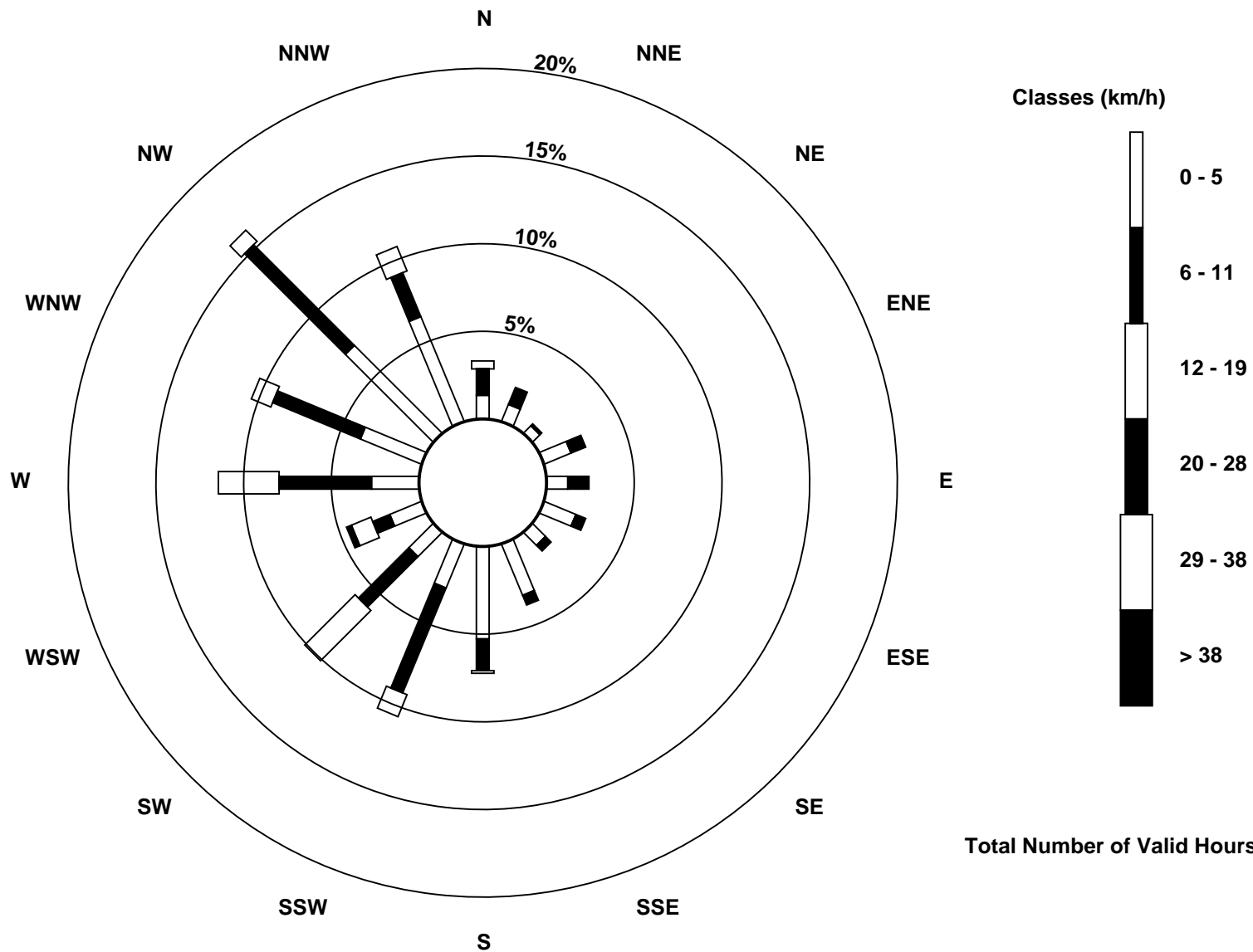
Total Number of Valid Hours: 664

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 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 - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 11 16:00	Hours in Service: 672 Hours of Data: 664 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.8
Minimum Value: 1 km/h on Feb 4 03:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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-Feb	2	1	2	5	4	4	4	2	2	3	3	3	3	3	4	3	3	1	1	1	1	1	1	1	5
2-Feb	1	1	2	2	2	2	1	1	1	2	2	3	2	3	4	3	2	2	2	1	AF	1	1	1	4
3-Feb	2	1	1	1	3	1	2	1	1	1	1	3	2	2	2	1	2	2	3	2	1	3	2	2	3
4-Feb	1	1	1	2	2	2	2	1	1	1	1	3	3	4	3	3	1	1	1	1	1	1	1	1	4
5-Feb	1	1	1	2	2	2	2	2	2	2	3	2	3	3	3	3	2	2	1	1	1	2	1	1	3
6-Feb	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2
7-Feb	1	1	1	1	1	1	1	1	1	3	4	5	5	5	5	4	4	2	3	3	2	3	3	2	5
8-Feb	3	3	3	3	2	2	2	2	2	2	3	5	5	5	5	4	4	4	4	5	5	5	4	4	5
9-Feb	3	4	3	4	3	3	3	2	3	2	2	2	1	2	1	1	1	1	2	2	1	1	1	2	4
10-Feb	1	1	1	2	1	1	1	1	AF	1	1	1	2	1	3	1	2	3	3	4	4	2	3	3	4
11-Feb	3	4	4	4	3	3	3	4	5	6	6	6	6	4	6	6	5	3	3	3	3	3	3	3	6
12-Feb	4	4	4	3	4	4	4	4	4	4	5	6	6	6	4	5	5	4	4	3	5	5	6	6	6
13-Feb	5	5	4	3	4	4	4	4	5	5	3	4	4	4	5	3	3	1	2	2	1	2	2	2	5
14-Feb	2	3	1	3	2	2	3	2	1	3	3	4	4	4	4	5	4	2	3	3	3	3	2	2	5
15-Feb	3	2	3	3	2	1	1	2	3	2	2	1	3	4	3	3	3	3	3	4	2	2	3	2	4
16-Feb	2	2	2	1	1	1	1	2	2	2	5	3	2	2	1	2	2	2	3	2	1	2	2	2	5
17-Feb	2	2	2	3	2	2	2	2	2	4	2	4	4	4	3	3	3	3	3	3	2	4	2	1	4
18-Feb	1	1	2	1	2	1	1	1	2	1	1	2	2	2	2	1	2	1	1	1	1	2	2	2	2
19-Feb	2	2	3	3	3	3	3	3	3	3	3	2	3	2	2	1	1	2	1	1	1	1	1	1	3
20-Feb	1	1	1	1	1	1	2	2	2	2	3	3	3	2	1	3	3	3	4	3	2	2	2	3	4
21-Feb	1	1	2	2	2	2	3	2	2	4	3	4	3	4	4	3	2	3	2	2	3	3	3	3	4
22-Feb	3	2	3	1	1	2	2	1	1	3	2	3	2	3	3	4	3	2	1	1	1	2	1	1	4
23-Feb	1	1	1	1	1	AF	AF	AF	1	1	2	2	2	2	2	1	1	AF	1	1	1	1	1	1	2
24-Feb	1	1	1	1	1	AF	1	2	3	3	3	4	3	3	3	3	2	2	1	2	2	2	2	1	4
25-Feb	1	1	1	2	2	2	3	2	3	3	4	3	3	4	4	2	3	3	5	3	2	2	2	3	5
26-Feb	5	5	5	4	4	3	3	3	4	4	4	4	4	4	5	3	3	2	1	1	1	1	1	1	5
27-Feb	1	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	AF	1	1	1	1	1	2
28-Feb	1	1	1	1	1	1	1	1	3	2	2	3	2	3	2	3	2	2	1	1	1	2	2	1	3
	5	5	5	5	4	4	4	4	5	6	6	6	6	6	6	6	5	4	5	5	5	5	6	6	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Conklin Community - February 2017

Direction of Maximum Speed: 241 deg on Feb 12 12:00		Hours in Service: 672
Direction of Maximum Daily Speed Average: 243.1 deg on Feb 12		Hours of Data: 664
Direction of Minimum Speed: 168 deg on Feb 24 07:00	Direction of Minimum Daily Speed Average: 1.4 deg on Feb 18	Hours of Missing Data: 8
Monthly Average Direction: 282.9 deg		Percent Operational Time: 98.8

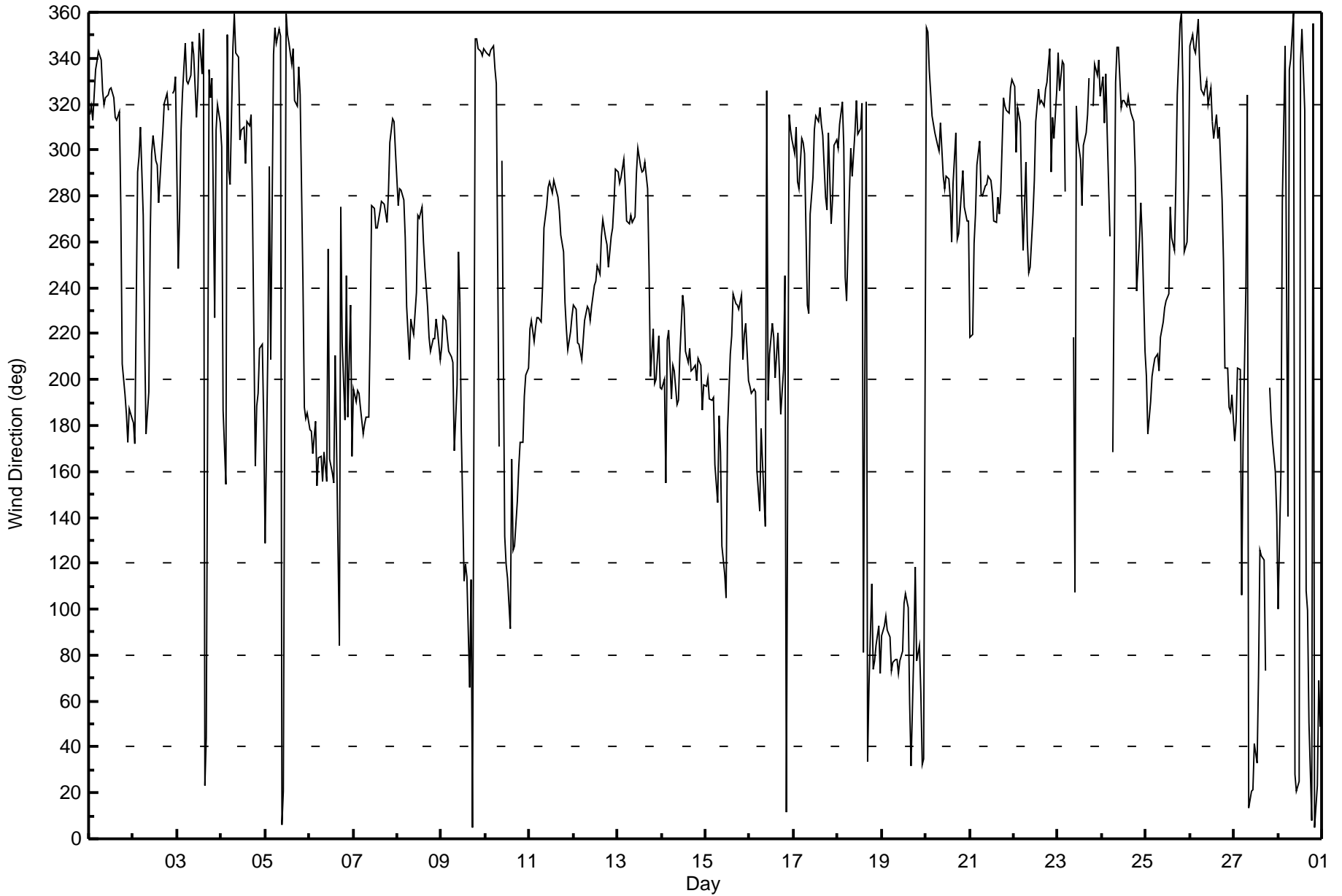
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	315	319	313	335	338	343	339	326	320	323	324	327	327	323	314	313	317	274	207	193	185	173	187	183	321.6
2-Feb	181	172	290	297	310	272	218	176	194	263	298	306	295	294	277	298	308	320	325	318	AF	324	326	332	289.8
3-Feb	249	273	309	325	347	330	329	333	347	342	314	327	351	333	353	23	44	335	323	331	227	309	320	312	329.7
4-Feb	301	187	154	350	291	285	344	359	342	341	304	309	310	294	312	311	315	274	162	188	194	214	215	181	289.5
5-Feb	128	215	293	209	342	353	347	353	350	6	21	359	350	346	337	344	322	319	336	324	243	188	183	185	345.4
6-Feb	178	178	168	182	154	166	166	156	169	155	257	165	159	155	210	170	84	275	216	183	245	184	233	167	172.0
7-Feb	196	191	195	194	188	177	181	183	183	222	276	275	266	266	273	277	277	276	269	281	303	314	313	300	266.7
8-Feb	276	283	282	278	262	232	209	227	222	219	238	271	270	275	260	249	231	219	213	218	218	226	221	209	239.6
9-Feb	214	228	225	218	212	210	207	169	198	256	234	177	113	120	114	66	113	5	349	348	344	343	341	344	216.8
10-Feb	342	341	341	344	345	336	329	171	AF	295	132	119	114	92	165	126	128	147	162	173	173	193	202	205	163.0
11-Feb	222	226	217	223	227	227	225	240	266	276	284	286	281	287	284	279	273	263	256	234	222	213	221	227	250.2
12-Feb	232	230	216	215	209	217	226	232	231	226	232	241	243	249	246	262	269	262	259	249	263	266	277	292	243.1
13-Feb	290	286	288	296	285	269	268	272	269	271	290	301	293	291	295	283	248	201	222	198	200	219	197	271.4	
14-Feb	196	200	155	217	221	192	206	204	189	191	211	237	231	212	208	213	204	204	206	199	209	206	187	198	206.2
15-Feb	197	201	191	191	192	163	146	184	168	128	116	105	177	211	219	237	233	233	231	237	209	220	225	199	203.7
16-Feb	197	194	196	195	160	143	179	164	136	326	191	211	224	219	201	220	204	185	204	246	12	315	309	304	207.0
17-Feb	298	310	286	283	305	303	299	233	229	272	288	309	315	312	319	311	306	279	274	308	268	279	302	305	295.1
18-Feb	301	311	321	301	245	234	281	301	289	308	322	307	309	321	81	321	33	67	111	74	78	84	93	72	335.9
19-Feb	89	93	97	91	88	73	77	78	78	72	78	82	103	107	101	59	32	83	119	78	84	63	32	35	83.2
20-Feb	353	351	335	315	311	308	302	299	312	288	283	289	287	279	260	286	307	261	264	282	291	275	269	269	289.8
21-Feb	218	219	259	272	293	304	281	280	285	285	289	287	281	269	268	279	272	281	323	319	317	316	327	331	291.0
22-Feb	327	299	319	312	279	257	295	260	247	249	272	287	312	326	320	322	319	327	330	344	291	314	305	326	303.8
23-Feb	342	326	339	337	282	AF	AF	AF	218	108	319	304	296	276	302	307	315	331	AF	319	337	333	339	323	313.9
24-Feb	332	312	333	307	262	AF	168	330	345	345	318	322	321	319	323	319	316	312	292	238	261	277	262	212	312.9
25-Feb	202	177	190	201	206	210	211	204	218	225	232	234	237	275	262	256	285	324	355	360	329	256	260	284	243.0
26-Feb	346	350	344	342	357	337	327	324	327	330	320	327	313	305	316	305	310	278	251	205	205	188	186	193	323.0
27-Feb	173	182	205	204	106	173	241	324	13	21	21	42	33	71	125	123	121	73	AF	196	183	173	160	141	111.1
28-Feb	100	160	277	311	345	141	335	340	360	28	20	25	338	352	317	108	100	51	8	355	5	23	69	49	24.8
253.1	247.1	256.9	259.2	260.0	256.1	256.2	251.2	262.6	283.8	282.7	289.7	286.6	282.4	281.5	281.7	282.0	267.5	256.1	242.9	235.4	251.7	254.5	240.4		
Diurnal Average																									

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Conklin Community - February 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Conklin Community - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Feb 16 09:00		Hours in Service: 672 Hours of Data: 664 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.8																									
Minimum Value: 9 deg on Feb 25 01:00																											
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 20 Median = 26 Q ₃ = 33 P ₉₀ = 53 P ₉₉ = 87																											
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-Feb	18	13	19	18	17	18	16	14	14	15	16	21	22	22	25	22	17	44	29	30	24	37	30	31	44		
2-Feb	14	33	35	30	28	76	88	74	11	46	32	25	29	28	27	27	23	15	33	29	AF	15	14	16	88		
3-Feb	22	21	25	15	31	16	13	13	15	17	32	32	33	31	28	28	29	21	17	29	45	22	16	19	45		
4-Feb	80	36	48	59	29	27	37	34	18	21	32	25	26	30	25	25	15	69	71	19	20	23	20	28	80		
5-Feb	30	92	65	79	23	16	12	38	16	24	25	27	31	34	28	23	15	14	13	49	74	65	52	50	92		
6-Feb	64	48	55	79	86	43	29	17	67	24	59	26	77	58	83	52	68	63	75	24	65	51	64	27	86		
7-Feb	77	25	23	26	39	42	46	16	21	57	31	29	25	26	25	28	26	23	19	27	26	18	18	25	77		
8-Feb	24	28	27	26	22	24	17	18	17	21	22	25	29	28	22	19	24	21	19	20	20	21	20	19	29		
9-Feb	30	22	26	24	17	21	37	30	44	41	32	78	55	39	45	36	55	53	19	17	19	13	12	16	78		
10-Feb	18	13	13	16	11	38	53	87	AF	37	36	90	57	45	29	19	20	16	16	17	20	26	30	27	90		
11-Feb	28	25	20	22	20	21	20	23	20	26	30	30	29	31	30	27	23	16	15	16	20	20	20	19	31		
12-Feb	19	19	19	19	18	19	20	20	19	20	19	18	18	21	15	25	24	16	22	15	19	18	27	29	29		
13-Feb	30	30	31	30	29	19	19	22	21	23	31	27	32	30	28	29	27	27	19	17	14	30	18	16	32		
14-Feb	18	26	24	25	20	22	19	15	14	31	24	24	23	20	27	22	19	19	20	17	16	20	21	18	31		
15-Feb	34	36	26	39	26	26	19	25	46	35	50	42	34	27	48	23	19	17	24	30	18	17	18	14	50		
16-Feb	15	16	14	13	20	24	82	81	95	65	44	24	24	29	24	20	19	19	44	62	64	45	23	25	95		
17-Feb	25	34	30	28	28	27	31	79	23	35	30	25	20	23	21	22	24	27	24	30	21	27	26	28	79		
18-Feb	24	22	19	34	29	26	33	27	26	30	26	35	27	80	61	80	21	36	36	47	46	39	38	37	80		
19-Feb	40	34	31	31	32	34	36	34	37	34	34	32	24	21	31	32	21	50	17	43	39	43	28	37	50		
20-Feb	16	18	15	17	19	25	28	29	25	30	31	30	32	29	19	29	23	21	21	29	31	26	19	20	32		
21-Feb	20	24	59	41	26	27	27	26	29	29	31	30	30	24	25	28	27	26	16	19	20	20	21	18	59		
22-Feb	17	28	18	23	44	19	28	18	16	26	27	32	23	29	23	22	19	17	17	18	23	18	22	20	44		
23-Feb	19	14	22	58	46	AF	AF	AF	65	33	94	28	32	45	31	26	18	18	AF	43	20	38	29	25	94		
24-Feb	23	41	18	43	38	AF	95	17	17	18	22	21	27	26	25	22	20	20	39	18	30	25	22	11	95		
25-Feb	9	18	16	20	19	17	17	18	21	22	21	21	27	31	27	17	38	18	19	24	24	27	34	33	38		
26-Feb	32	20	19	16	19	20	16	15	18	22	24	22	31	28	25	28	26	36	23	16	27	22	10	19	36		
27-Feb	23	22	17	38	73	72	53	44	22	31	37	35	32	73	46	28	40	63	AF	70	47	85	34	11	85		
28-Feb	74	34	60	53	67	63	44	21	28	24	30	84	59	56	31	93	32	32	23	51	87	44	46	35	93		
	80	92	65	79	86	76	95	87	95	65	94	90	77	80	83	93	68	69	75	70	87	85	64	50			
	Diurnal Maximum																										
AF - Analyzer Failure																											



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 16, 2017	Last Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:25
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	2658
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	851	852
Calculated slope	1.001469	0.998292	Chamber temp	45.2	44.9
Calculated intercept	-0.156222	0.640903	Pressure	652.8	638.5
Analyzer Background	22.4	22.4	Flow	0.480	0.471
Analyzer Coefficient	0.908	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	-0.2	----
as found span	5000	76.5	786.4	781.1	1.007
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	76.5	786.4	787.0	0.999
second point	5000	38.2	392.7	393.5	0.998
third point	5000	19.1	196.3	194.9	1.007
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	76.5	786.4	789.1	0.997
Average Correction Factor					1.001

Corrected As found 781.3 Previous response 785.4 % change 0.5%

Notes:

Sample inlet filter replaced after as founds. No adjustments made. Took the new "high point" average after replacing the sample filter.

Calibration Performed By: Asad Hidayat



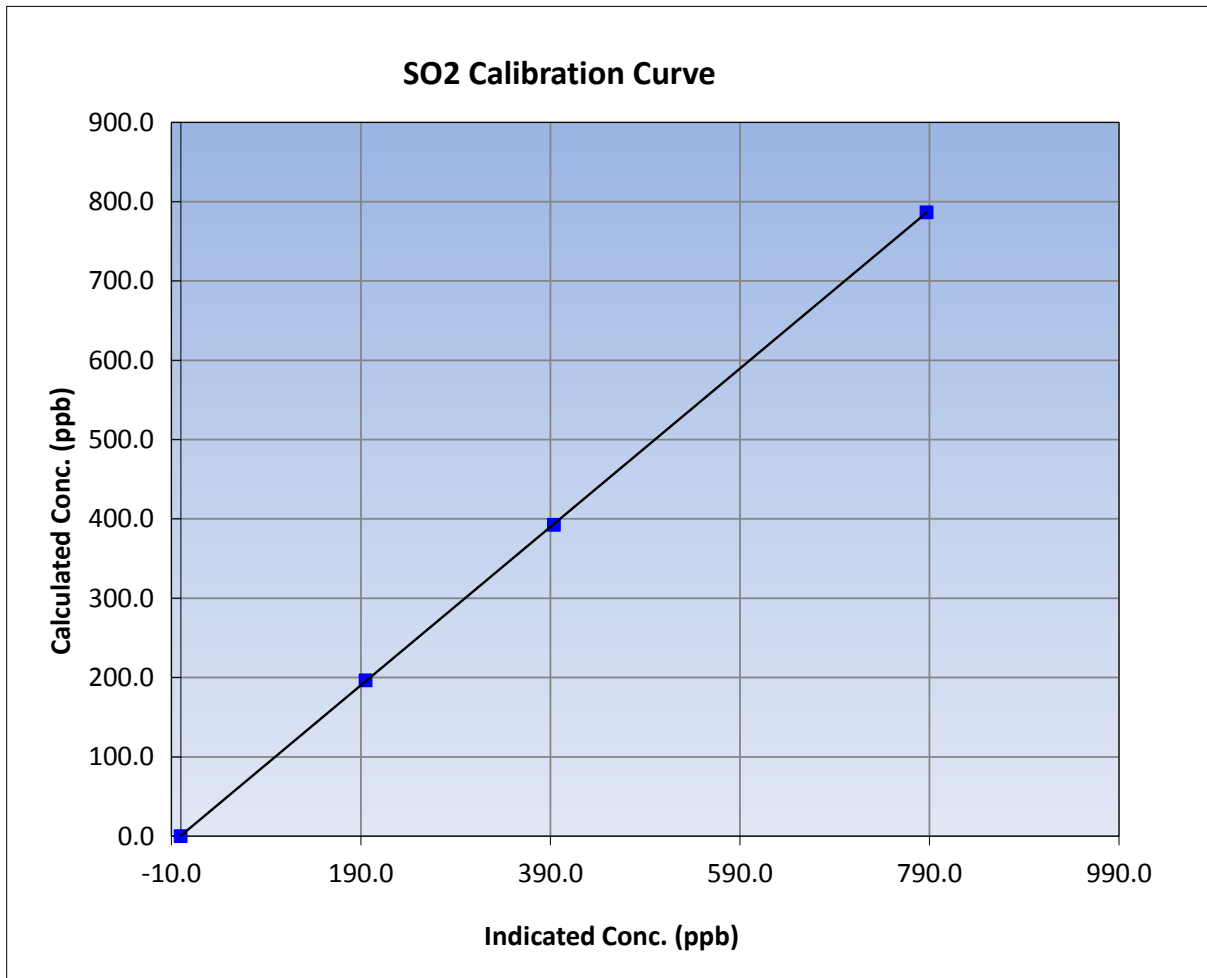
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:00	End Time (MST)	13:25
Analyzer make	Thermo 43i	Analyzer serial #	JC1428701363

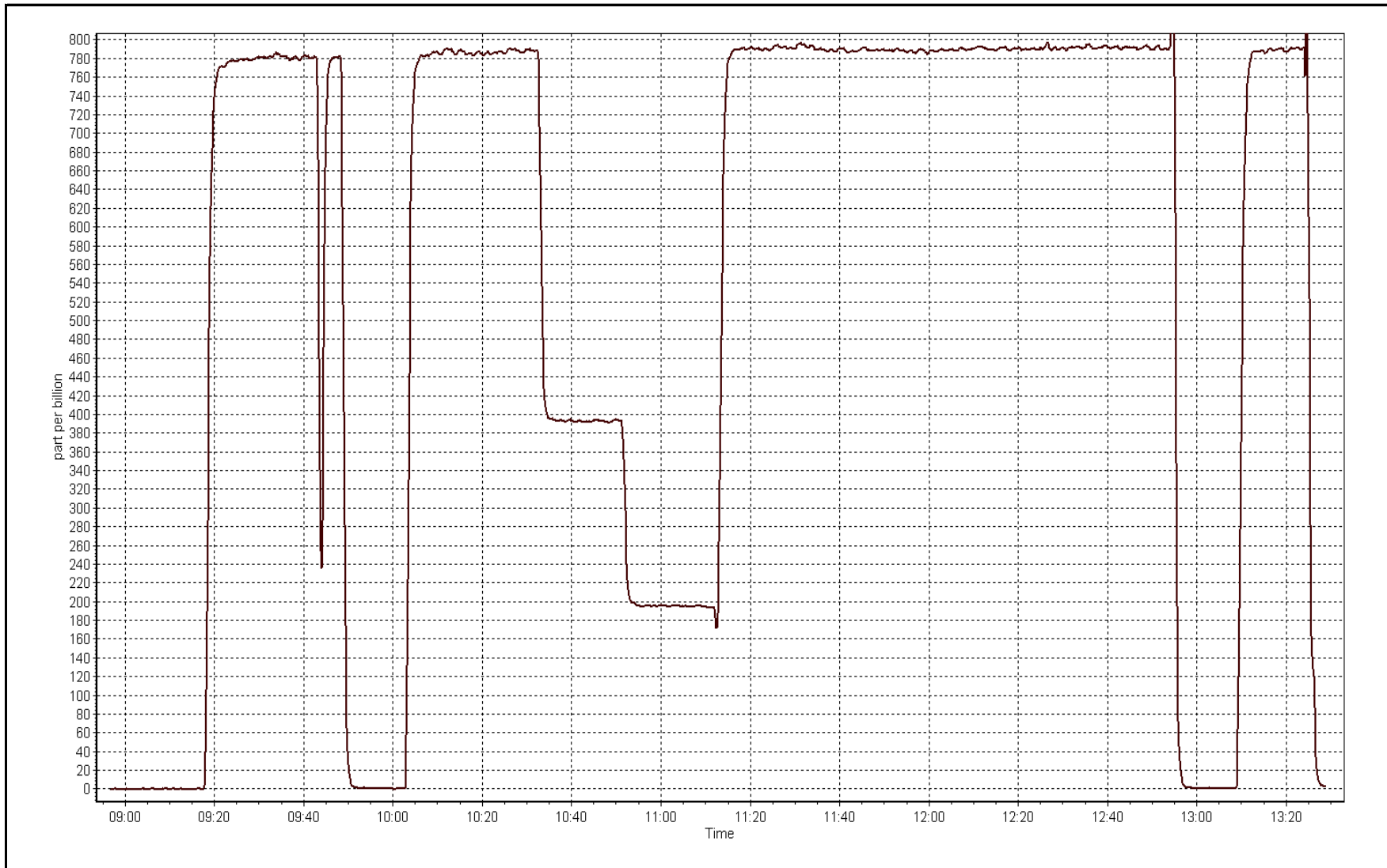
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999994
786.4	787.0	0.9993		
392.7	393.5	0.9979	Slope	0.998292
196.3	194.9	1.0072		
			Intercept	0.640903



SO2 Calibration Plot

Date: February 16, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 16, 2017	Last Calibration	January 12, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	13:25	End Time (MST)	16:05
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	2658
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	1048	1046
Calculated slope	0.997164	0.995666	Chamber temp	45	45
Calculated intercept	-0.039380	-0.023977	Pressure	660.0	643.5
Analyzer Background	1.47	1.53	Flow	0.427	0.418
Analyzer Coefficient	0.992	1.012	Intensity	92	93
			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	0.0	----
as found span	5000	80.6	80.1	78.5	1.021
SO2 scrubber check	5000	19.5	200.5	0.6	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	80.6	80.1	80.5	0.995
second point	5000	40.4	40.2	40.3	0.995
third point	5000	20.2	20.1	20.2	0.995
as left zero	6000	0.0	0.0	0.2	----
as left span	5000	80.6	80.1	80.7	0.993
Average Correction Factor					0.995

Corrected As found	78.4	Previous response	80.4	% change	2.5%
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Notes:

Sample inlet filter replaced after as founds. SO2 scrubber check completed after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



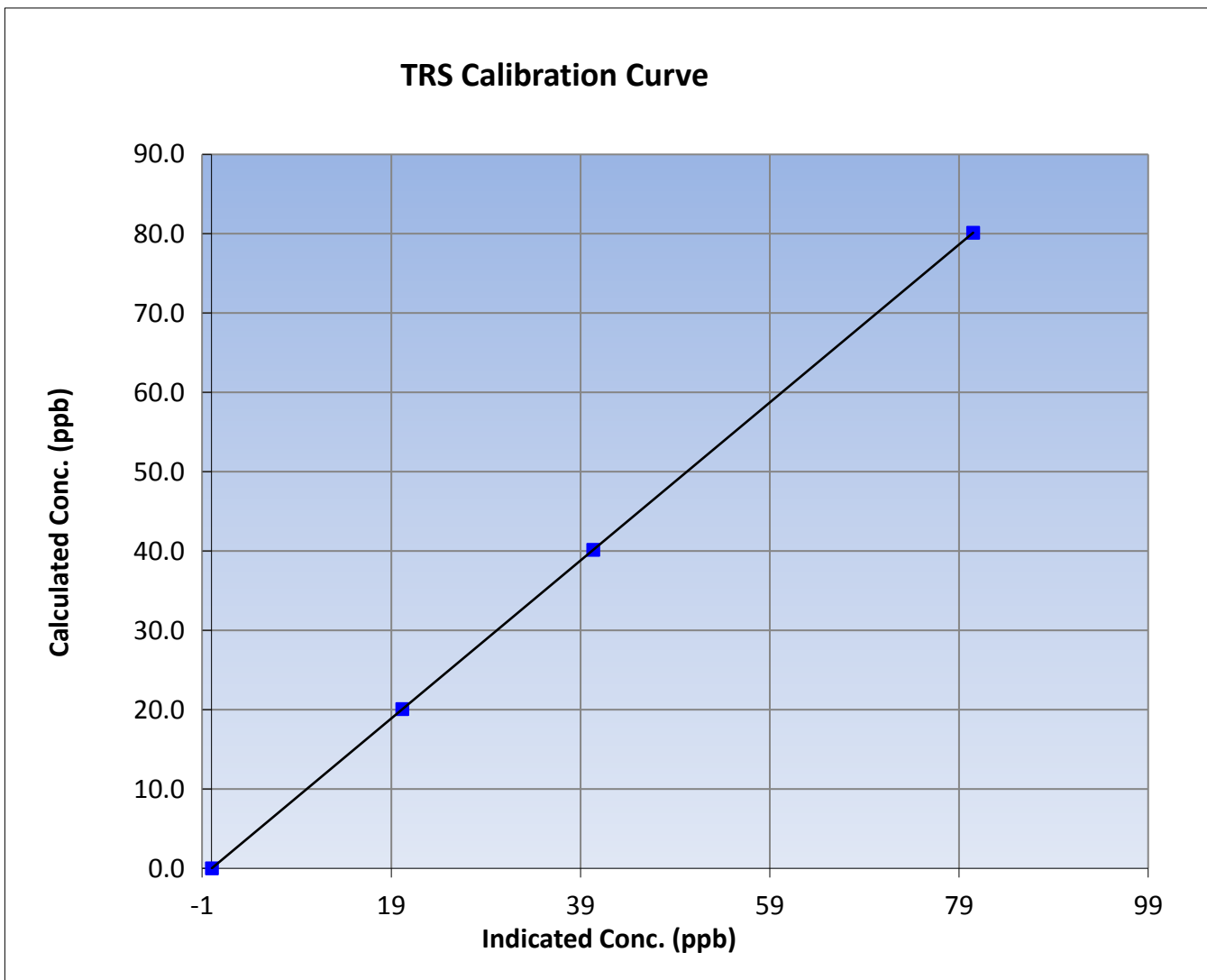
Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 12, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	13:25	End Time (MST)	16:05
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1236656116

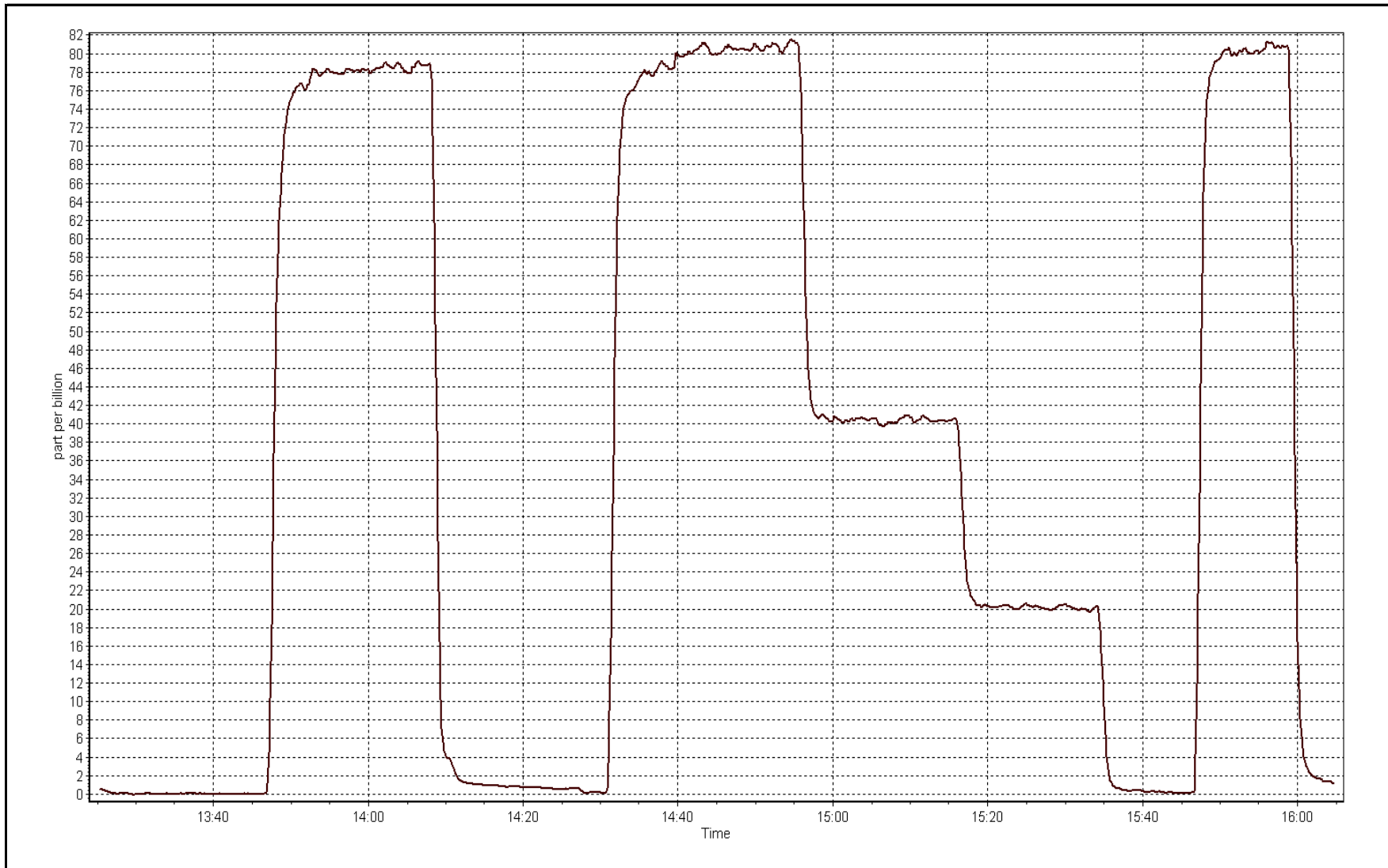
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
80.1	80.5	0.9952		
40.2	40.3	0.9955	Slope	0.995666
20.1	20.2	0.9950		
			Intercept	-0.023977



TRS Calibration Plot

Date: February 16, 2017





Wood Buffalo Environmental Association

THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	February 16, 2017	Last Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	13:25
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	2658
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	0.996624	0.998095	Carrier Pressure	37.0	37.0
THC Calc intercept	0.053846	0.068169	Fuel Pressure	49.7	49.7
NMHC Calc slope	0.997850	0.998089	Air Pressure	34.3	34.3
NMHC Calc intercept	0.036347	0.040430			

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	16.30	1.017
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	16.59	16.59	1.000
second point	5000	38.2	8.28	8.17	1.014
third point	5000	19.1	4.14	4.03	1.028
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	16.59	16.59	1.000
Average Correction Factor					1.014

Corrected As found 16.30 Previous response 16.59 % change 1.8%

Notes:

Sample inlet filter replaced after as founds. Chromatograms taken after each as founds point (zero & Span) and a blank after the as founds. 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	0.00	0.00	----
as found span	5000	76.5	8.75	8.52	1.027
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	4.31	1.014
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					1.016

Corrected As found 8.52 Previous response 8.73 % change 2.5%

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	76.5	7.83	7.78	1.007
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	7.83	7.84	0.999
second point	5000	38.2	3.91	3.86	1.013
third point	5000	19.1	1.96	1.91	1.024
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	7.83	7.84	0.999
Average Correction Factor					1.012

Corrected As found 7.78 Previous response 7.85 % change 0.9%



Wood Buffalo Environmental Association

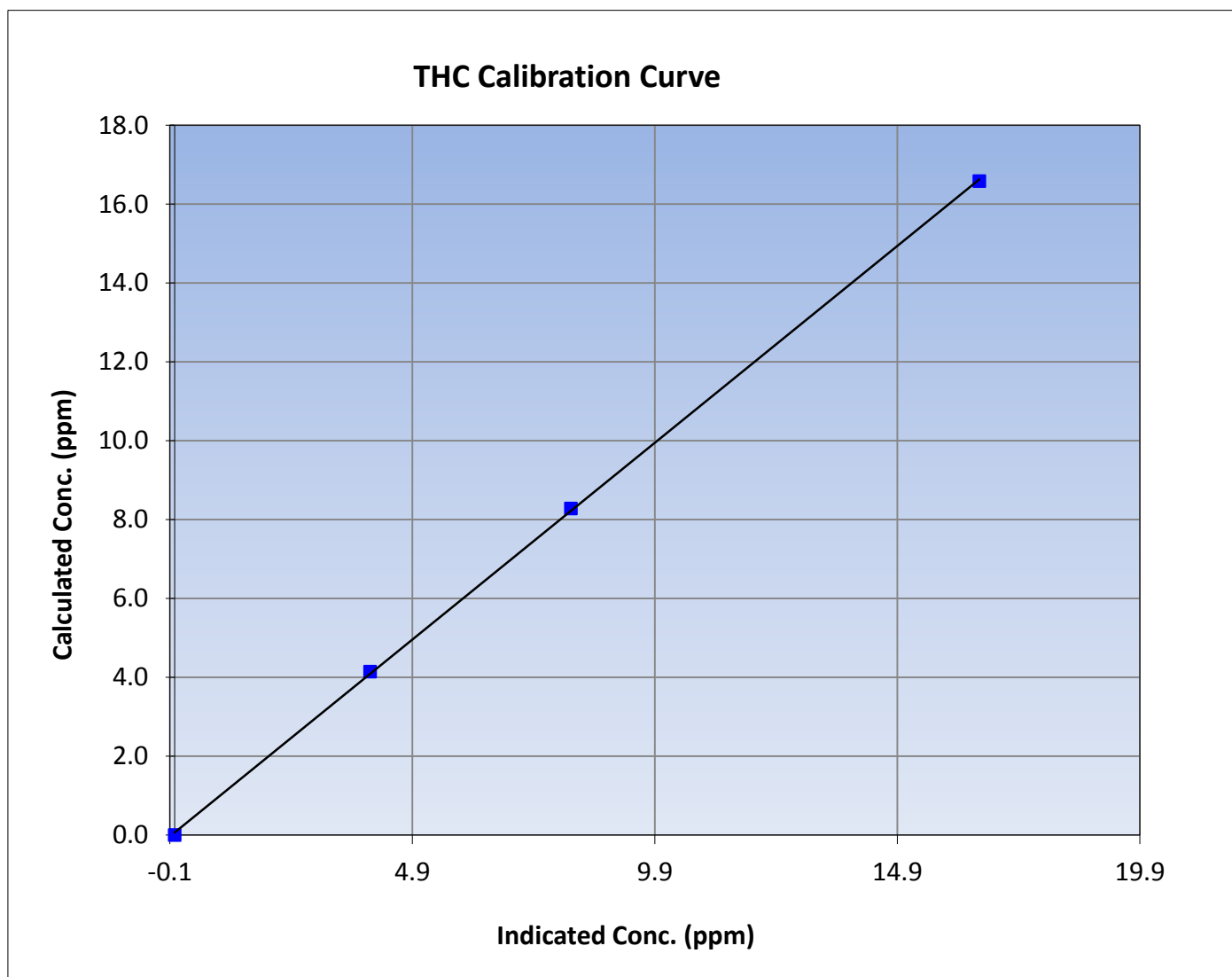
THC Calibration Summary

Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	8:55	End Time (MST)	13:25
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	0.999918
16.59	16.59	0.9997		
8.28	8.17	1.0137	Slope	0.998095
4.14	4.03	1.0275		
			Intercept	0.068169





Wood Buffalo Environmental Association

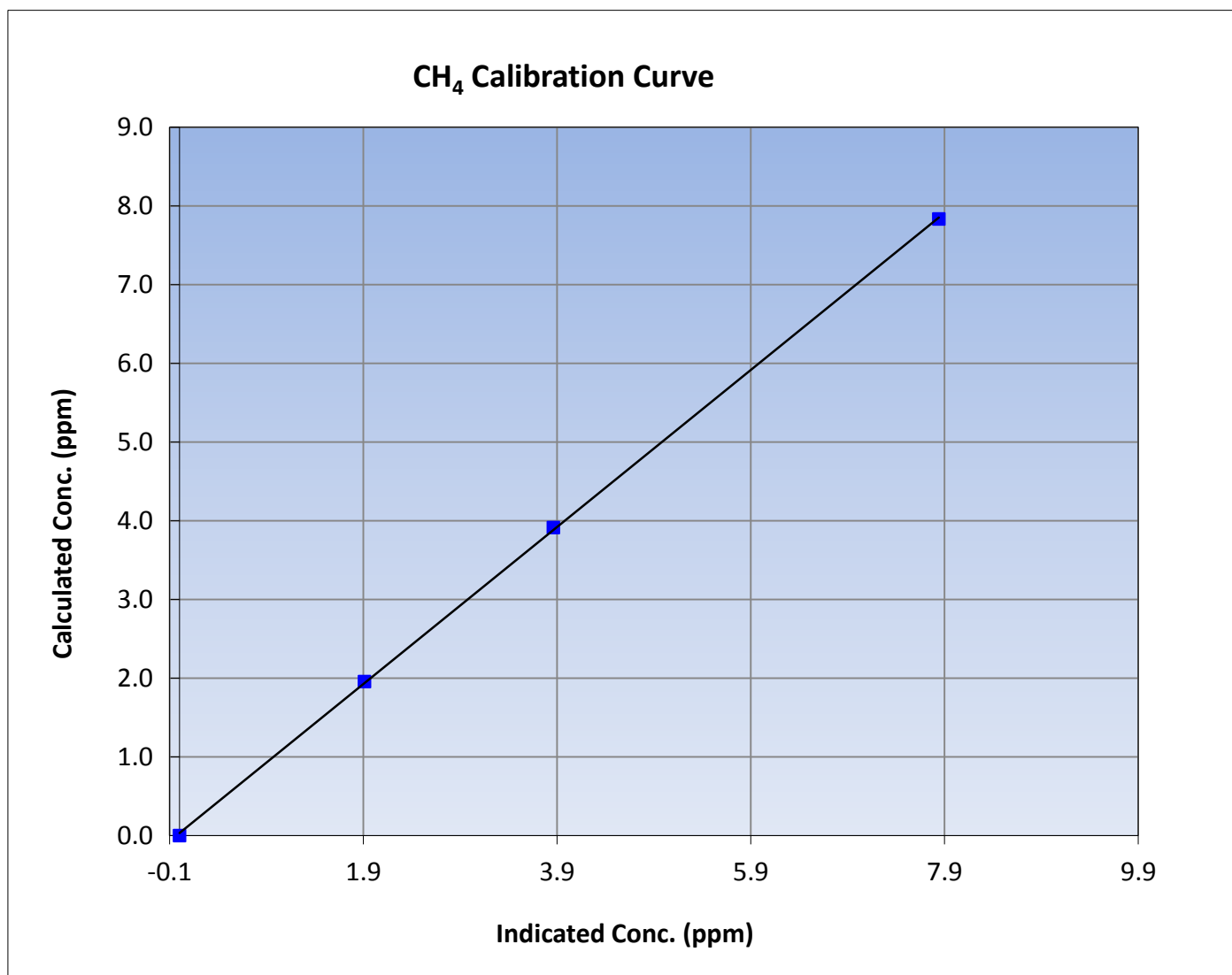
CH₄ Calibration Summary

Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	8:55	End Time (MST)	13:25
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	0.999923
7.83	7.84	0.9992		
3.91	3.86	1.0134	Slope	0.997829
1.96	1.91	1.0240		
			Intercept	0.030167





Wood Buffalo Environmental Association

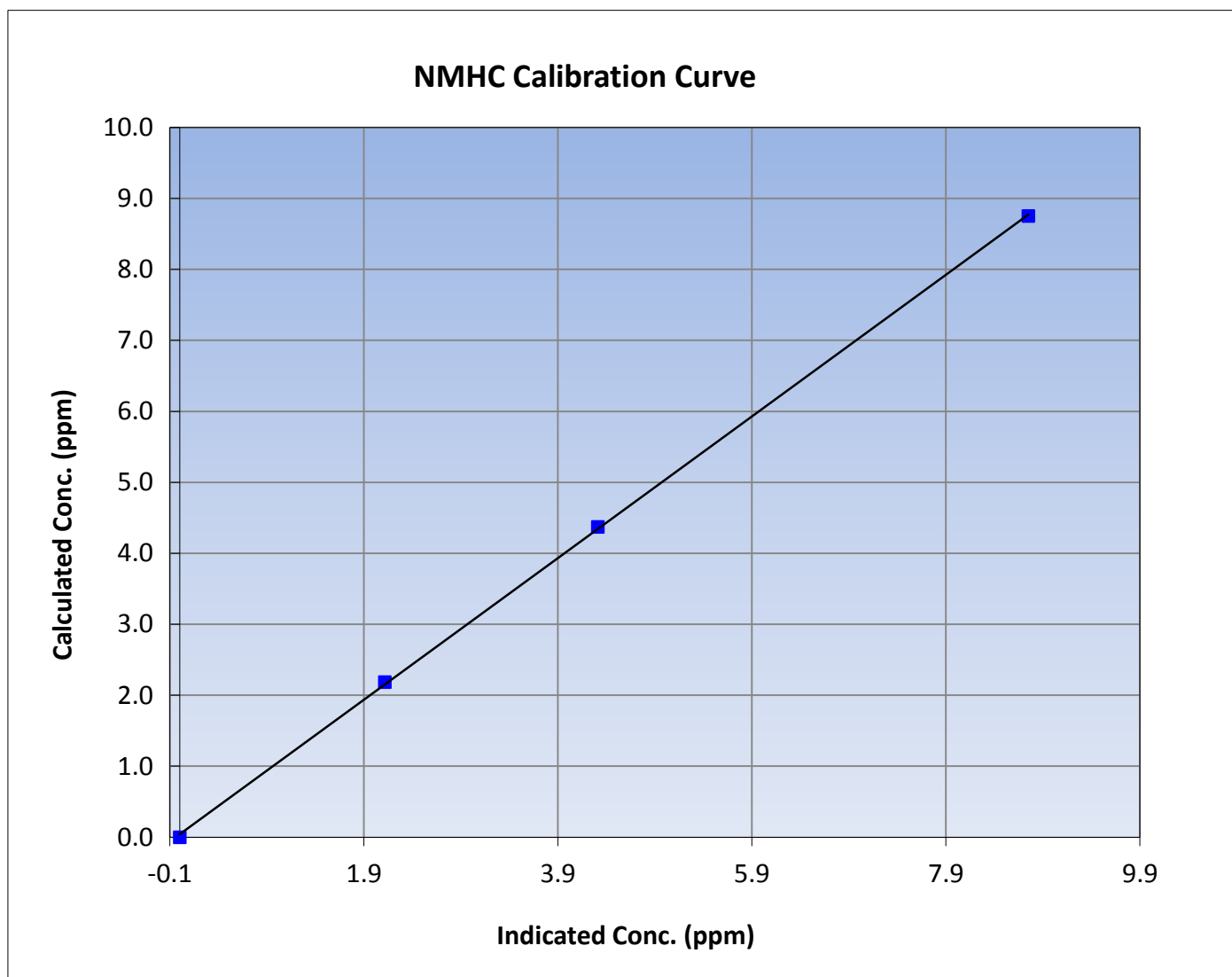
NMHC Calibration Summary

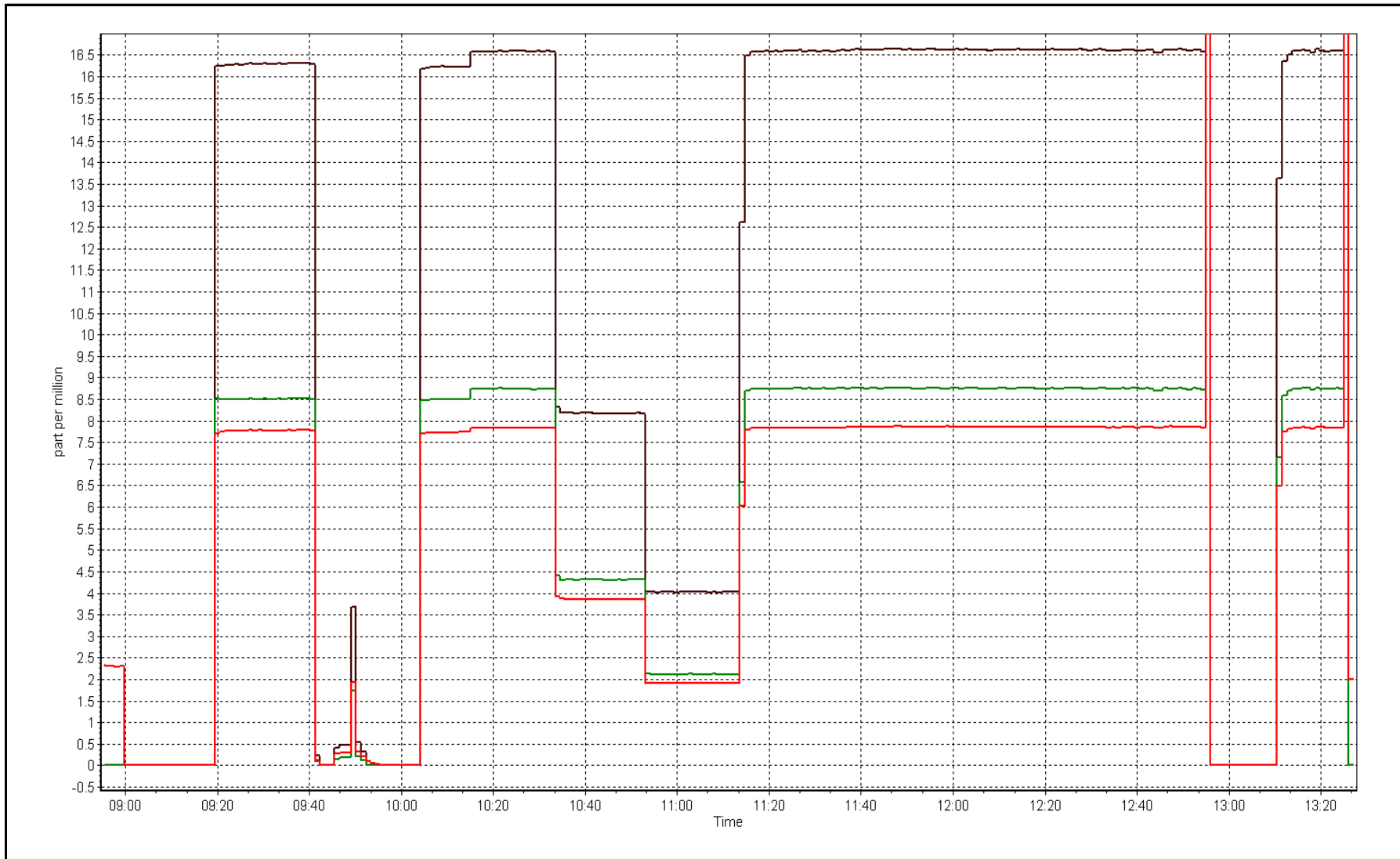
Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	8:55	End Time (MST)	13:25
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	0.999902
8.75	8.75	1.0002		
4.37	4.31	1.0139	Slope	0.998089
2.19	2.11	1.0336		
			Intercept	0.040430







Wood Buffalo Environmental Association THC / NMHC Calibration Report

version 02-2017

Station Information

Calibration Date	February 24, 2017	Last Calibration	February 16, 2017		
Station Name	Conklin Community	Station Number	AMS 21		
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Other:</td> <td>Cylinder Change</td> </tr> </table>			Other:	Cylinder Change
Other:	Cylinder Change				
Start Time (MST)	12:23	End Time (MST)	13:28		
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	2658		
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	0.998095	0.972739	Carrier Pressure	37.0	37.0
THC Calc intercept	0.068169	0.000000	Fuel Pressure	49.7	49.7
NMHC Calc slope	0.998089	0.970244	Air Pressure	34.3	34.3
NMHC Calc intercept	0.040430	0.000000			

Analyzer make	Thermo 55i	Analyzer serial #	1152430011
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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	17.05	0.973
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	16.59	17.05	0.973
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.973

Corrected As found	17.05	Previous response	16.55	% change	-2.9%
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Notes:

Changed out hydrogen and nitrogen cylinders after as founds. No adjustments made.

Calibration Performed By:	Asad Hidayat
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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	76.5	8.75	9.02	0.970
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	8.75	9.02	0.970
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.970

Corrected As found 9.02 Previous response 8.73 % change -3.2%

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	76.5	7.83	8.03	0.976
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	7.83	8.03	0.976
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.976

Corrected As found 8.03 Previous response 7.82 % change -2.6%



Wood Buffalo Environmental Association

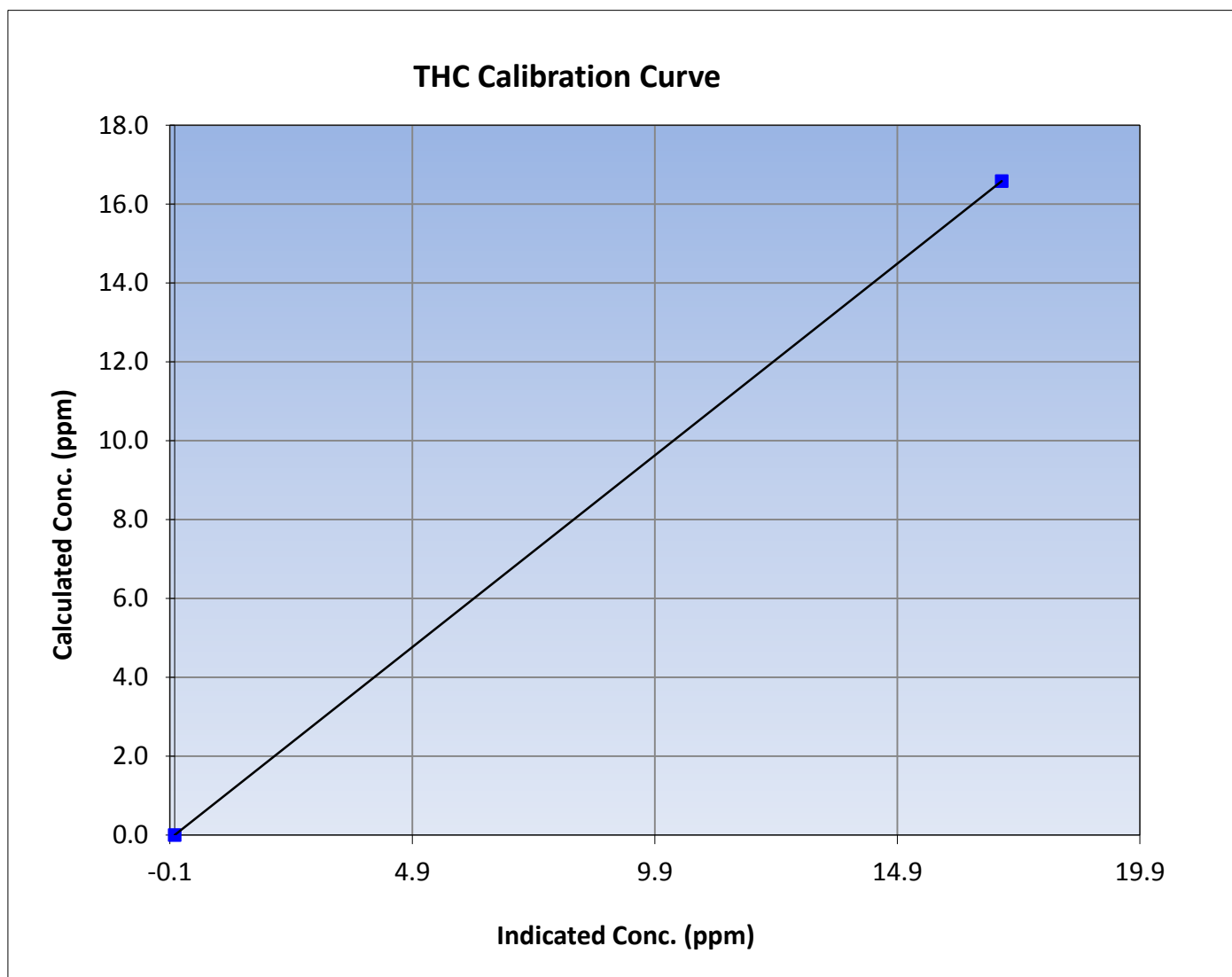
THC Calibration Summary

Station Information

Calibration Date	February 24, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:23	End Time (MST)	13:28
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	1.000000
16.59	17.05	0.9727		
			Slope	0.972739
			Intercept	0.000000





Wood Buffalo Environmental Association

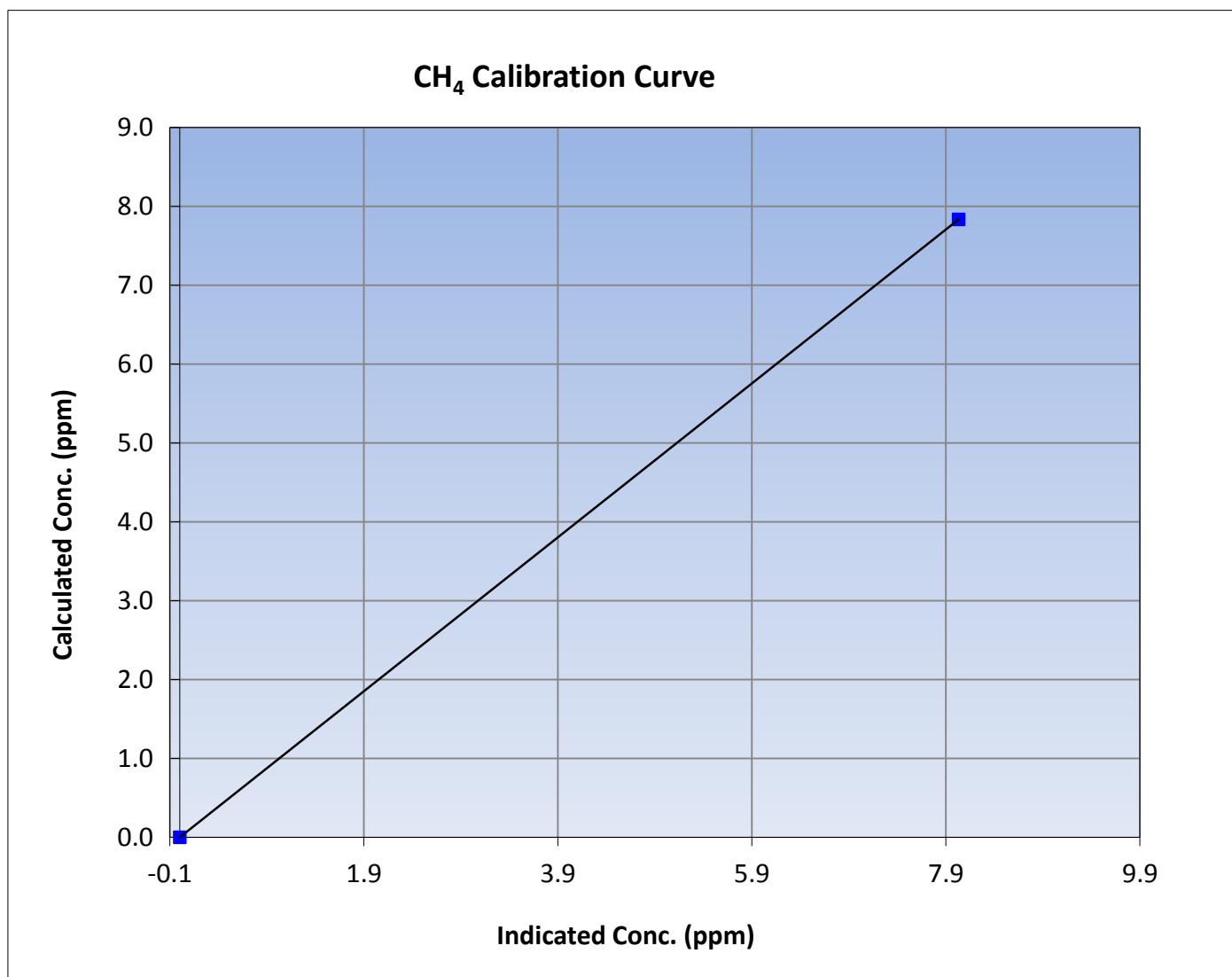
CH₄ Calibration Summary

Station Information

Calibration Date	February 24, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:23	End Time (MST)	13:28
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	1.000000
7.83	8.03	0.9755		
			Slope	0.975542
			Intercept	0.000000





Wood Buffalo Environmental Association

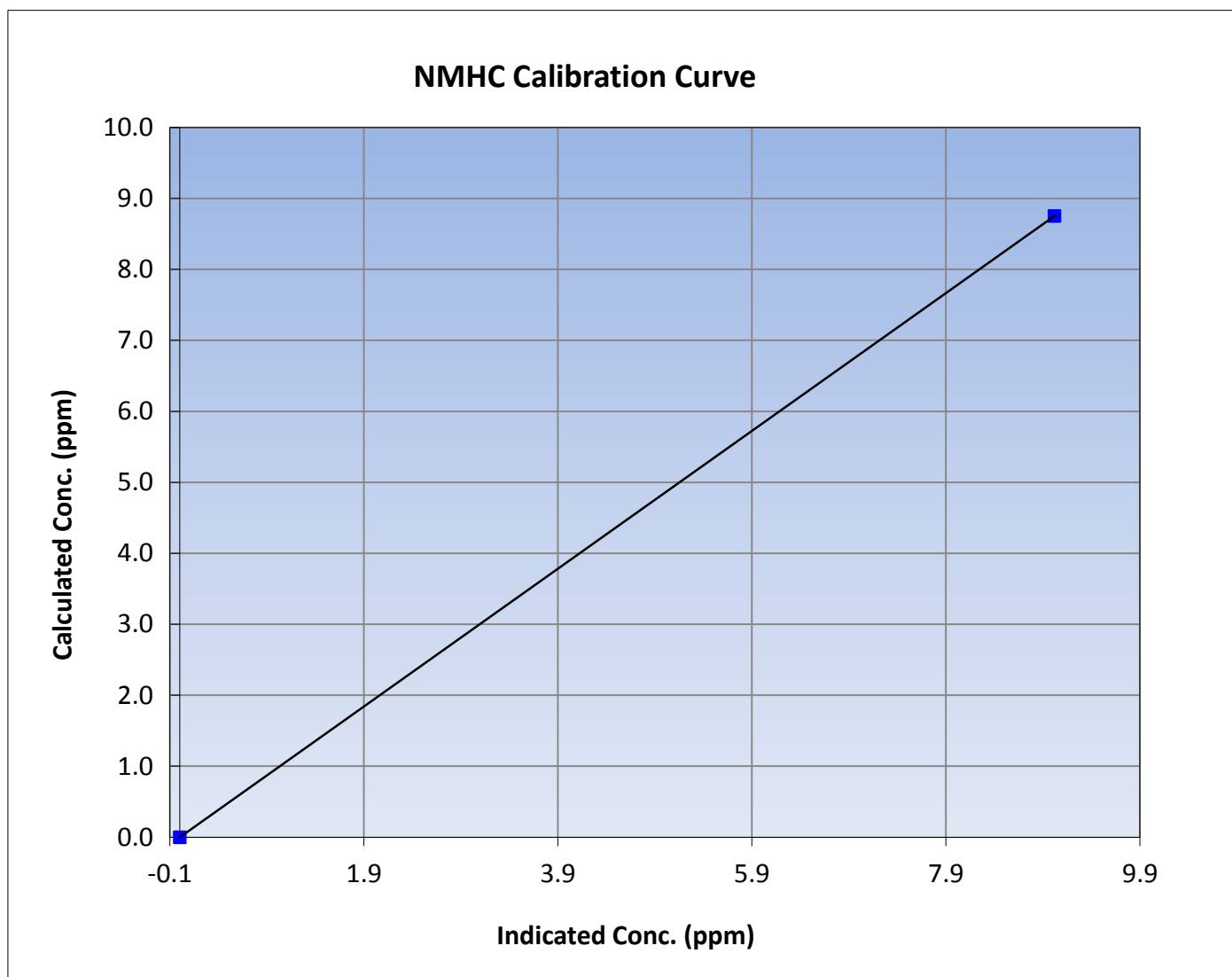
NMHC Calibration Summary

Station Information

Calibration Date	February 24, 2017	Previous Calibration	February 16, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:23	End Time (MST)	13:28
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

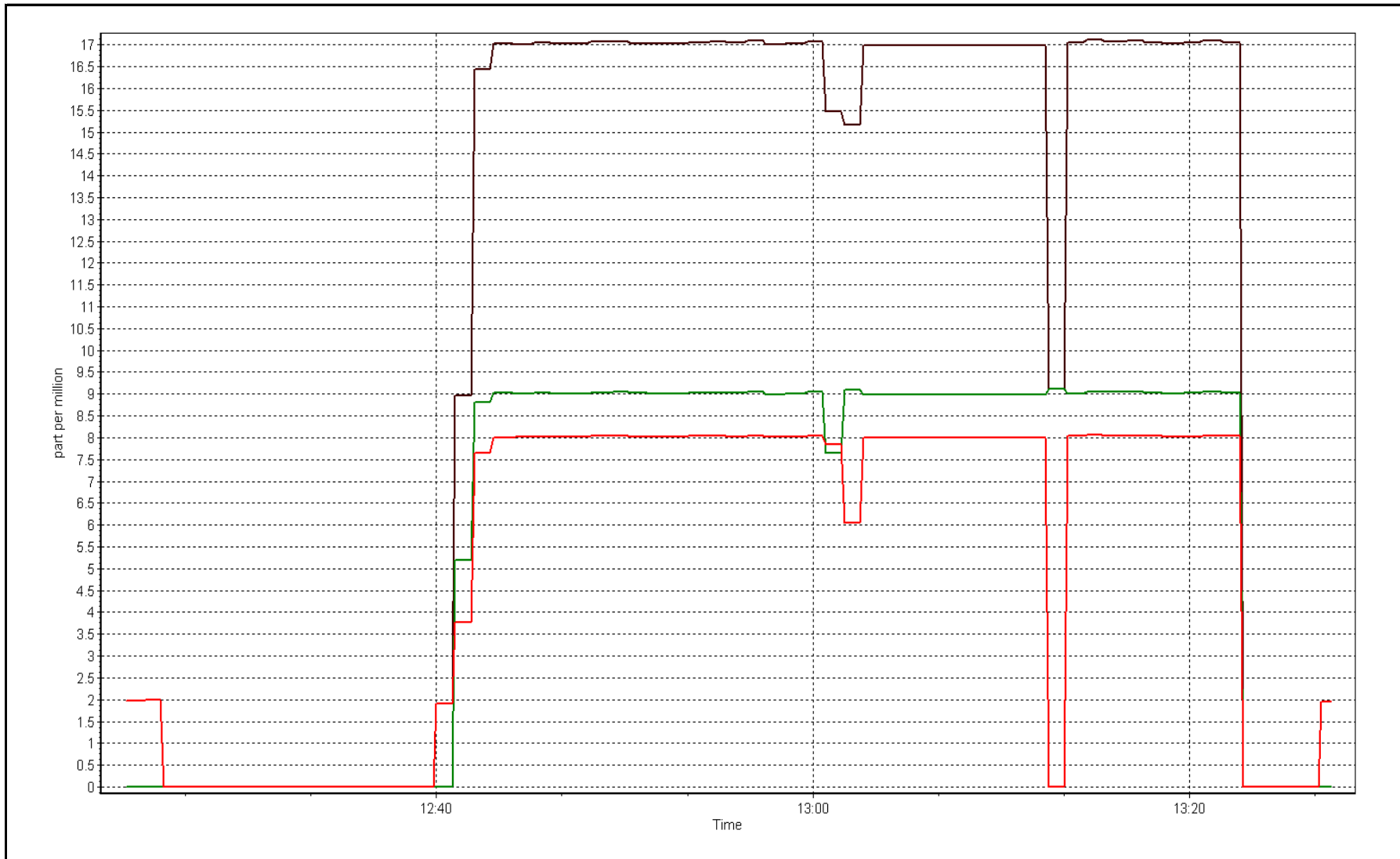
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
8.75	9.02	0.9702		
			Slope	0.970244
			Intercept	0.000000



THC Calibration Plot

Date: February 24, 2017

Site: AMS 21





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 9, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	12:02	End Time (MST)	14:40
NO2 GPT Ref date		Transfer Standard	Calibrator Photometer
Calibrator Make/Model	Teledyne API 700	Station temp.	21 Deg C
ZAG make/model	Teledyne API 701	Serial Number	2658
DACS make/model	Campbell Scientific CR3000	Serial Number	5611
		Serial Number	9628

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.4	26.3
Analyzer IP address	192.168.1.49		Lamp temp.	53.4	53.4
Calculated slope	0.994530	1.000256	Pressure	645.2	635.3
Calculated intercept	0.487031	-0.758571	Flow cell A	0.733	0.725
Analyzer Background	-1.3	-1.4	Flow cell B	0.726	0.715
Analyzer Coefficient	1.026	1.029	Cell A Intensity	70951	70671
			Cell B Intensity	68249	67665

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	800.00	0.0	0.0	----
as found span	5000	1038.00	300.0	299.4	1.002
calibrator zero	5000	800.00	0.0	0.0	----
high point	5000	1038.00	300.0	300.1	1.000
second point	5000	914.90	200.0	201.2	0.994
third point	5000	786.20	100.0	101.7	0.983
as left zero	6000	800.00	0.0	0.4	----
as left span	5000	569.10/1001.8	300.0	300.9	0.997
Average Correction Factor					0.992

Corrected As found	299.4	Previous response	301.2	% change	0.6%
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Notes:

New API T700 with a bench photometer was installed prior to the calibration. Sample inlet filter replaced after as founds. Adjusted span to proper concentration on the analyzer.

Calibration Performed By: Asad Hidayat



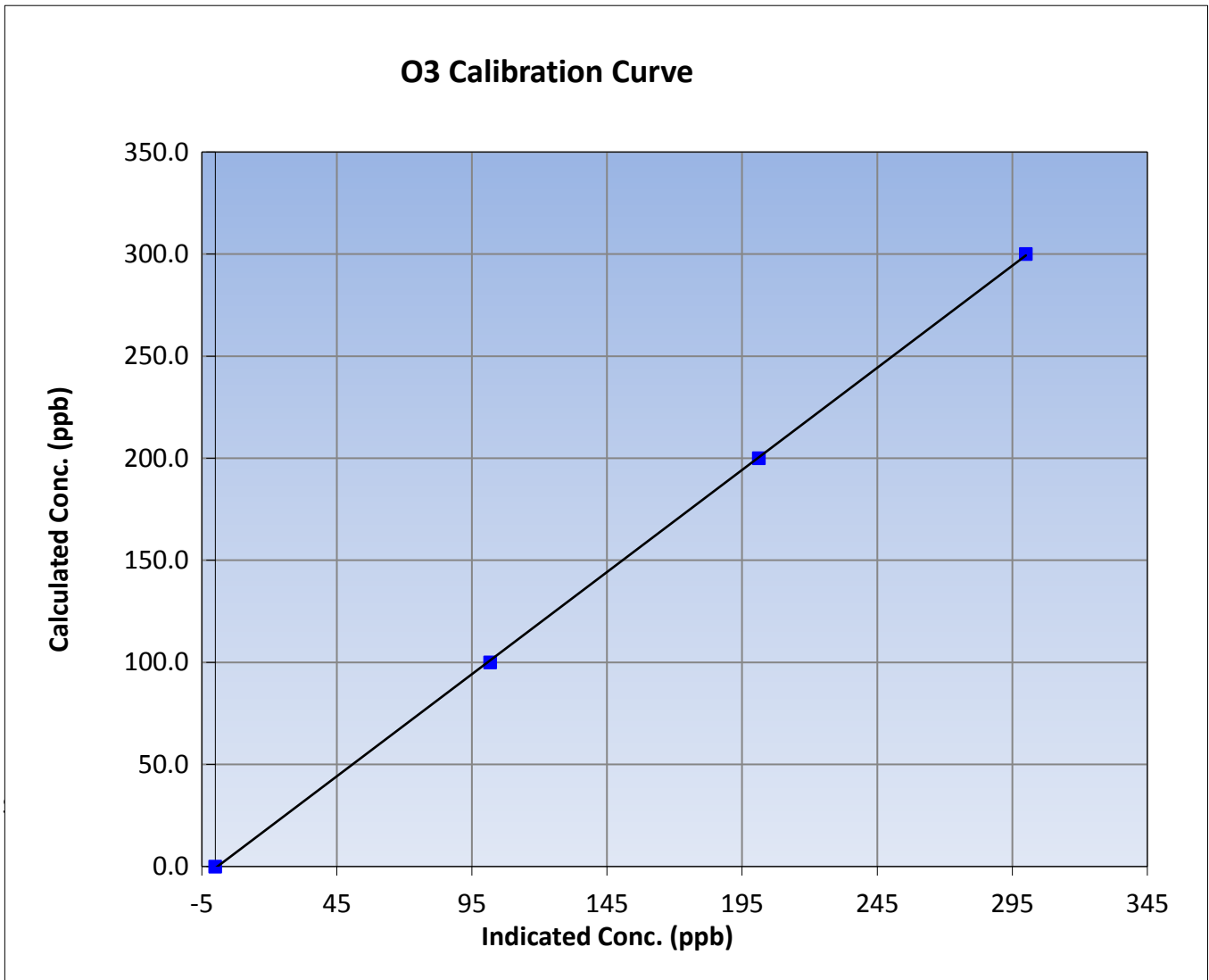
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February 09, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:02	End Time (MST)	14:40
Analyzer make	Thermo 49i	Analyzer serial #	1501663734

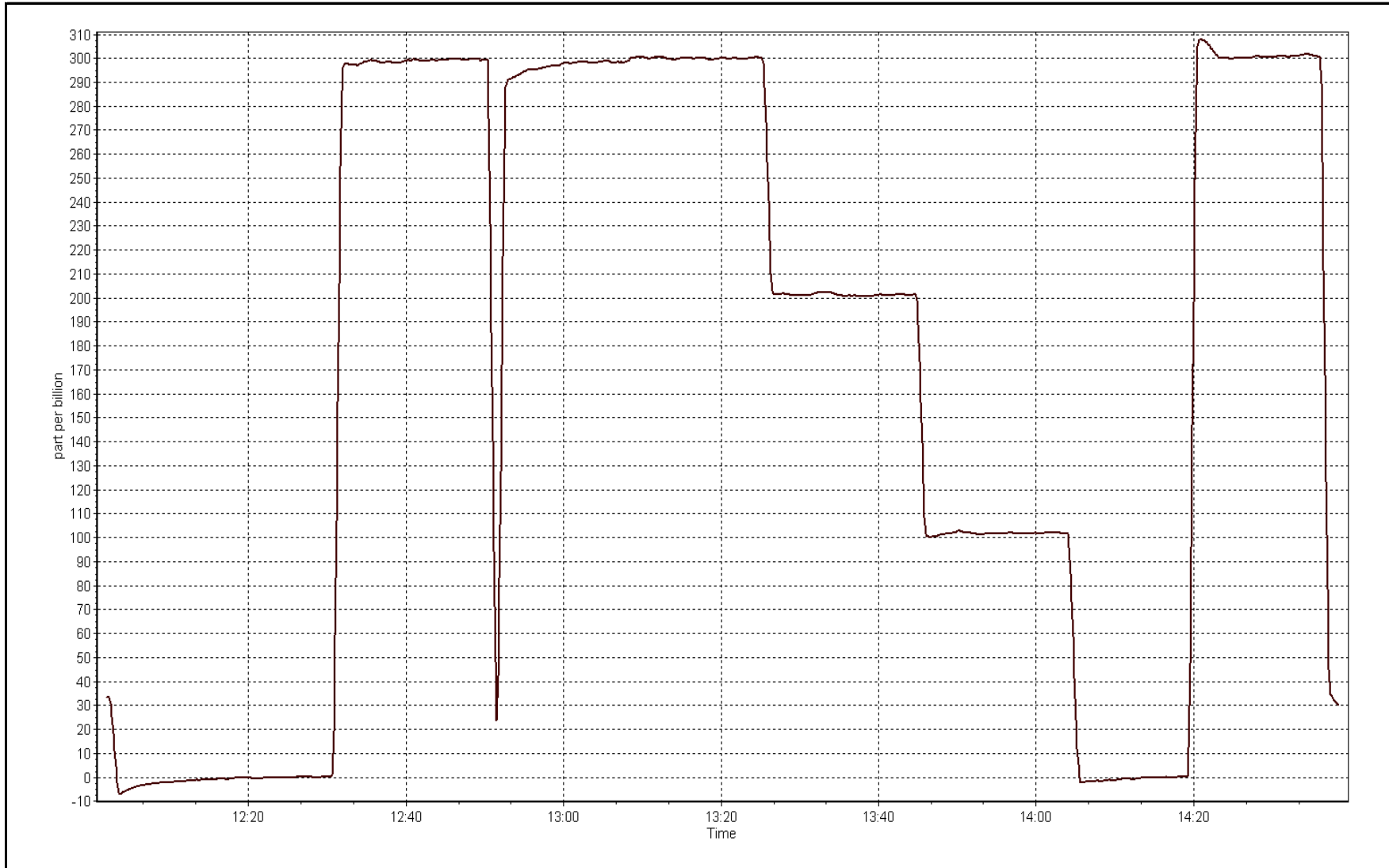
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999956
300.0	300.1	0.9998		
200.0	201.2	0.9943	Slope	1.000256
100.0	101.7	0.9831		
			Intercept	-0.758571



O3 Calibration Plot

Date: February 9, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	13:25
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	2658
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	0.998453	0.997524	1.002144
	Data Offset	-0.370305	0.063428	0.948734
Current Calibration	Data Slope	0.998275	0.997863	1.002598
	Data Offset	1.366985	1.732972	-0.210507

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	1.376		1.418	
NOX coefficient	0.997		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.9		9.2	
NOX bkgrnd	9.0		9.3	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	322.9	Deg C	327.4	Deg C
PMT voltage	-840.6	V	-840.6	V
PMT Temp	-2.9	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.5	mmHg	156.6	mmHg
R Cell Press Nox	160.5	mmHg	156.6	mmHg
NO sample flow	0.697	lpm	0.681	lpm
Nox sample Flow	0.698	lpm	0.682	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 16, 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	-0.2	-0.1	0.0	----	----
as found span	5000	76.5	801.7	801.7	0.0	772.9	772.8	0.2	1.0372	1.0375
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	----	----
high point	5000	76.5	801.7	801.7	0.0	801.7	801.8	-0.1	1.0000	0.9999
second point	5000	38.2	400.3	400.3	0.0	401.0	400.7	0.3	0.9984	0.9991
third point	5000	19.1	200.2	200.2	0.0	196.7	195.9	0.7	1.0178	1.0216
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
as left span	5000	76.5	801.7	408.8	393.0	800.1	404.8	395.4	1.0020	1.0099
Average Correction Factor									1.0054	1.0069

Corrected As found NO_x= 773.1 NO= 772.9 Percent Change NO_x= 3.9% NO= 4.0%
 Previous Response NO_x= 803.3 NO= 803.6

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	803.1	802.1	0.0	0.9983	0.9996	----	----
1st NO2 (400)	408.8	393.3	801.1	408.8	392.3	1.0007	----	1.0025	99.8%
2nd NO2 (200)	596.6	205.5	802.0	596.6	205.4	0.9997	----	1.0004	100.0%
3rd NO2 (100)	698.5	103.6	802.1	698.5	103.7	0.9995	----	0.9991	100.1%
2nd NO ref point		0.0	803.0	799.7	2.3	0.9984	1.0025	----	----
Average Correction Factor						0.9996		1.0007	99.9%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

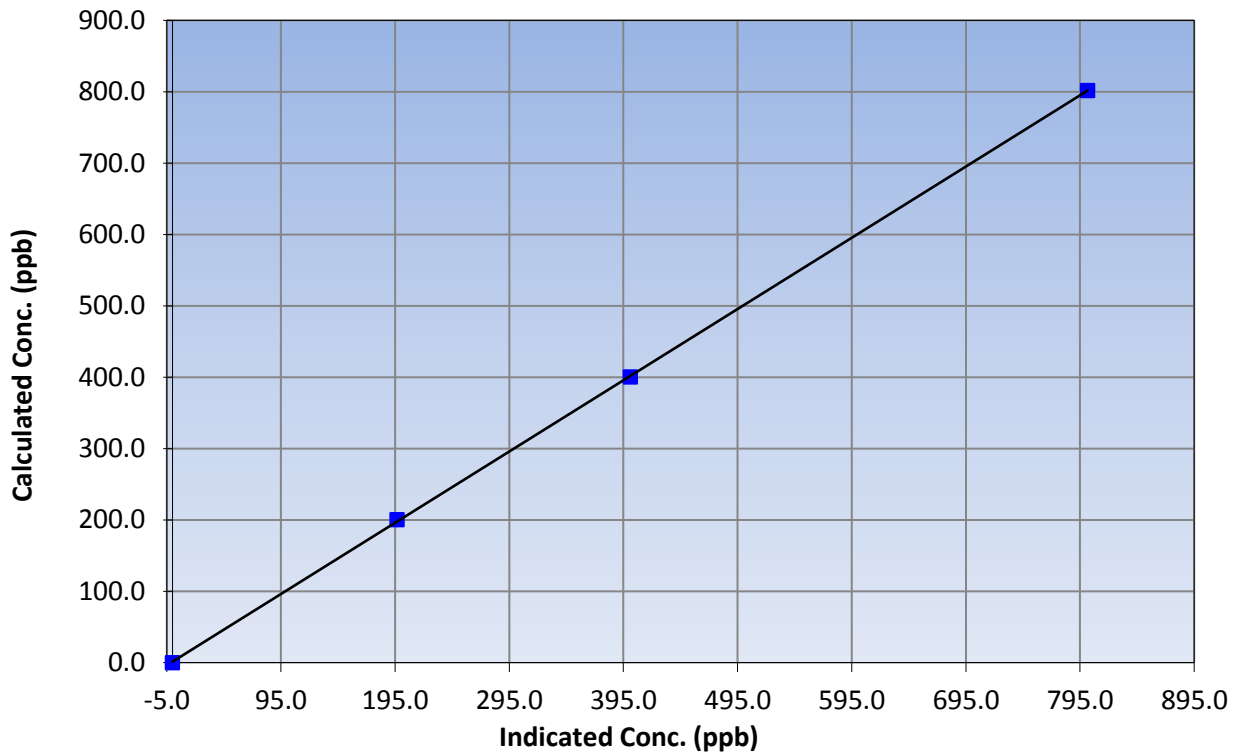
Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	8:55	End Time (MST)	13:25
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	----	Correlation Coefficient	0.999973
801.7	801.7	1.0000		
400.3	401.0	0.9984	Slope	0.998275
200.2	196.7	1.0178		
			Intercept	1.366985

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

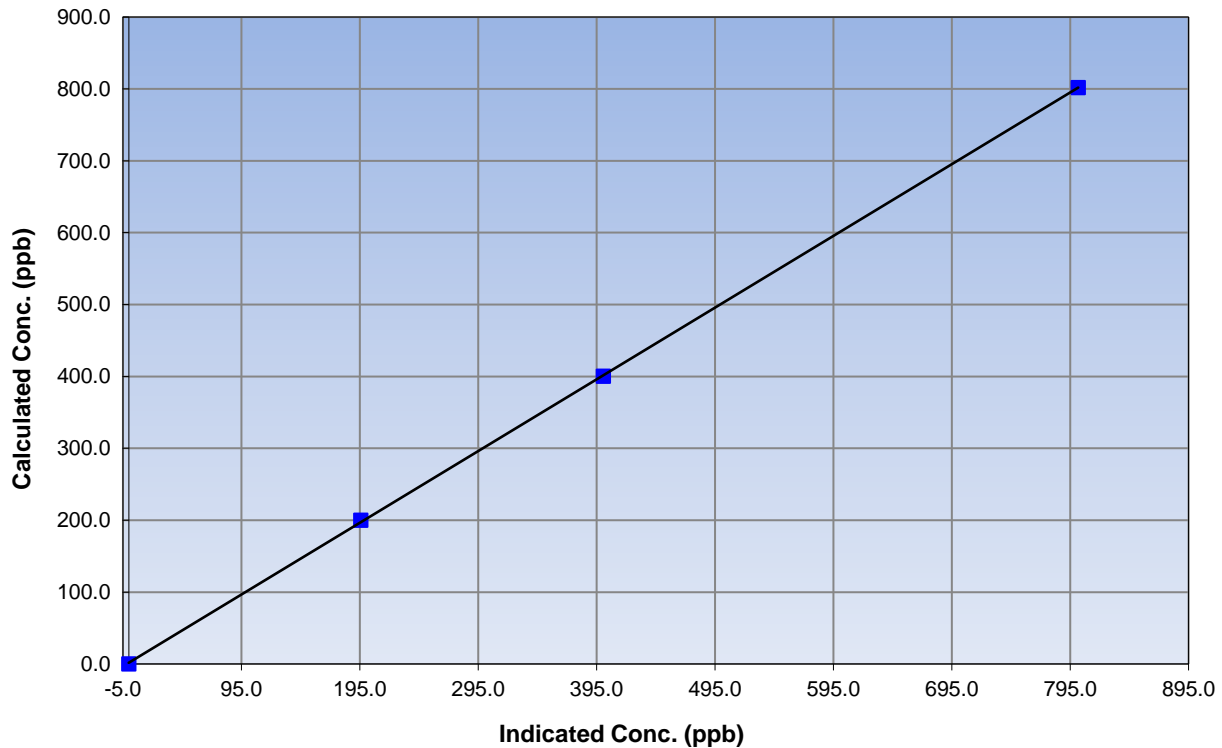
Station Information

Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	8:55	End Time (MST)	13:25
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	0.999964
801.7	801.8	0.9999		
400.3	400.7	0.9991	Slope	0.997863
200.2	195.9	1.0216		
			Intercept	1.732972

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

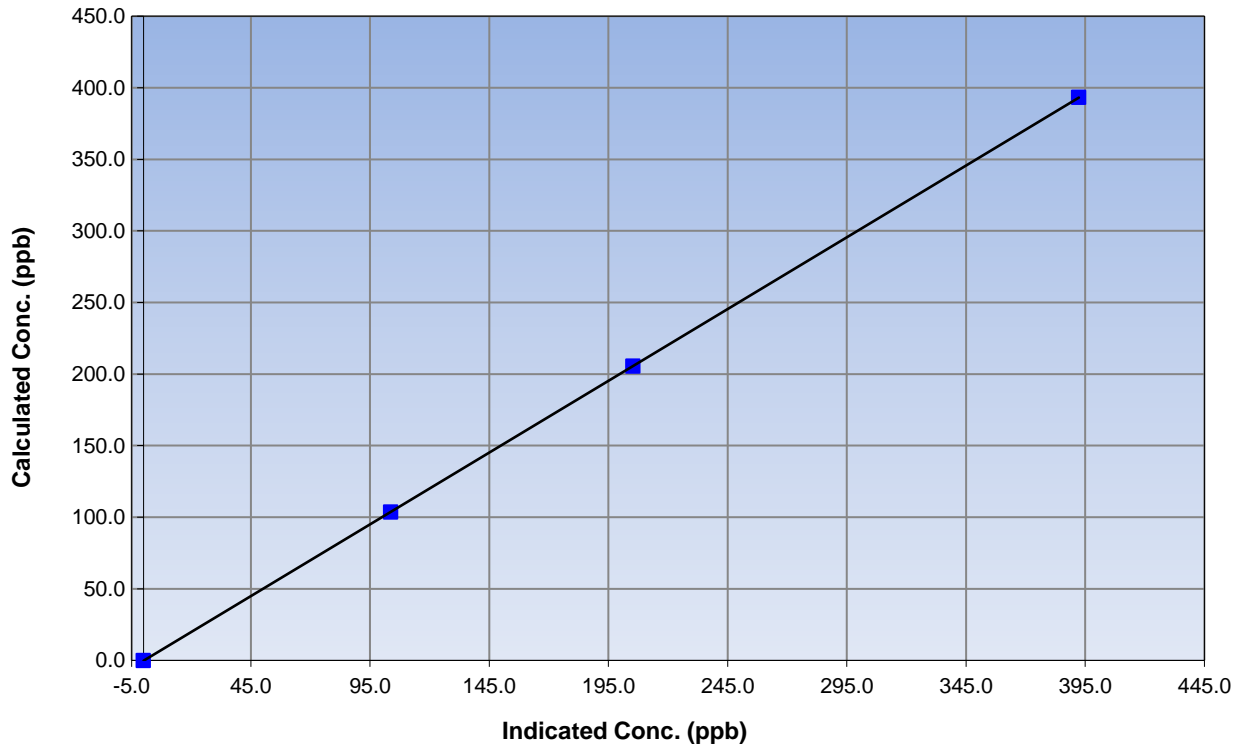
Station Information

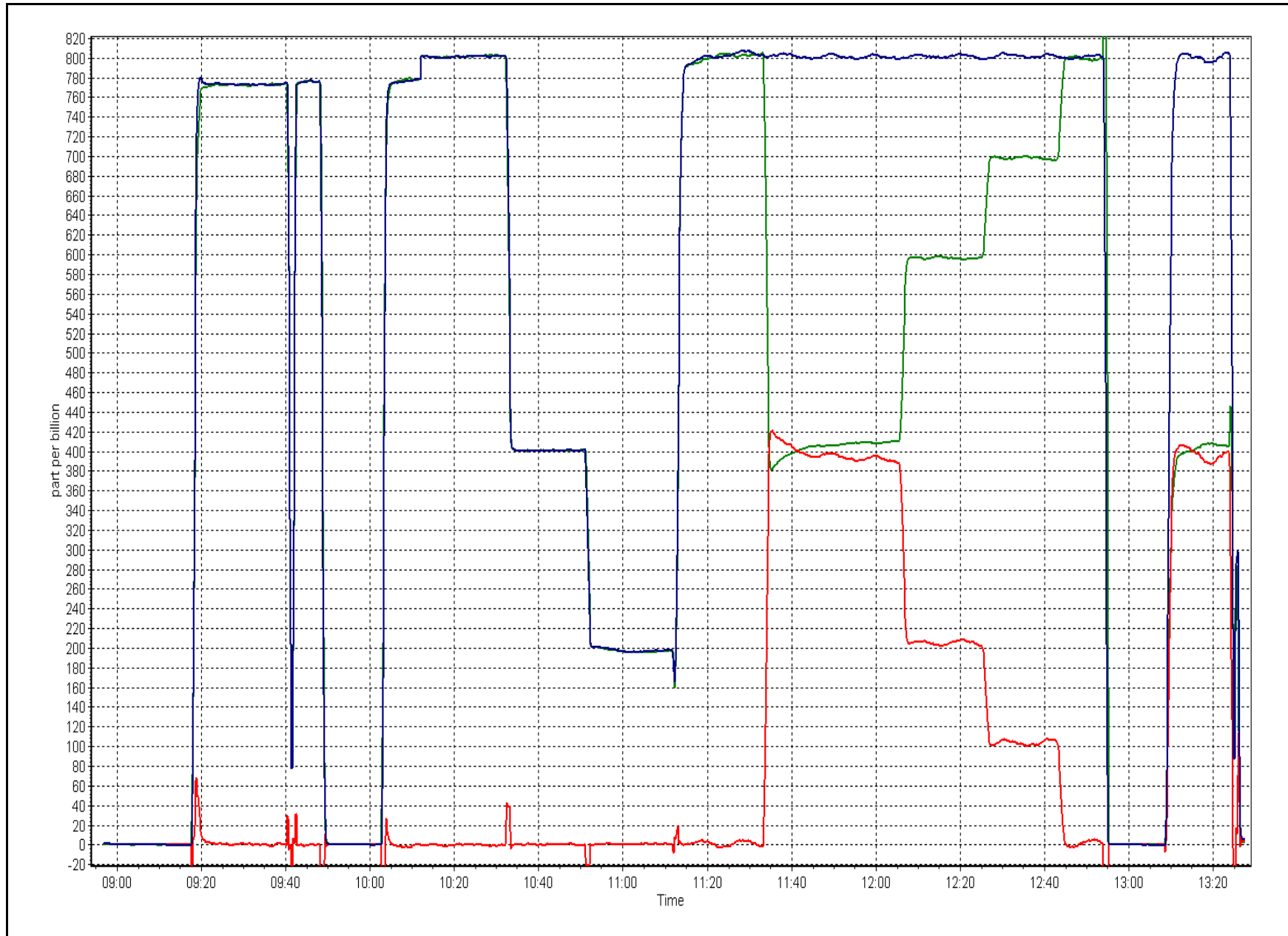
Calibration Date	February 16, 2017	Previous Calibration	January 10, 2017
Station Number	Conklin Community	Station Number	AMS 21
Start Time (MST)	8:55	End Time (MST)	13:25
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
393.3	392.3	1.0025		
205.5	205.4	1.0004	Slope	1.002598
103.6	103.7	0.9991		
			Intercept	-0.210507

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:	February 16, 2017	Last Cal Date:	January 12, 2017
Start time (MST):	12:25	End time (MST):	14:00
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)	11	11.6	11	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	918	917.6	918	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1018	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.5	-----	-0.5	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				<u>Tolerance</u>
Leak Test:	Date of check:	<u>February 16, 2017</u>	Last Cal Date:	<u>October 12, 2016</u>
	Flow w/o adaptor:	<u>16.96</u>	Flow w/ adaptor:	<u>16.86</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)	21		21	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	22		22	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	23		23	<input type="checkbox"/>	+/- 2 °C
RH (%)	22		22	<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. No adjustments made. Adjusted neph zero multiple times, kept going down to -0.4 to -0.7. Quarterly leak check completed; passed.

Calibration by: Asad Hidayat



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 22
JANVIER
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
 FEBRUARY 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	639	33	33	100	3	0	1	0
TRS(ppb) Average	640	32	32	100	0	0	0	0
THC(ppm) Average	634	36	38	99.7	2.2	-	2	-
NMHC(ppm) Average	634	36	38	99.7	0.025	-	0.001	-
CH4(ppm) Average	634	36	38	99.7	2.2	-	2	-
O3 (ppb) Average	638	32	34	99.7	52	0	50	-
NO2 (ppb) Average	636	36	36	100	15	0	5	-
NO (ppb) Average	636	36	36	100	6	-	2	-
NOX (ppb) Average	636	36	36	100	19	-	7	-
PM2.5 (ug/m3) Average	602	3	70	90.03	36.2	-	6.4	0
Wind Speed 10 m (km/h) Average	672	0	0	100	19	-	14	-
Wind Direction 10 m (deg) Average	672	0	0	100	-	-	-	-
Temperature 2 m (C) Average	672	0	0	100	13.9	-	6.7	-
Relative Humidity (%) Average	672	0	0	100	98	-	90.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
 FEBRUARY 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	639	0.3	0	-	0	0	0	0	0	1	3
TRS (ppb) Average	640	0.2	0	-	0	0	0	0	0	0	0
THC (ppm) Average	634	1.94	0	-	1.9	1.9	1.9	1.9	2	2	2.2
NMHC(ppm) Average	634	0	0.002	-	0	0	0	0	0	0	0.025
CH4(ppm) Average	634	1.94	0	-	1.9	1.9	1.9	1.9	2	2	2.2
O3 (ppb) Average	638	37.6	7	-	11	29	34	38	42	47	52
NO2 (ppb) Average	636	2.4	2	-	0	1	1	2	3	5	15
NO (ppb) Average	636	0.4	1	-	0	0	0	0	0	1	6
NOX (ppb) Average	636	2.8	2	-	0	1	1	2	4	6	19
PM2.5 (ug/m3) Average	602	3.35	3	-	0.1	0.9	1.7	2.7	4.1	6.4	36.2
Wind Speed 10 m (km/h) Average	672	6.2	4	-	0	2	3	6	9	11	19
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	672	-9.62	10.2	-	-32.3	-21.8	-17.8	-11.6	-1.2	4	13.9
Relative Humidity (%) Average	672	69	15	-	29	48	59	73	80	84	98

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	15 Feb 2017 12:00	15 Feb 2017 13:00	2	Maintenance - replaced carrier gas
O3	06 Feb 2017 15:00	06 Feb 2017 16:00	2	Maintenance - WBEA audit
PM2.5	04 Feb 2017 06:00	04 Feb 2017 13:00	8	Analyzer Failure - sample pump failure
PM2.6	10 Feb 2017 20:00	10 Feb 2017 20:00	1	Unstable operation - excessive baseline drift
PM2.7	11 Feb 2017 10:00	11 Feb 2017 12:00	3	Unstable operation - excessive baseline drift
PM2.8	11 Feb 2017 14:00	11 Feb 2017 18:00	5	Unstable operation - excessive baseline drift
PM2.9	11 Feb 2017 21:00	12 Feb 2017 06:00	10	Unstable operation - excessive baseline drift
PM2.10	12 Feb 2017 12:00	12 Feb 2017 12:00	1	Unstable operation - excessive baseline drift
PM2.11	12 Feb 2017 14:00	13 Feb 2017 11:00	22	Unstable operation - excessive baseline drift
PM2.12	13 Feb 2017 23:00	13 Feb 2017 23:00	1	Unstable operation - excessive baseline drift
PM2.13	14 Feb 2017 01:00	14 Feb 2017 02:00	2	Unstable operation - excessive baseline drift
PM2.14	14 Feb 2017 05:00	14 Feb 2017 07:00	3	Unstable operation - excessive baseline drift
PM2.15	14 Feb 2017 11:00	14 Feb 2017 14:00	4	Unstable operation - excessive baseline drift
PM2.16	16 Feb 2017 02:00	16 Feb 2017 03:00	2	Unstable operation - excessive baseline drift
PM2.17	17 Feb 2017 08:00	17 Feb 2017 12:00	5	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

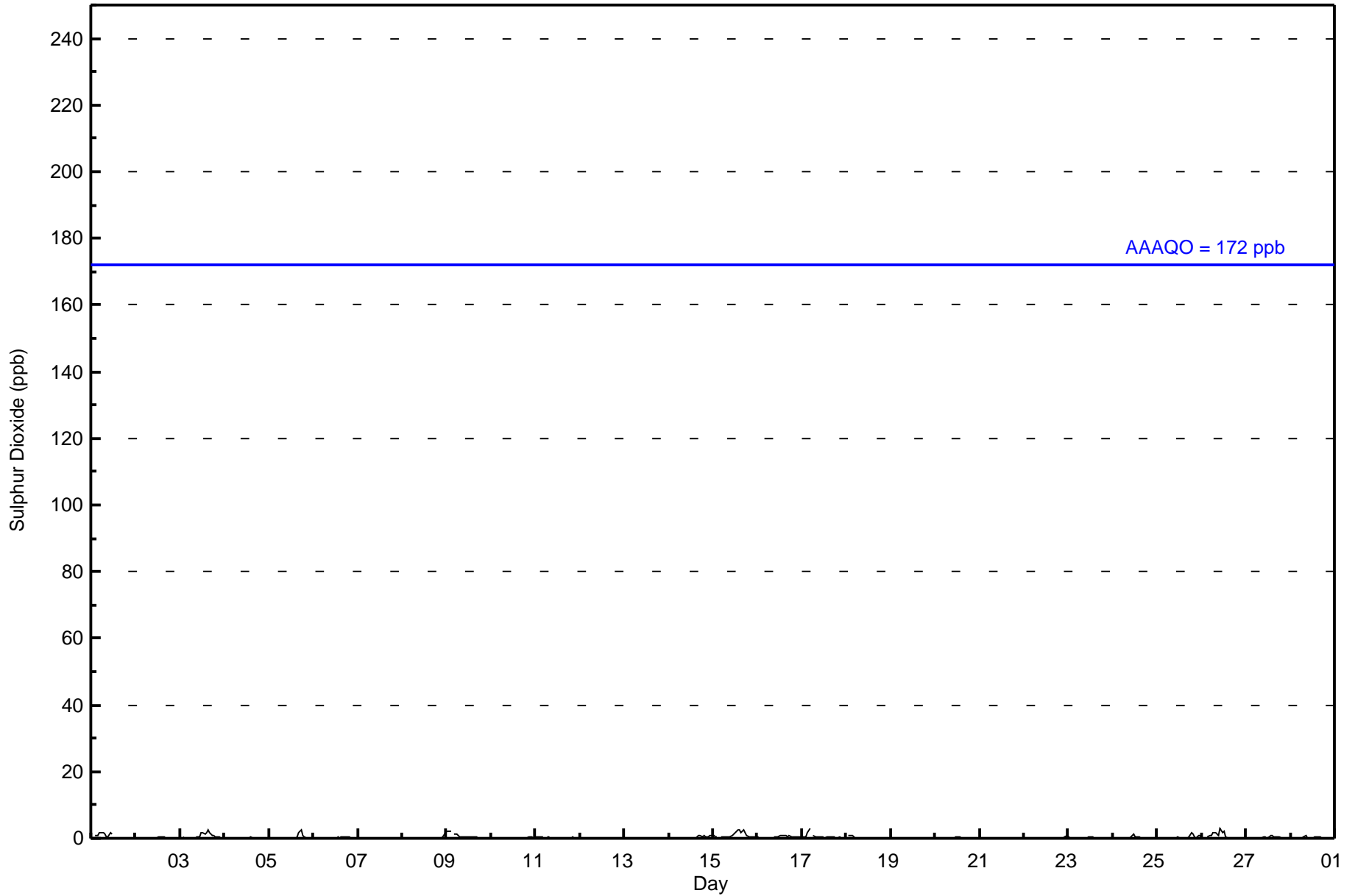
Janvier - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Feb 17 05:00 Maximum Daily Average: 0.9 ppb on Feb 15												Hours in Service: 672 Hours of Data: 639														
Minimum Value: 0 ppb on Feb 5 00:00 Minimum Daily Average: 0.0 ppb on Feb 21 Maximum Diurnal Average: 0.4 ppb at hour 5 Minimum Diurnal Average: 0.1 ppb at hour 22 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												Hours of Missing Data: 33 Hours of Calibration: 33 Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	1	1	2	2	2	1	0	1	2	1	C	C	C	C	C	0	0	0	0	0	0	0	0.7	2
2-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	1	2	2	1	2	2	2	1	1	1	0	0	0	0	0.7	2
4-Feb	0	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
5-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0	0.3	3	
6-Feb	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
7-Feb	0	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-Feb	0	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	2
9-Feb	2	2	2	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
10-Feb	0	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
11-Feb	0	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Feb	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
13-Feb	0	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
14-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.3	1
15-Feb	1	1	1	Z	0	0	0	0	0	1	1	1	2	2	2	2	2	2	1	0	0	0	0	0	0.9	2
16-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1
17-Feb	0	0	1	2	3	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
18-Feb	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
19-Feb	0	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
20-Feb	0	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
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1
23-Feb	0	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-Feb	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	1	1	0.3	2
26-Feb	0	0	Z	0	1	1	2	1	1	1	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0.6	3
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.2	1
28-Feb	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
0.2 0.2 0.3 0.2 0.4 0.2 0.3 0.2 0.2 0.2 0.3 0.4 0.4 0.3 0.3 0.3 0.4 0.3 0.3 0.2 0.2 0.1 0.2 0.2																								Diurnal Average		
2 2 2 2 3 2 2 1 1 1 3 2 2 2 2 2 2 3 2 1 1 1 1 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
Janvier - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Janvier - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Janvier - February 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	44	83	28	8	4	9	19	18	59	125	69	56	65	26	14	12	639
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	44	83	28	8	4	9	19	18	59	125	69	56	65	26	14	12	639

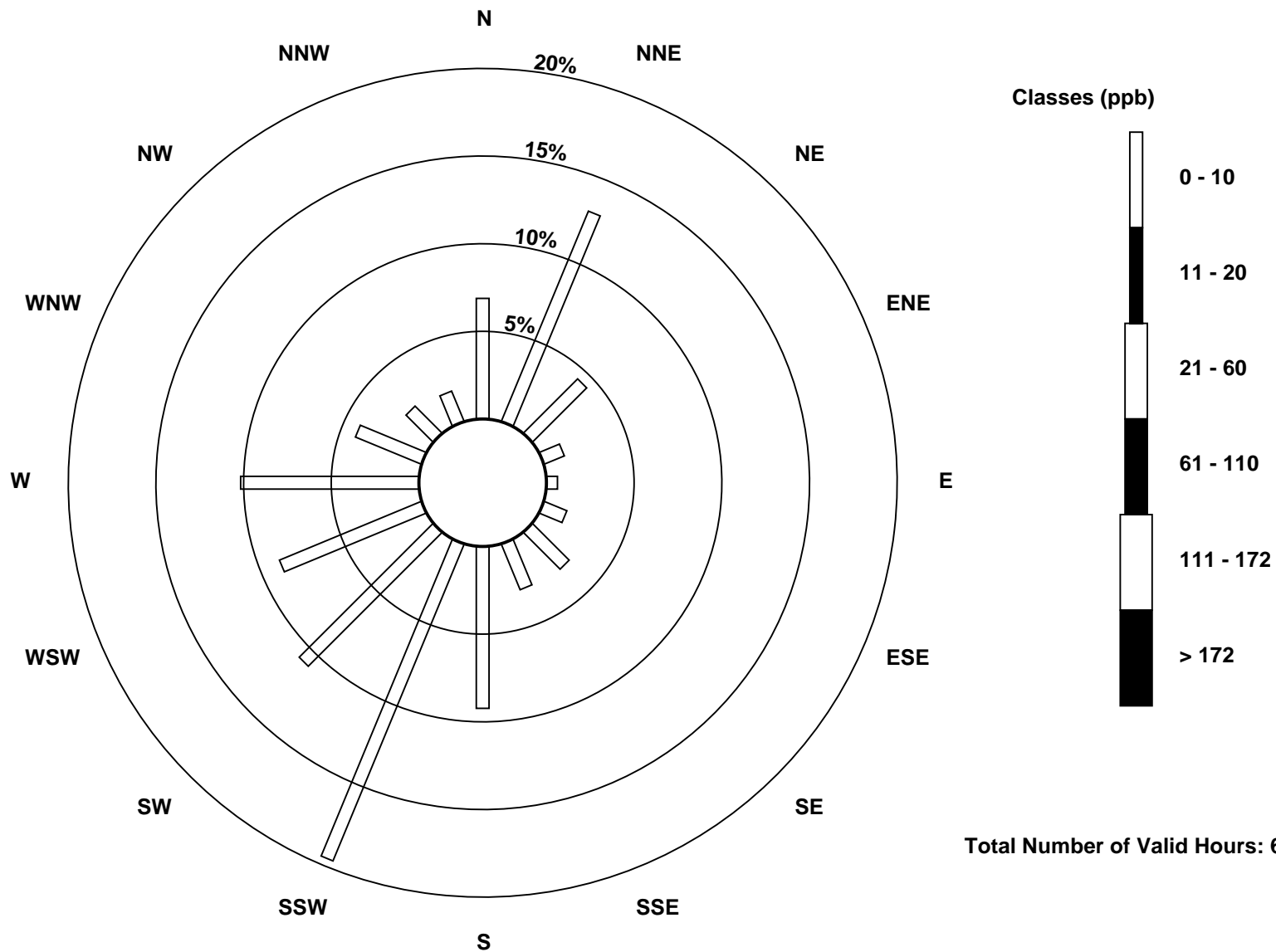
Total Number of Valid Hours: 639

Total Number of Hours: 672

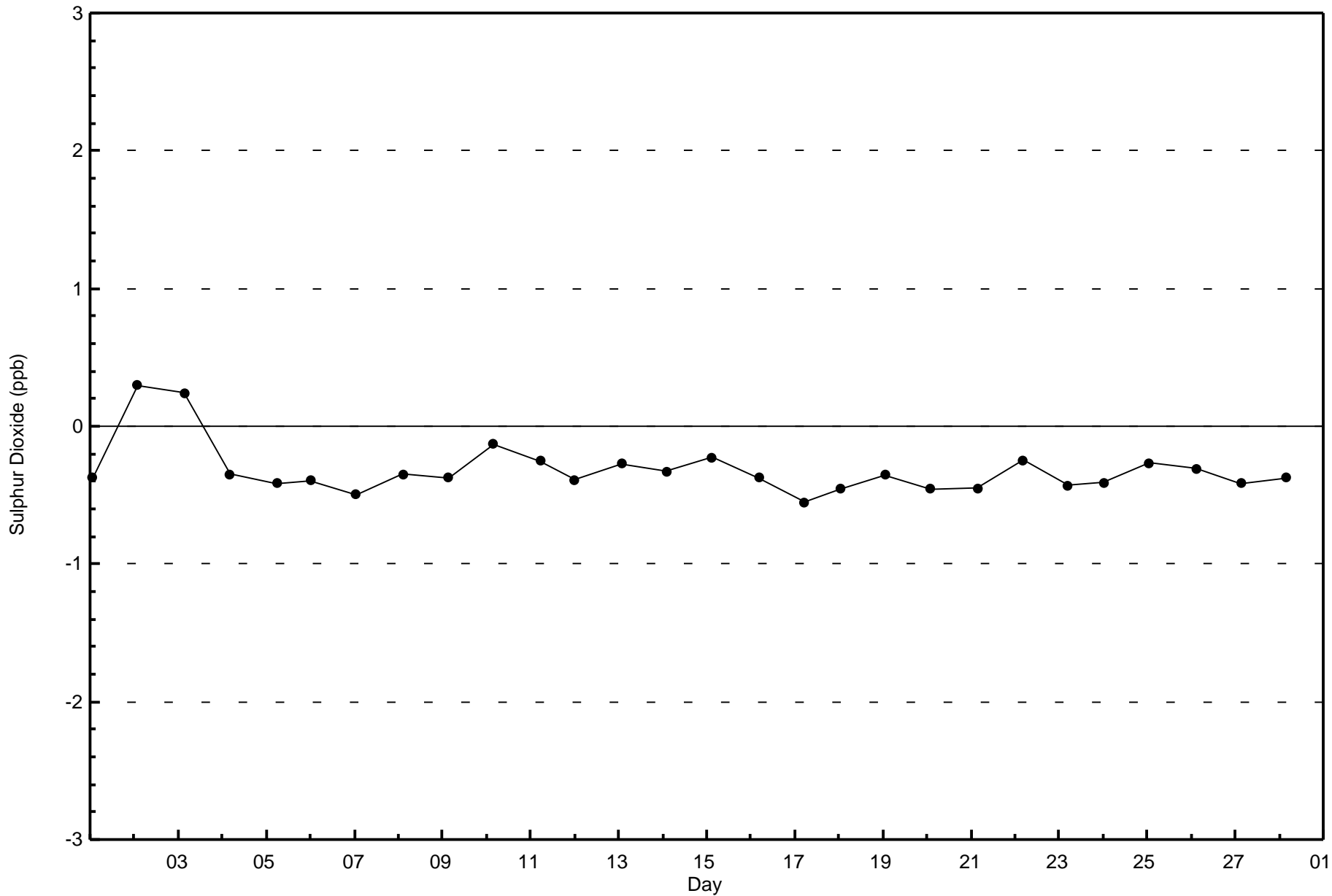


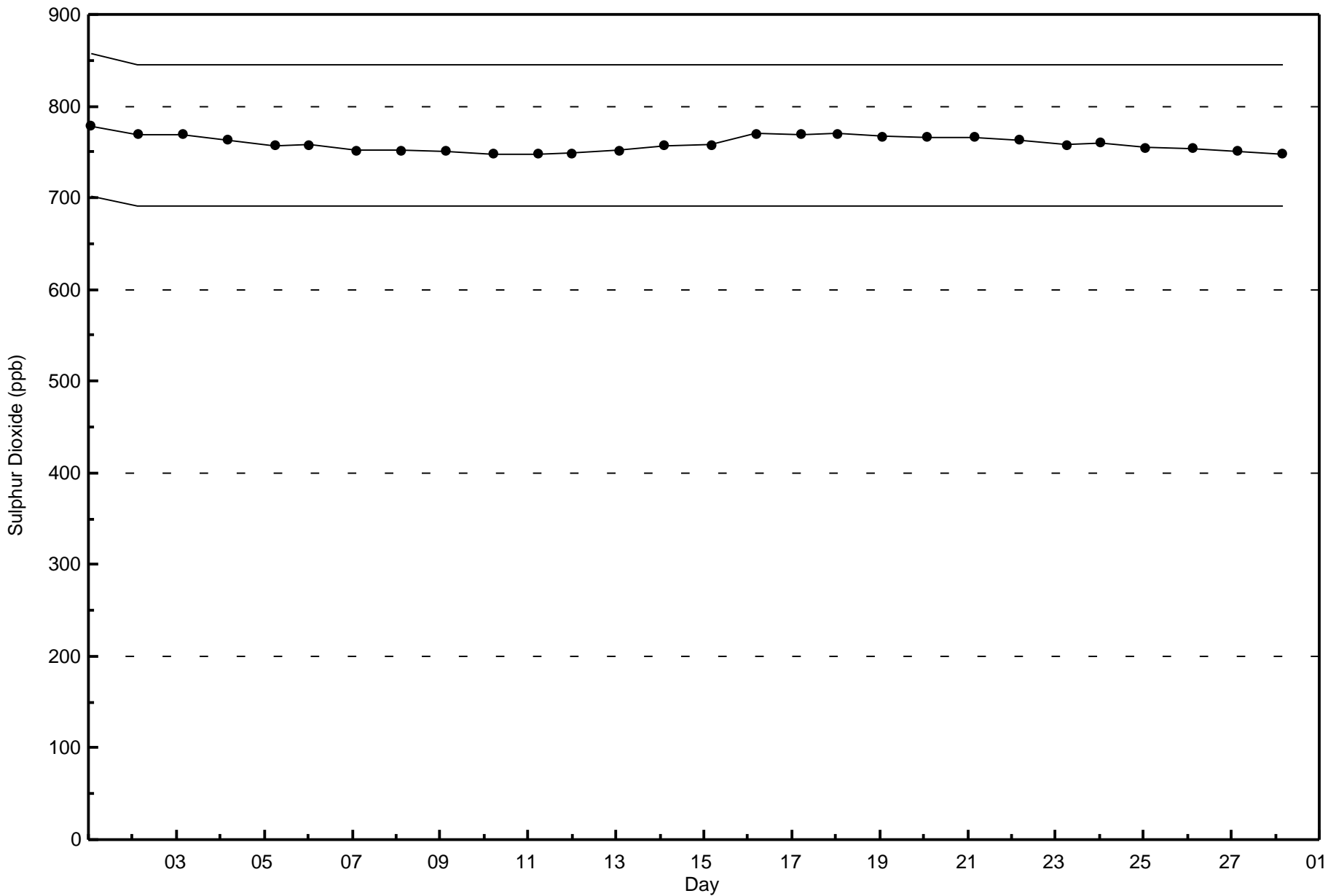
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Sulphur Dioxide (SO₂) - ppb
Janvier (AMS 22)



Total Number of Valid Hours: 639





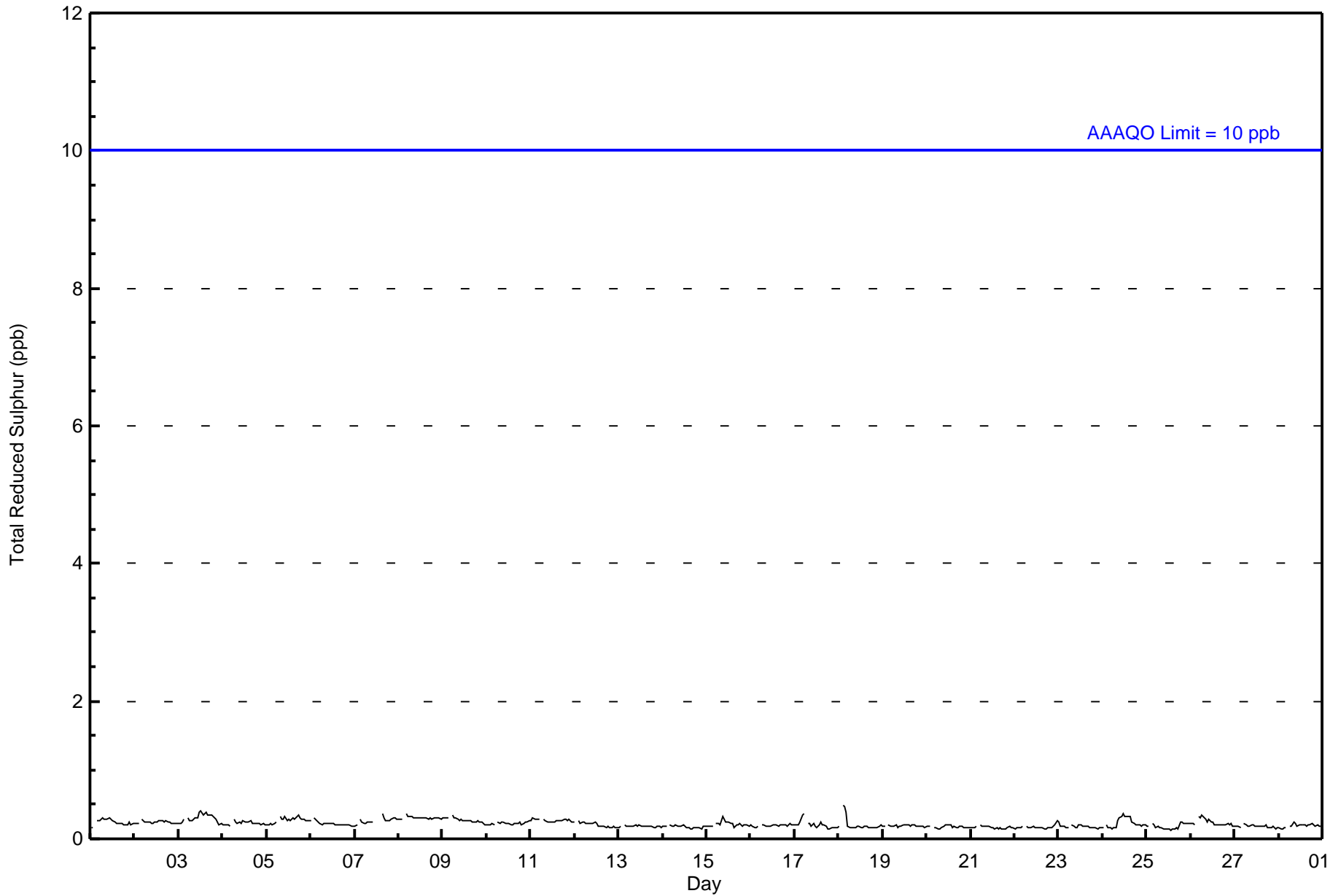


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672										Daily	Daily						
Maximum Value: 0 ppb on Feb 18 03:00										Maximum Daily Average: 0.3 ppb on Feb 8										Hours of Data: 640	Average	Maximum					
Minimum Value: 0 ppb on Feb 25 14:00										Minimum Daily Average: 0.2 ppb on Feb 21										Hours of Missing Data: 32							
Maximum Diurnal Average: 0.2 ppb at hour 6										Minimum Diurnal Average: 0.2 ppb at hour 24										Hours of Calibration: 32							
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: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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
4-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Feb	0	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
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Feb	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	0.3	0
9-Feb	0	0	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
10-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Feb	0	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
13-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Feb	0	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
19-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Feb	0	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
25-Feb	0	0	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
26-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
	0.2																								Diurnal Average		
	0																								Diurnal Maximum		
Z - zerospan	C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO):	1-hr 10 ppb	24-hr 3 ppb																									



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Janvier - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	640	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Janvier - February 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	44	83	28	9	3	10	19	17	58	126	66	54	64	29	15	15	640
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	44	83	28	9	3	10	19	17	58	126	66	54	64	29	15	15	640

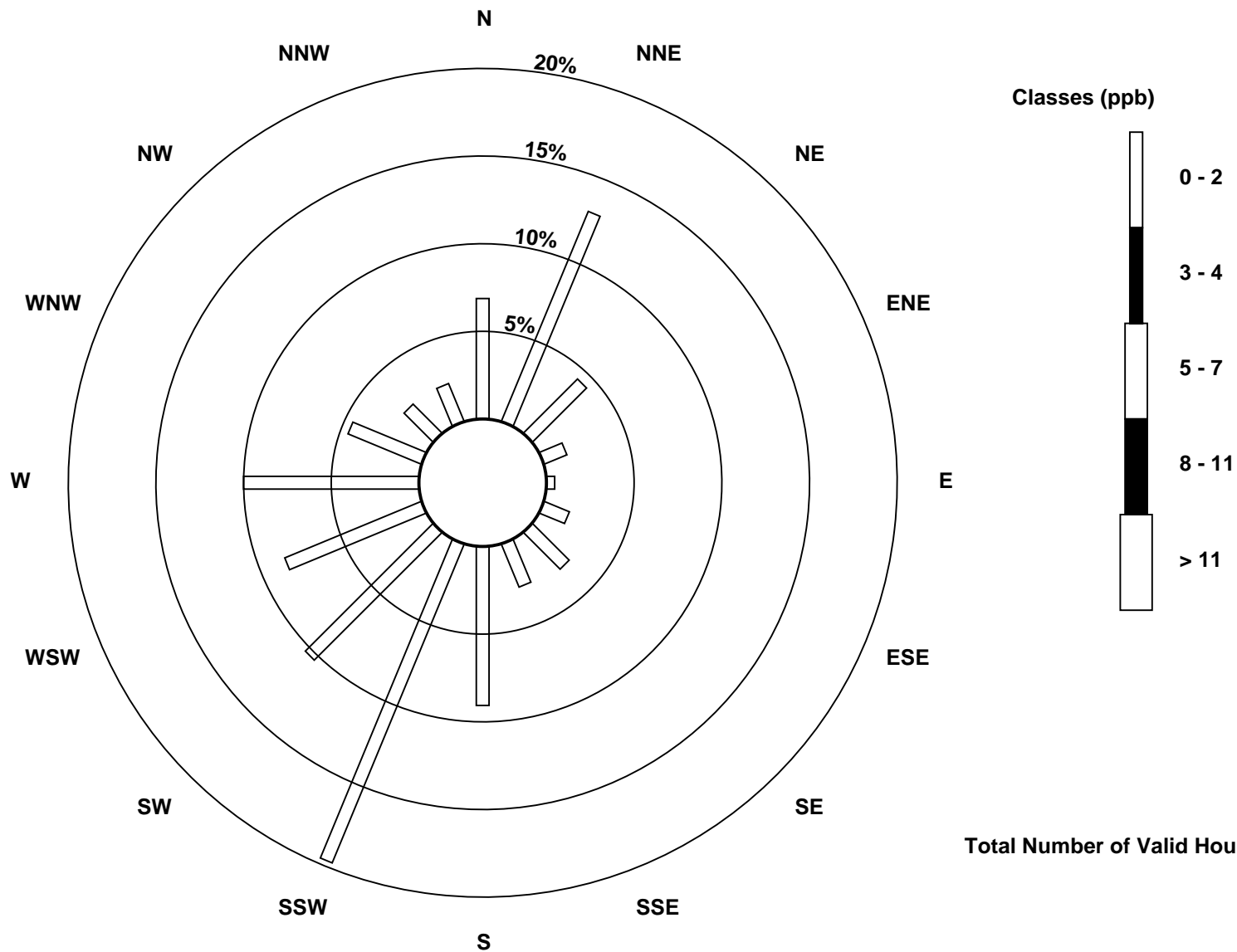
Total Number of Valid Hours: 640

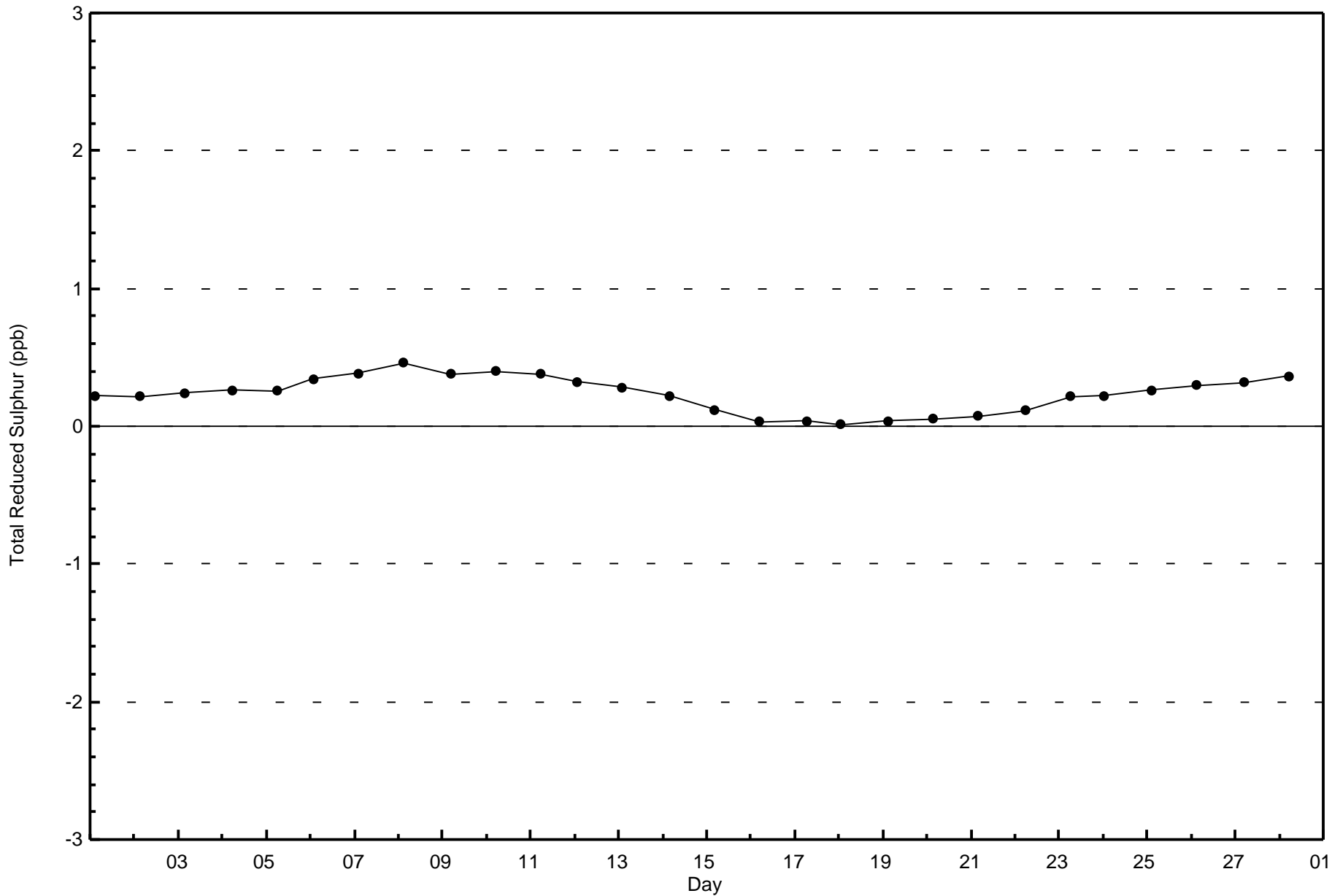
Total Number of Hours: 672

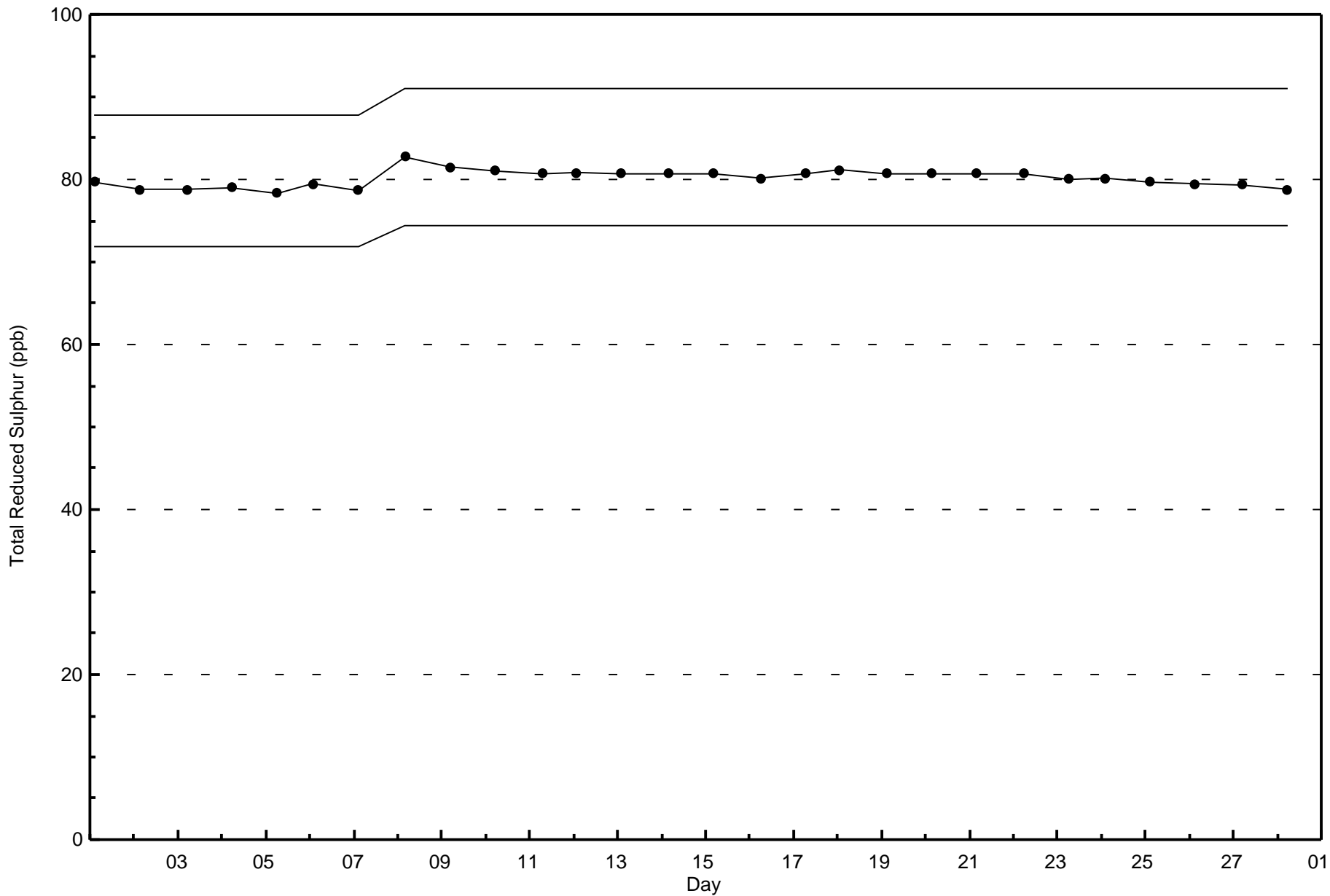


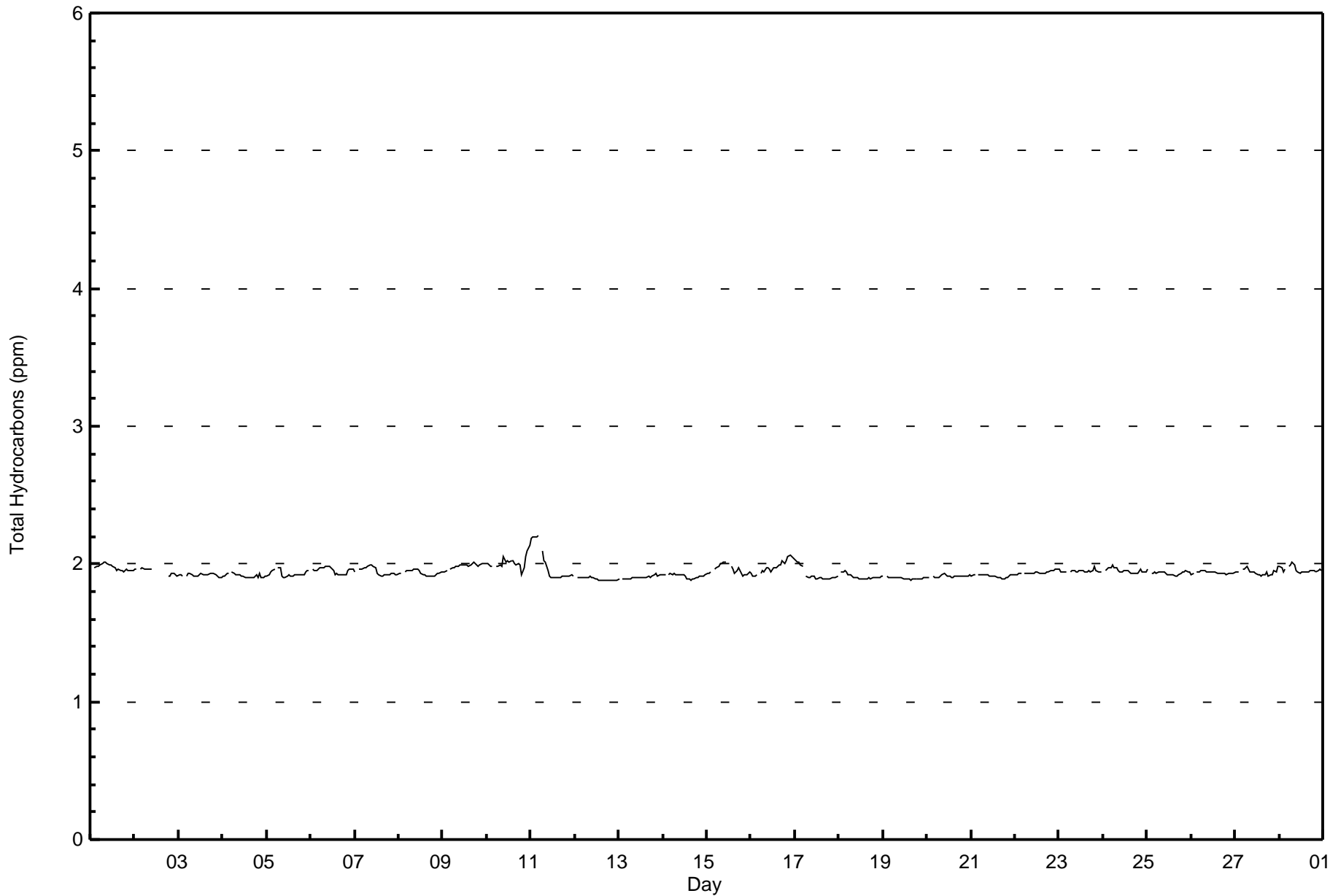
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Reduced Sulphur (TRS) - ppb
Janvier (AMS 22)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - February 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	621	97.95	97.95
2.1 - 3.0	13	2.05	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 634

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Janvier - February 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	84	28	8	4	9	19	18	57	113	67	55	62	25	14	13	621
2.1 - 3.0	0	0	0	0	0	0	0	0	1	11	1	0	0	0	0	0	13
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	45	84	28	8	4	9	19	18	58	124	68	55	62	25	14	13	634

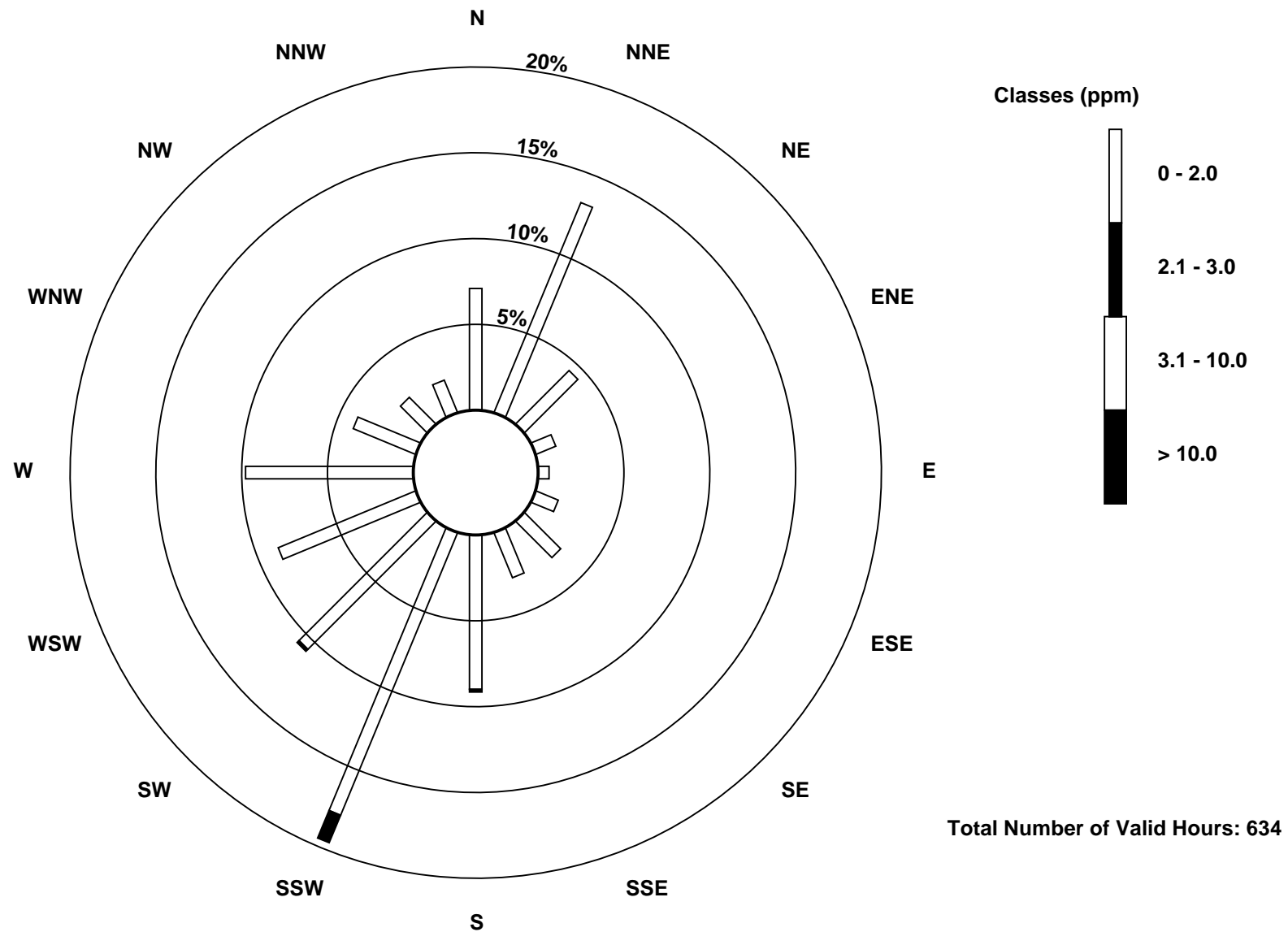
Total Number of Valid Hours: 634

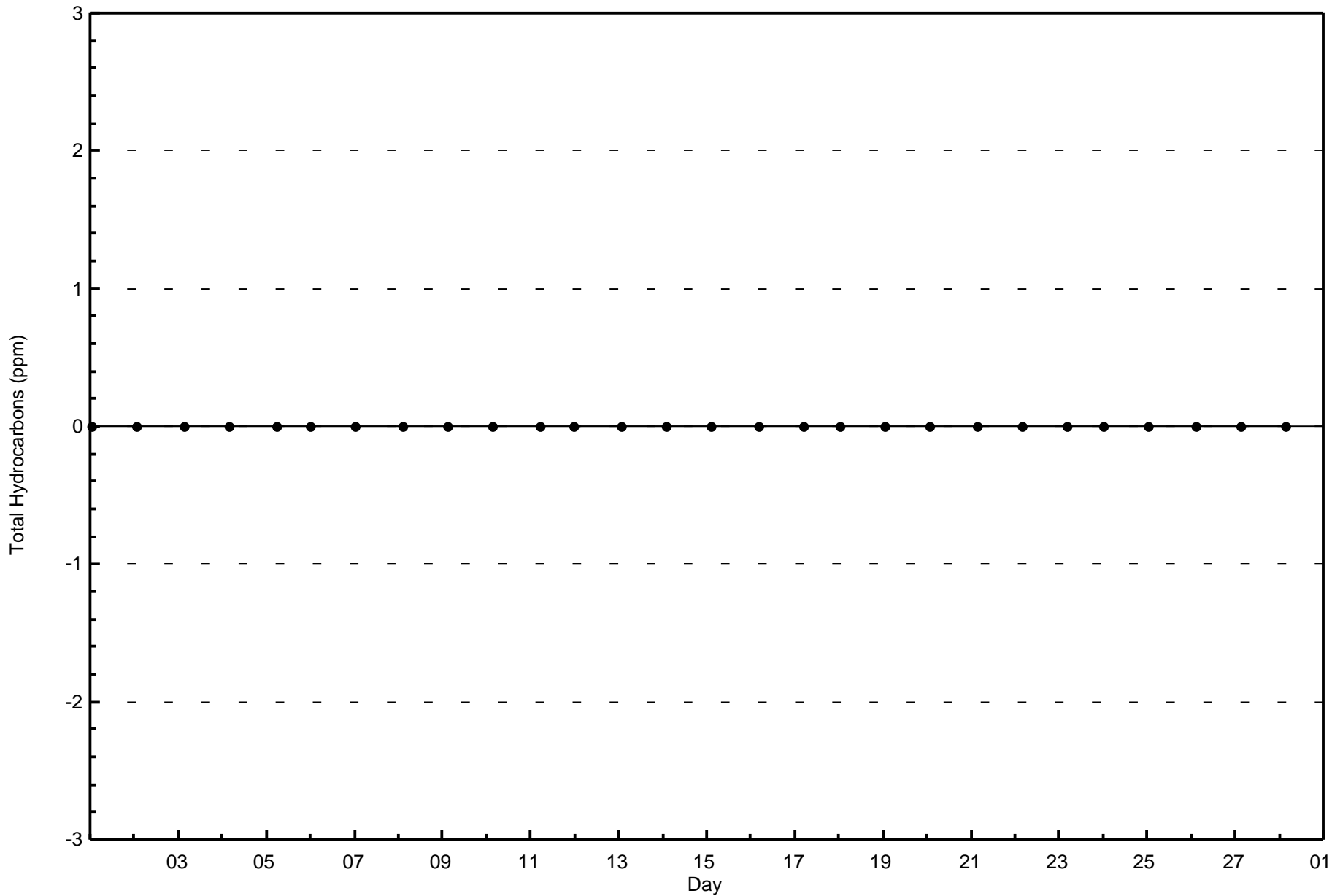
Total Number of Hours: 672

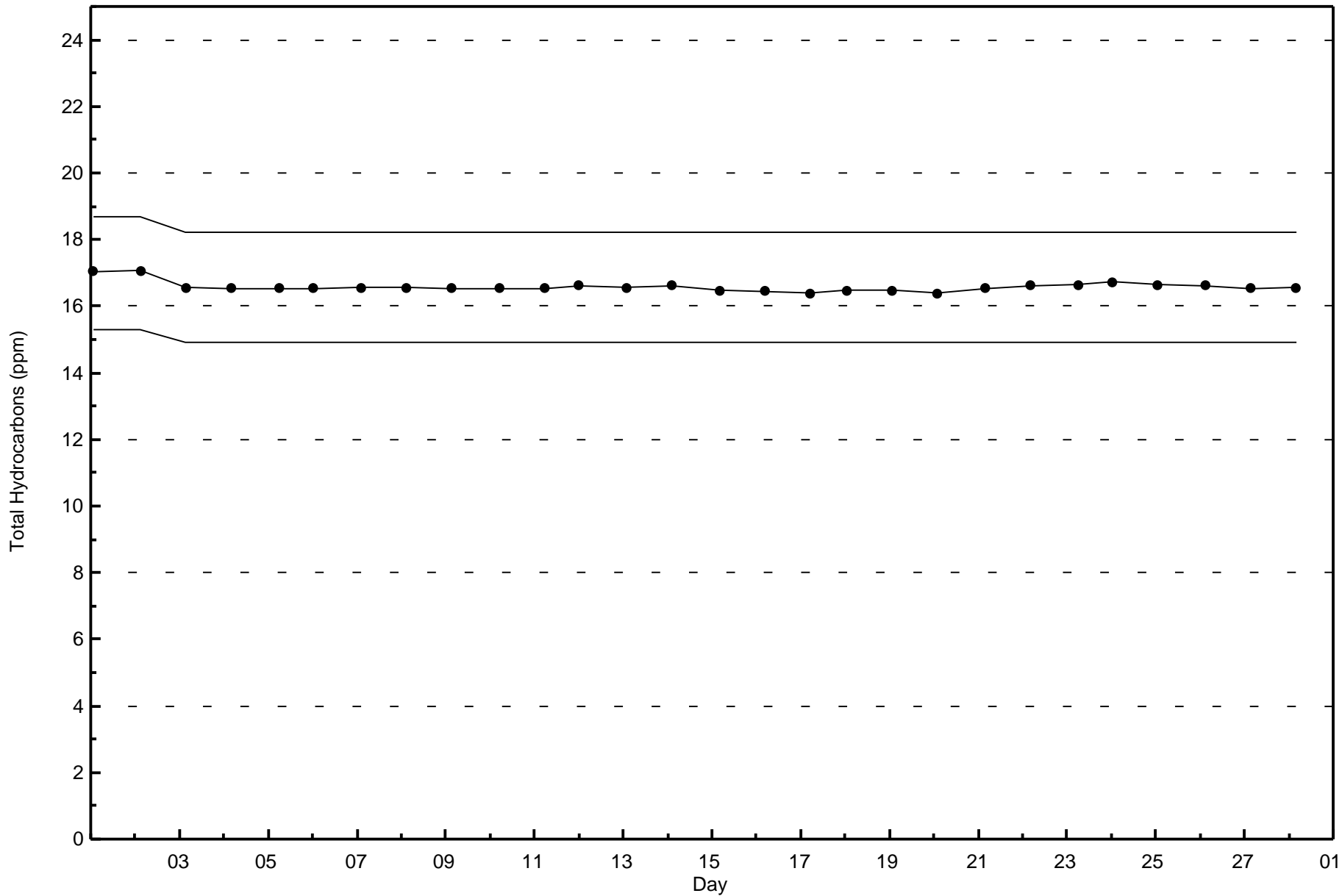


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Total Hydrocarbons (THC) - ppm
Janvier (AMS 22)





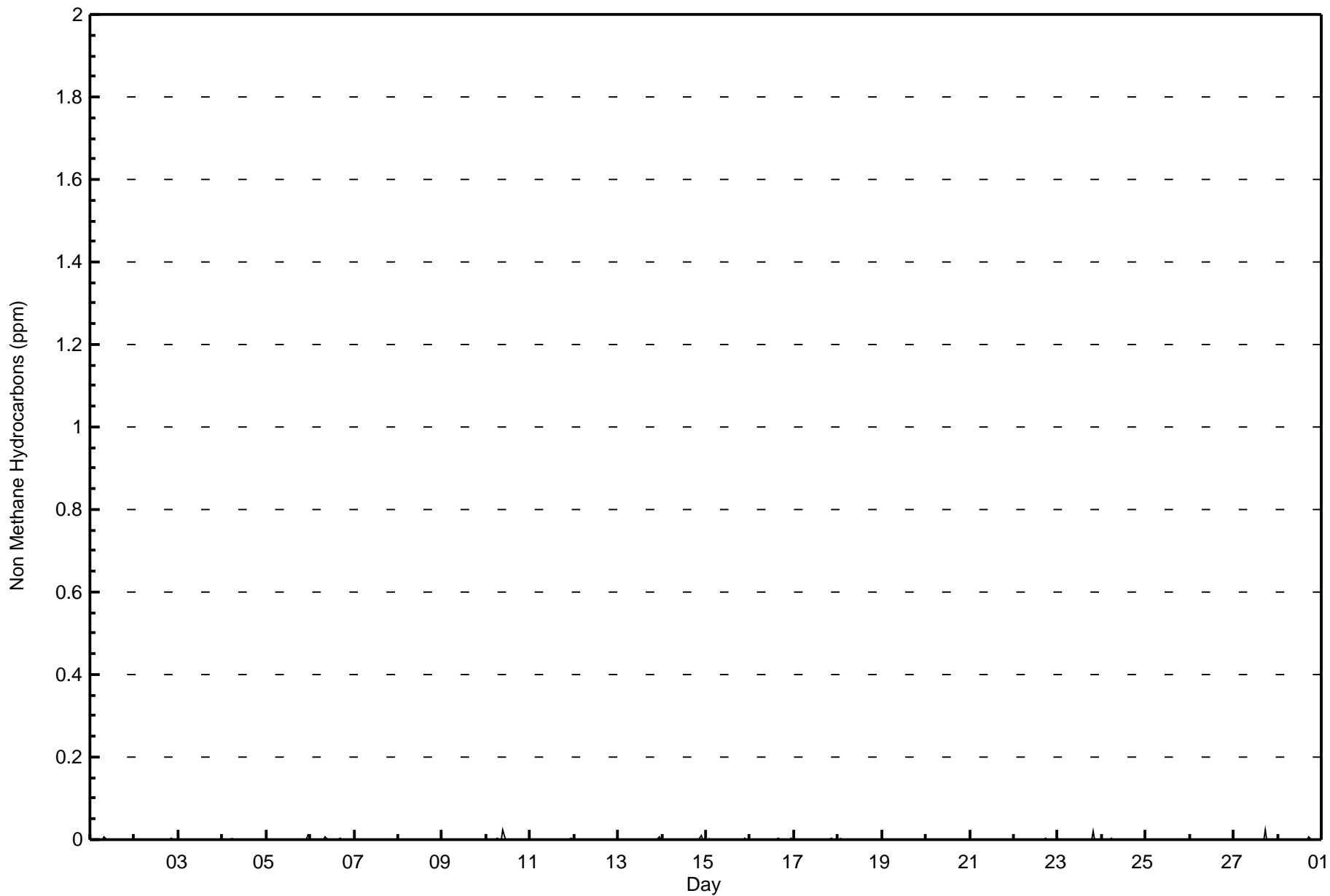




Summary of Hour Averages

Janvier - February 2017

Maximum Value: 0.025 ppm on Feb 10 10:00		Maximum Daily Average: 0.001 ppm on Feb 10		Hours in Service:	672																																
Minimum Value: 0.000 ppm on Feb 1 01:00		Minimum Daily Average: 0.000 ppm on Feb 7		Hours of Data:	634																																
Maximum Diurnal Average: 0.001 ppm at hour 18		Minimum Diurnal Average: 0.000 ppm at hour 14		Hours of Missing Data:	38																																
Monthly Average: 0.000 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 = 0.0		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-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.008	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008		
2-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	C	C	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.003		
3-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.002		
4-Feb	0.000	0.000	0.000	0.000	Z	0.005	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.015		
5-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.015	0.001	0.015			
6-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.008		
7-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
8-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
9-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
10-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.002	0.000	0.000	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	0.025	
11-Feb	0.001	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.002		
12-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
13-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
14-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15-Feb	0.000	0.000	0.003	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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-Feb	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	0.003	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
17-Feb	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18-Feb	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	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	0.000	0.000	0.000	0.000
19-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-Feb	Z	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	Diurnal Average
		0.001	0.002	0.003	0.000	0.001	0.005	0.002	0.008	0.008	0.025	0.001	0.000	0.001	0.000	0.001	0.003	0.003	0.023	0.001	0.020	0.003	0.009	0.007	0.015	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	Diurnal Maximum
Z - zerspan		C - Calibration					M - Maintenance																														





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	625	98.58	98.58
0.006 - 0.05	9	1.42	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 634

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - February 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	45	81	28	8	4	9	19	17	55	124	67	55	62	25	14	12	625
0.006 - 0.05	0	3	0	0	0	0	0	1	3	0	1	0	0	0	0	1	9
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	45	84	28	8	4	9	19	18	58	124	68	55	62	25	14	13	634

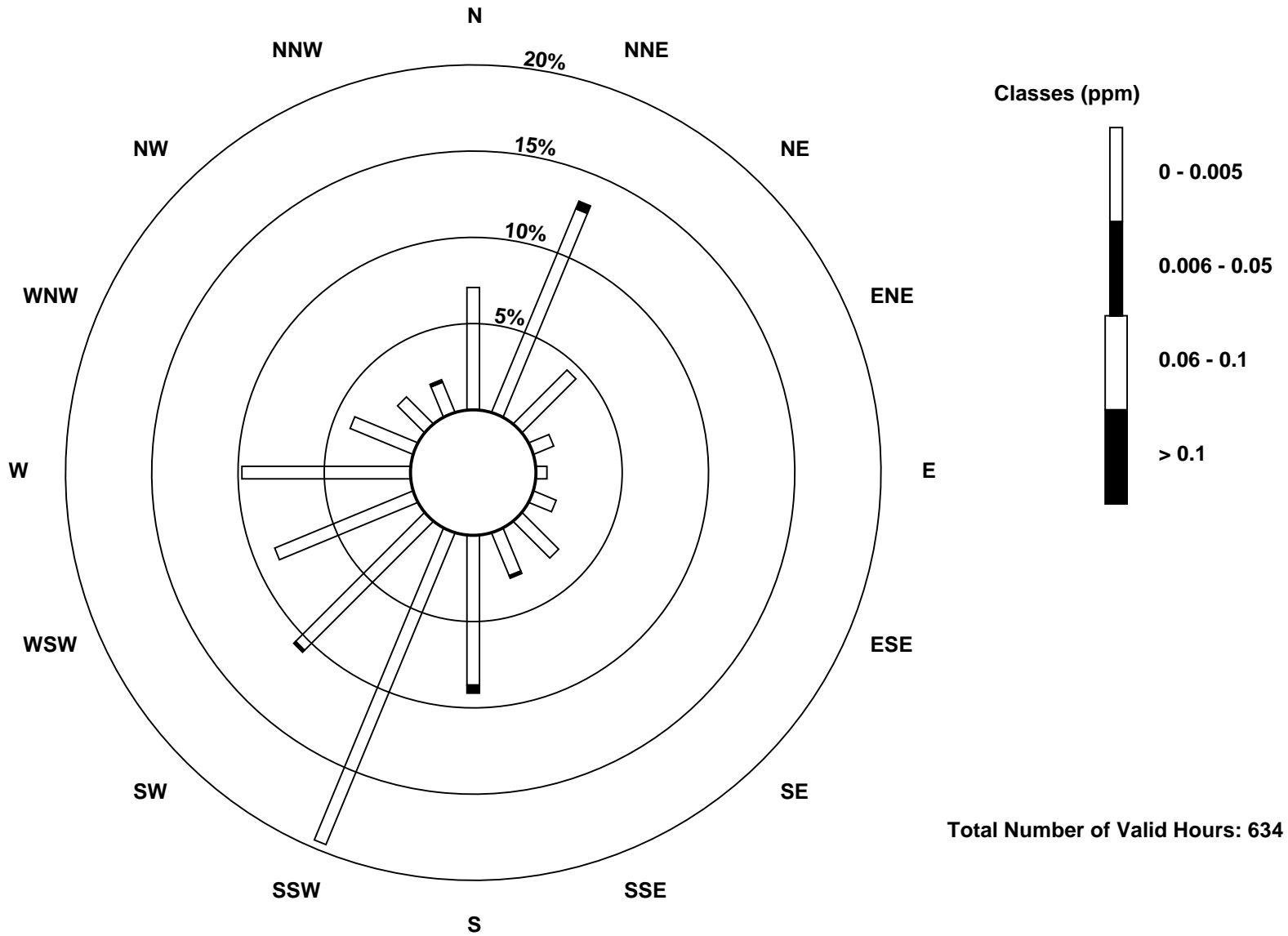
Total Number of Valid Hours: 634

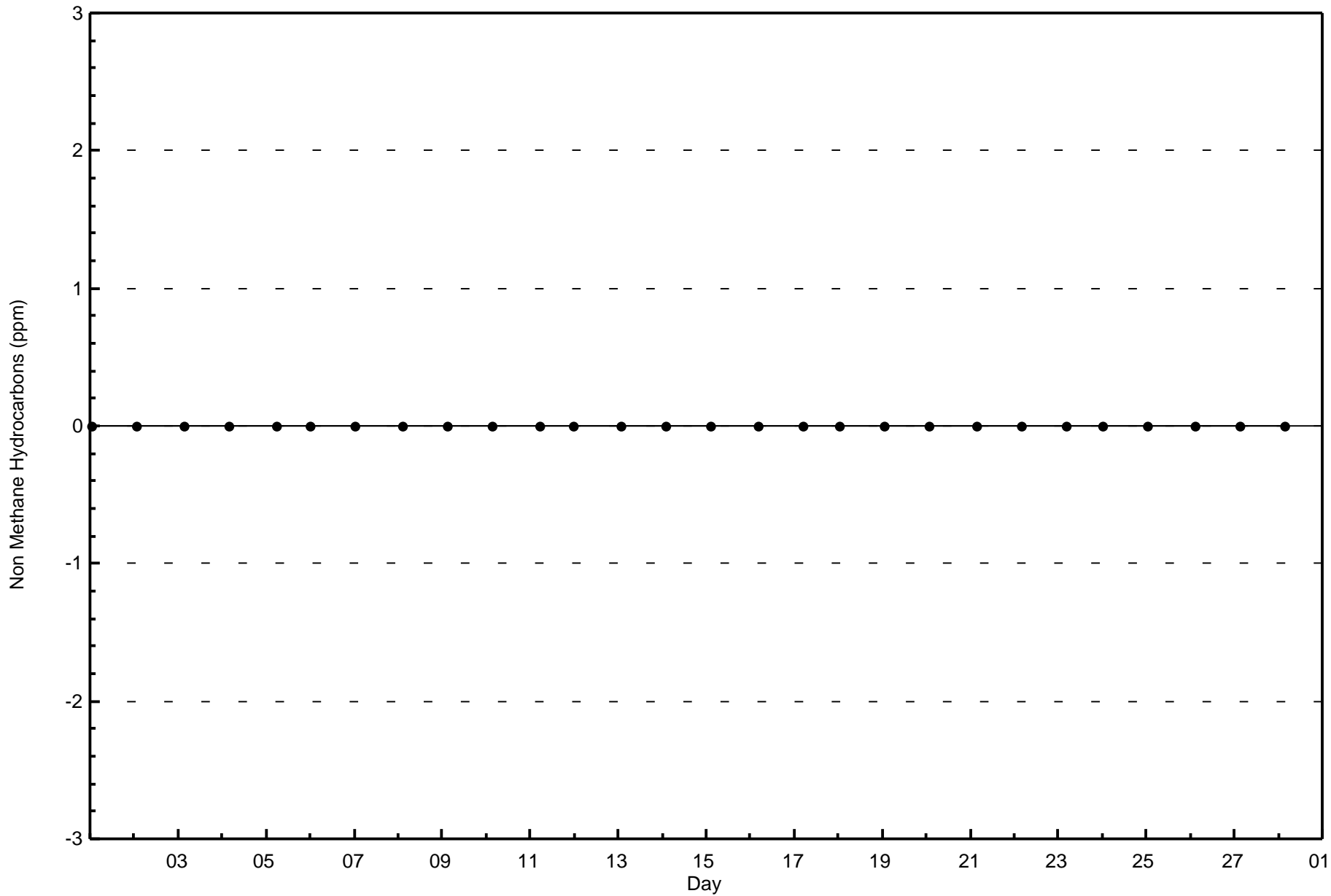
Total Number of Hours: 672

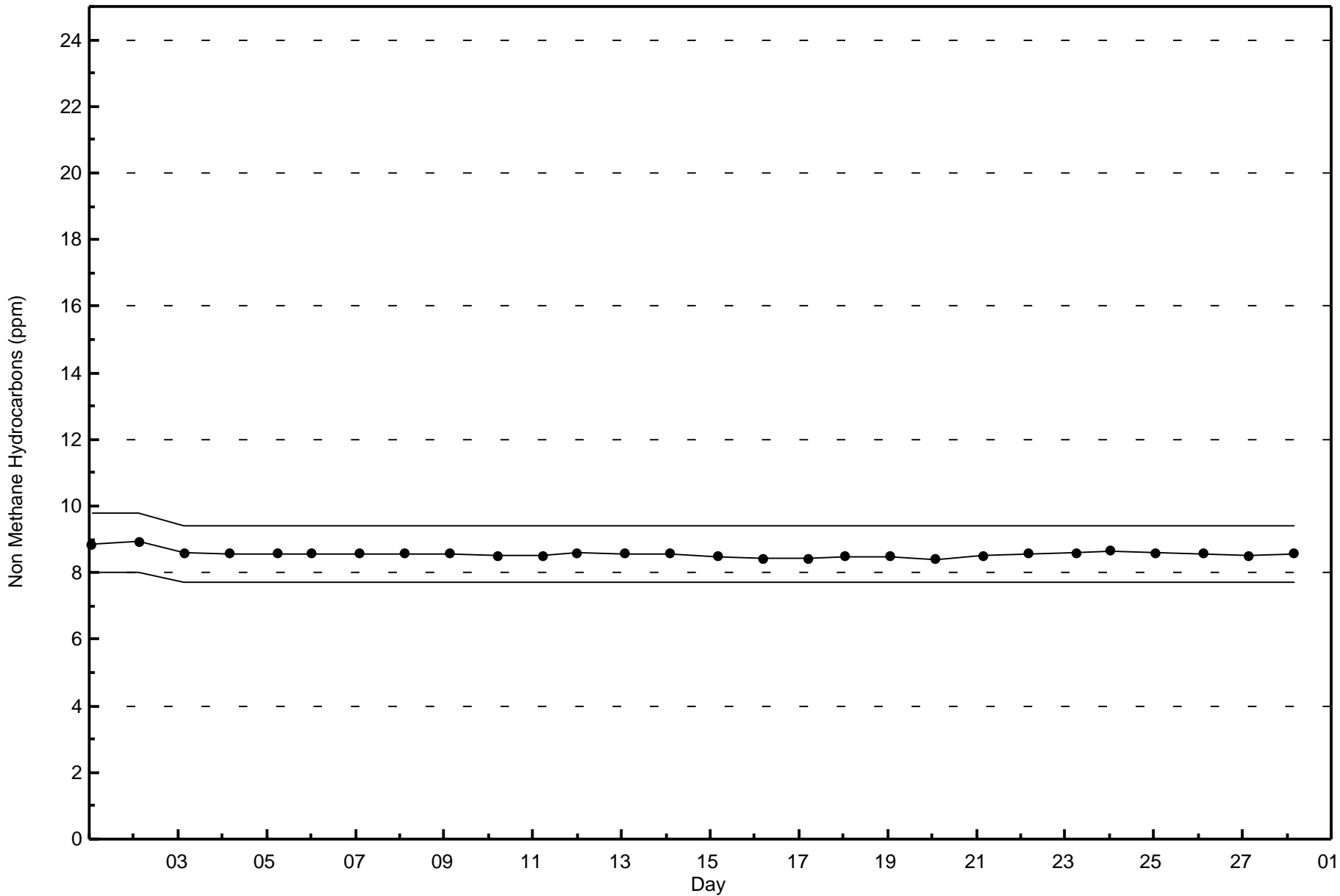


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Non Methane Hydrocarbons (NMHC) - ppm
Janvier (AMS 22)



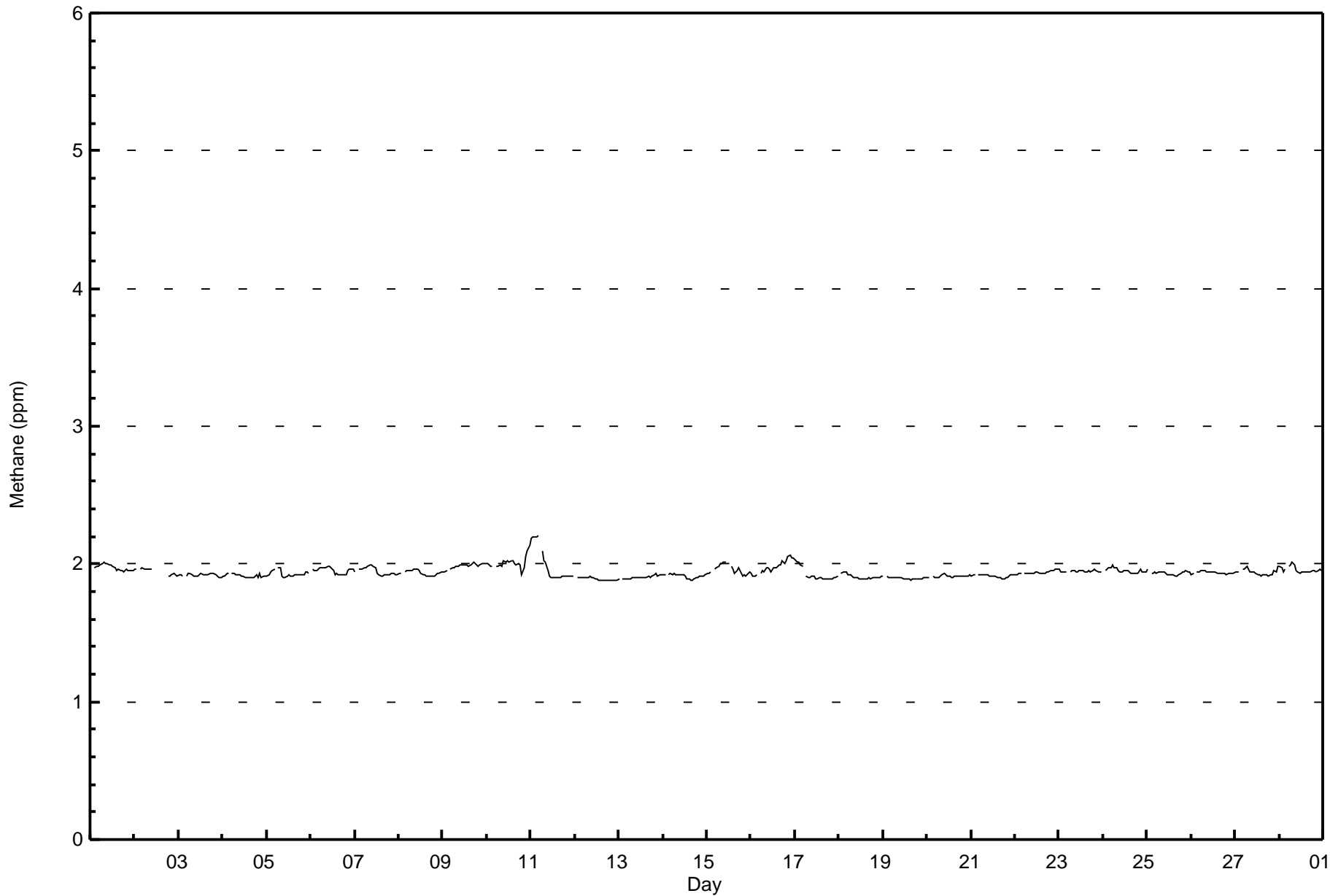






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - February 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	623	98.26	98.27
2.1 - 3.0	11	1.74	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 634

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - February 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	84	28	8	4	9	19	18	58	113	68	55	62	25	14	13	623
2.1 - 3.0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	11
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	45	84	28	8	4	9	19	18	58	124	68	55	62	25	14	13	634

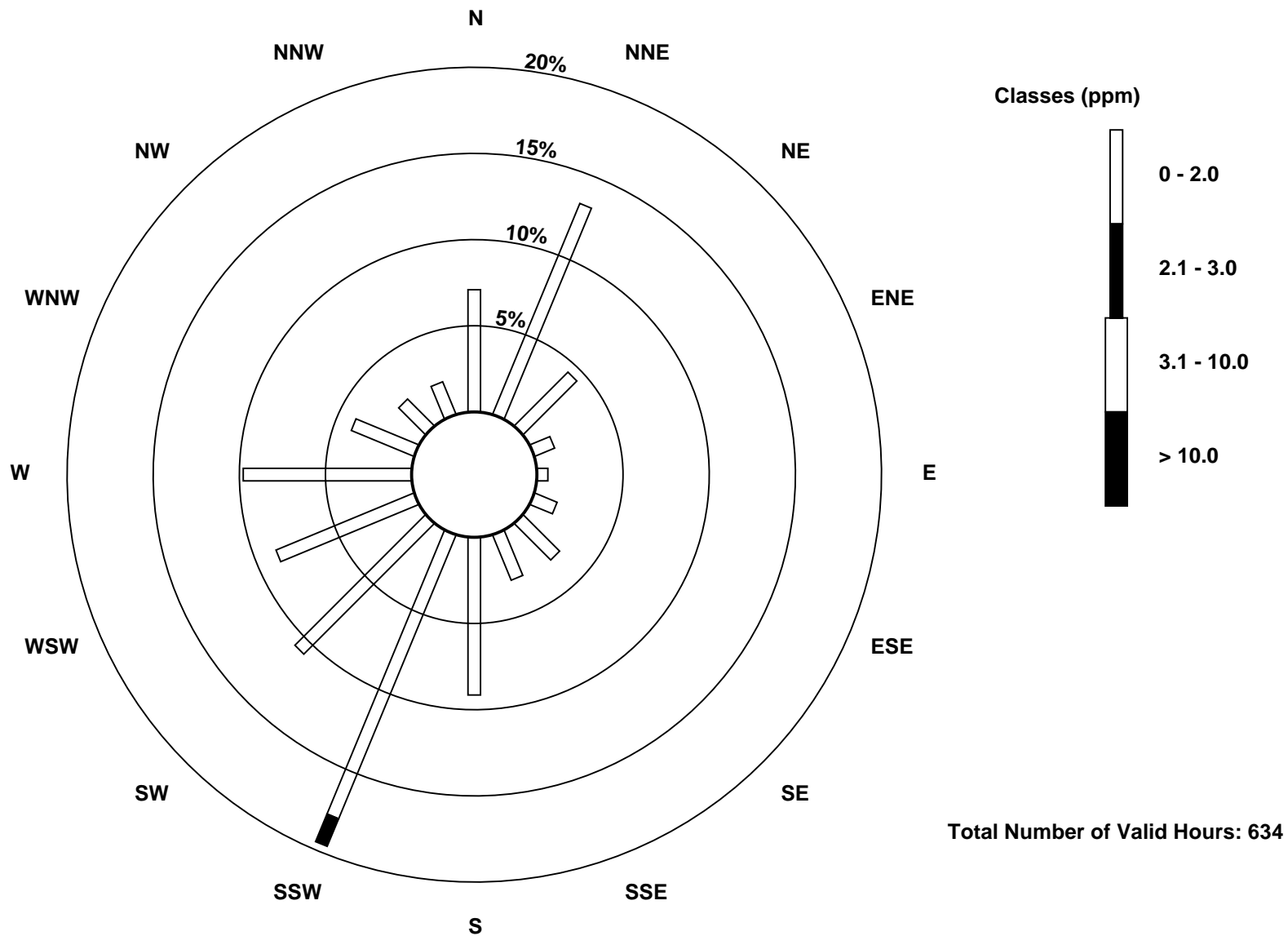
Total Number of Valid Hours: 634

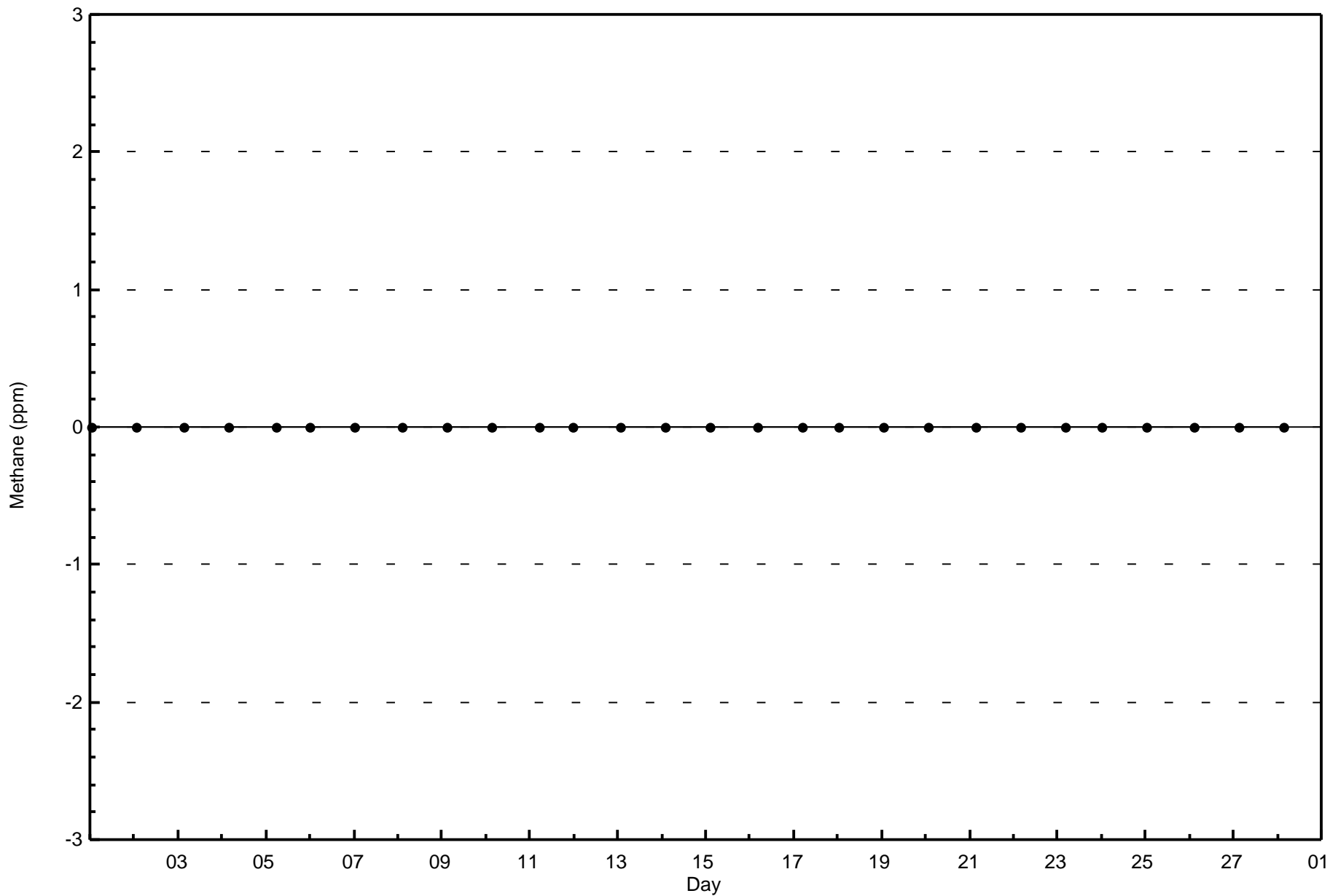
Total Number of Hours: 672

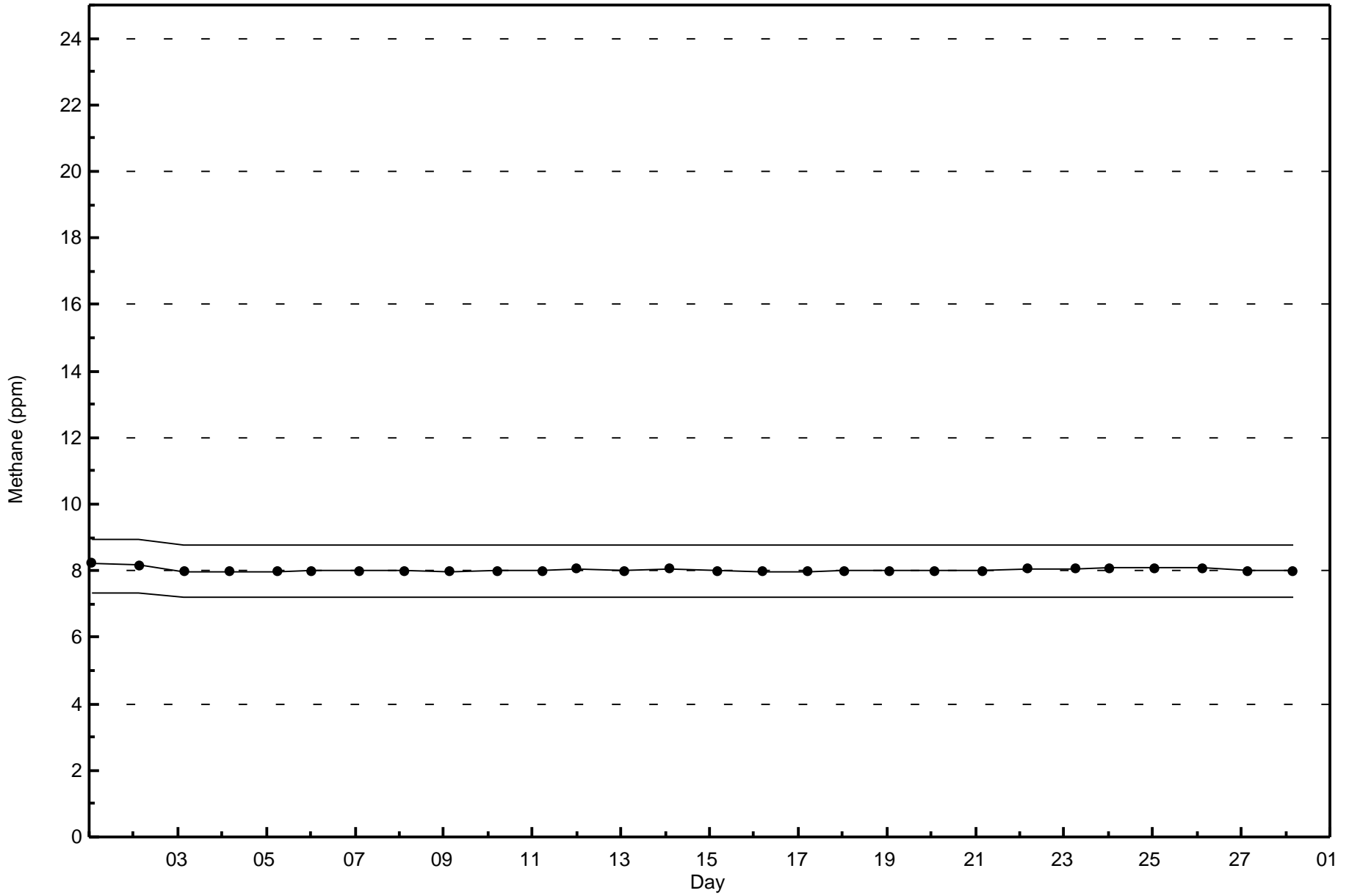


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Methane (CH₄) - ppm
Janvier (AMS 22)









Wood Buffalo Environmental Association
Summary of Hour Averages

Nitric Oxide (NO) - ppb
Janvier - February 2017

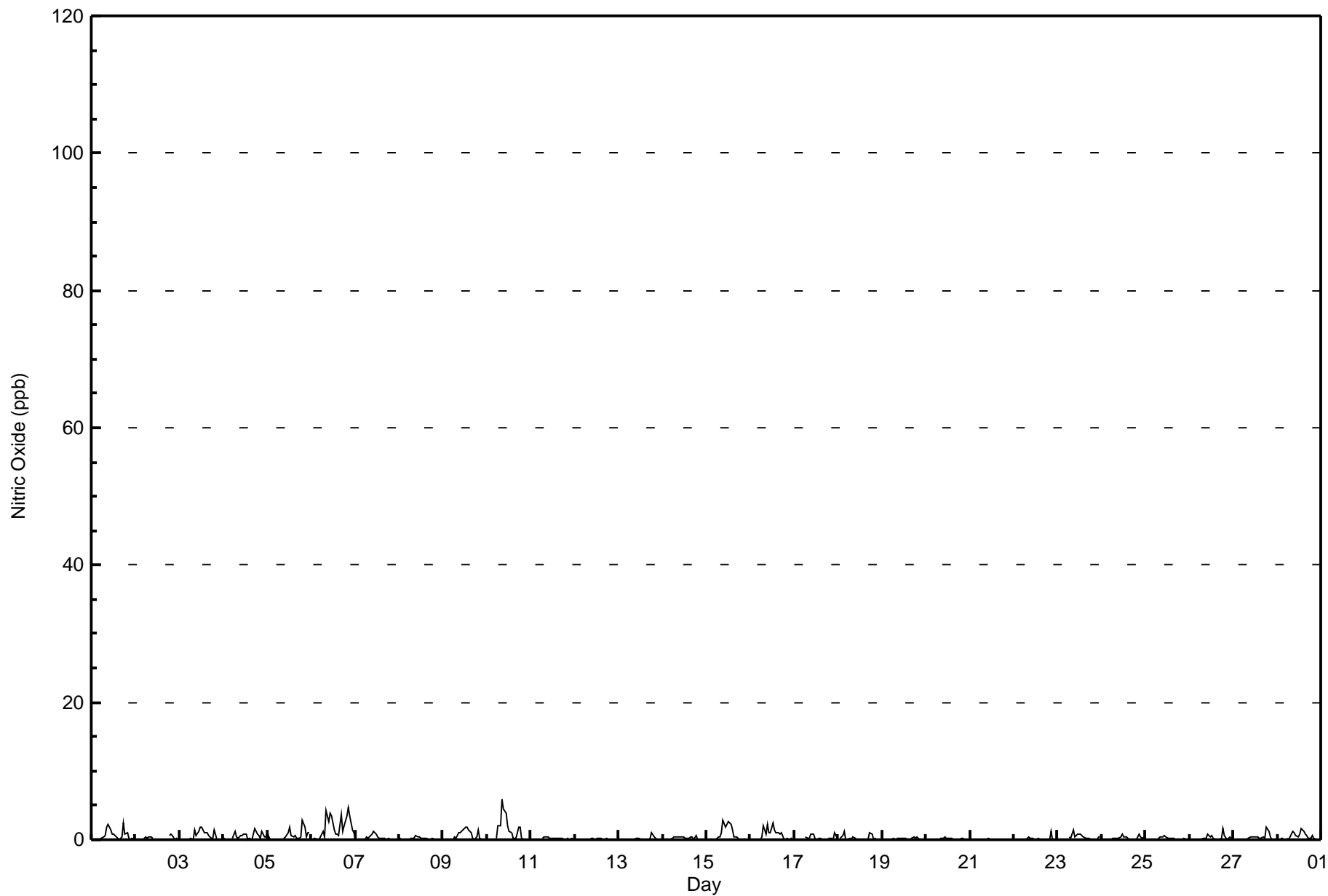
Maximum Value: 6 ppb on Feb 10 09:00														Maximum Daily Average: 1.8 ppb on Feb 6														Hours in Service: 672	
Minimum Value: 0 ppb on Feb 1 01:00														Minimum Daily Average: 0.0 ppb on Feb 21														Hours of Data: 636	
Maximum Diurnal Average: 0.9 ppb at hour 9														Minimum Diurnal Average: 0.0 ppb at hour 5														Hours of Missing Data: 36	
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 = 4														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-Feb	0	Z	0	0	0	0	0	1	2	2	1	1	1	0	0	0	0	2	1	1	0	0	0	0	0.6	2			
2-Feb	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	1	1	1	0	0	0	--	1			
3-Feb	0	0	0	Z	0	0	0	0	1	1	1	2	2	1	1	1	1	0	0	1	0	0	0	0.6	2				
4-Feb	0	0	0	0	Z	0	1	0	0	1	1	1	1	0	0	1	2	1	1	1	0	1	0	0.5	2				
5-Feb	1	0	0	0	0	Z	0	0	0	0	0	1	2	1	0	1	0	0	0	3	2	0	1	0.6	3				
6-Feb	Z	0	0	0	0	0	1	0	4	3	4	3	2	1	1	1	4	1	2	3	5	4	1	1.8	5				
7-Feb	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				
8-Feb	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				
9-Feb	0	0	0	Z	0	0	1	0	1	1	1	1	2	2	1	1	0	0	0	1	0	0	0	0.6	2				
10-Feb	0	0	0	0	Z	0	2	2	6	5	4	2	1	1	0	0	0	2	2	0	0	0	0	1.2	6				
11-Feb	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-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0				
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1				
14-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1				
15-Feb	0	0	0	Z	0	0	0	0	1	3	2	2	3	2	2	0	0	0	0	0	0	0	0	0.7	3				
16-Feb	0	0	0	0	Z	0	0	2	1	2	1	1	2	1	1	1	1	1	0	0	0	0	0	0.7	2				
17-Feb	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1				
18-Feb	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.2	1				
19-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0				
20-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0				
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0				
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1				
23-Feb	0	0	0	0	0	Z	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1				
24-Feb	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1				
25-Feb	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1				
26-Feb	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	1	0	0	0	0.3	2				
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0.3	2				
28-Feb	0	0	0	0	Z	0	0	0	1	1	1	0	1	2	1	1	1	0	0	1	0	0	0	0.5	2				
0.1														0.0														Diurnal Average	
1														0														Diurnal Maximum	
0.1														0.1															
0.0														0.0															
0.3														0.3															
0.9														0.9															
0.9														0.9															
0.8														0.8															
0.8														0.8															
0.7														0.7															
0.5														0.5															
0.4														0.4															
0.3														0.3															
0.4														0.4															
0.4														0.4															
0.5														0.5															
0.6														0.6															
0.4														0.4															
0.2														0.2															
0.2														0.2															
0.1														0.1															

Z - zerospan C - Calibration



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	636	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: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - February 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	84	28	8	4	9	19	18	58	124	69	55	63	25	14	13	636
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	45	84	28	8	4	9	19	18	58	124	69	55	63	25	14	13	636

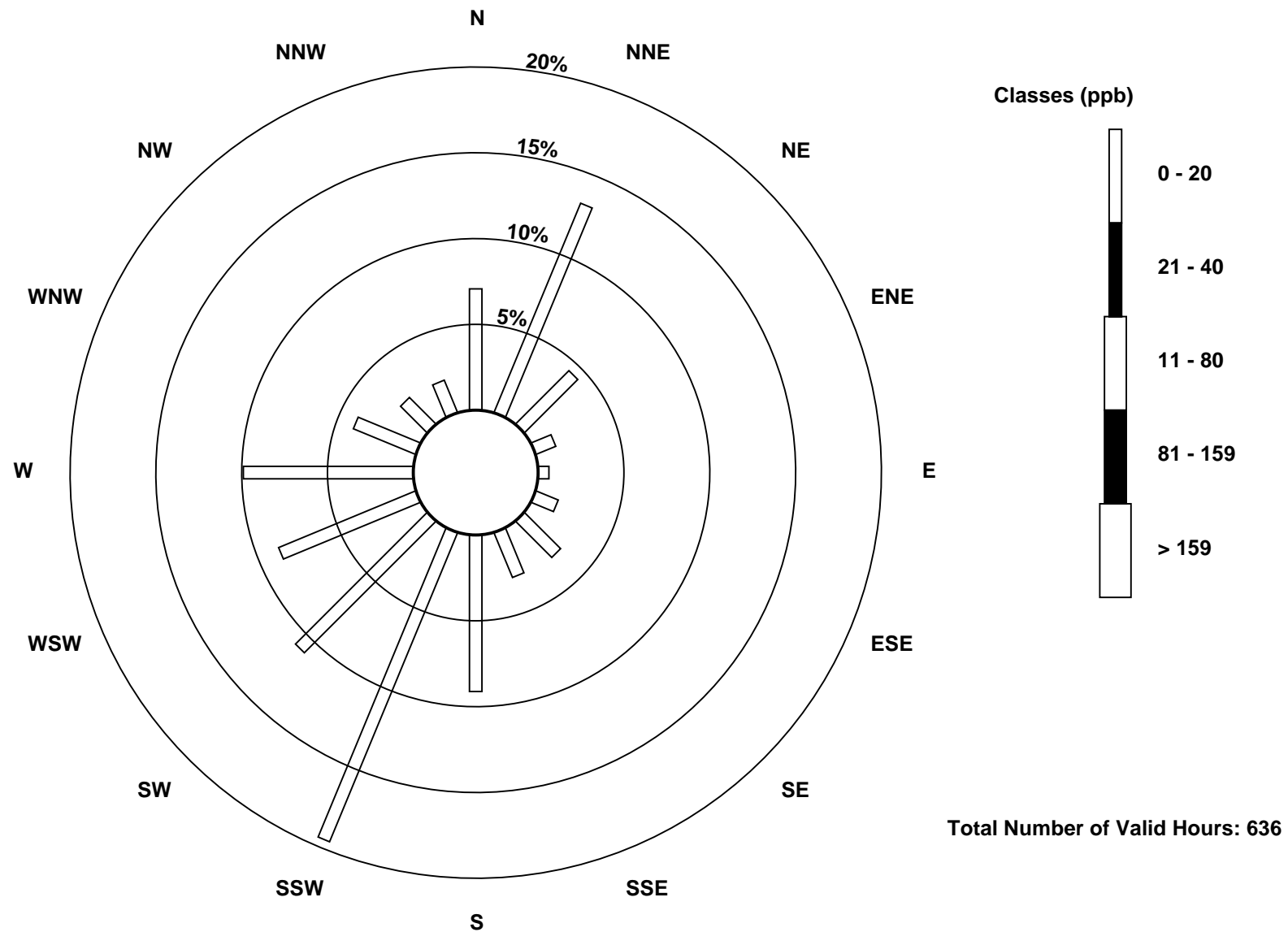
Total Number of Valid Hours: 636

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

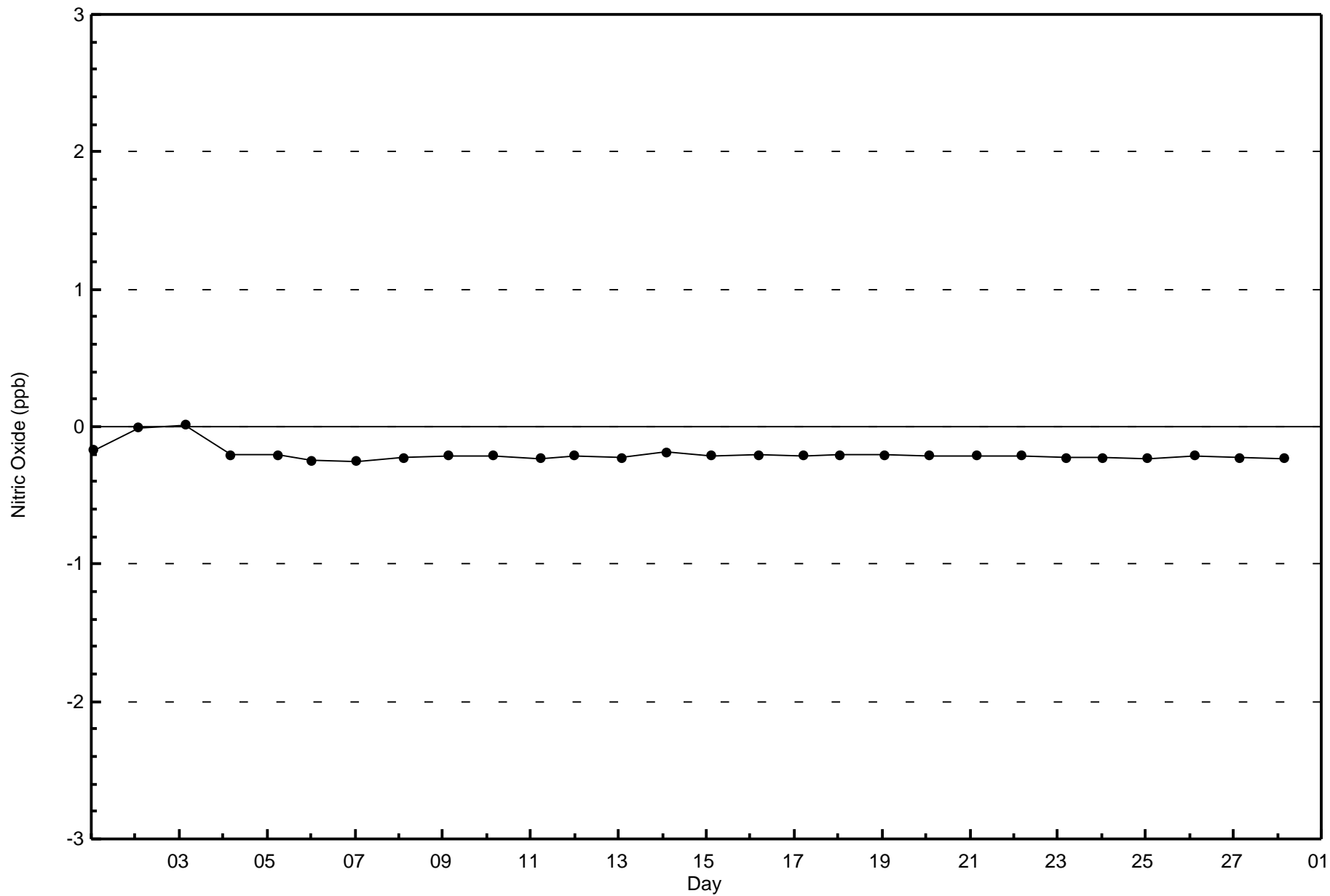
Nitric Oxide (NO) - ppb
Janvier (AMS 22)





Wood Buffalo Environmental Association
Zero Responses

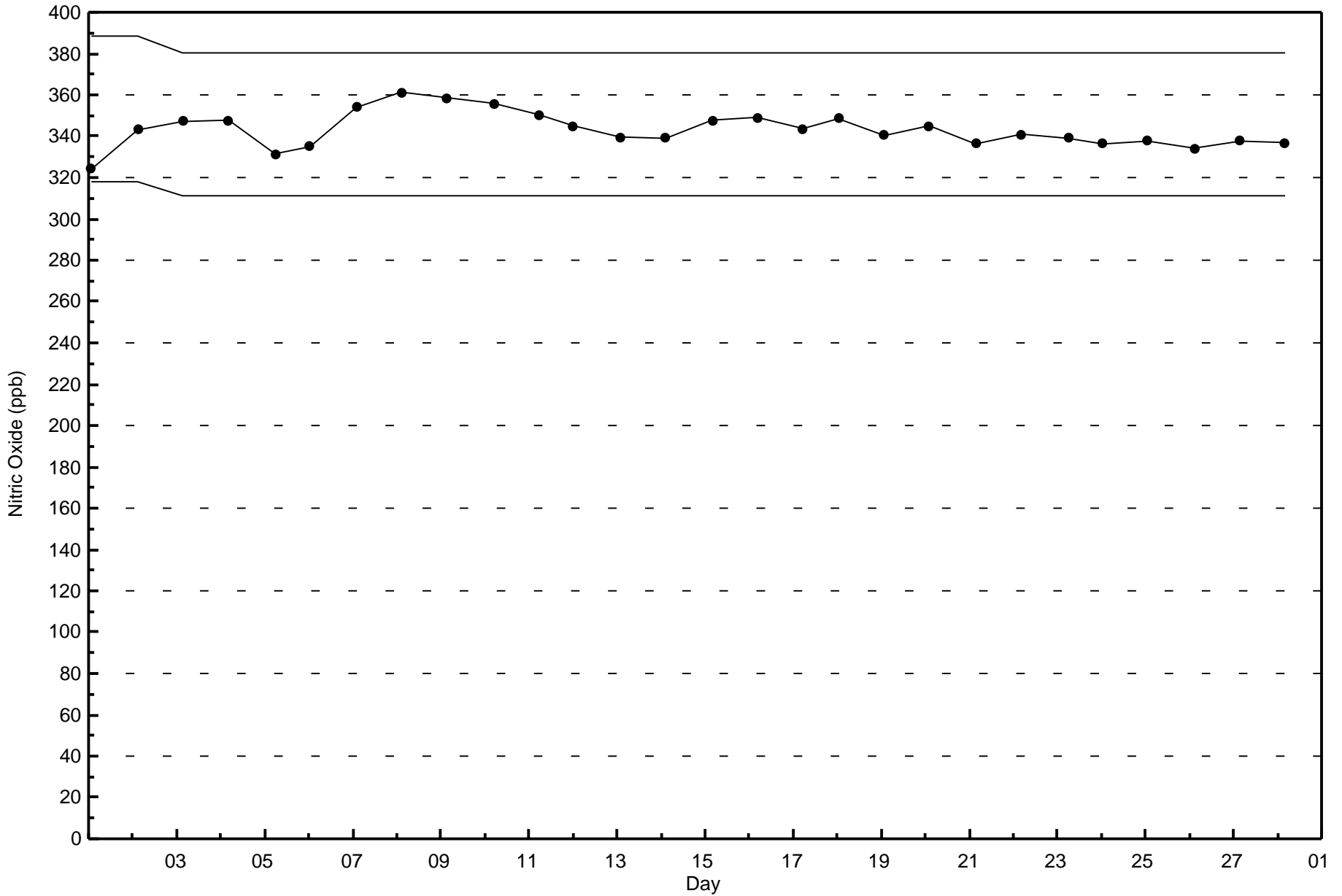
Nitric Oxide (NO) - ppb
Janvier - February 2017





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Janvier - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

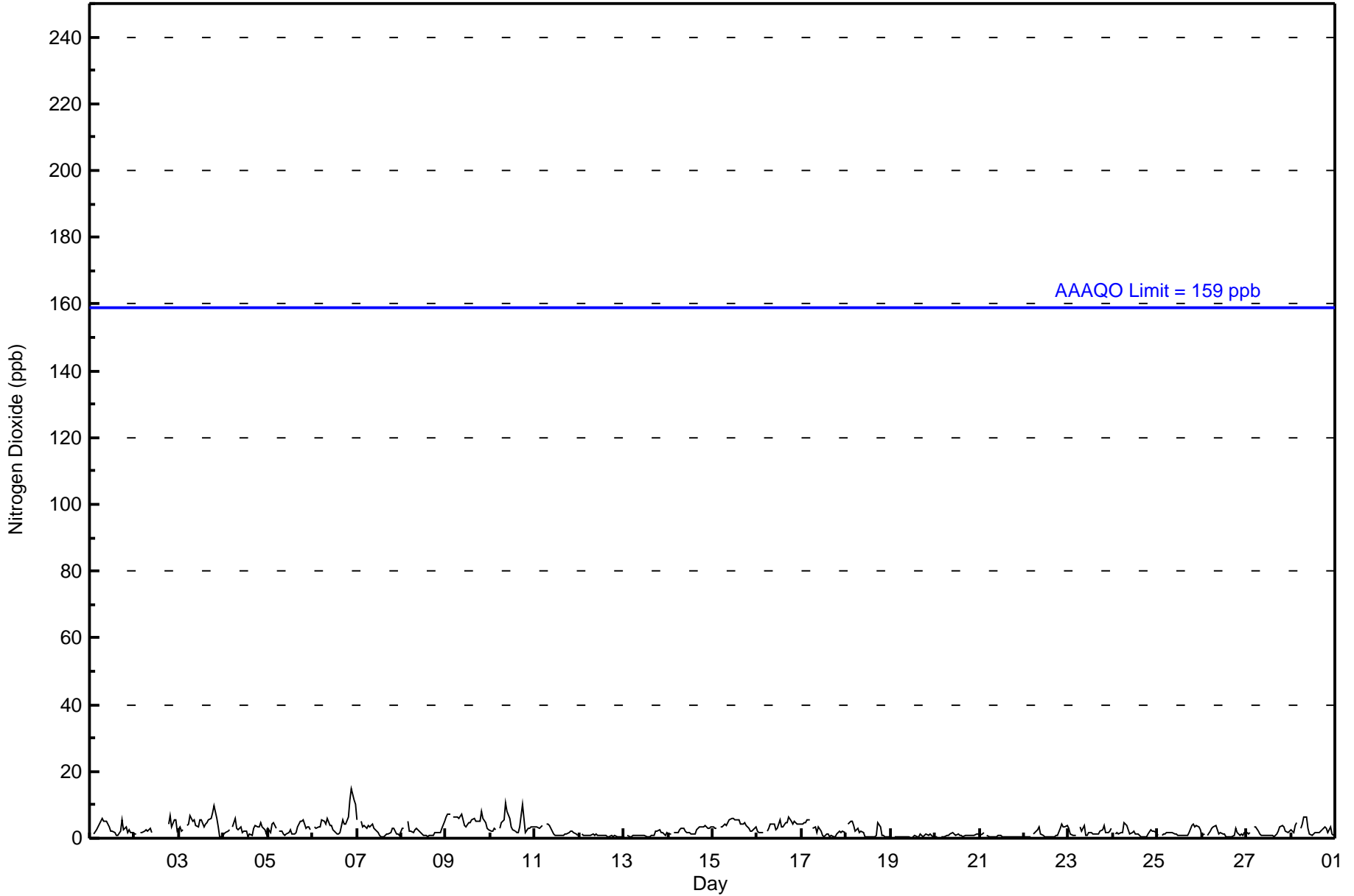
Janvier - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 15 ppb on Feb 6 22:00 Minimum Value: 0 ppb on Feb 19 12:00 Maximum Diurnal Average: 3.3 ppb at hour 9 Monthly Average: 2.4 ppb		Maximum Daily Average: 5.5 ppb on Feb 9 Minimum Daily Average: 0.6 ppb on Feb 21 Minimum Diurnal Average: 1.4 ppb at hour 15 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 10		Hours in Service: 672 Hours of Data: 636 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-Feb	1	Z	1	3	3	4	6	5	5	5	4	2	2	2	1	1	2	5	3	4	2	3	2	2	2.9	6
2-Feb	1	1	Z	2	2	2	3	2	3	2	C	C	C	C	C	C	C	C	4	7	4	5	6	2	--	7
3-Feb	3	2	2	Z	4	4	7	5	6	4	3	5	5	4	4	5	6	6	8	10	6	3	0	0	4.5	10
4-Feb	1	2	2	3	Z	4	6	3	3	3	2	2	2	1	1	1	3	4	3	3	5	3	2	1	2.6	6
5-Feb	3	2	4	5	3	Z	2	2	1	1	1	2	3	1	1	2	3	5	5	5	3	3	3	3	2.8	5
6-Feb	Z	4	3	4	4	5	5	4	6	4	4	3	2	1	1	2	6	4	4	7	11	15	11	10	5.2	15
7-Feb	6	Z	5	3	4	3	4	4	4	3	3	2	1	1	1	1	1	1	2	3	3	1	1	1	2.4	6
8-Feb	3	3	Z	5	2	2	2	3	3	3	2	1	1	1	1	1	1	1	2	2	2	2	3	5	2.1	5
9-Feb	6	7	7	Z	7	7	6	6	7	5	4	4	5	5	5	6	5	5	5	8	6	5	3	3	5.5	8
10-Feb	2	2	3	2	Z	3	5	6	11	8	6	3	3	2	2	2	4	10	6	2	3	3	3	3	4.0	11
11-Feb	4	3	3	3	4	Z	4	4	4	2	1	1	1	1	1	1	1	1	2	2	2	2	1	1	2.1	4
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
13-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	1.1	2
14-Feb	1	1	Z	2	2	2	2	3	3	2	2	2	1	1	1	2	3	3	3	3	4	3	3	3	2.3	4
15-Feb	3	3	3	Z	3	3	4	4	5	6	6	6	5	6	6	4	4	5	4	3	2	2	3	3	4.1	6
16-Feb	2	2	2	2	Z	2	3	4	4	4	3	3	6	3	3	5	5	6	5	4	5	4	4	4	3.7	6
17-Feb	4	5	5	6	5	Z	3	3	2	3	2	1	0	1	1	0	1	0	0	1	2	2	2	2	2.3	6
18-Feb	Z	4	5	5	4	2	3	2	2	2	1	0	0	1	1	0	1	5	3	1	1	1	0	1	1.9	5
19-Feb	0	Z	1	0	0	0	1	0	1	1	1	0	0	1	0	0	1	1	1	1	1	1	1	1	0.6	1
20-Feb	0	0	Z	0	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
21-Feb	1	1	2	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2
22-Feb	0	0	0	0	Z	1	2	3	3	1	1	0	0	0	0	0	1	1	1	3	4	4	3	4	1.5	4
23-Feb	3	1	1	1	1	Z	3	2	4	1	1	2	2	1	1	1	1	2	2	4	2	2	2	3	1.9	4
24-Feb	Z	1	2	1	2	2	5	4	3	1	2	2	1	1	1	0	0	1	0	1	3	2	2	2	1.7	5
25-Feb	1	Z	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	2	4	4	3	4	3	2	1.8	4
26-Feb	1	1	Z	1	2	3	3	4	3	1	2	1	1	1	0	0	0	1	3	2	1	1	1	2	1.5	4
27-Feb	2	1	2	Z	3	3	2	1	1	1	1	1	1	1	1	1	1	1	2	4	4	3	2	2	1.8	4
28-Feb	3	2	4	5	Z	3	4	6	6	3	1	1	1	2	2	2	2	2	4	3	2	3	1	1	2.7	6
																								Diurnal Average	Diurnal Maximum	
2.2 2.2 2.6 2.3 2.5 2.5 3.2 3.1 3.3 2.5 2.0 1.8 1.7 1.5 1.4 1.5 2.0 2.9 2.9 3.2 2.9 2.9 2.4 2.3 6 7 7 6 7 7 7 6 11 8 6 6 6 6 6 6 6 6 10 8 10 11 15 11 10																										
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Janvier - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	636	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: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Janvier - February 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	84	28	8	4	9	19	18	58	124	69	55	63	25	14	13	636
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	45	84	28	8	4	9	19	18	58	124	69	55	63	25	14	13	636

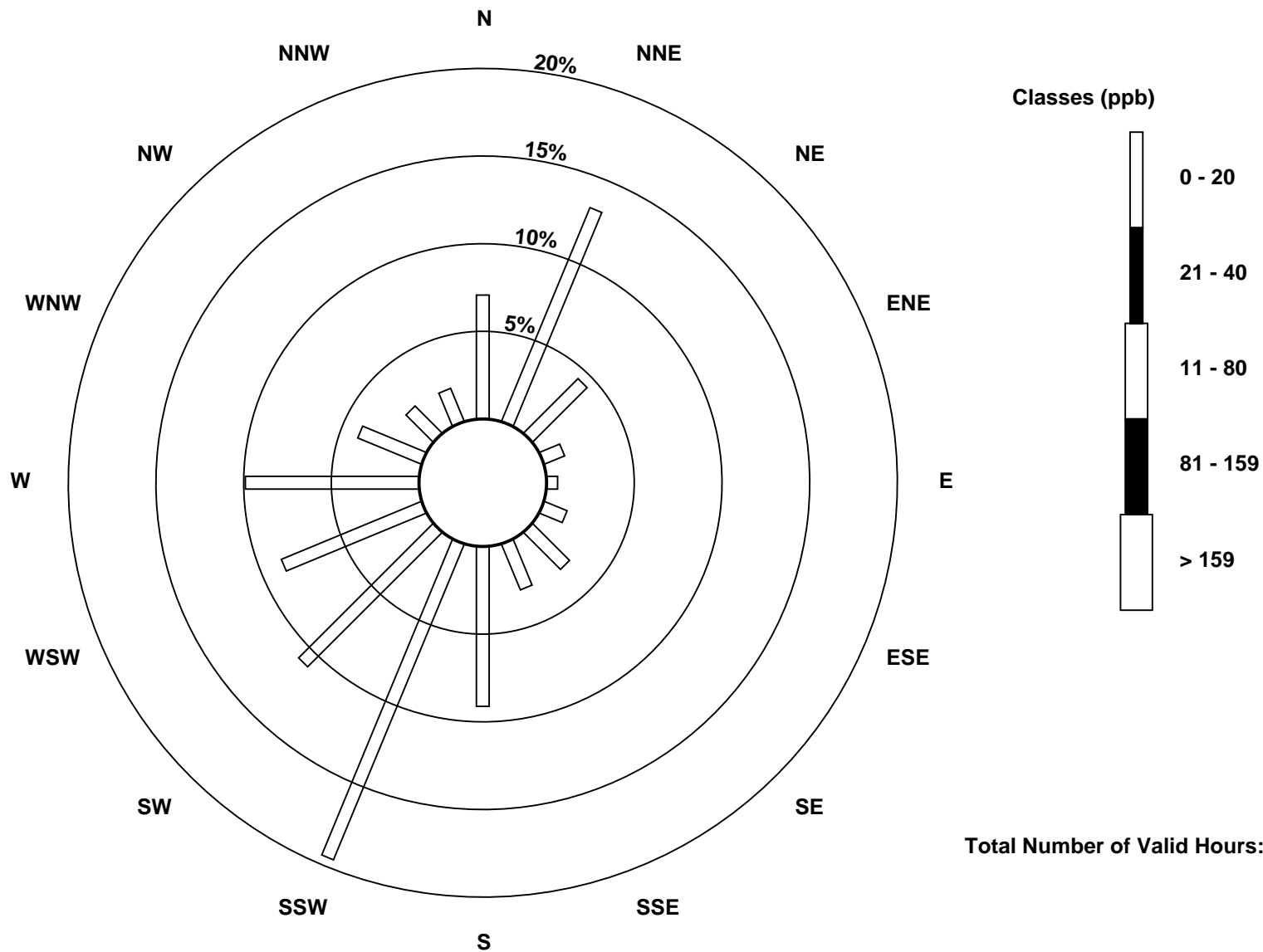
Total Number of Valid Hours: 636

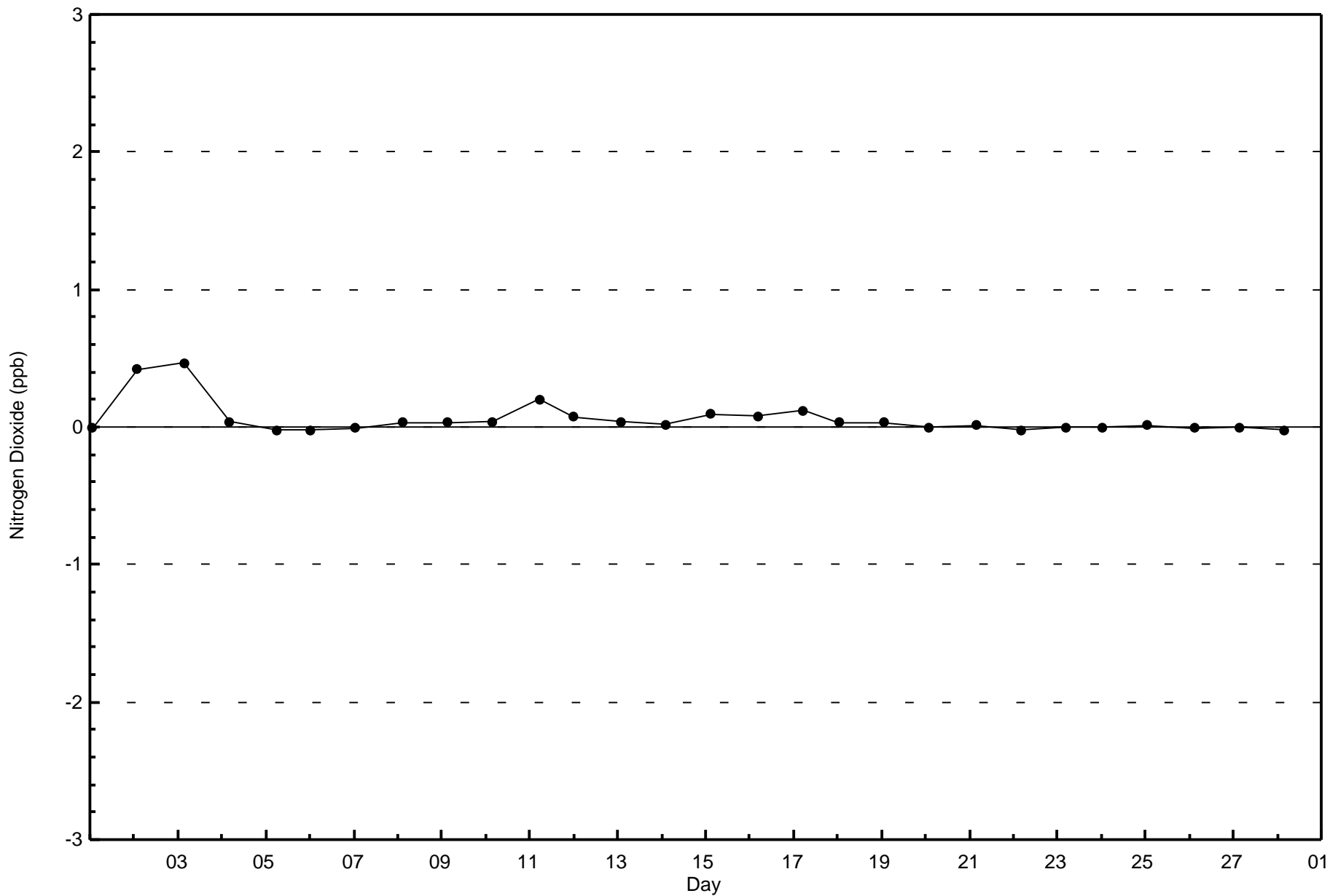
Total Number of Hours: 672

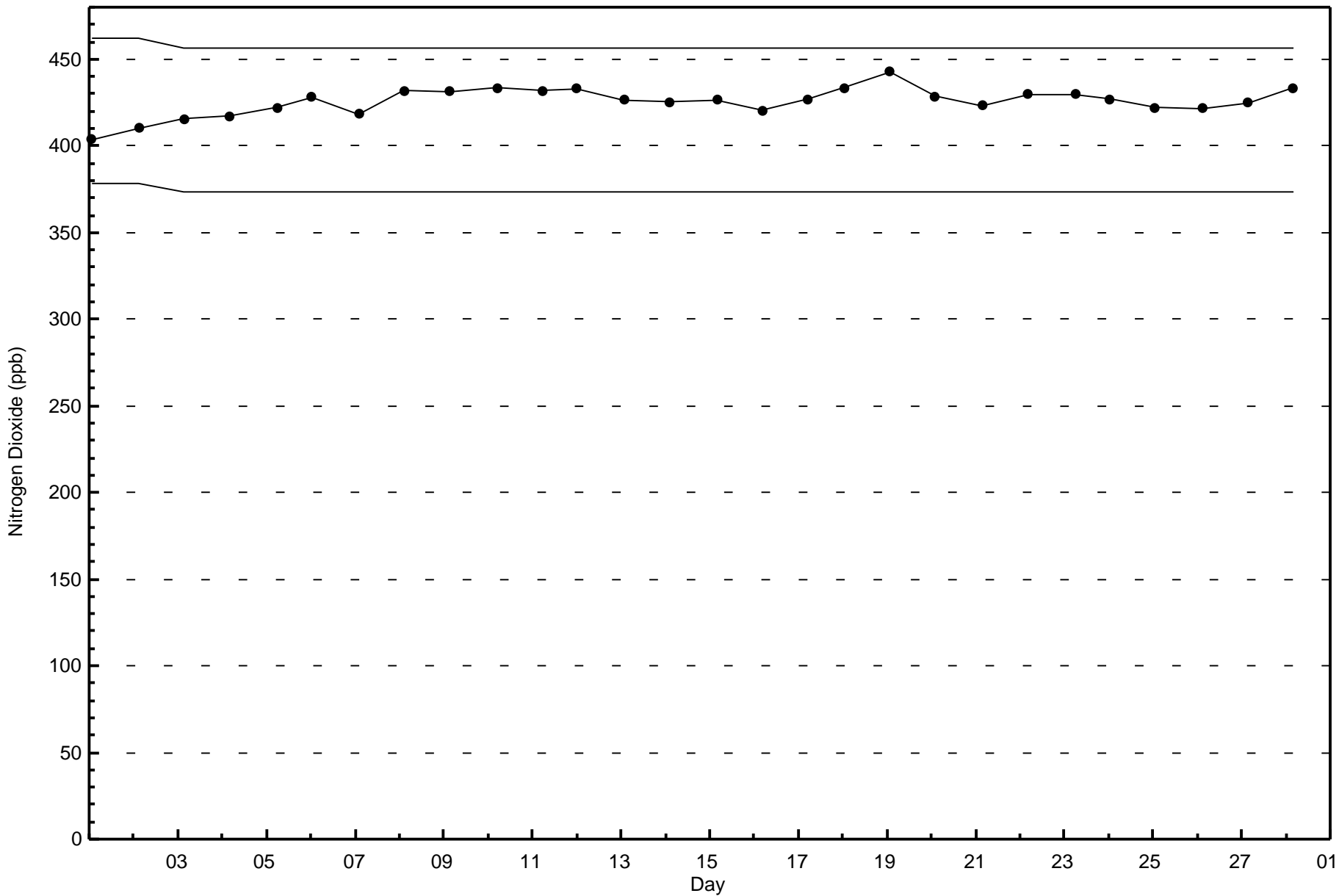


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

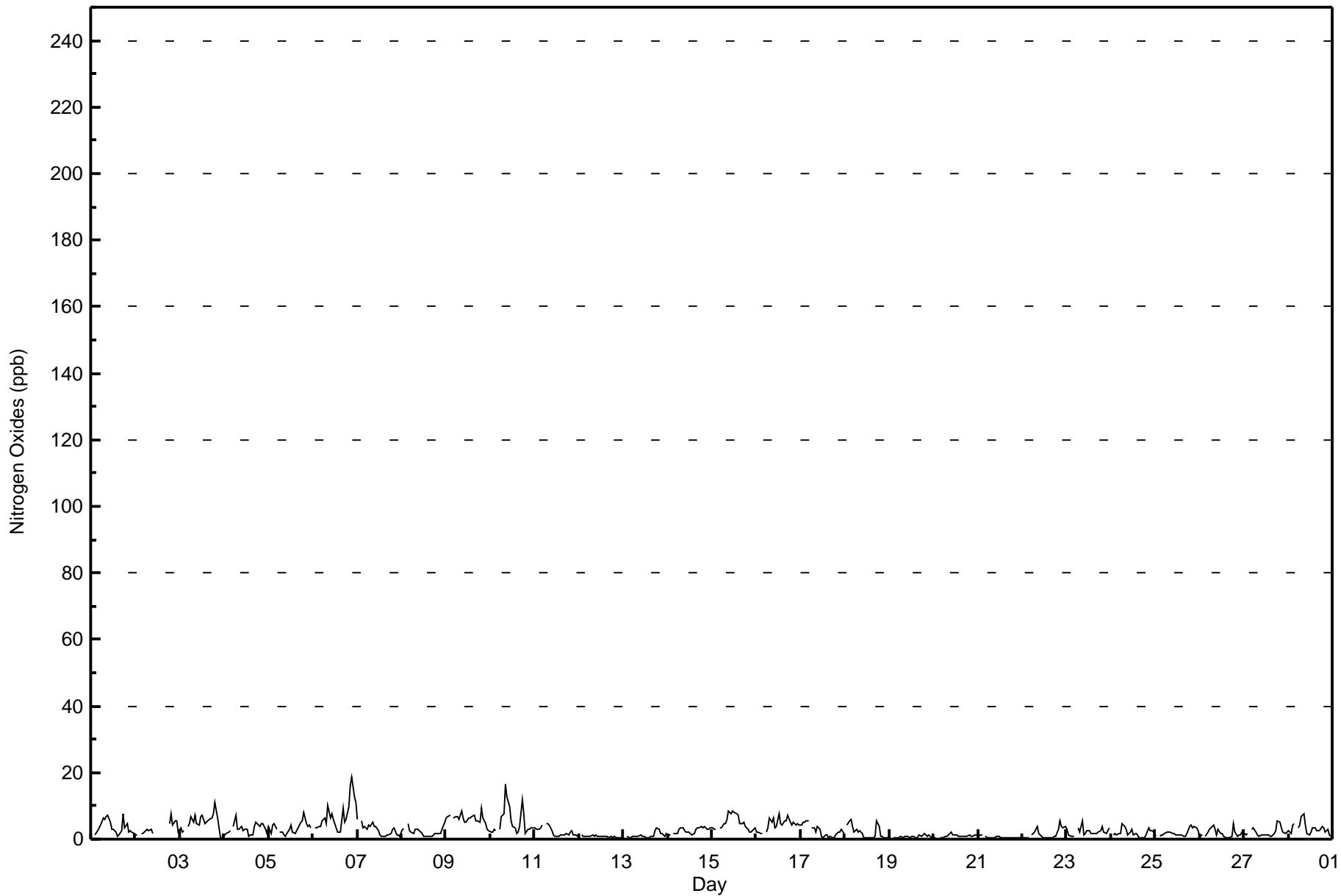
Janvier - February 2017

Maximum Value: 19 ppb on Feb 6 22:00																		Maximum Daily Average: 6.9 ppb on Feb 6						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 20 02:00																		Minimum Daily Average: 0.6 ppb on Feb 21						Hours of Data: 636		
Maximum Diurnal Average: 4.2 ppb at hour 9																		Minimum Diurnal Average: 1.8 ppb at hour 16						Hours of Missing Data: 36		
Monthly Average: 2.8 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 11						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-Feb	1	Z	1	3	3	4	6	6	7	7	5	3	3	2	1	1	3	8	3	5	2	3	2	2	3.5	8
2-Feb	1	1	Z	2	2	2	3	3	3	2	C	C	C	C	C	C	C	C	5	8	4	5	6	2	--	8
3-Feb	4	2	2	Z	4	4	7	5	7	5	4	7	7	4	5	6	6	6	8	11	6	3	0	0	5.0	11
4-Feb	1	2	2	2	Z	4	7	3	3	4	2	3	3	1	1	1	4	5	4	4	5	5	3	2	3.1	7
5-Feb	4	2	4	4	3	Z	2	2	1	1	2	3	4	2	2	2	3	5	6	8	5	4	4	4	3.4	8
6-Feb	Z	4	3	4	4	6	6	5	10	7	8	6	3	2	2	2	9	5	6	10	16	19	13	11	6.9	19
7-Feb	6	Z	5	3	4	3	4	4	5	4	4	3	1	1	1	1	1	1	2	3	3	1	1	1	2.7	6
8-Feb	3	3	Z	5	2	2	2	3	3	3	2	2	1	1	1	1	1	1	2	2	2	2	3	5	2.2	5
9-Feb	6	7	7	Z	6	7	7	6	8	6	5	5	7	6	7	7	5	5	5	9	6	5	3	2	6.1	9
10-Feb	2	2	3	2	Z	3	7	8	17	13	10	5	4	3	2	2	4	12	8	2	3	3	3	3	5.2	17
11-Feb	4	3	3	3	4	Z	5	5	4	3	1	1	1	1	1	1	1	2	1	2	3	1	1	1	2.3	5
12-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0.8	1
13-Feb	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3	2	2	1	2	1.2	3
14-Feb	1	1	Z	2	2	2	3	3	3	3	2	2	2	1	2	3	3	3	4	3	4	3	3	3	2.5	4
15-Feb	3	3	3	Z	3	3	5	4	6	8	8	8	8	8	7	5	5	5	4	3	2	2	3	3	4.8	8
16-Feb	2	2	2	2	Z	2	3	6	5	7	4	4	8	5	4	5	6	7	5	4	5	4	5	4	4.4	8
17-Feb	4	5	5	6	5	Z	3	3	2	4	3	1	0	1	1	0	1	0	0	1	2	2	3	2	2.5	6
18-Feb	Z	4	6	6	4	2	3	2	3	2	1	0	0	1	1	1	1	6	4	1	1	1	0	0	2.1	6
19-Feb	0	Z	1	0	0	0	1	0	1	1	1	1	1	1	0	0	1	1	1	2	1	1	1	1	0.8	2
20-Feb	0	0	Z	0	0	0	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
21-Feb	1	1	1	Z	1	1	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	1
22-Feb	0	0	0	0	Z	1	2	3	4	2	1	0	0	1	0	0	0	1	1	3	5	4	3	4	1.6	5
23-Feb	3	1	1	1	1	Z	4	2	5	1	1	2	3	2	2	1	2	2	2	4	2	2	2	3	2.2	5
24-Feb	Z	1	2	1	2	2	5	4	3	1	2	3	1	1	1	1	0	1	0	1	3	2	2	2	1.9	5
25-Feb	1	Z	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	2	4	4	3	4	3	1.9	4
26-Feb	1	1	Z	1	2	3	3	4	3	1	3	2	2	1	0	0	0	1	5	2	1	1	1	2	1.8	5
27-Feb	1	1	2	Z	3	3	2	1	1	1	1	1	1	1	1	1	2	2	6	5	4	2	2	2	2.1	6
28-Feb	3	2	4	5	Z	3	4	7	8	4	2	1	2	4	3	3	3	3	4	3	2	3	1	1	3.2	8
																		Diurnal Average						Diurnal Maximum		
2.3 2.2 2.6 2.4 2.5 2.6 3.5 3.4 4.2 3.4 2.8 2.5 2.5 2.0 1.8 1.8 2.4 3.3 3.4 3.8 3.4 3.1 2.6 2.4																										
6 7 7 6 6 7 7 8 17 13 10 8 8 8 7 7 9 12 8 11 16 19 13 11																										
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Janvier - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	636	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: 636

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Janvier - February 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	84	28	8	4	9	19	18	58	124	69	55	63	25	14	13	636
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	45	84	28	8	4	9	19	18	58	124	69	55	63	25	14	13	636

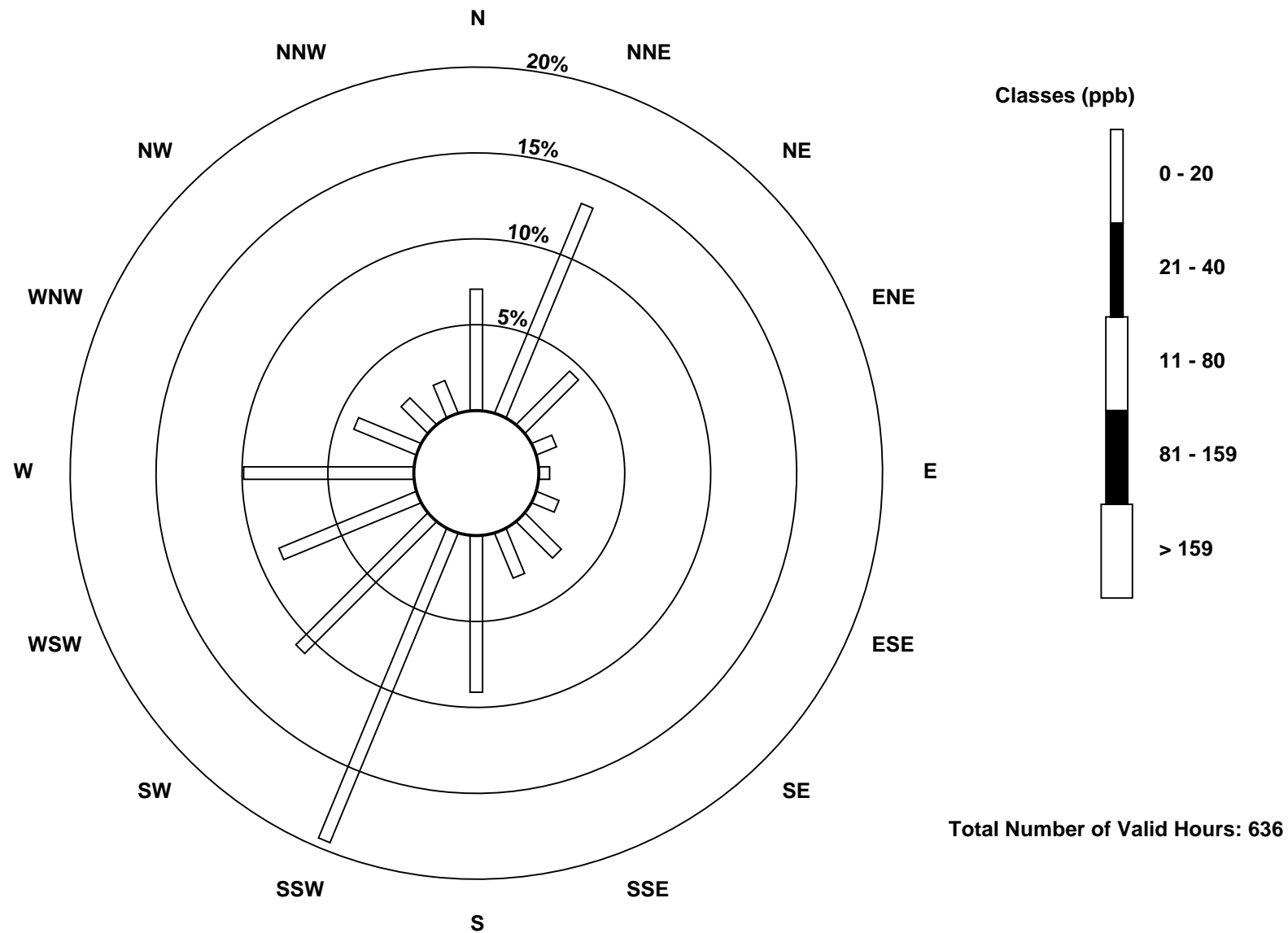
Total Number of Valid Hours: 636

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

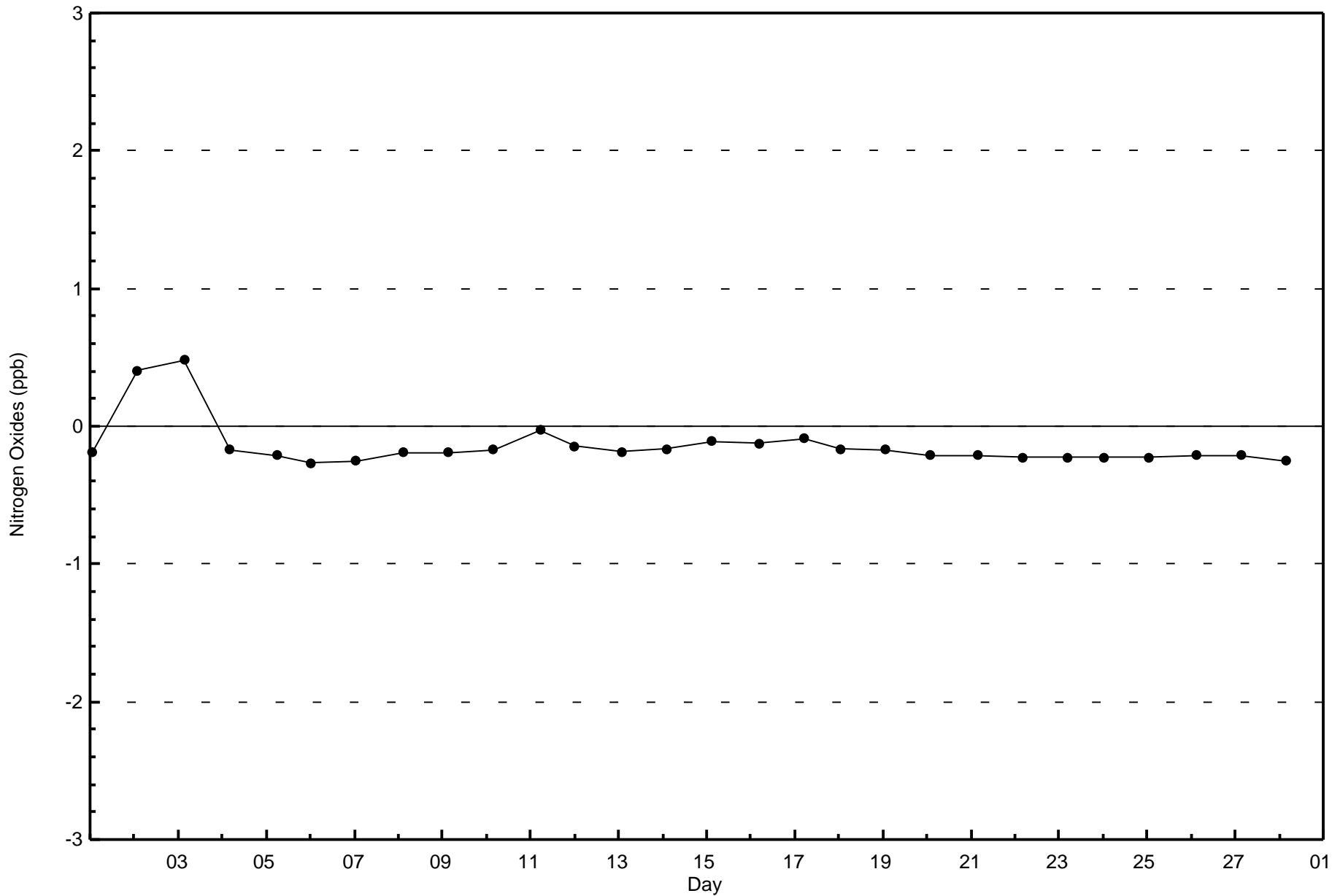
Nitrogen Oxides (NO_x) - ppb
Janvier (AMS 22)





Wood Buffalo Environmental Association
Zero Responses

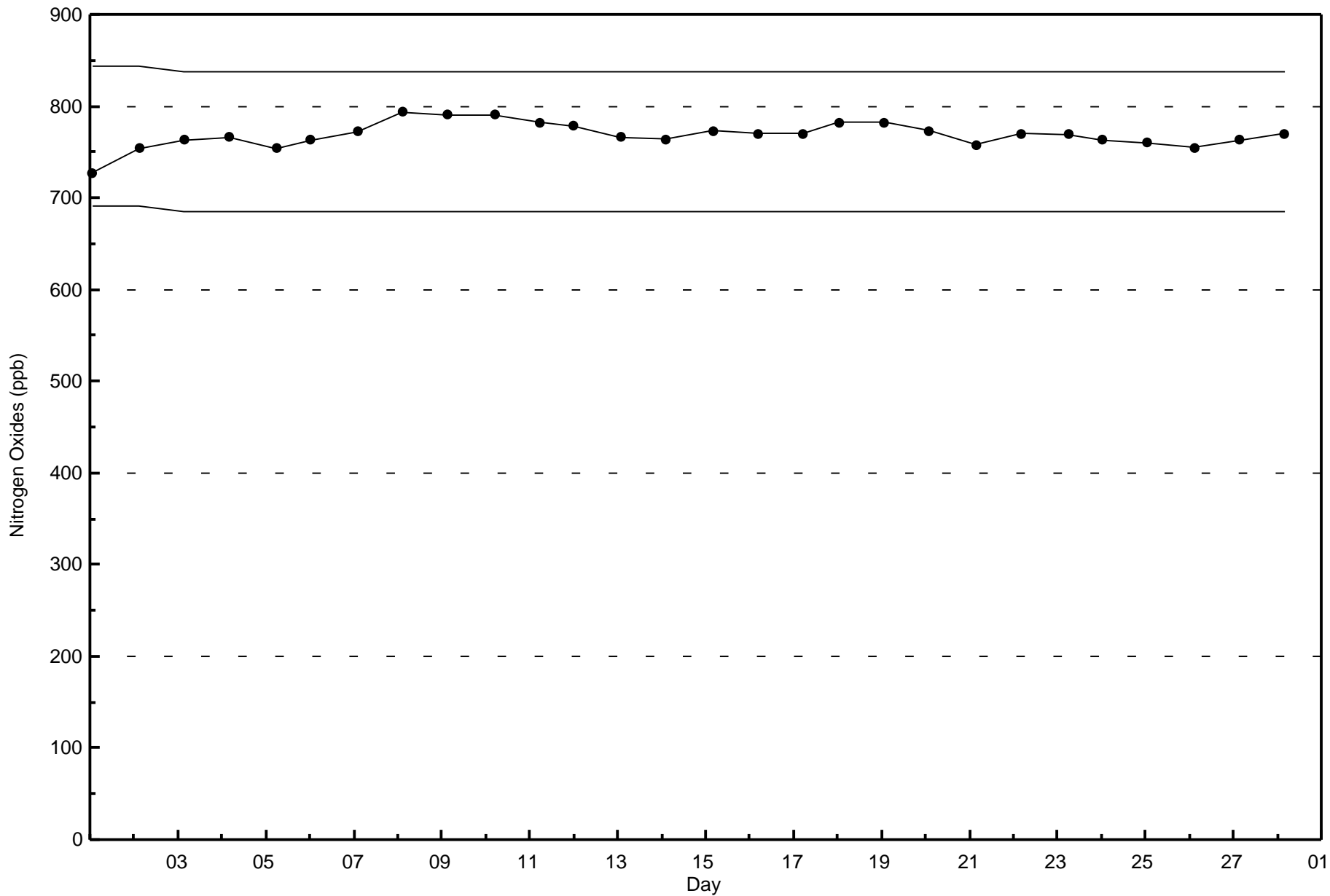
Nitrogen Oxides (NO_x) - ppb
Janvier - February 2017





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Janvier - February 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

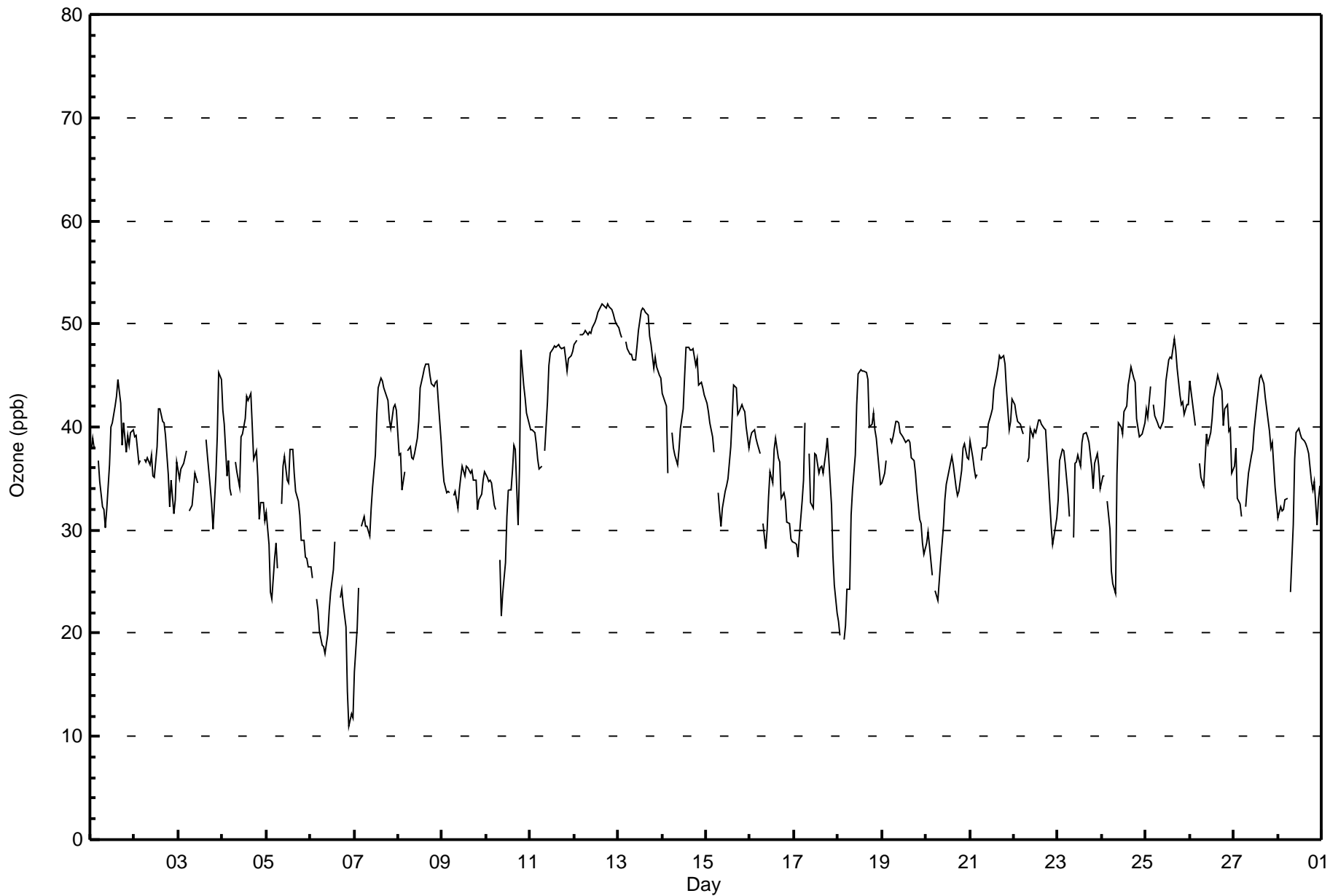
Janvier - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 52 ppb on Feb 12 19:00										Maximum Daily Average: 50.2 ppb on Feb 12										Hours of Data: 638						
Minimum Value: 11 ppb on Feb 6 22:00										Minimum Daily Average: 20.7 ppb on Feb 6										Hours of Missing Data: 34						
Maximum Diurnal Average: 42.6 ppb at hour 16										Minimum Diurnal Average: 33.7 ppb at hour 8										Hours of Calibration: 32						
Monthly Average: 37.6 ppb										Percentiles: P ₁ = 19 P ₁₀ = 29 Q ₁ = 34 Median = 38 Q ₃ = 42 P ₉₀ = 47 P ₉₉ = 52										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-Feb	38	39	38	Z	37	35	32	32	30	32	36	40	40	42	43	45	42	38	40	38	39	38	39	40	38.0	45
2-Feb	39	39	37	37	Z	37	37	37	36	37	35	35	38	42	42	41	40	39	35	32	35	32	33	37	37.0	42
3-Feb	35	36	36	36	38	Z	32	32	34	36	35	C	C	C	C	39	37	34	33	30	35	39	45	45	36.1	45
4-Feb	42	40	35	37	34	33	Z	37	36	34	39	39	41	43	43	43	40	37	38	35	31	33	33	31	37.1	43
5-Feb	32	29	24	23	27	29	26	Z	33	36	37	35	35	38	38	36	34	33	31	29	29	27	27	26	31.0	38
6-Feb	26	25	Z	23	22	20	19	19	18	20	22	24	26	29	M	M	23	24	23	21	14	11	12	12	20.7	29
7-Feb	16	20	24	Z	30	31	30	30	29	32	34	37	41	44	45	45	44	43	43	41	40	42	42	42	36.0	45
8-Feb	37	37	34	36	Z	38	38	37	37	37	39	41	44	45	46	46	46	45	44	44	44	44	42	39	40.9	46
9-Feb	36	35	34	34	34	Z	33	34	32	34	35	36	35	36	36	36	36	35	35	32	33	33	35	36	34.5	36
10-Feb	35	35	35	35	32	32	Z	27	22	24	27	31	34	34	36	38	38	31	36	48	44	43	41	40	34.6	48
11-Feb	40	40	39	38	37	36	36	Z	38	42	46	47	48	48	48	48	48	48	48	47	45	47	47	47	43.8	48
12-Feb	48	48	Z	49	49	49	49	49	49	49	50	50	51	51	52	52	52	52	52	52	51	51	50	50	50.2	52
13-Feb	50	49	49	Z	48	48	47	47	47	47	48	49	51	52	51	51	51	49	48	46	47	46	45	45	48.2	52
14-Feb	43	42	42	35	Z	39	38	37	36	38	40	42	45	48	48	47	47	48	46	47	44	44	44	43	42.8	48
15-Feb	42	42	40	39	37	Z	34	32	30	32	34	34	35	38	41	44	44	41	41	42	42	41	40	38	38.5	44
16-Feb	39	39	40	39	38	37	Z	31	28	30	33	36	35	38	39	37	37	33	34	33	31	31	29	29	34.5	40
17-Feb	29	29	27	29	33	35	40	Z	37	33	32	37	37	36	36	36	36	38	39	37	32	28	25	22	33.1	40
18-Feb	21	20	Z	19	21	24	24	31	34	37	42	45	46	45	45	45	45	40	40	41	40	39	36	34	35.5	46
19-Feb	35	36	37	Z	39	39	39	40	41	40	39	39	39	38	39	38	37	37	36	34	31	31	29	28	36.5	41
20-Feb	29	30	28	26	Z	24	23	25	27	30	33	34	36	37	37	36	34	33	34	36	38	38	37	37	32.3	38
21-Feb	39	37	36	35	35	Z	37	38	38	38	40	41	42	44	45	46	47	47	47	46	44	40	40	43	41.0	47
22-Feb	42	41	41	40	40	39	Z	37	37	40	39	40	39	41	41	40	40	40	37	33	30	29	29	31	37.6	42
23-Feb	33	37	38	38	36	33	31	Z	29	36	37	37	36	38	39	39	39	36	34	37	37	36	34	36.1	39	
24-Feb	35	35	Z	33	30	26	25	24	35	40	40	39	42	42	44	45	46	45	44	41	39	39	39	40	37.8	46
25-Feb	42	41	44	Z	42	41	40	40	40	41	42	44	46	47	47	49	48	46	43	42	42	41	42	42	43.1	49
26-Feb	44	42	41	40	Z	36	35	34	37	39	38	40	41	43	44	45	44	43	40	42	42	40	40	35	40.3	45
27-Feb	36	38	33	33	31	Z	32	34	36	37	38	40	42	44	45	45	44	43	42	40	38	39	34	33	38.0	45
28-Feb	31	32	32	32	33	33	Z	24	30	37	39	40	39	39	39	38	38	37	35	34	35	30	33	34	34.6	40
36.2 36.2 36.0 34.2 35.0 34.6 33.9 33.7 34.1 36.1 37.5 39.0 40.1 41.5 42.6 42.6 41.3 39.9 39.3 38.3 37.6 36.9 36.7 36.2																								Diurnal Average		
50 49 49 49 49 49 49 49 49 49 50 50 51 52 52 52 52 52 52 52 51 51 50 50																								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
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Janvier - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	13	2.04	2.04
21 - 50	610	95.61	97.65
51 - 82	15	2.35	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Janvier - February 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	0	0	0	1	0	2	1	5	4	0	0	0	0	0	0	13
21 - 50	43	80	28	8	3	9	18	17	54	117	66	48	60	29	15	15	610
51 - 82	0	0	0	0	0	0	0	0	0	0	2	9	4	0	0	0	15
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	80	28	8	4	9	20	18	59	121	68	57	64	29	15	15	638

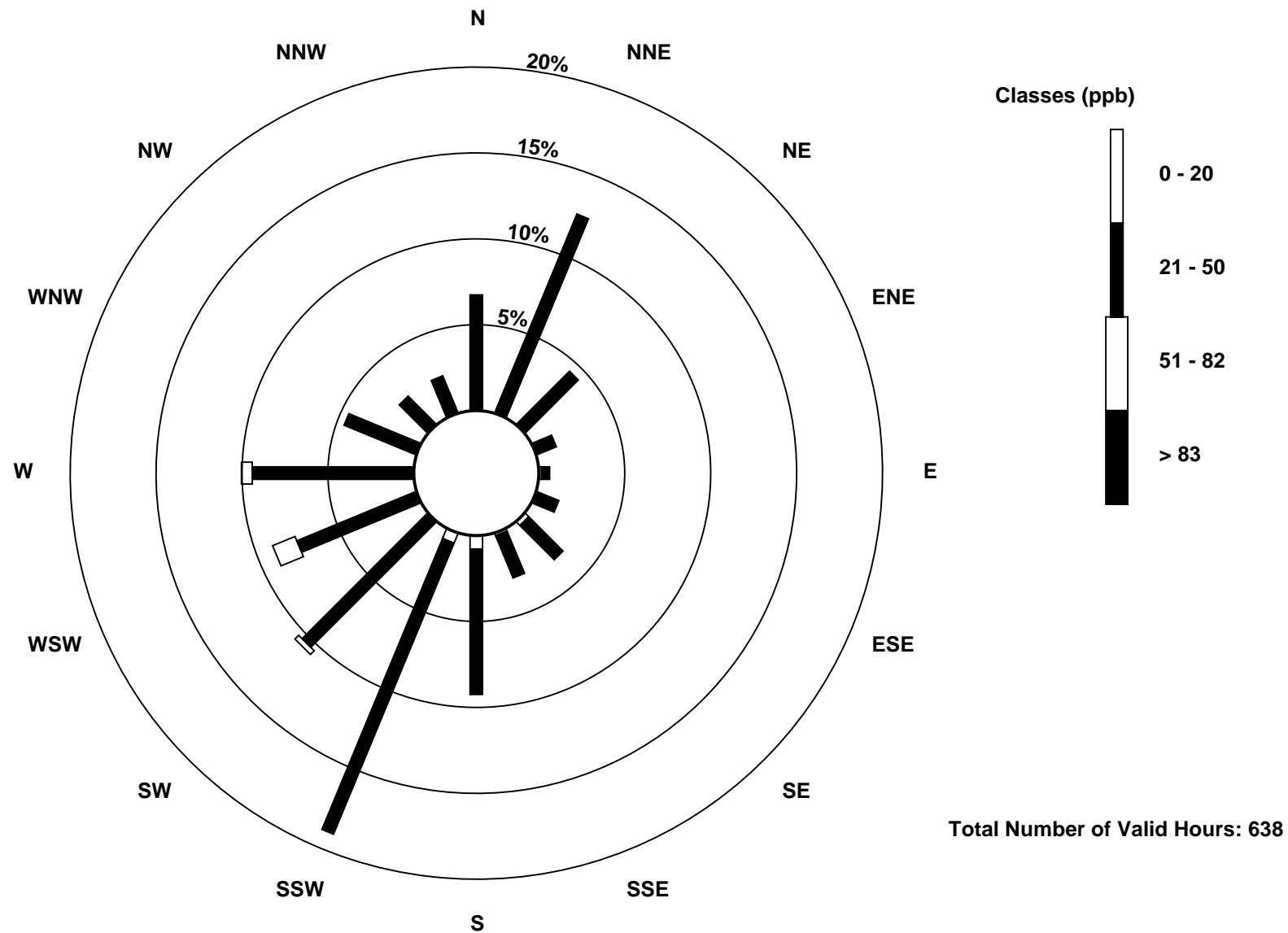
Total Number of Valid Hours: 638

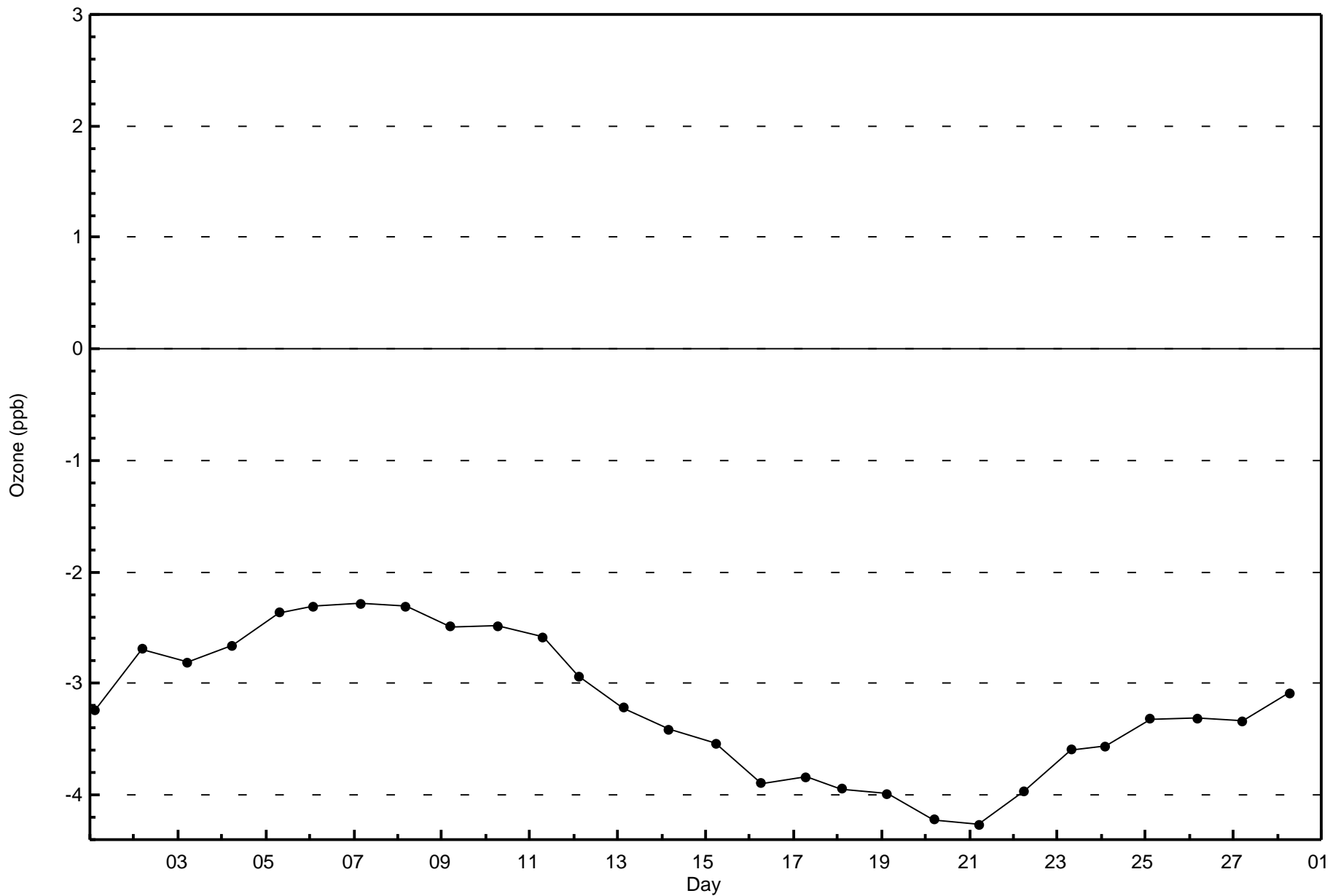
Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Ozone (O₃) - ppb
Janvier (AMS 22)

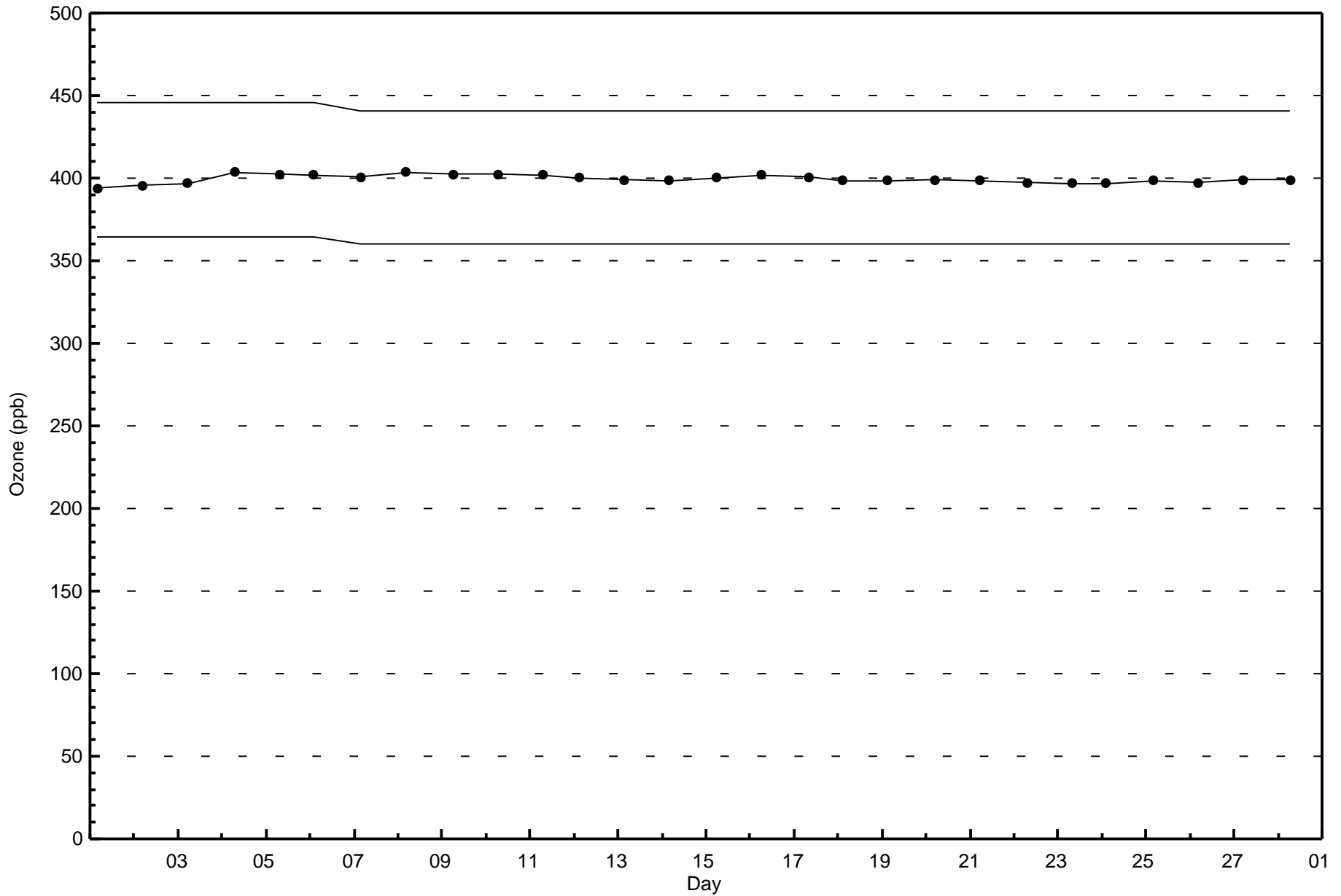






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Janvier - February 2017





Summary of Hour Averages

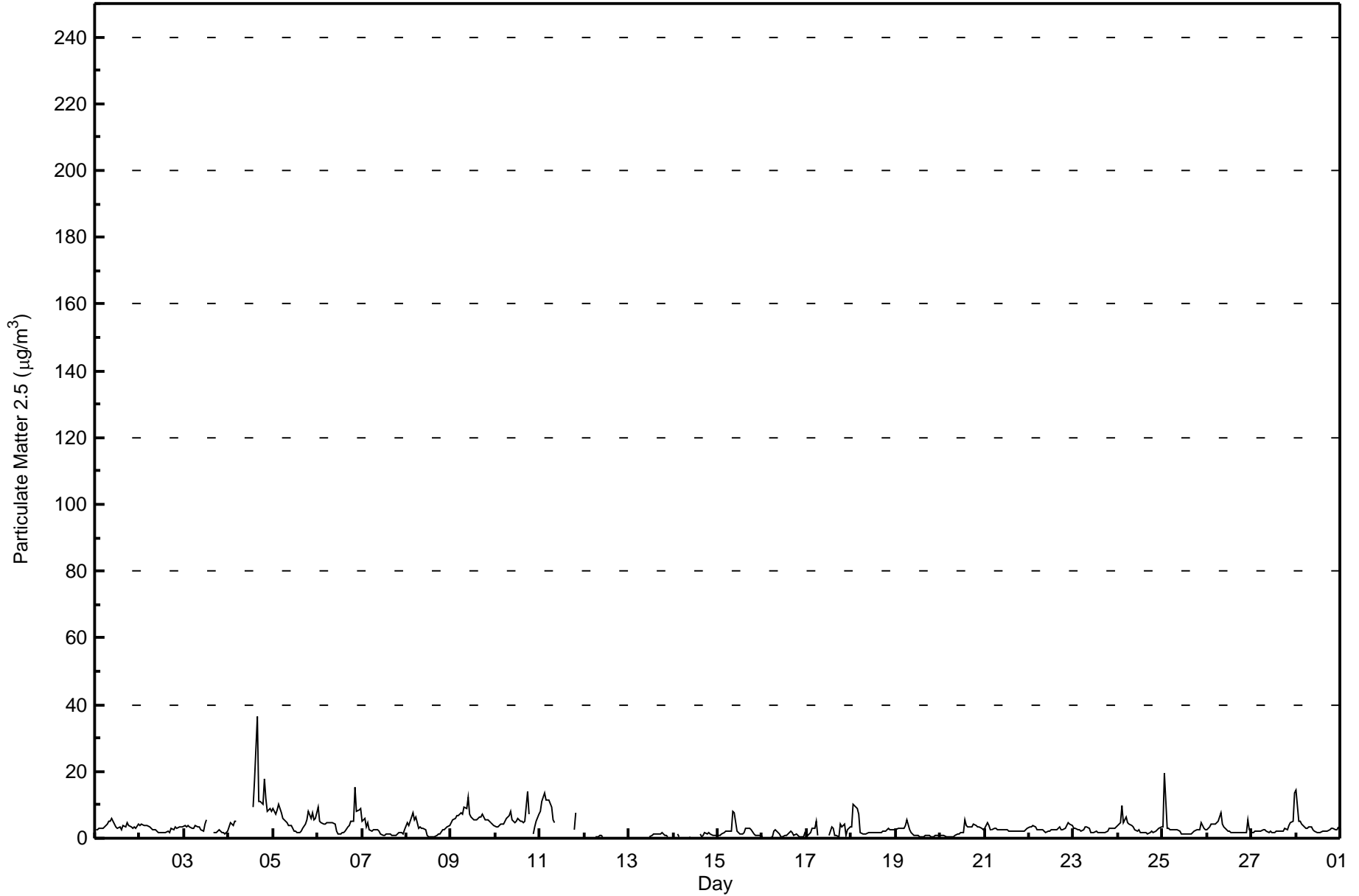
Janvier - February 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 36.2 µg/m ³ on Feb 4 16:00 Minimum Value: 0.1 µg/m ³ on Feb 11 13:00 Maximum Diurnal Average: 4.9 µg/m ³ at hour 2 Monthly Average: 3.35 µg/m ³		Maximum Daily Average: 6.4 µg/m ³ on Feb 9 Minimum Daily Average: 1.0 µg/m ³ on Feb 16 Minimum Diurnal Average: 1.9 µg/m ³ at hour 13 Percentiles: P ₁ = 0.2 P ₁₀ = 0.9 Q ₁ = 1.7 Median = 2.7 Q ₃ = 4.1 P ₉₀ = 6.4 P ₉₉ = 14.2		Hours in Service: 672 Hours of Data: 602 Hours of Missing Data: 70 Hours of Calibration: 3 Percent Operational Time: 90.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.4	2.4	2.8	2.8	3.1	3.2	4.2	5.0	5.0	5.9	4.4	3.5	2.8	3.3	2.7	3.9	3.2	4.6	3.9	3.5	3.0	3.2	2.9	4.2	3.6	5.9
2-Feb	3.8	4.3	3.8	3.9	3.9	3.5	3.1	2.5	2.7	2.2	1.7	1.8	1.6	1.7	1.7	2.3	1.8	3.1	2.7	3.4	3.0	3.4	3.5	3.5	2.9	4.3
3-Feb	3.6	3.3	3.7	3.4	2.8	3.0	4.0	3.4	3.3	2.7	2.1	4.2	5.3	C	C	C	1.6	1.7	2.0	2.7	1.9	1.5	1.3	1.9	2.8	5.3
4-Feb	3.3	4.5	3.9	5.2	5.0	AF	AF	AF	AF	AF	AF	AF	AF	9.4	17.4	36.2	10.9	11.2	10.4	17.9	11.7	8.2	8.9	7.9	--	36.2
5-Feb	9.0	7.0	8.4	10.3	7.6	5.9	5.4	4.7	3.9	3.9	3.8	2.3	2.0	1.6	1.8	2.1	2.9	4.4	5.4	8.1	6.0	7.7	5.6	6.1	5.2	10.3
6-Feb	9.2	5.1	4.6	4.2	4.3	4.8	4.7	4.7	4.7	4.3	2.3	1.5	1.3	1.5	1.8	2.0	3.3	3.9	5.2	4.9	15.4	7.9	8.3	9.0	4.9	15.4
7-Feb	5.2	5.7	3.6	4.6	2.5	2.3	2.5	2.6	2.6	1.9	1.3	1.0	1.1	1.2	1.1	1.1	1.0	0.9	0.9	1.4	1.6	1.8	1.2	2.5	2.2	5.7
8-Feb	4.6	3.7	5.0	7.5	5.7	6.3	3.2	3.4	3.1	2.8	2.6	0.8	0.5	0.4	0.5	0.6	0.9	1.2	1.1	2.4	2.7	2.9	3.5	3.7	2.9	7.5
9-Feb	4.5	5.5	5.9	6.8	6.8	7.5	7.4	9.5	9.0	12.3	7.2	6.4	5.7	5.3	5.5	6.2	6.2	7.2	5.5	5.6	5.3	4.7	4.0	3.8	6.4	12.3
10-Feb	3.3	3.5	3.9	4.4	4.3	5.2	6.0	6.8	8.1	5.7	4.5	4.9	5.9	5.2	5.0	4.8	4.9	14.1	7.0	UO	1.2	3.6	5.1	7.0	5.4	14.1
11-Feb	8.1	10.9	13.6	11.6	11.6	11.5	9.4	5.6	4.5	UO	UO	UO	0.1	UO	UO	UO	UO	UO	2.4	7.6	UO	UO	UO	UO	--	13.6
12-Feb	UO	UO	UO	UO	UO	UO	0.4	0.5	1.0	1.0	0.3	UO	0.4	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	1.0
13-Feb	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.2	0.8	1.1	1.1	1.2	1.1	1.5	1.5	0.9	0.8	0.3	UO	8.7	--	8.7
14-Feb	UO	UO	1.4	0.4	UO	UO	UO	0.2	0.1	0.5	UO	UO	UO	UO	1.1	0.5	0.9	1.7	1.3	1.7	1.1	0.7	0.9	0.9	--	1.7
15-Feb	0.9	1.0	1.4	1.7	2.3	2.2	2.2	2.3	8.2	7.6	2.1	1.8	1.4	1.4	1.8	2.9	2.8	3.0	2.6	1.3	1.0	0.7	1.0	1.0	2.3	8.2
16-Feb	0.4	UO	UO	0.1	0.2	0.6	2.1	2.7	1.6	1.2	0.3	0.3	0.8	0.9	1.2	1.9	1.5	0.9	1.2	0.7	0.3	0.3	0.4	1.7	1.0	2.7
17-Feb	0.7	1.1	1.6	2.8	2.9	4.9	0.7	UO	UO	UO	UO	UO	0.9	3.3	3.1	0.6	0.8	0.3	4.1	3.2	4.1	0.8	2.7	3.4	2.2	4.9
18-Feb	3.2	10.0	9.5	8.8	7.1	1.6	1.3	1.3	1.4	1.5	1.7	1.9	1.7	1.7	1.7	1.6	1.8	2.1	2.0	2.4	2.8	2.7	2.3	2.5	3.1	10.0
19-Feb	2.6	2.8	2.9	3.1	3.0	3.6	5.4	2.4	1.7	1.2	0.9	0.8	0.7	0.6	0.5	0.6	1.0	0.6	0.7	0.6	0.6	0.7	1.0	0.9	1.6	5.4
20-Feb	0.8	0.8	0.7	0.6	0.6	0.5	0.6	0.6	0.9	1.3	1.4	1.5	1.8	5.6	4.0	3.5	3.5	3.5	4.1	3.9	3.2	3.2	3.0	2.6	2.2	5.6
21-Feb	3.1	4.6	3.7	2.5	2.6	3.0	3.2	2.7	2.5	2.6	2.6	2.6	2.6	2.2	2.1	2.0	2.1	2.1	2.2	2.1	2.1	2.3	2.4	3.0	2.6	4.6
22-Feb	3.5	3.5	3.7	3.5	2.6	2.6	2.5	2.5	2.3	1.8	2.0	2.2	2.4	2.5	2.5	2.6	3.2	2.6	2.5	2.8	3.6	4.7	4.3	3.7	2.9	4.7
23-Feb	2.9	2.8	2.7	2.5	2.3	2.4	3.4	3.3	2.9	1.8	1.7	1.9	2.0	1.9	1.8	1.8	1.8	1.8	2.2	2.9	3.0	2.9	2.8	3.3	2.5	3.4
24-Feb	4.1	4.9	9.9	4.7	6.5	4.6	4.0	3.6	3.5	2.6	2.3	2.4	1.9	1.7	1.8	1.6	1.4	1.5	1.9	1.9	2.0	2.7	2.9	3.5	3.2	9.9
25-Feb	3.5	19.6	2.9	2.9	2.6	2.6	2.7	2.6	2.6	2.0	1.5	1.4	1.4	1.3	1.3	1.3	1.5	2.1	2.7	2.7	2.7	4.5	2.8	2.5	3.1	19.6
26-Feb	2.4	3.3	4.1	4.1	4.2	4.5	5.2	7.8	4.3	3.4	2.9	2.1	2.1	1.9	1.9	1.8	1.8	1.8	1.7	1.8	1.9	1.8	5.5	2.7	3.1	7.8
27-Feb	1.8	1.8	2.1	2.1	2.2	2.3	2.7	2.7	2.3	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.8	2.6	3.9	4.8	5.0	2.9	13.4
28-Feb	14.6	5.2	5.0	4.4	3.7	3.1	2.8	3.6	3.5	2.7	2.2	1.8	1.8	1.8	1.9	2.0	2.0	2.1	2.7	3.1	2.9	2.7	2.5	3.3	3.4	14.6
																								Diurnal Average		
4.1 4.9 4.4 4.2 4.0 3.8 3.6 3.5 3.4 3.1 2.3 2.1 1.9 2.5 2.7 3.5 2.5 3.2 3.1 3.5 3.4 3.1 3.4 4.1																								Diurnal Maximum		
14.6 19.6 13.6 11.6 11.6 11.5 9.4 9.5 9.0 12.3 7.2 6.4 5.9 9.4 17.4 36.2 10.9 14.1 10.4 17.9 15.4 8.2 8.9 13.4																										
C - Calibration AF - Analyzer Failure 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}) - $\mu\text{g}/\text{m}^3$
Janvier - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - February 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	446	74.09	74.09
6 - 15	76	12.62	86.71
16 - 25	3	0.50	87.21
26 - 80	1	0.17	87.38
> 81.0	0	0.00	87.38

Total Number of Valid Hours: 602

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - February 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	69	22	6	1	8	12	10	33	80	37	30	45	26	15	13	446
6 - 15	4	7	1	2	2	2	4	5	15	26	4	3	1	0	0	0	76
16 - 25	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	3
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	43	76	23	8	3	10	17	15	48	107	41	33	47	27	15	13	526

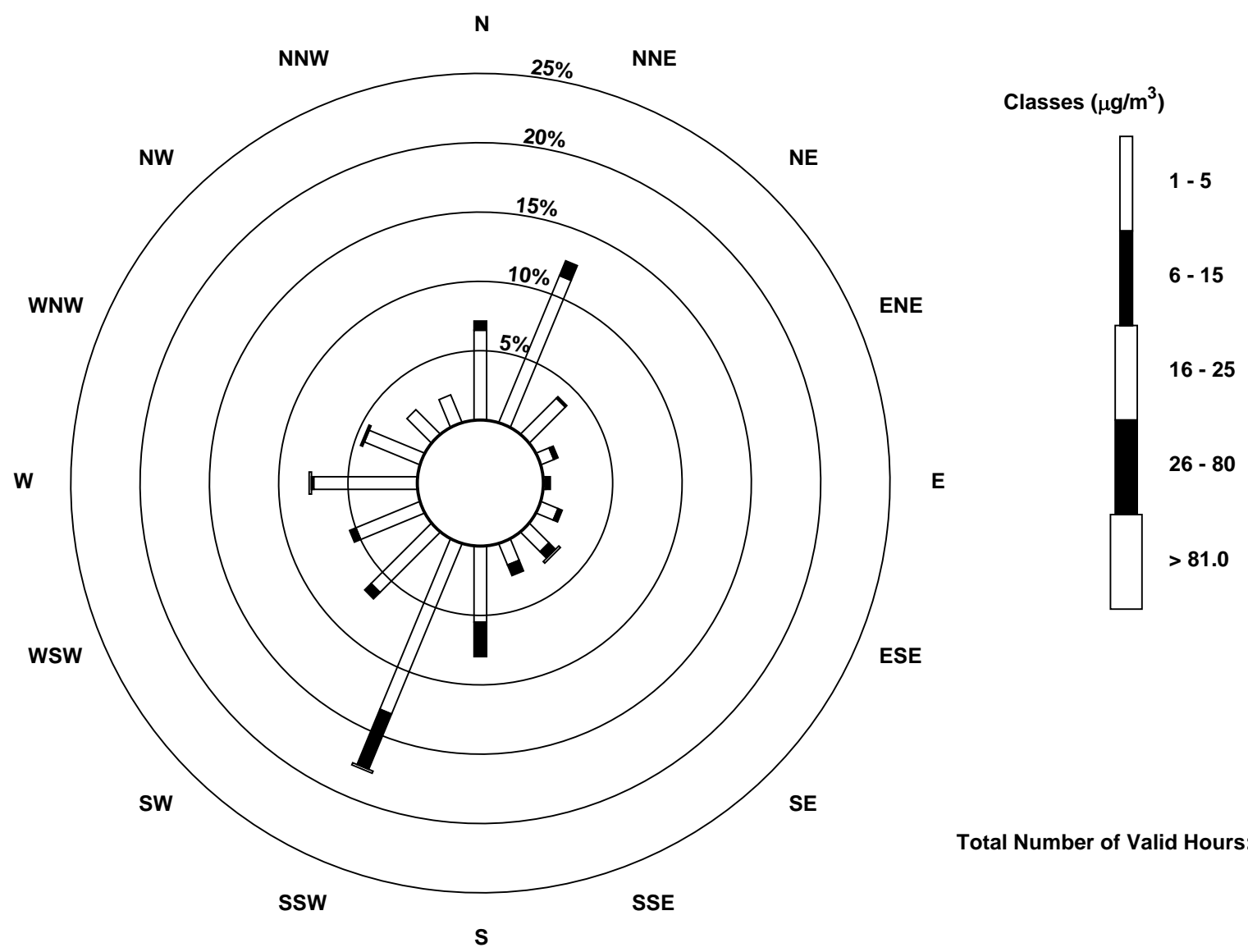
Total Number of Valid Hours: 602

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier (AMS 22)



Total Number of Valid Hours: 602



Wood Buffalo Environmental Association
Summary of Hour Averages

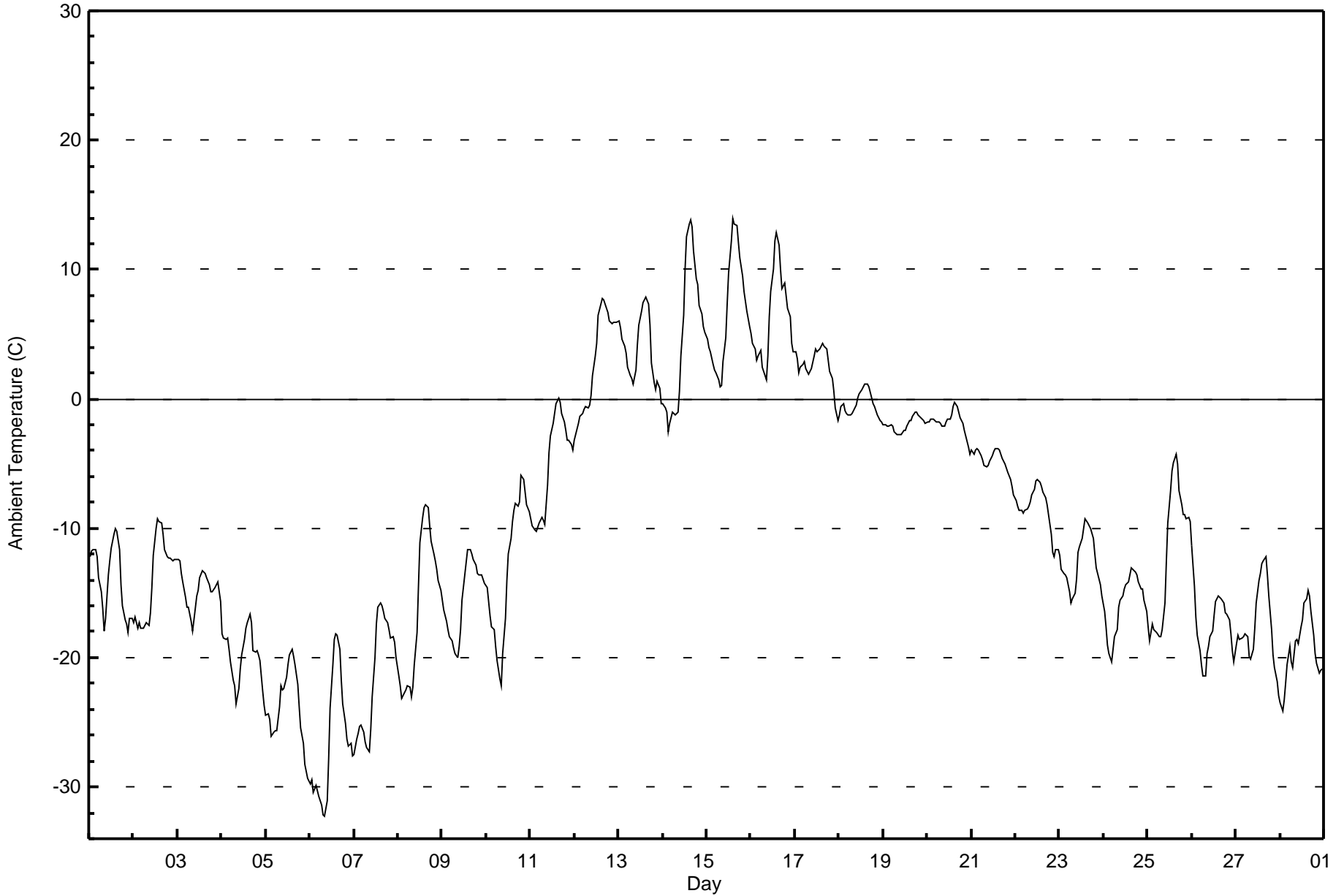
Ambient Temperature (AT) - C
Janvier - February 2017

Maximum Value: 13.9 C on Feb 15 15:00 Maximum Daily Average: 6.7 C on Feb 15																						Hours in Service: 672				
Minimum Value: -32.3 C on Feb 6 09:00 Minimum Daily Average: -26.3 C on Feb 6																						Hours of Data: 672				
Maximum Diurnal Average: -5.5 C at hour 16 Minimum Diurnal Average: -12.8 C at hour 8																						Hours of Missing Data: 0				
Monthly Average: -9.62 C Percentiles: P₁ = -30.0 P₁₀ = -21.8 Q₁ = -17.8 Median = -11.6 Q₃ = -1.2 P₉₀ = 4.0 P₉₉ = 12.8																						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-Feb	-12.2	-11.7	-11.7	-11.7	-12.2	-13.8	-14.9	-16.2	-17.9	-17.0	-13.6	-12.6	-11.5	-10.5	-10.1	-10.2	-11.6	-14.4	-16.0	-17.1	-17.4	-18.0	-17.0	-16.9	-14.0	-10.1
2-Feb	-17.3	-16.9	-17.7	-17.3	-17.7	-17.7	-17.5	-17.3	-17.5	-16.5	-14.6	-12.1	-10.0	-9.2	-9.5	-9.6	-10.5	-11.6	-12.2	-12.3	-12.3	-12.5	-12.4	-12.4	-13.9	-9.2
3-Feb	-12.4	-12.5	-13.5	-14.1	-15.3	-16.1	-16.1	-17.2	-18.0	-17.0	-15.3	-14.8	-13.8	-13.3	-13.4	-13.5	-13.8	-14.4	-14.9	-15.0	-14.6	-14.3	-14.2	-15.7	-14.7	-12.4
4-Feb	-18.2	-18.5	-18.6	-18.5	-19.4	-20.3	-21.8	-22.2	-23.6	-22.4	-20.9	-19.8	-18.6	-17.7	-17.2	-16.7	-17.3	-19.5	-19.6	-19.4	-19.7	-20.2	-22.6	-23.7	-19.8	-16.7
5-Feb	-24.4	-24.3	-24.7	-26.1	-25.8	-25.7	-25.7	-23.8	-22.2	-22.5	-22.4	-21.6	-20.5	-19.8	-19.3	-19.9	-20.6	-22.0	-23.8	-25.4	-26.6	-28.3	-28.8	-29.4	-23.9	-19.3
6-Feb	-29.7	-29.4	-30.4	-29.9	-30.3	-30.8	-31.4	-32.1	-32.3	-31.1	-27.8	-23.9	-20.5	-18.6	-18.1	-18.3	-19.4	-21.8	-23.6	-25.2	-26.3	-26.8	-26.6	-27.6	-26.3	-18.1
7-Feb	-27.5	-26.3	-25.9	-25.3	-25.3	-25.7	-26.5	-26.9	-27.3	-25.6	-23.0	-20.0	-17.4	-16.1	-15.7	-16.0	-16.4	-17.0	-17.3	-17.9	-18.4	-18.4	-18.9	-20.0	-21.5	-15.7
8-Feb	-21.4	-22.2	-23.1	-22.7	-22.5	-22.2	-22.3	-23.0	-22.3	-20.6	-18.1	-14.5	-11.2	-9.2	-8.4	-8.1	-8.4	-9.8	-11.0	-12.0	-12.5	-13.2	-14.0	-14.8	-16.1	-8.1
9-Feb	-15.5	-16.3	-17.2	-17.8	-18.3	-18.7	-19.2	-19.7	-20.0	-19.2	-17.8	-15.5	-13.7	-12.6	-11.6	-11.6	-12.0	-12.4	-12.8	-13.5	-13.6	-13.6	-13.9	-14.2	-15.5	-11.6
10-Feb	-14.6	-15.6	-16.8	-17.6	-17.8	-19.1	-20.2	-21.7	-22.2	-19.6	-16.9	-14.0	-11.9	-10.8	-9.5	-8.6	-8.1	-8.3	-7.9	-5.9	-6.2	-7.3	-8.2	-8.7	-13.2	-5.9
11-Feb	-9.2	-9.8	-10.1	-10.2	-9.9	-9.5	-9.2	-9.4	-9.7	-6.7	-4.1	-2.9	-1.9	-1.2	-0.4	0.0	-0.3	-1.1	-1.7	-2.5	-3.2	-3.2	-3.6	-3.9	-5.1	0.0
12-Feb	-3.2	-2.4	-1.9	-1.3	-1.2	-0.8	-0.5	-0.7	-0.4	0.3	1.7	3.3	4.3	6.5	7.3	7.8	7.7	7.0	6.7	6.0	5.8	5.9	5.9	6.0	2.9	7.8
13-Feb	6.0	5.5	4.6	4.1	3.5	2.5	1.7	1.6	1.2	2.2	4.1	5.7	6.8	7.4	7.7	7.8	7.4	5.7	2.8	1.2	0.7	1.3	0.8	-0.3	3.8	7.8
14-Feb	-0.4	-0.7	-1.1	-2.6	-1.9	-1.0	-1.1	-1.2	-1.0	0.7	3.3	6.5	10.1	12.5	13.5	13.8	13.3	11.4	9.3	8.9	7.2	6.5	5.6	5.1	4.9	13.8
15-Feb	4.6	4.0	3.6	2.7	2.2	2.0	1.4	1.0	1.0	2.9	4.7	7.3	9.7	12.2	13.9	13.6	13.4	12.1	10.9	9.5	8.3	7.5	6.8	5.6	6.7	13.9
16-Feb	5.0	4.3	3.9	3.0	3.3	3.8	2.4	2.1	1.4	3.3	6.3	8.3	10.0	12.2	12.9	11.9	10.0	8.5	9.0	8.0	7.0	6.3	4.3	3.7	6.3	12.9
17-Feb	3.6	3.1	2.0	2.5	2.7	2.9	2.3	1.9	2.1	2.4	3.3	3.8	3.7	3.8	4.1	4.3	4.1	3.8	3.0	2.1	1.6	0.6	-0.7	-1.6	2.5	4.3
18-Feb	-1.2	-0.6	-0.4	-0.9	-1.2	-1.3	-1.3	-1.1	-0.9	-0.5	0.0	0.4	0.7	0.9	1.1	1.1	1.0	0.5	-0.3	-0.6	-0.9	-1.2	-1.7	-1.8	-0.4	1.1
19-Feb	-2.0	-2.0	-2.1	-2.1	-2.0	-2.1	-2.6	-2.7	-2.8	-2.8	-2.8	-2.5	-2.5	-2.1	-1.7	-1.7	-1.4	-1.0	-1.1	-1.3	-1.5	-1.6	-1.7	-1.9	-2.0	-1.0
20-Feb	-1.8	-1.8	-1.6	-1.6	-1.7	-1.8	-1.8	-1.8	-2.1	-2.1	-1.8	-1.6	-1.6	-1.2	-0.6	-0.3	-0.6	-1.0	-1.5	-1.9	-2.5	-2.9	-3.7	-4.3	-1.8	-0.3
21-Feb	-3.9	-4.2	-4.0	-3.9	-3.9	-4.4	-4.8	-5.1	-5.3	-5.2	-4.8	-4.4	-4.1	-3.8	-3.8	-3.9	-4.3	-4.6	-5.0	-5.3	-5.7	-6.3	-6.7	-7.4	-4.8	-3.8
22-Feb	-7.9	-8.3	-8.7	-8.6	-8.8	-8.6	-8.5	-8.3	-7.9	-7.4	-7.0	-6.3	-6.3	-6.4	-6.8	-7.2	-7.7	-8.2	-8.9	-10.5	-11.9	-12.2	-11.7	-11.6	-8.6	-6.3
23-Feb	-12.1	-13.2	-13.5	-13.6	-13.8	-15.0	-15.8	-15.5	-15.0	-13.9	-11.8	-11.4	-10.8	-10.0	-9.3	-9.6	-9.8	-10.0	-10.7	-12.0	-13.1	-13.9	-14.3	-15.3	-12.6	-9.3
24-Feb	-16.4	-17.7	-19.0	-19.7	-20.3	-19.4	-18.4	-17.9	-16.1	-15.5	-15.3	-14.7	-14.4	-14.2	-13.6	-13.1	-13.2	-13.4	-13.6	-14.1	-14.7	-14.6	-15.6	-16.4	-15.9	-13.1
25-Feb	-17.6	-18.7	-17.4	-17.9	-17.9	-18.1	-18.4	-18.3	-17.8	-15.8	-12.6	-9.6	-7.1	-5.6	-4.9	-4.2	-5.0	-7.1	-8.2	-8.9	-8.9	-9.2	-9.2	-9.5	-12.0	-4.2
26-Feb	-11.3	-14.5	-16.9	-18.2	-19.5	-20.6	-21.4	-21.4	-19.7	-19.1	-18.4	-17.9	-16.8	-15.7	-15.2	-15.3	-15.4	-15.7	-16.5	-16.7	-17.1	-18.2	-19.5	-20.4	-17.6	-11.3
27-Feb	-18.9	-18.2	-18.5	-18.5	-18.4	-18.1	-18.4	-19.9	-20.2	-19.4	-17.7	-15.7	-14.0	-13.5	-12.7	-12.5	-12.2	-13.6	-15.3	-17.8	-19.8	-20.8	-21.9	-22.9	-17.5	-12.2
28-Feb	-23.5	-24.2	-23.2	-22.0	-20.5	-19.2	-20.3	-20.7	-18.7	-18.6	-18.9	-17.7	-17.1	-15.8	-15.4	-14.8	-15.2	-16.5	-18.3	-19.6	-20.4	-21.2	-21.0	-20.9	-19.3	-14.8
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Janvier - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	95	14.14	14.14
-20 - 0	445	66.22	80.36
0 - 10	115	17.11	97.47
10 - 20	17	2.53	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

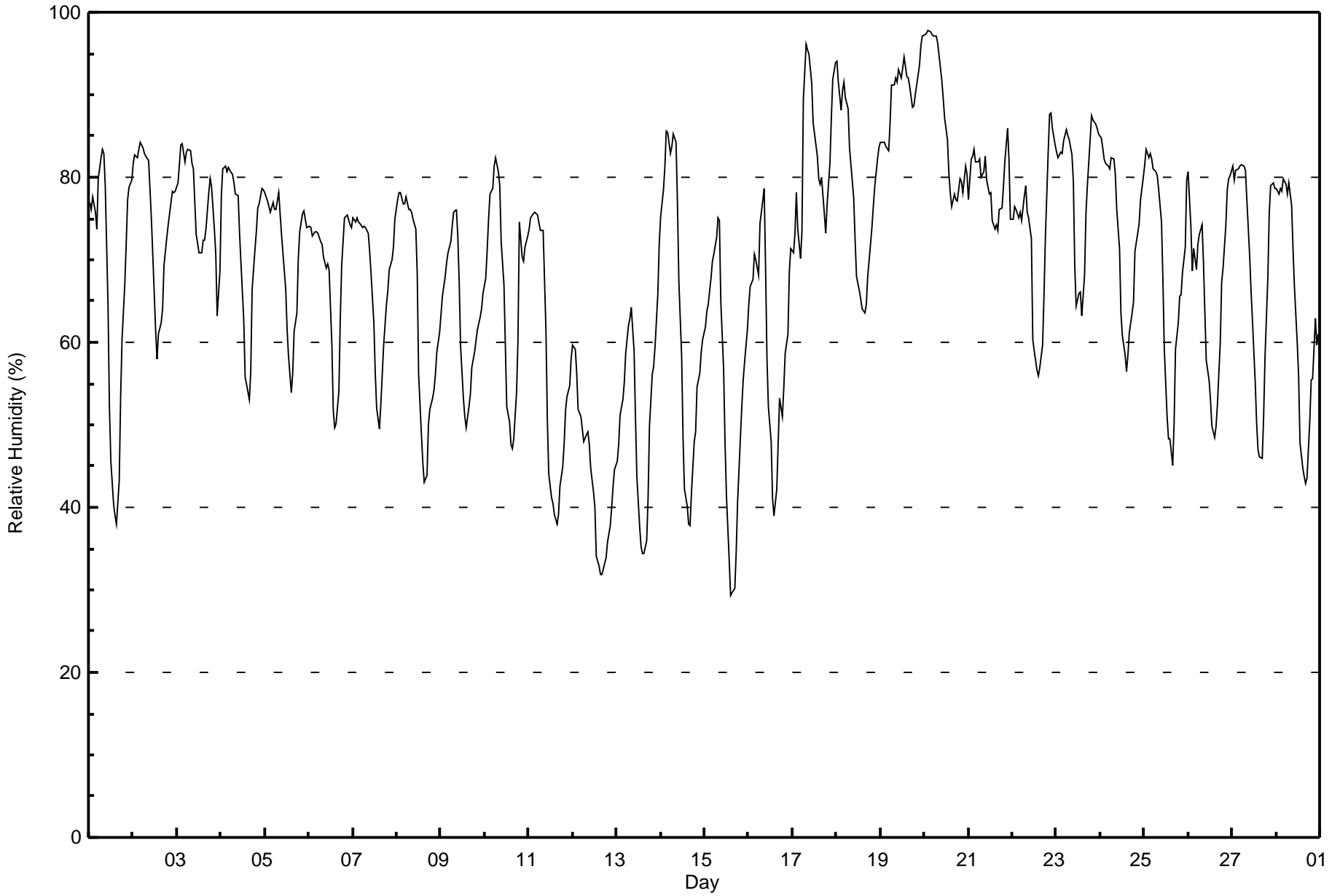
Janvier - February 2017

Maximum Value: 98 % on Feb 20 03:00 Maximum Daily Average: 90.3 % on Feb 19																		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 29 % on Feb 15 15:00 Minimum Daily Average: 43.6 % on Feb 12 Maximum Diurnal Average: 79.1 % at hour 8 Minimum Diurnal Average: 53.2 % at hour 15 Monthly Average: 69.0 % Percentiles: P ₁ = 33 P ₁₀ = 48 Q ₁ = 59 Median = 73 Q ₃ = 80 P ₉₀ = 84 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-Feb	77	76	78	76	74	80	82	83	83	79	64	52	46	40	39	38	43	53	60	67	72	77	79	80	66.6	83
2-Feb	82	83	82	83	84	84	83	83	82	78	75	71	62	58	61	62	64	69	73	74	76	78	78	78	75.1	84
3-Feb	79	81	84	84	82	83	83	83	82	81	73	72	71	71	72	72	74	78	80	79	74	71	63	69	76.7	84
4-Feb	78	81	81	81	81	81	80	79	78	78	73	70	63	56	55	53	56	66	71	73	76	77	79	78	72.7	81
5-Feb	78	77	76	76	77	76	76	78	76	73	71	67	62	58	54	56	61	63	70	73	76	76	75	74	70.8	78
6-Feb	74	74	73	73	73	73	72	72	70	69	69	69	60	52	50	50	54	63	69	75	75	75	74	74	68.1	75
7-Feb	75	75	75	75	74	74	74	74	73	71	68	62	56	52	50	53	56	60	65	66	69	70	72	75	67.2	75
8-Feb	77	78	78	77	77	78	76	76	76	75	74	68	56	49	45	43	44	50	52	53	54	56	59	61	63.9	78
9-Feb	63	66	68	70	71	72	74	76	76	73	67	59	53	51	50	52	54	57	59	60	61	63	64	66	63.6	76
10-Feb	68	71	75	78	79	81	82	81	79	72	67	59	52	50	48	47	48	54	60	75	70	70	72	73	67.1	82
11-Feb	74	75	76	76	76	75	73	74	74	62	51	44	41	40	39	38	39	43	45	48	52	53	55	58	57.5	76
12-Feb	60	59	56	52	51	50	48	49	49	48	45	42	40	34	33	32	32	33	34	36	38	40	42	45	43.6	60
13-Feb	46	48	51	53	55	59	62	63	64	59	51	44	38	35	34	34	36	41	50	56	57	60	66	72	51.4	72
14-Feb	75	79	81	86	85	83	84	85	84	77	68	58	48	42	40	38	38	42	48	49	55	56	59	60	63.3	86
15-Feb	62	64	65	68	70	71	73	75	75	65	57	48	41	33	29	30	30	35	41	48	52	55	58	62	54.4	75
16-Feb	65	67	68	71	70	68	74	76	79	69	58	52	48	41	39	42	48	53	51	54	59	61	69	71	60.5	79
17-Feb	71	73	78	74	70	73	90	96	95	95	91	87	85	83	80	79	80	76	73	77	82	87	92	94	82.5	96
18-Feb	94	91	88	90	92	90	88	84	82	77	72	68	66	65	64	64	65	68	72	74	77	79	82	84	78.1	94
19-Feb	84	84	84	84	83	87	91	91	92	91	93	92	93	95	92	92	91	88	89	90	92	94	96	97	90.3	97
20-Feb	97	98	98	98	97	97	97	96	95	92	89	87	85	80	78	76	78	77	77	80	80	78	81	80	87.2	98
21-Feb	77	82	82	83	82	82	82	80	81	83	80	78	78	75	74	74	74	76	76	79	82	86	82	75	79.3	86
22-Feb	75	76	76	75	76	75	78	79	76	75	72	60	59	57	56	57	60	66	73	83	88	88	86	84	72.8	88
23-Feb	83	82	83	83	84	86	85	85	83	79	69	64	66	66	63	68	76	79	85	87	87	86	86	85	79.2	87
24-Feb	85	84	82	82	81	81	82	82	80	76	71	64	61	58	56	58	61	64	65	71	73	74	77	80	72.9	85
25-Feb	82	83	82	83	82	81	81	80	78	75	68	59	51	48	48	45	50	59	62	66	66	68	71	80	68.7	83
26-Feb	81	74	69	71	69	72	73	74	70	64	58	55	53	50	49	50	53	60	67	69	74	79	80	80	66.3	81
27-Feb	81	80	81	81	81	82	81	81	77	71	66	63	55	50	47	46	46	51	58	68	76	79	79	79	69.1	82
28-Feb	79	78	79	78	80	79	78	79	77	71	67	60	56	48	45	44	43	44	50	55	56	63	60	61	63.7	80
																		75.7 76.4 76.8 77.1 77.0 77.5 78.8 79.1 78.0 74.2 68.9 63.4 58.7 54.9 53.2 53.4 55.5 59.6 63.4 67.4 69.5 71.4 72.7 74.1						Diurnal Average		
																		97 98 98 98 97 97 97 97 96 95 95 93 92 93 95 92 92 91 88 89 90 92 94 96 97						Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Janvier - February 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

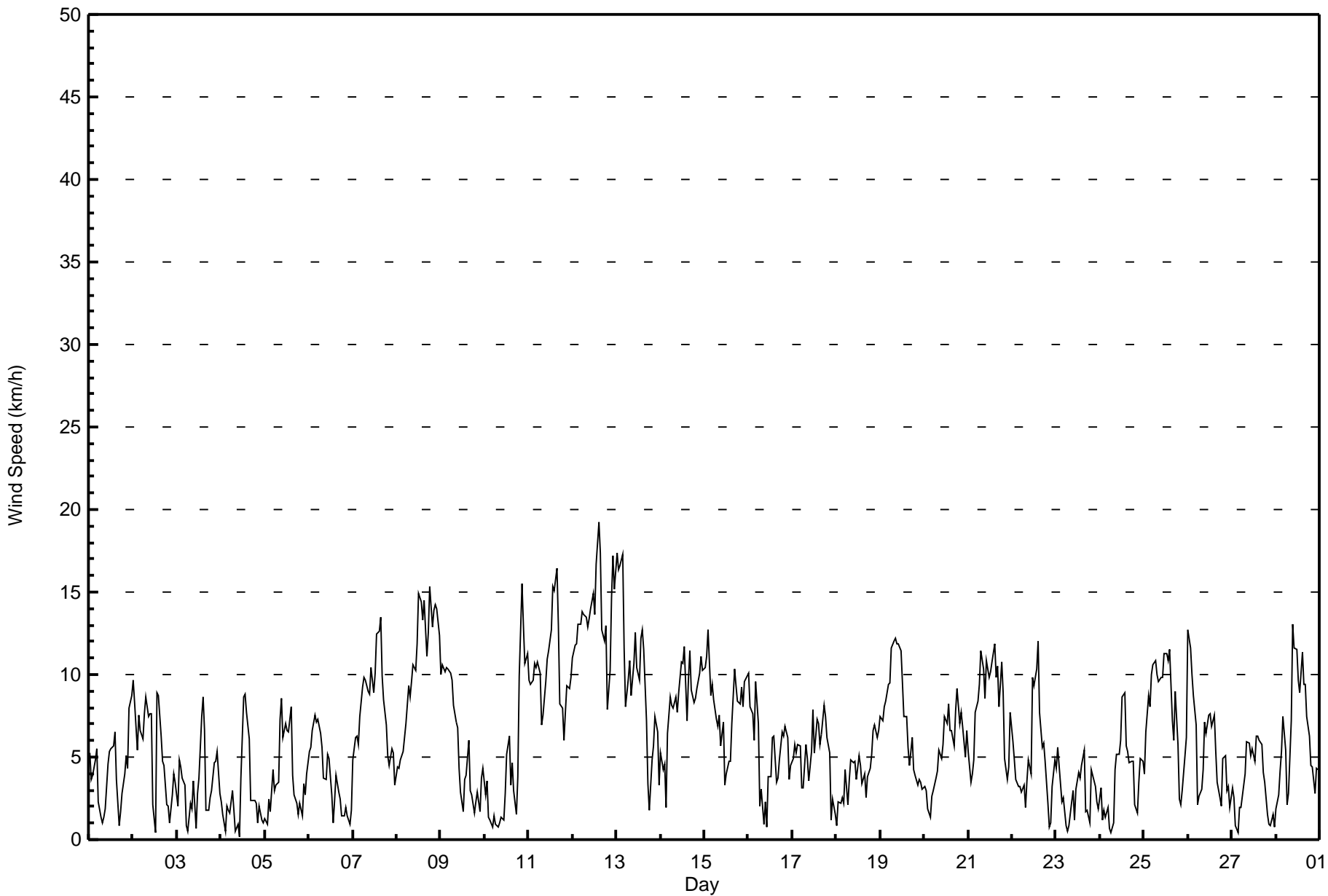
Wind Speed (WS) - km/h
Janvier - February 2017

Maximum Speed: 19 km/h on Feb 12 15:00 Minimum Speed Value: 0 km/h on Feb 4 11:00 Maximum Diurnal Speed Average: 5.1 km/h at hour 14 Monthly Average Velocity: 2.8 km/h 235.1 deg		Maximum Daily Speed Average: 13.0 km/h on Feb 12 Minimum Daily Speed Average: 0.4 km/h on Feb 18 Minimum Diurnal Speed Average: 2.4 km/h at hour 19 Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 9 P ₉₀ = 11 P ₉₉ = 17		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 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-Feb	W5	WNW4	N4	N5	N5	N2	N1	NNW1	SE1	S2	NNE5	N5	N6	WNW6	WNW7	NNW4	NNE1	SE2	S3	SSW4	SSW5	SSW4	SSW8	SSW9	WNW1.1	SSW9	
2-Feb	SSW10	SSW8	S5	S8	S7	SSW6	SSW8	S9	SSW7	SSW8	SSW8	S2	WNW0	WSW9	W9	WNW6	WNW5	W4	WSW2	WSW2	SE1	SSW3	SSW4	SSW3	SSW4.7	SSW10	
3-Feb	S2	NNE5	NNE4	N4	NNE3	NNE1	NNW1	NNE2	NE2	NNE4	SE1	SSW3	N4	NNE7	NNE9	NNE7	ESE2	SE2	WSW3	S3	SW5	W5	WNW5	W3	N1.5	NNE9	
4-Feb	S2	S2	WSW0	NNE2	NW2	N2	NNE3	NNE2	SE1	NNW1	SSE0	SW4	WSW9	W9	W8	WNW6	WSW2	S2	S2	SE2	ESE1	E2	ESE1	SSW1	WSW1.2	W9	
5-Feb	NE1	S1	NNE2	NNE2	NNE4	NNE3	N3	NNE3	NNE7	NNE9	NNE6	SW4	NNE7	N7	NNE8	N4	NW3	NW2	NNE2	SE2	SSE1	S3	S3	S4	NNE2.6	NNE9	
6-Feb	S5	S6	S7	S8	SSW7	SSW7	S6	S6	SSE4	SSW4	S5	SSW5	SW3	NNE1	NW2	NNE4	NNE3	ESE2	SE1	SSE1	SSW2	S1	SE1	S2	S2.9	S8	
7-Feb	S5	SSW6	S6	SSW6	SSW7	SSW9	SSW10	SSW10	SSW9	SSW9	SSW10	SW9	SW10	WSW12	W13	W13	WSW10	WSW8	WSW7	WSW5	WSW4	W6	W5	W3	SW7.0	WSW13	
8-Feb	SW4	SW4	SW5	WSW5	SSW6	SSW7	SSW9	SSW9	SSW10	SSW11	SSW10	SW12	WSW15	WSW14	WSW13	WSW14	SW11	SSW13	SSW15	SSW13	SSW14	SSW14	SW14	SW12	SW10.2	SSW15	
9-Feb	SSW10	SSW11	SSW10	SSW10	SSW10	SSW10	SSW10	SSW8	SSW7	SSW7	SSW4	SSE3	N2	NNE4	NNE4	NNE6	N3	N3	N2	NNE2	NNE3	NNE2	N4	NNE4	SSW2.6	SSW11	
10-Feb	N3	NNE4	NNE1	NE1	ENE1	SSE1	S1	ENE1	S1	SW1	NNW1	N3	NNE5	NNE6	NNW3	N5	N3	SW2	SSE4	SSE10	S15	SSW13	SSW11	SSW11	S1.4	S15	
11-Feb	SSW10	SSW9	SSW10	SSW11	SSW10	SSW11	SSW10	SSW7	SSW8	WSW10	W11	W11	WSW13	W15	WSW15	W16	W13	WSW8	SW8	SW6	SSW8	SSW9	S9	S10	SW8.9	W16	
12-Feb	SSW11	SW12	SW12	SW13	SW13	SW14	SW14	SW13	SW13	SW13	SW14	SW15	SW14	WSW17	WSW19	WSW17	WSW13	WSW12	WSW13	SW8	WSW10	WSW15	W17	W15	SW13.0	WSW19	
13-Feb	W17	W16	W17	W17	W12	SW8	SW10	SW11	SSW9	SW11	W13	W10	W10	W12	W13	WSW12	W7	WSW3	S2	SSW5	S6	S7	S7	SE3	WSW8.7	W17	
14-Feb	SSE5	SE4	SE5	SE2	S6	S9	S8	S8	SSW9	SSW8	SW9	SW11	SW11	SW12	SW7	SSW10	SSW11	SSW9	SSW8	SSW9	SSW9	S10	S11	SSW10	SSW7.9	SW12	
15-Feb	SSW10	SSW11	SSW13	SSW9	SSW9	SSW9	S7	S7	S8	S6	S7	SW3	W4	WSW5	SW5	SSW7	SSW10	SW9	SW8	SSW8	SSW9	SSW8	SSW10	SSW10	SSW7.7	SSW13	
16-Feb	S10	S8	SSW8	SSW6	S10	SSW7	S2	NNE3	N1	N2	NNE1	WSW4	SW4	SW6	S6	SSW3	S4	S5	SSW7	SSW6	SSW7	SSW6	S4	SSW4	SSW4.4	S10	
17-Feb	SW5	SW6	SW5	SW6	WSW6	NW3	WSW3	SSW6	SSW5	SW4	SW5	WNW8	WNW5	WNW7	W7	W6	WSW6	W8	W7	WSW6	W5	NNE1	SW2	SSE2	WSW4.5	W8	
18-Feb	ESE1	E2	ENE2	SE3	SSE2	SW4	SW2	SW4	SW5	SW5	WNW5	W4	WSW5	S5	SSW3	SW4	SSW3	NE4	ENE4	ENE5	ENE7	ENE7	NE6	NE7	SE0.4	ENE7	
19-Feb	NE7	NE7	NE8	NE8	NE9	NE9	NE12	NE12	NE12	NE12	NE12	NE11	NE10	NE7	NE7	NNE6	NE5	E6	ENE4	NE4	NNE3	NNE4	N4	N3	NE7.5	NE12	
20-Feb	N3	N3	NNW2	NW1	W3	WSW3	WSW4	W4	W5	W5	W6	W7	W7	WSW8	W7	WSW7	WSW6	WSW8	WSW9	WSW7	WSW8	SW7	SW5	WSW7	WSW4.9	WSW9	
21-Feb	WSW5	SW3	SW4	WSW5	W8	W8	W9	W11	W10	W9	W11	WSW10	W10	W11	W12	W10	W10	W8	W11	W9	WNW5	N4	NW4	WNW8	W7.7	W12	
22-Feb	W6	WNW5	WNW4	W3	W3	SW3	SW3	SW2	SSW4	WSW5	NW4	W10	WNW9	WNW10	WNW12	WNW8	WNW6	WNW6	NNE5	NNE2	ESE1	NW1	N3	NNE5	WNW3.9	WNW12	
23-Feb	NNE4	N6	N3	NNE2	NNE3	N1	S1	ESE1	NNE2	NE3	SSE1	SSW3	SSW4	WSW4	SSW4	SW5	SSW2	NE2	N1	NNE4	NNE4	NNE3	NNE2	NNE2	N0.8	N6	
24-Feb	NNE3	NNE1	SSW2	SSE1	SSE2	NNW1	NE0	NW1	NNE4	N5	NNW5	WNW6	WNW9	WNW9	NW6	NNW5	NNW5	W5	W5	SSW2	SSE2	SSW4	SSW5	SSW5	WNW1.9	WNW9	
25-Feb	S4	SSW7	SSW9	SSW8	SSW10	SSW11	SSW11	SSW10	SSW10	SSW10	SSW11	SW10	SSW11	SW11	SW11	SSW12	W7	NW6	N9	N6	W2	WSW2	SSW3	WSW5	NNW6	SW5.6	SSW12
26-Feb	NNE13	N12	N10	N9	N7	NNW2	NW3	SW3	NW4	WNW7	NW6	WNW8	WNW8	NW7	N8	N5	NNW3	WNW3	E2	ESE5	SE5	SE3	SE3	S2	NNW3.3	NNE13	
27-Feb	SSE3	SE3	SE1	NNW0	NNE2	N2	N3	NNE4	NNE6	NNE6	NNE5	NNE6	NE5	NNE6	N6	NNE6	NE6	NNE4	ENE3	ESE2	SSE1	ESE1	SSE1	SSW1	NNE2.6	NNE6	
28-Feb	S2	S3	S4	S5	S7	S5	N2	N3	NNE7	NNE13	NNE12	NNE11	NNE10	NNE9	NNE11	NNE9	NNE9	NNE7	NNE6	NNE5	NE4	NNE3	NNE4	NNE4	NNE4.4	NNE13	
SW2.8 SW2.5 SSW2.6 SW2.8 SSW3.1 SSW3.7 SSW3.3 SSW3.0 SSW2.5 WSW2.5 WSW2.8 WSW3.7 W4.1 W5.1 W4.9 W4.2 W3.1 WSW2.5 SW2.4 SSW2.6 SSW3.0 SSW3.0 SW2.9 SW2.6																								Diurnal Average			
W17 W16 W17 W17 SW13 SW14 SW14 SW13 SW13 SW13 SW14 SW15 WSW15 WSW17 WSW19 WSW17 W13 SSW13 SSW15 SSW13 S15 WSW15 W17 W15																								Diurnal Maximum			
All monthly, daily, and diurnal averages have been calculated using vector methods																											



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Janvier - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Janvier - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	332	49.40	49.40
6 - 11	274	40.77	90.18
12 - 19	66	9.82	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: 672

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Janvier - February 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	37	57	11	7	3	10	20	17	34	31	30	21	18	10	12	14	332
6 - 11	10	26	13	2	1	0	0	1	28	92	24	20	34	18	4	1	274
12 - 19	1	3	5	0	0	0	0	0	1	8	16	16	15	1	0	0	66
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	48	86	29	9	4	10	20	18	63	131	70	57	67	29	16	15	672

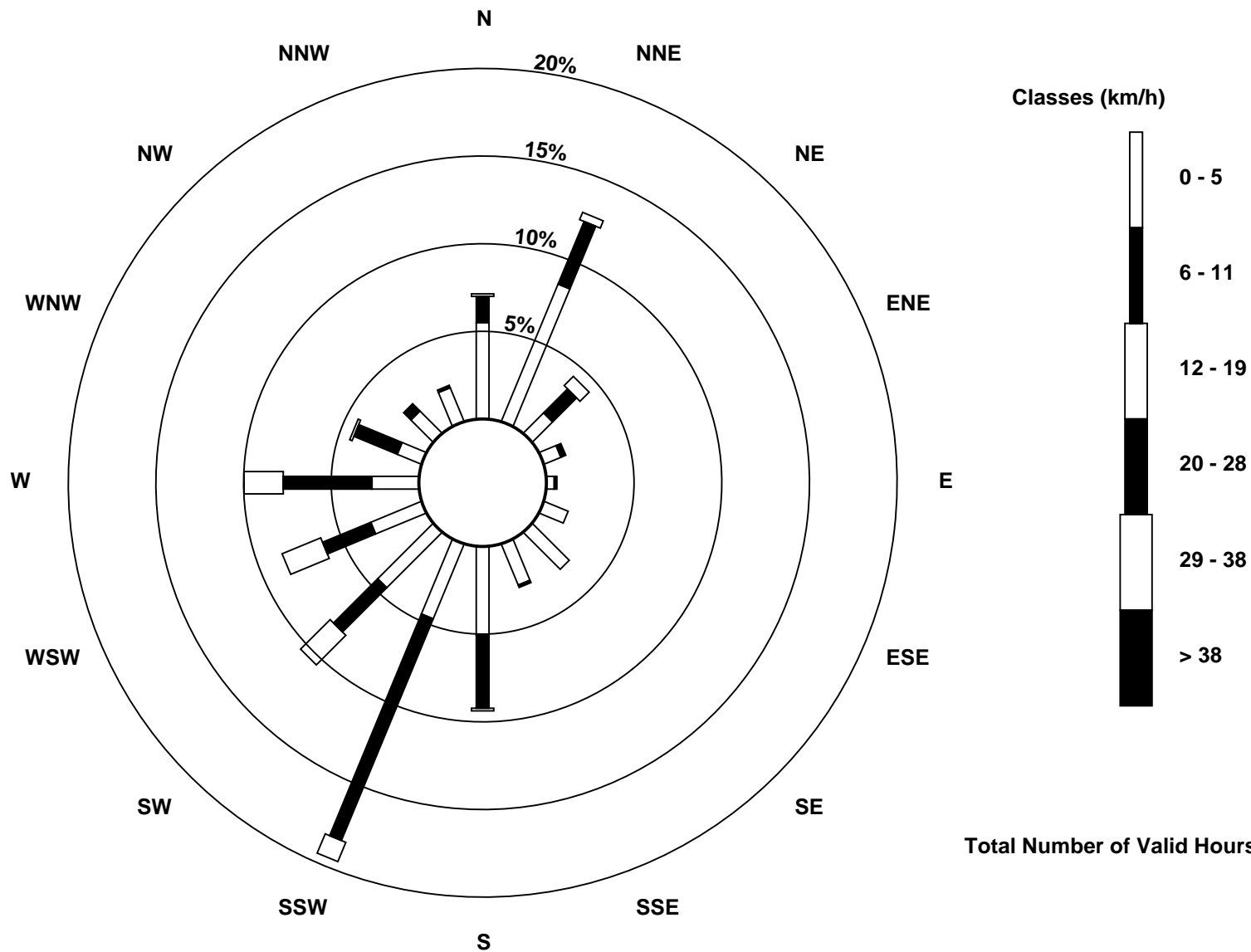
Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
Janvier (AMS 22)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Janvier - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 12 15:00 Minimum Value: 1 km/h on Feb 24 20:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 672 Hours of Data: 672 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-Feb	2	1	2	2	2	1	1	1	1	1	2	2	2	3	3	2	1	1	1	1	1	1	1	2	3
2-Feb	2	1	1	1	1	1	1	2	1	2	2	1	2	3	3	2	2	1	1	1	1	1	1	1	3
3-Feb	1	3	2	2	2	1	1	1	1	2	1	1	3	3	2	2	1	1	1	1	1	2	2	1	3
4-Feb	1	1	1	1	1	1	1	2	1	1	1	1	4	3	3	2	2	1	1	1	1	1	1	1	4
5-Feb	1	1	1	1	1	1	2	1	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	2	3
6-Feb	1	2	2	2	2	1	2	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	2
7-Feb	1	1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	3	3	3	1	1	2	2	1	4
8-Feb	1	1	1	1	1	2	2	2	2	2	3	4	5	4	5	5	4	4	3	4	5	5	5	4	5
9-Feb	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	3
10-Feb	1	2	1	1	1	1	1	1	1	1	1	1	2	3	2	1	1	1	2	3	5	4	3	2	5
11-Feb	3	3	2	2	3	2	2	2	2	3	4	4	5	5	5	5	4	2	2	2	2	2	3	3	5
12-Feb	3	3	3	4	4	4	4	4	4	4	4	5	4	6	6	6	4	4	5	3	3	5	5	5	6
13-Feb	5	5	5	5	4	2	3	3	2	3	4	3	4	4	4	4	2	2	1	1	1	2	2	1	5
14-Feb	1	1	1	1	2	2	1	2	2	2	3	3	3	4	4	4	3	3	2	2	2	2	2	2	4
15-Feb	2	2	2	2	2	2	2	1	1	2	2	2	1	2	2	3	3	3	3	2	2	2	2	2	3
16-Feb	2	2	2	1	2	2	1	1	2	2	1	2	2	3	2	1	1	2	2	2	2	2	1	1	3
17-Feb	1	2	2	1	2	2	2	1	2	2	2	3	2	3	3	2	1	2	2	2	1	1	1	1	3
18-Feb	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2
19-Feb	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	1	1	2	1	1	1	1	1	1	3
20-Feb	1	1	1	1	1	1	1	1	2	1	2	2	3	3	2	2	2	2	3	2	3	2	1	2	3
21-Feb	2	1	1	1	3	3	3	4	3	2	3	3	3	3	4	3	4	3	4	3	3	2	3	3	4
22-Feb	2	2	2	1	1	1	1	1	2	1	2	3	3	3	5	4	3	3	2	2	1	1	1	2	5
23-Feb	2	2	2	1	1	1	1	1	2	1	1	1	2	2	2	2	1	1	1	2	1	2	1	1	2
24-Feb	1	1	1	1	1	1	1	1	2	2	2	2	3	4	4	2	2	2	3	1	1	1	1	1	4
25-Feb	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	4	3	1	1	1	2	4	4
26-Feb	5	5	4	4	4	1	2	1	2	3	3	3	3	4	3	2	2	1	1	2	1	1	1	1	5
27-Feb	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	2	2	1	1	1	1	1	1	1	3
28-Feb	1	1	1	2	2	2	2	2	3	3	4	3	3	4	3	2	2	3	2	1	1	2	2	2	4
																	Diurnal Maximum								



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Janvier - February 2017

Direction of Maximum Speed: 249 deg on Feb 12 15:00 Direction of Maximum Daily Speed Average: 233.6 deg on Feb 12	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0
Direction of Minimum Speed: 161 deg on Feb 4 11:00 Direction of Minimum Daily Speed Average: 0.4 deg on Feb 18	Percent Operational Time: 100.0
Monthly Average Direction: 236.3 deg	

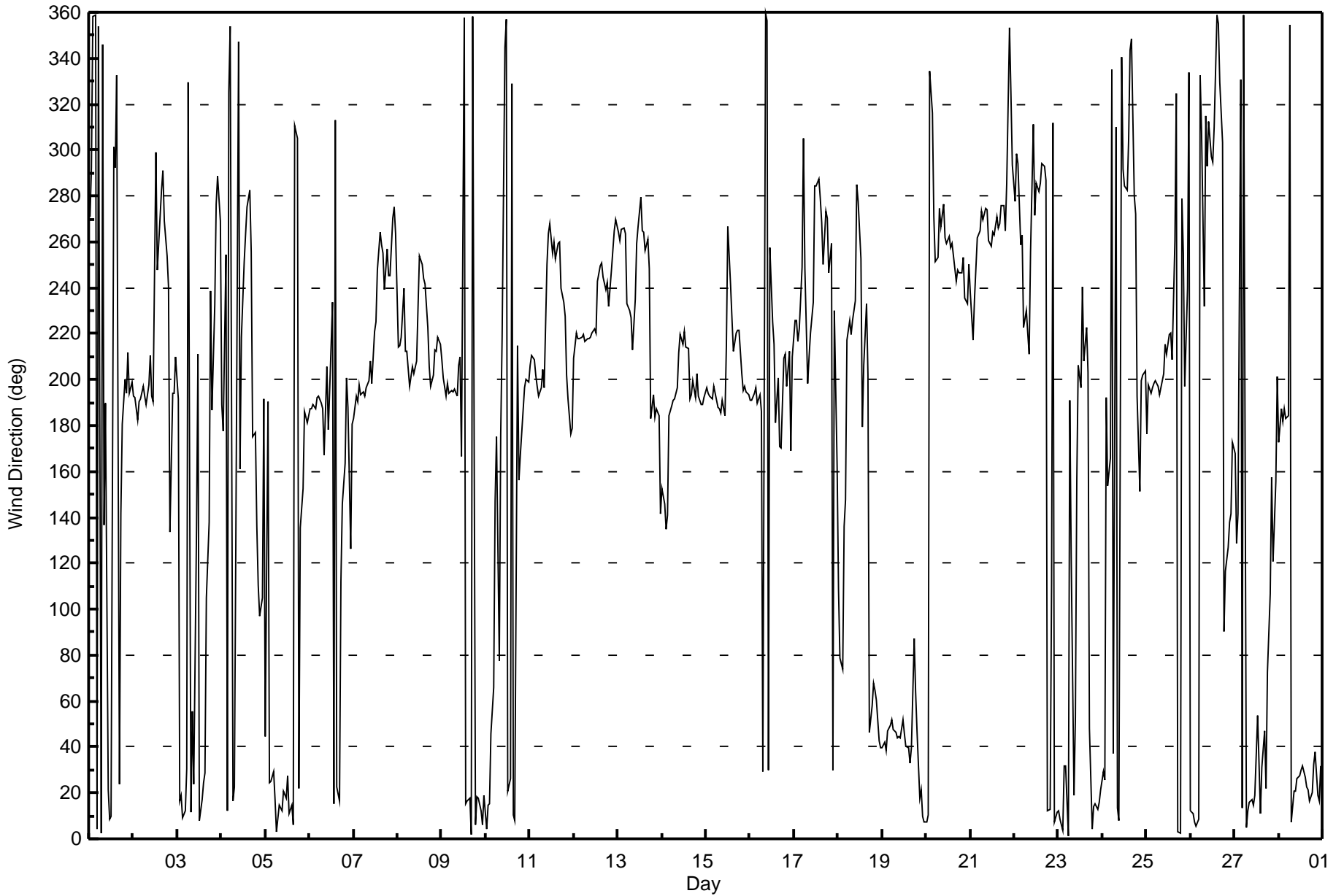
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	271	292	358	359	5	354	2	346	137	189	22	9	10	301	292	332	24	142	180	200	194	211	194	199	289.8
2-Feb	193	192	182	191	191	197	193	189	197	210	193	190	299	248	260	283	291	269	254	240	134	194	194	210	211.5
3-Feb	191	16	19	9	12	30	329	12	55	24	136	211	8	17	24	29	105	138	239	187	232	276	289	269	359.8
4-Feb	189	177	254	12	325	354	16	22	127	347	161	218	251	264	275	283	255	175	177	136	110	97	105	192	255.6
5-Feb	44	191	24	25	29	17	3	15	14	12	21	18	27	11	14	6	311	305	22	135	152	186	184	181	17.7
6-Feb	187	187	189	187	192	193	190	187	167	206	178	196	234	15	313	23	16	112	146	163	201	188	126	181	186.9
7-Feb	183	193	191	197	194	194	193	196	199	208	199	221	225	248	264	259	255	239	257	245	245	270	275	264	225.5
8-Feb	214	215	219	240	212	212	197	201	206	203	208	231	254	250	244	242	223	206	197	202	213	212	218	215	219.1
9-Feb	209	201	193	198	194	195	194	196	193	206	210	167	358	15	17	18	2	358	6	18	18	12	6	19	200.7
10-Feb	4	15	16	46	66	147	175	77	176	219	345	357	21	26	329	11	8	215	156	167	187	196	200	199	184.2
11-Feb	206	211	209	202	197	193	197	205	196	250	264	268	255	260	253	260	260	240	233	227	202	192	177	179	226.4
12-Feb	209	221	218	218	219	220	217	218	218	218	221	222	220	243	249	251	245	239	242	232	248	256	265	270	233.6
13-Feb	264	261	265	266	264	233	230	227	213	235	259	267	279	265	264	256	261	248	183	193	184	187	184	142	248.2
14-Feb	153	146	135	141	185	188	191	191	196	212	219	215	221	214	214	192	194	199	192	203	193	189	189	192	195.8
15-Feb	196	194	193	192	197	194	188	187	186	191	184	215	266	241	226	213	221	222	222	203	195	197	195	193	201.5
16-Feb	191	191	194	196	190	194	186	29	359	357	30	258	225	215	181	200	171	170	209	211	197	212	169	210	197.8
17-Feb	226	226	217	222	249	305	249	198	210	220	234	284	284	288	279	268	250	274	270	247	259	30	230	162	251.7
18-Feb	109	79	74	136	148	217	226	220	226	235	285	278	253	179	206	233	202	47	58	67	65	60	43	40	128.6
19-Feb	40	42	39	47	49	52	48	46	44	45	44	52	46	40	40	33	40	87	64	47	18	21	10	7	44.3
20-Feb	7	10	335	316	271	251	253	275	266	276	262	259	262	257	259	254	243	248	246	247	254	236	233	250	258.2
21-Feb	238	217	235	249	262	265	273	270	275	274	260	258	265	263	271	266	268	276	276	265	286	353	325	294	268.8
22-Feb	277	298	294	259	263	223	230	220	211	256	311	271	286	282	286	294	293	287	12	13	111	312	7	12	286.3
23-Feb	12	9	4	32	32	1	191	123	19	53	156	206	197	240	208	223	203	48	5	14	15	13	16	22	5.8
24-Feb	29	26	192	154	166	335	37	310	13	8	340	292	284	283	305	343	348	280	272	193	151	199	202	204	294.6
25-Feb	176	198	194	197	198	200	197	194	196	203	216	211	220	220	208	260	324	3	2	279	255	197	240	334	215.4
26-Feb	12	11	7	5	8	332	308	232	315	293	312	297	295	310	359	355	329	303	90	117	127	138	142	173	345.1
27-Feb	168	129	142	331	13	359	5	12	16	17	15	19	54	33	11	31	47	22	73	107	157	121	156	201	33.5
28-Feb	173	187	182	187	183	184	354	7	21	21	26	28	30	32	27	22	21	16	20	32	38	19	16	32	29.2
216.3 216.4 212.8 216.5 211.5 208.6 210.5 210.7 213.6 242.8 247.0 257.0 267.0 268.2 274.0 275.7 264.3 249.4 236.1 208.3 207.0 211.4 216.7 221.8																									Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Janvier - February 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Janvier - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on Feb 1 17:00 Minimum Value: 7 deg on Feb 2 05:00 Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 18 Median = 23 Q ₃ = 41 P ₉₀ = 61 P ₉₉ = 90		Hours in Service: 672 Hours of Data: 672 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-Feb	23	53	47	63	48	54	60	53	49	60	40	51	44	62	58	79	108	61	23	13	14	19	10	14	108	
2-Feb	10	11	12	8	7	11	8	11	14	18	16	77	101	24	23	33	44	26	37	30	74	24	12	23	101	
3-Feb	65	15	14	17	28	47	62	33	33	25	78	54	74	27	14	19	9	50	28	25	22	40	54	43	78	
4-Feb	41	64	87	33	44	39	27	69	84	81	94	46	29	28	28	29	49	39	28	63	74	56	56	83	94	
5-Feb	71	80	24	36	12	21	25	18	22	22	20	26	32	39	24	45	74	77	63	32	57	29	36	18	80	
6-Feb	13	9	7	9	9	9	10	11	23	36	10	34	65	100	66	24	15	30	54	22	46	45	91	66	100	
7-Feb	10	12	9	13	10	10	10	12	14	18	18	25	23	22	22	20	20	20	21	22	23	19	20	29	29	
8-Feb	25	20	20	19	18	16	14	15	16	16	20	22	21	22	22	24	25	18	16	19	21	21	21	19	25	
9-Feb	18	16	13	15	14	13	13	14	12	19	29	41	62	34	29	16	52	54	15	23	19	32	21	19	62	
10-Feb	24	23	34	72	68	22	65	53	54	39	78	44	22	32	51	22	37	55	30	20	18	16	17	15	78	
11-Feb	18	18	17	17	16	13	14	20	19	23	25	25	24	22	22	21	20	22	18	20	16	19	18	21	25	
12-Feb	17	19	19	20	19	20	20	20	19	21	20	22	22	25	21	21	23	24	24	31	21	19	18	20	31	
13-Feb	20	19	19	18	20	21	19	20	18	23	23	26	34	23	22	20	18	33	51	22	18	12	15	29	51	
14-Feb	20	26	18	44	13	11	10	16	15	17	21	21	22	22	25	19	13	14	10	15	12	12	10	13	44	
15-Feb	13	13	11	16	14	12	14	11	9	21	10	42	31	29	29	20	21	20	20	18	15	16	13	11	42	
16-Feb	9	11	14	14	10	15	28	49	89	71	84	34	33	33	34	28	18	24	19	16	17	19	36	21	89	
17-Feb	18	22	21	20	22	63	63	19	20	28	28	33	61	41	32	26	18	22	17	17	22	83	31	59	83	
18-Feb	81	48	69	40	90	28	53	22	19	21	47	65	31	37	60	65	54	60	20	24	21	20	22	18	90	
19-Feb	19	21	17	19	19	22	19	19	18	19	18	23	20	20	18	16	26	26	31	23	16	15	16	20	31	
20-Feb	25	23	54	78	18	14	18	19	18	25	21	21	22	23	24	22	24	21	21	20	20	19	22	21	78	
21-Feb	29	46	24	24	20	20	19	19	21	19	22	22	21	23	21	21	24	21	26	20	57	50	63	43	63	
22-Feb	28	52	52	36	36	25	25	44	20	25	76	27	32	31	33	52	59	51	59	38	53	48	35	30	76	
23-Feb	30	30	48	59	18	37	84	52	42	29	88	61	53	65	60	29	51	23	37	10	15	30	26	26	88	
24-Feb	9	38	61	49	35	71	97	70	47	39	51	44	32	35	64	60	57	48	24	32	45	21	13	15	97	
25-Feb	17	14	10	12	14	14	15	14	17	20	21	20	27	26	24	52	66	50	48	43	62	20	28	56	66	
26-Feb	27	28	41	42	54	81	61	39	68	56	60	48	45	63	52	54	69	50	27	14	12	18	14	24	81	
27-Feb	22	26	61	80	13	19	22	20	19	24	32	39	51	45	45	33	25	12	14	45	44	15	31	50	80	
28-Feb	16	27	18	19	12	17	69	70	19	15	14	22	19	36	12	19	18	17	13	23	20	17	37	36	70	
		81	80	87	80	90	81	97	70	89	81	94	77	101	100	66	79	108	77	63	63	74	83	91	83	
		Diurnal Maximum																								



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 1, 2017	Last Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	12:20	End Time (MST)	16:10
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	785	785
Calculated slope	1.002333	1.014298	Chamber temp	45.2	45.0
Calculated intercept	-0.789798	-1.021111	Pressure	720.7	716.4
Analyzer Background	15.8	15.4	Flow	0.511	0.508
Analyzer Coefficient	0.999	0.969	Intensity	90	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	-0.4	----
As Found Span	5007	78.6	780.2	783.3	0.996
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5007	78.6	780.2	770.0	1.013
second point	5007	39.3	390.1	385.2	1.013
third point	5009	19.6	194.5	194.5	1.000
as left zero	5000	0.0	0.0	-0.2	----
as left span	5009	78.6	779.9	774.1	1.008
Average Correction Factor					1.009

Corrected As found 783.7 Previous response 779.2 % change -0.6%

Notes:

Inlet filter changed after as founds & Adjusted span.

Calibration Performed By: Aswin Sasi Kumar



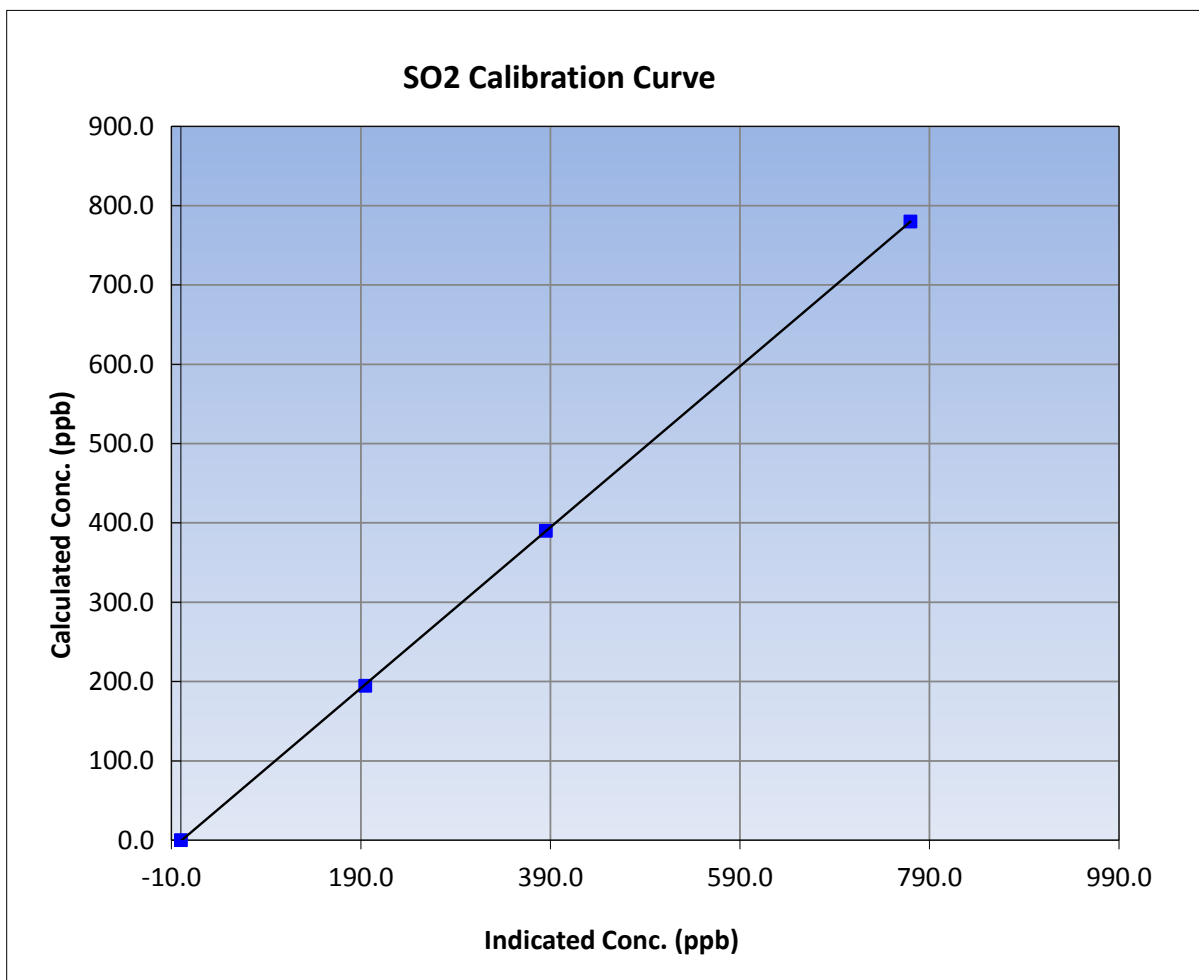
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 1, 2017	Previous Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	12:20	End Time (MST)	16:10
Analyzer make	Thermo 43i	Analyzer serial #	1152430006

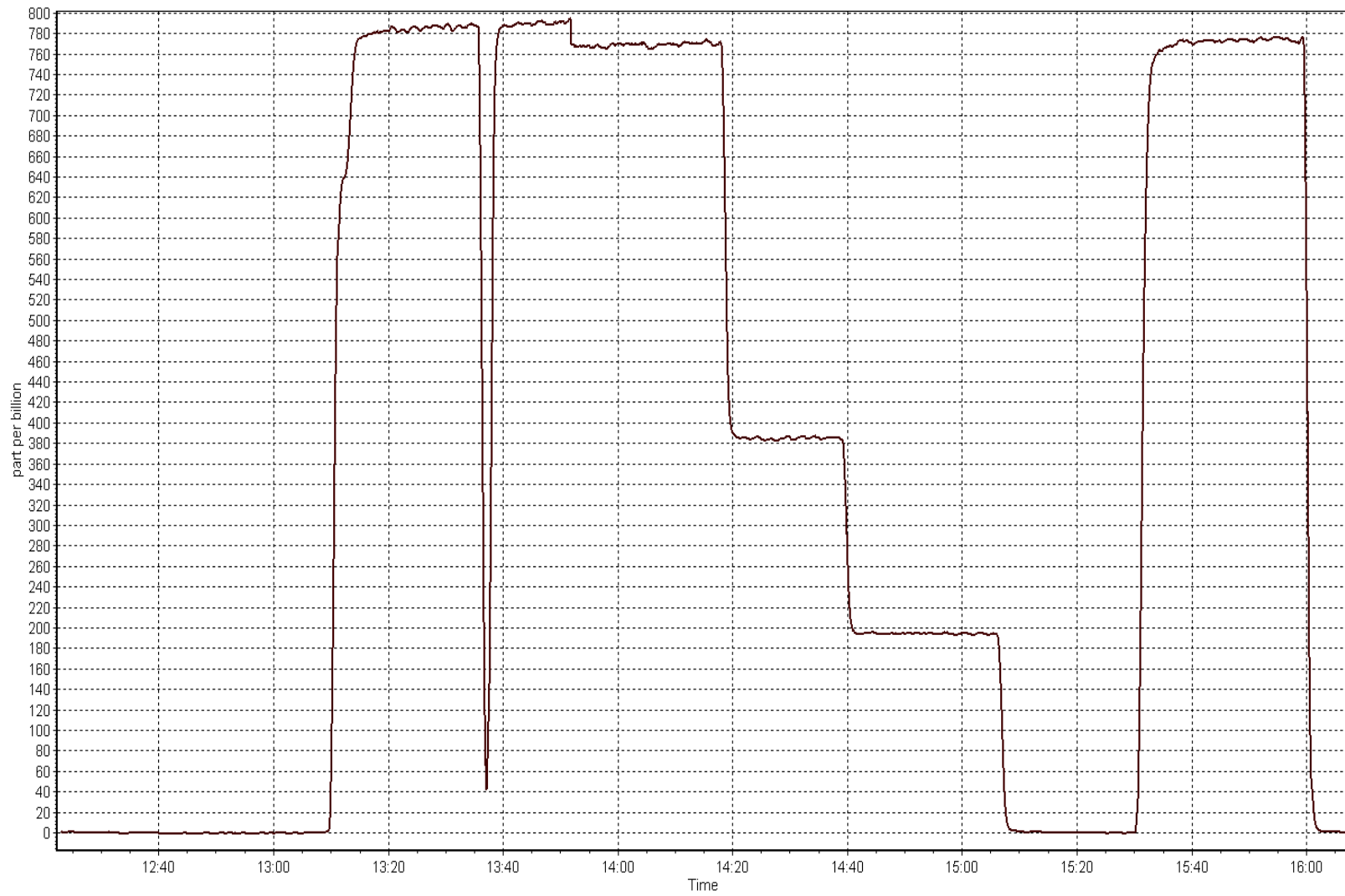
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999986
780.2	770.0	1.0133		
390.1	385.2	1.0128	Slope	1.014298
194.5	194.5	0.9999		
			Intercept	-1.021111



SO2 Calibration Plot

Date: February 1, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 7, 2017	Last Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	14:57
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	-648
Analyzer IP address	192.168.1.44		Lamp voltage	1003	1003
Calculated slope	1.003308	0.990441	Chamber temp	45	45
Calculated intercept	-0.401007	-0.476702	Pressure	673.7	669.2
Analyzer Background	3.8	3.8	Flow	0.427	0.421
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	0.4	----
As Found Span	5000	74.8	80.0	80.9	0.989
SO2 Scrubber	5000	10.0	99.4	0.8	----
calibrator zero	5000	0.0	0.0	0.4	----
High point	5000	74.8	80.0	81.2	0.986
Second point	5000	37.4	40.0	41.1	0.974
Third point	5000	18.7	20.0	20.7	0.967
As Left Zero	5000	0.0	0.0	0.5	----
As Left Span	5000	74.8	80.0	83.7	0.956
Average Correction Factor					0.976

Corrected As found	80.5	Previous response	80.2	% change	-0.4%
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Notes:

No adjustments made. As left span was higher than as found and high span points.

Calibration Performed By: Aswin Sasi Kumar



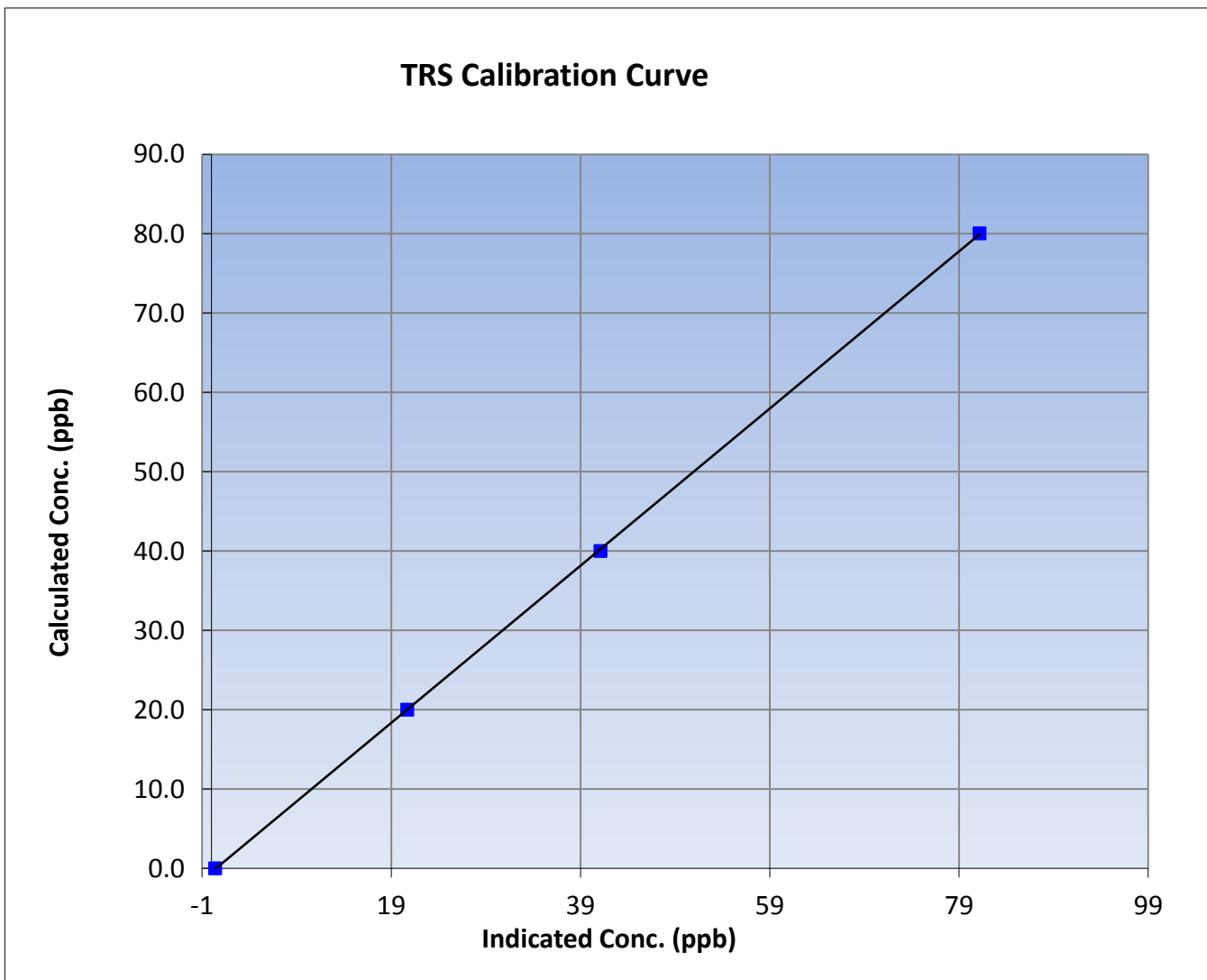
Wood Buffalo Environmental Association TRS Calibration Report

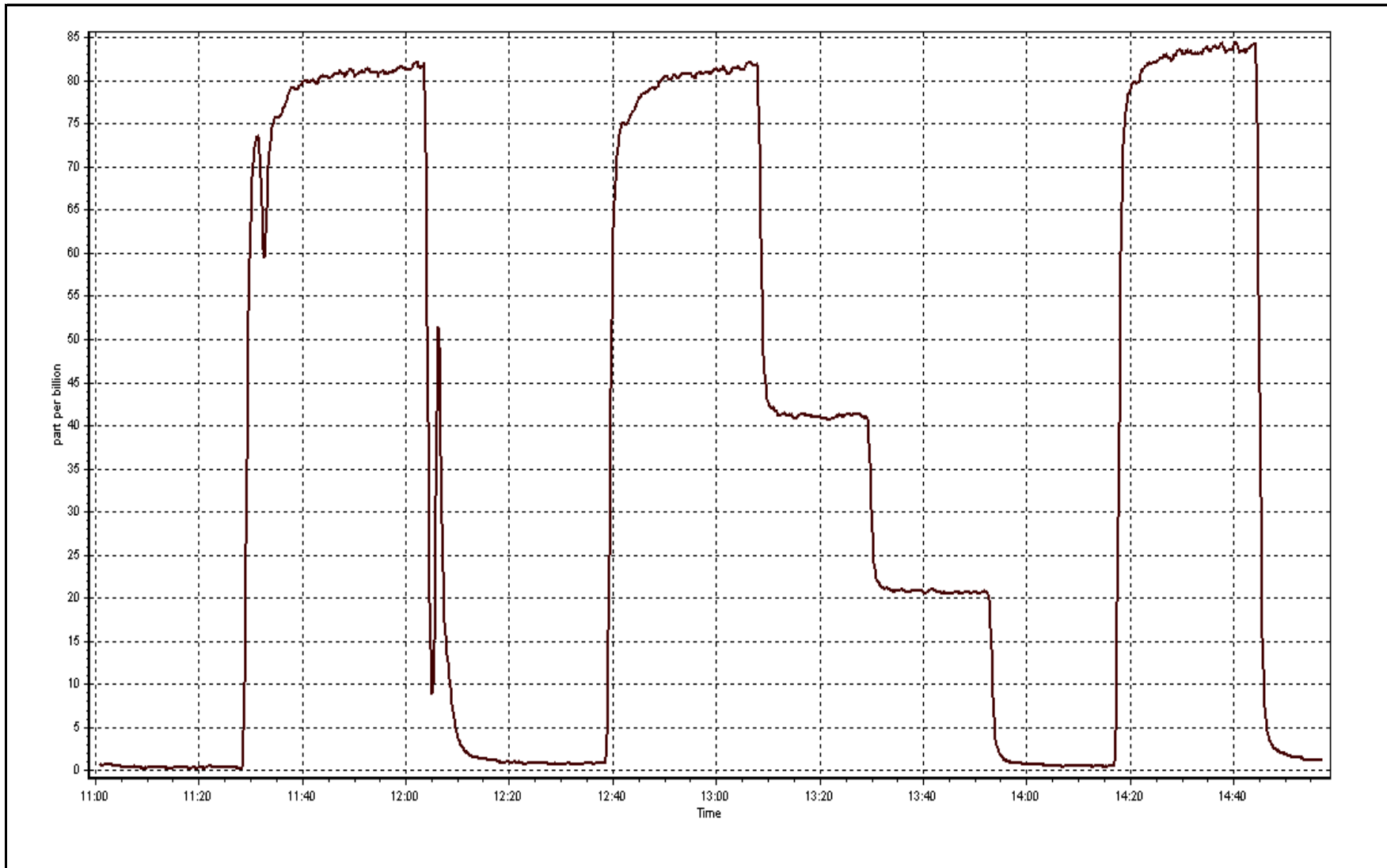
Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	11:00	End Time (MST)	14:57
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	0.4	----	Correlation Coefficient	0.999980
80.0	81.2	0.9859		
40.0	41.1	0.9737	Slope	0.990441
20.0	20.7	0.9671		
			Intercept	-0.476702







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 2, 2017	Last Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	10:26	End Time (MST)	17:35
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	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.2	175.3
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.998920	0.993719	Carrier Pressure	36.7	36.7
THC Calc intercept	0.022048	0.052286	Fuel Pressure	44.9	44.9
NMHC Calc slope	0.999451	0.994411	Air Pressure	33.7	33.7
NMHC Calc intercept	-0.008086	0.005957			

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	17.04	0.974
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	8.19	1.014
third point	5000	19.6	4.14	4.12	1.005
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	16.60	16.52	1.005
Average Correction Factor					1.004

Corrected As found 17.04 Previous response 16.60 % change -2.6%

Notes:

Span adjusted after as founds. Addressed issues of final span with Nox.

Calibration Performed By: Aswin Sasi Kumar



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	8.89	0.968
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.60	8.66	0.993
second point	5000	39.3	4.30	4.28	1.005
third point	5000	19.6	2.15	2.17	0.989
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.60	8.55	1.006
Average Correction Factor					0.996

Corrected As found 8.89 Previous response 8.62 % change -3.1%

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)
	5000	0	0.00	0.00	----
	5000	78.6	8.00	8.15	0.982
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.00	8.04	0.995
second point	5000	39.3	4.00	3.91	1.023
third point	5000	19.6	2.00	1.95	1.023
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.00	7.98	1.003
Average Correction Factor					1.014

Corrected As found 8.15 Previous response 7.98 % change -2.0%



Wood Buffalo Environmental Association

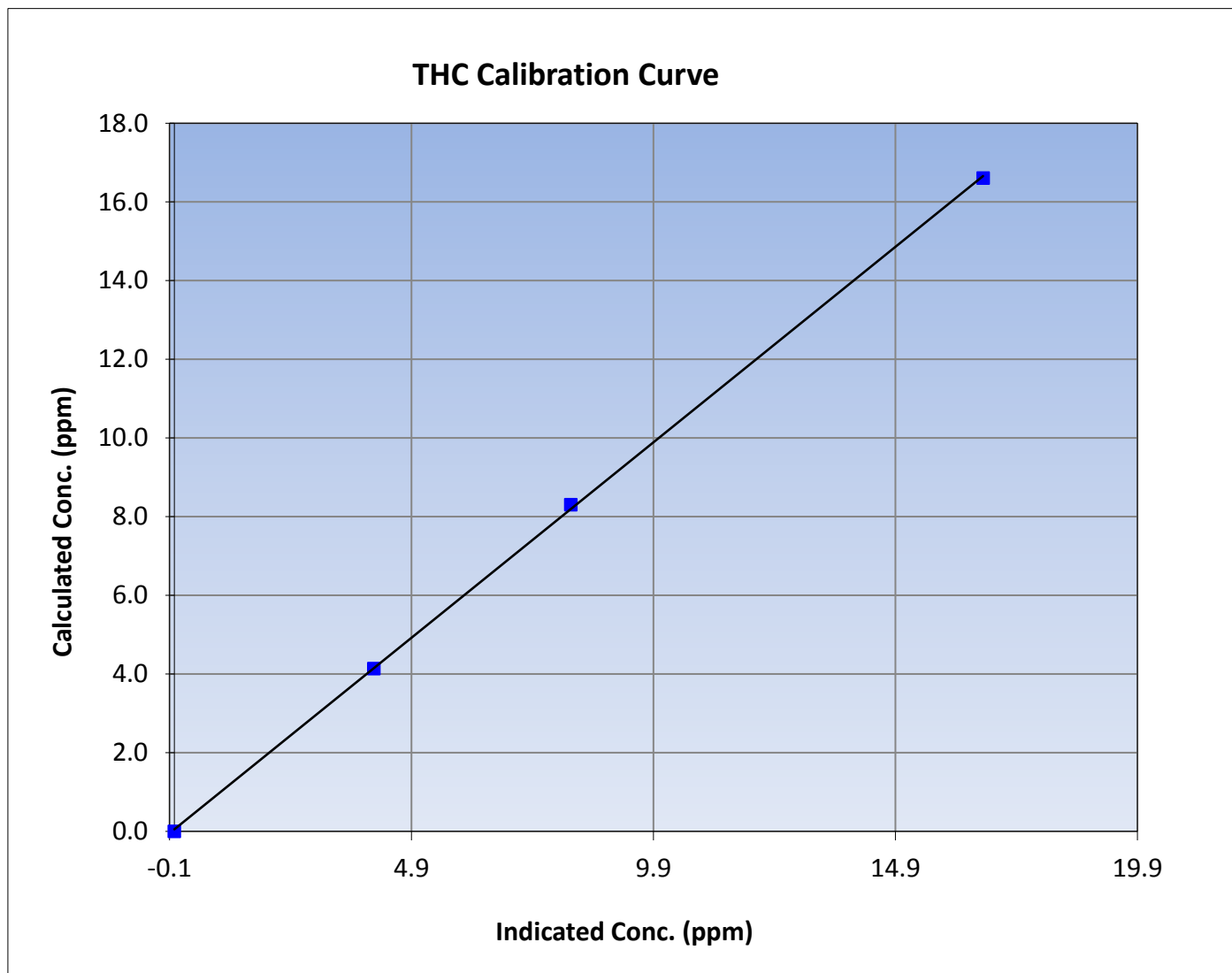
THC Calibration Summary

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:26	End Time (MST)	17:35
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	0.999881
16.60	16.71	0.9937		
8.30	8.19	1.0137	Slope	0.993719
4.14	4.12	1.0050		
			Intercept	0.052286





Wood Buffalo Environmental Association

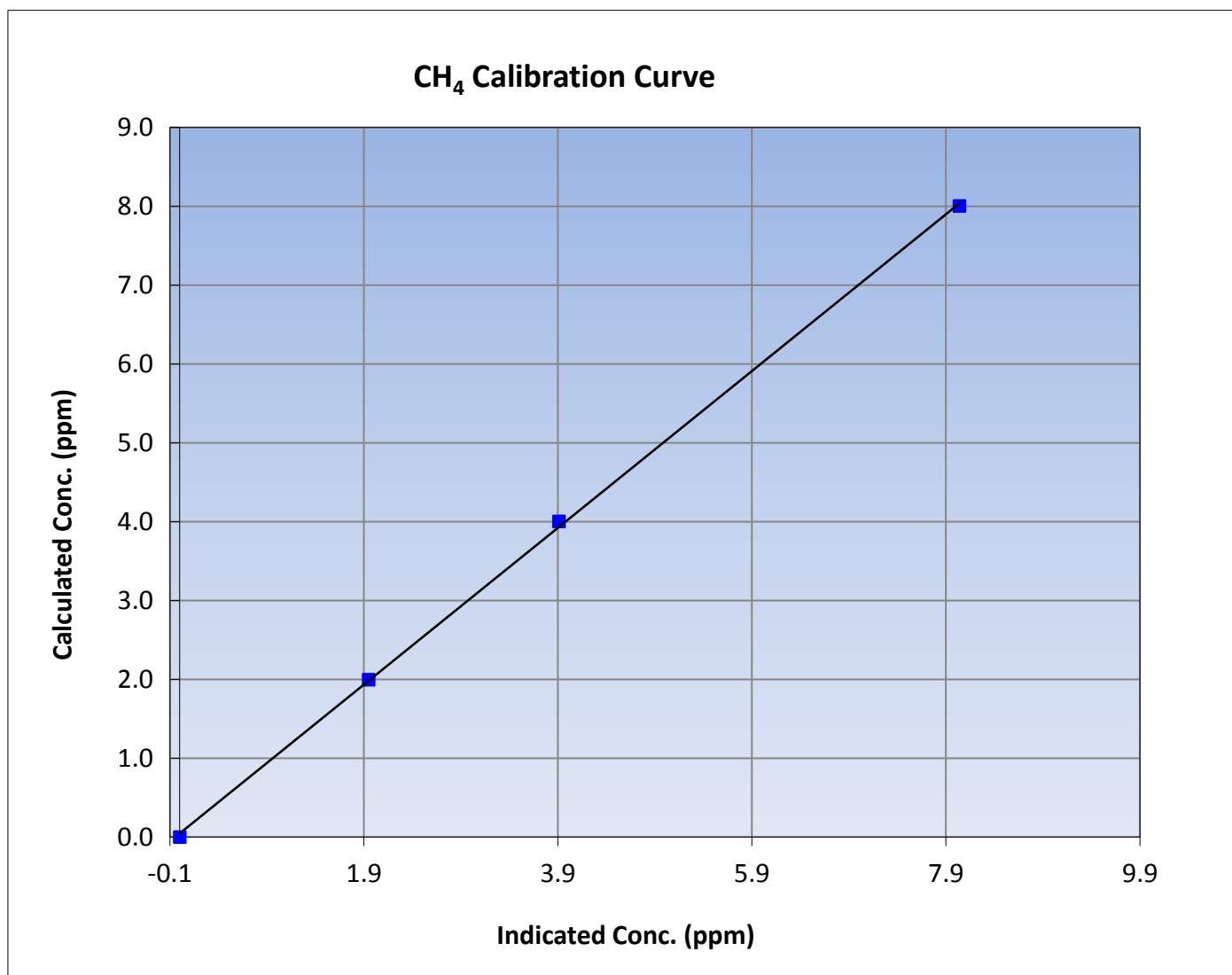
CH₄ Calibration Summary

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:26	End Time (MST)	17:35
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	0.999766
8.00	8.04	0.9952		
4.00	3.91	1.0232	Slope	0.994202
2.00	1.95	1.0232		
			Intercept	0.044523





Wood Buffalo Environmental Association

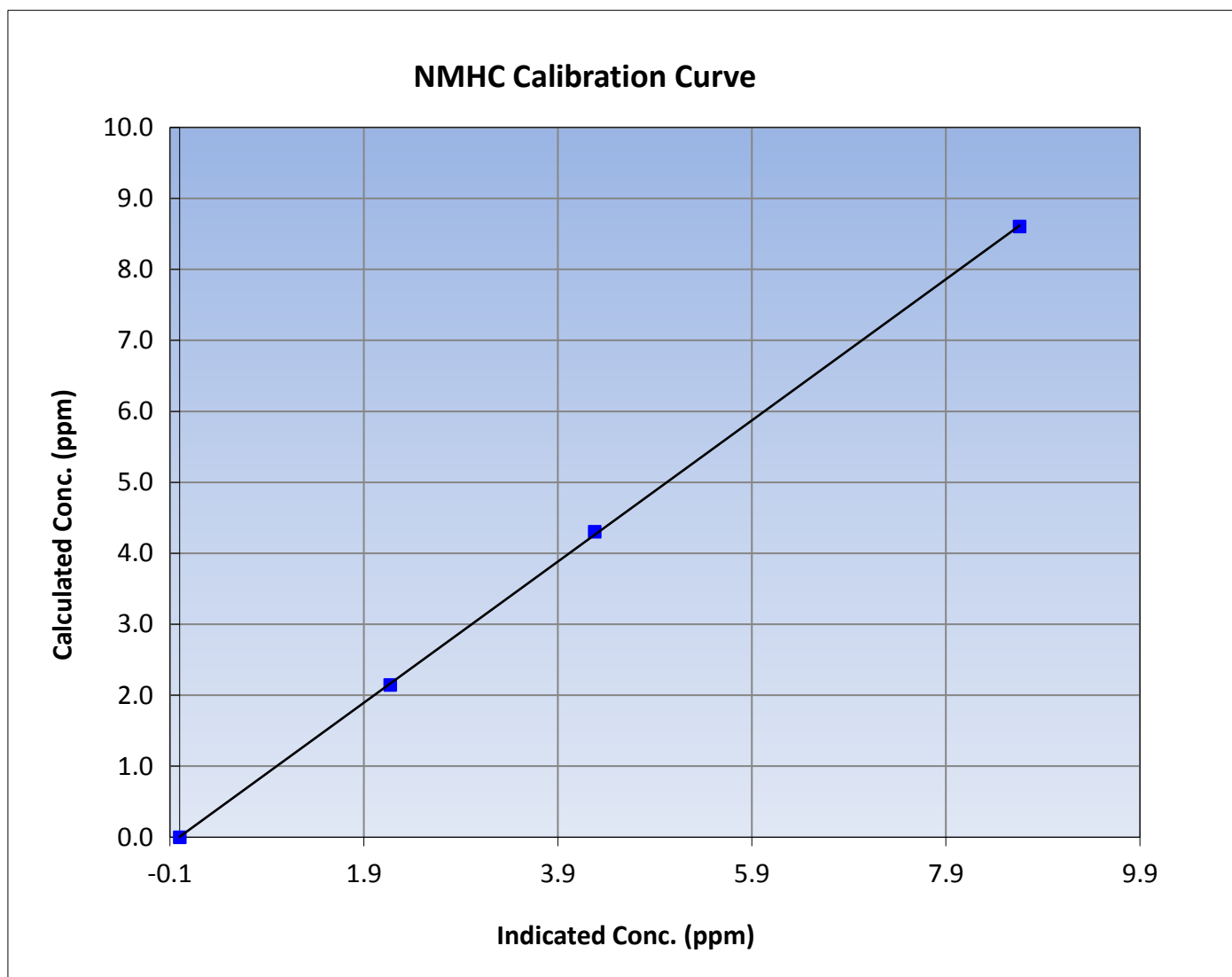
NMHC Calibration Summary

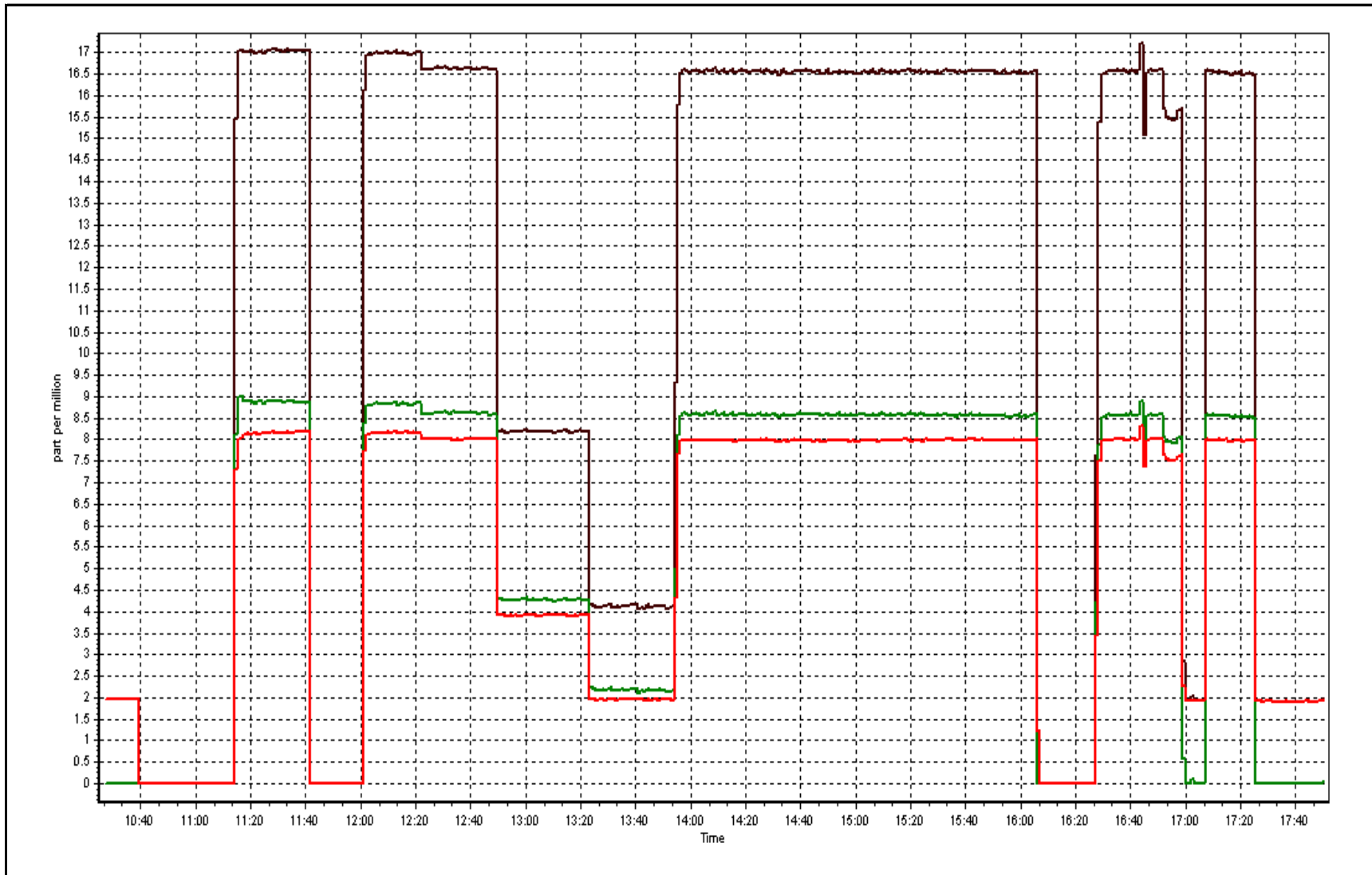
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 11, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:26	End Time (MST)	17:35
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	0.999947
8.60	8.66	0.9934		
4.30	4.28	1.0050	Slope	0.994411
2.15	2.17	0.9886		
			Intercept	0.005957







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 15, 2017	Last Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Maintenance		
Start Time (MST)	10:50	End Time (MST)	12:20
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	75.1	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.3	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.993719	1.013072	Carrier Pressure	36.7	36.7
THC Calc intercept	0.052286	0.000000	Fuel Pressure	44.9	44.9
NMHC Calc slope	0.994411	1.020495	Air Pressure	33.7	33.7
NMHC Calc intercept	0.005957	0.000000			

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	16.39	1.013
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	16.60	16.39	1.013
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.013

Corrected As found 16.39 Previous response 16.66 % change 1.6%

Notes:

Replacing N2 cylinder. Zero and span response remained almost the same after the change. No adjustments made.

Calibration Performed By: Aswin Sasi Kumar



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	8.43	1.020
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.60	8.43	1.020
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.020

Corrected As found 8.43 Previous response 8.65 % change 2.6%

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)
	5000	0	0.00	0.00	----
	5000	78.6	8.00	7.96	1.005
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.00	7.96	1.005
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.005

Corrected As found 7.96 Previous response 8.01 % change 0.7%



Wood Buffalo Environmental Association

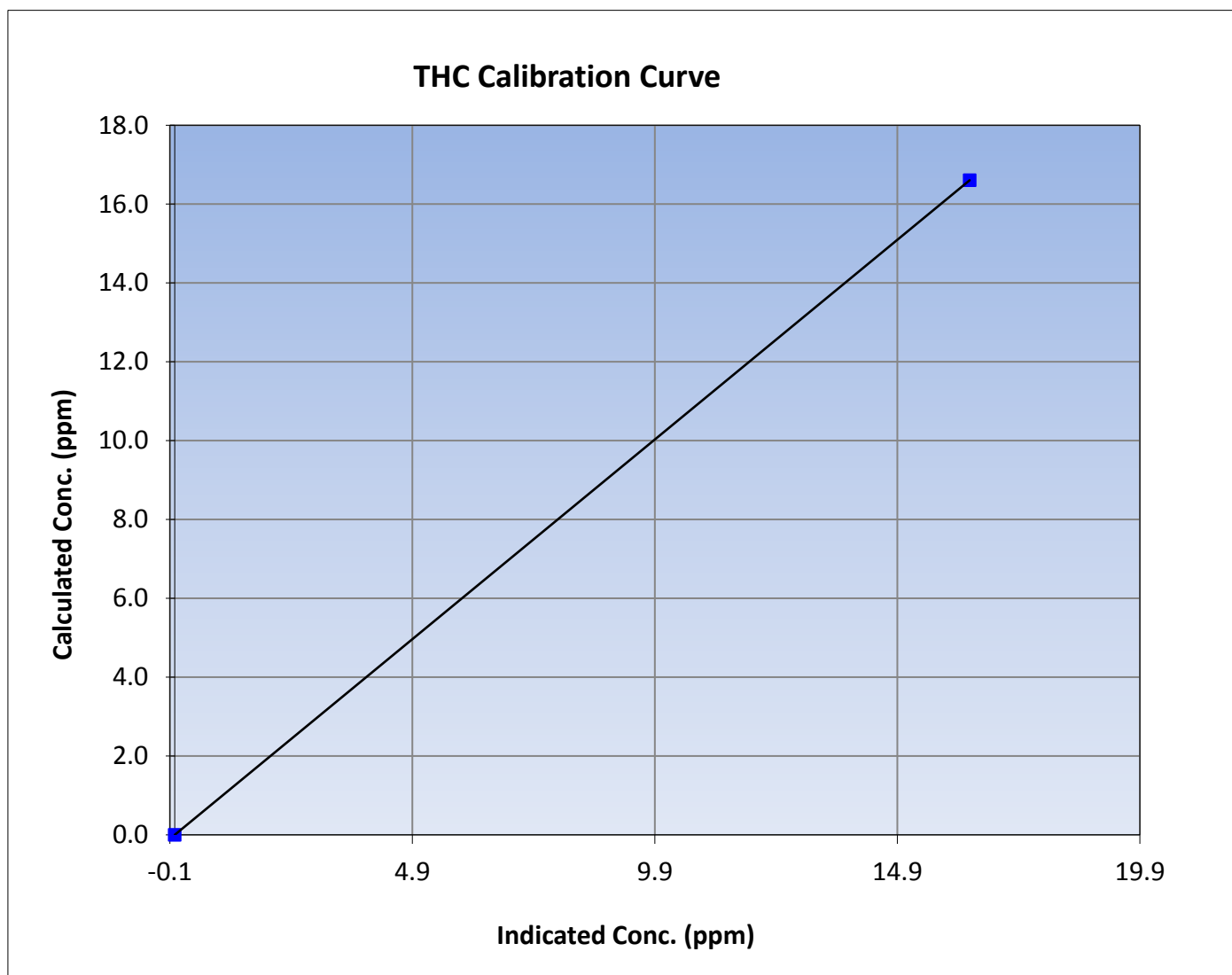
THC Calibration Summary

Station Information

Calibration Date	February 15, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:50	End Time (MST)	12:20
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	1.000000
16.60	16.39	1.0131		
			Slope	1.013072
			Intercept	0.000000





Wood Buffalo Environmental Association

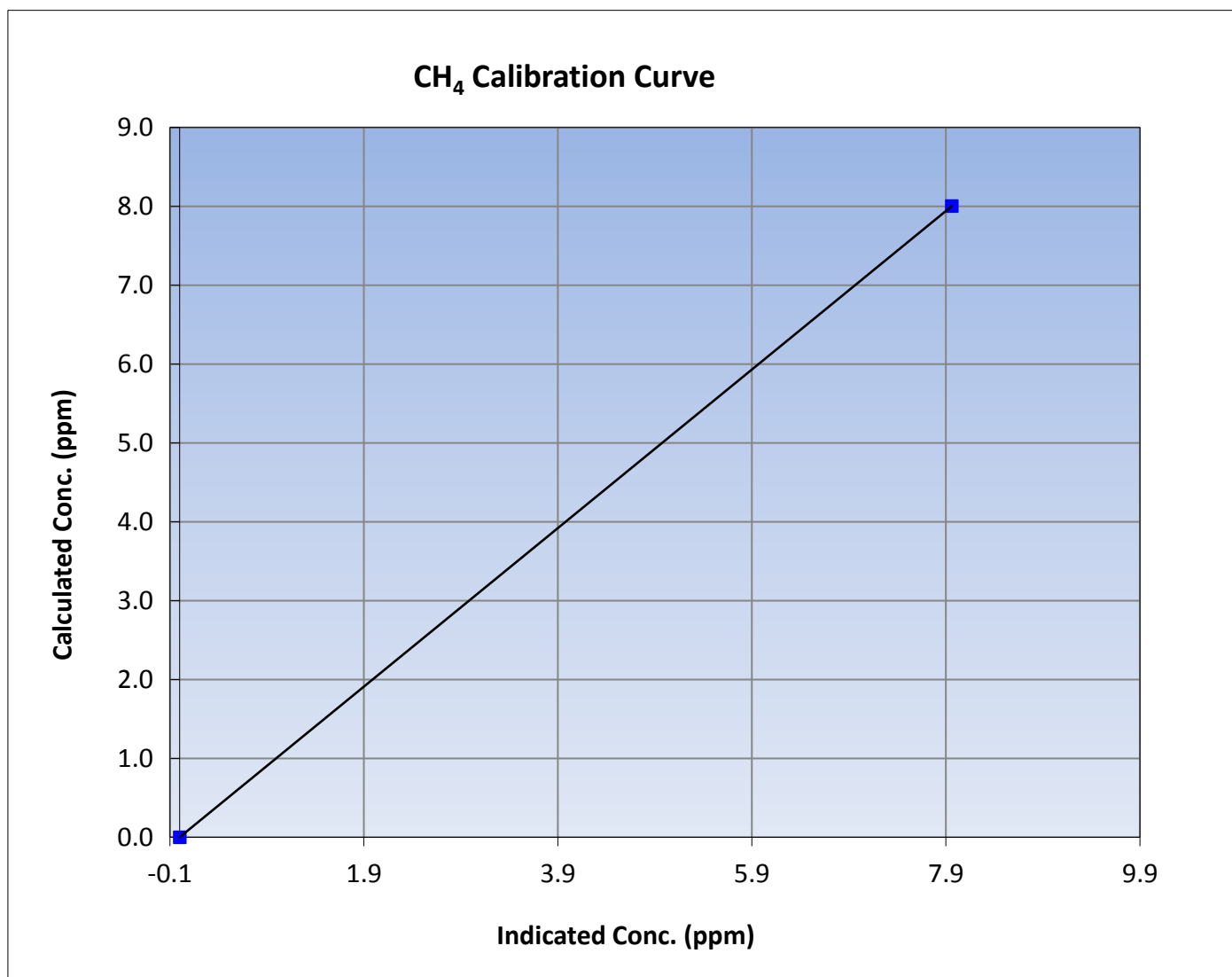
CH₄ Calibration Summary

Station Information

Calibration Date	February 15, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:50	End Time (MST)	12:20
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	1.000000
8.00	7.96	1.0052		
			Slope	1.005211
			Intercept	0.000000





Wood Buffalo Environmental Association

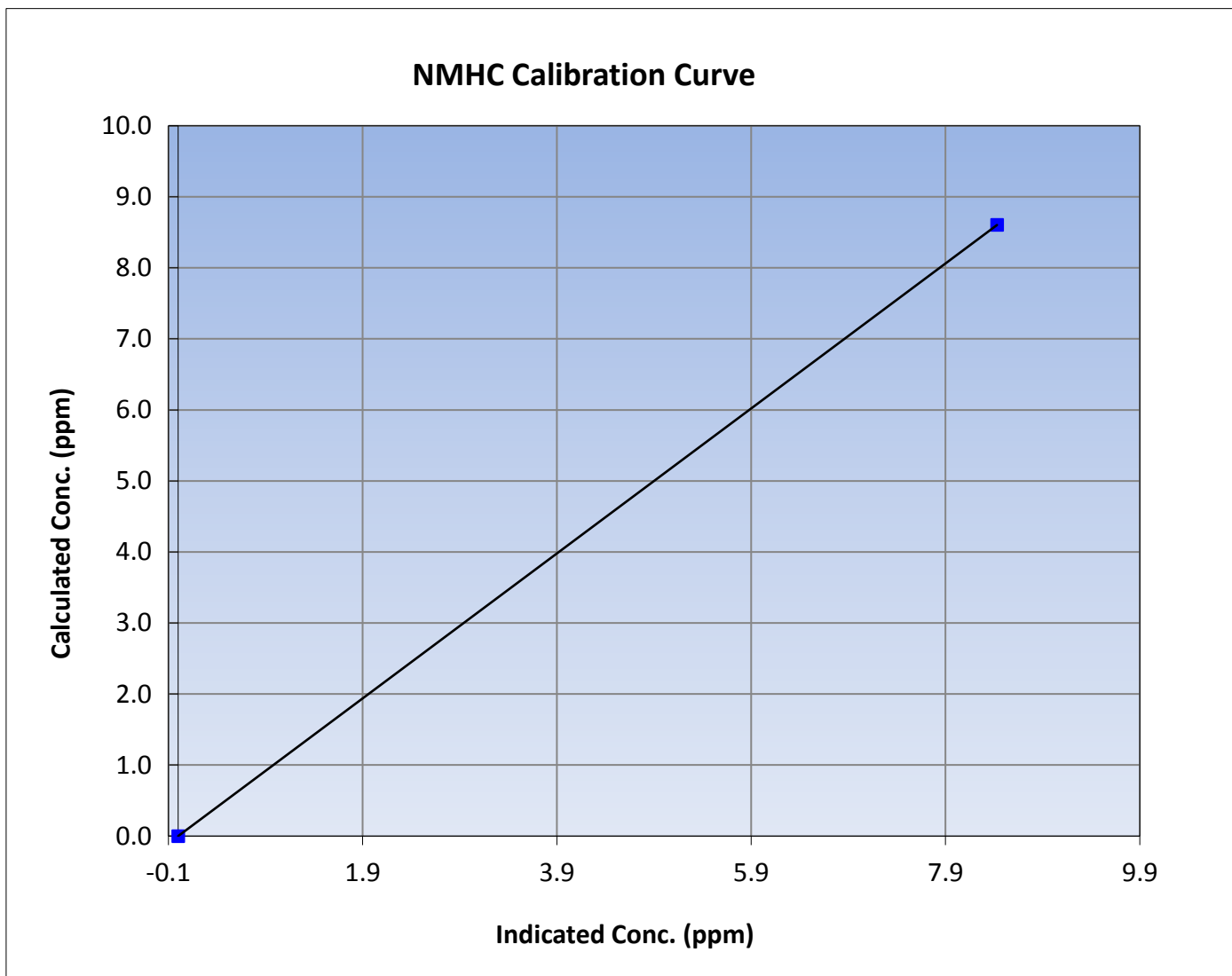
NMHC Calibration Summary

Station Information

Calibration Date	February 15, 2017	Previous Calibration	February 2, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:50	End Time (MST)	12:20
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

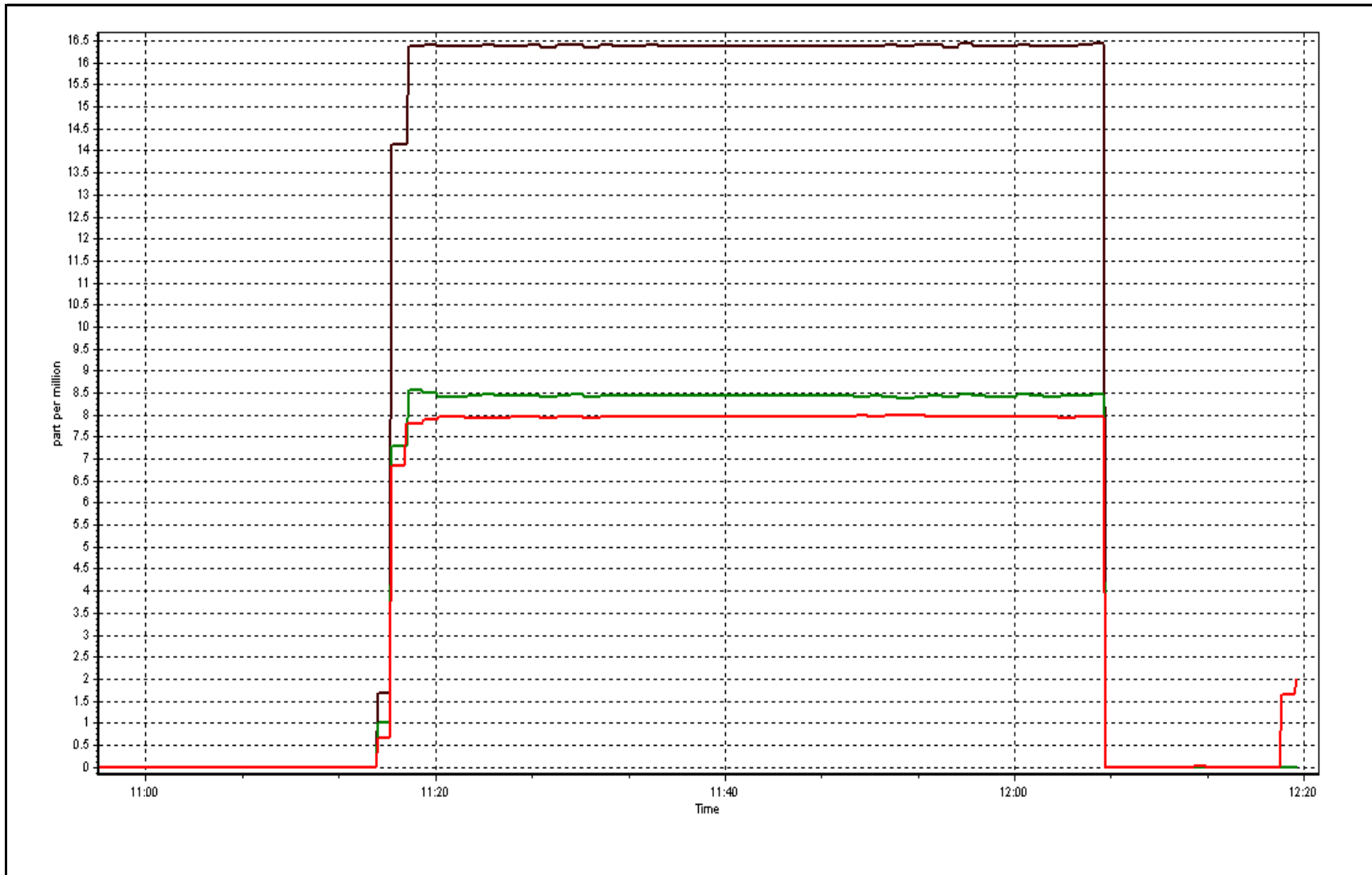
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	1.000000
8.60	8.43	1.0205		
			Slope	1.020495
			Intercept	0.000000



THC Calibration Plot

Date: February 15, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 12, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	15:05
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	26.6
Analyzer IP address	192.168.1.48		Lamp temp.	53.0	53.6
Calculated slope	1.003720	1.004190	Pressure	694.0	697.9
Calculated intercept	-1.617073	-3.093144	Flow cell A	0.767	0.770
Analyzer Background	-2.5		Flow cell B	0.742	0.744
Analyzer Coefficient	1.033	1.047	Cell A Intensity	94xxx	93xxx
			Cell B Intensity	87xxx	86xxx

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	-0.2	----
As Found Span	5000	1004	400.0	390.3	1.025
calibrator zero	5000	0.00	0.0	-0.2	----
high point (300ppb)	5000	1004	400.0	399.3	1.002
second point (200ppb)	5000	850	200.0	205.0	0.976
third point (100ppb)	5000		100.0	105.3	0.950
As Left Zero	5000	0.00	0.0	1.4	----
As Left Span	5000	1004	400.0	405.5	0.986
Average Correction Factor					0.976

Corrected As found 390.5 Previous response 400.1 % change 2.5%

Notes:

Adjusted Span. Third point was out of specifications. Went back upto high point and adjusted span. Suspect inlet filter was not conditioned fully. All points passed.

Calibration Performed By:

Aswin Sasi Kumar



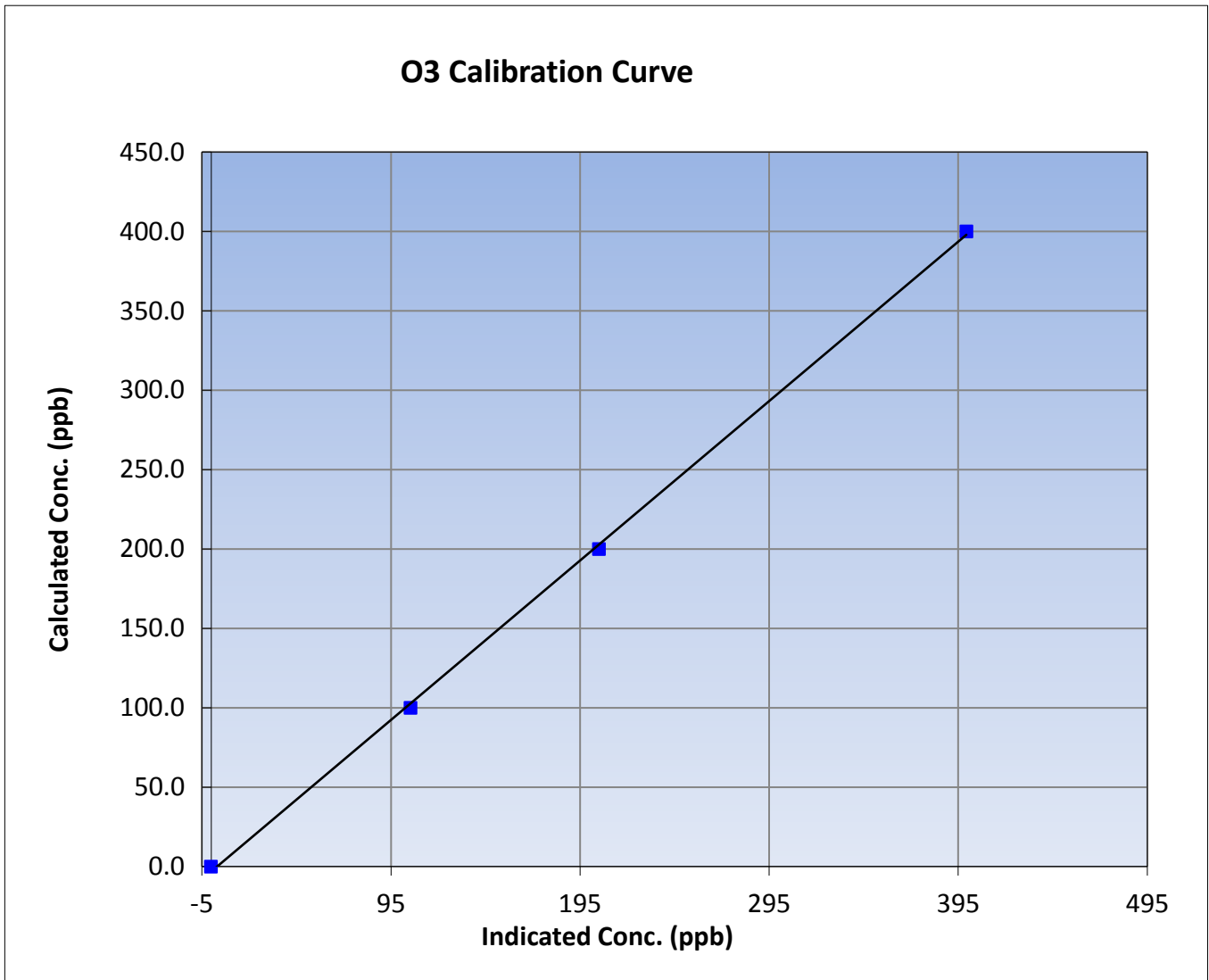
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February 3, 2017	Previous Calibration	January 12, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:25	End Time (MST)	15:05
Analyzer make	Thermo 49i	Analyzer serial #	1227254861

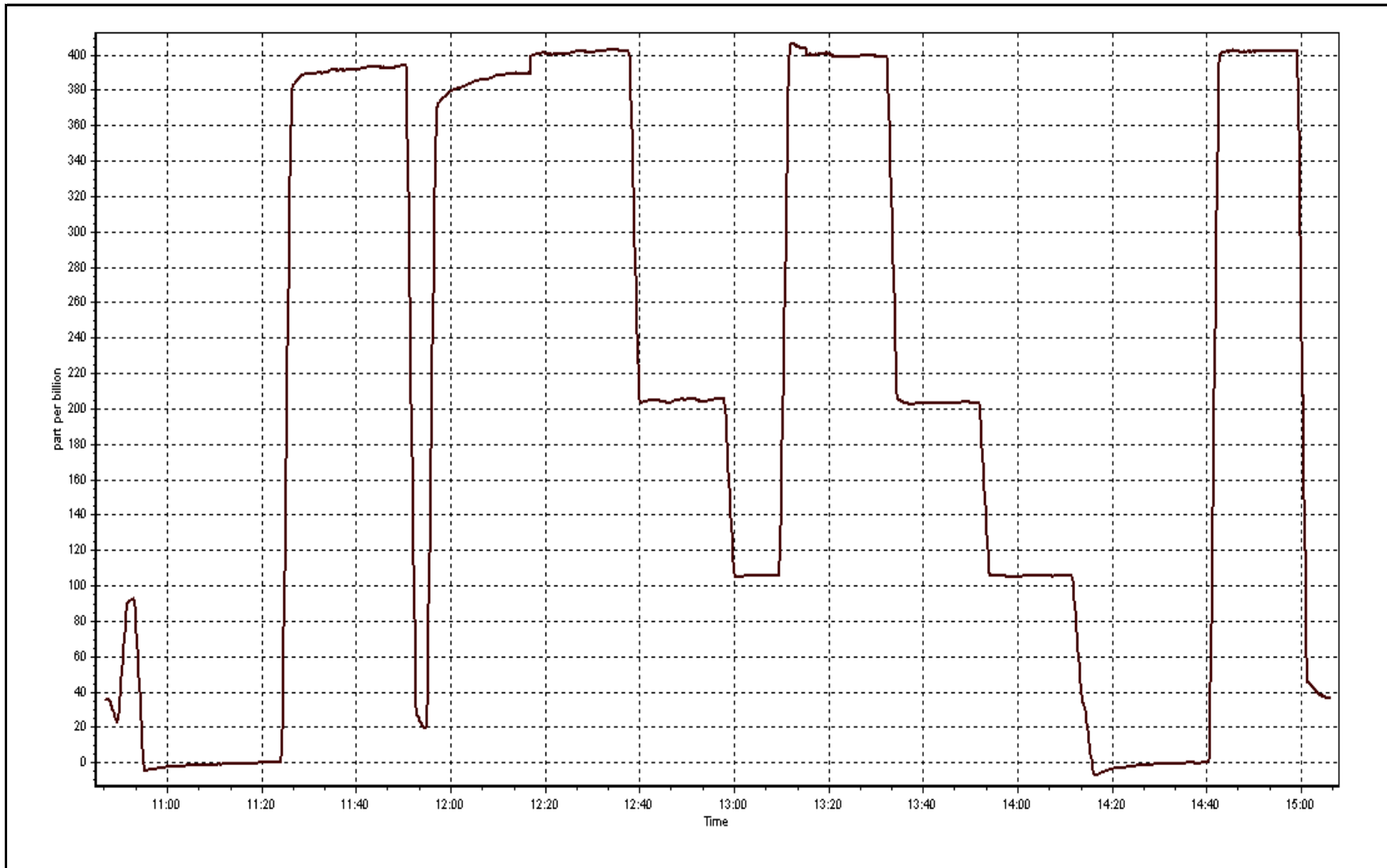
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999657
400.0	399.3	1.0018		
200.0	205.0	0.9756	Slope	1.004190
100.0	105.3	0.9497		
			Intercept	-3.093144



O3 Calibration Plot

Date: February 3, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 12, 2017
Station Name	Janvier	Station Number	AMS 22
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:26	End Time (MST)	17:35
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	0.999865	0.998048	0.999373
	Data Offset	-0.712549	0.353887	1.466980
Current Calibration	Data Slope	0.998747	0.997848	0.993731
	Data Offset	0.780641	1.850506	-0.624931

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1229254994
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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	0.874		0.923	
NOx coefficient	0.996		0.998	
NO2 coefficient	0.995		0.995	
NO bkgnd	2.5		2.6	
NOx bkgnd	2.5		2.7	
Chamber Temp	50.7	Deg C	50.3	Deg C
Moly Temp	342.6	Deg C	341.8	Deg C
PMT voltage	-762.2	V	-762.2	V
PMT Temp	-3.0	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	188.0	mmHg	189.0	mmHg
R Cell Press Nox	189.0	mmHg	189.3	mmHg
NO sample flow	0.824	lpm	0.826	lpm
Nox sample Flow	0.826	lpm	0.831	lpm

Notes:

As found was 6% out. Inlet filter changed after as founds. Diagnostics did not indicate that anything changed. Adjusted span. Final span dipped, crosschecked all connections on solenoid valve. Span seems to have stabilized after.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 2, 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	5009	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
as found span	5009	78.6	798.7	798.7	0.0	754.7	753.7	0.9	1.058	1.060
calibrator zero	5009	0.0	0.0	0.0	0.0	-0.1	-0.2	0.1	----	----
high point	5009	78.6	798.7	798.7	0.0	800.0	800.1	-0.2	0.998	0.998
second point	5007	39.3	399.5	399.5	0.0	396.8	395.4	1.4	1.007	1.010
third point	5006	19.6	199.3	199.3	0.0	199.5	197.8	1.8	0.999	1.008
as left zero	5008	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5007	78.6	799.0	375.7	423.3	808.4	377.2	431.2	0.988	0.996
Average Correction Factor									1.001	1.005

Corrcted As found NO_x= 754.8 NO= 753.9 Percent Change NO_x= 5.9% NO= 6.1%
 Previous Response NO_x= 799.5 NO= 799.9

GPT Calibration Data

Dilution Flow (total) 5009 ccm Source Gas Flow 78.60 ccm NOx ref calc conc = 798.7 ppb NO ref calc conc = 798.7 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	802.9	801.1	0.1	0.995	0.9970	----	----
1st NO2 (400)	375.7	425.4	803.5	375.7	427.8	0.994	----	0.994	100.6%
2nd NO2 (200)	585.1	216.0	805.3	585.1	220.2	0.992	----	0.981	101.9%
3rd NO2 (100)	692.1	109.1	801.8	692.1	109.7	0.996	----	0.995	100.6%
2nd NO ref point		0.0	803.4	804.6	-1.2	0.9942	0.9927	----	----
Average Correction Factor						0.9941		0.990	101.0%

Calibration Performed By: Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

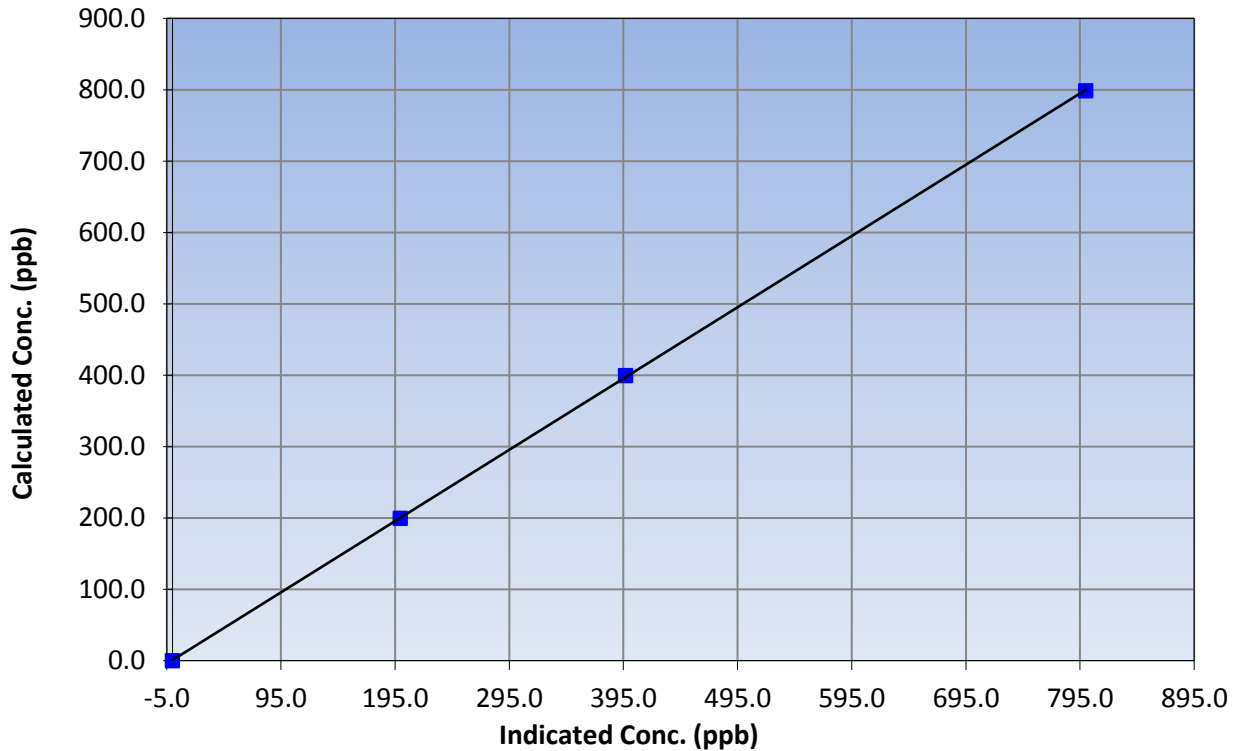
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 12, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:26	End Time (MST)	17:35
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	0.999977
798.7	800.0	0.9984		
399.5	396.8	1.0069	Slope	0.998747
199.3	199.5	0.9990		
			Intercept	0.780641

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

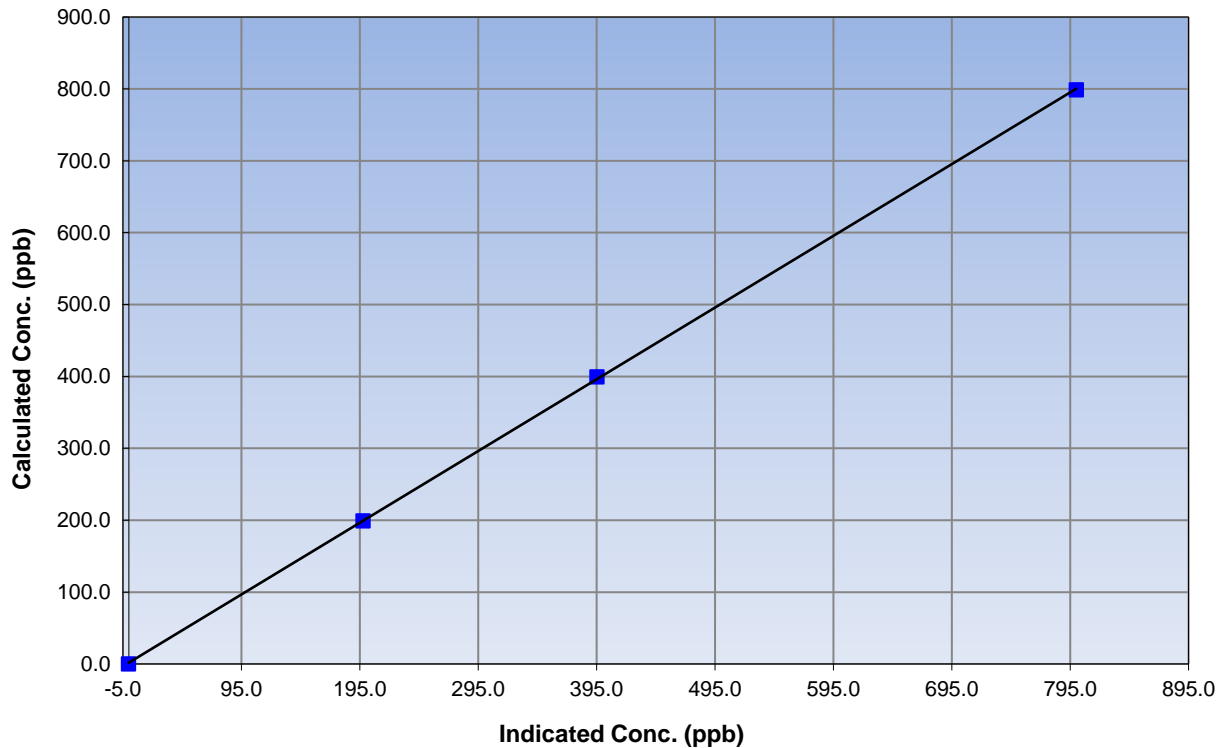
Station Information

Calibration Date	February 2, 2017	Previous Calibration	January 12, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:26	End Time (MST)	17:35
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	-0.2	N/A	Correlation Coefficient	0.999958
798.7	800.1	0.9982		
399.5	395.4	1.0104	Slope	0.997848
199.3	197.8	1.0078		
			Intercept	1.850506

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

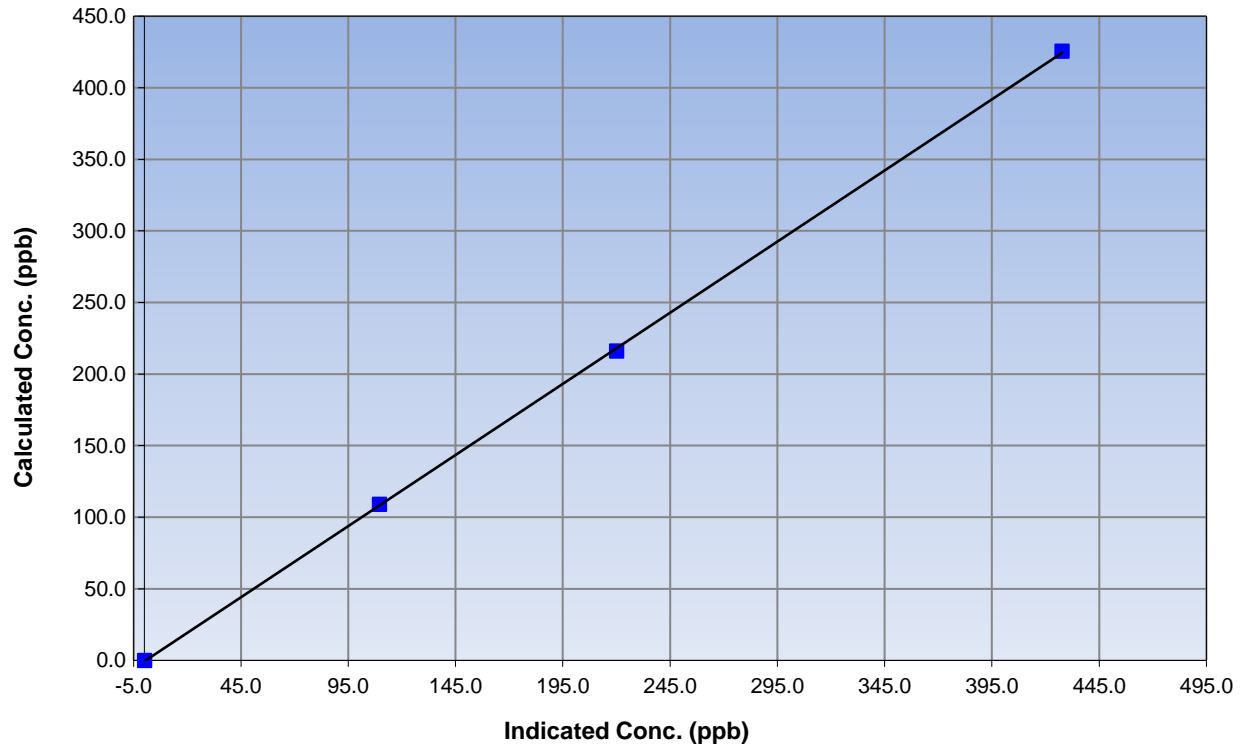
Station Information

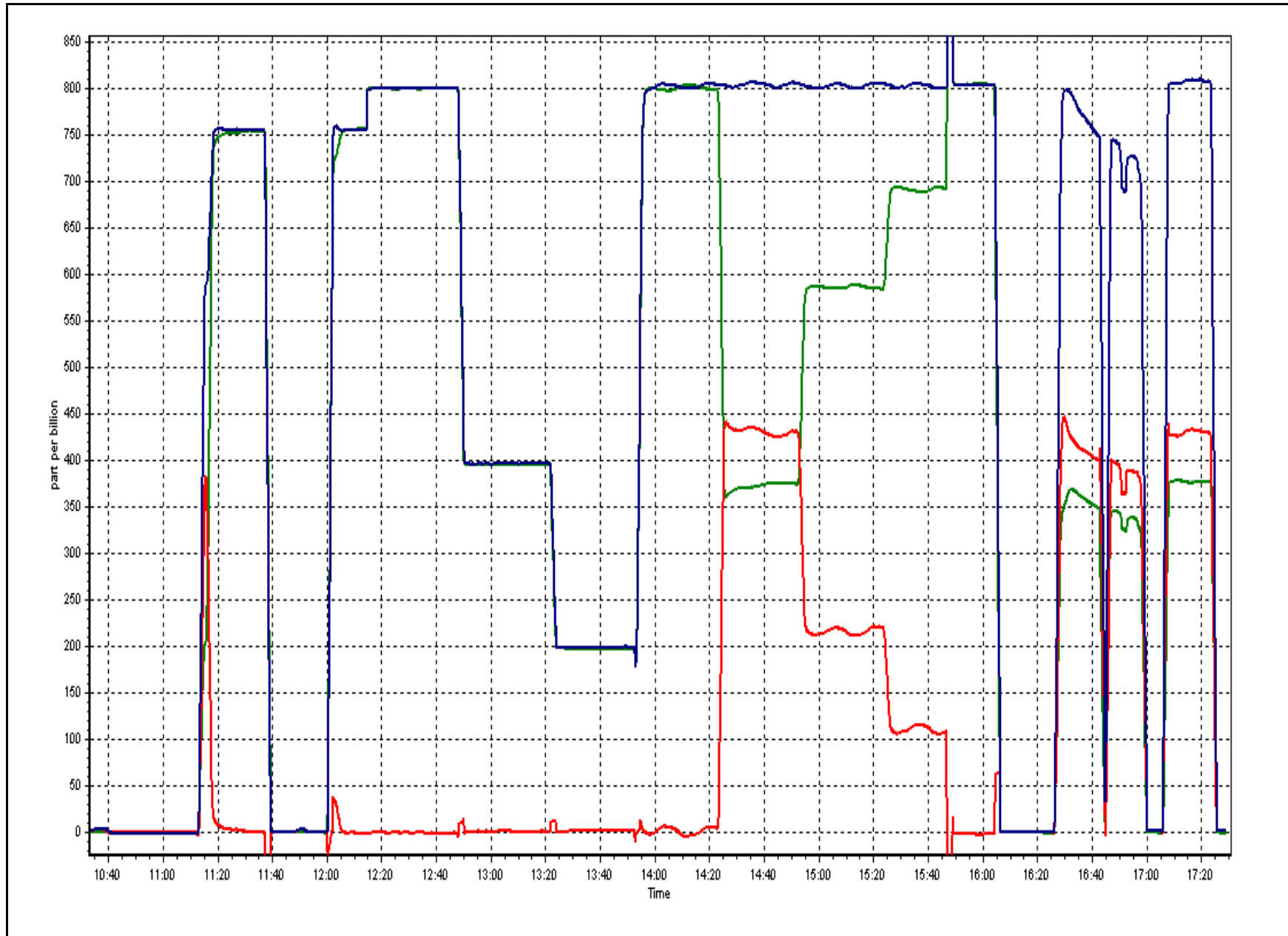
Calibration Date	February 2, 2017	Previous Calibration	January 12, 2017
Station Number	Janvier	Station Number	AMS 22
Start Time (MST)	10:26	End Time (MST)	17:35
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999935
425.4	427.8	0.9945		
216.0	220.2	0.9810	Slope	0.993731
109.1	109.7	0.9945		
			Intercept	-0.624931

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:	February 3, 2017	Last Cal Date:	January 13, 2017
Start time (MST):	13:36	End time (MST):	15:15
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:	141227
Temp/RH standard:	Delta-Cal	S/N:	141227

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)	-12.3	-10.6	-12.3	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	959	956.5	959	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1003.8	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	2.9	0	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

				<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: Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 500
CENOVUS
CHRISTINA LAKE
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
 FEBRUARY 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	640	0.8	1	-	0	0	0	0	1	2	15
H2S (ppb) Average	642	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	640	4.3	4	-	0	0	2	3	5	10	28
NO (ppb) Average	640	1.2	2	-	0	0	0	1	1	3	26
NOX (ppb) Average	640	5.5	6	-	0	1	2	4	7	12	44
Temperature 2 m (C) Average	672	-9.15	10.1	-	-35.1	-20.5	-16.7	-10.8	-1.2	4.5	14.1
Relative Humidity (%) Average	672	70.4	14	-	31	50	62	73	80	86	98
Wind Speed 10 m (km/h) Average	672	10	5	-	1	4	6	10	14	17	27
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
 FEBRUARY 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	640	32	32	100	15	0	2	0
H2S (ppb) Average	642	30	30	100	1	0	0	0
NO2 (ppb) Average	640	32	32	100	28	0	12	-
NO (ppb) Average	640	32	32	100	26	-	6	-
NOX (ppb) Average	640	32	32	100	44	-	18	-
Temperature 2 m (C) Average	672	0	0	100	14.1	-	6.8	-
Relative Humidity (%) Average	672	0	0	100	98	-	92	-
Wind Speed 10 m (km/h) Average	672	0	0	100	27	-	17	-
Wind Direction 10 m (deg) Average	672	0	0	100	-	-	-	-

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 15 ppb on Feb 17 06:00	Maximum Daily Average: 2.4 ppb on Feb 17		Hours of Data:	640
Minimum Value: 0 ppb on Feb 5 00:00	Minimum Daily Average: 0.0 ppb on Feb 19		Hours of Missing Data:	32
Maximum Diurnal Average: 1.8 ppb at hour 13	Minimum Diurnal Average: 0.4 ppb at hour 21		Hours of Calibration:	32
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		Percent Operational Time:	100.0

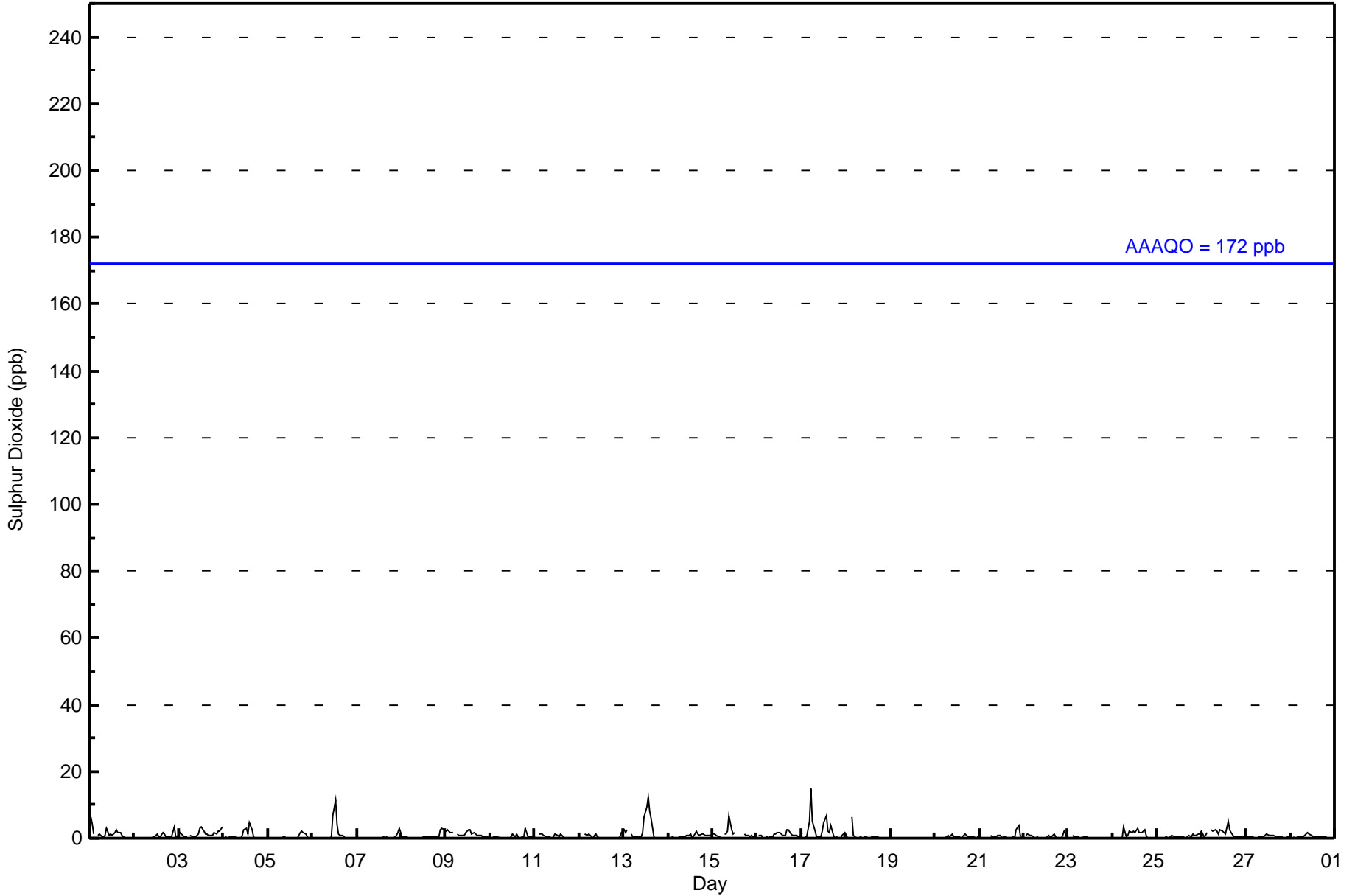
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	6	4	1	Z	1	1	0	0	1	3	1	1	1	2	3	2	2	1	1	0	0	0	0	0	1.3	6
2-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	4	0	0	0.6	4
3-Feb	2	1	1	0	1	Z	1	1	0	1	1	3	3	2	1	1	1	1	1	2	1	2	2	3	1.4	3
4-Feb	Z	1	0	0	0	1	0	0	0	0	1	2	3	1	5	3	0	0	0	0	0	0	0	0	0.8	5
5-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	0	0	0	0.4	2
6-Feb	0	0	Z	0	0	0	0	0	0	0	0	7	11	4	1	1	1	0	0	0	0	0	0	0	1.2	11
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	2	3	0.4	3
8-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	3	3	0.6	3	
9-Feb	2	3	2	2	1	Z	1	1	1	1	1	2	2	3	1	2	1	1	1	1	1	0	0	0	1.3	3
10-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	3	1	0	0	0	0.5	3	
11-Feb	0	Z	1	1	1	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1
12-Feb	0	0	Z	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
13-Feb	3	2	3	Z	1	0	0	0	0	1	2	6	9	12	8	6	0	0	0	0	0	0	0	0	2.4	12
14-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	1	2	1	1	1	1	1	1	1	1	0.7	2
15-Feb	1	1	1	1	1	Z	1	1	2	7	2	1	2	C	C	C	C	1	1	1	1	1	0	0	1.3	7
16-Feb	Z	1	1	0	0	1	0	0	1	1	1	1	2	1	1	1	2	3	1	1	1	1	0	0	1.0	3
17-Feb	2	Z	0	0	5	15	5	2	0	0	0	2	5	7	2	2	4	1	0	0	0	0	1	2	2.4	15
18-Feb	1	0	Z	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	6
19-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Feb	0	0	0	0	Z	0	1	1	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0.4	1
21-Feb	0	0	0	0	0	Z	1	1	0	0	1	1	0	0	0	0	0	0	0	0	3	4	1	0	0.6	4
22-Feb	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	2	0	0.5	2
23-Feb	0	Z	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Feb	0	0	Z	0	0	0	3	1	1	2	2	2	3	2	2	2	2	3	1	0	0	0	0	0	1.0	3
25-Feb	0	0	0	Z	0	0	0	0	1	1	0	1	0	0	0	0	0	1	0	1	1	1	1	1	0.5	1
26-Feb	2	0	1	2	Z	2	2	3	2	1	3	2	2	1	5	3	2	0	0	0	0	0	0	0	1.5	5
27-Feb	1	0	1	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1
28-Feb	Z	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0.5	2
	0.9	0.6	0.6	0.7	0.7	1.0	0.7	0.5	0.5	0.9	0.8	1.4	1.8	1.6	1.4	1.0	0.9	0.6	0.5	0.5	0.4	0.7	0.6	0.6	Diurnal Average	
	6	4	3	6	5	15	5	3	2	7	3	7	11	12	8	6	4	3	2	3	3	4	3	3	Diurnal Maximum	

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	637	99.53	99.53
11 - 20	3	0.47	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: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - February 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	17	38	27	22	27	16	20	25	45	63	79	108	38	40	57	15	637
11 - 20	0	0	0	0	0	0	0	0	1	0	0	0	0	2	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	17	38	27	22	27	16	20	25	46	63	79	108	38	42	57	15	640

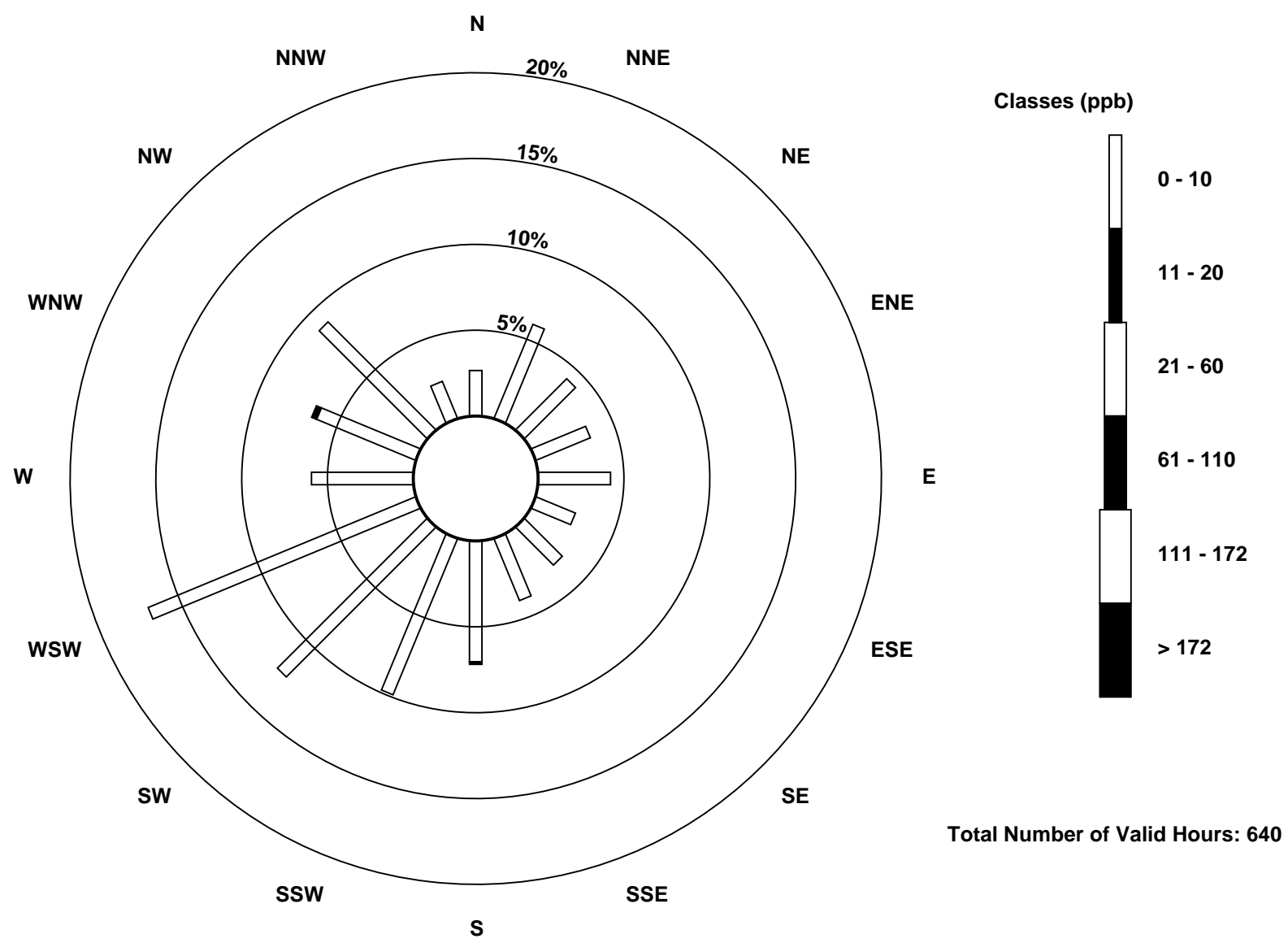
Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

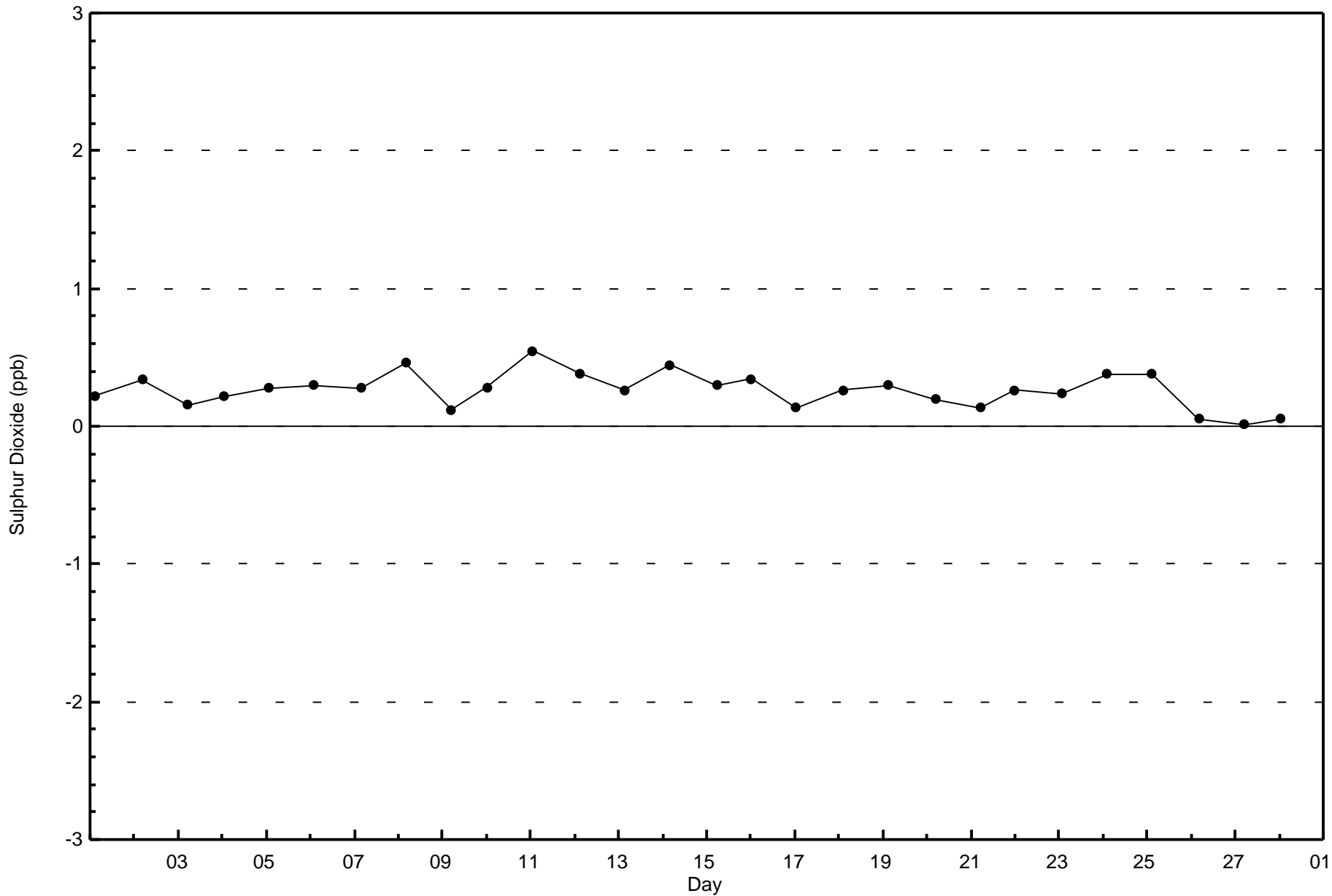
Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake (AMS500)





Wood Buffalo Environmental Association
Zero Responses

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - February 2017



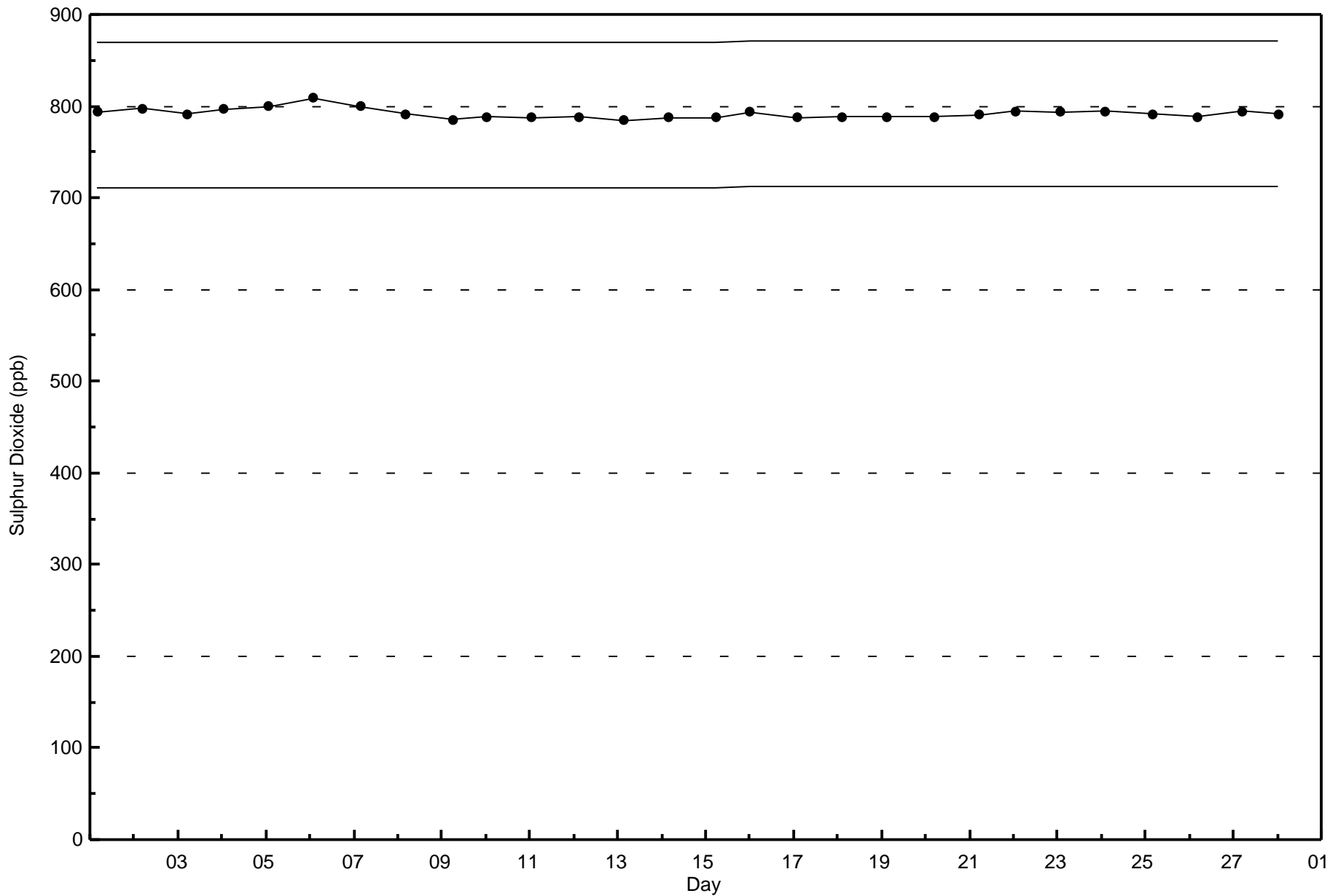


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO₂) - ppb

Cenovus - Christina Lake - February 2017

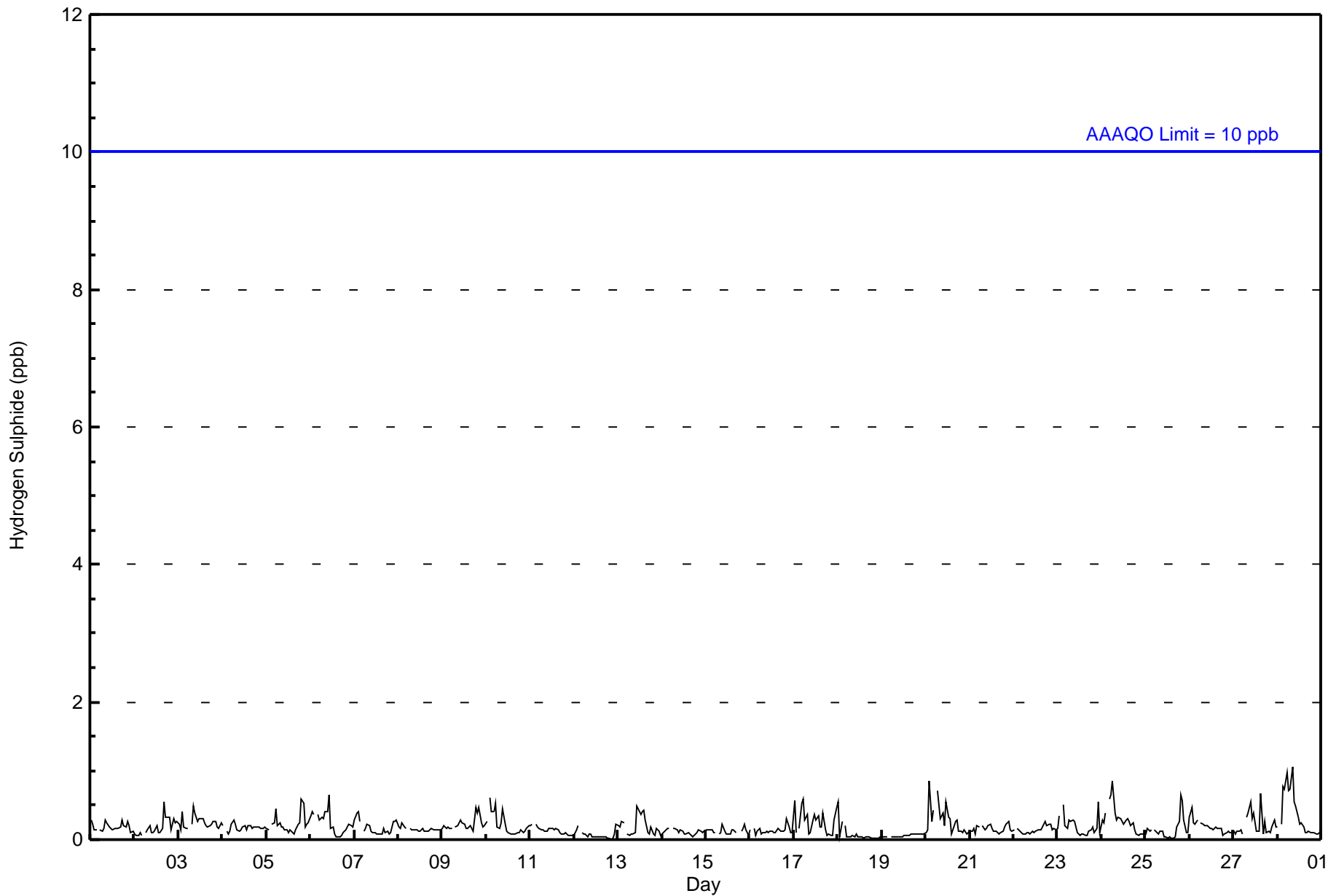




Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 1 ppb on Feb 28 09:00	Maximum Daily Average: 0.4 ppb on Feb 28		Hours of Data:	642
Minimum Value: 0 ppb on Feb 12 21:00	Minimum Daily Average: 0.1 ppb on Feb 19		Hours of Missing Data:	30
Maximum Diurnal Average: 0.3 ppb at hour 3	Minimum Diurnal Average: 0.1 ppb at hour 15		Hours of Calibration:	30
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:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
3-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
6-Feb	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
7-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Feb	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-Feb	0	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	0	0	0	0	0	0.1	0
16-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Feb	1	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Feb	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
19-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Feb	0	0	1	0	0	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Feb	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
24-Feb	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.2	1
26-Feb	0	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-Feb	0	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
28-Feb	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	1	1	0	1	0	Diurnal Maximum

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	642	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: 642

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - February 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	16	38	28	23	28	14	20	24	49	64	78	106	38	43	58	15	642
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	16	38	28	23	28	14	20	24	49	64	78	106	38	43	58	15	642

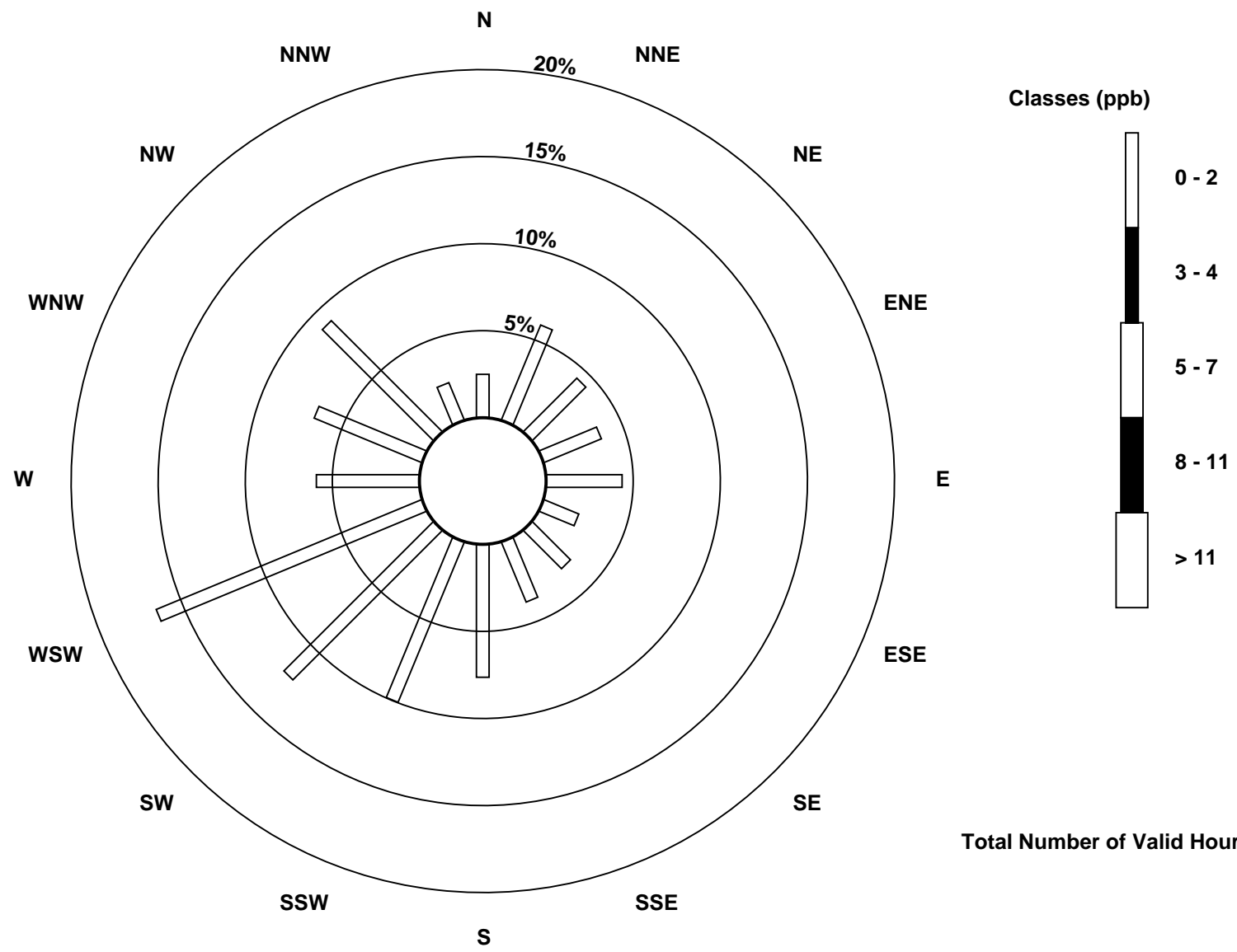
Total Number of Valid Hours: 642

Total Number of Hours: 672

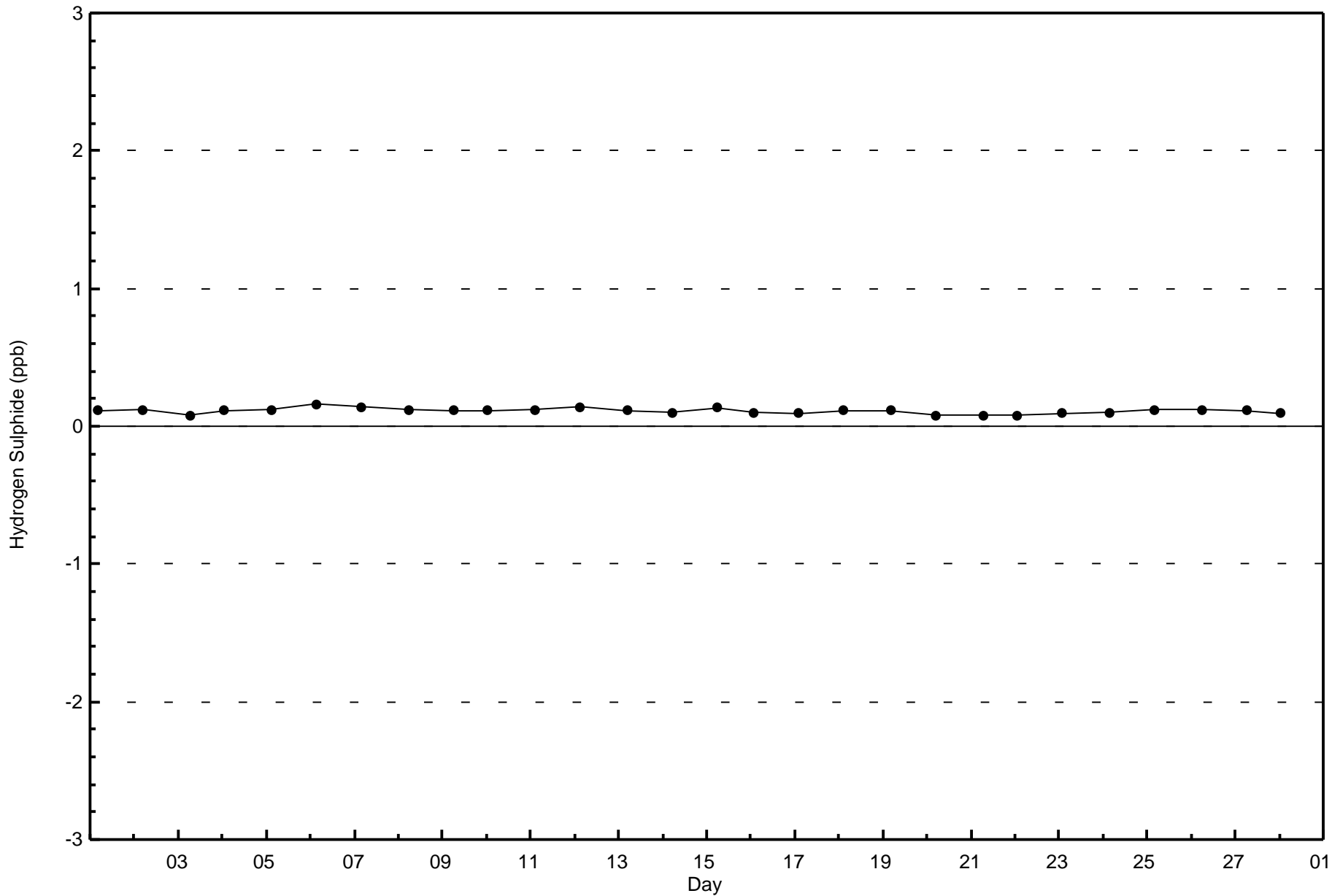


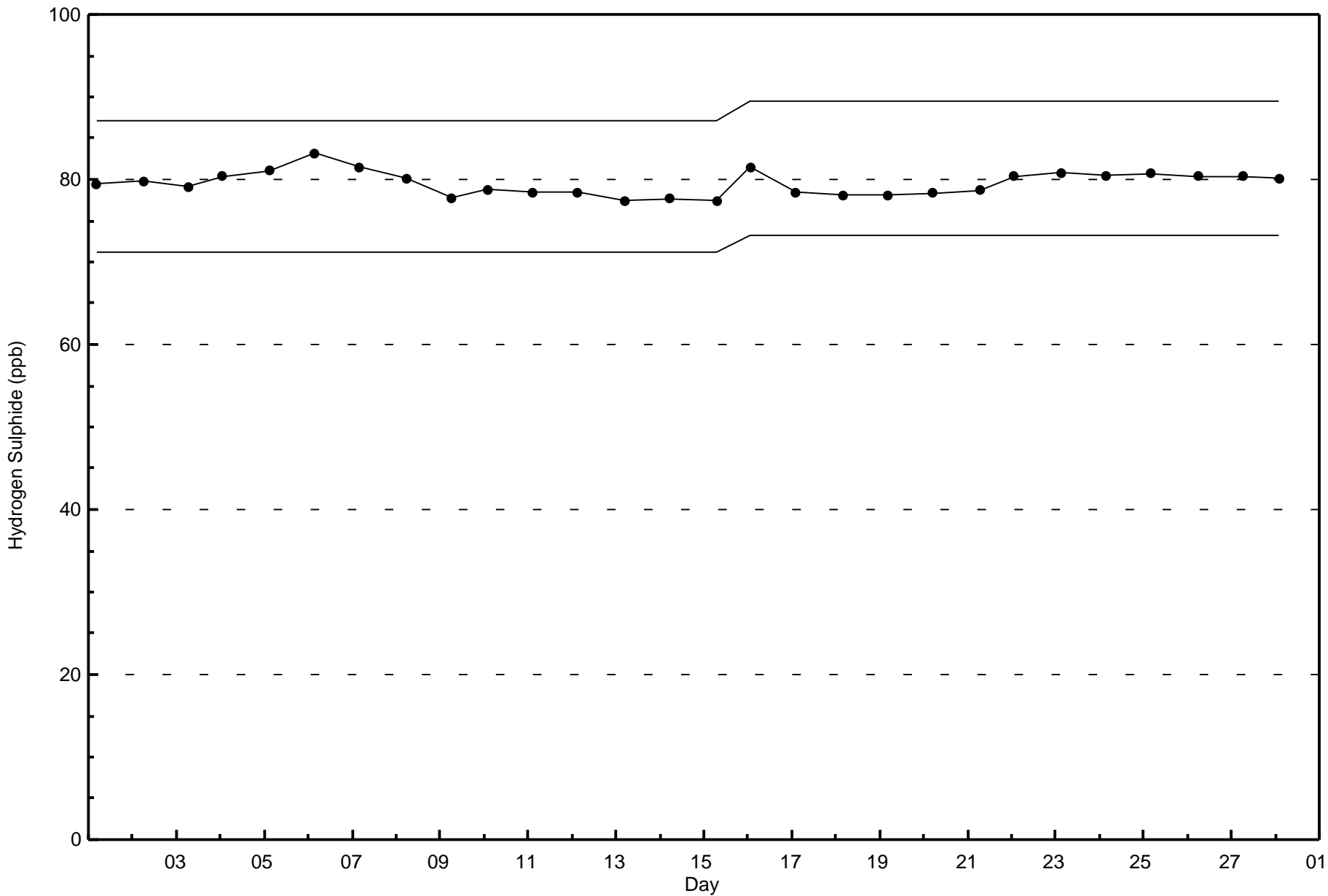
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake (AMS500)



Total Number of Valid Hours: 642







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

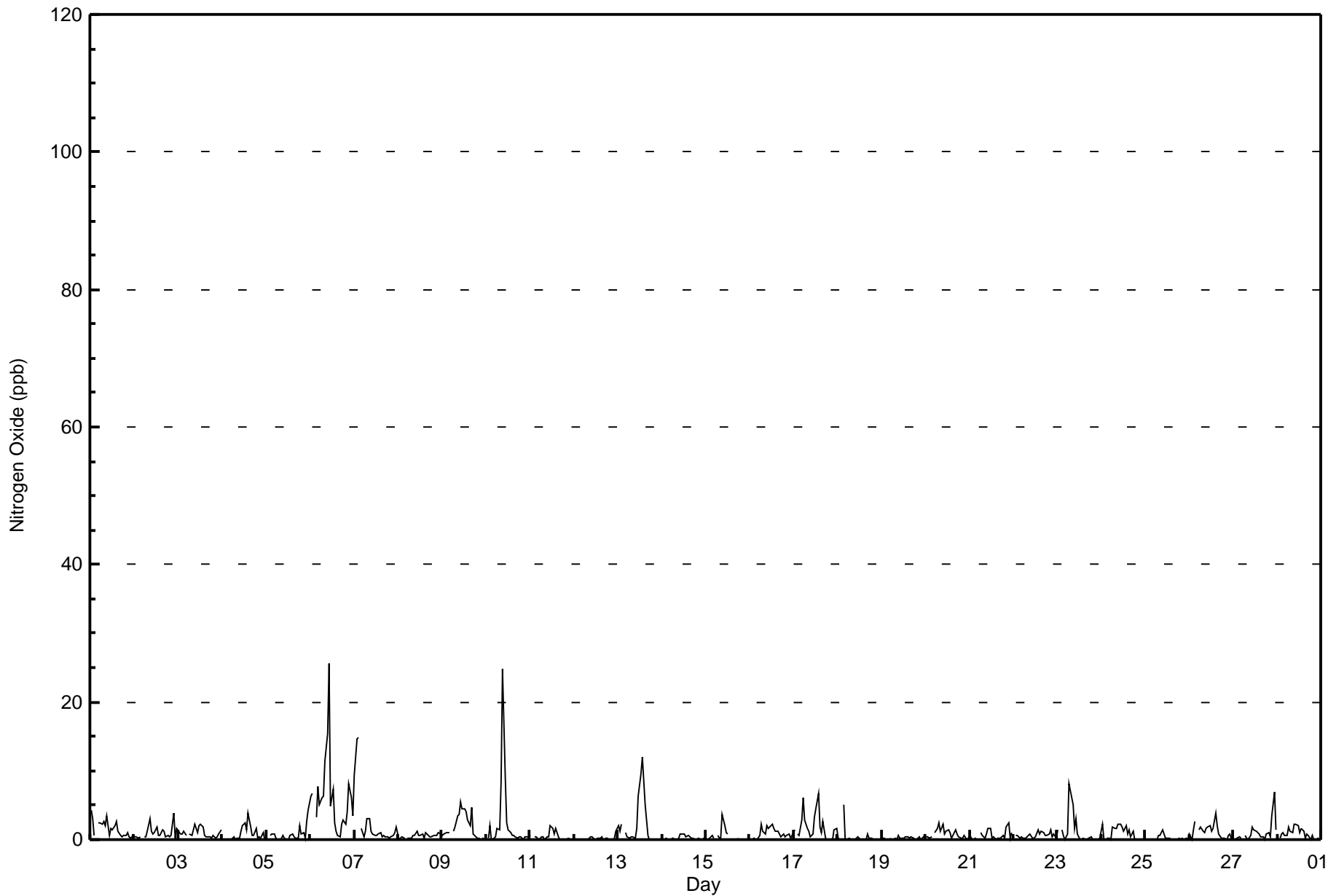
Cenovus - Christina Lake - February 2017

Maximum Value: 26 ppb on Feb 6 11:00																		Maximum Daily Average: 6.1 ppb on Feb 6						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 4 02:00																		Minimum Daily Average: 0.2 ppb on Feb 12						Hours of Data: 640		
Maximum Diurnal Average: 2.7 ppb at hour 10																		Minimum Diurnal Average: 0.4 ppb at hour 20						Hours of Missing Data: 32		
Monthly Average: 1.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 10						Hours of Calibration: 32		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	4	3	1	Z	3	2	2	3	2	3	1	2	1	2	3	1	1	0	1	1	1	0	0	1	1.6	4
2-Feb	0	0	0	0	Z	0	0	1	3	1	1	1	2	1	1	1	1	0	1	0	1	4	0	2	1.0	4
3-Feb	1	1	1	1	1	Z	1	1	1	2	1	2	2	2	1	0	0	0	0	1	0	0	1	1	0.9	2
4-Feb	Z	0	0	0	0	0	0	0	0	0	1	2	2	1	4	2	1	1	2	0	0	0	1	0	0.8	4
5-Feb	0	Z	1	1	1	0	0	0	0	1	0	0	0	1	1	0	0	0	2	1	1	0	3	4	0.7	4
6-Feb	6	7	Z	3	8	5	6	6	11	15	26	5	7	3	1	1	0	2	3	2	4	8	6	3	6.1	26
7-Feb	9	15	15	Z	2	0	1	3	3	1	1	1	1	1	1	0	1	0	0	0	0	1	1	2	2.6	15
8-Feb	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	0	1	1	0	0	1	1	1	1	1	0.5	1
9-Feb	1	1	1	1	1	Z	1	2	3	4	5	4	4	4	3	2	5	1	0	0	0	0	0	0	1.9	5
10-Feb	Z	0	2	0	0	0	2	1	8	25	9	2	1	1	1	1	0	0	0	0	0	0	0	0	2.5	25
11-Feb	1	Z	0	0	0	0	0	0	0	0	0	2	2	1	2	0	0	0	0	0	0	0	0	0	0.4	2
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
13-Feb	2	1	2	Z	1	0	0	0	0	0	2	6	10	12	9	5	1	0	0	0	0	0	0	0	2.3	12
14-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.2	1
15-Feb	0	0	0	1	0	Z	1	0	0	4	2	1	1	C	C	C	C	0	0	0	0	0	0	0	0.5	4
16-Feb	Z	0	0	0	0	1	2	1	1	2	2	2	2	2	1	1	1	0	1	0	1	1	0	1	0.9	2
17-Feb	1	Z	1	1	3	6	3	2	1	0	1	3	5	7	2	1	3	0	0	0	0	0	1	2	1.8	7
18-Feb	0	0	Z	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	5
19-Feb	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-Feb	0	1	0	0	Z	1	2	2	1	2	1	1	1	1	0	1	1	1	0	0	0	1	0	0	0.8	2
21-Feb	1	0	0	0	0	Z	1	1	0	1	2	2	0	0	0	0	0	0	1	0	2	2	0	1	0.6	2
22-Feb	Z	1	1	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0.6	1
23-Feb	1	Z	1	1	0	1	8	7	5	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1.3	8
24-Feb	2	0	Z	0	0	0	2	2	2	2	2	1	2	1	1	0	1	0	1	0	0	0	0	0	0.9	2
25-Feb	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Feb	1	0	1	3	Z	1	2	1	1	2	2	2	1	2	4	2	1	0	0	0	0	1	1	0	1.2	4
27-Feb	0	0	0	0	0	Z	1	0	0	1	2	1	1	1	1	0	0	0	1	1	0	3	7	1	1.0	7
28-Feb	Z	0	1	1	1	1	2	1	1	2	2	2	1	2	1	0	1	1	0	1	0	0	0	0	0.9	2
																		Diurnal Average						Diurnal Maximum		
1.4 1.2 1.2 0.8 0.9 0.9 1.4 1.3 1.7 2.7 2.4 1.7 1.7 1.7 1.4 0.9 0.8 0.4 0.5 0.4 0.5 0.8 0.9 0.8																		9 15 15 5 8 6 8 7 11 25 26 6 10 12 9 5 5 2 3 2 4 8 7 4								
Z - zerospan																		C - Calibration								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	99.69	99.69
21 - 40	2	0.31	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - February 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	17	38	26	22	27	15	20	25	46	63	79	108	38	42	57	15	638
21 - 40	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	17	38	27	22	27	16	20	25	46	63	79	108	38	42	57	15	640

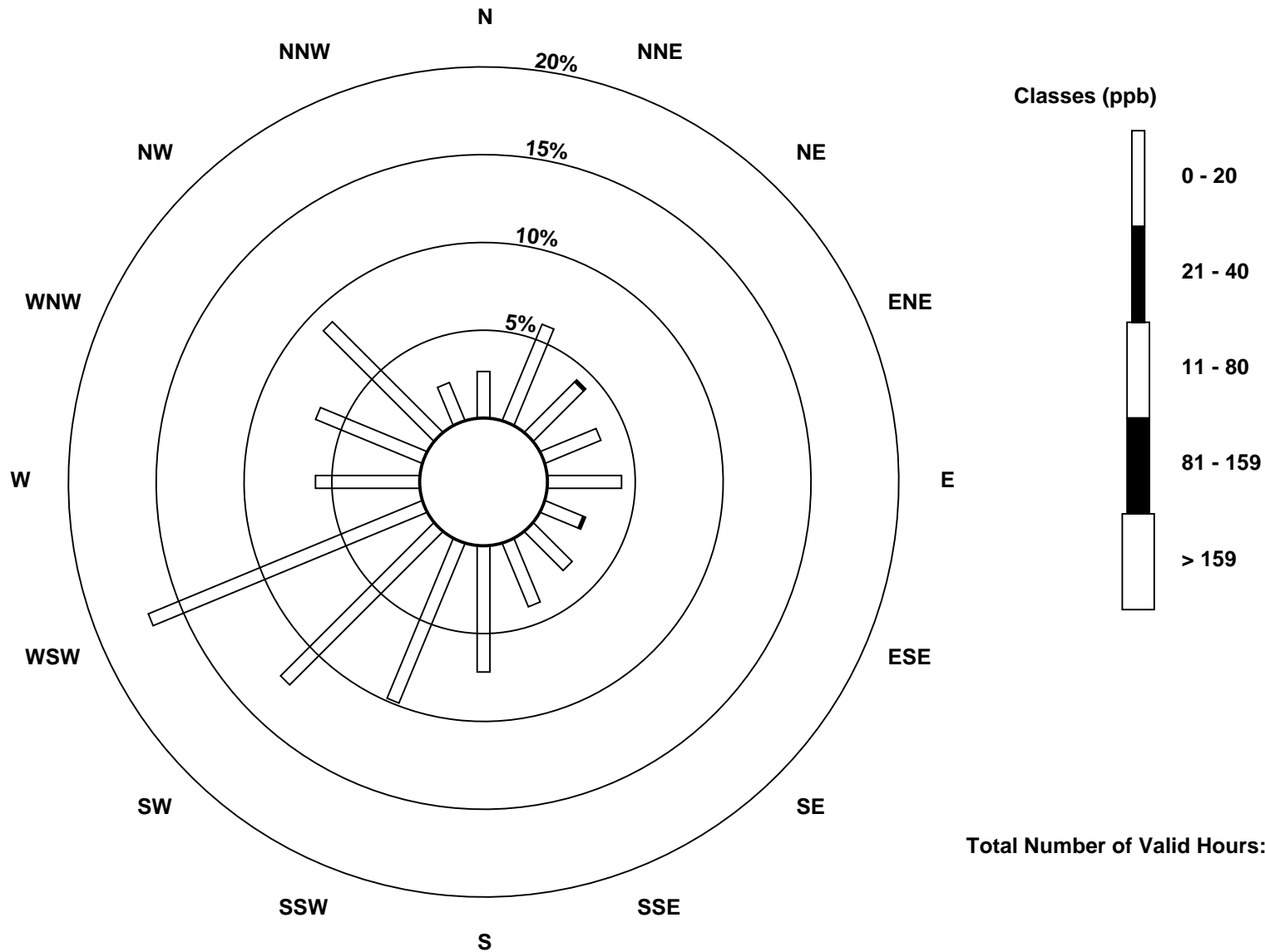
Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake (AMS500)



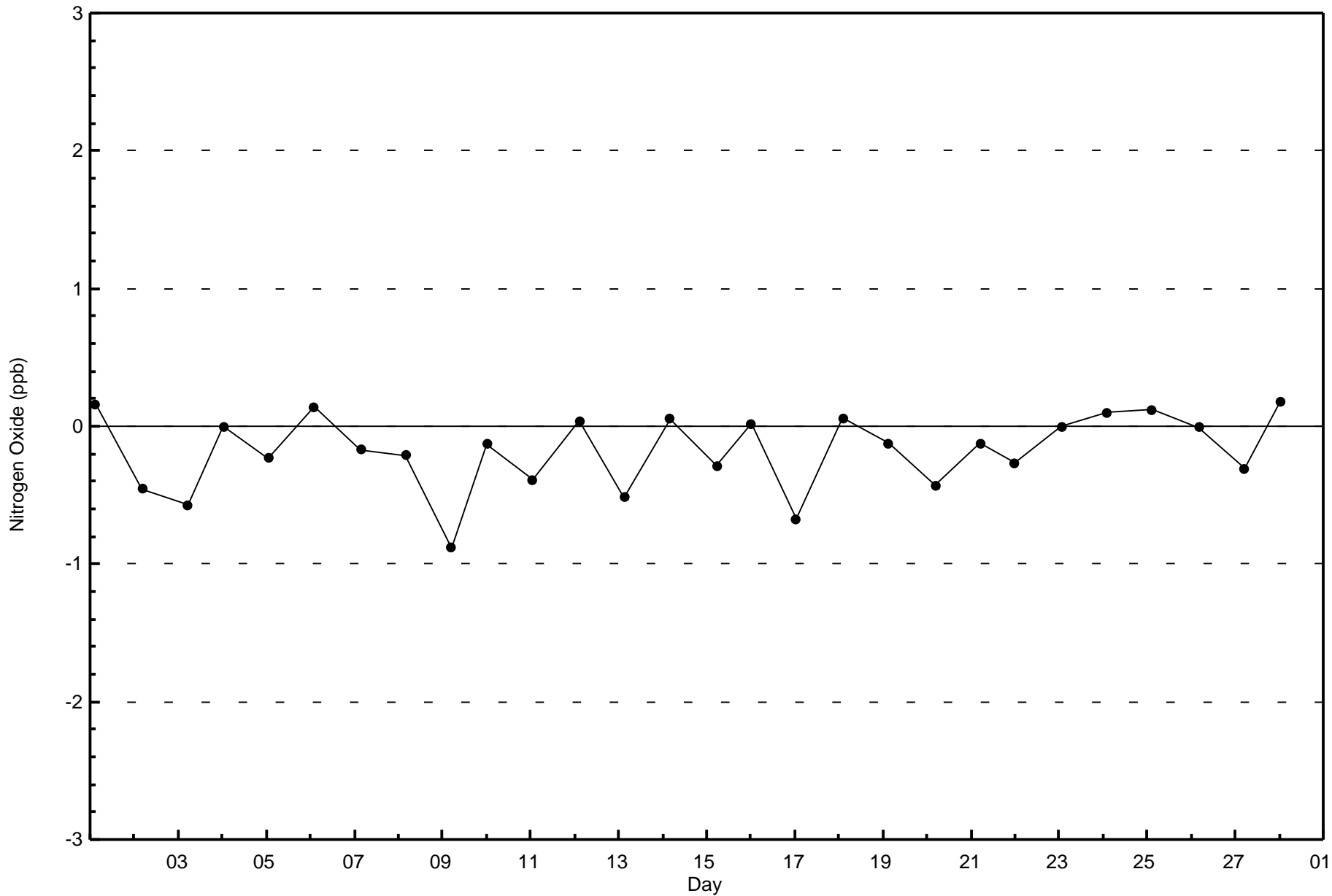


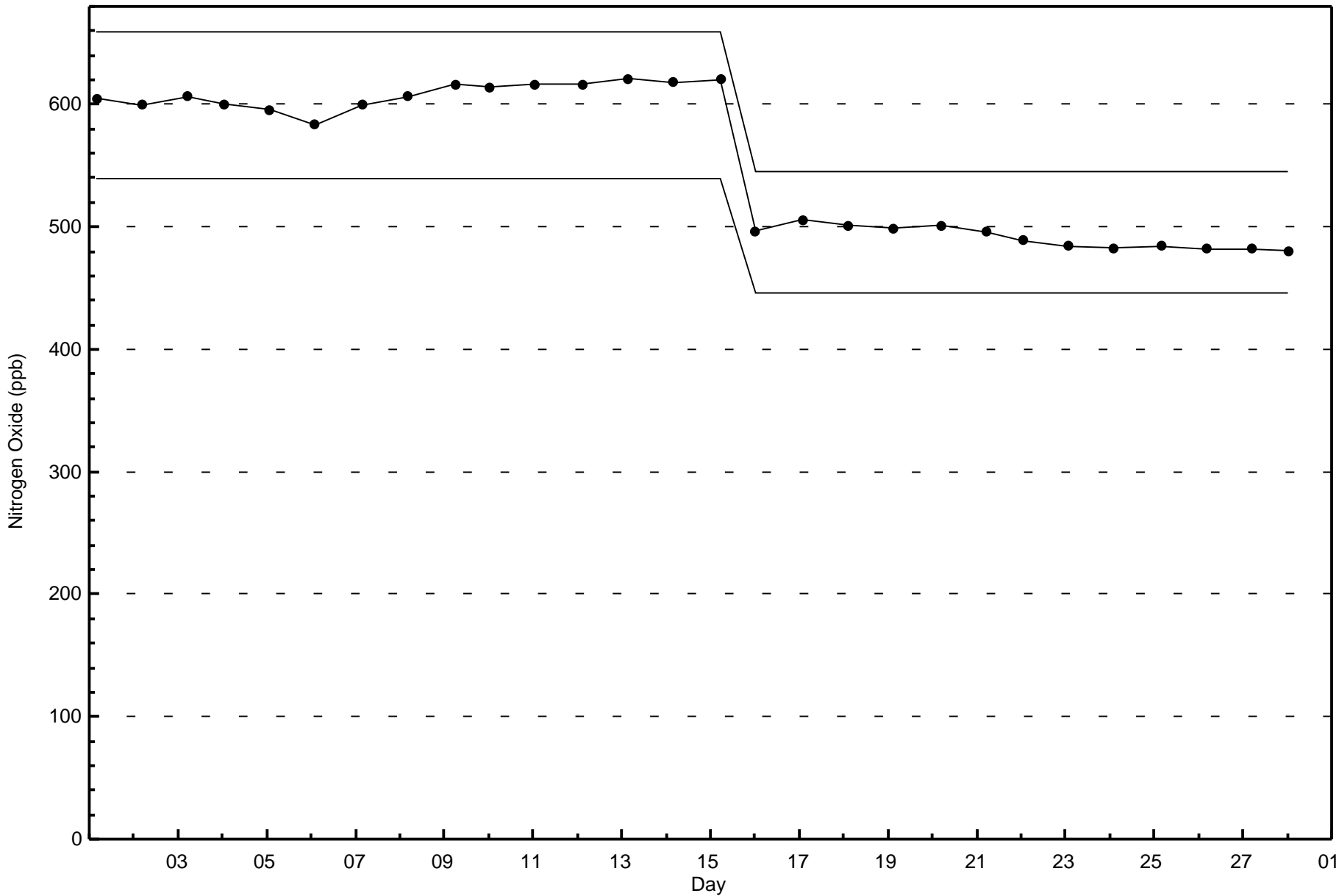
Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

Cenovus - Christina Lake - February 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

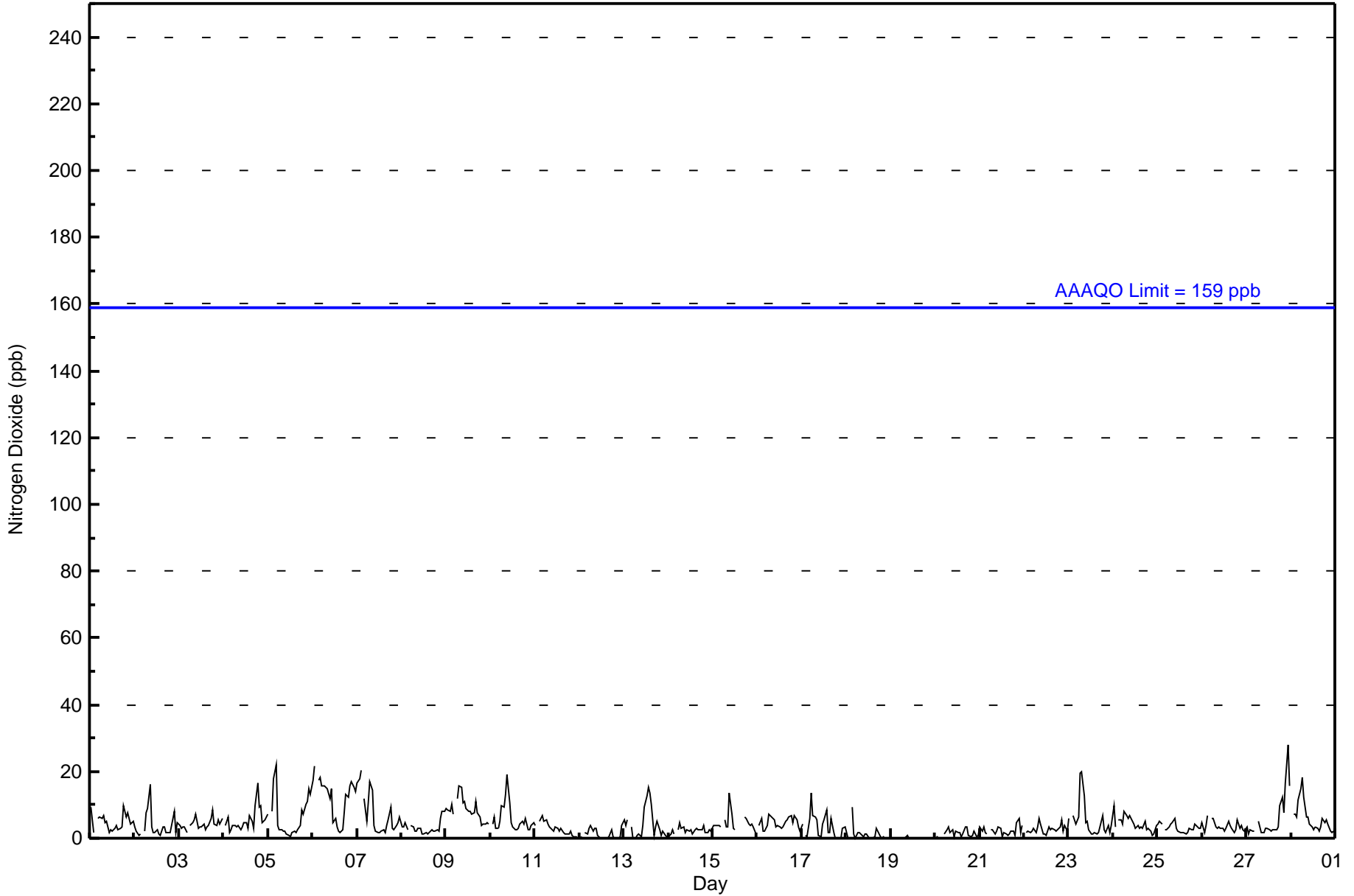
Cenovus - Christina Lake - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 28 ppb on Feb 27 23:00										Maximum Daily Average: 12.1 ppb on Feb 6										Hours of Data: 640						
Minimum Value: 0 ppb on Feb 12 01:00										Minimum Daily Average: 0.1 ppb on Feb 19										Hours of Missing Data: 32						
Maximum Diurnal Average: 6.4 ppb at hour 7										Minimum Diurnal Average: 2.8 ppb at hour 16										Hours of Calibration: 32						
Monthly Average: 4.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 19										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	9	5	2	Z	6	6	6	7	5	5	2	3	2	3	4	3	3	4	10	7	8	6	4	5	4.9	10
2-Feb	3	2	1	1	Z	2	8	9	16	3	2	2	3	1	1	4	3	2	2	2	4	8	2	5	3.6	16
3-Feb	4	3	4	3	2	Z	4	5	6	7	3	4	4	4	2	3	4	6	9	4	4	6	4	6	4.3	9
4-Feb	Z	4	6	2	3	4	4	3	4	3	3	5	5	3	7	5	3	10	17	9	10	5	6	6	5.4	17
5-Feb	7	Z	8	18	22	4	2	3	2	2	1	1	2	2	2	3	4	8	7	10	11	15	13	6.4	22	
6-Feb	18	22	Z	17	18	16	16	15	15	12	15	5	6	3	2	2	3	8	13	12	16	17	15	14	12.1	22
7-Feb	17	18	21	Z	12	5	11	17	15	4	2	2	2	2	2	4	5	9	3	3	4	5	6	7.3	21	
8-Feb	4	3	5	3	Z	4	4	2	2	3	3	1	1	2	1	2	3	2	2	3	2	6	8	8	3.2	8
9-Feb	9	9	8	10	7	Z	12	16	15	11	11	9	8	8	7	8	11	8	6	4	4	4	5	4	8.4	16
10-Feb	Z	4	6	3	3	5	10	9	13	19	11	5	3	3	3	3	4	5	4	6	3	2	4	5	5.8	19
11-Feb	4	Z	5	6	7	5	5	4	4	3	2	4	3	2	3	2	1	1	1	2	1	1	1	0	2.9	7
12-Feb	0	0	Z	2	1	3	4	2	3	3	1	0	0	0	0	0	1	3	0	0	0	0	1	4	1.2	4
13-Feb	5	4	6	Z	3	0	0	1	1	1	4	10	13	15	14	10	1	4	5	3	1	2	1	1	4.4	15
14-Feb	1	1	3	1	Z	2	5	3	3	2	3	2	3	1	3	3	3	2	3	4	2	2	3	2	2.4	5
15-Feb	4	4	4	4	3	Z	6	4	3	13	7	3	2	C	C	C	C	7	6	4	4	4	3	1	4.6	13
16-Feb	Z	4	6	2	2	4	7	7	6	6	3	4	3	3	5	5	6	7	5	7	6	4	2	4.6	7	
17-Feb	4	Z	1	1	6	14	7	6	5	1	1	4	5	8	2	2	6	2	0	0	0	0	3	3	3.5	14
18-Feb	2	0	Z	9	1	0	2	2	1	1	1	1	0	0	0	1	3	2	1	0	1	0	0	0	1.2	9
19-Feb	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
20-Feb	0	0	0	0	Z	1	2	4	2	3	0	2	2	2	1	1	3	3	1	0	1	2	0	1	1.4	4
21-Feb	3	2	3	2	1	Z	3	3	1	2	3	3	0	2	1	1	1	2	2	1	5	6	2	4	2.3	6
22-Feb	Z	2	2	2	2	3	2	3	6	4	1	1	1	3	2	3	3	2	3	4	5	2	4	2	2.7	6
23-Feb	6	Z	7	6	4	6	20	20	13	5	5	3	1	1	2	1	2	4	7	2	2	4	2	4	5.4	20
24-Feb	10	3	Z	6	5	4	8	7	6	7	5	4	3	4	3	4	3	5	3	3	2	1	1	4	4.4	10
25-Feb	4	5	4	Z	3	2	3	4	5	6	3	2	2	2	1	2	3	2	3	4	4	3	3	3	3.1	6
26-Feb	5	2	4	7	Z	6	6	4	3	3	3	3	2	3	5	4	3	2	3	6	3	4	3	2	3.6	7
27-Feb	4	1	3	2	2	Z	5	3	2	2	3	3	2	2	2	3	2	3	10	12	8	16	28	16	5.9	28
28-Feb	Z	7	7	6	11	15	18	12	6	6	4	3	3	3	3	2	4	6	5	5	4	2	2	2	6.0	18
5.3 4.4 4.8 4.8 5.5 4.9 6.4 6.2 5.8 4.8 3.7 3.1 2.8 3.1 2.8 2.8 3.0 3.9 4.9 4.0 4.0 4.5 4.5 4.4																								Diurnal Average		
18 22 21 18 22 16 20 20 16 19 15 10 13 15 14 10 11 10 17 12 16 17 28 16																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	637	99.53	99.53
21 - 40	3	0.47	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: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - February 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	17	38	27	21	26	16	20	25	46	62	79	108	38	42	57	15	637
21 - 40	0	0	0	1	1	0	0	0	0	1	0	0	0	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	17	38	27	22	27	16	20	25	46	63	79	108	38	42	57	15	640

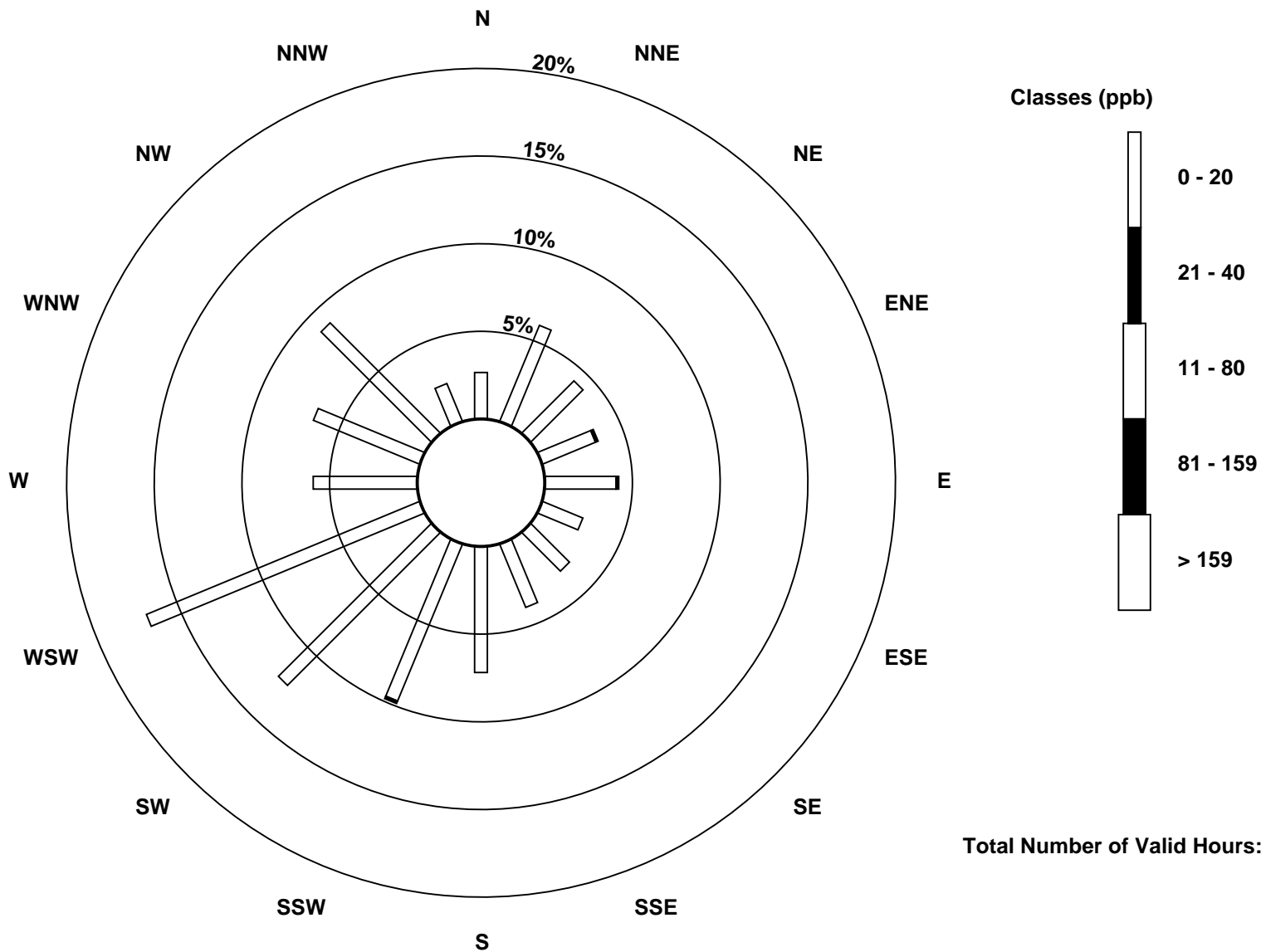
Total Number of Valid Hours: 640

Total Number of Hours: 672

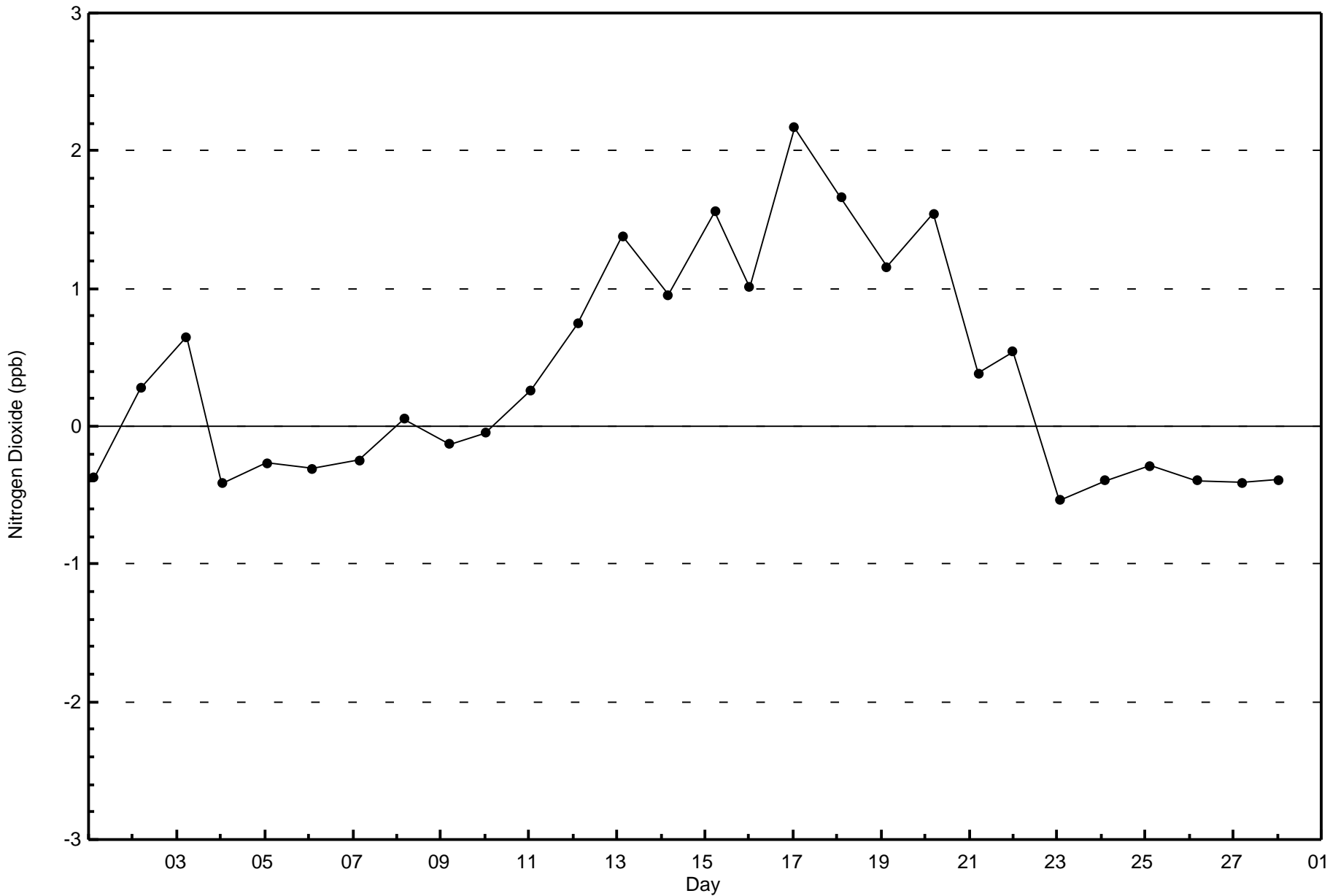


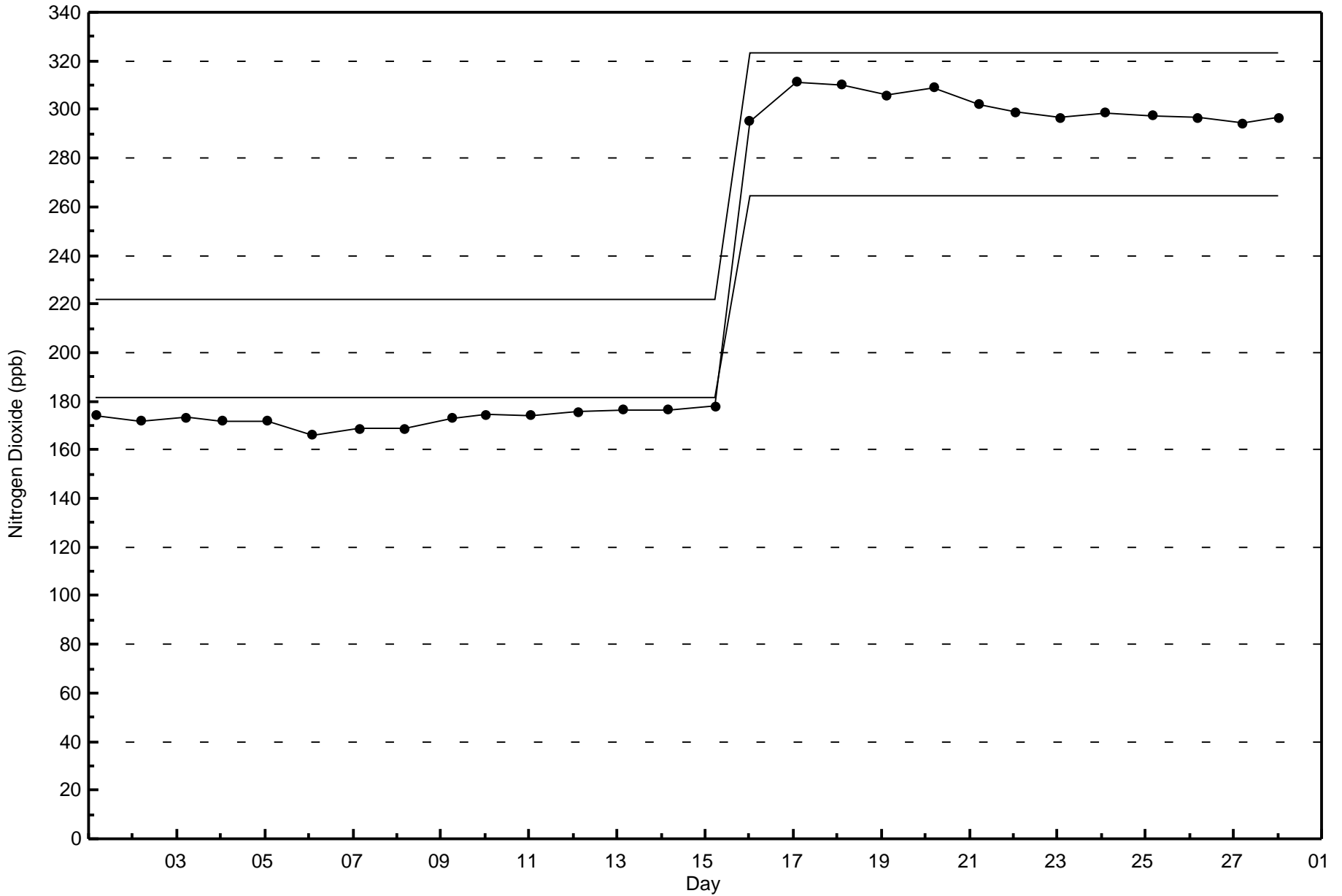
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake (AMS500)



Total Number of Valid Hours: 640





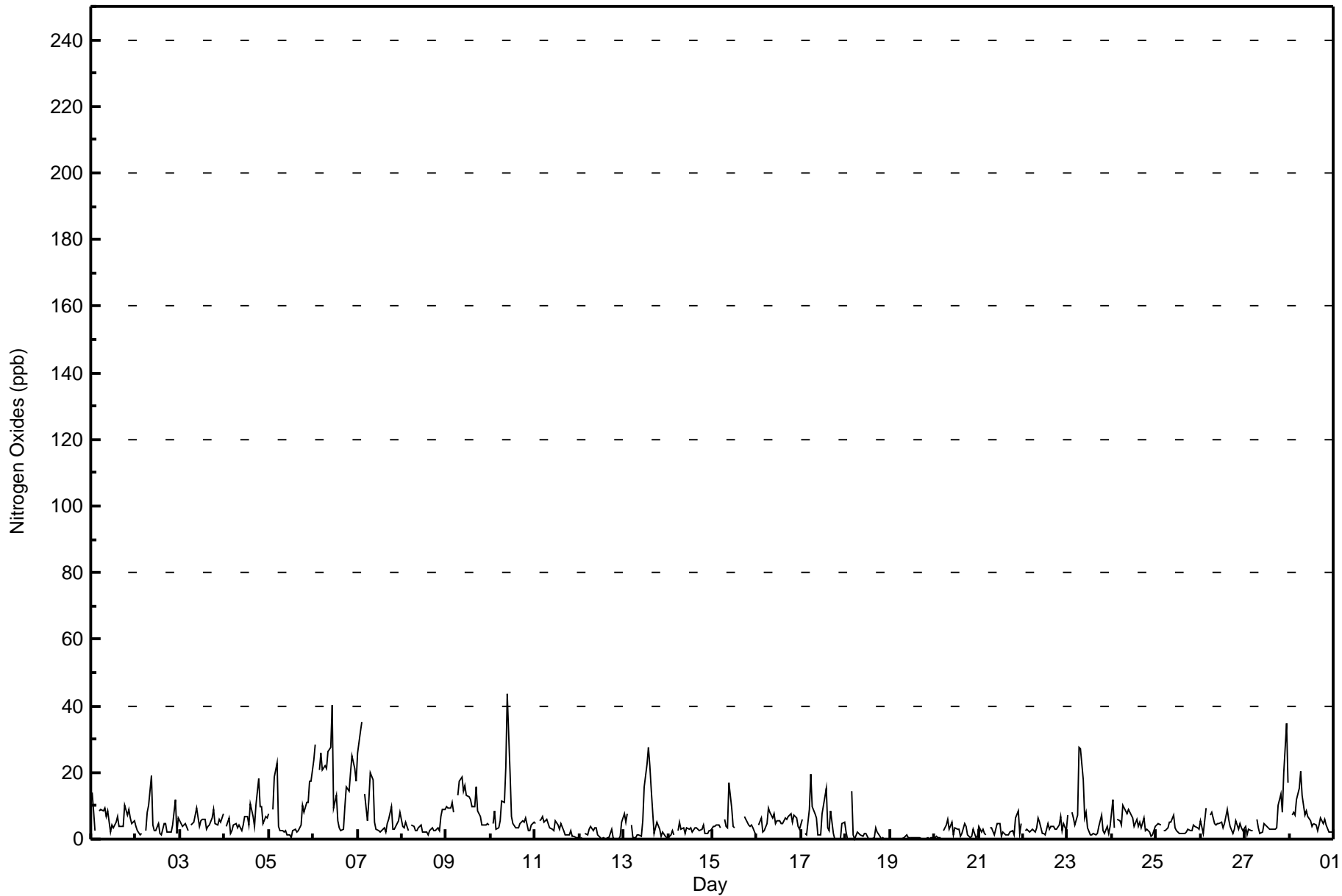


Maximum Value: 44 ppb on Feb 10 10:00		Maximum Daily Average: 18.1 ppb on Feb 6		Hours in Service: 672																							
Minimum Value: 0 ppb on Feb 12 01:00		Minimum Daily Average: 0.3 ppb on Feb 19		Hours of Data: 640																							
Maximum Diurnal Average: 7.7 ppb at hour 7		Minimum Diurnal Average: 3.7 ppb at hour 16		Hours of Missing Data: 32																							
Monthly Average: 5.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 7 P ₉₀ = 12 P ₉₉ = 25		Hours of Calibration: 32																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	14	8	3	Z	8	9	8	9	7	8	2	4	4	5	7	4	4	4	10	7	9	6	5	6	6.6	14	
2-Feb	4	3	1	2	Z	3	8	10	19	4	3	3	5	2	1	5	4	2	2	2	4	12	2	6	4.6	19	
3-Feb	5	4	4	5	3	Z	4	5	7	9	4	6	6	6	3	4	4	7	9	5	4	6	5	7	5.2	9	
4-Feb	Z	4	6	2	3	4	5	3	4	3	4	7	7	4	11	7	4	10	18	10	10	5	7	7	6.2	18	
5-Feb	7	Z	9	19	23	4	2	3	2	3	1	1	1	2	3	2	3	4	10	8	11	11	17	17	7.1	23	
6-Feb	24	28	Z	21	26	21	22	21	26	27	40	9	13	6	3	3	3	10	16	15	20	25	21	17	18.1	40	
7-Feb	26	32	35	Z	13	6	12	20	18	5	3	3	2	3	3	2	5	6	10	3	3	4	6	8	9.9	35	
8-Feb	4	4	5	3	Z	4	4	2	3	4	4	2	2	2	1	3	3	3	2	3	3	7	9	9	3.7	9	
9-Feb	10	9	9	11	8	Z	13	18	19	14	16	13	13	12	10	10	16	8	7	4	4	4	5	4	10.3	19	
10-Feb	Z	4	8	3	3	6	12	11	21	44	20	7	5	3	3	4	5	5	5	6	3	3	4	5	8.2	44	
11-Feb	5	Z	6	6	7	5	6	5	4	3	3	6	4	3	5	2	1	1	1	2	1	1	0	0	3.3	7	
12-Feb	0	0	Z	2	1	3	4	2	3	3	1	0	0	0	0	0	0	3	0	0	0	0	1	5	1.4	5	
13-Feb	7	5	8	Z	4	0	0	1	1	1	6	16	22	27	22	15	2	3	5	3	1	2	1	1	6.7	27	
14-Feb	1	1	3	1	Z	2	5	3	3	2	3	3	2	3	4	3	3	3	3	4	2	2	3	2	2.6	5	
15-Feb	4	4	4	4	3	Z	6	4	4	17	9	4	3	C	C	C	C	7	6	4	4	4	3	1	5.1	17	
16-Feb	Z	4	6	2	2	5	9	8	7	8	5	6	6	5	4	6	6	7	7	5	7	7	4	3	5.6	9	
17-Feb	6	Z	2	1	9	20	10	8	7	1	1	8	10	15	3	3	8	2	0	0	0	0	5	5	5.3	20	
18-Feb	2	0	Z	14	1	0	2	1	1	1	1	2	0	0	0	1	4	2	1	0	0	0	0	0	1.5	14	
19-Feb	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
20-Feb	0	1	0	0	Z	2	4	6	3	5	1	3	3	3	1	2	5	4	1	1	1	3	0	1	2.2	6	
21-Feb	4	2	3	2	1	Z	4	3	1	3	5	5	1	2	1	1	1	2	3	1	7	8	2	5	3.0	8	
22-Feb	Z	2	3	2	2	3	2	4	6	5	2	2	1	5	3	4	4	3	3	4	7	3	5	2	3.3	7	
23-Feb	7	Z	8	6	4	7	28	27	18	6	8	3	1	1	2	1	2	4	7	2	2	4	2	4	6.7	28	
24-Feb	12	3	Z	6	6	4	10	9	8	9	7	6	4	6	4	5	3	6	3	3	2	1	1	4	5.3	12	
25-Feb	4	5	4	Z	3	2	3	5	5	7	4	2	2	2	2	2	2	3	3	3	4	4	3	3	3.3	7	
26-Feb	5	1	5	9	Z	7	8	5	4	5	5	5	3	5	9	6	4	2	3	6	3	4	4	2	4.8	9	
27-Feb	4	1	3	3	3	Z	6	4	2	2	5	4	4	3	3	3	3	3	10	13	8	20	35	17	6.9	35	
28-Feb	Z	7	8	7	12	15	20	13	7	9	7	5	4	5	4	3	4	6	4	6	4	2	2	2	6.9	20	
6.7		5.6	6.0	5.7	6.4	5.8	7.7	7.5	7.5	7.5	6.1	4.8	4.5	4.8	4.2	3.7	3.8	4.3	5.4	4.3	4.4	5.3	5.4	5.2	Diurnal Average		
26		32	35	21	26	21	28	27	26	44	40	16	22	27	22	15	16	10	18	15	20	25	35	17	Diurnal Maximum		
Z - zerospan		C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	616	96.25	96.25
21 - 40	23	3.59	99.84
41 - 80	1	0.16	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - February 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	17	38	26	21	26	15	19	20	38	60	79	108	38	39	57	15	616
21 - 40	0	0	0	1	1	1	1	5	8	3	0	0	0	3	0	0	23
11 - 80	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	17	38	27	22	27	16	20	25	46	63	79	108	38	42	57	15	640

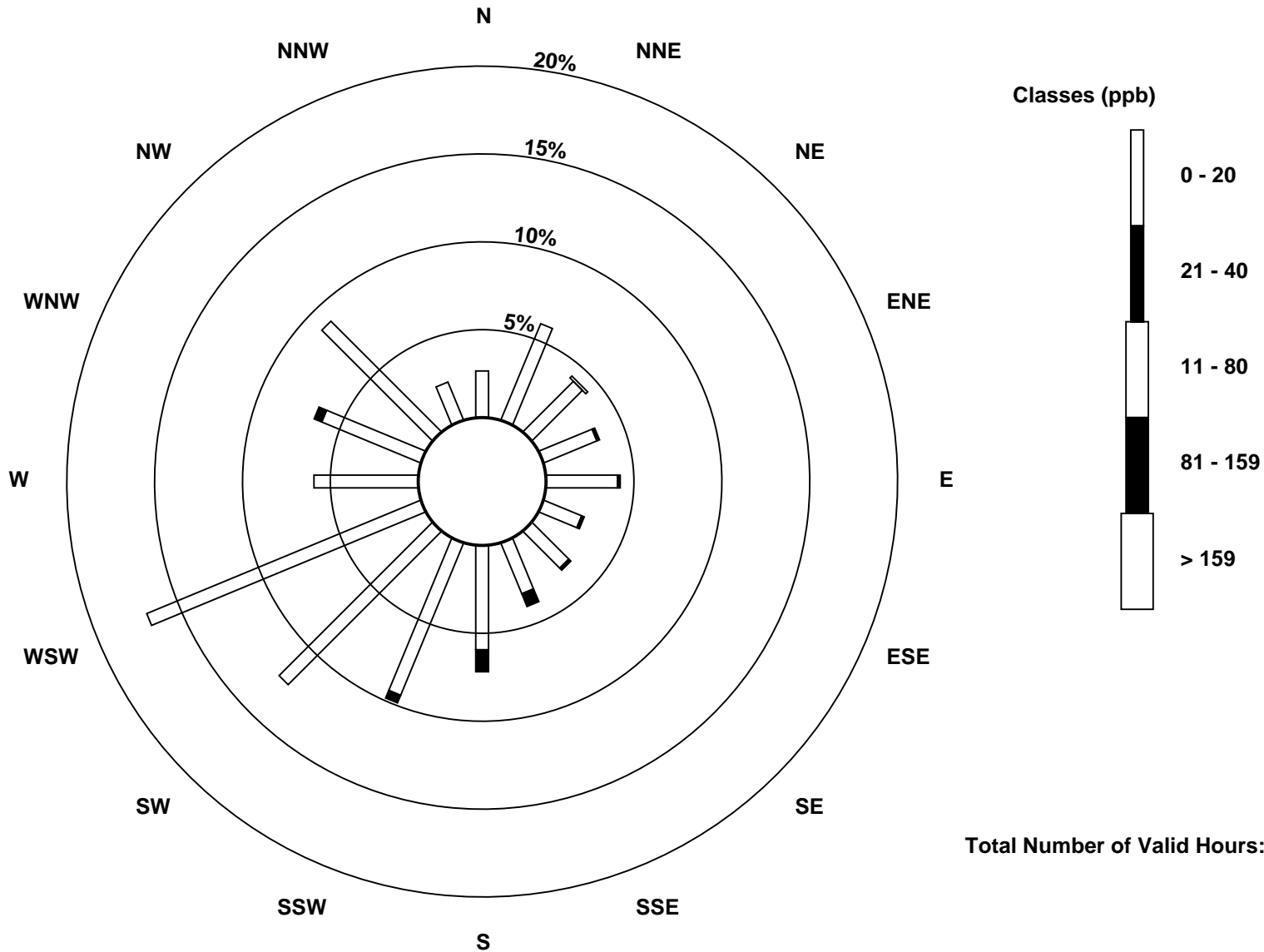
Total Number of Valid Hours: 640

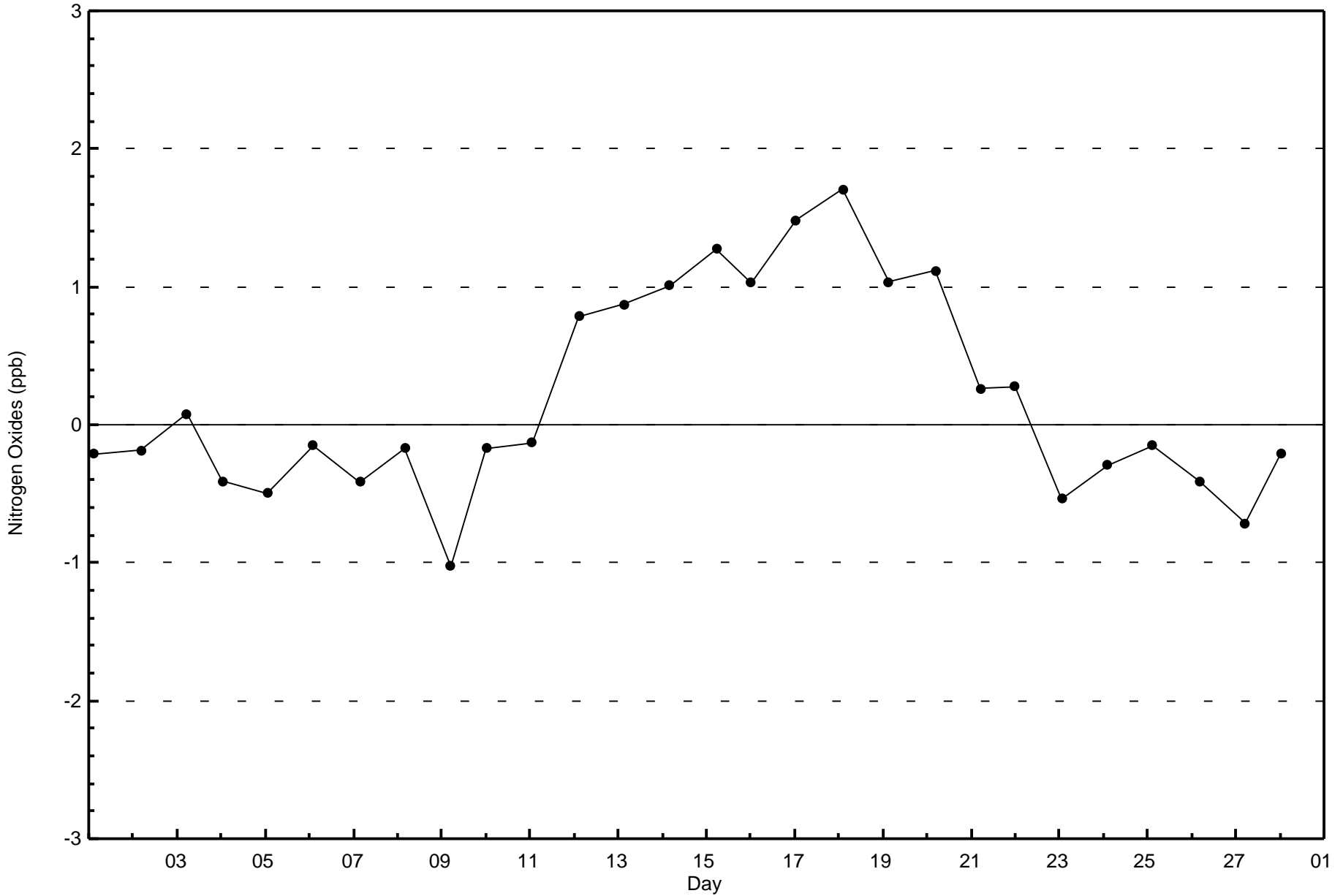
Total Number of Hours: 672

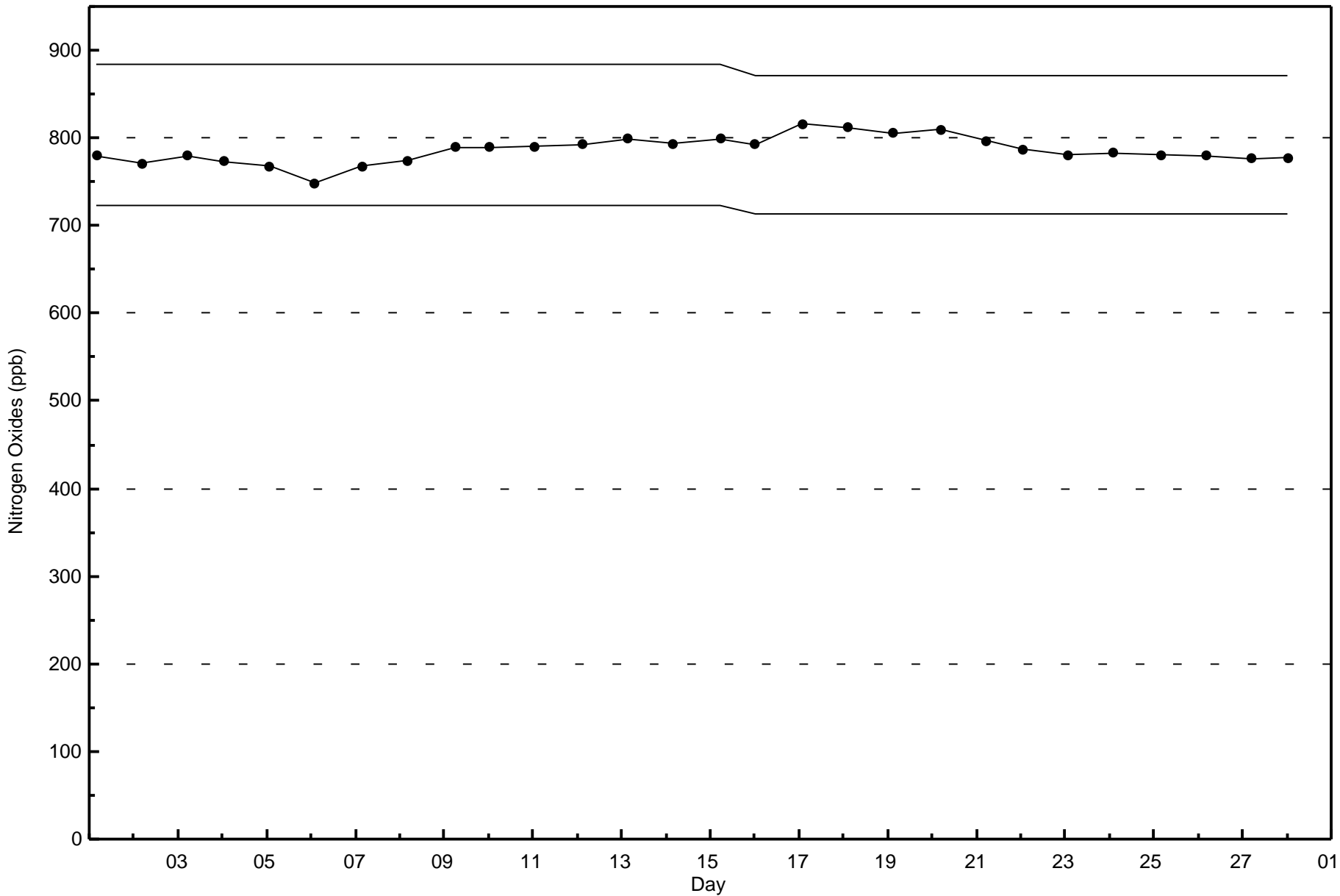


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake (AMS500)







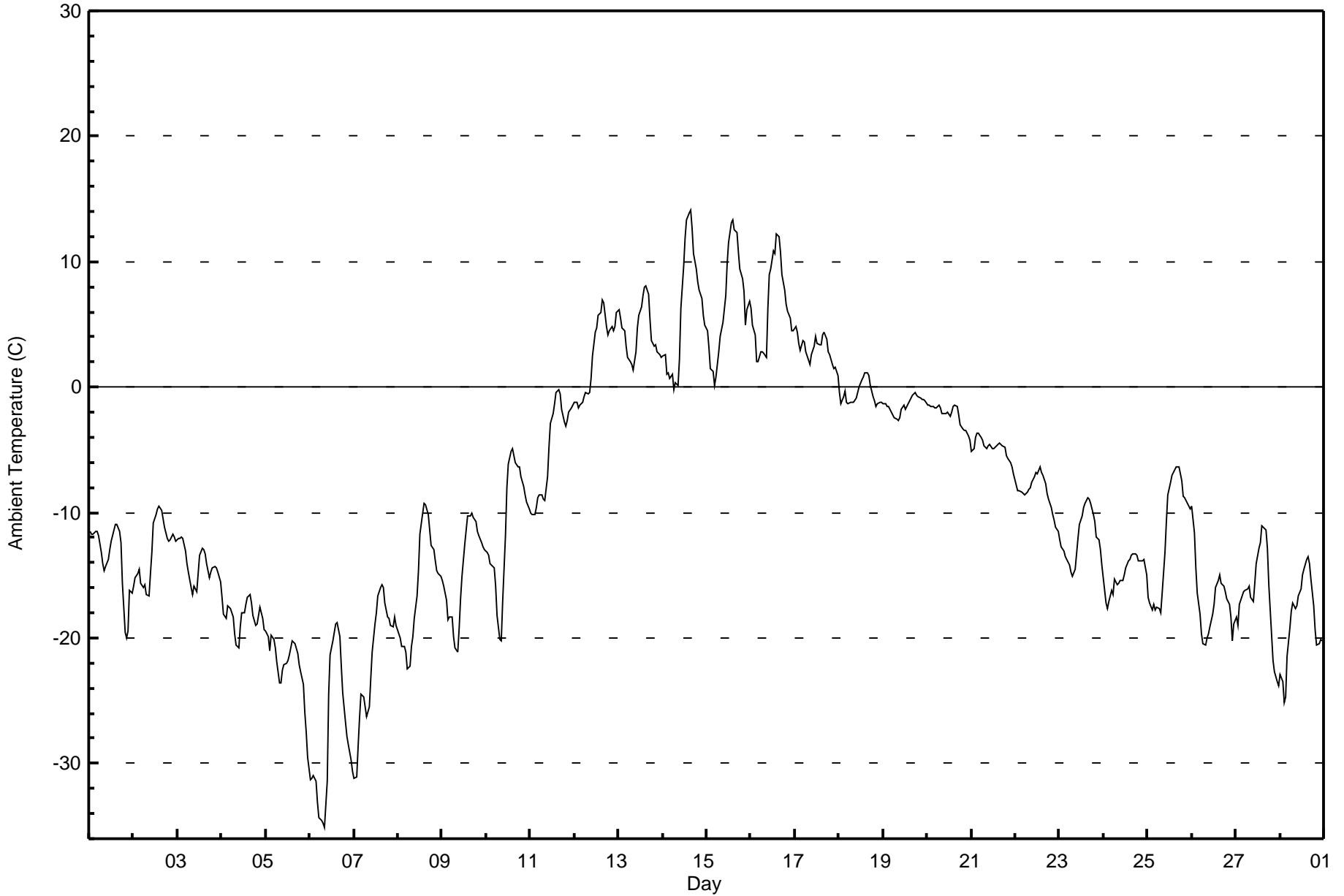


Maximum Value: 14.1 C on Feb 14 16:00 Maximum Daily Average: 6.8 C on Feb 15																						Hours in Service: 672 Hours of Data: 672					
Minimum Value: -35.1 C on Feb 6 09:00 Minimum Daily Average: -27.6 C on Feb 6 Maximum Diurnal Average: -5.5 C at hour 16 Minimum Diurnal Average: -11.9 C at hour 9 Monthly Average: -9.15 C Percentiles: P ₁ = -31.4 P ₁₀ = -20.5 Q ₁ = -16.7 Median = -10.8 Q ₃ = -1.2 P ₉₀ = 4.5 P ₉₉ = 12.5																						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-Feb	-11.5	-11.7	-11.7	-11.5	-11.5	-11.9	-13.2	-14.1	-14.6	-14.3	-13.7	-12.9	-12.2	-11.4	-10.9	-10.9	-11.5	-12.4	-15.6	-19.6	-20.0	-19.5	-16.2	-16.5	-13.7	-10.9	
2-Feb	-15.8	-15.2	-14.8	-14.6	-15.6	-15.9	-15.8	-16.5	-16.7	-14.9	-13.2	-10.9	-10.2	-9.7	-9.5	-9.8	-10.5	-11.1	-12.0	-12.3	-12.2	-11.8	-12.0	-12.2	-13.1	-9.5	
3-Feb	-12.0	-12.0	-12.0	-12.1	-13.1	-14.1	-14.8	-15.9	-16.6	-15.9	-16.3	-14.9	-13.4	-12.8	-12.9	-13.3	-14.1	-15.2	-14.8	-14.4	-14.3	-14.4	-14.7	-15.6	-14.2	-12.0	
4-Feb	-16.8	-18.1	-18.5	-17.5	-17.6	-17.6	-18.3	-19.7	-20.5	-20.8	-19.1	-18.0	-17.3	-16.7	-16.6	-17.2	-18.2	-19.0	-18.8	-18.3	-17.6	-18.5	-19.3	-18.2	-16.6		
5-Feb	-19.5	-19.9	-21.0	-19.7	-20.1	-20.8	-21.9	-23.6	-23.6	-22.5	-22.1	-22.0	-21.7	-21.3	-20.3	-20.4	-20.5	-21.2	-22.2	-22.7	-23.7	-25.9	-27.4	-29.5	-22.2	-19.5	
6-Feb	-31.3	-31.2	-30.9	-31.4	-33.1	-34.4	-34.6	-34.7	-35.1	-31.4	-24.5	-21.4	-20.2	-19.6	-18.9	-18.8	-19.9	-22.2	-24.4	-26.8	-27.8	-28.5	-29.7	-30.7	-27.6	-18.8	
7-Feb	-31.2	-31.1	-28.6	-26.4	-24.5	-24.7	-25.5	-26.3	-25.5	-23.2	-21.1	-18.9	-18.0	-16.7	-16.0	-15.7	-16.0	-17.2	-18.3	-18.4	-19.0	-19.1	-18.4	-19.0	-21.6	-15.7	
8-Feb	-19.6	-20.0	-20.6	-20.6	-21.1	-22.5	-22.2	-20.7	-19.9	-18.4	-16.6	-14.6	-11.8	-10.0	-9.3	-9.4	-10.1	-11.4	-12.6	-13.0	-13.9	-14.6	-14.8	-15.1	-15.9	-9.3	
9-Feb	-15.5	-15.8	-17.0	-18.6	-18.4	-18.4	-19.9	-20.8	-21.1	-19.2	-16.8	-15.1	-12.5	-11.4	-10.3	-10.2	-10.1	-10.4	-10.7	-11.5	-11.8	-12.4	-12.7	-13.0	-14.7	-10.1	
10-Feb	-13.2	-13.4	-14.1	-14.1	-14.4	-15.9	-18.3	-20.1	-20.3	-17.1	-11.9	-8.1	-6.2	-5.1	-4.9	-5.4	-6.0	-6.3	-6.4	-7.1	-7.9	-8.6	-9.2	-9.7	-11.0	-4.9	
11-Feb	-10.0	-10.2	-10.2	-9.6	-8.9	-8.6	-8.6	-8.9	-9.0	-7.2	-4.7	-2.9	-2.1	-1.3	-0.4	-0.2	-0.6	-1.8	-2.8	-3.1	-2.6	-2.0	-1.6	-1.5	-4.9	-0.2	
12-Feb	-1.2	-1.2	-1.6	-1.4	-1.2	-0.8	-0.5	-0.5	-0.4	0.7	2.5	4.4	4.7	5.8	6.0	7.0	6.8	4.8	4.1	4.5	4.8	4.5	4.9	5.9	2.6	7.0	
13-Feb	6.1	5.5	4.7	4.4	3.3	2.4	2.1	1.8	1.4	2.8	4.8	5.7	6.4	7.3	7.9	8.0	7.4	5.4	3.7	3.2	3.4	2.8	2.6	2.3	4.4	8.0	
14-Feb	2.5	2.6	1.1	1.1	0.7	1.1	-0.2	0.3	0.1	2.2	6.2	9.6	11.9	13.3	13.9	14.1	12.7	10.6	9.4	8.4	7.7	7.0	5.8	5.0	6.1	14.1	
15-Feb	4.4	3.2	1.5	1.3	0.1	0.7	2.8	4.1	4.6	5.1	7.2	9.9	11.6	13.1	13.3	12.5	12.4	10.7	9.4	8.6	7.6	4.9	6.2	6.8	6.8	13.3	
16-Feb	6.2	5.0	4.2	2.1	2.0	2.8	2.9	2.7	2.4	6.3	8.9	9.4	10.9	10.7	12.2	12.0	10.7	9.0	7.7	6.6	6.1	5.5	4.5	4.5	6.5	12.2	
17-Feb	4.9	4.4	3.4	2.9	3.8	3.6	2.8	2.2	1.8	2.6	3.2	4.0	3.5	3.4	4.1	4.4	3.8	2.8	2.6	1.8	1.5	1.5	0.9	3.0	4.9		
18-Feb	-0.4	-1.3	-0.8	-0.3	-1.2	-1.3	-1.2	-1.2	-1.2	-0.9	-0.4	0.0	0.6	0.8	1.1	1.2	0.9	0.1	-0.7	-1.1	-1.5	-1.3	-1.2	-1.3	-0.5	1.2	
19-Feb	-1.3	-1.4	-1.5	-1.6	-2.0	-2.2	-2.4	-2.6	-2.7	-2.4	-1.8	-1.5	-1.7	-1.6	-1.1	-0.9	-0.7	-0.4	-0.7	-0.8	-0.9	-1.0	-1.0	-1.1	-1.5	-0.4	
20-Feb	-1.4	-1.5	-1.5	-1.6	-1.6	-1.6	-1.4	-1.7	-2.2	-2.1	-2.1	-2.0	-2.3	-2.0	-1.6	-1.4	-1.6	-2.2	-3.0	-3.4	-3.4	-3.4	-3.9	-4.2	-2.2	-1.4	
21-Feb	-5.1	-4.9	-4.0	-3.7	-3.7	-4.0	-4.3	-4.7	-4.9	-4.6	-4.6	-4.9	-4.9	-4.7	-4.6	-4.5	-4.5	-4.6	-4.8	-5.5	-5.7	-6.0	-6.3	-6.9	-4.8	-3.7	
22-Feb	-7.8	-8.2	-8.3	-8.3	-8.4	-8.6	-8.4	-8.2	-8.0	-7.6	-7.2	-6.8	-7.0	-6.4	-6.8	-7.0	-7.6	-8.5	-8.9	-9.6	-10.1	-10.6	-11.2	-11.5	-8.4	-6.4	
23-Feb	-12.1	-12.7	-13.1	-13.5	-13.8	-14.2	-14.8	-15.1	-14.5	-13.3	-12.0	-10.9	-10.3	-9.6	-9.3	-8.8	-9.0	-9.3	-10.2	-10.7	-12.0	-12.2	-12.9	-14.2	-12.0	-8.8	
24-Feb	-16.2	-17.2	-17.6	-17.1	-16.2	-16.5	-15.3	-15.8	-15.7	-15.4	-15.0	-14.4	-13.9	-13.7	-13.4	-13.3	-13.2	-13.4	-13.8	-13.8	-13.9	-13.8	-15.0	-15.0	-15.0	-13.2	-13.2
25-Feb	-16.7	-17.2	-17.7	-17.3	-17.7	-17.6	-17.7	-18.0	-16.5	-13.2	-10.7	-8.6	-7.6	-7.0	-6.8	-6.4	-6.4	-6.4	-7.5	-8.7	-8.8	-9.1	-9.5	-9.7	-11.8	-6.4	
26-Feb	-9.4	-11.6	-14.5	-16.4	-18.1	-19.7	-20.5	-20.5	-20.0	-19.6	-19.2	-18.1	-17.3	-15.9	-15.4	-15.0	-15.6	-15.8	-16.3	-16.9	-17.4	-18.3	-20.2	-18.9	-17.1	-9.4	
27-Feb	-18.3	-18.9	-17.3	-16.6	-16.3	-16.2	-16.0	-15.9	-16.7	-17.1	-15.7	-14.1	-12.9	-12.4	-11.1	-11.2	-11.4	-12.9	-15.8	-19.7	-21.8	-22.7	-23.5	-23.8	-16.6	-11.1	
28-Feb	-22.9	-23.5	-25.2	-24.8	-21.4	-19.3	-17.9	-17.2	-17.7	-17.4	-16.6	-16.1	-15.0	-14.5	-13.7	-13.5	-14.0	-15.3	-17.4	-19.4	-20.5	-20.4	-20.1	-20.3	-18.5	-13.5	
																								Diurnal Average			
																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Cenovus - Christina Lake - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Cenovus - Christina Lake - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	81	12.05	12.05
-20 - 0	450	66.96	79.02
0 - 10	124	18.45	97.47
10 - 20	17	2.53	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



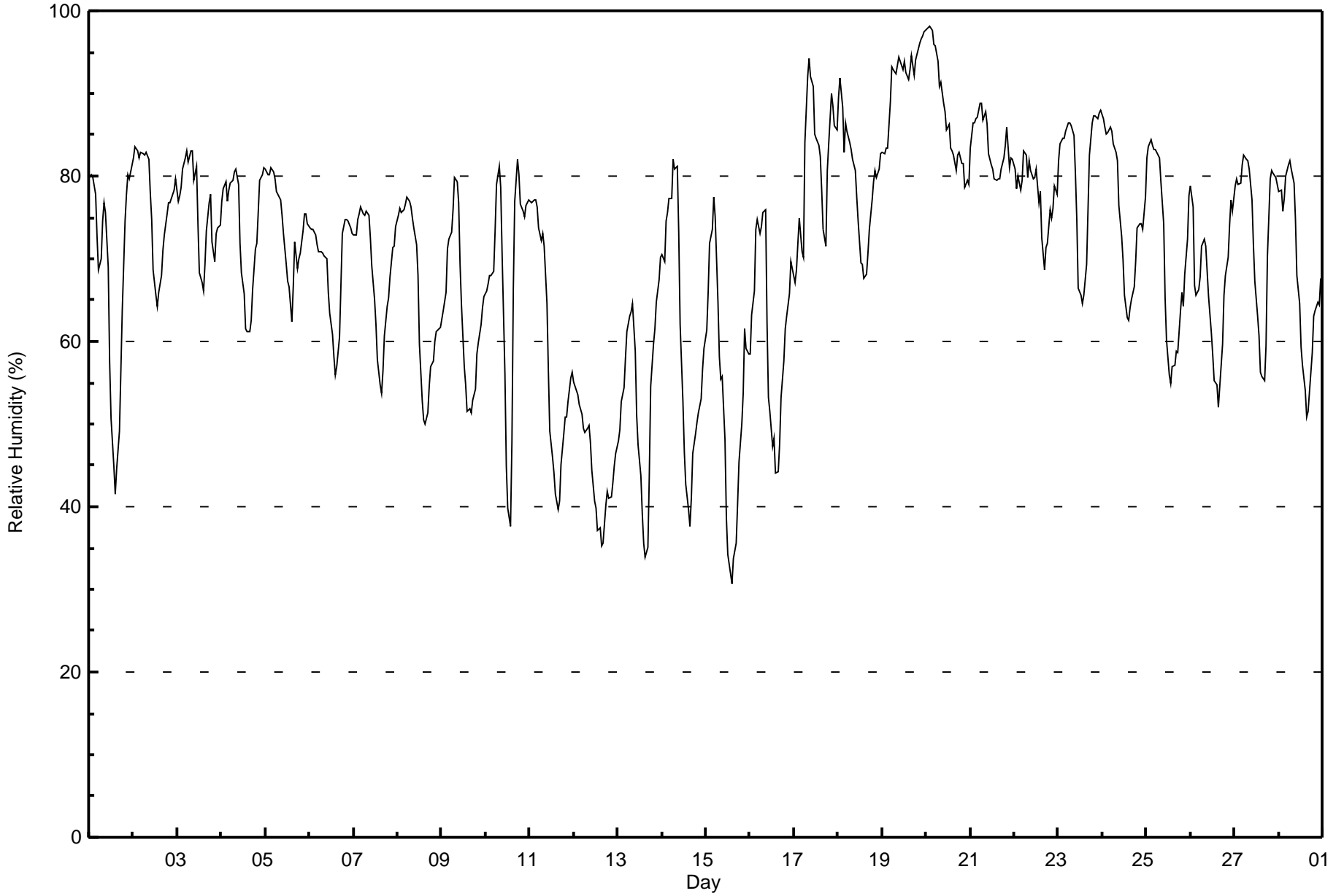
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Cenovus - Christina Lake - February 2017

Maximum Value: 98 % on Feb 20 03:00 Maximum Daily Average: 92.0 % on Feb 19																			Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 31 % on Feb 15 15:00 Minimum Daily Average: 45.0 % on Feb 12 Maximum Diurnal Average: 78.4 % at hour 8 Minimum Diurnal Average: 57.8 % at hour 15 Monthly Average: 70.4 % Percentiles: P ₁ = 36 P ₁₀ = 50 Q ₁ = 62 Median = 73 Q ₃ = 80 P ₉₀ = 86 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-Feb	80	80	80	78	73	69	70	75	77	76	69	57	51	45	41	45	49	56	64	75	78	80	80	81	67.8	81
2-Feb	82	84	83	82	83	83	83	83	82	78	75	69	66	64	66	68	71	73	75	77	77	78	78	80	76.6	84
3-Feb	77	78	79	81	82	83	82	83	83	80	81	74	68	67	66	69	73	77	78	72	70	73	74	74	76.0	83
4-Feb	77	78	79	77	78	79	79	80	81	79	72	68	66	61	61	61	63	66	71	72	76	80	80	81	73.6	81
5-Feb	81	80	80	81	81	80	78	77	77	75	73	69	67	67	62	67	72	69	70	71	73	75	75	74	74.0	81
6-Feb	74	74	74	73	72	71	71	71	70	70	66	63	61	58	56	57	60	67	73	75	75	75	74	73	68.8	75
7-Feb	73	73	75	75	76	75	75	76	75	73	69	65	62	58	55	54	57	61	64	65	68	71	71	74	68.3	76
8-Feb	75	76	76	76	77	78	77	76	75	74	72	68	60	53	50	50	51	55	57	58	60	61	61	62	65.7	78
9-Feb	63	64	66	71	72	73	76	80	79	77	69	64	57	55	51	52	51	53	54	59	60	62	64	65	64.1	80
10-Feb	66	67	68	68	68	73	79	81	79	70	56	45	40	38	48	66	77	82	80	77	76	75	76	77	68.0	82
11-Feb	77	77	77	77	76	74	72	73	72	65	56	49	46	44	42	40	41	45	49	51	51	53	56	56	59.0	77
12-Feb	55	54	54	52	51	49	49	50	50	48	44	41	40	37	37	35	36	40	42	41	41	43	45	46	45.0	55
13-Feb	48	49	53	54	58	61	63	64	65	59	51	48	44	39	36	34	35	44	54	60	62	65	67	70	53.4	70
14-Feb	71	70	75	76	77	77	82	81	81	73	62	53	47	43	40	38	41	46	49	50	51	53	57	59	60.4	82
15-Feb	61	66	72	73	77	75	65	58	55	56	48	39	34	32	31	34	36	40	45	50	54	61	59	58	53.4	77
16-Feb	58	63	66	74	75	73	74	76	76	62	53	51	47	48	44	44	48	53	58	62	63	66	70	69	61.4	76
17-Feb	67	69	72	75	71	70	84	92	94	92	91	85	85	84	82	78	74	71	81	84	90	89	86	86	81.3	94
18-Feb	89	92	88	83	86	85	84	83	82	81	78	75	69	69	68	68	71	74	77	79	81	80	81	83	79.4	92
19-Feb	83	83	83	83	89	93	93	92	93	94	94	93	94	93	92	93	95	92	94	95	96	97	97	97	92.0	97
20-Feb	98	98	98	98	96	96	94	91	91	89	88	86	86	83	83	82	81	83	83	82	82	79	80	79	87.6	98
21-Feb	83	87	87	87	87	89	89	87	88	86	83	81	81	80	79	80	80	81	82	84	86	81	82	82	83.8	89
22-Feb	81	78	80	78	80	83	83	80	82	81	80	80	81	77	78	73	69	71	72	76	75	76	79	78	77.8	83
23-Feb	82	84	85	85	85	86	86	86	85	80	75	66	66	65	66	69	76	83	86	87	87	87	88	88	80.5	88
24-Feb	87	86	85	85	86	85	84	83	82	76	73	70	66	63	64	65	67	70	74	74	74	74	77	77	75.5	87
25-Feb	82	83	84	84	83	83	83	82	79	74	65	60	56	55	57	57	59	59	64	66	64	68	72	78	70.8	84
26-Feb	79	76	67	66	66	68	71	72	71	69	65	61	58	55	55	52	55	60	66	68	70	74	77	76	66.6	79
27-Feb	79	80	79	79	81	82	82	82	81	77	72	67	63	61	56	56	55	59	70	80	81	80	80	79	73.4	82
28-Feb	78	78	76	77	80	81	82	81	79	75	68	65	59	57	54	51	52	54	59	63	64	65	64	68	67.9	82
	75.2	75.9	76.4	76.7	77.4	77.7	78.2	78.4	78.0	74.6	69.5	64.7	61.4	58.9	57.8	58.4	60.3	63.6	67.4	69.6	70.8	72.1	73.1	74.0	Diurnal Average	
	98	98	98	98	96	96	94	92	94	94	94	93	94	93	92	93	95	92	94	95	96	97	97	97	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Cenovus - Christina Lake - February 2017

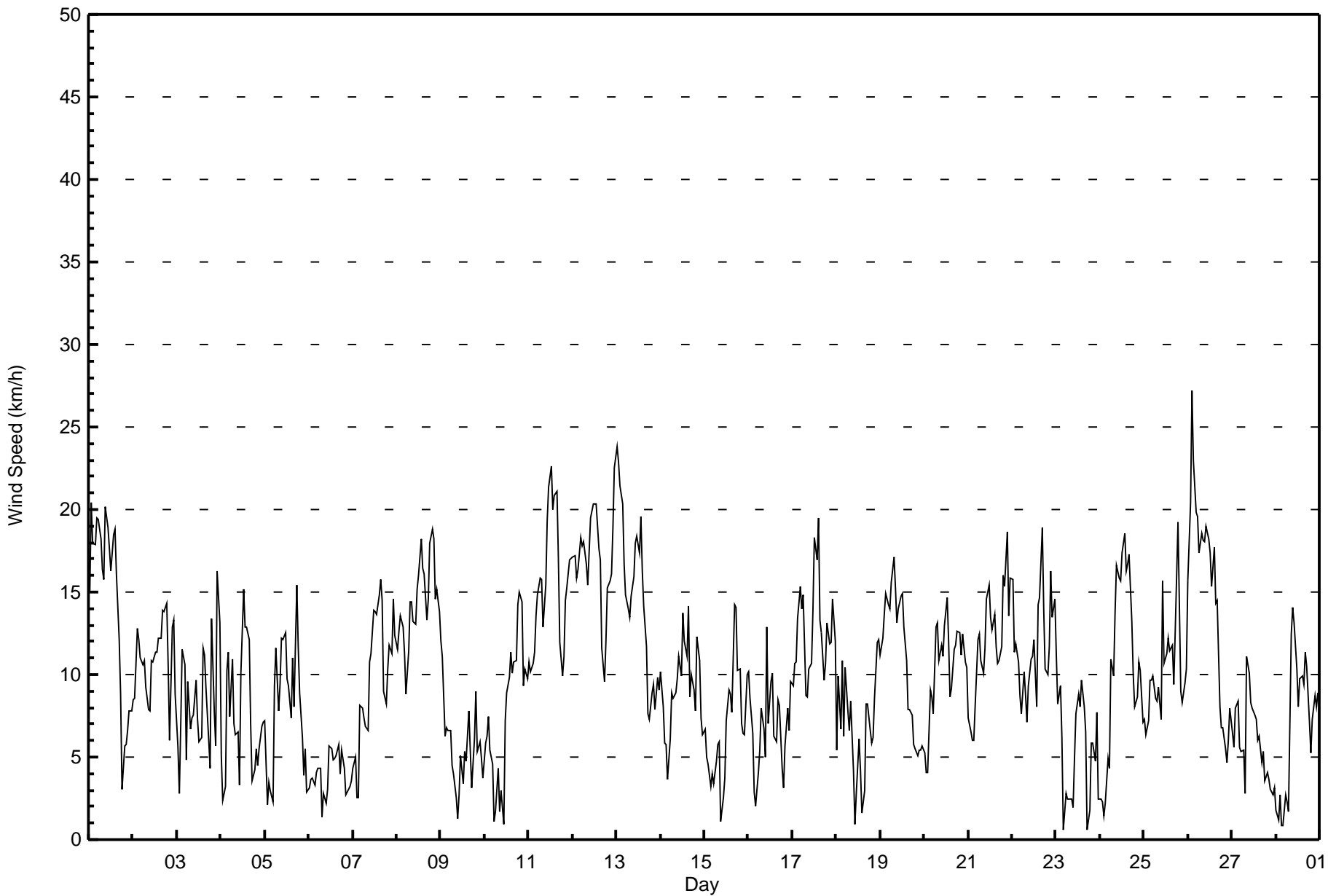
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	20	2.98	2.98
40 - 60	132	19.64	22.62
60 - 80	342	50.89	73.51
80 - 100	178	26.49	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 27 km/h on Feb 26 03:00		Maximum Daily Speed Average: 16.5 km/h on Feb 12		Hours in Service: 672																						
Minimum Speed Value: 1 km/h on Feb 23 05:00		Minimum Daily Speed Average: 0.9 km/h on Feb 18		Hours of Data: 672																						
Maximum Diurnal Speed Average: 6.9 km/h at hour 13		Minimum Diurnal Speed Average: 3.4 km/h at hour 9		Hours of Missing Data: 0																						
Monthly Average Velocity: 4.8 km/h 260.3 deg		Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 10 Q ₃ = 14 P ₉₀ = 17 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-Feb	WNW15	NW20	NW18	NW18	NW20	NW19	NW18	NW16	NW16	NW20	NW19	NW18	NW16	NW18	NW19	NW16	WNW12	WNW9	SSE3	SSW6	S6	SSW7	SW8	SSW8	NW12.3	NW20
2-Feb	SW8	SW9	WSW13	WSW12	SW11	SW11	SW11	SSW9	SW8	WSW8	WSW11	WSW11	WNW11	WSW11	WSW12	W12	WNW14	NW14	NW14	WNW11	WSW6	NW13	NW13	NNW9	W9.0	NW14
3-Feb	WNW6	WNW3	WNW7	NW12	NNE11	NE5	N10	NE7	N7	N8	NNE10	NNE7	NNE6	NNW6	N12	NNE11	NE9	NE6	SW4	NW13	NW8	WNW6	NW16	NW13	NNW6.3	NW16
4-Feb	WNW5	SE2	SE3	SW10	WSW11	WSW7	NNW11	NNE7	NNE6	NNE7	NNE3	WNW10	WNW15	WNW13	WNW12	WSW7	S4	SSE4	S6	SSE5	SSW6	SSW7	SSW7	W3.6	WNW15	
5-Feb	SSW7	SSE2	ESE3	SSE3	ENE2	N9	N12	NNE8	NNE9	NNE12	NNE12	NNE13	NNE10	NNE9	N7	NNE11	N8	NW15	NW12	NW9	WNW6	S4	SSW6	SSE3	N4.9	NW15
6-Feb	S3	S4	S4	SSE3	S4	S4	S4	SSE1	SSE3	SE2	ESE3	S6	S6	ESE5	ESE5	E5	NE6	ESE4	S5	S4	S3	S3	SSW3	S4	SSE3.0	NE6
7-Feb	S4	S5	S3	SE3	SW8	WSW8	SW7	SSW7	SW7	WSW11	WSW11	WSW14	WSW14	WSW14	WSW15	WSW16	WSW14	WSW9	SW8	WSW10	WSW12	WSW11	W15	W12	WSW9.1	WSW16
8-Feb	WSW12	WSW13	WSW14	WSW13	WSW11	WSW9	WSW11	WSW14	WSW14	WSW13	WSW13	WSW15	WSW16	WSW18	WSW16	SW16	SW13	SSW15	SSW18	SW19	SW18	SW15	SW15	SW14	SW14.0	SW19
9-Feb	SW12	SSW11	S6	S7	S7	SSW7	SE4	SE4	SE3	ESE1	ESE3	SE5	ENE3	NE5	NE5	NE8	ENE5	ENE3	N6	NNE9	N5	NNE6	NNE5	NNE4	ESE1.5	SW12
10-Feb	NNE6	N6	N7	NNE5	NNE5	SSE1	E2	S4	SSE2	NE3	NNE1	SE7	SE9	SE10	SSE11	SSE10	SE11	SE11	SSE14	SSE15	S14	S9	SSW10	SSW10	SSE4.8	SSE15
11-Feb	SSW11	SSW10	SSW11	SW11	SW14	SW15	SW16	SW16	WSW13	WSW15	W19	W21	W23	W20	W21	W21	WSW17	WSW12	SW10	SW11	SW14	SW15	SW17	SW17	WSW14.6	W23
12-Feb	SW17	SW17	SW16	SW16	SW18	SW18	SW18	SW17	SW15	SW17	SW20	WSW20	SW20	WSW20	WSW18	WSW17	WSW12	SW10	SW12	WSW15	WSW16	WSW16	WSW19	W23	SW16.5	W23
13-Feb	W24	W23	W21	W20	WSW17	WSW15	WSW14	WSW14	WSW15	WSW16	W18	W18	WNW17	WNW20	WNW16	W14	WSW12	SW8	SSW7	SW9	SW9	SSW8	SW10	SW9	W13.7	W24
14-Feb	SW10	SSW8	SSE6	S6	S4	S6	SSW9	SSW9	S9	SSW10	SSW11	SW10	SW14	SW12	SSW11	SSW14	SSW9	S10	SSW9	SSW8	SSW12	SSW11	SSW7	SSW6	SSW8.9	SSW14
15-Feb	SSW7	S5	SE5	SSE3	ESE4	SE3	SSE5	S6	S6	ESE1	ESE3	SSE4	S7	S9	SSW9	SW8	SW14	SW10	SW10	SSW7	S6	SW6	SW10	SSW5.6	SW14	
16-Feb	SSW10	SSW9	S6	SE3	SE2	ESE4	E5	ENE8	ENE7	SSE5	S13	S7	S10	S10	S6	SSW6	SSW8	SSW8	SSW4	S3	SW6	SW8	SW7	WSW10	S5.0	SSW13
17-Feb	WSW9	WSW11	WSW11	WSW13	W15	WNW14	WNW15	WNW9	SW9	WSW10	WSW11	W14	NW18	WNW17	NW20	WNW13	WNW13	WSW10	WSW11	WSW13	WSW12	W15	W12	W11.6	NW20	
18-Feb	W5	SW10	W7	WNW11	WSW6	SW10	SW8	SW7	WSW8	WSW4	ENE1	SSW3	WSW6	NE4	SW2	E3	ENE8	ENE8	E7	E6	E6	E9	E12	E12	S0.9	E12
19-Feb	E11	E12	E14	E15	E14	ENE14	ENE16	ENE17	ENE15	ENE13	E14	E15	E15	E13	E11	E8	E8	ESE8	E6	E5	E5	ENE5	ENE5	NE6	E10.7	ENE17
20-Feb	NE5	NNE4	N4	WNW9	WNW9	W8	W13	W13	W11	W12	WSW11	W13	W15	WSW12	WSW9	WSW9	WNW12	W12	WSW13	WSW13	WSW11	WSW12	WSW11	WSW10	W9.2	W15
21-Feb	SSW7	SSW7	SSW6	SW6	W8	WNW12	W12	W11	WSW10	WSW12	W15	W15	WSW13	WSW13	WSW14	WSW12	WSW11	WSW11	WNW12	NW16	NW15	NW19	WNW14	NW16	W10.3	NW19
22-Feb	NW16	WNW11	WNW12	NW11	WNW9	SW8	WSW10	WSW9	SW7	SW9	WSW11	WSW11	WNW12	WNW8	NW14	NW15	NW19	NW14	NNW10	NNW10	NW12	NW16	NW13	NW15	WNW10.0	NW19
23-Feb	NNW11	NNW8	NNW9	N6	ESE1	SSE3	SSW2	SSE2	ESE2	NE2	S5	SSW8	SW9	SW8	WSW10	SW8	WSW6	W1	SE2	NE6	NNE6	NE5	NNE8	E2	WNW1.2	NNW11
24-Feb	NE2	SE2	E1	WSW2	WNW5	W4	NW11	NNW10	NNW14	NNW17	NW16	NW16	NW17	NW19	NW16	NW17	NW17	WNW13	WNW10	SW8	SW9	SW11	WSW10	SSW7	WNW8.4	NW19
25-Feb	SSW7	SSW6	SSW7	SSW10	SSW10	SSW9	SSW8	SSW9	SSW7	SW16	WSW11	SW11	WSW12	WSW11	WSW12	WSW9	WNW13	N19	N14	NNW9	W8	WSW10	WSW10	WSW6.9	N19	
26-Feb	NW16	N20	NNW27	NNW23	NNW20	NNW20	NW17	NW19	NW18	NW18	NW19	NW18	NW17	W15	WNW18	WNW14	NW14	W8	SW7	S7	SSE6	SSE5	S6	S8	NW11.7	NNW27
27-Feb	S6	S6	SSW8	SSW8	S6	S5	SSW5	NNW3	NNE11	NNE10	N8	N8	NE8	NE7	NE6	NNE6	ENE5	NE5	E4	SE4	S4	S3	E3	E3	ENE1.7	NNE11
28-Feb	ENE2	ESE1	NE3	ESE1	SE1	SE3	SSW2	N2	NNE12	NNE14	NNE13	NNE10	NE8	NNE10	NE10	NE9	ENE11	NE11	NE7	NE5	ENE7	ENE9	ENE8	NE9	NE6.3	NNE14
WSW4.9WSW4.2WSW3.8 W4.5WSW4.2WSW4.4 W4.5WSW3.5 W3.4 W4.4 W5.4 W6.4 W6.9 W6.5 W6.8 W6.0 W5.0WSW4.1WSW3.6WSW4.0WSW4.7WSW4.9WSW5.4WSW5.0																								Diurnal Average		
W24 W23NNW27NNW23NNW20NNW20 NNW18 NNW19 NNW18 NNW20 SW20 W21 W23WSW20 W21 W21 NNW19 NW15 N19 SW19 SW18 NNW19WSW19 W23																								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
Cenovus - Christina Lake - February 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	133	19.79	19.79
6 - 11	296	44.05	63.84
12 - 19	219	32.59	96.43
20 - 28	24	3.57	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Cenovus - Christina Lake - February 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	7	12	10	10	15	17	20	21	7	2	2	3	3	0	1	133
6 - 11	9	26	16	8	9	1	5	4	28	56	48	50	6	16	4	10	296
12 - 19	4	6	0	5	10	0	0	2	1	5	32	55	21	25	51	2	219
20 - 28	1	0	0	0	0	0	0	0	0	0	1	3	10	1	4	4	24
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	17	39	28	23	29	16	22	26	50	68	83	110	40	45	59	17	672

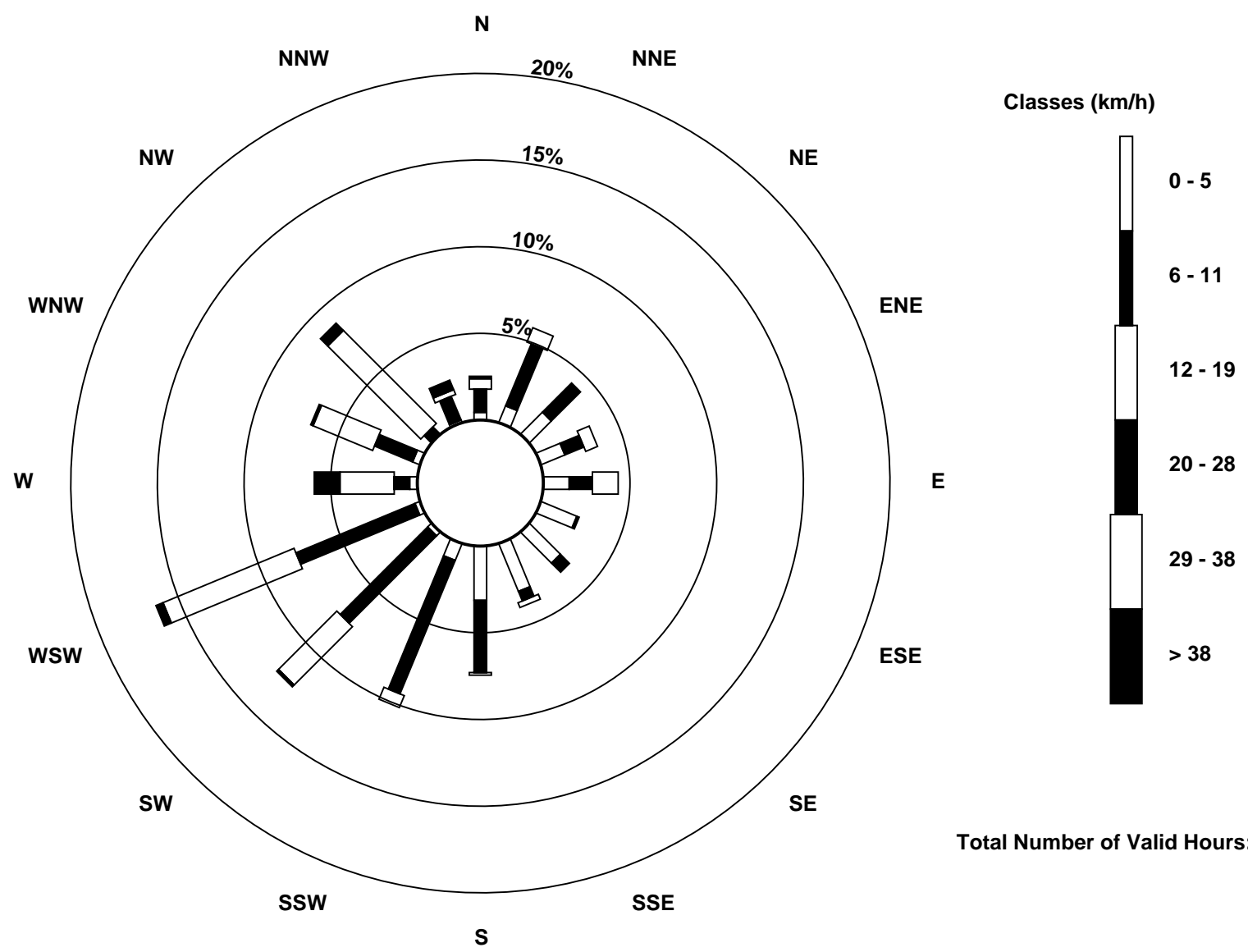
Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 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 - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 26 01:00 Minimum Value: 1 km/h on Feb 24 02:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 3 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																		Hours in Service: 672 Hours of Data: 672 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-Feb	4	3	3	4	4	4	4	3	4	3	3	4	3	4	4	4	2	3	1	2	1	1	1	1	4
2-Feb	2	3	3	2	2	2	2	1	2	2	3	3	3	3	4	4	3	3	3	4	2	3	2	3	4
3-Feb	3	2	2	2	2	3	3	1	1	2	3	2	3	4	2	2	2	1	3	3	4	3	3	6	6
4-Feb	2	1	1	3	2	3	3	2	2	1	2	3	4	4	4	4	2	2	2	2	1	1	1	1	4
5-Feb	1	1	1	2	2	2	3	2	2	2	2	2	2	2	3	2	2	3	2	2	3	1	2	2	3
6-Feb	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2	2	2
7-Feb	1	2	1	1	2	2	2	1	2	3	3	4	4	4	4	4	4	2	2	2	2	3	4	3	4
8-Feb	3	3	3	3	3	2	3	4	4	4	4	5	5	5	5	5	4	4	5	5	5	4	4	4	5
9-Feb	3	3	2	1	1	2	1	1	1	1	2	1	1	1	1	1	3	2	4	2	1	1	1	3	4
10-Feb	1	2	1	1	1	2	1	1	1	2	1	4	2	3	3	3	2	2	4	3	4	3	3	3	4
11-Feb	3	3	3	4	4	4	4	4	3	4	5	6	6	6	6	6	6	3	3	3	3	4	5	4	6
12-Feb	5	4	4	4	5	5	5	4	4	5	5	6	6	6	5	5	3	2	3	4	4	4	6	6	6
13-Feb	6	6	6	5	4	3	4	3	3	4	5	5	6	5	5	4	4	1	1	2	2	2	2	2	6
14-Feb	3	3	1	1	1	2	2	1	2	2	3	3	5	4	4	4	3	3	2	2	3	5	2	1	5
15-Feb	2	1	1	1	1	1	1	1	2	1	2	3	2	3	4	3	4	3	4	3	1	1	2	2	4
16-Feb	2	1	1	1	1	2	1	2	1	4	4	3	4	3	2	1	2	2	1	1	3	3	3	4	4
17-Feb	3	3	3	3	4	3	4	3	2	3	3	4	4	5	3	4	3	3	3	3	3	3	4	5	5
18-Feb	2	3	2	4	3	2	2	3	2	2	2	2	2	2	2	3	1	2	1	1	2	2	2	3	4
19-Feb	3	3	3	4	3	3	2	3	2	2	3	3	3	3	2	2	2	2	1	1	1	1	1	1	4
20-Feb	1	1	1	4	3	3	3	4	3	3	3	4	4	4	2	3	3	3	4	3	3	3	2	3	4
21-Feb	1	1	1	1	3	3	4	3	2	3	4	4	4	3	4	3	3	3	3	3	4	5	3	3	5
22-Feb	3	4	3	3	3	2	2	2	2	3	3	3	4	4	3	3	3	3	3	2	3	2	4	2	4
23-Feb	2	2	2	3	1	1	1	1	1	1	3	2	3	3	3	2	2	2	1	3	1	1	2	1	3
24-Feb	1	1	1	1	2	3	2	2	3	3	3	4	4	4	4	4	3	3	1	2	2	2	1	4	4
25-Feb	1	1	1	2	2	2	2	2	3	2	4	3	3	3	3	3	2	4	5	4	2	2	2	3	5
26-Feb	7	5	7	4	4	4	4	3	4	4	4	4	5	5	5	4	4	3	1	1	1	1	1	1	7
27-Feb	1	1	2	2	1	1	1	3	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	3
28-Feb	1	1	1	1	1	2	2	2	5	3	3	2	3	3	3	2	2	2	1	1	1	2	1	1	5
																		Diurnal Maximum							



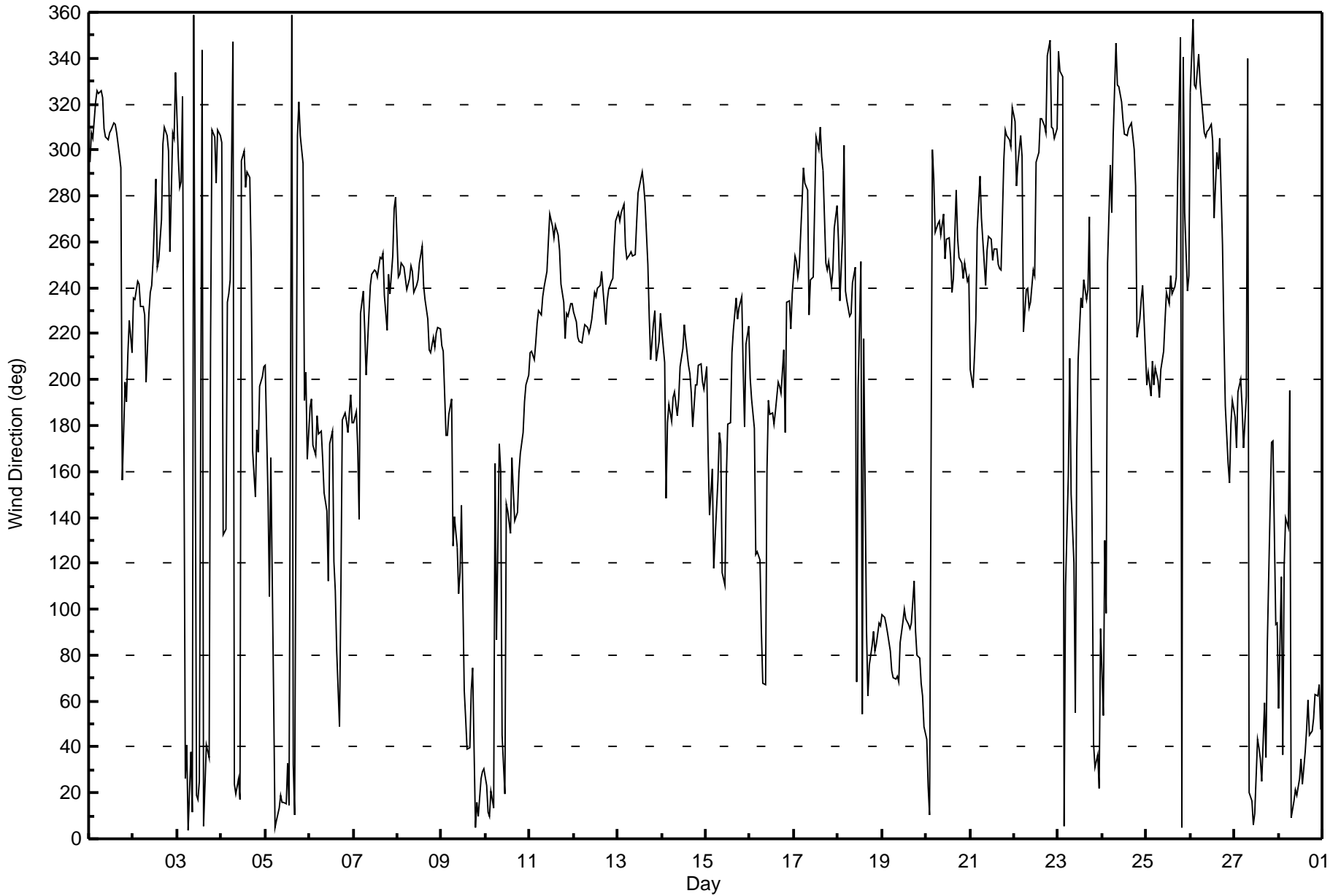
Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Cenovus - Christina Lake - February 2017

Direction of Maximum Speed: 328 deg on Feb 26 03:00		Hours in Service: 672
Direction of Maximum Daily Speed Average: 233.8 deg on Feb 12		Hours of Data: 672
Direction of Minimum Speed: 110 deg on Feb 23 05:00	Direction of Minimum Daily Speed Average: 0.9 deg on Feb 18	Hours of Missing Data: 0
Monthly Average Direction: 250.0 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-Feb	295	307	305	321	326	324	326	323	309	306	305	308	309	312	311	308	298	292	156	199	190	211	226	212	304.6
2-Feb	235	235	243	242	232	232	228	199	229	238	241	252	287	249	252	270	303	310	306	300	256	307	305	334	264.4
3-Feb	296	283	286	323	26	41	4	38	11	359	19	17	25	343	6	23	41	35	216	309	306	286	309	306	346.9
4-Feb	303	132	135	234	238	243	347	24	20	26	17	295	300	283	291	288	252	169	149	178	168	197	202	206	270.8
5-Feb	206	149	105	166	62	5	8	14	19	16	16	15	33	15	359	32	10	307	321	307	294	191	203	165	0.6
6-Feb	188	191	172	167	184	176	177	165	151	143	112	172	178	121	108	82	49	109	182	186	182	177	193	181	157.5
7-Feb	181	186	170	139	229	239	222	202	229	241	246	248	247	244	253	253	255	237	221	246	237	254	275	279	242.8
8-Feb	245	246	250	249	244	239	244	250	247	238	241	244	251	258	241	235	226	213	212	218	214	220	222	222	235.5
9-Feb	215	212	176	176	185	192	127	140	127	107	116	145	64	52	39	40	65	75	5	16	10	26	29	30	103.2
10-Feb	23	11	10	21	14	164	87	172	161	45	20	146	143	133	166	151	138	142	159	168	177	191	197	202	153.1
11-Feb	212	212	209	216	225	230	228	236	240	247	260	272	267	262	267	263	256	242	233	218	229	228	233	233	242.4
12-Feb	230	225	219	217	216	220	224	223	220	223	226	238	236	240	241	247	239	224	234	239	243	244	258	269	233.8
13-Feb	273	269	273	276	258	253	254	256	254	255	269	281	288	291	285	277	250	227	209	224	230	208	216	229	261.8
14-Feb	221	207	148	181	189	182	192	195	184	192	205	214	224	217	206	203	194	180	198	198	206	207	199	196	200.3
15-Feb	206	169	141	161	118	131	156	177	172	116	110	157	181	181	212	222	235	226	232	236	205	179	215	224	200.0
16-Feb	201	192	179	124	125	121	91	68	67	160	191	185	185	180	186	199	197	194	213	177	234	234	222	238	186.6
17-Feb	254	252	244	249	277	293	285	282	228	244	244	275	305	300	310	297	291	251	247	251	241	248	266	276	271.0
18-Feb	260	234	263	302	239	234	227	229	242	249	69	196	251	54	218	91	62	76	84	90	82	85	94	93	177.2
19-Feb	98	97	93	89	82	73	70	70	71	68	85	95	100	96	93	91	94	112	90	80	79	68	62	49	84.2
20-Feb	43	22	10	300	287	264	268	269	263	272	252	261	262	253	238	244	282	262	253	251	244	251	243	245	262.6
21-Feb	205	197	210	226	266	288	270	261	241	256	263	261	252	257	257	250	248	248	296	309	306	304	301	318	269.7
22-Feb	312	284	294	307	297	221	239	240	231	234	248	245	295	299	313	313	311	308	341	348	310	310	305	309	294.3
23-Feb	343	334	332	6	110	158	210	150	120	55	169	208	236	231	244	235	239	271	132	41	31	37	22	92	292.0
24-Feb	54	130	98	251	293	273	306	346	328	327	321	313	307	306	309	311	312	300	284	219	227	235	241	212	299.6
25-Feb	197	203	193	208	197	205	200	192	205	212	226	238	233	245	237	241	245	287	349	5	340	273	239	245	239.0
26-Feb	325	357	328	327	341	329	322	307	306	308	309	311	304	270	299	292	305	259	220	189	164	155	181	191	309.1
27-Feb	184	170	195	200	188	170	193	340	20	16	6	11	43	40	35	25	59	36	85	145	172	173	93	94	70.7
28-Feb	57	114	37	119	140	136	195	9	16	21	19	26	35	24	38	47	60	45	47	52	63	62	67	48	41.7
251.5 245.0 255.7 262.0 257.5 250.7 262.1 258.4 268.1 277.6 267.2 268.0 271.2 269.5 274.8 273.7 274.7 255.3 248.6 247.6 236.9 243.4 250.0 251.7																									
Diurnal Average																									

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Cenovus - Christina Lake - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Feb 18 11:00 Minimum Value: 6 deg on Feb 1 21:00 Percentiles: P ₁ = 8 P ₁₀ = 12 Q ₁ = 14 Median = 17 Q ₃ = 23 P ₉₀ = 40 P ₉₉ = 84																			Hours in Service: 672 Hours of Data: 672 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-Feb	19	9	8	15	11	12	11	12	13	8	10	13	13	12	12	16	15	20	46	16	6	13	13	14	46
2-Feb	13	17	13	13	11	11	11	12	17	18	18	21	27	17	18	26	15	13	11	18	35	15	11	32	35
3-Feb	47	84	27	14	21	74	18	13	14	16	16	28	33	65	16	12	17	13	42	14	47	47	10	14	84
4-Feb	37	74	45	17	14	32	20	38	21	15	57	29	18	29	22	23	30	42	20	22	15	14	8	8	74
5-Feb	11	67	36	44	55	14	16	16	13	14	13	15	16	24	45	14	27	10	13	11	58	27	23	67	67
6-Feb	40	30	16	15	13	12	13	49	51	33	35	25	35	33	33	33	16	40	8	13	28	30	37	24	51
7-Feb	16	19	55	50	13	14	15	13	20	18	19	21	19	21	21	18	16	16	17	15	13	26	18	22	55
8-Feb	15	14	14	14	13	18	17	16	16	20	19	18	20	18	21	19	18	16	16	17	17	19	18	19	21
9-Feb	17	19	26	18	13	14	27	26	37	64	39	18	29	14	20	20	31	20	25	13	12	15	12	37	64
10-Feb	13	16	14	14	17	77	49	18	52	35	88	63	18	20	21	21	13	12	16	11	15	17	15	17	88
11-Feb	18	18	19	22	18	18	16	17	18	18	16	17	17	17	19	17	17	17	16	16	16	16	16	16	22
12-Feb	16	16	16	16	16	16	17	16	17	17	17	19	17	18	19	17	17	14	15	15	16	15	16	15	19
13-Feb	16	16	16	16	15	15	16	15	15	16	16	18	20	16	17	21	17	14	10	16	17	15	16	17	21
14-Feb	16	25	16	15	23	27	14	13	13	14	17	19	19	18	17	18	17	13	16	14	14	22	16	14	27
15-Feb	19	13	25	44	27	28	20	15	14	65	48	64	23	25	21	25	17	15	14	14	16	7	19	14	65
16-Feb	16	9	11	34	39	35	20	6	13	63	18	24	22	14	20	12	13	17	42	32	27	20	74	46	74
17-Feb	27	20	22	18	19	19	19	35	17	15	17	26	15	18	10	22	17	21	16	16	16	16	19	24	35
18-Feb	40	15	32	20	51	13	26	42	27	71	99	81	38	62	82	89	13	15	13	12	14	14	12	12	99
19-Feb	18	13	12	12	11	10	9	9	9	9	13	14	12	12	14	14	18	18	13	11	12	12	9	10	18
20-Feb	26	24	41	56	19	23	17	17	21	22	19	19	18	20	17	22	21	18	17	17	17	18	15	16	56
21-Feb	14	14	14	16	24	20	20	20	16	22	19	18	18	18	17	16	17	16	30	10	13	18	14	16	30
22-Feb	15	32	29	18	27	16	17	20	19	17	18	17	29	45	15	16	11	13	25	27	13	9	16	11	45
23-Feb	18	21	23	34	69	36	40	22	34	52	32	31	21	29	24	20	19	92	57	38	7	16	13	43	92
24-Feb	40	47	65	77	33	58	12	18	16	14	16	17	15	17	15	14	11	17	30	12	16	14	16	14	77
25-Feb	9	11	9	13	12	15	15	12	17	22	18	24	22	21	20	17	16	34	19	16	30	36	14	15	36
26-Feb	45	19	15	11	17	14	15	11	11	14	14	16	23	23	21	25	19	29	19	6	12	20	15	11	45
27-Feb	12	14	16	15	18	13	22	71	9	15	22	25	22	29	28	27	33	17	25	15	27	17	25	30	71
28-Feb	61	71	21	54	85	45	70	93	15	15	18	19	24	32	19	18	12	8	10	13	13	13	13	10	93
																			61 84 65 77 85 77 70 93 52 71 99 81 38 65 82 89 33 92 57 38 58 47 74 67						
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 15, 2017	Last Calibration	January 11, 2017
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:00	End Time (MST)	16:48
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	1221
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	847	846
Calculated slope	0.998151	0.994500	Chamber temp	45.3	45.1
Calculated intercept	0.429532	0.854264	Pressure	674.9	663.4
Analyzer Background	13.7	13.6	Flow	0.590	0.585
Analyzer Coefficient	1.061	1.053	Intensity	91	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	800.0	0.991
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	79.3	793.0	797.3	0.995
second point	5000	39.7	397.0	397.2	0.999
third point	5000	19.8	198.0	197.6	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	79.3	793.0	793.6	0.999
Average Correction Factor					0.999

Corrected As found 799.8 Previous response 794.0 % change -0.7%

Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



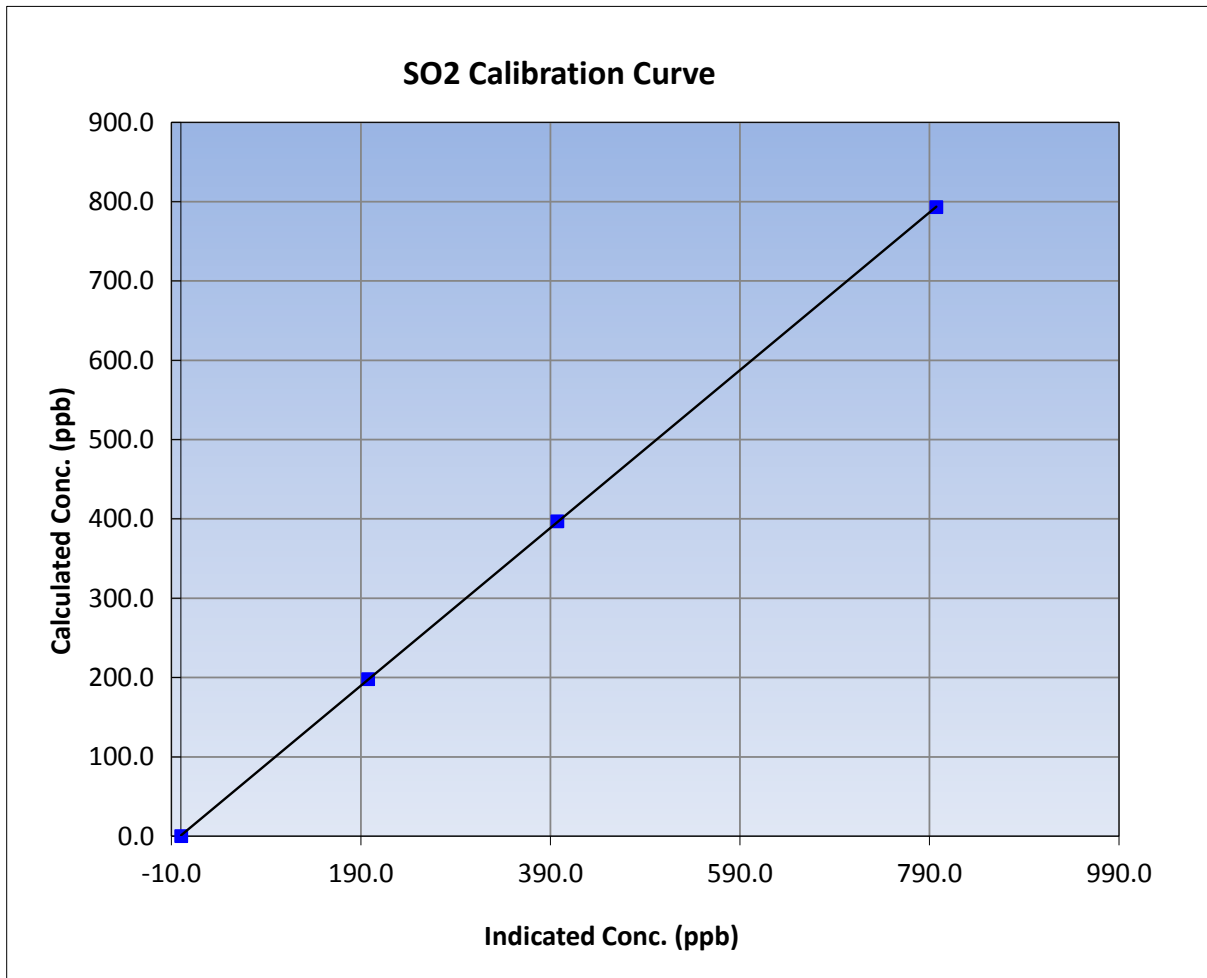
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Start Time (MST)	13:00	End Time (MST)	16:48
Analyzer make	Thermo 43i	Analyzer serial #	1118148497

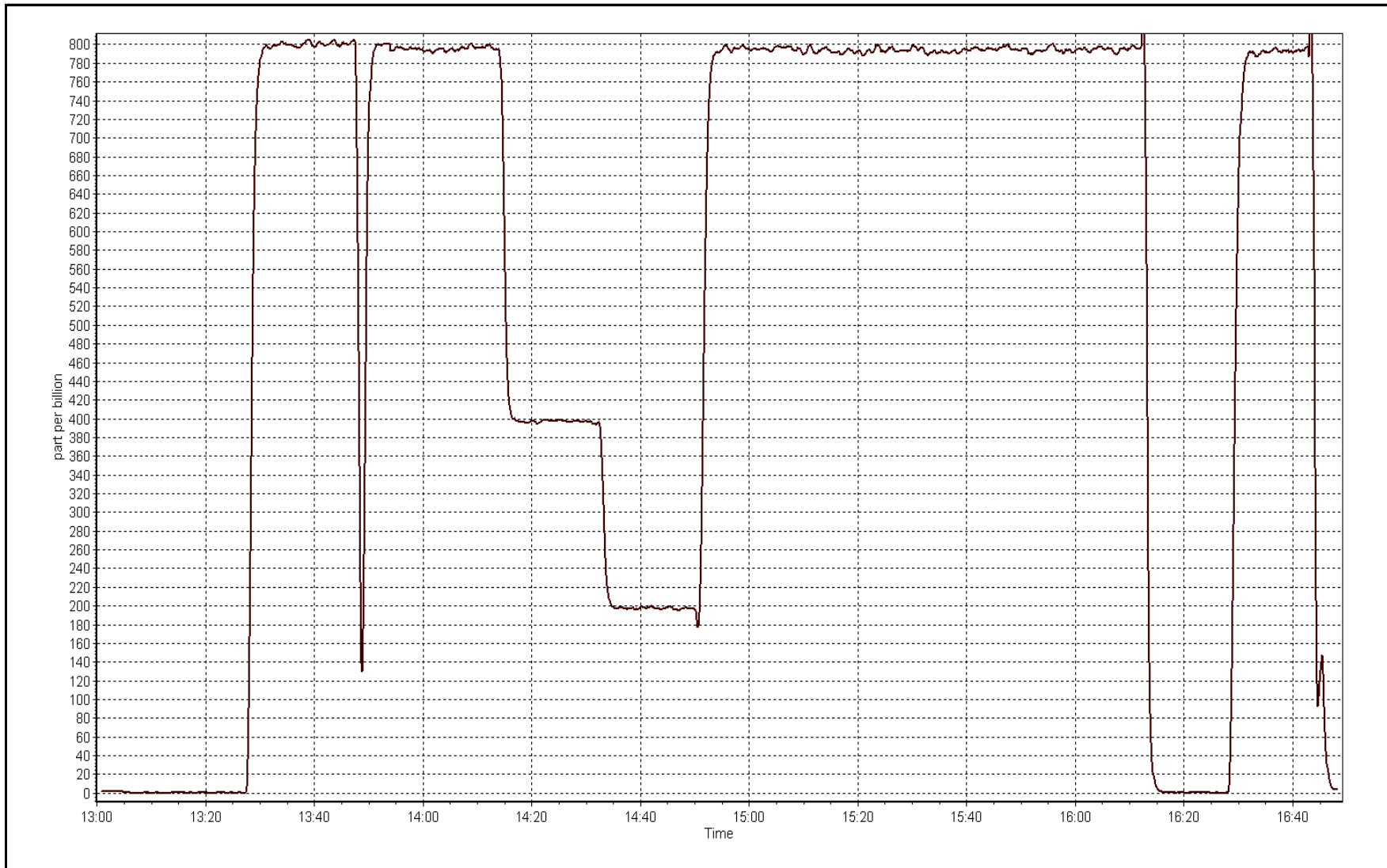
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999990
793.0	797.3	0.9947		
397.0	397.2	0.9994	Slope	0.994500
198.0	197.6	1.0022		
			Intercept	0.854264



SO2 Calibration Plot

Date: February 15, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 15, 2017	Last Calibration	January 11, 2017
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	16:45	End Time (MST)	19:10
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	1221
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	981	981
Calculated slope	0.992524	0.992344	Chamber temp	45	45
Calculated intercept	-0.127440	-0.031070	Pressure	646.3	640.6
Analyzer Background	1.58	1.58	Flow	0.431	0.429
Analyzer Coefficient	0.886	0.886	Intensity	92	91
			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	80.7	0.992
SO2 scrubber check	5000	20.0	200.0	1.7	----
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	40.6	0.987
third point	5000	19.8	20.2	20.2	1.000
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.5	80.1	81.6	0.981
Average Correction Factor					0.993

Corrected As found	80.6	Previous response	80.8	% change	0.3%
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Notes:

Sample inlet filter replaced and scrubber check completed after as founds. No adjustments made.

Calibration Performed By: Asad Hidayat



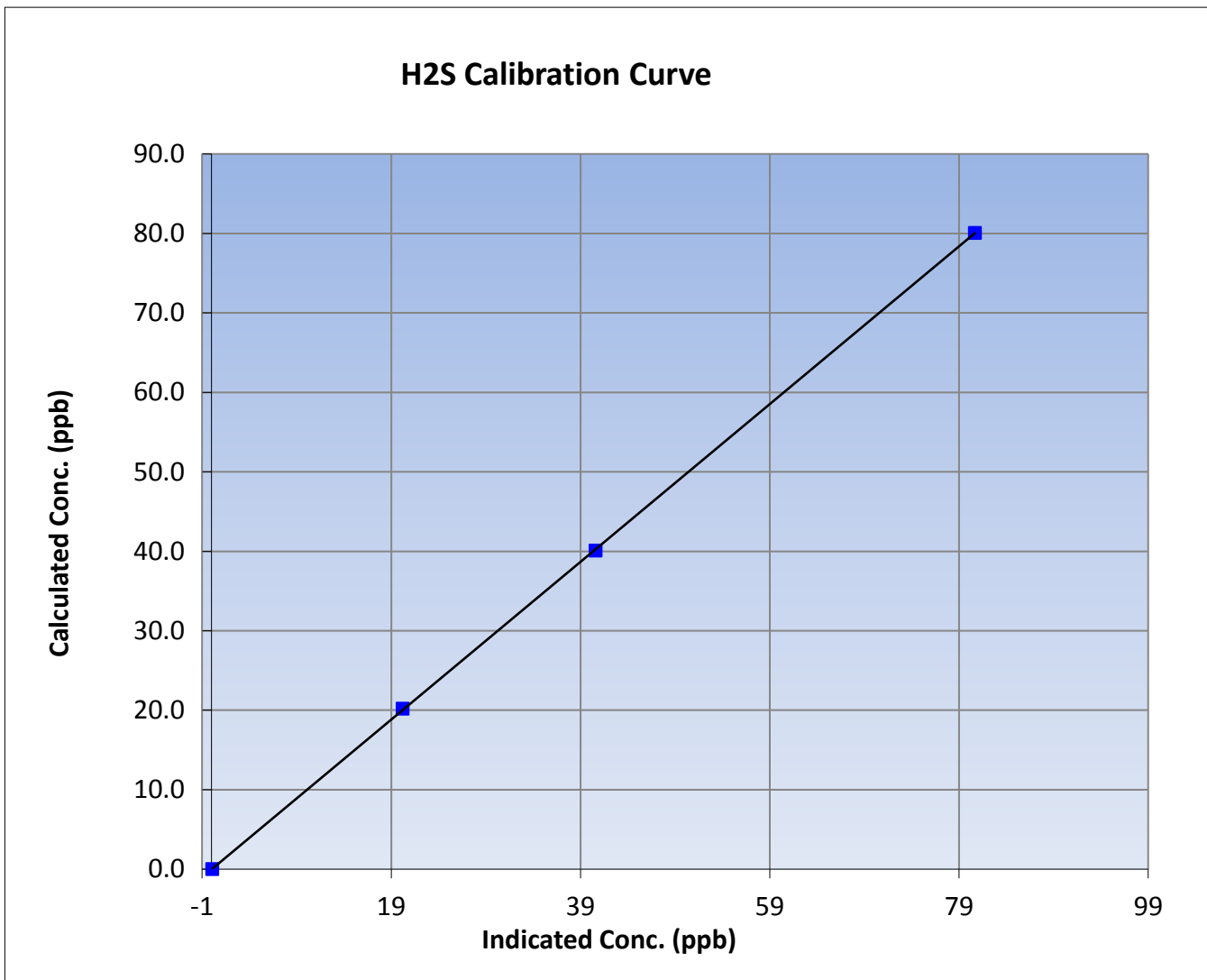
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	16:45	End Time (MST)	19:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

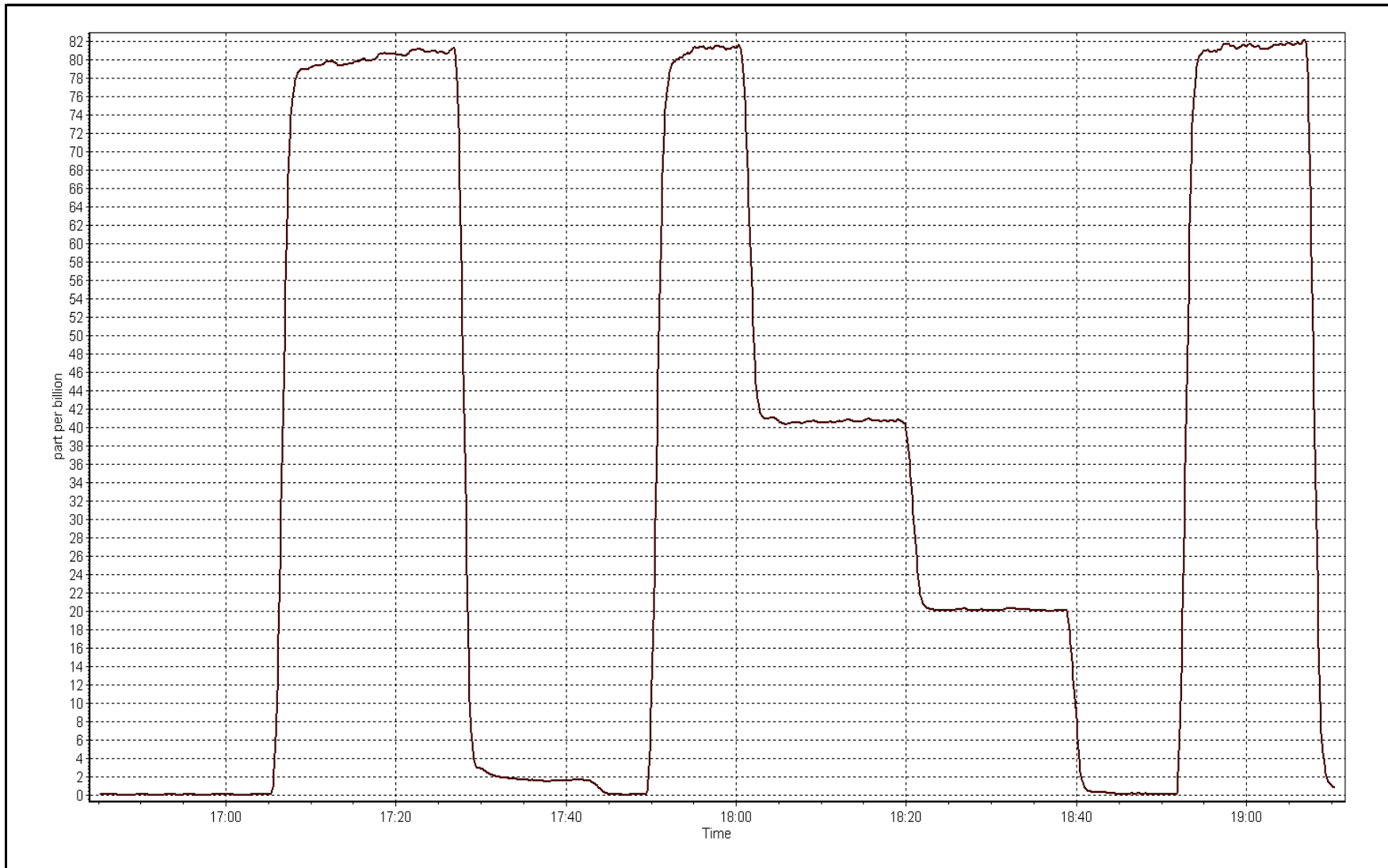
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999980
80.1	80.7	0.9924		
40.1	40.6	0.9873		
20.2	20.2	1.0003		
			Slope	0.992344
			Intercept	-0.031070



H2S Calibration Plot

Date: February 15, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:00	End Time (MST)	16:47
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	1221
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	0.997068	1.001996
	Data Offset	2.174968	1.941293
Current Calibration	Data Slope	1.000271	0.998927
	Data Offset	1.383011	1.105016

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.038		1.072	
NOX coefficient	1.049		1.077	
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	316.2	Deg C	315.4	Deg C
PMT voltage	826	V	826	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	85	ccm	84	ccm
R Cell press NO	5.6	mmHg	5.6	mmHg
R Cell Press Nox	5.6	mmHg	5.5	mmHg
NO sample flow	0.483	lpm	0.476	lpm
Nox sample Flow	0.489	lpm	0.481	lpm

Notes:

Calibrator replaced prior to doing the calibration since the existing calibrator at site had issues with the O3 generator. O3 points were switched to 300,200,100 ppb from 600,400,200 ppb for the GPT portion. Sample inlet filter replaced after as founds. Slightly adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 15, 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	-0.1	-0.1	0.0	----	----
as found span	5000	79.3	805.7	800.9	4.8	780.8	772.2	8.6	1.0319	1.0372
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	79.3	805.7	800.9	4.8	804.4	800.8	3.6	1.0017	1.0002
second point	5000	39.6	402.3	400.0	2.4	401.3	399.9	1.3	1.0027	1.0001
third point	5000	19.8	201.2	200.0	1.2	197.8	197.4	0.4	1.0170	1.0132
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	0.4	-0.7	----	----
as left span	5000	79.3	805.7	510.3	295.4	802.3	506.0	296.3	1.0042	1.0084
Average Correction Factor									1.0071	1.0045

Corrected As found NO_x= 780.9 NO= 772.3 Percent Change NO_x= 3.2% NO= 3.2%
 Previous Response NO_x= 805.9 NO= 797.4

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	803.3	799.0	0.0	1.0029	1.0024	----	----
1st NO2 (300)	510.3	293.5	801.8	510.3	291.5	1.0048	----	1.0068	99.3%
2nd NO2 (200)	607.8	196.0	803.6	607.8	195.7	1.0027	----	1.0014	99.9%
3rd NO2 (100)	704.1	99.7	802.8	704.1	98.7	1.0036	----	1.0102	99.0%
2nd NO ref point		4.8	803.1	799.7	3.4	1.0032	1.0015	----	----
Average Correction Factor						1.0036		1.0061	99.4%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

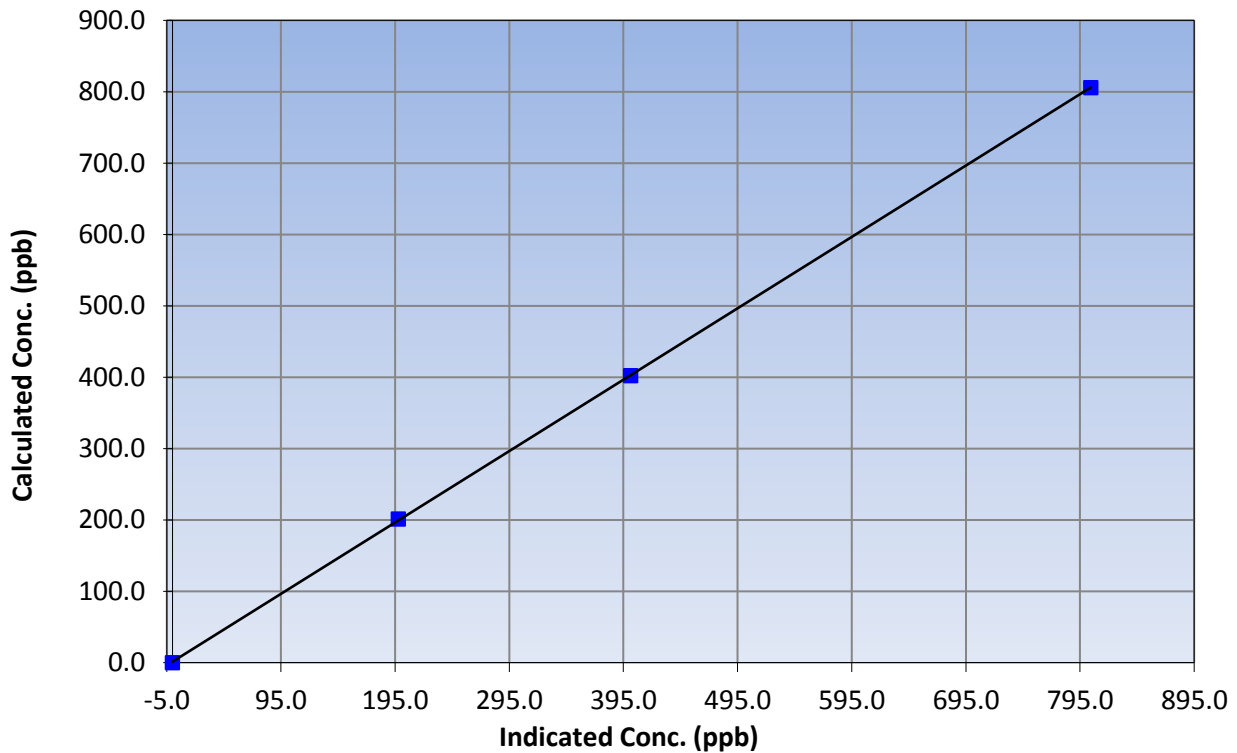
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:00	End Time (MST)	16:47
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	-0.1	----	Correlation Coefficient	0.999984
805.7	804.4	1.0017		
402.3	401.3	1.0027	Slope	1.000271
201.2	197.8	1.0170		
			Intercept	1.383011

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

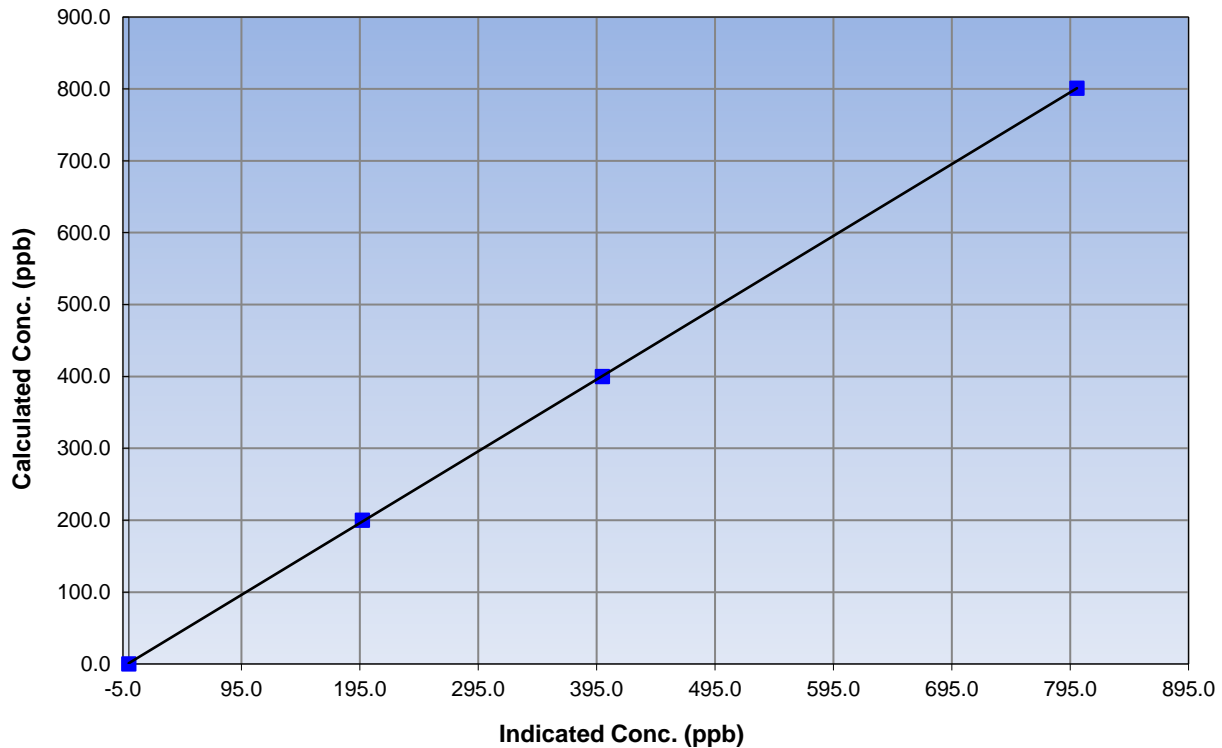
Station Information

Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:00	End Time (MST)	16:47
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	-0.1	N/A	Correlation Coefficient	0.999988
800.9	800.8	1.0002		
400.0	399.9	1.0001	Slope	0.998927
200.0	197.4	1.0132		
			Intercept	1.105016

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

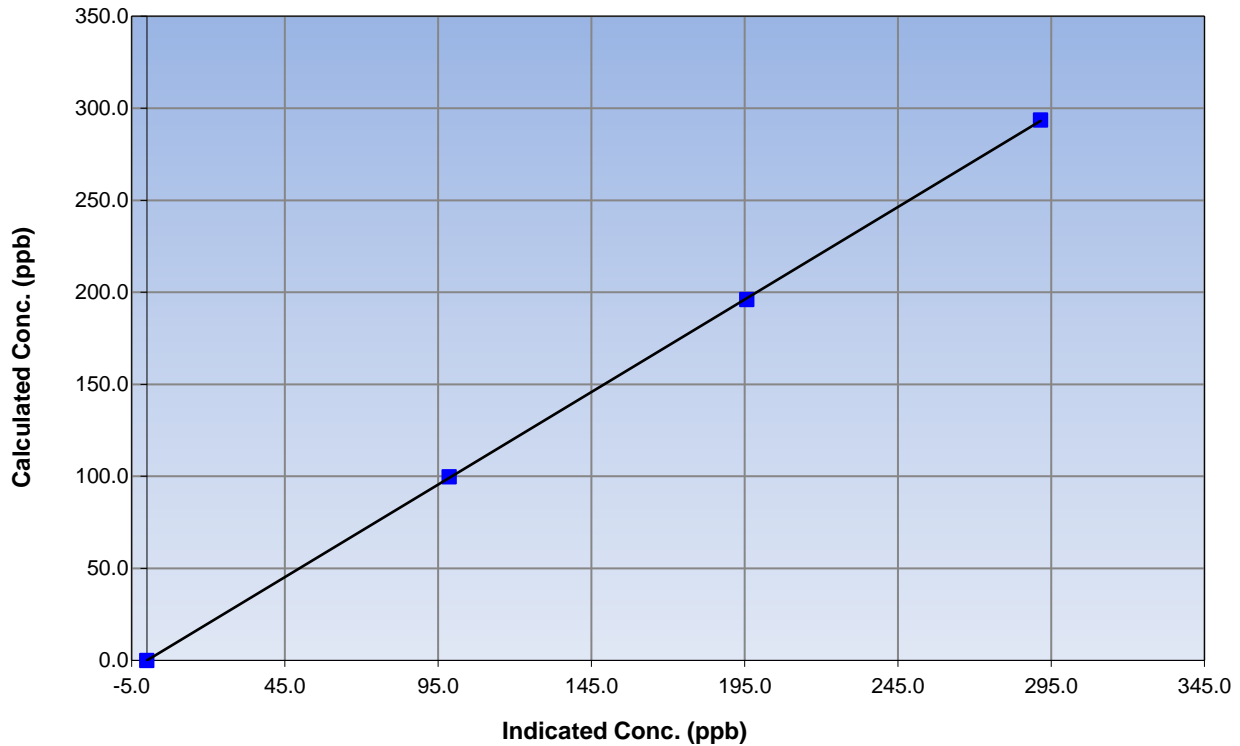
Station Information

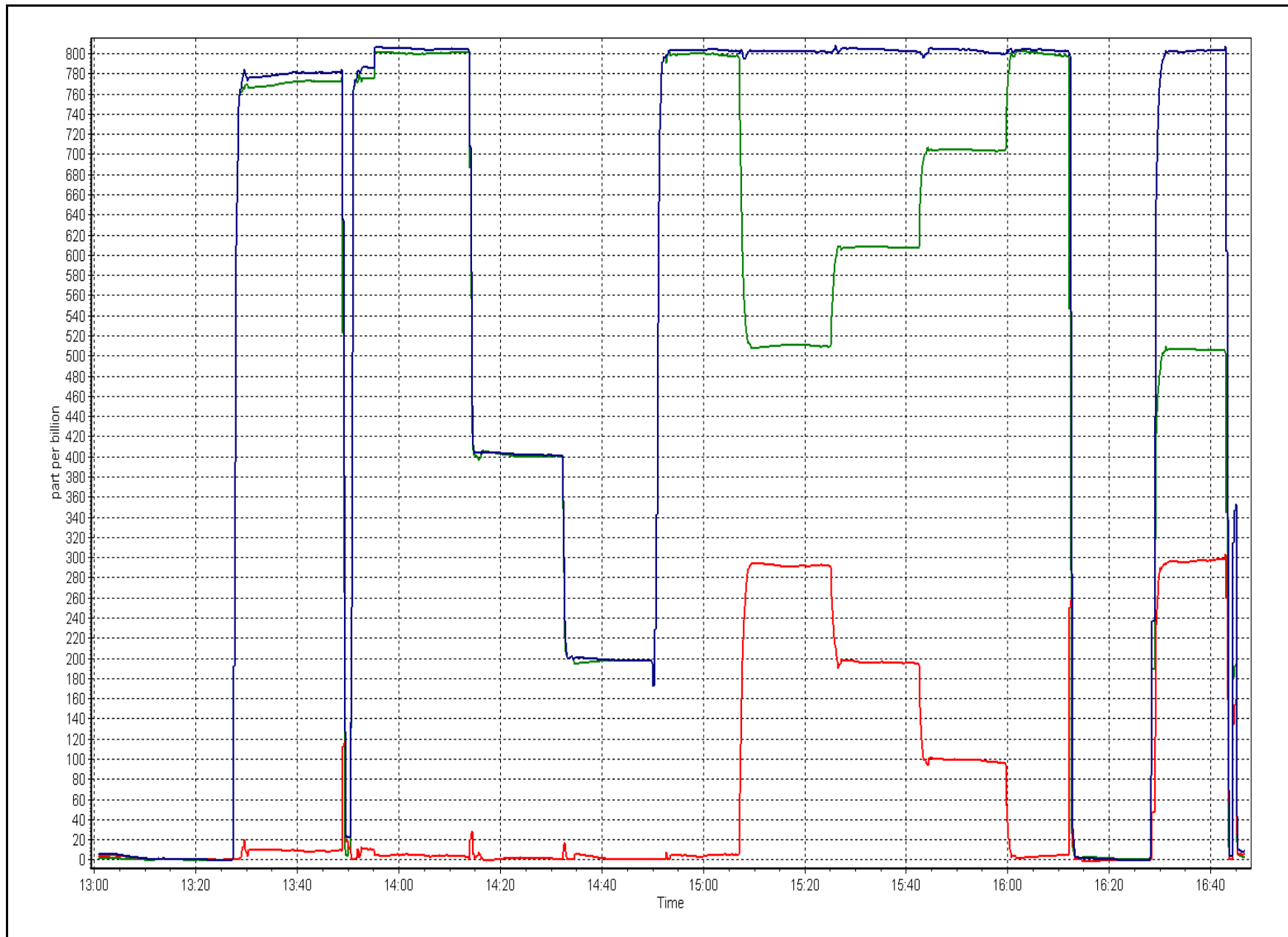
Calibration Date	February 15, 2017	Previous Calibration	January 11, 2017
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	13:00	End Time (MST)	16:47
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999979
293.5	291.5	1.0068		
196.0	195.7	1.0014	Slope	1.005379
99.7	98.7	1.0102		
			Intercept	0.025620

NO₂ Calibration Curve







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
FEBRUARY 2017**

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

March 30, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 FEBRUARY 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	627	33	45	98.21	10	0	3	0
H2S (ppb) Average	640	32	32	100.00	9	0	1	0
NO2 (ppb) Average	639	33	33	100.00	17	0	8	-
NO (ppb) Average	639	33	33	100.00	35	-	11	-
NOX (ppb) Average	639	33	33	100.00	49	-	19	-
Temperature 2 m (C) Average	672	0	0	100.00	14.7	-	9.8	-
Relative Humidity (%) Average	672	0	0	100.00	98	-	94	-
Wind Speed 10 m (km/h) Average	656	0	16	97.62	38	-	26	-
Wind Direction 10 m (deg) Average	656	0	16	97.62	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 FEBRUARY 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	627	1.2	1	-	0	0	0	1	1	3	10
H2S (ppb) Average	640	0.5	1	-	0	0	0	0	1	1	9
NO2 (ppb) Average	639	5.2	3	-	0	2	3	5	7	9	17
NO (ppb) Average	639	5.6	6	-	0	0	1	4	8	13	35
NOX (ppb) Average	639	10.8	8	-	1	3	5	9	14	21	49
Temperature 2 m (C) Average	672	-9.45	9.9	-	-27.1	-21.1	-16.7	-12.2	-2.1	5.8	14.7
Relative Humidity (%) Average	672	73	15	-	28	52	61	78	84	88	98
Wind Speed 10 m (km/h) Average	656	13.9	7	-	0	5	9	13	18	23	38
Wind Direction 10 m (deg) Average	656	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
FEBRUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	06 Feb 2017 02:00	06 Feb 2017 13:00	12	Unstable Operation - shelter temp fluctuation
Wind Speed, Wind Direction	20 Feb 2017 00:00	20 Feb 2017 13:00	14	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	23 Feb 2017 06:00	23 Feb 2017 06:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	27 Feb 2017 03:00	27 Feb 2017 03:00	1	Flat line in sensor output signal - sensor frozen



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 10 ppb on Feb 26 10:00	Maximum Daily Average: 2.8 ppb on Feb 26
Minimum Value: 0 ppb on Feb 24 21:00	Hours of Data: 627
Maximum Diurnal Average: 1.7 ppb at hour 16	Hours of Missing Data: 45
Monthly Average: 1.2 ppb	Hours of Calibration: 33
Minimum Daily Average: 0.3 ppb on Feb 19	Percent Operational Time: 98.2
Minimum Diurnal Average: 0.8 ppb at hour 24	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P 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-Feb	3	Z	1	1	2	3	2	2	3	3	2	4	3	2	5	3	1	0	0	1	1	0	1	0	1.9	5	
2-Feb	0	1	Z	1	0	0	0	0	0	0	2	1	1	1	3	1	1	3	3	3	1	1	1	0	1.1	3	
3-Feb	1	1	0	Z	0	0	0	1	3	6	4	4	4	2	2	2	2	1	1	1	1	1	1	1	1.7	6	
4-Feb	0	0	0	0	Z	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	0.9	2	
5-Feb	1	0	0	0	0	Z	1	1	1	1	1	1	1	2	4	5	4	3	2	2	2	1	1	0	1.5	5	
6-Feb	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	1	1	1	1	1	1	1	1	1	1	1	--	1	
7-Feb	1	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	5	5	3	2	1.2	5	
8-Feb	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	2	
9-Feb	0	0	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	
10-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	
11-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0.8	1	
12-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
13-Feb	1	Z	1	1	0	0	0	0	0	0	2	1	3	2	1	1	1	1	1	1	1	1	0	1	0.8	3	
14-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1.2	2	
15-Feb	1	1	1	Z	1	1	1	1	1	1	1	4	5	3	4	4	3	2	2	1	1	1	1	1	1.9	5	
16-Feb	1	1	0	0	Z	0	0	1	1	1	1	1	2	2	2	3	2	2	3	1	1	1	1	2	1.3	3	
17-Feb	4	4	4	6	7	Z	1	2	1	2	2	4	3	2	2	1	1	1	1	1	1	2	2	3	2.4	7	
18-Feb	Z	3	1	3	4	3	2	1	2	4	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1.4	4	
19-Feb	0	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-Feb	0	0	Z	1	1	0	1	0	0	1	2	1	1	1	1	1	1	1	1	1	1	0	1	0	0.6	2	
21-Feb	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	0.8	2	
22-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	2	1	2	1	0	0	1	2	1	1	1	0.9	2	
23-Feb	0	0	0	0	0	Z	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1	
24-Feb	Z	1	1	1	1	1	2	0	1	1	1	C	C	C	C	C	3	2	1	1	0	0	0	0	0.9	3	
25-Feb	0	Z	1	0	1	0	0	0	0	0	0	0	1	1	1	1	4	3	3	1	3	2	2	2	1	1.2	4
26-Feb	0	0	Z	0	2	7	6	5	7	10	3	6	4	4	4	3	1	1	1	0	0	0	0	0	2.8	10	
27-Feb	0	0	0	Z	1	1	0	0	0	0	1	2	2	2	3	2	2	2	2	2	1	1	1	1	1	1.2	3
28-Feb	1	1	1	1	Z	2	2	1	0	0	0	1	1	1	1	1	2	3	3	2	1	1	0	1	1.1	3	
	0.9	0.9	0.8	1.0	1.2	1.1	1.0	0.9	1.0	1.5	1.2	1.6	1.6	1.4	1.6	1.7	1.4	1.3	1.1	1.0	1.1	1.0	0.9	0.8		Diurnal Average	
	4	4	4	6	7	7	6	5	7	10	4	6	5	4	5	5	4	3	3	3	5	5	3	3		Diurnal Maximum	

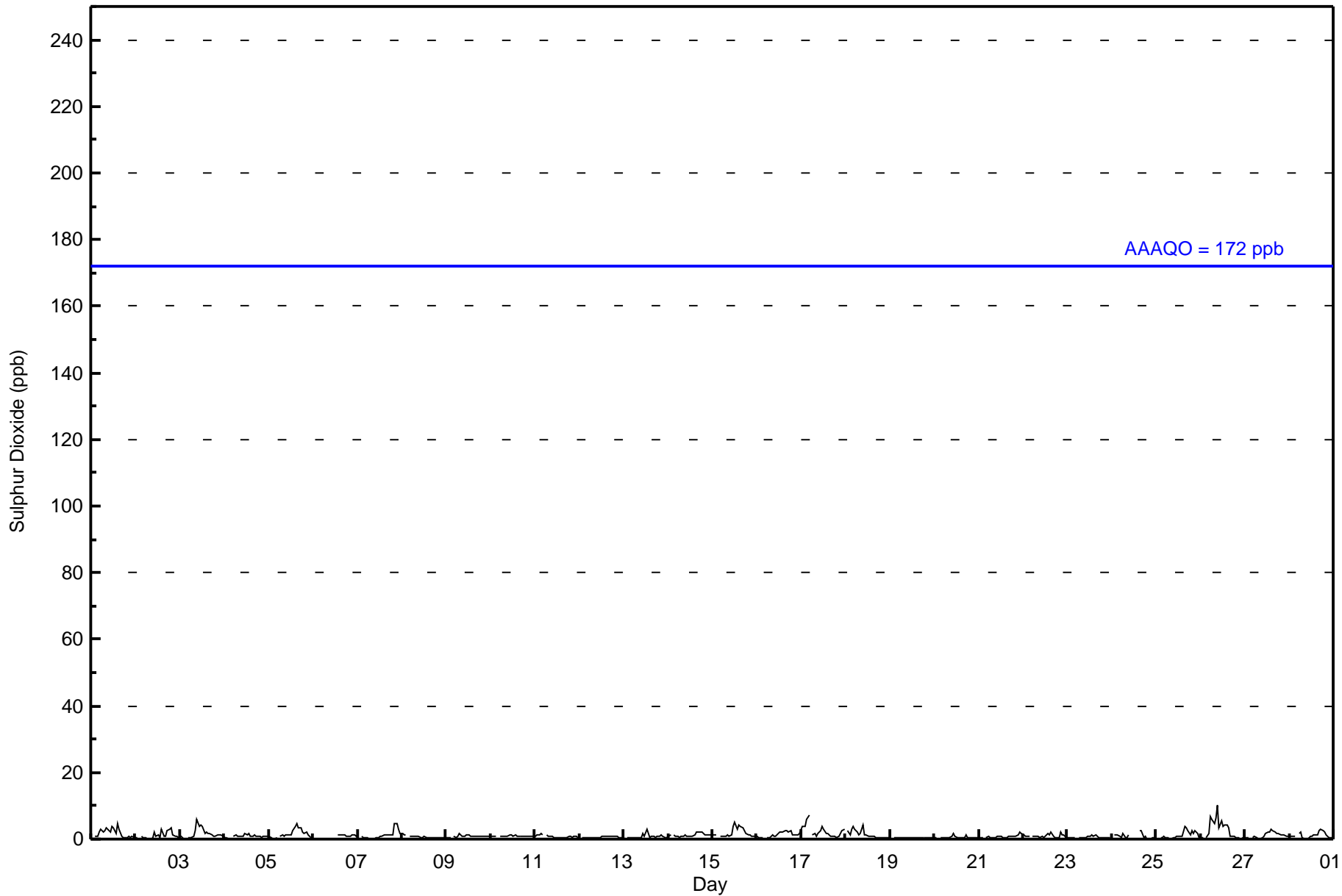
Z - zerospan C - Calibration UO - Unstable Operation

Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	627	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: 627

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - February 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	50	16	9	14	11	32	12	14	6	18	34	76	115	117	34	55	613
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	50	16	9	14	11	32	12	14	6	18	34	76	115	117	34	55	613

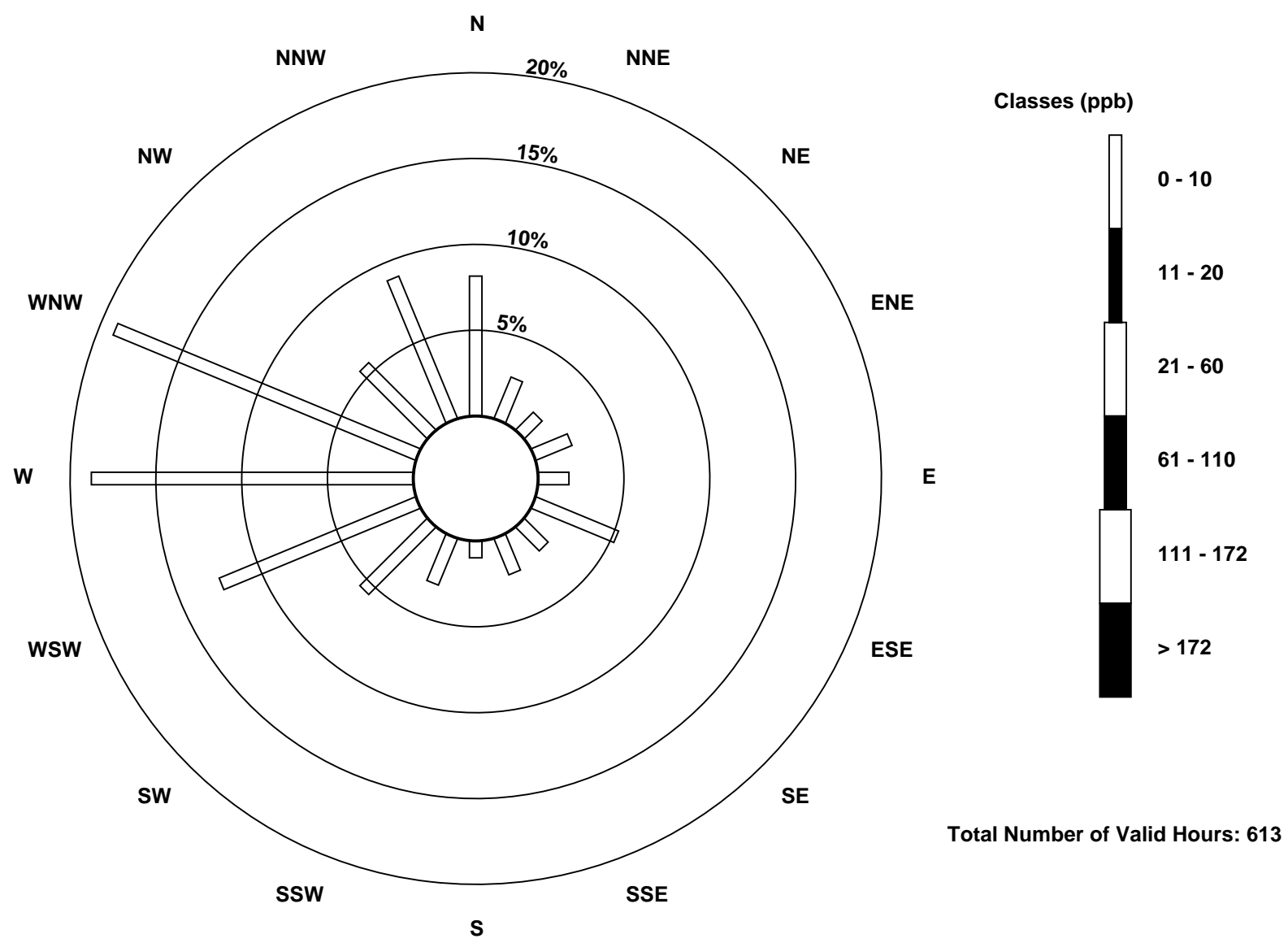
Total Number of Valid Hours: 613

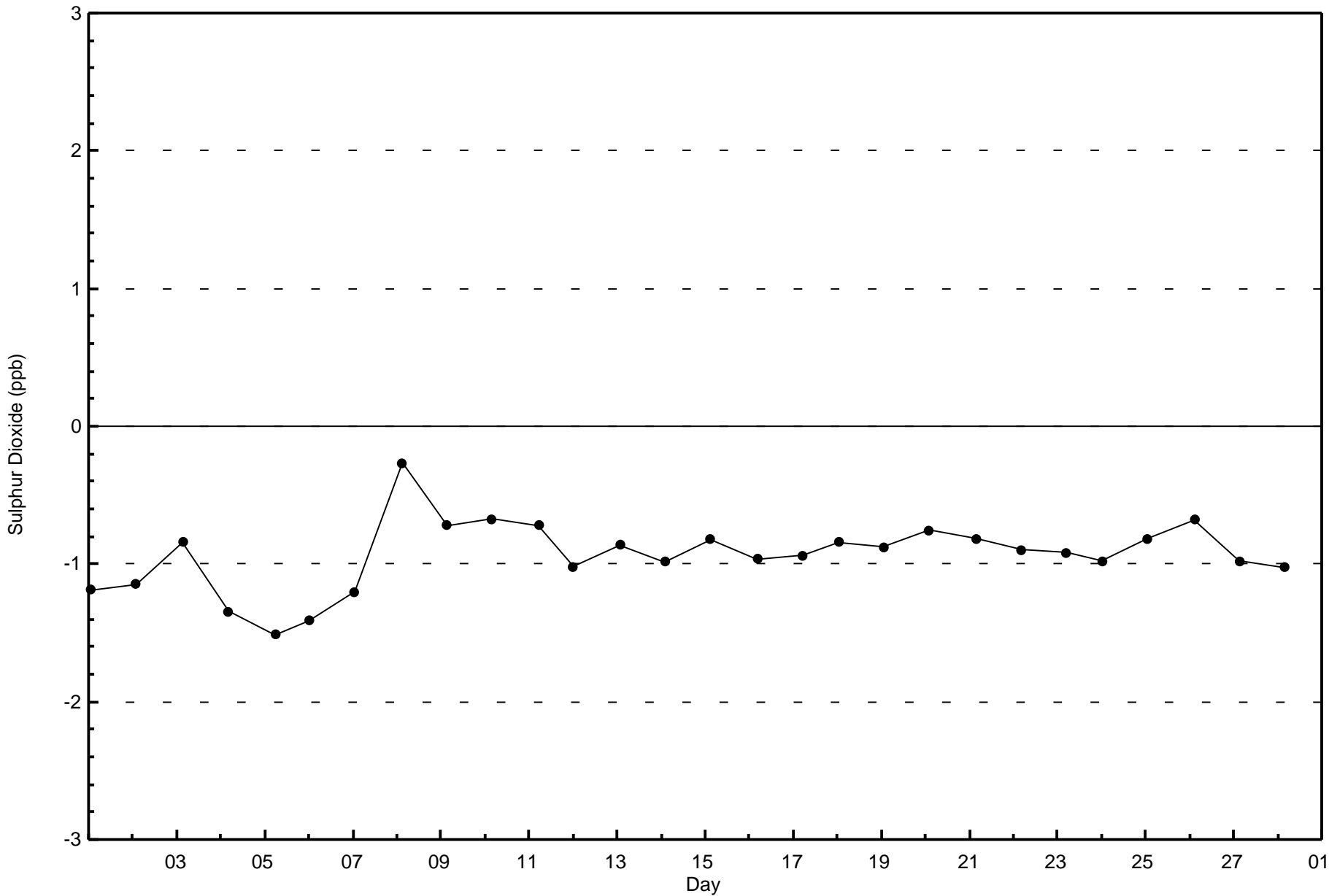
Total Number of Hours: 672

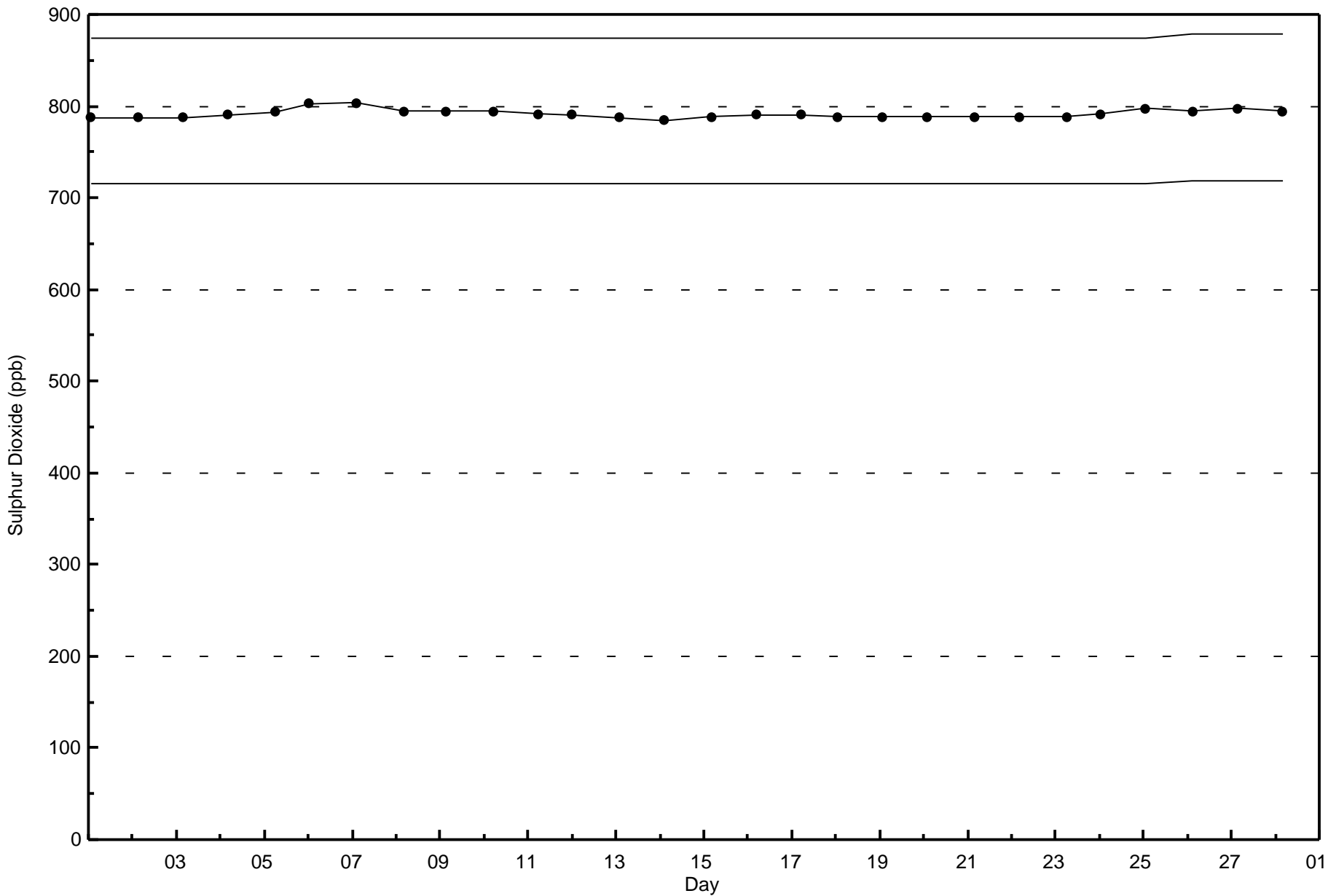


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)







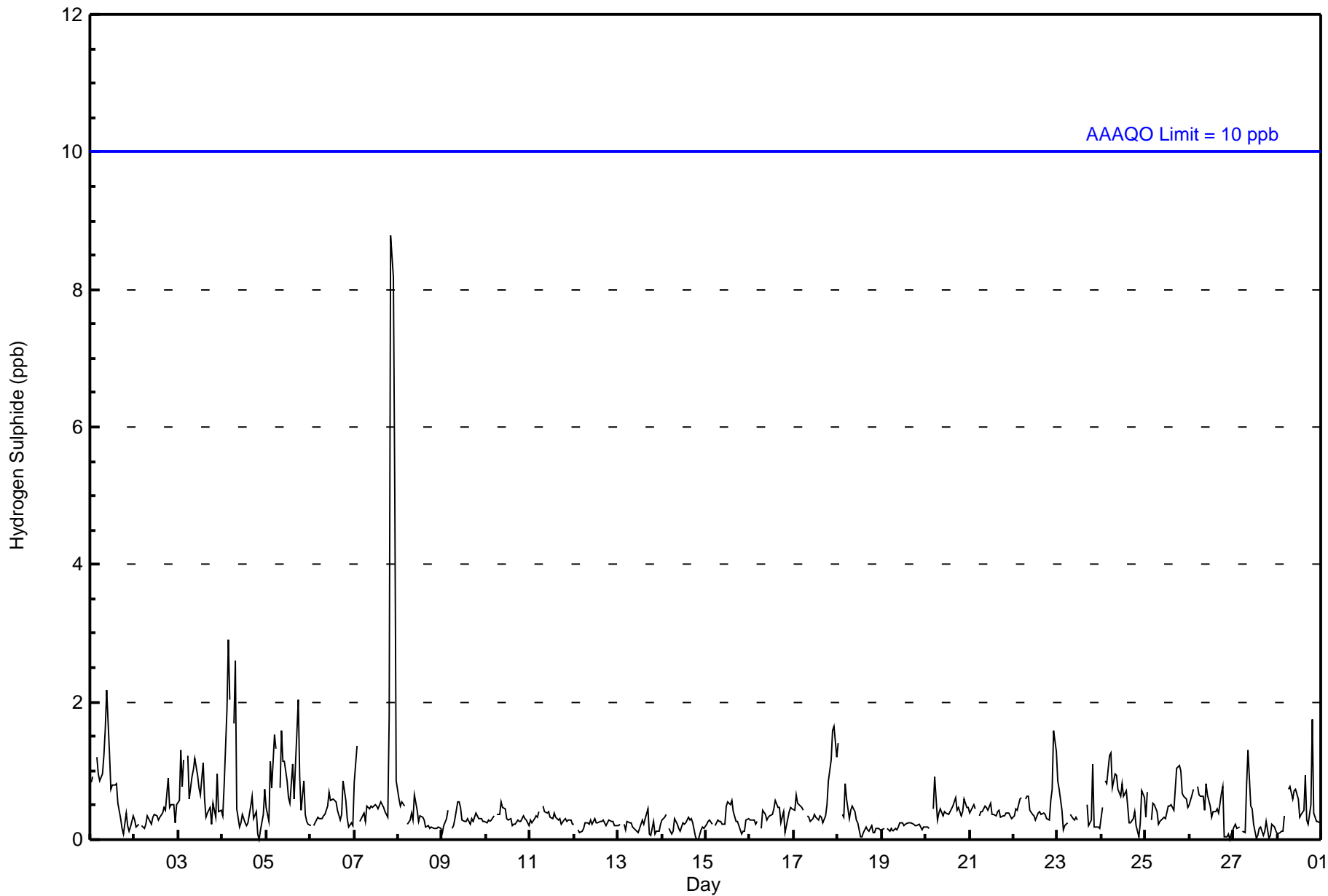


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 ppb on Feb 7 21:00 Maximum Daily Average: 1.5 ppb on Feb 7										Hours in Service: 672 Hours of Data: 640 Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0																
Minimum Value: 0 ppb on Feb 4 21:00 Maximum Diurnal Average: 0.6 ppb at hour 22 Monthly Average: 0.5 ppb										Minimum Daily Average: 0.2 ppb on Feb 19 Minimum Diurnal Average: 0.4 ppb at hour 13 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 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-Feb	1	1	Z	1	1	1	1	1	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.8	2
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0.4	1
3-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	0	0	0.7	1
4-Feb	0	1	2	3	2	Z	2	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.8	3
5-Feb	0	0	1	1	2	1	Z	1	2	1	1	1	1	1	1	1	1	2	1	0	1	0	0	0	0.9	2
6-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0.4	1
7-Feb	1	1	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	2	9	8	5	1	1.5	9
8-Feb	1	0	1	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Feb	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Feb	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
11-Feb	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-Feb	0	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
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
17-Feb	0	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	1	0.6	2
18-Feb	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Feb	0	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
20-Feb	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0.4	1
21-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Feb	0	0	0	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0.5	2
23-Feb	1	1	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	1	0	0	1	0	0	0	0	0.4	1
24-Feb	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0.6	1
25-Feb	0	1	Z	0	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	0.5	1
26-Feb	1	1	1	Z	1	1	1	1	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0.5	1
27-Feb	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-Feb	0	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	1	0	0	1	2	0	0	0	0	0.5	2
0.4 0.5 0.5 0.5 0.6 0.5 0.4 0.6 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.6 0.6 0.5 0.4 1 1 2 3 2 1 2 3 2 2 1 1 1 1 1 1 1 1 2 1 2 9 8 5 1																								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
ConocoPhillips - Surmont - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	635	99.22	99.22
3 - 4	2	0.31	99.53
5 - 7	1	0.16	99.69
8 - 11	2	0.31	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - February 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	52	16	9	14	13	32	12	14	6	18	38	80	112	116	31	57	620
3 - 4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
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	2	0	2
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	53	16	9	14	13	32	12	14	6	18	38	80	112	117	33	58	625

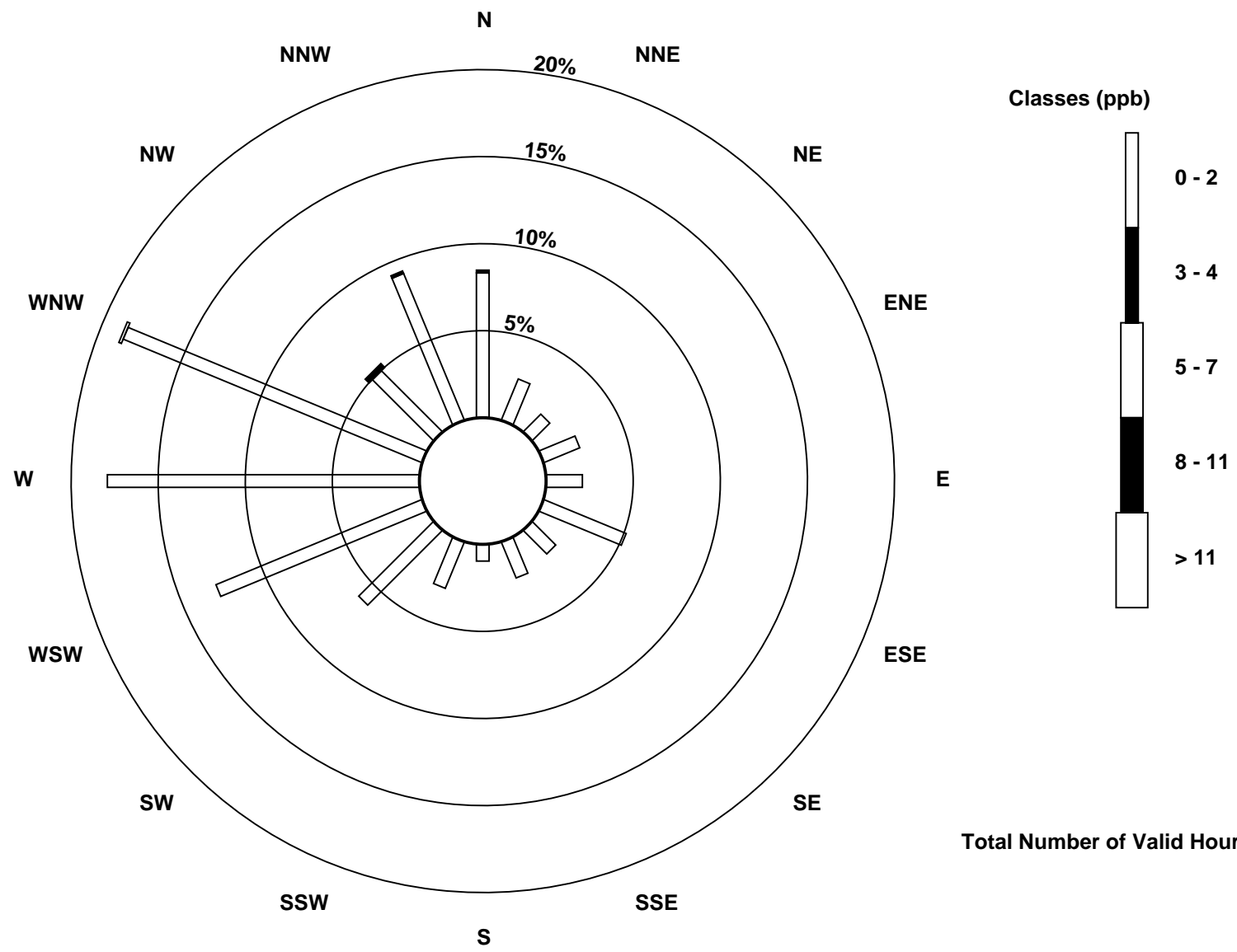
Total Number of Valid Hours: 625

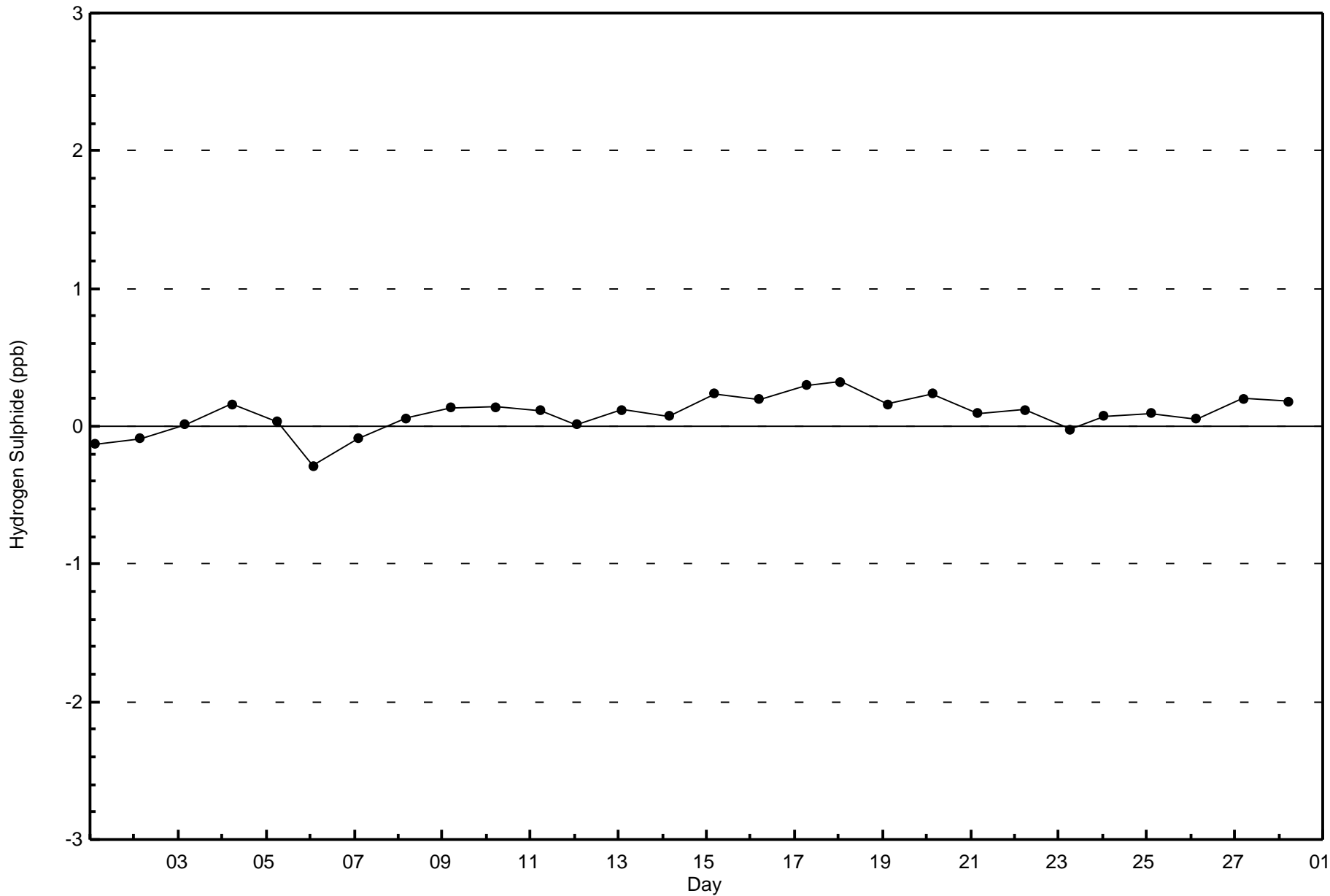
Total Number of Hours: 672

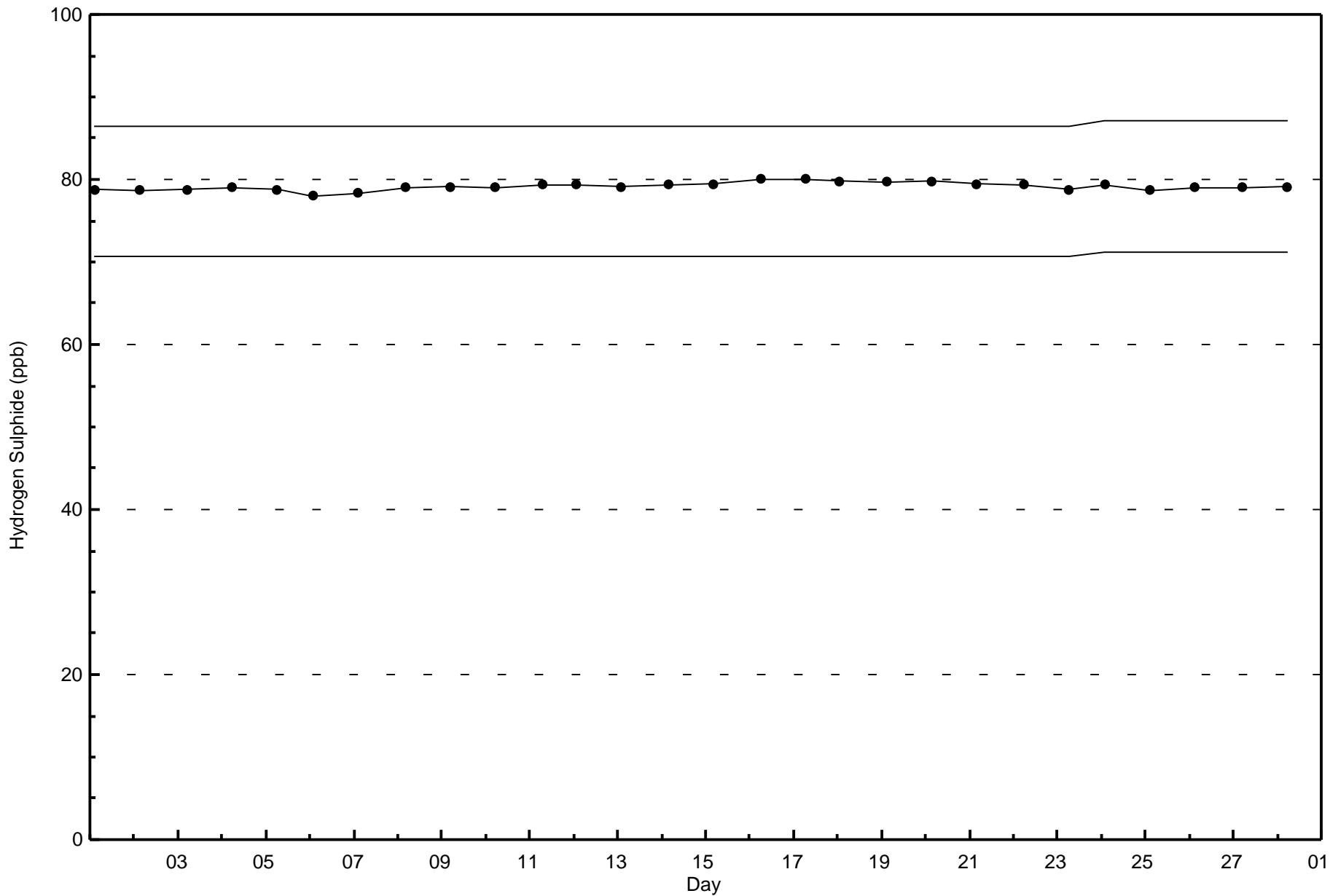


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)









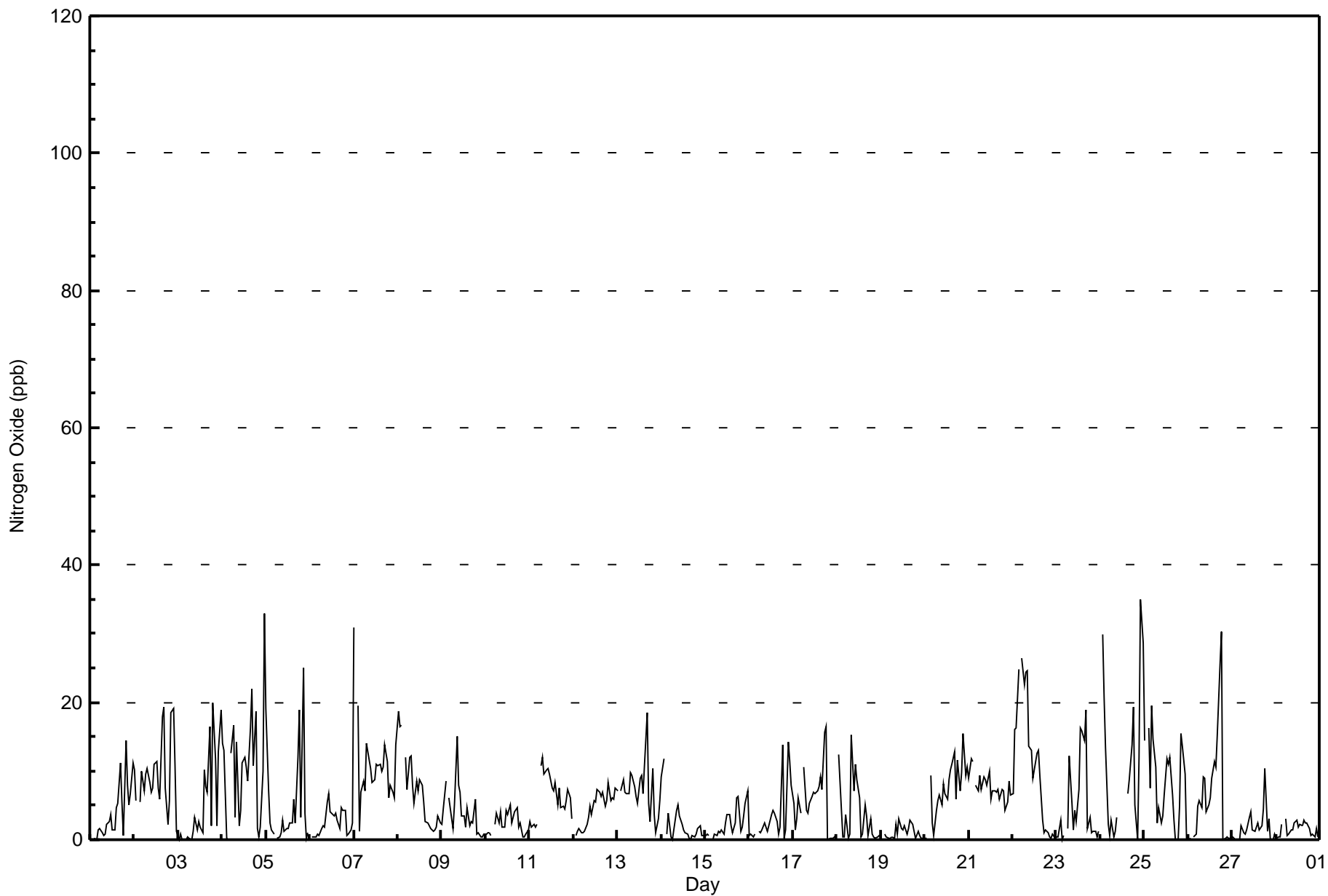
Maximum Value: 35 ppb on Feb 24 23:00																		Maximum Daily Average: 11.3 ppb on Feb 24						Hours in Service: 672			
Minimum Value: 0 ppb on Feb 1 04:00																		Minimum Daily Average: 1.1 ppb on Feb 19						Hours of Data: 639			
Maximum Diurnal Average: 7.4 ppb at hour 19																		Minimum Diurnal Average: 3.9 ppb at hour 5						Hours of Missing Data: 33			
Monthly Average: 5.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 8 P ₉₀ = 13 P ₉₉ = 28						Hours of Calibration: 33			
																								Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	1	Z	0	0	1	2	1	1	1	2	3	4	1	1	5	5	11	6	1	14	8	5	7	11	4.0	14	
2-Feb	10	6	Z	6	10	7	9	10	8	7	8	11	11	7	6	18	19	7	2	6	19	19	11	1	9.5	19	
3-Feb	0	1	0	Z	0	0	0	0	1	3	1	3	2	1	10	8	7	17	2	20	12	2	13	19	5.3	20	
4-Feb	14	13	0	0	Z	13	17	3	14	2	4	11	12	11	9	16	22	11	19	2	0	2	10	33	10.3	33	
5-Feb	19	7	2	1	1	Z	0	0	1	3	1	2	2	2	6	2	12	19	3	25	4	0	1	5.1	25		
6-Feb	Z	0	0	0	1	1	2	2	2	5	7	4	4	3	4	3	2	5	4	4	1	1	1	2	2.5	7	
7-Feb	31	Z	20	1	7	9	7	14	12	10	8	9	11	11	11	10	10	14	11	6	8	7	6	14	10.7	31	
8-Feb	19	17	17	Z	12	7	12	12	8	5	9	7	9	8	6	3	3	2	2	1	2	2	4	3	7.2	19	
9-Feb	2	5	8	Z	6	3	2	5	15	8	7	3	3	2	5	2	3	2	6	1	1	0	0	1	4.0	15	
10-Feb	1	1	1	1	Z	2	4	2	4	2	2	4	4	5	2	3	4	5	2	2	0	0	1	2	2.3	5	
11-Feb	3	2	2	2	2	Z	11	12	10	10	10	9	8	7	8	5	7	5	5	4	6	7	6	3	6.3	12	
12-Feb	Z	1	1	2	1	1	1	2	3	5	4	6	6	7	7	6	7	5	6	8	6	6	6	8	4.5	8	
13-Feb	7	Z	7	9	7	7	7	10	9	8	6	5	9	9	7	11	18	5	3	10	4	1	3	6	7.3	18	
14-Feb	9	12	Z	1	4	0	0	1	4	5	3	2	1	1	1	0	0	1	0	1	2	2	1	1	2.3	12	
15-Feb	1	1	1	Z	0	1	1	1	1	1	1	1	2	4	4	2	1	2	6	6	1	2	3	5	7	2.4	7
16-Feb	1	1	1	1	Z	1	1	1	2	2	1	2	4	4	4	3	1	2	14	0	2	14	11	8	3.5	14	
17-Feb	5	2	3	6	4	Z	11	4	4	5	6	7	7	7	8	9	7	16	16	0	0	0	0	1	5.6	16	
18-Feb	Z	12	4	0	0	4	0	1	15	7	11	9	6	0	1	5	4	1	3	1	0	0	0	1	3.7	15	
19-Feb	0	Z	1	0	0	0	0	0	2	1	3	2	1	2	1	2	3	2	1	0	1	1	0	0	1.1	3	
20-Feb	0	0	Z	9	2	1	4	6	6	5	8	7	6	9	10	11	13	6	12	7	10	15	9	11	7.3	15	
21-Feb	9	12	11	Z	8	7	9	7	9	9	8	10	6	7	7	7	7	6	7	7	4	5	8	7	7.8	12	
22-Feb	7	16	16	25	Z	26	23	24	25	14	13	9	10	13	13	9	3	1	1	1	0	0	1	0	10.9	26	
23-Feb	0	0	3	0	1	Z	2	12	5	1	4	3	7	16	16	14	19	2	3	1	1	1	0	1	5.0	19	
24-Feb	Z	30	21	13	2	1	3	0	1	3	C	C	C	C	C	7	9	14	19	5	0	12	35	29	11.3	35	
25-Feb	14	Z	16	8	19	15	11	2	5	2	3	7	12	11	12	7	3	0	0	5	15	14	10	0	8.3	19	
26-Feb	0	0	Z	0	1	5	6	5	9	9	4	5	6	9	11	11	15	26	30	0	0	0	0	0	6.6	30	
27-Feb	0	0	0	Z	0	2	1	1	1	3	4	1	1	2	2	1	2	5	10	1	3	0	0	1	1.9	10	
28-Feb	0	1	0	2	Z	3	1	1	1	1	2	3	2	2	2	3	2	2	2	1	1	0	2	1	1.5	3	
																		Diurnal Average						Diurnal Maximum			
6.4 6.0 5.7 4.0 3.9 4.9 5.1 5.1 6.4 5.0 5.3 5.4 5.7 6.1 6.3 6.6 7.4 6.5 7.4 4.1 4.7 4.5 5.4 6.0																		31 30 21 25 19 26 23 24 25 14 13 11 12 16 16 18 22 26 30 20 25 19 35 33									
Z - zerospan																		C - Calibration									



Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	624	97.65	97.65
21 - 40	15	2.35	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - February 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	50	16	9	14	13	33	12	14	6	18	38	81	108	110	33	55	610
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	7	7	1	0	15
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	50	16	9	14	13	33	12	14	6	18	38	81	115	117	34	55	625

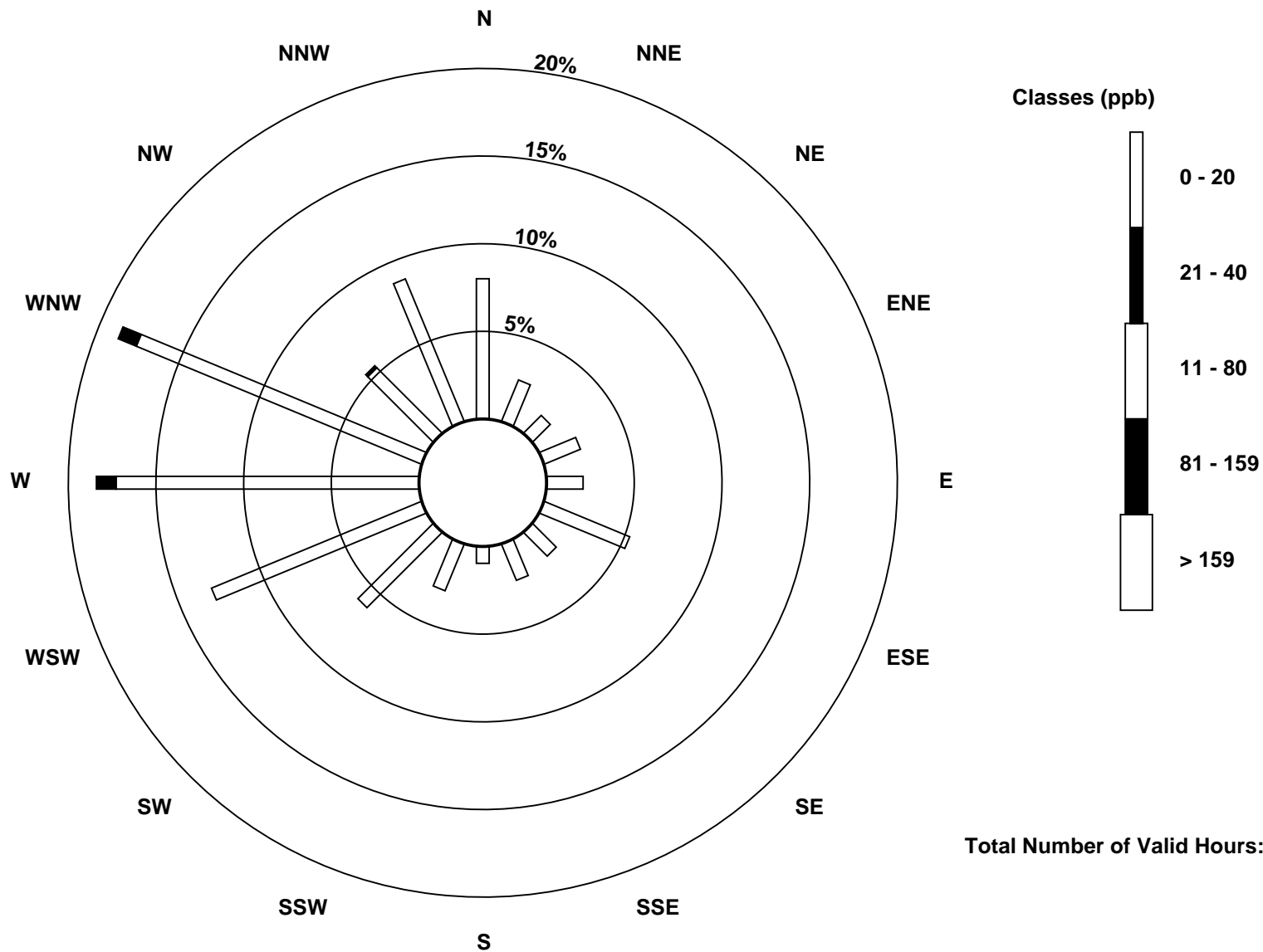
Total Number of Valid Hours: 625

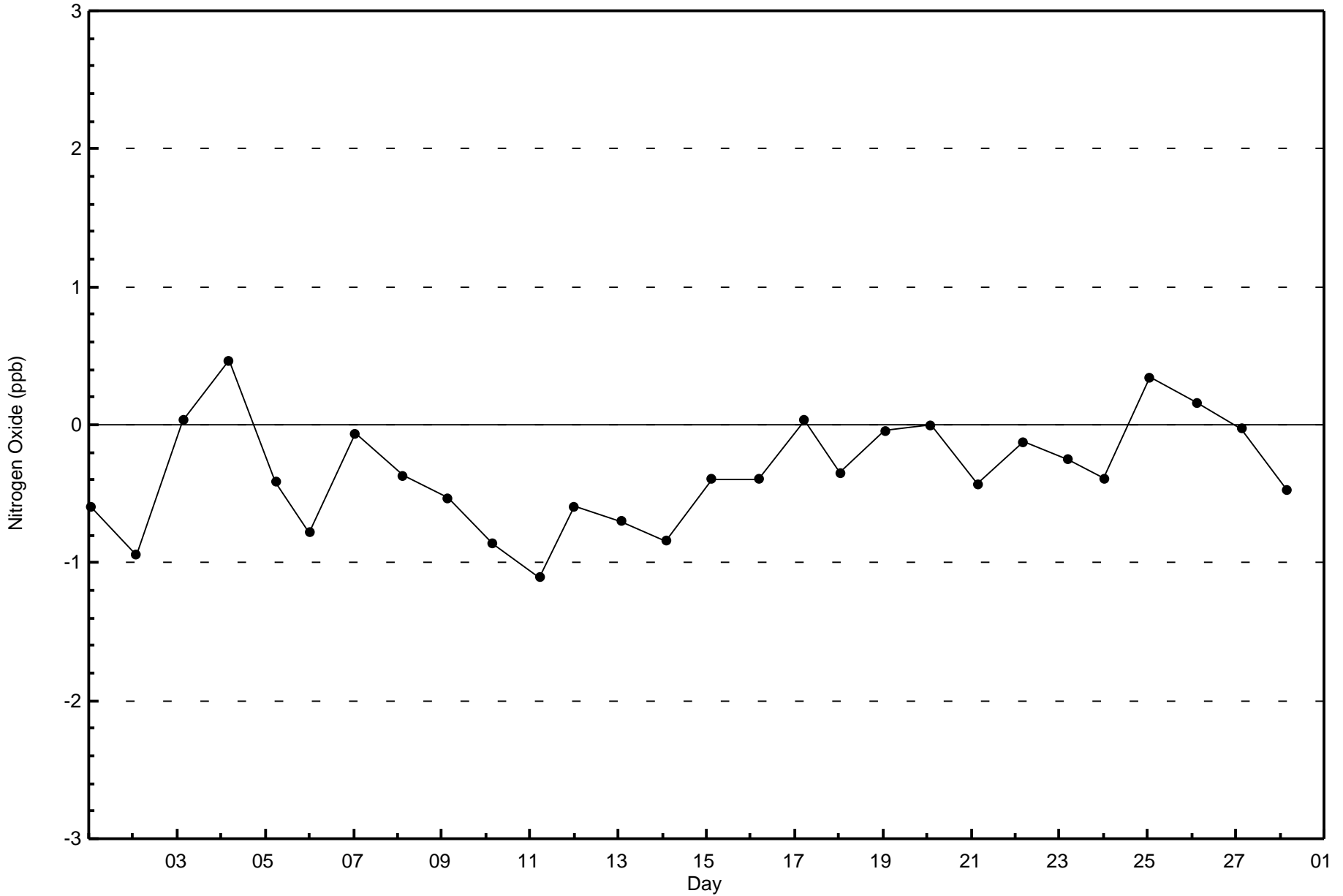
Total Number of Hours: 672

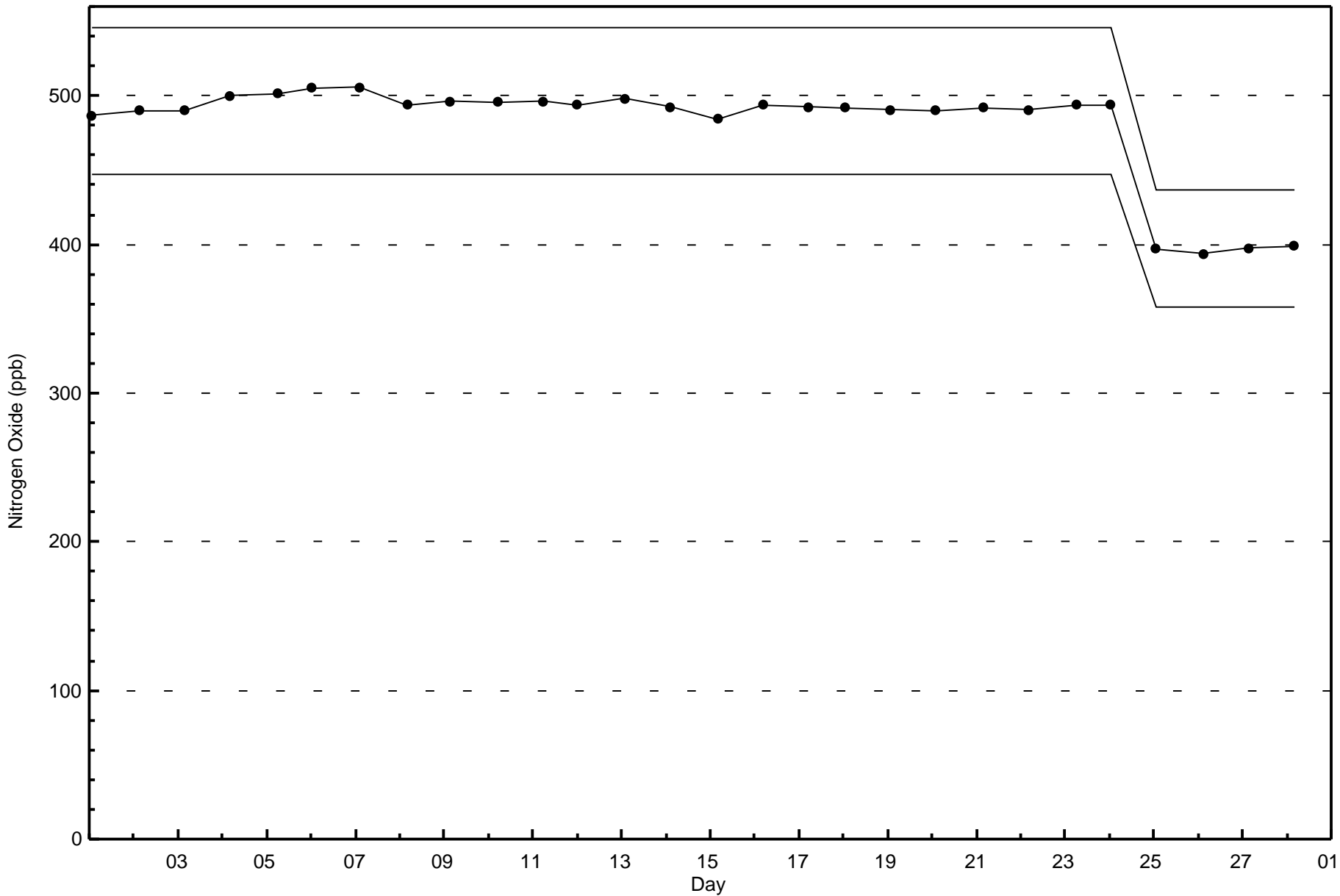


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

ConocoPhillips - Surmont - February 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 17 ppb on Feb 5 19:00	Maximum Daily Average: 8.3 ppb on Feb 4		Hours of Data:	639
Minimum Value: 0 ppb on Feb 19 21:00	Minimum Daily Average: 1.0 ppb on Feb 19		Hours of Missing Data:	33
Maximum Diurnal Average: 7.0 ppb at hour 19	Minimum Diurnal Average: 4.3 ppb at hour 13		Hours of Calibration:	33
Monthly Average: 5.2 ppb	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 7 P ₉₀ = 9 P ₉₉ = 13		Percent Operational Time:	100.0

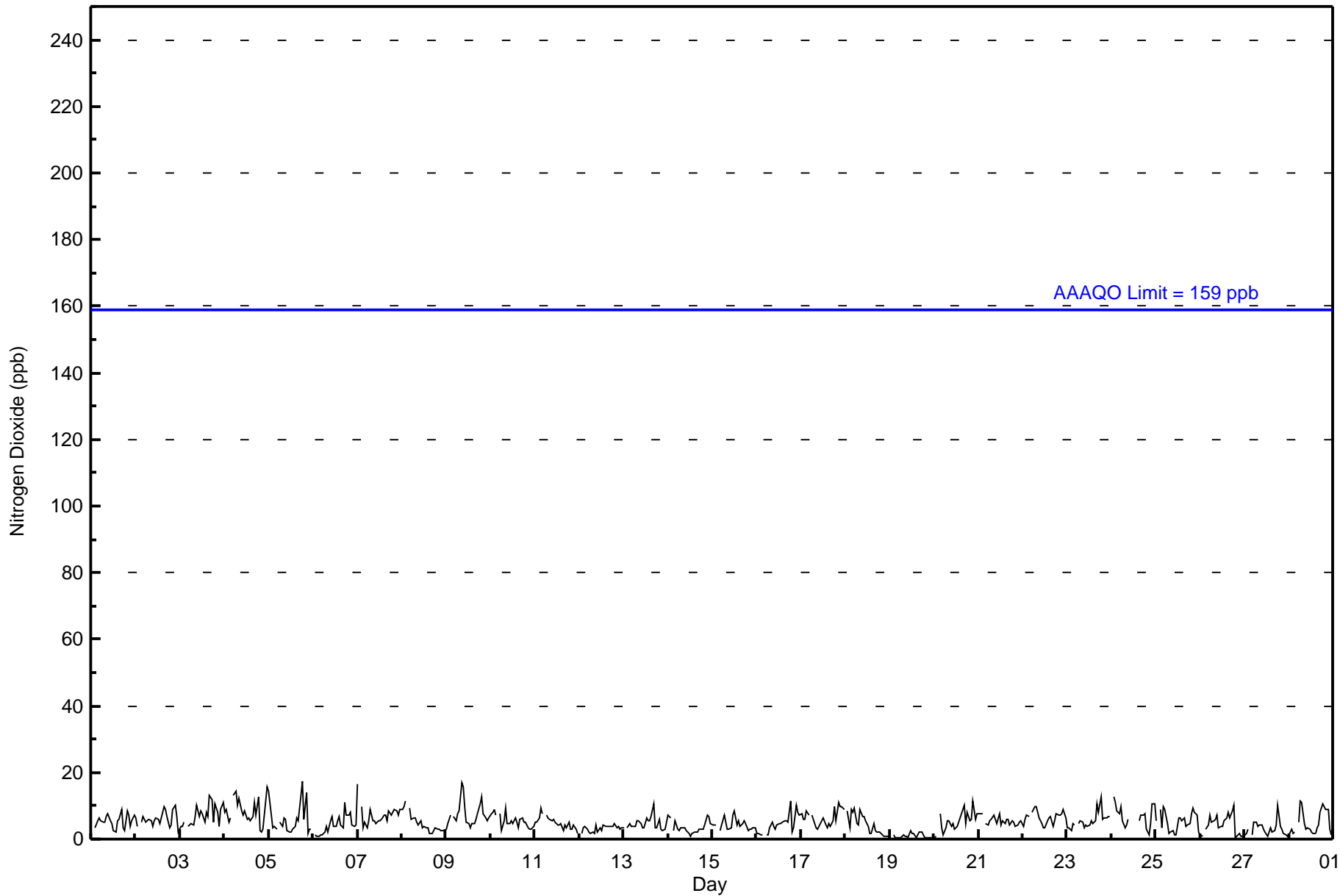
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	3	Z	3	6	6	6	5	5	7	8	5	5	2	2	5	6	9	4	3	8	7	4	5	7	5.3	9
2-Feb	6	4	Z	5	7	5	5	6	6	4	5	7	6	5	6	10	9	7	3	4	9	10	7	2	6.0	10
3-Feb	4	4	5	Z	4	4	5	4	7	10	7	8	8	5	8	7	13	12	5	11	8	4	9	11	7.0	13
4-Feb	8	9	5	6	Z	13	14	10	12	8	7	8	6	6	5	7	11	7	13	3	2	3	11	16	8.3	16
5-Feb	14	7	3	4	3	Z	5	4	7	6	3	2	2	3	4	6	5	13	17	6	14	2	3	3	5.9	17
6-Feb	Z	1	1	1	1	1	2	4	2	5	7	4	4	5	7	4	3	11	7	7	8	4	4	4	4.3	11
7-Feb	17	Z	10	4	5	3	5	9	6	5	5	5	6	6	7	7	6	9	7	8	9	9	7	9	7.0	17
8-Feb	9	10	11	Z	10	6	6	7	5	4	6	3	4	4	4	2	2	3	4	3	3	3	3	3	4.8	11
9-Feb	3	5	7	Z	7	6	8	9	17	16	10	5	5	4	5	5	6	8	11	13	8	6	5	6	7.4	17
10-Feb	8	8	9	7	Z	8	3	6	9	5	5	6	5	6	5	4	6	7	5	5	3	3	3	4	5.5	9
11-Feb	5	5	6	9	8	Z	7	6	6	5	6	5	4	4	5	3	4	3	5	3	3	4	3	2	4.9	9
12-Feb	Z	2	4	4	3	2	2	2	2	4	2	3	3	4	4	4	4	4	4	5	4	4	3	4	3.2	5
13-Feb	3	Z	3	5	4	4	4	6	6	5	3	4	6	5	6	7	10	4	3	6	3	2	3	5	4.6	10
14-Feb	7	6	Z	3	5	3	3	3	4	3	3	2	1	2	2	2	2	3	3	3	4	7	7	5	3.6	7
15-Feb	4	4	4	Z	2	4	7	5	3	3	3	7	8	4	6	4	5	6	5	2	3	3	4	4	4.3	8
16-Feb	2	2	1	1	Z	1	1	4	5	4	3	4	5	5	5	5	5	5	12	2	3	10	8	7	4.4	12
17-Feb	8	6	6	8	7	Z	7	5	4	3	5	6	7	4	3	5	4	6	10	6	11	10	10	9	6.4	11
18-Feb	Z	9	4	9	8	9	5	4	9	7	7	6	4	2	2	5	3	2	2	2	1	1	1	1	4.3	9
19-Feb	1	Z	1	1	1	0	1	1	1	1	0	3	2	2	1	1	2	2	1	0	0	0	1	1	1.0	3
20-Feb	0	1	Z	8	4	1	3	5	6	4	5	3	4	5	6	8	10	5	8	5	6	12	6	8	5.3	12
21-Feb	8	8	8	Z	5	4	5	6	7	6	5	8	4	6	5	6	6	4	6	5	4	4	5	5	5.6	8
22-Feb	4	6	7	7	Z	8	10	10	8	6	5	4	4	5	7	7	4	6	8	7	7	8	9	6	6.5	10
23-Feb	4	3	2	5	4	Z	5	6	5	3	4	4	4	6	5	5	11	8	13	6	7	6	7	7	5.6	13
24-Feb	Z	13	11	9	8	10	6	3	4	6	C	C	C	C	C	6	7	7	8	3	1	5	10	11	6.9	13
25-Feb	6	Z	9	3	10	9	5	2	2	2	1	1	7	6	6	6	4	4	5	8	9	8	7	2	5.3	10
26-Feb	1	1	Z	3	4	7	5	5	6	7	3	4	4	6	6	8	7	8	10	1	1	2	1	1	4.4	10
27-Feb	1	2	3	Z	1	5	5	4	4	4	3	2	1	2	3	2	2	4	10	4	3	2	1	1	3.1	10
28-Feb	1	3	2	2	Z	5	11	11	5	3	3	3	2	2	2	3	4	8	11	10	9	9	3	1	4.9	11
	5.2	5.1	5.3	4.9	5.1	5.2	5.3	5.4	5.8	5.3	4.4	4.5	4.3	4.3	4.7	5.1	5.9	6.0	7.0	5.1	5.4	5.1	5.2	5.1		Diurnal Average
	17	13	11	9	10	13	14	11	17	16	10	8	8	6	8	10	13	13	17	13	14	12	11	16		Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - February 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	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: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - February 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	50	16	9	14	13	33	12	14	6	18	38	81	115	117	34	55	625
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	50	16	9	14	13	33	12	14	6	18	38	81	115	117	34	55	625

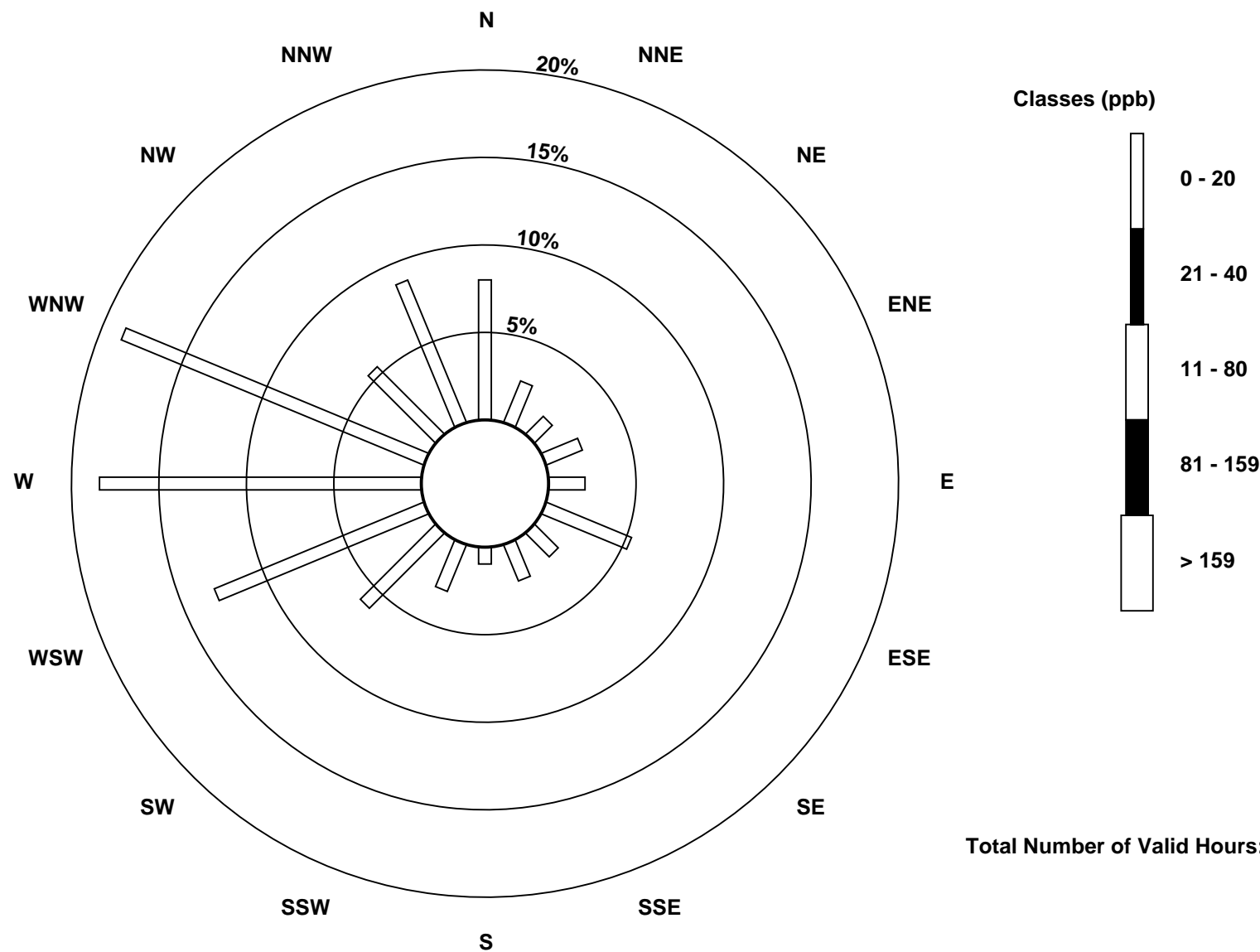
Total Number of Valid Hours: 625

Total Number of Hours: 672

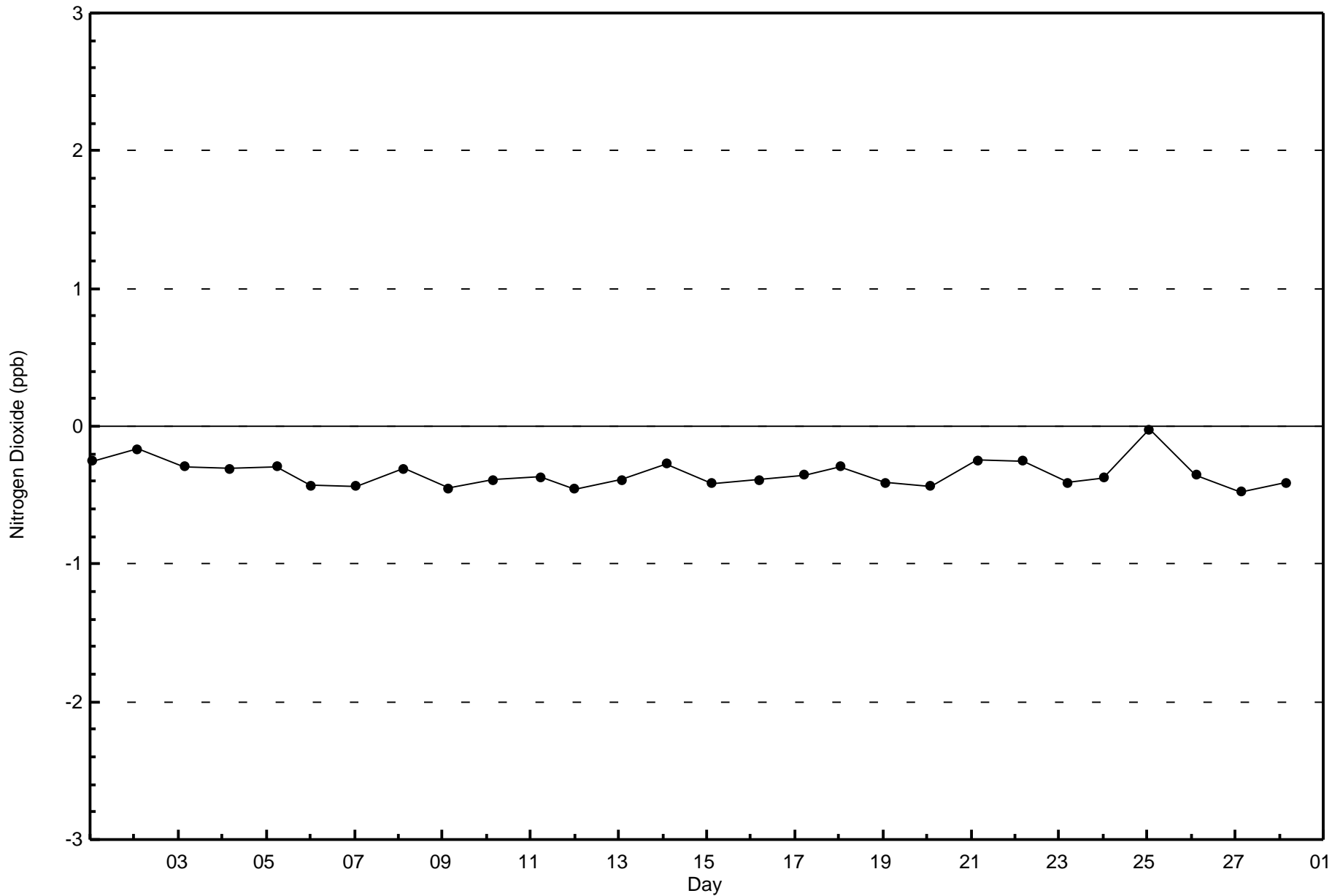


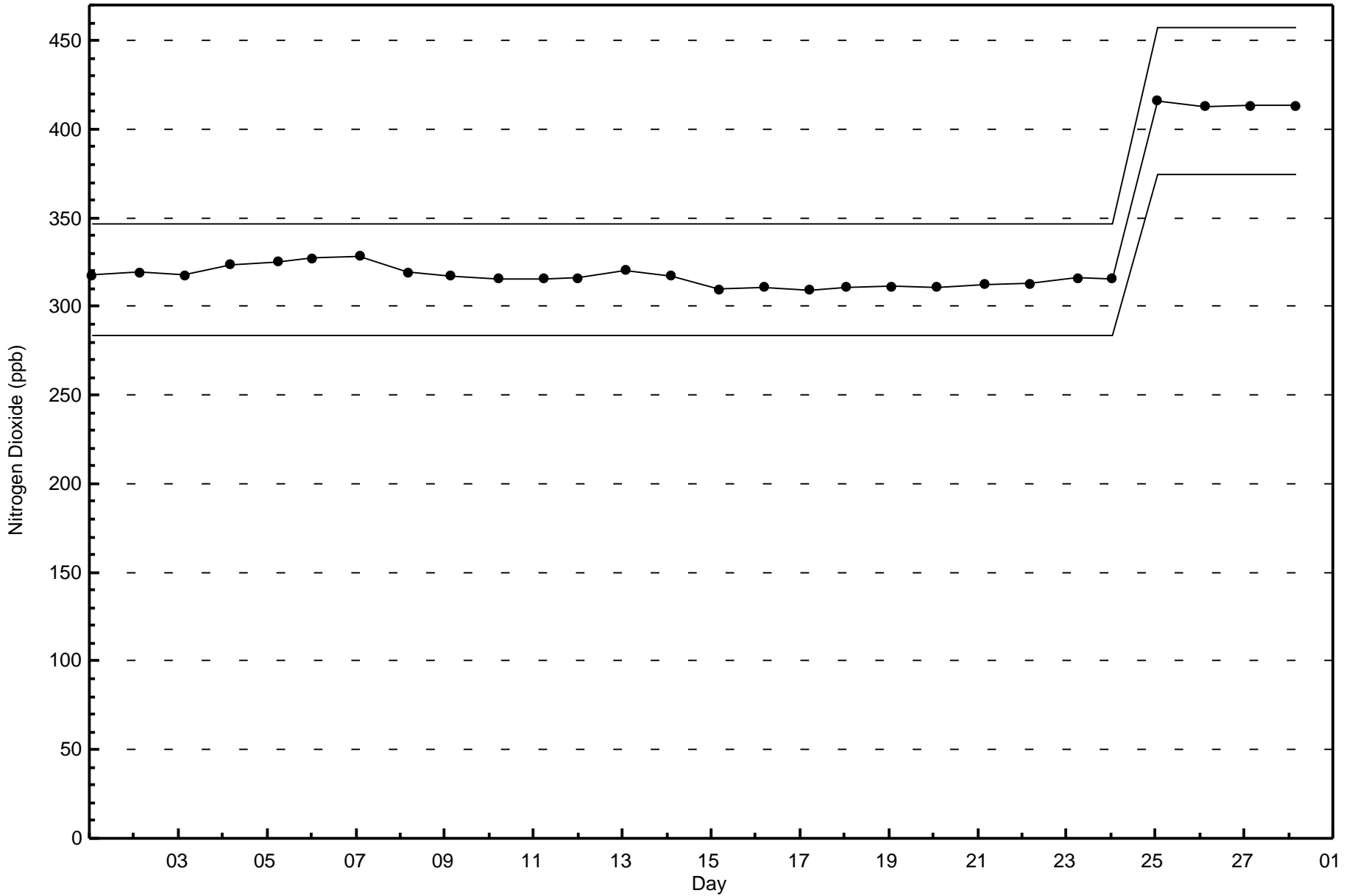
Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 625





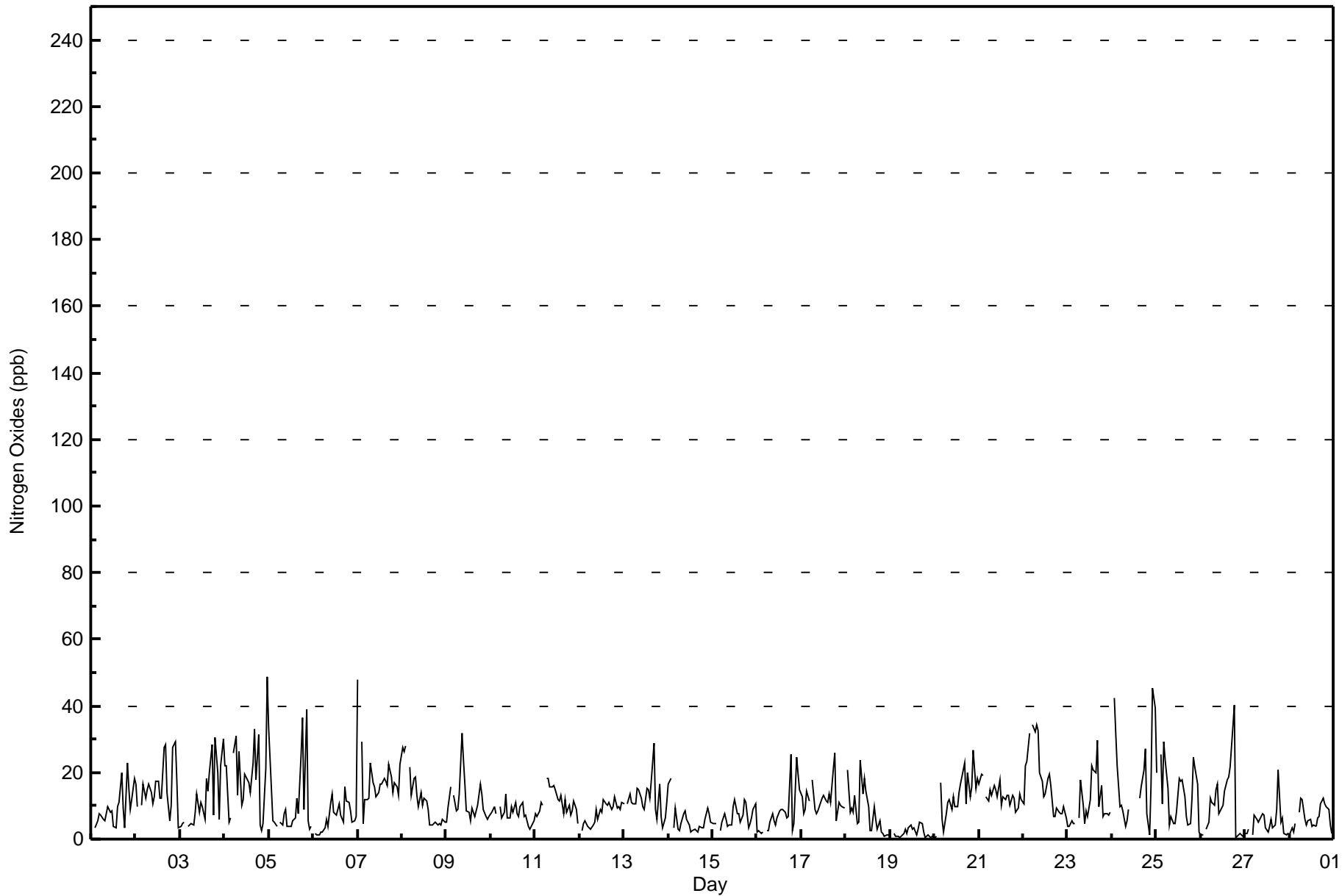


Maximum Value: 49 ppb on Feb 5 00:00										Maximum Daily Average: 18.6 ppb on Feb 4										Hours in Service: 672																																																																																																			
Minimum Value: 1 ppb on Feb 26 20:00										Minimum Daily Average: 2.0 ppb on Feb 19										Hours of Data: 639																																																																																																			
Maximum Diurnal Average: 14.4 ppb at hour 19										Minimum Diurnal Average: 8.9 ppb at hour 4										Hours of Missing Data: 33																																																																																																			
Monthly Average: 10.8 ppb										Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 14 P ₉₀ = 21 P ₉₉ = 39										Hours of Calibration: 33																																																																																																			
																				Percent Operational Time: 100.0																																																																																																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																																																																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																																																																															
1-Feb	4	Z	4	6	8	7	6	6	8	10	8	8	4	3	10	11	20	9	3	23	15	9	12	18	9.2	23																																																																																													
2-Feb	16	10	Z	10	17	12	15	16	14	11	13	17	18	12	12	28	28	14	6	10	28	29	17	4	15.5	29																																																																																													
3-Feb	4	5	5	Z	4	4	5	4	8	13	8	11	10	6	18	14	20	28	7	31	20	6	22	30	12.3	31																																																																																													
4-Feb	22	22	5	6	Z	26	31	13	26	10	12	19	18	17	14	23	33	18	32	4	3	5	21	49	18.6	49																																																																																													
5-Feb	33	15	6	5	4	Z	5	4	8	9	4	4	4	5	6	12	8	25	36	9	39	6	3	4	11.0	39																																																																																													
6-Feb	Z	2	1	1	2	2	4	6	4	11	14	8	7	9	11	7	5	16	11	11	9	5	5	7	6.8	16																																																																																													
7-Feb	48	Z	29	5	12	12	12	23	17	16	13	14	17	17	18	17	16	22	19	14	17	16	13	23	17.8	48																																																																																													
8-Feb	28	26	28	Z	21	13	18	19	13	10	14	10	12	12	9	4	4	5	5	4	4	4	6	5	12.0	28																																																																																													
9-Feb	5	9	16	Z	13	9	9	14	32	24	17	8	8	5	9	7	9	10	16	14	9	7	6	7	11.4	32																																																																																													
10-Feb	8	9	10	8	Z	10	6	8	13	6	6	10	8	11	8	7	10	11	7	7	4	3	4	5	7.8	13																																																																																													
11-Feb	8	7	8	11	10	Z	18	18	15	16	16	15	12	12	13	8	12	8	10	7	9	11	9	5	11.2	18																																																																																													
12-Feb	Z	2	5	5	4	3	3	4	5	9	6	9	8	12	11	10	11	9	10	13	9	10	9	11	7.7	13																																																																																													
13-Feb	10	Z	10	13	11	11	11	15	15	12	10	9	15	15	12	17	29	9	6	17	7	3	6	11	11.9	29																																																																																													
14-Feb	16	18	Z	4	9	3	3	5	8	8	6	4	2	3	2	2	4	3	4	6	9	8	5	5	5.9	18																																																																																													
15-Feb	5	5	5	Z	2	5	8	6	4	4	4	10	12	3	8	8	5	7	12	11	4	5	6	9	11	6.7	12																																																																																												
16-Feb	2	2	2	2	Z	3	3	5	7	5	4	6	8	9	9	8	6	7	25	2	5	24	19	15	7.8	25																																																																																													
17-Feb	13	8	9	14	11	Z	18	9	7	8	11	12	13	11	11	14	11	21	26	6	11	10	10	9	11.9	26																																																																																													
18-Feb	Z	21	8	9	8	13	5	5	24	14	18	14	10	2	2	10	6	3	5	2	1	1	1	1	8.0	24																																																																																													
19-Feb	1	Z	2	1	1	1	1	2	3	2	3	4	3	3	1	3	5	4	2	1	1	1	1	1	2.0	5																																																																																													
20-Feb	1	1	Z	17	6	2	8	11	12	9	13	10	10	14	16	18	23	11	20	13	16	27	15	18	12.6	27																																																																																													
21-Feb	17	19	19	Z	13	11	15	13	16	15	13	18	10	13	12	13	13	10	13	12	8	9	13	12	13.4	19																																																																																													
22-Feb	10	22	23	32	Z	34	32	34	33	20	18	13	14	18	20	16	7	7	9	8	8	8	10	7	17.4	34																																																																																													
23-Feb	4	4	5	5	5	Z	6	18	10	5	9	7	12	22	21	20	30	10	16	7	8	8	7	8	10.6	30																																																																																													
24-Feb	Z	43	32	22	10	10	8	4	5	9	C	C	C	C	C	12	16	21	27	8	1	17	45	40	18.3	45																																																																																													
25-Feb	20	Z	25	11	29	24	15	4	7	5	5	8	18	17	18	13	7	4	5	12	25	22	17	2	13.6	29																																																																																													
26-Feb	1	1	Z	3	5	12	11	10	15	16	7	9	10	15	18	18	22	34	40	1	1	2	1	1	11.1	40																																																																																													
27-Feb	2	2	3	Z	1	7	6	5	6	7	7	3	2	4	6	3	4	9	21	5	6	2	1	2	5.0	21																																																																																													
28-Feb	1	3	2	5	Z	8	12	12	6	4	6	6	4	4	4	6	7	10	12	10	10	9	4	2	6.4	12																																																																																													
11.7										11.1										10.9				8.9				9.0				10.1				10.5				10.5				12.2				10.3				9.8				9.9				10.0				10.3				11.1				11.7				13.2				12.5				14.4				9.2				10.1				9.6				10.6				11.1				Diurnal Average											
48										43										32				32				29				34				32				34				32				34				33				24				18				19				18				22				21				28				33				34				40				31				39				29				45				49				Diurnal Maximum			
Z - zerospan										C - Calibration																																																																																																													



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - February 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	570	89.20	89.20
21 - 40	65	10.17	99.37
41 - 80	4	0.63	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - February 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	50	16	9	14	13	33	11	14	5	18	38	80	87	89	28	51	556
21 - 40	0	0	0	0	0	0	1	0	1	0	0	1	26	26	6	4	65
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	2	2	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	50	16	9	14	13	33	12	14	6	18	38	81	115	117	34	55	625

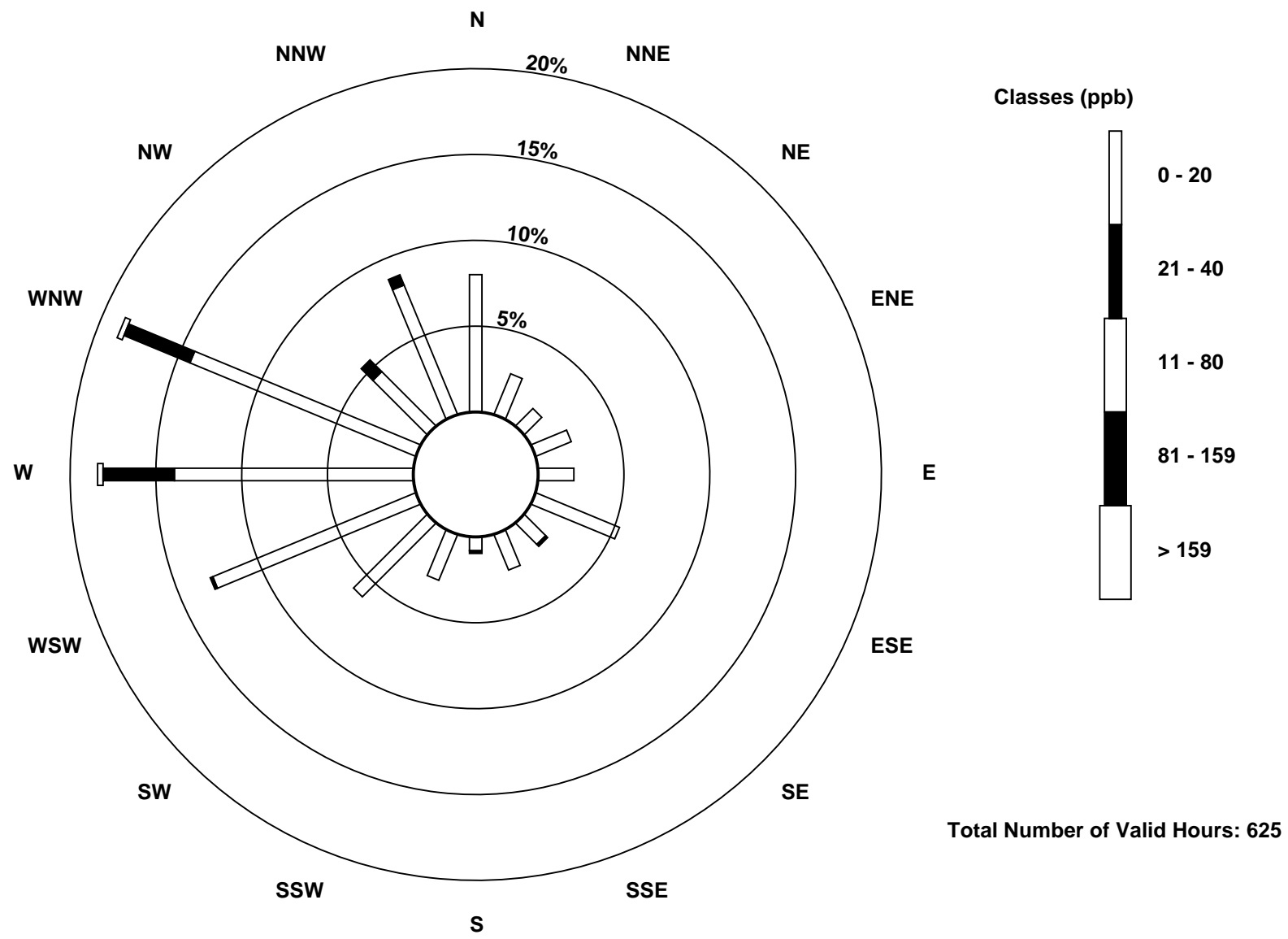
Total Number of Valid Hours: 625

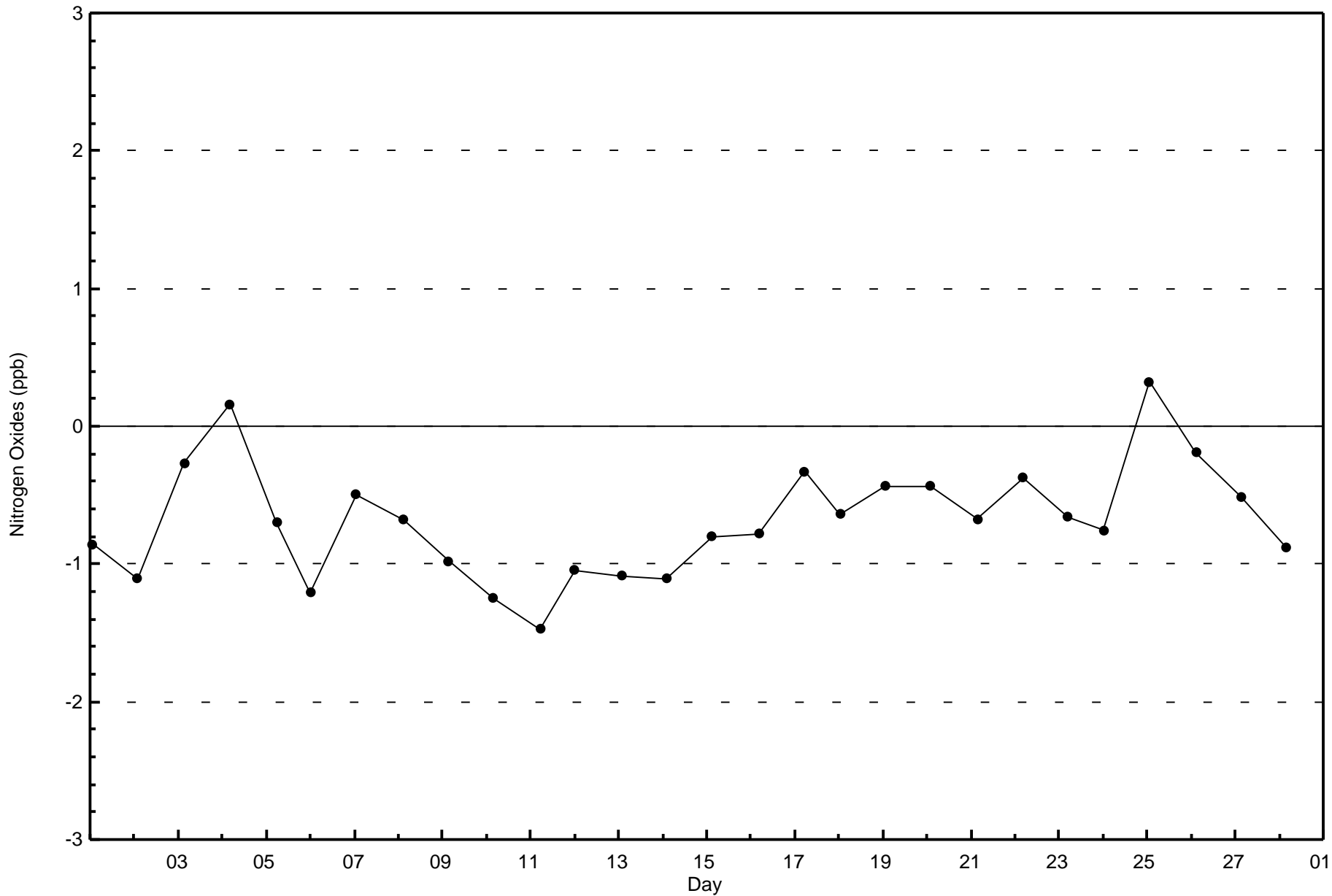
Total Number of Hours: 672

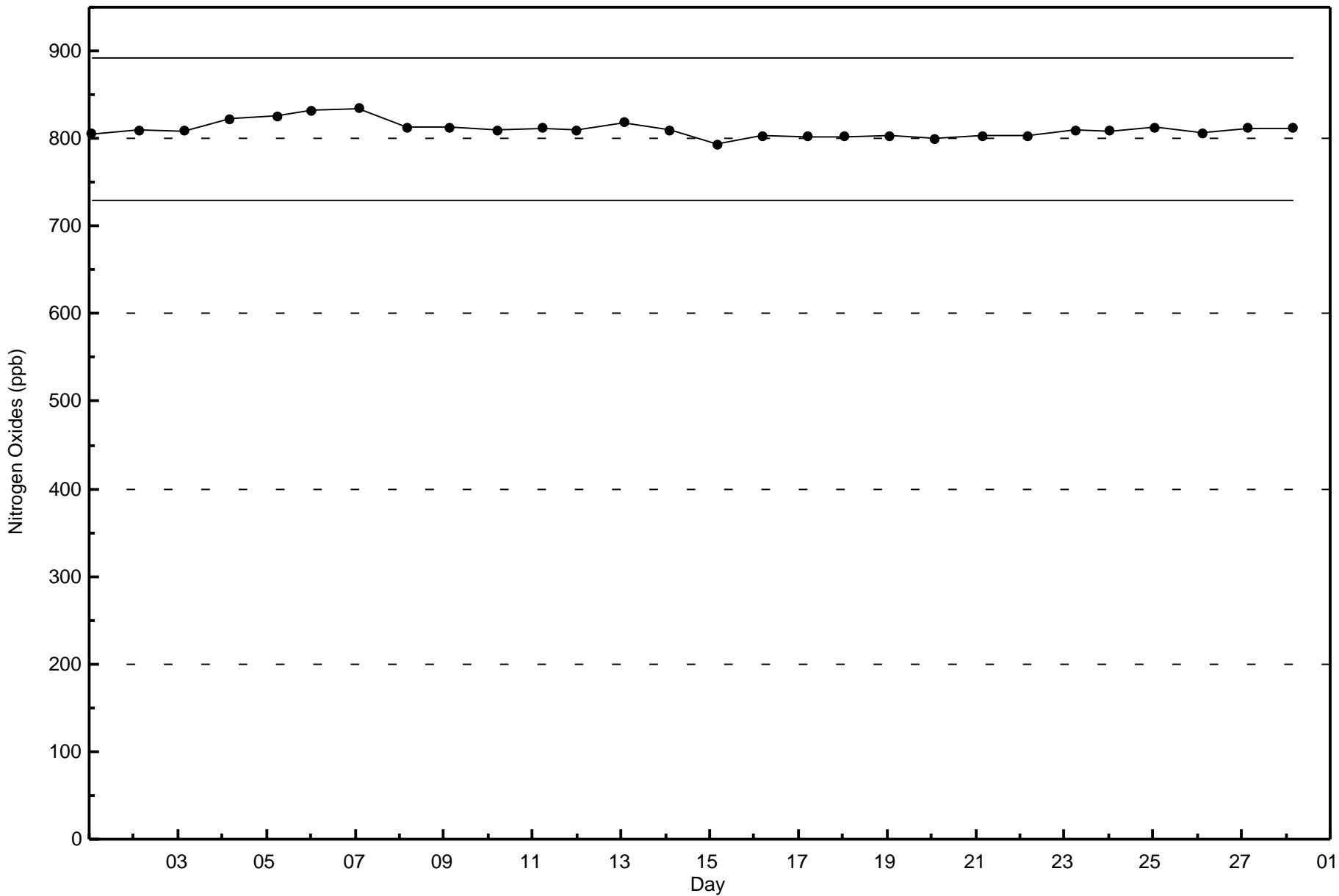


Wood Buffalo Environmental Association
Wind Rose Feb 2017

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)







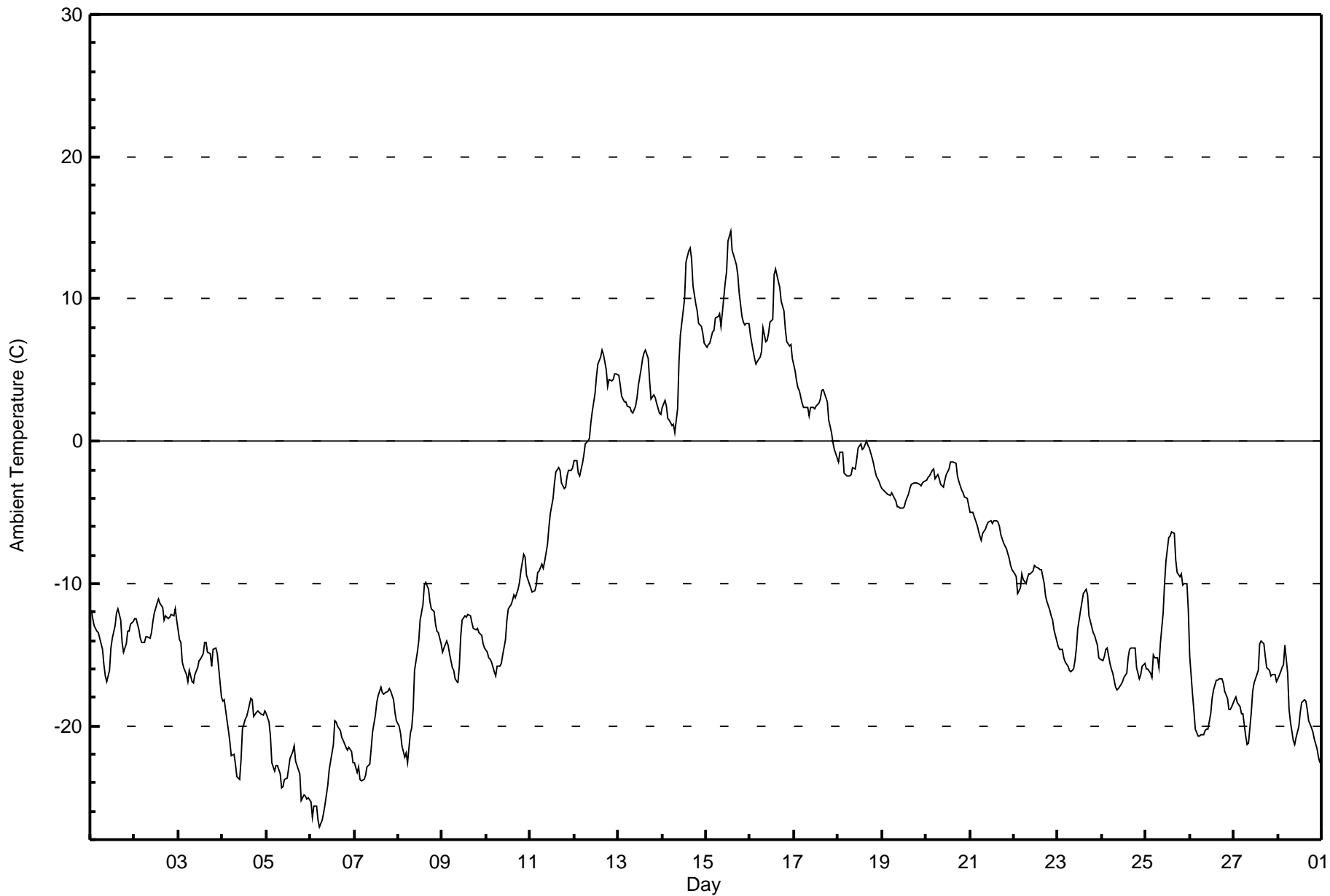


Maximum Value: 14.7 C on Feb 15 14:00 Maximum Daily Average: 9.8 C on Feb 15																						Hours in Service:	672																							
Minimum Value: -27.1 C on Feb 6 06:00 Minimum Daily Average: -23.2 C on Feb 6																						Hours of Data:	672																							
Maximum Diurnal Average: -7.0 C at hour 16 Minimum Diurnal Average: -11.3 C at hour 9																						Hours of Missing Data:	0																							
Monthly Average: -9.45 C Percentiles: P ₁ = -25.8 P ₁₀ = -21.1 Q ₁ = -16.7 Median = -12.2 Q ₃ = -2.1 P ₉₀ = 5.8 P ₉₉ = 12.7																						Hours of Calibration:	0																							
																						Percent Operational Time:	100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																						
1-Feb	-11.9	-12.5	-13.0	-13.3	-13.4	-13.8	-14.6	-15.7	-16.5	-16.9	-16.1	-14.5	-13.8	-12.9	-12.1	-11.8	-12.6	-14.2	-14.8	-14.3	-13.4	-13.3	-12.8	-12.6	-13.8	-11.8																				
2-Feb	-12.5	-12.5	-13.3	-13.9	-14.1	-14.2	-13.8	-13.7	-13.9	-13.5	-12.7	-12.1	-11.4	-11.1	-11.4	-11.7	-12.6	-12.2	-12.5	-12.4	-12.2	-12.2	-11.8	-12.5	-12.7	-11.1																				
3-Feb	-13.9	-14.2	-15.5	-15.9	-16.4	-16.8	-16.1	-16.8	-17.0	-16.4	-15.9	-15.4	-15.3	-14.9	-14.2	-14.2	-14.9	-14.9	-15.8	-14.7	-14.5	-15.0	-15.9	-18.0	-15.5	-13.9																				
4-Feb	-18.3	-18.2	-19.6	-20.3	-21.1	-22.1	-22.0	-22.7	-23.5	-23.8	-22.4	-20.3	-19.5	-19.3	-19.0	-18.1	-18.2	-19.3	-19.1	-18.9	-19.1	-19.1	-19.2	-19.0	-20.1	-18.1																				
5-Feb	-19.2	-19.7	-20.7	-22.6	-23.2	-22.8	-22.8	-23.3	-24.3	-24.3	-23.8	-23.7	-23.0	-22.3	-21.8	-21.4	-22.5	-23.1	-23.4	-25.3	-24.8	-24.9	-25.1	-25.0	-23.0	-19.2																				
6-Feb	-25.3	-26.4	-25.7	-25.6	-26.6	-27.1	-26.7	-26.1	-25.6	-24.2	-23.1	-22.5	-21.3	-19.7	-19.8	-20.0	-20.4	-20.8	-21.1	-21.5	-21.7	-21.6	-21.8	-22.6	-23.2	-19.7																				
7-Feb	-22.6	-23.2	-22.9	-23.8	-23.9	-23.8	-23.5	-22.9	-22.7	-21.6	-20.4	-19.3	-18.3	-17.9	-17.3	-17.6	-17.8	-17.7	-17.6	-17.4	-17.6	-18.2	-19.0	-19.6	-20.3	-17.3																				
8-Feb	-20.1	-20.5	-21.4	-22.2	-21.9	-22.6	-20.5	-20.1	-18.9	-16.1	-14.9	-14.1	-12.6	-11.5	-10.1	-9.9	-10.5	-11.3	-11.8	-12.0	-12.8	-13.3	-13.4	-14.3	-15.7	-9.9																				
9-Feb	-14.8	-14.5	-14.1	-14.3	-15.0	-15.9	-16.1	-16.7	-17.0	-15.8	-13.8	-12.6	-12.2	-12.3	-12.2	-12.2	-12.8	-13.2	-13.2	-13.2	-13.4	-13.7	-14.2	-14.5	-14.1	-12.2																				
10-Feb	-14.8	-15.2	-15.3	-15.5	-16.2	-16.5	-15.9	-15.8	-15.6	-15.0	-13.9	-12.5	-11.8	-11.5	-11.2	-10.7	-11.0	-10.4	-9.9	-9.1	-8.0	-8.2	-9.4	-10.0	-12.6	-8.0																				
11-Feb	-10.3	-10.6	-10.5	-10.1	-9.2	-9.1	-8.6	-8.9	-8.5	-7.3	-6.1	-5.1	-4.0	-2.9	-2.1	-1.8	-2.0	-2.9	-3.3	-3.2	-2.5	-2.1	-2.0	-1.9	-5.6	-1.8																				
12-Feb	-1.4	-1.4	-2.2	-2.5	-1.6	-1.0	-0.2	0.0	0.2	1.3	2.1	3.3	4.6	5.4	5.9	6.4	6.2	5.0	3.8	4.3	4.2	4.3	4.7	4.7	2.3	6.4																				
13-Feb	4.6	4.0	3.2	2.8	2.8	2.5	2.4	2.1	2.0	2.5	3.1	4.0	5.1	5.8	6.2	6.4	5.8	4.2	3.0	3.2	3.1	2.7	2.0	1.9	3.5	6.4																				
14-Feb	2.4	2.9	2.4	1.6	1.5	1.1	1.2	0.6	2.3	5.7	7.5	9.2	10.1	12.6	13.4	13.5	12.7	10.9	9.7	9.2	8.2	8.1	7.6	6.9	6.7	13.5																				
15-Feb	6.6	6.8	6.9	7.7	7.8	8.7	8.7	9.0	8.1	9.1	11.1	11.9	14.1	14.7	13.4	13.1	12.4	11.8	10.5	8.8	8.4	8.2	8.3	8.3	9.8	14.7																				
16-Feb	7.5	6.9	5.9	5.4	5.6	5.9	6.3	8.0	7.0	7.1	7.6	8.4	8.6	11.8	12.1	11.3	10.8	9.9	9.1	7.9	7.0	6.7	6.8	5.9	7.9	12.1																				
17-Feb	5.0	4.3	3.7	3.6	2.7	2.4	2.4	2.3	1.8	2.4	2.4	2.3	2.4	2.6	3.0	3.6	3.7	3.1	2.8	1.5	0.6	-0.1	-0.6	-1.2	2.4	5.0																				
18-Feb	-1.5	-0.7	-0.7	-2.2	-2.4	-2.5	-2.4	-2.3	-1.8	-1.9	-1.3	-0.5	-0.2	-0.6	-0.5	0.1	-0.3	-0.5	-1.1	-1.5	-2.1	-2.4	-2.9	-3.1	-1.5	0.1																				
19-Feb	-3.3	-3.5	-3.6	-3.7	-3.8	-3.6	-3.8	-4.2	-4.6	-4.7	-4.7	-4.7	-4.6	-4.2	-3.7	-3.3	-3.0	-2.9	-2.9	-3.0	-3.0	-3.1	-3.0	-2.9	-3.7	-2.9																				
20-Feb	-2.7	-2.6	-2.5	-2.1	-2.0	-2.6	-2.3	-2.7	-3.0	-3.3	-2.7	-2.4	-1.9	-1.5	-1.5	-1.5	-1.6	-2.5	-2.9	-3.4	-3.7	-3.9	-4.0	-4.6	-2.7	-1.5																				
21-Feb	-5.0	-5.0	-5.3	-5.6	-5.9	-6.7	-6.9	-6.5	-6.2	-5.8	-5.7	-5.6	-5.8	-5.6	-5.5	-5.7	-6.0	-6.5	-7.1	-7.3	-7.6	-8.2	-8.7	-9.0	-6.4	-5.0																				
22-Feb	-9.4	-9.5	-10.7	-10.3	-9.3	-9.7	-10.0	-9.6	-9.3	-9.3	-9.1	-8.7	-8.8	-8.9	-9.0	-9.0	-10.0	-10.9	-11.3	-11.9	-12.2	-12.6	-13.2	-14.1	-10.3	-8.7																				
23-Feb	-14.5	-14.6	-14.6	-15.2	-15.5	-15.8	-16.1	-16.2	-16.0	-15.4	-14.5	-13.1	-11.9	-11.3	-10.7	-10.4	-10.8	-12.2	-13.1	-13.4	-13.6	-14.4	-15.2	-15.4	-13.9	-10.4																				
24-Feb	-15.4	-15.1	-14.6	-14.5	-15.6	-16.0	-16.3	-17.3	-17.5	-17.4	-17.1	-16.9	-16.6	-16.3	-15.2	-14.6	-14.5	-14.5	-14.5	-15.9	-16.7	-16.4	-15.8	-15.6	-15.8	-14.5																				
25-Feb	-16.0	-16.1	-16.3	-16.6	-15.1	-15.2	-15.2	-15.9	-14.3	-12.1	-10.0	-8.4	-6.8	-6.7	-6.3	-6.5	-8.3	-9.2	-9.5	-9.3	-10.1	-10.0	-10.0	-11.8	-11.5	-6.3																				
26-Feb	-15.1	-17.8	-18.9	-20.2	-20.8	-20.7	-20.6	-20.6	-20.3	-20.2	-20.2	-19.1	-18.1	-17.5	-16.8	-16.8	-16.7	-16.7	-17.0	-17.6	-18.0	-18.9	-18.9	-18.6	-18.6	-15.1																				
27-Feb	-18.2	-17.9	-18.4	-18.7	-19.1	-19.1	-20.7	-21.3	-21.2	-19.1	-17.6	-17.0	-16.4	-16.1	-14.2	-14.1	-14.2	-15.1	-15.9	-16.1	-16.5	-16.4	-16.4	-16.9	-17.4	-14.1																				
28-Feb	-16.7	-16.2	-15.9	-15.7	-14.3	-16.3	-18.8	-19.8	-21.1	-21.3	-20.8	-20.0	-19.0	-18.4	-18.2	-18.2	-18.8	-19.6	-20.1	-20.4	-21.0	-21.6	-22.2	-22.6	-19.0	-14.3																				
																						-9.9	-10.1	-10.5	-10.9	-10.9	-11.2	-11.2	-11.3	-11.3	-10.6	-9.8	-8.9	-8.2	-7.5	-7.1	-7.0	-7.4	-8.1	-8.5	-8.8	-9.0	-9.3	-9.5	-9.9	Diurnal Average
																						7.5	6.9	6.9	7.7	7.8	8.7	8.7	9.0	8.1	9.1	11.1	11.9	14.1	14.7	13.4	13.5	12.7	11.8	10.5	9.2	8.4	8.2	8.3	8.3	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - February 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
ConocoPhillips - Surmont - February 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	93	13.84	13.84
-20 - 0	444	66.07	79.91
0 - 10	116	17.26	97.17
10 - 20	19	2.83	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



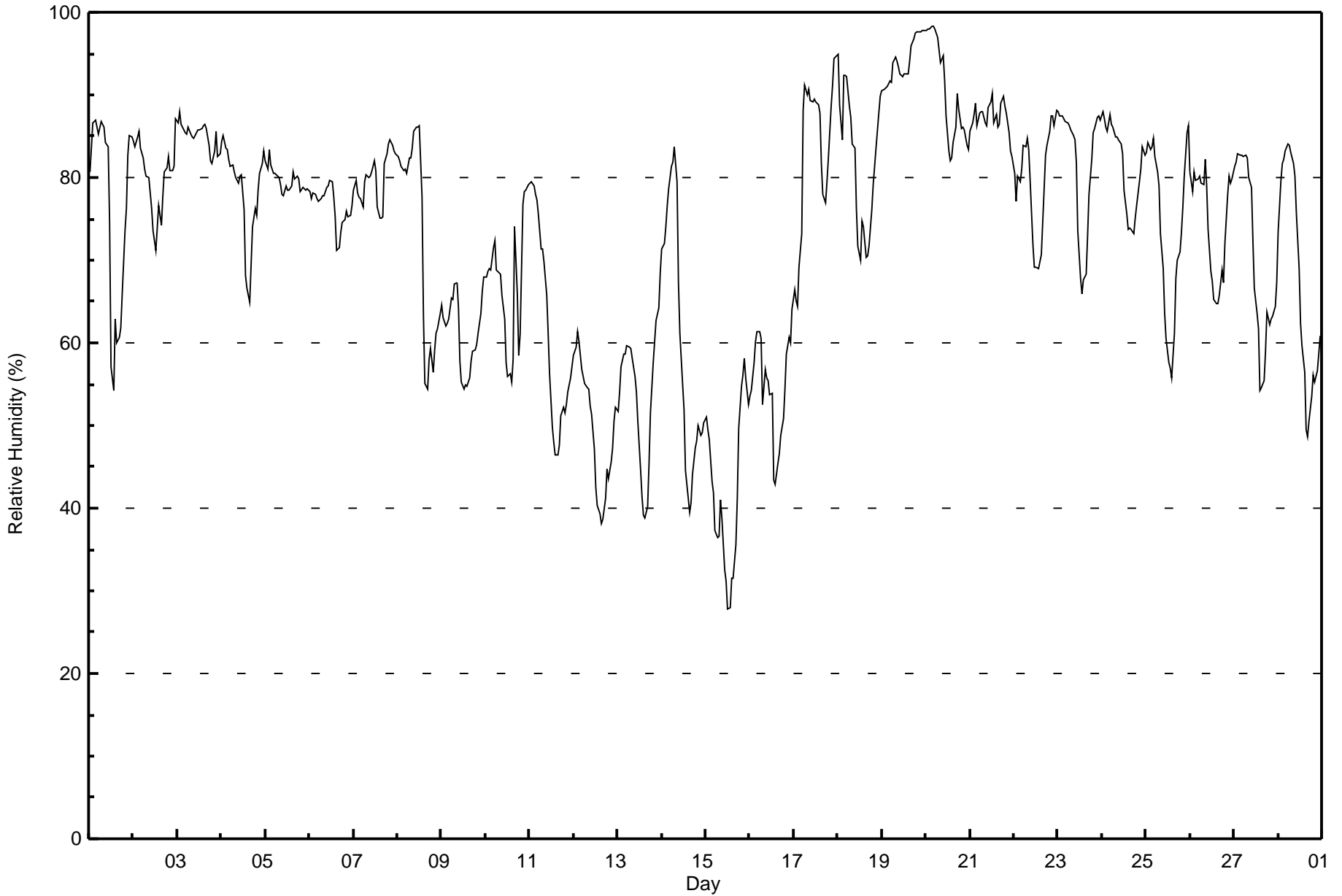
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

ConocoPhillips - Surmont - February 2017

Maximum Value: 98 % on Feb 20 05:00																			Maximum Daily Average: 94.1 % on Feb 19						Hours in Service: 672																				
Minimum Value: 28 % on Feb 15 13:00																			Minimum Daily Average: 42.1 % on Feb 15						Hours of Data: 672																				
Maximum Diurnal Average: 78.6 % at hour 6																			Minimum Diurnal Average: 63.6 % at hour 16						Hours of Missing Data: 0																				
Monthly Average: 73.0 %																			Percentiles: P ₁ = 36 P ₁₀ = 52 Q ₁ = 61 Median = 78 Q ₃ = 84 P ₉₀ = 88 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-Feb	81	83	87	87	86	85	87	86	86	84	84	75	57	54	63	60	61	62	66	74	76	83	85	85	76.5	87																			
2-Feb	84	84	85	86	84	82	81	80	80	78	76	74	71	74	77	74	78	81	81	82	81	81	81	87	80.1	87																			
3-Feb	87	88	86	86	85	85	86	85	85	85	86	86	86	86	86	86	86	84	82	82	83	86	83	83	85.1	88																			
4-Feb	84	85	84	83	82	81	81	81	80	79	80	80	76	68	67	65	69	74	76	75	78	81	82	83	78.2	85																			
5-Feb	82	81	83	82	81	81	80	80	79	78	78	79	78	78	79	81	80	80	80	78	79	79	79	79	79.7	83																			
6-Feb	78	78	78	78	77	77	77	78	78	79	79	80	80	78	75	71	71	73	75	75	76	75	75	77	76.6	80																			
7-Feb	79	80	78	78	77	77	80	80	80	80	81	82	81	76	75	75	75	82	83	84	85	84	83	83	79.9	85																			
8-Feb	82	82	81	81	81	81	82	82	84	86	86	86	86	78	63	55	54	58	59	56	59	61	62	64	72.9	86																			
9-Feb	64	63	62	62	63	65	65	67	67	64	58	55	54	55	55	56	58	59	59	60	61	64	66	68	61.3	68																			
10-Feb	68	69	69	69	71	72	69	69	68	66	63	58	56	56	55	58	74	66	58	61	77	78	79	79	67.0	79																			
11-Feb	79	80	79	78	77	76	71	71	70	66	61	56	50	48	46	46	48	51	52	51	52	54	56	57	61.5	80																			
12-Feb	59	59	61	60	57	56	55	55	54	52	51	47	43	40	39	38	39	41	45	44	46	47	50	52	49.6	61																			
13-Feb	52	54	57	59	59	60	60	59	58	56	54	51	45	41	39	39	40	45	52	58	60	63	64	69	53.8	69																			
14-Feb	71	72	74	77	79	81	82	84	79	67	61	55	52	45	41	39	41	44	47	48	50	49	49	50	59.9	84																			
15-Feb	51	50	48	43	42	37	36	37	41	39	33	31	28	28	32	32	36	41	50	55	56	58	56	53	42.1	58																			
16-Feb	54	54	58	60	61	61	61	53	57	56	55	54	54	43	43	45	47	49	51	54	59	61	60	64	54.7	64																			
17-Feb	66	65	64	69	73	88	91	90	91	89	89	89	89	89	88	82	78	77	79	82	89	91	94	95	83.3	95																			
18-Feb	95	89	84	92	92	92	89	87	84	84	76	72	70	75	74	70	70	72	76	79	81	84	88	90	81.9	95																			
19-Feb	91	91	91	91	92	91	94	95	94	93	93	92	93	92	93	94	96	97	97	98	98	98	98	98	94.1	98																			
20-Feb	98	98	98	98	98	98	97	95	94	95	92	87	83	82	82	84	86	90	88	86	86	86	84	83	90.4	98																			
21-Feb	86	87	88	89	86	88	88	88	87	86	88	89	90	87	88	86	87	89	90	89	88	85	83	83	87.2	90																			
22-Feb	81	77	80	79	81	84	84	85	83	80	72	69	69	69	70	71	79	83	84	86	88	87	86	88	79.7	88																			
23-Feb	88	87	87	87	87	87	86	86	85	85	82	74	68	66	68	68	73	78	82	85	86	87	88	87	81.5	88																			
24-Feb	88	87	86	86	88	86	86	85	85	85	84	83	78	76	74	74	73	75	77	79	81	84	83	83	81.5	88																			
25-Feb	83	84	83	84	85	83	81	79	73	69	63	60	58	57	56	61	68	70	71	73	76	80	85	86	73.7	86																			
26-Feb	81	78	81	80	80	80	79	79	82	79	74	69	67	65	65	65	66	69	67	72	78	80	79	80	74.8	82																			
27-Feb	81	82	83	83	83	83	83	82	80	79	72	67	64	62	54	55	55	59	64	62	63	63	64	67	70.4	83																			
28-Feb	73	80	82	82	83	84	84	83	82	80	76	69	62	60	56	50	49	50	54	56	55	57	59	61	67.8	84																			
																			77.4	77.3	77.8	78.1	78.2	78.6	78.4	77.9	77.4	75.6	73.1	70.3	67.4	65.3	64.4	63.6	65.6	67.8	69.4	70.8	73.0	74.3	75.1	76.2	Diurnal Average		
																			98	98	98	98	98	98	97	95	94	95	93	92	93	92	93	94	96	97	97	97	98	98	98	98	98	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - February 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	17	2.53	2.53
40 - 60	134	19.94	22.47
60 - 80	237	35.27	57.74
80 - 100	284	42.26	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 38 km/h on Feb 12 23:00	Maximum Daily Speed Average: 25.8 km/h on Feb 12	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 18 13:00	Minimum Daily Speed Average: 1.7 km/h on Feb 18	Hours of Data: 656
Maximum Diurnal Speed Average: 10.0 km/h at hour 22	Minimum Diurnal Speed Average: 6.4 km/h at hour 18	Hours of Missing Data: 16
Monthly Average Velocity: 8.8 km/h 283.4 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 13 Q ₃ = 18 P ₉₀ = 23 P ₉₉ = 33	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Feb	NNW21	NNW22	NNW19	NNW19	NNW20	NNW21	NNW23	NNW20	NNW16	N16	N13	NNW18	NNW17	NNW16	NW15	NW14	WNW12	W8	W7	WNW8	WNW17	WNW19	WNW19	WNW20	NNW15.0	NNW23		
2-Feb	WNW19	WNW17	WNW17	WNW16	WNW18	WNW17	WNW18	WNW19	WNW18	WNW18	WNW18	WNW15	WNW14	WNW15	NW14	WNW13	W12	NW12	NNW14	NW12	WNW12	W11	WNW11	N11	WNW14.6	WNW19		
3-Feb	N13	NNW12	N13	N11	N12	N12	NNW14	NNW16	NNW15	NNW14	N13	N12	N12	N9	NNW5	NNW4	WNW2	W10	W10	WNW12	WNW13	NNW13	WNW11	W9	NNW9.7	NNW16		
4-Feb	WNW8	NNW8	N12	N11	N9	NNW7	NW7	NNW6	W5	SW4	SW3	WNW16	WNW15	WNW14	W12	W9	WSW9	W7	SW3	SW6	WSW8	NW5	WNW9	WNW7.0	WNW16			
5-Feb	WNW6	NW2	N10	NNW15	NNW16	NNW14	N13	N13	N14	NNW16	N17	N13	N13	N12	N14	NW14	N11	NNW8	WNW8	W8	WNW9	W10	W11	WSW10	NNW9.7	N17		
6-Feb	WSW9	WSW11	WSW10	SW8	SW11	SW11	SW10	WSW10	WSW9	WSW3	E4	ESE3	E4	NNE7	NNE8	ENE8	ENE7	NE5	NNW5	SW4	WSW7	WSW8	WSW8	W10	WSW3.6	SW11		
7-Feb	WNW10	WNW10	W11	WSW10	W9	W16	W20	W19	W25	W27	W24	W19	W19	WNW22	W23	W24	W22	WNW19	WNW19	WNW18	NW19	NW17	WNW13	WNW11	W17.3	W27		
8-Feb	WNW10	WNW11	W11	W11	W15	W15	W19	W19	WNW19	WNW18	W22	W29	W29	W31	W31	WSW28	WSW20	SW13	SW17	WSW20	WSW22	WSW36	W34	WSW29	W20.4	WSW36		
9-Feb	WSW29	W25	W22	W17	W15	WSW15	WSW11	WSW10	WSW8	S2	SE4	ESE8	ESE8	SE8	ESE6	E7	ESE8	ESE6	E4	NE5	NE5	ENE5	NE5	ENE4	WSW3.6	WSW29		
10-Feb	ENE3	ENE4	ENE2	ESE2	SSW2	SSW5	SSW8	S7	S9	S13	SSW11	SSE9	SE6	SE12	SSE9	SE10	SE10	SE10	SE12	SSE18	SSW10	SSW13	SSW14	SW14	S7.4	SSE18		
11-Feb	WSW14	WSW18	WSW14	SW9	WSW12	W17	W24	W25	W29	W30	W27	W27	W26	W27	W28	W26	W24	W20	W23	W24	W27	W24	W28	WSW34	W22.8	WSW34		
12-Feb	WSW30	WSW23	WSW20	WSW19	WSW22	WSW24	WSW23	WSW26	WSW26	WSW24	WSW21	W27	W36	W32	W29	W29	W23	WSW16	W18	W28	W33	W36	WNW38	W31	W25.8	WNW38		
13-Feb	W33	W32	W32	W30	WNW29	WNW28	WNW30	W26	WNW24	WNW27	WNW26	WNW22	WNW19	WNW21	WNW22	W18	W14	W11	WSW13	W15	W17	WSW15	WSW8	WSW15	W21.5	W33		
14-Feb	W17	W14	W10	WSW11	WSW11	WSW13	SW11	SSW8	WSW12	W22	WSW21	WSW15	WSW22	SW11	SSW12	SW14	SSW13	SW16	WSW20	WSW29	WSW27	WSW27	WSW21	WSW17	WSW15.9	WSW29		
15-Feb	WSW17	WSW20	SW14	SW12	SW11	SW10	SW10	WSW16	WSW15	SSW11	SSW12	SW13	SSW7	SSW8	WSW18	WSW23	W26	W22	WSW21	WSW21	WSW21	W21	W14	WSW14.7	W26			
16-Feb	SW7	SW7	SW11	WSW17	WSW17	WSW13	SW10	S10	SSE15	SSE16	SE16	SSE8	SSE8	SW7	SSW4	SSE3	S5	SW7	W4	WSW13	WSW14	W15	WNW18	WNW12	SW7.3	WNW18		
17-Feb	WNW16	NW17	NW17	NW17	WNW21	WNW23	WNW14	WNW11	WNW13	WNW17	WNW19	WNW18	WNW18	WNW17	WNW18	WNW16	WNW17	WNW14	WNW9	N10	N10	N8	N9	N11	NW13.9	WNW23		
18-Feb	N11	NW11	NNW8	NNE8	NNE5	N3	NNE4	N7	WNW14	NW15	WNW7	NW5	NNW0	ENE8	ENE7	WSW3	WSW7	SE5	ESE8	ESE9	ESE11	ESE11	ESE11	ESE11	NNE1.7	NW15		
19-Feb	ESE12	ESE14	ESE14	ESE14	E14	ESE15	ESE15	E15	E17	E18	E18	E14	E13	ESE12	ESE10	ESE10	ESE11	ESE10	ESE10	ESE9	ESE9	ESE8	ESE7	AF	ESE12.4	E18		
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WNW19	W17	W14	WNW11	NW15	WNW12	W11	W13	W11	W15	W13	----	WNW19
21-Feb	W17	W15	W17	WNW16	WNW22	WNW22	WNW19	WNW19	WNW17	WNW17	WNW17	WNW13	WNW15	WNW16	WNW15	WNW15	WNW14	WNW17	WNW15	WNW14	NW12	NW16	NW19	NW17	WNW16.3	WNW22		
22-Feb	NW15	WNW14	W11	W9	WNW12	WNW10	W8	WNW8	WNW10	WNW14	WNW19	WNW19	WNW18	WNW17	WNW16	NW16	NNW12	NNE8	NNE6	N6	N9	N12	N14	N9	NW10.4	WNW19		
23-Feb	N8	NNE6	N1	ENE3	E1	AF	ESE2	SE4	SSE5	SSE4	ESE3	NE2	WNW4	W9	W10	WNW9	NW7	NNE7	NNE5	N7	N5	ENE4	SW3	NW1	NNW1.7	W10		
24-Feb	NNW3	W6	NW6	NNW8	NNW14	NNW16	NNW18	NNW16	NNW13	NNW12	N12	N15	NNW15	N13	NW14	WNW17	WNW16	WNW14	WNW12	W8	W10	W10	W11	W11	NW10.5	NNW18		
25-Feb	W12	W9	W8	WSW5	WNW8	WNW5	WSW8	SW11	WSW20	WSW19	WSW20	WSW19	W19	W15	W15	NW20	NNW21	NNW19	NNW17	NW12	W9	W16	NW12	N19	WNW11.1	NNW21		
26-Feb	N25	NNW23	NNW23	NNW24	NNW20	NNW21	NNW20	NW18	NNW21	NNW17	NNW16	NW16	NW16	WNW16	WNW12	NW5	WNW6	W9	SW6	SW7	SW8	SW8	SW7	NW12.8	N25			
27-Feb	SSW5	SSE3	AF	E3	E2	NNE6	NNE9	NNW9	N7	NE3	ENE5	ENE8	NE7	NNE7	NE5	ENE7	ESE8	SE8	SE11	SE14	SSE12	SSW13	SSW13	SSW11	ESE2.8	SSE14		
28-Feb	SW12	SW13	WSW18	WSW17	WNW15	NW14	NNW22	NNW21	NNW20	N15	N15	N14	N13	N14	N13	NNE12	NNE13	NNE10	N8	N9	N7	NE6	ESE8	ESE9	NNW8.4	NNW22		

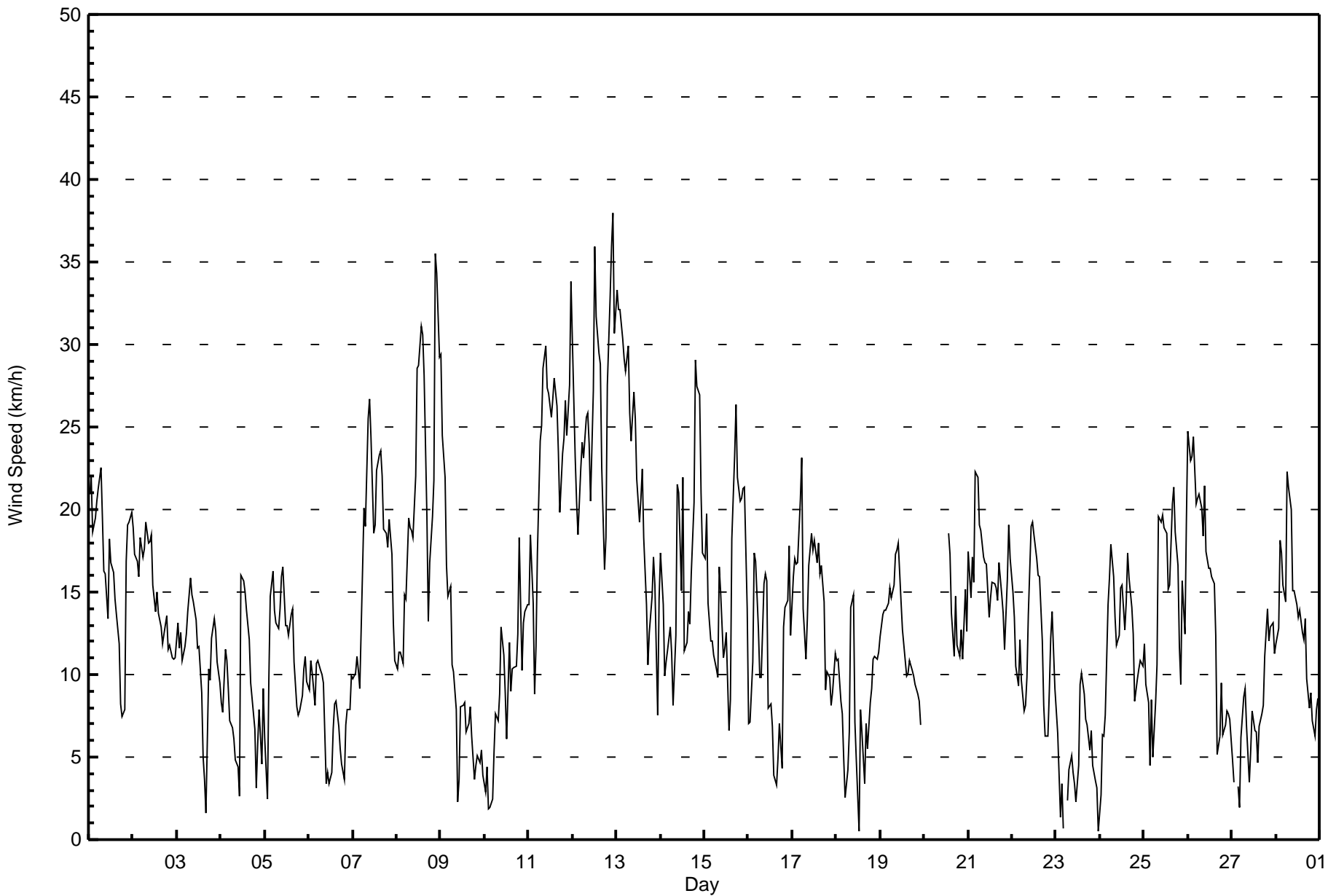
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W33	W32	W32	W30	WNW29	WNW28	WNW30	W26	W29	W30	W27	W29	W36	W32	W31	W29	W24	W26	W23	WSW29	W33	W36	WNW38	WSW34	Diurnal Maximum

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
ConocoPhillips - Surmont - February 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - February 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	67	10.21	10.21
6 - 11	200	30.49	40.70
12 - 19	270	41.16	81.86
20 - 28	92	14.02	95.88
29 - 38	27	4.12	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 672



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
ConocoPhillips - Surmont - February 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	7	8	6	4	3	4	2	4	5	3	2	3	5	5	67
6 - 11	23	11	2	6	1	23	7	4	3	8	23	22	33	23	4	7	200
12 - 19	28	2	0	0	7	7	2	6	1	7	11	27	35	81	25	31	270
20 - 28	1	0	0	0	0	0	0	0	0	0	0	26	33	13	1	18	92
29 - 38	0	0	0	0	0	0	0	0	0	0	0	6	18	3	0	0	27
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	16	9	14	14	34	12	14	6	19	39	84	121	123	35	61	656

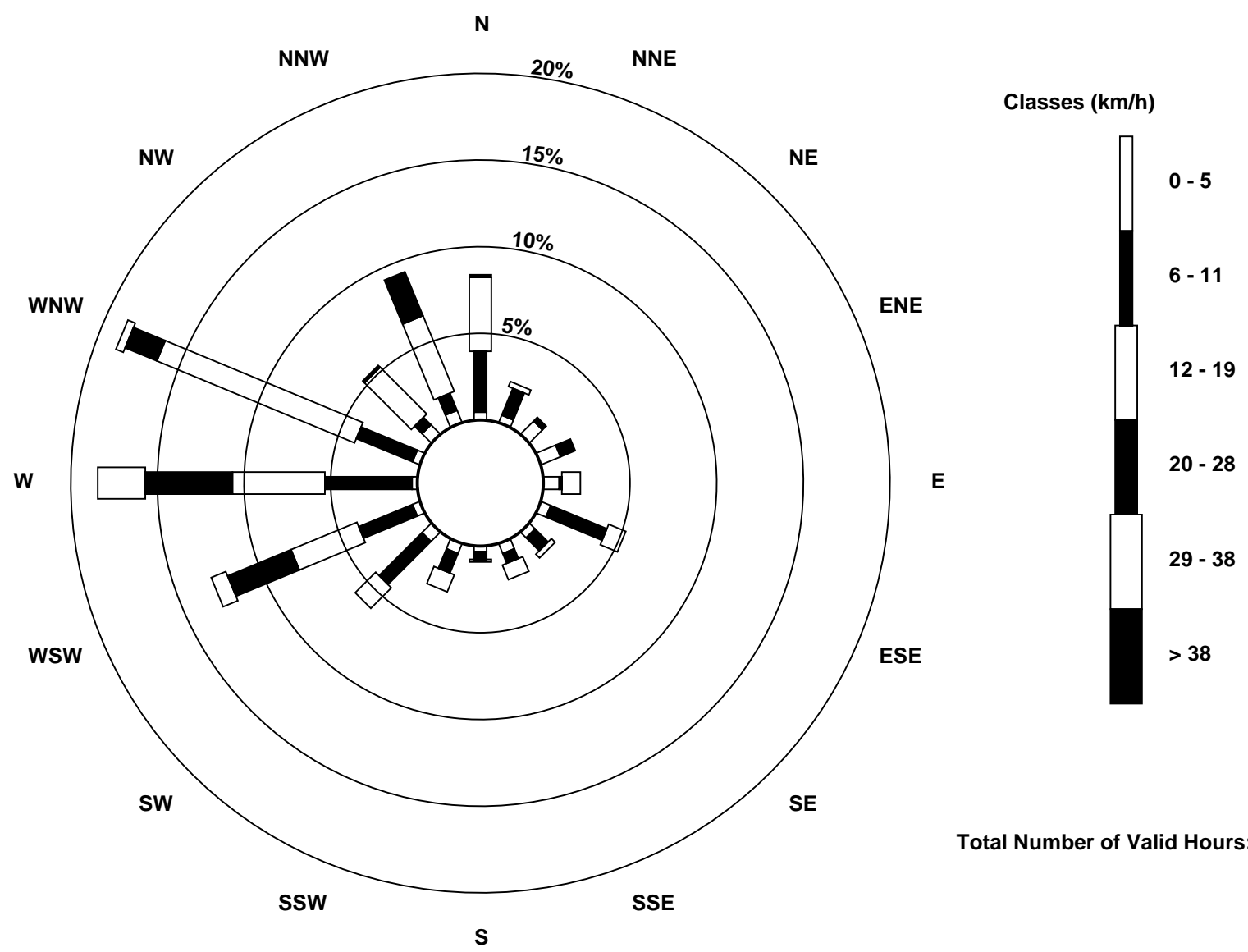
Total Number of Valid Hours: 656

Total Number of Hours: 672



Wood Buffalo Environmental Association
Wind Rose Feb 2017

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 656



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 14 09:00														Hours in Service: 672 Hours of Data: 656 Hours of Missing Data: 16 Hours of Calibration: 0 Percent Operational Time: 97.6																											
Minimum Value: 1 km/h on Feb 10 02:00																																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P 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-Feb	4	4	4	3	4	4	5	4	3	2	3	4	4	4	3	3	2	1	2	2	5	3	4	3	5																
2-Feb	3	3	3	3	3	2	3	3	3	3	3	2	2	3	2	2	3	3	3	3	2	2	2	3	3																
3-Feb	3	3	3	2	2	2	2	3	3	2	3	2	3	2	2	2	2	2	1	2	2	3	3	2	3																
4-Feb	2	3	3	2	2	2	2	2	1	2	2	3	3	3	4	2	2	2	2	1	2	3	3	1	4																
5-Feb	2	2	2	4	2	2	2	2	2	3	3	4	3	2	2	3	2	2	2	2	1	1	1	2	4																
6-Feb	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2																
7-Feb	2	1	1	2	3	2	3	3	4	4	4	5	6	5	4	5	4	3	3	3	3	3	2	2	6																
8-Feb	1	2	2	2	3	2	4	3	3	3	5	6	6	6	6	6	5	4	5	5	7	6	5	4	7																
9-Feb	4	3	4	3	3	4	2	1	1	2	1	2	2	2	1	1	1	2	1	1	1	1	1	1	4																
10-Feb	1	1	1	1	2	2	2	1	2	3	3	3	2	3	3	2	2	2	2	4	3	4	3	4	4																
11-Feb	4	4	5	2	5	4	5	5	5	5	6	6	6	6	6	5	5	3	3	4	5	5	5	5	6																
12-Feb	5	4	4	4	5	4	4	4	5	4	4	6	7	7	6	6	6	4	5	6	6	6	8	6	8																
13-Feb	6	5	5	5	5	5	5	5	4	5	5	4	4	4	5	4	4	1	2	2	2	2	2	5	6																
14-Feb	4	3	2	2	2	2	2	3	9	5	5	6	5	4	4	4	4	4	5	4	4	4	3	2	9																
15-Feb	2	4	3	2	2	1	1	2	4	3	3	2	3	3	4	4	4	4	5	6	3	3	3	4	6	6															
16-Feb	2	2	3	2	2	3	2	2	4	4	3	3	2	2	2	1	2	2	1	4	3	4	4	2	4	4															
17-Feb	2	3	3	3	3	4	3	2	2	3	3	3	3	3	4	3	3	4	2	2	2	2	2	3	4																
18-Feb	2	3	2	1	1	2	3	2	7	4	5	3	3	2	2	2	2	2	2	2	2	2	2	2	7																
19-Feb	2	3	3	3	3	3	3	3	4	4	4	3	3	2	2	2	2	2	2	2	2	1	2	AF	4																
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	3	3	3	3	2	2	2	3	4	3	4																
21-Feb	5	3	4	3	5	6	5	4	4	5	3	3	2	3	3	3	3	3	4	4	2	4	4	4	6																
22-Feb	3	2	2	2	3	2	2	2	2	4	3	3	3	4	3	3	4	3	2	2	2	2	2	3	4																
23-Feb	1	2	2	2	1	AF	2	2	2	2	2	4	3	3	2	2	1	1	1	1	1	2	2	1	4																
24-Feb	2	1	2	3	5	3	3	4	3	2	3	3	3	3	4	3	4	4	3	1	1	1	1	3	5																
25-Feb	6	2	3	2	3	3	3	4	4	5	4	4	4	3	3	4	4	4	4	2	2	4	4	5	6																
26-Feb	5	5	5	5	4	4	5	5	4	5	4	3	4	4	3	3	4	4	2	1	1	1	1	1	5																
27-Feb	2	2	AF	1	2	4	2	2	2	2	1	2	2	2	1	2	2	2	2	3	3	3	2	2	4																
28-Feb	2	2	3	2	3	3	4	3	4	3	3	3	3	3	3	2	2	2	1	2	1	1	2	2	4																
														Diurnal Maximum				6	5	5	5	5	6	5	5	9	5	6	6	7	7	6	6	6	5	6	6	7	6	8	6
AF - Analyzer Failure																																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - February 2017

Direction of Maximum Speed: 284 deg on Feb 12 23:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 260.6 deg on Feb 12	Hours of Data: 656
Direction of Minimum Speed: 328 deg on Feb 18 13:00	Hours of Missing Data: 16
Direction of Minimum Daily Speed Average: 1.7 deg on Feb 18	Percent Operational Time: 97.6
Monthly Average Direction: 288.0 deg	

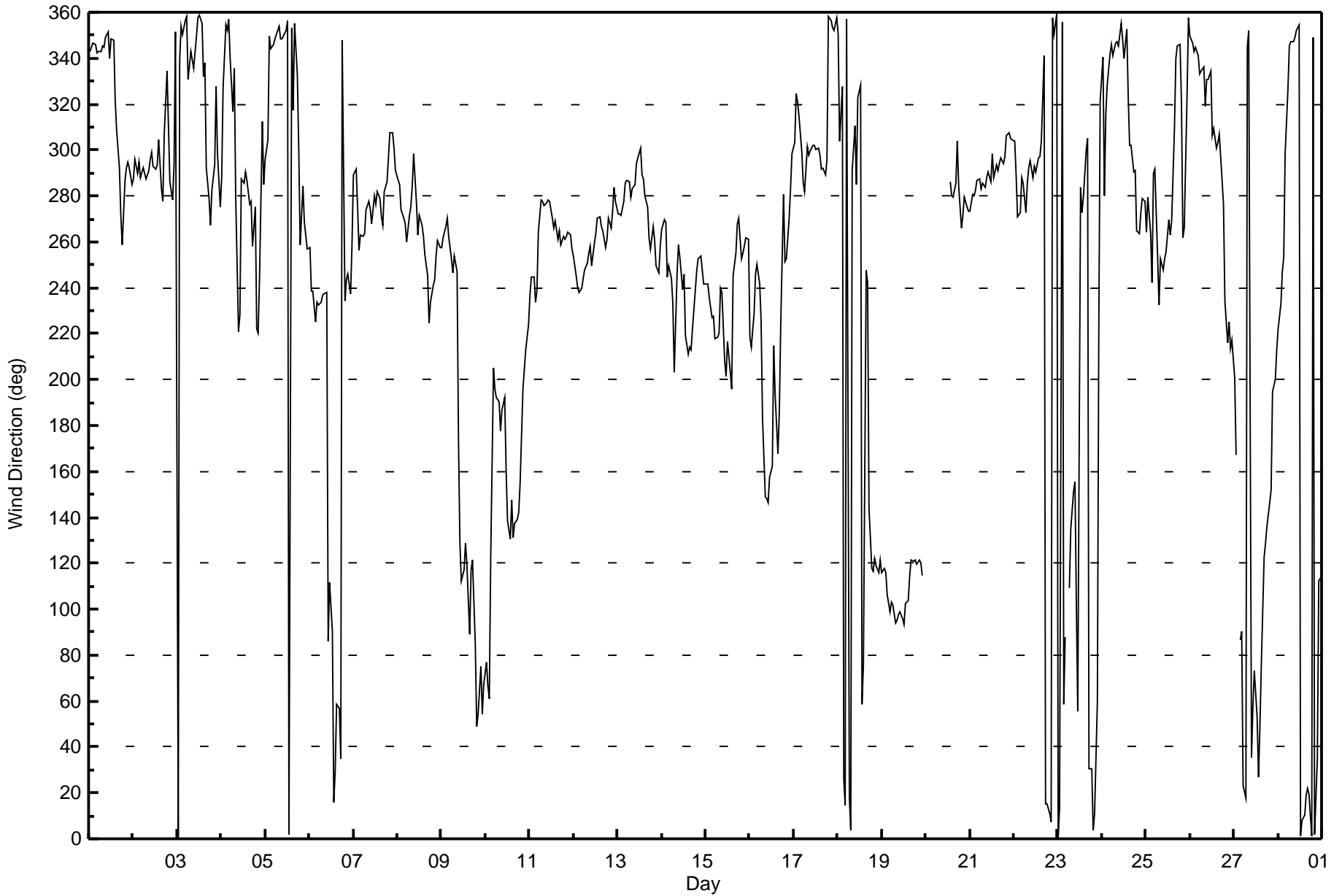
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	343	345	347	346	342	343	343	345	345	349	351	340	348	348	321	309	292	272	259	287	292	295	293	285	327.9
2-Feb	288	296	290	295	288	293	290	287	291	296	299	293	292	294	304	283	278	307	334	311	286	278	293	352	295.3
3-Feb	0	339	354	350	356	358	331	343	339	336	350	358	359	355	332	338	292	279	268	282	294	328	298	275	331.8
4-Feb	288	327	354	352	357	341	317	335	280	221	228	287	286	290	287	277	278	258	275	222	220	244	312	285	294.0
5-Feb	296	305	350	344	346	348	350	354	349	348	350	352	357	2	354	317	355	333	300	259	284	269	263	257	333.6
6-Feb	258	239	239	225	234	232	234	237	237	238	86	112	90	16	29	58	57	35	348	234	243	246	237	259	245.9
7-Feb	289	291	275	256	263	262	263	274	278	275	268	280	277	282	279	271	268	282	286	297	308	308	301	291	279.5
8-Feb	287	285	274	270	268	260	272	275	284	299	277	263	272	267	263	254	245	224	234	241	243	254	260	258	262.7
9-Feb	258	262	267	270	262	252	246	254	247	175	129	112	117	129	119	89	117	122	85	49	54	75	54	67	240.3
10-Feb	77	66	61	122	205	196	192	190	177	187	192	161	138	131	148	131	137	139	142	155	196	204	213	224	169.0
11-Feb	237	244	244	234	239	264	278	277	276	277	278	277	270	266	269	261	265	259	263	261	262	264	263	257	264.7
12-Feb	254	245	240	238	240	244	248	251	255	258	250	260	264	270	271	267	265	258	261	270	266	273	284	277	260.6
13-Feb	272	272	272	278	286	287	286	280	283	285	294	296	301	289	287	280	275	261	257	267	260	249	247	258	278.6
14-Feb	265	270	268	244	250	244	233	203	246	259	253	239	246	219	211	214	213	222	239	247	253	254	248	242	243.6
15-Feb	241	242	235	227	227	218	218	220	240	238	208	201	217	203	196	245	255	268	270	253	255	258	262	261	242.5
16-Feb	219	214	229	246	250	242	225	183	149	148	146	157	163	215	194	168	186	224	281	251	253	270	283	298	222.5
17-Feb	303	325	321	315	300	286	282	301	298	299	302	302	300	301	298	292	292	289	296	358	356	353	352	357	307.0
18-Feb	350	304	328	26	15	357	18	3	291	311	285	323	328	59	76	247	242	144	118	117	122	119	116	122	25.4
19-Feb	116	118	116	106	99	103	102	94	95	97	99	96	94	102	103	114	121	121	121	120	121	120	115	AF	106.6
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	286	280	280	286	304	284	266	271	280	275	273	--
21-Feb	273	281	280	283	287	287	283	286	284	288	291	286	298	288	294	291	294	296	294	297	307	308	305	304	290.6
22-Feb	304	289	271	273	288	286	273	285	292	295	288	293	290	296	297	304	341	15	15	11	8	358	350	360	307.0
23-Feb	0	14	356	59	88	AF	109	135	152	155	102	56	284	273	279	300	305	31	30	4	11	60	221	322	346.3
24-Feb	341	280	316	328	342	346	341	346	347	345	355	349	340	353	323	302	302	291	291	265	263	273	279	277	320.4
25-Feb	264	279	264	242	290	291	253	232	252	248	252	255	270	263	269	309	340	345	346	321	262	266	324	358	285.2
26-Feb	350	347	343	344	341	333	335	336	319	331	331	335	306	310	301	303	307	287	276	235	216	225	214	217	322.6
27-Feb	201	167	AF	87	90	23	18	345	352	35	58	73	53	27	49	75	122	129	136	146	152	195	200	213	116.7
28-Feb	222	233	247	253	299	326	345	347	347	349	352	354	1	8	11	19	22	20	1	349	2	35	112	113	342.6
	282.0	282.6	284.3	287.9	290.6	288.9	290.6	293.0	286.8	289.0	289.5	292.4	290.6	292.5	288.0	282.1	280.9	279.2	277.0	266.3	266.9	269.2	273.5	274.5	
	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
ConocoPhillips - Surmont - February 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
ConocoPhillips - Surmont - February 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Feb 24 00:00 Minimum Value: 6 deg on Feb 5 23:00 Percentiles: P ₁ = 7 P ₁₀ = 9 Q ₁ = 11 Median = 13 Q ₃ = 18 P ₉₀ = 29 P ₉₉ = 76																	Hours in Service: 672 Hours of Data: 656 Hours of Missing Data: 16 Hours of Calibration: 0 Percent Operational Time: 97.6									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	13	12	12	12	12	12	12	11	11	10	14	15	13	15	20	21	12	9	15	19	13	10	11	9	21	
2-Feb	10	10	9	10	9	10	10	9	11	11	11	11	13	10	14	10	10	21	21	19	10	11	12	25	25	
3-Feb	16	21	14	15	14	15	14	11	15	13	15	16	16	18	45	47	88	11	7	10	12	23	17	13	88	
4-Feb	14	31	13	12	15	38	30	29	25	22	76	11	16	14	16	13	12	14	18	54	23	14	63	11	76	
5-Feb	23	85	20	15	9	12	14	15	13	11	11	14	15	15	13	22	19	31	19	20	10	7	6	18	85	
6-Feb	15	13	7	17	9	9	8	8	7	62	33	21	29	16	14	18	18	20	47	37	12	13	9	14	62	
7-Feb	9	8	10	12	16	8	8	9	9	9	10	17	14	12	11	10	9	10	11	11	11	10	11	10	17	
8-Feb	9	9	9	8	9	8	9	9	12	12	14	11	12	11	10	10	13	16	16	15	14	10	8	8	16	
9-Feb	8	8	9	10	9	10	10	11	11	58	27	12	14	16	24	13	17	26	27	17	9	25	12	20	58	
10-Feb	29	21	66	53	34	25	16	18	14	15	18	25	24	12	20	16	10	11	11	21	20	18	16	18	66	
11-Feb	14	11	12	16	17	12	11	11	9	10	11	11	11	11	11	10	11	9	8	8	9	10	10	8	17	
12-Feb	9	10	12	12	12	9	10	9	9	10	11	11	11	11	12	11	11	13	12	10	9	10	11	11	13	
13-Feb	10	9	9	9	10	10	9	10	9	10	12	11	14	14	11	13	9	8	9	9	7	10	16	11	16	
14-Feb	11	13	16	10	13	8	14	24	41	10	10	34	12	22	19	17	15	16	13	8	7	7	7	8	41	
15-Feb	8	9	12	10	12	9	10	13	12	14	15	15	17	49	46	10	8	11	15	8	7	9	10	24	49	
16-Feb	26	16	17	8	7	14	9	33	22	13	11	23	24	35	65	42	29	32	25	8	9	12	11	13	65	
17-Feb	13	13	12	12	9	10	18	12	9	10	10	11	11	11	11	11	11	11	21	16	16	15	16	16	21	
18-Feb	16	20	39	13	35	70	16	33	18	18	56	54	87	20	21	81	21	48	14	12	11	11	11	11	87	
19-Feb	12	12	11	14	12	12	12	12	11	11	13	12	12	12	12	12	11	12	12	10	11	12	12	AF	14	
20-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	12	11	12	13	14	12	13	11	12	13	11	14
21-Feb	13	12	11	11	12	14	13	13	13	12	13	13	11	15	12	12	12	11	11	12	17	14	11	12	17	
22-Feb	17	14	8	9	12	14	12	16	12	12	14	14	18	17	18	17	31	31	13	36	15	15	12	17	36	
23-Feb	12	23	55	27	33	AF	30	22	21	22	30	71	87	21	21	32	42	13	17	12	22	55	49	93	93	
24-Feb	44	15	28	31	20	12	13	13	15	25	20	14	23	16	27	12	15	11	12	8	7	7	9	14	44	
25-Feb	22	14	21	37	32	71	32	21	9	12	12	14	15	14	15	19	14	12	16	24	16	11	49	18	71	
26-Feb	16	13	13	14	13	14	15	15	15	16	20	21	20	27	20	22	55	67	10	16	10	8	9	9	67	
27-Feb	28	52	AF	21	30	43	13	11	14	31	23	19	20	25	28	26	14	12	10	9	16	17	13	11	52	
28-Feb	9	12	9	9	20	25	10	12	13	13	14	16	15	18	19	16	10	15	13	11	13	34	11	12	34	
																	44 85 66 53 35 71 32 33 41 62 76 71 87 49 65 81 88 67 47 54 23 55 63 93									
Diurnal Maximum																										
AF - Analyzer Failure																										



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 24, 2017	Last Calibration	January 17, 2017
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	14:46
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	1501	1460
Calculated slope	0.997075	0.999937	Chamber temp	50.0	50.0
Calculated intercept	1.713046	1.753568	Pressure	20.6	21.5
Analyzer Background	26.8	26.8	Flow	0.501	0.529
Analyzer Coefficient	1.037	1.037	Intensity	37	36

Analyzer make API T100 Analyzer serial # 598

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.8	----
as found span	5000	83.2	803.7	802.8	1.001
calibrator zero	5000	0.0	0.0	-0.8	----
high point	5000	83.2	803.7	802.8	1.001
second point	5000	41.6	401.9	398.7	1.008
third point	5000	20.8	200.9	198.9	1.010
as left zero	5000	0.0	0.0	-0.8	----
as left span	5000	83.2	803.7	802.8	1.001
Average Correction Factor					1.006

Corrected As found 803.6 Previous response 804.4 % change 0.1%

Notes:

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

Calibration Performed By: Aswin Sasi Kumar



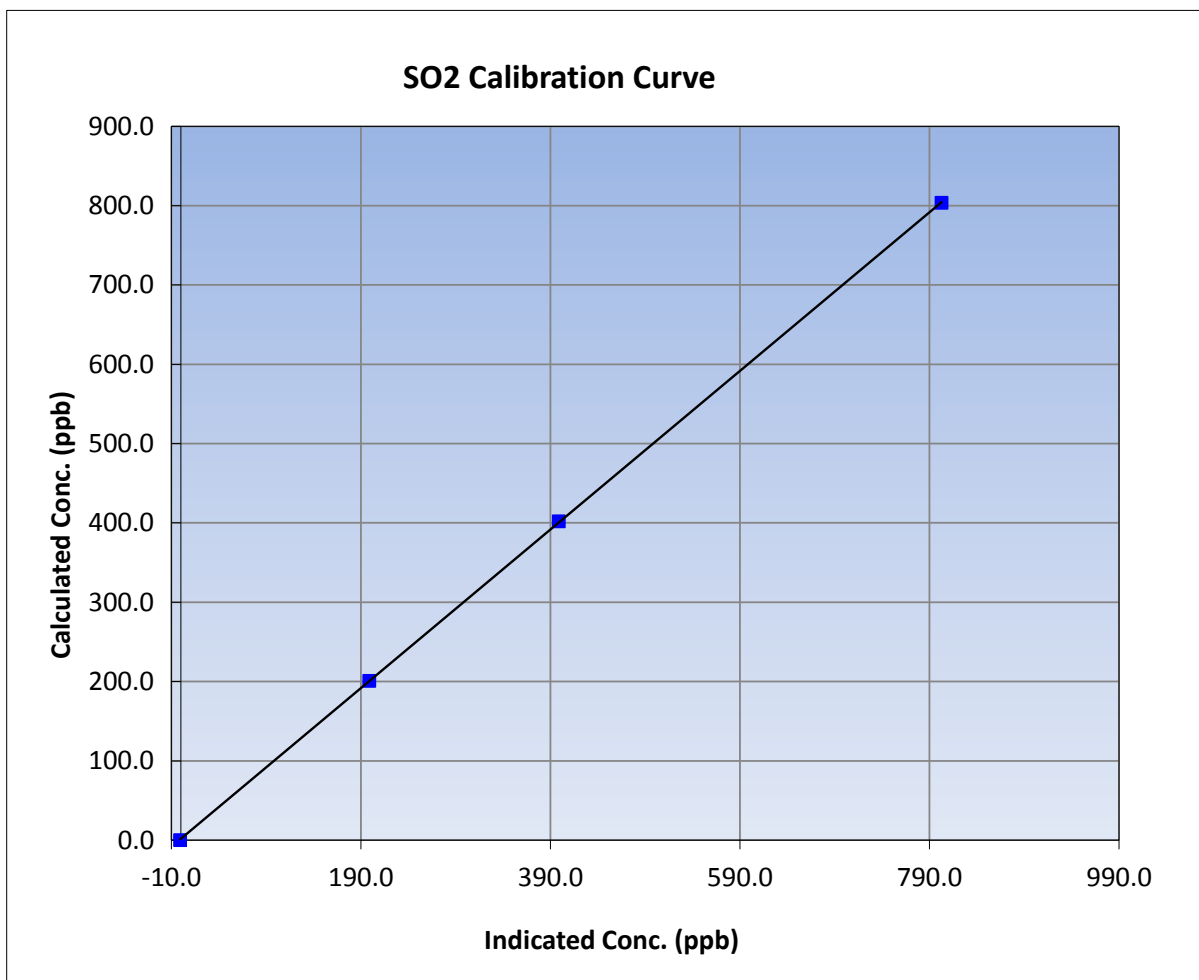
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 24, 2017	Previous Calibration	January 17, 2017
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:05	End Time (MST)	14:46
Analyzer make	API T100	Analyzer serial #	598

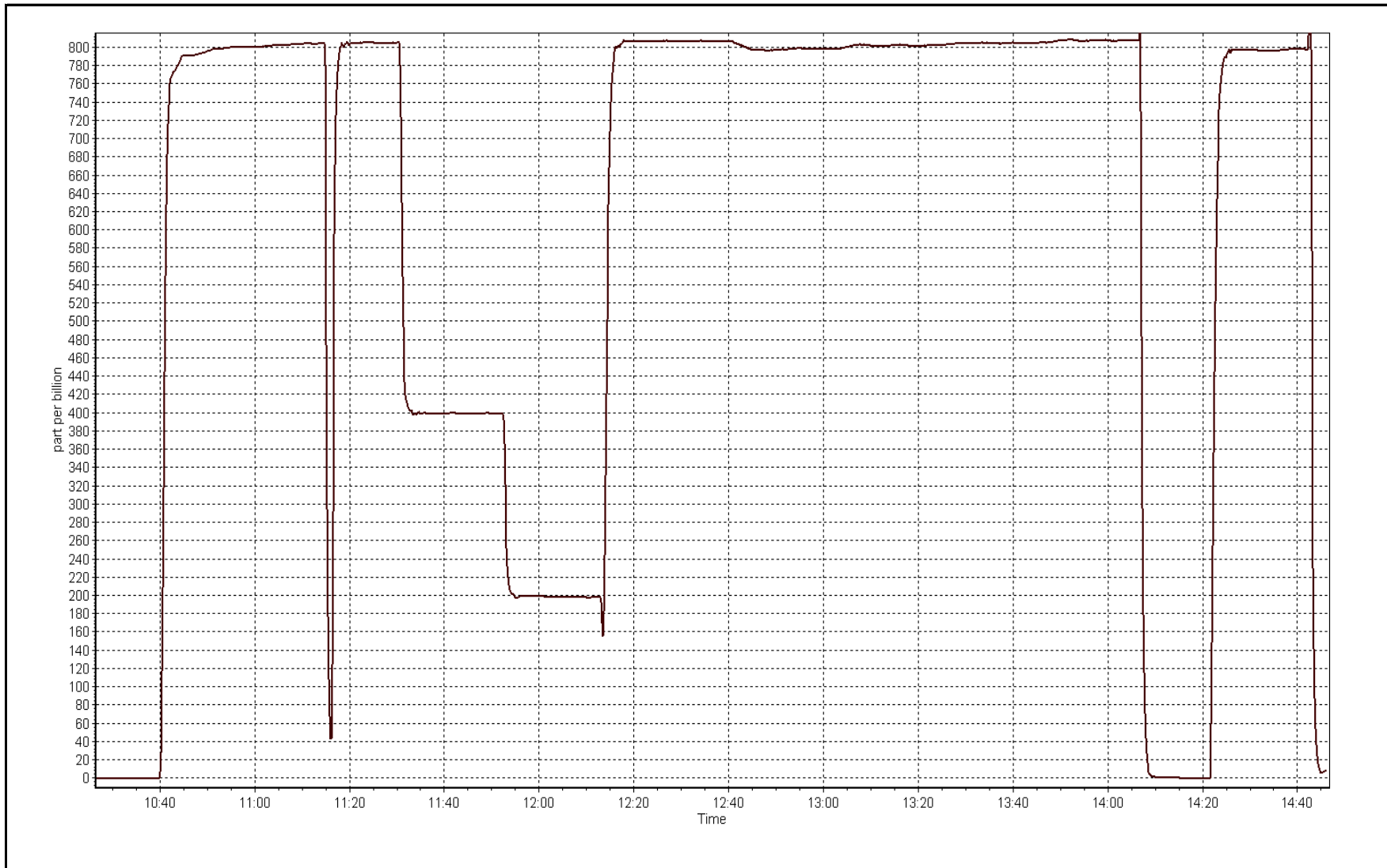
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	----	Correlation Coefficient	0.999990
803.7	802.8	1.0011		
401.9	398.7	1.0079	Slope	0.999937
200.9	198.9	1.0103		
			Intercept	1.753568



SO2 Calibration Plot

Date: February 24, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 23, 2017	Last Calibration	January 9, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	11:54	End Time (MST)	15:20
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	2305	2273
Calculated slope	1.001662	1.007086	Chamber temp	50.0	50.0
Calculated intercept	0.183592	0.234751	Pressure	23.1	23.4
Analyzer Background	21.1	21.2	Flow (SLPM)	0.592	0.612
Analyzer Coefficient	0.982	0.982	Intensity	51	50
			Converter temp.	316	317

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	79.4	1.009
SO2 scrubber check	5000	20.7	200.0	3.3	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	38.5	80.1	79.4	1.009
second point	5000	19.3	40.1	39.5	1.016
third point	5000	12.0	25.0	24.4	1.024
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	38.5	80.1	79.3	1.010
Average Correction Factor					1.016

Corrected As found	79.4	Previous response	79.8	% change	0.4%
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Notes:

Sample inlet filter replaced and performed SO2 scrubber after as founds. No Adjustments made.

Calibration Performed By: Aswin Sasi Kumar



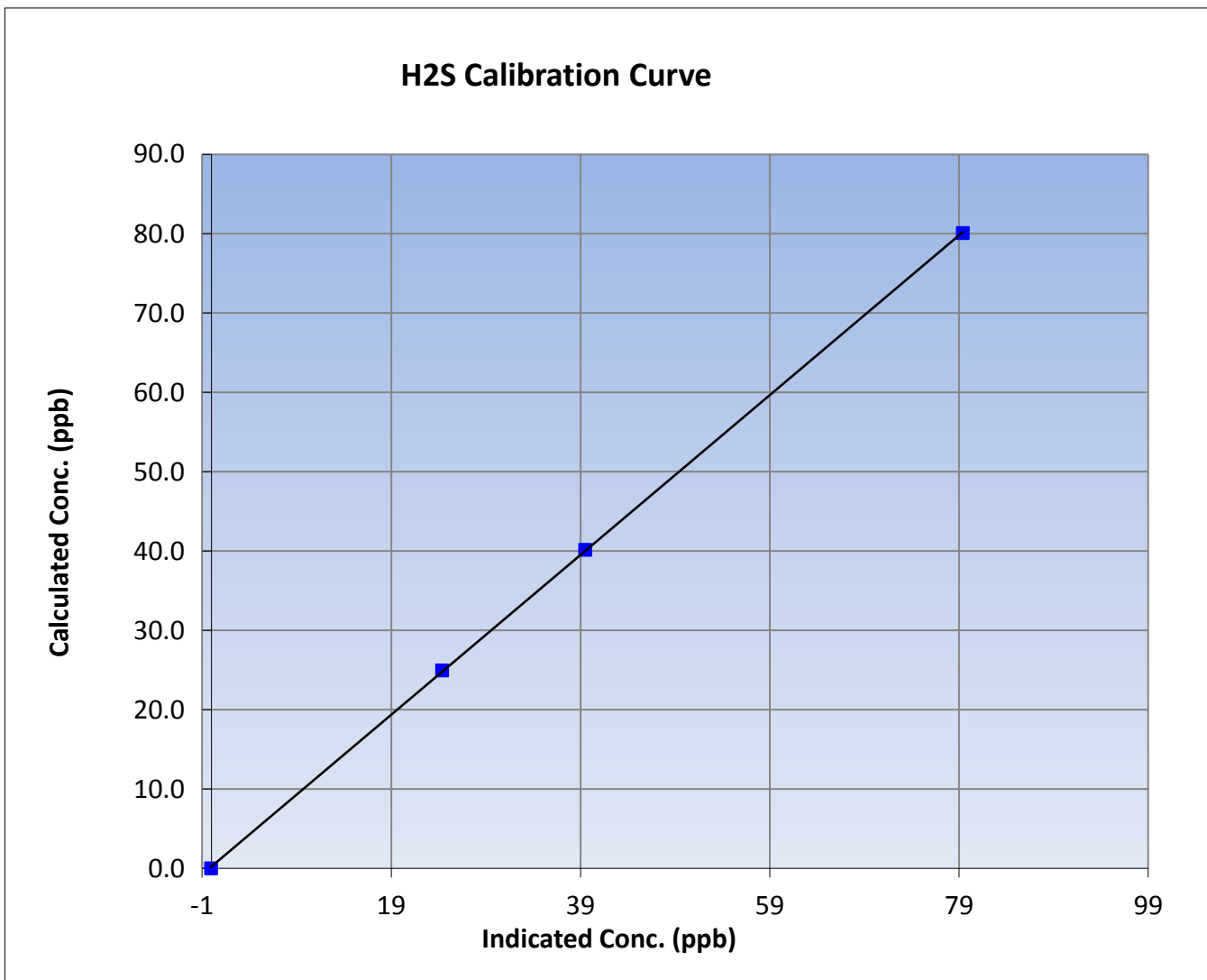
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 23, 2017	Previous Calibration	January 9, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	11:54	End Time (MST)	15:20
Analyzer make	API T101	Analyzer serial #	197

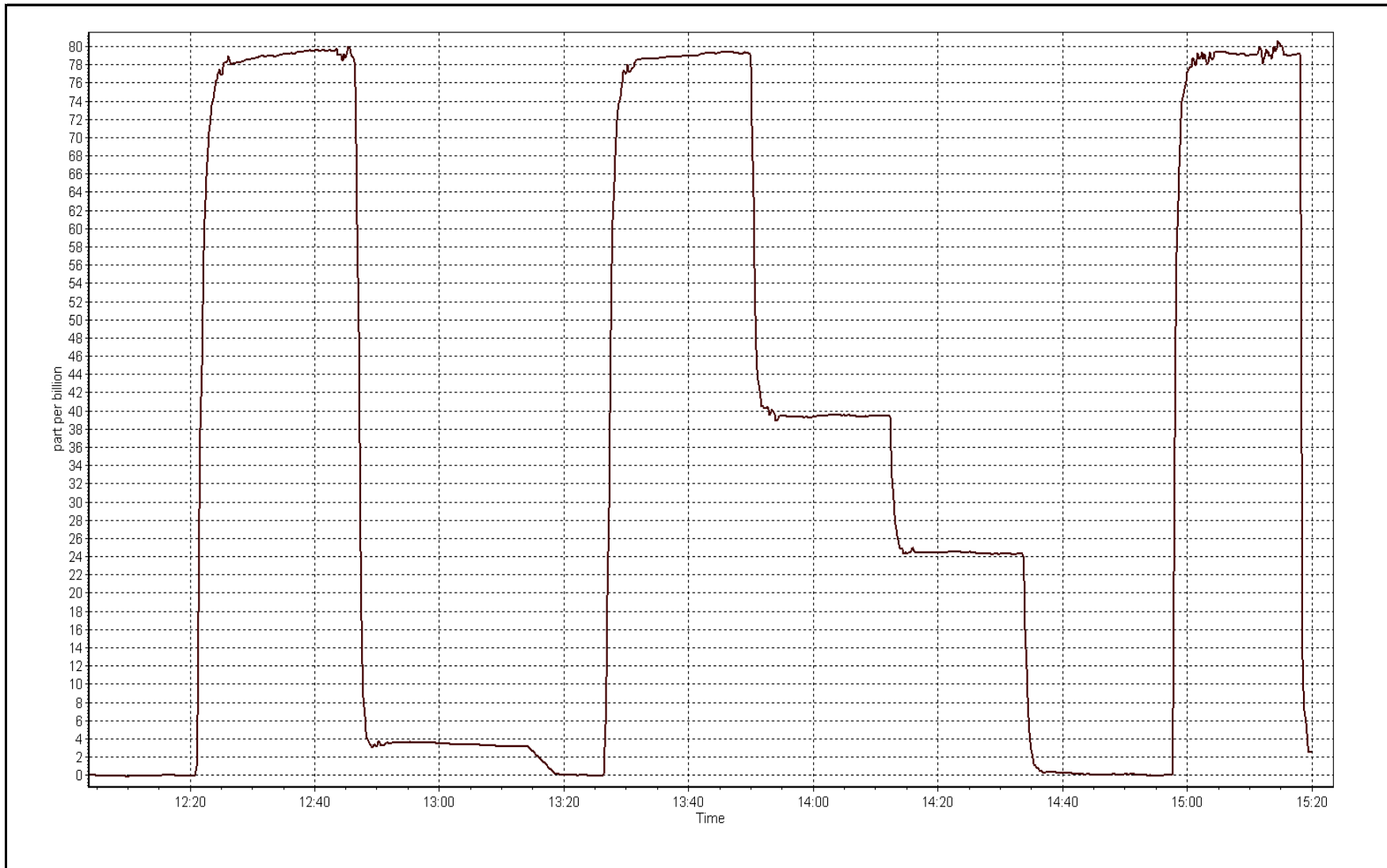
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999972
80.1	79.4	1.0086		
40.1	39.5	1.0163	Slope	1.007086
25.0	24.4	1.0238		
			Intercept	0.234751



H2S Calibration Plot

Date: February 23, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 24, 2017	Previous Calibration	January 17, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	14:46
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	1.002342	1.002157	0.994133
	Data Offset	1.317767	1.184320	0.245043
Current Calibration	Data Slope	0.993636	0.993659	0.996971
	Data Offset	1.910886	1.912773	-1.774536

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	0.969		0.969	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgnd	5.4		5.4	
NOX bkgnd	5.9		5.9	
Chamber Temp	50.4	Deg C	50.2	Deg C
Moly Temp	322.1	Deg C	322.6	Deg C
PMT voltage	-866.5	V	-866.9	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	156.7	mmHg	160.6	mmHg
R Cell Press Nox	156.9	mmHg	160.9	mmHg
NO sample flow	0.671	lpm	0.688	lpm
Nox sample Flow	0.670	lpm	0.689	lpm

Notes:

Sample inlet filter replaced after as founds. No adjustments made. First GPT done at 800 NO, 400 O3.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 24, 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	0.5	0.3	0.2	----	----
as found span	5000	83.2	800.4	800.4	0.0	805.0	804.9	0.1	0.9942	0.9944
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.3	0.2	----	----
high point	5000	83.2	800.4	800.4	0.0	805.0	804.9	0.1	0.9943	0.9944
second point	5000	41.6	400.2	400.2	0.0	398.9	399.0	0.0	1.0031	1.0030
third point	5000	20.8	200.1	200.1	0.0	197.5	197.7	-0.2	1.0131	1.0120
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.3	0.2	----	----
as left span	5000	83.2	800.4	394.1	406.3	801.5	394.1	407.4	0.9986	1.0001
Average Correction Factor									1.0035	1.0031

Corrected As found

NO_x= 804.5

NO= 804.6

Percent Change

NO_x= -0.9%

NO= -0.9%

Previous Response

NO_x= 797.2

NO= 797.5

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	0.2	0.9994	1.0011	----	----
1st NO2 (300)	394.1	405.4	801.5	394.1	407.4	0.9986	----	0.9951	100.5%
2nd NO2 (200)	587.9	211.6	803.2	587.9	215.2	0.9966	----	0.9832	101.7%
3rd NO2 (100)	689.2	110.4	803.1	689.2	113.9	0.9966	----	0.9690	103.2%
2nd NO ref point		0.0	802.0	801.0	0.8	0.9980	0.9992	----	----
Average Correction Factor						0.9974		0.9824	101.8%

Calibration Performed By:

Aswin Sasi Kumar



Wood Buffalo Environmental Association

NO_x Calibration Summary

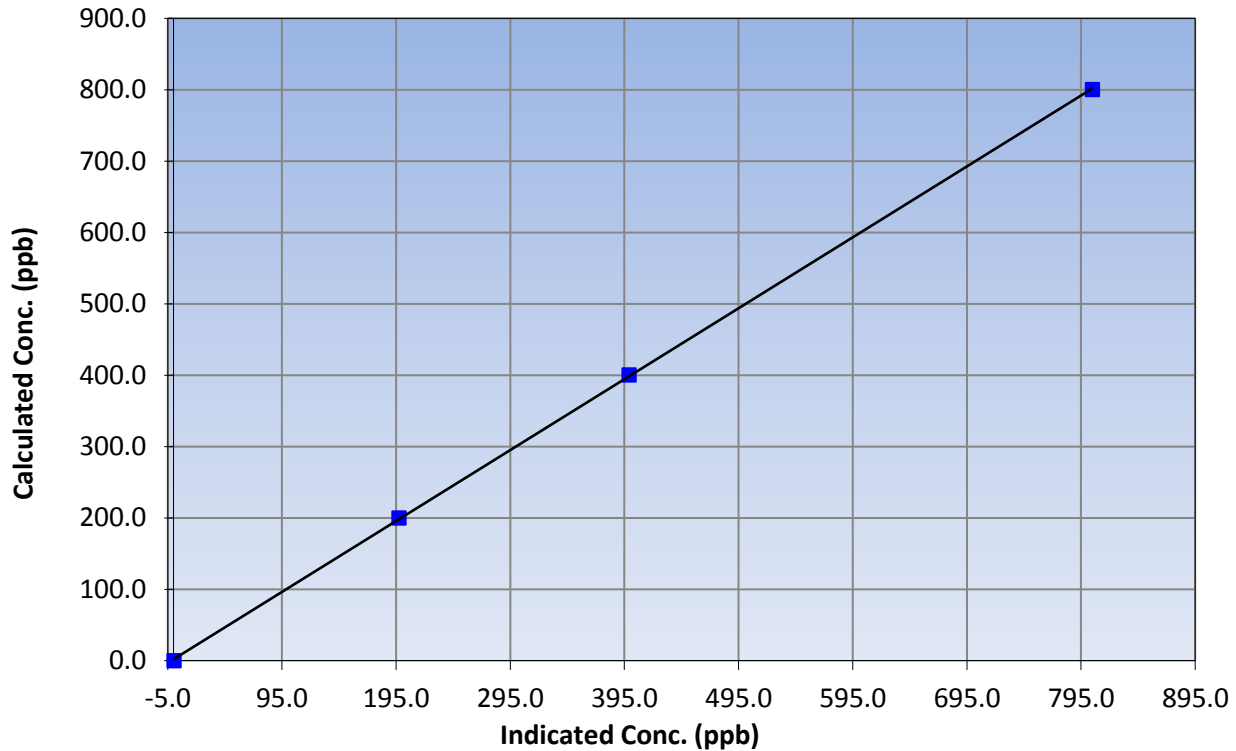
Station Information

Calibration Date	February 24, 2017	Previous Calibration	January 17, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:05	End Time (MST)	14:46
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	0.5	----	Correlation Coefficient	0.999957
800.4	805.0	0.9943		
400.2	398.9	1.0031	Slope	0.993636
200.1	197.5	1.0131		
			Intercept	1.910886

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

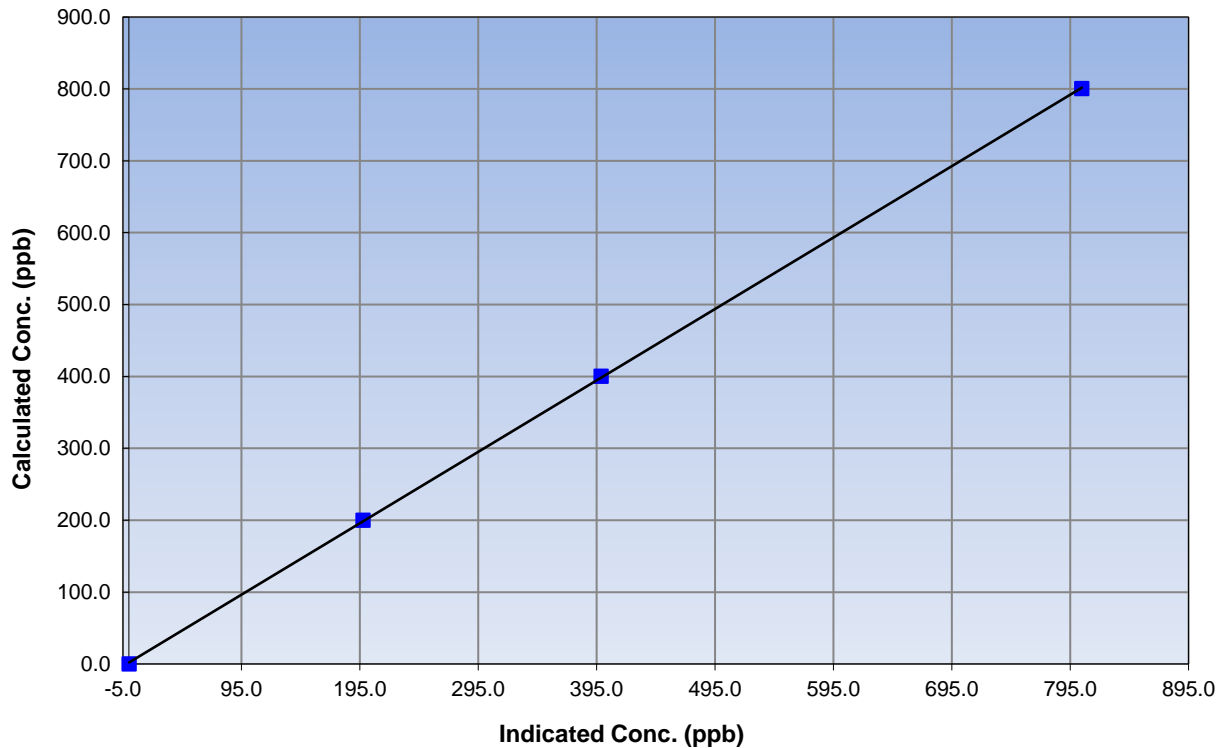
Station Information

Calibration Date	February 24, 2017	Previous Calibration	January 17, 2017
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:05	End Time (MST)	14:46
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	0.3	N/A	Correlation Coefficient	0.999963
800.4	804.9	0.9944		
400.2	399.0	1.0030	Slope	0.993659
200.1	197.7	1.0120		
			Intercept	1.912773

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

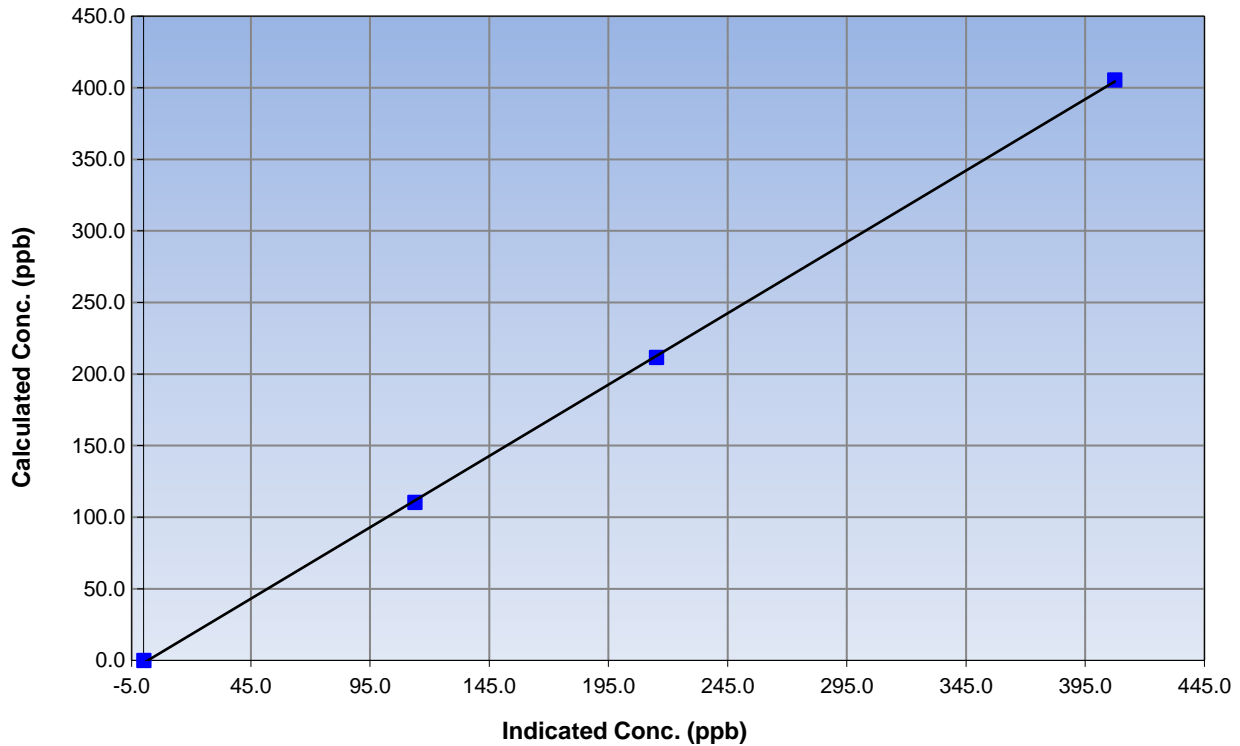
Station Information

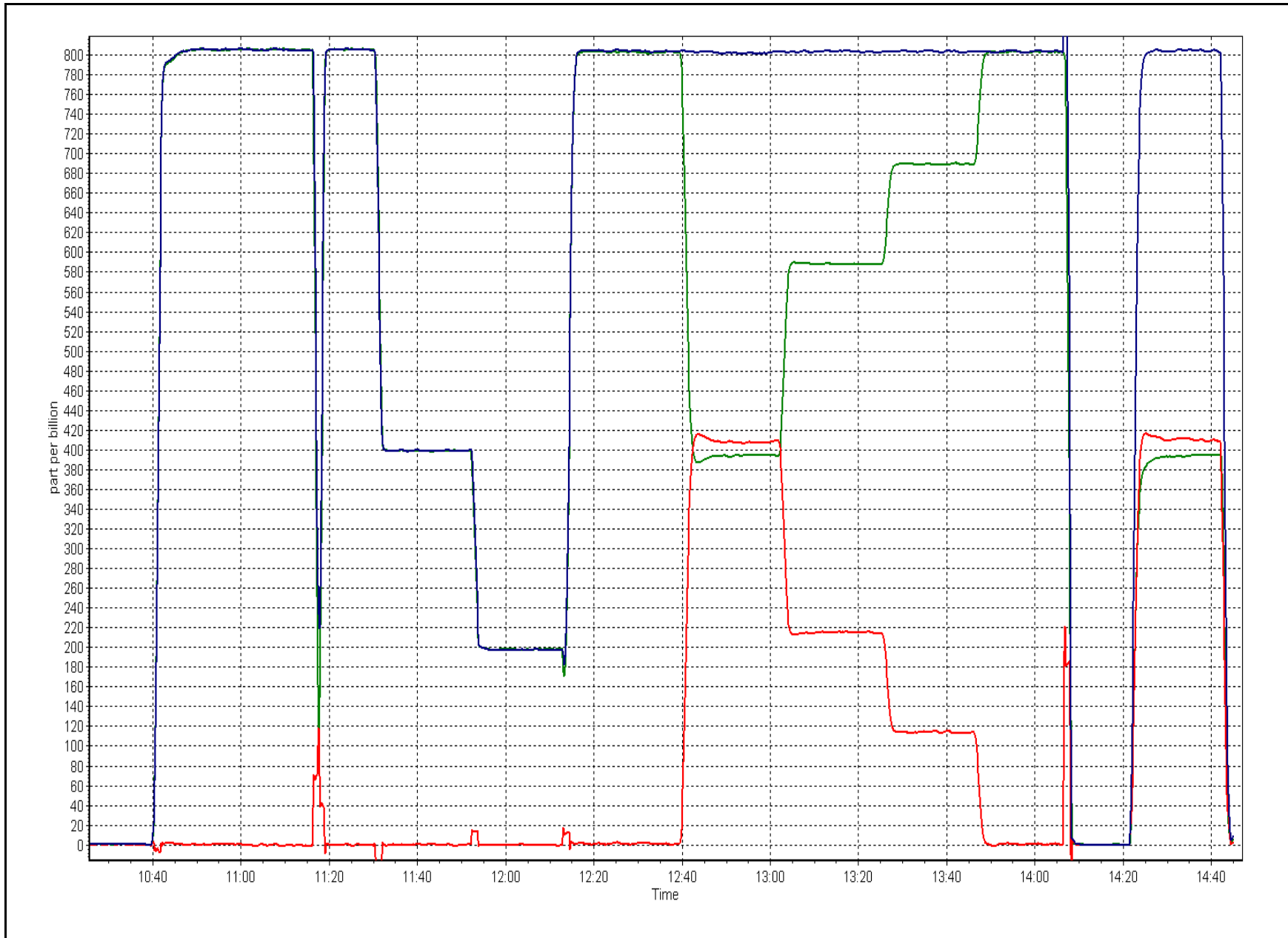
Calibration Date	February 24, 2017	Previous Calibration	January 17, 2017
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:05	End Time (MST)	14:46
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999922
405.4	407.4	0.9951		
211.6	215.2	0.9832	Slope	0.996971
110.4	113.9	0.9690		
			Intercept	-1.774536

NO₂ Calibration Curve







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

Passive Measurements: Maxxam Analytics Ltd
Edmonton, Alberta

VOCs: InnoTech Alberta, Inc.
Vegreville, Alberta

Particulate Matter: Atmospheric Research & Analysis, Inc.
Morrisville, NC

PAHs: Airzone One Ltd
Mississauga, Ontario

Precipitation: InnoTech Alberta, Inc.
Vegreville, Alberta



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

VOLATILE ORGANIC COMPOUNDS DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

VOCs: InnoTech Alberta, Inc.
Vegreville, Alberta



FILE CONTENTS DESCRIPTION	VOC - Speciated Volatile Organic Compounds
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	ppbv (parts per billion volume)
OBSERVATION TYPE	Gas
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Evacuated canister
ANALYTICAL METHODS	GC/MS - Gas chromatography/mass spectrometer
ANALYTICAL LABORATORY	InnoTech Alberta Inc
USER NOTE 1	Data are not blank corrected
SAMPLING INSTRUMENT TYPE	Tisch TE123
FLOW RATE	10.0 cc/min (cubic centimeters per minute)
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 01-Jan			Patricia McInnes AMS 6 01-Jan	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	0.04	V0	< 0.02	V1
1-Butene	0.02	0.14	V0	0.1	V0
1-Pentene	0.01	0.02	V0	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.08	V0	0.05	V0
2,2-Dimethylbutane	0.01	0.06	V0	0.01	V0
2,3,4-Trimethylpentane	0.01	0.03	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.09	V0	0.02	V0
2,3-Dimethylpentane	0.02	0.09	V0	0.05	V0
2,4-Dimethylpentane	0.01	0.03	V0	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.02	V0	0.02	V0
2-Methylhexane	0.01	0.05	V0	0.03	V0
2-Methylpentane	0.01	0.27	V0	0.05	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.06	V0	0.03	V0
3-Methylpentane	0.01	0.17	V0	0.03	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.5	V0	1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.19	V0	0.12	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.04	V0	0.04	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.06	V0	< 0.02	V1
Cyclopentane	0.01	0.07	V0	0.01	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	2.2	V0	1.6	V0
Ethylbenzene	0.01	0.02	V0	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.78	V0	0.35	V0
Isopentane	0.03	0.84	V0	0.3	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.08	V0	0.07	V0
Methanol	3	4	V0	5	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.06	V0	0.03	V0
Methylcyclopentane	0.02	0.09	V0	0.04	V0
n-Butane	0.03	0.95	V0	0.7	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.07	V0	0.04	V0
n-Hexane	0.01	0.13	V0	0.05	V0
n-Nonane	0.01	0.02	V0	0.01	V0
n-Octane	0.02	0.03	V0	0.03	V0
n-Pentane	0.1	0.5	V0	0.1	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.03	V0	0.03	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.16	V0	0.12	V0
trans-2-Butene	0.01	0.06	V0	0.05	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name	Athabasca Valley			Anzac	
Station #	AMS 7			AMS 14	
Sample Date	01-Jan			01-Jan	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.06	V0	0.08	V0
1-Pentene	0.01	< 0.01	V1	0.01	V0
2,2,4-Trimethylpentane	0.01	0.02	V0	0.03	V0
2,2-Dimethylbutane	0.01	0.01	V0	0.02	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	0.02	V0	0.02	V0
2,3-Dimethylpentane	0.02	0.03	V0	0.04	V0
2,4-Dimethylpentane	0.01	< 0.01	V1	0.01	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.03	V0	0.01	V0
2-Methylhexane	0.01	0.03	V0	0.04	V0
2-Methylpentane	0.01	0.07	V0	0.09	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.04	V0	0.04	V0
3-Methylpentane	0.01	0.03	V0	0.06	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.3	V0	1.6	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.08	V0	0.14	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.02	V0	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	0.03	V0
Cyclopentane	0.01	0.01	V0	0.04	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.7	V0	0.8	V0
Ethylbenzene	0.01	0.02	V0	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.25	V0	0.54	V0
Isopentane	0.03	0.23	V0	0.56	V0
Isoprene	0.01	0.02	V0	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.03	V0	0.04	V0
Methanol	3	6	V0	7	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.04	V0	0.05	V0
Methylcyclopentane	0.02	0.03	V0	0.07	V0
n-Butane	0.03	0.53	V0	1.34	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.07	V0	0.07	V0
n-Hexane	0.01	0.05	V0	0.16	V0
n-Nonane	0.01	0.02	V0	< 0.01	V1
n-Octane	0.02	0.05	V0	0.03	V0
n-Pentane	0.1	0.1	V0	0.5	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.02	V0	0.02	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.09	V0	0.16	V0
trans-2-Butene	0.01	0.02	V0	0.05	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Barge Landing AMS 9 01-Jan	Fort McKay South AMS 13 01-Jan			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.07	V0	0.05	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.1	V0	0.03	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	0.12	V0	0.04	V0
2,3-Dimethylpentane	0.02	0.03	V0	0.03	V0
2,4-Dimethylpentane	0.01	0.01	V0	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.02	V0	0.03	V0
2-Methylhexane	0.01	0.03	V0	0.02	V0
2-Methylpentane	0.01	0.42	V0	0.07	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.04	V0	0.04	V0
3-Methylpentane	0.01	0.23	V0	0.07	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	2	V0	1.3	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.15	V0	0.08	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.03	V0	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.06	V0	0.04	V0
Cyclopentane	0.01	0.12	V0	0.03	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.5	V0	0.5	V0
Ethylbenzene	0.01	0.01	V0	0.01	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.76	V0	0.41	V0
Isopentane	0.03	1.09	V0	0.41	V0
Isoprene	0.01	< 0.01	V1	0.05	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1	< 0.03	V1
Methanol	3	7	V0	< 3	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.06	V0	0.06	V0
Methylcyclopentane	0.02	0.07	V0	0.04	V0
n-Butane	0.03	1.18	V0	0.41	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.05	V0	0.07	V0
n-Hexane	0.01	0.18	V0	0.04	V0
n-Nonane	0.01	0.01	V0	0.02	V0
n-Octane	0.02	< 0.02	V1	0.04	V0
n-Pentane	0.1	1.1	V0	0.2	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	< 0.01	V1	< 0.01	V1
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.06	V0	0.06	V0
trans-2-Butene	0.01	0.05	V0	0.04	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 01-Jan		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.04	V0
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.12	V0
2,3,4-Trimethylpentane	0.01	0.01	V0
2,3-Dimethylbutane	0.02	0.2	V0
2,3-Dimethylpentane	0.02	0.08	V0
2,4-Dimethylpentane	0.01	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.02	V0
2-Methylhexane	0.01	0.02	V0
2-Methylpentane	0.01	0.31	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1
3-Methylhexane	0.02	0.05	V0
3-Methylpentane	0.01	0.32	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.6	V0
alpha-Pinene	0.3	3.1	V4
Benzene	0.01	0.12	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.22	V0
Cyclopentane	0.01	0.13	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.4	V0
Ethylbenzene	0.01	< 0.01	V1
Formaldehyde	3	< 3	V1
Isobutane	0.02	1.67	V0
Isopentane	0.03	1.78	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1
Methanol	3	< 3	V1
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylcyclohexane	0.01	0.17	V0
Methylcyclopentane	0.02	0.19	V0
n-Butane	0.03	0.6	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.06	V0
n-Hexane	0.01	0.11	V0
n-Nonane	0.01	0.02	V0
n-Octane	0.02	0.03	V0
n-Pentane	0.1	0.7	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	< 0.01	V1
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.05	V0
trans-2-Butene	0.01	0.03	V0
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1
Isobutylene	0.3	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1



Station Name Station # Sample Date	Bertha Ganter -			Patricia McInnes	
	Fort McKay			AMS 6	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.03	V0	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	0.03	V0	0.03	V0
1-Butene	0.02	0.09	V0	0.13	V0
1-Pentene	0.01	0.01	V0	0.01	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1	0.04	V0
2,2-Dimethylbutane	0.01	0.07	V0	0.03	V0
2,3,4-Trimethylpentane	0.01	0.03	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.11	V0	0.04	V0
2,3-Dimethylpentane	0.02	0.07	V0	0.06	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.14	V0	0.03	V0
2-Methylhexane	0.01	0.09	V0	0.05	V0
2-Methylpentane	0.01	0.13	V0	0.1	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.05	V0	< 0.02	V1
3-Methylhexane	0.02	0.11	V0	0.06	V0
3-Methylpentane	0.01	0.11	V0	0.06	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	0.8	V0	0.8	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.2	V0	0.17	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.04	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.09	V0	0.03	V0
Cyclopentane	0.01	0.04	V0	0.02	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.6	V0	1	V0
Ethylbenzene	0.01	0.05	V0	0.03	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.66	V0	0.5	V0
Isopentane	0.03	0.55	V0	0.43	V0
Isoprene	0.01	< 0.01	V1	0.01	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.15	V0	0.09	V0
Methanol	3	3	V0	5	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.21	V0	0.05	V0
Methylcyclopentane	0.02	0.11	V0	0.07	V0
n-Butane	0.03	0.62	V0	0.95	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.22	V0	0.09	V0
n-Hexane	0.01	0.15	V0	0.13	V0
n-Nonane	0.01	0.06	V0	0.01	V0
n-Octane	0.02	0.19	V0	0.04	V0
n-Pentane	0.1	0.3	V0	0.3	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.07	V0	0.04	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.32	V0	0.18	V0
trans-2-Butene	0.01	< 0.01	V1	0.01	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name	Athabasca Valley			Anzac	
Station #	AMS 7			AMS 14	
Sample Date	07-Jan			07-Jan	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	0.04	V0	0.02	V0
1-Butene	0.02	0.08	V0	0.08	V0
1-Pentene	0.01	0.01	V0	0.01	V0
2,2,4-Trimethylpentane	0.01	0.13	V0	0.03	V0
2,2-Dimethylbutane	0.01	0.02	V0	0.01	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	< 0.01	V1
2,3-Dimethylbutane	0.02	0.02	V0	0.02	V0
2,3-Dimethylpentane	0.02	0.04	V0	0.03	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.01	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.01	V0	0.01	V0
2-Methylhexane	0.01	0.03	V0	0.02	V0
2-Methylpentane	0.01	0.06	V0	0.07	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.03	V0	0.03	V0
3-Methylpentane	0.01	0.04	V0	0.03	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	0.8	V0	0.9	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.18	V0	0.18	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	< 0.02	V1
Cyclopentane	0.01	0.02	V0	0.02	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.9	V0	1	V0
Ethylbenzene	0.01	0.02	V0	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.31	V0	0.4	V0
Isopentane	0.03	0.38	V0	0.37	V0
Isoprene	0.01	0.01	V0	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.05	V0	0.04	V0
Methanol	3	5	V0	5	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.02	V0	0.02	V0
Methylcyclopentane	0.02	0.03	V0	0.04	V0
n-Butane	0.03	0.63	V0	0.76	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.03	V0	0.03	V0
n-Hexane	0.01	0.05	V0	0.06	V0
n-Nonane	0.01	< 0.01	V1	0.01	V0
n-Octane	0.02	< 0.02	V1	< 0.02	V1
n-Pentane	0.1	0.2	V0	0.3	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.03	V0	0.02	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.15	V0	0.12	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Barge Landing AMS 9 07-Jan	Fort McKay South AMS 13 07-Jan			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.07	V0	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	0.03	V0	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	0.02	V0
1-Butene	0.02	0.07	V0	0.07	V0
1-Pentene	0.01	0.01	V0	0.01	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.21	V0	0.1	V0
2,3,4-Trimethylpentane	0.01	0.03	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.5	V0	0.15	V0
2,3-Dimethylpentane	0.02	0.22	V0	0.06	V0
2,4-Dimethylpentane	0.01	0.17	V0	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.33	V0	0.1	V0
2-Methylhexane	0.01	0.88	V0	0.06	V0
2-Methylpentane	0.01	3.63	V4	0.38	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.2	V0	0.04	V0
3-Methylhexane	0.02	0.75	V0	0.08	V0
3-Methylpentane	0.01	1.85	V4	0.22	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.9	V0	1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.97	V0	0.21	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	1.47	V4	0.07	V0
Cyclopentane	0.01	0.53	V0	0.08	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.4	V0	0.6	V0
Ethylbenzene	0.01	0.09	V0	0.04	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	4.52	V4	0.51	V0
Isopentane	0.03	10.1	V4	0.75	V0
Isoprene	0.01	0.01	V0	0.03	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	0.01	V0	< 0.01	V1
m,p-Xylene	0.03	0.39	V0	0.07	V0
Methanol	3	< 3	V1	< 3	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	1.82	V0	0.15	V0
Methylcyclopentane	0.02	1.45	V4	0.1	V0
n-Butane	0.03	40.2	V4	0.57	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	1.7	V0	0.15	V0
n-Hexane	0.01	5.07	V4	0.19	V0
n-Nonane	0.01	0.19	V0	0.05	V0
n-Octane	0.02	0.61	V0	0.14	V0
n-Pentane	0.1	16.9	V4	0.7	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.11	V0	0.04	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	1.18	V0	0.2	V0
trans-2-Butene	0.01	< 0.01	V1	0.02	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 07-Jan		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.05	V0
1-Pentene	0.01	0.02	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.12	V0
2,3,4-Trimethylpentane	0.01	0.03	V0
2,3-Dimethylbutane	0.02	0.26	V0
2,3-Dimethylpentane	0.02	0.16	V0
2,4-Dimethylpentane	0.01	0.04	V0
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.17	V0
2-Methylhexane	0.01	0.1	V0
2-Methylpentane	0.01	0.13	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	0.06	V0
3-Methylhexane	0.02	0.14	V0
3-Methylpentane	0.01	0.32	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.3	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.13	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.36	V0
Cyclopentane	0.01	0.12	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.4	V0
Ethylbenzene	0.01	0.04	V0
Formaldehyde	3	< 3	V1
Isobutane	0.02	2.51	V0
Isopentane	0.03	2.27	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	0.1	V0
Methanol	3	< 3	V1
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylcyclohexane	0.01	0.38	V0
Methylcyclopentane	0.02	0.29	V0
n-Butane	0.03	0.73	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.3	V0
n-Hexane	0.01	0.12	V0
n-Nonane	0.01	0.08	V0
n-Octane	0.02	0.23	V0
n-Pentane	0.1	0.2	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	0.04	V0
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.21	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1
Isobutylene	0.3	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1



Station Name Station # Sample Date	Bertha Ganter - Fort McKay			Patricia McInnes AMS 6	
	AMS 1			AMS 6	
	13-Jan			13-Jan	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	0.06	V0
1,3,5-Trimethylbenzene	0.02	0.02	V0	0.03	V0
1,3-Butadiene	0.02	0.03	V0	0.06	V0
1-Butene	0.02	0.19	V0	0.19	V0
1-Pentene	0.01	0.02	V0	0.02	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1	0.17	V0
2,2-Dimethylbutane	0.01	0.03	V0	0.01	V0
2,3,4-Trimethylpentane	0.01	0.01	V0	0.05	V0
2,3-Dimethylbutane	0.02	0.04	V0	0.03	V0
2,3-Dimethylpentane	0.02	0.09	V0	0.15	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.04	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.17	V0	0.03	V0
2-Methylhexane	0.01	0.17	V0	0.07	V0
2-Methylpentane	0.01	0.19	V0	0.14	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.06	V0	0.03	V0
3-Methylhexane	0.02	0.2	V0	0.08	V0
3-Methylpentane	0.01	0.1	V0	0.08	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.2	V0	1.2	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.19	V0	0.26	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.06	V0	0.03	V0
Cyclopentane	0.01	0.03	V0	0.02	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.9	V0	3.4	V0
Ethylbenzene	0.01	0.06	V0	0.06	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.68	V0	1.04	V0
Isopentane	0.03	0.41	V0	0.63	V0
Isoprene	0.01	0.04	V0	0.02	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.17	V0	0.21	V0
Methanol	3	3	V0	20	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.2	V0	0.05	V0
Methylcyclopentane	0.02	0.18	V0	0.08	V0
n-Butane	0.03	1.26	V0	1.81	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.41	V0	0.06	V0
n-Hexane	0.01	0.39	V0	0.11	V0
n-Nonane	0.01	0.08	V0	0.02	V0
n-Octane	0.02	0.23	V0	0.03	V0
n-Pentane	0.1	0.3	V0	0.3	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.07	V0	0.09	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.33	V0	0.38	V0
trans-2-Butene	0.01	< 0.01	V1	0.01	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	0.02	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Athabasca Valley			Anzac	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	0.03	V0	< 0.02	V1
1,3-Butadiene	0.02	0.05	V0	0.02	V0
1-Butene	0.02	0.14	V0	0.03	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.09	V0	0.07	V0
2,2-Dimethylbutane	0.01	0.02	V0	< 0.01	V1
2,3,4-Trimethylpentane	0.01	0.02	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.02	V0	< 0.02	V1
2,3-Dimethylpentane	0.02	0.09	V0	0.06	V0
2,4-Dimethylpentane	0.01	0.03	V0	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.02	V0	< 0.01	V1
2-Methylhexane	0.01	0.08	V0	0.02	V0
2-Methylpentane	0.01	0.13	V0	0.06	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.06	V0	0.02	V0
3-Methylpentane	0.01	0.07	V0	0.03	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1	V0	1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.25	V0	0.12	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.03	V0	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.03	V0	< 0.02	V1
Cyclopentane	0.01	0.02	V0	< 0.01	V1
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	2.4	V0	0.7	V0
Ethylbenzene	0.01	0.05	V0	0.01	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.87	V0	0.48	V0
Isopentane	0.03	0.5	V0	0.23	V0
Isoprene	0.01	0.02	V0	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.16	V0	0.04	V0
Methanol	3	19	V0	3	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.04	V0	0.03	V0
Methylcyclopentane	0.02	0.06	V0	0.02	V0
n-Butane	0.03	1.41	V0	0.87	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.05	V0	0.02	V0
n-Hexane	0.01	0.09	V0	0.05	V0
n-Nonane	0.01	0.01	V0	< 0.01	V1
n-Octane	0.02	< 0.02	V1	< 0.02	V1
n-Pentane	0.1	0.2	V0	0.1	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.07	V0	0.02	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.26	V0	0.16	V0
trans-2-Butene	0.01	0.02	V0	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Barge Landing AMS 9 13-Jan	Fort McKay South AMS 13 13-Jan			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	0.03	V0
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	0.02	V0
1,3-Butadiene	0.02	0.04	V0	0.03	V0
1-Butene	0.02	0.16	V0	0.2	V0
1-Pentene	0.01	0.02	V0	0.03	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.03	V0	0.04	V0
2,3,4-Trimethylpentane	0.01	0.01	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.05	V0	0.07	V0
2,3-Dimethylpentane	0.02	0.07	V0	0.15	V0
2,4-Dimethylpentane	0.01	0.01	V0	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.14	V0	0.53	V0
2-Methylhexane	0.01	0.13	V0	0.25	V0
2-Methylpentane	0.01	0.15	V0	0.22	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.06	V0	0.19	V0
3-Methylhexane	0.02	0.14	V0	0.33	V0
3-Methylpentane	0.01	0.07	V0	0.14	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.1	V0	0.9	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.17	V0	0.2	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.03	V0	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.06	V0	0.13	V0
Cyclopentane	0.01	0.02	V0	0.03	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1.5	V0	2.4	V0
Ethylbenzene	0.01	0.05	V0	0.14	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.85	V0	0.78	V0
Isopentane	0.03	0.43	V0	0.43	V0
Isoprene	0.01	0.01	V0	0.02	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	0.01	V0
m,p-Xylene	0.03	0.13	V0	0.32	V0
Methanol	3	5	V0	< 3	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.17	V0	0.49	V0
Methylcyclopentane	0.02	0.14	V0	0.27	V0
n-Butane	0.03	1.29	V0	1.2	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.26	V0	0.9	V0
n-Hexane	0.01	0.27	V0	0.55	V0
n-Nonane	0.01	0.06	V0	0.2	V0
n-Octane	0.02	0.19	V0	0.83	V0
n-Pentane	0.1	0.3	V0	0.3	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.06	V0	0.11	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.32	V0	0.6	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 13-Jan		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.03	V0
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.07	V0
1-Pentene	0.01	0.01	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.07	V0
2,3,4-Trimethylpentane	0.01	0.02	V0
2,3-Dimethylbutane	0.02	0.13	V0
2,3-Dimethylpentane	0.02	0.12	V0
2,4-Dimethylpentane	0.01	0.03	V0
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.22	V0
2-Methylhexane	0.01	0.11	V0
2-Methylpentane	0.01	0.09	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	0.09	V0
3-Methylhexane	0.02	0.13	V0
3-Methylpentane	0.01	0.19	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.1	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.12	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.22	V0
Cyclopentane	0.01	0.05	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.5	V0
Ethylbenzene	0.01	0.07	V0
Formaldehyde	3	< 3	V1
Isobutane	0.02	1.65	V0
Isopentane	0.03	1.18	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	0.01	V0
m,p-Xylene	0.03	0.15	V0
Methanol	3	< 3	V1
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylcyclohexane	0.01	0.37	V0
Methylcyclopentane	0.02	0.22	V0
n-Butane	0.03	1.06	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.29	V0
n-Hexane	0.01	0.15	V0
n-Nonane	0.01	0.09	V0
n-Octane	0.02	0.29	V0
n-Pentane	0.1	0.2	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	0.05	V0
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.3	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1
Isobutylene	0.3	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1



Station Name Station # Sample Date	Bertha Ganter -				
	Fort McKay		Patricia McInnes		
	AMS 1		AMS 6		
	19-Jan		19-Jan		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	0.04	V0
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	0.03	V0
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.05	V0	0.12	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.07	V0	0.09	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.03	V0
2,3-Dimethylbutane	0.02	0.11	V0	0.12	V0
2,3-Dimethylpentane	0.02	0.04	V0	0.1	V0
2,4-Dimethylpentane	0.01	< 0.01	V1	0.03	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.05	V0	0.26	V0
2-Methylhexane	0.01	0.03	V0	0.12	V0
2-Methylpentane	0.01	0.15	V0	0.32	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	0.11	V0
3-Methylhexane	0.02	0.05	V0	0.16	V0
3-Methylpentane	0.01	0.11	V0	0.21	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.1	V0	1.2	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.14	V0	0.24	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.05	V0	0.11	V0
Cyclopentane	0.01	0.04	V0	0.1	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.3	V0	1.5	V0
Ethylbenzene	0.01	0.02	V0	0.1	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.38	V0	0.51	V0
Isopentane	0.03	0.43	V0	1.02	V0
Isoprene	0.01	0.01	V0	0.01	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	0.01	V0
m,p-Xylene	0.03	0.05	V0	0.25	V0
Methanol	3	6	V0	10	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.07	V0	0.24	V0
Methylcyclopentane	0.02	0.06	V0	0.19	V0
n-Butane	0.03	0.39	V0	0.9	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.09	V0	0.41	V0
n-Hexane	0.01	0.1	V0	0.32	V0
n-Nonane	0.01	0.03	V0	0.14	V0
n-Octane	0.02	0.07	V0	0.45	V0
n-Pentane	0.1	0.3	V0	1	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.02	V0	0.09	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.11	V0	0.4	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Athabasca Valley AMS 7 19-Jan			Anzac AMS 14 19-Jan	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	0.03	V0
1,3,5-Trimethylbenzene	0.02	0.02	V0	0.02	V0
1,3-Butadiene	0.02	< 0.02	V1	0.2	V0
1-Butene	0.02	0.12	V0	0.55	V0
1-Pentene	0.01	0.02	V0	0.06	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1	0.04	V0
2,2-Dimethylbutane	0.01	0.05	V0	0.04	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.07	V0	0.06	V0
2,3-Dimethylpentane	0.02	0.08	V0	0.08	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.02	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.18	V0	0.08	V0
2-Methylhexane	0.01	0.15	V0	0.09	V0
2-Methylpentane	0.01	0.26	V0	0.14	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.08	V0	0.03	V0
3-Methylhexane	0.02	0.19	V0	0.1	V0
3-Methylpentane	0.01	0.18	V0	0.12	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.2	V0	2.1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.17	V0	0.82	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	0.08	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	0.02	V0
Cyclohexane	0.02	0.08	V0	0.06	V0
Cyclopentane	0.01	0.07	V0	0.04	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.7	V0	0.7	V0
Ethylbenzene	0.01	0.06	V0	0.05	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.47	V0	0.68	V0
Isopentane	0.03	0.75	V0	0.84	V0
Isoprene	0.01	< 0.01	V1	0.05	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	0.01	V0	< 0.01	V1
m,p-Xylene	0.03	0.14	V0	0.11	V0
Methanol	3	10	V0	6	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.19	V0	0.09	V0
Methylcyclopentane	0.02	0.17	V0	0.12	V0
n-Butane	0.03	0.83	V0	1.21	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.45	V0	0.18	V0
n-Hexane	0.01	0.4	V0	0.24	V0
n-Nonane	0.01	0.11	V0	0.05	V0
n-Octane	0.02	0.31	V0	0.12	V0
n-Pentane	0.1	0.7	V0	0.7	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.06	V0	0.05	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.27	V0	0.4	V0
trans-2-Butene	0.01	0.02	V0	0.09	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	0.02	V0
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Barge Landing AMS 9 19-Jan	Fort McKay South AMS 13 19-Jan			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.04	V0	0.04	V0
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.14	V0	0.09	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.18	V0	0.13	V0
2,3-Dimethylpentane	0.02	0.05	V0	0.05	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.01	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.05	V0	0.08	V0
2-Methylhexane	0.01	0.04	V0	0.05	V0
2-Methylpentane	0.01	0.61	V0	0.2	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.02	V0	0.04	V0
3-Methylhexane	0.02	0.04	V0	0.07	V0
3-Methylpentane	0.01	0.33	V0	0.14	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1	V0	1.1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.24	V0	0.16	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.08	V0	0.07	V0
Cyclopentane	0.01	0.16	V0	0.06	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.7	V0	1	V0
Ethylbenzene	0.01	0.02	V0	0.03	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.36	V0	0.46	V0
Isopentane	0.03	1.09	V0	0.57	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.03	V0	0.06	V0
Methanol	3	6	V0	4	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.06	V0	0.1	V0
Methylcyclopentane	0.02	0.1	V0	0.08	V0
n-Butane	0.03	0.38	V0	0.41	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.1	V0	0.13	V0
n-Hexane	0.01	0.22	V0	0.13	V0
n-Nonane	0.01	0.03	V0	0.05	V0
n-Octane	0.02	0.06	V0	0.11	V0
n-Pentane	0.1	1.2	V0	0.5	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.02	V0	0.03	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.1	V0	0.13	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 19-Jan		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	0.04	V0
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.04	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1
2,3-Dimethylbutane	0.02	0.06	V0
2,3-Dimethylpentane	0.02	0.04	V0
2,4-Dimethylpentane	0.01	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.03	V0
2-Methylhexane	0.01	0.03	V0
2-Methylpentane	0.01	0.05	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1
3-Methylhexane	0.02	0.04	V0
3-Methylpentane	0.01	0.09	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.3	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.09	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.08	V0
Cyclopentane	0.01	0.03	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.4	V0
Ethylbenzene	0.01	0.01	V0
Formaldehyde	3	< 3	V1
Isobutane	0.02	0.56	V0
Isopentane	0.03	0.57	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1
Methanol	3	< 3	V1
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylcyclohexane	0.01	0.06	V0
Methylcyclopentane	0.02	0.08	V0
n-Butane	0.03	0.37	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.06	V0
n-Hexane	0.01	0.04	V0
n-Nonane	0.01	0.02	V0
n-Octane	0.02	0.04	V0
n-Pentane	0.1	0.2	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	< 0.01	V1
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.05	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1
Isobutylene	0.3	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1



Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 25-Jan			Patricia McInnes AMS 6 25-Jan	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.05	V0	0.06	V0
1,3,5-Trimethylbenzene	0.02	0.03	V0	0.03	V0
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.24	V0	0.24	V0
1-Pentene	0.01	0.03	V0	0.03	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1	0.08	V0
2,2-Dimethylbutane	0.01	0.05	V0	0.02	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.02	V0
2,3-Dimethylbutane	0.02	0.09	V0	0.05	V0
2,3-Dimethylpentane	0.02	0.17	V0	0.08	V0
2,4-Dimethylpentane	0.01	0.03	V0	0.03	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.56	V0	0.04	V0
2-Methylhexane	0.01	0.32	V0	0.12	V0
2-Methylpentane	0.01	0.34	V0	0.16	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.19	V0	0.02	V0
3-Methylhexane	0.02	0.45	V0	0.09	V0
3-Methylpentane	0.01	0.22	V0	0.11	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.4	V0	2.9	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.42	V0	0.4	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.03	V0	0.05	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.16	V0	0.04	V0
Cyclopentane	0.01	0.05	V0	0.04	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.7	V0	3.6	V0
Ethylbenzene	0.01	0.14	V0	0.07	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.94	V0	1.25	V0
Isopentane	0.03	0.71	V0	0.95	V0
Isoprene	0.01	0.02	V0	0.22	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	0.02	V0	< 0.01	V1
m,p-Xylene	0.03	0.38	V0	0.2	V0
Methanol	3	8	V0	32	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.48	V0	0.07	V0
Methylcyclopentane	0.02	0.39	V0	0.11	V0
n-Butane	0.03	2.1	V0	2.38	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	1.25	V0	0.1	V0
n-Hexane	0.01	0.96	V0	0.17	V0
n-Nonane	0.01	0.25	V0	0.02	V0
n-Octane	0.02	0.86	V0	0.05	V0
n-Pentane	0.1	0.6	V0	0.5	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.14	V0	0.08	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.75	V0	0.34	V0
trans-2-Butene	0.01	0.04	V0	0.03	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Athabasca Valley			Anzac	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	0.02	V0	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.15	V0	0.22	V0
1-Pentene	0.01	0.03	V0	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.06	V0	0.12	V0
2,2-Dimethylbutane	0.01	0.01	V0	0.01	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.04	V0
2,3-Dimethylbutane	0.02	0.04	V0	< 0.02	V1
2,3-Dimethylpentane	0.02	0.05	V0	0.13	V0
2,4-Dimethylpentane	0.01	0.03	V0	0.04	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.02	V0	0.01	V0
2-Methylhexane	0.01	0.06	V0	0.02	V0
2-Methylpentane	0.01	0.14	V0	0.06	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.06	V0	0.03	V0
3-Methylpentane	0.01	0.09	V0	0.05	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.2	V0	1.1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.29	V0	0.21	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.04	V0	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.03	V0	0.02	V0
Cyclopentane	0.01	0.03	V0	0.03	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	2.4	V0	0.8	V0
Ethylbenzene	0.01	0.04	V0	0.02	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	1.22	V0	0.71	V0
Isopentane	0.03	0.92	V0	0.53	V0
Isoprene	0.01	0.01	V0	0.01	V0
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	0.13	V0	0.03	V0
Methanol	3	32	V0	6	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.04	V0	0.03	V0
Methylcyclopentane	0.02	0.08	V0	0.05	V0
n-Butane	0.03	3.87	V0	1.43	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.06	V0	0.03	V0
n-Hexane	0.01	0.13	V0	0.09	V0
n-Nonane	0.01	0.02	V0	0.01	V0
n-Octane	0.02	0.03	V0	< 0.02	V1
n-Pentane	0.1	0.5	V0	0.4	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.05	V0	0.01	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.22	V0	0.12	V0
trans-2-Butene	0.01	0.02	V0	0.02	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	0.03	V0	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Barge Landing AMS 9 25-Jan	Fort McKay South AMS 13 25-Jan			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	0.09	V0
1,3,5-Trimethylbenzene	0.02	0.02	V0	0.05	V0
1,3-Butadiene	0.02	0.07	V0	< 0.02	V1
1-Butene	0.02	0.33	V0	0.16	V0
1-Pentene	0.01	0.05	V0	0.04	V0
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.06	V0	0.08	V0
2,3,4-Trimethylpentane	0.01	0.02	V0	0.07	V0
2,3-Dimethylbutane	0.02	0.08	V0	0.15	V0
2,3-Dimethylpentane	0.02	0.1	V0	0.25	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.04	V0
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	0.29	V0	1.75	V4
2-Methylhexane	0.01	0.19	V0	0.47	V0
2-Methylpentane	0.01	0.25	V0	0.35	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	0.11	V0	0.57	V0
3-Methylhexane	0.02	0.24	V0	0.79	V0
3-Methylpentane	0.01	0.15	V0	0.25	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.5	V0	1.2	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.44	V0	0.43	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.05	V0	0.02	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.12	V0	0.36	V0
Cyclopentane	0.01	0.05	V0	0.06	V0
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1.5	V0	0.5	V0
Ethylbenzene	0.01	0.1	V0	0.46	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	1	V0	0.89	V0
Isopentane	0.03	0.72	V0	0.68	V0
Isoprene	0.01	0.02	V0	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	0.01	V0	0.04	V0
m,p-Xylene	0.03	0.26	V0	1.18	V4
Methanol	3	9	V0	5	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.29	V0	1.45	V0
Methylcyclopentane	0.02	0.25	V0	0.61	V0
n-Butane	0.03	2.27	V0	2.04	V0
n-Decane	0.06	< 0.06	V1	0.1	V0
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.53	V0	2.39	V0
n-Hexane	0.01	0.52	V0	0.99	V0
n-Nonane	0.01	0.11	V0	0.7	V0
n-Octane	0.02	0.43	V0	2.68	V4
n-Pentane	0.1	0.6	V0	0.6	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.08	V0	0.37	V0
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.57	V0	1.86	V0
trans-2-Butene	0.01	0.06	V0	0.03	V0
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 25-Jan		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	0.02	V0
1-Butene	0.02	0.07	V0
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.02	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1
2,3-Dimethylbutane	0.02	0.03	V0
2,3-Dimethylpentane	0.02	0.03	V0
2,4-Dimethylpentane	0.01	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	0.03	V0
2-Methylhexane	0.01	0.03	V0
2-Methylpentane	0.01	0.08	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1
3-Methylhexane	0.02	0.04	V0
3-Methylpentane	0.01	0.06	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.1	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.2	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.05	V0
Cyclopentane	0.01	0.03	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.4	V0
Ethylbenzene	0.01	0.02	V0
Formaldehyde	3	< 3	V1
Isobutane	0.02	0.74	V0
Isopentane	0.03	0.62	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	0.04	V0
Methanol	3	3	V0
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylcyclohexane	0.01	0.07	V0
Methylcyclopentane	0.02	0.06	V0
n-Butane	0.03	1.55	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.06	V0
n-Hexane	0.01	0.11	V0
n-Nonane	0.01	0.02	V0
n-Octane	0.02	0.05	V0
n-Pentane	0.1	0.4	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	0.02	V0
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.11	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1
Isobutylene	0.3	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1



Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 31-Jan			Patricia McInnes AMS 6 31-Jan	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.05	V0	< 0.02	V1
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.01	V0	< 0.01	V1
2,2-Dimethylbutane	0.01	< 0.01	V1	< 0.01	V1
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	< 0.02	V1	< 0.02	V1
2,3-Dimethylpentane	0.02	< 0.02	V1	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	< 0.01	V1	< 0.01	V1
2-Methylhexane	0.01	0.02	V0	0.01	V0
2-Methylpentane	0.01	0.07	V0	0.03	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.03	V0	< 0.02	V1
3-Methylpentane	0.01	0.06	V0	0.02	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	3	V4	< 3	V1
Acetone	0.4	1.6	V0	0.8	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.12	V0	0.1	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	0.03	V0	< 0.02	V1
Cyclopentane	0.01	< 0.01	V1	< 0.01	V1
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1.5	V0	0.4	V0
Ethylbenzene	0.01	0.01	V0	< 0.01	V1
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.29	V0	0.28	V0
Isopentane	0.03	0.19	V0	0.16	V0
Isoprene	0.01	0.02	V0	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1	< 0.03	V1
Methanol	3	5	V0	< 3	V1
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.03	V0	< 0.01	V1
Methylcyclopentane	0.02	0.04	V0	< 0.02	V1
n-Butane	0.03	0.4	V0	0.36	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.04	V0	0.02	V0
n-Hexane	0.01	0.17	V0	0.03	V0
n-Nonane	0.01	< 0.01	V1	< 0.01	V1
n-Octane	0.02	< 0.02	V1	< 0.02	V1
n-Pentane	0.1	0.2	V0	0.1	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	0.01	V0	< 0.01	V1
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.25	V0	0.03	V0
trans-2-Butene	0.01	0.02	V0	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name	Athabasca Valley			Anzac	
Station #	AMS 7			AMS 14	
Sample Date	31-Jan			31-Jan	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	0.03	V0	< 0.02	V1
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	0.03	V0	< 0.01	V1
2,2-Dimethylbutane	0.01	0.01	V0	< 0.01	V1
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	< 0.02	V1	< 0.02	V1
2,3-Dimethylpentane	0.02	0.02	V0	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	< 0.01	V1	< 0.01	V1
2-Methylhexane	0.01	0.01	V0	< 0.01	V1
2-Methylpentane	0.01	0.03	V0	0.02	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	< 0.02	V1	< 0.02	V1
3-Methylpentane	0.01	0.02	V0	0.02	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1	V0	1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.11	V0	0.08	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.03	V0	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	< 0.02	V1
Cyclopentane	0.01	< 0.01	V1	< 0.01	V1
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	0.5	V0	< 0.3	V1
Ethylbenzene	0.01	0.01	V0	< 0.01	V1
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.32	V0	0.23	V0
Isopentane	0.03	0.26	V0	0.15	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1	< 0.03	V1
Methanol	3	14	V0	3	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	< 0.01	V1	< 0.01	V1
Methylcyclopentane	0.02	0.02	V0	< 0.02	V1
n-Butane	0.03	0.52	V0	0.34	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.02	V0	0.01	V0
n-Hexane	0.01	0.04	V0	0.03	V0
n-Nonane	0.01	< 0.01	V1	< 0.01	V1
n-Octane	0.02	< 0.02	V1	< 0.02	V1
n-Pentane	0.1	0.2	V0	0.1	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	< 0.01	V1	< 0.01	V1
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.05	V0	0.03	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	Barge Landing AMS 9 31-Jan	Fort McKay South AMS 13 31-Jan			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1	< 0.02	V1
1-Butene	0.02	< 0.02	V1	< 0.02	V1
1-Pentene	0.01	< 0.01	V1	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,2-Dimethylbutane	0.01	0.02	V0	< 0.01	V1
2,3,4-Trimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2,3-Dimethylbutane	0.02	0.02	V0	< 0.02	V1
2,3-Dimethylpentane	0.02	0.03	V0	< 0.02	V1
2,4-Dimethylpentane	0.01	< 0.01	V1	< 0.01	V1
2-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1	< 0.3	V1
2-Methylheptane	0.01	< 0.01	V1	< 0.01	V1
2-Methylhexane	0.01	0.05	V0	0.01	V0
2-Methylpentane	0.01	0.07	V0	0.03	V0
3-Methyl-1-butene	0.3	< 0.3	V1	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1	< 0.02	V1
3-Methylhexane	0.02	0.07	V0	< 0.02	V1
3-Methylpentane	0.01	0.07	V0	0.02	V0
4-Methyl-1-pentene	0.3	< 0.3	V1	< 0.3	V1
Acetaldehyde	3	< 3	V1	< 3	V1
Acetone	0.4	1.1	V0	1	V0
alpha-Pinene	0.3	< 0.3	V1	< 0.3	V1
Benzene	0.01	0.1	V0	0.11	V0
beta-Pinene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Butene	0.02	0.02	V0	0.03	V0
cis-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Cyclohexane	0.02	< 0.02	V1	< 0.02	V1
Cyclopentane	0.01	0.02	V0	< 0.01	V1
Cyclopentene	0.3	< 0.3	V1	< 0.3	V1
Ethanol	0.3	1	V0	< 0.3	V1
Ethylbenzene	0.01	< 0.01	V1	0.01	V0
Formaldehyde	3	< 3	V1	< 3	V1
Isobutane	0.02	0.35	V0	0.24	V0
Isopentane	0.03	0.27	V0	0.14	V0
Isoprene	0.01	< 0.01	V1	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1	< 0.03	V1
Methanol	3	14	V0	4	V0
Methylethylketone	0.3	< 0.3	V1	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1	< 0.4	V1
Methylcyclohexane	0.01	0.02	V0	0.02	V0
Methylcyclopentane	0.02	0.03	V0	0.02	V0
n-Butane	0.03	0.37	V0	0.35	V0
n-Decane	0.06	< 0.06	V1	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1	< 0.4	V1
n-Heptane	0.01	0.06	V0	0.03	V0
n-Hexane	0.01	0.08	V0	0.06	V0
n-Nonane	0.01	< 0.01	V1	0.01	V0
n-Octane	0.02	< 0.02	V1	< 0.02	V1
n-Pentane	0.1	0.2	V0	0.1	V0
n-Propylbenzene	0.05	< 0.05	V1	< 0.05	V1
n-Undecane	0.5	< 0.5	V1	< 0.5	V1
Naphthalene	0.5	< 0.5	V1	< 0.5	V1
o-Xylene	0.01	< 0.01	V1	< 0.01	V1
Styrene	0.04	< 0.04	V1	< 0.04	V1
Toluene	0.01	0.05	V0	0.06	V0
trans-2-Butene	0.01	< 0.01	V1	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1	< 0.02	V1
Isobutylene	0.3	< 0.3	V1	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1	< 0.3	V1



Station Name Station # Sample Date	CNRL Horizon AMS 15 31-Jan		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	< 0.03	V1
1,3,5-Trimethylbenzene	0.02	< 0.02	V1
1,3-Butadiene	0.02	< 0.02	V1
1-Butene	0.02	< 0.02	V1
1-Pentene	0.01	< 0.01	V1
2,2,4-Trimethylpentane	0.01	< 0.01	V1
2,2-Dimethylbutane	0.01	0.03	V0
2,3,4-Trimethylpentane	0.01	< 0.01	V1
2,3-Dimethylbutane	0.02	0.08	V0
2,3-Dimethylpentane	0.02	0.05	V0
2,4-Dimethylpentane	0.01	0.01	V0
2-Methyl-1-pentene	0.3	< 0.3	V1
2-Methyl-2-butene	0.3	< 0.3	V1
2-Methylheptane	0.01	< 0.01	V1
2-Methylhexane	0.01	0.02	V0
2-Methylpentane	0.01	0.05	V0
3-Methyl-1-butene	0.3	< 0.3	V1
3-Methylheptane	0.02	< 0.02	V1
3-Methylhexane	0.02	0.03	V0
3-Methylpentane	0.01	0.14	V0
4-Methyl-1-pentene	0.3	< 0.3	V1
Acetaldehyde	3	< 3	V1
Acetone	0.4	1.4	V0
alpha-Pinene	0.3	< 0.3	V1
Benzene	0.01	0.1	V0
beta-Pinene	0.3	< 0.3	V1
cis-2-Butene	0.02	< 0.02	V1
cis-2-Hexene	0.3	< 0.3	V1
cis-2-Pentene	0.02	< 0.02	V1
Cyclohexane	0.02	0.12	V0
Cyclopentane	0.01	0.04	V0
Cyclopentene	0.3	< 0.3	V1
Ethanol	0.3	0.5	V0
Ethylbenzene	0.01	< 0.01	V1
Formaldehyde	3	< 3	V1
Isobutane	0.02	0.83	V0
Isopentane	0.03	0.79	V0
Isoprene	0.01	< 0.01	V1
Isopropylalcohol	0.4	< 0.4	V1
Isopropylbenzene	0.01	< 0.01	V1
m,p-Xylene	0.03	< 0.03	V1
Methanol	3	3	V0
Methylethylketone	0.3	< 0.3	V1
Methylisobutylketone	0.4	< 0.4	V1
Methylcyclohexane	0.01	0.08	V0
Methylcyclopentane	0.02	0.1	V0
n-Butane	0.03	0.45	V0
n-Decane	0.06	< 0.06	V1
n-Dodecane	0.4	< 0.4	V1
n-Heptane	0.01	0.03	V0
n-Hexane	0.01	0.07	V0
n-Nonane	0.01	< 0.01	V1
n-Octane	0.02	< 0.02	V1
n-Pentane	0.1	0.2	V0
n-Propylbenzene	0.05	< 0.05	V1
n-Undecane	0.5	< 0.5	V1
Naphthalene	0.5	< 0.5	V1
o-Xylene	0.01	< 0.01	V1
Styrene	0.04	< 0.04	V1
Toluene	0.01	0.05	V0
trans-2-Butene	0.01	< 0.01	V1
trans-2-Hexene	0.3	< 0.3	V1
trans-2-Pentene	0.02	< 0.02	V1
Isobutylene	0.3	< 0.3	V1
Methylvinylketone	0.3	< 0.3	V1



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1	Bertha Ganter - Fort McKay AMS 1	Bertha Ganter - Fort McKay AMS 1	Bertha Ganter - Fort McKay AMS 1
	Jan 01 - Jan 31 Average	Jan 01 - Jan 31 Std Dev	Jan 01 - Jan 31 Total Samples (#)	Jan 01 - Jan 31 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.02	6	3
1,3,5-Trimethylbenzene	0.01	0.01	6	2
1,3-Butadiene	0.02	0.02	6	3
1-Butene	0.13	0.08	6	6
1-Pentene	0.01	0.01	6	4
2,2,4-Trimethylpentane	0.02	0.03	6	2
2,2-Dimethylbutane	0.05	0.03	6	5
2,3,4-Trimethylpentane	0.02	0.01	6	5
2,3-Dimethylbutane	0.07	0.04	6	5
2,3-Dimethylpentane	0.08	0.06	6	5
2,4-Dimethylpentane	0.02	0.01	6	4
2-Methyl-1-pentene	0.00	0.00	6	0
2-Methyl-2-butene	0.00	0.00	6	0
2-Methylheptane	0.16	0.21	6	5
2-Methylhexane	0.11	0.12	6	6
2-Methylpentane	0.19	0.10	6	6
3-Methyl-1-butene	0.00	0.00	6	0
3-Methylheptane	0.05	0.07	6	3
3-Methylhexane	0.15	0.16	6	6
3-Methylpentane	0.13	0.06	6	6
4-Methyl-1-pentene	0.00	0.00	6	0
Acetaldehyde	0.50	1.22	6	1
Acetone	1.27	0.29	6	6
alpha-Pinene	0.00	0.00	6	0
Benzene	0.21	0.11	6	6
beta-Pinene	0.00	0.00	6	0
cis-2-Butene	0.01	0.02	6	2
cis-2-Hexene	0.00	0.00	6	0
cis-2-Pentene	0.00	0.00	6	0
Cyclohexane	0.08	0.05	6	6
Cyclopentane	0.04	0.02	6	5
Cyclopentene	0.00	0.00	6	0
Ethanol	1.03	0.70	6	6
Ethylbenzene	0.05	0.05	6	6
Formaldehyde	0.00	0.00	6	0
Isobutane	0.62	0.24	6	6
Isopentane	0.52	0.23	6	6
Isoprene	0.02	0.02	6	4
Isopropylalcohol	0.00	0.00	6	0
Isopropylbenzene	0.00	0.01	6	1
m,p-Xylene	0.14	0.13	6	5
Methanol	4.83	1.94	6	6
Methylethylketone	0.00	0.00	6	0
Methylisobutylketone	0.00	0.00	6	0
Methylcyclohexane	0.18	0.17	6	6
Methylcyclopentane	0.15	0.13	6	6
n-Butane	0.95	0.65	6	6
n-Decane	0.00	0.00	6	0
n-Dodecane	0.00	0.00	6	0
n-Heptane	0.35	0.46	6	6
n-Hexane	0.32	0.33	6	6
n-Nonane	0.07	0.09	6	5
n-Octane	0.23	0.32	6	5
n-Pentane	0.37	0.15	6	6
n-Propylbenzene	0.00	0.00	6	0
n-Undecane	0.00	0.00	6	0
Naphthalene	0.00	0.00	6	0
o-Xylene	0.06	0.05	6	6
Styrene	0.00	0.00	6	0
Toluene	0.32	0.23	6	6
trans-2-Butene	0.02	0.03	6	3
trans-2-Hexene	0.00	0.00	6	0
trans-2-Pentene	0.00	0.00	6	0
Isobutylene	0.00	0.00	6	0
Methylvinylketone	0.00	0.00	6	0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Patricia McInnes AMS 6 Jan 01 - Jan 31 Average	Patricia McInnes AMS 6 Jan 01 - Jan 31 Std Dev	Patricia McInnes AMS 6 Jan 01 - Jan 31 Total Samples (#)	Patricia McInnes AMS 6 Jan 01 - Jan 31 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.03	0.03	6	3
1,3,5-Trimethylbenzene	0.02	0.02	6	3
1,3-Butadiene	0.02	0.03	6	2
1-Butene	0.13	0.08	6	5
1-Pentene	0.01	0.01	6	3
2,2,4-Trimethylpentane	0.06	0.06	6	4
2,2-Dimethylbutane	0.03	0.03	6	5
2,3,4-Trimethylpentane	0.02	0.02	6	5
2,3-Dimethylbutane	0.04	0.04	6	5
2,3-Dimethylpentane	0.07	0.05	6	5
2,4-Dimethylpentane	0.02	0.01	6	5
2-Methyl-1-pentene	0.00	0.00	6	0
2-Methyl-2-butene	0.00	0.00	6	0
2-Methylheptane	0.06	0.10	6	5
2-Methylhexane	0.07	0.05	6	6
2-Methylpentane	0.13	0.10	6	6
3-Methyl-1-butene	0.00	0.00	6	0
3-Methylheptane	0.03	0.04	6	3
3-Methylhexane	0.07	0.06	6	5
3-Methylpentane	0.09	0.07	6	6
4-Methyl-1-pentene	0.00	0.00	6	0
Acetaldehyde	0.00	0.00	6	0
Acetone	1.32	0.80	6	6
alpha-Pinene	0.00	0.00	6	0
Benzene	0.22	0.11	6	6
beta-Pinene	0.00	0.00	6	0
cis-2-Butene	0.03	0.02	6	5
cis-2-Hexene	0.00	0.00	6	0
cis-2-Pentene	0.00	0.00	6	0
Cyclohexane	0.04	0.04	6	4
Cyclopentane	0.03	0.04	6	5
Cyclopentene	0.00	0.00	6	0
Ethanol	1.92	1.30	6	6
Ethylbenzene	0.05	0.04	6	5
Formaldehyde	0.00	0.00	6	0
Isobutane	0.66	0.40	6	6
Isopentane	0.58	0.35	6	6
Isoprene	0.04	0.09	6	4
Isopropylalcohol	0.00	0.00	6	0
Isopropylbenzene	0.00	0.00	6	1
m,p-Xylene	0.14	0.10	6	5
Methanol	12.00	11.92	6	5
Methylethylketone	0.00	0.00	6	0
Methylisobutylketone	0.00	0.00	6	0
Methylcyclohexane	0.07	0.09	6	5
Methylcyclopentane	0.08	0.06	6	5
n-Butane	1.18	0.76	6	6
n-Decane	0.00	0.00	6	0
n-Dodecane	0.00	0.00	6	0
n-Heptane	0.12	0.15	6	6
n-Hexane	0.14	0.10	6	6
n-Nonane	0.03	0.05	6	5
n-Octane	0.10	0.17	6	5
n-Pentane	0.38	0.34	6	6
n-Propylbenzene	0.00	0.00	6	0
n-Undecane	0.00	0.00	6	0
Naphthalene	0.00	0.00	6	0
o-Xylene	0.06	0.04	6	5
Styrene	0.00	0.00	6	0
Toluene	0.24	0.15	6	6
trans-2-Butene	0.02	0.02	6	4
trans-2-Hexene	0.00	0.00	6	0
trans-2-Pentene	0.00	0.01	6	1
Isobutylene	0.00	0.00	6	0
Methylvinylketone	0.00	0.00	6	0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
	AMS 7	AMS 7	AMS 7	AMS 7
	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Compound Name	Average	Std Dev	Total Samples (#)	Total ≥ MDL (#)
	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.02	6	3
1,3,5-Trimethylbenzene	0.01	0.01	6	3
1,3-Butadiene	0.02	0.02	6	2
1-Butene	0.10	0.05	6	6
1-Pentene	0.01	0.01	6	3
2,2,4-Trimethylpentane	0.06	0.05	6	5
2,2-Dimethylbutane	0.02	0.02	6	6
2,3,4-Trimethylpentane	0.01	0.01	6	4
2,3-Dimethylbutane	0.03	0.02	6	5
2,3-Dimethylpentane	0.05	0.03	6	6
2,4-Dimethylpentane	0.02	0.01	6	4
2-Methyl-1-pentene	0.00	0.00	6	0
2-Methyl-2-butene	0.00	0.00	6	0
2-Methylheptane	0.04	0.07	6	5
2-Methylhexane	0.06	0.05	6	6
2-Methylpentane	0.12	0.08	6	6
3-Methyl-1-butene	0.00	0.00	6	0
3-Methylheptane	0.01	0.03	6	1
3-Methylhexane	0.06	0.07	6	5
3-Methylpentane	0.07	0.06	6	6
4-Methyl-1-pentene	0.00	0.00	6	0
Acetaldehyde	0.00	0.00	6	0
Acetone	1.08	0.18	6	6
alpha-Pinene	0.00	0.00	6	0
Benzene	0.18	0.08	6	6
beta-Pinene	0.00	0.00	6	0
cis-2-Butene	0.02	0.02	6	4
cis-2-Hexene	0.00	0.00	6	0
cis-2-Pentene	0.00	0.00	6	0
Cyclohexane	0.02	0.03	6	3
Cyclopentane	0.03	0.02	6	5
Cyclopentene	0.00	0.00	6	0
Ethanol	1.27	0.89	6	6
Ethylbenzene	0.03	0.02	6	6
Formaldehyde	0.00	0.00	6	0
Isobutane	0.57	0.39	6	6
Isopentane	0.51	0.28	6	6
Isoprene	0.01	0.01	6	4
Isopropylalcohol	0.00	0.00	6	0
Isopropylbenzene	0.00	0.00	6	1
m,p-Xylene	0.09	0.07	6	5
Methanol	14.33	10.09	6	6
Methylethylketone	0.00	0.00	6	0
Methylisobutylketone	0.00	0.00	6	0
Methylcyclohexane	0.06	0.07	6	5
Methylcyclopentane	0.07	0.06	6	6
n-Butane	1.30	1.30	6	6
n-Decane	0.00	0.00	6	0
n-Dodecane	0.00	0.00	6	0
n-Heptane	0.11	0.17	6	6
n-Hexane	0.13	0.14	6	6
n-Nonane	0.03	0.04	6	4
n-Octane	0.07	0.12	6	3
n-Pentane	0.32	0.23	6	6
n-Propylbenzene	0.00	0.00	6	0
n-Undecane	0.00	0.00	6	0
Naphthalene	0.00	0.00	6	0
o-Xylene	0.04	0.03	6	5
Styrene	0.00	0.00	6	0
Toluene	0.17	0.09	6	6
trans-2-Butene	0.01	0.01	6	4
trans-2-Hexene	0.00	0.00	6	0
trans-2-Pentene	0.01	0.01	6	1
Isobutylene	0.00	0.00	6	0
Methylvinylketone	0.00	0.00	6	0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Anzac AMS 14 Jan 01 - Jan 31 Average ppbv	Anzac AMS 14 Jan 01 - Jan 31 Std Dev ppbv	Anzac AMS 14 Jan 01 - Jan 31 Total Samples (#)	Anzac AMS 14 Jan 01 - Jan 31 Total ≥ MDL (#)
Compound Name				
1,2,4-Trimethylbenzene	0.01	0.01	6	1
1,3,5-Trimethylbenzene	0.00	0.01	6	1
1,3-Butadiene	0.04	0.08	6	3
1-Butene	0.16	0.21	6	5
1-Pentene	0.01	0.02	6	3
2,2,4-Trimethylpentane	0.05	0.04	6	5
2,2-Dimethylbutane	0.01	0.02	6	4
2,3,4-Trimethylpentane	0.01	0.02	6	3
2,3-Dimethylbutane	0.02	0.02	6	3
2,3-Dimethylpentane	0.06	0.05	6	5
2,4-Dimethylpentane	0.02	0.01	6	5
2-Methyl-1-pentene	0.00	0.00	6	0
2-Methyl-2-butene	0.00	0.00	6	0
2-Methylheptane	0.02	0.03	6	4
2-Methylhexane	0.03	0.03	6	5
2-Methylpentane	0.07	0.04	6	6
3-Methyl-1-butene	0.00	0.00	6	0
3-Methylheptane	0.01	0.01	6	1
3-Methylhexane	0.04	0.03	6	5
3-Methylpentane	0.05	0.04	6	6
4-Methyl-1-pentene	0.00	0.00	6	0
Acetaldehyde	0.00	0.00	6	0
Acetone	1.28	0.47	6	6
alpha-Pinene	0.00	0.00	6	0
Benzene	0.26	0.28	6	6
beta-Pinene	0.00	0.00	6	0
cis-2-Butene	0.03	0.03	6	4
cis-2-Hexene	0.00	0.00	6	0
cis-2-Pentene	0.00	0.01	6	1
Cyclohexane	0.02	0.02	6	3
Cyclopentane	0.02	0.02	6	4
Cyclopentene	0.00	0.00	6	0
Ethanol	0.67	0.34	6	5
Ethylbenzene	0.02	0.02	6	5
Formaldehyde	0.00	0.00	6	0
Isobutane	0.51	0.18	6	6
Isopentane	0.45	0.25	6	6
Isoprene	0.01	0.02	6	2
Isopropylalcohol	0.00	0.00	6	0
Isopropylbenzene	0.00	0.00	6	0
m,p-Xylene	0.04	0.04	6	5
Methanol	5.00	1.67	6	6
Methylethylketone	0.00	0.00	6	0
Methylisobutylketone	0.00	0.00	6	0
Methylcyclohexane	0.04	0.03	6	5
Methylcyclopentane	0.05	0.04	6	5
n-Butane	0.99	0.41	6	6
n-Decane	0.00	0.00	6	0
n-Dodecane	0.00	0.00	6	0
n-Heptane	0.06	0.06	6	6
n-Hexane	0.11	0.08	6	6
n-Nonane	0.01	0.02	6	3
n-Octane	0.03	0.05	6	2
n-Pentane	0.35	0.23	6	6
n-Propylbenzene	0.00	0.00	6	0
n-Undecane	0.00	0.00	6	0
Naphthalene	0.00	0.00	6	0
o-Xylene	0.02	0.02	6	5
Styrene	0.00	0.00	6	0
Toluene	0.17	0.12	6	6
trans-2-Butene	0.03	0.04	6	3
trans-2-Hexene	0.00	0.00	6	0
trans-2-Pentene	0.00	0.01	6	1
Isobutylene	0.00	0.00	6	0
Methylvinylketone	0.00	0.00	6	0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
 Indicated Sites and Dates

Station Name Station # Sample Date	Barge Landing AMS 9 Jan 01 - Jan 31 Average	Barge Landing AMS 9 Jan 01 - Jan 31 Std Dev	Barge Landing AMS 9 Jan 01 - Jan 31 Total Samples (#)	Barge Landing AMS 9 Jan 01 - Jan 31 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.03	6	2
1,3,5-Trimethylbenzene	0.01	0.01	6	2
1,3-Butadiene	0.02	0.03	6	2
1-Butene	0.11	0.12	6	5
1-Pentene	0.01	0.02	6	3
2,2,4-Trimethylpentane	0.00	0.00	6	0
2,2-Dimethylbutane	0.09	0.07	6	6
2,3,4-Trimethylpentane	0.01	0.01	6	4
2,3-Dimethylbutane	0.16	0.18	6	6
2,3-Dimethylpentane	0.08	0.07	6	6
2,4-Dimethylpentane	0.04	0.06	6	5
2-Methyl-1-pentene	0.00	0.00	6	0
2-Methyl-2-butene	0.00	0.00	6	0
2-Methylheptane	0.14	0.14	6	5
2-Methylhexane	0.22	0.33	6	6
2-Methylpentane	0.86	1.37	6	6
3-Methyl-1-butene	0.00	0.00	6	0
3-Methylheptane	0.07	0.08	6	4
3-Methylhexane	0.21	0.27	6	6
3-Methylpentane	0.45	0.69	6	6
4-Methyl-1-pentene	0.00	0.00	6	0
Acetaldehyde	0.00	0.00	6	0
Acetone	1.43	0.44	6	6
alpha-Pinene	0.00	0.00	6	0
Benzene	0.35	0.33	6	6
beta-Pinene	0.00	0.00	6	0
cis-2-Butene	0.02	0.02	6	4
cis-2-Hexene	0.00	0.00	6	0
cis-2-Pentene	0.00	0.00	6	0
Cyclohexane	0.30	0.58	6	5
Cyclopentane	0.15	0.19	6	6
Cyclopentene	0.00	0.00	6	0
Ethanol	0.93	0.48	6	6
Ethylbenzene	0.05	0.04	6	5
Formaldehyde	0.00	0.00	6	0
Isobutane	1.31	1.60	6	6
Isopentane	2.28	3.84	6	6
Isoprene	0.01	0.01	6	3
Isopropylalcohol	0.00	0.00	6	0
Isopropylbenzene	0.00	0.01	6	2
m,p-Xylene	0.14	0.16	6	4
Methanol	6.83	4.62	6	5
Methylethylketone	0.00	0.00	6	0
Methylisobutylketone	0.00	0.00	6	0
Methylcyclohexane	0.40	0.70	6	6
Methylcyclopentane	0.34	0.55	6	6
n-Butane	7.62	15.98	6	6
n-Decane	0.00	0.00	6	0
n-Dodecane	0.00	0.00	6	0
n-Heptane	0.45	0.64	6	6
n-Hexane	1.06	1.97	6	6
n-Nonane	0.07	0.07	6	5
n-Octane	0.22	0.25	6	4
n-Pentane	3.38	6.63	6	6
n-Propylbenzene	0.00	0.00	6	0
n-Undecane	0.00	0.00	6	0
Naphthalene	0.00	0.00	6	0
o-Xylene	0.05	0.05	6	4
Styrene	0.00	0.00	6	0
Toluene	0.38	0.44	6	6
trans-2-Butene	0.02	0.03	6	2
trans-2-Hexene	0.00	0.00	6	0
trans-2-Pentene	0.00	0.00	6	0
Isobutylene	0.00	0.00	6	0
Methylvinylketone	0.00	0.00	6	0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Volatile Organic Compounds (VOCs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Fort McKay South	Fort McKay South	Fort McKay South	Fort McKay South
	AMS 13	AMS 13	AMS 13	AMS 13
	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Compound Name	Average ppbv	Std Dev ppbv	Total Samples (#)	Total ≥ MDL (#)
1,2,4-Trimethylbenzene	0.02	0.04	6	2
1,3,5-Trimethylbenzene	0.01	0.02	6	2
1,3-Butadiene	0.01	0.01	6	2
1-Butene	0.09	0.08	6	5
1-Pentene	0.01	0.02	6	3
2,2,4-Trimethylpentane	0.00	0.00	6	0
2,2-Dimethylbutane	0.06	0.04	6	5
2,3,4-Trimethylpentane	0.02	0.03	6	4
2,3-Dimethylbutane	0.09	0.06	6	5
2,3-Dimethylpentane	0.09	0.09	6	5
2,4-Dimethylpentane	0.02	0.02	6	4
2-Methyl-1-pentene	0.00	0.00	6	0
2-Methyl-2-butene	0.00	0.00	6	0
2-Methylheptane	0.42	0.68	6	5
2-Methylhexane	0.14	0.18	6	6
2-Methylpentane	0.21	0.14	6	6
3-Methyl-1-butene	0.00	0.00	6	0
3-Methylheptane	0.14	0.22	6	4
3-Methylhexane	0.22	0.30	6	5
3-Methylpentane	0.14	0.09	6	6
4-Methyl-1-pentene	0.00	0.00	6	0
Acetaldehyde	0.00	0.00	6	0
Acetone	1.08	0.15	6	6
alpha-Pinene	0.00	0.00	6	0
Benzene	0.20	0.12	6	6
beta-Pinene	0.00	0.00	6	0
cis-2-Butene	0.01	0.02	6	3
cis-2-Hexene	0.00	0.00	6	0
cis-2-Pentene	0.00	0.00	6	0
Cyclohexane	0.11	0.13	6	5
Cyclopentane	0.04	0.03	6	5
Cyclopentene	0.00	0.00	6	0
Ethanol	0.83	0.83	6	5
Ethylbenzene	0.12	0.18	6	6
Formaldehyde	0.00	0.00	6	0
Isobutane	0.55	0.24	6	6
Isopentane	0.50	0.22	6	6
Isoprene	0.02	0.02	6	3
Isopropylalcohol	0.00	0.00	6	0
Isopropylbenzene	0.01	0.02	6	2
m,p-Xylene	0.27	0.46	6	4
Methanol	2.17	2.40	6	3
Methylethylketone	0.00	0.00	6	0
Methylisobutylketone	0.00	0.00	6	0
Methylcyclohexane	0.38	0.55	6	6
Methylcyclopentane	0.19	0.23	6	6
n-Butane	0.83	0.67	6	6
n-Decane	0.02	0.04	6	1
n-Dodecane	0.00	0.00	6	0
n-Heptane	0.61	0.93	6	6
n-Hexane	0.33	0.37	6	6
n-Nonane	0.17	0.27	6	6
n-Octane	0.63	1.05	6	5
n-Pentane	0.40	0.24	6	6
n-Propylbenzene	0.00	0.00	6	0
n-Undecane	0.00	0.00	6	0
Naphthalene	0.00	0.00	6	0
o-Xylene	0.09	0.14	6	4
Styrene	0.00	0.00	6	0
Toluene	0.49	0.70	6	6
trans-2-Butene	0.02	0.02	6	3
trans-2-Hexene	0.00	0.00	6	0
trans-2-Pentene	0.00	0.00	6	0
Isobutylene	0.00	0.00	6	0
Methylvinylketone	0.00	0.00	6	0



Station Name Station # Sample Date	CNRL Horizon AMS 15 Jan 01 - Jan 31 Average	CNRL Horizon AMS 15 Jan 01 - Jan 31 Std Dev	CNRL Horizon AMS 15 Jan 01 - Jan 31 Total Samples (#)	CNRL Horizon AMS 15 Jan 01 - Jan 31 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.01	0.01	6	1
1,3,5-Trimethylbenzene	0.00	0.00	6	0
1,3-Butadiene	0.00	0.01	6	1
1-Butene	0.05	0.03	6	5
1-Pentene	0.01	0.01	6	2
2,2,4-Trimethylpentane	0.00	0.00	6	0
2,2-Dimethylbutane	0.07	0.04	6	6
2,3,4-Trimethylpentane	0.01	0.01	6	3
2,3-Dimethylbutane	0.13	0.09	6	6
2,3-Dimethylpentane	0.08	0.05	6	6
2,4-Dimethylpentane	0.02	0.02	6	4
2-Methyl-1-pentene	0.00	0.00	6	0
2-Methyl-2-butene	0.00	0.00	6	0
2-Methylheptane	0.08	0.09	6	5
2-Methylhexane	0.05	0.04	6	6
2-Methylpentane	0.12	0.10	6	6
3-Methyl-1-butene	0.00	0.00	6	0
3-Methylheptane	0.03	0.04	6	2
3-Methylhexane	0.07	0.05	6	6
3-Methylpentane	0.19	0.11	6	6
4-Methyl-1-pentene	0.00	0.00	6	0
Acetaldehyde	0.00	0.00	6	0
Acetone	1.30	0.19	6	6
alpha-Pinene	0.52	1.27	6	1
Benzene	0.13	0.04	6	6
beta-Pinene	0.00	0.00	6	0
cis-2-Butene	0.01	0.01	6	1
cis-2-Hexene	0.00	0.00	6	0
cis-2-Pentene	0.00	0.00	6	0
Cyclohexane	0.18	0.11	6	6
Cyclopentane	0.07	0.05	6	6
Cyclopentene	0.00	0.00	6	0
Ethanol	0.43	0.05	6	6
Ethylbenzene	0.02	0.03	6	4
Formaldehyde	0.00	0.00	6	0
Isobutane	1.33	0.75	6	6
Isopentane	1.20	0.69	6	6
Isoprene	0.00	0.00	6	0
Isopropylalcohol	0.00	0.00	6	0
Isopropylbenzene	0.00	0.00	6	1
m,p-Xylene	0.05	0.06	6	3
Methanol	1.00	1.55	6	2
Methylethylketone	0.00	0.00	6	0
Methylisobutylketone	0.00	0.00	6	0
Methylcyclohexane	0.19	0.15	6	6
Methylcyclopentane	0.16	0.09	6	6
n-Butane	0.79	0.44	6	6
n-Decane	0.00	0.00	6	0
n-Dodecane	0.00	0.00	6	0
n-Heptane	0.13	0.13	6	6
n-Hexane	0.10	0.04	6	6
n-Nonane	0.04	0.04	6	5
n-Octane	0.11	0.12	6	5
n-Pentane	0.32	0.20	6	6
n-Propylbenzene	0.00	0.00	6	0
n-Undecane	0.00	0.00	6	0
Naphthalene	0.00	0.00	6	0
o-Xylene	0.02	0.02	6	3
Styrene	0.00	0.00	6	0
Toluene	0.13	0.10	6	6
trans-2-Butene	0.01	0.01	6	1
trans-2-Hexene	0.00	0.00	6	0
trans-2-Pentene	0.00	0.00	6	0
Isobutylene	0.00	0.00	6	0
Methylvinylketone	0.00	0.00	6	0



Wood Buffalo Environmental Association

VOC summary (ppbv)

2017 January

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99%	Max.	Mean	Std. Dev.	Median	Outlier	Test
1,2,4-Trimethylbenzene	36%	42	27	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.05	0.06	0.09	0.09	0.02	0.02	0.00	0.00	0.14
1,3,5-Trimethylbenzene	31%	42	29	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.03	0.05	0.05	0.01	0.01	0.00	0.00	0.08
1,3-Butadiene	36%	42	27	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.04	0.06	0.20	0.20	0.02	0.03	0.00	0.00	0.19
1-Butene	88%	42	5	0.00	0.00	0.04	0.08	0.10	0.15	0.16	0.22	0.24	0.55	0.55	0.11	0.10	0.08	0.08	0.63
1-Pentene	50%	42	21	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.04	0.06	0.06	0.06	0.01	0.02	0.01	0.01	0.09
2,2,4-Trimethylpentane	38%	42	26	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.08	0.12	0.17	0.17	0.03	0.04	0.00	0.00	0.23
2,2-Dimethylbutane	88%	42	5	0.00	0.01	0.03	0.04	0.07	0.08	0.10	0.12	0.12	0.21	0.21	0.05	0.05	0.03	0.03	0.27
2,3,4-Trimethylpentane	67%	42	14	0.00	0.00	0.02	0.02	0.02	0.02	0.03	0.04	0.07	0.07	0.07	0.02	0.02	0.02	0.02	0.09
2,3-Dimethylbutane	83%	42	7	0.00	0.02	0.05	0.07	0.11	0.12	0.15	0.20	0.50	0.50	0.08	0.09	0.05	0.05	0.53	0.53
2,3-Dimethylpentane	90%	42	4	0.00	0.02	0.03	0.06	0.08	0.09	0.10	0.15	0.17	0.25	0.25	0.07	0.06	0.06	0.06	0.36
2,4-Dimethylpentane	74%	42	11	0.00	0.00	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.17	0.17	0.02	0.03	0.02	0.02	0.16
2-Methyl-1-pentene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-Methyl-2-butene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-Methylheptane	81%	42	8	0.00	0.01	0.03	0.05	0.14	0.17	0.29	0.53	1.75	1.75	0.13	0.29	0.03	0.03	1.57	1.57
2-Methylhexane	98%	42	1	0.00	0.02	0.05	0.06	0.11	0.12	0.19	0.32	0.88	0.88	0.10	0.15	0.05	0.05	0.87	0.87
2-Methylpentane	100%	42	0	0.02	0.05	0.07	0.13	0.15	0.25	0.27	0.35	0.42	3.63	3.63	0.24	0.55	0.13	0.13	3.00
3-Methyl-1-butene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-Methylheptane	43%	42	24	0.00	0.00	0.00	0.02	0.06	0.06	0.11	0.19	0.57	0.57	0.05	0.10	0.00	0.00	0.54	0.54
3-Methylhexane	90%	42	4	0.00	0.02	0.03	0.06	0.07	0.13	0.14	0.24	0.45	0.79	0.79	0.12	0.17	0.06	0.06	0.98
3-Methylpentane	100%	42	0	0.02	0.03	0.06	0.10	0.12	0.18	0.21	0.25	0.32	1.85	1.85	0.16	0.28	0.10	0.10	1.56
4-Methyl-1-pentene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acetaldehyde	2%	42	41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	3.00	0.07	0.46	0.00	0.00	2.39
Acetone	100%	42	0	0.80	0.90	1.00	1.20	1.20	1.40	1.50	1.60	2.00	2.90	2.90	1.25	0.40	1.20	1.20	3.27
alpha-Pinene	2%	42	41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.10	3.10	0.07	0.48	0.00	0.00	2.47
Benzene	100%	42	0	0.08	0.10	0.12	0.17	0.19	0.24	0.25	0.42	0.44	0.97	0.97	0.22	0.18	0.17	0.17	1.12
beta-Pinene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cis-2-Butene	55%	42	19	0.00	0.00	0.02	0.03	0.03	0.03	0.04	0.05	0.08	0.08	0.02	0.02	0.02	0.02	0.12	0.12
cis-2-Hexene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cis-2-Pentene	2%	42	41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.02
Cyclohexane	76%	42	10	0.00	0.02	0.06	0.06	0.09	0.12	0.22	0.36	1.47	1.47	0.11	0.23	0.06	0.06	1.26	1.26
Cyclopentane	86%	42	6	0.00	0.02	0.03	0.04	0.06	0.07	0.12	0.13	0.53	0.53	0.05	0.08	0.03	0.03	0.47	0.47
Cyclopentene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethanol	95%	42	2	0.00	0.40	0.50	0.70	0.90	1.50	1.50	2.40	2.40	3.60	3.60	1.01	0.83	0.70	0.70	5.17
Ethylbenzene	88%	42	5	0.00	0.01	0.02	0.04	0.06	0.06	0.10	0.14	0.46	0.46	0.05	0.07	0.02	0.02	0.42	0.42
Formaldehyde	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isobutane	100%	42	0	0.23	0.29	0.38	0.66	0.74	0.87	0.94	1.25	1.67	4.52	4.52	0.79	0.74	0.66	0.66	4.50
Isobutylene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isopentane	100%	42	0	0.14	0.23	0.38	0.57	0.68	0.84	0.92	1.09	1.78	10.10	10.10	0.86	1.52	0.57	0.57	8.46
Isoprene	48%	42	22	0.00	0.00	0.00	0.01	0.02	0.02	0.03	0.05	0.22	0.22	0.01	0.04	0.00	0.00	0.19	0.19
Isopropylalcohol	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isopropylbenzene	19%	42	34	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04	0.04	0.00	0.01	0.00	0.00	0.04	0.04
m,p-Xylene	74%	42	11	0.00	0.00	0.00	0.07	0.10	0.15	0.17	0.26	0.38	1.18	1.18	0.12	0.20	0.07	0.07	1.11
Methanol	79%	42	9	0.00	3.00	5.00	6.00	7.00	9.00	14.00	20.00	32.00	32.00	6.60	7.45	5.00	5.00	43.83	43.83
Methylcyclohexane	93%	42	3	0.00	0.02	0.03	0.06	0.08	0.19	0.21	0.38	0.49	1.82	1.82	0.19	0.35	0.06	0.06	1.95
Methylcyclopentane	95%	42	2	0.00	0.02	0.04	0.08	0.10	0.17	0.19	0.27	0.39	1.45	1.45	0.15	0.24	0.08	0.08	1.33
Methylethylketone	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methylisobutylketone	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methylvinylketone	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Butane	100%	42	0	0.34	0.37	0.45	0.87	1.06	1.34	1.43	2.10	2.38	40.20	40.20	1.95	6.09	0.87	0.87	32.39
n-Decane	2%	42	41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.00	0.02	0.00	0.00	0.08
n-Dodecane	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Heptane	100%	42	0	0.01	0.03	0.04	0.07	0.10	0.26	0.30	0.53	1.25	2.39	2.39	0.26	0.48	0.07	0.07	2.65
n-Hexane	100%	42	0	0.03	0.04	0.06	0.13	0.15	0.22	0.27	0.52	0.96	5.07	5.07	0.31	0.78	0.13	0.13	4.22
n-Nonane	79%	42	9	0.00	0.01	0.02	0.03	0.06	0.08	0.14	0.20	0.70	0.70	0.06	0.12	0.02	0.02	0.65	0.65
n-Octane	69%	42	13	0.00	0.00	0.04	0.06	0.19	0.23	0.45	0.83	2.68	2.68	0.20	0.45	0.04	0.04	2.43	2.43
n-Pentane	100%	42	0	0.10	0.10	0.20	0.30	0.40	0.60	0.60	0.70	1.10	16.90	16.90	0.79	2.56	0.30	0.30	13.59
n-Propylbenzene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Undecane	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Naphthalene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
o-Xylene	76%	42	10	0.00	0.01	0.03	0.04	0.07	0.07	0.09	0.11	0.37	0.37	0.05	0.06	0.03	0.03	0.36	0.36
Styrene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toluene	100%	42	0	0.03	0.05	0.09	0.16	0.22	0.32	0.34	0.57	0.75	1.86	1.86	0.27	0.34	0.16	0.16	1.95
trans-2-Butene	48%	42	22	0.00	0.00	0.00	0.02	0.03	0.03	0.05	0.06	0.09	0.09	0.02	0.02	0.00	0.00	0.13	0.13
trans-2-Hexene	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trans-2-Pentene	7%	42	39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.03	0.00	0.01	0.00	0.00	0.03



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

**INTEGRATED MONITORING PROGRAM
MONTHLY REPORT**

**PARTICULATE MATTER - IONS
DATA SUMMARY
JANUARY 2017**

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM_{2.5}) - IONS DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER MEDIUM	< 2.5 μm or < 10 μm 47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Compound Name	Bertha Ganter - Fort							
	Station Name	McKay	AMS 1	AMS 6	AMS 6	Travel Blank	AMS 6	AMS 6
	Station #	AMS 1	AMS 1	AMS 6	AMS 6	01-Jan	AMS 6	AMS 6
	Sample Date	01-Jan	01-Jan	01-Jan	01-Jan	01-Jan	01-Jan	01-Jan
	Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5
	Total Air Volume (m ³)	24	24	8	8	24	24	24
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	QC Flag
Particulate Matter	1.00	4.01	V0	3.86	V6	0.31	V0	V0
Calcium	0.16	0.04	V0	0.08	V6	0.00	V1	V1
Magnesium	0.03	0.03	V0	0.04	V6	0.00	V0	V0
Potassium	0.09	0.01	V0	0.00	V6	0.00	V1	V1
Sodium	0.05	0.14	V0	0.14	V6	0.00	V1	V1
Chloride	0.12	0.14	V0	0.19	V6	0.01	V0	V0
Fluoride	0.15	0.01	V0	0.03	V6	0.02	V0	V0
Nitrate	0.20	0.20	V0	0.21	V6	-9999	M2	M2
Sulphate	0.25	0.22	V0	0.44	V6	0.00	V1	V1
Phosphate	0.26	0.00	V1	0.00	V6	0.00	V1	V1
Ammonium (as N)	0.02	0.06	V0	0.13	V6	0.00	V0	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		01-Jan	
Sample Date	01-Jan			01-Jan		01-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	3.11	V0	3.09	V0	0.31	V0
Calcium	0.16	0.04	V0	0.04	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.02	V0	0.00	V0
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.13	V0	0.12	V0	0.00	V1
Chloride	0.12	0.08	V0	0.13	V0	0.01	V0
Fluoride	0.15	0.01	V0	0.01	V0	0.02	V0
Nitrate	0.20	0.27	V0	0.16	V0	-9999	M2
Sulphate	0.25	0.46	V0	0.52	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.13	V0	0.14	V0	0.00	V0



Compound Name	Bertha Ganter - Fort							
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	5.53	V0	8.33	V0	0.33	V0	
Calcium	0.16	0.06	V0	0.07	V0	0.01	V0	
Magnesium	0.03	0.06	V0	0.05	V0	0.00	V1	
Potassium	0.09	0.01	V0	0.03	V0	0.00	V1	
Sodium	0.05	0.29	V0	0.30	V0	0.00	V1	
Chloride	0.12	0.32	V0	0.36	V0	0.00	V1	
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1	
Nitrate	0.20	0.33	V0	0.50	V0	0.01	V0	
Sulphate	0.25	0.87	V0	0.82	V0	0.00	V1	
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1	
Ammonium (as N)	0.02	0.23	V0	0.22	V0	0.00	V0	



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		07-Jan	
Sample Date	07-Jan			07-Jan		07-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	5.81	V0	4.92	V0	0.33	V0
Calcium	0.16	0.05	V0	0.04	V0	0.01	V0
Magnesium	0.03	0.05	V0	0.04	V0	0.00	V1
Potassium	0.09	0.07	V0	0.03	V0	0.00	V1
Sodium	0.05	0.22	V0	0.21	V0	0.00	V1
Chloride	0.12	0.27	V0	0.21	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.45	V0	0.35	V0	0.01	V0
Sulphate	0.25	0.50	V0	0.46	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.17	V0	0.14	V0	0.00	V0



Compound Name	Bertha Ganter - Fort							
	Station Name	McKay	AMS 1	Patricia McInnes	AMS 6	Travel Blank	AMS 6	Travel Blank
	Station #	AMS 1	AMS 6	AMS 6	AMS 6	13-Jan	AMS 6	13-Jan
	Sample Date	AMS 1	AMS 6	AMS 6	AMS 6	13-Jan	AMS 6	13-Jan
	Particulate Size	AMS 1	AMS 6	AMS 6	AMS 6	13-Jan	AMS 6	13-Jan
	Total Air Volume (m ³)	AMS 1	AMS 6	AMS 6	AMS 6	13-Jan	AMS 6	13-Jan
		24	24	24	24	24	24	24
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	QC Flag
Particulate Matter	1.00	8.83	V0	8.19	V0	0.34	V0	V0
Calcium	0.16	0.06	V0	0.03	V0	0.00	V0	V1
Magnesium	0.03	0.05	V0	0.03	V0	0.00	V0	V1
Potassium	0.09	0.10	V0	0.03	V0	0.00	V0	V1
Sodium	0.05	0.28	V0	0.18	V0	0.00	V0	V1
Chloride	0.12	0.14	V0	0.07	V0	0.00	V0	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V0	V1
Nitrate	0.20	1.51	V0	1.25	V0	0.01	V0	V0
Sulphate	0.25	1.16	V0	0.45	V0	0.00	V0	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1	V1
Ammonium (as N)	0.02	0.53	V0	0.30	V0	0.00	V0	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		13-Jan	
Sample Date	13-Jan			13-Jan		13-Jan	
Particulate Size	PM2.5			PM2.5		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	7.03	V0	2.31	V0	0.34	V0
Calcium	0.16	0.05	V0	0.03	V0	0.00	V1
Magnesium	0.03	0.05	V0	0.01	V0	0.00	V1
Potassium	0.09	0.02	V0	0.01	V0	0.00	V1
Sodium	0.05	0.31	V0	0.06	V0	0.00	V1
Chloride	0.12	0.21	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	1.33	V0	0.25	V0	0.01	V0
Sulphate	0.25	0.42	V0	0.21	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.27	V0	0.08	V0	0.00	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		19-Jan	
	Sample Date	19-Jan		19-Jan		19-Jan	
Particulate Size	PM2.5		PM2.5		PM2.5		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	5.45	V0	8.71	V0	0.40	V0
Calcium	0.16	0.03	V0	0.03	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.02	V0	0.00	V0
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.03	V0	0.01	V0	0.00	V0
Chloride	0.12	0.00	V1	0.00	V1	0.01	V0
Fluoride	0.15	0.00	V1	0.00	V1	0.01	V0
Nitrate	0.20	0.03	V0	0.26	V0	0.03	V0
Sulphate	0.25	1.13	V0	2.37	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.29	V0	0.75	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Particulate Size	PM2.5			PM2.5		24	
Total Air Volume (m ³)	23.8			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	7.58	V0	7.52	V4	0.40	V0
Calcium	0.16	0.05	V0	0.06	V0	0.01	V0
Magnesium	0.03	0.03	V0	0.03	V0	0.00	V0
Potassium	0.09	0.06	V0	0.12	V0	0.00	V1
Sodium	0.05	0.02	V0	0.01	V0	0.00	V0
Chloride	0.12	0.01	V0	0.02	V0	0.01	V0
Fluoride	0.15	0.00	V1	0.03	V0	0.01	V0
Nitrate	0.20	0.11	V0	0.73	V0	0.03	V0
Sulphate	0.25	2.20	V0	1.32	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.66	V0	0.48	V0	0.00	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		25-Jan	
	Sample Date	25-Jan		25-Jan		25-Jan	
Particulate Size	PM2.5		PM2.5		PM2.5		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	24.85	V0	16.88	V0	0.32	V0
Calcium	0.16	0.08	V0	0.07	V0	0.00	V1
Magnesium	0.03	0.05	V0	0.04	V0	0.00	V0
Potassium	0.09	0.19	V0	0.13	V0	0.00	V1
Sodium	0.05	0.08	V0	0.03	V0	0.00	V1
Chloride	0.12	0.04	V0	0.03	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	2.00	V0	1.83	V0	0.00	V1
Sulphate	0.25	4.11	V0	2.65	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	1.71	V0	1.24	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		25-Jan	
Sample Date	25-Jan			25-Jan		25-Jan	
Particulate Size	PM2.5			PM2.5		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	10.14	V0	8.86	V0	0.32	V0
Calcium	0.16	0.04	V0	0.04	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.02	V0	0.00	V0
Potassium	0.09	0.07	V0	0.05	V0	0.00	V1
Sodium	0.05	0.04	V0	0.02	V0	0.00	V1
Chloride	0.12	0.04	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.01	V0
Nitrate	0.20	0.79	V0	0.26	V0	0.00	V1
Sulphate	0.25	1.37	V0	1.30	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.56	V0	0.44	V0	0.00	V0



Compound Name	Bertha Ganter - Fort							
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	2.06	V0	1.63	V4	0.33	V0	
Calcium	0.16	0.02	V0	0.02	V0	0.04	V0	
Magnesium	0.03	0.01	V0	0.01	V0	0.02	V0	
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1	
Sodium	0.05	0.02	V0	0.02	V0	0.00	V1	
Chloride	0.12	0.01	V0	0.01	V0	0.01	V0	
Fluoride	0.15	0.01	V0	0.00	V1	0.00	V1	
Nitrate	0.20	0.06	V0	0.07	V0	0.07	V0	
Sulphate	0.25	0.23	V0	0.25	V0	0.00	V1	
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1	
Ammonium (as N)	0.02	0.06	V0	0.07	V0	0.00	V0	



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		31-Jan	
Sample Date	31-Jan			31-Jan		31-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	2.20	V0	1.36	V0	0.33	V0
Calcium	0.16	0.03	V0	0.03	V0	0.04	V0
Magnesium	0.03	0.01	V0	0.01	V0	0.02	V0
Potassium	0.09	0.02	V0	0.01	V0	0.00	V1
Sodium	0.05	0.02	V0	0.02	V0	0.00	V1
Chloride	0.12	0.01	V0	0.01	V0	0.01	V0
Fluoride	0.15	0.00	V1	0.01	V0	0.00	V1
Nitrate	0.20	0.11	V0	0.05	V0	0.07	V0
Sulphate	0.25	0.24	V0	0.22	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.08	V0	0.07	V0	0.00	V0



Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	8.45	8.33	6	6
Calcium	0.05	0.02	6	6
Magnesium	0.04	0.02	6	6
Potassium	0.06	0.08	6	6
Sodium	0.14	0.12	6	6
Chloride	0.11	0.12	6	5
Fluoride	0.01	0.00	6	5
Nitrate	0.69	0.85	6	6
Sulphate	1.29	1.44	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.48	0.63	6	6



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	7.93	5.24	6	6
Calcium	0.05	0.03	6	6
Magnesium	0.03	0.01	6	6
Potassium	0.04	0.05	6	5
Sodium	0.11	0.12	6	6
Chloride	0.11	0.14	6	5
Fluoride	0.01	0.01	6	4
Nitrate	0.69	0.70	6	6
Sulphate	1.16	1.06	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.45	0.45	6	6



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	5.98	2.95	6	6
Calcium	0.04	0.01	6	6
Magnesium	0.03	0.02	6	6
Potassium	0.04	0.03	6	6
Sodium	0.12	0.12	6	6
Chloride	0.10	0.11	6	6
Fluoride	0.00	0.00	6	3
Nitrate	0.51	0.48	6	6
Sulphate	0.86	0.76	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.31	0.24	6	6



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.68	2.99	6	6
Calcium	0.04	0.01	6	6
Magnesium	0.02	0.01	6	6
Potassium	0.04	0.04	6	6
Sodium	0.07	0.08	6	6
Chloride	0.06	0.09	6	6
Fluoride	0.01	0.01	6	5
Nitrate	0.30	0.23	6	6
Sulphate	0.67	0.51	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.22	0.18	6	6



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.68	2.99	6	6
Calcium	0.04	0.01	6	6
Magnesium	0.02	0.01	6	6
Potassium	0.04	0.04	6	6
Sodium	0.07	0.08	6	6
Chloride	0.06	0.09	6	6
Fluoride	0.01	0.01	6	5
Nitrate	0.30	0.23	6	6
Sulphate	0.67	0.51	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.22	0.18	6	6



Wood Buffalo Environmental Association

PM2.5 Ion Summary (µg/sample)

2017 January

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99%	Max.	Mean	Std. Dev.	Median	Outlier Test
Particulate Matter	100%	24	0	31	39	74	139	180	209	212	243	405	596	596	160	128	139	797
Calcium	100%	24	0	0.51	0.60	0.75	0.99	1.05	1.35	1.38	1.59	1.74	1.98	1.98	1.04	0.39	0.99	2.99
Magnesium	100%	24	0	0.27	0.30	0.39	0.60	0.72	1.11	1.14	1.17	1.23	1.50	1.50	0.69	0.37	0.60	2.53
Potassium	96%	24	1	0.03	0.12	0.24	0.51	0.75	1.56	1.65	2.91	3.09	4.50	4.50	1.00	1.17	0.51	6.85
Sodium	100%	24	0	0.18	0.36	0.48	1.38	2.97	4.98	5.28	7.05	7.23	7.53	7.53	2.59	2.57	1.38	15.46
Chloride	92%	24	2	0.06	0.12	0.18	0.84	1.71	3.45	5.07	6.45	7.62	8.55	8.55	2.17	2.60	0.84	15.17
Fluoride	71%	24	7	0.06	0.09	0.12	0.21	0.24	0.27	0.27	0.30	0.33	0.69	0.69	0.21	0.13	0.21	0.85
Nitrate	100%	24	0	0.72	1.38	2.61	6.36	8.46	18.90	29.94	36.12	43.86	47.88	47.88	12.95	14.28	6.36	84.34
Sulphate	100%	24	0	3.48	5.25	6.09	12.48	20.82	31.68	32.76	56.79	63.57	98.55	98.55	23.58	23.49	12.48	141.06
Phosphate	0%	24	24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	
Ammonium (as N)	100%	24	0	1.07	1.40	1.86	5.43	6.99	12.70	13.39	18.10	29.72	41.14	41.14	8.71	9.74	5.43	57.41



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM₁₀) - IONS DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER	$< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$
MEDIUM	47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		01-Jan	
Sample Date	01-Jan			01-Jan		01-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	7.07	V0	6.59	V0	0.25	V0
Calcium	0.16	0.10	V0	0.15	V0	0.01	V0
Magnesium	0.03	0.05	V0	0.05	V0	0.00	V1
Potassium	0.09	0.00	V0	0.01	V0	0.00	V1
Sodium	0.05	0.20	V0	0.20	V0	0.00	V1
Chloride	0.12	0.26	V0	0.31	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	0.26	V0	0.24	V0	0.02	V0
Sulphate	0.25	0.28	V0	0.38	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.06	V0	0.09	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		01-Jan	
Sample Date	01-Jan			01-Jan		01-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	4.70	V6	7.66	V0	0.25	V0
Calcium	0.16	0.08	V6	0.11	V0	0.01	V0
Magnesium	0.03	0.04	V6	0.04	V0	0.00	V1
Potassium	0.09	0.01	V6	0.00	V0	0.00	V1
Sodium	0.05	0.23	V6	0.17	V0	0.00	V1
Chloride	0.12	0.22	V6	0.23	V0	0.00	V1
Fluoride	0.15	0.01	V6	0.01	V0	0.01	V0
Nitrate	0.20	0.33	V6	0.23	V0	0.02	V0
Sulphate	0.25	0.52	V6	0.56	V0	0.00	V1
Phosphate	0.26	0.00	V6	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.12	V6	0.14	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		01-Jan	
Sample Date	01-Jan			01-Jan		01-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	4.70	V0	7.81	V0	0.25	V0
Calcium	0.16	0.09	V0	0.09	V0	0.01	V0
Magnesium	0.03	0.04	V0	0.05	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.16	V0	0.20	V0	0.00	V1
Chloride	0.12	0.25	V0	0.26	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	0.14	V0	0.23	V0	0.02	V0
Sulphate	0.25	0.23	V0	0.23	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.05	V0	0.05	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			01-Jan	
Sample Date	01-Jan			01-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	14.62	V0	0.25	V0
Calcium	0.16	0.19	V0	0.01	V0
Magnesium	0.03	0.07	V0	0.00	V1
Potassium	0.09	0.02	V0	0.00	V1
Sodium	0.05	0.22	V0	0.00	V1
Chloride	0.12	0.29	V0	0.00	V1
Fluoride	0.15	0.02	V0	0.01	V0
Nitrate	0.20	0.26	V0	0.02	V0
Sulphate	0.25	0.32	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.05	V0	0.00	V0



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		07-Jan	
Sample Date	07-Jan			07-Jan		07-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	11.08	V0	11.45	V0	0.36	V0
Calcium	0.16	0.15	V0	0.18	V0	0.01	V0
Magnesium	0.03	0.10	V0	0.08	V0	0.00	V1
Potassium	0.09	0.02	V0	0.05	V0	0.00	V1
Sodium	0.05	0.42	V0	0.48	V0	0.00	V1
Chloride	0.12	0.56	V0	0.71	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	0.48	V0	0.55	V0	0.01	V0
Sulphate	0.25	0.99	V0	0.86	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.24	V0	0.22	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		07-Jan	
Sample Date	07-Jan			07-Jan		07-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	12.65	V0	5.18	V0	0.36	V0
Calcium	0.16	0.35	V0	0.05	V0	0.01	V0
Magnesium	0.03	0.09	V0	0.05	V0	0.00	V1
Potassium	0.09	0.09	V0	0.03	V0	0.00	V1
Sodium	0.05	0.70	V0	0.26	V0	0.00	V1
Chloride	0.12	1.01	V0	0.28	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.00	V1	0.01	V0
Nitrate	0.20	0.61	V0	0.42	V0	0.01	V0
Sulphate	0.25	0.66	V0	0.49	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.16	V0	0.13	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		07-Jan	
Sample Date	07-Jan			07-Jan		07-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	8.86	V0	8.50	V0	0.36	V0
Calcium	0.16	0.13	V0	0.09	V0	0.01	V0
Magnesium	0.03	0.07	V0	0.08	V0	0.00	V1
Potassium	0.09	0.02	V0	0.03	V0	0.00	V1
Sodium	0.05	0.38	V0	0.46	V0	0.00	V1
Chloride	0.12	0.52	V0	0.62	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	0.35	V0	0.37	V0	0.01	V0
Sulphate	0.25	0.77	V0	0.88	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.19	V0	0.20	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			07-Jan	
Sample Date	07-Jan			07-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	11.96	V0	0.36	V0
Calcium	0.16	0.14	V0	0.01	V0
Magnesium	0.03	0.10	V0	0.00	V1
Potassium	0.09	0.04	V0	0.00	V1
Sodium	0.05	0.58	V0	0.00	V1
Chloride	0.12	0.86	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0
Nitrate	0.20	0.30	V0	0.01	V0
Sulphate	0.25	0.61	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.10	V0	0.00	V0



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		13-Jan	
Sample Date	13-Jan			13-Jan		13-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	18.55	V0	10.00	V0	0.15	V0
Calcium	0.16	0.38	V0	0.07	V0	0.01	V0
Magnesium	0.03	0.09	V0	0.04	V0	0.00	V1
Potassium	0.09	0.10	V0	0.05	V0	0.00	V1
Sodium	0.05	0.38	V0	0.26	V0	0.00	V1
Chloride	0.12	0.28	V0	0.18	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	1.85	V0	1.34	V0	0.02	V0
Sulphate	0.25	1.42	V0	0.48	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.52	V0	0.30	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		13-Jan	
Sample Date	13-Jan			13-Jan		13-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	9.24	V0	4.82	V0	0.15	V0
Calcium	0.16	0.14	V0	0.05	V0	0.01	V0
Magnesium	0.03	0.07	V0	0.02	V0	0.00	V1
Potassium	0.09	0.03	V0	0.02	V0	0.00	V1
Sodium	0.05	0.52	V0	0.09	V0	0.00	V1
Chloride	0.12	0.49	V0	0.03	V0	0.00	V1
Fluoride	0.15	0.02	V0	0.01	V0	0.01	V0
Nitrate	0.20	1.50	V0	0.37	V0	0.02	V0
Sulphate	0.25	0.51	V0	0.27	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.28	V0	0.09	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		13-Jan	
Sample Date	13-Jan			13-Jan		13-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	14.87	V0	15.56	V0	0.15	V0
Calcium	0.16	0.17	V0	0.20	V0	0.01	V0
Magnesium	0.03	0.06	V0	0.08	V0	0.00	V1
Potassium	0.09	0.06	V0	0.04	V0	0.00	V1
Sodium	0.05	0.31	V0	0.40	V0	0.00	V1
Chloride	0.12	0.14	V0	0.28	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	1.40	V0	1.26	V0	0.02	V0
Sulphate	0.25	1.21	V0	0.75	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.43	V0	0.26	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			13-Jan	
Sample Date	13-Jan			13-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	18.70	V0	0.15	V0
Calcium	0.16	0.25	V0	0.01	V0
Magnesium	0.03	0.07	V0	0.00	V1
Potassium	0.09	0.07	V0	0.00	V1
Sodium	0.05	0.33	V0	0.00	V1
Chloride	0.12	0.12	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0
Nitrate	0.20	1.34	V0	0.02	V0
Sulphate	0.25	1.38	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.43	V0	0.00	V0



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	5.69	V0	9.80	V0	0.33	V0
Calcium	0.16	0.04	V0	0.05	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.02	V0	0.00	V0
Potassium	0.09	0.01	V0	0.02	V0	0.00	V1
Sodium	0.05	0.03	V0	0.02	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	0.07	V0	0.24	V0	0.02	V0
Sulphate	0.25	1.16	V0	2.39	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.31	V0	0.75	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	23.7			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	10.27	V0	10.14	V0	0.33	V0
Calcium	0.16	0.10	V0	0.07	V0	0.00	V1
Magnesium	0.03	0.03	V0	0.03	V0	0.00	V0
Potassium	0.09	0.07	V0	0.13	V0	0.00	V1
Sodium	0.05	0.04	V0	0.01	V0	0.00	V1
Chloride	0.12	0.01	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.03	V0	0.01	V0
Nitrate	0.20	0.23	V0	0.70	V0	0.02	V0
Sulphate	0.25	2.44	V0	1.34	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.69	V0	0.47	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	6.15	V0	4.20	V0	0.33	V0
Calcium	0.16	0.04	V0	0.04	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.02	V0	0.00	V0
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.03	V0	0.04	V0	0.00	V1
Chloride	0.12	0.01	V0	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.01	V0
Nitrate	0.20	0.08	V0	0.03	V0	0.02	V0
Sulphate	0.25	1.12	V0	1.13	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.30	V0	0.21	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			19-Jan	
Sample Date	19-Jan			19-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	5.76	V0	0.33	V0
Calcium	0.16	0.03	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.00	V0
Potassium	0.09	0.01	V0	0.00	V1
Sodium	0.05	0.03	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.01	V0
Nitrate	0.20	0.04	V0	0.02	V0
Sulphate	0.25	1.04	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.26	V0	0.00	V0



		Bertha Ganter - Fort					
Station Name		McKay		Patricia McInnes		Travel Blank	
Station #		AMS 1		AMS 6			
Sample Date		25-Jan		25-Jan		25-Jan	
Particulate Size		PM10		PM10			
Total Air Volume (m ³)		24		24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	36.15	V0	18.04	V0	0.41	V0
Calcium	0.16	0.22	V0	0.08	V0	0.00	V1
Magnesium	0.03	0.06	V0	0.04	V0	0.00	V1
Potassium	0.09	0.20	V0	0.13	V0	0.00	V1
Sodium	0.05	0.11	V0	0.06	V0	0.00	V1
Chloride	0.12	0.05	V0	0.06	V0	0.00	V1
Fluoride	0.15	0.02	V0	0.01	V0	0.01	V0
Nitrate	0.20	2.26	V0	1.93	V0	0.02	V0
Sulphate	0.25	4.29	V0	2.77	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	1.74	V0	1.29	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		25-Jan	
Sample Date	25-Jan			25-Jan		25-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	14.39	V0	9.57	V0	0.41	V0
Calcium	0.16	0.17	V0	0.04	V0	0.00	V1
Magnesium	0.03	0.05	V0	0.02	V0	0.00	V1
Potassium	0.09	0.08	V0	0.05	V0	0.00	V1
Sodium	0.05	0.34	V0	0.02	V0	0.00	V1
Chloride	0.12	0.44	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.00	V1	0.01	V0
Nitrate	0.20	0.92	V0	0.31	V0	0.02	V0
Sulphate	0.25	1.47	V0	1.31	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.56	V0	0.44	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		25-Jan	
Sample Date	25-Jan			25-Jan		25-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	22.20	V0	13.27	V0	0.41	V0
Calcium	0.16	0.12	V0	0.06	V0	0.00	V1
Magnesium	0.03	0.05	V0	0.03	V0	0.00	V1
Potassium	0.09	0.13	V0	0.11	V0	0.00	V1
Sodium	0.05	0.06	V0	0.03	V0	0.00	V1
Chloride	0.12	0.04	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.01	V0
Nitrate	0.20	2.09	V0	0.60	V0	0.02	V0
Sulphate	0.25	3.61	V0	2.11	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	1.58	V0	0.73	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			25-Jan	
Sample Date	25-Jan			25-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	25.20	V0	0.41	V0
Calcium	0.16	0.30	V0	0.00	V1
Magnesium	0.03	0.06	V0	0.00	V1
Potassium	0.09	0.15	V0	0.00	V1
Sodium	0.05	0.04	V0	0.00	V1
Chloride	0.12	0.01	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0
Nitrate	0.20	1.29	V0	0.02	V0
Sulphate	0.25	4.83	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	1.65	V0	0.00	V0



		Bertha Ganter - Fort					
Station Name		McKay		Patricia McInnes		Travel Blank	
Station #		AMS 1		AMS 6			
Sample Date		31-Jan		31-Jan		31-Jan	
Particulate Size		PM10		PM10			
Total Air Volume (m ³)		24		24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	4.03	V0	2.86	V0	0.12	V0
Calcium	0.16	0.04	V0	0.04	V0	0.01	V0
Magnesium	0.03	0.01	V0	0.02	V0	0.00	V0
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.03	V0	0.03	V0	0.00	V1
Chloride	0.12	0.03	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.01	V0	0.00	V1
Nitrate	0.20	0.08	V0	0.09	V0	0.00	V1
Sulphate	0.25	0.25	V0	0.27	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.06	V0	0.07	V0	0.00	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		31-Jan	
Sample Date	31-Jan			31-Jan		31-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	4.70	V0	2.22	V0	0.12	V0
Calcium	0.16	0.07	V0	0.03	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.01	V0	0.00	V0
Potassium	0.09	0.02	V0	0.01	V0	0.00	V1
Sodium	0.05	0.09	V0	0.02	V0	0.00	V1
Chloride	0.12	0.10	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.15	V0	0.06	V0	0.00	V1
Sulphate	0.25	0.26	V0	0.24	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.08	V0	0.07	V0	0.00	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		31-Jan	
Sample Date	31-Jan			31-Jan		31-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	3.18	V0	6.82	V0	0.12	V0
Calcium	0.16	0.05	V0	0.04	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.02	V0	0.00	V0
Potassium	0.09	0.01	V0	0.00	V0	0.00	V1
Sodium	0.05	0.03	V0	0.04	V0	0.00	V1
Chloride	0.12	0.02	V0	0.03	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.01	V0	0.00	V1
Nitrate	0.20	0.08	V0	0.06	V0	0.00	V1
Sulphate	0.25	0.21	V0	0.20	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.06	V0	0.04	V0	0.00	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			31-Jan	
Sample Date	31-Jan			31-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	8.29	V0	0.12	V0
Calcium	0.16	0.08	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.00	V0
Potassium	0.09	0.00	V1	0.00	V1
Sodium	0.05	0.04	V0	0.00	V1
Chloride	0.12	0.04	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1
Nitrate	0.20	0.11	V0	0.00	V1
Sulphate	0.25	0.25	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.06	V0	0.00	V0



Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	13.76	12.13	6	6
Calcium	0.15	0.13	6	6
Magnesium	0.06	0.03	6	6
Potassium	0.06	0.08	6	6
Sodium	0.19	0.17	6	6
Chloride	0.20	0.21	6	5
Fluoride	0.01	0.01	6	5
Nitrate	0.83	0.97	6	6
Sulphate	1.40	1.49	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.49	0.64	6	6



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	9.79	5.08	6	6
Calcium	0.09	0.06	6	6
Magnesium	0.04	0.02	6	6
Potassium	0.05	0.05	6	6
Sodium	0.17	0.18	6	6
Chloride	0.21	0.27	6	5
Fluoride	0.01	0.00	6	6
Nitrate	0.73	0.74	6	6
Sulphate	1.19	1.10	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.45	0.48	6	6



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	9.33	4.01	6	6
Calcium	0.15	0.10	6	6
Magnesium	0.05	0.02	6	6
Potassium	0.05	0.03	6	6
Sodium	0.32	0.26	6	6
Chloride	0.38	0.36	6	6
Fluoride	0.01	0.01	6	5
Nitrate	0.62	0.51	6	6
Sulphate	0.98	0.83	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.32	0.25	6	6



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m³	Std Dev µg/m³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	6.60	3.06	6	6
Calcium	0.06	0.03	6	6
Magnesium	0.03	0.01	6	6
Potassium	0.04	0.05	6	6
Sodium	0.10	0.10	6	6
Chloride	0.10	0.12	6	6
Fluoride	0.01	0.01	6	4
Nitrate	0.35	0.21	6	6
Sulphate	0.70	0.50	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.22	0.18	6	6



Station Name	Fort McKay South	Fort McKay South	Fort McKay South	Fort McKay South
Station #	AMS 13	AMS 13	AMS 13	AMS 13
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	9.99	7.26	6	6
Calcium	0.10	0.05	6	6
Magnesium	0.04	0.02	6	6
Potassium	0.04	0.05	6	6
Sodium	0.16	0.15	6	6
Chloride	0.16	0.20	6	6
Fluoride	0.01	0.00	6	5
Nitrate	0.69	0.85	6	6
Sulphate	1.19	1.26	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.43	0.58	6	6



Station Name Station # Sample Date Particulate Size	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Average $\mu\text{g}/\text{m}^3$	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Std Dev $\mu\text{g}/\text{m}^3$	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Total Samples (#)	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Total \geq MDL (#)
Compound Name				
Particulate Matter	9.36	4.24	6	6
Calcium	0.09	0.06	6	6
Magnesium	0.04	0.03	6	6
Potassium	0.03	0.04	6	6
Sodium	0.19	0.20	6	6
Chloride	0.20	0.24	6	5
Fluoride	0.01	0.00	6	5
Nitrate	0.43	0.46	6	6
Sulphate	0.88	0.70	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.25	0.25	6	6



Station Name	Albian Muskeg River	Albian Muskeg River	Albian Muskeg River	Albian Muskeg River
Station #	AMS 16	AMS 16	AMS 16	AMS 16
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m³	Std Dev µg/m³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	14.09	7.11	6	6
Calcium	0.17	0.10	6	6
Magnesium	0.06	0.03	6	6
Potassium	0.05	0.05	6	5
Sodium	0.21	0.22	6	6
Chloride	0.22	0.33	6	5
Fluoride	0.01	0.01	6	4
Nitrate	0.56	0.60	6	6
Sulphate	1.40	1.73	6	6
Phosphate	0.00	0.00	6	0
Ammonium (as N)	0.43	0.62	6	6

Wood Buffalo Environmental Association

PM10 Ion Summary (µg/sample)

2017 January

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99% Max.	Mean	Std. Dev.	Median	Outlier Test	
Particulate Matter	100%	42	0	53	101	137	222	243	319	351	445	533	868	868	250	161	222	1056
Calcium	100%	42	0	0.75	0.90	1.14	2.22	2.70	3.66	4.17	5.37	7.14	9.03	9.03	2.78	2.06	2.22	13.07
Magnesium	100%	42	0	0.33	0.39	0.48	1.05	1.20	1.59	1.74	1.95	2.10	2.34	2.34	1.09	0.62	1.05	4.21
Potassium	98%	42	1	0.06	0.12	0.24	0.51	0.90	1.62	1.86	3.03	3.15	4.68	4.68	1.06	1.14	0.51	6.77
Sodium	100%	42	0	0.30	0.60	0.81	3.84	4.86	7.83	9.03	10.98	12.54	16.77	16.77	4.60	4.42	3.84	26.72
Chloride	90%	42	4	0.06	0.12	0.36	2.79	5.40	6.81	7.35	13.38	17.01	24.21	24.21	5.02	6.07	2.79	35.38
Fluoride	81%	42	8	0.09	0.12	0.15	0.24	0.24	0.27	0.27	0.33	0.39	0.66	0.66	0.23	0.11	0.24	0.76
Nitrate	100%	42	0	0.78	1.59	3.42	7.83	10.11	22.17	30.99	35.94	46.41	54.18	54.18	14.42	15.21	7.83	90.46
Sulphate	100%	42	0	4.80	5.73	6.69	18.57	24.93	32.25	34.05	57.78	86.73	115.92	115.92	26.55	26.42	18.57	158.67
Phosphate	0%	42	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Ammonium (as N)	100%	42	0	1.00	1.42	1.86	5.29	6.76	10.65	12.56	17.91	37.95	41.81	41.81	8.89	10.58	5.29	61.78



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER - METALS DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM ions: Atmospheric Research & Analysis, Inc.
Morrisville, NC



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM_{2.5}) - METALS DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM metals: Atmospheric Research & Analysis, Inc.
Morrisville, NC



FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER	$< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$
MEDIUM	47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		01-Jan	
	Sample Date	01-Jan		01-Jan		01-Jan	
Particulate Size	PM2.5		PM2.5		PM2.5		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	3.91	V0	3.00	V0	0.27	V0
Aluminum	0.1380326	0.0192624	V0	0.0130281	V0	0.0000000	V1
Antimony	0.0001784	0.0001250	V0	0.0000222	V0	0.0000000	V1
Arsenic	0.0001060	0.0002448	V0	0.0000161	V0	0.0000000	V1
Barium	0.0092847	0.0000000	V1	0.0006811	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	-9999	M2	0.0000051	V0	0.0000010	V0
Cadmium	0.0000174	0.0000075	V0	0.0000030	V0	0.0000000	V1
Calcium	0.4112124	0.0372160	V0	0.0318022	V0	0.0000000	V1
Cerium	0.0000174	0.0000231	V0	0.0000154	V0	0.0000000	V1
Cesium	0.0000100	0.0000023	V0	0.0000015	V0	0.0000000	V1
Chromium	0.0022262	0.0002431	V0	0.0001526	V0	0.0002596	V0
Cobalt	0.0000273	0.0000332	V0	0.0000183	V0	0.0000083	V0
Copper	0.0017171	0.0004448	V0	0.0004402	V0	0.0002153	V0
Iron	0.0393063	0.0159904	V0	0.0132950	V0	0.0023146	V0
Lanthanum	0.0000130	0.0000105	V0	0.0000074	V0	0.0000010	V0
Lead	0.0008577	0.0003261	V0	0.0000899	V0	0.0000000	V1
Lithium	0.0000374	0.0000182	V0	0.0000276	V0	0.0000000	V1
Magnesium	0.0091409	0.0232757	V0	0.0170411	V0	0.0007939	V0
Manganese	0.0006949	0.0004984	V0	0.0003374	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000551	V0	0.0000444	V0	0.0000000	V1
Neodymium	0.0000140	0.0000093	V0	0.0000050	V0	0.0000000	V1
Nickel	0.0005429	0.0001439	V0	0.0001897	V0	0.0000776	V0
Niobium	0.0000202	0.0000027	V0	0.0000019	V0	0.0000009	V0
Palladium	0.0000632	0.0000000	V1	0.0000000	V1	0.0000000	V1
Phosphorus	0.0459574	0.0067601	V0	0.0065088	V0	0.0059455	V0
Platinum	0.0000088	0.0000011	V0	0.0000005	V0	0.0000010	V0
Potassium	0.0061261	0.0201888	V0	0.0163882	V0	0.0008246	V0
Praseodymium	0.0000070	0.0000019	V0	0.0000013	V0	0.0000000	V1
Rubidium	0.0000184	0.0000417	V0	0.0000289	V0	0.0000009	V0
Samarium	0.0000133	0.0000012	V0	0.0000009	V0	0.0000000	V1
Selenium	0.0003366	0.0000374	V0	0.0000330	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000011	V0	0.0000006	V0	0.0000000	V1
Sodium	0.0169447	0.1023715	V0	0.0732863	V0	0.0008508	V0
Strontium	0.0003375	0.0001847	V0	0.0001422	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000008	V0	0.0000000	V1	0.0000000	V1
Thorium	0.0000059	0.0000022	V0	0.0000015	V0	0.0000000	V1
Tin	0.0004414	0.0000810	V0	0.0000405	V0	0.0000000	V1
Titanium	0.0015201	0.0012450	V0	0.0007372	V0	0.0004079	V0
Tungsten	0.0000938	0.0000448	V0	0.0000438	V0	0.0000098	V0
Uranium	0.0000048	0.0000011	V0	0.0000008	V0	0.0000000	V1
Vanadium	0.0007697	0.0000861	V0	0.0000660	V0	0.0000000	V1
Zinc	0.0055897	0.0023045	V0	0.0012590	V0	0.0003684	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		01-Jan	
Sample Date	01-Jan			01-Jan		01-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	3.00	V0	3.18	V0	0.27	V0
Aluminum	0.1380326	0.0179840	V0	0.0154638	V0	0.0000000	V1
Antimony	0.0001784	0.0000476	V0	0.0000233	V0	0.0000000	V1
Arsenic	0.0001060	0.0000192	V0	0.0000348	V0	0.0000000	V1
Barium	0.0092847	0.0006913	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000122	V0	0.0000037	V0	0.0000010	V0
Cadmium	0.0000174	0.0000041	V0	0.0000230	V0	0.0000000	V1
Calcium	0.4112124	0.0331301	V0	0.0298460	V0	0.0000000	V1
Cerium	0.0000174	0.0000172	V0	0.0000131	V0	0.0000000	V1
Cesium	0.0000100	0.0000019	V0	0.0000020	V0	0.0000000	V1
Chromium	0.0022262	0.0001435	V0	0.0001826	V0	0.0002596	V0
Cobalt	0.0000273	0.0000358	V0	0.0000125	V0	0.0000083	V0
Copper	0.0017171	0.0004679	V0	0.0002468	V0	0.0002153	V0
Iron	0.0393063	0.0183703	V0	0.0122629	V0	0.0023146	V0
Lanthanum	0.0000130	0.0000084	V0	0.0000073	V0	0.0000010	V0
Lead	0.0008577	0.0000776	V0	0.0002274	V0	0.0000000	V1
Lithium	0.0000374	0.0000163	V0	0.0000142	V0	0.0000000	V1
Magnesium	0.0091409	0.0209744	V0	0.0238464	V0	0.0007939	V0
Manganese	0.0006949	0.0003794	V0	0.0002743	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000390	V0	0.0002394	V0	0.0000000	V1
Neodymium	0.0000140	0.0000066	V0	0.0000047	V0	0.0000000	V1
Nickel	0.0005429	0.0002548	V0	0.0001658	V0	0.0000776	V0
Niobium	0.0000202	0.0000037	V0	0.0000024	V0	0.0000009	V0
Palladium	0.0000632	0.0000072	V0	0.0000152	V0	0.0000000	V1
Phosphorus	0.0459574	0.0064785	V0	0.0066071	V0	0.0059455	V0
Platinum	0.0000088	0.0000010	V0	0.0000011	V0	0.0000010	V0
Potassium	0.0061261	0.0174797	V0	0.0180430	V0	0.0008246	V0
Praseodymium	0.0000070	0.0000017	V0	0.0000011	V0	0.0000000	V1
Rubidium	0.0000184	0.0000343	V0	0.0000371	V0	0.0000009	V0
Samarium	0.0000133	0.0000010	V0	0.0000010	V0	0.0000000	V1
Selenium	0.0003366	0.0000409	V0	0.0000763	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000006	V0	0.0000039	V0	0.0000000	V1
Sodium	0.0169447	0.0935614	V0	0.1050226	V0	0.0008508	V0
Strontium	0.0003375	0.0002053	V0	0.0001728	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000005	V0	0.0000006	V0	0.0000000	V1
Thorium	0.0000059	0.0000020	V0	0.0000017	V0	0.0000000	V1
Tin	0.0004414	0.0000549	V0	0.0000581	V0	0.0000000	V1
Titanium	0.0015201	0.0011764	V0	0.0057426	V0	0.0004079	V0
Tungsten	0.0000938	0.0000468	V0	0.0000087	V0	0.0000098	V0
Uranium	0.0000048	0.0000010	V0	0.0000009	V0	0.0000000	V1
Vanadium	0.0007697	0.0002338	V0	0.0001817	V0	0.0000000	V1
Zinc	0.0055897	0.0013600	V0	0.0013753	V0	0.0003684	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		07-Jan	
	Sample Date	07-Jan		07-Jan		07-Jan	
Particulate Size	PM2.5		PM2.5		PM2.5		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	5.19	V0	5.92	V0	0.26	V0
Aluminum	0.1380326	0.0129906	V0	0.0161929	V0	0.0000000	V1
Antimony	0.0001784	0.0000174	V0	0.0001444	V0	0.0000000	V1
Arsenic	0.0001060	0.0000406	V0	0.0000768	V0	0.0000000	V1
Barium	0.0092847	0.0000000	V1	0.0005269	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000101	V0	0.0000152	V0	0.0000166	V0
Cadmium	0.0000174	0.0000073	V0	0.0000117	V0	0.0000000	V1
Calcium	0.4112124	0.0428887	V0	0.0517260	V0	0.0000000	V1
Cerium	0.0000174	0.0000159	V0	0.0000179	V0	0.0000000	V1
Cesium	0.0000100	0.0000015	V0	0.0000015	V0	0.0000000	V1
Chromium	0.0022262	0.0001723	V0	0.0003353	V0	0.0001152	V0
Cobalt	0.0000273	0.0000252	V0	0.0000583	V0	0.0000081	V0
Copper	0.0017171	0.0002401	V0	0.0005400	V0	0.0002142	V0
Iron	0.0393063	0.0127435	V0	0.0198657	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000078	V0	0.0000083	V0	0.0000000	V1
Lead	0.0008577	0.0001196	V0	0.0001657	V0	0.0000000	V1
Lithium	0.0000374	0.0000175	V0	0.0000210	V0	0.0000000	V1
Magnesium	0.0091409	0.0420322	V0	0.0477116	V0	0.0008931	V0
Manganese	0.0006949	0.0005119	V0	0.0007000	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000347	V0	0.0000676	V0	0.0000000	V1
Neodymium	0.0000140	0.0000048	V0	0.0000048	V0	0.0000000	V1
Nickel	0.0005429	0.0001431	V0	0.0003335	V0	0.0001440	V0
Niobium	0.0000202	0.0000020	V0	0.0000034	V0	0.0000000	V1
Palladium	0.0000632	0.0000000	V1	0.0000033	V0	0.0000000	V1
Phosphorus	0.0459574	0.0073197	V0	0.0130107	V0	0.0050646	V0
Platinum	0.0000088	0.0000007	V0	0.0000011	V0	0.0000005	V0
Potassium	0.0061261	0.0252891	V0	0.0503860	V0	0.0012198	V0
Praseodymium	0.0000070	0.0000012	V0	0.0000013	V0	0.0000000	V1
Rubidium	0.0000184	0.0000321	V0	0.0000703	V0	0.0000011	V0
Samarium	0.0000133	0.0000008	V0	0.0000010	V0	0.0000000	V1
Selenium	0.0003366	0.0000363	V0	0.0000496	V0	0.0000146	V0
Silicon	0.7676322	0.0000000	V1	0.1507574	V0	0.0000000	V1
Silver	0.0000100	0.0000008	V0	0.0000047	V0	0.0000000	V1
Sodium	0.0169447	0.1887287	V0	0.2489305	V0	0.0011602	V0
Strontium	0.0003375	0.0002837	V0	0.0003339	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000013	V0	0.0000013	V0	0.0000000	V1
Thorium	0.0000059	0.0000016	V0	0.0000014	V0	0.0000000	V1
Tin	0.0004414	0.0000395	V0	0.0000794	V0	0.0000000	V1
Titanium	0.0015201	0.0006563	V0	0.0014597	V0	0.0003449	V0
Tungsten	0.0000938	0.0000373	V0	0.0000808	V0	0.0000059	V0
Uranium	0.0000048	0.0000008	V0	0.0000008	V0	0.0000000	V1
Vanadium	0.0007697	0.0001494	V0	0.0001019	V0	0.0000524	V0
Zinc	0.0055897	0.0022310	V0	0.0045556	V0	0.0004187	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		07-Jan	
Sample Date	07-Jan			07-Jan		07-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	5.90	V0	4.55	V0	0.26	V0
Aluminum	0.1380326	0.0119497	V0	0.0071696	V0	0.0000000	V1
Antimony	0.0001784	0.0000980	V0	0.0000419	V0	0.0000000	V1
Arsenic	0.0001060	0.0001311	V0	0.0000668	V0	0.0000000	V1
Barium	0.0092847	0.0008506	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	-9999	M2	-9999	M2	0.0000166	V0
Cadmium	0.0000174	0.0000327	V0	0.0000177	V0	0.0000000	V1
Calcium	0.4112124	0.0528705	V0	0.0245489	V0	0.0000000	V1
Cerium	0.0000174	0.0000198	V0	0.0000100	V0	0.0000000	V1
Cesium	0.0000100	0.0000018	V0	0.0000009	V0	0.0000000	V1
Chromium	0.0022262	0.0002206	V0	0.0002455	V0	0.0001152	V0
Cobalt	0.0000273	0.0000375	V0	0.0000165	V0	0.0000081	V0
Copper	0.0017171	0.0006685	V0	0.0003105	V0	0.0002142	V0
Iron	0.0393063	0.0172048	V0	0.0068380	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000071	V0	0.0000042	V0	0.0000000	V1
Lead	0.0008577	0.0015786	V0	0.0001149	V0	0.0000000	V1
Lithium	0.0000374	0.0000194	V0	0.0000062	V0	0.0000000	V1
Magnesium	0.0091409	0.0416174	V0	0.0291224	V0	0.0008931	V0
Manganese	0.0006949	0.0006940	V0	0.0002012	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000482	V0	0.0000311	V0	0.0000000	V1
Neodymium	0.0000140	0.0000057	V0	0.0000019	V0	0.0000000	V1
Nickel	0.0005429	0.0001852	V0	0.0004641	V0	0.0001440	V0
Niobium	0.0000202	0.0000024	V0	0.0000018	V0	0.0000000	V1
Palladium	0.0000632	0.0000000	V1	0.0000000	V1	0.0000000	V1
Phosphorus	0.0459574	0.0081030	V0	0.0065227	V0	0.0050646	V0
Platinum	0.0000088	0.0000009	V0	0.0000012	V0	0.0000005	V0
Potassium	0.0061261	0.0791564	V0	0.0300486	V0	0.0012198	V0
Praseodymium	0.0000070	0.0000014	V0	0.0000005	V0	0.0000000	V1
Rubidium	0.0000184	0.0001189	V0	0.0000451	V0	0.0000011	V0
Samarium	0.0000133	0.0000008	V0	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0000413	V0	0.0000300	V0	0.0000146	V0
Silicon	0.7676322	0.0000000	V1	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000037	V0	0.0000033	V0	0.0000000	V1
Sodium	0.0169447	0.1994112	V0	0.1468277	V0	0.0011602	V0
Strontium	0.0003375	0.0003352	V0	0.0001818	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000015	V0	0.0000011	V0	0.0000000	V1
Thorium	0.0000059	0.0000015	V0	0.0000004	V0	0.0000000	V1
Tin	0.0004414	0.0001130	V0	0.0001046	V0	0.0000000	V1
Titanium	0.0015201	0.0007395	V0	0.0007581	V0	0.0003449	V0
Tungsten	0.0000938	0.0000413	V0	0.0000261	V0	0.0000059	V0
Uranium	0.0000048	0.0000012	V0	0.0000004	V0	0.0000000	V1
Vanadium	0.0007697	0.0000569	V0	-9999	M2	0.0000524	V0
Zinc	0.0055897	0.0081995	V0	0.0028302	V0	0.0004187	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		13-Jan	
	Sample Date	13-Jan		13-Jan		13-Jan	
Particulate Size	PM2.5		PM2.5		PM2.5		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	8.75	V0	8.03	V0	0.14	V0
Aluminum	0.1380326	0.0187563	V0	0.0107343	V0	0.0000000	V1
Antimony	0.0001784	0.0000753	V0	0.0001770	V0	0.0000000	V1
Arsenic	0.0001060	0.0003816	V0	0.0000832	V0	0.0000000	V1
Barium	0.0092847	0.0010763	V0	0.0017446	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000446	V0	0.0000136	V0	0.0003284	V0
Cadmium	0.0000174	0.0000248	V0	0.0000437	V0	0.0000000	V1
Calcium	0.4112124	0.0555385	V0	0.0349991	V0	0.0000000	V1
Cerium	0.0000174	0.0000241	V0	0.0000414	V0	0.0000000	V1
Cesium	0.0000100	0.0000026	V0	0.0000016	V0	0.0000000	V1
Chromium	0.0022262	0.0002513	V0	0.0002899	V0	0.0000975	V0
Cobalt	0.0000273	0.0000415	V0	0.0000818	V0	0.0000122	V0
Copper	0.0017171	0.0007666	V0	0.0012207	V0	0.0001134	V0
Iron	0.0393063	0.0290468	V0	0.0320685	V0	0.0017654	V0
Lanthanum	0.0000130	0.0000460	V0	0.0000399	V0	0.0000008	V0
Lead	0.0008577	0.0002668	V0	0.0002701	V0	0.0000000	V1
Lithium	0.0000374	0.0000287	V0	0.0000140	V0	0.0000000	V1
Magnesium	0.0091409	0.0442936	V0	0.0251911	V0	0.0011184	V0
Manganese	0.0006949	0.0020145	V0	0.0005606	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001621	V0	0.0001673	V0	0.0000000	V1
Neodymium	0.0000140	0.0000076	V0	0.0000077	V0	0.0000000	V1
Nickel	0.0005429	0.0004675	V0	0.0006694	V0	0.0003413	V0
Niobium	0.0000202	0.0000035	V0	0.0000073	V0	0.0000000	V1
Palladium	0.0000632	0.0000043	V0	0.0000051	V0	0.0000073	V0
Phosphorus	0.0459574	0.0088163	V0	0.0072920	V0	0.0114763	V0
Platinum	0.0000088	0.0000012	V0	0.0000009	V0	0.0000007	V0
Potassium	0.0061261	0.0887071	V0	0.0604714	V0	0.0010961	V0
Praseodymium	0.0000070	0.0000022	V0	0.0000026	V0	0.0000000	V1
Rubidium	0.0000184	0.0001218	V0	0.0001043	V0	0.0000010	V0
Samarium	0.0000133	0.0000015	V0	0.0000006	V0	0.0000000	V1
Selenium	0.0003366	0.0000530	V0	0.0000480	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000037	V0	0.0000066	V0	0.0000000	V1
Sodium	0.0169447	0.2502514	V0	0.1492998	V0	0.0010745	V0
Strontium	0.0003375	0.0005499	V0	0.0002256	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000013	V0	0.0000013	V0	0.0000000	V1
Thorium	0.0000059	0.0000021	V0	0.0000011	V0	0.0000000	V1
Tin	0.0004414	0.0001544	V0	0.0001920	V0	0.0000000	V1
Titanium	0.0015201	0.0011368	V0	0.0010832	V0	0.0003423	V0
Tungsten	0.0000938	0.0000585	V0	0.0000846	V0	0.0000094	V0
Uranium	0.0000048	0.0000010	V0	0.0000006	V0	0.0000000	V1
Vanadium	0.0007697	0.0003724	V0	0.0000968	V0	0.0000487	V0
Zinc	0.0055897	0.0078118	V0	0.0127836	V0	0.0004480	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		13-Jan	
Sample Date	13-Jan			13-Jan		13-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	7.10	V0	2.80	V0	0.14	V0
Aluminum	0.1380326	0.0132045	V0	0.0102186	V0	0.0000000	V1
Antimony	0.0001784	0.0002276	V0	0.0000234	V0	0.0000000	V1
Arsenic	0.0001060	0.0001353	V0	0.0000705	V0	0.0000000	V1
Barium	0.0092847	0.0026212	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000175	V0	0.0000031	V0	0.0003284	V0
Cadmium	0.0000174	0.0000211	V0	0.0000279	V0	0.0000000	V1
Calcium	0.4112124	0.0457679	V0	0.0245202	V0	0.0000000	V1
Cerium	0.0000174	0.0000478	V0	0.0000085	V0	0.0000000	V1
Cesium	0.0000100	0.0000016	V0	0.0000013	V0	0.0000000	V1
Chromium	0.0022262	0.0002857	V0	0.0001739	V0	0.0000975	V0
Cobalt	0.0000273	0.0000181	V0	0.0000309	V0	0.0000122	V0
Copper	0.0017171	0.0020223	V0	0.0003975	V0	0.0001134	V0
Iron	0.0393063	0.0331218	V0	0.0073485	V0	0.0017654	V0
Lanthanum	0.0000130	0.0000279	V0	0.0000133	V0	0.0000008	V0
Lead	0.0008577	0.0006137	V0	0.0000961	V0	0.0000000	V1
Lithium	0.0000374	0.0000162	V0	0.0000079	V0	0.0000000	V1
Magnesium	0.0091409	0.0490263	V0	0.0106807	V0	0.0011184	V0
Manganese	0.0006949	0.0005278	V0	0.0002237	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001852	V0	0.0000479	V0	0.0000000	V1
Neodymium	0.0000140	0.0000096	V0	0.0000037	V0	0.0000000	V1
Nickel	0.0005429	0.0005551	V0	0.0001810	V0	0.0003413	V0
Niobium	0.0000202	0.0000043	V0	0.0000022	V0	0.0000000	V1
Palladium	0.0000632	0.0000067	V0	0.0000091	V0	0.0000073	V0
Phosphorus	0.0459574	0.0093007	V0	0.0120940	V0	0.0114763	V0
Platinum	0.0000088	0.0000006	V0	0.0000012	V0	0.0000007	V0
Potassium	0.0061261	0.0380846	V0	0.0333018	V0	0.0010961	V0
Praseodymium	0.0000070	0.0000032	V0	0.0000010	V0	0.0000000	V1
Rubidium	0.0000184	0.0000441	V0	0.0000574	V0	0.0000010	V0
Samarium	0.0000133	0.0000009	V0	0.0000006	V0	0.0000000	V1
Selenium	0.0003366	0.0000542	V0	0.0000228	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000034	V0	0.0000044	V0	0.0000000	V1
Sodium	0.0169447	0.2816505	V0	0.0629121	V0	0.0010745	V0
Strontium	0.0003375	0.0004104	V0	0.0001011	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000012	V0	0.0000007	V0	0.0000000	V1
Thorium	0.0000059	0.0000013	V0	0.0000007	V0	0.0000000	V1
Tin	0.0004414	0.0002093	V0	0.0000919	V0	0.0000000	V1
Titanium	0.0015201	0.0014870	V0	0.0009288	V0	0.0003423	V0
Tungsten	0.0000938	0.0000708	V0	0.0000497	V0	0.0000094	V0
Uranium	0.0000048	0.0000009	V0	0.0000003	V0	0.0000000	V1
Vanadium	0.0007697	0.0000821	V0	0.0000939	V0	0.0000487	V0
Zinc	0.0055897	0.0074315	V0	0.0032359	V0	0.0004480	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		19-Jan	
	Sample Date	19-Jan		19-Jan		19-Jan	
Particulate Size	PM2.5		PM2.5		PM2.5		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	5.35	V0	8.59	V0	0.23	V0
Aluminum	0.1380326	0.0065585	V0	0.0116941	V0	0.0082660	V0
Antimony	0.0001784	0.0000135	V0	0.0000568	V0	0.0000000	V1
Arsenic	0.0001060	0.0000243	V0	0.0001249	V0	0.0000000	V1
Barium	0.0092847	0.0000000	V1	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000123	V0	0.0000173	V0	0.0002200	V0
Cadmium	0.0000174	0.0000190	V0	0.0000319	V0	0.0000000	V1
Calcium	0.4112124	0.0216413	V0	0.0269698	V0	0.0193477	V0
Cerium	0.0000174	0.0000040	V0	0.0000320	V0	0.0000015	V0
Cesium	0.0000100	0.0000006	V0	0.0000015	V0	0.0000000	V1
Chromium	0.0022262	0.0001589	V0	0.0003421	V0	0.0000000	V1
Cobalt	0.0000273	0.0000349	V0	0.0000456	V0	0.0000102	V0
Copper	0.0017171	0.0003257	V0	0.0004783	V0	0.0022809	V0
Iron	0.0393063	0.0065319	V0	0.0141886	V0	0.0029521	V0
Lanthanum	0.0000130	0.0000041	V0	0.0000249	V0	0.0000018	V0
Lead	0.0008577	0.0000616	V0	0.0001903	V0	0.0000000	V1
Lithium	0.0000374	0.0000061	V0	0.0000224	V0	0.0000018	V0
Magnesium	0.0091409	0.0067034	V0	0.0056280	V0	0.0021902	V0
Manganese	0.0006949	0.0004089	V0	0.0005799	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000473	V0	0.0007871	V0	0.0000000	V1
Neodymium	0.0000140	0.0000015	V0	0.0000100	V0	0.0000000	V1
Nickel	0.0005429	0.0001306	V0	0.0013410	V0	0.0001583	V0
Niobium	0.0000202	0.0000021	V0	0.0000049	V0	0.0000012	V0
Palladium	0.0000632	0.0000000	V1	0.0000037	V0	0.0000000	V1
Phosphorus	0.0459574	0.0121918	V0	0.0124621	V0	0.0116637	V0
Platinum	0.0000088	0.0000012	V0	0.0000013	V0	0.0000013	V0
Potassium	0.0061261	0.0274464	V0	0.0372042	V0	0.0021074	V0
Praseodymium	0.0000070	0.0000004	V0	0.0000026	V0	0.0000000	V1
Rubidium	0.0000184	0.0000442	V0	0.0000701	V0	0.0000029	V0
Samarium	0.0000133	0.0000000	V1	0.0000019	V0	0.0000000	V1
Selenium	0.0003366	0.0000183	V0	0.0000864	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0339935	V0	0.0000000	V1
Silver	0.0000100	0.0000020	V0	0.0000029	V0	0.0000008	V0
Sodium	0.0169447	0.0308388	V0	0.0212505	V0	0.0025411	V0
Strontium	0.0003375	0.0000580	V0	0.0000761	V0	0.0000188	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000004	V0	0.0000010	V0	0.0000000	V1
Thorium	0.0000059	0.0000004	V0	0.0000031	V0	0.0000000	V1
Tin	0.0004414	0.0001032	V0	0.0002059	V0	0.0000000	V1
Titanium	0.0015201	0.0005633	V0	0.0013426	V0	0.0004814	V0
Tungsten	0.0000938	-9999	M2	0.0001335	V0	0.0000155	V0
Uranium	0.0000048	0.0000002	V0	0.0000037	V0	0.0000000	V1
Vanadium	0.0007697	0.0001708	V0	0.0046213	V0	0.0000583	V0
Zinc	0.0055897	0.0034736	V0	0.0049770	V0	0.0009657	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	23.8			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	7.80	V0	7.74	V4	0.23	V0
Aluminum	0.1380326	0.0165878	V0	0.0151469	V0	0.0082660	V0
Antimony	0.0001784	0.0000611	V0	0.0000760	V0	0.0000000	V1
Arsenic	0.0001060	0.0000837	V0	0.0001164	V0	0.0000000	V1
Barium	0.0092847	0.0008304	V0	0.0005113	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000239	V0	0.0000237	V0	0.0002200	V0
Cadmium	0.0000174	0.0000308	V0	0.0003343	V0	0.0000000	V1
Calcium	0.4112124	0.0338075	V0	0.0338932	V0	0.0193477	V0
Cerium	0.0000174	0.0000193	V0	0.0000122	V0	0.0000015	V0
Cesium	0.0000100	0.0000020	V0	0.0000063	V0	0.0000000	V1
Chromium	0.0022262	0.0003336	V0	0.0002129	V0	0.0000000	V1
Cobalt	0.0000273	0.0000509	V0	0.0000255	V0	0.0000102	V0
Copper	0.0017171	0.0013817	V0	0.0017614	V0	0.0022809	V0
Iron	0.0393063	0.0253634	V0	0.0178383	V0	0.0029521	V0
Lanthanum	0.0000130	0.0000181	V0	0.0000254	V0	0.0000018	V0
Lead	0.0008577	0.0002045	V0	0.0004293	V0	0.0000000	V1
Lithium	0.0000374	0.0000263	V0	0.0000134	V0	0.0000018	V0
Magnesium	0.0091409	0.0085271	V0	0.0050769	V0	0.0021902	V0
Manganese	0.0006949	0.0013998	V0	0.0007779	V0	0.0000000	V1
Molybdenum	0.0007116	0.0004587	V0	0.0001884	V0	0.0000000	V1
Neodymium	0.0000140	0.0000072	V0	0.0000034	V0	0.0000000	V1
Nickel	0.0005429	0.0006270	V0	0.0003029	V0	0.0001583	V0
Niobium	0.0000202	0.0000053	V0	0.0000029	V0	0.0000012	V0
Palladium	0.0000632	0.0000034	V0	0.0000063	V0	0.0000000	V1
Phosphorus	0.0459574	0.0118102	V0	0.0128996	V0	0.0116637	V0
Platinum	0.0000088	0.0000015	V0	0.0000008	V0	0.0000013	V0
Potassium	0.0061261	0.0765975	V0	0.1467101	V0	0.0021074	V0
Praseodymium	0.0000070	0.0000020	V0	0.0000010	V0	0.0000000	V1
Rubidium	0.0000184	0.0001231	V0	0.0004780	V0	0.0000029	V0
Samarium	0.0000133	0.0000013	V0	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0000648	V0	0.0000621	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0552362	V0	0.0000000	V1
Silver	0.0000100	0.0000060	V0	0.0000212	V0	0.0000008	V0
Sodium	0.0169447	0.0298593	V0	0.0140421	V0	0.0025411	V0
Strontium	0.0003375	0.0001330	V0	0.0000737	V0	0.0000188	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000010	V0	0.0000112	V0	0.0000000	V1
Thorium	0.0000059	0.0000024	V0	0.0000012	V0	0.0000000	V1
Tin	0.0004414	0.0001834	V0	0.0001976	V0	0.0000000	V1
Titanium	0.0015201	0.0029867	V0	0.0014326	V0	0.0004814	V0
Tungsten	0.0000938	0.0000514	V0	0.0000457	V0	0.0000155	V0
Uranium	0.0000048	0.0000022	V0	0.0000008	V0	0.0000000	V1
Vanadium	0.0007697	0.0025025	V0	0.0007394	V0	0.0000583	V0
Zinc	0.0055897	0.0087493	V0	0.0181894	V0	0.0009657	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1	AMS 6	25-Jan			
	Sample Date	PM2.5	PM2.5	24			
Total Air Volume (m ³)	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	24.21	V0	16.51	V0	0.55	V0
Aluminum	0.1380326	0.0264321	V0	0.0131857	V0	0.0000000	V1
Antimony	0.0001784	0.0001394	V0	0.0001917	V0	0.0000000	V1
Arsenic	0.0001060	0.0002333	V0	0.0001508	V0	0.0000000	V1
Barium	0.0092847	0.0015533	V0	0.0015772	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000244	V0	0.0000129	V0	0.0000580	V0
Cadmium	0.0000174	0.0001625	V0	0.0001444	V0	0.0000000	V1
Calcium	0.4112124	0.0608110	V0	0.0289909	V0	0.0000000	V1
Cerium	0.0000174	0.0000376	V0	0.0000435	V0	0.0000000	V1
Cesium	0.0000100	0.0000053	V0	0.0000031	V0	0.0000000	V1
Chromium	0.0022262	0.0007028	V0	0.0002782	V0	0.0000000	V1
Cobalt	0.0000273	0.0000519	V0	0.0000336	V0	0.0000071	V0
Copper	0.0017171	0.0010909	V0	0.0009326	V0	0.0002182	V0
Iron	0.0393063	0.0380363	V0	0.0206553	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000602	V0	0.0000714	V0	0.0000000	V1
Lead	0.0008577	0.0004378	V0	0.0003954	V0	0.0000000	V1
Lithium	0.0000374	0.0000365	V0	0.0000165	V0	0.0000000	V1
Magnesium	0.0091409	0.0099428	V0	0.0058718	V0	0.0013998	V0
Manganese	0.0006949	0.0020714	V0	0.0005854	V0	0.0000000	V1
Molybdenum	0.0007116	0.0002767	V0	0.0001400	V0	0.0000000	V1
Neodymium	0.0000140	0.0000141	V0	0.0000077	V0	0.0000000	V1
Nickel	0.0005429	0.0006680	V0	0.0003284	V0	0.0001070	V0
Niobium	0.0000202	0.0000056	V0	0.0000036	V0	0.0000000	V1
Palladium	0.0000632	0.0000041	V0	0.0000059	V0	0.0000000	V1
Phosphorus	0.0459574	0.0148258	V0	0.0122838	V0	0.0126610	V0
Platinum	0.0000088	0.0000011	V0	0.0000022	V0	0.0000013	V0
Potassium	0.0061261	0.2159929	V0	0.1577607	V0	0.0024381	V0
Praseodymium	0.0000070	0.0000038	V0	0.0000020	V0	0.0000000	V1
Rubidium	0.0000184	0.0003735	V0	0.0003036	V0	0.0000020	V0
Samarium	0.0000133	0.0000025	V0	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0000925	V0	0.0000704	V0	0.0000162	V0
Silicon	0.7676322	0.0901219	V0	0.0853161	V0	0.1252639	V0
Silver	0.0000100	0.0000167	V0	0.0000144	V0	0.0000000	V1
Sodium	0.0169447	0.0423724	V0	0.0356238	V0	0.0013868	V0
Strontium	0.0003375	0.0002554	V0	0.0001542	V0	0.0000155	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000063	V0	0.0000035	V0	0.0000000	V1
Thorium	0.0000059	0.0000044	V0	0.0000020	V0	0.0000000	V1
Tin	0.0004414	0.0002092	V0	0.0002494	V0	0.0000286	V0
Titanium	0.0015201	0.0015155	V0	0.0010314	V0	0.0004250	V0
Tungsten	0.0000938	0.0000606	V0	0.0001519	V0	0.0000093	V0
Uranium	0.0000048	0.0000022	V0	0.0000013	V0	0.0000000	V1
Vanadium	0.0007697	0.0014156	V0	0.0002404	V0	0.0000000	V1
Zinc	0.0055897	0.0221598	V0	0.0159970	V0	0.0005740	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		25-Jan	
Sample Date	25-Jan			25-Jan		25-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	10.13	V0	9.02	V0	0.55	V0
Aluminum	0.1380326	0.0178538	V0	0.0118800	V0	0.0000000	V1
Antimony	0.0001784	0.0002869	V0	0.0000610	V0	0.0000000	V1
Arsenic	0.0001060	0.0000867	V0	0.0000629	V0	0.0000000	V1
Barium	0.0092847	0.0029443	V0	0.0006077	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000192	V0	0.0000493	V0	0.0000580	V0
Cadmium	0.0000174	0.0000734	V0	0.0000972	V0	0.0000000	V1
Calcium	0.4112124	0.0424156	V0	0.0272367	V0	0.0000000	V1
Cerium	0.0000174	0.0000469	V0	0.0000126	V0	0.0000000	V1
Cesium	0.0000100	0.0000017	V0	0.0000015	V0	0.0000000	V1
Chromium	0.0022262	0.0003046	V0	0.0002124	V0	0.0000000	V1
Cobalt	0.0000273	0.0000554	V0	0.0000292	V0	0.0000071	V0
Copper	0.0017171	0.0019992	V0	0.0005636	V0	0.0002182	V0
Iron	0.0393063	0.0454829	V0	0.0156998	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000260	V0	0.0000222	V0	0.0000000	V1
Lead	0.0008577	0.0002793	V0	0.0001533	V0	0.0000000	V1
Lithium	0.0000374	0.0000164	V0	0.0000097	V0	0.0000000	V1
Magnesium	0.0091409	0.0085696	V0	0.0063652	V0	0.0013998	V0
Manganese	0.0006949	0.0008766	V0	0.0003391	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001675	V0	0.0001814	V0	0.0000000	V1
Neodymium	0.0000140	0.0000078	V0	0.0000031	V0	0.0000000	V1
Nickel	0.0005429	0.0003721	V0	0.0003578	V0	0.0001070	V0
Niobium	0.0000202	0.0000064	V0	0.0000027	V0	0.0000000	V1
Palladium	0.0000632	0.0000117	V0	0.0000050	V0	0.0000000	V1
Phosphorus	0.0459574	0.0110073	V0	0.0126459	V0	0.0126610	V0
Platinum	0.0000088	0.0000014	V0	0.0000007	V0	0.0000013	V0
Potassium	0.0061261	0.0909902	V0	0.0860180	V0	0.0024381	V0
Praseodymium	0.0000070	0.0000030	V0	0.0000008	V0	0.0000000	V1
Rubidium	0.0000184	0.0001447	V0	0.0001197	V0	0.0000020	V0
Samarium	0.0000133	0.0000010	V0	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0000531	V0	0.0000405	V0	0.0000162	V0
Silicon	0.7676322	0.0376354	V0	0.1013019	V0	0.1252639	V0
Silver	0.0000100	0.0000324	V0	0.0000120	V0	0.0000000	V1
Sodium	0.0169447	0.0593239	V0	0.0281379	V0	0.0013868	V0
Strontium	0.0003375	0.0002400	V0	0.0000872	V0	0.0000155	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000017	V0	0.0000016	V0	0.0000000	V1
Thorium	0.0000059	0.0000025	V0	0.0000009	V0	0.0000000	V1
Tin	0.0004414	0.0002812	V0	0.0002036	V0	0.0000286	V0
Titanium	0.0015201	0.0018430	V0	0.0014167	V0	0.0004250	V0
Tungsten	0.0000938	0.0000503	V0	0.0000609	V0	0.0000093	V0
Uranium	0.0000048	0.0000012	V0	0.0000006	V0	0.0000000	V1
Vanadium	0.0007697	0.0002163	V0	0.0001219	V0	0.0000000	V1
Zinc	0.0055897	0.0109843	V0	0.0078668	V0	0.0005740	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		31-Jan	
	Sample Date	31-Jan		31-Jan		31-Jan	
Particulate Size	PM2.5		PM2.5		PM2.5		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	2.00	V0	1.91	V4	0.20	V0
Aluminum	0.1380326	0.0080856	V0	0.0000000	V1	0.0000000	V1
Antimony	0.0001784	0.0000192	V0	0.0000095	V0	0.0000000	V1
Arsenic	0.0001060	0.0000151	V0	0.0000142	V0	0.0000000	V1
Barium	0.0092847	0.0000000	V1	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	-9999	M2	0.0000093	V0	0.0000029	V0
Cadmium	0.0000174	0.0000054	V0	0.0000046	V0	0.0000000	V1
Calcium	0.4112124	0.0446056	V0	0.0260102	V0	0.0000000	V1
Cerium	0.0000174	0.0000063	V0	0.0000045	V0	0.0000026	V0
Cesium	0.0000100	0.0000009	V0	0.0000009	V0	0.0000000	V1
Chromium	0.0022262	0.0002583	V0	0.0002315	V0	0.0006484	V0
Cobalt	0.0000273	0.0000729	V0	0.0001727	V0	0.0000371	V0
Copper	0.0017171	0.0004520	V0	0.0002023	V0	0.0002624	V0
Iron	0.0393063	0.0145941	V0	0.0054981	V0	0.0141312	V0
Lanthanum	0.0000130	0.0000036	V0	0.0000022	V0	0.0000012	V0
Lead	0.0008577	0.0000864	V0	0.0000696	V0	0.0000000	V1
Lithium	0.0000374	0.0000072	V0	0.0000047	V0	0.0000000	V1
Magnesium	0.0091409	0.0119163	V0	0.0075055	V0	0.0020170	V0
Manganese	0.0006949	0.0001873	V0	0.0001262	V0	0.0000895	V0
Molybdenum	0.0007116	0.0000510	V0	0.0000738	V0	0.0000628	V0
Neodymium	0.0000140	0.0000023	V0	0.0000016	V0	0.0000012	V0
Nickel	0.0005429	0.0003632	V0	0.0003070	V0	0.0004201	V0
Niobium	0.0000202	0.0000038	V0	0.0000020	V0	0.0000021	V0
Palladium	0.0000632	0.0000027	V0	0.0000037	V0	0.0000032	V0
Phosphorus	0.0459574	0.0146268	V0	0.0129330	V0	0.0131071	V0
Platinum	0.0000088	0.0000014	V0	0.0000016	V0	0.0000018	V0
Potassium	0.0061261	0.0308899	V0	0.0294287	V0	0.0015038	V0
Praseodymium	0.0000070	0.0000006	V0	0.0000003	V0	0.0000003	V0
Rubidium	0.0000184	0.0000370	V0	0.0000354	V0	0.0000030	V0
Samarium	0.0000133	0.0000000	V1	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0000267	V0	0.0000167	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000006	V0	-9999	M2	0.0000000	V1
Sodium	0.0169447	0.0285192	V0	0.0273588	V0	0.0029716	V0
Strontium	0.0003375	0.0000681	V0	0.0000599	V0	0.0000175	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000006	V0	0.0000005	V0	0.0000000	V1
Thorium	0.0000059	0.0000006	V0	0.0000004	V0	0.0000004	V0
Tin	0.0004414	0.0000725	V0	0.0000776	V0	0.0000218	V0
Titanium	0.0015201	0.0040338	V0	0.0012386	V0	0.0007897	V0
Tungsten	0.0000938	0.0000619	V0	0.0000765	V0	0.0000333	V0
Uranium	0.0000048	0.0000007	V0	0.0000008	V0	0.0000000	V1
Vanadium	0.0007697	0.0000373	V0	0.0001602	V0	0.0000000	V1
Zinc	0.0055897	0.0023787	V0	0.0021471	V0	0.0006843	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		31-Jan	
Sample Date	31-Jan			31-Jan		31-Jan	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	2.25	V0	1.41	V0	0.20	V0
Aluminum	0.1380326	0.0066509	V0	0.0000000	V1	0.0000000	V1
Antimony	0.0001784	0.0000508	V0	0.0000000	V1	0.0000000	V1
Arsenic	0.0001060	0.0000135	V0	0.0000130	V0	0.0000000	V1
Barium	0.0092847	0.0005963	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000063	V0	-9999	M2	0.0000029	V0
Cadmium	0.0000174	0.0000068	V0	0.0000072	V0	0.0000000	V1
Calcium	0.4112124	0.0265793	V0	0.0222346	V0	0.0000000	V1
Cerium	0.0000174	0.0000119	V0	0.0000045	V0	0.0000026	V0
Cesium	0.0000100	0.0000009	V0	0.0000005	V0	0.0000000	V1
Chromium	0.0022262	0.0001947	V0	0.0002418	V0	0.0006484	V0
Cobalt	0.0000273	0.0000350	V0	-9999	M2	0.0000371	V0
Copper	0.0017171	0.0005159	V0	0.0002163	V0	0.0002624	V0
Iron	0.0393063	0.0113127	V0	0.0052430	V0	0.0141312	V0
Lanthanum	0.0000130	0.0000044	V0	0.0000031	V0	0.0000012	V0
Lead	0.0008577	0.0001214	V0	0.0000655	V0	0.0000000	V1
Lithium	0.0000374	0.0000063	V0	0.0000035	V0	0.0000000	V1
Magnesium	0.0091409	0.0061241	V0	0.0059450	V0	0.0020170	V0
Manganese	0.0006949	0.0002455	V0	0.0000967	V0	0.0000895	V0
Molybdenum	0.0007116	0.0000541	V0	0.0000327	V0	0.0000628	V0
Neodymium	0.0000140	0.0000021	V0	0.0000013	V0	0.0000012	V0
Nickel	0.0005429	0.0003736	V0	0.0005345	V0	0.0004201	V0
Niobium	0.0000202	0.0000018	V0	0.0000018	V0	0.0000021	V0
Palladium	0.0000632	0.0000048	V0	0.0000000	V1	0.0000032	V0
Phosphorus	0.0459574	0.0130263	V0	0.0132695	V0	0.0131071	V0
Platinum	0.0000088	0.0000027	V0	0.0000005	V0	0.0000018	V0
Potassium	0.0061261	0.0320145	V0	0.0142504	V0	0.0015038	V0
Praseodymium	0.0000070	0.0000006	V0	0.0000000	V1	0.0000003	V0
Rubidium	0.0000184	0.0000365	V0	0.0000190	V0	0.0000030	V0
Samarium	0.0000133	0.0000000	V1	0.0000000	V1	0.0000000	V1
Selenium	0.0003366	0.0000187	V0	0.0000203	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.0668833	V0	0.0000000	V1
Silver	0.0000100	0.0000028	V0	0.0000028	V0	0.0000000	V1
Sodium	0.0169447	0.0290604	V0	0.0251492	V0	0.0029716	V0
Strontium	0.0003375	0.0000761	V0	0.0000480	V0	0.0000175	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000006	V0	0.0000000	V1	0.0000000	V1
Thorium	0.0000059	0.0000006	V0	0.0000003	V0	0.0000004	V0
Tin	0.0004414	0.0000914	V0	0.0000627	V0	0.0000218	V0
Titanium	0.0015201	0.0007414	V0	0.0006538	V0	0.0007897	V0
Tungsten	0.0000938	0.0001081	V0	0.0000274	V0	0.0000333	V0
Uranium	0.0000048	0.0000008	V0	0.0000006	V0	0.0000000	V1
Vanadium	0.0007697	0.0000562	V0	0.0000382	V0	0.0000000	V1
Zinc	0.0055897	0.0025540	V0	0.0013086	V0	0.0006843	V0



Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	8.23	8.13	6	6
Aluminum	0.0153476	0.0075545	6	6
Antimony	0.0000650	0.0000570	6	6
Arsenic	0.0001566	0.0001518	6	6
Barium	0.0004383	0.0006955	6	2
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000229	0.0000158	4	4
Cadmium	0.0000377	0.0000616	6	6
Calcium	0.0437835	0.0138781	6	6
Cerium	0.0000185	0.0000125	6	6
Cesium	0.0000022	0.0000017	6	6
Chromium	0.0002978	0.0002029	6	6
Cobalt	0.0000433	0.0000171	6	6
Copper	0.0005534	0.0003183	6	6
Iron	0.0194905	0.0117042	6	6
Lanthanum	0.0000220	0.0000246	6	6
Lead	0.0002164	0.0001509	6	6
Lithium	0.0000190	0.0000119	6	6
Magnesium	0.0230273	0.0165809	6	6
Manganese	0.0009487	0.0008557	6	6
Molybdenum	0.0001045	0.0000964	6	6
Neodymium	0.0000066	0.0000047	6	6
Nickel	0.0003194	0.0002204	6	6
Niobium	0.0000033	0.0000013	6	6
Palladium	0.0000018	0.0000021	6	3
Phosphorus	0.0107568	0.0036096	6	6
Platinum	0.0000011	0.0000002	6	6
Potassium	0.0680857	0.0767626	6	6
Praseodymium	0.0000017	0.0000013	6	6
Rubidium	0.0001084	0.0001341	6	6
Samarium	0.0000010	0.0000010	6	4
Selenium	0.0000440	0.0000264	6	6
Silicon	0.0150203	0.0367921	6	1
Silver	0.0000042	0.0000063	6	6
Sodium	0.1071803	0.0931217	6	6
Strontium	0.0002333	0.0001809	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000018	0.0000022	6	6
Thorium	0.0000019	0.0000015	6	6
Tin	0.0001100	0.0000617	6	6
Titanium	0.0015251	0.0012808	6	6
Tungsten	0.0000526	0.0000110	5	5
Uranium	0.0000010	0.0000007	6	6
Vanadium	0.0003719	0.0005240	6	6
Zinc	0.0067266	0.0078564	6	6



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	7.33	5.23	6	6
Aluminum	0.0108059	0.0056068	6	5
Antimony	0.0001003	0.0000805	6	6
Arsenic	0.0000777	0.0000555	6	6
Barium	0.0007550	0.0007554	6	4
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000122	0.0000044	6	6
Cadmium	0.0000399	0.0000537	6	6
Calcium	0.0334164	0.0095535	6	6
Cerium	0.0000258	0.0000156	6	6
Cesium	0.0000017	0.0000007	6	6
Chromium	0.0002716	0.0000710	6	6
Cobalt	0.0000684	0.0000555	6	6
Copper	0.0006357	0.0003716	6	6
Iron	0.0175952	0.0089491	6	6
Lanthanum	0.0000257	0.0000264	6	6
Lead	0.0001968	0.0001212	6	6
Lithium	0.0000177	0.0000079	6	6
Magnesium	0.0181582	0.0164046	6	6
Manganese	0.0004816	0.0002105	6	6
Molybdenum	0.0002134	0.0002849	6	6
Neodymium	0.0000061	0.0000030	6	6
Nickel	0.0005281	0.0004294	6	6
Niobium	0.0000038	0.0000020	6	6
Palladium	0.0000036	0.0000020	6	5
Phosphorus	0.0107484	0.0030035	6	6
Platinum	0.0000013	0.0000006	6	6
Potassium	0.0586065	0.0509792	6	6
Praseodymium	0.0000017	0.0000009	6	6
Rubidium	0.0001021	0.0001024	6	6
Samarium	0.0000007	0.0000007	6	4
Selenium	0.0000507	0.0000251	6	6
Silicon	0.0450112	0.0616541	6	3
Silver	0.0000058	0.0000053	5	5
Sodium	0.0926249	0.0901339	6	6
Strontium	0.0001653	0.0001018	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000013	0.0000012	6	5
Thorium	0.0000016	0.0000009	6	6
Tin	0.0001408	0.0000854	6	6
Titanium	0.0011488	0.0002568	6	6
Tungsten	0.0000952	0.0000400	6	6
Uranium	0.0000013	0.0000012	6	6
Vanadium	0.0008811	0.0018333	6	6
Zinc	0.0069532	0.0060160	6	6



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	6.03	2.99	6	6
Aluminum	0.0140385	0.0043877	6	6
Antimony	0.0001287	0.0001029	6	6
Arsenic	0.0000783	0.0000526	6	6
Barium	0.0014224	0.0010628	6	6
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000158	0.0000068	5	5
Cadmium	0.0000282	0.0000251	6	6
Calcium	0.0390952	0.0096488	6	6
Cerium	0.0000271	0.0000159	6	6
Cesium	0.0000017	0.0000004	6	6
Chromium	0.0002471	0.0000728	6	6
Cobalt	0.0000388	0.0000132	6	6
Copper	0.0011759	0.0007254	6	6
Iron	0.0251426	0.0124706	6	6
Lanthanum	0.0000153	0.0000101	6	6
Lead	0.0004792	0.0005712	6	6
Lithium	0.0000168	0.0000065	6	6
Magnesium	0.0224731	0.0185952	6	6
Manganese	0.0006872	0.0004145	6	6
Molybdenum	0.0001588	0.0001602	6	6
Neodymium	0.0000065	0.0000025	6	6
Nickel	0.0003946	0.0001698	6	6
Niobium	0.0000040	0.0000017	6	6
Palladium	0.0000056	0.0000039	6	5
Phosphorus	0.0099543	0.0024464	6	6
Platinum	0.0000014	0.0000007	6	6
Potassium	0.0557205	0.0302139	6	6
Praseodymium	0.0000020	0.0000010	6	6
Rubidium	0.0000836	0.0000505	6	6
Samarium	0.0000008	0.0000004	6	5
Selenium	0.0000455	0.0000159	6	6
Silicon	0.0062726	0.0153646	6	1
Silver	0.0000082	0.0000120	6	6
Sodium	0.1154778	0.1030439	6	6
Strontium	0.0002333	0.0001244	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000011	0.0000005	6	6
Thorium	0.0000017	0.0000007	6	6
Tin	0.0001555	0.0000843	6	6
Titanium	0.0014957	0.0008469	6	6
Tungsten	0.0000615	0.0000249	6	6
Uranium	0.0000012	0.0000005	6	6
Vanadium	0.0005246	0.0009722	6	6
Zinc	0.0065464	0.0037657	6	6



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.78	2.99	6	6
Aluminum	0.0099798	0.0057954	6	5
Antimony	0.0000376	0.0000278	6	5
Arsenic	0.0000607	0.0000352	6	6
Barium	0.0001865	0.0002905	6	2
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000200	0.0000218	4	4
Cadmium	0.0000845	0.0001265	6	6
Calcium	0.0270466	0.0042550	6	6
Cerium	0.0000102	0.0000033	6	6
Cesium	0.0000021	0.0000021	6	6
Chromium	0.0002115	0.0000294	6	6
Cobalt	0.0000229	0.0000081	5	5
Copper	0.0005827	0.0005908	6	6
Iron	0.0108717	0.0051797	6	6
Lanthanum	0.0000126	0.0000094	6	6
Lead	0.0001811	0.0001338	6	6
Lithium	0.0000092	0.0000042	6	6
Magnesium	0.0135061	0.0103729	6	6
Manganese	0.0003188	0.0002389	6	6
Molybdenum	0.0001201	0.0000932	6	6
Neodymium	0.0000030	0.0000012	6	6
Nickel	0.0003343	0.0001486	6	6
Niobium	0.0000023	0.0000005	6	6
Palladium	0.0000059	0.0000058	6	4
Phosphorus	0.0106731	0.0032052	6	6
Platinum	0.0000009	0.0000003	6	6
Potassium	0.0547286	0.0519464	6	6
Praseodymium	0.0000007	0.0000004	6	5
Rubidium	0.0001260	0.0001758	6	6
Samarium	0.0000003	0.0000004	6	2
Selenium	0.0000420	0.0000227	6	6
Silicon	0.0372369	0.0435131	6	3
Silver	0.0000079	0.0000073	6	6
Sodium	0.0636819	0.0526025	6	6
Strontium	0.0001108	0.0000545	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000025	0.0000043	6	5
Thorium	0.0000009	0.0000005	6	6
Tin	0.0001197	0.0000650	6	6
Titanium	0.0018221	0.0019484	6	6
Tungsten	0.0000364	0.0000191	6	6
Uranium	0.0000006	0.0000003	6	6
Vanadium	0.0002350	0.0002867	5	5
Zinc	0.0058010	0.0065256	6	6



Wood Buffalo Environmental Association

PM2.5 Metal Summary (µg/sample)

2017 January

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99%	Max.	Mean	Std. Dev.	Median	Outlier	Test
Particulate Matter	100%	24	0	34	48	72	142	171	206	210	243	396	581	581	158	122	142	770	
Aluminum	92%	24	2	0.1141	0.1574	0.2452	0.3127	0.3169	0.3948	0.4285	0.4502	0.4623	0.6344	0.6344	0.3111	0.1242	0.3127	0.9321	
Antimony	96%	24	1	0.0002	0.0003	0.0006	0.0015	0.0018	0.0033	0.0035	0.0046	0.0055	0.0069	0.0069	0.0020	0.0018	0.0015	0.0111	
Arsenic	100%	24	0	0.0003	0.0003	0.0006	0.0018	0.0020	0.0031	0.0032	0.0056	0.0059	0.0092	0.0092	0.0022	0.0021	0.0018	0.0130	
Barium	58%	24	10	0.0031	0.0041	0.0056	0.0143	0.0163	0.0258	0.0373	0.0419	0.0629	0.0707	0.0707	0.0190	0.0186	0.0143	0.1118	
Beryllium	0%	24	24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000		
Bismuth	100%	24	0	0.0001	0.0001	0.0002	0.0004	0.0005	0.0006	0.0006	0.0011	0.0011	0.0012	0.0012	0.0005	0.0003	0.0004	0.0021	
Cadmium	100%	24	0	0.0001	0.0001	0.0002	0.0006	0.0007	0.0010	0.0018	0.0035	0.0039	0.0080	0.0080	0.0011	0.0018	0.0006	0.0101	
Calcium	100%	24	0	0.5194	0.5885	0.6473	0.8046	0.8400	1.0705	1.0984	1.2689	1.3329	1.4595	1.4595	0.8598	0.2703	0.8046	2.2114	
Cerium	100%	24	0	0.0001	0.0001	0.0003	0.0004	0.0005	0.0008	0.0009	0.0010	0.0011	0.0011	0.0011	0.0005	0.0003	0.0004	0.0022	
Cesium	100%	24	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0000	0.0000	0.0000	0.0002	
Chromium	100%	24	0	0.0034	0.0038	0.0047	0.0058	0.0060	0.0070	0.0073	0.0080	0.0082	0.0169	0.0169	0.0062	0.0027	0.0058	0.0195	
Cobalt	100%	24	0	0.0003	0.0004	0.0007	0.0009	0.0010	0.0013	0.0014	0.0020	0.0041	0.0058	0.0058	0.0013	0.0012	0.0009	0.0075	
Copper	100%	24	0	0.0049	0.0058	0.0095	0.0124	0.0135	0.0262	0.0293	0.0423	0.0480	0.0485	0.0485	0.0177	0.0134	0.0124	0.0844	
Iron	100%	24	0	0.1258	0.1568	0.2943	0.3838	0.4281	0.6036	0.6971	0.7949	0.9129	1.0916	1.0916	0.4384	0.2560	0.3838	1.7186	
Lanthanum	100%	24	0	0.0001	0.0001	0.0002	0.0003	0.0004	0.0006	0.0007	0.0011	0.0014	0.0017	0.0017	0.0005	0.0005	0.0003	0.0027	
Lead	100%	24	0	0.0015	0.0017	0.0023	0.0046	0.0055	0.0078	0.0095	0.0105	0.0147	0.0379	0.0379	0.0064	0.0075	0.0046	0.0441	
Lithium	100%	24	0	0.0001	0.0001	0.0002	0.0004	0.0004	0.0005	0.0005	0.0007	0.0007	0.0009	0.0009	0.0004	0.0002	0.0004	0.0014	
Magnesium	100%	24	0	0.1218	0.1409	0.1609	0.2860	0.5034	0.6989	0.9988	1.0630	1.1451	1.1766	1.1766	0.4629	0.3657	0.2860	2.2917	
Manganese	100%	24	0	0.0023	0.0045	0.0066	0.0123	0.0135	0.0168	0.0187	0.0333	0.0483	0.0497	0.0497	0.0146	0.0126	0.0123	0.0776	
Molybdenum	100%	24	0	0.0007	0.0008	0.0012	0.0018	0.0039	0.0044	0.0045	0.0066	0.0109	0.0189	0.0189	0.0036	0.0041	0.0018	0.0240	
Neodymium	100%	24	0	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0001	0.0001	0.0001	0.0005	
Nickel	100%	24	0	0.0031	0.0035	0.0046	0.0086	0.0089	0.0128	0.0133	0.0160	0.0161	0.0322	0.0322	0.0095	0.0063	0.0086	0.0409	
Niobium	100%	24	0	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0000	0.0001	0.0003	
Palladium	71%	24	7	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0004	0.0004	0.0001	0.0001	0.0001	0.0005	
Phosphorus	100%	24	0	0.1555	0.1565	0.1757	0.2903	0.2948	0.3104	0.3123	0.3185	0.3510	0.3558	0.3558	0.2527	0.0697	0.2903	0.6012	
Platinum	100%	24	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001	
Potassium	100%	24	0	0.3420	0.4195	0.6587	0.8929	1.2093	2.0644	2.1290	3.5210	3.7863	5.1838	5.1838	1.4222	1.2376	0.8929	7.6102	
Praseodymium	96%	24	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0002	
Rubidium	100%	24	0	0.0005	0.0008	0.0009	0.0014	0.0017	0.0029	0.0029	0.0073	0.0090	0.0115	0.0115	0.0025	0.0028	0.0014	0.0166	
Samarium	63%	24	9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001	
Selenium	100%	24	0	0.0004	0.0004	0.0007	0.0010	0.0012	0.0015	0.0015	0.0018	0.0021	0.0022	0.0022	0.0011	0.0005	0.0010	0.0037	
Silicon	33%	24	16	0.0000	0.0000	0.0000	0.3347	0.6585	1.3257	1.6052	2.1629	2.4312	3.6182	3.6182	0.7169	0.9932	0.3347	5.6827	
Silver	100%	24	0	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0008	0.0008	0.0002	0.0002	0.0001	0.0011	
Sodium	100%	24	0	0.3370	0.6036	0.6974	1.5099	2.2455	3.5832	4.5295	5.9743	6.0060	6.7596	6.7596	2.2735	2.0034	1.5099	12.2904	
Strontium	100%	24	0	0.0012	0.0014	0.0018	0.0041	0.0044	0.0061	0.0068	0.0080	0.0098	0.0132	0.0132	0.0045	0.0030	0.0041	0.0197	
Tantalum	0%	24	24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
Thallium	92%	24	2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0003	0.0003	0.0000	0.0001	0.0000	0.0003	
Thorium	100%	24	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0002	
Tin	100%	24	0	0.0009	0.0013	0.0019	0.0025	0.0037	0.0049	0.0049	0.0050	0.0060	0.0067	0.0067	0.0032	0.0017	0.0025	0.0118	
Titanium	100%	24	0	0.0135	0.0158	0.0182	0.0297	0.0322	0.0357	0.0364	0.0711	0.0968	0.1378	0.1378	0.0359	0.0285	0.0297	0.1783	
Tungsten	100%	24	0	0.0002	0.0007	0.0011	0.0014	0.0015	0.0019	0.0020	0.0032	0.0036	0.0186	0.0186	0.0022	0.0036	0.0014	0.0201	
Uranium	100%	24	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001	
Vanadium	100%	24	0	0.0009	0.0013	0.0021	0.0038	0.0044	0.0089	0.0116	0.0340	0.0596	0.1109	0.1109	0.0123	0.0248	0.0038	0.1361	
Zinc	100%	24	0	0.0302	0.0326	0.0553	0.1093	0.1784	0.2082	0.2636	0.3839	0.4365	0.5318	0.5318	0.1561	0.1395	0.1093	0.8538	



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PARTICULATE MATTER (PM₁₀) - METALS DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PM metals: Atmospheric Research & Analysis, Inc.
Morrisville, NC



FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with PM_{10} Inlet for PM_{10} and with PM_{10} Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER	$< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$
MEDIUM	47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ($\mu\text{g}/\text{m}^3$) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For PM_{10} FRM Partisol PM_{10} sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1	AMS 6	AMS 6		Travel Blank	
	Sample Date	01-Jan	01-Jan	01-Jan		01-Jan	
Particulate Size	PM10	PM10	PM10	PM10		PM10	
Total Air Volume (m ³)	24	24	24	24		24	
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	7.11	V0	6.24	V0	0.20	V0
Aluminum	0.1380326	0.1272952	V0	0.0956063	V0	0.0000000	V1
Antimony	0.0001784	0.0001144	V0	0.0000973	V0	0.0000000	V1
Arsenic	0.0001060	0.0001884	V0	0.0000375	V0	0.0000000	V1
Barium	0.0092847	0.0013375	V0	0.0022673	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000046	V0	0.0000104	V0	0.0000007	V0
Cadmium	0.0000174	0.0000075	V0	0.0000048	V0	0.0000000	V1
Calcium	0.4112124	0.0981404	V0	0.1167505	V0	0.0000000	V1
Cerium	0.0000174	0.0001320	V0	0.0001149	V0	0.0000000	V1
Cesium	0.0000100	0.0000097	V0	0.0000080	V0	0.0000000	V1
Chromium	0.0022262	0.0006407	V0	0.0002939	V0	0.0000000	V1
Cobalt	0.0000273	0.0000653	V0	0.0000576	V0	0.0000155	V0
Copper	0.0017171	0.0006897	V0	0.0008513	V0	0.0001343	V0
Iron	0.0393063	0.0859466	V0	0.0794358	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000618	V0	0.0000527	V0	0.0000000	V1
Lead	0.0008577	0.0002917	V0	0.0001300	V0	0.0000000	V1
Lithium	0.0000374	0.0001347	V0	0.0001126	V0	0.0000000	V1
Magnesium	0.0091409	0.0430744	V0	0.0436866	V0	0.0007118	V0
Manganese	0.0006949	0.0017758	V0	0.0017903	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000819	V0	0.0000929	V0	0.0000000	V1
Neodymium	0.0000140	0.0000561	V0	0.0000459	V0	0.0000000	V1
Nickel	0.0005429	0.0003095	V0	0.0002445	V0	0.0001421	V0
Niobium	0.0000202	0.0000156	V0	0.0000121	V0	0.0000000	V1
Palladium	0.0000632	0.0000030	V0	0.0000086	V0	0.0000000	V1
Phosphorus	0.0459574	0.0081959	V0	0.0071655	V0	0.0060481	V0
Platinum	0.0000088	0.0000006	V0	0.0000010	V0	0.0000004	V0
Potassium	0.0061261	0.0535168	V0	0.0457798	V0	0.0009458	V0
Praseodymium	0.0000070	0.0000154	V0	0.0000121	V0	0.0000000	V1
Rubidium	0.0000184	0.0001723	V0	0.0001414	V0	0.0000000	V1
Samarium	0.0000133	0.0000102	V0	0.0000081	V0	0.0000000	V1
Selenium	0.0003366	0.0000918	V0	0.0000870	V0	0.0000000	V1
Silicon	0.7676322	0.2631624	V0	0.2224591	V0	0.0000000	V1
Silver	0.0000100	0.0000017	V0	0.0000015	V0	0.0000000	V1
Sodium	0.0169447	0.1271255	V0	0.1369245	V0	0.0007914	V0
Strontium	0.0003375	0.0005137	V0	0.0005614	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000016	V0	0.0000013	V0	0.0000000	V1
Thorium	0.0000059	0.0000171	V0	0.0000130	V0	0.0000000	V1
Tin	0.0004414	0.0000806	V0	0.0001066	V0	0.0000000	V1
Titanium	0.0015201	0.0044662	V0	0.0037972	V0	0.0002248	V0
Tungsten	0.0000938	0.0001193	V0	0.0000886	V0	0.0000145	V0
Uranium	0.0000048	0.0000051	V0	0.0000043	V0	0.0000000	V1
Vanadium	0.0007697	0.0004447	V0	0.0002960	V0	0.0000367	V0
Zinc	0.0055897	0.0026871	V0	0.0023203	V0	0.0003833	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		01-Jan	
Sample Date	01-Jan			01-Jan		01-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	3.93	V0	5.49	V0	0.20	V0
Aluminum	0.1380326	0.0297607	V0	0.0690826	V0	0.0000000	V1
Antimony	0.0001784	0.0001621	V0	0.0000305	V0	0.0000000	V1
Arsenic	0.0001060	0.0000243	V0	0.0000599	V0	0.0000000	V1
Barium	0.0092847	0.0021890	V0	0.0009178	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000172	V0	0.0000558	V0	0.0000007	V0
Cadmium	0.0000174	0.0000035	V0	0.0000228	V0	0.0000000	V1
Calcium	0.4112124	0.0573294	V0	0.1045406	V0	0.0000000	V1
Cerium	0.0000174	0.0000444	V0	0.0000681	V0	0.0000000	V1
Cesium	0.0000100	0.0000031	V0	0.0000063	V0	0.0000000	V1
Chromium	0.0022262	0.0003009	V0	0.0002465	V0	0.0000000	V1
Cobalt	0.0000273	0.0000239	V0	0.0000634	V0	0.0000155	V0
Copper	0.0017171	0.0012909	V0	0.0005292	V0	0.0001343	V0
Iron	0.0393063	0.0377147	V0	0.0536879	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000198	V0	0.0000345	V0	0.0000000	V1
Lead	0.0008577	0.0001048	V0	0.0002961	V0	0.0000000	V1
Lithium	0.0000374	0.0000287	V0	0.0000646	V0	0.0000000	V1
Magnesium	0.0091409	0.0292943	V0	0.0419233	V0	0.0007118	V0
Manganese	0.0006949	0.0007980	V0	0.0012685	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001356	V0	0.0000902	V0	0.0000000	V1
Neodymium	0.0000140	0.0000149	V0	0.0000288	V0	0.0000000	V1
Nickel	0.0005429	0.0001985	V0	0.0004370	V0	0.0001421	V0
Niobium	0.0000202	0.0000070	V0	0.0000090	V0	0.0000000	V1
Palladium	0.0000632	0.0000078	V0	0.0000075	V0	0.0000000	V1
Phosphorus	0.0459574	0.0070969	V0	0.0086189	V0	0.0060481	V0
Platinum	0.0000088	0.0000017	V0	0.0000017	V0	0.0000004	V0
Potassium	0.0061261	0.0231468	V0	0.0404740	V0	0.0009458	V0
Praseodymium	0.0000070	0.0000046	V0	0.0000073	V0	0.0000000	V1
Rubidium	0.0000184	0.0000495	V0	0.0001103	V0	0.0000000	V1
Samarium	0.0000133	0.0000024	V0	0.0000059	V0	0.0000000	V1
Selenium	0.0003366	0.0000626	V0	0.0000822	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.1006734	V0	0.0000000	V1
Silver	0.0000100	0.0000011	V0	0.0000032	V0	0.0000000	V1
Sodium	0.0169447	0.1462809	V0	0.1509335	V0	0.0007914	V0
Strontium	0.0003375	0.0004597	V0	0.0004495	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000007	V0	0.0000013	V0	0.0000000	V1
Thorium	0.0000059	0.0000043	V0	0.0000092	V0	0.0000000	V1
Tin	0.0004414	0.0001941	V0	0.0000943	V0	0.0000000	V1
Titanium	0.0015201	0.0054462	V0	0.0033605	V0	0.0002248	V0
Tungsten	0.0000938	0.0000472	V0	0.0000892	V0	0.0000145	V0
Uranium	0.0000048	0.0000024	V0	0.0000032	V0	0.0000000	V1
Vanadium	0.0007697	0.0001369	V0	0.0003747	V0	0.0000367	V0
Zinc	0.0055897	0.0019464	V0	0.0027486	V0	0.0003833	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		01-Jan	
Sample Date	01-Jan			01-Jan		01-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	4.06	V0	8.92	V0	0.20	V0
Aluminum	0.1380326	0.1010981	V0	0.1719394	V0	0.0000000	V1
Antimony	0.0001784	0.0000166	V0	0.0000119	V0	0.0000000	V1
Arsenic	0.0001060	0.0000375	V0	0.0000442	V0	0.0000000	V1
Barium	0.0092847	0.0010420	V0	0.0015248	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000032	V0	0.0000256	V0	0.0000007	V0
Cadmium	0.0000174	0.0000029	V0	0.0000023	V0	0.0000000	V1
Calcium	0.4112124	0.0825123	V0	0.0653641	V0	0.0000000	V1
Cerium	0.0000174	0.0001009	V0	0.0001749	V0	0.0000000	V1
Cesium	0.0000100	0.0000095	V0	0.0000127	V0	0.0000000	V1
Chromium	0.0022262	0.0002672	V0	0.0004949	V0	0.0000000	V1
Cobalt	0.0000273	0.0000461	V0	0.0000695	V0	0.0000155	V0
Copper	0.0017171	0.0002904	V0	0.0004709	V0	0.0001343	V0
Iron	0.0393063	0.0660354	V0	0.1013225	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000494	V0	0.0000833	V0	0.0000000	V1
Lead	0.0008577	0.0000868	V0	0.0001048	V0	0.0000000	V1
Lithium	0.0000374	0.0001044	V0	0.0001954	V0	0.0000000	V1
Magnesium	0.0091409	0.0421126	V0	0.0401461	V0	0.0007118	V0
Manganese	0.0006949	0.0014174	V0	0.0026462	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000549	V0	0.0000501	V0	0.0000000	V1
Neodymium	0.0000140	0.0000442	V0	0.0000750	V0	0.0000000	V1
Nickel	0.0005429	0.0002667	V0	0.0003332	V0	0.0001421	V0
Niobium	0.0000202	0.0000137	V0	0.0000235	V0	0.0000000	V1
Palladium	0.0000632	0.0000052	V0	0.0000056	V0	0.0000000	V1
Phosphorus	0.0459574	0.0071622	V0	0.0077879	V0	0.0060481	V0
Platinum	0.0000088	0.0000009	V0	0.0000008	V0	0.0000004	V0
Potassium	0.0061261	0.0397436	V0	0.0528268	V0	0.0009458	V0
Praseodymium	0.0000070	0.0000123	V0	0.0000210	V0	0.0000000	V1
Rubidium	0.0000184	0.0001437	V0	0.0002121	V0	0.0000000	V1
Samarium	0.0000133	0.0000079	V0	0.0000130	V0	0.0000000	V1
Selenium	0.0003366	0.0000893	V0	0.0001104	V0	0.0000000	V1
Silicon	0.7676322	0.1596490	V0	0.5150074	V0	0.0000000	V1
Silver	0.0000100	0.0000000	V1	0.0000007	V0	0.0000000	V1
Sodium	0.0169447	0.1293104	V0	0.1089243	V0	0.0007914	V0
Strontium	0.0003375	0.0004429	V0	0.0005290	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000012	V0	0.0000018	V0	0.0000000	V1
Thorium	0.0000059	0.0000134	V0	0.0000214	V0	0.0000000	V1
Tin	0.0004414	0.0000457	V0	0.0000485	V0	0.0000000	V1
Titanium	0.0015201	0.0048285	V0	0.0060661	V0	0.0002248	V0
Tungsten	0.0000938	0.0000561	V0	0.0000757	V0	0.0000145	V0
Uranium	0.0000048	0.0000041	V0	0.0000067	V0	0.0000000	V1
Vanadium	0.0007697	0.0003381	V0	0.0003861	V0	0.0000367	V0
Zinc	0.0055897	0.0014826	V0	0.0017710	V0	0.0003833	V0



Compound Name	MDL (µg/sample)	Albian Muskeg River		Travel Blank	
		Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	12.71	V0	0.20	V0
Aluminum	0.1380326	0.4549144	V0	0.0000000	V1
Antimony	0.0001784	0.0000331	V0	0.0000000	V1
Arsenic	0.0001060	0.0001057	V0	0.0000000	V1
Barium	0.0092847	0.0028801	V0	0.0000000	V1
Beryllium	0.0000946	0.0000104	V0	0.0000000	V1
Bismuth	0.0000093	0.0000110	V0	0.0000007	V0
Cadmium	0.0000174	0.0000041	V0	0.0000000	V1
Calcium	0.4112124	0.1885754	V0	0.0000000	V1
Cerium	0.0000174	0.0004613	V0	0.0000000	V1
Cesium	0.0000100	0.0000300	V0	0.0000000	V1
Chromium	0.0022262	0.0017728	V0	0.0000000	V1
Cobalt	0.0000273	0.0001707	V0	0.0000155	V0
Copper	0.0017171	0.0008164	V0	0.0001343	V0
Iron	0.0393063	0.2921492	V0	0.0000000	V1
Lanthanum	0.0000130	0.0002247	V0	0.0000000	V1
Lead	0.0008577	0.0002086	V0	0.0000000	V1
Lithium	0.0000374	0.0006718	V0	0.0000000	V1
Magnesium	0.0091409	0.0780071	V0	0.0007118	V0
Manganese	0.0006949	0.0089150	V0	0.0000000	V1
Molybdenum	0.0007116	0.0003051	V0	0.0000000	V1
Neodymium	0.0000140	0.0002004	V0	0.0000000	V1
Nickel	0.0005429	0.0012754	V0	0.0001421	V0
Niobium	0.0000202	0.0000595	V0	0.0000000	V1
Palladium	0.0000632	0.0000092	V0	0.0000000	V1
Phosphorus	0.0459574	0.0106415	V0	0.0060481	V0
Platinum	0.0000088	0.0000011	V0	0.0000004	V0
Potassium	0.0061261	0.1215915	V0	0.0009458	V0
Praseodymium	0.0000070	0.0000519	V0	0.0000000	V1
Rubidium	0.0000184	0.0004989	V0	0.0000000	V1
Samarium	0.0000133	0.0000371	V0	0.0000000	V1
Selenium	0.0003366	0.0002952	V0	0.0000000	V1
Silicon	0.7676322	0.9891088	V0	0.0000000	V1
Silver	0.0000100	0.0000020	V0	0.0000000	V1
Sodium	0.0169447	0.1627981	V0	0.0007914	V0
Strontium	0.0003375	0.0011840	V0	0.0000000	V1
Tantalum	0.0000394	0.0000037	V0	0.0000000	V1
Thallium	0.0000090	0.0000039	V0	0.0000000	V1
Thorium	0.0000059	0.0000672	V0	0.0000000	V1
Tin	0.0004414	0.0000809	V0	0.0000000	V1
Titanium	0.0015201	0.0165489	V0	0.0002248	V0
Tungsten	0.0000938	0.0001296	V0	0.0000145	V0
Uranium	0.0000048	0.0000170	V0	0.0000000	V1
Vanadium	0.0007697	0.0009918	V0	0.0000367	V0
Zinc	0.0055897	0.0042250	V0	0.0003833	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		07-Jan	
	Sample Date	07-Jan		07-Jan		07-Jan	
Particulate Size	PM10		PM10		PM10		
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	10.09	V0	11.02	V0	0.22	V0
Aluminum	0.1380326	0.1672030	V0	0.2114909	V0	0.0000000	V1
Antimony	0.0001784	0.0000417	V0	0.0003080	V0	0.0000000	V1
Arsenic	0.0001060	0.0000703	V0	0.0001183	V0	0.0000000	V1
Barium	0.0092847	0.0015335	V0	0.0035857	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000094	V0	0.0000479	V0	0.0000033	V0
Cadmium	0.0000174	0.0000104	V0	0.0000183	V0	0.0000021	V0
Calcium	0.4112124	0.1254944	V0	0.2996972	V0	0.0000000	V1
Cerium	0.0000174	0.0001781	V0	0.0001783	V0	0.0000046	V0
Cesium	0.0000100	0.0000114	V0	0.0000098	V0	0.0000000	V1
Chromium	0.0022262	0.0003412	V0	0.0006334	V0	0.0000000	V1
Cobalt	0.0000273	0.0000899	V0	0.0001157	V0	0.0000682	V0
Copper	0.0017171	0.0006767	V0	0.0018015	V0	0.0000850	V0
Iron	0.0393063	0.1021262	V0	0.1375843	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000869	V0	0.0000821	V0	0.0000041	V0
Lead	0.0008577	0.0002011	V0	0.0003166	V0	0.0000000	V1
Lithium	0.0000374	0.0001960	V0	0.0001459	V0	0.0000000	V1
Magnesium	0.0091409	0.0897997	V0	0.1205213	V0	0.0011135	V0
Manganese	0.0006949	0.0023054	V0	0.0033981	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000855	V0	0.0002287	V0	0.0000000	V1
Neodymium	0.0000140	0.0000744	V0	0.0000693	V0	0.0000000	V1
Nickel	0.0005429	0.0003631	V0	0.0011054	V0	0.0001064	V0
Niobium	0.0000202	0.0000212	V0	0.0000205	V0	0.0000009	V0
Palladium	0.0000632	0.0000042	V0	0.0000128	V0	0.0000073	V0
Phosphorus	0.0459574	0.0086955	V0	0.0156388	V0	0.0059440	V0
Platinum	0.0000088	0.0000008	V0	0.0000015	V0	0.0000008	V0
Potassium	0.0061261	0.0737302	V0	0.1088230	V0	0.0034895	V0
Praseodymium	0.0000070	0.0000197	V0	0.0000189	V0	0.0000000	V1
Rubidium	0.0000184	0.0002126	V0	0.0002420	V0	0.0000013	V0
Samarium	0.0000133	0.0000132	V0	0.0000117	V0	0.0000000	V1
Selenium	0.0003366	0.0001236	V0	0.0001606	V0	0.0000000	V1
Silicon	0.7676322	0.2813912	V0	0.4845844	V0	0.0000000	V1
Silver	0.0000100	0.0000017	V0	0.0000069	V0	0.0000000	V1
Sodium	0.0169447	0.3509742	V0	0.4626278	V0	0.0015553	V0
Strontium	0.0003375	0.0008530	V0	0.0011855	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000028	V0	0.0000030	V0	0.0000000	V1
Thorium	0.0000059	0.0000217	V0	0.0000178	V0	0.0000000	V1
Tin	0.0004414	0.0000796	V0	0.0002441	V0	0.0000000	V1
Titanium	0.0015201	0.0063189	V0	0.0080848	V0	0.0003755	V0
Tungsten	0.0000938	0.0001364	V0	0.0000874	V0	0.0001128	V0
Uranium	0.0000048	0.0000064	V0	0.0000056	V0	0.0000000	V1
Vanadium	0.0007697	0.0005332	V0	0.0008349	V0	0.0000836	V0
Zinc	0.0055897	0.0034333	V0	0.0112683	V0	0.0003629	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		07-Jan	
Sample Date	07-Jan			07-Jan		07-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	11.40	V0	5.45	V0	0.22	V0
Aluminum	0.1380326	0.0963336	V0	0.0195803	V0	0.0000000	V1
Antimony	0.0001784	0.0001749	V0	0.0000444	V0	0.0000000	V1
Arsenic	0.0001060	0.0001152	V0	0.0000760	V0	0.0000000	V1
Barium	0.0092847	0.0024986	V0	0.0004171	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000095	V0	0.0000048	V0	0.0000033	V0
Cadmium	0.0000174	0.0000250	V0	0.0000176	V0	0.0000021	V0
Calcium	0.4112124	0.2431755	V0	0.0550623	V0	0.0000000	V1
Cerium	0.0000174	0.0001317	V0	0.0000234	V0	0.0000046	V0
Cesium	0.0000100	0.0000071	V0	0.0000020	V0	0.0000000	V1
Chromium	0.0022262	0.0006246	V0	0.0001396	V0	0.0000000	V1
Cobalt	0.0000273	0.0000569	V0	0.0000374	V0	0.0000682	V0
Copper	0.0017171	0.0016727	V0	0.0003653	V0	0.0000850	V0
Iron	0.0393063	0.1140427	V0	0.0184169	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000599	V0	0.0000121	V0	0.0000041	V0
Lead	0.0008577	0.0011385	V0	0.0001283	V0	0.0000000	V1
Lithium	0.0000374	0.0000952	V0	0.0000191	V0	0.0000000	V1
Magnesium	0.0091409	0.0619572	V0	0.0410071	V0	0.0011135	V0
Manganese	0.0006949	0.0032237	V0	0.0005104	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001678	V0	0.0000377	V0	0.0000000	V1
Neodymium	0.0000140	0.0000528	V0	0.0000083	V0	0.0000000	V1
Nickel	0.0005429	0.0004630	V0	0.0001729	V0	0.0001064	V0
Niobium	0.0000202	0.0000132	V0	0.0000035	V0	0.0000009	V0
Palladium	0.0000632	0.0000113	V0	0.0000037	V0	0.0000073	V0
Phosphorus	0.0459574	0.0087535	V0	0.0066981	V0	0.0059440	V0
Platinum	0.0000088	0.0000011	V0	0.0000011	V0	0.0000008	V0
Potassium	0.0061261	0.0949432	V0	0.0380528	V0	0.0034895	V0
Praseodymium	0.0000070	0.0000139	V0	0.0000022	V0	0.0000000	V1
Rubidium	0.0000184	0.0002106	V0	0.0000646	V0	0.0000013	V0
Samarium	0.0000133	0.0000084	V0	0.0000015	V0	0.0000000	V1
Selenium	0.0003366	0.0000855	V0	0.0000403	V0	0.0000000	V1
Silicon	0.7676322	0.2193271	V0	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000042	V0	0.0000037	V0	0.0000000	V1
Sodium	0.0169447	0.3901926	V0	0.1917068	V0	0.0015553	V0
Strontium	0.0003375	0.0008727	V0	0.0002987	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000020	V0	0.0000013	V0	0.0000000	V1
Thorium	0.0000059	0.0000128	V0	0.0000022	V0	0.0000000	V1
Tin	0.0004414	0.0001662	V0	0.0000496	V0	0.0000000	V1
Titanium	0.0015201	0.0034941	V0	0.0011810	V0	0.0003755	V0
Tungsten	0.0000938	0.0001181	V0	0.0000341	V0	0.0001128	V0
Uranium	0.0000048	0.0000042	V0	0.0000010	V0	0.0000000	V1
Vanadium	0.0007697	0.0003068	V0	0.0001158	V0	0.0000836	V0
Zinc	0.0055897	0.0072451	V0	0.0035963	V0	0.0003629	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		07-Jan	
Sample Date	07-Jan			07-Jan		07-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	7.26	V0	8.84	V0	0.22	V0
Aluminum	0.1380326	0.1503508	V0	0.1110182	V0	0.0000000	V1
Antimony	0.0001784	0.0000637	V0	0.0000338	V0	0.0000000	V1
Arsenic	0.0001060	0.0000685	V0	0.0000586	V0	0.0000000	V1
Barium	0.0092847	0.0015864	V0	0.0011047	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000349	V0	0.0000088	V0	0.0000033	V0
Cadmium	0.0000174	0.0000052	V0	0.0000055	V0	0.0000021	V0
Calcium	0.4112124	0.1061599	V0	0.0868927	V0	0.0000000	V1
Cerium	0.0000174	0.0001547	V0	0.0001172	V0	0.0000046	V0
Cesium	0.0000100	0.0000102	V0	0.0000083	V0	0.0000000	V1
Chromium	0.0022262	0.0004445	V0	0.0014145	V0	0.0000000	V1
Cobalt	0.0000273	0.0000712	V0	0.0001162	V0	0.0000682	V0
Copper	0.0017171	0.0008280	V0	0.0004320	V0	0.0000850	V0
Iron	0.0393063	0.0942325	V0	0.0832992	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000744	V0	0.0000592	V0	0.0000041	V0
Lead	0.0008577	0.0001748	V0	0.0001567	V0	0.0000000	V1
Lithium	0.0000374	0.0002066	V0	0.0001160	V0	0.0000000	V1
Magnesium	0.0091409	0.0755061	V0	0.0736285	V0	0.0011135	V0
Manganese	0.0006949	0.0019242	V0	0.0016260	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000756	V0	0.0001501	V0	0.0000000	V1
Neodymium	0.0000140	0.0000647	V0	0.0000517	V0	0.0000000	V1
Nickel	0.0005429	0.0004171	V0	0.0004158	V0	0.0001064	V0
Niobium	0.0000202	0.0000173	V0	0.0000140	V0	0.0000009	V0
Palladium	0.0000632	0.0000222	V0	0.0000000	V1	0.0000073	V0
Phosphorus	0.0459574	0.0080419	V0	0.0078503	V0	0.0059440	V0
Platinum	0.0000088	0.0000015	V0	0.0000013	V0	0.0000008	V0
Potassium	0.0061261	0.0611743	V0	0.0505960	V0	0.0034895	V0
Praseodymium	0.0000070	0.0000173	V0	0.0000135	V0	0.0000000	V1
Rubidium	0.0000184	0.0001779	V0	0.0001379	V0	0.0000013	V0
Samarium	0.0000133	0.0000116	V0	0.0000098	V0	0.0000000	V1
Selenium	0.0003366	0.0001103	V0	0.0000919	V0	0.0000000	V1
Silicon	0.7676322	0.2958710	V0	0.2003100	V0	0.0000000	V1
Silver	0.0000100	0.0000014	V0	0.0000017	V0	0.0000000	V1
Sodium	0.0169447	0.3064978	V0	0.3031912	V0	0.0015553	V0
Strontium	0.0003375	0.0007262	V0	0.0006600	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000021	V0	0.0000019	V0	0.0000000	V1
Thorium	0.0000059	0.0000213	V0	0.0000143	V0	0.0000000	V1
Tin	0.0004414	0.0000820	V0	0.0000896	V0	0.0000000	V1
Titanium	0.0015201	0.0043562	V0	0.0045733	V0	0.0003755	V0
Tungsten	0.0000938	0.0001285	V0	-9999	M2	0.0001128	V0
Uranium	0.0000048	0.0000055	V0	0.0000046	V0	0.0000000	V1
Vanadium	0.0007697	0.0003795	V0	0.0004775	V0	0.0000836	V0
Zinc	0.0055897	0.0031381	V0	0.0028652	V0	0.0003629	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			07-Jan	
Sample Date	07-Jan			07-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	10.48	V0	0.22	V0
Aluminum	0.1380326	0.2168492	V0	0.0000000	V1
Antimony	0.0001784	0.0000163	V0	0.0000000	V1
Arsenic	0.0001060	0.0000631	V0	0.0000000	V1
Barium	0.0092847	0.0016153	V0	0.0000000	V1
Beryllium	0.0000946	0.0000064	V0	0.0000000	V1
Bismuth	0.0000093	0.0000177	V0	0.0000033	V0
Cadmium	0.0000174	0.0000052	V0	0.0000021	V0
Calcium	0.4112124	0.1165543	V0	0.0000000	V1
Cerium	0.0000174	0.0002084	V0	0.0000046	V0
Cesium	0.0000100	0.0000142	V0	0.0000000	V1
Chromium	0.0022262	0.0004592	V0	0.0000000	V1
Cobalt	0.0000273	0.0000727	V0	0.0000682	V0
Copper	0.0017171	0.0011479	V0	0.0000850	V0
Iron	0.0393063	0.1114253	V0	0.0000000	V1
Lanthanum	0.0000130	0.0001027	V0	0.0000041	V0
Lead	0.0008577	0.0002031	V0	0.0000000	V1
Lithium	0.0000374	0.0003112	V0	0.0000000	V1
Magnesium	0.0091409	0.0883641	V0	0.0011135	V0
Manganese	0.0006949	0.0023803	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000728	V0	0.0000000	V1
Neodymium	0.0000140	0.0000904	V0	0.0000000	V1
Nickel	0.0005429	0.0004182	V0	0.0001064	V0
Niobium	0.0000202	0.0000331	V0	0.0000009	V0
Palladium	0.0000632	0.0000062	V0	0.0000073	V0
Phosphorus	0.0459574	0.0079238	V0	0.0059440	V0
Platinum	0.0000088	-9999	M2	0.0000008	V0
Potassium	0.0061261	0.0780287	V0	0.0034895	V0
Praseodymium	0.0000070	0.0000234	V0	0.0000000	V1
Rubidium	0.0000184	0.0002532	V0	0.0000013	V0
Samarium	0.0000133	0.0000166	V0	0.0000000	V1
Selenium	0.0003366	0.0001493	V0	0.0000000	V1
Silicon	0.7676322	0.4911297	V0	0.0000000	V1
Silver	0.0000100	0.0000009	V0	0.0000000	V1
Sodium	0.0169447	0.3641133	V0	0.0015553	V0
Strontium	0.0003375	0.0008869	V0	0.0000000	V1
Tantalum	0.0000394	0.0000021	V0	0.0000000	V1
Thallium	0.0000090	0.0000026	V0	0.0000000	V1
Thorium	0.0000059	0.0000279	V0	0.0000000	V1
Tin	0.0004414	0.0000867	V0	0.0000000	V1
Titanium	0.0015201	0.0085106	V0	0.0003755	V0
Tungsten	0.0000938	0.0000926	V0	0.0001128	V0
Uranium	0.0000048	0.0000081	V0	0.0000000	V1
Vanadium	0.0007697	0.0004907	V0	0.0000836	V0
Zinc	0.0055897	0.0036684	V0	0.0003629	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1	AMS 6	AMS 6		Travel Blank	
	Sample Date	13-Jan	13-Jan	13-Jan		13-Jan	
Particulate Size	PM10	PM10	PM10	PM10		PM10	
Total Air Volume (m ³)	24	24	24	24		24	
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	17.64	V0	10.28	V0	0.14	V0
Aluminum	0.1380326	0.1495124	V0	0.0322262	V0	0.0000000	V1
Antimony	0.0001784	0.0001477	V0	0.0005379	V0	0.0000000	V1
Arsenic	0.0001060	0.0004639	V0	0.0001062	V0	0.0000000	V1
Barium	0.0092847	0.0034795	V0	0.0045913	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000385	V0	0.0000228	V0	0.0000099	V0
Cadmium	0.0000174	0.0000262	V0	0.0000386	V0	0.0000000	V1
Calcium	0.4112124	0.3881606	V0	0.0762570	V0	0.0000000	V1
Cerium	0.0000174	0.0001999	V0	0.0001183	V0	0.0000000	V1
Cesium	0.0000100	0.0000115	V0	0.0000032	V0	0.0000000	V1
Chromium	0.0022262	0.0005169	V0	0.0003660	V0	0.0000000	V1
Cobalt	0.0000273	0.0001437	V0	0.0000347	V0	0.0000553	V0
Copper	0.0017171	0.0012266	V0	0.0034501	V0	0.0001085	V0
Iron	0.0393063	0.1422422	V0	0.0936955	V0	0.0000000	V1
Lanthanum	0.0000130	0.0001473	V0	0.0000657	V0	0.0000000	V1
Lead	0.0008577	0.0003339	V0	0.0002518	V0	0.0000000	V1
Lithium	0.0000374	0.0001552	V0	0.0000319	V0	0.0000000	V1
Magnesium	0.0091409	0.0798141	V0	0.0321808	V0	0.0013806	V0
Manganese	0.0006949	0.0058924	V0	0.0014214	V0	0.0000000	V1
Molybdenum	0.0007116	0.0005221	V0	0.0002295	V0	0.0000000	V1
Neodymium	0.0000140	0.0000835	V0	0.0000279	V0	0.0000000	V1
Nickel	0.0005429	0.0017196	V0	0.0004307	V0	0.0001178	V0
Niobium	0.0000202	0.0000206	V0	0.0000089	V0	0.0000000	V1
Palladium	0.0000632	0.0000048	V0	0.0000160	V0	0.0000000	V1
Phosphorus	0.0459574	0.0115522	V0	0.0086395	V0	0.0109877	V0
Platinum	0.0000088	0.0000010	V0	0.0000011	V0	0.0000011	V0
Potassium	0.0061261	0.1271130	V0	0.0669291	V0	0.0024199	V0
Praseodymium	0.0000070	0.0000223	V0	0.0000108	V0	0.0000000	V1
Rubidium	0.0000184	0.0002941	V0	0.0001247	V0	0.0000010	V0
Samarium	0.0000133	0.0000146	V0	0.0000025	V0	0.0000000	V1
Selenium	0.0003366	0.0001699	V0	0.0000896	V0	0.0000000	V1
Silicon	0.7676322	0.2307456	V0	0.0000000	V1	0.0000000	V1
Silver	0.0000100	0.0000050	V0	0.0000063	V0	0.0000000	V1
Sodium	0.0169447	0.3167584	V0	0.1842361	V0	0.0019769	V0
Strontium	0.0003375	0.0014608	V0	0.0004442	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000027	V0	0.0000014	V0	0.0000000	V1
Thorium	0.0000059	0.0000247	V0	0.0000046	V0	0.0000012	V0
Tin	0.0004414	0.0001885	V0	0.0003829	V0	0.0000000	V1
Titanium	0.0015201	0.0088002	V0	0.0039234	V0	0.0004779	V0
Tungsten	0.0000938	0.0000930	V0	0.0000730	V0	0.0000637	V0
Uranium	0.0000048	0.0000067	V0	0.0000018	V0	0.0000010	V0
Vanadium	0.0007697	0.0033835	V0	0.0002012	V0	0.0000000	V1
Zinc	0.0055897	0.0087748	V0	0.0061960	V0	0.0004039	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14			
Sample Date	13-Jan			13-Jan		13-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	9.09	V0	3.47	V0	0.14	V0
Aluminum	0.1380326	0.0314064	V0	0.0244090	V0	0.0000000	V1
Antimony	0.0001784	0.0006847	V0	0.0000244	V0	0.0000000	V1
Arsenic	0.0001060	0.0001393	V0	0.0000632	V0	0.0000000	V1
Barium	0.0092847	0.0065843	V0	0.0005335	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000330	V0	0.0000035	V0	0.0000099	V0
Cadmium	0.0000174	0.0000169	V0	0.0000252	V0	0.0000000	V1
Calcium	0.4112124	0.1114765	V0	0.0394008	V0	0.0000000	V1
Cerium	0.0000174	0.0001960	V0	0.0000259	V0	0.0000000	V1
Cesium	0.0000100	0.0000031	V0	0.0000027	V0	0.0000000	V1
Chromium	0.0022262	0.0006088	V0	0.0001887	V0	0.0000000	V1
Cobalt	0.0000273	0.0000641	V0	0.0000369	V0	0.0000553	V0
Copper	0.0017171	0.0048396	V0	0.0005202	V0	0.0001085	V0
Iron	0.0393063	0.1200095	V0	0.0172881	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000674	V0	0.0000239	V0	0.0000000	V1
Lead	0.0008577	0.0005539	V0	0.0000977	V0	0.0000000	V1
Lithium	0.0000374	0.0000352	V0	0.0000203	V0	0.0000000	V1
Magnesium	0.0091409	0.0520858	V0	0.0147150	V0	0.0013806	V0
Manganese	0.0006949	0.0015691	V0	0.0004759	V0	0.0000000	V1
Molybdenum	0.0007116	0.0003097	V0	0.0000591	V0	0.0000000	V1
Neodymium	0.0000140	0.0000495	V0	0.0000101	V0	0.0000000	V1
Nickel	0.0005429	0.0007888	V0	0.0001975	V0	0.0001178	V0
Niobium	0.0000202	0.0000121	V0	0.0000036	V0	0.0000000	V1
Palladium	0.0000632	0.0000284	V0	0.0000050	V0	0.0000000	V1
Phosphorus	0.0459574	0.0142489	V0	0.0134870	V0	0.0109877	V0
Platinum	0.0000088	0.0000015	V0	0.0000010	V0	0.0000011	V0
Potassium	0.0061261	0.0451576	V0	0.0343801	V0	0.0024199	V0
Praseodymium	0.0000070	0.0000128	V0	0.0000025	V0	0.0000000	V1
Rubidium	0.0000184	0.0000684	V0	0.0000693	V0	0.0000010	V0
Samarium	0.0000133	0.0000030	V0	0.0000016	V0	0.0000000	V1
Selenium	0.0003366	0.0001176	V0	0.0000316	V0	0.0000000	V1
Silicon	0.7676322	0.1487082	V0	0.1157108	V0	0.0000000	V1
Silver	0.0000100	0.0000051	V0	0.0000043	V0	0.0000000	V1
Sodium	0.0169447	0.3293403	V0	0.0716554	V0	0.0019769	V0
Strontium	0.0003375	0.0007476	V0	0.0001562	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000012	V0	0.0000007	V0	0.0000000	V1
Thorium	0.0000059	0.0000052	V0	0.0000023	V0	0.0000012	V0
Tin	0.0004414	0.0004658	V0	0.0000920	V0	0.0000000	V1
Titanium	0.0015201	0.0041927	V0	0.0014024	V0	0.0004779	V0
Tungsten	0.0000938	0.0000733	V0	0.0000601	V0	0.0000637	V0
Uranium	0.0000048	0.0000026	V0	0.0000011	V0	0.0000010	V0
Vanadium	0.0007697	0.0001549	V0	0.0001315	V0	0.0000000	V1
Zinc	0.0055897	0.0068873	V0	0.0034705	V0	0.0004039	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		13-Jan	
Sample Date	13-Jan			13-Jan		13-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	13.14	V0	16.23	V0	0.14	V0
Aluminum	0.1380326	0.1939945	V0	0.3859708	V0	0.0000000	V1
Antimony	0.0001784	0.0001253	V0	0.0000533	V0	0.0000000	V1
Arsenic	0.0001060	0.0000909	V0	0.0000915	V0	0.0000000	V1
Barium	0.0092847	0.0030360	V0	0.0035713	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000111	V0	0.0000000	V1
Bismuth	0.0000093	0.0000242	V0	0.0000150	V0	0.0000099	V0
Cadmium	0.0000174	0.0000249	V0	0.0000150	V0	0.0000000	V1
Calcium	0.4112124	0.2038079	V0	0.2132206	V0	0.0000000	V1
Cerium	0.0000174	0.0002295	V0	0.0003886	V0	0.0000000	V1
Cesium	0.0000100	0.0000140	V0	0.0000283	V0	0.0000000	V1
Chromium	0.0022262	0.0005462	V0	0.0007927	V0	0.0000000	V1
Cobalt	0.0000273	0.0000832	V0	0.0001278	V0	0.0000553	V0
Copper	0.0017171	0.0009634	V0	0.0008990	V0	0.0001085	V0
Iron	0.0393063	0.1743756	V0	0.2918423	V0	0.0000000	V1
Lanthanum	0.0000130	0.0001620	V0	0.0002603	V0	0.0000000	V1
Lead	0.0008577	0.0003063	V0	0.0003173	V0	0.0000000	V1
Lithium	0.0000374	0.0001733	V0	0.0003879	V0	0.0000000	V1
Magnesium	0.0091409	0.0804192	V0	0.1030150	V0	0.0013806	V0
Manganese	0.0006949	0.0051550	V0	0.0064514	V0	0.0000000	V1
Molybdenum	0.0007116	0.0002937	V0	0.0002174	V0	0.0000000	V1
Neodymium	0.0000140	0.0000952	V0	0.0001712	V0	0.0000000	V1
Nickel	0.0005429	0.0011603	V0	0.0009144	V0	0.0001178	V0
Niobium	0.0000202	0.0000226	V0	0.0000480	V0	0.0000000	V1
Palladium	0.0000632	0.0000591	V0	0.0000116	V0	0.0000000	V1
Phosphorus	0.0459574	0.0171328	V0	0.0167647	V0	0.0109877	V0
Platinum	0.0000088	0.0000026	V0	0.0000027	V0	0.0000011	V0
Potassium	0.0061261	0.1218494	V0	0.1285805	V0	0.0024199	V0
Praseodymium	0.0000070	0.0000266	V0	0.0000446	V0	0.0000000	V1
Rubidium	0.0000184	0.0003081	V0	0.0005072	V0	0.0000010	V0
Samarium	0.0000133	0.0000169	V0	0.0000309	V0	0.0000000	V1
Selenium	0.0003366	0.0001669	V0	0.0002500	V0	0.0000000	V1
Silicon	0.7676322	0.5029542	V0	1.2068688	V0	0.0000000	V1
Silver	0.0000100	0.0000063	V0	0.0000042	V0	0.0000000	V1
Sodium	0.0169447	0.3154628	V0	0.3356074	V0	0.0019769	V0
Strontium	0.0003375	0.0010414	V0	0.0014198	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000034	V0	0.0000000	V1
Thallium	0.0000090	0.0000032	V0	0.0000039	V0	0.0000000	V1
Thorium	0.0000059	0.0000265	V0	0.0000508	V0	0.0000012	V0
Tin	0.0004414	0.0001487	V0	0.0000821	V0	0.0000000	V1
Titanium	0.0015201	0.0070258	V0	0.0148133	V0	0.0004779	V0
Tungsten	0.0000938	0.0001350	V0	0.0001327	V0	0.0000637	V0
Uranium	0.0000048	0.0000072	V0	0.0000147	V0	0.0000010	V0
Vanadium	0.0007697	0.0025606	V0	0.0017257	V0	0.0000000	V1
Zinc	0.0055897	0.0074960	V0	0.0055027	V0	0.0004039	V0



Station Name	Albian Muskeg River			Travel Blank	
Station #	AMS 16			13-Jan	
Sample Date	13-Jan			13-Jan	
Particulate Size	PM10			24	
Total Air Volume (m ³)	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	14.98	V0	0.14	V0
Aluminum	0.1380326	0.2931986	V0	0.0000000	V1
Antimony	0.0001784	0.0000751	V0	0.0000000	V1
Arsenic	0.0001060	0.0001184	V0	0.0000000	V1
Barium	0.0092847	0.0030403	V0	0.0000000	V1
Beryllium	0.0000946	0.0000078	V0	0.0000000	V1
Bismuth	0.0000093	0.0000287	V0	0.0000099	V0
Cadmium	0.0000174	0.0000300	V0	0.0000000	V1
Calcium	0.4112124	0.3029028	V0	0.0000000	V1
Cerium	0.0000174	0.0003164	V0	0.0000000	V1
Cesium	0.0000100	0.0000201	V0	0.0000000	V1
Chromium	0.0022262	0.0007164	V0	0.0000000	V1
Cobalt	0.0000273	0.0001052	V0	0.0000553	V0
Copper	0.0017171	0.0011137	V0	0.0001085	V0
Iron	0.0393063	0.2148187	V0	0.0000000	V1
Lanthanum	0.0000130	0.0002230	V0	0.0000000	V1
Lead	0.0008577	0.0003508	V0	0.0000000	V1
Lithium	0.0000374	0.0003159	V0	0.0000000	V1
Magnesium	0.0091409	0.0970109	V0	0.0013806	V0
Manganese	0.0006949	0.0051480	V0	0.0000000	V1
Molybdenum	0.0007116	0.0003802	V0	0.0000000	V1
Neodymium	0.0000140	0.0001305	V0	0.0000000	V1
Nickel	0.0005429	0.0011323	V0	0.0001178	V0
Niobium	0.0000202	0.0000406	V0	0.0000000	V1
Palladium	0.0000632	0.0000088	V0	0.0000000	V1
Phosphorus	0.0459574	0.0166181	V0	0.0109877	V0
Platinum	0.0000088	0.0000012	V0	0.0000011	V0
Potassium	0.0061261	0.1334963	V0	0.0024199	V0
Praseodymium	0.0000070	0.0000351	V0	0.0000000	V1
Rubidium	0.0000184	0.0004227	V0	0.0000010	V0
Samarium	0.0000133	0.0000237	V0	0.0000000	V1
Selenium	0.0003366	0.0002393	V0	0.0000000	V1
Silicon	0.7676322	0.6643686	V0	0.0000000	V1
Silver	0.0000100	0.0000059	V0	0.0000000	V1
Sodium	0.0169447	0.3432744	V0	0.0019769	V0
Strontium	0.0003375	0.0012635	V0	0.0000000	V1
Tantalum	0.0000394	0.0000030	V0	0.0000000	V1
Thallium	0.0000090	0.0000041	V0	0.0000000	V1
Thorium	0.0000059	0.0000394	V0	0.0000012	V0
Tin	0.0004414	0.0000940	V0	0.0000000	V1
Titanium	0.0015201	0.0151433	V0	0.0004779	V0
Tungsten	0.0000938	0.0002295	V0	0.0000637	V0
Uranium	0.0000048	0.0000105	V0	0.0000010	V0
Vanadium	0.0007697	0.0017581	V0	0.0000000	V1
Zinc	0.0055897	0.0091195	V0	0.0004039	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	19-Jan		19-Jan		19-Jan	
	Particulate Size	PM10		PM10		PM10	
Total Air Volume (m ³)	24		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	5.70	V0	9.81	V0	0.20	V0
Aluminum	0.1380326	0.0164941	V0	0.0478003	V0	0.0113044	V0
Antimony	0.0001784	0.0000226	V0	0.0000936	V0	0.0000000	V1
Arsenic	0.0001060	0.0000342	V0	0.0001620	V0	0.0000000	V1
Barium	0.0092847	0.0004120	V0	0.0008356	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000125	V0	0.0000119	V0	0.0000083	V0
Cadmium	0.0000174	0.0000227	V0	0.0000365	V0	0.0000000	V1
Calcium	0.4112124	0.0352400	V0	0.0362116	V0	0.0239059	V0
Cerium	0.0000174	0.0000151	V0	0.0000976	V0	0.0000008	V0
Cesium	0.0000100	0.0000014	V0	0.0000029	V0	0.0000000	V1
Chromium	0.0022262	0.0004339	V0	0.0004348	V0	0.0001286	V0
Cobalt	0.0000273	0.0000393	V0	0.0000703	V0	0.0000852	V0
Copper	0.0017171	0.0003858	V0	0.0008790	V0	0.0025436	V0
Iron	0.0393063	0.0211841	V0	0.0344416	V0	0.0042323	V0
Lanthanum	0.0000130	0.0000111	V0	0.0000552	V0	0.0000000	V1
Lead	0.0008577	0.0000800	V0	0.0002331	V0	0.0000000	V1
Lithium	0.0000374	0.0000169	V0	0.0000500	V0	0.0000000	V1
Magnesium	0.0091409	0.0097280	V0	0.0084373	V0	0.0019701	V0
Manganese	0.0006949	0.0008089	V0	0.0010006	V0	0.0000544	V0
Molybdenum	0.0007116	0.0000707	V0	0.0009824	V0	0.0000000	V1
Neodymium	0.0000140	0.0000055	V0	0.0000288	V0	0.0000000	V1
Nickel	0.0005429	0.0001853	V0	0.0017076	V0	0.0001454	V0
Niobium	0.0000202	0.0000034	V0	0.0000112	V0	0.0000009	V0
Palladium	0.0000632	0.0000000	V1	0.0000208	V0	0.0000060	V0
Phosphorus	0.0459574	0.0120715	V0	0.0128720	V0	0.0111772	V0
Platinum	0.0000088	0.0000005	V0	0.0000011	V0	0.0000011	V0
Potassium	0.0061261	0.0395680	V0	0.0479997	V0	0.0084899	V0
Praseodymium	0.0000070	0.0000015	V0	0.0000082	V0	0.0000000	V1
Rubidium	0.0000184	0.0000623	V0	0.0000995	V0	0.0000044	V0
Samarium	0.0000133	0.0000011	V0	0.0000053	V0	0.0000000	V1
Selenium	0.0003366	0.0000276	V0	0.0001198	V0	0.0000000	V1
Silicon	0.7676322	0.0000000	V1	0.1159525	V0	0.0000000	V1
Silver	0.0000100	0.0000022	V0	0.0000042	V0	0.0000007	V0
Sodium	0.0169447	0.0397932	V0	0.0288419	V0	0.0039854	V0
Strontium	0.0003375	0.0001272	V0	0.0001694	V0	0.0000197	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000005	V0	0.0000015	V0	0.0000000	V1
Thorium	0.0000059	0.0000018	V0	0.0000097	V0	0.0000000	V1
Tin	0.0004414	0.0000922	V0	0.0001289	V0	0.0000534	V0
Titanium	0.0015201	0.0011831	V0	0.0034011	V0	0.0003560	V0
Tungsten	0.0000938	0.0001066	V0	0.0000662	V0	0.0000696	V0
Uranium	0.0000048	0.0000007	V0	0.0000057	V0	0.0000000	V1
Vanadium	0.0007697	0.0002594	V0	0.0072017	V0	0.0000330	V0
Zinc	0.0055897	0.0043842	V0	0.0054282	V0	0.0014431	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	23.7			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	10.03	V0	9.90	V0	0.20	V0
Aluminum	0.1380326	0.0391578	V0	0.0326938	V0	0.0113044	V0
Antimony	0.0001784	0.0001355	V0	0.0001179	V0	0.0000000	V1
Arsenic	0.0001060	0.0001028	V0	0.0001390	V0	0.0000000	V1
Barium	0.0092847	0.0026522	V0	0.0011956	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000194	V0	0.0000415	V0	0.0000083	V0
Cadmium	0.0000174	0.0000331	V0	0.0003934	V0	0.0000000	V1
Calcium	0.4112124	0.1388927	V0	0.0659905	V0	0.0239059	V0
Cerium	0.0000174	0.0000684	V0	0.0000383	V0	0.0000008	V0
Cesium	0.0000100	0.0000031	V0	0.0000080	V0	0.0000000	V1
Chromium	0.0022262	0.0005920	V0	0.0003548	V0	0.0001286	V0
Cobalt	0.0000273	0.0000606	V0	0.0000356	V0	0.0000852	V0
Copper	0.0017171	0.0020097	V0	0.0009094	V0	0.0025436	V0
Iron	0.0393063	0.0524964	V0	0.0722818	V0	0.0042323	V0
Lanthanum	0.0000130	0.0000447	V0	0.0000527	V0	0.0000000	V1
Lead	0.0008577	0.0002523	V0	0.0005243	V0	0.0000000	V1
Lithium	0.0000374	0.0000522	V0	0.0000322	V0	0.0000000	V1
Magnesium	0.0091409	0.0171138	V0	0.0104067	V0	0.0019701	V0
Manganese	0.0006949	0.0036201	V0	0.0017467	V0	0.0000544	V0
Molybdenum	0.0007116	0.0006231	V0	0.0002761	V0	0.0000000	V1
Neodymium	0.0000140	0.0000277	V0	0.0000141	V0	0.0000000	V1
Nickel	0.0005429	0.0014432	V0	0.0004594	V0	0.0001454	V0
Niobium	0.0000202	0.0000111	V0	0.0000057	V0	0.0000009	V0
Palladium	0.0000632	0.0000045	V0	0.0000195	V0	0.0000060	V0
Phosphorus	0.0459574	0.0146971	V0	0.0144821	V0	0.0111772	V0
Platinum	0.0000088	0.0000011	V0	0.0000025	V0	0.0000011	V0
Potassium	0.0061261	0.0955022	V0	0.1692851	V0	0.0084899	V0
Praseodymium	0.0000070	0.0000074	V0	0.0000038	V0	0.0000000	V1
Rubidium	0.0000184	0.0001607	V0	0.0005731	V0	0.0000044	V0
Samarium	0.0000133	0.0000047	V0	0.0000028	V0	0.0000000	V1
Selenium	0.0003366	0.0000958	V0	0.0000776	V0	0.0000000	V1
Silicon	0.7676322	0.1072980	V0	0.1134646	V0	0.0000000	V1
Silver	0.0000100	0.0000048	V0	0.0000236	V0	0.0000007	V0
Sodium	0.0169447	0.0475814	V0	0.0227310	V0	0.0039854	V0
Strontium	0.0003375	0.0007080	V0	0.0002088	V0	0.0000197	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000013	V0	0.0000127	V0	0.0000000	V1
Thorium	0.0000059	0.0000094	V0	0.0000044	V0	0.0000000	V1
Tin	0.0004414	0.0002093	V0	0.0001788	V0	0.0000534	V0
Titanium	0.0015201	0.0031693	V0	0.0015673	V0	0.0003560	V0
Tungsten	0.0000938	0.0000586	V0	0.0000711	V0	0.0000696	V0
Uranium	0.0000048	0.0000039	V0	0.0000019	V0	0.0000000	V1
Vanadium	0.0007697	0.0045138	V0	0.0011883	V0	0.0000330	V0
Zinc	0.0055897	0.0106282	V0	0.0206246	V0	0.0014431	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	6.20	V0	4.26	V0	0.20	V0
Aluminum	0.1380326	0.0394822	V0	0.0134811	V0	0.0113044	V0
Antimony	0.0001784	0.0000408	V0	0.0000126	V0	0.0000000	V1
Arsenic	0.0001060	0.0000353	V0	0.0000267	V0	0.0000000	V1
Barium	0.0092847	0.0006451	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000241	V0	0.0000078	V0	0.0000083	V0
Cadmium	0.0000174	0.0000270	V0	0.0000175	V0	0.0000000	V1
Calcium	0.4112124	0.0533942	V0	0.0218640	V0	0.0239059	V0
Cerium	0.0000174	0.0000305	V0	0.0000106	V0	0.0000008	V0
Cesium	0.0000100	0.0000024	V0	0.0000014	V0	0.0000000	V1
Chromium	0.0022262	0.0002819	V0	0.0002244	V0	0.0001286	V0
Cobalt	0.0000273	0.0001380	V0	0.0000199	V0	0.0000852	V0
Copper	0.0017171	0.0005444	V0	0.0002828	V0	0.0025436	V0
Iron	0.0393063	0.0297180	V0	0.0135851	V0	0.0042323	V0
Lanthanum	0.0000130	0.0000198	V0	0.0000079	V0	0.0000000	V1
Lead	0.0008577	0.0001013	V0	0.0000639	V0	0.0000000	V1
Lithium	0.0000374	0.0000397	V0	0.0000133	V0	0.0000000	V1
Magnesium	0.0091409	0.0123264	V0	0.0112477	V0	0.0019701	V0
Manganese	0.0006949	0.0012501	V0	0.0003097	V0	0.0000544	V0
Molybdenum	0.0007116	0.0000875	V0	0.0001025	V0	0.0000000	V1
Neodymium	0.0000140	0.0000123	V0	0.0000043	V0	0.0000000	V1
Nickel	0.0005429	0.0002550	V0	0.0001964	V0	0.0001454	V0
Niobium	0.0000202	0.0000057	V0	0.0000030	V0	0.0000009	V0
Palladium	0.0000632	0.0000073	V0	0.0000048	V0	0.0000060	V0
Phosphorus	0.0459574	0.0130590	V0	0.0121861	V0	0.0111772	V0
Platinum	0.0000088	0.0000006	V0	0.0000013	V0	0.0000011	V0
Potassium	0.0061261	0.0441427	V0	0.0262877	V0	0.0084899	V0
Praseodymium	0.0000070	0.0000033	V0	0.0000011	V0	0.0000000	V1
Rubidium	0.0000184	0.0000888	V0	0.0000428	V0	0.0000044	V0
Samarium	0.0000133	0.0000023	V0	0.0000009	V0	0.0000000	V1
Selenium	0.0003366	0.0000410	V0	0.0000420	V0	0.0000000	V1
Silicon	0.7676322	0.0851921	V0	0.0657322	V0	0.0000000	V1
Silver	0.0000100	0.0000028	V0	0.0000017	V0	0.0000007	V0
Sodium	0.0169447	0.0463179	V0	0.0443582	V0	0.0039854	V0
Strontium	0.0003375	0.0001696	V0	0.0000896	V0	0.0000197	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000006	V0	0.0000004	V0	0.0000000	V1
Thorium	0.0000059	0.0000034	V0	0.0000013	V0	0.0000000	V1
Tin	0.0004414	0.0001332	V0	0.0000801	V0	0.0000534	V0
Titanium	0.0015201	0.0019474	V0	0.0026866	V0	0.0003560	V0
Tungsten	0.0000938	0.0000499	V0	0.0000179	V0	0.0000696	V0
Uranium	0.0000048	0.0000012	V0	0.0000009	V0	0.0000000	V1
Vanadium	0.0007697	0.0003429	V0	0.0002473	V0	0.0000330	V0
Zinc	0.0055897	0.0065747	V0	0.0027679	V0	0.0014431	V0



Compound Name	MDL (µg/sample)	Albian Muskeg River		Travel Blank	
		Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	5.66	V0	0.20	V0
Aluminum	0.1380326	0.0473691	V0	0.0113044	V0
Antimony	0.0001784	0.0000201	V0	0.0000000	V1
Arsenic	0.0001060	0.0000277	V0	0.0000000	V1
Barium	0.0092847	0.0008787	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000122	V0	0.0000083	V0
Cadmium	0.0000174	0.0000198	V0	0.0000000	V1
Calcium	0.4112124	0.0364227	V0	0.0239059	V0
Cerium	0.0000174	0.0000405	V0	0.0000008	V0
Cesium	0.0000100	0.0000030	V0	0.0000000	V1
Chromium	0.0022262	0.0003329	V0	0.0001286	V0
Cobalt	0.0000273	0.0000351	V0	0.0000852	V0
Copper	0.0017171	0.0004788	V0	0.0025436	V0
Iron	0.0393063	0.0326040	V0	0.0042323	V0
Lanthanum	0.0000130	0.0000243	V0	0.0000000	V1
Lead	0.0008577	0.0000880	V0	0.0000000	V1
Lithium	0.0000374	0.0000633	V0	0.0000000	V1
Magnesium	0.0091409	0.0107067	V0	0.0019701	V0
Manganese	0.0006949	0.0008499	V0	0.0000544	V0
Molybdenum	0.0007116	0.0000772	V0	0.0000000	V1
Neodymium	0.0000140	0.0000166	V0	0.0000000	V1
Nickel	0.0005429	0.0006127	V0	0.0001454	V0
Niobium	0.0000202	0.0000078	V0	0.0000009	V0
Palladium	0.0000632	0.0000000	V1	0.0000060	V0
Phosphorus	0.0459574	0.0127702	V0	0.0111772	V0
Platinum	0.0000088	0.0000004	V0	0.0000011	V0
Potassium	0.0061261	0.0342553	V0	0.0084899	V0
Praseodymium	0.0000070	0.0000045	V0	0.0000000	V1
Rubidium	0.0000184	0.0000779	V0	0.0000044	V0
Samarium	0.0000133	0.0000032	V0	0.0000000	V1
Selenium	0.0003366	0.0000420	V0	0.0000000	V1
Silicon	0.7676322	0.1346950	V0	0.0000000	V1
Silver	0.0000100	0.0000018	V0	0.0000007	V0
Sodium	0.0169447	0.0359128	V0	0.0039854	V0
Strontium	0.0003375	0.0001590	V0	0.0000197	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000006	V0	0.0000000	V1
Thorium	0.0000059	0.0000053	V0	0.0000000	V1
Tin	0.0004414	0.0000719	V0	0.0000534	V0
Titanium	0.0015201	0.0019256	V0	0.0003560	V0
Tungsten	0.0000938	0.0000266	V0	0.0000696	V0
Uranium	0.0000048	0.0000019	V0	0.0000000	V1
Vanadium	0.0007697	0.0003102	V0	0.0000330	V0
Zinc	0.0055897	0.0039319	V0	0.0014431	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	25-Jan		25-Jan		25-Jan	
	Particulate Size	PM10		PM10		PM10	
Total Air Volume (m ³)	23.4		24		24		
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	36.13	V0	18.52	V0	0.37	V0
Aluminum	0.1380326	0.1456394	V0	0.0342655	V0	0.0000000	V1
Antimony	0.0001784	0.0002184	V0	0.0006905	V0	0.0000000	V1
Arsenic	0.0001060	0.0002322	V0	0.0001567	V0	0.0000000	V1
Barium	0.0092847	0.0037956	V0	0.0058787	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000208	V0	0.0000403	V0	0.0000053	V0
Cadmium	0.0000174	0.0001608	V0	0.0001432	V0	0.0000000	V1
Calcium	0.4112124	0.3348987	V0	0.0649016	V0	0.0236842	V0
Cerium	0.0000174	0.0002389	V0	0.0001491	V0	0.0000008	V0
Cesium	0.0000100	0.0000108	V0	0.0000042	V0	0.0000000	V1
Chromium	0.0022262	0.0007109	V0	0.0004860	V0	0.0000000	V1
Cobalt	0.0000273	0.0001323	V0	0.0000549	V0	0.0000656	V0
Copper	0.0017171	0.0018601	V0	0.0040657	V0	0.0001741	V0
Iron	0.0393063	0.1657273	V0	0.0852507	V0	0.0034667	V0
Lanthanum	0.0000130	0.0001650	V0	0.0001283	V0	0.0000000	V1
Lead	0.0008577	0.0005383	V0	0.0004121	V0	0.0000000	V1
Lithium	0.0000374	0.0001342	V0	0.0000307	V0	0.0000000	V1
Magnesium	0.0091409	0.0470157	V0	0.0139697	V0	0.0011457	V0
Manganese	0.0006949	0.0057795	V0	0.0014269	V0	0.0000315	V0
Molybdenum	0.0007116	0.0007900	V0	0.0002935	V0	0.0000000	V1
Neodymium	0.0000140	0.0000969	V0	0.0000312	V0	0.0000000	V1
Nickel	0.0005429	0.0034268	V0	0.0003554	V0	0.0001936	V0
Niobium	0.0000202	0.0000269	V0	0.0000093	V0	0.0000010	V0
Palladium	0.0000632	0.0000077	V0	0.0000239	V0	0.0000000	V1
Phosphorus	0.0459574	0.0169408	V0	0.0134903	V0	0.0123709	V0
Platinum	0.0000088	0.0000013	V0	0.0000013	V0	0.0000005	V0
Potassium	0.0061261	0.2375783	V0	0.1612230	V0	0.0073836	V0
Praseodymium	0.0000070	0.0000257	V0	0.0000111	V0	0.0000000	V1
Rubidium	0.0000184	0.0004731	V0	0.0003200	V0	0.0000039	V0
Samarium	0.0000133	0.0000179	V0	0.0000020	V0	0.0000017	V0
Selenium	0.0003366	0.0002083	V0	0.0001139	V0	0.0000000	V1
Silicon	0.7676322	0.2810339	V0	0.1162070	V0	0.1673703	V0
Silver	0.0000100	0.0000178	V0	0.0000153	V0	0.0000061	V0
Sodium	0.0169447	0.0884343	V0	0.0778345	V0	0.0035788	V0
Strontium	0.0003375	0.0010468	V0	0.0004039	V0	0.0000240	V0
Tantalum	0.0000394	0.0000017	V0	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000072	V0	0.0000036	V0	0.0000000	V1
Thorium	0.0000059	0.0000302	V0	0.0000049	V0	0.0000000	V1
Tin	0.0004414	0.0002121	V0	0.0005297	V0	0.0000263	V0
Titanium	0.0015201	0.0077110	V0	0.0033705	V0	0.0001918	V0
Tungsten	0.0000938	0.0000931	V0	0.0000867	V0	0.0000866	V0
Uranium	0.0000048	0.0000089	V0	0.0000030	V0	0.0000000	V1
Vanadium	0.0007697	0.0091281	V0	0.0003460	V0	0.0000000	V1
Zinc	0.0055897	0.0219640	V0	0.0169018	V0	0.0008724	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14			
Sample Date	25-Jan			25-Jan		25-Jan	
Particulate Size	PM10			PM10		24	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	13.91	V0	9.62	V0	0.37	V0
Aluminum	0.1380326	0.1092734	V0	0.0218661	V0	0.0000000	V1
Antimony	0.0001784	0.0012035	V0	0.0000930	V0	0.0000000	V1
Arsenic	0.0001060	0.0001197	V0	0.0000796	V0	0.0000000	V1
Barium	0.0092847	0.0130450	V0	0.0013915	V0	0.0000000	V1
Beryllium	0.0000946	0.0000048	V0	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000424	V0	0.0000248	V0	0.0000053	V0
Cadmium	0.0000174	0.0000884	V0	0.0000975	V0	0.0000000	V1
Calcium	0.4112124	0.2994097	V0	0.0335023	V0	0.0236842	V0
Cerium	0.0000174	0.0002929	V0	0.0000297	V0	0.0000008	V0
Cesium	0.0000100	0.0000070	V0	0.0000023	V0	0.0000000	V1
Chromium	0.0022262	0.0007034	V0	0.0003356	V0	0.0000000	V1
Cobalt	0.0000273	0.0000763	V0	0.0000491	V0	0.0000656	V0
Copper	0.0017171	0.0078813	V0	0.0005225	V0	0.0001741	V0
Iron	0.0393063	0.3090458	V0	0.0575232	V0	0.0034667	V0
Lanthanum	0.0000130	0.0001236	V0	0.0000370	V0	0.0000000	V1
Lead	0.0008577	0.0004224	V0	0.0001629	V0	0.0000000	V1
Lithium	0.0000374	0.0000873	V0	0.0000267	V0	0.0000000	V1
Magnesium	0.0091409	0.0657540	V0	0.0084943	V0	0.0011457	V0
Manganese	0.0006949	0.0045554	V0	0.0009330	V0	0.0000315	V0
Molybdenum	0.0007116	0.0004220	V0	0.0001286	V0	0.0000000	V1
Neodymium	0.0000140	0.0000764	V0	0.0000083	V0	0.0000000	V1
Nickel	0.0005429	0.0004602	V0	0.0002592	V0	0.0001936	V0
Niobium	0.0000202	0.0000245	V0	0.0000069	V0	0.0000010	V0
Palladium	0.0000632	0.0000415	V0	0.0000000	V1	0.0000000	V1
Phosphorus	0.0459574	0.0163630	V0	0.0130897	V0	0.0123709	V0
Platinum	0.0000088	0.0000037	V0	0.0000012	V0	0.0000005	V0
Potassium	0.0061261	0.1277990	V0	0.0936817	V0	0.0073836	V0
Praseodymium	0.0000070	0.0000258	V0	0.0000024	V0	0.0000000	V1
Rubidium	0.0000184	0.0002862	V0	0.0001355	V0	0.0000039	V0
Samarium	0.0000133	0.0000112	V0	0.0000017	V0	0.0000017	V0
Selenium	0.0003366	0.0001914	V0	0.0000488	V0	0.0000000	V1
Silicon	0.7676322	0.3765664	V0	0.1543284	V0	0.1673703	V0
Silver	0.0000100	0.0000425	V0	0.0000117	V0	0.0000061	V0
Sodium	0.0169447	0.3653420	V0	0.0380491	V0	0.0035788	V0
Strontium	0.0003375	0.0015139	V0	0.0001708	V0	0.0000240	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000034	V0	0.0000017	V0	0.0000000	V1
Thorium	0.0000059	0.0000184	V0	0.0000033	V0	0.0000000	V1
Tin	0.0004414	0.0008700	V0	0.0000917	V0	0.0000263	V0
Titanium	0.0015201	0.0088948	V0	0.0010930	V0	0.0001918	V0
Tungsten	0.0000938	0.0001917	V0	0.0000560	V0	0.0000866	V0
Uranium	0.0000048	0.0000069	V0	0.0000011	V0	0.0000000	V1
Vanadium	0.0007697	0.0004372	V0	0.0001538	V0	0.0000000	V1
Zinc	0.0055897	0.0144591	V0	0.0076003	V0	0.0008724	V0



Compound Name	Station Name Station # Sample Date Particulate Size Total Air Volume (m ³)	Fort McKay South			CNRL Horizon		Travel Blank	
		MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter		1.00	21.12	V0	13.91	V0	0.37	V0
Aluminum		0.1380326	0.0575976	V0	0.0669670	V0	0.0000000	V1
Antimony		0.0001784	0.0001669	V0	0.0000570	V0	0.0000000	V1
Arsenic		0.0001060	0.0001687	V0	0.0001095	V0	0.0000000	V1
Barium		0.0092847	0.0023473	V0	0.0011809	V0	0.0000000	V1
Beryllium		0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth		0.0000093	0.0000271	V0	0.0000112	V0	0.0000053	V0
Cadmium		0.0000174	0.0001336	V0	0.0001313	V0	0.0000000	V1
Calcium		0.4112124	0.1120367	V0	0.0453452	V0	0.0236842	V0
Cerium		0.0000174	0.0000876	V0	0.0000668	V0	0.0000008	V0
Cesium		0.0000100	0.0000055	V0	0.0000065	V0	0.0000000	V1
Chromium		0.0022262	0.0005535	V0	0.0003136	V0	0.0000000	V1
Cobalt		0.0000273	0.0000443	V0	0.0001802	V0	0.0000656	V0
Copper		0.0017171	0.0012738	V0	0.0006209	V0	0.0001741	V0
Iron		0.0393063	0.0726373	V0	0.0517635	V0	0.0034667	V0
Lanthanum		0.0000130	0.0000899	V0	0.0000606	V0	0.0000000	V1
Lead		0.0008577	0.0003718	V0	0.0002283	V0	0.0000000	V1
Lithium		0.0000374	0.0000662	V0	0.0000673	V0	0.0000000	V1
Magnesium		0.0091409	0.0179191	V0	0.0143578	V0	0.0011457	V0
Manganese		0.0006949	0.0028822	V0	0.0013133	V0	0.0000315	V0
Molybdenum		0.0007116	0.0005515	V0	0.0001164	V0	0.0000000	V1
Neodymium		0.0000140	0.0000338	V0	0.0000289	V0	0.0000000	V1
Nickel		0.0005429	0.0015250	V0	0.0006021	V0	0.0001936	V0
Niobium		0.0000202	0.0000101	V0	0.0000126	V0	0.0000010	V0
Palladium		0.0000632	0.0000042	V0	0.0000164	V0	0.0000000	V1
Phosphorus		0.0459574	0.0135463	V0	0.0135701	V0	0.0123709	V0
Platinum		0.0000088	0.0000006	V0	0.0000021	V0	0.0000005	V0
Potassium		0.0061261	0.1646404	V0	0.1595792	V0	0.0073836	V0
Praseodymium		0.0000070	0.0000095	V0	0.0000076	V0	0.0000000	V1
Rubidium		0.0000184	0.0003043	V0	0.0003257	V0	0.0000039	V0
Samarium		0.0000133	0.0000055	V0	0.0000049	V0	0.0000017	V0
Selenium		0.0003366	0.0001093	V0	0.0000981	V0	0.0000000	V1
Silicon		0.7676322	0.1800289	V0	0.2586365	V0	0.1673703	V0
Silver		0.0000100	0.0000134	V0	0.0000121	V0	0.0000061	V0
Sodium		0.0169447	0.0698950	V0	0.0443329	V0	0.0035788	V0
Strontium		0.0003375	0.0004120	V0	0.0002713	V0	0.0000240	V0
Tantalum		0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium		0.0000090	0.0000041	V0	0.0000027	V0	0.0000000	V1
Thorium		0.0000059	0.0000100	V0	0.0000091	V0	0.0000000	V1
Tin		0.0004414	0.0002123	V0	0.0001268	V0	0.0000263	V0
Titanium		0.0015201	0.0032649	V0	0.0039438	V0	0.0001918	V0
Tungsten		0.0000938	0.0000881	V0	0.0000386	V0	0.0000866	V0
Uranium		0.0000048	0.0000036	V0	0.0000032	V0	0.0000000	V1
Vanadium		0.0007697	0.0020798	V0	0.0003102	V0	0.0000000	V1
Zinc		0.0055897	0.0164335	V0	0.0125035	V0	0.0008724	V0



Compound Name	MDL (µg/sample)	Albian Muskeg River		Travel Blank	
		Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	24.55	V0	0.37	V0
Aluminum	0.1380326	0.1683870	V0	0.0000000	V1
Antimony	0.0001784	0.0001182	V0	0.0000000	V1
Arsenic	0.0001060	0.0002479	V0	0.0000000	V1
Barium	0.0092847	0.0029280	V0	0.0000000	V1
Beryllium	0.0000946	0.0000075	V0	0.0000000	V1
Bismuth	0.0000093	0.0000097	V0	0.0000053	V0
Cadmium	0.0000174	0.0001534	V0	0.0000000	V1
Calcium	0.4112124	0.4141821	V0	0.0236842	V0
Cerium	0.0000174	0.0002559	V0	0.0000008	V0
Cesium	0.0000100	0.0000137	V0	0.0000000	V1
Chromium	0.0022262	0.0006312	V0	0.0000000	V1
Cobalt	0.0000273	0.0001170	V0	0.0000656	V0
Copper	0.0017171	0.0007714	V0	0.0001741	V0
Iron	0.0393063	0.2567837	V0	0.0034667	V0
Lanthanum	0.0000130	0.0001808	V0	0.0000000	V1
Lead	0.0008577	0.0004533	V0	0.0000000	V1
Lithium	0.0000374	0.0001826	V0	0.0000000	V1
Magnesium	0.0091409	0.0591420	V0	0.0011457	V0
Manganese	0.0006949	0.0052708	V0	0.0000315	V0
Molybdenum	0.0007116	0.0009095	V0	0.0000000	V1
Neodymium	0.0000140	0.0001081	V0	0.0000000	V1
Nickel	0.0005429	0.0019312	V0	0.0001936	V0
Niobium	0.0000202	0.0000357	V0	0.0000010	V0
Palladium	0.0000632	0.0000045	V0	0.0000000	V1
Phosphorus	0.0459574	0.0171478	V0	0.0123709	V0
Platinum	0.0000088	0.0000028	V0	0.0000005	V0
Potassium	0.0061261	0.2081254	V0	0.0073836	V0
Praseodymium	0.0000070	0.0000284	V0	0.0000000	V1
Rubidium	0.0000184	0.0005127	V0	0.0000039	V0
Samarium	0.0000133	0.0000204	V0	0.0000017	V0
Selenium	0.0003366	0.0002467	V0	0.0000000	V1
Silicon	0.7676322	0.6227232	V0	0.1673703	V0
Silver	0.0000100	0.0000147	V0	0.0000061	V0
Sodium	0.0169447	0.0590564	V0	0.0035788	V0
Strontium	0.0003375	0.0010056	V0	0.0000240	V0
Tantalum	0.0000394	0.0000023	V0	0.0000000	V1
Thallium	0.0000090	0.0000061	V0	0.0000000	V1
Thorium	0.0000059	0.0000318	V0	0.0000000	V1
Tin	0.0004414	0.0001532	V0	0.0000263	V0
Titanium	0.0015201	0.0095223	V0	0.0001918	V0
Tungsten	0.0000938	0.0001273	V0	0.0000866	V0
Uranium	0.0000048	0.0000120	V0	0.0000000	V1
Vanadium	0.0007697	0.0068497	V0	0.0000000	V1
Zinc	0.0055897	0.0179264	V0	0.0008724	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1	AMS 6	31-Jan			
	Sample Date	31-Jan	31-Jan	31-Jan			
Particulate Size	PM10	PM10	PM10	PM10			
Total Air Volume (m ³)	24	24	24	24			
MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	
Particulate Matter	1.00	3.64	V0	3.21	V0	0.23	V0
Aluminum	0.1380326	0.0681044	V0	0.0358148	V0	0.0000000	V1
Antimony	0.0001784	0.0000216	V0	0.0000178	V0	0.0000000	V1
Arsenic	0.0001060	0.0000275	V0	0.0000196	V0	0.0000000	V1
Barium	0.0092847	0.0007433	V0	0.0004712	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000095	V0	0.0000157	V0	0.0000032	V0
Cadmium	0.0000174	0.0000039	V0	0.0000050	V0	0.0000000	V1
Calcium	0.4112124	0.0581261	V0	0.0750181	V0	0.0000000	V1
Cerium	0.0000174	0.0000708	V0	0.0000350	V0	0.0000000	V1
Cesium	0.0000100	0.0000049	V0	0.0000027	V0	0.0000000	V1
Chromium	0.0022262	0.0026386	V0	0.0008688	V0	0.0000000	V1
Cobalt	0.0000273	0.0001366	V0	0.0001057	V0	0.0000820	V0
Copper	0.0017171	0.0003493	V0	0.0004841	V0	0.0001341	V0
Iron	0.0393063	0.0708972	V0	0.0372539	V0	0.0016412	V0
Lanthanum	0.0000130	0.0000350	V0	0.0000170	V0	0.0000000	V1
Lead	0.0008577	0.0000895	V0	0.0000818	V0	0.0000000	V1
Lithium	0.0000374	0.0000638	V0	0.0000316	V0	0.0000000	V1
Magnesium	0.0091409	0.0154549	V0	0.0131246	V0	0.0023739	V0
Manganese	0.0006949	0.0010356	V0	0.0006843	V0	0.0000410	V0
Molybdenum	0.0007116	0.0001152	V0	0.0003519	V0	0.0000513	V0
Neodymium	0.0000140	0.0000302	V0	0.0000151	V0	0.0000000	V1
Nickel	0.0005429	0.0013862	V0	0.0013526	V0	0.0002214	V0
Niobium	0.0000202	0.0000142	V0	0.0000098	V0	0.0000014	V0
Palladium	0.0000632	0.0000027	V0	0.0000029	V0	0.0000029	V0
Phosphorus	0.0459574	0.0148668	V0	0.0151679	V0	0.0116948	V0
Platinum	0.0000088	0.0000010	V0	0.0000013	V0	0.0000015	V0
Potassium	0.0061261	0.0423459	V0	0.0358949	V0	0.0016240	V0
Praseodymium	0.0000070	0.0000081	V0	0.0000039	V0	0.0000000	V1
Rubidium	0.0000184	0.0001014	V0	0.0000661	V0	0.0000028	V0
Samarium	0.0000133	0.0000058	V0	0.0000025	V0	0.0000000	V1
Selenium	0.0003366	0.0000538	V0	0.0000426	V0	0.0000000	V1
Silicon	0.7676322	0.2756613	V0	0.1206786	V0	0.0000000	V1
Silver	0.0000100	0.0000008	V0	0.0000006	V0	0.0000000	V1
Sodium	0.0169447	0.0344384	V0	0.0301628	V0	0.0012297	V0
Strontium	0.0003375	0.0002224	V0	0.0001830	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000009	V0	0.0000006	V0	0.0000000	V1
Thorium	0.0000059	0.0000097	V0	0.0000043	V0	0.0000000	V1
Tin	0.0004414	0.0000630	V0	0.0000596	V0	0.0000000	V1
Titanium	0.0015201	0.0034391	V0	0.0026485	V0	0.0006761	V0
Tungsten	0.0000938	0.0000988	V0	0.0001765	V0	0.0000891	V0
Uranium	0.0000048	0.0000028	V0	0.0000017	V0	0.0000000	V1
Vanadium	0.0007697	0.0001994	V0	0.0003142	V0	0.0000000	V1
Zinc	0.0055897	0.0018357	V0	0.0022232	V0	0.0003780	V0



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		31-Jan	
Sample Date	31-Jan			31-Jan		31-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	4.58	V0	2.12	V0	0.23	V0
Aluminum	0.1380326	0.0745999	V0	0.0299343	V0	0.0000000	V1
Antimony	0.0001784	0.0001549	V0	0.0000094	V0	0.0000000	V1
Arsenic	0.0001060	0.0000316	V0	0.0000182	V0	0.0000000	V1
Barium	0.0092847	0.0022728	V0	0.0003944	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000097	V0	0.0000018	V0	0.0000032	V0
Cadmium	0.0000174	0.0000073	V0	0.0000074	V0	0.0000000	V1
Calcium	0.4112124	0.1319558	V0	0.0530918	V0	0.0000000	V1
Cerium	0.0000174	0.0001008	V0	0.0000287	V0	0.0000000	V1
Cesium	0.0000100	0.0000055	V0	0.0000023	V0	0.0000000	V1
Chromium	0.0022262	0.0002418	V0	0.0002140	V0	0.0000000	V1
Cobalt	0.0000273	0.0000412	V0	0.0000290	V0	0.0000820	V0
Copper	0.0017171	0.0016508	V0	0.0002439	V0	0.0001341	V0
Iron	0.0393063	0.0903999	V0	0.0209892	V0	0.0016412	V0
Lanthanum	0.0000130	0.0000438	V0	0.0000138	V0	0.0000000	V1
Lead	0.0008577	0.0001313	V0	0.0000799	V0	0.0000000	V1
Lithium	0.0000374	0.0000688	V0	0.0000252	V0	0.0000000	V1
Magnesium	0.0091409	0.0212768	V0	0.0118380	V0	0.0023739	V0
Manganese	0.0006949	0.0018898	V0	0.0005620	V0	0.0000410	V0
Molybdenum	0.0007116	0.0000965	V0	0.0000805	V0	0.0000513	V0
Neodymium	0.0000140	0.0000351	V0	0.0000113	V0	0.0000000	V1
Nickel	0.0005429	0.0003385	V0	0.0002419	V0	0.0002214	V0
Niobium	0.0000202	0.0000125	V0	0.0000048	V0	0.0000014	V0
Palladium	0.0000632	0.0000077	V0	0.0000000	V1	0.0000029	V0
Phosphorus	0.0459574	0.0140431	V0	0.0129415	V0	0.0116948	V0
Platinum	0.0000088	0.0000019	V0	0.0000007	V0	0.0000015	V0
Potassium	0.0061261	0.0879671	V0	0.0230075	V0	0.0016240	V0
Praseodymium	0.0000070	0.0000092	V0	0.0000028	V0	0.0000000	V1
Rubidium	0.0000184	0.0001217	V0	0.0000499	V0	0.0000028	V0
Samarium	0.0000133	0.0000064	V0	0.0000019	V0	0.0000000	V1
Selenium	0.0003366	0.0000726	V0	0.0000285	V0	0.0000000	V1
Silicon	0.7676322	0.2141735	V0	0.0615929	V0	0.0000000	V1
Silver	0.0000100	0.0000019	V0	0.0000022	V0	0.0000000	V1
Sodium	0.0169447	0.0752228	V0	0.0323393	V0	0.0012297	V0
Strontium	0.0003375	0.0003857	V0	0.0001328	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000011	V0	0.0000005	V0	0.0000000	V1
Thorium	0.0000059	0.0000095	V0	0.0000034	V0	0.0000000	V1
Tin	0.0004414	0.0001675	V0	0.0000274	V0	0.0000000	V1
Titanium	0.0015201	0.0044168	V0	0.0014884	V0	0.0006761	V0
Tungsten	0.0000938	0.0000648	V0	0.0000374	V0	0.0000891	V0
Uranium	0.0000048	0.0000032	V0	0.0000018	V0	0.0000000	V1
Vanadium	0.0007697	0.0003094	V0	0.0000934	V0	0.0000000	V1
Zinc	0.0055897	0.0031144	V0	0.0103258	V0	0.0003780	V0



Station Name	Fort McKay South			CNRL Horizon		Travel Blank	
Station #	AMS 13			AMS 15		31-Jan	
Sample Date	31-Jan			31-Jan		31-Jan	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m ³)	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	2.77	V0	4.13	V0	0.23	V0
Aluminum	0.1380326	0.0504790	V0	0.2016112	V0	0.0000000	V1
Antimony	0.0001784	0.0000110	V0	0.0000099	V0	0.0000000	V1
Arsenic	0.0001060	0.0000246	V0	0.0000427	V0	0.0000000	V1
Barium	0.0092847	0.0004906	V0	0.0016774	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000058	V0	0.0000000	V1
Bismuth	0.0000093	0.0000197	V0	0.0000074	V0	0.0000032	V0
Cadmium	0.0000174	0.0000064	V0	0.0000040	V0	0.0000000	V1
Calcium	0.4112124	0.0354321	V0	0.0671592	V0	0.0000000	V1
Cerium	0.0000174	0.0000572	V0	0.0002033	V0	0.0000000	V1
Cesium	0.0000100	0.0000036	V0	0.0000159	V0	0.0000000	V1
Chromium	0.0022262	0.0001554	V0	0.0003463	V0	0.0000000	V1
Cobalt	0.0000273	0.0000440	V0	0.0001192	V0	0.0000820	V0
Copper	0.0017171	0.0011788	V0	0.0003250	V0	0.0001341	V0
Iron	0.0393063	0.0380305	V0	0.1360267	V0	0.0016412	V0
Lanthanum	0.0000130	0.0000269	V0	0.0000999	V0	0.0000000	V1
Lead	0.0008577	0.0000738	V0	0.0004521	V0	0.0000000	V1
Lithium	0.0000374	0.0000399	V0	0.0001926	V0	0.0000000	V1
Magnesium	0.0091409	0.0120945	V0	0.0369084	V0	0.0023739	V0
Manganese	0.0006949	0.0005497	V0	0.0022839	V0	0.0000410	V0
Molybdenum	0.0007116	0.0000000	V1	0.0000592	V0	0.0000513	V0
Neodymium	0.0000140	0.0000242	V0	0.0000879	V0	0.0000000	V1
Nickel	0.0005429	0.0001756	V0	0.0003810	V0	0.0002214	V0
Niobium	0.0000202	0.0000062	V0	0.0000321	V0	0.0000014	V0
Palladium	0.0000632	0.0000000	V1	0.0000041	V0	0.0000029	V0
Phosphorus	0.0459574	0.0133349	V0	0.0152261	V0	0.0116948	V0
Platinum	0.0000088	0.0000013	V0	0.0000006	V0	0.0000015	V0
Potassium	0.0061261	0.0381305	V0	0.0692961	V0	0.0016240	V0
Praseodymium	0.0000070	0.0000066	V0	0.0000231	V0	0.0000000	V1
Rubidium	0.0000184	0.0000813	V0	0.0002606	V0	0.0000028	V0
Samarium	0.0000133	0.0000045	V0	0.0000170	V0	0.0000000	V1
Selenium	0.0003366	0.0000437	V0	0.0001486	V0	0.0000000	V1
Silicon	0.7676322	0.1640753	V0	0.5165061	V0	0.0000000	V1
Silver	0.0000100	0.0000006	V0	0.0000024	V0	0.0000000	V1
Sodium	0.0169447	0.0297483	V0	0.0473924	V0	0.0012297	V0
Strontium	0.0003375	0.0001548	V0	0.0005947	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000021	V0	0.0000000	V1
Thallium	0.0000090	0.0000007	V0	0.0000018	V0	0.0000000	V1
Thorium	0.0000059	0.0000061	V0	0.0000269	V0	0.0000000	V1
Tin	0.0004414	0.0000538	V0	0.0000611	V0	0.0000000	V1
Titanium	0.0015201	0.0024522	V0	0.0097086	V0	0.0006761	V0
Tungsten	0.0000938	0.0000499	V0	0.0000706	V0	0.0000891	V0
Uranium	0.0000048	0.0000019	V0	0.0000082	V0	0.0000000	V1
Vanadium	0.0007697	0.0001082	V0	0.0004875	V0	0.0000000	V1
Zinc	0.0055897	0.0025508	V0	0.0018060	V0	0.0003780	V0



Compound Name	Albian Muskeg River			Travel Blank	
	MDL (µg/sample)	Results (µg/m ³)	QC Flag	Results (µg/m ³)	QC Flag
Particulate Matter	1.00	8.44	V0	0.23	V0
Aluminum	0.1380326	0.3152989	V0	0.0000000	V1
Antimony	0.0001784	0.0000478	V0	0.0000000	V1
Arsenic	0.0001060	0.0000637	V0	0.0000000	V1
Barium	0.0092847	0.0024130	V0	0.0000000	V1
Beryllium	0.0000946	0.0000091	V0	0.0000000	V1
Bismuth	0.0000093	0.0000053	V0	0.0000032	V0
Cadmium	0.0000174	0.0000055	V0	0.0000000	V1
Calcium	0.4112124	0.2011011	V0	0.0000000	V1
Cerium	0.0000174	0.0003321	V0	0.0000000	V1
Cesium	0.0000100	0.0000207	V0	0.0000000	V1
Chromium	0.0022262	0.0005986	V0	0.0000000	V1
Cobalt	0.0000273	0.0001353	V0	0.0000820	V0
Copper	0.0017171	0.0009257	V0	0.0001341	V0
Iron	0.0393063	0.2189096	V0	0.0016412	V0
Lanthanum	0.0000130	0.0001603	V0	0.0000000	V1
Lead	0.0008577	0.0001702	V0	0.0000000	V1
Lithium	0.0000374	0.0004138	V0	0.0000000	V1
Magnesium	0.0091409	0.0470142	V0	0.0023739	V0
Manganese	0.0006949	0.0042771	V0	0.0000410	V0
Molybdenum	0.0007116	0.0001107	V0	0.0000513	V0
Neodymium	0.0000140	0.0001431	V0	0.0000000	V1
Nickel	0.0005429	0.0005890	V0	0.0002214	V0
Niobium	0.0000202	0.0000573	V0	0.0000014	V0
Palladium	0.0000632	0.0000084	V0	0.0000029	V0
Phosphorus	0.0459574	0.0160987	V0	0.0116948	V0
Platinum	0.0000088	0.0000016	V0	0.0000015	V0
Potassium	0.0061261	0.0944007	V0	0.0016240	V0
Praseodymium	0.0000070	0.0000383	V0	0.0000000	V1
Rubidium	0.0000184	0.0003527	V0	0.0000028	V0
Samarium	0.0000133	0.0000259	V0	0.0000000	V1
Selenium	0.0003366	0.0002218	V0	0.0000000	V1
Silicon	0.7676322	0.9486990	V0	0.0000000	V1
Silver	0.0000100	0.0000021	V0	0.0000000	V1
Sodium	0.0169447	0.0582709	V0	0.0012297	V0
Strontium	0.0003375	0.0008203	V0	0.0000000	V1
Tantalum	0.0000394	0.0000034	V0	0.0000000	V1
Thallium	0.0000090	0.0000028	V0	0.0000000	V1
Thorium	0.0000059	0.0000436	V0	0.0000000	V1
Tin	0.0004414	0.0000866	V0	0.0000000	V1
Titanium	0.0015201	0.0147415	V0	0.0006761	V0
Tungsten	0.0000938	0.0001592	V0	0.0000891	V0
Uranium	0.0000048	0.0000130	V0	0.0000000	V1
Vanadium	0.0007697	0.0006436	V0	0.0000000	V1
Zinc	0.0055897	0.0034535	V0	0.0003780	V0



Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	13.38	12.16	6	6
Aluminum	0.1123748	0.0580818	6	6
Antimony	0.0000944	0.0000798	6	6
Arsenic	0.0001694	0.0001669	6	6
Barium	0.0018835	0.0014205	6	6
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000159	0.0000123	6	6
Cadmium	0.0000386	0.0000605	6	6
Calcium	0.1733434	0.1500261	6	6
Cerium	0.0001391	0.0000840	6	6
Cesium	0.0000083	0.0000042	6	6
Chromium	0.0008804	0.0008718	6	6
Cobalt	0.0001012	0.0000430	6	6
Copper	0.0008647	0.0005801	6	6
Iron	0.0980206	0.0516564	6	6
Lanthanum	0.0000845	0.0000613	6	6
Lead	0.0002557	0.0001725	6	6
Lithium	0.0001168	0.0000650	6	6
Magnesium	0.0474811	0.0325788	6	6
Manganese	0.0029329	0.0023111	6	6
Molybdenum	0.0002776	0.0003055	6	6
Neodymium	0.0000578	0.0000345	6	6
Nickel	0.0012317	0.0012474	6	6
Niobium	0.0000170	0.0000080	6	6
Palladium	0.0000037	0.0000025	6	5
Phosphorus	0.0120538	0.0034120	6	6
Platinum	0.0000009	0.0000003	6	6
Potassium	0.0956420	0.0766496	6	6
Praseodymium	0.0000154	0.0000091	6	6
Rubidium	0.0002193	0.0001488	6	6
Samarium	0.0000105	0.0000062	6	6
Selenium	0.0001125	0.0000688	6	6
Silicon	0.2219990	0.1104053	6	5
Silver	0.0000049	0.0000065	6	6
Sodium	0.1595873	0.1396145	6	6
Strontium	0.0007040	0.0005125	6	6
Tantalum	0.0000003	0.0000007	6	1
Thallium	0.0000026	0.0000024	6	6
Thorium	0.0000175	0.0000104	6	6
Tin	0.0001193	0.0000638	6	6
Titanium	0.0053198	0.0028357	6	6
Tungsten	0.0001079	0.0000171	6	6
Uranium	0.0000051	0.0000029	6	6
Vanadium	0.0023247	0.0035478	6	6
Zinc	0.0071798	0.0076382	6	6



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	9.85	5.18	6	6
Aluminum	0.0762007	0.0704414	6	6
Antimony	0.0002909	0.0002727	6	6
Arsenic	0.0001000	0.0000597	6	6
Barium	0.0029383	0.0021334	6	6
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000248	0.0000157	6	6
Cadmium	0.0000411	0.0000521	6	6
Calcium	0.1114727	0.0957690	6	6
Cerium	0.0001155	0.0000488	6	6
Cesium	0.0000051	0.0000030	6	6
Chromium	0.0005138	0.0002086	6	6
Cobalt	0.0000731	0.0000314	6	6
Copper	0.0019219	0.0014998	6	6
Iron	0.0779436	0.0384937	6	6
Lanthanum	0.0000668	0.0000370	6	6
Lead	0.0002376	0.0001207	6	6
Lithium	0.0000671	0.0000498	6	6
Magnesium	0.0386534	0.0422932	6	6
Manganese	0.0016203	0.0009515	6	6
Molybdenum	0.0003631	0.0003154	6	6
Neodymium	0.0000363	0.0000189	6	6
Nickel	0.0008660	0.0006064	6	6
Niobium	0.0000119	0.0000044	6	6
Palladium	0.0000142	0.0000078	6	6
Phosphorus	0.0121623	0.0034861	6	6
Platinum	0.0000012	0.0000002	6	6
Potassium	0.0777749	0.0483930	6	6
Praseodymium	0.0000108	0.0000049	6	6
Rubidium	0.0001656	0.0000961	6	6
Samarium	0.0000053	0.0000039	6	6
Selenium	0.0001022	0.0000395	6	6
Silicon	0.1766469	0.1664918	6	5
Silver	0.0000058	0.0000053	6	6
Sodium	0.1534379	0.1632522	6	6
Strontium	0.0004912	0.0003729	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000019	0.0000011	6	6
Thorium	0.0000090	0.0000055	6	6
Tin	0.0002420	0.0001827	6	6
Titanium	0.0042042	0.0019526	6	6
Tungsten	0.0000964	0.0000403	6	6
Uranium	0.0000037	0.0000018	6	6
Vanadium	0.0015324	0.0027864	6	6
Zinc	0.0073896	0.0057129	6	6



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	8.82	3.90	6	6
Aluminum	0.0634220	0.0348061	6	6
Antimony	0.0004192	0.0004386	6	6
Arsenic	0.0000888	0.0000487	6	6
Barium	0.0048737	0.0043415	6	6
Beryllium	0.0000008	0.0000020	6	1
Bismuth	0.0000219	0.0000132	6	6
Cadmium	0.0000290	0.0000311	6	6
Calcium	0.1637066	0.0898873	6	6
Cerium	0.0001391	0.0000921	6	6
Cesium	0.0000048	0.0000020	6	6
Chromium	0.0005119	0.0001911	6	6
Cobalt	0.0000538	0.0000185	6	6
Copper	0.0032242	0.0026227	6	6
Iron	0.1206182	0.0979544	6	6
Lanthanum	0.0000599	0.0000353	6	6
Lead	0.0004339	0.0003857	6	6
Lithium	0.0000612	0.0000272	6	6
Magnesium	0.0412470	0.0213123	6	6
Manganese	0.0026093	0.0014189	6	6
Molybdenum	0.0002924	0.0002025	6	6
Neodymium	0.0000427	0.0000216	6	6
Nickel	0.0006154	0.0004501	6	6
Niobium	0.0000134	0.0000059	6	6
Palladium	0.0000169	0.0000148	6	6
Phosphorus	0.0125337	0.0036990	6	6
Platinum	0.0000018	0.0000010	6	6
Potassium	0.0790860	0.0380870	6	6
Praseodymium	0.0000123	0.0000075	6	6
Rubidium	0.0001495	0.0000893	6	6
Samarium	0.0000060	0.0000033	6	6
Selenium	0.0001042	0.0000468	6	6
Silicon	0.1776789	0.1264794	6	5
Silver	0.0000099	0.0000161	6	6
Sodium	0.2256600	0.1536073	6	6
Strontium	0.0007813	0.0004029	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000016	0.0000009	6	6
Thorium	0.0000099	0.0000052	6	6
Tin	0.0003455	0.0002810	6	6
Titanium	0.0049356	0.0020955	6	6
Tungsten	0.0000923	0.0000545	6	6
Uranium	0.0000039	0.0000017	6	6
Vanadium	0.0009765	0.0017365	6	6
Zinc	0.0073801	0.0046614	6	6



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	6.01	3.17	6	6
Aluminum	0.0329277	0.0183808	6	6
Antimony	0.0000533	0.0000427	6	6
Arsenic	0.0000726	0.0000392	6	6
Barium	0.0008083	0.0004247	6	6
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000220	0.0000227	6	6
Cadmium	0.0000940	0.0001502	6	6
Calcium	0.0585980	0.0253240	6	6
Cerium	0.0000357	0.0000167	6	6
Cesium	0.0000039	0.0000026	6	6
Chromium	0.0002465	0.0000842	6	6
Cobalt	0.0000419	0.0000124	6	6
Copper	0.0005151	0.0002244	6	6
Iron	0.0400312	0.0239983	6	6
Lanthanum	0.0000290	0.0000155	6	6
Lead	0.0002149	0.0001700	6	6
Lithium	0.0000314	0.0000170	6	6
Magnesium	0.0213974	0.0156791	6	6
Manganese	0.0009161	0.0005095	6	6
Molybdenum	0.0001120	0.0000860	6	6
Neodymium	0.0000135	0.0000078	6	6
Nickel	0.0002947	0.0001231	6	6
Niobium	0.0000056	0.0000021	6	6
Palladium	0.0000059	0.0000072	6	4
Phosphorus	0.0115529	0.0031237	6	6
Platinum	0.0000013	0.0000006	6	6
Potassium	0.0664802	0.0560598	6	6
Praseodymium	0.0000035	0.0000020	6	6
Rubidium	0.0001671	0.0002014	6	6
Samarium	0.0000026	0.0000017	6	6
Selenium	0.0000515	0.0000232	6	6
Silicon	0.0909617	0.0536006	6	5
Silver	0.0000081	0.0000083	6	6
Sodium	0.0845692	0.0703783	6	6
Strontium	0.0002361	0.0001196	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000030	0.0000048	6	6
Thorium	0.0000041	0.0000026	6	6
Tin	0.0000890	0.0000519	6	6
Titanium	0.0016821	0.0008419	6	6
Tungsten	0.0000580	0.0000207	6	6
Uranium	0.0000017	0.0000008	6	6
Vanadium	0.0003429	0.0004266	6	6
Zinc	0.0080610	0.0068178	6	6



Station Name	Fort McKay South	Fort McKay South	Fort McKay South	Fort McKay South
Station #	AMS 13	AMS 13	AMS 13	AMS 13
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m ³	Std Dev µg/m ³	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	9.09	6.90	6	6
Aluminum	0.0988337	0.0620901	6	6
Antimony	0.0000707	0.0000627	6	6
Arsenic	0.0000709	0.0000538	6	6
Barium	0.0015246	0.0010040	6	6
Beryllium	0.0000000	0.0000000	6	0
Bismuth	0.0000222	0.0000106	6	6
Cadmium	0.0000333	0.0000502	6	6
Calcium	0.0988905	0.0593270	6	6
Cerium	0.0001101	0.0000721	6	6
Cesium	0.0000075	0.0000044	6	6
Chromium	0.0003748	0.0001640	6	6
Cobalt	0.0000712	0.0000366	6	6
Copper	0.0008465	0.0003762	6	6
Iron	0.0791716	0.0522382	6	6
Lanthanum	0.0000704	0.0000523	6	6
Lead	0.0001858	0.0001255	6	6
Lithium	0.0001050	0.0000707	6	6
Magnesium	0.0400630	0.0314036	6	6
Manganese	0.0021964	0.0016439	6	6
Molybdenum	0.0001772	0.0002090	6	5
Neodymium	0.0000457	0.0000301	6	6
Nickel	0.0006333	0.0005668	6	6
Niobium	0.0000126	0.0000066	6	6
Palladium	0.0000163	0.0000223	6	5
Phosphorus	0.0120462	0.0037603	6	6
Platinum	0.0000013	0.0000008	6	6
Potassium	0.0782801	0.0527473	6	6
Praseodymium	0.0000126	0.0000084	6	6
Rubidium	0.0001840	0.0001011	6	6
Samarium	0.0000081	0.0000054	6	6
Selenium	0.0000934	0.0000473	6	6
Silicon	0.2312951	0.1493953	6	6
Silver	0.0000041	0.0000051	6	5
Sodium	0.1495387	0.1295558	6	6
Strontium	0.0004912	0.0003415	6	6
Tantalum	0.0000000	0.0000000	6	0
Thallium	0.0000020	0.0000014	6	6
Thorium	0.0000135	0.0000089	6	6
Tin	0.0001126	0.0000641	6	6
Titanium	0.0039792	0.0018501	6	6
Tungsten	0.0000846	0.0000393	6	6
Uranium	0.0000039	0.0000022	6	6
Vanadium	0.0009682	0.0010626	6	6
Zinc	0.0062793	0.0055037	6	6



Station Name Station # Sample Date Particulate Size Compound Name	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Average µg/m ³	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Std Dev µg/m ³	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Total Samples (#)	CNRL Horizon AMS 15 Jan 01 - Jan 31 PM10 Total ≥ MDL (#)
Particulate Matter	9.38	4.93	6	6
Aluminum	0.1584979	0.1307252	6	6
Antimony	0.0000297	0.0000215	6	6
Arsenic	0.0000622	0.0000319	6	6
Barium	0.0015098	0.0011688	6	5
Beryllium	0.0000028	0.0000047	6	2
Bismuth	0.0000126	0.0000069	6	6
Cadmium	0.0000293	0.0000504	6	6
Calcium	0.0833076	0.0673638	6	6
Cerium	0.0001602	0.0001320	6	6
Cesium	0.0000122	0.0000094	6	6
Chromium	0.0005977	0.0004470	6	6
Cobalt	0.0001055	0.0000548	6	6
Copper	0.0005051	0.0002267	6	6
Iron	0.1129732	0.0971252	6	6
Lanthanum	0.0000952	0.0000866	6	6
Lead	0.0002205	0.0001449	6	6
Lithium	0.0001621	0.0001314	6	6
Magnesium	0.0465506	0.0356037	6	6
Manganese	0.0024384	0.0021274	6	6
Molybdenum	0.0001160	0.0000620	6	6
Neodymium	0.0000698	0.0000582	6	6
Nickel	0.0004738	0.0002527	6	6
Niobium	0.0000222	0.0000161	6	6
Palladium	0.0000071	0.0000059	6	5
Phosphorus	0.0122309	0.0037484	6	6
Platinum	0.0000015	0.0000008	6	6
Potassium	0.0811944	0.0515498	6	6
Praseodymium	0.0000185	0.0000152	6	6
Rubidium	0.0002477	0.0001605	6	6
Samarium	0.0000127	0.0000106	6	6
Selenium	0.0001235	0.0000708	6	6
Silicon	0.4605102	0.4068079	6	6
Silver	0.0000038	0.0000042	6	6
Sodium	0.1473011	0.1359523	6	6
Strontium	0.0005941	0.0004581	6	6
Tantalum	0.0000009	0.0000015	6	2
Thallium	0.0000021	0.0000012	6	6
Thorium	0.0000206	0.0000173	6	6
Tin	0.0000814	0.0000269	6	6
Titanium	0.0069653	0.0045406	6	6
Tungsten	0.0000671	0.0000436	5	5
Uranium	0.0000064	0.0000048	6	6
Vanadium	0.0006057	0.0005565	6	6
Zinc	0.0045360	0.0041336	6	6



Station Name	Albian Muskeg River	Albian Muskeg River	Albian Muskeg River	Albian Muskeg River
Station #	AMS 16	AMS 16	AMS 16	AMS 16
Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average $\mu\text{g}/\text{m}^3$	Std Dev $\mu\text{g}/\text{m}^3$	Total Samples (#)	Total \geq MDL (#)
Particulate Matter	12.80	6.61	6	6
Aluminum	0.2493362	0.1392381	6	6
Antimony	0.0000517	0.0000389	6	6
Arsenic	0.0001044	0.0000775	6	6
Barium	0.0022926	0.0008695	6	6
Beryllium	0.0000069	0.0000036	6	5
Bismuth	0.0000141	0.0000082	6	6
Cadmium	0.0000363	0.0000583	6	6
Calcium	0.2099564	0.1339557	6	6
Cerium	0.0002691	0.0001409	6	6
Cesium	0.0000170	0.0000090	6	6
Chromium	0.0007518	0.0005183	6	6
Cobalt	0.0001060	0.0000475	6	6
Copper	0.0008756	0.0002471	6	6
Iron	0.1877817	0.0972257	6	6
Lanthanum	0.0001526	0.0000774	6	6
Lead	0.0002457	0.0001326	6	6
Lithium	0.0003264	0.0002084	6	6
Magnesium	0.0633742	0.0317158	6	6
Manganese	0.0044735	0.0027701	6	6
Molybdenum	0.0003092	0.0003208	6	6
Neodymium	0.0001148	0.0000611	6	6
Nickel	0.0009931	0.0005688	6	6
Niobium	0.0000390	0.0000189	6	6
Palladium	0.0000062	0.0000035	6	5
Phosphorus	0.0135334	0.0037302	6	6
Platinum	0.0000014	0.0000009	5	5
Potassium	0.1116497	0.0588242	6	6
Praseodymium	0.0000303	0.0000159	6	6
Rubidium	0.0003530	0.0001657	6	6
Samarium	0.0000211	0.0000112	6	6
Selenium	0.0001991	0.0000903	6	6
Silicon	0.6417874	0.3148144	6	6
Silver	0.0000046	0.0000052	6	6
Sodium	0.1705710	0.1486776	6	6
Strontium	0.0008865	0.0003946	6	6
Tantalum	0.0000024	0.0000013	6	5
Thallium	0.0000034	0.0000018	6	6
Thorium	0.0000359	0.0000203	6	6
Tin	0.0000956	0.0000292	6	6
Titanium	0.0110654	0.0055255	6	6
Tungsten	0.0001275	0.0000675	6	6
Uranium	0.0000104	0.0000051	6	6
Vanadium	0.0018407	0.0025066	6	6
Zinc	0.0070541	0.0057385	6	6



Wood Buffalo Environmental Association

PM10 Metal Summary (µg/sample)

2017 January

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99% Max.	Mean	Std. Dev.	Median	Outlier Test	
Particulate Matter	100%	42	0	51	87	131	218	238	305	334	423	507	845	845	237	157	218	1023
Aluminum	100%	42	0	0.3200	0.5900	0.8200	1.7900	2.6200	4.0100	4.1300	5.2000	7.5700	10.9200	10.9200	2.7117	2.4796	1.7900	15.1095
Antimony	100%	42	0	0.0002	0.0003	0.0005	0.0015	0.0023	0.0035	0.0039	0.0074	0.0164	0.0289	0.0289	0.0035	0.0056	0.0015	0.0313
Arsenic	100%	42	0	0.0004	0.0006	0.0009	0.0018	0.0024	0.0028	0.0033	0.0040	0.0054	0.0111	0.0111	0.0023	0.0020	0.0018	0.0121
Barium	98%	42	1	0.0047	0.0113	0.0211	0.0388	0.0545	0.0703	0.0730	0.0888	0.1411	0.3131	0.3131	0.0543	0.0538	0.0388	0.3235
Beryllium	19%	42	34	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0001	0.0001	0.0001	0.0004
Bismuth	100%	42	0	0.0000	0.0001	0.0002	0.0004	0.0005	0.0006	0.0007	0.0010	0.0010	0.0013	0.0013	0.0005	0.0003	0.0004	0.0021
Cadmium	100%	42	0	0.0001	0.0001	0.0001	0.0004	0.0006	0.0008	0.0009	0.0032	0.0037	0.0094	0.0094	0.0010	0.0017	0.0004	0.0096
Calcium	100%	42	0	0.5247	0.8691	1.3215	2.3554	2.6889	4.5258	4.8914	7.1927	7.8366	9.9404	9.9404	3.0775	2.4763	2.3554	15.4588
Cerium	100%	42	0	0.0003	0.0007	0.0011	0.0028	0.0036	0.0048	0.0050	0.0070	0.0080	0.0111	0.0111	0.0033	0.0026	0.0028	0.0163
Cesium	100%	42	0	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0007	0.0007	0.0002	0.0002	0.0002	0.0010
Chromium	100%	42	0	0.0034	0.0054	0.0072	0.0110	0.0131	0.0151	0.0154	0.0190	0.0339	0.0633	0.0633	0.0133	0.0108	0.0110	0.0675
Cobalt	100%	42	0	0.0005	0.0008	0.0011	0.0017	0.0018	0.0028	0.0029	0.0033	0.0034	0.0043	0.0043	0.0019	0.0010	0.0017	0.0070
Copper	100%	42	0	0.0059	0.0084	0.0116	0.0204	0.0222	0.0306	0.0396	0.0476	0.0976	0.1892	0.1892	0.0300	0.0344	0.0204	0.2019
Iron	100%	42	0	0.3260	0.5084	0.9127	2.0460	2.2616	3.2646	3.4138	5.2538	7.0042	7.4171	7.4171	2.4540	1.8961	2.0460	11.9347
Lanthanum	100%	42	0	0.0002	0.0004	0.0008	0.0015	0.0018	0.0025	0.0031	0.0039	0.0054	0.0062	0.0062	0.0019	0.0015	0.0015	0.0096
Lead	100%	42	0	0.0015	0.0020	0.0025	0.0050	0.0060	0.0080	0.0089	0.0109	0.0126	0.0273	0.0273	0.0061	0.0048	0.0050	0.0300
Lithium	100%	42	0	0.0003	0.0006	0.0008	0.0017	0.0027	0.0042	0.0046	0.0075	0.0093	0.0161	0.0161	0.0030	0.0032	0.0017	0.0189
Magnesium	100%	42	0	0.2025	0.2570	0.3353	0.9842	1.0485	1.5781	1.8121	2.1207	2.3283	2.8925	2.8925	1.0235	0.7470	0.9842	4.7585
Manganese	100%	42	0	0.0074	0.0135	0.0240	0.0426	0.0548	0.0816	0.1026	0.1265	0.1414	0.2140	0.2140	0.0588	0.0475	0.0426	0.2965
Molybdenum	98%	42	1	0.0005	0.0014	0.0019	0.0031	0.0052	0.0073	0.0084	0.0132	0.0185	0.0236	0.0236	0.0056	0.0057	0.0031	0.0339
Neodymium	100%	42	0	0.0001	0.0002	0.0004	0.0011	0.0013	0.0018	0.0021	0.0026	0.0034	0.0048	0.0048	0.0013	0.0011	0.0011	0.0068
Nickel	100%	42	0	0.0041	0.0047	0.0064	0.0105	0.0141	0.0272	0.0306	0.0366	0.0413	0.0802	0.0802	0.0175	0.0157	0.0105	0.0958
Niobium	100%	42	0	0.0001	0.0001	0.0002	0.0003	0.0003	0.0003	0.0005	0.0006	0.0009	0.0012	0.0014	0.0014	0.0004	0.0003	0.0021
Palladium	86%	42	6	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0007	0.0014	0.0014	0.0002	0.0003	0.0002	0.0016
Phosphorus	100%	42	0	0.1608	0.1869	0.2073	0.3142	0.3251	0.3568	0.3654	0.3964	0.4024	0.4115	0.4115	0.2949	0.0800	0.3142	0.6950
Platinum	100%	42	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0000	0.0000	0.0000	0.0002
Potassium	100%	42	0	0.5522	0.8251	0.9714	1.6631	2.2484	2.9244	3.0672	3.8694	4.0628	5.5593	5.5593	2.0191	1.2688	1.6631	8.3634
Praseodymium	100%	42	0	0.0000	0.0001	0.0001	0.0003	0.0003	0.0005	0.0006	0.0007	0.0009	0.0012	0.0012	0.0004	0.0003	0.0003	0.0018
Rubidium	100%	42	0	0.0010	0.0016	0.0021	0.0041	0.0051	0.0073	0.0077	0.0111	0.0122	0.0138	0.0138	0.0051	0.0035	0.0041	0.0228
Samarium	100%	42	0	0.0000	0.0000	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0009	0.0009	0.0002	0.0002	0.0002	0.0013
Selenium	100%	42	0	0.0007	0.0010	0.0013	0.0023	0.0027	0.0036	0.0040	0.0053	0.0059	0.0071	0.0071	0.0027	0.0016	0.0023	0.0109
Silicon	90%	42	4	0.0000	1.4782	2.7771	5.1402	6.2073	9.0376	11.7871	14.9454	22.7688	28.9649	28.9649	6.8794	6.5580	5.1402	39.6693
Silver	98%	42	1	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0004	0.0004	0.0010	0.0010	0.0001	0.0002	0.0001	0.0011
Sodium	100%	42	0	0.5455	0.7761	1.0646	2.6142	3.5107	7.3559	7.6022	8.4234	8.7682	11.1031	11.1031	3.7378	3.1861	2.6142	19.6684
Strontium	100%	42	0	0.0022	0.0037	0.0050	0.0123	0.0158	0.0209	0.0241	0.0285	0.0341	0.0363	0.0363	0.0143	0.0099	0.0123	0.0638
Tantalum	19%	42	34	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001
Thallium	100%	42	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0003	0.0003	0.0001	0.0001	0.0000	0.0003
Thorium	100%	42	0	0.0000	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0008	0.0010	0.0016	0.0016	0.0004	0.0003	0.0002	0.0021
Tin	100%	42	0	0.0007	0.0013	0.0019	0.0023	0.0031	0.0043	0.0047	0.0059	0.0112	0.0209	0.0209	0.0037	0.0037	0.0023	0.0223
Titanium	100%	42	0	0.0262	0.0357	0.0645	0.1006	0.1098	0.1804	0.2043	0.2330	0.3555	0.3972	0.3972	0.1307	0.0970	0.1006	0.6154
Tungsten	100%	42	0	0.0004	0.0009	0.0014	0.0021	0.0022	0.0031	0.0031	0.0038	0.0046	0.0126	0.0126	0.0024	0.0019	0.0021	0.0121
Uranium	100%	42	0	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0001	0.0001	0.0001	0.0006
Vanadium	100%	42	0	0.0022	0.0033	0.0062	0.0091	0.0115	0.0238	0.0414	0.0812	0.1644	0.2136	0.2136	0.0293	0.0489	0.0091	0.2738
Zinc	100%	42	0	0.0356	0.0467	0.0664	0.1052	0.1578	0.2189	0.2519	0.3944	0.4302	0.5140	0.5140	0.1638	0.1313	0.1052	0.8203



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

POLYCYCLIC AROMATIC HYDROCARBONS DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

PAHs: Airzone One Ltd
Mississauga, Ontario



FILE CONTENTS DESCRIPTION	PAH - Speciated PAH Gas + Particle Phase Measurements
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
UNITS	ng/m ³ (nanogram per cubic meter)
OBSERVATION TYPE	Particles + gas
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	filtration and adsorbent
PARTICLE DIAMETER	TSP (total suspended particle)
MEDIUM	a glass fiber filter + PUF/XAD-2/PUF
ANALYTICAL METHOD	Gas Chromatograph/Mass Spectrometer (GC/MS)
SAMPLE PREPARATION	Solvent Extraction
ANALYTICAL LABORATORY	AIRZONE One Inc.
USER NOTE 1	Data are recovery corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration (ng/m ³) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions
SAMPLING INSTRUMENT TYPE	Tisch TE-1000 High-Volume Sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Compound Name	MDL (ng/m ³)	Bertha Ganter -					
		Fort McKay		Patricia McInnes		Travel Blank	
		AMS 1	AMS 6	AMS 6		01-Jan	
		01-Jan	01-Jan	01-Jan	01-Jan	01-Jan	01-Jan
Total Air Volume (m ³)		315.99	316	316	316	316	
		Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	27.433	V0	15.459	V0	0.093	V0
Acenaphthylene	0.011	2.587	V0	1.354	V0	0.025	V0
Acenaphthene	0.006	2.750	V0	1.006	V0	0.041	V0
Fluorene	0.007	1.109	V0	0.866	V0	0.009	V0
Phenanthrene	0.007	4.912	V0	2.448	V0	0.022	V0
Anthracene	0.017	0.607	V0	0.237	V0	0.003	V1
Acridine	0.019	0.132	V0	0.015	V1	0.017	V1
Fluoranthene	0.007	0.809	V0	0.403	V0	0.009	V0
Pyrene	0.008	1.072	V0	0.379	V0	0.014	V0
Benzo(c)phenanthrene	0.015	0.135	V0	0.057	V0	0.011	V1
Benz(a)anthracene	0.014	0.470	V0	0.127	V0	0.012	V1
Chrysene	0.013	0.450	V0	0.184	V0	0.012	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.024	V0	0.013	V1	0.005	V1
Benzo(b)fluoranthene	0.020	0.450	V0	0.078	V0	0.005	V1
Benzo(k)fluoranthene	0.013	0.249	V0	0.072	V0	0.001	V1
Benzo(a)pyrene	0.016	0.343	V0	0.057	V0	0.003	V1
3-Methylcholanthrene	0.022	0.014	V1	0.016	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.372	V0	0.049	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.272	V0	0.046	V0	0.002	V1
Benzo(ghi)perylene	0.020	0.323	V0	0.147	V0	0.004	V1
Dibenzo(a,l)pyrene	0.024	0.036	V0	0.017	V1	0.003	V1
Dibenzo(a,i)pyrene	0.025	0.016	V1	0.016	V1	0.006	V1
Dibenzo(a,h)pyrene	0.020	0.013	V1	0.015	V1	0.003	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14			
Sample Date	01-Jan			01-Jan		01-Jan	
Total Air Volume (m ³)	316.02			316.01		316	
Compound Name	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	14.578	V0	17.456	V0	0.093	V0
Acenaphthylene	0.011	1.599	V0	1.458	V0	0.025	V0
Acenaphthene	0.006	1.772	V0	1.353	V0	0.041	V0
Fluorene	0.007	1.056	V0	1.019	V0	0.009	V0
Phenanthrene	0.007	3.227	V0	2.238	V0	0.022	V0
Anthracene	0.017	0.391	V0	0.243	V0	0.003	V1
Acridine	0.019	0.119	V0	0.135	V0	0.017	V1
Fluoranthene	0.007	0.440	V0	0.630	V0	0.009	V0
Pyrene	0.008	0.257	V0	0.317	V0	0.014	V0
Benzo(c)phenanthrene	0.015	0.073	V0	0.064	V0	0.011	V1
Benz(a)anthracene	0.014	0.043	V0	0.145	V0	0.012	V1
Chrysene	0.013	0.127	V0	0.266	V0	0.012	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.016	V0	0.019	V0	0.005	V1
Benzo(b)fluoranthene	0.020	0.129	V0	0.131	V0	0.005	V1
Benzo(k)fluoranthene	0.013	0.127	V0	0.090	V0	0.001	V1
Benzo(a)pyrene	0.016	0.060	V0	0.067	V0	0.003	V1
3-Methylcholanthrene	0.022	0.015	V1	0.021	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.080	V0	0.163	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.049	V0	0.114	V0	0.002	V1
Benzo(ghi)perylene	0.020	0.121	V0	0.156	V0	0.004	V1
Dibenzo(a,l)pyrene	0.024	0.017	V1	0.034	V0	0.003	V1
Dibenzo(a,i)pyrene	0.025	0.014	V1	0.049	V0	0.006	V1
Dibenzo(a,h)pyrene	0.020	0.012	V1	0.025	V0	0.003	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	07-Jan		07-Jan		07-Jan	
Total Air Volume (m ³)		316		316		316	
	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	20.216	V0	39.912	V0	0.123	V0
Acenaphthylene	0.011	2.034	V0	1.744	V0	0.025	V0
Acenaphthene	0.006	1.026	V0	3.118	V0	0.030	V0
Fluorene	0.007	1.656	V0	1.719	V0	0.046	V0
Phenanthrene	0.007	3.846	V0	4.063	V0	0.033	V0
Anthracene	0.017	0.320	V0	0.453	V0	0.012	V1
Acridine	0.019	0.050	V0	0.194	V0	0.024	V0
Fluoranthene	0.007	0.942	V0	1.037	V0	0.014	V0
Pyrene	0.008	0.990	V0	0.987	V0	0.013	V0
Benzo(c)phenanthrene	0.015	0.075	V0	0.117	V0	0.011	V1
Benz(a)anthracene	0.014	0.293	V0	0.262	V0	0.004	V1
Chrysene	0.013	0.411	V0	0.424	V0	0.009	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.020	V0	0.040	V0	0.007	V1
Benzo(b)fluoranthene	0.020	0.294	V0	0.223	V0	0.009	V1
Benzo(k)fluoranthene	0.013	0.119	V0	0.144	V0	0.006	V1
Benzo(a)pyrene	0.016	0.174	V0	0.151	V0	0.004	V1
3-Methylcholanthrene	0.022	0.019	V1	0.010	V1	0.004	V1
Indeno(123-cd)pyrene	0.017	0.167	V0	0.208	V0	0.005	V1
Dibenz(a,h)anthracene	0.020	0.075	V0	0.066	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.154	V0	0.295	V0	0.003	V1
Dibenzo(a,l)pyrene	0.024	0.016	V1	0.030	V0	0.004	V1
Dibenzo(a,i)pyrene	0.025	0.018	V1	0.014	V1	0.004	V1
Dibenzo(a,h)pyrene	0.020	0.011	V1	0.015	V1	0.002	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14			
Sample Date	07-Jan			07-Jan		07-Jan	
Total Air Volume (m ³)	316.02			316.01		316	
Compound Name	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	29.183	V0	28.617	V0	0.123	V0
Acenaphthylene	0.011	2.035	V0	1.010	V0	0.025	V0
Acenaphthene	0.006	1.671	V0	0.356	V0	0.030	V0
Fluorene	0.007	1.881	V0	1.646	V0	0.046	V0
Phenanthrene	0.007	4.830	V0	2.122	V0	0.033	V0
Anthracene	0.017	0.333	V0	0.147	V0	0.012	V1
Acridine	0.019	0.021	V0	0.048	V0	0.024	V0
Fluoranthene	0.007	1.272	V0	0.890	V0	0.014	V0
Pyrene	0.008	1.359	V0	0.433	V0	0.013	V0
Benzo(c)phenanthrene	0.015	0.115	V0	0.077	V0	0.011	V1
Benz(a)anthracene	0.014	0.437	V0	0.149	V0	0.004	V1
Chrysene	0.013	0.604	V0	0.388	V0	0.009	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.043	V0	0.015	V0	0.007	V1
Benzo(b)fluoranthene	0.020	0.339	V0	0.119	V0	0.009	V1
Benzo(k)fluoranthene	0.013	0.172	V0	0.103	V0	0.006	V1
Benzo(a)pyrene	0.016	0.281	V0	0.053	V0	0.004	V1
3-Methylcholanthrene	0.022	0.015	V1	0.014	V1	0.004	V1
Indeno(123-cd)pyrene	0.017	0.332	V0	0.081	V0	0.005	V1
Dibenz(a,h)anthracene	0.020	0.161	V0	0.204	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.357	V0	0.062	V0	0.003	V1
Dibenzo(a,l)pyrene	0.024	0.052	V0	0.014	V1	0.004	V1
Dibenzo(a,i)pyrene	0.025	0.016	V1	0.021	V1	0.004	V1
Dibenzo(a,h)pyrene	0.020	0.024	V0	0.025	V0	0.002	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	13-Jan		13-Jan		13-Jan	
	Total Air Volume (m ³)	315.99		316		316	
	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	13.594	V0	31.430	V0	0.052	V0
Acenaphthylene	0.011	4.724	V0	10.184	V0	0.043	V0
Acenaphthene	0.006	0.798	V0	2.844	V0	0.015	V0
Fluorene	0.007	1.676	V0	3.415	V0	0.022	V0
Phenanthrene	0.007	4.764	V0	10.659	V0	0.023	V0
Anthracene	0.017	0.339	V0	0.916	V0	0.010	V1
Acridine	0.019	0.085	V0	0.040	V0	0.007	V1
Fluoranthene	0.007	0.473	V0	1.213	V0	0.006	V1
Pyrene	0.008	0.952	V0	1.670	V0	0.011	V0
Benzo(c)phenanthrene	0.015	0.033	V0	0.066	V0	0.005	V1
Benz(a)anthracene	0.014	0.361	V0	0.255	V0	0.009	V1
Chrysene	0.013	0.708	V0	0.532	V0	0.009	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.023	V0	0.035	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.250	V0	0.335	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.250	V0	0.335	V0	0.004	V1
Benzo(a)pyrene	0.016	0.168	V0	0.182	V0	0.002	V1
3-Methylcholanthrene	0.022	0.019	V1	0.015	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.115	V0	0.160	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.247	V0	0.279	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.204	V0	0.143	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.035	V0	0.032	V0	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.019	V1	0.014	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.007	V1	0.006	V1	0.002	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14			
Sample Date	13-Jan			13-Jan		13-Jan	
Total Air Volume (m ³)	316.02			316		316	
Compound Name	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	38.820	V0	10.937	V0	0.052	V0
Acenaphthylene	0.011	6.562	V0	0.855	V0	0.043	V0
Acenaphthene	0.006	3.298	V0	0.342	V0	0.015	V0
Fluorene	0.007	3.059	V0	1.157	V0	0.022	V0
Phenanthrene	0.007	9.080	V0	1.987	V0	0.023	V0
Anthracene	0.017	0.682	V0	0.160	V0	0.010	V1
Acridine	0.019	0.039	V0	0.008	V1	0.007	V1
Fluoranthene	0.007	1.077	V0	0.365	V0	0.006	V1
Pyrene	0.008	1.570	V0	0.292	V0	0.011	V0
Benzo(c)phenanthrene	0.015	0.045	V0	0.006	V1	0.005	V1
Benz(a)anthracene	0.014	0.127	V0	0.033	V0	0.009	V1
Chrysene	0.013	0.267	V0	0.156	V0	0.009	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.008	V1	0.006	V1	0.002	V1
Benzo(b)fluoranthene	0.020	0.194	V0	0.076	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.195	V0	0.077	V0	0.004	V1
Benzo(a)pyrene	0.016	0.046	V0	0.008	V1	0.002	V1
3-Methylcholanthrene	0.022	0.008	V1	0.001	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.066	V0	0.023	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.028	V0	0.107	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.115	V0	0.072	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.015	V1	0.011	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.007	V1	0.008	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.009	V1	0.005	V1	0.002	V1



Station Name	Bertha Ganter -							
	Station #	Fort McKay	AMS 1	AMS 1	Patricia McInnes	AMS 6	AMS 6	Travel Blank
Sample Date		19-Jan	19-Jan	19-Jan	19-Jan	19-Jan	19-Jan	19-Jan
Total Air Volume (m ³)		315.99	315.99	315.99	315.99	315.99	316	316
Compound Name	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	
Naphthalene	0.008	9.230	V0	15.484	V0	0.045	V0	
Acenaphthylene	0.011	7.326	V0	6.609	V0	0.028	V0	
Acenaphthene	0.006	1.140	V0	1.413	V0	0.004	V1	
Fluorene	0.007	1.421	V0	2.020	V0	0.011	V0	
Phenanthrene	0.007	4.360	V0	6.740	V0	0.032	V0	
Anthracene	0.017	0.285	V0	0.824	V0	0.016	V1	
Acridine	0.019	0.003	V1	0.068	V0	0.007	V1	
Fluoranthene	0.007	0.520	V0	0.593	V0	0.014	V0	
Pyrene	0.008	0.678	V0	1.125	V0	0.009	V0	
Benzo(c)phenanthrene	0.015	0.012	V1	0.038	V0	0.005	V1	
Benz(a)anthracene	0.014	0.045	V0	0.164	V0	0.007	V1	
Chrysene	0.013	0.163	V0	0.374	V0	0.005	V1	
7,12-Dimethylbenz(a)anthracene	0.013	0.002	V1	0.013	V1	0.003	V1	
Benzo(b)fluoranthene	0.020	0.113	V0	0.184	V0	0.005	V1	
Benzo(k)fluoranthene	0.013	0.113	V0	0.165	V0	0.005	V1	
Benzo(a)pyrene	0.016	0.004	V1	0.043	V0	0.001	V1	
3-Methylcholanthrene	0.022	0.009	V1	0.008	V1	0.003	V1	
Indeno(123-cd)pyrene	0.017	0.042	V0	0.066	V0	0.002	V1	
Dibenz(a,h)anthracene	0.020	0.019	V1	0.074	V0	0.002	V1	
Benzo(ghi)perylene	0.020	0.019	V1	0.116	V0	0.004	V1	
Dibenzo(a,l)pyrene	0.024	0.011	V1	0.009	V1	0.002	V1	
Dibenzo(a,i)pyrene	0.025	0.009	V1	0.007	V1	0.003	V1	
Dibenzo(a,h)pyrene	0.020	0.009	V1	0.017	V1	0.003	V1	



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		19-Jan	
Sample Date	19-Jan			19-Jan		19-Jan	
Total Air Volume (m ³)	306.59			315.99		316	
Compound Name	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	11.721	V0	28.757	V0	0.045	V0
Acenaphthylene	0.011	1.056	V0	9.741	V0	0.028	V0
Acenaphthene	0.006	0.635	V0	2.070	V0	0.004	V1
Fluorene	0.007	1.575	V0	3.097	V0	0.011	V0
Phenanthrene	0.007	4.481	V0	8.825	V0	0.032	V0
Anthracene	0.017	0.336	V0	0.483	V0	0.016	V1
Acridine	0.019	0.015	V1	0.145	V0	0.007	V1
Fluoranthene	0.007	0.370	V0	0.763	V0	0.014	V0
Pyrene	0.008	0.650	V0	1.689	V0	0.009	V0
Benzo(c)phenanthrene	0.015	0.028	V0	0.163	V0	0.005	V1
Benz(a)anthracene	0.014	0.151	V0	1.065	V0	0.007	V1
Chrysene	0.013	0.256	V0	0.681	V0	0.005	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.007	V1	0.100	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.109	V0	0.254	V0	0.005	V1
Benzo(k)fluoranthene	0.013	0.110	V0	0.420	V0	0.005	V1
Benzo(a)pyrene	0.016	0.074	V0	0.123	V0	0.001	V1
3-Methylcholanthrene	0.022	0.003	V1	0.031	V0	0.003	V1
Indeno(123-cd)pyrene	0.017	0.103	V0	0.354	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.127	V0	0.200	V0	0.002	V1
Benzo(ghi)perylene	0.020	0.111	V0	0.152	V0	0.004	V1
Dibenzo(a,l)pyrene	0.024	0.015	V1	0.021	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.022	V1	0.018	V1	0.003	V1
Dibenzo(a,h)pyrene	0.020	0.008	V1	0.021	V0	0.003	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	25-Jan		25-Jan		25-Jan	
Total Air Volume (m ³)	316		315.99		316		
MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	
Naphthalene	0.008	19.075	V0	42.692	V0	0.055	V0
Acenaphthylene	0.011	7.789	V0	11.666	V0	0.014	V0
Acenaphthene	0.006	0.984	V0	3.018	V0	0.009	V0
Fluorene	0.007	2.669	V0	4.478	V0	0.014	V0
Phenanthrene	0.007	8.035	V0	8.881	V0	0.020	V0
Anthracene	0.017	0.682	V0	0.785	V0	0.006	V1
Acridine	0.019	0.052	V0	0.152	V0	0.007	V1
Fluoranthene	0.007	0.654	V0	1.175	V0	0.004	V1
Pyrene	0.008	1.183	V0	1.813	V0	0.017	V0
Benzo(c)phenanthrene	0.015	0.085	V0	0.073	V0	0.003	V1
Benz(a)anthracene	0.014	0.278	V0	0.716	V0	0.006	V1
Chrysene	0.013	0.376	V0	0.488	V0	0.007	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.034	V0	0.051	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.312	V0	0.417	V0	0.006	V1
Benzo(k)fluoranthene	0.013	0.350	V0	0.624	V0	0.005	V1
Benzo(a)pyrene	0.016	0.112	V0	0.179	V0	0.003	V1
3-Methylcholanthrene	0.022	0.025	V0	0.042	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.131	V0	0.107	V0	0.004	V1
Dibenz(a,h)anthracene	0.020	0.096	V0	0.145	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.159	V0	0.217	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.019	V1	0.043	V0	0.003	V1
Dibenzo(a,i)pyrene	0.025	0.018	V1	0.082	V0	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.017	V1	0.021	V0	0.001	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14			
Sample Date	25-Jan			25-Jan		25-Jan	
Total Air Volume (m ³)	316.02			316		316	
Compound Name	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	29.865	V0	14.815	V0	0.055	V0
Acenaphthylene	0.011	9.248	V0	0.520	V0	0.014	V0
Acenaphthene	0.006	1.963	V0	0.810	V0	0.009	V0
Fluorene	0.007	2.840	V0	1.504	V0	0.014	V0
Phenanthrene	0.007	7.154	V0	1.824	V0	0.020	V0
Anthracene	0.017	0.620	V0	0.150	V0	0.006	V1
Acridine	0.019	0.013	V1	0.028	V0	0.007	V1
Fluoranthene	0.007	1.057	V0	0.178	V0	0.004	V1
Pyrene	0.008	1.965	V0	0.298	V0	0.017	V0
Benzo(c)phenanthrene	0.015	0.048	V0	0.030	V0	0.003	V1
Benz(a)anthracene	0.014	0.249	V0	0.040	V0	0.006	V1
Chrysene	0.013	0.475	V0	0.200	V0	0.007	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.013	V1	0.005	V1	0.002	V1
Benzo(b)fluoranthene	0.020	0.410	V0	0.125	V0	0.006	V1
Benzo(k)fluoranthene	0.013	0.411	V0	0.125	V0	0.005	V1
Benzo(a)pyrene	0.016	0.149	V0	0.036	V0	0.003	V1
3-Methylcholanthrene	0.022	0.007	V1	0.015	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.182	V0	0.075	V0	0.004	V1
Dibenz(a,h)anthracene	0.020	0.107	V0	0.106	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.199	V0	0.035	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.024	V0	0.015	V1	0.003	V1
Dibenzo(a,i)pyrene	0.025	0.018	V1	0.062	V0	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.012	V1	0.035	V0	0.001	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	31-Jan		31-Jan		31-Jan	
	Total Air Volume (m ³)	316		316.01		316	
	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	9.641	V0	6.683	V0	0.064	V0
Acenaphthylene	0.011	1.222	V0	0.576	V0	0.028	V0
Acenaphthene	0.006	0.806	V0	0.254	V0	0.013	V0
Fluorene	0.007	1.289	V0	1.839	V0	0.011	V0
Phenanthrene	0.007	1.936	V0	2.353	V0	0.015	V0
Anthracene	0.017	0.138	V0	0.209	V0	0.009	V1
Acridine	0.019	0.033	V0	0.184	V0	0.002	V1
Fluoranthene	0.007	0.433	V0	0.956	V0	0.010	V0
Pyrene	0.008	0.522	V0	0.373	V0	0.005	V1
Benzo(c)phenanthrene	0.015	0.030	V0	0.032	V0	0.004	V1
Benz(a)anthracene	0.014	0.123	V0	0.077	V0	0.004	V1
Chrysene	0.013	0.384	V0	0.190	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.053	V0	0.058	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.193	V0	0.104	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.193	V0	0.104	V0	0.006	V1
Benzo(a)pyrene	0.016	0.126	V0	0.052	V0	0.003	V1
3-Methylcholanthrene	0.022	0.006	V1	0.006	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.165	V0	0.039	V0	0.003	V1
Dibenz(a,h)anthracene	0.020	0.406	V0	0.131	V0	0.002	V1
Benzo(ghi)perylene	0.020	0.137	V0	0.020	V0	0.001	V1
Dibenzo(a,l)pyrene	0.024	0.021	V1	0.010	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.060	V0	0.032	V0	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.015	V1	0.029	V0	0.002	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14			
Sample Date	31-Jan			31-Jan		31-Jan	
Total Air Volume (m ³)	316.01			316		316	
Compound Name	MDL (ng/m ³)	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag	Results (ng/m ³)	QC Flag
Naphthalene	0.008	13.780	V0	3.346	V0	0.064	V0
Acenaphthylene	0.011	2.239	V0	0.445	V0	0.028	V0
Acenaphthene	0.006	0.563	V0	0.191	V0	0.013	V0
Fluorene	0.007	1.138	V0	0.343	V0	0.011	V0
Phenanthrene	0.007	2.305	V0	1.427	V0	0.015	V0
Anthracene	0.017	0.145	V0	0.165	V0	0.009	V1
Acridine	0.019	0.073	V0	0.126	V0	0.002	V1
Fluoranthene	0.007	0.363	V0	0.323	V0	0.010	V0
Pyrene	0.008	0.445	V0	0.320	V0	0.005	V1
Benzo(c)phenanthrene	0.015	0.007	V1	0.030	V0	0.004	V1
Benz(a)anthracene	0.014	0.136	V0	0.057	V0	0.004	V1
Chrysene	0.013	0.083	V0	0.206	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.024	V0	0.028	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.142	V0	0.090	V0	0.003	V1
Benzo(k)fluoranthene	0.013	0.143	V0	0.090	V0	0.006	V1
Benzo(a)pyrene	0.016	0.033	V0	0.079	V0	0.003	V1
3-Methylcholanthrene	0.022	0.007	V1	0.033	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.084	V0	0.098	V0	0.003	V1
Dibenz(a,h)anthracene	0.020	0.051	V0	0.137	V0	0.002	V1
Benzo(ghi)perylene	0.020	0.075	V0	0.070	V0	0.001	V1
Dibenzo(a,l)pyrene	0.024	0.009	V1	0.018	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.067	V0	0.063	V0	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.028	V0	0.016	V1	0.002	V1



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Polycyclic Aromatic Hydrocarbons (PAHs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 Jan 01 - Jan 31	Bertha Ganter - Fort McKay AMS 1 Jan 01 - Jan 31	Bertha Ganter - Fort McKay AMS 1 Jan 01 - Jan 31	Bertha Ganter - Fort McKay AMS 1 Jan 01 - Jan 31
	Average ng/m ³	Std Dev ng/m ³	Total Samples (#)	Total ≥ MDL (#)
Compound Name				
Naphthalene	16.532	7.047	6	6
Acenaphthylene	4.280	2.795	6	6
Acenaphthene	1.251	0.746	6	6
Fluorene	1.637	0.550	6	6
Phenanthrene	4.642	1.982	6	6
Anthracene	0.395	0.207	6	6
Acridine	0.059	0.044	6	5
Fluoranthene	0.638	0.203	6	6
Pyrene	0.900	0.250	6	6
Benzo(c)phenanthrene	0.062	0.046	6	5
Benz(a)anthracene	0.262	0.155	6	6
Chrysene	0.415	0.175	6	6
7,12-Dimethylbenz(a)anthracene	0.026	0.017	6	5
Benzo(b)fluoranthene	0.268	0.115	6	6
Benzo(k)fluoranthene	0.212	0.090	6	6
Benzo(a)pyrene	0.155	0.111	6	5
3-Methylcholanthrene	0.015	0.007	6	1
Indeno(123-cd)pyrene	0.166	0.111	6	6
Dibenz(a,h)anthracene	0.186	0.147	6	5
Benzo(ghi)perylene	0.166	0.099	6	5
Dibenzo(a,l)pyrene	0.023	0.010	6	2
Dibenzo(a,i)pyrene	0.023	0.018	6	1
Dibenzo(a,h)pyrene	0.012	0.004	6	0



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
Polycyclic Aromatic Hydrocarbons (PAHs) - Summary

2017
Indicated Sites and Dates

Station Name Station # Sample Date	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
	AMS 6	AMS 6	AMS 6	AMS 6
	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
Compound Name	Average ng/m ³	Std Dev ng/m ³	Total Samples (#)	Total ≥ MDL (#)
Naphthalene	25.277	14.787	6	6
Acenaphthylene	5.355	4.829	6	6
Acenaphthene	1.942	1.213	6	6
Fluorene	2.390	1.313	6	6
Phenanthrene	5.857	3.467	6	6
Anthracene	0.570	0.311	6	6
Acridine	0.109	0.078	6	5
Fluoranthene	0.896	0.328	6	6
Pyrene	1.058	0.614	6	6
Benzo(c)phenanthrene	0.064	0.031	6	6
Benz(a)anthracene	0.267	0.231	6	6
Chrysene	0.365	0.148	6	6
7,12-Dimethylbenz(a)anthracene	0.035	0.019	6	4
Benzo(b)fluoranthene	0.224	0.132	6	6
Benzo(k)fluoranthene	0.241	0.209	6	6
Benzo(a)pyrene	0.111	0.067	6	6
3-Methylcholanthrene	0.016	0.013	6	1
Indeno(123-cd)pyrene	0.105	0.067	6	6
Dibenz(a,h)anthracene	0.124	0.085	6	6
Benzo(ghi)perylene	0.157	0.093	6	6
Dibenzo(a,l)pyrene	0.023	0.014	6	3
Dibenzo(a,i)pyrene	0.028	0.028	6	2
Dibenzo(a,h)pyrene	0.017	0.008	6	2



Compound Name	Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
	Station #	AMS 7	AMS 7	AMS 7	AMS 7
	Sample Date	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31	Jan 01 - Jan 31
		Average ng/m ³	Std Dev ng/m ³	Total Samples (#)	Total ≥ MDL (#)
Naphthalene		22.991	11.125	6	6
Acenaphthylene		3.790	3.324	6	6
Acenaphthene		1.650	1.004	6	6
Fluorene		1.925	0.851	6	6
Phenanthrene		5.179	2.522	6	6
Anthracene		0.418	0.200	6	6
Acridine		0.047	0.042	6	4
Fluoranthene		0.763	0.415	6	6
Pyrene		1.041	0.687	6	6
Benzo(c)phenanthrene		0.053	0.038	6	5
Benz(a)anthracene		0.191	0.138	6	6
Chrysene		0.302	0.202	6	6
7,12-Dimethylbenz(a)anthracene		0.018	0.014	6	3
Benzo(b)fluoranthene		0.221	0.125	6	6
Benzo(k)fluoranthene		0.193	0.111	6	6
Benzo(a)pyrene		0.107	0.095	6	6
3-Methylcholanthrene		0.009	0.005	6	0
Indeno(123-cd)pyrene		0.141	0.102	6	6
Dibenz(a,h)anthracene		0.087	0.052	6	6
Benzo(ghi)perylene		0.163	0.104	6	6
Dibenzo(a,l)pyrene		0.022	0.016	6	2
Dibenzo(a,i)pyrene		0.024	0.022	6	1
Dibenzo(a,h)pyrene		0.016	0.009	6	2



Station Name Station # Sample Date	Anzac AMS 14 Jan 01 - Jan 31 Average ng/m ³	Anzac AMS 14 Jan 01 - Jan 31 Std Dev ng/m ³	Anzac AMS 14 Jan 01 - Jan 31 Total Samples (#)	Anzac AMS 14 Jan 01 - Jan 31 Total ≥ MDL (#)
Compound Name				
Naphthalene	17.321	10.007	6	6
Acenaphthylene	2.338	3.645	6	6
Acenaphthene	0.854	0.732	6	6
Fluorene	1.461	0.922	6	6
Phenanthrene	3.071	2.833	6	6
Anthracene	0.225	0.131	6	6
Acridine	0.082	0.060	6	5
Fluoranthene	0.525	0.278	6	6
Pyrene	0.558	0.556	6	6
Benzo(c)phenanthrene	0.062	0.056	6	5
Benz(a)anthracene	0.248	0.403	6	6
Chrysene	0.316	0.196	6	6
7,12-Dimethylbenz(a)anthracene	0.029	0.036	6	4
Benzo(b)fluoranthene	0.132	0.063	6	6
Benzo(k)fluoranthene	0.151	0.133	6	6
Benzo(a)pyrene	0.061	0.039	6	5
3-Methylcholanthrene	0.019	0.012	6	2
Indeno(123-cd)pyrene	0.132	0.118	6	6
Dibenz(a,h)anthracene	0.145	0.046	6	6
Benzo(ghi)perylene	0.091	0.051	6	6
Dibenzo(a,l)pyrene	0.019	0.008	6	1
Dibenzo(a,i)pyrene	0.037	0.024	6	3
Dibenzo(a,h)pyrene	0.021	0.010	6	4



Wood Buffalo Environmental Association

PAH Summary (ng/m³)

2017 January

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99% Max.	Mean	Std. Dev.	Median	Outlier Test	
3-Methylcholanthrene	17%	24	20	0.0011	0.0056	0.0079	0.0145	0.0151	0.0195	0.0213	0.0306	0.0330	0.0421	0.0421	0.0150	0.0099	0.0145	0.0646
7,12-Dimethylbenz(a)anthracene	67%	24	8	0.0016	0.0056	0.0129	0.0226	0.0241	0.0397	0.0431	0.0535	0.0577	0.0999	0.0999	0.0271	0.0223	0.0226	0.1386
Acenaphthene	100%	24	0	0.1907	0.3420	0.7980	1.1404	1.4134	2.0697	2.7504	3.0183	3.1177	3.2982	3.2982	1.4243	0.9761	1.1404	6.3050
Acenaphthylene	100%	24	0	0.4446	0.5763	1.2223	2.0349	2.5872	7.3261	7.7893	9.7409	10.1836	11.6660	11.6660	3.9409	3.6450	2.0349	22.1659
Acridine	79%	24	5	0.0035	0.0131	0.0281	0.0523	0.0732	0.1317	0.1346	0.1520	0.1844	0.1943	0.1943	0.0741	0.0591	0.0523	0.3698
Anthracene	100%	24	0	0.1380	0.1471	0.2089	0.3359	0.3911	0.6202	0.6821	0.7845	0.8236	0.9155	0.9155	0.4020	0.2419	0.3359	1.6115
Benz(a)anthracene	100%	24	0	0.0330	0.0433	0.1232	0.1513	0.2493	0.2931	0.3612	0.4698	0.7157	1.0646	1.0646	0.2419	0.2393	0.1513	1.4386
Benzo(a)pyrene	92%	24	2	0.0042	0.0330	0.0518	0.0787	0.1229	0.1681	0.1742	0.1822	0.2814	0.3427	0.3427	0.1083	0.0840	0.0787	0.5282
Benzo(b)fluoranthene	100%	24	0	0.0762	0.0895	0.1195	0.1926	0.2235	0.3120	0.3346	0.4101	0.4174	0.4497	0.4497	0.2113	0.1159	0.1926	0.7906
Benzo(c)phenanthrene	88%	24	3	0.0061	0.0118	0.0301	0.0573	0.0660	0.0772	0.0851	0.1172	0.1347	0.1632	0.1632	0.0600	0.0408	0.0573	0.2638
Benzo(ghi)perylene	96%	24	1	0.0187	0.0346	0.0754	0.1435	0.1520	0.1993	0.2043	0.2947	0.3226	0.3573	0.3573	0.1442	0.0887	0.1435	0.5879
Benzo(k)fluoranthene	100%	24	0	0.0716	0.0899	0.1098	0.1443	0.1719	0.2504	0.3354	0.4108	0.4201	0.6238	0.6238	0.1993	0.1374	0.1443	0.8862
Chrysene	100%	24	0	0.0834	0.1559	0.2004	0.3755	0.3877	0.4754	0.4879	0.6043	0.6808	0.7083	0.7083	0.3497	0.1752	0.3755	1.2256
Dibenz(a,h)anthracene	96%	24	1	0.0188	0.0461	0.0735	0.1137	0.1312	0.1996	0.2042	0.2720	0.2788	0.4063	0.4063	0.1353	0.0930	0.1137	0.6005
Dibenzo(a,h)pyrene	33%	24	16	0.0051	0.0066	0.0108	0.0150	0.0167	0.0245	0.0246	0.0281	0.0290	0.0353	0.0353	0.0164	0.0081	0.0150	0.0567
Dibenzo(a,i)pyrene	29%	24	17	0.0072	0.0081	0.0143	0.0184	0.0191	0.0488	0.0599	0.0627	0.0674	0.0823	0.0823	0.0280	0.0224	0.0184	0.1398
Dibenzo(a,l)pyrene	33%	24	16	0.0091	0.0103	0.0147	0.0182	0.0211	0.0321	0.0341	0.0358	0.0428	0.0522	0.0522	0.0218	0.0115	0.0182	0.0793
Fluoranthene	100%	24	0	0.1777	0.3627	0.4328	0.6537	0.8091	1.0369	1.0568	1.1753	1.2133	1.2720	1.2720	0.7056	0.3266	0.6537	2.3388
Fluorene	100%	24	0	0.3432	1.0195	1.1568	1.6561	1.7193	2.6691	2.8404	3.0973	3.4150	4.4781	4.4781	1.8532	0.9548	1.6561	6.6274
Indeno(123-cd)pyrene	100%	24	0	0.0225	0.0423	0.0749	0.1072	0.1314	0.1672	0.1823	0.3318	0.3540	0.3723	0.3723	0.1360	0.0971	0.1072	0.6215
Naphthalene	100%	24	0	3.3459	9.2301	13.5945	17.4558	20.2162	29.1832	29.8654	38.8203	39.9119	42.6919	42.6919	20.5302	11.0147	17.4558	75.6036
Phenanthrene	100%	24	0	1.4268	1.9355	2.3047	4.3596	4.7637	7.1538	8.0347	8.8813	9.0795	10.6587	10.6587	4.6872	2.7743	4.3596	18.5589
Pyrene	100%	24	0	0.2566	0.2977	0.3789	0.9519	0.9903	1.3585	1.5696	1.6887	1.8134	1.9647	1.9647	0.8891	0.5544	0.9519	3.6610



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

INTEGRATED MONITORING PROGRAM MONTHLY REPORT

PRECIPITATION DATA SUMMARY JANUARY 2017

Prepared
March 30, 2017

SAMPLE COLLECTION AND DATA COMPILATION BY:

Wood Buffalo Environmental Association
Fort McMurray, Alberta

LABORATORY ANALYSIS BY:

Precipitation: InnoTech Alberta, Inc.
Vegreville, Alberta



FILE CONTENTS DESCRIPTION	Precipitation Measurement of ions, pH and conductivity	
SAMPLING INTERVAL	A week	
SAMPLING FREQUENCY OF DATA	Weekly	
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection	
UNITS	mg/L (milligram per liter)	
OBSERVATION TYPE	Wet Precipitation Measurement of ions, pH and conductivity	
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	moveable cover with precipitation sensors	
MEDIUM	Polyethylene Collection bucket	
ANALYTICALMETHODS	pH by pH meter Conductivity by Conductivity meter IONS by Ion Chromatography (IC)	
ANALYTICAL LABORATORY	InnoTech Alberta Inc	
USER NOTE 1	Data are not blank corrected	
SAMPLING INSTRUMENT TYPE	2000-2016 March	MIC precipitation collector
	2016 March- 2016 Sep	NTN Precip N-CON Sampler Total Precipitation Collector (TPC-3000)
	2016 Sep- current	
FLAGS USED		
M1	Missing value because no value is available	
M2	Missing value because invalidated by Data Originator	



		Compound unit	Acidity $\mu\text{eq/L}$	Ammonium mg/L	Bicarbonate $\mu\text{eq/L}$	Calcium mg/L	Chloride mg/L	Conductivity (25°C) $\mu\text{S/cm}$	Magnesium mg/L	Nitrate mg/L	pH	Phosphate mg/L	Potassium mg/L	Sodium mg/L	Sulfate mg/L	
START DATE	END DATE	DRY WEEK	PRECIP													
03-Jan-17	12-Jan-17	X	15	0.015	94.4	1.47	0.882	16	0.246	1.27	7.27	< 0.015	0.135	0.533	1.44	
12-Jan-17	17-Jan-17	X	M1	M1	M1	M1	M1	M1	M1	M1	6.46	M1	M1	M1	M1	
17-Jan-17	24-Jan-17	X	M1	0.295	18.8	2.28	0.855	M1	0.267	2.65	6.57	<0.015	0.195	0.687	1.58	
24-Jan-17	02-Feb-17	X	M1	0.069	77.3	2.65	1.25	M1	0.284	1.56	7.18	<0.015	0.186	0.849	1.09	



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