



Wood Buffalo Environmental Association

FEBRUARY 2016 MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
March 24, 2016

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



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March 24, 2016

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**RE: Monthly Ambient Air Quality Monitoring Report February 2016
Wood Buffalo Environmental Association**

Enclosed is the February 2016 Ambient Air Quality Monitoring Report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter
AMS 2 - Mildred Lake
AMS 3 - Lower Camp B (meteorology)
AMS 4 - Buffalo Viewpoint
AMS 5 - Mannix
AMS 6 - Patricia McInnes
AMS 7 - Athabasca Valley
AMS 8 - Fort Chipewyan
AMS 9 - Barge Landing
AMS 11 - Lower Camp (air quality)
AMS 13 - Fort McKay South
AMS 14 - Anzac
AMS 15 - CNRL Horizon
AMS 16 - Shell Muskeg River
AMS 17 - Wapasu
AMS 18 - Conklin Lookout
AMS 19 - Firebag
AMS 20 - Brion MacKay River
AMS 500 - Cenovus Christina Lake
AMS 501 - Statoil Leismer
AMS 502 - ConocoPhillips Surmont

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

Member	EPEA Approval No.
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01



Member	EPEA Approval No.
Cenovus Energy	48522-01-00
Connacher Oil and Gas Ltd.	240008-00-03
ConocoPhillips Canada	48263-00-00
Devon Canada Corporation	224816-00-03
Finning Canada Ltd.	Not Applicable
Hammerstone Corporation	189942-00-02
Husky Oil Operations Ltd.	206355-00-00
Imperial Oil Ltd.	00046586-00-00
MEG Energy Corporation	00216466-00-04
Nexen Energy ULC.	137467-00-00
Shell Canada Energy	20809-01-00
Statoil Canada Ltd.	241311-00-02
Suncor Energy Inc.	094-02-00
Sunshine Oilsands Ltd.	305529-00-00
Syncrude Canada Ltd.	026-02-00
Teck Resources Ltd.	EIA Application
Total E&P Canada Ltd.	228044-00-00
Williams Energy (Canada) Inc.	73203-01-00

Aboriginal Communities

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

Government and Non-Industrial Organizations

Alberta Energy Regulator
Alberta Environment & 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

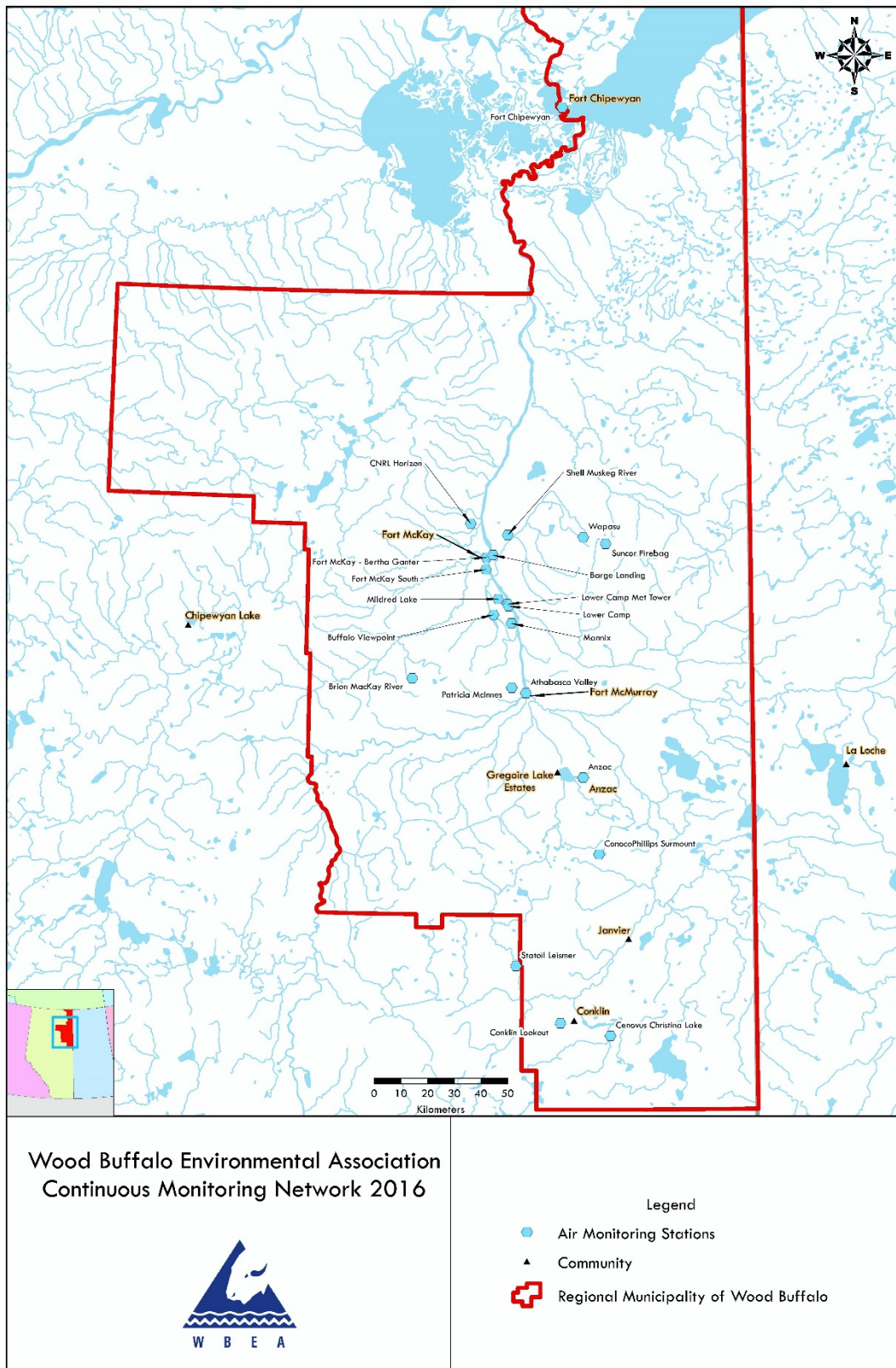


Figure 1: Map of WBEA Air Monitoring Network.

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 SO₂, CO, NO₂, NH₃, O₃, and PM_{2.5}.

There were 7 H₂S ambient ground level concentrations in excess of the 1-hour and 24-hour H₂S air quality objectives reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there were 4 concentration in excess of the 1-hour H₂S air quality objective. There were one 1-hour and two 24-hour objective exceedances reported in real-time that were found not to be in exceedance after data processing.

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

<u>Site</u>	<u>Parameter</u>	<u>Date / Time</u>	<u>Reference</u>	<u>Period</u>	Concentration ppb or ug/m ³		<u>Status</u>
					<u>Reported</u>	<u>Final</u>	
AMS 5 Mannix	H ₂ S	11Feb16:24:00	308232	24hr	3	3	nae
AMS 5 Mannix	H ₂ S	22Feb16:02:00	308506	1hr	16	16	exc
AMS 5 Mannix	H ₂ S	22Feb16:05:00	308506	1hr	10	10	nae
AMS 5 Mannix	H ₂ S	22Feb16:06:00	308506	1hr	17	17	exc
AMS 5 Mannix	H ₂ S	22Feb16:24:00	308506	24hr	3	3	nae
AMS 11 Lower Camp	H ₂ S	08Feb16:15:00	308091	1hr	15	15	exc
AMS 11 Lower Camp	H ₂ S	08Feb16:16:00	308091	1hr	13	13	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 AEMERA Airdata Warehouse

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

On January 22, 2016, the CASA Data Warehouse was transitioned to the AEMERA airdata warehouse. The data warehouse contains archived, historical data for which quality assurance processes have been completed. This data is at least one month old and for some stations, extends back to 1986. The website address is airdata.aemera.org.

2.0 Operational Status

Continuous Monitoring

In February 2016, there were no incidents resulting in compliance monitoring instruments operating less than 90% of the time.

In February 2016, there were two incidents of a monitoring instrument not required for air quality compliance operating less than 90% of the time.

1. The 167m wind sensors at AMS 3 – Lower Camp Met Tower had 102 hours of invalid data due to freezing temperatures and ice buildup.
2. The 75m wind sensors at AMS 5 – Mannix had 91 hours of invalid data due to freezing temperatures and ice buildup.

Intermittent Monitoring

The results for passive and integrated monitoring of PAH, VOC, RSC, PM_{2.5} and PM₁₀ samples were not available in time for submission with this report. These results will be submitted at a later date.

3.0 Monitoring Notes

General Network Notes

The Ammonia (NH₃) analyzer currently operates on a 0 to 2500 ppb operating range with a detection level of 5 ppb in the WBEA network. In data processing, values less than 5 ppb have been considered below detection levels and are reported as zero.

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

Station 1, Fort McKay - Bertha Ganter

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. Additional time for stabilization after exposure to high concentrations of NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 to 2 hours following the daily spans have been reported as invalid for a total of 43 hours this month. Maintenance on the daily zero and span systems and verification of analyzer response on February 7 interrupted the normal operations of the NH₃ analyzer for 2 hours.

Maintenance on the daily zero and span systems and verification of analyzers responses on February 14 interrupted the normal operations of the SO₂, THC, and NO₂ analyzers for 2 hours.

Maintenance to condition the GC column on February 18 affected the normal operations of the THC analyzer for 20 hours.

Maintenance and cleaning of the sample manifold on February 22 interrupted the normal operations of the SO₂, TRS, THC, O₃, and NH₃ analyzers for 1 hour.

Unstable operation due to negative baseline drift on February 25 affected the normal operations of the PM_{2.5} analyzer for 2 hours.

A station power outage on February 29 interrupted the normal operations of all air quality analyzers for 4 hours.

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

The NO₂ analyzer underwent preventative maintenance in December of 2015 with a gradual decrease in performance noted month to month during routine calibrations. A calibration on February 22 to address decreasing daily spans showed the as found span point to be 10.7% low from the previous calibration. Subsequent investigations indicated a small leak in the sample exhaust system was source of the issue. The leak was resolved and follow-up calibrations were performed on the analyzer to ensure data integrity.

Station 2, Mildred Lake

A station power outage on February 29 interrupted the normal operations of all air quality analyzers for 4 hours.

Maintenance and cleaning of the sample manifold on February 2 interrupted the normal operations of the SO₂ and THC analyzers for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 69 hours of invalid data this reporting period.

Station 3, Lower Camp B - Meteorology

Flat lines in output signals of the sonic wind sensors at 20, 45, 100, and 167 m elevations resulted in 50, 8, 41, and 102 hours of downtime for each respective sensor.

Station 4, Buffalo Viewpoint

No operational issues to report this month.

Station 5, Mannix

Flat lines in output signals of the sonic wind sensors at 20, 45, 75, and 90 m elevations resulted in 14, 22, 91, and 67 hours of downtime for each respective sensor.

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 hour following each daily span has been reported as invalid for a total of 29 hours this month.

Maintenance to access the wind sensors for inventory purposes on February 1 resulted in 2 hours of invalid data.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on February 1 interrupted the normal operations of the TRS, O₃, and CO analyzers for 2 hours.

A station power outage on February 21 interrupted the normal operations of all air quality analyzers for 2 to 3 hours.

Maintenance to access the wind sensors for inventory purposes on February 1 resulted in 1 hour of invalid data. Flat-lines in the output signal of the wind sensor resulted in 3 hours of invalid data this reporting period.

Station 8, Fort Chipewyan

Confirmation of analyzer response prior to maintenance to the calibration system on February 2 interrupted the normal operations of the O₃ analyzer for 3 hours.

Maintenance and replacement of the O₃ analyzer sample pump and a follow-up calibration between February 14 and 15 resulted in 20 hours of downtime.

Flat-lines in the output signal of the wind sensor resulted in 38 hours of invalid data this reporting period. The sensor was replaced on February 2 during a routine site visit for calibrations and maintenance.

Station 9, Barge Landing

A station power outage on February 29 interrupted the normal operations of all air quality analyzers for 4 hours.

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

Station 11, Lower Camp

No operational issues to report this month.

Station 13, Fort McKay South

A station power outage on February 29 interrupted the normal operations of all air quality analyzers for 4 hours.

Maintenance to access the wind sensors for inventory purposes on February 17 resulted in 1 hour of invalid data. Flat-lines in the output signal of the wind sensor resulted in 17 hours of invalid data this reporting period.

Station 14, Anzac

The SO₂ analyzer experienced a single episode of unstable operations due to excessive baseline drift on February 12 resulting in 4 hours of invalid data.

The automated calibration system required resets on February 19 and 28 following station power spikes. Verification of the daily zero and span response interrupted the routine operations of all air quality analyzers for 1-2 hours on the above dates.

Flat-lines in the output signal of the wind sensor resulted in 7 hours of invalid data this reporting period. Maintenance to replace the wind sensors due to frequent ice-up on February 22 interrupted the routine operations of the wind sensors for 2 hours.

Station 15, CNRL Horizon

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

Station 16, Shell Muskeg River

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

Station 17, Wapasu

Depletion and replacement of the fuel cylinder at the station on February 24 interrupted the normal operations of the THC analyzer for 2 hours.

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

Station 18, Conklin Lookout

No operational issues to report this month.

Station 19, Firebag

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

Station 20, Brion MacKay River

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

Station 500, Cenovus Christina Lake

Maintenance and cleaning of the sample manifold on February 18 interrupted the normal operations of the SO₂ and NO₂ analyzers for 1 hour.

Verification of the daily zero and span response on February 29 interrupted the routine operations of the NO₂ analyzer for 1 hour.

Station 501, Statoil Leismer

A station power outage on February 3 interrupted the normal operations of all air quality analyzers for 2 hours.

The SO₂ analyzer experienced multiple instances of unstable operations due to excessive baseline drift resulting in 24 hours of invalid data this reporting period.

There were two issues associated with the operation of the H₂S analyzer resulting in 4 hours of invalid data. The H₂S analyzer experienced multiple episodes of unstable baseline drifts during previous reporting periods and for 1 hour this month. As a result, it was replaced during routine monthly calibrations. A follow-up calibration to examine baseline response of the newly installed analyzer resulted in an additional 3 hours of downtime.

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

Station 502, ConocoPhillips Surmont

The SO₂ analyzer experienced three instances of unstable operations resulting in 14 hours of invalid data this reporting period. Unstable operations due to excessive baseline drift on February 11 resulted in 2 hours of invalid data; fluctuating shelter temperatures causing excessive baseline drift on February 28 and 29 resulted in 4 and 8 hours, respectively, of invalid data.

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

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

Yours sincerely,

Wood Buffalo Environmental Association

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 2016

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Prepared: Mar 22 2016 09:01

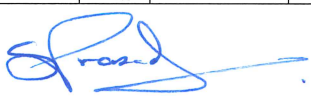
APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	2	2016					
254465-00-00							
149968-00-01							
48522-01-00	CONTINUOUS AMBIENT MONITORING						
240008-00-03				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03	SO2(ppm)	1	98.99	0.029	0	0.005	0
189942-00-02	SO2(ppm)	2	99.28	0.032	0	0.008	0
206355-00-00	SO2(ppm)	4	100.00	0.039	0	0.004	0
46586-00-00	SO2(ppm)	5	100.00	0.081	0	0.023	0
216466-00-04	SO2(ppm)	6	100.00	0.021	0	0.008	0
137467-00-00	SO2(ppm)	7	99.57	0.023	0	0.005	0
20809-01-00	SO2(ppm)	8	100.00	0.002	0	0.001	0
241311-00-00	SO2(ppm)	11	100.00	0.065	0	0.008	0
094-02-00	SO2(ppm)	13	99.43	0.021	0	0.003	0
305529-00-00	SO2(ppm)	14	99.28	0.008	0	0.002	0
026-02-00	SO2(ppm)	15	100.00	0.031	0	0.005	0
228044-00-00	SO2(ppm)	16	100.00	0.035	0	0.009	0
73203-01-00	SO2(ppm)	17	100.00	0.016	0	0.004	0
	SO2(ppm)	18	100.00	0.005	0	0.002	0
	SO2(ppm)	19	100.00	0.016	0	0.004	0
	SO2(ppm)	20	100.00	0.014	0	0.004	0
	SO2(ppm)	500	99.86	0.011	0	0.002	0
	SO2(ppm)	501	96.26	0.009	0	0.002	0
	SO2(ppm)	502	97.99	0.025	0	0.007	0
	H2S(ppm)	2	99.43	0.010	0	0.002	0
	H2S(ppm)	4	100.00	0.010	0	0.002	0
	H2S(ppm)	5	100.00	0.017	2	0.003	0
	H2S(ppm)	11	100.00	0.015	2	0.003	0
	H2S(ppm)	17	100.00	0.002	0	0.001	0
	H2S(ppm)	19	100.00	0.003	0	0.001	0
	H2S(ppm)	20	100.00	0.002	0	0.001	0
	H2S(ppm)	500	100.00	0.002	0	0.000	0
	H2S(ppm)	501	99.14	0.001	0	0.000	0
	H2S(ppm)	502	100.00	0.002	0	0.001	0
	TRS(ppm)	1	99.28	0.006	0	0.002	0
	TRS(ppm)	6	100.00	0.003	0	0.001	0
	TRS(ppm)	7	99.43	0.004	0	0.001	0
	TRS(ppm)	9	99.43	0.004	0	0.001	0
	TRS(ppm)	13	99.43	0.004	0	0.001	0
	TRS(ppm)	14	99.57	0.005	0	0.001	0
	TRS(ppm)	15	100.00	0.004	0	0.001	0
	TRS(ppm)	18	100.00	0.001	0	0.000	0
	THC(ppm)	1	96.12	3.5	-	2.7	-
	THC(ppm)	2	99.28	5.2	-	3.0	-
	THC(ppm)	4	100.00	5.3	-	3.2	-
	THC(ppm)	5	100.00	9.8	-	3.7	-
	THC(ppm)	6	100.00	2.9	-	2.1	-
	THC(ppm)	7	99.57	3.0	-	2.3	-
	THC(ppm)	9	99.43	5.1	-	3.2	-
	THC(ppm)	11	100.00	3.8	-	3.0	-
	THC(ppm)	13	99.43	4.0	-	3.0	-
	THC(ppm)	14	99.86	2.8	-	2.1	-
	THC(ppm)	15	100.00	6.5	-	3.3	-
	THC(ppm)	16	100.00	6.9	-	4.0	-
	THC(ppm)	17	99.71	3.0	-	2.4	-
	THC(ppm)	18	100.00	2.4	-	2.3	-
	THC(ppm)	19	100.00	2.9	-	2.4	-
	THC(ppm)	20	100.00	3.2	-	2.4	-
	O3(ppm)	1	99.28	0.040	0	0.032	-
	O3(ppm)	6	100.00	0.043	0	0.038	-
	O3(ppm)	7	99.28	0.039	0	0.028	-
	O3(ppm)	8	96.70	0.043	0	0.039	-

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

FEBRUARY 2016

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Prepared: Mar 22 2016 09:01

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	2	2016					
254465-00-00							
149968-00-01							
48522-01-00	CONTINUOUS AMBIENT MONITORING						
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	O3(ppm)	13	99.43	0.043	0	0.030	-
189942-00-02	O3(ppm)	14	99.57	0.047	0	0.043	-
206355-00-00	O3(ppm)	17	100.00	0.043	0	0.039	-
46586-00-00	O3(ppm)	18	100.00	0.050	0	0.048	-
216466-00-04	NO2(ppm)	1	99.14	0.033	0	0.021	-
137467-00-00	NO2(ppm)	6	100.00	0.036	0	0.015	-
20809-01-00	NO2(ppm)	7	99.57	0.045	0	0.021	-
241311-00-02	NO2(ppm)	8	100.00	0.010	0	0.004	-
094-02-00	NO2(ppm)	13	99.43	0.036	0	0.018	-
305529-00-00	NO2(ppm)	14	99.86	0.027	0	0.010	-
026-02-00	NO2(ppm)	15	100.00	0.045	0	0.025	-
228044-00-00	NO2(ppm)	16	100.00	0.066	0	0.033	-
73203-01-00	NO2(ppm)	17	100.00	0.025	0	0.011	-
	NO2(ppm)	18	100.00	0.009	0	0.007	-
	NO2(ppm)	19	100.00	0.038	0	0.013	-
	NO2(ppm)	20	100.00	0.035	0	0.020	-
	NO2(ppm)	500	99.71	0.038	0	0.009	-
	NO2(ppm)	501	99.71	0.011	0	0.005	-
	NO2(ppm)	502	100.00	0.027	0	0.012	-
	CO(ppm)	7	99.43	0.6	0	0.3	-
	NH3(ppm)	1	92.82	0.000	0	0.000	-
	NH3(ppm)	6	95.83	0.000	0	0.000	-
	PM2.5(ug/m3)	1	99.14	69.8	-	12.1	0
	PM2.5(ug/m3)	6	100.00	44.4	-	10.4	0
	PM2.5(ug/m3)	7	99.71	33.6	-	11.7	0
	PM2.5(ug/m3)	8	100.00	15.9	-	3.9	0
	PM2.5(ug/m3)	13	99.43	24.6	-	10	0
	PM2.5(ug/m3)	14	100.00	56.4	-	7.8	0
	PM2.5(ug/m3)	15	100.00	35.6	-	10.1	0
	PM2.5(ug/m3)	16	100.00	35.4	-	15.9	0
	PM2.5(ug/m3)	17	100.00	21.2	-	6.4	0
	PM2.5(ug/m3)	18	100.00	20.4	-	9.1	0
	WIND	1	100.00	-	-	-	-
	WIND	2	90.09	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	97.99	-	-	-	-
	WIND	6	99.71	-	-	-	-
	WIND	7	99.43	-	-	-	-
	WIND	8	94.11	-	-	-	-
	WIND	9	98.99	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	13	97.41	-	-	-	-
	WIND	14	98.71	-	-	-	-
	WIND	15	98.99	-	-	-	-
	WIND	16	99.86	-	-	-	-
	WIND	17	99.71	-	-	-	-
	WIND	18	100.00	-	-	-	-
	WIND	19	98.71	-	-	-	-
	WIND	20	96.55	-	-	-	-
	WIND	500	100.00	-	-	-	-
	WIND	501	99.28	-	-	-	-
	WIND	502	96.41	-	-	-	-
							
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 2016

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY - BERTHA GANTER (AMS 1)
FEBRUARY 2016

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	657	32	39	98.99	29	0	5	0
TRS(ppb) Average	658	33	38	99.28	6	0	2	0
THC(ppm) Average	637	32	59	96.12	3.5	-	2.7	-
NMHC(ppm) Average	637	32	59	96.12	0.569	-	0.223	-
CH4(ppm) Average	637	32	59	96.12	3.1	-	2.4	-
O3 (ppb) Average	658	33	38	99.28	40	0	32	-
NO2 (ppb) Average	650	40	46	99.14	33	0	21	-
NO (ppb) Average	650	40	46	99.14	82	-	43	-
NOX (ppb) Average	650	40	46	99.14	103	-	59	-
NH3 (ppb) Average	603	43	93	92.82	0	0	0	-
PM2.5 (ug/m3) Average	688	2	8	99.14	69.8	-	12.1	0
Wind Speed 10 m (km/h) Average	696	0	0	100.00	16	-	9	-
Wind Direction 10 m (deg) Average	696	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	696	0	0	100.00	10.4	-	1.4	-
Temperature 10 m (C) Average	696	0	0	100.00	10.1	-	2.6	-
Relative Humidity (%) Average	696	0	0	100.00	96	-	90	-
Precipitation (mm) Total	696	0	0	100.00	1.7	-	11.2	-
Leaf Wetness (% of range) Average	696	0	0	100.00	47	-	15	-
Global Solar Radiation (W/m2) Average	696	0	0	100.00	454	-	116	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	657	1.2	3	-	0	0	0	0	1	3	29
TRS (ppb) Average	658	0.9	1	-	0	0	0	1	1	2	6
THC (ppm) Average	637	2.14	0.3	-	1.8	1.9	1.9	2	2.3	2.5	3.5
NMHC(ppm) Average	637	0.065	0.097	-	0	0	0	0	0.1	0.2	0.569
CH4(ppm) Average	637	2.08	0.2	-	1.8	1.9	1.9	2	2.2	2.3	3.1
O3 (ppb) Average	658	17.9	10	-	3	4	8	18	26	32	40
NO2 (ppb) Average	650	13	7	-	0	4	7	13	18	22	33
NO (ppb) Average	650	6.5	13	-	0	0	0	1	7	19	82
NOX (ppb) Average	650	19.5	17	-	0	5	8	15	25	39	103
NH3 (ppb) Average	603	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	688	6.07	5.6	-	0.4	1.6	2.6	4.5	8.1	12.6	69.8
Wind Speed 10 m (km/h) Average	696	5	3	-	0	1	2	5	7	10	16
Wind Direction 10 m (deg) Average	696	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	696	-11.82	7.4	-	-36.6	-19.7	-15.6	-12.3	-7	-2.7	10.4
Temperature 10 m (C) Average	696	-11.33	7.2	-	-34.9	-18.9	-15.5	-11.9	-6.6	-2.1	10.1
Relative Humidity (%) Average	696	76.7	11	-	32	60	72	79	84	90	96
Precipitation (mm) Total	696	-	-	28.42	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	696	3.1	5	-	-1	0	0	0	3	12	47
Global Solar Radiation (W/m2) Average	696	48.1	97	-	0	0	0	0	48	172	454

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKAY (AMS 1)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	29 Feb 2016 21:00	01 Mar 2016 00:00	4	Station power failure
SO2, TRS, THC, O3, NH3	22 Feb 2016 11:00	22 Feb 2016 11:00	1	Maintenance - manifold cleaning
SO2, THC, NO2	14 Feb 2016 09:00	14 Feb 2016 10:00	2	Maintenance - reinitiated daily QA check
THC	18 Feb 2016 14:00	19 Feb 2016 09:00	20	Maintenance - column bake out and conditioning
NH3	01 Feb 2016 05:00	29 Feb 2016 10:00	43	Stabilization after daily span
NH3	07 Feb 2016 08:00	07 Feb 2016 09:00	2	Maintenance - reinitiated daily QA check
PM2.5	25 Feb 2016 17:00	25 Feb 2016 18:00	2	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

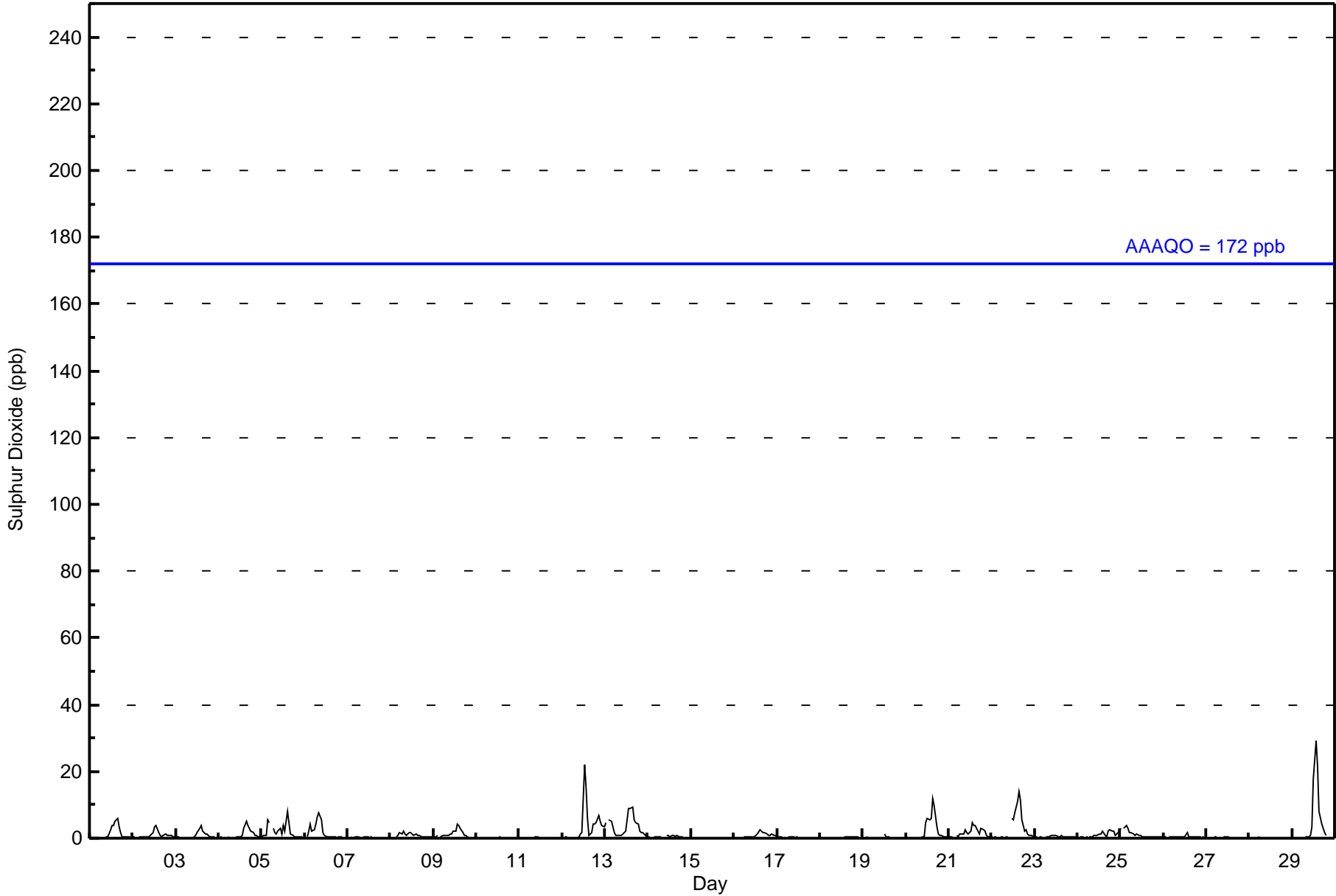
Fort McKay - Bertha Ganter - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 29 ppb on Feb 29 14:00 Maximum Daily Average: 4.9 ppb on Feb 29										Hours in Service: 696 Hours of Data: 657 Hours of Missing Data: 39 Hours of Calibration: 32 Percent Operational Time: 99.0																
Minimum Value: 0 ppb on Feb 20 02:00 Minimum Daily Average: 0.1 ppb on Feb 10 Maximum Diurnal Average: 3.4 ppb at hour 14 Minimum Diurnal Average: 0.3 ppb at hour 2 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 = 12																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	1	3	4	4	5	6	3	2	1	0	0	0	0	0	1.3	6
2-Feb	0	0	Z	0	0	0	0	0	0	0	1	2	3	4	2	1	0	1	1	1	1	1	1	0	0.9	4
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	2	3	4	2	1	1	1	0	0	0	0	0	0.8	4
4-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	3	5	4	3	2	2	1	1	0	0	1.1	5
5-Feb	0	1	1	6	4	Z	3	2	1	2	3	1	4	2	8	5	1	1	1	0	0	0	0	2.0	8	
6-Feb	Z	0	2	4	2	3	4	6	8	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.8	8
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	1	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	0	1	1	0	0.9	2
9-Feb	1	1	1	Z	1	1	1	1	1	1	1	2	2	4	4	3	2	1	1	0	0	0	0	1.2	4	
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	0	0	Z	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	1	2	22	15	6	1	2	4	4	5	7	5	4	3	3.6	22
13-Feb	5	Z	5	5	3	2	1	1	1	1	1	2	6	9	9	9	5	5	4	2	2	2	1	1	3.5	9
14-Feb	0	0	Z	0	0	0	0	0	0	M	M	1	1	1	1	0	1	1	0	0	0	0	0	0	0.4	1
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	0.1	0
16-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	2	2	2	1	1	1	1	1	1	1	0.8	2
17-Feb	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
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	C	C	C	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	0	5	6	5	6	12	10	3	1	1	1	0	1	2.3	12
21-Feb	0	0	0	Z	1	1	1	1	1	3	2	1	2	5	4	4	2	1	3	3	2	1	0	0	1.7	5
22-Feb	0	0	0	0	Z	0	0	0	0	0	M	6	6	8	11	14	11	5	2	3	1	1	1	0	3.2	14
23-Feb	0	0	0	0	0	Z	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
24-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	0	2	3	2	2	1	1	2	1.0	3
25-Feb	3	Z	3	4	3	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.1	4
26-Feb	0	0	Z	0	0	0	0	0	1	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0.4	2
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Feb	0	0	0	0	0	Z	0	0	0	1	1	3	18	29	22	8	4	3	2	1	PF	PF	PF	PF	4.9	29
0.5 0.3 0.6 0.9 0.8 0.5 0.6 0.6 0.7 0.8 0.8 1.3 2.8 3.4 3.2 2.7 1.8 1.3 1.0 0.8 0.8 0.6 0.5 0.4 Diurnal Average 5 1 5 6 4 3 4 6 8 6 3 6 22 29 22 14 11 5 4 5 7 5 4 3 Diurnal Maximum																										
Z - zerspan C - Calibration M - Maintenance PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	648	98.63	98.63
11 - 20	6	0.91	99.54
21 - 60	3	0.46	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: 657

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	148	73	37	12	8	3	5	55	105	38	25	31	15	28	21	44	648
11 - 20	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	0	3	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	148	73	37	12	8	3	5	56	113	38	25	31	15	28	21	44	657

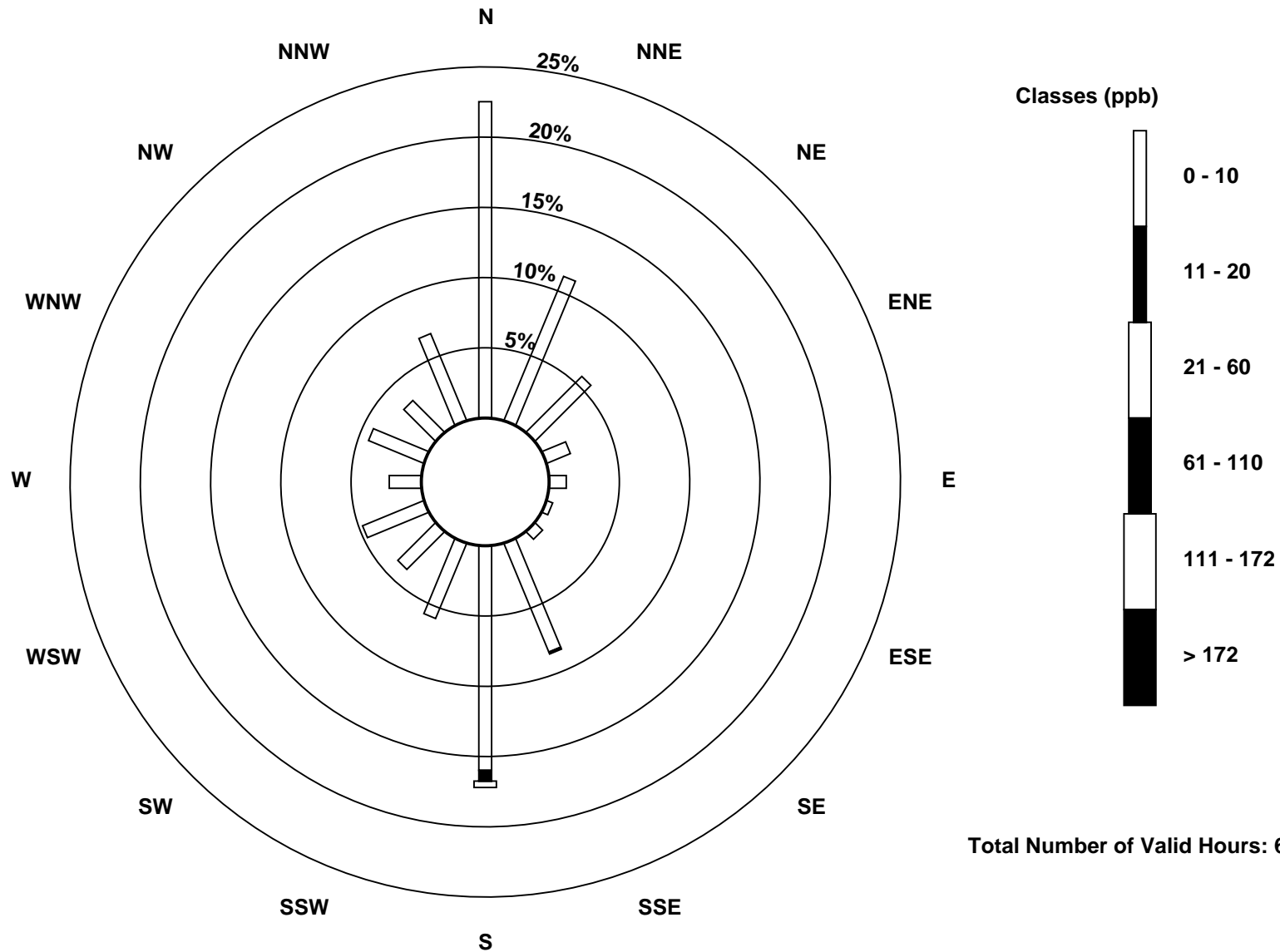
Total Number of Valid Hours: 657

Total Number of Hours: 696

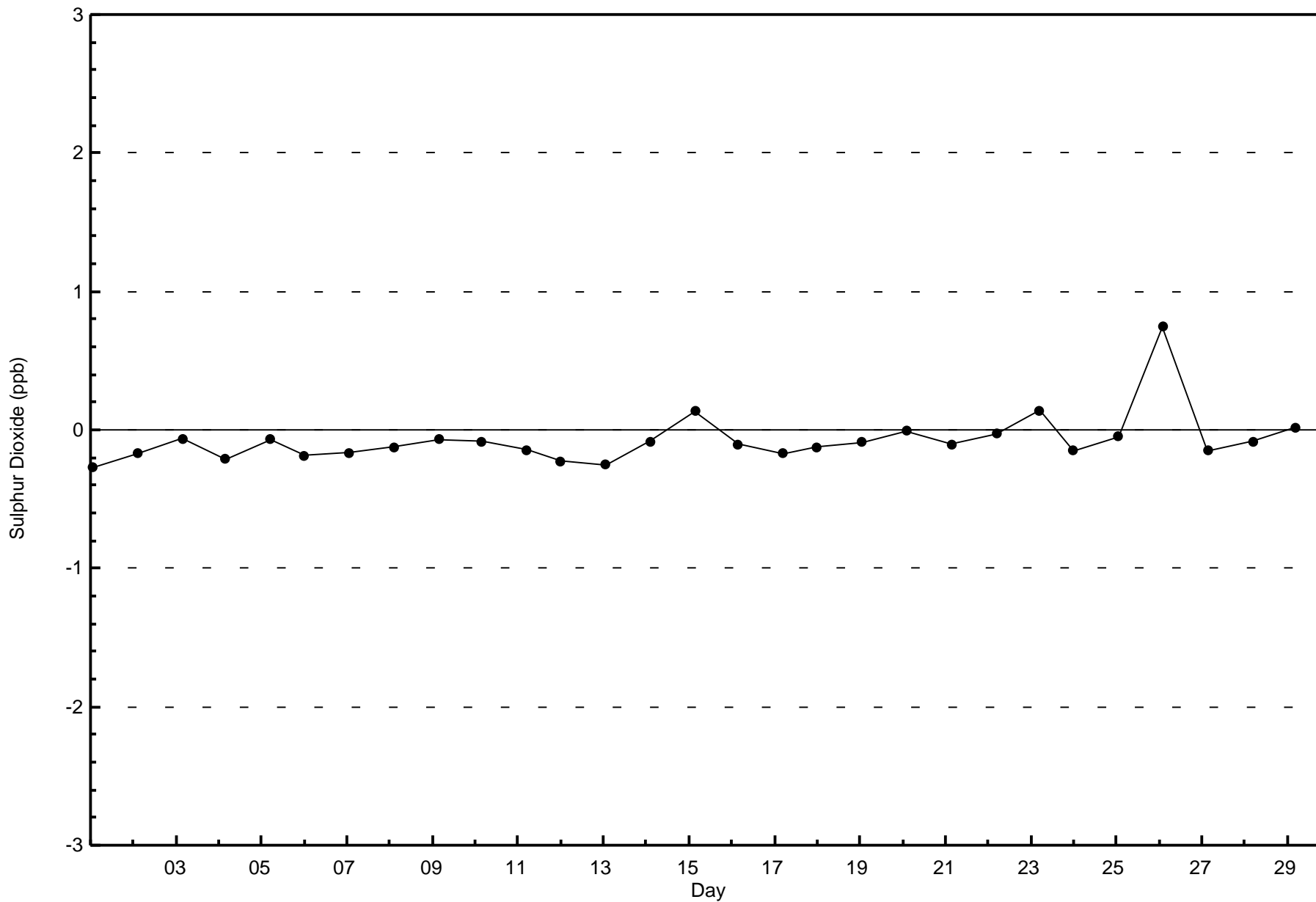


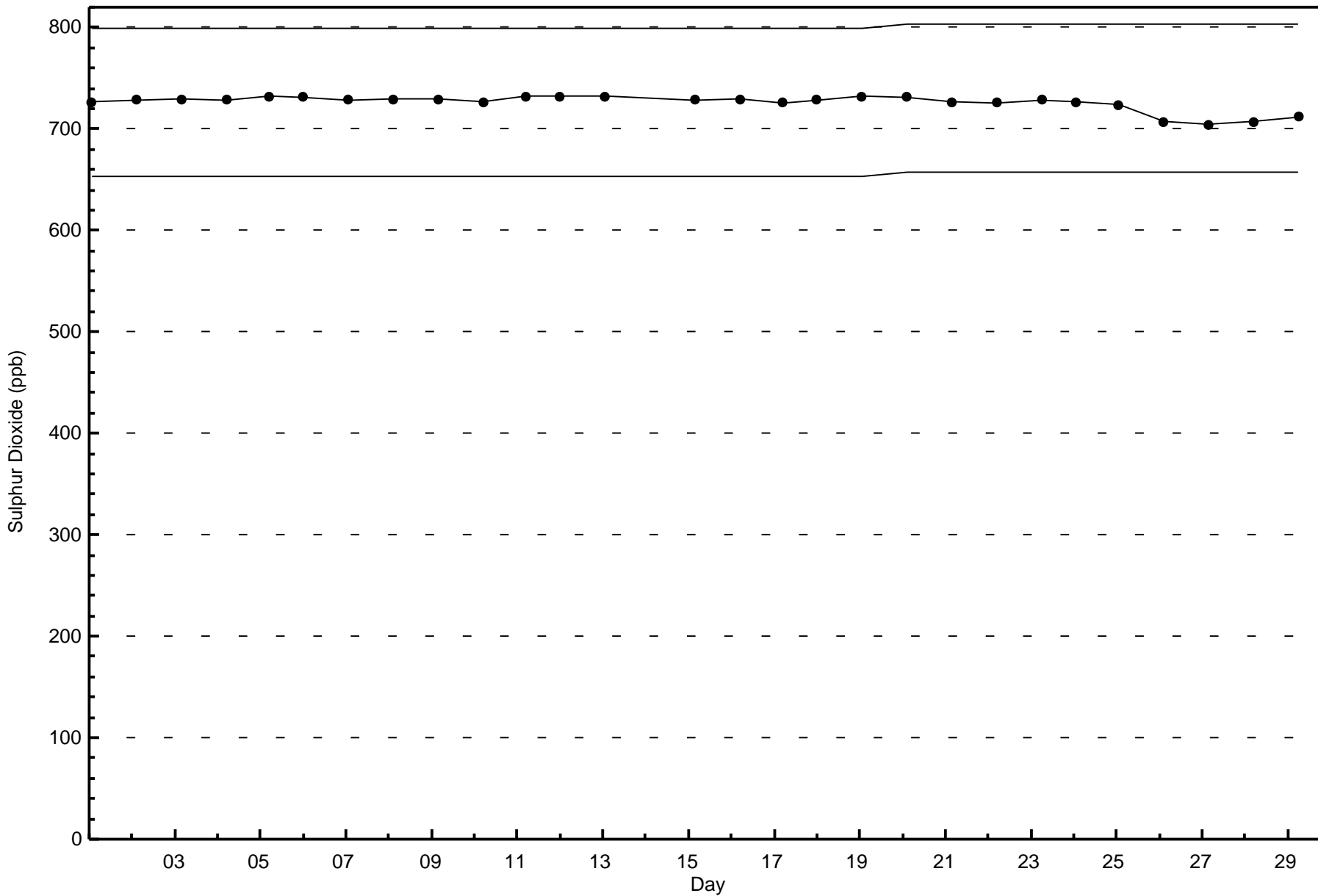
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 657







Wood Buffalo Environmental Association

Summary of Hour Averages

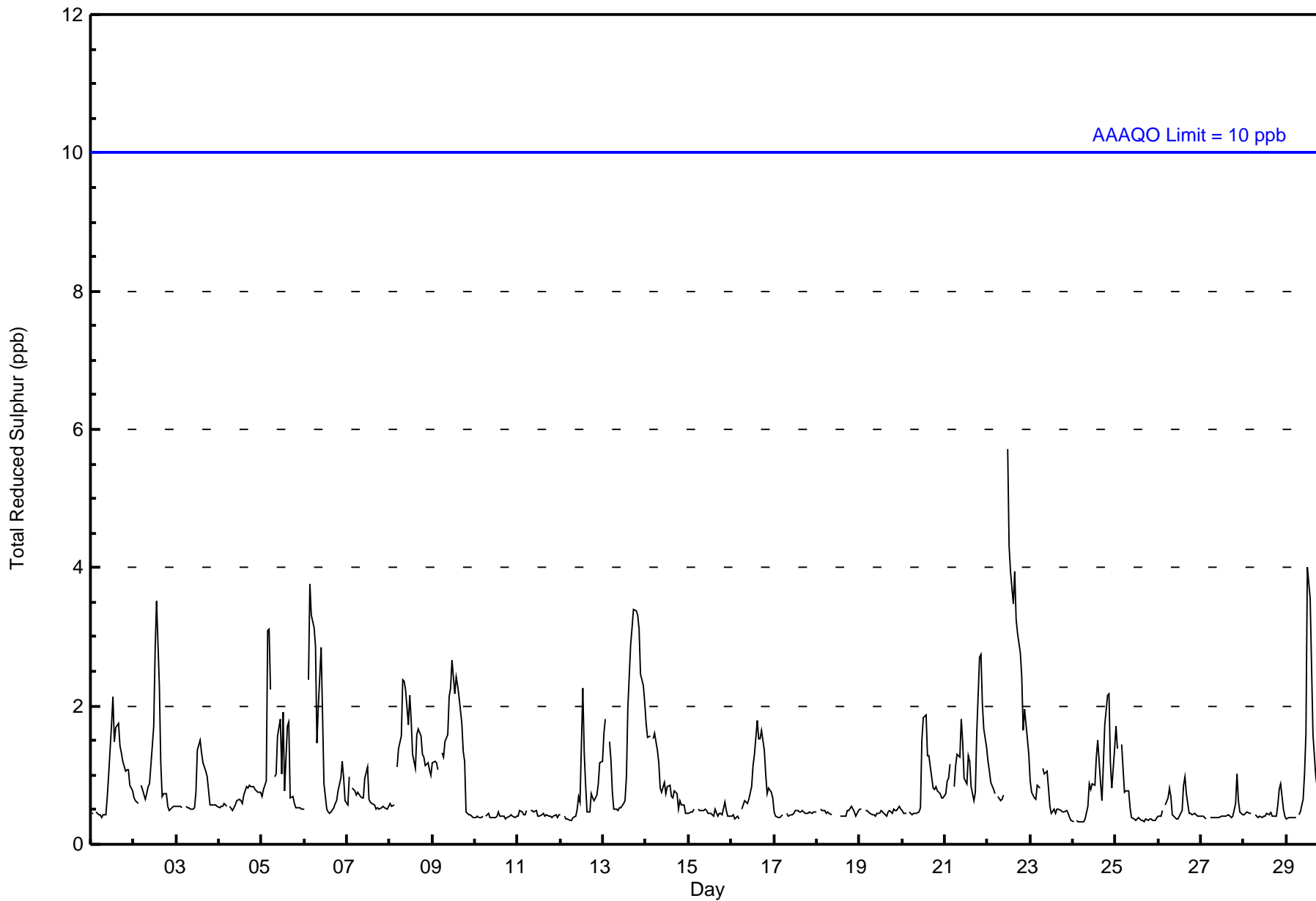
**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - February 2016**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																	
Maximum Value: 6 ppb on Feb 22 12:00										Maximum Daily Average: 2.1 ppb on Feb 22										Hours of Data: 658							
Minimum Value: 0 ppb on Feb 25 17:00										Minimum Daily Average: 0.4 ppb on Feb 10										Hours of Missing Data: 38							
Maximum Diurnal Average: 1.3 ppb at hour 13										Minimum Diurnal Average: 0.7 ppb at hour 1										Hours of Calibration: 33							
Monthly Average: 0.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 4										Percent Operational Time: 99.3							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	0	Z	0	0	0	0	0	0	1	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1.0	2	
2-Feb	1	1	1	Z	1	1	1	1	1	1	1	2	3	4	2	1	1	1	1	1	0	1	1	1	1.1	4	
3-Feb	1	1	1	1	Z	1	1	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0.7	2	
4-Feb	1	1	1	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
5-Feb	1	1	1	3	3	2	Z	1	1	2	2	1	2	1	2	2	1	1	1	1	1	1	1	1	1.2	3	
6-Feb	1	Z	2	4	3	3	3	1	2	3	2	1	0	0	0	0	1	1	1	1	1	1	1	1	1.4	4	
7-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	
8-Feb	1	1	1	Z	1	1	2	2	2	2	2	2	2	1	1	2	2	2	2	1	1	1	1	1	1.4	2	
9-Feb	1	1	1	1	Z	1	1	1	2	2	2	3	2	2	2	2	2	2	1	1	0	0	0	0	1.4	3	
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	0.4	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	0.4	0	
12-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	2	1	1	0	0	1	1	1	1	1	1	1	0.7	2	
13-Feb	2	2	Z	1	1	1	1	0	0	1	1	1	1	1	2	3	3	3	3	3	3	2	2	2	1.7	3	
14-Feb	2	2	2	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.9	2	
15-Feb	0	0	0	1	Z	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0.5	1	
16-Feb	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	0.9	2	
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	0.4	0	
18-Feb	0	Z	1	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	1	1	0	0	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	1	0	0	1	0.5	1	
20-Feb	0	0	0	Z	0	0	0	0	0	0	1	2	2	2	1	1	1	1	1	1	1	1	1	1	0.8	2	
21-Feb	1	1	1	1	Z	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	3	3	2	2	1.3	3	
22-Feb	1	1	1	1	1	Z	1	1	1	1	M	6	4	4	3	4	3	3	3	3	2	2	2	2	2.1	6	
23-Feb	1	1	1	1	1	1	Z	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0.6	1	
24-Feb	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	1	1	1	1	2	2	2	1	1	0.9	2	
25-Feb	2	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
26-Feb	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.5	1	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1	
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.5	1	
29-Feb	0	0	0	0	0	0	Z	0	0	1	1	2	4	4	3	2	1	1	1	1	1	PF	PF	PF	PF	1.1	4
0.7 0.7 0.7 0.9 0.9 0.8 0.8 0.7 0.7 0.8 0.9 1.1 1.3 1.2 1.1 1.1 0.9 0.9 0.9 0.9 0.9 0.8 0.7 0.7																								Diurnal Average			
2 2 2 4 3 3 3 2 2 3 2 6 4 4 3 4 3 3 3 3 3 3 2 2 2																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	629	95.59	95.59
3 - 4	28	4.26	99.85
5 - 7	1	0.15	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	145	73	37	12	9	3	7	50	94	35	25	30	18	25	23	43	629
3 - 4	1	0	1	0	0	0	0	6	14	4	0	1	0	1	0	0	28
5 - 7	0	0	0	0	0	0	0	0	1	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	146	73	38	12	9	3	7	56	109	39	25	31	18	26	23	43	658

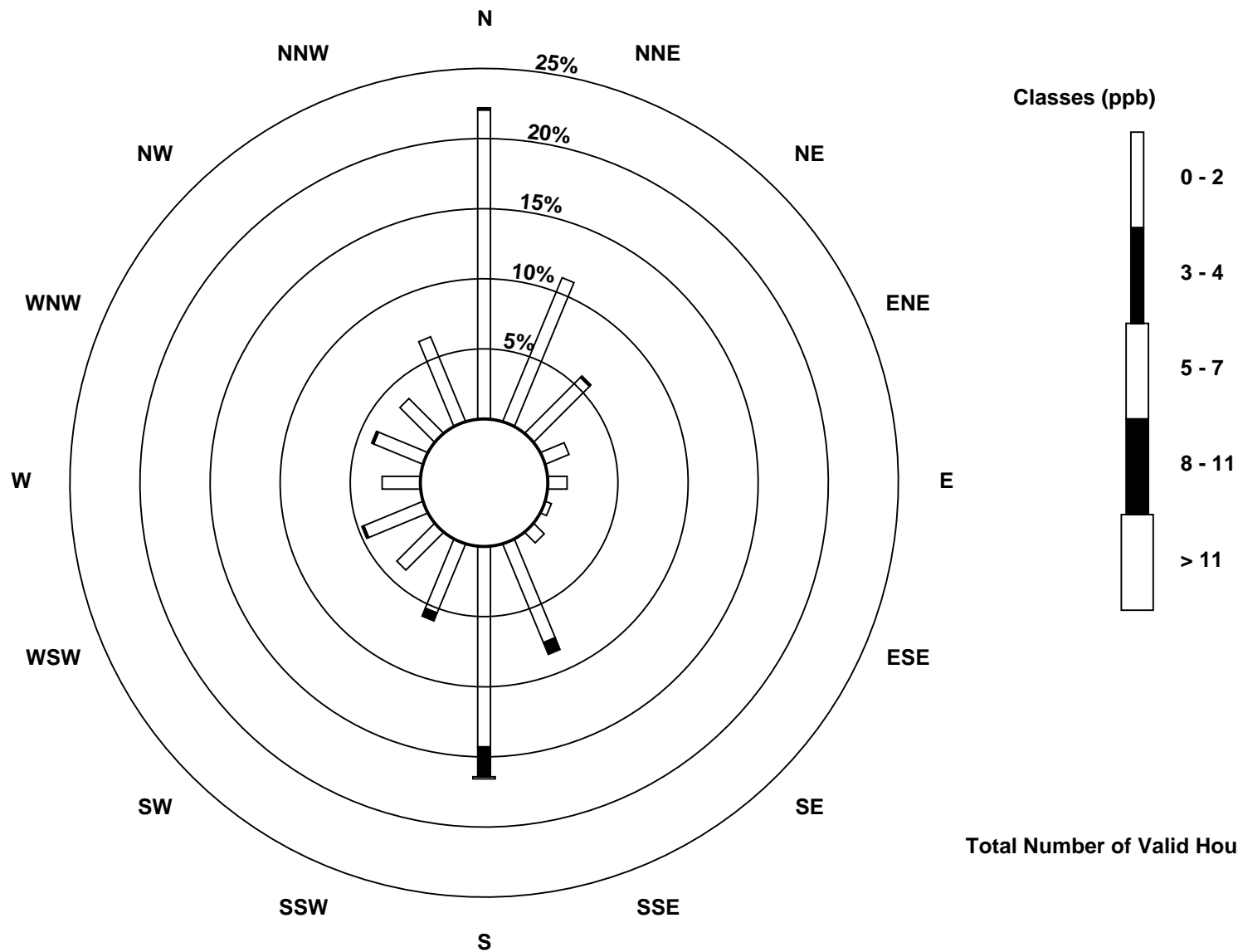
Total Number of Valid Hours: 658

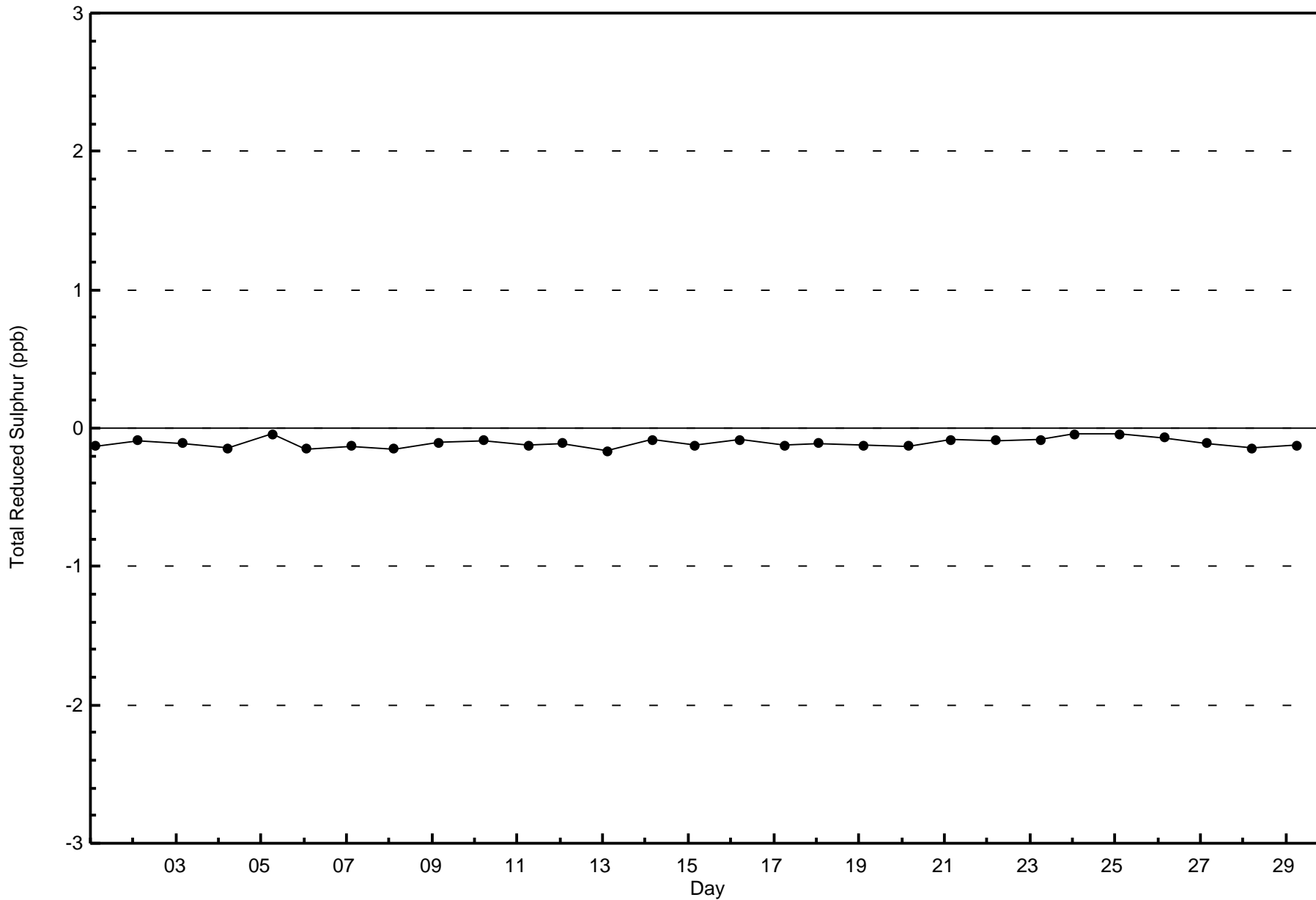
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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

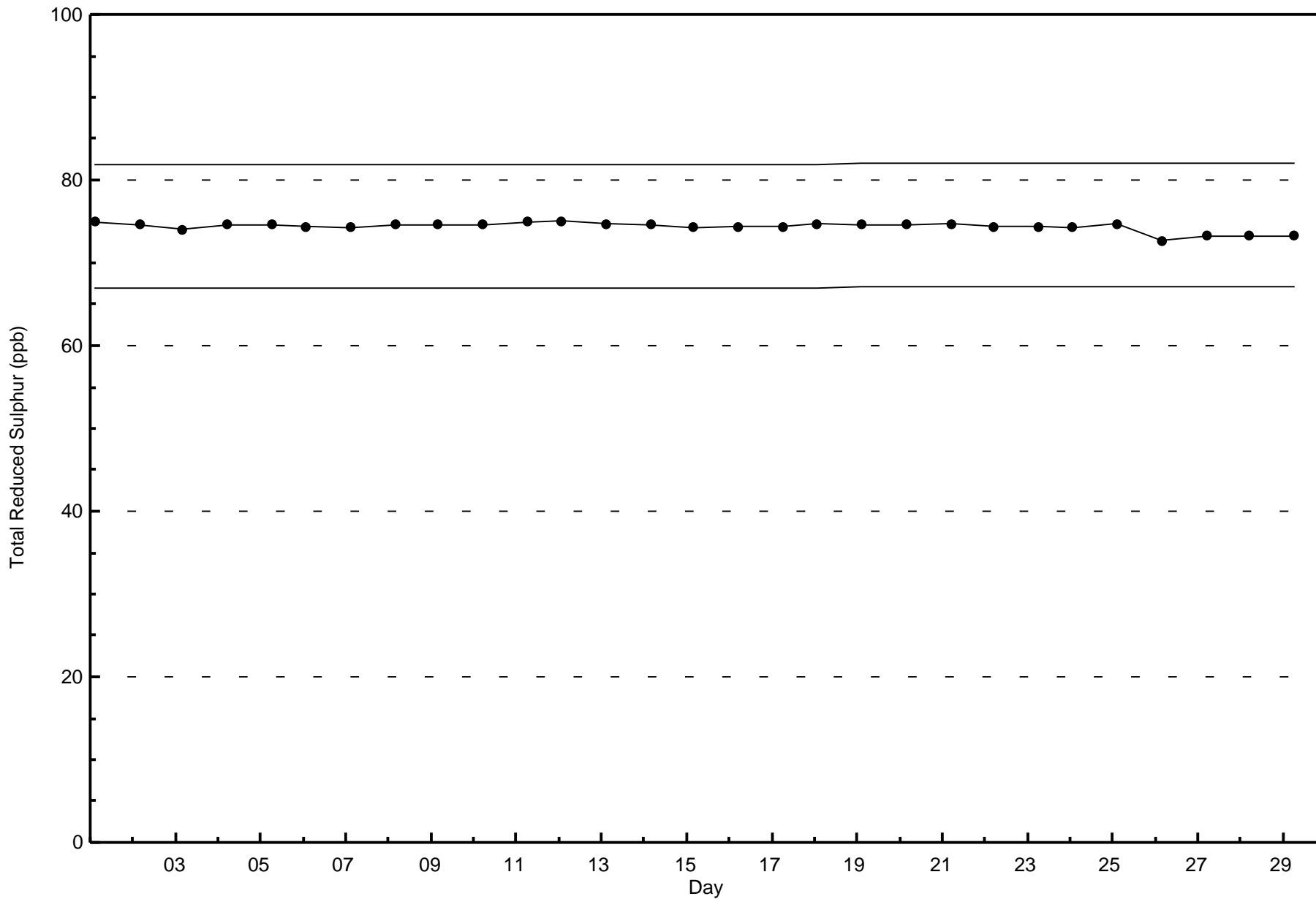






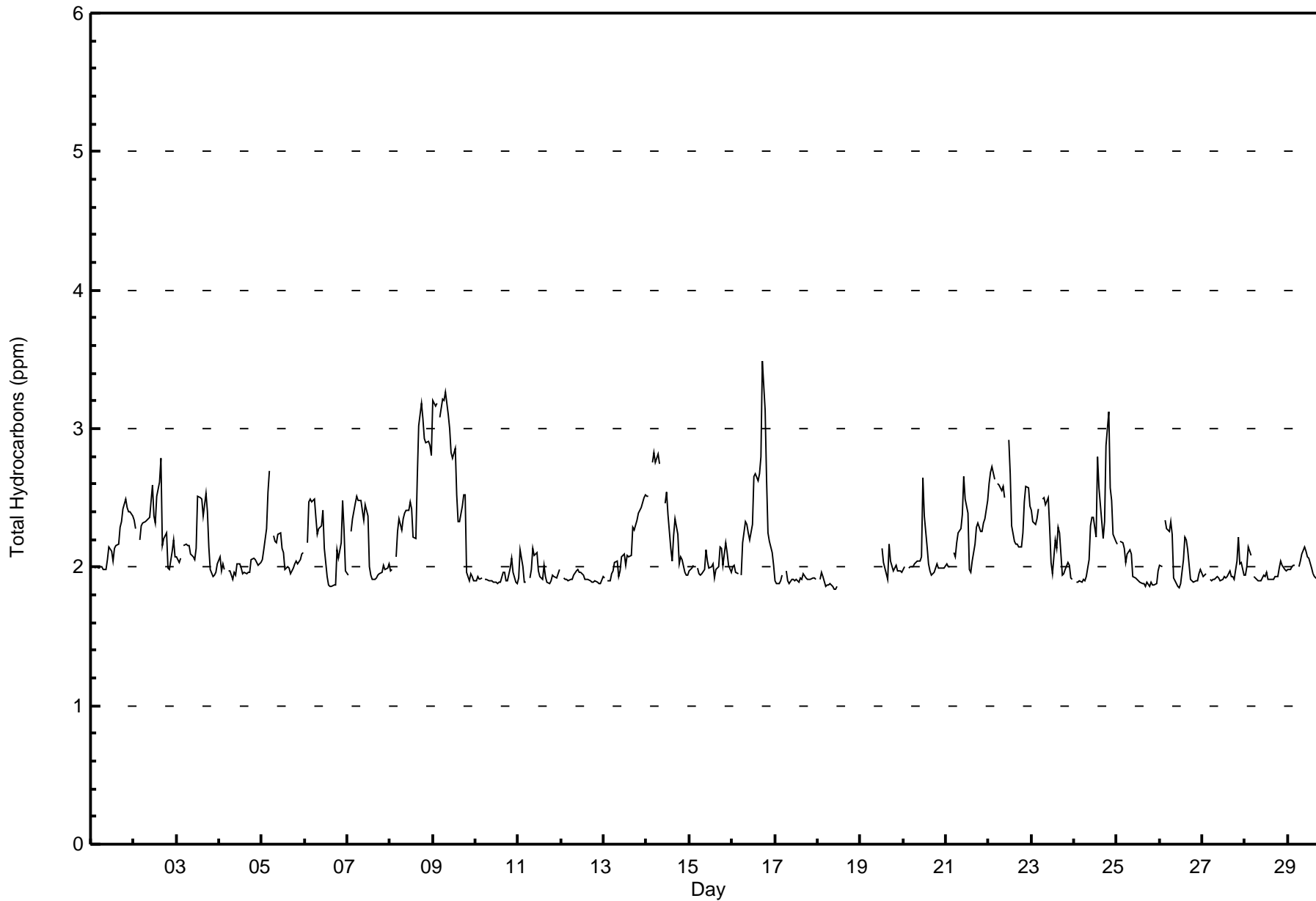
Wood Buffalo Environmental Association
Span Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - February 2016





Maximum Value: 3.5 ppm on Feb 16 18:00																				Maximum Daily Average: 2.7 ppm on Feb 9					Hours in Service: 696	
Minimum Value: 1.8 ppm on Feb 18 11:00																				Minimum Daily Average: 1.9 ppm on Feb 17					Hours of Data: 637	
Maximum Diurnal Average: 2.2 ppm at hour 5																				Minimum Diurnal Average: 2.1 ppm at hour 24					Hours of Missing Data: 59	
Monthly Average: 2.14 ppm																				Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.2					Hours of Calibration: 32	
																									Percent Operational Time: 96.1	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.3	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.2	2.5
2-Feb	2.3	Z	Z	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.6	2.4	2.3	2.5	2.6	2.8	2.2	2.2	2.2	2.0	2.0	2.1	2.2	2.1	2.3	2.8
3-Feb	2.1	2.0	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.5	2.5	2.5	2.4	2.5	2.4	2.1	2.0	1.9	1.9	2.0	2.0	2.2	2.5
4-Feb	2.1	2.0	2.0	2.0	Z	2.0	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1
5-Feb	2.1	2.1	2.3	2.5	2.7	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1
6-Feb	Z	2.2	2.5	2.5	2.5	2.5	2.4	2.2	2.3	2.3	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.2	2.5	2.3	2.0	2.2	2.5
7-Feb	1.9	Z	2.3	2.3	2.5	2.5	2.5	2.5	2.4	2.3	2.5	2.4	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.5
8-Feb	2.0	2.0	Z	2.1	2.3	2.4	2.3	2.4	2.4	2.4	2.4	2.5	2.4	2.2	2.2	2.6	3.0	3.2	3.1	2.9	2.9	2.9	2.9	2.8	2.5	3.2
9-Feb	3.2	3.2	3.2	Z	3.1	3.2	3.2	3.3	3.1	3.0	2.8	2.8	2.9	2.5	2.3	2.3	2.4	2.5	2.5	2.0	1.9	2.0	1.9	1.9	2.7	3.3
10-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	2.0	2.0	1.9	1.9	2.0	2.1	2.0	1.9	1.9	1.9	2.1
11-Feb	1.9	2.1	2.0	1.9	1.9	Z	1.9	2.0	2.1	2.1	2.1	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1
12-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	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	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.1	2.5
14-Feb	2.5	2.5	Z	2.8	2.8	2.8	2.8	2.7	M	M	2.5	2.5	2.4	2.1	2.0	2.2	2.4	2.2	2.0	2.1	2.1	2.0	1.9	1.9	2.3	2.8
15-Feb	2.0	2.0	2.0	Z	2.0	2.0	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.1	2.0	2.2	2.1	2.0	2.0	2.0	2.2
16-Feb	2.0	2.0	2.0	1.9	Z	1.9	2.2	2.3	2.3	2.2	2.2	2.3	2.7	2.7	2.6	2.7	2.8	3.5	3.1	2.6	2.3	2.2	2.1	2.0	2.4	3.5
17-Feb	1.9	1.9	1.9	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
18-Feb	Z	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	C	M	M	M	M	M	M	M	M	M	M	M	--	2.0
19-Feb	M	M	M	M	M	M	M	M	M	M	C	C	C	2.1	2.0	2.0	1.9	2.2	2.0	2.0	2.0	2.0	2.0	2.0	--	2.2
20-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6	2.4	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6
21-Feb	2.0	2.0	2.0	Z	2.1	2.1	2.2	2.3	2.3	2.4	2.7	2.5	2.4	2.0	2.0	2.0	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.2	2.7
22-Feb	2.6	2.7	2.7	2.6	Z	2.6	2.6	2.6	2.6	2.5	M	2.9	2.7	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.5	2.6	2.6	2.5	2.9
23-Feb	2.4	2.3	2.3	2.4	2.4	Z	2.5	2.5	2.4	2.5	2.3	2.0	2.0	2.2	2.1	2.3	2.2	1.9	2.0	2.0	2.0	2.0	1.9	1.9	2.2	2.5
24-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.3	2.4	2.4	2.2	2.8	2.6	2.3	2.2	2.3	2.9	3.1	2.6	2.5	2.2	2.2	3.1
25-Feb	2.2	Z	2.2	2.2	2.1	2.0	2.1	2.1	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	2.0	2.0	2.0	2.2
26-Feb	2.0	2.0	Z	2.3	2.3	2.3	2.3	2.2	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.2	2.1	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.3
27-Feb	1.9	1.9	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.2	2.0	2.0	1.9	2.0	2.2
28-Feb	1.9	2.0	2.1	2.1	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
29-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.1	PF	PF	PF	PF	2.0	2.1
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerspan C - Calibration M - Maintenance PF - Power Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	345	54.16	54.16
2.1 - 3.0	279	43.80	97.96
3.1 - 10.0	13	2.04	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - February 2016

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	102	59	20	5	5	0	1	14	39	12	13	20	9	17	13	16	345
2.1 - 3.0	35	13	13	5	3	3	4	40	71	24	11	10	5	9	8	25	279
3.1 - 10.0	4	0	0	0	0	0	0	0	3	1	1	1	1	1	0	1	13
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	141	72	33	10	8	3	5	54	113	37	25	31	15	27	21	42	637

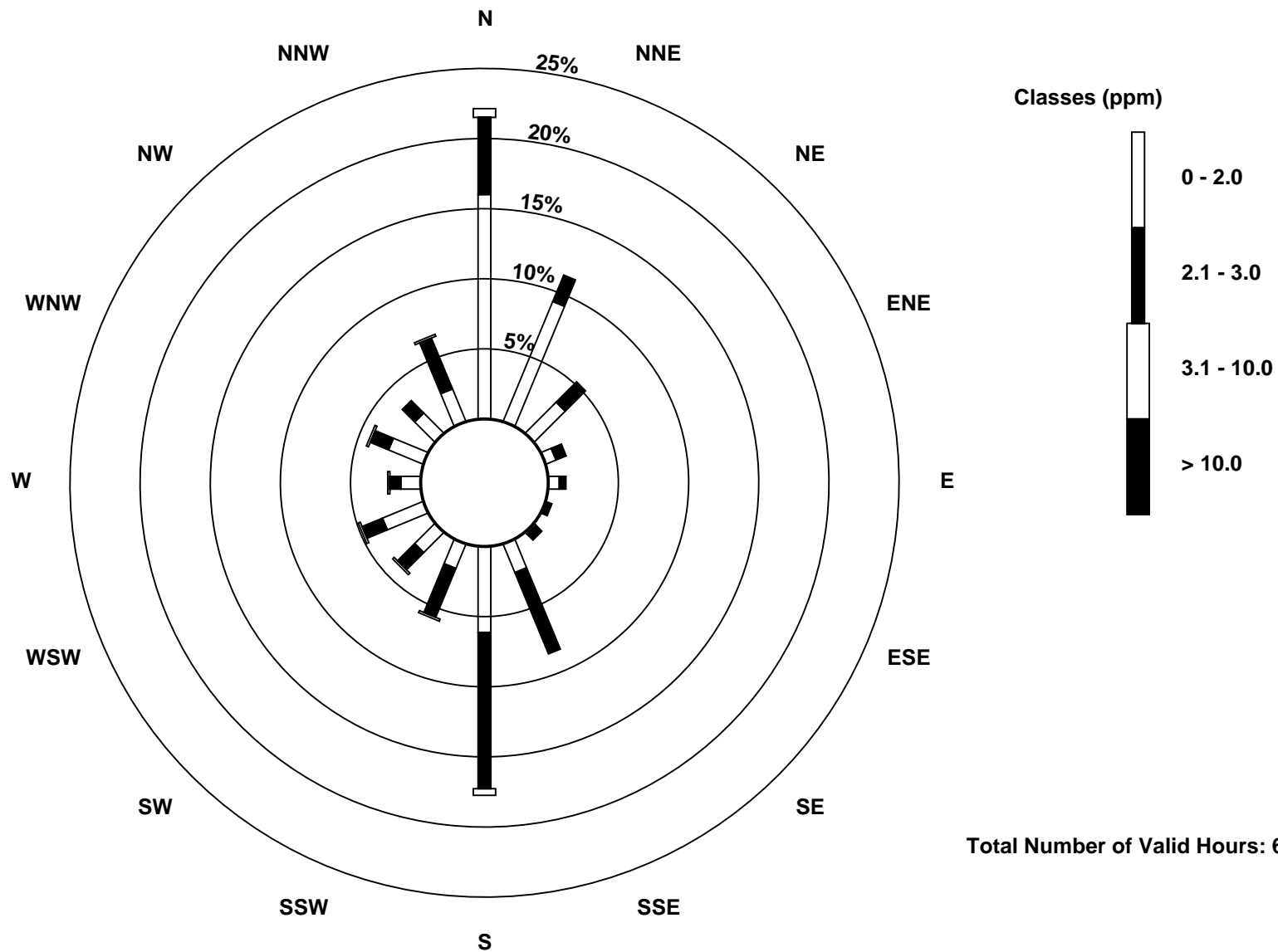
Total Number of Valid Hours: 637

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



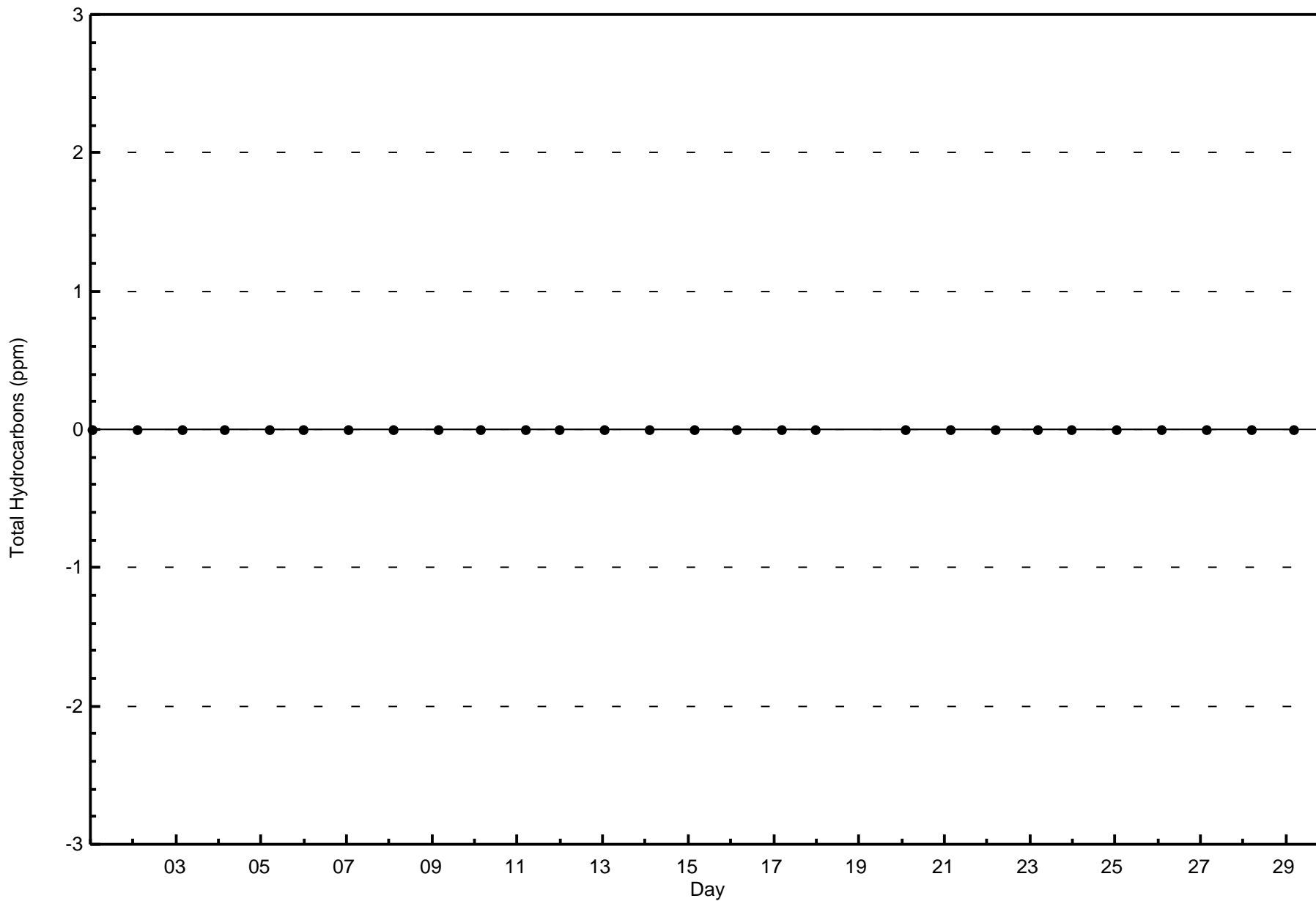


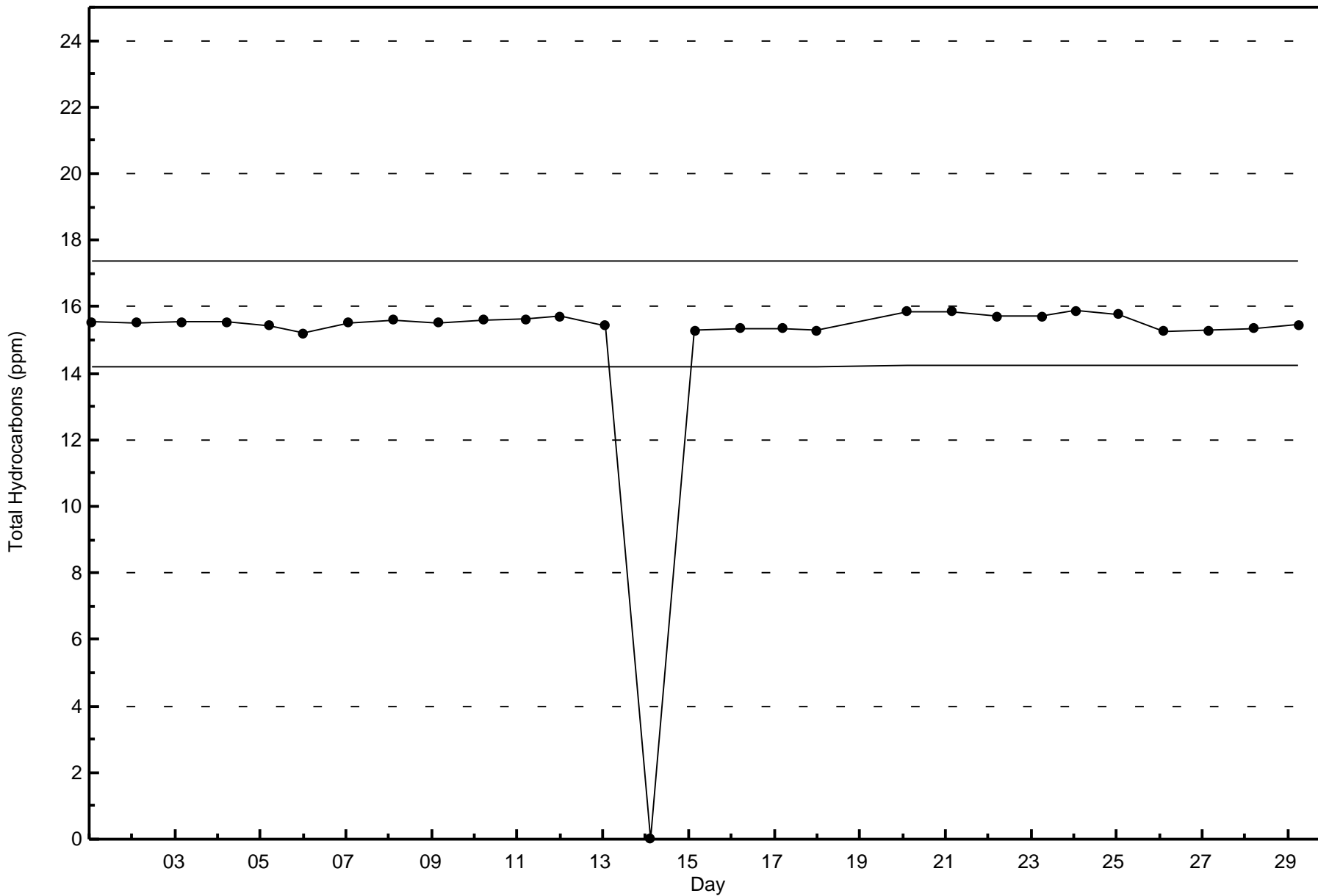
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - February 2016







Wood Buffalo Environmental Association
Summary of Hour Averages

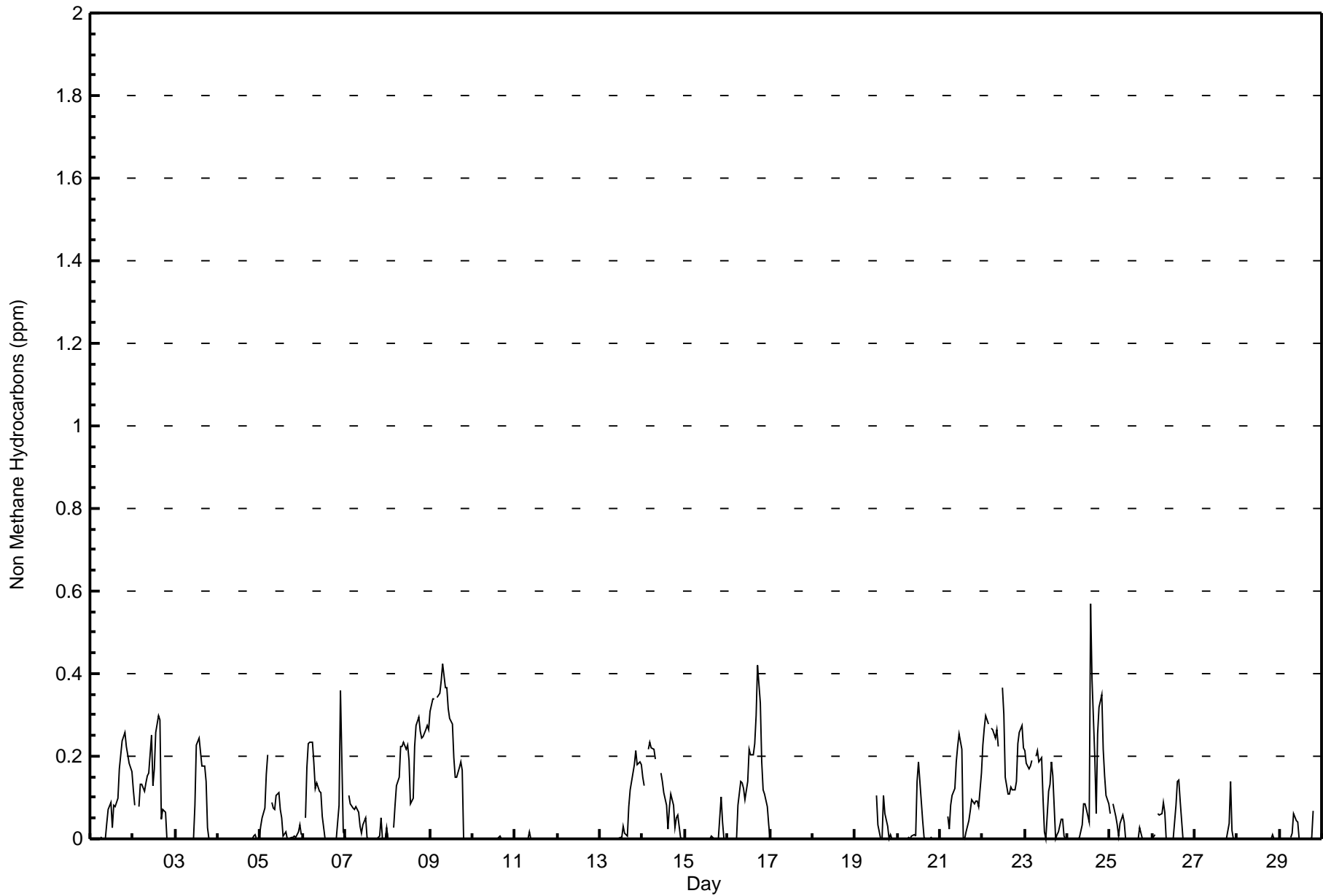
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - February 2016

Maximum Value: 0.569 ppm on Feb 24 14:00 Maximum Daily Average: 0.223 ppm on Feb 9		Hours in Service: 696 Hours of Data: 637 Hours of Missing Data: 59 Hours of Calibration: 32 Percent Operational Time: 96.1																									
Minimum Value: 0.000 ppm on Feb 1 01:00 Minimum Daily Average: 0.000 ppm on Feb 17 Maximum Diurnal Average: 0.080 ppm at hour 14 Minimum Diurnal Average: 0.043 ppm at hour 24 Monthly Average: 0.065 ppm Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.4																											
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	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.038	0.073	0.088	0.027	0.083	0.079	0.098	0.169	0.202	0.237	0.257	0.224	0.202	0.183	0.163	0.092	0.257	
2-Feb	0.120	0.083	Z	0.078	0.132	0.131	0.114	0.137	0.151	0.160	0.251	0.128	0.169	0.259	0.298	0.289	0.049	0.070	0.063	0.000	0.000	0.000	0.000	0.000	0.117	0.298	
3-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.082	0.228	0.245	0.211	0.175	0.177	0.139	0.026	0.000	0.000	0.000	0.000	0.056	0.245		
4-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.011	0.000	0.002	0.001	0.011	
5-Feb	0.029	0.051	0.074	0.154	0.204	Z	0.087	0.076	0.071	0.105	0.111	0.073	0.050	0.005	0.017	0.000	0.000	0.002	0.003	0.006	0.003	0.017	0.033	0.011	0.051	0.204	
6-Feb	Z	0.050	0.174	0.231	0.233	0.234	0.184	0.123	0.137	0.115	0.111	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.082	0.359	0.189	0.019	0.100	0.359	
7-Feb	0.000	Z	0.105	0.085	0.074	0.071	0.077	0.065	0.032	0.014	0.035	0.052	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.052	0.000	0.001	0.028	0.030	0.105	
8-Feb	0.000	0.000	Z	0.027	0.080	0.130	0.148	0.225	0.224	0.235	0.218	0.226	0.188	0.086	0.098	0.223	0.275	0.294	0.261	0.244	0.246	0.264	0.275	0.266	0.184	0.294	
9-Feb	0.308	0.339	0.338	Z	0.342	0.352	0.383	0.423	0.365	0.368	0.314	0.292	0.278	0.196	0.149	0.150	0.171	0.187	0.166	0.000	0.000	0.000	0.000	0.000	0.223	0.423	
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	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	
11-Feb	0.000	0.000	0.001	0.000	0.000	Z	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.016	
12-Feb	Z	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
13-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.005	0.031	0.012	0.005	0.078	0.119	0.158	0.180	0.213	0.181	0.187	0.181	0.059	0.213	
14-Feb	0.149	0.128	Z	0.216	0.233	0.222	0.216	0.193	M	M	0.160	0.140	0.113	0.082	0.022	0.075	0.107	0.080	0.029	0.052	0.056	0.003	0.000	0.000	0.108	0.233	
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	0.006	0.000	0.000	0.000	0.000	0.103	0.041	0.000	0.000	0.006	0.103	
16-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.082	0.139	0.135	0.121	0.094	0.140	0.216	0.204	0.202	0.229	0.298	0.420	0.329	0.187	0.118	0.108	0.079	0.033	0.136	0.420	
17-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	
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	C	M	M	M	M	M	M	M	M	M	M	--	0.000	
19-Feb	M	M	M	M	M	M	M	M	M	M	C	C	C	0.107	0.033	0.000	0.000	0.107	0.060	0.029	0.000	0.011	0.000	0.000	--	0.107	
20-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.003	0.002	0.006	0.009	0.008	0.138	0.187	0.092	0.046	0.002	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.022	0.187	
21-Feb	0.000	0.000	0.000	Z	0.053	0.024	0.082	0.104	0.121	0.188	0.224	0.254	0.217	0.003	0.000	0.016	0.045	0.069	0.095	0.086	0.091	0.090	0.079	0.161	0.087	0.254	
22-Feb	0.227	0.267	0.300	0.277	Z	0.269	0.265	0.243	0.265	0.223	M	0.366	0.301	0.151	0.108	0.110	0.124	0.120	0.119	0.140	0.230	0.259	0.275	0.222	0.221	0.366	
23-Feb	0.215	0.183	0.169	0.177	0.190	Z	0.202	0.215	0.188	0.195	0.100	0.017	0.001	0.116	0.132	0.188	0.154	0.000	0.010	0.016	0.047	0.046	0.007	0.000	0.112	0.215	
24-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.035	0.085	0.084	0.071	0.042	0.569	0.387	0.196	0.061	0.254	0.318	0.350	0.217	0.154	0.105	0.086	0.131	0.569	
25-Feb	0.061	Z	0.086	0.054	0.035	0.006	0.038	0.057	0.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.002	0.018	0.086	
26-Feb	0.000	0.010	Z	0.060	0.058	0.061	0.087	0.064	0.001	0.000	0.000	0.000	0.000	0.080	0.138	0.142	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.142	
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	0.036	0.140	0.020	0.001	0.000	0.009	0.140	
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	0.009	0.000	0.000	0.000	0.000	0.009	
29-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.005	0.013	0.061	0.045	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.067	PF	PF	PF	PF	0.012	0.067
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan		C - Calibration				M - Maintenance				PF - Power Failure																	



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	342	53.69	53.69
0.006 - 0.05	66	10.36	64.05
0.06 - 0.1	107	16.80	80.85
> 0.1	122	19.15	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - February 2016**

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	111	61	17	3	3	0	0	16	36	8	11	21	9	13	13	20	342
0.006 - 0.05	8	5	3	1	2	0	1	6	20	6	4	1	1	4	2	2	66
0.06 - 0.1	10	2	9	3	2	0	3	12	32	11	3	3	2	6	4	5	107
> 0.1	12	4	4	3	1	3	1	20	25	12	7	6	3	4	2	15	122
Totals	141	72	33	10	8	3	5	54	113	37	25	31	15	27	21	42	637

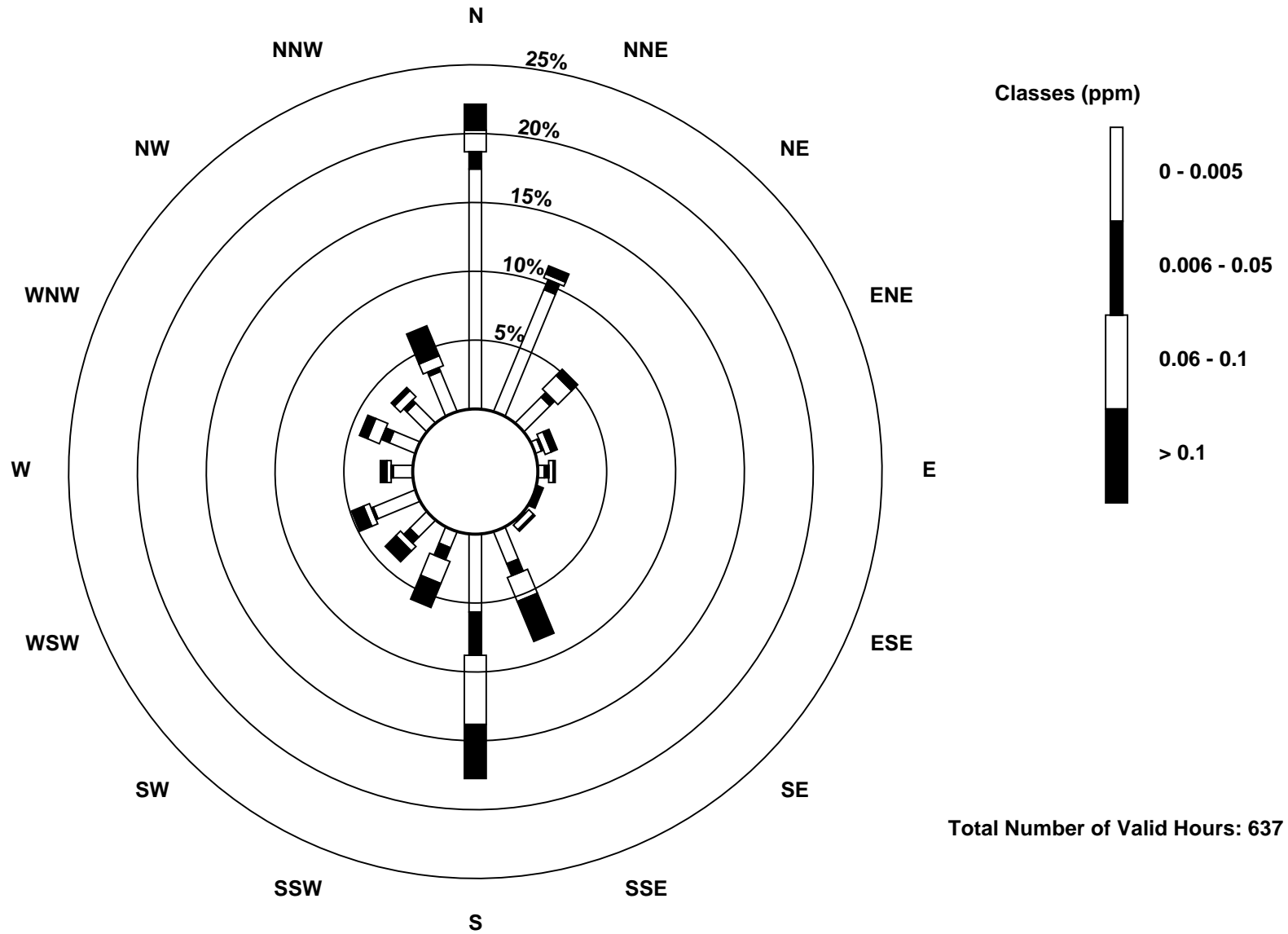
Total Number of Valid Hours: 637

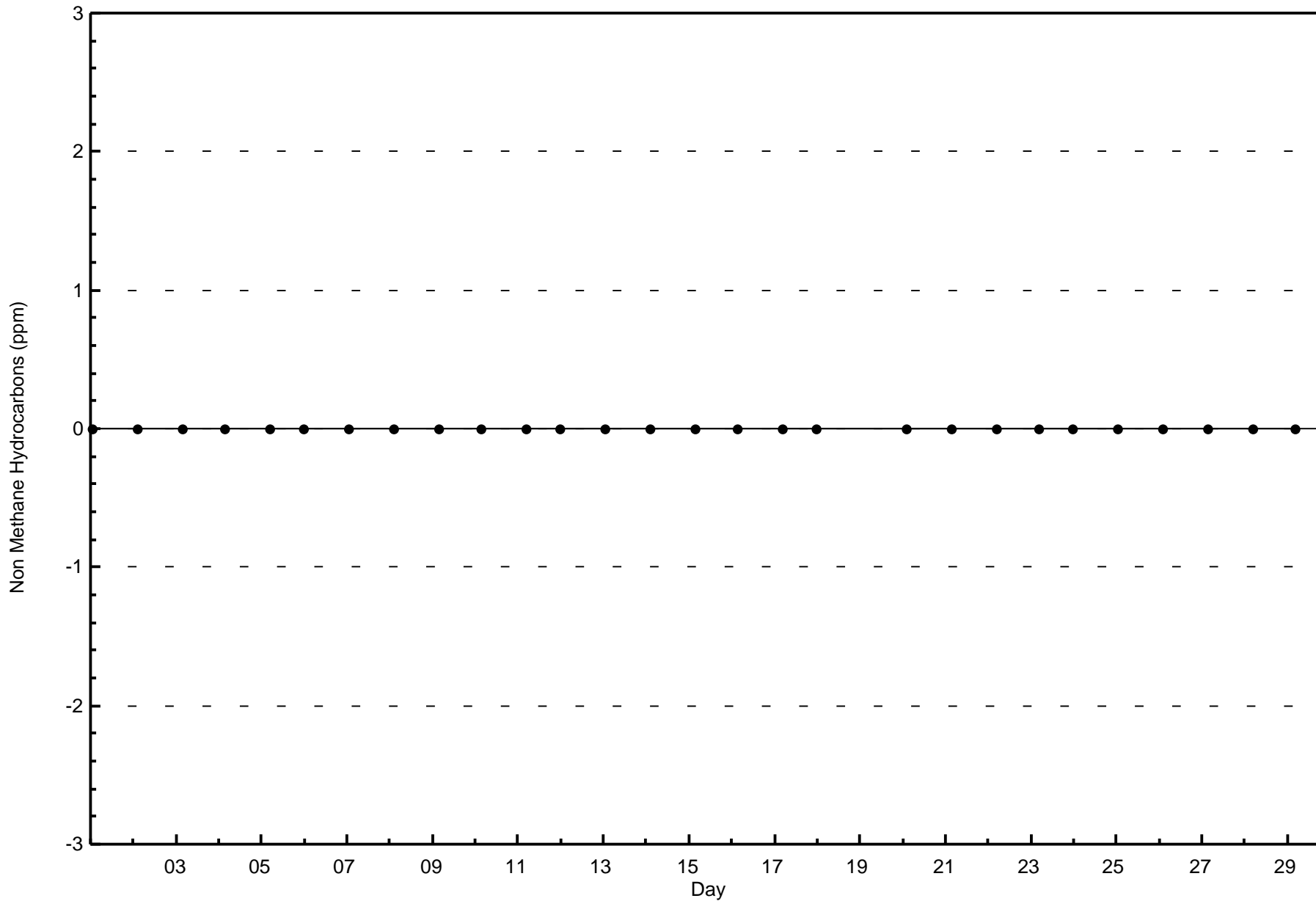
Total Number of Hours: 696

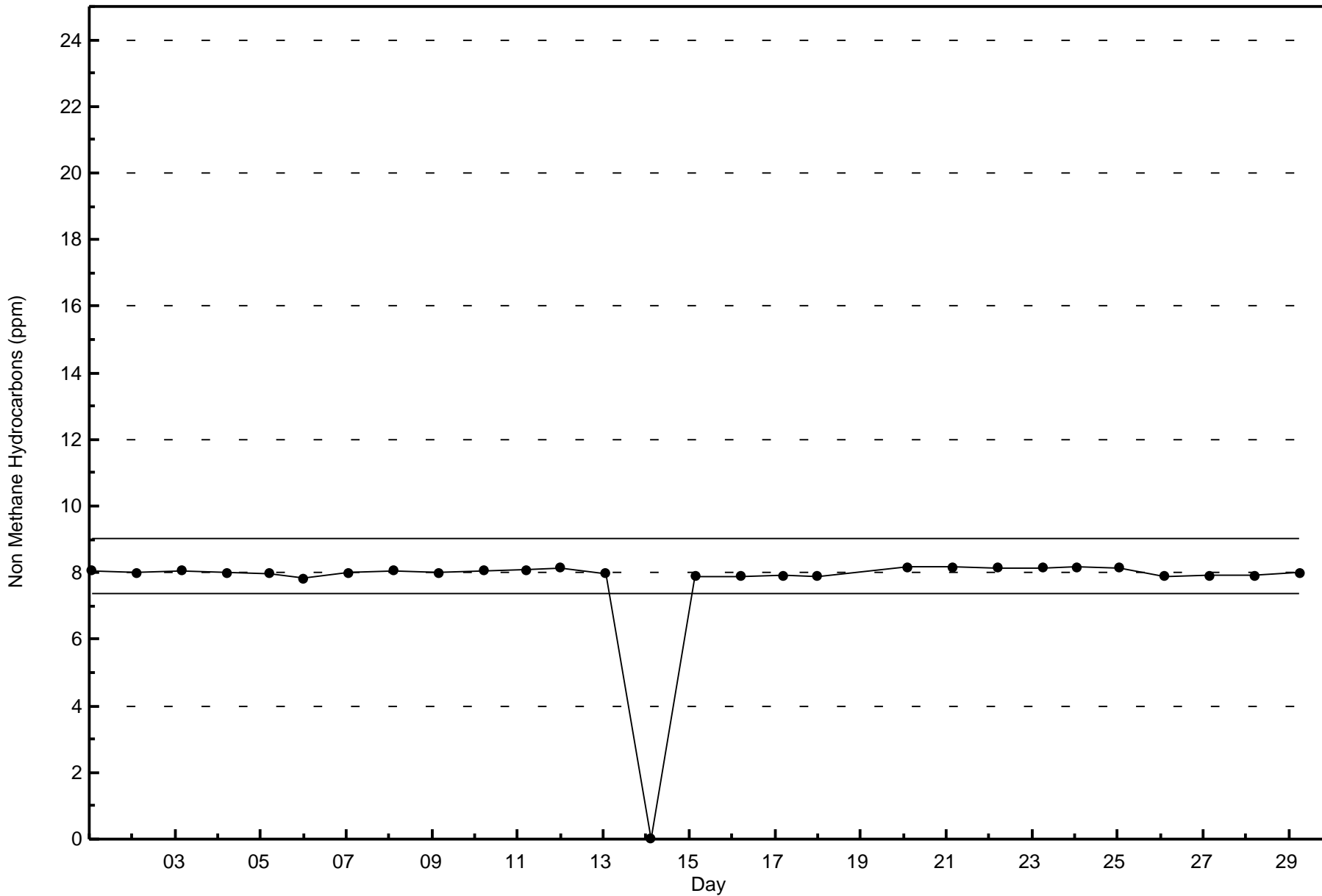


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









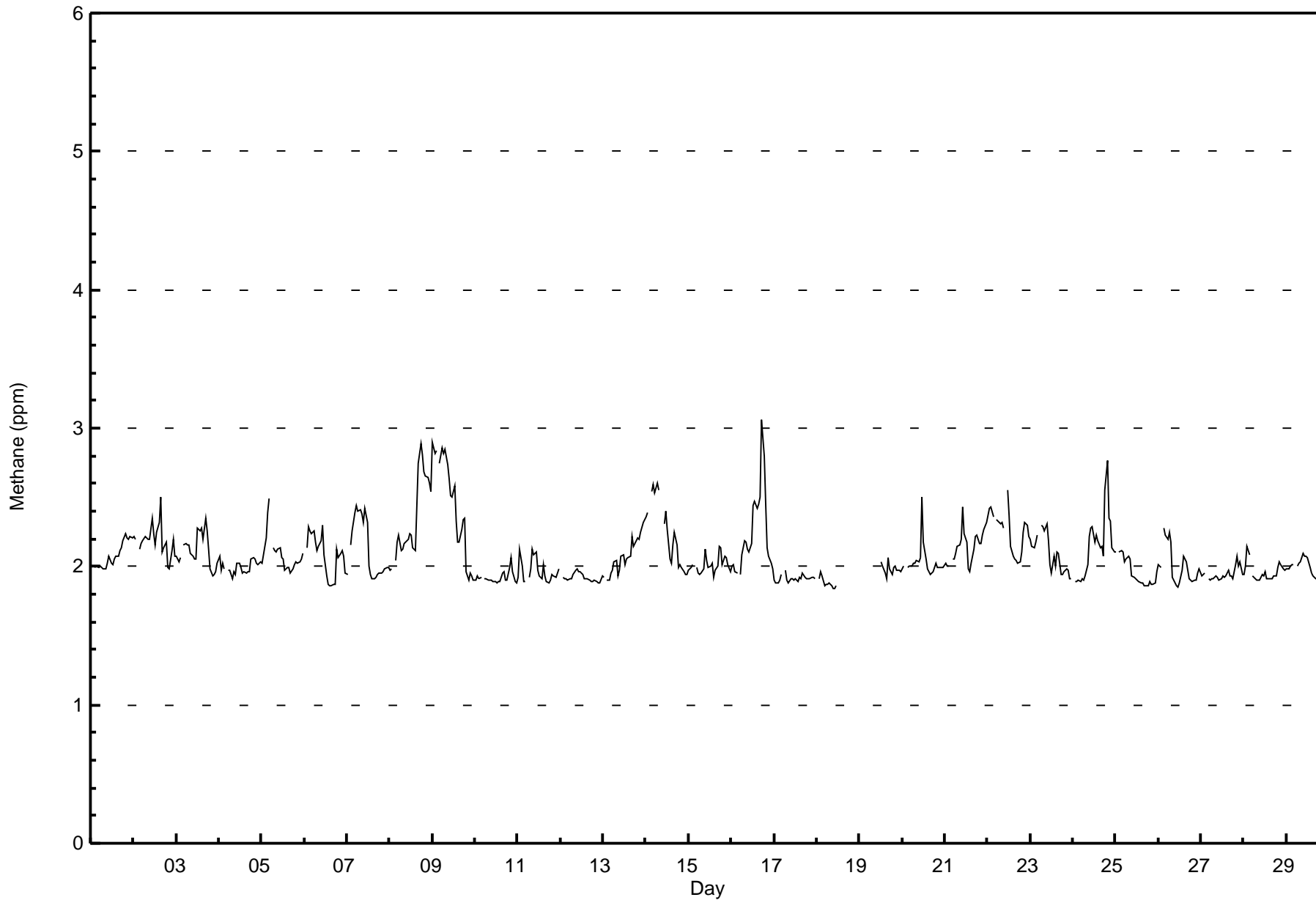
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Fort McKay - Bertha Ganter - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696													
Maximum Value: 3.1 ppm on Feb 16 18:00														Maximum Daily Average: 2.4 ppm on Feb 9													
Minimum Value: 1.8 ppm on Feb 18 11:00														Minimum Daily Average: 1.9 ppm on Feb 17													
Maximum Diurnal Average: 2.1 ppm at hour 5														Minimum Diurnal Average: 2.0 ppm at hour 15													
Monthly Average: 2.08 ppm														Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 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	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	
2-Feb	2.2	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.5	2.1	2.1	2.2	2.0	2.0	2.1	2.2	2.1	2.2	2.5
3-Feb	2.1	2.0	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.3	2.3	2.3	2.2	2.4	2.3	2.1	2.0	1.9	1.9	2.0	2.0	2.1	2.4	
4-Feb	2.1	2.0	2.0	2.0	Z	2.0	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	
5-Feb	2.0	2.1	2.2	2.4	2.5	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.5	
6-Feb	Z	2.1	2.3	2.3	2.2	2.3	2.2	2.1	2.1	2.2	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.3	
7-Feb	1.9	Z	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	
8-Feb	2.0	2.0	Z	2.0	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.4	2.7	2.9	2.8	2.7	2.7	2.6	2.6	2.5	2.3	2.9	
9-Feb	2.9	2.8	2.8	Z	2.7	2.9	2.8	2.8	2.7	2.6	2.5	2.5	2.6	2.3	2.2	2.2	2.3	2.3	2.4	2.0	1.9	2.0	1.9	1.9	2.4	2.9	
10-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	2.0	2.0	1.9	1.9	2.0	2.1	2.0	1.9	1.9	1.9	2.1	
11-Feb	1.9	2.1	2.0	1.9	1.9	Z	1.9	2.0	2.1	2.1	2.1	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	
12-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
13-Feb	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.0	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.1	2.3	
14-Feb	2.4	2.4	Z	2.5	2.6	2.5	2.6	2.6	M	M	2.3	2.4	2.3	2.1	2.0	2.2	2.2	2.2	2.0	2.0	2.0	1.9	1.9	1.9	2.2	2.6	
15-Feb	2.0	2.0	2.0	Z	2.0	2.0	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.1	
16-Feb	2.0	2.0	2.0	1.9	Z	1.9	2.1	2.2	2.2	2.1	2.1	2.2	2.4	2.5	2.4	2.4	2.5	3.1	2.8	2.5	2.1	2.1	2.0	2.0	2.2	3.1	
17-Feb	1.9	1.9	1.9	1.9	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
18-Feb	Z	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	C	M	M	M	M	M	M	M	M	M	M	M	--	2.0	
19-Feb	M	M	M	M	M	M	M	M	M	M	C	C	C	2.0	2.0	2.0	1.9	2.1	2.0	1.9	2.0	2.0	2.0	2.0	--	2.1	
20-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5	2.2	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5	
21-Feb	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.2	2.2	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.1	2.4	
22-Feb	2.4	2.4	2.4	2.4	Z	2.3	2.3	2.3	2.3	2.3	M	2.6	2.4	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.2	2.3	2.6	
23-Feb	2.2	2.1	2.1	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.2	2.0	2.0	2.1	2.0	2.1	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.1	2.3	
24-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.6	2.8	2.4	2.3	2.1	2.1	2.1	2.8	
25-Feb	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.1	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	2.0	2.0	2.0	2.1	
26-Feb	2.0	2.0	Z	2.3	2.2	2.2	2.2	2.2	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.3	
27-Feb	1.9	1.9	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1	2.0	2.0	1.9	1.9	2.1	
28-Feb	1.9	2.0	2.1	2.1	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
29-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.1	PF	PF	PF	PF	2.0	2.1	
																								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 2.0 2.0 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.0																											
2.9 2.8 2.8 2.5 2.7 2.9 2.8 2.8 2.7 2.6 2.5 2.6 2.6 2.5 2.4 2.5 2.7 3.1 2.8 2.8 2.7 2.6 2.6 2.5																											
Z - zerspan C - Calibration M - Maintenance PF - Power Failure																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	362	56.83	56.83
2.1 - 3.0	274	43.01	99.84
3.1 - 10.0	1	0.16	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 696



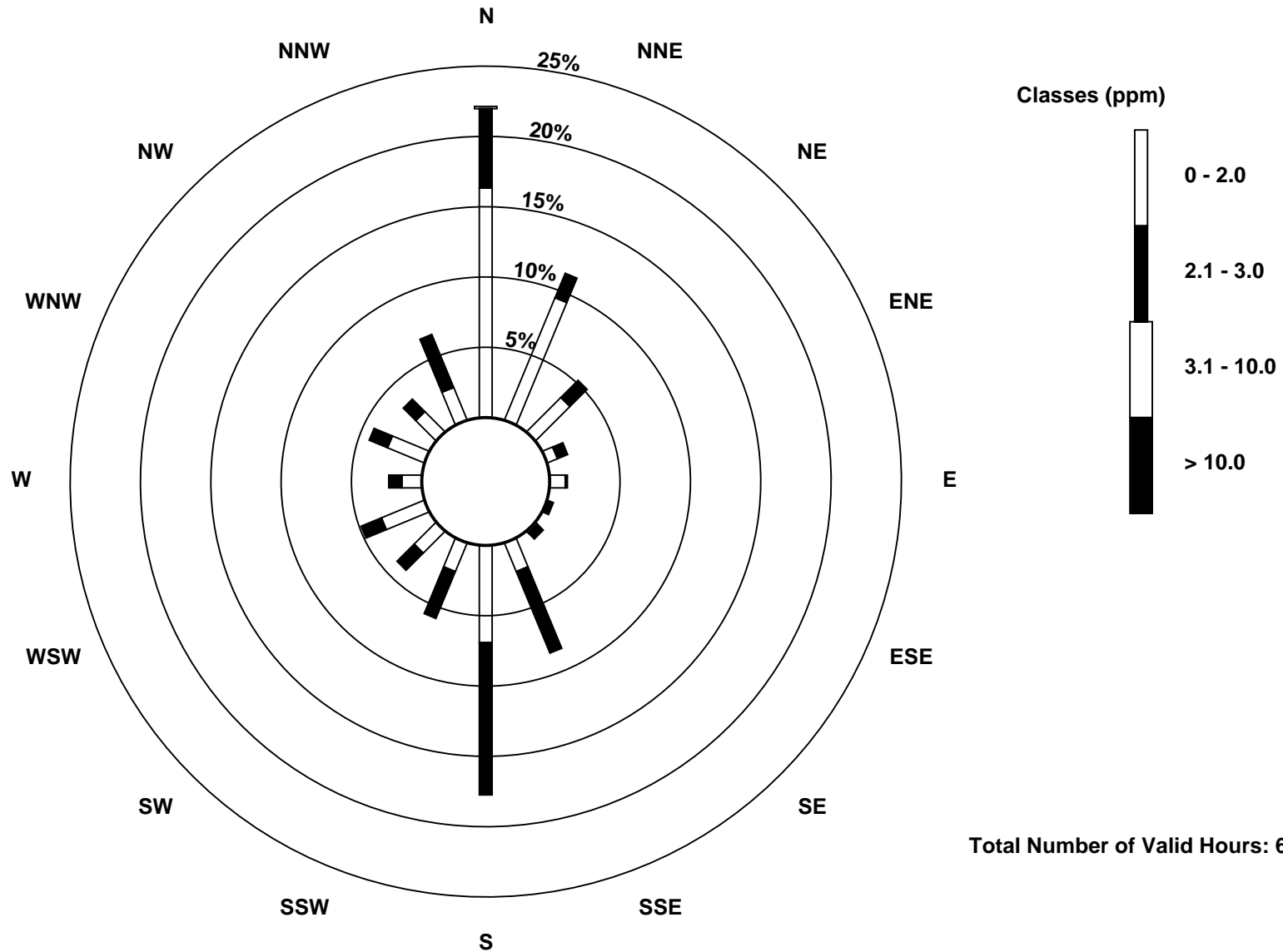
Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - February 2016

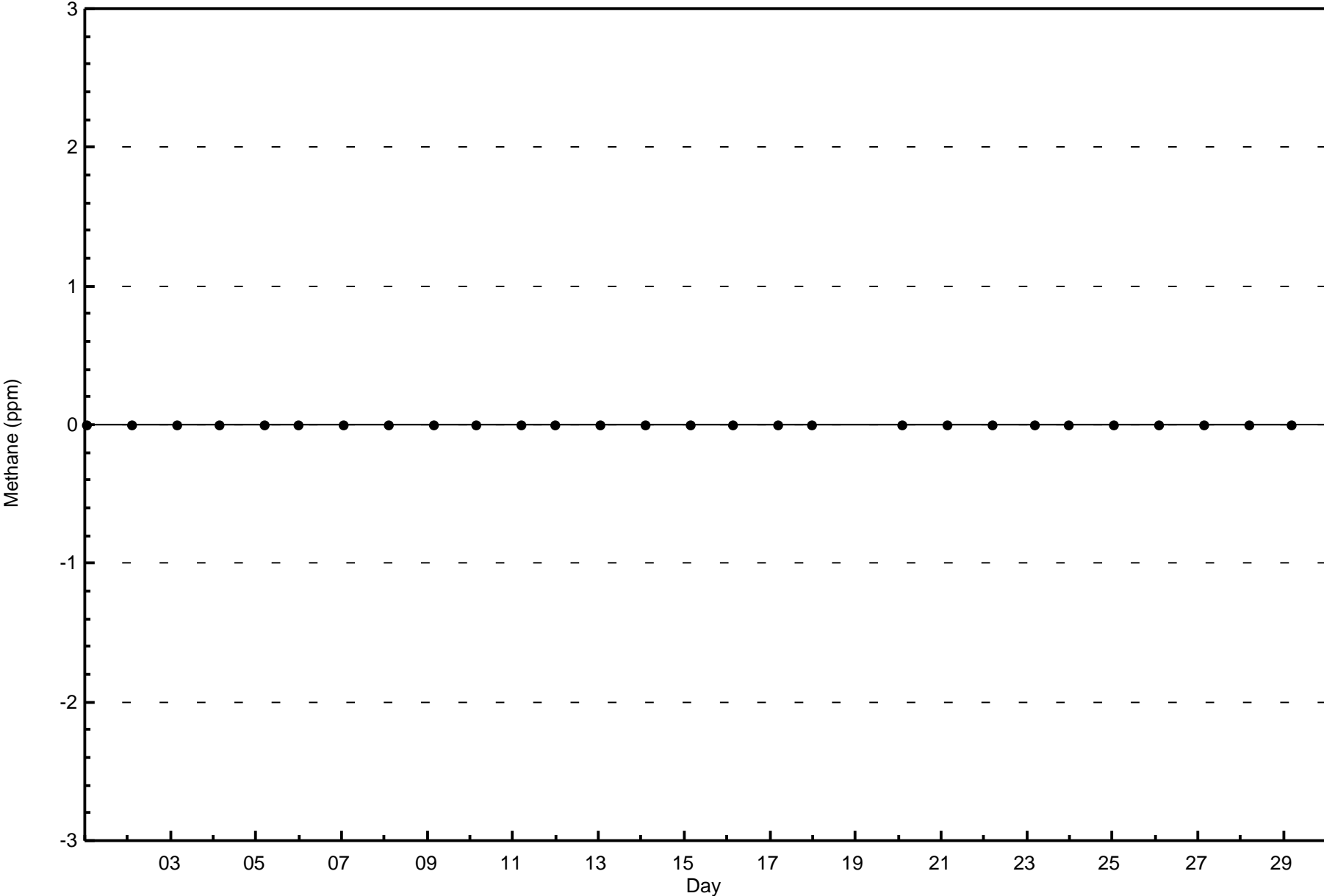
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	104	60	22	5	7	0	1	14	44	14	14	21	9	18	13	16	362
2.1 - 3.0	36	12	11	5	1	3	4	40	69	23	11	10	6	9	8	26	274
3.1 - 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	141	72	33	10	8	3	5	54	113	37	25	31	15	27	21	42	637

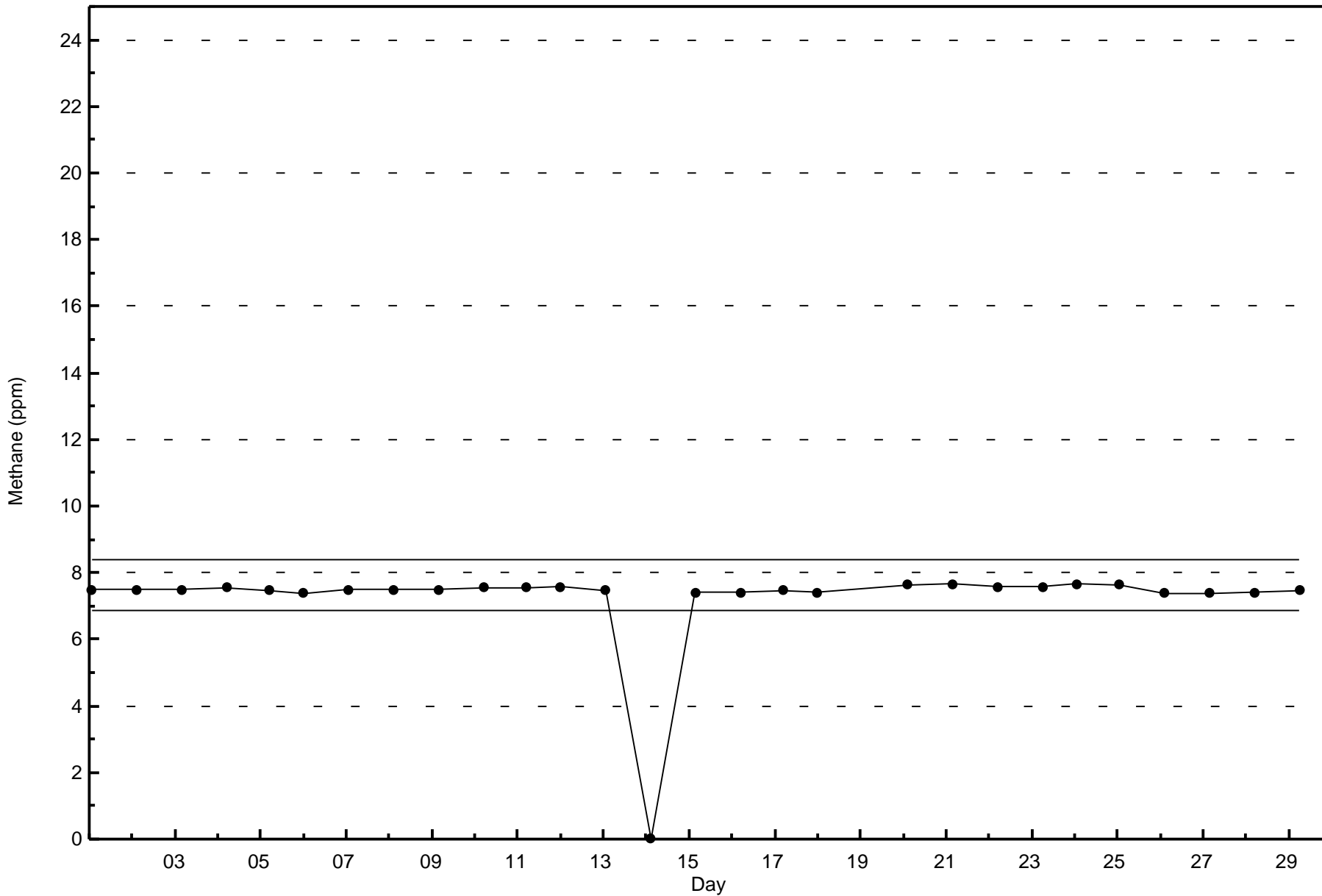
Total Number of Valid Hours: 637

Total Number of Hours: 696



Total Number of Valid Hours: 637







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

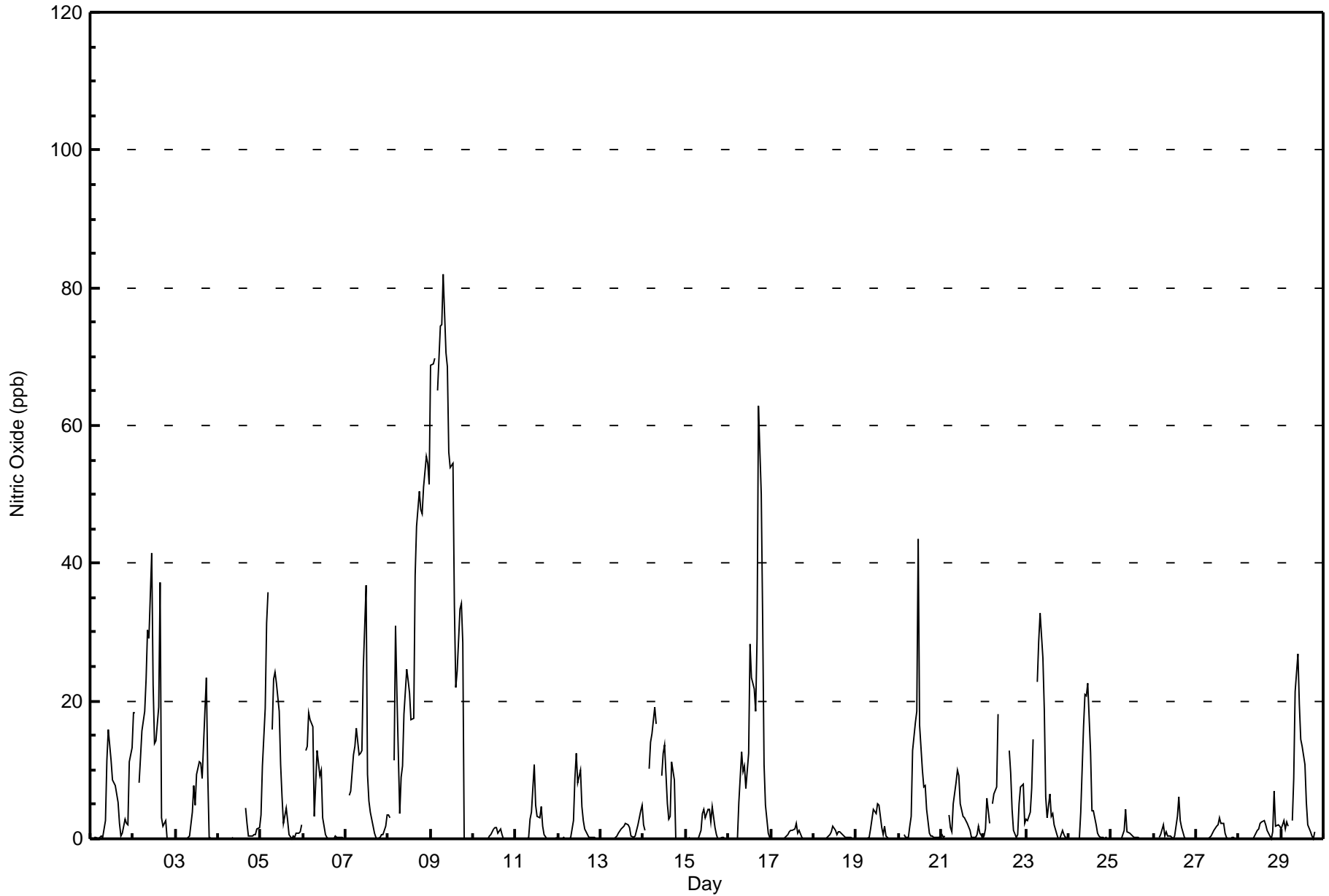
Fort McKay - Bertha Ganter - February 2016

Maximum Value: 82 ppb on Feb 9 08:00																		Maximum Daily Average: 42.8 ppb on Feb 9						Hours in Service: 696		
Minimum Value: 0 ppb on Feb 6 18:00																		Minimum Daily Average: 0.4 ppb on Feb 10						Hours of Data: 650		
Maximum Diurnal Average: 12.6 ppb at hour 11																		Minimum Diurnal Average: 2.9 ppb at hour 22						Hours of Missing Data: 46		
Monthly Average: 6.5 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 7 P ₉₀ = 19 P ₉₉ = 69						Hours of Calibration: 40		
																								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	0	Z	0	0	0	0	0	0	3	11	16	11	9	8	8	5	2	0	1	3	2	2	11	13	4.7	16
2-Feb	18	18	Z	8	12	16	19	23	30	29	42	22	14	14	19	37	3	2	3	0	0	0	0	0	14.3	42
3-Feb	0	0	0	Z	0	0	0	0	0	0	4	8	5	9	11	11	9	19	23	9	0	0	0	0	4.8	23
4-Feb	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	5	2	0	0	1	1	1	2	--	5
5-Feb	3	11	19	31	36	Z	16	23	24	23	19	11	6	2	4	3	1	0	0	0	1	1	1	2	10.3	36
6-Feb	Z	13	13	18	17	16	3	8	13	9	10	3	1	0	0	0	0	0	0	0	0	0	0	0	5.5	18
7-Feb	0	Z	6	7	12	13	16	12	12	13	25	37	9	5	4	2	1	0	0	0	1	1	2	3	7.9	37
8-Feb	3	3	Z	11	31	21	4	9	11	18	25	23	21	17	18	38	45	51	48	47	51	55	54	51	28.5	55
9-Feb	69	69	70	Z	65	74	75	82	71	68	56	54	54	34	22	24	33	34	28	0	0	0	0	0	42.8	82
10-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0.4	2
11-Feb	0	0	0	0	0	Z	0	0	3	4	11	5	3	3	5	2	1	0	0	0	0	0	0	0	1.6	11
12-Feb	Z	0	0	0	0	0	0	0	3	9	12	8	10	5	3	1	1	0	0	0	0	0	0	0	2.3	12
13-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	0	0	0	1	2	4	5	1.1	5
14-Feb	2	1	Z	10	14	15	19	17	M	M	9	12	14	5	3	3	11	8	0	0	0	0	0	0	6.9	19
15-Feb	0	0	0	Z	0	0	0	0	1	4	4	3	4	4	2	5	2	1	0	0	0	0	0	0	1.3	5
16-Feb	0	0	0	0	Z	0	5	13	10	11	7	12	28	23	22	18	29	63	50	32	11	5	1	0	14.8	63
17-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0.5	2
18-Feb	Z	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.4	2
19-Feb	0	Z	0	0	0	0	0	0	1	3	4	4	5	5	2	1	2	0	0	0	0	0	0	0	1.2	5
20-Feb	0	0	Z	1	0	0	2	3	13	17	19	44	16	10	8	8	4	1	0	0	0	0	0	0	6.4	44
21-Feb	1	0	0	Z	3	2	1	5	8	10	9	5	3	3	3	2	1	0	0	0	1	2	1	0	2.7	10
22-Feb	0	2	6	2	Z	5	7	8	18	C	C	C	C	C	13	9	4	1	0	1	5	7	8	2	5.5	18
23-Feb	3	3	4	7	14	Z	23	29	33	26	19	6	3	6	3	4	2	1	0	0	1	1	0	0	8.2	33
24-Feb	Z	0	0	0	0	0	0	4	16	21	21	23	13	4	4	2	1	0	0	0	0	0	0	0	4.7	23
25-Feb	0	Z	0	0	0	0	0	1	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
26-Feb	0	0	Z	0	1	2	0	1	0	0	0	0	0	3	6	3	2	0	0	0	0	0	0	0	0.9	6
27-Feb	0	0	0	Z	0	0	0	0	0	1	1	2	2	3	2	2	1	0	0	0	0	0	0	0	0.7	3
28-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	2	2	3	2	1	1	0	1	7	2	2	2	1.2	7
29-Feb	1	3	1	2	2	Z	3	9	21	27	19	14	13	11	5	2	1	0	0	1	PF	PF	PF	PF	7.2	27
4.1 5.1 5.0 4.1 8.7 6.9 6.6 8.5 10.6 11.9 12.6 11.6 9.2 6.9 6.2 6.6 6.0 6.5 4.9 3.0 2.9 2.9 3.1 2.9																		Diurnal Average								
69 69 70 31 65 74 75 82 71 68 56 54 54 34 22 38 45 63 50 47 51 55 54 51																		Diurnal Maximum								
Z - zerspan		C - Calibration			M - Maintenance			PF - Power Failure																		



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	587	90.31	90.31
21 - 40	39	6.00	96.31
41 - 80	23	3.54	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 650

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	137	68	33	11	8	1	6	42	95	34	24	29	14	27	20	38	587
21 - 40	4	4	2	1	1	1	0	8	13	2	0	0	0	0	1	2	39
11 - 80	6	1	1	0	0	1	1	2	2	2	0	2	1	1	0	3	23
81 - 159	0	0	0	0	0	0	0	0	0	0	1	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	147	73	36	12	9	3	7	52	110	38	25	31	15	28	21	43	650

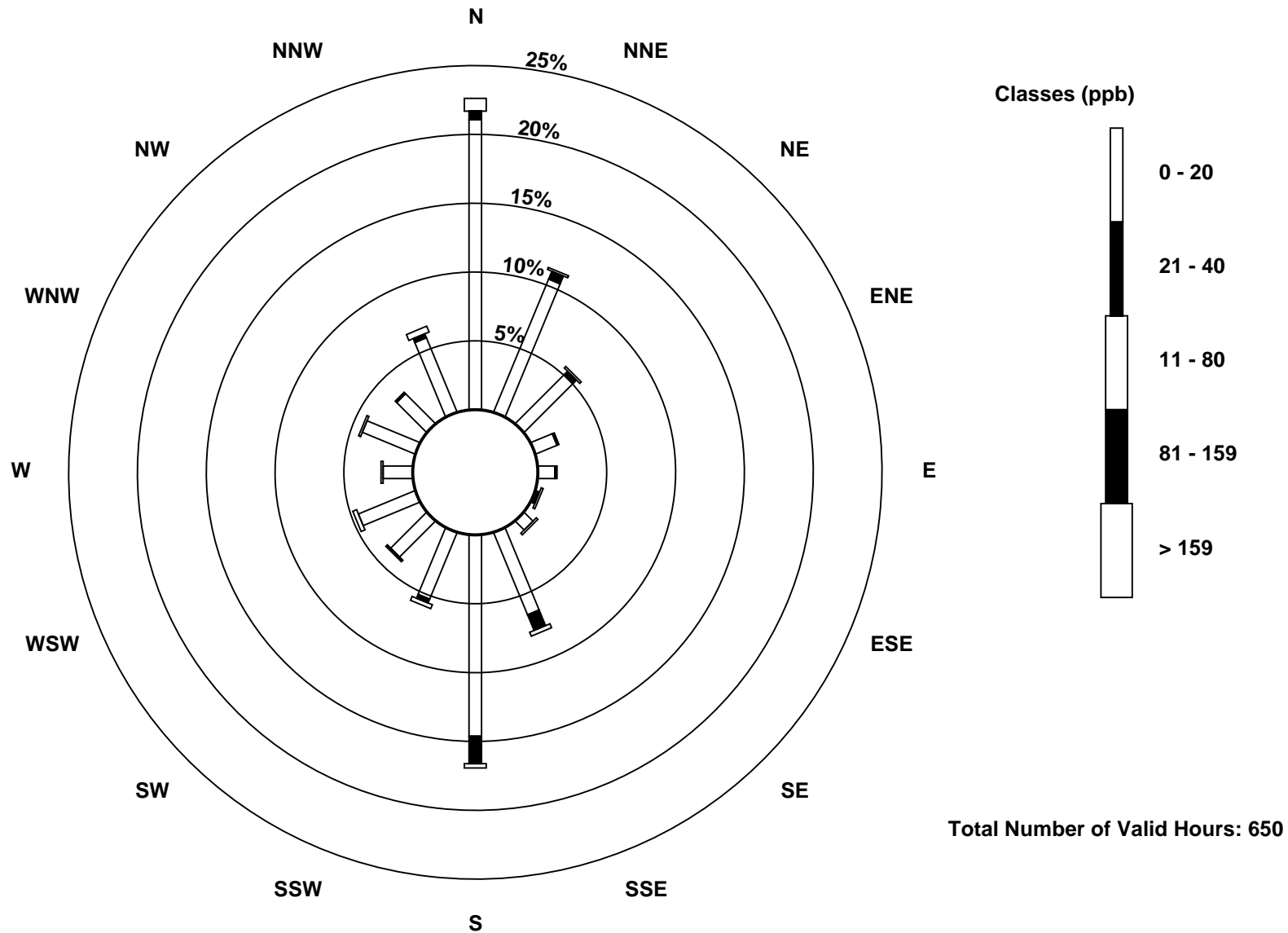
Total Number of Valid Hours: 650

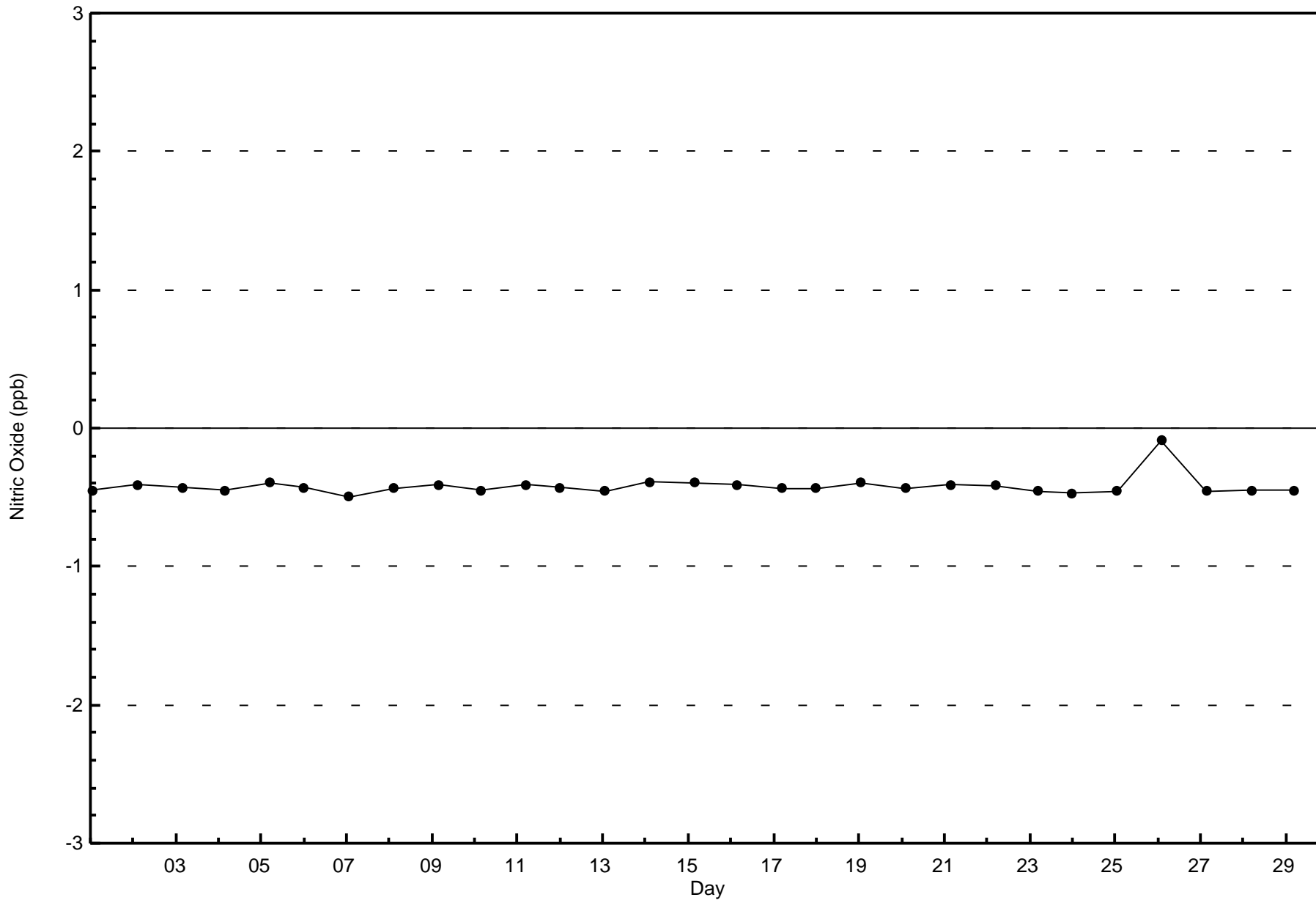
Total Number of Hours: 696

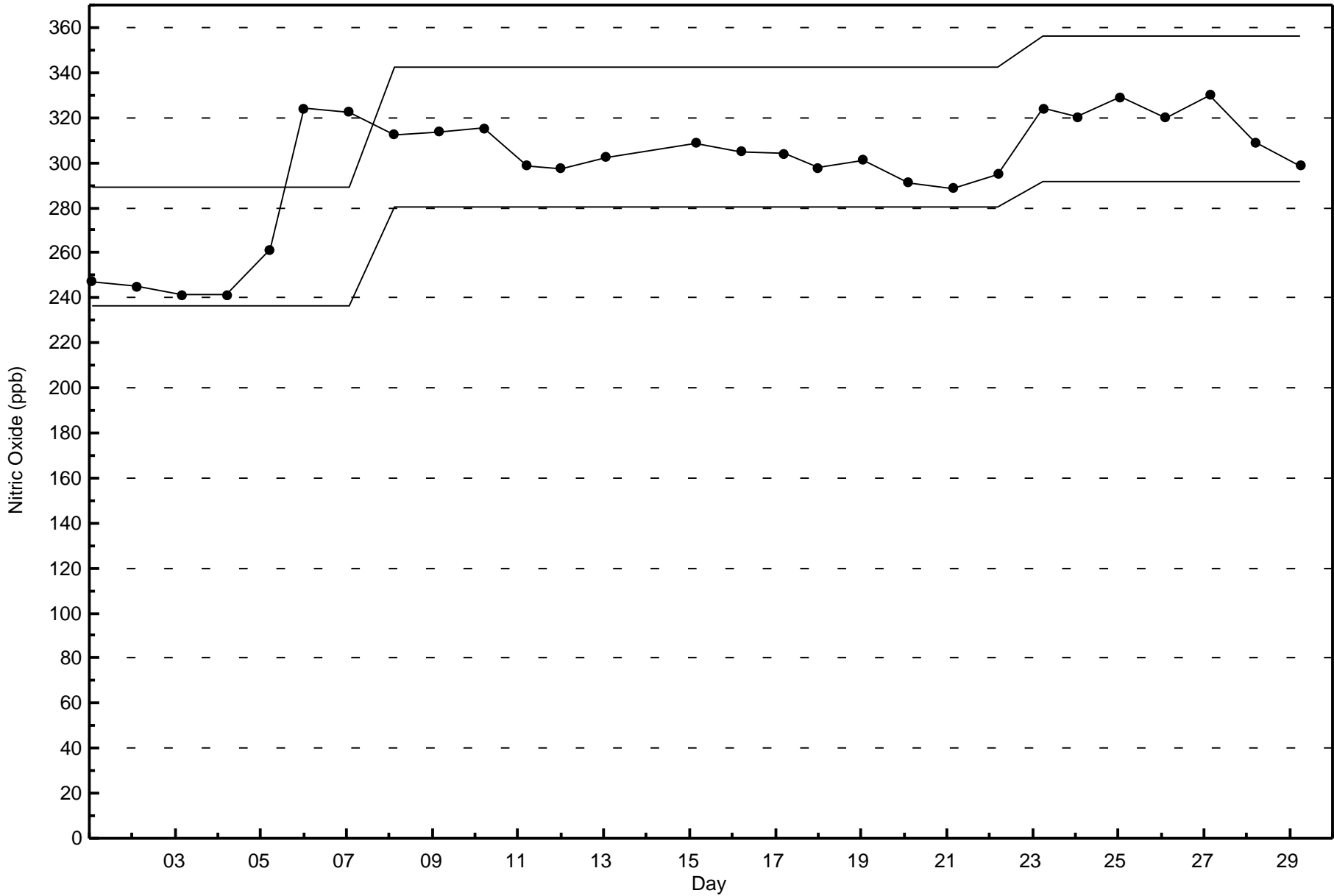


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

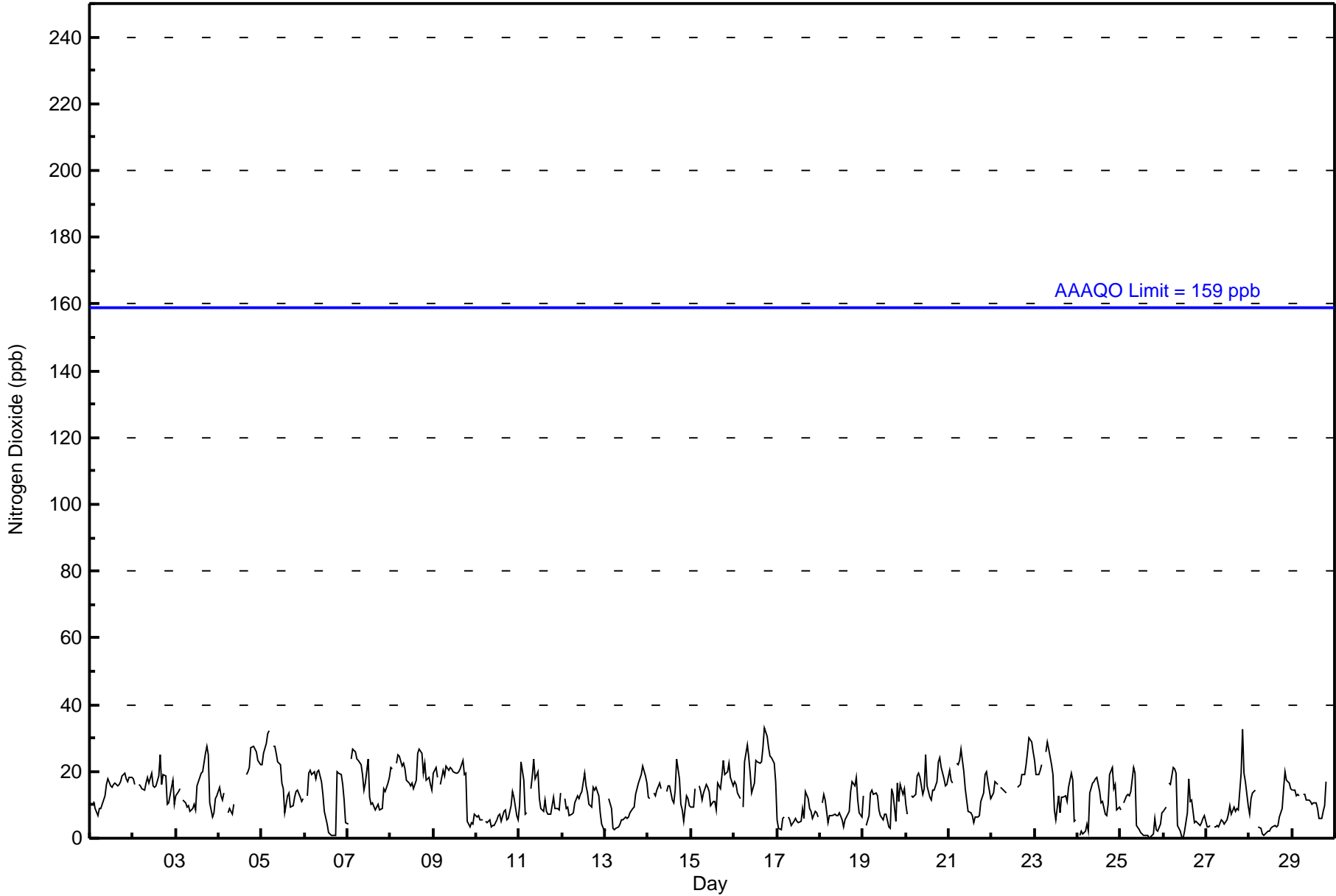
Fort McKay - Bertha Ganter - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 33 ppb on Feb 16 18:00										Maximum Daily Average: 21.3 ppb on Feb 16																
Minimum Value: 0 ppb on Feb 26 12:00										Minimum Daily Average: 6.4 ppb on Feb 25																
Maximum Diurnal Average: 15.4 ppb at hour 20										Minimum Diurnal Average: 10.3 ppb at hour 14																
Monthly Average: 13.0 ppb										Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 13 Q ₃ = 18 P ₉₀ = 22 P ₉₉ = 29																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	Z	11	9	7	9	9	10	13	16	18	16	15	16	17	16	16	17	19	20	18	17	18	18	14.3	20
2-Feb	18	16	Z	16	16	15	14	17	18	17	19	16	15	16	19	25	16	19	19	10	11	15	18	10	16.2	25
3-Feb	13	14	15	Z	11	11	9	10	8	9	10	8	16	18	19	20	25	27	25	10	6	8	12	13	13.8	27
4-Feb	15	13	12	13	Z	8	9	7	10	C	C	C	C	C	C	19	20	21	27	28	27	26	23	22	--	28
5-Feb	22	25	28	32	Z	28	28	26	23	22	17	15	8	13	14	9	10	12	14	15	12	11	12	18.5	32	
6-Feb	Z	13	20	20	19	20	18	20	20	17	13	8	4	2	1	1	1	1	20	19	19	16	12	5	12.5	20
7-Feb	4	Z	24	27	26	24	24	22	19	15	17	24	12	10	11	8	9	10	8	9	15	14	17	18	15.9	27
8-Feb	21	21	Z	22	25	24	22	23	21	17	16	16	17	15	17	26	27	25	20	22	18	18	16	14	20.1	27
9-Feb	20	21	18	Z	16	20	19	21	20	21	21	20	19	19	20	21	24	19	20	5	4	5	4	7	16.7	24
10-Feb	6	7	6	5	Z	5	5	6	3	4	4	6	7	7	5	8	9	5	6	10	14	12	7	6	6.6	14
11-Feb	10	23	18	7	8	Z	15	19	24	18	20	12	9	8	12	8	7	7	10	12	9	9	8	13	12.4	24
12-Feb	Z	12	9	9	7	7	8	11	13	12	13	14	20	16	14	10	10	15	14	15	13	8	4	2	11.0	20
13-Feb	3	Z	12	9	3	3	3	4	4	5	6	6	6	7	8	9	10	13	16	18	19	21	19	17	9.5	21
14-Feb	12	12	Z	14	13	15	17	15	M	M	14	16	16	12	11	14	24	18	10	8	5	13	12	10	13.2	24
15-Feb	9	9	15	Z	16	14	11	14	16	15	14	10	11	11	9	16	15	19	23	19	20	23	18	16	14.8	23
16-Feb	17	16	14	12	Z	10	23	28	24	20	14	17	23	23	23	23	27	33	31	27	25	24	23	17	21.3	33
17-Feb	5	3	3	6	6	Z	6	6	4	5	6	5	5	5	9	6	14	12	9	8	6	8	8	7	6.5	14
18-Feb	Z	10	13	11	5	7	7	7	7	7	7	8	6	3	5	6	8	14	17	16	18	12	8	6	9.0	18
19-Feb	13	Z	4	7	14	14	13	13	13	9	7	5	7	7	3	3	15	13	5	16	11	16	13	15	10.3	16
20-Feb	10	7	Z	13	12	13	19	20	18	13	15	25	16	12	11	15	14	17	23	24	21	18	16	16	16.0	25
21-Feb	21	17	17	Z	23	22	23	27	20	15	12	8	8	7	5	6	6	7	11	14	19	20	17	12	14.5	27
22-Feb	13	14	17	16	Z	15	15	14	14	C	C	C	C	C	15	16	16	19	19	22	26	30	29	26	18.6	30
23-Feb	23	19	19	20	22	Z	26	29	27	22	19	9	6	13	8	12	12	13	11	15	19	17	5	5	16.2	29
24-Feb	Z	1	2	1	2	4	2	14	17	17	18	14	11	11	7	7	10	19	21	15	16	8	9	10.7	21	
25-Feb	8	Z	11	13	13	13	14	21	19	4	3	2	1	1	1	1	0	0	1	6	3	2	4	8	6.4	21
26-Feb	8	9	Z	17	16	21	21	20	4	2	1	0	2	8	18	11	12	5	5	5	4	5	6	7	8.8	21
27-Feb	3	3	4	Z	3	3	4	4	6	5	4	6	7	10	7	9	8	9	9	19	33	20	17	10	8.8	33
28-Feb	7	12	14	14	Z	3	3	1	1	1	2	2	3	3	4	4	4	6	9	15	20	18	16	15	7.7	20
29-Feb	14	14	13	13	13	Z	13	13	12	12	11	10	10	11	9	6	6	8	10	17	PF	PF	PF	PF	11.3	17
12.0 13.0 13.1 13.6 13.6 12.5 13.7 15.1 14.3 12.3 12.0 11.2 10.7 10.3 10.8 11.7 12.8 13.6 14.8 15.4 15.4 15.0 13.1 11.9																								Diurnal Average		
23 25 28 32 32 24 28 29 27 23 22 25 23 23 23 26 27 33 31 28 33 30 29 26																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	559	86.00	86.00
21 - 40	91	14.00	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: 650

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	132	68	34	11	8	2	6	47	91	27	20	25	13	23	18	34	559
21 - 40	15	5	2	1	1	1	1	5	19	11	5	6	2	5	3	9	91
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	147	73	36	12	9	3	7	52	110	38	25	31	15	28	21	43	650

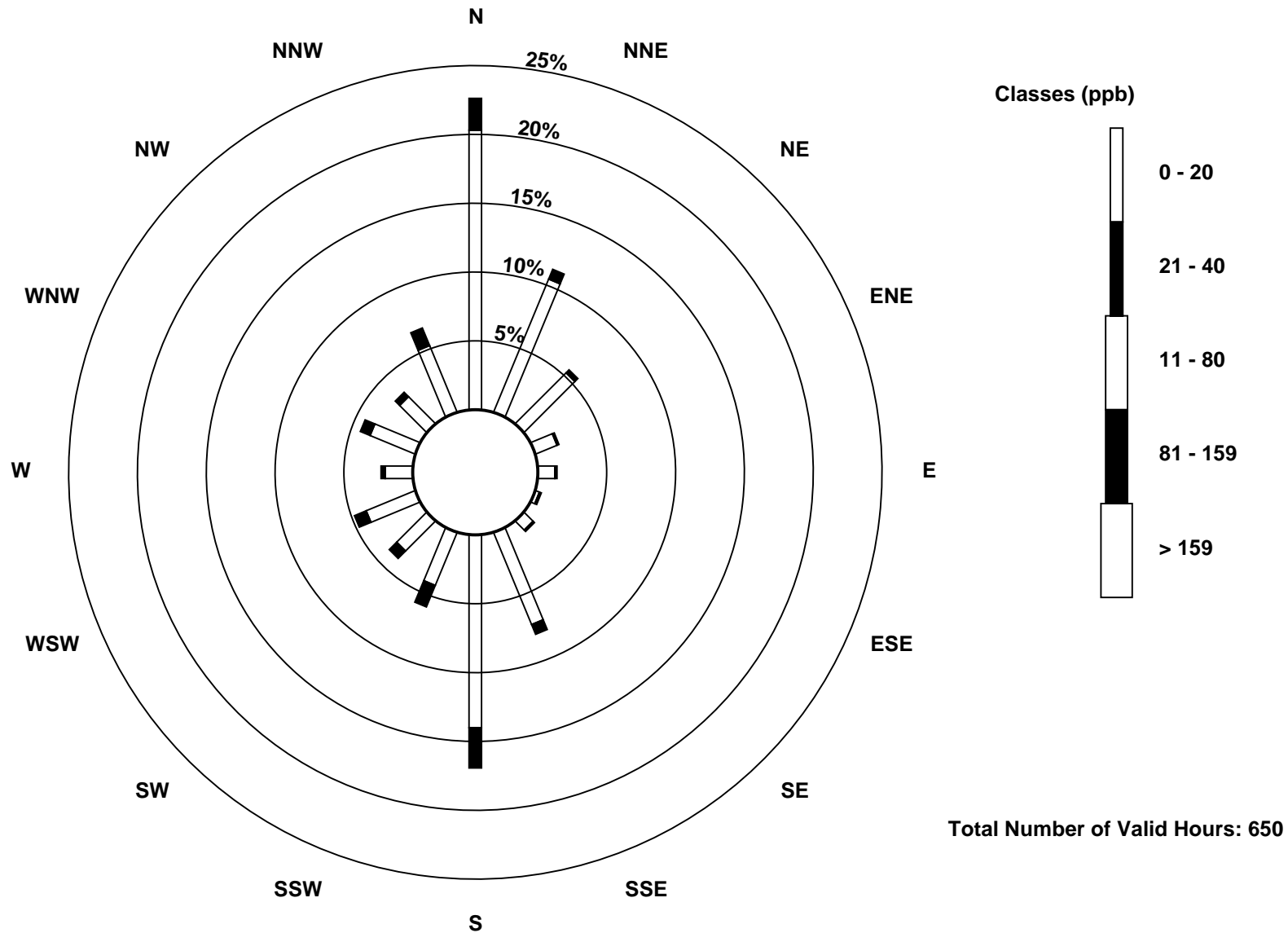
Total Number of Valid Hours: 650

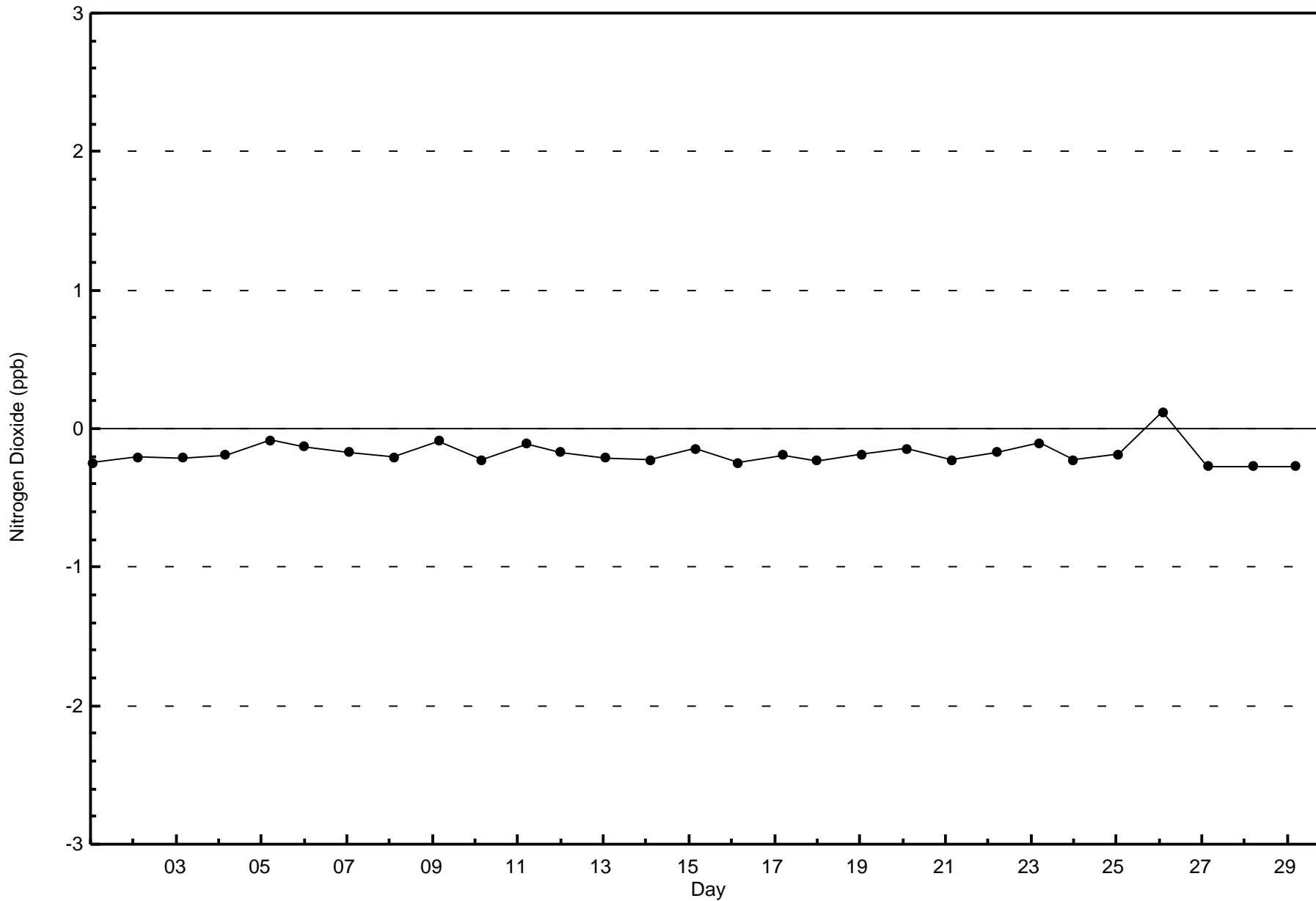
Total Number of Hours: 696

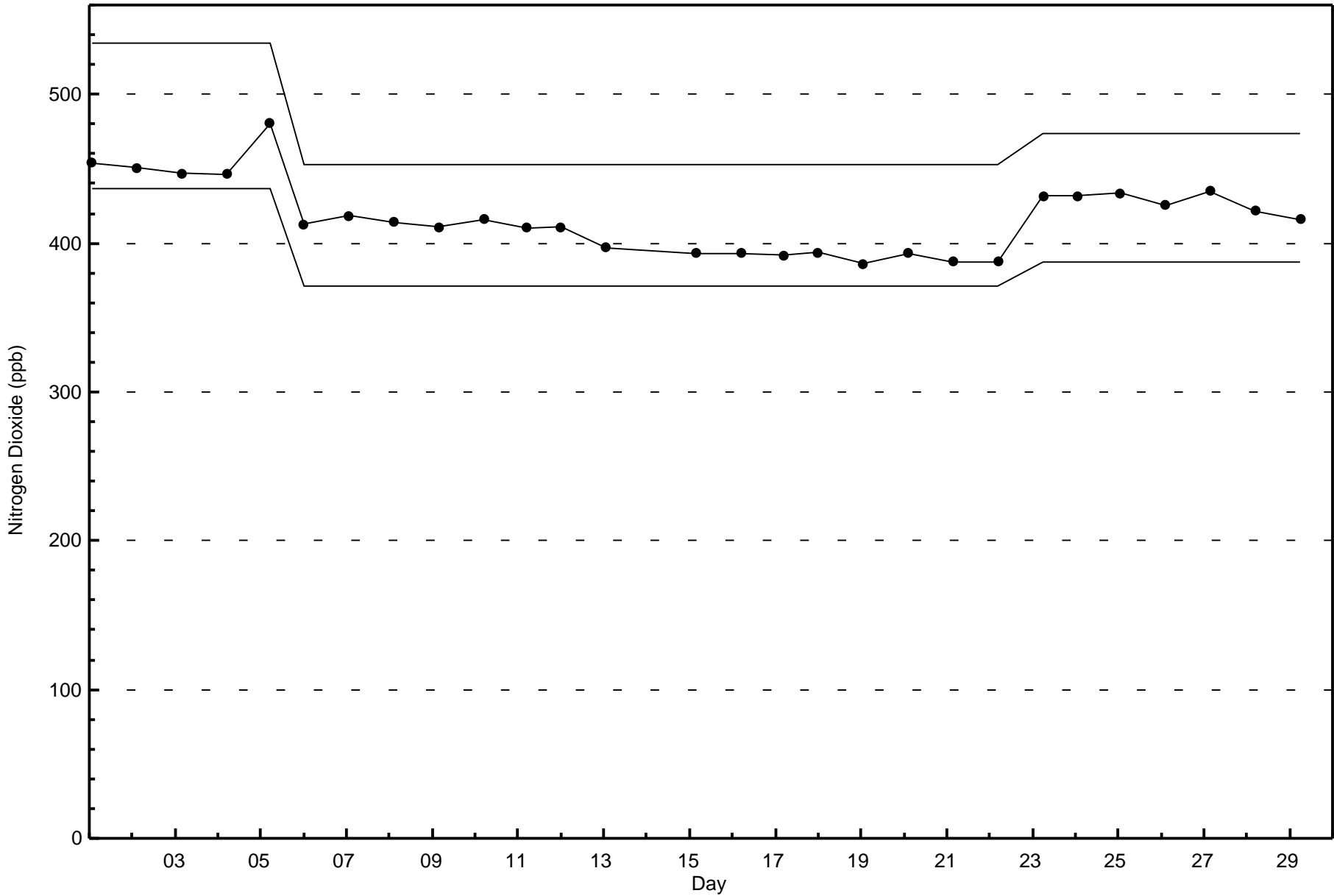


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









Wood Buffalo Environmental Association
Summary of Hour Averages

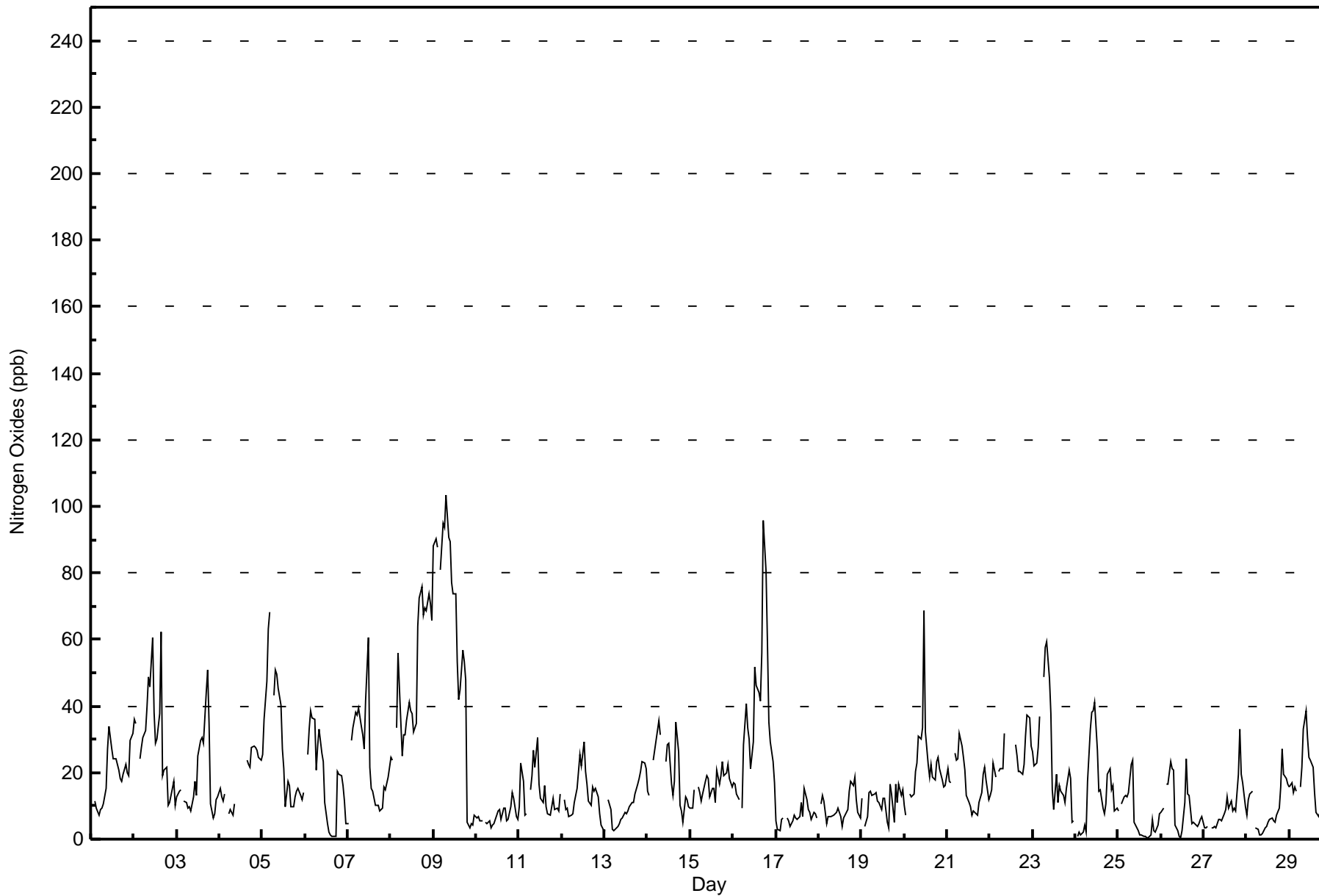
Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - February 2016

Maximum Value: 103 ppb on Feb 9 08:00		Maximum Daily Average: 59.4 ppb on Feb 9		Hours in Service: 696																						
Minimum Value: 0 ppb on Feb 25 17:00		Minimum Daily Average: 6.8 ppb on Feb 25		Hours of Data: 650																						
Maximum Diurnal Average: 24.9 ppb at hour 9		Minimum Diurnal Average: 14.8 ppb at hour 24		Hours of Missing Data: 46																						
Monthly Average: 19.5 ppb		Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 8 Median = 15 Q ₃ = 25 P ₉₀ = 39 P ₉₉ = 90		Hours of Calibration: 40																						
				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	5	Z	11	9	7	9	9	11	15	27	34	27	24	24	24	21	18	17	19	22	20	19	30	32	19.0	34
2-Feb	36	35	Z	24	27	31	33	40	49	46	61	38	29	30	38	62	19	21	21	10	11	15	18	10	30.6	62
3-Feb	13	14	15	Z	11	11	10	10	8	13	18	13	25	30	30	29	44	51	35	11	6	7	12	13	18.6	51
4-Feb	15	13	12	13	Z	8	9	7	11	C	C	C	C	C	C	24	22	28	28	28	27	25	24	--	28	
5-Feb	26	36	47	63	68	Z	43	51	50	45	40	27	21	10	17	16	10	10	13	14	15	13	12	14	28.8	68
6-Feb	Z	26	33	39	36	36	21	28	33	26	23	11	5	2	1	1	1	1	20	20	19	16	12	5	18.0	39
7-Feb	4	Z	30	34	38	37	40	34	31	27	41	61	22	15	14	10	10	10	8	9	16	15	19	22	23.8	61
8-Feb	25	24	Z	34	56	45	25	32	31	35	41	39	38	32	35	64	72	76	67	70	69	74	71	66	48.6	76
9-Feb	88	90	88	Z	81	95	93	103	91	90	77	74	74	53	42	45	57	53	48	5	3	5	4	7	59.4	103
10-Feb	6	7	6	5	Z	5	5	6	4	4	5	7	8	9	6	9	9	5	6	10	14	12	7	6	7.0	14
11-Feb	10	23	18	7	8	Z	15	19	27	22	31	17	12	11	16	10	8	7	10	12	9	9	8	13	14.0	31
12-Feb	Z	12	9	9	7	7	8	11	15	20	25	22	29	20	16	12	10	16	14	15	13	8	4	2	13.3	29
13-Feb	3	Z	12	9	3	3	3	4	5	6	6	8	7	8	10	11	11	14	17	18	21	23	23	21	10.7	23
14-Feb	14	13	Z	24	27	30	36	31	M	M	23	28	29	17	13	18	35	26	10	8	5	13	12	10	20.1	36
15-Feb	9	9	15	Z	16	14	11	14	17	19	18	13	15	15	11	21	16	19	23	19	20	23	18	16	16.2	23
16-Feb	17	16	14	12	Z	10	28	40	34	30	21	29	52	46	44	42	56	96	81	59	35	29	23	17	36.1	96
17-Feb	5	3	3	6	6	Z	6	6	4	6	7	6	6	7	11	7	15	12	9	8	6	8	7	7	7.0	15
18-Feb	Z	10	13	11	5	7	7	7	7	7	8	9	7	4	6	7	9	14	17	16	18	12	8	6	9.4	18
19-Feb	12	Z	4	7	14	14	13	13	14	11	11	9	12	12	5	4	17	13	5	17	11	16	13	15	11.5	17
20-Feb	10	7	Z	14	13	14	20	23	31	30	33	69	32	22	19	22	19	18	23	25	21	18	16	16	22.4	69
21-Feb	21	17	17	Z	26	24	24	32	28	25	21	13	11	10	7	9	8	7	11	14	20	22	18	12	17.2	32
22-Feb	13	15	23	18	Z	20	21	21	32	C	C	C	C	C	28	25	20	20	19	23	31	37	37	28	24.0	37
23-Feb	26	22	23	28	37	Z	49	58	59	48	38	15	9	19	11	16	14	13	11	15	21	18	5	6	24.4	59
24-Feb	Z	1	2	1	2	4	2	18	33	38	39	41	27	15	15	9	8	10	19	21	15	16	8	9	15.4	41
25-Feb	8	Z	11	13	13	13	14	22	24	5	3	3	1	1	1	1	0	0	1	6	3	2	4	8	6.8	24
26-Feb	8	9	Z	17	17	23	21	21	4	2	1	0	3	11	24	14	13	5	5	5	4	5	6	7	9.7	24
27-Feb	3	3	4	Z	3	3	4	4	6	6	5	7	9	13	9	12	9	9	9	19	33	20	17	10	9.5	33
28-Feb	7	12	14	14	Z	3	3	1	1	2	4	4	5	6	6	6	5	7	9	16	27	19	18	16	9.0	27
29-Feb	16	17	14	16	14	Z	16	22	33	38	30	25	24	21	14	8	7	9	10	18	PF	PF	PF	PF	18.5	38
																								Diurnal Average		
																								Diurnal Maximum		
16.1 18.1 18.1 17.8 22.3 19.4 20.3 23.7 24.9 24.2 24.6 22.8 19.8 17.2 17.0 18.3 18.7 20.1 19.7 18.4 18.3 17.9 16.2 14.8																										
88 90 88 63 81 95 93 103 91 90 77 74 74 53 44 64 72 96 81 70 69 74 71 66																										
Z - zerspan C - Calibration M - Maintenance PF - Power Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	428	65.85	65.85
21 - 40	163	25.08	90.92
41 - 80	48	7.38	98.31
81 - 159	9	1.38	99.69
> 159	0	0.00	99.69

Total Number of Valid Hours: 650

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	120	62	29	11	7	1	5	22	57	11	13	21	9	19	17	24	428
21 - 40	16	5	5	0	1	0	1	23	40	23	11	8	5	8	3	14	163
11 - 80	9	6	2	1	1	2	0	7	11	3	0	1	0	0	1	4	48
81 - 159	1	0	0	0	0	0	1	0	1	1	1	1	1	1	0	1	9
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	146	73	36	12	9	3	7	52	109	38	25	31	15	28	21	43	648

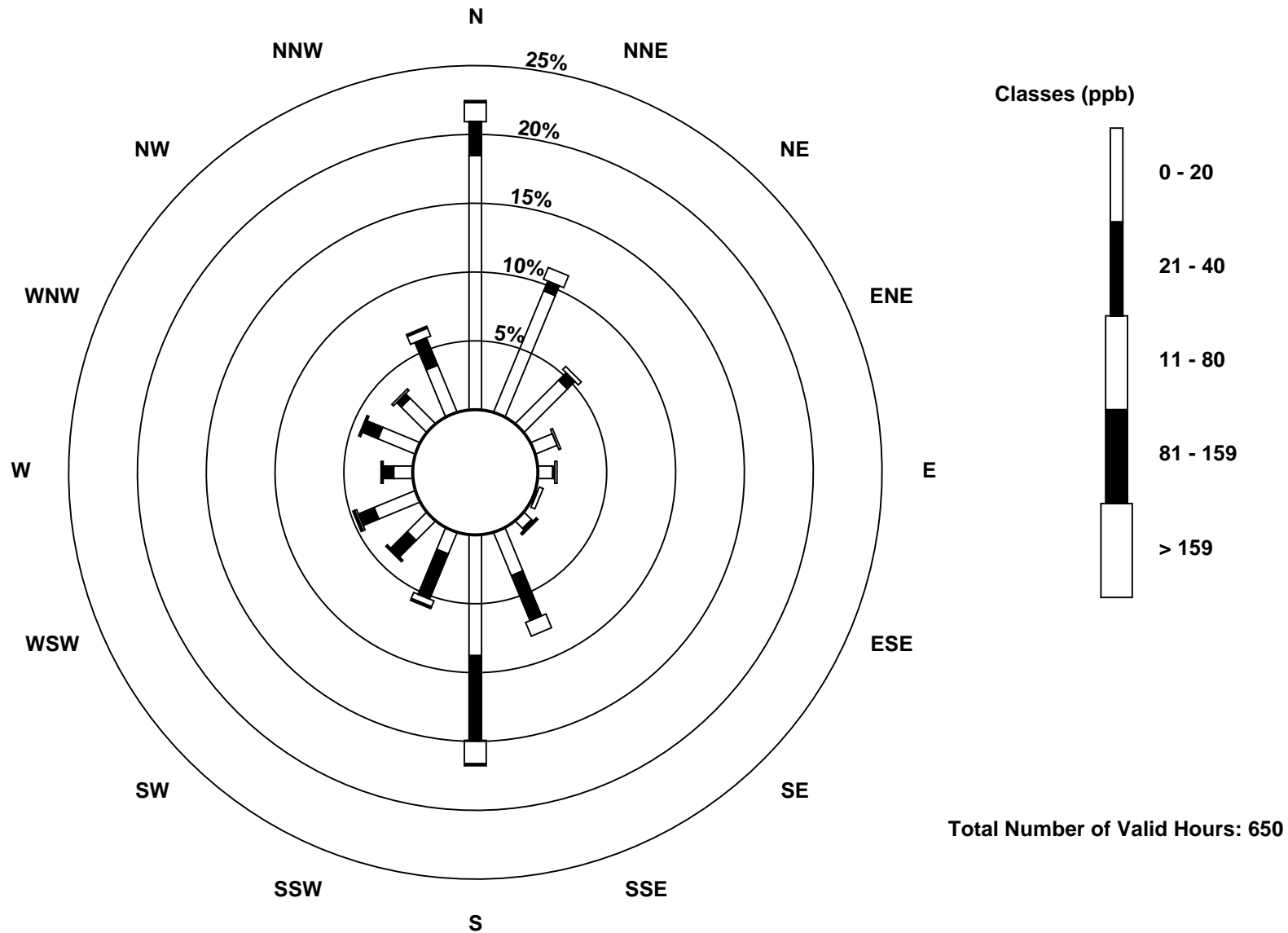
Total Number of Valid Hours: 650

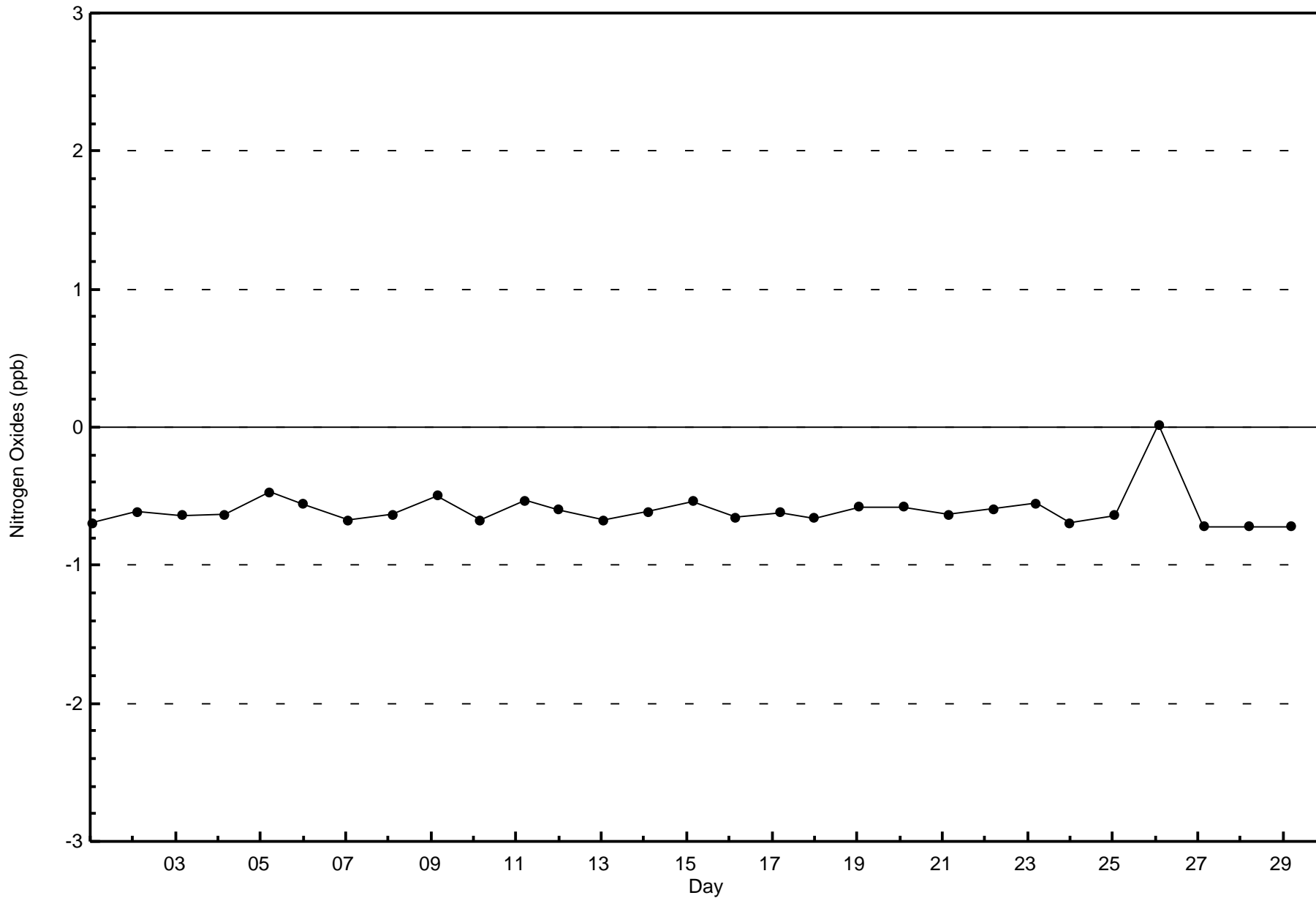
Total Number of Hours: 696

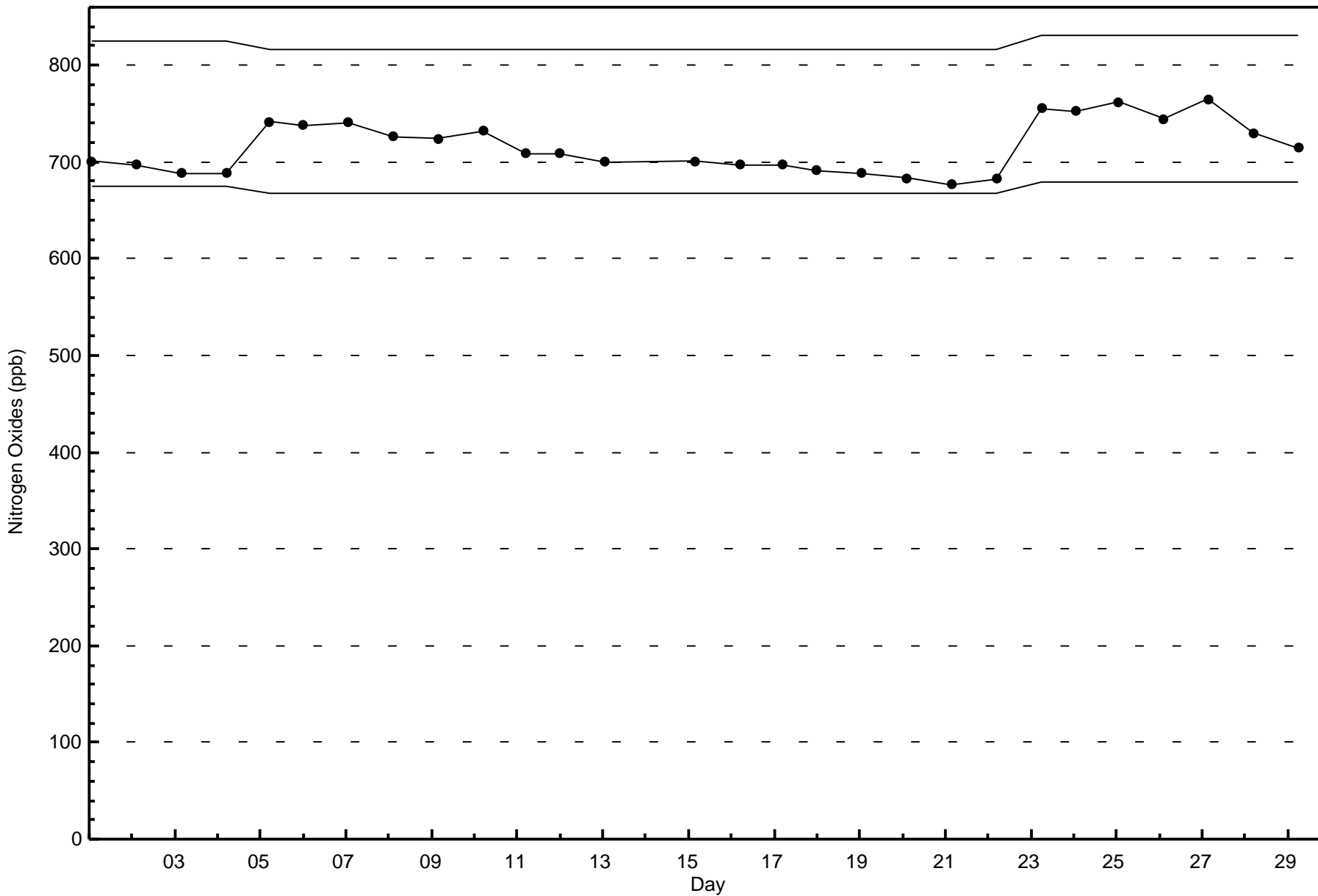


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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







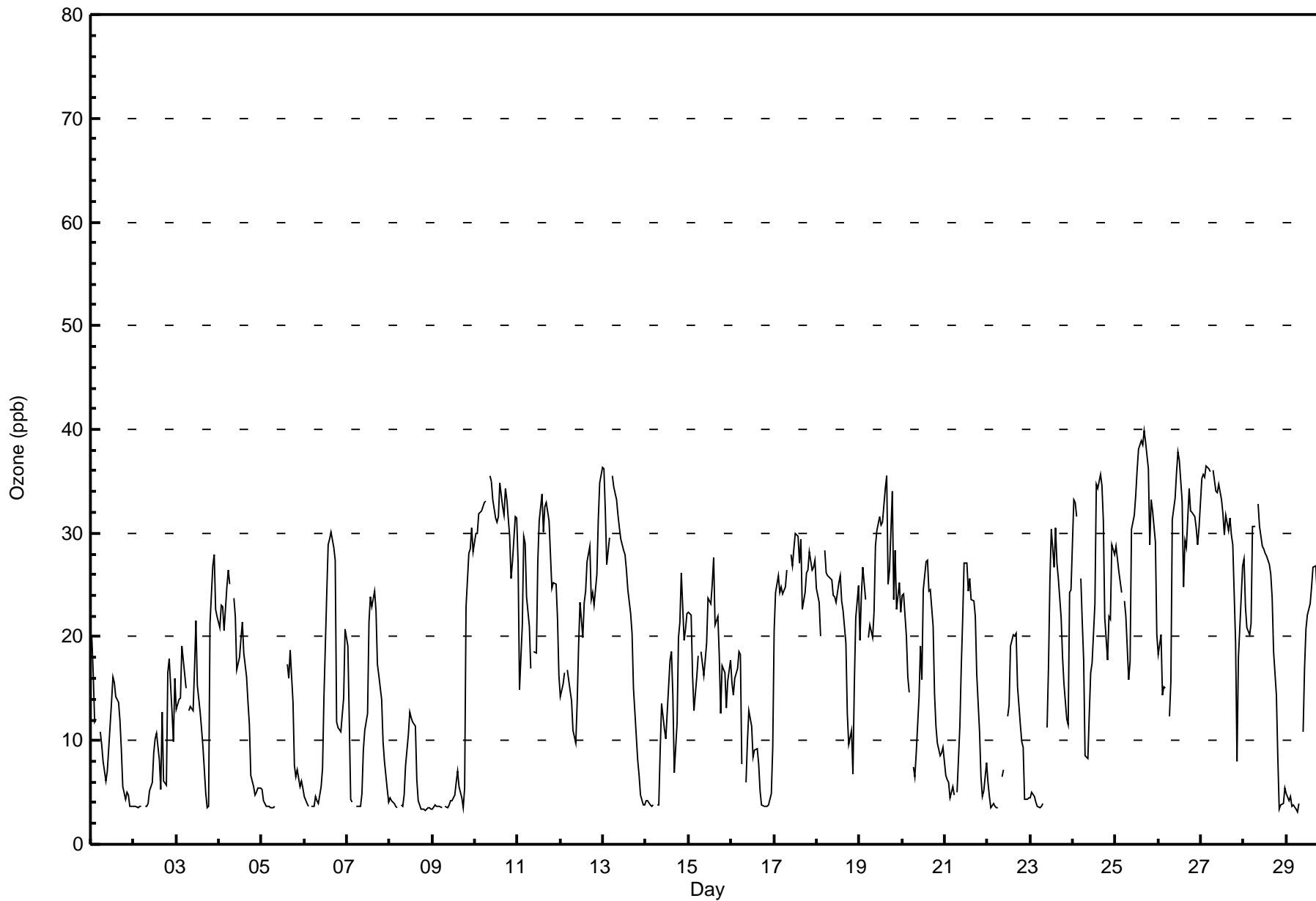


Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		696																					
Maximum Value: 40 ppb on Feb 25 17:00		Maximum Daily Average: 31.8 ppb on Feb 10		Hours of Data:		658																					
Minimum Value: 3 ppb on Feb 29 07:00		Minimum Daily Average: 5.8 ppb on Feb 8		Hours of Missing Data:		38																					
Maximum Diurnal Average: 23.9 ppb at hour 14		Minimum Diurnal Average: 12.3 ppb at hour 8		Hours of Calibration:		33																					
Monthly Average: 17.9 ppb		Percentiles: P ₁ = 3 P ₁₀ = 4 Q ₁ = 8 Median = 18 Q ₃ = 26 P ₉₀ = 32 P ₉₉ = 37		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	20	16	12	12	Z	11	10	8	6	7	9	14	16	16	14	14	12	9	6	4	5	5	4	4	10.1	20	
2-Feb	4	4	4	4	4	Z	4	4	4	5	6	9	10	11	8	5	13	6	6	17	18	13	10	16	7.9	18	
3-Feb	13	14	14	19	18	15	Z	13	13	13	17	22	15	13	11	9	5	4	4	21	27	28	23	22	15.3	28	
4-Feb	21	23	23	21	25	26	25	Z	24	22	17	18	20	21	18	16	14	11	7	6	5	5	5	5	16.4	26	
5-Feb	5	4	4	4	4	4	4	4	Z	5	C	C	C	C	17	16	19	14	8	6	7	6	6	5	7.4	19	
6-Feb	5	4	4	Z	4	4	5	4	4	6	7	14	24	29	29	30	29	27	12	11	11	12	14	21	13.4	30	
7-Feb	19	12	4	4	Z	4	4	4	5	9	11	13	21	24	23	24	22	17	16	14	10	8	5	4	12.1	24	
8-Feb	4	4	4	4	4	Z	4	4	5	8	11	13	12	12	11	6	4	3	3	3	3	3	3	3	5.8	13	
9-Feb	3	4	4	4	4	4	Z	4	4	4	4	4	5	6	7	6	5	4	5	23	28	29	31	28	9.4	31	
10-Feb	30	30	32	32	33	33	33	Z	35	35	33	31	31	32	35	33	32	34	33	30	26	27	32	31	31.8	35	
11-Feb	27	15	21	30	29	24	21	17	Z	19	18	27	31	34	30	33	33	31	28	25	25	25	22	16	25.3	34	
12-Feb	14	15	17	Z	17	15	14	11	10	14	19	23	20	23	24	27	29	24	24	23	26	31	35	36	21.4	36	
13-Feb	36	32	27	30	Z	36	34	33	32	30	29	28	28	26	25	22	20	15	10	8	7	5	4	4	22.7	36	
14-Feb	4	4	4	4	4	Z	4	4	9	13	11	10	13	18	19	14	7	12	20	21	26	20	21	22	12.3	26	
15-Feb	22	22	16	13	16	18	Z	19	16	18	19	24	23	25	28	21	22	18	13	17	17	13	16	18	18.9	28	
16-Feb	16	14	16	17	19	18	8	Z	6	10	13	11	8	9	9	8	5	4	4	4	4	4	5	9	9.6	19	
17-Feb	21	24	26	24	25	24	25	26	Z	28	27	29	30	30	27	29	23	24	26	26	28	26	27	27	26.2	30	
18-Feb	25	23	20	Z	28	26	26	26	26	24	24	23	25	26	23	23	19	13	10	11	7	15	22	25	21.3	28	
19-Feb	20	24	27	24	Z	20	21	20	22	29	30	32	31	31	34	36	25	26	34	24	28	23	25	22	26.4	36	
20-Feb	24	24	20	16	15	Z	7	7	9	14	19	16	25	27	27	24	25	21	14	11	10	9	9	9	16.6	27	
21-Feb	7	6	6	5	6	5	Z	5	11	17	22	27	27	24	26	24	23	22	16	11	7	5	5	8	13.6	27	
22-Feb	6	5	3	4	4	4	4	Z	7	7	M	12	13	19	20	20	20	15	11	10	9	4	4	5	9.4	20	
23-Feb	5	5	5	4	4	3	4	4	Z	11	17	25	30	27	31	27	26	22	18	16	12	12	24	24	15.4	31	
24-Feb	33	33	32	Z	26	21	18	9	8	13	17	18	23	35	34	36	35	31	22	18	22	22	29	28	24.3	36	
25-Feb	29	28	26	24	Z	23	22	16	18	30	32	34	36	38	39	38	40	39	36	29	33	32	29	20	30.1	40	
26-Feb	18	20	14	15	15	Z	12	16	31	33	36	38	37	33	25	29	29	34	32	32	32	31	29	30	27.1	38	
27-Feb	35	36	35	36	36	Z	36	34	34	35	33	32	30	32	30	31	30	29	19	8	18	21	27	30.2	36		
28-Feb	27	23	21	20	21	31	31	Z	33	31	29	29	28	28	27	26	24	19	14	8	3	4	4	5	21.1	33	
29-Feb	5	4	5	4	4	3	3	4	Z	11	17	21	22	23	25	27	27	24	20	12	PF	PF	PF	PF	13.7	27	
		17.2	16.3	15.3	14.9	15.0	17.0	14.2	12.3	15.5	17.2	19.6	21.3	22.8	23.9	23.4	22.6	21.2	19.1	16.6	15.9	15.8	15.5	16.5	17.1	Diurnal Average	
		36	36	35	36	36	36	34	36	35	35	36	38	37	38	39	38	40	39	36	32	33	32	35	36	Diurnal Maximum	
Z - zerspan		C - Calibration		M - Maintenance		PF - Power Failure																					
Alberta Ambient Air Quality Objectives (AAAQO):		1-hr		82 ppb																							



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	367	55.78	55.78
21 - 50	291	44.22	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	19	13	5	2	3	5	32	64	33	20	26	16	18	18	34	367
21 - 50	90	54	25	7	7	0	2	23	47	2	4	4	2	8	4	12	291
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	149	73	38	12	9	3	7	55	111	35	24	30	18	26	22	46	658

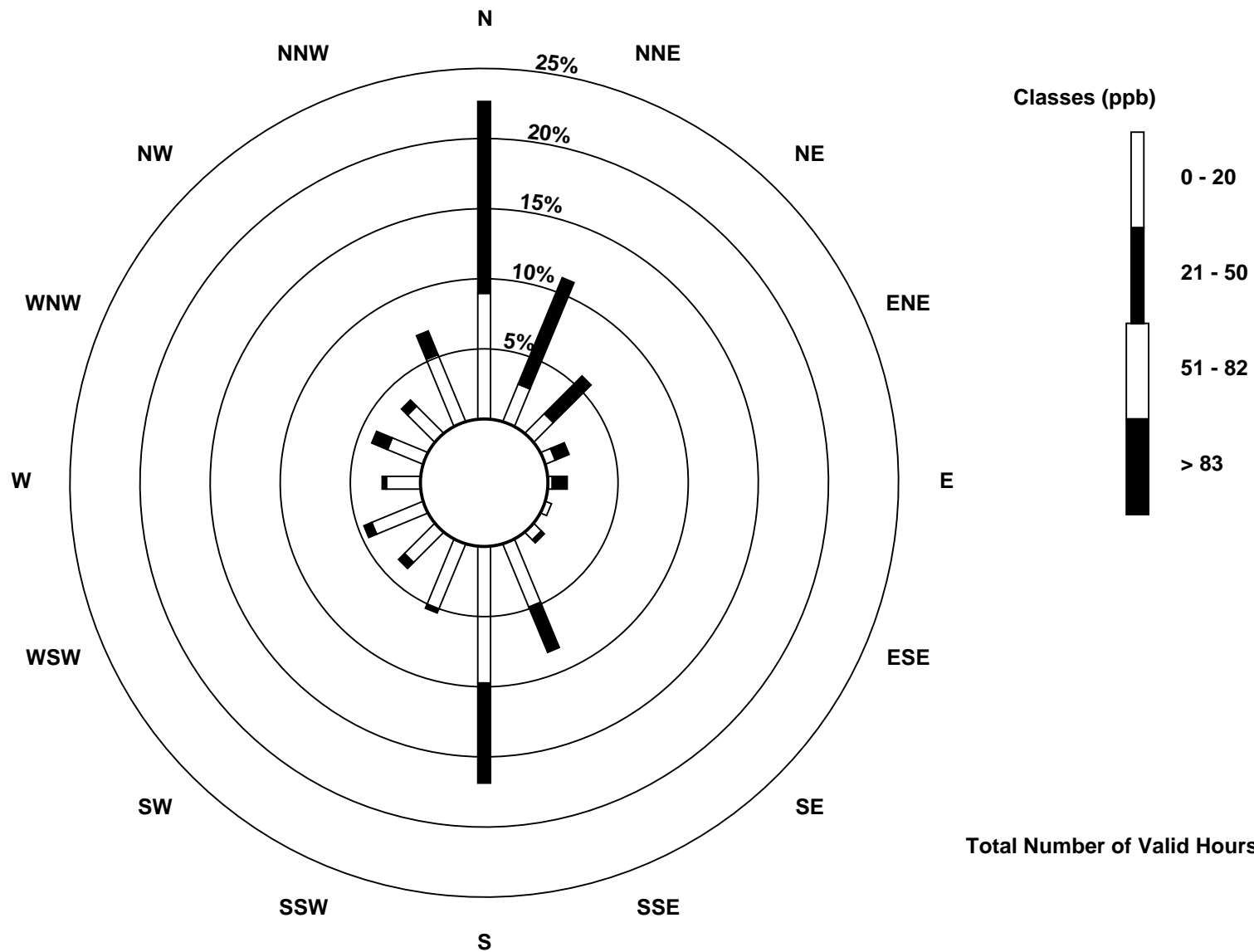
Total Number of Valid Hours: 658

Total Number of Hours: 696

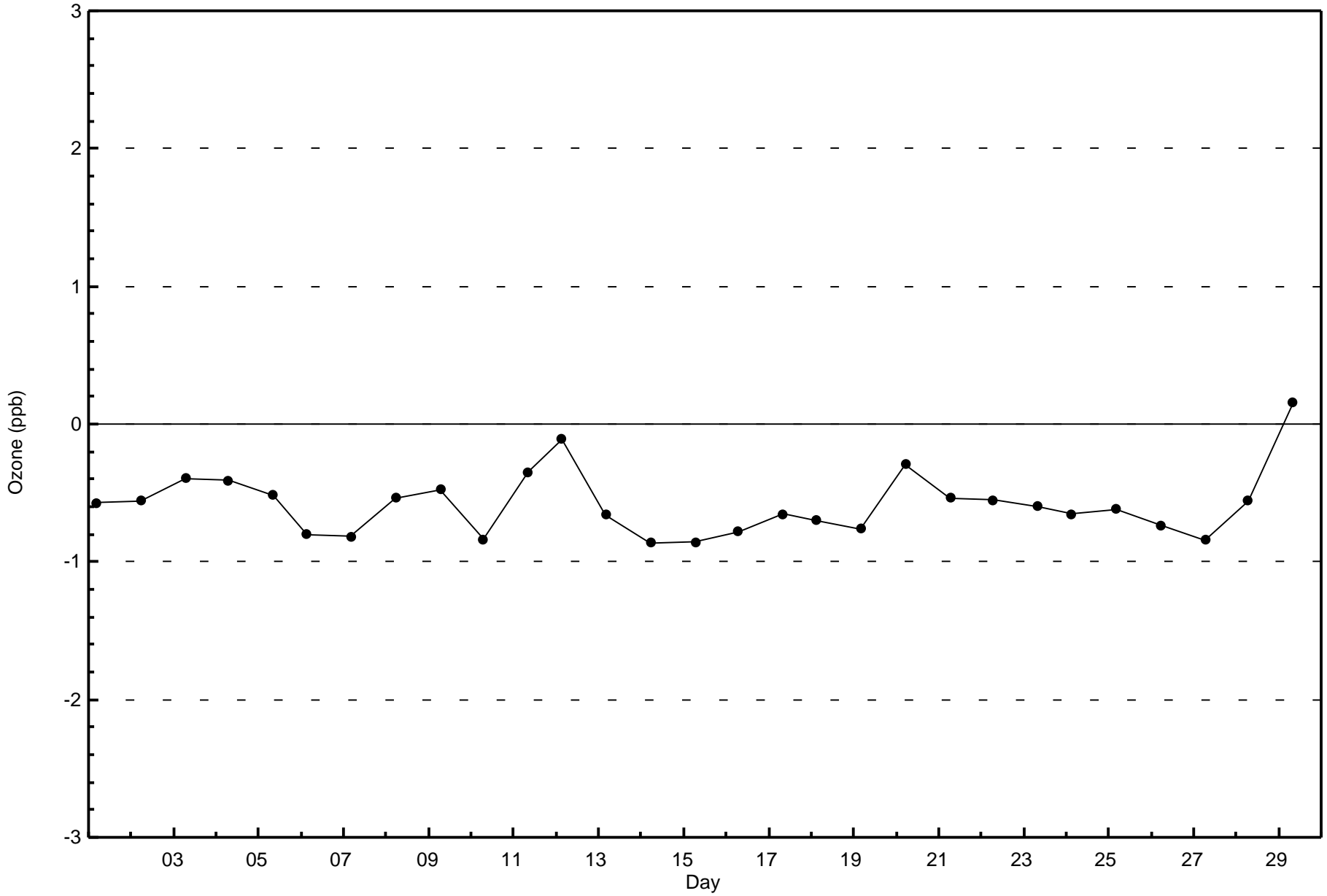


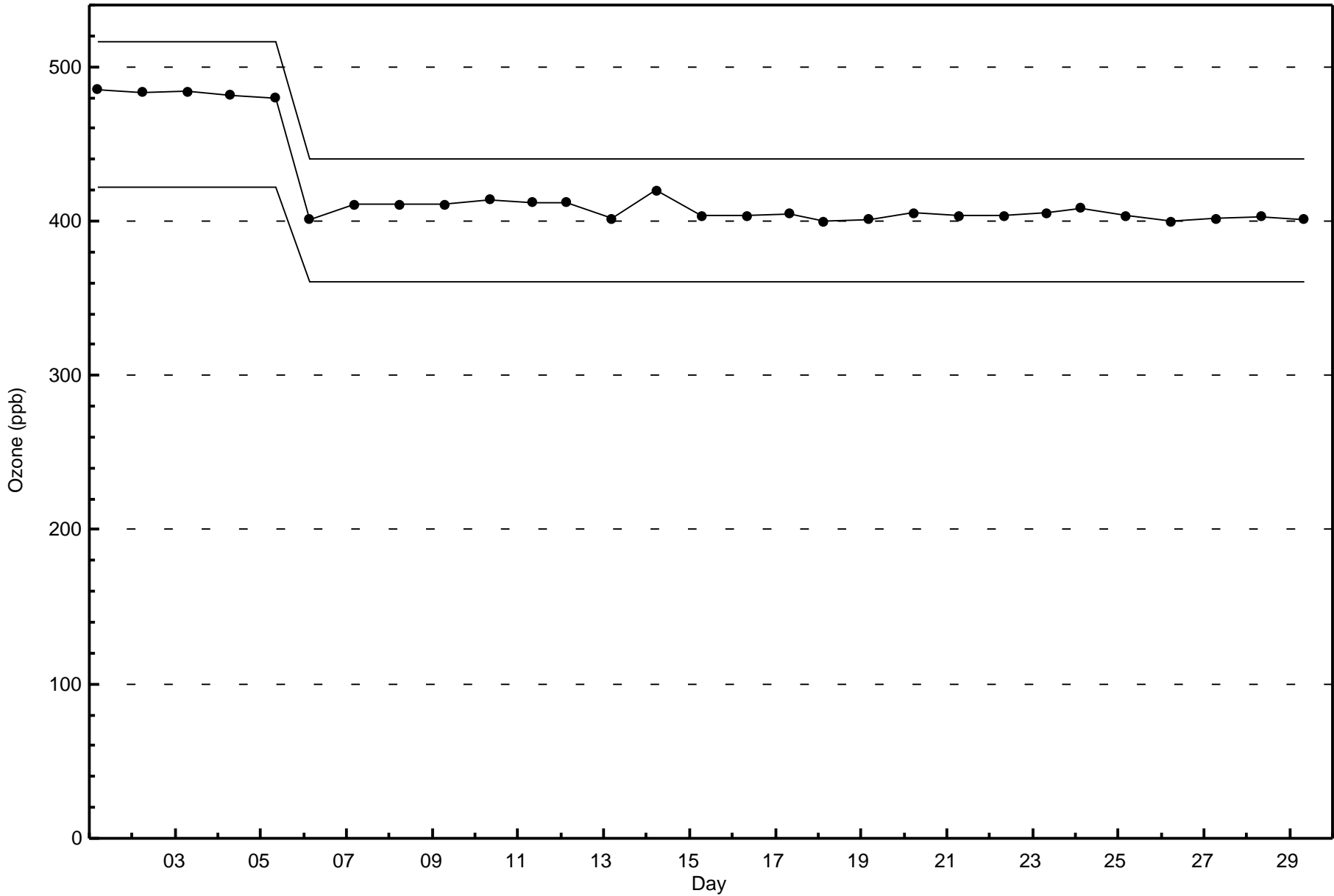
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 658







Wood Buffalo Environmental Association

Summary of Hour Averages

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

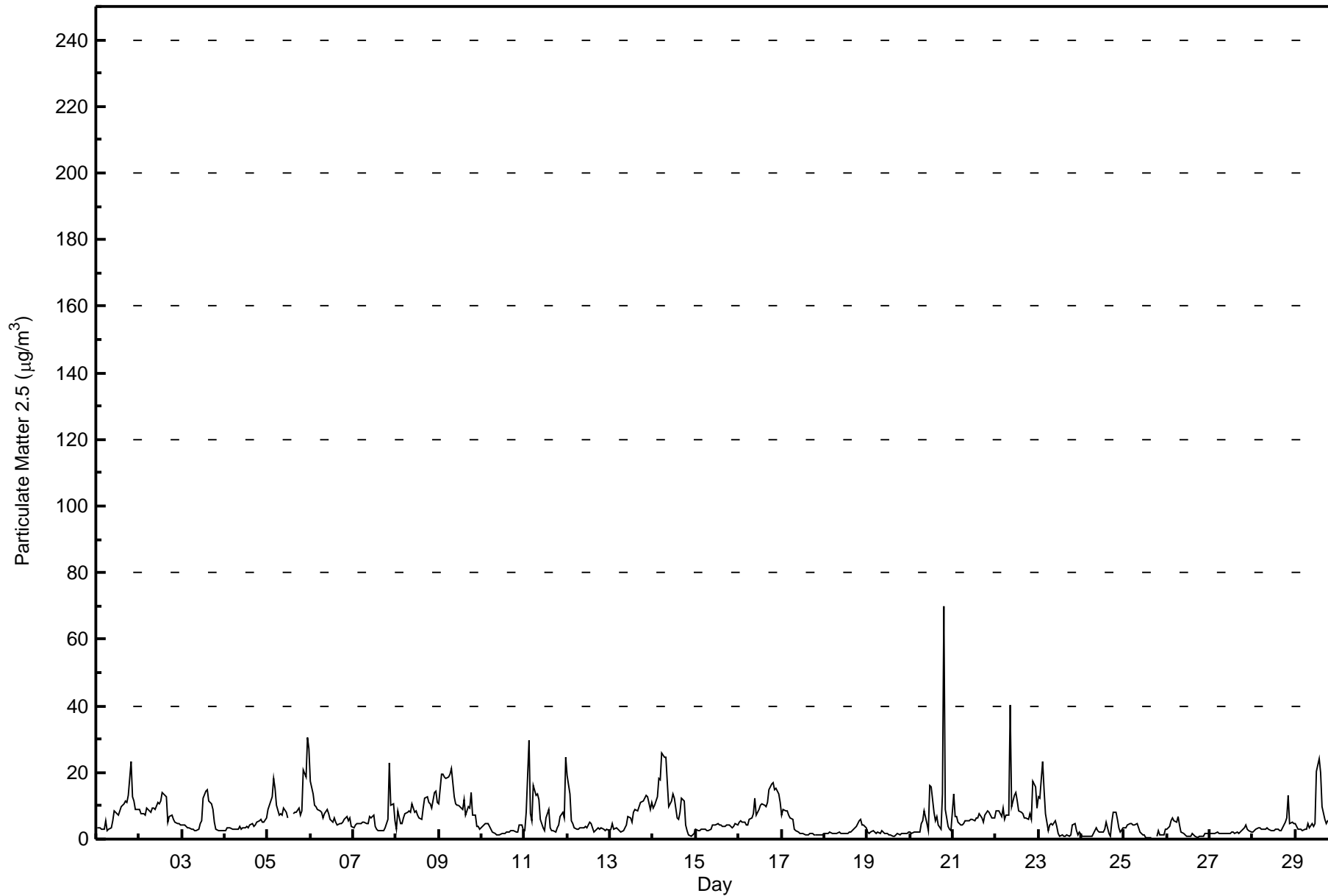
Fort McKay - Bertha Ganter - February 2016

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 696																								
Maximum Value: 69.8 µg/m ³ on Feb 20 20:00		Maximum Daily Average: 12.1 µg/m ³ on Feb 5																								
Minimum Value: 0.4 µg/m ³ on Feb 25 16:00		Hours of Data: 688																								
Maximum Diurnal Average: 8.5 µg/m ³ at hour 20		Hours of Missing Data: 8																								
Monthly Average: 6.07 µg/m ³		Hours of Calibration: 2																								
Minimum Daily Average: 1.8 µg/m ³ on Feb 19		Percent Operational Time: 99.1																								
Minimum Diurnal Average: 5.2 µg/m ³ at hour 11		Percentiles: P ₁ = 0.7 P ₁₀ = 1.6 Q ₁ = 2.6 Median = 4.5 Q ₃ = 8.1 P ₉₀ = 12.6 P ₉₉ = 24.4																								
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	3.5	3.2	3.2	3.1	2.8	5.6	2.7	3.0	3.2	5.4	8.4	7.8	7.3	8.3	9.9	10.5	11.6	11.1	13.3	23.1	12.6	11.3	8.9	8.7	7.9	23.1
2-Feb	8.8	7.7	7.4	7.2	9.5	9.0	7.8	9.3	9.2	8.8	10.9	10.7	11.3	13.8	13.1	12.7	5.2	7.0	7.1	5.8	4.9	4.8	4.5	4.1	8.4	13.8
3-Feb	4.2	4.1	3.7	3.4	3.2	2.9	2.9	2.7	2.7	3.1	4.7	5.5	12.4	14.4	14.6	11.4	10.4	9.0	4.9	3.0	2.5	2.5	2.5	2.4	5.6	14.6
4-Feb	2.6	3.2	3.3	3.5	3.1	3.1	3.0	3.1	3.8	3.0	3.6	3.4	3.7	3.2	4.1	4.5	4.0	4.3	5.3	5.5	5.9	5.2	4.9	6.4	4.0	6.4
5-Feb	8.7	10.3	12.6	18.1	15.4	10.2	7.0	7.6	7.2	9.2	8.2	6.5	C	C	7.8	8.2	8.0	9.1	7.2	8.6	20.6	18.6	30.4	27.1	12.1	30.4
6-Feb	17.5	13.4	10.1	9.8	8.7	8.3	8.0	6.6	7.4	8.9	7.7	5.9	5.2	6.3	5.1	4.4	4.8	4.8	5.1	5.9	6.7	5.7	6.3	3.8	7.4	17.5
7-Feb	3.3	4.4	4.7	4.5	4.8	5.0	5.1	4.7	4.6	6.8	6.3	7.2	4.0	3.0	2.7	2.5	2.4	2.6	3.6	5.8	22.7	10.0	10.4	5.7	5.7	22.7
8-Feb	2.8	8.3	4.5	4.8	6.6	7.6	7.9	8.3	8.2	10.4	8.2	8.5	7.1	6.5	6.1	9.5	12.2	12.7	11.0	10.4	9.3	13.8	14.5	11.0	8.8	14.5
9-Feb	10.4	19.7	19.7	18.5	18.1	18.8	19.5	21.3	12.9	10.7	10.4	10.1	9.4	8.7	11.7	7.0	9.7	9.5	14.0	7.2	7.1	3.9	3.6	2.9	11.9	21.3
10-Feb	3.9	4.3	4.6	4.6	3.8	3.1	2.2	1.7	1.4	1.3	1.4	1.6	1.6	1.8	2.0	2.1	2.5	2.6	2.6	2.0	2.2	4.2	4.0	2.3	2.7	4.6
11-Feb	2.4	8.0	29.6	7.6	5.5	16.1	13.3	13.7	12.0	5.9	3.5	2.7	6.5	9.1	3.4	2.5	2.6	1.9	3.2	4.2	6.9	8.1	6.2	24.6	8.3	29.6
12-Feb	19.3	13.4	5.4	4.8	3.5	3.1	2.9	3.3	3.5	3.5	4.0	3.3	5.0	4.5	3.6	2.3	2.9	3.2	3.0	3.2	2.8	2.6	2.8	2.6	4.5	19.3
13-Feb	3.1	4.7	2.8	3.5	3.1	2.4	2.1	2.7	3.3	4.2	6.6	6.2	5.2	8.1	9.0	8.4	9.8	11.1	11.3	12.3	12.9	12.5	8.8	10.8	6.9	12.9
14-Feb	9.5	10.2	12.6	18.3	17.8	25.7	24.6	24.8	16.9	9.8	11.4	13.4	12.1	6.5	5.9	7.9	12.5	11.6	4.0	2.6	1.1	1.0	1.3	1.8	11.0	25.7
15-Feb	3.0	2.7	2.7	3.1	2.9	3.1	2.6	2.5	3.1	4.2	4.1	4.2	4.5	4.3	4.1	3.9	3.9	4.2	4.4	4.2	3.2	3.7	4.5	4.3	3.6	4.5
16-Feb	5.1	5.4	5.0	5.0	4.3	4.1	5.8	6.5	7.7	12.4	7.1	8.9	10.2	10.7	10.1	9.7	10.9	15.0	16.5	17.1	14.7	15.1	13.5	10.9	9.7	17.1
17-Feb	7.4	8.8	8.6	8.7	7.1	6.2	5.7	2.9	2.6	2.2	1.8	1.6	1.5	1.4	1.4	1.4	1.6	1.5	1.3	1.3	1.2	1.3	1.3	1.2	3.3	8.8
18-Feb	1.5	1.8	1.8	1.9	1.8	1.7	1.6	1.9	2.2	1.7	1.7	1.6	1.6	1.6	2.0	2.2	2.8	3.3	3.7	5.7	5.9	4.2	4.3	3.3	2.6	5.9
19-Feb	2.3	1.8	2.0	2.5	2.0	1.9	1.9	1.9	2.5	2.2	1.8	1.6	1.4	1.3	1.0	0.9	1.4	1.6	1.3	1.6	1.5	1.9	1.9	1.9	1.8	2.5
20-Feb	1.9	1.8	2.0	2.1	2.1	2.2	4.8	5.6	8.4	4.8	2.7	16.3	15.8	8.0	5.7	6.9	4.3	2.9	13.4	69.8	8.8	4.0	2.9	2.6	8.3	69.8
21-Feb	13.5	6.6	6.7	5.1	4.3	4.2	4.8	5.7	5.6	5.6	5.8	5.7	5.5	6.5	6.4	7.5	6.4	5.2	7.2	8.7	8.2	7.1	6.3	6.2	6.4	13.5
22-Feb	8.3	8.5	8.3	6.9	9.4	5.8	7.0	7.1	40.2	9.7	13.2	14.0	11.4	8.3	7.9	7.5	6.5	6.2	6.1	7.5	6.1	17.2	15.7	9.2	10.3	40.2
23-Feb	12.9	12.3	23.3	15.0	7.5	2.7	4.3	4.9	4.2	5.6	4.0	1.7	0.9	1.1	0.8	1.0	1.1	1.0	1.4	4.3	4.5	2.6	1.1	2.1	5.0	23.3
24-Feb	0.7	0.7	0.7	0.7	0.7	0.7	0.6	1.6	3.3	2.5	2.2	2.3	2.1	3.0	5.0	1.8	0.7	5.2	8.1	7.9	5.8	3.5	2.1	3.4	2.7	8.1
25-Feb	3.3	3.2	4.2	4.6	4.8	4.1	4.1	4.7	3.3	2.1	1.4	1.2	0.5	0.4	0.4	0.4	UO	UO	0.9	2.7	1.1	1.1	1.4	2.9	2.4	4.8
26-Feb	3.0	3.7	5.7	6.2	5.6	4.9	6.6	4.3	2.3	1.5	1.3	1.0	0.8	1.0	1.5	1.1	0.7	0.4	0.9	0.9	0.9	1.5	1.9	1.7	2.5	6.6
27-Feb	1.5	1.5	1.7	1.9	1.9	1.8	1.7	1.7	1.8	1.9	1.8	1.8	2.0	2.2	1.9	1.9	1.8	2.2	2.4	3.2	4.0	3.0	2.6	2.2	2.1	4.0
28-Feb	2.2	2.5	3.1	3.3	3.4	3.1	3.1	3.2	3.4	2.9	2.7	2.7	2.7	3.0	3.1	2.5	2.5	3.4	5.0	6.2	13.0	4.8	5.0	4.8	3.8	13.0
29-Feb	4.6	3.1	3.0	2.8	2.7	2.8	2.8	4.6	3.6	4.6	3.8	4.7	20.2	24.3	20.1	9.9	6.0	4.8	5.4	5.6	PF	PF	PF	PF	7.0	24.3
5.9 6.2 7.0 6.3 5.7 5.9 5.7 5.9 6.6 5.3 5.2 5.6 6.1 6.1 5.9 5.3 5.3 5.6 6.0 8.5 7.1 6.3 6.2 6.1																								Diurnal Average		
19.3 19.7 29.6 18.5 18.1 25.7 24.6 24.8 40.2 12.4 13.2 16.3 20.2 24.3 20.1 12.7 12.5 15.0 16.5 69.8 22.7 18.6 30.4 27.1																								Diurnal Maximum		
C - Calibration UO - Unstable Operation PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - February 2016





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 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	385	55.96	55.96
6 - 15	241	35.03	90.99
16 - 25	31	4.51	95.49
26 - 80	6	0.87	96.37
> 81.0	0	0.00	96.37

Total Number of Valid Hours: 688

Total Number of Hours: 696



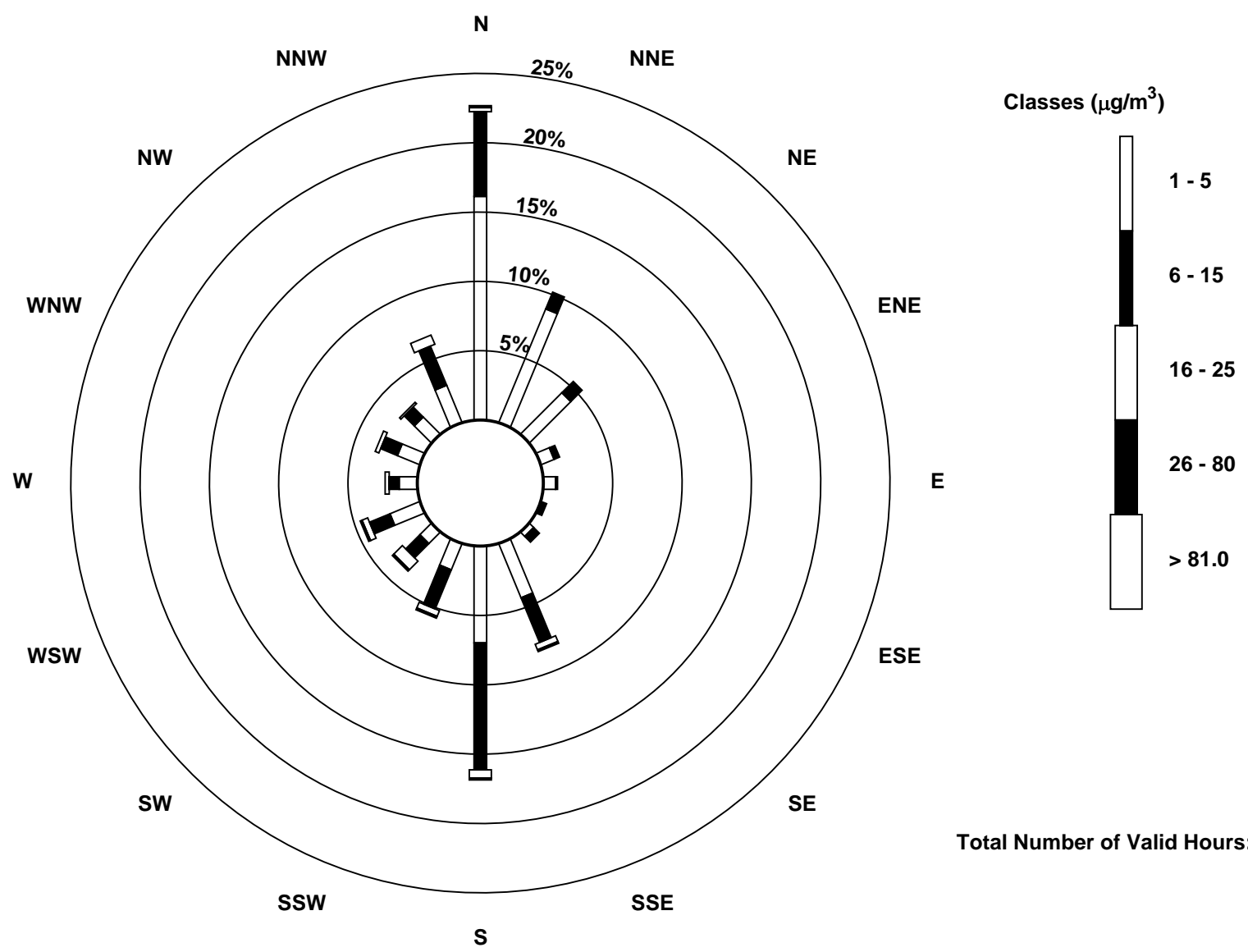
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay - Bertha Ganter - February 2016

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	111	61	29	7	6	0	3	29	48	14	8	16	9	12	12	20	385
6 - 15	42	9	8	3	1	3	4	24	63	21	10	11	5	9	7	21	241
16 - 25	2	0	0	0	0	0	0	3	4	3	6	3	2	2	1	5	31
26 - 80	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	6
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	156	70	37	10	7	3	7	57	116	39	25	31	16	23	20	46	663

Total Number of Valid Hours: 688

Total Number of Hours: 696



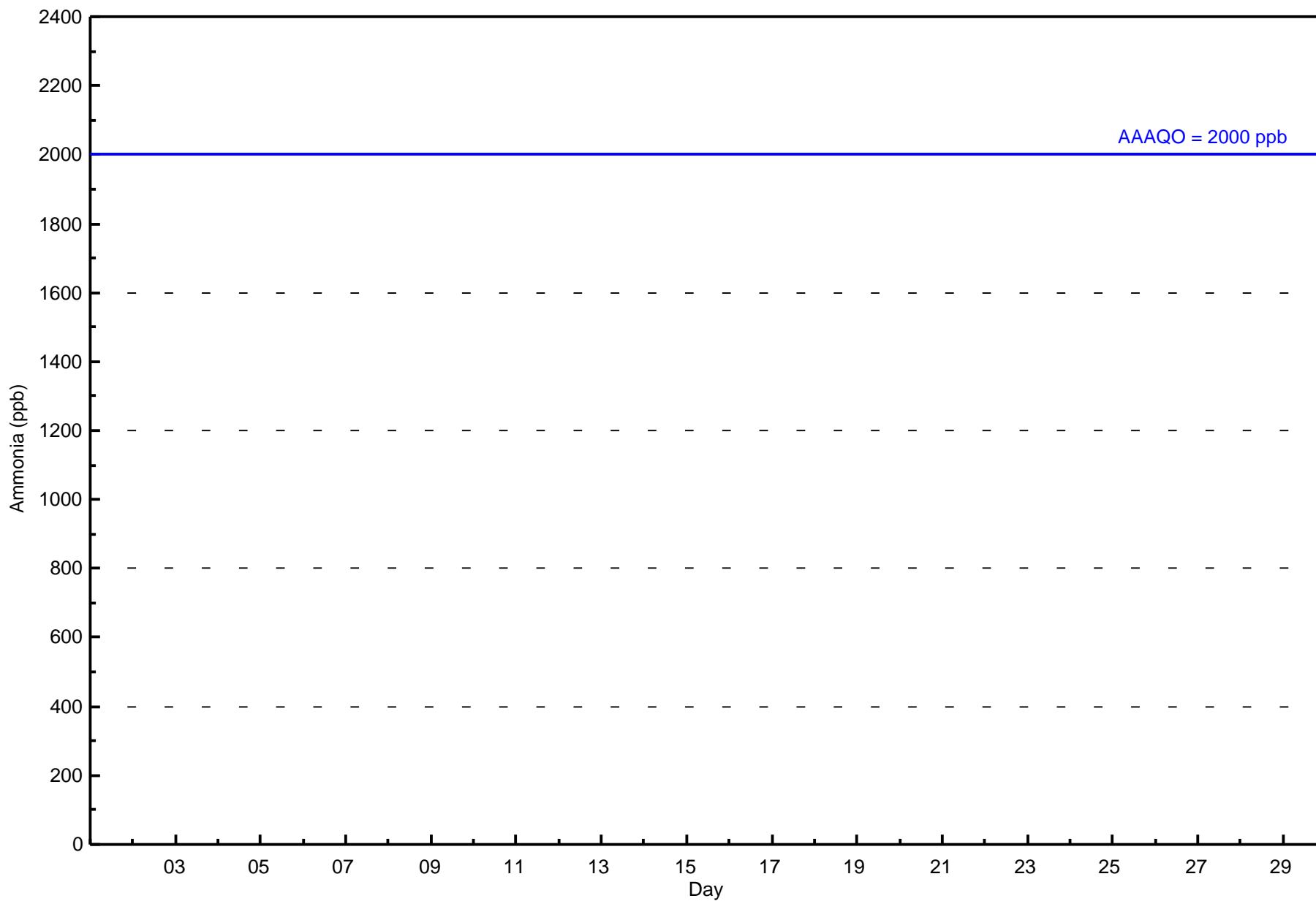


Number of Exceedences (AAAQO): 1-hr: 0										Hours in Service: 696										Daily Average		Daily Maximum					
Maximum Value: 0 ppb on Feb 1 01:00										Maximum Daily Average: 0.0 ppb on Feb 1										Hours of Data: 603							
Minimum Value: 0 ppb on Feb 1 01:00										Minimum Daily Average: 0.0 ppb on Feb 1										Hours of Missing Data: 93							
Maximum Diurnal Average: 0.0 ppb at hour 1										Minimum Diurnal Average: 0.0 ppb at hour 1										Hours of Calibration: 43							
Monthly Average: 0.0 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0										Percent Operational Time: 92.8							
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	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-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
3-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
4-Feb	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Feb	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Feb	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Feb	0	0	0	Z	0	0	0	M	M	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	Z	RE	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	Z	RE	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	Z	RE	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0	
11-Feb	0	0	0	0	0	0	0	Z	RE	RE	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	0	
12-Feb	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
13-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	
14-Feb	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
15-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	
16-Feb	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
17-Feb	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
18-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	
19-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	
20-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	
21-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	
22-Feb	0	0	0	0	0	0	Z	RE	RE	0	M	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	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
24-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	
25-Feb	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
26-Feb	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
27-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	
28-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	
29-Feb	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	0	
0.0																								Diurnal Average			
0																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance RE - Recovery																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - February 2016**

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: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	133	66	37	12	9	3	7	51	104	30	22	29	16	23	19	42	603
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	133	66	37	12	9	3	7	51	104	30	22	29	16	23	19	42	603

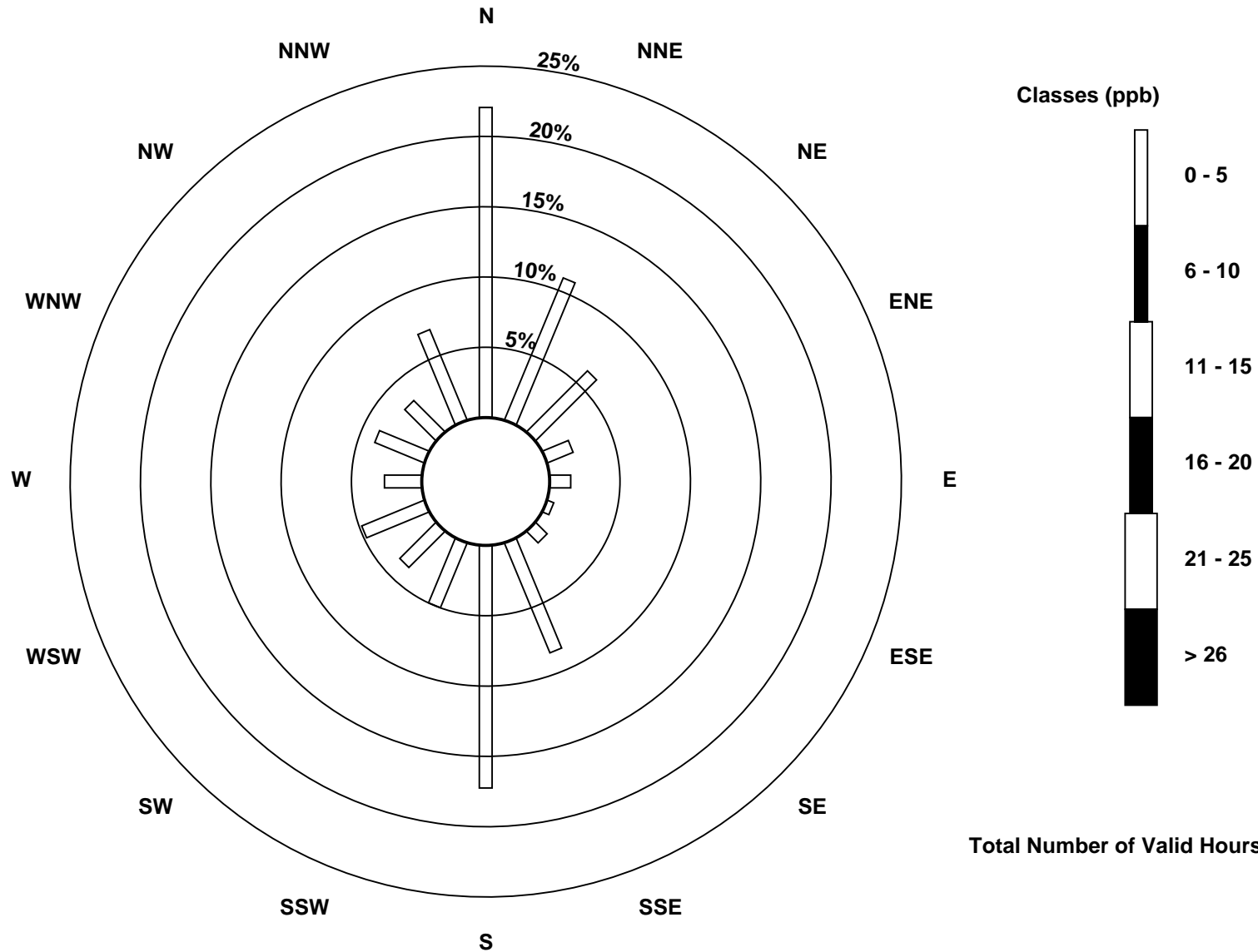
Total Number of Valid Hours: 603

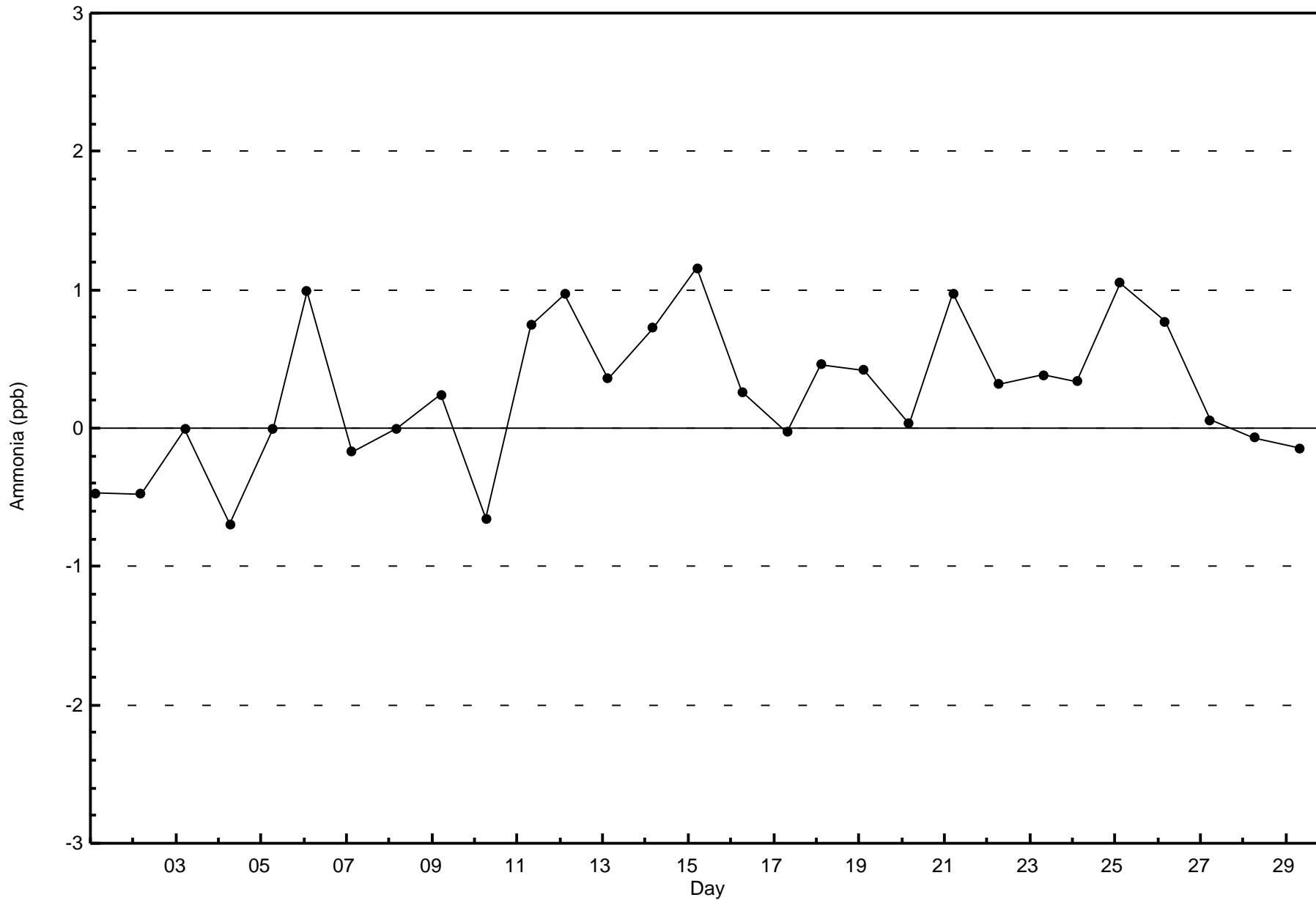
Total Number of Hours: 696

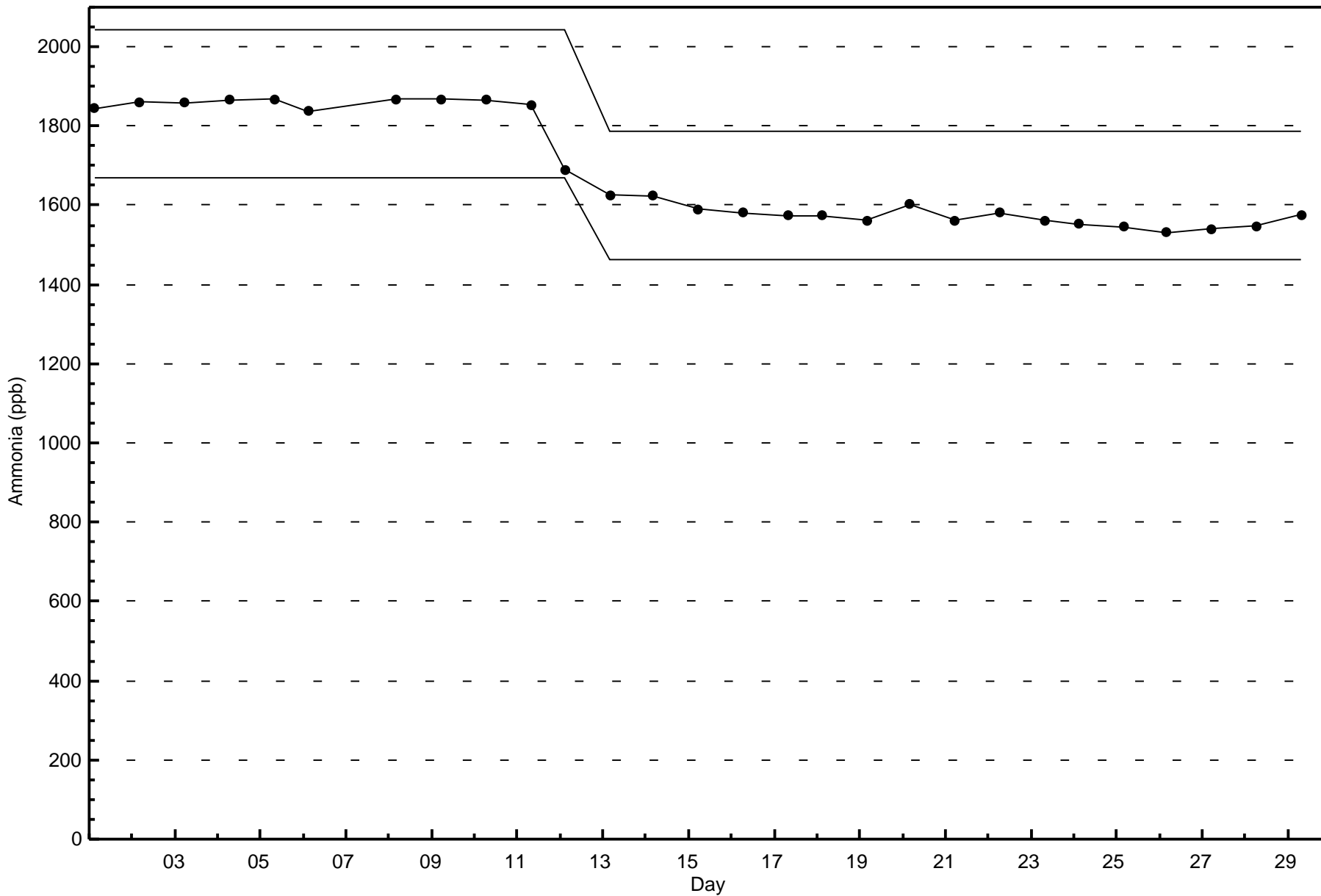


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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







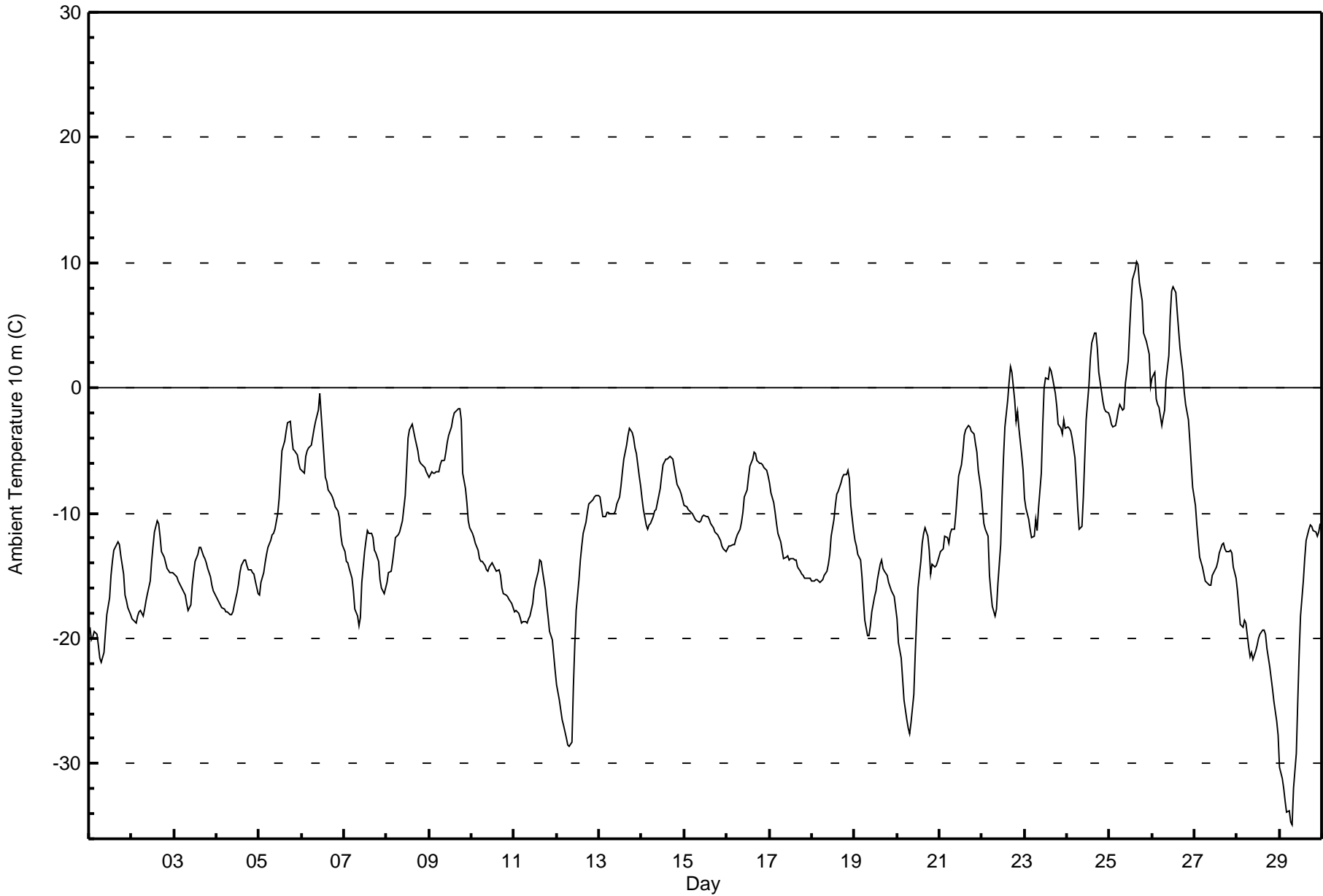


Maximum Value: 10.1 C on Feb 25 16:00		Maximum Daily Average: 2.6 C on Feb 25		Hours in Service: 696																						
Minimum Value: -34.9 C on Feb 29 08:00		Minimum Daily Average: -21.7 C on Feb 29		Hours of Data: 696																						
Maximum Diurnal Average: -7.5 C at hour 16		Minimum Diurnal Average: -14.9 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -11.33 C		Percentiles: P ₁ = -31.7 P ₁₀ = -18.9 Q ₁ = -15.5 Median = -11.9 Q ₃ = -6.6 P ₉₀ = -2.1 P ₉₉ = 7.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-19.2	-20.1	-19.9	-19.4	-19.6	-20.5	-21.6	-21.9	-21.1	-19.6	-18.2	-16.7	-15.0	-13.8	-13.0	-12.5	-12.3	-12.5	-13.5	-14.9	-16.5	-17.0	-17.5	-18.1	-17.3	-12.3
2-Feb	-18.5	-18.5	-18.8	-18.2	-17.9	-17.8	-18.3	-17.6	-17.0	-16.4	-15.4	-13.9	-12.6	-11.5	-10.7	-10.9	-11.9	-13.0	-13.5	-14.0	-14.4	-14.7	-14.8	-14.8	-15.2	-10.7
3-Feb	-14.9	-15.1	-15.4	-15.6	-15.9	-16.3	-16.5	-17.2	-17.8	-17.3	-15.7	-14.8	-13.8	-13.3	-12.7	-12.7	-13.4	-13.7	-14.0	-14.4	-15.1	-15.7	-16.2	-16.4	-15.2	-12.7
4-Feb	-16.8	-17.1	-17.3	-17.5	-17.7	-17.9	-17.9	-18.1	-18.1	-17.8	-17.3	-16.3	-15.6	-14.8	-14.2	-13.7	-13.8	-14.2	-14.5	-14.6	-14.7	-14.8	-15.4	-16.4	-16.1	-13.7
5-Feb	-16.5	-15.5	-14.8	-14.0	-13.3	-12.7	-12.2	-11.8	-11.7	-11.3	-10.1	-8.8	-6.9	-5.1	-4.3	-3.5	-2.7	-2.7	-3.9	-4.9	-5.0	-5.3	-6.0	-6.4	-8.7	-2.7
6-Feb	-6.6	-6.8	-5.5	-5.1	-4.8	-4.5	-3.9	-3.2	-2.7	-1.8	-0.4	-2.1	-5.4	-7.2	-7.5	-8.1	-8.5	-8.7	-9.0	-9.4	-9.9	-10.3	-11.7	-12.5	-6.5	-0.4
7-Feb	-13.0	-13.9	-14.0	-14.4	-15.1	-16.2	-17.7	-18.3	-19.0	-18.3	-15.5	-13.1	-12.2	-11.4	-11.6	-11.6	-12.0	-12.9	-13.2	-13.9	-15.3	-16.0	-16.5	-15.9	-14.6	-11.4
8-Feb	-15.5	-14.7	-14.6	-13.9	-13.0	-11.9	-11.7	-11.5	-11.0	-10.6	-8.6	-6.3	-4.0	-3.3	-2.9	-3.4	-4.0	-5.0	-5.8	-6.1	-6.2	-6.4	-6.7	-7.0	-8.5	-2.9
9-Feb	-7.2	-6.7	-6.7	-6.9	-6.7	-6.7	-6.2	-5.8	-5.7	-5.1	-4.4	-3.7	-3.1	-2.4	-2.0	-1.9	-1.6	-1.7	-2.5	-6.9	-8.0	-9.1	-10.6	-11.2	-5.5	-1.6
10-Feb	-11.7	-11.9	-12.4	-12.9	-13.6	-13.9	-13.8	-14.1	-14.5	-14.6	-14.3	-14.0	-14.2	-14.5	-14.7	-14.6	-15.0	-16.0	-16.4	-16.5	-16.7	-16.9	-17.2	-17.5	-14.7	-11.7
11-Feb	-17.9	-17.8	-18.0	-18.4	-18.8	-18.7	-18.7	-18.7	-18.4	-18.2	-17.2	-16.1	-15.5	-14.6	-13.7	-13.9	-14.6	-16.1	-17.3	-18.3	-19.4	-20.1	-21.3	-22.6	-17.7	-13.7
12-Feb	-23.7	-25.0	-25.8	-26.4	-27.0	-27.9	-28.5	-28.6	-28.3	-23.9	-20.6	-17.8	-15.3	-13.7	-12.6	-11.6	-10.7	-9.9	-9.2	-9.1	-9.0	-8.7	-8.6	-8.6	-17.9	-8.6
13-Feb	-8.7	-9.5	-10.3	-10.3	-9.9	-9.9	-10.0	-10.0	-10.1	-9.9	-9.3	-8.7	-7.8	-6.7	-5.6	-4.6	-3.7	-3.2	-3.5	-4.0	-4.8	-5.2	-7.0	-7.8	-7.5	-3.2
14-Feb	-8.9	-9.7	-11.0	-11.3	-10.9	-10.8	-10.3	-9.8	-9.7	-9.1	-8.1	-7.0	-6.1	-5.7	-5.6	-5.6	-5.5	-5.7	-6.3	-7.1	-7.7	-8.1	-8.5	-8.9	-8.2	-5.5
15-Feb	-9.3	-9.5	-9.7	-9.8	-10.0	-10.2	-10.4	-10.6	-10.7	-10.6	-10.3	-10.2	-10.2	-10.3	-10.8	-11.2	-11.5	-11.5	-11.6	-11.7	-12.2	-12.6	-12.8	-13.1	-10.8	-9.3
16-Feb	-12.9	-12.6	-12.6	-12.5	-12.5	-12.1	-11.7	-11.3	-10.8	-9.9	-8.7	-8.2	-7.2	-6.2	-5.7	-5.1	-5.2	-5.8	-6.0	-6.0	-6.1	-6.4	-6.6	-7.0	-8.7	-5.1
17-Feb	-7.6	-8.4	-9.1	-9.9	-10.8	-11.6	-12.2	-13.0	-13.6	-13.6	-13.4	-13.8	-13.6	-13.6	-13.7	-13.7	-14.3	-14.7	-14.8	-15.0	-15.2	-15.2	-15.2	-15.2	-13.0	-7.6
18-Feb	-15.4	-15.4	-15.3	-15.3	-15.5	-15.4	-15.3	-15.0	-14.6	-14.1	-13.2	-11.8	-10.5	-9.4	-8.5	-8.2	-7.6	-7.1	-6.9	-6.9	-6.6	-7.2	-9.4	-11.3	-11.5	-6.6
19-Feb	-12.2	-12.6	-13.2	-13.7	-15.1	-16.9	-18.5	-19.8	-19.8	-19.0	-17.8	-16.6	-16.2	-15.3	-14.1	-13.8	-14.5	-14.6	-15.0	-15.5	-15.9	-16.2	-16.6	-17.6	-15.9	-12.2
20-Feb	-18.5	-20.3	-21.6	-23.2	-24.9	-26.5	-27.2	-27.7	-26.8	-24.5	-21.3	-18.5	-16.0	-13.8	-12.4	-11.6	-11.2	-11.9	-13.0	-14.8	-14.1	-14.3	-14.2	-13.8	-18.4	-11.2
21-Feb	-13.0	-13.0	-12.9	-11.9	-11.9	-12.4	-11.6	-11.3	-11.3	-10.0	-8.5	-7.0	-6.1	-5.2	-3.8	-3.3	-3.0	-3.2	-3.5	-3.7	-4.4	-5.1	-6.5	-8.1	-7.9	-3.0
22-Feb	-9.6	-10.8	-11.3	-11.8	-15.0	-16.3	-17.5	-18.2	-17.7	-15.6	-12.5	-8.7	-5.6	-3.2	-1.0	0.5	1.7	1.2	-1.0	-2.7	-1.9	-3.2	-5.3	-6.6	-8.0	1.7
23-Feb	-8.8	-9.6	-10.5	-11.3	-11.9	-11.8	-10.5	-11.4	-9.6	-6.9	-3.0	0.0	0.8	0.7	1.6	1.3	0.8	-0.5	-1.4	-2.9	-3.3	-3.7	-2.6	-3.3	-4.9	1.6
24-Feb	-3.2	-3.2	-3.4	-4.0	-5.6	-7.5	-9.6	-11.3	-11.0	-8.7	-5.6	-2.5	0.2	2.4	3.6	4.4	4.3	3.1	1.3	-0.3	-1.1	-1.6	-1.8	-2.0	-2.6	4.4
25-Feb	-2.3	-2.9	-3.1	-2.9	-2.4	-1.7	-1.3	-1.8	-1.6	0.3	2.2	4.6	6.9	8.6	9.4	10.1	9.9	8.4	7.0	4.3	4.0	3.8	2.7	0.1	2.6	10.1
26-Feb	0.8	1.3	-0.8	-1.4	-1.6	-3.1	-2.4	-1.8	0.5	2.6	5.7	7.8	8.0	7.7	6.0	4.6	3.1	1.3	-0.3	-1.3	-2.5	-4.2	-6.1	-7.9	0.7	8.0
27-Feb	-9.4	-10.9	-12.3	-13.5	-14.3	-14.9	-15.4	-15.5	-15.7	-15.7	-14.9	-14.5	-14.3	-13.8	-13.2	-12.6	-12.4	-12.9	-13.1	-13.1	-13.0	-13.2	-14.3	-15.2	-13.7	-9.4
28-Feb	-16.2	-17.5	-18.9	-19.2	-18.6	-18.8	-20.7	-21.5	-21.2	-21.6	-21.1	-20.6	-20.1	-19.7	-19.4	-19.3	-19.6	-20.7	-22.3	-23.2	-24.0	-25.1	-26.6	-27.7	-21.0	-16.2
29-Feb	-30.3	-31.2	-32.0	-33.0	-33.8	-33.8	-34.6	-34.9	-32.0	-29.2	-25.1	-21.4	-18.2	-15.4	-13.6	-12.1	-11.3	-10.9	-11.0	-11.3	-11.5	-11.8	-11.5	-10.9	-21.7	-10.9
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - February 2016**

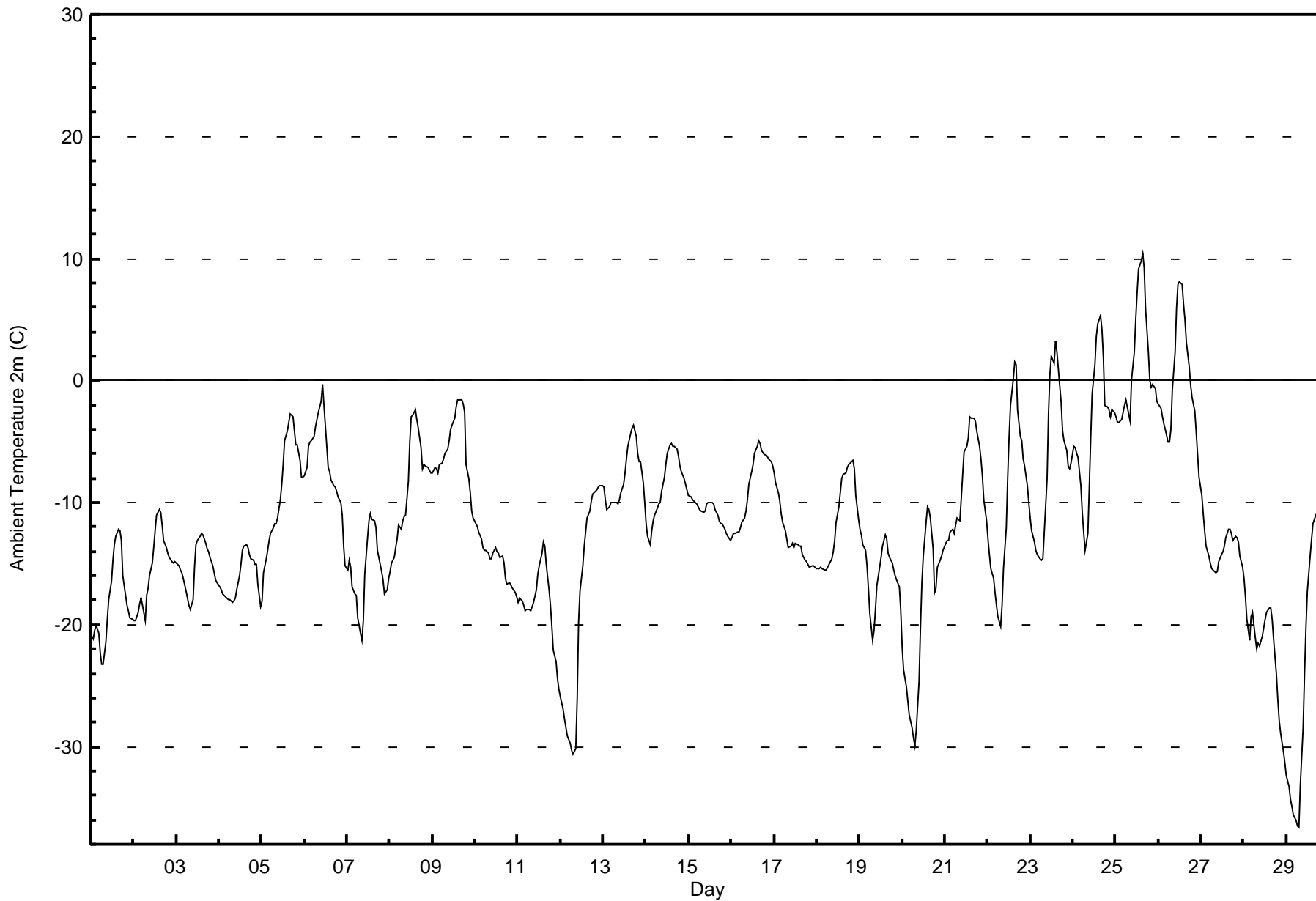
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	55	7.90	7.90
-20 - 0	599	86.06	93.97
0 - 10	41	5.89	99.86
10 - 20	1	0.14	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Value: 10.4 C on Feb 25 16:00		Maximum Daily Average: 1.4 C on Feb 25		Hours in Service: 696																						
Minimum Value: -36.6 C on Feb 29 08:00		Minimum Daily Average: -22.3 C on Feb 29		Hours of Data: 696																						
Maximum Diurnal Average: -7.1 C at hour 16		Minimum Diurnal Average: -15.7 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -11.82 C		Percentiles: P ₁ = -33.5 P ₁₀ = -19.7 Q ₁ = -15.6 Median = -12.3 Q ₃ = -7.0 P ₉₀ = -2.7 P ₉₉ = 7.8		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	-20.9	-21.2	-20.5	-20.0	-20.8	-22.3	-23.3	-23.3	-21.4	-19.5	-17.9	-16.4	-14.7	-13.5	-12.7	-12.2	-12.3	-13.1	-15.9	-17.6	-18.4	-18.9	-19.4	-19.5	-18.2	-12.2
2-Feb	-19.7	-19.6	-19.0	-18.3	-17.8	-18.5	-19.6	-17.7	-17.0	-16.0	-15.0	-13.7	-12.3	-11.1	-10.5	-10.8	-11.9	-13.2	-13.7	-14.1	-14.5	-14.8	-14.9	-14.9	-15.4	-10.5
3-Feb	-14.9	-15.2	-15.5	-15.7	-16.2	-17.3	-17.8	-18.4	-18.8	-17.9	-15.3	-13.5	-13.1	-12.8	-12.5	-12.6	-13.4	-13.8	-14.1	-14.5	-15.1	-15.8	-16.3	-16.5	-15.3	-12.5
4-Feb	-17.0	-17.1	-17.4	-17.6	-17.8	-18.0	-18.0	-18.2	-18.1	-17.8	-17.2	-16.0	-15.0	-13.9	-13.6	-13.4	-13.7	-14.3	-14.6	-14.7	-15.0	-15.1	-16.7	-18.6	-16.2	-13.4
5-Feb	-18.1	-15.7	-14.6	-13.9	-13.1	-12.6	-12.1	-11.8	-11.7	-11.3	-9.8	-8.5	-6.8	-4.9	-4.2	-3.4	-2.8	-2.9	-4.1	-5.3	-5.3	-6.5	-7.9	-7.9	-9.0	-2.8
6-Feb	-7.8	-7.1	-5.4	-5.1	-4.9	-4.6	-3.8	-3.2	-2.6	-1.7	-0.4	-2.0	-5.4	-7.1	-7.5	-8.1	-8.6	-8.8	-9.1	-9.5	-9.9	-11.0	-13.6	-15.2	-6.8	-0.4
7-Feb	-15.6	-14.7	-15.3	-16.9	-17.4	-17.6	-19.5	-20.7	-21.3	-19.6	-15.8	-12.9	-11.5	-10.9	-11.4	-11.5	-12.0	-14.0	-14.4	-15.7	-16.4	-17.5	-17.1	-16.2	-15.7	-10.9
8-Feb	-15.6	-15.0	-14.5	-13.7	-12.9	-11.9	-12.2	-11.5	-11.2	-11.1	-8.2	-5.0	-3.0	-2.8	-2.4	-3.2	-3.9	-5.6	-7.2	-6.9	-7.0	-7.1	-7.4	-7.6	-8.6	-2.4
9-Feb	-7.5	-7.1	-7.2	-7.6	-6.9	-6.8	-6.4	-5.9	-5.7	-4.9	-4.0	-3.7	-3.0	-2.2	-1.6	-1.6	-1.6	-1.9	-2.6	-6.8	-8.0	-9.2	-10.6	-11.2	-5.6	-1.6
10-Feb	-11.7	-12.0	-12.5	-13.0	-13.7	-13.9	-13.9	-14.2	-14.6	-14.6	-14.2	-13.7	-14.0	-14.2	-14.5	-14.4	-14.9	-16.2	-16.7	-16.6	-16.7	-17.0	-17.4	-17.7	-14.7	-11.7
11-Feb	-18.1	-17.9	-18.1	-18.4	-18.9	-18.8	-18.7	-18.8	-18.5	-18.1	-17.2	-15.9	-15.2	-14.1	-13.3	-13.6	-15.1	-17.1	-18.4	-20.2	-22.0	-23.0	-24.5	-25.3	-18.3	-13.3
12-Feb	-25.9	-26.9	-27.8	-28.4	-29.1	-29.7	-30.2	-30.6	-30.2	-26.1	-19.8	-17.3	-15.1	-13.6	-12.4	-11.3	-10.7	-9.9	-9.3	-9.1	-9.0	-8.7	-8.7	-8.7	-18.7	-8.7
13-Feb	-8.7	-9.7	-10.5	-10.4	-10.0	-10.0	-10.0	-10.0	-10.1	-9.8	-9.2	-8.5	-7.6	-6.4	-5.4	-4.4	-3.9	-3.6	-4.5	-6.0	-6.6	-6.7	-8.3	-10.0	-7.9	-3.6
14-Feb	-11.8	-12.8	-13.5	-12.3	-11.5	-11.0	-10.4	-10.1	-10.0	-9.1	-8.0	-6.9	-5.9	-5.2	-5.1	-5.3	-5.3	-5.6	-6.2	-7.0	-7.5	-8.0	-8.5	-9.0	-8.6	-5.1
15-Feb	-9.4	-9.6	-9.7	-9.9	-10.1	-10.3	-10.5	-10.7	-10.8	-10.6	-10.1	-10.0	-10.0	-10.2	-10.6	-11.1	-11.5	-11.7	-11.8	-12.2	-12.6	-12.8	-13.1	-10.8	-9.4	
16-Feb	-12.9	-12.6	-12.5	-12.4	-12.4	-12.1	-11.6	-11.2	-10.7	-9.7	-8.5	-7.4	-6.8	-6.0	-5.3	-4.9	-5.1	-5.8	-6.1	-6.0	-6.1	-6.4	-6.7	-7.0	-8.6	-4.9
17-Feb	-7.6	-8.4	-9.1	-9.9	-10.9	-11.6	-12.3	-13.0	-13.7	-13.6	-13.4	-13.6	-13.4	-13.5	-13.5	-13.6	-14.2	-14.7	-14.9	-15.1	-15.3	-15.2	-15.2	-15.2	-13.0	-7.6
18-Feb	-15.4	-15.4	-15.3	-15.4	-15.5	-15.5	-15.3	-15.1	-14.6	-14.0	-13.1	-11.6	-10.3	-9.2	-8.1	-7.7	-7.5	-7.1	-6.9	-6.7	-6.6	-7.3	-9.5	-11.3	-11.4	-6.6
19-Feb	-12.2	-12.6	-13.4	-13.9	-15.1	-17.1	-19.1	-21.3	-20.4	-18.7	-16.8	-15.3	-14.5	-13.6	-12.6	-13.0	-14.1	-14.5	-14.9	-15.6	-15.9	-16.3	-16.9	-18.9	-15.7	-12.2
20-Feb	-21.9	-23.7	-25.1	-26.2	-27.4	-28.4	-29.3	-29.9	-28.6	-24.6	-20.2	-16.5	-14.4	-11.6	-10.3	-10.5	-11.3	-13.8	-17.4	-17.0	-15.3	-14.8	-14.3	-13.9	-19.4	-10.3
21-Feb	-13.3	-13.1	-13.0	-12.4	-12.2	-12.5	-11.9	-11.2	-11.5	-9.6	-7.7	-5.8	-5.3	-4.7	-3.0	-3.1	-3.1	-3.3	-4.1	-5.3	-6.4	-7.8	-9.8	-11.5	-8.4	-3.0
22-Feb	-13.0	-14.3	-15.4	-16.3	-17.4	-18.5	-19.4	-20.1	-18.4	-15.4	-12.0	-7.9	-4.6	-2.0	0.2	1.5	1.3	-2.4	-4.5	-4.9	-6.4	-6.9	-8.6	-10.0	-9.8	1.5
23-Feb	-11.3	-12.3	-13.3	-13.9	-14.2	-14.6	-14.7	-14.5	-12.4	-8.1	-2.7	0.5	2.0	1.4	3.2	2.3	1.0	-1.8	-4.1	-4.9	-5.7	-7.1	-7.3	-6.7	-6.6	3.2
24-Feb	-5.4	-5.5	-5.9	-6.3	-8.6	-10.8	-12.5	-13.9	-12.5	-8.8	-4.8	-1.1	1.4	3.6	4.6	5.4	4.2	1.9	-2.0	-2.1	-2.4	-2.9	-2.3	-2.6	-3.7	5.4
25-Feb	-3.0	-3.4	-3.4	-3.2	-2.6	-2.0	-1.6	-2.7	-3.3	0.1	2.4	5.0	7.2	9.1	9.9	10.4	9.3	5.9	2.3	0.1	-0.6	-0.3	-0.6	-1.7	1.4	10.4
26-Feb	-1.9	-2.2	-2.9	-3.5	-4.0	-5.0	-5.0	-4.0	-0.8	2.3	5.9	7.9	8.1	7.8	6.2	5.0	3.1	1.2	-0.3	-1.4	-2.5	-4.2	-6.1	-7.9	-0.2	8.1
27-Feb	-9.4	-10.9	-12.3	-13.6	-14.3	-14.9	-15.4	-15.6	-15.7	-15.7	-14.8	-14.2	-14.1	-13.6	-12.9	-12.2	-12.2	-12.6	-13.1	-12.8	-12.9	-13.2	-14.3	-15.3	-13.6	-9.4
28-Feb	-16.2	-17.7	-19.6	-21.3	-19.3	-19.0	-21.0	-21.9	-21.5	-21.7	-21.0	-20.3	-19.5	-19.0	-18.6	-18.6	-19.6	-21.2	-24.1	-26.2	-27.9	-28.9	-30.4	-31.3	-21.9	-16.2
29-Feb	-32.4	-33.3	-34.3	-34.9	-35.5	-36.0	-36.5	-36.6	-33.1	-28.4	-24.0	-20.3	-17.2	-14.4	-13.0	-11.7	-11.0	-10.8	-11.8	-12.1	-12.3	-12.1	-11.8	-10.9	-22.3	-10.8
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort McKay - Bertha Ganter - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	65	9.34	9.34
-20 - 0	596	85.63	94.97
0 - 10	34	4.89	99.86
10 - 20	1	0.14	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



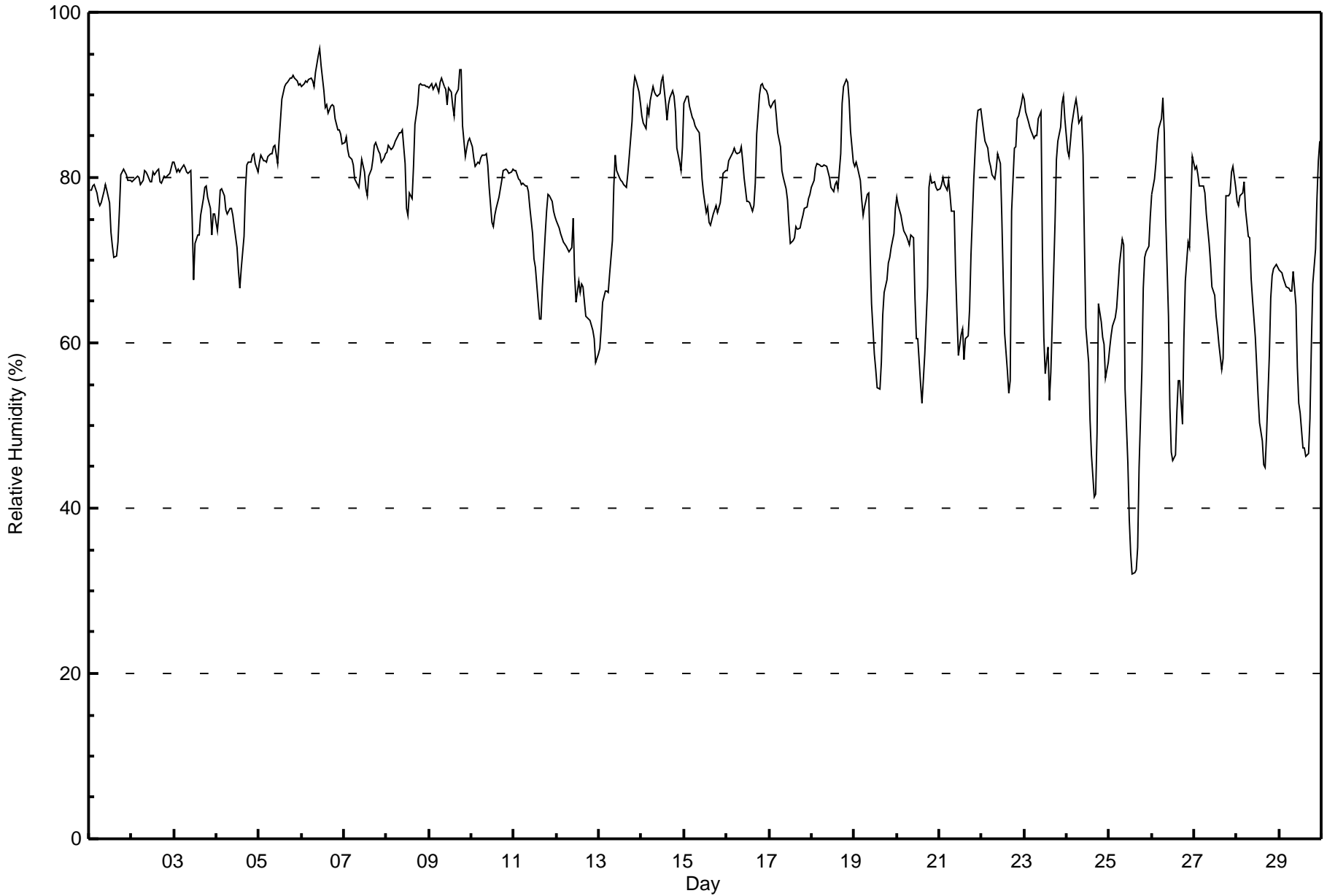
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort McKay - Bertha Ganter - February 2016

Maximum Value: 96 % on Feb 6 11:00 Maximum Daily Average: 89.9 % on Feb 6																		Hours in Service: 696 Hours of Data: 696								
Minimum Value: 32 % on Feb 25 14:00 Minimum Daily Average: 56.3 % on Feb 25 Maximum Diurnal Average: 80.8 % at hour 4 Minimum Diurnal Average: 67.4 % at hour 15 Monthly Average: 76.7 % Percentiles: P ₁ = 40 P ₁₀ = 60 Q ₁ = 72 Median = 79 Q ₃ = 84 P ₉₀ = 90 P ₉₉ = 92																		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	79	78	79	79	78	77	77	77	78	79	78	77	73	72	70	70	72	76	80	81	81	80	80	80	77.2	81
2-Feb	79	80	80	80	80	79	80	81	81	80	80	80	81	80	81	81	79	79	80	80	80	81	81	82	80.2	82
3-Feb	82	81	81	81	81	82	81	81	80	81	75	68	72	73	73	75	77	79	79	78	76	73	76	76	77.5	82
4-Feb	74	76	78	79	78	76	76	76	76	75	74	72	69	67	69	73	78	82	82	82	83	83	82	81	76.6	83
5-Feb	82	83	82	82	82	83	83	83	84	84	82	84	87	89	91	91	91	92	92	92	92	92	91	91	86.9	92
6-Feb	91	91	92	91	92	92	92	91	93	95	96	94	90	88	89	88	89	89	89	87	86	86	85	84	89.9	96
7-Feb	84	85	83	83	82	82	80	79	79	80	82	81	79	78	80	81	82	84	84	83	83	82	82	83	81.7	85
8-Feb	83	84	83	84	84	84	85	85	85	86	82	76	75	78	77	81	86	89	91	91	91	91	91	91	84.8	91
9-Feb	91	91	91	91	91	90	92	92	91	91	89	91	90	89	87	90	91	93	93	86	83	84	84	85	89.4	93
10-Feb	84	82	81	82	82	82	83	83	83	81	79	75	74	75	76	78	79	80	81	81	81	80	81	81	80.1	84
11-Feb	81	81	80	80	79	79	79	79	78	77	73	70	69	65	63	63	67	73	76	78	78	77	76	75	74.8	81
12-Feb	75	74	73	73	72	72	71	71	71	75	68	65	67	66	67	67	63	63	63	63	62	60	58	59	67.4	75
13-Feb	59	62	65	66	66	66	68	72	79	83	81	80	80	79	79	79	80	83	87	91	92	92	90	89	77.9	92
14-Feb	87	87	86	88	88	89	91	90	90	90	92	92	89	87	89	90	91	90	88	84	82	81	84	84	88.1	92
15-Feb	89	90	90	89	87	87	86	86	85	83	80	78	76	76	75	74	76	76	77	76	77	79	80	81	81.3	90
16-Feb	81	82	82	83	84	83	83	83	84	82	80	77	77	77	76	77	79	85	90	91	91	91	91	90	83.3	91
17-Feb	89	89	89	89	87	85	84	81	80	79	77	74	72	72	73	74	74	74	75	75	76	77	77	78	79.2	89
18-Feb	79	80	81	82	82	81	81	81	81	81	80	79	78	79	80	79	83	89	91	92	92	89	86	82	82.8	92
19-Feb	81	82	81	80	77	75	76	78	78	71	65	59	57	55	54	58	63	66	68	70	70	72	73	76	70.2	82
20-Feb	78	77	75	74	74	73	72	72	73	73	65	60	60	55	53	56	59	67	79	80	79	79	79	78	70.4	80
21-Feb	79	79	80	79	79	80	78	76	76	69	63	59	61	62	58	60	61	64	71	80	83	87	88	88	73.3	88
22-Feb	87	86	84	84	82	81	80	80	81	83	82	75	68	61	57	54	55	76	84	84	87	88	89	90	78.2	90
23-Feb	89	88	87	86	86	85	85	85	87	88	71	61	56	59	53	56	62	75	82	84	86	89	90	87	78.3	90
24-Feb	83	83	84	86	89	89	88	87	87	83	72	62	58	51	47	41	42	49	65	62	61	60	56	58	68.4	89
25-Feb	59	61	62	63	64	67	69	73	72	54	45	39	35	32	32	33	35	45	57	67	70	71	72	75	56.3	75
26-Feb	78	80	82	84	86	87	90	85	75	63	52	47	46	46	52	55	55	50	61	67	72	72	77	83	68.6	90
27-Feb	81	81	80	79	79	79	78	76	72	70	67	66	63	62	60	57	58	69	78	78	78	81	81	79	73.0	81
28-Feb	77	77	78	78	79	76	73	73	68	65	61	57	53	50	48	45	45	49	58	65	68	69	70	69	64.7	79
29-Feb	69	68	68	67	67	67	66	66	69	65	57	53	52	47	47	46	47	51	60	67	71	78	82	84	63.0	84
																		Diurnal Average								
																		Diurnal Maximum								



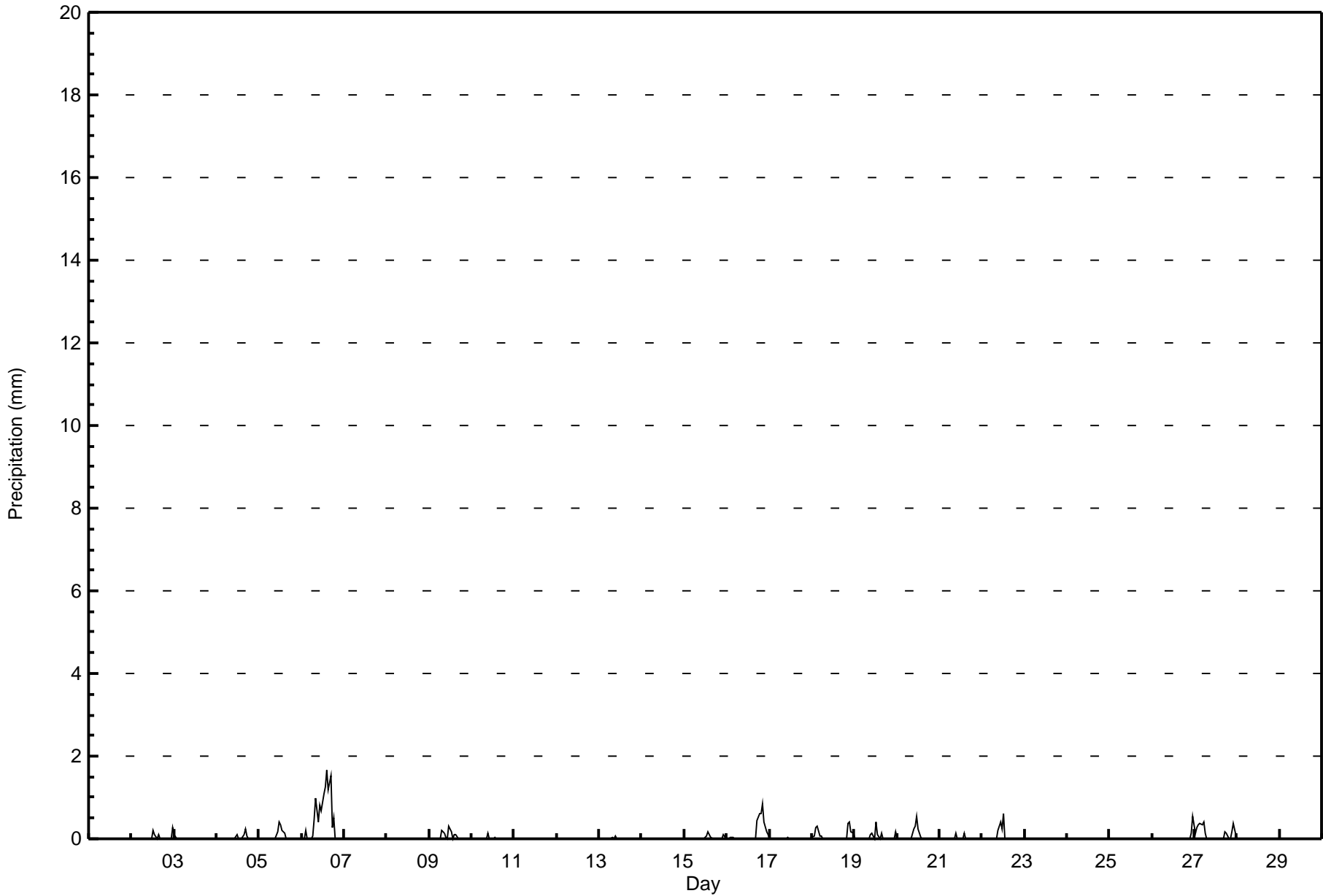


Maximum Value: 1.7 mm on Feb 6 15:00 Maximum Daily Total: 11.2 mm on Feb 6		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Minimum Value: 0.0 mm on Feb 1 01:00 Maximum Diurnal Total: 3.1 mm at hour 13 Monthly Total: 28.42 mm		Minimum Daily Total: 0.0 mm on Feb 1 Minimum Diurnal Total: 0.2 mm at hour 7 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 0.8																									
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.3
3-Feb	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
4-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2
5-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.4
6-Feb	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.5	1.0	0.4	0.8	0.7	1.1	1.3	1.7	1.2	1.5	0.3	0.5	0.0	0.0	0.0	0.0	0.0	11.2	1.7	
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	0.2	0.2	0.1	0.0	0.3	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	0.3
10-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2
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	0.1	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	0.1	0.1	0.1
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	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.2	0.2
16-Feb	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	0.4	0.6	0.6	0.9	0.4	0.2	0.1	3.2	0.9	0.9	
17-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	
18-Feb	0.1	0.1	0.3	0.3	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	0.4	0.4	0.2	0.1	1.9	0.4	0.4	
19-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.4	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	0.4	0.4	
20-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.5	0.5	
21-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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	
22-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.6	0.6	
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	0.1	0.5	0.7	0.5	0.5	
27-Feb	0.2	0.3	0.3	0.4	0.3	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.2	0.4	0.1	2.9	0.4	0.4	
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	
29-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	
																								Diurnal Average			
																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	669	96.12	96.12
0.4 - 0.5	15	2.16	98.28
0.6 - 0.7	4	0.57	98.85
0.8 - 1.4	6	0.86	99.71
1.5 - 10	2	0.29	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

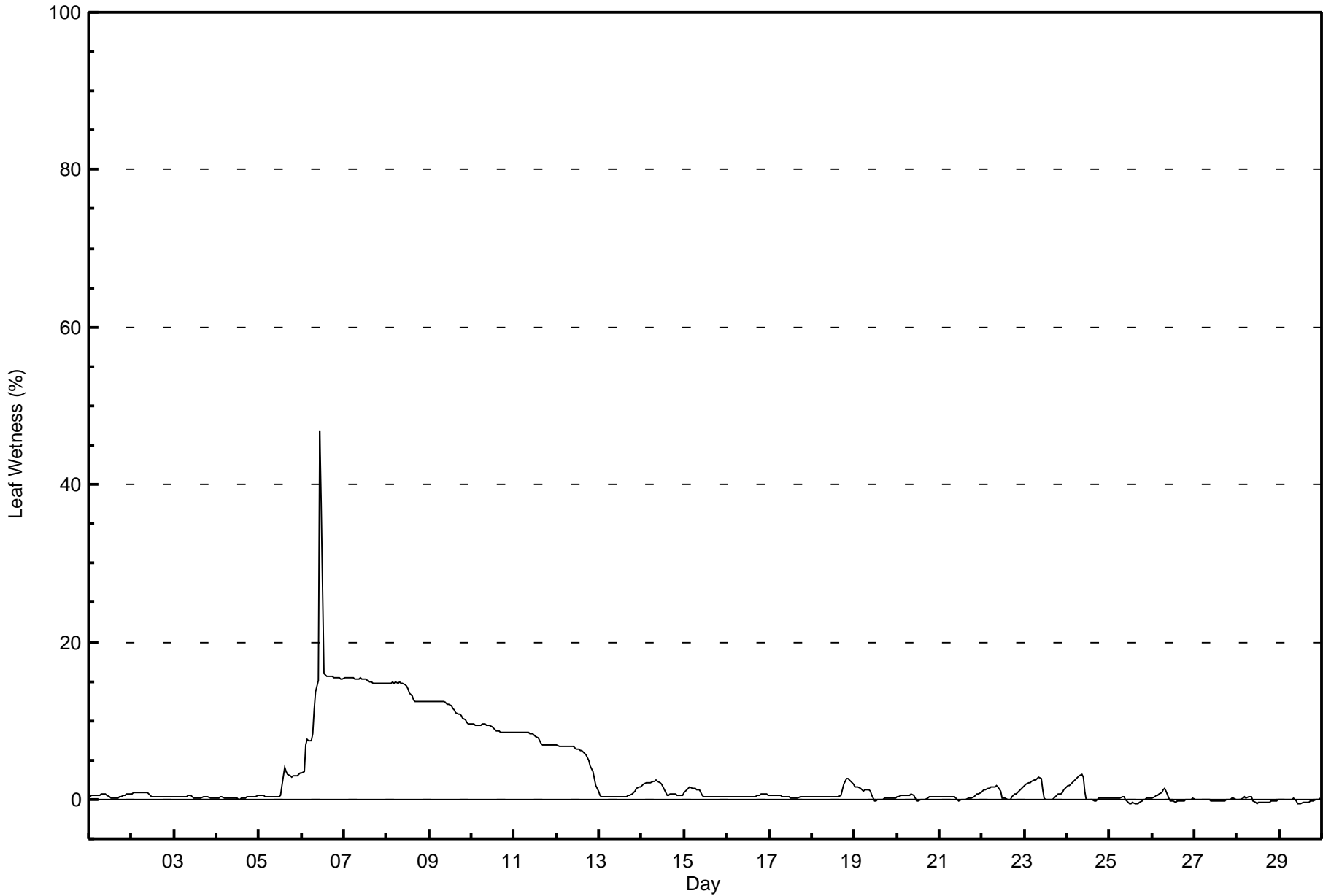


Maximum Value: 47 % on Feb 6 11:00														Maximum Daily Average: 15.1 % on Feb 7														Hours in Service: 696	
Minimum Value: -1 % on Feb 29 12:00														Minimum Daily Average: -0.2 % on Feb 29														Hours of Data: 696	
Maximum Diurnal Average: 4.2 % at hour 11														Minimum Diurnal Average: 2.8 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 3.1 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 3 P ₉₀ = 12 P ₉₉ = 16														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1			
2-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	0.5	1			
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	0.3	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	0.2	0			
5-Feb	1	1	0	0	0	0	0	0	0	0	0	0	1	2	4	4	3	3	3	3	3	3	3	3	1.6	4			
6-Feb	3	4	7	8	8	7	8	11	14	15	47	38	16	16	16	16	16	16	16	16	15	15	15	15	14.9	47			
7-Feb	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15.1	15			
8-Feb	15	15	15	15	15	15	15	15	15	15	15	14	14	14	13	13	12	12	12	12	12	12	12	12	13.8	15			
9-Feb	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11	10	10	10	10	11.5	12			
10-Feb	10	10	9	9	9	9	10	10	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9.1	10			
11-Feb	9	9	9	9	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7.8	9			
12-Feb	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	5	5	4	4	3	2	1	5.6	7			
13-Feb	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	0.6	2			
14-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2			
15-Feb	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2			
16-Feb	0	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			
17-Feb	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
18-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	3	3	2	2	0.9	3			
19-Feb	2	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2			
20-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	0.3	1			
21-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1			
22-Feb	1	1	1	1	1	2	2	2	2	2	1	0	0	0	0	0	0	0	1	1	1	1	1	2	0.9	2			
23-Feb	2	2	2	2	2	2	3	3	3	3	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1.3	3			
24-Feb	2	2	2	2	2	3	3	3	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	3			
25-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0	-0.1	0			
26-Feb	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
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	-0.1	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	-0.1	0			
29-Feb	0	0	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-0.2	0			
	2.9	3.0	3.1	3.2	3.2	3.2	3.2	3.4	3.5	3.4	4.2	3.6	2.8	2.8	2.8	2.8	2.8	2.8	2.9	2.9	2.9	2.9	2.9	2.9	Diurnal Average				
	15	15	15	15	15	15	15	15	15	15	47	38	16	16	16	16	16	16	16	16	15	15	15	15	Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (LW) - %
Fort McKay - Bertha Ganter - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Fort McKay - Bertha Ganter - February 2016

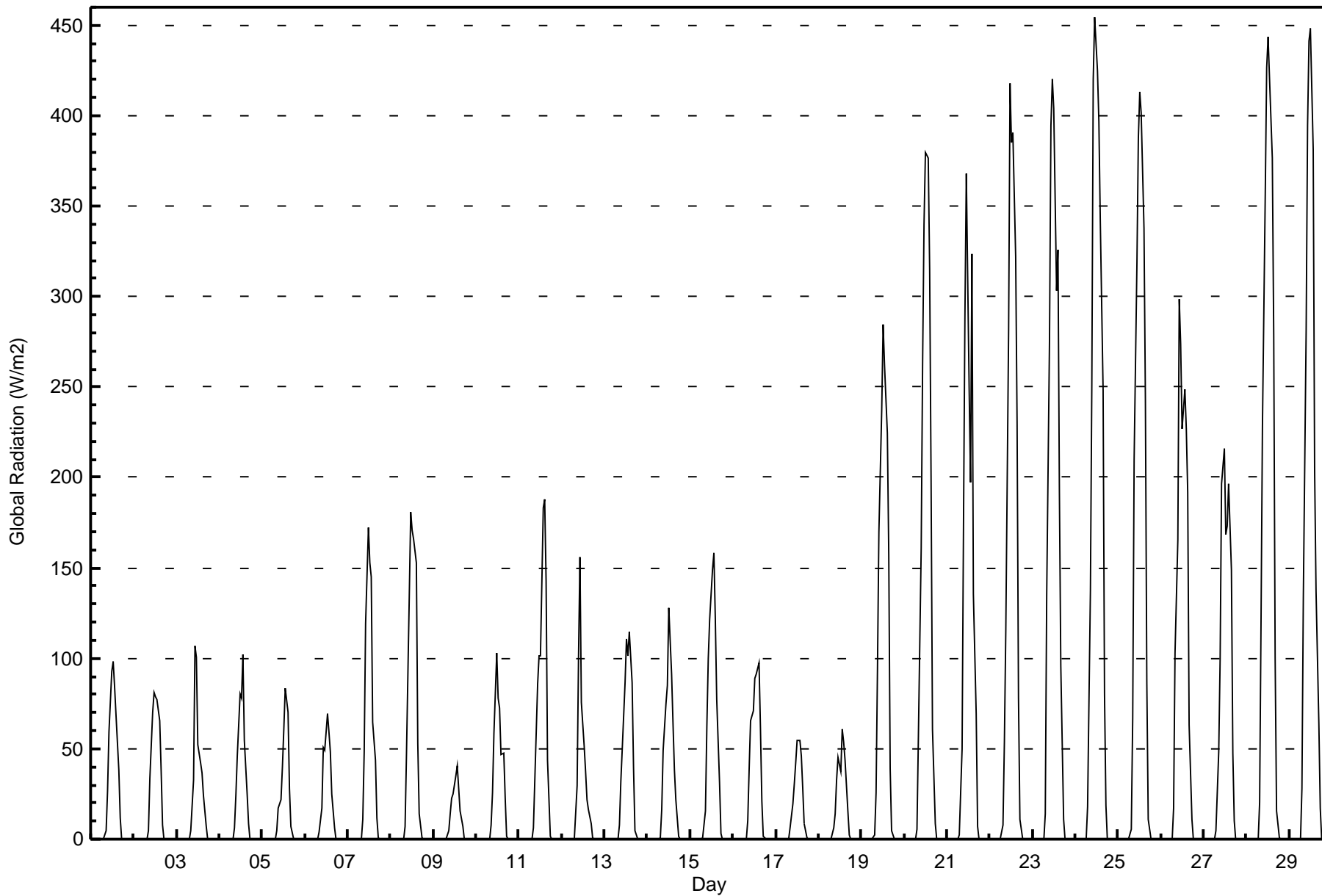
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	214	35.55	35.55
0.4 - 0.5	67	11.13	46.68
0.6 - 0.7	39	6.48	53.16
0.8 - 1.4	49	8.14	61.30
1.5 - 10	143	23.75	85.05
> 10	86	14.29	99.34

Total Number of Valid Hours: 602

Total Number of Hours: 696



Maximum Value: 454 W/m2 on Feb 24 12:00																			Maximum Daily Average: 116.3 W/m2 on Feb 24						Hours in Service: 696																			
Minimum Value: 0 W/m2 on Feb 1 02:00																			Minimum Daily Average: 8.0 W/m2 on Feb 9						Hours of Data: 696																			
Maximum Diurnal Average: 190.9 W/m2 at hour 12																			Minimum Diurnal Average: 0.0 W/m2 at hour 21						Hours of Missing Data: 0																			
Monthly Average: 48.1 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 48 P ₉₀ = 172 P ₉₉ = 419						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	4	27	59	93	98	84	69	38	11	0	0	0	0	0	0	0	20.2	98																		
2-Feb	0	0	0	0	0	0	0	0	5	34	70	81	79	77	66	38	8	0	0	0	0	0	0	0	19.1	81																		
3-Feb	0	0	0	0	0	0	0	0	5	33	106	100	52	42	36	24	7	0	0	0	0	0	0	0	16.9	106																		
4-Feb	0	0	0	0	0	0	0	0	6	24	46	81	78	102	54	25	9	0	0	0	0	0	0	0	17.7	102																		
5-Feb	0	0	0	0	0	0	0	0	5	17	21	40	61	84	70	28	7	0	0	0	0	0	0	0	13.9	84																		
6-Feb	0	0	0	0	0	0	0	0	4	17	51	49	69	59	48	25	6	0	0	0	0	0	0	0	13.7	69																		
7-Feb	0	0	0	0	0	0	0	0	11	48	120	172	153	145	65	44	12	1	0	0	0	0	0	0	32.1	172																		
8-Feb	0	0	0	0	0	0	0	0	7	48	136	181	171	166	153	53	14	1	0	0	0	0	0	0	38.7	181																		
9-Feb	0	0	0	0	0	0	0	0	4	14	22	25	35	41	28	15	7	0	0	0	0	0	0	0	8.0	41																		
10-Feb	0	0	0	0	0	0	0	0	7	26	58	103	78	72	47	47	23	2	0	0	0	0	0	0	19.3	103																		
11-Feb	0	0	0	0	0	0	0	0	6	33	86	102	101	183	188	143	44	2	0	0	0	0	0	0	37.0	188																		
12-Feb	0	0	0	0	0	0	0	0	30	100	156	76	51	37	22	16	9	1	0	0	0	0	0	0	20.8	156																		
13-Feb	0	0	0	0	0	0	0	0	7	32	50	86	111	102	115	86	40	4	0	0	0	0	0	0	26.4	115																		
14-Feb	0	0	0	0	0	0	0	1	17	49	75	85	128	91	64	39	22	2	0	0	0	0	0	0	23.8	128																		
15-Feb	0	0	0	0	0	0	0	1	15	62	100	122	149	158	122	77	31	3	0	0	0	0	0	0	35.0	158																		
16-Feb	0	0	0	0	0	0	0	0	10	39	66	71	89	91	98	62	21	2	0	0	0	0	0	0	22.9	98																		
17-Feb	0	0	0	0	0	0	0	0	6	19	31	42	54	54	46	28	9	1	0	0	0	0	0	0	12.1	54																		
18-Feb	0	0	0	0	0	0	0	0	6	14	33	45	38	61	54	44	15	3	0	0	0	0	0	0	13.1	61																		
19-Feb	0	0	0	0	0	0	0	2	26	94	170	237	285	262	224	158	39	5	0	0	0	0	0	0	62.6	285																		
20-Feb	0	0	0	0	0	0	0	6	56	160	263	340	379	376	315	200	61	8	0	0	0	0	0	0	90.2	379																		
21-Feb	0	0	0	0	0	0	0	2	50	174	288	368	249	197	323	135	70	7	0	0	0	0	0	0	77.7	368																		
22-Feb	0	0	0	0	0	0	0	7	54	115	281	418	385	390	322	230	78	11	0	0	0	0	0	0	95.5	418																		
23-Feb	0	0	0	0	0	0	0	14	135	277	395	421	404	303	326	192	96	11	0	0	0	0	0	0	107.2	421																		
24-Feb	0	0	0	0	0	0	0	18	137	251	420	454	425	397	343	248	80	19	0	0	0	0	0	0	116.3	454																		
25-Feb	0	0	0	0	0	0	0	5	67	210	319	388	414	402	337	243	87	11	0	0	0	0	0	0	103.4	414																		
26-Feb	0	0	0	0	0	0	0	17	103	165	299	274	227	249	227	192	63	11	0	0	0	0	0	0	76.1	299																		
27-Feb	0	0	0	0	0	0	0	5	48	99	196	216	168	173	197	149	48	10	0	0	0	0	0	0	54.5	216																		
28-Feb	0	0	0	0	0	0	0	20	121	228	357	426	443	421	376	279	100	16	0	0	0	0	0	0	116.2	443																		
29-Feb	0	0	0	0	0	0	0	28	134	282	394	441	449	382	204	137	64	17	0	0	0	0	0	0	105.5	449																		
																			0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	37.4	92.8	160.9	190.9	187.0	179.4	156.5	103.3	37.2	5.1	0.1	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
																			0	0	0	0	0	0	0	28	137	282	420	454	449	421	376	279	100	19	0	0	0	0	0	0	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m²
Fort McKay - Bertha Ganter - February 2016

Concentration Ranges (W/m²)	Number of Hours	%	Cumulative %
0 - 20	470	67.53	67.53
21 - 100	120	17.24	84.77
101 - 300	72	10.34	95.11
301 - 600	34	4.89	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 696

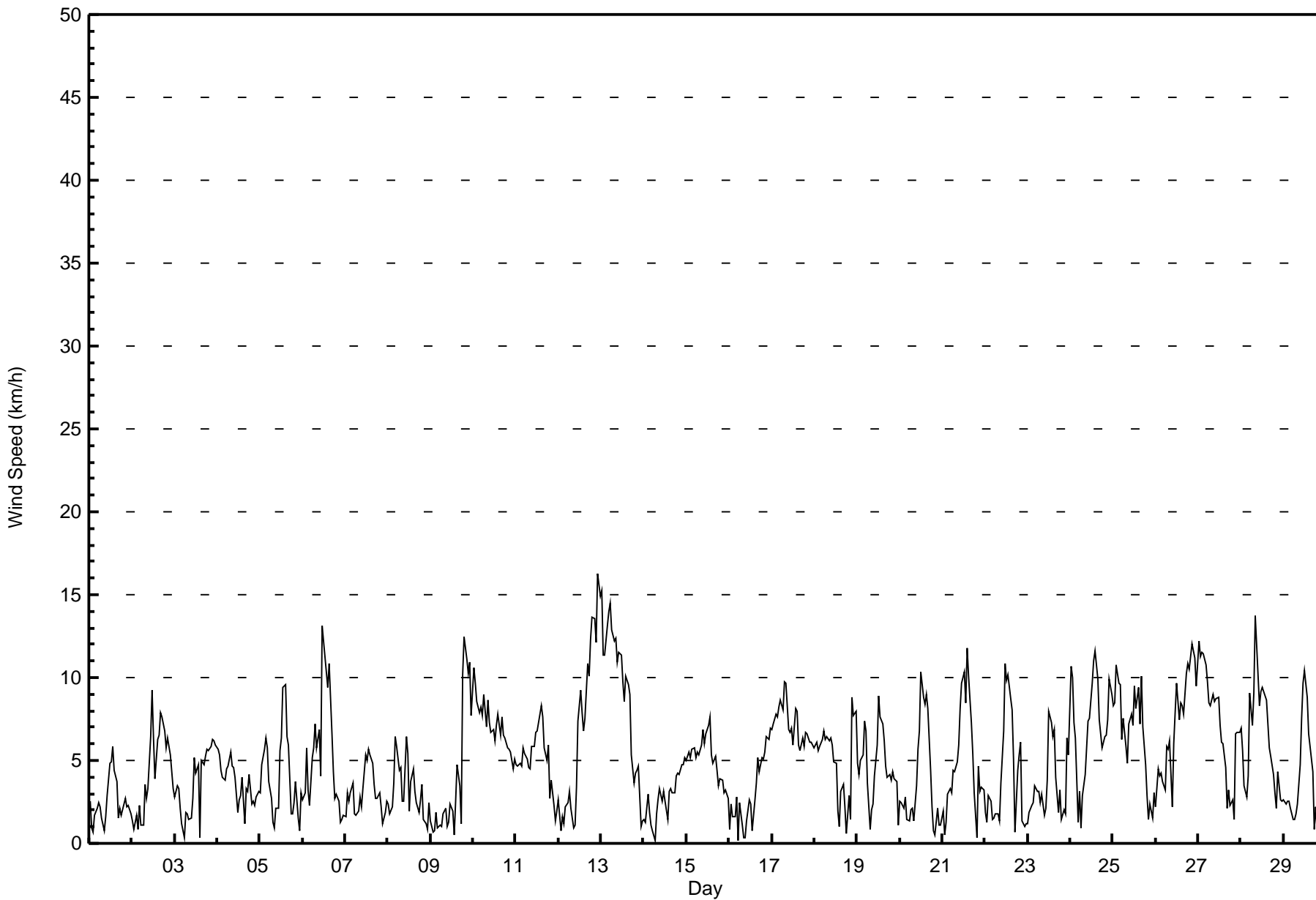
Total Number of Hours: 696



Maximum Speed: 16 km/h on Feb 12 23:00	Maximum Daily Speed Average: 9.1 km/h on Feb 13	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 14 07:00	Minimum Daily Speed Average: 0.7 km/h on Feb 23	Hours of Data: 696
Maximum Diurnal Speed Average: 2.2 km/h at hour 22	Minimum Diurnal Speed Average: 0.1 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 0.7 km/h 16.7 deg	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 7 P ₉₀ = 10 P ₉₉ = 14	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	W3	W1	SW1	SW2	SW2	SW2	WSW2	WSW2	SSW1	S2	S3	S5	S5	S6	S4	SSE4	SSE2	S2	WSW2	W2	NNW3	NW2	NNW2	NNW2	SSW1.5	S6
2-Feb	NW1	SW1	NNW2	N1	SSE2	WSW1	SSE1	S4	S3	SSE3	SSE6	S9	S6	SSE4	N6	N6	N8	N8	N7	N6	N6	N5	N4	NNW3	N1.0	S9
3-Feb	NNE3	N3	N3	N2	N1	NW0	NNW2	W2	WSW1	WSW2	SSE3	SSE5	SE4	S5	SW0	N5	N5	N5	N6	NNE6	NNE6	N6	N6	N6	N2.0	N6
4-Feb	N6	N5	N4	N4	NNW4	NNW4	NNW5	N5	N5	N5	NNW4	NE2	S3	SSE3	SSE4	E1	NNE3	N3	NNW4	NNW2	NW3	WNW2	W3	WSW3	NNW2.4	N6
5-Feb	SSW3	S5	S6	S6	S6	S4	SSW3	SSW1	NW1	NW2	SSW2	S6	SSW6	S9	S10	S6	S6	SSW2	NW2	WNW2	SW4	SW2	S1	SW3	SSW3.5	S10
6-Feb	SW3	S3	S6	SSW3	S2	S5	SSE6	S7	S6	S7	SSW4	N13	N11	N10	N9	N11	N7	N4	NNE3	NNE3	NE3	ENE1	ESE1	NNE2	N1.0	N13
7-Feb	N2	N3	NNW3	NW3	WNW4	WNW2	SW2	W2	NNW3	N2	NNE3	NNE5	NE5	NE6	NE5	NNE5	N4	NW3	WNW3	W3	SSW2	W1	S2	S3	N1.6	NE6
8-Feb	S2	WSW2	SSE2	S4	S6	S6	SSW4	S5	SSW3	SSW3	S6	SSE5	NE2	NNE4	N4	NNE3	N2	N2	N3	NNW4	NNW1	WSW1	SSW1	N2	S0.9	S6
9-Feb	W1	WSW1	WNW1	NNW2	S1	SSW1	NNW1	SW2	S2	SE1	ESE1	NE2	N2	ESE0	SSE3	S5	SSE3	NNE1	N10	N12	N11	NNE10	NNE11	NNE8	NNE2.2	N12
10-Feb	NNE11	NNE10	NNE9	NE8	NE8	NNE8	NNE9	NNE7	NNE9	NNE7	NNE7	NNE7	NNE6	NE7	NNE8	N7	N8	N7	N6	N6	N6	N5	NNW4	N5	NNE7.0	NNE11
11-Feb	N5	N5	N5	N5	N6	N5	N5	NNW5	N4	N6	N6	N7	N7	N8	N8	N8	N6	N5	N6	NW3	N4	NNW2	NNW1	W2	N4.9	N8
12-Feb	WSW3	WNW1	W2	WNW1	NW2	NW2	NNW3	W2	NW1	SSW1	SSE3	S7	S9	S8	S7	SSE8	SSE11	S10	S12	SSE14	S14	SSE12	S16	S15	S5.7	S16
13-Feb	S15	S11	S11	S13	S14	S14	S13	S12	S12	S11	S12	S11	S10	S9	S10	S10	S9	S5	SSW4	SSW4	SSW4	S5	NNW1	W1	S9.1	S15
14-Feb	WNW1	NNW1	NNW3	NNW2	WNW1	SSE1	WSW0	NNW2	NW3	W3	WNW3	WNW3	SSW3	SE1	ENE3	NE3	NE3	NE3	NE4	NNE4	NE4	NNE5	N5	N5	N1.6	N5
15-Feb	N5	N6	N5	N6	N6	N5	N5	N5	N6	N7	N6	NNE7	NNE7	NNE8	NE5	NNE5	N5	N4	NNE3	NNE4	NE4	N3	NNE3	N3	N5.0	NNE8
16-Feb	NW1	N2	NNE2	ENE2	N3	SSE0	SSW2	SW1	WNW0	SSW0	SW1	SE3	ENE2	E1	NE3	NNE4	N5	N4	N5	NNW5	NNW5	NNW6	N6	N7	N2.2	N7
17-Feb	N7	N7	N8	N8	N8	N9	N8	NNE10	N10	NNE7	NNE7	NE7	NE6	NNE8	NE8	NE6	NE6	NNE6	NNE7	NNE7	NNE6	NNE6	NNE6	NNE6	NNE6.9	NNE10
18-Feb	N6	N6	N6	N6	N6	N7	N6	N6	N6	NNW6	N6	N5	N5	N2	ENE1	SSE3	WNW4	NW2	ENE1	SSE3	NE1	N9	NNE8	NE8	N4.2	N9
19-Feb	NE5	N4	NNW5	N5	N7	N7	N4	NE1	SSW2	SE2	SE4	E6	E9	E8	ENE7	ENE6	ENE5	E4	NE4	NNE4	NE4	NNE4	N4	N1	NE3.3	E9
20-Feb	NNW3	NW2	NW2	WNW3	WNW1	WSW1	WSW2	SW2	SSW1	S4	SSE6	SSE7	SSE10	SSE9	SSE8	S9	S8	S4	SSW2	WSW1	WSW1	N2	NNW1	NW1	S2.4	SSE10
21-Feb	SW2	NNE0	WSW1	SSW3	S3	SSE3	SSW4	S4	S5	SSE6	SSE8	SSE10	SSE10	SSE9	SSE12	S10	S7	S5	S3	SSE0	N5	W3	NW3	NNW3	S3.8	SSE12
22-Feb	NW2	NNW1	NNW3	NNW3	WSW1	WSW1	SW2	WSW2	SW1	S4	S7	S11	SSE10	SSE10	S9	S8	S5	WSW1	WNW4	N5	NNW6	SSW1	SW1	WNW1	SSW2.0	S11
23-Feb	SW1	SW2	SW2	SSW2	SSW3	SSW3	S3	S2	S3	SSE2	SSE2	E4	E8	ENE7	E6	ENE7	NE4	NNE2	W3	SW1	SSW2	WSW2	WNW6	WNW5	SE0.7	E8
24-Feb	WNW11	WNW10	WNW7	WNW6	NNW1	WSW3	NW1	SSW3	S4	S6	SSE7	SSE8	SSE10	SSE11	SSE12	SSE10	S7	S7	S6	S6	S7	S7	S10	S9	S4.8	SSE12
25-Feb	S8	S8	S11	S10	S10	S6	S8	S6	S5	SW7	WSW8	SW7	SW10	WSW8	W9	W7	WNW10	NW7	WNW5	SW3	SSW1	NNW2	SSE2	SSE3	SW4.6	S11
26-Feb	SSW2	SW4	S4	S4	S4	SSE3	S6	SSW6	WSW6	S2	WNW6	NW8	NNW10	N7	NE8	NE8	NE8	NNE10	NNE11	NNE10	NNE12	NNE12	N11	N9	NNE3.3	NNE12
27-Feb	N12	N11	N12	NNE11	N11	N10	N9	N8	N9	N9	N9	N9	NNE7	NNE6	NNE6	N5	NE2	E3	NNE2	SE3	NNE1	N7	NNE7	NNE7	N6.9	N12
28-Feb	N7	NNE6	N3	NNW3	N4	N9	N7	N9	N14	N12	NNE8	NNE9	NNE9	NE9	NE9	NE7	NE6	NNE5	N4	N3	NNW2	NNW4	NW3	WNW3	NNE6.0	N14
29-Feb	WSW3	WSW2	WSW3	WSW3	WSW2	W1	WSW1	SSW2	SSW2	SSE5	SSE8	SSE10	SSE10	S9	S7	S6	S4	S1	SW2	SE1	NW1	NE0	SSW3	S5	S3.1	SSE10
NNW1.5NNW1.6NNW1.1NNW0.9NNW0.5NNW0.6 NW0.4 W0.5 NW0.7 ESE0.1 SSE0.9 ESE1.4 ESE1.9 ESE1.9 E1.9 E1.4 NE0.8NNE1.4 N2.0 N1.7 N1.9 N2.2 N1.7 N1.4																								Diurnal Average		
S15 S11 N12 S13 S14 S14 S13 S12 N14 N12 S12 N13 N11 SSE11 SSE12 N11 SSE11 NNE10 SSE12 SSE14 S14 SSE12 S16 S15																								Diurnal Maximum		

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	412	59.20	59.20
6 - 11	260	37.36	96.55
12 - 19	24	3.45	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: 696

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - February 2016**

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	70	27	22	8	4	3	7	28	47	39	23	30	16	22	22	44	412
6 - 11	81	45	17	4	5	0	0	24	61	2	3	3	2	7	2	4	260
12 - 19	6	2	0	0	0	0	0	5	11	0	0	0	0	0	0	0	24
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	157	74	39	12	9	3	7	57	119	41	26	33	18	29	24	48	696

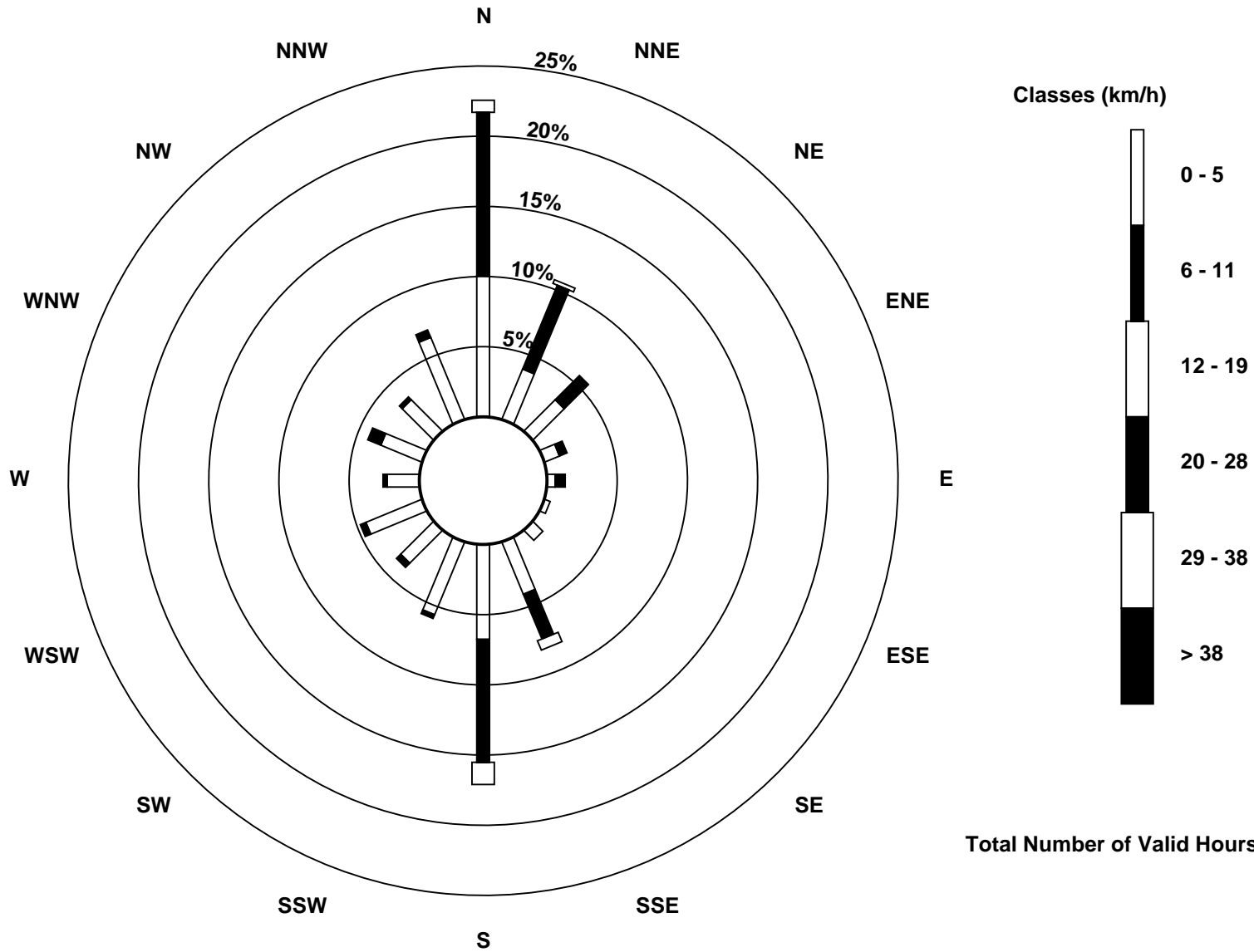
Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 696



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 6 12:00 Minimum Value: 0 km/h on Feb 20 19:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 696 Hours of Data: 696 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	1	1	1	0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	2	1	1	1	2
2-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	2	2	2	2	1	1	3
3-Feb	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2
4-Feb	2	2	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	0	1	1	1	2
5-Feb	1	1	1	2	1	1	1	1	1	1	1	1	2	2	3	3	3	1	1	1	1	1	1	1	3
6-Feb	1	1	2	1	1	2	1	2	1	2	1	6	5	4	4	4	2	2	1	1	1	1	1	1	6
7-Feb	1	1	1	1	1	1	1	2	1	1	1	2	2	3	2	2	1	1	1	1	1	1	1	1	3
8-Feb	1	1	1	1	2	3	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
9-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	5	5	5	5	3	5
10-Feb	4	4	4	3	4	3	4	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	1	4
11-Feb	1	1	1	1	2	2	2	1	2	2	2	2	3	3	3	3	2	1	1	2	1	1	1	1	3
12-Feb	1	1	1	1	1	1	1	1	1	1	1	3	2	2	3	2	3	2	3	3	3	3	4	3	4
13-Feb	3	3	3	4	4	3	3	3	3	3	2	2	2	2	2	2	2	3	2	2	1	1	2	1	4
14-Feb	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2
15-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	1	2	2	1	1	1	3
16-Feb	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
17-Feb	3	2	3	2	3	3	3	4	4	3	3	3	3	3	3	2	2	3	2	2	2	2	3	2	4
18-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	3	3	3	3
19-Feb	2	2	1	2	3	2	1	1	1	1	1	2	2	2	2	2	2	1	2	2	2	2	1	1	3
20-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2	1	0	1	1	1	1	1	2
21-Feb	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	2	2	1	1	1	1	2
22-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	1	1	2
23-Feb	1	1	1	1	2	1	1	2	1	1	1	2	3	2	2	2	1	1	1	1	1	2	3	4	4
24-Feb	2	2	2	2	1	2	1	1	2	1	1	1	2	2	2	2	1	1	1	1	1	2	2	2	2
25-Feb	1	1	2	2	2	2	2	1	2	3	3	3	4	3	4	3	4	1	1	1	1	1	1	1	4
26-Feb	1	1	1	1	1	1	2	2	3	2	3	3	4	3	3	3	4	5	5	5	5	5	4	4	5
27-Feb	4	4	4	4	4	4	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	2	3	3	4
28-Feb	2	2	1	1	2	4	2	3	5	5	3	4	4	4	4	3	2	2	1	1	1	1	1	1	5
29-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1	1	1	1	1	1	1	2
Diurnal Maximum																									



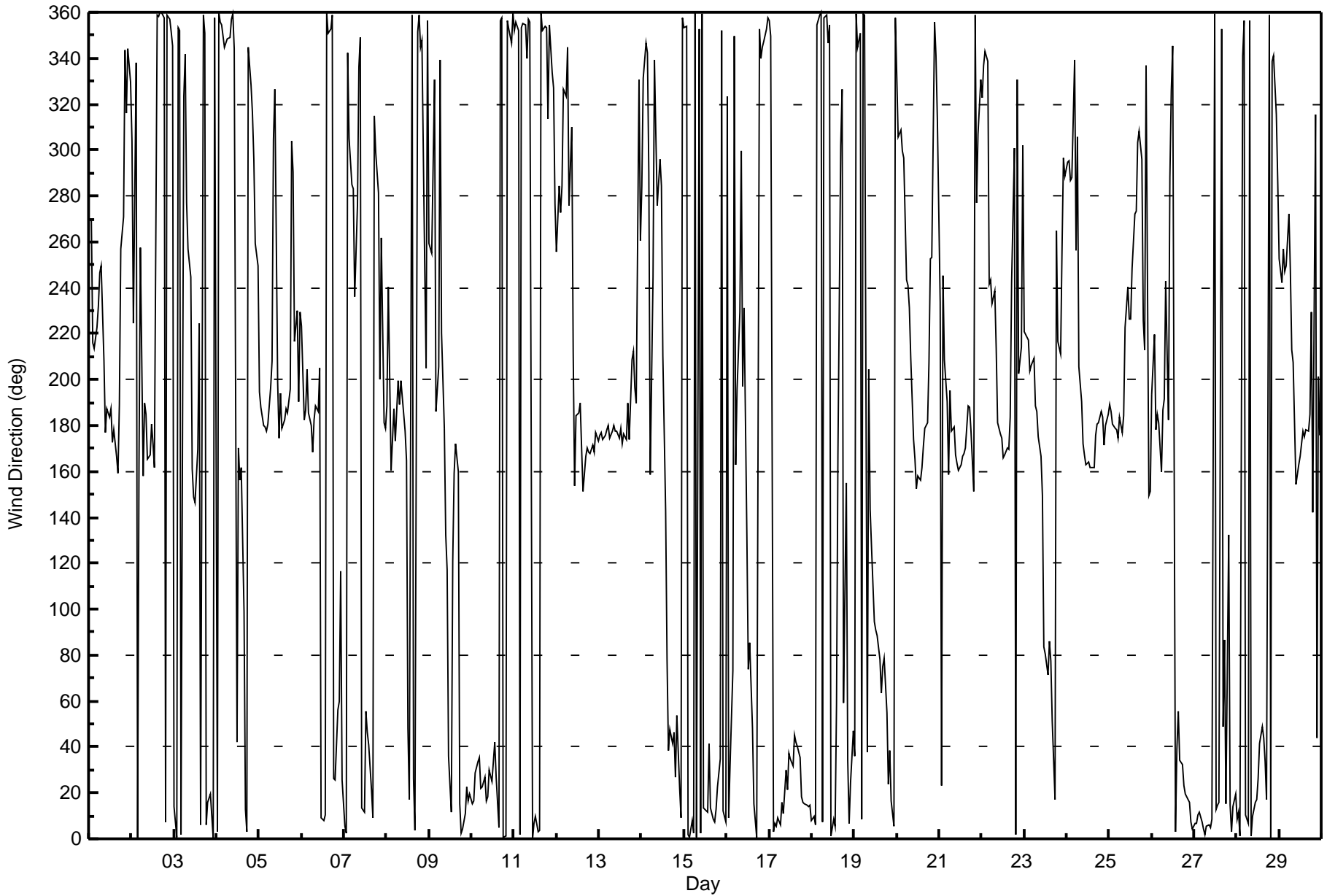
Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - February 2016

Direction of Maximum Speed: 177 deg on Feb 12 23:00																						Hours in Service:	696		
Direction of Maximum Daily Speed Average: 179.4 deg on Feb 13																						Hours of Data:	696		
Direction of Minimum Speed: 244 deg on Feb 14 07:00											Direction of Minimum Daily Speed Average: 0.7 deg on Feb 23											Hours of Missing Data:	0		
Monthly Average Direction: 284.3 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	270	269	216	214	223	232	247	249	208	177	187	184	188	172	178	167	159	189	257	271	344	316	344	329	211.4
2-Feb	304	225	338	0	162	258	158	190	185	165	167	180	172	162	358	358	360	360	357	7	359	357	351	345	358.4
3-Feb	14	0	353	352	2	323	342	277	257	245	161	149	146	170	224	6	359	351	6	16	19	10	0	357	6.8
4-Feb	3	360	356	354	345	347	348	349	357	359	344	42	170	156	162	99	13	3	345	328	316	296	260	250	348.5
5-Feb	194	188	180	180	178	180	196	208	305	326	199	175	194	178	182	187	185	196	304	291	217	230	190	229	192.2
6-Feb	223	182	187	204	186	180	168	182	188	186	205	9	8	10	360	351	352	359	26	26	56	60	117	25	9.5
7-Feb	5	2	342	305	285	283	236	276	336	349	14	12	56	46	41	21	9	315	299	281	200	262	181	179	350.6
8-Feb	189	240	160	174	187	173	200	189	199	192	178	165	48	17	359	27	4	352	359	344	348	250	205	356	185.1
9-Feb	260	255	293	331	186	206	339	220	178	132	117	36	11	121	159	172	160	15	2	4	11	23	17	20	16.1
10-Feb	15	17	28	34	36	22	22	27	17	18	30	25	33	42	27	5	357	357	1	1	356	353	347	360	17.0
11-Feb	352	356	352	2	353	355	354	340	357	356	0	7	10	3	3	360	352	354	353	313	355	334	327	277	354.9
12-Feb	255	284	273	284	326	323	345	276	310	212	154	184	185	190	170	151	167	170	169	168	172	168	177	173	177.0
13-Feb	176	177	174	176	178	180	175	178	180	177	178	174	179	172	176	174	190	174	208	212	196	190	331	261	179.4
14-Feb	284	332	346	343	290	159	244	339	307	276	296	284	211	143	78	38	47	41	47	27	53	22	9	358	5.8
15-Feb	353	354	2	1	8	3	360	1	353	3	359	13	12	12	42	14	9	7	13	22	35	352	12	7	7.3
16-Feb	323	9	32	73	350	163	196	229	299	197	231	132	74	86	48	15	8	1	352	340	344	347	353	358	1.2
17-Feb	357	350	3	7	5	9	6	16	11	30	21	37	35	31	45	42	40	35	18	16	15	15	14	15	18.1
18-Feb	8	10	6	354	358	360	7	358	359	347	354	1	9	6	58	167	302	326	59	155	34	7	25	47	6.3
19-Feb	36	360	345	351	8	360	359	38	204	144	127	94	91	88	78	63	75	79	55	24	39	17	5	358	47.2
20-Feb	333	306	309	300	297	244	241	232	209	174	166	153	158	156	162	171	179	181	208	253	253	356	341	313	180.9
21-Feb	234	23	245	208	190	159	195	178	179	167	164	161	163	167	168	170	188	188	178	152	359	277	307	331	178.4
22-Feb	323	337	343	339	241	243	233	239	214	181	177	174	166	167	170	169	184	242	301	2	331	202	214	302	192.3
23-Feb	221	220	217	204	206	209	189	186	175	167	150	83	81	71	86	77	51	17	265	216	211	257	297	288	138.5
24-Feb	295	295	287	288	339	256	306	206	191	172	167	163	164	162	162	162	176	180	181	186	184	172	180	185	190.5
25-Feb	189	186	181	179	178	175	184	177	184	222	241	226	226	248	272	274	303	308	296	226	213	337	150	151	218.6
26-Feb	193	220	178	185	181	160	186	192	243	182	288	326	345	3	39	56	34	33	23	19	17	16	7	4	11.9
27-Feb	7	7	10	12	8	4	2	6	6	5	9	359	13	14	16	352	49	87	15	132	15	3	14	19	10.1
28-Feb	9	12	1	341	356	10	7	356	1	10	16	17	26	42	49	44	34	17	359	0	339	341	315	286	11.9
29-Feb	253	242	257	247	249	272	248	213	207	154	159	163	167	178	175	178	178	185	230	142	315	44	201	176	186.1
331.0	334.9	337.4	326.8	329.6	337.1	316.3	276.9	316.0	110.1	162.2	121.6	120.2	113.7	101.1	87.6	34.1	15.4	355.2	1.8	6.0	359.5	354.9	352.3		
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Feb 16 10:00 Minimum Value: 9 deg on Feb 24 19:00 Percentiles: P ₁ = 11 P ₁₀ = 14 Q ₁ = 23 Median = 32 Q ₃ = 45 P ₉₀ = 66 P ₉₉ = 93																			Hours in Service: 696 Hours of Data: 696 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	39	66	37	23	27	46	56	87	52	22	22	34	24	24	32	65	32	28	38	51	38	30	55	87
2-Feb	63	93	67	80	26	65	68	26	37	25	16	17	16	53	28	30	29	29	29	33	28	26	24	27	93
3-Feb	39	30	24	70	80	72	28	40	30	48	30	13	16	20	96	36	32	23	30	36	43	38	27	26	96
4-Feb	26	28	25	31	28	25	28	27	26	28	34	81	36	60	25	76	35	33	23	20	20	30	41	21	81
5-Feb	33	19	17	13	14	25	40	80	88	49	45	19	20	17	22	30	23	62	68	71	34	77	90	13	90
6-Feb	20	29	21	32	65	29	17	16	16	14	31	36	35	32	29	25	27	32	49	47	46	54	37	46	65
7-Feb	74	66	32	34	27	57	76	76	36	52	32	36	45	54	47	38	32	19	31	40	38	64	31	28	76
8-Feb	20	27	19	30	17	30	18	22	84	43	15	17	72	44	35	40	31	50	39	23	45	77	73	46	84
9-Feb	80	81	63	76	71	61	61	27	32	74	69	37	48	85	60	18	16	81	26	35	40	47	38	39	85
10-Feb	33	35	45	46	43	43	43	42	35	40	43	43	51	50	39	38	27	26	24	31	29	24	24	23	51
11-Feb	19	25	25	27	23	23	24	24	25	28	32	36	40	33	29	26	27	22	21	42	20	34	77	64	77
12-Feb	13	68	47	57	23	33	27	41	59	72	23	22	17	22	29	17	16	16	15	14	14	15	14	14	72
13-Feb	14	14	13	14	15	16	14	14	14	15	14	14	16	17	14	14	16	32	32	18	23	30	79	55	79
14-Feb	65	75	35	53	78	74	83	45	39	33	38	38	39	83	44	41	50	48	54	48	48	44	33	29	83
15-Feb	26	26	31	29	28	30	27	25	22	30	35	33	33	36	44	41	30	35	37	45	47	28	28	44	47
16-Feb	73	36	65	70	38	98	34	93	96	103	87	27	64	95	56	42	31	27	21	21	20	21	23	26	103
17-Feb	27	24	30	31	30	35	33	36	34	43	44	44	51	40	40	50	45	44	37	33	36	41	42	40	51
18-Feb	31	32	29	26	26	25	31	32	30	26	29	32	39	65	80	34	20	39	78	19	68	34	43	46	80
19-Feb	49	45	24	31	34	26	28	76	58	42	36	25	17	24	35	39	34	34	45	46	40	47	31	90	90
20-Feb	40	27	45	48	43	43	33	28	33	17	13	14	12	11	14	13	13	12	23	42	91	18	68	47	91
21-Feb	20	77	40	18	30	18	14	13	13	18	14	12	13	13	13	13	13	14	43	95	14	43	43	28	95
22-Feb	71	77	23	36	53	39	40	26	41	29	16	13	14	14	14	11	17	84	38	22	16	71	85	59	85
23-Feb	50	54	39	13	24	24	42	37	37	59	56	64	26	34	27	27	45	65	16	51	47	66	14	53	66
24-Feb	12	12	18	19	70	23	59	36	20	17	14	14	12	11	12	11	13	11	9	10	12	11	11	13	70
25-Feb	12	12	13	13	13	16	12	17	24	33	41	38	30	45	39	37	23	13	21	36	52	59	57	34	59
26-Feb	61	20	28	17	37	28	16	34	45	83	42	36	30	44	40	42	49	48	42	41	35	35	31	33	83
27-Feb	29	30	30	31	33	32	32	28	32	30	31	35	40	40	39	46	64	24	46	51	71	27	38	45	71
28-Feb	32	39	25	29	30	32	31	26	31	32	44	42	43	47	48	47	46	36	21	23	41	24	30	22	48
29-Feb	13	20	19	14	24	48	47	28	23	10	13	13	14	18	20	22	22	43	26	79	63	80	29	15	80
80 93 67 80 80 98 83 93 96 103 87 81 72 95 96 76 65 84 78 95 91 80 90 90																									
Diurnal Maximum																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 19, 2016	Last Calibration	January 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:05
Gas Cert Reference	LL107945	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	08/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	819	819
Calculated slope	1.000542	0.995834	Chamber temp	45.4	45.1
Calculated intercept	2.113788	1.469391	Pressure	691.0	685.1
Analyzer Background	12.4	12.4	Flow	0.505	0.501
Analyzer Coefficient	0.951	0.942	Intensity	90	90
Analyzer make	Thermo 43i		Analyzer serial #	JC1501301448	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.1	----
as found span	5500	81.3	734.7	739.7	0.993
calibrator zero	5500	0.0	0.0	0.5	----
high point	5500	81.3	734.7	737.7	0.996
second point	5500	45.6	412.1	410.4	1.004
third point	5500	22.8	206.0	203.9	1.011
as left zero	5500	0.0	0.0	0.3	----
as left span	5500	81.3	734.7	737.8	0.996
Average Correction Factor					1.004

Corrected As found 739.8 Previous response 732.1 % change -1.0%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



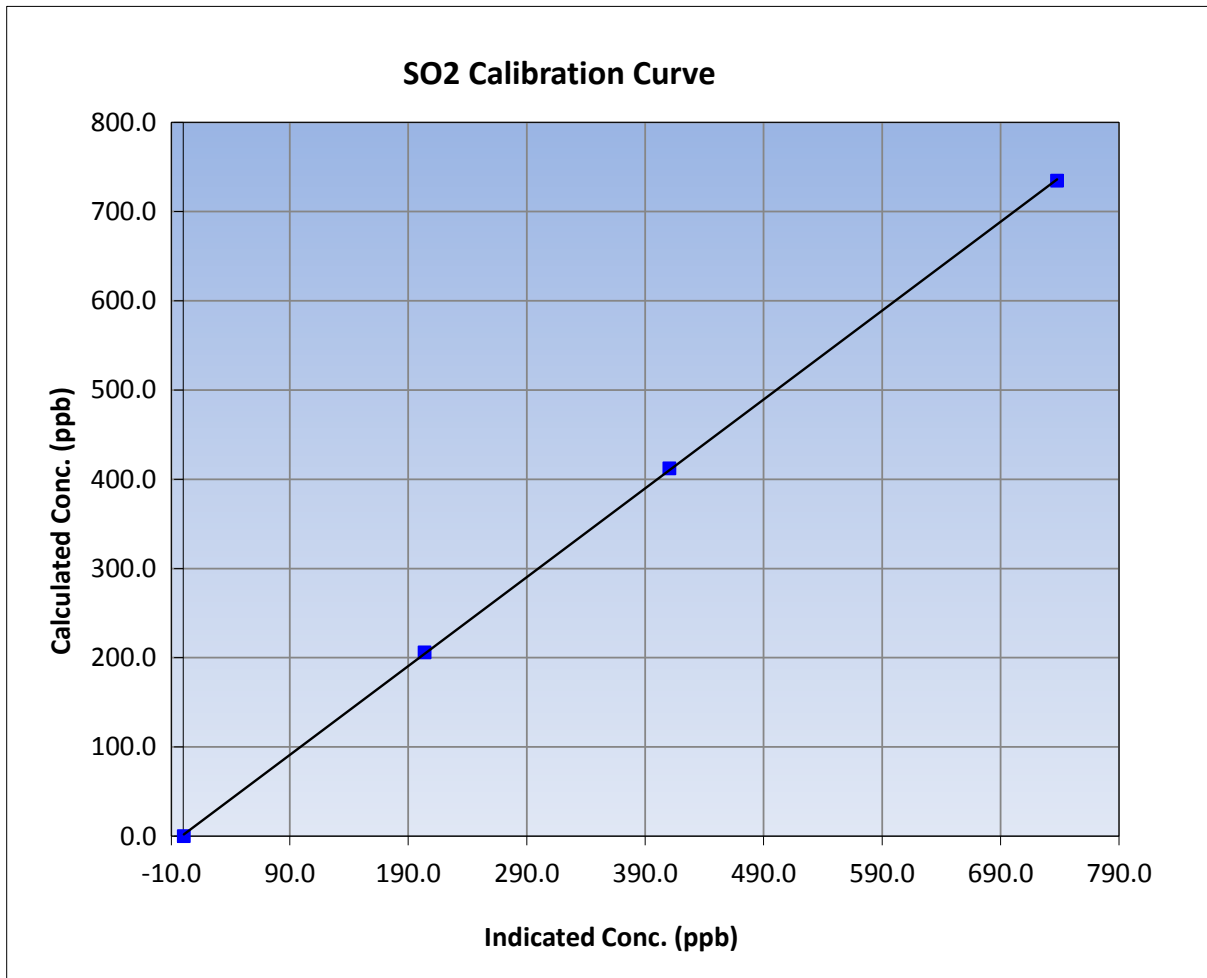
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 19, 2016	Previous Calibration	January 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:15	End Time (MST)	12:05
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

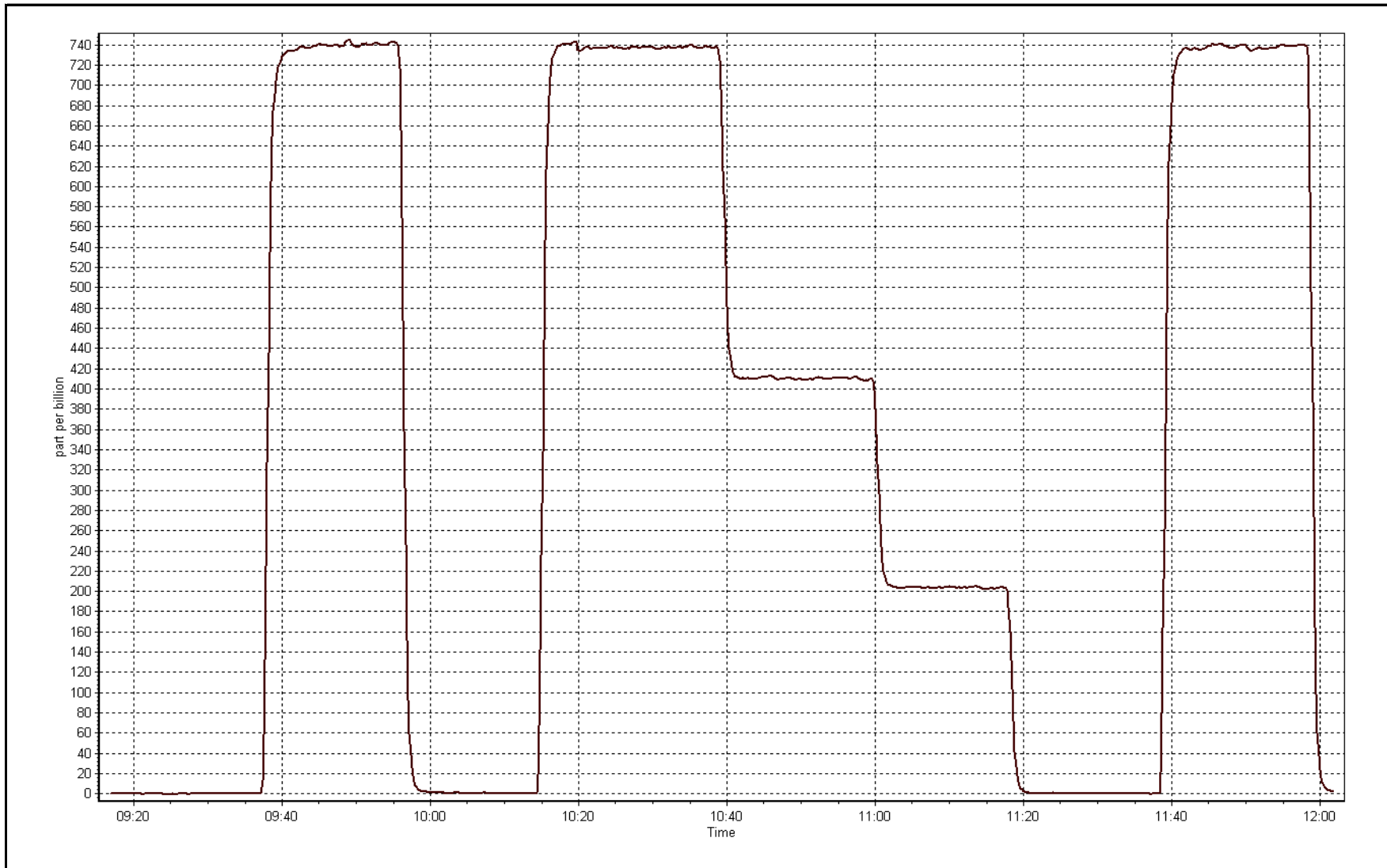
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999959
734.7	737.7	0.9958		
412.1	410.4	1.0040	Slope	0.995834
206.0	203.9	1.0107		
			Intercept	1.469391



SO2 Calibration Plot

Date: February 19, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 18, 2016	Last Calibration	January 25, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:15
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	SA140071A 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-859	-859
Analyzer IP address	192.168.1.42		Lamp voltage	1166	1164
Calculated slope	0.998535	1.000829	Chamber temp	45	45
Calculated intercept	0.306831	0.147310	Pressure	678.4	664.2
Analyzer Background	1.86	1.88	Flow	0.413	0.402
Analyzer Coefficient	1.018	1.018	Intensity	80	80
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	470	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.2	----
as found span	6500	46.0	75.0	74.6	1.006
SO2 scrubber check	5500	22.8	206.0	0.4	----
calibrator zero	6500	0.0	0.0	0.0	----
high point	6500	46.0	75.0	74.9	1.001
second point	6500	24.6	40.1	39.7	1.009
third point	6500	12.3	20.1	19.8	1.012
as left zero	6000	0.0	0.0	0.1	----
as left span	6500	46.0	75.0	75.3	0.996
Average Correction Factor					1.008

Corrected As found	74.7	Previous response	74.8	% change	0.1%
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Notes:

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

Calibration Performed By:

Devin Russell



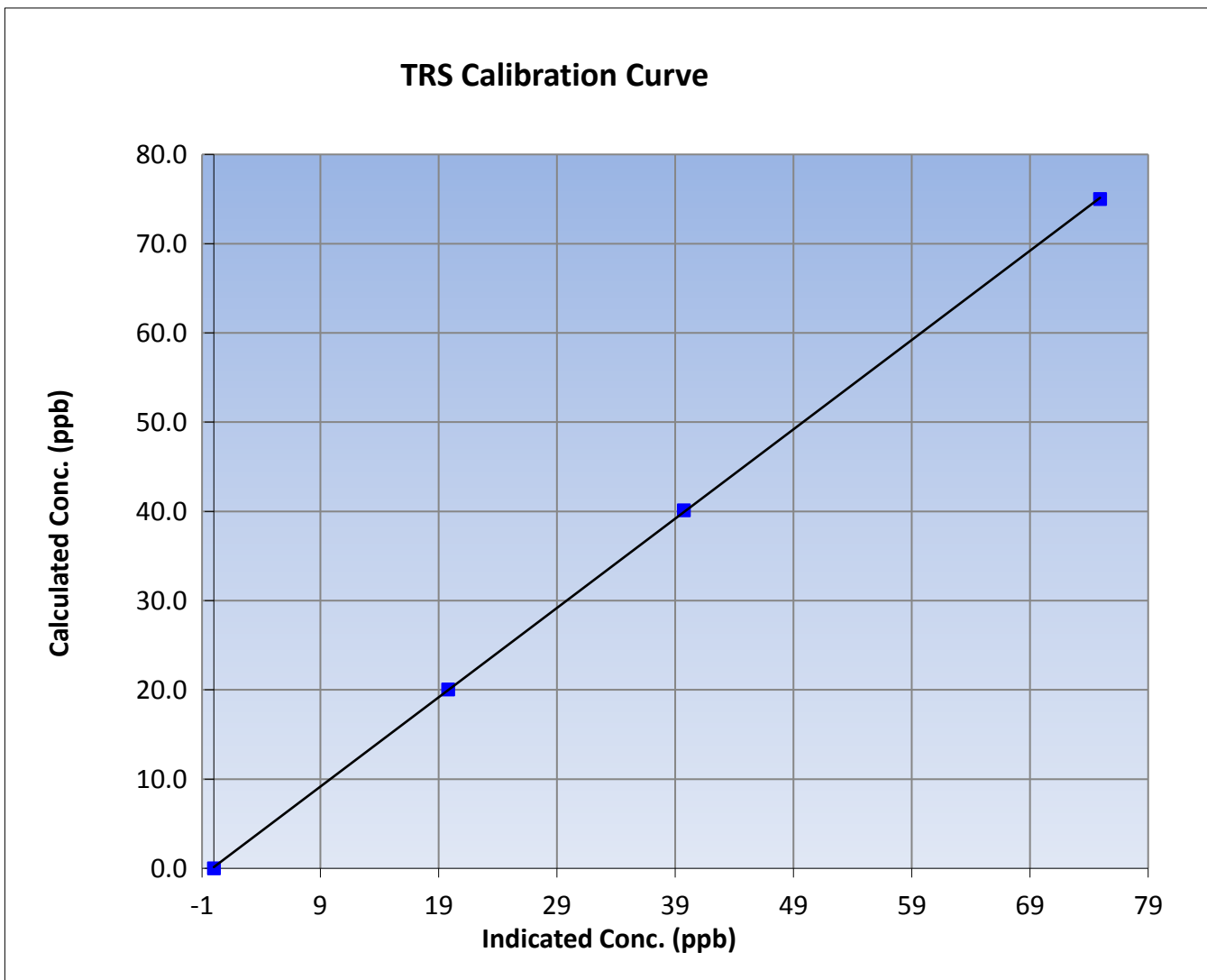
Wood Buffalo Environmental Association TRS Calibration Report

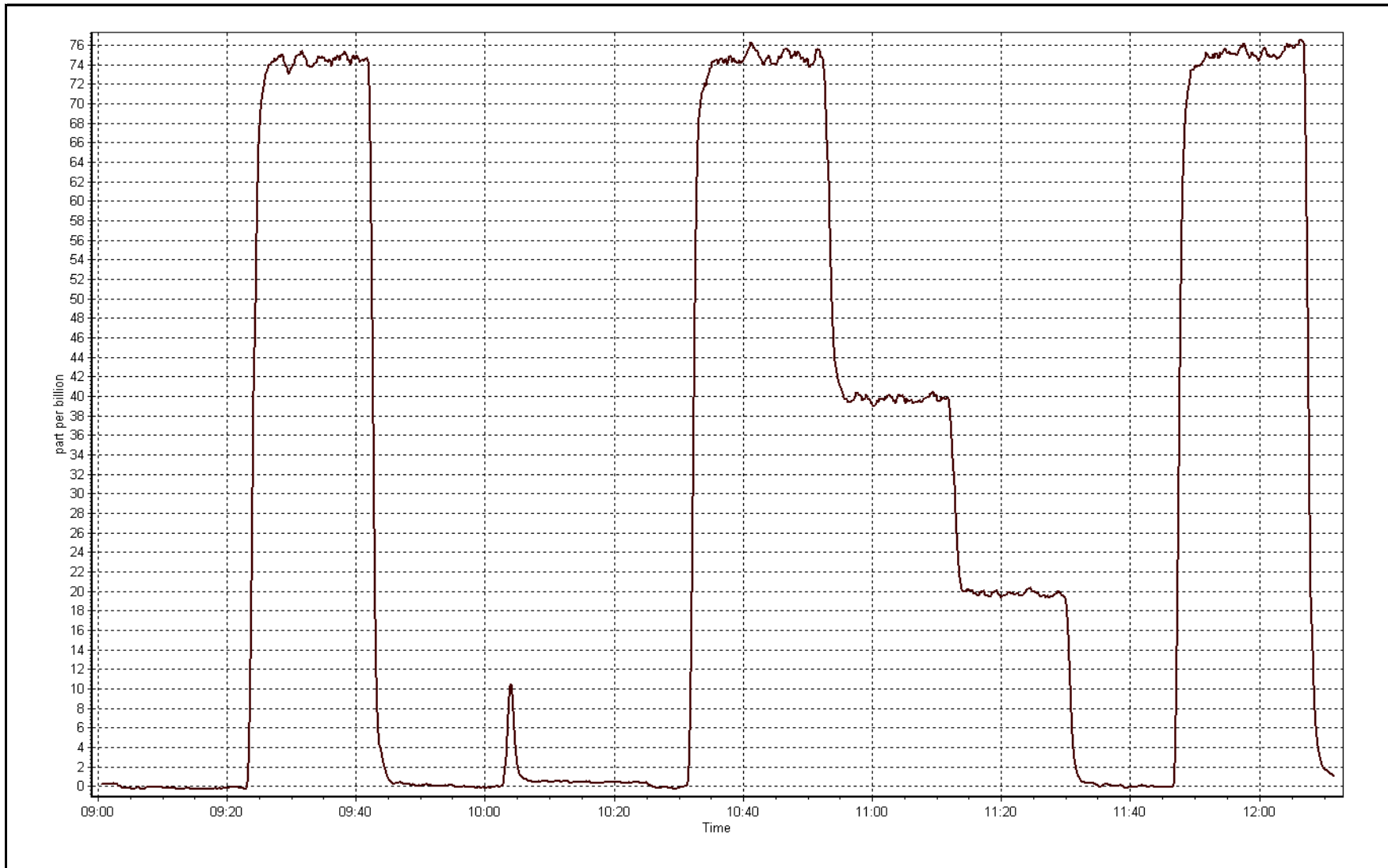
Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 25, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	12:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999974
75.0	74.9	1.0011		
40.1	39.7	1.0095	Slope	1.000829
20.1	19.8	1.0120		
			Intercept	0.147310







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 18, 2016	Last Calibration	January 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:05	End Time (MST)	12:05
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	515.0 ppm	CH4 Equiv Conc.	1065.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.4	74.9
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	0.998204	0.998709	Carrier Pressure	37.3	37.3
THC Calc intercept	0.083483	0.066623	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.998431	0.999035	Air Pressure	35.0	35.0
NMHC Calc intercept	0.020847	0.011102			

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	81.3	15.74	15.15	1.039
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.75	1.000
second point	5500	45.6	8.83	8.70	1.015
third point	5500	22.8	4.41	4.31	1.025
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	15.74	15.79	0.997
Average Correction Factor					1.013

Corrected As found 15.15 Previous response 15.69 % change 3.5%

Notes:

Column conditioned after as founds on Feb 18. Calibration completed on Feb 19. Span adjusted.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	8.13	7.78	1.045
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.14	0.999
second point	5500	45.6	4.56	4.53	1.007
third point	5500	22.8	2.28	2.27	1.004
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	8.13	8.14	0.999
Average Correction Factor					1.003

Corrected As found 7.78 Previous response 8.12 % change 4.4%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	7.61	7.36	1.034
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.61	1.000
second point	5500	45.6	4.27	4.17	1.024
third point	5500	22.8	2.13	2.04	1.047
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	7.61	7.66	0.994
Average Correction Factor					1.024

Corrected As found 7.36 Previous response 7.57 % change 2.8%



Wood Buffalo Environmental Association

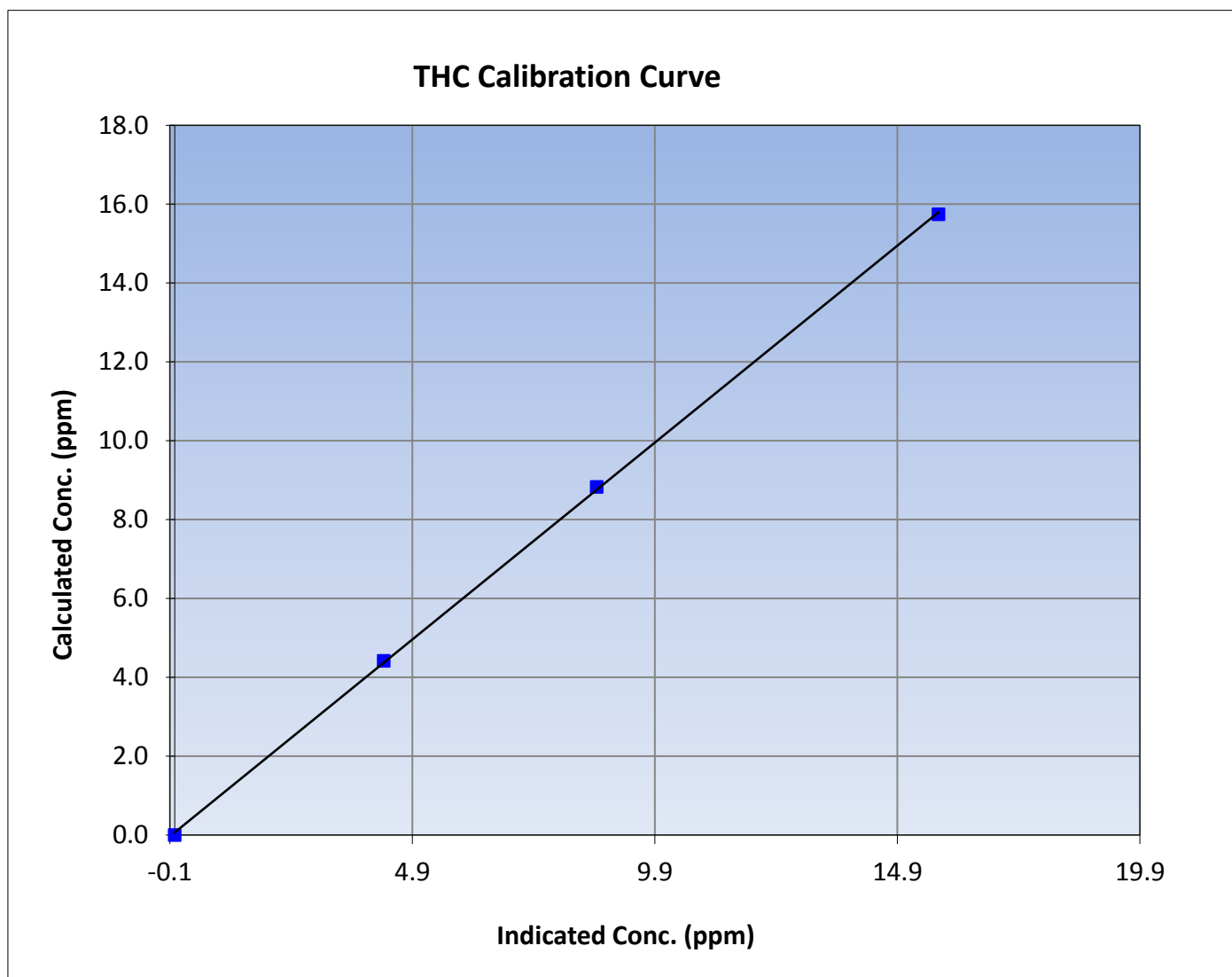
THC Calibration Summary

Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:05	End Time (MST)	12:05
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999889
15.74	15.75	0.9995		
8.83	8.70	1.0149	Slope	0.998709
4.41	4.31	1.0248		
			Intercept	0.066623





Wood Buffalo Environmental Association

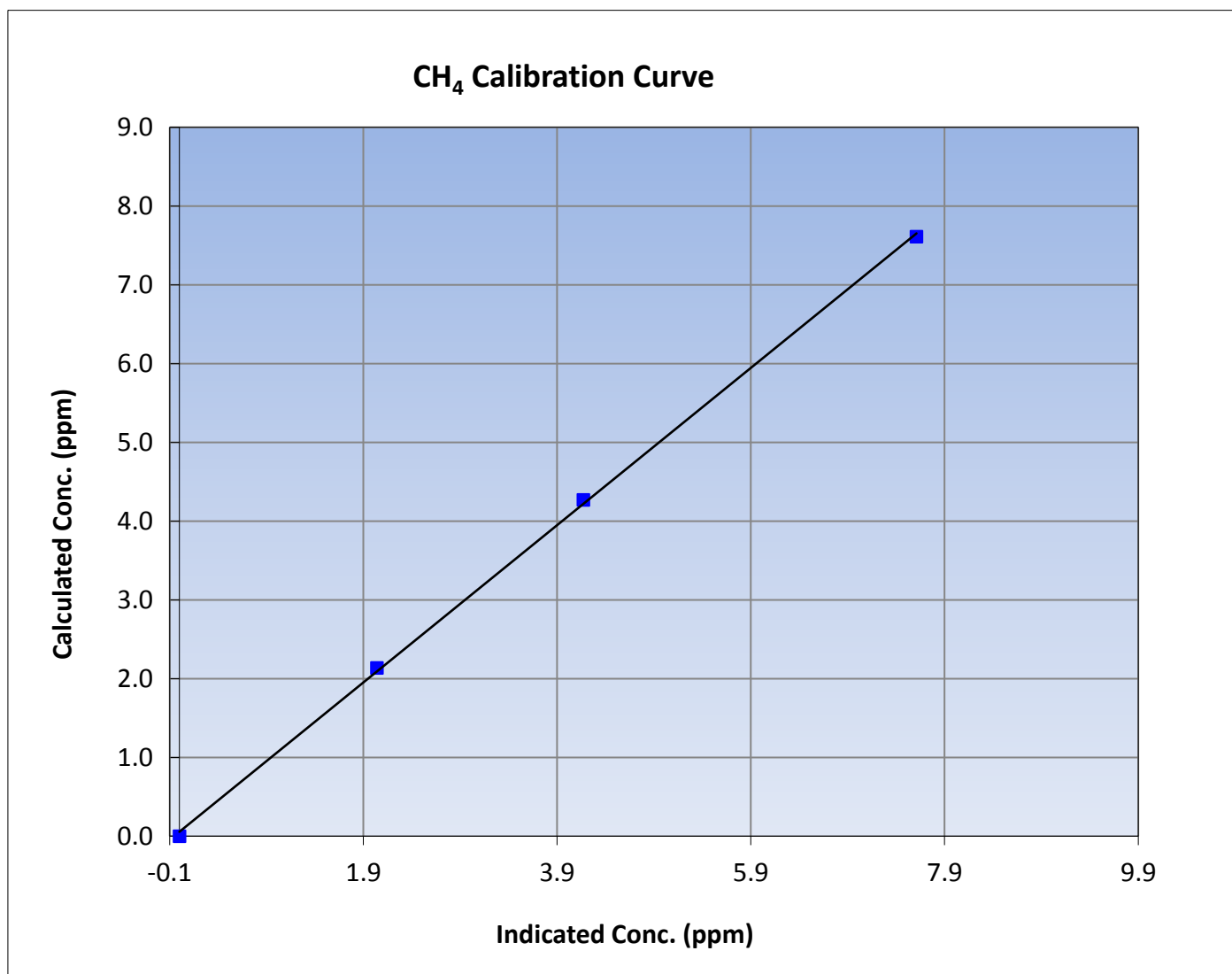
CH₄ Calibration Summary

Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:05	End Time (MST)	12:05
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999710
7.61	7.61	1.0003		
4.27	4.17	1.0239	Slope	0.998361
2.13	2.04	1.0465		
			Intercept	0.055003





Wood Buffalo Environmental Association

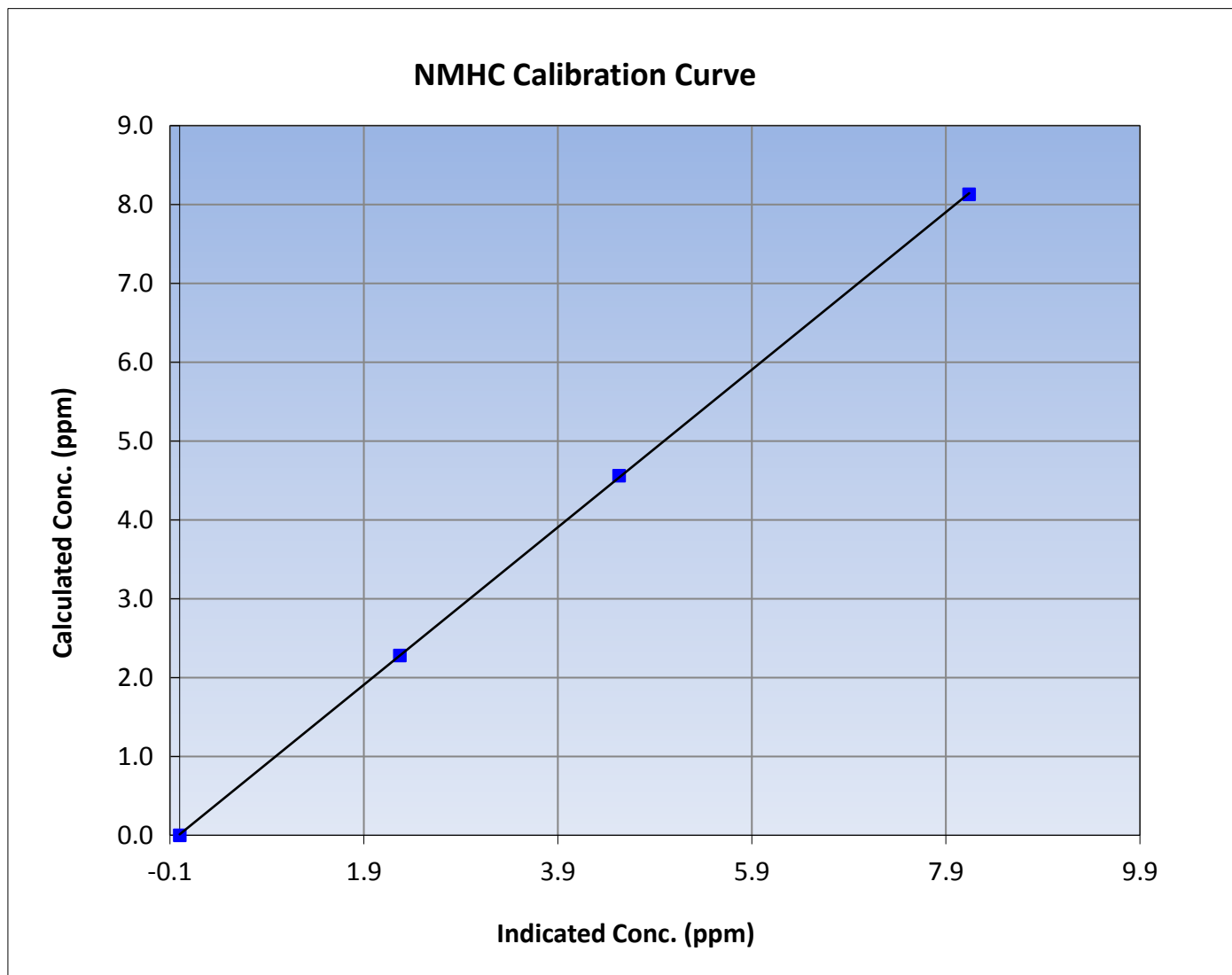
NMHC Calibration Summary

Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 15, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:05	End Time (MST)	12:05
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

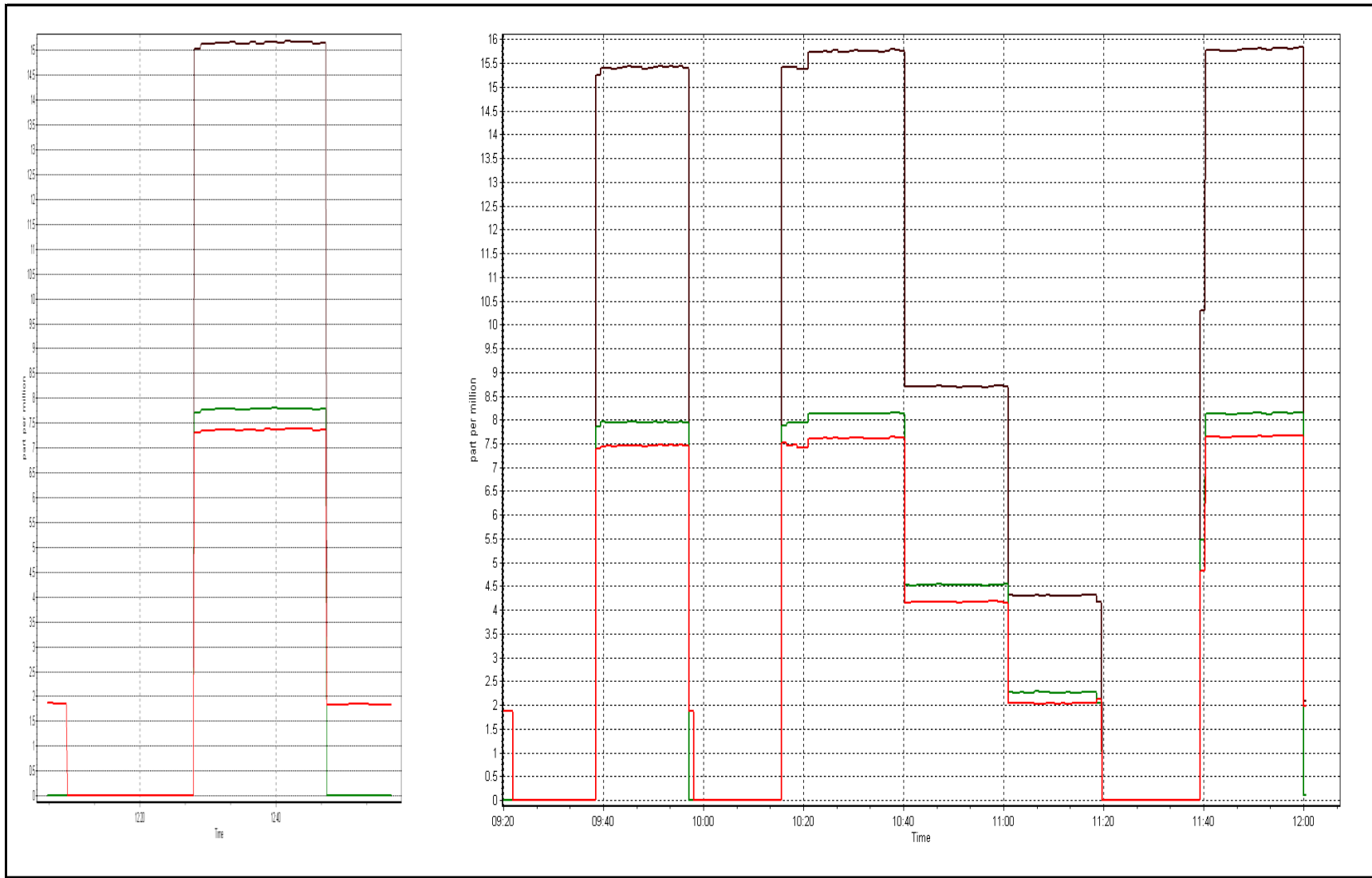
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999977
8.13	8.14	0.9988		
4.56	4.53	1.0066	Slope	0.999035
2.28	2.27	1.0044		
			Intercept	0.011102



THC Calibration Plot

Date: February 18, 2016



As founds Feb 18

Calibration after column conditioning, Feb 19



Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 5, 2016	Previous Calibration	January 22, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	13:40
NO2 GPT Ref date	February-04-16	Transfer Standard	N/A
Calibrator Make/Model	Sabio 4010	Station temp.	23 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1730512
DACS make/model	Campbell Scientific CR3000	Serial Number	587
		Serial Number	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	28.6	28.3
Analyzer IP address	192.168.1.48		Lamp temp.	53.6	53.6
Calculated slope	1.002286	1.003637	Pressure	712.2	711.9
Calculated intercept	0.921726	-0.345932	Flow cell A	0.756	0.756
Analyzer Background	-2.7	-2.6	Flow cell B	0.759	0.760
Analyzer Coefficient	1.094	1.056	Cell A Intensity	71867	71455
			Cell B Intensity	68064	67793

Analyzer make	Thermo 49i	Analyzer serial #	1300156233
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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	1.3	----
as found span	5000	0.98	444.4	462.6	0.961
calibrator zero	5000	0.00	0.0	0.1	----
high point	5000	0.98	444.4	443.5	1.002
second point	5000	0.56	234.5	232.7	1.008
third point	5000	0.34	121.0	122.1	0.991
as left zero	5500	0.00	0.0	0.9	----
as left span	5000	0.98	305.0	304.6	1.001
Average Correction Factor					1.000

Corrected As found	461.3	Previous response	442.5	% change	-4.1%
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Notes:

Sample inlet filter replaced after as founds. Span adjusted. Before as lefts were completed, the sequence in the calibrator was changed from 400 ppb of O₃ to 350 ppb of O₃.

Calibration Performed By:

Devin Russell



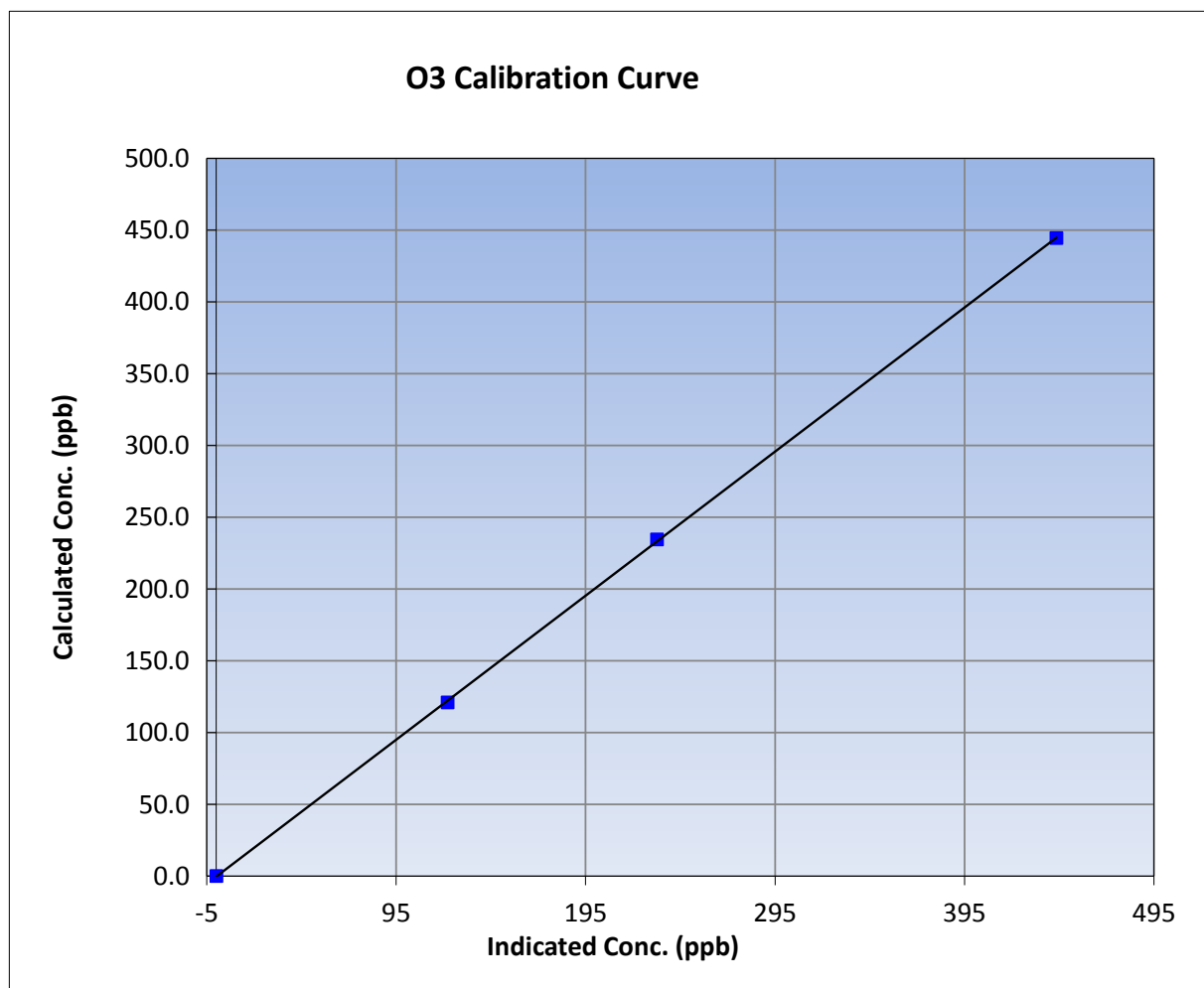
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-05-16	Previous Calibration	January 22, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:20	End Time (MST)	13:40
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

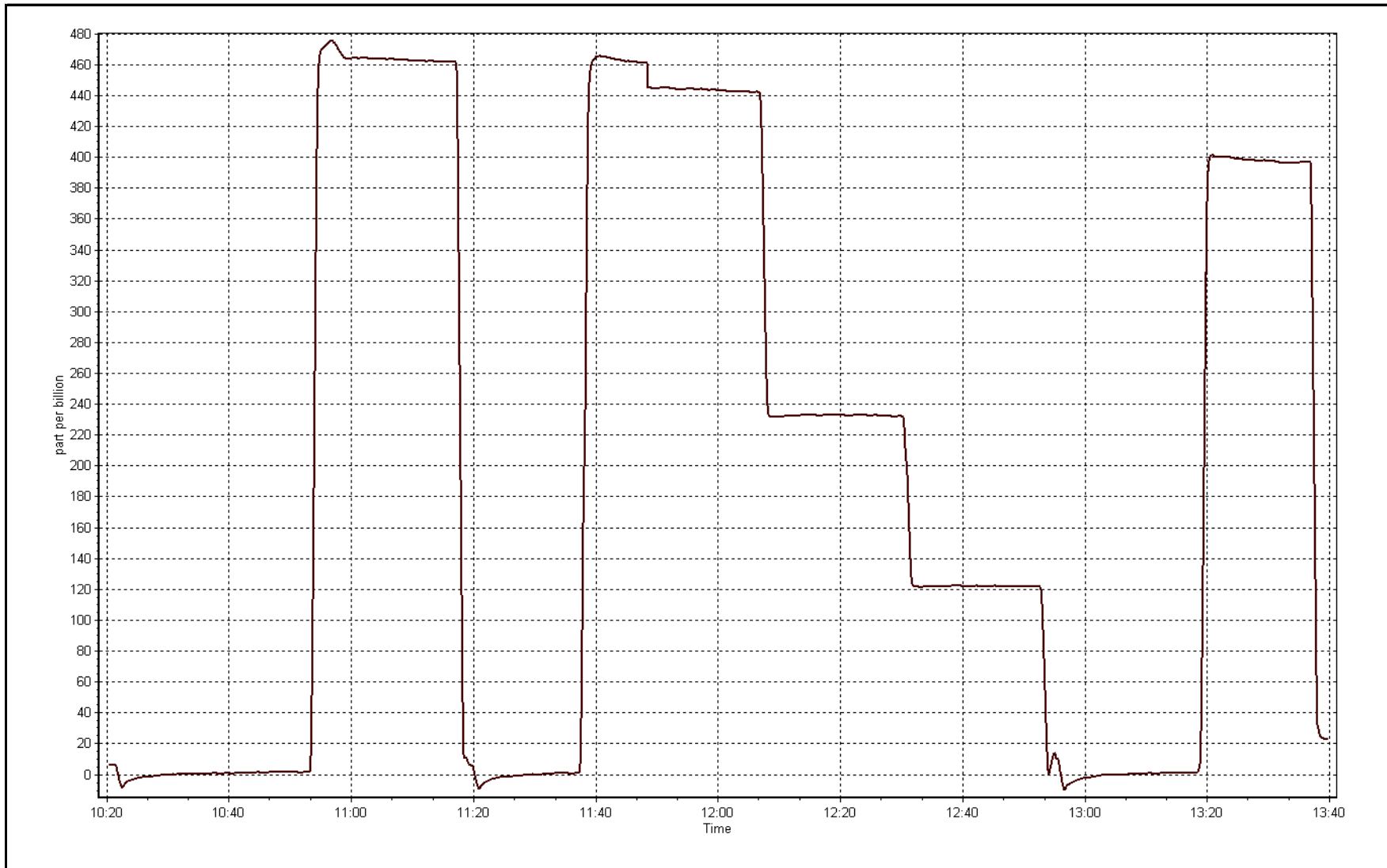
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999967
444.4	443.5	1.0020		
234.5	232.7	1.0080	Slope	1.003637
121.0	122.1	0.9907		
			Intercept	-0.345932



O3 Calibration Plot

Date: February 5, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 4, 2016	Previous Calibration	January 7, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	14:45
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL107945
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	09/08/2018
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

DACS Information

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

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999012	0.998813	1.005396
	Data Offset	2.632056	2.720436	-0.735706
Current Calibration	Data Slope	1.004779	1.000422	1.008568
	Data Offset	2.184737	2.486359	1.021020

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	192.168.1.43		192.168.1.43	
NO coefficient	0.890		0.958	
NOx coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgnd	5.8		6.1	
NOx bkgnd	6.1		6.4	
Chamber Temp	50.5	Deg C	50.4	Deg C
Moly Temp	324.7	Deg C	326.6	Deg C
PMT voltage	-816	V	-816.6	V
PMT Temp	-3.1	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	169.9	mmHg	178.2	mmHg
R Cell Press Nox	169.9	mmHg	178.2	mmHg
NO sample flow	0.631	lpm	0.578	lpm
Nox sample Flow	0.631	lpm	0.631	lpm

Notes:

Inlet filter changed after as founds. Fitting on Charcoal scrubber was leaking. Leak fixed and scrubber passed leak check. Capillaries checked; visual check looked good, o-rings replaced. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 4, 2016

Station Number:

AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-0.6	-0.4	-0.2	----	----
as found span	5500	81.4	753.3	750.4	3.0	684.8	684.6	0.2	1.1001	1.0961
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5500	81.4	753.3	750.4	3.0	748.7	748.9	-0.3	1.0062	1.0019
second point	5500	45.6	422.0	420.3	1.7	416.9	416.4	0.5	1.0122	1.0094
third point	5500	22.8	211.0	210.2	0.8	205.7	205.2	0.4	1.0259	1.0240
as left zero	5500	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
as left span	5500	81.4	753.3	302.0	451.4	744.5	286.4	458.1	1.0119	1.0543
Average Correction Factor									1.0148	1.0118

Corrected As found
Previous Response

NO_x= 685.4
NO_x= 751.4

NO= 685.0
NO= 748.5

Percent Change

NO_x= 9.6%

NO= 9.3%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 81.40 ccm NOx ref calc conc = 753.3 ppb NO ref calc conc = 750.4 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		3.0	746.8	746.4	0.0	1.0088	1.0054	----	----
1st NO2 (300)	302.0	447.4	745.0	302.0	443.1	1.0112	----	1.0097	99.0%
2nd NO2 (200)	511.8	237.5	745.9	511.8	234.1	1.0099	----	1.0146	98.6%
3rd NO2 (100)	625.4	123.9	746.1	625.4	120.7	1.0096	----	1.0264	97.4%
2nd NO ref point	----	3.0	745.2	744.4	0.8	1.0110	1.0080	----	----
Average Correction Factor						1.0104		1.0169	98.3%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

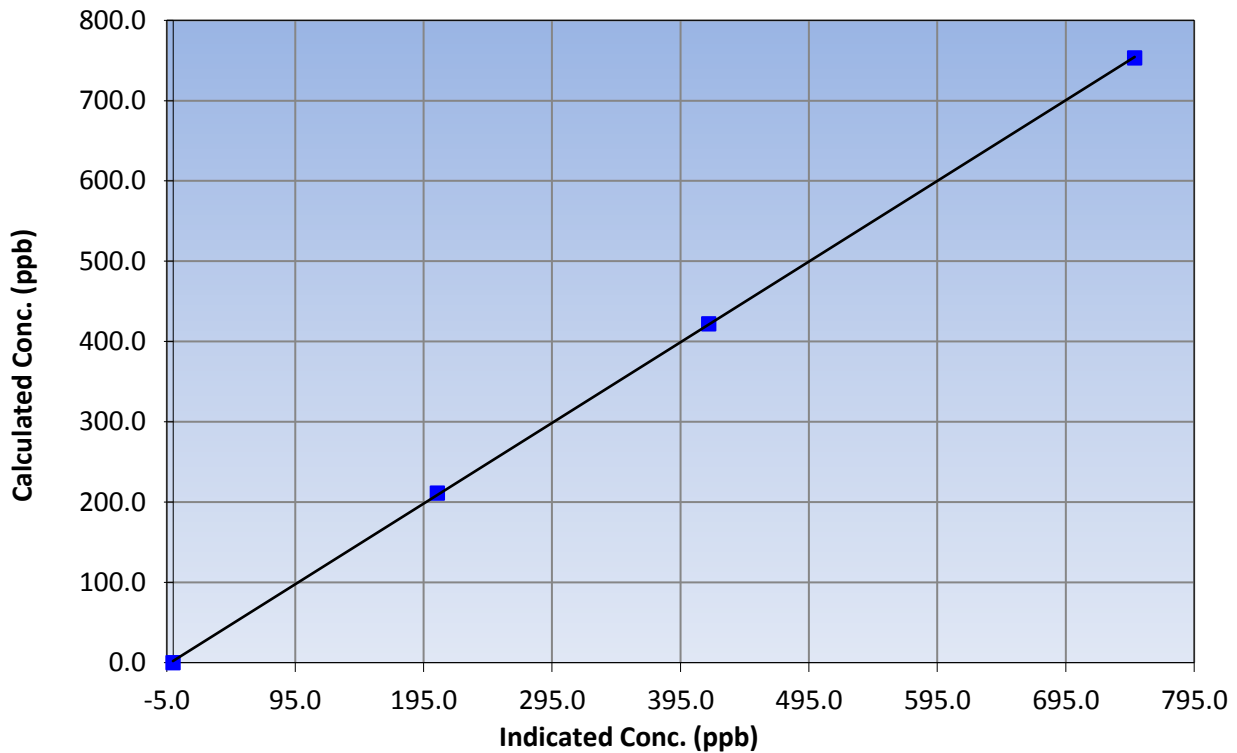
Station Information

Calibration Date	February 4, 2016	Previous Calibration	January 7, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999966
753.3	748.7	1.0062		
422.0	416.9	1.0122	Slope	1.004779
211.0	205.7	1.0259		
			Intercept	2.184737

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

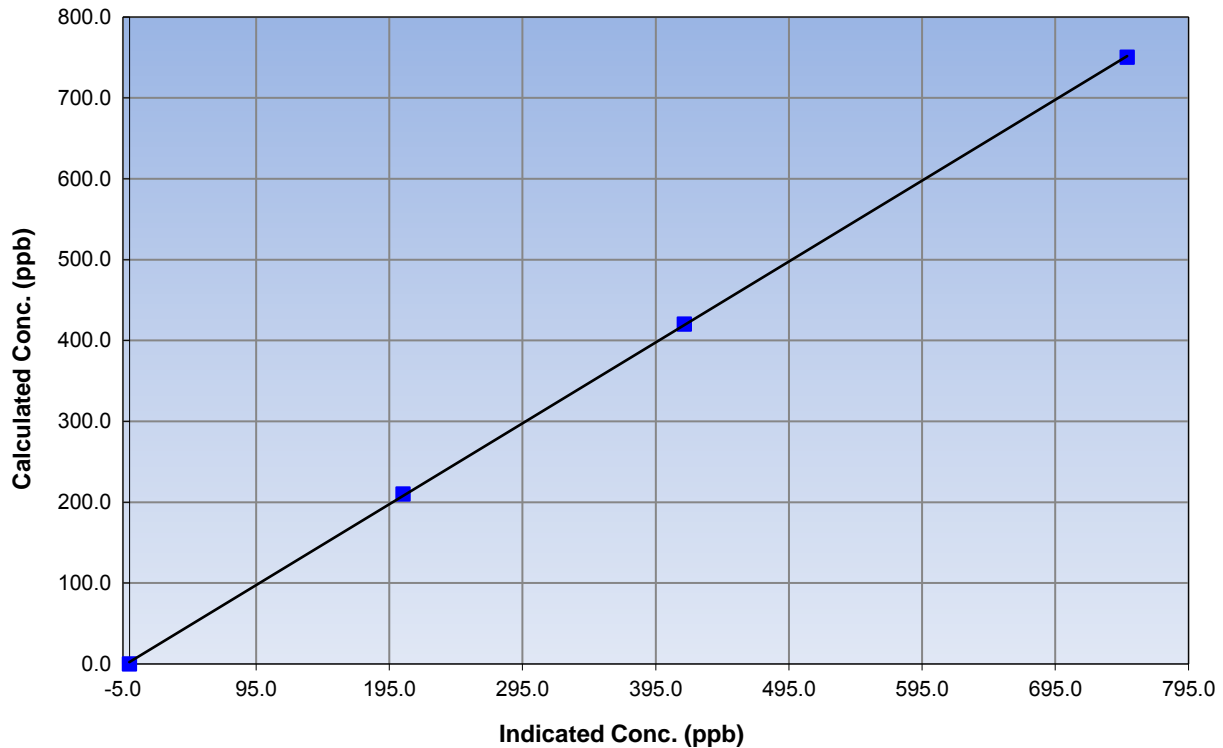
Station Information

Calibration Date	February 4, 2016	Previous Calibration	January 7, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999954
750.4	748.9	1.0019		
420.3	416.4	1.0094	Slope	1.000422
210.2	205.2	1.0240		
			Intercept	2.486359

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

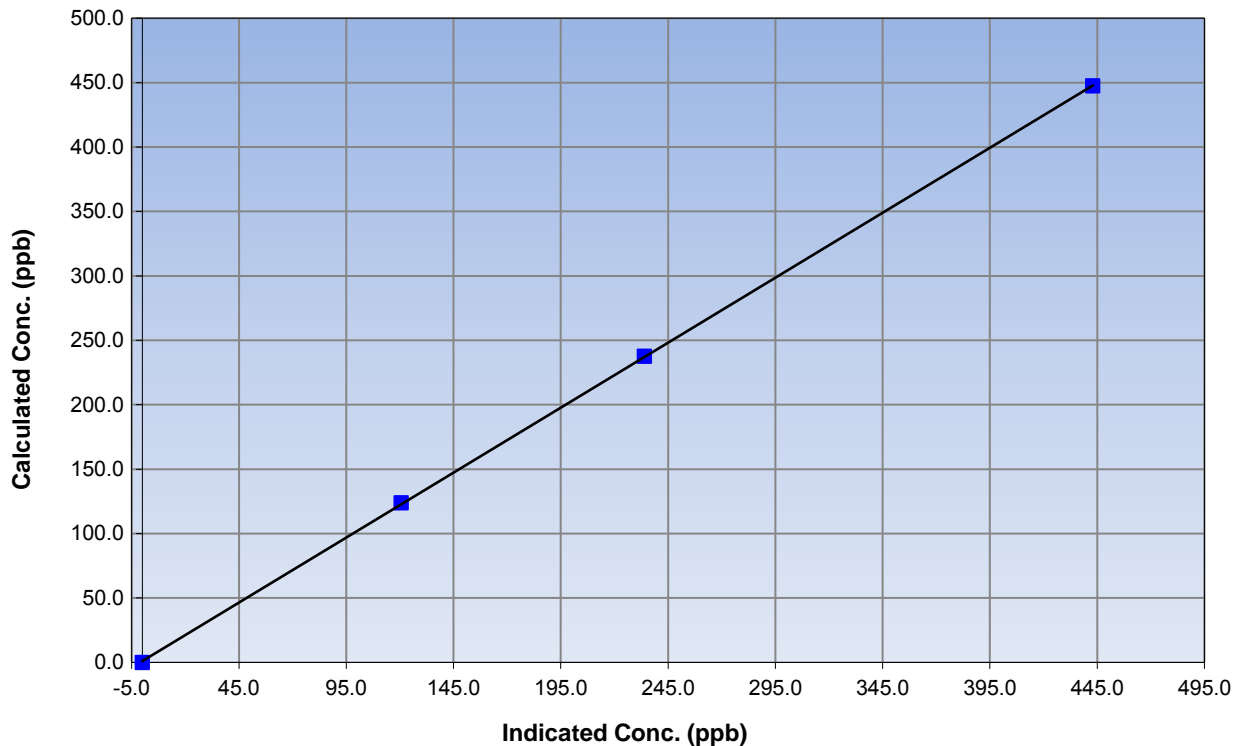
Station Information

Calibration Date	February 4, 2016	Previous Calibration	January 7, 2016
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

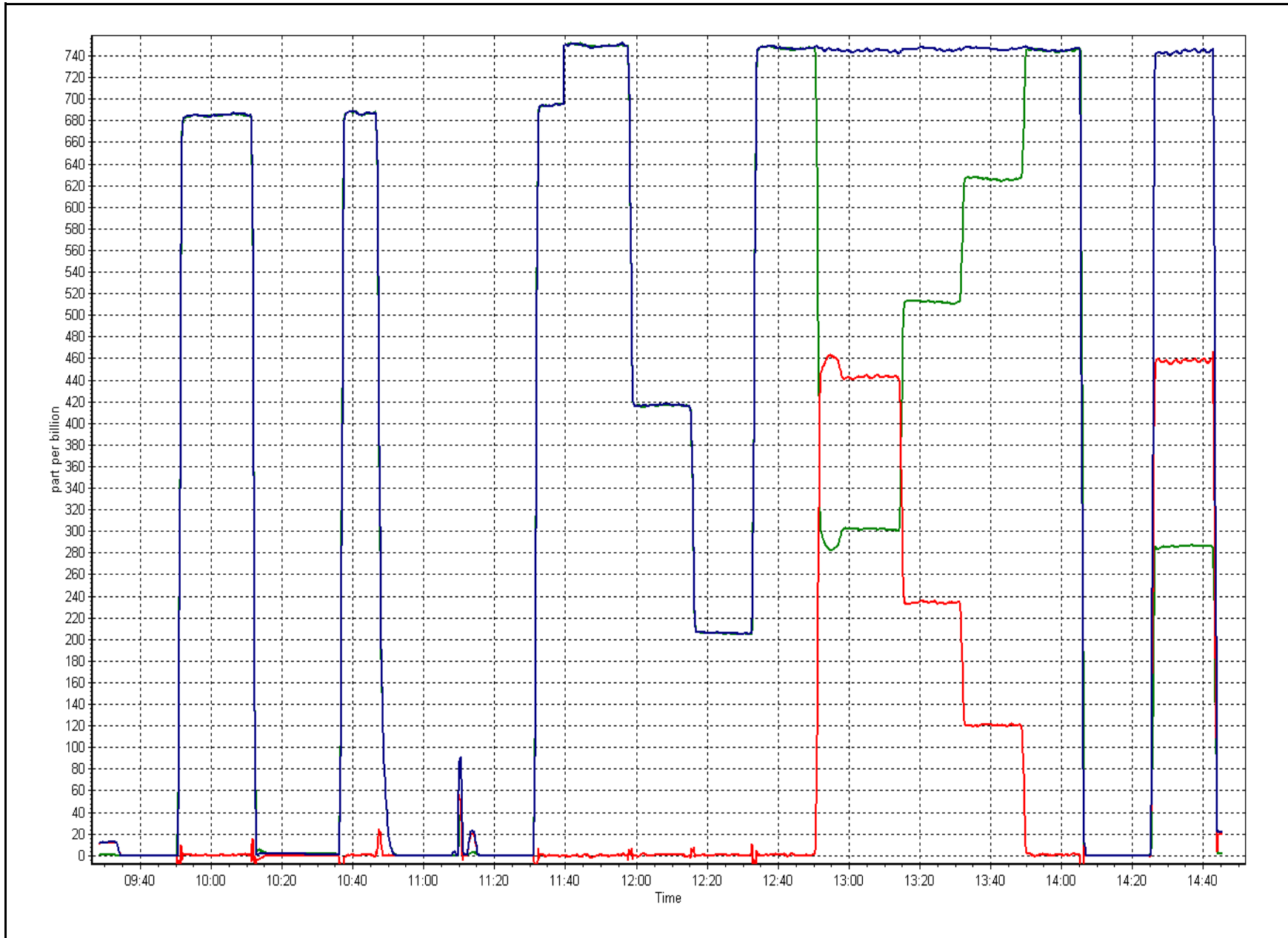
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999975
447.4	443.1	1.0097		
237.5	234.1	1.0146	Slope	1.008568
123.9	120.7	1.0264		
			Intercept	1.021020

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 4, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 22, 2016	Previous Calibration	February 4, 2016		
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1		
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; text-align: center;">Other</td> <td>Maintenance to determin cause for drift.</td> </tr> </table>			Other	Maintenance to determin cause for drift.
Other	Maintenance to determin cause for drift.				
Start Time (MST)	9:20	End Time (MST)	13:45		
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL107945		
NOX Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	09/08/2018		
Calibrator	Sabio 4010	Serial Number	1730512		
Zero air Generator	Teledyne API T701	Serial Number	587		

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	2582
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.004779	1.000422	1.008568
	Data Offset	2.184737	2.486359	1.021020
Current Calibration	Data Slope	0.999933	1.000643	1.003293
	Data Offset	3.148099	3.048577	-0.931894

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	192.168.1.43		192.168.1.43	
NO coefficient	0.958		1.050	
NOX coefficient	1.000		1.004	
NO2 coefficient	1.000		1.000	
NO bkgnd	6.1		6.5	
NOX bkgnd	6.4		6.9	
Chamber Temp	50.4	Deg C	50.3	Deg C
Moly Temp	326.6	Deg C	327.6	Deg C
PMT voltage	-816.6	V	-816.6	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	178.2	mmHg	189.2	mmHg
R Cell Press Nox	178.2	mmHg	189.2	mmHg
NO sample flow	0.578	lpm	0.535	lpm
Nox sample Flow	0.631	lpm	0.535	lpm

Notes:

Fittings on Charcoal scrubber changed to create better seal. Analyzer checked for leaks, none found. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 22, 2016

Station Number:

AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-0.6	-0.4	-0.1	----	----
as found span	5500	81.4	753.3	750.4	3.0	674.6	673.4	1.2	1.1167	1.1143
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.6	-0.4	-0.2	----	----
high point	5500	81.4	753.3	750.4	3.0	752.2	748.9	3.3	1.0015	1.0020
second point	5500	45.6	422.0	420.3	1.7	416.4	414.3	2.0	1.0136	1.0145
third point	5500	22.8	211.0	210.2	0.8	205.9	205.1	0.8	1.0248	1.0250
as left zero	5500	0.0	0.0	0.0	0.0	-0.6	-0.4	-0.2	----	----
as left span	5500	81.4	753.3	348.1	405.2	744.9	335.4	409.5	1.0113	1.0379
Average Correction Factor									1.0133	1.0138

Corrected As found
Previous Response

NO_x= 675.2
NO_x= 747.6

NO= 673.8
NO= 747.6

Percent Change

NO_x= 10.7%

NO= 10.9%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 81.40 ccm NOx ref calc conc = 753.3 ppb NO ref calc conc = 750.4 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		3.0	748.3	745.0	-0.2	1.0068	1.0072	----	----
1st NO2 (300)	348.1	399.8	746.9	348.1	398.7	1.0087	----	1.0028	99.7%
2nd NO2 (200)	510.3	237.7	748.7	510.3	238.5	1.0062	----	0.9969	100.3%
3rd NO2 (100)	625.3	122.7	749.7	625.3	124.5	1.0048	----	0.9858	101.4%
2nd NO ref point	----	3.0	747.5	744.0	3.5	1.0079	1.0086	----	----
Average Correction Factor						1.0069		0.9952	100.5%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

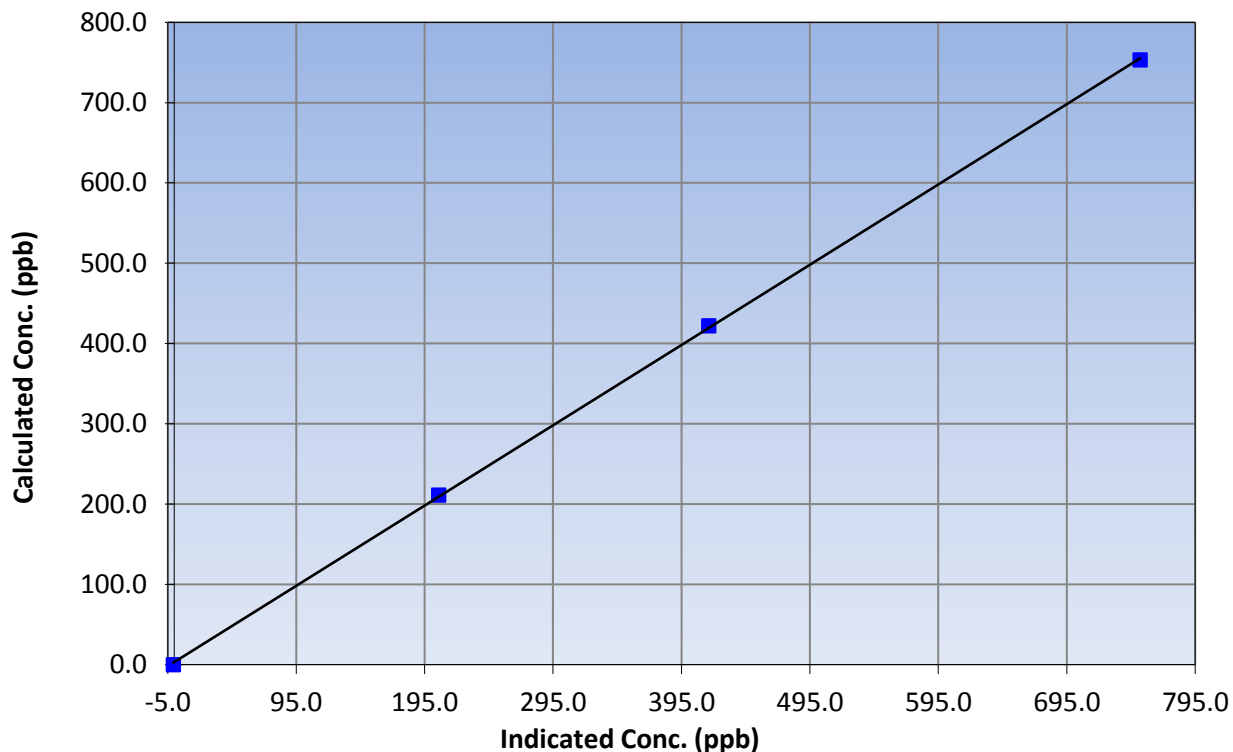
Station Information

Calibration Date	February 22, 2016	Previous Calibration	February 4, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	----	Correlation Coefficient	0.999933
753.3	752.2	1.0015		
422.0	416.4	1.0136	Slope	0.999933
211.0	205.9	1.0248		
			Intercept	3.148099

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

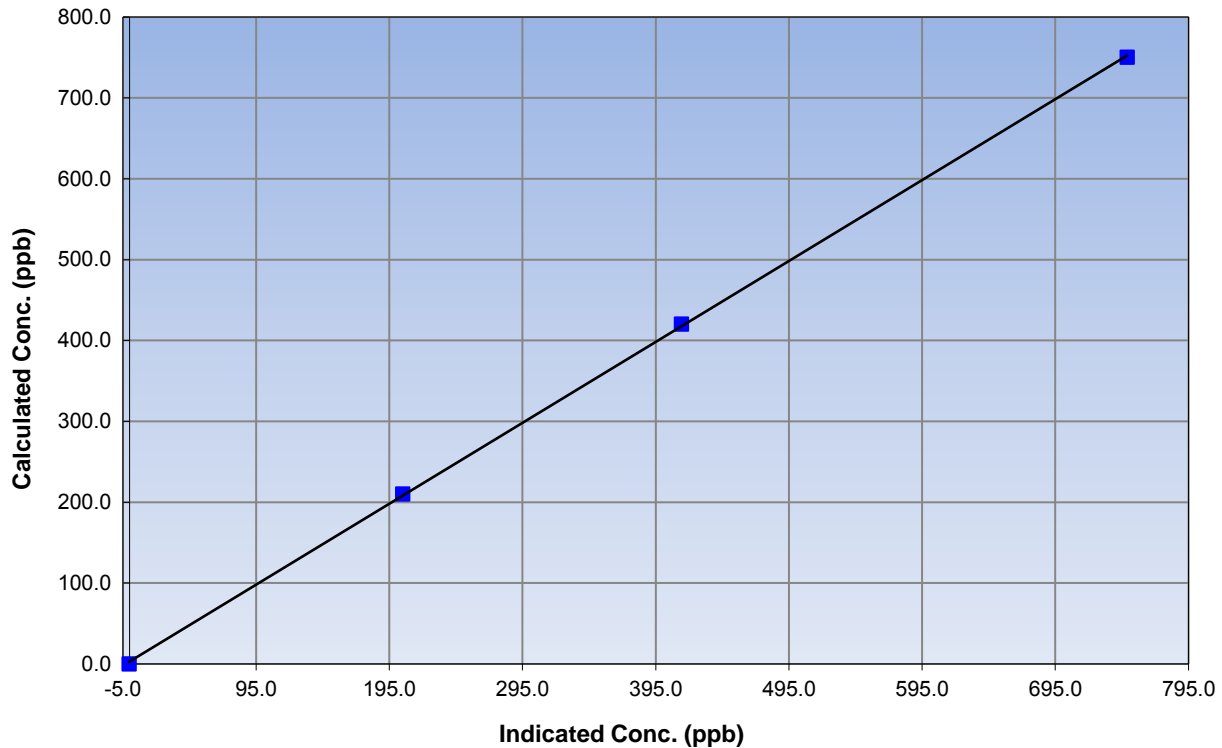
Station Information

Calibration Date	February 22, 2016	Previous Calibration	February 4, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999928
750.4	748.9	1.0020		
420.3	414.3	1.0145	Slope	1.000643
210.2	205.1	1.0250		
			Intercept	3.048577

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

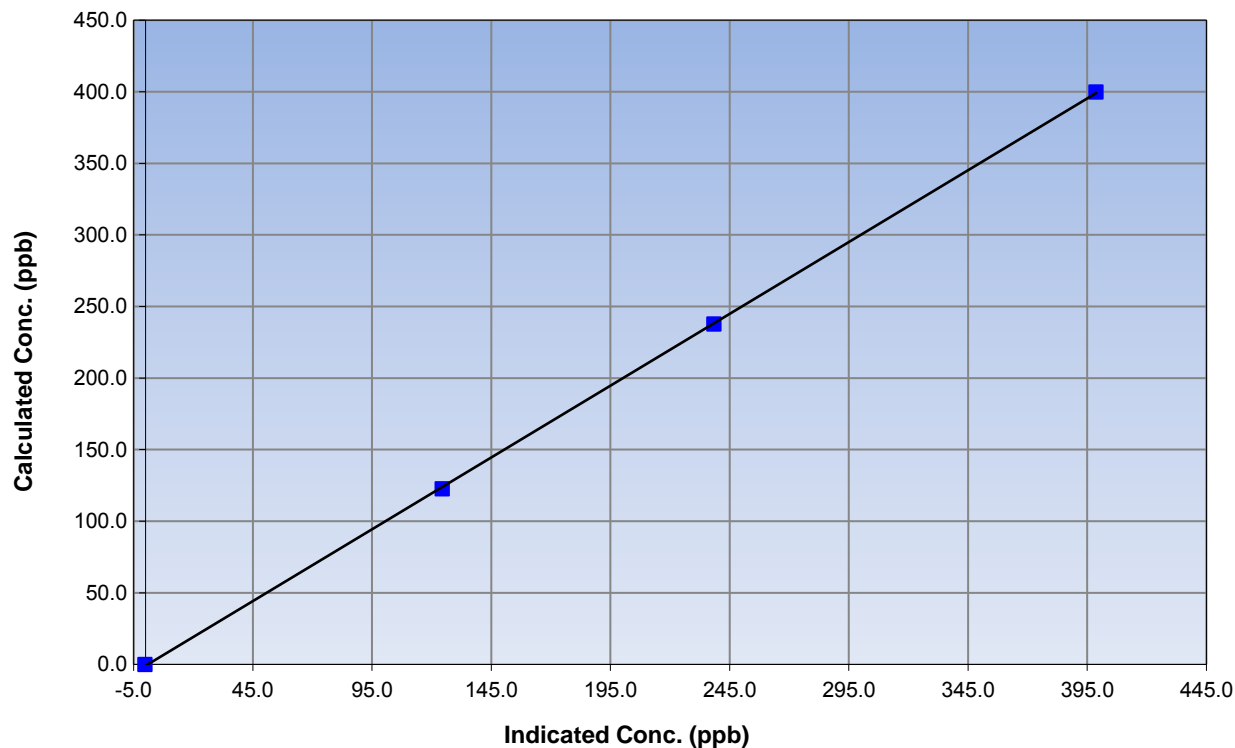
Station Information

Calibration Date	February 22, 2016	Previous Calibration	February 4, 2016
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

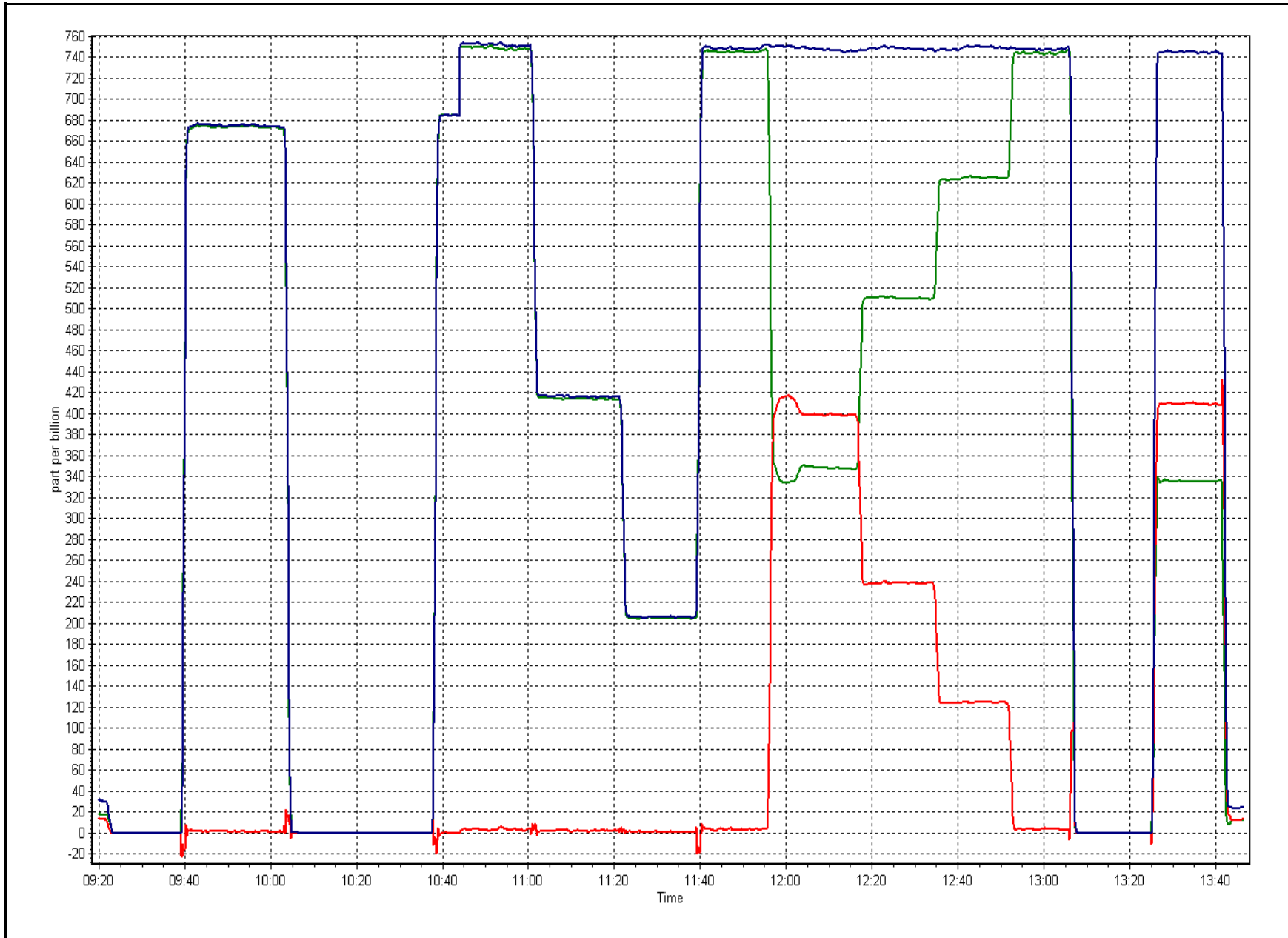
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999958
399.8	398.7	1.0028		
237.7	238.5	0.9969	Slope	1.003293
122.7	124.5	0.9858		
			Intercept	-0.931894

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 22, 2016





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 10, 2016	NOX Previous Cal Date	January 20, 2016
NH3 Calibration Date	February 11, 2016	NH3 Previous Cal Date	January 20, 2016
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	15:05
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	192 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.9 ppm	NH3 Expiry Date / SN	3/Mar/2012 LL156612
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	14/Jan/2016 3222140

DACs Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.000028	0.987433	1.003122	1.000403	1.014353
	Data Offset	1.218514	-0.529194	2.238588	1.995034	-0.333712
Cal Stats After	Data Slope	0.988695	0.976214	0.998201	0.996400	1.015272
	Data Offset	-0.148304	-0.156194	2.031045	2.992312	-0.383661
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152	
Converter	API 501 NH3	Converter serial #	147	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	-0.3	ppb	0.0	ppb
NOx BKG	-0.1	ppb	0.0	ppb
Nt BKG	0.1		0.0	
NO coefficient	1.247		1.239	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.383		1.371	
NH3 coefficient	0.940		0.940	
Nt coefficient	1.390		1.376	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.3	Deg C	315.2	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	86.0	ccm
R Cell Press	4.4	mmHg	4.8	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	560.0	ccm	528.0	ccm
Sample Flow 2 Nox	560.0	ccm	532.0	ccm
Sample Flow 3 Nt	560.0	ccm	534.0	ccm

Notes:

Inlet filter changed after as founds. Zero and span adjusted. NH3 as founds completed before NH3 cylinder changed.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

February 11, 2016

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	0.0	-1.0	1.0	----	----
as found NO	5500	81.3	752.4	752.4	----	754.6	753.0	1.7	0.997	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
high NO point	5500	81.3	752.4	752.4	----	751.5	754.0	-2.5	1.001	----
NO/O ₃ point	5500	81.3	752.4	752.4	----	752.1	754.8	-2.8	1.000	----
as found NH ₃	6500	67.7	1999.8	NA	1999.8	2048.6	25.7	2022.8	0.976	0.989
first NH ₃	6500	67.7	1999.8	NA	1999.8	2048.6	25.7	2022.8	0.976	0.989
second NH ₃										
third NH ₃										
Average Correction Factor									1.0008	0.9886

Nt Corrected As Found Nt = 754.6 ppb
 NOx Corrected As Found NOx = 754.0 ppb
 NH₃ Previous Converter Efficiency = 94.0 %

Previous Response Nt = 762.5 ppb
 Previous Response NOx = 747.8 ppb
 NH₃ Current Converter Efficiency = 94.0 %

Nt percent change 1.1%
 NOx percent change -0.8%
 NH₃ percent change 0.0%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: February 10, 2016 Station Number: AMS 1

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.6	1.8	-0.2	----	----
as found span	5500	81.4	753.3	750.4	753.3	760.0	760.0	761.8	0.9912	0.9873
calibrator zero	5500	0.0	0.0	0.0	0.0	0.0	-0.4	0.2	----	----
high point	5500	81.4	753.3	750.4	753.3	754.0	752.3	751.5	0.9991	0.9974
second point	5500	45.6	422.0	420.3	422.0	419.3	415.6	415.7	1.0064	1.0115
third point	5500	22.8	211.0	210.2	211.0	207.4	206.4	205.3	1.0175	1.0183
Average Correction Factor									1.0077	1.0091

	<u>Nt</u>	<u>NO_x</u>	<u>NO</u>	<u>NO₂</u>
Corrected As found	762.0	759.4	758.2	----
Previous Response	763.4	748.7	748.1	----
Percent Change	0.2%	-1.4%	-1.3%	-0.1%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 81.4 ccm NO_x ref calc conc = 753.3 ppb NO ref calc conc = 750.4 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	----	3.0	754.8	752.8	2.0	0.9980	0.9967	----	----
1st NO ₂ (300)	346.7	409.1	750.6	346.7	403.9	1.0036	----	1.0128	98.7%
2nd NO ₂ (200)	510.7	245.1	751.0	510.7	240.4	1.0031	----	1.0196	98.1%
3rd NO ₂ (100)	627.4	128.4	755.0	627.4	127.6	0.9978	----	1.0063	99.4%
2nd NO ref point	----	3.0	753.0	751.4	1.6	1.0005	0.9986	----	----
Average Correction Factor						1.0012	0.9977	1.0129	98.7%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

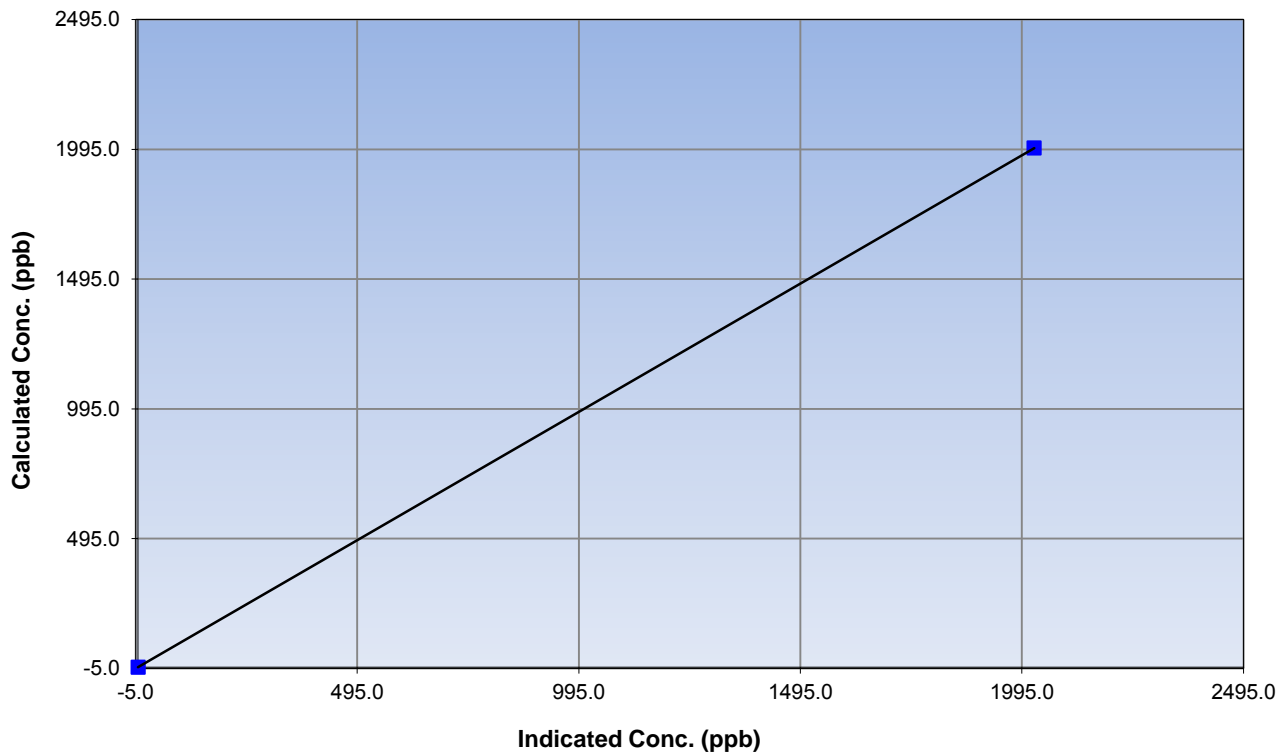
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
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	0.2	----	Correlation Coefficient	1.000000
1999.8	2022.8	0.9886		
			Slope	0.988695
			Intercept	-0.148304

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

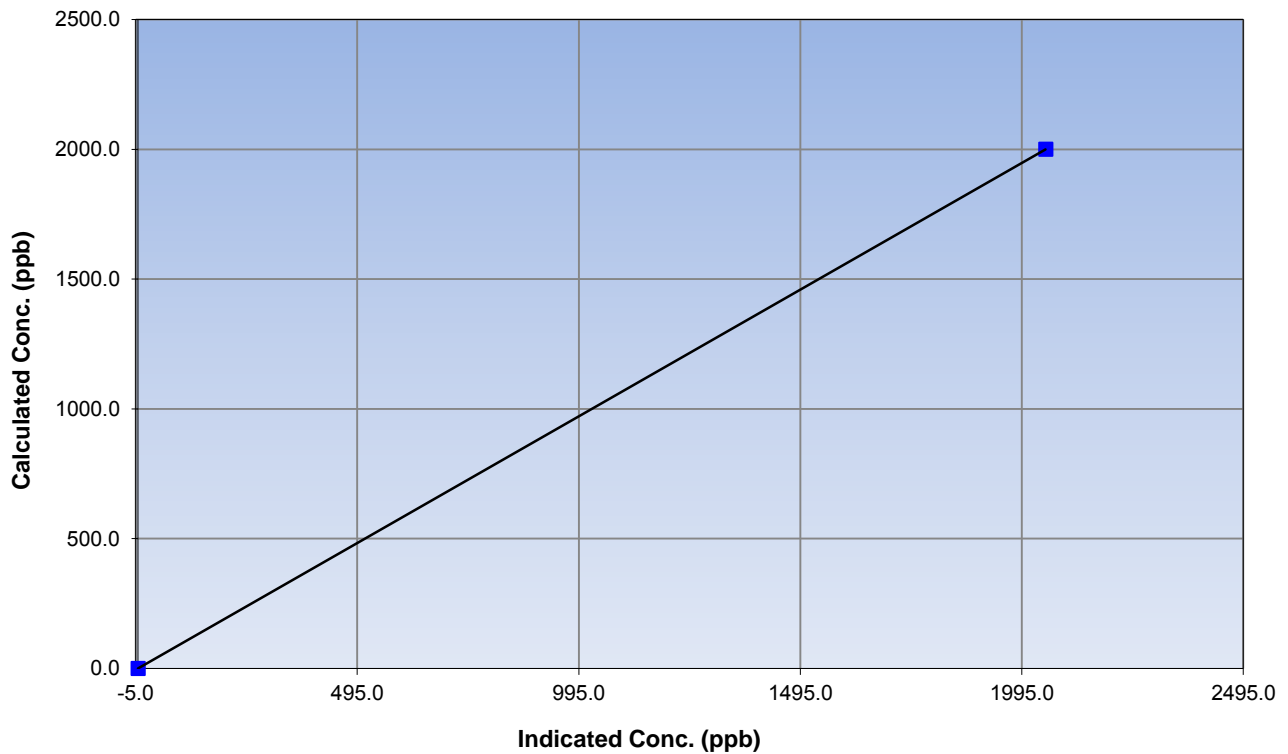
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
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	0.2	----	Correlation Coefficient	1.000000
1999.8	2048.6	0.9761		
			Slope	0.976214
			Intercept	-0.156194

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

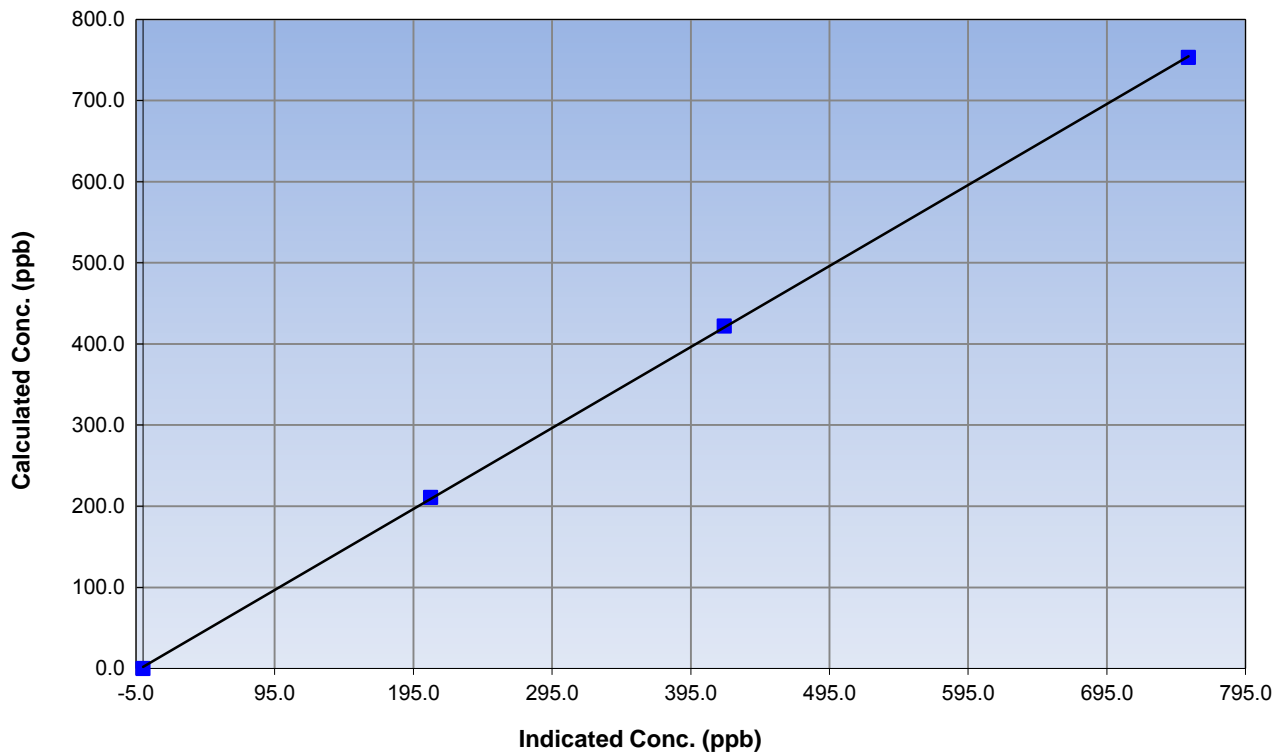
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
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	0.0	----	Correlation Coefficient	0.999962
753.3	754.0	0.9991		
422.0	419.3	1.0064	Slope	0.998201
211.0	207.4	1.0175		
			Intercept	2.031045

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

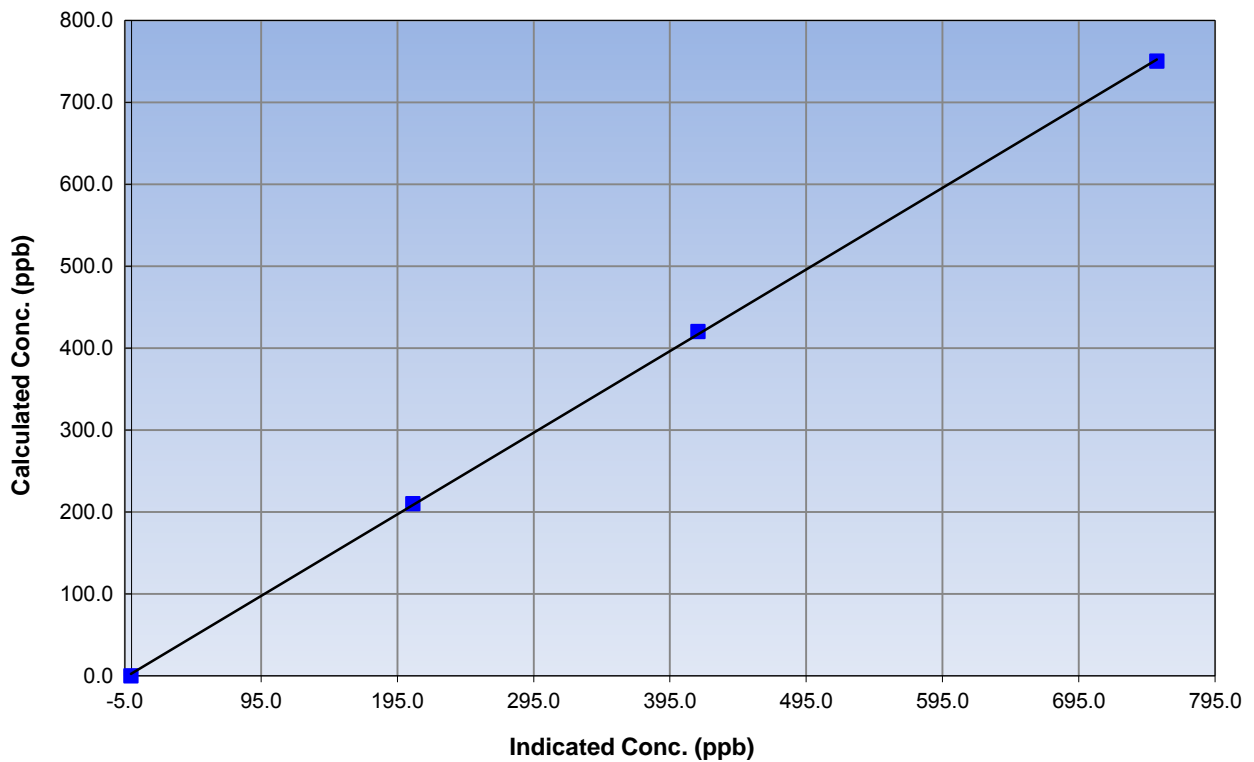
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999919
750.4	752.3	0.9974		
420.3	415.6	1.0115	Slope	0.996400
210.2	206.4	1.0183		
			Intercept	2.992312

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

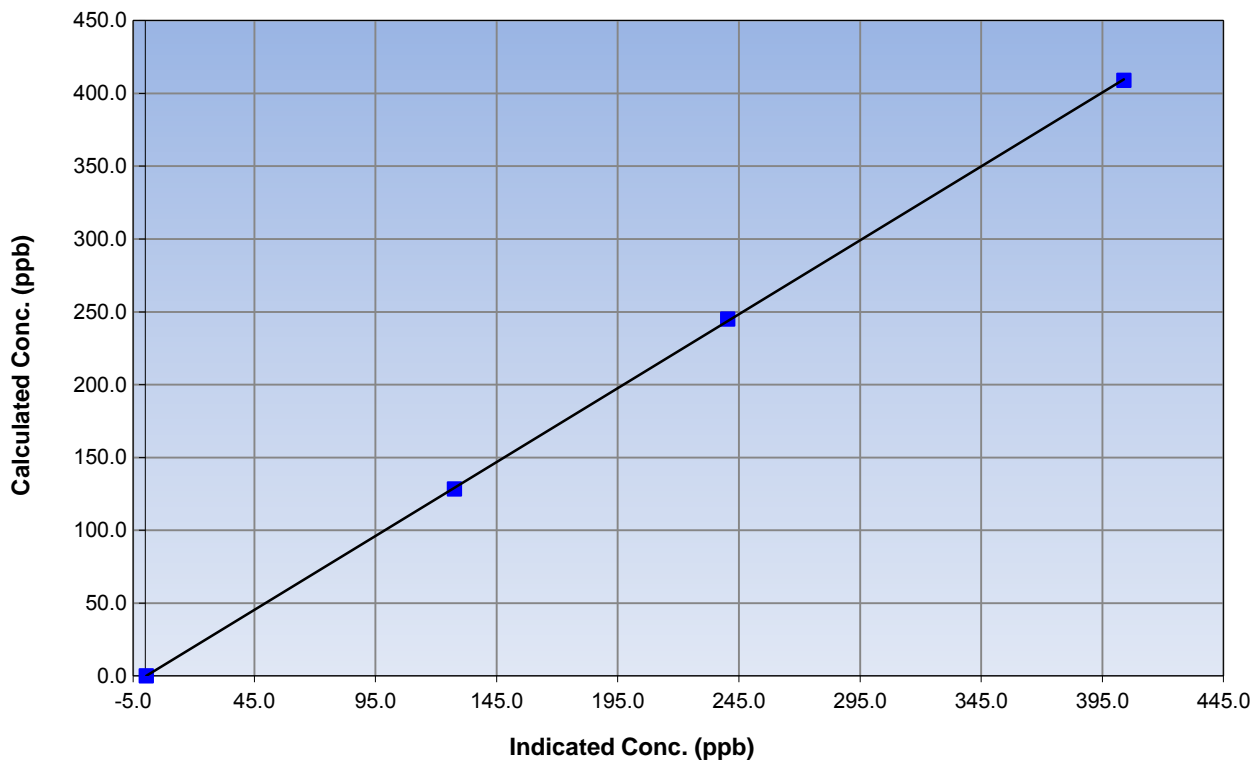
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

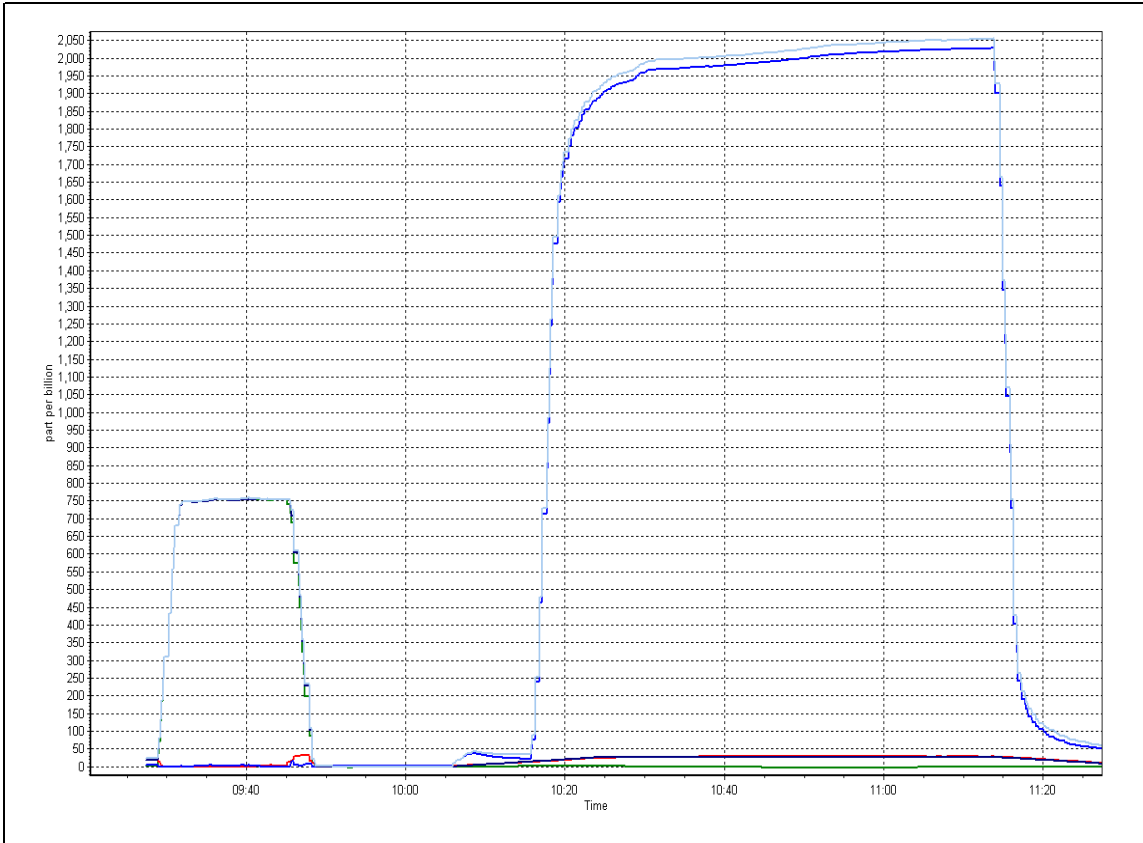
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999967
409.1	403.9	1.0128		
245.1	240.4	1.0196	Slope	1.015272
128.4	127.6	1.0063		
			Intercept	-0.383661

NO₂ Calibration Curve



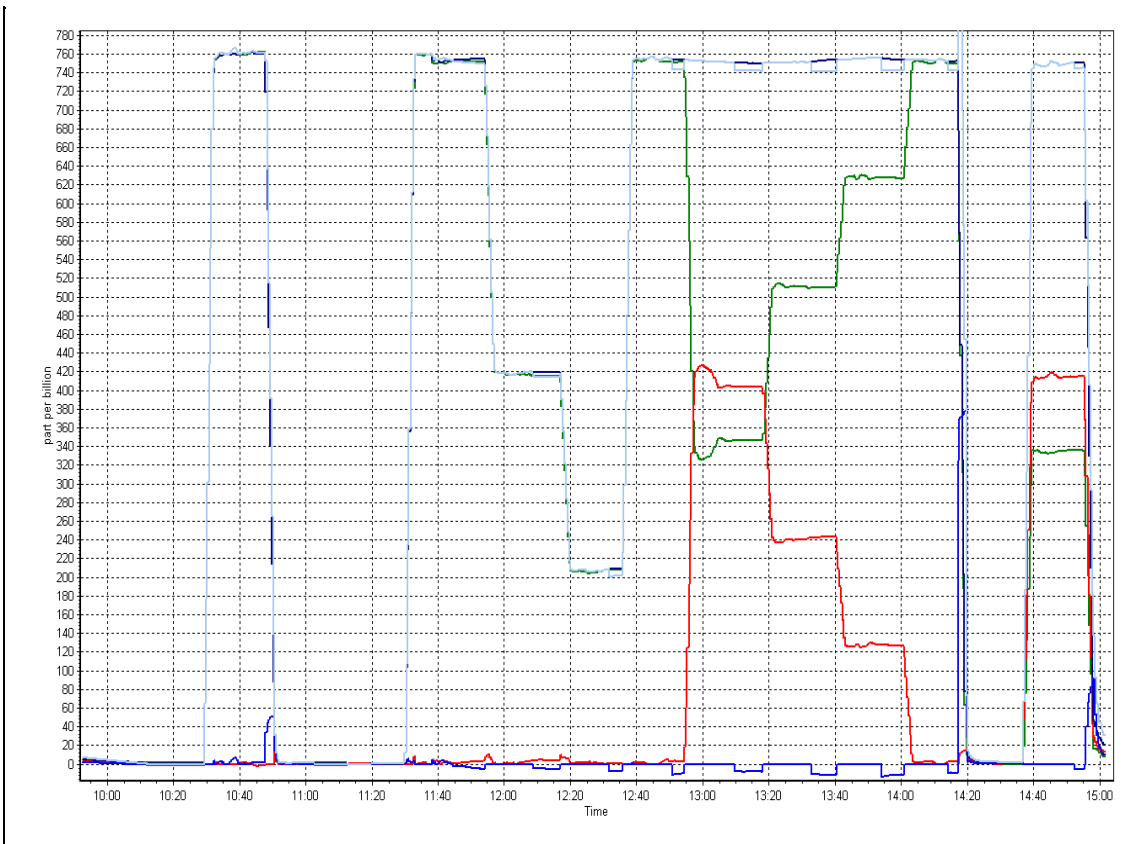
NH₃ Calibration Plot

Date: February 11, 2016



NO_x Calibration Plot

Date: February 10, 2016





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 10, 2016	NOX Previous Cal Date	January 20, 2016
NH3 Calibration Date	February 11, 2016	NH3 Previous Cal Date	January 20, 2016
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	15:05
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	30.6 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.9 ppm	NH3 Expiry Date / SN	21/Dec/2012 LL76495
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	14/Jan/2016 3222140

DACs Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.988695	0.976214	0.998201	0.996400	1.015272
	Data Offset	-0.148304	-0.156194	2.031045	2.992312	-0.383661
Cal Stats After	Data Slope	0.999146	0.985628	0.998201	0.996400	1.015272
	Data Offset	-12.76	-13.97	2.031045	2.992312	-0.383661
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152	
Converter	API 501 NH3	Converter serial #	147	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	-0.3	ppb	0.0	ppb
NOx BKG	-0.1	ppb	0.0	ppb
Nt BKG	0.1		0.0	
NO coefficient	1.247		1.239	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.383		1.371	
NH3 coefficient	0.940		0.929	
Nt coefficient	1.390		1.376	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.3	Deg C	315.2	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	86.0	ccm
R Cell Press	4.4	mmHg	4.8	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	560.0	ccm	528.0	ccm
Sample Flow 2 Nox	560.0	ccm	532.0	ccm
Sample Flow 3 Nt	560.0	ccm	534.0	ccm

Notes:

NH3 cylinder changed after as founds.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

February 11, 2016

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	0.0	-1.0	1.0	----	----
as found NO	5500	81.3	752.4	752.4	----	754.6	753.0	1.7	0.997	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
high NO point	5500	81.3	752.4	752.4	----	751.5	754.0	-2.5	1.001	----
NO/O ₃ point	5500	81.3	752.4	752.4	----	752.1	754.8	-2.8	1.000	----
as found NH ₃	1500	88.2	1799.3	NA	1799.3	1805.6	24.8	1778.6	0.997	1.012
first NH ₃	1500	88.2	1799.3	NA	1799.3	1830.5	24.8	1805.6	0.983	0.996
second NH ₃	1500	49.0	999.6	NA	999.6	1037.2	16.7	1020.4	0.964	0.980
third NH ₃	1500	24.6	501.8	NA	501.8	537.8	7.8	528.5	0.933	0.950
Average Correction Factor									1.0008	0.9752

Nt Corrected As Found Nt = 754.6 ppb
 NOx Corrected As Found NOx = 754.0 ppb
 NH₃ Previous Converter Efficiency = 94.0 %

Previous Response Nt = 770.9 ppb
 Previous Response NOx = 751.7 ppb
 NH₃ Current Converter Efficiency = 92.9 %

Nt percent change 2.2%
 NOx percent change -0.3%
 NH₃ percent change -1.1%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: February 10, 2016 Station Number: AMS 1

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.6	1.8	-0.2	----	----
as found span	5500	81.4	753.3	750.4	753.3	760.0	760.0	761.8	0.9912	0.9873
calibrator zero	5500	0.0	0.0	0.0	0.0	0.0	-0.4	0.2	----	----
high point	5500	81.4	753.3	750.4	753.3	754.0	752.3	751.5	0.9991	0.9974
second point	5500	45.6	422.0	420.3	422.0	419.3	415.6	415.7	1.0064	1.0115
third point	5500	22.8	211.0	210.2	211.0	207.4	206.4	205.3	1.0175	1.0183
Average Correction Factor									1.0077	1.0091

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	762.0	759.4	758.2	----
Previous Response	771.8	752.6	750.1	----
Percent Change	1.3%	-0.9%	-1.1%	0.2%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 81.4 ccm NO_x ref calc conc = 753.3 ppb NO ref calc conc = 750.4 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	----	3.0	754.8	752.8	2.0	0.9980	0.9967	----	----
1st NO ₂ (300)	346.7	409.1	750.6	346.7	403.9	1.0036	----	1.0128	98.7%
2nd NO ₂ (200)	510.7	245.1	751.0	510.7	240.4	1.0031	----	1.0196	98.1%
3rd NO ₂ (100)	627.4	128.4	755.0	627.4	127.6	0.9978	----	1.0063	99.4%
2nd NO ref point	----	3.0	753.0	751.4	1.6	1.0005	0.9986	----	----
Average Correction Factor						1.0012	0.9977	1.0129	98.7%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

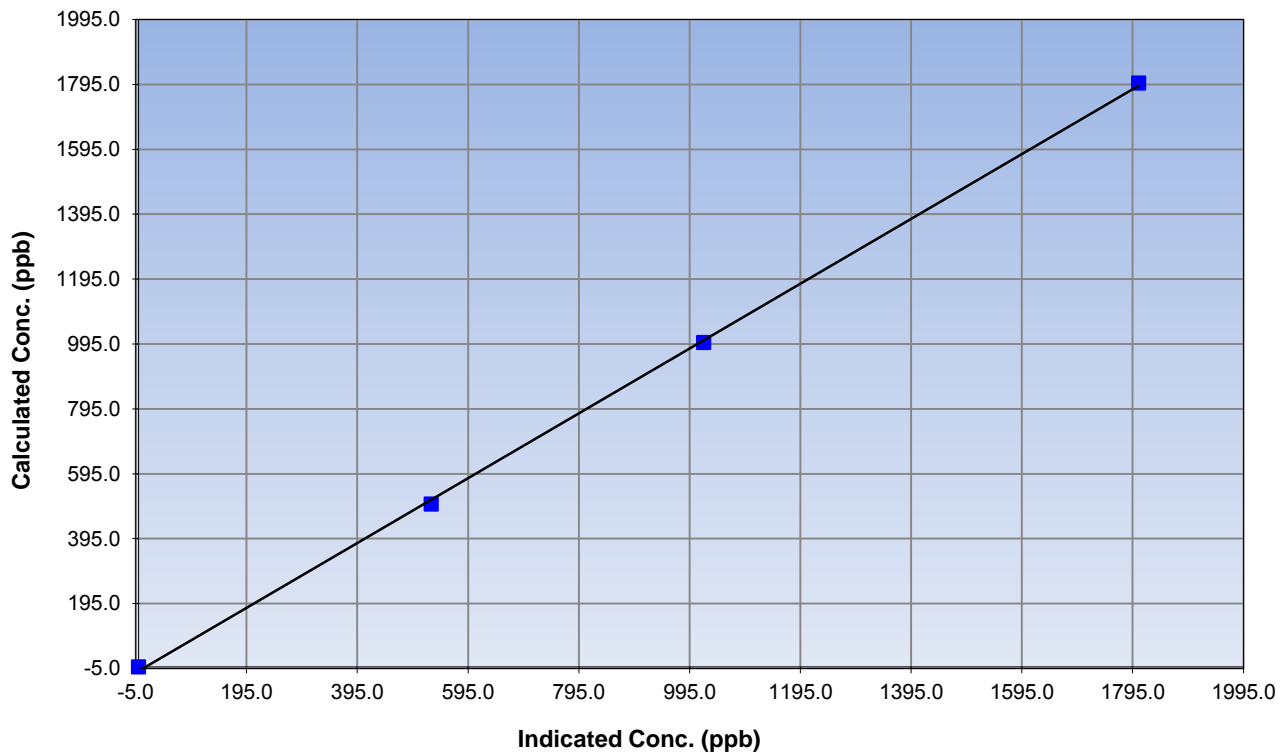
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
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	0.2	----	Correlation Coefficient	0.999743
1799.3	1805.6	0.9965		
999.6	1020.4	0.9796	Slope	0.999146
501.8	528.5	0.9496		
			Intercept	-12.763451

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

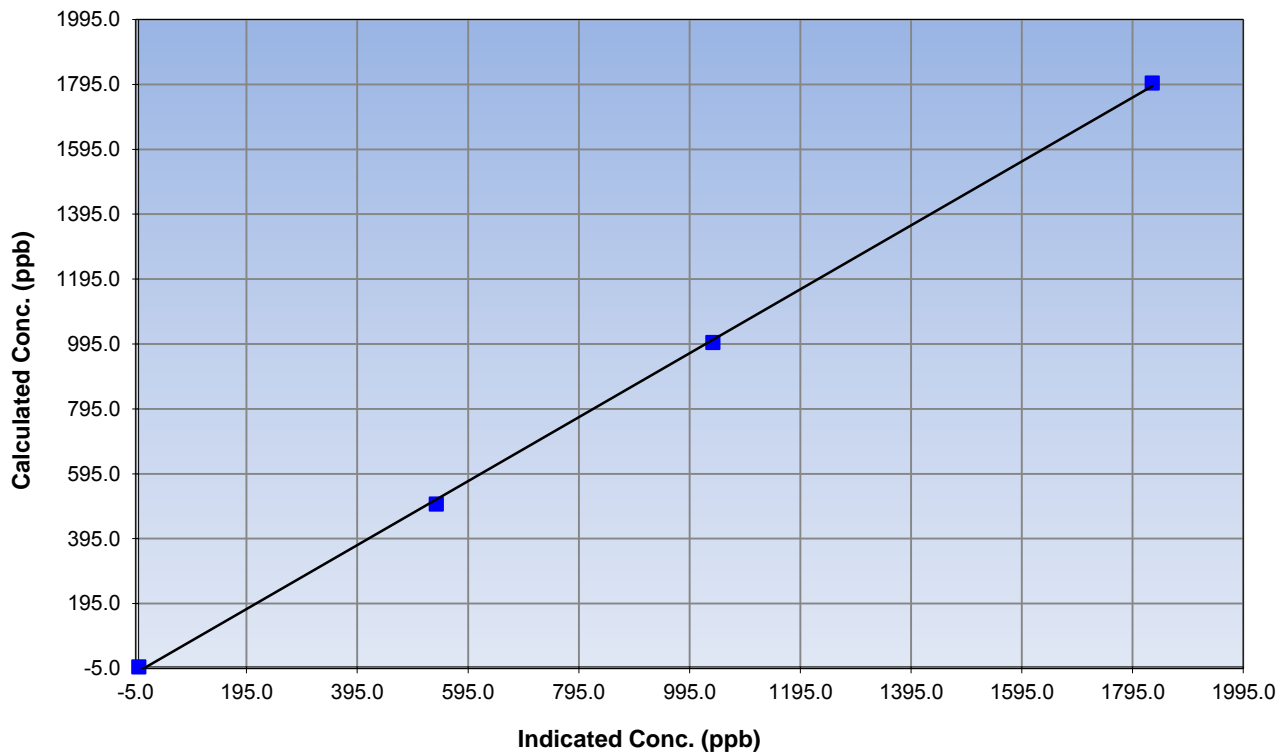
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
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	0.2	----	Correlation Coefficient	0.999688
1799.3	1830.5	0.9830		
999.6	1037.2	0.9638	Slope	0.985628
501.8	537.8	0.9332		
			Intercept	-13.971117

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

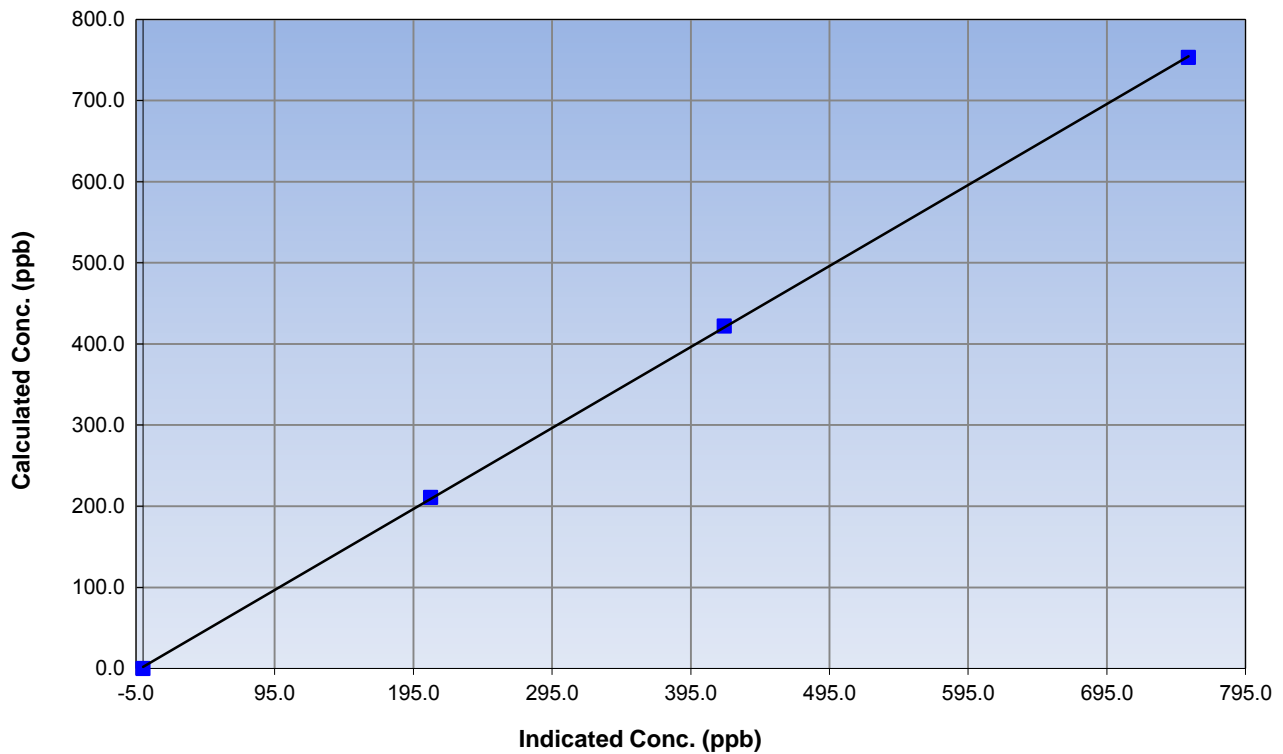
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
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	0.0	----	Correlation Coefficient	0.999962
753.3	754.0	0.9991		
422.0	419.3	1.0064	Slope	0.998201
211.0	207.4	1.0175		
			Intercept	2.031045

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

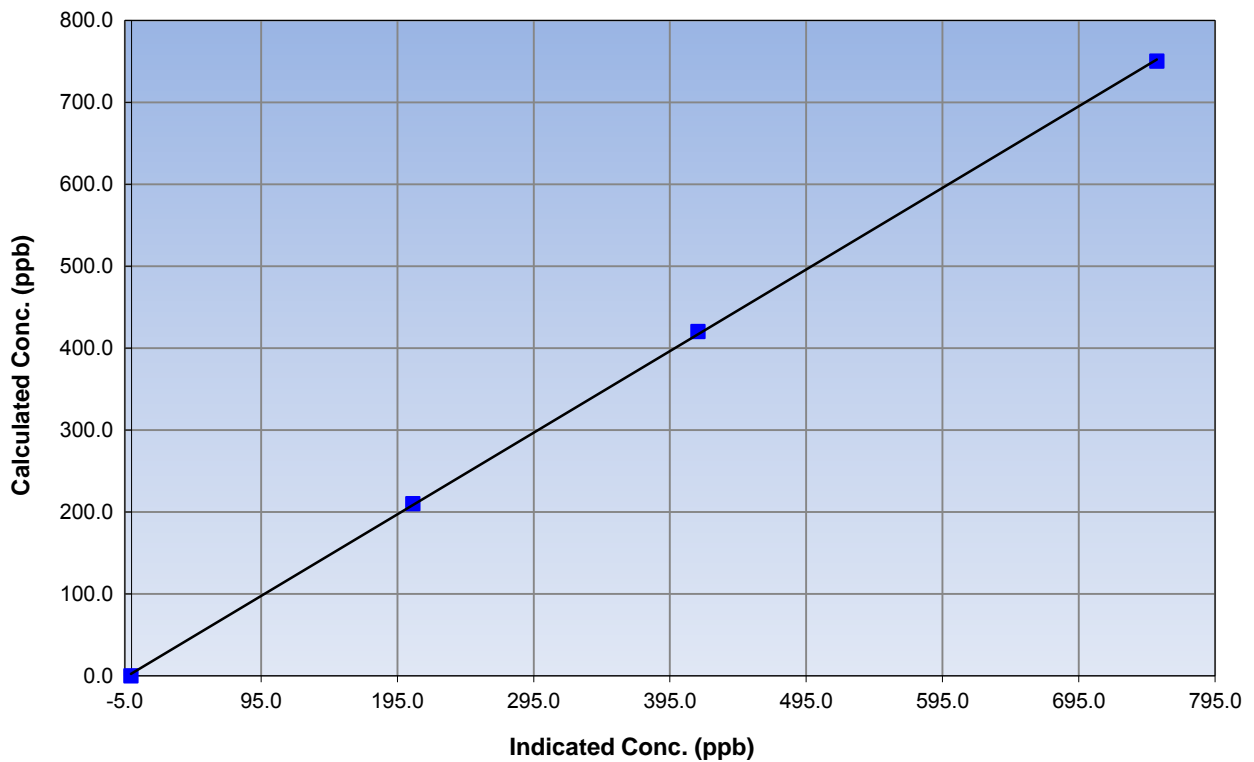
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999919
750.4	752.3	0.9974		
420.3	415.6	1.0115	Slope	0.996400
210.2	206.4	1.0183		
			Intercept	2.992312

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

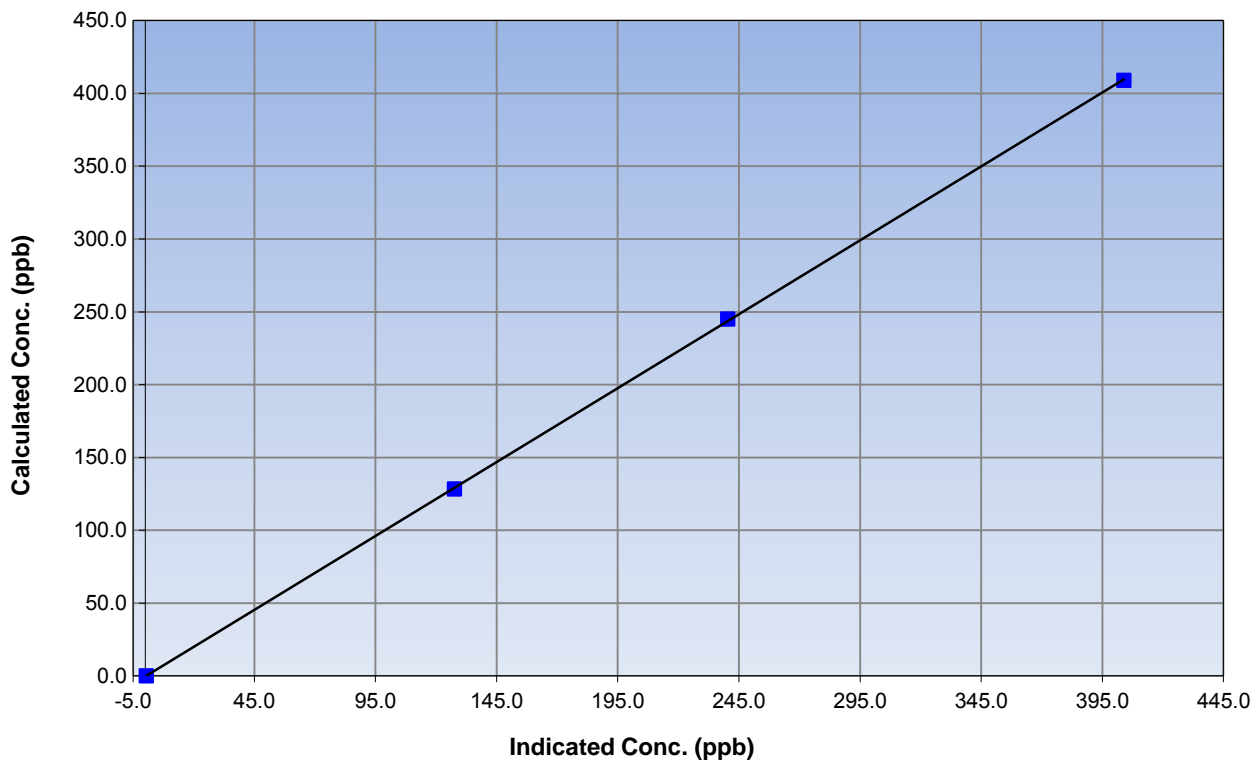
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:50	End Time (MST)	15:05
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

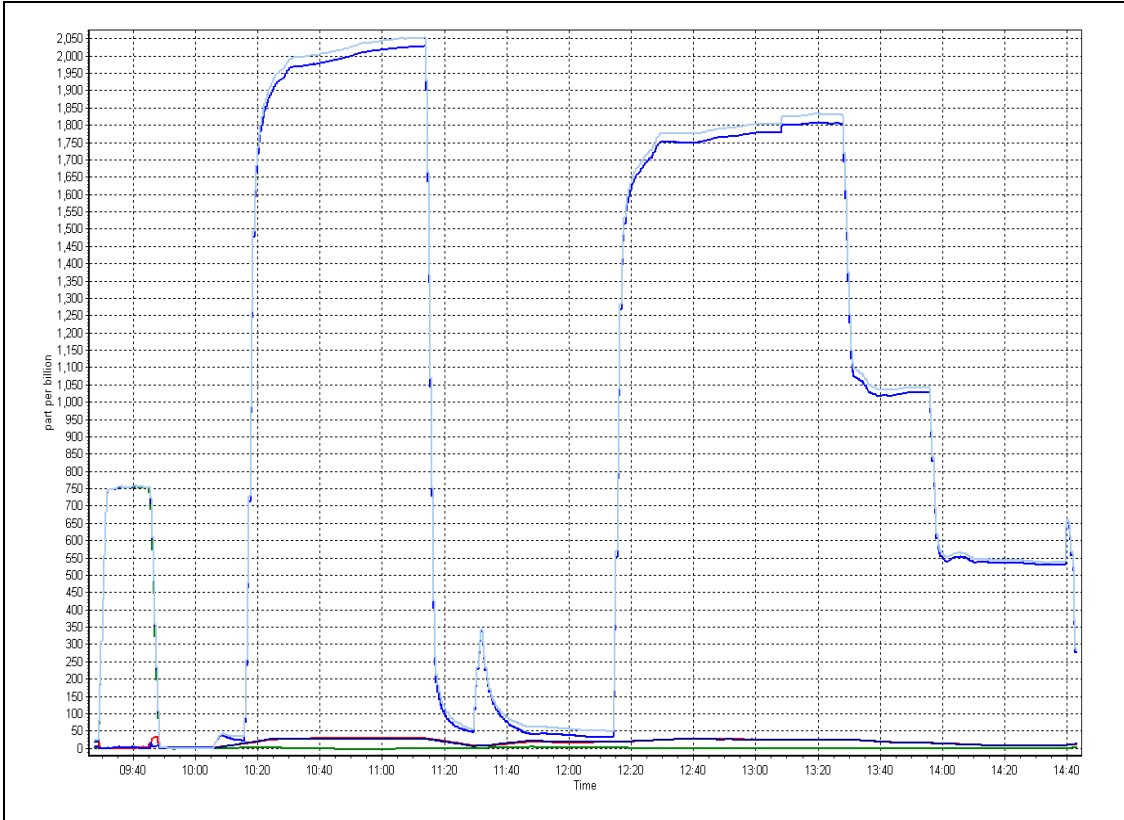
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999967
409.1	403.9	1.0128		
245.1	240.4	1.0196	Slope	1.015272
128.4	127.6	1.0063		
			Intercept	-0.383661

NO₂ Calibration Curve



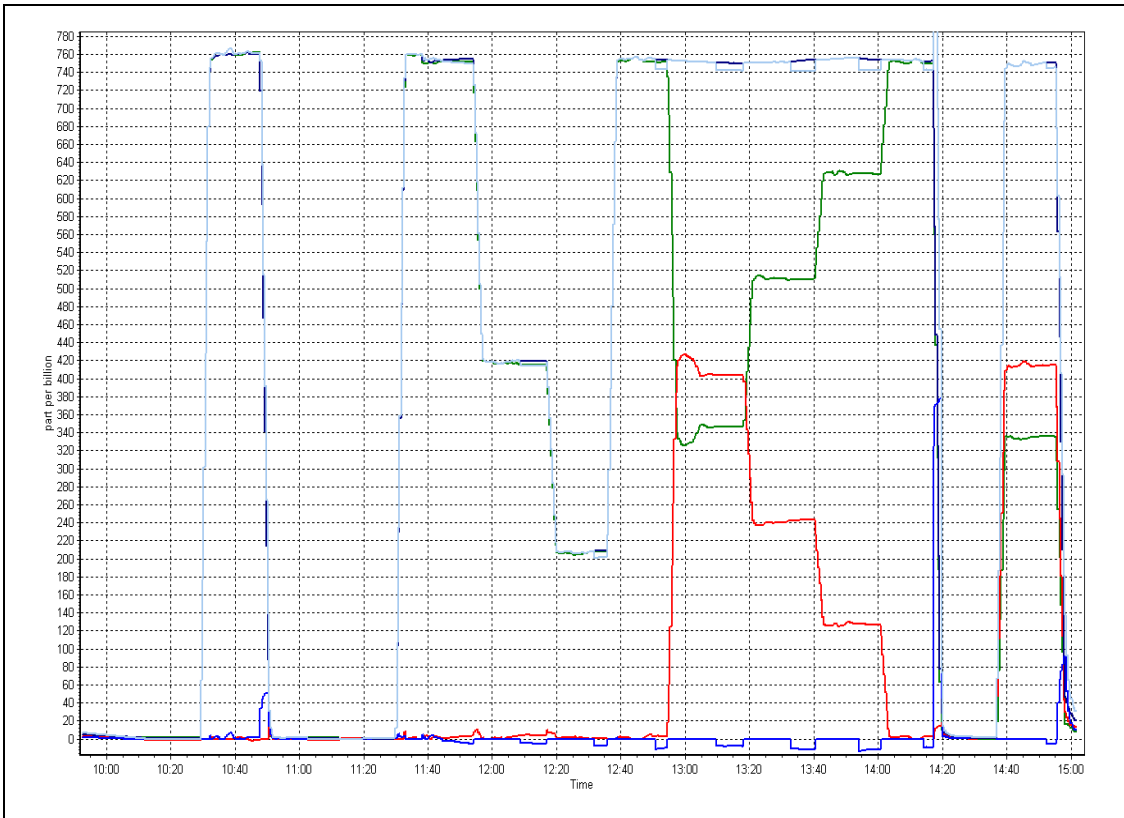
NH₃ Calibration Plot

Date: February 11, 2016



NO_x Calibration Plot

Date: February 10, 2016





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	February 5, 2016	Previous Calibration:	January 15, 2016
Station Name:	Bertha Ganter - Fort McKay	Station Number:	AMS 1
Start Time (MST):	12:05	End Time (MST):	13:42
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	141228

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number:	
C ₁₄ Source SN:	
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	T1 <input checked="" type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-7.0	-7.2	-0.2	-7.0
T2	20.0	na	na	
T3	23.0	na	na	
T4	18.0	na	na	
RH (%)	13.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	972	968.6	-3.4	972

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	998	-2	998	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	293		293
Neph	0.3		0.3
C14	24.2		24.2
Indicated Concentration (ug/m3)	0.1	no	0
Offset 1	219.1		219.1
Offset 2	34.2		34.2

Leak Check (Quarterly)

Leak Check Date:	February 5, 2016	Previous Leak Check Date:	April 20, 2015
------------------	------------------	---------------------------	----------------

	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.63		0.14
*Flow with adaptor (LPM):	16.49		

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

Mass Foil Calibration (Annualy)

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

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good/cleaned	05/02/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Status showing error 02 "analog out range 2". Reset analyzer, cleared error. Cyclone head cleaned. No adjustments made.

Calibration Performed By:	Devin Russell
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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 2
MILDRED LAKE
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
 FEBRUARY 2016

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	656	35	40	99.28	32	0	8	0
H2S (ppb) Average	654	38	42	99.43	10	0	2	0
THC (ppm) Average	657	34	39	99.28	5.2	-	3	-
Temperature (C) Average	696	0	0	100.00	8.6	-	2.3	-
Relative Humidity (%) Average	696	0	0	100.00	97	-	94	-
Wind Speed 10 m (km/h) Average	627	0	69	90.09	24	-	14	-
Wind Direction 10 m (deg) Average	627	0	69	90.09	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	656	2.7	5	-	0	0	0	0	2	10	32
H2S (ppb) Average	654	0.9	1	-	0	0	0	0	1	3	10
THC (ppm) Average	657	2.48	0.4	-	2	2.1	2.2	2.3	2.7	3.1	5.2
Temperature 2 m (C) Average	696	-10.87	6.9	-	-31.8	-18.5	-15.4	-11.5	-6	-2	8.6
Relative Humidity (%) Average	696	79.7	12	-	40	62	73	83	88	93	97
Wind Speed 10 m (km/h) Average	627	8.3	4	-	0	3	5	8	11	14	24
Wind Direction 10 m (deg) Average	627	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S, THC	29 Feb 2016 21:00	01 Mar 2016 00:00	4	Station power failure
SO2, THC	02 Feb 2016 14:00	02 Feb 2016 14:00	1	Maintenance - sample manifold cleaning
Wind Speed, Wind Direction	01 Feb 2016 01:00	01 Feb 2016 01:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	01 Feb 2016 03:00	01 Feb 2016 03:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	06 Feb 2016 13:00	08 Feb 2016 12:00	48	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	08 Feb 2016 17:00	09 Feb 2016 11:00	19	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association
Summary of Hour Averages

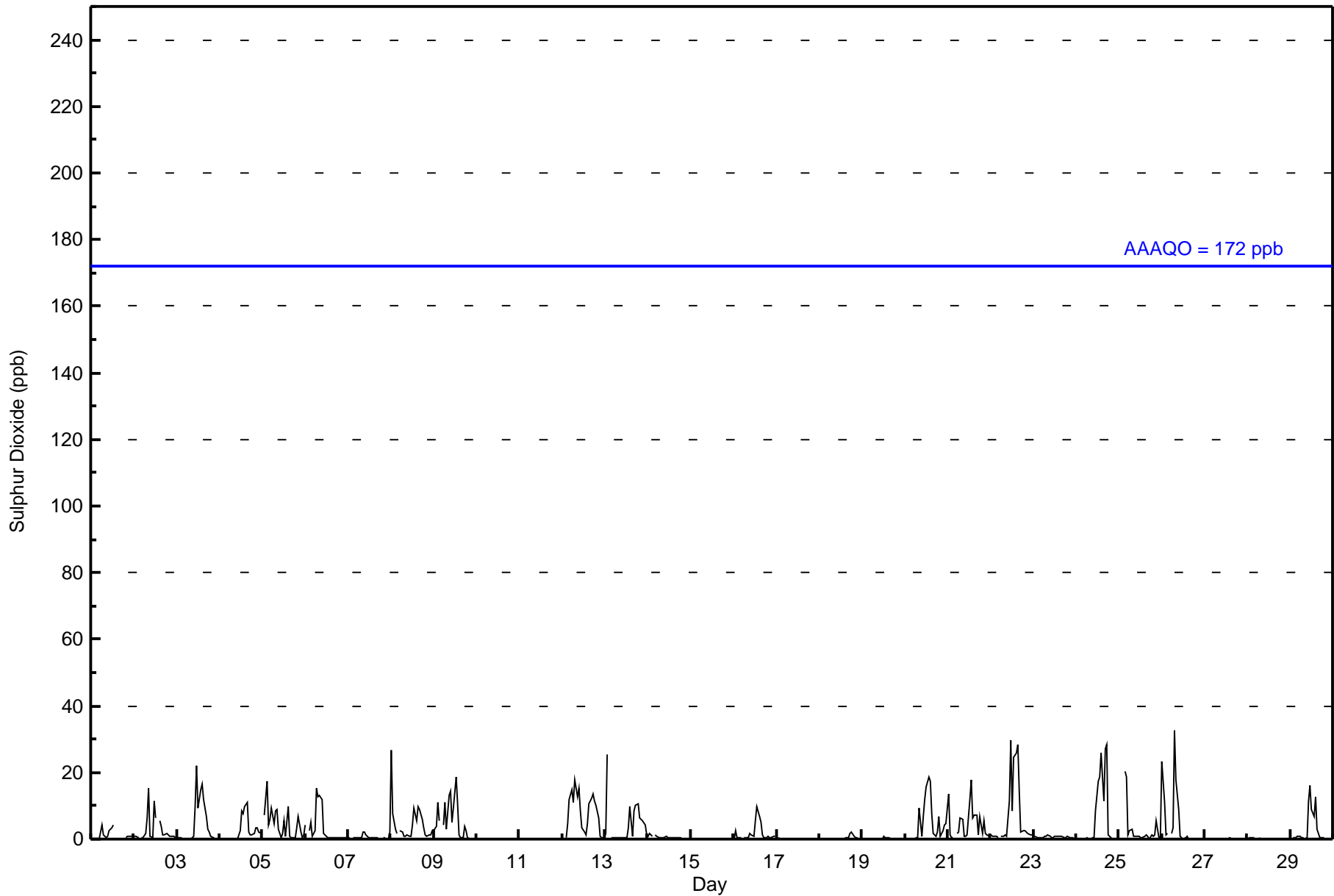
Sulphur Dioxide (SO₂) - ppb
Mildred Lake - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 32 ppb on Feb 26 08:00 Maximum Daily Average: 7.6 ppb on Feb 12												Hours in Service: 696 Hours of Data: 656														
Minimum Value: 0 ppb on Feb 1 01:00 Minimum Daily Average: 0.0 ppb on Feb 10 Maximum Diurnal Average: 5.8 ppb at hour 15 Minimum Diurnal Average: 0.7 ppb at hour 24 Monthly Average: 2.7 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 10 P ₉₉ = 26												Hours of Missing Data: 40 Hours of Calibration: 35 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	0	Z	0	0	2	4	1	0	1	3	3	4	C	C	C	C	C	C	1	1	1	1	1	--	4
2-Feb	1	1	1	Z	1	1	2	6	15	1	1	12	6	M	5	4	1	1	2	1	1	1	1	1	2.9	15
3-Feb	0	0	0	0	Z	0	0	0	0	1	10	22	9	15	16	12	7	3	2	1	0	0	0	0	4.3	22
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	2	9	7	10	11	2	1	1	2	3	3	2	2	2.5	11
5-Feb	Z	7	17	4	6	10	5	8	9	3	1	2	6	1	10	1	0	0	0	4	7	2	0	1	4.5	17
6-Feb	4	Z	2	5	1	3	15	13	13	12	2	1	1	0	0	0	0	0	0	0	0	0	0	0	3.2	15
7-Feb	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0.5	2
8-Feb	27	7	3	2	Z	3	2	1	1	1	1	1	4	9	6	10	9	6	3	1	1	1	1	2	4.5	27
9-Feb	3	4	11	5	Z	4	11	3	13	15	5	9	19	11	1	0	0	4	2	1	0	0	0	0	5.3	19
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	0
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	0.1	0
12-Feb	0	Z	0	5	12	15	11	18	13	15	9	4	2	1	5	10	12	14	11	10	6	1	0	0	7.6	18
13-Feb	2	25	Z	1	0	0	0	0	0	0	0	0	0	3	10	1	8	10	11	6	6	6	4	1	4.2	25
14-Feb	1	2	1	Z	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.5	2
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	0
16-Feb	0	2	0	0	0	Z	0	0	0	2	1	1	5	10	7	5	1	1	1	1	1	1	1	1	1.8	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	0.1	0
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	0	0	0.3	2
19-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	0.2	1
20-Feb	0	0	0	Z	0	0	0	1	9	1	7	12	16	19	17	8	2	1	2	7	1	2	4	5	4.9	19
21-Feb	13	1	1	0	Z	2	2	6	6	1	1	1	12	18	6	7	7	1	7	2	6	2	1	1	4.5	18
22-Feb	1	1	1	1	1	Z	1	1	1	1	11	30	9	24	26	29	14	2	2	2	2	2	1	1	7.1	30
23-Feb	Z	1	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1
24-Feb	0	Z	0	0	0	0	0	0	0	0	1	9	17	19	26	11	27	28	1	0	0	0	0	0	6.1	28
25-Feb	0	0	Z	20	19	1	2	3	1	1	1	1	1	0	1	1	1	0	1	1	1	5	0	1	2.7	20
26-Feb	23	11	1	2	Z	2	3	32	18	9	1	0	0	0	1	0	0	0	0	0	0	0	0	0	4.5	32
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
29-Feb	Z	0	0	0	1	1	0	0	0	0	11	16	9	7	13	3	0	0	0	0	0	0	0	0	3.4	16
																								Diurnal Average	Diurnal Maximum	
3.2 2.6 1.7 1.8 1.9 1.9 2.2 3.3 3.6 2.3 2.3 4.4 4.5 5.4 5.8 4.2 3.4 2.7 1.8 1.5 1.4 1.0 0.7 0.7 27 25 17 20 19 15 15 32 18 15 11 30 19 24 26 29 27 28 11 10 7 6 4 5																										
Z - zerspan C - Calibration M - Maintenance PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mildred Lake - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	598	91.16	91.16
11 - 20	46	7.01	98.17
21 - 60	12	1.83	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mildred Lake - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	86	162	31	9	9	10	13	60	49	30	19	14	12	10	9	15	538
11 - 20	0	1	0	0	2	1	8	21	5	2	0	2	0	0	0	0	42
21 - 60	0	0	0	0	0	0	0	8	1	0	0	1	1	0	0	0	11
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	86	163	31	9	11	11	21	89	55	32	19	17	13	10	9	15	591

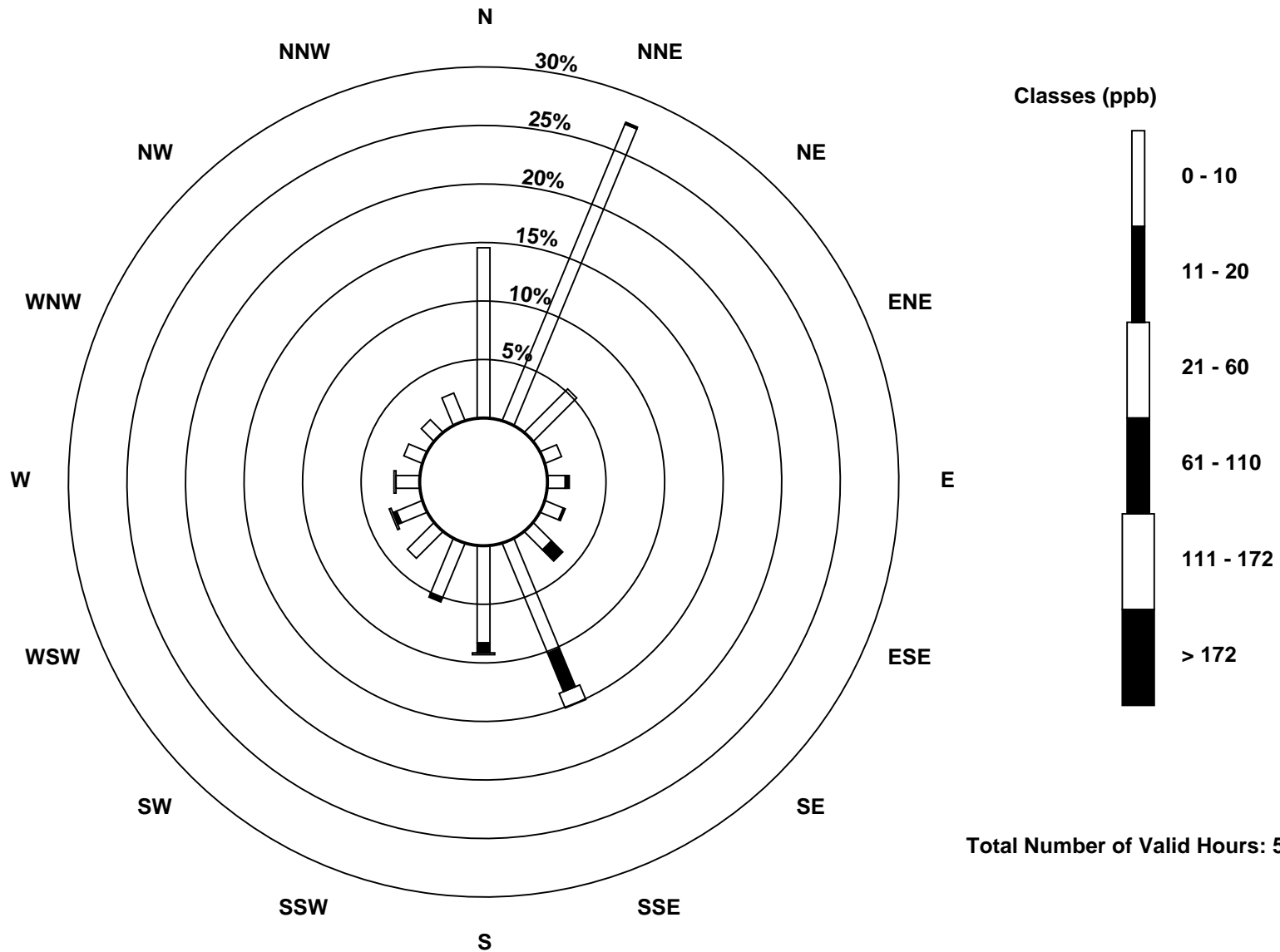
Total Number of Valid Hours: 591

Total Number of Hours: 696

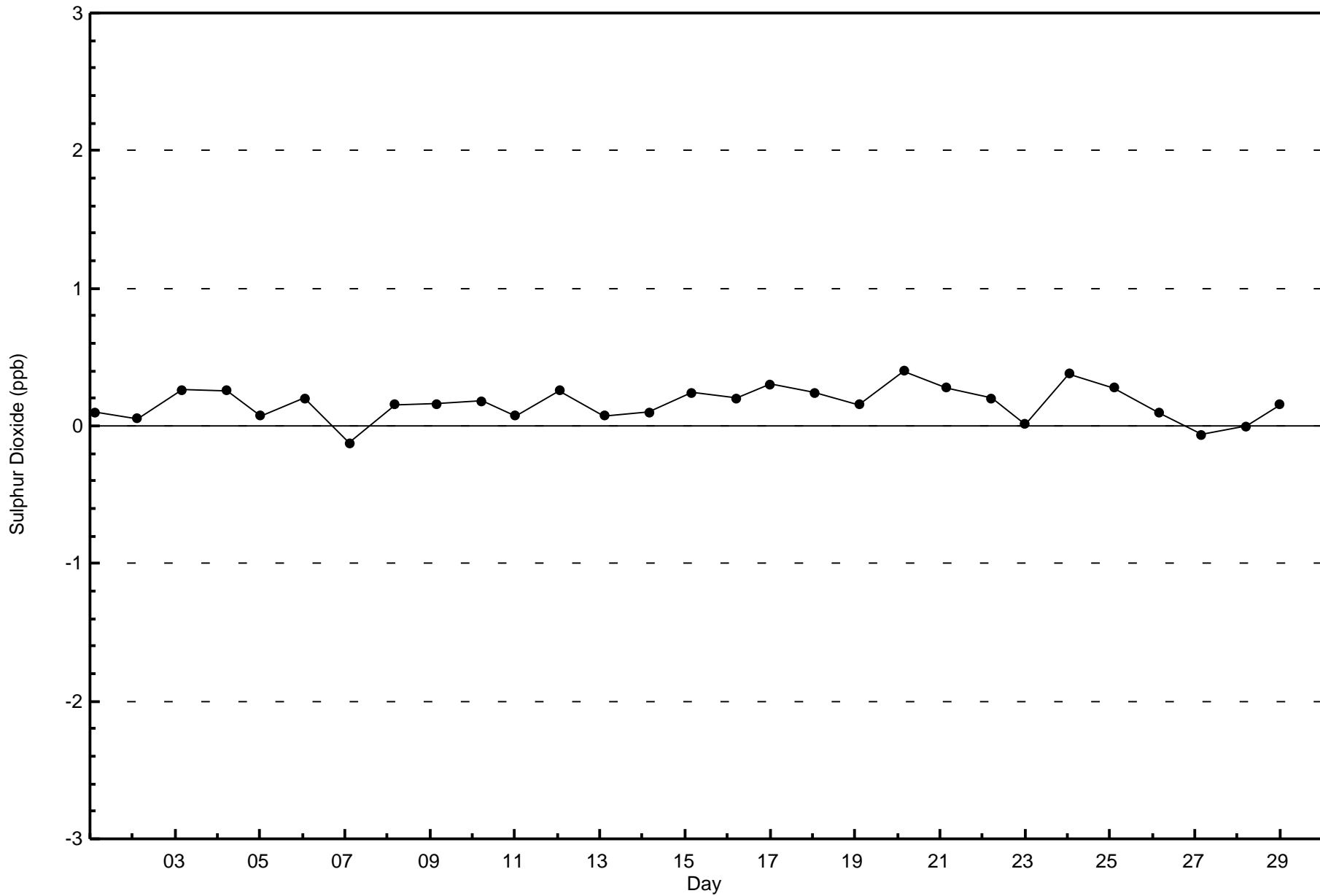


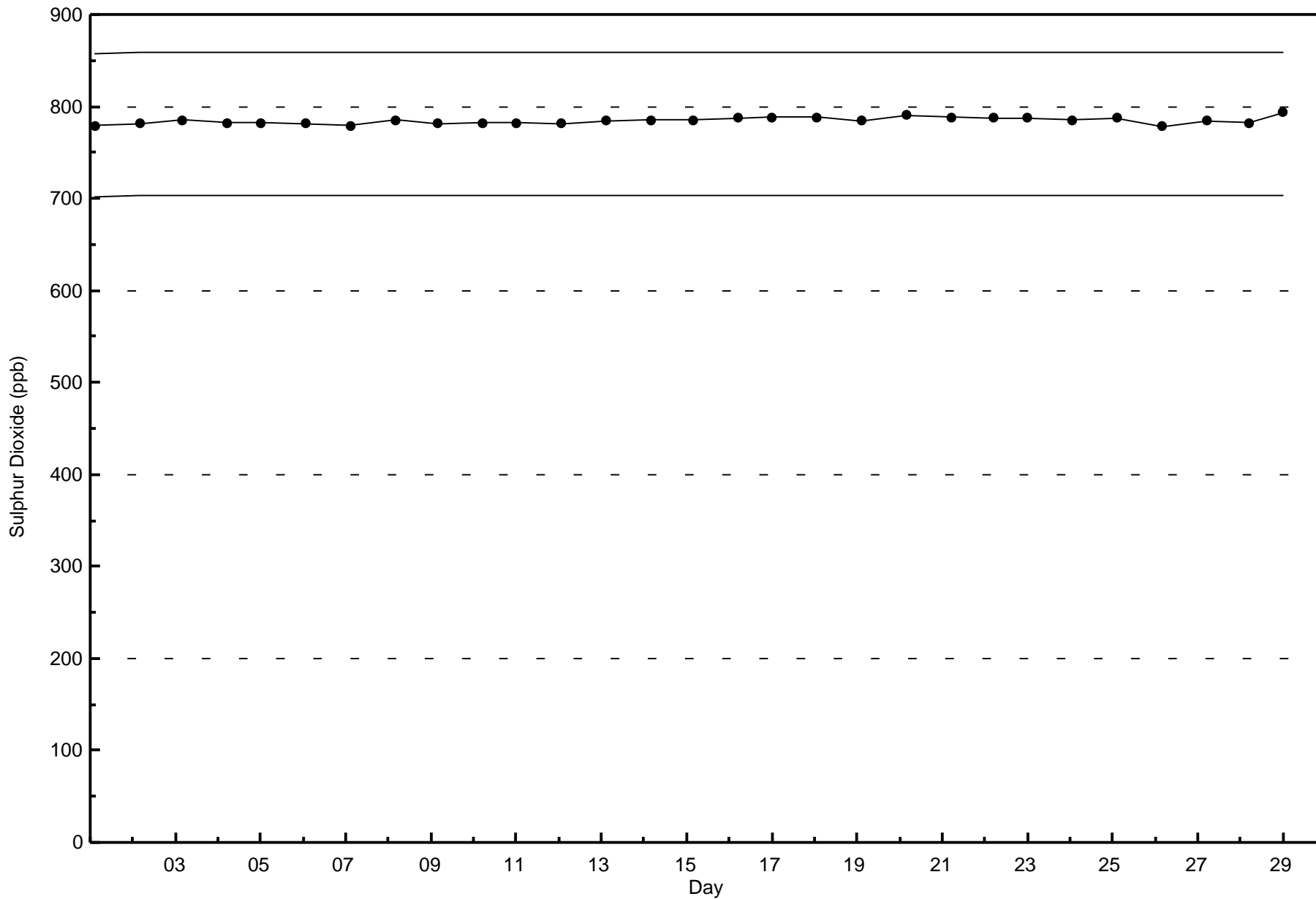
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 591







Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 696
Maximum Value: 10 ppb on Feb 26 08:00	Maximum Daily Average: 2.2 ppb on Feb 9
Minimum Value: 0 ppb on Feb 10 03:00	Hours of Data: 654
Maximum Diurnal Average: 1.3 ppb at hour 8	Hours of Missing Data: 42
Monthly Average: 0.9 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.0 ppb on Feb 10	Percent Operational Time: 99.4
Minimum Diurnal Average: 0.5 ppb at hour 24	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 5	

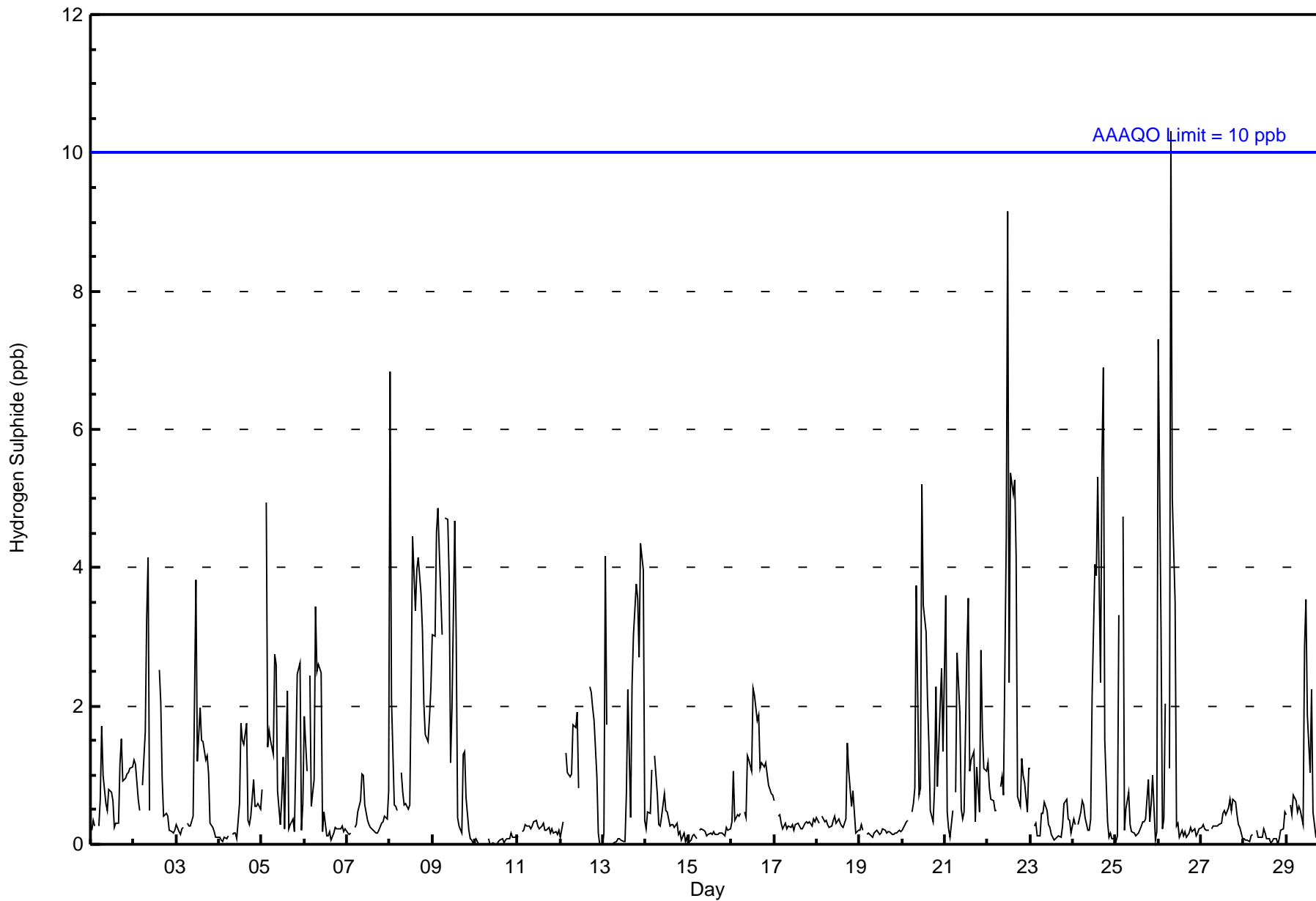
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	0	Z	0	1	2	1	1	0	1	1	1	0	0	0	1	2	1	1	1	1	1	1	0.8	2
2-Feb	1	1	1	0	Z	1	2	3	4	0	C	C	C	C	3	2	1	0	0	0	0	0	0	0	1.1	4
3-Feb	0	0	0	0	0	Z	0	0	0	0	2	4	1	2	2	1	1	1	1	0	0	0	0	0	0.8	4
4-Feb	0	0	0	0	0	0	Z	0	0	0	0	1	2	1	1	2	0	0	0	1	1	1	1	1	0.5	2
5-Feb	1	Z	5	1	2	2	1	3	3	1	0	1	1	0	2	0	0	0	0	1	2	3	0	1	1.3	5
6-Feb	2	1	Z	2	1	1	3	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	3
7-Feb	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
8-Feb	7	2	1	1	0	Z	1	1	1	1	1	1	2	4	3	4	4	4	3	2	2	1	2	2	2.1	7
9-Feb	3	3	5	5	4	3	Z	5	5	4	1	2	5	3	0	0	0	1	1	1	0	0	0	0	2.2	5
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	0.0	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	0.2	0
12-Feb	0	0	Z	1	1	1	1	2	2	2	1	C	C	C	C	C	2	2	2	2	1	0	0	0	1.1	2
13-Feb	0	4	2	Z	0	0	0	0	0	0	0	0	0	1	2	0	2	3	4	4	3	4	4	0	1.5	4
14-Feb	0	0	0	1	Z	1	1	0	0	0	1	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	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Feb	0	1	0	0	0	0	Z	0	0	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1.0	2
17-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	0.3	1
18-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.4	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	0	1	1	4	1	1	5	3	3	2	1	0	0	1	2	1	2	3	1	1.5	5
21-Feb	4	0	0	0	0	Z	1	3	2	1	0	0	3	4	1	1	1	0	1	0	3	2	1	1	1.3	4
22-Feb	1	1	1	1	0	0	Z	1	1	1	4	9	2	5	5	5	4	1	1	1	1	1	0	1	2.1	9
23-Feb	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
24-Feb	0	0	Z	0	0	1	1	0	0	0	2	4	4	5	2	6	7	2	0	0	0	0	0	0	1.6	7
25-Feb	0	0	3	Z	5	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0.7	5
26-Feb	7	3	0	0	2	Z	1	10	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	10
27-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0.4	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	0.1	0
29-Feb	0	Z	1	0	1	1	0	1	0	0	3	4	2	1	2	0	0	0	0	0	PF	PF	PF	PF	0.9	4
	1.1	0.8	0.8	0.7	0.8	0.6	0.8	1.3	1.2	0.8	0.7	1.2	1.2	1.3	1.2	0.9	1.0	1.0	0.8	0.7	0.7	0.7	0.6	0.5	Diurnal Average	
	7	4	5	5	5	3	3	10	5	4	4	9	5	5	5	5	6	7	4	4	3	4	4	2	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	589	90.06	90.06
3 - 4	46	7.03	97.09
5 - 7	17	2.60	99.69
8 - 11	2	0.31	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 654

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	86	165	31	9	9	7	15	62	51	26	16	15	11	9	10	14	536
3 - 4	1	0	1	0	0	4	5	14	4	5	2	1	1	0	0	0	38
5 - 7	0	0	0	0	1	0	0	8	1	0	0	1	1	0	0	0	12
8 - 11	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	87	165	32	9	10	11	20	85	56	31	18	18	13	9	10	14	588

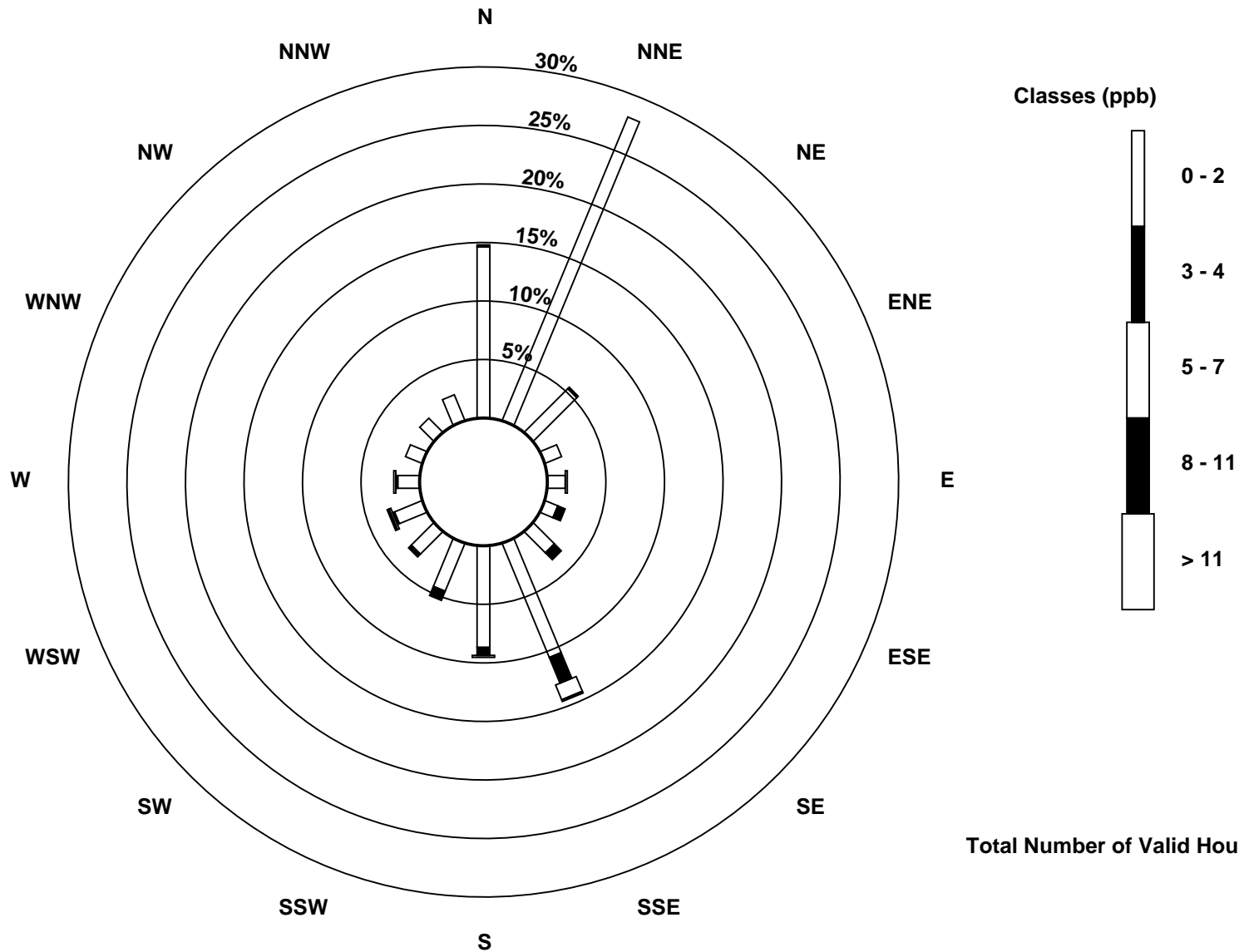
Total Number of Valid Hours: 588

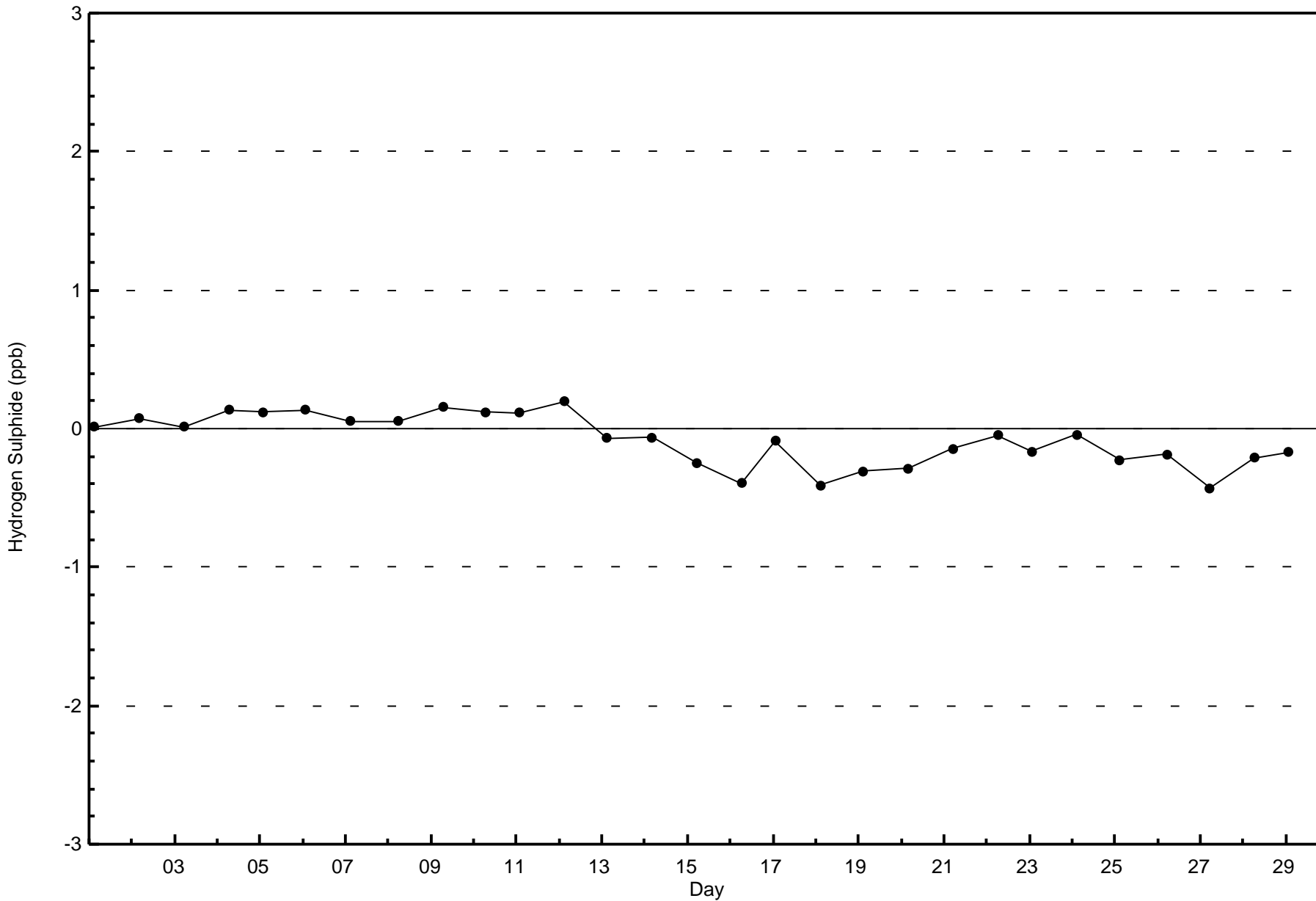
Total Number of Hours: 696

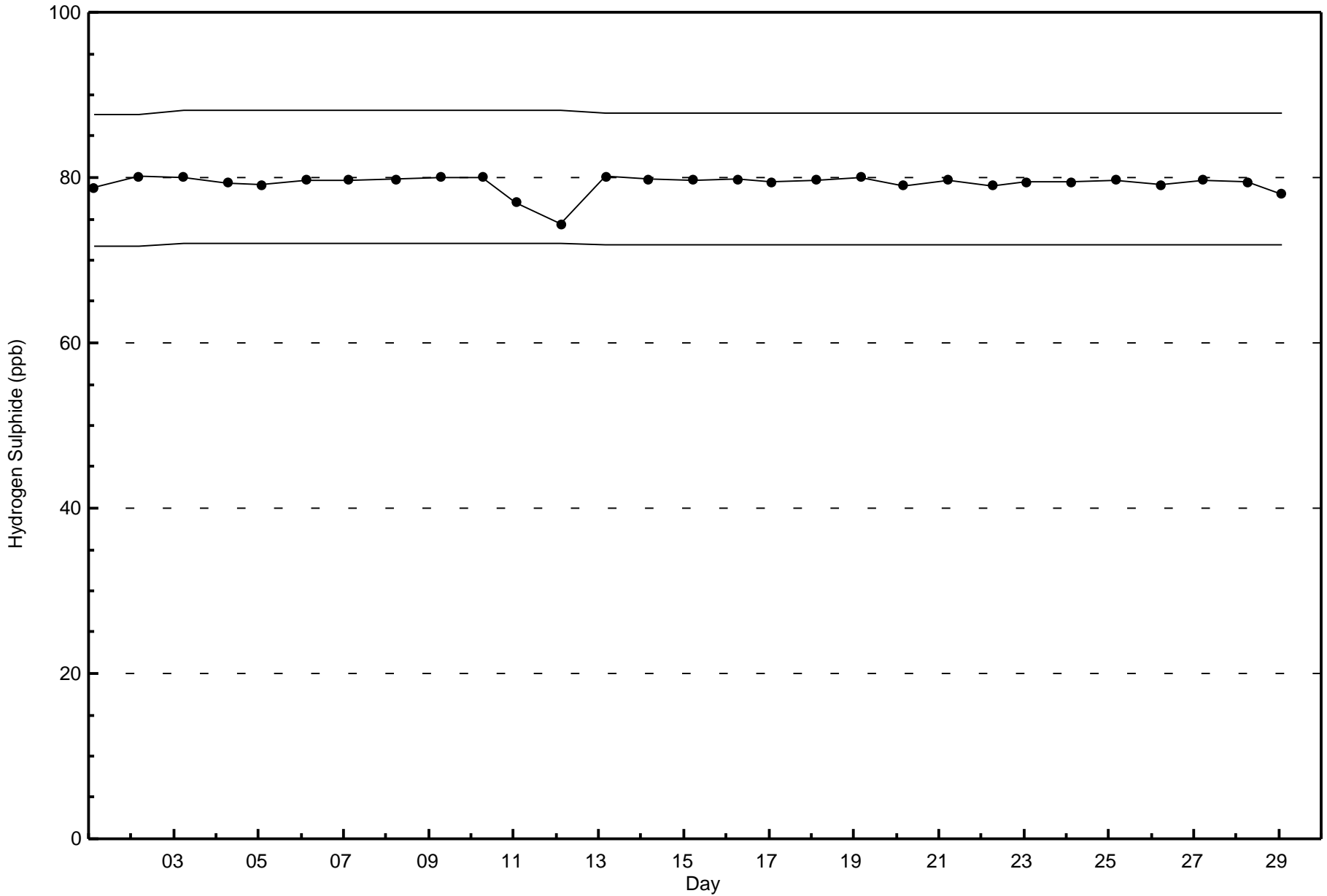


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





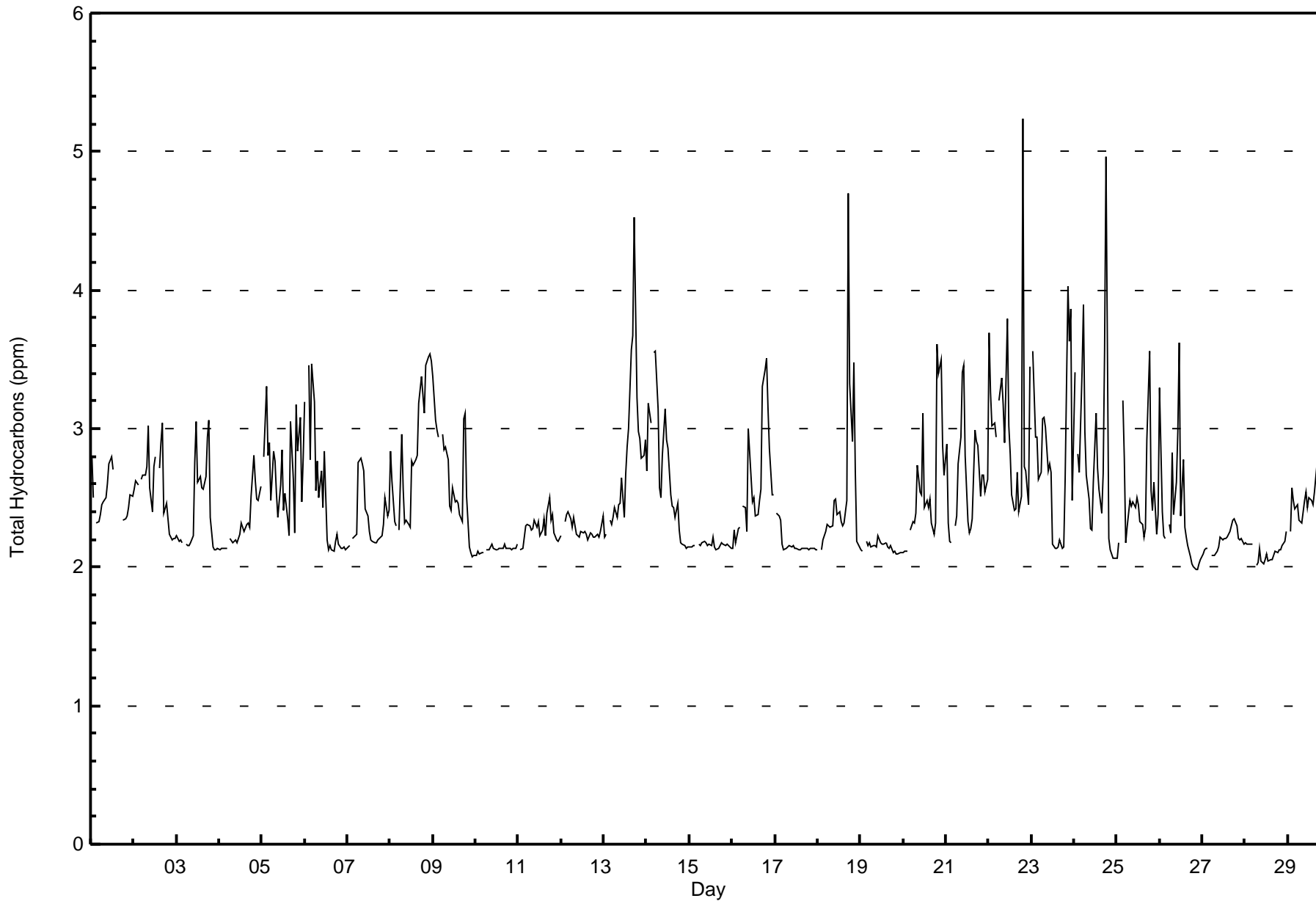




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Mildred Lake - February 2016

Maximum Value: 5.2 ppm on Feb 22 20:00 Maximum Daily Average: 3.0 ppm on Feb 22																				Hours in Service: 696 Hours of Data: 657 Hours of Missing Data: 39 Hours of Calibration: 34 Percent Operational Time: 99.3									
Minimum Value: 2.0 ppm on Feb 26 22:00 Minimum Daily Average: 2.1 ppm on Feb 28 Maximum Diurnal Average: 2.7 ppm at hour 18 Minimum Diurnal Average: 2.4 ppm at hour 15 Monthly Average: 2.48 ppm Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.7 P ₉₀ = 3.1 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	2.8	2.5	Z	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.7	2.8	2.7	C	C	C	C	C	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.8			
2-Feb	2.6	2.6	2.6	Z	2.6	2.7	2.7	2.7	3.0	2.6	2.4	2.7	2.8	M	2.7	2.9	3.0	2.4	2.5	2.4	2.2	2.2	2.2	2.2	2.6	3.0			
3-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.8	3.0	2.6	2.7	2.6	2.6	2.7	2.9	3.1	2.4	2.2	2.1	2.1	2.1	2.4	3.1			
4-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.8	2.6	2.5	2.5	2.6	2.3	2.8			
5-Feb	Z	2.8	3.3	2.8	2.9	2.5	2.8	2.8	2.5	2.4	2.6	2.8	2.4	2.5	2.3	2.2	3.1	2.6	2.3	3.2	2.8	3.1	2.5	2.8	2.7	3.3			
6-Feb	3.2	Z	3.5	2.8	3.5	3.2	2.6	2.8	2.5	2.7	2.4	2.8	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.5	3.5			
7-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.8	2.8	2.7	2.7	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.4	2.4	2.3	2.8			
8-Feb	2.8	2.6	2.3	2.3	Z	2.3	3.0	2.6	2.3	2.3	2.3	2.3	2.8	2.7	2.8	2.8	3.2	3.4	3.2	3.1	3.5	3.5	3.5	3.5	2.8	3.5			
9-Feb	3.4	3.1	3.0	2.9	Z	3.0	2.8	2.9	2.8	2.4	2.4	2.6	2.5	2.5	2.5	2.4	2.3	3.1	3.1	2.5	2.1	2.1	2.1	2.1	2.6	3.4			
10-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.2	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	2.2	2.1	2.2			
11-Feb	Z	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.4	2.5	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.5			
12-Feb	2.2	Z	2.3	2.4	2.4	2.3	2.3	2.4	2.2	2.2	2.2	2.3	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	2.4			
13-Feb	2.2	2.2	Z	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.6	2.4	2.7	2.9	3.0	3.6	3.7	4.5	3.2	3.0	2.9	2.8	2.8	2.9	2.8	4.5			
14-Feb	2.7	3.2	3.0	Z	3.5	3.6	3.1	2.6	2.5	2.8	3.1	2.9	2.9	2.5	2.4	2.4	2.4	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.7	3.6			
15-Feb	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2			
16-Feb	2.1	2.3	2.2	2.3	2.3	Z	2.4	2.4	2.3	3.0	2.8	2.5	2.5	2.4	2.4	2.5	2.6	3.3	3.4	3.5	3.1	2.9	2.5	2.5	2.6	3.5			
17-Feb	Z	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4			
18-Feb	2.1	Z	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.5	4.7	3.3	2.9	3.5	2.7	2.2	2.1	2.5	4.7			
19-Feb	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2			
20-Feb	2.1	2.1	2.1	Z	2.3	2.3	2.3	2.4	2.7	2.5	2.5	3.1	2.4	2.5	2.4	2.5	2.3	2.2	2.3	3.6	3.4	3.5	2.9	2.7	2.6	3.6			
21-Feb	2.9	2.3	2.2	2.2	Z	2.3	2.4	2.7	2.9	3.4	3.5	2.8	2.3	2.3	2.3	2.4	3.0	2.9	2.9	2.5	2.7	2.7	2.5	2.6	2.6	3.5			
22-Feb	3.7	3.3	3.0	3.0	2.9	Z	3.2	3.4	3.2	2.9	3.8	3.0	2.8	2.5	2.4	2.4	2.7	2.4	2.5	5.2	2.7	2.7	2.4	3.5	3.0	5.2			
23-Feb	Z	3.6	2.9	2.9	2.6	2.7	3.1	3.1	3.0	2.7	2.7	2.7	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.6	4.0	3.6	3.9	2.5	2.8	4.0			
24-Feb	3.4	Z	2.8	2.7	3.4	3.9	3.0	2.7	2.5	2.3	2.3	2.6	3.1	2.7	2.6	2.4	2.7	3.6	5.0	2.2	2.1	2.1	2.1	2.1	2.8	5.0			
25-Feb	2.1	2.2	Z	3.2	2.8	2.2	2.3	2.5	2.4	2.5	2.4	2.5	2.4	2.3	2.3	2.2	2.3	2.9	3.6	2.6	2.4	2.6	2.2	2.4	2.5	3.6			
26-Feb	3.3	2.4	2.2	2.2	Z	2.3	2.2	2.8	2.4	2.6	3.0	3.6	2.4	2.8	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.4	3.6			
27-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3			
28-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.3			
29-Feb	Z	2.3	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.8	3.0	2.7	2.5	PF	PF	PF	PF	2.5	3.0			
																								Diurnal Average					
																								Diurnal Maximum					
2.5 2.4 2.5 2.4 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.6 2.4 2.4 2.4 2.4 2.4 2.5 2.7 2.6 2.6 2.5 2.5 2.4 2.4 2.5 3.5																													
3.7 3.6 3.5 3.2 3.5 3.9 3.2 3.4 3.2 3.4 3.8 3.6 3.1 2.9 3.0 3.6 3.7 4.7 5.0 5.2 4.0 3.6 3.9 3.5 2.5 3.5																													
Z - zerspan			C - Calibration			M - Maintenance			PF - Power Failure																				





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mildred Lake - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	10	1.52	1.52
2.1 - 3.0	580	88.28	89.80
3.1 - 10.0	67	10.20	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 657

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Mildred Lake - February 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	10
2.1 - 3.0	74	154	29	9	11	11	18	79	47	27	18	16	9	7	4	12	525
3.1 - 10.0	11	2	0	0	0	0	3	11	8	5	1	1	4	3	5	3	57
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	86	163	31	9	11	11	21	90	55	32	19	17	13	10	9	15	592

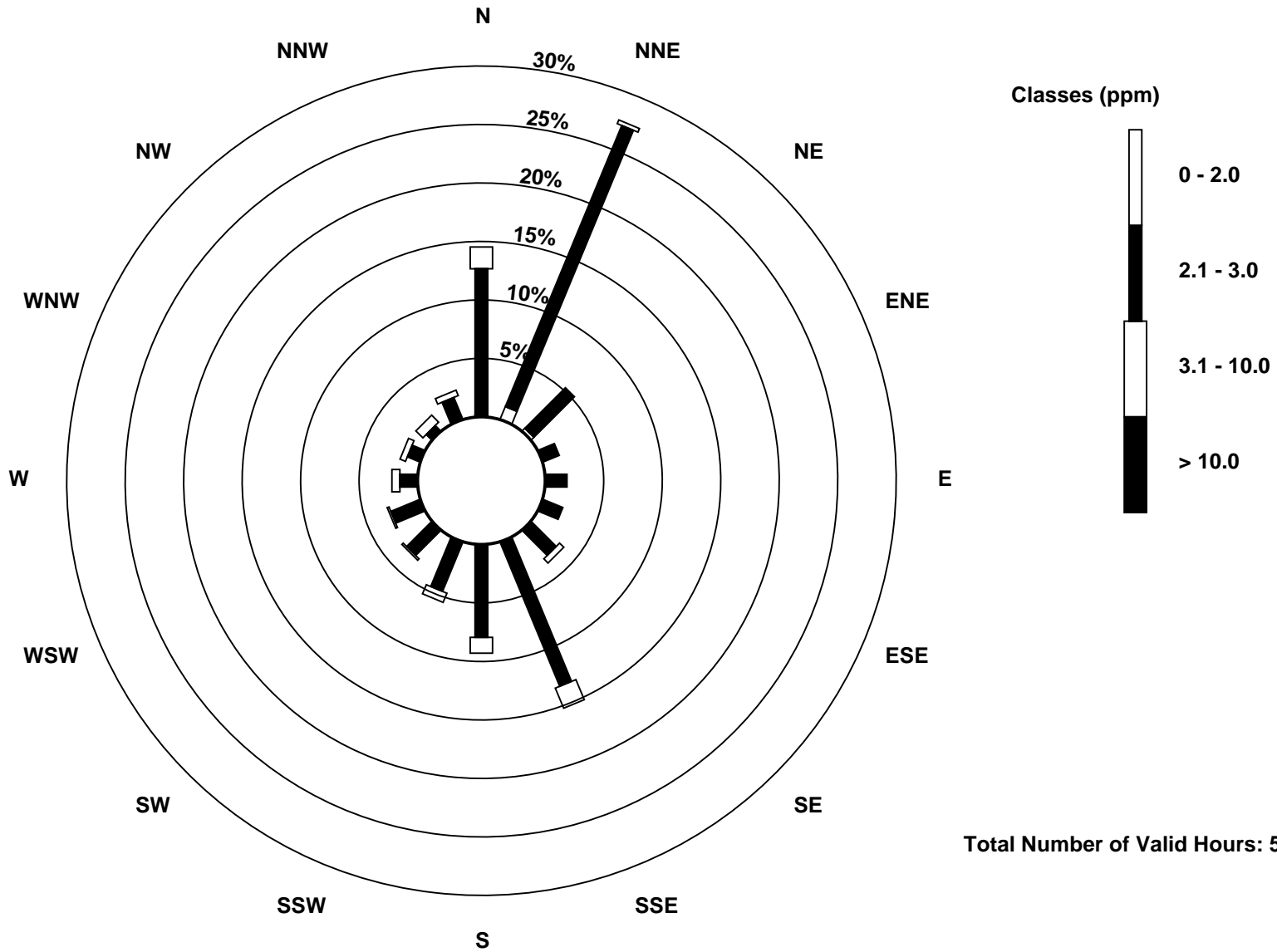
Total Number of Valid Hours: 592

Total Number of Hours: 696

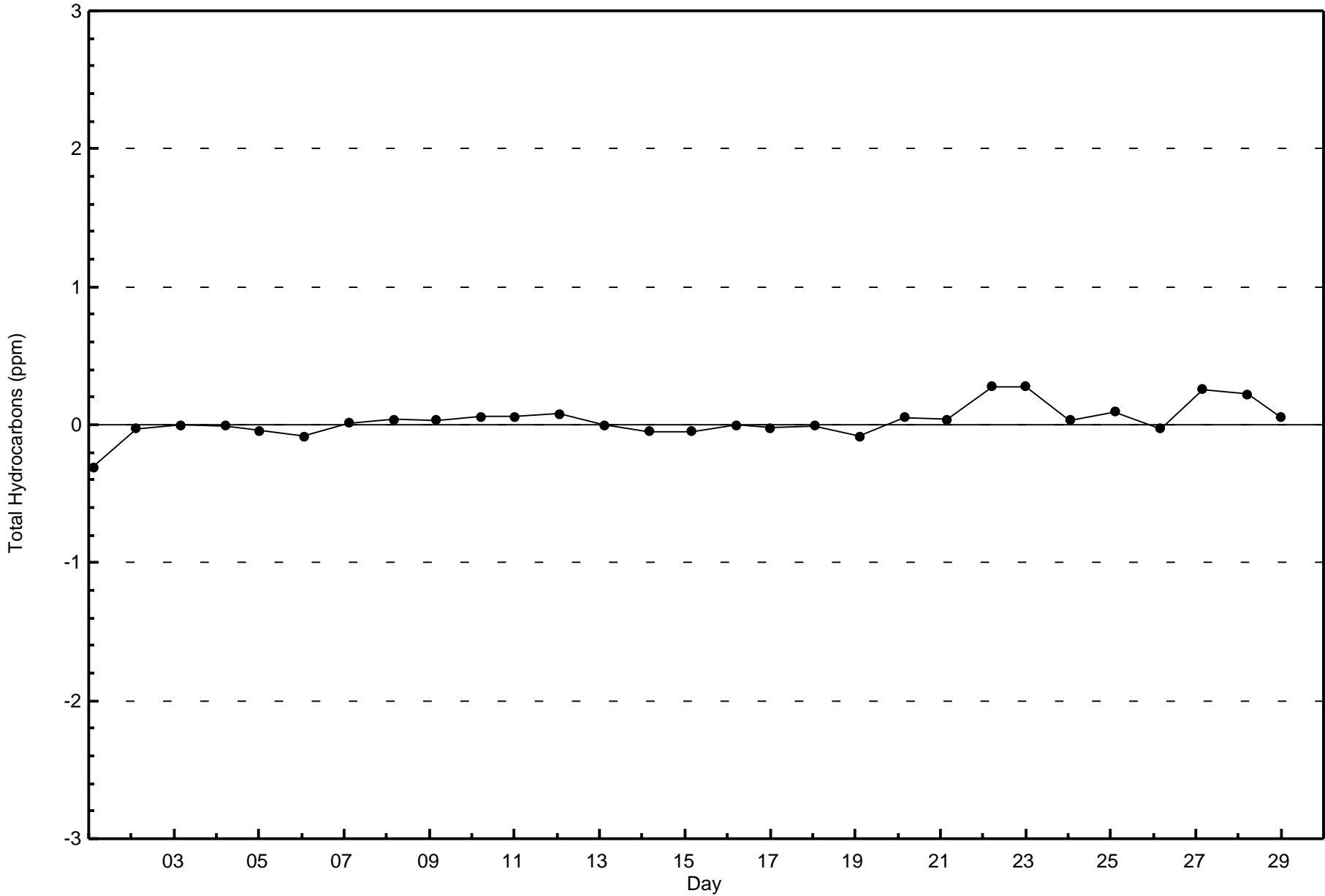


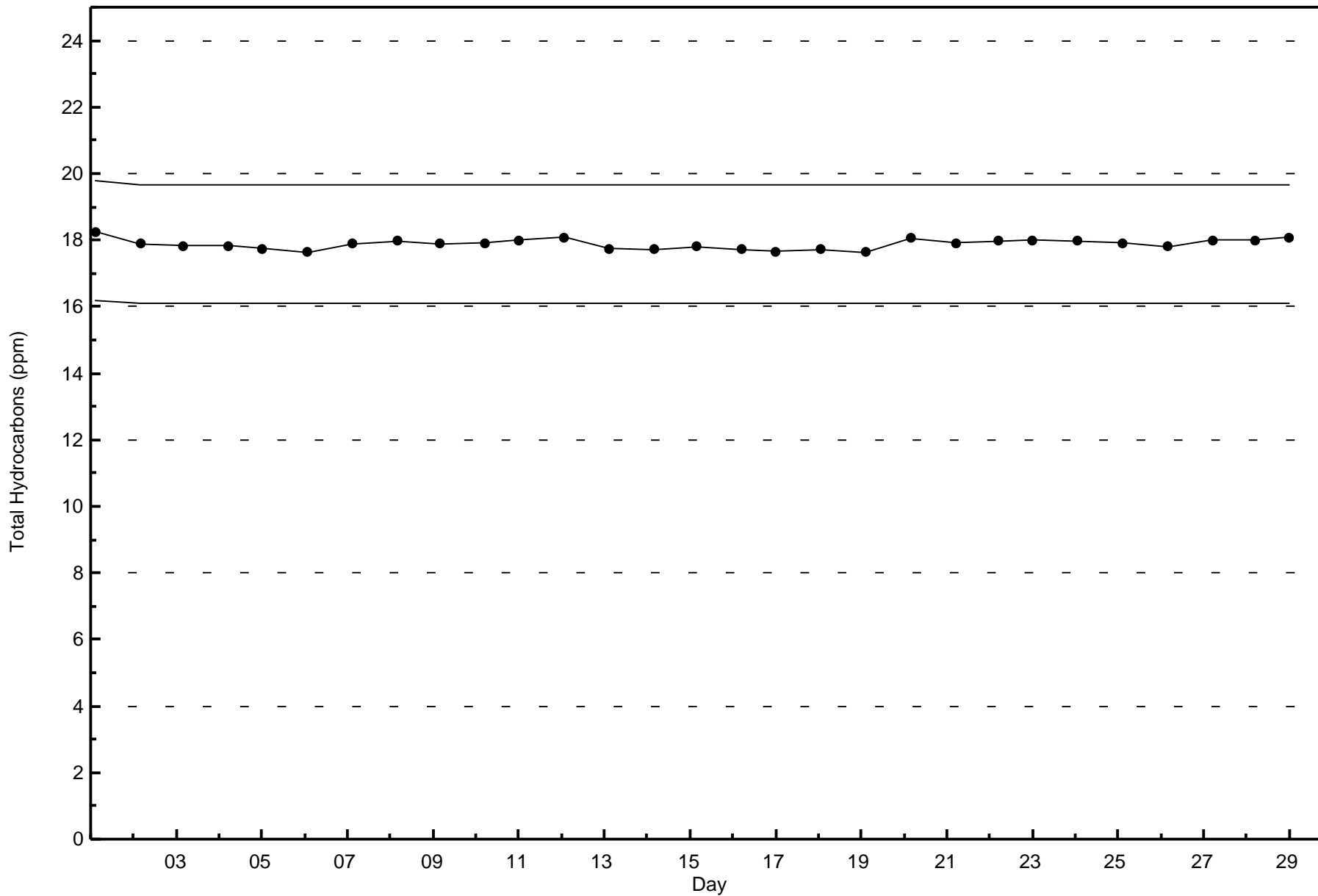
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 592







Wood Buffalo Environmental Association
Summary of Hour Averages

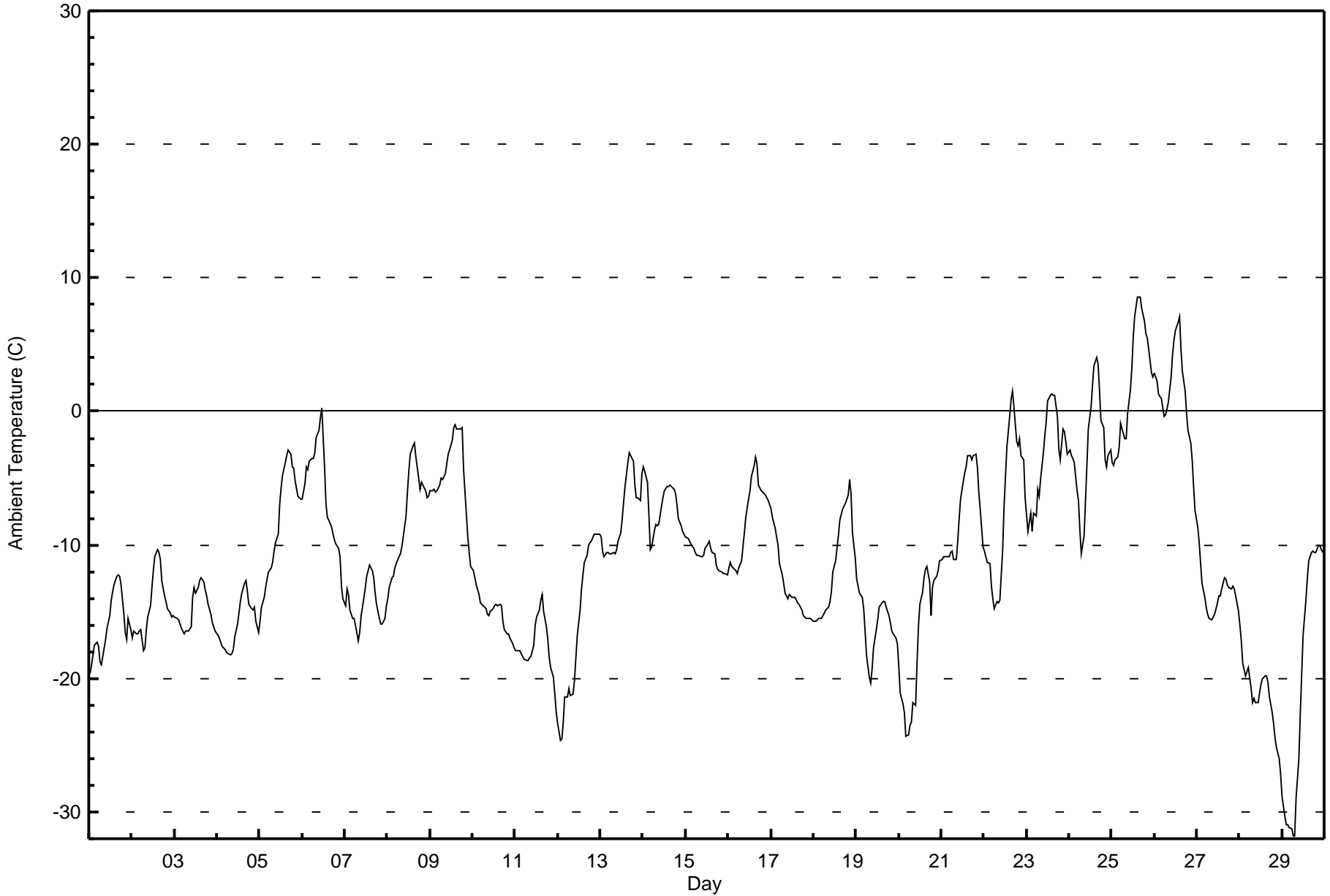
Ambient Temperature (AT) - C
Mildred Lake - February 2016

Maximum Value: 8.6 C on Feb 25 16:00 Maximum Daily Average: 2.3 C on Feb 25																						Hours in Service:	696			
Minimum Value: -31.8 C on Feb 29 07:00 Minimum Daily Average: -21.2 C on Feb 28																						Hours of Data:	696			
Maximum Diurnal Average: -7.4 C at hour 16 Minimum Diurnal Average: -13.8 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -10.87 C Percentiles: P ₁ = -29.0 P ₁₀ = -18.5 Q ₁ = -15.4 Median = -11.5 Q ₃ = -6.0 P ₉₀ = -2.0 P ₉₉ = 6.6																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-19.6	-19.0	-18.2	-17.5	-17.3	-17.6	-18.7	-19.0	-17.7	-17.1	-16.2	-15.3	-14.1	-13.5	-13.0	-12.4	-12.2	-12.4	-13.0	-15.2	-16.6	-17.1	-15.5	-16.3	-16.0	-12.2
2-Feb	-17.0	-16.5	-16.7	-16.7	-16.5	-16.3	-17.9	-17.7	-16.3	-15.4	-14.5	-13.2	-12.0	-10.9	-10.4	-10.6	-11.1	-12.6	-13.8	-14.2	-14.8	-15.1	-15.3	-15.3	-14.6	-10.4
3-Feb	-15.4	-15.5	-15.7	-15.9	-16.2	-16.6	-16.4	-16.4	-16.5	-16.1	-13.9	-13.2	-13.6	-13.2	-12.7	-12.5	-12.7	-13.4	-13.9	-14.4	-15.2	-15.8	-16.1	-16.5	-14.9	-12.5
4-Feb	-16.8	-17.0	-17.3	-17.6	-17.8	-18.1	-18.1	-18.2	-17.8	-16.8	-15.9	-15.1	-14.3	-13.6	-12.9	-12.7	-13.5	-14.5	-14.8	-14.8	-14.7	-15.8	-16.5	-16.5	-15.9	-12.7
5-Feb	-15.8	-14.6	-13.9	-13.2	-12.5	-12.0	-11.7	-11.3	-10.5	-9.8	-9.2	-7.0	-5.8	-4.7	-3.9	-3.3	-2.9	-3.2	-4.2	-4.3	-5.2	-6.3	-6.4	-6.5	-8.3	-2.9
6-Feb	-6.6	-5.4	-4.2	-4.4	-3.8	-3.5	-3.5	-3.1	-2.0	-1.4	-0.5	0.3	-4.3	-7.0	-8.0	-8.1	-8.7	-9.2	-9.6	-9.9	-10.3	-10.8	-13.1	-14.1	-6.3	0.3
7-Feb	-14.5	-13.3	-13.7	-14.9	-15.5	-15.5	-16.0	-17.2	-16.6	-15.2	-14.7	-13.2	-12.4	-11.9	-11.5	-11.9	-12.5	-13.6	-14.4	-15.5	-15.9	-15.9	-15.5	-14.6	-14.4	-11.5
8-Feb	-14.0	-13.2	-12.5	-12.4	-11.7	-11.4	-10.9	-10.7	-10.1	-9.4	-7.9	-6.1	-4.4	-3.2	-2.6	-2.4	-3.4	-5.0	-5.9	-5.3	-5.5	-6.0	-6.5	-6.4	-7.8	-2.4
9-Feb	-6.0	-5.9	-5.8	-6.1	-5.9	-5.5	-5.0	-5.1	-4.7	-4.0	-3.2	-2.8	-2.2	-1.2	-1.1	-1.3	-1.3	-1.4	-1.2	-4.4	-7.7	-9.4	-10.6	-11.6	-4.7	-1.1
10-Feb	-12.0	-12.5	-13.0	-13.7	-14.3	-14.5	-14.5	-14.8	-15.2	-15.3	-14.9	-14.8	-14.6	-14.5	-14.5	-14.5	-14.6	-15.8	-16.4	-16.6	-16.6	-17.0	-17.4	-17.7	-15.0	-12.0
11-Feb	-17.9	-17.9	-17.9	-18.2	-18.3	-18.6	-18.7	-18.7	-18.5	-18.3	-17.4	-16.0	-15.4	-14.8	-14.1	-13.7	-15.0	-16.2	-17.1	-18.5	-19.2	-20.0	-21.2	-22.6	-17.7	-13.7
12-Feb	-23.4	-24.6	-24.5	-23.3	-21.4	-21.4	-20.8	-21.3	-21.2	-20.1	-18.4	-16.8	-14.9	-13.2	-12.2	-11.3	-10.8	-10.1	-9.8	-9.7	-9.2	-9.2	-9.2	-9.2	-16.1	-9.2
13-Feb	-9.4	-10.5	-10.9	-10.6	-10.5	-10.6	-10.6	-10.6	-10.7	-10.3	-9.7	-9.0	-8.0	-6.8	-5.6	-3.9	-3.1	-3.3	-3.7	-5.5	-6.5	-6.5	-6.6	-4.7	-7.8	-3.1
14-Feb	-4.2	-4.4	-5.3	-7.8	-10.3	-10.1	-8.9	-8.5	-8.6	-8.5	-7.1	-6.5	-6.0	-5.7	-5.7	-5.5	-5.7	-5.9	-6.1	-7.0	-8.0	-8.5	-8.9	-9.2	-7.2	-4.2
15-Feb	-9.4	-9.5	-9.7	-9.9	-10.3	-10.5	-10.8	-10.8	-10.9	-10.9	-10.8	-10.2	-9.9	-9.7	-10.3	-10.5	-10.7	-11.5	-11.8	-11.9	-12.1	-12.1	-12.2	-12.3	-10.8	-9.4
16-Feb	-11.7	-11.3	-11.6	-11.8	-11.9	-12.1	-11.7	-11.2	-10.2	-9.1	-8.0	-6.6	-5.9	-4.9	-4.1	-3.4	-4.0	-5.5	-6.0	-6.0	-6.1	-6.3	-6.7	-7.0	-8.0	-3.4
17-Feb	-7.3	-7.9	-8.8	-9.4	-10.1	-11.4	-12.3	-12.9	-13.6	-14.0	-13.7	-13.8	-13.9	-13.9	-14.1	-14.3	-14.4	-14.9	-15.2	-15.4	-15.5	-15.6	-15.5	-15.6	-13.1	-7.3
18-Feb	-15.7	-15.7	-15.6	-15.5	-15.5	-15.3	-15.1	-14.9	-14.7	-14.3	-13.5	-12.1	-11.1	-10.2	-9.3	-8.2	-7.4	-7.1	-6.9	-6.3	-5.1	-6.1	-9.1	-11.0	-11.5	-5.1
19-Feb	-12.6	-13.1	-13.6	-13.9	-14.8	-16.4	-18.2	-19.9	-20.4	-19.3	-17.7	-16.4	-15.6	-14.6	-14.3	-14.3	-14.2	-14.7	-15.3	-15.8	-16.4	-16.7	-16.9	-17.4	-15.9	-12.6
20-Feb	-19.1	-21.1	-21.9	-22.5	-24.4	-24.2	-23.5	-23.3	-21.8	-22.0	-18.8	-16.1	-14.5	-13.5	-12.4	-11.8	-11.6	-12.8	-15.3	-13.2	-12.7	-12.3	-11.9	-11.2	-17.2	-11.2
21-Feb	-11.1	-10.9	-10.8	-10.8	-10.9	-10.6	-10.5	-11.1	-11.1	-9.7	-8.0	-6.5	-5.2	-4.6	-4.1	-3.3	-3.3	-3.7	-3.4	-3.2	-4.1	-6.0	-7.3	-10.1	-7.5	-3.2
22-Feb	-10.4	-10.9	-11.3	-11.4	-13.1	-14.0	-14.8	-14.3	-14.3	-14.1	-10.3	-7.1	-4.9	-2.7	-0.4	0.9	1.5	0.4	-2.3	-2.6	-2.0	-3.3	-3.7	-6.5	-7.1	1.5
23-Feb	-7.8	-9.0	-7.6	-9.0	-7.6	-7.8	-5.9	-6.4	-5.1	-3.1	-1.8	-0.8	0.8	1.3	1.3	1.2	1.2	-0.4	-2.8	-3.7	-1.3	-1.5	-2.3	-3.2	-3.4	1.3
24-Feb	-2.9	-3.3	-3.5	-3.8	-5.9	-6.7	-8.9	-10.6	-9.3	-6.7	-4.1	-1.3	0.4	2.0	3.4	4.0	3.5	1.5	-0.7	-1.2	-3.6	-4.2	-3.3	-2.9	-2.8	4.0
25-Feb	-3.9	-4.1	-3.6	-3.4	-2.7	-0.9	-1.3	-2.0	-2.0	-0.1	1.6	3.2	5.5	7.1	8.5	8.6	8.6	7.7	6.7	5.8	5.5	4.7	2.9	2.6	2.3	8.6
26-Feb	2.9	2.3	1.3	1.1	1.0	-0.3	-0.3	0.1	0.7	2.6	4.2	5.3	6.0	6.7	7.1	4.6	3.0	1.5	-0.1	-1.4	-2.4	-3.7	-5.7	-7.4	1.2	7.1
27-Feb	-8.7	-9.9	-11.4	-12.9	-13.9	-14.7	-15.2	-15.5	-15.6	-15.4	-15.2	-14.3	-13.8	-13.8	-13.2	-12.5	-12.6	-13.0	-13.2	-13.3	-13.1	-13.3	-13.8	-15.0	-13.5	-8.7
28-Feb	-16.1	-17.2	-18.8	-19.8	-19.5	-19.2	-20.8	-21.8	-21.5	-21.8	-21.9	-21.0	-20.4	-20.1	-19.8	-19.8	-20.3	-21.4	-22.5	-23.4	-24.5	-25.1	-26.0	-27.1	-21.2	-16.1
29-Feb	-28.9	-30.3	-31.0	-30.9	-31.1	-31.2	-31.8	-31.8	-28.9	-26.0	-22.7	-19.7	-16.8	-14.1	-12.6	-11.2	-10.6	-10.4	-10.6	-10.6	-10.0	-10.1	-10.3	-10.5	-20.1	-10.0
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Mildred Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Mildred Lake - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	49	7.04	7.04
-20 - 0	602	86.49	93.53
0 - 10	45	6.47	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

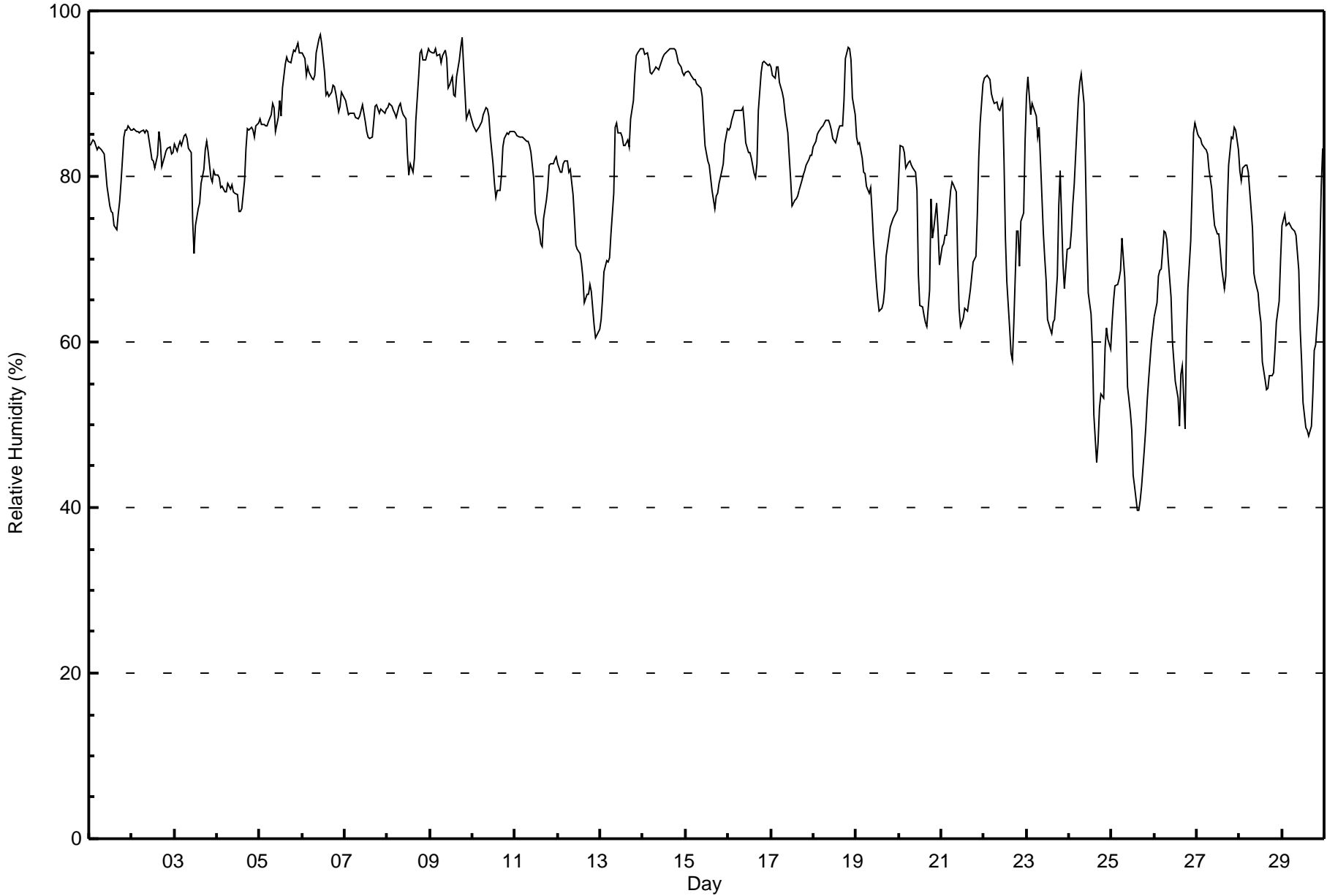


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Mildred Lake - February 2016**

Maximum Value: 97 % on Feb 6 11:00 Maximum Daily Average: 94.1 % on Feb 14																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 40 % on Feb 25 15:00 Minimum Daily Average: 55.4 % on Feb 25 Maximum Diurnal Average: 84.1 % at hour 7 Minimum Diurnal Average: 72.3 % at hour 15 Monthly Average: 79.7 % Percentiles: P ₁ = 47 P ₁₀ = 62 Q ₁ = 73 Median = 83 Q ₃ = 88 P ₉₀ = 93 P ₉₉ = 96																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	84	84	84	84	83	83	83	83	83	81	79	77	76	76	74	73	75	77	79	85	86	86	86	86	86	81.1	86
2-Feb	86	86	86	85	85	86	86	85	86	85	83	82	82	81	83	85	84	81	82	83	83	84	83	83	83	83.9	86
3-Feb	84	83	84	84	84	85	85	85	85	83	83	75	71	74	76	77	79	81	83	84	83	80	79	81	80	80.9	85
4-Feb	80	80	79	79	78	78	79	79	79	78	78	78	76	76	76	79	83	86	86	86	86	85	86	86	86	80.6	86
5-Feb	87	86	86	86	86	87	87	89	88	85	87	89	87	91	94	94	94	94	95	95	95	96	95	95	95	90.4	96
6-Feb	95	94	92	93	93	92	92	92	95	97	97	96	93	90	90	90	90	91	91	90	88	88	90	90	92.0	97	
7-Feb	89	88	87	88	88	88	87	87	87	88	89	87	85	85	85	85	87	89	89	88	88	88	88	88	87.3	89	
8-Feb	88	89	88	88	88	87	89	89	88	88	87	83	80	82	81	82	87	92	95	95	94	94	95	95	88.4	95	
9-Feb	95	95	95	95	95	95	94	95	95	94	91	91	92	90	90	92	94	96	97	93	87	87	88	87	92.6	97	
10-Feb	86	86	85	86	86	87	88	88	88	87	85	82	79	77	78	78	80	83	85	85	85	85	85	85	84.3	88	
11-Feb	85	85	85	85	85	85	84	84	84	83	80	76	75	73	72	71	75	77	79	81	82	81	82	82	80.4	85	
12-Feb	81	80	80	82	82	82	81	81	78	75	72	71	71	69	68	65	66	66	67	66	62	60	61	61	71.9	82	
13-Feb	63	65	68	70	70	70	73	78	86	86	85	85	85	84	84	84	87	89	92	95	95	95	95	95	82.1	95	
14-Feb	95	95	95	94	93	92	93	93	93	93	94	94	95	95	95	95	96	95	95	95	94	93	93	92	94.1	96	
15-Feb	93	93	92	92	92	92	91	91	91	90	87	84	82	81	80	78	76	78	78	79	81	81	84	86	85.4	93	
16-Feb	86	86	87	88	88	88	88	88	88	86	84	83	83	82	80	80	82	88	93	94	94	94	93	94	87.3	94	
17-Feb	93	92	92	93	93	91	90	89	88	85	82	80	76	77	77	78	78	79	80	81	81	82	83	83	84.4	93	
18-Feb	84	84	85	85	86	86	87	87	87	86	86	85	84	85	86	86	86	89	94	96	95	94	90	87	87.5	96	
19-Feb	85	84	84	82	80	80	79	78	79	76	72	67	65	64	64	65	66	70	73	74	74	75	76	76	74.5	85	
20-Feb	80	84	83	83	81	82	82	81	81	81	78	68	64	64	63	62	62	66	77	73	74	77	74	69	74.6	84	
21-Feb	72	72	73	73	76	78	79	79	78	70	64	62	63	64	64	64	66	68	70	70	75	82	86	91	72.5	91	
22-Feb	92	92	92	92	90	89	89	89	88	88	89	82	73	67	62	59	58	62	73	73	69	75	76	84	79.3	92	
23-Feb	90	92	87	89	88	87	85	86	82	73	70	67	63	62	61	62	63	68	76	81	69	66	69	71	75.3	92	
24-Feb	71	73	77	79	86	89	91	92	89	81	73	66	63	59	51	45	48	52	54	53	59	62	60	59	68.1	92	
25-Feb	62	65	67	67	68	69	73	68	62	55	51	49	44	42	40	40	41	43	47	50	53	55	60	61	55.4	73	
26-Feb	63	65	68	69	69	73	73	72	70	65	60	58	55	53	50	56	57	49	61	66	72	78	85	86	65.6	86	
27-Feb	85	85	85	84	83	83	83	81	78	76	74	73	73	71	69	66	68	76	81	85	85	86	86	83	79.1	86	
28-Feb	81	80	81	81	81	80	76	74	68	67	66	64	62	58	55	54	54	56	56	56	59	62	65	70	67.0	81	
29-Feb	74	75	74	74	74	74	74	73	73	69	61	58	53	50	49	49	50	54	59	60	64	71	79	83	65.6	83	
																								Diurnal Average			
																								Diurnal Maximum			





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mildred Lake - February 2016

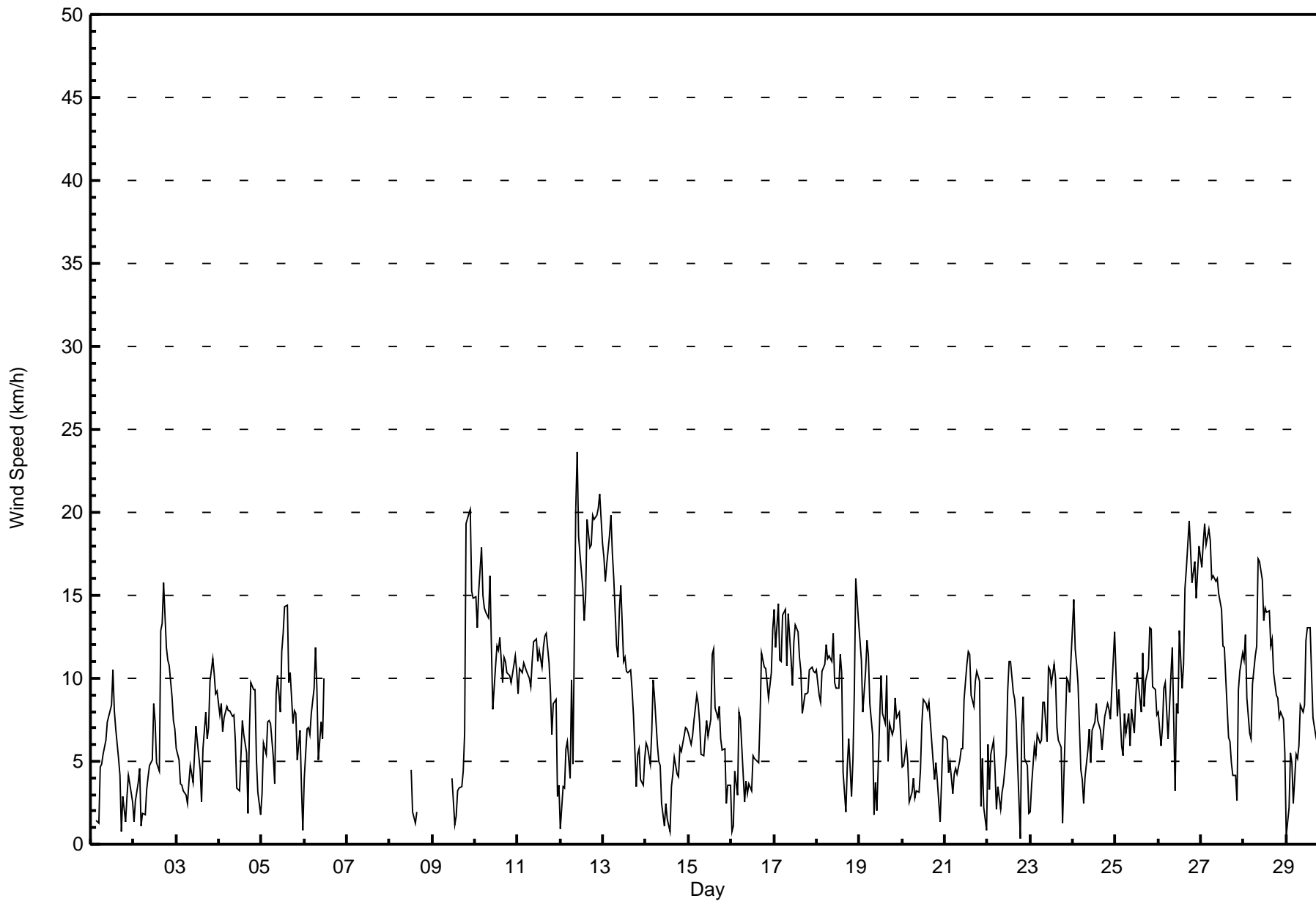
Maximum Speed: 24 km/h on Feb 12 10:00		Maximum Daily Speed Average: 13.8 km/h on Feb 12		Hours in Service:	696																						
Minimum Speed Value: 0 km/h on Feb 22 19:00		Minimum Daily Speed Average: 1.1 km/h on Feb 22		Hours of Data:	627																						
Maximum Diurnal Speed Average: 4.1 km/h at hour 22		Minimum Diurnal Speed Average: 0.7 km/h at hour 9		Hours of Missing Data:	69																						
Monthly Average Velocity: 2.2 km/h 39.5 deg		Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 20		Percent Operational Time:	90.1																						
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	AF	SW0	AF	E1	E1	S5	S5	S5	S6	S7	SSE8	SSE8	SSE10	S8	S7	SSE5	SE4	ENE1	SSE3	ENE1	SE3	E4	ENE4	NNE3	SSE3.7	SSE10	
2-Feb	SSE1	NNE3	NNE4	N5	ENE1	SE2	SSE2	SE3	SSW4	SSW5	S5	SSE8	S7	SSE5	NE4	N13	NNE13	NNE16	N12	NNE11	NNE11	N9	NNE7	N7	NNE3.3	NNE16	
3-Feb	NNE6	NNE5	NNE4	NE4	NE3	E3	E2	E4	ESE5	ESE4	S5	S7	SSE6	ESE4	E3	NNE6	NNE8	NNE6	NNE7	NNE10	NNE11	NE10	NNE9	NNE9	NE3.8	NNE11	
4-Feb	NNE8	N9	N7	N8	N8	NNE8	NNE8	NNE8	NNE8	NNE6	NNE3	ESE3	ESE3	S5	SSE7	SSE7	SE5	ENE2	NNE7	N10	N9	N9	N5	N3	WSW2	NNE4.3	NNE10
5-Feb	S3	SSE6	SSE5	S7	SSE7	SE7	SSE5	SE4	SSE9	S10	S8	SSE12	S13	SSE14	SSE14	S10	S10	S7	S8	S8	SSE5	SSW7	SSW4	S1	S7.4	SSE14	
6-Feb	S4	S7	SSE7	S7	SSE8	SSE9	SSE12	SSE9	SE5	S7	SSW6	NW10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	SSE12	
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	----	----	
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE4	S2	N1	SW2	AF	AF	AF	AF	AF	AF	AF	----	SE4	
9-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE4	E1	SSW2	WSW3	SSW3	SSE3	SE4	NNE7	N19	NNE20	NNE20	NNE15	NNE15	----	NNE20
10-Feb	NNE15	NNE13	NNE15	NE18	NNE15	NNE14	NNE14	NNE14	NNE16	NNE12	NNE8	NNE11	NE12	NE12	NE12	NNE10	NNE11	NNE11	NNE10	NNE10	NNE10	N10	N11	NNE10	NNE12.1	NE18	
11-Feb	NNE9	N11	N10	N11	N11	N10	N10	N10	N11	N12	N12	N11	N12	NNE11	N12	N13	N13	NNE11	NNE9	NNE7	NNE8	NNE9	N3	N4	N9.9	N13	
12-Feb	S1	E3	SE3	SE6	SE6	SE4	SSE10	SE5	SSE20	SSE24	SSE19	SSE17	SSE15	S14	SSE15	SSE20	SSE18	SSE18	SSE20	SSE20	SSE20	SSE20	SSE21	SSE18	SSE13.8	SSE24	
13-Feb	SSE17	SSE16	SSE17	SSE19	SSE20	SSE18	S16	S12	S11	SSE14	SSE16	S11	SSE11	SSE10	SSE10	SSE10	SSE9	SSE8	SE3	ESE5	ESE6	SSW4	SW4	WSW5	SSE10.9	SSE20	
14-Feb	WSW6	WSW6	SW5	N7	N10	N9	N6	N5	N5	NNW2	SSW1	W2	W2	NE1	ENE3	NE4	NNE5	NNE4	NNE4	NNE6	NNE6	NNE6	NNE7	NNE7	N3.5	N10	
15-Feb	NNE7	NNE6	NNE6	NNE7	NNE9	NNE9	NNE7	NNE5	NNE5	NNE6	NE7	NNE7	NNE8	N11	NNE12	NNE8	NNE8	NNE8	NNE6	NNE6	NNE6	NNE2	NE4	NNE4	NNE6.8	NNE12	
16-Feb	NNW1	SE1	NNE4	NNE3	N8	NNE8	NNE6	NE3	SSW4	SW3	SW4	SSW3	ESE5	ESE5	E5	E5	NNE8	N11	N11	N11	N10	N9	N10	N13	NNE4.1	N13	
17-Feb	N14	N12	N14	NNE11	NNE11	NNE14	NNE14	NNE11	NNE14	NNE11	NE10	NNE12	NNE13	NNE13	NE11	NNE10	NE8	NE9	NNE9	NNE9	NNE10	NNE11	NNE10	NNE10	NNE11.2	N14	
18-Feb	NNE10	NNE9	NNE9	N10	NNE11	N12	NNE11	NNE11	NNE11	N13	NNE10	N9	N9	N11	N10	NE4	SSW2	NW5	N6	NNW3	WNW5	N9	NNE16	NNE13	N8.7	NNE16	
19-Feb	NNE12	N11	N8	NNW10	N12	NNE11	NE9	NE7	ENE2	NNE4	ENE2	NNW8	N10	N8	NNE7	N10	NE5	NE7	NE7	NE7	NE9	NNE8	NNE8	NNE7	NNE7.3	NNE12	
20-Feb	N5	N5	N6	N5	N3	SSW3	SSW4	S3	SSW3	SSW3	SSW4	SSE7	SSE9	SSE9	SSE8	SSE9	SE7	SE5	SE4	S5	S4	N1	SSE4	SSE7	SSE2.9	SSE9	
21-Feb	S6	S6	S4	S5	S3	S4	S5	ESE4	SSE5	S6	S6	SSE9	SSE11	SSE12	SSE11	SSE9	SSE8	SSE10	SSE10	S10	E2	NE5	NE2	WNW1	SSE5.8	SSE12	
22-Feb	N6	NNW3	N5	N6	NNE4	N2	SSW3	SSW2	SSW3	SSW4	SSE5	SSE9	SSE11	SSE11	SSE9	SSE9	SE7	ESE5	E0	NNW7	N9	N5	NNW5	W2	SE1.1	SSE11	
23-Feb	S2	SW4	WSW6	WSW5	WSW7	WSW6	W6	W9	W9	W6	NNW11	NNW11	N10	NNE11	N10	N7	NNE6	NNE6	NW1	W4	WNW10	NW10	NW9	NNW11	NW4.9	NNW11	
24-Feb	NW15	NW12	WNW11	WNW10	N5	NW4	W2	S4	SSW6	SW7	SSW5	S7	SSE7	SSE8	SSE7	S7	SSE6	SSE7	S8	SSW8	SW8	SSW8	SSW9	SSW13	SSW4.0	NW15	
25-Feb	S10	SSE8	SSE9	SE6	S5	SSW8	SSW7	SW8	SW6	SW8	SW7	SSW9	SW10	SW10	W8	WNW12	WNW8	NW10	WNW11	WNW13	WNW13	W10	WSW9	WSW8	WSW5.8	WNW13	
26-Feb	W8	WSW6	SW7	WSW9	WSW10	WSW6	WSW8	WSW10	WSW12	W3	NW8	NW8	NNW13	NNW9	NNE11	NE15	NE17	NNE19	NE18	NE16	NE17	NE15	NNE16	NNE18	N5.7	NNE19	
27-Feb	NNE17	NNE18	NNE19	NNE18	NNE19	NNE18	NNE16	NNE16	NNE16	NNE16	NNE15	NNE14	NNE12	N12	N10	N6	NNW6	N5	NE4	ENE4	ENE3	NNE9	NNE10	NNE12	NNE12.1	NNE19	
28-Feb	NNE11	NNE13	NNE9	NNE7	N6	NNE10	NNE11	N12	NNE17	NNE17	NNE16	N13	NNE14	NE14	NNE14	NNE12	N12	NNE10	NNE9	NNE9	NNE8	NNE8	NNE8	NNE6	NNE11.0	NNE17	
29-Feb	WSW1	S2	SW6	S5	S2	SW5	SSW5	SW6	SSW8	S8	S8	SSE12	SSE13	SSE13	SSE10	SSE8	SSE7	S6	S5	S6	SSE8	SSE10	SSE10	SSE10	S6.8	SSE13	
NNE3.2 NNE2.7 NNE2.7 NNE2.8 NNE3.2 NNE2.5 NE1.6 NE1.6 ENE0.7 ESE0.8 ESE0.8 ESE1.1 ESE1.8 ESE2.5 E2.4 ENE2.3 ENE2.9 NE3.7 NE3.2 NNE3.6 NNE4.1 NNE4.1 NNE3.7 NNE3.5																								Diurnal Average			
SSE17 NNE18 NNE19 SSE19 SSE20 NNE18 NNE16 NNE16 SSE20 SSE24 SSE19 SSE17 SSE15 SSE14 SSE15 SSE20 SSE18 NNE19 SSE20 SSE20 NNE20 SSE20 SSE21 SSE18																								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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 6 12:00 Minimum Value: 1 km/h on Feb 20 06:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 696 Hours of Data: 627 Hours of Missing Data: 69 Hours of Calibration: 0 Percent Operational Time: 90.1									
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	AF	1	AF	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	
2-Feb	1	1	1	1	2	2	1	2	2	2	1	2	2	2	3	2	3	3	3	3	3	2	2	2	3	
3-Feb	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	2	2	2	1	3	3	3	2	2	3	
4-Feb	2	2	2	2	1	1	2	2	2	1	2	2	1	2	2	1	1	2	1	2	2	1	1	2	2	
5-Feb	1	2	1	2	2	2	2	2	2	5	4	1	3	3	3	4	2	2	1	2	2	2	3	1	5	
6-Feb	2	2	2	2	2	3	3	3	1	2	3	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	7	
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	--	
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	1	2	1	AF	AF	AF	AF	AF	AF	AF	2	
9-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	1	1	1	1	1	7	6	5	5	5	4	7	
10-Feb	4	4	4	5	5	5	4	4	5	3	3	3	3	3	4	2	2	3	2	2	2	2	2	2	5	
11-Feb	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	2	
12-Feb	1	1	1	2	1	2	3	3	5	5	3	3	3	4	4	4	4	4	4	4	4	3	4	3	5	
13-Feb	3	3	3	3	3	3	3	3	2	3	2	3	2	2	2	2	2	2	1	1	1	1	1	1	3	
14-Feb	1	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
15-Feb	2	1	1	1	2	2	1	1	1	2	2	2	2	3	3	2	2	2	1	1	2	1	1	1	3	
16-Feb	1	1	1	2	2	2	1	1	2	2	1	1	2	1	2	1	4	2	2	1	2	2	2	3	4	
17-Feb	2	3	3	3	3	4	4	4	4	3	3	3	3	3	3	3	2	3	2	2	3	2	3	3	4	
18-Feb	2	2	2	2	2	2	3	2	3	2	2	2	2	2	1	1	2	2	1	2	5	4	4	5		
19-Feb	4	2	2	4	3	3	2	2	1	1	2	3	2	3	3	3	2	2	3	2	2	2	2	2	4	
20-Feb	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	
21-Feb	1	2	2	1	1	1	1	1	2	1	1	1	2	2	2	2	1	2	2	2	2	1	1	1	2	
22-Feb	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1	3	3	2	1	1	3	
23-Feb	2	1	1	2	1	1	1	2	2	3	2	2	2	3	3	2	2	1	1	2	2	2	2	2	3	
24-Feb	4	3	3	3	1	3	2	1	2	2	1	1	1	1	1	1	1	1	1	2	2	1	2	2	4	
25-Feb	2	2	2	1	2	2	2	2	2	2	3	2	4	3	3	3	2	2	3	3	4	4	3	3	4	
26-Feb	2	2	3	4	3	2	3	3	4	2	3	3	2	2	3	4	4	5	5	5	6	4	4	4	6	
27-Feb	4	4	5	4	4	4	4	4	3	4	4	4	3	2	2	2	1	1	2	1	1	3	2	3	5	
28-Feb	3	4	3	2	1	3	3	4	5	5	4	3	4	4	3	3	3	2	2	2	2	2	2	1	5	
29-Feb	1	1	1	1	2	1	2	1	2	1	2	2	2	3	2	1	1	1	1	1	2	1	2	1	3	
																	Diurnal Maximum									
																	4 4 5 5 5 5 4 4 5 5 4 7 4 4 4 4 4 5 7 6 6 5 5 4									
AF - Analyzer Failure																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Mildred Lake - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	184	29.35	29.35
6 - 11	320	51.04	80.38
12 - 19	112	17.86	98.25
20 - 28	11	1.75	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 627

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Mildred Lake - February 2016**

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	18	12	10	12	10	16	13	26	21	8	5	6	2	2	6	184
6 - 11	54	102	12	0	0	1	6	53	32	10	11	13	7	5	6	8	320
12 - 19	20	50	8	0	0	0	0	23	3	1	0	1	0	3	2	1	112
20 - 28	0	2	0	0	0	0	0	9	0	0	0	0	0	0	0	0	11
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	91	172	32	10	12	11	22	98	61	32	19	19	13	10	10	15	627

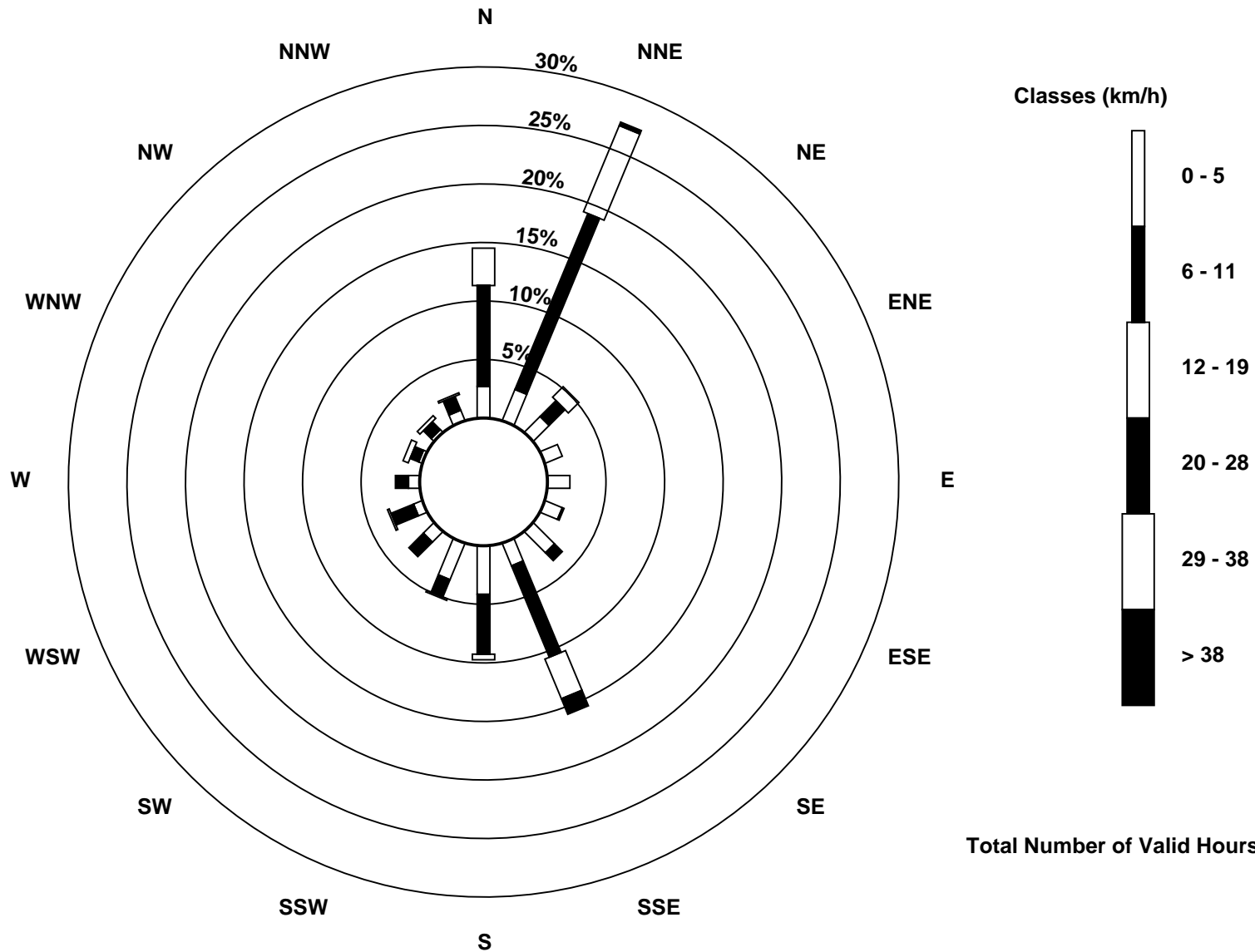
Total Number of Valid Hours: 627

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Mildred Lake - February 2016

Direction of Maximum Speed: 162 deg on Feb 12 10:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 159.4 deg on Feb 12	Hours of Data: 627
Direction of Minimum Speed: 89 deg on Feb 22 19:00	Hours of Missing Data: 69
Direction of Minimum Daily Speed Average: 1.1 deg on Feb 22	Percent Operational Time: 90.1
Monthly Average Direction: 202.4 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	AF	229	AF	95	92	171	181	186	191	175	161	168	167	178	174	156	144	75	167	68	141	85	66	14	161.2	
2-Feb	151	12	31	11	72	138	159	140	198	210	190	158	170	161	41	6	13	15	7	22	13	7	13	9	25.4	
3-Feb	22	29	16	42	35	90	91	87	122	116	178	180	156	115	94	25	14	14	18	18	28	35	17	19	44.2	
4-Feb	21	7	10	5	4	12	24	20	23	23	16	112	179	159	160	138	68	12	4	6	5	4	349	244	20.5	
5-Feb	185	162	159	186	149	137	156	134	158	182	190	168	179	167	165	187	169	184	180	175	147	197	199	183	170.9	
6-Feb	179	176	168	178	167	162	158	160	136	181	213	323	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	--	
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	137	173	1	225	AF	AF	AF	AF	AF	AF	AF	--	
9-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	149	84	196	245	202	149	137	14	10	15	19	24	20	--
10-Feb	20	30	29	37	32	30	27	30	31	29	26	15	39	46	39	26	12	13	21	19	18	10	8	16	26.0	
11-Feb	15	9	8	11	10	5	5	5	4	6	6	10	7	13	360	6	8	13	18	13	20	15	350	359	8.6	
12-Feb	182	92	138	142	136	128	168	142	160	162	165	166	166	172	160	157	154	154	155	153	163	164	167	167	159.4	
13-Feb	162	160	162	167	167	168	169	173	172	166	166	176	167	163	161	164	158	152	126	107	118	193	216	242	165.1	
14-Feb	257	256	236	7	4	7	6	0	358	348	194	279	267	55	60	45	25	29	28	32	26	28	14	14	5.2	
15-Feb	20	14	20	17	14	14	15	26	24	27	38	28	25	9	13	25	20	19	28	33	32	20	44	27	21.5	
16-Feb	338	145	15	31	5	15	21	41	210	222	219	193	107	119	101	97	14	6	9	7	4	7	4	6	18.6	
17-Feb	10	9	9	16	17	22	20	26	19	32	38	29	18	27	42	19	40	37	30	28	25	31	32	27	24.2	
18-Feb	24	24	19	6	13	11	18	15	13	6	13	2	357	359	5	43	210	326	351	334	302	2	16	31	9.3	
19-Feb	27	9	9	340	4	19	44	44	70	27	71	348	355	8	21	9	52	46	47	40	40	27	32	22	21.0	
20-Feb	3	357	358	350	3	197	199	176	198	201	193	156	154	155	155	157	145	128	142	184	183	3	153	160	158.5	
21-Feb	171	182	189	184	174	182	178	119	164	174	178	164	153	152	166	166	161	162	163	171	101	40	51	284	162.9	
22-Feb	9	337	4	357	21	353	213	207	201	197	164	158	162	150	152	158	127	104	89	339	353	353	337	276	125.3	
23-Feb	183	236	251	251	254	242	261	259	264	262	345	337	356	24	360	352	13	33	305	275	302	310	313	339	312.8	
24-Feb	317	313	299	297	354	312	266	178	207	216	205	175	154	155	166	169	155	165	179	194	214	203	193	193	212.0	
25-Feb	178	155	148	132	173	212	192	221	220	220	219	203	235	235	270	290	289	313	298	299	293	266	248	256	241.7	
26-Feb	259	238	230	243	252	244	251	254	240	264	313	317	328	341	20	43	40	29	34	34	38	34	24	20	355.9	
27-Feb	21	21	21	21	18	23	22	18	17	13	18	12	13	10	2	9	344	355	56	67	70	16	25	27	18.3	
28-Feb	17	31	27	23	8	16	18	10	12	19	19	4	13	34	18	20	8	17	24	31	23	17	14	15	18.1	
29-Feb	245	174	215	186	189	224	207	214	204	188	171	155	157	160	150	159	158	174	190	174	166	166	164	166	173.6	
	14.6	20.7	18.3	16.6	23.0	29.2	45.8	38.3	72.5	113.8	114.9	119.3	112.5	102.5	79.0	68.9	57.9	41.0	37.6	29.6	22.8	20.2	21.0	18.9		
	Diurnal Average																									

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



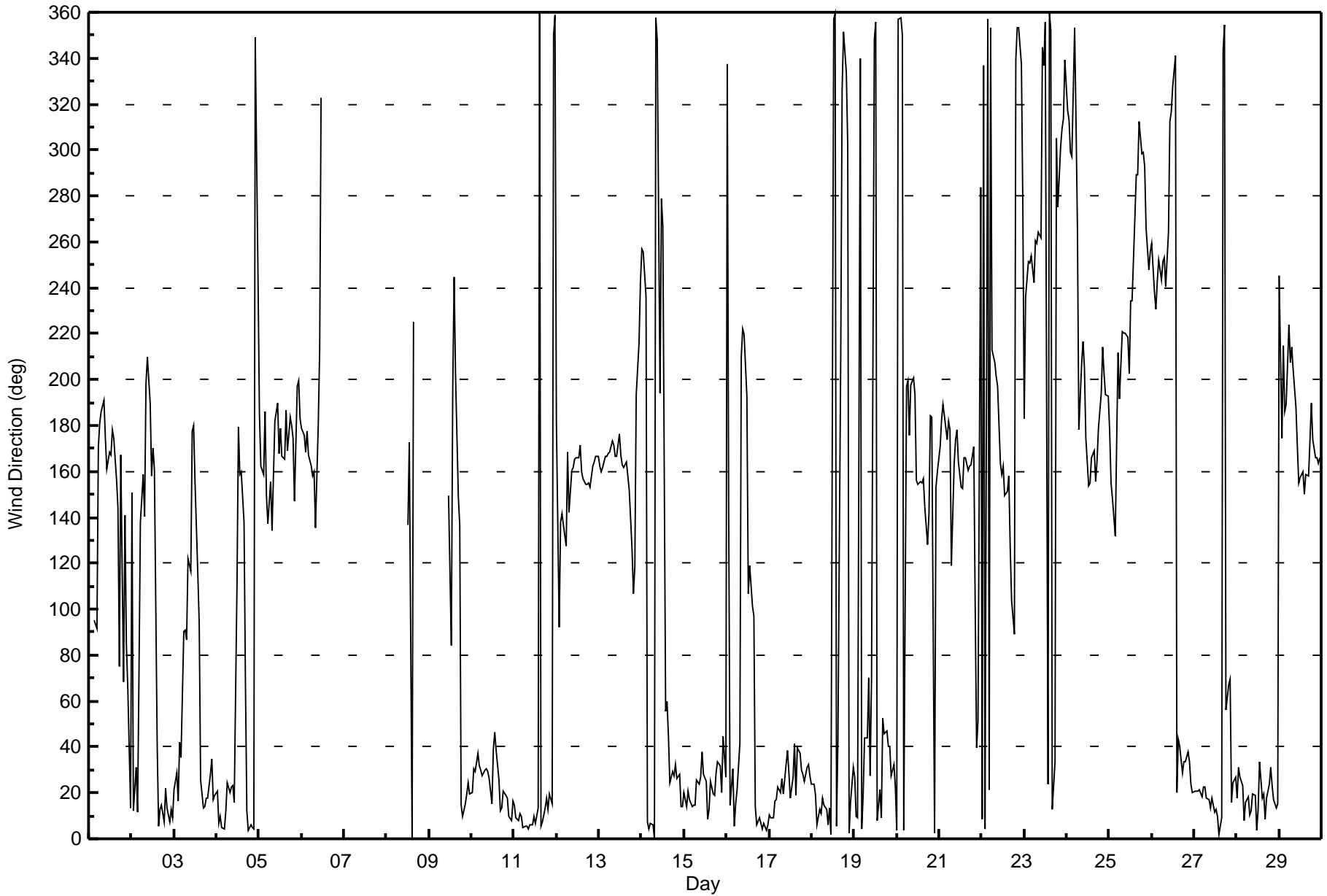
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Mildred Lake - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 696
Maximum Value: 102 deg on Feb 22 19:00	Hours of Data: 627
Minimum Value: 8 deg on Feb 29 08:00	Hours of Missing Data: 69
Percentiles: P ₁ = 10 P ₁₀ = 12 Q ₁ = 14 Median = 17 Q ₃ = 23 P ₉₀ = 40 P ₉₉ = 84	Hours of Calibration: 0
	Percent Operational Time: 90.1

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	AF	71	AF	22	72	14	14	17	17	19	16	16	13	17	19	26	21	71	45	42	26	21	21	31	72	
2-Feb	83	35	26	21	70	76	71	40	35	29	25	17	18	20	51	12	14	14	16	20	15	15	15	14	83	
3-Feb	17	17	22	42	49	30	27	17	23	24	31	24	26	23	53	19	17	17	17	15	17	17	18	15	53	
4-Feb	18	13	15	16	14	13	17	15	15	17	25	49	28	22	19	25	65	14	10	9	10	18	23	60	65	
5-Feb	34	13	21	18	21	22	25	21	18	22	15	17	17	12	18	17	12	14	16	28	38	26	87	84	87	
6-Feb	38	17	23	20	17	19	16	17	29	23	26	51	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	51	
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	--	
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	30	48	86	40	AF	AF	AF	AF	AF	AF	AF	86	
9-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	70	88	33	26	33	25	74	17	16	16	17	16	88
10-Feb	17	16	16	17	19	16	18	19	19	20	28	16	22	20	18	19	14	13	14	14	14	12	10	12	28	
11-Feb	11	10	10	11	11	12	10	12	10	10	10	15	14	17	14	15	13	13	15	21	12	10	53	40	53	
12-Feb	60	24	29	24	15	53	24	36	14	12	12	12	13	14	16	14	14	14	14	14	11	11	11	10	60	
13-Feb	12	12	11	11	10	11	11	14	13	12	10	16	12	17	16	12	13	13	29	15	10	23	26	19	29	
14-Feb	14	20	40	20	10	11	10	10	13	63	68	42	54	75	26	19	18	20	19	18	16	16	14	15	75	
15-Feb	14	14	15	15	13	13	13	18	18	21	20	23	21	17	18	20	16	16	16	19	19	72	27	22	72	
16-Feb	80	72	15	37	14	13	16	57	31	42	26	43	35	30	22	28	25	10	13	12	12	13	13	12	80	
17-Feb	13	14	13	16	19	18	17	17	16	17	19	20	18	19	23	17	18	18	17	16	16	16	17	16	23	
18-Feb	16	15	14	11	12	11	15	16	14	12	14	13	12	11	13	29	63	34	14	44	26	13	15	18	63	
19-Feb	16	14	15	14	19	16	18	13	67	38	61	25	20	25	30	20	39	17	25	17	16	16	16	15	67	
20-Feb	19	9	11	11	75	9	9	27	41	29	24	16	16	15	15	14	18	11	17	11	11	66	39	15	75	
21-Feb	19	15	22	16	19	19	20	12	17	14	19	16	16	16	13	13	12	11	11	12	68	14	51	84	84	
22-Feb	11	41	14	10	15	59	14	22	24	22	21	16	14	16	17	15	20	34	102	36	24	34	41	56	102	
23-Feb	70	43	14	23	20	21	18	13	15	31	12	10	19	21	23	17	16	13	71	26	12	13	13	11	71	
24-Feb	15	14	15	15	31	59	80	28	15	17	26	14	14	15	10	10	16	13	12	15	12	14	11	11	80	
25-Feb	17	17	14	18	38	25	14	16	21	20	34	14	24	26	28	18	24	13	18	17	19	27	25	27	38	
26-Feb	21	41	26	24	22	20	21	19	27	64	24	29	13	20	23	15	17	16	17	19	18	19	17	15	64	
27-Feb	16	16	15	16	15	14	15	15	15	14	16	17	20	15	13	22	14	24	37	40	60	13	16	18	60	
28-Feb	21	17	16	18	17	16	15	14	16	19	18	19	24	23	19	23	15	14	16	15	15	14	12	18	24	
29-Feb	77	43	15	13	30	12	12	8	12	16	20	15	14	16	16	15	14	13	15	18	11	11	12	10	77	
	83	72	40	42	75	76	80	57	67	64	68	51	70	88	86	40	65	71	102	44	68	72	87	84		
	Diurnal Maximum																									

AF - Analyzer Failure





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 1, 2016	Last Calibration	December 3, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	13:45	End Time (MST)	18:00
Gas Cert Reference	SA1301009	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	792	799
Calculated slope	0.998497	0.999629	Chamber temp	45.0	45.2
Calculated intercept	0.410876	1.429048	Pressure	682.5	699.1
Analyzer Background	21.5	20.8	Flow	0.482	0.496
Analyzer Coefficient	0.980	0.941	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # JC1404901075

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	82.7	780.7	801.2	0.974
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	82.7	780.7	780.3	1.001
second point	5000	41.5	391.8	389.7	1.005
third point	5000	20.8	196.4	193.7	1.014
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	82.7	780.7	783.3	0.997
Average Correction Factor					1.007

Corrected As found 801.2 Previous response 781.5 % change -2.5%

Notes:

MFC done prior to calibration. Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

Evan Magill



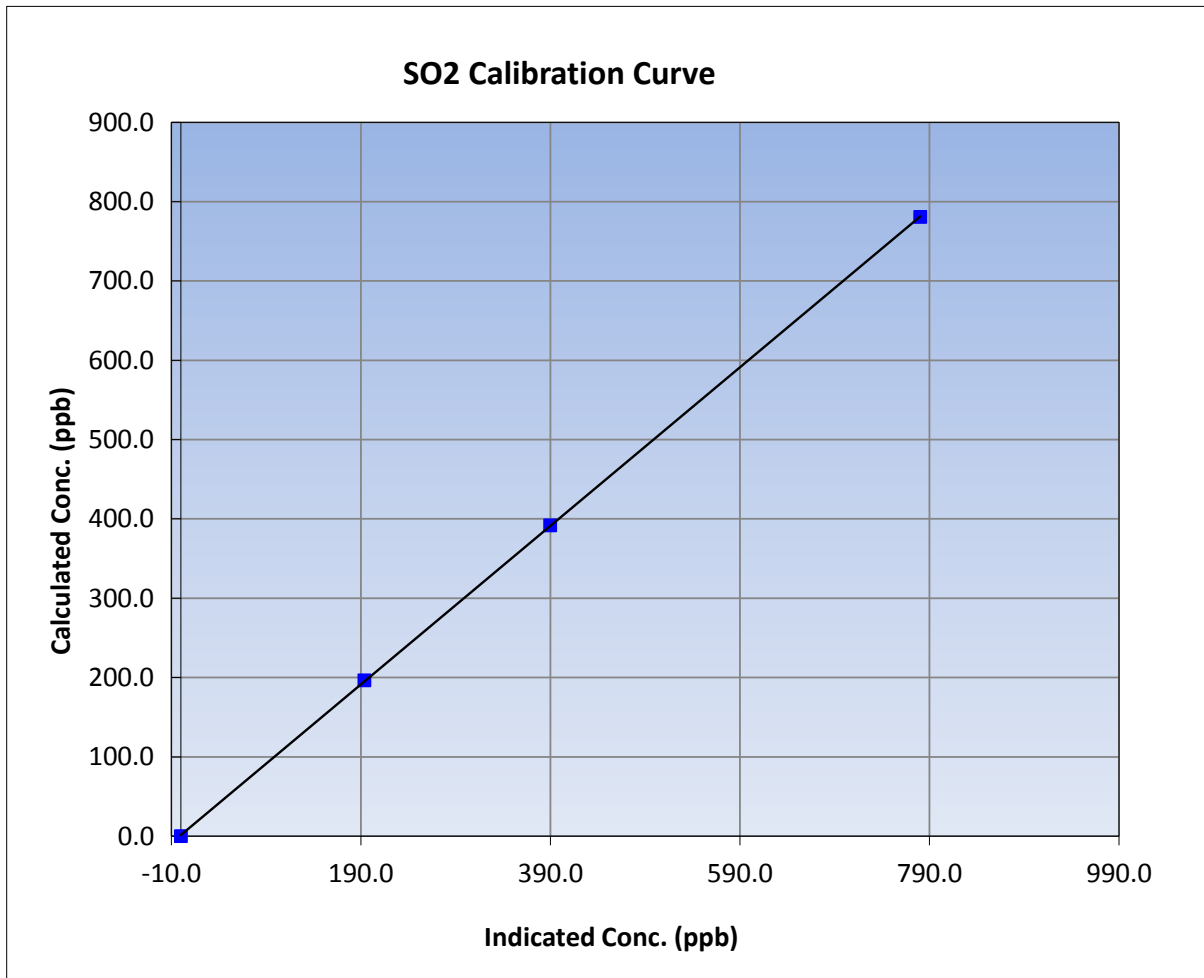
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 1, 2016	Previous Calibration	December 3, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:45	End Time (MST)	18:00
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

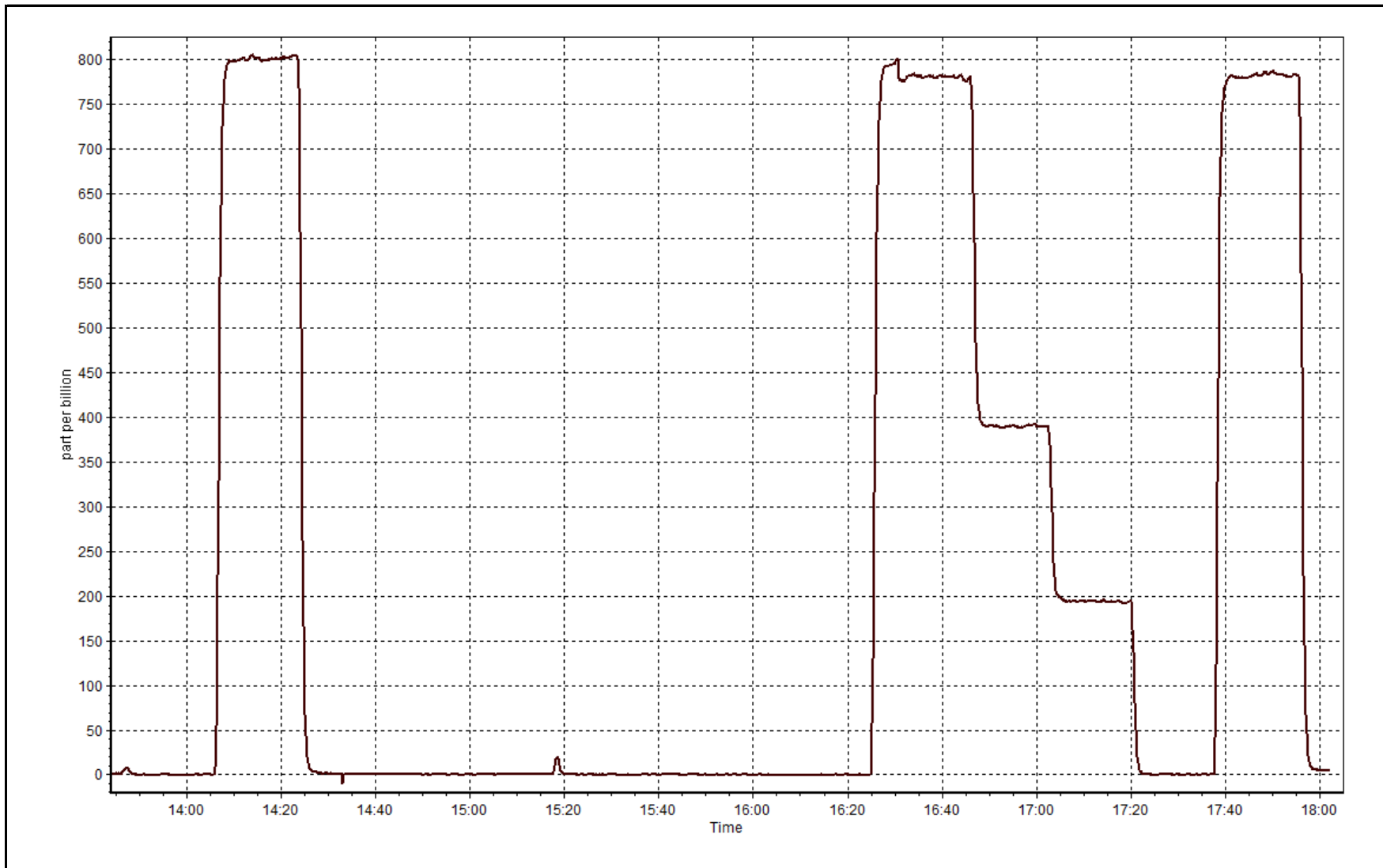
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999986
780.7	780.3	1.0005		
391.8	389.7	1.0053	Slope	0.999629
196.4	193.7	1.0137		
			Intercept	1.429048



SO2 Calibration Plot

Date: February 1, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 2, 2016	Last Calibration	January 5, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:25
Gas Cert Reference	ALM028262	Station temp.	22 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	1185
ZAG air Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA1301009 12-Dec-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-600	-601
Analyzer IP address	192.168.1.42		Lamp voltage	784	787
Calculated slope	0.992638	0.991833	Chamber temp	45	45
Calculated intercept	0.066376	0.184261	Pressure	649.2	656.8
Analyzer Background	14.3	14	Flow	0.534	0.510
Analyzer Coefficient	0.971	0.954	Intensity	87	88
			Converter temp.	325	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	4000	64.1	80.8	81.7	0.989
SO2 scrubber check	5000	21.2	200.1	1.7	----
calibrator zero	4000	0.0	0.0	0.0	----
high point	4000	64.1	80.8	81.4	0.993
second point	4000	32.1	40.4	40.5	0.999
third point	4000	16.1	20.3	20.1	1.012
as left zero	5000	0.0	0.0	0.1	----
as left span	4000	64.1	80.8	81.8	0.987
Average Correction Factor					1.001

Corrected As found	81.6	Previous response	81.3	% change	-0.4%
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Notes:

Changed inlet filter and scrubber check done after as founds. Adjusted span.

Calibration Performed By: Evan Magill



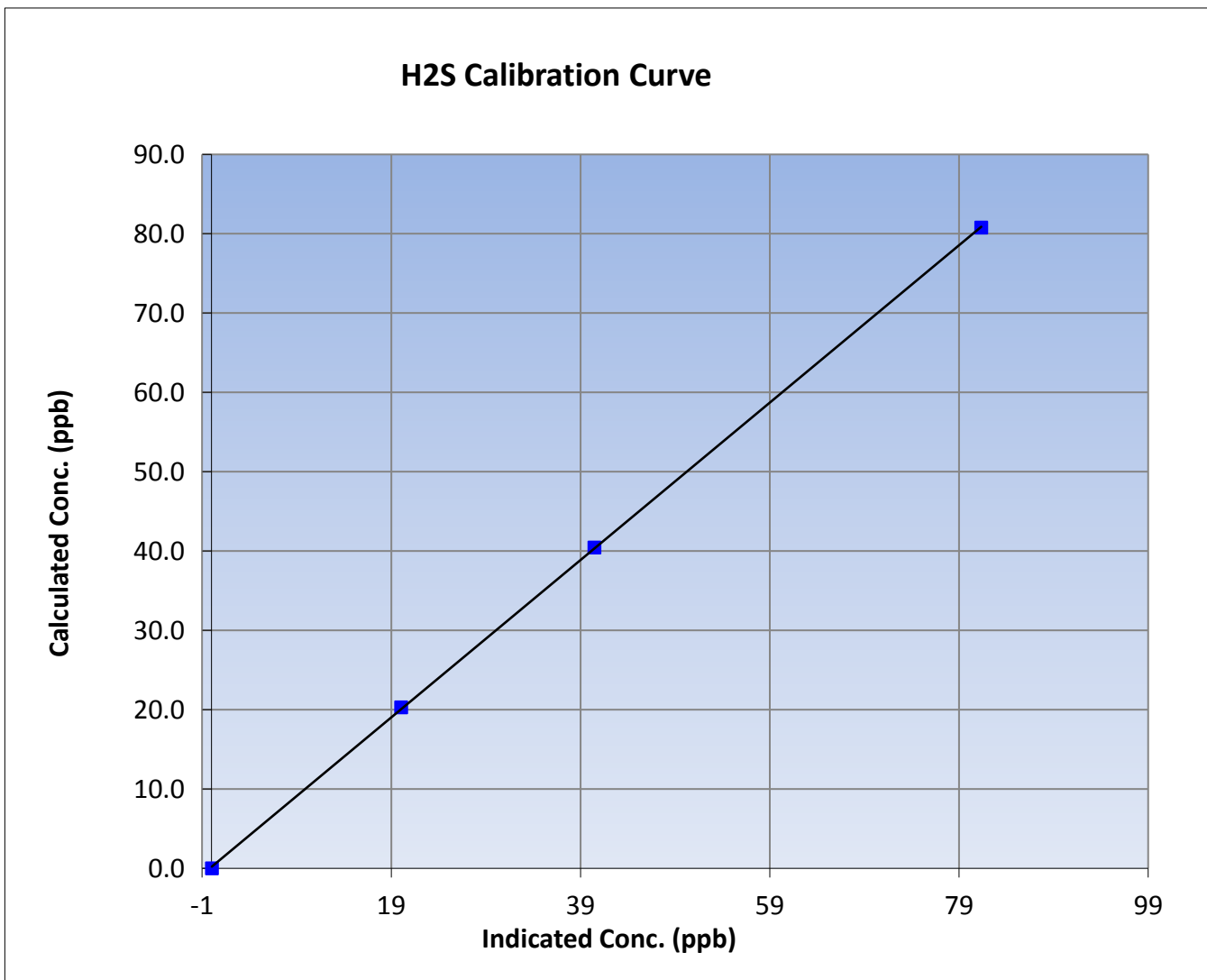
Wood Buffalo Environmental Association H2S Calibration Report

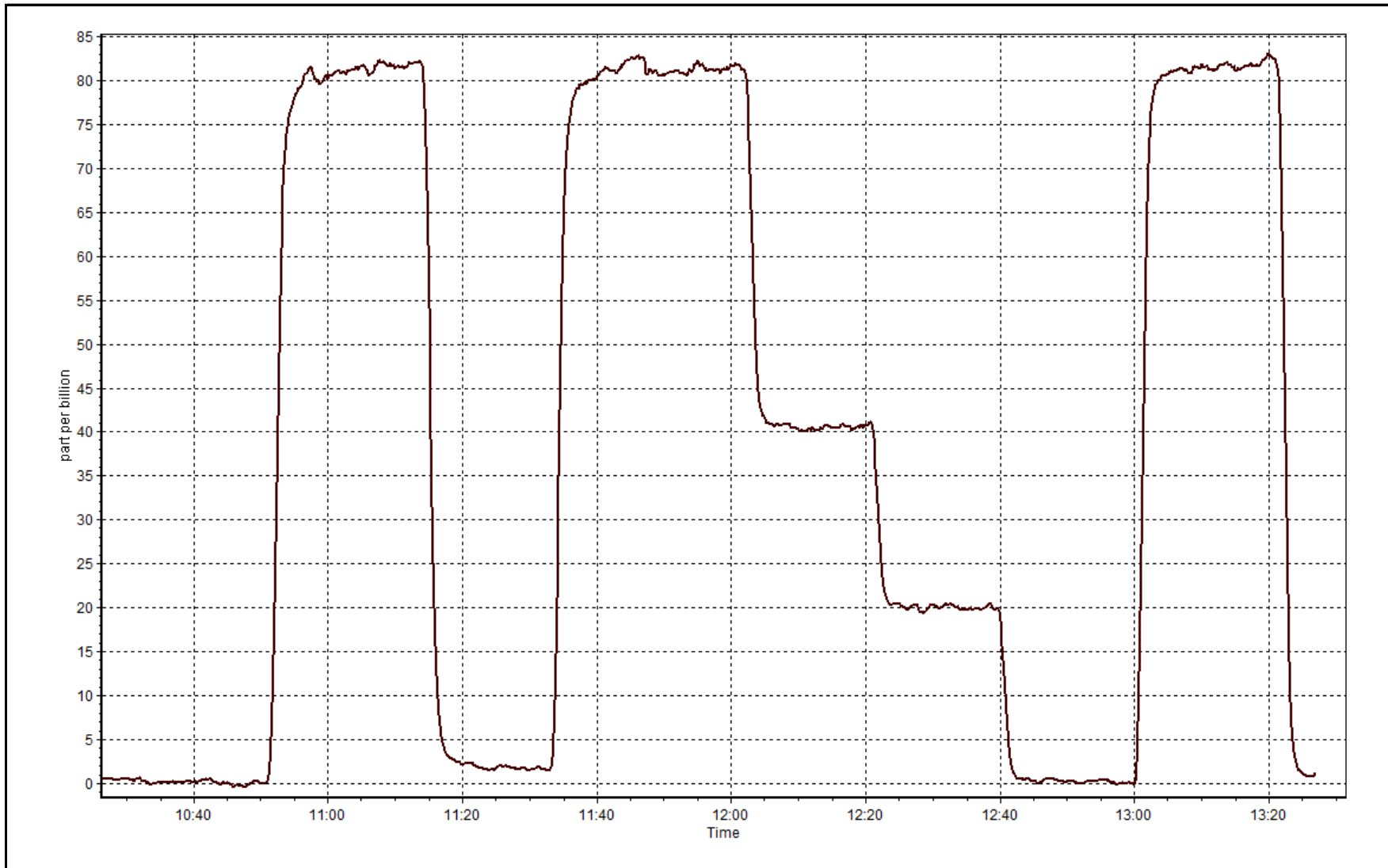
Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 5, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:30	End Time (MST)	13:25
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999965
80.8	81.4	0.9927		
40.4	40.5	0.9994	Slope	0.991833
20.3	20.1	1.0118		
			Intercept	0.184261







Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 12, 2016	Last Calibration	February 2, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Other: Replacing pump		
Start Time (MST)	11:46	End Time (MST)	15:37
Gas Cert Reference	ALM028262	Station temp.	22 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	1185
ZAG air Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA1301009 12-Dec-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.42		Lamp voltage	786	787
Calculated slope	0.991833	0.996020	Chamber temp	45	45
Calculated intercept	0.184261	0.202556	Pressure	705.0	548.4
Analyzer Background	14	15.7	Flow	0.267	1.048
Analyzer Coefficient	0.954	0.954	Intensity	87	88
			Converter temp.	324	325

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	0.3	----
as found span	4000	64.1	80.8	76.2	1.060
SO2 scrubber check	5000	21.2	200.1	1.6	----
calibrator zero	4000	0.0	0.0	0.0	----
high point	4000	64.1	80.8	81.0	0.997
second point	4000	32.1	40.4	40.3	1.003
third point	4000	16.1	20.3	20.0	1.017
as left zero	5000	0.0	0.0	0.0	----
as left span	4000	64.1	80.8	81.5	0.991
Average Correction Factor					1.006

Corrected As found	75.9	Previous response	81.2	% change	7.0%
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Notes:

Re-calibrating instrument due to exhaust pump flow dropping significantly. Scrubber check done before calibrator zero. Pump replaced before scrubber check. Adjusted zero.

Calibration Performed By: Asad Hidayat



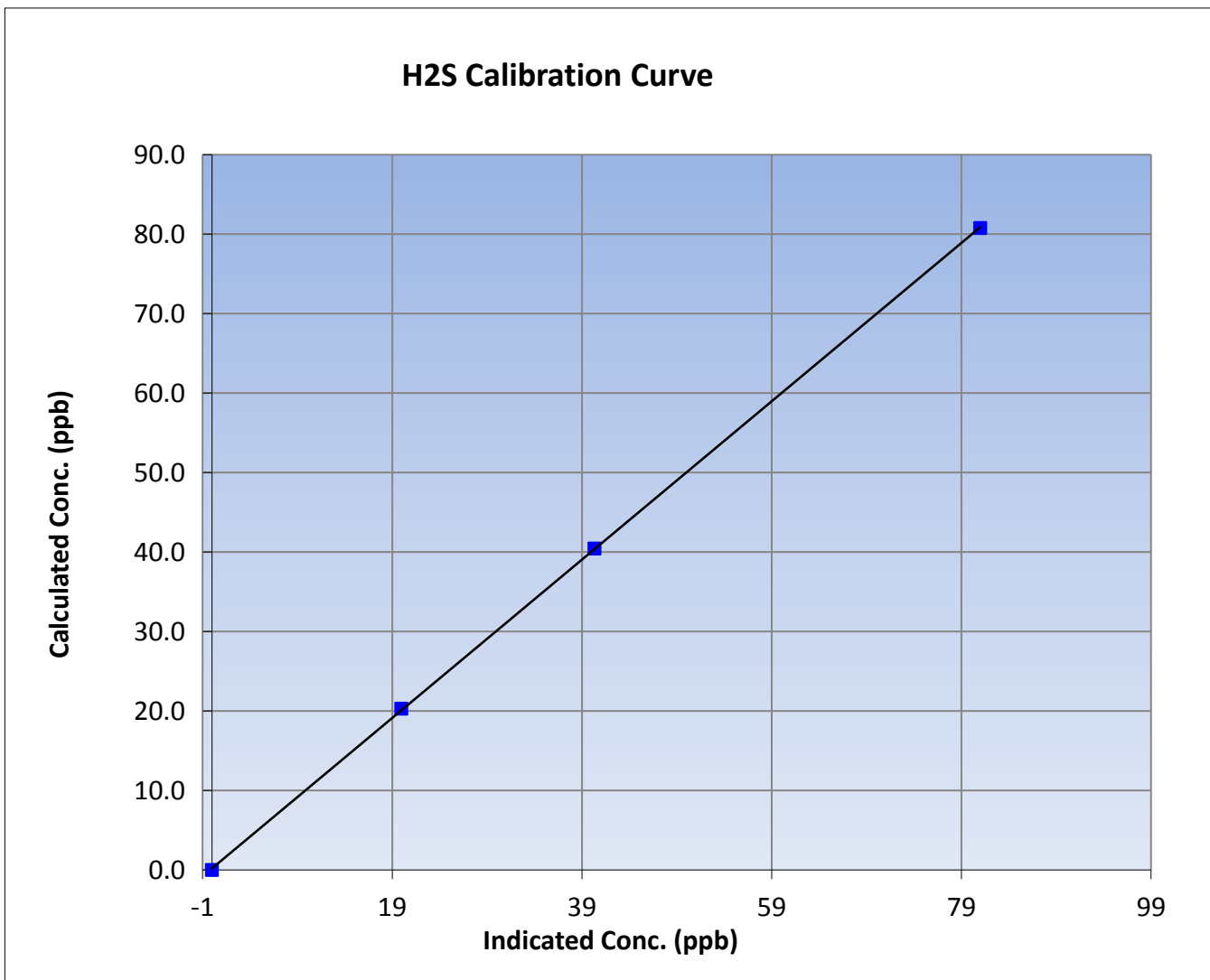
Wood Buffalo Environmental Association H2S Calibration Report

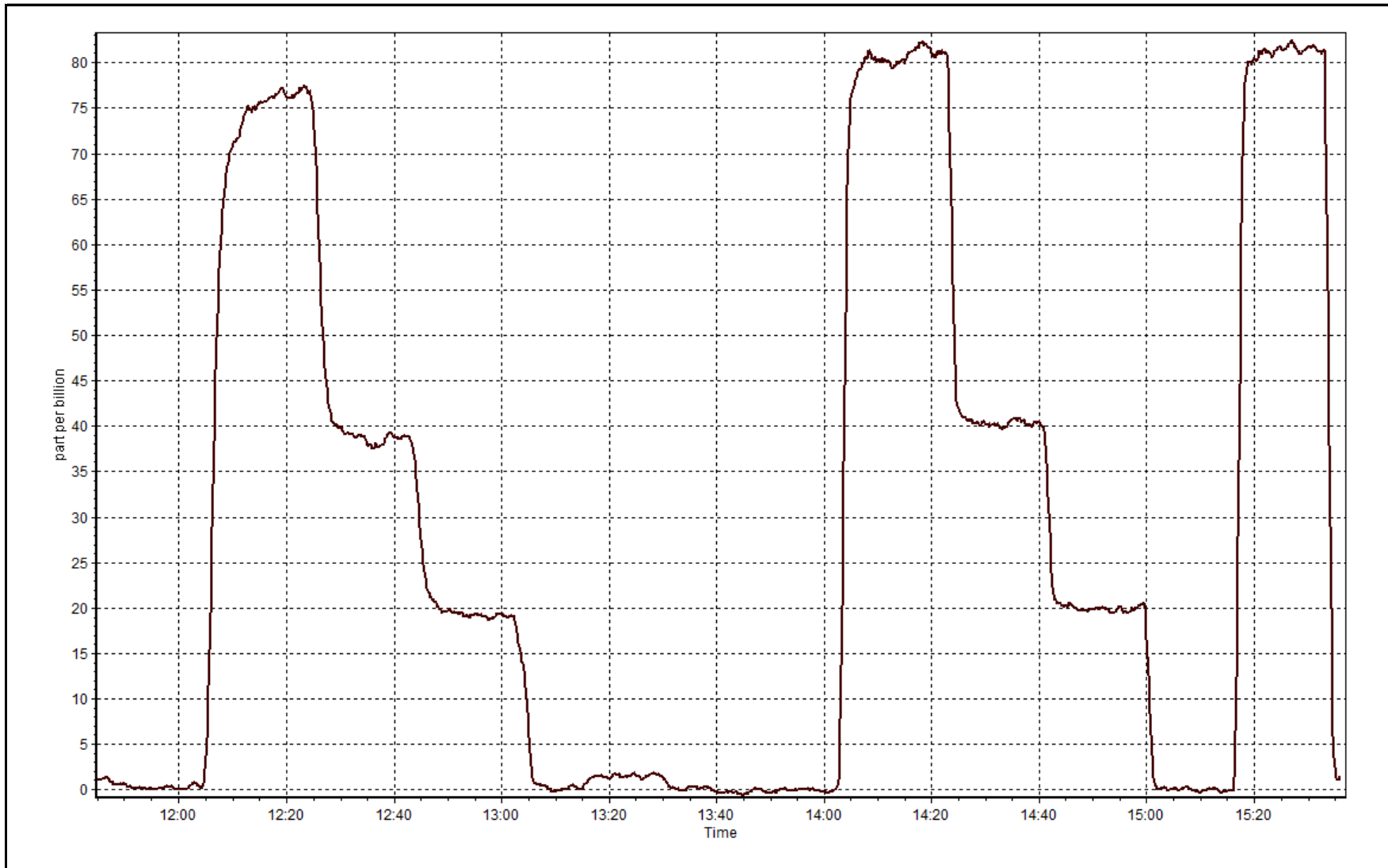
Station Information

Calibration Date	February 12, 2016	Previous Calibration	February 2, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:46	End Time (MST)	15:37
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999971
80.8	81.0	0.9974		
40.4	40.3	1.0031	Slope	0.996020
20.3	20.0	1.0168		
			Intercept	0.202556







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-01-16	Last Calibration	January-05-16
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	13:45	End Time (MST)	18:00
Gas Cert Reference	SA1301009	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1087.5 ppm
C3H8 Cal Gas Conc.	210 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.8	39.8
Calculated slope	0.997897	1.001389	Fuel Pressure	25.6	25.6
Calculated intercept	0.033424	0.033486	Analyzer Coeff	4.750	4.651
			Analyzer BKG	2.58	2.40

Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231
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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	-0.31	----
as found span	5000	82.7	17.99	18.62	0.966
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	82.7	17.99	17.95	1.002
second point	5000	41.5	9.03	8.95	1.009
third point	5000	20.8	4.52	4.46	1.014
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	82.7	17.99	17.89	1.005
Average Correction Factor					1.008

Corrected As found	18.93	Previous response	17.99	% change	-5.0%
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Notes:

MFC done prior to calibration. Changed inlet filter after as founds. Replaced THC pump after as founds. Adjusted zero and span.

Calibration Performed By:

Evan Magill



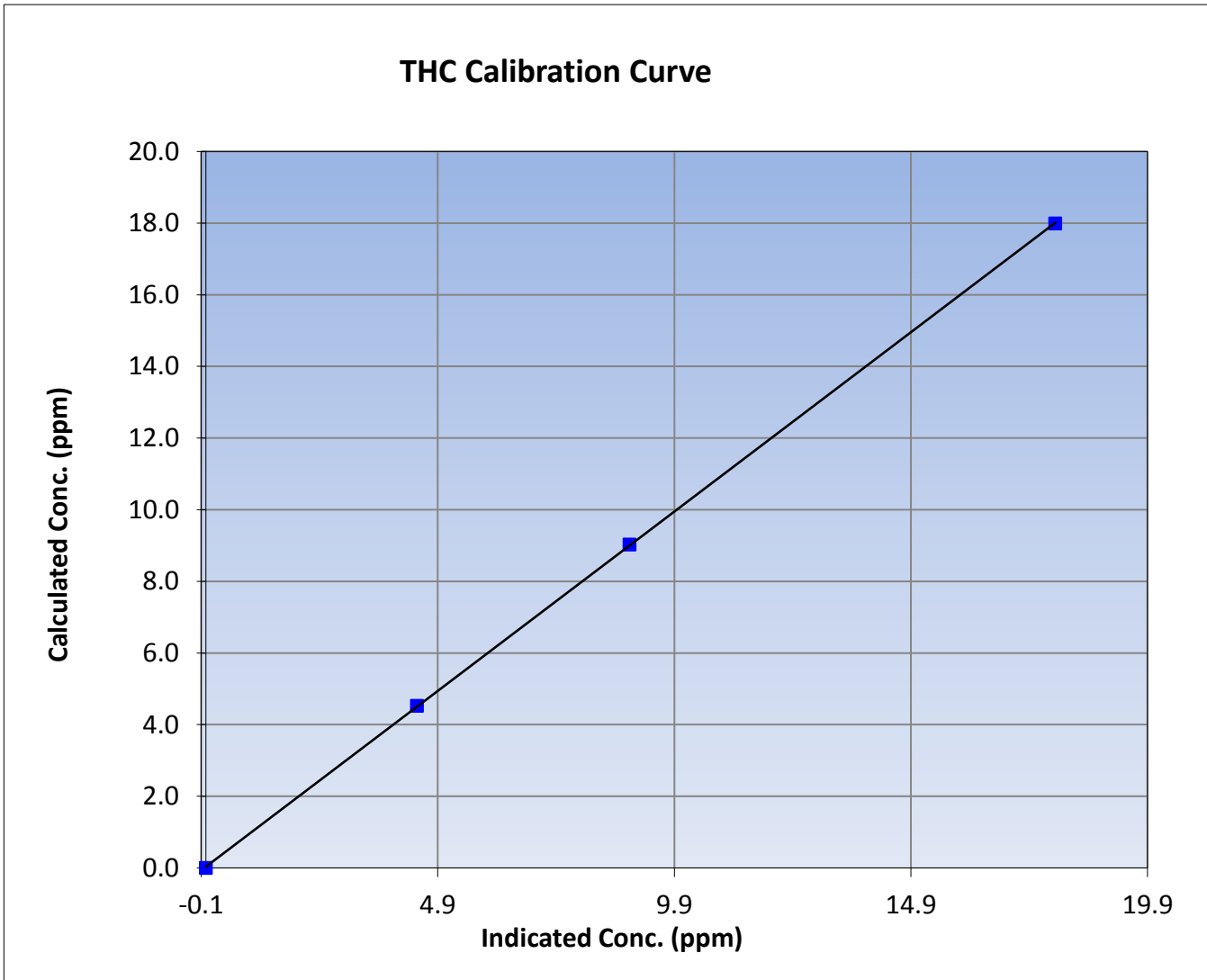
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 5, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:45	End Time (MST)	18:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

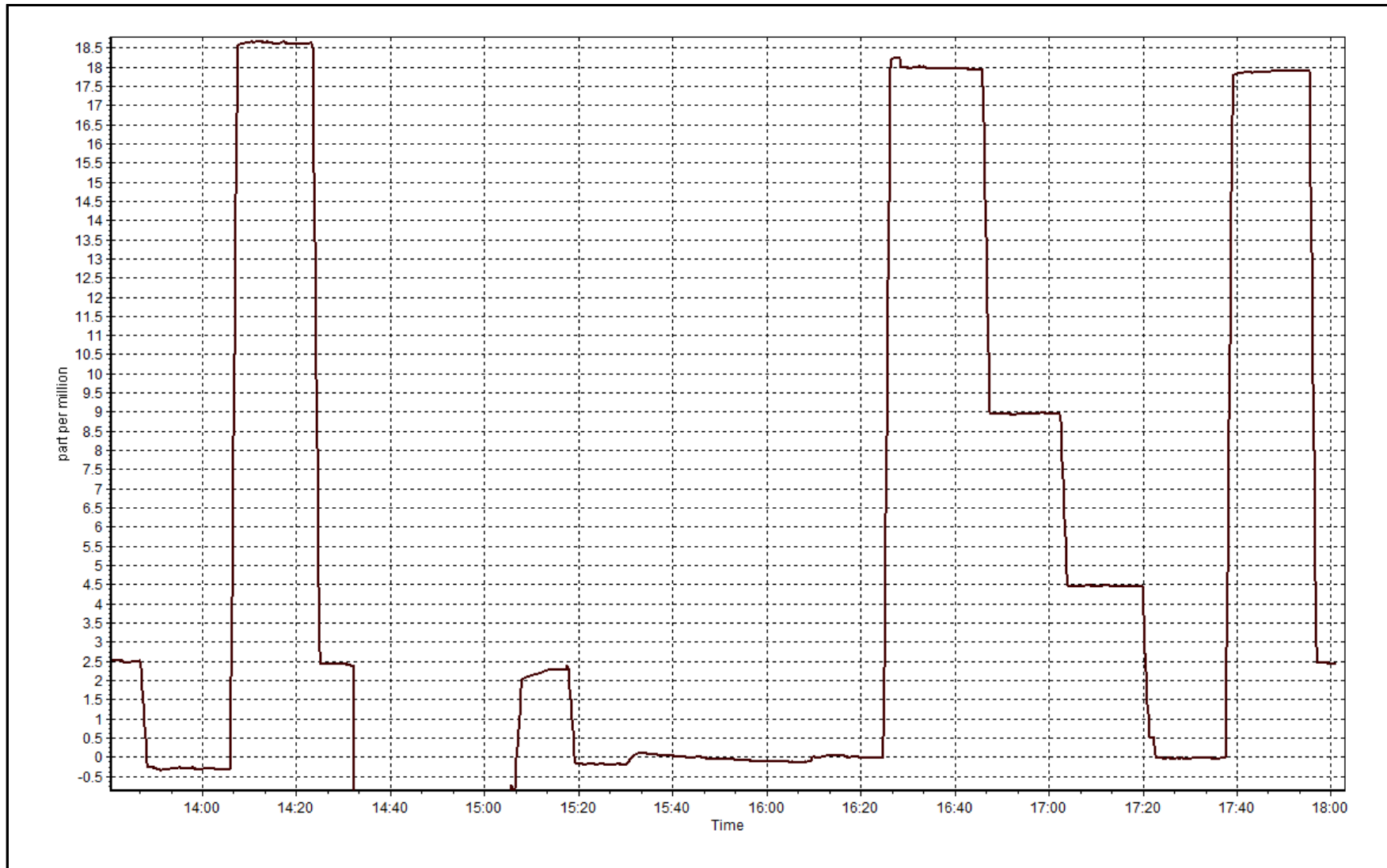
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999983
17.99	17.95	1.0021		
9.03	8.95	1.0085	Slope	1.001389
4.52	4.46	1.0143		
			Intercept	0.033486



THC Calibration Plot

Date: February 1, 2016





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3 LOWER CAMP METEOROLOGY FEBRUARY 2016

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
FEBRUARY 2016

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	696	0	0	100.00	7.9	-	1.9	-
Temperature 45 m (C) Average	696	0	0	100.00	7.7	-	2.3	-
Temperature 100 m (C) Average	696	0	0	100.00	9.3	-	3.2	-
Temperature 167 m (C) Average	696	0	0	100.00	9.1	-	3.3	-
Relative Humidity 20 m (%) Average	696	0	0	100.00	95	-	91.0	-
Relative Humidity 45 m (%) Average	696	0	0	100.00	94	-	90.0	-
Relative Humidity 100 m (%) Average	696	0	0	100.00	94	-	92.0	-
Relative Humidity 167 m (%) Average	696	0	0	100.00	95	-	91.0	-
Wind Speed 20 m (km/h) Average	646	0	50	92.82	22	-	15.0	-
Wind Speed 45 m (km/h) Average	688	0	8	98.85	26	-	18.0	-
Wind Speed 100 m (km/h) Average	655	0	41	94.11	40	-	28.0	-
Wind Speed 167 m (km/h) Average	594	0	102	85.34	43	-	33.0	-
Wind Direction 20 m (deg) Average	646	0	50	92.82	-	-	-	-
Wind Direction 45 m (deg) Average	688	0	8	98.85	-	-	-	-
Wind Direction 100 m (deg) Average	655	0	41	94.11	-	-	-	-
Wind Direction 167 m (deg) Average	594	0	102	85.34	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	646	0	50	92.82	0.8	-	0.2	-
Vertical Wind Speed 45 m (km/h) Average	688	0	8	98.85	1.6	-	1.0	-
Vertical Wind Speed 100 m (km/h) Average	655	0	41	94.11	4.3	-	1.8	-
Vertical Wind Speed 167 m (km/h) Average	594	0	102	85.34	4.9	-	2.1	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
FEBRUARY 2016

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	696	-10.95	7.1	-	-34.2	-18.5	-15	-11.4	-6.3	-1.7	7.9
Temperature 45 m (C) Average	696	-10.76	7	-	-32.4	-18.3	-15	-11.5	-6	-1.6	7.7
Temperature 100 m (C) Average	696	-10.41	7	-	-29	-18.5	-15.3	-11.3	-5	-0.7	9.3
Temperature 167 m (C) Average	696	-10.28	7.1	-	-26.6	-18.5	-15.5	-11.3	-4.3	-0.3	9.1
Relative Humidity 20 m (%) Average	696	77.1	12	-	41	60	71	80	85	90	95
Relative Humidity 45 m (%) Average	696	75.9	12	-	39	59	69	79	84	89	94
Relative Humidity 100 m (%) Average	696	76.8	13	-	32	58	71	80	86	90	94
Relative Humidity 167 m (%) Average	696	77.3	13	-	32	58	71	82	86	90	95
Wind Speed 20 m (km/h) Average	646	6.4	4	-	0	2	3	6	9	12	22
Wind Speed 45 m (km/h) Average	688	8.4	5	-	0	2	4	7	12	16	26
Wind Speed 100 m (km/h) Average	655	12.2	8	-	0	3	7	11	16	23	40
Wind Speed 167 m (km/h) Average	594	14.5	9	-	1	5	8	13	19	28	43
Wind Direction 20 m (deg) Average	646	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	688	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	655	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	594	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	646	-0.03	0.2	-	-0.6	-0.2	-0.1	0	0.1	0.1	0.8
Vertical Wind Speed 45 m (km/h) Average	688	0.1	0.4	-	-0.9	-0.3	-0.1	0	0.3	0.7	1.6
Vertical Wind Speed 100 m (km/h) Average	655	0.27	0.6	-	-0.8	-0.2	0	0.1	0.4	0.8	4.3
Vertical Wind Speed 167 m (km/h) Average	594	0.51	0.8	-	-1	0	0.1	0.3	0.6	1.3	4.9

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)
 FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	06 Feb 2016 09:00	08 Feb 2016 10:00	50	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	06 Feb 2016 09:00	06 Feb 2016 16:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	06 Feb 2016 09:00	06 Feb 2016 12:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	14 Feb 2016 06:00	15 Feb 2016 14:00	33	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	18 Feb 2016 21:00	18 Feb 2016 23:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	20 Feb 2016 08:00	20 Feb 2016 08:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	05 Feb 2016 15:00	05 Feb 2016 22:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	06 Feb 2016 09:00	06 Feb 2016 12:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	14 Feb 2016 07:00	15 Feb 2016 16:00	34	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	17 Feb 2016 05:00	18 Feb 2016 15:00	35	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	18 Feb 2016 19:00	19 Feb 2016 15:00	21	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association
Summary of Hour Averages

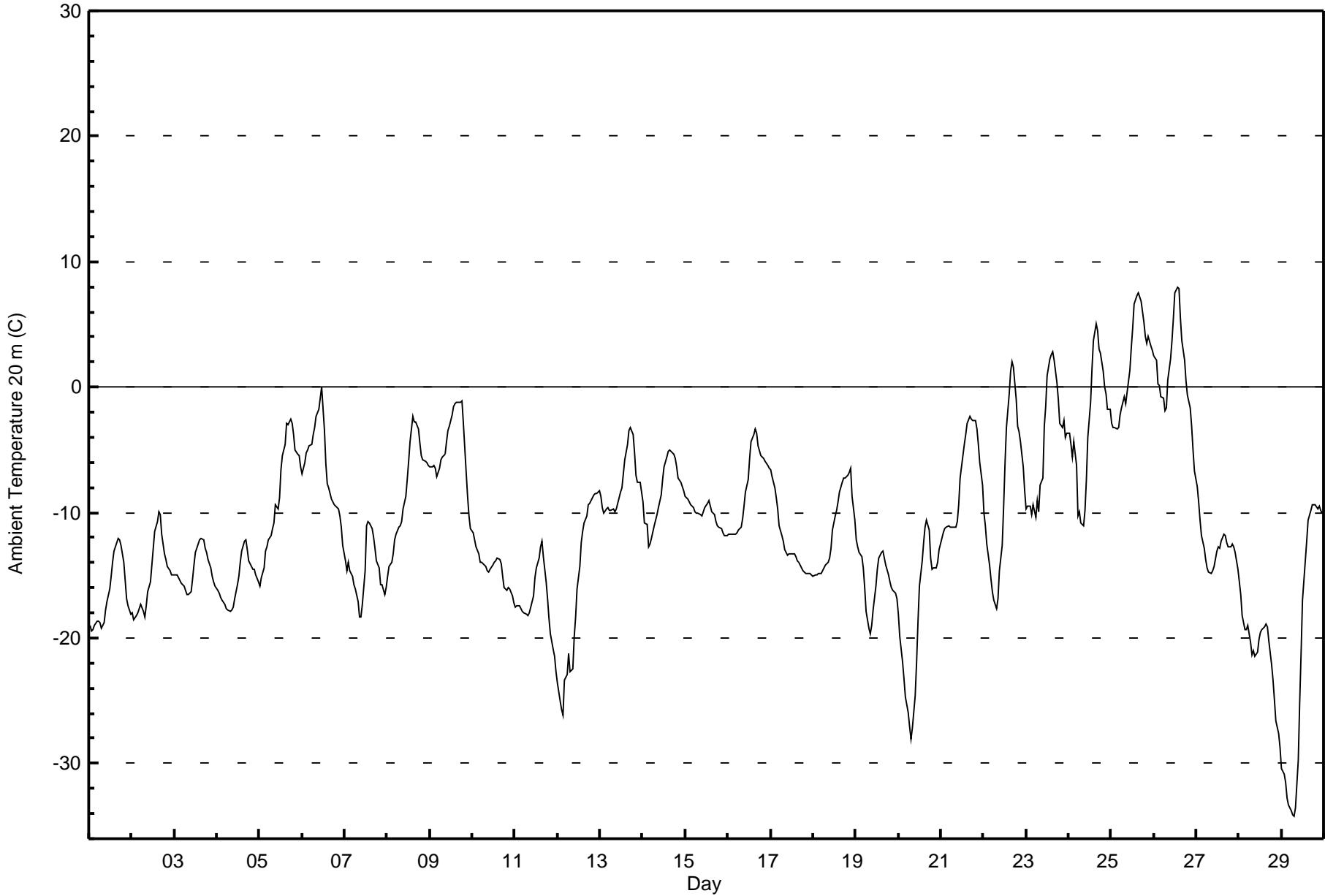
Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - February 2016

Maximum Value: 7.9 C on Feb 26 14:00 Maximum Daily Average: 1.9 C on Feb 25																						Hours in Service:	696			
Minimum Value: -34.2 C on Feb 29 08:00 Minimum Daily Average: -21.0 C on Feb 28																						Hours of Data:	696			
Maximum Diurnal Average: -6.9 C at hour 16 Minimum Diurnal Average: -14.2 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -10.95 C Percentiles: P ₁ = -31.1 P ₁₀ = -18.5 Q ₁ = -15.0 Median = -11.4 Q ₃ = -6.3 P ₉₀ = -1.7 P ₉₉ = 6.6																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-19.0	-19.4	-19.4	-19.0	-18.7	-18.6	-18.8	-19.3	-18.7	-17.7	-17.1	-16.1	-15.1	-14.0	-13.1	-12.4	-12.1	-12.2	-12.6	-14.0	-15.5	-16.9	-17.5	-18.1	-16.5	-12.1
2-Feb	-18.0	-18.5	-18.2	-18.0	-17.7	-17.4	-17.8	-18.3	-17.5	-16.3	-15.5	-14.1	-12.9	-11.5	-10.7	-10.0	-10.2	-11.8	-13.3	-13.8	-14.2	-14.6	-14.9	-15.0	-15.0	-10.0
3-Feb	-15.0	-15.0	-15.2	-15.4	-15.7	-15.9	-16.2	-16.5	-16.5	-16.3	-15.3	-14.1	-13.2	-12.5	-12.2	-12.0	-12.1	-12.8	-13.2	-13.7	-14.5	-15.1	-15.5	-15.8	-14.6	-12.0
4-Feb	-16.2	-16.5	-16.8	-17.0	-17.4	-17.7	-17.8	-17.9	-17.8	-17.5	-16.8	-15.8	-15.0	-13.9	-13.0	-12.3	-12.1	-12.9	-13.9	-14.3	-14.5	-14.5	-15.0	-15.5	-15.5	-12.1
5-Feb	-15.8	-15.2	-14.4	-13.0	-12.8	-12.1	-11.8	-11.3	-10.9	-9.4	-9.7	-8.8	-6.6	-5.4	-4.6	-2.9	-3.0	-2.6	-2.9	-3.8	-5.0	-5.4	-5.5	-6.4	-8.3	-2.6
6-Feb	-7.0	-6.0	-5.3	-5.1	-4.7	-4.6	-3.8	-3.3	-2.4	-1.7	-0.9	0.1	-3.5	-6.2	-7.7	-8.1	-8.9	-9.2	-9.3	-9.4	-9.7	-10.2	-11.2	-12.7	-6.3	0.1
7-Feb	-13.9	-14.6	-13.9	-14.7	-15.0	-15.7	-16.1	-17.1	-18.3	-18.3	-17.3	-14.6	-11.0	-10.7	-10.8	-11.2	-11.9	-12.8	-13.8	-14.5	-15.7	-15.8	-16.5	-16.0	-14.6	-10.7
8-Feb	-15.1	-14.3	-14.0	-13.3	-12.2	-11.8	-11.2	-11.1	-10.7	-9.7	-8.7	-7.4	-5.9	-4.3	-2.3	-2.7	-2.8	-3.4	-4.5	-5.5	-5.8	-5.9	-6.0	-6.3	-8.1	-2.3
9-Feb	-6.4	-6.3	-6.2	-6.4	-7.1	-6.5	-5.8	-5.6	-5.4	-4.4	-3.5	-3.1	-2.2	-1.6	-1.3	-1.2	-1.2	-1.2	-1.1	-2.9	-6.8	-8.8	-10.3	-11.3	-4.9	-1.1
10-Feb	-11.6	-12.1	-12.7	-13.3	-13.9	-13.9	-14.1	-14.3	-14.6	-14.8	-14.6	-14.2	-14.0	-13.9	-13.7	-13.8	-14.1	-15.1	-16.0	-16.2	-16.0	-16.1	-16.7	-17.2	-14.5	-11.6
11-Feb	-17.5	-17.5	-17.4	-17.6	-17.8	-18.0	-18.1	-18.2	-18.0	-17.6	-16.6	-15.2	-14.4	-13.6	-12.8	-12.3	-13.5	-15.6	-16.9	-18.5	-19.6	-20.8	-21.4	-22.7	-17.2	-12.3
12-Feb	-23.6	-25.0	-25.7	-26.2	-23.4	-22.9	-21.3	-22.7	-22.5	-19.9	-18.3	-16.1	-14.3	-12.4	-11.5	-10.8	-10.2	-9.4	-9.2	-9.1	-8.6	-8.5	-8.4	-8.3	-16.2	-8.3
13-Feb	-8.8	-9.6	-10.1	-9.8	-9.6	-9.8	-9.8	-9.7	-9.9	-9.7	-9.2	-8.4	-8.0	-6.9	-5.8	-4.6	-3.5	-3.3	-3.8	-5.2	-7.0	-7.6	-7.6	-8.4	-7.8	-3.3
14-Feb	-9.1	-10.8	-11.0	-12.7	-12.5	-12.1	-11.1	-10.7	-10.2	-9.6	-8.6	-7.3	-6.3	-5.5	-5.1	-5.0	-5.1	-5.4	-5.7	-6.4	-7.2	-7.6	-7.9	-8.3	-8.4	-5.0
15-Feb	-8.8	-9.0	-9.2	-9.4	-9.6	-10.0	-10.1	-10.1	-10.2	-10.3	-9.9	-9.6	-9.3	-9.1	-9.5	-10.0	-10.2	-10.8	-11.0	-11.2	-11.3	-11.6	-11.8	-11.8	-10.1	-8.8
16-Feb	-11.7	-11.7	-11.8	-11.8	-11.7	-11.6	-11.4	-11.1	-10.5	-9.5	-8.3	-7.3	-5.7	-4.3	-3.8	-3.4	-3.7	-4.7	-5.5	-5.6	-5.7	-5.9	-6.2	-6.5	-7.9	-3.4
17-Feb	-6.5	-7.1	-8.0	-8.8	-9.7	-11.1	-11.8	-12.3	-12.9	-13.4	-13.3	-13.3	-13.3	-13.3	-13.6	-13.8	-14.0	-14.4	-14.6	-14.8	-14.8	-14.9	-14.8	-14.9	-12.5	-6.5
18-Feb	-15.1	-15.0	-14.9	-14.9	-14.9	-14.7	-14.5	-14.2	-14.0	-13.6	-12.8	-11.4	-10.3	-9.8	-9.1	-8.3	-7.5	-7.3	-7.3	-7.1	-6.8	-6.5	-8.7	-10.6	-11.2	-6.5
19-Feb	-12.1	-12.8	-13.1	-13.5	-14.4	-16.0	-17.8	-19.2	-19.7	-19.0	-17.8	-15.9	-14.5	-13.7	-13.1	-13.0	-13.6	-14.2	-14.9	-15.5	-16.0	-16.2	-16.4	-16.9	-15.4	-12.1
20-Feb	-18.1	-19.9	-21.9	-23.2	-24.7	-26.0	-27.0	-28.0	-27.1	-24.6	-21.9	-18.7	-15.9	-13.9	-12.4	-11.2	-10.6	-11.4	-13.7	-14.5	-14.4	-14.4	-13.9	-13.0	-18.4	-10.6
21-Feb	-12.1	-11.6	-11.3	-11.2	-11.1	-11.2	-11.1	-11.1	-11.2	-10.7	-9.4	-7.3	-5.5	-4.6	-3.8	-2.9	-2.3	-2.5	-2.6	-2.7	-3.3	-4.6	-6.1	-7.8	-7.4	-2.3
22-Feb	-10.1	-11.0	-12.5	-14.1	-15.3	-16.3	-17.0	-17.6	-16.9	-14.7	-12.6	-9.6	-6.2	-3.2	-0.6	1.2	2.0	1.6	-1.0	-3.1	-3.6	-4.3	-6.4	-8.3	-8.3	2.0
23-Feb	-9.7	-9.4	-9.5	-10.1	-9.4	-10.4	-9.1	-10.0	-7.8	-7.3	-3.1	-1.5	0.9	2.2	2.6	2.9	2.1	0.4	-1.0	-2.8	-3.2	-2.6	-4.0	-3.7	-4.3	2.9
24-Feb	-3.6	-4.6	-5.6	-4.3	-6.2	-10.3	-10.0	-10.9	-11.0	-9.8	-7.3	-4.0	-1.2	1.5	3.8	5.0	4.5	3.1	2.7	1.3	0.1	-0.5	-1.8	-1.8	-3.0	5.0
25-Feb	-2.9	-3.2	-3.2	-3.3	-3.3	-2.2	-1.7	-0.8	-1.3	-0.4	1.4	3.2	4.7	6.6	7.3	7.6	7.2	6.8	5.2	4.1	3.5	4.0	3.2	2.9	1.9	7.6
26-Feb	2.5	2.1	0.3	0.1	-0.8	-0.9	-1.9	-1.7	0.6	2.2	3.7	5.5	7.5	7.9	7.8	5.5	3.7	2.1	0.4	-0.6	-1.7	-3.1	-5.0	-6.7	1.2	7.9
27-Feb	-7.9	-9.2	-10.6	-11.9	-12.8	-13.7	-14.4	-14.8	-14.9	-14.7	-14.3	-13.1	-12.7	-12.8	-12.3	-11.7	-11.8	-12.4	-12.7	-12.7	-12.5	-12.7	-13.2	-14.6	-12.7	-7.9
28-Feb	-15.5	-16.5	-18.2	-19.4	-19.4	-19.0	-20.3	-21.3	-21.0	-21.5	-21.2	-20.1	-19.6	-19.4	-19.2	-18.9	-19.1	-20.3	-22.1	-23.4	-24.9	-26.6	-27.6	-28.7	-21.0	-15.5
29-Feb	-30.5	-30.9	-31.5	-32.7	-33.3	-33.7	-34.1	-34.2	-33.5	-29.7	-25.1	-21.2	-16.9	-13.9	-12.3	-10.7	-9.9	-9.4	-9.4	-9.4	-9.7	-9.5	-9.9	-10.0	-20.9	-9.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	46	6.61	6.61
-20 - 0	603	86.64	93.25
0 - 10	47	6.75	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Summary of Hour Averages

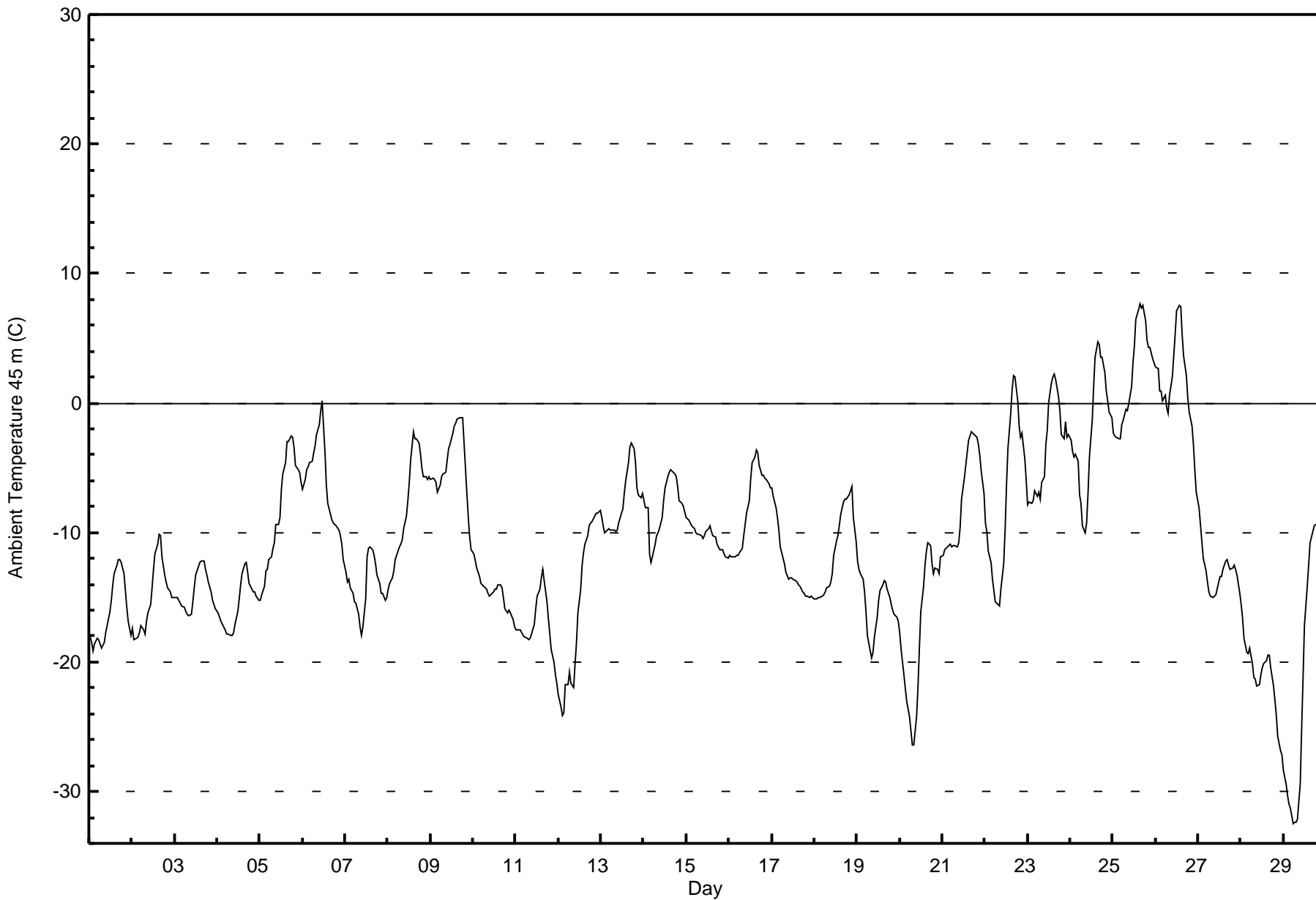
Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - February 2016

Maximum Value: 7.7 C on Feb 25 16:00 Maximum Daily Average: 2.3 C on Feb 25																						Hours in Service:	696			
Minimum Value: -32.4 C on Feb 29 06:00 Minimum Daily Average: -21.0 C on Feb 28																						Hours of Data:	696			
Maximum Diurnal Average: -7.1 C at hour 17 Minimum Diurnal Average: -13.8 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -10.76 C Percentiles: P ₁ = -29.5 P ₁₀ = -18.3 Q ₁ = -15.0 Median = -11.5 Q ₃ = -6.0 P ₉₀ = -1.6 P ₉₉ = 7.0																						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	-18.0	-18.5	-19.2	-18.6	-18.2	-18.2	-18.6	-18.9	-18.5	-17.8	-17.2	-16.1	-15.2	-14.0	-13.2	-12.5	-12.1	-12.1	-12.4	-13.2	-14.4	-15.8	-16.9	-17.9	-16.1	-12.1
2-Feb	-17.5	-18.3	-18.1	-18.0	-17.7	-17.1	-17.5	-17.8	-16.8	-16.2	-15.6	-14.2	-12.9	-11.6	-10.8	-10.2	-10.3	-11.9	-13.3	-13.8	-14.3	-14.6	-15.0	-15.0	-14.9	-10.2
3-Feb	-15.0	-15.0	-15.2	-15.5	-15.7	-15.8	-16.1	-16.3	-16.4	-16.3	-15.4	-14.3	-13.3	-12.7	-12.3	-12.2	-12.2	-12.9	-13.3	-13.8	-14.5	-15.2	-15.6	-15.9	-14.6	-12.2
4-Feb	-16.3	-16.5	-16.9	-17.1	-17.5	-17.8	-17.9	-17.9	-17.7	-17.1	-16.1	-15.1	-14.1	-13.1	-12.4	-12.3	-13.0	-13.0	-14.0	-14.4	-14.6	-14.6	-14.9	-15.2	-15.6	-12.3
5-Feb	-15.3	-14.8	-14.1	-13.0	-12.8	-12.1	-11.8	-11.3	-10.7	-9.4	-9.4	-8.8	-6.7	-5.5	-4.6	-3.0	-3.0	-2.5	-2.6	-3.4	-4.9	-5.1	-5.3	-6.2	-8.2	-2.5
6-Feb	-6.7	-5.9	-5.1	-4.9	-4.6	-4.5	-3.8	-3.3	-2.4	-1.7	-0.6	0.2	-3.7	-6.4	-7.8	-8.2	-9.0	-9.3	-9.4	-9.5	-9.8	-10.2	-10.9	-12.1	-6.2	0.2
7-Feb	-13.0	-13.8	-13.6	-14.3	-14.7	-15.3	-15.5	-16.3	-17.3	-18.0	-17.3	-15.1	-11.8	-11.3	-11.1	-11.3	-11.8	-12.4	-13.3	-13.9	-14.6	-14.7	-15.2	-15.0	-14.2	-11.1
8-Feb	-14.4	-13.9	-13.5	-13.0	-12.1	-11.7	-11.1	-10.9	-10.6	-9.8	-8.7	-7.5	-6.1	-4.4	-2.2	-2.8	-2.8	-3.1	-3.9	-5.0	-5.7	-5.7	-5.9	-5.7	-7.9	-2.2
9-Feb	-5.9	-5.8	-6.0	-6.1	-6.8	-6.3	-5.7	-5.5	-5.3	-4.4	-3.6	-3.1	-2.3	-1.8	-1.6	-1.2	-1.2	-1.1	-1.1	-3.0	-7.0	-8.9	-10.4	-11.3	-4.8	-1.1
10-Feb	-11.7	-12.2	-12.7	-13.4	-14.0	-14.0	-14.2	-14.4	-14.7	-14.9	-14.8	-14.5	-14.4	-14.3	-14.0	-14.1	-14.2	-15.0	-15.9	-16.2	-16.0	-16.2	-16.7	-17.3	-14.6	-11.7
11-Feb	-17.5	-17.5	-17.5	-17.7	-17.9	-18.1	-18.2	-18.3	-18.2	-17.8	-17.1	-15.9	-14.9	-14.4	-13.5	-12.8	-13.7	-15.3	-16.6	-17.8	-19.1	-20.0	-20.9	-21.6	-17.2	-12.8
12-Feb	-22.5	-23.5	-24.1	-23.9	-21.8	-21.7	-20.8	-21.6	-22.0	-20.1	-18.5	-16.3	-14.4	-12.5	-11.6	-10.9	-10.3	-9.5	-9.3	-9.1	-8.7	-8.6	-8.5	-8.3	-15.8	-8.3
13-Feb	-8.8	-9.5	-10.0	-9.8	-9.7	-9.8	-9.8	-9.8	-10.0	-9.8	-9.3	-8.5	-8.2	-7.0	-6.0	-4.6	-3.5	-3.1	-3.5	-4.6	-6.5	-7.1	-7.3	-7.0	-7.6	-3.1
14-Feb	-7.6	-8.1	-8.1	-11.7	-12.3	-11.9	-10.9	-10.3	-10.1	-9.7	-8.8	-7.6	-6.5	-5.6	-5.3	-5.2	-5.2	-5.4	-5.7	-6.5	-7.5	-7.8	-8.0	-8.4	-8.1	-5.2
15-Feb	-8.8	-9.1	-9.3	-9.5	-9.7	-10.0	-10.2	-10.1	-10.3	-10.5	-10.2	-10.0	-9.7	-9.5	-9.9	-10.2	-10.4	-10.9	-11.1	-11.3	-11.4	-11.7	-11.9	-11.9	-10.3	-8.8
16-Feb	-11.8	-11.8	-11.9	-11.9	-11.8	-11.8	-11.6	-11.2	-10.2	-9.4	-8.6	-7.5	-5.8	-4.6	-4.1	-3.7	-3.8	-4.9	-5.6	-5.6	-5.8	-5.9	-6.3	-6.5	-8.0	-3.7
17-Feb	-6.6	-7.2	-8.1	-8.8	-9.8	-11.1	-12.0	-12.5	-13.0	-13.6	-13.5	-13.5	-13.6	-13.7	-13.9	-14.1	-14.2	-14.5	-14.7	-14.9	-14.9	-15.0	-14.9	-15.0	-12.6	-6.6
18-Feb	-15.1	-15.1	-15.0	-15.0	-14.9	-14.8	-14.6	-14.3	-14.2	-13.8	-13.2	-11.7	-10.7	-10.2	-9.4	-8.6	-7.6	-7.4	-7.4	-7.1	-6.7	-6.4	-8.8	-10.7	-11.4	-6.4
19-Feb	-12.2	-12.9	-13.2	-13.6	-14.5	-16.1	-17.9	-19.2	-19.6	-19.2	-18.0	-16.5	-15.2	-14.5	-14.1	-13.8	-13.8	-14.3	-15.0	-15.6	-16.0	-16.3	-16.5	-16.8	-15.6	-12.2
20-Feb	-17.8	-19.0	-21.0	-22.0	-23.1	-24.3	-25.3	-26.4	-26.4	-24.3	-22.0	-18.9	-16.2	-14.1	-12.5	-11.4	-10.7	-11.1	-12.4	-13.1	-12.8	-12.9	-13.2	-11.8	-17.6	-10.7
21-Feb	-11.7	-11.4	-11.2	-11.1	-10.9	-11.1	-11.0	-11.0	-11.1	-10.7	-9.6	-7.4	-5.8	-4.8	-3.9	-2.9	-2.3	-2.3	-2.4	-2.6	-3.1	-4.1	-5.3	-7.0	-7.3	-2.3
22-Feb	-9.3	-10.0	-11.4	-12.3	-13.6	-14.5	-15.3	-15.6	-15.7	-14.4	-12.4	-9.8	-6.4	-3.5	-0.8	1.1	2.1	2.0	0.2	-1.8	-2.6	-2.4	-4.3	-6.0	-7.4	2.1
23-Feb	-7.8	-7.7	-7.7	-7.6	-6.8	-7.2	-6.9	-7.5	-6.1	-5.7	-3.2	-2.1	0.1	1.6	2.0	2.2	1.8	0.5	-0.5	-2.4	-2.8	-1.5	-2.6	-2.5	-3.3	2.2
24-Feb	-2.9	-3.8	-4.1	-3.9	-4.5	-7.1	-7.7	-9.5	-10.0	-9.3	-7.0	-4.1	-1.4	1.3	3.5	4.8	4.5	3.5	3.6	2.4	0.9	0.2	-0.7	-1.1	-2.2	4.8
25-Feb	-2.3	-2.6	-2.7	-2.8	-2.8	-1.7	-1.3	-0.4	-0.6	0.0	1.3	3.1	4.4	6.4	7.3	7.7	7.3	7.6	6.4	4.8	4.3	4.3	3.5	3.1	2.3	7.7
26-Feb	2.7	2.6	0.9	0.9	0.2	0.6	-0.4	-0.8	0.7	2.1	3.7	5.3	7.1	7.6	7.4	5.3	3.6	2.1	0.4	-0.7	-1.7	-3.2	-5.1	-6.8	1.4	7.6
27-Feb	-8.0	-9.3	-10.7	-12.0	-13.0	-13.8	-14.6	-14.9	-15.1	-15.0	-14.8	-13.8	-13.4	-13.4	-12.8	-12.2	-12.1	-12.5	-12.8	-12.8	-12.6	-12.8	-13.3	-14.6	-12.9	-8.0
28-Feb	-15.6	-16.6	-18.1	-19.2	-19.3	-18.9	-20.1	-21.2	-21.3	-21.9	-21.8	-21.0	-20.4	-20.1	-19.9	-19.5	-19.5	-20.4	-21.8	-22.9	-24.1	-25.8	-26.9	-27.2	-21.0	-15.6
29-Feb	-28.4	-29.4	-30.3	-31.0	-31.3	-32.4	-32.3	-32.3	-32.2	-29.5	-25.2	-21.3	-17.2	-14.2	-12.5	-10.8	-9.9	-9.5	-9.4	-9.3	-9.5	-9.5	-9.9	-10.0	-20.3	-9.3
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	48	6.90	6.90
-20 - 0	597	85.78	92.67
0 - 10	51	7.33	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

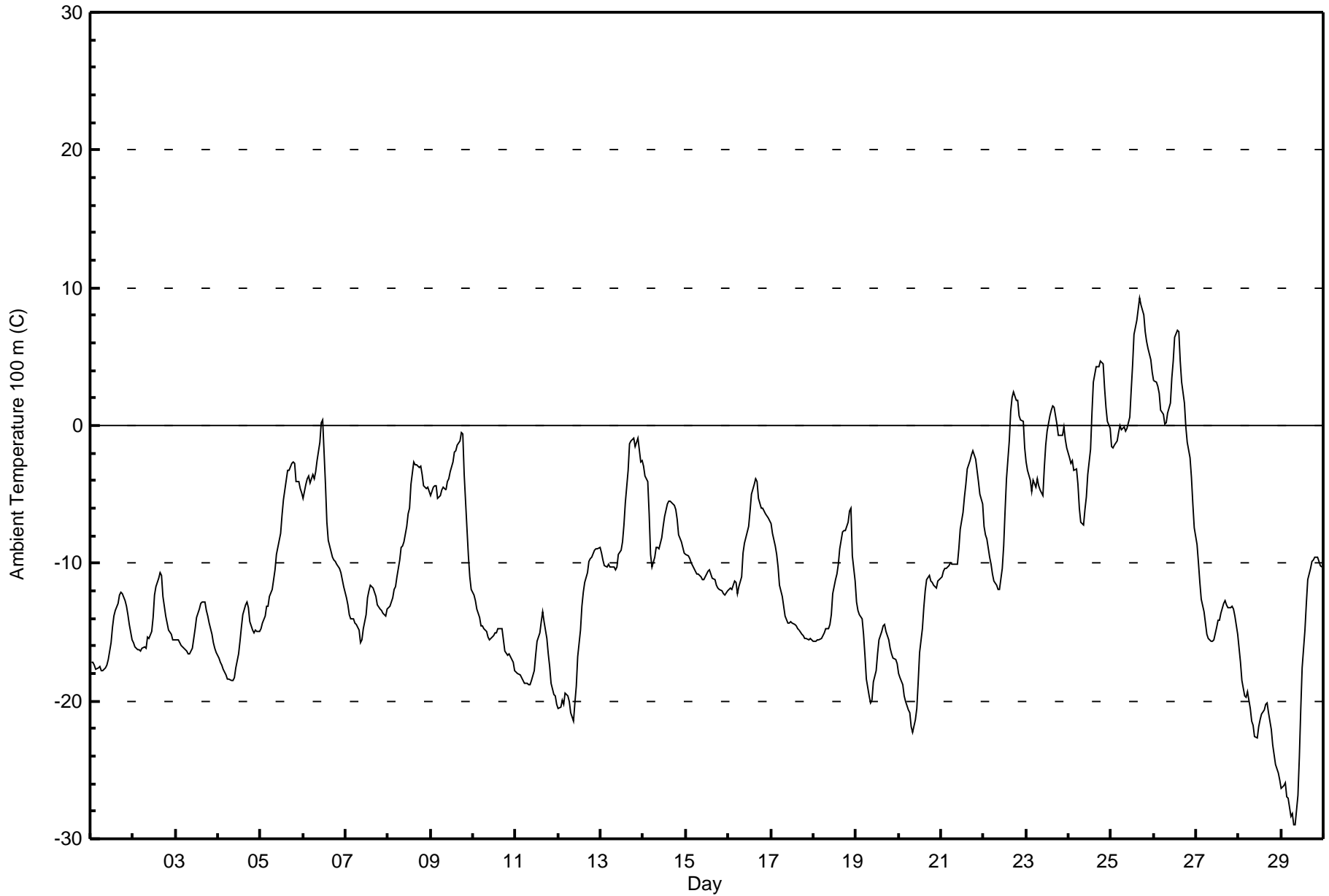


Maximum Value: 9.3 C on Feb 25 17:00 Maximum Daily Average: 3.2 C on Feb 25																							Hours in Service:	696		
Minimum Value: -29.0 C on Feb 29 09:00 Minimum Daily Average: -21.3 C on Feb 28																							Hours of Data:	696		
Maximum Diurnal Average: -7.4 C at hour 17 Minimum Diurnal Average: -13.0 C at hour 9																							Hours of Missing Data:	0		
Monthly Average: -10.41 C Percentiles: P ₁ = -26.5 P ₁₀ = -18.5 Q ₁ = -15.3 Median = -11.3 Q ₃ = -5.0 P ₉₀ = -0.7 P ₉₉ = 6.8																							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	-17.2	-17.2	-17.4	-17.7	-17.6	-17.5	-17.8	-17.8	-17.6	-17.4	-17.0	-15.7	-14.6	-13.8	-13.4	-12.9	-12.3	-12.1	-12.2	-12.7	-13.1	-13.8	-14.4	-15.5	-15.4	-12.1
2-Feb	-15.7	-16.1	-16.2	-16.3	-16.3	-16.1	-16.1	-16.2	-15.3	-15.4	-14.9	-14.0	-12.3	-11.7	-11.1	-10.7	-10.8	-12.4	-13.8	-14.3	-14.8	-15.2	-15.5	-15.6	-14.5	-10.7
3-Feb	-15.6	-15.6	-15.8	-16.0	-16.1	-16.3	-16.4	-16.6	-16.6	-16.2	-15.5	-14.8	-14.0	-13.3	-12.9	-12.8	-12.8	-13.4	-13.8	-14.4	-15.1	-15.8	-16.2	-16.5	-15.1	-12.8
4-Feb	-16.8	-17.1	-17.4	-17.7	-18.1	-18.4	-18.5	-18.5	-18.3	-17.6	-16.5	-15.6	-14.7	-13.7	-13.0	-12.8	-13.2	-14.2	-14.9	-15.0	-14.9	-14.9	-14.9	-14.9	-16.1	-12.8
5-Feb	-14.7	-14.4	-13.9	-13.1	-13.1	-12.4	-11.9	-11.2	-10.5	-9.3	-8.3	-7.8	-6.5	-5.4	-3.9	-3.3	-3.2	-2.7	-2.6	-2.8	-4.1	-4.0	-4.6	-4.9	-7.9	-2.6
6-Feb	-5.3	-4.3	-3.9	-3.7	-4.2	-3.6	-3.9	-3.3	-2.5	-1.2	0.2	0.4	-4.3	-7.0	-8.4	-8.8	-9.5	-9.8	-9.9	-10.0	-10.3	-10.7	-11.2	-11.7	-6.1	0.4
7-Feb	-12.5	-13.0	-13.7	-14.0	-14.1	-14.3	-14.5	-14.8	-15.8	-15.6	-14.8	-13.7	-12.5	-12.0	-11.6	-11.8	-12.1	-12.4	-13.1	-13.3	-13.4	-13.7	-13.9	-13.3	-13.5	-11.6
8-Feb	-13.2	-13.1	-12.5	-11.9	-11.7	-10.9	-9.8	-8.9	-8.8	-8.5	-7.3	-6.4	-6.0	-4.3	-2.7	-2.9	-2.8	-3.1	-3.0	-3.5	-4.3	-4.6	-4.5	-4.8	-7.1	-2.7
9-Feb	-5.1	-4.5	-4.4	-4.4	-5.3	-5.0	-4.7	-4.5	-4.7	-4.1	-3.8	-3.3	-2.7	-1.9	-1.8	-1.4	-1.1	-0.5	-0.6	-3.6	-7.5	-9.5	-11.0	-11.9	-4.5	-0.5
10-Feb	-12.3	-12.8	-13.3	-13.9	-14.5	-14.5	-14.7	-14.9	-15.3	-15.5	-15.5	-15.2	-15.1	-15.1	-14.7	-14.7	-14.8	-15.5	-16.4	-16.7	-16.6	-16.8	-17.2	-17.8	-15.2	-12.3
11-Feb	-17.9	-18.0	-18.1	-18.3	-18.5	-18.7	-18.7	-18.8	-18.8	-18.5	-17.8	-16.6	-15.7	-15.1	-14.2	-13.5	-14.2	-15.4	-16.6	-17.5	-18.8	-19.5	-19.6	-20.2	-17.5	-13.5
12-Feb	-20.5	-20.5	-20.0	-20.2	-19.4	-19.7	-20.1	-20.8	-21.5	-20.2	-18.9	-16.7	-14.9	-13.1	-12.1	-11.4	-10.7	-9.8	-9.7	-9.6	-9.1	-8.9	-8.9	-8.8	-15.2	-8.8
13-Feb	-9.2	-9.7	-10.2	-10.2	-10.1	-10.3	-10.3	-10.2	-10.5	-10.2	-9.4	-9.0	-8.5	-7.2	-5.6	-3.3	-1.3	-1.1	-0.9	-1.5	-1.2	-0.9	-2.6	-2.6	-6.5	-0.9
14-Feb	-2.9	-3.6	-4.1	-6.4	-9.3	-10.2	-9.5	-8.9	-8.8	-8.9	-8.2	-7.3	-6.6	-5.7	-5.5	-5.5	-5.6	-5.8	-6.1	-6.9	-7.9	-8.5	-8.9	-9.2	-7.1	-2.9
15-Feb	-9.4	-9.5	-9.7	-9.9	-10.3	-10.6	-10.8	-10.7	-10.9	-11.2	-11.2	-11.0	-10.6	-10.5	-10.8	-11.1	-11.2	-11.6	-11.8	-11.9	-12.0	-12.2	-12.3	-12.0	-11.0	-9.4
16-Feb	-11.9	-11.8	-11.9	-11.3	-11.4	-12.2	-11.7	-11.0	-9.3	-8.6	-8.1	-7.3	-6.2	-5.0	-4.3	-3.8	-4.1	-5.3	-6.0	-6.0	-6.2	-6.4	-6.7	-6.9	-8.0	-3.8
17-Feb	-7.1	-7.8	-8.7	-9.4	-10.2	-11.6	-12.4	-13.1	-13.8	-14.4	-14.3	-14.3	-14.4	-14.4	-14.6	-14.7	-14.8	-15.2	-15.3	-15.4	-15.5	-15.6	-15.5	-15.6	-13.3	-7.1
18-Feb	-15.7	-15.6	-15.5	-15.6	-15.4	-15.3	-15.1	-14.8	-14.8	-14.4	-13.7	-12.2	-11.2	-10.7	-10.1	-9.0	-7.8	-7.7	-7.7	-7.0	-6.2	-6.0	-9.4	-11.3	-11.8	-6.0
19-Feb	-12.8	-13.4	-13.7	-14.1	-15.1	-16.7	-18.5	-19.6	-20.2	-19.9	-18.6	-17.8	-16.6	-15.6	-14.9	-14.5	-14.5	-14.9	-15.6	-16.1	-16.6	-16.9	-17.0	-17.3	-16.3	-12.8
20-Feb	-18.0	-18.3	-18.8	-19.6	-20.1	-20.7	-20.8	-21.9	-22.2	-21.4	-20.5	-18.6	-16.5	-14.8	-13.2	-12.0	-11.2	-10.9	-11.3	-11.3	-11.6	-11.8	-11.3	-11.2	-16.2	-10.9
21-Feb	-10.9	-10.6	-10.4	-10.3	-10.2	-10.0	-10.0	-10.1	-10.1	-10.1	-8.9	-7.6	-6.3	-5.2	-4.3	-3.2	-2.5	-2.2	-1.9	-2.5	-3.3	-4.1	-5.0	-5.7	-6.9	-1.9
22-Feb	-7.3	-7.9	-8.3	-9.5	-10.1	-10.8	-11.3	-11.5	-11.9	-11.9	-10.3	-8.7	-6.2	-3.8	-1.1	1.0	2.0	2.4	1.9	1.9	0.7	0.4	0.3	-1.7	-5.1	2.4
23-Feb	-2.7	-3.2	-4.0	-4.7	-4.0	-4.4	-3.9	-4.4	-4.7	-5.1	-3.1	-1.5	-0.4	0.8	1.1	1.5	1.3	0.1	-0.7	-0.7	-0.8	-0.2	-1.0	-1.6	-1.9	1.5
24-Feb	-2.4	-2.7	-2.5	-3.2	-3.2	-4.3	-6.0	-7.1	-7.3	-6.1	-5.1	-3.5	-1.7	0.9	3.1	4.3	4.2	4.3	4.7	4.4	2.7	1.4	0.3	-0.2	-1.0	4.7
25-Feb	-1.5	-1.6	-1.5	-1.1	-0.5	0.0	-0.3	-0.1	-0.4	-0.2	0.6	2.5	4.4	6.6	7.6	8.5	9.3	8.7	8.1	6.9	6.1	5.6	4.8	3.9	3.2	9.3
26-Feb	3.3	3.2	2.9	2.3	1.1	0.8	0.1	0.2	0.9	1.7	3.5	4.7	6.4	7.0	6.9	4.7	3.1	1.6	-0.1	-1.3	-2.3	-3.8	-5.7	-7.5	1.4	7.0
27-Feb	-8.6	-10.0	-11.3	-12.6	-13.5	-14.4	-15.1	-15.4	-15.7	-15.7	-15.5	-14.6	-14.2	-14.1	-13.6	-12.9	-12.7	-13.1	-13.2	-13.3	-13.1	-13.4	-13.9	-15.2	-13.5	-8.6
28-Feb	-16.2	-17.2	-18.5	-19.6	-19.7	-19.3	-20.5	-21.4	-21.8	-22.6	-22.6	-21.9	-21.3	-21.0	-20.7	-20.3	-20.2	-20.8	-22.0	-23.2	-23.9	-24.6	-25.2	-25.7	-21.3	-16.2
29-Feb	-26.4	-26.1	-26.0	-26.9	-27.1	-28.3	-28.1	-28.9	-29.0	-26.9	-24.1	-20.6	-17.6	-14.8	-12.9	-11.2	-10.4	-9.9	-9.7	-9.5	-9.6	-9.8	-10.2	-10.3	-18.9	-9.5
																							Diurnal Average			
																							Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 100 m (AT100m) - C
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 100 m (AT100m) - C
Lower Camp Met Tower - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	46	6.61	6.61
-20 - 0	593	85.20	91.81
0 - 10	57	8.19	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

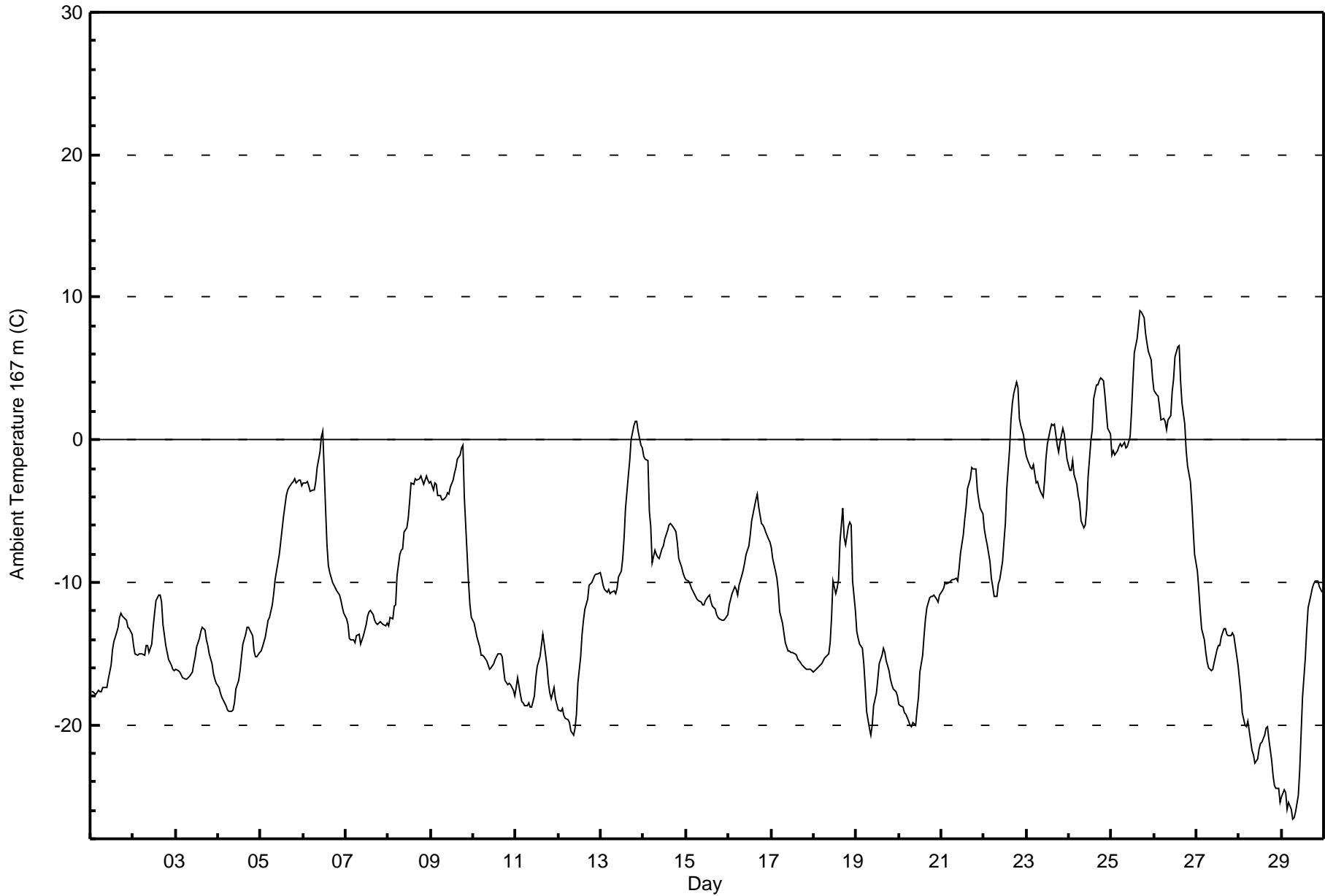


Maximum Value: 9.1 C on Feb 25 17:00 Maximum Daily Average: 3.3 C on Feb 25																						Hours in Service:	696			
Minimum Value: -26.6 C on Feb 29 07:00 Minimum Daily Average: -21.5 C on Feb 28																						Hours of Data:	696			
Maximum Diurnal Average: -7.6 C at hour 17 Minimum Diurnal Average: -12.5 C at hour 8																						Hours of Missing Data:	0			
Monthly Average: -10.28 C Percentiles: P ₁ = -25.1 P ₁₀ = -18.5 Q ₁ = -15.5 Median = -11.3 Q ₃ = -4.3 P ₉₀ = -0.3 P ₉₉ = 6.6																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-17.7	-17.7	-17.8	-17.9	-17.6	-17.6	-17.6	-17.4	-17.4	-17.3	-16.8	-15.8	-14.7	-14.2	-13.8	-13.1	-12.5	-12.2	-12.3	-12.5	-12.7	-13.1	-13.3	-13.7	-15.3	-12.2
2-Feb	-14.5	-15.0	-15.1	-15.1	-15.1	-15.0	-15.2	-14.5	-14.4	-14.9	-14.3	-13.2	-12.1	-11.3	-10.9	-10.9	-11.4	-13.0	-14.4	-14.9	-15.4	-15.8	-16.1	-16.2	-14.1	-10.9
3-Feb	-16.1	-16.2	-16.3	-16.5	-16.7	-16.8	-16.7	-16.7	-16.6	-16.3	-15.7	-15.2	-14.5	-13.9	-13.5	-13.2	-13.3	-14.0	-14.4	-15.0	-15.7	-16.4	-16.8	-17.1	-15.6	-13.2
4-Feb	-17.4	-17.7	-18.0	-18.3	-18.6	-19.0	-19.0	-19.1	-18.9	-18.5	-17.5	-16.9	-16.2	-15.2	-14.3	-13.6	-13.1	-13.1	-13.4	-13.7	-14.8	-15.2	-15.2	-15.0	-16.3	-13.1
5-Feb	-14.9	-14.5	-13.8	-13.3	-12.7	-12.5	-11.5	-10.8	-9.9	-9.2	-8.0	-7.2	-6.3	-5.4	-3.9	-3.5	-3.3	-3.1	-2.9	-2.7	-3.0	-2.8	-2.8	-3.2	-7.5	-2.7
6-Feb	-3.1	-3.0	-2.9	-3.2	-3.7	-3.6	-3.5	-2.9	-1.9	-0.8	0.2	0.6	-4.8	-7.4	-8.8	-9.3	-10.0	-10.2	-10.4	-10.6	-10.9	-11.3	-11.8	-12.2	-6.1	0.6
7-Feb	-12.5	-13.0	-13.9	-14.1	-14.1	-14.2	-13.8	-13.6	-14.3	-14.1	-13.8	-12.9	-12.3	-12.1	-12.0	-12.3	-12.6	-12.9	-13.0	-12.8	-12.8	-12.9	-13.0	-12.8	-13.2	-12.0
8-Feb	-13.0	-12.5	-12.6	-11.7	-11.6	-9.5	-8.1	-7.8	-7.7	-6.5	-6.1	-5.5	-4.3	-3.0	-3.2	-2.7	-2.8	-2.7	-2.5	-2.8	-3.2	-2.6	-2.8	-3.1	-6.2	-2.5
9-Feb	-2.9	-3.5	-3.1	-3.1	-3.9	-3.9	-4.2	-4.2	-4.0	-3.7	-3.8	-3.3	-2.9	-2.4	-1.9	-1.4	-1.1	-0.6	-0.4	-4.0	-8.0	-10.0	-11.6	-12.5	-4.2	-0.4
10-Feb	-12.9	-13.4	-13.9	-14.6	-15.1	-15.1	-15.2	-15.5	-15.8	-16.1	-16.0	-15.7	-15.5	-15.2	-15.0	-15.1	-15.2	-16.1	-16.9	-17.1	-17.1	-17.2	-17.5	-18.0	-15.6	-12.9
11-Feb	-17.4	-16.7	-17.9	-18.4	-18.5	-18.7	-18.7	-18.5	-18.7	-18.7	-17.9	-16.7	-15.9	-15.2	-14.5	-13.7	-14.4	-15.9	-17.1	-17.8	-18.2	-17.4	-18.2	-18.6	-17.2	-13.7
12-Feb	-19.0	-19.0	-18.8	-19.4	-19.6	-19.7	-19.9	-20.4	-20.7	-20.3	-19.2	-17.1	-15.2	-13.6	-12.6	-11.9	-11.2	-10.2	-10.1	-10.0	-9.5	-9.4	-9.4	-9.4	-15.2	-9.4
13-Feb	-9.7	-10.2	-10.5	-10.7	-10.5	-10.8	-10.7	-10.6	-10.8	-10.5	-9.7	-9.3	-8.3	-6.9	-4.8	-2.5	-1.5	0.0	1.0	1.3	1.3	0.6	-0.4	-0.6	-6.0	1.3
14-Feb	-1.2	-1.4	-1.4	-5.0	-6.1	-8.6	-7.8	-8.1	-8.3	-8.4	-7.7	-7.4	-7.0	-6.4	-6.0	-5.8	-6.0	-6.2	-6.5	-7.3	-8.4	-8.9	-9.3	-9.6	-6.6	-1.2
15-Feb	-9.8	-9.9	-10.1	-10.4	-10.8	-11.0	-11.2	-11.4	-11.4	-11.6	-11.6	-11.3	-11.0	-10.9	-11.4	-11.7	-11.9	-12.3	-12.5	-12.5	-12.6	-12.7	-12.6	-12.3	-11.4	-9.8
16-Feb	-11.6	-11.2	-10.8	-10.3	-10.5	-10.9	-10.2	-9.5	-9.1	-8.6	-8.0	-7.4	-6.7	-5.6	-4.7	-4.2	-3.8	-4.7	-5.9	-6.0	-6.2	-6.4	-6.9	-7.2	-7.8	-3.8
17-Feb	-7.5	-8.3	-9.2	-9.8	-10.6	-12.1	-12.9	-13.5	-14.2	-14.8	-14.9	-14.9	-15.0	-15.0	-15.2	-15.4	-15.5	-15.8	-16.0	-16.0	-16.1	-16.1	-16.1	-16.2	-13.8	-7.5
18-Feb	-16.3	-16.2	-16.0	-15.9	-15.7	-15.5	-15.4	-15.2	-15.0	-14.2	-12.5	-9.9	-10.8	-10.4	-9.8	-7.1	-4.8	-6.9	-7.4	-6.1	-5.8	-6.0	-10.0	-11.9	-11.4	-4.8
19-Feb	-13.4	-14.0	-14.3	-14.6	-15.7	-17.3	-19.1	-20.2	-20.7	-20.1	-18.7	-17.8	-16.8	-15.7	-15.1	-14.6	-14.9	-15.5	-16.2	-16.8	-17.2	-17.5	-17.7	-17.9	-16.7	-13.4
20-Feb	-18.5	-18.7	-18.7	-19.1	-19.3	-19.8	-20.0	-20.2	-19.8	-20.1	-19.0	-18.0	-16.3	-15.2	-13.7	-12.6	-11.8	-11.1	-11.0	-11.0	-10.9	-11.2	-11.4	-10.9	-15.8	-10.9
21-Feb	-10.6	-10.4	-10.1	-10.2	-10.0	-9.9	-9.8	-9.8	-9.7	-9.9	-9.0	-8.0	-6.6	-5.6	-4.7	-3.4	-2.8	-2.0	-2.0	-2.0	-3.5	-4.2	-4.8	-5.2	-6.8	-2.0
22-Feb	-6.3	-6.9	-7.4	-8.6	-9.7	-10.3	-11.0	-11.0	-10.1	-9.8	-8.6	-7.1	-5.9	-3.4	-0.7	1.4	2.5	3.3	4.1	3.7	1.5	1.0	0.3	-0.6	-4.2	4.1
23-Feb	-1.2	-1.4	-2.0	-2.0	-1.8	-3.1	-3.0	-3.3	-3.6	-4.1	-2.9	-1.3	-0.3	0.7	1.1	1.0	1.1	-0.3	-0.8	-0.2	0.8	0.4	-0.5	-1.3	-1.2	1.1
24-Feb	-2.2	-2.1	-1.4	-2.5	-3.2	-3.9	-4.4	-5.7	-6.2	-5.9	-4.9	-2.6	-0.1	0.7	2.9	3.8	3.8	4.1	4.3	4.1	3.2	2.0	0.8	0.4	-0.6	4.3
25-Feb	-1.0	-0.8	-1.0	-0.8	-0.5	-0.3	-0.5	-0.1	-0.6	-0.5	0.2	2.0	4.1	6.1	7.1	8.1	9.1	8.9	8.6	7.5	6.8	6.2	5.7	4.3	3.3	9.1
26-Feb	3.5	3.2	3.0	2.3	1.4	1.5	1.3	0.7	1.4	1.7	3.3	4.3	5.8	6.5	6.6	4.2	2.6	1.1	-0.8	-1.9	-2.9	-4.4	-6.3	-8.0	1.3	6.6
27-Feb	-9.2	-10.5	-11.9	-13.2	-14.1	-14.9	-15.6	-16.0	-16.2	-16.1	-15.7	-14.7	-14.5	-14.4	-13.9	-13.2	-13.3	-13.6	-13.7	-13.8	-13.6	-13.8	-14.4	-15.8	-14.0	-9.2
28-Feb	-16.8	-17.7	-19.1	-20.1	-20.2	-19.8	-21.1	-21.9	-22.1	-22.7	-22.4	-21.7	-21.3	-21.2	-20.8	-20.3	-20.1	-21.1	-22.5	-23.6	-24.3	-24.5	-24.5	-25.5	-21.5	-16.8
29-Feb	-25.1	-24.6	-24.7	-25.9	-25.4	-26.0	-26.6	-26.5	-26.1	-25.0	-23.1	-20.6	-18.0	-15.3	-13.3	-11.8	-10.9	-10.4	-10.2	-9.9	-10.0	-10.3	-10.5	-10.7	-18.4	-9.9
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 167 m (AT167m) - C
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 167 m (AT167m) - C
Lower Camp Met Tower - February 2016**

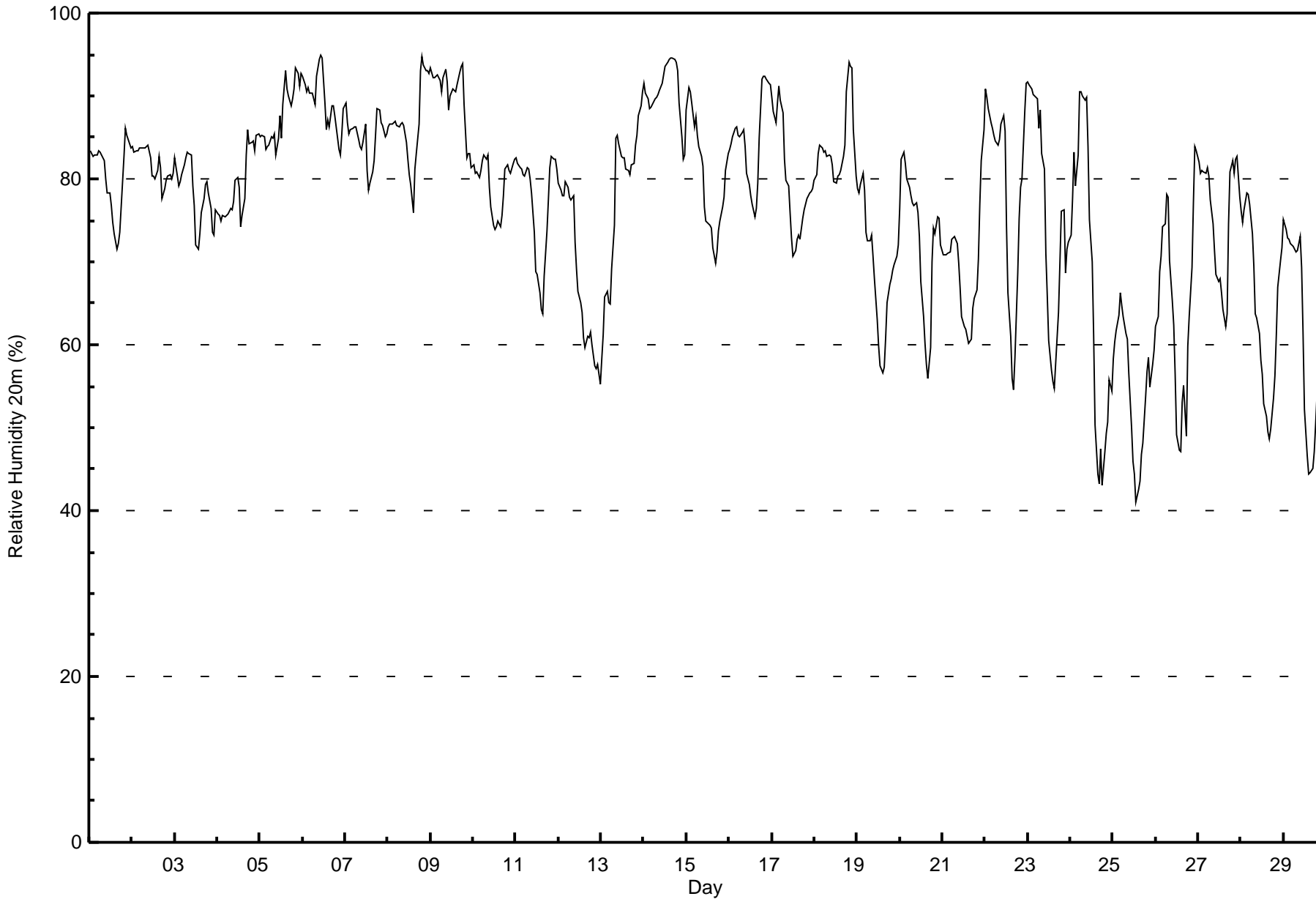
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	41	5.89	5.89
-20 - 0	592	85.06	90.95
0 - 10	63	9.05	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Value: 95 % on Feb 6 11:00 Maximum Daily Average: 90.6 % on Feb 14																		Hours in Service: 696								
Minimum Value: 41 % on Feb 25 14:00 Minimum Daily Average: 55.0 % on Feb 25																		Hours of Data: 696								
Maximum Diurnal Average: 81.6 % at hour 5 Minimum Diurnal Average: 68.9 % at hour 16																		Hours of Missing Data: 0								
Monthly Average: 77.1 % Percentiles: P ₁ = 44 P ₁₀ = 60 Q ₁ = 71 Median = 80 Q ₃ = 85 P ₉₀ = 90 P ₉₉ = 94																		Hours of Calibration: 0								
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	83	83	83	83	83	83	83	83	82	80	78	78	77	75	73	71	72	73	77	83	86	85	85	84	80.2	86
2-Feb	84	83	83	83	84	84	84	84	84	84	83	80	80	80	81	83	81	78	79	80	80	80	80	81	81.8	84
3-Feb	83	80	79	80	81	82	83	83	83	79	77	72	72	73	76	78	79	80	78	77	74	73	76	78.3	83	
4-Feb	76	76	75	76	75	76	76	76	76	77	80	80	79	74	76	78	83	86	84	84	85	83	85	85	79.2	86
5-Feb	85	85	85	84	84	84	85	85	85	83	85	88	85	89	93	91	90	89	90	91	93	93	91	93	87.7	93
6-Feb	92	91	91	91	90	90	90	89	92	94	95	95	89	86	87	86	89	89	88	86	84	83	86	89	89.2	95
7-Feb	89	87	85	86	86	86	86	85	84	84	84	87	81	79	79	81	82	85	88	88	87	86	85	85	84.9	89
8-Feb	86	87	87	87	87	86	86	87	87	86	84	82	80	79	76	81	83	87	93	95	94	93	93	93	86.6	95
9-Feb	93	92	92	92	93	92	91	92	93	92	88	90	91	91	91	91	93	94	94	89	82	83	83	81	90.1	94
10-Feb	82	81	81	80	81	82	83	82	83	79	77	74	74	74	75	74	76	78	81	82	81	81	82	82	79.4	83
11-Feb	82	82	81	81	80	80	81	81	80	78	74	69	69	66	64	64	68	74	77	81	83	82	82	81	76.8	83
12-Feb	79	79	78	78	80	79	78	77	78	72	69	67	65	64	61	60	61	61	62	60	57	57	58	55	68.1	80
13-Feb	58	61	66	66	65	65	69	74	85	85	84	83	82	83	81	81	80	82	82	84	85	88	89	90	77.9	90
14-Feb	92	90	90	88	89	89	90	90	91	92	93	94	94	94	95	95	94	94	93	89	85	82	83	83	90.6	95
15-Feb	88	91	91	89	86	87	85	84	83	81	77	75	75	74	74	72	70	71	74	75	77	78	81	83	80.0	91
16-Feb	83	84	85	86	86	85	85	86	86	84	81	79	78	77	75	76	79	85	92	92	92	92	91	91	84.7	92
17-Feb	90	88	87	89	91	90	88	82	80	79	76	73	71	71	73	73	73	75	76	77	78	78	79	79	79.8	91
18-Feb	80	81	83	84	84	83	83	83	83	83	82	80	79	80	80	81	83	84	90	94	93	93	86	80	83.9	94
19-Feb	79	78	79	81	79	74	73	73	73	71	68	63	60	57	57	57	61	65	67	68	69	70	71	72	69.3	81
20-Feb	77	82	83	82	80	79	78	77	77	77	76	73	68	63	60	58	56	60	70	74	73	75	75	72	72.7	83
21-Feb	71	71	71	71	71	73	73	73	72	70	67	63	62	62	61	60	61	64	66	67	70	77	82	86	69.3	86
22-Feb	91	90	89	87	86	85	85	84	85	87	88	86	74	66	61	56	55	58	69	75	79	80	88	92	78.9	92
23-Feb	92	91	91	90	90	90	86	88	83	81	71	66	60	57	56	55	58	64	70	76	76	69	72	72	75.2	92
24-Feb	73	78	83	79	83	90	91	90	90	84	75	70	61	50	44	43	47	43	47	49	51	56	54	54	67.6	91
25-Feb	58	60	62	64	66	65	63	61	61	57	50	46	44	41	43	44	47	48	54	57	58	55	58	59	55.0	66
26-Feb	62	63	69	71	74	75	78	78	70	65	62	56	49	47	47	53	55	49	60	63	69	77	84	83	65.1	84
27-Feb	82	81	81	81	81	81	80	77	75	71	68	68	68	66	64	62	64	75	81	82	81	82	83	78	75.5	83
28-Feb	76	75	76	78	78	77	73	70	64	63	61	58	56	53	51	49	49	50	54	56	61	67	70	72	64.1	78
29-Feb	75	74	73	73	72	72	72	71	71	73	69	62	52	47	44	45	45	47	50	54	55	63	73	80	63.0	80
																		Diurnal Average								
																		Diurnal Maximum								





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 20m (RH20m) - %
Lower Camp Met Tower - February 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	72	10.34	10.34
60 - 80	275	39.51	49.86
80 - 100	349	50.14	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



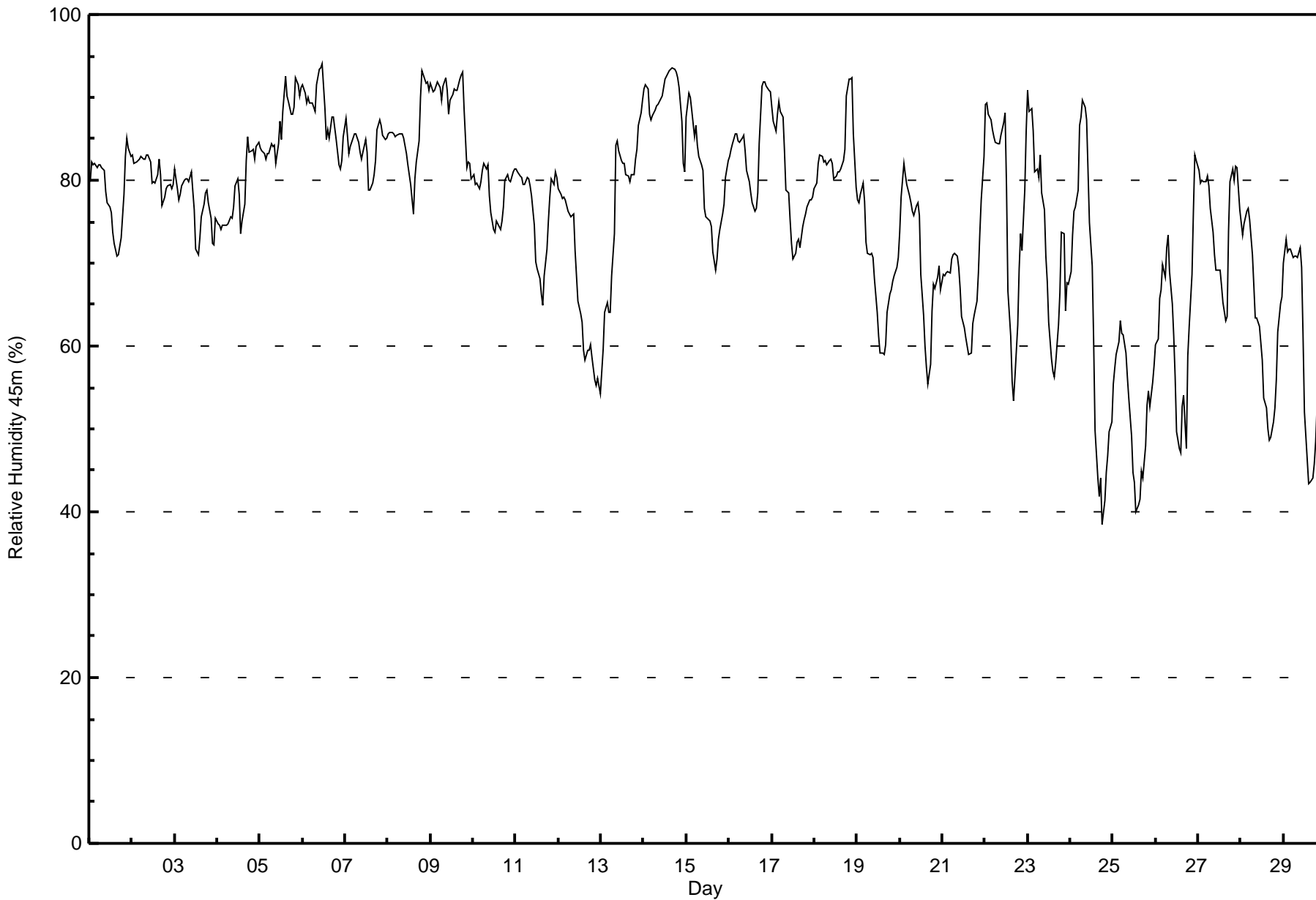
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 45m (RH45m) - %

Lower Camp Met Tower - February 2016

Maximum Value: 94 % on Feb 6 12:00 Maximum Daily Average: 90.0 % on Feb 14																		Hours in Service: 696								
Minimum Value: 39 % on Feb 24 19:00 Minimum Daily Average: 52.4 % on Feb 25																		Hours of Data: 696								
Maximum Diurnal Average: 80.0 % at hour 4 Minimum Diurnal Average: 68.5 % at hour 16																		Hours of Missing Data: 0								
Monthly Average: 75.9 % Percentiles: P ₁ = 44 P ₁₀ = 59 Q ₁ = 69 Median = 79 Q ₃ = 84 P ₉₀ = 89 P ₉₉ = 93																		Hours of Calibration: 0								
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	80	82	82	82	82	82	82	82	81	79	77	77	76	74	72	71	71	72	73	78	83	85	84	83	78.7	85
2-Feb	83	82	82	82	83	83	83	83	83	83	82	80	80	80	81	83	81	77	78	79	79	79	79	80	80.9	83
3-Feb	81	79	78	78	79	80	80	80	80	81	79	76	72	71	73	76	77	79	79	77	75	72	72	75	77.1	81
4-Feb	75	75	74	75	75	75	75	76	75	77	79	80	78	74	75	77	82	85	83	84	84	83	84	85	78.4	85
5-Feb	84	84	83	83	83	83	84	84	84	82	84	87	85	88	92	90	89	88	88	89	92	92	90	91	86.7	92
6-Feb	91	91	89	90	89	89	89	88	92	93	94	94	89	85	86	85	88	88	86	85	82	81	82	85	88.0	94
7-Feb	87	85	83	84	85	86	86	85	83	83	83	85	83	79	79	80	81	82	86	87	87	85	85	85	83.9	87
8-Feb	86	86	86	86	85	85	86	86	86	85	83	82	81	80	76	80	82	85	90	93	93	92	92	91	85.6	93
9-Feb	92	91	91	91	92	91	90	91	92	91	88	90	90	91	91	91	92	93	93	89	82	82	82	80	89.4	93
10-Feb	81	80	80	79	80	81	82	81	82	78	76	74	74	75	75	74	75	77	80	81	80	80	81	81	78.6	82
11-Feb	81	81	81	80	80	79	80	80	79	78	75	70	69	68	66	65	69	72	75	78	80	80	81	80	76.2	81
12-Feb	79	78	78	78	78	76	76	76	76	72	69	65	64	63	60	58	60	59	60	59	56	55	56	54	66.8	79
13-Feb	57	60	64	65	64	64	68	74	84	85	84	82	82	81	80	80	81	81	83	84	87	88	90	77.0	90	
14-Feb	91	92	91	88	87	88	89	89	89	90	91	92	93	93	93	93	93	93	92	91	87	82	81	90.0	93	
15-Feb	88	91	90	88	85	87	84	83	82	81	77	76	75	75	74	71	69	70	73	74	76	77	80	82	79.6	91
16-Feb	83	84	84	86	86	85	85	85	85	84	81	80	78	77	76	77	78	84	91	92	92	91	91	91	84.4	92
17-Feb	89	87	86	88	90	88	88	84	79	78	75	72	71	71	73	73	72	74	75	76	77	78	78	78	79.1	90
18-Feb	79	80	82	83	83	82	82	82	82	83	82	80	80	81	81	81	82	84	90	92	92	92	86	79	83.4	92
19-Feb	78	77	78	80	77	73	71	71	71	71	68	64	61	59	59	59	60	64	66	67	68	68	69	71	68.8	80
20-Feb	74	78	82	81	79	78	77	76	76	77	77	76	69	64	60	57	55	58	64	68	67	68	70	67	70.7	82
21-Feb	69	69	69	69	69	71	71	71	71	70	67	63	62	61	60	59	59	63	64	65	69	74	78	83	67.7	83
22-Feb	89	89	88	87	86	85	85	84	84	85	87	88	79	67	61	56	53	56	63	69	74	71	79	86	77.2	89
23-Feb	91	88	89	86	81	81	80	83	79	76	71	68	63	59	57	56	58	63	66	74	74	64	68	67	72.6	91
24-Feb	69	73	76	77	79	87	88	90	89	87	81	75	70	61	50	44	42	44	39	41	45	47	50	51	64.7	90
25-Feb	55	57	59	61	63	62	61	59	56	54	49	45	44	40	41	41	45	44	48	53	55	53	56	58	52.4	63
26-Feb	60	61	66	67	70	68	72	73	69	65	61	56	50	48	47	53	54	48	59	62	69	76	83	82	63.3	83
27-Feb	81	80	80	80	80	80	79	77	74	71	69	69	69	67	65	63	63	74	80	81	80	82	81	77	75.1	82
28-Feb	75	73	75	76	77	75	71	67	63	63	62	60	58	54	53	50	49	49	51	53	56	62	65	66	62.6	77
29-Feb	70	73	71	72	72	71	71	71	71	72	70	61	52	46	43	44	44	46	49	53	54	62	72	79	62.0	79
																		Diurnal Average								
																		Diurnal Maximum								





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 45m (RH45m) - %
Lower Camp Met Tower - February 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	2	0.29	0.29
40 - 60	81	11.64	11.93
60 - 80	305	43.82	55.75
80 - 100	308	44.25	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 100m (RH100m) - %

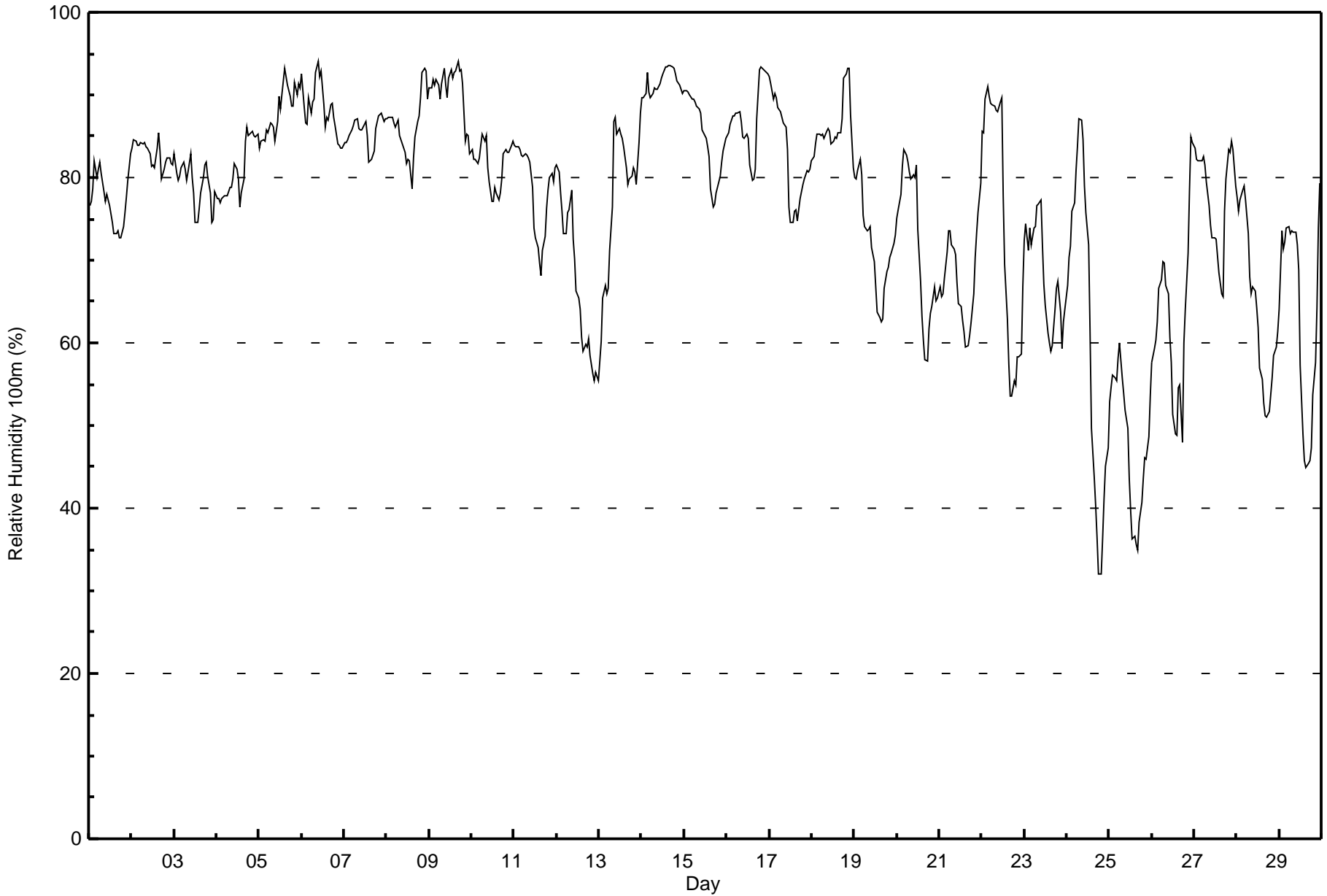
Lower Camp Met Tower - February 2016

Maximum Value: 94 % on Feb 6 10:00 Maximum Daily Average: 91.6 % on Feb 14																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 32 % on Feb 24 19:00 Minimum Daily Average: 47.8 % on Feb 25 Maximum Diurnal Average: 81.1 % at hour 7 Minimum Diurnal Average: 70.6 % at hour 17 Monthly Average: 76.8 % Percentiles: P ₁ = 36 P ₁₀ = 58 Q ₁ = 71 Median = 80 Q ₃ = 86 P ₉₀ = 90 P ₉₉ = 93																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	77	79	82	80	81	82	80	78	77	78	77	76	75	73	73	74	73	73	74	76	78	80	83	77.2	83
2-Feb	83	84	84	84	84	84	84	84	84	84	83	81	81	81	83	86	83	80	81	82	82	82	82	82	82.9	86
3-Feb	83	81	80	80	81	82	81	80	81	83	80	78	75	75	76	78	80	81	82	80	78	75	75	78	79.2	83
4-Feb	77	77	77	77	78	78	78	79	79	80	82	81	80	76	78	80	84	86	85	85	86	85	85	85	80.8	86
5-Feb	84	84	85	84	86	85	87	87	86	84	87	90	88	90	93	92	91	90	89	89	91	90	91	91	88.1	93
6-Feb	93	88	87	87	90	88	89	90	93	94	92	93	89	86	87	87	89	89	87	86	84	84	84	84	88.2	94
7-Feb	84	84	85	85	86	86	87	87	86	86	86	86	87	85	82	82	83	83	86	87	88	88	87	87	85.5	88
8-Feb	87	87	87	87	87	86	87	85	85	84	83	82	82	82	79	82	85	87	87	90	93	93	93	89	86.2	93
9-Feb	91	91	92	91	92	91	89	91	93	91	90	92	93	92	93	93	94	93	93	91	84	85	85	83	90.6	94
10-Feb	83	82	82	82	82	84	85	84	85	81	79	77	77	79	78	77	78	80	83	83	83	83	84	84	81.6	85
11-Feb	84	84	84	83	83	83	83	83	82	82	79	74	73	71	70	68	71	73	76	79	80	81	80	81	78.5	84
12-Feb	82	81	78	76	73	73	76	76	78	73	70	66	65	64	61	59	60	60	61	59	56	55	56	55	67.2	82
13-Feb	58	60	65	67	66	67	71	76	87	87	85	86	85	85	84	81	79	80	80	81	81	79	84	88	77.6	88
14-Feb	90	90	90	93	90	90	91	91	91	91	92	93	93	93	94	94	93	93	93	93	92	91	91	90	91.6	94
15-Feb	90	91	90	90	89	89	89	89	88	88	86	85	85	84	82	79	76	77	78	79	80	82	83	85	84.8	91
16-Feb	85	85	86	87	87	88	88	88	87	85	85	85	85	82	80	80	81	87	93	93	93	93	93	93	87.0	93
17-Feb	92	91	89	90	90	89	88	87	87	86	83	76	75	75	76	76	75	77	78	79	80	81	81	81	82.6	92
18-Feb	82	82	84	85	85	85	85	85	86	86	86	84	84	85	85	85	85	87	92	93	93	93	88	81	86.1	93
19-Feb	80	80	81	82	80	75	74	73	74	74	72	70	67	64	63	63	63	67	69	69	70	71	72	73	71.9	82
20-Feb	75	76	78	81	83	83	82	81	80	80	80	82	74	68	63	60	58	58	62	64	64	67	65	65	72.0	83
21-Feb	67	66	66	68	71	74	74	72	71	71	67	65	64	63	61	60	60	61	62	66	70	73	76	79	67.7	79
22-Feb	86	85	89	91	90	89	89	89	88	88	89	90	78	69	63	57	54	54	55	55	58	58	59	67	74.6	91
23-Feb	72	74	71	74	72	74	74	77	77	77	72	67	65	61	60	59	60	64	67	68	64	59	62	64	68.1	77
24-Feb	67	70	72	76	77	81	84	87	87	85	79	76	72	61	50	44	40	36	32	32	36	41	45	47	61.6	87
25-Feb	53	55	56	56	55	58	60	56	54	52	50	44	40	36	37	36	35	38	41	43	46	46	49	54	47.8	60
26-Feb	58	59	60	62	67	68	70	70	67	66	61	58	51	49	49	55	55	48	60	64	71	78	85	84	63.1	85
27-Feb	84	82	82	82	82	83	82	80	77	74	73	73	73	70	68	66	66	76	80	83	83	84	83	79	77.7	84
28-Feb	78	76	77	79	79	77	73	68	66	67	66	64	62	57	56	53	51	51	52	54	56	58	60	61	64.2	79
29-Feb	64	74	71	72	74	74	73	74	73	73	72	69	57	49	46	45	45	46	47	54	58	64	74	79	63.6	79
	78.9	79.3	79.6	80.5	80.7	80.8	81.1	80.9	81.0	80.3	78.8	77.3	75.0	72.6	71.3	70.6	70.6	71.5	73.2	74.3	75.1	75.8	76.9	77.7	Diurnal Average	
	93	91	92	93	92	91	90	91	93	94	92	93	93	93	93	94	94	93	93	93	93	93	93	93	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 100m (RH100m) - %
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 100m (RH100m) - %
Lower Camp Met Tower - February 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	10	1.44	1.44
40 - 60	78	11.21	12.64
60 - 80	251	36.06	48.71
80 - 100	357	51.29	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 167m (RH167m) - %

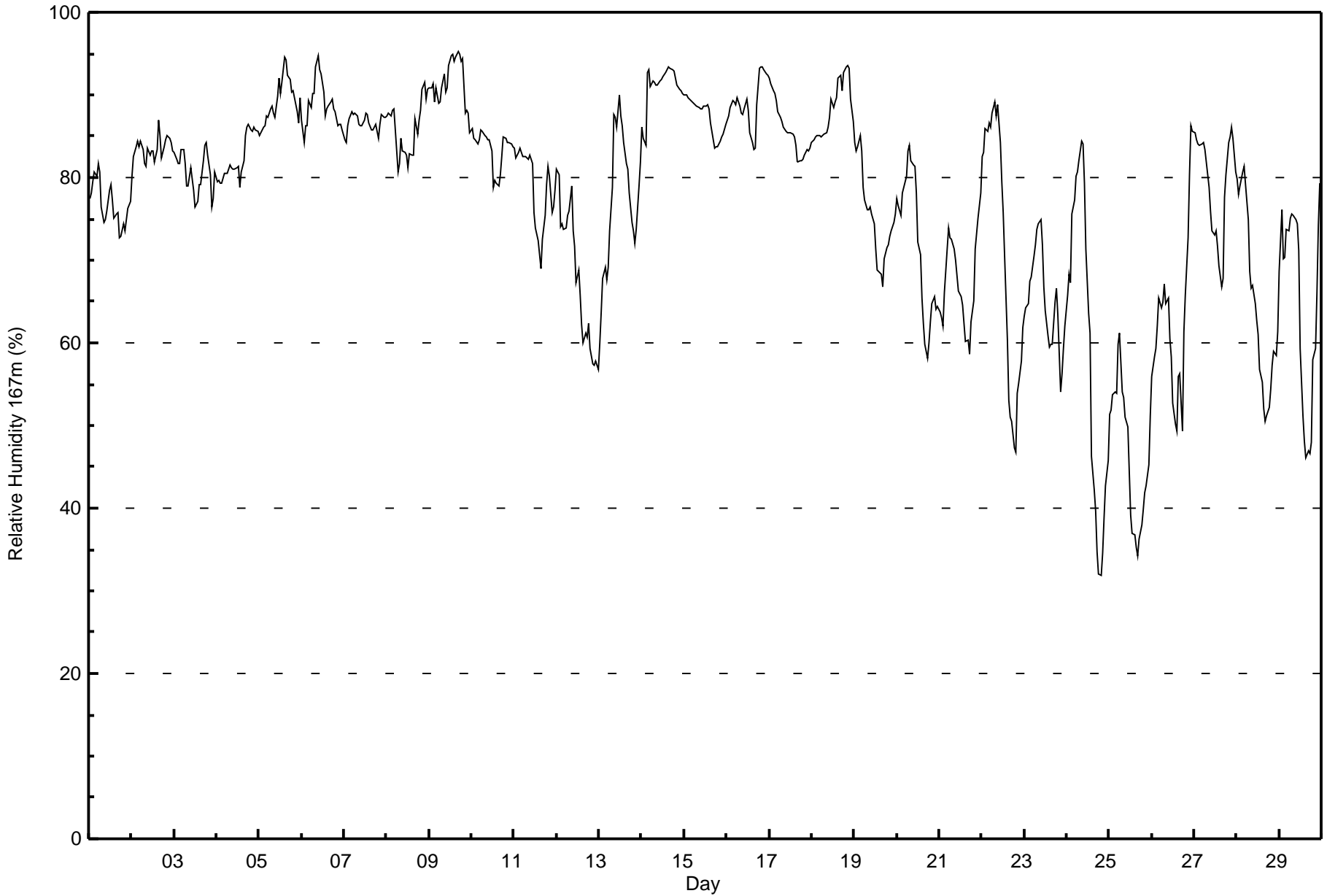
Lower Camp Met Tower - February 2016

Maximum Value: 95 % on Feb 9 17:00 Maximum Daily Average: 91.5 % on Feb 9																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 32 % on Feb 24 20:00 Minimum Daily Average: 46.5 % on Feb 25 Maximum Diurnal Average: 81.2 % at hour 7 Minimum Diurnal Average: 72.4 % at hour 16 Monthly Average: 77.3 % Percentiles: P ₁ = 37 P ₁₀ = 58 Q ₁ = 71 Median = 82 Q ₃ = 86 P ₉₀ = 90 P ₉₉ = 95																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	77	78	80	81	80	82	81	76	75	75	76	78	79	77	75	76	76	73	73	74	74	75	76	77	76.8	82	
2-Feb	80	83	84	84	84	84	83	82	81	84	83	83	83	82	83	87	85	82	84	85	85	85	84	83	83.5	87	
3-Feb	83	82	82	82	83	83	82	79	79	81	80	79	76	77	79	79	82	84	84	83	80	76	77	81	80.6	84	
4-Feb	80	80	79	79	80	81	80	82	81	81	81	81	79	81	82	85	86	87	86	86	86	86	86	86	82.3	87	
5-Feb	85	85	86	86	87	87	88	89	88	87	90	92	90	92	95	94	92	92	90	91	90	88	87	90	89.2	95	
6-Feb	87	84	86	86	89	89	90	90	93	95	93	93	90	87	88	89	89	90	88	88	86	86	86	86	88.8	95	
7-Feb	85	84	86	87	88	88	88	87	86	86	86	87	88	88	87	86	86	86	86	86	85	86	88	87	87	86.6	88
8-Feb	87	88	88	88	88	86	81	82	85	83	83	83	81	83	83	83	87	85	87	88	91	92	90	91	85.8	92	
9-Feb	91	91	91	89	91	89	89	91	93	90	91	93	95	95	94	95	95	95	94	94	88	88	88	85	91.5	95	
10-Feb	86	85	85	84	85	86	86	85	85	85	85	83	79	80	79	79	80	83	85	85	84	84	84	84	83.5	86	
11-Feb	84	82	83	83	83	83	82	82	82	83	82	76	74	72	71	69	72	75	79	81	80	76	76	78	78.8	84	
12-Feb	81	80	74	74	74	74	75	76	79	74	72	67	69	66	62	60	61	61	62	59	57	57	58	57	67.9	81	
13-Feb	60	64	68	69	68	69	74	79	88	87	86	90	87	86	84	82	81	78	75	73	72	74	79	82	77.3	90	
14-Feb	86	85	84	93	93	91	92	91	91	91	92	92	93	93	93	93	93	93	93	92	91	91	90	90	91.1	93	
15-Feb	90	90	90	89	89	89	89	89	89	88	88	88	89	89	88	87	85	84	84	84	84	85	85	86	87.4	90	
16-Feb	87	87	89	89	89	89	90	89	88	88	88	90	88	86	84	83	84	89	93	93	93	93	93	92	88.9	93	
17-Feb	92	91	91	90	89	88	87	87	86	86	86	85	85	85	85	84	82	82	82	82	83	83	83	84	85.8	92	
18-Feb	84	85	85	85	85	85	85	85	86	86	87	89	88	89	90	92	92	91	93	93	93	93	90	87	88.3	93	
19-Feb	84	83	84	85	83	79	77	76	76	76	76	74	71	69	69	68	67	70	72	72	73	74	75	76	75.3	85	
20-Feb	77	77	75	78	79	80	83	84	82	82	81	78	72	71	65	62	60	58	60	62	65	66	64	64	71.9	84	
21-Feb	64	63	62	66	71	74	73	73	71	70	68	66	66	65	62	60	60	59	62	65	71	73	75	78	67.4	78	
22-Feb	83	83	86	86	87	86	88	89	87	89	84	79	76	71	60	53	51	50	47	47	54	55	58	62	71.3	89	
23-Feb	63	64	65	67	68	70	72	74	74	75	72	67	64	61	59	60	60	65	67	63	54	56	59	62	65.1	75	
24-Feb	66	68	67	76	77	80	81	82	84	84	79	71	63	61	46	42	40	35	32	32	35	39	43	46	59.6	84	
25-Feb	51	52	54	54	54	60	61	54	53	51	50	44	39	37	37	35	34	36	38	40	42	43	45	51	46.5	61	
26-Feb	56	58	59	62	65	64	65	67	65	65	61	58	53	50	49	56	56	49	61	66	73	80	86	86	63.0	86	
27-Feb	85	84	84	84	84	84	83	82	79	76	73	73	74	72	69	67	68	78	80	84	85	86	85	81	79.2	86	
28-Feb	80	78	79	81	81	79	75	69	67	67	65	63	61	57	55	52	50	51	52	54	57	59	59	61	64.7	81	
29-Feb	69	76	70	70	74	73	75	76	75	75	74	71	59	51	48	46	47	47	48	58	59	66	74	79	65.1	79	
	78.7	79.0	79.1	80.3	81.0	81.1	81.2	80.9	81.0	80.7	79.7	78.5	76.4	74.8	73.2	72.4	72.5	72.6	73.7	74.5	74.9	75.8	76.6	77.6	Diurnal Average		
	92	91	91	93	93	91	92	91	93	95	93	93	95	95	95	95	95	95	94	94	93	93	93	92	Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 167m (RH167m) - %
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 167m (RH167m) - %
Lower Camp Met Tower - February 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	14	2.01	2.01
40 - 60	73	10.49	12.50
60 - 80	217	31.18	43.68
80 - 100	392	56.32	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Speed: 22 km/h on Feb 13 05:00	Maximum Daily Speed Average: 14.6 km/h on Feb 13	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 29 02:00	Minimum Daily Speed Average: 0.8 km/h on Feb 20	Hours of Data: 646
Maximum Diurnal Speed Average: 2.4 km/h at hour 12	Minimum Diurnal Speed Average: 0.6 km/h at hour 9	Hours of Missing Data: 50
Monthly Average Velocity: 1.0 km/h 59.4 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 19	Percent Operational Time: 92.8

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	NNW2	N2	NNW2	NNW2	N2	SE2	SSE1	SE1	SE4	SE5	SSE5	SSE9	SSE10	SSE9	SSE9	SE4	E2	NNW2	N3	N3	NNW1	NNW2	NNW2	NNW3	SE1.5	SSE10	
2-Feb	NNW2	NNW3	NNW2	NNW3	NW1	NNW2	NNW2	WNW0	SSE2	SSE3	SSE6	SSE10	SSE10	SSE6	E1	NNW7	NNW7	N11	NNW7	N6	N6	NNW5	NNW5	NNW4	N1.6	N11	
3-Feb	NNW3	N3	N4	N2	NNW2	E1	N1	N2	NW1	N2	S1	S2	SSE4	SE3	WSW1	N4	NNW4	N5	N5	NNE7	NNE8	NNE7	N7	N7	N2.7	NNE8	
4-Feb	N6	NNW5	NNW5	N5	NNW6	N6	NNE5	N4	N5	NNW4	NW3	NW1	SSW2	SSE6	SSE4	S2	N3	N5	NNW6	NNW4	NNW4	N3	NW3	WSW3	NNW2.8	SSE6	
5-Feb	SE3	ESE2	SE2	SSE6	SE6	SSE1	SSE4	SSE2	SSE2	SSE8	SSE10	SSE8	SSE4	SSE9	SSE12	SSE7	S7	S4	SSE7	SSE7	SSE3	SE5	SE3	S2	SSE5.1	SSE12	
6-Feb	SSE4	SSE6	SSE5	SSE8	SSE4	SSE7	SE6	ESE4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	SSE8	
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	----	----	
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE12	SSE11	SSE7	S3	WSW1	WSW2	W2	W1	NNW2	NNW2	NNW3	NW1	W1	NNW3	----	SSE12
9-Feb	NW2	NE1	S1	N2	NNW2	SSW1	SE2	SSE2	SSE4	SSE4	SSE4	SSE3	WNW0	N2	N3	SSE1	SE3	SSE6	NE2	N14	N12	N13	NNE11	N12	NNE2.0	N14	
10-Feb	N9	N11	N11	NNE14	NNE9	NNE11	NNE9	NNE7	NNE9	NNE9	NNE7	N7	NNE7	N9	NNE8	N7	N9	N7	N5	N4	N5	N6	NNW4	NNW5	N7.7	NNE14	
11-Feb	N4	N5	NNW4	NNW5	N6	NNW5	NNW4	NNW4	NNW4	NNW5	NNW6	N6	N7	N8	NNW8	N8	NNW6	NNW5	NNW4	N5	N4	N4	NW3	NW3	NNW4.9	N8	
12-Feb	NNW3	NNW2	N3	NNW3	ENE3	E4	SE6	SE2	SE4	SE8	SSE10	SSE17	SSE16	SE14	SE17	SE18	SE19	SE19	SE19	SE19	SSE19	SSE21	SSE22	S19	SSE10.6	SSE22	
13-Feb	SSE19	SSE16	SSE19	SSE21	SSE22	S19	SSE17	S14	SSE12	SSE12	SSE15	SSE18	SSE13	SSE13	SSE13	SSE14	SSE12	SSE11	SSE13	SSE12	SSE14	SSE12	SSE11	SE10	SSE14.6	SSE22	
14-Feb	ESE4	NNE4	NNE3	N6	NNW4	NNW3	W1	NW2	NW2	N2	N3	N3	NE1	N2	N4	NNE5	NNE4	N4	NNE6	N6	N6	N6	N6	NNW6	N3.4	N6	
15-Feb	N6	N5	N6	N8	N9	N9	N6	NNE7	N6	N8	NNE7	N7	N8	N9	N9	NNE7	NNE5	N6	N4	N3	NNE3	NW3	N3	NW3	N5.9	N9	
16-Feb	NNW2	N4	NNW4	NNW3	NNW5	NNW3	NNW3	NW2	NW1	N3	N2	NNW3	NNW1	NNE1	N3	N4	N5	NNW6	NNW5	NNW5	NNW5	NNW5	NNW5	NNW6	NNW7	NNW3.6	NNW7
17-Feb	NNW7	NNW7	N10	N9	NNE8	N10	N12	N10	N10	NNE7	NNE9	NNE9	N9	N10	NNE9	N8	NNE7	NNE8	NNE7	N8	N7	N7	NNE6	N7	N8.3	N12	
18-Feb	N6	N5	N4	NNW4	NNW5	N6	N5	NNW5	NNW4	NNW5	N5	N5	NNW5	NNW7	NNW6	NW3	W2	N4	NNW4	NNW2	NW2	NNW5	N13	N13	N5.0	NNE13	
19-Feb	NNE10	N9	N7	N6	N7	N10	NNE7	NNE4	NW2	NNW3	NW1	NNE4	N5	NNE6	N7	N7	NNE5	NNE5	NE5	NNE6	NNE6	NNE5	N5	NNW4	N5.4	N10	
20-Feb	NNW3	NNW3	NW3	NNW2	NNW2	NNW1	NNW1	NNW2	NNW1	S1	SSE6	SSE6	SSE7	SSE7	SSE6	SSE5	SSE3	S0	NW1	NNW1	NNW2	NNW3	NW0	S1	SSE0.8	SSE7	
21-Feb	SE1	SE4	SSE8	SSE9	SSE8	SSE9	SSE8	SSE8	SSE9	SSE8	SSE10	SSE10	SSE13	SSE12	SSE11	SSE11	SSE11	SSE11	SSE9	SSE10	SE6	SE1	N3	WNW1	W4	SSE7.1	SSE13
22-Feb	NW3	NW3	NW2	NNW3	NNW3	NW2	SW1	SSE1	SSE3	SSE6	SSE9	SSE10	SSE11	SSE8	SSE9	SSE8	SSE6	SSE1	WNW3	WNW3	W2	NW1	NE0	ESE1	SSE2.2	SSE11	
23-Feb	W1	S2	SSE4	SE6	SE9	SE11	SE9	SE11	SE6	SE7	S1	N3	N7	N6	NNE6	NNW5	N4	N4	WNW2	W4	WSW3	W4	W7	NW4	SE1.1	SE11	
24-Feb	N3	ESE3	NW0	NW5	WSW3	SE4	SSE8	SSE10	SSE10	SSE10	SSE10	SSE9	SSE8	SSE5	S3	SSE4	SSE5	S10	S10	S11	S11	S13	SSE19	SSE16	SSE6.9	SSE19	
25-Feb	SE11	SE14	SSE16	SSE16	SSE16	SSE17	SSE11	SSE7	SSE14	SE7	SW7	SW10	WSW9	W12	W12	W12	W10	W7	W5	W11	W9	W15	W14	W9	SSW6.3	SSE17	
26-Feb	SW3	SSE7	SE8	SSE12	SSE9	SSE11	SSE10	S7	W14	WNW7	W5	WNW6	NNW5	NNW6	NNE8	NNE9	NNE9	N12	NNE12	NE11	NNE11	NNE12	N11	NNE12	NNE2.5	W14	
27-Feb	N11	N13	N14	N12	N12	N12	N11	N11	N11	N10	N10	NNW9	NNW8	N8	N6	NNW5	NNW4	N3	NNE3	NNW2	NNE1	N8	N8	N10	N8.3	N14	
28-Feb	NNE9	NNE10	N8	NNW4	NNW5	N5	N6	N8	N10	NNE13	NNE10	N9	N10	NNE10	N11	N9	N8	N9	NNW4	NNW3	N3	N5	WNW3	NNW2	N7.0	NNE13	
29-Feb	ESE0	W0	NNW3	NNW2	NNW3	NW2	NNW2	NNW1	NW1	S1	SSE8	SSE10	SSE11	SSE12	SSE11	S6	S5	S5	SSW4	S7	SSE9	SSE9	SSE10	SSE10	SSE4.2	SSE12	
NNE1.9 NNE2.0 NNE1.6 NE1.2 NE1.2 ENE1.4 E1.4 E1.0 ENE0.6 E1.2 SE2.2 SE2.4 SE2.0 ESE1.6 E1.2 ENE0.9 NE0.9 NNE1.6 NNE1.0 NNE1.3 NNE1.3 N1.6 N1.2 N1.5																								Diurnal Average			
SSE19 SSE16 SSE19 SSE21 SSE22 S19 SSE17 S14 W14 NNE13 SSE15 SSE18 SSE16 SE14 SE17 SE18 SE19 SE19 SE19 SE19 SSE19 SSE21 SSE22 S19																								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

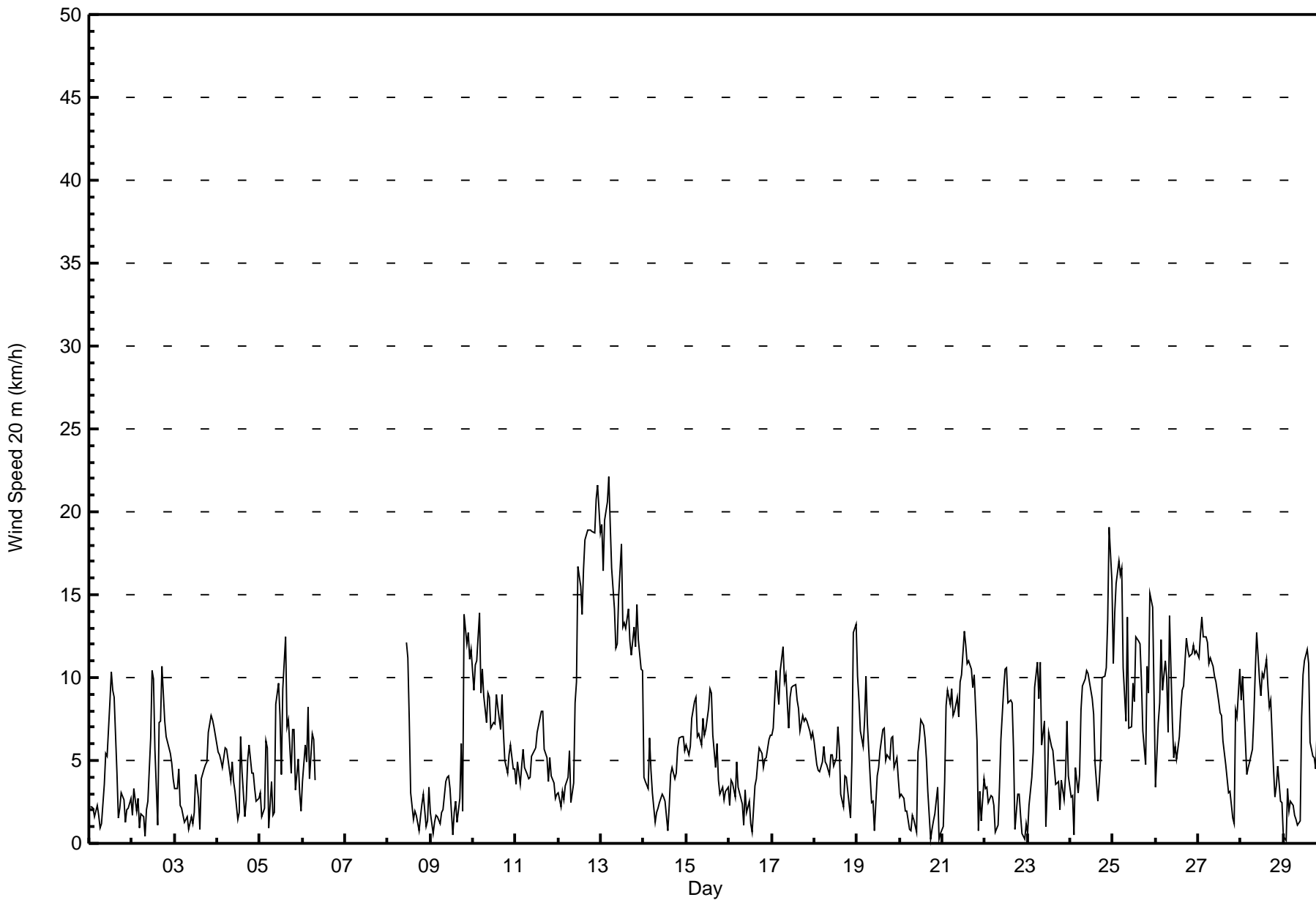
Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 12 12:00 Minimum Value: 0 km/h on Feb 29 01:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 6														Hours in Service: 696 Hours of Data: 646 Hours of Missing Data: 50 Hours of Calibration: 0 Percent Operational Time: 92.8											
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	1	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	1	1	1	1	1	1	1	1	3
2-Feb	1	2	1	1	1	2	1	1	2	2	3	3	2	2	2	3	3	4	3	3	2	2	2	1	4
3-Feb	1	1	2	2	2	1	1	1	1	1	1	2	1	1	2	2	2	2	3	3	3	3	2	3	
4-Feb	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1	1	2	
5-Feb	2	1	1	2	2	1	2	1	2	3	3	2	2	3	5	3	2	2	3	3	2	2	3	5	
6-Feb	2	2	3	3	2	2	4	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	
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	--	
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	3	3	2	1	2	1	1	1	1	2	1	1	3	
9-Feb	1	1	2	2	1	1	1	2	2	2	3	3	1	1	2	1	1	3	4	6	5	6	5	6	
10-Feb	4	4	5	6	4	4	4	3	5	4	3	3	4	3	3	2	3	3	2	2	2	2	2	6	
11-Feb	1	2	2	2	2	2	2	1	2	2	2	2	3	3	3	3	2	2	2	2	2	1	1	3	
12-Feb	1	1	1	2	2	2	3	2	3	5	5	7	6	5	6	6	6	7	6	6	6	5	6	7	
13-Feb	5	5	5	4	5	5	4	3	3	3	3	4	4	3	5	4	5	3	3	2	2	2	3	5	
14-Feb	3	2	2	2	2	2	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	
15-Feb	2	2	2	3	3	3	2	3	2	3	3	2	3	3	3	3	2	2	2	1	1	2	1	3	
16-Feb	1	1	1	2	2	2	1	1	2	2	1	1	2	1	1	2	2	2	2	2	2	2	2	2	
17-Feb	2	3	4	4	3	4	5	4	4	4	4	4	3	4	3	3	3	3	3	3	2	2	3	5	
18-Feb	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	1	2	1	1	1	4	4	5	5	
19-Feb	4	4	3	2	4	4	3	2	1	1	1	2	2	3	3	3	2	2	2	3	2	2	1	4	
20-Feb	1	1	1	1	1	1	0	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	2	
21-Feb	1	2	1	2	2	2	2	2	2	3	2	3	3	4	3	2	2	2	3	4	2	1	1	4	
22-Feb	1	2	2	1	1	1	1	1	2	2	3	3	3	3	3	3	2	2	2	2	2	1	1	3	
23-Feb	1	1	2	3	2	3	4	2	3	3	1	2	2	3	2	2	2	2	1	2	2	2	2	4	
24-Feb	2	1	1	2	2	2	2	2	2	2	2	3	3	2	1	1	2	3	2	2	4	3	3	4	
25-Feb	4	3	3	3	3	3	3	4	2	4	3	3	3	4	4	3	3	4	4	2	3	5	4	5	
26-Feb	2	4	3	2	2	3	3	3	7	4	3	3	3	3	3	5	4	5	5	5	5	5	4	7	
27-Feb	4	5	5	5	4	4	4	4	4	4	4	3	3	3	2	2	2	1	2	1	2	3	3	5	
28-Feb	4	4	3	2	2	3	2	3	5	6	4	3	4	5	4	4	3	3	2	1	2	1	1	6	
29-Feb	0	1	1	1	1	1	1	1	1	1	3	2	3	4	4	3	2	2	1	3	3	2	2	4	
														Diurnal Maximum											
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	320	49.54	49.54
6 - 11	253	39.16	88.70
12 - 19	69	10.68	99.38
20 - 28	4	0.62	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

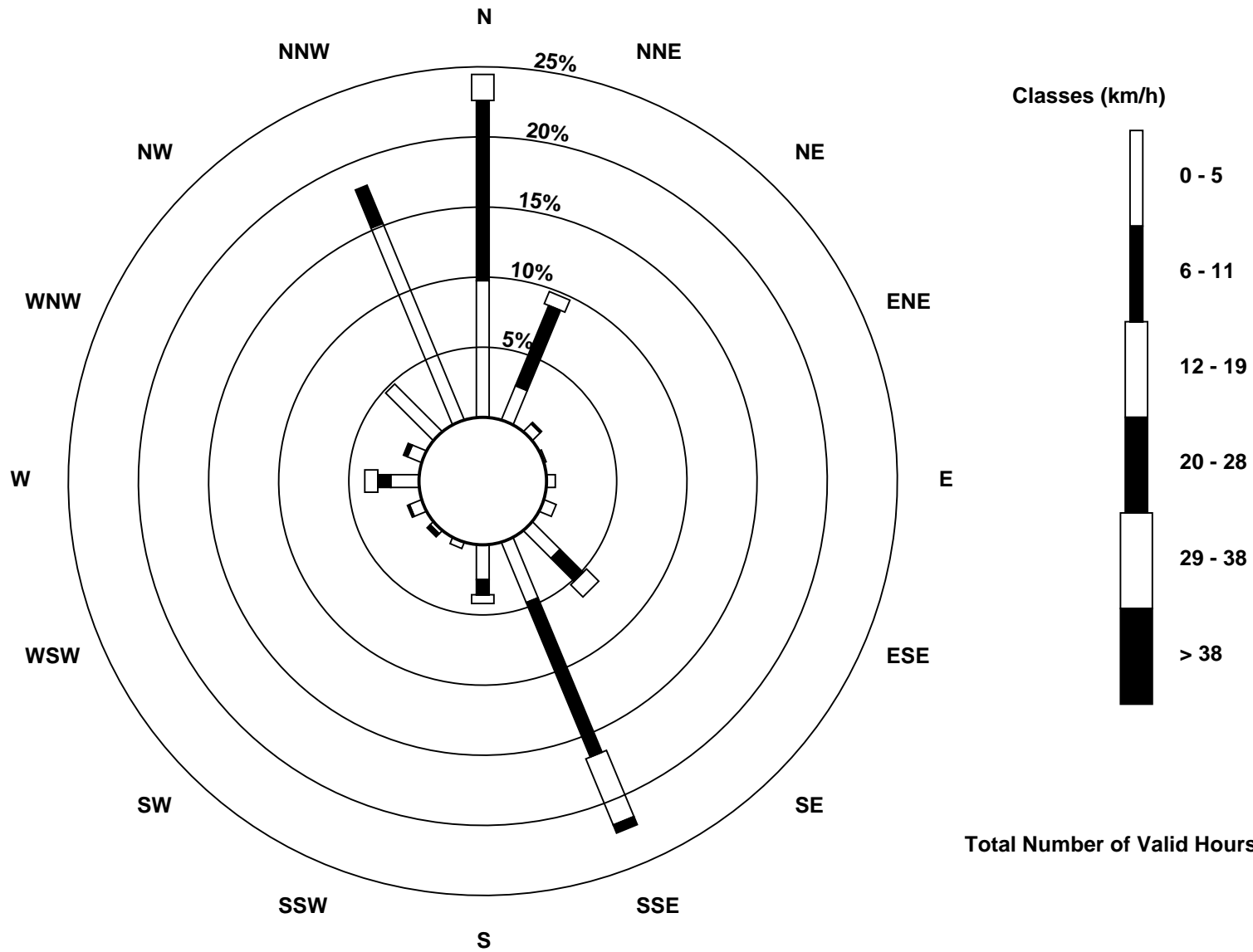
Total Number of Valid Hours: 646

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Maximum Speed: 26 km/h on Feb 12 22:00	Maximum Daily Speed Average: 18.1 km/h on Feb 13	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 29 02:00	Minimum Daily Speed Average: 0.2 km/h on Feb 23	Hours of Data: 688
Maximum Diurnal Speed Average: 3.1 km/h at hour 2	Minimum Diurnal Speed Average: 0.8 km/h at hour 9	Hours of Missing Data: 8
Monthly Average Velocity: 1.9 km/h 39.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 25	Percent Operational Time: 98.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	NNW3	NNW3	NNW3	NW1	NW3	SE2	SSE3	SE4	SE6	SE7	SE6	SSE10	SE12	SE11	SE11	SE5	E2	N2	N4	NNW4	NNW2	NNW3	NW3	NNW4	SE1.9	SE12	
2-Feb	NW2	NNW5	NNW3	NNW4	N2	N2	N3	NW1	SSE5	SE4	SE8	SE13	SE11	SE7	ENE1	NNW10	NNW11	N15	NNW10	N10	NNW9	NNW7	NNW8	NNW6	N2.6	NNW15	
3-Feb	NNW5	N5	N7	NNE4	NNW3	ENE2	NE1	NNE2	E1	N2	SSE1	SSE2	SE5	SE3	WSW1	N6	NNW6	N7	N7	N11	NNE12	N11	N10	N10	N4.1	NNE12	
4-Feb	N8	NNW8	NNW7	NNW7	NNW8	N8	N8	NNW5	N7	NNW5	NW4	NW2	SSW2	SE7	SSE5	SSE2	NNW4	NNW7	NNW8	NNW6	NNW5	NNW5	NW3	W2	NNW4.1	N8	
5-Feb	SE4	ESE4	SE4	SE8	SE7	SE2	SE5	SE3	SE4	SSE11	SSE11	SE10	SE6	SE12	SE17	SE10	SSE9	SSE5	SSE8	SSE9	SE4	SE7	SE5	SSE4	SE6.9	SE17	
6-Feb	SE5	SE7	SE6	SE9	SE5	SE8	SE11	ESE6	AF	AF	AF	AF	AF	AF	AF	AF	N13	N9	N9	N9	N6	NNE5	NNE4	NNE2	----	N13	
7-Feb	NNW2	NNW6	NNW5	NNW5	NNW4	NW2	SSW1	WSW1	WNW3	NNW5	NNW6	NNW5	NNW9	N9	N10	NNE10	N8	N7	NNW3	W3	SSE1	SSE2	ESE0	SE3	NNW3.6	NNE10	
8-Feb	SE4	SSE1	SE3	SE7	SE4	SE11	SE9	SE6	SE7	SE11	SE14	SE14	SE9	SSE4	W1	WSW2	WNW1	W1	NNW2	NNW5	NNW5	NNW1	WSW1	NNW3	SE3.6	SE14	
9-Feb	E1	SSE1	SE4	ENE1	NNW4	S2	SE3	SE4	SE5	SE6	SE5	SE4	WNW0	NNW2	N4	S1	SE4	SE8	NE3	NNW19	N18	N18	NNE17	N18	NNE2.9	NNW19	
10-Feb	N13	N16	N16	N21	N14	N16	N14	N11	NNE14	NNE13	N10	N10	NNE11	N12	N12	N10	N13	N10	NNW8	NNW6	NNW8	NNW9	NNW6	NNW7	N11.5	NNE21	
11-Feb	NNW5	NNW7	NNW5	NNW7	NNW8	NNW6	NNW6	NNW6	NNW6	NNW8	NNW7	NNW8	N9	NNW10	NW9	NNW10	NNW8	NNW8	NNW6	NNW8	NNW7	N7	WNW4	NW3	NNW6.9	NNW10	
12-Feb	NNW3	NW4	NNW3	NE1	ESE8	ESE10	SE9	SE6	SE7	SE14	SE15	SE23	SE21	SE19	SE22	SE24	SE26	SE26	SE25	SE25	SE24	SE26	SSE26	SSE20	SE15.0	SE26	
13-Feb	SSE23	SE23	SE25	SSE24	SSE24	SSE21	SSE18	SSE16	SSE14	SSE14	SE19	SSE20	SE18	SE17	SE19	SE20	SE18	SE16	SE15	SE14	SE18	SE15	SE14	SE12	SSE18.1	SE25	
14-Feb	SE6	N3	NW3	NNW9	NNW7	NNW5	W1	WNW2	NW3	NNW3	NNW3	NNW3	N3	NNE1	N3	N5	NNE7	N5	NNW6	N9	N9	N10	N9	NNW8	N4.5	N10	
15-Feb	N8	NNW7	NNW8	N10	N12	N13	N9	NNE10	N9	N10	NNE9	N9	N10	N13	N12	NNE9	NNE7	N9	N6	N5	NNE5	NW3	N5	NW4	N8.3	N13	
16-Feb	NNW3	N5	NNW5	NNW4	NNW7	NNW5	NNW4	NW3	W2	NW3	NNW2	NNW3	NNE1	NNE1	N4	N5	N7	NNW8	NNW8	NNW7	NNW7	NNW7	NW8	NNW9	NNW4.8	NNW9	
17-Feb	NNW10	NNW10	N14	N14	N13	N16	N17	N15	N15	NNE10	NNE13	N14	N13	N15	N13	N12	NNE10	N12	N11	N11	N11	N9	N10	N10	N12.2	N17	
18-Feb	N9	N7	N6	NNW6	NNW7	NNW8	NNW7	NNW7	NNW6	NNW8	NNW7	NNW6	NNW7	NNW9	NNW8	NW3	W3	NNW5	NNW6	NNW3	NW2	NNW8	N18	N20	NNW7.0	N20	
19-Feb	NNE16	N13	N10	N9	N11	N14	NNE12	N6	NW3	NW3	NNW1	N6	N6	N8	N9	N9	NNE8	NNE8	NE8	NNE10	NNE10	N7	N7	NNW6	N8.0	NNE16	
20-Feb	NNW5	NNW4	NW4	NNW2	NW3	NNW1	WNW1	NNW2	NW2	SSE1	SSE8	SE8	SE9	SE8	SSE7	SE6	SE3	SE2	NW1	NNW2	NW2	NNW4	N2	SE4	SE1.0	SE9	
21-Feb	SE5	SE6	SE10	SE11	SE10	SE12	SE9	SE9	SE10	SE9	SE12	SE12	SE16	SE17	SE14	SSE12	SE13	SE12	SE15	SE9	ESE2	NNE4	NW0	WSW5	SE9.2	SE17	
22-Feb	NW5	NW4	NW4	NNW5	NW5	NW2	W1	SSE1	SSE6	SSE8	SE11	SE15	SE14	SE12	SE11	SE11	SE8	SE3	NW3	NW4	NNW3	SSW1	WSW0	SSE2	SE2.8	SE15	
23-Feb	WSW1	S4	SSE8	SE9	SSE6	SSE10	SSE5	SSE6	SSE4	SSE6	W2	N5	N10	N8	N8	NNW6	N5	N6	NW2	WSW5	WSW4	WNW6	W6	NW8	WNW0.2	SSE10	
24-Feb	NNW6	NE3	NNW4	NW6	W5	SSE3	SSE7	SE12	SE11	SE12	SE11	SE13	SE11	SSE9	SSE5	SSE3	SSE5	SSE9	S13	S13	S13	S15	SSE19	SSE18	SSE7.4	SSE19	
25-Feb	SE15	SE17	SE20	SE22	SE20	SE19	SE13	SSE6	SSE12	S6	SW9	SW12	WSW11	WSW17	WSW17	WSW17	WSW18	WSW14	W10	W9	WSW15	W13	WSW21	W20	WSW12	SSW8.3	SE22
26-Feb	WSW6	SSE7	SE11	SE13	SE10	SSE10	SE9	S7	WSW22	W10	W6	W7	NW6	NNW9	N12	NNE14	NNE14	N19	NNE18	NNE17	NNE18	N18	N18	N19	N4.7	WSW22	
27-Feb	N17	N19	N19	N17	N17	N16	N15	N15	N15	N14	N13	NNW11	NNW11	NNW10	N8	NNW6	NNW5	N4	N4	NNE2	NNE2	N11	N12	N16	N11.4	N19	
28-Feb	N13	NNE16	N12	NNW6	NNW6	N7	N9	NNW11	N15	N19	N15	N12	N15	NNE15	N15	N13	N12	N13	NNW8	NNW5	NNW5	N9	NNW5	NW4	N10.5	N19	
29-Feb	NW2	W0	W4	NNW4	WNW3	NW4	WNW2	WNW3	W1	SSE4	SE10	SE12	SE13	SE14	SE14	S7	S6	S6	S6	S9	SE11	SE11	SE13	SE13	SSE5.2	SE14	
NNE2.8 NNE3.1 NNE2.4 NE2.3 NNE2.2 NE2.1 ENE1.9 ENE1.4 ENE0.8 E1.8 ESE2.4 ESE2.8 E2.6 E2.2 ENE2.0 NE2.0 NNE2.4 NNE3.0 NNE2.3 N2.6 NNE2.7 N2.9 N2.6 N2.6																								Diurnal Average			
SSE23 SE23 SE25 SSE24 SSE24 SSE21 SSE18 SSE16 WSW22 N19 SE19 SE23 SE21 SE19 SE22 SE24 SE26 SE26 SE25 SE25 SE24 SE26 SSE26 SSE20																								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

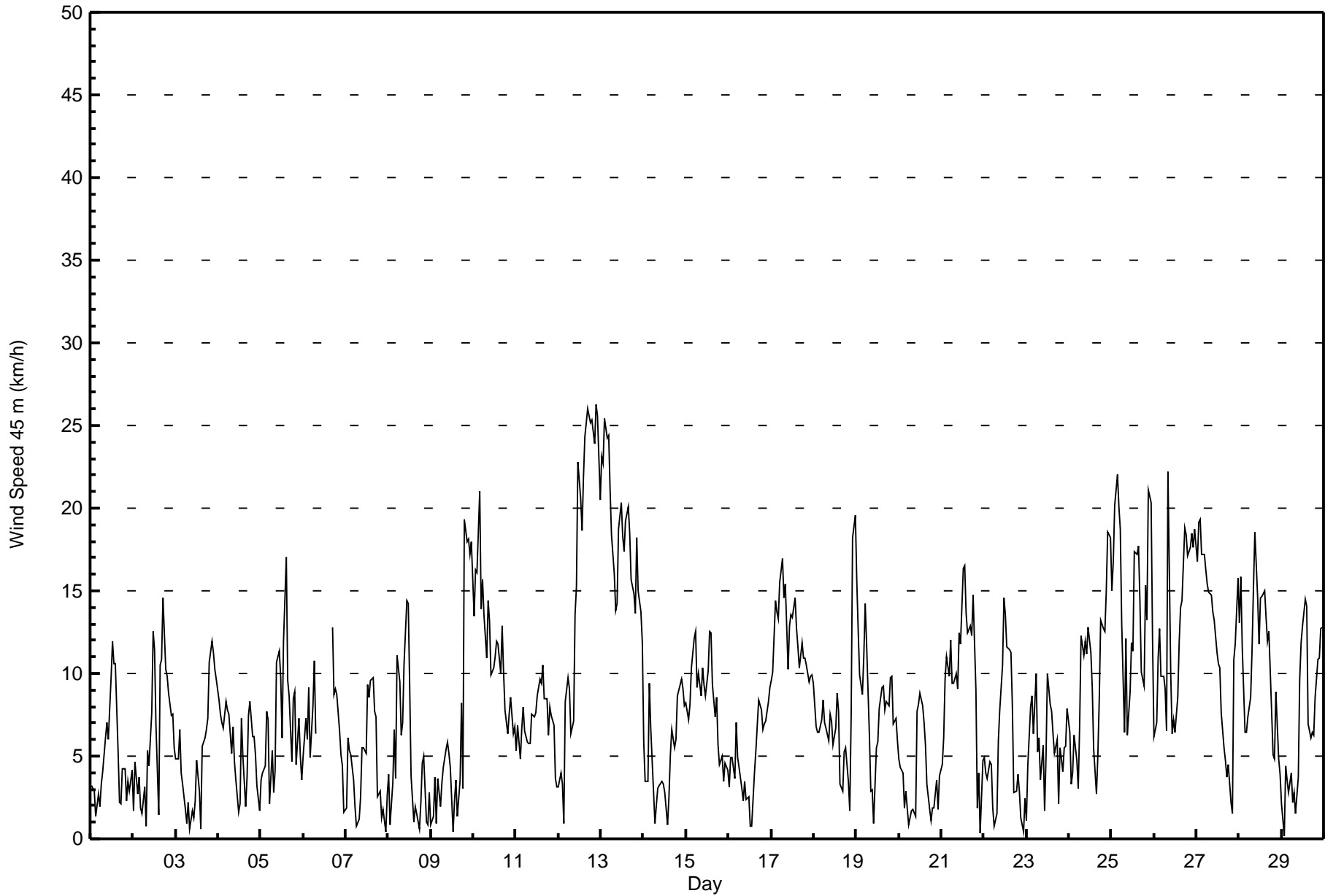
Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 26 09:00 Minimum Value: 0 km/h on Feb 20 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7																		Hours in Service: 696 Hours of Data: 688 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	1	2	1	1	2	1	1	3	2	2	2	2	2	2	2	1	2	1	1	1	1	2	2	3	3
2-Feb	1	2	1	1	1	2	1	1	3	2	4	3	2	2	2	4	3	4	3	3	3	2	2	1	4	
3-Feb	1	2	2	2	2	1	1	1	1	1	1	1	2	1	1	2	2	3	2	3	4	3	3	4		
4-Feb	3	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	3	2	2	2	2	1	1	3		
5-Feb	2	1	2	2	2	2	2	2	3	4	3	2	3	2	6	3	3	2	3	3	2	2	3	2		
6-Feb	2	2	2	3	2	2	5	4	AF	AF	AF	AF	AF	AF	AF	AF	4	2	2	2	2	2	1	1		
7-Feb	1	2	2	2	2	1	1	1	2	1	1	2	3	2	3	3	2	1	1	1	1	1	1	1		
8-Feb	1	1	1	2	3	4	4	2	2	3	2	2	3	2	1	1	1	1	2	2	3	1	1	3		
9-Feb	1	2	2	2	2	2	1	2	2	2	3	3	1	2	2	1	2	3	5	7	5	6	5	5		
10-Feb	4	5	6	6	5	5	5	3	6	4	3	3	4	3	3	2	3	4	2	2	2	2	2	2		
11-Feb	1	2	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	2	1	1	1		
12-Feb	1	1	2	2	3	3	3	4	4	5	5	8	7	6	6	7	7	7	6	6	6	6	7	6		
13-Feb	5	5	5	5	5	5	4	4	4	4	3	4	4	3	5	3	4	4	3	1	2	2	2	2		
14-Feb	3	1	3	3	2	3	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	2		
15-Feb	2	2	2	3	3	3	3	3	2	3	4	3	3	3	3	3	2	2	2	1	1	2	1	1		
16-Feb	1	2	1	2	2	2	2	1	2	2	2	1	2	1	1	2	2	2	2	2	2	2	2	2		
17-Feb	3	3	4	4	4	5	5	5	4	4	5	5	3	4	4	4	3	4	3	3	3	2	3	2		
18-Feb	3	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	1	2	1	2	1	5	5	5		
19-Feb	5	4	3	2	4	4	3	3	1	1	1	2	3	3	3	3	3	2	3	3	3	2	2	2		
20-Feb	2	1	1	1	0	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	2	1	1		
21-Feb	1	2	2	1	1	1	1	2	1	3	2	3	3	3	3	2	2	2	3	6	3	1	1	2		
22-Feb	2	2	3	1	1	1	1	1	3	2	3	3	3	3	2	2	2	3	2	2	1	2	1	2		
23-Feb	1	2	2	2	2	3	3	2	2	4	2	3	2	3	2	2	2	2	1	3	2	2	3	2		
24-Feb	2	1	2	3	3	2	3	1	2	2	2	2	2	1	1	2	3	2	2	2	3	3	3	3		
25-Feb	4	4	3	1	2	2	4	3	2	3	3	2	3	3	3	2	3	4	5	1	3	4	4	3		
26-Feb	3	5	2	2	2	2	3	5	8	5	3	3	3	3	4	5	5	6	5	6	6	5	5	6		
27-Feb	5	6	5	5	4	4	4	3	4	4	3	4	3	3	2	2	2	1	2	2	2	4	5	5		
28-Feb	5	5	3	2	2	4	3	4	6	6	5	4	4	5	4	4	3	3	3	1	2	1	3	1		
29-Feb	1	1	2	1	1	1	1	1	1	3	3	2	3	4	4	3	2	2	1	3	3	2	2	2		
Diurnal Maximum																										
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	241	35.03	35.03
6 - 11	274	39.83	74.85
12 - 19	145	21.08	95.93
20 - 28	28	4.07	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

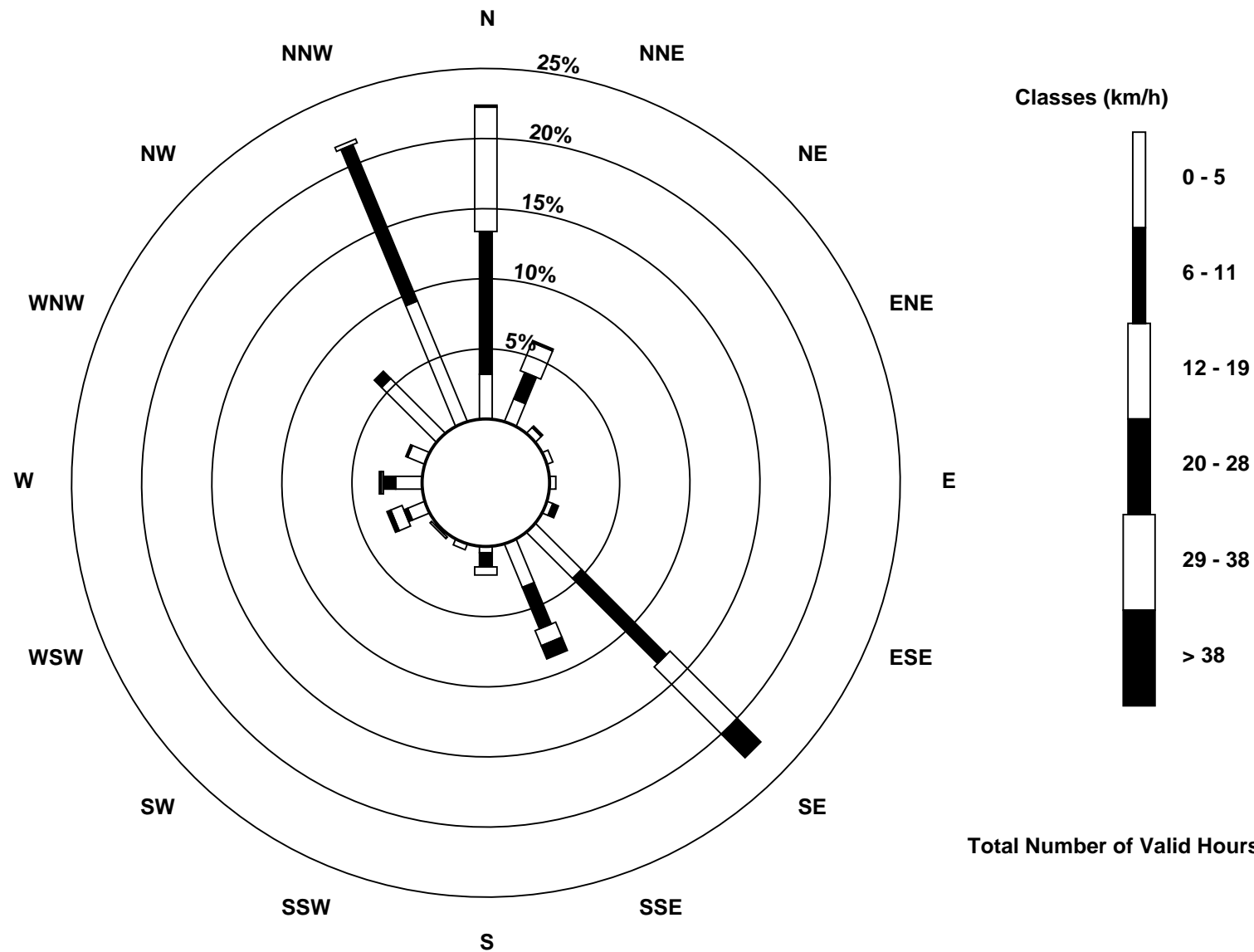
Total Number of Valid Hours: 688

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 688



Maximum Speed: 40 km/h on Feb 12 18:00	Maximum Daily Speed Average: 27.6 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 2 05:00	Minimum Daily Speed Average: 2.7 km/h on Feb 22	Hours of Data: 655
Maximum Diurnal Speed Average: 4.0 km/h at hour 12	Minimum Diurnal Speed Average: 1.6 km/h at hour 8	Hours of Missing Data: 41
Monthly Average Velocity: 2.0 km/h 43.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 7 Median = 11 Q ₃ = 16 P ₉₀ = 23 P ₉₉ = 35	Percent Operational Time: 94.1

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	N5	NNW2	NNW2	NE2	ENE1	SSE5	SE9	SSE9	SSE11	SSE10	SE11	SE13	SSE18	SSE11	SSE9	SE5	SSE3	SE4	SSE1	ESE2	ESE2	ESE3	SE8	ESE3	SE5.3	SSE18
2-Feb	SE3	N2	E3	ESE2	NNW0	SE6	SSW2	SE8	SSE8	S3	SE9	SE17	SSE9	SE6	ENE2	NNW16	N16	N20	NNW16	N15	N13	NNW11	NNW11	NNW9	NNE3.1	N20
3-Feb	N8	N7	N10	NNE8	N6	ENE3	E3	ENE7	ESE6	SE5	SE5	SE7	SE6	ESE4	ESE2	N6	N9	N8	N10	N15	NNE16	N16	N14	N13	NNE5.7	NNE16
4-Feb	N12	N11	N9	N9	N11	N10	N10	N7	N9	N6	NNW3	E1	SSE4	SE9	SE7	SE4	N3	N9	N11	N10	NNW11	NNW9	NNW7	WNW4	N5.6	N12
5-Feb	SW4	SSE5	SSE10	SSE10	SE14	SE9	SE11	SE10	SE16	SSE20	SSE18	SE21	SSE12	SSE18	SE29	SE17	SSE16	SSE8	SSE11	SSE15	SE14	SE14	SSE7	SE11	SE13.0	SE29
6-Feb	SE12	SSE12	SE15	SSE13	SSE9	SSE12	SE23	SE14	AF	AF	AF	AF	N36	N33	N23	N20	N16	N12	N12	N12	NNE9	NNE6	NNE6	ENE5	NE6.1	N36
7-Feb	ENE4	NNE11	N9	N9	NNW4	NW2	SE1	SE4	ESE7	ENE3	N7	N12	N14	N10	N13	NNE13	NNE11	NNE13	NNE8	NNW3	SSW2	S3	SW2	SSE8	NNE5.1	N14
8-Feb	SSE8	SSE5	S3	S5	S3	SSE10	SSE13	SSE8	S7	S7	S7	SSE7	SE11	SE5	NNW2	NNW2	N3	E1	SE2	NNE4	N6	N2	SE4	SE7	SSE3.8	SSE13
9-Feb	SE9	SSE5	SE13	SE9	SE0	SSE8	SE7	SE11	SE14	SE15	SE11	SSE8	SE3	SSW1	W4	SSW4	SSE5	SSE7	N6	N26	N26	N25	NNE23	N25	ENE3.4	N26
10-Feb	N21	N24	N23	NNE29	N21	NNE23	NNE20	N15	NNE21	NNE18	N13	N14	NNE15	N15	NNE15	N13	N17	N14	N12	N10	N11	N12	N10	N11	N16.3	NNE29
11-Feb	N10	N11	NNW8	N10	N12	N10	N10	N10	N9	N10	NNW9	NNW9	N10	N11	NNW11	N13	N13	N14	N11	N11	N12	N8	NNW5	NW3	N10.0	N14
12-Feb	W2	ESE4	SE14	SE21	SE28	SE32	SE25	SE20	SE22	SE33	SE29	SE32	SE30	SE28	SE31	SE35	SE39	SE40	SE38	SE38	SE34	SSE36	SSE32	SSE26	SE27.6	SE40
13-Feb	SSE30	SE34	SSE33	SSE30	SSE29	SSE28	SSE24	SSE21	SSE18	SSE18	SSE22	SSE24	SSE18	SSE16	SSE18	SSE18	SSE15	SSE12	SSW6	S3	S5	SW5	SW7	WSW12	SSE17.5	SE34
14-Feb	WSW17	WSW19	WSW22	NNW9	NNW12	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	WSW22
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N16	NNE12	N10	N12	N7	NNE6	NNW3	NNE3	NE3	---	N16
16-Feb	WNW2	WNW3	WNW4	NNW1	N9	N8	N7	NE5	SE9	SSE6	S2	SE4	SE7	SE4	ENE1	NNE2	NNW7	NNW13	N13	N11	NNW12	NNW11	NNW14	NNW16	N4.4	NNW16
17-Feb	N16	NNW15	N20	N19	N18	N21	N22	N20	N20	NNE14	NNE18	NNE18	N17	NNE19	NNE16	N16	NNE13	NNE16	NNE14	NNE14	N14	N13	NNE13	N14	N16.5	N22
18-Feb	NNE13	NNE10	N9	N10	N11	N12	N12	N10	N9	N11	N10	NNW6	NW8	NNW11	NNW10	NNE5	NW1	NW6	NNW8	NNW6	AF	AF	AF	NNE28	N9.3	NNE28
19-Feb	NNE21	N17	N14	N12	N15	N19	NNE15	NNE9	N4	NNW3	N2	N8	N9	N11	N11	N12	NNE11	NNE10	NE10	NNE13	NNE13	NNE10	N10	N9	N11.0	NNE21
20-Feb	N8	NNW9	NNW11	NNW7	N4	WNW1	SSE2	AF	SE5	SSW1	SE6	SE10	SE11	SE9	SE8	SE7	ESE5	SE8	SE8	SE10	SE7	SSE3	SSE5	SSE11	SE3.6	SE11
21-Feb	SSE11	SSE10	SSE9	S6	S3	S3	SSE5	SE7	SSE10	SSE10	SSE8	SSE10	SE16	SE18	SSE16	SSE13	SSE16	SSE15	SSE22	SE15	ESE8	E7	SE6	SSW2	SSE10.0	SSE22
22-Feb	NNE5	N2	NNW9	NNW7	N6	NNE5	WSW1	SE3	SSE6	SSE8	SE15	SE19	SE13	SE16	SE14	SE12	SE12	ESE8	ESE2	NW10	NNW14	NNW11	NNW7	W2	ESE2.7	SE19
23-Feb	SE4	SSW5	SW10	WSW12	WSW19	WSW18	WSW20	WSW18	WSW19	WSW14	WNW7	NNW10	N14	N12	N10	NNW9	N8	NNE8	NNE2	W8	WNW14	WNW18	WNW16	NW19	WNW8.2	WSW20
24-Feb	NW17	NW13	WNW17	W17	WNW8	W7	WSW11	SW7	SSW6	S4	SSE6	SE11	SE14	SE11	SSE5	SSE3	SSE7	S13	SSW17	SSW18	SSW18	SSW20	S24	S25	SSW7.3	S25
25-Feb	SSE18	SSE20	SSE21	S14	S13	S11	S12	SW15	SSW10	SW11	SW15	SW18	WSW19	WSW23	WSW23	W26	W26	WNW16	W20	W28	W25	WSW33	WSW33	WSW24	WSW15.2	WSW33
26-Feb	WSW17	SW7	SW7	SW10	SW9	SW8	SW10	WSW19	WSW35	W15	WNW9	NNW11	NW12	NNW12	NNE15	NNE19	NNE20	NNE27	NNE25	NNE23	NNE24	NNE24	NNE24	NNE27	NNW8.2	WSW35
27-Feb	NNE24	NNE26	N28	N24	N23	N22	N21	N20	N20	N18	N16	NNW14	NNW13	NNW12	N9	NNW7	NNW5	NNW4	NNE4	NE4	E1	N14	NNE16	N21	N14.9	N28
28-Feb	N18	NNE22	N16	N12	N12	N14	N13	N20	N22	N25	N20	N14	N18	NNE20	N19	N18	N16	N16	N13	N10	N8	N12	N11	NNW10	N15.7	N25
29-Feb	N6	SE5	SSE7	SSE4	SSE12	SSE8	SSE8	SSE6	SSE6	SSE10	SE15	SSE16	SE17	SE19	SE16	S8	S7	S10	S10	S11	SSE13	SSE14	SSE15	SSE17	SSE10.1	SE19
N3.1 NNE2.7 NNE2.1 NNE2.2 NNE2.3 ENE1.8 E2.1 ESE1.6 SE1.8 SE2.4 ESE3.0 SE4.0 E3.3 E3.1 ENE2.7 NE3.0 NE3.1 NNE3.8 NNE3.1 NNE3.6 N3.9 N3.6 N2.9 N3.3																								Diurnal Average		
SSE30 SE34 SSE33 SSE30 SSE29 SE32 SE25 SSE21 WSW35 SE33 SE29 SE32 N36 N33 SE31 SE35 SE39 SE40 SE38 SE38 SE34 SSE36 WSW33 NNE28																								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

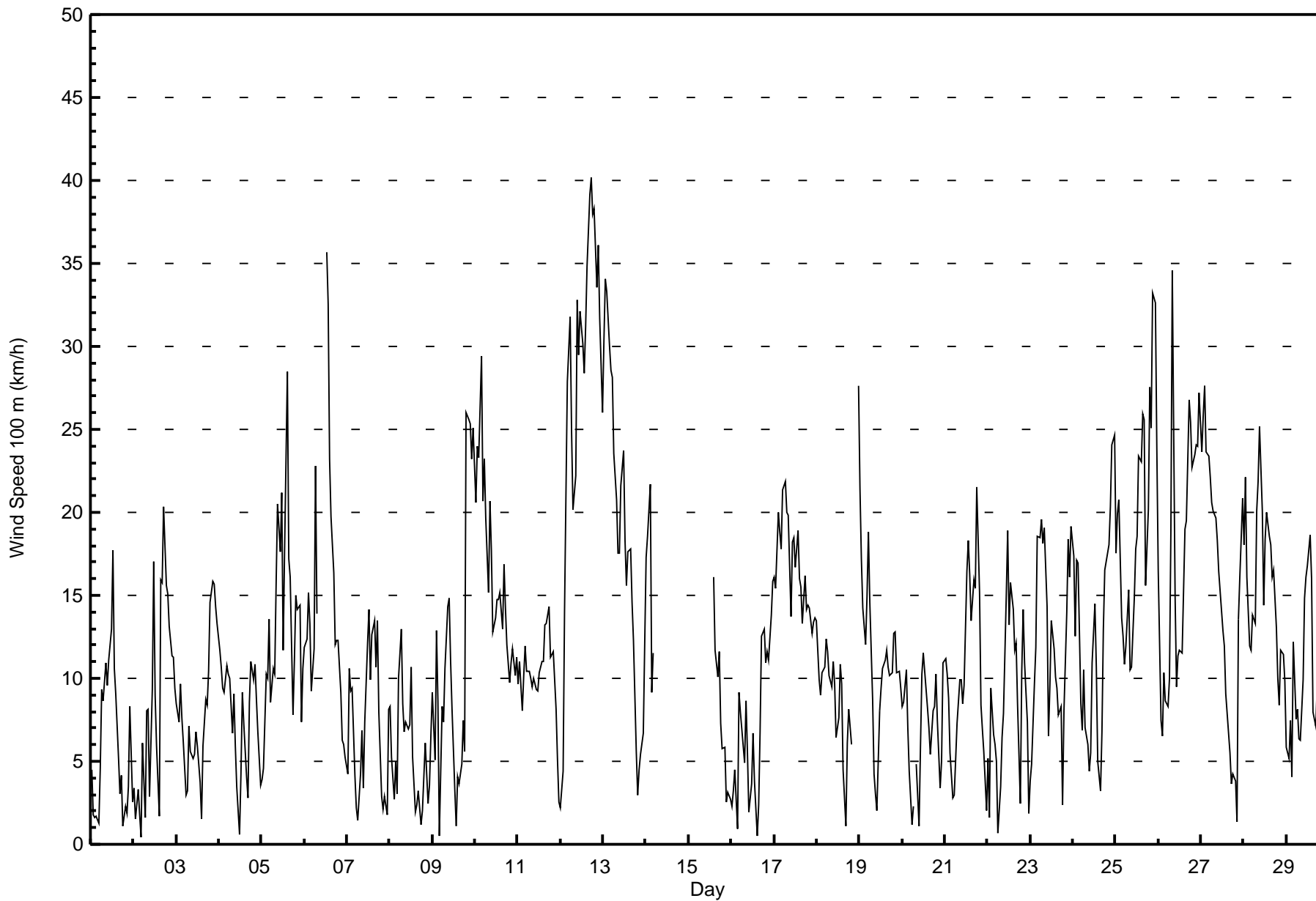
Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Feb 9 19:00 Minimum Value: 1 km/h on Feb 20 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 7														Hours in Service: 696 Hours of Data: 655 Hours of Missing Data: 41 Hours of Calibration: 0 Percent Operational Time: 94.1											
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	1	1	1	3	1	2	2	3	2	4	2	4	2	2	2	2	1	1	1	1	1	2	4
2-Feb	2	1	2	2	2	2	1	4	4	2	3	4	5	3	2	4	3	3	3	4	2	2	2	1	5
3-Feb	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	2	2	3	2	2	3	2	2	3	
4-Feb	2	2	2	1	2	1	2	1	1	1	1	1	3	2	2	2	2	2	2	2	1	1	1	3	
5-Feb	1	1	2	2	2	3	3	2	7	7	4	3	5	5	6	4	3	2	3	3	4	3	5	7	
6-Feb	2	3	3	4	2	4	5	3	AF	AF	AF	AF	6	5	4	3	4	2	1	1	2	2	1	6	
7-Feb	2	4	3	2	2	1	1	2	1	2	1	1	2	2	2	2	1	1	1	2	1	1	1	4	
8-Feb	2	2	1	2	2	3	4	3	3	2	2	2	2	2	2	1	1	1	1	1	2	1	2	4	
9-Feb	3	2	2	5	2	3	4	1	3	2	3	2	2	1	1	1	2	1	10	6	4	5	4	10	
10-Feb	4	4	6	5	5	4	5	3	5	4	2	2	3	2	2	2	2	3	1	2	1	1	2	6	
11-Feb	1	1	2	2	2	1	2	1	2	2	2	2	2	2	2	2	3	2	2	2	3	1	2	3	
12-Feb	1	3	4	6	2	2	5	8	7	3	3	4	5	4	5	6	4	3	4	4	5	4	7	8	
13-Feb	4	3	3	5	6	6	5	4	4	5	3	3	2	3	3	3	3	2	1	2	2	4	3	6	
14-Feb	5	3	4	4	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	3	1	1	2	1	1	1	3	
16-Feb	1	1	2	2	3	2	1	1	2	3	1	2	2	2	1	1	2	2	2	1	1	2	2	3	
17-Feb	2	3	3	3	3	5	5	3	3	4	5	3	3	3	3	2	2	3	2	2	2	2	2	5	
18-Feb	2	2	1	2	2	1	1	1	2	2	2	2	2	3	3	2	1	1	1	1	AF	AF	AF	4	
19-Feb	4	3	2	2	3	3	3	4	1	1	2	2	2	2	2	2	2	1	2	2	2	2	1	4	
20-Feb	2	1	1	2	1	1	1	AF	2	1	4	1	1	1	2	1	1	2	1	1	1	2	1	4	
21-Feb	1	2	3	1	1	1	2	2	3	2	2	3	2	2	3	2	2	2	2	6	4	3	1	6	
22-Feb	1	1	3	2	1	1	1	1	1	2	2	3	2	2	2	2	1	4	2	6	2	2	3	6	
23-Feb	2	2	3	4	3	4	4	2	4	4	4	3	2	3	2	2	2	2	2	5	3	3	3	5	
24-Feb	3	3	3	7	3	3	2	2	4	1	1	3	2	2	2	1	2	4	4	3	3	4	5	7	
25-Feb	4	3	4	3	3	2	3	5	3	4	3	2	2	3	3	3	2	4	6	2	3	3	2	6	
26-Feb	5	5	3	4	3	4	3	6	5	9	5	3	4	3	3	4	4	5	4	6	6	4	4	9	
27-Feb	4	4	4	4	3	2	2	2	2	2	3	3	3	2	2	2	1	1	4	2	1	4	5	5	
28-Feb	4	4	3	2	2	4	3	4	6	5	5	3	3	4	3	3	2	2	3	2	1	1	2	6	
29-Feb	2	5	4	1	4	2	2	2	1	3	2	2	2	3	3	3	2	2	2	3	3	3	2	5	
														5 5 6 7 6 6 5 8 7 9 5 4 6 5 6 6 4 5 10 6 6 5 7 7											
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 100 m (WS100m) - km/h
Lower Camp Met Tower - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	124	18.93	18.93
6 - 11	233	35.57	54.50
12 - 19	195	29.77	84.27
20 - 28	77	11.76	96.03
29 - 38	24	3.66	99.69
> 38	2	0.31	100.00

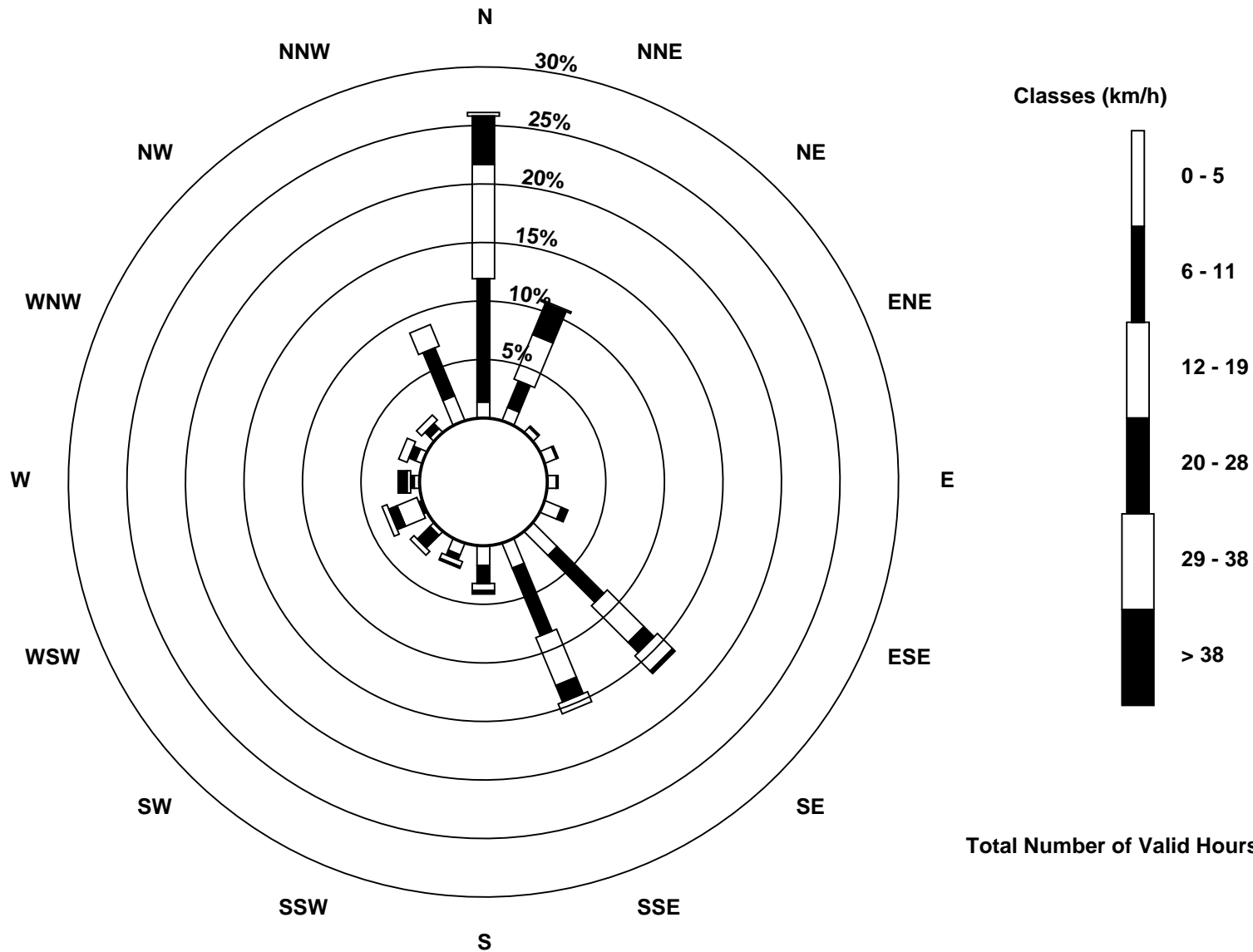
Total Number of Valid Hours: 655

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - February 2016

Maximum Speed: 43 km/h on Feb 12 18:00	Maximum Daily Speed Average: 32.8 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 1 km/h on Feb 2 15:00	Minimum Daily Speed Average: 1.2 km/h on Feb 22	Hours of Data: 594
Maximum Diurnal Speed Average: 4.9 km/h at hour 10	Minimum Diurnal Speed Average: 0.5 km/h at hour 3	Hours of Missing Data: 102
Monthly Average Velocity: 0.7 km/h 121.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 19 P ₉₀ = 28 P ₉₉ = 40	Percent Operational Time: 85.3

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	NNE8	NE5	NNE4	ENE3	SSE3	SSE5	S7	S14	S13	S13	SSE14	SSE14	SSE16	SSE9	S8	S6	S6	S9	S7	SSE3	S6	S5	SSE7	SSE6	SSE6.6	SSE16		
2-Feb	S7	SSW5	SE4	SE4	S3	S5	SSW7	S8	S9	S7	SSE8	SSE13	SSE9	S7	NW1	N18	N18	N20	N17	N18	N15	N13	N12	N11	N2.2	N20		
3-Feb	N11	NNE9	N10	NE8	N6	ENE3	ESE2	ENE5	SE4	SSE5	SSE5	SSE8	SSE5	E4	ESE3	NNE5	N10	NNE9	NNE11	NNE15	NNE17	NNE17	NNE15	N14	NNE5.9	NNE17		
4-Feb	NNE13	N11	N10	N10	N11	N10	N10	NNE7	NNE8	NE7	ENE3	SE4	SE8	SE9	SE9	SE6	E4	ENE7	ENE3	NE5	NNE10	N8	NNW4	W5	NNE4.7	NNE13		
5-Feb	SW4	SSE6	SSE14	SSE14	SSE18	SE17	SE17	SE19	SE29	SSE28	SSE21	SSE24	SSE18	SSE20	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE14	SSE13	----	SE29	
6-Feb	SSE16	SSE16	SSE16	SSE16	SSE13	SSE15	SSE26	SSE17	AF	AF	AF	AF	N37	N34	N25	N21	N19	N14	N15	NNE13	NNE10	NNE7	NNE5	ENE6	NE5.6	N37		
7-Feb	ENE8	NE18	NNE15	NNE14	NE8	NE4	ESE6	SSE6	SE3	E8	NE8	NNE10	N13	NNE9	NNE12	NNE14	NNE11	NNE14	NE12	ESE7	SSE6	SSW7	SSW6	S10	NE6.2	NE18		
8-Feb	S13	SSE10	SSW7	SSW10	SSW7	S13	SSW6	S5	S9	SSW10	SSW8	SSW6	S4	NNW2	NNW5	ENE3	E2	S4	S5	ESE5	SE3	SSE6	S9	SSE8	S5.5	S13		
9-Feb	SE15	S10	SSE17	SE15	SSE6	SSE14	SE11	SE15	SE18	SE22	SSE17	SSE15	SE9	S4	SW8	SSW7	SSW7	SSW7	NW8	N26	N26	N26	NNE25	NNE28	ESE4.5	NNE28		
10-Feb	N21	N26	NNE26	NNE33	NNE22	NNE25	NNE21	NNE16	NNE21	NNE20	NNE13	NNE13	NNE15	NNE14	NNE15	NNE12	N16	N15	N15	NNE12	NNE11	NNE11	NNE10	NNE11	NNE17.2	NNE33		
11-Feb	ENE12	ENE10	NNE8	NNE9	NNE11	NNE11	NNE11	NNE10	NNE9	N11	N11	N11	N11	N12	NNW11	N13	N15	N16	NNE13	NNE12	NE15	E11	SE8	SE7	NNE9.3	N16		
12-Feb	SSE8	SE15	SE26	SE31	SE33	SE37	SE33	SE31	SSE33	SE38	SE32	SSE35	SE32	SE32	SE34	SE39	SE42	SE43	SE40	SE43	SSE35	SSE35	SSE31	SSE29	SE32.8	SE43		
13-Feb	SSE30	SSE34	SSE31	SSE28	SSE28	SSE30	SSE25	SSE22	SSE18	SSE19	S23	S21	S14	S11	S15	SSW19	SSW14	SSW15	WSW18	W16	WSW17	WSW18	W26	W26	S16.4	SSE34		
14-Feb	W29	W30	W31	NNW12	N6	N13	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	W31		
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N10	N10	NNE8	NE6	NE6	NE1	ESE1	ESE4	----	N10	
16-Feb	S4	S6	SSE6	SSE11	S3	N3	ENE5	ESE10	SE16	SSE11	SSE8	SSE8	SE8	SE7	SE7	ESE5	ENE5	NNE9	NNE14	NNE13	N12	N11	N13	N16	E3.2	SE16		
17-Feb	N18	N18	N22	N19	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	N22	
18-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NE5	SSE9	NNW5	AF	AF	AF	AF	AF	AF	AF	AF	SSE9
19-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N12	NNE12	NNE10	NE12	NNE15	NNE15	NNE12	NNE12	NNE10	----	NNE15	
20-Feb	NNE9	NNE8	NNE9	N6	N4	N2	SW2	SSE1	S2	SW5	S5	S7	SSE9	SE9	SE9	SE8	SE7	SSE11	SSE12	SSE12	SSE15	SSE11	S9	SSE11	SE4.7	SSE15		
21-Feb	SSE12	S10	S8	SSW8	SW8	SW8	SSW7	S6	SSE10	S12	S7	S9	SSE13	SSE14	SSE15	S15	SSE15	S16	SSE20	SSE20	SE13	ESE9	SE9	SW4	S10.1	SSE20		
22-Feb	NNE4	NE6	N10	NNE11	NE10	NNE8	N3	SSW1	SSW4	SSW9	S9	SSE10	SSE12	SSE15	SSE10	S7	SSE9	SSE9	WSW4	NW25	NNW22	NNW21	N11	N5	N1.2	NW25		
23-Feb	ENE3	SW6	W20	W20	W23	W30	W26	W24	W24	WSW26	NNW13	NNW16	N15	NNE13	N10	NNW10	N8	NNE10	N3	NNW13	NNW29	NNW29	NW28	NW29	NNW14.3	WSW30		
24-Feb	NNW29	NNW27	NNW27	NNW24	NW15	NW12	NNW10	WSW14	WSW16	SW11	SW9	S6	S7	SSE9	SSW4	SSW4	S7	SSW14	SSW27	SSW29	SSW37	SSW41	SSW35	SSW33	WSW13.1	SSW41		
25-Feb	SSW23	SSW24	S21	SSW20	SSW17	SSW14	SSW15	SW24	SW18	WSW20	WSW22	SW21	WSW24	WSW29	W26	W30	W29	NNW21	W28	W38	W36	W40	W39	W33	WSW22.1	W40		
26-Feb	W28	WSW19	WSW19	WSW21	WSW23	WSW26	WSW29	WSW33	W42	W20	NNW16	NNW16	NW15	NNW13	NNE16	NE20	NNE21	NNE29	NNE28	NNE26	NNE25	NNE25	NNE26	NNE31	NW11.4	W42		
27-Feb	NNE26	NNE28	NNE30	NNE25	NNE24	NNE22	NNE21	N21	N19	N19	N16	N14	N13	N12	N9	NNW7	NNW5	NNW4	NNE4	ENE6	SE3	N12	NNE18	NNE22	N15.3	NNE30		
28-Feb	N19	NNE24	NNE19	NNE18	NNE18	NNE18	N17	N26	N25	NNE25	NNE20	N14	N19	NNE20	N18	NNE18	N16	N16	NNE17	NNE16	NE13	NE13	ENE8	N4	NNE17.2	N26		
29-Feb	S2	SSE15	SSE15	SSE13	SE21	SSE16	SSE15	SSE14	SSE12	SSE13	SSE15	SSE14	SSE17	SSE17	SSE13	S11	S9	S12	SSW12	SSW15	S17	S16	SSE17	S18	SSE13.6	SE21		

N0.9	ENE0.9	N0.5	E1.1	SE1.3	SSE2.0	SSE3.3	S4.0	S4.6	S4.9	SSE4.2	SSE4.9	SE2.8	ESE2.6	E1.1	NNE1.8	NE2.3	NE2.6	NNE2.1	N3.3	N3.0	NNW2.9	NW1.8	NW1.9	Diurnal Average	
SSE30	SSE34	W31	NNE33	SE33	SE37	SE33	WSW33	W42	SE38	SE32	SSE35	N37	N34	SE34	SE39	SE42	SE43	SE40	SE43	SSW37	SSW41	W39	SSW33	Diurnal Maximum	

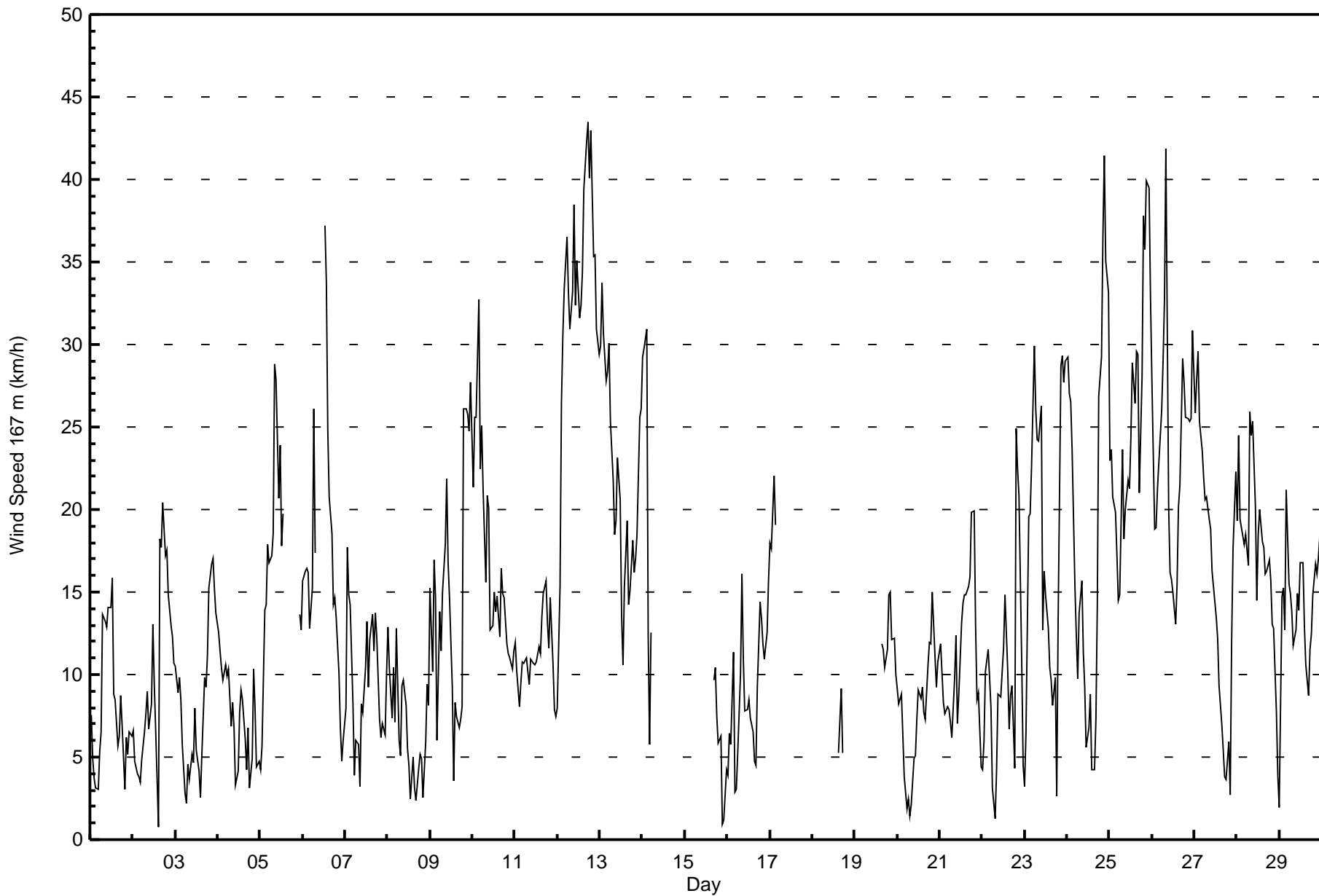
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 26 10:00 Minimum Value: 0 km/h on Feb 20 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 7																	Hours in Service: 696 Hours of Data: 594 Hours of Missing Data: 102 Hours of Calibration: 0 Percent Operational Time: 85.3								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	1	1	1	0	1	1	2	2	2	2	2	2	3	3	2	2	2	2	2	1	1	1	1	1	3
2-Feb	1	1	1	1	2	2	1	1	2	3	3	3	3	2	2	4	3	3	3	4	2	2	2	1	4
3-Feb	1	2	2	2	1	1	1	1	1	1	1	2	1	1	2	2	2	3	2	2	3	3	3	2	3
4-Feb	2	1	2	1	1	1	1	2	1	1	2	1	2	2	2	2	2	2	2	1	1	2	1	1	2
5-Feb	1	2	2	2	2	3	3	2	5	6	5	5	8	4	AF	AF	AF	AF	AF	AF	AF	AF	2	2	8
6-Feb	3	2	2	3	3	5	4	3	AF	AF	AF	AF	6	5	4	3	3	2	1	2	2	1	2	6	
7-Feb	2	4	2	2	2	1	1	2	3	2	2	2	1	2	2	2	1	1	1	2	1	1	1	4	4
8-Feb	2	4	2	2	4	3	2	1	2	2	3	1	1	1	2	1	1	1	3	1	2	3	2	4	4
9-Feb	4	3	2	4	3	3	4	1	2	2	4	2	2	2	2	2	1	2	7	5	3	4	5	5	7
10-Feb	5	5	7	5	5	5	6	3	5	4	2	2	3	2	2	2	2	2	2	2	1	1	1	1	7
11-Feb	1	2	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	3	3	2	2	4	3	4
12-Feb	1	5	2	2	2	2	2	4	7	3	3	3	3	3	4	5	4	3	4	3	6	6	6	5	7
13-Feb	4	3	5	5	5	4	5	4	4	4	2	3	3	2	3	3	3	3	3	2	2	3	2	1	5
14-Feb	2	2	2	4	2	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	1	2	1	2	1	2
16-Feb	1	1	2	5	3	2	1	3	2	3	1	2	2	2	1	1	1	3	2	1	1	1	1	2	5
17-Feb	1	2	2	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3
18-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	4	2	AF	AF	AF	AF	AF	4
19-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	3	1	2	2	3	3	3	1	3
20-Feb	2	1	1	1	0	1	1	0	0	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2
21-Feb	2	1	1	1	1	1	1	1	3	2	2	2	2	2	2	2	2	2	3	3	5	4	3	1	5
22-Feb	1	1	2	1	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	8	4	4	2	1	8
23-Feb	1	4	3	3	2	6	2	1	4	4	4	2	1	3	2	2	2	2	2	6	2	2	2	3	6
24-Feb	4	3	3	4	2	3	2	3	5	2	1	1	2	2	1	2	3	3	4	5	4	2	4	3	5
25-Feb	4	2	3	3	3	3	3	3	3	5	2	2	2	3	4	2	1	3	4	1	3	2	1	2	5
26-Feb	4	7	4	3	3	2	2	3	5	9	5	3	4	3	3	3	5	5	5	7	6	4	4	4	9
27-Feb	4	4	5	4	3	3	2	3	3	2	2	3	2	2	2	2	2	1	4	1	2	5	5	4	5
28-Feb	4	5	3	3	3	3	4	4	5	5	4	3	3	4	3	3	2	2	2	3	3	2	3	1	5
29-Feb	2	5	2	2	4	4	2	2	2	2	3	2	3	3	3	3	2	2	1	1	2	2	3	2	5
	5	7	7	5	5	6	6	4	7	9	5	5	8	5	4	5	5	5	7	8	6	6	6	5	
Diurnal Maximum																									
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	80	13.47	13.47
6 - 11	184	30.98	44.44
12 - 19	186	31.31	75.76
20 - 28	88	14.81	90.57
29 - 38	47	7.91	98.48
> 38	9	1.52	100.00

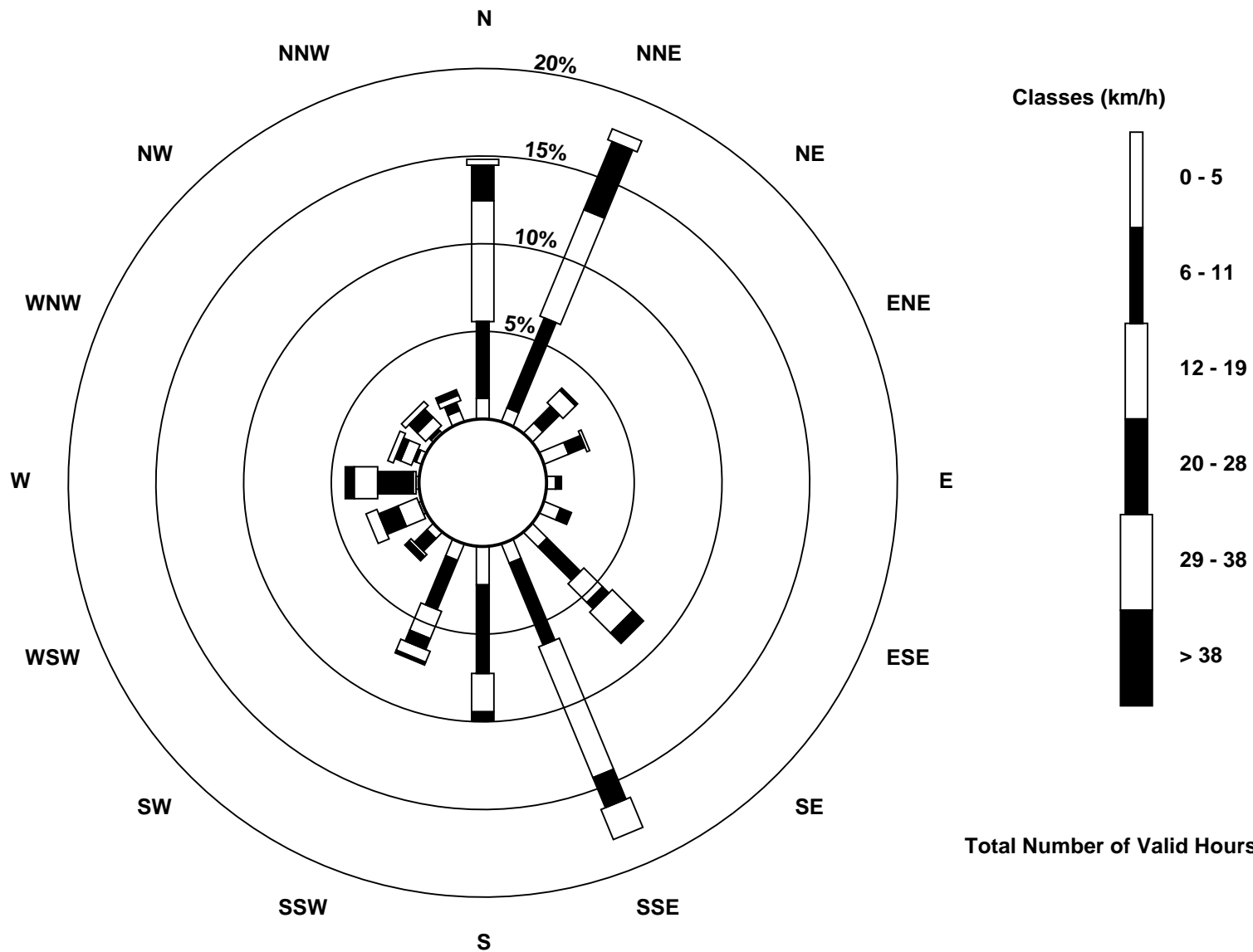
Total Number of Valid Hours: 594

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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 2016

Direction of Maximum Speed: 165 deg on Feb 13 05:00																						Hours in Service: 696			
Direction of Maximum Daily Speed Average: 158.0 deg on Feb 13																						Hours of Data: 646			
Direction of Minimum Speed: 263 deg on Feb 29 02:00											Direction of Minimum Daily Speed Average: 0.8 deg on Feb 20											Hours of Missing Data: 50			
Monthly Average Direction: 336.8 deg																						Percent Operational Time: 92.8			
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	342	356	330	333	351	132	150	133	140	139	147	159	154	154	151	135	83	341	359	350	339	342	334	331	136.2
2-Feb	336	340	328	327	324	330	344	282	153	148	151	153	157	147	79	347	346	355	341	356	351	336	342	331	356.7
3-Feb	339	351	355	11	337	96	2	4	324	351	191	180	153	145	257	358	344	356	2	12	17	12	7	4	5.2
4-Feb	355	346	348	349	346	354	12	352	355	337	319	326	203	157	165	172	351	354	337	339	341	350	310	249	344.3
5-Feb	144	120	136	149	138	160	150	149	151	168	159	148	154	153	153	152	170	177	167	165	158	136	129	182	154.8
6-Feb	157	153	148	157	148	151	142	114	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	--
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	146	151	150	177	242	247	268	262	334	344	342	314	267	343	--
9-Feb	313	55	170	356	333	213	141	152	150	155	157	150	299	11	10	165	140	153	56	353	360	359	21	11	22.2
10-Feb	6	8	11	15	14	14	16	13	18	30	16	7	27	359	16	5	359	358	356	349	352	353	335	346	8.3
11-Feb	352	356	335	339	349	345	341	337	346	346	347	351	360	350	332	352	347	340	345	359	350	354	315	311	345.5
12-Feb	339	342	350	345	66	88	131	135	125	138	149	155	148	141	145	140	145	143	143	144	153	159	166	171	147.1
13-Feb	160	152	157	163	165	170	168	171	168	161	155	164	153	152	148	149	149	150	153	155	156	159	140	158.0	
14-Feb	120	14	15	351	333	336	270	311	311	353	2	1	1	41	4	354	17	14	352	14	5	4	355	348	359.4
15-Feb	358	352	352	354	357	358	354	33	5	6	21	0	1	3	359	14	16	358	353	357	15	326	11	325	1.5
16-Feb	348	3	337	346	347	346	330	320	321	351	350	343	337	27	4	2	2	337	336	333	333	335	329	334	342.2
17-Feb	346	346	354	6	14	10	4	9	11	24	18	12	1	11	13	9	16	15	15	6	2	359	18	3	7.7
18-Feb	8	358	353	347	347	350	349	343	341	348	356	355	340	335	331	323	274	355	344	329	305	342	7	11	349.7
19-Feb	18	5	359	357	7	1	31	12	308	327	314	13	11	13	357	359	26	30	45	24	23	13	1	346	9.6
20-Feb	343	330	322	333	330	339	330	335	344	186	162	151	154	157	163	159	154	170	304	345	343	342	322	172	161.8
21-Feb	137	142	148	150	152	150	148	150	155	152	151	153	151	152	156	161	156	155	154	141	145	10	303	265	152.8
22-Feb	320	304	321	330	333	313	220	152	167	168	155	152	155	148	153	156	156	152	299	295	276	305	37	112	165.7
23-Feb	277	179	147	138	141	143	144	140	137	139	169	360	7	8	12	346	356	1	287	261	241	261	263	306	137.7
24-Feb	357	122	306	319	253	144	147	154	151	154	153	151	152	161	166	178	168	167	179	173	173	172	159	158	161.5
25-Feb	143	143	149	152	148	150	156	158	152	163	224	232	248	260	261	262	268	275	276	267	267	268	273	263	208.7
26-Feb	234	155	144	151	152	149	152	173	265	286	268	283	332	331	14	29	22	11	17	35	31	17	11	16	26.4
27-Feb	11	10	3	3	359	358	356	359	360	357	357	348	344	349	355	338	334	356	19	31	28	355	10	11	359.6
28-Feb	13	19	1	344	336	354	355	352	6	13	12	3	6	19	2	6	4	357	345	338	356	355	295	329	2.1
29-Feb	109	263	328	346	340	323	335	343	319	170	155	155	156	153	151	179	188	191	201	180	147	150	150	153	161.3
17.3 29.6 28.8 45.3 48.4 70.5 88.2 80.0 74.4 95.8 135.1 143.4 128.4 118.6 99.8 62.4 52.2 24.1 26.8 15.1 20.5 356.6 355.6 356.8																									
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

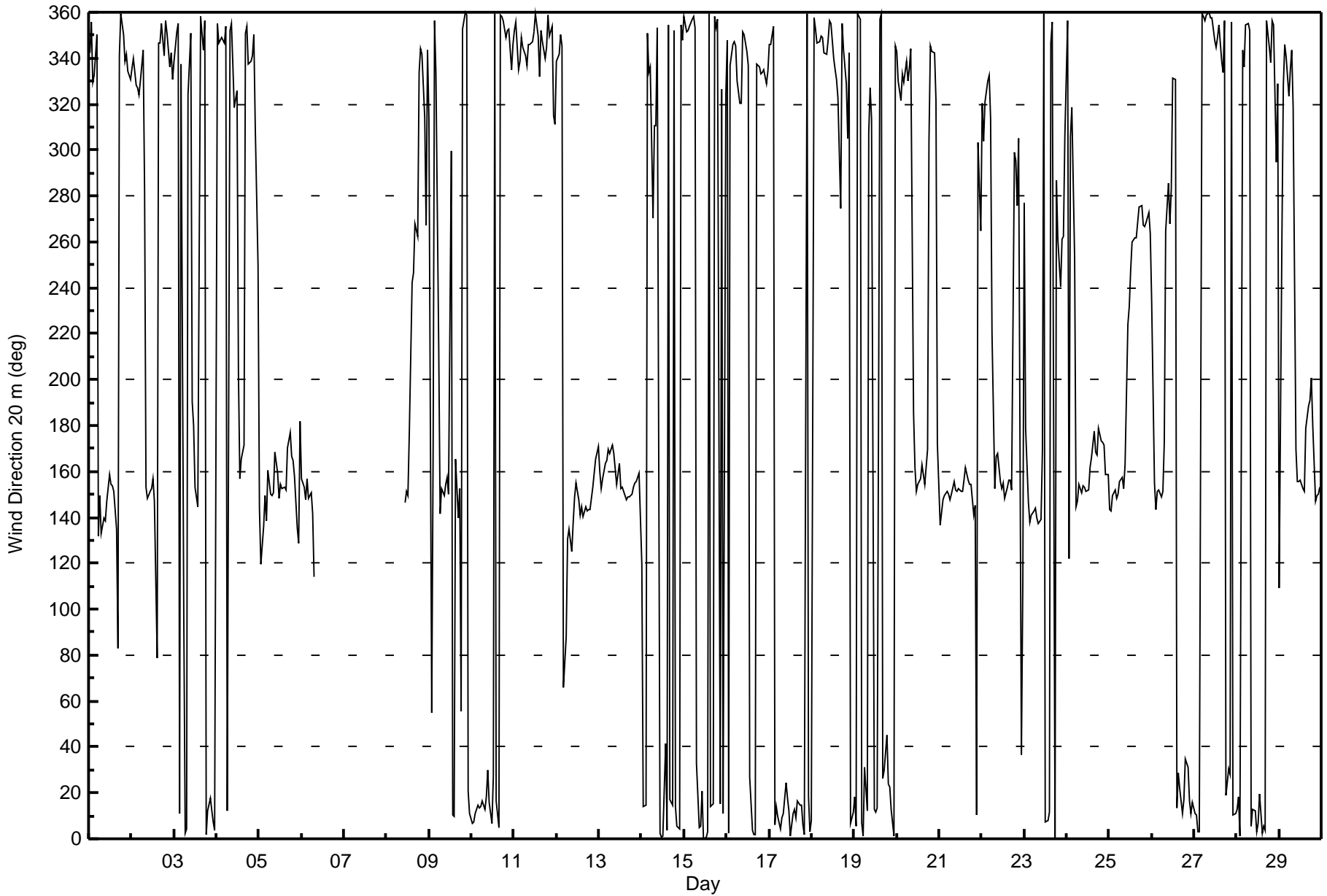
Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Feb 24 03:00 Minimum Value: 5 deg on Feb 25 06:00 Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 17 Median = 22 Q ₃ = 32 P ₉₀ = 61 P ₉₉ = 99																								Hours in Service: 696 Hours of Data: 646 Hours of Missing Data: 50 Hours of Calibration: 0 Percent Operational Time: 92.8	
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	46	25	25	26	25	52	61	60	48	17	22	10	10	12	12	21	55	73	21	20	46	36	37	32	73
2-Feb	37	26	41	33	88	81	43	76	88	67	25	13	10	18	75	18	18	16	20	24	19	18	18	18	88
3-Feb	21	27	20	56	57	63	30	41	65	36	64	47	28	33	69	24	21	25	28	22	22	22	24	21	69
4-Feb	21	19	19	23	18	22	24	22	20	20	27	61	47	17	21	87	73	21	17	20	18	24	28	19	87
5-Feb	41	36	43	16	20	74	29	56	83	19	12	17	45	14	15	19	15	19	16	28	32	23	79	50	83
6-Feb	27	16	17	9	46	17	79	62	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	79
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	--
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	8	10	15	34	37	81	56	62	66	37	52	59	68	35	81
9-Feb	54	76	87	73	63	42	47	71	24	19	29	44	82	44	53	51	14	14	75	18	22	20	23	22	87
10-Feb	22	21	21	22	26	23	24	24	25	25	25	23	31	20	24	22	16	20	17	21	20	18	18	21	31
11-Feb	17	19	36	19	17	19	19	18	23	20	20	23	21	19	19	22	19	24	33	14	22	26	29	35	36
12-Feb	31	31	32	53	43	44	28	87	53	35	27	16	17	19	17	18	16	17	15	16	15	11	11	11	87
13-Feb	12	13	10	10	9	11	10	11	12	16	11	8	14	12	15	13	19	14	9	8	7	6	8	14	19
14-Feb	43	25	32	16	25	47	62	28	28	33	24	23	37	86	36	22	25	27	18	22	24	19	18	21	86
15-Feb	19	17	17	16	16	17	19	26	20	20	27	21	18	19	30	26	26	20	26	32	29	35	26	21	35
16-Feb	30	20	25	48	23	24	25	40	86	42	62	43	84	99	24	25	16	16	18	17	16	17	14	16	99
17-Feb	18	20	18	21	22	22	21	21	23	27	24	27	20	21	24	23	23	22	21	19	19	18	24	22	27
18-Feb	23	23	21	20	19	17	22	23	23	26	24	32	23	20	19	39	36	18	19	32	30	17	21	22	39
19-Feb	24	20	19	15	22	24	25	24	30	37	82	35	36	31	27	23	30	29	26	21	22	26	20	18	82
20-Feb	30	32	32	35	27	84	56	30	36	82	12	14	12	12	13	15	18	93	76	35	27	26	103	70	103
21-Feb	81	30	8	8	8	9	10	9	8	12	12	12	14	14	13	9	11	9	14	44	96	17	62	43	96
22-Feb	26	64	38	23	20	38	90	57	22	12	12	14	12	18	15	14	16	99	49	66	78	95	101	69	101
23-Feb	71	37	30	20	9	10	15	9	27	19	97	56	19	31	25	30	28	22	37	34	36	40	10	22	97
24-Feb	50	39	105	35	54	22	11	11	7	7	9	12	14	13	15	21	20	20	11	13	12	13	6	9	105
25-Feb	17	9	9	7	9	5	8	17	7	28	16	14	14	14	13	12	16	25	66	9	13	13	13	18	66
26-Feb	57	30	15	8	13	10	10	36	26	30	51	31	32	32	23	29	26	21	23	25	23	21	22	22	57
27-Feb	23	23	21	20	18	16	16	16	18	18	18	19	21	23	22	32	34	32	30	67	81	15	22	22	81
28-Feb	24	21	17	24	22	32	18	18	20	24	24	23	23	27	21	23	21	16	20	23	24	18	39	23	39
29-Feb	74	103	26	48	26	18	27	47	80	93	14	10	14	16	14	21	16	18	16	19	15	14	10	11	103
81 103 105 73 88 84 90 87 88 93 97 61 84 99 75 87 73 99 76 67 96 95 103 70																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - February 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - February 2016

Direction of Maximum Speed: 145 deg on Feb 12 22:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 146.3 deg on Feb 13	Hours of Data: 688
Direction of Minimum Speed: 264 deg on Feb 29 02:00	Hours of Missing Data: 8
Direction of Minimum Daily Speed Average: 0.2 deg on Feb 23	Percent Operational Time: 98.9
Monthly Average Direction: 338.0 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	328	332	338	319	323	130	148	141	134	131	137	147	142	145	143	127	92	355	2	343	329	337	324	337	124.4
2-Feb	305	335	333	335	355	354	353	315	150	140	140	141	145	137	57	341	343	349	337	353	348	333	337	329	358.0
3-Feb	338	350	351	14	335	78	36	33	85	354	156	154	140	128	239	355	341	355	357	9	12	7	3	0	5.3
4-Feb	352	340	342	343	343	351	7	347	350	333	313	324	193	145	155	156	346	346	334	335	337	343	320	264	343.0
5-Feb	133	112	126	141	130	132	139	136	137	152	147	137	140	141	141	155	168	158	154	137	129	125	151	142.0	
6-Feb	140	141	134	143	136	139	130	115	AF	AF	AF	AF	AF	AF	AF	AF	5	2	351	0	10	25	23	18	--
7-Feb	338	345	333	341	345	311	200	243	301	329	327	331	348	358	2	13	3	355	334	268	159	164	114	143	345.7
8-Feb	133	158	133	138	134	139	143	141	146	135	138	140	138	159	259	254	289	267	333	344	345	336	255	340	139.0
9-Feb	100	161	141	69	344	173	131	145	136	142	145	144	300	347	356	176	132	139	39	347	356	357	16	8	26.2
10-Feb	5	5	6	11	9	10	11	9	12	23	9	3	21	356	9	1	355	355	348	344	347	347	332	342	3.9
11-Feb	344	348	333	335	343	339	336	334	343	342	343	345	352	345	325	347	343	340	345	348	346	350	301	317	341.1
12-Feb	337	310	329	47	113	114	128	138	126	135	139	143	137	132	135	133	137	136	136	136	142	145	153	162	138.1
13-Feb	147	141	144	151	156	160	158	160	156	149	145	156	142	143	141	139	139	140	138	137	142	139	143	132	146.3
14-Feb	134	8	318	346	341	343	267	300	308	347	348	343	351	15	355	350	14	8	348	10	4	359	349	344	353.0
15-Feb	355	346	347	352	354	354	350	28	0	3	15	357	356	359	353	12	13	354	351	355	12	324	4	321	357.9
16-Feb	339	357	335	342	342	342	329	319	267	323	327	342	13	26	353	356	349	331	333	330	329	331	326	330	335.6
17-Feb	342	341	349	1	11	5	0	5	7	20	15	7	357	8	8	7	12	10	8	3	358	355	11	359	3.7
18-Feb	3	355	350	342	343	345	344	341	338	343	348	347	336	331	328	322	262	342	339	328	319	336	3	7	345.9
19-Feb	13	2	357	354	5	357	26	10	321	320	335	8	6	4	349	356	21	24	38	18	17	9	358	340	6.1
20-Feb	338	333	319	327	309	334	282	340	307	164	148	138	140	143	148	146	139	138	324	339	323	330	357	125	134.8
21-Feb	134	133	135	138	137	138	133	136	141	137	139	143	141	139	142	149	145	142	145	135	116	23	309	256	139.9
22-Feb	325	312	317	334	320	311	275	168	159	154	139	139	141	138	142	143	136	125	318	310	336	212	255	152	144.8
23-Feb	246	170	150	146	150	147	161	147	164	150	261	355	1	5	3	343	355	4	308	255	253	293	275	310	303.1
24-Feb	343	36	333	307	262	167	149	143	138	139	137	139	140	147	153	162	152	157	175	176	174	172	159	156	155.9
25-Feb	137	135	138	140	137	138	146	166	153	170	219	225	239	251	253	252	258	276	269	256	259	257	262	257	208.8
26-Feb	238	150	133	142	144	147	145	190	253	275	269	279	319	327	10	26	17	8	12	29	23	10	7	11	9.8
27-Feb	7	6	1	360	355	353	353	355	356	352	351	343	340	343	351	333	332	349	9	18	28	351	7	6	355.7
28-Feb	7	13	356	345	337	353	350	346	359	8	8	358	1	15	358	1	1	351	344	336	336	354	332	321	357.6
29-Feb	313	264	274	330	298	317	296	296	275	151	142	142	145	141	141	170	176	179	186	172	144	144	140	145	155.4
	14.1	19.3	23.5	36.5	27.8	55.3	69.5	62.0	57.1	80.8	110.0	121.9	101.1	87.9	70.2	44.6	33.3	18.9	13.1	5.1	12.6	358.8	3.0	0.4	
	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

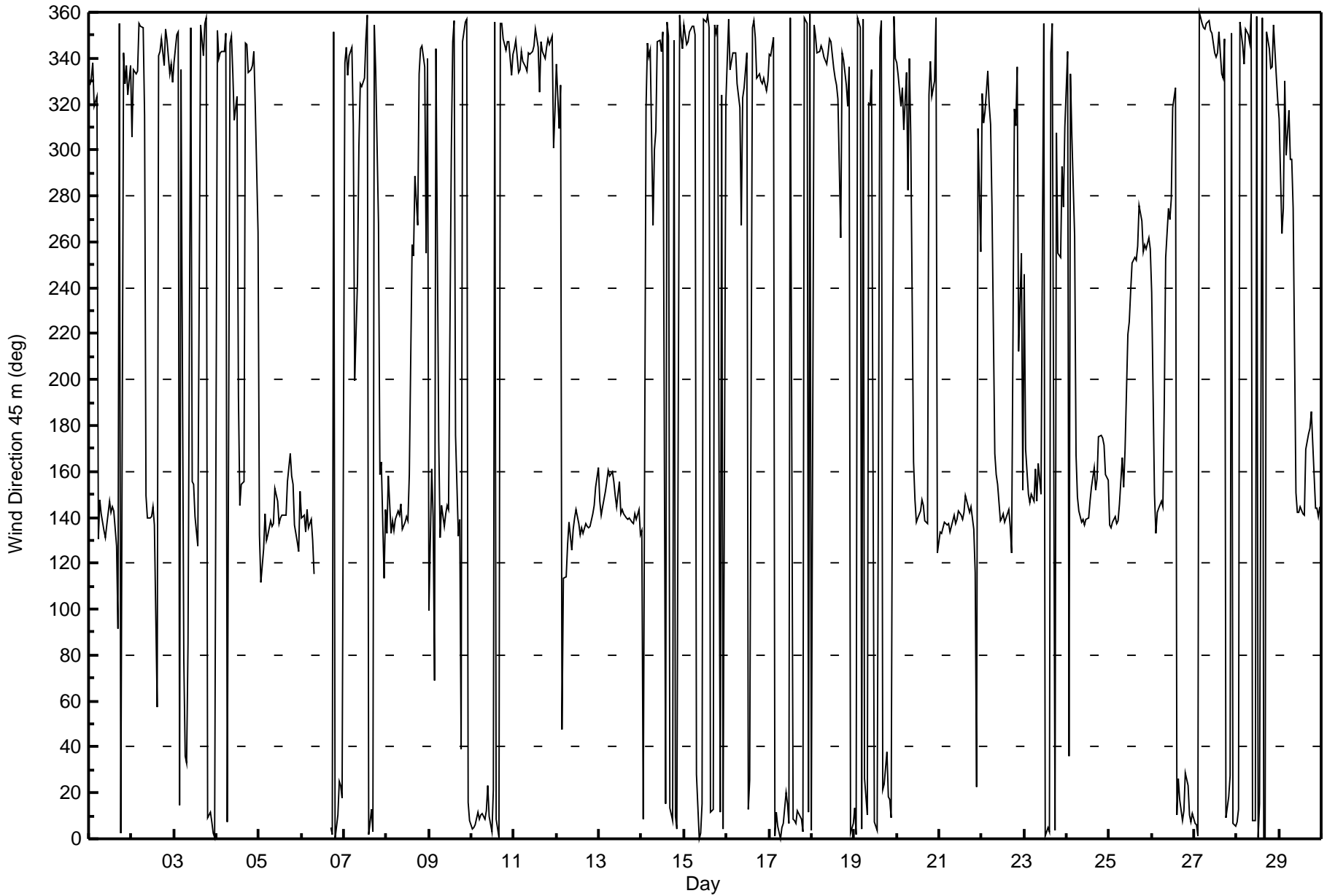
Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Feb 16 13:00 Minimum Value: 3 deg on Feb 25 04:00 Percentiles: P ₁ = 4 P ₁₀ = 9 Q ₁ = 12 Median = 16 Q ₃ = 25 P ₉₀ = 49 P ₉₉ = 89		Hours in Service: 696 Hours of Data: 688 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	32	16	16	22	14	59	15	11	14	12	19	8	7	7	9	18	40	75	18	8	31	23	23	23	75
2-Feb	40	17	31	23	53	59	21	68	51	35	21	10	7	13	69	14	14	12	16	17	14	13	12	14	69
3-Feb	15	20	15	43	44	32	49	37	82	30	74	43	24	26	75	19	17	23	23	16	15	15	17	16	82
4-Feb	16	15	15	19	13	17	17	18	14	14	22	62	48	14	18	86	61	16	13	14	14	16	22	54	86
5-Feb	39	10	23	12	15	61	23	43	49	16	8	13	25	11	11	14	13	16	13	19	27	15	39	29	61
6-Feb	15	12	15	8	26	12	36	35	AF	AF	AF	AF	AF	AF	AF	AF	15	11	9	15	21	16	16	57	57
7-Feb	46	12	28	17	26	43	83	60	41	17	17	21	18	14	15	18	15	6	28	39	87	51	93	26	93
8-Feb	22	83	11	15	51	12	11	10	13	8	4	5	10	27	69	66	67	68	72	12	33	67	73	68	83
9-Feb	86	71	41	75	35	25	20	16	18	13	20	26	87	45	50	45	11	13	70	14	19	16	16	15	87
10-Feb	16	15	15	16	18	15	17	17	17	18	19	17	23	15	17	15	11	16	12	16	14	12	14	14	23
11-Feb	13	13	23	14	12	15	15	14	17	14	14	19	15	15	16	19	16	17	20	14	10	11	33	27	33
12-Feb	33	17	41	83	15	16	20	40	34	21	16	11	12	14	12	13	11	11	11	11	12	9	10	10	83
13-Feb	11	9	7	9	8	9	9	9	10	14	8	7	9	6	9	6	9	8	8	5	3	3	5	9	14
14-Feb	25	35	84	9	15	34	77	15	15	26	14	20	31	86	32	17	18	23	14	18	20	14	13	18	86
15-Feb	13	13	12	12	12	12	16	18	16	13	21	17	12	14	14	19	16	16	19	21	24	29	20	19	29
16-Feb	21	13	21	45	19	17	17	35	64	47	51	47	103	96	19	19	10	12	13	13	13	12	12	13	103
17-Feb	15	15	13	16	14	16	15	15	18	21	18	21	15	15	18	17	15	15	16	14	14	14	17	17	21
18-Feb	17	17	15	14	13	12	15	17	16	16	17	22	17	14	15	34	28	16	13	25	30	15	17	17	34
19-Feb	17	15	15	10	18	21	15	18	26	30	95	23	27	23	18	18	24	24	16	14	14	17	17	14	95
20-Feb	20	14	18	37	26	63	22	25	42	73	8	9	9	9	10	13	16	30	74	22	17	35	48	23	74
21-Feb	9	9	6	4	5	3	6	6	5	8	6	7	9	8	10	9	11	6	8	34	82	27	102	23	102
22-Feb	26	39	31	14	10	43	80	39	15	8	8	8	7	12	8	8	9	84	60	43	42	55	90	49	90
23-Feb	62	35	13	11	20	13	37	22	44	36	72	28	11	23	17	25	22	16	39	22	42	30	20	14	72
24-Feb	22	37	37	25	53	47	31	7	11	5	5	6	9	10	11	19	13	12	5	7	8	10	6	8	53
25-Feb	10	9	6	3	4	3	11	24	9	32	14	10	10	8	7	5	11	10	19	4	7	7	7	13	32
26-Feb	49	40	9	11	14	13	14	35	14	20	54	27	28	29	18	23	18	15	16	18	18	14	15	14	54
27-Feb	16	16	16	16	13	13	12	12	14	14	12	15	16	16	17	28	30	25	25	59	73	10	16	15	73
28-Feb	18	15	14	16	17	22	15	15	15	18	17	17	18	20	15	17	15	12	13	12	19	6	29	15	29
29-Feb	52	95	28	12	42	10	25	19	48	66	9	7	11	13	11	16	10	12	12	13	12	12	7	8	95
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - February 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - February 2016

Direction of Maximum Speed: 141 deg on Feb 12 18:00																				Hours in Service: 696							
Direction of Maximum Daily Speed Average: 141.4 deg on Feb 12																				Hours of Data: 655							
Direction of Minimum Speed: 344 deg on Feb 2 05:00										Direction of Minimum Daily Speed Average: 2.7 deg on Feb 22										Hours of Missing Data: 41							
Monthly Average Direction: 335.7 deg																								Percent Operational Time: 94.1			
Day	Hourly Period Ending At (MST)																								Daily Average		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	4	347	342	47	72	148	139	159	155	152	144	146	149	156	160	146	159	143	157	108	117	121	129	106	143.3		
2-Feb	139	354	85	110	344	137	198	132	158	174	141	143	156	143	68	346	351	356	346	360	358	344	347	342	19.3		
3-Feb	355	6	358	25	351	61	97	76	120	132	139	139	140	116	114	2	350	8	8	10	14	11	10	4	23.6		
4-Feb	4	349	354	354	349	354	6	0	358	349	333	87	149	143	143	127	10	357	355	352	346	338	329	287	356.8		
5-Feb	214	148	151	158	140	127	134	128	141	148	152	142	151	147	142	145	147	164	161	154	136	146	148	140	146.0		
6-Feb	144	150	142	153	149	160	140	139	AF	AF	AF	AF	5	358	357	2	0	1	359	8	20	27	29	64	39.4		
7-Feb	57	28	9	357	327	318	139	133	118	78	357	354	357	8	9	16	12	13	12	345	203	176	230	149	15.1		
8-Feb	154	164	177	182	178	167	152	156	171	171	176	164	139	137	328	343	10	89	125	29	355	358	145	140	153.0		
9-Feb	136	166	143	139	136	148	139	127	138	139	144	149	128	195	281	212	155	159	351	354	356	2	14	11	70.1		
10-Feb	3	7	8	13	11	12	14	11	13	25	11	7	23	3	16	8	2	2	356	0	1	359	353	354	8.3		
11-Feb	1	357	347	350	355	351	352	351	350	351	348	344	353	351	330	350	353	354	359	353	6	360	333	322	351.5		
12-Feb	272	110	133	132	137	138	139	139	140	142	141	144	140	136	138	138	141	141	140	140	144	147	153	159	141.4		
13-Feb	148	144	148	151	156	157	154	155	154	153	156	157	149	152	162	165	164	193	170	171	218	234	246	157.1			
14-Feb	253	252	254	341	340	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	15	9	1	7	22	26	342	13	41	--		
16-Feb	291	285	341	336	349	353	9	34	146	147	185	146	127	136	68	22	346	345	351	349	339	340	334	340	351.8		
17-Feb	352	348	353	6	10	7	4	6	8	21	16	13	1	12	15	8	16	14	15	12	8	8	18	7	8.0		
18-Feb	13	15	11	356	3	360	360	359	351	351	351	337	326	336	338	15	321	304	331	335	AF	AF	AF	15	355.2		
19-Feb	14	5	358	356	8	1	28	23	1	343	6	359	359	0	352	359	24	26	37	23	20	16	7	357	9.5		
20-Feb	357	342	345	341	351	282	152	AF	146	200	133	142	132	135	134	131	123	139	139	146	139	147	165	149	128.9		
21-Feb	150	159	162	170	173	171	158	146	157	155	156	151	144	143	149	158	150	154	147	141	121	85	133	201	148.9		
22-Feb	21	354	337	334	5	30	238	136	148	156	144	143	145	138	138	141	125	123	121	318	342	330	327	268	117.1		
23-Feb	143	200	234	238	248	247	252	247	245	244	293	318	357	10	3	341	6	22	23	270	285	296	302	312	282.8		
24-Feb	317	313	294	279	301	278	243	226	213	190	154	138	136	140	156	165	151	172	199	198	195	196	182	180	204.8		
25-Feb	164	161	155	170	172	172	173	216	205	230	231	228	241	245	257	262	264	286	273	270	268	258	258	257	237.0		
26-Feb	254	229	232	220	228	221	234	249	251	270	296	288	313	331	14	33	23	14	17	29	26	16	12	16	337.1		
27-Feb	13	12	7	5	3	2	1	3	3	356	356	348	344	345	350	338	333	342	15	51	87	358	13	10	2.1		
28-Feb	10	16	7	11	4	5	2	355	359	10	11	357	2	16	2	6	6	1	0	5	3	360	356	337	4.3		
29-Feb	349	141	157	151	150	147	160	149	148	147	144	151	143	144	146	172	176	177	186	186	163	157	151	155	155.0		
11.2 20.4 15.7 22.2 21.4 60.2 98.9 104.9 144.4 126.6 123.4 133.7 91.0 80.6 60.4 36.3 38.0 30.0 21.6 11.8 10.2 352.7 354.3 0.8																								Diurnal Average			
AF - Analyzer Failure																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 696
Maximum Value: 98 deg on Feb 2 05:00	Hours of Data: 655
Minimum Value: 3 deg on Feb 12 10:00	Hours of Missing Data: 41
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 10 Q ₃ = 16 P ₉₀ = 36 P ₉₉ = 81	Hours of Calibration: 0
	Percent Operational Time: 94.1

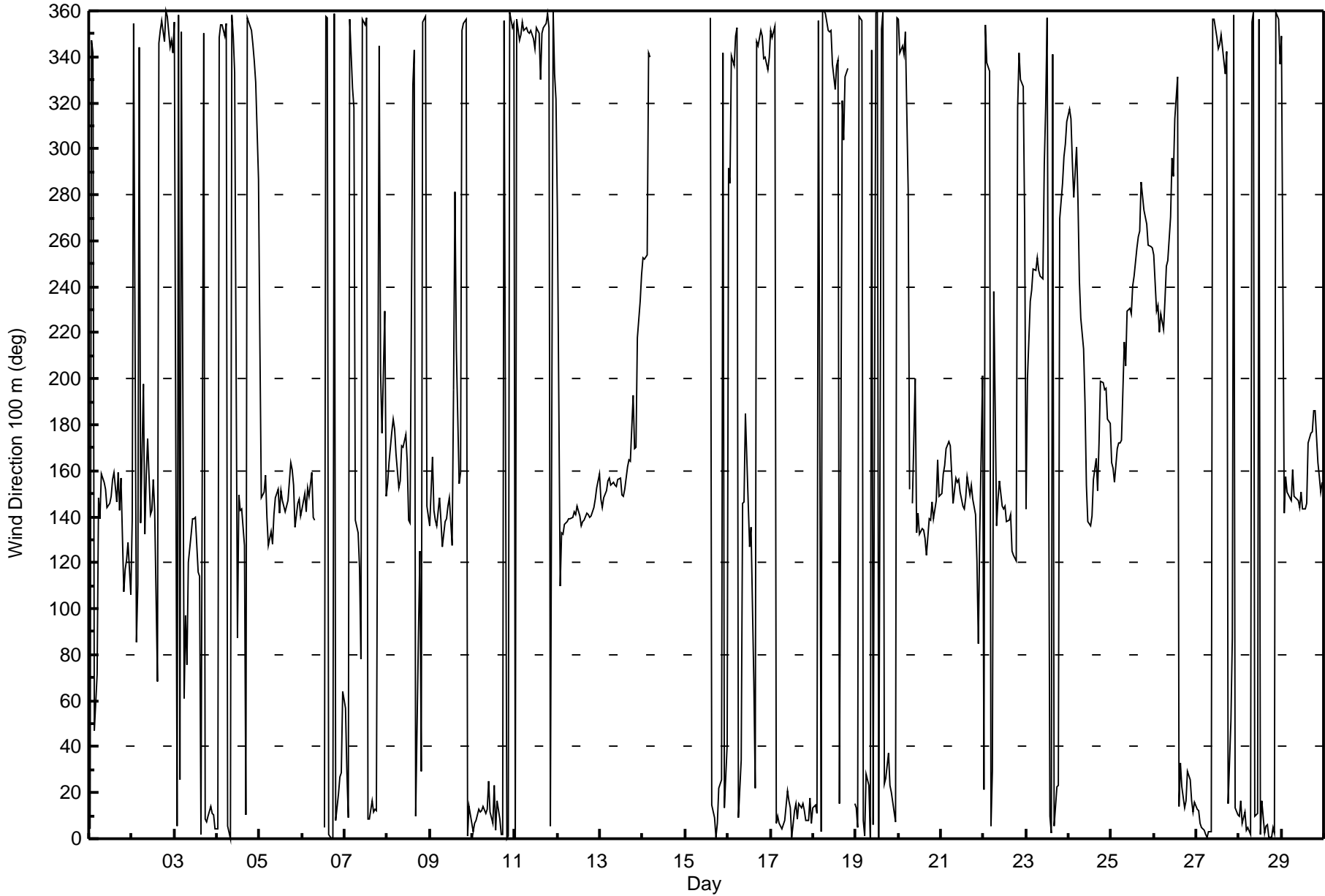
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	10	32	22	19	29	16	5	9	9	12	10	9	5	11	11	32	38	23	71	19	58	10	5	48	71
2-Feb	26	87	37	73	98	11	46	45	21	63	11	6	12	17	64	9	9	7	9	12	10	10	6	6	98
3-Feb	7	12	7	24	20	18	13	6	20	8	11	14	16	15	71	18	13	17	17	8	8	9	11	9	71
4-Feb	11	12	10	13	9	7	10	13	6	11	14	79	45	8	12	29	75	10	6	6	6	7	8	30	79
5-Feb	28	18	10	10	9	13	10	10	11	9	9	6	18	10	4	7	8	14	10	8	11	12	14	6	28
6-Feb	6	10	7	13	12	14	7	10	AF	AF	AF	AF	11	8	6	7	5	5	4	7	17	12	19	19	19
7-Feb	25	15	21	13	27	40	40	20	8	55	14	12	8	10	8	11	8	5	8	47	34	51	50	18	55
8-Feb	11	32	20	21	40	12	10	13	27	11	9	11	6	10	44	42	17	44	46	14	11	23	35	15	46
9-Feb	7	27	6	48	86	16	21	8	5	5	8	10	26	62	29	18	16	13	89	10	11	10	8	7	89
10-Feb	7	8	8	8	11	9	11	10	9	12	14	10	15	10	10	10	5	10	9	10	7	5	7	6	15
11-Feb	6	6	12	7	5	8	7	7	8	8	10	10	9	10	11	15	10	8	8	7	8	10	37	37	37
12-Feb	36	61	10	7	3	3	7	13	10	3	3	3	5	5	5	6	4	4	4	4	8	5	8	8	61
13-Feb	7	3	5	7	7	7	7	7	7	8	6	4	7	7	10	8	12	12	21	25	19	25	26	12	26
14-Feb	9	7	7	20	8	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	8	12	6	8	15	16	16	22	36	60
16-Feb	41	35	32	97	22	11	19	37	12	17	62	23	13	46	80	43	8	6	7	6	5	6	5	8	97
17-Feb	7	8	7	9	6	9	9	9	10	14	10	12	8	9	12	10	8	9	11	9	10	9	11	10	14
18-Feb	12	9	9	7	7	5	7	12	9	9	10	14	13	11	11	33	77	13	6	8	AF	AF	AF	11	77
19-Feb	11	7	7	4	10	17	10	20	16	41	88	10	11	15	11	15	15	19	10	9	9	10	11	9	88
20-Feb	9	5	4	8	8	56	41	AF	22	63	18	8	4	6	8	9	9	7	6	4	13	23	11	6	63
21-Feb	6	7	8	9	21	14	14	9	11	12	10	11	6	5	8	9	9	7	5	10	38	21	17	60	60
22-Feb	46	63	15	12	12	8	81	15	9	7	4	5	7	7	5	5	7	28	68	20	9	6	21	67	81
23-Feb	13	36	12	13	7	8	5	7	7	17	37	12	8	15	10	13	15	10	58	13	13	6	6	6	58
24-Feb	8	10	13	12	12	28	12	16	37	17	10	9	4	6	12	24	19	16	10	8	8	10	6	5	37
25-Feb	8	10	8	9	17	13	18	10	11	18	7	5	5	5	5	3	5	12	15	3	7	3	3	5	18
26-Feb	13	37	29	15	23	22	21	10	4	16	25	20	15	23	15	16	13	8	9	12	12	8	8	7	37
27-Feb	9	8	9	10	8	7	6	7	8	8	8	10	11	11	12	21	23	18	36	43	70	6	9	9	70
28-Feb	11	8	10	11	12	10	10	9	10	12	9	11	12	13	11	11	10	8	7	11	12	7	6	6	13
29-Feb	15	61	18	19	6	9	10	11	14	14	9	6	6	8	9	13	9	7	12	13	7	9	9	7	61
	46	87	37	97	98	56	81	45	37	63	88	79	45	62	80	43	77	44	89	47	70	51	50	67	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 100 m (WD100m) - deg
Lower Camp Met Tower - February 2016





Maximum Value: 0.8 km/h on Feb 19 13:00 Maximum Daily Average: 0.2 km/h on Feb 24																								Hours in Service: 696 Hours of Data: 646		
Minimum Value: -0.6 km/h on Feb 25 23:00 Minimum Daily Average: -0.2 km/h on Feb 27 Maximum Diurnal Average: 0.0 km/h at hour 8 Minimum Diurnal Average: -0.1 km/h at hour 15 Monthly Average: -0.03 km/h Percentiles: $P_1 = -0.5$ $P_{10} = -0.2$ $Q_1 = -0.1$ Median = 0.0 $Q_3 = 0.1$ $P_{90} = 0.1$ $P_{99} = 0.5$																								Hours of Missing Data: 50 Hours of Calibration: 0 Percent Operational Time: 92.8		
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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.1
2-Feb	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-0.1	0.1	0.2	0.1	0.0	0.2	-0.3	0.1	0.1	0.0	0.2	0.1	0.2	0.0	0.2
3-Feb	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	0.2	-0.2	0.0	0.0	-0.2	0.0	0.0	-0.1	0.0	0.0	-0.1	0.0	0.2
4-Feb	0.1	0.0	0.0	0.1	0.1	-0.1	-0.1	0.1	-0.1	0.0	0.0	0.2	-0.1	-0.1	0.1	0.0	0.0	-0.1	0.0	0.1	0.1	0.0	-0.1	0.1	0.0	0.2
5-Feb	0.1	0.0	0.0	0.1	-0.2	0.1	-0.1	0.1	0.1	0.1	-0.1	0.1	-0.2	-0.2	0.0	-0.2	0.0	-0.1	0.0	0.1	0.1	0.0	-0.2	0.2	0.0	0.2
6-Feb	0.1	0.1	0.0	0.0	0.1	0.1	-0.3	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.1
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	--	--
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	-0.1	0.0	0.0	-0.1	--	0.1
9-Feb	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	-0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.0	0.0	-0.2	0.0	-0.2	0.0	-0.1	0.0	0.2
10-Feb	0.0	-0.1	-0.3	-0.1	-0.2	-0.1	-0.1	-0.2	0.1	-0.1	-0.2	-0.1	0.1	-0.4	0.0	-0.1	-0.3	-0.1	0.0	0.0	-0.1	-0.1	0.1	0.1	-0.1	0.1
11-Feb	0.0	-0.2	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	-0.3	-0.3	-0.1	-0.3	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.1	0.1
12-Feb	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	-0.3	0.1	-0.2	-0.3	-0.3	-0.1	-0.4	-0.4	0.3	-0.1	0.3
13-Feb	-0.1	0.0	-0.2	-0.3	0.1	0.4	0.2	0.1	-0.1	-0.1	-0.1	0.1	-0.2	-0.2	-0.1	-0.2	-0.2	0.0	0.1	0.2	0.1	0.3	0.2	0.1	0.0	0.4
14-Feb	0.2	0.1	0.1	-0.4	0.0	0.1	0.0	0.1	0.0	0.0	-0.2	-0.2	0.2	0.3	-0.1	-0.2	0.0	-0.1	0.0	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.3
15-Feb	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	0.0	-0.3	-0.5	-0.5	-0.2	-0.2	0.1	-0.1	0.0	0.0	-0.1	0.1	-0.1	-0.1	-0.1	0.1
16-Feb	0.0	-0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	-0.1	0.1	-0.2	0.0	-0.1	0.0	0.0	-0.1	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.2
17-Feb	0.0	0.0	-0.4	-0.3	-0.1	-0.3	-0.4	-0.1	-0.1	-0.1	-0.1	0.0	-0.4	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.2	-0.2	0.1	-0.1	-0.1	0.1
18-Feb	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.3	-0.3	-0.1	0.1
19-Feb	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	0.0	-0.1	0.1	0.1	0.8	0.8	0.4	-0.3	-0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.8
20-Feb	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	-0.2	0.0	-0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
21-Feb	0.0	0.1	-0.1	-0.1	0.1	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.2	-0.3	0.0	0.0	-0.1	-0.2	0.0	0.0	0.1	-0.1	-0.1	0.1
22-Feb	-0.1	0.0	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	-0.1	-0.3	-0.2	0.0	-0.1	0.0	0.0	0.0	0.0	-0.2	0.0	0.1	0.1	0.1	0.0	0.1
23-Feb	0.0	0.1	0.1	0.2	0.5	0.2	0.2	0.3	0.1	0.3	0.1	0.0	-0.2	0.2	0.1	0.0	0.0	-0.2	0.1	-0.2	-0.1	0.0	-0.3	-0.1	0.1	0.5
24-Feb	-0.1	0.1	0.0	-0.1	0.0	0.2	0.3	0.1	0.2	0.1	0.1	0.0	0.2	-0.2	-0.1	-0.1	0.0	0.2	0.6	0.6	0.5	0.5	0.7	0.5	0.2	0.7
25-Feb	0.0	0.0	-0.2	-0.1	-0.1	0.1	0.2	0.3	0.4	0.2	-0.2	-0.3	-0.3	-0.5	-0.5	-0.3	-0.3	-0.2	-0.1	-0.4	-0.2	-0.5	-0.6	-0.4	-0.2	0.4
26-Feb	-0.1	0.3	0.2	0.2	0.1	0.5	0.3	0.2	-0.3	-0.2	-0.1	0.0	0.1	0.0	-0.2	0.0	-0.2	0.1	0.1	-0.2	-0.2	-0.1	-0.1	0.2	0.0	0.5
27-Feb	0.0	-0.3	-0.5	-0.3	-0.5	-0.5	-0.2	-0.4	-0.4	-0.4	-0.4	0.0	0.1	-0.2	-0.3	-0.1	0.0	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	-0.2	0.1
28-Feb	0.0	0.0	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	-0.2	-0.2	0.1	-0.5	-0.1	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.0	-0.1	0.1
29-Feb	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	-0.1	0.1	0.0	0.1	0.1	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.1
0.0 0.0 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.1 -0.1 0.0 -0.1 -0.1 -0.1 0.0 -0.1 0.0 0.0 0.0 0.0 0.0 0.0																								Diurnal Average		
0.2 0.3 0.2 0.2 0.5 0.5 0.3 0.3 0.4 0.3 0.1 0.8 0.8 0.4 0.1 0.1 0.2 0.2 0.6 0.6 0.5 0.5 0.7 0.5																								Diurnal Maximum		
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h
Lower Camp Met Tower - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on Feb 12 18:00 Minimum Value: 0.1 km/h on Feb 20 08:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.2 Q ₁ = 0.7 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 2.4 P ₉₉ = 3.4																								Hours in Service: 696 Hours of Data: 646 Hours of Missing Data: 50 Hours of Calibration: 0 Percent Operational Time: 92.8	
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	0.2	0.3	0.3	0.1	0.2	0.1	0.3	0.2	0.6	0.9	0.9	1.1	1.4	1.2	1.3	0.8	0.4	0.3	0.3	0.2	0.1	0.2	0.2	0.4	1.4
2-Feb	0.1	0.5	0.3	0.5	0.3	0.2	0.2	0.1	0.4	0.6	1.2	1.6	1.1	1.2	0.9	1.5	1.6	2.1	1.5	1.6	1.3	1.1	1.0	0.8	2.1
3-Feb	0.7	0.8	0.9	0.8	0.5	0.1	0.1	0.2	0.2	0.3	0.6	0.7	1.0	0.9	0.6	1.0	0.9	1.0	1.2	1.6	2.0	1.8	1.7	1.5	2.0
4-Feb	1.3	1.1	1.0	1.0	1.3	1.2	1.2	0.9	1.0	0.9	0.9	0.8	1.2	1.0	0.6	0.7	0.9	1.2	0.8	0.9	0.7	0.2	0.2	1.3	1.3
5-Feb	0.2	0.2	0.3	0.7	1.1	0.6	0.8	0.5	0.9	1.5	1.1	1.3	1.2	1.6	2.2	1.5	1.1	0.7	0.7	0.7	0.5	0.8	0.6	0.4	2.2
6-Feb	0.5	0.8	0.6	0.9	0.6	0.8	2.0	1.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.0
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	--
8-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.3	1.6	1.5	0.7	0.5	0.4	0.2	0.1	0.2	0.4	0.6	0.2	0.1	0.5	1.6
9-Feb	0.2	0.2	0.4	0.4	0.3	0.3	0.2	0.4	0.7	0.7	0.8	0.7	0.5	0.7	0.9	0.3	0.3	0.7	1.2	2.8	2.8	2.9	2.8	2.9	2.9
10-Feb	2.2	2.6	2.7	3.5	2.4	2.6	2.4	1.9	2.4	2.2	1.8	1.9	2.1	2.0	2.1	1.6	1.8	1.5	1.0	0.9	1.1	1.2	1.0	1.0	3.5
11-Feb	0.7	1.1	0.9	1.0	1.1	1.0	0.9	0.9	1.0	1.2	1.4	1.7	1.6	1.6	1.6	1.7	1.1	0.9	0.6	0.6	0.7	0.5	0.3	0.2	1.7
12-Feb	0.2	0.3	0.5	0.7	1.0	1.1	1.4	1.1	1.3	2.6	2.6	3.2	3.1	2.9	3.2	3.6	3.8	4.0	3.6	3.7	3.2	3.2	2.9	2.2	4.0
13-Feb	2.8	2.8	2.8	2.6	2.5	2.4	1.9	1.8	1.6	1.9	2.1	2.0	2.5	2.1	2.4	2.4	2.2	1.6	1.2	1.1	1.3	1.1	1.1	1.6	2.8
14-Feb	1.0	0.5	0.8	0.9	1.0	1.2	0.3	0.8	0.7	0.8	0.7	0.8	0.8	0.7	0.8	0.9	1.2	1.0	0.8	1.4	1.4	1.5	1.3	1.3	1.5
15-Feb	1.2	1.1	1.1	1.5	1.8	1.8	1.3	1.7	1.3	1.7	1.8	1.6	1.7	2.0	2.0	1.7	1.4	1.3	0.9	0.7	0.8	0.6	0.7	0.6	2.0
16-Feb	0.6	0.8	0.7	0.6	1.0	0.9	0.7	0.6	0.5	0.7	0.7	0.8	0.7	0.9	1.1	1.0	0.9	1.2	1.1	0.9	1.0	1.1	1.2	1.4	1.4
17-Feb	1.5	1.6	2.1	2.1	2.1	2.6	2.6	2.4	2.4	1.9	2.2	2.4	2.2	2.5	2.2	2.0	1.8	1.9	1.7	1.8	1.6	1.4	1.6	1.5	2.6
18-Feb	1.4	1.2	1.0	0.9	1.0	1.2	1.1	1.1	1.1	1.2	1.3	1.2	1.2	1.4	1.3	0.9	0.5	0.8	0.8	0.6	0.3	1.2	2.7	3.0	3.0
19-Feb	2.6	1.9	1.4	1.0	1.9	2.2	1.8	1.0	0.3	0.9	1.0	1.6	1.7	1.8	1.8	1.7	1.4	1.2	1.2	1.5	1.6	1.2	1.2	0.8	2.6
20-Feb	0.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.9	1.3	1.4	1.4	1.1	0.9	0.6	0.2	0.1	0.1	0.1	0.3	0.2	0.2	1.4
21-Feb	0.3	0.4	0.8	1.0	0.9	1.1	0.9	1.0	0.9	1.2	1.5	1.6	2.3	2.2	1.8	1.2	1.1	0.8	1.5	1.4	0.7	0.4	0.2	0.3	2.3
22-Feb	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.4	0.6	1.4	1.9	1.7	1.9	1.5	1.3	0.8	0.4	0.3	0.4	0.2	0.3	0.2	0.1	1.9
23-Feb	0.1	0.3	0.6	0.8	0.9	1.4	1.4	1.2	1.2	1.3	0.7	0.9	1.7	1.8	1.6	1.2	0.9	0.7	0.2	0.9	0.7	0.5	0.7	0.4	1.8
24-Feb	0.6	0.5	0.6	1.0	0.4	0.4	0.8	0.7	0.7	1.0	1.4	1.7	1.7	1.3	0.9	0.5	0.6	0.6	1.0	1.1	1.1	1.4	1.6	1.6	1.7
25-Feb	1.5	1.2	1.5	1.7	1.9	1.2	1.0	0.8	1.0	1.1	1.3	1.3	1.4	1.9	1.7	1.6	1.4	0.8	0.9	1.2	1.1	2.2	2.1	1.5	2.2
26-Feb	1.0	1.0	0.9	1.0	1.1	1.2	1.2	1.4	3.0	2.0	1.2	1.4	1.5	1.4	1.9	2.5	2.4	3.1	3.1	2.9	2.9	3.0	2.7	3.1	3.1
27-Feb	2.8	3.1	3.1	2.9	2.5	2.3	2.1	2.2	2.2	2.2	2.1	1.9	1.8	1.8	1.6	1.4	1.1	0.8	0.8	0.7	0.5	1.5	1.8	2.4	3.1
28-Feb	2.2	2.6	1.6	0.9	0.9	1.1	1.1	1.6	2.4	3.1	2.8	2.2	2.5	2.8	2.5	2.3	1.9	1.6	0.8	0.5	0.5	0.4	0.3	0.2	3.1
29-Feb	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.2	0.3	0.5	1.3	1.4	2.0	2.3	2.0	1.1	0.8	0.8	0.9	0.9	1.1	1.4	1.4	1.4	2.3
2.8 3.1 3.1 3.5 2.5 2.6 2.6 2.4 3.0 3.1 2.8 3.2 3.1 2.9 3.2 3.6 3.8 4.0 3.6 3.7 3.2 3.2 2.9 3.1																								Diurnal Maximum	
AF - Analyzer Failure																									



Maximum Value: 1.6 km/h on Feb 25 00:00 Maximum Daily Average: 1.0 km/h on Feb 13																								Hours in Service: 696				
Minimum Value: -0.9 km/h on Feb 25 22:00 Minimum Daily Average: -0.3 km/h on Feb 27																								Hours of Data: 688				
Maximum Diurnal Average: 0.2 km/h at hour 12 Minimum Diurnal Average: 0.0 km/h at hour 22																								Hours of Missing Data: 8				
Monthly Average: 0.10 km/h Percentiles: $P_1 = -0.6$ $P_{10} = -0.3$ $Q_1 = -0.1$ Median = 0.0 $Q_3 = 0.3$ $P_{90} = 0.7$ $P_{99} = 1.3$																								Hours of Calibration: 0				
Percent Operational Time: 98.9																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Feb	-0.1	-0.1	0.0	0.0	-0.1	0.2	0.2	0.3	0.4	0.3	0.1	0.5	0.5	0.5	0.5	0.3	0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	0.1	0.5		
2-Feb	0.0	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	0.5	0.4	0.5	0.6	0.7	0.6	0.1	-0.3	-0.1	-0.4	-0.2	-0.2	-0.3	0.1	-0.2	0.0	0.0	0.7		
3-Feb	0.0	0.0	-0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	0.3	0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.3		
4-Feb	0.0	-0.2	-0.2	0.0	-0.2	-0.1	-0.1	0.0	-0.2	-0.1	-0.1	0.1	-0.1	0.3	0.2	0.0	-0.1	-0.3	-0.3	-0.1	0.0	-0.2	-0.1	0.0	-0.1	0.3		
5-Feb	0.3	0.2	0.3	0.4	-0.1	0.0	0.1	0.2	0.2	0.3	0.6	0.1	0.0	0.5	0.7	0.3	0.0	0.0	0.4	0.5	0.2	0.0	0.4	0.3	0.2	0.7		
6-Feb	0.5	0.4	0.2	0.4	0.4	0.5	0.3	0.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.1	-0.3	-0.3	-0.1	-0.1	0.0	0.0	0.1	--	0.5	
7-Feb	0.0	-0.2	-0.2	-0.2	-0.1	0.0	0.1	0.1	0.0	-0.2	-0.2	0.0	-0.2	-0.4	-0.2	-0.1	-0.1	-0.2	0.0	0.0	0.1	0.1	0.1	0.2	-0.1	0.2	0.2	
8-Feb	0.2	0.1	0.2	0.6	0.4	0.7	0.5	0.5	0.5	0.7	0.8	0.8	0.6	0.1	0.1	0.0	0.0	0.0	-0.1	-0.2	-0.1	0.0	0.0	-0.2	0.3	0.8	0.8	
9-Feb	0.1	0.2	0.3	0.0	-0.2	0.0	0.2	0.4	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.6	0.3	-0.6	-0.2	-0.2	0.0	-0.4	0.1	0.6	0.6	
10-Feb	0.0	-0.2	-0.2	-0.3	-0.2	-0.1	0.0	0.0	0.0	0.1	-0.1	-0.1	0.1	-0.1	-0.1	-0.1	-0.3	-0.2	-0.2	0.0	-0.1	-0.2	0.0	-0.1	-0.1	0.1	0.1	
11-Feb	-0.1	-0.2	0.1	-0.1	-0.2	-0.1	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.3	-0.5	-0.5	-0.4	0.1	-0.3	-0.2	-0.2	-0.3	-0.2	-0.2	0.0	-0.2	0.1	0.1	
12-Feb	0.0	-0.1	0.0	0.1	0.4	0.5	0.4	0.2	0.3	0.7	0.4	1.0	0.9	0.9	0.9	0.8	1.1	1.2	1.1	1.1	1.1	1.2	1.0	1.0	0.7	1.2	1.2	
13-Feb	1.2	1.2	1.1	1.0	1.2	1.2	1.1	0.8	0.6	0.6	1.0	0.9	0.7	0.7	0.8	1.1	0.8	1.0	1.3	1.3	1.5	1.4	1.2	1.2	1.0	1.5	1.5	
14-Feb	0.6	0.2	-0.1	-0.8	-0.2	-0.1	0.0	-0.1	-0.1	0.0	-0.2	0.1	0.2	-0.1	0.2	-0.1	-0.3	-0.2	-0.2	-0.3	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	0.6	
15-Feb	-0.1	-0.2	-0.1	-0.2	-0.3	-0.2	-0.1	0.0	-0.2	0.0	0.2	-0.3	-0.5	-0.5	-0.3	-0.1	0.0	-0.1	0.0	0.0	-0.1	0.1	-0.1	-0.3	-0.2	0.2	0.2	
16-Feb	-0.1	-0.1	-0.2	0.0	-0.2	0.0	-0.1	-0.1	0.0	-0.3	0.0	-0.2	0.0	0.0	0.0	-0.1	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	-0.1	0.0	0.0	
17-Feb	-0.1	-0.1	-0.6	-0.3	-0.1	-0.3	-0.6	-0.2	-0.1	0.2	0.2	0.1	-0.4	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	0.0	-0.2	-0.2	-0.1	-0.2	-0.2	0.2	0.2	
18-Feb	0.0	0.0	-0.1	0.0	-0.1	-0.2	0.0	-0.1	0.0	-0.3	-0.1	-0.1	-0.2	-0.3	-0.1	0.0	-0.1	-0.2	-0.2	0.0	0.0	-0.1	-0.5	-0.5	-0.1	0.0	0.0	
19-Feb	-0.1	-0.3	-0.2	-0.2	-0.1	-0.3	0.1	-0.1	-0.2	0.1	0.1	0.9	0.9	0.2	-0.4	-0.2	0.2	0.0	0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.9	0.9	
20-Feb	-0.2	-0.2	-0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.4	0.4	0.5	0.5	0.4	0.3	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.5	0.5	
21-Feb	0.3	0.5	0.4	0.6	0.9	1.0	0.7	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.4	0.2	0.7	0.6	0.7	0.3	0.1	0.0	0.1	-0.1	0.5	1.0	1.0	
22-Feb	-0.2	-0.1	-0.2	0.0	-0.1	0.1	0.0	0.1	0.3	0.4	0.6	0.6	0.5	0.5	0.5	0.8	0.6	0.2	0.0	-0.2	-0.1	0.1	0.1	0.2	0.2	0.8	0.8	
23-Feb	0.0	0.2	0.5	0.9	0.7	0.9	0.3	0.5	0.1	0.6	0.1	0.1	-0.2	0.2	0.0	0.0	0.0	-0.2	0.0	-0.4	-0.1	-0.3	-0.4	-0.4	0.1	0.9	0.9	
24-Feb	-0.2	0.0	-0.2	-0.4	-0.1	0.2	0.6	1.0	1.1	0.9	0.8	0.8	0.7	0.4	0.2	0.0	0.2	0.6	0.5	0.4	0.4	1.5	1.6	1.6	0.5	1.6	1.6	
25-Feb	1.1	1.0	1.0	1.5	1.2	1.2	1.0	0.3	0.9	0.5	-0.1	-0.1	-0.2	-0.7	-0.6	-0.4	-0.5	-0.5	-0.4	-0.7	-0.4	-0.9	-0.9	-0.6	0.1	1.5	1.5	
26-Feb	0.0	0.7	1.0	1.0	0.7	1.0	0.9	0.5	0.1	-0.4	-0.2	0.0	0.0	-0.2	0.0	0.1	-0.1	-0.2	-0.1	0.2	0.1	-0.3	0.0	0.1	0.2	1.0	1.0	
27-Feb	-0.2	-0.4	-0.5	-0.6	-0.5	-0.5	-0.3	-0.4	-0.4	-0.5	-0.5	-0.1	0.0	-0.3	-0.3	-0.1	-0.1	0.0	-0.1	0.0	0.0	-0.3	-0.2	-0.4	-0.3	0.0	0.0	
28-Feb	-0.1	-0.1	-0.3	-0.2	-0.2	-0.1	-0.2	-0.2	-0.3	0.0	0.0	-0.3	-0.3	0.2	-0.5	-0.1	0.0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.1	-0.1	-0.2	0.2	0.2
29-Feb	0.0	0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.4	0.3	0.5	0.4	0.6	0.5	0.4	-0.1	0.0	0.2	0.2	0.4	0.4	0.6	0.7	0.2	0.7	0.7	
																								Diurnal Average				
																								Diurnal Maximum				
0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.0 0.1 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.1																												
1.2 1.2 1.1 1.5 1.2 1.2 1.1 1.0 1.1 0.9 1.0 1.0 0.9 0.9 0.9 1.1 1.1 1.2 1.3 1.3 1.5 1.4 1.5 1.6 1.6 1.6 1.6 1.6 1.6																												
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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 km/h on Feb 12 18:00 Minimum Value: 0.1 km/h on Feb 20 07:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.6 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 2.3 P ₉₉ = 3.3																				Hours in Service: 696 Hours of Data: 688 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9					
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	0.3	0.2	0.3	0.1	0.1	0.2	0.4	0.4	0.7	0.9	0.9	1.0	1.2	1.0	1.1	0.8	0.4	0.5	0.3	0.2	0.1	0.1	0.2	0.4	1.2
2-Feb	0.2	0.4	0.3	0.5	0.4	0.3	0.2	0.1	0.6	0.7	1.0	1.4	0.9	1.1	0.9	1.7	1.8	2.1	1.7	1.7	1.5	1.3	1.2	1.0	2.1
3-Feb	0.9	0.9	0.9	0.8	0.6	0.1	0.1	0.3	0.2	0.2	0.6	0.7	1.1	0.9	0.6	0.8	1.0	1.1	1.2	1.8	1.8	1.8	1.8	1.6	1.8
4-Feb	1.4	1.3	1.1	1.1	1.2	1.2	1.1	0.9	1.0	1.0	0.9	1.0	0.9	1.1	1.1	0.7	0.9	1.3	0.9	1.1	0.7	0.2	0.2	1.4	1.4
5-Feb	0.3	0.2	0.4	0.7	1.2	0.8	0.9	0.7	1.3	1.8	1.0	1.4	1.4	1.5	1.9	1.6	1.3	0.8	1.0	0.8	0.6	0.9	0.7	1.9	1.9
6-Feb	0.6	0.8	0.8	0.7	0.6	0.8	2.2	1.3	AF	AF	AF	AF	AF	AF	AF	AF	1.0	1.1	0.9	1.2	1.1	0.8	0.3	0.2	2.2
7-Feb	0.2	0.5	0.6	0.5	0.2	0.2	0.2	0.3	0.2	0.4	0.6	1.0	1.7	1.4	1.5	1.4	0.7	0.4	0.3	0.2	0.2	0.2	0.1	0.3	1.7
8-Feb	0.3	0.3	0.3	0.5	0.5	0.8	0.8	0.6	0.7	0.9	0.9	1.1	1.2	0.7	0.5	0.3	0.2	0.1	0.2	0.4	0.5	0.2	0.1	0.4	1.2
9-Feb	0.3	0.3	0.5	0.4	0.4	0.3	0.3	0.5	0.7	0.9	0.9	0.6	0.5	0.6	0.7	0.4	0.3	0.6	1.3	3.0	3.0	3.0	2.8	3.0	3.0
10-Feb	2.4	2.8	2.8	3.5	2.5	2.7	2.4	2.0	2.5	2.3	1.8	2.0	2.1	2.1	2.1	1.7	1.8	1.6	1.0	1.0	1.2	1.1	1.1	1.1	3.5
11-Feb	0.8	1.2	1.0	1.2	1.2	1.1	1.1	1.0	1.1	1.3	1.5	1.7	1.5	1.5	1.8	1.8	1.4	1.1	0.6	0.4	0.8	0.5	0.4	0.2	1.8
12-Feb	0.2	0.4	0.7	0.9	1.5	1.6	1.7	1.6	1.7	3.1	2.7	2.7	2.7	2.8	2.9	3.3	3.5	3.7	3.3	3.4	3.2	3.1	2.9	2.7	3.7
13-Feb	2.7	2.7	2.6	2.8	2.6	2.6	2.2	1.8	1.7	1.9	1.8	2.0	2.2	1.7	2.1	1.7	2.1	1.2	0.9	0.7	0.7	0.6	0.8	1.6	2.8
14-Feb	1.3	0.7	1.2	0.9	1.0	0.7	0.2	0.2	0.3	0.7	0.6	0.6	0.9	0.6	0.7	0.9	1.2	1.0	0.8	1.4	1.5	1.5	1.3	1.4	1.5
15-Feb	1.2	1.1	1.2	1.4	1.8	1.7	1.4	1.7	1.3	1.8	1.8	1.6	1.5	1.9	1.9	1.6	1.4	1.3	0.9	0.7	0.8	0.6	0.5	0.6	1.9
16-Feb	0.5	0.6	0.7	0.7	1.1	1.0	0.8	0.6	0.6	0.6	0.7	0.7	0.7	0.9	0.9	0.9	0.8	1.4	1.3	1.1	1.2	1.2	1.4	1.6	1.6
17-Feb	1.7	1.8	2.1	2.0	2.1	2.5	2.6	2.3	2.4	1.9	2.4	2.4	2.0	2.5	2.1	2.1	1.7	1.9	1.8	1.7	1.7	1.5	1.6	1.5	2.6
18-Feb	1.5	1.2	1.0	1.1	1.2	1.3	1.2	1.2	1.2	1.3	1.2	1.2	1.1	1.7	1.5	0.9	0.5	0.7	0.8	0.7	0.3	1.2	2.7	3.0	3.0
19-Feb	2.5	1.9	1.4	1.0	1.8	2.2	1.8	1.0	0.4	1.0	1.1	1.9	2.0	2.1	1.8	1.7	1.5	1.1	1.2	1.5	1.5	1.3	1.2	0.9	2.5
20-Feb	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.8	0.9	1.1	1.2	1.1	0.9	0.6	0.3	0.2	0.2	0.2	0.4	0.2	0.3	1.2
21-Feb	0.3	0.4	0.7	0.6	0.5	0.6	0.5	0.7	0.6	0.9	1.1	1.3	1.9	1.7	1.8	1.2	1.0	0.7	1.2	1.2	0.8	0.5	0.3	0.3	1.9
22-Feb	0.2	0.3	0.4	0.2	0.1	0.1	0.1	0.3	0.5	0.6	1.0	1.5	1.4	1.7	1.2	1.0	0.7	0.5	0.4	0.5	0.3	0.3	0.3	0.2	1.7
23-Feb	0.1	0.4	1.0	1.3	1.2	1.5	1.4	1.1	1.3	1.4	0.7	0.9	1.5	1.8	1.6	1.3	1.0	0.7	0.3	1.2	0.9	0.7	0.7	0.6	1.8
24-Feb	1.0	0.6	0.8	1.4	0.6	0.5	1.0	0.8	0.9	0.6	1.0	1.3	1.4	1.2	0.9	0.6	0.6	0.8	1.0	1.3	1.3	1.6	1.5	1.6	1.6
25-Feb	1.4	1.3	0.9	0.8	1.1	0.8	0.8	1.0	1.0	1.3	1.5	1.4	1.4	1.6	1.3	1.0	1.3	0.9	1.0	0.8	1.0	2.2	2.0	1.8	2.2
26-Feb	1.4	1.3	1.2	1.3	1.4	1.3	1.3	1.6	3.2	2.1	1.3	1.7	1.8	1.7	1.9	2.6	2.4	3.2	3.2	2.8	2.9	3.0	2.8	3.4	3.4
27-Feb	2.9	3.2	3.3	2.9	2.5	2.4	2.1	2.3	2.2	2.2	2.0	2.1	2.0	1.8	1.6	1.4	1.3	0.8	0.6	0.7	0.5	1.4	1.8	2.3	3.3
28-Feb	2.2	2.6	1.6	1.1	1.1	1.3	1.3	1.8	2.5	3.2	2.7	2.2	2.6	2.9	2.4	2.4	1.9	1.6	0.9	0.7	0.5	0.4	0.4	0.2	3.2
29-Feb	0.1	0.2	0.4	0.2	0.4	0.2	0.2	0.3	0.2	0.6	1.2	1.2	1.8	2.2	1.9	1.2	0.8	0.9	0.9	1.0	1.1	1.4	1.1	1.2	2.2
2.9 3.2 3.3 3.5 2.6 2.7 2.6 2.3 3.2 3.2 2.7 2.7 2.7 2.9 2.9 3.3 3.5 3.7 3.3 3.4 3.2 3.1 2.9 3.4																								Diurnal Maximum	
AF - Analyzer Failure																									



Maximum Value: 4.3 km/h on Feb 12 23:00 Maximum Daily Average: 1.8 km/h on Feb 12																								Hours in Service: 696 Hours of Data: 655			
Minimum Value: -0.8 km/h on Feb 24 04:00 Minimum Daily Average: -0.1 km/h on Feb 23																								Hours of Missing Data: 41 Hours of Calibration: 0			
Maximum Diurnal Average: 0.5 km/h at hour 10 Minimum Diurnal Average: 0.1 km/h at hour 5																								Percent Operational Time: 94.1			
Monthly Average: 0.27 km/h Percentiles: $P_1 = -0.6$ $P_{10} = -0.2$ $Q_1 = 0.0$ Median = 0.1 $Q_3 = 0.4$ $P_{90} = 0.8$ $P_{99} = 3.2$																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0.0	0.0	0.1	0.0	0.0	0.3	0.8	0.4	0.6	0.3	0.0	0.9	0.9	0.5	0.3	0.2	0.2	0.4	0.0	0.1	0.1	0.1	0.4	0.1	0.3	0.9	
2-Feb	0.1	0.0	0.1	0.1	0.0	0.3	0.1	0.4	0.4	0.2	0.7	0.7	0.3	0.3	0.2	-0.2	0.2	0.3	0.0	0.2	-0.1	0.0	0.1	0.0	0.2	0.7	
3-Feb	0.1	0.0	0.1	0.5	0.2	0.0	0.1	0.0	0.3	0.4	0.2	0.0	0.1	0.2	-0.3	-0.1	0.1	0.1	0.2	0.4	0.2	0.0	0.1	0.2	0.1	0.5	
4-Feb	0.1	0.0	0.2	-0.1	0.0	-0.1	0.0	-0.1	0.0	-0.1	0.0	-0.2	0.2	0.4	0.0	-0.1	0.1	-0.1	-0.2	-0.1	0.0	-0.2	-0.1	0.0	0.0	0.4	
5-Feb	0.1	0.2	0.4	0.2	-0.7	-0.3	0.9	0.4	0.7	1.6	0.9	-0.4	0.4	1.0	1.0	0.6	0.2	-0.2	0.3	0.9	0.3	0.2	0.5	0.8	0.4	1.6	
6-Feb	1.2	0.3	0.3	0.1	0.2	0.3	2.2	0.7	AF	AF	AF	AF	-0.1	-0.2	-0.1	0.3	0.0	0.0	0.0	0.2	0.0	-0.1	0.0	0.0	0.3	2.2	
7-Feb	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.3	0.3	0.1	0.0	0.3	0.0	-0.1	0.2	0.1	-0.1	-0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.1	0.3	
8-Feb	0.3	0.0	0.0	-0.1	0.2	0.1	0.7	0.5	0.2	0.1	-0.1	0.2	0.3	0.3	0.2	-0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.3	0.1	0.7	
9-Feb	0.4	0.2	0.8	0.5	0.1	0.4	0.3	0.5	0.8	0.6	0.3	0.2	0.1	0.0	-0.2	0.0	0.3	0.4	0.1	-0.1	0.1	0.9	0.4	-0.3	0.3	0.9	
10-Feb	0.9	0.1	-0.1	-0.1	0.2	0.2	0.3	0.5	0.4	-0.1	0.3	0.2	0.5	0.1	0.4	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.9	
11-Feb	-0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.0	-0.2	-0.2	-0.3	-0.2	0.0	0.5	0.1	0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.5	
12-Feb	0.0	0.1	0.7	0.9	1.1	1.5	0.3	0.1	1.2	3.7	2.0	2.0	1.7	2.0	1.7	1.4	2.3	2.4	2.0	1.9	3.6	4.3	4.3	1.5	1.8	4.3	
13-Feb	2.9	2.4	3.2	3.6	2.6	1.5	2.5	2.5	2.8	2.2	1.5	0.7	1.1	0.6	0.8	0.2	0.3	0.4	0.0	0.1	0.2	0.0	0.1	-0.2	1.3	3.6	
14-Feb	-0.4	-0.4	-0.6	-0.2	-0.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.2	-0.2
15-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	-0.2	-0.2
16-Feb	0.0	-0.2	-0.2	0.0	-0.2	-0.1	-0.1	-0.1	0.3	0.3	0.0	0.2	0.2	0.2	-0.1	0.0	-0.2	-0.2	0.1	0.0	-0.2	-0.2	-0.2	0.0	0.0	0.3	
17-Feb	0.2	0.1	0.2	0.1	0.2	0.5	0.0	0.4	0.2	0.8	0.2	0.3	-0.1	0.1	0.1	0.1	0.0	0.0	-0.2	0.1	0.4	0.2	0.3	0.3	0.2	0.8	
18-Feb	0.2	0.2	0.1	0.2	0.1	0.1	0.3	0.3	0.1	0.0	-0.2	0.0	0.0	-0.3	0.1	0.0	0.0	-0.2	-0.1	-0.1	AF	AF	AF	-0.2	0.0	0.3	
19-Feb	0.1	0.2	0.4	0.1	0.2	0.0	0.3	0.0	0.0	-0.1	0.0	0.3	0.0	-0.4	-0.7	-0.3	0.3	0.0	0.1	-0.2	0.0	-0.1	0.0	0.2	0.0	0.4	
20-Feb	-0.1	-0.1	0.0	0.0	0.0	0.0	0.1	AF	0.2	0.1	0.2	0.5	0.4	0.2	0.2	0.4	0.3	0.8	0.6	0.6	0.3	0.0	0.0	0.6	0.2	0.8	
21-Feb	0.7	0.3	-0.1	0.0	0.1	0.0	0.1	0.3	0.3	0.5	0.3	0.1	0.6	0.8	1.9	1.3	0.8	0.7	1.2	1.0	0.4	0.1	0.2	0.1	0.5	1.9	
22-Feb	0.0	0.0	-0.1	-0.1	0.1	0.0	0.0	0.2	0.5	0.3	0.9	1.2	0.5	1.0	0.7	1.0	0.8	0.6	0.2	-0.3	-0.2	-0.2	-0.1	0.0	0.3	1.2	
23-Feb	0.2	0.1	0.2	0.4	-0.4	0.0	-0.3	-0.4	-0.5	0.3	-0.1	-0.2	-0.3	0.1	-0.4	0.5	0.2	0.0	0.0	-0.3	-0.2	-0.7	-0.6	-0.8	-0.1	0.5	
24-Feb	-0.6	-0.1	-0.5	-0.8	-0.5	-0.1	-0.1	-0.1	0.3	0.0	0.4	0.3	0.6	0.7	0.2	-0.1	0.5	0.5	0.7	1.2	1.2	0.7	0.0	0.0	0.2	1.2	
25-Feb	1.4	0.9	0.3	-0.1	0.0	-0.1	0.1	0.4	-0.1	0.6	0.8	0.8	0.7	0.2	0.0	0.1	0.3	-0.4	0.1	-0.4	-0.1	-0.1	0.3	0.2	0.2	1.4	
26-Feb	0.6	0.2	-0.3	-0.3	0.2	0.1	0.5	1.9	3.5	0.2	-0.3	-0.2	0.4	0.4	0.0	0.4	0.0	0.2	0.2	0.4	0.3	0.3	0.5	0.6	0.4	3.5	
27-Feb	0.7	0.5	0.1	-0.2	0.2	0.0	0.1	0.3	0.4	0.2	0.0	0.1	0.0	-0.2	0.1	0.0	0.0	0.2	-0.1	0.0	0.0	0.0	0.3	0.0	0.1	0.7	
28-Feb	0.5	-0.2	0.1	0.0	-0.1	0.2	0.0	0.1	-0.1	0.4	0.0	-0.1	-0.5	0.4	-0.2	0.3	0.2	0.1	0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.5	
29-Feb	0.0	0.3	0.4	0.1	0.7	0.4	0.4	0.4	0.4	0.4	0.5	0.8	0.8	1.3	0.8	0.4	-0.2	-0.1	0.1	0.2	0.0	0.0	0.2	0.6	0.4	1.3	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.3 2.9			
																								0.2 2.4			
																								0.2 3.2			
																								0.2 3.6			
																								0.1 2.6			
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																								0.3 4.3			
																								0.2 1.5			

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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.5 km/h on Feb 6 13:00 Minimum Value: 0.1 km/h on Feb 1 04:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.3 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.6 P ₉₀ = 2.2 P ₉₉ = 3.2																								Hours in Service: 696 Hours of Data: 655 Hours of Missing Data: 41 Hours of Calibration: 0 Percent Operational Time: 94.1	
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	0.4	0.4	0.3	0.1	0.1	0.5	0.5	0.8	0.8	1.1	1.0	0.9	1.1	1.0	1.0	0.7	0.6	0.7	0.6	0.3	0.3	0.3	0.3	0.4	1.1
2-Feb	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.7	0.6	0.7	1.2	0.9	0.5	0.7	1.3	1.5	1.6	1.4	1.5	1.4	1.3	0.9	0.7	1.6
3-Feb	0.6	1.0	0.5	0.5	0.4	0.3	0.2	0.4	0.4	0.2	0.4	0.6	0.8	1.0	0.6	0.6	0.8	0.9	1.0	1.6	1.9	1.8	1.6	1.2	1.9
4-Feb	1.4	1.3	1.1	1.0	0.9	0.8	0.8	0.7	0.6	0.7	0.7	0.6	1.1	1.3	1.1	0.8	0.6	0.6	0.5	0.6	0.6	0.3	0.2	0.3	1.4
5-Feb	0.4	0.4	0.7	1.1	1.4	1.1	0.9	1.0	2.3	2.1	1.6	1.9	1.8	1.6	1.4	1.8	1.8	1.4	1.4	1.2	0.9	1.0	0.8	0.6	2.3
6-Feb	0.8	0.9	1.3	0.9	0.9	1.3	2.2	1.7	AF	AF	AF	AF	3.5	2.8	1.7	1.5	1.1	0.6	0.6	1.0	1.1	0.9	0.5	0.6	3.5
7-Feb	0.4	0.9	0.8	0.5	0.3	0.2	0.2	0.3	0.4	0.4	0.3	0.6	0.9	0.9	1.0	1.3	0.6	0.3	0.4	0.3	0.2	0.3	0.2	0.6	1.3
8-Feb	0.8	0.6	0.6	0.7	0.6	0.9	1.0	0.7	0.7	0.7	0.7	0.7	0.8	0.5	0.4	0.3	0.2	0.1	0.3	0.2	0.2	0.2	0.4	0.6	1.0
9-Feb	0.6	0.5	0.6	0.4	0.2	0.6	0.5	0.5	1.0	1.1	1.3	0.8	0.7	0.4	0.5	0.4	0.5	0.6	0.9	2.2	2.1	2.4	3.0	2.6	3.0
10-Feb	2.2	2.2	2.7	3.5	2.9	2.6	2.6	2.0	2.5	2.6	1.7	1.5	2.2	1.8	1.8	1.3	0.9	1.1	1.0	0.8	0.8	0.7	0.8	0.7	3.5
11-Feb	0.5	0.8	1.0	0.8	0.7	0.8	0.9	0.7	1.0	1.2	1.4	1.6	1.3	1.4	1.9	1.5	1.3	0.8	0.7	0.4	0.7	0.5	0.7	0.3	1.9
12-Feb	0.3	1.0	1.4	1.7	1.4	1.3	1.9	2.4	2.4	1.5	1.4	1.8	2.2	2.4	2.5	2.7	2.7	2.4	2.5	2.6	3.0	2.8	3.3	3.2	3.3
13-Feb	2.4	1.8	2.4	2.8	3.2	2.8	2.6	2.2	1.9	1.8	1.8	1.6	1.8	1.3	1.3	1.3	1.7	1.3	0.7	0.6	0.7	0.6	1.1	1.8	3.2
14-Feb	1.6	1.6	1.8	0.8	0.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.8
15-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	1.5
16-Feb	0.3	0.4	0.4	0.6	1.0	0.8	0.5	0.3	0.7	0.7	0.4	0.5	0.8	0.7	0.5	0.7	0.5	0.8	0.8	0.7	0.8	0.8	1.2	1.2	1.2
17-Feb	1.4	1.7	1.9	1.6	1.6	2.4	2.4	2.2	2.0	2.2	2.3	2.4	1.5	2.0	2.0	1.7	1.5	1.7	1.6	1.5	1.6	1.3	1.7	1.1	2.4
18-Feb	1.3	1.1	0.6	1.0	0.8	0.8	0.9	1.0	1.2	1.2	1.0	1.0	0.9	1.6	1.4	0.6	0.3	0.5	0.4	0.3	AF	AF	AF	2.4	2.4
19-Feb	2.4	1.3	1.1	0.5	1.6	2.0	1.7	1.1	0.6	0.6	1.1	1.2	1.6	1.8	1.7	1.7	1.7	1.1	1.4	1.5	1.5	1.4	1.4	0.8	2.4
20-Feb	0.4	0.2	0.1	0.2	0.1	0.2	0.2	AF	0.3	0.3	0.3	0.5	0.6	0.8	0.8	0.8	0.7	0.7	0.5	0.5	0.4	0.4	0.5	0.6	0.8
21-Feb	0.6	0.9	0.7	0.6	0.5	0.4	0.5	0.5	0.8	0.9	0.8	1.1	1.7	1.6	1.7	1.6	1.3	1.2	1.4	1.4	1.0	0.8	0.6	0.4	1.7
22-Feb	0.3	0.2	0.3	0.5	0.3	0.2	0.3	0.2	0.4	0.6	0.7	1.0	0.9	1.2	0.9	0.8	0.6	0.7	0.5	1.1	0.5	0.8	0.3	0.3	1.2
23-Feb	0.3	0.5	1.5	2.0	1.7	1.7	1.6	1.7	1.7	2.4	0.8	0.9	0.8	1.8	1.4	1.5	1.1	0.9	0.4	1.3	1.7	1.1	1.1	1.0	2.4
24-Feb	1.6	1.4	1.7	1.8	1.0	0.8	1.5	1.3	1.3	0.5	0.6	0.8	0.9	0.9	0.7	0.5	0.9	1.0	1.3	1.3	1.4	1.7	1.5	1.7	1.8
25-Feb	1.9	1.7	1.6	1.4	1.4	1.2	1.1	1.3	1.1	1.9	1.8	1.3	1.3	1.1	0.8	0.6	0.6	1.0	1.4	0.7	1.1	0.7	0.7	1.5	1.9
26-Feb	2.0	1.8	1.6	1.8	2.1	2.1	2.1	2.6	2.0	2.6	1.8	1.7	2.0	1.8	1.8	2.9	2.8	3.0	3.3	3.5	3.5	2.9	2.5	2.8	3.5
27-Feb	2.8	2.9	3.1	3.0	2.2	1.6	1.4	1.7	1.7	1.8	1.7	2.2	2.3	2.0	1.9	1.8	1.3	0.6	0.2	0.6	0.4	0.6	1.8	2.3	3.1
28-Feb	2.1	2.5	1.7	1.5	1.3	1.5	1.7	1.8	2.7	3.1	2.4	2.3	2.4	3.0	2.1	2.1	1.6	1.3	0.9	1.2	0.9	0.7	0.6	0.3	3.1
29-Feb	0.3	0.7	0.8	0.5	0.7	0.6	0.8	0.5	0.5	0.6	0.8	1.0	1.7	2.0	1.8	1.4	0.7	0.8	0.8	1.1	1.2	1.3	1.4	1.6	2.0
2.8 2.9 3.1 3.5 3.2 2.8 2.6 2.6 2.7 3.1 2.4 2.4 3.5 3.0 2.5 2.9 2.8 3.0 3.3 3.5 3.5 2.9 3.3 3.2																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 4.9 km/h on Feb 26 09:00 Maximum Daily Average: 2.1 km/h on Feb 12																								Hours in Service:	696		
Minimum Value: -1.0 km/h on Feb 5 05:00 Minimum Daily Average: 0.1 km/h on Feb 23																								Hours of Data:	594		
Maximum Diurnal Average: 0.9 km/h at hour 9 Minimum Diurnal Average: 0.3 km/h at hour 15																								Hours of Missing Data:	102		
Monthly Average: 0.51 km/h Percentiles: $P_1 = -0.5$ $P_{10} = 0.0$ $Q_1 = 0.1$ Median = 0.3 $Q_3 = 0.6$ $P_{90} = 1.3$ $P_{99} = 4.1$																								Hours of Calibration:	0		
																								Percent Operational Time:	85.3		
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	0.1	0.1	0.1	0.2	0.4	0.3	0.2	0.3	0.3	0.5	1.0	0.5	0.6	0.1	0.3	0.5	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	1.0	
2-Feb	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.3	0.2	0.3	0.4	0.6	0.6	0.1	0.2	0.0	0.3	0.5	0.2	0.2	0.0	0.1	0.1	0.1	0.3	0.6	
3-Feb	0.1	0.1	0.1	0.7	0.3	0.1	0.2	0.2	0.3	0.3	0.3	0.1	0.2	0.3	0.0	-0.1	0.3	0.2	0.2	0.4	0.1	0.0	0.2	0.2	0.2	0.7	
4-Feb	0.2	0.2	0.1	0.1	0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.1	0.4	0.3	0.2	0.1	0.4	0.2	0.1	0.1	0.2	0.2	0.0	0.2	0.1	0.4	
5-Feb	0.4	0.2	0.6	0.2	-1.0	-0.2	1.9	1.2	1.4	2.1	1.4	0.6	0.9	1.3	AF	AF	AF	AF	AF	AF	AF	AF	0.7	0.7	--	2.1	
6-Feb	0.9	0.8	0.9	0.6	0.5	0.3	2.8	0.9	AF	AF	AF	AF	0.1	-0.2	-0.2	0.4	-0.2	-0.1	-0.1	0.2	0.2	0.0	0.1	0.1	0.4	2.8	
7-Feb	0.2	0.0	0.0	0.1	0.1	0.1	0.4	0.3	0.3	0.4	0.3	0.5	0.2	0.1	0.3	0.1	0.1	0.1	0.2	0.4	0.3	0.5	0.6	0.3	0.2	0.6	
8-Feb	0.1	0.3	0.3	0.7	0.5	0.3	0.4	0.4	0.6	0.8	0.6	0.5	0.3	0.0	0.0	0.1	0.2	0.4	0.6	0.4	0.2	0.3	0.3	0.5	0.4	0.8	
9-Feb	1.2	0.4	1.1	0.9	0.4	0.9	0.7	0.8	1.3	0.7	0.9	0.9	0.5	0.3	0.4	0.6	0.7	0.7	0.4	0.1	0.4	1.1	0.5	-0.4	0.6	1.3	
10-Feb	0.8	0.2	-0.2	-0.2	0.7	0.3	0.2	0.7	0.5	-0.1	0.4	0.3	0.7	0.3	0.3	0.2	0.0	-0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.8	
11-Feb	0.0	0.3	0.5	0.3	0.0	0.2	0.1	0.2	0.5	0.3	0.0	0.0	-0.2	-0.2	-0.1	0.2	0.7	0.3	0.4	0.1	0.2	0.6	0.4	0.5	0.2	0.7	
12-Feb	0.3	0.9	1.4	2.1	1.6	2.1	0.5	0.6	2.2	4.6	2.4	2.1	1.8	2.4	2.0	1.8	2.3	2.2	2.2	1.9	4.0	4.7	4.1	1.3	2.1	4.7	
13-Feb	3.2	2.6	2.9	3.2	2.3	1.2	2.0	2.4	2.5	1.9	0.8	0.0	0.5	0.6	1.0	1.4	0.4	1.1	0.2	0.3	0.5	0.4	0.9	0.2	1.4	3.2	
14-Feb	0.1	-0.2	-0.3	0.2	0.1	0.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.4
15-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	--	0.4
16-Feb	0.3	0.2	0.4	0.5	0.4	0.1	0.1	0.4	1.1	0.6	0.3	0.4	0.4	0.5	0.5	0.1	0.1	0.0	0.2	0.2	0.1	0.0	0.1	0.2	0.3	1.1	
17-Feb	0.4	0.5	0.4	0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.5
18-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	--	0.5
19-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	--	0.2
20-Feb	0.1	0.0	0.2	0.2	0.0	0.1	0.2	0.1	0.2	0.4	0.3	0.3	0.3	0.1	0.0	0.3	0.8	0.9	0.7	0.5	0.8	0.6	0.1	0.6	0.3	0.9	
21-Feb	0.5	0.3	0.4	0.7	0.3	0.3	0.5	0.4	0.4	0.2	0.4	0.1	0.5	0.6	1.2	0.9	0.5	0.4	0.8	1.4	1.0	0.6	0.5	0.4	0.6	1.4	
22-Feb	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.4	0.7	0.4	0.5	0.5	1.4	0.5	0.4	0.7	0.7	0.2	-0.4	-0.2	-0.2	0.0	0.1	0.3	1.4	
23-Feb	0.1	0.4	0.6	0.8	-0.2	0.7	-0.1	-0.1	0.2	1.7	0.0	-0.4	-0.5	0.0	-0.5	0.6	0.5	0.2	0.1	-0.2	-0.1	-0.3	-0.5	-0.6	0.1	1.7	
24-Feb	-0.6	0.0	-0.1	-0.9	-0.6	-0.3	-0.1	0.2	1.0	0.6	0.4	0.2	0.2	0.9	0.2	0.0	0.6	1.4	3.1	3.4	3.9	4.3	3.8	3.6	1.0	4.3	
25-Feb	2.0	1.7	0.4	1.5	1.2	1.0	0.8	1.6	0.9	1.5	2.1	1.4	1.7	0.9	0.3	0.5	0.9	0.4	0.8	0.1	0.3	0.1	0.5	1.0	1.0	2.1	
26-Feb	1.8	1.1	0.1	0.4	1.2	1.3	3.2	4.1	4.9	1.0	-0.2	-0.1	0.8	0.8	-0.1	0.4	0.2	0.3	0.2	0.4	0.6	0.3	0.3	0.9	1.0	4.9	
27-Feb	1.0	0.9	0.3	-0.1	0.2	0.0	0.2	0.3	0.5	0.4	0.0	0.0	0.2	0.0	-0.1	0.2	0.1	0.0	0.0	0.1	0.3	0.0	0.3	0.1	0.2	1.0	
28-Feb	0.4	-0.3	0.0	0.4	-0.2	0.3	0.0	0.4	0.1	0.4	0.1	-0.1	-0.6	0.5	-0.2	0.5	0.4	0.4	0.3	0.3	0.1	0.1	0.2	0.1	0.1	0.5	
29-Feb	0.1	0.8	0.5	0.5	1.3	0.7	0.6	0.8	0.6	0.6	1.1	0.7	0.5	1.2	0.7	0.5	-0.1	0.0	1.1	1.0	-0.2	-0.3	0.0	0.1	0.5	1.3	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.5 3.6			
																								3.2 4.1			

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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.8 km/h on Feb 12 23:00 Minimum Value: 0.1 km/h on Feb 20 06:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.5 Median = 0.9 Q ₃ = 1.5 P ₉₀ = 2.4 P ₉₉ = 3.5																								Hours in Service: 696 Hours of Data: 594 Hours of Missing Data: 102 Hours of Calibration: 0 Percent Operational Time: 85.3	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	0.5	0.5	0.4	0.2	0.2	0.4	0.4	0.5	0.6	0.8	1.0	0.9	1.3	0.9	0.9	0.7	0.6	0.6	0.7	0.3	0.4	0.4	0.4	0.4	1.3
2-Feb	0.3	0.4	0.3	0.5	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.9	0.7	0.4	0.4	0.9	1.3	1.6	1.1	1.5	1.5	1.3	0.8	0.6	1.6
3-Feb	0.6	1.1	0.5	0.6	0.5	0.3	0.3	0.3	0.3	0.4	0.4	0.6	0.7	0.9	0.7	0.4	0.7	0.9	1.0	1.7	2.0	1.9	1.6	1.2	2.0
4-Feb	1.6	1.2	1.0	0.9	0.7	0.6	0.7	0.7	0.5	0.4	0.5	0.5	1.2	1.4	1.2	0.9	0.7	0.6	0.4	0.2	0.4	0.3	0.2	0.4	1.6
5-Feb	0.4	0.4	0.7	0.9	1.1	1.3	1.1	1.1	2.2	2.2	1.5	1.6	1.7	1.5	AF	AF	AF	AF	AF	AF	AF	AF	0.7	0.7	2.2
6-Feb	0.7	0.8	1.2	0.9	0.9	1.0	2.3	1.5	AF	AF	AF	AF	3.8	2.9	1.8	1.7	1.2	0.6	0.5	1.0	1.2	1.0	0.6	0.8	3.8
7-Feb	0.6	1.1	0.9	0.6	0.5	0.4	0.6	0.4	0.4	0.4	0.4	0.7	0.8	1.0	1.1	1.2	0.6	0.2	0.3	0.3	0.4	0.5	0.5	0.6	1.2
8-Feb	0.7	0.6	0.7	0.9	0.9	0.8	0.7	0.5	0.8	0.7	0.8	0.5	0.5	0.3	0.4	0.2	0.3	0.3	0.6	0.3	0.3	0.5	0.5	0.6	0.9
9-Feb	0.8	0.6	0.8	0.7	0.4	0.7	0.7	0.6	0.9	1.0	1.5	1.0	1.0	0.5	0.6	0.5	0.5	0.6	0.8	2.1	1.9	2.4	3.1	2.7	3.1
10-Feb	2.6	2.5	2.9	3.5	3.0	2.8	2.8	2.2	2.5	2.4	1.6	1.8	2.5	1.9	1.9	1.6	1.0	1.2	1.0	0.9	0.9	0.6	0.5	0.5	3.5
11-Feb	0.4	0.5	0.6	0.4	0.4	0.3	0.4	0.3	0.5	0.6	0.8	1.1	1.3	1.1	1.6	1.5	1.2	1.1	1.0	0.8	0.6	0.7	0.8	0.7	1.6
12-Feb	0.5	1.2	0.9	1.2	1.0	1.1	1.5	1.8	2.4	1.8	1.5	1.7	2.6	2.4	2.9	2.6	3.0	2.8	3.1	2.7	3.4	3.5	3.8	3.0	3.8
13-Feb	2.7	2.2	2.9	3.0	2.9	2.5	2.4	2.0	1.8	1.6	1.2	1.0	1.2	0.9	1.2	1.2	1.7	1.2	0.7	0.9	0.5	0.8	0.9	0.7	3.0
14-Feb	0.9	0.6	0.7	1.0	0.3	0.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.0
15-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	0.8
16-Feb	0.4	0.5	0.8	1.2	1.0	0.7	0.3	0.3	1.0	0.8	0.5	0.7	0.9	0.8	0.6	0.7	0.6	0.4	0.4	0.3	0.3	0.3	0.4	0.5	1.2
17-Feb	1.0	1.2	1.7	1.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.7
18-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.4	0.6	0.7	AF	AF	AF	AF	AF	0.7
19-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.0	1.7	1.1	1.3	1.2	1.6	1.5	1.7	1.1	2.0
20-Feb	0.6	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.4	0.4	0.7	0.8	0.8	0.9	0.9	1.0	0.8	0.7	0.7	0.7	0.5	0.6	1.0
21-Feb	0.7	0.6	0.6	0.5	0.3	0.4	0.5	0.5	0.6	0.7	0.5	0.7	1.3	1.5	1.2	0.9	0.9	0.7	1.4	1.6	1.1	0.7	0.6	0.4	1.6
22-Feb	0.4	0.4	0.4	0.4	0.3	0.2	0.4	0.2	0.4	0.6	0.6	0.8	0.7	1.3	1.0	0.6	0.6	0.8	0.6	1.2	0.7	1.2	0.5	0.2	1.3
23-Feb	0.2	0.5	0.9	1.1	0.8	0.9	0.7	0.7	0.8	1.4	0.8	1.0	0.9	1.9	1.7	1.8	1.2	1.0	0.5	1.1	0.9	0.7	0.6	0.8	1.9
24-Feb	1.8	1.7	1.4	1.5	0.9	1.1	0.7	1.1	1.4	0.8	0.3	0.4	0.7	0.9	0.5	0.5	0.9	0.9	0.9	0.8	0.8	1.0	1.4	1.1	1.8
25-Feb	1.3	1.5	1.2	1.0	1.1	1.2	0.9	1.2	1.1	2.0	0.9	1.2	0.9	1.3	0.9	0.7	0.6	1.3	1.4	0.7	0.8	0.4	0.5	1.1	2.0
26-Feb	1.7	1.8	1.5	1.5	1.8	1.5	1.1	1.6	1.3	3.0	2.2	1.8	2.0	1.8	1.9	2.7	2.9	3.0	3.2	3.5	3.5	3.0	2.6	2.5	3.5
27-Feb	2.8	2.8	3.3	3.0	2.4	2.1	1.5	1.8	1.9	1.6	1.5	1.7	2.2	1.9	1.8	1.8	1.2	0.5	0.3	0.4	0.4	0.6	1.7	2.5	3.3
28-Feb	2.2	2.4	2.0	1.8	1.5	1.9	2.0	2.1	3.0	3.2	2.7	2.5	2.9	3.5	2.4	2.5	2.0	1.5	1.1	1.6	1.4	0.8	0.7	0.5	3.5
29-Feb	0.4	1.0	0.9	0.8	0.9	0.8	0.8	0.6	0.5	0.6	0.9	0.9	1.8	1.8	1.4	1.0	0.5	0.5	0.8	0.9	0.7	0.8	1.2	1.0	1.8
2.8 2.8 3.3 3.5 3.0 2.8 2.8 2.2 3.0 3.2 2.7 2.5 3.8 3.5 2.9 2.7 3.0 3.0 3.2 3.5 3.5 3.5 3.8 3.0 Diurnal Maximum																									
AF - Analyzer Failure																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 4
BUFFALO VIEWPOINT
FEBRUARY 2016**

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

March 24, 2016



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

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	662	34	34	100.00	39	0	4	0
H2S (ppb) Average	663	33	33	100.00	10	0	2	0
THC (ppm) Average	662	34	34	100.00	5.3	-	3.2	-
Temperature (C) Average	696	0	0	100.00	8.8	-	2.7	-
Relative Humidity (%) Average	696	0	0	100.00	97	-	93	-
Wind Speed 10 m (km/h) Average	696	0	0	100.00	35	-	16	-
Wind Direction 10 m (deg) Average	696	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	662	0.8	2	-	0	0	0	0	1	1	39
H2S (ppb) Average	663	0.5	1	-	0	0	0	0	0	1	10
THC (ppm) Average	662	2.43	0.4	-	2.2	2.2	2.2	2.3	2.4	2.8	5.3
Temperature 2 m (C) Average	696	-10.81	7.3	-	-35.2	-18.9	-15.4	-11.5	-5.5	-1.3	8.8
Relative Humidity (%) Average	696	78.8	12	-	36	60	73	82	87	92	97
Wind Speed 10 m (km/h) Average	696	9.6	5	-	0	4	6	8	13	17	35
Wind Direction 10 m (deg) Average	696	-	-	-	-	-	-	-	-	-	-

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

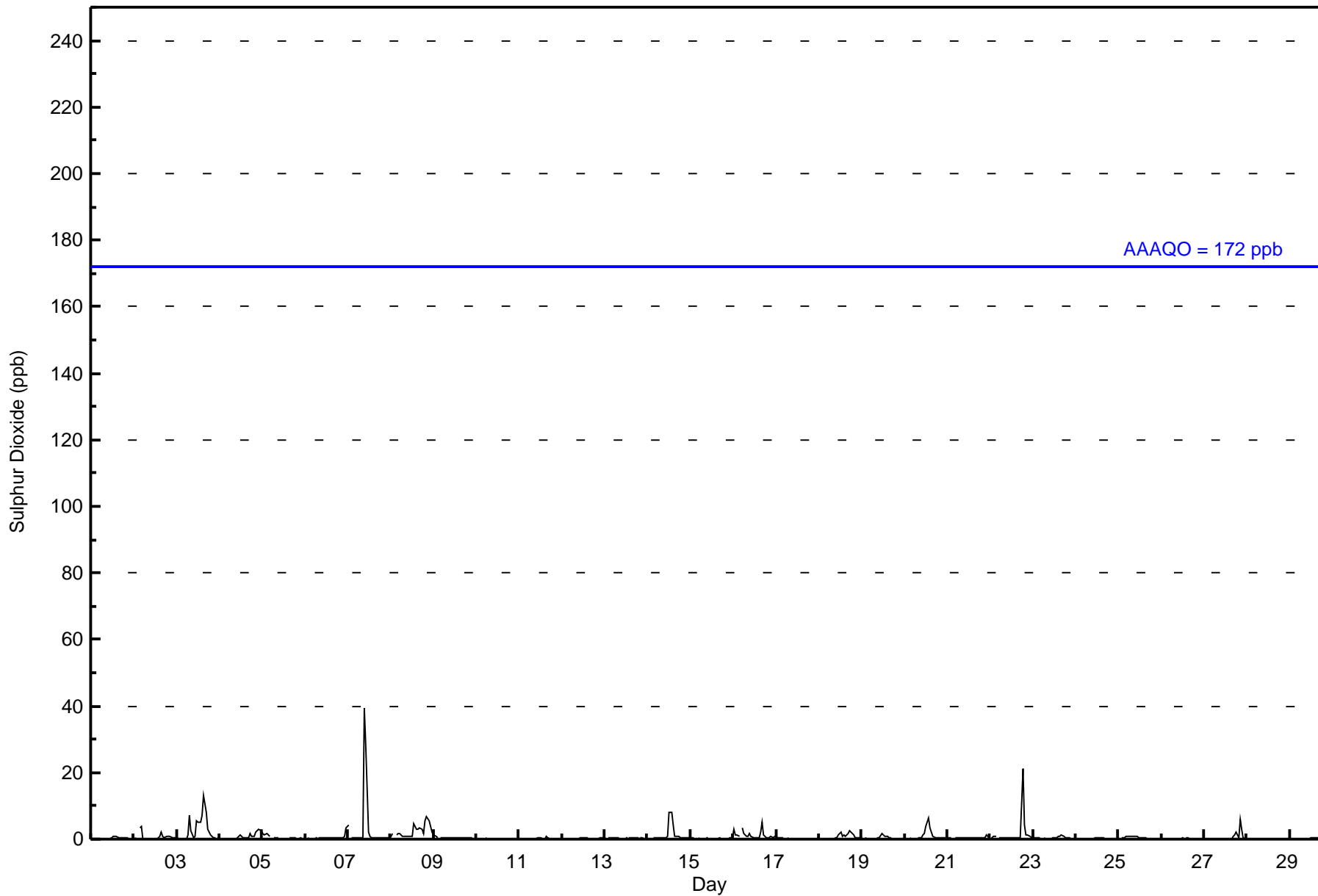
Buffalo Viewpoint - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																	
Maximum Value: 39 ppb on Feb 7 10:00										Maximum Daily Average: 3.5 ppb on Feb 7										Hours of Data: 662							
Minimum Value: 0 ppb on Feb 17 19:00										Minimum Daily Average: 0.0 ppb on Feb 28										Hours of Missing Data: 34							
Maximum Diurnal Average: 1.7 ppb at hour 10										Minimum Diurnal Average: 0.3 ppb at hour 3										Hours of Calibration: 34							
Monthly Average: 0.8 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 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	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1	
2-Feb	0	0	Z	3	4	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0.7	4	
3-Feb	0	0	0	Z	0	0	1	7	3	0	1	6	5	5	7	13	8	3	2	1	0	0	0	2.8	13		
4-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	2	1	1	2	3	3	3	0.8	3	
5-Feb	2	1	2	1	1	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.5	2		
6-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0.4	3	
7-Feb	4	Z	1	0	0	0	0	0	0	39	28	2	1	1	0	0	0	0	0	0	0	0	0	3.5	39		
8-Feb	1	2	Z	1	2	2	1	1	1	1	1	1	1	5	3	3	3	3	2	5	7	5	4	2	2.4	7	
9-Feb	1	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	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	0.2	0		
11-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	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	0.2	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	0.2	0		
14-Feb	0	0	Z	0	1	1	1	1	0	1	1	8	8	4	1	1	1	1	1	1	0	0	0	1.3	8		
15-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1		
16-Feb	3	1	1	1	Z	3	2	1	1	2	1	1	0	0	0	2	5	1	1	1	1	1	1	1.3	5		
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	0.2	1		
18-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	2	2	2	1	1	0	0	0.7	2		
19-Feb	0	Z	0	0	0	0	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0.4	2		
20-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	4	6	3	2	1	1	0	0	0	0	0	1.0	6		
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1	
22-Feb	0	0	1	1	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	21	4	1	1	1	1	1.5	21	
23-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.4	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	0.2	0		
25-Feb	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1		
26-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1		
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	6	3	0	0	0.7	6		
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	0		
29-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		
0.6 0.4 0.3 0.5 0.5 0.4 0.3 0.5 0.3 1.7 1.4 0.7 1.0 1.2 1.0 1.1 1.0 0.6 1.3 0.7 0.8 0.6 0.5 0.5										Diurnal Average																	
4 2 2 3 4 3 2 7 3 39 28 6 8 8 7 13 8 3 21 5 7 5 4 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
Buffalo Viewpoint - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	658	99.40	99.40
11 - 20	1	0.15	99.55
21 - 60	3	0.45	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	177	67	12	8	3	15	94	123	23	9	7	26	21	19	20	34	658
11 - 20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	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	179	67	13	8	3	15	94	123	23	9	7	26	21	19	21	34	662

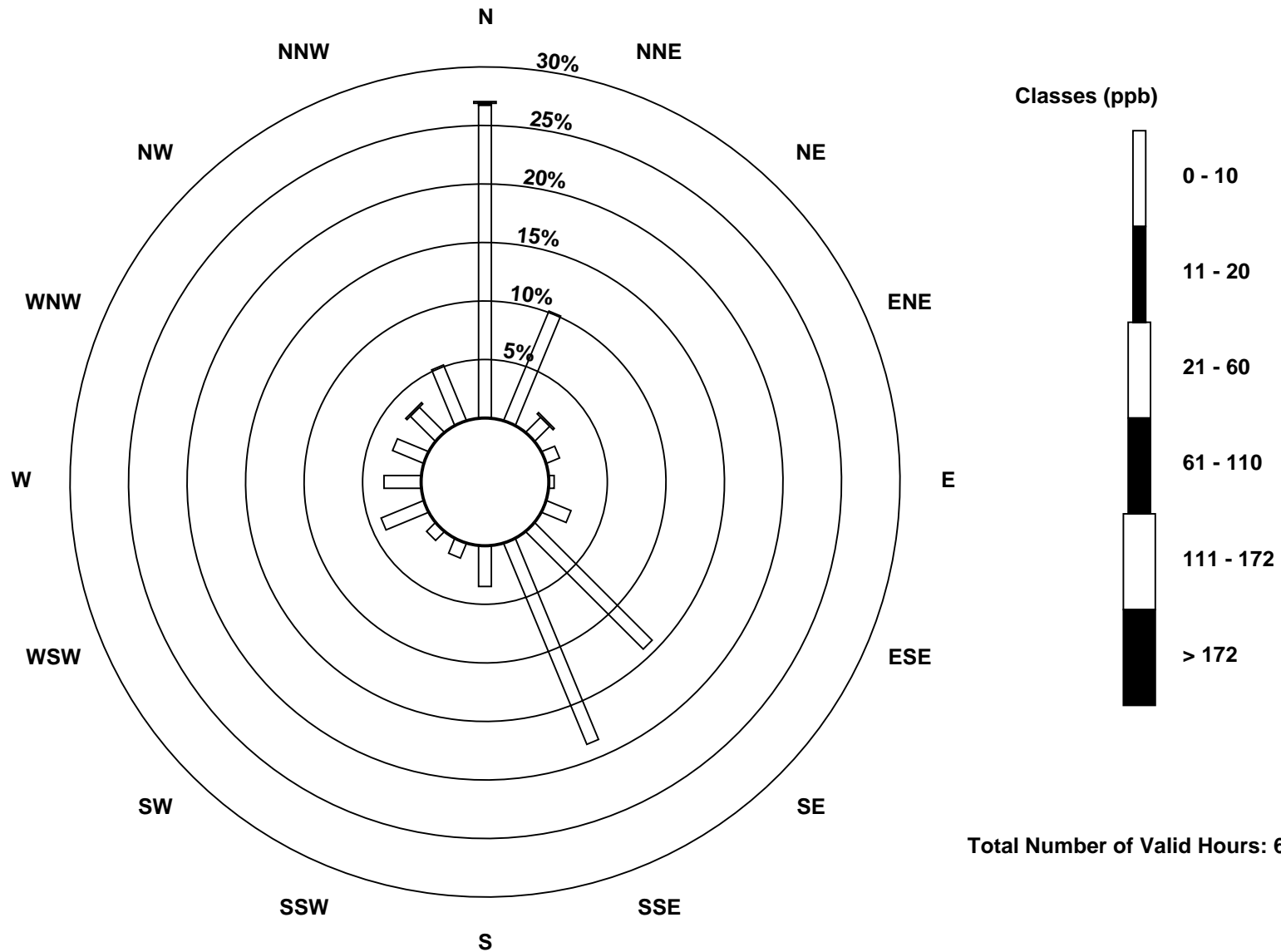
Total Number of Valid Hours: 662

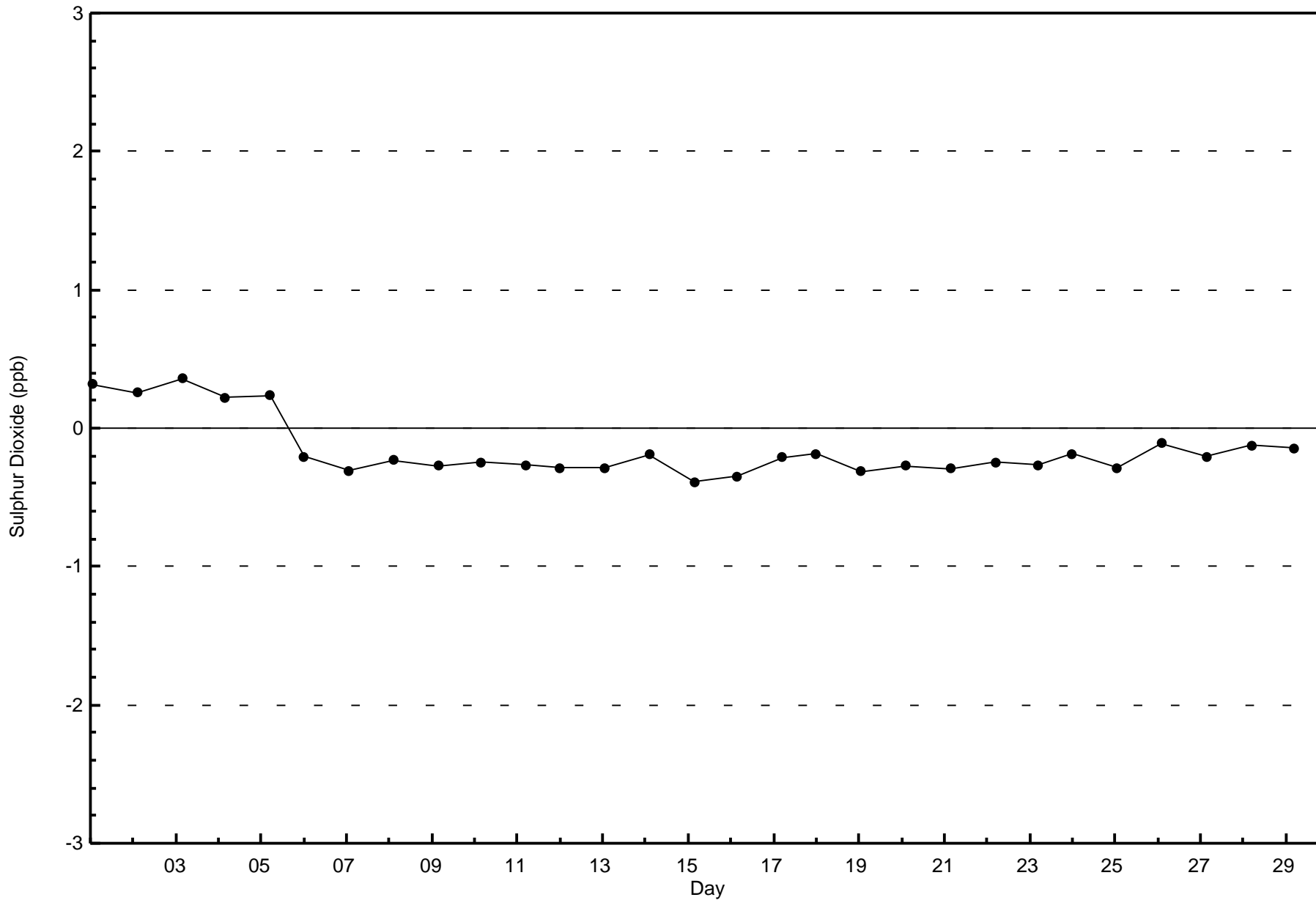
Total Number of Hours: 696

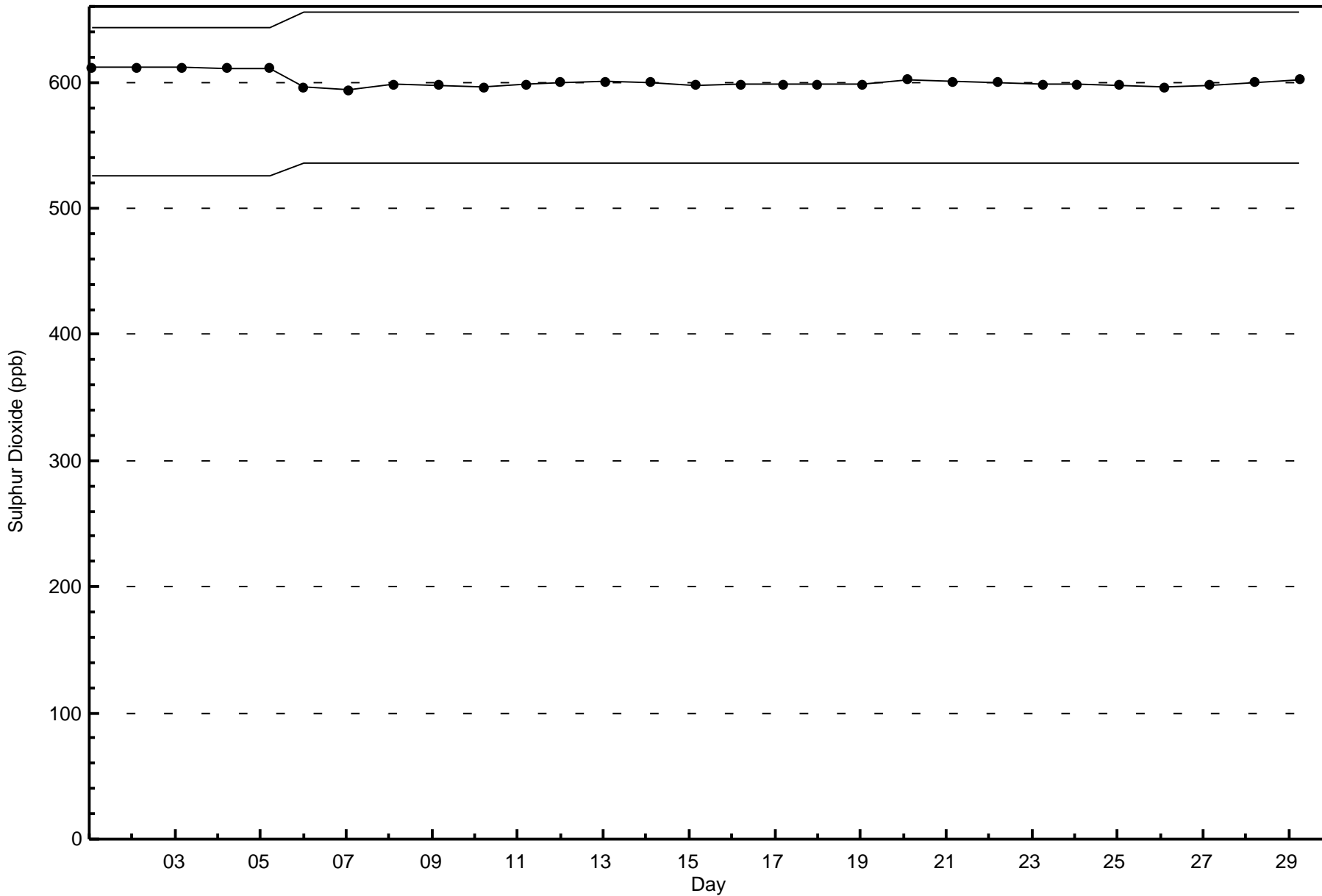


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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

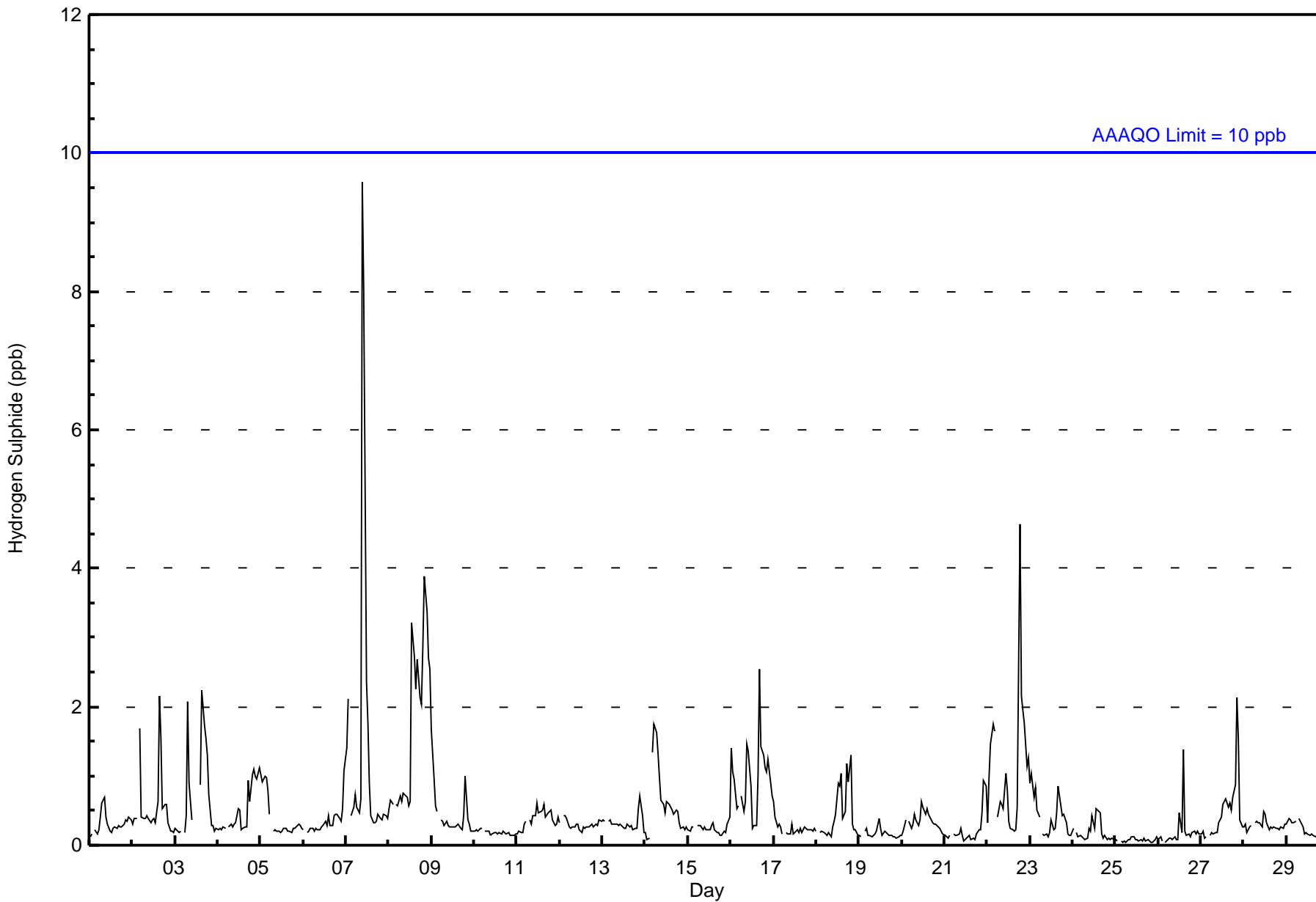








Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 10 ppb on Feb 7 10:00										Maximum Daily Average: 1.7 ppb on Feb 8										Hours of Data: 663						
Minimum Value: 0 ppb on Feb 25 22:00										Minimum Daily Average: 0.1 ppb on Feb 25										Hours of Missing Data: 33						
Maximum Diurnal Average: 0.7 ppb at hour 10										Minimum Diurnal Average: 0.3 ppb at hour 6										Hours of Calibration: 33						
Monthly Average: 0.5 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Feb	0	0	0	Z	2	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	0	0	0	0	0.6	2
3-Feb	0	0	0	0	Z	0	0	2	1	0	C	C	C	C	1	2	2	2	1	1	0	0	0	0.7	2	
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0.5	1	
5-Feb	1	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	1	1	0.3	1
7-Feb	1	2	Z	0	1	1	1	0	1	10	8	2	2	1	0	0	0	0	0	0	0	0	0	0	1.5	10
8-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	3	3	2	3	2	2	3	4	3	3	3	1.7	4
9-Feb	2	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	2	
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	0.2	0	
11-Feb	0	0	0	0	0	0	Z	0	0	0	0	1	0	0	1	1	0	0	0	1	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	0.3	0	
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1	
14-Feb	0	0	0	Z	1	2	2	1	1	1	1	0	1	1	1	1	0	1	0	0	0	0	0	0.6	2	
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	0.2	0	
16-Feb	1	1	1	1	1	Z	1	0	1	1	1	1	0	0	0	1	3	1	1	1	1	1	1	1.0	3	
17-Feb	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0	0.5	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	1	1	0	1	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	1	1	0.2	1
22-Feb	0	1	1	2	2	Z	0	1	1	1	1	1	0	0	0	0	0	1	5	2	2	2	1	1	1.1	5
23-Feb	1	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1	
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1	
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	0.1	0	
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	0	0.5	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	0.3	0	
29-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
0.4 0.5 0.4 0.4 0.5 0.3 0.4 0.4 0.4 0.4 0.7 0.6 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.6 0.6 0.5 0.4 0.4																								Diurnal Average		
2 2 1 2 2 2 2 2 2 1 10 8 2 2 3 3 2 3 2 5 3 4 3 3 3																								Diurnal Maximum		
Z - zerspan 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
Buffalo Viewpoint - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	651	98.19	98.19
3 - 4	9	1.36	99.55
5 - 7	1	0.15	99.70
8 - 11	2	0.30	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	173	68	10	7	2	13	96	124	21	10	8	27	19	18	19	36	651
3 - 4	3	1	2	1	1	0	0	0	1	0	0	0	0	0	0	0	9
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
8 - 11	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	177	69	13	8	3	13	96	124	22	10	8	27	19	18	20	36	663

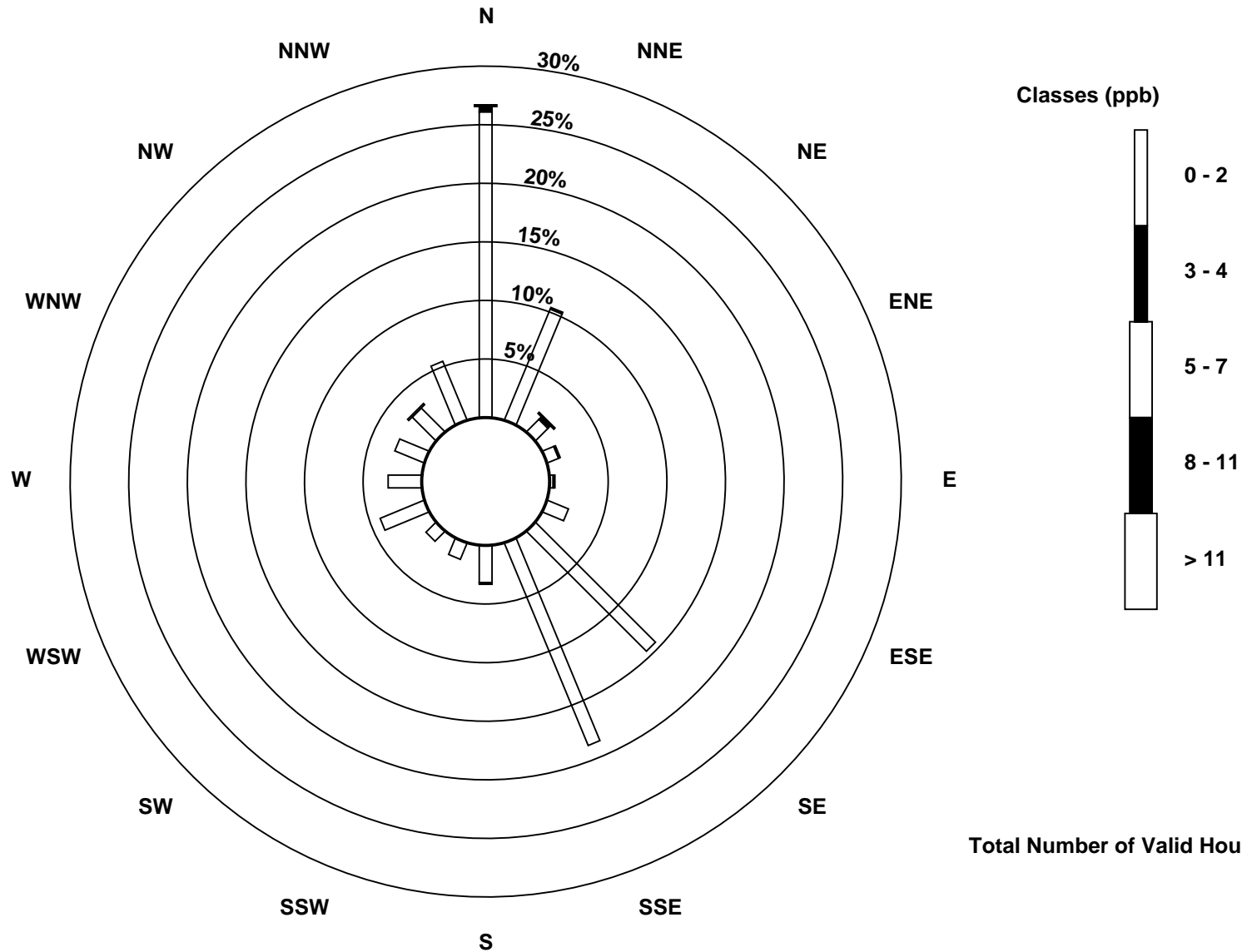
Total Number of Valid Hours: 663

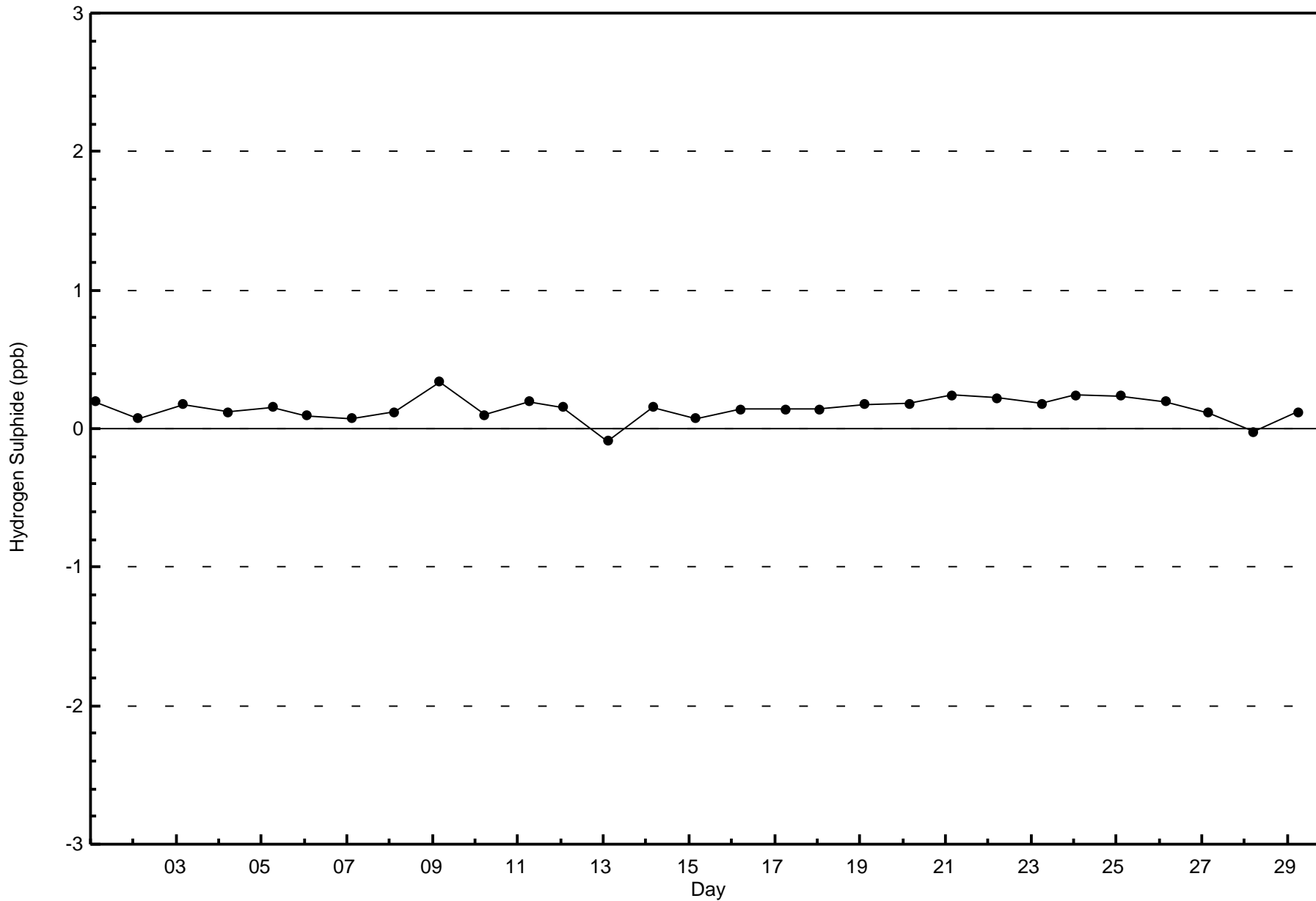
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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

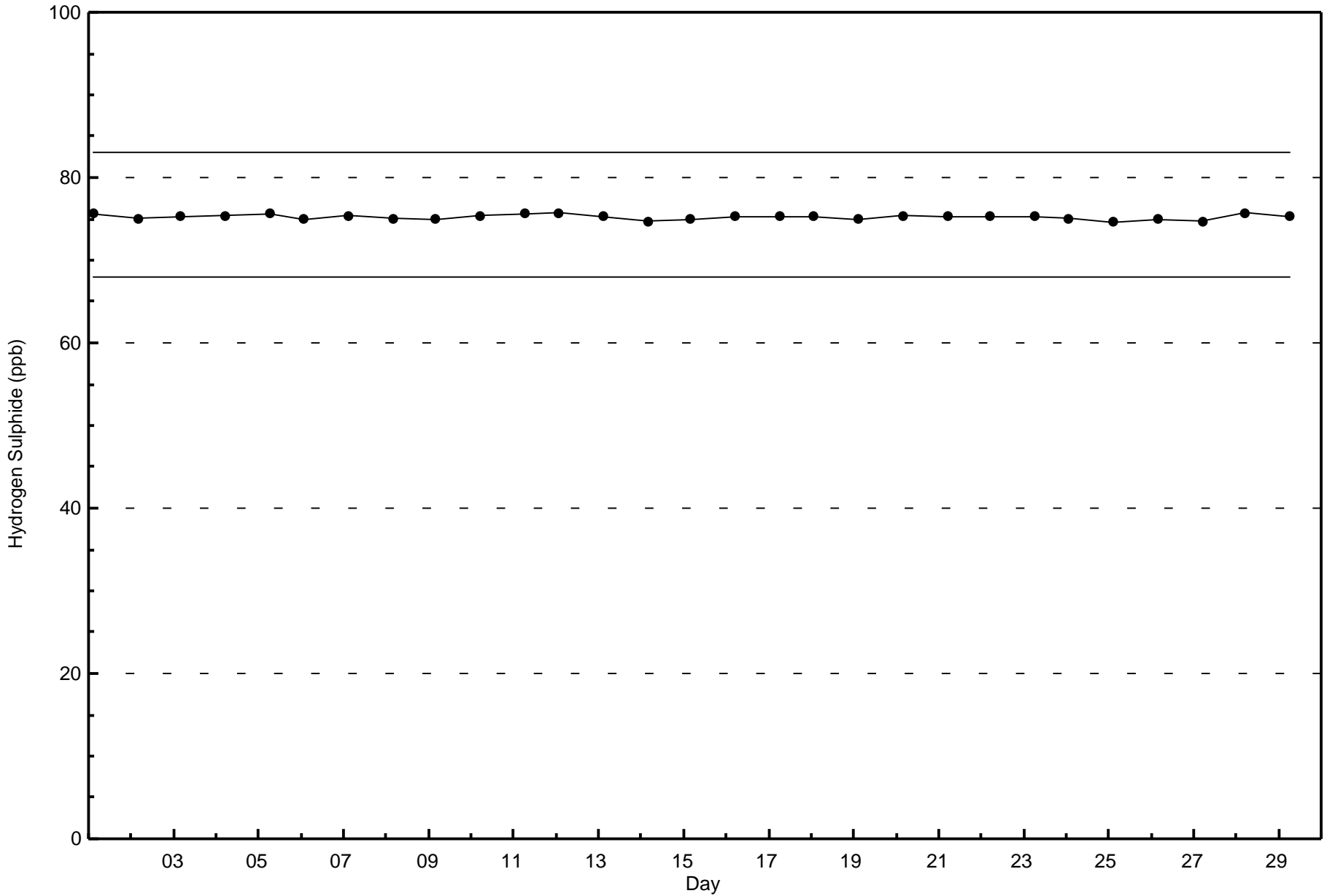






Wood Buffalo Environmental Association
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - February 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

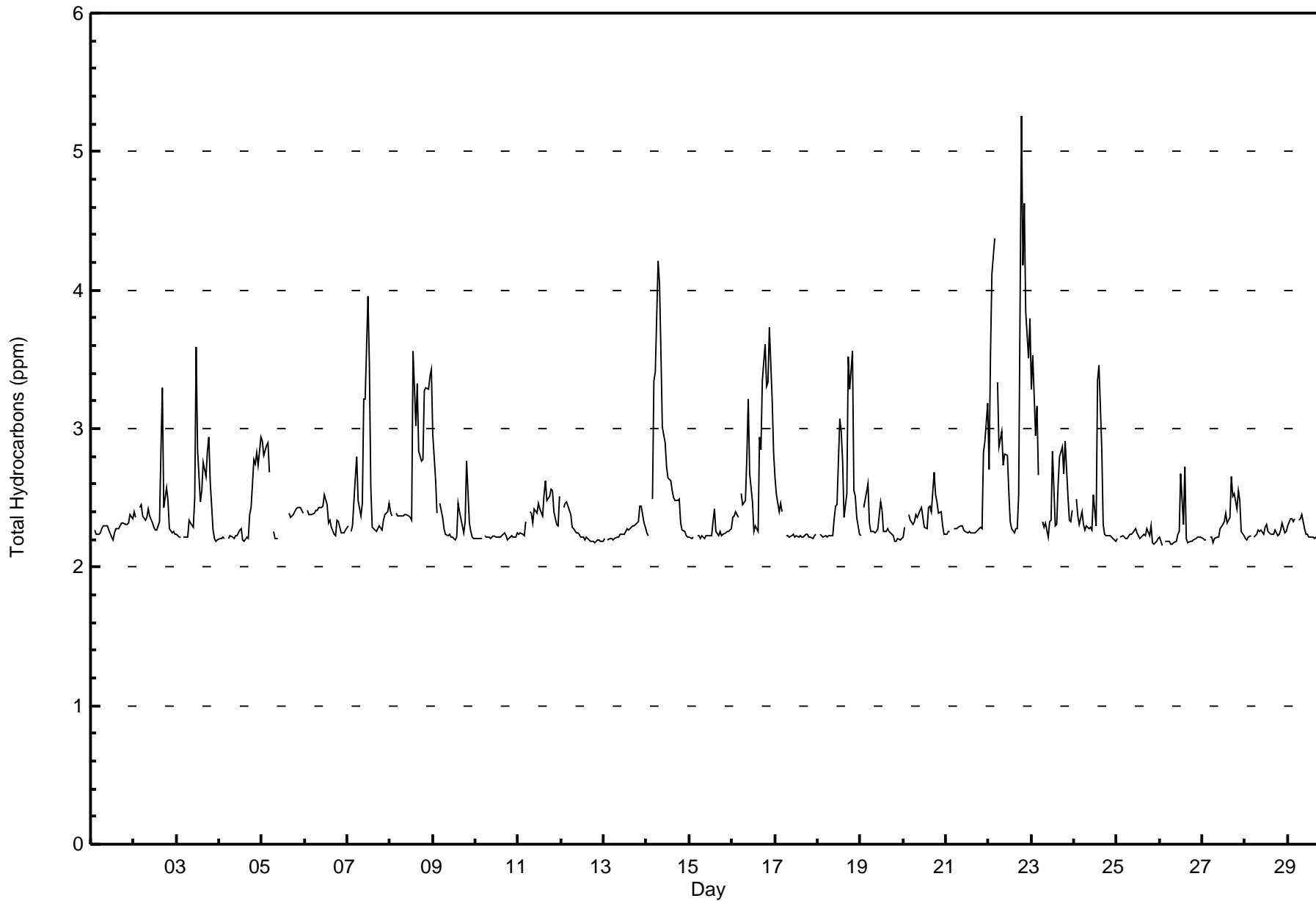
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - February 2016

Maximum Value: 5.3 ppm on Feb 22 19:00 Maximum Daily Average: 3.2 ppm on Feb 22																				Hours in Service: 696 Hours of Data: 662 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0						
Minimum Value: 2.2 ppm on Feb 26 02:00 Minimum Daily Average: 2.2 ppm on Feb 10 Maximum Diurnal Average: 2.6 ppm at hour 19 Minimum Diurnal Average: 2.4 ppm at hour 9 Monthly Average: 2.43 ppm Percentiles: P ₁ = 2.2 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.8 P ₉₉ = 4.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4
2-Feb	2.4	2.4	Z	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.8	3.3	2.4	2.6	2.5	2.3	2.2	2.3	2.2	2.4	3.3
3-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.5	3.6	2.8	2.5	2.6	2.8	2.7	2.8	2.9	2.6	2.3	2.2	2.2	2.2	2.5	3.6
4-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.4	2.8	2.7	2.8	2.7	2.9	2.4	2.9
5-Feb	2.9	2.8	2.9	2.9	2.7	Z	2.3	2.2	2.2	2.2	C	C	C	C	C	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.9
6-Feb	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.5
7-Feb	2.3	Z	2.3	2.3	2.6	2.8	2.5	2.4	2.5	3.2	3.2	4.0	3.5	2.6	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.6	4.0
8-Feb	2.4	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	3.6	3.0	3.3	2.8	2.8	2.8	3.3	3.3	3.3	3.4	3.4	2.8	3.6
9-Feb	3.0	2.6	2.4	Z	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.4	2.3	2.2	2.3	2.8	2.3	2.3	2.2	2.2	2.4	3.0
10-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
11-Feb	2.2	2.2	2.2	2.2	2.3	Z	2.4	2.4	2.3	2.4	2.4	2.5	2.4	2.4	2.5	2.6	2.5	2.5	2.6	2.6	2.4	2.3	2.3	2.5	2.4	2.6
12-Feb	Z	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
13-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.4
14-Feb	2.2	2.2	Z	2.5	3.3	3.4	4.2	4.0	3.6	3.0	2.9	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.2	2.2	2.7	4.2
15-Feb	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	2.3	2.4	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.4
16-Feb	2.4	2.4	2.4	2.4	Z	2.5	2.5	2.5	2.8	3.2	2.7	2.5	2.3	2.3	2.3	2.9	2.8	3.3	3.6	3.3	3.3	3.7	3.2	2.8	2.8	3.7
17-Feb	2.6	2.5	2.4	2.5	2.4	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	2.3	2.6
18-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	3.1	3.0	2.8	2.4	2.5	3.5	3.3	3.6	2.6	2.5	2.4	2.2	2.6	3.6
19-Feb	2.2	Z	2.4	2.5	2.6	2.3	2.3	2.3	2.2	2.3	2.3	2.5	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6
20-Feb	2.2	2.3	Z	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.7	2.5	2.5	2.4	2.4	2.3	2.2	2.4	2.7
21-Feb	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.8	2.9	3.2	2.4	3.2
22-Feb	2.7	3.5	4.1	4.4	Z	3.3	2.9	3.0	2.7	2.8	2.8	2.5	2.3	2.3	2.2	2.3	2.3	2.5	5.3	4.2	4.6	3.8	3.5	3.8	3.2	5.3
23-Feb	3.3	3.5	2.9	3.2	2.7	Z	2.3	2.3	2.3	2.2	2.3	2.3	2.8	2.3	2.3	2.6	2.8	2.9	2.7	2.9	2.5	2.3	2.3	2.4	2.6	3.5
24-Feb	Z	2.5	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.3	3.3	3.5	2.9	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.5
25-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3
26-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.7	2.3	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.7
27-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.4	2.7	2.5	2.5	2.4	2.5	2.5	2.3	2.2	2.3	2.7
28-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.3
29-Feb	2.3	2.3	2.3	2.3	2.4	Z	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4
2.4 2.4 2.4 2.5 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 2.5 2.6 2.5 2.5 2.5 2.4 2.4																								Diurnal Average		
3.3 3.5 4.1 4.4 3.3 3.4 4.2 4.0 3.6 3.2 3.2 4.0 3.5 3.6 3.5 3.3 3.3 3.5 5.3 4.2 4.6 3.8 3.5 3.8																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	617	93.20	93.20
3.1 - 10.0	45	6.80	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - February 2016**

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	173	64	10	7	2	15	93	121	20	8	7	25	18	13	15	26	617
3.1 - 10.0	6	3	3	1	1	0	1	2	3	1	0	1	3	6	6	8	45
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	179	67	13	8	3	15	94	123	23	9	7	26	21	19	21	34	662

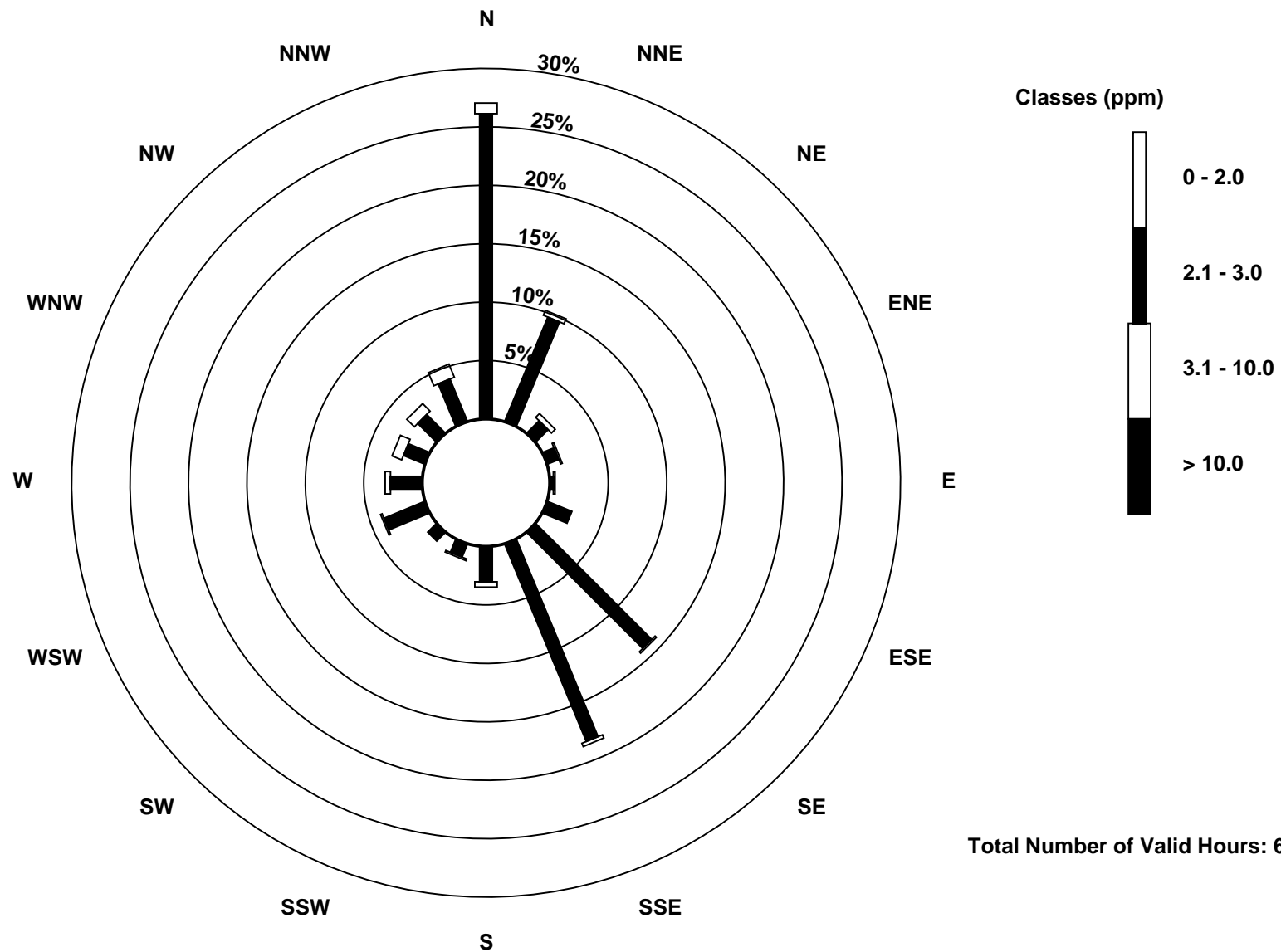
Total Number of Valid Hours: 662

Total Number of Hours: 696

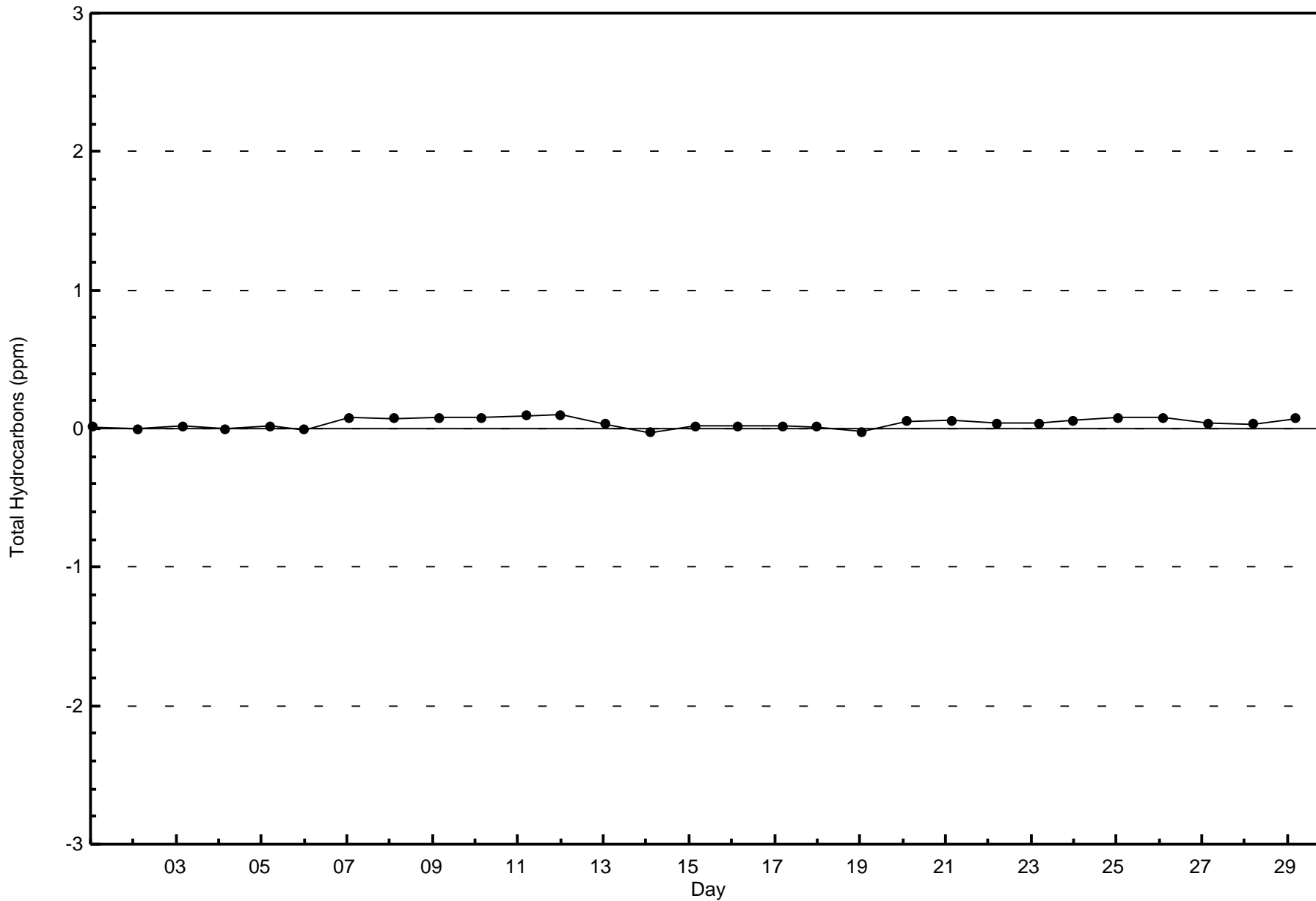


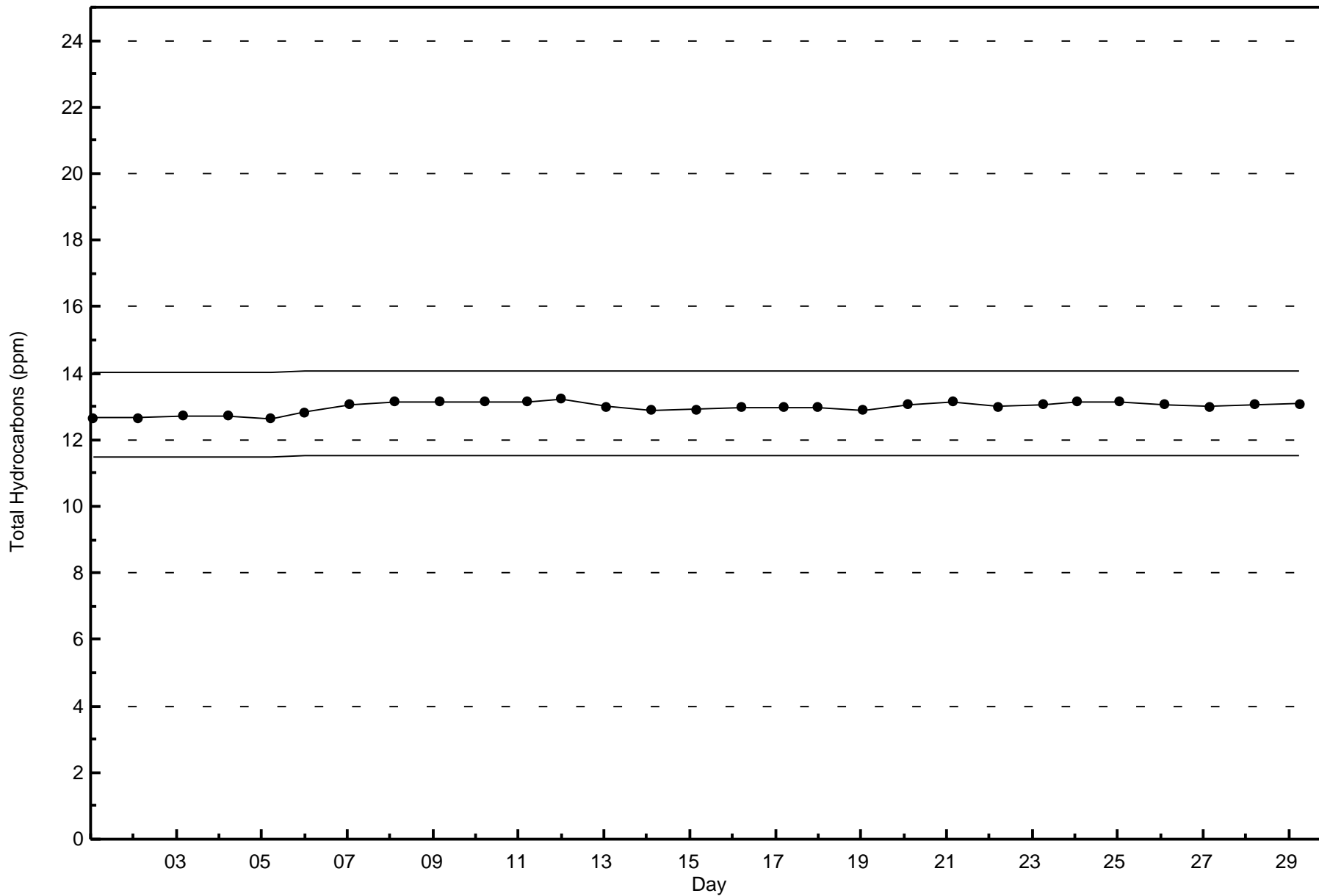
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 662



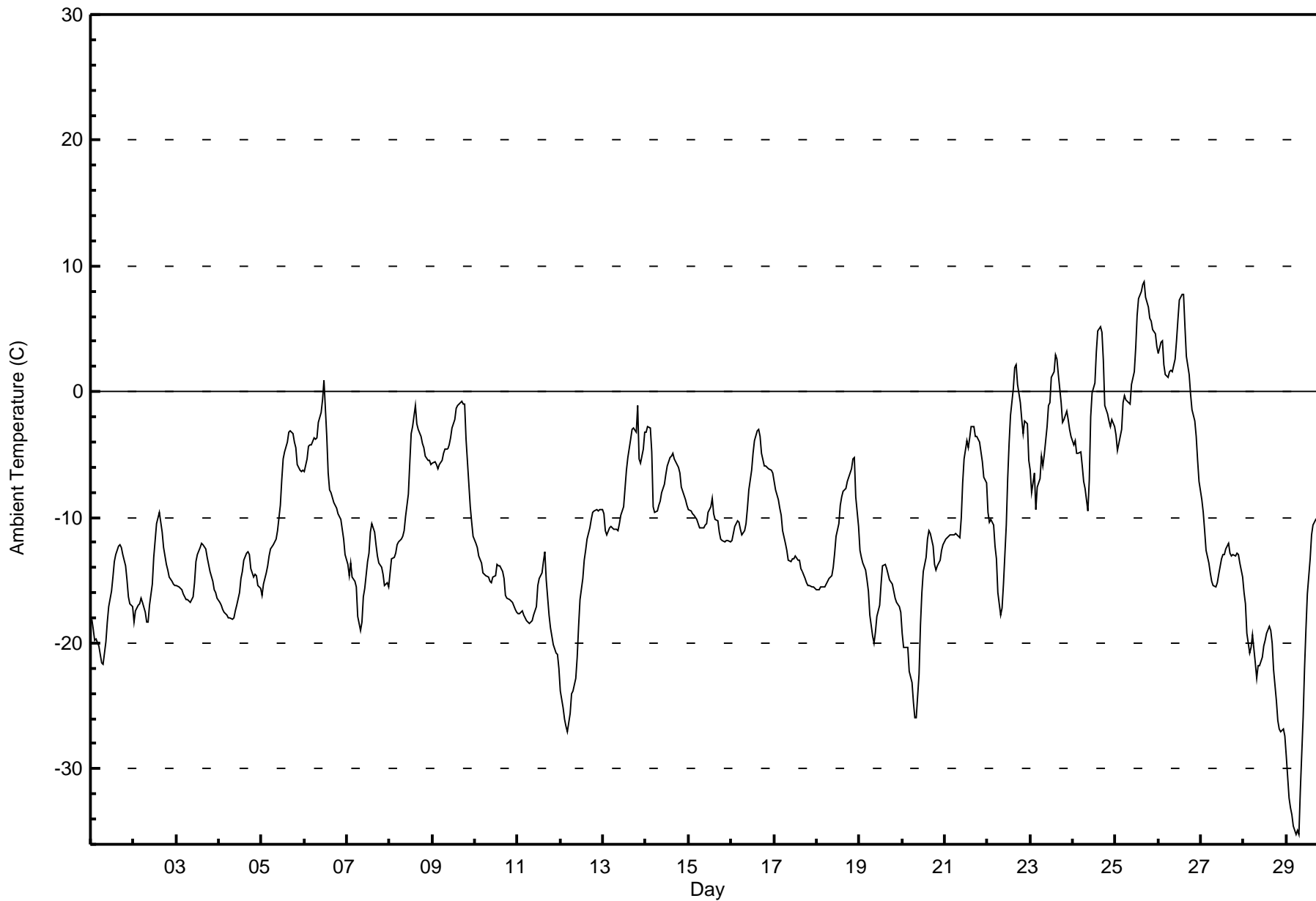




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Buffalo Viewpoint - February 2016

Maximum Value: 8.8 C on Feb 25 17:00 Maximum Daily Average: 2.7 C on Feb 25																				Hours in Service: 696 Hours of Data: 696						
Minimum Value: -35.2 C on Feb 29 08:00 Minimum Daily Average: -21.6 C on Feb 28 Maximum Diurnal Average: -7.0 C at hour 16 Minimum Diurnal Average: -14.2 C at hour 8 Monthly Average: -10.81 C Percentiles: P ₁ = -33.3 P ₁₀ = -18.9 Q ₁ = -15.4 Median = -11.5 Q ₃ = -5.5 P ₉₀ = -1.3 P ₉₉ = 7.3																				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	-18.2	-18.9	-19.8	-19.7	-20.3	-20.9	-21.6	-21.7	-19.9	-18.3	-17.1	-15.9	-14.7	-13.5	-12.9	-12.3	-12.2	-12.4	-12.9	-13.8	-14.9	-16.3	-16.9	-17.1	-16.8	-12.2
2-Feb	-18.3	-17.5	-17.0	-16.9	-16.4	-16.8	-17.5	-18.3	-18.4	-17.0	-15.3	-13.2	-11.8	-10.5	-9.6	-10.4	-11.1	-12.4	-13.7	-14.2	-14.7	-15.1	-15.4	-15.4	-14.9	-9.6
3-Feb	-15.4	-15.5	-15.6	-15.8	-16.1	-16.6	-16.5	-16.6	-16.7	-16.3	-15.2	-13.5	-13.0	-12.4	-12.1	-12.1	-12.5	-13.2	-13.8	-14.3	-15.0	-15.7	-16.0	-16.4	-14.9	-12.1
4-Feb	-16.7	-17.0	-17.3	-17.5	-17.8	-18.0	-18.0	-18.1	-18.0	-17.5	-17.0	-16.0	-14.8	-14.3	-13.4	-12.8	-12.7	-13.0	-14.1	-14.7	-14.6	-14.6	-15.4	-15.7	-15.8	-12.7
5-Feb	-16.2	-15.3	-14.4	-13.8	-13.1	-12.5	-12.2	-12.0	-11.7	-11.0	-9.1	-7.0	-5.4	-4.8	-4.0	-3.3	-3.1	-3.3	-4.0	-4.5	-5.8	-6.3	-6.3	-6.2	-8.6	-3.1
6-Feb	-6.4	-5.3	-4.4	-4.2	-4.2	-3.7	-3.8	-3.6	-2.4	-1.6	-0.6	0.9	-3.5	-6.5	-7.8	-8.1	-8.8	-9.1	-9.2	-9.7	-10.2	-10.9	-11.8	-12.9	-6.2	0.9
7-Feb	-13.7	-14.6	-13.7	-14.8	-15.1	-15.5	-17.9	-19.0	-18.4	-16.3	-15.6	-13.5	-12.8	-11.2	-10.5	-11.2	-12.1	-13.1	-13.6	-14.0	-14.6	-15.4	-15.2	-15.5	-14.5	-10.5
8-Feb	-14.5	-13.3	-13.1	-12.8	-12.2	-12.0	-11.7	-11.5	-11.1	-9.9	-8.2	-5.7	-3.3	-2.7	-1.1	-2.5	-3.0	-3.6	-4.2	-4.5	-5.1	-5.5	-5.4	-5.8	-7.6	-1.1
9-Feb	-5.7	-5.5	-5.8	-6.1	-5.8	-5.4	-4.9	-4.6	-4.6	-4.2	-3.6	-2.9	-2.2	-1.3	-1.1	-1.0	-0.8	-1.0	-1.0	-3.7	-7.4	-9.2	-10.4	-11.5	-4.6	-0.8
10-Feb	-12.0	-12.4	-13.1	-13.7	-14.4	-14.6	-14.6	-14.7	-15.1	-15.2	-14.7	-14.6	-13.7	-13.8	-13.9	-14.3	-14.8	-16.2	-16.4	-16.5	-16.6	-16.8	-17.3	-17.6	-14.9	-12.0
11-Feb	-17.7	-17.6	-17.5	-17.8	-18.0	-18.2	-18.4	-18.4	-18.2	-17.7	-17.1	-15.4	-14.9	-14.4	-13.5	-12.8	-15.0	-17.7	-18.8	-19.4	-20.1	-20.8	-20.9	-22.1	-17.6	-12.8
12-Feb	-23.8	-25.1	-26.1	-26.7	-27.1	-25.6	-24.0	-23.9	-22.8	-21.1	-18.7	-16.5	-14.9	-13.4	-12.6	-11.7	-10.9	-10.2	-9.6	-9.5	-9.3	-9.5	-9.4	-9.4	-17.2	-9.3
13-Feb	-9.8	-11.0	-11.4	-10.8	-10.7	-10.9	-10.9	-10.9	-11.0	-10.5	-9.9	-9.2	-7.7	-6.2	-5.3	-3.8	-3.0	-2.8	-3.3	-1.1	-5.3	-5.7	-4.6	-3.2	-7.5	-1.1
14-Feb	-3.3	-2.8	-2.9	-4.8	-9.1	-9.6	-9.5	-9.1	-8.7	-8.1	-7.3	-6.6	-5.9	-5.2	-5.1	-4.9	-5.3	-5.8	-6.0	-6.4	-7.6	-8.2	-8.6	-9.1	-6.7	-2.8
15-Feb	-9.4	-9.4	-9.7	-9.9	-10.2	-10.5	-10.8	-10.8	-10.8	-10.6	-10.5	-9.6	-9.2	-8.5	-9.8	-10.2	-10.3	-11.2	-11.7	-11.8	-11.9	-11.9	-11.8	-11.9	-10.5	-8.5
16-Feb	-11.8	-11.3	-10.7	-10.3	-10.3	-11.0	-11.4	-11.1	-10.5	-9.3	-7.8	-6.2	-4.9	-3.9	-3.2	-3.0	-3.5	-4.9	-5.9	-5.9	-6.0	-6.2	-6.3	-6.5	-7.6	-3.0
17-Feb	-7.1	-7.8	-8.6	-9.2	-9.8	-11.1	-12.1	-12.6	-13.4	-13.6	-13.3	-13.3	-13.1	-13.4	-13.4	-14.1	-14.4	-14.9	-15.2	-15.4	-15.4	-15.6	-15.5	-15.6	-12.8	-7.1
18-Feb	-15.7	-15.7	-15.6	-15.5	-15.5	-15.3	-15.1	-14.8	-14.6	-14.0	-12.8	-11.5	-10.5	-9.0	-8.3	-7.9	-7.7	-7.2	-6.8	-6.2	-5.4	-5.2	-8.4	-10.7	-11.2	-5.2
19-Feb	-12.6	-13.1	-13.6	-14.2	-15.0	-15.9	-17.7	-19.5	-20.0	-19.1	-17.9	-17.0	-15.3	-13.9	-13.7	-14.1	-14.5	-14.9	-15.3	-15.9	-16.4	-16.8	-17.1	-17.6	-15.9	-12.6
20-Feb	-19.3	-20.3	-20.3	-20.3	-22.3	-23.2	-24.7	-25.9	-25.9	-22.5	-18.6	-16.0	-14.3	-13.2	-11.8	-11.1	-11.3	-12.3	-13.8	-14.2	-13.8	-13.4	-12.6	-12.2	-17.2	-11.1
21-Feb	-11.8	-11.6	-11.5	-11.4	-11.4	-11.4	-11.3	-11.4	-11.6	-10.1	-7.2	-5.3	-3.9	-4.4	-3.7	-2.8	-2.7	-3.6	-3.6	-4.0	-4.8	-5.6	-6.8	-7.2	-7.5	-2.7
22-Feb	-9.6	-10.4	-10.1	-10.6	-12.2	-13.3	-16.0	-17.7	-17.2	-15.3	-10.6	-6.9	-4.1	-1.8	0.2	1.9	2.1	0.6	-0.9	-2.2	-3.4	-2.3	-2.6	-5.5	-7.0	2.1
23-Feb	-6.2	-8.0	-6.4	-9.4	-7.5	-6.9	-5.1	-6.0	-5.1	-2.8	-1.0	-0.8	1.2	1.5	3.0	2.6	1.4	-0.9	-2.5	-2.2	-1.6	-2.2	-3.0	-3.5	-3.0	3.0
24-Feb	-4.2	-3.9	-4.9	-4.9	-4.8	-5.9	-7.2	-7.7	-9.5	-7.0	-2.0	-0.1	0.7	3.1	4.9	5.2	4.8	2.4	-1.1	-1.7	-2.4	-2.8	-2.2	-2.8	-2.2	5.2
25-Feb	-3.5	-4.7	-4.1	-3.0	-0.9	-0.3	-0.6	-0.8	-1.0	0.5	1.6	3.5	6.0	7.4	8.0	8.5	8.8	7.5	6.7	5.8	5.6	4.9	4.6	3.6	2.7	8.8
26-Feb	3.1	4.0	4.1	2.2	1.4	1.1	1.6	1.7	1.5	2.6	4.1	5.8	7.3	7.8	7.7	5.2	2.8	1.3	-0.2	-1.4	-2.3	-3.6	-5.4	-7.2	1.9	7.8
27-Feb	-8.6	-9.6	-11.1	-12.6	-13.6	-14.5	-15.1	-15.4	-15.5	-15.2	-14.5	-13.3	-12.9	-12.9	-12.5	-12.1	-12.8	-13.1	-13.0	-13.1	-12.9	-12.9	-13.6	-14.7	-13.1	-8.6
28-Feb	-16.0	-16.8	-19.3	-20.8	-20.3	-19.3	-21.5	-22.8	-21.8	-21.8	-21.1	-20.2	-19.8	-19.2	-18.7	-18.9	-20.0	-22.2	-24.6	-26.2	-26.9	-27.0	-26.8	-27.4	-21.6	-16.0
29-Feb	-28.9	-32.3	-33.1	-33.7	-34.6	-35.2	-34.8	-35.2	-31.8	-25.9	-22.1	-18.9	-16.1	-13.3	-11.4	-10.6	-10.2	-10.3	-10.4	-10.7	-10.3	-10.3	-10.7	-10.8	-20.9	-10.2
	-12.2	-12.5	-12.6	-13.1	-13.4	-13.5	-13.9	-14.2	-13.9	-12.7	-11.1	-9.6	-8.5	-7.7	-7.1	-7.0	-7.3	-8.2	-8.9	-9.4	-10.0	-10.4	-10.8	-11.3	Diurnal Average	
	3.1	4.0	4.1	2.2	1.4	1.1	1.6	1.7	1.5	2.6	4.1	5.8	7.3	7.8	8.0	8.5	8.8	7.5	6.7	5.8	5.6	4.9	4.6	3.6	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Buffalo Viewpoint - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	55	7.90	7.90
-20 - 0	592	85.06	92.96
0 - 10	49	7.04	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



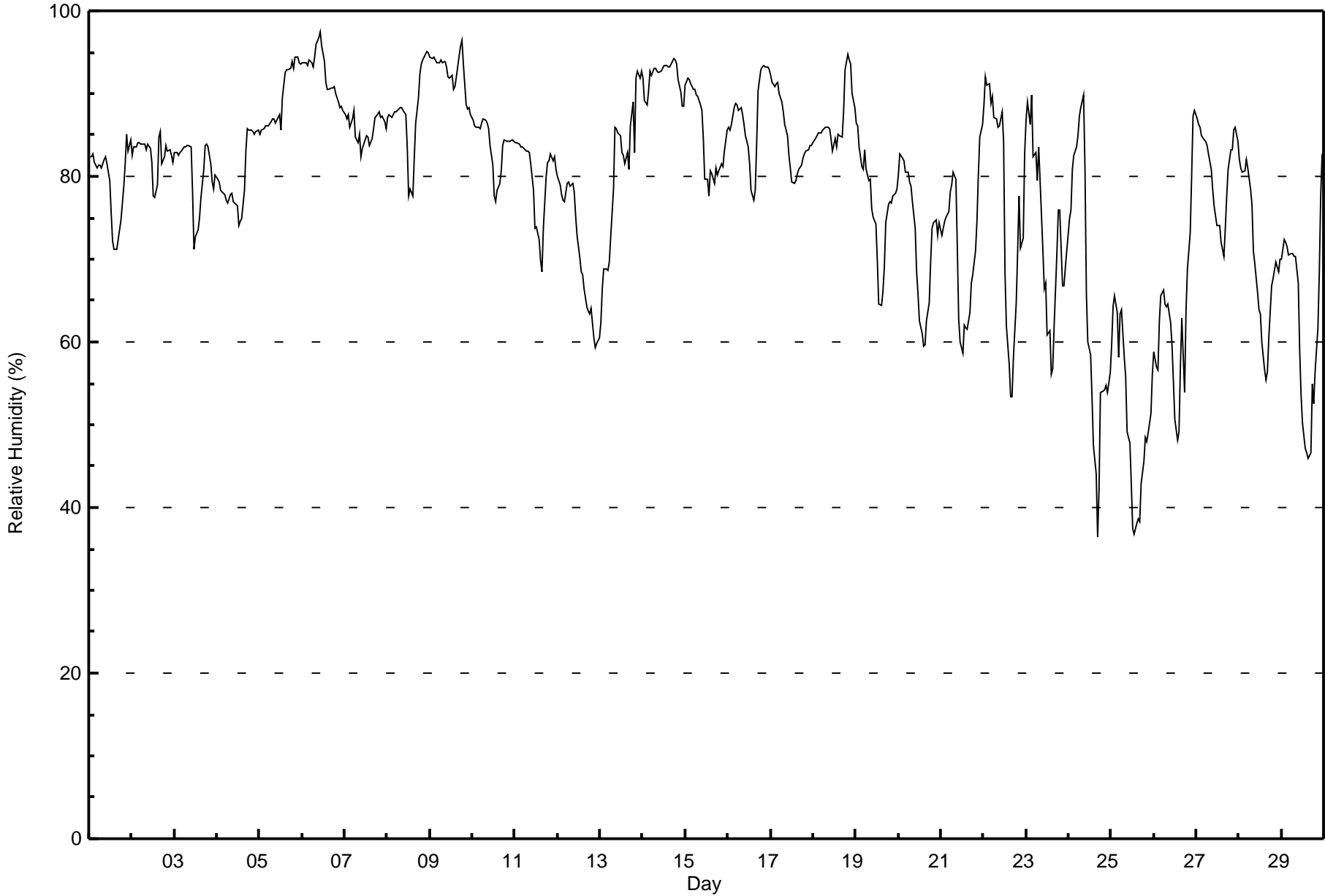
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Buffalo Viewpoint - February 2016

Maximum Value: 97 % on Feb 6 11:00 Maximum Daily Average: 92.6 % on Feb 9																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 36 % on Feb 24 17:00 Minimum Daily Average: 51.0 % on Feb 25 Maximum Diurnal Average: 83.0 % at hour 6 Minimum Diurnal Average: 71.0 % at hour 15 Monthly Average: 78.8 % Percentiles: P ₁ = 43 P ₁₀ = 60 Q ₁ = 73 Median = 82 Q ₃ = 87 P ₉₀ = 92 P ₉₉ = 95																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	82	82	83	82	81	81	81	81	82	82	81	79	76	72	71	71	72	74	75	79	82	85	83	84	79.3	85
2-Feb	83	84	84	84	84	84	84	84	83	84	83	82	78	78	79	85	85	82	82	84	83	83	83	82	82.7	85
3-Feb	83	83	83	83	83	84	84	84	84	84	78	71	73	74	75	78	81	84	84	84	82	79	78	80	80.5	84
4-Feb	80	79	78	78	78	77	77	78	78	77	77	76	74	75	75	78	83	86	86	85	85	85	86	86	79.9	86
5-Feb	85	86	86	86	86	86	87	87	87	86	87	87	86	89	93	93	93	93	94	93	94	94	94	94	89.4	94
6-Feb	94	94	94	93	94	94	93	94	96	97	97	96	94	91	90	91	91	91	91	90	89	88	89	88	92.4	97
7-Feb	87	87	87	86	87	88	85	84	85	82	83	84	85	85	84	85	86	87	87	88	87	87	87	86	85.8	88
8-Feb	87	87	87	87	88	88	88	88	88	88	87	84	78	79	78	82	86	89	92	94	94	95	95	95	87.7	95
9-Feb	94	94	94	94	94	94	94	94	94	93	92	92	92	91	91	92	95	96	96	94	89	88	88	88	92.6	96
10-Feb	87	86	86	86	86	86	87	87	86	86	84	81	78	77	78	79	81	84	84	84	84	84	84	84	83.7	87
11-Feb	84	84	84	84	84	83	83	83	83	81	78	74	74	72	70	69	74	80	82	82	83	82	82	81	79.8	84
12-Feb	80	79	78	77	77	79	79	79	79	78	75	73	70	68	68	66	64	64	63	64	61	59	60	60	70.9	80
13-Feb	62	66	69	69	69	70	73	79	86	86	85	85	83	83	81	83	81	86	89	83	92	93	92	93	80.7	93
14-Feb	92	89	89	90	93	92	93	93	93	93	93	93	93	93	93	93	93	94	94	92	90	89	89	89	92.1	94
15-Feb	91	92	92	91	90	91	90	90	89	88	85	80	80	78	81	80	79	81	80	81	82	81	83	86	84.9	92
16-Feb	86	86	86	88	89	89	88	88	88	86	85	84	82	78	77	78	84	90	93	93	93	93	93	93	87.1	93
17-Feb	92	91	91	91	91	90	89	88	86	85	83	81	79	79	79	80	81	81	82	83	83	83	84	84	84.9	92
18-Feb	84	85	85	85	85	86	86	86	86	86	85	83	85	84	85	85	85	88	93	95	94	93	90	88	86.9	95
19-Feb	86	86	84	81	81	83	81	79	80	76	75	74	70	65	64	66	69	74	77	77	77	78	78	78	76.6	86
20-Feb	80	83	82	82	81	81	79	79	77	74	68	66	63	61	60	60	62	65	70	74	74	75	73	74	72.5	83
21-Feb	73	74	75	75	76	78	79	80	80	72	63	60	59	62	62	61	64	67	68	71	75	80	85	86	71.8	86
22-Feb	89	92	91	91	89	90	87	87	86	86	88	84	68	62	57	53	53	58	65	71	78	71	73	83	77.1	92
23-Feb	87	89	86	90	82	83	80	84	80	71	66	67	61	61	56	57	62	71	76	76	67	67	69	71	73.2	90
24-Feb	75	76	81	82	84	85	87	88	90	81	66	60	59	53	48	44	36	42	54	54	54	55	54	56	65.2	90
25-Feb	60	64	66	64	58	63	64	58	56	49	48	43	37	37	38	39	38	43	46	49	48	49	51	56	51.0	66
26-Feb	59	57	57	63	66	66	65	64	65	62	60	55	51	48	49	57	63	54	64	69	73	80	87	88	63.3	88
27-Feb	87	86	86	85	84	84	84	83	81	78	76	74	74	74	72	70	74	78	81	83	83	86	86	84	80.6	87
28-Feb	82	81	80	81	82	81	78	77	71	70	66	64	63	60	57	55	56	60	67	68	69	70	68	70	69.8	82
29-Feb	70	72	72	72	70	71	71	70	70	67	59	54	50	47	47	46	47	55	52	56	62	68	78	83	62.9	83
82.1 82.6 82.5 82.8 82.4 83.0 82.6 82.6 82.3 80.3 77.7 75.4 72.8 71.6 71.0 71.6 73.0 75.8 78.2 79.1 79.6 80.1 80.7 81.7																		Diurnal Average								
94 94 94 94 94 94 94 94 96 97 97 96 94 93 93 93 95 96 96 96 95 94 95 95 95																		Diurnal Maximum								





Maximum Speed: 35 km/h on Feb 6 13:00	Maximum Daily Speed Average: 16.4 km/h on Feb 10	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 16 01:00	Minimum Daily Speed Average: 0.9 km/h on Feb 22	Hours of Data: 696
Maximum Diurnal Speed Average: 4.5 km/h at hour 20	Minimum Diurnal Speed Average: 0.6 km/h at hour 11	Hours of Missing Data: 0
Monthly Average Velocity: 2.8 km/h 16.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 13 P ₉₀ = 17 P ₉₉ = 26	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	S2	SSW2	S4	S3	SSE4	SE6	SSE7	SSE8	SSE8	SE7	SSE9	SSE9	SE11	SSE6	SSE8	SSE5	SE7	SSE5	SSE7	SE7	SE5	SSE5	SE3	S4	SSE5.9	SE11
2-Feb	SSE6	SSE3	SE3	ESE1	SSE2	S4	SSE4	SE6	S5	SSE5	SSE7	SE9	SSE8	SE4	NNE4	N17	NNW16	NNW21	N18	N15	N13	N13	N13	N12	N3.5	NNW21
3-Feb	N10	NNE7	NNE7	NNE6	N5	SE2	E2	ENE3	SSE3	SSE4	SSE5	SSE5	ESE4	ENE2	N6	N8	N9	N10	N14	N15	NNE16	N12	N13	NNE5.1	NNE16	
4-Feb	N12	N13	N11	N11	N10	N10	NNE10	N8	N7	N5	NNW4	N4	NE3	ESE6	ESE6	ESE6	E3	NNE5	N7	N8	N5	NW3	WSW4	N5.5	N13	
5-Feb	SSE4	SE4	SSE6	SSE9	SE11	SE9	SSE6	SSE5	SSE5	SSE7	SSE11	SSE13	SSE12	SSE14	SSE16	SSE11	SSE10	S7	SSE9	SSE9	SE7	SE7	SE7	SSE8.6	SSE16	
6-Feb	SSE7	SSE8	SSE10	SSE10	SE11	SSE10	SE13	SE10	SE6	SSE7	S6	NW12	N35	N28	N25	N27	N22	N15	N7	N10	NNE8	NE4	NE6	NE5	NNE5.3	N35
7-Feb	ENE4	NNE9	N9	NNW7	WNW4	W4	SSE5	SE6	ESE4	NE5	N4	WNW5	WNW7	N7	N8	N10	N7	N6	N4	NW3	S5	S6	SE4	SSE5	N2.3	N10
8-Feb	SE7	SSE7	S6	S5	S3	SE6	SE9	S8	S9	SSE8	SSE6	SSE6	SE5	NNE3	N3	NNE3	NE1	SSE3	SSE3	ENE6	NE7	N2	S3	E2	SE3.4	SE9
9-Feb	SE5	SE5	SE8	SSE7	SE4	SSE8	SE8	SE8	SE9	SE8	SSE8	SSE6	SE4	SE4	WSW3	SSW3	SSE5	SSE7	N3	N30	N25	N24	N20	N23	NE2.6	N30
10-Feb	N24	N20	N21	NNE21	N21	N21	N21	N21	N21	N18	NNE12	NNE13	N15	NNE14	N15	N14	N14	N14	N15	N13	N12	N10	N11	NNE13	N16.4	N24
11-Feb	NNE11	N9	N7	N11	NNE12	NNE10	NNE9	N10	N9	N10	N11	N10	N11	NNW12	NNW11	NNW12	NNW14	N12	NNW10	NNW11	NNE10	NNE9	NW4	WNW0	N9.5	NNW14
12-Feb	SSE4	SE4	SSE6	SSE6	SSE7	SSE10	SSE10	SSE10	SE10	SE10	SE10	SE12	SSE13	SSE12	SE13	SE15	SE18	SE19	SE16	SE17	SSE18	SSE18	SSE18	SSE14	SE12.0	SE19
13-Feb	SE13	SE13	SSE15	SSE15	SSE15	SSE14	SSE12	SSE10	SSE11	SSE12	SSE11	SSE11	SSE10	SE9	SE9	SE10	SE10	SSE11	SSE6	SW5	SSE9	SSE7	SW6	WNW2	SSE9.7	SSE15
14-Feb	W7	WSW12	WSW15	NW9	N7	N6	W3	WNW4	WNW4	WNW4	WNW5	WNW5	WNW4	NNW2	NNE6	NNE7	NNE9	NNE7	N7	N10	NNE10	N11	N14	N13	NNW5.0	WSW15
15-Feb	N12	N9	N12	N11	N14	N16	N14	NNE13	NNE11	N13	N14	N10	N8	N14	N15	N11	N6	N11	N8	NNE6	NNE6	NW0	NE3	NE4	N9.9	N16
16-Feb	N0	SE2	SE3	ESE4	NNE5	NNE7	NNE8	N6	SSW3	S5	SSE7	SSE6	SE6	ESE4	SE6	SSW3	N4	N8	N12	NNW10	NNW10	NNW7	NNW9	NNW14	NNE2.6	NNW14
17-Feb	NNW16	N18	N20	N13	NNW16	N20	N21	N16	N20	N14	NNE12	N17	N16	N17	N13	N14	NNE9	NNE13	NNE13	NNE15	N16	NNE16	NNE14	NNE14	N15.4	N21
18-Feb	NNE15	NNE14	NNE12	N11	NNE13	NNE12	NNE13	NNE13	NNE13	N11	N9	NNW6	NW8	NNW8	NNW9	NNE5	SSW2	WNW5	NW8	NW5	W7	NW14	N24	N20	N9.4	N24
19-Feb	NNE16	N13	NW16	NW18	NW20	NNW15	NNE12	NNE8	N4	WNW2	NNE5	NNE5	NNE6	N7	N5	N5	NNE5	NNE7	NNE7	NNE10	NNE9	N8	N8	N9	N8.2	NW20
20-Feb	N7	NNW5	NNW4	N4	SW1	SSE5	SSE4	SE5	SSE5	SE4	SE4	SE6	SE7	SE8	ESE6	ENE6	ENE7	ESE6	SE6	SSE5	SE6	SSE6	SE8	SE9	SE3.7	SE9
21-Feb	SE8	SSE6	SSE6	SE7	SSE7	SSE7	SSE7	SE7	SE7	SE5	SE6	SSE7	SE9	ESE11	SE11	SE9	SE6	SE7	SE9	SE6	SE5	NE8	NNW4	WSW5	SE6.2	ESE11
22-Feb	NNW7	NNW7	NW4	WNW5	NNW3	W2	S4	SSE4	SE5	SE4	SE4	SE6	SE9	SE10	SE9	SE8	ESE8	SE5	NW3	NW10	NNW12	N5	W4	SE4	ESE0.9	NNW12
23-Feb	SSW4	SSE3	SW5	S5	SW7	SW9	W8	WNW9	W9	WSW17	W15	NW6	N6	NE7	N6	NW4	NNW3	NNW5	NW2	WSW8	W7	W12	W10	WNW5	W4.9	WSW17
24-Feb	NW15	WNW14	WNW13	W11	W10	WSW6	WSW6	WSW6	SE7	SSE6	SE3	ESE3	SE8	NE4	NNE4	NE6	S7	SSE8	SSE9	SSE9	SSE10	SSE10	SSE12	SSE13	SSW2.9	NW15
25-Feb	SE12	SE11	SE11	SE10	SSW9	S8	S8	SSW10	SSW10	SW10	WSW17	WSW13	WSW12	WSW17	WSW16	WSW13	WSW15	W12	WSW16	WSW20	WSW20	WSW19	WSW18	W12	SW10.5	WSW20
26-Feb	W9	SW14	WSW13	WSW6	W7	WSW8	WSW11	WSW21	WSW17	W13	W9	W8	NNW11	NW11	N9	NNE16	NNE19	N25	NNE22	N21	NNE23	NNE23	N24	N24	NNW8.6	N25
27-Feb	NNE26	N25	N28	N27	N26	N22	N22	N21	N20	N20	N17	N13	N14	N13	N10	NNW6	WNW6	NW2	NNE3	ENE4	SSW2	N10	N15	N17	N14.9	N28
28-Feb	N20	N18	N14	N11	N6	N12	N17	N19	N24	N25	N19	N17	N18	N15	N14	N16	N16	N15	N12	N8	N9	N11	NNE9	N3	N14.4	N25
29-Feb	ENE2	SSE6	S7	SE7	SSE7	SSE10	SSE7	S7	SSE8	SE9	SE8	SE8	ESE10	ESE10	SSE8	SSE6	S3	SE2	SSE5	SSE7	SE9	SSE10	SSE10	SSE10	SE7.0	ESE10

NNE4.3	N3.3	NNW2.5	N2.6	N2.8	NNE2.1	NE2.4	NNE1.5	NE1.2	NE1.0	NE0.6	NE0.8	NE2.5	NE3.3	NNE3.3	NNE4.0	NNE3.1	NNE3.8	NNE3.6	N4.5	NNE4.2	N4.1	N4.0	NNE4.3	Diurnal Average
NNE26	N25	N28	N27	N26	N22	N22	N21	N24	N25	N19	N17	N35	N28	N25	N27	N22	N25	NNE22	N30	N25	N24	N24	N24	Diurnal Maximum

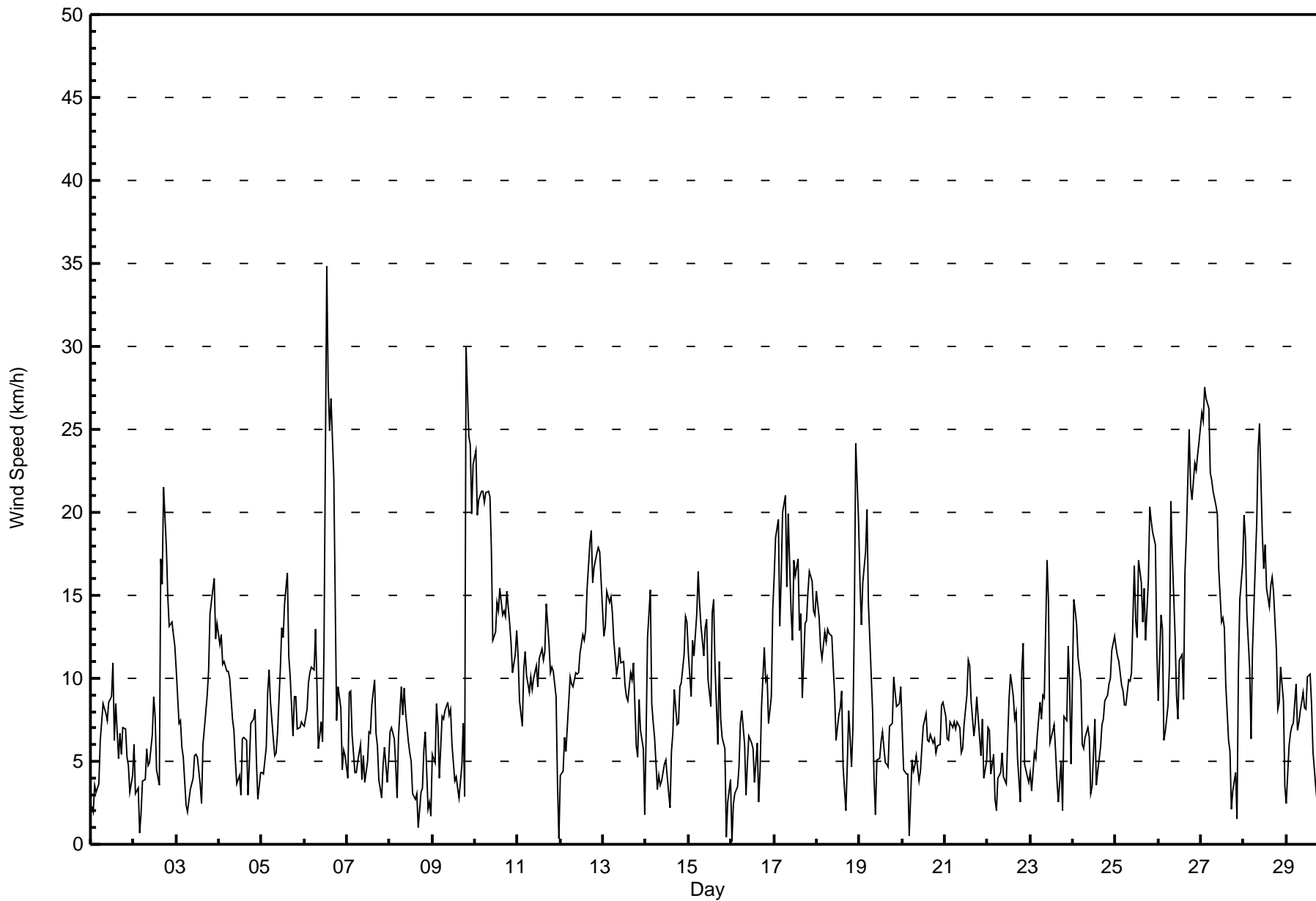
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Buffalo Viewpoint - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 6 12:00 Minimum Value: 0 km/h on Feb 20 20:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 696 Hours of Data: 696 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	1	1	0	1	1	1	1	1	2	2	2	3	2	2	2	1	1	1	1	1	2	1	1	3
2-Feb	1	2	1	1	2	2	2	2	2	3	2	2	2	1	3	4	4	4	5	4	2	3	2	2	5
3-Feb	2	3	2	2	2	1	1	1	1	1	2	2	2	1	2	1	2	2	2	3	3	3	2	2	3
4-Feb	2	2	2	2	2	2	2	3	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	3
5-Feb	1	1	2	2	2	2	2	1	1	2	3	3	4	4	4	3	3	2	3	4	2	1	1	1	4
6-Feb	1	2	2	2	2	3	3	2	2	2	2	9	7	5	5	5	4	2	1	2	2	1	1	1	9
7-Feb	2	3	3	2	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	3
8-Feb	1	1	1	1	2	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	2	2	2	2
9-Feb	2	2	1	2	2	1	1	2	2	2	2	2	1	1	1	1	1	2	9	6	5	6	5	4	9
10-Feb	4	5	4	5	5	4	4	4	4	4	3	3	3	3	3	2	2	2	2	2	2	2	2	2	5
11-Feb	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	3	2	3	2	1	1	2	1	1	3
12-Feb	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	5	5	4	4	5	5	5	3	5
13-Feb	3	3	3	4	4	3	3	2	3	3	3	3	3	2	2	2	1	2	2	1	2	3	2	1	4
14-Feb	3	3	3	3	1	2	1	1	1	1	1	1	2	1	1	1	2	2	1	2	2	2	2	2	3
15-Feb	3	2	2	2	3	3	2	3	3	2	2	2	1	3	3	2	1	2	2	2	2	1	2	1	3
16-Feb	1	1	2	2	2	1	1	1	2	2	2	2	1	2	1	2	1	2	2	1	2	1	2	3	3
17-Feb	3	2	3	3	3	3	4	3	3	4	3	4	3	3	3	3	2	3	3	3	3	3	3	2	4
18-Feb	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	2	2	2	5	4	4	5
19-Feb	4	2	4	3	4	3	3	2	2	1	2	1	1	1	2	1	2	3	1	2	2	2	1	1	4
20-Feb	2	1	1	1	1	1	1	2	1	1	2	1	2	2	2	2	1	1	1	0	1	1	1	1	2
21-Feb	1	1	1	1	0	1	1	0	1	1	2	2	2	2	3	3	1	2	2	2	2	2	1	1	3
22-Feb	2	2	2	1	1	1	1	0	1	1	1	2	2	2	2	1	1	3	2	3	3	2	1	2	3
23-Feb	1	1	1	1	2	3	3	2	3	5	4	2	1	2	2	1	1	2	1	1	2	2	2	2	5
24-Feb	5	3	2	2	1	2	2	2	1	1	1	2	1	1	1	2	1	1	1	1	1	2	2	2	5
25-Feb	2	2	2	2	3	3	2	3	2	3	4	4	5	4	4	3	2	2	4	3	4	4	3	3	5
26-Feb	4	3	5	3	2	2	5	4	6	7	2	2	4	3	2	4	4	5	4	4	5	4	4	4	7
27-Feb	6	5	5	4	4	3	3	3	3	3	4	3	2	2	2	2	2	1	2	2	1	6	3	3	6
28-Feb	4	3	2	3	2	3	3	6	4	5	3	2	3	3	3	3	2	2	3	2	2	1	3	1	6
29-Feb	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	1	2	1	2	2	2	2	2	3
																	Diurnal Maximum								
																	6 5 5 5 5 4 5 6 6 7 4 9 7 5 5 5 5 5 9 6 5 6 5 4								





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Buffalo Viewpoint - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	170	24.43	24.43
6 - 11	317	45.55	69.97
12 - 19	159	22.84	92.82
20 - 28	48	6.90	99.71
29 - 38	2	0.29	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Buffalo Viewpoint - February 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	11	8	5	3	6	27	30	14	7	3	3	4	14	10	9	170
6 - 11	65	30	5	3	0	9	62	83	10	3	4	7	12	3	6	15	317
12 - 19	65	26	0	0	0	0	10	19	0	0	1	15	5	2	5	11	159
20 - 28	38	5	0	0	0	0	0	0	0	0	0	3	0	0	1	1	48
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	186	72	13	8	3	15	99	132	24	10	8	28	21	19	22	36	696

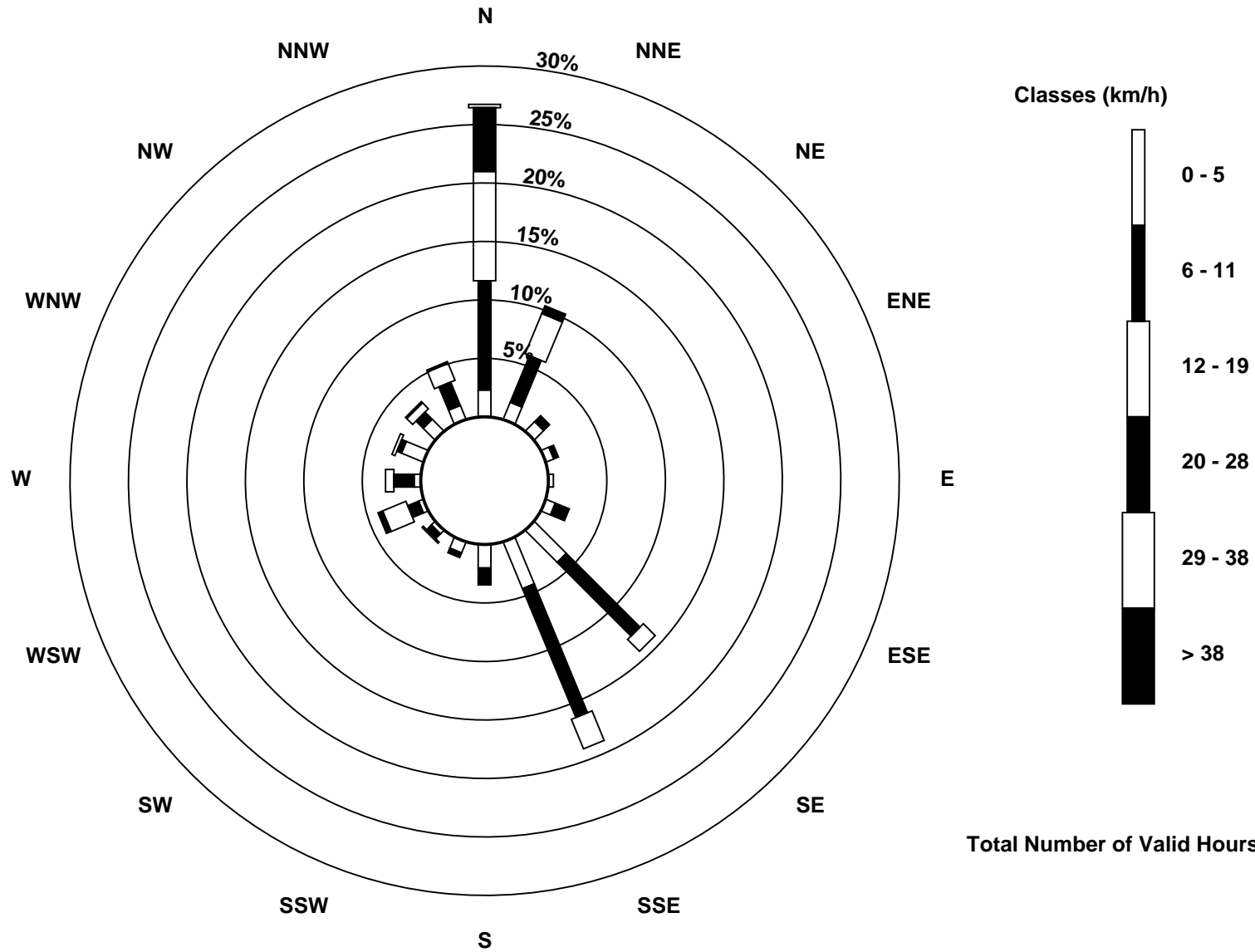
Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - February 2016

Direction of Maximum Speed: 8 deg on Feb 6 13:00 Direction of Maximum Daily Speed Average: 6.2 deg on Feb 10	Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0
Direction of Minimum Speed: 354 deg on Feb 16 01:00 Direction of Minimum Daily Speed Average: 0.9 deg on Feb 22	Percent Operational Time: 100.0
Monthly Average Direction: 311.1 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	182	192	176	178	165	137	147	147	150	140	149	148	144	150	150	152	145	152	156	141	140	149	140	175	150.4	
2-Feb	156	152	137	112	162	175	155	142	173	164	161	146	152	133	33	355	346	348	352	357	356	352	356	2	9.9	
3-Feb	9	12	13	23	11	133	98	77	154	148	148	160	149	122	67	11	7	10	8	1	6	14	0	2	19.8	
4-Feb	4	353	353	355	357	10	20	9	3	6	342	1	37	111	115	112	101	16	358	3	359	352	318	240	8.8	
5-Feb	152	136	159	151	139	141	150	149	165	152	153	152	161	151	149	164	161	169	160	154	130	161	146	147	152.5	
6-Feb	150	156	150	148	137	148	136	138	132	149	181	311	8	3	2	353	354	355	4	10	28	35	49	54	28.9	
7-Feb	77	18	7	346	282	280	151	146	111	40	9	301	299	351	351	8	360	353	6	321	169	174	140	153	4.3	
8-Feb	135	158	187	178	171	144	133	169	175	149	155	160	141	27	4	30	41	159	149	63	36	8	187	86	142.5	
9-Feb	140	140	134	149	134	150	136	146	136	146	152	149	138	145	250	193	159	155	357	355	353	359	4	359	54.1	
10-Feb	358	1	6	13	10	6	8	7	5	4	14	14	10	17	7	3	355	359	7	7	4	358	2	15	6.2	
11-Feb	18	8	350	3	14	16	12	8	1	354	353	352	352	348	341	338	345	349	347	348	13	22	320	282	357.5	
12-Feb	163	141	157	161	153	149	149	149	140	140	131	139	150	153	142	142	144	145	144	143	149	148	150	151	146.3	
13-Feb	144	142	148	147	151	154	154	157	157	152	150	157	152	138	132	139	139	158	158	230	150	155	216	282	152.3	
14-Feb	269	249	246	304	7	1	276	300	294	284	287	282	292	347	31	18	15	14	7	10	14	11	3	358	335.6	
15-Feb	5	354	1	359	10	10	5	14	15	358	9	6	359	352	352	360	351	2	9	14	30	318	55	35	4.9	
16-Feb	354	126	141	122	24	20	15	356	207	171	163	159	129	110	132	201	8	352	2	348	343	334	345	345	12.7	
17-Feb	344	349	349	349	348	357	357	4	359	6	14	6	3	5	11	3	20	16	12	12	10	12	13	14	2.8	
18-Feb	16	16	16	9	15	17	14	14	12	11	356	338	310	339	342	15	211	297	316	312	278	316	358	6	356.9	
19-Feb	13	358	313	313	315	348	14	29	10	285	26	14	14	7	1	6	19	29	33	25	21	5	1	2	357.4	
20-Feb	356	338	337	3	225	166	168	144	160	144	133	127	127	131	116	74	63	113	136	159	139	148	146	137	125.5	
21-Feb	145	150	157	144	150	148	150	142	142	138	144	149	134	119	134	143	135	135	146	144	133	48	331	254	139.9	
22-Feb	333	336	314	303	338	280	186	148	141	146	134	132	129	129	130	132	122	124	326	308	340	349	262	140	115.1	
23-Feb	199	156	221	191	236	227	277	288	279	250	268	307	9	42	10	320	330	342	326	253	271	269	265	287	272.0	
24-Feb	305	294	294	279	277	254	243	239	152	157	102	134	43	26	41	190	161	153	156	157	158	156	149	199.4		
25-Feb	146	138	143	135	192	172	173	203	204	235	250	250	242	242	255	253	250	266	255	249	248	244	249	260	231.1	
26-Feb	271	236	243	251	278	248	239	249	250	268	263	275	336	318	4	20	20	6	12	9	15	12	10	9	331.8	
27-Feb	13	11	10	11	8	1	4	5	5	360	353	352	352	350	352	347	295	310	30	57	197	2	4	3	3.2	
28-Feb	360	8	359	6	357	2	9	358	349	1	2	351	349	3	3	352	349	354	3	5	354	6	21	2	359.3	
29-Feb	57	159	188	139	150	162	153	171	151	143	131	126	117	114	147	155	170	144	166	149	143	147	151	150	146.2	
	11.5	6.2	348.1	8.3	6.0	31.2	44.2	33.3	39.3	38.1	54.7	41.2	38.5	36.1	31.4	18.2	15.7	13.3	13.8	3.1	11.6	5.6	3.8	11.5		
Diurnal Average																										

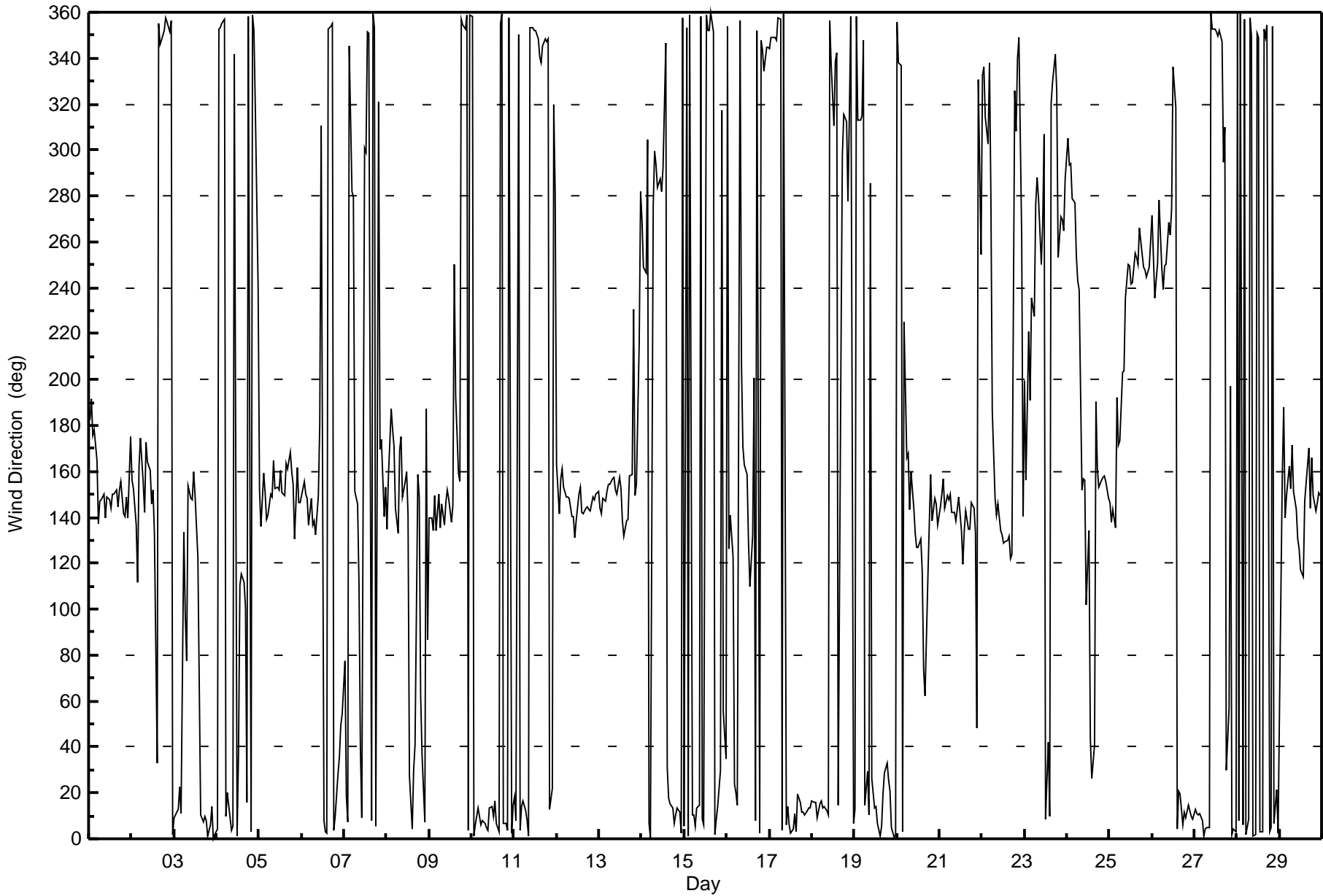
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Buffalo Viewpoint - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Feb 2 04:00 Minimum Value: 4 deg on Feb 1 07:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 16 Q ₃ = 22 P ₉₀ = 38 P ₉₉ = 77																			Hours in Service: 696 Hours of Data: 696 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	33	37	14	13	11	6	4	7	11	15	16	17	16	25	19	26	14	16	10	8	30	34	51	22	51
2-Feb	14	36	45	102	80	43	36	23	34	60	18	16	18	22	60	15	13	14	14	17	14	13	14	14	102
3-Feb	14	13	13	25	35	37	52	45	26	20	20	39	34	34	59	20	13	14	15	14	15	15	16	15	59
4-Feb	15	14	13	15	15	14	15	17	13	16	28	25	57	21	20	19	44	14	14	13	16	16	27	25	57
5-Feb	23	15	20	13	12	19	24	19	22	20	18	18	19	18	18	19	19	17	14	34	22	16	9	12	34
6-Feb	12	14	14	13	12	17	16	15	24	19	25	37	18	18	16	17	15	14	13	12	15	18	7	25	37
7-Feb	38	17	18	34	24	15	25	14	37	11	28	14	13	31	14	13	13	11	15	43	29	16	33	16	43
8-Feb	11	16	25	22	71	19	14	15	11	14	16	27	22	50	59	25	87	15	38	29	7	67	48	79	87
9-Feb	39	17	10	20	28	16	10	15	17	17	18	21	26	32	29	29	16	14	86	17	15	17	16	17	86
10-Feb	16	14	14	14	16	16	13	15	16	16	19	20	15	14	14	14	14	14	12	14	14	12	13	11	20
11-Feb	10	16	16	12	11	11	14	15	12	12	12	14	14	12	14	12	11	17	25	15	11	16	36	89	89
12-Feb	28	20	14	15	15	14	16	15	16	18	19	19	19	20	20	18	18	18	18	17	18	17	18	18	28
13-Feb	17	16	16	18	17	18	17	17	17	19	18	19	15	16	14	11	11	22	31	19	32	52	73	73	
14-Feb	32	16	14	45	15	24	26	12	20	24	16	18	29	69	14	16	14	15	14	14	16	15	14	13	69
15-Feb	13	12	14	15	14	12	13	14	14	14	13	15	14	13	14	14	15	13	13	16	18	101	72	23	101
16-Feb	91	49	41	38	28	14	15	11	58	23	21	25	26	52	22	65	30	20	12	11	13	13	11	12	91
17-Feb	12	13	13	14	14	17	15	15	15	14	14	15	15	16	16	15	16	13	13	13	13	13	13	13	17
18-Feb	12	11	12	13	12	12	13	12	11	12	13	27	20	21	19	24	72	24	13	18	17	25	17	16	72
19-Feb	14	16	17	11	14	17	15	19	41	69	28	18	18	15	15	22	27	21	13	13	13	15	14	12	69
20-Feb	21	15	14	21	78	17	20	16	12	18	27	25	23	20	31	33	16	15	13	10	9	7	8	7	78
21-Feb	13	11	11	9	6	10	10	7	8	17	23	27	22	16	20	17	17	14	17	25	50	16	43	25	50
22-Feb	30	15	38	18	30	50	26	10	9	12	16	15	15	15	16	14	12	44	70	16	18	40	40	63	70
23-Feb	46	54	24	18	19	26	23	13	28	12	17	43	17	15	23	45	56	38	56	14	14	10	12	41	56
24-Feb	12	11	11	9	10	26	41	17	22	20	62	61	16	50	21	15	44	12	9	9	10	11	15	12	62
25-Feb	12	11	11	12	34	31	20	16	13	24	12	17	23	15	14	15	9	14	14	10	11	11	11	15	34
26-Feb	45	15	23	36	25	19	18	12	19	29	18	33	25	21	18	15	14	15	15	15	15	15	15	15	45
27-Feb	15	14	14	13	15	16	14	16	15	16	14	16	13	12	13	25	18	49	39	37	78	18	15	17	78
28-Feb	16	14	13	11	26	13	13	15	13	16	16	12	13	17	15	14	11	14	12	15	12	10	8	17	26
29-Feb	57	22	29	10	19	8	9	7	12	17	21	22	19	22	26	28	29	67	15	13	14	14	15	15	67
Diurnal Maximum																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 5, 2016	Last Calibration	January 20, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:24	End Time (MST)	11:05
Gas Cert Reference	LL107924	Station temp.	21 Deg C
Cal Gas Concentration	49.8 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	840	840
Calculated slope	0.994972	0.977314	Chamber temp	45.0	45.0
Calculated intercept	0.375268	-0.215009	Pressure	703.0	703.0
Analyzer Background	10.5	10.5	Flow	0.501	0.501
Analyzer Coefficient	0.833	0.833	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	0.2	----
as found span	5000	60.2	599.6	613.7	0.977
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	60.2	599.6	613.7	0.977
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.977

Corrected As found 613.5 Previous response 602.2 % change -1.8%

Notes:

No adjustments. Changing out mix cal gas cylinder.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 5, 2016	Last Calibration	January 20, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	14:49
Gas Cert Reference	LL107929	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	08-Spet-2018
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-593	-593
Analyzer IP address	192.168.1.43		Lamp voltage	840	842
Calculated slope	0.977314	0.995175	Chamber temp	45.0	45.0
Calculated intercept	-0.215009	0.908648	Pressure	703.0	689.5
Analyzer Background	10.5	10.9	Flow	0.501	0.491
Analyzer Coefficient	0.833	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	602.2	0.997
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	60.4	600.4	602.2	0.997
second point	5000	30.2	300.2	301.8	0.995
third point	5000	15.1	150.1	148.4	1.011
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	60.4	600.4	601.7	0.998
Average Correction Factor					1.001

Corrected As found 602.5 Previous response 614.5 % change 2.0%

Notes:

Sample inlet filter replaced after as founds. Changed out mix cal gas cylinder after as founds. Adjusted zero and span.

Calibration Performed By: Asad Hidayat



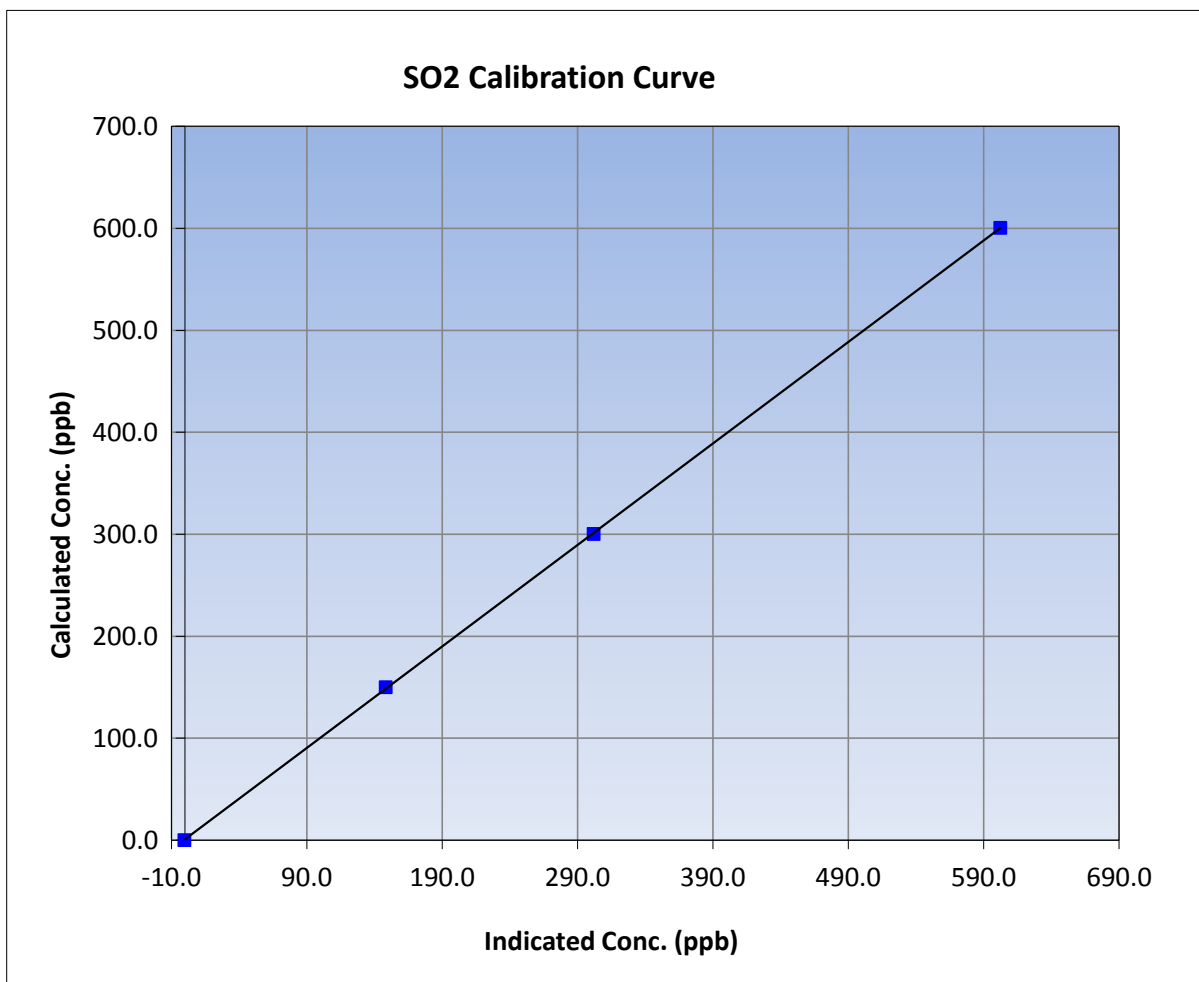
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 5, 2016	Previous Calibration	January 20, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	12:40	End Time (MST)	14:49
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

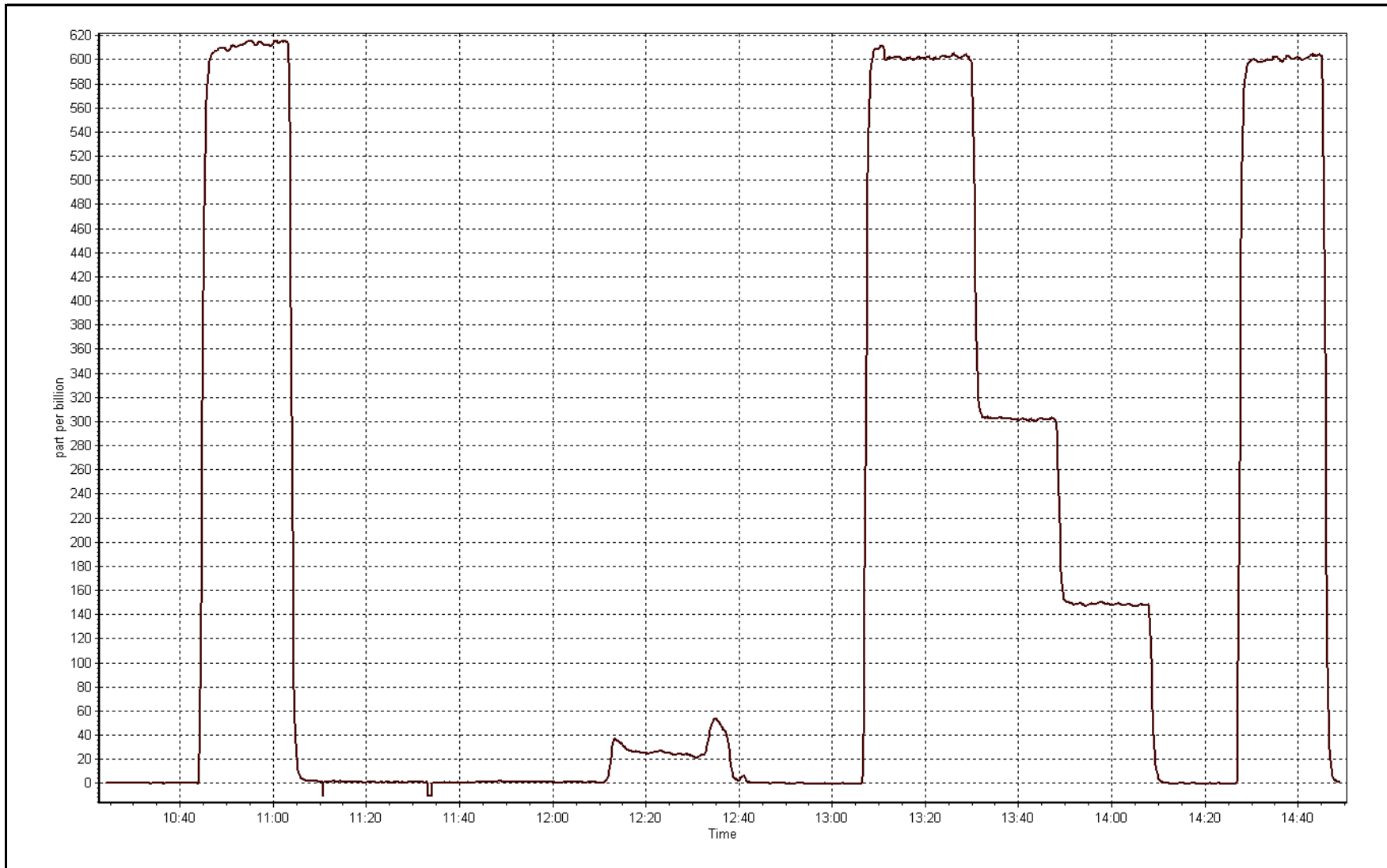
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999981
600.4	602.2	0.9970		
300.2	301.8	0.9947	Slope	0.995175
150.1	148.4	1.0114		
			Intercept	0.908648



SO2 Calibration Plot

Date: February 5, 2016





Wood Buffalo Environmental Association

H2S Calibration Report

Station Information

Calibration Date	February 3, 2016	Last Calibration	January 18, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:42	End Time (MST)	13:18
Gas Cert Reference	LL101590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	2/22/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL107924 29-May-14

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-617
Analyzer IP address	192.168.1.42		Lamp voltage	878	878
Calculated slope	0.990715	0.991459	Chamber temp	45	45
Calculated intercept	0.002987	-0.030123	Pressure	549.9	551.1
Analyzer Background	14	13.9	Flow	1.037	1.049
Analyzer Coefficient	0.862	0.862	Intensity	94	94
			Converter temp.	331	329

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	46.1	74.9	75.6	0.991
SO2 scrubber check	5000	15.1	150.4	1.7	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	46.1	74.9	75.6	0.991
second point	6000	25.9	42.1	42.6	0.988
third point	6000	15.4	25.0	25.1	0.995
as left zero	5000	0.0	0.0	0.1	----
as left span	6000	46.1	74.9	75.5	0.992
Average Correction Factor					0.992

Corrected As found	75.5	Previous response	75.6	% change	0.1%
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Notes:

Scrubber check done and sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



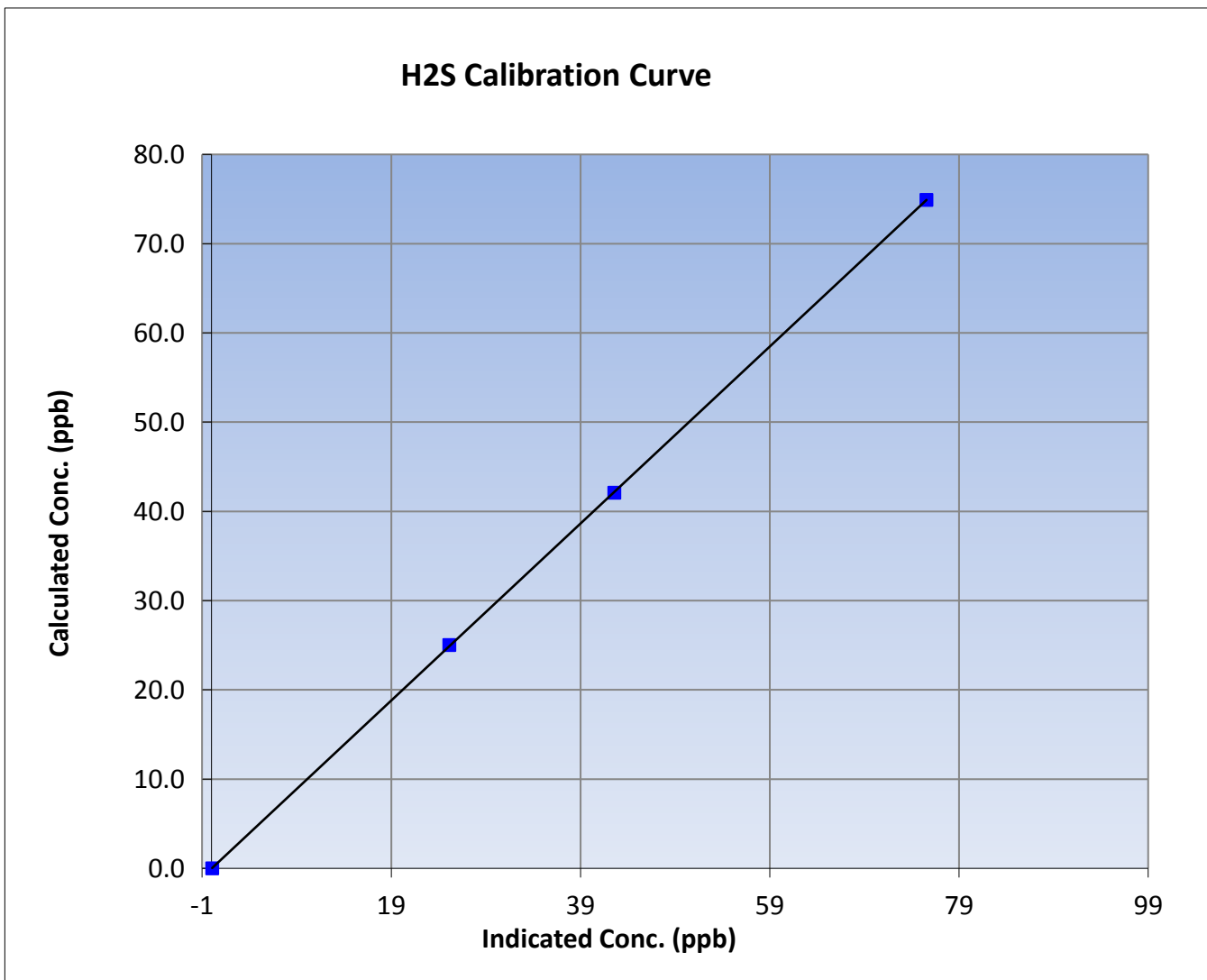
Wood Buffalo Environmental Association H2S Calibration Report

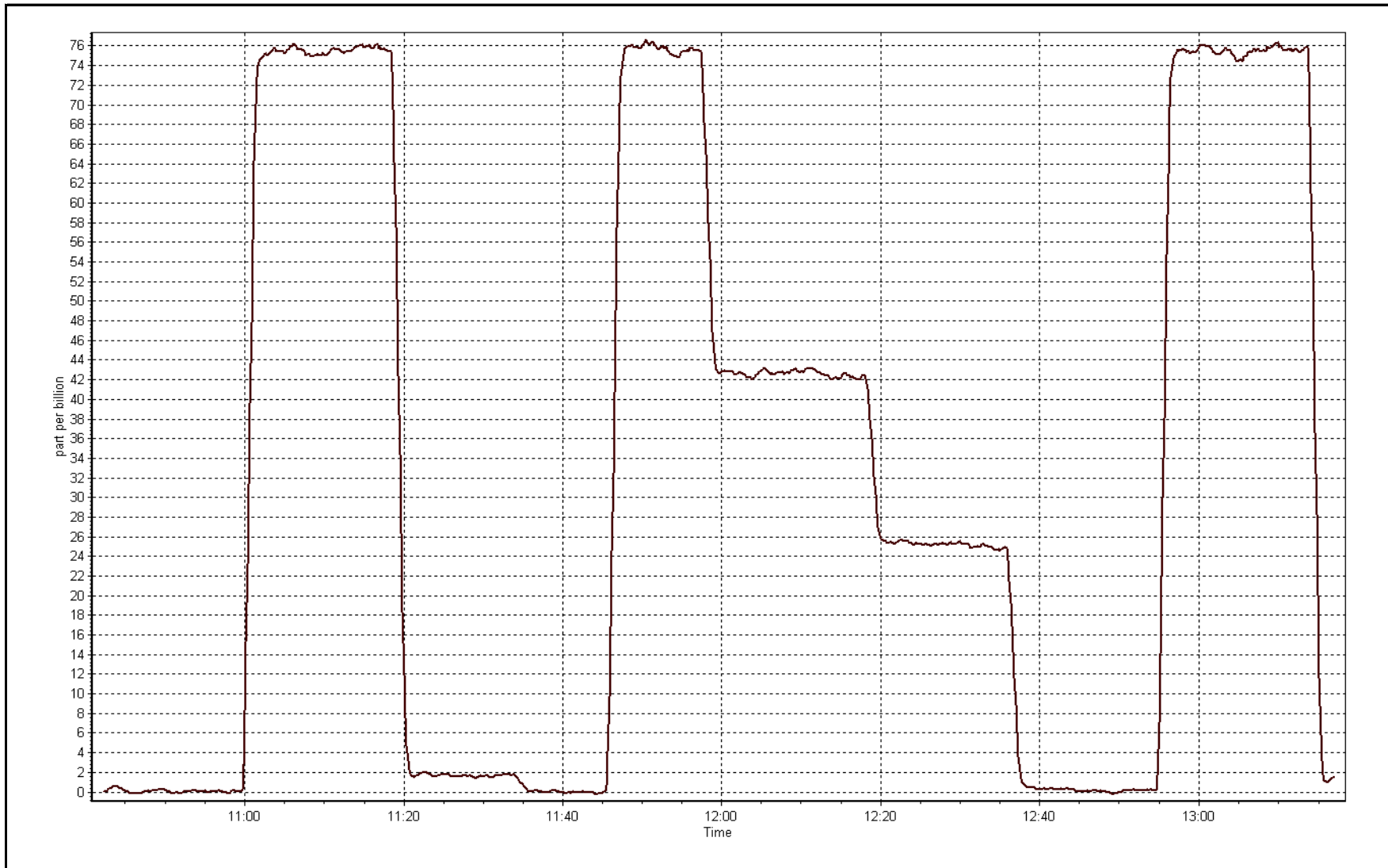
Station Information

Calibration Date	February 3, 2016	Previous Calibration	January 18, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:42	End Time (MST)	13:18
Analyzer make	TEI 450i	Analyzer serial #	1336160094

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999990
74.9	75.6	0.9913		
42.1	42.6	0.9882	Slope	0.991459
25.0	25.1	0.9954		
			Intercept	-0.030123







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-05-16	Last Calibration	January-20-16
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:24	End Time (MST)	11:05
Gas Cert Reference	LL107924	Cal Gas Expiry Date	08-Sep-18
CH4 Cal Gas Conc.	511 ppm	CH4 Equiv Conc.	1058.3 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

	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	30.4	30.4
Calculated slope	1.006436	1.018492	Fuel Pressure	19.9	19.9
Calculated intercept	-0.054033	-0.010185	Analyzer Coeff	4.1	4.1
			Analyzer BKG	0.850	0.850

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

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	60.2	12.74	12.52	1.018
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.2	12.74	12.52	1.018
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.018

Corrected As found	12.51	Previous response	12.71	% change	1.6%
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Notes:

No adjustments. Changing out mix cal gas cylinder and pump.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-05-16	Last Calibration	January-20-16
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	14:48
Gas Cert Reference	LL107929	Cal Gas Expiry Date	08-Sep-18
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

	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	30.4	30.4
Calculated slope	1.018492	1.002427	Fuel Pressure	19.9	19.9
Calculated intercept	-0.010185	-0.049994	Analyzer Coeff	4.1	4.2
			Analyzer BKG	0.850	0.890

Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671
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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	0.03	----
as found span	5000	60.4	12.82	12.82	1.000
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	60.4	12.82	12.82	1.000
second point	5000	30.2	6.41	6.48	0.989
third point	5000	15.1	3.20	3.25	0.986
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	60.4	12.82	12.86	0.997
Average Correction Factor					0.992

Corrected As found	12.79	Previous response	12.60	% change	-1.5%
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Notes:

Changed inlet filter af as founds. Replaced pump for preventative maintenance. Changed out mix cal gas cylinder after as founds as well. Adjusted span.

Calibration Performed By:

Asad Hidayat



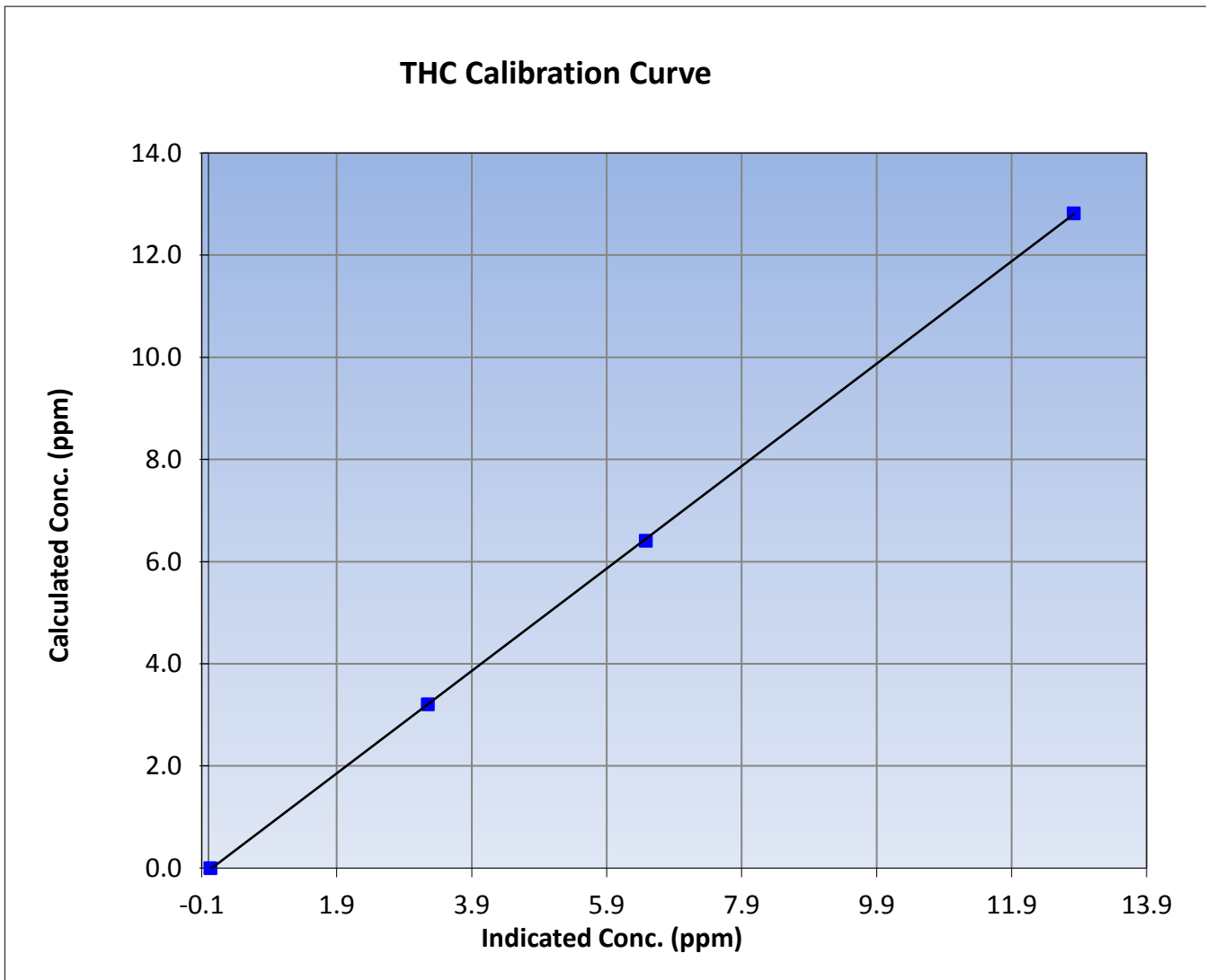
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 5, 2016	Previous Calibration	January 20, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	12:40	End Time (MST)	14:48
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

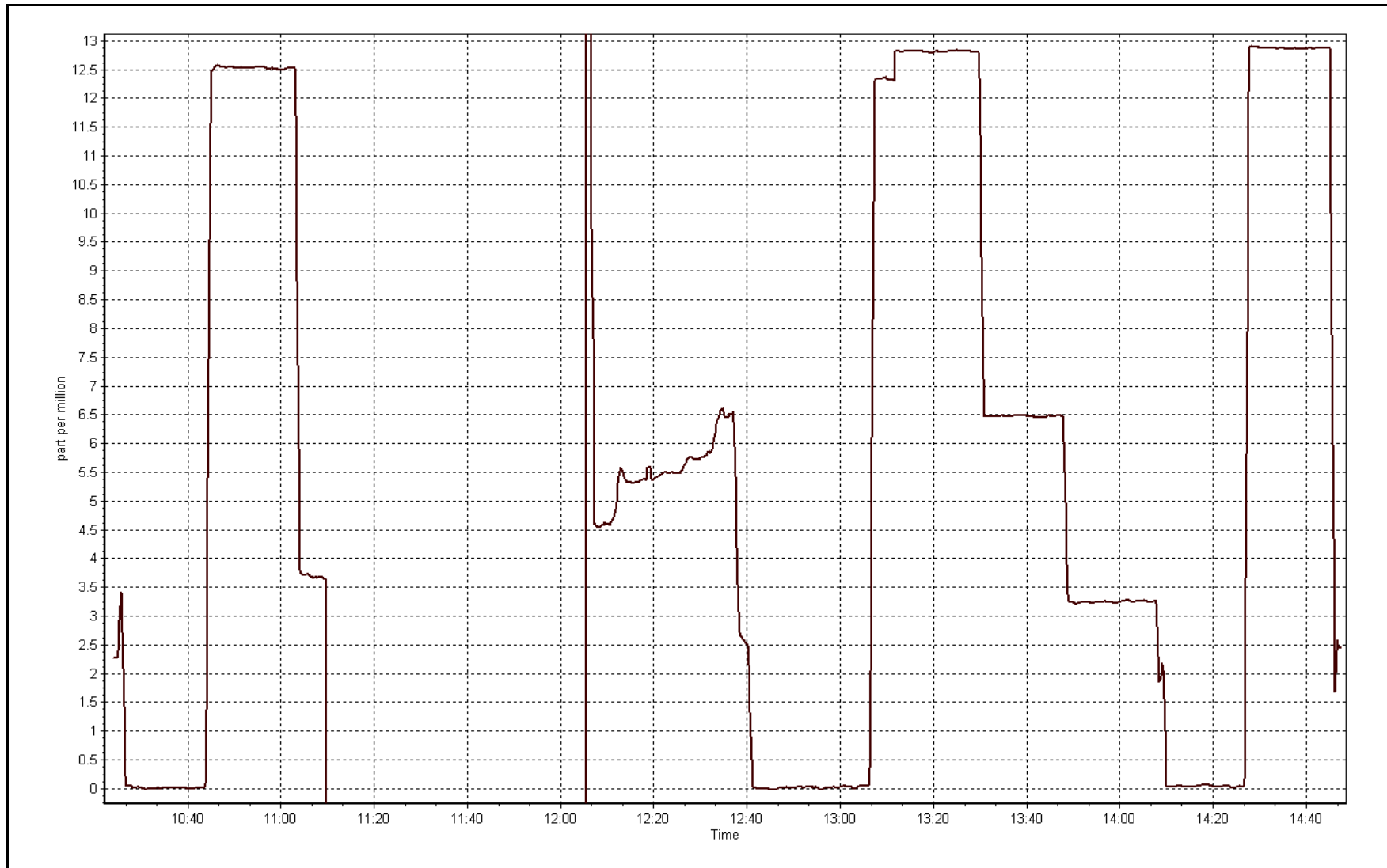
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999977
12.82	12.82	1.0000		
6.41	6.48	0.9892	Slope	1.002427
3.20	3.25	0.9861		
			Intercept	-0.049994



THC Calibration Plot

Date: February 5, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 5
MANNIX
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
FEBRUARY 2016

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	664	32	32	100.00	81	0	23	0
H2S (ppb) Average	662	34	34	100.00	17	2	3	0
THC (ppm) Average	664	32	32	100.00	9.8	-	3.7	-
Temperature 2 m (C) Average	696	0	0	100.00	8	-	2.1	-
Temperature 20 m (C) Average	696	0	0	100.00	8.8	-	3	-
Temperature 45 m (C) Average	696	0	0	100.00	9	-	3.2	-
Temperature 75 m (C) Average	696	0	0	100.00	8.8	-	3.2	-
Temperature 90 m (C) Average	696	0	0	100.00	8.7	-	3.1	-
Relative Humidity 2 m (%) Average	696	0	0	100.00	95	-	92	-
Relative Humidity 20 m (%) Average	696	0	0	100.00	95	-	92	-
Relative Humidity 45 m (%) Average	696	0	0	100.00	96	-	92	-
Relative Humidity 75 m (%) Average	696	0	0	100.00	96	-	92	-
Relative Humidity 90 m (%) Average	696	0	0	100.00	96	-	92	-
Wind Speed 20 m (km/h) Average	682	0	14	97.99	30	-	16	-
Wind Speed 45 m (km/h) Average	674	0	22	96.84	38	-	22	-
Wind Speed 75 m (km/h) Average	605	0	91	86.93	44	-	24	-
Wind Speed 90 m (km/h) Average	629	0	67	90.37	45	-	27	-
Wind Direction 20 m (deg) Average	682	0	14	97.99	-	-	-	-
Wind Direction 45 m (deg) Average	674	0	22	96.84	-	-	-	-
Wind Direction 75 m (deg) Average	605	0	91	86.93	-	-	-	-
Wind Direction 90 m (deg) Average	629	0	67	90.37	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	682	0	14	97.99	0.9	-	0.6	-
Vertical Wind Speed 45 m (km/h) Average	674	0	22	96.84	1.6	-	1.1	-
Vertical Wind Speed 75 m (km/h) Average	605	0	91	86.93	1.4	-	0.4	-
Vertical Wind Speed 90 m (km/h) Average	629	0	67	90.37	3.9	-	1.4	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	664	4.1	9	-	0	0	0	1	3	12	81
H2S (ppb) Average	662	1.3	2	-	0	0	0	1	2	3	17
THC (ppm) Average	664	2.51	0.6	-	2.2	2.2	2.3	2.4	2.5	2.8	9.8
Temperature 2 m (C) Average	696	-10.57	6.7	-	-30	-18	-15	-11.2	-5.6	-2.4	8
Temperature 20 m (C) Average	696	-10.29	6.9	-	-29	-18	-15.1	-11.2	-4.8	-1.1	8.8
Temperature 45 m (C) Average	696	-10.24	7	-	-28.1	-18.1	-15.1	-11.2	-4.6	-0.6	9
Temperature 75 m (C) Average	696	-10.19	7.1	-	-26.9	-17.9	-15.3	-11.4	-4.3	-0.5	8.8
Temperature 90 m (C) Average	696	-10.14	7.1	-	-26.5	-18	-15.5	-11.4	-4	-0.5	8.7
Relative Humidity 2 m (%) Average	696	77.8	12	-	38	61	72	81	86	91	95
Relative Humidity 20 m (%) Average	696	76.7	13	-	34	58	70	80	86	90	95
Relative Humidity 45 m (%) Average	696	76.8	13	-	33	57	69	81	87	90	96
Relative Humidity 75 m (%) Average	696	77.3	14	-	33	57	70	82	87	90	96
Relative Humidity 90 m (%) Average	696	77.5	14	-	33	57	71	82	87	91	96
Wind Speed 20 m (km/h) Average	682	8.9	5	-	0	3	5	8	12	16	30
Wind Speed 45 m (km/h) Average	674	12.1	7	-	0	4	7	11	16	22	38
Wind Speed 75 m (km/h) Average	605	14.8	8	-	0	5	9	14	20	27	44
Wind Speed 90 m (km/h) Average	629	16	8	-	0	6	10	15	22	28	45
Wind Direction 20 m (deg) Average	682	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	674	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	605	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	629	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	682	0.11	0.3	-	-0.6	-0.2	-0.1	0.1	0.3	0.4	0.9
Vertical Wind Speed 45 m (km/h) Average	674	0.04	0.6	-	-1.8	-0.7	-0.4	0	0.5	0.8	1.6
Vertical Wind Speed 75 m (km/h) Average	605	0.08	0.3	-	-1.1	-0.3	-0.1	0.1	0.3	0.5	1.4
Vertical Wind Speed 90 m (km/h) Average	629	0.65	0.7	-	-1.7	0	0.2	0.5	1.1	1.5	3.9

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	05 Feb 2016 15:00	05 Feb 2016 23:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	06 Feb 2016 08:00	06 Feb 2016 12:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	05 Feb 2016 15:00	06 Feb 2016 12:00	22	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	05 Feb 2016 15:00	05 Feb 2016 23:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	06 Feb 2016 09:00	06 Feb 2016 12:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	07 Feb 2016 11:00	07 Feb 2016 11:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	14 Feb 2016 07:00	17 Feb 2016 06:00	72	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	17 Feb 2016 08:00	17 Feb 2016 08:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	17 Feb 2016 11:00	17 Feb 2016 14:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	06 Feb 2016 09:00	06 Feb 2016 12:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	07 Feb 2016 11:00	07 Feb 2016 11:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	14 Feb 2016 07:00	16 Feb 2016 14:00	56	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	17 Feb 2016 06:00	17 Feb 2016 11:00	6	Flat line in sensor output signal - Sensor frozen



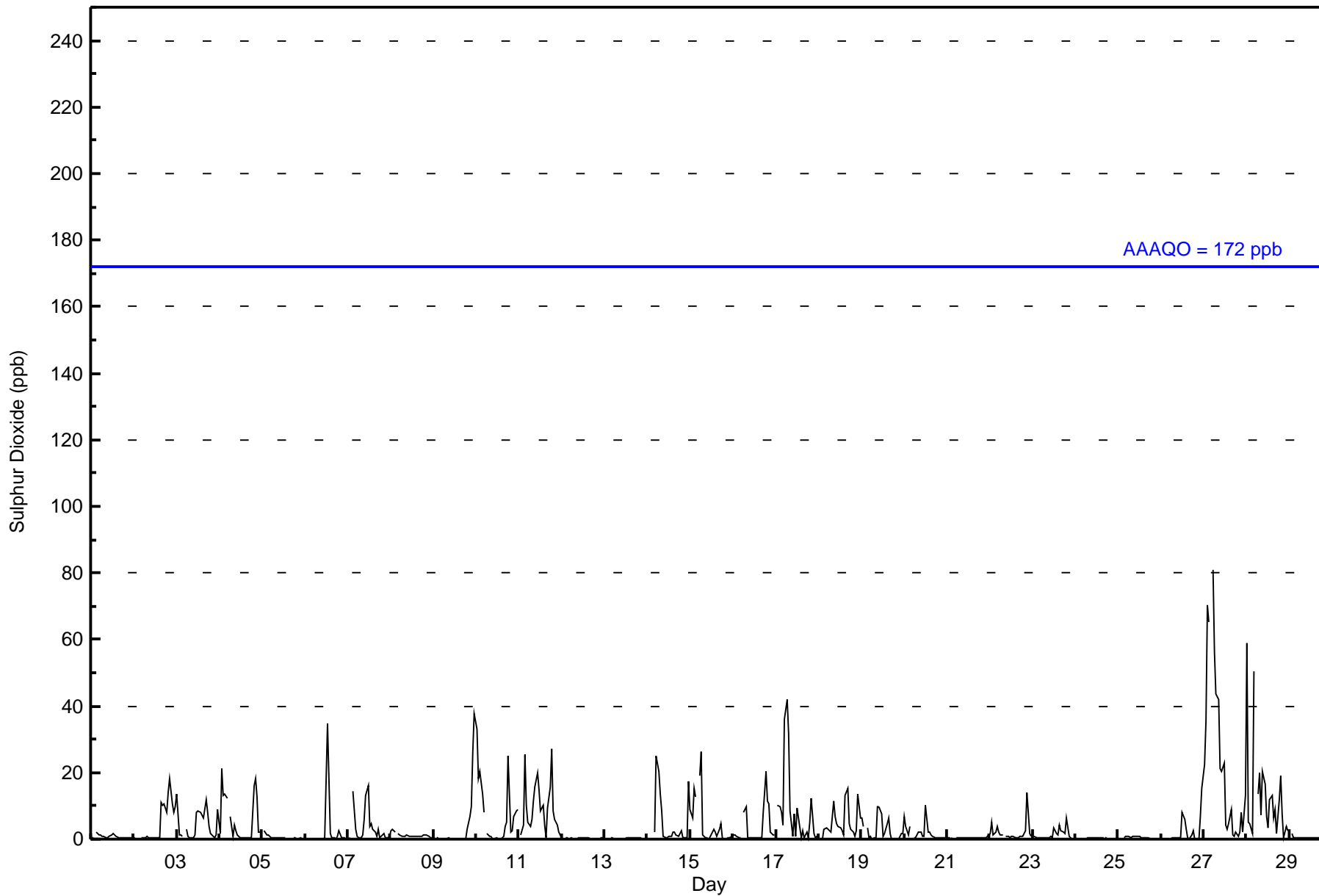
Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 81 ppb on Feb 27 06:00										Maximum Daily Average: 23.2 ppb on Feb 27										Hours of Data: 664						
Minimum Value: 0 ppb on Feb 10 13:00										Minimum Daily Average: 0.2 ppb on Feb 12										Hours of Missing Data: 32						
Maximum Diurnal Average: 7.3 ppb at hour 6										Minimum Diurnal Average: 2.0 ppb at hour 15										Hours of Calibration: 32						
Monthly Average: 4.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 12 P ₉₉ = 43										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	1	Z	2	1	1	1	1	0	0	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0.7	2
2-Feb	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	11	10	11	8	14	18	10	8	10	4.5	18
3-Feb	13	1	1	1	Z	3	1	1	1	1	1	8	9	8	7	6	12	8	4	2	1	0	1	9	4.3	13
4-Feb	2	21	13	14	12	Z	7	1	4	3	1	1	0	0	0	0	0	0	0	16	18	13	2	2	5.7	21
5-Feb	Z	2	1	1	1	1	0	0	0	0	0	0	1	0	1	C	C	C	0	0	0	0	0	0	0.6	2
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	35	18	2	0	0	0	1	3	0	0	0	0	2.7	35
7-Feb	0	0	Z	14	3	1	1	1	1	6	13	16	4	5	3	2	1	3	1	1	2	1	1	1	3.4	16
8-Feb	3	3	2	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1.2	3
9-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	10	26	38	3.7	38
10-Feb	33	18	20	14	8	Z	2	1	1	0	0	0	0	0	0	1	4	5	25	2	2	7	8	9	6.9	33
11-Feb	Z	1	4	25	10	5	4	6	12	16	20	15	9	10	4	0	9	16	27	9	6	4	2	1	9.4	27
12-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
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	2	25	20	14	9	1	0	0	1	1	2	2	1	1	2	2	0	1	1	17	4.5	25
15-Feb	9	7	15	13	Z	19	26	1	0	0	1	2	3	2	1	3	5	0	0	0	0	1	1	1	4.8	26
16-Feb	1	1	1	1	0	Z	8	10	1	0	0	0	0	0	0	0	0	8	20	12	10	2	1	1	3.5	20
17-Feb	Z	10	10	8	4	36	42	32	8	1	7	1	9	3	0	3	0	2	0	5	12	2	0	1	8.6	42
18-Feb	0	Z	0	3	4	3	3	2	12	7	5	4	3	3	1	13	15	5	3	2	1	2	14	6	4.8	15
19-Feb	6	4	Z	3	0	1	0	0	1	10	10	8	1	2	5	6	2	0	0	0	0	0	2	2	2.7	10
20-Feb	7	4	1	4	Z	0	0	1	2	2	1	1	10	2	2	1	1	1	1	0	0	0	0	0	1.9	10
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	1	0.4	1
22-Feb	2	5	1	2	4	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	14	2	1	2.0	14
23-Feb	Z	1	0	0	0	0	0	1	1	1	0	3	2	1	4	3	2	2	6	1	0	0	0	0	1.3	6
24-Feb	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Feb	0	0	Z	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	8	6	3	0	0	1	2	0	0	0	7	15	2.0	15	
27-Feb	22	36	71	65	Z	81	56	44	42	21	20	23	4	3	5	9	1	1	2	1	2	8	2	13	23.2	81
28-Feb	59	5	4	2	51	Z	14	20	7	21	17	7	3	12	13	6	9	2	12	19	7	0	4	3	12.9	59
29-Feb	Z	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	2
																								Diurnal Average		
																								Diurnal Maximum		
6.7 4.9 6.2 7.0 4.6 7.3 6.5 4.8 3.8 3.2 3.6 3.1 3.8 2.9 2.0 2.6 2.7 2.5 4.0 3.5 3.3 2.7 2.9 4.6																										
59 36 71 65 51 81 56 44 42 21 20 23 35 18 13 13 15 16 27 19 18 14 26 38																										
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
Mannix - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	590	88.86	88.86
11 - 20	48	7.23	96.08
21 - 60	23	3.46	99.55
61 - 110	3	0.45	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mannix - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	79	56	11	7	6	15	102	113	28	11	15	23	23	25	21	44	579
11 - 20	26	4	0	0	0	0	0	0	0	0	0	0	1	1	3	13	48
21 - 60	20	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	23
61 - 110	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	128	61	11	7	6	15	102	113	28	11	15	23	24	26	26	57	653

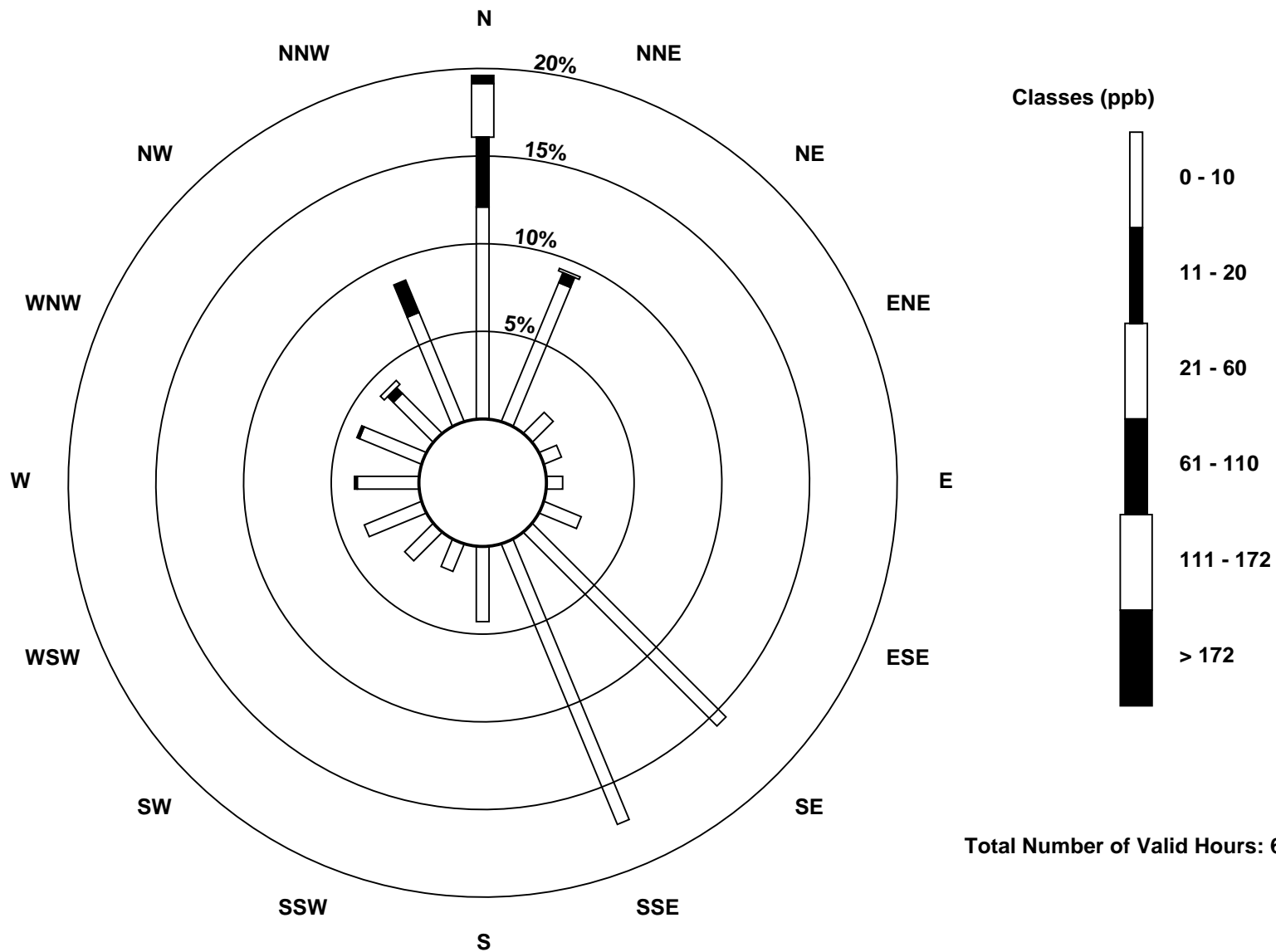
Total Number of Valid Hours: 653

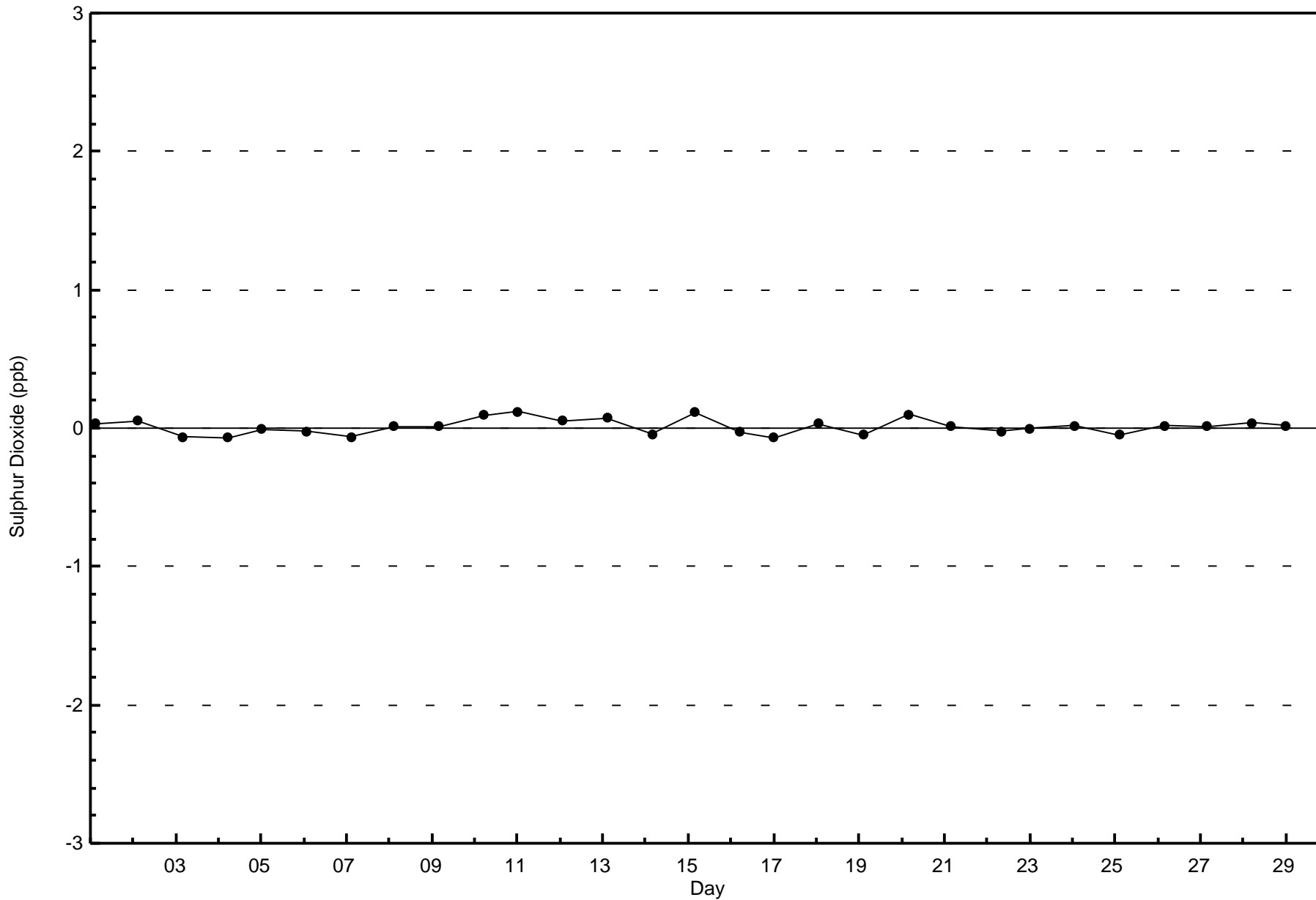
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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

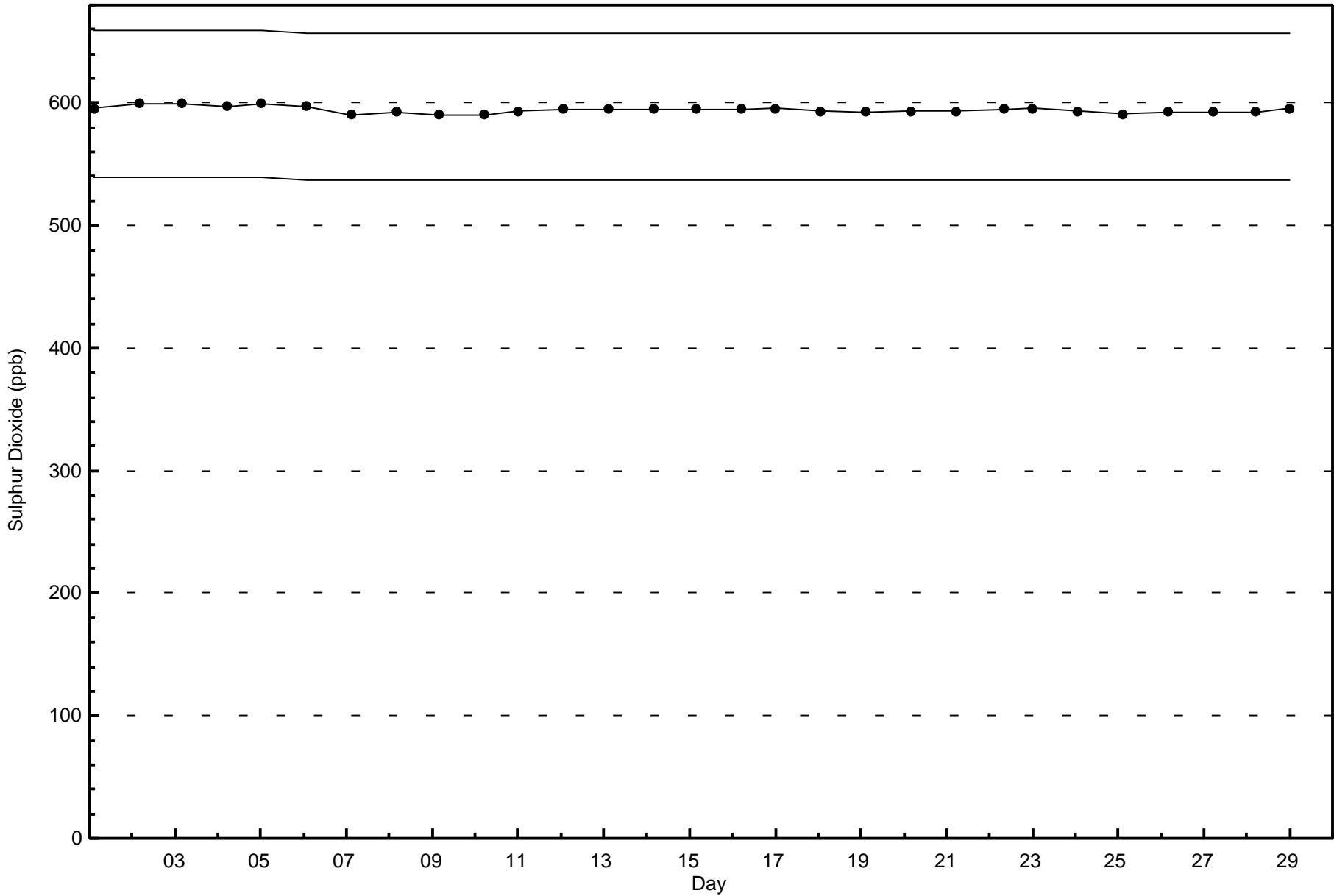






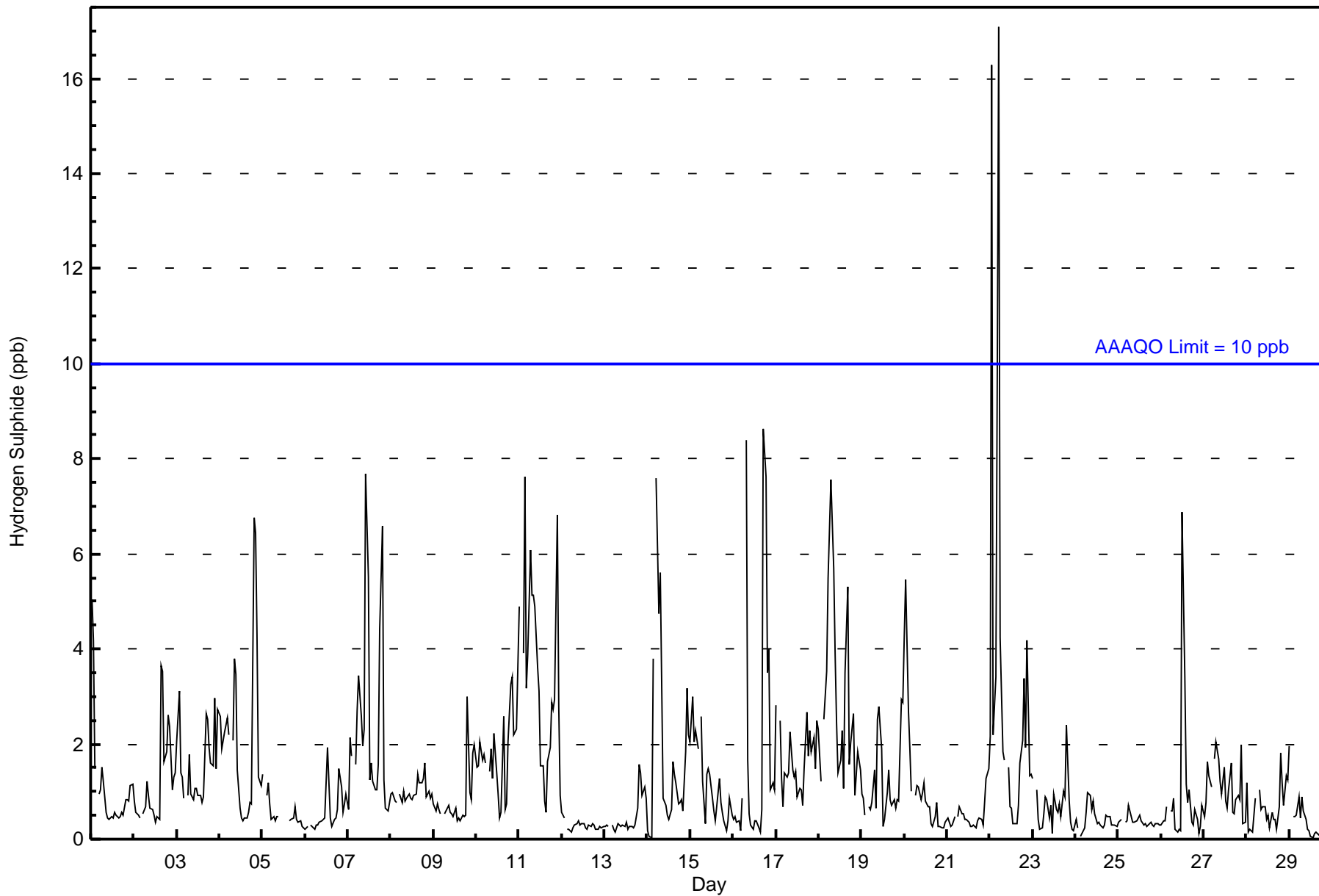
Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mannix - February 2016





Number of Exceedences (AAAQO): 1-hr: 2 24-hr: 0 Maximum Value: 17 ppb on Feb 22 06:00 Maximum Daily Average: 3.4 ppb on Feb 22										Hours in Service: 696 Hours of Data: 662 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																
Minimum Value: 0 ppb on Feb 29 14:00 Maximum Diurnal Average: 2.2 ppb at hour 6 Monthly Average: 1.3 ppb										Minimum Daily Average: 0.3 ppb on Feb 12 Minimum Diurnal Average: 0.6 ppb at hour 15 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 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	4	1	Z	1	1	2	1	1	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1.1	5
2-Feb	1	1	0	0	Z	1	1	1	1	1	1	1	0	0	0	4	4	2	2	3	2	1	1	1	1.2	4
3-Feb	2	3	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	3	3	2	2	2	3	1	3	1.6	3
4-Feb	3	2	2	2	3	2	Z	2	4	3	1	1	0	0	0	0	1	1	1	7	6	4	1	1	2.1	7
5-Feb	1	Z	1	1	1	0	0	0	0	0	C	C	C	C	C	0	0	0	1	0	0	0	0	0	0.6	1
6-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	1	1	1	1	1	1	0.6	2
7-Feb	1	2	2	Z	2	3	3	3	2	2	8	6	1	2	1	1	1	2	4	7	1	1	1	1	2.4	8
8-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.0	2
9-Feb	1	1	1	1	1	Z	1	1	1	1	1	0	1	0	0	0	0	0	1	3	1	1	2	2	0.8	3
10-Feb	2	2	2	2	2	2	Z	1	2	1	2	1	1	0	1	3	1	1	2	3	3	2	2	4	1.8	4
11-Feb	5	Z	4	8	3	4	6	5	5	5	4	3	2	2	1	1	2	2	3	3	3	7	3	1	3.4	8
12-Feb	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	0.5	2
14-Feb	0	0	0	4	Z	8	5	6	3	1	1	1	0	1	2	1	1	1	1	1	1	2	3	2	1.9	8
15-Feb	2	3	2	2	2	Z	3	1	0	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1.2	3
16-Feb	0	0	0	0	0	1	Z	8	2	1	0	0	0	0	0	0	1	9	8	3	4	1	1	1	1.9	9
17-Feb	3	Z	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	3	2	2	2	2	1	2	1.6	3
18-Feb	2	1	Z	3	4	5	7	8	6	4	2	1	2	2	1	4	5	2	2	3	1	1	2	1	3.0	8
19-Feb	1	1	1	Z	1	1	1	1	1	3	3	2	0	0	1	1	1	1	1	1	1	1	3	3	1.2	3
20-Feb	4	5	3	2	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	1.2	5
21-Feb	0	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1
22-Feb	2	16	2	3	10	17	4	2	2	Z	2	1	1	0	0	0	1	2	2	3	2	4	1	1	3.4	17
23-Feb	1	Z	1	0	0	0	1	1	1	0	1	0	1	1	1	1	0	1	1	2	1	0	0	0	0.7	2
24-Feb	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
25-Feb	0	0	0	Z	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
26-Feb	0	0	0	1	Z	1	1	1	0	0	0	0	7	3	1	1	1	0	0	1	0	0	0	1	0.9	7
27-Feb	0	1	2	1	1	Z	2	2	2	1	1	2	1	1	1	2	1	1	1	1	1	2	0	0	1.1	2
28-Feb	1	0	0	0	0	1	Z	1	1	1	1	0	1	0	1	0	0	0	1	2	1	1	1	1	0.7	2
29-Feb	2	Z	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
1.5 1.9 1.2 1.5 1.4 2.2 1.7 1.9 1.4 1.2 1.3 1.0 0.9 0.8 0.6 0.9 1.0 1.2 1.3 1.9 1.3 1.4 1.1 1.2																								Diurnal Average		
5 16 4 8 10 17 7 8 6 5 8 6 7 3 2 4 5 9 8 7 6 7 3 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
Mannix - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	576	87.01	87.01
3 - 4	57	8.61	95.62
5 - 7	19	2.87	98.49
8 - 11	8	1.21	99.70
> 11	2	0.30	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



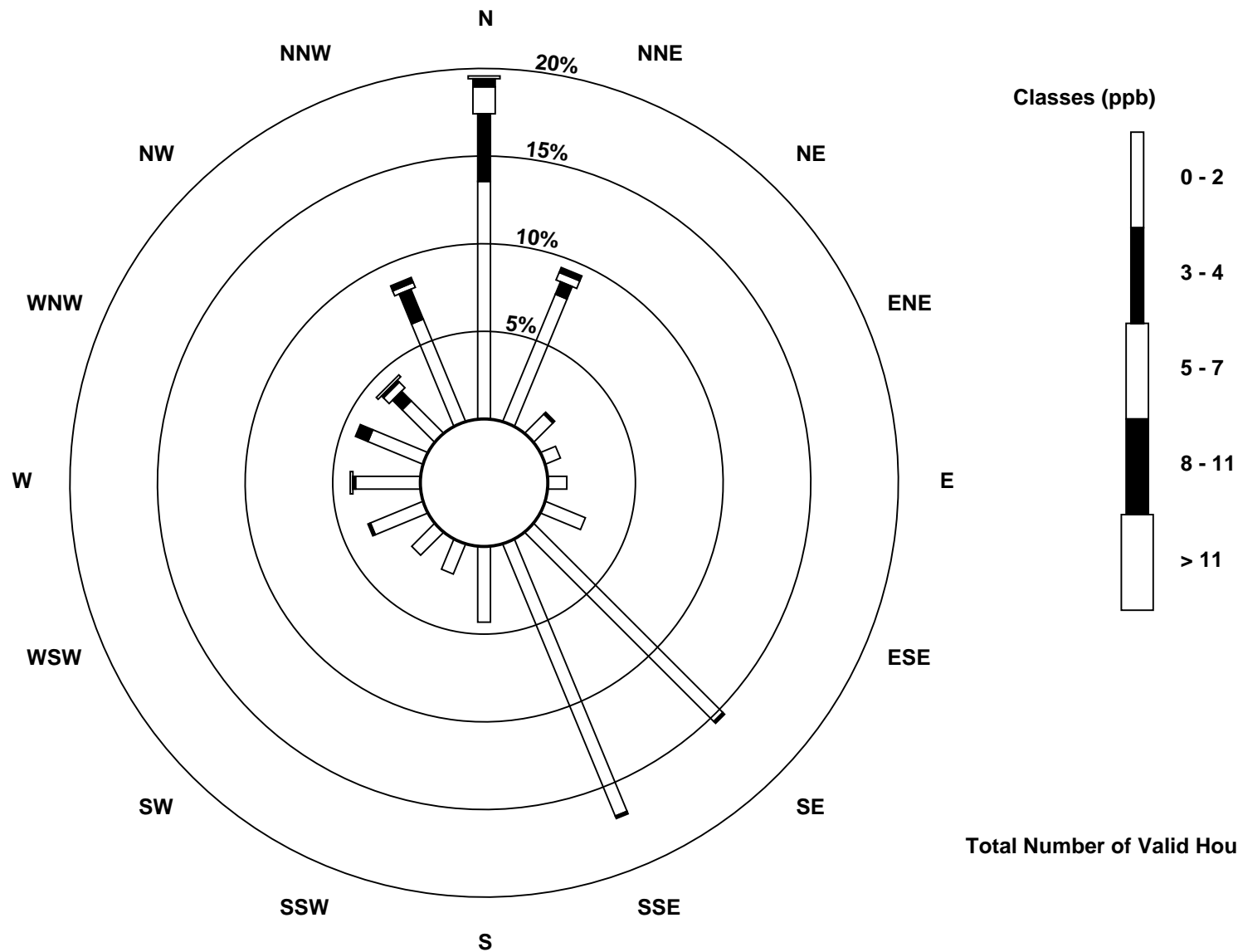
**Wood Buffalo Environmental Association
Frequency Distribution**

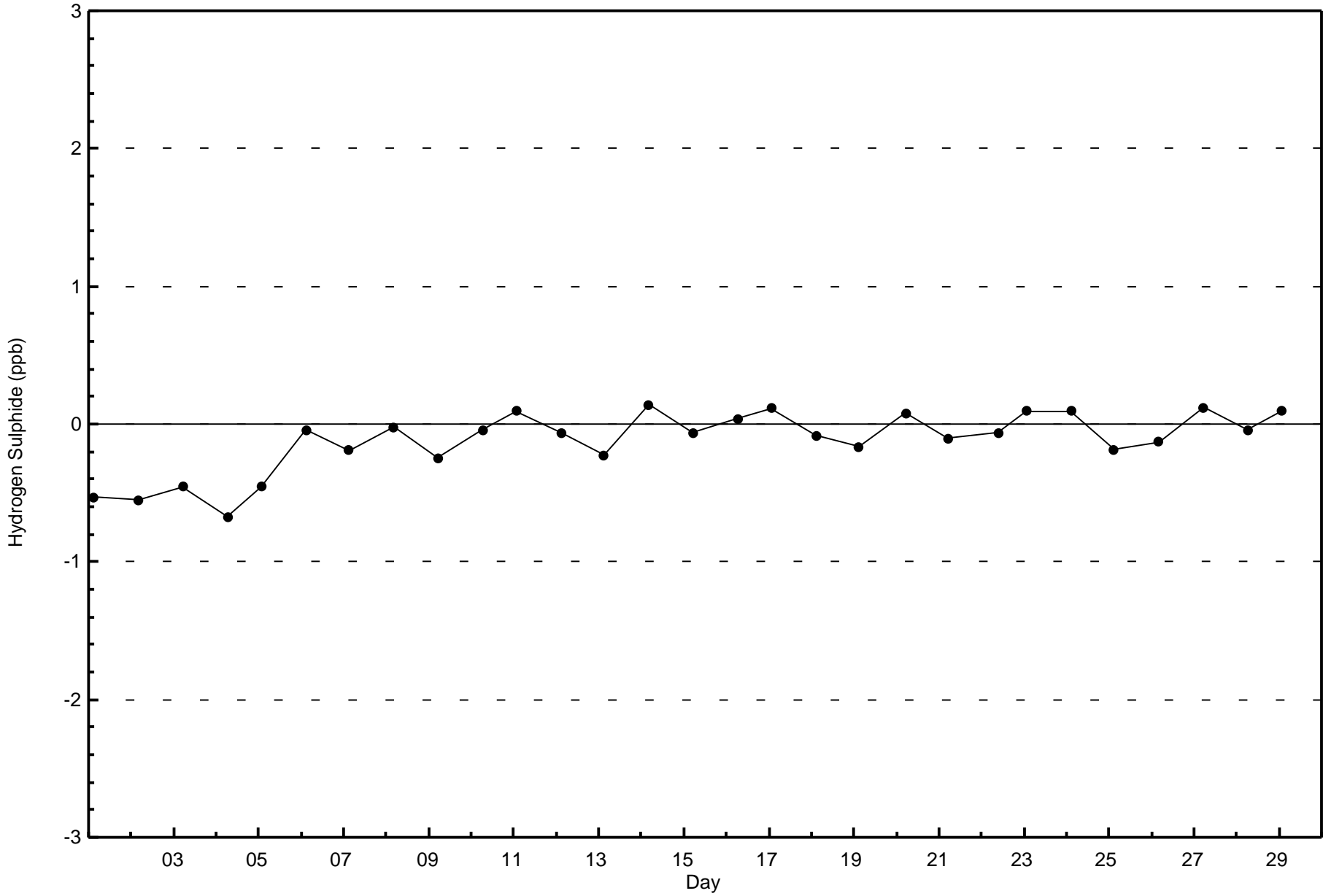
**Hydrogen Sulphide (H₂S) - ppb
Mannix - February 2016**

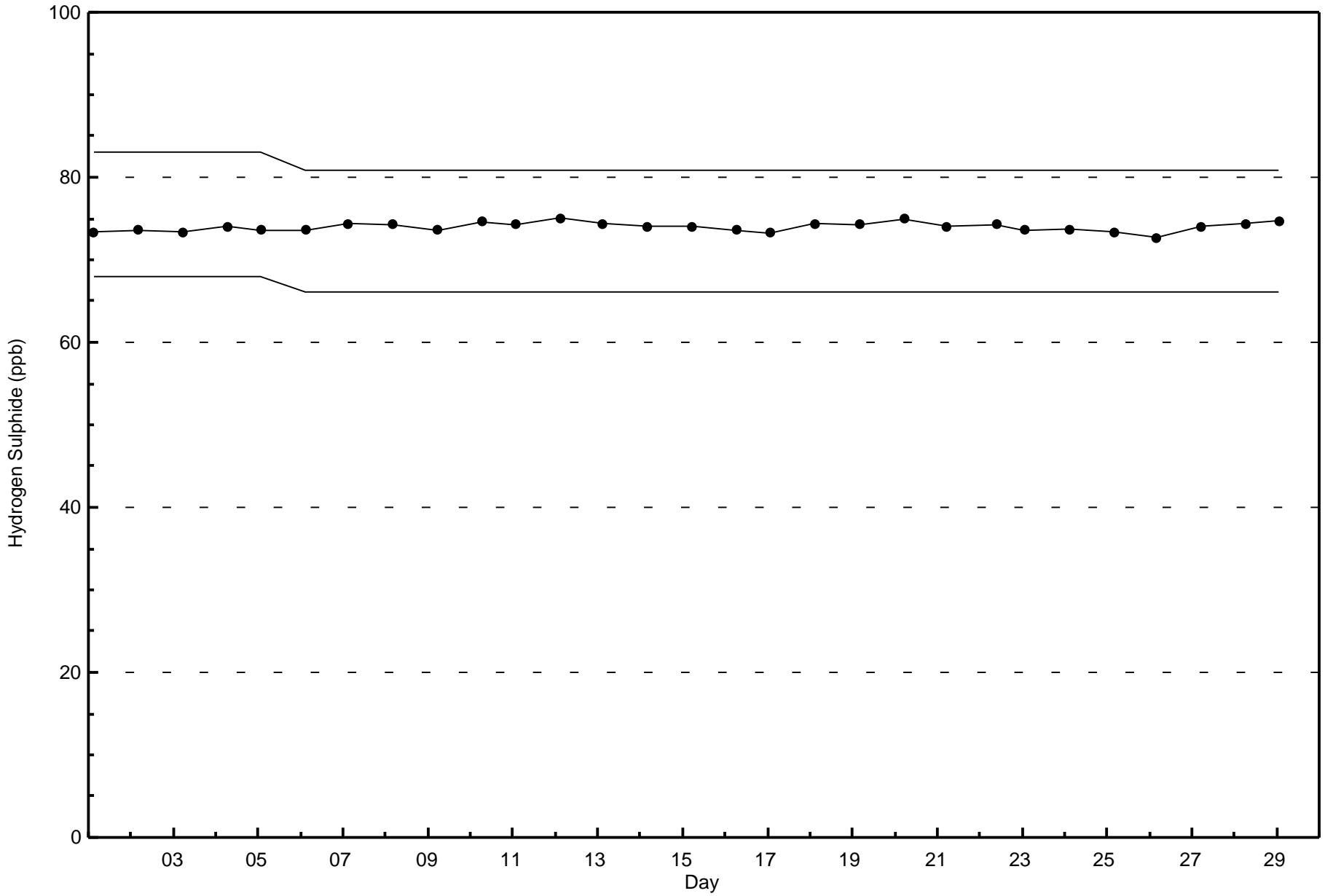
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	88	51	10	6	7	16	99	109	28	12	12	21	24	22	17	41	563
3 - 4	25	5	1	0	0	0	1	1	0	0	0	1	1	5	5	12	57
5 - 7	10	3	0	0	0	0	0	0	0	0	0	0	1	0	3	2	19
8 - 11	3	2	0	0	0	0	0	0	0	0	0	0	0	0	1	2	8
> 11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2
Totals	127	61	11	6	7	16	100	110	28	12	12	22	26	27	27	57	649

Total Number of Valid Hours: 649

Total Number of Hours: 696

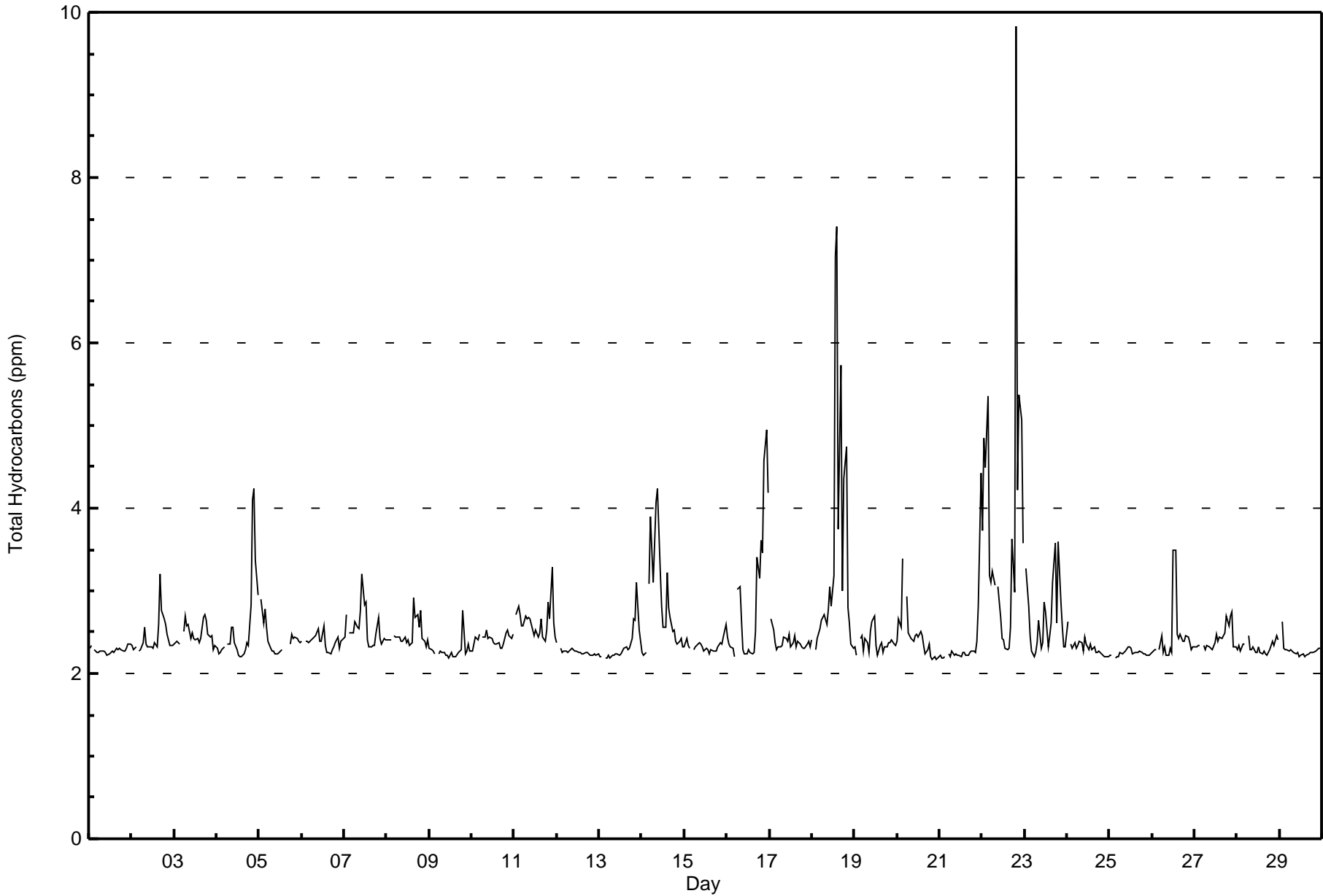








Maximum Value: 9.8 ppm on Feb 22 20:00		Maximum Daily Average: 3.7 ppm on Feb 22		Hours in Service:	696																																											
Minimum Value: 2.2 ppm on Feb 20 21:00		Minimum Daily Average: 2.2 ppm on Feb 25		Hours of Data:	664																																											
Maximum Diurnal Average: 2.9 ppm at hour 20		Minimum Diurnal Average: 2.4 ppm at hour 1		Hours of Missing Data:	32																																											
Monthly Average: 2.51 ppm		Percentiles: P ₁ = 2.2 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.4 Q ₃ = 2.5 P ₉₀ = 2.8 P ₉₉ = 5.0		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	2.3	2.3	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4																						
2-Feb	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.6	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.6	3.2	2.8	2.7	2.6	2.5	2.3	2.3	2.3	2.4	3.2																						
3-Feb	2.4	2.4	2.4	2.4	Z	2.5	2.7	2.6	2.6	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.7	2.7	2.6	2.5	2.4	2.5	2.3	2.3	2.5	2.7																						
4-Feb	2.3	2.2	2.3	2.3	2.3	Z	2.4	2.4	2.6	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.8	4.1	4.2	3.4	2.9	2.6	4.2																						
5-Feb	Z	2.9	2.6	2.8	2.6	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	C	C	C	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.9																						
6-Feb	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.6	2.3	2.2	2.3	2.2	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.6																						
7-Feb	2.4	2.7	Z	2.5	2.5	2.5	2.6	2.6	2.5	2.8	3.2	2.8	2.9	2.4	2.3	2.3	2.3	2.3	2.5	2.7	2.4	2.4	2.4	2.4	2.5	3.2																						
8-Feb	2.4	2.4	2.4	Z	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.9	2.7	2.7	2.6	2.8	2.4	2.4	2.3	2.4	2.5	2.9																						
9-Feb	2.3	2.3	2.3	2.2	Z	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.8	2.2	2.3	2.3	2.3	2.8																						
10-Feb	2.3	2.4	2.4	2.4	2.5	Z	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.5	2.5	2.4	2.5	2.4	2.5																						
11-Feb	Z	2.7	2.8	2.7	2.6	2.6	2.7	2.7	2.7	2.7	2.5	2.5	2.5	2.4	2.5	2.7	2.4	2.4	2.5	2.9	2.7	3.3	2.6	2.4	2.6	3.3																						
12-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	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4																						
13-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	2.3	2.3	2.3	2.3	2.3	2.4	2.7	2.6	3.1	2.5	2.4	2.3	3.1																						
14-Feb	2.3	2.2	2.2	Z	3.1	3.9	3.1	3.6	4.1	4.2	3.3	2.8	2.6	2.6	3.2	2.8	2.7	2.5	2.5	2.4	2.3	2.4	2.4	2.3	2.8	4.2																						
15-Feb	2.3	2.4	2.3	2.3	Z	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.6	2.6																						
16-Feb	2.4	2.3	2.3	2.3	2.2	Z	3.0	3.1	2.6	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.5	3.4	3.2	3.6	3.5	4.6	4.9	4.2	2.9	4.9																						
17-Feb	Z	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.3	2.4	2.5	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.7																						
18-Feb	2.4	Z	2.3	2.4	2.5	2.6	2.7	2.7	2.6	2.8	3.0	2.8	3.2	7.1	7.4	3.8	5.7	3.0	4.4	4.7	2.8	2.6	2.3	2.3	3.4	7.4																						
19-Feb	2.3	2.2	Z	2.4	2.5	2.3	2.4	2.4	2.3	2.5	2.6	2.7	2.3	2.2	2.3	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.7																						
20-Feb	2.4	2.7	2.6	3.4	Z	2.9	2.5	2.5	2.4	2.4	2.5	2.5	2.4	2.5	2.5	2.3	2.2	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.4	3.4																						
21-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.8	4.4	2.4	4.4																						
22-Feb	3.7	4.8	4.5	5.4	3.2	3.1	3.2	3.1	Z	3.1	2.7	2.4	2.4	2.3	2.3	2.3	2.6	3.6	3.0	9.8	4.2	5.4	5.1	3.6	3.7	9.8																						
23-Feb	Z	3.3	2.8	2.4	2.3	2.2	2.3	2.4	2.6	2.3	2.4	2.9	2.7	2.3	2.5	2.6	3.1	3.6	2.6	3.6	2.9	2.6	2.3	2.3	2.6	3.6																						
24-Feb	2.6	Z	2.4	2.3	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.6																						
25-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3																						
26-Feb	2.2	2.3	2.3	Z	2.3	2.5	2.2	2.3	2.2	2.2	2.3	2.3	3.5	3.5	2.5	2.4	2.5	2.4	2.4	2.5	2.4	2.4	2.3	2.3	2.4	3.5																						
27-Feb	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.4	2.5	2.5	2.7	2.6	2.7	2.7	2.3	2.3	2.4	2.7																						
28-Feb	2.3	2.3	2.3	2.4	2.4	Z	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.4	2.3	2.5	2.4	2.5																						
29-Feb	Z	2.6	2.3	2.3	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	2.3	2.3	2.3	2.3	2.3	2.3	2.6																						
																								Diurnal Average																								
																								Diurnal Maximum																								
																								2.4	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.5	2.5	2.4	2.5	2.5	2.5	2.9	2.6	2.7	2.6	2.5	
																								3.7	4.8	4.5	5.4	3.2	3.9	3.2	3.6	4.1	4.2	3.3	2.9	3.5	7.1	7.4	3.8	5.7	3.6	4.4	9.8	4.2	5.4	5.1	4.4	
Z - zerospan																								C - Calibration																								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	611	92.02	92.02
3.1 - 10.0	53	7.98	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Mannix - February 2016**

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	125	58	11	6	5	15	101	112	27	11	14	22	18	15	14	46	600
3.1 - 10.0	3	3	0	1	1	0	1	1	1	0	1	1	6	11	12	11	53
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	128	61	11	7	6	15	102	113	28	11	15	23	24	26	26	57	653

Total Number of Valid Hours: 653

Total Number of Hours: 696

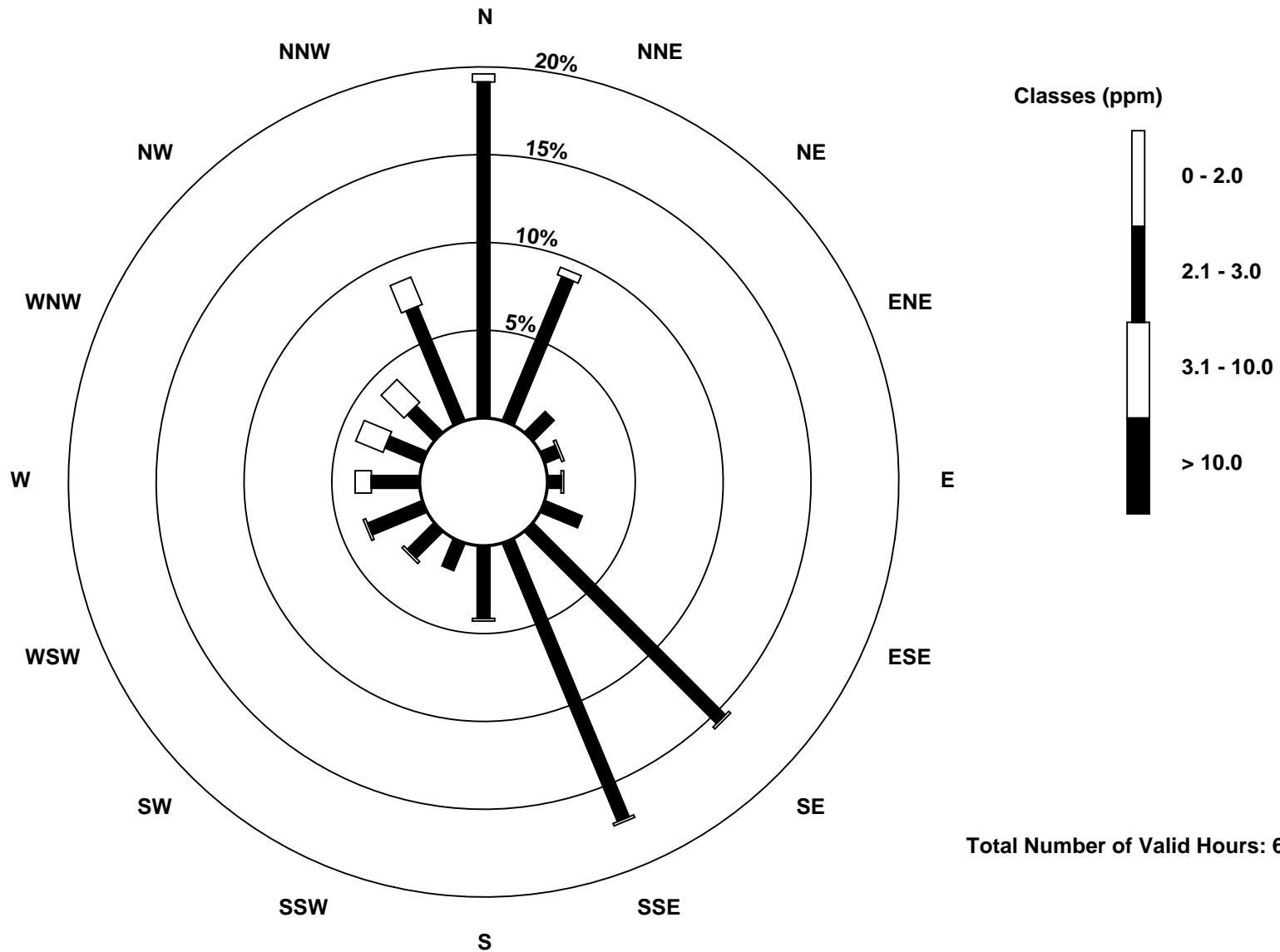


Wood Buffalo Environmental Association

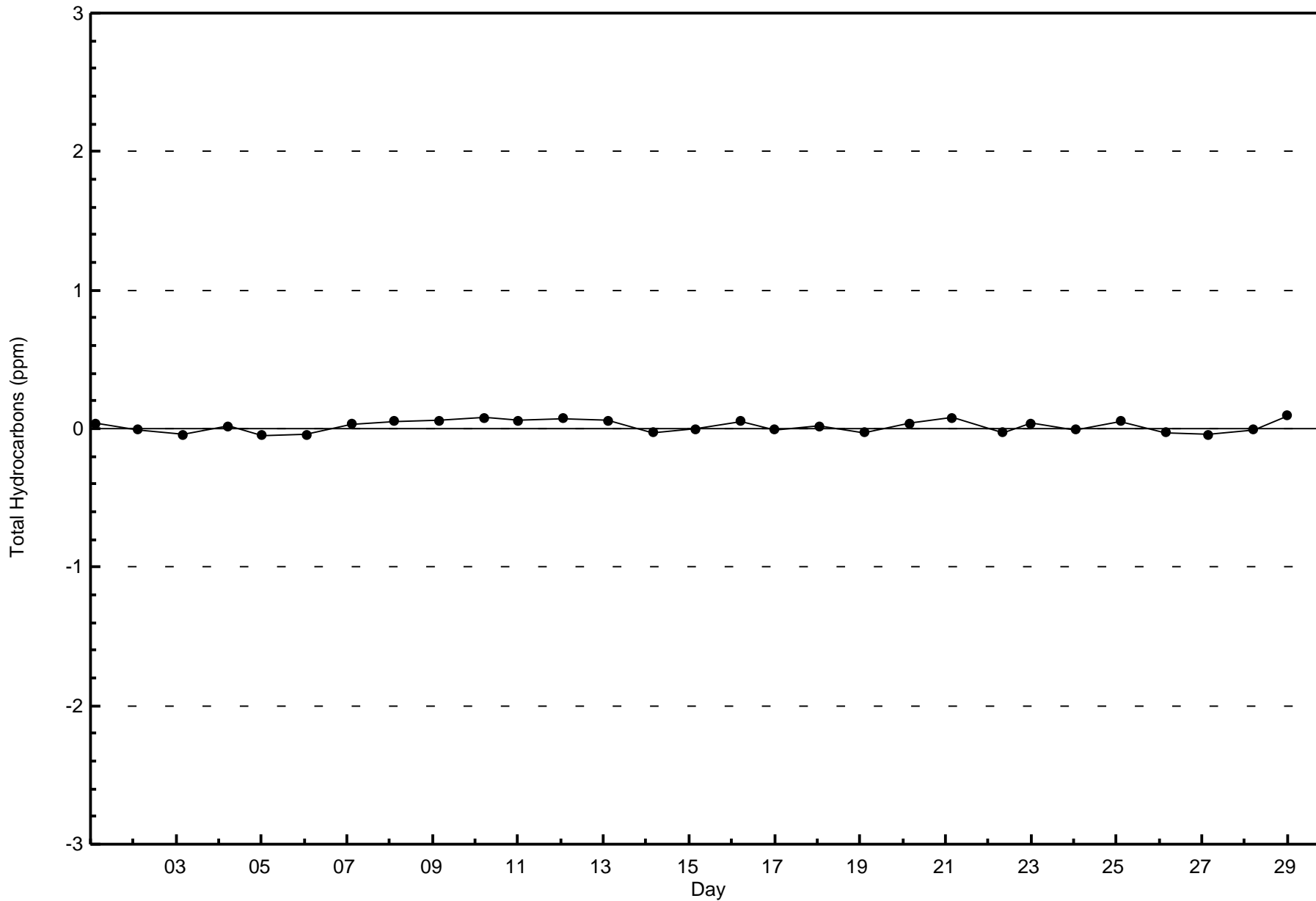
Wind Rose Feb 2016

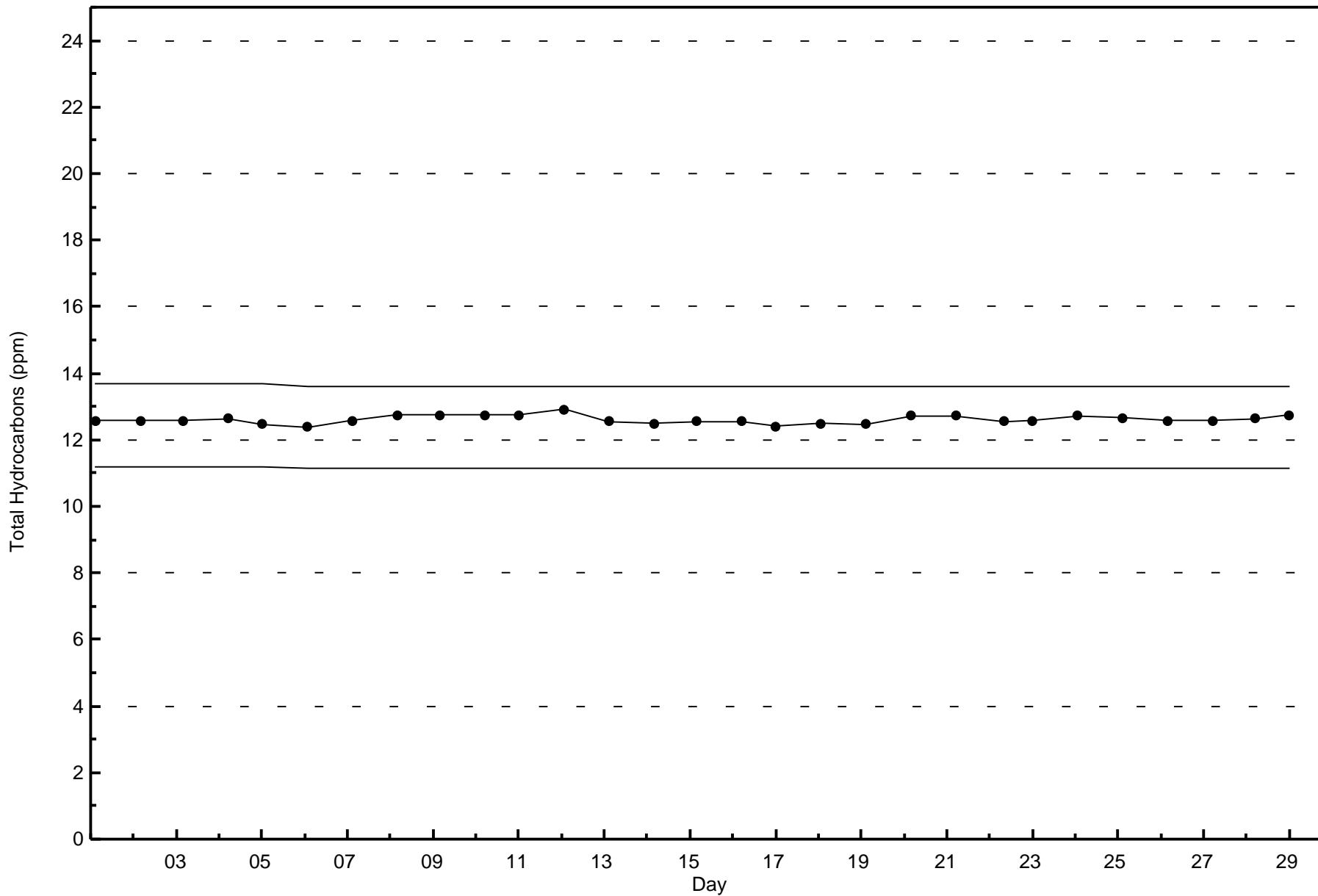
Total Hydrocarbons (THC) - ppm

Mannix (AMS 5)



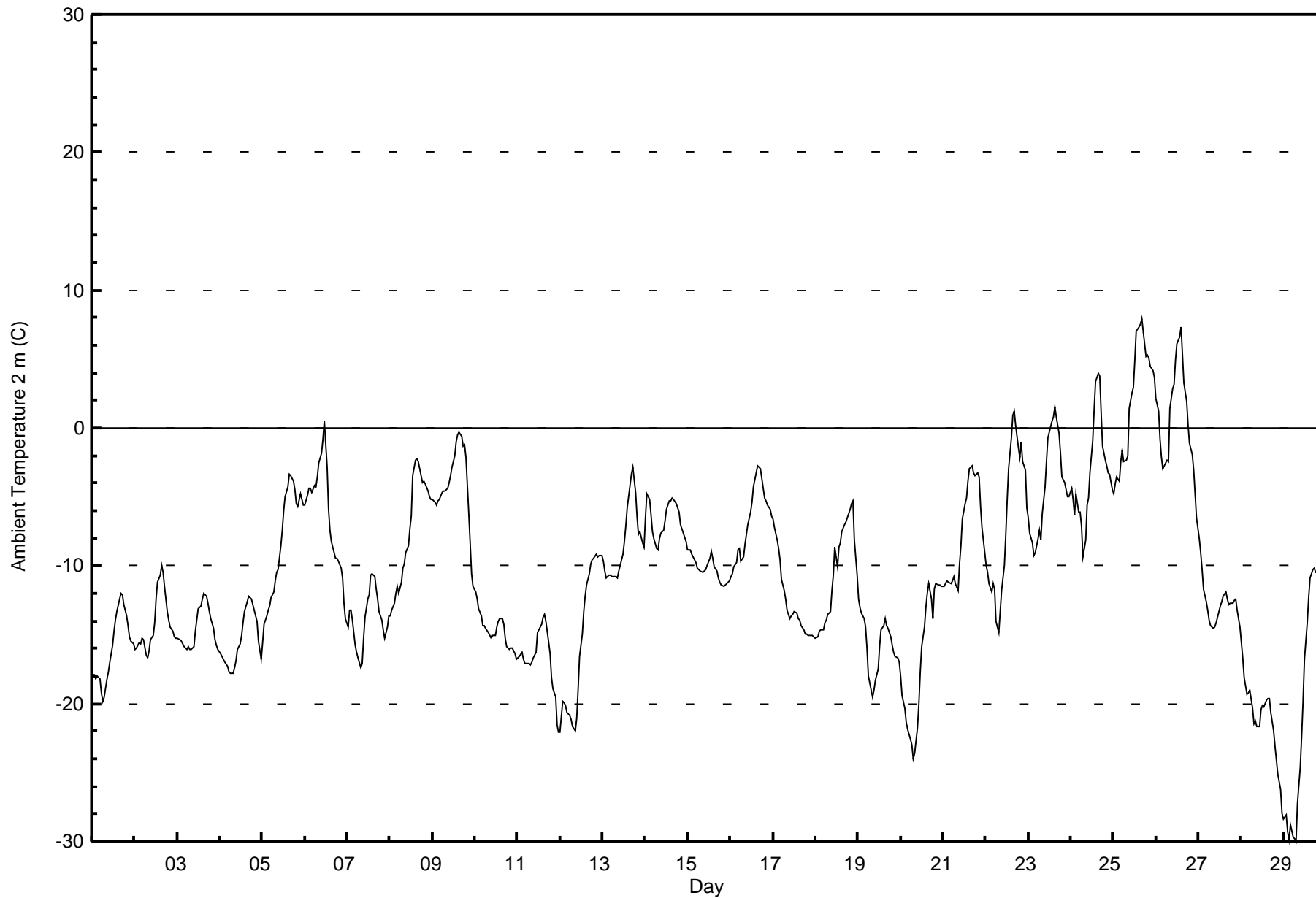
Total Number of Valid Hours: 653







Maximum Value: 8.0 C on Feb 25 17:00		Maximum Daily Average: 2.1 C on Feb 25		Hours in Service: 696																							
Minimum Value: -30.0 C on Feb 29 08:00		Minimum Daily Average: -21.0 C on Feb 28		Hours of Data: 696																							
Maximum Diurnal Average: -7.1 C at hour 16		Minimum Diurnal Average: -13.6 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -10.57 C		Percentiles: P ₁ = -28.2 P ₁₀ = -18.0 Q ₁ = -15.0 Median = -11.2 Q ₃ = -5.6 P ₉₀ = -2.4 P ₉₉ = 6.4		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	-17.9	-17.9	-18.2	-18.0	-18.2	-19.2	-19.8	-19.5	-18.2	-17.7	-16.9	-15.7	-14.7	-13.9	-13.3	-12.4	-12.0	-12.1	-12.8	-13.6	-14.3	-15.2	-15.4	-15.6	-16.0	-12.0	
2-Feb	-16.1	-15.9	-15.6	-15.7	-15.3	-15.3	-16.4	-16.7	-16.2	-15.4	-15.0	-14.1	-12.4	-11.2	-10.7	-10.0	-10.5	-11.5	-13.3	-14.0	-14.4	-14.8	-15.1	-15.3	-14.2	-10.0	
3-Feb	-15.3	-15.4	-15.5	-15.6	-15.9	-16.0	-15.9	-16.1	-16.1	-15.8	-14.8	-13.9	-13.1	-12.9	-12.4	-12.0	-12.2	-12.8	-13.3	-13.9	-14.6	-15.4	-15.8	-16.1	-14.6	-12.0	
4-Feb	-16.3	-16.6	-16.8	-17.0	-17.3	-17.6	-17.8	-17.8	-17.4	-16.9	-16.1	-15.6	-15.0	-14.2	-13.3	-12.6	-12.2	-12.3	-12.4	-13.3	-13.6	-14.0	-15.4	-16.8	-15.3	-12.2	
5-Feb	-15.5	-14.2	-13.7	-13.3	-12.9	-12.3	-11.9	-11.1	-10.4	-10.3	-8.6	-7.4	-6.0	-5.0	-4.3	-3.4	-3.5	-3.8	-4.4	-5.4	-5.7	-4.8	-5.2	-5.6	-8.3	-3.4	
6-Feb	-5.6	-4.8	-4.3	-4.3	-4.7	-4.1	-4.2	-3.5	-2.5	-1.8	-0.8	0.5	-2.9	-5.9	-7.5	-8.2	-9.1	-9.4	-9.5	-9.7	-10.2	-10.9	-12.7	-13.9	-6.3	0.5	
7-Feb	-14.5	-13.2	-13.2	-13.9	-15.7	-16.3	-16.7	-17.4	-17.1	-15.3	-13.7	-12.4	-12.1	-10.7	-10.6	-10.8	-11.7	-12.4	-13.3	-13.9	-14.7	-15.2	-14.5	-13.7	-13.9	-10.6	
8-Feb	-13.6	-13.2	-12.7	-12.0	-11.5	-12.0	-11.2	-10.2	-9.9	-9.1	-8.5	-7.3	-6.4	-3.5	-2.3	-2.2	-2.4	-3.5	-3.9	-3.9	-4.1	-4.6	-4.9	-5.1	-7.4	-2.2	
9-Feb	-5.2	-5.4	-5.6	-5.3	-5.2	-4.7	-4.6	-4.6	-4.4	-4.0	-3.5	-2.9	-2.1	-1.0	-0.5	-0.3	-0.6	-1.3	-1.2	-2.2	-6.2	-8.4	-10.5	-11.5	-4.2	-0.3	
10-Feb	-11.9	-12.4	-13.1	-13.7	-14.4	-14.4	-14.5	-14.8	-15.1	-15.2	-15.1	-15.0	-14.5	-14.1	-13.8	-13.8	-14.2	-15.3	-15.8	-16.1	-16.0	-16.0	-16.4	-16.8	-14.7	-11.9	
11-Feb	-16.7	-16.5	-16.3	-16.8	-17.1	-17.1	-17.1	-17.2	-17.0	-16.7	-16.2	-14.9	-14.6	-14.2	-13.8	-13.6	-14.0	-15.6	-16.4	-18.1	-18.9	-19.6	-21.5	-22.1	-16.7	-13.6	
12-Feb	-22.1	-19.8	-19.9	-20.2	-20.7	-20.8	-21.1	-21.6	-21.9	-21.0	-19.0	-16.6	-15.0	-13.3	-12.2	-11.3	-10.5	-9.8	-9.6	-9.5	-9.2	-9.4	-9.3	-9.2	-15.5	-9.2	
13-Feb	-9.6	-10.4	-10.9	-10.7	-10.7	-10.8	-10.8	-10.7	-10.9	-10.4	-10.0	-9.2	-8.2	-7.1	-5.8	-4.1	-3.3	-2.8	-4.7	-6.4	-7.8	-7.5	-8.3	-8.6	-8.3	-2.8	
14-Feb	-6.5	-4.8	-5.2	-6.3	-7.6	-8.1	-8.8	-8.8	-8.0	-7.7	-7.4	-6.7	-5.9	-5.3	-5.2	-5.1	-5.2	-5.5	-5.8	-6.1	-7.0	-7.6	-7.9	-8.3	-6.7	-4.8	
15-Feb	-8.8	-8.8	-9.2	-9.4	-9.8	-10.1	-10.3	-10.4	-10.5	-10.3	-10.2	-10.0	-9.4	-8.9	-9.4	-10.1	-10.3	-10.8	-11.2	-11.4	-11.5	-11.4	-11.3	-11.1	-10.2	-8.8	
16-Feb	-10.8	-10.5	-10.1	-9.8	-8.9	-8.7	-9.7	-9.3	-8.5	-7.7	-7.1	-6.1	-5.4	-4.3	-3.2	-2.8	-2.8	-3.0	-4.4	-5.1	-5.3	-5.6	-5.9	-6.4	-6.7	-2.8	
17-Feb	-6.6	-7.2	-8.1	-8.8	-9.6	-10.9	-11.8	-12.4	-13.3	-13.9	-13.6	-13.6	-13.4	-13.5	-13.9	-13.9	-14.4	-14.6	-14.9	-14.9	-15.0	-15.1	-15.1	-15.2	-12.6	-6.6	
18-Feb	-15.3	-15.2	-14.7	-14.6	-14.6	-14.2	-13.9	-13.6	-13.3	-11.8	-10.6	-8.6	-10.0	-8.7	-8.3	-7.5	-7.0	-6.8	-6.5	-5.9	-5.5	-5.3	-8.1	-10.6	-10.4	-5.3	
19-Feb	-12.4	-13.1	-13.4	-13.8	-14.5	-16.0	-18.0	-19.0	-19.5	-19.0	-18.3	-17.5	-15.8	-14.7	-14.4	-13.9	-14.3	-14.5	-15.1	-15.7	-16.3	-16.6	-16.7	-17.0	-15.8	-12.4	
20-Feb	-18.0	-19.4	-20.3	-21.3	-21.9	-22.6	-23.0	-24.0	-23.6	-21.8	-20.0	-17.7	-15.8	-14.4	-13.0	-12.0	-11.3	-12.4	-13.9	-11.7	-11.2	-11.3	-11.4	-11.5	-16.8	-11.2	
21-Feb	-11.5	-11.3	-11.1	-11.2	-11.3	-11.1	-10.8	-11.2	-11.7	-9.9	-8.5	-6.6	-5.5	-5.1	-3.9	-3.0	-2.8	-3.3	-3.4	-3.2	-3.6	-5.7	-7.2	-9.1	-7.6	-2.8	
22-Feb	-9.9	-10.4	-11.3	-11.9	-11.2	-11.7	-14.0	-14.9	-13.3	-11.8	-10.0	-7.7	-5.1	-2.9	-0.7	1.0	1.3	0.3	-1.4	-2.2	-1.0	-2.4	-3.0	-5.8	-6.7	1.3	
23-Feb	-6.5	-7.6	-8.4	-9.2	-9.1	-8.0	-7.5	-8.2	-6.2	-4.3	-2.4	-0.7	-0.3	0.6	0.8	1.5	0.8	-0.4	-1.8	-3.6	-4.0	-4.4	-5.0	-5.0	-4.1	1.5	
24-Feb	-4.4	-5.1	-6.3	-4.8	-6.1	-6.1	-7.1	-9.4	-8.1	-5.5	-5.0	-3.3	-0.9	1.3	3.4	3.9	3.7	1.1	-1.4	-2.4	-2.7	-3.2	-3.3	-4.5	-3.2	3.9	
25-Feb	-4.8	-4.1	-3.5	-3.9	-2.4	-1.6	-2.4	-2.4	-2.0	1.4	2.6	3.0	4.9	7.0	7.3	7.5	8.0	7.0	5.2	5.3	5.1	4.4	4.2	3.7	2.1	8.0	
26-Feb	2.2	1.3	-0.8	-2.1	-3.0	-2.5	-2.4	-2.4	1.4	2.8	3.1	4.9	6.1	6.6	7.3	5.3	3.3	1.9	0.2	-1.1	-1.9	-3.0	-4.8	-6.5	0.7	7.3	
27-Feb	-8.0	-9.0	-10.3	-11.7	-12.6	-13.2	-13.9	-14.3	-14.6	-14.5	-14.1	-13.3	-12.9	-12.6	-12.2	-11.9	-12.4	-12.8	-12.7	-12.7	-12.5	-12.4	-13.2	-14.4	-12.6	-8.0	
28-Feb	-15.6	-16.7	-18.1	-19.3	-19.2	-19.0	-20.4	-21.4	-21.2	-21.7	-21.6	-20.5	-20.2	-20.2	-19.8	-19.6	-19.6	-20.7	-22.0	-23.1	-24.1	-25.1	-26.3	-27.9	-21.0	-15.6	
29-Feb	-28.3	-28.1	-29.3	-29.9	-28.8	-29.7	-29.8	-30.0	-27.3	-24.7	-22.4	-19.8	-16.8	-14.2	-12.3	-10.8	-10.3	-10.2	-10.5	-10.4	-10.1	-10.2	-10.6	-10.7	-19.4	-10.1	
		-11.9	-11.9	-12.3	-12.6	-12.8	-12.9	-13.3	-13.6	-13.0	-12.1	-11.2	-10.0	-9.1	-8.2	-7.5	-7.1	-7.2	-7.8	-8.6	-9.1	-9.5	-10.0	-10.7	-11.4	Diurnal Average	
		2.2	1.3	-0.8	-2.1	-2.4	-1.6	-2.4	-2.4	1.4	2.8	3.1	4.9	6.1	7.0	7.3	7.5	8.0	7.0	5.2	5.3	5.1	4.4	4.2	3.7	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2 m (AT2m) - C
Mannix - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	45	6.47	6.47
-20 - 0	610	87.64	94.11
0 - 10	41	5.89	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Summary of Hour Averages

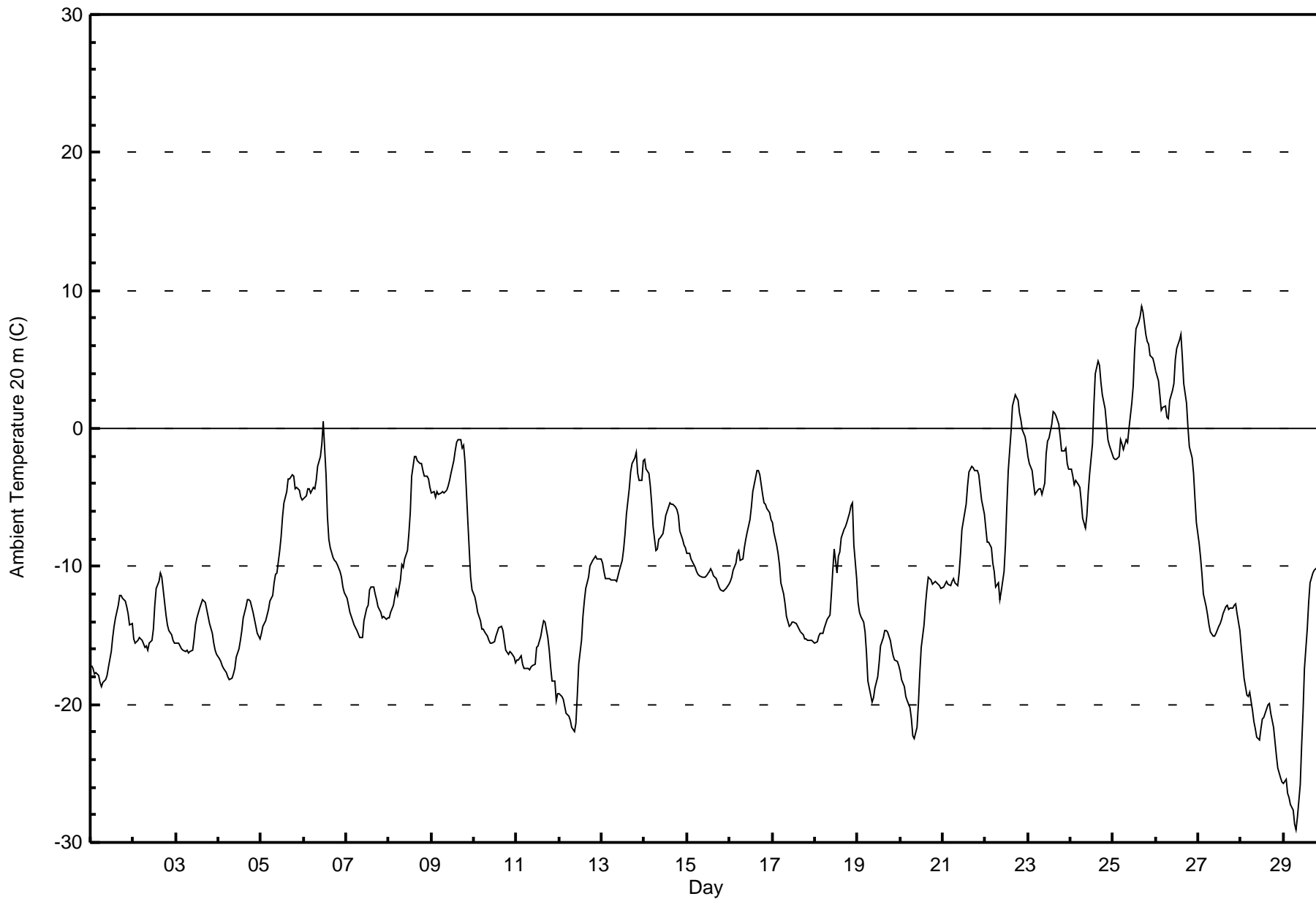
Mannix - February 2016

Maximum Value: 8.8 C on Feb 25 17:00 Maximum Daily Average: 3.0 C on Feb 25																						Hours in Service:	696			
Minimum Value: -29.0 C on Feb 29 08:00 Minimum Daily Average: -21.1 C on Feb 28																						Hours of Data:	696			
Maximum Diurnal Average: -7.3 C at hour 17 Minimum Diurnal Average: -12.9 C at hour 9																						Hours of Missing Data:	0			
Monthly Average: -10.29 C Percentiles: P ₁ = -25.9 P ₁₀ = -18.0 Q ₁ = -15.1 Median = -11.2 Q ₃ = -4.8 P ₉₀ = -1.1 P ₉₉ = 6.8																						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	-17.2	-17.4	-17.8	-17.7	-17.9	-18.4	-18.7	-18.5	-18.2	-17.9	-17.3	-16.2	-15.1	-14.3	-13.7	-12.8	-12.2	-12.1	-12.3	-12.5	-12.9	-13.4	-14.3	-14.1	-15.5	-12.1
2-Feb	-15.3	-15.6	-15.3	-15.1	-15.3	-15.4	-15.9	-15.8	-16.0	-15.6	-15.4	-14.5	-12.8	-11.6	-11.0	-10.5	-10.7	-11.6	-13.6	-14.2	-14.6	-15.0	-15.4	-15.6	-14.2	-10.5
3-Feb	-15.5	-15.6	-15.8	-15.9	-16.1	-16.2	-16.1	-16.3	-16.1	-16.1	-15.2	-14.2	-13.7	-13.1	-12.7	-12.4	-12.6	-13.1	-13.6	-14.1	-14.9	-15.6	-16.1	-16.3	-14.9	-12.4
4-Feb	-16.6	-16.9	-17.2	-17.3	-17.7	-18.0	-18.2	-18.1	-17.8	-17.3	-16.5	-15.9	-15.4	-14.6	-13.7	-12.9	-12.4	-12.4	-12.5	-13.4	-13.8	-14.3	-14.9	-15.3	-15.6	-12.4
5-Feb	-14.9	-14.4	-13.9	-13.5	-13.1	-12.5	-12.1	-11.2	-10.6	-10.5	-8.9	-7.8	-6.4	-5.4	-4.6	-3.6	-3.6	-3.4	-3.4	-4.3	-4.3	-4.5	-5.0	-5.2	-8.2	-3.4
6-Feb	-5.1	-4.9	-4.4	-4.4	-4.7	-4.3	-4.4	-3.7	-2.8	-2.1	-1.1	0.5	-3.4	-6.4	-8.0	-8.7	-9.4	-9.6	-9.7	-9.9	-10.4	-10.8	-11.5	-11.8	-6.3	0.5
7-Feb	-12.3	-12.8	-13.3	-13.6	-14.3	-14.4	-14.7	-15.2	-15.2	-15.1	-13.9	-13.0	-12.8	-11.7	-11.5	-11.5	-12.0	-12.4	-13.0	-13.3	-13.7	-13.6	-13.9	-13.7	-13.4	-11.5
8-Feb	-13.7	-13.4	-12.9	-12.2	-11.7	-12.1	-10.9	-9.9	-10.1	-9.5	-8.9	-7.6	-6.2	-3.4	-2.0	-2.0	-2.3	-2.5	-2.5	-3.1	-3.5	-3.4	-3.7	-4.3	-7.2	-2.0
9-Feb	-4.7	-4.5	-4.9	-4.6	-4.8	-4.6	-4.6	-4.7	-4.5	-4.2	-3.7	-3.2	-2.4	-1.6	-1.1	-0.8	-0.8	-1.4	-1.3	-2.5	-6.7	-8.8	-10.8	-11.7	-4.3	-0.8
10-Feb	-12.2	-12.7	-13.3	-13.9	-14.6	-14.6	-14.8	-15.1	-15.4	-15.6	-15.6	-15.5	-15.1	-14.7	-14.4	-14.4	-14.6	-15.3	-16.0	-16.4	-16.2	-16.3	-16.6	-17.0	-15.0	-12.2
11-Feb	-16.8	-16.7	-16.5	-17.1	-17.4	-17.4	-17.4	-17.5	-17.3	-17.2	-17.1	-15.9	-15.7	-15.0	-14.4	-14.0	-14.0	-15.2	-16.0	-17.3	-18.3	-18.3	-19.7	-19.2	-16.7	-14.0
12-Feb	-19.2	-19.4	-19.6	-20.2	-20.7	-20.8	-21.2	-21.7	-22.0	-21.3	-19.3	-17.1	-15.4	-13.7	-12.5	-11.6	-10.7	-10.0	-9.8	-9.6	-9.3	-9.5	-9.5	-9.4	-15.6	-9.3
13-Feb	-9.8	-10.4	-10.9	-10.9	-10.9	-11.0	-11.0	-10.9	-11.1	-10.7	-10.3	-9.5	-8.7	-7.6	-6.2	-4.4	-3.2	-2.6	-2.1	-1.7	-3.2	-3.8	-3.8	-2.3	-7.4	-1.7
14-Feb	-2.3	-2.9	-3.2	-4.2	-5.5	-7.1	-8.8	-8.8	-8.0	-7.9	-7.7	-7.0	-6.3	-5.7	-5.4	-5.5	-5.5	-5.7	-5.9	-6.3	-7.4	-8.0	-8.4	-8.7	-6.3	-2.3
15-Feb	-9.1	-9.1	-9.4	-9.6	-10.0	-10.4	-10.5	-10.7	-10.8	-10.8	-10.8	-10.7	-10.3	-10.1	-10.3	-10.7	-10.9	-11.2	-11.5	-11.7	-11.8	-11.7	-11.6	-11.3	-10.6	-9.1
16-Feb	-11.1	-10.8	-10.3	-9.8	-9.0	-8.8	-9.6	-9.4	-8.7	-8.1	-7.5	-6.6	-5.7	-4.6	-3.6	-3.1	-3.1	-3.3	-4.8	-5.4	-5.5	-5.8	-6.1	-6.6	-7.0	-3.1
17-Feb	-6.8	-7.5	-8.4	-9.1	-9.9	-11.2	-12.0	-12.7	-13.6	-14.3	-14.2	-14.1	-14.1	-14.4	-14.5	-14.7	-14.9	-15.3	-15.3	-15.4	-15.4	-15.4	-15.5	-15.5	-13.0	-6.8
18-Feb	-15.5	-15.4	-15.0	-14.9	-14.8	-14.4	-14.2	-13.8	-13.6	-12.0	-10.2	-8.8	-10.5	-9.3	-9.0	-8.0	-7.3	-7.1	-6.8	-6.1	-5.6	-5.4	-8.5	-10.9	-10.7	-5.4
19-Feb	-12.6	-13.3	-13.6	-14.0	-14.7	-16.3	-18.3	-19.3	-19.8	-19.5	-18.8	-18.0	-17.0	-15.8	-15.2	-14.6	-14.6	-14.8	-15.4	-16.0	-16.5	-16.8	-16.9	-17.2	-16.2	-12.6
20-Feb	-17.6	-18.2	-18.7	-19.4	-19.7	-20.2	-21.0	-22.3	-22.4	-21.7	-19.9	-17.7	-15.9	-14.2	-12.8	-11.7	-10.8	-11.0	-11.3	-11.2	-11.1	-11.3	-11.4	-11.6	-16.0	-10.8
21-Feb	-11.5	-11.3	-11.1	-11.3	-11.4	-11.1	-10.9	-11.2	-11.4	-10.5	-9.1	-7.4	-6.1	-5.5	-4.2	-3.2	-2.8	-2.8	-3.0	-3.1	-3.3	-4.3	-5.1	-6.2	-7.4	-2.8
22-Feb	-7.2	-8.3	-8.2	-8.6	-9.8	-10.4	-11.5	-11.2	-12.4	-11.8	-10.4	-8.4	-5.5	-3.0	-0.2	1.6	2.0	2.4	2.1	1.1	0.7	-0.1	-0.6	-1.2	-5.0	2.4
23-Feb	-2.0	-2.6	-3.1	-3.9	-4.7	-4.5	-4.4	-4.3	-4.8	-4.0	-1.8	-0.9	-0.7	0.3	1.3	1.2	0.9	0.3	-0.6	-1.6	-1.7	-1.4	-2.5	-2.9	-2.0	1.3
24-Feb	-3.0	-3.4	-4.1	-3.7	-4.0	-4.2	-5.3	-6.5	-7.2	-6.3	-4.6	-3.3	-1.1	1.7	4.0	4.8	4.6	3.3	2.4	1.4	0.4	-0.8	-1.2	-1.8	-1.6	4.8
25-Feb	-2.1	-2.3	-2.2	-2.0	-0.9	-1.1	-1.5	-0.8	-1.0	0.0	1.8	3.0	5.6	7.2	7.7	8.1	8.8	8.4	6.9	6.3	6.1	5.3	5.0	4.7	3.0	8.8
26-Feb	4.2	3.4	2.4	1.3	1.5	1.6	0.8	0.7	2.0	2.8	3.3	4.9	5.8	6.4	6.8	5.2	3.2	1.8	0.1	-1.3	-2.1	-3.3	-5.1	-6.8	1.6	6.8
27-Feb	-8.3	-9.3	-10.6	-12.0	-12.9	-13.6	-14.2	-14.7	-15.0	-15.1	-14.8	-14.4	-14.1	-13.8	-13.4	-12.9	-12.8	-13.1	-13.0	-13.0	-12.8	-12.8	-13.5	-14.7	-13.1	-8.3
28-Feb	-15.9	-17.0	-18.1	-19.3	-19.4	-19.2	-20.4	-21.3	-21.8	-22.4	-22.5	-21.8	-21.0	-20.9	-20.3	-20.0	-20.0	-20.6	-21.6	-22.7	-23.7	-24.6	-25.4	-25.7	-21.1	-15.9
29-Feb	-25.7	-25.4	-26.4	-26.7	-27.3	-27.6	-28.7	-29.0	-28.2	-25.8	-23.0	-20.5	-17.4	-14.5	-12.6	-11.2	-10.5	-10.2	-10.2	-10.1	-10.1	-10.3	-10.7	-10.8	-18.9	-10.1
																						Diurnal Average				
																						Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Mannix - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C
Mannix - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	40	5.75	5.75
-20 - 0	602	86.49	92.24
0 - 10	54	7.76	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

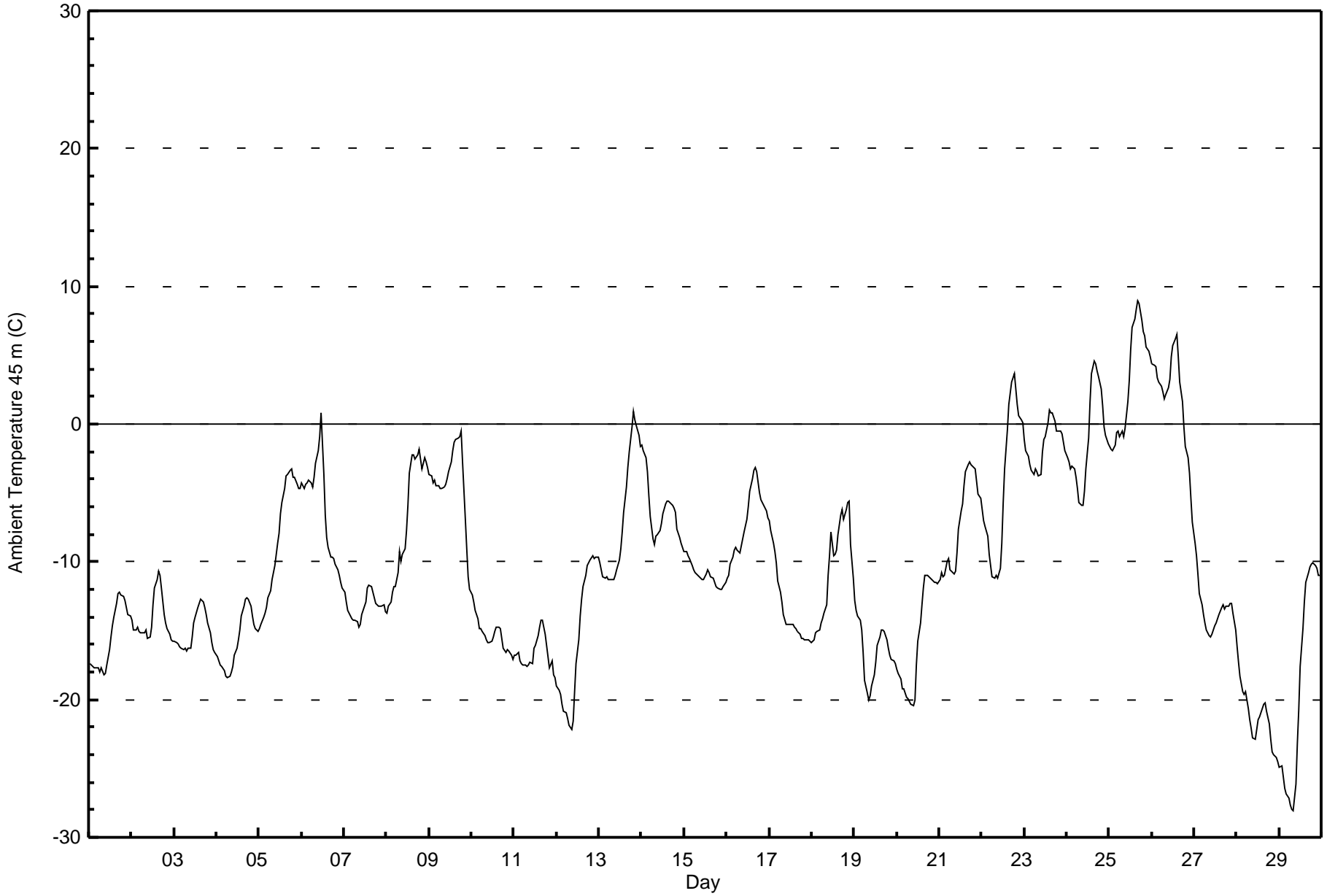
Total Number of Hours: 696



Summary of Hour Averages

Mannix - February 2016

Maximum Value: 9.0 C on Feb 25 17:00		Maximum Daily Average: 3.2 C on Feb 25		Hours in Service: 696																						
Minimum Value: -28.1 C on Feb 29 09:00		Minimum Daily Average: -21.2 C on Feb 28		Hours of Data: 696																						
Maximum Diurnal Average: -7.5 C at hour 17		Minimum Diurnal Average: -12.7 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -10.24 C		Percentiles: P ₁ = -26.1 P ₁₀ = -18.1 Q ₁ = -15.1 Median = -11.2 Q ₃ = -4.6 P ₉₀ = -0.6 P ₉₉ = 6.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-17.4	-17.5	-17.6	-17.7	-17.7	-17.7	-18.0	-17.7	-18.2	-18.1	-17.5	-16.4	-15.4	-14.6	-14.0	-13.0	-12.4	-12.3	-12.4	-12.5	-12.8	-13.4	-13.8	-14.0	-15.5	-12.3
2-Feb	-14.3	-14.9	-14.9	-14.7	-15.1	-15.1	-15.1	-15.1	-15.0	-15.6	-15.5	-14.8	-13.1	-11.9	-11.3	-10.7	-11.0	-11.9	-13.8	-14.4	-14.9	-15.2	-15.6	-15.8	-14.2	-10.7
3-Feb	-15.8	-15.9	-16.0	-16.2	-16.3	-16.4	-16.3	-16.5	-16.3	-16.3	-15.5	-14.4	-14.1	-13.3	-13.0	-12.7	-12.9	-13.3	-13.8	-14.4	-15.1	-15.9	-16.4	-16.6	-15.1	-12.7
4-Feb	-16.9	-17.2	-17.5	-17.6	-17.9	-18.3	-18.4	-18.3	-18.0	-17.6	-16.8	-16.2	-15.6	-14.9	-13.9	-13.2	-12.7	-12.6	-12.7	-13.2	-14.0	-14.5	-14.8	-15.1	-15.7	-12.6
5-Feb	-14.9	-14.5	-14.1	-13.8	-13.3	-12.6	-12.1	-11.3	-10.7	-10.2	-8.6	-7.9	-6.5	-5.7	-4.6	-3.8	-3.6	-3.3	-3.2	-3.8	-3.8	-4.4	-4.7	-4.6	-8.2	-3.2
6-Feb	-4.3	-4.7	-4.4	-4.3	-4.1	-4.3	-4.6	-3.9	-2.8	-1.9	-0.9	0.8	-3.6	-6.6	-8.3	-8.9	-9.6	-9.7	-9.8	-10.2	-10.6	-11.0	-11.5	-11.9	-6.3	0.8
7-Feb	-12.2	-12.9	-13.5	-13.8	-14.2	-14.2	-14.2	-14.3	-14.8	-14.6	-13.8	-13.2	-13.0	-11.9	-11.7	-11.8	-12.2	-12.6	-13.0	-13.2	-13.2	-13.3	-13.1	-13.6	-13.3	-11.7
8-Feb	-13.8	-13.3	-12.9	-12.2	-11.8	-11.8	-10.7	-9.3	-9.9	-9.5	-9.1	-7.8	-5.9	-3.5	-2.3	-2.3	-2.5	-2.2	-1.8	-2.6	-3.3	-2.4	-2.7	-3.2	-6.9	-1.8
9-Feb	-3.7	-3.8	-4.3	-4.1	-4.5	-4.5	-4.7	-4.7	-4.6	-4.4	-4.0	-3.5	-2.7	-1.9	-1.3	-1.1	-1.0	-0.9	-0.5	-2.7	-6.9	-9.1	-11.1	-12.0	-4.2	-0.5
10-Feb	-12.5	-12.9	-13.6	-14.2	-14.9	-14.9	-15.1	-15.4	-15.7	-15.9	-15.9	-15.8	-15.4	-15.1	-14.8	-14.7	-14.9	-15.5	-16.3	-16.6	-16.4	-16.5	-16.7	-17.1	-15.3	-12.5
11-Feb	-16.8	-16.8	-16.6	-17.2	-17.3	-17.5	-17.5	-17.6	-17.5	-17.3	-17.4	-16.3	-16.0	-15.3	-14.8	-14.3	-14.2	-15.2	-16.1	-16.9	-17.7	-17.2	-18.2	-18.4	-16.7	-14.2
12-Feb	-19.0	-19.3	-19.6	-20.4	-20.8	-21.0	-21.4	-21.9	-22.2	-21.5	-19.5	-17.3	-15.7	-14.0	-12.8	-11.8	-11.0	-10.2	-10.0	-9.9	-9.5	-9.7	-9.7	-9.7	-15.7	-9.5
13-Feb	-10.0	-10.6	-11.1	-11.1	-11.1	-11.3	-11.3	-11.2	-11.3	-11.0	-10.5	-9.8	-9.0	-7.9	-6.4	-4.5	-3.2	-2.1	-0.2	0.9	0.3	-0.1	-0.8	-1.6	-6.9	0.9
14-Feb	-1.6	-1.9	-2.4	-3.5	-5.1	-6.7	-8.4	-8.7	-8.1	-8.0	-7.8	-7.2	-6.5	-5.8	-5.6	-5.7	-5.9	-6.1	-6.5	-7.6	-8.3	-8.7	-9.0	-6.3	-1.6	
15-Feb	-9.3	-9.2	-9.6	-9.8	-10.2	-10.6	-10.8	-10.9	-11.1	-11.2	-11.3	-11.3	-10.9	-10.6	-10.8	-11.1	-11.2	-11.5	-11.8	-11.9	-12.0	-12.0	-11.8	-11.5	-10.9	-9.2
16-Feb	-11.1	-10.9	-10.2	-9.6	-9.2	-8.9	-9.2	-9.4	-8.8	-8.4	-7.8	-6.9	-6.0	-4.9	-3.9	-3.3	-3.2	-3.5	-5.0	-5.5	-5.7	-5.9	-6.3	-6.8	-7.1	-3.2
17-Feb	-7.0	-7.7	-8.7	-9.3	-10.1	-11.4	-12.2	-12.9	-13.8	-14.6	-14.5	-14.5	-14.6	-14.8	-14.8	-15.1	-15.2	-15.6	-15.6	-15.7	-15.7	-15.7	-15.7	-15.7	-13.3	-7.0
18-Feb	-15.8	-15.7	-15.1	-15.0	-15.0	-14.4	-14.1	-13.8	-13.1	-11.0	-9.6	-7.9	-9.6	-9.4	-9.2	-8.0	-6.6	-6.2	-6.9	-6.2	-5.7	-5.5	-8.7	-11.2	-10.6	-5.5
19-Feb	-12.9	-13.5	-13.9	-14.3	-15.0	-16.6	-18.6	-19.6	-20.0	-19.7	-19.0	-18.2	-17.3	-16.1	-15.5	-14.9	-14.9	-15.1	-15.7	-16.3	-16.8	-17.1	-17.2	-17.4	-16.5	-12.9
20-Feb	-17.8	-18.1	-18.5	-19.2	-19.2	-19.9	-19.9	-20.2	-20.3	-20.4	-20.0	-17.5	-15.7	-14.5	-13.1	-11.9	-11.0	-11.0	-11.1	-11.2	-11.3	-11.5	-11.5	-11.6	-15.7	-11.0
21-Feb	-11.3	-10.8	-11.1	-11.0	-10.0	-9.8	-10.6	-10.7	-10.9	-10.6	-9.4	-7.6	-6.3	-5.8	-4.5	-3.4	-2.9	-2.8	-2.9	-3.1	-3.3	-4.1	-5.0	-5.4	-7.2	-2.8
22-Feb	-6.2	-7.0	-7.4	-8.2	-9.5	-10.3	-11.1	-11.2	-11.0	-11.2	-10.5	-8.6	-5.7	-3.3	-0.4	1.4	2.2	3.1	3.6	2.6	1.5	0.7	0.3	0.1	-4.4	3.6
23-Feb	-1.1	-1.9	-2.3	-3.0	-3.4	-3.6	-3.3	-3.4	-3.8	-3.7	-2.0	-1.1	-0.9	0.1	1.0	0.9	0.8	0.2	-0.5	-0.5	-0.5	-0.7	-1.4	-2.0	-1.5	1.0
24-Feb	-2.4	-2.7	-3.2	-3.1	-3.3	-3.8	-4.7	-5.7	-5.8	-5.9	-4.9	-3.2	-1.0	1.7	3.7	4.6	4.4	3.9	3.4	2.5	1.3	-0.2	-0.8	-1.4	-1.1	4.6
25-Feb	-1.6	-1.8	-1.9	-1.5	-0.6	-0.5	-0.9	-0.5	-0.9	-0.3	1.6	3.2	5.4	7.1	7.6	8.3	9.0	8.8	7.5	6.7	6.4	5.6	5.2	4.8	3.2	9.0
26-Feb	4.4	4.2	4.2	3.3	3.0	2.7	2.3	1.9	2.2	2.7	3.3	4.9	5.6	6.2	6.6	4.9	3.0	1.6	-0.2	-1.6	-2.4	-3.6	-5.4	-7.1	2.0	6.6
27-Feb	-8.6	-9.6	-10.9	-12.3	-13.2	-13.8	-14.5	-15.0	-15.3	-15.4	-15.2	-14.7	-14.4	-14.1	-13.8	-13.3	-13.1	-13.4	-13.2	-13.2	-13.0	-13.0	-13.7	-15.0	-13.4	-8.6
28-Feb	-16.2	-17.2	-18.3	-19.5	-19.6	-19.4	-20.6	-21.5	-22.1	-22.7	-22.9	-22.2	-21.4	-21.3	-20.7	-20.3	-20.3	-20.8	-21.7	-22.9	-23.8	-24.0	-24.2	-24.5	-21.2	-16.2
29-Feb	-24.9	-24.8	-25.7	-26.4	-26.8	-27.1	-27.7	-28.0	-28.1	-26.2	-23.2	-20.7	-17.6	-14.9	-12.9	-11.5	-10.8	-10.4	-10.2	-10.1	-10.3	-10.5	-11.0	-11.0	-18.8	-10.1
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C
Mannix - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	42	6.03	6.03
-20 - 0	597	85.78	91.81
0 - 10	57	8.19	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

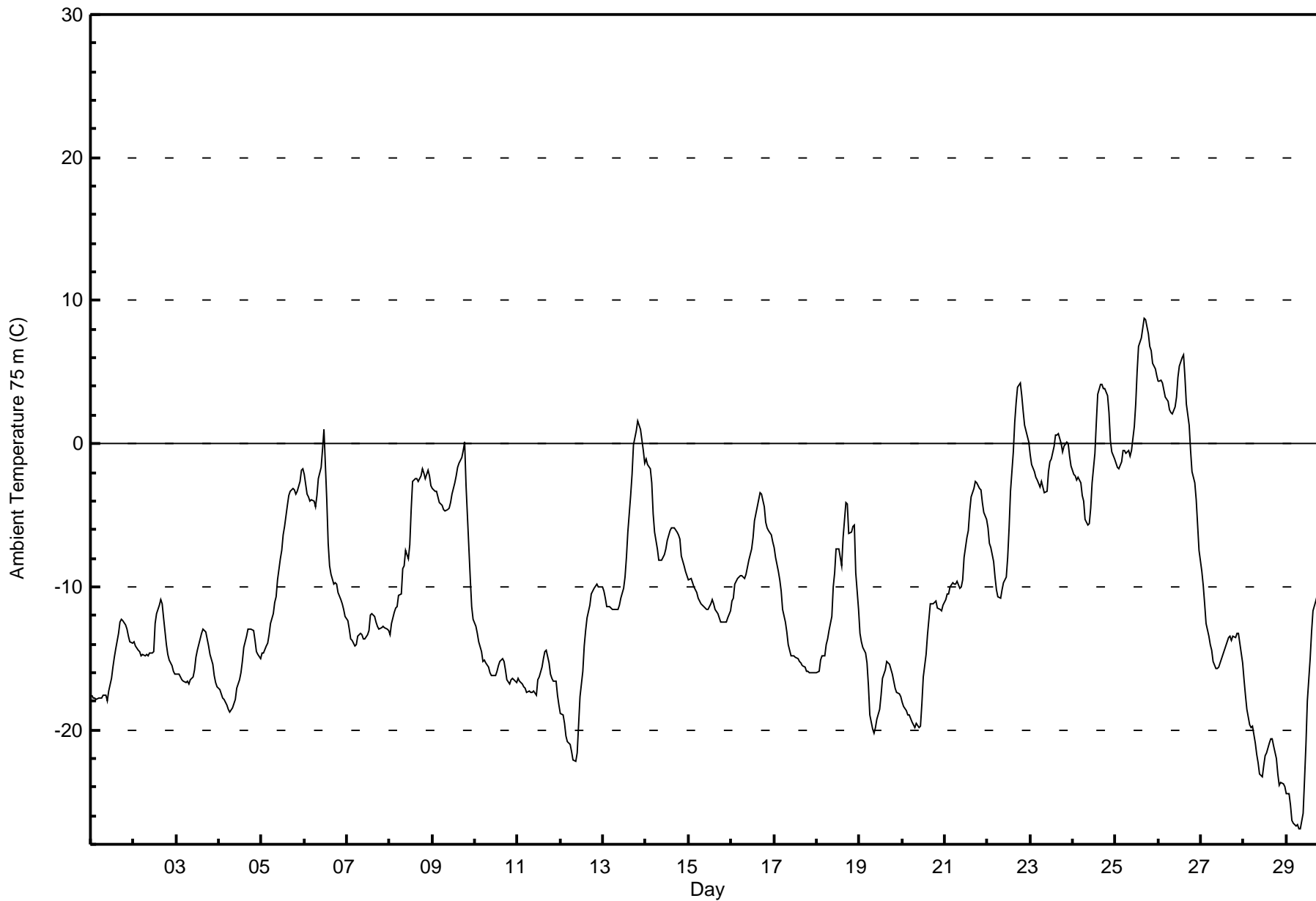
Total Number of Hours: 696



Summary of Hour Averages

Mannix - February 2016

Maximum Value: 8.8 C on Feb 25 17:00 Maximum Daily Average: 3.2 C on Feb 25																						Hours in Service:	696			
Minimum Value: -26.9 C on Feb 29 08:00 Minimum Daily Average: -21.4 C on Feb 28																						Hours of Data:	696			
Maximum Diurnal Average: -7.5 C at hour 17 Minimum Diurnal Average: -12.5 C at hour 9																						Hours of Missing Data:	0			
Monthly Average: -10.19 C Percentiles: P ₁ = -25.7 P ₁₀ = -17.9 Q ₁ = -15.3 Median = -11.4 Q ₃ = -4.3 P ₉₀ = -0.5 P ₉₉ = 6.8																						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	-17.6	-17.8	-17.7	-17.9	-17.8	-17.8	-17.8	-17.6	-17.6	-17.9	-17.3	-16.4	-15.6	-14.9	-14.3	-13.3	-12.5	-12.3	-12.4	-12.6	-12.9	-13.4	-13.9	-13.9	-15.6	-12.3
2-Feb	-13.8	-14.2	-14.4	-14.5	-14.9	-14.8	-14.9	-14.7	-14.8	-14.7	-14.6	-14.6	-12.5	-11.9	-11.3	-10.9	-11.2	-12.2	-14.1	-14.7	-15.1	-15.5	-16.0	-16.1	-14.0	-10.9
3-Feb	-16.1	-16.1	-16.3	-16.5	-16.6	-16.7	-16.6	-16.7	-16.5	-16.3	-15.8	-15.0	-14.4	-13.6	-13.2	-13.0	-13.2	-13.6	-14.2	-14.7	-15.5	-16.2	-16.7	-16.9	-15.4	-13.0
4-Feb	-17.2	-17.5	-17.8	-17.9	-18.2	-18.6	-18.8	-18.4	-18.2	-17.8	-17.1	-16.5	-16.0	-15.2	-14.2	-13.5	-13.0	-12.9	-12.9	-13.0	-13.8	-14.6	-14.7	-15.0	-16.0	-12.9
5-Feb	-14.6	-14.6	-14.1	-14.0	-13.4	-12.5	-11.8	-11.1	-10.7	-9.5	-8.0	-7.5	-6.4	-5.8	-4.3	-3.7	-3.3	-3.2	-3.2	-3.6	-3.3	-2.7	-1.9	-1.7	-7.7	-1.7
6-Feb	-2.1	-3.5	-3.8	-4.0	-3.9	-4.0	-4.5	-3.6	-2.4	-1.7	-0.4	1.0	-3.9	-6.9	-8.6	-9.2	-9.8	-9.7	-9.8	-10.4	-10.9	-11.2	-11.6	-12.1	-6.1	1.0
7-Feb	-12.3	-12.9	-13.7	-13.8	-14.2	-14.0	-13.5	-13.2	-13.4	-13.7	-13.6	-13.4	-13.1	-12.0	-11.9	-12.0	-12.5	-12.8	-13.0	-12.8	-12.8	-12.9	-13.0	-13.1	-13.1	-11.9
8-Feb	-13.4	-12.5	-11.8	-11.5	-11.4	-10.6	-10.5	-8.7	-8.5	-7.4	-8.0	-7.0	-4.6	-2.7	-2.4	-2.4	-2.7	-2.3	-1.8	-2.1	-2.4	-1.9	-2.2	-3.0	-6.3	-1.8
9-Feb	-3.2	-3.4	-3.4	-3.7	-4.1	-4.3	-4.6	-4.7	-4.6	-4.5	-4.1	-3.5	-2.8	-2.2	-1.6	-1.4	-1.0	-0.5	0.1	-3.0	-7.3	-9.4	-11.4	-12.3	-4.2	0.1
10-Feb	-12.8	-13.3	-13.9	-14.5	-15.2	-15.1	-15.4	-15.7	-16.0	-16.2	-16.2	-16.2	-15.9	-15.5	-15.3	-15.0	-15.2	-15.8	-16.5	-16.8	-16.5	-16.4	-16.6	-16.7	-15.5	-12.8
11-Feb	-16.4	-16.6	-16.7	-16.9	-17.1	-17.4	-17.3	-17.4	-17.4	-17.3	-17.6	-16.5	-16.3	-15.6	-15.0	-14.5	-14.5	-15.3	-16.1	-16.4	-16.6	-16.6	-17.6	-18.2	-16.6	-14.5
12-Feb	-18.9	-18.9	-19.6	-20.4	-20.8	-21.0	-21.5	-22.1	-22.2	-21.7	-19.7	-17.7	-15.9	-14.2	-13.1	-12.1	-11.3	-10.5	-10.3	-10.2	-9.8	-10.0	-10.0	-10.0	-15.9	-9.8
13-Feb	-10.3	-10.8	-11.3	-11.4	-11.4	-11.6	-11.6	-11.5	-11.6	-11.3	-10.8	-10.1	-9.3	-8.0	-6.1	-3.6	-2.2	-0.1	0.9	1.6	1.3	1.0	-0.5	-1.3	-6.7	1.6
14-Feb	-1.1	-1.5	-1.8	-2.8	-4.9	-6.2	-7.4	-8.2	-8.2	-8.1	-7.8	-7.4	-6.7	-6.1	-5.9	-5.9	-6.1	-6.3	-6.7	-7.9	-8.5	-8.9	-9.2	-6.2	-1.1	
15-Feb	-9.5	-9.4	-9.8	-10.0	-10.4	-10.8	-11.0	-11.2	-11.4	-11.5	-11.6	-11.5	-11.1	-10.9	-11.2	-11.6	-11.8	-12.2	-12.4	-12.5	-12.5	-12.4	-12.2	-11.7	-11.3	-9.4
16-Feb	-11.0	-10.8	-9.8	-9.4	-9.3	-9.2	-9.2	-9.4	-9.1	-8.6	-8.2	-7.4	-6.5	-5.4	-4.4	-3.9	-3.4	-3.5	-4.4	-5.5	-5.8	-6.1	-6.4	-6.9	-7.2	-3.4
17-Feb	-7.2	-8.0	-8.9	-9.5	-10.3	-11.6	-12.4	-13.1	-14.1	-14.8	-14.8	-14.9	-14.9	-15.1	-15.2	-15.3	-15.5	-15.6	-15.9	-15.9	-16.0	-16.0	-16.0	-16.0	-13.6	-7.2
18-Feb	-16.0	-15.9	-15.1	-14.8	-14.8	-14.0	-13.6	-13.1	-12.1	-10.0	-9.0	-7.4	-7.4	-7.9	-8.5	-6.5	-4.1	-4.2	-6.3	-6.2	-5.8	-5.7	-9.0	-11.5	-10.0	-4.1
19-Feb	-13.2	-13.9	-14.2	-14.6	-15.4	-16.9	-19.0	-19.9	-20.2	-19.9	-19.3	-18.6	-17.6	-16.4	-15.8	-15.2	-15.3	-15.4	-16.1	-16.6	-17.1	-17.4	-17.5	-17.7	-16.8	-13.2
20-Feb	-18.1	-18.4	-18.7	-19.0	-19.0	-19.4	-19.7	-19.8	-19.6	-19.9	-19.8	-18.2	-16.3	-14.7	-13.4	-12.2	-11.2	-11.2	-11.1	-11.0	-11.4	-11.6	-11.6	-11.3	-15.7	-11.0
21-Feb	-10.9	-10.5	-10.5	-10.0	-9.8	-9.8	-9.8	-9.6	-10.1	-10.1	-9.5	-7.9	-6.6	-6.1	-4.7	-3.7	-3.1	-2.7	-2.8	-3.1	-3.2	-4.1	-4.8	-5.3	-7.0	-2.7
22-Feb	-5.9	-7.0	-7.3	-8.3	-9.4	-10.2	-10.7	-10.8	-10.2	-9.7	-9.3	-8.0	-5.9	-3.3	-0.6	1.4	2.8	3.9	4.3	3.3	2.3	1.3	0.5	0.1	-4.0	4.3
23-Feb	-0.7	-1.4	-1.9	-2.4	-2.6	-3.0	-2.6	-3.0	-3.4	-3.4	-2.0	-1.2	-1.1	-0.2	0.6	0.6	0.7	0.0	-0.6	-0.2	0.1	0.0	-0.9	-1.6	-1.3	0.7
24-Feb	-2.1	-2.2	-2.5	-2.3	-2.8	-3.6	-4.0	-5.3	-5.7	-5.6	-4.6	-2.8	-0.7	1.5	3.4	4.1	4.2	3.9	3.8	3.4	2.2	0.2	-0.6	-1.1	-0.8	4.2
25-Feb	-1.4	-1.7	-1.8	-1.2	-0.5	-0.5	-0.7	-0.5	-0.9	-0.5	1.2	2.7	5.0	6.8	7.4	8.1	8.8	8.7	7.7	6.8	6.5	5.6	5.2	4.8	3.2	8.8
26-Feb	4.4	4.4	4.3	3.8	3.3	2.9	2.4	2.2	2.1	2.5	3.2	4.7	5.5	6.0	6.3	4.6	2.7	1.3	-0.5	-1.9	-2.7	-3.9	-5.7	-7.4	1.8	6.3
27-Feb	-8.9	-9.9	-11.2	-12.6	-13.4	-14.0	-14.4	-15.3	-15.7	-15.8	-15.6	-15.0	-14.7	-14.4	-14.1	-13.6	-13.5	-13.7	-13.5	-13.5	-13.2	-13.3	-14.0	-15.3	-13.7	-8.9
28-Feb	-16.5	-17.6	-18.6	-19.7	-19.9	-19.7	-20.9	-21.7	-22.3	-23.1	-23.2	-22.5	-21.8	-21.6	-21.0	-20.6	-20.6	-21.1	-22.0	-23.1	-23.9	-23.7	-23.8	-24.0	-21.4	-16.5
29-Feb	-24.4	-24.5	-25.3	-26.3	-26.5	-26.8	-26.6	-26.9	-26.9	-25.9	-23.5	-21.0	-17.9	-15.0	-13.2	-11.7	-11.0	-10.6	-10.2	-10.2	-10.4	-10.6	-11.1	-11.2	-18.6	-10.2
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 75 m (AT75m) - C
Mannix - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	38	5.46	5.46
-20 - 0	597	85.78	91.24
0 - 10	61	8.76	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

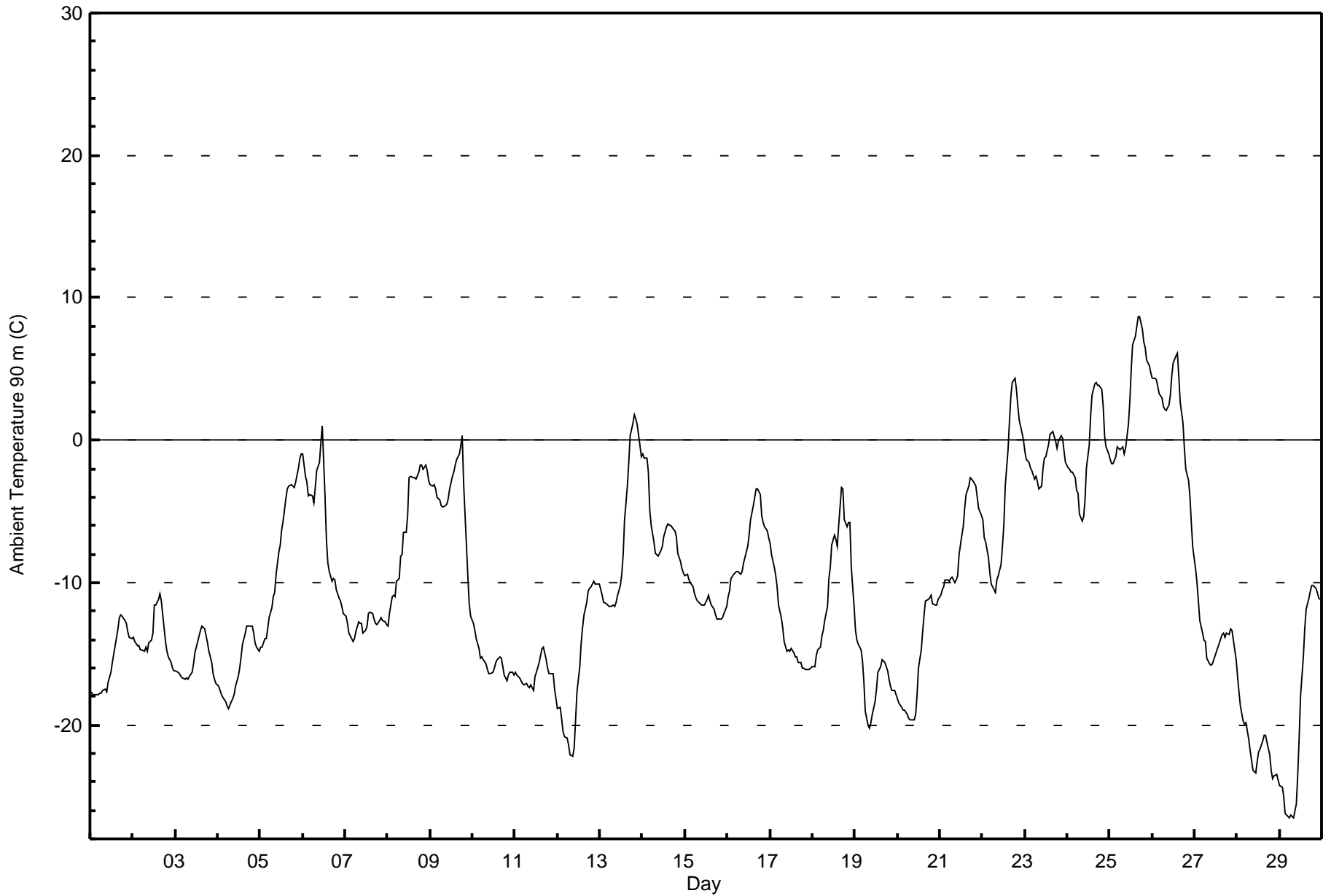
Total Number of Hours: 696



Summary of Hour Averages

Mannix - February 2016

Maximum Value: 8.7 C on Feb 25 17:00		Maximum Daily Average: 3.1 C on Feb 25		Hours in Service: 696																							
Minimum Value: -26.5 C on Feb 29 09:00		Minimum Daily Average: -21.4 C on Feb 28		Hours of Data: 696																							
Maximum Diurnal Average: -7.6 C at hour 17		Minimum Diurnal Average: -12.4 C at hour 9		Hours of Missing Data: 0																							
Monthly Average: -10.14 C		Percentiles: P ₁ = -25.4 P ₁₀ = -18.0 Q ₁ = -15.5 Median = -11.4 Q ₃ = -4.0 P ₉₀ = -0.5 P ₉₉ = 6.6		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	-17.7	-17.9	-17.8	-17.9	-17.9	-17.8	-17.8	-17.6	-17.5	-17.6	-17.0	-16.3	-15.6	-15.0	-14.4	-13.3	-12.4	-12.3	-12.4	-12.7	-12.9	-13.4	-13.8	-13.9	-15.5	-12.3	
2-Feb	-13.8	-14.1	-14.4	-14.4	-14.7	-14.7	-14.8	-14.5	-14.8	-14.2	-14.0	-13.5	-11.6	-11.6	-11.2	-10.8	-11.3	-12.2	-14.2	-14.8	-15.2	-15.6	-16.1	-16.2	-13.9	-10.8	
3-Feb	-16.2	-16.3	-16.4	-16.6	-16.7	-16.8	-16.7	-16.8	-16.6	-16.3	-15.7	-14.9	-14.5	-13.7	-13.4	-13.1	-13.3	-13.7	-14.3	-14.9	-15.6	-16.4	-16.8	-17.0	-15.5	-13.1	
4-Feb	-17.3	-17.6	-17.9	-18.0	-18.3	-18.7	-18.8	-18.4	-18.2	-17.9	-17.2	-16.6	-16.0	-15.3	-14.3	-13.6	-13.1	-13.0	-13.0	-13.1	-13.5	-14.3	-14.5	-14.9	-16.0	-13.0	
5-Feb	-14.5	-14.5	-14.0	-14.0	-13.3	-12.5	-11.8	-11.0	-10.7	-9.4	-7.9	-7.3	-6.3	-5.7	-4.1	-3.5	-3.3	-3.2	-3.2	-3.4	-3.0	-1.9	-1.3	-1.0	-7.5	-1.0	
6-Feb	-1.0	-2.5	-2.9	-3.9	-3.9	-3.9	-4.4	-3.3	-2.2	-1.6	-0.2	1.0	-4.0	-7.0	-8.7	-9.2	-9.9	-9.7	-9.8	-10.5	-11.1	-11.2	-11.6	-12.2	-6.0	1.0	
7-Feb	-12.3	-12.8	-13.6	-13.7	-14.1	-14.0	-13.5	-12.8	-12.9	-12.9	-13.6	-13.4	-13.1	-12.1	-12.0	-12.2	-12.6	-12.9	-12.9	-12.7	-12.5	-12.7	-12.7	-13.0	-12.9	-12.0	
8-Feb	-13.1	-12.1	-11.0	-10.9	-10.9	-9.9	-9.7	-8.1	-8.0	-6.5	-6.4	-5.3	-2.7	-2.5	-2.6	-2.7	-2.8	-2.3	-1.7	-1.8	-2.0	-1.8	-2.1	-2.8	-5.8	-1.7	
9-Feb	-3.1	-3.2	-3.2	-3.4	-4.0	-4.2	-4.6	-4.7	-4.6	-4.5	-4.1	-3.4	-2.6	-2.2	-1.7	-1.4	-1.0	-0.4	0.3	-3.0	-7.4	-9.5	-11.5	-12.4	-4.2	0.3	
10-Feb	-12.9	-13.4	-14.0	-14.6	-15.3	-15.2	-15.5	-15.8	-16.1	-16.4	-16.4	-16.3	-16.0	-15.6	-15.4	-15.2	-15.4	-15.9	-16.5	-16.9	-16.5	-16.3	-16.3	-16.5	-15.6	-12.9	
11-Feb	-16.3	-16.5	-16.7	-16.9	-17.0	-17.2	-17.1	-17.3	-17.4	-17.2	-17.6	-16.6	-16.3	-15.7	-15.1	-14.6	-14.5	-15.4	-16.0	-16.4	-16.4	-16.4	-17.5	-18.2	-16.5	-14.5	
12-Feb	-18.9	-18.8	-19.5	-20.4	-20.8	-20.9	-21.4	-22.1	-22.2	-21.6	-19.6	-17.6	-15.9	-14.2	-13.2	-12.2	-11.4	-10.6	-10.4	-10.3	-9.9	-10.1	-10.1	-10.1	-15.9	-9.9	
13-Feb	-10.5	-10.9	-11.4	-11.5	-11.6	-11.7	-11.7	-11.6	-11.6	-11.4	-10.9	-10.2	-9.4	-8.0	-5.6	-3.3	-1.6	0.4	1.2	1.8	1.5	1.1	-0.4	-1.2	-6.6	1.8	
14-Feb	-0.9	-1.2	-1.3	-2.3	-4.9	-6.0	-7.1	-7.9	-8.0	-8.1	-7.7	-7.4	-6.8	-6.1	-5.9	-6.0	-6.0	-6.2	-6.4	-6.7	-7.9	-8.6	-9.0	-9.3	-6.2	-0.9	
15-Feb	-9.5	-9.4	-9.8	-10.0	-10.3	-10.8	-11.1	-11.2	-11.5	-11.6	-11.6	-11.6	-11.2	-10.9	-11.2	-11.6	-11.9	-12.3	-12.5	-12.5	-12.6	-12.5	-12.2	-11.7	-11.3	-9.4	
16-Feb	-11.0	-10.6	-9.7	-9.4	-9.3	-9.3	-9.2	-9.4	-9.2	-8.6	-8.2	-7.5	-6.6	-5.6	-4.6	-4.0	-3.4	-3.4	-3.8	-5.3	-5.8	-6.1	-6.4	-6.8	-7.2	-3.4	
17-Feb	-7.2	-8.0	-9.0	-9.5	-10.3	-11.6	-12.5	-13.2	-14.1	-14.8	-14.7	-14.8	-14.6	-14.9	-15.2	-15.2	-15.6	-15.6	-16.0	-16.0	-16.1	-16.1	-16.1	-16.0	-13.6	-7.2	
18-Feb	-15.9	-15.9	-15.1	-14.7	-14.6	-13.8	-13.4	-12.6	-11.7	-9.8	-8.9	-7.3	-6.7	-7.0	-7.5	-6.0	-3.4	-3.4	-5.6	-6.1	-5.8	-5.7	-9.0	-11.6	-9.6	-3.4	
19-Feb	-13.4	-14.0	-14.3	-14.7	-15.5	-17.0	-19.1	-20.1	-20.2	-19.8	-19.2	-18.4	-17.5	-16.3	-15.9	-15.5	-15.5	-15.7	-16.2	-16.8	-17.3	-17.6	-17.6	-17.8	-16.9	-13.4	
20-Feb	-18.2	-18.5	-18.7	-18.9	-19.0	-19.2	-19.6	-19.6	-19.6	-19.6	-19.3	-17.9	-16.0	-14.8	-13.4	-12.3	-11.3	-11.2	-11.1	-10.9	-11.5	-11.5	-11.6	-11.2	-15.6	-10.9	
21-Feb	-10.9	-10.5	-10.3	-9.8	-9.8	-9.9	-9.8	-9.6	-10.0	-9.8	-9.5	-8.1	-6.7	-6.1	-4.8	-3.8	-3.2	-2.7	-2.7	-3.0	-3.2	-4.0	-4.8	-5.3	-7.0	-2.7	
22-Feb	-5.6	-6.9	-7.2	-8.3	-9.3	-10.2	-10.3	-10.7	-9.8	-9.5	-8.7	-7.5	-5.9	-3.2	-0.7	1.3	3.1	4.0	4.4	3.6	2.3	1.4	0.5	0.0	-3.9	4.4	
23-Feb	-0.8	-1.4	-1.6	-2.0	-2.2	-2.8	-2.5	-2.9	-3.4	-3.3	-2.0	-1.3	-1.1	-0.3	0.4	0.5	0.6	-0.1	-0.6	-0.1	0.3	0.1	-0.8	-1.5	-1.2	0.6	
24-Feb	-1.9	-2.0	-2.2	-2.2	-2.7	-3.5	-3.7	-5.2	-5.7	-5.4	-4.2	-2.0	-0.4	1.7	3.2	4.0	4.1	3.8	3.8	3.5	2.4	0.3	-0.5	-1.0	-0.7	4.1	
25-Feb	-1.3	-1.7	-1.7	-1.2	-0.5	-0.5	-0.7	-0.5	-0.9	-0.5	1.1	2.6	4.9	6.7	7.3	8.0	8.7	8.7	8.7	7.8	6.9	6.5	5.6	5.2	4.7	3.1	8.7
26-Feb	4.3	4.4	4.2	3.8	3.3	2.9	2.4	2.2	2.1	2.5	3.2	4.6	5.4	5.9	6.2	4.5	2.6	1.2	-0.6	-2.0	-2.9	-4.0	-5.8	-7.5	1.8	6.2	
27-Feb	-9.1	-10.0	-11.3	-12.6	-13.5	-14.1	-14.2	-15.3	-15.8	-15.8	-15.7	-15.1	-14.8	-14.5	-14.2	-13.7	-13.6	-13.8	-13.6	-13.6	-13.3	-13.3	-14.1	-15.4	-13.8	-9.1	
28-Feb	-16.6	-17.7	-18.6	-19.7	-20.0	-19.8	-21.0	-21.8	-22.5	-23.2	-23.4	-22.6	-21.9	-21.7	-21.1	-20.7	-20.7	-21.2	-22.1	-23.2	-23.7	-23.6	-23.4	-23.9	-21.4	-16.6	
29-Feb	-24.3	-24.3	-25.1	-26.3	-26.3	-26.5	-26.3	-26.4	-26.5	-25.5	-23.5	-20.9	-18.0	-15.2	-13.3	-11.9	-11.1	-10.6	-10.2	-10.2	-10.4	-10.7	-11.1	-11.2	-18.6	-10.2	
																								Diurnal Average			
																								Diurnal Maximum			





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 90 m (AT90m) - C
Mannix - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	39	5.60	5.60
-20 - 0	596	85.63	91.24
0 - 10	61	8.76	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

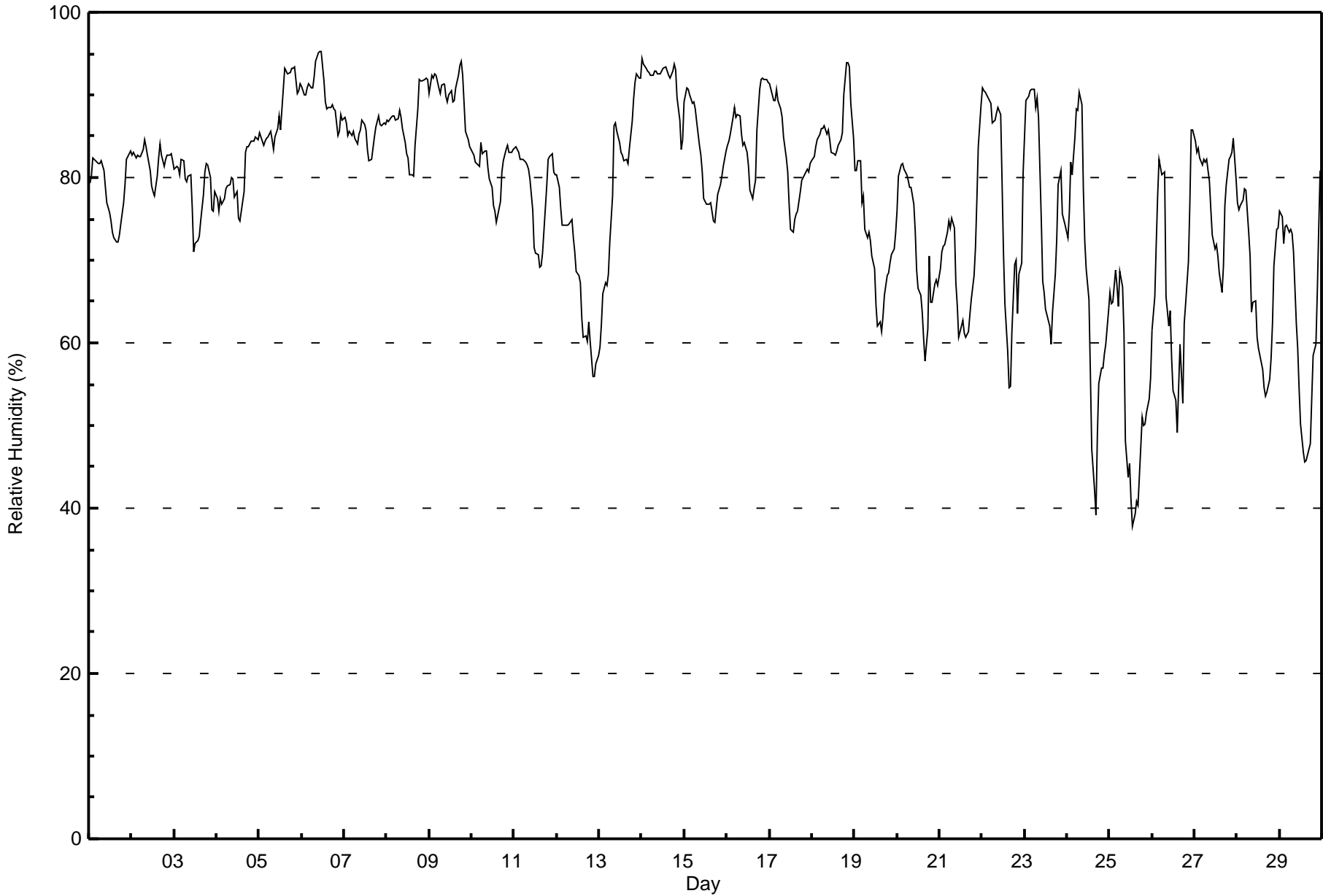
Mannix - February 2016

Maximum Value: 95 % on Feb 6 11:00 Maximum Daily Average: 91.8 % on Feb 14																		Hours in Service: 696 Hours of Data: 696								
Minimum Value: 38 % on Feb 25 14:00 Minimum Daily Average: 53.5 % on Feb 25 Maximum Diurnal Average: 82.7 % at hour 6 Minimum Diurnal Average: 70.3 % at hour 16 Monthly Average: 77.8 % Percentiles: P ₁ = 44 P ₁₀ = 61 Q ₁ = 72 Median = 81 O ₃ = 86 P ₉₀ = 91 P ₉₉ = 94																		Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	79	80	82	82	82	82	82	82	81	79	77	76	75	73	73	72	72	73	74	77	79	82	83	83	78.4	83
2-Feb	83	83	82	83	83	83	83	85	84	83	81	79	78	78	80	82	84	83	81	82	83	83	83	82	82.1	85
3-Feb	81	81	81	80	82	82	80	80	80	80	76	71	72	72	73	75	78	81	82	82	80	76	76	78	78.3	82
4-Feb	77	76	78	77	78	79	79	79	80	80	78	78	75	75	76	78	83	84	84	84	84	84	85	85	79.8	85
5-Feb	85	85	84	84	85	85	86	84	83	85	86	87	86	88	93	93	93	93	93	93	93	90	90	91	88.2	93
6-Feb	91	90	90	91	91	91	91	92	94	95	95	95	92	89	88	88	88	89	88	88	85	86	88	87	90.1	95
7-Feb	87	87	85	86	85	86	85	84	85	86	87	86	86	83	82	82	84	85	86	87	86	86	87	87	85.4	87
8-Feb	87	87	87	87	87	87	87	88	87	86	84	83	82	80	80	80	84	88	92	92	92	92	92	92	86.9	92
9-Feb	90	92	92	93	92	91	90	91	91	90	89	90	91	89	89	91	92	94	94	92	86	85	85	84	90.1	94
10-Feb	83	83	82	82	81	84	83	83	83	81	80	79	77	76	75	76	77	81	82	83	84	83	83	83	81.0	84
11-Feb	84	84	83	82	82	82	82	81	81	80	76	72	71	71	69	69	71	76	79	82	83	83	81	80	78.5	84
12-Feb	80	79	76	74	74	74	74	74	75	73	71	69	68	67	63	61	61	60	62	60	56	56	57	59	67.7	80
13-Feb	60	62	66	67	67	68	72	78	86	87	86	84	83	83	82	82	84	87	90	91	92	92	92	92	80.1	92
14-Feb	94	94	93	93	93	92	92	93	93	93	93	93	93	93	92	92	93	94	93	90	87	83	85	85	91.8	94
15-Feb	89	91	91	90	89	89	88	87	84	83	81	77	77	77	77	75	75	76	78	79	80	81	83	83	82.2	91
16-Feb	84	84	85	87	88	87	88	87	85	84	84	83	81	78	77	79	80	86	91	92	92	92	92	92	85.8	92
17-Feb	91	91	89	89	91	89	88	87	85	82	81	77	74	73	75	76	76	78	80	80	80	81	81	82	82.3	91
18-Feb	82	83	84	85	85	86	86	86	85	86	85	83	83	83	83	84	85	85	90	94	94	93	89	85	85.9	94
19-Feb	81	81	82	82	77	78	74	73	73	72	70	69	65	62	63	61	63	66	68	68	70	71	71	73	71.4	82
20-Feb	76	80	82	82	81	80	80	79	79	77	74	69	67	66	64	60	58	62	71	65	65	67	68	67	71.5	82
21-Feb	69	71	72	72	73	75	74	75	74	67	65	61	62	63	61	61	61	63	65	68	72	77	84	89	69.7	89
22-Feb	91	91	90	90	89	89	87	87	88	88	88	79	71	65	59	55	55	61	69	70	64	68	70	80	76.8	91
23-Feb	85	89	90	91	91	91	88	90	87	75	68	66	64	63	62	60	64	68	73	79	81	76	75	74	77.0	91
24-Feb	73	76	82	80	85	88	88	90	89	79	72	69	65	56	47	42	39	49	55	57	57	59	60	64	67.6	90
25-Feb	66	65	65	69	67	64	69	67	61	48	44	45	41	38	39	41	40	44	51	50	50	52	53	56	53.5	69
26-Feb	62	66	72	78	82	80	81	81	66	62	64	58	54	53	49	55	60	53	62	65	70	77	86	86	67.5	86
27-Feb	84	83	84	82	82	82	82	82	80	76	73	71	72	71	69	66	69	77	79	82	83	83	85	80	78.2	85
28-Feb	77	76	77	77	79	78	73	70	64	65	65	61	59	59	57	55	53	54	56	58	62	69	74	74	66.3	79
29-Feb	76	75	72	74	74	73	74	73	71	62	59	54	50	47	46	46	47	48	53	59	60	66	74	81	63.1	81
	81.0	81.5	82.0	82.4	82.6	82.7	82.2	82.4	81.2	78.7	76.9	74.7	72.9	71.4	70.5	70.3	71.2	73.5	76.5	77.6	77.6	78.5	79.5	80.4	Diurnal Average	
	94	94	93	93	93	92	92	93	94	95	95	95	93	93	93	93	93	94	94	94	94	93	92	92	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mannix - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	3	0.43	0.43
40 - 60	58	8.33	8.76
60 - 80	257	36.93	45.69
80 - 100	378	54.31	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

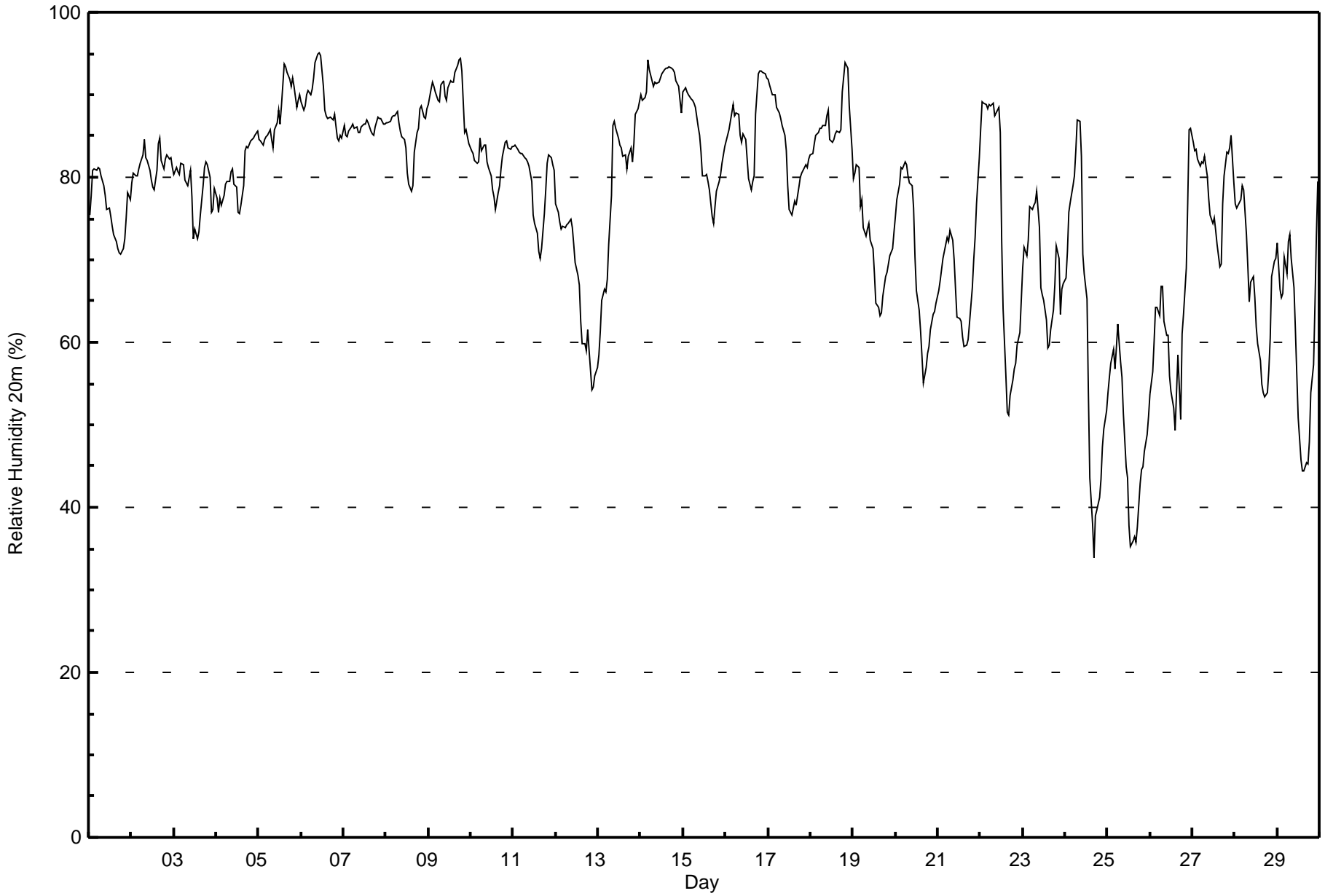


Maximum Value: 95 % on Feb 6 11:00																			Maximum Daily Average: 91.6 % on Feb 14						Hours in Service: 696	
Minimum Value: 34 % on Feb 24 17:00																			Minimum Daily Average: 48.1 % on Feb 25						Hours of Data: 696	
Maximum Diurnal Average: 81.1 % at hour 8																			Minimum Diurnal Average: 70.4 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 76.7 %																			Percentiles: P ₁ = 37 P ₁₀ = 58 Q ₁ = 70 Median = 80 Q ₃ = 86 P ₉₀ = 90 P ₉₉ = 94						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	75	78	81	81	81	81	81	80	79	78	76	76	75	74	73	72	71	71	71	71	73	75	78	77	76.2	81
2-Feb	79	80	80	80	81	82	83	85	82	82	81	80	79	78	81	84	85	82	81	82	83	82	82	81	81.5	85
3-Feb	80	81	81	80	82	82	80	79	79	81	78	73	74	73	75	79	81	82	82	80	76	76	79	78.5	82	
4-Feb	78	76	77	77	78	79	80	79	81	81	79	76	76	76	77	79	83	84	83	84	85	85	86	80.2	86	
5-Feb	85	84	84	85	85	85	86	85	84	86	87	88	86	89	94	93	93	92	91	92	91	88	89	90	87.9	94
6-Feb	89	88	89	90	91	90	91	92	94	95	95	95	91	88	87	87	87	87	87	88	85	84	85	85	89.1	95
7-Feb	86	85	85	86	86	86	86	86	86	85	86	86	86	87	87	86	85	85	86	87	87	87	86	86	86.1	87
8-Feb	87	87	87	87	88	87	88	87	86	85	85	84	80	79	78	79	83	85	86	88	89	87	87	88	85.3	89
9-Feb	89	91	92	91	90	89	89	91	92	90	89	91	92	92	92	93	94	94	94	93	85	86	85	84	90.3	94
10-Feb	83	83	82	82	82	85	83	84	84	82	81	80	78	78	76	78	79	81	82	84	84	84	83	84	81.8	85
11-Feb	84	84	83	83	83	83	82	82	82	81	79	75	74	73	71	70	71	76	78	82	83	82	81	81	79.4	84
12-Feb	77	76	75	74	74	74	74	74	75	74	72	70	68	67	63	60	60	59	62	59	54	55	56	57	66.9	77
13-Feb	59	61	65	67	66	68	72	78	86	87	86	85	84	84	83	83	81	83	84	82	84	88	88	89	78.7	89
14-Feb	90	89	90	90	94	93	92	91	91	91	92	93	93	93	93	93	93	93	93	93	92	91	89	88	91.6	94
15-Feb	90	91	90	90	89	89	89	89	86	85	83	80	80	80	80	78	75	74	76	78	79	80	82	84	83.3	91
16-Feb	84	85	86	88	89	88	88	88	85	84	85	85	82	80	79	79	80	88	92	93	93	93	92	92	86.6	93
17-Feb	92	91	90	90	90	89	88	87	86	85	83	79	76	75	76	77	77	79	80	80	81	82	81	82	83.2	92
18-Feb	83	83	84	85	85	86	86	86	86	88	88	85	84	85	85	86	86	86	90	94	94	93	89	83	86.6	94
19-Feb	80	81	81	81	76	77	74	73	74	74	72	71	68	65	64	63	64	66	68	68	69	71	71	73	71.9	81
20-Feb	75	77	79	81	81	82	82	80	79	79	76	70	66	64	61	58	55	57	59	60	62	63	64	65	69.8	82
21-Feb	66	68	69	70	72	73	72	74	72	70	66	63	63	62	61	59	60	60	62	67	70	73	77	82	68.0	82
22-Feb	86	89	89	89	88	89	89	89	87	88	89	85	72	64	56	51	51	54	55	57	57	60	61	65	73.4	89
23-Feb	69	71	70	72	76	76	77	77	78	74	67	66	65	63	59	60	61	64	67	72	70	63	66	67	68.8	78
24-Feb	68	71	76	77	79	80	83	87	87	83	71	68	65	54	44	38	34	39	40	41	43	47	49	52	61.5	87
25-Feb	54	56	58	59	57	59	62	58	56	51	45	44	38	35	36	36	36	38	43	45	45	47	49	51	48.1	62
26-Feb	54	56	60	64	64	63	67	67	63	61	61	56	54	52	49	54	59	51	61	63	69	77	86	86	62.4	86
27-Feb	84	83	83	82	81	82	82	82	80	78	75	74	75	73	72	69	70	77	80	83	83	84	85	79	79.1	85
28-Feb	77	76	77	77	79	78	73	69	65	67	68	65	62	60	58	55	54	53	54	57	61	68	70	70	66.4	79
29-Feb	72	66	65	66	70	68	72	73	70	67	62	56	51	46	44	44	45	45	48	54	57	65	73	80	60.9	80
																			78.4 78.9 79.6 80.1 80.6 80.8 81.0 81.1 80.5 79.7 77.8 75.9 73.8 72.0 70.7 70.4 70.7 71.8 73.7 75.1 75.4 76.4 77.5 78.1						Diurnal Average	
																			92 91 92 91 94 93 92 92 94 95 95 95 93 93 94 93 94 94 94 94 94 93 92 92						Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 20m (RH20m) - %
Mannix - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 20m (RH20m) - %
Mannix - February 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	10	1.44	1.44
40 - 60	76	10.92	12.36
60 - 80	253	36.35	48.71
80 - 100	357	51.29	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

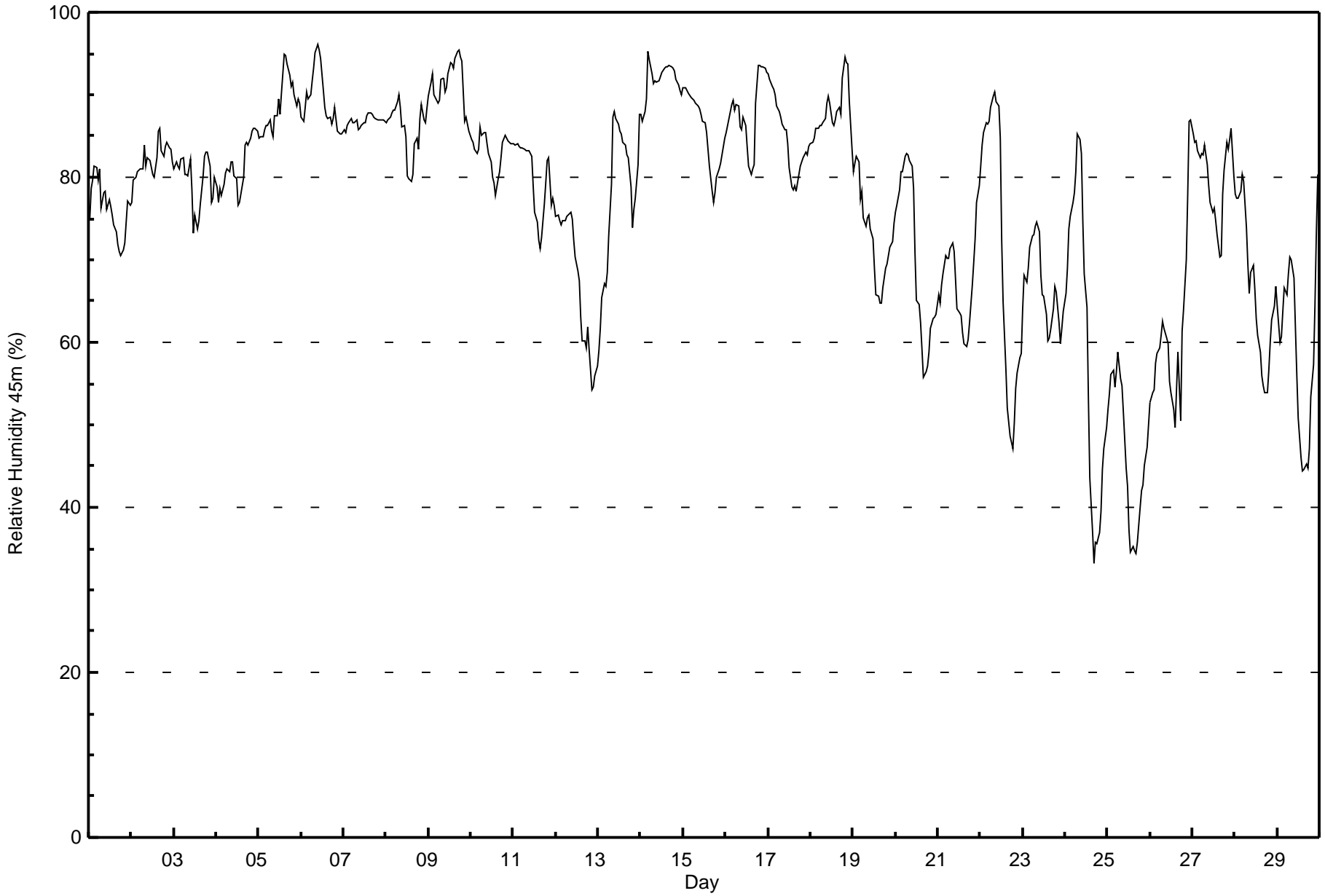


Maximum Value: 96 % on Feb 6 10:00																			Maximum Daily Average: 91.7 % on Feb 14						Hours in Service: 696																								
Minimum Value: 33 % on Feb 24 17:00																			Minimum Daily Average: 46.5 % on Feb 25						Hours of Data: 696																								
Maximum Diurnal Average: 81.2 % at hour 8																			Minimum Diurnal Average: 71.4 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 76.8 %																			Percentiles: P ₁ = 35 P ₁₀ = 57 Q ₁ = 69 Median = 81 Q ₃ = 87 P ₉₀ = 90 P ₉₉ = 95						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	75	79	80	81	81	80	81	76	78	78	76	77	77	75	74	73	72	71	70	71	72	75	77	77	76.1	81																							
2-Feb	77	80	80	81	81	81	81	84	81	82	82	81	80	80	82	86	86	83	82	84	84	83	83	82	82.0	86																							
3-Feb	81	82	81	81	82	82	80	80	80	82	78	73	75	74	75	77	80	83	83	83	81	77	77	80	79.6	83																							
4-Feb	79	77	79	78	79	80	81	81	82	82	80	80	77	77	78	80	84	84	84	85	86	86	86	86	81.2	86																							
5-Feb	85	85	85	86	86	86	87	86	85	87	88	89	88	90	95	95	94	92	91	92	90	89	89	89	88.7	95																							
6-Feb	87	87	88	90	89	90	92	93	95	96	95	94	91	88	87	87	87	86	87	89	86	85	85	85	89.3	96																							
7-Feb	86	85	86	87	87	87	87	87	86	86	86	87	87	87	88	88	88	87	87	87	87	87	87	87	86.7	88																							
8-Feb	87	87	87	88	88	88	89	90	89	86	86	85	80	80	80	80	84	85	83	87	89	87	87	88	85.8	90																							
9-Feb	90	92	93	90	90	89	89	92	92	90	91	93	94	94	93	94	95	95	95	94	87	87	86	86	91.3	95																							
10-Feb	85	84	83	83	83	86	85	86	85	84	83	82	80	79	78	80	81	82	84	85	85	84	84	84	83.1	86																							
11-Feb	84	84	84	84	84	83	83	83	83	83	83	79	76	75	72	71	73	77	79	82	82	77	78	77	79.8	84																							
12-Feb	75	75	75	74	75	75	75	75	76	75	72	70	69	67	63	60	60	59	62	59	54	55	56	57	67.3	76																							
13-Feb	59	62	65	67	67	68	73	79	87	88	87	86	86	85	84	84	83	82	79	74	76	77	81	88	77.9	88																							
14-Feb	88	87	88	89	95	94	93	91	92	92	92	93	93	93	93	93	94	93	93	92	91	91	90	90	91.7	95																							
15-Feb	91	91	90	90	90	89	89	89	89	88	88	87	87	85	83	81	78	77	78	80	81	82	83	85	85.5	91																							
16-Feb	85	86	87	89	89	88	89	89	86	86	87	86	84	81	80	81	82	89	94	94	93	93	93	93	87.7	94																							
17-Feb	93	92	91	91	90	89	88	87	86	86	86	84	81	79	79	79	78	80	81	82	82	83	83	84	84.7	93																							
18-Feb	84	84	85	86	86	86	86	87	87	89	90	89	87	86	87	88	88	88	92	95	94	94	89	83	87.9	95																							
19-Feb	81	82	82	82	77	78	75	74	75	75	74	73	69	66	66	65	65	67	69	69	71	71	72	74	73.0	82																							
20-Feb	76	77	79	81	81	83	83	83	82	81	79	71	65	65	62	59	56	56	57	59	62	63	63	63	70.2	83																							
21-Feb	66	65	67	68	71	70	70	71	72	71	68	64	64	63	61	60	60	60	62	67	70	73	77	79	67.4	79																							
22-Feb	81	84	85	87	86	87	89	90	90	89	89	85	72	65	57	52	50	49	47	50	54	56	58	59	71.3	90																							
23-Feb	64	68	67	69	71	73	73	74	75	73	68	66	66	63	60	61	61	64	67	66	62	60	62	64	66.6	75																							
24-Feb	66	69	74	75	77	78	81	85	85	83	75	68	64	53	44	37	33	36	36	37	40	45	47	50	59.8	85																							
25-Feb	52	54	56	57	55	56	59	56	55	51	45	43	37	35	35	35	34	36	40	42	43	45	47	50	46.5	59																							
26-Feb	53	54	54	57	59	59	61	62	62	60	60	55	54	52	50	54	59	50	61	64	70	78	87	87	60.9	87																							
27-Feb	85	84	84	83	82	83	83	84	82	79	77	76	76	75	73	70	70	78	81	84	83	85	86	80	80.2	86																							
28-Feb	78	77	77	78	80	80	74	69	66	68	69	67	63	61	59	56	55	54	54	57	60	63	64	67	66.5	80																							
29-Feb	64	60	61	64	67	66	68	70	70	68	62	56	51	46	44	45	45	45	47	53	57	65	73	80	59.5	80																							
																								77.8	78.3	79.1	79.8	80.3	80.6	80.8	81.2	81.1	80.7	79.1	77.2	74.8	73.1	71.8	71.4	71.6	72.1	73.4	74.6	74.9	75.7	77.0	77.7	Diurnal Average	
																								93	92	93	91	95	94	93	93	95	96	95	94	94	94	95	95	95	95	95	95	94	94	93	93	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 45m (RH45m) - %
Mannix - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 45m (RH45m) - %
Mannix - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	13	1.87	1.87
40 - 60	78	11.21	13.07
60 - 80	229	32.90	45.98
80 - 100	376	54.02	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

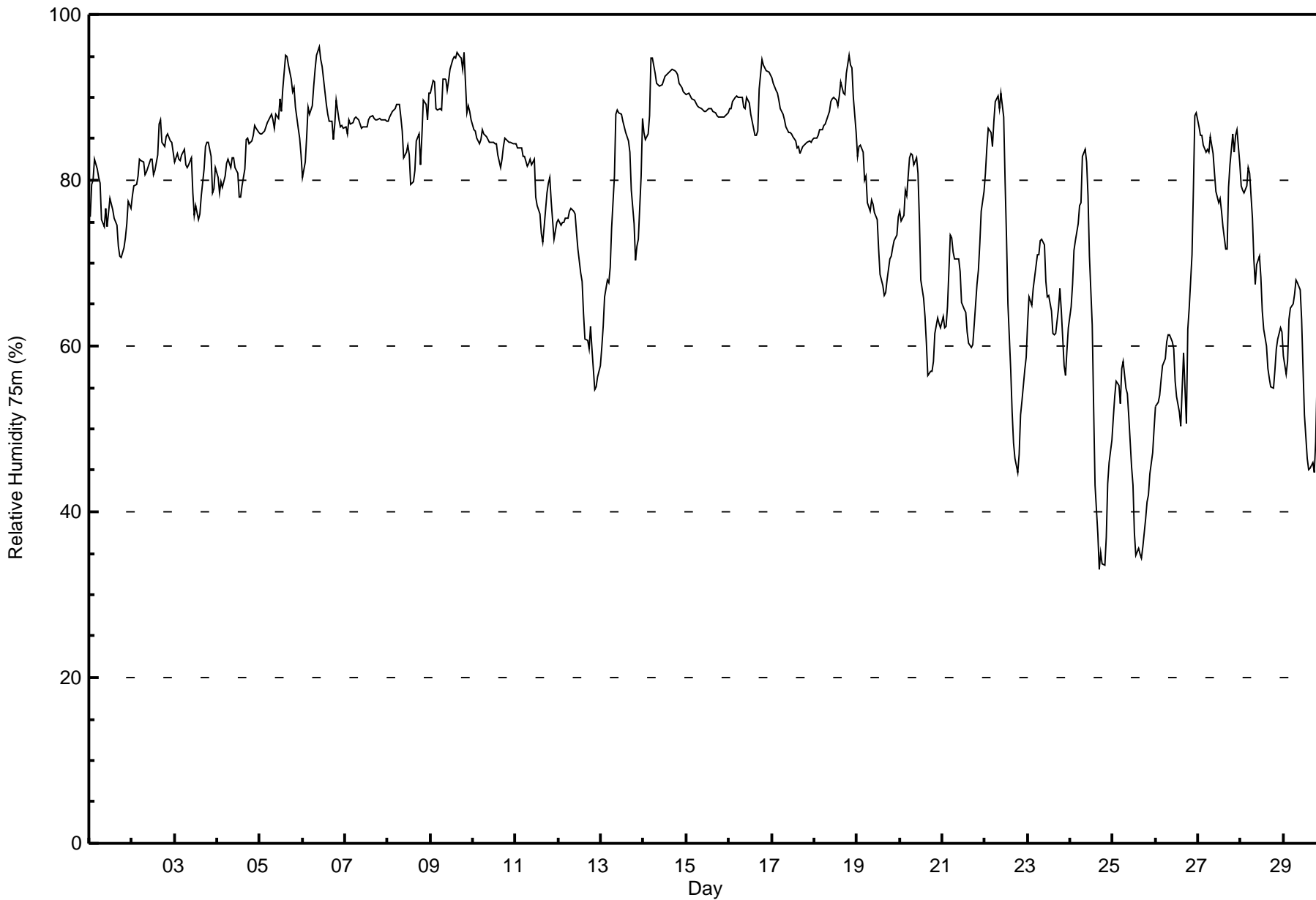


Maximum Value: 96 % on Feb 6 10:00 Maximum Daily Average: 91.7 % on Feb 9																		Hours in Service: 696								
Minimum Value: 33 % on Feb 24 17:00 Minimum Daily Average: 46.3 % on Feb 25																		Hours of Data: 696								
Maximum Diurnal Average: 81.1 % at hour 8 Minimum Diurnal Average: 72.7 % at hour 17																		Hours of Missing Data: 0								
Monthly Average: 77.3 % Percentiles: P ₁ = 35 P ₁₀ = 57 Q ₁ = 70 Median = 82 O ₃ = 87 P ₉₀ = 90 P ₉₉ = 95																		Hours of Calibration: 0								
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	76	79	80	83	81	80	80	75	74	77	74	78	77	76	75	75	72	71	71	72	73	75	77	77	76.2	83
2-Feb	78	79	79	81	83	82	82	81	81	81	83	82	81	81	83	87	87	85	84	85	86	85	85	83	82.7	87
3-Feb	82	83	83	82	83	84	82	82	82	83	78	76	77	75	76	78	81	84	85	85	83	79	79	81	80.9	85
4-Feb	80	78	80	79	81	82	83	82	83	83	82	81	78	78	79	81	85	85	84	85	86	87	86	86	82.2	87
5-Feb	86	86	86	86	87	87	88	87	86	88	87	90	88	91	95	95	94	92	91	91	89	86	85	83	88.5	95
6-Feb	80	82	85	89	88	89	91	93	95	96	95	94	91	89	88	87	87	85	87	90	87	86	87	86	88.7	96
7-Feb	87	86	87	87	87	87	88	87	87	86	86	86	87	87	88	88	88	87	87	87	87	87	87	87	87.1	88
8-Feb	87	88	88	88	89	89	89	88	86	83	83	84	83	79	80	81	85	86	82	85	90	89	87	91	85.9	91
9-Feb	90	92	92	89	88	89	89	92	92	91	92	93	95	95	95	95	95	95	93	95	88	89	88	87	91.7	95
10-Feb	86	86	85	84	85	86	86	85	85	85	85	85	84	84	83	81	82	84	85	85	85	84	84	84	84.6	86
11-Feb	84	84	84	84	83	83	82	82	83	82	83	78	77	76	74	73	74	78	80	80	78	73	74	75	79.2	84
12-Feb	75	75	75	75	75	75	76	77	76	76	74	72	69	68	64	61	61	60	62	60	55	55	56	58	67.9	77
13-Feb	60	62	66	68	68	70	74	80	88	89	88	88	87	86	86	85	83	79	75	70	72	73	81	87	77.7	89
14-Feb	86	85	86	88	95	95	93	92	91	91	92	92	93	93	93	93	93	93	93	92	91	91	91	91	91.4	95
15-Feb	90	90	90	90	90	89	89	89	89	89	88	88	89	89	89	88	88	88	88	88	88	88	88	88	88.7	90
16-Feb	89	89	89	90	90	90	90	90	89	89	90	89	88	87	85	85	86	91	95	94	94	93	93	93	89.9	95
17-Feb	92	92	91	90	90	89	88	87	86	86	86	86	85	85	84	84	83	84	84	84	85	85	85	85	86.5	92
18-Feb	85	85	85	86	86	87	87	87	88	90	90	90	90	89	90	92	90	90	93	95	94	94	90	86	89.1	95
19-Feb	83	84	84	83	80	81	77	76	78	77	76	75	72	69	67	66	66	68	70	71	72	73	73	76	74.9	84
20-Feb	76	75	76	79	78	83	83	83	82	83	81	75	68	66	64	60	57	57	57	58	61	63	63	62	70.4	83
21-Feb	64	62	62	65	73	73	71	71	70	71	69	65	64	64	62	60	60	60	62	67	69	72	76	79	67.2	79
22-Feb	81	84	86	86	84	87	89	90	89	91	88	80	73	65	57	52	48	46	45	47	52	53	57	59	70.4	91
23-Feb	63	66	65	67	68	71	71	73	73	72	68	66	66	64	61	61	65	67	64	58	57	59	62	65.3	73	
24-Feb	65	67	71	73	75	77	77	83	84	82	78	71	63	53	43	37	33	35	34	34	37	43	46	49	58.7	84
25-Feb	51	54	56	55	53	57	58	55	54	51	45	43	37	35	36	35	34	36	39	41	42	45	47	50	46.3	58
26-Feb	53	53	54	56	58	58	60	61	61	61	60	56	54	52	50	55	59	51	62	65	71	79	88	88	61.0	88
27-Feb	86	85	85	84	83	84	83	85	83	81	79	77	78	76	74	72	72	79	82	86	83	85	86	82	81.4	86
28-Feb	79	79	79	79	82	81	75	70	67	70	71	68	64	62	60	57	56	55	55	57	60	61	62	62	67.2	82
29-Feb	59	57	58	63	65	65	66	68	68	67	63	57	52	46	45	45	46	45	48	56	58	65	74	81	59.0	81
																		Diurnal Average								
																		Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 75m (RH75m) - %
Mannix - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 75m (RH75m) - %
Mannix - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	13	1.87	1.87
40 - 60	80	11.49	13.36
60 - 80	212	30.46	43.82
80 - 100	391	56.18	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

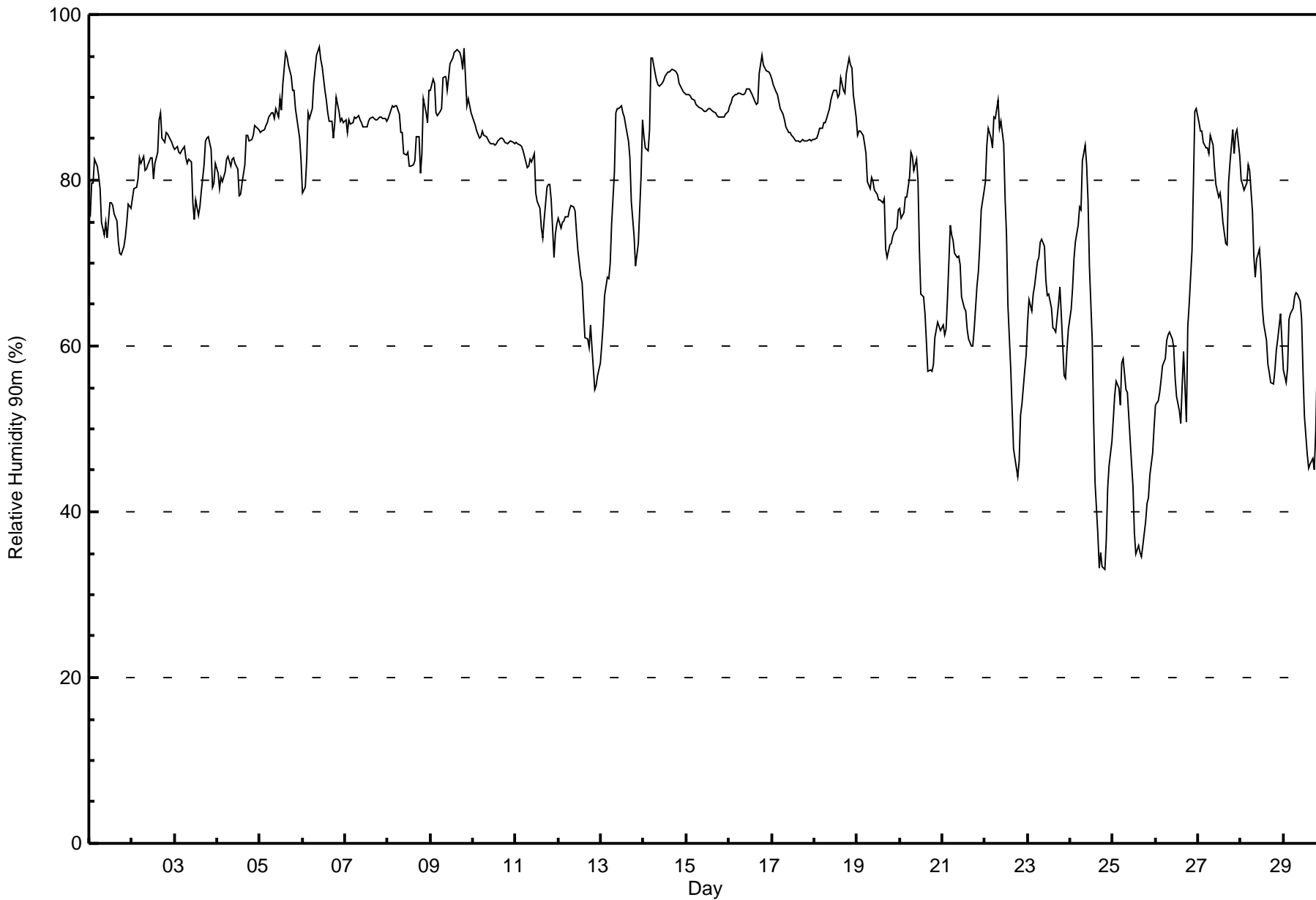


Maximum Value: 96 % on Feb 6 10:00																			Maximum Daily Average: 91.9 % on Feb 9						Hours in Service: 696																								
Minimum Value: 33 % on Feb 24 20:00																			Minimum Daily Average: 46.3 % on Feb 25						Hours of Data: 696																								
Maximum Diurnal Average: 81.3 % at hour 9																			Minimum Diurnal Average: 73.2 % at hour 18						Hours of Missing Data: 0																								
Monthly Average: 77.5 %																			Percentiles: P ₁ = 36 P ₁₀ = 57 Q ₁ = 71 Median = 82 Q ₃ = 87 P ₉₀ = 91 P ₉₉ = 95						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	76	80	80	83	82	81	79	75	73	75	73	77	77	77	76	75	72	71	71	72	73	75	77	77	76.1	83																							
2-Feb	78	79	79	80	83	82	83	81	81	82	83	83	80	82	83	87	88	85	85	86	86	85	85	84	82.9	88																							
3-Feb	84	84	83	83	84	84	83	82	82	82	77	75	78	76	77	79	82	85	85	85	84	79	80	82	81.4	85																							
4-Feb	81	79	80	80	81	82	83	82	82	83	82	81	78	78	80	82	85	85	85	85	85	87	86	86	82.5	87																							
5-Feb	86	86	86	87	87	88	88	88	87	89	88	90	88	91	95	95	94	92	91	91	89	86	85	82	88.7	95																							
6-Feb	78	79	82	88	88	89	92	93	95	96	95	94	91	90	88	87	87	85	87	90	88	87	87	87	88.5	96																							
7-Feb	87	86	87	87	87	88	87	88	87	87	86	86	86	87	88	88	87	87	87	88	88	87	87	87	87.2	88																							
8-Feb	87	88	89	89	89	89	88	86	86	83	83	83	82	82	82	82	85	85	81	83	90	88	87	91	85.8	91																							
9-Feb	91	92	92	88	88	88	89	92	93	91	92	94	95	95	96	96	95	95	93	96	89	90	89	88	91.9	96																							
10-Feb	87	87	86	85	85	86	85	85	85	85	84	84	84	84	85	85	85	85	85	84	85	85	85	84	85.0	87																							
11-Feb	85	84	84	84	84	83	82	82	82	82	83	79	77	77	74	73	75	79	79	79	78	71	74	75	79.4	85																							
12-Feb	75	74	75	75	76	76	76	77	77	76	74	71	69	68	64	61	61	60	63	60	55	55	56	58	68.0	77																							
13-Feb	60	63	66	68	68	70	75	81	88	89	89	89	88	88	87	85	83	77	73	70	71	72	81	87	77.8	89																							
14-Feb	85	84	84	86	95	95	93	92	92	91	92	92	93	93	93	93	93	93	93	92	91	91	91	91	91.2	95																							
15-Feb	90	90	90	90	90	89	89	89	89	88	88	88	89	89	89	88	88	88	88	88	88	88	88	88	88.7	90																							
16-Feb	89	89	90	90	90	90	90	90	90	91	91	91	91	90	90	89	89	93	95	94	93	93	93	93	91.1	95																							
17-Feb	92	92	91	90	90	89	88	87	86	86	86	86	85	85	85	85	85	85	85	85	85	85	85	85	86.6	92																							
18-Feb	85	85	86	86	86	87	87	88	89	90	90	91	91	90	90	92	91	91	93	95	94	94	90	88	89.5	95																							
19-Feb	85	86	86	85	84	83	80	79	80	80	79	78	78	78	77	78	72	71	72	72	73	74	74	76	78.4	86																							
20-Feb	77	75	76	78	78	80	83	83	81	83	80	72	66	66	64	60	57	57	57	58	61	63	62	62	70.0	83																							
21-Feb	62	61	62	66	75	73	73	71	71	71	70	66	65	64	62	61	60	60	62	67	69	72	76	79	67.4	79																							
22-Feb	80	84	86	85	84	88	87	90	86	87	84	78	73	65	57	52	48	46	44	46	52	53	57	59	69.7	90																							
23-Feb	63	66	64	66	67	70	71	73	73	72	68	66	66	65	62	62	65	67	64	64	56	56	59	62	65.2	73																							
24-Feb	64	67	70	73	74	77	77	82	84	82	78	70	61	51	44	37	33	35	33	33	37	43	46	48	58.3	84																							
25-Feb	51	54	56	55	53	58	58	55	54	52	46	43	37	35	36	35	35	36	39	41	42	44	47	50	46.3	58																							
26-Feb	53	53	54	56	58	59	61	61	62	61	60	56	54	52	51	55	59	51	62	65	72	79	88	89	61.3	89																							
27-Feb	87	86	86	85	84	84	83	85	84	82	79	78	79	77	75	72	72	80	82	86	83	86	86	83	81.8	87																							
28-Feb	80	79	79	80	82	81	76	71	68	71	72	69	65	63	61	58	57	56	55	57	59	61	64	60	67.6	82																							
29-Feb	57	56	57	63	64	65	66	67	66	65	63	57	52	47	45	46	46	45	49	57	59	66	74	80	58.9	80																							
																								77.8	78.2	78.9	79.7	80.5	81.1	81.1	81.2	81.3	81.0	79.8	78.2	76.4	75.3	74.3	73.8	73.4	73.2	73.9	74.8	74.9	75.7	77.2	78.0	Diurnal Average	
																								92	92	92	90	95	95	93	93	95	96	95	94	95	95	96	96	95	95	95	96	94	94	93	93	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 90m (RH90m) - %
Mannix - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity 90m (RH90m) - %
Mannix - February 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	13	1.87	1.87
40 - 60	78	11.21	13.07
60 - 80	214	30.75	43.82
80 - 100	391	56.18	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Speed: 30 km/h on Feb 6 13:00	Maximum Daily Speed Average: 16.3 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 25 13:00	Minimum Daily Speed Average: 0.7 km/h on Feb 2	Hours of Data: 682
Maximum Diurnal Speed Average: 3.1 km/h at hour 23	Minimum Diurnal Speed Average: 1.1 km/h at hour 15	Hours of Missing Data: 14
Monthly Average Velocity: 1.6 km/h 26.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 23	Percent Operational Time: 98.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	N5	NNW2	W3	WSW2	WSW3	SSW4	SSE8	SSE9	SSE8	SSE8	SSE8	SSE7	SSE9	SSE7	SSE9	SSE7	SSE6	SSE7	SSE7	SSE5	S5	SSE4	SE4	SE5	SSE4.8	SSE9
2-Feb	S5	SSW5	SSE4	SSE3	SW3	S5	SW5	SSE4	S6	SSE6	SSE6	SE8	SSE8	SE6	SE3	NNW8	NNW9	NNW13	NNW12	N12	NNW10	NNW8	NNW8	NNW7	NW0.7	NNW13
3-Feb	N6	N5	N5	NNE6	NNW4	ENE1	NE2	NE4	SSE3	SSE5	SSE4	SSE5	SSE6	ESE3	SE4	NW3	N6	N7	NNE8	N9	N12	NNE15	N11	N10	NNE3.7	NNE15
4-Feb	N9	N9	NNW6	N7	NNW6	NNW4	N6	N6	N5	NNW2	SSE3	ESE4	SE7	SE6	SE6	SE5	ESE6	E7	ENE4	N4	NW4	WNW4	W6	W6	NNE2.0	N9
5-Feb	SSW1	SE3	SE7	SSE10	SE8	SE7	SE7	SE10	SE13	SSE8	SSE12	SSE11	SSE12	SSE11	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	SE13
6-Feb	SSE11	SSE12	SE9	SSE10	SSE13	SE11	SE13	AF	AF	AF	AF	AF	N30	N20	N19	NNW17	NNW16	NNW13	NNW9	N7	NNE8	N4	NNE4	NE5	NNE4.7	N30
7-Feb	NE4	NNE11	NNE9	NNW6	WNW3	N4	SE2	S6	SE4	ENE6	NNE7	NNW6	NW8	NNW6	NNW7	NNW8	N6	N7	N6	NW2	SW5	SSW5	S2	SSE7	N2.8	NNE11
8-Feb	SSE8	S7	SSW6	S5	S3	SE6	SE5	S5	SW7	S5	SSE5	SSE5	ESE4	SSE4	SE0	ESE1	SSW1	S2	SSE4	ESE3	SE4	SSE5	SSE6	SE5	SSE4.1	SSE8
9-Feb	SSE7	SSE7	SE7	SSE5	SSE4	SSE9	SE7	SSE6	SE9	SE10	SE7	SSE4	SSE2	SSW3	SW5	S4	SSE4	SSE7	ESE1	N18	NNW18	N15	N19	N20	E1.9	N20
10-Feb	N15	N13	N16	NNE18	NNE20	N22	NNE17	NNE15	NNE14	NNE13	NNE9	NNE11	NNE13	NNE10	NNE11	N9	N9	N9	N16	N11	N8	N5	NNW5	N9	NNE12.2	N22
11-Feb	NNE9	N7	NNW3	N6	N8	N7	N7	N6	N6	N5	NNW6	NNW5	NNW8	NW9	NW9	WNW9	NNW10	N10	N10	NNW6	NNE9	NNE6	WSW4	S3	NNW6.0	N10
12-Feb	SSE8	ESE8	SE11	SE15	SE16	SE17	SE19	SE19	SE14	SE15	SE16	SE14	SE14	SE12	SE17	SE20	SE19	SE20	SE18	SE21	SE21	SE21	SE21	SE18	SE16.3	SE21
13-Feb	SE16	SE17	SE20	SE18	SE17	SE15	SE14	SSE12	SSE11	SE11	SE11	SSE13	SE10	SE9	SE9	SSE10	SE10	SSE9	S6	S3	SE8	SE6	SSE7	S3	SE10.9	SE20
14-Feb	WSW10	WSW13	W15	WNW9	NNW8	NW7	NNW4	N4	NW5	WNW5	W6	W6	W5	WNW1	ENE3	NE6	NNE8	NNE7	N5	N7	N9	N11	N12	N8	NW4.6	W15
15-Feb	N11	N5	N9	N8	N14	N13	N11	N13	NNE12	N10	N10	N7	NNW6	NNW10	NNW10	N7	NNW6	NNW7	NNE6	NNE5	N4	WSW4	SE1	ESE2	N7.3	N14
16-Feb	SW3	SSE3	S5	SSE6	SSE4	SE2	NNE4	NNE5	ESE7	SSE8	SSE8	SSE8	SE6	SE3	SSE5	SE5	NNE2	NNW4	NNW6	NW5	NW6	NW5	NW7	WNW9	SE0.9	WNW9
17-Feb	NNW9	NNW11	NNW13	NNW10	NNW14	N15	N13	N14	NNE17	NNE15	N13	NNE13	N12	NNE12	NNE13	N10	NNE11	NNE14	N14	N13	N14	N12	NNE12	N12	N12.4	NNE17
18-Feb	NNE13	NNE11	N9	N9	N10	N10	N9	N8	NNE5	NE5	ENE2	SW2	W8	WNW7	NW8	NNW3	W4	W8	WNW8	WNW8	WNW7	WNW10	N20	N20	NNW6.5	N20
19-Feb	N20	N13	NNW10	NNW11	NNW15	N14	NNE12	NNE9	NNW6	WNW3	NNE3	N4	NW11	NW11	WNW10	NNW9	NNE6	NE8	NE8	NNE10	NNE11	NNE12	NNE12	N9	N8.7	NNE20
20-Feb	N9	N6	N7	NNW3	NW2	SW2	SW5	WSW3	SW4	S1	SE4	ESE4	ESE6	E7	E7	E7	ESE4	ESE3	SE7	SSE9	SSE7	SSE5	SSE5	SSE6	ESE2.2	N9
21-Feb	SSE6	SSE7	SSE7	SSE5	SSE5	SSE7	SSE7	SE5	SSE8	SSE9	SSE10	SSE9	SE10	SE10	SE11	SSE10	SSE10	SE9	SE10	SE9	SE10	ENE3	NE2	W4	SSE6.9	SE11
22-Feb	NNW6	NW4	WNW6	NNW6	N8	N7	W3	S2	S2	SSE5	SE8	SE10	SE8	SE9	SE5	SE4	E6	E5	NE1	WNW9	NNW12	NW9	WNW8	WNW4	N0.8	NNW12
23-Feb	W2	SW5	SW7	WSW7	SW8	SW7	WSW6	W7	W6	WSW5	WNW7	WNW12	NNW7	N8	SE1	NW6	WNW7	NNW6	NW3	WSW9	W12	W15	W15	WNW14	W6.2	W15
24-Feb	WNW15	WNW13	WNW13	WNW16	WNW9	WSW10	WSW5	S4	SSE6	SSE6	SE3	ESE4	SE6	SE5	SSE2	SSE2	S6	SSE9	S12	SSE12	S12	S11	SSE13	SSE14	SSW4.6	WNW16
25-Feb	SSE16	SSE15	SSE15	SSE11	S9	SSE9	SSE10	SSW11	SSW7	SSW5	SW6	ESE3	ENE0	WSW17	W19	W23	WSW18	WSW13	WSW17	W20	W18	WSW13	WSW13	WSW11	SW8.9	W23
26-Feb	SW5	S5	SSE7	SE6	S6	SSW5	S9	SW6	WSW16	W15	W15	WNW13	NW12	NW10	NNW7	NNE14	NNE17	NNE21	NNE18	NNE22	NNE17	NNE20	N19	N20	NNW5.9	NNE22
27-Feb	N23	N23	N24	N24	N24	N22	N20	N15	N15	N12	N9	NW10	NW13	NW10	NW8	NW6	W7	W5	N3	NE4	S3	NNW6	N12	N17	N11.8	N24
28-Feb	N15	NNE18	N17	NNE16	N13	N13	NNE18	NNW15	NNW20	NNE21	N13	N11	NNE14	N15	N12	NNE13	N11	N12	N12	N11	NNE11	N11	N6	WSW4	N13.1	NNE21
29-Feb	E3	SE6	S5	SSE8	SE7	SSE10	SE10	SSE11	SSE8	SSE8	SE8	SE13	SE14	SE16	SE14	SE12	SSE10	SSE9	SSE9	SSE9	SSE8	SSE8	SE9	SSE11	SSE9.2	SE16

NNE2.8	NNE1.8	N1.3	NNE1.7	NNE2.1	NE1.8	ENE2.1	ENE1.5	E1.1	ESE1.7	ESE1.7	SE1.7	NE1.4	NE1.2	NNE1.1	NNE1.8	NNE1.9	NNE2.7	NNE2.6	N3.1	N2.6	N2.9	N3.1	N2.3	Diurnal Average
N23	N23	N24	N24	N24	N22	N20	SE19	NNW20	NNE21	SE16	SE14	N30	N20	W19	W23	SE19	NNE21	SE18	NNE22	SE21	SE21	SE21	N20	Diurnal Maximum

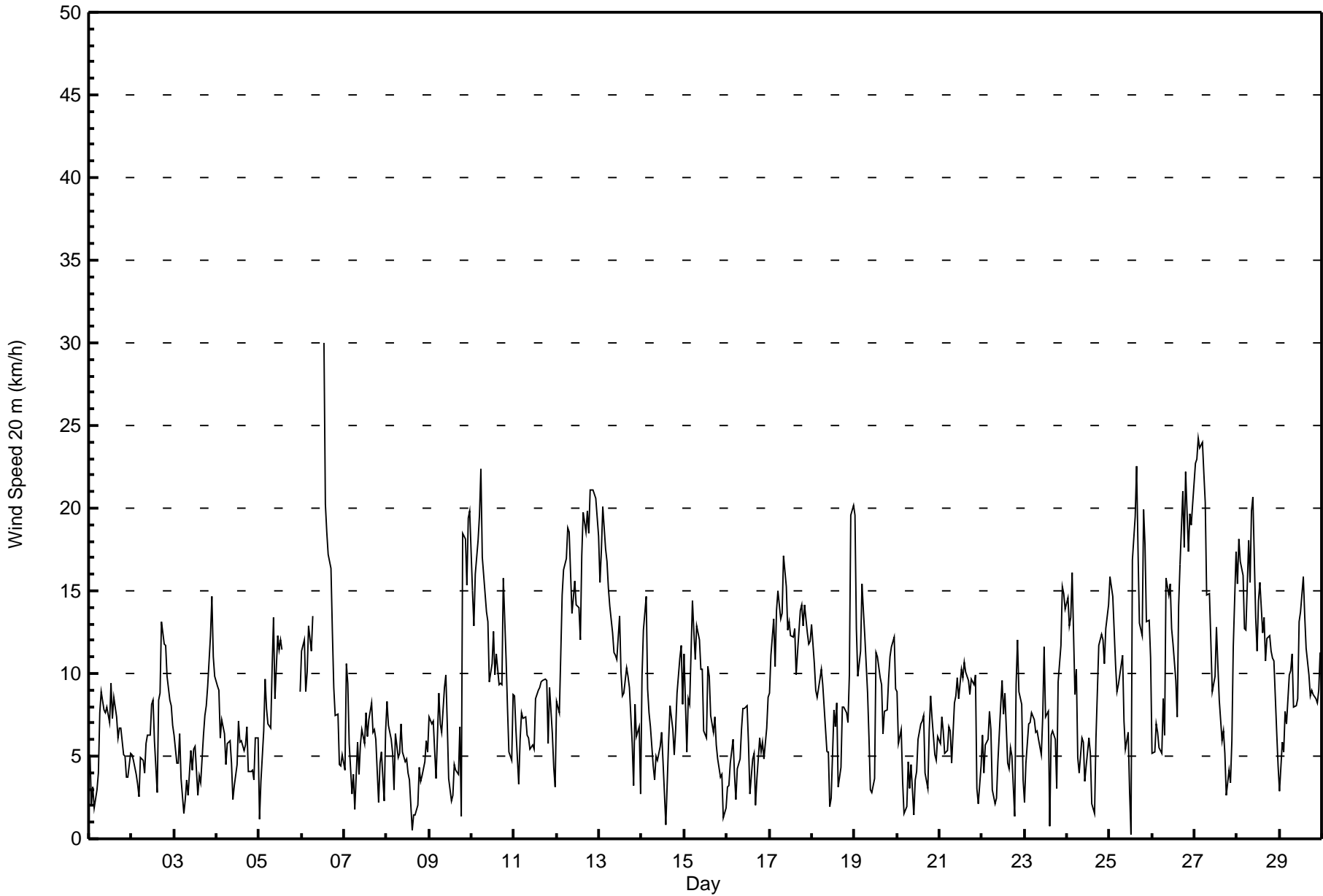
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696											
Maximum Value: 9 km/h on Feb 6 13:00														Hours of Data: 682											
Minimum Value: 1 km/h on Feb 8 16:00														Hours of Missing Data: 14											
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 6														Hours of Calibration: 0											
														Percent Operational Time: 98.0											
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	1	1	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	2	2	1	1	1	1	2	3
2-Feb	1	1	2	1	1	2	1	2	2	3	2	3	2	2	2	4	4	3	4	4	3	2	2	2	4
3-Feb	2	2	2	3	1	1	2	2	2	1	2	2	2	1	2	1	2	2	3	3	4	4	3	4	4
4-Feb	3	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	2	2	1	2	1	1	2	1	3
5-Feb	1	2	2	3	3	2	2	3	5	2	3	3	3	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	5
6-Feb	2	2	2	2	3	3	4	AF	AF	AF	AF	AF	9	7	5	5	4	4	3	2	2	2	1	1	9
7-Feb	1	3	3	3	2	1	1	2	2	2	2	2	3	2	3	2	2	2	1	2	2	1	1	2	3
8-Feb	2	2	2	1	2	3	2	2	3	2	2	2	1	1	1	1	1	1	2	1	2	2	2	2	3
9-Feb	2	2	2	2	2	2	2	2	3	3	2	2	2	1	1	2	1	2	4	7	7	6	6	6	7
10-Feb	5	5	6	6	5	6	5	5	3	4	3	3	3	3	3	3	3	3	4	3	3	2	2	3	6
11-Feb	1	2	1	2	2	2	2	2	1	2	2	2	2	2	3	2	2	3	3	2	2	2	3	2	3
12-Feb	2	3	3	5	5	5	5	5	5	5	5	4	4	3	5	6	6	6	6	6	5	5	5	4	6
13-Feb	4	5	4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	3	3	2	1	2	2	1	5
14-Feb	2	2	2	4	2	2	2	2	1	1	1	2	1	1	2	2	2	2	1	2	3	3	3	3	4
15-Feb	3	2	3	3	4	4	3	3	3	2	3	3	3	3	3	3	2	2	2	2	2	1	1	2	4
16-Feb	1	2	1	2	3	1	1	1	2	2	2	3	2	2	2	2	1	2	2	2	2	1	1	2	3
17-Feb	3	3	4	4	4	5	4	6	6	5	5	5	3	3	4	3	3	3	3	3	3	3	3	3	6
18-Feb	3	3	2	2	2	2	2	4	2	2	2	2	2	2	2	2	1	2	2	3	2	3	6	7	7
19-Feb	6	4	4	4	6	5	4	3	1	2	1	2	3	3	2	2	3	3	2	3	3	3	3	2	6
20-Feb	2	2	2	1	1	2	1	1	2	1	1	2	2	2	2	2	2	1	2	2	2	1	1	1	2
21-Feb	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	2	2	2	2	3	2	3	2	3	3
22-Feb	3	2	2	2	2	1	2	1	1	2	3	3	3	2	2	2	1	1	2	3	3	2	2	1	3
23-Feb	1	2	1	2	1	1	3	2	3	3	6	4	3	3	2	2	2	2	1	1	2	1	2	2	6
24-Feb	3	2	2	3	4	1	4	2	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	4
25-Feb	2	3	3	3	2	2	2	3	2	3	3	2	3	4	5	4	4	2	4	2	3	4	3	4	5
26-Feb	2	2	3	2	2	3	2	4	4	4	2	2	3	3	3	3	4	6	6	6	5	5	5	5	6
27-Feb	6	5	6	6	5	5	5	4	4	4	4	4	3	3	3	2	1	1	3	2	2	4	3	5	6
28-Feb	6	6	4	4	4	5	5	7	6	5	4	4	5	4	3	3	3	3	3	2	2	2	3	2	7
29-Feb	1	2	2	2	2	2	2	2	2	3	3	4	4	4	4	2	2	2	2	2	2	2	2	2	4
Diurnal Maximum																									
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Mannix - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	184	26.98	26.98
6 - 11	321	47.07	74.05
12 - 19	147	21.55	95.60
20 - 28	29	4.25	99.85
29 - 38	1	0.15	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Mannix - February 2016**

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	7	8	6	2	12	23	31	20	8	10	9	7	6	9	11	184
6 - 11	62	23	3	1	5	4	47	75	8	4	5	6	9	15	16	38	321
12 - 19	41	28	0	0	0	0	28	12	2	0	0	8	8	7	2	11	147
20 - 28	13	6	0	0	0	0	7	0	0	0	0	0	2	0	0	1	29
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	132	64	11	7	7	16	105	118	30	12	15	23	26	28	27	61	682

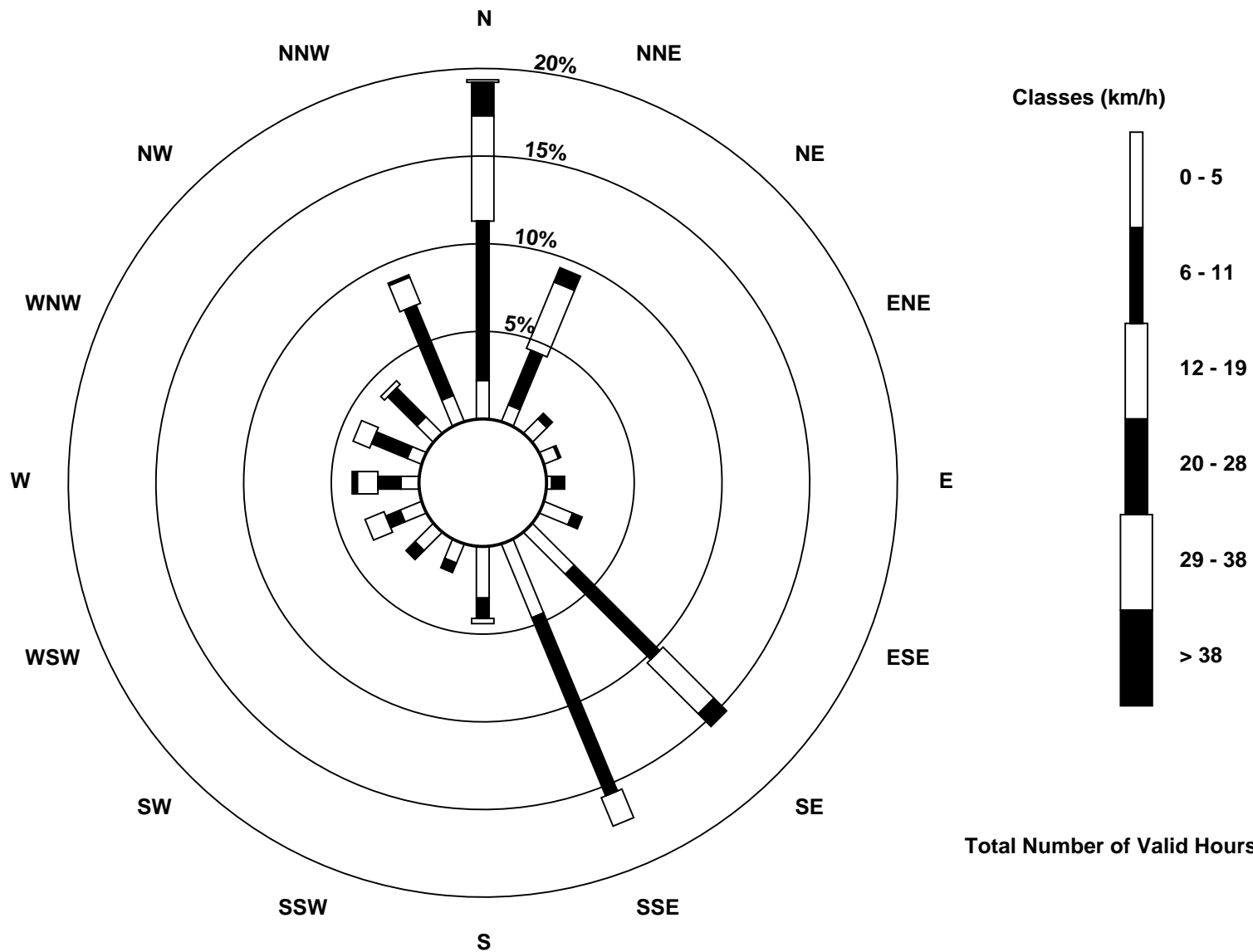
Total Number of Valid Hours: 682

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 682



Maximum Speed: 38 km/h on Feb 6 13:00	Maximum Daily Speed Average: 21.6 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 8 15:00	Minimum Daily Speed Average: 0.5 km/h on Feb 2	Hours of Data: 674
Maximum Diurnal Speed Average: 4.1 km/h at hour 1	Minimum Diurnal Speed Average: 1.4 km/h at hour 15	Hours of Missing Data: 22
Monthly Average Velocity: 2.1 km/h 18.7 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 7 Median = 11 Q ₃ = 16 P ₉₀ = 22 P ₉₉ = 30	Percent Operational Time: 96.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	N7	N3	NW2	N1	SW2	SSE5	SSE8	SSE15	SSE12	SSE10	SE11	SE8	SE12	SSE9	SSE10	SSE10	SSE9	SSE10	SSE11	SSE9	SSE9	SSE7	SE4	SE7	SSE6.8	SSE15
2-Feb	SE9	SSE7	SE5	ESE4	S4	SSE8	S7	SSE5	SSE10	SSE10	SSE9	SE9	SSE10	SE7	SE3	NNW12	NNW12	NNW17	NNW16	NNW16	NNW13	NNW11	NNW11	NNW9	N0.5	NNW17
3-Feb	N9	N6	N6	NNE8	NNW5	ENE2	NE2	NE4	SE3	SSE6	SSE5	SE6	SSE6	ESE2	SE4	WNW4	NNW8	N10	N10	N12	N16	N19	N14	N13	NNE4.9	NNE19
4-Feb	N12	NNW12	NNW8	NNW10	NNW8	NNW6	N7	N7	N6	NNW3	SSE4	ESE5	SE8	SE7	SE7	ESE6	E6	ENE8	ENE5	NNE5	NW5	NW4	W5	W7	NNE3.0	N12
5-Feb	SW2	SE5	SE9	SSE13	SE11	SE8	SE10	SE15	SE19	SSE15	SE18	SE17	SE16	SE16	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	SE19
6-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N38	N27	NNW25	NNW24	NNW22	NNW18	NNW14	N10	NNE10	N6	NNE8	NE7	----	N38
7-Feb	NE6	NNE14	N13	NNW9	NNW4	N5	E3	SSE9	SE8	ENE7	NNE11	NNW8	NW9	NNW7	NNW10	NNW11	N9	NNW10	N9	NNE3	SSW4	S6	S5	SSE11	N4.0	NNE14
8-Feb	SE13	SSE12	S11	S10	S6	SE12	ESE9	SE9	S10	SSE10	SSE7	SSE6	SE5	SE3	SSW0	ESE1	SSW3	S5	S9	ESE5	SE6	SSE8	SSE11	SSE11	SSE7.1	SE13
9-Feb	SE12	SSE13	SE13	ESE9	SE7	SE13	SE10	SE8	SE13	SE13	SE9	SSE5	SSE4	S4	SW6	S6	SSE6	SSE9	WSW3	N26	NNW24	N21	N27	N27	E3.1	N27
10-Feb	N21	N18	N23	N24	N25	N30	N22	NNE19	NNE17	NNE16	N11	NNE13	NNE15	NNE12	NNE14	N12	NNW13	NNW13	N21	N14	N11	N8	NNW7	N12	N16.0	N30
11-Feb	NNE10	NNE8	N4	N8	N11	N11	N10	N9	N8	N7	NNW7	NNW7	NNW10	NW10	NW11	WNW11	NNW13	N16	N14	N10	NNE12	ENE7	SE4	SE8	N7.6	N16
12-Feb	SE13	ESE11	SE15	ESE20	ESE23	SE24	SE26	SE25	ESE19	ESE19	SE21	SE18	SE18	SE16	SE21	SE25	SE25	SE26	SE24	SE27	SE27	SE26	SE26	SE23	SE21.6	SE27
13-Feb	SE20	SE23	SE26	SE22	SE21	SE19	SE18	SE16	SE15	SE14	SE14	SSE17	SE12	SE10	SE12	SSE15	SSE14	SSE16	SSW12	W10	S7	S12	SW7	WSW6	SSE13.2	SE26
14-Feb	WSW18	WSW22	WSW22	WNW14	NW14	NW11	N10	NNW7	NW7	WNW4	W5	WSW7	W5	WNW1	NE3	NNE6	NNE10	NNE8	N6	N8	N12	N14	N16	N12	NW6.8	WSW22
15-Feb	N15	N8	N12	N11	N19	N17	N15	N17	N16	N13	N12	NNW8	NNW7	NNW12	NNW12	N9	NNW8	NNW9	N7	NNE6	NNE4	WSW4	SE2	ESE3	N9.5	N19
16-Feb	S4	SSE5	SSE8	SE10	SE6	SE4	ENE3	NE7	ESE9	SSE10	SE10	SSE9	SE7	SE3	SSE6	SE6	NE3	N5	NNW10	NW7	NW7	NW6	NW8	NW11	ESE1.8	NW11
17-Feb	NW12	NW15	NNW18	NNW14	NNW18	N20	N18	N18	N22	N19	N16	NNE16	N15	N15	NNE15	N13	NNE14	N17	N18	N17	N18	N16	N15	N15	N16.0	N22
18-Feb	N16	N14	N11	N11	N13	N13	N14	N11	NNE6	E8	E7	SE5	W5	WNW7	NW9	NNW5	WNW3	W5	WNW10	WNW10	WNW10	WNW14	N27	N27	N8.0	N27
19-Feb	N26	N17	NNW14	NW15	NNW20	NNW19	NNE16	NNE11	NNW7	NW3	N3	NNW4	NW13	NW13	WNW11	NW11	NNE7	NNE9	NNE9	NNE12	NNE14	NNE14	N16	N12	N11.2	N26
20-Feb	N12	N9	N9	NNW5	NNW4	SSW2	SSW2	SSE2	SW3	SSW3	SE4	ESE4	ESE6	E7	E8	E8	ESE5	ESE5	SE11	SE13	SE9	SSE8	SSE8	SSE10	ESE3.3	SE13
21-Feb	SE10	SSE14	SSE12	S9	SSW7	S9	SSE11	SSE11	SE12	SSE12	SE11	SE10	SE12	SE12	SE13	SE13	SE13	SE12	SE15	SE14	SE13	E6	ENE3	WSW4	SE9.9	SE15
22-Feb	NW10	N6	NW5	N11	N13	N9	NNW2	SSE2	SSE6	SSE9	SE12	SE12	SE9	SE11	SE6	SE6	ESE7	SE8	SW2	WNW17	NW22	NW17	NW13	NW8	N1.8	NW22
23-Feb	NNW4	WSW4	WSW9	WSW13	WSW14	WSW13	WSW16	W14	W14	WSW13	W14	WNW15	NNW11	N10	ENE1	NW8	NW8	NNW8	NNW3	WSW11	W18	W21	W23	WNW23	W10.4	W23
24-Feb	WNW24	WNW22	WNW22	WNW26	WNW16	W14	W10	SW5	SSW8	S9	SSE5	SE6	SE8	SE7	S3	SSW3	S10	SSE14	S21	SSE23	S27	S23	SSE22	SSE22	SSW8.2	S27
25-Feb	SSE24	SSE23	SSE22	S18	S18	SSE14	S16	SSW19	SSW14	SSW10	SW9	SSE3	SSW4	WSW21	WSW23	WSW27	WSW23	WSW19	WSW20	WSW26	WSW24	WSW20	WSW19	WSW16	WSW14.0	WSW27
26-Feb	SW10	SSW9	S10	S9	SW12	SW11	SW13	WSW14	WSW23	W19	W19	W16	NNW16	NNW13	NNW10	NNE18	NNE22	N28	N23	NNE29	NNE22	N25	N25	N27	NW8.8	NNE29
27-Feb	N30	N30	N33	N31	N32	N30	N28	N20	N20	N16	N12	NW12	NW14	NW12	NW10	NW7	W7	W5	NNW3	NE5	S5	NNW8	N16	N23	N15.5	N33
28-Feb	N21	N24	N23	N22	N17	N17	N24	NNW21	NNW26	N26	N17	N14	N18	N18	N15	N16	N14	N17	N18	N15	NNE15	N14	NNE8	NNE1	N17.4	NNW26
29-Feb	ESE6	SE11	SSE12	SSE12	SE13	SE16	SSE16	SE15	SE11	SE11	SE10	SE15	SE16	SE18	SE16	SE14	SE12	SSE12	SSE15	SSE15	SSE13	SSE12	SE13	SSE16	SE13.1	SE18
N4.1 NNE2.6 N1.9 N2.6 N3.4 NNE2.6 NE2.6 ENE2.0 ESE1.6 ESE2.4 ESE2.3 ESE2.2 NE1.8 NE1.5 NNE1.4 N2.3 NNE2.3 NNE3.2 N2.7 N4.0 N3.3 NNW3.1 N4.0 N3.6																								Diurnal Average		
N30 N30 N33 N31 N32 N30 N28 SE25 NNW26 N26 SE21 SE18 N38 N27 NNW25 WSW27 SE25 N28 SE24 NNE29 S27 SE26 N27 N27																								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

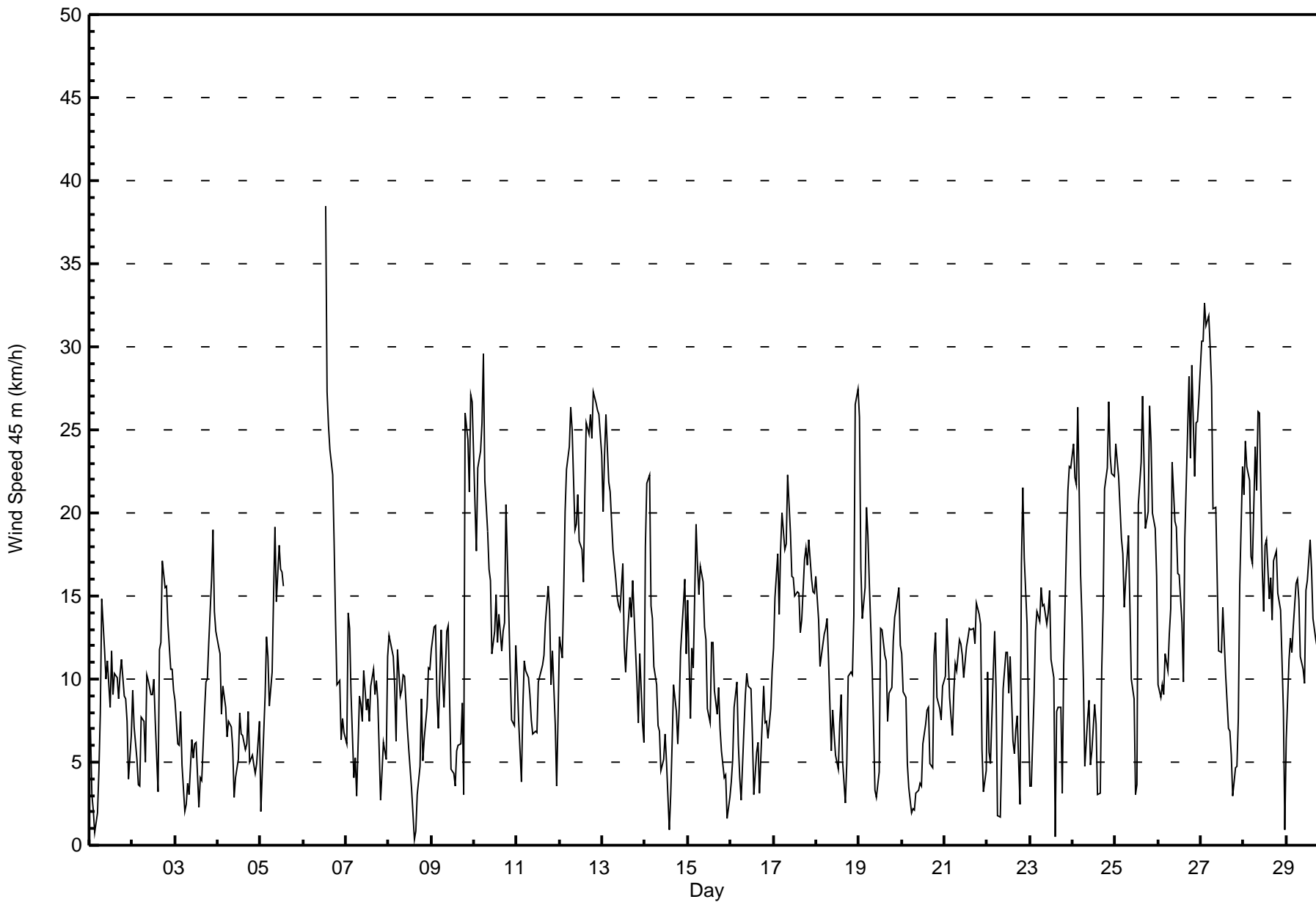
Wind Speed 45 m (WS45m) - km/h
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 28 08:00													Hours in Service: 696 Hours of Data: 674 Hours of Missing Data: 22 Hours of Calibration: 0 Percent Operational Time: 96.8												
Minimum Value: 1 km/h on Feb 1 03:00																									
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	2	1	1	1	1	2	2	1	2	2	3	3	3	2	2	2	2	2	1	1	1	2	1	1	3
2-Feb	1	1	2	2	2	1	1	1	2	4	2	3	2	2	3	5	4	3	4	4	3	2	2	2	5
3-Feb	2	2	2	3	2	1	2	2	2	1	2	2	2	1	2	1	2	3	3	3	3	4	3	3	4
4-Feb	2	2	2	2	2	2	2	2	1	1	3	2	2	2	2	2	2	2	1	2	1	1	2	1	3
5-Feb	2	2	2	3	3	2	3	3	5	2	3	3	3	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5
6-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	8	7	5	5	3	4	2	2	3	2	2	8
7-Feb	1	5	3	3	1	1	1	3	2	2	2	2	2	2	2	2	2	2	1	3	1	1	1	2	5
8-Feb	2	2	1	1	3	4	2	2	3	2	2	2	1	1	1	1	1	2	1	1	1	2	1	2	4
9-Feb	3	1	3	2	2	2	2	2	3	3	2	2	2	2	2	2	1	2	4	7	7	7	5	6	7
10-Feb	6	5	7	7	5	6	5	5	4	4	3	3	3	3	2	2	2	3	3	2	4	2	2	3	7
11-Feb	1	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	3	4	4	2	3	2	3	4
12-Feb	3	4	4	5	5	5	5	5	5	5	5	4	4	3	6	7	6	6	6	6	5	5	5	4	7
13-Feb	4	5	4	5	4	4	3	3	2	3	3	3	2	2	2	2	1	3	3	4	2	2	2	2	5
14-Feb	3	2	2	5	1	2	3	3	2	1	1	1	2	1	1	2	3	2	1	2	2	2	2	3	5
15-Feb	2	2	2	2	4	3	3	3	2	2	2	3	2	2	3	2	2	2	2	2	1	2	1	2	4
16-Feb	1	2	2	3	3	2	1	2	3	2	2	3	2	3	3	2	1	2	2	1	1	1	1	2	3
17-Feb	3	3	4	4	4	6	5	7	5	5	6	5	3	3	3	3	2	2	3	3	3	3	2	2	7
18-Feb	3	2	2	1	2	1	2	3	2	3	3	3	3	2	3	2	2	3	2	3	2	4	6	7	7
19-Feb	5	4	4	5	6	5	4	4	1	2	1	3	3	3	2	2	3	3	2	3	3	3	3	2	6
20-Feb	2	1	1	2	2	2	1	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	2
21-Feb	1	1	1	1	1	2	1	2	2	2	2	3	3	2	3	2	2	2	2	3	2	3	3	3	3
22-Feb	1	3	2	3	2	2	1	1	1	2	3	3	3	2	2	3	2	3	3	5	3	2	4	2	5
23-Feb	2	1	3	2	1	3	3	2	2	4	7	5	2	3	2	2	2	2	2	3	3	1	2	2	7
24-Feb	2	2	3	3	4	2	5	3	1	1	2	2	3	2	3	2	4	1	1	2	2	3	2	2	5
25-Feb	2	2	2	2	3	2	3	2	2	4	3	3	4	4	5	4	3	2	3	3	3	4	3	4	5
26-Feb	3	2	2	2	2	3	2	6	3	4	2	2	3	3	2	4	4	6	6	5	5	4	4	4	6
27-Feb	4	3	4	4	4	3	4	4	4	4	4	4	2	2	2	2	1	1	3	2	2	6	2	5	6
28-Feb	7	7	4	4	5	6	5	8	6	6	3	3	4	4	3	2	3	3	3	2	2	2	3	1	8
29-Feb	3	3	2	1	4	3	1	2	2	2	3	4	4	4	3	2	2	3	1	1	2	2	2	2	4
													Diurnal Maximum												
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 45 m (WS45m) - km/h
Mannix - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Mannix - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	105	15.58	15.58
6 - 11	247	36.65	52.23
12 - 19	224	33.23	85.46
20 - 28	89	13.20	98.66
29 - 38	9	1.34	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Mannix - February 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	4	5	5	1	9	14	12	5	9	4	5	6	4	5	11	105
6 - 11	40	16	3	3	7	8	44	41	15	4	5	4	4	6	18	29	247
12 - 19	65	19	0	0	0	2	50	24	4	3	2	10	8	7	11	19	224
20 - 28	31	2	0	0	0	2	19	6	3	0	0	11	2	5	1	7	89
29 - 38	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	150	42	8	8	8	21	127	83	27	16	11	30	20	22	35	66	674

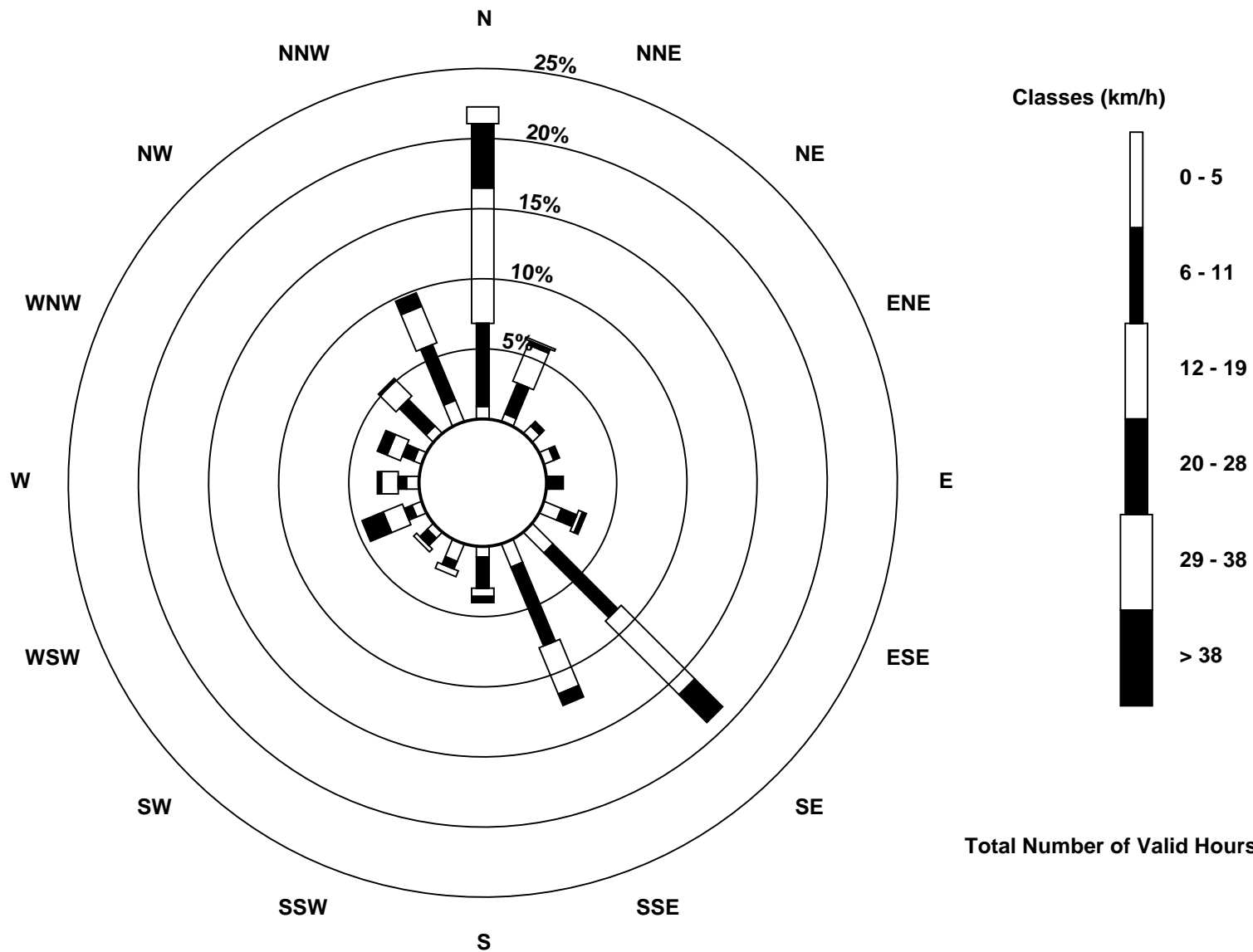
Total Number of Valid Hours: 674

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Maximum Speed: 44 km/h on Feb 6 13:00	Maximum Daily Speed Average: 23.6 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 8 16:00	Minimum Daily Speed Average: 1.2 km/h on Feb 2	Hours of Data: 605
Maximum Diurnal Speed Average: 5.1 km/h at hour 11	Minimum Diurnal Speed Average: 1.3 km/h at hour 15	Hours of Missing Data: 91
Monthly Average Velocity: 1.7 km/h 54.0 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 14 Q ₃ = 20 P ₉₀ = 27 P ₉₉ = 33	Percent Operational Time: 86.9

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	NNE8	NNE3	NNE1	ENE1	SSE2	SSE7	SSE10	SSE15	SSE16	SSE15	SE16	SE11	SE15	SSE12	SSE12	SSE13	SSE13	SE14	SE14	SE11	SE9	SSE10	SSE6	SSE8	SSE9.1	SE16	
2-Feb	SE9	SSE8	SE7	SE5	SE2	SE8	S7	SSE8	SSE10	SSE13	SSE16	SE12	SSE13	SSE11	SSE5	NNW15	NNW14	NNW19	NNW18	N18	N15	NNW12	NNW12	NNW10	ENE1.2	NNW19	
3-Feb	N11	N7	N7	NNE9	NNW5	ENE2	NE2	NE4	SE3	SE7	SE6	SE6	SSE7	ESE2	SE4	WNW4	NNW8	N11	N11	N13	N18	NNE22	N16	N15	NNE5.7	NNE22	
4-Feb	N13	N12	NNW9	N10	NNW10	N8	N9	NNE7	NNE6	NNE3	SSE4	ESE4	SE7	SE7	SE6	ESE5	E5	ENE8	E5	ENE5	N5	NNW5	WNW3	W7	NNE3.8	N13	
5-Feb	S2	SE5	SE10	SSE16	SE16	SE9	SE12	SE16	SE21	SE20	SE24	SE23	SE21	SE20	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE23	----	SE24	
6-Feb	SE20	SE18	SE13	SE18	SE20	SE21	SE20	SE17	AF	AF	AF	AF	N44	N31	NNW29	NNW28	NNW26	NNW21	NNW17	N11	NNE12	N8	NNE8	NE7	NNE7.7	N44	
7-Feb	NE6	NNE17	NNE17	N12	N7	NNE7	E4	SE6	SE8	ENE6	AF	N11	NNW9	N8	N10	NNW12	N11	N12	NNE11	ENE5	SE7	SSE10	SSE9	SSE16	NNE4.9	NNE17	
8-Feb	SSE19	SE14	SSE19	SSE18	S14	SSE20	SE12	SE13	SSE11	SSE15	SSE15	SSE10	SSE7	SSE1	NW1	ESE0	SSW4	S6	S9	SE8	SE9	SE10	SE14	SE10	SSE10.3	SSE20	
9-Feb	SE12	SE15	SE14	SE9	SE7	SE14	SE10	SE8	SE12	SE16	SE12	SE7	SSE7	S6	SSW6	S7	S7	SSW7	W10	N31	NNW28	N25	N32	N30	E3.6	N32	
10-Feb	N24	N21	N27	N27	N29	N33	NNE25	NNE21	NNE19	NNE18	NNE13	NNE14	NNE17	NNE13	NNE15	N13	N15	N16	N22	N16	N12	N9	N9	NNE12	N18.2	N33	
11-Feb	NE12	NE10	NNE4	NNE9	NNE11	NNE11	NNE11	NNE10	NNE9	NNE6	NNW7	NNW8	NNW10	NNW10	NW11	NW12	NNW15	N19	NNE17	NNE10	NE11	E7	ESE6	SE10	NNE7.8	N19	
12-Feb	SE15	SE13	SE15	SE20	SE22	SE25	SE29	SE28	SE23	SE21	SE22	SE20	SE22	SE19	SE21	SE27	SE27	SE29	SE26	SE29	SE29	SE30	SE30	SE27	SE23.6	SE30	
13-Feb	SE22	SE27	SE31	SE25	SE25	SE22	SE21	SE19	SE18	SE17	SE17	SSE20	SE13	SE12	SSE17	SSE19	SSE18	S21	SW19	W19	SW12	SW13	WSW13	WSW13	SSE14.5	SE31	
14-Feb	WSW26	WSW28	WSW30	W20	NW16	NW13	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	WSW30	
15-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	----	----	
16-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	----	----	
17-Feb	AF	AF	AF	AF	AF	AF	AF	N19	AF	N24	N21	AF	AF	AF	AF	NNE16	N14	NNE15	N18	N20	N19	N20	N18	NNE18	N17	----	N24
18-Feb	N18	NNE15	NNE11	NNE11	NNE13	NNE12	NNE13	NNE11	ENE6	ESE8	ESE8	SE9	SE6	NW2	NW8	NNE5	ESE4	SE4	WNW9	WNW12	WNW13	WNW16	N30	N32	N7.4	N32	
19-Feb	N29	N19	NNW16	NW17	NNW24	NNW21	NNE18	NNE13	NNW8	NW4	N2	NNW5	NW13	NNW13	NW11	NNW11	NNE8	NNE11	NNE11	NNE14	NNE16	NNE17	N18	N14	N12.8	N29	
20-Feb	N13	NNE9	N8	N6	N5	NE1	SSW3	SSE2	SSE3	S5	SE5	SE4	ESE6	ESE5	E6	E7	SE6	SE7	SE13	SE17	SE12	SE11	SSE11	SE14	ESE4.5	SE17	
21-Feb	SE15	SSE17	SSE15	SSW10	WSW7	S5	SSE11	SSE10	SSE14	SSE16	SSE13	SE11	SE13	SE13	SE15	SE15	SE16	SE15	SE20	SE15	SE12	E7	E3	WSW4	SSE11.0	SE20	
22-Feb	NW12	NNE7	N7	N14	NNE16	N10	NNW3	SSW3	S5	SSE12	SSE15	SE15	SE12	SE13	SE9	SE7	SE10	SSE12	WSW7	WNW25	NW27	NNW25	NW17	NW7	NNW1.9	NW27	
23-Feb	N5	W4	WSW13	WSW21	WSW23	WSW21	WSW23	W21	WSW21	WSW20	W19	NNW17	NNW14	N12	NNE2	NW8	NW10	N9	NNW4	W14	WNW24	W27	W27	WNW29	W13.9	WNW29	
24-Feb	WNW31	WNW30	WNW29	WNW33	WNW21	W16	W15	WSW8	SW8	SW10	SSW8	SSE7	SE12	SE10	SSW4	SW5	S12	S17	S27	S30	S35	S31	S30	S29	SW11.0	S35	
25-Feb	S31	SSE27	S25	S24	SSW22	S16	S20	SSW23	SSW19	SW13	SW11	S5	SSW6	WSW23	WSW24	WSW25	WSW26	WSW23	WSW26	WSW30	WSW26	WSW24	WSW21	WSW21	SW17.9	WSW32	
26-Feb	WSW14	SW12	SSW9	SW11	WSW16	WSW15	WSW16	WSW20	WSW28	W22	W21	W18	NW20	NW15	NNW11	NNE22	NNE26	N33	N27	NNE33	NNE26	N29	N28	N30	NW10.9	NNE33	
27-Feb	N34	N33	N35	N35	N35	N33	N29	N23	N23	N19	N14	NW12	NW14	NW12	NW10	NW7	W6	W5	N3	NE5	SSE6	N8	N18	N26	N17.0	N35	
28-Feb	N24	N28	N27	N27	N21	N20	N28	NNW25	NNW29	N28	N18	N15	N19	N19	N16	N17	N15	N20	N21	N18	NNE18	NE12	ENE7	SE4	N19.2	NNW29	
29-Feb	SE10	SE16	SE18	SE15	SE14	SE20	SE20	SE18	SE15	SE15	SE12	SE18	SE17	SE20	SE18	SE15	SE15	SSE16	S19	S18	SSE17	SSE16	SSE18	SSE20	SE16.2	SE20	

NNE3.6	NE2.9	NE1.4	N1.6	N2.3	ENE2.4	E3.1	ESE3.1	SE2.5	SE3.8	SSE5.1	SE4.0	E3.0	E1.9	NNE1.3	N2.2	NNE2.0	NE2.9	NNE2.2	N3.8	N3.3	N2.8	N3.7	NNE2.7	Diurnal Average
N34	N33	N35	N35	N35	N33	SE29	SE28	NNW29	N28	SE24	SE23	N44	N31	NNW29	WSW29	SE27	N33	N27	NNE33	S35	S31	N32	N32	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

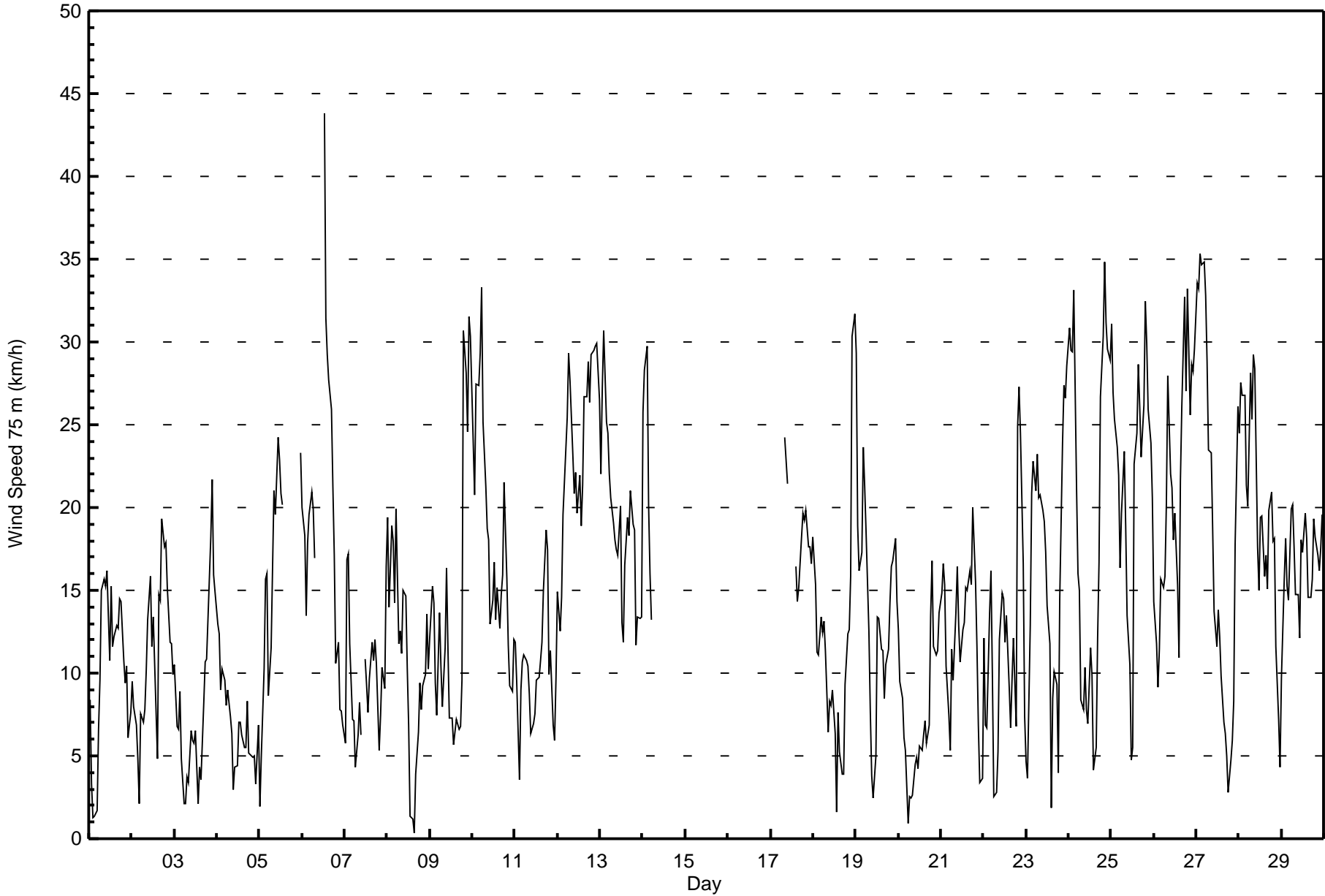
Wind Speed 75 m (WS75m) - km/h
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 28 08:00														Hours in Service: 696 Hours of Data: 605 Hours of Missing Data: 91 Hours of Calibration: 0 Percent Operational Time: 86.9											
Minimum Value: 1 km/h on Feb 1 03:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 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	2	1	1	1	3	1	1	1	2	4	3	2	2	2	2	3	1	1	1	1	2	1	2	4
2-Feb	2	1	2	2	1	2	1	2	1	4	3	3	3	3	4	6	4	3	4	4	3	2	2	2	6
3-Feb	2	3	2	4	1	1	1	2	2	1	2	2	2	1	2	1	2	3	3	3	2	3	3	4	
4-Feb	2	2	2	2	1	1	2	2	1	1	3	2	3	3	3	3	3	2	2	2	2	1	1	3	
5-Feb	1	1	4	3	3	3	4	5	5	3	2	3	3	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	
6-Feb	4	3	4	3	3	2	5	3	AF	AF	AF	AF	7	8	5	4	2	2	2	3	3	2	2	8	
7-Feb	2	6	3	3	2	2	2	1	2	3	AF	AF	2	2	3	2	2	2	2	3	1	1	2	6	
8-Feb	2	2	2	1	3	5	4	2	4	2	2	4	1	2	1	1	1	1	1	2	1	1	2	5	
9-Feb	4	3	6	3	2	5	4	4	3	4	3	2	2	2	2	1	1	2	4	7	7	7	5	7	
10-Feb	6	5	7	6	5	5	5	5	3	4	3	3	3	3	2	2	2	2	2	2	3	1	1	7	
11-Feb	1	1	2	2	1	1	1	2	1	1	2	2	2	2	2	2	2	2	4	2	1	2	2	5	
12-Feb	3	4	6	6	6	7	7	6	6	7	6	5	4	5	7	8	8	7	7	8	6	5	5	8	
13-Feb	5	5	3	5	4	4	3	3	2	3	3	2	2	3	1	1	3	2	3	2	2	2	2	5	
14-Feb	3	2	2	8	2	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	8	
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
17-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	
18-Feb	3	2	1	1	2	1	2	3	2	3	3	3	5	2	3	2	2	3	3	3	1	4	5	8	
19-Feb	5	3	4	5	6	5	4	4	1	2	1	2	2	3	2	3	3	3	2	4	3	3	3	6	
20-Feb	2	1	1	2	1	1	1	1	2	1	1	2	2	2	2	3	3	2	3	2	3	2	1	3	
21-Feb	1	1	1	3	1	1	2	2	2	2	3	3	2	3	3	2	2	2	3	6	4	4	3	6	
22-Feb	2	2	2	3	2	3	1	1	1	2	2	2	3	2	3	2	2	2	4	6	3	2	5	6	
23-Feb	2	2	5	2	1	4	4	1	2	4	5	4	2	3	3	2	2	2	2	3	3	1	1	5	
24-Feb	2	3	3	3	4	2	3	2	1	2	1	2	1	3	2	3	3	5	2	1	1	2	3	5	
25-Feb	2	1	2	2	3	2	2	3	2	4	3	3	4	4	4	4	3	3	4	3	3	3	3	4	
26-Feb	4	2	3	4	3	3	3	6	3	4	3	2	3	3	2	4	4	5	6	5	5	3	3	6	
27-Feb	3	3	4	3	3	2	3	3	2	3	4	4	2	2	2	2	1	1	3	2	3	7	2	7	
28-Feb	8	6	4	4	6	7	5	9	6	6	3	3	5	3	2	2	3	3	2	2	2	2	2	9	
29-Feb	3	6	4	2	6	2	1	2	2	2	4	4	4	4	3	2	2	3	1	2	2	2	2	6	
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 75 m (WS75m) - km/h
Mannix - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 75 m (WS75m) - km/h
Mannix - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	67	11.07	11.07
6 - 11	164	27.11	38.18
12 - 19	215	35.54	73.72
20 - 28	114	18.84	92.56
29 - 38	44	7.27	99.83
> 38	1	0.17	100.00

Total Number of Valid Hours: 605

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h
Mannix - February 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	6	4	4	4	6	9	6	5	4	1	1	2	2	2	6	67
6 - 11	23	23	4	4	4	6	36	21	6	6	4	3	3	1	8	12	164
12 - 19	39	28	1	0	0	0	62	34	5	1	5	7	6	4	11	12	215
20 - 28	25	6	0	0	0	0	35	4	5	2	0	18	6	3	2	8	114
29 - 38	19	1	0	0	0	0	7	0	6	0	0	4	0	5	0	2	44
> 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	112	64	9	8	8	12	149	65	27	13	10	33	17	15	23	40	605

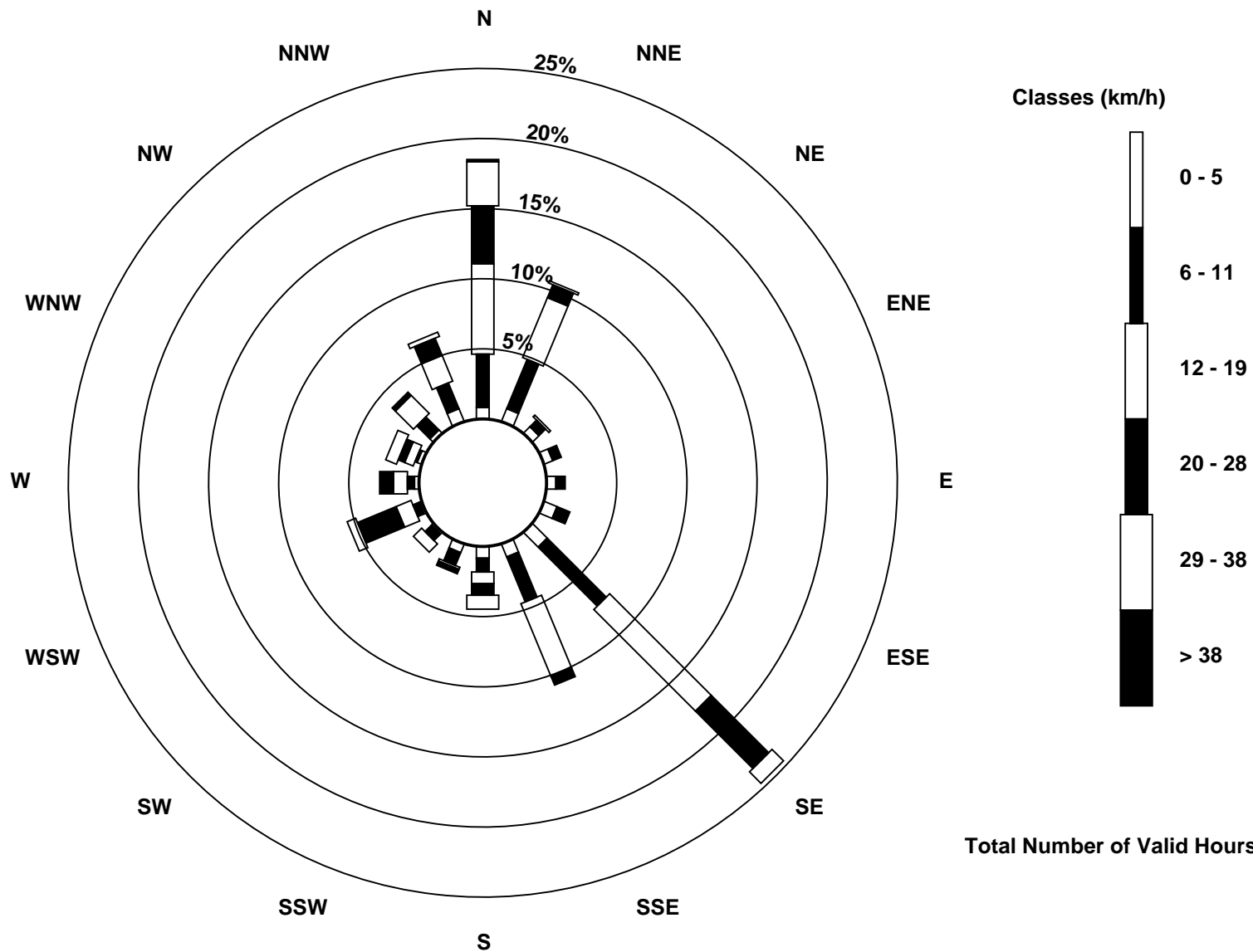
Total Number of Valid Hours: 605

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 605



Maximum Speed: 45 km/h on Feb 6 13:00		Maximum Daily Speed Average: 27.1 km/h on Feb 12		Hours in Service: 696																							
Minimum Speed Value: 0 km/h on Feb 8 16:00		Minimum Daily Speed Average: 1.4 km/h on Feb 2		Hours of Data: 629																							
Maximum Diurnal Speed Average: 6.1 km/h at hour 11		Minimum Diurnal Speed Average: 1.3 km/h at hour 16		Hours of Missing Data: 67																							
Monthly Average Velocity: 1.9 km/h 77.4 deg		Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 15 Q ₃ = 22 P ₉₀ = 28 P ₉₉ = 34		Percent Operational Time: 90.4																							
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	NNE9	NE3	ENE2	E2	SSE3	SSE8	SSE10	SSE16	SSE17	SSE19	SE19	SE14	SE18	SSE13	SSE14	SSE15	SSE15	SE16	SE16	SE12	SE11	S12	S8	SSE9	SSE10.5	SE19	
2-Feb	SE11	SSE9	SSE8	SE6	SE4	SE9	SSE6	SSE7	SSE10	SSE15	SSE18	SSE12	SSE13	SSE14	S6	NNW16	NNW15	NNW20	NNW18	N19	N16	NNW12	NNW12	NNW10	E1.4	NNW20	
3-Feb	N11	NNE7	N7	NNE9	NNW5	ENE2	ENE2	ENE3	SE4	SE7	SE7	SSE7	SSE7	SE3	SSE5	WNW3	N8	N11	N11	N14	N19	NNE22	N16	N16	NNE5.6	NNE22	
4-Feb	N13	N12	N9	N11	N10	N9	N10	NE8	NNE6	NE3	SSE5	ESE6	SE9	SE8	SE8	ESE8	E7	E10	E7	E5	NNE4	N5	WNW2	W6	NE4.0	N13	
5-Feb	SE4	SE6	SE12	SSE18	SE20	SE13	SE15	SE19	SE24	SE22	SE27	SE27	SE24	SE22	SE25	SE25	SE24	SE18	SE18	SE18	ESE16	SE24	SSE25	SSE24	SE19.5	SE27	
6-Feb	SE23	SE24	SE18	SE19	SE20	SSE23	SE22	SE22	AF	AF	AF	AF	N45	N33	N31	NNW29	NNW27	NNW22	NNW18	N11	NNE12	N8	NNE7	NE6	NE7.6	N45	
7-Feb	ENE5	NNE17	NNE19	N12	NNE8	NE7	E5	SSE4	SSE6	E5	AF	N11	NNW10	N7	N9	N12	N11	N13	NNE10	E7	SE10	SSE13	SSE13	SSE20	NE4.9	SSE20	
8-Feb	SSE22	SE13	SSE20	SSE20	S18	SSE20	SE14	SE11	SSE12	SSE12	S15	S11	S6	W3	NW2	SSE0	SSW4	S7	S10	SE9	SE12	SE12	SE15	SE12	SSE11.0	SSE22	
9-Feb	SE14	SE17	SE17	SE14	ESE10	SE15	ESE13	SE11	ESE13	SE20	SE14	SE11	SSE10	SSE8	SSW7	S8	SSW7	SW8	W12	N32	NNW30	N25	N33	N32	E4.5	N33	
10-Feb	N25	N22	N29	N29	NNE31	N35	NNE26	NNE22	NNE19	NNE19	NNE13	NNE15	NNE17	NNE13	NNE15	N13	N15	N17	N22	NNE16	NNE11	NNE8	NNE8	NE11	NNE18.6	N35	
11-Feb	ENE12	ENE10	NE3	NE8	NE11	NE12	NE11	NE11	NE9	NNE6	N7	N8	NNW10	NNW9	NNW11	NW12	N15	N20	NNE19	NNE10	ENE11	ESE13	ESE10	SE12	NNE7.8	N20	
12-Feb	SE16	SE17	ESE19	ESE24	ESE24	SE27	SE32	SE31	SE28	SE25	SE25	SE23	SE25	SE22	SE25	SE31	SE31	SE33	SE31	SE33	SE33	SE33	SE33	SE29	SE27.1	SE33	
13-Feb	SE25	SE31	SE34	SE28	SE27	SE24	SE23	SE21	SE20	SE20	SSE20	SSE22	SSE14	SSE14	SSE19	S20	S19	SSW22	WSW22	W21	WSW15	WSW15	WSW16	WSW17	SSE15.7	SE34	
14-Feb	W28	W30	W32	W22	NW17	NW14	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	W32	
15-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	---	---	
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE6	SE8	E8	NE5	NNE12	N11	NNW10	NNW9	NNW11	NNW12	---	NNW12	
17-Feb	NNW15	NNW18	NNW21	N17	NNW19	AF	AF	AF	AF	AF	AF	AF	N15	N15	N17	NNE17	N14	NNE15	N18	N20	N20	N20	N18	NNE18	N17	N17.2	NNW21
18-Feb	NNE19	NNE15	NNE11	NNE10	NE13	NE11	NE12	NE10	E10	ESE17	ESE15	ESE13	SE12	SE4	NW4	ENE5	ESE9	SE8	NW7	NNW14	NNW14	NNW17	N32	N33	NNE6.6	N33	
19-Feb	N30	N20	NNW17	NW18	NNW25	N22	NNE19	NNE13	NNW8	NW4	N2	NNW5	NW13	NNW14	NW11	NNW11	NNE9	NE11	NNE12	NNE15	NNE18	NNE18	N19	N15	N13.4	N30	
20-Feb	NNE13	NNE10	NNE8	N7	N6	NE3	SSW2	S2	SSE3	S6	SSE6	SE6	SE7	ESE7	ESE8	E8	SE7	SE10	SE16	SE20	SE15	SSE13	SSE14	SSE16	ESE5.8	SE20	
21-Feb	SSE17	SSE16	S13	SSW10	WSW9	SSW5	S10	S8	SSE13	SSE17	SSE14	SSE12	SE14	SE15	SE17	SSE17	SSE18	SE17	SE23	SE19	SE16	E9	E4	WSW4	SSE11.6	SE23	
22-Feb	NW12	NNE7	N7	N15	NNE16	N9	NW3	SW2	SSW3	S11	SSE13	SE15	SE14	SE15	SE11	SSE7	SE10	SSE12	W9	NW27	NW28	NNW26	NW18	NNW7	NNW2.2	NW28	
23-Feb	N4	W4	W15	W24	W26	WSW24	W26	W23	W23	WSW22	W20	NNW17	NNW15	N12	NNE2	NW8	NNW10	N9	NNW4	W16	NNW26	NNW28	NNW27	NNW30	NNW15.0	NNW30	
24-Feb	WNW33	WNW32	WNW31	WNW33	WNW22	WNW17	W16	WSW10	WSW9	WSW12	SW10	S8	SSE11	SE12	SSW5	SW6	SSW13	S18	S28	S32	S37	S34	S32	S32	SW12.1	S37	
25-Feb	S34	S29	S27	S26	SSW23	S17	S21	SW26	SSW21	SW15	SW11	SSW6	SSW7	WSW23	WSW24	W28	WSW27	W25	W28	W35	W32	WSW28	WSW26	WSW22	SW19.5	W35	
26-Feb	WSW16	SW13	SW10	SW12	WSW17	WSW17	WSW17	WSW22	WSW30	W23	W22	W18	NW21	NW16	NNW11	NNE22	NNE27	N34	N29	NNE35	NNE26	NNE29	N29	N30	NW11.8	NNE35	
27-Feb	N35	N34	N36	N36	N36	N34	N29	N25	N24	N19	N14	NNW11	NW13	NNW12	NW9	NW7	W6	W5	N2	NE5	SSE7	N8	N19	N27	N17.4	N36	
28-Feb	N26	N29	N28	N29	N23	N21	N29	N27	N30	N29	N18	N15	N20	N20	N16	N17	N15	N21	N22	NNE19	NNE19	NE10	E8	SE7	N19.7	N30	
29-Feb	SE13	SE20	SSE21	SSE17	SE18	SE23	SE21	SE22	SE18	SE18	SE15	SE21	SE19	SE21	SE20	SSE16	SSE16	SSE18	S21	S20	SSE20	SSE18	SSE20	SSE22	SSE18.5	SE23	
NNE3.4 NE3.1 NE1.9 NNE2.0 NNE2.5 E2.5 ESE3.8 SE3.5 SE3.8 SE5.3 SSE6.1 SE4.5 E3.2 E2.4 ESE1.8 ENE1.3 ENE2.0 ENE2.7 NE2.0 N3.3 NNE2.7 NNE1.8 NNE2.6 NNE2.2																								Diurnal Average			
N35 N34 N36 N36 N36 N35 SE32 SE31 N30 N29 SE27 SE27 N45 N33 N31 SE31 SE31 NNE34 SE31 W35 S37 S34 SE33 N33																								Diurnal Maximum			
AF - Analyzer Failure																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

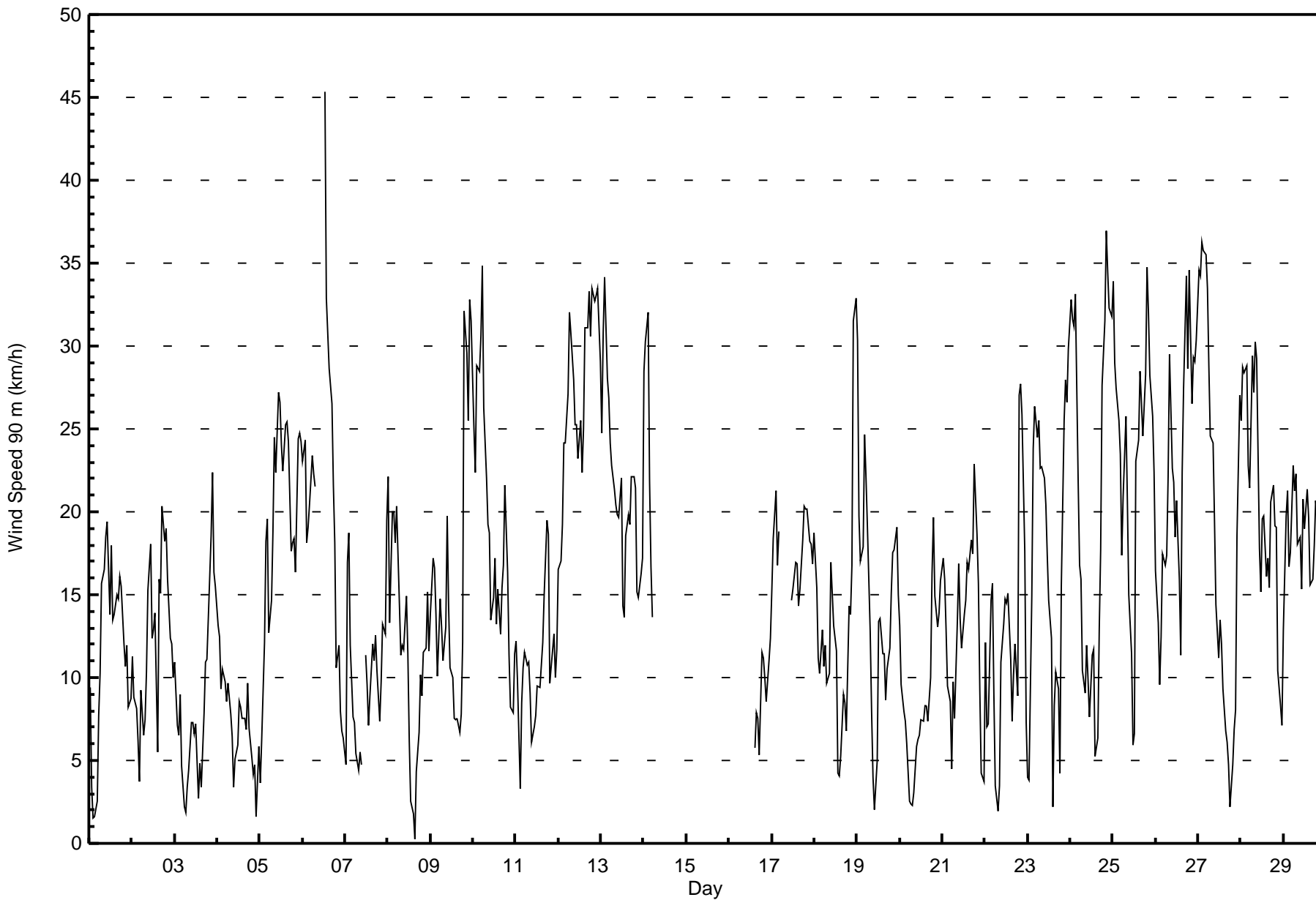
Wind Speed 90 m (WS90m) - km/h
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 28 08:00														Hours in Service: 696 Hours of Data: 629 Hours of Missing Data: 67 Hours of Calibration: 0 Percent Operational Time: 90.4																								
Minimum Value: 1 km/h on Feb 21 00:00																																						
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	2	2	1	1	1	2	1	1	1	1	3	2	2	2	2	2	3	1	1	1	1	1	1	1	3													
2-Feb	2	1	1	1	2	2	1	2	2	5	2	2	2	3	3	6	5	3	5	4	4	2	2	1	6													
3-Feb	3	3	2	4	2	1	1	1	2	1	2	2	2	1	2	1	2	3	3	3	2	3	3	3	4													
4-Feb	2	2	2	2	1	1	2	2	1	1	3	2	2	2	2	2	2	2	2	2	2	1	1	1	3													
5-Feb	1	1	3	3	2	3	3	3	4	3	2	2	4	3	4	3	1	2	3	5	4	3	1	5														
6-Feb	2	1	4	3	2	2	6	2	AF	AF	AF	AF	7	8	5	4	2	1	2	3	2	2	2	8														
7-Feb	2	7	2	3	2	2	2	1	2	2	AF	2	3	2	3	2	2	2	2	1	2	1	2	7														
8-Feb	2	3	2	1	2	3	4	2	2	3	2	2	3	1	1	1	1	1	1	1	1	2	1	4														
9-Feb	4	3	5	4	2	4	3	3	2	3	3	2	2	3	2	1	1	2	4	6	7	8	4	8														
10-Feb	6	5	7	6	6	5	5	5	3	4	3	3	3	3	2	2	2	2	2	2	3	1	1	7														
11-Feb	1	1	2	2	1	1	1	2	1	1	2	2	2	2	2	2	2	2	5	2	1	3	2	5														
12-Feb	4	3	4	4	4	6	6	5	4	6	5	4	3	4	6	7	6	6	6	6	5	5	5	7														
13-Feb	4	4	3	4	4	4	3	3	2	2	3	3	2	2	1	1	3	2	2	2	2	3	2	4														
14-Feb	3	1	1	9	2	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	9														
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--														
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	2	1	2	1	1	1	1	2	3													
17-Feb	4	3	3	5	4	AF	AF	AF	AF	AF	AF	AF	AF	5	4	4	3	4	2	3	2	3	3	3	5													
18-Feb	2	2	1	1	1	2	1	3	4	3	4	4	5	3	4	1	3	4	4	3	1	4	5	8	8													
19-Feb	5	3	4	6	7	5	4	4	2	3	1	2	2	3	2	3	3	3	2	4	3	3	3	2	7													
20-Feb	2	1	1	2	1	1	1	1	2	1	1	2	2	2	2	2	3	2	2	2	2	2	2	1	3													
21-Feb	1	2	1	2	2	1	2	1	4	2	2	2	2	2	3	2	2	2	2	6	4	4	4	2	6													
22-Feb	2	2	2	3	2	3	2	1	2	2	2	3	2	2	2	2	1	2	5	6	4	2	5	2	6													
23-Feb	2	2	7	2	1	4	4	1	1	4	5	4	1	3	3	2	2	2	3	3	1	1	1	2	7													
24-Feb	2	2	2	3	4	2	2	3	1	1	1	1	2	3	2	3	3	5	3	2	2	2	3	2	5													
25-Feb	2	2	2	2	3	2	2	3	2	4	3	3	5	4	4	4	3	4	4	3	3	3	3	4	5													
26-Feb	4	2	3	4	3	3	3	5	3	4	3	2	3	2	2	4	4	5	6	5	5	3	3	2	6													
27-Feb	3	3	3	3	3	2	3	3	2	3	5	4	2	2	2	2	1	1	2	2	3	7	2	5	7													
28-Feb	8	6	4	4	7	7	5	9	6	6	4	4	5	3	3	2	3	2	2	2	2	1	2	9	9													
29-Feb	3	6	4	1	6	3	1	2	2	2	4	3	4	3	3	2	2	2	1	2	2	2	1	1	6													
														8	7	7	9	7	7	6	9	6	6	5	5	7	8	6	7	6	6	6	6	6	7	8	5	8
Diurnal Maximum																																						
AF - Analyzer Failure																																						



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 90 m (WS90m) - km/h
Mannix - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 90 m (WS90m) - km/h
Mannix - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	54	8.59	8.59
6 - 11	163	25.91	34.50
12 - 19	215	34.18	68.68
20 - 28	134	21.30	89.98
29 - 38	62	9.86	99.84
> 38	1	0.16	100.00

Total Number of Valid Hours: 629

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 90 m (WS90m) - km/h
Mannix - February 2016

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	2	6	6	5	0	5	6	1	5	1	1	3	2	4	3	54
6 - 11	25	18	13	2	9	7	25	17	12	6	4	3	3	0	5	14	163
12 - 19	35	29	2	1	0	9	48	38	7	1	3	9	3	7	8	15	215
20 - 28	22	6	0	0	0	2	40	16	7	3	1	13	10	6	2	6	134
29 - 38	26	4	0	0	0	0	13	0	7	0	0	1	4	5	0	2	62
> 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	113	59	21	9	14	18	131	77	34	15	9	27	23	20	19	40	629

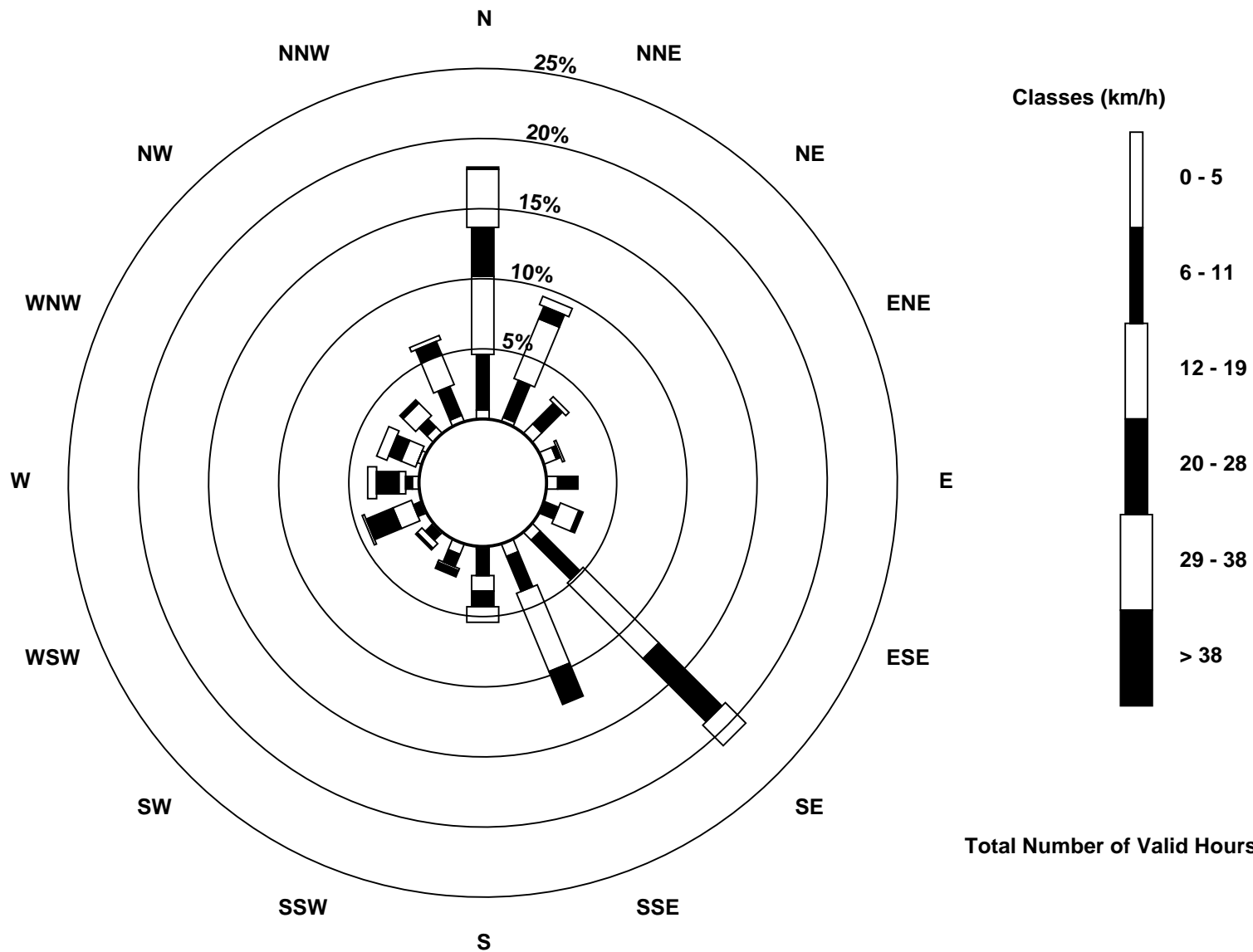
Total Number of Valid Hours: 629

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Mannix - February 2016

Direction of Maximum Speed: 4 deg on Feb 6 13:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 135.4 deg on Feb 12	Hours of Data: 682
Direction of Minimum Speed: 69 deg on Feb 25 13:00	Hours of Missing Data: 14
Direction of Minimum Daily Speed Average: 0.7 deg on Feb 2	Percent Operational Time: 98.0
Monthly Average Direction: 289.4 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	353	329	277	243	255	205	165	161	159	154	151	159	148	148	153	162	164	162	165	166	172	162	126	138	161.4
2-Feb	175	203	155	156	229	173	216	160	172	160	154	141	156	145	144	344	336	341	334	355	348	334	334	333	320.6
3-Feb	1	357	1	21	338	71	47	47	148	161	160	148	160	114	145	306	356	1	12	359	11	18	11	8	19.5
4-Feb	5	353	342	351	342	344	3	2	350	333	159	105	135	145	142	133	102	81	70	356	314	301	268	267	13.4
5-Feb	211	139	142	154	139	141	145	140	132	157	155	149	155	150	AF	AF	AF	AF	AF	AF	AF	AF	AF	149	--
6-Feb	148	151	145	151	155	145	135	AF	AF	AF	AF	AF	4	360	349	346	346	345	336	8	29	9	26	44	25.0
7-Feb	43	20	16	343	294	0	126	169	128	66	22	347	316	338	348	343	356	349	2	312	223	212	176	151	359.7
8-Feb	148	170	195	184	179	143	127	169	214	169	152	151	117	147	126	104	195	170	167	102	138	154	160	145	158.7
9-Feb	151	155	135	148	160	156	141	147	133	139	140	162	162	195	230	190	166	152	106	360	343	358	10	1	88.6
10-Feb	3	9	11	13	18	10	18	23	27	33	16	25	30	29	18	4	349	350	11	9	0	357	348	8	13.3
11-Feb	13	11	336	359	2	3	3	359	5	352	332	329	330	316	313	295	338	3	7	346	12	23	256	179	347.3
12-Feb	149	122	135	128	131	133	134	134	127	128	131	134	145	142	135	134	134	135	133	135	141	140	142	145	135.4
13-Feb	138	136	141	141	143	144	146	148	148	146	146	157	142	138	144	149	146	152	179	174	145	143	151	184	145.9
14-Feb	258	257	261	302	334	320	348	355	324	283	267	261	276	300	73	46	26	24	355	357	3	10	8	356	326.1
15-Feb	1	354	3	0	10	352	355	11	12	8	7	352	330	331	338	1	337	347	14	16	7	244	134	113	357.9
16-Feb	225	166	171	150	156	124	24	33	110	155	154	153	126	134	160	132	33	345	348	318	313	306	306	302	144.0
17-Feb	326	329	333	345	343	5	356	2	12	15	9	22	7	15	23	6	21	12	8	6	5	10	16	5	3.9
18-Feb	14	15	10	10	11	11	10	5	13	34	78	221	280	293	305	327	265	268	288	297	295	298	358	6	343.8
19-Feb	11	356	334	328	335	351	20	20	343	300	18	357	310	324	302	327	33	40	37	19	21	21	14	6	356.5
20-Feb	6	358	357	332	319	228	236	252	236	185	134	106	120	95	92	86	112	106	131	147	148	160	158	152	118.8
21-Feb	156	163	161	157	165	167	160	143	152	153	150	148	141	135	142	148	147	143	139	137	135	73	34	266	147.9
22-Feb	331	309	300	345	1	10	273	189	170	149	141	141	140	136	130	125	97	98	44	302	330	321	300	292	356.4
23-Feb	278	220	232	238	235	235	251	265	261	241	284	301	347	11	128	309	294	347	312	258	266	276	278	285	275.7
24-Feb	292	287	283	287	284	257	247	170	162	167	128	121	128	124	159	158	186	158	170	168	176	179	168	166	202.5
25-Feb	166	157	158	166	180	157	161	206	192	194	230	110	69	252	259	264	255	258	256	261	262	256	256	252	227.5
26-Feb	217	172	152	144	177	205	190	231	250	279	276	282	305	308	341	23	27	15	14	19	18	14	6	6	345.5
27-Feb	7	10	8	8	9	5	4	359	0	357	358	323	316	320	321	322	271	273	350	44	181	347	2	11	356.4
28-Feb	5	12	11	15	11	10	16	346	345	12	7	353	14	10	9	12	356	359	5	11	16	11	3	258	5.8
29-Feb	85	124	171	148	138	154	143	157	163	153	139	140	140	141	140	143	147	153	167	166	153	149	144	155	147.6
12.3	23.0	10.1	24.1	17.6	43.3	67.8	70.8	84.6	103.1	122.1	124.9	55.8	42.2	21.8	11.5	16.4	21.7	19.2	2.9	359.7	353.8	357.1	0.3		
Diurnal Average																									

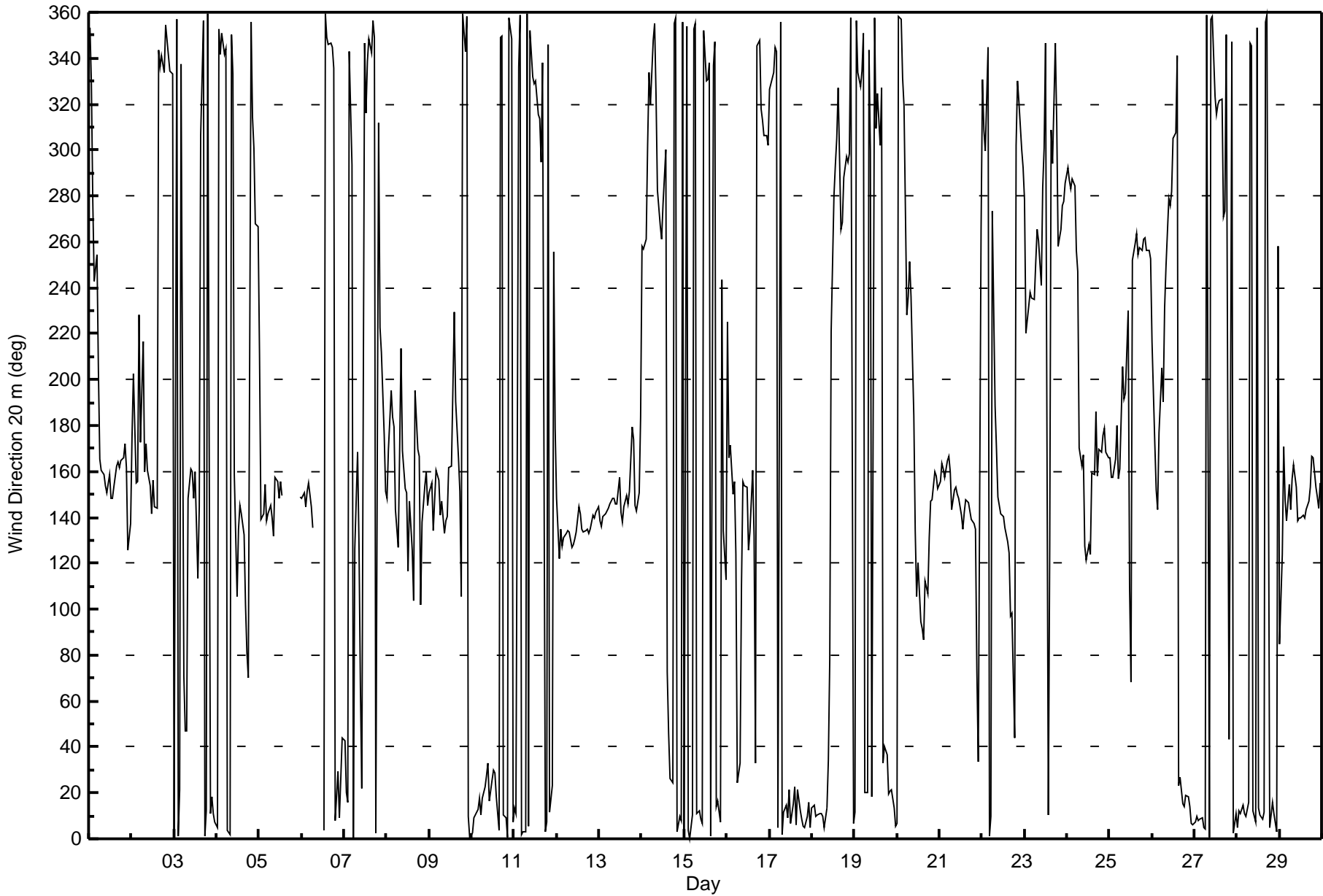
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Feb 25 13:00 Minimum Value: 4 deg on Feb 23 22:00 Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 11 Median = 14 Q ₃ = 21 P ₉₀ = 34 P ₉₉ = 79		Hours in Service: 696 Hours of Data: 682 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.0																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	14	44	13	33	14	32	6	8	12	11	11	14	10	13	17	23	15	11	14	12	8	29	24	12	44
2-Feb	17	23	26	31	42	27	23	25	20	33	14	11	11	13	68	17	20	13	13	20	17	13	13	14	68
3-Feb	21	20	19	28	34	48	32	18	36	11	20	27	26	31	42	40	14	21	14	17	13	10	13	17	48
4-Feb	13	16	16	16	15	21	25	25	19	38	70	24	16	16	16	21	22	19	25	40	26	14	13	8	70
5-Feb	63	19	20	11	13	17	21	14	12	12	10	11	13	14	AF	AF	AF	AF	AF	AF	AF	AF	AF	10	63
6-Feb	9	9	8	10	10	11	11	AF	AF	AF	AF	AF	15	16	14	11	11	11	13	17	15	20	16	11	20
7-Feb	11	10	17	20	50	26	58	21	27	28	21	23	16	24	20	16	16	13	12	59	26	18	45	16	59
8-Feb	12	20	11	19	40	16	16	23	15	22	18	18	24	14	92	31	35	30	25	17	16	28	16	22	92
9-Feb	17	17	11	23	38	9	12	13	12	10	11	19	40	37	21	23	19	9	67	14	14	16	13	15	67
10-Feb	16	17	17	13	13	11	13	14	13	11	15	15	17	19	14	15	14	15	9	10	20	15	21	13	21
11-Feb	8	10	35	12	9	12	11	14	10	21	19	25	12	14	17	14	17	12	29	37	9	29	71	50	71
12-Feb	11	15	11	12	11	10	10	10	11	11	11	10	9	11	11	11	11	10	10	10	9	9	9	10	15
13-Feb	11	9	8	9	10	10	10	10	9	10	9	9	11	11	10	10	9	13	34	46	6	10	13	37	46
14-Feb	16	7	5	42	11	16	25	28	13	26	7	7	18	76	20	12	13	15	20	19	14	12	11	15	76
15-Feb	10	14	12	14	10	13	14	11	10	11	12	23	24	15	15	21	18	16	14	24	26	29	79	50	79
16-Feb	34	57	22	13	47	48	18	26	32	11	11	16	18	76	42	25	45	19	19	23	12	14	9	11	76
17-Feb	16	12	12	18	15	16	15	18	13	12	15	14	13	15	14	20	12	9	10	12	11	10	10	11	20
18-Feb	11	10	8	9	10	9	10	19	21	19	79	72	12	13	11	43	27	11	10	10	12	19	15	14	79
19-Feb	11	16	15	15	23	16	13	17	17	39	34	39	12	17	16	21	33	17	15	14	12	11	11	12	39
20-Feb	11	14	22	21	49	51	12	27	36	66	22	28	19	18	13	11	31	17	17	8	9	10	10	8	66
21-Feb	10	7	8	10	10	8	11	12	10	9	11	12	12	11	9	10	9	7	9	11	9	85	56	33	85
22-Feb	34	44	19	20	9	12	53	30	30	19	12	10	12	11	19	20	20	23	91	14	14	13	24	21	91
23-Feb	44	26	8	14	7	21	18	11	20	73	64	17	18	32	80	17	15	33	33	6	10	4	5	8	80
24-Feb	8	7	5	8	11	11	70	38	13	15	23	15	14	15	75	88	26	11	7	6	11	12	11	6	88
25-Feb	6	7	7	11	14	10	9	12	14	21	21	57	99	13	11	9	8	12	10	6	8	10	9	12	99
26-Feb	25	35	17	22	28	38	20	53	12	15	8	12	12	16	19	11	12	12	13	13	11	9	11	10	53
27-Feb	10	9	10	10	9	10	10	12	13	14	19	26	12	15	17	27	16	16	52	36	44	26	13	12	52
28-Feb	16	12	11	11	15	19	12	17	16	11	18	23	19	12	14	12	18	12	12	8	8	7	37	22	37
29-Feb	39	11	23	11	14	8	7	7	14	17	13	10	11	10	10	9	9	8	10	10	10	10	9	9	39
Diurnal Maximum																									
AF - Analyzer Failure																									





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg
Mannix - February 2016

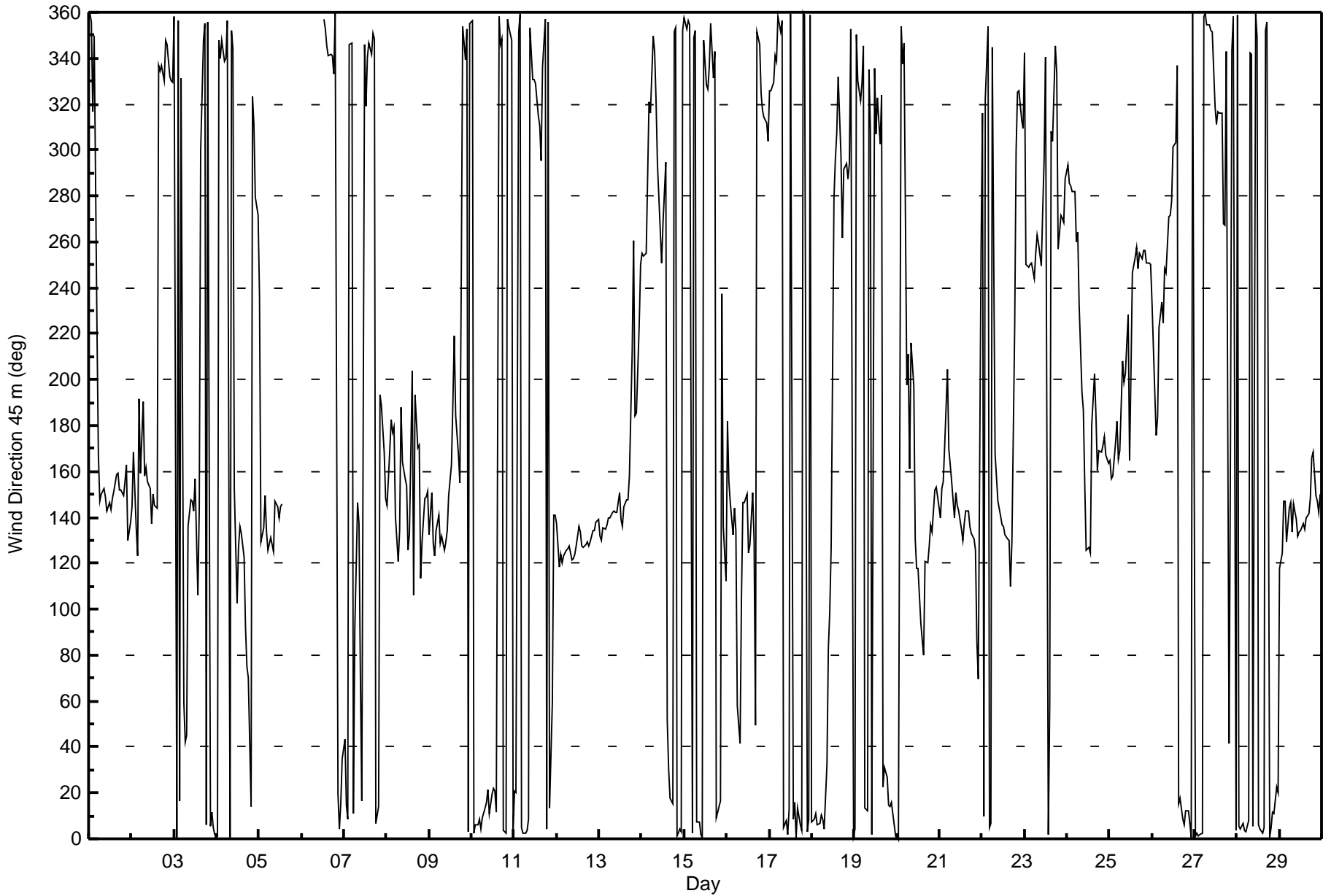
Direction of Maximum Speed: 357 deg on Feb 6 13:00																						Hours in Service: 696			
Direction of Maximum Daily Speed Average: 128.6 deg on Feb 12																						Hours of Data: 674			
Direction of Minimum Speed: 204 deg on Feb 8 15:00											Direction of Minimum Daily Speed Average: 0.5 deg on Feb 2											Hours of Missing Data: 22			
Monthly Average Direction: 316.0 deg																						Percent Operational Time: 96.8			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	359	355	317	350	222	167	147	150	153	149	143	146	143	148	151	158	159	152	152	150	155	163	130	138	149.5
2-Feb	144	168	135	123	191	159	190	158	161	155	152	138	150	145	144	337	334	337	330	348	346	332	330	330	356.5
3-Feb	358	0	356	17	332	59	42	45	136	148	147	143	157	106	144	300	348	355	6	356	6	11	5	2	12.4
4-Feb	1	348	340	348	338	340	356	1	352	344	152	103	127	136	133	123	92	75	70	14	324	311	280	271	11.7
5-Feb	236	129	135	149	133	126	131	128	125	147	145	140	145	146	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
6-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	357	353	345	341	342	341	333	360	20	4	15	35	--
7-Feb	43	15	8	346	346	11	91	147	138	71	16	346	319	340	346	342	351	348	6	14	193	189	169	148	11.2
8-Feb	145	157	182	177	179	140	121	134	188	164	157	154	126	133	204	106	193	170	172	114	130	148	149	151	154.5
9-Feb	132	151	129	123	134	141	129	132	126	130	134	149	163	190	219	184	167	155	244	354	339	353	3	355	86.2
10-Feb	356	3	6	6	9	4	9	13	16	21	11	19	22	21	12	358	346	348	3	3	357	353	348	4	6.2
11-Feb	21	20	352	360	5	3	3	4	9	353	331	331	329	315	311	295	336	357	4	356	14	59	141	141	353.9
12-Feb	138	118	124	120	123	125	127	127	121	122	124	127	136	134	128	127	128	129	127	129	135	134	138	139	128.6
13-Feb	132	130	135	135	137	140	140	142	143	142	142	150	139	136	144	148	148	158	212	261	185	186	224	250	148.6
14-Feb	255	254	255	288	321	316	350	343	322	294	265	251	268	294	52	31	18	15	352	353	1	4	3	352	317.4
15-Feb	357	352	356	354	2	349	352	7	8	2	0	348	328	327	336	355	332	343	9	12	16	237	136	112	353.9
16-Feb	182	156	147	133	144	134	58	42	106	147	146	150	125	128	150	130	49	351	346	325	317	314	312	304	119.0
17-Feb	326	326	330	341	339	358	352	356	5	8	2	13	359	9	16	1	14	6	3	360	359	3	9	359	357.7
18-Feb	8	9	11	6	7	10	8	5	32	83	99	127	279	296	307	332	298	262	292	294	288	294	353	1	349.2
19-Feb	5	350	330	322	329	345	14	12	335	308	2	336	307	323	303	324	23	31	27	15	14	16	6	1	350.6
20-Feb	2	0	354	337	347	198	211	161	216	197	130	118	118	94	86	80	121	121	128	136	134	152	153	149	111.7
21-Feb	140	153	156	171	204	169	163	156	140	151	145	143	135	130	137	143	143	136	133	130	126	86	70	257	144.2
22-Feb	316	10	322	354	5	7	345	168	157	147	140	137	136	132	131	130	110	129	224	300	325	326	313	309	355.0
23-Feb	343	250	249	250	251	244	255	263	259	250	274	296	340	2	58	308	304	346	334	257	271	270	269	288	275.6
24-Feb	293	286	284	282	282	260	264	233	195	187	154	126	127	125	181	202	185	160	169	168	172	175	167	164	206.7
25-Feb	165	157	158	173	182	166	169	208	199	203	228	165	204	246	253	257	249	255	253	256	256	251	251	250	221.1
26-Feb	234	194	176	184	223	234	225	248	247	271	271	278	301	303	337	15	18	9	6	12	12	7	0	360	325.2
27-Feb	1	3	1	2	2	358	359	355	355	352	352	319	311	316	316	316	268	267	343	41	169	343	358	4	351.8
28-Feb	359	6	4	7	4	3	8	343	342	6	360	349	6	4	2	5	352	355	1	5	12	11	22	20	1.3
29-Feb	118	124	147	147	129	144	147	133	146	139	132	133	134	137	135	140	142	148	166	168	150	147	142	150	142.3
4.9 17.7 8.2 2.1 357.6 26.2 46.0 66.1 105.6 116.7 121.1 119.9 51.6 35.2 13.2 2.0 11.6 19.9 9.9 355.7 353.8 346.1 352.6 352.3																									
Diurnal Average																									
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 96 deg on Feb 8 15:00 Minimum Value: 2 deg on Feb 21 02:00 Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 15 P ₉₀ = 29 P ₉₉ = 75														Hours in Service: 696 Hours of Data: 674 Hours of Missing Data: 22 Hours of Calibration: 0 Percent Operational Time: 96.8													
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	11	23	24	85	31	37	4	6	6	9	8	13	8	12	14	18	12	8	7	6	6	15	14	8	85		
2-Feb	6	14	18	17	32	16	14	24	16	28	11	10	10	12	75	12	16	11	10	16	14	10	12	9	75		
3-Feb	16	16	15	20	29	39	31	14	41	11	20	26	22	38	41	39	12	18	13	13	9	7	10	13	41		
4-Feb	9	14	14	12	11	11	22	20	15	27	76	20	14	15	13	17	21	16	23	20	20	14	14	6	76		
5-Feb	52	14	17	8	9	12	14	8	7	7	7	8	12	11	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	52		
6-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	12	12	9	7	7	6	8	13	11	13	12	8	13		
7-Feb	8	7	14	11	28	16	32	10	15	30	14	16	14	17	12	12	10	7	10	83	29	21	22	11	83		
8-Feb	9	15	7	13	19	8	9	8	19	13	11	14	12	14	96	57	23	16	14	16	5	9	6	9	96		
9-Feb	7	7	7	10	10	10	9	11	7	7	10	17	25	31	15	19	14	8	59	10	10	13	8	11	59		
10-Feb	11	12	12	10	9	7	9	10	10	10	12	11	13	15	10	12	9	10	5	6	14	8	12	9	15		
11-Feb	6	7	26	8	6	6	6	8	9	22	15	18	9	12	17	12	14	7	19	24	12	22	43	20	43		
12-Feb	8	9	8	8	7	6	7	6	8	7	7	7	7	8	9	8	8	8	8	7	7	7	7	8	9		
13-Feb	7	6	6	7	8	7	7	7	6	7	7	6	8	8	8	6	5	10	24	13	18	9	14	15	24		
14-Feb	5	3	3	36	8	10	12	11	9	23	15	6	17	69	18	9	8	9	17	14	9	7	7	10	69		
15-Feb	6	12	6	9	7	8	11	8	6	8	9	16	20	12	12	17	14	13	13	17	25	28	70	39	70		
16-Feb	25	23	13	7	34	28	34	16	25	8	9	15	15	77	32	19	30	14	10	17	11	12	8	10	77		
17-Feb	13	9	9	15	12	12	11	14	9	9	11	10	11	10	9	15	9	5	6	8	5	7	7	8	15		
18-Feb	8	7	7	5	6	6	6	11	36	17	52	42	52	11	11	30	87	52	9	7	10	18	11	10	87		
19-Feb	8	12	11	11	21	12	10	13	16	41	36	38	11	14	14	18	25	12	11	11	9	8	8	9	41		
20-Feb	7	4	5	16	30	48	35	34	49	40	15	20	15	17	12	11	27	12	6	5	8	9	7	4	49		
21-Feb	6	2	7	11	13	8	9	6	9	6	8	9	9	8	8	8	6	6	5	8	7	59	60	50	60		
22-Feb	30	15	23	11	4	7	60	39	11	11	9	8	9	8	15	14	15	13	70	12	10	7	16	7	70		
23-Feb	54	23	14	4	4	12	4	5	8	7	19	16	13	27	89	13	13	28	37	7	8	3	3	7	89		
24-Feb	5	4	4	4	4	10	17	33	7	11	19	10	10	11	54	96	23	11	3	3	3	4	7	3	96		
25-Feb	4	4	5	6	8	9	12	7	8	12	17	53	65	10	9	7	6	10	7	4	6	6	6	8	65		
26-Feb	12	31	15	13	18	20	14	7	9	13	5	10	10	15	15	9	8	9	10	8	9	6	6	6	31		
27-Feb	6	5	5	6	5	5	4	7	7	10	13	21	9	11	12	22	11	13	57	34	41	27	10	8	57		
28-Feb	12	8	7	8	12	15	9	13	12	8	13	18	15	9	9	9	15	7	7	5	6	5	12	62	62		
29-Feb	24	9	8	4	9	6	6	5	9	12	10	8	9	8	9	7	6	6	9	7	7	7	6	6	24		
														54 31 26 85 34 48 60 39 49 41 76 53 65 77 96 96 87 52 70 83 41 59 70 62													
														Diurnal Maximum													
AF - Analyzer Failure																											





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - February 2016

Direction of Maximum Speed: 360 deg on Feb 6 13:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 130.3 deg on Feb 12	Hours of Data: 605
Direction of Minimum Speed: 103 deg on Feb 8 16:00	Direction of Minimum Daily Speed Average: 1.2 deg on Feb 2
Direction of Minimum Speed: 103 deg on Feb 8 16:00	Hours of Missing Data: 91
Monthly Average Direction: 266.2 deg	Percent Operational Time: 86.9

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	15	24	20	59	162	154	151	152	151	149	138	137	142	153	157	160	154	143	144	142	145	165	160	147	146.3	
2-Feb	133	148	145	128	137	132	175	162	158	154	155	144	154	154	159	338	341	344	338	352	353	342	337	338	64.5	
3-Feb	5	10	3	22	336	62	49	55	128	132	135	145	156	121	144	299	348	1	9	2	9	14	10	7	18.1	
4-Feb	7	353	347	355	348	351	4	21	15	20	149	109	125	132	131	121	92	77	81	57	360	338	297	274	24.6	
5-Feb	173	127	139	151	135	124	128	126	127	134	137	133	140	145	AF	AF	AF	AF	AF	AF	AF	AF	AF	135	--	
6-Feb	129	129	127	140	142	144	131	133	AF	AF	AF	AF	360	355	348	345	345	345	341	1	19	7	16	36	31.5	
7-Feb	52	18	13	359	11	32	80	138	142	74	AF	359	334	351	354	348	355	356	21	67	138	158	152	150	30.5	
8-Feb	149	136	166	168	173	152	127	132	159	154	165	168	151	150	326	103	192	175	175	135	132	135	133	139	152.3	
9-Feb	128	141	128	124	126	134	125	126	125	129	135	138	152	171	209	185	181	193	266	357	343	356	5	358	78.8	
10-Feb	359	4	8	9	11	7	12	15	18	23	15	22	25	24	15	1	352	355	7	9	9	7	7	23	10.3	
11-Feb	46	48	23	25	29	27	29	30	33	17	342	347	340	328	321	306	345	2	15	18	45	99	121	133	15.6	
12-Feb	133	128	124	124	125	127	128	128	127	126	126	128	135	132	129	129	130	131	130	130	135	135	138	140	130.3	
13-Feb	134	131	135	135	138	140	139	141	142	143	144	152	145	145	155	165	167	185	235	264	236	227	252	256	159.5	
14-Feb	255	255	257	280	309	321	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
15-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	--	
16-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	--	
17-Feb	AF	AF	AF	AF	AF	AF	AF	359	AF	7	7	AF	AF	AF	AF	16	3	13	8	6	3	2	7	12	3	--
18-Feb	11	14	25	24	22	31	31	32	69	112	111	124	136	319	313	32	104	131	302	297	286	299	355	4	10.2	
19-Feb	7	353	336	323	331	348	16	14	340	325	358	328	314	329	312	332	24	33	29	19	16	19	9	5	354.8	
20-Feb	11	14	6	359	7	41	208	147	161	175	137	127	122	103	93	85	133	127	128	131	129	146	154	144	113.9	
21-Feb	141	159	168	197	248	181	166	165	150	160	148	144	137	132	139	145	146	138	134	130	125	95	90	254	148.5	
22-Feb	314	24	349	4	16	7	345	203	184	167	148	139	137	137	136	140	131	154	251	301	322	330	323	325	343.8	
23-Feb	350	270	254	254	254	250	256	259	257	255	274	300	343	5	25	315	322	351	339	270	285	280	278	295	279.1	
24-Feb	297	291	291	286	290	274	274	243	226	222	206	153	137	134	194	215	190	169	176	175	178	180	173	171	217.3	
25-Feb	172	164	169	183	192	180	182	212	207	216	230	190	205	246	254	258	250	258	255	258	258	252	252	252	224.8	
26-Feb	242	215	202	216	238	245	238	252	248	270	275	279	304	307	342	20	19	10	9	15	15	10	4	4	322.8	
27-Feb	5	5	3	5	5	1	4	0	358	357	356	325	319	323	322	321	276	268	350	40	154	350	3	6	356.8	
28-Feb	2	8	6	8	5	6	9	347	346	8	2	353	10	8	5	8	359	0	5	10	22	34	66	130	5.8	
29-Feb	128	131	144	146	127	138	138	130	129	131	133	136	136	139	138	144	145	150	173	176	154	153	147	154	143.2	
30.1 51.4 48.9 10.3 10.7 68.5 83.7 122.8 129.1 131.9 146.7 131.9 90.5 89.5 32.2 1.9 29.3 36.9 11.8 358.5 2.0 353.1 3.5 21.3																										
Diurnal Average																										

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



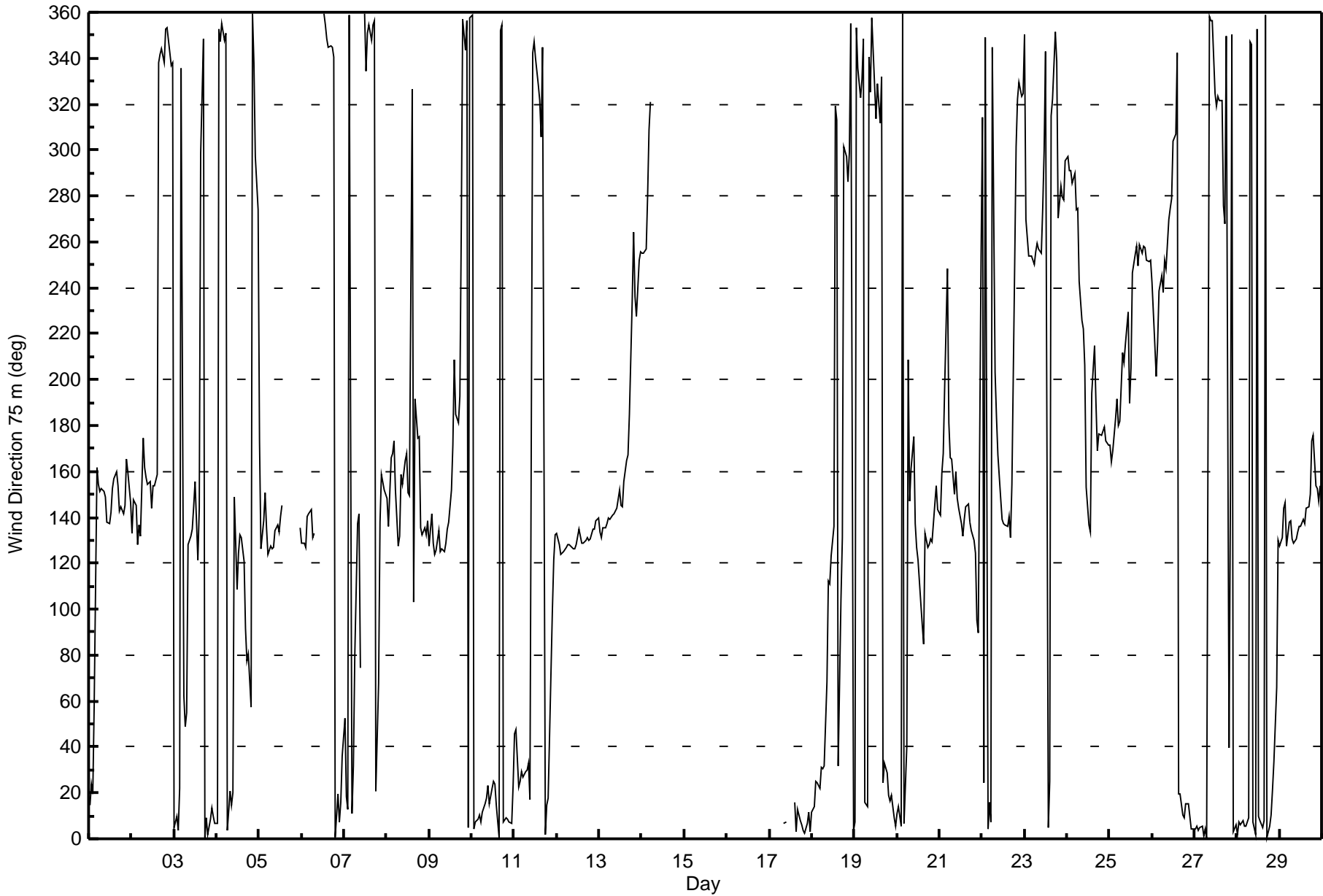
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 75 m (WD75m) - deg

Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696																								
Maximum Value: 92 deg on Feb 8 14:00														Hours of Data: 605																								
Minimum Value: 2 deg on Feb 21 02:00														Hours of Missing Data: 91																								
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 23 P ₉₉ = 62														Hours of Calibration: 0																								
														Percent Operational Time: 86.9																								
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	9	14	25	39	27	13	5	5	4	5	8	11	6	9	11	13	8	5	5	7	9	5	14	16	39													
2-Feb	6	11	16	13	33	8	24	15	15	12	6	10	8	9	63	11	14	11	10	15	11	11	14	8	63													
3-Feb	13	14	12	18	33	26	58	15	32	9	15	24	20	37	33	43	14	17	12	10	7	5	9	10	58													
4-Feb	8	12	13	12	10	8	18	18	15	27	47	20	13	13	14	16	21	12	19	23	30	13	27	8	47													
5-Feb	51	10	15	6	8	10	11	7	7	5	4	6	11	11	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	51													
6-Feb	5	6	6	8	9	7	9	7	AF	AF	AF	AF	10	10	7	4	5	4	5	12	9	12	13	9	13													
7-Feb	10	8	11	7	11	12	24	12	13	20	AF	AF	11	12	14	12	11	8	6	10	36	10	12	10	6	36												
8-Feb	9	10	9	8	8	6	7	4	20	4	5	8	12	92	69	92	19	6	10	12	5	6	5	10	92													
9-Feb	7	5	8	10	7	9	11	13	7	6	9	10	17	21	15	16	14	14	35	7	9	11	6	9	35													
10-Feb	10	11	9	7	8	6	7	8	8	8	9	9	10	13	8	9	7	8	4	6	11	6	7	12	13													
11-Feb	7	7	34	7	8	7	7	9	11	24	14	14	9	12	18	12	15	5	12	19	14	18	13	16	34													
12-Feb	8	10	9	8	7	6	6	6	6	7	7	7	6	8	9	7	8	7	7	7	6	6	6	7	10													
13-Feb	7	5	5	6	6	7	6	6	5	7	6	5	8	8	8	5	5	15	17	6	13	16	7	8	17													
14-Feb	3	3	3	25	9	14	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	25													
15-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	--													
16-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	--													
17-Feb	AF	AF	AF	AF	AF	AF	9	AF	6	6	AF	AF	AF	AF	7	13	7	4	5	6	4	6	5	6	13													
18-Feb	8	6	7	6	6	9	5	9	42	15	16	14	35	88	12	31	27	70	11	5	9	19	9	9	88													
19-Feb	6	10	9	10	18	11	8	12	16	37	39	34	11	14	13	16	20	8	9	9	7	7	6	7	39													
20-Feb	8	5	5	14	11	86	13	42	42	8	16	14	13	18	15	14	21	10	6	5	8	7	4	5	86													
21-Feb	8	2	5	22	10	17	7	7	6	3	9	10	8	8	7	7	5	6	4	9	10	36	63	51	63													
22-Feb	26	10	17	6	3	4	46	31	20	7	8	5	8	6	10	12	8	9	50	10	8	4	13	10	50													
23-Feb	16	37	11	3	3	7	3	4	4	4	10	16	10	25	90	13	11	23	34	8	6	3	4	5	90													
24-Feb	3	3	3	3	6	9	15	6	12	7	8	19	5	10	45	38	19	9	5	5	3	3	6	3	45													
25-Feb	3	4	6	5	7	10	14	5	6	10	13	44	48	8	8	7	5	10	7	4	5	5	5	7	48													
26-Feb	9	21	19	10	13	12	10	5	7	12	6	10	8	15	12	8	7	7	8	7	7	5	4	4	21													
27-Feb	4	4	4	4	4	4	5	5	5	7	13	18	9	11	12	22	12	13	61	35	33	27	8	6	61													
28-Feb	10	7	6	6	10	12	7	11	11	7	12	15	13	8	9	7	12	5	5	5	5	6	15	17	17													
29-Feb	8	8	4	4	9	6	5	5	6	7	10	7	8	8	8	7	5	4	11	8	5	5	5	4	11													
														51	37	34	39	33	86	58	42	42	37	47	44	48	92	90	92	27	70	61	36	33	36	63	51	
														Diurnal Maximum																								
AF - Analyzer Failure																																						

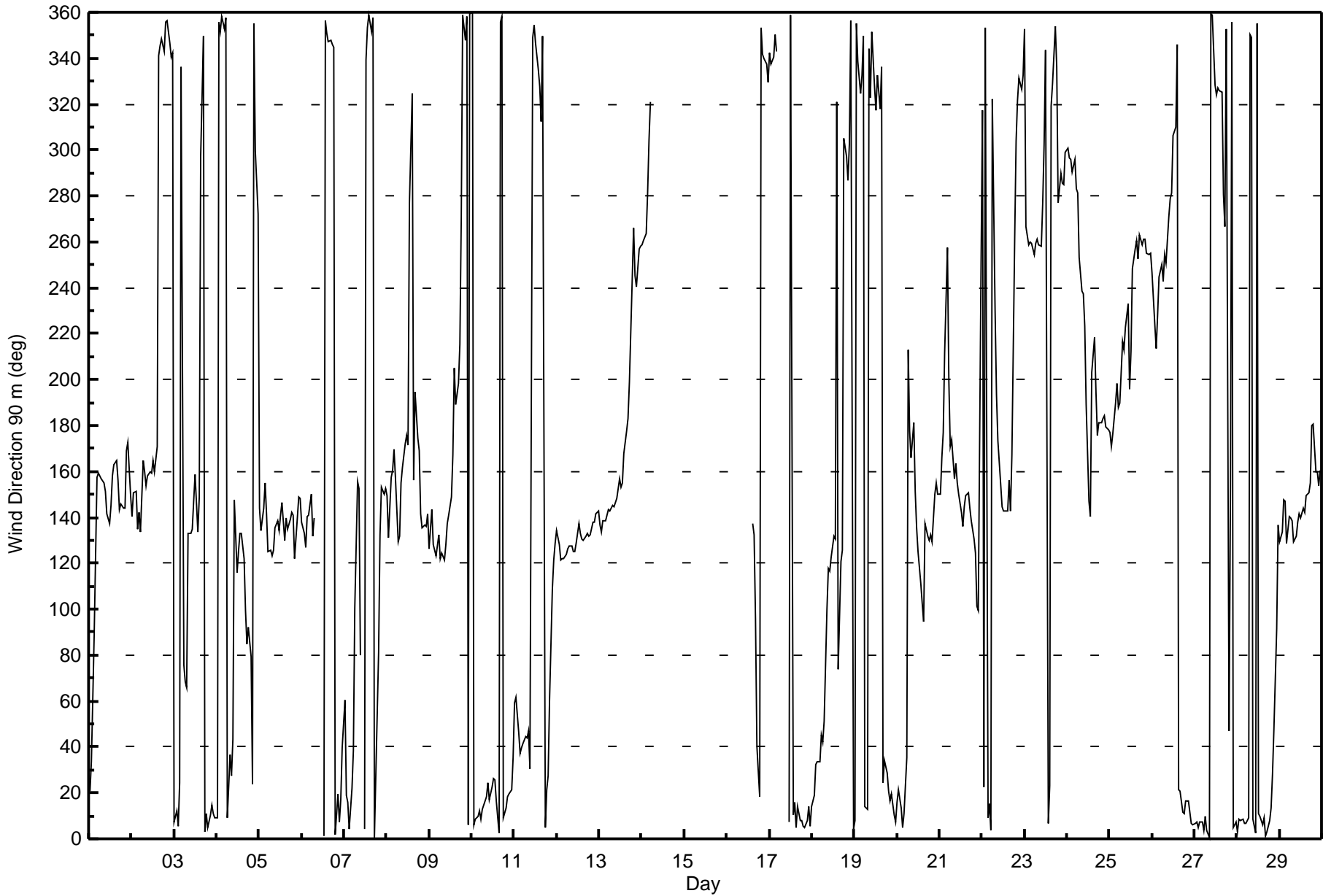




Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction 90 m (WD90m) - deg
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 92 deg on Feb 8 16:00 Minimum Value: 2 deg on Feb 29 07:00 Percentiles: P ₁ = 3 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 22 P ₉₉ = 69																	Hours in Service: 696 Hours of Data: 629 Hours of Missing Data: 67 Hours of Calibration: 0 Percent Operational Time: 90.4																														
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	8	16	19	37	22	8	4	4	4	3	8	8	5	8	10	10	8	3	4	4	8	3	12	18	37																						
2-Feb	6	9	14	11	17	8	23	10	15	13	4	11	9	6	50	12	12	10	10	14	11	11	15	8	50																						
3-Feb	11	13	13	20	33	29	50	18	24	7	12	23	18	29	32	45	14	15	11	9	7	4	8	9	50																						
4-Feb	8	11	13	12	8	7	16	16	16	23	38	19	11	12	13	14	19	10	15	25	32	15	69	15	69																						
5-Feb	32	11	11	5	8	6	9	5	5	4	3	5	12	12	8	4	3	4	8	12	8	10	3	3	32																						
6-Feb	6	4	4	8	8	7	9	7	AF	AF	AF	AF	10	9	6	4	4	4	4	11	8	12	14	10	14																						
7-Feb	18	8	10	6	11	15	38	32	25	33	AF	AF	8	10	14	11	10	8	5	10	27	7	9	7	5	38																					
8-Feb	12	11	7	8	5	5	7	6	19	7	6	5	27	50	63	92	18	8	9	9	4	8	5	11	92																						
9-Feb	7	4	5	6	6	10	8	10	5	4	8	6	12	15	14	13	15	11	30	6	8	10	6	8	30																						
10-Feb	9	10	8	7	7	6	6	7	8	7	9	8	9	12	8	8	6	6	4	6	12	6	8	12	12																						
11-Feb	7	9	42	7	7	6	6	8	13	25	11	13	9	12	19	12	14	5	12	20	16	9	11	13	42																						
12-Feb	8	11	5	4	4	4	4	4	4	4	4	5	5	7	8	6	7	6	6	6	6	6	6	6	11																						
13-Feb	6	4	4	5	6	7	6	5	5	6	5	4	8	7	7	5	4	13	14	5	11	15	6	6	15																						
14-Feb	2	3	3	17	10	13	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	17																						
15-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	--																						
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	35	15	13	19	7	7	7	9	6	7	35																						
17-Feb	10	6	6	12	10	AF	AF	AF	AF	AF	AF	AF	12	12	8	6	12	6	5	5	5	5	5	6	12																						
18-Feb	11	6	7	6	6	12	7	15	36	8	11	14	10	69	74	37	7	9	52	6	5	18	8	7	74																						
19-Feb	6	9	9	9	17	9	7	11	15	37	50	31	10	12	13	15	20	8	8	8	6	6	6	7	50																						
20-Feb	9	5	6	8	8	69	13	43	41	9	18	13	9	14	11	13	18	6	3	3	4	7	3	3	69																						
21-Feb	7	2	7	22	7	21	7	7	4	3	8	9	8	8	6	6	5	5	3	8	6	27	61	40	61																						
22-Feb	24	11	18	5	4	7	45	40	29	8	8	4	6	5	8	13	8	6	41	10	8	3	12	11	45																						
23-Feb	15	60	11	4	3	6	3	4	4	3	9	16	10	24	85	14	10	20	36	9	4	3	4	4	85																						
24-Feb	2	3	3	2	6	8	15	5	11	7	6	20	6	12	37	30	17	7	5	4	3	3	6	3	37																						
25-Feb	3	4	6	6	6	10	14	5	5	9	12	36	37	8	8	6	5	11	7	4	5	5	5	7	37																						
26-Feb	8	18	19	10	11	10	9	5	6	11	7	10	8	15	11	7	6	6	7	6	7	4	4	4	19																						
27-Feb	4	4	4	4	4	4	6	4	4	6	12	16	9	11	12	23	13	13	84	38	22	32	7	6	84																						
28-Feb	9	6	5	5	9	10	6	10	10	6	11	14	12	7	9	6	12	5	5	5	7	8	14	13	14																						
29-Feb	7	8	3	5	6	5	2	4	5	5	8	6	8	7	8	6	4	4	12	8	4	5	4	4	12																						
Diurnal Maximum																								32	60	42	37	33	69	50	43	41	37	50	36	37	69	85	92	20	20	84	38	32	32	69	40
AF - Analyzer Failure																																															





Summary of Hour Averages

Mannix - February 2016

Maximum Value: 0.9 km/h on Feb 12 18:00 Maximum Daily Average: 0.6 km/h on Feb 12																								Hours in Service: 696		
Minimum Value: -0.6 km/h on Feb 6 17:00 Minimum Daily Average: -0.1 km/h on Feb 23																								Hours of Data: 682		
Maximum Diurnal Average: 0.2 km/h at hour 11 Minimum Diurnal Average: 0.0 km/h at hour 24																								Hours of Missing Data: 14		
Monthly Average: 0.11 km/h Percentiles: P ₁ = -0.4 P ₁₀ = -0.2 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.4 P ₉₉ = 0.8																								Hours of Calibration: 0		
Percent Operational Time: 98.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-0.1	0.1	0.0	-0.1	-0.1	-0.2	0.1	0.4	0.4	0.4	0.4	0.2	0.5	0.5	0.3	0.2	0.2	0.3	0.2	0.1	0.0	0.1	0.2	0.3	0.2	0.5
2-Feb	0.1	-0.2	0.2	0.1	0.0	0.1	-0.1	0.2	0.1	0.2	0.2	0.4	0.3	0.4	0.4	0.1	-0.2	-0.3	0.0	0.0	-0.1	-0.2	-0.1	0.0	0.1	0.4
3-Feb	0.1	-0.1	0.0	0.2	0.0	0.4	0.4	0.5	0.2	0.0	0.3	0.4	0.1	0.2	0.3	-0.1	-0.1	0.0	0.1	0.0	0.1	0.4	0.0	0.0	0.1	0.5
4-Feb	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.2	0.0	-0.1	0.1	0.2	0.5	0.4	0.3	0.4	0.4	0.3	0.4	0.4	0.0	0.1	0.1	0.1	0.0	0.1	0.5
5-Feb	0.1	0.3	0.4	0.4	0.4	0.2	0.3	0.3	0.3	0.2	0.4	0.4	0.2	0.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.1	0.6
6-Feb	0.4	0.4	0.2	0.0	0.4	0.4	0.0	AF	AF	AF	AF	AF	-0.5	-0.2	-0.2	-0.2	-0.6	-0.3	-0.1	0.1	0.4	0.0	0.1	0.2	0.0	0.4
7-Feb	0.2	0.3	0.1	-0.1	0.0	0.0	0.1	0.0	0.3	0.3	0.1	-0.1	0.0	0.2	0.1	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	0.4	0.1	0.4
8-Feb	0.4	0.1	-0.1	0.0	0.1	0.4	0.2	0.1	-0.3	0.1	0.2	0.2	0.3	0.2	0.4	0.2	0.1	0.0	0.1	0.3	0.3	0.2	0.2	0.3	0.2	0.4
9-Feb	0.3	0.3	0.4	0.3	0.2	0.4	0.3	0.4	0.3	0.5	0.5	0.1	0.3	0.2	0.0	0.1	0.2	0.2	0.1	0.0	-0.3	-0.1	0.2	-0.2	0.2	0.5
10-Feb	0.0	0.1	0.2	0.0	0.0	-0.3	0.2	0.2	0.4	0.4	0.3	0.2	0.3	0.6	0.3	0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.1	0.6
11-Feb	0.1	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.1	0.1	0.5	-0.1	0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	-0.2	0.0	0.0	0.5
12-Feb	0.4	0.3	0.4	0.5	0.5	0.7	0.9	0.7	0.3	0.0	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.9	0.7	0.8	0.7	0.5	0.9	0.7	0.6	0.9
13-Feb	0.6	0.8	0.6	0.6	0.6	0.8	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.4	0.0	0.1	0.2	0.3	0.1	0.0	0.5	0.8
14-Feb	-0.3	-0.5	-0.4	-0.1	-0.2	-0.1	0.0	0.1	0.0	0.0	0.0	-0.3	0.0	0.2	0.5	0.3	0.3	0.2	-0.1	0.0	-0.1	0.0	-0.1	-0.1	0.0	0.5
15-Feb	-0.3	0.0	0.0	-0.1	0.0	-0.2	-0.1	0.1	0.1	0.0	-0.1	0.1	0.1	-0.1	-0.1	0.2	0.0	0.0	0.3	0.2	0.1	0.0	0.1	0.1	0.0	0.3
16-Feb	0.0	0.1	0.1	0.3	0.2	0.2	0.1	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.2	0.3	0.1	0.1	-0.1	-0.1	0.0	0.1	0.0	-0.1	0.2	0.4
17-Feb	-0.2	-0.2	-0.1	-0.1	-0.2	0.0	0.0	-0.1	0.0	-0.1	0.0	0.2	-0.1	0.2	0.2	0.2	0.1	-0.1	-0.1	-0.1	-0.2	0.0	0.1	-0.1	0.0	0.2
18-Feb	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	-0.1	0.1	0.2	0.3	0.0	-0.1	0.0	-0.2	0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.3	-0.2	-0.2	0.0	0.3
19-Feb	-0.2	-0.2	-0.1	-0.3	-0.2	-0.1	0.3	0.2	-0.1	0.0	0.1	0.0	-0.4	-0.2	-0.2	-0.3	0.1	0.5	0.5	0.2	0.1	0.1	-0.1	-0.2	0.0	0.5
20-Feb	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	-0.3	0.1	0.5	0.6	0.6	0.4	0.4	0.5	0.3	0.3	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.6
21-Feb	0.2	0.3	0.2	0.2	0.1	0.0	0.2	0.3	0.4	0.3	0.3	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.4	0.2	0.1	0.0	0.3	0.5
22-Feb	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.1	0.2	0.3	0.4	0.4	0.3	0.5	0.4	0.3	0.3	0.1	-0.2	-0.4	-0.3	-0.2	0.0	0.1	0.5
23-Feb	0.0	-0.1	-0.1	-0.1	-0.2	-0.3	-0.2	-0.1	-0.3	-0.1	0.0	-0.3	0.1	0.0	0.1	0.1	0.0	0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.1	0.1
24-Feb	-0.4	-0.4	-0.3	-0.5	-0.2	-0.2	-0.1	0.1	0.1	0.3	0.3	0.4	0.4	0.4	0.3	0.2	0.4	0.1	0.2	0.0	0.0	0.4	0.5	0.1	0.1	0.5
25-Feb	0.5	0.8	0.8	0.4	0.0	0.6	0.4	-0.3	-0.1	0.1	-0.1	0.3	0.3	-0.4	-0.5	-0.3	-0.5	-0.4	-0.3	-0.2	-0.2	-0.3	-0.4	-0.4	0.0	0.8
26-Feb	-0.1	0.1	0.2	0.3	0.1	0.0	-0.3	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	-0.1	0.2	0.3	0.4	0.3	0.0	0.1	0.2	-0.1	-0.3	-0.3	0.0	0.4
27-Feb	-0.1	-0.2	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.4	0.0	0.2	0.1	0.1	0.0	0.0	0.2	0.0	-0.1	-0.1	-0.3	-0.1	0.2
28-Feb	-0.1	0.0	-0.2	0.1	0.0	0.2	0.2	-0.2	-0.3	-0.2	0.1	0.0	0.3	-0.4	-0.3	0.0	-0.1	-0.2	-0.2	-0.1	0.1	-0.1	-0.1	-0.2	-0.1	0.3
29-Feb	0.2	0.2	0.1	0.4	0.3	0.5	0.7	0.4	0.1	0.3	0.5	0.3	0.4	0.7	0.7	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.7
Diurnal Average																								Diurnal Average		
Diurnal Maximum																								Diurnal Maximum		
AF - Analyzer Failure																										



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.9 km/h on Feb 6 13:00 Minimum Value: 0.2 km/h on Feb 20 05:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.4 P ₉₀ = 2.2 P ₉₉ = 3.0																								Hours in Service: 696 Hours of Data: 682 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	0.5	0.4	0.2	0.2	0.2	0.4	0.4	0.7	0.9	0.9	1.1	1.0	1.3	1.1	1.2	1.0	0.9	0.8	0.8	0.4	0.4	0.4	0.3	0.4	1.3
2-Feb	0.4	0.4	0.4	0.3	0.3	0.6	0.4	0.5	0.5	0.8	0.8	1.1	1.0	1.0	0.8	1.4	1.5	1.6	1.6	1.7	1.4	1.1	1.1	1.0	1.7
3-Feb	1.2	0.8	0.7	1.0	0.5	0.5	0.5	0.6	0.3	0.5	0.8	1.2	1.0	0.8	0.7	0.6	0.9	1.1	1.1	1.3	1.6	1.9	1.6	1.4	1.9
4-Feb	1.3	1.2	0.9	1.0	0.9	0.8	1.0	0.7	0.7	0.9	1.1	1.3	1.1	1.0	1.0	0.9	0.8	0.6	0.5	0.5	0.4	0.2	0.2	1.3	
5-Feb	0.3	0.6	1.0	1.1	1.2	0.9	1.0	1.5	2.1	0.9	1.1	1.4	1.4	1.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.8	2.1
6-Feb	0.8	1.2	0.8	1.0	1.1	1.3	1.7	AF	AF	AF	AF	AF	3.9	3.1	2.8	2.5	2.3	1.7	1.3	1.1	1.2	0.6	0.4	0.3	3.9
7-Feb	0.2	1.2	1.3	0.7	0.3	0.3	0.2	0.5	0.5	0.6	0.9	1.0	1.0	1.1	1.4	1.2	1.0	0.8	0.6	0.4	0.3	0.2	0.3	0.7	1.4
8-Feb	1.0	0.9	0.7	0.6	0.5	0.9	0.9	0.6	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.4	0.3	0.2	0.4	0.4	0.4	0.3	0.5	0.4	1.0
9-Feb	0.6	0.7	0.8	0.6	0.6	0.7	0.9	0.6	1.4	1.4	1.0	0.5	0.7	0.8	0.7	0.7	0.6	0.5	0.6	2.9	2.7	2.5	2.8	3.0	3.0
10-Feb	2.6	2.2	2.7	2.6	2.8	2.9	2.3	1.9	1.9	1.8	1.6	1.6	1.8	1.7	1.7	1.4	1.5	1.4	1.9	1.4	1.0	0.8	0.7	1.0	2.9
11-Feb	0.7	0.7	0.5	0.8	1.0	1.0	0.9	0.8	0.7	0.8	0.9	1.1	1.1	1.2	1.3	1.0	1.2	1.3	1.3	0.6	0.6	0.4	0.6	0.4	1.3
12-Feb	0.6	1.2	1.6	2.7	2.6	2.6	2.9	2.6	2.3	2.3	2.6	2.1	1.8	1.7	2.5	3.0	2.8	2.8	2.7	2.9	2.6	2.5	2.5	2.3	3.0
13-Feb	2.2	2.3	2.3	2.1	2.2	2.0	1.8	1.6	1.3	1.4	1.4	1.4	1.4	1.1	1.2	1.2	1.1	1.0	0.5	0.4	0.4	0.5	0.4	0.4	2.3
14-Feb	0.5	0.9	0.6	0.7	0.7	0.7	0.8	0.6	0.6	0.5	0.5	0.5	0.6	0.7	0.8	0.9	1.1	1.0	0.8	1.1	1.3	1.4	1.6	1.3	1.6
15-Feb	1.4	0.8	1.2	1.1	1.7	1.7	1.7	1.7	1.5	1.4	1.4	1.2	1.1	1.4	1.5	1.3	0.9	1.1	0.9	0.7	0.6	0.5	0.5	0.4	1.7
16-Feb	0.4	0.6	0.6	0.6	0.8	0.6	0.3	0.8	1.1	1.0	1.0	1.1	1.0	0.8	0.7	0.9	0.4	0.6	1.1	0.7	0.7	0.5	0.6	0.8	1.1
17-Feb	1.3	1.5	1.8	1.6	1.9	2.4	2.1	2.1	2.4	2.0	1.9	2.0	1.7	1.9	1.8	1.7	1.5	1.5	1.8	1.8	1.7	1.5	1.5	1.5	2.4
18-Feb	1.5	1.3	1.0	0.9	1.1	1.0	1.1	1.0	0.8	0.7	0.8	1.1	0.7	0.8	0.8	0.7	0.5	0.6	0.7	0.8	0.7	1.1	2.8	2.9	2.9
19-Feb	2.5	1.7	1.4	1.6	2.2	2.1	1.8	1.3	0.6	0.6	0.9	1.0	1.3	1.6	1.3	1.5	1.2	1.3	1.4	1.5	1.4	1.5	1.6	1.2	2.5
20-Feb	0.9	0.4	0.4	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.8	1.0	1.4	1.1	1.2	1.1	0.8	0.6	0.7	0.8	0.8	0.5	0.5	0.5	1.4
21-Feb	0.5	0.6	0.6	0.4	0.4	0.5	0.6	0.6	0.6	0.8	1.2	1.3	1.4	1.4	1.3	1.3	0.9	0.6	0.9	1.1	1.1	0.8	0.3	0.2	1.4
22-Feb	0.4	0.3	0.3	0.6	0.8	0.4	0.4	0.2	0.4	0.5	1.2	1.2	1.2	1.3	1.0	0.8	0.7	0.4	0.3	0.7	1.2	1.0	0.6	0.2	1.3
23-Feb	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.6	0.6	0.8	1.3	1.2	1.3	1.3	0.9	0.9	0.5	0.6	0.2	0.4	0.5	0.4	0.6	1.0	1.3
24-Feb	1.4	1.1	0.8	1.5	0.6	0.3	0.5	0.4	0.4	0.8	0.6	1.0	1.2	1.2	0.9	0.9	1.0	0.5	0.8	0.7	1.6	1.5	1.4	1.0	1.6
25-Feb	1.1	1.3	1.4	1.1	1.3	0.9	0.8	1.4	1.1	1.1	1.1	0.9	1.0	1.9	1.9	1.8	1.7	1.0	1.0	1.4	1.6	1.6	1.4	1.3	1.9
26-Feb	0.9	0.9	0.7	0.5	0.8	1.0	0.5	1.0	2.0	1.6	0.9	1.1	1.4	1.2	1.2	1.8	2.1	2.9	2.7	3.0	2.3	2.3	2.5	2.5	3.0
27-Feb	3.0	2.8	3.0	3.1	2.9	2.9	2.5	2.2	2.3	2.0	1.8	1.4	1.4	1.5	1.3	1.1	0.9	0.7	0.6	0.8	0.7	0.9	1.6	2.4	3.1
28-Feb	2.6	2.5	2.3	2.3	2.0	2.0	2.5	2.7	3.0	2.7	2.1	2.0	2.2	2.0	1.8	1.8	1.6	1.7	1.7	1.1	1.1	0.8	0.5	0.3	3.0
29-Feb	0.4	0.7	0.6	0.5	0.9	0.5	0.8	0.6	1.0	1.2	1.4	1.9	1.8	1.9	1.8	1.3	1.1	0.9	1.0	0.8	0.9	1.0	1.2	1.2	1.9
3.0 2.8 3.0 3.1 2.9 2.9 2.9 2.7 3.0 2.7 2.6 2.1 3.9 3.1 2.8 3.0 2.8 2.9 2.7 3.0 2.7 2.5 2.8 3.0																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 1.6 km/h on Feb 12 21:00 Maximum Daily Average: 1.1 km/h on Feb 12																								Hours in Service: 696		
Minimum Value: -1.8 km/h on Feb 6 13:00 Minimum Daily Average: -0.6 km/h on Feb 27																								Hours of Data: 674		
Maximum Diurnal Average: 0.3 km/h at hour 12 Minimum Diurnal Average: -0.1 km/h at hour 23																								Hours of Missing Data: 22		
Monthly Average: 0.04 km/h Percentiles: P ₁ = -1.4 P ₁₀ = -0.7 Q ₁ = -0.4 Median = 0.0 Q ₃ = 0.5 P ₉₀ = 0.8 P ₉₉ = 1.5																								Hours of Calibration: 0		
																								Percent Operational Time: 96.8		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-0.2	0.1	-0.1	0.1	0.0	0.2	0.5	1.0	0.8	0.7	0.6	0.4	0.7	0.8	0.6	0.5	0.5	0.6	0.6	0.5	0.4	0.3	0.2	0.4	0.4	1.0
2-Feb	0.7	0.2	0.3	0.2	0.1	0.4	0.1	0.3	0.6	0.6	0.5	0.7	0.6	0.4	0.4	-0.3	-0.8	-0.9	-0.7	-0.8	-0.5	-0.5	-0.4	-0.4	0.0	0.7
3-Feb	-0.1	-0.2	-0.2	0.0	-0.1	0.5	0.5	0.4	0.3	0.2	0.3	0.5	0.4	0.4	0.3	-0.2	-0.5	-0.4	-0.3	-0.3	-0.5	-0.2	-0.4	-0.3	0.0	0.5
4-Feb	-0.4	-0.6	-0.3	-0.4	-0.4	-0.3	0.0	-0.2	-0.3	-0.1	0.4	0.5	0.5	0.5	0.8	0.6	0.4	0.2	0.3	0.1	-0.1	0.0	0.0	-0.1	0.0	0.8
5-Feb	0.0	0.4	0.6	0.8	0.9	0.4	0.6	0.8	0.9	0.8	0.9	1.0	0.7	1.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1.1
6-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-1.8	-1.1	-1.1	-1.5	-1.5	-1.1	-0.5	-0.2	0.0	-0.2	-0.1	0.0	--	0.0
7-Feb	0.1	-0.2	-0.4	-0.4	-0.1	-0.1	0.1	0.5	0.5	0.3	-0.3	-0.4	0.2	0.0	-0.1	-0.4	-0.3	-0.5	-0.2	0.0	0.0	0.0	0.2	0.4	-0.1	0.5
8-Feb	0.4	0.2	-0.2	-0.1	0.1	0.4	0.2	0.4	0.0	0.2	0.4	0.3	0.4	0.3	0.4	0.1	0.2	0.2	0.3	0.3	0.4	0.6	0.8	0.7	0.3	0.8
9-Feb	0.8	0.8	0.9	0.6	0.5	0.8	0.5	0.6	0.8	0.9	0.7	0.3	0.4	0.3	0.2	0.2	0.3	0.4	-0.1	-0.9	-1.1	-0.6	-0.9	-0.8	0.2	0.9
10-Feb	-0.4	-0.6	-0.3	-0.9	-1.2	-1.4	-0.6	-0.6	-0.2	-0.1	0.0	0.1	-0.2	0.2	-0.3	-0.3	-0.6	-0.6	-0.8	-0.6	-0.3	-0.2	-0.3	-0.5	-0.5	0.2
11-Feb	-0.1	-0.1	-0.1	-0.3	-0.3	-0.4	-0.5	-0.3	-0.3	-0.1	-0.1	0.5	-0.3	0.2	0.0	-0.1	-0.5	-0.6	-0.5	-0.4	-0.3	0.1	0.2	0.4	-0.1	0.5
12-Feb	0.7	0.5	0.9	0.8	1.0	1.2	1.4	1.0	0.7	0.5	0.8	0.8	0.9	1.0	1.0	1.2	1.5	1.5	1.1	1.4	1.6	1.4	1.6	1.5	1.1	1.6
13-Feb	1.3	1.3	1.3	1.2	1.3	1.5	1.1	1.0	0.9	1.0	1.2	0.9	0.9	0.8	0.9	1.2	1.0	0.8	-0.1	-0.2	0.2	0.3	-0.1	-0.2	0.8	1.5
14-Feb	-0.5	-0.6	-0.6	-0.4	-0.7	-0.4	-0.3	-0.3	-0.2	0.0	0.0	-0.3	0.0	0.2	0.5	0.0	0.1	0.0	-0.4	-0.5	-0.6	-0.8	-1.0	-0.5	-0.3	0.5
15-Feb	-0.8	-0.3	-0.5	-0.5	-0.6	-0.8	-0.5	-0.4	-0.7	-0.6	-0.6	-0.2	0.0	-0.4	-0.7	-0.2	-0.2	-0.3	0.2	0.1	0.0	0.0	0.1	0.3	-0.3	0.3
16-Feb	0.2	0.3	0.4	0.7	0.3	0.3	0.1	0.2	0.5	0.8	0.6	0.7	0.5	0.5	0.6	0.3	0.2	0.0	-0.3	-0.3	-0.2	-0.1	-0.1	-0.2	0.2	0.8
17-Feb	-0.6	-0.8	-0.6	-0.3	-0.8	-0.5	-0.4	-0.5	-1.0	-0.8	-0.5	-0.2	-0.7	-0.3	-0.3	-0.1	-0.5	-0.6	-0.9	-0.7	-0.9	-0.5	-0.4	-0.6	-0.6	-0.1
18-Feb	-0.5	-0.4	-0.2	-0.5	-0.5	-0.3	-0.3	-0.5	0.1	0.5	0.6	0.4	-0.2	-0.1	-0.3	-0.2	0.0	0.0	0.0	-0.1	-0.3	-0.6	-1.1	-1.1	-0.2	0.6
19-Feb	-1.1	-0.8	-0.5	-0.7	-0.7	-0.6	0.0	0.0	-0.3	-0.2	0.2	0.0	-0.8	-0.7	-0.4	-0.6	-0.3	0.4	0.4	0.0	-0.4	-0.5	-0.6	-0.6	-0.4	0.4
20-Feb	-0.5	-0.2	-0.2	-0.1	-0.1	0.0	0.1	0.2	0.0	0.2	0.5	0.9	0.7	0.5	0.3	0.2	0.4	0.4	0.8	0.8	0.6	0.5	0.4	0.5	0.3	0.9
21-Feb	0.7	0.9	0.5	0.1	0.0	0.2	0.3	0.7	1.0	0.7	0.6	1.0	1.0	0.6	0.7	0.9	0.8	0.8	0.8	0.8	0.7	0.3	0.1	0.1	0.6	1.0
22-Feb	-0.3	-0.1	-0.2	-0.4	-0.3	-0.3	0.0	0.1	0.4	0.5	0.8	0.8	0.6	0.6	0.7	0.5	0.4	0.5	0.0	-0.7	-1.2	-0.9	-0.7	-0.3	0.0	0.8
23-Feb	-0.1	-0.1	-0.1	-0.2	-0.4	-0.4	-0.5	-0.3	-0.5	-0.2	-0.2	-0.5	-0.3	-0.2	0.1	-0.2	-0.1	-0.3	-0.1	-0.1	-0.4	-0.5	-0.4	-0.8	-0.3	0.1
24-Feb	-0.9	-0.9	-0.9	-1.0	-0.6	-0.3	-0.2	0.1	0.0	0.1	0.3	0.5	0.6	0.4	0.4	0.6	0.3	0.8	0.8	0.9	0.9	0.9	1.1	1.2	0.2	1.2
25-Feb	1.2	1.6	1.5	0.9	0.5	0.9	0.8	-0.1	0.1	0.2	0.1	0.6	0.9	-0.2	-0.7	-0.2	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.5	-0.3	0.2	1.6
26-Feb	-0.1	0.2	0.3	0.3	0.0	0.1	-0.2	-0.3	-0.4	-0.4	-0.5	-0.5	-0.7	-0.3	-0.2	-0.2	-0.2	-0.7	-0.9	-1.0	-0.5	-1.0	-1.3	-1.3	-0.4	0.3
27-Feb	-1.5	-1.4	-1.4	-1.3	-1.4	-1.2	-1.1	-0.8	-0.8	-0.6	-0.4	-0.2	-0.7	0.0	0.3	0.0	0.3	-0.1	-0.1	0.1	0.2	-0.3	-0.8	-0.9	-0.6	0.3
28-Feb	-0.6	-0.8	-1.1	-0.7	-0.6	-0.2	-0.3	-0.7	-1.1	-1.0	-0.7	-0.5	-0.3	-0.9	-0.8	-0.7	-0.3	-0.7	-0.6	-0.5	-0.4	-0.3	-0.2	0.0	-0.6	0.0
29-Feb	0.3	0.6	0.8	0.8	0.7	1.0	1.3	0.9	0.7	0.7	1.0	0.8	1.0	1.0	1.0	1.0	0.7	0.8	0.7	0.6	0.8	0.7	0.8	1.1	0.8	1.3
																								Diurnal Average		
																								Diurnal Maximum		
-0.1 0.0 0.0 -0.1 -0.1 0.0 0.1 0.1 0.1 0.2 0.3 0.3 0.2 0.2 0.1 0.1 0.0 0.0 0.0 -0.1 -0.1 -0.1 -0.1 -0.1																										
1.3 1.6 1.5 1.2 1.3 1.5 1.4 1.0 1.0 1.0 1.2 1.0 1.0 1.0 1.1 1.0 1.2 1.5 1.5 1.1 1.4 1.6 1.4 1.6 1.5																										
AF - Analyzer Failure																										



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.6 km/h on Feb 6 13:00 Minimum Value: 0.1 km/h on Feb 5 00:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.5 P ₉₀ = 2.2 P ₉₉ = 3.1																								Hours in Service: 696 Hours of Data: 674 Hours of Missing Data: 22 Hours of Calibration: 0 Percent Operational Time: 96.8		
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0.6	0.5	0.2	0.2	0.1	0.3	0.3	0.4	0.8	1.1	1.2	1.1	1.4	1.4	1.2	1.1	1.0	1.0	0.7	0.3	0.2	0.4	0.3	0.5	1.4	
2-Feb	0.3	0.3	0.4	0.4	0.2	0.5	0.2	0.4	0.5	0.8	0.9	1.2	1.1	1.0	0.9	1.7	1.8	1.8	1.8	1.8	1.4	1.4	1.4	1.0	1.8	
3-Feb	1.3	1.0	0.8	1.1	0.5	0.6	0.8	0.7	0.4	0.4	0.9	1.4	1.2	0.9	0.9	0.7	0.9	1.1	1.3	1.5	1.6	1.8	1.5	1.4	1.8	
4-Feb	1.3	1.1	1.1	0.9	0.9	0.8	1.1	0.6	0.6	0.6	1.1	1.3	1.6	1.5	1.4	1.3	1.0	0.9	0.7	0.4	0.6	0.4	0.1	0.1	1.6	
5-Feb	0.2	0.7	0.9	1.1	1.3	1.0	1.0	1.4	2.0	0.9	1.1	1.4	1.5	1.7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.0	
6-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.6	3.1	2.9	2.3	2.2	1.6	1.2	1.1	1.3	0.7	0.4	0.3	3.6
7-Feb	0.2	1.3	1.3	0.7	0.4	0.3	0.3	0.3	0.6	0.5	0.8	1.0	1.2	1.3	1.6	1.5	1.0	0.9	0.7	0.4	0.3	0.3	0.3	0.7	1.6	
8-Feb	0.9	0.7	0.5	0.6	0.6	1.0	0.9	0.8	0.7	0.6	0.8	0.7	0.7	0.6	0.6	0.4	0.3	0.2	0.3	0.4	0.6	0.4	0.5	0.4	1.0	
9-Feb	0.4	0.6	0.6	0.6	0.5	0.7	1.0	0.9	1.3	1.5	1.2	0.6	0.7	0.8	0.7	0.6	0.5	0.4	0.6	2.6	3.0	2.6	2.8	3.2	3.2	
10-Feb	2.8	2.5	2.9	2.5	2.9	2.9	2.4	1.9	2.1	1.9	1.8	1.8	1.9	1.9	1.8	1.6	1.4	1.3	1.4	1.2	0.8	0.7	0.7	0.7	2.9	
11-Feb	0.6	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.5	0.6	0.9	1.4	1.2	1.6	1.5	1.2	1.3	1.2	1.3	0.6	0.6	0.7	0.7	0.6	1.6	
12-Feb	0.8	1.1	1.6	2.5	2.4	2.6	2.9	2.5	2.2	2.2	2.3	2.0	1.9	2.1	2.9	3.1	3.0	3.0	2.7	3.0	2.9	2.8	2.9	2.6	3.1	
13-Feb	2.4	2.2	2.2	2.2	2.4	2.2	2.1	1.7	1.4	1.6	1.6	1.5	1.4	1.2	1.1	1.0	0.8	1.1	0.6	0.4	0.4	0.7	0.8	0.7	2.4	
14-Feb	0.7	0.5	0.7	0.7	0.7	0.8	0.6	0.6	0.5	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.2	1.1	0.8	1.0	1.0	1.2	1.4	1.3	1.4	
15-Feb	1.1	0.7	1.0	1.0	1.4	1.6	1.8	1.6	1.3	1.2	1.3	1.4	1.4	1.8	1.8	1.3	1.0	1.2	1.1	0.8	0.6	0.4	0.5	0.5	1.8	
16-Feb	0.5	0.6	0.7	0.7	0.8	0.8	0.3	0.6	1.0	1.1	1.1	1.2	1.2	0.9	0.9	1.0	0.5	0.6	1.0	0.8	0.8	0.7	0.8	1.0	1.2	
17-Feb	1.6	1.8	2.1	1.7	2.1	2.3	2.3	2.2	2.2	1.9	1.8	2.0	1.8	1.9	1.9	1.8	1.5	1.3	1.5	1.6	1.5	1.4	1.5	1.2	2.3	
18-Feb	1.3	1.1	0.7	0.7	0.9	0.7	0.8	0.7	1.2	1.3	1.3	1.3	0.8	0.7	0.7	0.5	0.3	0.6	0.6	0.7	0.7	1.2	2.8	2.7	2.8	
19-Feb	2.3	1.7	1.6	1.7	2.5	2.1	2.0	1.6	0.6	0.7	1.0	1.3	1.5	2.2	1.6	1.8	1.4	1.4	1.6	1.7	1.6	1.5	1.7	1.3	2.5	
20-Feb	1.0	0.3	0.3	0.3	0.2	0.1	0.1	0.2	0.3	0.3	0.7	1.1	1.5	1.3	1.1	1.1	0.9	0.7	0.6	0.8	1.1	0.5	0.4	0.4	1.5	
21-Feb	0.5	0.3	0.5	0.4	0.3	0.4	0.5	0.6	0.6	0.8	1.2	1.5	1.6	1.4	1.4	1.3	1.0	0.6	0.9	1.1	0.9	1.1	0.4	0.3	1.6	
22-Feb	0.5	0.2	0.3	0.6	0.5	0.4	0.2	0.1	0.2	0.5	1.0	1.2	1.4	1.1	1.1	0.8	0.8	0.6	0.5	0.9	1.2	1.1	0.6	0.2	1.4	
23-Feb	0.3	0.3	0.6	0.3	0.4	0.6	0.5	0.4	0.5	0.8	1.3	1.2	1.4	1.3	1.0	1.2	0.7	0.7	0.2	0.3	0.5	0.4	0.5	0.9	1.4	
24-Feb	1.3	0.9	0.8	1.0	0.5	0.4	0.6	0.3	0.3	0.6	0.5	0.9	1.0	1.2	1.1	1.1	0.9	0.4	0.4	0.5	0.7	1.2	1.2	0.9	1.3	
25-Feb	1.2	1.0	1.1	1.0	1.2	0.9	0.8	1.3	1.1	1.2	1.5	1.2	1.5	2.1	2.2	1.9	1.5	1.0	0.9	1.5	1.6	1.7	1.3	1.4	2.2	
26-Feb	1.3	1.1	0.9	0.6	1.3	1.5	0.6	1.1	1.8	1.6	0.8	1.3	1.6	1.3	1.5	1.8	2.2	2.8	2.9	3.1	2.4	2.0	1.9	2.1	3.1	
27-Feb	2.4	2.2	2.5	2.6	2.2	2.0	1.6	2.0	2.1	1.9	2.0	1.8	1.8	2.1	1.8	1.4	1.1	0.7	0.5	0.9	0.7	0.9	1.5	2.3	2.6	
28-Feb	2.6	2.4	2.2	2.4	2.1	2.3	2.8	3.3	3.3	2.5	2.3	2.5	2.6	2.1	2.0	1.8	1.7	1.6	1.5	1.1	1.0	0.6	0.4	0.3	3.3	
29-Feb	0.6	0.8	0.7	0.3	0.9	0.5	0.6	0.5	0.7	1.2	1.8	1.9	2.2	2.1	1.9	1.5	1.1	1.0	0.7	0.7	1.0	1.0	1.2	1.2	2.2	
2.8 2.5 2.9 2.6 2.9 2.9 2.9 3.3 3.3 2.5 2.3 2.5 3.6 3.1 2.9 3.1 3.0 3.0 2.9 3.1 3.0 2.8 2.9 3.2																										
Diurnal Maximum																										
AF - Analyzer Failure																										



Maximum Value: 1.4 km/h on Feb 17 07:00 Maximum Daily Average: 0.4 km/h on Feb 25																								Hours in Service: 696 Hours of Data: 605		
Minimum Value: -1.1 km/h on Feb 10 06:00 Minimum Daily Average: -0.3 km/h on Feb 12																								Hours of Missing Data: 91 Hours of Calibration: 0		
Maximum Diurnal Average: 0.2 km/h at hour 11 Minimum Diurnal Average: 0.0 km/h at hour 3																								Percent Operational Time: 86.9		
Monthly Average: 0.08 km/h Percentiles: P ₁ = -0.7 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.5 P ₉₉ = 0.7																										
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	-0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.6	0.7	0.6	0.2	0.1	0.2	0.6	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.2	0.1	0.1	0.3	0.7
2-Feb	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.4	0.4	0.5	0.2	0.3	0.2	0.3	0.0	-0.4	-0.4	-0.3	-0.3	0.0	0.0	0.0	-0.1	0.1	0.5
3-Feb	0.2	0.1	-0.1	0.0	0.2	0.6	0.4	0.3	0.2	0.0	0.0	0.3	0.2	0.4	0.2	0.0	-0.2	-0.1	-0.1	0.2	-0.1	0.1	-0.1	0.1	0.1	0.6
4-Feb	-0.1	-0.1	-0.1	0.1	0.0	0.0	0.1	0.0	0.0	-0.1	0.4	0.3	0.1	-0.1	0.5	0.3	0.2	0.1	0.4	0.2	0.1	0.0	0.1	0.1	0.1	0.5
5-Feb	0.1	0.1	0.2	0.6	0.3	-0.1	-0.1	-0.3	-0.4	0.1	-0.1	-0.1	0.2	0.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.2	0.6
6-Feb	-0.1	-0.2	-0.2	0.4	0.4	0.4	-0.2	0.0	AF	AF	AF	AF	-1.0	-0.4	-0.5	-1.0	-0.9	-0.7	-0.1	0.2	0.0	-0.1	0.0	0.0	-0.2	0.4
7-Feb	0.1	0.0	-0.2	-0.1	0.0	-0.1	0.1	0.1	0.3	0.1	AF	-0.4	0.4	0.2	-0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.4	0.0	0.4
8-Feb	0.3	-0.1	0.0	0.1	0.1	0.5	-0.3	0.0	0.1	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.5
9-Feb	-0.2	0.3	0.0	-0.1	-0.1	-0.1	-0.2	0.0	-0.3	-0.1	0.0	0.1	0.3	0.3	0.2	0.1	0.2	0.0	0.0	0.0	-0.1	0.4	0.0	0.3	0.0	0.4
10-Feb	0.6	0.4	0.2	-0.4	-0.5	-1.1	-0.5	-0.2	0.1	0.1	0.3	0.3	0.1	0.6	-0.2	0.0	-0.1	-0.2	-0.3	-0.1	0.1	0.1	0.1	-0.1	0.0	0.6
11-Feb	0.1	0.0	0.1	0.1	0.0	-0.1	0.0	0.1	0.0	0.2	0.3	0.8	0.0	0.7	0.5	0.5	0.1	-0.1	0.1	0.0	0.0	0.2	0.2	0.0	0.2	0.8
12-Feb	0.0	-0.2	-0.3	-0.7	-0.6	-0.5	-0.4	-0.7	-0.5	-0.6	-0.6	-0.3	-0.1	0.0	-0.3	-0.6	-0.1	-0.1	-0.5	-0.4	0.0	0.0	0.1	0.2	-0.3	0.2
13-Feb	0.1	-0.3	-0.2	-0.1	0.4	0.6	0.2	0.3	0.2	0.3	0.5	0.6	0.5	0.4	0.6	0.7	0.5	0.3	-0.1	0.2	0.1	0.0	0.1	0.0	0.2	0.7
14-Feb	0.0	0.0	0.0	0.3	0.1	0.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.3
15-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	0.3
16-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	0.3
17-Feb	AF	AF	AF	AF	AF	AF	AF	1.4	AF	-0.2	-0.1	AF	AF	AF	AF	AF	-0.2	0.1	-0.6	-0.4	-0.5	-0.2	-0.3	0.0	-0.2	1.4
18-Feb	-0.2	-0.1	-0.1	-0.2	-0.3	-0.1	-0.1	-0.2	0.3	0.6	0.7	0.2	0.1	0.2	0.2	0.1	0.0	0.0	0.6	0.4	0.0	0.0	-0.3	-0.4	0.1	0.7
19-Feb	-0.4	-0.3	-0.1	-0.1	0.0	0.1	0.3	0.0	-0.1	-0.1	0.3	0.3	-0.5	-0.3	-0.1	-0.2	-0.1	0.4	0.5	0.3	-0.1	-0.4	-0.3	-0.4	-0.1	0.5
20-Feb	-0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.4	0.2	0.5	0.3	0.0	0.2	0.1	-0.1	0.0	0.0	0.4	0.5	0.4	0.1	0.5
21-Feb	0.3	0.7	0.2	-0.1	0.0	0.1	0.2	0.4	0.7	0.6	0.4	0.5	0.5	-0.3	0.1	0.5	0.4	0.1	-0.1	-0.1	-0.3	0.3	0.1	0.2	0.2	0.7
22-Feb	0.2	0.1	-0.1	-0.1	0.0	-0.1	0.0	0.1	0.2	0.4	0.5	0.3	0.2	0.0	0.2	0.1	0.2	0.4	0.1	0.1	-0.2	-0.2	-0.2	0.0	0.1	0.5
23-Feb	0.1	0.0	0.1	0.2	0.0	-0.2	0.0	0.2	0.0	0.4	0.6	0.1	0.1	-0.2	0.1	0.1	-0.1	-0.1	0.1	0.1	0.3	0.4	0.4	0.1	0.1	0.6
24-Feb	0.4	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	-0.1	0.0	0.2	0.3	-0.1	0.3	0.7	0.2	0.4	0.5	0.5	0.6	0.5	0.5	0.5	0.3	0.7
25-Feb	0.5	0.7	0.5	0.5	0.2	0.3	0.3	-0.2	0.1	0.2	0.4	0.6	1.1	0.4	0.1	0.6	0.2	0.1	0.3	0.5	0.6	0.5	0.2	0.1	0.4	1.1
26-Feb	0.0	-0.1	-0.1	0.1	0.2	0.4	-0.1	0.2	0.4	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.1	-0.1	-0.3	-0.6	-0.1	-0.5	-0.5	-0.6	0.0	0.4
27-Feb	-0.9	-0.7	-0.8	-0.6	-0.7	-0.5	-0.4	-0.3	-0.3	-0.1	0.1	0.2	-0.1	0.5	0.8	0.4	0.5	0.1	0.0	0.2	0.3	0.0	-0.4	-0.3	-0.1	0.8
28-Feb	0.2	-0.3	-0.5	-0.5	-0.2	0.2	0.3	0.0	-0.2	-0.4	0.0	-0.1	0.1	-0.4	-0.6	-0.4	0.4	-0.2	-0.1	-0.2	0.0	0.0	0.1	0.1	-0.1	0.4
29-Feb	-0.1	-0.1	0.4	0.6	-0.3	0.1	0.3	-0.3	-0.1	0.0	0.3	0.1	0.2	0.0	0.1	0.4	0.2	0.6	0.4	0.2	0.7	0.6	0.5	0.8	0.2	0.8
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 75 m (VW75m) - km/h
Mannix - February 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	696
Maximum Value: 3.4 km/h on Feb 28 08:00			Hours of Data:	605
Minimum Value: 0.1 km/h on Feb 20 07:00			Hours of Missing Data:	91
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.5 P ₉₀ = 2.1 P ₉₉ = 3.1			Hours of Calibration:	0
			Percent Operational Time:	86.9

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

AF - Analyzer Failure



Summary of Hour Averages

Mannix - February 2016

Maximum Value: 3.9 km/h on Feb 24 01:00 Maximum Daily Average: 1.4 km/h on Feb 23																								Hours in Service:	696			
Minimum Value: -1.7 km/h on Feb 12 05:00 Minimum Daily Average: -0.6 km/h on Feb 12																								Hours of Data:	629			
Maximum Diurnal Average: 0.9 km/h at hour 20 Minimum Diurnal Average: 0.4 km/h at hour 9																								Hours of Missing Data:	67			
Monthly Average: 0.65 km/h Percentiles: P ₁ = -1.1 P ₁₀ = 0.0 Q ₁ = 0.2 Median = 0.5 Q ₃ = 1.1 P ₉₀ = 1.5 P ₉₉ = 3.1																								Hours of Calibration:	0			
																								Percent Operational Time:	90.4			
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	0.3	0.2	0.1	0.1	0.1	0.2	0.3	0.5	0.7	0.8	0.5	0.2	0.4	0.7	0.4	0.5	0.4	0.4	0.5	0.4	0.3	0.2	0.1	0.1	0.4	0.8		
2-Feb	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.3	0.4	0.5	0.5	0.2	0.3	0.3	0.4	1.4	0.8	1.2	1.2	1.0	1.1	1.2	1.0	0.8	0.6	1.4		
3-Feb	0.9	0.6	0.4	0.4	0.7	0.6	0.3	0.3	0.1	0.0	0.0	0.3	0.1	0.3	0.1	0.2	0.4	0.7	0.6	1.2	1.2	1.4	0.9	1.2	0.5	1.4		
4-Feb	0.7	0.8	0.7	0.9	0.9	0.7	0.8	0.3	0.3	0.0	0.4	0.0	-0.1	-0.1	0.3	0.1	0.2	0.2	0.3	0.2	0.4	0.3	0.3	0.6	0.4	0.9		
5-Feb	0.0	0.0	0.3	0.7	0.6	-0.4	-0.4	-0.8	-0.9	0.3	0.3	0.1	0.2	0.3	-0.5	0.4	0.4	0.2	0.2	0.3	0.2	-0.5	0.1	0.7	0.9	0.1	0.9	
6-Feb	0.3	0.0	-0.5	0.3	0.3	0.6	-0.6	0.2	AF	AF	AF	AF	2.0	2.4	2.1	1.5	1.5	1.2	1.6	1.1	0.7	0.5	0.4	0.2	0.8	2.4		
7-Feb	0.2	1.1	1.0	0.9	0.5	0.4	0.7	0.1	0.4	0.4	AF	0.7	1.2	1.0	0.9	1.1	0.9	0.9	0.4	0.2	0.1	0.2	0.3	0.7	0.6	1.2		
8-Feb	0.6	-0.3	0.4	0.4	0.3	0.7	-0.2	0.1	0.2	0.3	0.2	0.3	0.2	0.2	0.3	0.2	0.1	0.2	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.7		
9-Feb	-0.4	0.4	-0.2	-0.4	-0.3	-0.1	-0.5	0.0	-0.6	-0.4	0.1	0.1	0.3	0.3	0.1	0.1	0.1	0.0	1.0	2.5	2.5	2.4	2.1	2.8	0.5	2.8		
10-Feb	2.7	2.1	2.1	1.1	1.3	1.0	0.9	1.0	1.2	1.0	1.2	1.0	0.8	1.2	0.7	0.8	1.1	1.0	1.2	0.9	0.8	0.6	0.5	0.3	1.1	2.7		
11-Feb	0.5	0.3	0.3	0.3	0.1	0.2	0.2	0.3	0.2	0.5	1.0	1.5	0.8	1.7	1.7	1.6	1.4	1.3	1.2	0.4	0.1	-0.2	0.0	-0.1	0.6	1.7		
12-Feb	0.0	-0.4	-0.8	-1.6	-1.7	-1.6	-1.1	-1.2	-0.7	-1.2	-1.2	-0.5	0.2	0.0	-0.5	-0.7	-0.3	-0.2	-0.5	-0.5	0.2	0.1	0.2	0.5	-0.6	0.5		
13-Feb	0.4	-0.1	0.2	0.2	0.6	0.7	0.3	0.4	0.3	0.3	0.5	0.6	0.5	0.4	0.5	0.7	0.4	0.1	0.7	1.7	0.7	0.5	1.0	1.0	0.5	1.7		
14-Feb	1.5	1.7	1.9	2.2	1.9	1.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.2	
15-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	AF	AF	--
16-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	AF	AF	--
17-Feb	1.1	1.3	2.1	1.5	2.4	AF	AF	AF	AF	AF	AF	AF	2.3	1.1	0.9	0.6	0.9	0.1	0.7	0.5	0.9	0.7	1.1	0.8	0.7	1.1	2.4	
18-Feb	1.0	0.7	0.2	0.2	0.3	0.6	0.4	0.6	0.0	-0.6	-0.9	0.4	0.0	0.2	0.7	0.2	-0.4	-0.3	1.2	1.6	0.9	1.3	1.5	1.1	0.5	1.6		
19-Feb	0.9	0.9	1.1	1.4	2.1	1.8	1.1	0.6	0.5	0.2	0.3	0.8	0.6	0.7	0.8	0.8	0.2	0.7	1.0	1.0	0.8	0.5	0.9	0.5	0.8	2.1		
20-Feb	0.4	0.4	0.4	0.5	0.3	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.0	0.2	0.1	-0.1	0.2	0.1	-0.1	0.1	-0.1	0.5	0.6	0.6	0.2	0.6		
21-Feb	0.7	0.5	0.1	0.0	0.5	0.1	0.2	0.3	0.6	0.6	0.5	0.5	0.6	-0.1	0.3	0.6	0.5	0.4	0.3	-0.1	-0.7	0.0	0.1	0.5	0.3	0.7		
22-Feb	1.5	0.4	0.4	0.8	1.0	0.4	0.4	0.2	0.2	0.3	0.5	0.5	0.3	0.2	0.2	0.2	0.5	0.3	0.8	3.1	2.6	2.3	1.5	0.6	0.8	3.1		
23-Feb	0.4	0.3	1.0	1.5	1.4	1.0	1.4	1.5	1.1	1.6	2.2	1.8	1.4	0.9	0.1	0.8	1.0	0.6	0.3	1.4	2.5	2.9	2.8	3.6	1.4	3.6		
24-Feb	3.9	3.6	3.5	3.2	2.5	1.5	1.7	0.7	0.2	0.1	0.1	0.2	0.5	0.0	0.4	0.9	0.2	0.5	0.6	0.5	0.4	0.5	0.8	1.1	3.9			
25-Feb	0.8	0.5	0.5	0.5	0.1	0.3	0.3	-0.1	0.1	0.3	0.6	0.8	1.1	1.2	1.3	2.2	1.3	1.6	1.8	2.5	2.5	1.9	1.4	1.1	1.0	2.5		
26-Feb	0.5	0.1	-0.1	0.3	0.7	1.1	0.4	1.2	1.5	1.8	1.9	1.7	2.3	1.8	1.1	1.2	1.4	2.1	1.5	1.2	1.4	1.2	1.2	1.3	1.2	2.3		
27-Feb	1.2	1.5	1.4	1.6	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.1	1.1	1.5	1.6	1.1	0.9	0.3	0.3	0.3	0.3	0.7	0.9	1.7	1.1	1.7		
28-Feb	2.1	1.4	1.3	1.2	1.3	1.5	2.1	2.3	2.4	1.5	1.4	1.1	1.3	0.7	0.5	0.6	1.7	1.2	1.2	0.9	0.7	0.2	0.0	0.1	1.2	2.4		
29-Feb	-0.2	-0.1	0.7	0.6	-0.3	0.4	0.6	0.2	-0.1	0.0	0.3	0.3	0.4	0.2	0.3	0.4	0.4	0.7	0.3	0.2	0.6	0.5	0.7	0.8	0.3	0.8		
																								Diurnal Average	0.8			
																								Diurnal Maximum	3.6			
AF - Analyzer Failure																												



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 90 m (VW90m) - km/h
Mannix - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.6 km/h on Feb 28 09:00 Minimum Value: 0.1 km/h on Feb 20 08:00 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 = 3.0																								Hours in Service: 696 Hours of Data: 629 Hours of Missing Data: 67 Hours of Calibration: 0 Percent Operational Time: 90.4	
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	0.7	0.6	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.8	0.6	0.9	1.0	1.3	0.9	0.9	0.7	0.5	0.4	0.2	0.2	0.2	0.3	0.3	1.3
2-Feb	0.3	0.2	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.5	0.6	0.7	0.6	0.8	0.6	1.4	1.6	1.9	1.8	1.6	1.4	1.5	1.3	1.1	1.9
3-Feb	1.3	1.2	0.8	1.1	0.7	0.6	0.7	0.5	0.4	0.4	0.7	1.4	1.0	0.8	0.7	0.7	1.0	1.3	1.6	1.4	1.3	1.5	1.2	1.6	
4-Feb	1.3	1.1	0.9	0.9	0.8	0.6	0.9	0.6	0.7	0.6	1.2	1.3	1.5	1.3	1.5	1.3	0.9	0.9	0.7	0.7	0.6	0.3	0.3	0.4	1.5
5-Feb	0.5	0.4	0.5	0.9	0.7	1.0	1.1	1.4	1.6	0.6	0.7	0.9	1.2	1.3	1.5	0.9	0.6	0.5	1.0	0.9	1.2	0.8	0.4	0.6	1.6
6-Feb	0.8	0.7	1.0	0.6	0.6	0.7	1.2	0.7	AF	AF	AF	AF	3.2	3.0	2.4	1.5	1.4	0.7	0.9	1.0	1.1	0.6	0.3	0.3	3.2
7-Feb	0.4	1.1	1.0	0.7	0.5	0.8	1.9	0.9	0.7	0.9	AF	0.8	1.4	0.9	1.5	1.4	0.9	0.9	0.6	0.5	0.3	0.3	0.3	0.3	1.9
8-Feb	0.6	0.9	0.3	0.5	0.6	0.8	0.9	1.1	1.0	0.4	0.4	0.6	0.4	0.5	0.6	0.4	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.5	1.1
9-Feb	0.9	0.3	0.9	0.9	0.8	0.7	1.0	0.8	1.0	1.1	0.9	0.7	0.5	0.8	0.6	0.5	0.6	0.4	1.1	2.1	2.7	2.4	2.7	3.2	3.2
10-Feb	2.8	2.6	2.5	2.4	3.0	2.8	2.2	1.7	2.1	1.7	1.7	1.8	1.6	2.0	1.8	1.4	1.3	1.2	1.3	1.1	0.8	0.6	0.5	0.6	3.0
11-Feb	0.5	0.4	0.6	0.5	0.6	0.7	0.5	0.6	0.4	0.6	1.0	1.3	1.0	1.8	1.6	1.5	1.2	1.1	1.4	0.6	0.4	0.9	1.0	0.9	1.8
12-Feb	0.9	1.3	1.7	2.0	1.9	2.0	2.1	1.8	1.6	1.8	2.1	1.7	1.6	2.0	2.7	2.8	2.9	3.0	2.6	2.7	2.8	2.6	2.6	2.4	3.0
13-Feb	2.1	1.6	1.7	1.9	2.3	2.3	1.9	1.5	1.1	1.4	1.3	1.2	1.2	0.9	0.7	0.5	1.0	1.0	0.7	0.7	1.1	1.1	1.1	1.1	2.3
14-Feb	0.7	0.5	0.5	0.9	1.0	1.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.0
15-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	--
16-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.9	1.0	0.6	0.5	0.6	0.7	0.8	0.6	0.8	0.9	1.9
17-Feb	1.5	1.4	1.8	1.6	2.3	AF	AF	AF	AF	AF	AF	AF	2.1	2.1	1.6	1.5	1.1	1.6	1.2	1.5	1.4	1.4	1.1	1.1	2.3
18-Feb	1.2	1.0	0.6	0.6	0.7	0.7	0.6	0.7	1.4	2.0	1.7	1.8	0.7	0.8	1.0	0.5	0.9	0.9	0.9	0.9	0.5	1.2	2.3	2.0	2.3
19-Feb	1.8	1.3	1.3	1.3	1.8	1.7	1.5	1.3	0.6	0.8	1.0	1.5	1.5	2.2	1.8	2.0	1.6	1.1	1.3	1.5	1.5	1.3	1.5	1.3	2.2
20-Feb	1.1	0.3	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.2	0.3	0.9	1.1	1.1	1.1	1.0	1.1	0.6	0.4	0.5	0.9	0.3	0.3	0.2	1.1
21-Feb	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.9	1.3	1.7	1.2	1.3	1.2	0.9	0.3	0.6	1.0	1.1	1.3	0.4	0.4	1.7
22-Feb	0.7	0.6	0.5	0.7	0.4	0.4	0.3	0.3	0.2	0.3	0.6	0.7	1.1	0.9	0.8	0.6	0.5	0.3	1.0	1.2	1.1	0.5	0.7	0.4	1.2
23-Feb	0.4	0.4	1.1	0.4	0.5	0.7	0.5	0.7	0.6	0.6	1.5	1.1	1.0	1.2	1.0	1.4	0.8	0.9	0.4	0.7	0.7	0.5	0.6	0.9	1.5
24-Feb	1.2	0.9	0.6	0.5	0.5	0.7	0.8	0.5	0.4	0.3	0.4	0.4	0.6	1.0	1.4	1.3	0.9	0.6	0.4	0.5	0.6	1.2	1.0	1.1	1.4
25-Feb	1.1	1.0	1.1	1.1	1.4	1.2	0.8	1.4	1.1	1.2	1.4	1.4	1.8	2.2	2.6	2.1	1.7	1.4	1.1	1.7	1.8	1.8	1.7	1.8	2.6
26-Feb	1.8	1.4	1.4	1.1	1.8	1.9	1.1	1.5	1.8	1.7	1.2	1.5	1.4	1.3	1.6	1.6	1.6	2.7	2.8	2.5	2.2	1.6	1.6	1.8	2.8
27-Feb	2.0	2.0	2.2	2.1	2.0	1.8	1.7	1.6	1.4	1.7	1.7	2.1	1.9	2.2	1.8	1.7	1.2	0.6	0.5	0.8	0.5	0.9	1.4	2.4	2.4
28-Feb	2.7	2.3	2.4	2.2	2.0	2.6	2.8	3.5	3.6	2.6	2.5	2.7	2.7	2.2	2.2	1.6	1.7	1.2	1.3	1.2	0.9	0.4	0.5	0.6	3.6
29-Feb	0.9	0.9	0.5	0.4	0.9	0.4	0.3	0.5	0.8	0.7	1.6	1.6	1.9	1.9	1.6	1.2	0.7	0.7	0.4	0.4	0.8	0.9	0.9	0.9	1.9
2.8 2.6 2.5 2.4 3.0 2.8 2.8 3.5 3.6 2.6 2.5 2.7 3.2 3.0 2.7 2.8 2.9 3.0 2.8 2.7 2.8 2.6 2.7 3.2 Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 5, 2016	Last Calibration	January 12, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	14:00	End Time (MST)	16:45
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-635
Analyzer IP address	192.168.1.43		Lamp voltage	827	828
Calculated slope	0.996194	0.996005	Chamber temp	45.0	45.1
Calculated intercept	0.500873	1.026153	Pressure	688.2	685.2
Analyzer Background	7.5	7.4	Flow	0.492	0.488
Analyzer Coefficient	0.995	0.984	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	0.1	----
as found span	5000	60.0	600.0	606.9	0.989
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	60.0	600.0	601.4	0.998
second point	5000	30.0	300.0	301.1	0.996
third point	5000	15.0	150.0	147.5	1.017
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.0	600.0	602.3	0.996
Average Correction Factor					1.004

Corrected As found 606.8 Previous response 601.8 % change -0.8%

Notes:

Changed inlet filter after as founds. Small adjustment on the span.

Calibration Performed By: Evan Magill



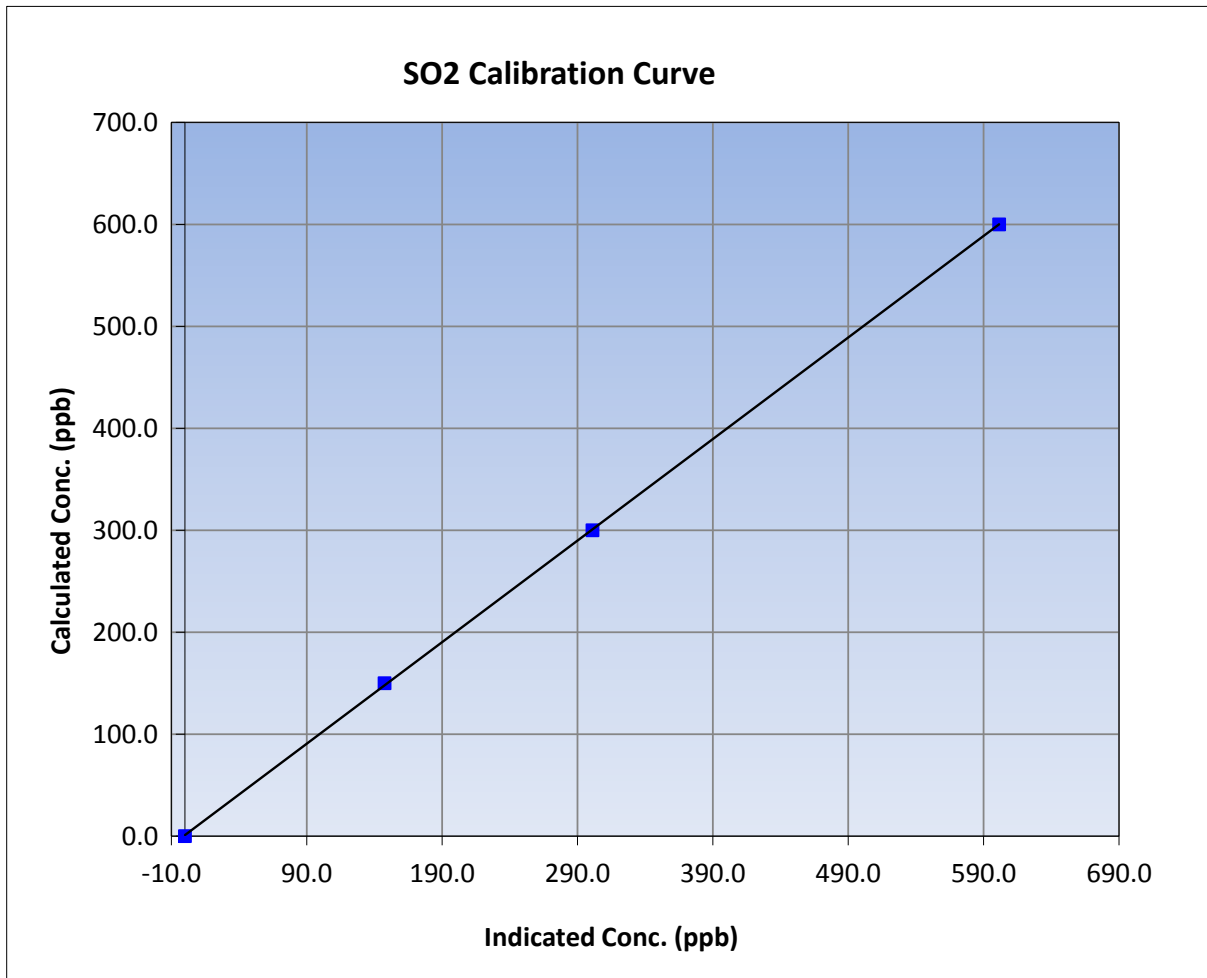
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 5, 2016	Previous Calibration	January 12, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	14:00	End Time (MST)	16:45
Analyzer make	TEI 43i	Analyzer serial #	1008841399

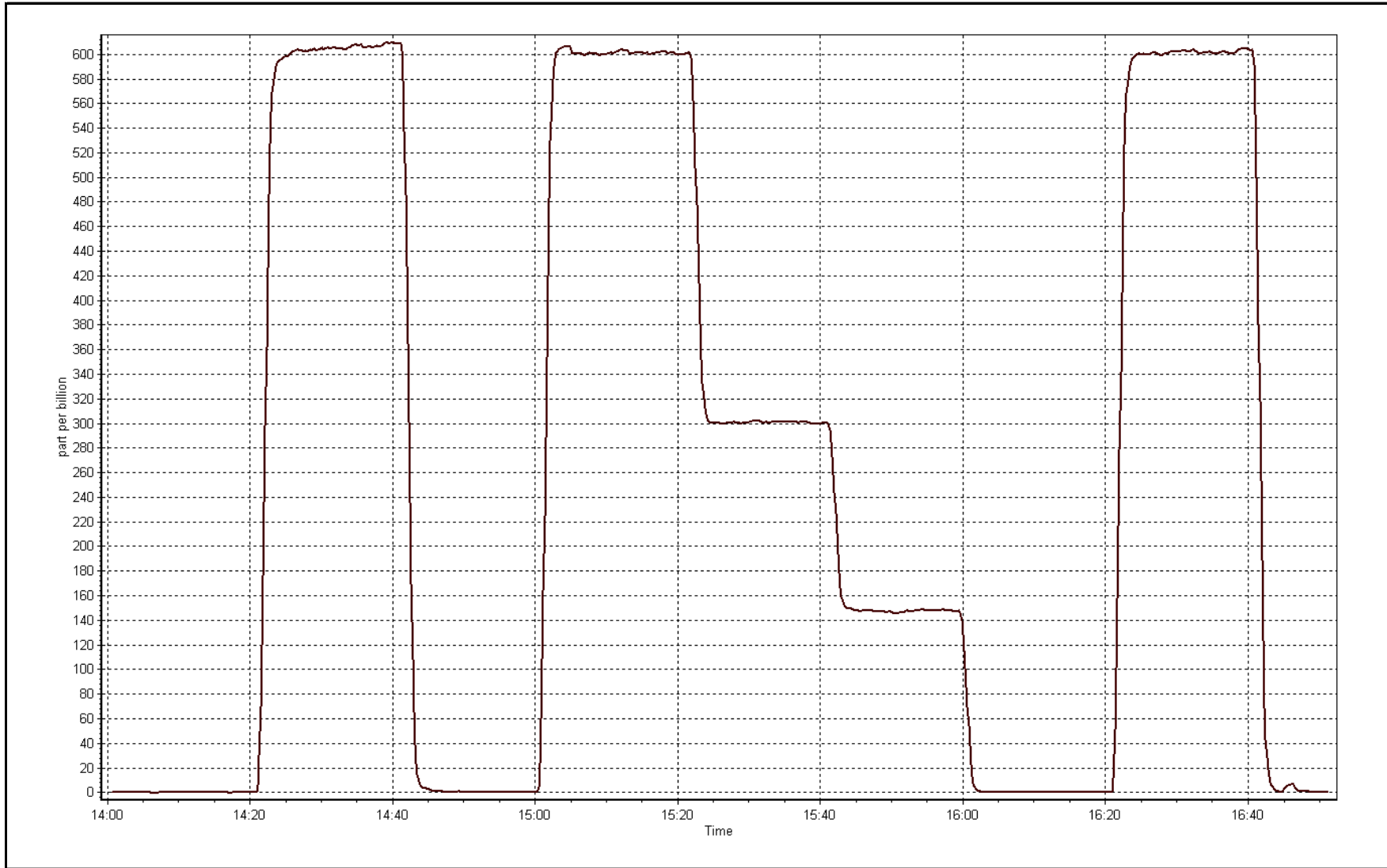
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999969
600.0	601.4	0.9976		
300.0	301.1	0.9964	Slope	0.996005
150.0	147.5	1.0168		
			Intercept	1.026153



SO2 Calibration Plot

Date: February 5, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 5, 2016	Last Calibration	January 8, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:45
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	138
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 09-Sep-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-657	-657
Analyzer IP address	192.168.1.42		Lamp voltage	816	818
Calculated slope	0.991257	0.992482	Chamber temp	45	45
Calculated intercept	0.111066	0.097141	Pressure	516.5	497.7
Analyzer Background	19.6	19.7	Flow	1.064	1.034
Analyzer Coefficient	0.956	0.968	Intensity	103	103
			Converter temp.	325	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.6	----
as found span	5000	74.4	75.0	73.8	1.017
SO2 scrubber check	5000	15.0	150.0	1.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.4	75.0	75.4	0.994
second point	5000	41.6	41.9	42.2	0.994
third point	5000	24.8	25.0	25.1	0.995
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	74.4	75.0	75.6	0.993
Average Correction Factor					0.994

Corrected As found	74.4	Previous response	75.5	% change	1.5%
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Notes:

Changed inlet filter and scrubber check done after as founds. Reset analyzer after as founds because the display was unresponsive. Adjusted zero and span.

Calibration Performed By: Evan Magill



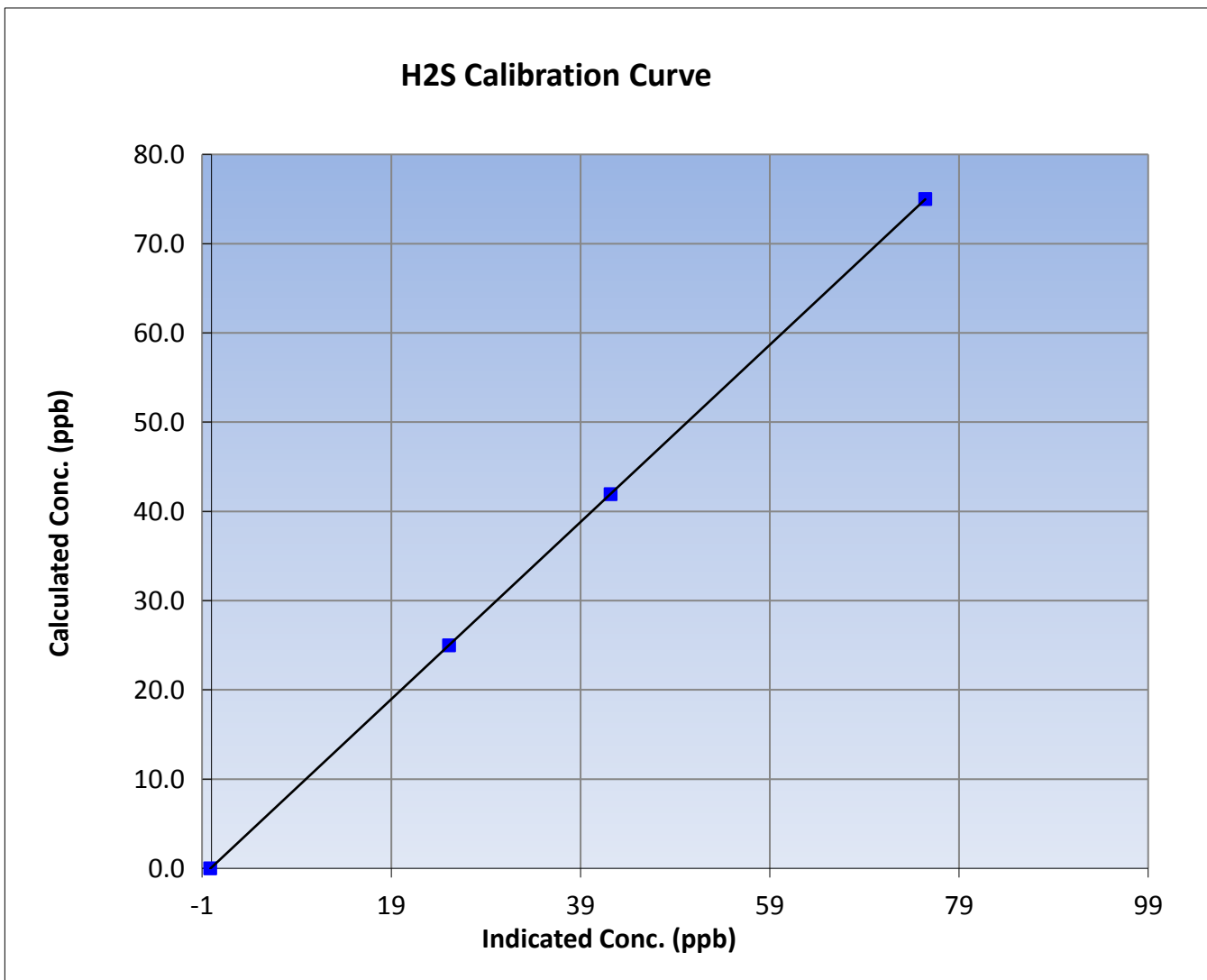
Wood Buffalo Environmental Association H2S Calibration Report

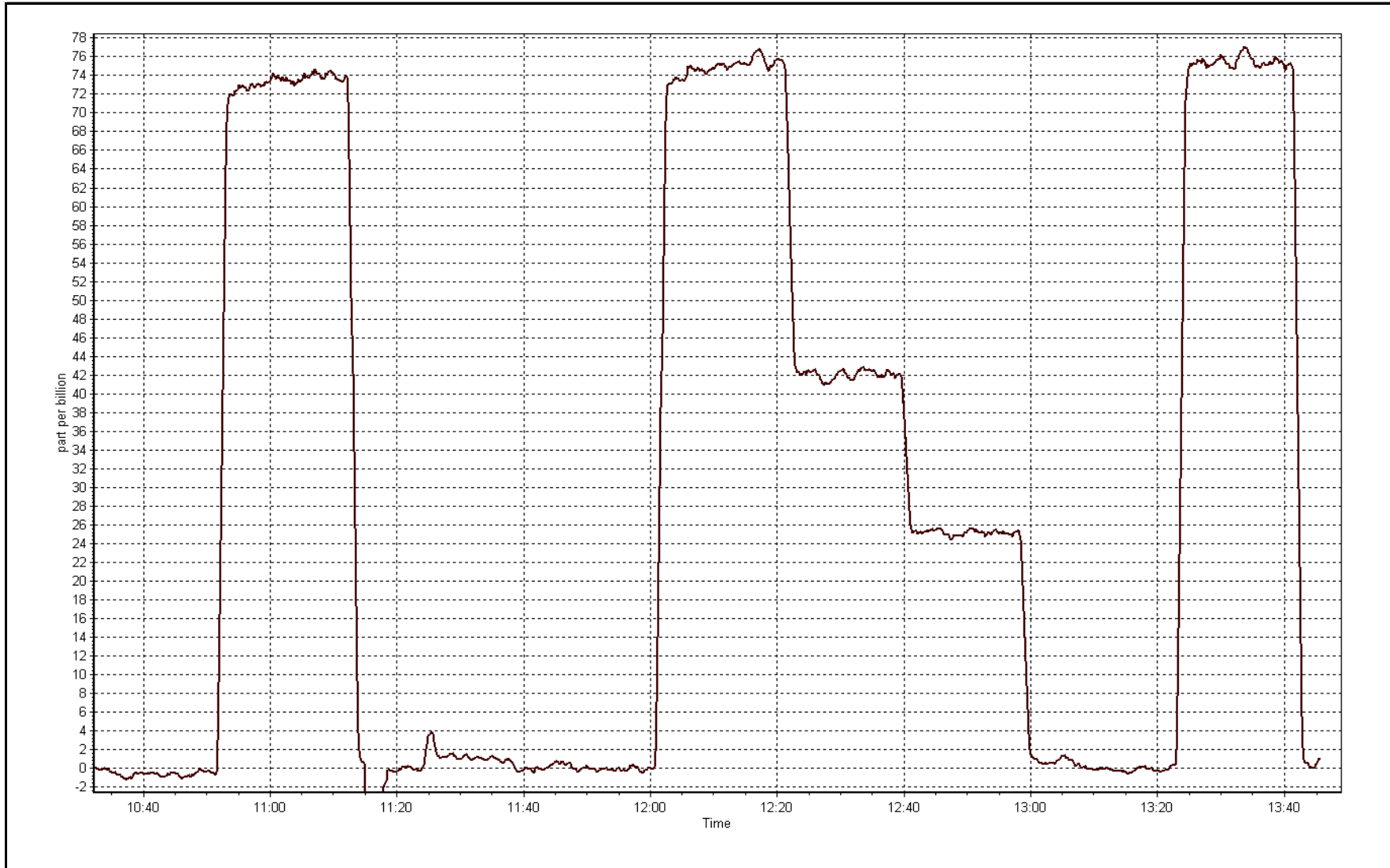
Station Information

Calibration Date	February 5, 2016	Previous Calibration	January 8, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	10:30	End Time (MST)	13:45
Analyzer make	Thermo 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999999
75.0	75.4	0.9941		
41.9	42.2	0.9941	Slope	0.992482
25.0	25.1	0.9952		
			Intercept	0.097141







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-05-16	Last Calibration	January-12-16
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	14:00	End Time (MST)	16:45
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	After		Before	After
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	1.006460	1.006268	Fuel Pressure	20.2	20.2
Calculated intercept	0.022166	-0.001959	Analyzer Coeff	3.4	3.4
			Analyzer BKG	2.850	2.800

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	-0.05	----
as found span	5000	60.0	12.46	12.33	1.010
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	60.0	12.46	12.39	1.005
second point	5000	30.0	6.23	6.18	1.008
third point	5000	15.0	3.11	3.08	1.011
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	60.0	12.46	12.39	1.005
Average Correction Factor					1.008

Corrected As found	12.38	Previous response	12.35	% change	-0.2%
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Notes:

Changed inlet filter after as founds. Small adjustment on zero and span.

Calibration Performed By:

Evan Magill



Wood Buffalo Environmental Association THC Calibration Report

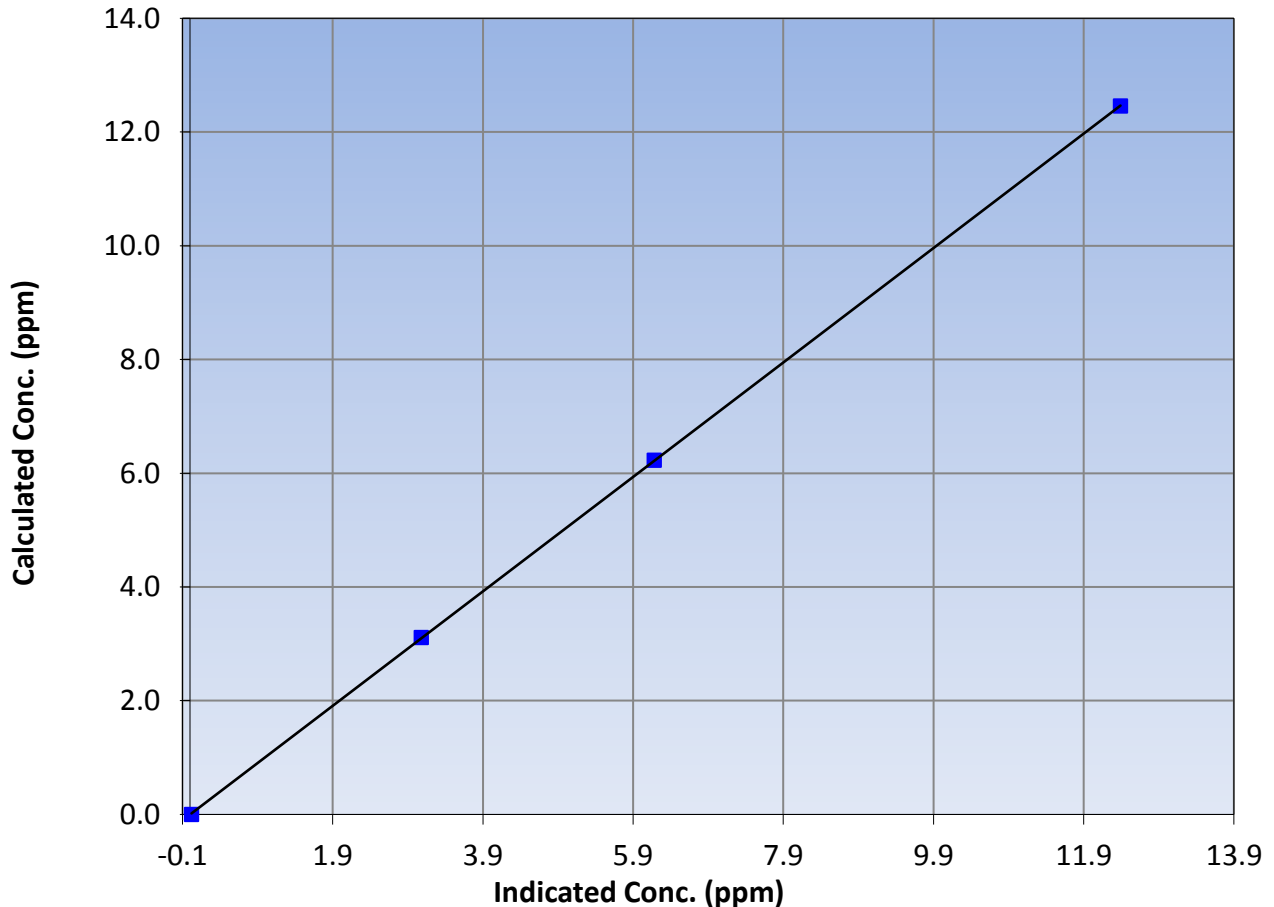
Station Information

Calibration Date	February 5, 2016	Previous Calibration	January 12, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	14:00	End Time (MST)	16:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

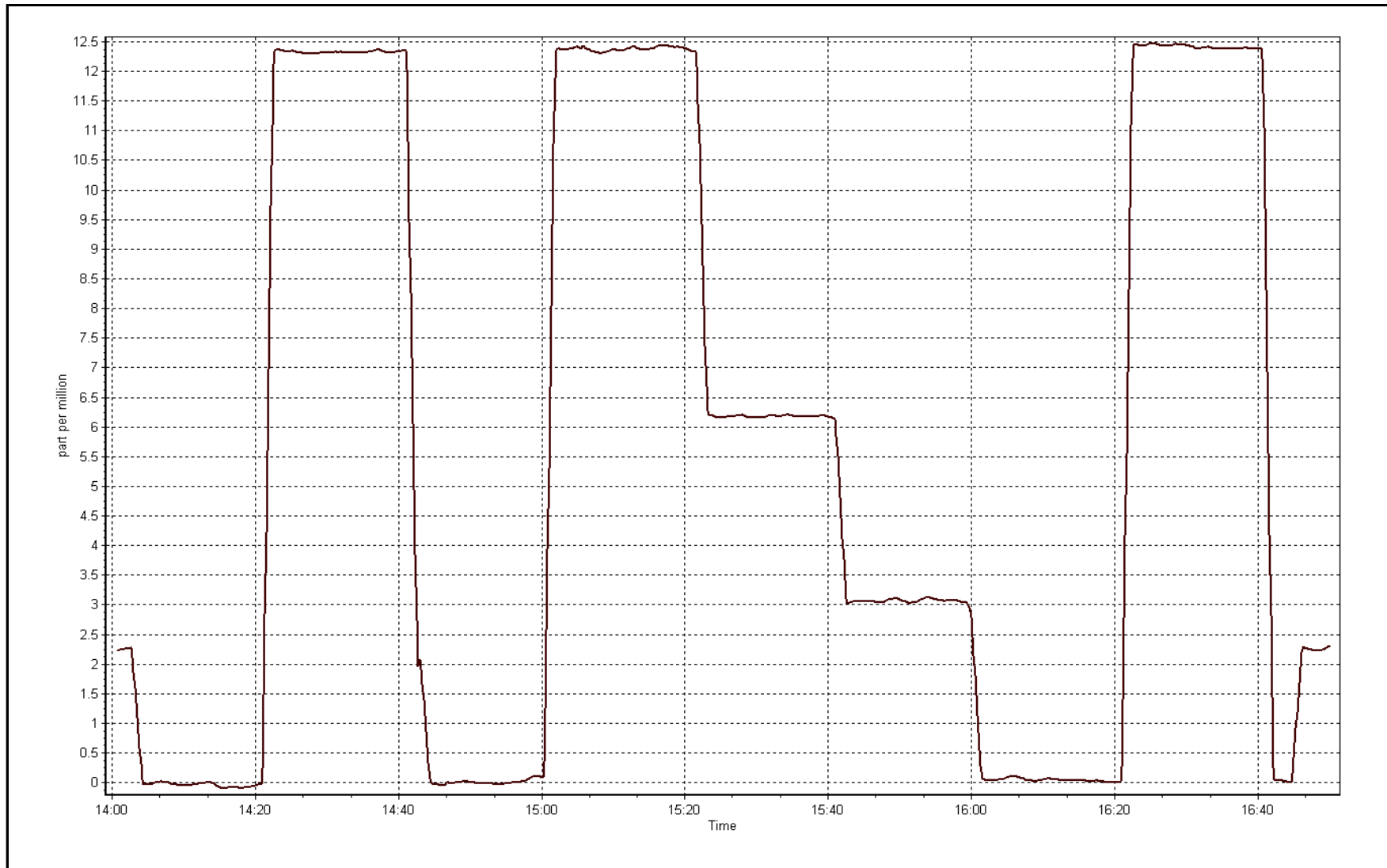
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999990
12.46	12.39	1.0053		
6.23	6.18	1.0078	Slope	1.006268
3.11	3.08	1.0110		
			Intercept	-0.001959

THC Calibration Curve



THC Calibration Plot

Date: February 5, 2016





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
FEBRUARY 2016

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 FEBRUARY 2016

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	664	32	32	100.00	21	0	8	0
TRS (ppb) Average	663	33	33	100.00	3	0	1	0
THC (ppm) Average	664	32	32	100.00	2.9	-	2.1	-
NMHC(ppm) Average	664	32	32	100.00	0.225	-	0.017	-
CH4(ppm) Average	664	32	32	100.00	2.8	-	2.1	-
O3 (ppb) Average	659	37	37	100.00	43	0	38	-
NO2 (ppb) Average	656	40	40	100.00	36	0	15	-
NO (ppb) Average	656	40	40	100.00	59	-	8	-
NOX (ppb) Average	656	40	40	100.00	96	-	23	-
NH3 (ppb) Average	626	41	70	95.83	0	0	0	-
PM2.5 (ug/m3) Average	694	2	2	100.00	44.4	-	10.4	0
Temperature 2 m (C) Average	696	0	0	100.00	9.5	-	2.9	-
Relative Humidity (%) Average	696	0	0	100.00	95	-	92	-
Wind Speed 10 m (km/h) Average	694	0	2	99.71	26	-	15	-
Wind Direction 10 m (deg) Average	694	0	2	99.71	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	664	1.7	3	-	0	0	0	0	2	6	21
TRS (ppb) Average	663	0.3	0	-	0	0	0	0	0	1	3
THC (ppm) Average	664	2.04	0.1	-	1.9	2	2	2	2.1	2.1	2.9
NMHC(ppm) Average	664	0.002	0.014	-	0	0	0	0	0	0	0.225
CH4(ppm) Average	664	2.03	0.1	-	1.9	2	2	2	2.1	2.1	2.8
O3 (ppb) Average	659	22.8	10	-	3	9	15	24	31	35	43
NO2 (ppb) Average	656	9.9	7	-	0	2	5	8	14	20	36
NO (ppb) Average	656	3.2	6	-	0	0	0	1	4	8	59
NOX (ppb) Average	656	13.1	11	-	0	3	6	10	18	26	96
NH3 (ppb) Average	626	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	694	4.64	4.1	-	0.6	1.7	2.3	3.4	5.4	9.1	44.4
Temperature 2 m (C) Average	696	-9.96	7.2	-	-33.2	-18	-14.7	-10.8	-4.6	-0.9	9.5
Relative Humidity (%) Average	696	76.3	13	-	34	57	69	80	85	90	95
Wind Speed 10 m (km/h) Average	694	8.9	5	-	0	3	5	8	12	16	26
Wind Direction 10 m (deg) Average	694	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NH3	01 Feb 2016 06:00	29 Feb 2016 04:00	29	Stabilization after daily span
Wind Speed, Wind Direction	01 Feb 2016 09:00	01 Feb 2016 10:00	2	Maintenance to access sensor serial numbers



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

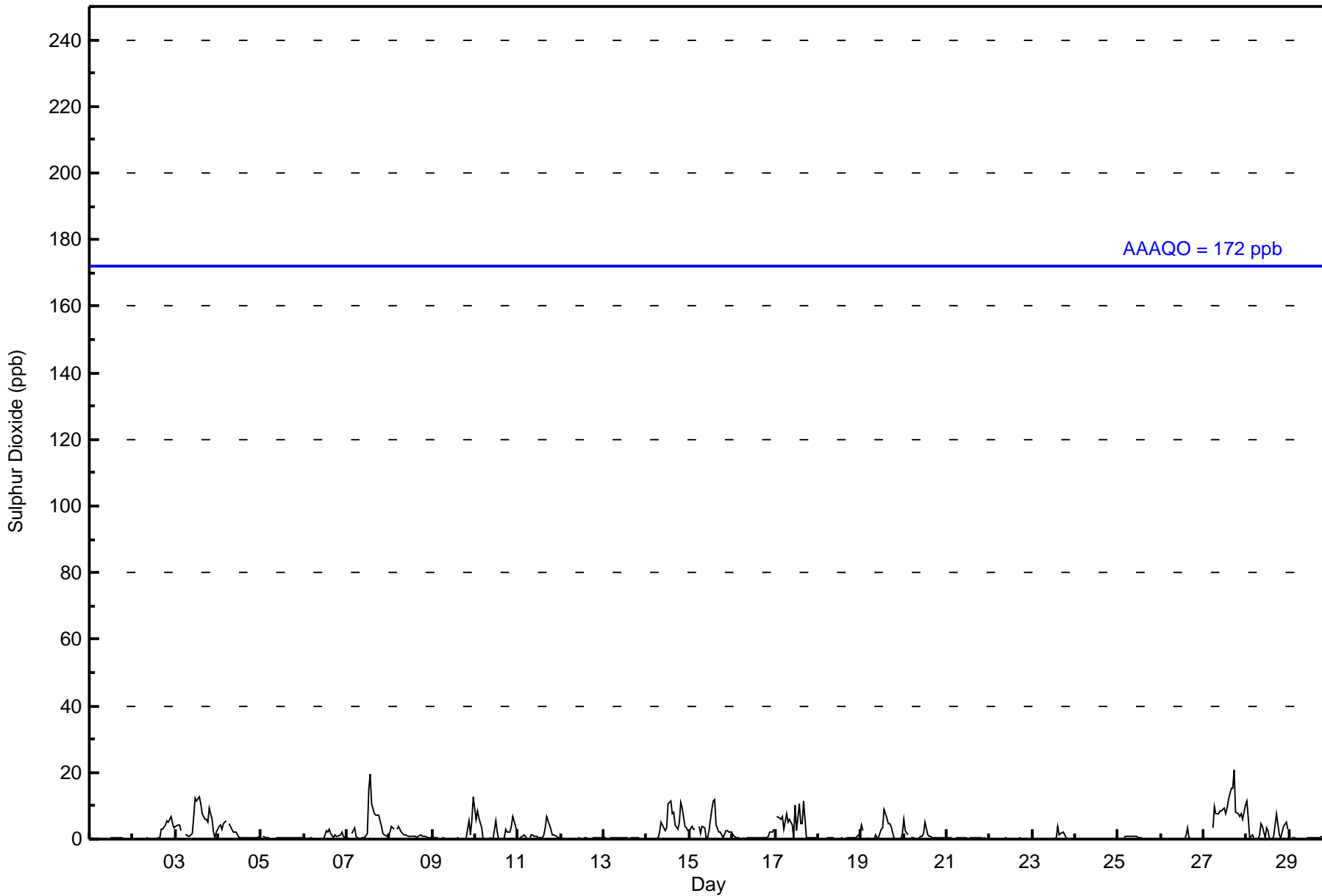
Patricia McInnes - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696												
Maximum Value: 21 ppb on Feb 27 18:00														Maximum Daily Average: 7.9 ppb on Feb 27												
Minimum Value: 0 ppb on Feb 22 05:00														Minimum Daily Average: 0.0 ppb on Feb 24												
Maximum Diurnal Average: 3.2 ppb at hour 14														Minimum Diurnal Average: 0.8 ppb at hour 6												
Monthly Average: 1.7 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 12												
														Hours of Data: 664												
														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	C	C	C	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	3	3	4	6	5	7	5	3	1.6	7
3-Feb	4	4	4	3	Z	1	1	1	1	1	7	12	11	13	11	8	6	6	5	9	6	2	0	2	5.1	13
4-Feb	4	4	3	4	5	Z	5	3	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1.7	5
5-Feb	Z	1	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
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	2	2	3	2	1	1	1	1	1	2	1	0	0.8	3
7-Feb	0	0	Z	2	3	1	0	0	0	0	1	2	15	20	11	8	7	7	7	4	2	1	1	1	4.0	20
8-Feb	2	4	3	Z	3	4	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1.4	4
9-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	1	6	13	1.3	13
10-Feb	6	8	6	3	0	Z	0	0	0	0	0	5	2	0	0	0	1	3	2	2	4	7	4	2	2.5	8
11-Feb	Z	1	1	1	1	0	0	1	1	1	1	0	0	0	1	4	7	4	3	1	1	1	0	0	1.4	7
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	1	0	0	0	0	0	0.3	1
14-Feb	0	0	0	Z	0	0	0	2	5	4	2	4	11	12	7	8	4	3	5	11	9	4	3	2	4.3	12
15-Feb	3	4	3	3	Z	4	2	4	3	0	0	3	9	11	12	4	2	2	1	0	2	3	2	2	3.4	12
16-Feb	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	3	0.6	3
17-Feb	Z	7	7	6	7	3	8	5	6	4	1	10	3	10	5	5	11	1	1	0	0	1	0	0	4.4	11
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.3	2
19-Feb	4	3	Z	0	0	0	0	0	1	0	1	3	3	9	6	5	5	4	1	0	0	0	0	2	2.1	9
20-Feb	6	2	1	Z	1	0	0	0	0	1	1	2	5	1	1	1	1	0	0	0	0	0	0	0	1.1	6
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	0	0	0	0	0	0	0.1	0
23-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	2	2	1	0	0	0	0	0	0.5	4
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	0
25-Feb	0	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0.3	3
27-Feb	0	0	0	0	Z	3	10	8	8	8	9	9	8	10	12	15	15	21	8	8	7	8	6	10	7.9	21
28-Feb	11	6	0	1	1	Z	0	1	5	4	0	3	2	0	0	1	4	7	1	1	2	4	5	3	2.8	11
29-Feb	Z	1	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerspan 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 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	645	97.14	97.14
11 - 20	18	2.71	99.85
21 - 60	1	0.15	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: 664

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	118	37	7	4	12	45	99	37	40	18	39	28	21	26	25	89	645
11 - 20	8	3	0	0	3	1	0	0	0	0	0	0	0	0	0	3	18
21 - 60	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	126	40	8	4	15	46	99	37	40	18	39	28	21	26	25	92	664

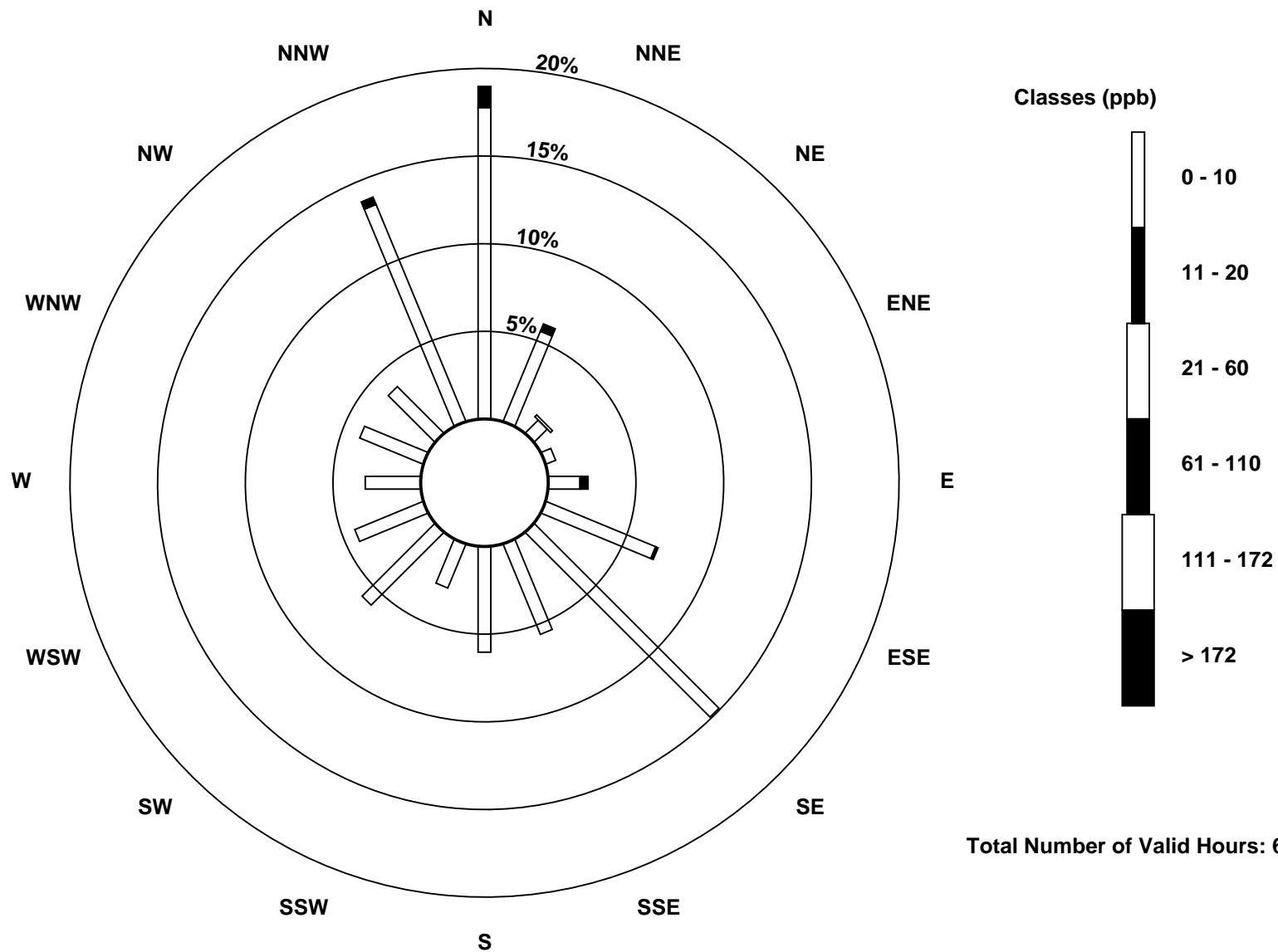
Total Number of Valid Hours: 664

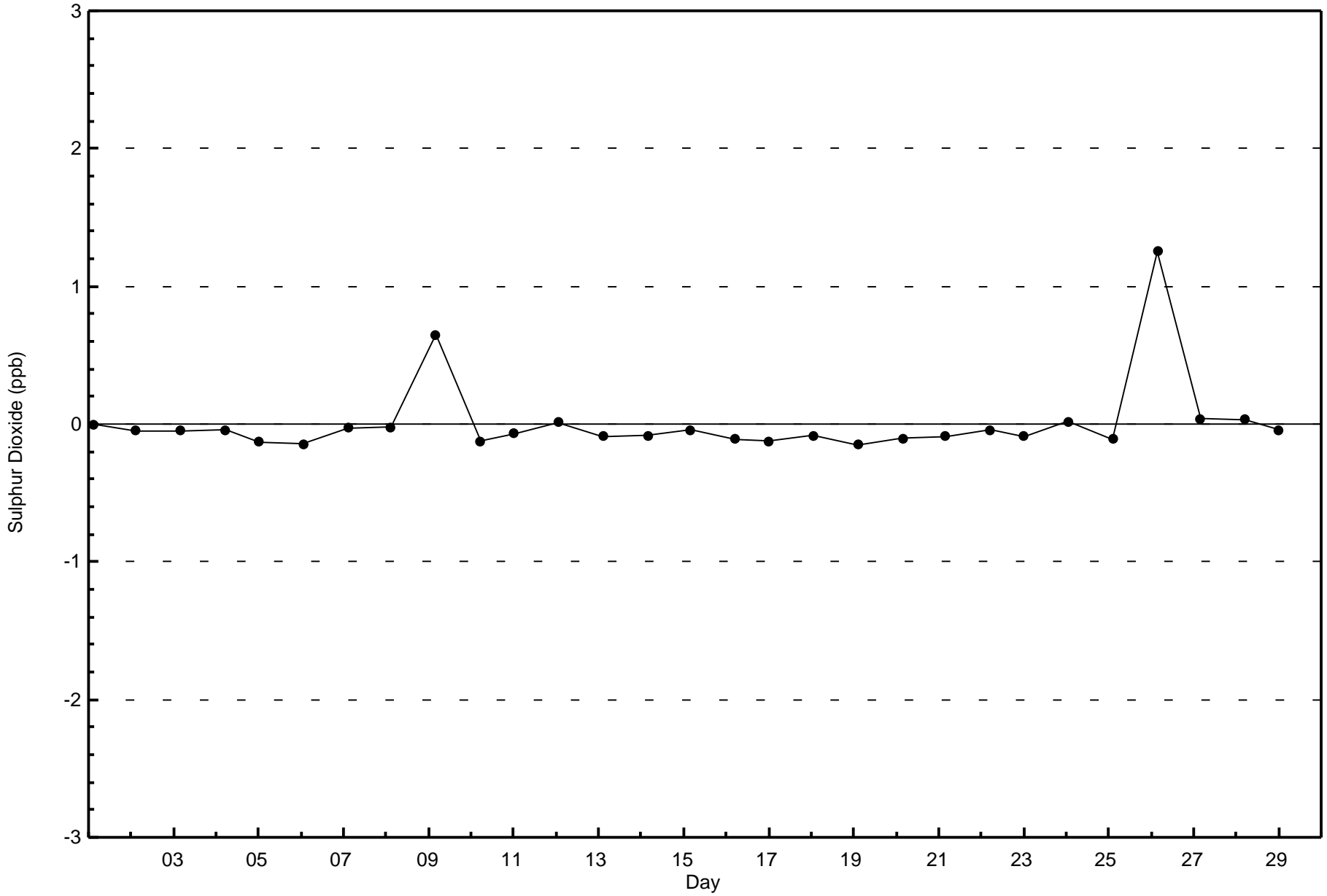
Total Number of Hours: 696

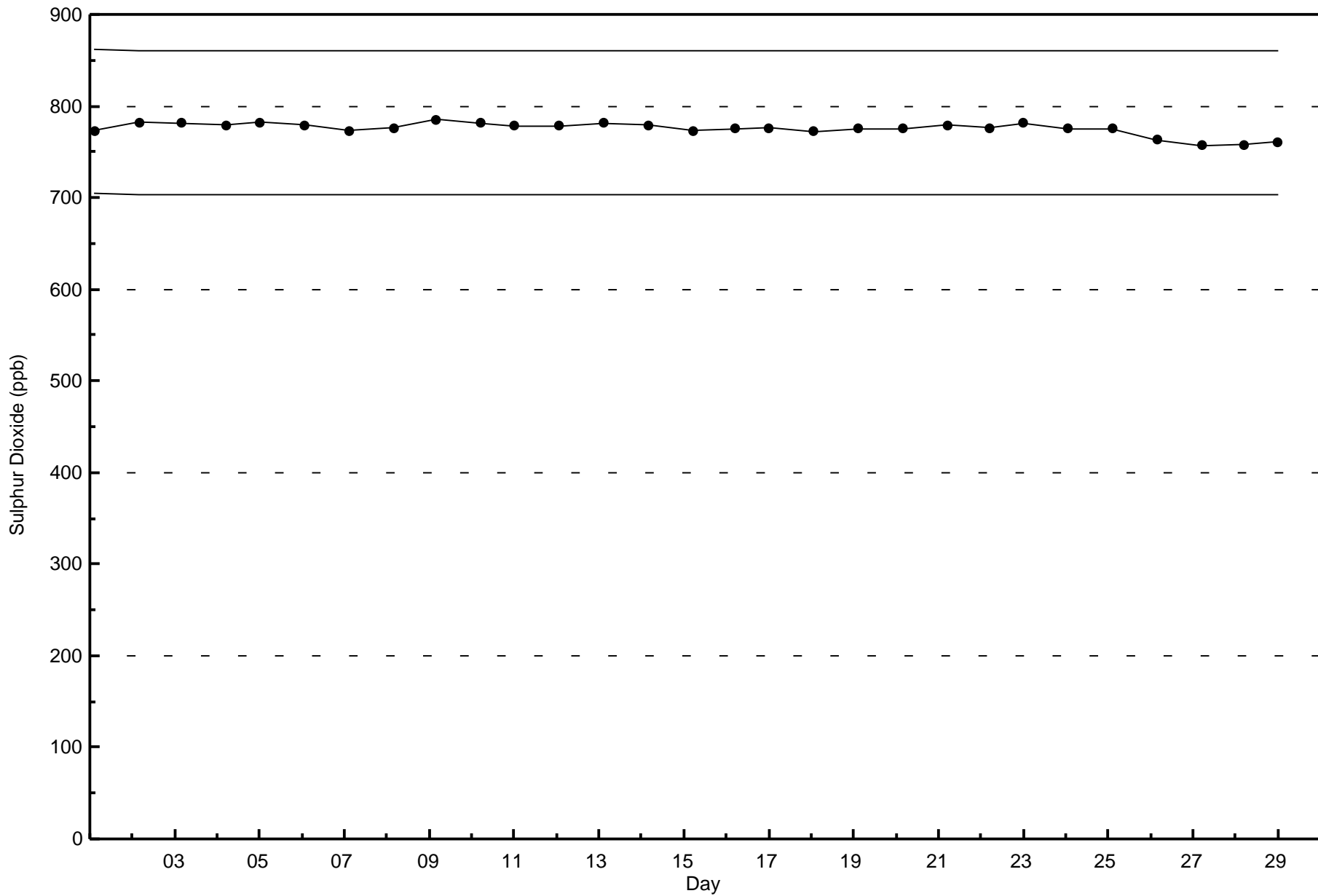


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

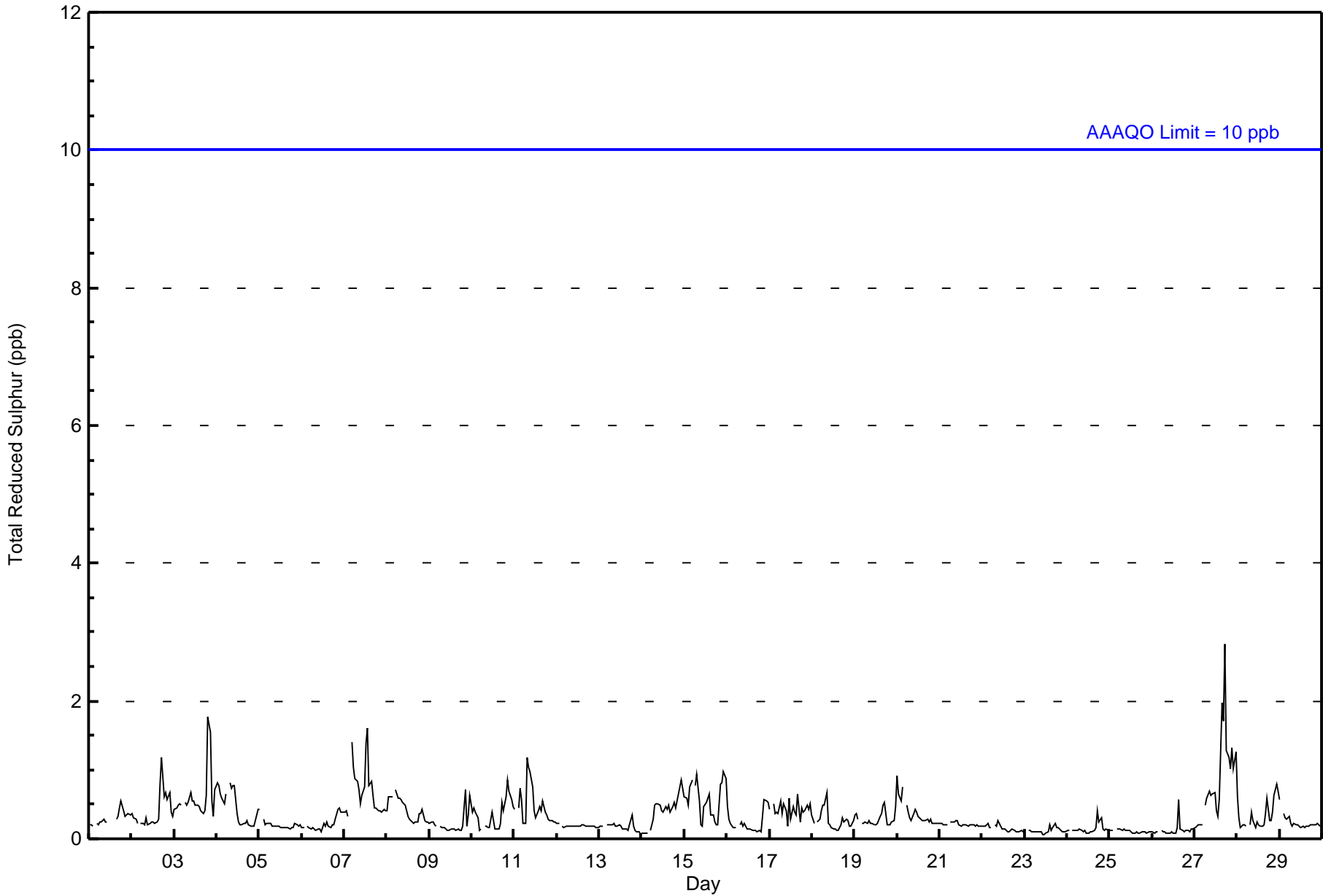
Patricia McInnes - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 3 ppb on Feb 27 18:00										Maximum Daily Average: 0.9 ppb on Feb 27										Hours of Data: 663						
Minimum Value: 0 ppb on Feb 23 11:00										Minimum Daily Average: 0.1 ppb on Feb 25										Hours of Missing Data: 33						
Maximum Diurnal Average: 0.4 ppb at hour 18										Minimum Diurnal Average: 0.3 ppb at hour 15										Hours of Calibration: 33						
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 = 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	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	1	0	0	0	0	0	0.3	1
2-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0.4	1
3-Feb	0	0	0	1	0	Z	1	0	1	1	1	1	0	0	0	0	0	0	1	2	2	1	0	1	0.6	2
4-Feb	1	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.2	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	0.2	0
7-Feb	0	0	0	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0.7	2
8-Feb	0	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.2	1
10-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0.3	1
11-Feb	0	Z	0	1	1	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.5	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	0.2	0
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	0.2	0
14-Feb	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0.4	1
15-Feb	1	1	0	1	1	Z	1	1	1	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1	0.6	1
16-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1
17-Feb	0	Z	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0.4	1
18-Feb	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	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	1	0	0	0	0	0	0	0.3	1
20-Feb	1	1	1	1	Z	0	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	0	Z	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	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.1	0
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	0.1	0
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	0.1	0
26-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
27-Feb	0	0	0	0	0	Z	0	1	1	1	1	1	0	0	1	2	2	3	1	1	1	1	1	1	0.9	3
28-Feb	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0.3	1
29-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
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.4																								Diurnal Average		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 2 2 3 1 2 2 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	662	99.85	99.85
3 - 4	1	0.15	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	127	40	7	4	15	47	96	37	38	19	40	28	17	26	27	92	660
3 - 4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	127	40	8	4	15	47	96	37	38	19	40	28	17	26	27	92	661

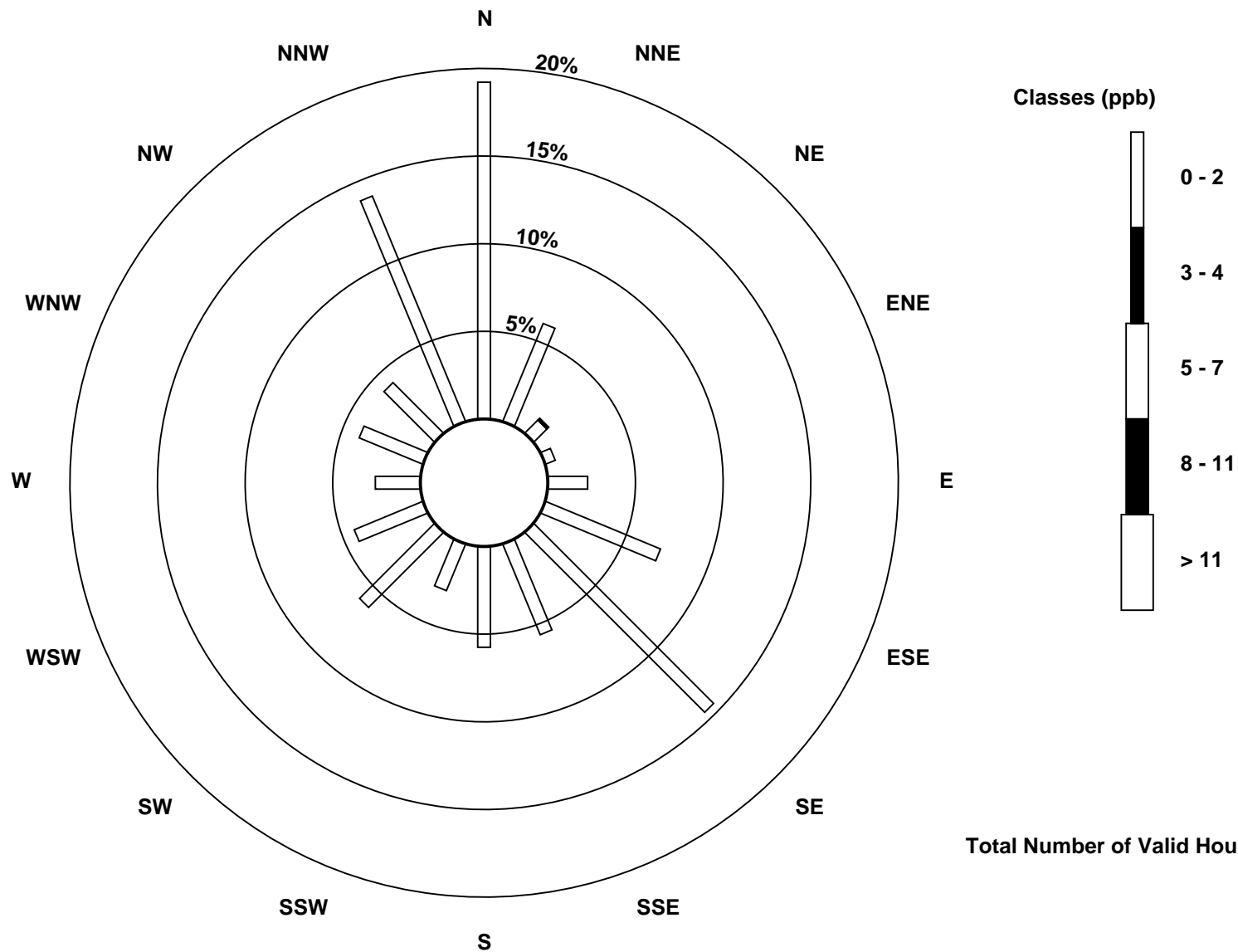
Total Number of Valid Hours: 661

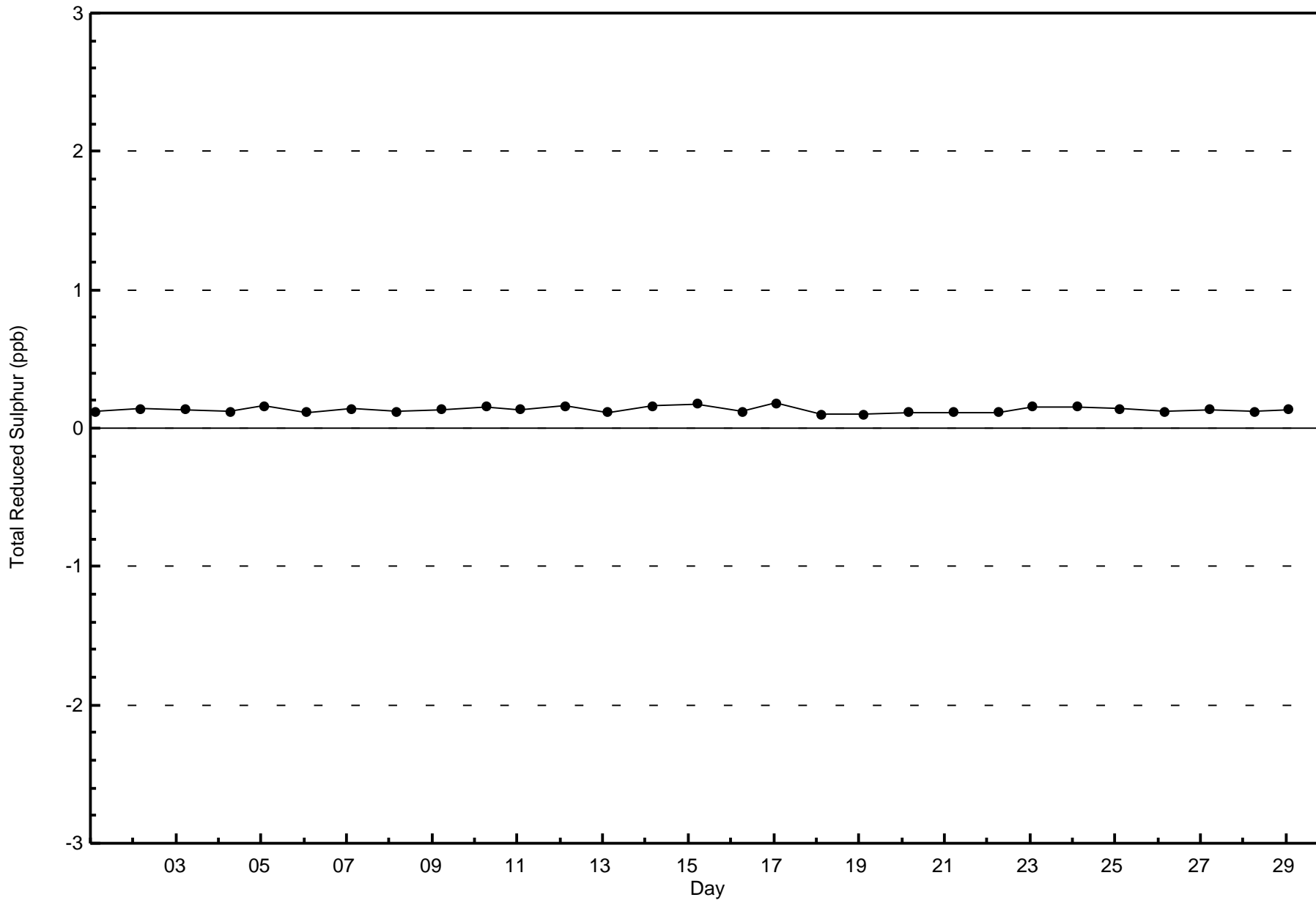
Total Number of Hours: 696

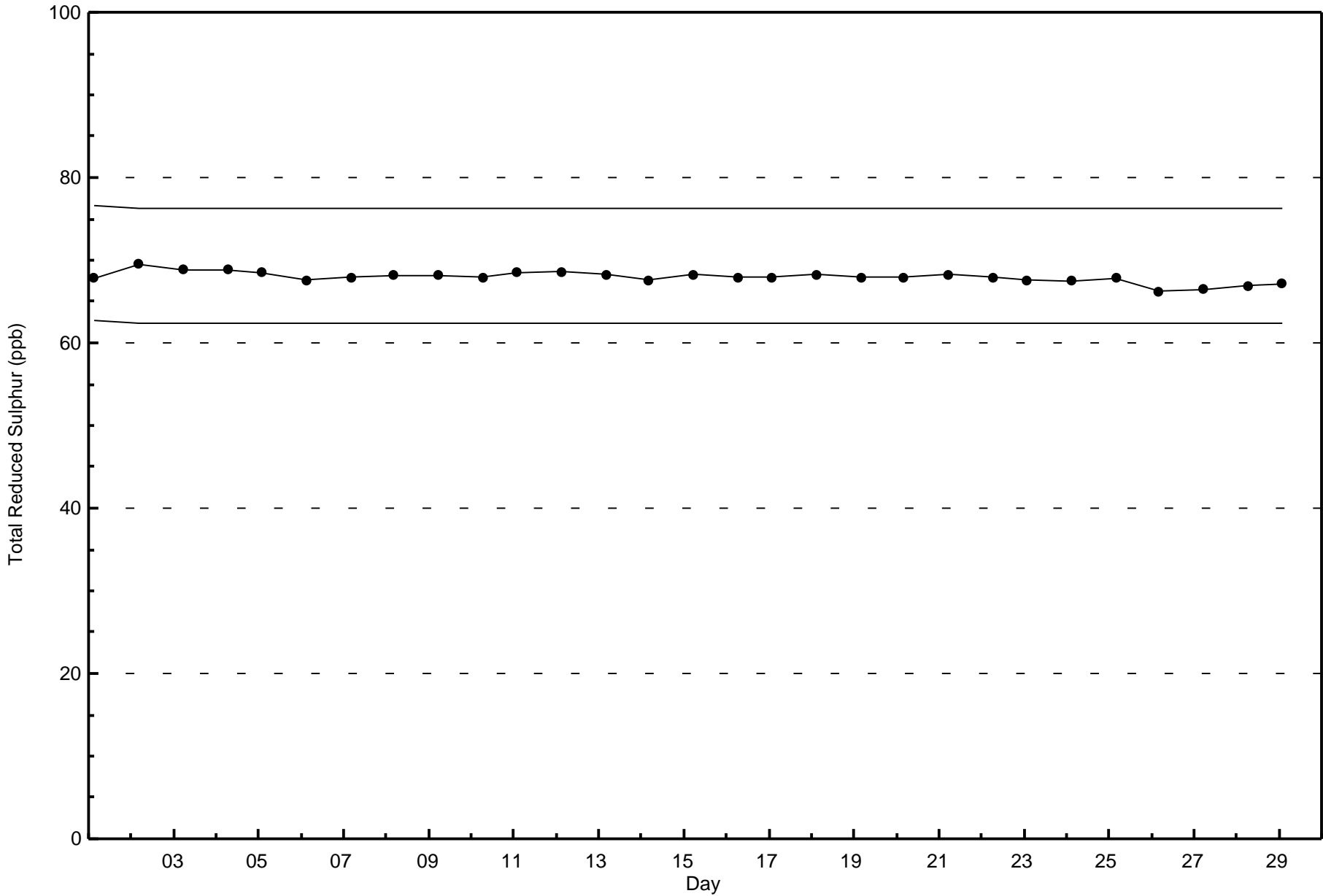


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



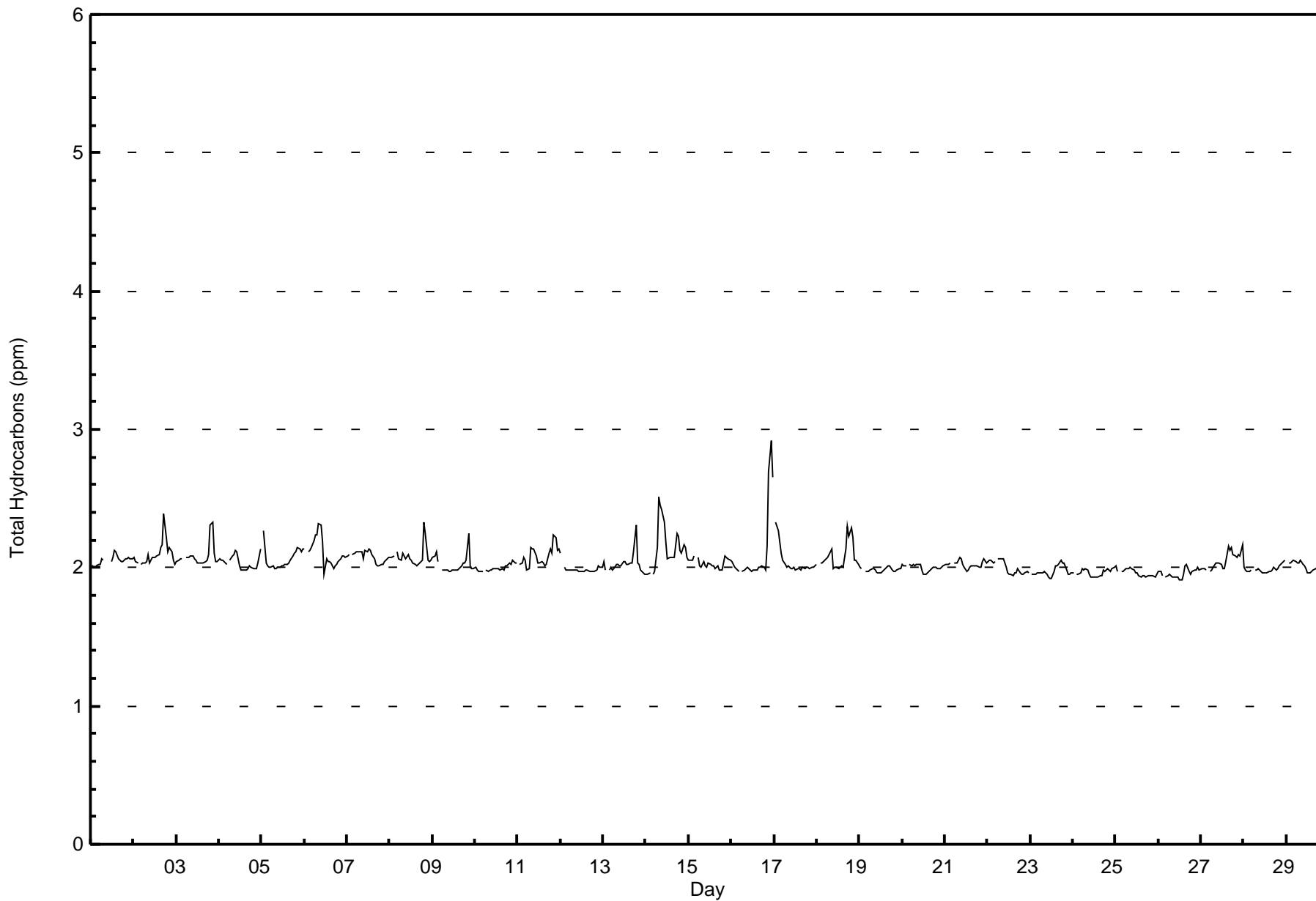






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Patricia McInnes - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Patricia McInnes - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	465	70.03	70.03
2.1 - 3.0	199	29.97	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - February 2016

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	97	24	3	2	9	40	77	21	24	14	33	22	16	19	11	53	465
2.1 - 3.0	29	16	5	2	6	6	22	16	16	4	6	6	5	7	14	39	199
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	126	40	8	4	15	46	99	37	40	18	39	28	21	26	25	92	664

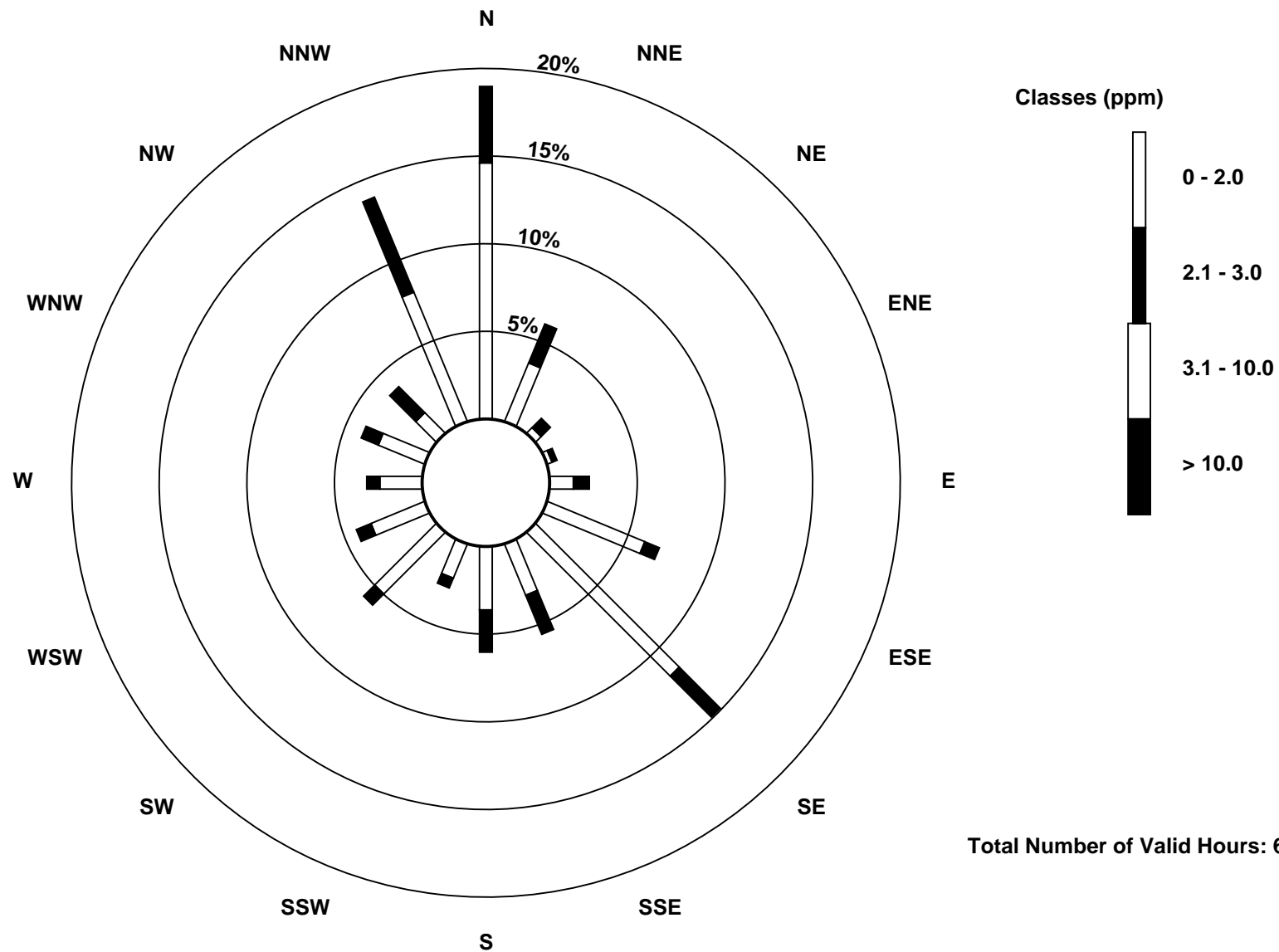
Total Number of Valid Hours: 664

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

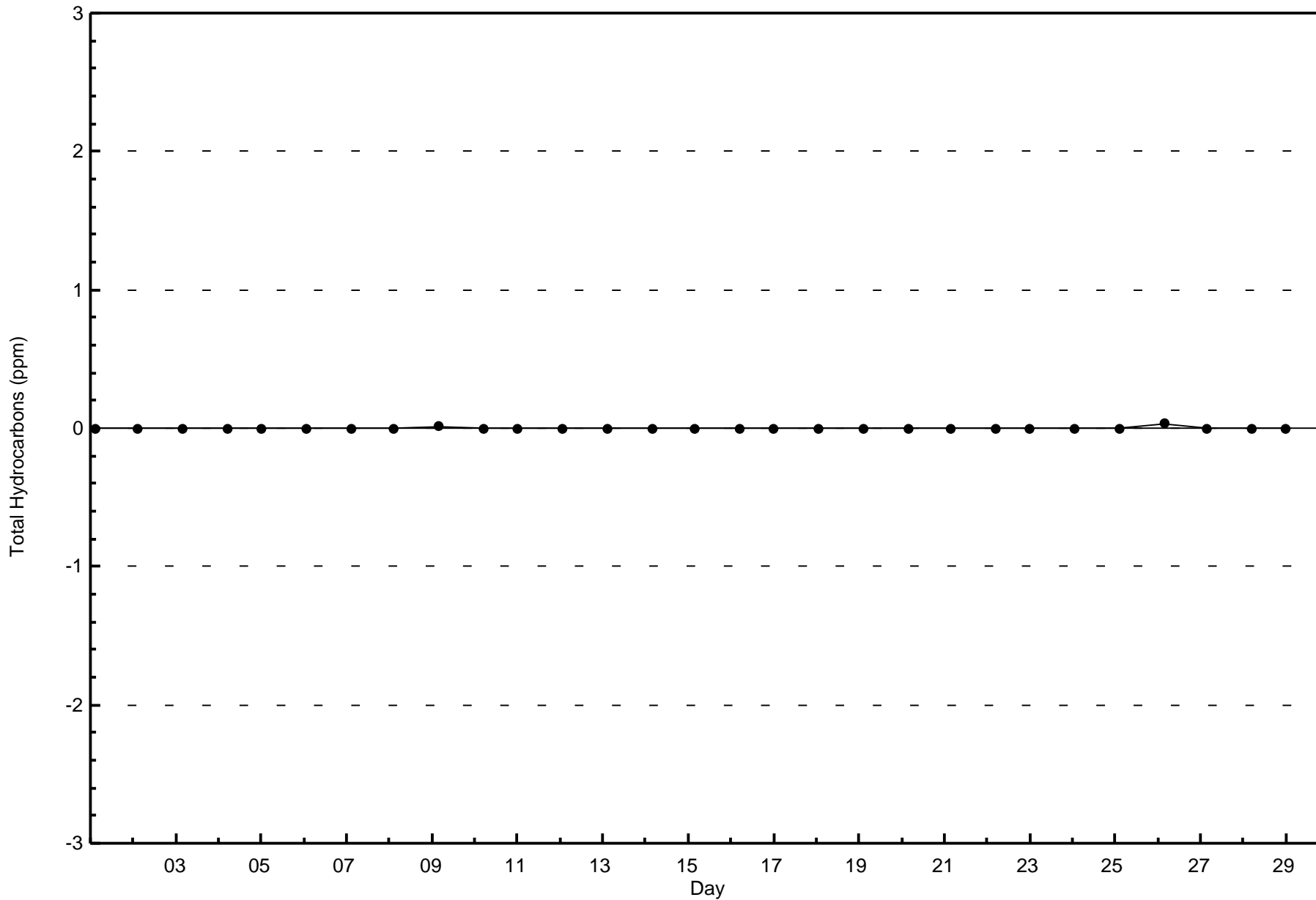
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)

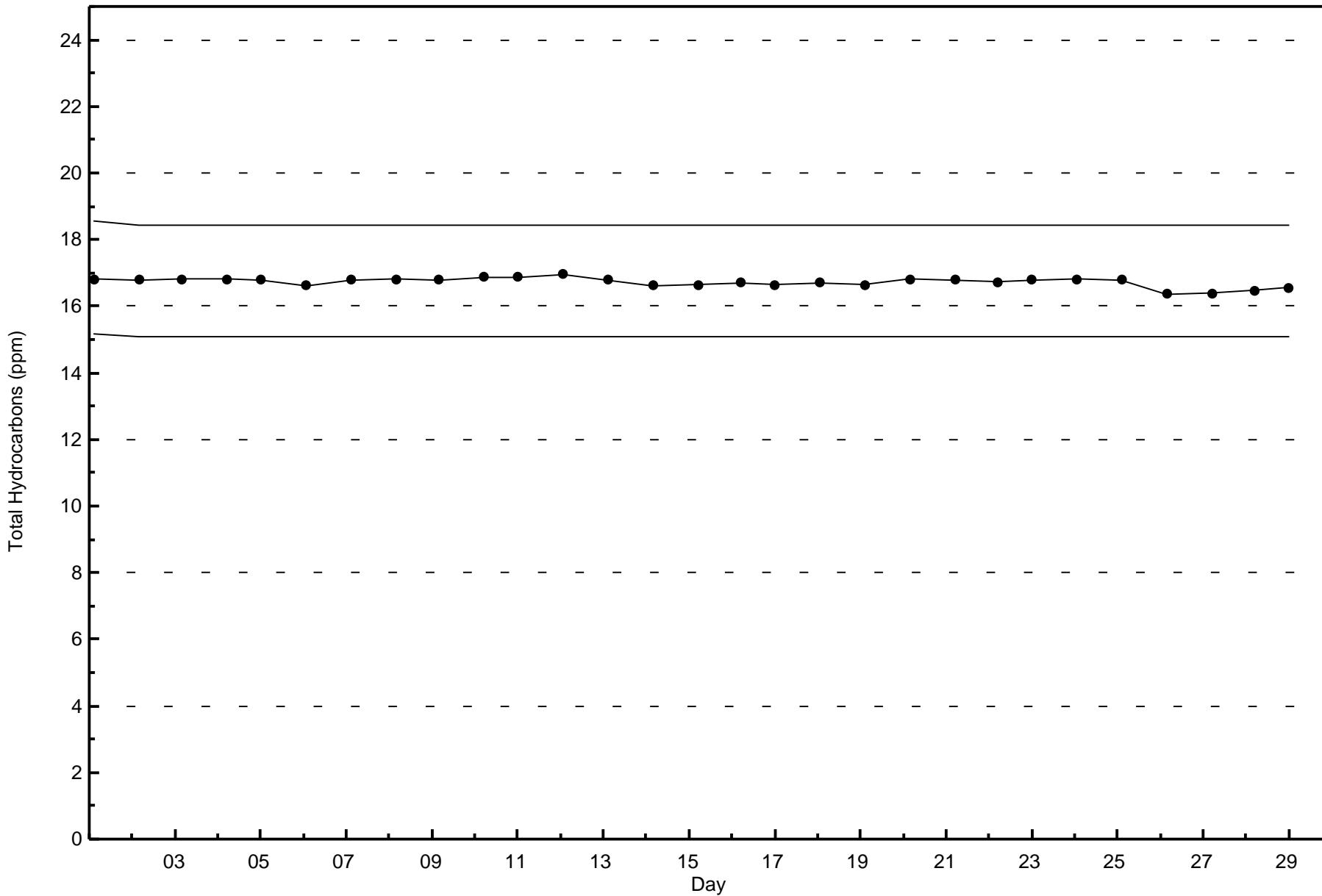




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Patricia McInnes - February 2016



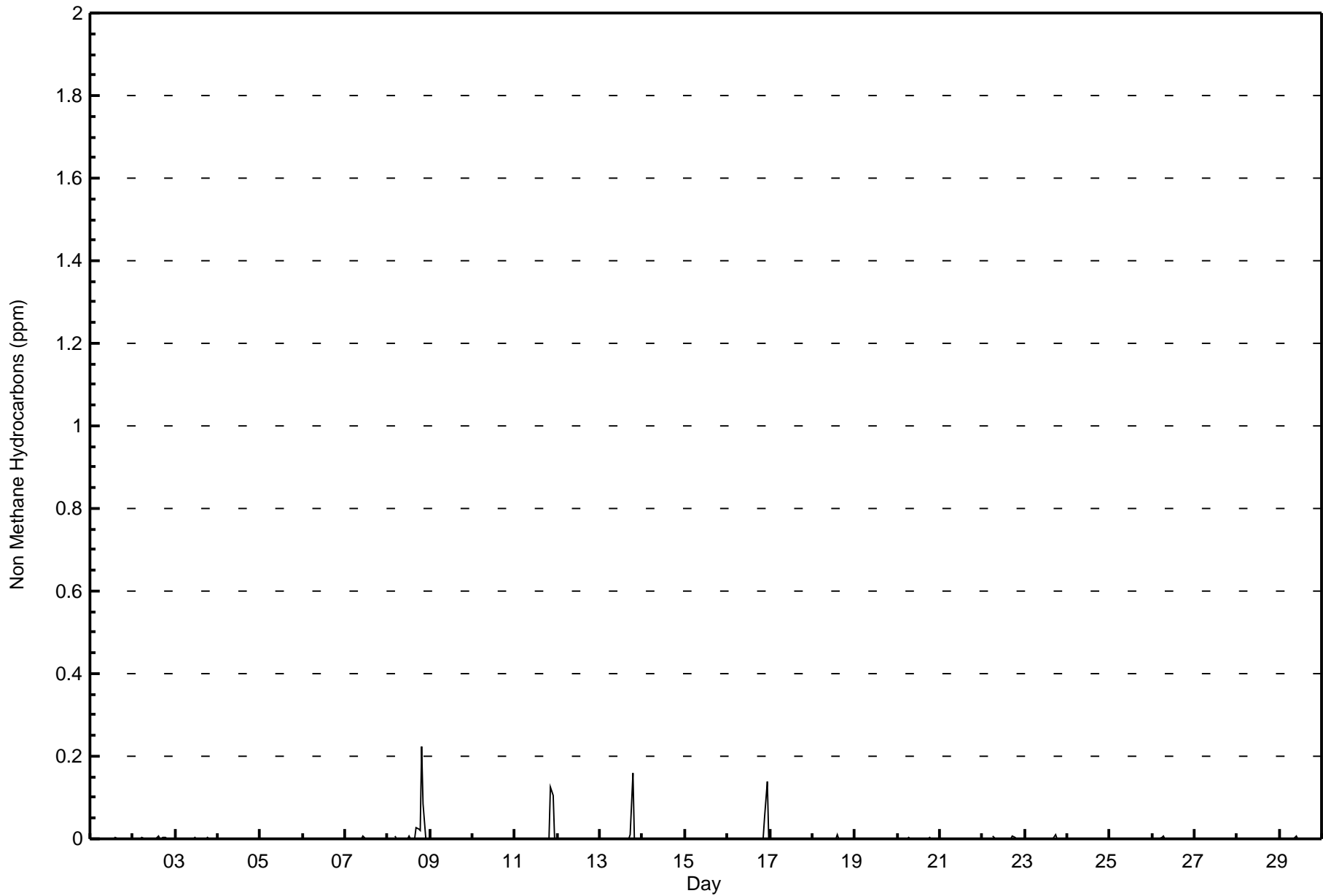




Summary of Hour Averages

Patricia McInnes - February 2016

Table containing summary statistics (Maximum Value, Minimum Value, etc.), operational metrics (Hours in Service, etc.), and a 28-day hourly data grid with columns for hours 1-24, Daily Average, and Daily Maximum.





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	643	96.84	96.84
0.006 - 0.05	15	2.26	99.10
0.06 - 0.1	4	0.60	99.70
> 0.1	2	0.30	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - February 2016**

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	123	37	8	3	15	44	97	36	37	17	37	28	20	26	23	92	643
0.006 - 0.05	1	3	0	1	0	1	2	1	2	0	2	0	1	0	1	0	15
0.06 - 0.1	2	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	4
> 0.1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
Totals	126	40	8	4	15	46	99	37	40	18	39	28	21	26	25	92	664

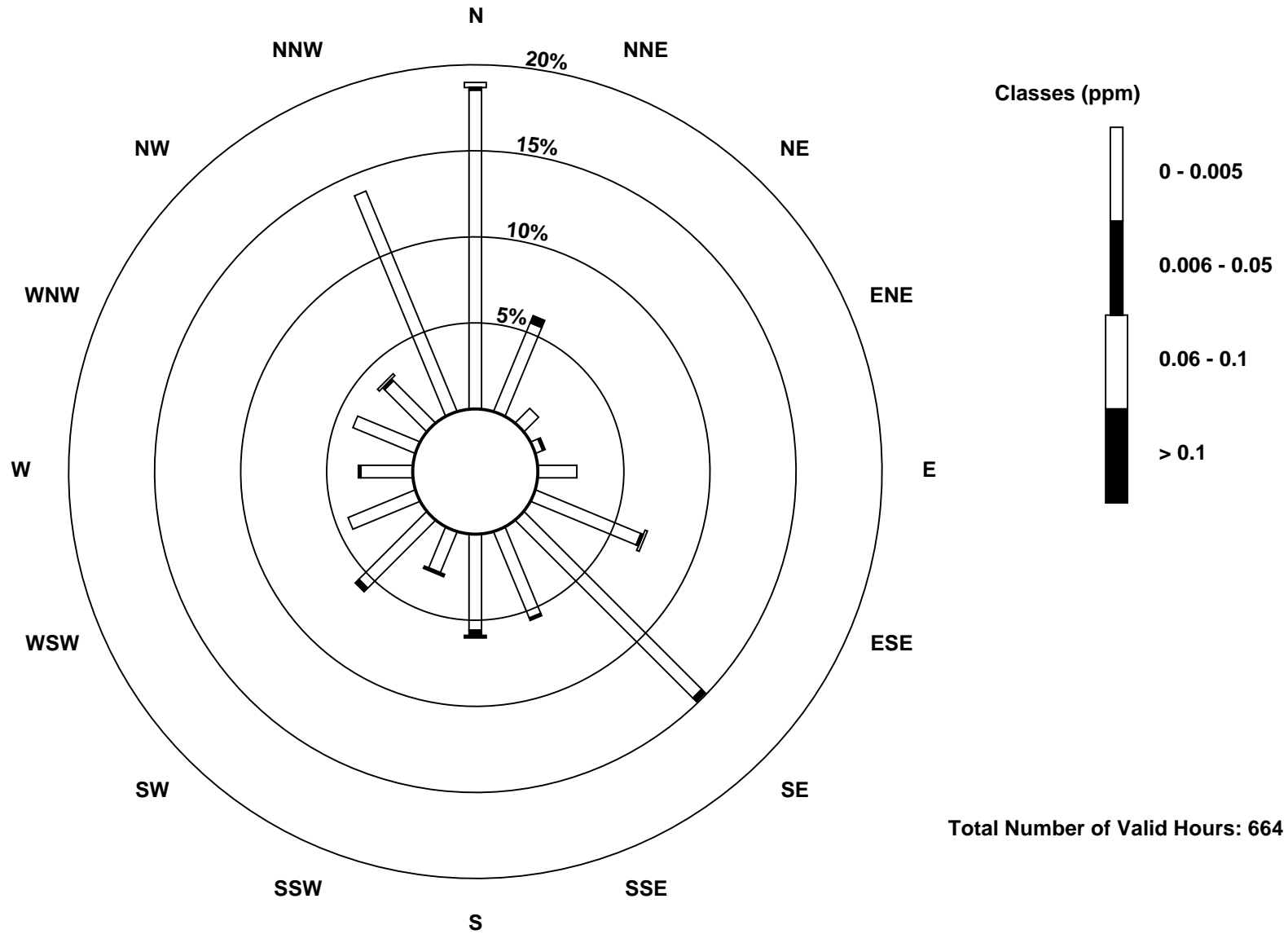
Total Number of Valid Hours: 664

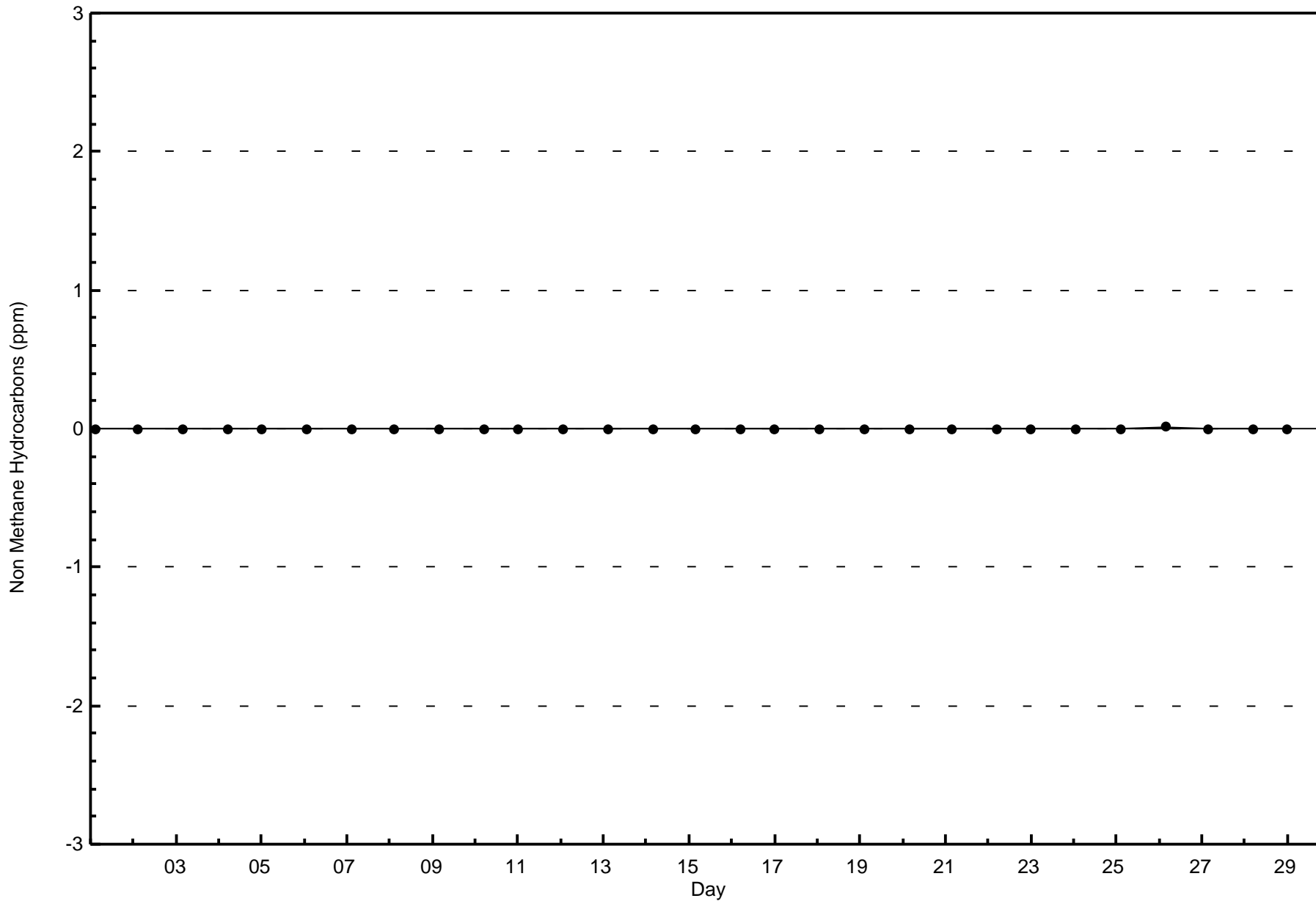
Total Number of Hours: 696

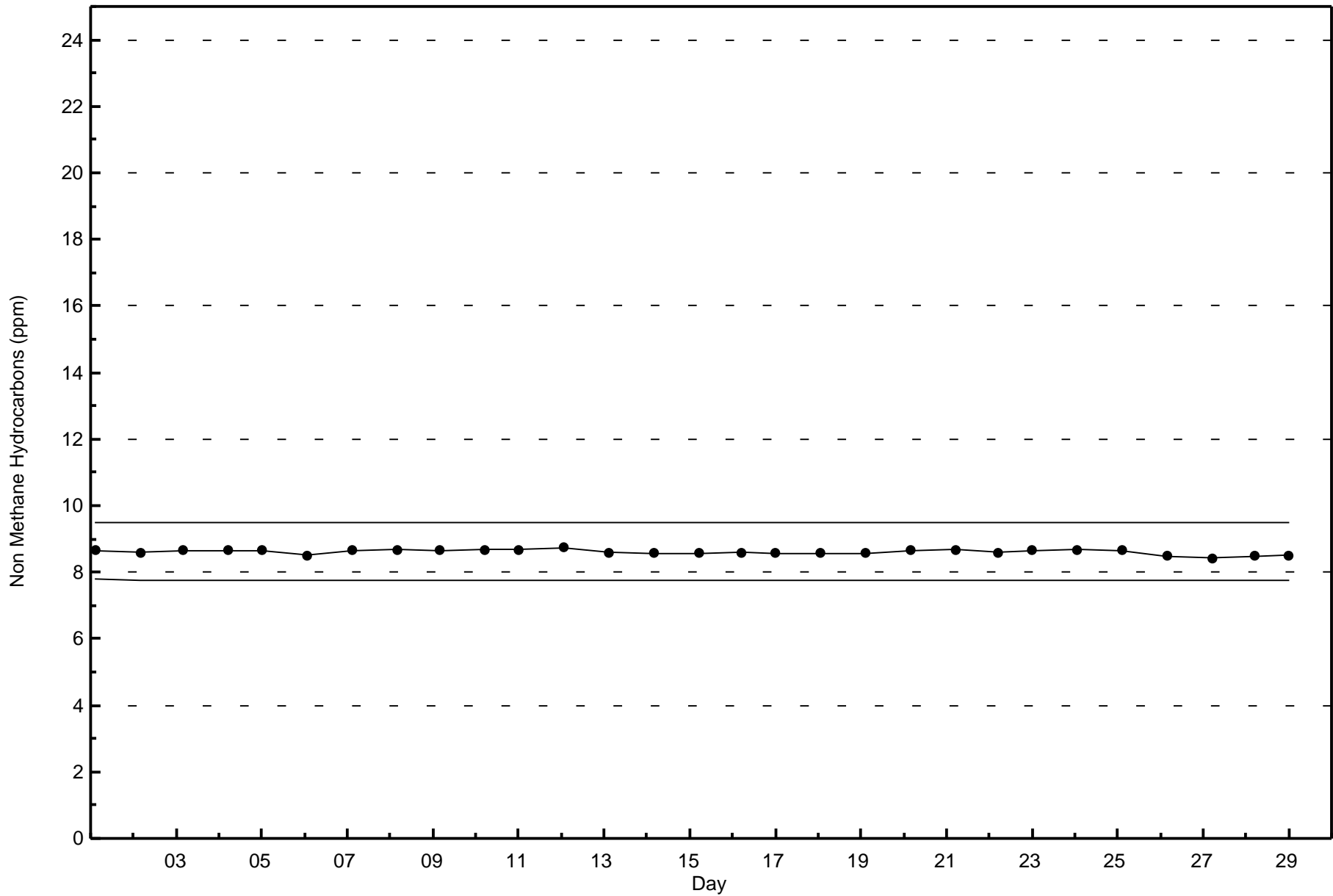


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









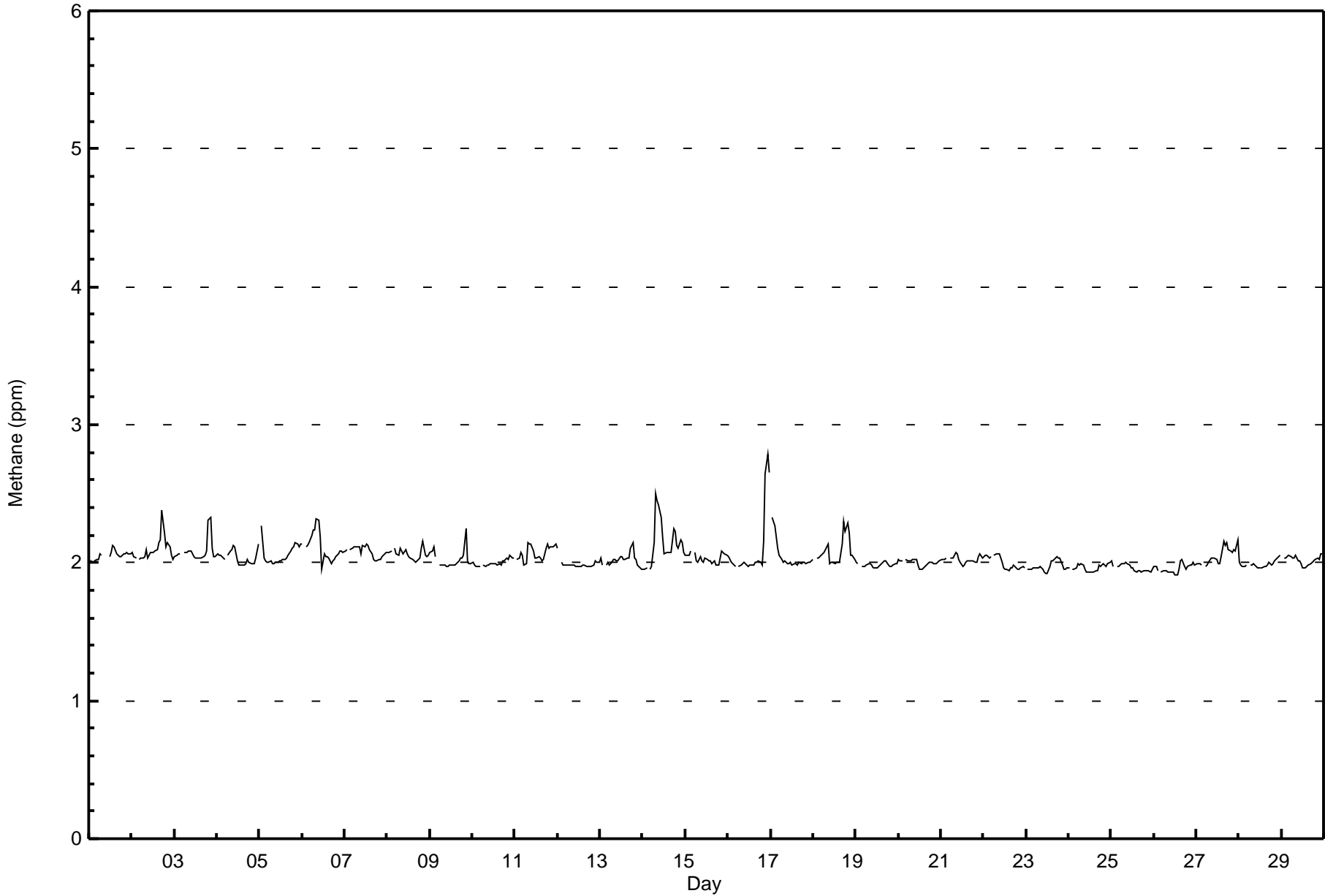
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Patricia McInnes - February 2016

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		696																														
Maximum Value: 2.8 ppm on Feb 16 23:00		Maximum Daily Average: 2.1 ppm on Feb 14		Hours of Data:		664																																
Minimum Value: 1.9 ppm on Feb 26 13:00		Minimum Daily Average: 2.0 ppm on Feb 26		Hours of Missing Data:		32																																
Maximum Diurnal Average: 2.1 ppm at hour 23		Minimum Diurnal Average: 2.0 ppm at hour 13		Hours of Calibration:		32																																
Monthly Average: 2.03 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.1 P ₉₉ = 2.4		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	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	C	C	C	2.0	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	2.1				
2-Feb	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4		
3-Feb	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.3	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
4-Feb	2.1	2.1	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
5-Feb	Z	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.1	2.1	2.3	
6-Feb	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.2	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
7-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
8-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
9-Feb	2.1	2.1	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	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
10-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	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
11-Feb	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	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
12-Feb	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
13-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	2.1	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	2.0	2.0	2.0	2.0	2.1	
14-Feb	1.9	2.0	2.0	Z	1.9	2.0	2.1	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	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	2.5	
15-Feb	2.1	2.1	2.1	2.1	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
16-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	2.2	2.6	2.8	2.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.8	
17-Feb	Z	2.3	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	
18-Feb	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	2.3	2.2	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	2.3	
19-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0
20-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
21-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.1	
22-Feb	2.0	2.1	2.1	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
23-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
24-Feb	2.0	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0
26-Feb	2.0	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2
28-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	2.0	2.0	2.0	2.0	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
29-Feb	Z	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	2.0	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
																										Diurnal Average												
																										Diurnal Maximum												
Z - zerspan		C - Calibration																																				





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	468	70.48	70.48
2.1 - 3.0	196	29.52	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



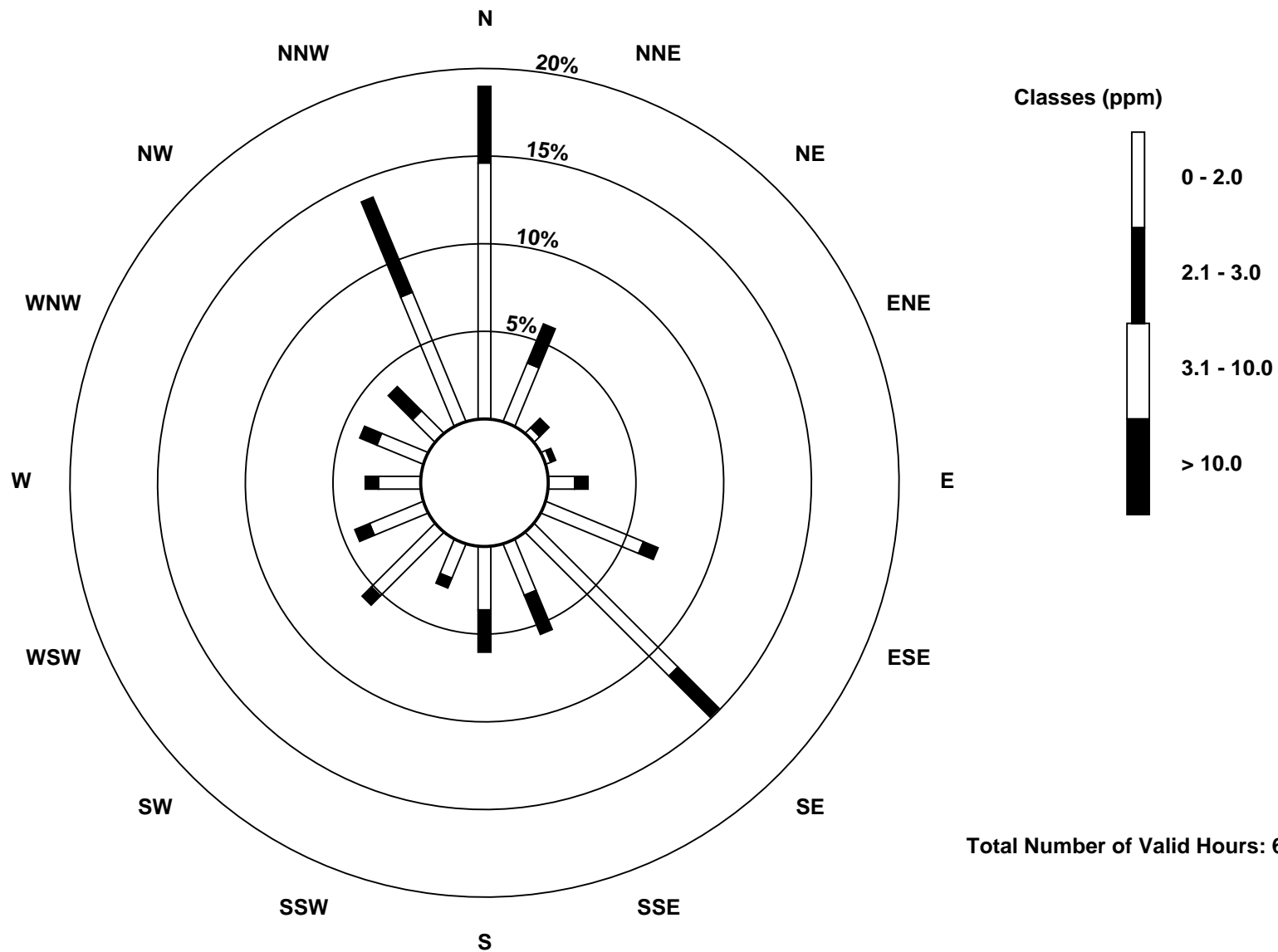
Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - February 2016

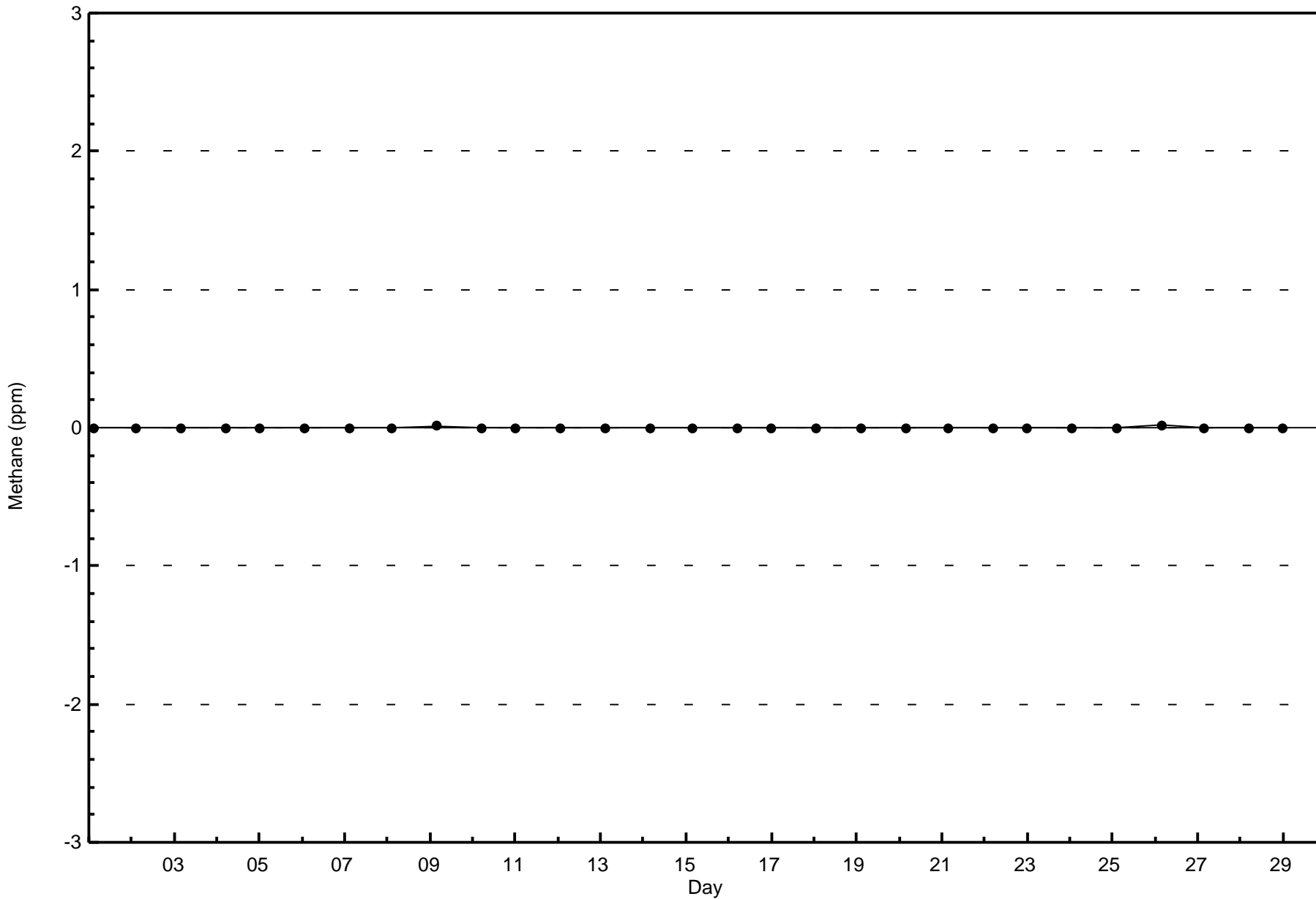
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	97	24	3	2	10	40	77	21	24	14	34	22	16	19	12	53	468
2.1 - 3.0	29	16	5	2	5	6	22	16	16	4	5	6	5	7	13	39	196
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	126	40	8	4	15	46	99	37	40	18	39	28	21	26	25	92	664

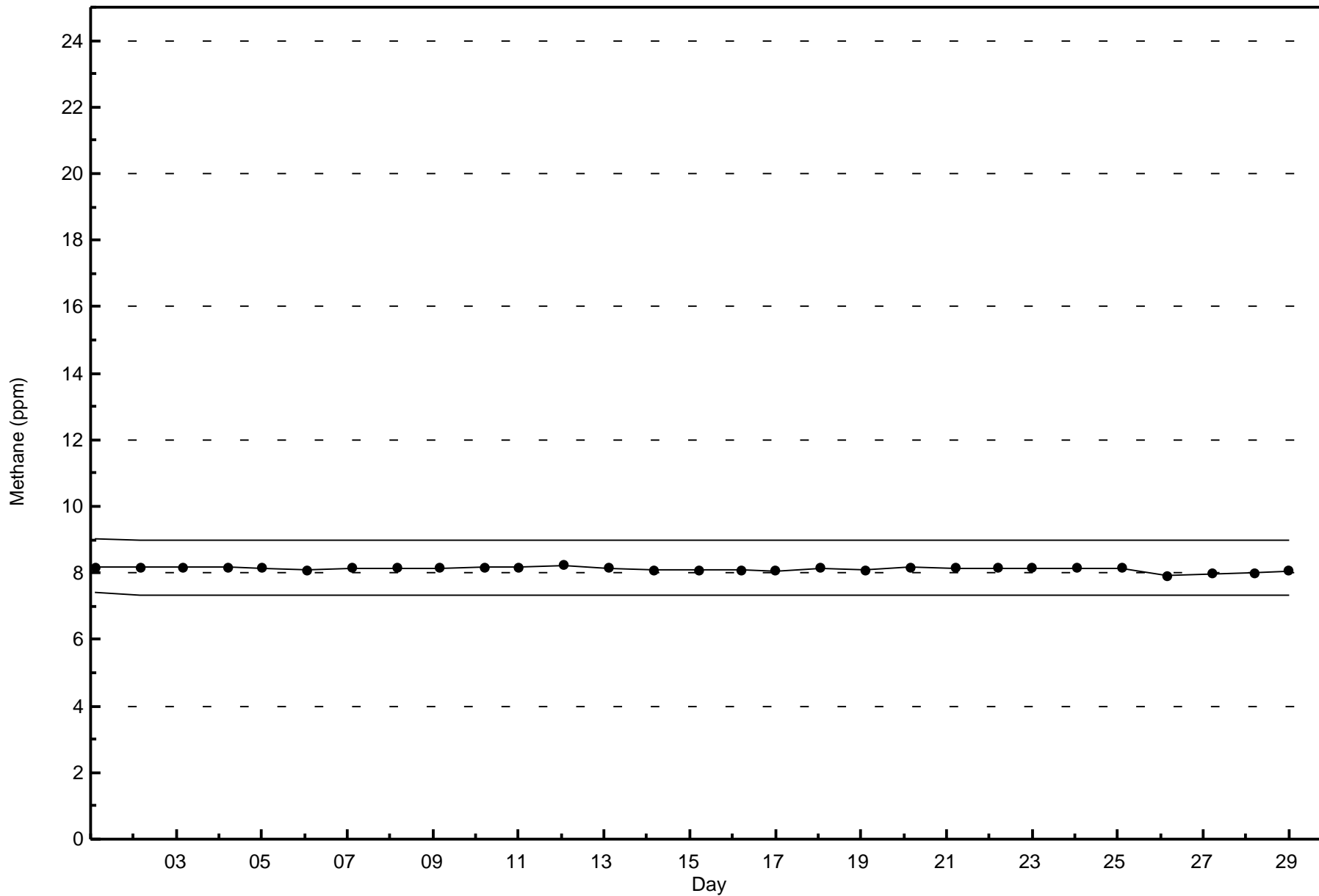
Total Number of Valid Hours: 664

Total Number of Hours: 696



Total Number of Valid Hours: 664







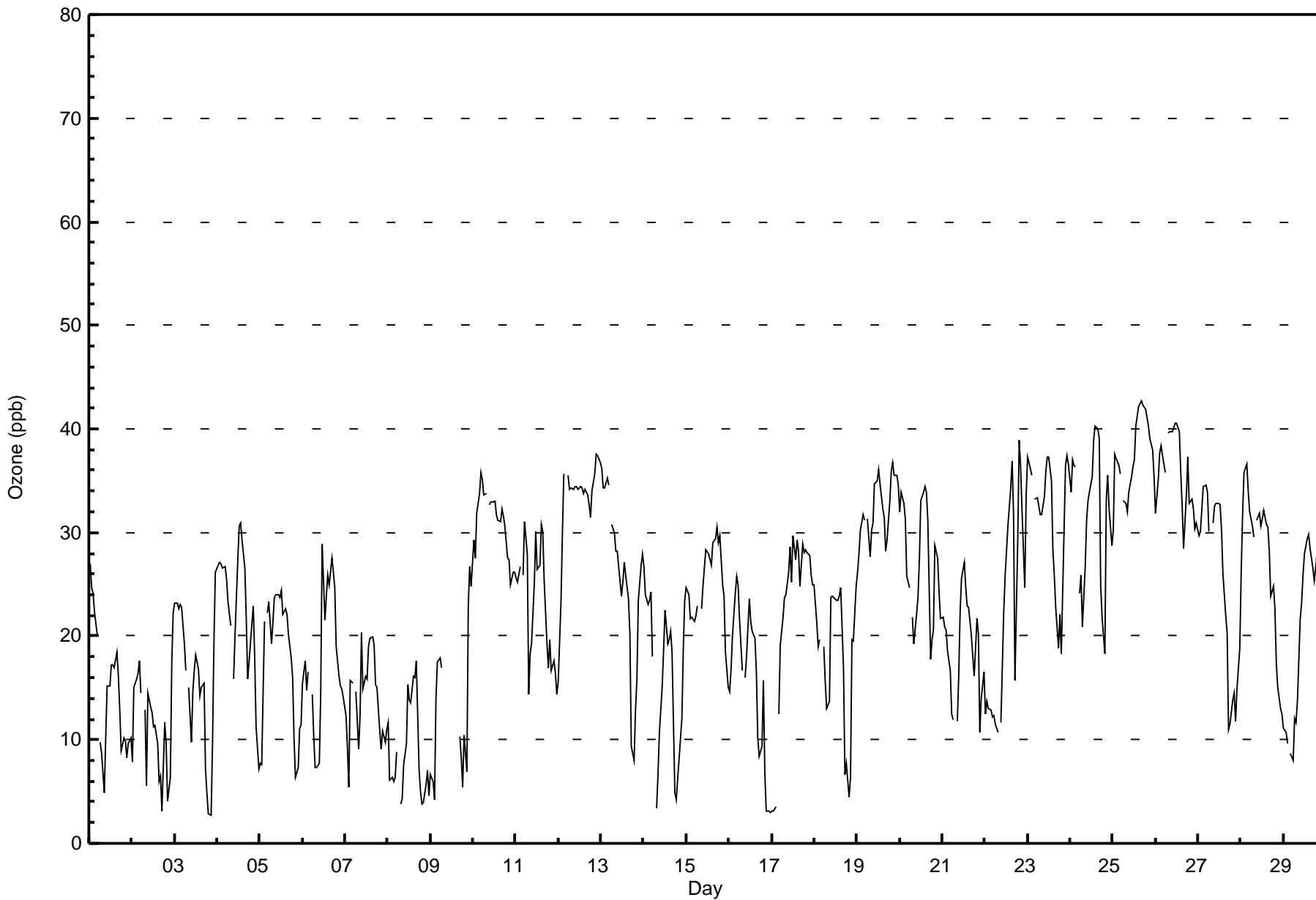
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Patricia McInnes - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																	
Maximum Value: 43 ppb on Feb 25 17:00										Maximum Daily Average: 37.5 ppb on Feb 25										Hours of Data: 659							
Minimum Value: 3 ppb on Feb 3 21:00										Minimum Daily Average: 8.7 ppb on Feb 8										Hours of Missing Data: 37							
Maximum Diurnal Average: 27.3 ppb at hour 13										Minimum Diurnal Average: 18.9 ppb at hour 18										Hours of Calibration: 37							
Monthly Average: 22.8 ppb										Percentiles: P ₁ = 3 P ₁₀ = 9 Q ₁ = 15 Median = 24 O ₃ = 31 P ₉₀ = 35 P ₉₉ = 40										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	27	25	24	22	20	Z	10	9	5	10	15	15	17	17	17	18	16	13	9	10	10	8	10	10	14.7	27	
2-Feb	8	15	16	16	18	14	Z	13	6	15	13	13	11	11	10	6	6	3	12	10	4	6	17	22	11.5	22	
3-Feb	23	23	23	23	23	19	17	Z	15	10	15	17	18	17	14	15	15	7	5	3	3	10	19	26	15.6	26	
4-Feb	27	27	27	27	27	26	23	21	Z	16	20	27	31	31	29	27	22	16	17	21	23	18	11	7	22.6	31	
5-Feb	8	8	21	Z	22	23	19	21	24	24	24	24	22	23	22	20	18	16	10	6	7	11	11	17.8	24		
6-Feb	16	18	15	17	Z	14	10	7	7	8	14	29	21	24	26	25	27	26	25	19	16	15	15	14	17.8	29	
7-Feb	12	9	5	16	16	Z	15	9	12	20	15	16	16	19	20	20	19	15	15	11	9	11	10	11	14.0	20	
8-Feb	12	6	6	6	6	9	Z	4	4	8	10	15	14	14	16	16	18	7	5	4	4	6	7	5	8.7	18	
9-Feb	7	6	4	14	17	18	17	Z	C	C	C	C	C	C	C	C	C	10	8	5	10	7	23	27	25	--	27
10-Feb	29	28	32	34	36	35	34	34	Z	33	33	33	33	32	31	31	32	32	31	28	27	25	26	26	31.0	36	
11-Feb	26	25	27	Z	26	31	28	14	18	19	25	30	26	27	31	30	25	19	17	20	17	18	16	14	23.0	31	
12-Feb	16	23	30	36	Z	36	34	34	34	34	34	34	34	34	34	34	34	33	31	34	36	37	37	37	33.1	37	
13-Feb	36	34	34	35	35	Z	31	30	28	28	27	24	25	27	26	24	20	9	8	13	16	23	27	28	25.6	36	
14-Feb	27	24	23	23	24	18	Z	3	7	11	15	19	23	19	20	21	18	5	4	6	8	12	19	23	16.2	27	
15-Feb	25	24	22	22	21	22	23	Z	23	25	27	28	28	27	27	29	29	31	29	30	25	24	18	15	24.9	31	
16-Feb	15	17	20	24	26	25	22	17	Z	16	18	24	21	21	20	16	10	8	9	16	7	3	3	3	15.7	26	
17-Feb	3	3	4	Z	12	19	22	24	24	26	29	25	30	27	29	28	25	29	28	28	28	28	26	25	22.7	30	
18-Feb	25	21	19	20	Z	19	16	13	14	24	24	24	23	23	24	25	17	7	8	5	6	20	20	25	18.2	25	
19-Feb	26	28	30	32	31	Z	31	28	30	31	35	35	36	35	32	31	28	29	33	36	37	36	36	35	32.2	37	
20-Feb	32	34	33	31	26	25	Z	22	19	22	24	27	33	34	34	34	31	18	20	21	29	28	24	22	27.0	34	
21-Feb	22	21	21	19	17	12	12	Z	12	16	22	26	27	25	23	23	20	18	16	22	20	11	14	17	18.9	27	
22-Feb	12	14	13	13	12	12	11	11	Z	12	22	26	28	31	34	37	32	16	29	39	36	32	25	34	23.1	39	
23-Feb	37	37	36	Z	33	33	33	32	32	33	36	37	37	35	28	26	23	19	22	18	31	37	37	37	31.7	37	
24-Feb	34	37	36	36	Z	24	26	21	27	31	33	34	35	39	40	40	39	25	22	18	33	36	32	29	31.6	40	
25-Feb	30	38	37	36	36	Z	33	33	32	34	35	36	37	40	42	42	43	42	42	41	40	39	38	35	37.5	43	
26-Feb	32	35	38	38	37	36	Z	40	40	40	40	40	40	40	36	33	28	34	37	33	33	32	30	31	35.8	40	
27-Feb	30	30	32	34	35	34	30	Z	31	33	33	33	33	30	26	22	20	11	12	14	15	12	15	19	25.3	35	
28-Feb	26	32	36	37	34	32	31	30	Z	31	32	31	31	32	31	30	28	24	25	23	17	15	13	12	27.5	37	
29-Feb	11	11	10	Z	9	8	12	12	14	22	23	26	28	29	30	28	27	25	27	28	26	25	25	24	20.8	30	
21.8 22.5 23.2 25.5 24.0 22.7 22.4 20.0 19.9 22.5 24.7 26.7 27.3 27.2 26.9 26.2 23.6 18.9 19.3 19.6 19.6 20.6 21.0 21.4																								Diurnal Average			
37 38 38 38 37 36 34 40 40 40 40 40 40 40 42 42 43 42 42 41 40 39 38 37																								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
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	265	40.21	40.21
21 - 50	394	59.79	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	18	4	4	7	16	39	25	23	7	11	7	8	9	16	37	263
21 - 50	97	19	4	0	8	32	55	9	15	12	28	20	12	15	12	56	394
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	129	37	8	4	15	48	94	34	38	19	39	27	20	24	28	93	657

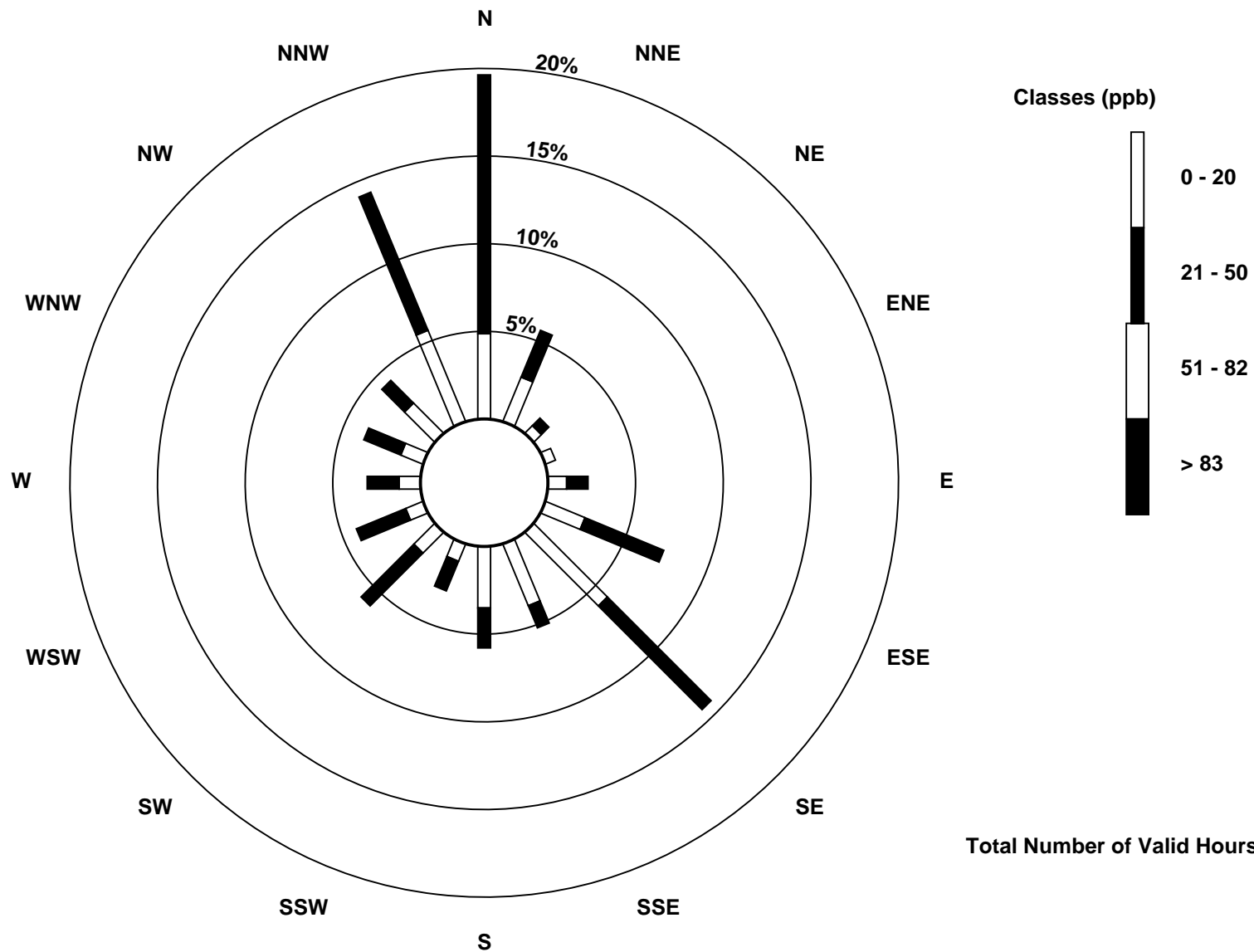
Total Number of Valid Hours: 657

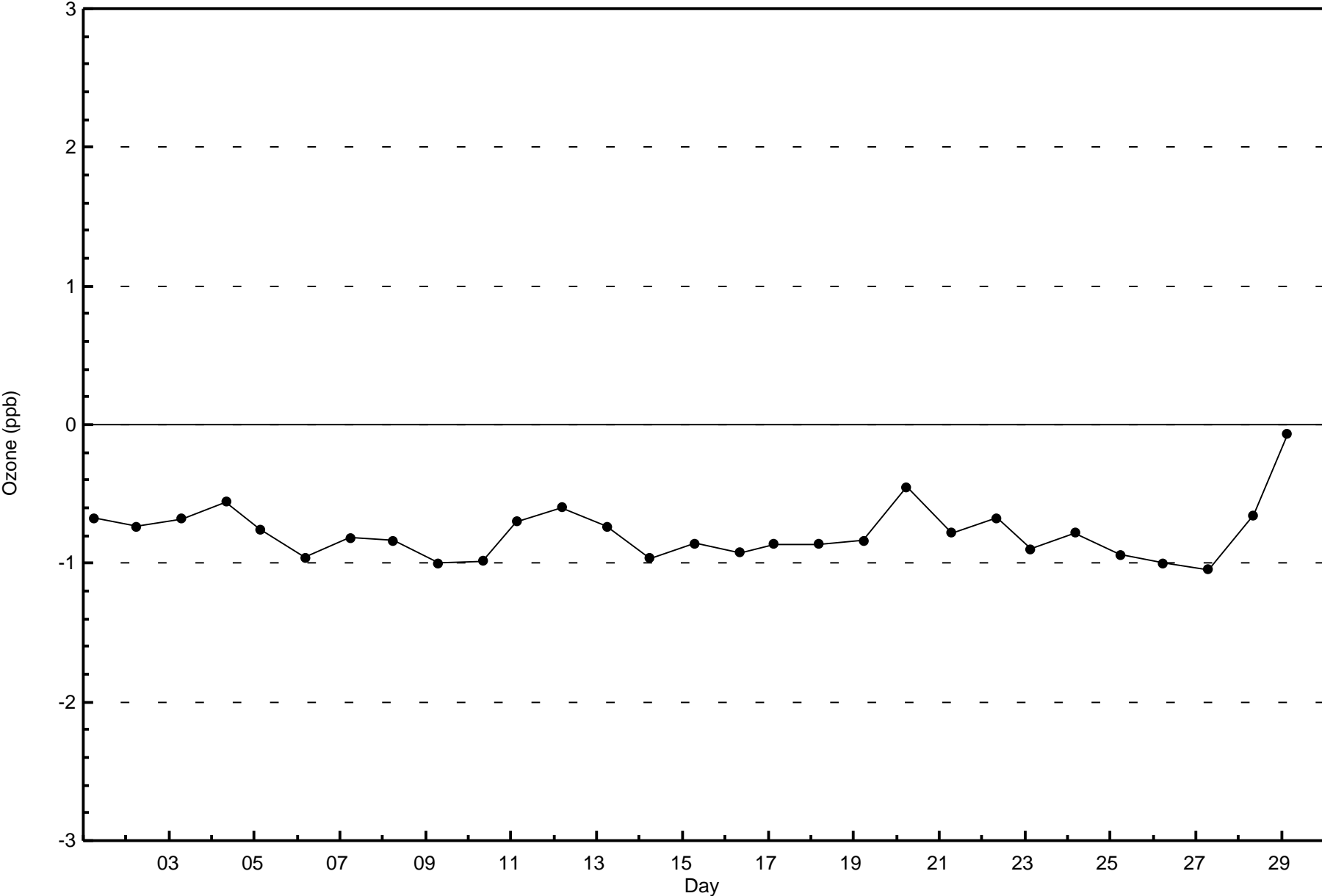
Total Number of Hours: 696

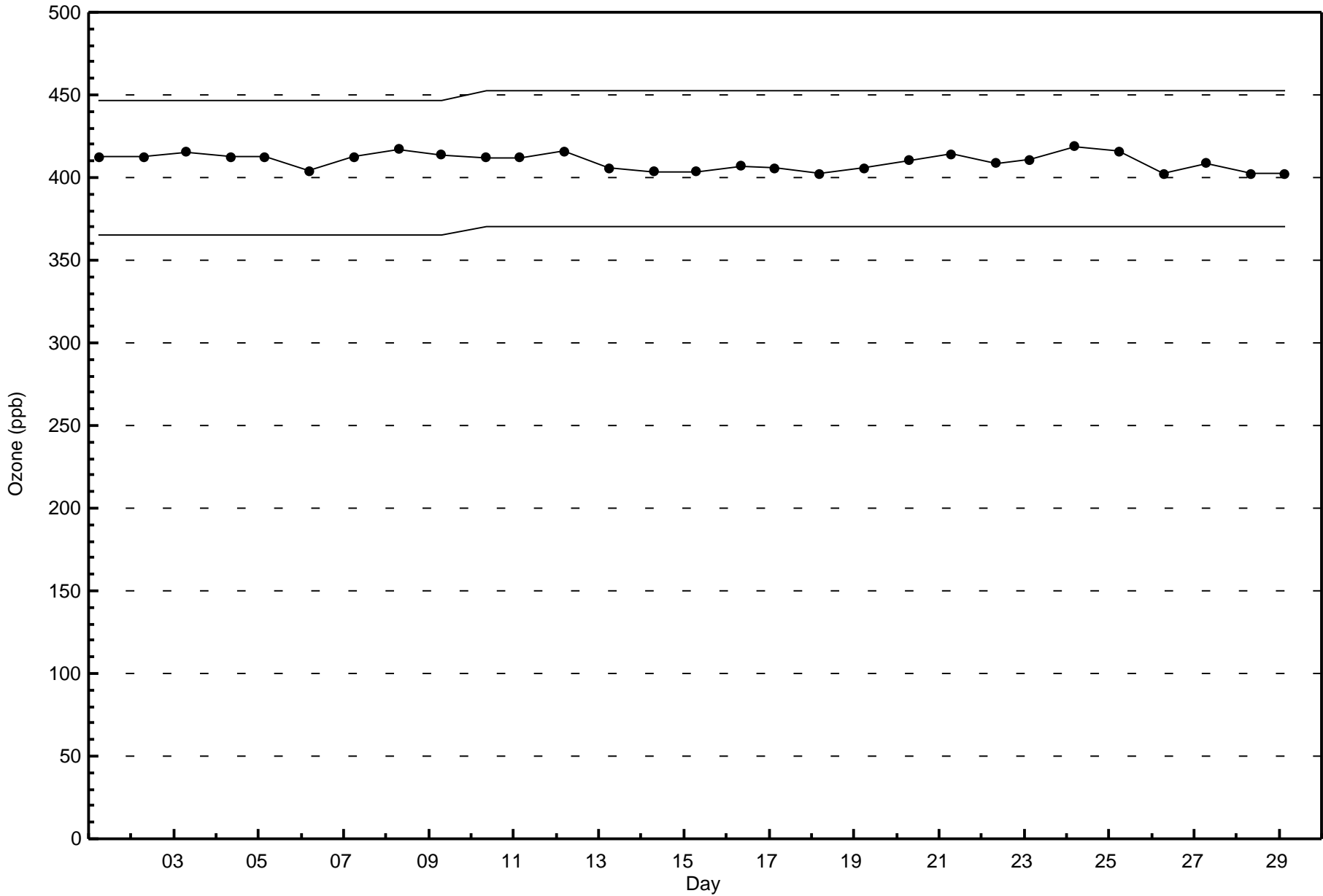


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



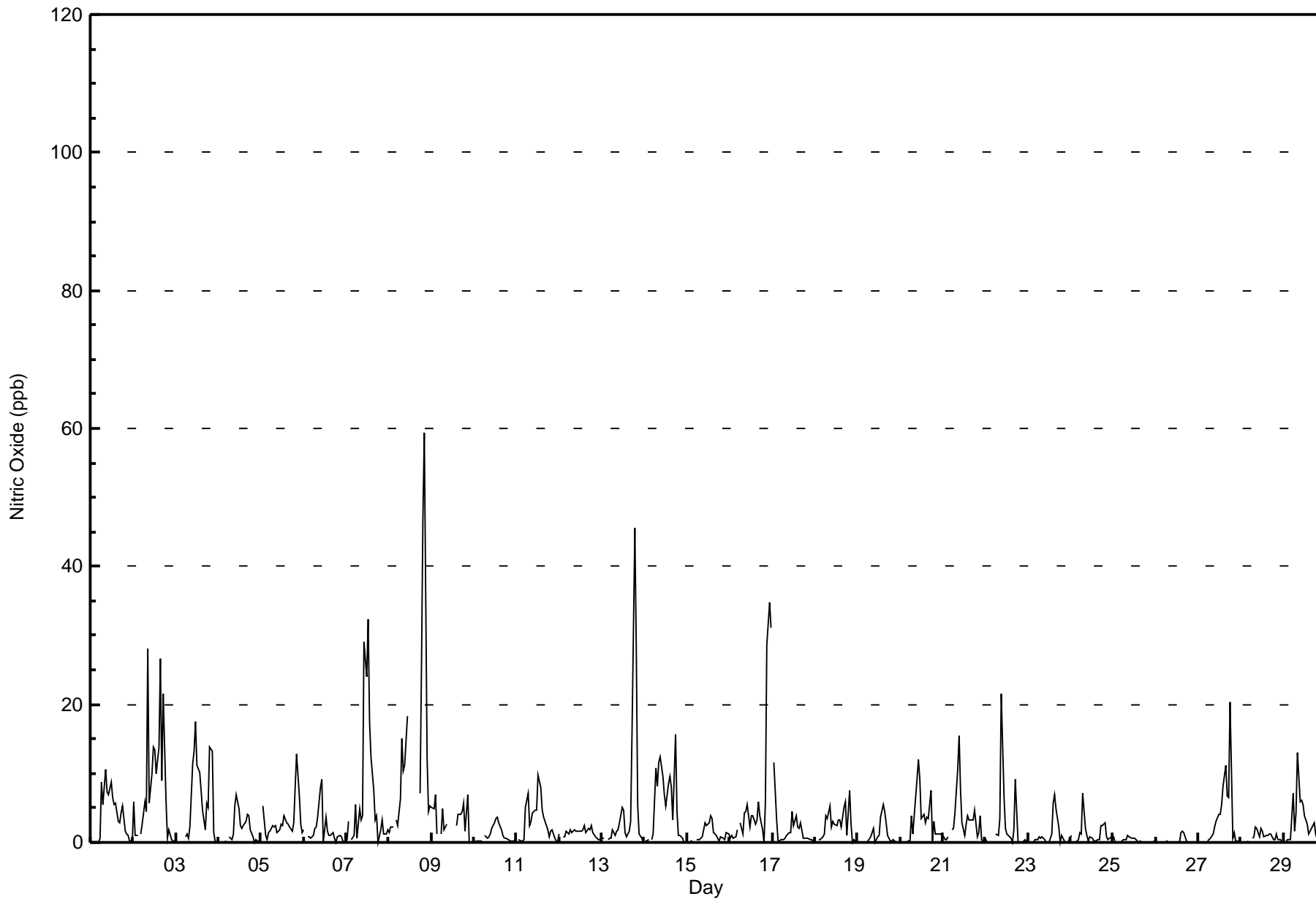






Maximum Value: 59 ppb on Feb 8 21:00																		Maximum Daily Average: 7.9 ppb on Feb 2						Hours in Service: 696		
Minimum Value: 0 ppb on Feb 3 03:00																		Minimum Daily Average: 0.2 ppb on Feb 26						Hours of Data: 656		
Maximum Diurnal Average: 5.9 ppb at hour 11																		Minimum Diurnal Average: 0.3 ppb at hour 4						Hours of Missing Data: 40		
Monthly Average: 3.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 8 P ₉₉ = 29						Hours of Calibration: 40		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	1	9	6	11	7	7	9	6	5	6	3	3	4	5	2	1	1	0	0	3.7	11
2-Feb	6	1	1	Z	1	3	6	4	28	6	10	14	13	10	14	27	9	22	6	1	2	0	0	0	7.9	28
3-Feb	0	0	0	0	Z	1	1	1	2	11	13	17	11	10	8	5	2	6	5	14	13	1	0	0	5.3	17
4-Feb	0	0	0	0	0	Z	1	0	1	5	7	5	2	2	2	3	4	4	2	1	0	0	0	0	1.8	7
5-Feb	Z	5	1	0	1	2	2	2	2	1	2	3	2	4	3	3	2	2	3	8	13	7	3	1	3.1	13
6-Feb	2	Z	1	1	1	1	2	2	4	8	9	0	4	2	1	1	1	1	0	1	1	1	0	0	1.8	9
7-Feb	0	3	Z	0	1	5	1	5	3	4	29	24	32	18	12	8	3	4	0	2	3	1	1	2	7.1	32
8-Feb	2	2	2	Z	3	2	6	15	10	11	18	C	C	C	C	C	C	7	26	47	59	12	4	5	--	59
9-Feb	5	5	7	1	Z	1	5	2	3	C	C	C	C	C	2	4	4	5	6	2	7	0	0	0	3.2	7
10-Feb	0	0	0	0	0	Z	1	1	1	1	2	3	3	4	3	2	1	1	1	0	0	0	0	0	1.1	4
11-Feb	Z	0	0	0	0	5	7	2	3	4	5	5	10	8	5	4	3	2	1	2	2	1	0	0	3.0	10
12-Feb	1	Z	1	1	2	1	2	1	2	2	2	2	2	2	2	1	2	2	3	1	1	1	0	0	1.4	3
13-Feb	1	1	Z	0	1	1	2	1	2	2	3	5	5	1	1	2	3	16	45	28	5	1	1	0	5.5	45
14-Feb	0	0	0	Z	0	1	11	8	12	12	10	7	5	8	10	8	3	16	4	1	1	1	0	0	5.2	16
15-Feb	0	0	0	0	Z	0	0	0	1	2	3	2	3	4	3	1	1	1	0	1	1	0	1	1	1.2	4
16-Feb	1	1	1	1	2	Z	3	1	4	5	5	2	4	4	3	3	6	4	2	0	6	29	35	31	6.6	35
17-Feb	Z	12	3	0	0	0	0	1	1	1	1	5	2	4	2	2	3	1	1	1	1	0	0	0	1.8	12
18-Feb	0	Z	0	0	1	1	4	3	5	2	3	3	2	3	3	2	5	6	1	8	3	0	0	0	2.5	8
19-Feb	0	0	Z	0	0	0	0	1	1	2	0	1	1	4	5	4	3	1	0	0	0	0	0	0	1.1	5
20-Feb	0	0	0	Z	0	0	4	1	4	9	12	9	3	4	3	4	3	7	0	3	1	1	1	1	3.2	12
21-Feb	1	0	0	1	Z	2	2	4	11	15	8	3	1	3	4	3	3	3	5	1	1	4	0	0	3.3	15
22-Feb	0	0	0	0	0	Z	1	1	3	21	6	2	1	1	1	0	2	9	0	0	0	0	0	0	2.2	21
23-Feb	Z	0	0	0	0	0	1	1	1	0	0	0	0	1	6	7	5	2	0	1	0	0	0	0	1.1	7
24-Feb	1	Z	0	0	0	1	1	7	2	1	0	1	1	0	0	0	1	3	2	3	1	0	1	1	1.2	7
25-Feb	1	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0.2	2
27-Feb	0	0	0	0	Z	0	1	1	1	2	3	4	4	6	8	11	7	6	20	1	1	0	0	0	3.3	20
28-Feb	0	0	0	0	0	Z	1	1	2	2	1	2	2	1	1	1	1	1	0	0	1	0	0	0	0.8	2
29-Feb	Z	0	0	0	0	7	2	4	13	6	6	5	4	3	1	2	2	3	1	0	1	1	0	1	2.8	13
																		Diurnal Average		Diurnal Maximum						
																		0.9		6						
																		1.3		12						
																		0.8		7						
																		0.3		1						
																		0.6		3						
																		1.6		7						
																		2.6		11						
																		2.7		15						
																		4.6		28						
																		5.2		21						
																		5.9		29						
																		4.9		24						
																		4.6		32						
																		4.1		18						
																		4.0		14						
																		4.0		27						
																		3.0		9						
																		4.7		22						
																		4.8		45						
																		4.4		47						
																		4.4		59						
																		2.2		29						
																		1.8		35						
																		1.6		31						

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	641	97.71	97.71
21 - 40	12	1.83	99.54
41 - 80	3	0.46	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Patricia McInnes - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	122	37	8	1	15	46	95	33	38	16	38	28	21	26	25	90	639
21 - 40	4	1	0	1	0	0	0	1	1	1	1	0	0	0	0	2	12
11 - 80	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	126	38	8	2	15	47	95	34	40	18	39	28	21	26	25	92	654

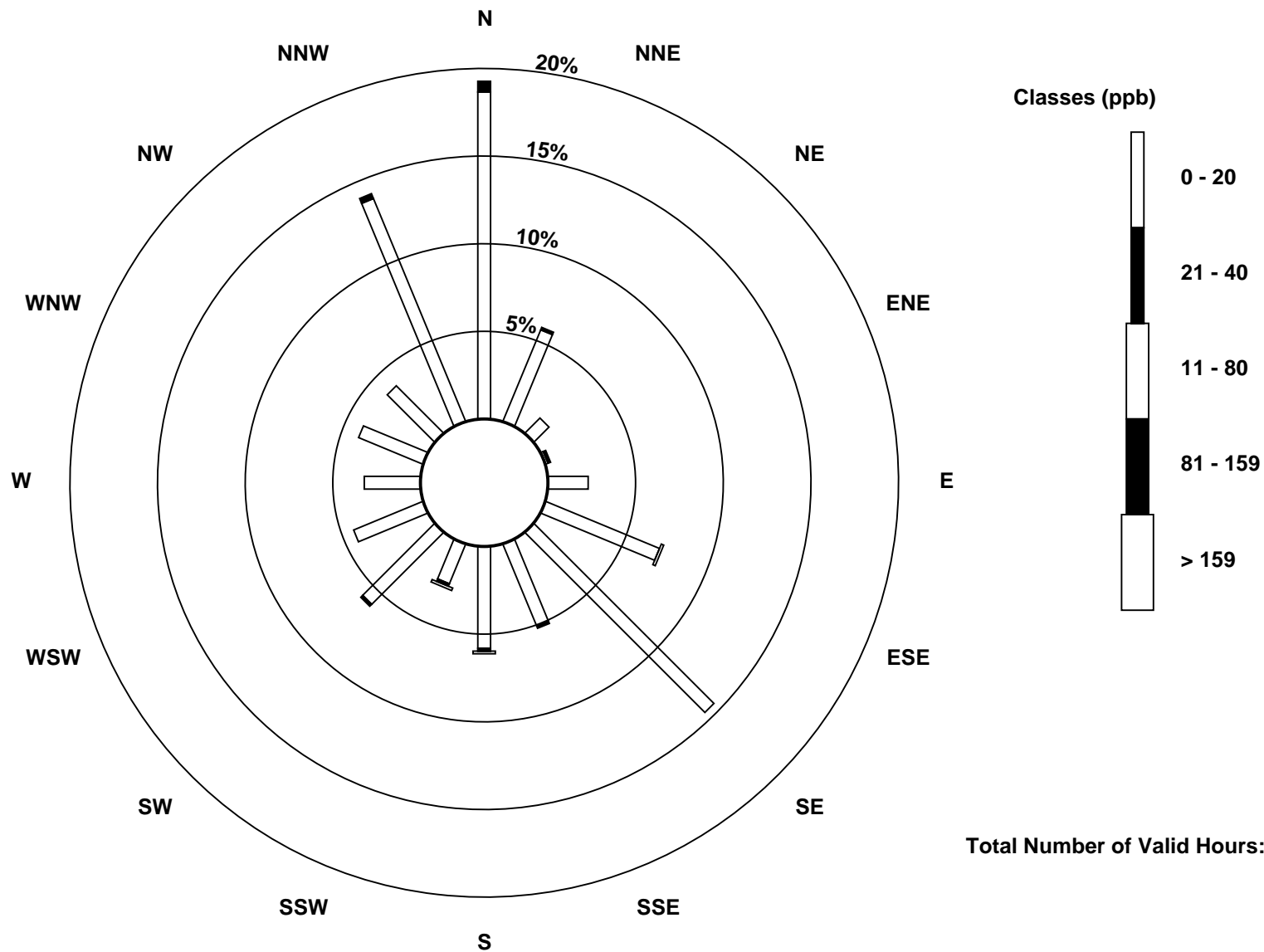
Total Number of Valid Hours: 654

Total Number of Hours: 696

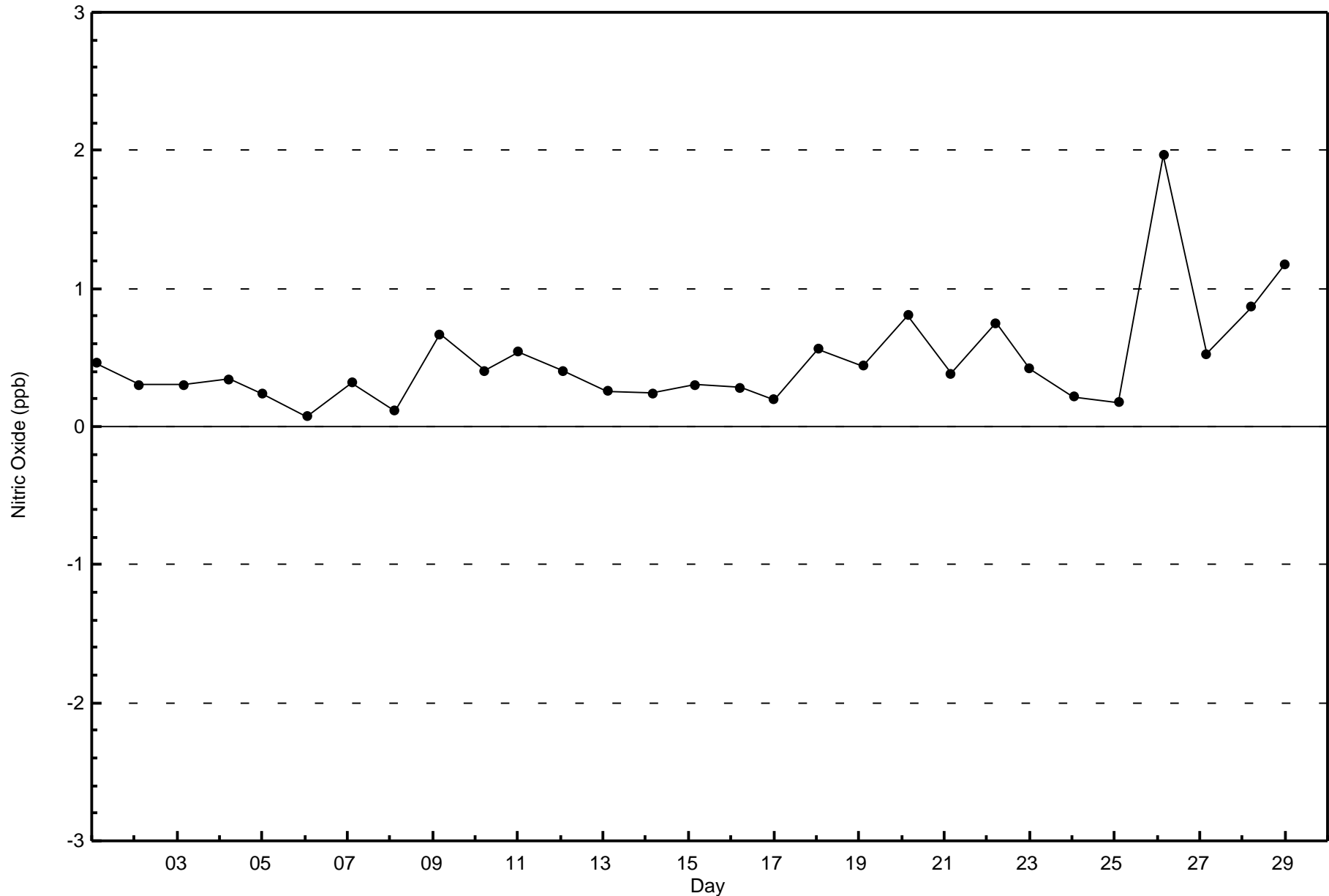


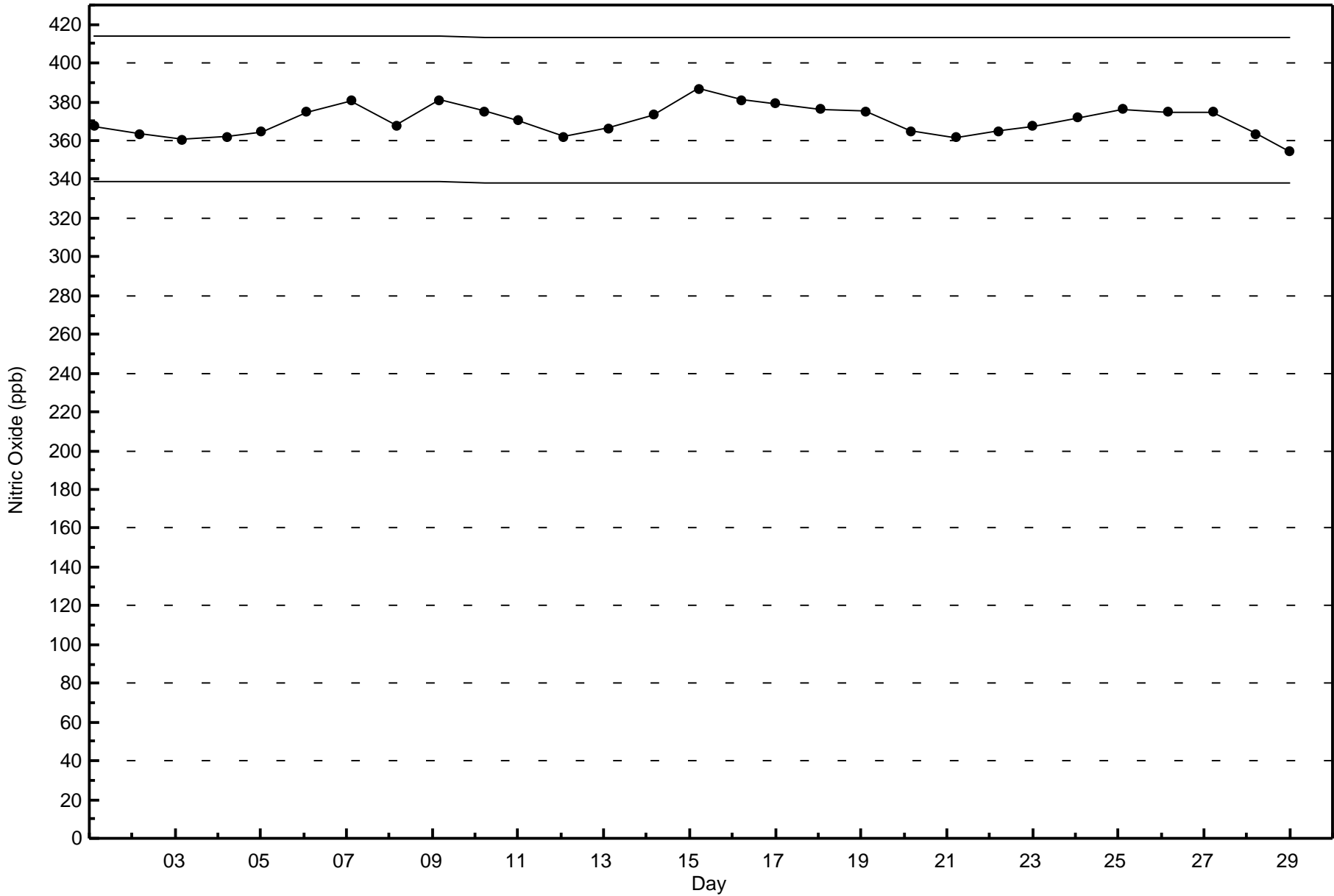
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 654







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

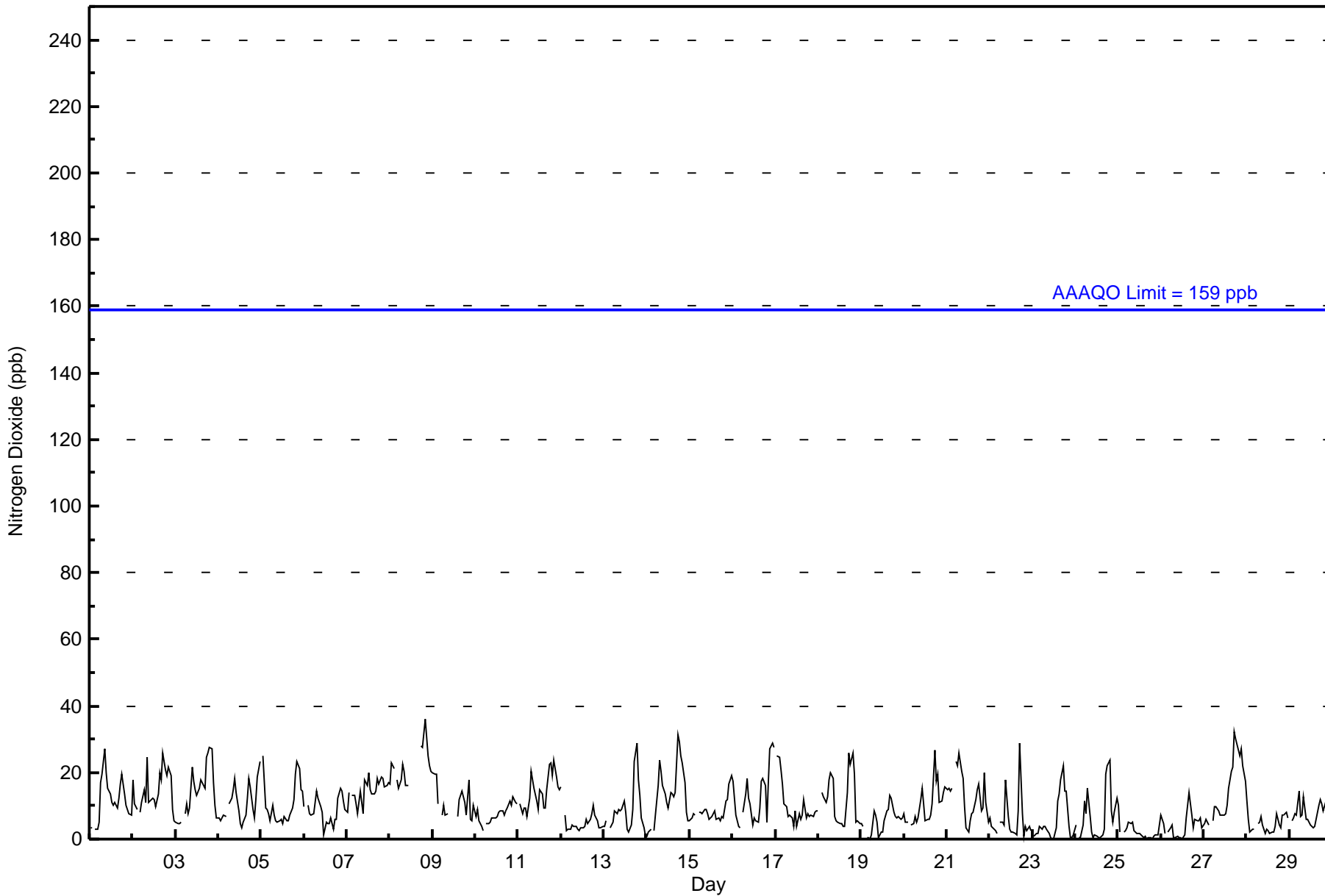
Patricia McInnes - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 36 ppb on Feb 8 21:00 Maximum Daily Average: 14.6 ppb on Feb 2										Hours in Service: 696 Hours of Data: 656																																						
Minimum Value: 0 ppb on Feb 23 12:00 Minimum Daily Average: 2.3 ppb on Feb 25 Maximum Diurnal Average: 17.0 ppb at hour 18 Minimum Diurnal Average: 6.0 ppb at hour 13 Monthly Average: 9.9 ppb Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 5 Median = 8 Q ₃ = 14 P ₉₀ = 20 P ₉₉ = 29										Hours of Missing Data: 40 Hours of Calibration: 40 Percent Operational Time: 100.0																																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	4	3	Z	3	3	5	17	19	27	20	15	14	11	10	11	9	12	17	20	13	10	9	8	7	11.6	27																						
2-Feb	18	11	9	Z	8	11	15	11	25	11	12	12	12	10	13	20	18	26	21	19	21	19	9	5	14.6	26																						
3-Feb	5	5	5	5	Z	8	10	8	9	22	17	15	13	15	18	17	15	25	26	28	27	17	10	6	14.1	28																						
4-Feb	6	6	6	7	7	Z	11	12	15	18	14	9	5	4	5	7	12	18	16	9	6	12	19	23	10.7	23																						
5-Feb	Z	25	9	9	8	6	10	7	5	5	6	6	5	7	6	6	7	10	12	20	23	21	15	14	10.5	25																						
6-Feb	10	Z	10	8	7	8	11	15	12	10	8	1	5	5	5	7	3	6	6	12	15	15	12	9	8.6	15																						
7-Feb	8	14	Z	13	13	11	8	14	11	8	18	16	20	15	13	14	14	18	17	19	18	16	16	17	14.3	20																						
8-Feb	17	23	21	Z	18	15	18	22	20	16	16	C	C	C	C	C	C	28	27	32	36	25	22	20	--	36																						
9-Feb	20	20	20	11	Z	7	10	7	8	C	C	C	C	C	7	12	15	13	11	7	18	6	6	10	11.4	20																						
10-Feb	7	9	5	4	3	Z	5	5	5	6	6	6	7	8	9	9	7	9	9	11	10	13	11	10	7.5	13																						
11-Feb	Z	11	8	9	9	7	12	20	18	15	12	9	15	14	9	9	15	23	23	19	24	19	16	15	14.3	24																						
12-Feb	16	Z	7	3	3	3	4	4	4	3	3	3	3	4	6	5	6	8	10	7	6	4	3	4	5.1	16																						
13-Feb	4	6	Z	4	4	5	8	8	9	8	9	12	8	3	2	4	9	23	29	18	13	6	3	1	8.5	29																						
14-Feb	1	2	3	Z	2	7	16	24	20	16	13	11	9	14	13	13	14	31	29	25	23	17	8	6	13.8	31																						
15-Feb	6	6	8	7	Z	8	8	8	9	9	8	6	7	8	8	6	6	5	7	7	12	12	17	19	8.4	19																						
16-Feb	17	12	7	4	4	Z	8	14	18	12	11	4	6	6	5	9	17	18	16	5	17	27	29	27	12.8	29																						
17-Feb	Z	25	24	21	17	11	10	7	7	6	4	8	4	8	6	7	12	7	8	7	7	7	8	9	9.9	25																						
18-Feb	8	Z	14	13	11	13	18	20	18	7	5	5	5	5	4	4	14	26	22	26	20	5	6	5	11.8	26																						
19-Feb	5	4	Z	1	0	0	1	8	7	5	1	2	2	6	8	9	13	12	8	7	6	7	6	6	5.4	13																						
20-Feb	8	5	5	Z	4	5	7	5	6	12	15	11	5	6	6	7	11	27	17	20	11	12	14	16	10.1	27																						
21-Feb	15	15	15	15	Z	23	22	26	21	18	10	4	2	5	8	8	12	15	17	8	9	20	11	5	13.2	26																						
22-Feb	6	4	4	3	2	Z	5	5	4	18	7	3	2	2	2	1	8	29	8	1	4	3	4	2	5.4	29																						
23-Feb	Z	1	2	2	4	3	4	4	3	2	1	0	0	3	11	14	18	22	14	14	4	1	0	1	5.5	22																						
24-Feb	4	Z	0	0	4	11	8	15	7	2	1	1	1	1	0	1	3	19	22	24	8	5	8	12	6.9	24																						
25-Feb	10	2	Z	2	3	3	5	5	5	3	2	2	2	1	1	1	0	0	0	1	1	1	1	4	2.3	10																						
26-Feb	7	5	2	Z	2	3	4	1	0	1	0	0	0	1	6	10	14	7	3	6	6	5	6	4	4.1	14																						
27-Feb	5	6	5	4	Z	5	10	10	9	7	7	7	8	10	15	21	22	32	30	27	25	27	22	18	14.4	32																						
28-Feb	11	6	2	3	3	Z	5	5	7	4	2	3	3	2	2	2	4	8	4	4	7	7	8	6	4.7	11																						
29-Feb	Z	5	6	8	7	14	7	7	13	6	6	5	4	4	4	6	10	12	11	9	12	10	10	10	8.0	14																						
																								9.1	9.2	8.2	6.5	6.1	8.1	9.5	10.9	11.1	9.6	8.1	6.5	6.0	6.4	7.2	8.4	11.1	17.0	15.2	13.8	13.8	11.9	10.6	10.1	Diurnal Average
																								20	25	24	21	18	23	22	26	27	22	18	16	20	15	18	21	22	32	30	32	36	27	29	27	Diurnal Maximum
Z - zerspan 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 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	597	91.01	91.01
21 - 40	59	8.99	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	116	34	6	2	15	43	90	28	34	16	37	28	21	25	22	79	596
21 - 40	10	4	2	0	0	4	5	6	6	2	2	0	0	1	3	13	58
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	126	38	8	2	15	47	95	34	40	18	39	28	21	26	25	92	654

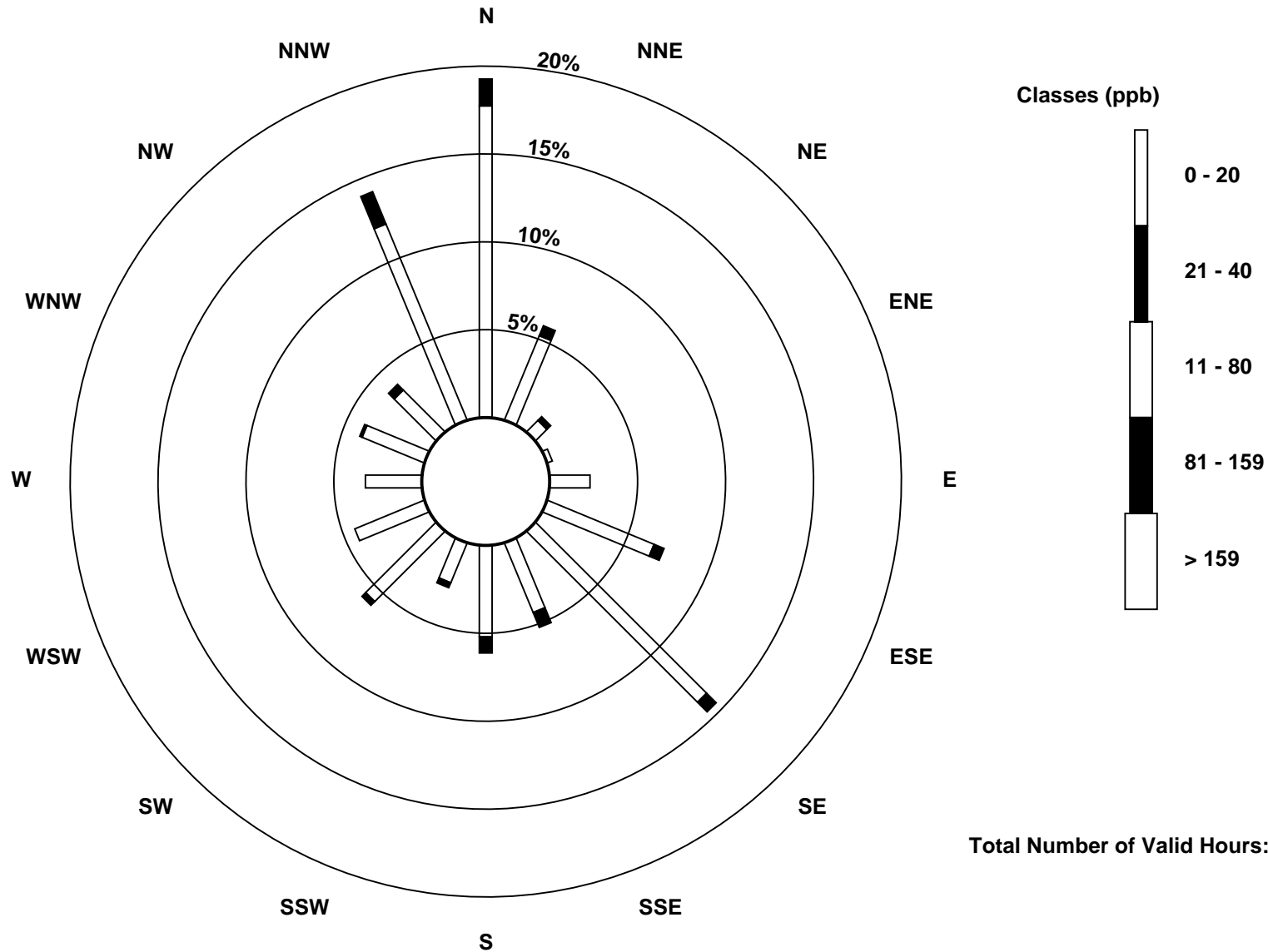
Total Number of Valid Hours: 654

Total Number of Hours: 696

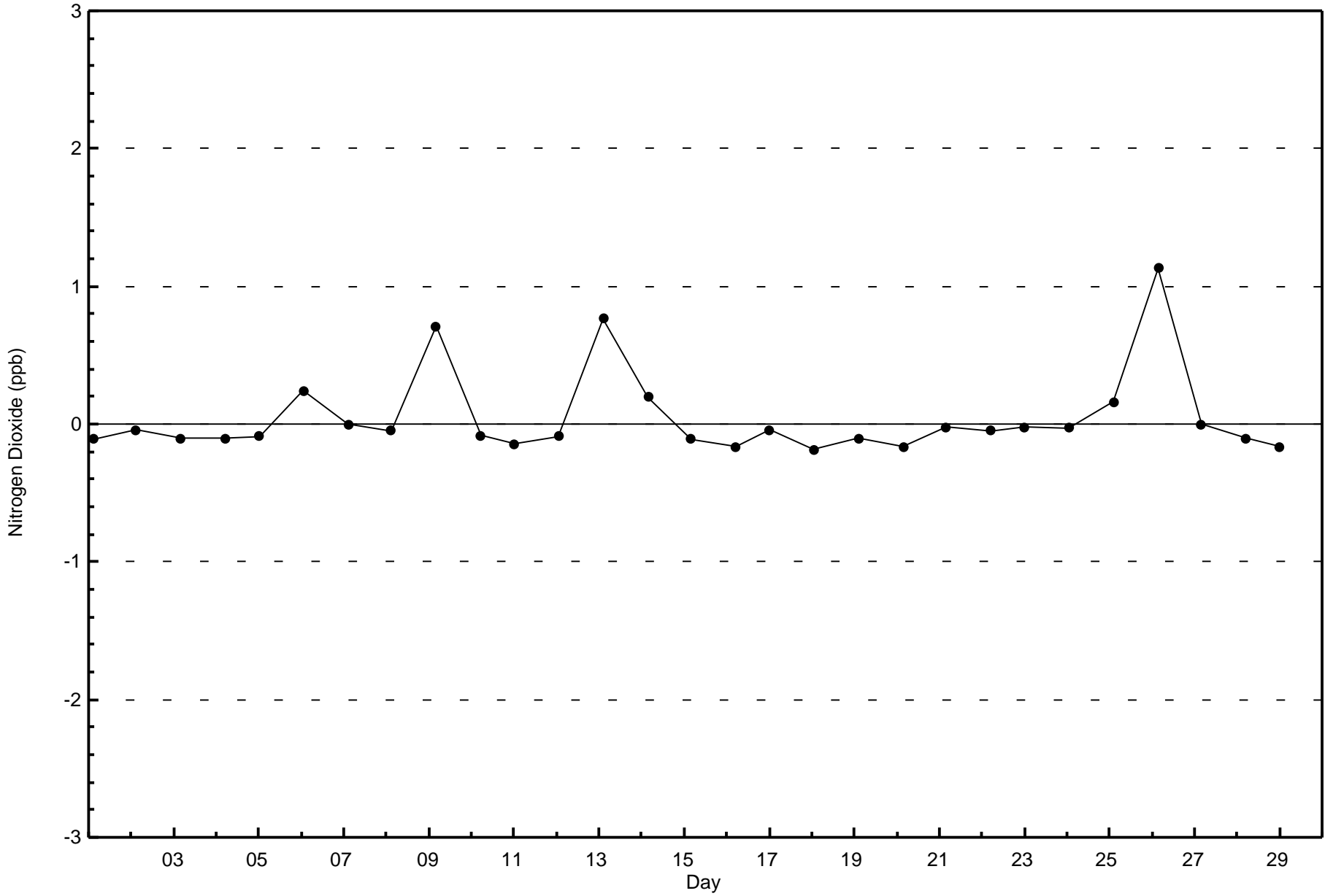


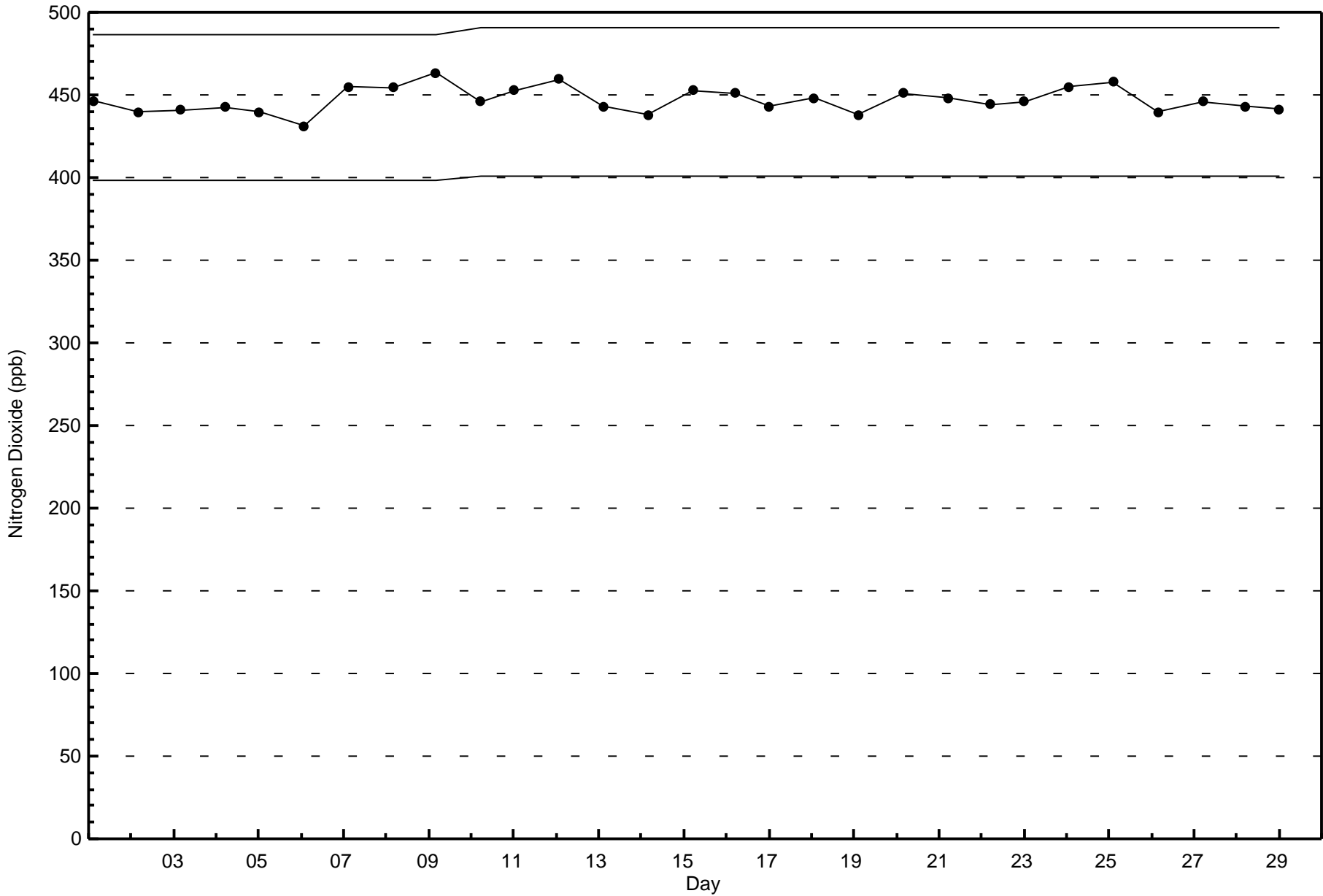
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 654







Wood Buffalo Environmental Association
Summary of Hour Averages

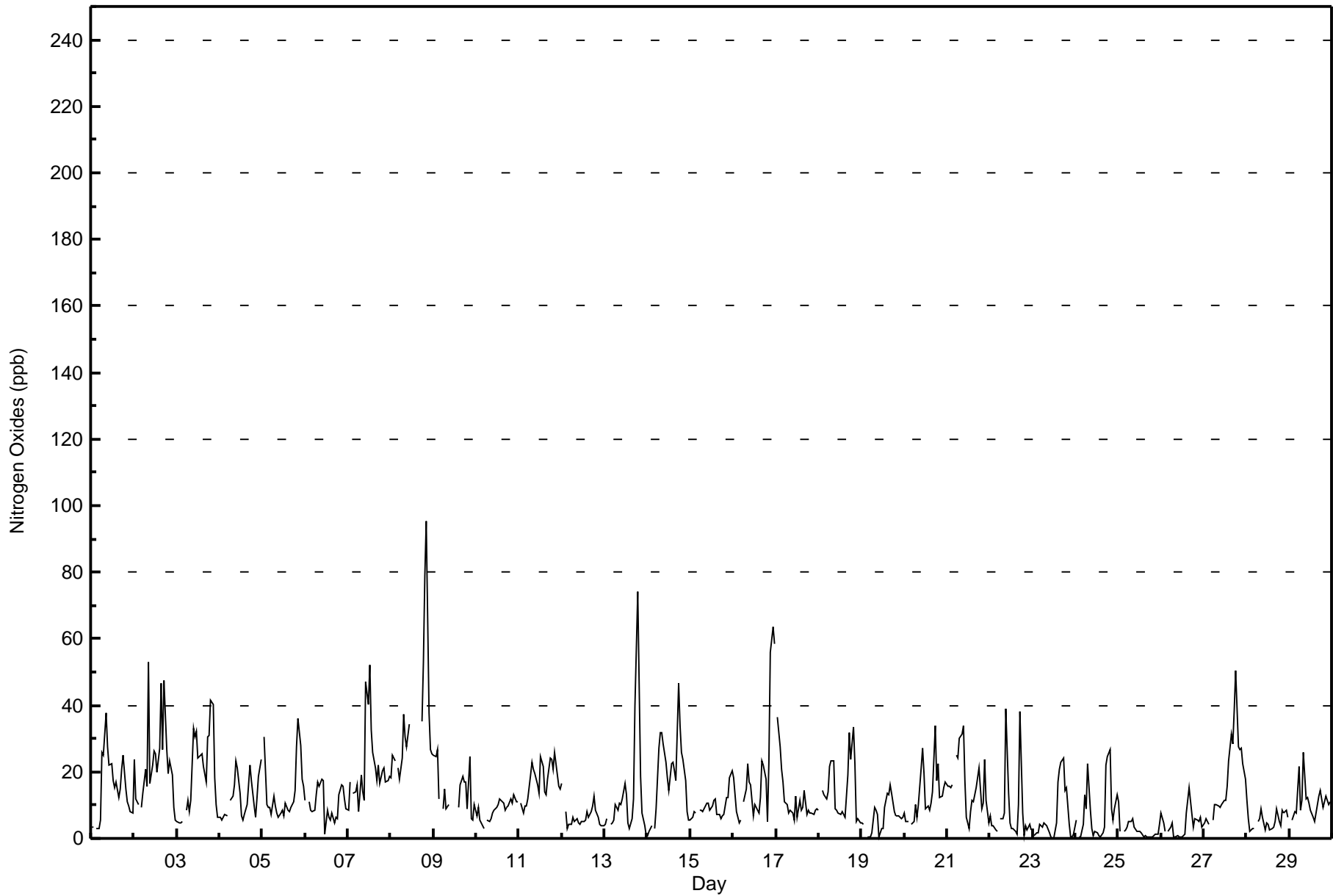
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - February 2016

Maximum Value: 96 ppb on Feb 8 21:00		Maximum Daily Average: 22.6 ppb on Feb 2		Hours in Service: 696																																													
Minimum Value: 0 ppb on Feb 23 12:00		Minimum Daily Average: 2.6 ppb on Feb 25		Hours of Data: 656																																													
Maximum Diurnal Average: 21.7 ppb at hour 18		Minimum Diurnal Average: 6.7 ppb at hour 5		Hours of Missing Data: 40																																													
Monthly Average: 13.1 ppb		Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 6 Median = 10 Q ₃ = 18 P ₉₀ = 26 P ₉₉ = 53		Hours of Calibration: 40																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	4	3	Z	3	3	6	26	25	38	27	22	23	17	15	17	12	15	21	25	15	11	10	8	7	15.3	38																							
2-Feb	24	12	10	Z	9	14	21	16	53	17	22	26	25	20	27	47	27	48	27	20	23	19	9	6	22.6	53																							
3-Feb	5	5	5	5	Z	8	12	8	12	33	31	32	24	25	26	22	17	30	31	41	40	18	10	6	19.4	41																							
4-Feb	6	6	6	7	7	Z	11	13	16	23	21	13	7	6	7	10	16	22	17	10	6	12	19	24	12.5	24																							
5-Feb	Z	30	10	9	9	7	13	10	8	6	7	9	7	11	8	8	9	11	14	27	36	28	18	16	13.6	36																							
6-Feb	12	Z	11	9	8	9	13	17	16	18	17	1	9	6	6	8	5	6	6	13	16	15	12	9	10.4	18																							
7-Feb	9	17	Z	14	14	16	8	19	14	11	47	40	52	33	26	21	18	22	16	20	21	17	17	19	21.4	52																							
8-Feb	18	25	23	Z	21	18	24	37	31	27	34	C	C	C	C	C	C	35	53	79	96	38	27	26	--	96																							
9-Feb	25	24	27	12	Z	9	15	9	10	C	C	C	C	C	9	16	19	17	17	9	25	6	6	10	14.7	27																							
10-Feb	7	9	5	4	3	Z	6	5	6	8	8	9	10	12	11	10	8	9	10	12	11	13	11	11	8.6	13																							
11-Feb	Z	11	8	10	10	12	19	23	21	20	16	13	24	22	14	13	18	24	24	21	26	19	16	15	17.2	26																							
12-Feb	17	Z	8	3	4	4	6	5	6	4	4	5	5	5	8	6	8	10	13	8	7	4	4	4	6.5	17																							
13-Feb	4	6	Z	4	5	6	10	9	10	10	12	17	13	4	3	6	12	40	74	46	19	7	4	1	14.0	74																							
14-Feb	1	2	4	Z	3	9	27	32	32	28	23	18	14	22	23	20	17	47	34	26	24	17	8	6	19.0	47																							
15-Feb	6	6	8	7	Z	8	8	8	10	11	11	8	10	11	12	7	7	6	7	7	12	12	18	20	9.6	20																							
16-Feb	18	13	8	5	6	Z	11	15	22	17	16	7	10	9	8	12	23	22	18	5	23	56	64	58	19.4	64																							
17-Feb	Z	37	28	21	17	11	10	8	8	8	5	13	6	12	8	9	15	7	8	7	8	7	9	9	11.7	37																							
18-Feb	9	Z	15	13	12	14	22	23	24	9	9	7	7	8	7	6	19	32	24	34	22	5	6	4	14.3	34																							
19-Feb	5	4	Z	0	0	0	2	9	8	7	0	3	3	9	14	13	16	13	8	7	7	7	6	6	6.5	16																							
20-Feb	8	5	5	Z	4	5	10	6	10	21	27	20	9	10	9	11	14	34	17	23	12	13	15	17	13.3	34																							
21-Feb	16	15	15	16	Z	25	24	30	31	34	17	6	3	8	11	11	15	18	21	9	11	24	11	5	16.4	34																							
22-Feb	7	4	4	3	2	Z	6	6	8	39	13	5	3	3	2	1	10	38	8	1	4	3	4	3	7.6	39																							
23-Feb	Z	1	2	2	4	4	5	4	4	2	0	0	0	5	17	21	23	24	14	15	4	1	0	1	6.6	24																							
24-Feb	5	Z	0	0	4	13	9	22	9	3	1	2	2	1	1	2	3	22	24	27	9	6	9	13	8.1	27																							
25-Feb	11	2	Z	2	3	3	5	5	6	3	2	2	2	2	1	1	0	0	0	0	1	1	1	4	2.6	11																							
26-Feb	8	5	2	Z	2	3	4	1	0	1	0	0	0	1	8	12	15	7	3	6	6	5	6	4	4.4	15																							
27-Feb	5	6	5	4	Z	6	10	10	10	9	10	11	11	16	23	32	28	39	51	28	27	27	22	18	17.7	51																							
28-Feb	11	6	2	3	3	Z	5	6	9	6	3	5	4	3	3	3	5	9	5	4	8	8	9	6	5.5	11																							
29-Feb	Z	6	7	8	8	21	8	12	26	12	12	11	8	6	5	8	13	14	12	9	13	11	10	11	10.9	26																							
																								9.9	10.4	9.0	6.8	6.7	9.6	12.1	13.5	15.7	14.8	14.0	11.4	10.7	10.5	11.2	12.4	14.2	21.7	20.1	18.2	18.1	14.1	12.4	11.7	Diurnal Average	
																								25	37	28	21	21	25	27	37	53	39	47	40	52	33	27	47	28	48	74	79	96	56	64	58	Diurnal Maximum	
Z - zerspan																								C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	520	79.27	79.27
21 - 40	120	18.29	97.56
41 - 80	15	2.29	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 656

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	23	4	1	10	38	79	20	26	15	36	26	21	23	19	76	520
21 - 40	20	13	3	0	5	8	16	13	13	1	2	2	0	3	6	13	118
11 - 80	3	2	1	1	0	0	0	1	1	2	1	0	0	0	0	3	15
81 - 159	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	126	38	8	2	15	47	95	34	40	18	39	28	21	26	25	92	654

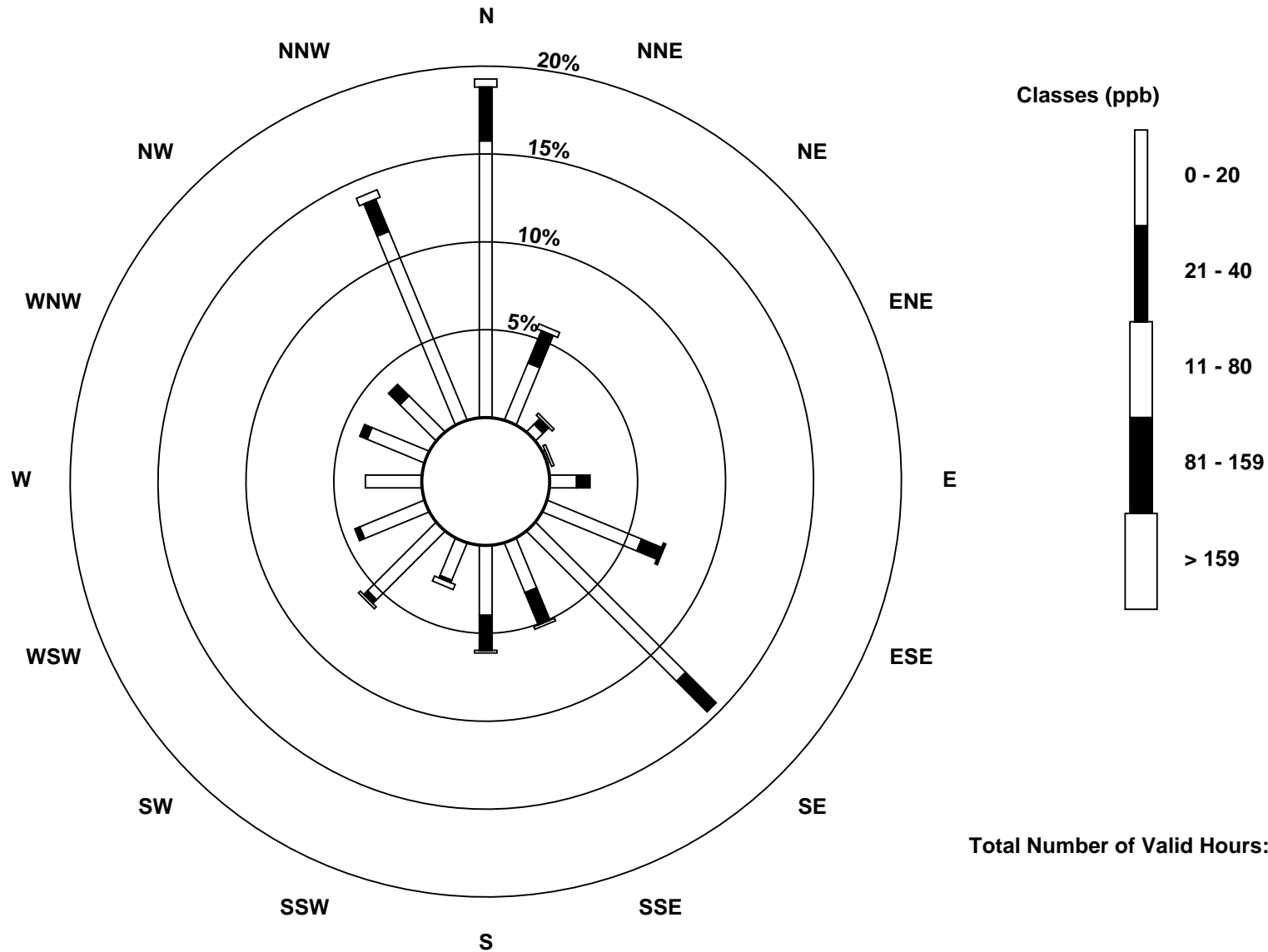
Total Number of Valid Hours: 654

Total Number of Hours: 696

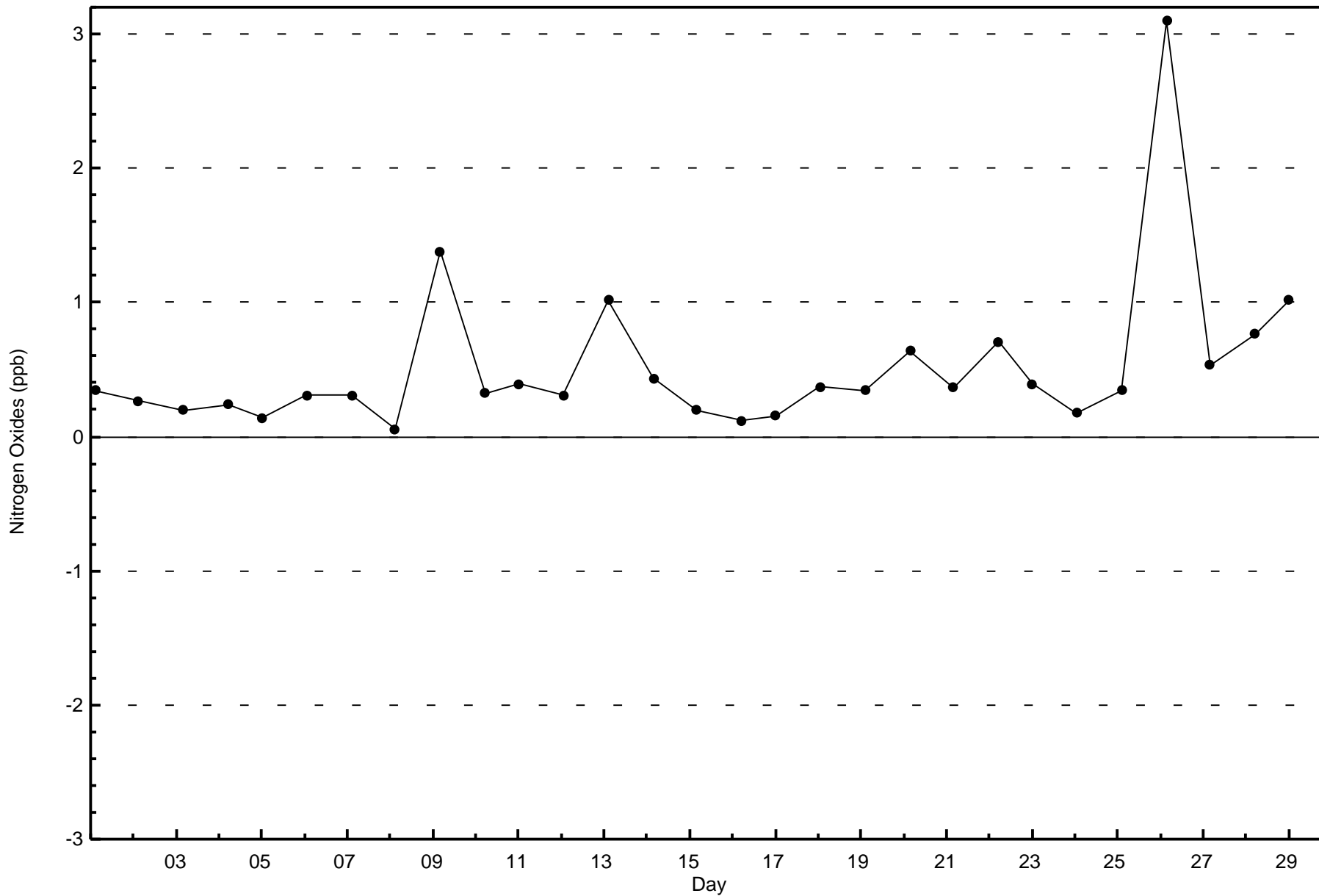


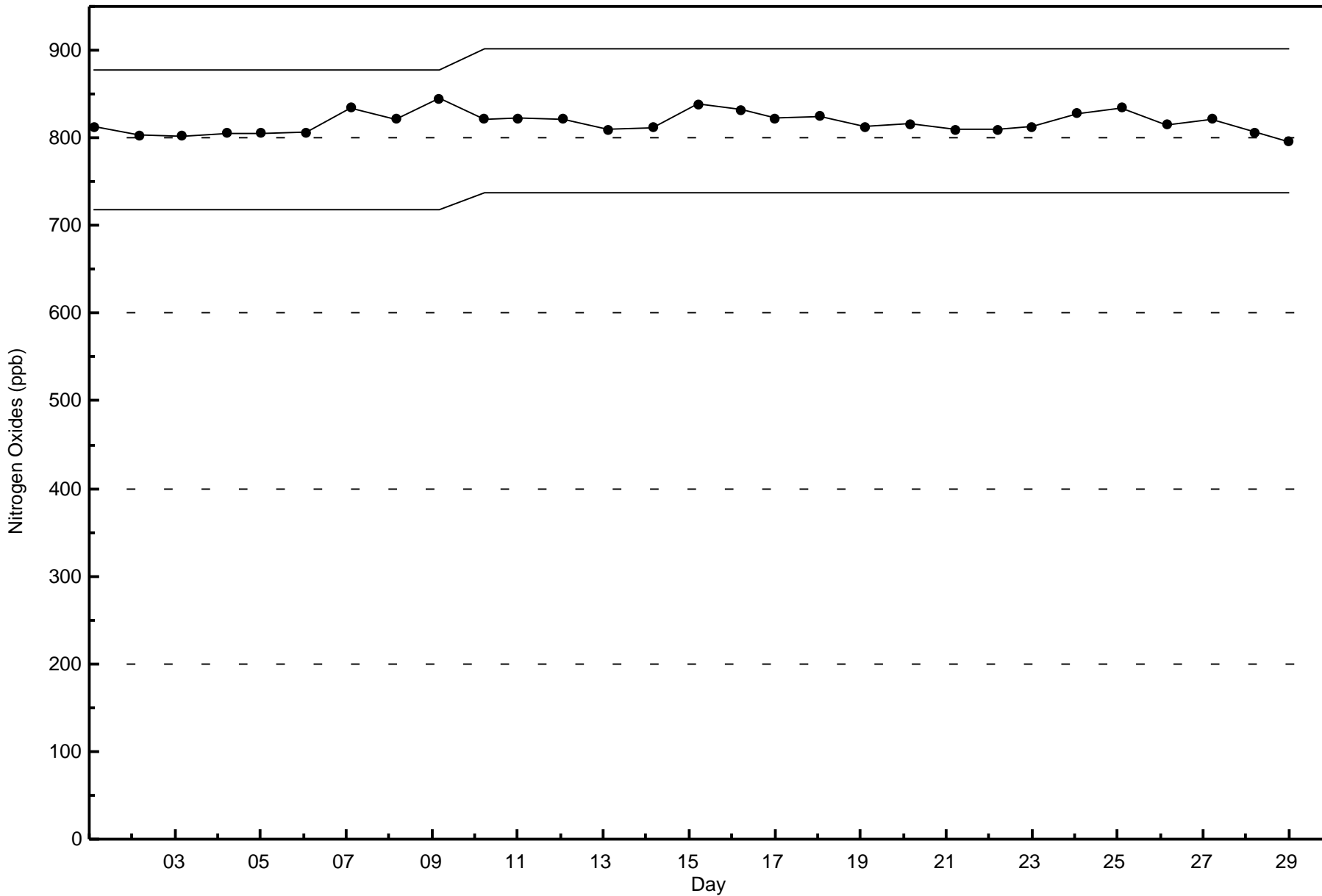
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 654





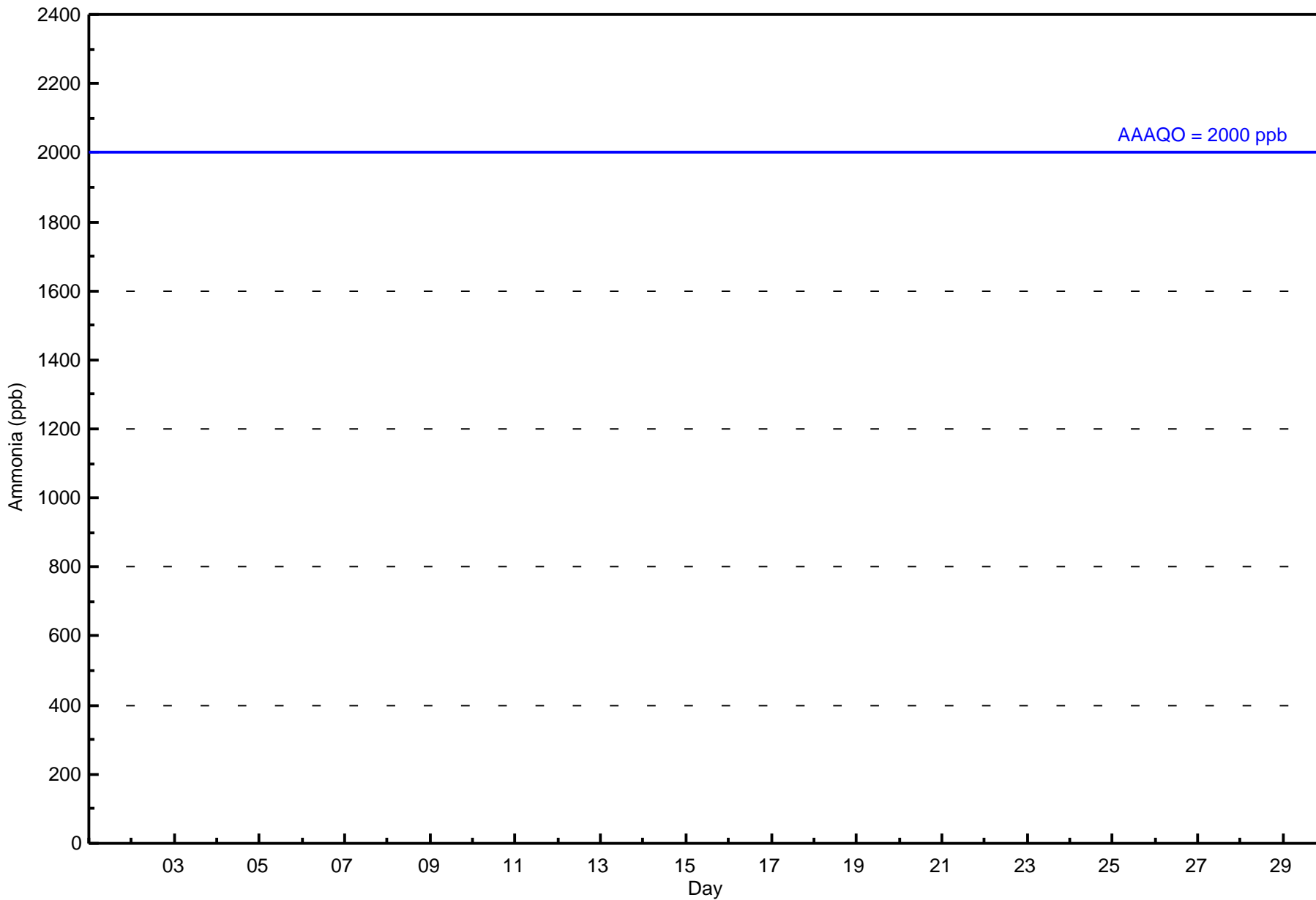


Number of Exceedences (AAAQO): 1-hr: 0 Maximum Value: 0 ppb on Feb 1 01:00 Maximum Daily Average: 0.0 ppb on Feb 1										Hours in Service: 696 Hours of Data: 626 Hours of Missing Data: 70 Hours of Calibration: 41 Percent Operational Time: 95.8																	
Minimum Value: 0 ppb on Feb 1 01:00 Maximum Diurnal Average: 0.0 ppb at hour 1 Monthly Average: 0.0 ppb										Minimum Daily Average: 0.0 ppb on Feb 1 Minimum Diurnal Average: 0.0 ppb at hour 1 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-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
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	C	C	C	C	C	C	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	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
12-Feb	0	0	0	Z	RE	0	0	0	0	C	C	C	C	C	C	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	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	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	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
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	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
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
29-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
0.0 0.0																								Diurnal Average	0.0		
0 0																								Diurnal Maximum	0		
Z - zerospan C - Calibration RE - Recovery Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	626	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: 626

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ammonia (NH₃) - ppb
Patricia McInnes - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	123	34	8	2	15	45	91	33	37	18	36	24	18	22	28	90	624
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	123	34	8	2	15	45	91	33	37	18	36	24	18	22	28	90	624

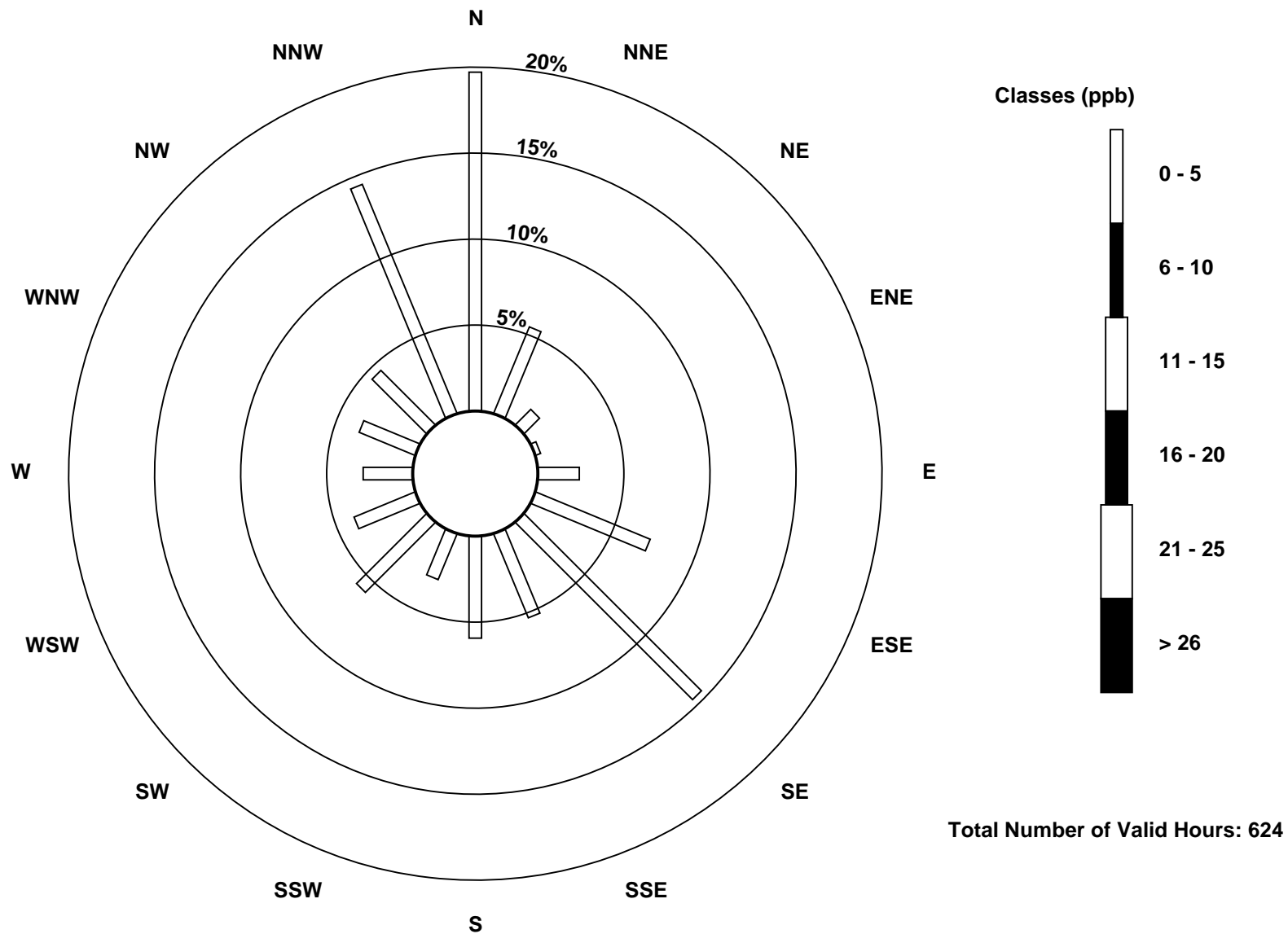
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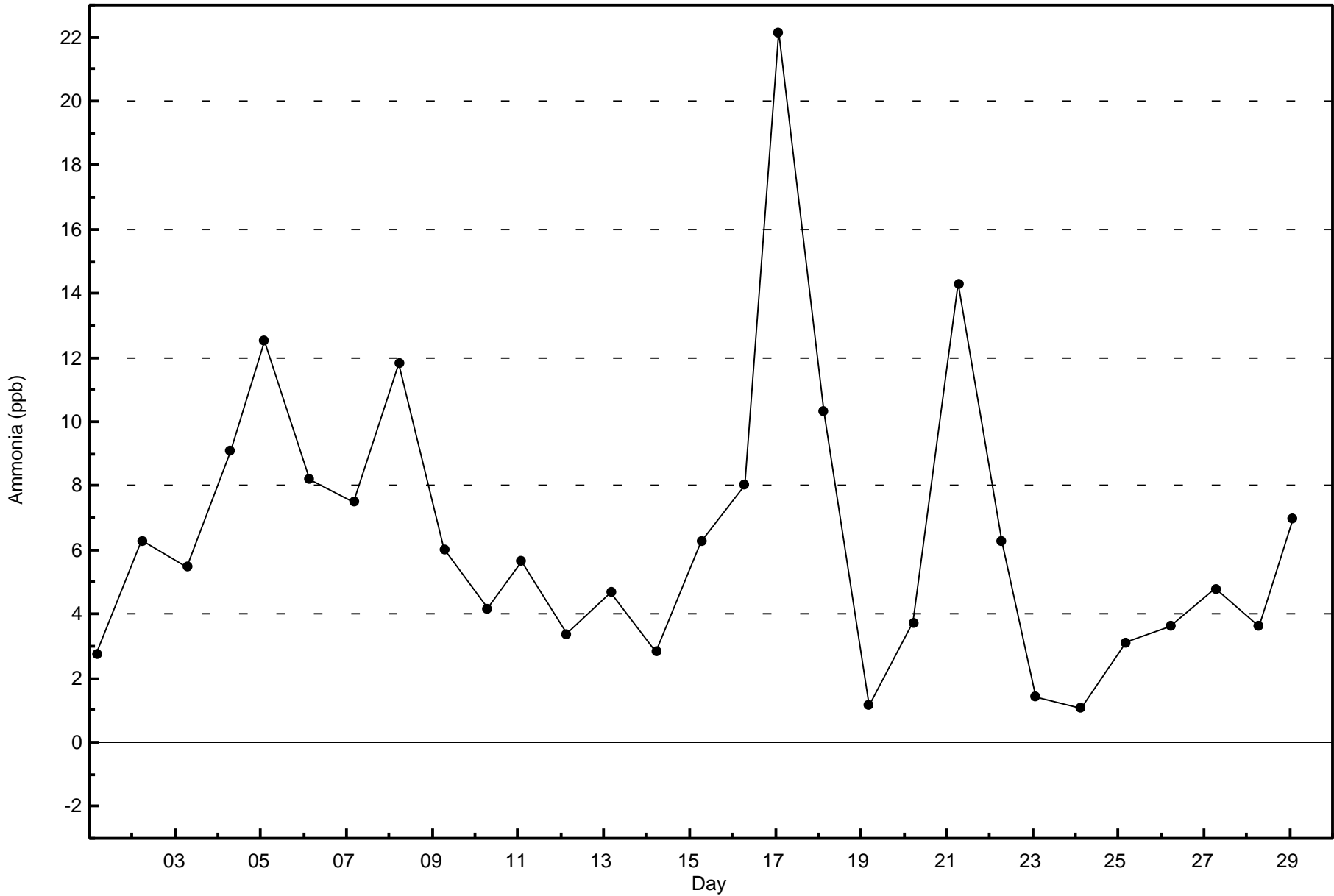
Total Number of Hours: 696

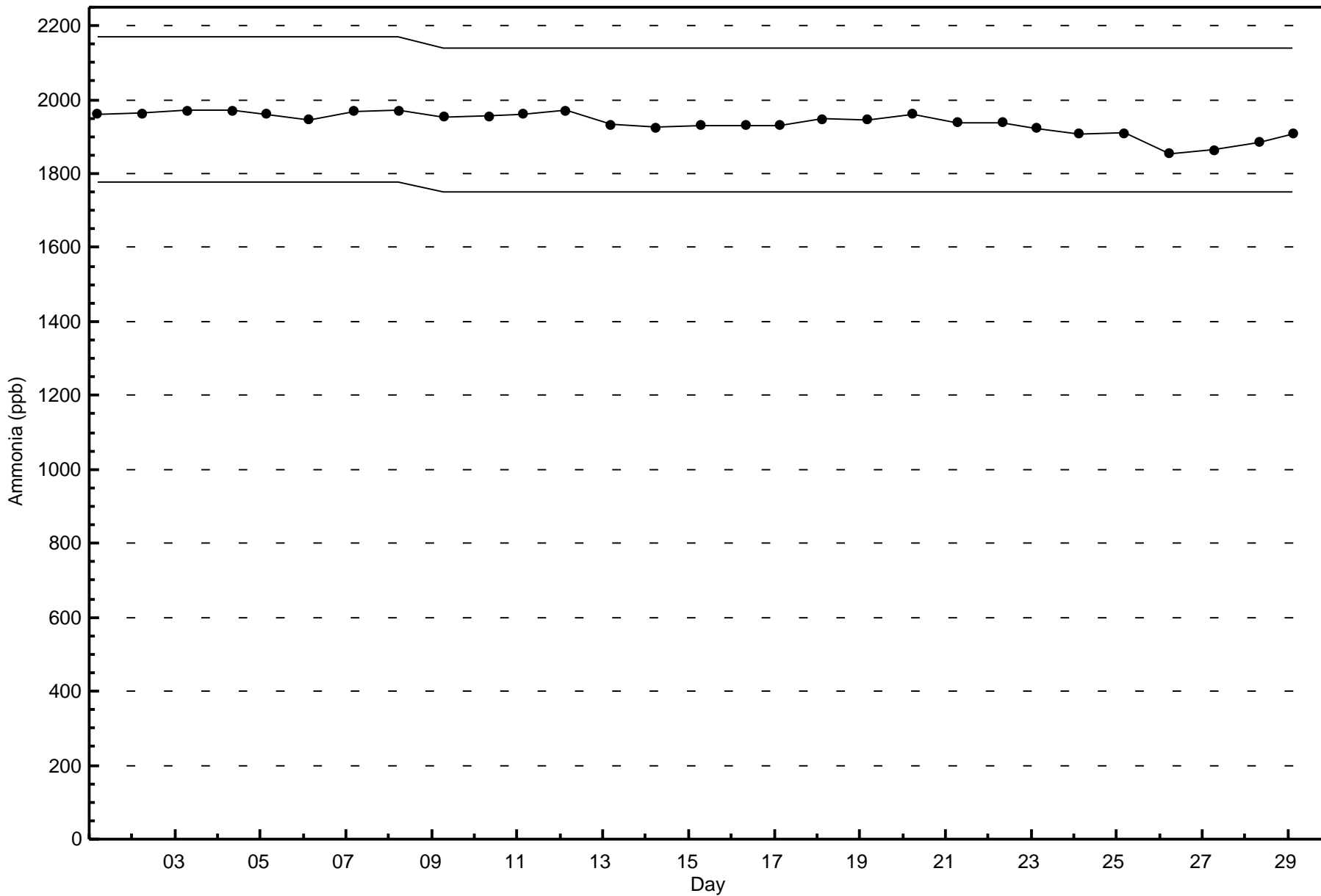


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 44.4 µg/m ³ on Feb 27 18:00 Minimum Value: 0.6 µg/m ³ on Feb 22 16:00 Maximum Diurnal Average: 7.2 µg/m ³ at hour 18 Monthly Average: 4.64 µg/m ³		Maximum Daily Average: 10.4 µg/m ³ on Feb 27 Minimum Daily Average: 2.1 µg/m ³ on Feb 25 Minimum Diurnal Average: 3.2 µg/m ³ at hour 6 Percentiles: P ₁ = 0.9 P ₁₀ = 1.7 Q ₁ = 2.3 Median = 3.4 Q ₃ = 5.4 P ₉₀ = 9.1 P ₉₉ = 19.0		Hours in Service: 696 Hours of Data: 694 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.8	2.3	2.4	2.5	2.4	2.6	4.3	4.6	6.7	4.6	4.2	4.9	4.0	4.8	3.8	3.6	4.0	4.9	5.9	5.4	7.5	16.5	6.8	3.9	4.8	16.5
2-Feb	5.4	4.6	3.3	2.9	2.7	3.0	3.1	3.4	5.1	3.9	4.2	3.8	3.6	3.4	4.5	6.3	6.9	11.4	5.8	5.6	7.2	6.7	4.9	4.0	4.8	11.4
3-Feb	4.0	3.9	3.9	3.8	3.6	3.9	3.8	3.7	3.7	5.9	15.8	22.6	15.2	12.6	11.7	9.3	8.7	13.1	13.2	16.4	13.7	5.3	3.1	2.5	8.5	22.6
4-Feb	3.2	3.1	3.2	3.1	2.7	2.9	3.2	3.7	3.9	4.6	4.7	3.9	2.8	3.0	2.5	2.5	2.8	3.1	4.6	3.2	3.4	4.0	3.9	5.3	3.5	5.3
5-Feb	5.8	6.4	4.9	3.9	4.0	3.2	3.2	3.4	3.1	5.9	3.8	3.9	4.6	5.3	5.8	6.4	6.4	7.9	7.8	10.8	17.9	13.4	7.7	8.0	6.4	17.9
6-Feb	6.2	5.4	5.4	5.4	11.0	5.1	4.9	5.4	5.7	7.7	4.2	1.0	2.2	4.3	6.5	6.2	4.3	7.3	8.4	7.6	7.3	6.3	7.3	5.7	5.9	11.0
7-Feb	7.2	9.6	6.9	5.7	7.3	7.1	7.1	9.3	8.3	5.8	5.3	6.1	13.7	13.5	7.1	6.6	10.4	11.5	13.4	12.6	11.2	9.2	14.5	11.6	9.2	14.5
8-Feb	8.7	9.7	8.7	6.0	5.8	6.5	6.8	6.2	6.9	7.2	6.2	4.4	3.5	3.6	3.2	3.5	4.7	6.6	8.5	20.1	19.1	8.1	9.3	13.5	7.8	20.1
9-Feb	8.3	4.4	6.4	2.7	2.2	2.1	2.2	2.0	1.8	1.8	1.6	1.5	1.7	1.7	2.1	3.5	4.3	3.4	2.8	4.1	6.9	4.2	4.2	3.5	3.3	8.3
10-Feb	4.1	4.1	4.3	4.7	3.7	1.9	1.3	1.4	1.8	2.2	2.3	2.3	2.6	2.5	2.2	2.3	1.9	3.0	2.9	3.3	3.0	3.8	3.0	5.3	2.9	5.3
11-Feb	4.2	2.4	2.3	2.9	3.1	2.4	2.3	4.6	5.0	5.1	4.4	2.4	2.2	2.5	2.1	1.9	2.8	5.2	9.7	9.6	7.0	5.0	3.9	4.5	4.1	9.7
12-Feb	6.0	5.2	3.4	2.6	2.7	2.6	5.0	3.6	4.0	C	C	1.7	1.6	1.6	1.6	1.6	1.7	2.1	2.8	3.3	1.8	2.1	2.0	1.7	2.8	6.0
13-Feb	1.5	2.2	2.1	1.8	1.8	1.8	2.0	2.3	3.0	3.3	3.0	3.1	4.3	6.4	6.4	6.0	5.5	9.9	17.3	12.8	7.0	2.3	1.5	1.2	4.5	17.3
14-Feb	1.1	1.1	1.2	1.1	1.1	1.6	4.0	5.6	8.1	11.8	13.0	12.2	9.0	12.0	12.1	10.2	9.0	15.9	15.1	13.5	18.2	14.3	8.3	3.2	8.4	18.2
15-Feb	1.6	2.0	2.4	2.7	2.9	2.0	1.7	1.8	1.8	1.1	1.2	2.1	3.1	3.7	4.2	2.9	3.3	3.5	2.9	3.0	4.7	5.0	5.5	5.3	2.9	5.5
16-Feb	6.0	5.1	3.1	2.3	2.3	2.7	4.0	3.6	4.2	3.6	4.1	2.8	3.0	2.4	2.4	3.0	3.3	4.1	4.8	3.4	6.0	8.3	11.8	13.4	4.6	13.4
17-Feb	15.0	16.6	13.0	16.4	13.0	11.5	8.5	6.2	5.9	3.8	3.0	3.1	2.1	2.4	2.3	2.3	2.8	2.5	2.3	2.2	2.0	2.0	2.0	2.1	6.0	16.6
18-Feb	2.4	2.7	2.7	2.6	2.3	2.6	3.3	4.1	4.3	4.4	4.8	5.1	5.2	4.4	3.5	3.2	3.7	6.2	5.3	7.1	6.2	6.1	6.1	4.3	4.3	7.1
19-Feb	4.9	4.1	3.0	2.4	2.2	1.9	2.1	2.2	2.4	2.0	1.4	3.7	3.3	3.1	4.3	5.0	8.0	2.5	1.8	1.3	1.2	1.8	1.7	1.7	2.8	8.0
20-Feb	3.2	2.6	2.5	2.8	2.6	2.9	3.6	3.9	4.3	3.6	4.3	2.1	1.3	1.2	1.5	1.8	1.7	9.4	15.5	6.3	4.4	2.7	2.7	2.8	3.7	15.5
21-Feb	2.9	3.8	3.3	2.9	2.9	2.1	2.4	4.3	3.2	3.3	2.3	1.8	2.0	2.4	3.3	3.5	5.9	6.0	6.2	5.3	5.1	13.3	6.1	4.9	4.1	13.3
22-Feb	3.8	3.2	2.9	2.9	2.7	2.6	2.8	2.1	2.0	3.1	3.1	1.3	1.0	1.0	0.6	0.6	1.7	3.7	1.8	1.3	1.4	1.9	4.0	2.0	2.2	4.0
23-Feb	1.8	2.5	2.3	1.5	1.3	1.0	0.9	0.9	0.9	1.4	1.1	1.0	1.0	2.7	9.0	3.1	5.5	8.0	5.7	5.0	1.7	1.7	1.8	1.7	2.6	9.0
24-Feb	2.0	2.1	2.2	2.1	2.3	2.8	2.3	5.3	2.7	2.0	1.1	0.9	1.0	0.9	0.9	1.0	1.1	2.5	3.2	12.6	3.4	3.3	2.7	2.7	2.6	12.6
25-Feb	4.4	2.5	2.3	2.3	2.6	2.5	2.7	3.1	3.3	2.6	1.8	1.7	1.6	1.4	1.2	1.2	1.1	1.1	1.3	1.6	1.5	1.7	2.0	2.8	2.1	4.4
26-Feb	4.0	5.4	2.5	2.2	2.3	2.7	2.8	2.5	2.0	1.7	1.6	1.5	1.3	1.6	2.9	4.2	3.5	2.7	2.5	3.2	3.5	3.0	3.6	3.8	2.8	5.4
27-Feb	4.0	3.3	2.9	2.6	2.9	2.9	3.6	4.1	4.4	3.9	4.2	3.7	3.1	3.4	5.4	37.9	29.0	44.4	15.0	14.8	12.6	19.0	14.3	8.0	10.4	44.4
28-Feb	2.4	1.9	1.9	2.3	2.3	2.2	2.2	2.5	3.1	2.7	2.5	2.6	2.5	2.0	2.2	2.3	2.5	4.0	3.2	4.0	7.1	4.7	5.2	4.5	3.0	7.1
29-Feb	5.0	4.3	4.4	4.4	3.9	4.7	5.1	4.7	5.0	2.1	1.7	1.4	1.4	1.5	1.8	2.2	2.4	2.8	3.6	3.3	5.5	3.3	3.3	3.2	3.4	5.5
4.6 4.4 3.8 3.5 3.5 3.2 3.5 3.8 4.0 4.0 4.0 3.8 3.6 3.8 4.0 5.0 5.1 7.2 6.7 7.0 6.8 6.2 5.3 4.7 15.0 16.6 13.0 16.4 13.0 11.5 8.5 9.3 8.3 11.8 15.8 22.6 15.2 13.5 12.1 37.9 29.0 44.4 17.3 20.1 19.1 19.0 14.5 13.5																								Diurnal Average Diurnal Maximum		
C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										

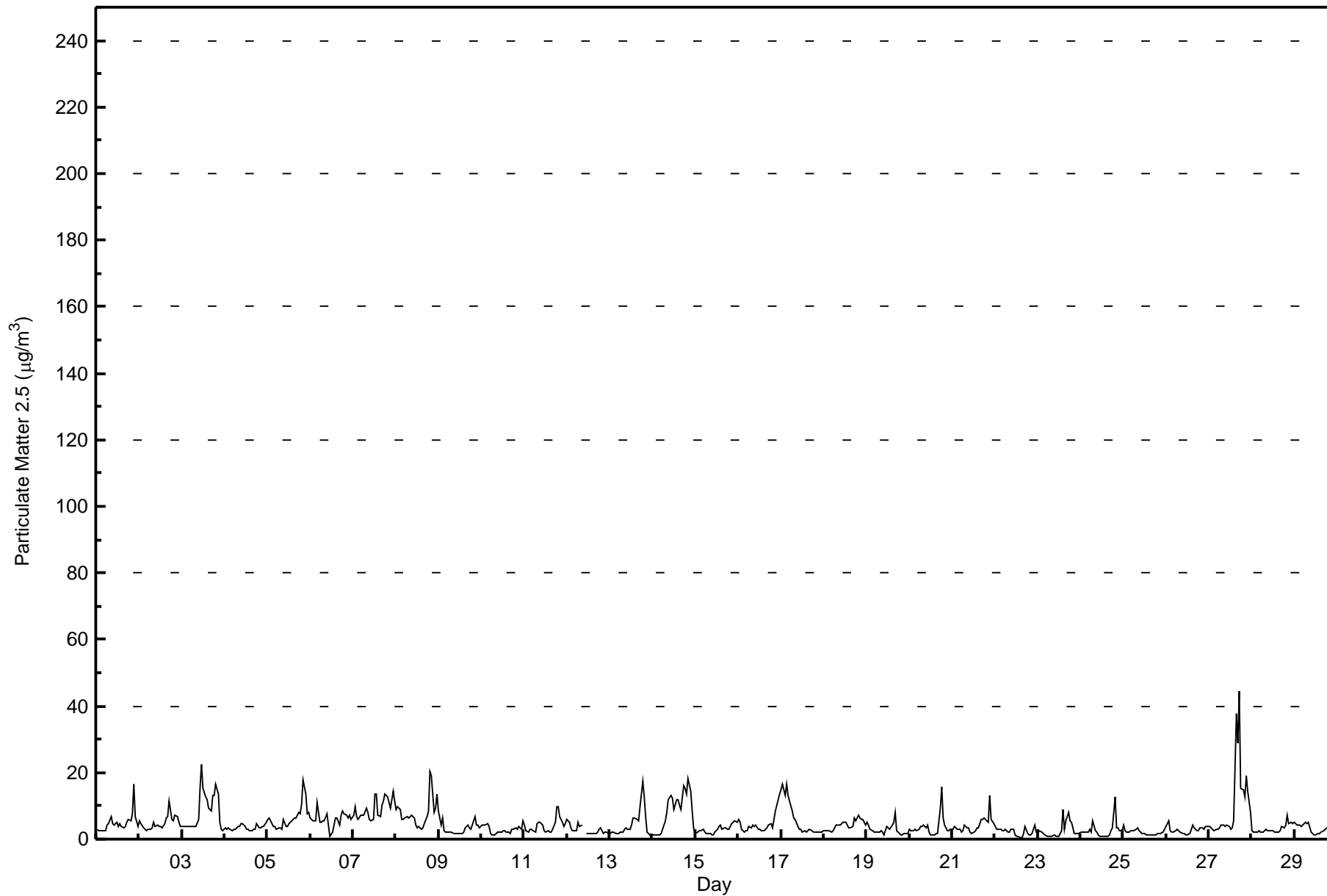


Wood Buffalo Environmental Association

Hourly Averages

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

Patricia McInnes - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - February 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	517	74.50	74.50
6 - 15	148	21.33	95.82
16 - 25	14	2.02	97.84
26 - 80	3	0.43	98.27
> 81.0	0	0.00	98.27

Total Number of Valid Hours: 694

Total Number of Hours: 696



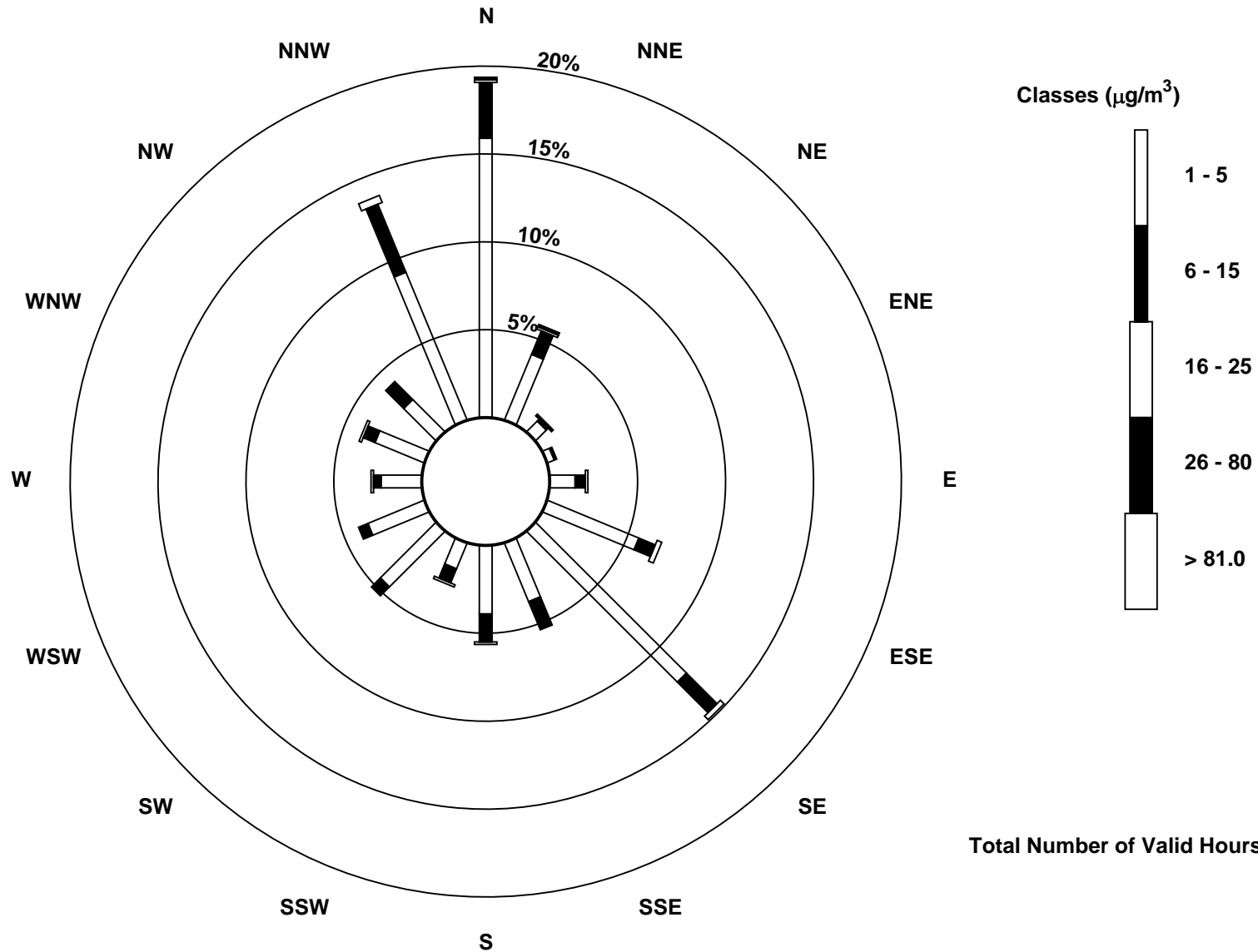
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - February 2016

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	110	28	6	3	10	39	84	25	27	11	31	24	16	21	18	63	516
6 - 15	22	10	1	1	4	7	17	12	11	6	5	4	3	5	10	29	147
16 - 25	1	1	0	0	1	2	2	0	1	1	0	0	1	1	0	3	14
26 - 80	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	134	40	8	4	15	48	103	37	39	18	36	28	20	27	28	95	680

Total Number of Valid Hours: 692

Total Number of Hours: 696



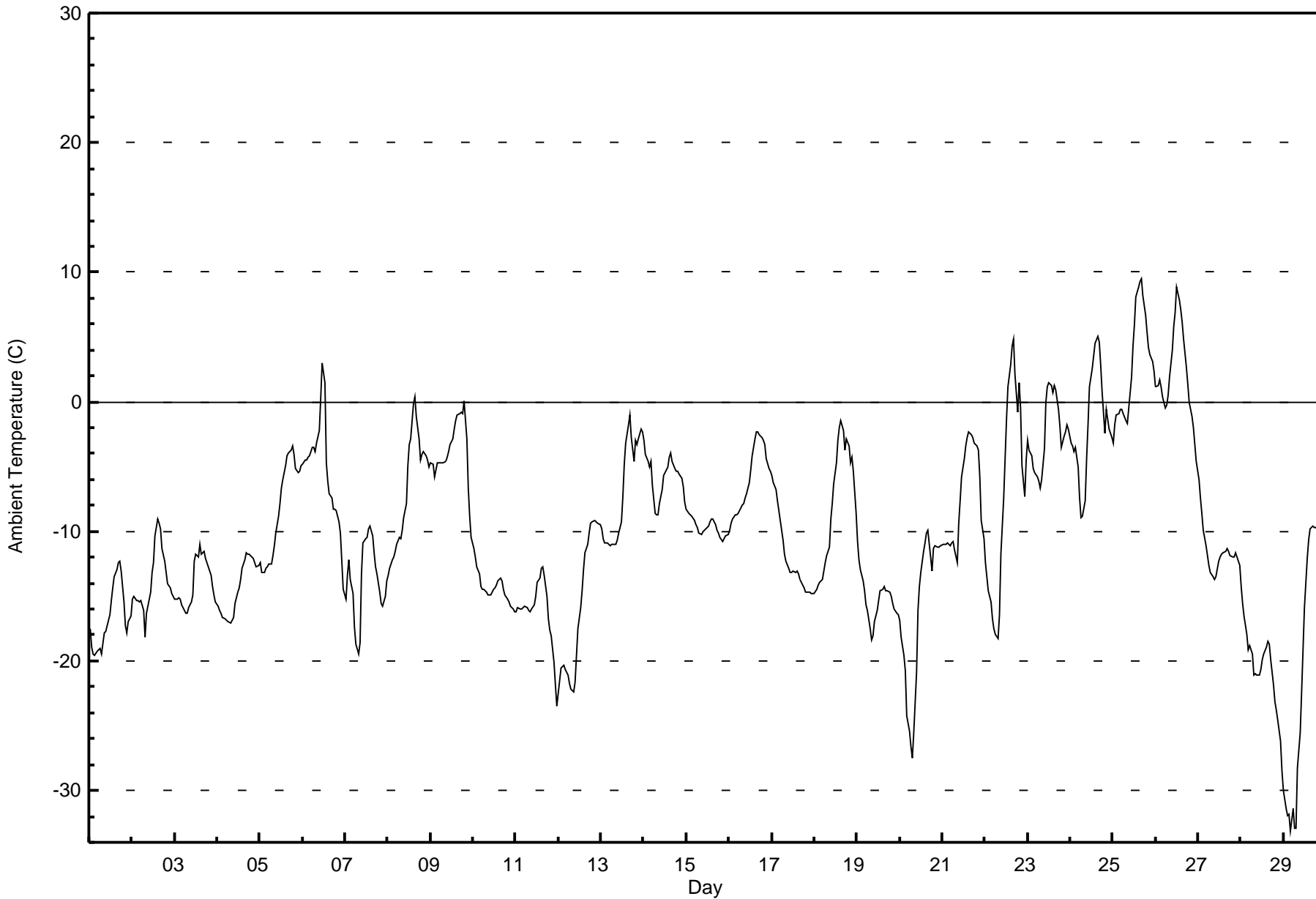
Total Number of Valid Hours: 692



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Patricia McInnes - February 2016

Maximum Value: 9.5 C on Feb 25 17:00 Maximum Daily Average: 2.9 C on Feb 25																						Hours in Service: 696 Hours of Data: 696				
Minimum Value: -33.2 C on Feb 29 05:00 Minimum Daily Average: -20.4 C on Feb 28 Maximum Diurnal Average: -6.2 C at hour 16 Minimum Diurnal Average: -13.6 C at hour 8 Monthly Average: -9.96 C Percentiles: P ₁ = -30.8 P ₁₀ = -18.0 Q ₁ = -14.7 Median = -10.8 Q ₃ = -4.6 P ₉₀ = -0.9 P ₉₉ = 7.8																						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	-17.6	-19.0	-19.4	-19.6	-19.3	-19.1	-19.0	-19.5	-17.8	-17.7	-17.3	-16.5	-15.4	-14.4	-13.5	-13.0	-12.4	-12.3	-13.1	-15.5	-17.3	-17.9	-17.0	-16.5	-16.7	-12.3
2-Feb	-15.3	-15.0	-15.3	-15.4	-15.4	-15.4	-16.1	-18.1	-16.4	-15.8	-14.7	-13.2	-12.4	-10.3	-9.0	-9.4	-9.8	-11.3	-12.3	-13.2	-14.1	-14.4	-14.8	-15.0	-13.8	-9.0
3-Feb	-15.2	-15.2	-15.2	-15.3	-15.6	-16.1	-16.3	-16.4	-15.9	-15.5	-14.9	-12.3	-11.8	-12.0	-11.0	-11.8	-11.5	-12.1	-12.4	-12.7	-13.4	-14.3	-14.9	-15.4	-14.0	-11.0
4-Feb	-15.8	-16.1	-16.3	-16.6	-16.7	-16.9	-17.0	-17.1	-16.8	-16.7	-15.5	-14.6	-14.3	-13.7	-12.8	-12.2	-11.7	-11.8	-11.7	-12.0	-12.1	-12.4	-12.7	-12.6	-14.4	-11.7
5-Feb	-12.4	-13.1	-13.1	-12.8	-12.7	-12.6	-12.5	-11.8	-11.1	-10.1	-8.8	-7.8	-6.7	-6.0	-5.0	-4.2	-4.0	-3.8	-3.4	-4.1	-5.2	-5.5	-5.4	-5.0	-8.2	-3.4
6-Feb	-4.9	-4.5	-4.5	-4.2	-4.1	-3.5	-3.5	-3.8	-3.2	-2.2	0.3	3.0	1.5	-4.7	-6.1	-7.1	-7.4	-8.3	-8.3	-8.4	-9.3	-10.2	-12.4	-14.5	-5.4	3.0
7-Feb	-15.2	-13.4	-12.2	-13.7	-14.8	-17.4	-18.7	-19.4	-18.6	-13.2	-10.9	-10.5	-10.5	-9.8	-9.6	-10.3	-11.7	-12.8	-13.3	-14.7	-15.6	-15.8	-15.1	-13.8	-13.8	-9.6
8-Feb	-13.4	-12.9	-12.2	-11.9	-11.6	-11.0	-10.4	-10.6	-9.9	-8.9	-7.9	-5.0	-3.3	-2.8	-0.1	0.4	-1.1	-2.8	-4.5	-4.1	-3.8	-4.2	-4.5	-5.0	-6.7	0.4
9-Feb	-4.7	-4.8	-5.8	-5.2	-4.8	-4.7	-4.8	-4.7	-4.6	-4.3	-3.8	-3.3	-2.9	-2.1	-1.5	-1.0	-0.9	-0.8	-0.9	0.1	-2.9	-6.6	-8.8	-10.5	-3.9	0.1
10-Feb	-11.3	-12.0	-12.7	-13.3	-14.2	-14.5	-14.5	-14.7	-14.9	-14.9	-14.9	-14.5	-14.4	-14.1	-13.9	-13.6	-13.9	-14.5	-14.9	-15.3	-15.5	-15.8	-16.0	-16.2	-14.4	-11.3
11-Feb	-16.3	-15.9	-15.9	-16.0	-15.9	-15.8	-15.9	-16.1	-16.2	-16.0	-15.7	-15.0	-13.9	-13.6	-12.9	-12.7	-13.4	-15.0	-16.7	-17.7	-18.0	-20.1	-21.9	-23.5	-16.3	-12.7
12-Feb	-22.5	-20.5	-20.4	-20.3	-20.7	-21.1	-21.7	-22.2	-22.4	-21.6	-19.6	-17.5	-15.9	-14.6	-13.0	-11.7	-11.0	-10.1	-9.4	-9.3	-9.1	-9.2	-9.4	-9.4	-15.9	-9.1
13-Feb	-9.8	-10.6	-10.8	-10.9	-10.9	-11.1	-11.0	-11.1	-11.0	-10.7	-10.1	-9.2	-7.3	-4.9	-3.2	-1.8	-1.1	-2.8	-4.6	-3.0	-3.3	-2.9	-2.1	-2.3	-6.9	-1.1
14-Feb	-3.0	-4.0	-4.6	-5.0	-4.6	-6.4	-8.6	-8.7	-8.7	-7.9	-6.7	-5.7	-5.4	-5.1	-4.3	-3.9	-4.7	-5.2	-5.3	-5.4	-5.6	-5.9	-6.5	-7.7	-5.8	-3.0
15-Feb	-8.3	-8.7	-8.7	-8.9	-9.1	-9.5	-9.7	-10.1	-10.2	-10.0	-9.9	-9.8	-9.6	-9.3	-9.1	-9.1	-9.5	-9.9	-10.1	-10.4	-10.8	-10.6	-10.4	-10.3	-9.7	-8.3
16-Feb	-9.9	-9.4	-9.0	-8.7	-8.7	-8.7	-8.4	-8.0	-7.9	-7.5	-7.1	-6.2	-5.2	-4.2	-2.9	-2.3	-2.3	-2.5	-2.8	-2.9	-3.3	-4.4	-5.1	-5.4	-5.9	-2.3
17-Feb	-5.7	-6.3	-6.8	-7.6	-8.4	-9.2	-10.7	-11.7	-12.3	-12.9	-13.2	-13.1	-13.1	-13.1	-13.1	-13.2	-13.8	-14.2	-14.4	-14.6	-14.7	-14.7	-14.8	-14.8	-11.9	-5.7
18-Feb	-14.8	-14.5	-14.2	-13.9	-13.7	-13.0	-12.4	-11.9	-11.3	-9.0	-7.9	-6.3	-4.7	-3.0	-2.0	-1.5	-2.2	-3.7	-2.8	-3.4	-4.7	-4.3	-5.3	-8.6	-7.9	-1.5
19-Feb	-10.8	-12.2	-12.9	-13.9	-14.6	-15.7	-16.1	-17.5	-18.4	-18.0	-17.0	-16.1	-15.4	-14.6	-14.5	-14.3	-14.6	-14.6	-14.7	-15.0	-15.6	-16.0	-16.3	-16.5	-15.2	-10.8
20-Feb	-16.9	-18.2	-19.6	-20.8	-24.2	-25.5	-26.6	-27.5	-25.5	-20.9	-16.1	-14.2	-13.1	-11.5	-10.9	-10.1	-10.0	-12.0	-13.1	-11.3	-11.1	-11.2	-11.2	-11.1	-16.4	-10.0
21-Feb	-11.0	-11.0	-11.0	-10.9	-11.1	-10.9	-10.8	-11.4	-12.5	-9.4	-7.7	-5.8	-4.4	-3.4	-2.7	-2.3	-2.5	-2.8	-3.2	-3.4	-3.8	-5.8	-9.2	-10.6	-7.4	-2.3
22-Feb	-12.4	-13.5	-14.6	-15.5	-16.8	-17.6	-18.0	-18.3	-16.4	-11.7	-7.5	-4.4	-1.4	1.2	2.9	4.3	4.8	2.1	-0.8	1.5	-0.4	-5.0	-7.3	-4.4	-7.0	4.8
23-Feb	-2.9	-3.7	-4.2	-5.1	-5.5	-5.8	-6.2	-6.6	-6.0	-3.6	-0.1	1.1	1.4	1.3	0.7	1.3	0.9	-0.5	-1.9	-3.5	-2.7	-2.3	-1.8	-2.1	-2.4	1.4
24-Feb	-3.2	-3.4	-3.8	-3.5	-5.1	-7.4	-9.0	-8.8	-7.6	-4.4	-1.8	1.1	2.5	3.6	4.5	5.0	4.6	2.9	0.8	-2.5	-0.6	-1.4	-2.1	-2.8	-1.8	5.0
25-Feb	-3.2	-1.8	-1.1	-0.9	-0.6	-0.5	-0.9	-1.4	-1.6	-0.5	2.0	4.2	5.9	8.1	8.9	9.3	9.5	8.2	6.6	5.3	4.2	3.6	3.1	2.3	2.9	9.5
26-Feb	1.2	1.3	1.6	1.2	0.4	-0.5	-0.3	0.5	1.9	4.0	5.9	6.9	8.8	7.9	7.1	6.1	4.8	2.6	1.3	0.0	-1.2	-2.0	-3.3	-4.6	2.2	8.8
27-Feb	-6.1	-7.4	-8.6	-10.0	-11.1	-11.9	-12.6	-13.1	-13.5	-13.7	-13.5	-12.3	-12.0	-11.8	-11.7	-11.5	-11.3	-11.5	-11.8	-11.9	-12.0	-11.6	-11.9	-12.7	-11.5	-6.1
28-Feb	-14.2	-15.6	-16.5	-18.0	-19.1	-18.8	-19.5	-21.1	-20.9	-21.1	-21.1	-20.7	-19.9	-19.5	-19.0	-18.5	-18.7	-20.0	-21.9	-23.1	-23.8	-24.6	-26.2	-28.5	-20.4	-14.2
29-Feb	-30.0	-31.4	-31.9	-31.8	-33.2	-31.4	-32.9	-32.9	-28.3	-25.6	-22.4	-19.2	-15.8	-12.1	-10.7	-9.8	-9.6	-9.7	-9.7	-9.8	-9.8	-10.0	-10.4	-10.7	-20.0	-9.6
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Patricia McInnes - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	42	6.03	6.03
-20 - 0	597	85.78	91.81
0 - 10	57	8.19	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



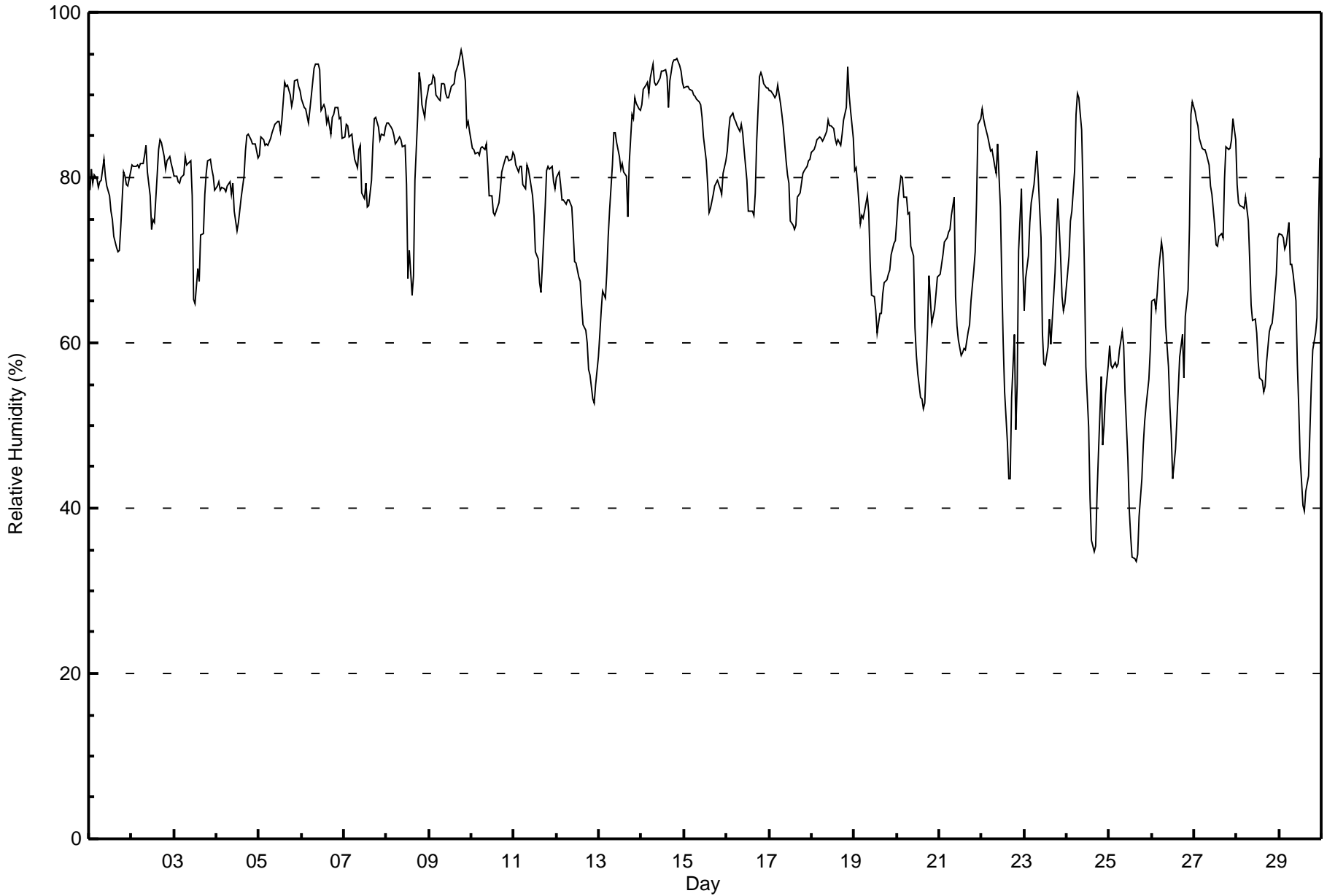
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Patricia McInnes - February 2016

Maximum Value: 95 % on Feb 9 19:00 Maximum Daily Average: 92.1 % on Feb 14																			Hours in Service: 696 Hours of Data: 696								
Minimum Value: 34 % on Feb 25 16:00 Minimum Daily Average: 49.4 % on Feb 25 Maximum Diurnal Average: 81.3 % at hour 8 Minimum Diurnal Average: 68.1 % at hour 15 Monthly Average: 76.3 % Percentiles: P ₁ = 35 P ₁₀ = 57 Q ₁ = 69 Median = 80 Q ₃ = 85 P ₉₀ = 90 P ₉₉ = 94																			Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	78	81	79	80	80	79	79	80	82	80	79	78	76	75	73	71	71	71	74	81	80	79	79	81	77.8	82	
2-Feb	81	81	81	82	81	82	82	83	84	81	78	74	75	75	80	83	84	84	83	81	82	83	82	81	80.9	84	
3-Feb	80	80	80	79	80	80	83	82	82	82	78	65	65	69	67	73	73	78	80	82	82	81	80	79	77.5	83	
4-Feb	79	79	78	79	79	78	79	79	78	79	76	73	75	76	78	80	83	85	85	85	84	84	84	82	79.9	85	
5-Feb	83	85	85	84	84	84	85	85	86	86	87	87	86	87	92	91	91	90	89	89	92	92	91	90	87.5	92	
6-Feb	90	88	88	87	87	90	91	93	94	94	93	88	89	88	87	87	85	87	88	88	89	87	87	85	88.8	94	
7-Feb	85	86	86	85	85	83	82	81	83	84	78	77	79	76	77	80	84	87	87	86	85	85	85	86	83.1	87	
8-Feb	87	87	86	86	85	84	85	85	85	84	84	79	68	71	66	68	80	87	93	92	89	87	89	90	83.1	93	
9-Feb	91	91	92	92	90	90	89	91	91	90	90	90	91	91	91	93	94	95	95	95	92	86	87	86	91.0	95	
10-Feb	84	83	83	83	83	84	84	83	84	81	78	78	76	75	76	77	79	81	81	83	83	82	82	83	81.0	84	
11-Feb	83	81	81	81	81	79	79	82	81	80	78	75	71	70	67	66	69	76	81	81	81	81	80	79	77.7	83	
12-Feb	80	81	79	77	77	77	77	77	76	73	70	70	68	67	65	62	62	60	57	56	53	53	55	58	68.0	81	
13-Feb	61	64	66	65	68	73	76	82	85	86	84	83	81	82	81	80	75	82	88	87	90	89	88	88	79.3	90	
14-Feb	89	91	91	91	90	92	94	92	91	91	92	93	93	92	88	92	94	94	94	94	94	93	92	92	92.1	94	
15-Feb	91	91	91	91	90	90	90	89	89	89	87	85	82	79	76	76	78	79	79	80	79	78	81	82	84.2	91	
16-Feb	83	86	87	88	87	87	86	86	86	85	83	80	76	76	76	75	78	84	92	93	92	91	91	91	85.0	93	
17-Feb	91	91	90	90	90	91	89	88	86	82	80	79	75	74	74	74	78	78	79	81	81	81	82	82	82.7	91	
18-Feb	83	83	84	85	85	85	84	85	86	87	86	86	86	86	85	84	84	84	85	87	89	93	90	88	85	85.8	93
19-Feb	81	81	79	74	75	75	76	78	76	70	66	66	64	61	64	63	66	67	68	68	69	71	72	72	70.9	81	
20-Feb	75	77	80	80	78	78	76	76	72	71	62	58	56	53	53	52	53	62	68	65	62	64	66	68	66.9	80	
21-Feb	68	69	71	72	73	73	74	75	78	66	62	60	58	59	59	59	61	62	65	69	71	77	86	87	69.0	87	
22-Feb	88	87	86	85	84	83	83	81	81	84	77	68	60	54	48	44	44	53	61	49	55	71	79	69	69.8	88	
23-Feb	64	68	71	75	77	79	81	83	80	73	61	58	57	59	63	60	63	69	73	78	70	66	64	65	69.0	83	
24-Feb	68	71	75	76	81	88	90	90	86	78	69	57	50	41	36	35	35	42	47	56	48	50	54	57	61.6	90	
25-Feb	60	57	57	58	57	57	59	61	60	54	46	40	37	34	34	34	34	39	44	48	50	52	56	59	49.4	61	
26-Feb	65	65	64	66	69	72	71	67	62	57	52	49	44	47	51	54	58	61	56	63	67	74	88	89	63.0	89	
27-Feb	88	87	86	85	84	83	83	83	81	79	78	74	72	72	73	73	73	80	84	83	83	85	87	85	80.9	88	
28-Feb	79	77	77	76	76	78	75	70	65	63	63	61	58	56	55	54	55	58	61	62	62	64	68	73	66.1	79	
29-Feb	73	73	73	71	72	75	69	70	68	65	57	52	46	40	40	42	44	49	55	59	61	63	73	82	61.4	82	
	79.6	80.1	80.2	80.1	80.3	81.0	81.1	81.3	80.6	78.4	75.0	71.8	69.4	68.5	68.1	68.3	69.8	73.3	75.7	76.6	76.5	77.3	79.2	79.5	Diurnal Average		
	91	91	92	92	90	92	94	93	94	94	93	93	93	93	92	93	94	95	95	95	94	94	93	92	Diurnal Maximum		





Maximum Speed: 26 km/h on Feb 6 14:00	Maximum Daily Speed Average: 14.5 km/h on Feb 28	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 3 15:00	Minimum Daily Speed Average: 1.5 km/h on Feb 1	Hours of Data: 694
Maximum Diurnal Speed Average: 4.2 km/h at hour 24	Minimum Diurnal Speed Average: 0.8 km/h at hour 10	Hours of Missing Data: 2
Monthly Average Velocity: 2.3 km/h 353.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 21	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	NW4	WNW5	WNW3	W2	WSW2	WNW1	E3	SE3	M	M	ESE5	SE5	SE7	SE5	SE5	SSE5	SE5	SE4	SE3	SSE1	SW3	W2	WSW1	NE1	SSE1.5	SE7	
2-Feb	ESE4	ESE4	ESE5	SE4	SE5	SSE5	SSE2	SE1	SSE5	SE5	S3	ESE4	SSE7	SSE6	SE4	ENE4	N13	NNW12	NNW16	NNW13	NNW12	NNW12	NNW11	NNW10	N1.9	NNW16	
3-Feb	NNW9	NNW7	NW6	NNW5	NW6	NNW3	WSW2	NNW3	NNW1	SE5	SE4	E5	ESE3	E3	NNE0	S2	NNW3	NNW6	N8	NNW9	N12	N13	NNW11	NNW11	N4.0	N13	
4-Feb	NNW10	NNW10	N10	NNW10	NNW9	N9	N10	NNW8	NNW5	N6	NNE4	E6	SE8	SE8	ESE8	ESE7	E5	NNE6	N5	NNW7	NNW6	N6	NNW4	NW3	N4.5	NNW10	
5-Feb	ESE2	ESE6	SE6	SE6	ESE7	SE8	SE6	SE10	SE3	SE11	SE10	SE12	SE12	SE7	SE12	SE13	SE12	SE10	SE9	SSE5	SE5	SE5	SE5	SSE5	SE8.1	SE13	
6-Feb	SE7	SSE5	S5	SE7	SSE8	S7	SE6	SSE5	S6	SSE5	WSW7	W18	NW18	N26	NNW22	NNW17	NNW19	N12	NNW7	NNE5	NNE8	N7	NW2	W3	NNW3.3	N26	
7-Feb	NW2	NNW2	N7	NNW9	W4	WNW2	WNW2	WSW2	SW5	SW7	NNE4	N10	N14	N12	N12	NNW13	NNW10	NNW8	WNW4	W4	WNW2	SW5	S3	S4	NNW4.0	N14	
8-Feb	S3	S4	SSW5	SSW4	S5	S8	SE5	ESE4	WSW2	SSE3	S5	SSE5	ENE6	ENE4	SSE2	NNE3	NNE6	NNE3	SW2	S2	ESE4	SSE4	SSE4	WSW1	SSE2.2	S8	
9-Feb	SSE4	S4	SE2	SE4	SE5	SE6	SE8	SE9	ESE8	SE9	SE8	SE8	SSE7	SE5	S2	SSE4	S4	S3	SW4	NNW9	N22	NNW21	NNW23	N21	ENE1.6	NNW23	
10-Feb	N21	N18	N21	N22	N22	N19	N15	N13	N13	N12	N12	N14	NNE13	N12	N11	N10	N10	NNW10	N11	N10	NNW9	NNW9	N9	N9	N13.3	N22	
11-Feb	N8	N6	N7	N9	NNE9	NNE9	NNE8	N9	NNE9	N8	N9	NNE11	N11	N12	N12	N12	N11	NNW7	NW6	NNW7	N8	NW6	NW4	W3	N7.8	N12	
12-Feb	ESE5	ESE5	ESE11	ESE14	ESE13	SE16	ESE17	SE14	ESE15	ESE18	ESE14	SE13	SE15	SE17	ESE16	ESE16	ESE15	ESE14	SE12	SE13	SE14	SE17	SE16	SE13	SE13.8	ESE18	
13-Feb	SE12	SE9	SE13	SE14	SE13	SE12	SE12	SE10	SE8	ESE8	SE6	SE5	SSE8	SSW9	SSW12	S7	SSE8	SSE5	SSW7	SSW6	SSW10	SW9	SW11	WSW9	SSE7.1	SE14	
14-Feb	WSW11	WSW11	SW9	SW10	WSW10	NNW4	NNE5	NNW5	NNW5	NW4	NW1	N2	NNE4	E4	E3	NNE7	NNE10	NNE9	N7	NNW8	N8	N7	NNW8	NNW11	NW3.4	WSW11	
15-Feb	NNW10	NNW9	NNW7	N10	N10	N11	N12	N12	NNW13	N10	N12	N12	NNW8	NNW8	N9	N9	NNW8	N6	NNE6	NE6	S1	E6	E4	N8.0	NNW13		
16-Feb	SSE3	SE8	SE8	ESE8	SE10	ESE8	ESE6	NNE4	NNE5	E3	SE6	SE6	E5	SE5	SSE1	N3	NNE1	NW3	N4	NW5	N7	N9	N8	NNW9	ENE2.3	SE10	
17-Feb	NNW11	NNW12	NNW13	NNW14	NNW12	NNW17	NNW19	NNW18	N19	N17	N15	N15	N15	N15	N14	N12	N14	N12	N14	N14	N14	N13	N12	N11	N14.0	N19	
18-Feb	N12	N10	N9	N9	NNE9	NNE8	NNE7	NNE6	NE5	ESE13	E11	ESE11	ESE12	ESE13	ESE12	ESE13	ENE7	NNW4	SW3	N7	N8	NW13	NW19	NNW22	NE5.6	NNW22	
19-Feb	NNW20	N14	NNW14	NW18	WNW15	WNW17	NNW13	NNE10	N8	NNW6	NW10	NNW10	NNW9	N10	NE9	NE9	NNE9	NNE9	NNW9	N13	N13	N12	NNW10	NNW9	NNW10.3	NNW20	
20-Feb	NNW10	NNW8	NNW7	NW5	WNW5	W2	WSW2	W4	SW2	SSE4	ESE4	E6	SE8	ESE7	SE9	ESE7	ESE6	ESE4	ESE2	SE5	SE6	ESE5	ESE4	SE4	ESE1.8	NNW10	
21-Feb	SSE5	SE3	SE3	SE2	SE3	SSE4	S4	SE4	SSE3	SE3	SE6	SSE7	S9	SE6	E6	SE6	SE7	ESE5	SE5	SE8	SE6	SSE4	NW2	NW6	SE4.0	S9	
22-Feb	SW3	SSW2	WNW2	WNW3	WNW6	NW5	W4	SW3	SSW3	S4	SSE5	SE7	SSE9	S11	SSW13	SW13	S7	S3	WSW9	WSW12	WNW8	WNW7	WSW5	WSW10	SW4.1	SSW13	
23-Feb	WSW13	W10	WSW11	WSW11	SW10	WSW12	WSW14	SW10	SW9	SW12	W16	WNW19	NW18	NNW13	NNE11	NE7	NNE7	NW2	NW5	W6	WNW8	WNW11	WNW13	WNW12	W7.8	WNW19	
24-Feb	NW11	NNW13	WNW12	WNW12	W7	SW6	SW6	SW5	SW6	SW7	SW8	SSW8	SSW11	SW12	SW9	SSW8	SSW8	S7	S7	S7	S9	S10	S7	S7	SW6.5	WNW13	
25-Feb	S9	SSW14	SSW17	SSW14	SW14	SW12	SW10	SW13	SW12	SW12	WSW14	SW12	SW14	WSW14	W19	W21	W18	WSW15	W14	WSW13	WSW13	WSW14	WSW12	SW6	WSW12.4	W21	
26-Feb	S7	SSW7	SW10	SW12	SW12	SSW10	SW10	WSW14	W12	W12	NW14	WNW15	NW13	NNW14	NNE12	NNE11	N16	N17	N18	N19	N18	N16	N15	N17	NNW6.8	N19	
27-Feb	N19	N19	N20	N20	N21	N19	N19	N14	N15	NNW15	NNW15	NNW13	N14	N13	N19	N11	NNE10	N7	NE4	NE4	NNE7	SE3	WNW2	N12	NNW16	N12.4	N21
28-Feb	NNW19	N19	N18	N16	N17	N19	N19	N16	N17	N20	N19	N17	NNE15	NNE19	N16	N16	NNW15	NNW13	NNW10	NNW10	NNW11	NNW7	NNW5	NW5	N14.5	N20	
29-Feb	NNW2	W1	SW4	S2	S2	S5	S2	SSW3	SSE5	SE8	SE5	SE7	SE6	E4	ESE2	E1	SE3	SSE6	S7	S7	SSE7	SE7	SE7	SE7	SSE3.9	SE8	

NNW3.6	NNW3.0	NNW2.7	NNW2.6	NW1.9	N1.5	N1.8	N1.5	NNW1.3	ENE0.8	N1.1	NNE1.5	NE1.8	NE3.2	NE2.6	NNE2.8	NNE3.7	N3.0	NNW2.8	NNW3.3	N3.6	NNW3.5	NNW3.7	NNW4.2	Diurnal Average
N21	N19	N21	N22	N22	N19	N19	NNW18	N19	N20	N19	WNW19	NW18	N26	NNW22	W21	NNW19	N17	N18	N19	N22	NNW21	NNW23	NNW22	Diurnal Maximum

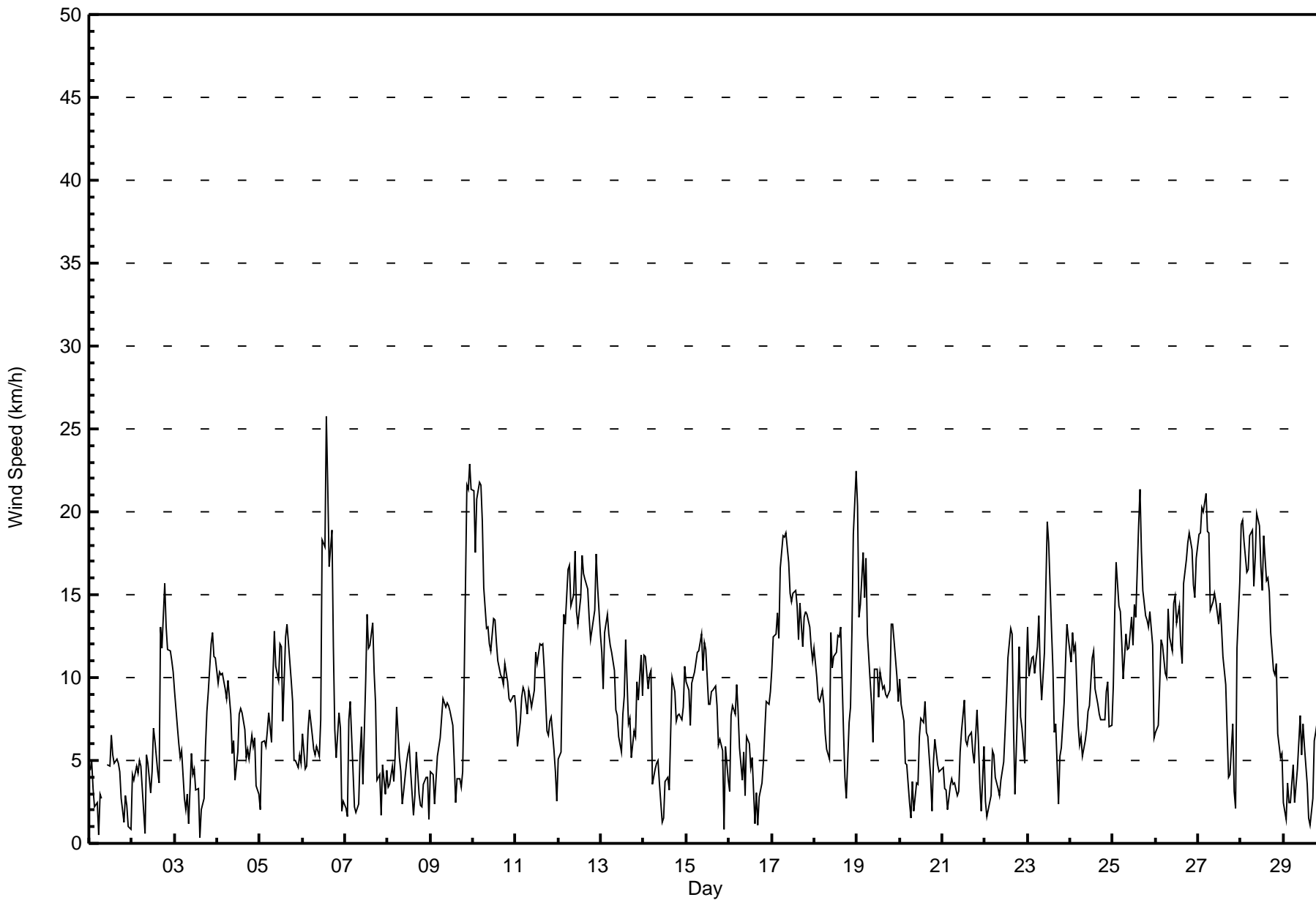
M - Maintenance
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Patricia McInnes - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 6 13:00 Minimum Value: 0 km/h on Feb 29 07:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 696 Hours of Data: 694 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	1	1	2	1	1	2	M	M	1	1	1	1	2	2	2	1	1	1	1	1	1	1	2	
2-Feb	1	1	1	1	2	1	2	2	3	1	1	1	2	2	1	3	4	3	3	2	2	2	2	2	4	
3-Feb	2	1	1	2	2	1	2	1	1	1	1	2	2	1	1	2	1	1	1	2	3	3	2	3		
4-Feb	2	2	2	2	1	1	2	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	2		
5-Feb	2	1	1	1	2	2	1	3	3	2	2	3	3	2	3	3	3	2	2	3	1	1	2	3		
6-Feb	2	2	2	2	2	2	1	2	1	1	6	3	7	7	5	4	4	3	2	1	1	2	1	7		
7-Feb	1	2	3	2	1	1	1	1	2	2	2	2	2	2	2	3	2	1	1	1	2	1	1	3		
8-Feb	1	1	1	1	2	2	1	2	1	1	1	2	1	2	1	2	1	1	1	2	1	1	1	2		
9-Feb	2	1	1	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	2	6	5	4	4	6		
10-Feb	5	4	4	4	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	5		
11-Feb	2	1	1	2	1	2	1	1	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	2		
12-Feb	2	2	4	3	3	4	4	3	4	4	4	3	4	3	4	3	3	3	2	3	3	4	4	4		
13-Feb	3	2	3	3	3	3	3	2	2	1	2	1	2	2	3	2	2	1	3	2	1	2	2	3		
14-Feb	2	1	2	1	1	3	3	2	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	3		
15-Feb	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	1	2		
16-Feb	2	2	2	2	3	2	3	1	1	1	2	3	1	2	2	1	1	1	1	1	2	2	2	3		
17-Feb	2	2	2	3	2	3	4	4	4	4	3	3	3	3	3	3	3	3	3	2	2	2	2	4		
18-Feb	2	2	1	1	1	1	1	1	2	3	2	3	3	3	3	3	3	2	1	4	2	3	5	5		
19-Feb	4	3	4	3	3	3	3	2	2	2	2	3	3	2	2	2	2	2	2	2	3	2	2	4		
20-Feb	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	2	1	1	1	2		
21-Feb	1	1	1	2	0	1	1	1	1	1	2	2	3	1	1	1	2	1	1	2	1	1	2	3		
22-Feb	1	1	1	1	2	1	1	1	1	1	1	1	2	2	3	3	3	1	3	2	2	1	1	3		
23-Feb	3	1	2	1	2	2	2	1	2	2	4	4	4	4	2	2	2	1	1	1	1	2	2	4		
24-Feb	3	2	1	2	2	1	1	2	2	1	2	2	2	3	3	2	2	1	1	2	2	2	1	3		
25-Feb	1	3	3	3	3	2	2	3	2	3	3	2	4	5	4	5	4	3	2	2	2	2	1	5		
26-Feb	1	1	2	2	2	1	2	4	4	5	4	4	3	4	2	2	5	3	4	4	4	3	3	5		
27-Feb	3	3	3	3	4	3	3	3	2	2	2	2	2	2	2	2	1	1	2	3	1	1	3	4		
28-Feb	4	4	3	3	3	3	4	3	4	4	4	3	3	3	3	3	3	3	2	1	1	2	1	4		
29-Feb	1	1	1	1	1	2	0	0	2	2	1	1	2	2	1	1	1	1	1	1	1	1	1	2		
																	Diurnal Maximum									
M - Maintenance																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Patricia McInnes - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	209	30.12	30.12
6 - 11	275	39.63	69.74
12 - 19	193	27.81	97.55
20 - 28	17	2.45	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Patricia McInnes - February 2016**

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	11	4	2	10	20	34	28	22	5	11	8	10	14	14	12	209
6 - 11	48	24	4	2	5	14	47	10	18	10	18	9	3	5	7	51	275
12 - 19	71	5	0	0	0	16	22	0	0	5	12	12	7	9	7	27	193
20 - 28	11	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	17
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	134	40	8	4	15	50	103	38	40	20	41	29	21	28	28	95	694

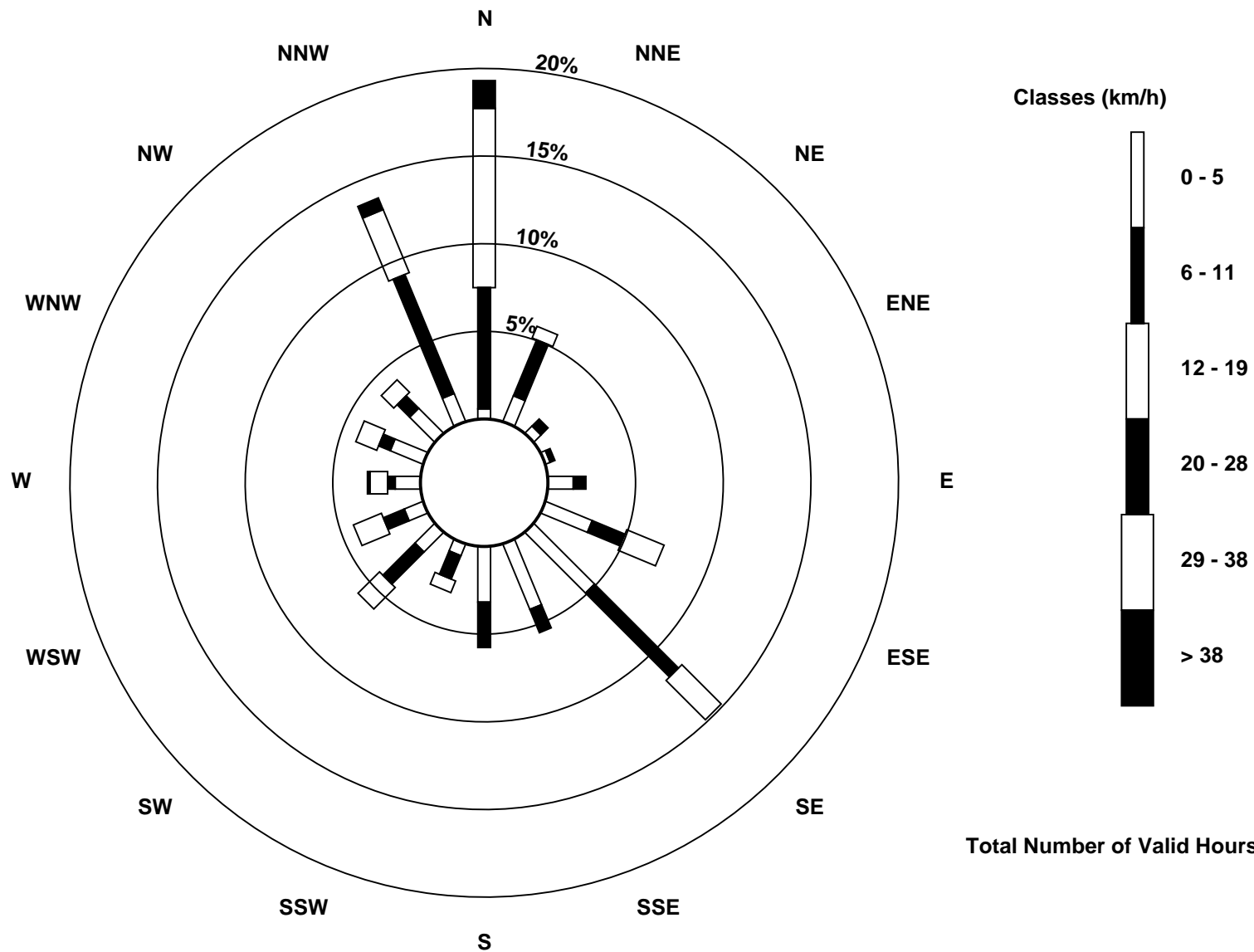
Total Number of Valid Hours: 694

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Patricia McInnes - February 2016

Direction of Maximum Speed: 8 deg on Feb 6 14:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 356.2 deg on Feb 28	Hours of Data: 694
Direction of Minimum Speed: 17 deg on Feb 3 15:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.5 deg on Feb 1	Percent Operational Time: 99.7
Monthly Average Direction: 314.2 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	314	299	298	269	251	296	98	132	M	M	116	130	137	145	126	150	138	134	141	150	236	259	249	56	152.5
2-Feb	115	110	113	124	142	153	164	144	149	144	176	122	159	150	130	61	354	334	334	330	337	327	333	339	4.6
3-Feb	341	331	322	340	321	334	253	301	328	128	140	92	105	86	17	185	338	347	9	348	349	358	339	342	349.7
4-Feb	341	336	349	347	344	4	6	347	343	10	15	91	129	136	110	108	88	22	7	343	329	355	327	305	8.4
5-Feb	119	111	127	132	122	132	135	126	132	145	138	134	144	133	130	132	127	138	141	148	146	137	144	157	134.4
6-Feb	143	148	172	139	164	182	128	161	179	160	239	269	317	8	348	345	332	350	346	19	28	10	311	260	337.8
7-Feb	326	342	349	331	267	295	296	239	220	227	18	5	354	351	0	347	343	334	301	259	293	229	187	185	328.3
8-Feb	170	178	198	200	182	185	140	111	245	166	187	167	71	61	156	29	12	14	215	177	118	158	164	252	157.4
9-Feb	149	187	125	146	139	133	138	127	120	125	133	142	151	133	174	149	174	179	220	328	350	344	348	352	67.2
10-Feb	350	2	2	3	5	4	3	1	3	7	8	7	20	10	0	355	351	348	0	353	339	346	350	8	0.8
11-Feb	9	8	349	0	19	32	33	8	23	356	6	14	8	10	6	357	349	339	318	344	4	319	304	264	1.5
12-Feb	112	109	121	122	121	124	122	127	123	121	119	125	126	127	120	119	117	123	124	124	137	143	139	136	125.0
13-Feb	134	128	133	135	137	135	131	135	127	123	135	138	161	194	211	189	157	158	210	205	212	224	234	257	162.4
14-Feb	248	237	229	232	245	338	28	344	285	307	308	2	20	80	97	33	13	18	356	345	354	0	338	344	325.2
15-Feb	340	343	342	349	350	353	353	349	344	352	350	350	346	348	350	351	360	344	358	29	40	186	91	93	354.4
16-Feb	161	131	132	123	130	107	108	33	26	101	142	127	86	136	152	10	29	316	5	320	352	354	350	337	77.8
17-Feb	343	338	336	331	334	344	344	345	351	356	1	354	8	11	5	0	4	357	357	354	352	360	1	357	352.6
18-Feb	11	7	6	9	14	16	18	17	39	102	98	107	107	118	114	112	65	345	233	2	0	322	323	347	34.0
19-Feb	345	350	328	314	303	303	327	14	351	339	309	331	329	8	50	41	21	15	348	6	7	356	339	336	344.2
20-Feb	341	337	329	315	291	267	244	273	219	160	115	99	125	120	129	118	111	108	123	125	128	122	121	134	110.6
21-Feb	151	140	125	124	132	154	173	133	157	140	143	155	171	131	101	128	129	114	128	139	139	163	314	326	139.3
22-Feb	225	203	292	289	299	325	269	234	201	170	152	142	163	171	199	231	189	170	255	258	286	303	241	242	226.7
23-Feb	250	260	247	246	231	237	239	236	231	235	268	303	314	348	32	36	29	316	313	272	283	289	282	286	276.1
24-Feb	305	293	288	285	259	215	236	218	233	231	235	203	196	215	232	194	206	184	182	181	190	186	185	169	223.8
25-Feb	176	206	210	206	218	214	214	225	219	232	246	232	220	252	267	275	264	258	262	258	250	243	238	217	236.7
26-Feb	173	194	224	232	226	209	231	251	263	269	307	297	324	341	25	26	10	4	358	10	10	10	6	2	326.9
27-Feb	358	357	359	357	355	355	359	350	349	348	343	347	351	351	359	13	8	45	44	22	144	295	357	346	356.2
28-Feb	346	352	356	352	350	359	8	7	355	6	7	7	21	14	4	353	346	346	336	337	346	338	333	304	356.2
29-Feb	335	272	220	183	177	182	175	194	167	143	146	144	143	88	108	92	129	165	188	180	153	143	145	137	157.3
340.1 335.8 329.2 327.1 317.2 352.0 10.2 354.5 347.3 60.4 2.5 20.5 42.3 40.3 37.7 28.1 14.1 2.2 336.0 341.5 349.2 332.9 329.4 333.6																									
Diurnal Average																									

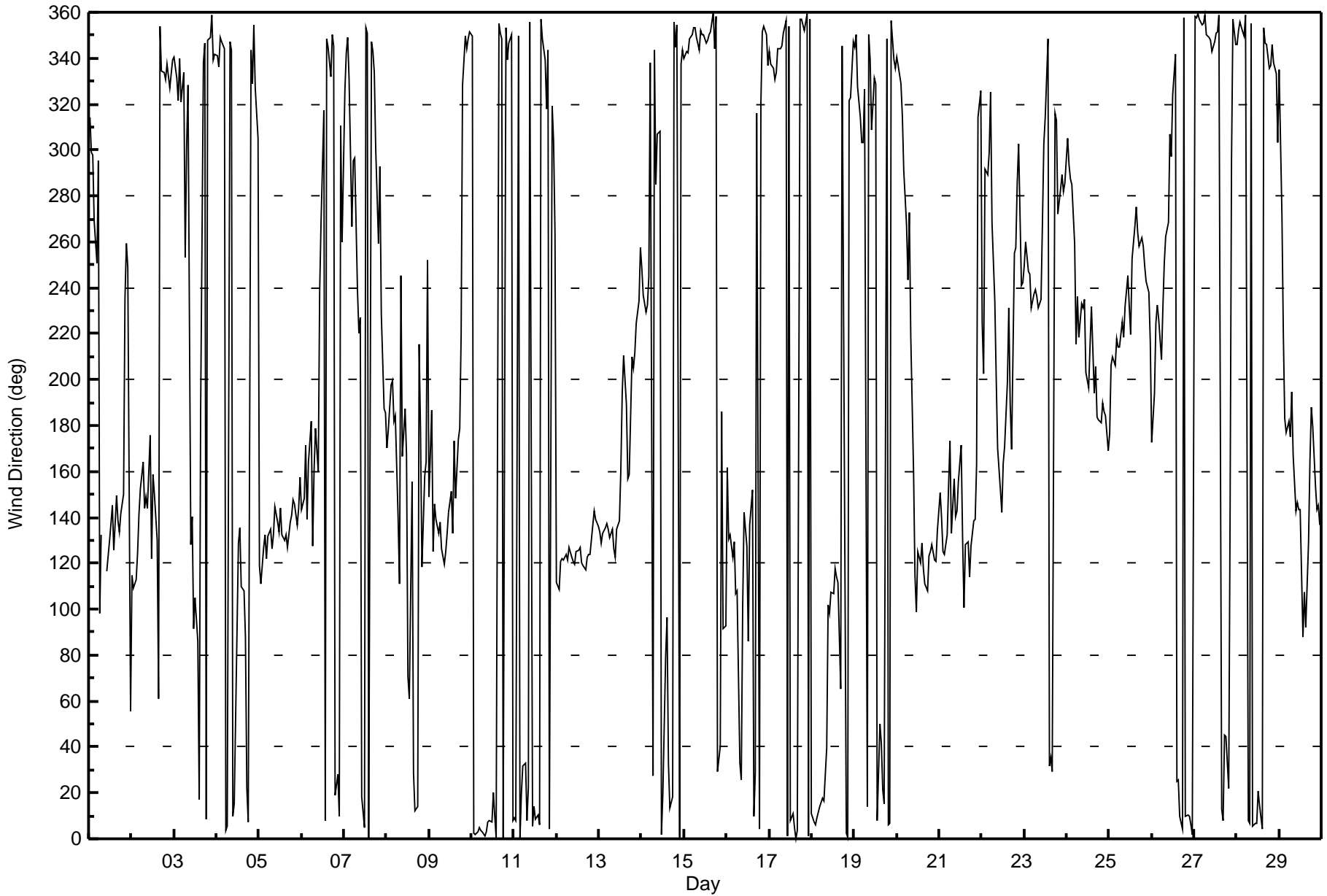
M - Maintenance
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Patricia McInnes - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Feb 15 22:00		Hours in Service: 696 Hours of Data: 694 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																							
Minimum Value: 5 deg on Feb 24 19:00 Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 12 Median = 15 Q ₃ = 22 P ₉₀ = 40 P ₉₉ = 85																									
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	6	23	44	52	89	26	44	M	M	17	21	17	17	27	44	25	26	26	64	20	27	63	85	89
2-Feb	28	30	20	29	20	20	80	88	22	29	37	28	21	15	31	56	16	9	9	10	12	9	9	10	88
3-Feb	10	12	12	39	25	22	42	18	73	14	35	35	43	24	86	66	36	14	17	14	15	18	13	14	86
4-Feb	12	9	15	19	11	13	14	13	17	11	37	25	18	15	18	15	16	21	19	16	15	19	27	24	37
5-Feb	84	14	20	20	16	18	19	15	15	16	14	15	16	18	14	14	14	16	13	41	32	16	16	25	84
6-Feb	16	35	20	21	23	18	21	27	20	20	44	11	40	15	14	12	14	11	11	18	12	10	34	19	44
7-Feb	42	79	20	14	32	66	57	46	8	9	78	14	11	13	16	13	11	10	26	21	56	12	28	17	79
8-Feb	31	30	17	30	18	13	42	32	46	44	17	19	22	22	51	38	15	29	59	69	29	26	21	61	69
9-Feb	24	14	75	34	20	17	14	16	14	15	16	15	12	21	73	26	18	21	27	40	13	9	12	14	75
10-Feb	14	13	14	14	14	15	13	13	13	17	16	14	13	15	15	15	12	12	12	13	10	11	12	10	17
11-Feb	9	16	11	13	16	11	12	11	15	14	13	13	14	13	16	13	11	24	17	12	14	27	22	51	51
12-Feb	25	17	16	13	13	13	12	15	13	12	14	15	14	13	13	11	11	13	13	12	13	12	13	13	25
13-Feb	13	11	12	12	13	14	13	14	14	13	15	15	24	15	13	22	17	16	22	25	14	9	11	16	25
14-Feb	10	8	7	8	7	56	60	44	15	18	78	40	21	31	55	28	12	17	18	10	15	19	14	11	78
15-Feb	10	10	11	10	11	13	13	12	10	13	13	15	15	14	14	14	15	14	23	17	23	93	17	20	93
16-Feb	39	14	15	15	16	20	25	36	25	55	25	25	22	21	87	39	84	59	33	26	11	12	12	9	87
17-Feb	9	10	9	10	11	14	11	12	12	15	15	17	15	13	14	15	14	13	13	13	12	12	13	17	17
18-Feb	11	9	10	10	11	9	13	16	32	14	13	13	12	13	13	12	55	30	33	14	12	13	16	13	55
19-Feb	12	15	19	11	12	10	21	13	15	33	15	20	26	19	15	11	16	11	16	13	12	13	10	12	33
20-Feb	10	11	10	27	22	28	72	23	47	23	20	21	18	18	17	17	11	8	19	16	13	12	13	15	72
21-Feb	12	18	26	73	17	16	19	32	27	30	17	22	18	23	12	15	15	26	16	16	15	45	89	17	89
22-Feb	44	76	62	26	10	12	33	16	22	19	19	15	18	11	24	15	22	47	10	9	34	13	23	8	76
23-Feb	5	10	8	8	11	8	8	9	13	12	21	14	16	26	12	14	16	49	18	15	9	7	10	11	49
24-Feb	10	8	8	8	21	15	11	22	15	13	12	21	19	22	26	17	21	7	5	5	12	10	8	6	26
25-Feb	11	13	11	12	10	12	13	10	11	16	12	16	16	33	14	13	12	8	8	8	9	11	9	31	33
26-Feb	26	18	12	11	10	10	13	14	19	44	12	17	23	27	10	10	16	13	14	12	13	11	12	13	44
27-Feb	14	15	15	14	14	13	14	12	12	13	10	12	14	14	13	19	17	20	57	23	54	64	14	12	64
28-Feb	12	14	14	12	13	14	13	13	13	15	15	18	16	13	17	14	11	11	9	8	9	10	14	12	18
29-Feb	56	71	17	34	46	17	17	9	19	15	22	20	26	48	93	84	66	19	15	15	18	12	11	12	93
Diurnal Maximum																									
M - Maintenance																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 1, 2016	Last Calibration	January 11, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	10:48
Gas Cert Reference	EY0000355	Station temp.	21 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	18/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-677
Analyzer IP address	192.168.1.43		Lamp voltage	766	767
Calculated slope	0.993709	0.997954	Chamber temp	45.0	45.1
Calculated intercept	0.974519	1.061742	Pressure	700.0	698.2
Analyzer Background	5.9	5.8	Flow	0.444	0.443
Analyzer Coefficient	1.101	1.112	Intensity	91	91
Analyzer make	Thermo 43i		Analyzer serial #	1008841397	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	0.0	----
as found span	5500	86.8	785.9	786.7	0.999
calibrator zero	5500	0.0	0.0	0.0	----
high point	5500	86.8	785.9	786.7	0.999
second point	5500	43.4	393.0	393.1	1.000
third point	5500	21.7	196.5	194.2	1.012
as left zero	5500	0.0	0.0	0.2	----
as left span	5500	86.8	785.9	782.4	1.005
Average Correction Factor					1.004

Corrected As found 786.7 Previous response 789.9 % change 0.4%

Notes:

No maintenance done. No adjustments made.

Calibration Performed By:

Devin Russell



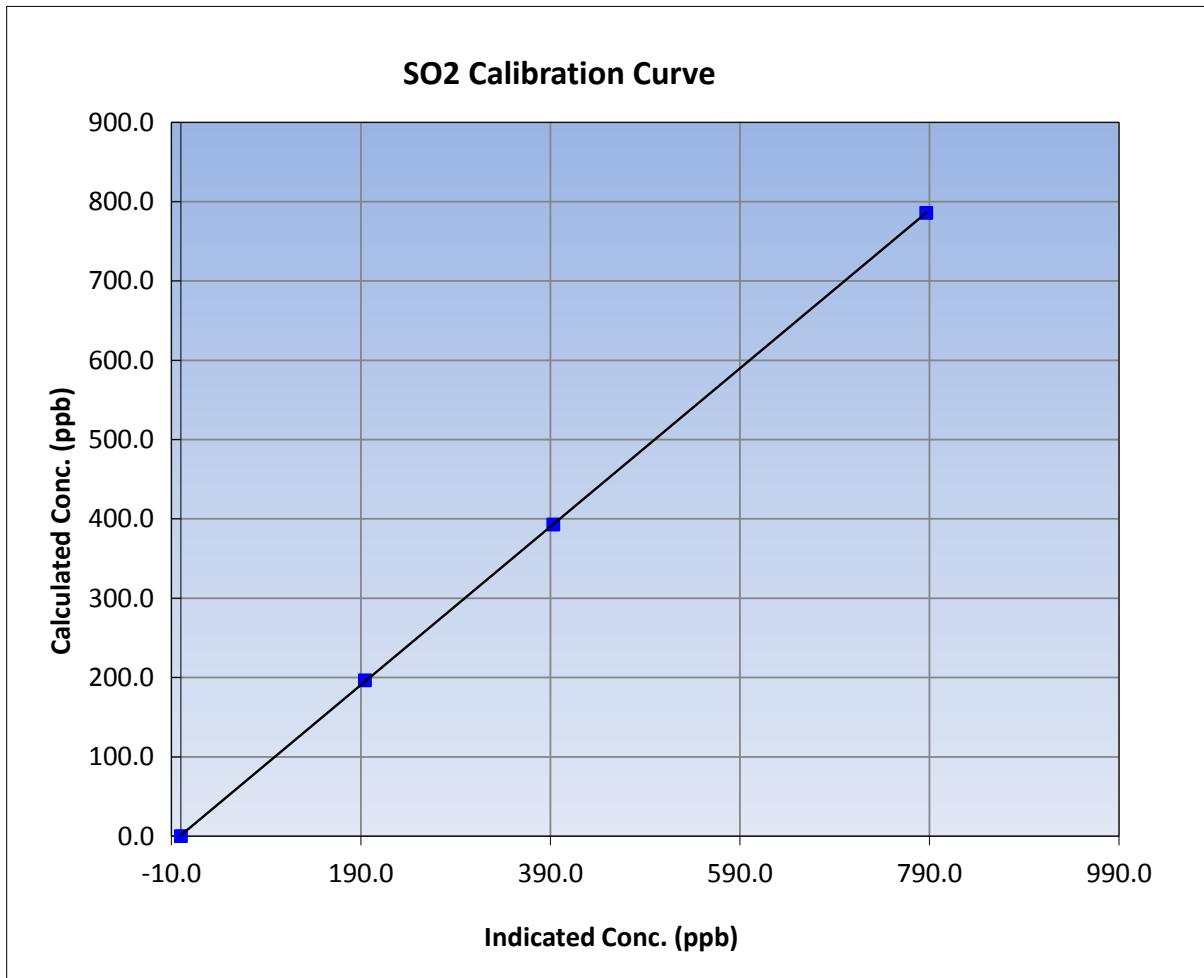
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 11, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:40	End Time (MST)	10:48
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

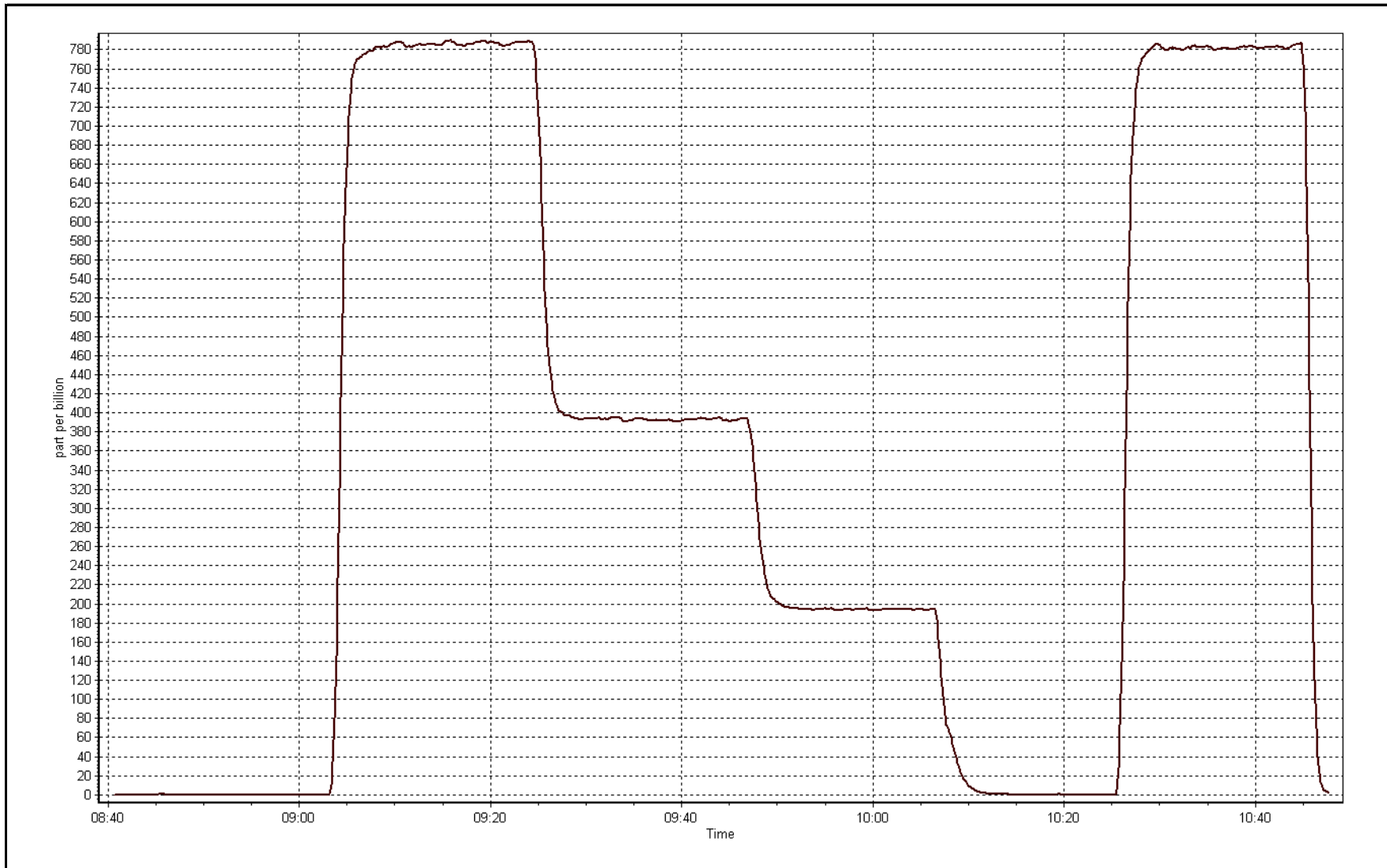
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999989
785.9	786.7	0.9990		
393.0	393.1	0.9998	Slope	0.997954
196.5	194.2	1.0117		
			Intercept	1.061742



SO2 Calibration Plot

Date: February 1, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 1, 2015	Last Calibration	January 19, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	14:00
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppb	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppb	SO2 gas cert/exp	SA130110A 12/Dec/16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.42		Lamp voltage	1013	1008
Calculated slope	0.997310	0.995596	Chamber temp	45	45
Calculated intercept	-0.227938	-0.097533	Pressure	680.3	689.1
Analyzer Background	2.01	1.99	Flow	0.430	0.434
Analyzer Coefficient	1.105	1.105	Intensity	91	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153358	
Converter make/model	CDN-101		Converter serial #	520	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	79.5	70.0	69.0	1.014
SO2 scrubber check	5500	21.7	196.5	0.3	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	79.5	70.0	70.3	0.995
second point	6000	39.8	35.0	35.6	0.985
third point	6000	20.5	18.0	18.0	1.003
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	79.5	70.0	70.4	0.993
Average Correction Factor					0.995

Corrected As found	68.9	Previous response	70.4	% change	2.2%
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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



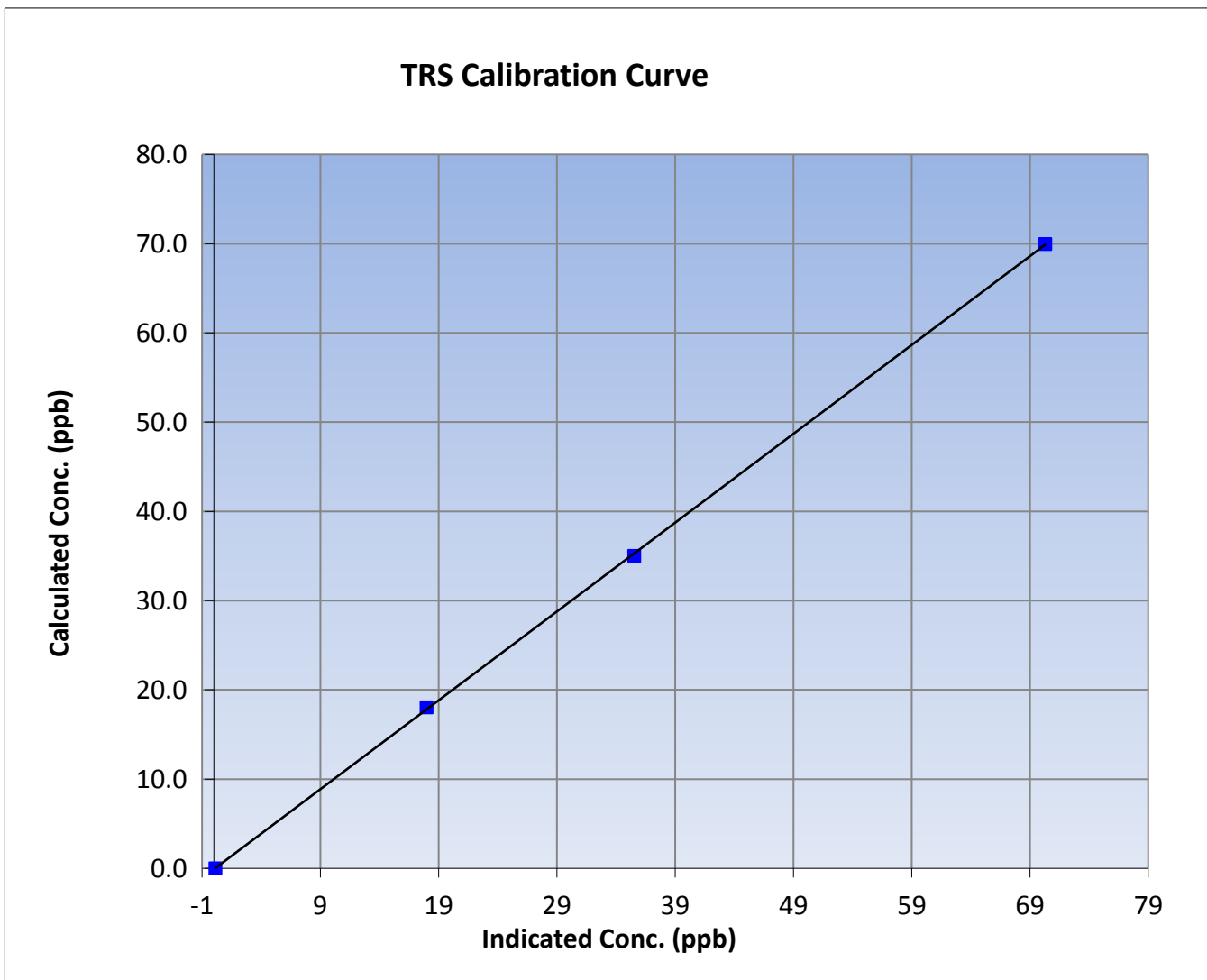
Wood Buffalo Environmental Association TRS Calibration Report

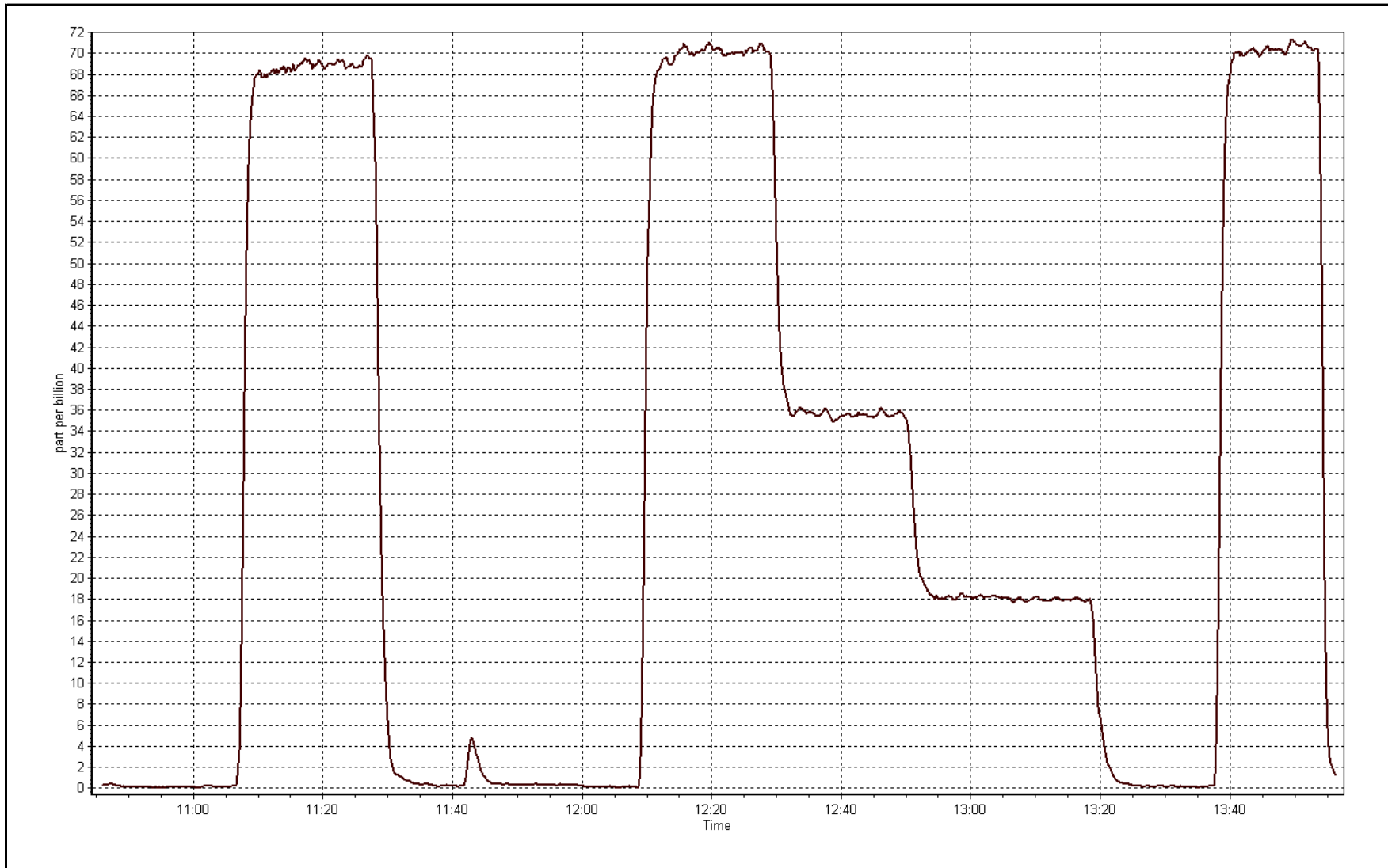
Station Information

Calibration Date	February 1, 2015	Previous Calibration	January 19, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:45	End Time (MST)	14:00
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999948
70.0	70.3	0.9953		
35.0	35.6	0.9852	Slope	0.995596
18.0	18.0	1.0033		
			Intercept	-0.097533







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 9, 2016	Previous Calibration	January 13, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	15:40
NO2 GPT Ref date	February-09-16	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	29.3	28.1
Analyzer IP address	192.168.1.48		Lamp temp.	53.6	53.5
Calculated slope	1.002516	1.003941	Pressure	664.4	671.5
Calculated intercept	-1.855207	-0.678072	Flow cell A	0.702	0.709
Analyzer Background	-1.7	-1.6	Flow cell B	0.727	0.732
Analyzer Coefficient	1.034	1.027	Cell A Intensity	76307	75982
			Cell B Intensity	71533	71208

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
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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	5500	0.00	0.0	0.6	----
as found span	5500	0.78	408.1	414.0	0.986
calibrator zero	5500	0.00	0.0	0.2	----
high point	5500	0.78	408.1	407.3	1.002
second point	5500	0.52	255.6	254.7	1.004
third point	5500	0.26	103.5	104.8	0.988
as left zero	5500	0.00	0.0	0.5	----
as left span	5500	0.78	408.1	400.0	1.020
Average Correction Factor					0.998

Corrected As found	413.4	Previous response	408.9	% change	-1.1%
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Notes:

Completed as founds. Set analyzer back to monitoring ambient air, to recalibrate Nox. Span adjusted.

Calibration Performed By: Devin Russell



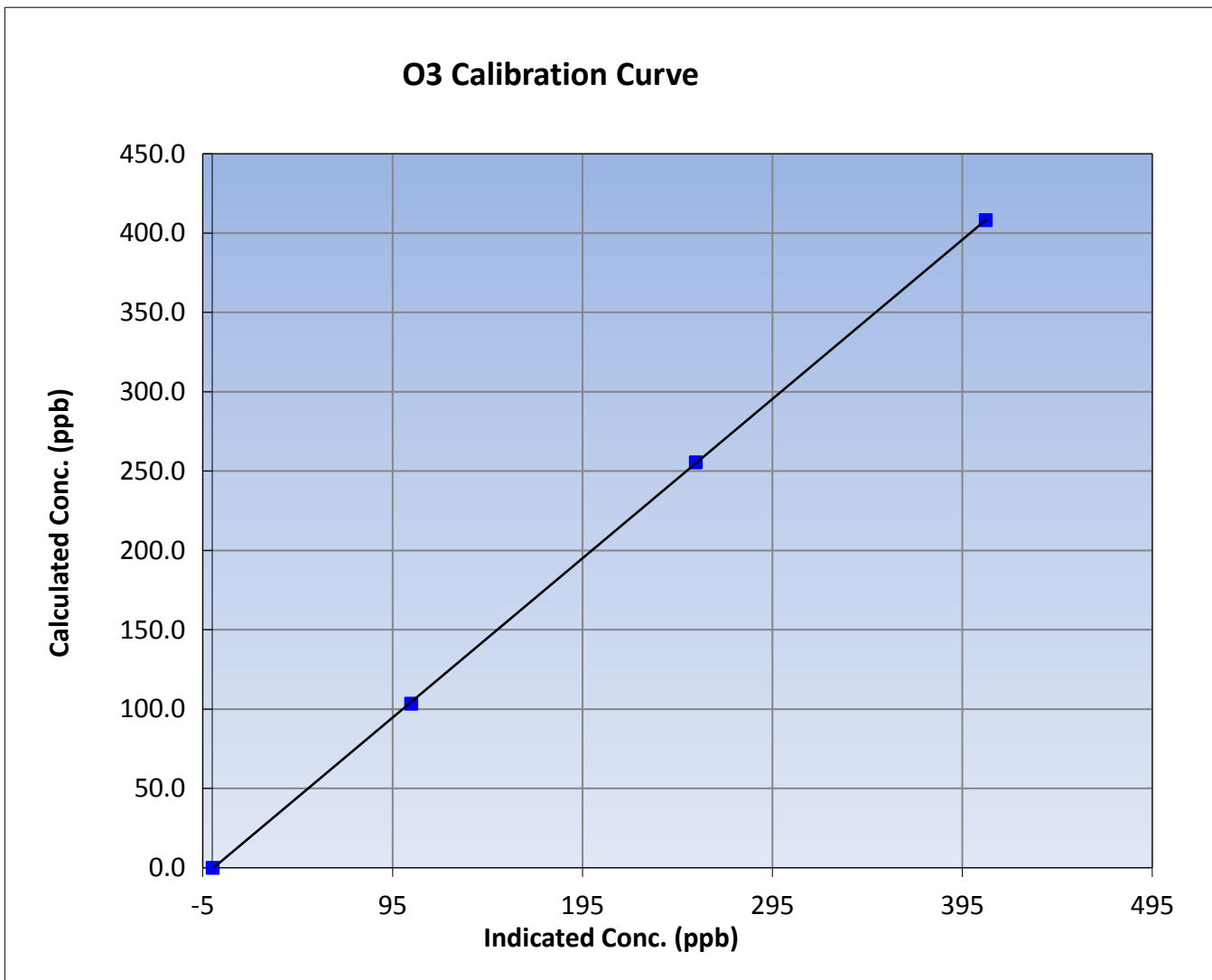
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-09-16	Previous Calibration	January 13, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	15:40
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

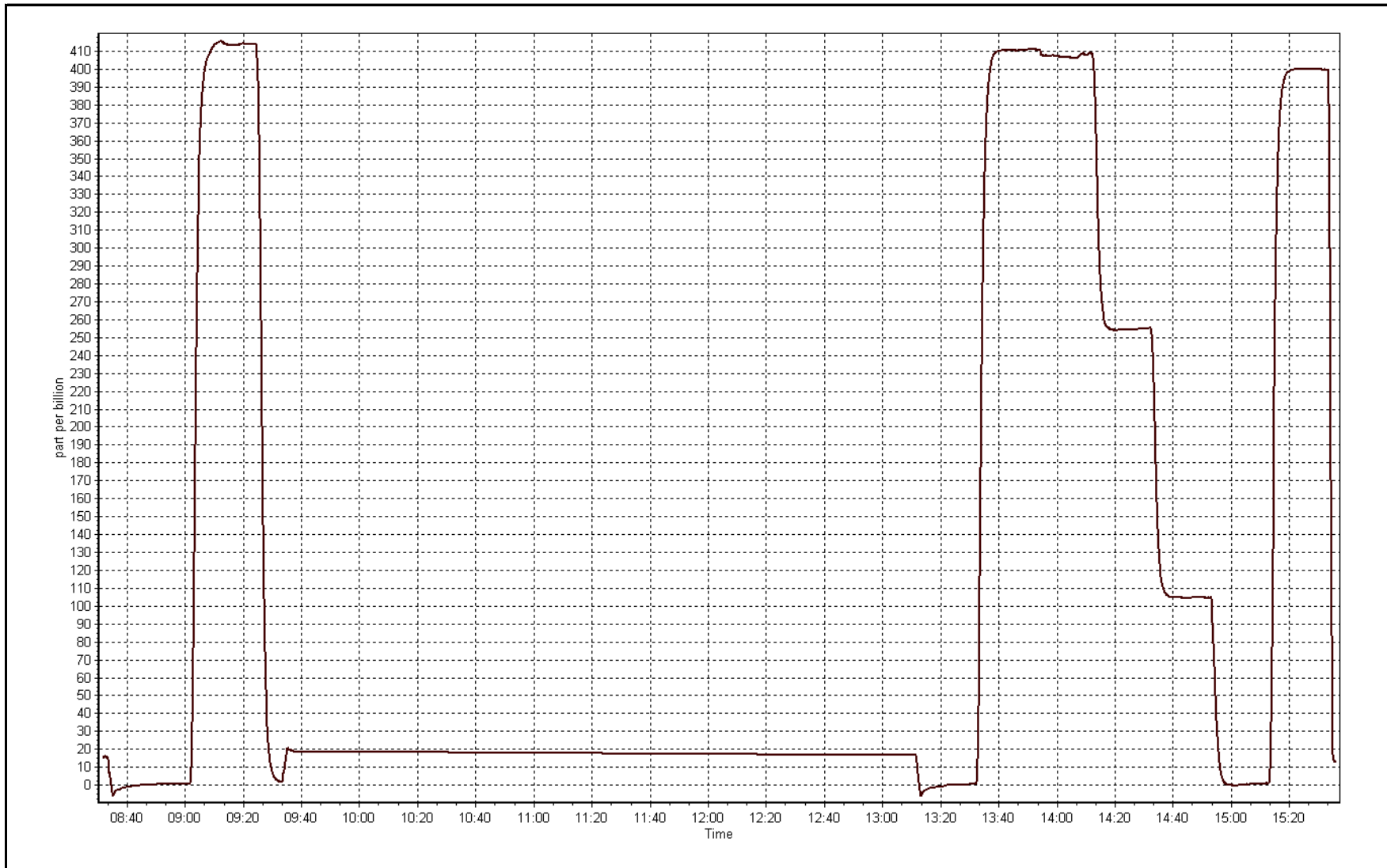
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999982
408.1	407.3	1.0020		
255.6	254.7	1.0037	Slope	1.003941
103.5	104.8	0.9878		
			Intercept	-0.678072



O3 Calibration Plot

Date: February 9, 2016





Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February-01-16	Last Calibration	January-11-16
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	10:47
Gas Cert Reference	EY0000355	Cal Gas Expiry Date	September-18-18
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1068.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	74.9
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	0.998084	1.001528	Carrier Pressure	34.5	34.5
THC Calc intercept	0.038139	0.050382	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.997079	1.003782	Air Pressure	32.4	32.4
NMHC Calc intercept	0.016077	0.028299			

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	5500	0.0	0.00	0.00	----
as found span	5500	86.8	16.85	16.80	1.003
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	16.85	16.80	1.003
second point	5500	43.4	8.43	8.35	1.009
third point	5500	21.7	4.21	4.10	1.028
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	16.85	16.77	1.005
Average Correction Factor					1.013

Corrected As found 16.80 Previous response 16.85 % change 0.3%

Notes:

No maintenance done. 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	86.8	8.68	8.63	1.006
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	8.68	8.63	1.006
second point	5500	43.4	4.34	4.29	1.012
third point	5500	21.7	2.17	2.10	1.033
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	8.68	8.62	1.007
Average Correction Factor					1.017

Corrected As found 8.63 Previous response 8.69 % change 0.7%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	86.8	8.17	8.17	1.001
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	86.8	8.17	8.17	1.001
second point	5500	43.4	4.09	4.06	1.007
third point	5500	21.7	2.04	2.00	1.022
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	86.8	8.17	8.15	1.003
Average Correction Factor					1.010

Corrected As found 8.17 Previous response 8.16 % change -0.1%



Wood Buffalo Environmental Association

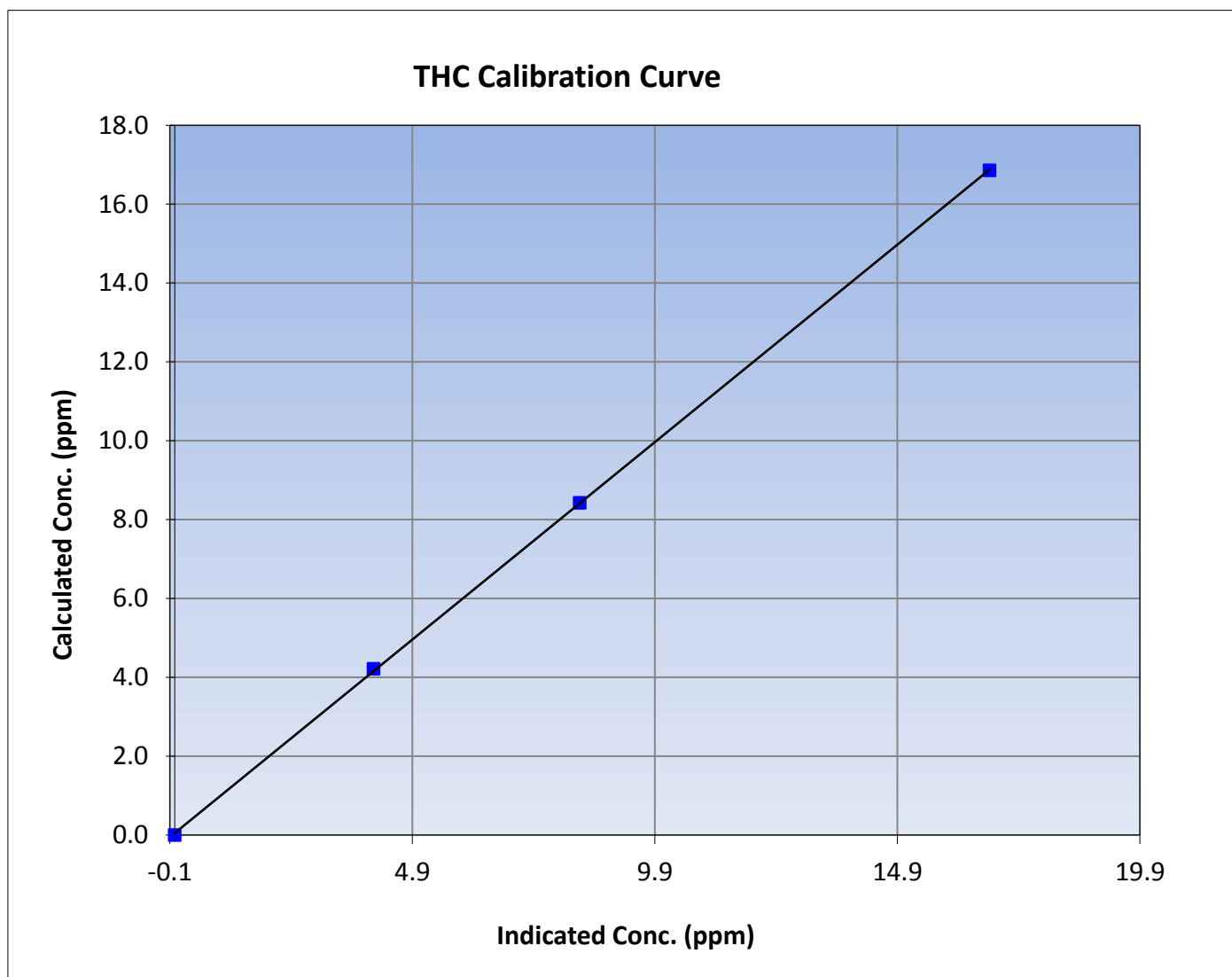
THC Calibration Summary

Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 11, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:40	End Time (MST)	10:47
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999958
16.85	16.80	1.0033		
8.43	8.35	1.0093	Slope	1.001528
4.21	4.10	1.0277		
			Intercept	0.050382





Wood Buffalo Environmental Association

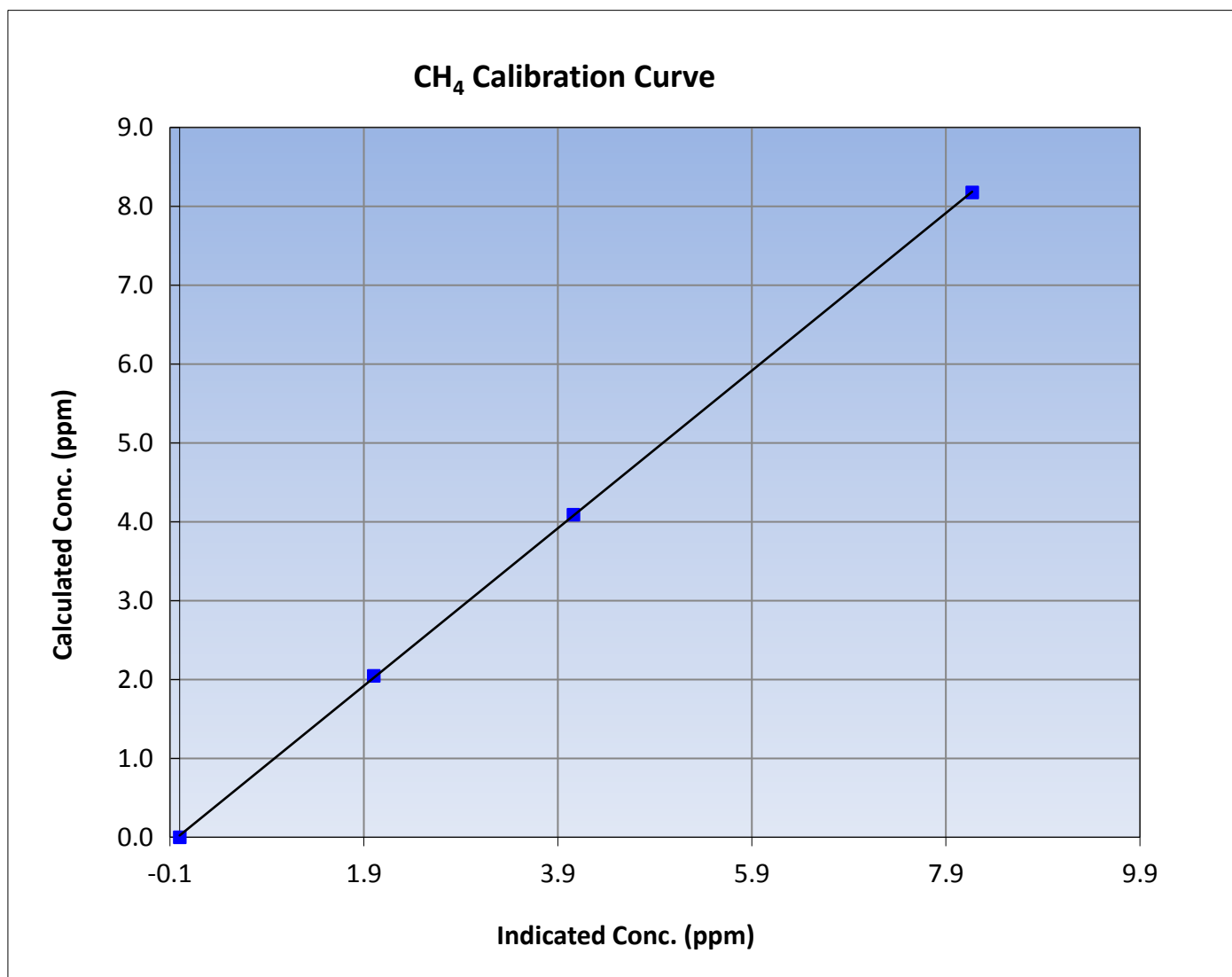
CH₄ Calibration Summary

Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 11, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:40	End Time (MST)	10:47
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999967
8.17	8.17	1.0006		
4.09	4.06	1.0068	Slope	0.999144
2.04	2.00	1.0219		
			Intercept	0.022100





Wood Buffalo Environmental Association

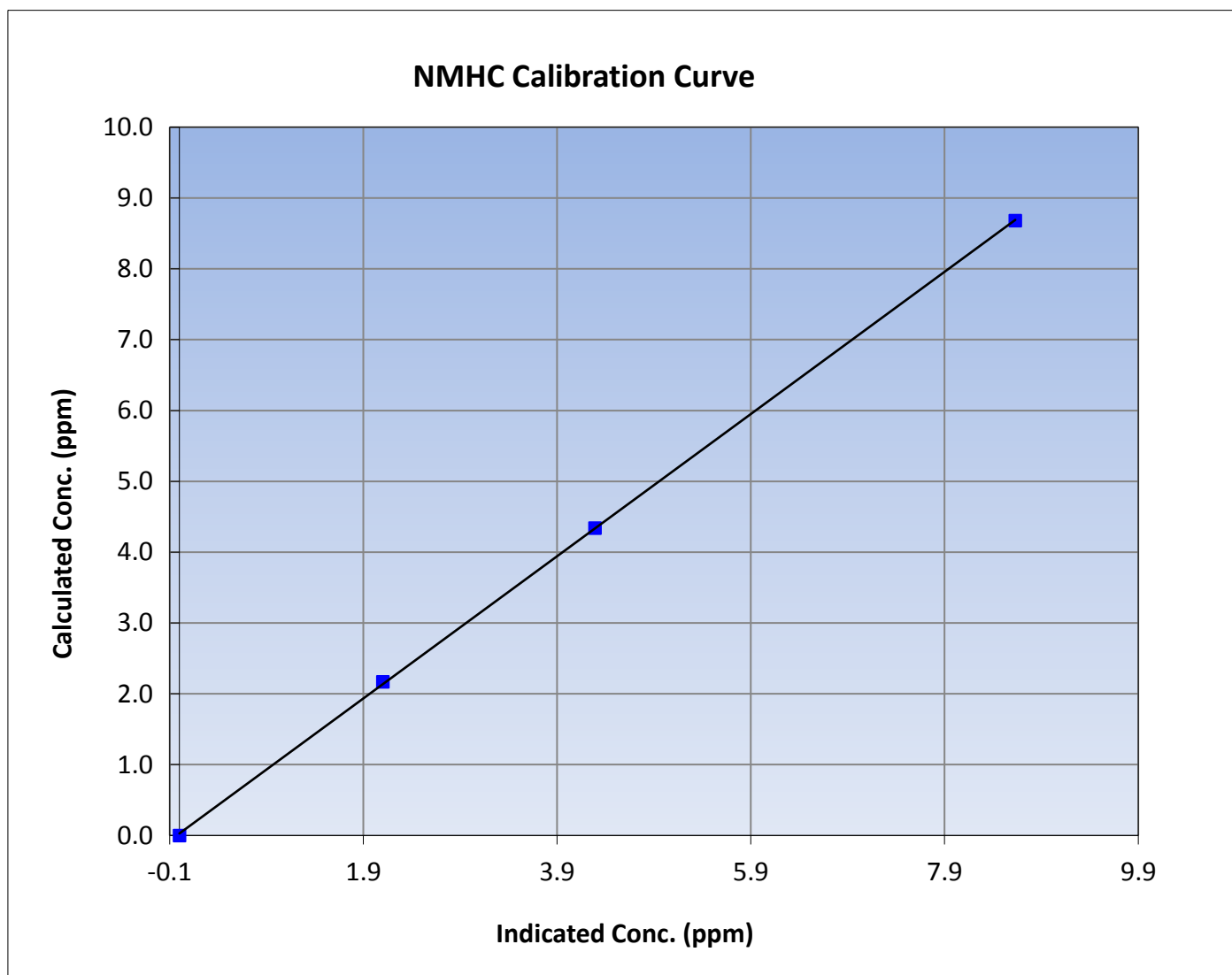
NMHC Calibration Summary

Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 11, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:40	End Time (MST)	10:47
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

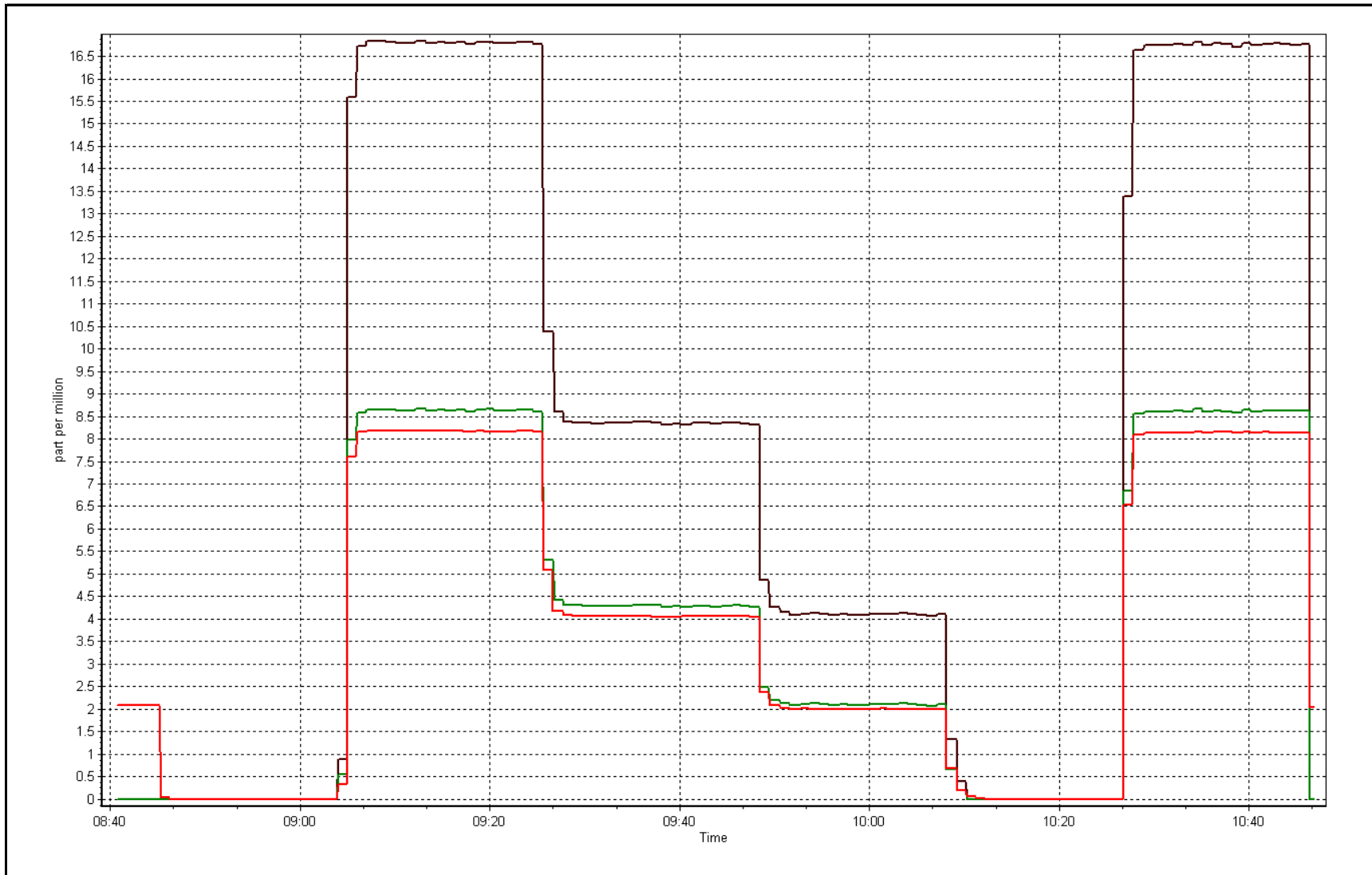
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999949
8.68	8.63	1.0058		
4.34	4.29	1.0117	Slope	1.003782
2.17	2.10	1.0333		
			Intercept	0.028299



THC Calibration Plot

Date: February 1, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 13, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	16:05
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001638	1.003921	0.997310
	Data Offset	0.456218	0.703648	-0.906406
Current Calibration	Data Slope	1.002131	1.002170	1.053505
	Data Offset	1.958063	2.039358	-1.897277

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	192.168.1.43		192.168.1.43	
NO coefficient	1.036		1.231	
NOx coefficient	1.000		1.003	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.600		3.1	
NOx bkgrnd	2.900		3.5	
Chamber Temp	50.400	Deg C	50.5	Deg C
Moly Temp	327.400	Deg C	327.6	Deg C
PMT voltage	-760.700	V	-761.1	V
PMT Temp	-3.000	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	163.500	mmHg	192.4	mmHg
R Cell Press Nox	163.500	mmHg	192.4	mmHg
NO sample flow	0.859	lpm	0.785	lpm
Nox sample Flow	0.859	lpm	0.785	lpm

Notes:

Pump and scrubber changed after as founds. Span adjusted. Nox drifted up during GPT.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 8, 2016

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	0.2	0.1	0.1	----	----
as found span	5500	86.8	803.3	800.1	3.2	805.4	803.3	2.1	0.9974	0.9961
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	0.2	-0.1	----	----
high point	5500	86.8	803.3	800.1	3.2	800.5	797.4	3.0	1.0035	1.0035
second point	5500	43.4	401.6	400.1	1.6	398.4	396.4	2.1	1.0081	1.0092
third point	5500	21.7	200.8	200.0	0.8	195.9	195.1	0.8	1.0252	1.0255
as left zero	5500	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
as left span	5500	86.8	803.3	356.0	447.3	842.3	412.4	429.9	0.9537	0.8632
Average Correction Factor									1.0123	1.0127

Corrected As found

NO_x= 805.2

NO= 803.1

Percent Change

NO_x= -0.5%

NO= -0.9%

Previous Response

NO_x= 801.5

NO= 796.3

GPT Calibration Data

Dilution Flow (total) 5500 ccm

Source Gas Flow 86.80 ccm

NOx ref calc conc = 803.3 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		3.2	821.8	818.3	-0.1	0.9775	0.9778	----	----
1st NO2 (300)	356.0	465.5	798.1	356.0	442.1	1.0065	----	1.0528	95.0%
2nd NO2 (200)	543.5	277.9	811.0	543.5	267.5	0.9905	----	1.0391	96.2%
3rd NO2 (100)	708.5	112.9	819.0	708.5	110.5	0.9809	----	1.0221	97.8%
2nd NO ref point	----	3.2	796.8	794.0	2.9	1.0082	1.0078	----	----
Average Correction Factor						0.9965		1.0380	96.4%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

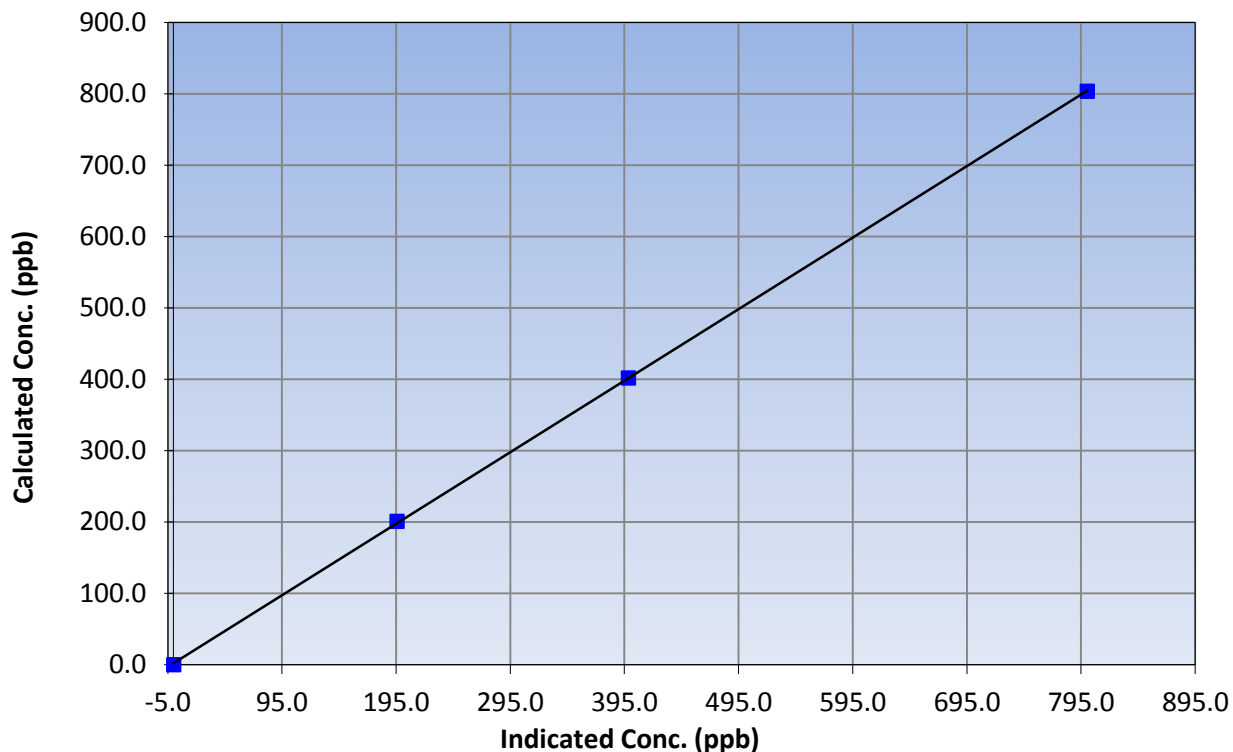
Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 13, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999966
803.3	800.5	1.0035		
401.6	398.4	1.0081	Slope	1.002131
200.8	195.9	1.0252		
			Intercept	1.958063

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

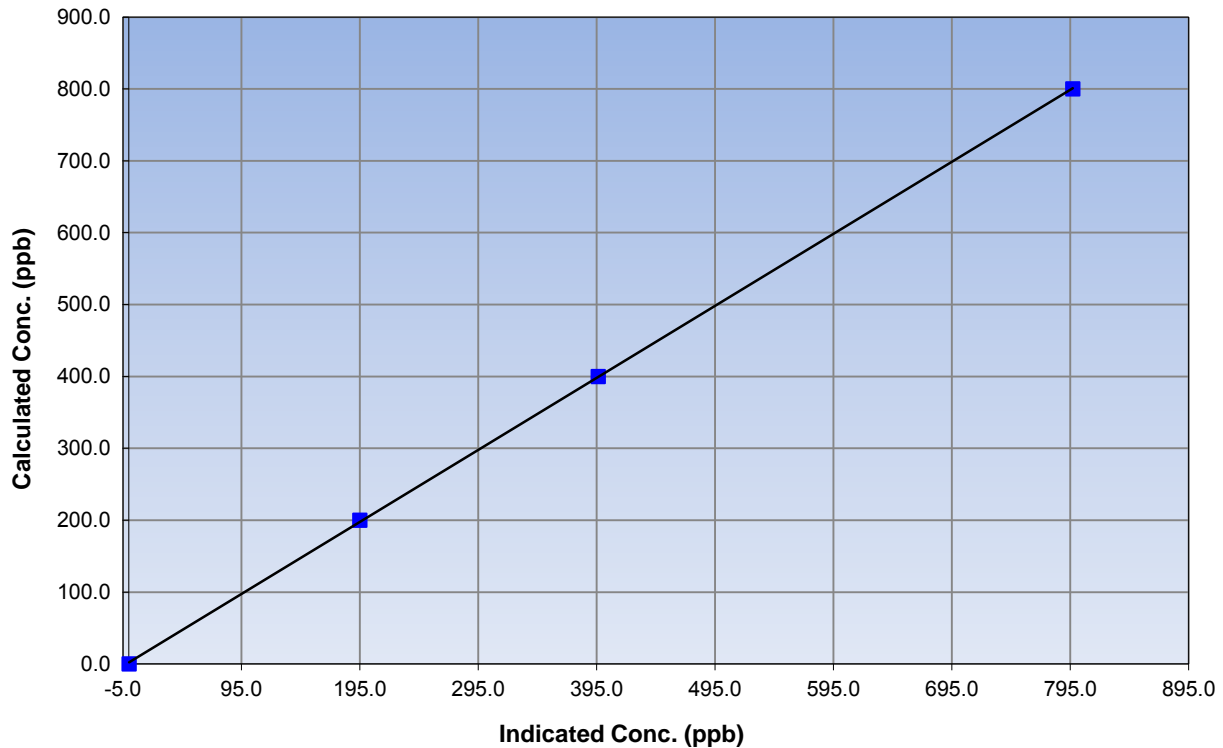
Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 13, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999963
800.1	797.4	1.0035		
400.1	396.4	1.0092	Slope	1.002170
200.0	195.1	1.0255		
			Intercept	2.039358

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

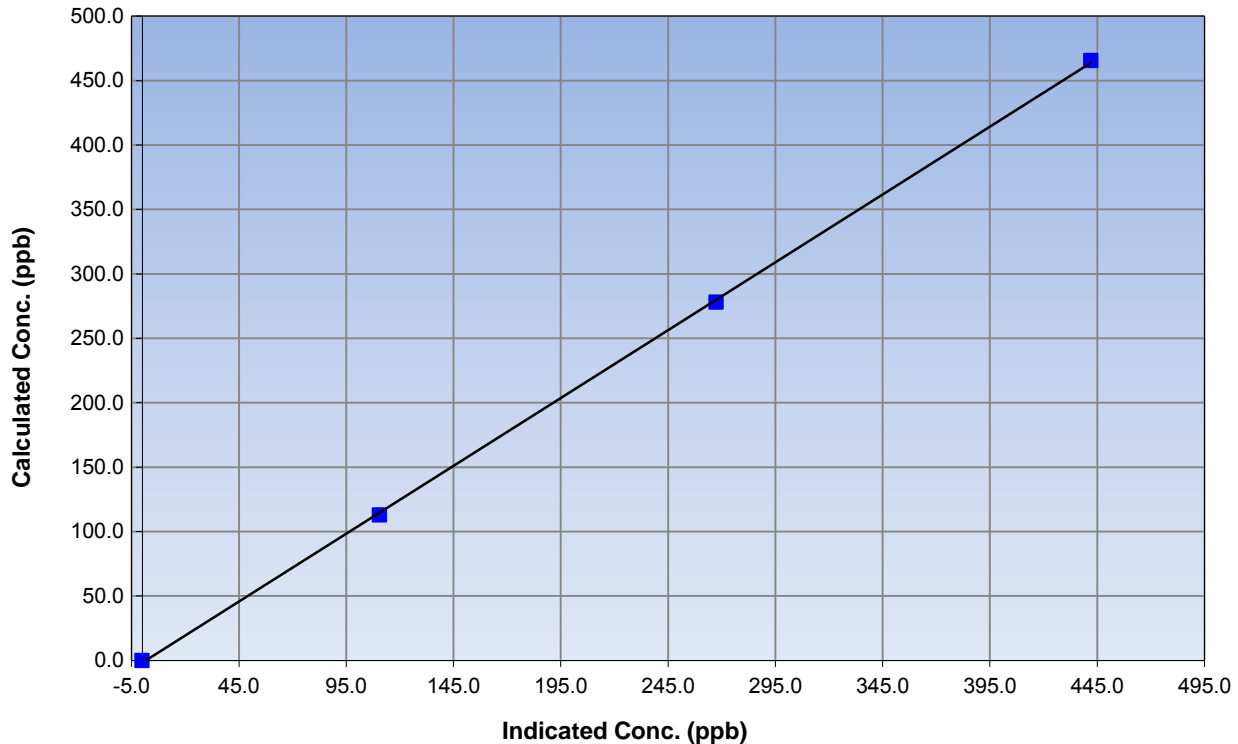
Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 13, 2016
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

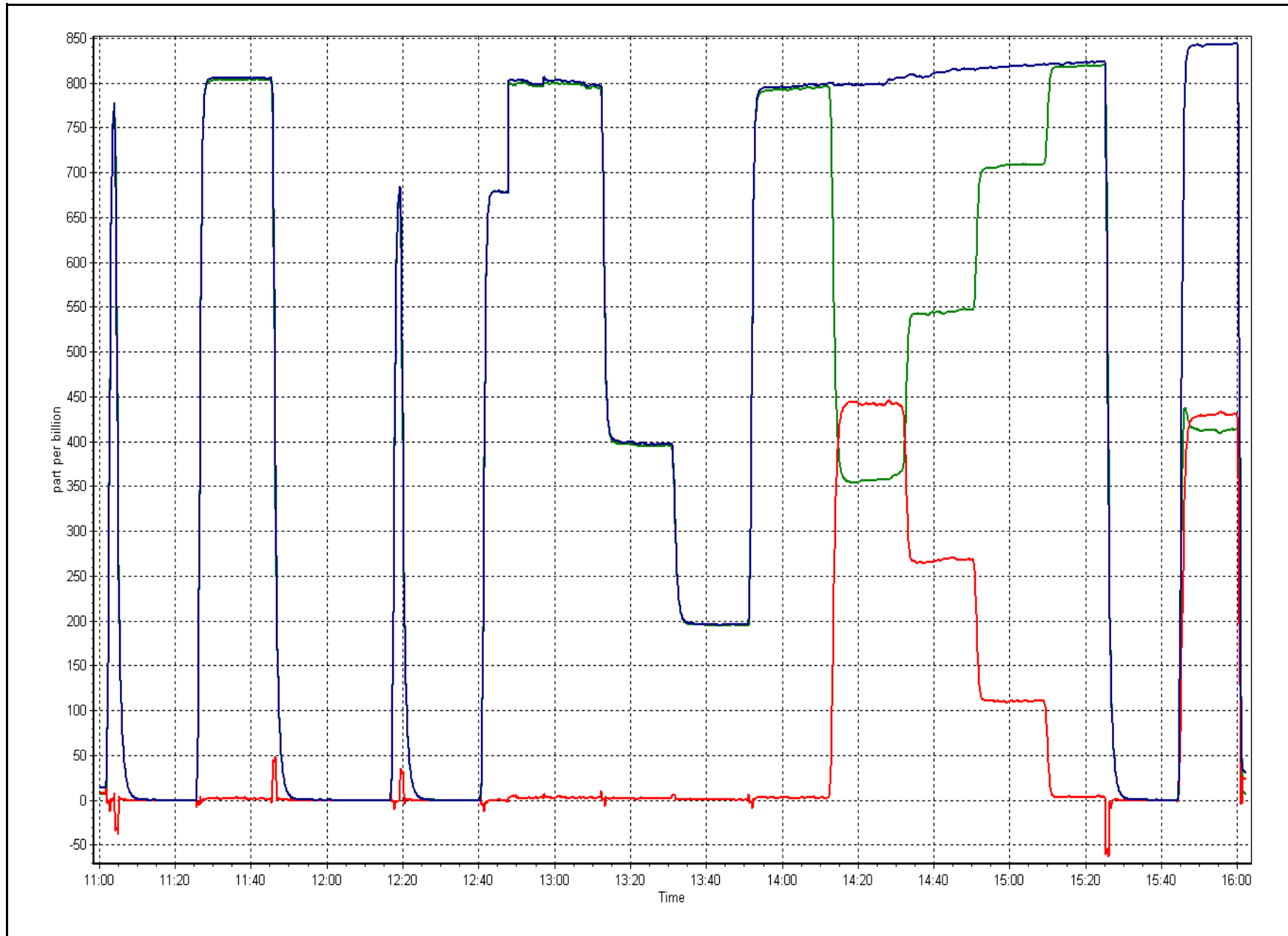
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999898
465.5	442.1	1.0528		
277.9	267.5	1.0391	Slope	1.053505
112.9	110.5	1.0221		
			Intercept	-1.897277

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 8, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 9, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Recalibration due to drift.		
Start Time (MST)	9:30	End Time (MST)	13:15
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOX Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002131	1.002170	1.053505
	Data Offset	1.958063	2.039358	-1.897277
Current Calibration	Data Slope	0.999249	0.999035	1.002822
	Data Offset	0.737563	0.810200	0.113638

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.231		1.186	
NOX coefficient	1.003		1.002	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.100		3.0	
NOX bkgrnd	3.500		3.3	
Chamber Temp	50.500	Deg C	50.6	Deg C
Moly Temp	327.600	Deg C	327.1	Deg C
PMT voltage	-761.100	V	-760.7	V
PMT Temp	-3.000	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	192.400	mmHg	184.8	mmHg
R Cell Press Nox	192.400	mmHg	184.8	mmHg
NO sample flow	0.785	lpm	0.76	lpm
Nox sample Flow	0.785	lpm	0.760	lpm

Notes:

Recalibration. NOx drifted during GPT portion in yesterdays calibration. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 9, 2016

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	0.1	0.1	0.1	----	----
as found span	5500	86.8	803.3	800.1	3.2	833.3	828.4	4.9	0.9639	0.9658
calibrator zero	5500	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
high point	5500	86.8	803.3	800.1	3.2	803.0	800.1	3.0	1.0003	1.0001
second point	5500	43.4	401.6	400.1	1.6	402.4	400.6	1.9	0.9980	0.9987
third point	5500	21.7	200.8	200.0	0.8	198.3	197.6	0.7	1.0129	1.0123
as left zero	5500	0.0	0.0	0.0	0.0	0.5	0.3	0.1	----	----
as left span	5500	86.8	803.3	393.0	410.3	819.7	401.4	418.3	0.9800	0.9789
Average Correction Factor									1.0037	1.0037

Corrected As found
Previous Response

NO_x= 833.2
NO_x= 799.6

NO= 828.3
NO= 796.4

Percent Change

NO_x= -4.0%

NO= -3.9%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.80 ccm NOx ref calc conc = 803.3 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		3.2	803.2	801.1	0.1	1.0001	0.9988	----	----
1st NO2 (300)	393.0	411.3	803.0	393.0	410.0	1.0004	----	1.0031	99.7%
2nd NO2 (200)	545.6	258.7	803.5	545.6	258.0	0.9997	----	1.0029	99.7%
3rd NO2 (100)	697.6	106.7	803.6	697.6	106.0	0.9996	----	1.0064	99.4%
2nd NO ref point	----	3.2	803.3	801.7	1.5	1.0000	0.9980	----	----
Average Correction Factor						0.9999		1.0041	99.6%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

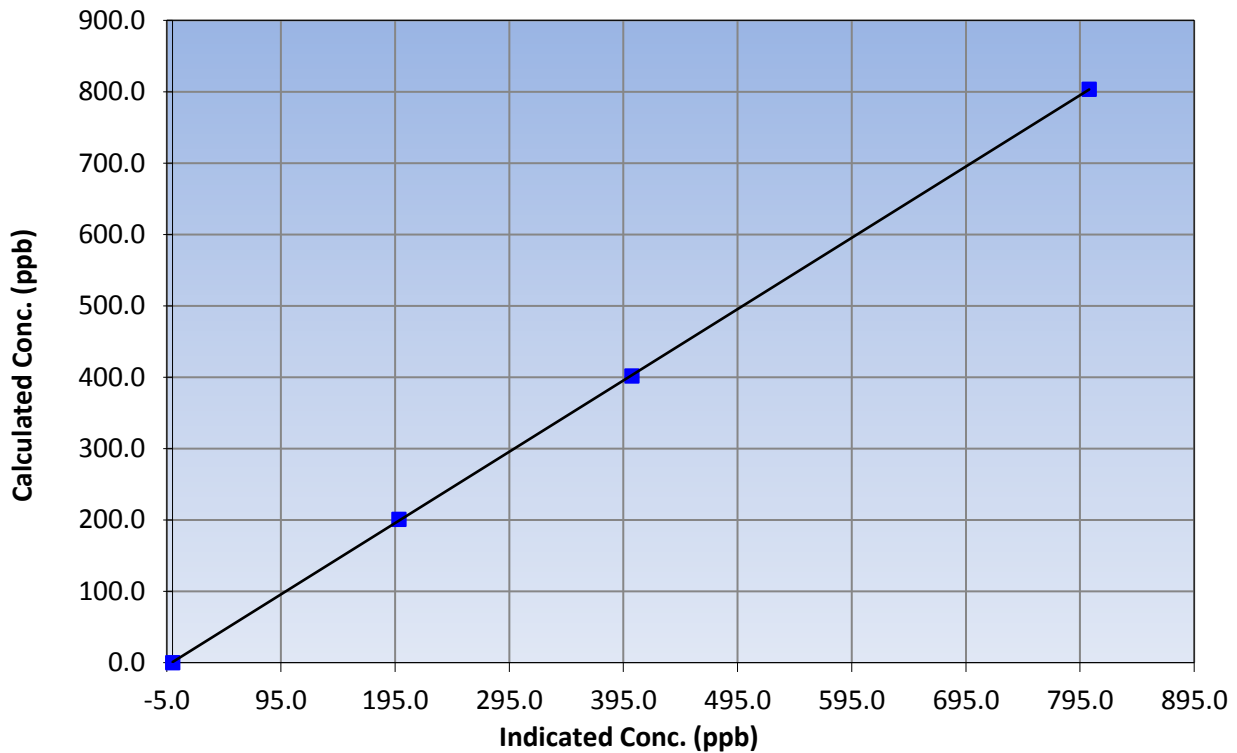
Station Information

Calibration Date	February 9, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	13:15
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	0.999983
803.3	803.0	1.0003		
401.6	402.4	0.9980	Slope	0.999249
200.8	198.3	1.0129		
			Intercept	0.737563

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

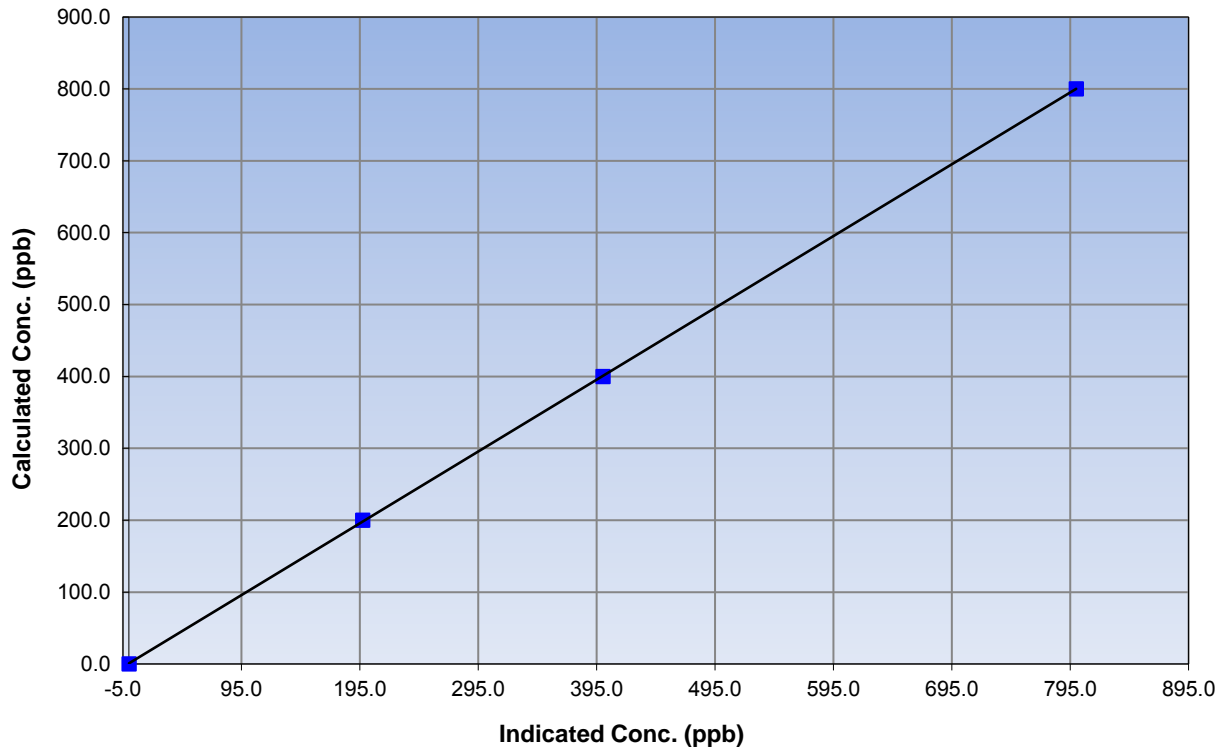
Station Information

Calibration Date	February 9, 2016	Previous Calibration	February 8, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	13:15
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	0.999986
800.1	800.1	1.0001		
400.1	400.6	0.9987	Slope	0.999035
200.0	197.6	1.0123		
			Intercept	0.810200

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

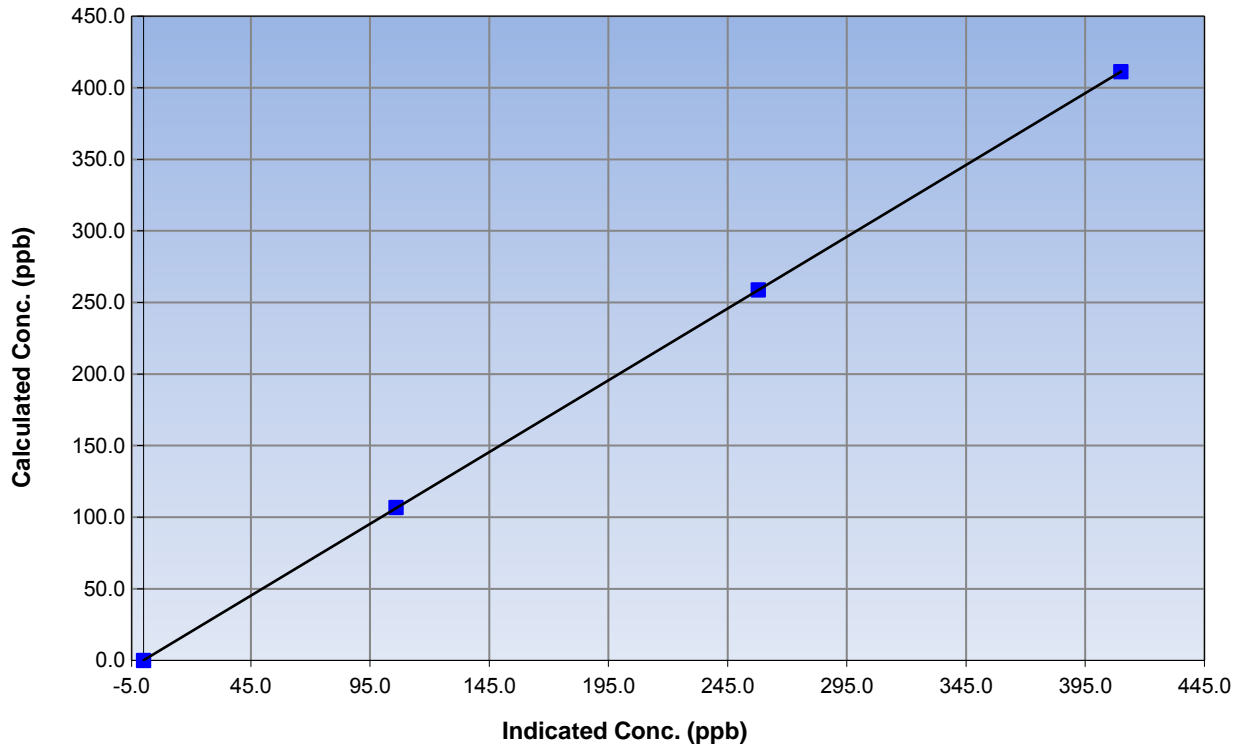
Station Information

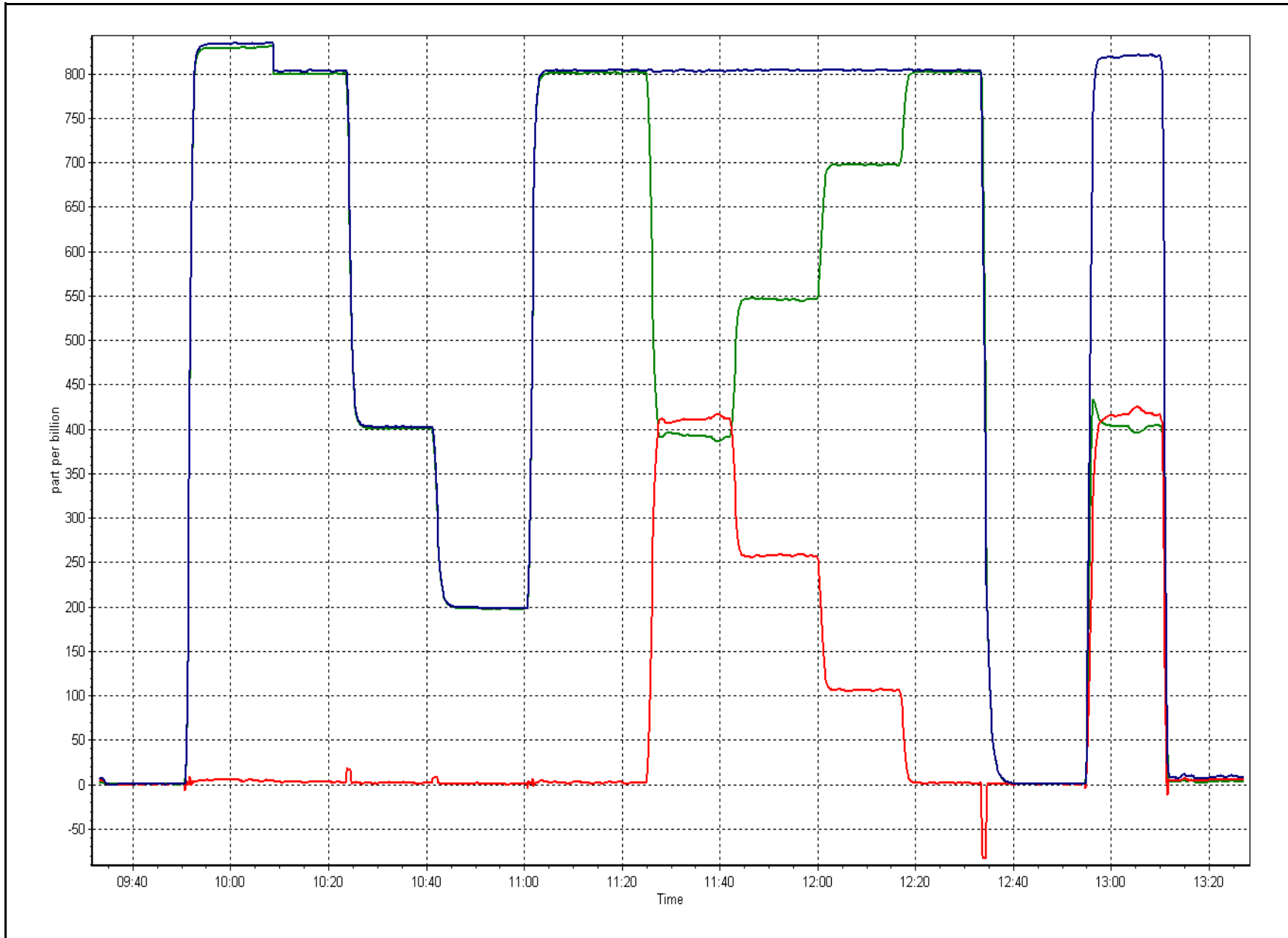
Calibration Date	February 9, 2016	Previous Calibration	February 8, 2016
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	13:15
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999999
411.3	410.0	1.0031		
258.7	258.0	1.0029	Slope	1.002822
106.7	106.0	1.0064		
			Intercept	0.113638

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 8, 2016	NOx Previous Cal Date	January 18, 2016
NH3 Calibration Date	February 12, 2016	NH3 Previous Cal Date	January 18, 2016
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	16:05
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	75.1 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.9 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355

DACs Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.996732	0.978884	0.998449	0.999597	1.002198
	Data Offset	-2.403705	-4.272492	0.763099	2.295604	-2.265249
Cal Stats After	Data Slope	0.998646	0.983286	0.999902	0.995789	0.993557
	Data Offset	-4.372688	-5.649164	3.138092	2.955928	2.449072
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	215
Converter	API 501 NH#	Converter serial #	217

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOx Conc range	1000	ppb	1000	ppb
NO BKG	-0.2	ppb	-0.2	ppb
NOx BKG	-0.2	ppb	-0.2	ppb
Nt BKG	-0.4		-0.4	
NO coefficient	1.113		1.002	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.135		1.012	
NH3 coefficient	0.970		0.976	
Nt coefficient	1.130		1.013	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.6	Deg C	314.7	Deg C
PMT Temp	7.1	Deg C	7.0	Deg C
O3 flow	85.0	ccm	86.0	ccm
R Cell Press	4.8	mmHg	6.2	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	547.0	ccm	562.0	ccm
Sample Flow 2 Nox	547.0	ccm	562.0	ccm
Sample Flow 3 Nt	547.0	ccm	575.0	ccm

Notes:

Pump and scrubber changed after as founds. Span adjusted. Nox drifted down during GPT. NH3 span adjusted.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

February 12, 2016

Station Number:

AMS 6

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-1.3	-2.7	1.4	----	----
as found NO	5500	86.8	803.3	803.3	----	804.0	803.5	0.5	0.999	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	-0.8	1.0	----	----
high NO point	5500	86.8	803.3	803.3	----	800.6	801.7	-1.1	1.003	----
NO/O ₃ point	5500	86.8	803.3	803.3	----	798.3	796.5	1.8	1.006	----
as found NH ₃	3500	93.2	1999.8	NA	1999.8	2038.1	31.2	2006.7	0.981	0.997
first NH ₃	3500	93.2	1999.8	NA	1999.8	2035.5	31.3	2004.2	0.982	0.998
second NH ₃	3500	46.6	999.9	NA	999.9	1029.1	18.5	1010.4	0.972	0.990
third NH ₃	3500	23.3	500.0	NA	500.0	517.4	11.0	506.3	0.966	0.987
Average Correction Factor									1.0048	0.9916

Nt Corrected As Found Nt = 805.3 ppb
 NOx Corrected As Found NOx = 806.2 ppb
 NH₃ Previous Converter Efficiency = 97.0 %

Previous Response Nt = 824.9 ppb
 Previous Response NOx = 803.8 ppb
 NH₃ Current Converter Efficiency = 97.6 %

Nt percent change 2.4%
 NOx percent change -0.3%
 NH₃ percent change 0.6%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: February 8, 2016 Station Number: AMS 6

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-0.9	-0.9	-0.1	----	----
as found span	5500	86.8	803.3	800.1	803.3	803.8	800.4	804.3	0.9994	0.9997
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.8	-0.9	0.2	----	----
high point	5500	86.8	803.3	800.1	803.3	801.7	801.6	800.6	1.0020	0.9981
second point	5500	43.4	401.6	400.1	401.6	396.5	397.5	398.6	1.0129	1.0064
third point	5500	21.7	200.8	200.0	200.8	196.0	196.0	196.8	1.0247	1.0204
Average Correction Factor									1.0132	1.0083

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	804.4	804.6	801.3	----
Previous Response	824.9	803.8	798.2	----
Percent Change	2.5%	-0.1%	-0.4%	0.3%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.8 ccm NO_x ref calc conc = 803.3 ppb NO ref calc conc = 800.1 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	----	3.2	796.5	793.5	3.0	1.0086	1.0083	----	----
1st NO ₂ (300)	357.2	439.5	798.2	357.2	441.0	1.0064	----	0.9966	100.3%
2nd NO ₂ (200)	538.2	258.5	795.2	538.2	257.0	1.0102	----	1.0060	99.4%
3rd NO ₂ (100)	691.1	105.6	792.1	691.1	100.9	1.0142	----	1.0469	95.5%
2nd NO ref point	----	3.2	798.1	801.2	-3.2	1.0066	0.9987	----	----
Average Correction Factor						1.0093	1.0035	1.0165	98.4%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

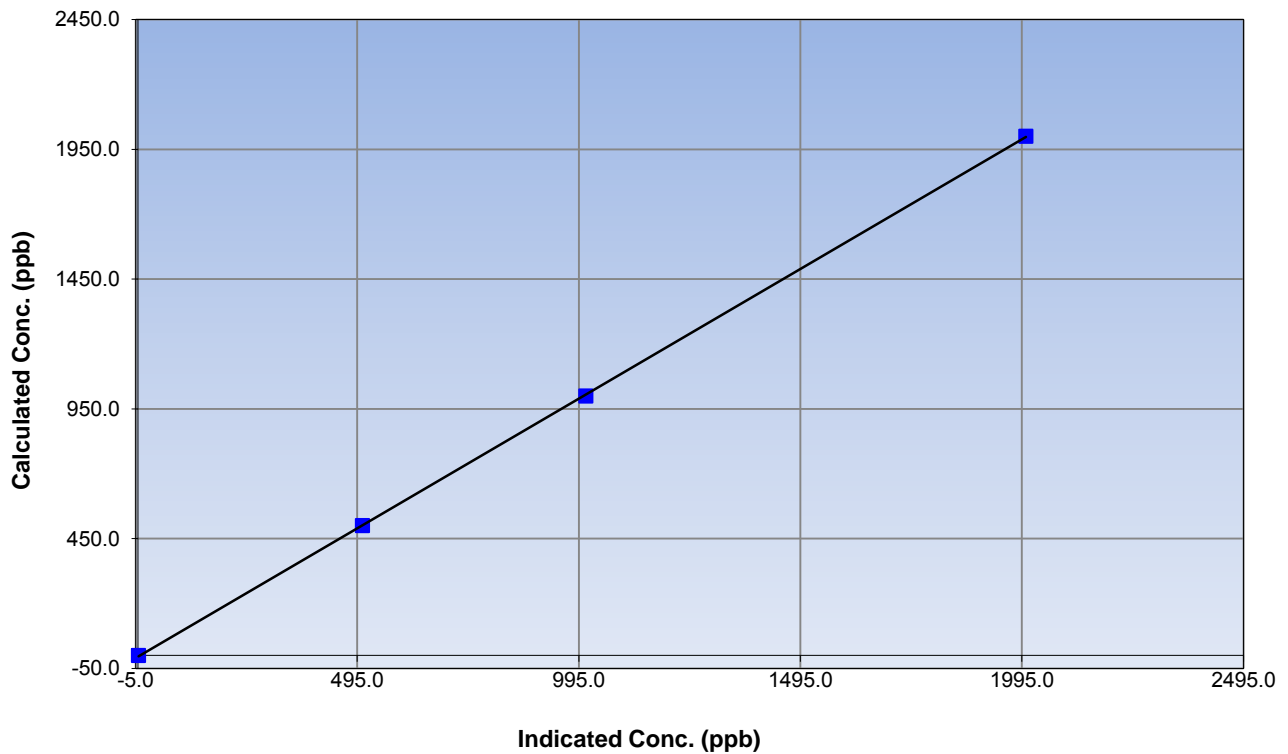
Station Information

Calibration Date	February 12, 2016	Previous Calibration	January 18, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	API T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.0	----	Correlation Coefficient	0.999980
1999.8	2004.2	0.9978		
999.9	1010.4	0.9896	Slope	0.998646
500.0	506.3	0.9874		
			Intercept	-4.372688

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

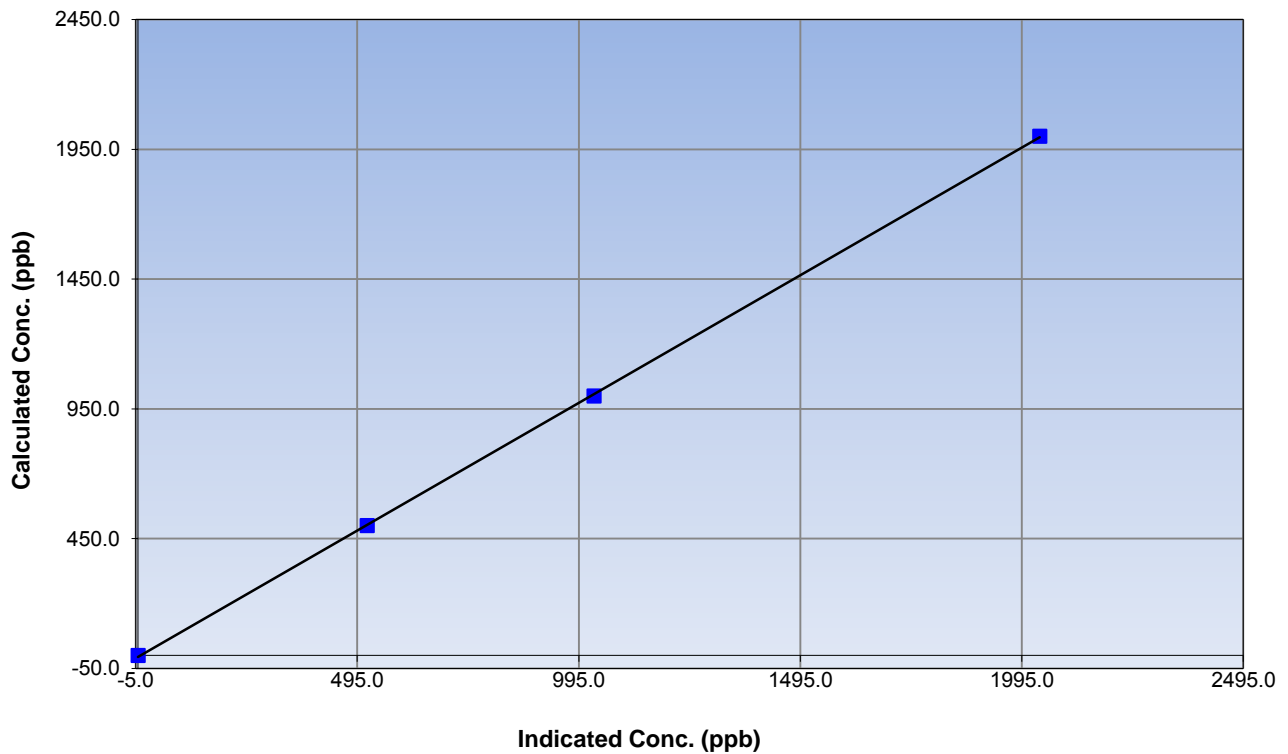
Station Information

Calibration Date	February 12, 2016	Previous Calibration	January 18, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	API T201	Analyzer serial #	215

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999956
1999.8	2035.5	0.9825		
999.9	1029.1	0.9717	Slope	0.983286
500.0	517.4	0.9663		
			Intercept	-5.649164

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

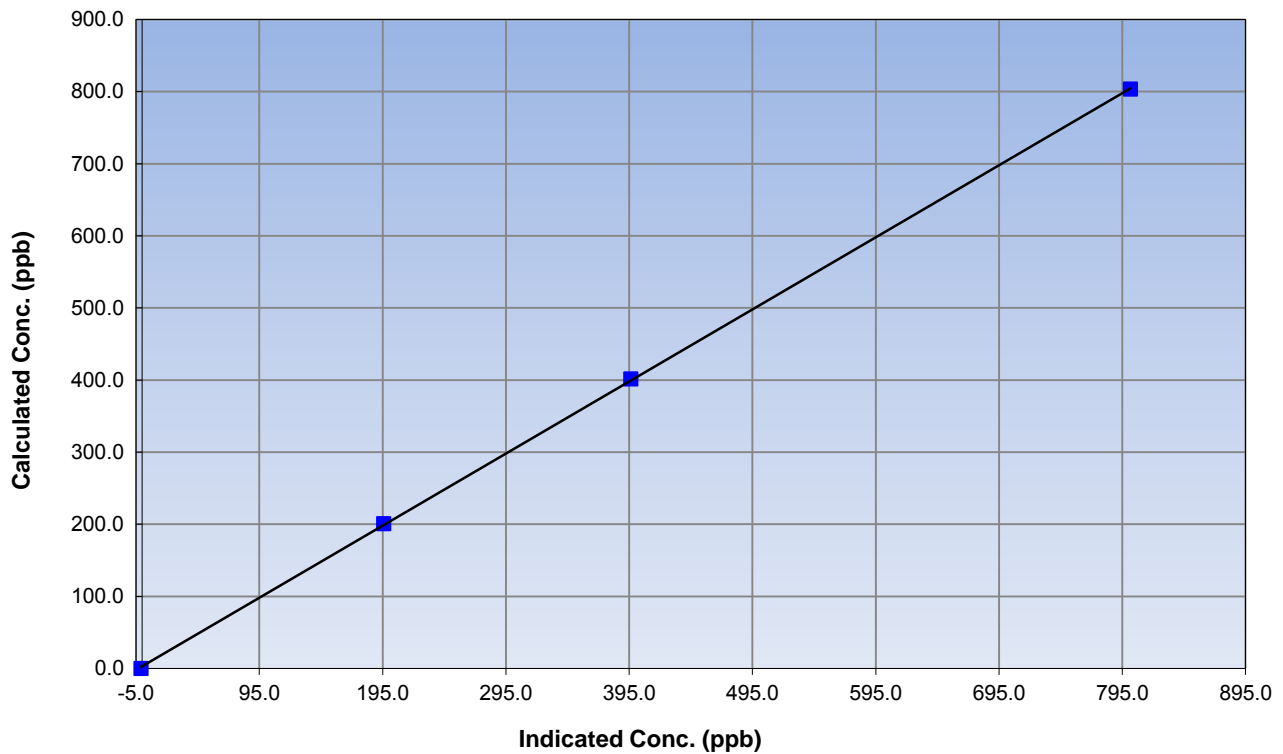
Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 18, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	API T201	Analyzer serial #	215

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	----	Correlation Coefficient	0.999959
803.3	801.7	1.0020		
401.6	396.5	1.0129	Slope	0.999902
200.8	196.0	1.0247		
			Intercept	3.138092

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

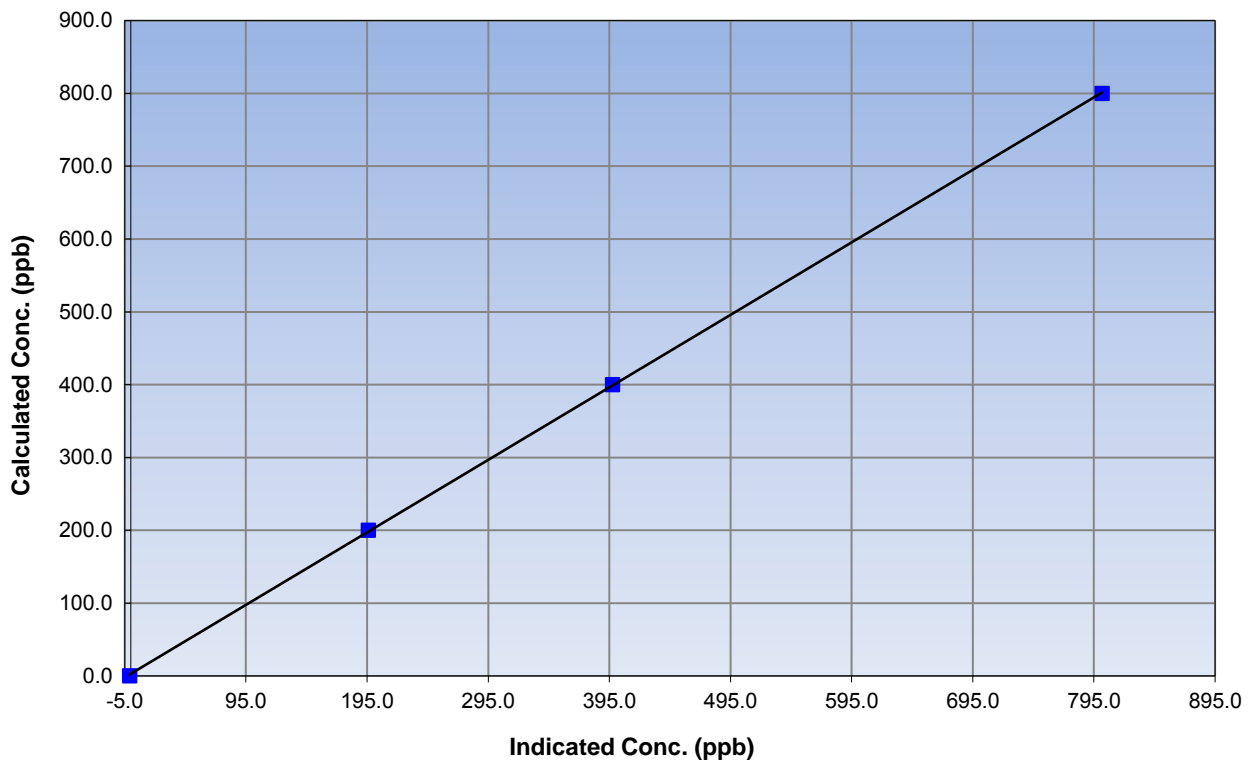
Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 18, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.9	----	Correlation Coefficient	0.999970
800.1	801.6	0.9981		
400.1	397.5	1.0064	Slope	0.995789
200.0	196.0	1.0204		
			Intercept	2.955928

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

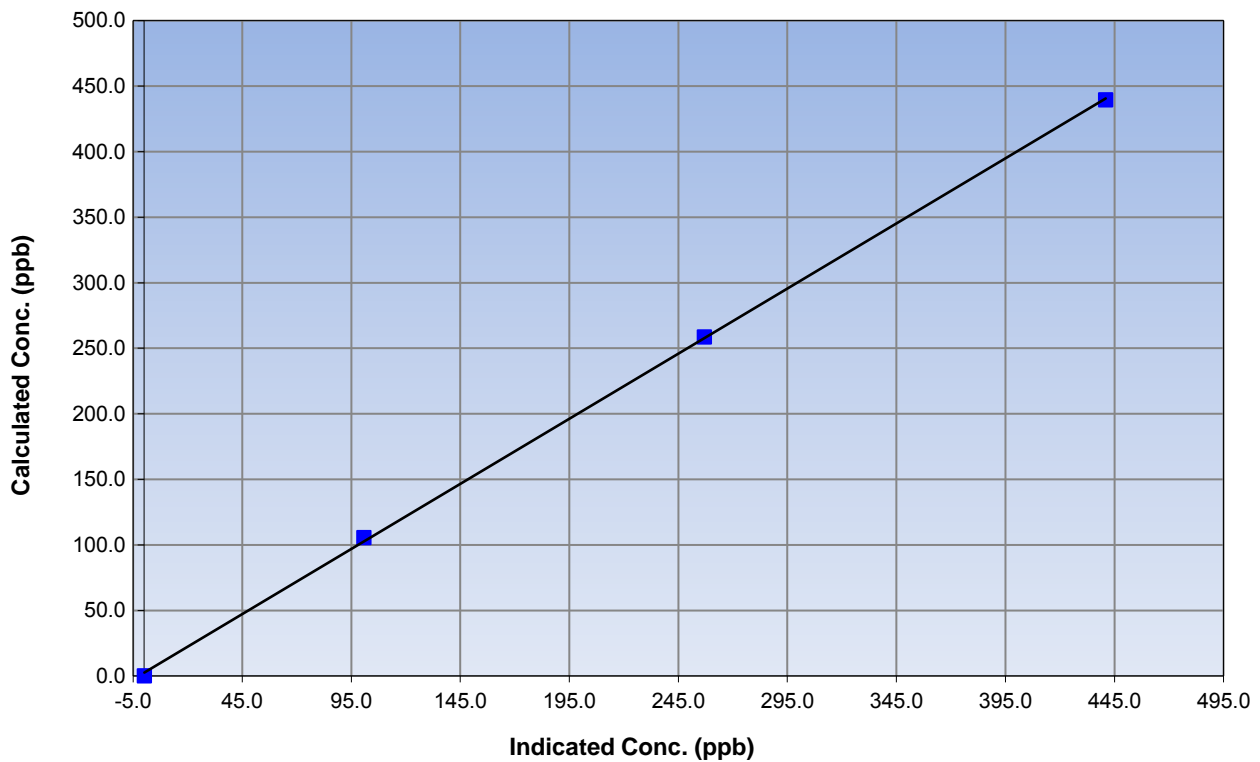
Station Information

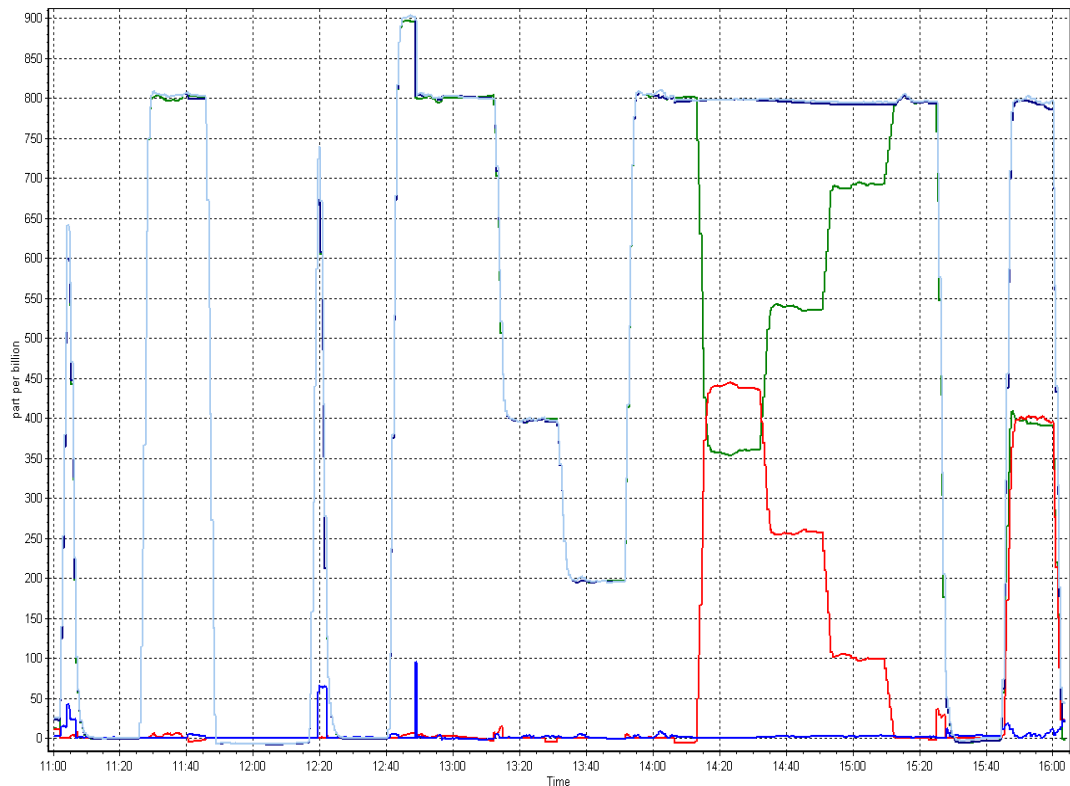
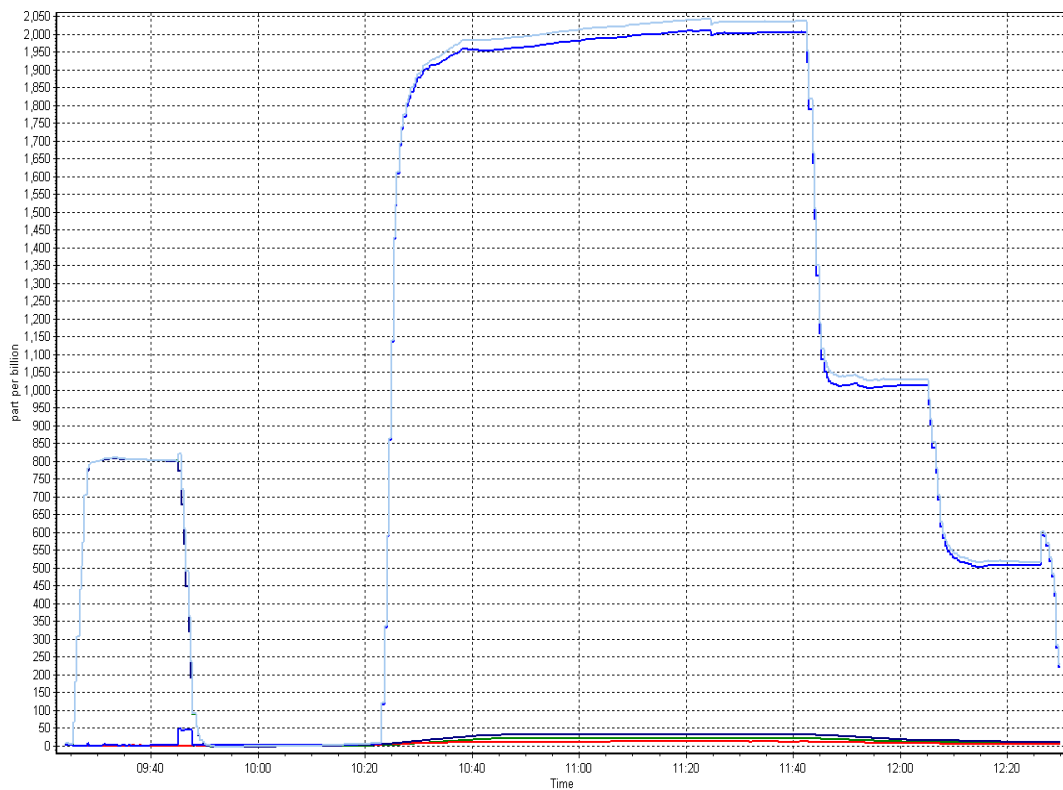
Calibration Date	February 8, 2016	Previous Calibration	January 18, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999846
439.5	441.0	0.9966		
258.5	257.0	1.0060	Slope	0.993557
105.6	100.9	1.0469		
			Intercept	2.449072

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date: February 12, 2016 Previous Calibration: January 19, 2016
 Station Name: Patricia McInnis Station Number: AMS 6
 Start Time (MST): 9:25 End Time (MST): 10:50
 Calibrator Make/Model: Delta Cal Calibrator Serial Number: 141228

SHARP INFORMATION

Particulate Fraction: PM2.5
 Make/Model: Thermo / SHARP 5030
 Serial Number:
 C₁₄ Source SN:
 Confirmation of Time settings: Yes No
 Parameters Checked: T1 T2 T3 T4 P3 Main Flow Beta Neph

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-20.0	-21.2	-1.2	-21.2
T2	16.0	na	na	16.0
T3	20.0	na	na	20.0
T4	5.0	na	na	8.0
RH (%)	10.0	na	na	14.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	986	979.5	-6.5	986

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	998	-2	998	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	203		203
Neph	0.1		0.1
C14	7.6		7.6
Indicated Concentration (ug/m3)	0.1	no	0.1
Offset 1	204.1		204.1
Offset 2	32.5		32.5

Leak Check (Quarterly)

Leak Check Date: February 12, 2016 Previous Leak Check Date: September 28, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.63	
*Flow with adaptor (LPM):	16.56	0.07

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

Mass Foil Calibration (Annually)

Foil Calibration Date: Previous Foil Calibration: May 20, 2015
 Zeroed?:
 Foil Mass: Mass foil set S/N:
 Previous Correction Factor:
 New Correction Factor:

INSPECTION DATA

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

NOTES:

Cyclone head cleaned. Filter tape is good, about 50% left on the roll.

Calibration Performed By: Devin Russell



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 7
ATHABASCA VALLEY
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 FEBRUARY 2016

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	658	35	38	99.57	23	0	5	0
TRS (ppb) Average	659	33	37	99.43	4	0	1	0
THC (ppm) Average	658	35	38	99.57	3	-	2.3	-
NMHC (ppm) Average	658	35	38	99.57	0.495	-	0.098	-
CH4(ppm) Average	658	35	38	99.57	2.5	-	2.2	-
O3 (ppb) Average	659	32	37	99.28	39	0	28	-
NO2 (ppb) Average	658	35	38	99.57	45	0	21	-
NO (ppb) Average	658	35	38	99.57	56	-	18	-
NOX (ppb) Average	658	35	38	99.57	85	-	38	-
PM2.5 (ug/m3) Average	693	1	3	99.71	33.6	-	11.7	0
CO(ppm) Average	660	32	36	99.43	0.6	0	0.3	-
Temperature 2 m (C) Average	696	0	0	100.00	9.7	-	1.1	-
Barometric Pressure (inHg) Average	696	0	0	100.00	29.6	-	29.5	-
Relative Humidity (%) Average	696	0	0	100.00	95	-	90	-
Wind Speed 10 m (km/h) Average	692	0	4	99.43	26	-	14	-
Wind Direction 10 m (deg) Average	692	0	4	99.43	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	658	1.1	2	-	0	0	0	0	1	3	23
TRS (ppb) Average	659	0.5	0	-	0	0	0	0	1	1	4
THC (ppm) Average	658	1.98	0.1	-	1.8	1.9	1.9	1.9	2	2.1	3
NMHC (ppm) Average	658	0.015	0.057	-	0	0	0	0	0	0	0.495
CH4(ppm) Average	658	1.97	0.1	-	1.8	1.9	1.9	1.9	2	2.1	2.5
O3 (ppb) Average	659	16.5	10	-	0	3	9	16	25	29	39
NO2 (ppb) Average	658	12.7	7	-	1	5	7	10	17	24	45
NO (ppb) Average	658	5.3	8	-	0	0	1	2	6	15	56
NOX (ppb) Average	658	18	14	-	1	6	9	14	22	38	85
PM2.5 (ug/m3) Average	693	4.75	3.7	-	0.3	1.8	2.5	3.8	5.7	8.5	33.6
CO(ppm) Average	660	0.12	0.1	-	0	0.1	0.1	0.1	0.1	0.2	0.6
Temperature 2 m (C) Average	696	-10.6	6.7	-	-31.3	-18	-14.4	-11.4	-6.1	-2.6	9.7
Barometric Pressure (inHg) Average	696	29.01	0.3	-	28.2	28.7	28.8	29	29.2	29.3	29.6
Relative Humidity (%) Average	696	76.9	12	-	34	60	71	80	85	89	95
Wind Speed 10 m (km/h) Average	692	8.2	5	-	0	2	4	8	12	15	26
Wind Direction 10 m (deg) Average	692	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC, O3, NO2	21 Feb 2016 12:00	21 Feb 2016 14:00	3	Station power failure
TRS, PM2.5, CO	21 Feb 2016 12:00	21 Feb 2016 13:00	2	Station power failure
TRS, O3, CO	01 Feb 2016 10:00	01 Feb 2016 11:00	2	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	01 Feb 2016 11:00	01 Feb 2016 11:00	1	Maintenance - access to serial numbers
Wind Speed, Wind Direction	08 Feb 2016 17:00	08 Feb 2016 17:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	14 Feb 2016 09:00	14 Feb 2016 09:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	21 Feb 2016 16:00	21 Feb 2016 16:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

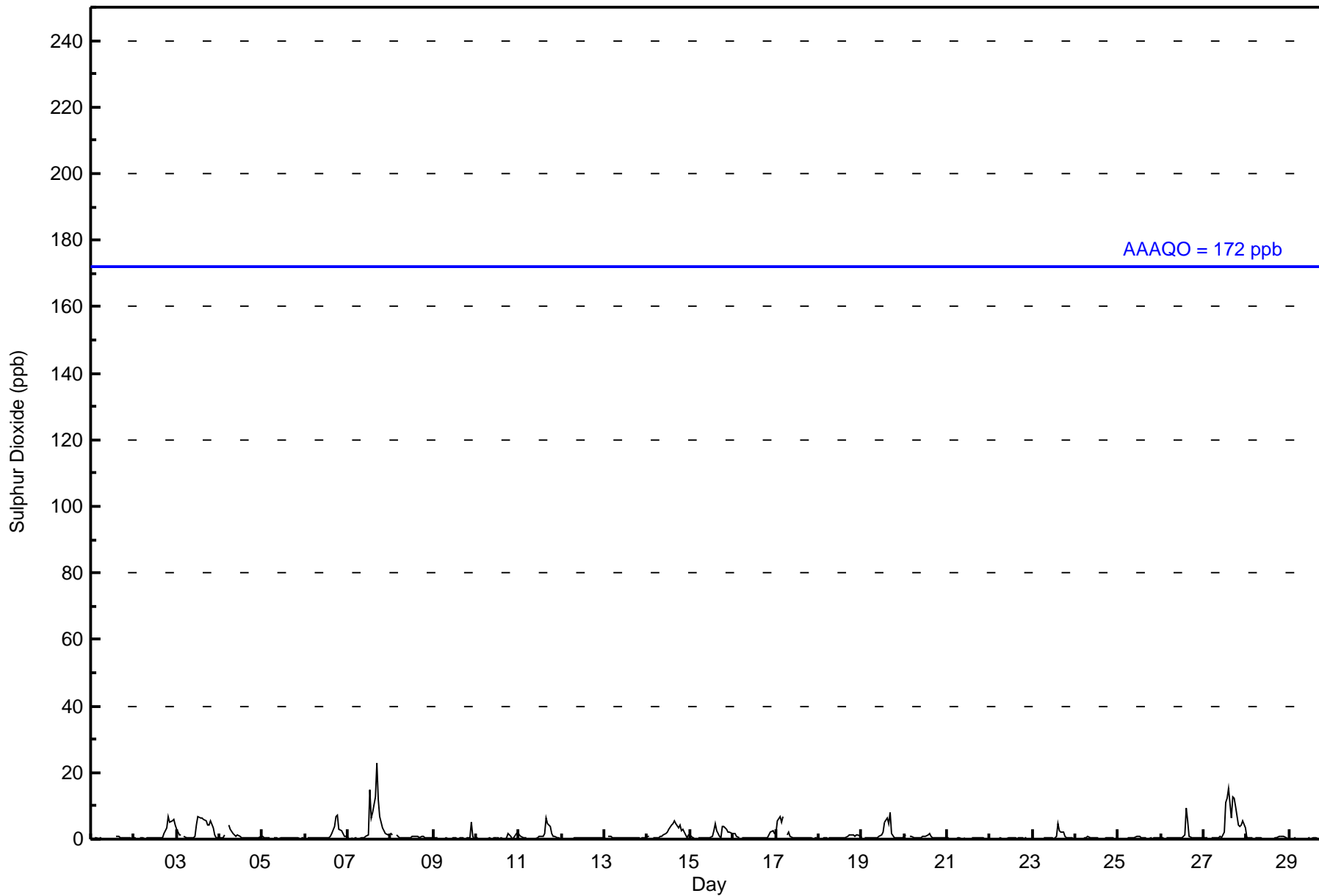
Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696																										
Maximum Value: 23 ppb on Feb 7 17:00														Maximum Daily Average: 4.6 ppb on Feb 27																										
Minimum Value: 0 ppb on Feb 22 04:00														Minimum Daily Average: 0.2 ppb on Feb 22																										
Maximum Diurnal Average: 2.5 ppb at hour 17														Minimum Diurnal Average: 0.4 ppb at hour 9																										
Monthly Average: 1.1 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 12																										
														Hours of Data: 658																										
														Hours of Missing Data: 38																										
														Hours of Calibration: 35																										
														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	0	Z	0	0	0	0	0	0	C	C	C	C	C	C	1	1	1	1	0	0	0	0	0	0	--	1														
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	7	5	6	6	4	1.6	7														
3-Feb	3	1	1	Z	1	1	0	0	0	0	1	4	7	6	6	6	6	4	4	6	4	1	1	0	2.8	7														
4-Feb	0	0	1	1	Z	4	3	2	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0.9	4														
5-Feb	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1														
6-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	4	7	7	3	3	2	1	1	1.4	7														
7-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	15	6	8	13	23	12	7	4	2	2	1	1	4.2	23														
8-Feb	2	1	Z	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	2														
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0.5	5														
10-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	2	2	0.5	2														
11-Feb	1	1	0	1	0	Z	0	0	0	0	0	1	1	1	2	7	5	4	2	1	1	0	0	0	1.2	7														
12-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.3	1														
13-Feb	0	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														
14-Feb	1	1	Z	1	1	0	0	1	1	1	2	2	3	4	5	5	5	3	4	3	3	1	1	1	2.1	5														
15-Feb	1	0	0	Z	0	0	0	0	0	0	0	1	2	5	2	1	1	4	4	3	2	2	2	2	1.4	5														
16-Feb	2	2	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2	2	2	0.8	2														
17-Feb	2	6	7	5	7	Z	1	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1.5	7														
18-Feb	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1														
19-Feb	0	Z	1	0	0	0	1	0	0	0	1	1	2	5	6	5	8	2	0	0	0	0	0	0	1.5	8														
20-Feb	1	1	Z	1	1	1	0	0	0	1	1	1	1	1	2	1	1	1	1	1	0	1	0	0	0.7	2														
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	PF	PF	PF	0	1	1	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	0	0	0	1	0	0	0	0	0	0	0.2	1														
23-Feb	0	0	0	0	0	Z	0	0	0	0	1	0	0	1	5	2	2	2	1	1	1	0	0	0	0.8	5														
24-Feb	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1														
25-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1														
26-Feb	0	0	Z	0	0	0	0	0	1	1	1	1	0	1	9	5	1	0	0	0	0	0	0	0	1.0	9														
27-Feb	0	0	0	Z	0	0	0	0	0	1	1	2	11	12	15	7	13	12	10	4	4	4	6	3	4.6	15														
28-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0.3	1														
29-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1														
														0.7	0.7	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.8	1.8	1.8	2.4	2.1	2.5	1.9	1.8	1.4	1.1	1.1	1.0	0.8	Diurnal Average	
														3	6	7	5	7	4	3	2	1	1	2	4	15	12	15	13	23	12	10	7	5	6	6	4	Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure														Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	649	98.63	98.63
11 - 20	8	1.22	99.85
21 - 60	1	0.15	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: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	112	15	10	12	15	20	162	44	9	12	17	16	23	7	20	152	646
11 - 20	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	117	15	10	12	15	20	162	44	9	12	17	16	23	7	20	156	655

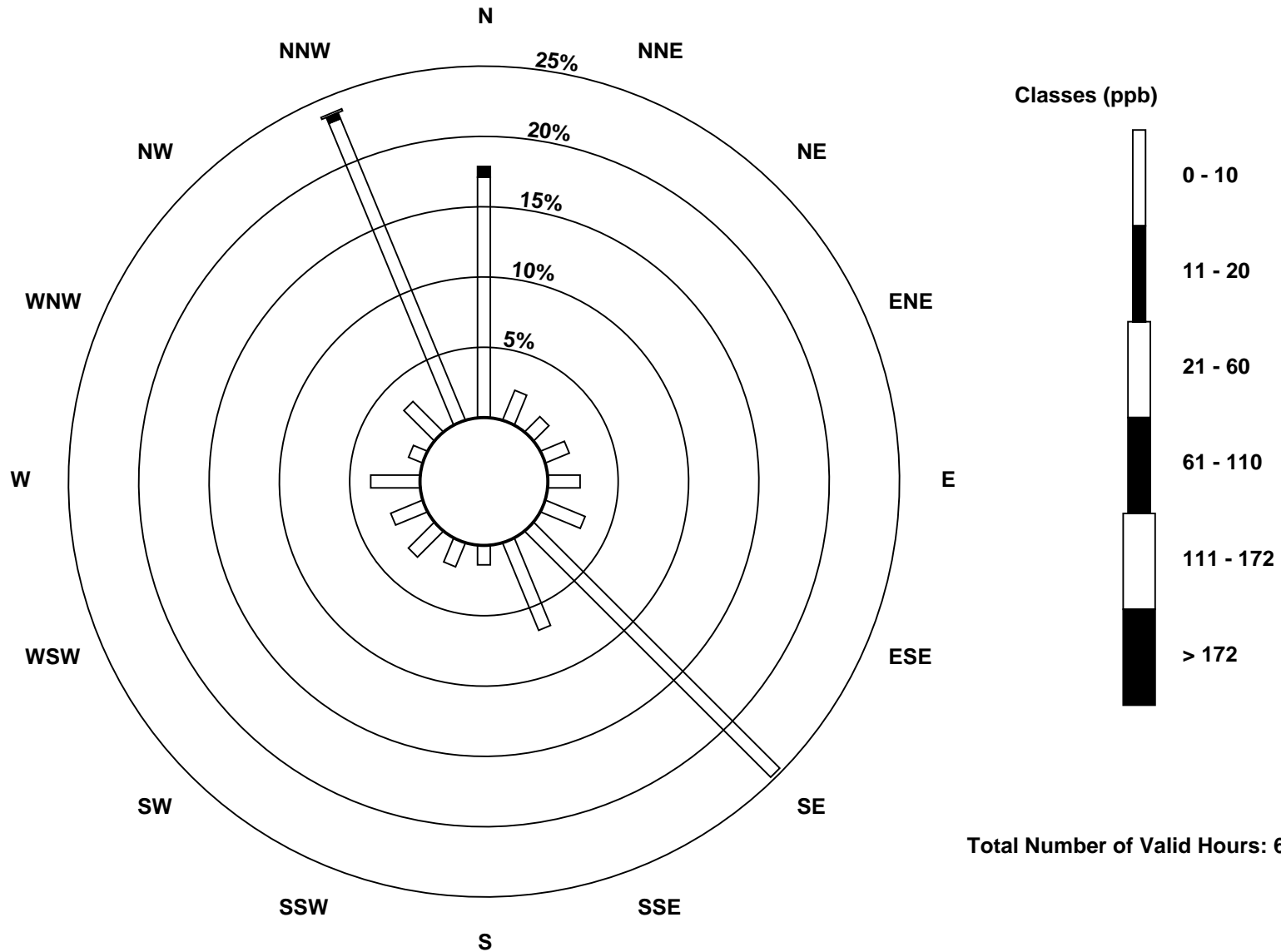
Total Number of Valid Hours: 655

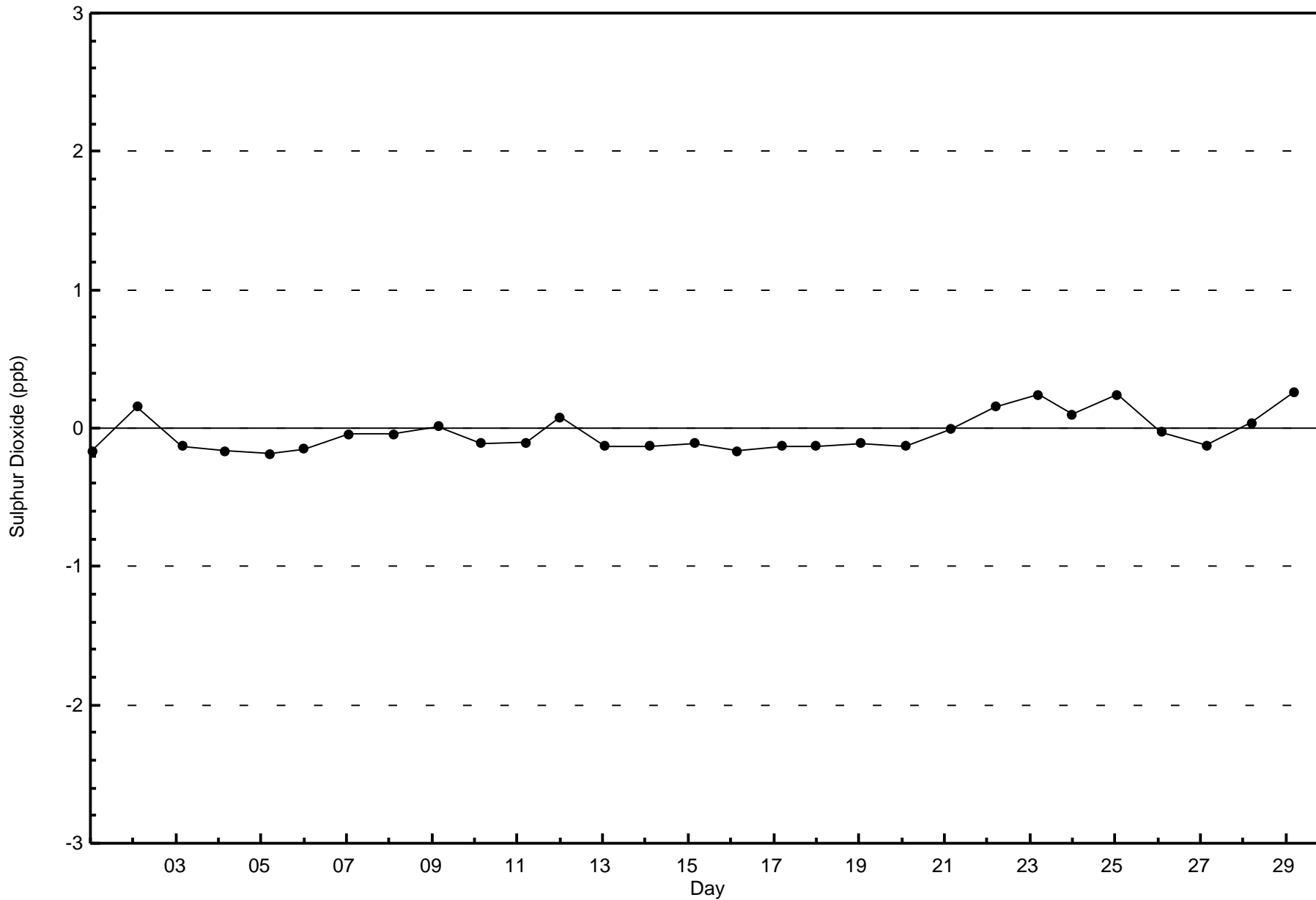
Total Number of Hours: 696

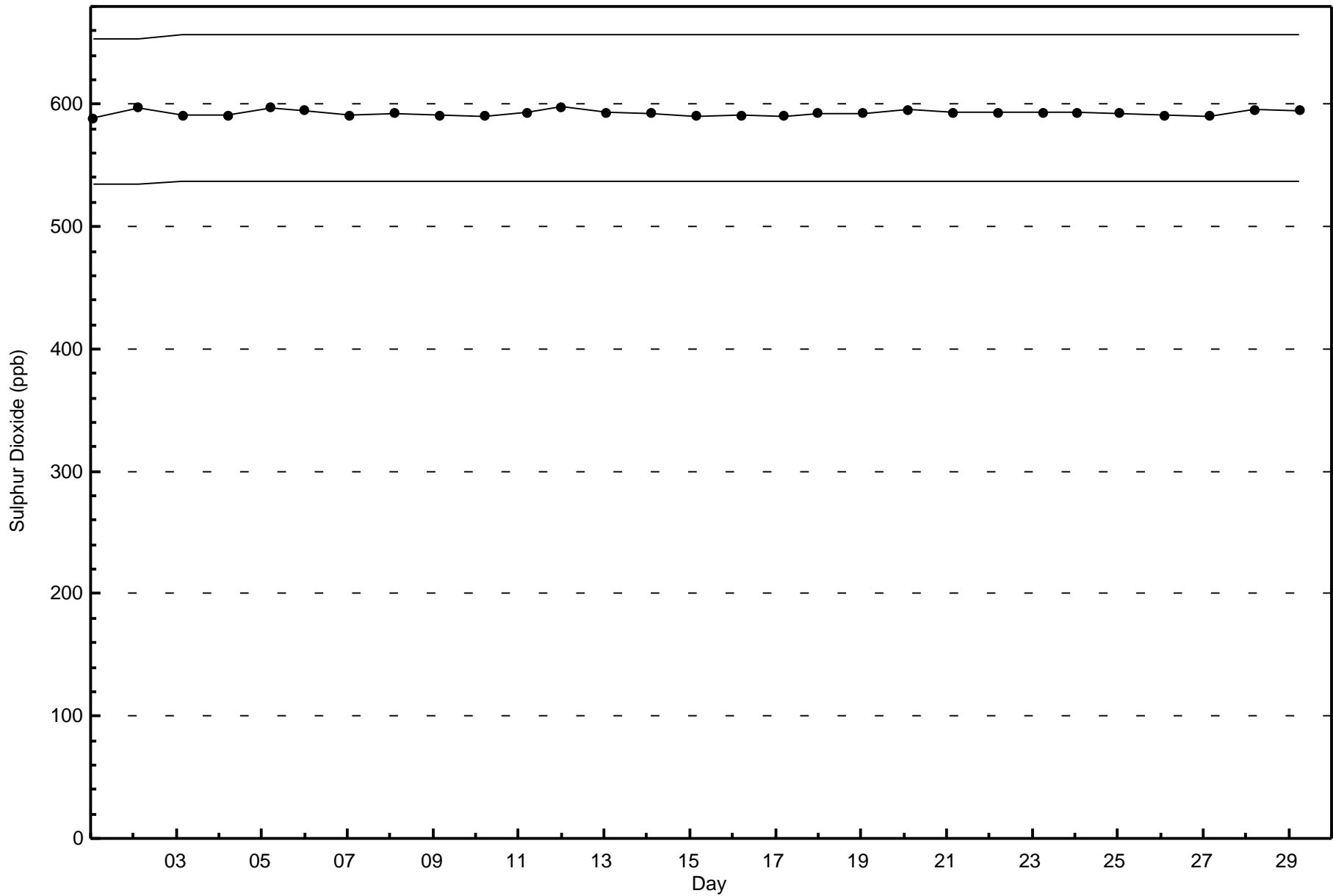


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

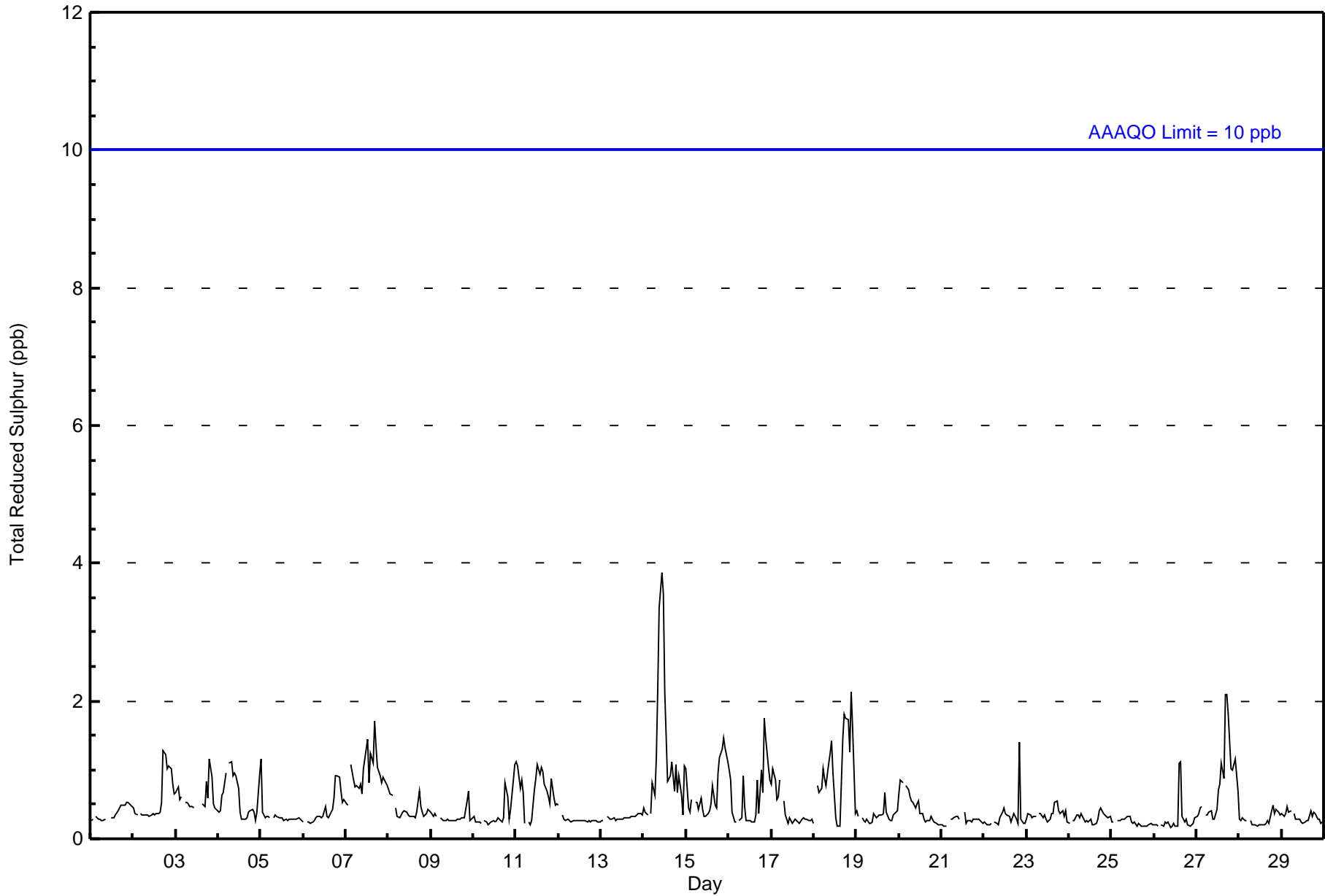
Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4 ppb on Feb 14 11:00 Maximum Daily Average: 1.2 ppb on Feb 14																	Hours in Service: 696 Hours of Data: 659									
Minimum Value: 0 ppb on Feb 26 10:00 Minimum Daily Average: 0.2 ppb on Feb 25 Maximum Diurnal Average: 0.6 ppb at hour 21 Minimum Diurnal Average: 0.4 ppb at hour 14 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 = 2																	Hours of Missing Data: 37 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	0	0	Z	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1
2-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	0.6	1
3-Feb	1	1	1	1	Z	1	1	1	0	0	0	C	C	C	C	1	0	1	1	1	1	1	0	0	0.6	1
4-Feb	0	0	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	1
5-Feb	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1
7-Feb	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1.0	2
8-Feb	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	0	0	0	0	0	0	1	1	0	0	0.3	1
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0.4	1
11-Feb	1	1	1	1	1	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.7	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	0.3	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	0.3	0
14-Feb	0	0	0	Z	0	1	1	1	2	3	4	4	2	1	1	1	1	1	1	1	1	1	0	1	1.2	4
15-Feb	1	0	0	1	Z	1	1	0	1	0	0	0	0	0	1	1	0	0	1	1	1	1	1	1	0.7	1
16-Feb	1	1	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	1	0	1	1	2	1	1	1	0.6	2
17-Feb	1	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Feb	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	2	2	2	1	2	2	0	1.0	2
19-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	0.3	1
20-Feb	1	1	1	Z	1	1	1	1	1	0	1	1	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	PF	PF	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	1	0	0	0	0.3	1
23-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
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	0.3	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	0.2	0
26-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	0.3	1
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	2	2	2	1	1	1	1	1	0.8	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	0.3	0
29-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
0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.5																								Diurnal Average		
1 1 1 1 1 1 1 1 1 2 3 4 4 2 1 1 1 2 2 2 2 2 2 2 2 1																								Diurnal Maximum		
Z - zerspan C - Calibration M - Maintenance PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	656	99.54	99.54
3 - 4	3	0.46	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: 659

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	122	15	9	11	14	20	164	45	8	12	16	15	23	6	20	153	653
3 - 4	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	3
5 - 7	0	0	0	0	0	0	0	0	0	0	0	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	122	15	9	12	14	20	164	45	8	12	16	16	23	7	20	153	656

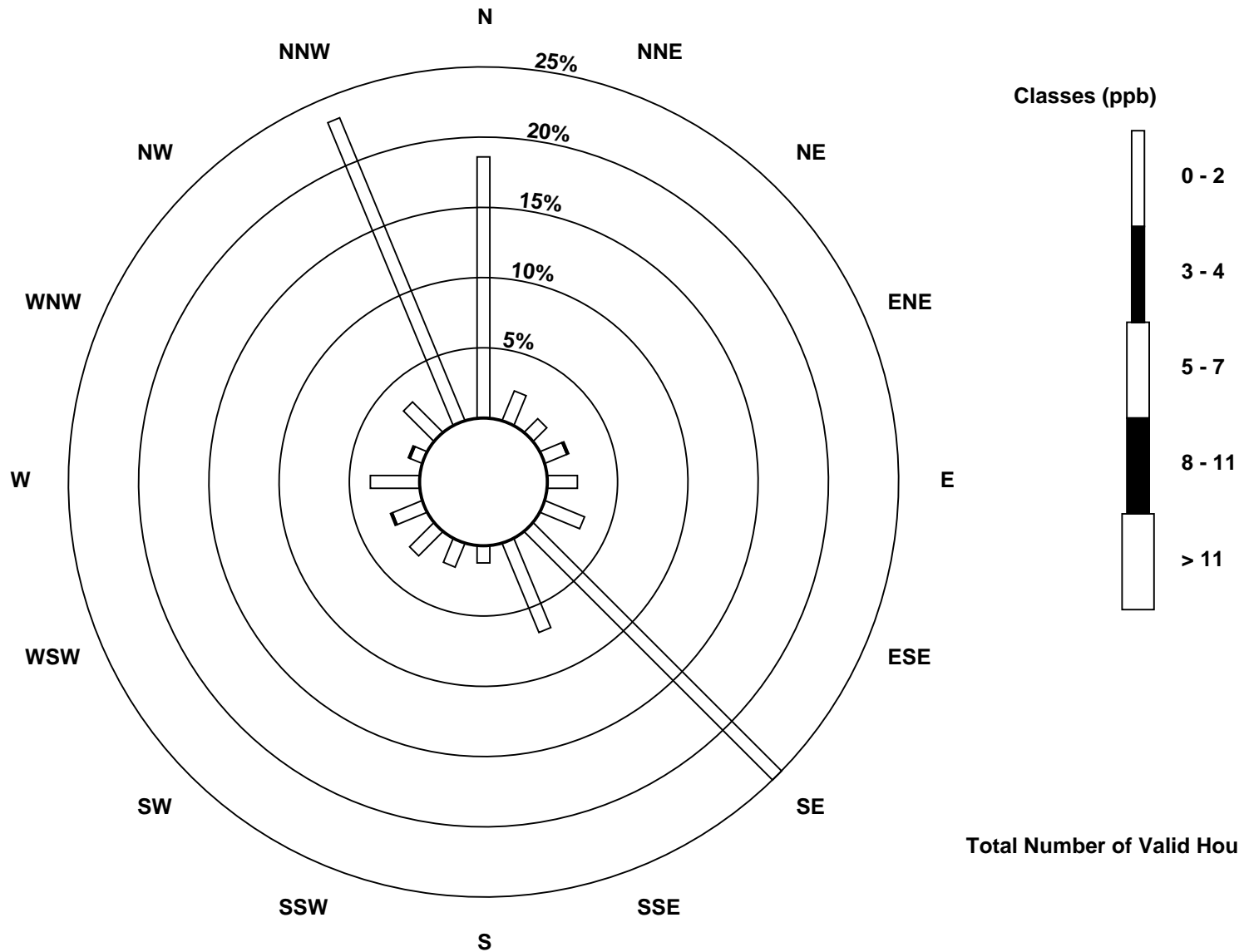
Total Number of Valid Hours: 656

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

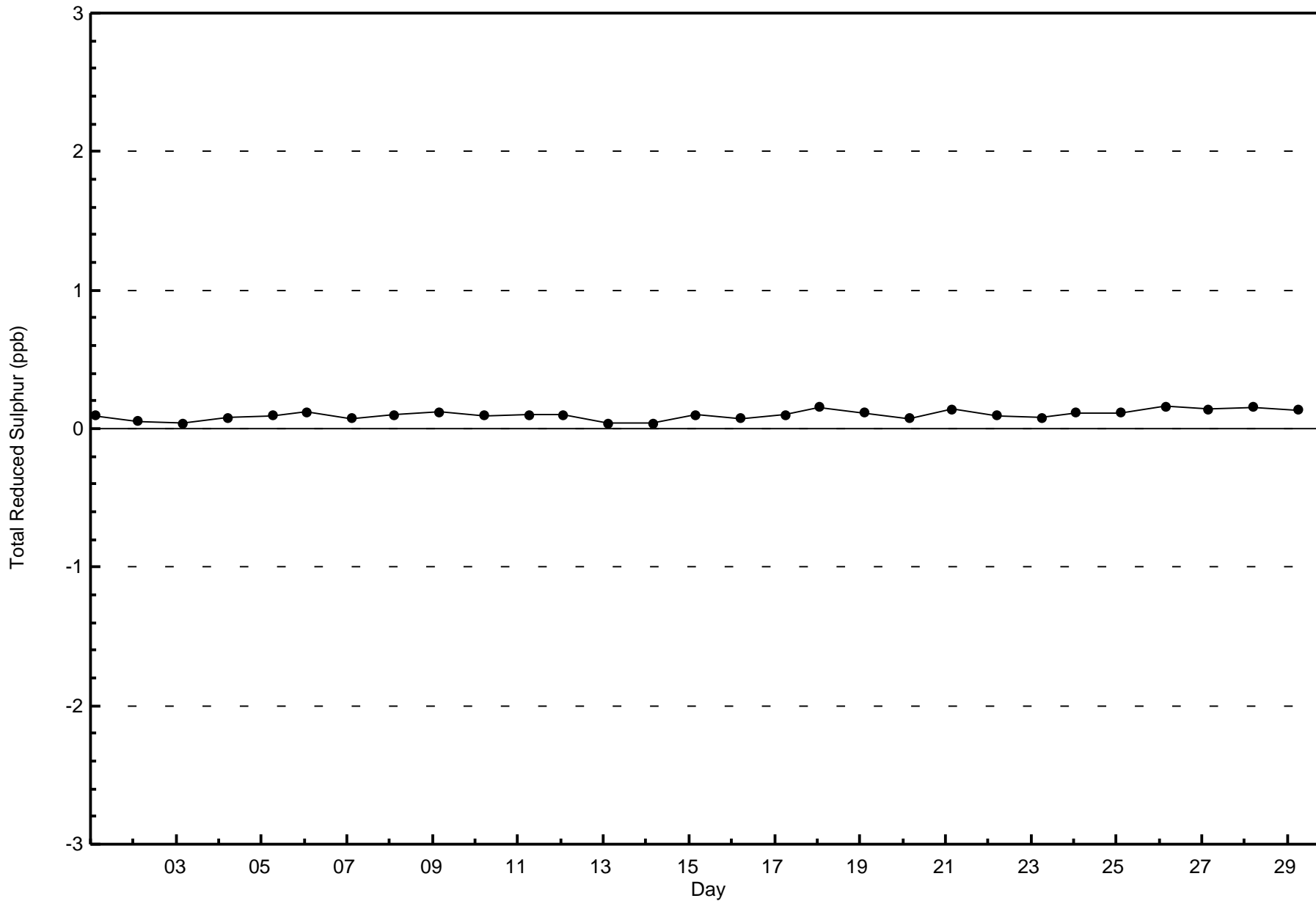
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Zero Responses

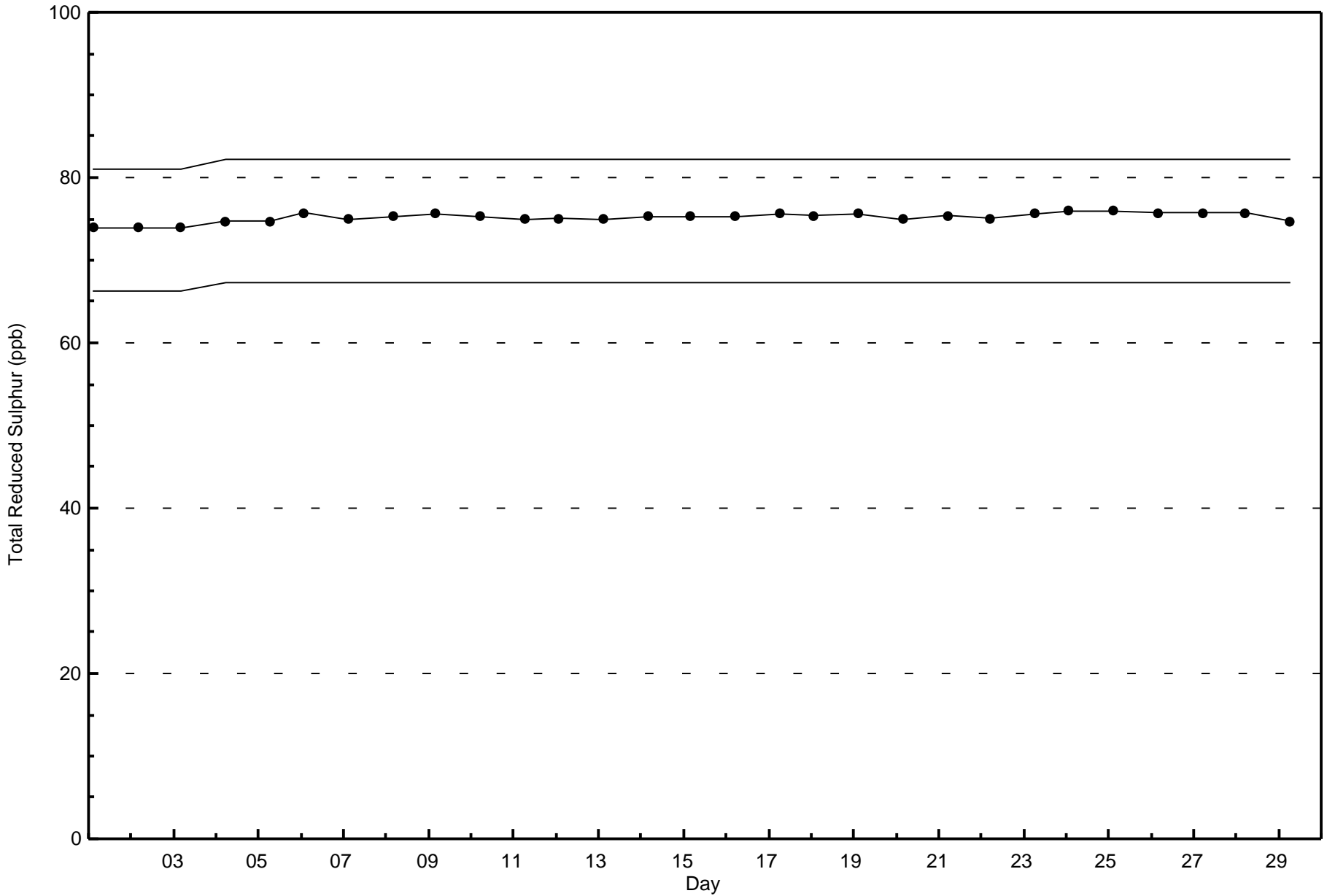
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 2016





Wood Buffalo Environmental Association
Span Responses

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - February 2016

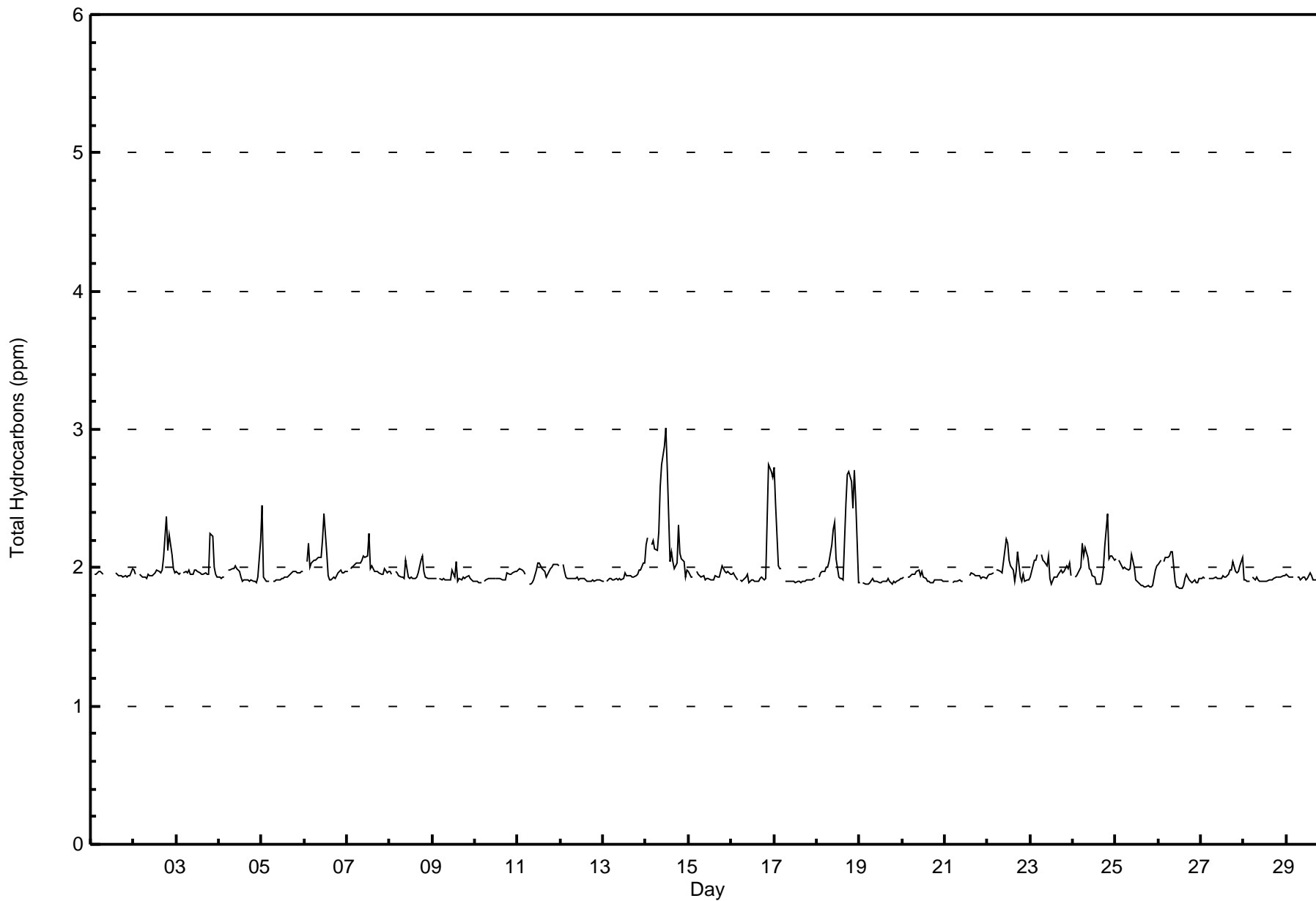




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2016

Maximum Value: 3.0 ppm on Feb 14 12:00																								Hours in Service: 696		
Maximum Daily Average: 2.3 ppm on Feb 14																								Hours of Data: 658		
Minimum Value: 1.8 ppm on Feb 26 13:00																								Hours of Missing Data: 38		
Minimum Daily Average: 1.9 ppm on Feb 19																								Hours of Calibration: 35		
Maximum Diurnal Average: 2.0 ppm at hour 22																								Percent Operational Time: 99.6		
Minimum Diurnal Average: 1.9 ppm at hour 16																										
Monthly Average: 1.98 ppm																										
Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.7																										
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	1.9	2.0	2.0	2.0	2.0	C	C	C	C	C	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-Feb	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.1	2.2	2.1	2.0	2.0	2.0	2.4
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	1.9	2.0	2.0	2.0	2.2	2.2	2.0	2.0	1.9	2.0	2.2	2.2
4-Feb	1.9	1.9	1.9	1.9	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	2.2	2.0	2.2	2.2
5-Feb	2.5	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5
6-Feb	Z	2.0	2.2	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.4
7-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
8-Feb	2.0	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.1
9-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
10-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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
11-Feb	2.0	2.0	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
12-Feb	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	2.0
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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0
14-Feb	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.3	2.6	2.7	2.9	3.0	2.7	2.0	2.1	2.0	2.0	2.0	2.3	2.1	2.1	2.0	1.9	2.0	2.3	3.0
15-Feb	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
16-Feb	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3	2.7	2.7	2.7	2.0	2.7
17-Feb	2.7	2.5	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.7
18-Feb	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.3	2.3	2.1	1.9	1.9	1.9	1.9	2.5	2.7	2.7	2.6	2.4	2.7	2.5	1.9	2.2	2.7
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
20-Feb	1.9	1.9	Z	1.9	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
21-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	PF	PF	PF	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
22-Feb	1.9	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.0	2.0	2.0	1.9	2.0	2.1	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.2
23-Feb	1.9	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.1
24-Feb	Z	1.9	1.9	2.0	2.0	2.2	2.1	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.4	2.1	2.1	2.1	2.1	2.0	2.4
25-Feb	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.1
26-Feb	2.0	2.1	Z	2.0	2.1	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
27-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1
28-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
29-Feb	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0
2.0																								Diurnal Average		
2.7																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	570	86.63	86.63
2.1 - 3.0	88	13.37	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2016**

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	104	10	9	9	11	20	140	31	7	10	17	15	23	6	18	138	568
2.1 - 3.0	13	5	1	3	4	0	22	13	2	2	0	1	0	1	2	18	87
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	117	15	10	12	15	20	162	44	9	12	17	16	23	7	20	156	655

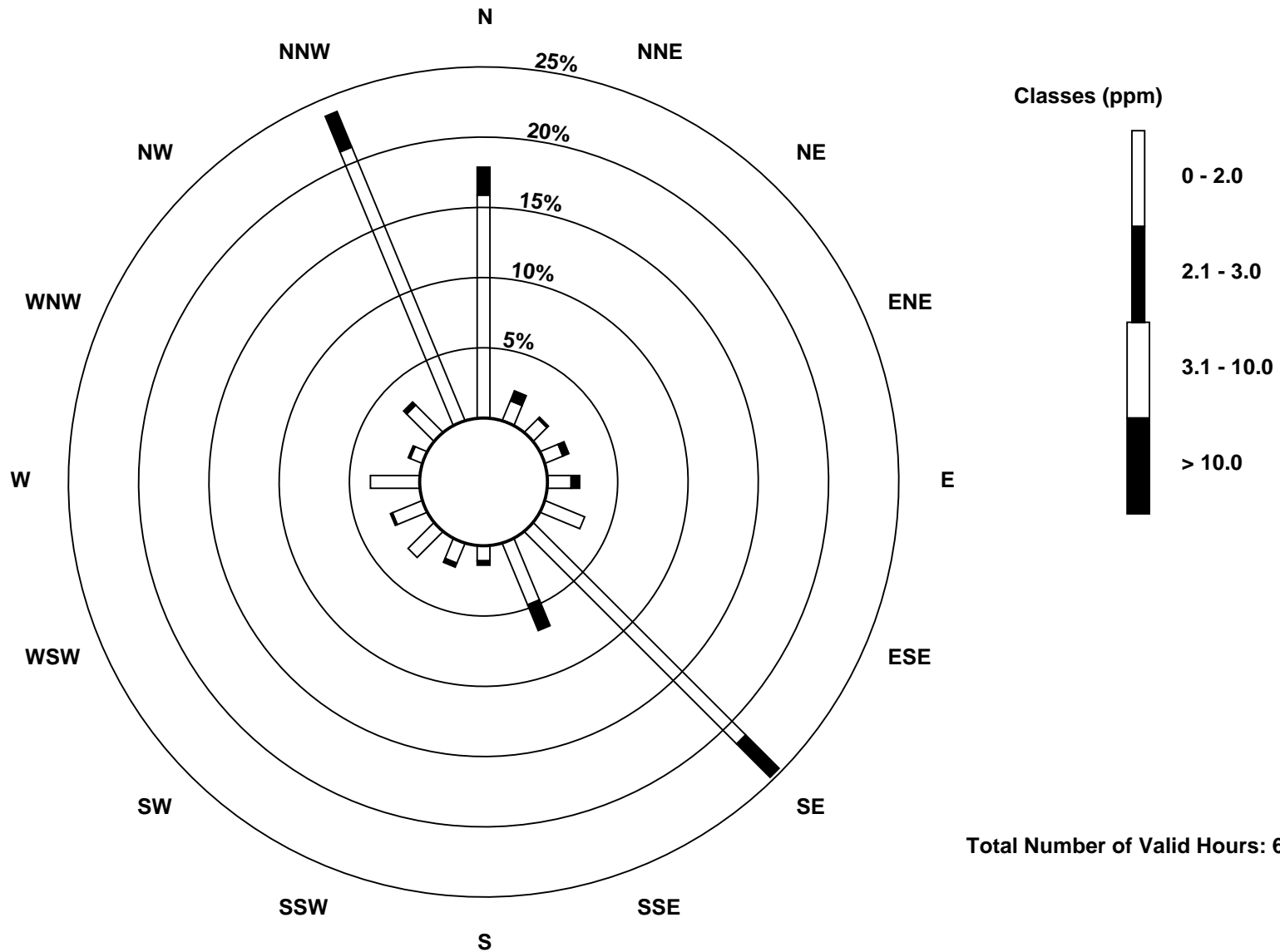
Total Number of Valid Hours: 655

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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

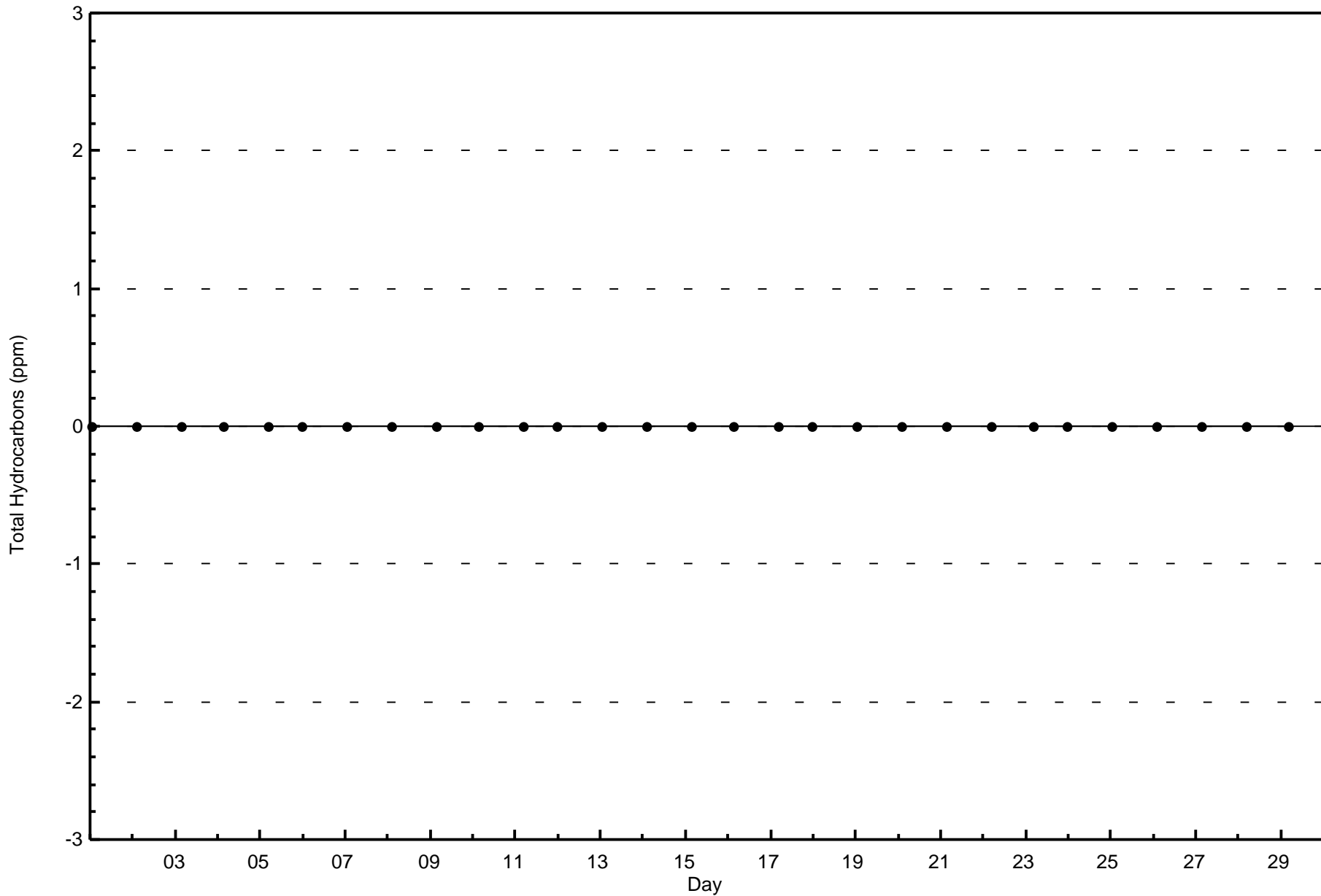


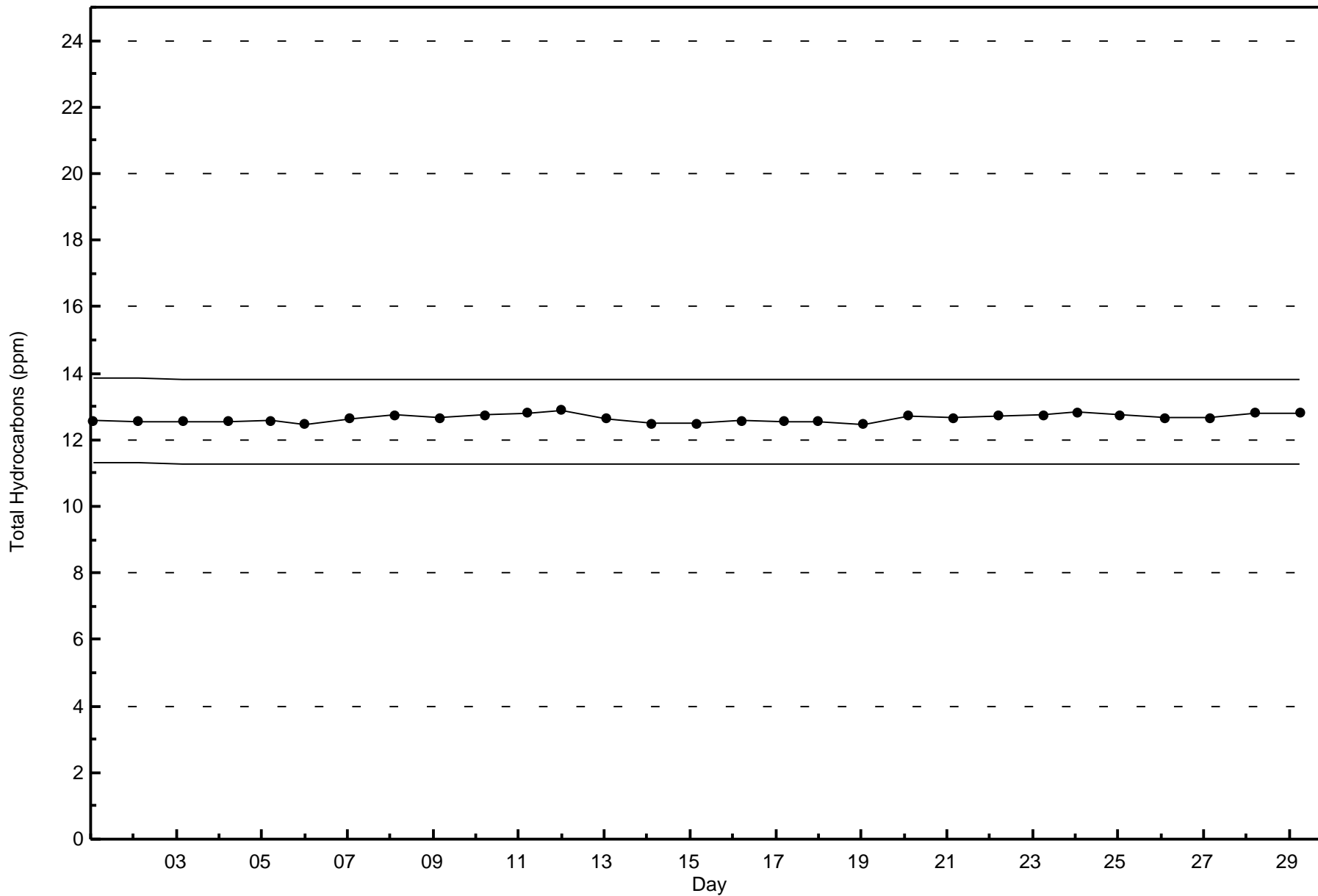
Total Number of Valid Hours: 655



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - February 2016





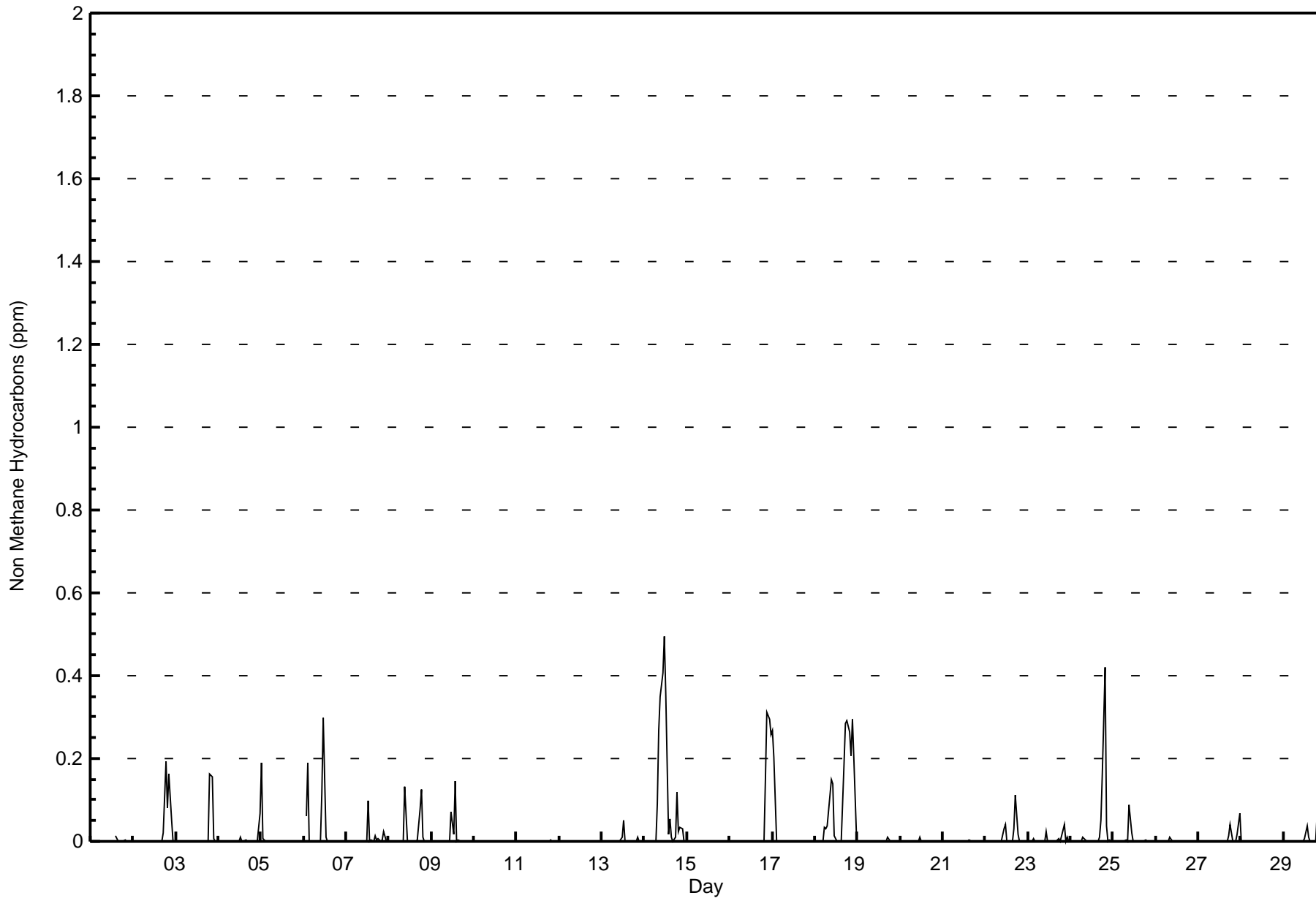


Maximum Value: 0.495 ppm on Feb 14 12:00		Maximum Daily Average: 0.098 ppm on Feb 14		Hours in Service:	696																								
Minimum Value: 0.000 ppm on Feb 1 01:00		Minimum Daily Average: 0.000 ppm on Feb 28		Hours of Data:	658																								
Maximum Diurnal Average: 0.036 ppm at hour 20		Minimum Diurnal Average: 0.000 ppm at hour 5		Hours of Missing Data:	38																								
Monthly Average: 0.015 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:	35																								
				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	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	0.013	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	--	0.013			
2-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	0.020	0.194	0.082	0.163	0.051	0.000	0.000	0.022	0.194			
3-Feb	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	0.161	0.156	0.006	0.000	0.000	0.014	0.161		
4-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.004	0.068			
5-Feb	0.191	0.007	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	0.009	0.191			
6-Feb	Z	0.060	0.189	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.117	0.299	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.029	0.299			
7-Feb	0.000	Z	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.099	0.000	0.002	0.000	0.014	0.004	0.006	0.000	0.003	0.025	0.000	0.000	0.000	0.007	0.099			
8-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.134	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.079	0.125	0.009	0.000	0.000	0.000	0.000	0.015	0.134			
9-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.071	0.018	0.147	0.000	0.003	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.010	0.147			
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	0.001	0.000	0.000	0.000	0.000	0.001			
11-Feb	0.000	0.000	0.000	0.000	0.000	Z	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	0.003	0.000	0.000	0.001	0.000	0.000	0.003			
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	0.009	0.052	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.003	0.052			
14-Feb	0.000	0.000	Z	0.000	0.001	0.000	0.000	0.091	0.269	0.350	0.406	0.495	0.361	0.016	0.053	0.009	0.000	0.009	0.118	0.023	0.033	0.029	0.000	0.001	0.098	0.495			
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	0.000	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	0.000	0.000	0.000	0.000	0.000	0.148	0.313	0.295	0.257	0.044	0.313			
17-Feb	0.269	0.203	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	0.021	0.269			
18-Feb	Z	0.000	0.000	0.000	0.001	0.035	0.030	0.038	0.111	0.149	0.141	0.014	0.000	0.000	0.000	0.000	0.185	0.284	0.292	0.264	0.205	0.295	0.199	0.000	0.097	0.295			
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	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010			
20-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.012			
21-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	PF	PF	PF	0.000	0.003	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	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.030	0.042	0.000	0.000	0.000	0.000	0.029	0.113	0.017	0.000	0.000	0.000	0.000	0.000	0.010	0.113			
23-Feb	0.000	0.000	0.000	0.007	0.000	Z	0.000	0.000	0.000	0.000	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.014	0.042	0.000	0.009	0.000	0.005	0.042			
24-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.052	0.164	0.422	0.038	0.000	0.002	0.000	0.000	0.031	0.422			
25-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.087	0.021	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	0.005	0.087			
26-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009			
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	0.013	0.041	0.001	0.000	0.000	0.016	0.067	0.006	0.067			
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			
29-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.036	0.011	0.000	0.001	0.000	0.000	0.063	0.013	0.000	0.000	0.000	0.006	0.063			
		0.018	0.011	0.008	0.000	0.000	0.002	0.001	0.005	0.014	0.026	0.026	0.035	0.021	0.007	0.003	0.001	0.008	0.020	0.033	0.036	0.028	0.025	0.018	0.014	Diurnal Average			
		0.269	0.203	0.189	0.007	0.001	0.035	0.030	0.091	0.269	0.350	0.406	0.495	0.361	0.147	0.053	0.009	0.185	0.284	0.292	0.422	0.205	0.313	0.295	0.257	Diurnal Maximum			
Z - zerspan		C - Calibration			PF - Power Failure																								



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	561	85.26	85.26
0.006 - 0.05	51	7.75	93.01
0.06 - 0.1	20	3.04	96.05
> 0.1	26	3.95	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - February 2016**

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	100	12	8	8	12	19	142	36	7	10	17	14	20	6	18	130	559
0.006 - 0.05	6	1	1	2	3	1	9	6	1	2	0	1	3	0	0	15	51
0.06 - 0.1	2	2	0	1	0	0	9	1	0	0	0	0	0	0	0	5	20
> 0.1	9	0	1	1	0	0	2	1	1	0	0	1	0	1	2	6	25
Totals	117	15	10	12	15	20	162	44	9	12	17	16	23	7	20	156	655

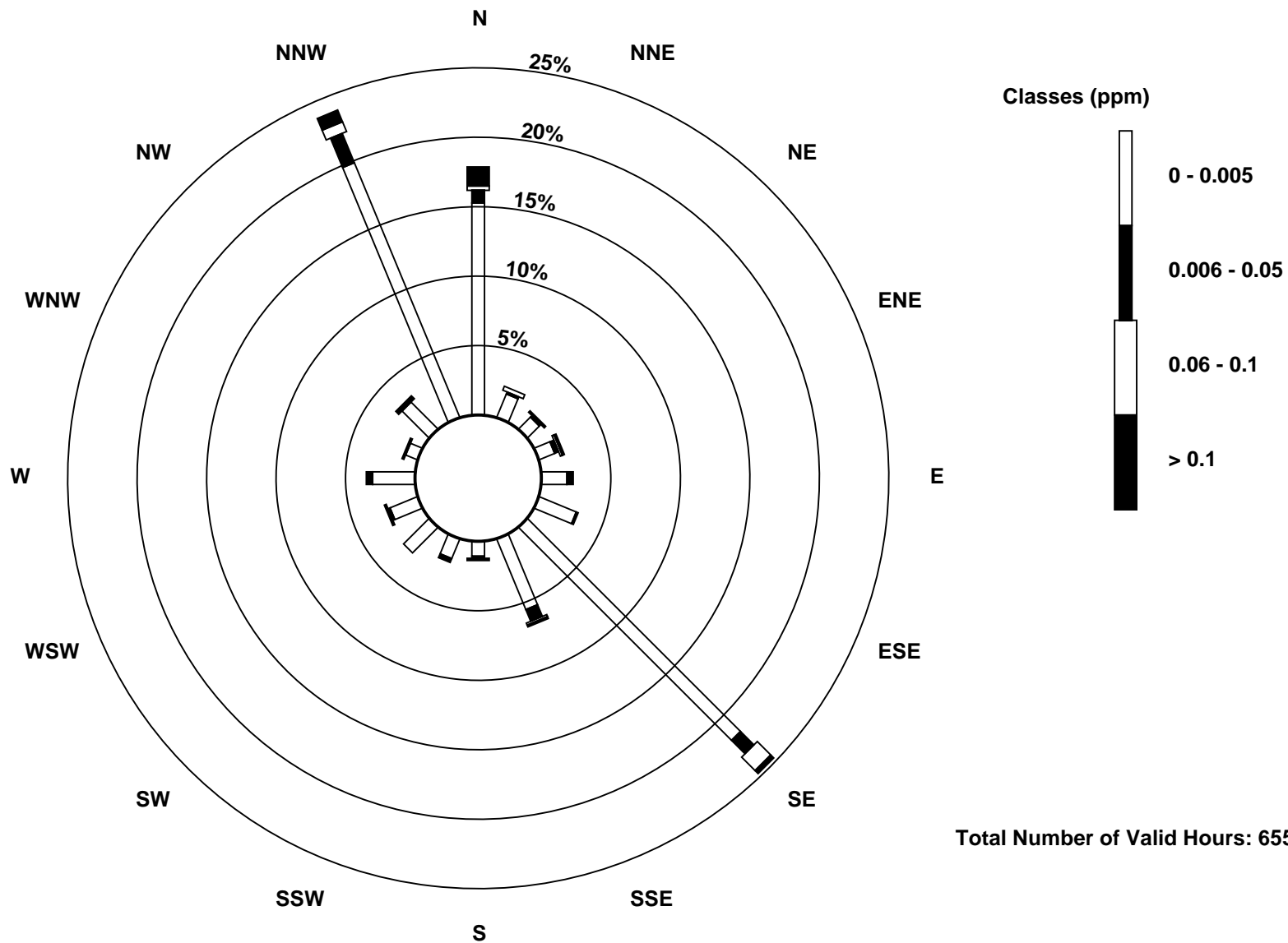
Total Number of Valid Hours: 655

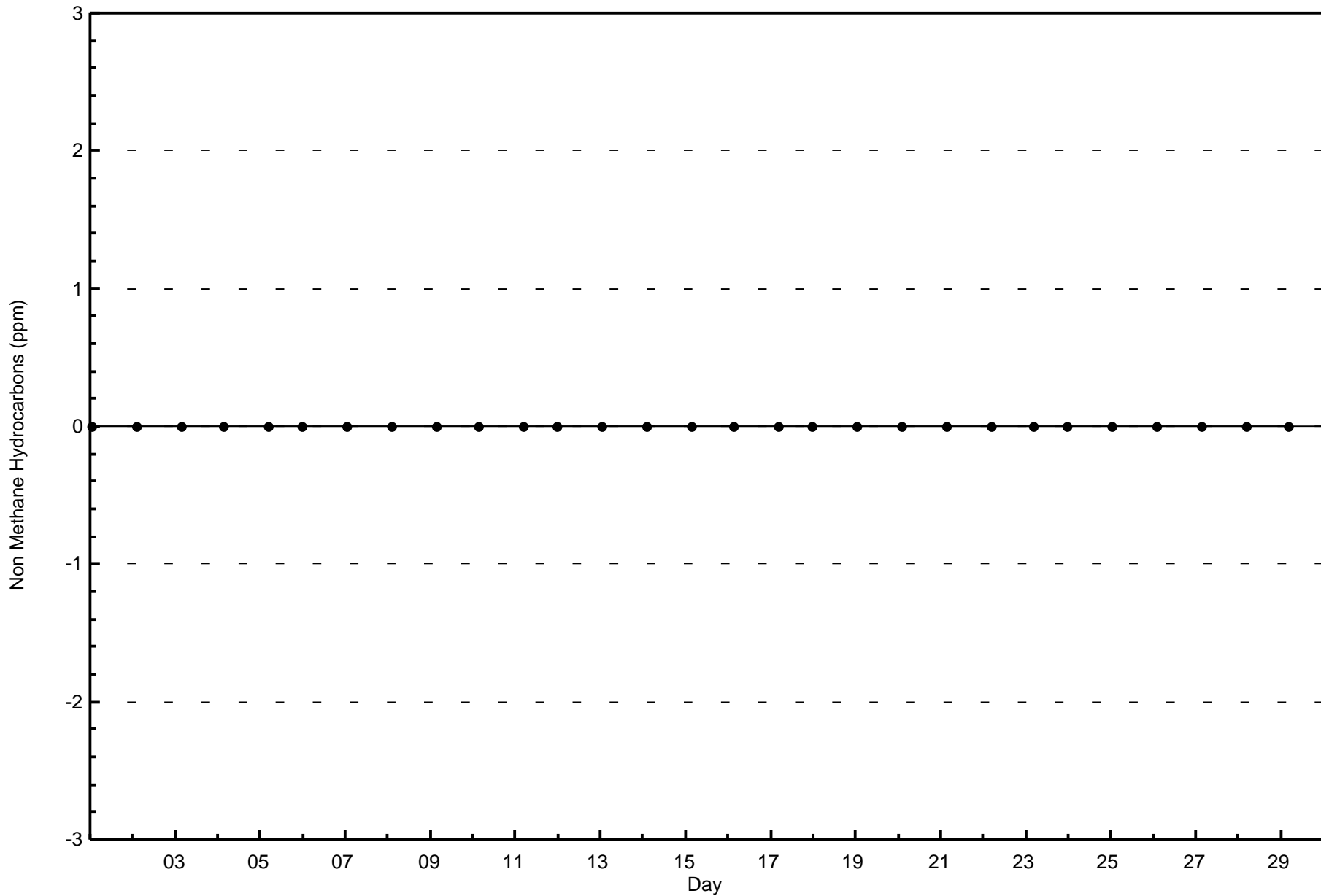
Total Number of Hours: 696

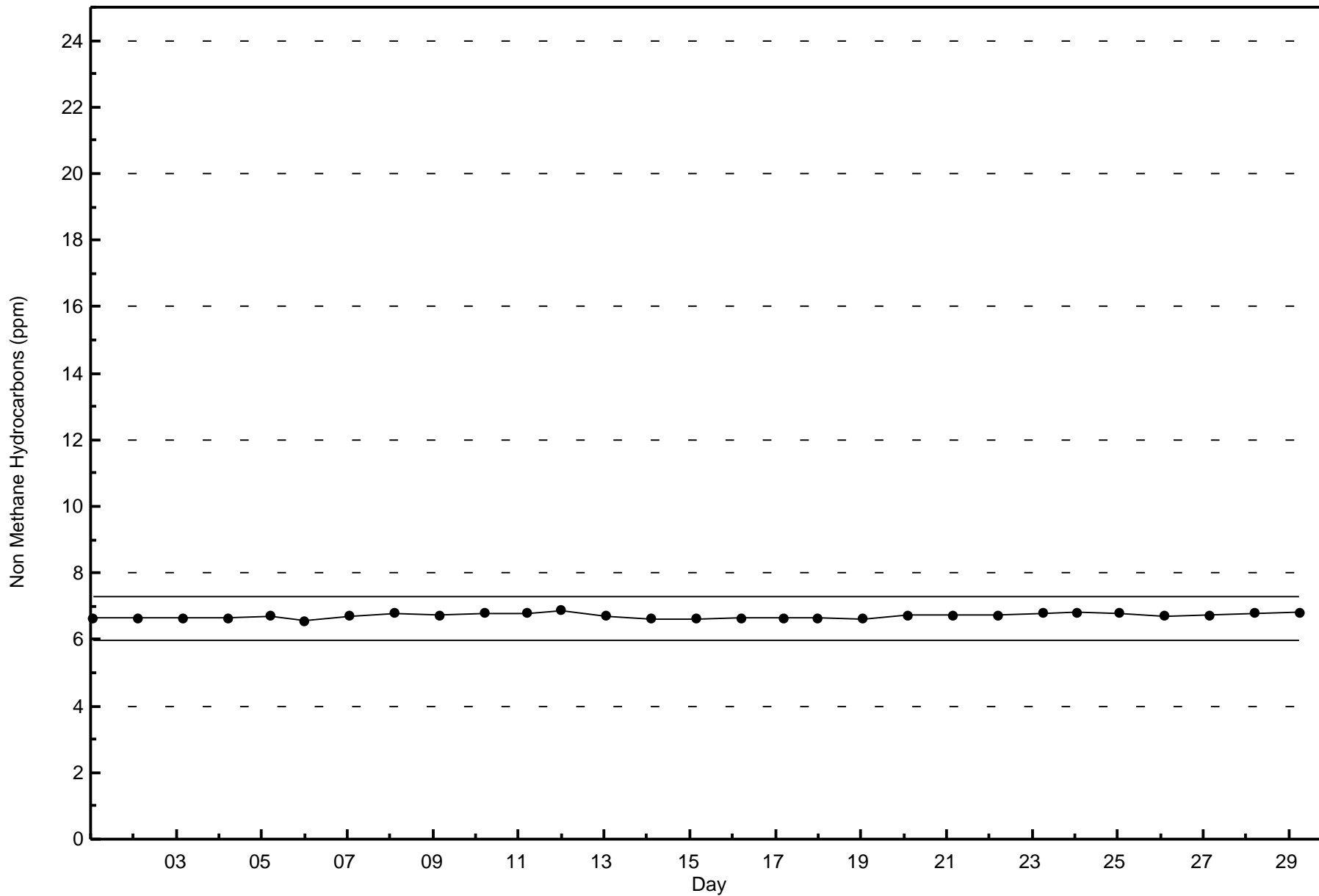


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)









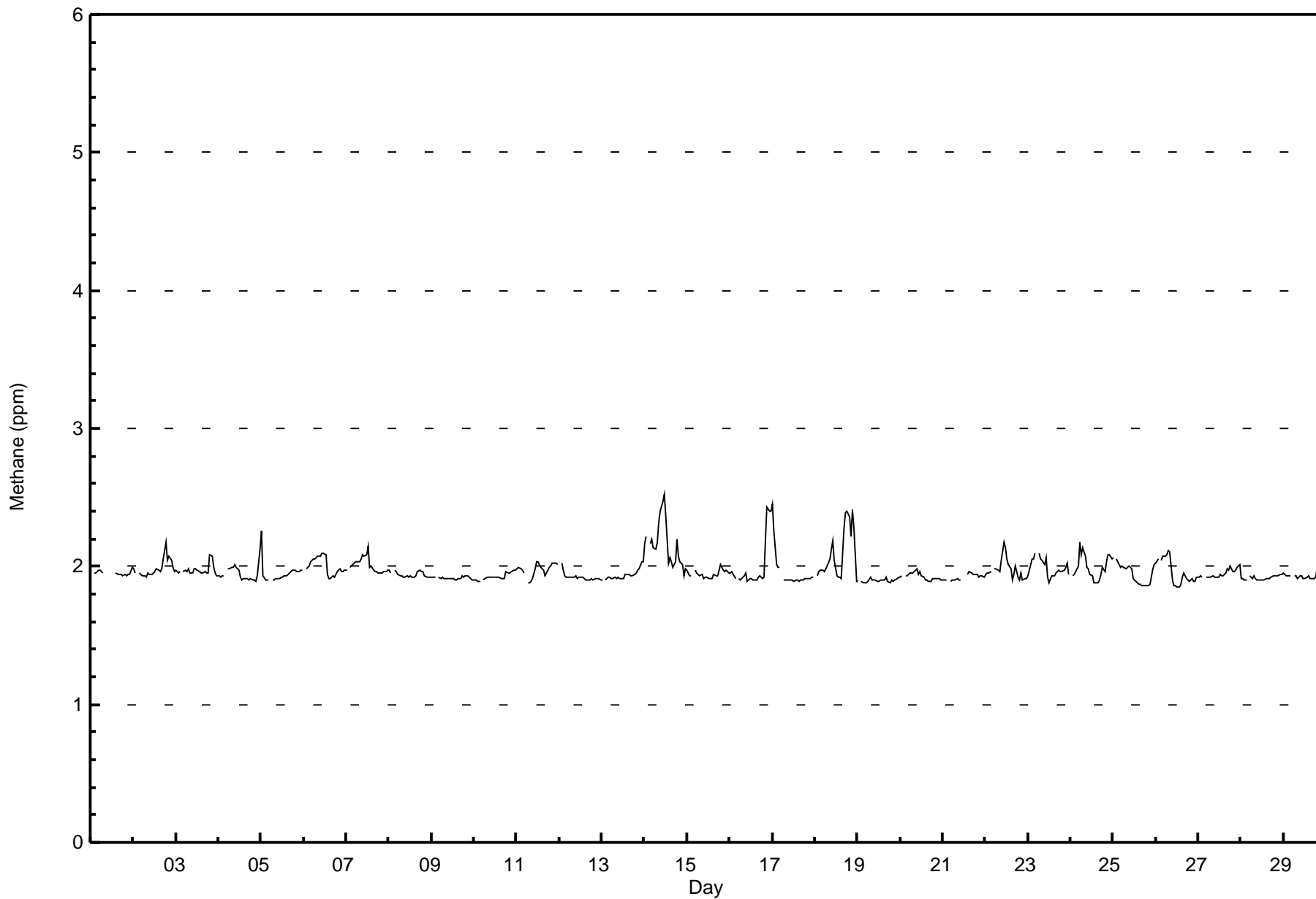
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696												
Maximum Value: 2.5 ppm on Feb 14 12:00														Maximum Daily Average: 2.2 ppm on Feb 14												
Minimum Value: 1.8 ppm on Feb 26 13:00														Minimum Daily Average: 1.9 ppm on Feb 19												
Maximum Diurnal Average: 2.0 ppm at hour 1														Minimum Diurnal Average: 1.9 ppm at hour 16												
Monthly Average: 1.97 ppm														Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.4												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	1.9	2.0	2.0	2.0	2.0	C	C	C	C	C	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-Feb	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.1	2.0	2.0	2.0	2.0	2.2
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	1.9	2.0	2.0	2.0	2.1	2.1	2.0	2.0	1.9	2.0	2.1
4-Feb	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	1.9	2.1
5-Feb	2.3	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.3
6-Feb	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
7-Feb	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	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.1
8-Feb	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	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0
9-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
10-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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
11-Feb	2.0	2.0	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
12-Feb	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	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	2.0	2.0	2.0	2.0	1.9	2.0
14-Feb	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.2	2.3	2.4	2.5	2.5	2.4	2.0	2.1	2.0	2.0	2.0	2.2	2.1	2.0	2.0	1.9	2.0	2.2	2.5
15-Feb	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
16-Feb	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.4	2.4	2.4	2.0	2.4
17-Feb	2.5	2.3	2.0	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.5
18-Feb	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.0	1.9	1.9	1.9	1.9	2.3	2.4	2.4	2.4	2.2	2.4	2.3	1.9	2.1	2.4
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
20-Feb	1.9	1.9	Z	1.9	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
21-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	PF	PF	PF	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
22-Feb	1.9	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.2
23-Feb	1.9	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	
24-Feb	Z	1.9	1.9	2.0	2.0	2.2	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.2
25-Feb	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.1
26-Feb	2.0	2.1	Z	2.0	2.1	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
27-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0
28-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
29-Feb	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0
2.0 2.0 1.9 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 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																								Diurnal Average		
2.5 2.3 2.1 2.2 2.2 2.2 2.1 2.2 2.3 2.4 2.5 2.5 2.4 2.0 2.1 2.0 2.3 2.4 2.4 2.4 2.2 2.4 2.4 2.4 2.4 2.4																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	584	88.75	88.75
2.1 - 3.0	74	11.25	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - February 2016**

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	104	10	9	9	11	20	146	33	8	10	17	15	23	6	18	143	582
2.1 - 3.0	13	5	1	3	4	0	16	11	1	2	0	1	0	1	2	13	73
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	117	15	10	12	15	20	162	44	9	12	17	16	23	7	20	156	655

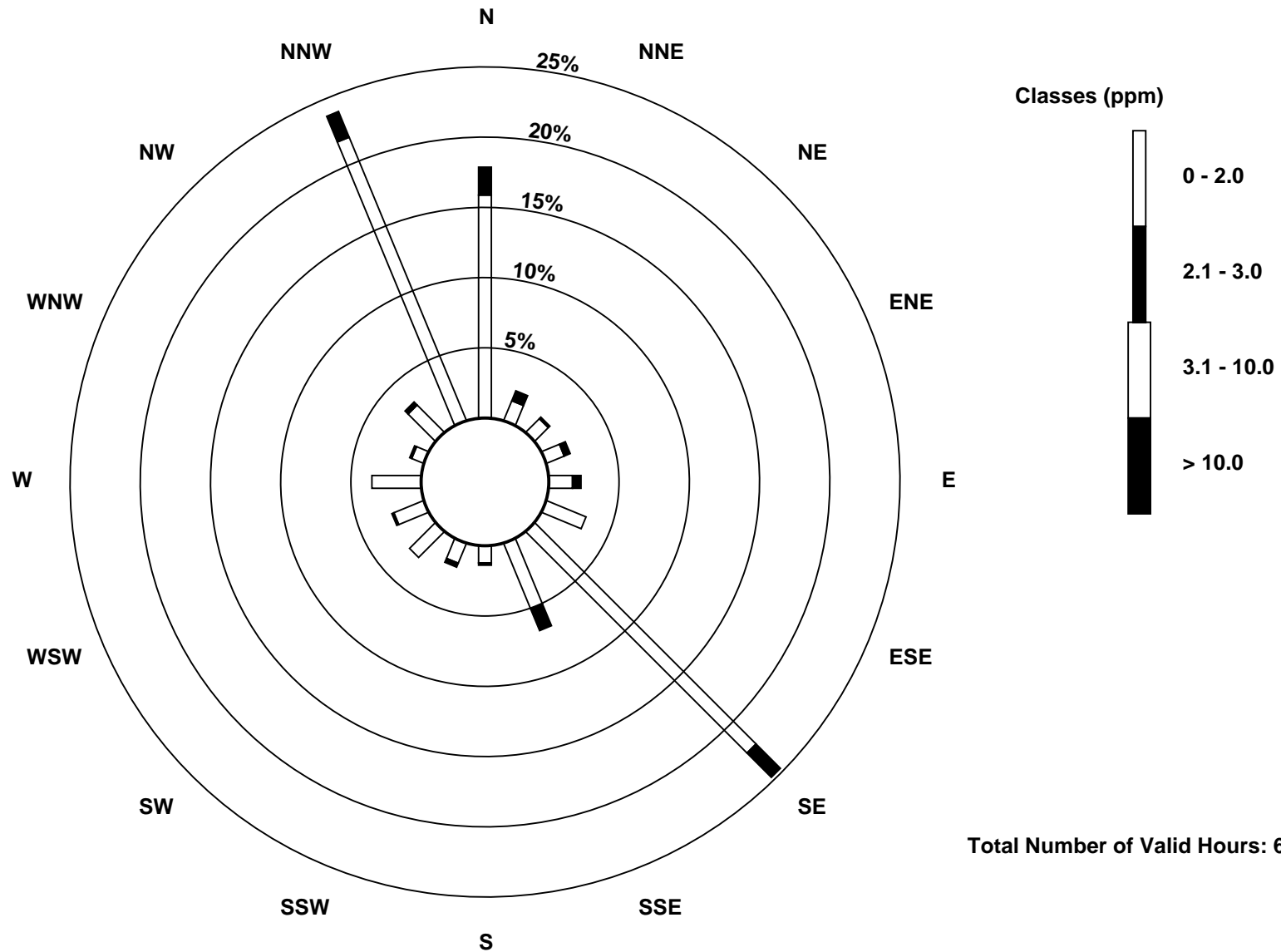
Total Number of Valid Hours: 655

Total Number of Hours: 696

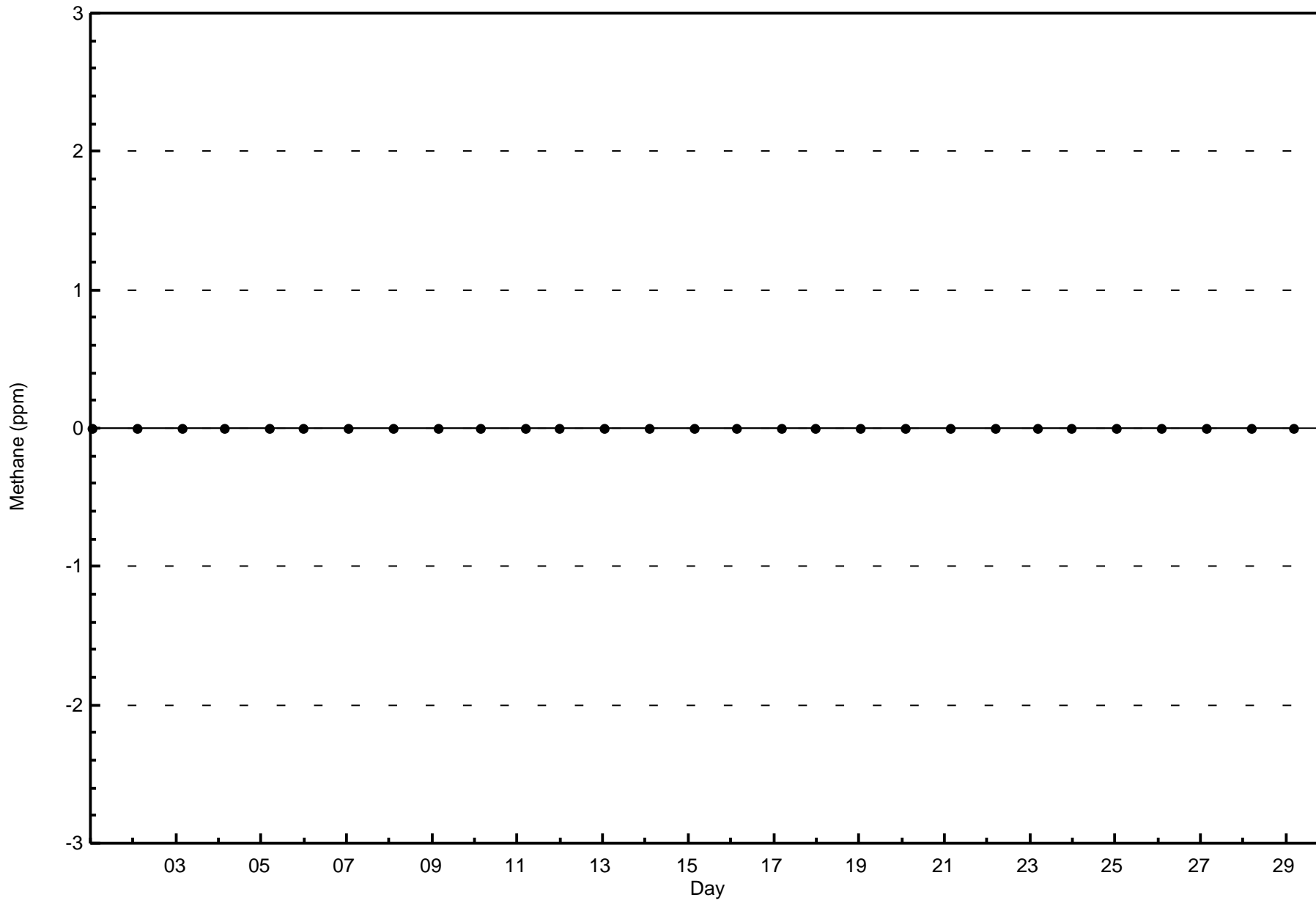


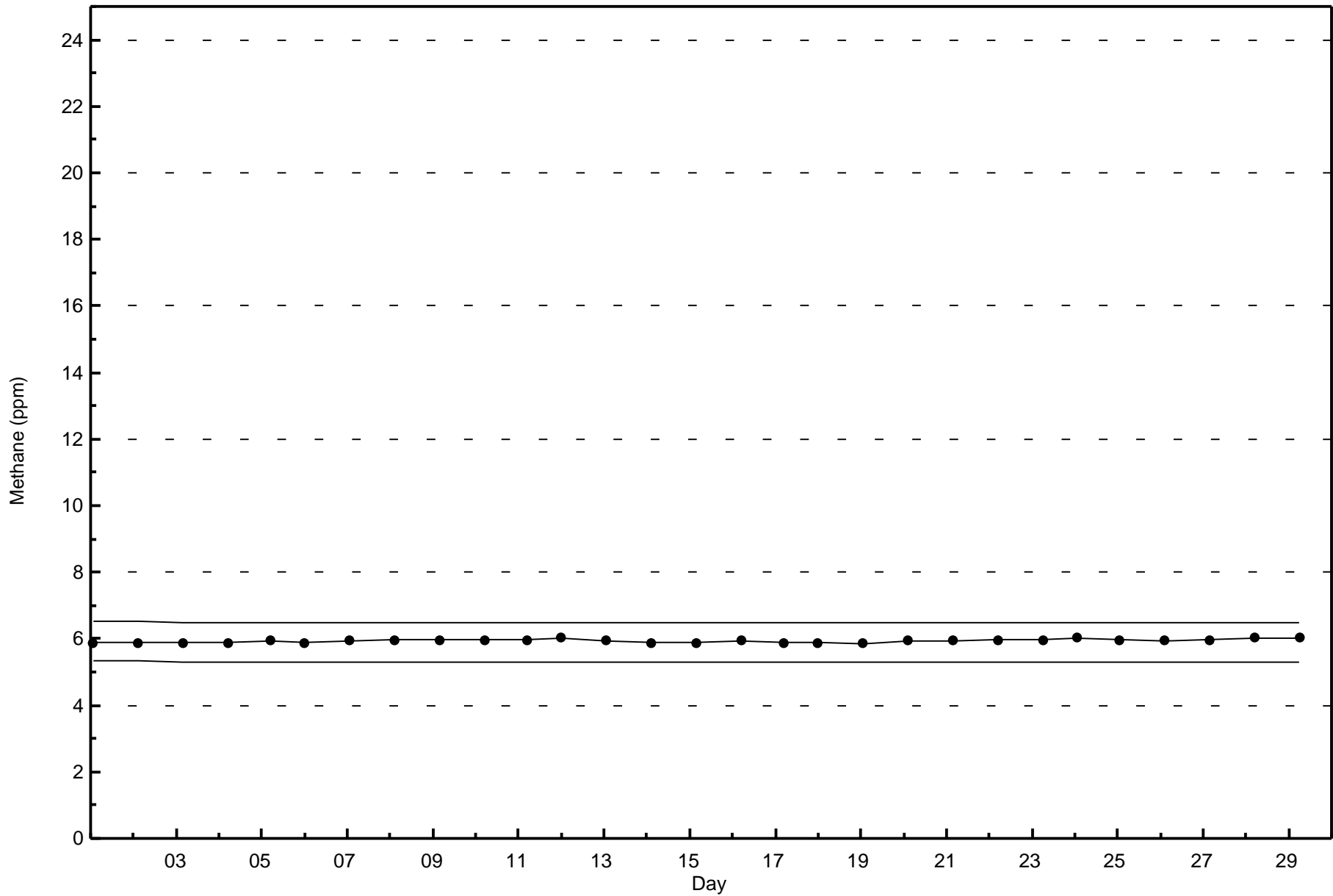
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Methane (CH₄) - ppm
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 655







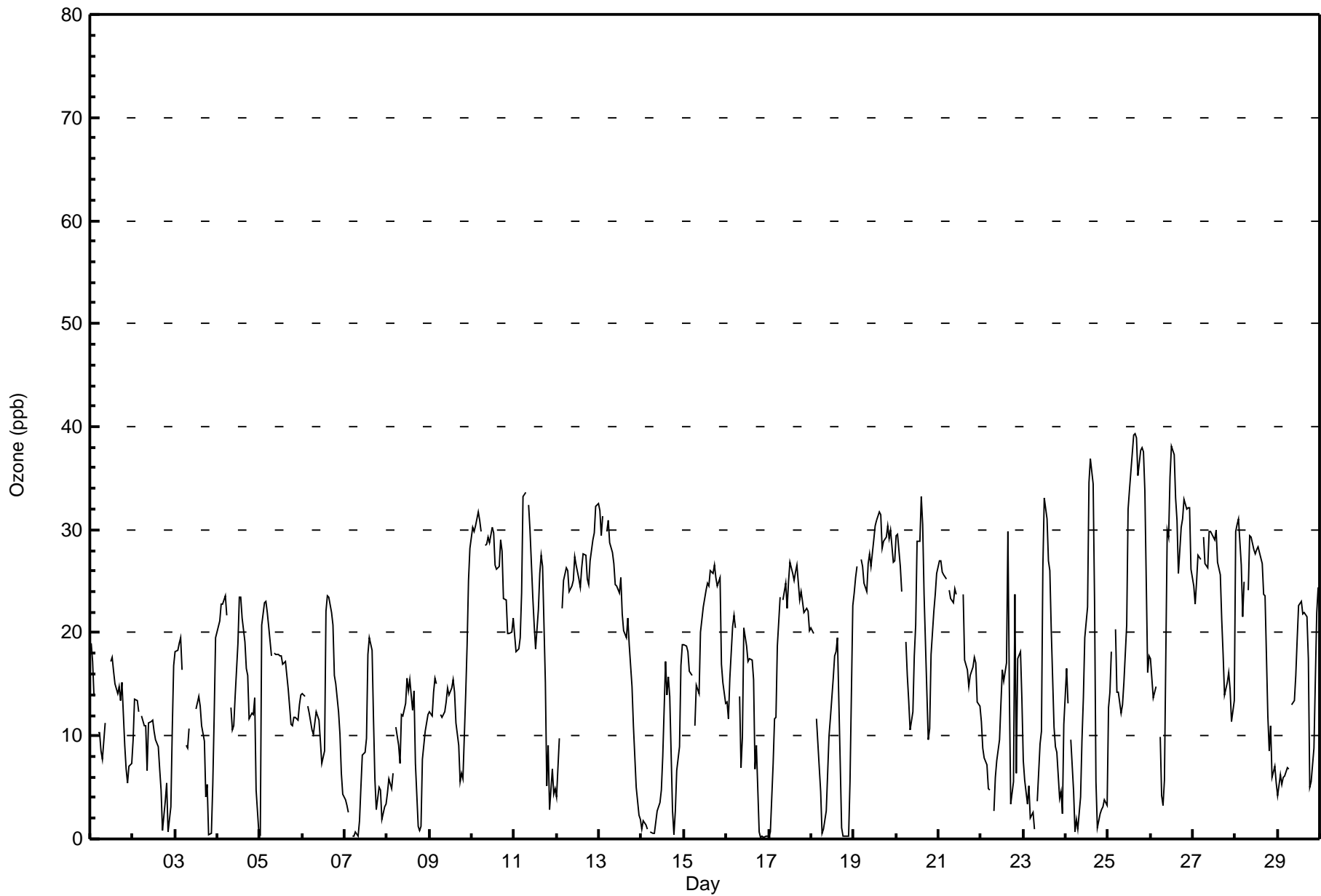
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 39 ppb on Feb 25 16:00										Maximum Daily Average: 27.9 ppb on Feb 19																
Minimum Value: 0 ppb on Feb 16 22:00										Minimum Daily Average: 6.0 ppb on Feb 7																
Maximum Diurnal Average: 23.0 ppb at hour 14										Minimum Diurnal Average: 12.5 ppb at hour 19																
Monthly Average: 16.5 ppb										Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 9 Median = 16 Q ₃ = 25 P ₉₀ = 29 P ₉₉ = 38																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	17	14	Z	10	10	9	8	11	M	M	17	18	16	15	14	15	13	15	9	7	5	7	7	12.3	19
2-Feb	10	14	13	12	Z	12	11	11	7	11	11	11	11	10	9	7	5	1	4	5	1	3	11	17	8.9	17
3-Feb	18	18	19	20	16	Z	9	9	11	C	C	C	13	14	13	11	9	4	5	0	0	5	12	19	11.3	20
4-Feb	21	21	23	23	24	22	Z	13	11	11	14	19	23	24	21	19	17	16	12	12	12	14	5	1	16.3	24
5-Feb	0	21	23	23	22	21	18	Z	18	18	18	18	18	17	17	16	14	11	11	12	12	12	13	14	15.9	23
6-Feb	14	14	Z	13	12	11	10	11	12	12	9	7	9	22	24	23	22	21	16	15	12	10	6	4	13.5	24
7-Feb	4	3	3	Z	0	0	1	0	2	5	8	8	10	18	20	18	12	6	3	5	5	2	3	3	6.0	20
8-Feb	4	6	5	6	Z	11	9	7	12	12	13	16	14	15	12	14	7	1	1	1	8	10	11	12	9.1	16
9-Feb	12	12	14	16	15	Z	12	12	12	13	15	14	15	15	14	11	9	6	6	6	14	19	25	28	13.7	28
10-Feb	30	30	30	32	31	30	Z	28	29	29	29	30	30	27	26	26	29	28	23	23	20	20	20	21	27.0	32
11-Feb	20	18	19	19	24	33	34	Z	32	30	23	21	18	22	26	28	26	15	5	9	3	7	4	5	19.2	34
12-Feb	4	10	Z	22	25	26	26	24	25	25	27	27	25	24	26	28	27	25	25	27	29	30	32	33	24.9	33
13-Feb	32	29	31	Z	30	31	29	28	27	25	25	24	25	22	20	19	21	19	15	11	8	5	2	2	20.9	32
14-Feb	1	2	1	1	Z	1	0	1	2	3	4	5	8	17	14	16	14	3	0	3	7	9	17	19	6.3	19
15-Feb	19	19	18	16	16	Z	11	15	14	20	21	23	24	25	25	26	26	27	25	24	25	17	15	13	20.2	27
16-Feb	13	12	16	21	22	20	Z	14	7	10	20	19	17	17	17	15	7	9	1	0	0	0	0	0	11.2	22
17-Feb	0	1	7	12	12	19	23	Z	23	25	22	25	27	26	25	26	27	23	24	23	22	22	22	20	19.8	27
18-Feb	20	20	Z	12	7	5	1	1	3	6	10	12	16	18	18	20	7	1	0	0	0	0	6	23	8.9	23
19-Feb	24	25	26	Z	27	26	25	24	27	28	26	29	30	31	32	31	28	29	29	30	29	30	27	27	27.9	32
20-Feb	29	30	26	24	Z	19	16	13	11	12	18	21	29	29	33	31	24	14	10	11	18	22	24	26	21.2	33
21-Feb	27	27	26	26	25	Z	24	23	23	24	24	PF	PF	PF	24	17	16	15	16	17	18	17	13	13	20.7	27
22-Feb	11	9	8	7	5	5	Z	3	6	8	10	13	16	15	17	30	15	3	6	24	6	18	18	14	11.6	30
23-Feb	8	6	3	5	2	3	1	Z	4	9	10	26	33	31	27	26	20	11	9	8	4	5	2	11	11.5	33
24-Feb	17	13	Z	10	5	1	2	1	4	10	14	20	22	35	37	34	23	6	1	2	3	3	4	3	11.7	37
25-Feb	13	14	18	Z	20	14	14	12	13	15	21	32	34	36	39	39	39	35	38	38	38	34	16	18	25.7	39
26-Feb	17	14	14	15	Z	10	4	3	6	30	29	35	38	37	33	31	26	30	31	33	32	32	32	26	24.3	38
27-Feb	25	23	25	27	Z	29	27	26	30	30	29	29	30	27	26	21	18	14	15	16	15	11	13	23.2	30	
28-Feb	30	31	31	27	22	25	Z	24	29	29	28	28	28	28	27	27	24	24	12	9	11	6	7	5	22.2	31
29-Feb	4	6	5	6	6	7	7	Z	13	13	16	19	23	23	22	22	22	18	5	5	9	15	22	24	13.6	24
15.4 16.0 16.8 16.4 16.9 15.0 13.5 13.0 14.4 17.2 18.4 20.3 21.5 23.0 22.8 22.5 19.0 14.9 12.5 13.1 12.7 13.3 13.4 14.6																								Diurnal Average		
32 31 31 32 31 33 34 28 32 30 30 35 38 37 39 39 39 35 38 38 38 38 34 32 33																								Diurnal Maximum		
Z - zerspan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	416	63.13	63.13
21 - 50	243	36.87	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	9	7	8	14	17	115	31	9	7	10	12	17	7	17	76	413
21 - 50	64	6	2	4	2	1	48	13	0	3	7	3	7	0	4	79	243
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	121	15	9	12	16	18	163	44	9	10	17	15	24	7	21	155	656

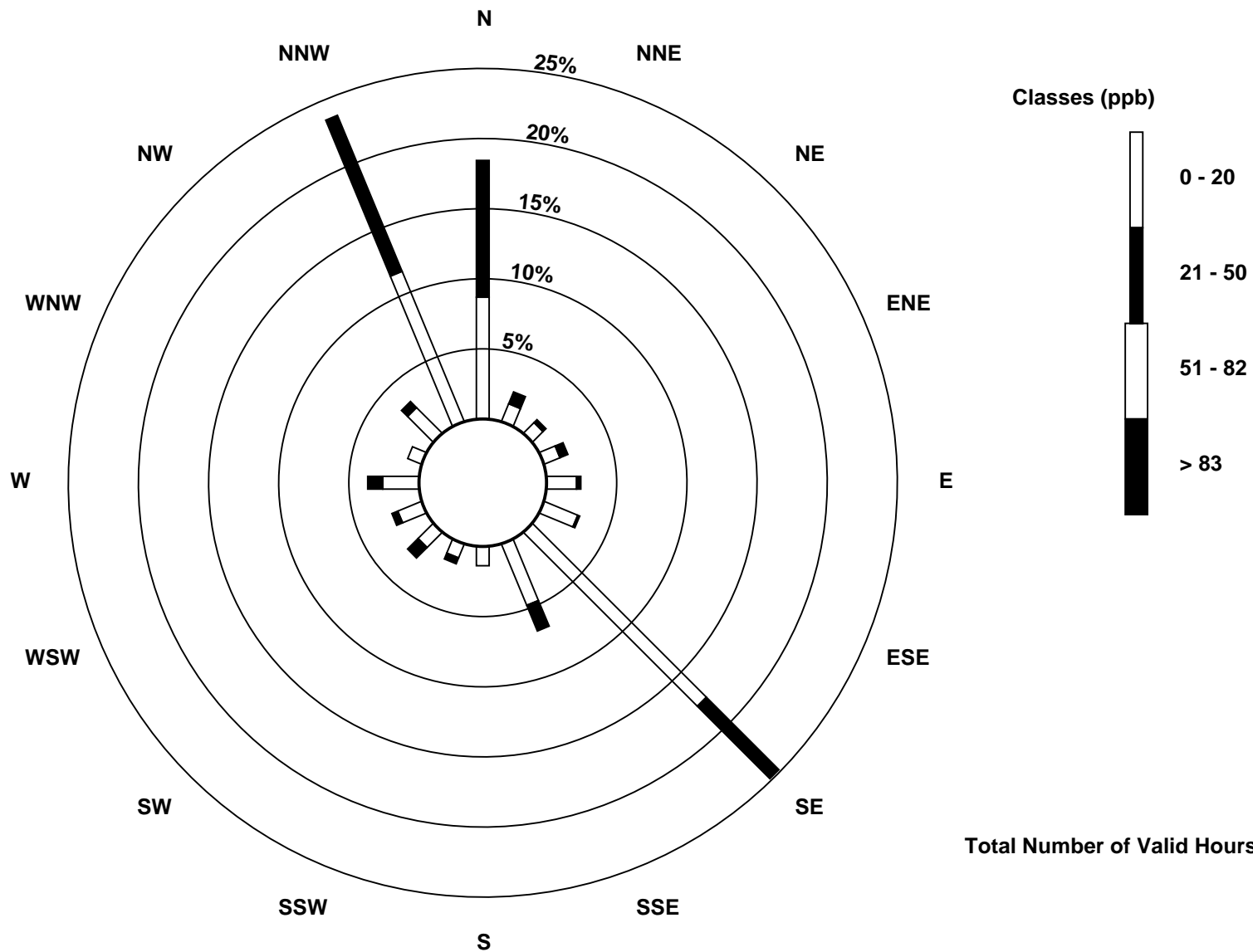
Total Number of Valid Hours: 656

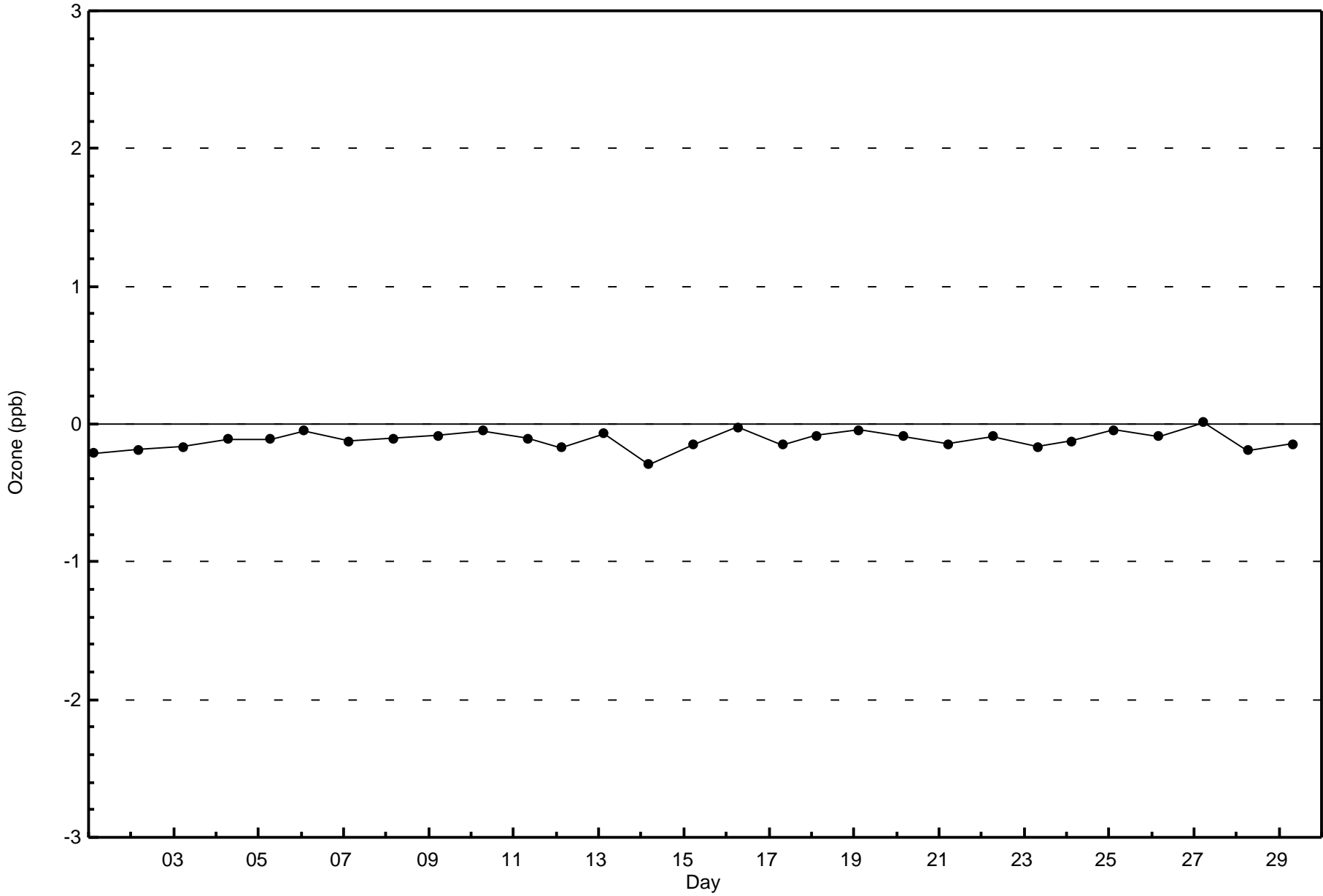
Total Number of Hours: 696

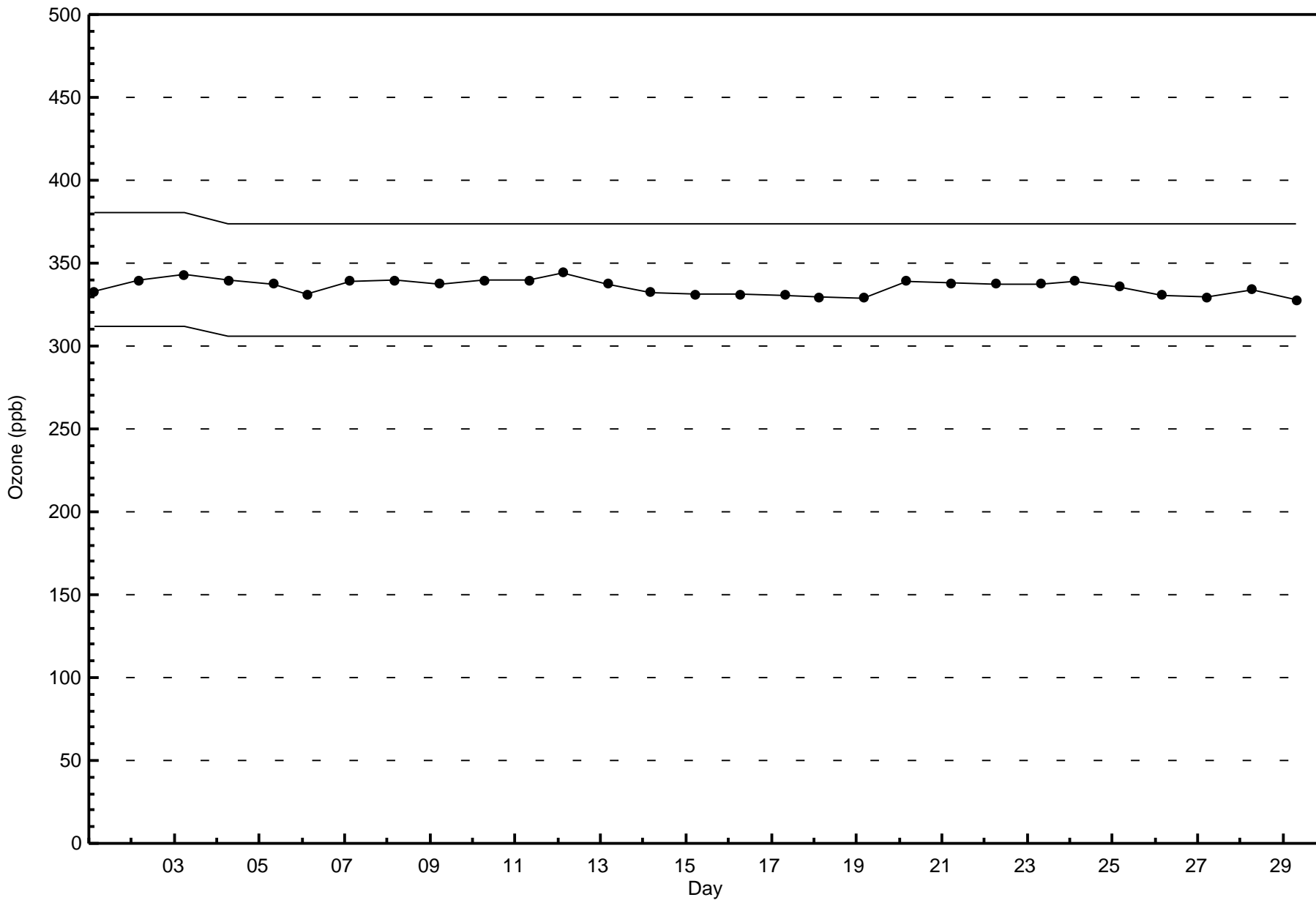


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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







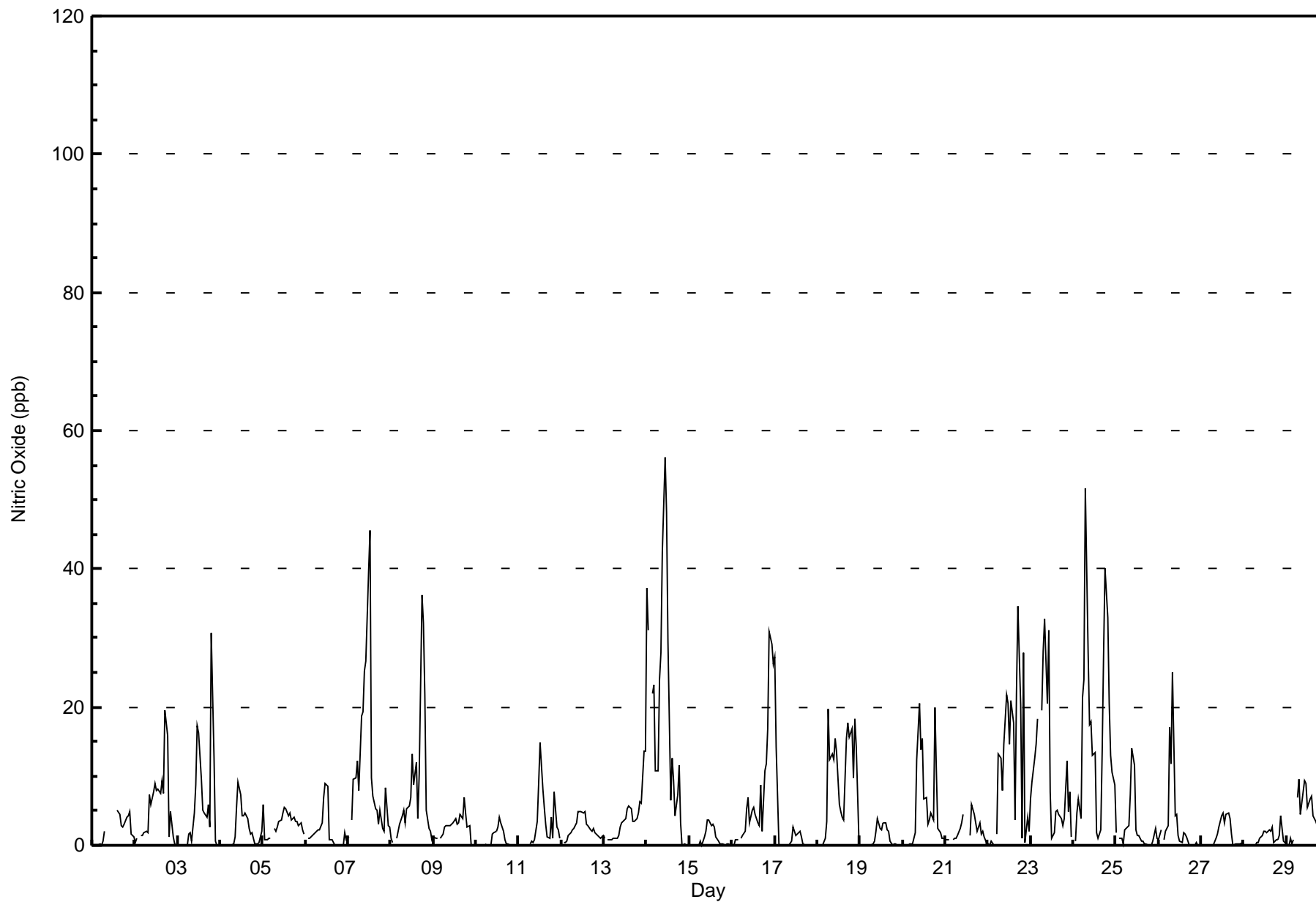


Maximum Value: 56 ppb on Feb 14 11:00		Maximum Daily Average: 18.2 ppb on Feb 14		Hours in Service:	696																																												
Minimum Value: 0 ppb on Feb 6 17:00		Minimum Daily Average: 0.8 ppb on Feb 10		Hours of Data:	658																																												
Maximum Diurnal Average: 10.3 ppb at hour 11		Minimum Diurnal Average: 1.2 ppb at hour 3		Hours of Missing Data:	38																																												
Monthly Average: 5.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 6 P ₉₀ = 15 P ₉₉ = 40		Hours of Calibration:	35																																												
				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	0	Z	0	0	0	0	1	2	C	C	C	C	C	C	5	4	3	3	3	4	4	5	2	1	--	5																							
2-Feb	0	1	Z	1	2	2	2	2	7	6	8	9	8	8	8	9	8	19	16	1	5	1	0	0	5.4	19																							
3-Feb	0	0	0	Z	0	0	2	2	1	5	9	17	16	10	5	5	4	6	3	31	13	1	0	0	5.5	31																							
4-Feb	0	0	0	0	Z	0	0	0	1	5	9	7	4	4	5	4	2	2	2	0	0	0	0	2	2.2	9																							
5-Feb	6	1	1	1	1	Z	2	2	3	3	4	5	5	5	4	5	4	4	4	4	3	3	2	2	3.1	6																							
6-Feb	Z	1	1	1	1	2	2	2	2	3	7	9	9	1	1	1	0	0	0	0	0	0	2	1	2.0	9																							
7-Feb	1	Z	4	10	10	12	8	19	19	25	27	40	46	10	7	5	5	3	5	3	2	8	3	3	11.9	46																							
8-Feb	1	0	Z	1	2	3	4	5	3	5	6	7	13	9	12	4	10	36	32	22	5	3	2	1	8.1	36																							
9-Feb	1	1	1	Z	1	2	3	3	3	3	3	3	4	3	3	4	4	7	5	3	3	0	0	0	2.6	7																							
10-Feb	0	0	0	0	Z	0	0	0	0	2	2	2	3	4	3	2	1	0	0	0	0	0	0	0	0.8	4																							
11-Feb	0	0	0	0	0	Z	0	1	0	1	3	9	15	8	5	3	1	1	4	1	8	3	2	1	2.9	15																							
12-Feb	Z	0	0	1	1	2	2	2	3	5	5	5	5	5	3	3	2	2	2	2	1	1	1	1	2.5	5																							
13-Feb	1	Z	1	1	1	1	1	1	2	3	3	4	4	5	6	5	3	3	4	5	6	6	14	14	4.0	14																							
14-Feb	37	31	Z	22	23	11	11	24	28	43	56	48	29	6	13	9	4	7	12	3	0	0	0	0	18.2	56																							
15-Feb	0	0	0	Z	0	0	1	0	1	2	4	4	3	3	3	1	1	0	0	0	0	0	0	0	1.0	4																							
16-Feb	0	0	1	1	Z	1	1	2	5	7	3	5	5	5	3	3	9	2	11	12	17	31	29	26	7.8	31																							
17-Feb	27	14	0	0	0	Z	0	0	0	1	3	2	1	2	2	1	0	0	0	0	0	0	0	0	2.3	27																							
18-Feb	Z	0	0	0	1	3	20	12	13	12	16	13	6	5	4	4	15	18	16	17	10	18	14	0	9.5	20																							
19-Feb	0	Z	0	0	0	0	0	0	1	2	4	3	2	3	3	2	2	1	0	0	0	0	0	0	1.0	4																							
20-Feb	0	0	Z	0	0	0	1	2	12	20	14	16	7	7	3	4	5	4	20	11	2	2	1	1	5.7	20																							
21-Feb	1	1	1	Z	1	1	1	1	2	3	5	PF	PF	PF	1	6	4	3	2	3	2	2	1	0	2.1	6																							
22-Feb	0	0	1	0	Z	2	13	13	8	15	22	21	15	21	18	4	22	35	20	1	28	0	4	2	11.4	35																							
23-Feb	7	9	13	15	18	Z	20	28	33	20	31	8	1	2	5	5	4	4	3	4	12	5	8	1	11.1	33																							
24-Feb	Z	1	5	7	4	21	24	52	28	18	18	13	13	2	1	2	14	28	40	33	21	13	10	9	16.3	52																							
25-Feb	2	Z	1	1	0	2	3	3	7	14	12	2	1	1	1	1	0	0	0	0	0	1	2	1	2.4	14																							
26-Feb	1	2	Z	1	2	3	17	12	25	4	4	1	1	0	2	2	1	0	0	0	0	0	0	0	3.4	25																							
27-Feb	0	0	0	Z	0	0	0	0	1	2	3	4	5	3	5	5	4	2	0	0	0	0	0	0	1.5	5																							
28-Feb	0	0	0	0	Z	0	0	0	0	1	1	2	2	2	2	2	3	0	1	1	1	4	1	0	1.1	4																							
29-Feb	0	0	1	0	1	Z	7	10	5	8	9	9	6	7	7	4	3	3	7	14	7	3	2	1	4.9	14																							
																								3.4	2.6	1.2	2.6	2.9	2.8	5.0	6.9	7.7	8.5	10.3	9.9	8.4	5.2	4.8	3.7	4.8	6.6	7.2	6.0	5.2	3.9	3.5	2.3	Diurnal Average	
																								37	31	13	22	23	21	24	52	33	43	56	48	46	21	18	9	22	36	40	33	28	31	29	26	Diurnal Maximum	
Z - zerspan																								C - Calibration				PF - Power Failure																					



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	618	93.92	93.92
21 - 40	35	5.32	99.24
41 - 80	5	0.76	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	111	14	10	10	11	20	153	36	7	11	17	15	23	6	18	154	616
21 - 40	6	1	0	1	4	0	9	7	2	1	0	0	0	0	2	1	34
41 - 80	0	0	0	1	0	0	0	1	0	0	0	1	0	1	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	117	15	10	12	15	20	162	44	9	12	17	16	23	7	20	156	655

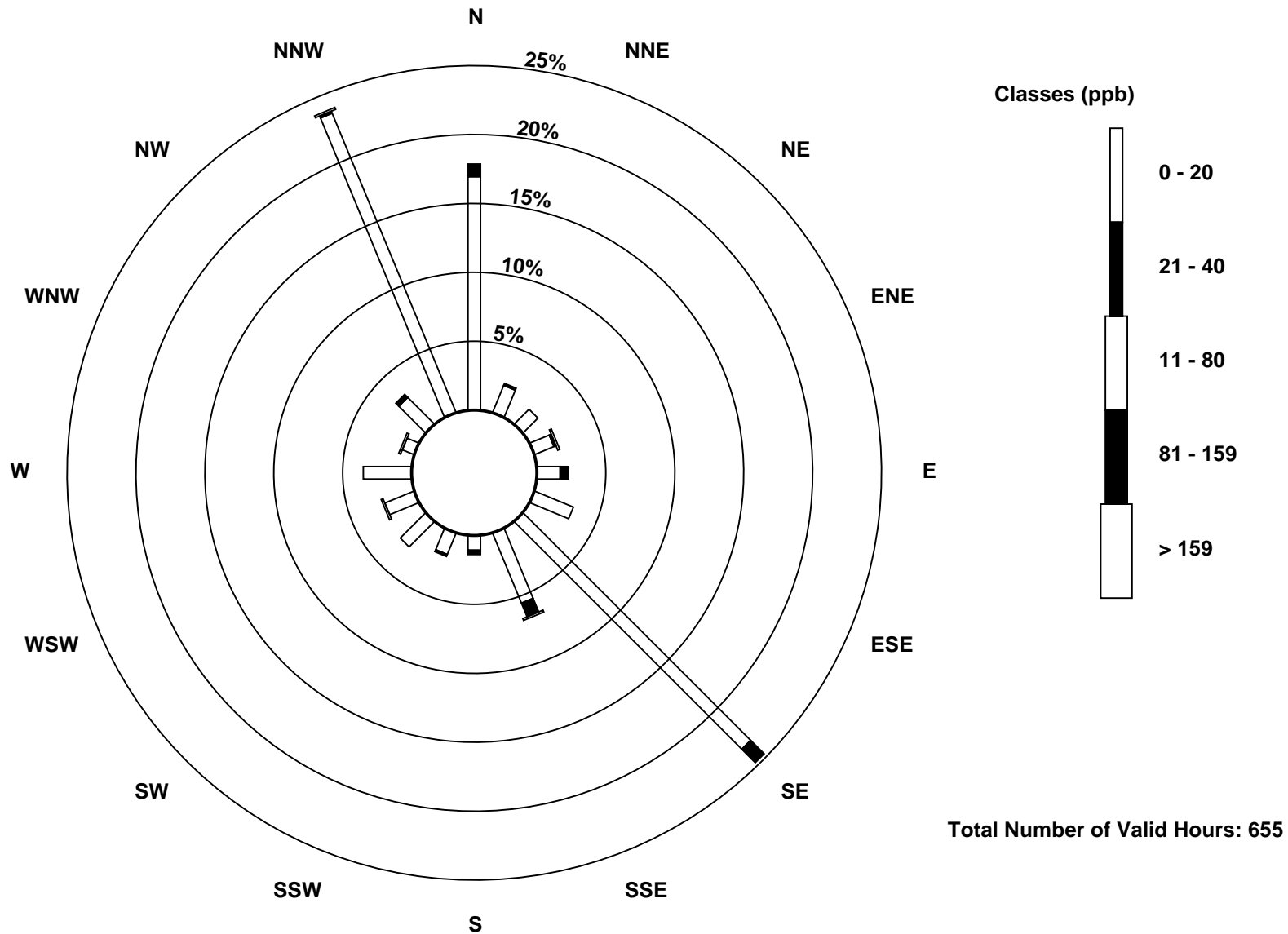
Total Number of Valid Hours: 655

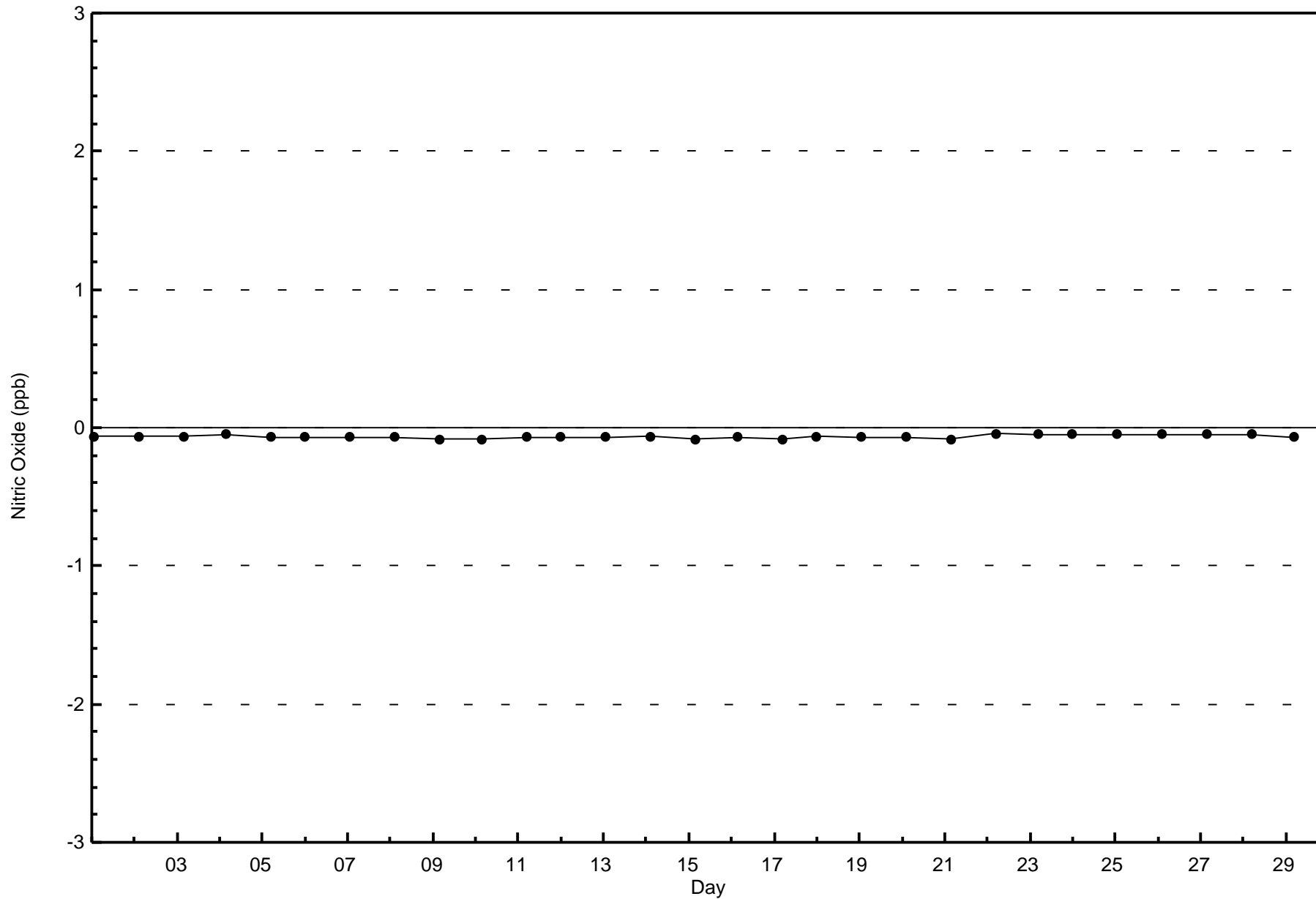
Total Number of Hours: 696

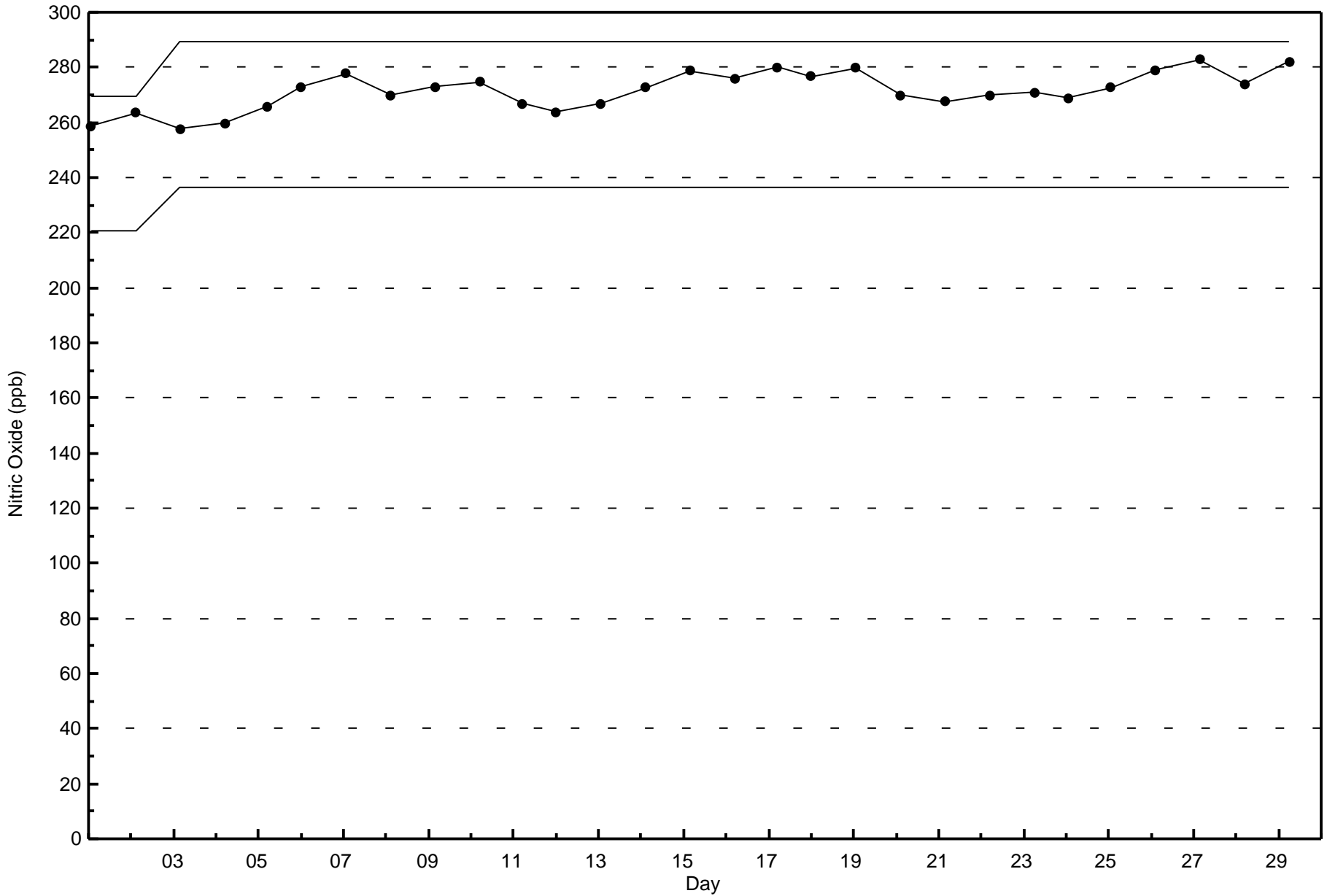


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

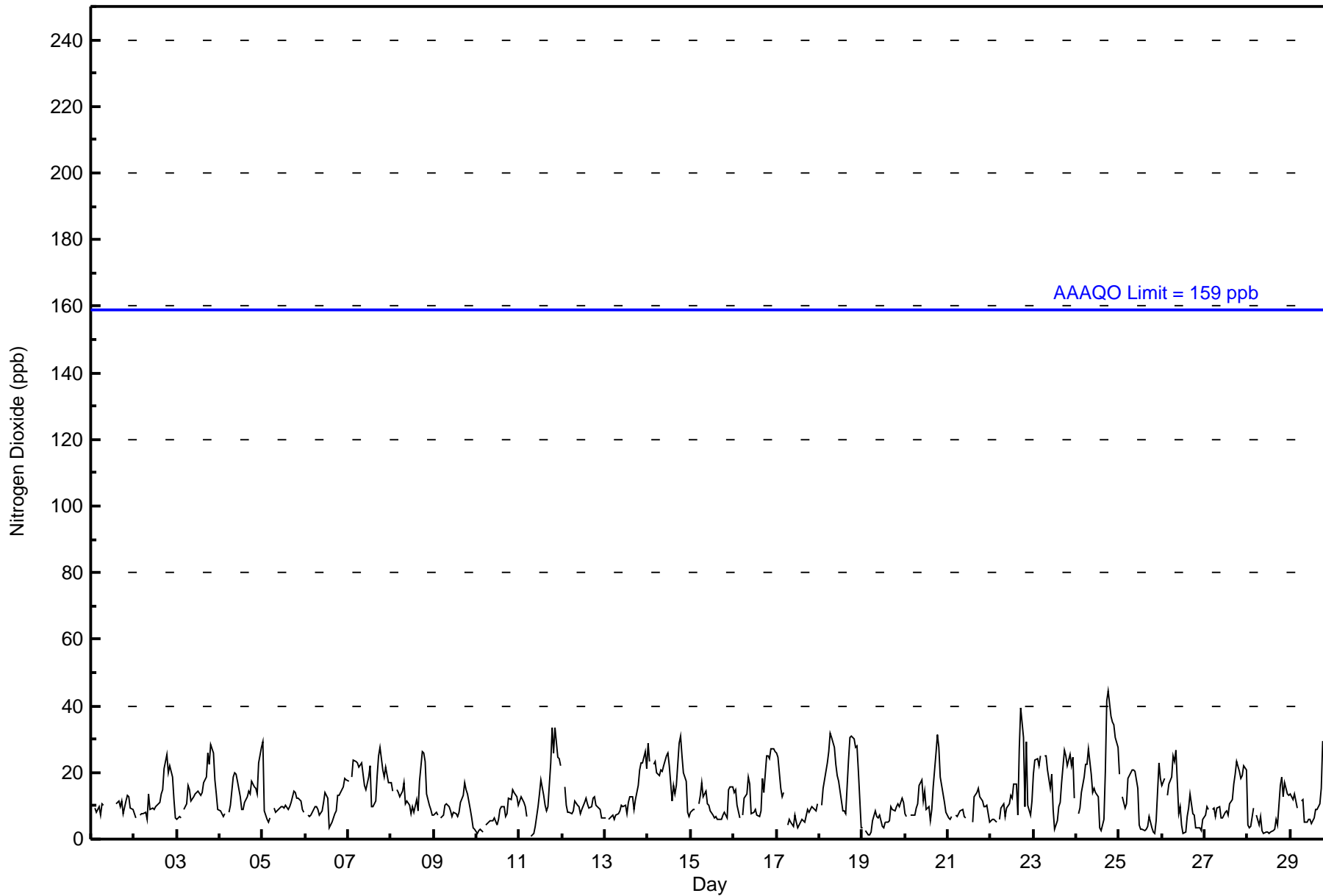
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696												
Maximum Value: 45 ppb on Feb 24 19:00														Maximum Daily Average: 20.9 ppb on Feb 24												
Minimum Value: 1 ppb on Feb 11 07:00														Minimum Daily Average: 6.4 ppb on Feb 19												
Maximum Diurnal Average: 19.9 ppb at hour 19														Minimum Diurnal Average: 8.0 ppb at hour 14												
Monthly Average: 12.7 ppb														Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 17 P ₉₀ = 24 P ₉₉ = 33												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	8	Z	9	8	10	7	11	10	C	C	C	C	C	C	11	12	10	12	8	12	13	13	9	9	--	13
2-Feb	8	6	Z	7	8	8	8	6	14	9	9	9	10	10	11	14	15	21	25	20	22	19	12	7	12.0	25
3-Feb	6	7	6	Z	9	11	16	15	11	13	13	14	15	13	14	17	19	26	22	29	26	18	14	9	14.8	29
4-Feb	9	8	7	8	Z	8	10	19	20	19	17	13	9	9	11	13	14	14	17	16	15	14	23	28	13.9	28
5-Feb	29	8	6	5	6	Z	10	8	9	9	10	10	9	10	9	10	11	14	14	12	12	12	9	8	10.4	29
6-Feb	Z	7	7	7	8	10	10	9	7	8	11	14	12	3	4	5	8	9	13	13	15	16	18	18	10.1	18
7-Feb	17	Z	19	24	23	23	21	23	20	16	15	19	22	10	10	11	19	25	28	21	19	22	17	17	19.0	28
8-Feb	17	15	Z	15	14	13	14	17	11	11	10	8	10	8	12	9	17	26	26	23	14	10	9	7	13.6	26
9-Feb	7	8	7	Z	6	7	10	11	10	9	7	8	8	7	8	11	13	17	15	13	9	6	4	3	8.8	17
10-Feb	2	3	3	2	Z	4	5	6	6	5	6	4	6	9	10	10	7	8	12	12	15	14	13	10	7.4	15
11-Feb	12	13	11	10	7	Z	1	1	2	4	10	13	18	13	10	9	10	23	33	26	34	25	24	22	14.3	34
12-Feb	Z	16	10	8	8	8	9	11	10	10	8	9	11	12	11	10	10	12	13	10	9	9	6	6	9.8	16
13-Feb	7	Z	6	7	7	6	7	8	8	10	10	10	8	11	13	13	9	12	16	21	23	23	26	21	12.2	26
14-Feb	29	23	Z	22	23	20	19	21	20	22	25	26	22	11	16	14	16	29	31	25	20	17	8	7	20.3	31
15-Feb	8	9	9	Z	11	13	17	13	14	11	10	8	7	6	7	6	6	7	8	6	15	16	16	16	9.9	17
16-Feb	14	15	10	7	Z	7	12	14	19	17	8	8	9	7	7	9	18	14	25	25	24	27	27	26	15.1	27
17-Feb	26	24	15	13	14	Z	4	6	5	4	7	5	3	5	6	5	5	9	8	9	10	9	9	10	9.2	26
18-Feb	Z	10	15	18	23	26	32	31	28	23	19	17	12	9	8	8	24	31	31	30	27	28	20	4	20.5	32
19-Feb	3	Z	3	1	1	2	6	9	7	6	7	4	3	5	5	5	10	9	9	10	11	10	12	11	6.4	12
20-Feb	8	7	Z	7	7	7	10	11	16	18	12	15	9	10	6	9	16	26	31	28	19	14	11	8	13.1	31
21-Feb	6	6	7	Z	7	7	8	9	9	7	7	PF	PF	PF	5	13	14	15	13	11	10	10	10	5	8.8	15
22-Feb	5	6	6	5	Z	6	10	11	7	10	11	13	12	17	17	7	27	39	31	10	29	10	7	11	13.3	39
23-Feb	19	24	24	22	25	Z	25	25	21	15	19	9	3	6	10	11	17	27	25	22	26	22	25	12	18.8	27
24-Feb	Z	8	9	14	19	22	23	27	19	14	15	14	13	4	3	6	20	42	45	37	35	31	28	28	20.9	45
25-Feb	20	Z	13	10	10	18	19	21	21	21	15	4	3	3	2	3	4	7	3	2	2	5	23	18	10.7	23
26-Feb	16	18	Z	13	17	19	25	24	27	8	10	4	2	2	7	9	14	8	7	3	4	3	3	6	10.7	27
27-Feb	7	10	9	Z	9	9	7	10	10	6	6	8	9	7	10	12	17	20	23	21	18	19	22	21	12.6	23
28-Feb	4	4	4	10	Z	7	4	7	2	2	2	2	2	2	3	3	6	4	16	19	13	17	13	13	6.9	19
29-Feb	14	12	13	11	10	Z	12	12	5	5	6	6	5	6	9	9	11	15	29	29	28	20	12	9	12.4	29
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	547	83.13	83.13
21 - 40	109	16.57	99.70
41 - 80	2	0.30	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	96	13	9	10	13	19	141	31	6	7	17	11	19	4	15	133	544
21 - 40	21	2	1	2	2	1	21	11	3	5	0	5	4	3	5	23	109
11 - 80	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	117	15	10	12	15	20	162	44	9	12	17	16	23	7	20	156	655

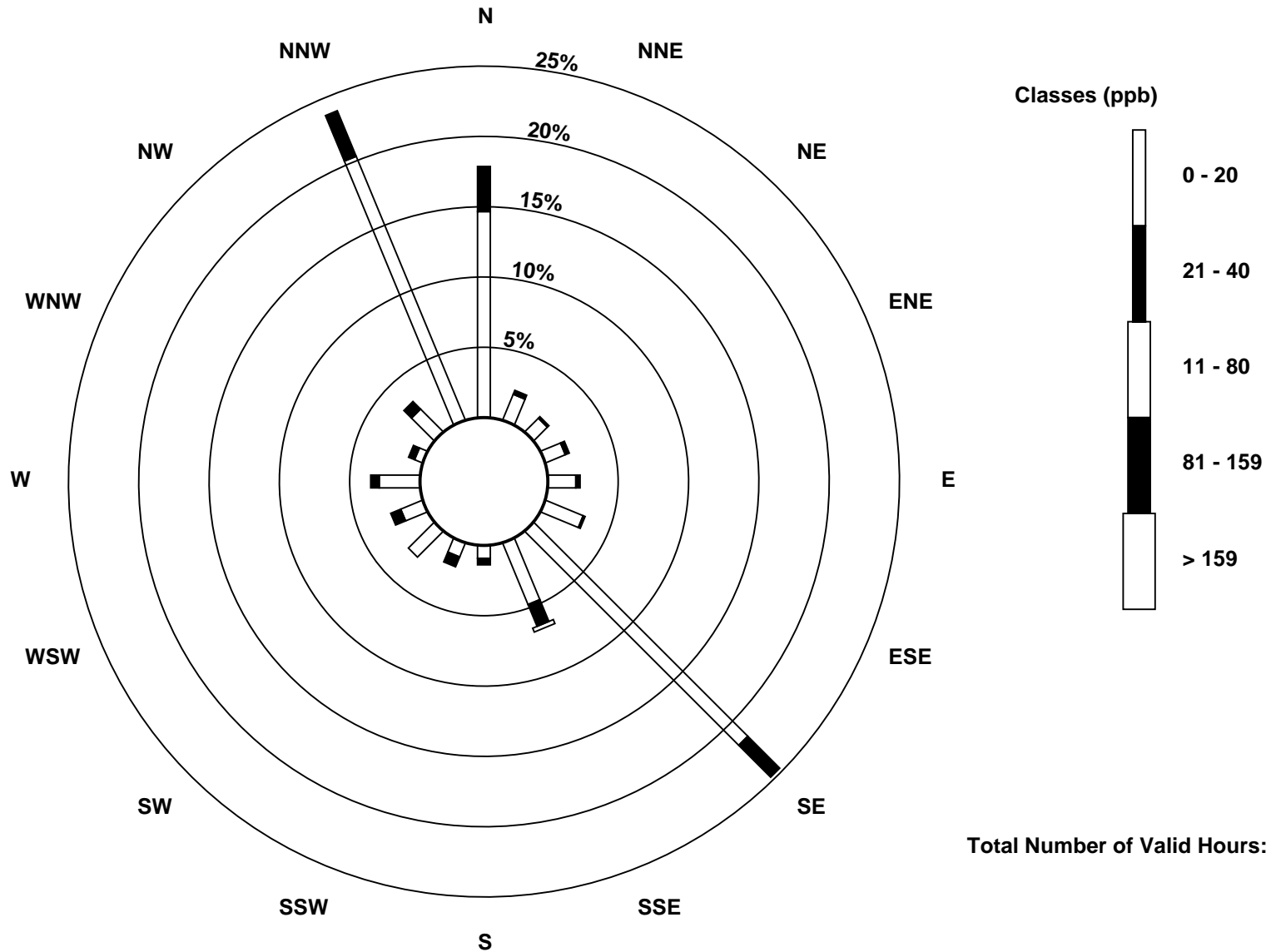
Total Number of Valid Hours: 655

Total Number of Hours: 696

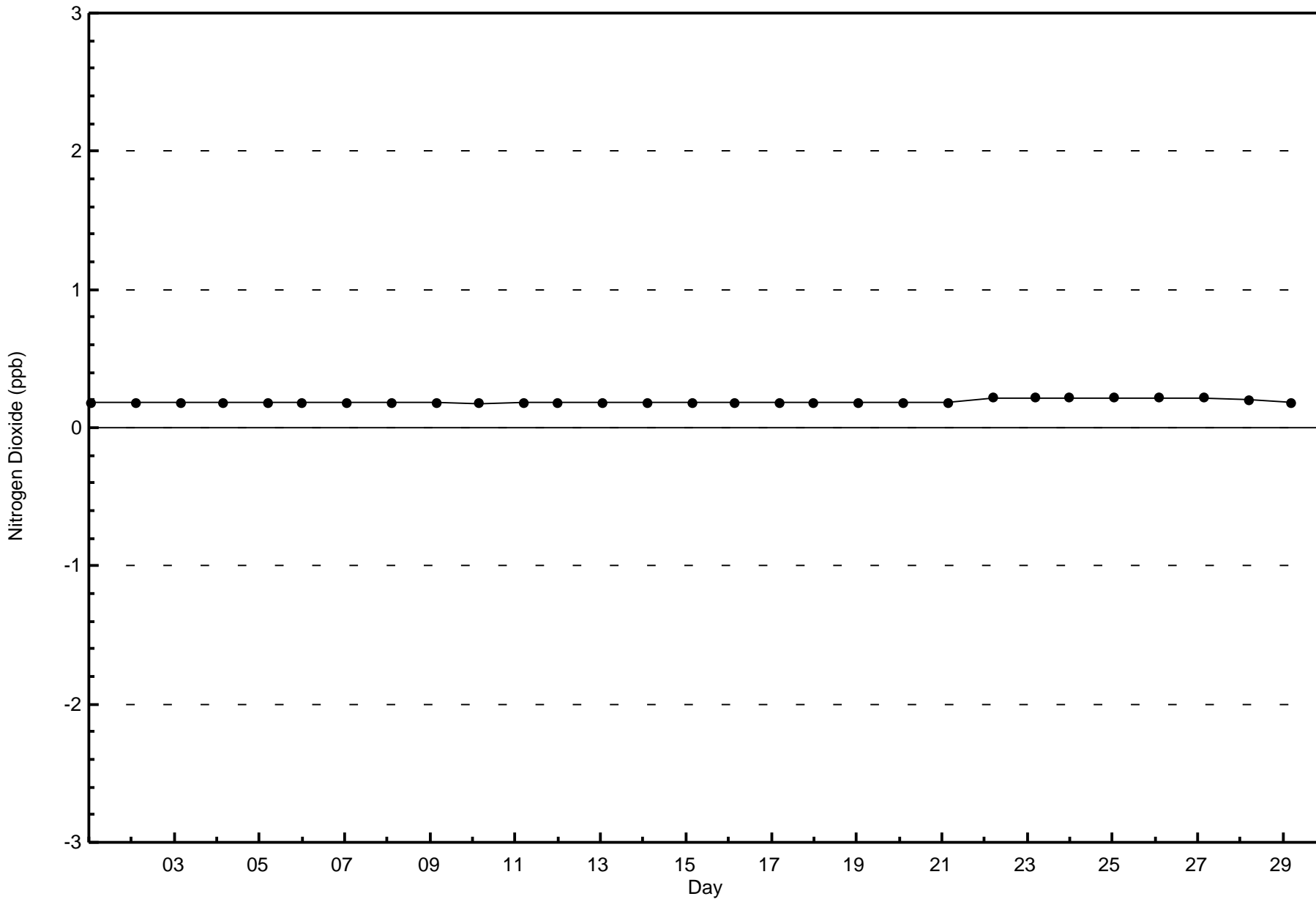


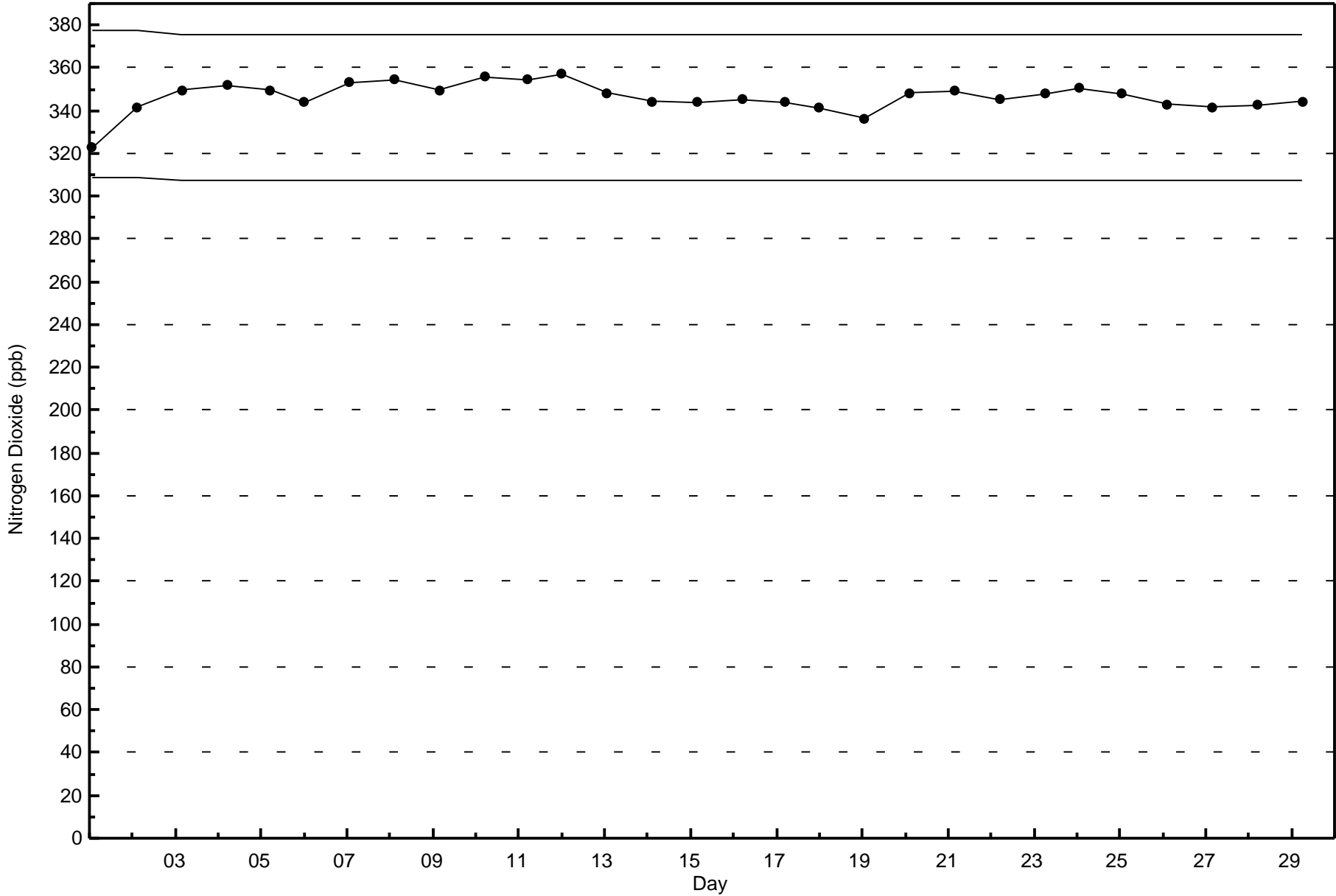
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 655



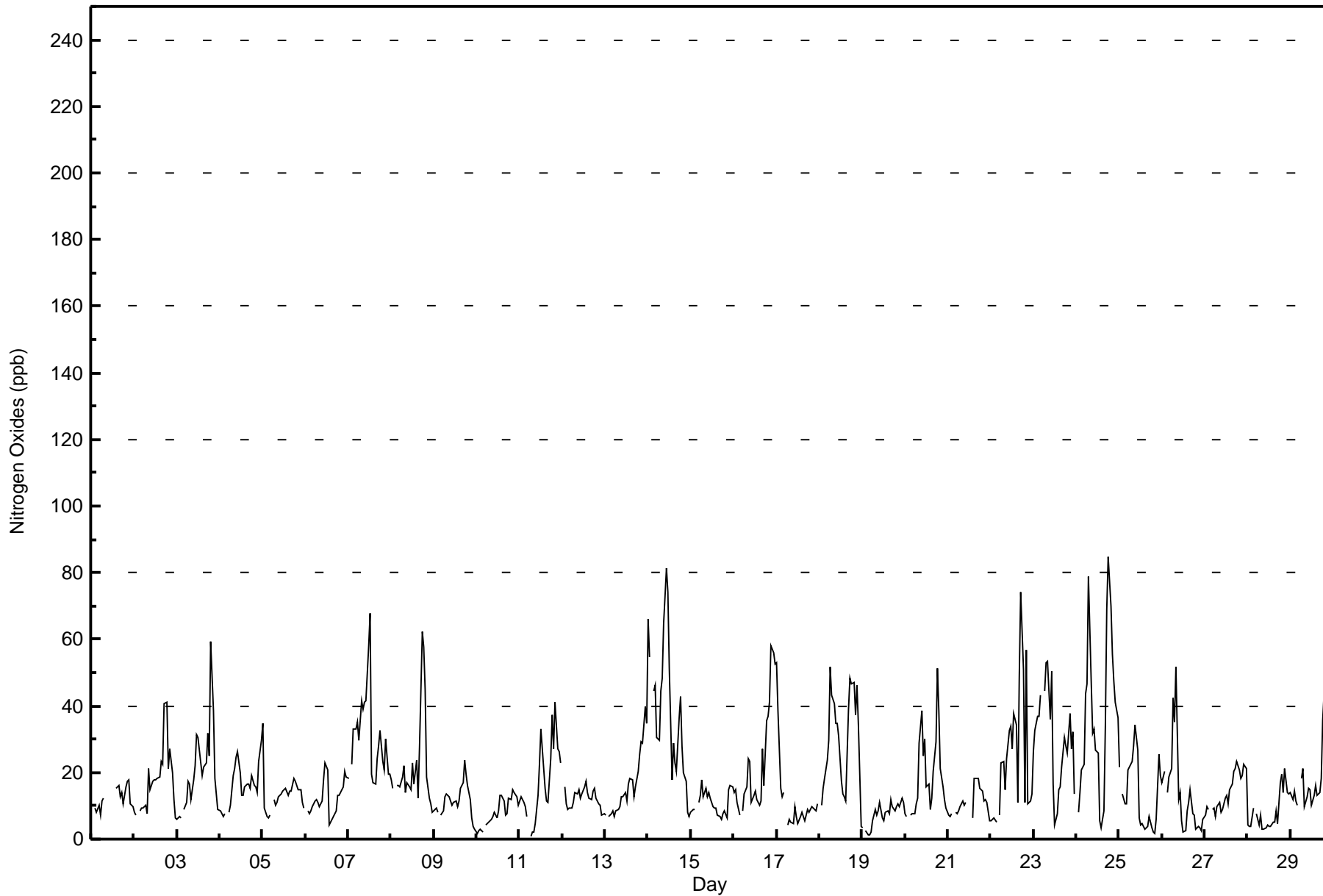




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 2016

Maximum Value: 85 ppb on Feb 24 19:00		Maximum Daily Average: 38.5 ppb on Feb 14		Hours in Service: 696																						
Minimum Value: 1 ppb on Feb 11 07:00		Minimum Daily Average: 7.4 ppb on Feb 19		Hours of Data: 658																						
Maximum Diurnal Average: 27.1 ppb at hour 19		Minimum Diurnal Average: 10.7 ppb at hour 3		Hours of Missing Data: 38																						
Monthly Average: 18.0 ppb		Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 14 Q ₃ = 22 P ₉₀ = 38 P ₉₉ = 69		Hours of Calibration: 35																						
				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	8	Z	9	8	10	7	11	12	C	C	C	C	C	C	15	16	13	14	11	16	17	18	11	10	--	18
2-Feb	8	7	Z	8	9	9	10	8	21	15	17	18	18	18	19	23	22	41	41	21	27	20	12	7	17.4	41
3-Feb	6	7	6	Z	9	11	18	17	12	18	22	31	31	23	19	22	23	32	25	59	38	18	13	9	20.4	59
4-Feb	9	8	7	8	Z	8	10	19	21	25	26	20	13	13	16	16	17	15	19	16	16	14	23	30	16.0	30
5-Feb	35	9	7	6	7	Z	12	10	11	13	13	14	15	15	13	14	15	18	17	16	15	15	11	9	13.6	35
6-Feb	Z	8	8	9	10	12	12	11	10	12	18	23	21	4	5	6	7	8	13	13	15	16	20	19	12.1	23
7-Feb	18	Z	22	33	33	35	29	41	39	41	42	58	68	20	17	17	24	28	33	23	21	30	20	19	30.9	68
8-Feb	18	15	Z	16	16	16	19	22	14	17	16	15	23	17	24	12	28	62	58	45	19	12	11	8	21.8	62
9-Feb	8	9	8	Z	7	9	13	13	13	12	10	11	11	10	11	15	17	24	19	16	12	6	4	3	11.4	24
10-Feb	2	3	3	2	Z	4	5	5	6	7	8	6	8	13	13	12	7	8	12	12	15	14	13	10	8.2	15
11-Feb	12	13	11	10	7	Z	1	2	2	5	13	22	33	21	15	11	11	24	37	27	41	27	26	23	17.2	41
12-Feb	Z	16	11	9	9	9	11	14	13	15	12	14	16	17	14	12	12	14	15	12	11	10	7	8	12.2	17
13-Feb	7	Z	7	7	8	7	8	9	10	13	13	14	11	16	18	18	13	16	20	25	29	29	40	35	16.2	40
14-Feb	66	54	Z	44	46	31	30	45	48	65	81	74	51	18	29	23	20	36	43	28	20	17	8	7	38.5	81
15-Feb	8	9	9	Z	11	13	18	13	15	13	14	12	10	9	9	7	7	6	8	8	6	15	16	16	10.9	18
16-Feb	14	15	11	7	Z	8	14	16	24	23	11	13	14	12	10	11	27	16	36	37	41	58	56	53	22.9	58
17-Feb	53	39	15	13	14	Z	4	6	5	5	10	7	5	7	8	7	5	9	8	9	10	9	9	10	11.5	53
18-Feb	Z	10	15	18	24	29	52	43	41	35	35	31	17	13	13	11	39	48	47	47	37	46	35	4	30.0	52
19-Feb	3	Z	2	1	1	2	6	9	7	8	11	6	5	8	8	8	12	10	9	10	11	10	12	11	7.4	12
20-Feb	8	7	Z	7	8	8	10	12	29	38	25	30	16	17	9	12	20	29	51	38	21	16	12	9	18.8	51
21-Feb	7	7	7	Z	8	8	9	10	11	10	11	PF	PF	PF	7	18	18	18	15	15	11	12	11	5	10.9	18
22-Feb	6	6	7	5	Z	7	23	23	15	24	32	34	27	38	34	11	49	74	51	11	57	10	11	13	24.7	74
23-Feb	26	33	37	37	43	Z	45	53	54	36	50	16	4	8	15	16	21	31	28	26	38	27	32	14	29.9	54
24-Feb	Z	8	14	21	23	44	47	79	47	32	33	27	26	6	4	8	34	69	85	70	56	47	41	36	37.2	85
25-Feb	22	Z	13	11	11	21	22	23	28	34	27	6	4	5	3	3	4	7	3	2	2	6	26	19	13.1	34
26-Feb	17	21	Z	14	19	21	42	35	52	12	14	6	2	3	8	11	15	8	7	3	4	4	3	6	14.2	52
27-Feb	7	10	9	Z	9	9	7	10	11	8	9	12	13	10	15	17	20	21	23	21	18	19	22	21	14.0	23
28-Feb	4	4	4	9	Z	7	4	7	3	3	3	4	4	4	5	5	8	5	17	19	14	21	14	14	8.0	21
29-Feb	14	12	14	12	10	Z	18	21	10	13	15	15	10	13	16	13	14	18	36	44	34	23	14	10	17.4	44
																								Diurnal Average		
																								Diurnal Maximum		
15.4 13.7 10.7 13.1 14.7 14.0 17.5 20.3 20.4 19.6 21.2 20.0 17.7 13.2 13.6 13.0 18.0 24.5 27.1 23.7 22.6 19.7 18.3 15.1																										
66 54 37 44 46 44 52 79 54 65 81 74 68 38 34 23 49 74 85 70 57 58 56 53																										
Z - zerspan C - Calibration PF - Power Failure																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	471	71.58	71.58
21 - 40	129	19.60	91.19
41 - 80	56	8.51	99.70
81 - 159	1	0.15	99.85
> 159	0	0.00	99.85

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	7	8	5	6	16	126	24	4	4	15	10	19	3	14	121	470
21 - 40	17	7	2	5	7	4	24	10	3	5	2	5	3	3	4	27	128
11 - 80	12	1	0	2	2	0	12	9	2	3	0	0	1	1	2	8	55
81 - 159	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	117	15	10	12	15	20	162	44	9	12	17	15	23	7	20	156	654

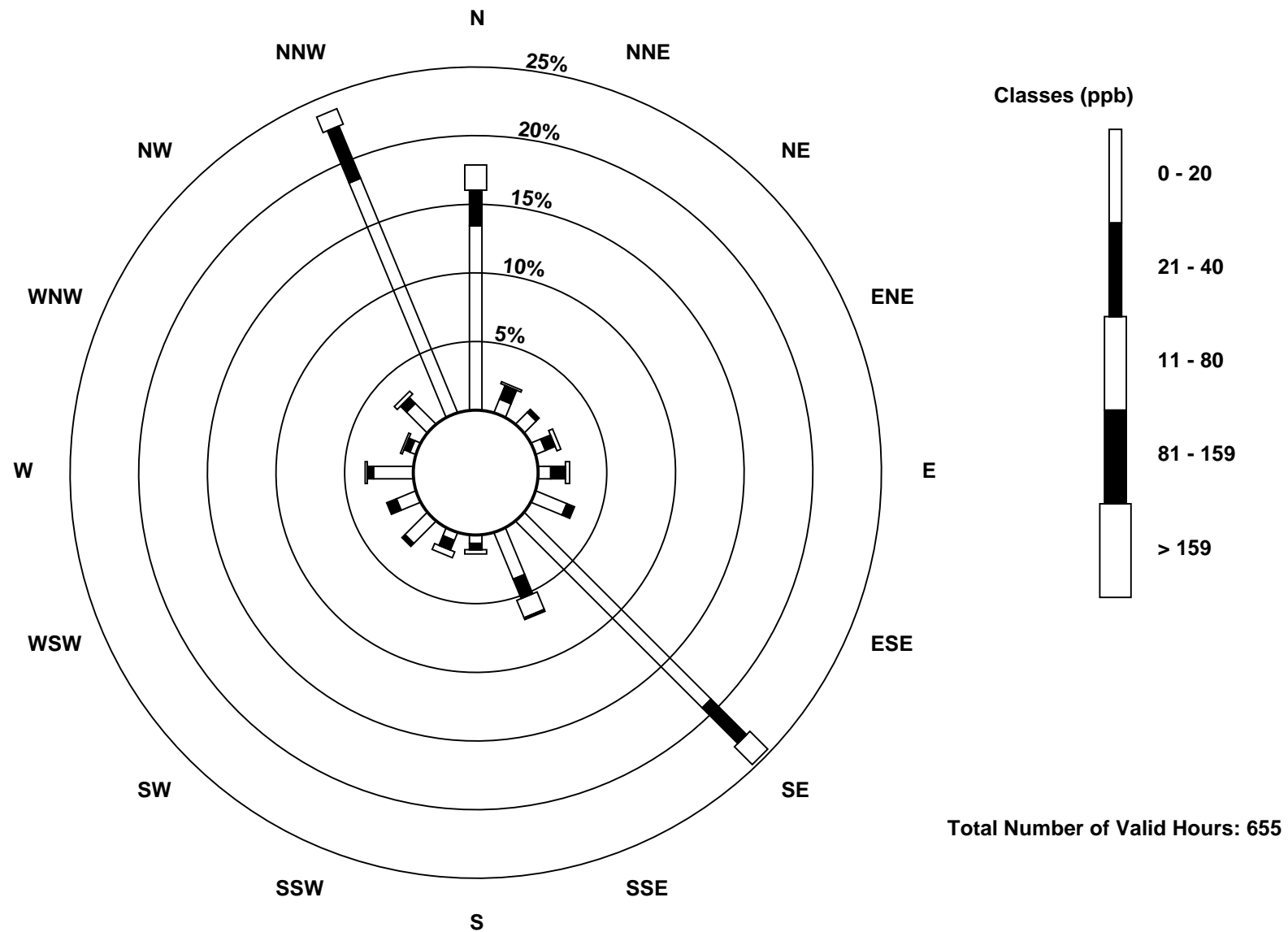
Total Number of Valid Hours: 655

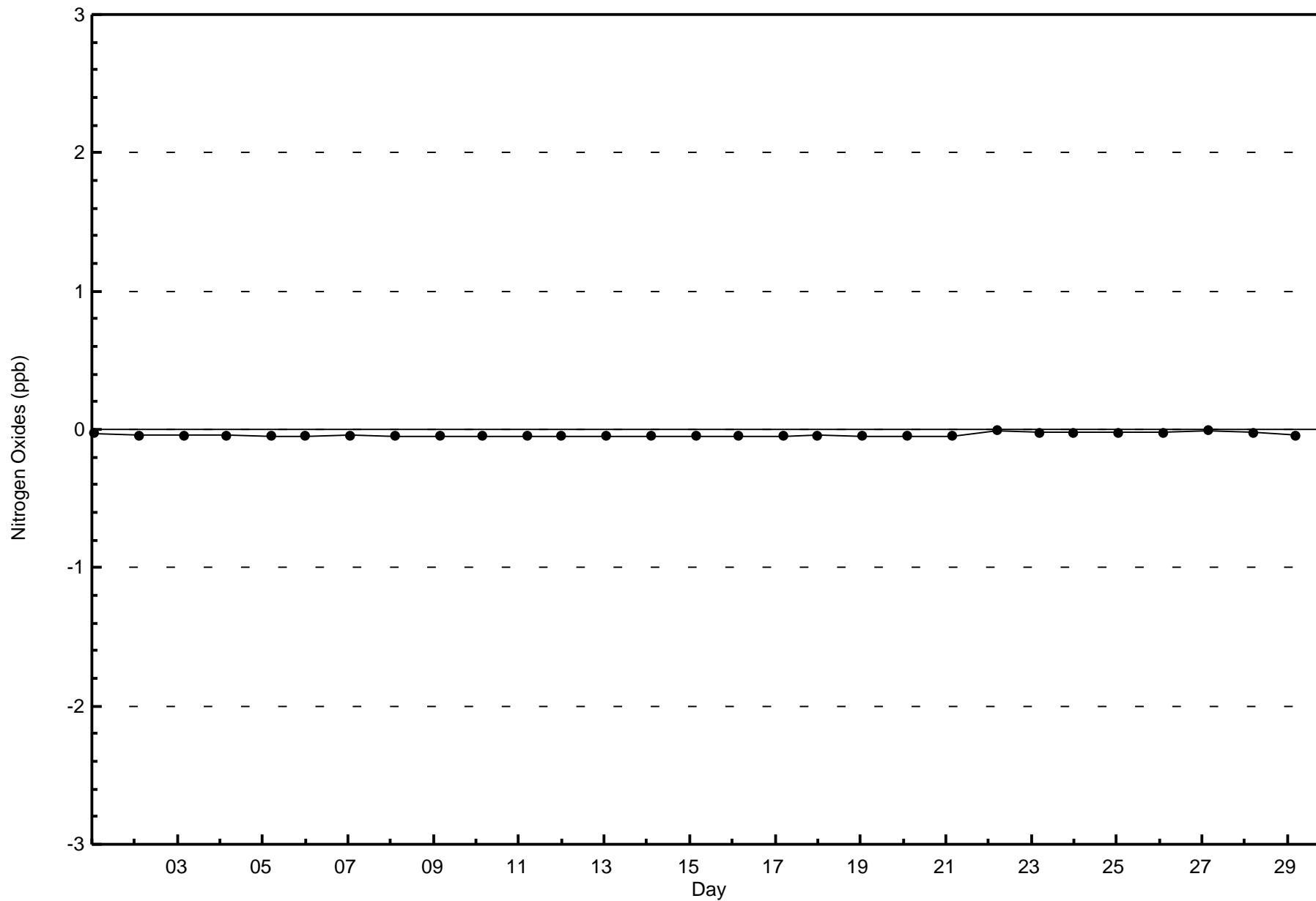
Total Number of Hours: 696

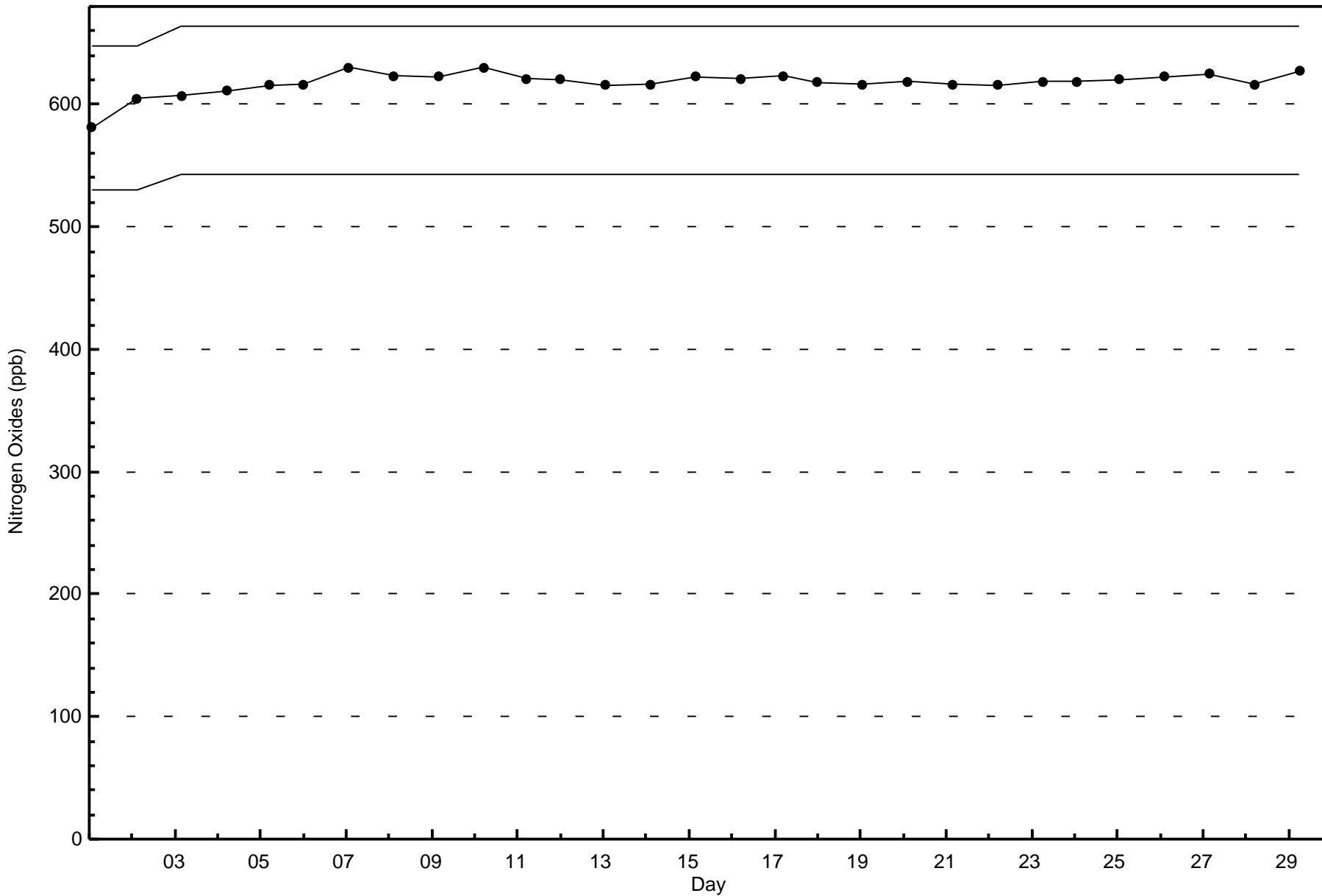


Wood Buffalo Environmental Association
Wind Rose Feb 2016

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









Wood Buffalo Environmental Association

Summary of Hour Averages

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

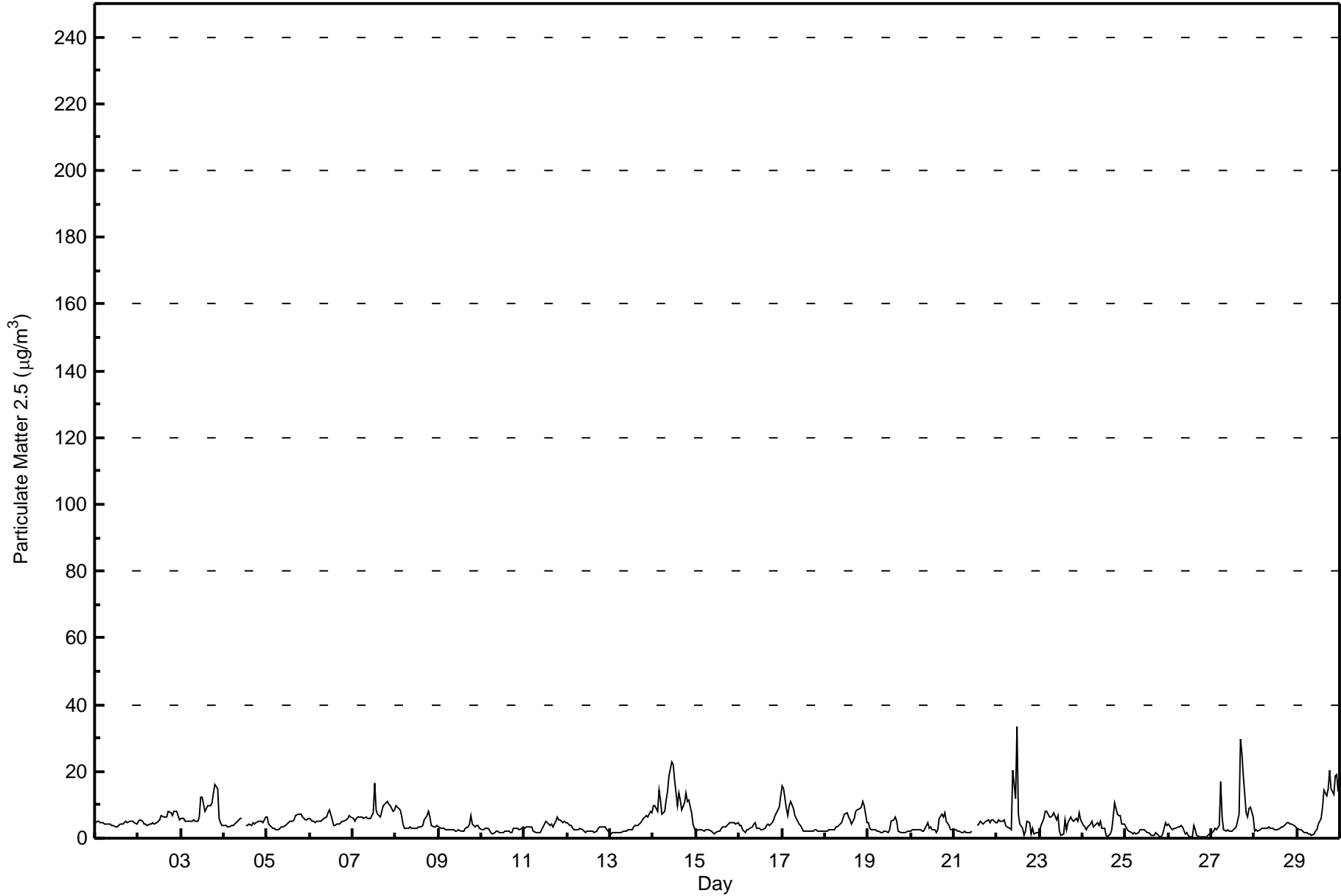
Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 33.6 µg/m ³ on Feb 22 12:00 Minimum Value: 0.3 µg/m ³ on Feb 25 21:00 Maximum Diurnal Average: 6.9 µg/m ³ at hour 19 Monthly Average: 4.75 µg/m ³		Maximum Daily Average: 11.7 µg/m ³ on Feb 14 Minimum Daily Average: 1.8 µg/m ³ on Feb 25 Minimum Diurnal Average: 3.7 µg/m ³ at hour 7 Percentiles: P ₁ = 0.4 P ₁₀ = 1.8 Q ₁ = 2.5 Median = 3.8 Q ₃ = 5.7 P ₉₀ = 8.5 P ₉₉ = 20.4		Hours in Service: 696 Hours of Data: 693 Hours of Missing Data: 3 Hours of Calibration: 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	4.5	5.2	5.1	4.7	4.5	4.1	4.4	4.2	4.2	4.0	3.8	3.4	3.4	3.8	4.2	4.4	4.6	4.9	4.7	5.0	5.2	4.9	4.6	4.2	4.4	5.2
2-Feb	5.1	5.5	5.0	4.4	4.3	3.9	4.3	4.2	4.5	4.4	4.7	5.0	5.4	6.6	6.2	6.4	6.3	7.9	7.8	6.9	8.1	8.2	6.6	5.3	5.7	8.2
3-Feb	6.1	5.8	5.3	5.0	5.0	5.1	5.3	5.5	5.0	5.0	6.2	12.2	12.3	8.2	9.0	9.8	9.6	10.5	13.7	16.3	14.6	5.9	4.6	3.9	7.9	16.3
4-Feb	4.0	3.8	3.6	3.5	3.8	4.0	4.1	4.9	5.6	5.9	5.9	C	3.8	4.0	4.1	4.0	4.8	4.1	4.8	5.0	5.0	5.0	4.7	6.4	4.6	6.4
5-Feb	6.3	4.1	3.5	3.0	2.8	2.7	2.7	3.0	3.2	3.3	3.8	4.1	4.5	4.9	5.0	5.6	6.6	7.2	7.2	7.0	6.4	5.7	5.7	5.8	4.7	7.2
6-Feb	6.0	5.3	4.9	4.8	4.9	5.1	5.2	5.5	6.1	6.4	7.5	8.4	5.6	3.9	3.7	4.3	4.3	4.6	4.9	5.3	5.6	5.8	6.6	6.5	5.5	8.4
7-Feb	5.8	5.2	5.9	6.3	6.4	6.5	5.7	6.4	5.8	5.8	6.1	7.8	16.4	8.4	7.1	6.2	8.1	9.7	10.2	10.9	10.4	9.6	8.2	8.6	7.8	16.4
8-Feb	9.8	9.5	8.5	6.6	4.4	3.0	3.1	3.2	3.2	2.9	3.2	2.9	2.8	3.2	3.3	3.7	5.4	6.9	8.0	6.4	4.0	3.6	3.6	3.6	4.8	9.8
9-Feb	3.2	3.1	3.0	2.8	2.5	2.6	2.6	2.4	2.5	2.3	2.3	2.5	2.3	2.1	2.3	2.8	3.5	4.3	6.7	4.2	3.4	3.9	3.9	2.8	3.1	6.7
10-Feb	2.5	2.6	2.8	2.8	2.5	1.7	1.4	1.6	1.9	1.9	1.8	1.7	1.9	2.1	2.1	2.1	1.9	1.9	3.0	2.8	2.8	2.6	3.1	3.2	2.3	3.2
11-Feb	3.0	3.5	3.5	3.4	3.4	2.2	1.9	1.9	1.7	1.8	3.6	4.4	5.2	4.3	3.9	4.1	3.6	5.2	6.4	5.4	5.6	4.5	4.9	4.5	3.8	6.4
12-Feb	4.6	4.0	3.7	3.2	2.7	2.6	2.5	2.8	2.5	2.0	1.8	2.0	2.1	2.0	2.0	1.8	2.1	2.8	3.4	3.4	3.2	3.5	2.7	1.8	2.7	4.6
13-Feb	1.3	1.6	1.6	1.5	1.6	1.6	1.8	1.9	2.1	2.3	2.5	2.6	2.7	3.3	3.8	4.0	4.3	4.7	6.1	6.5	6.8	6.4	8.0	7.7	3.6	8.0
14-Feb	9.7	9.5	8.0	14.5	11.5	7.3	8.2	11.3	14.0	18.6	22.9	21.9	17.5	9.6	13.7	11.6	8.5	10.8	13.6	10.8	11.4	7.7	4.3	3.0	11.7	22.9
15-Feb	1.9	2.4	2.5	2.7	2.2	2.3	2.7	2.5	2.3	1.5	1.4	1.9	2.1	2.3	2.9	3.3	3.5	4.0	4.2	4.7	4.6	4.6	4.3	4.8	3.0	4.8
16-Feb	3.6	3.6	2.4	1.8	2.3	2.8	3.1	3.4	4.4	4.6	2.8	2.9	2.6	2.6	2.8	3.8	4.2	3.8	4.8	5.6	6.8	7.5	9.5	12.9	4.4	12.9
17-Feb	15.7	14.9	8.8	6.8	9.8	11.0	8.8	7.0	5.9	4.4	3.7	2.8	2.3	2.2	2.3	2.3	2.0	2.3	2.3	2.4	2.2	2.2	2.2	2.3	5.3	15.7
18-Feb	1.9	2.0	2.4	2.6	2.5	2.7	3.4	3.5	4.2	4.7	5.7	7.0	7.7	6.4	5.3	4.3	6.1	8.2	8.3	9.0	9.2	11.0	9.8	4.5	5.5	11.0
19-Feb	4.5	3.1	2.5	2.6	2.4	2.1	1.9	1.9	1.8	1.9	1.9	1.9	2.7	5.2	5.6	6.5	5.0	2.1	1.9	1.5	1.7	1.8	2.1	2.2	2.8	6.5
20-Feb	2.0	2.4	2.5	2.4	2.5	2.4	2.3	2.3	3.0	4.5	2.8	3.2	2.4	2.7	1.6	2.4	6.1	7.4	6.4	7.7	5.0	3.6	2.7	2.6	3.5	7.7
21-Feb	2.5	2.4	2.1	2.1	1.8	1.7	1.9	1.9	1.9	1.6	2.1	PF	PF	3.8	4.3	5.2	4.2	4.5	5.2	5.6	4.6	5.3	5.4	4.8	3.4	5.6
22-Feb	4.8	5.4	5.0	4.9	5.3	3.8	3.5	2.8	2.5	20.4	11.8	33.6	7.4	4.3	3.0	0.9	2.2	5.1	4.7	1.1	2.8	1.4	1.7	1.7	5.8	33.6
23-Feb	2.2	3.9	6.1	8.0	7.9	6.5	6.5	6.7	7.6	5.6	6.6	1.9	0.7	1.4	5.3	2.5	4.8	6.4	5.7	5.2	5.8	5.1	7.8	5.7	5.2	8.0
24-Feb	3.7	3.3	2.7	3.5	4.2	5.3	3.4	4.0	4.6	3.6	5.0	3.0	3.0	0.8	0.5	1.1	2.5	6.2	10.5	7.1	6.6	7.0	4.1	4.1	4.2	10.5
25-Feb	3.5	2.6	2.3	1.5	1.5	1.6	1.4	1.7	2.7	2.7	2.7	2.3	1.9	1.6	0.6	0.6	0.6	1.5	0.7	0.4	0.3	1.1	4.7	3.7	1.8	4.7
26-Feb	4.3	3.0	2.4	2.8	3.0	3.2	3.6	3.7	3.4	1.2	1.8	0.8	0.4	0.3	3.9	2.7	0.9	0.5	0.5	0.4	0.4	0.4	0.8	1.2	1.9	4.3
27-Feb	1.6	2.2	2.8	2.6	3.7	16.9	6.3	2.6	2.3	2.7	2.2	2.3	2.7	2.9	3.2	7.1	29.7	25.6	18.7	7.8	6.5	9.0	9.5	6.1	7.4	29.7
28-Feb	2.3	2.3	2.2	2.4	2.8	3.1	2.8	3.0	3.2	3.0	3.0	2.7	2.5	2.3	2.8	3.2	3.5	3.7	4.9	4.8	4.1	4.3	3.9	3.3	3.2	4.9
29-Feb	2.8	2.5	2.5	2.2	1.8	1.6	1.3	1.2	1.0	1.3	2.3	2.7	4.1	5.8	9.3	14.6	12.5	14.8	20.4	14.8	13.2	18.6	19.2	14.0	7.7	20.4
																								Diurnal Average		
																								Diurnal Maximum		
C - Calibration PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - February 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	487	70.27	70.27
6 - 15	170	24.53	94.81
16 - 25	13	1.88	96.68
26 - 80	3	0.43	97.11
> 81.0	0	0.00	97.11

Total Number of Valid Hours: 693

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - February 2016**

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	91	7	9	8	10	16	135	37	4	9	13	8	12	4	16	105	484
6 - 15	22	7	1	4	5	4	36	12	4	3	2	5	7	2	5	50	169
16 - 25	2	0	0	1	0	0	2	0	1	0	0	2	0	1	1	3	13
26 - 80	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	117	14	10	13	16	20	173	49	9	12	15	15	19	7	22	158	669

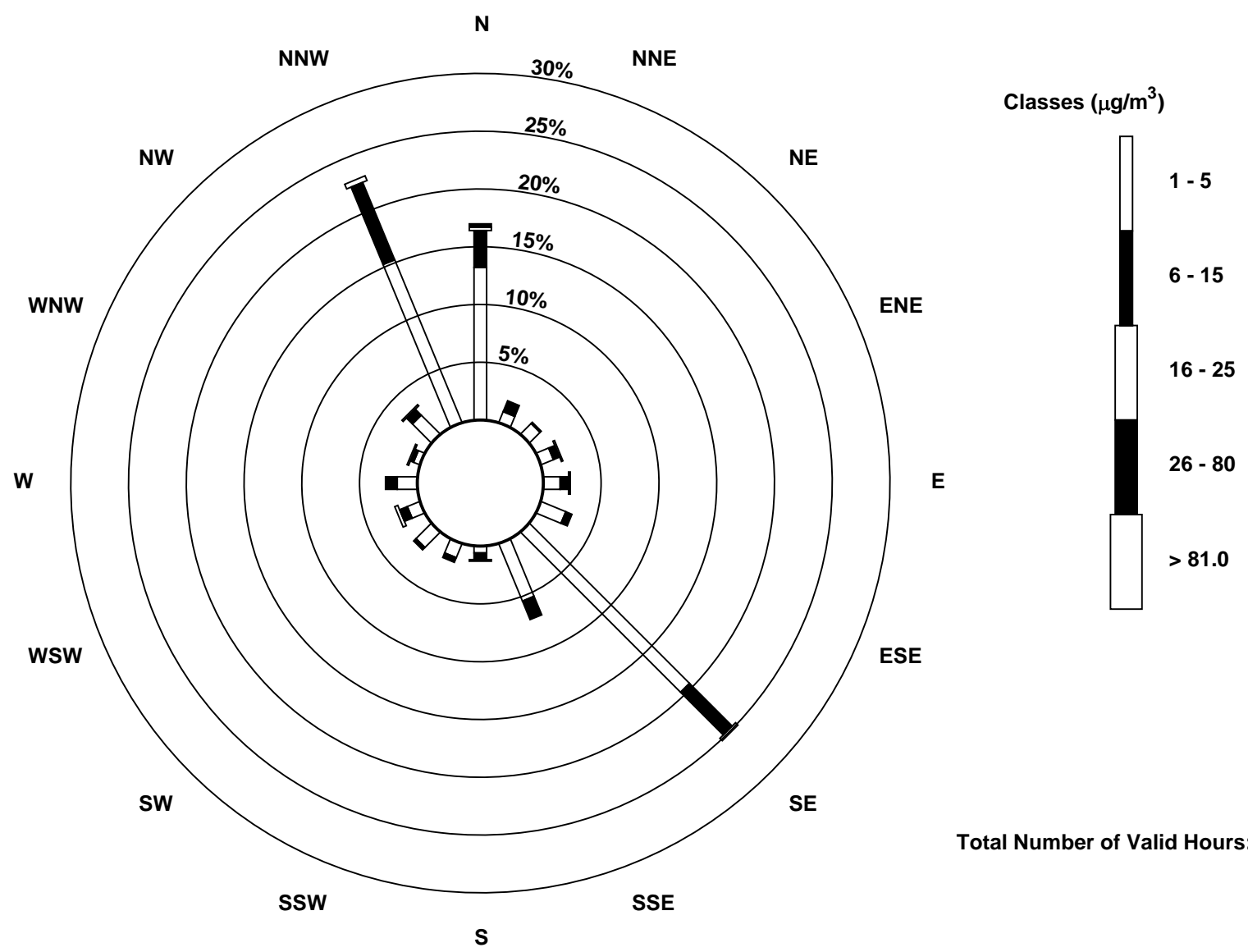
Total Number of Valid Hours: 689

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 689



Wood Buffalo Environmental Association
Summary of Hour Averages

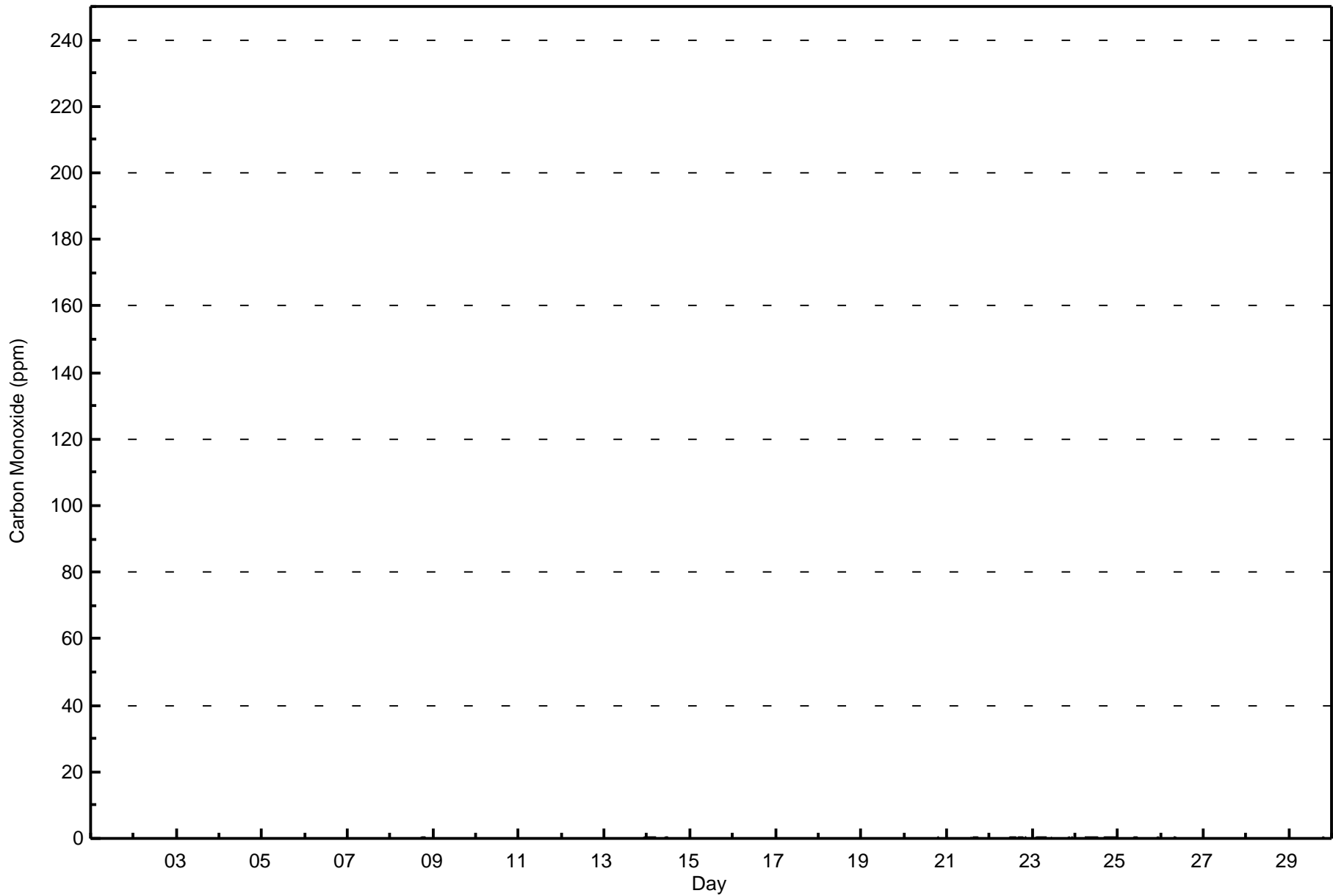
Carbon Monoxide (CO) - ppm
Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 0.6 ppm on Feb 24 19:00 Maximum Daily Average: 0.3 ppm on Feb 24																		Hours in Service: 696 Hours of Data: 660 Hours of Missing Data: 36 Hours of Calibration: 32 Percent Operational Time: 99.4																				
Minimum Value: 0.0 ppm on Feb 28 18:00 Minimum Daily Average: 0.0 ppm on Feb 28 Maximum Diurnal Average: 0.2 ppm at hour 18 Minimum Diurnal Average: 0.1 ppm at hour 4 Monthly Average: 0.12 ppm Percentiles: P ₁ = 0.0 P ₁₀ = 0.1 Q ₁ = 0.1 Median = 0.1 Q ₃ = 0.1 P ₉₀ = 0.2 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	0.0	0.0	0.1	0.0	0.0	Z	0.1	0.1	0.1	M	M	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
2-Feb	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	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	0.1	0.1	0.1	0.1	0.1		
3-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
4-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	C	C	C	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
5-Feb	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	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
6-Feb	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
7-Feb	0.1	0.1	0.1	0.1	0.1	Z	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	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
8-Feb	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	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	0.1	0.1	0.1
10-Feb	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	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	0.1	0.1	0.1
11-Feb	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	Z	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
12-Feb	0.1	0.1	0.1	0.1	Z	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	0.1	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
13-Feb	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
14-Feb	0.4	0.4	0.3	0.3	0.3	0.2	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1
15-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
16-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	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	0.1	0.1	0.1
17-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18-Feb	0.1	0.1	0.1	0.1	Z	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	0.1	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	0.1
19-Feb	0.1	0.1	0.1	0.1	0.1	Z	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	0.1	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
20-Feb	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
21-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	PF	PF	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	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	
22-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.5	0.4	0.1	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
23-Feb	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Z	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	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
24-Feb	0.1	0.1	0.1	0.1	Z	0.3	0.3	0.4	0.3	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.3	0.5	0.6	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
25-Feb	0.2	0.2	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
26-Feb	0.2	0.2	0.2	0.1	0.2	0.2	Z	0.3	0.3	0.1	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	0.1	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
27-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	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
28-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	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
29-Feb	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
																												Diurnal Average										
																												Diurnal Maximum										
Z - zerspan C - Calibration M - Maintenance PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm																																						



Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	649	98.33	98.33
0.4 - 0.5	10	1.52	99.85
0.6 - 0.7	1	0.15	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: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - February 2016**

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	117	14	10	12	13	19	160	44	8	11	16	15	24	6	21	156	646
0.4 - 0.5	0	0	0	0	1	0	4	3	1	1	0	0	0	0	0	0	10
0.6 - 0.7	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
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	117	14	10	12	14	19	164	48	9	12	16	15	24	6	21	156	657

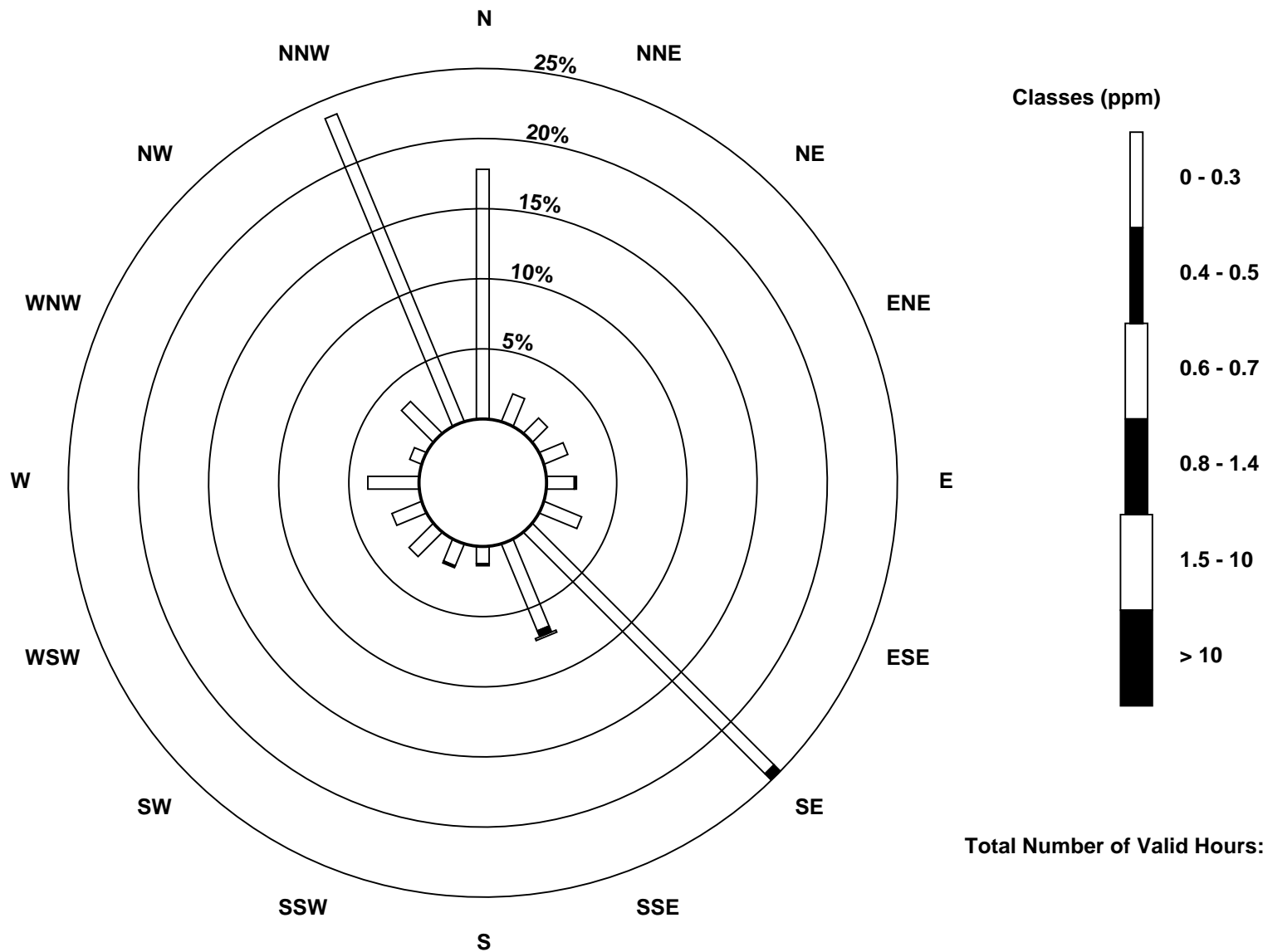
Total Number of Valid Hours: 657

Total Number of Hours: 696

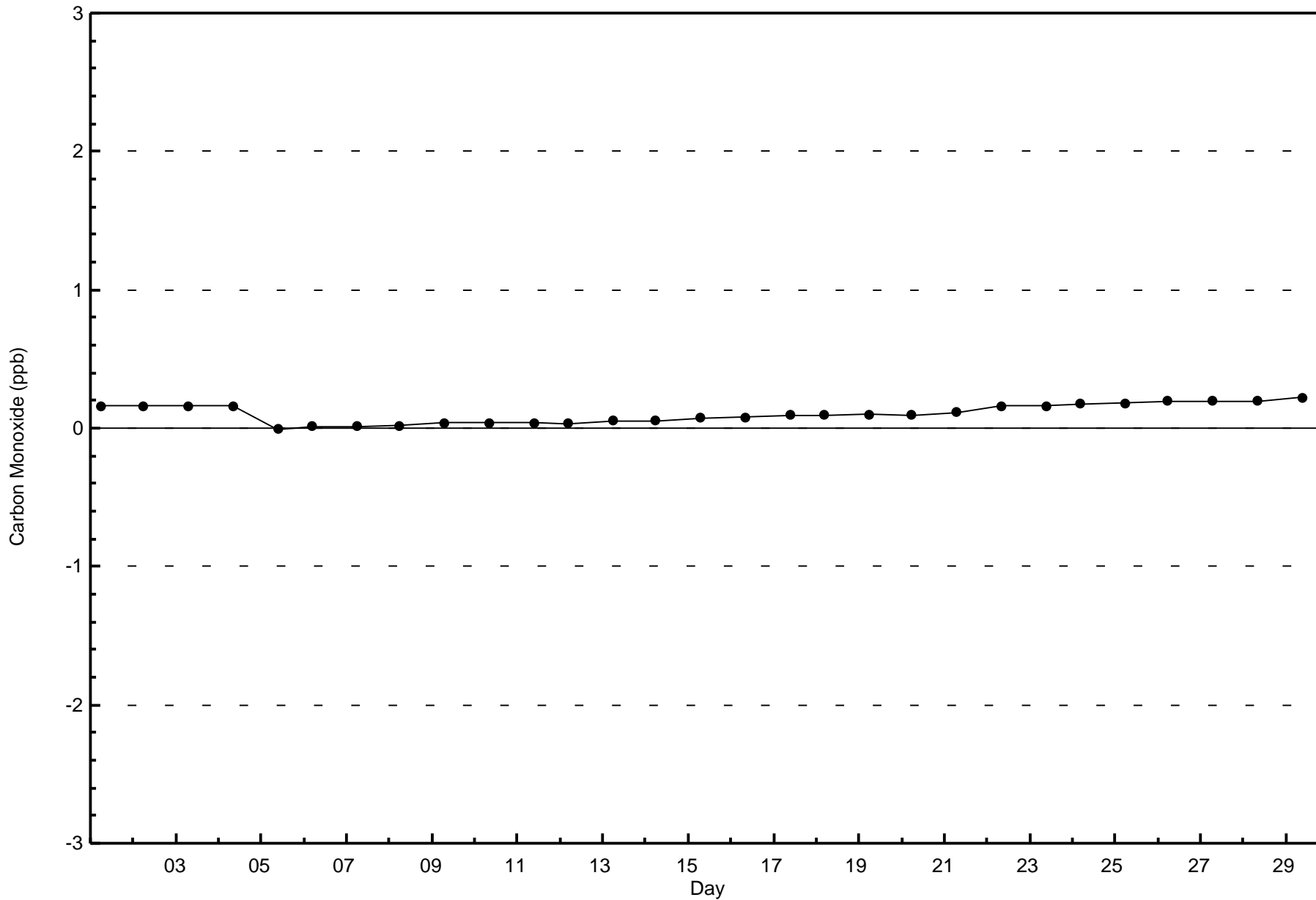


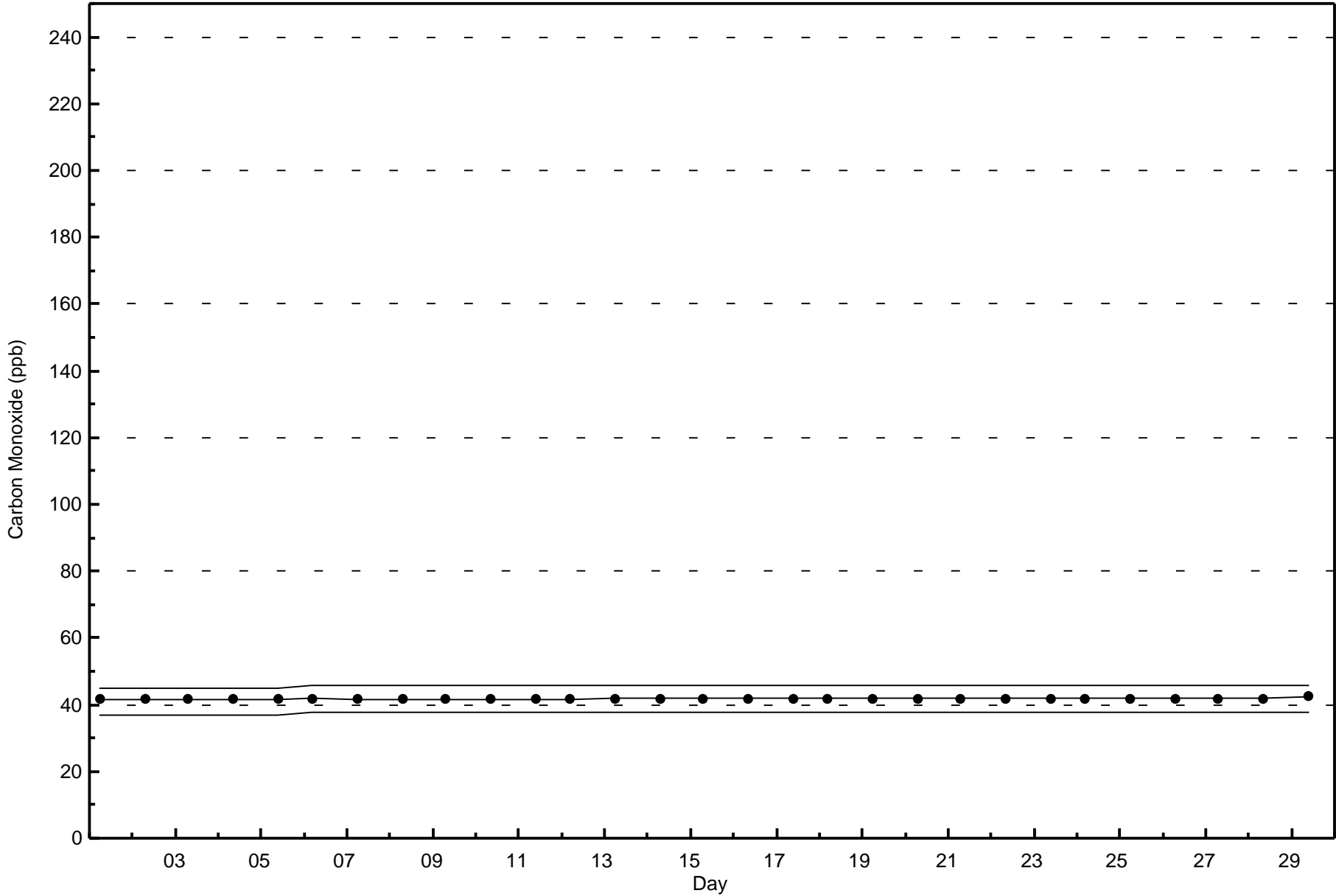
Wood Buffalo Environmental Association
Wind Rose Feb 2016

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



Total Number of Valid Hours: 657



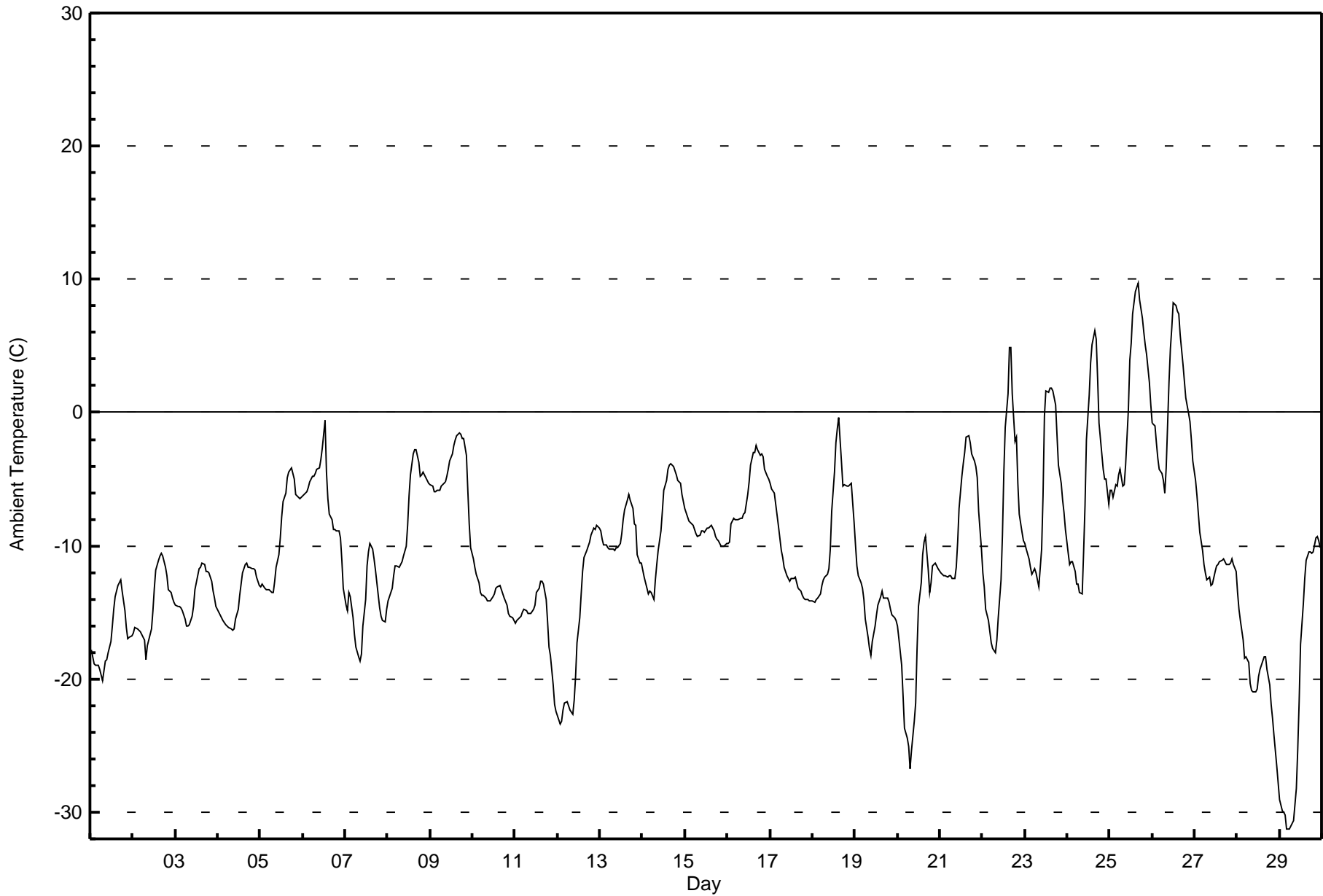




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Athabasca Valley - February 2016

Maximum Value: 9.7 C on Feb 25 17:00		Maximum Daily Average: 1.1 C on Feb 25		Hours in Service: 696																						
Minimum Value: -31.3 C on Feb 29 05:00		Minimum Daily Average: -20.2 C on Feb 29		Hours of Data: 696																						
Maximum Diurnal Average: -6.2 C at hour 16		Minimum Diurnal Average: -14.3 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -10.60 C		Percentiles: P ₁ = -30.4 P ₁₀ = -18.0 Q ₁ = -14.4 Median = -11.4 Q ₃ = -6.1 P ₉₀ = -2.6 P ₉₉ = 7.5		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	-17.8	-18.3	-18.9	-19.0	-18.9	-19.3	-19.7	-20.1	-18.6	-18.6	-18.0	-17.2	-16.0	-14.8	-13.8	-13.0	-12.7	-12.6	-13.4	-14.9	-16.1	-17.0	-16.9	-16.8	-16.8	-12.6
2-Feb	-16.6	-16.1	-16.2	-16.3	-16.5	-16.6	-17.1	-18.6	-17.5	-17.1	-16.2	-14.8	-13.2	-11.8	-11.1	-10.8	-10.6	-10.8	-11.6	-12.3	-13.3	-13.5	-13.9	-14.2	-14.4	-10.6
3-Feb	-14.5	-14.6	-14.6	-14.7	-14.9	-15.5	-16.0	-16.0	-16.0	-15.3	-14.5	-13.3	-12.7	-11.8	-11.6	-11.3	-11.4	-11.9	-11.9	-12.0	-12.6	-13.4	-14.0	-14.6	-13.7	-11.3
4-Feb	-15.0	-15.2	-15.4	-15.6	-15.9	-16.0	-16.2	-16.3	-16.4	-16.2	-15.5	-14.8	-13.8	-12.8	-12.1	-11.4	-11.3	-11.6	-11.7	-11.7	-11.7	-11.9	-12.4	-13.0	-13.9	-11.3
5-Feb	-13.1	-12.9	-13.2	-13.3	-13.3	-13.3	-13.5	-13.6	-12.7	-11.7	-10.7	-9.4	-7.9	-6.7	-6.1	-4.8	-4.4	-4.2	-4.6	-5.0	-6.1	-6.3	-6.5	-6.4	-9.1	-4.2
6-Feb	-6.3	-6.0	-5.9	-5.7	-5.2	-4.8	-4.7	-4.5	-4.3	-4.2	-3.6	-2.6	-0.6	-4.5	-6.5	-7.6	-8.0	-8.7	-8.7	-8.8	-8.9	-9.4	-11.1	-13.2	-6.4	-0.6
7-Feb	-14.5	-14.8	-13.5	-13.9	-15.4	-16.7	-17.6	-18.3	-18.6	-18.1	-16.1	-14.1	-11.6	-10.4	-9.8	-10.2	-11.0	-11.8	-12.7	-14.7	-15.3	-15.7	-15.7	-14.7	-14.4	-9.8
8-Feb	-14.1	-13.8	-13.2	-12.2	-11.5	-11.5	-11.7	-11.4	-11.2	-10.8	-10.0	-8.5	-6.3	-4.7	-3.1	-2.8	-2.8	-3.7	-4.8	-4.7	-4.5	-4.9	-5.1	-5.3	-8.0	-2.8
9-Feb	-5.4	-5.5	-5.9	-5.9	-5.9	-5.8	-5.5	-5.4	-5.2	-4.8	-4.3	-3.6	-3.1	-2.5	-2.0	-1.7	-1.5	-1.6	-1.9	-2.0	-3.3	-5.8	-8.3	-10.2	-4.5	-1.5
10-Feb	-11.0	-11.6	-12.2	-12.8	-13.5	-13.7	-13.7	-13.9	-14.2	-14.1	-14.1	-13.8	-13.6	-13.2	-13.1	-12.9	-13.3	-13.6	-13.9	-14.5	-15.0	-15.3	-15.4	-15.7	-13.7	-11.0
11-Feb	-15.8	-15.6	-15.4	-15.3	-15.0	-14.8	-14.9	-15.1	-15.1	-15.0	-14.8	-14.4	-13.6	-13.2	-12.7	-12.7	-12.9	-14.0	-15.7	-17.6	-18.2	-20.4	-21.9	-22.4	-15.7	-12.7
12-Feb	-22.8	-23.4	-23.2	-22.4	-21.9	-21.7	-22.0	-22.4	-22.7	-21.6	-19.8	-17.3	-15.4	-13.7	-11.9	-10.8	-10.4	-10.1	-9.7	-9.2	-8.7	-8.7	-8.5	-8.6	-16.1	-8.5
13-Feb	-8.8	-9.5	-9.9	-10.0	-10.1	-10.3	-10.3	-10.3	-10.3	-10.1	-10.1	-9.8	-9.1	-8.0	-7.3	-6.6	-6.1	-6.6	-7.2	-8.3	-8.5	-10.7	-11.3	-11.3	-9.2	-6.1
14-Feb	-11.8	-12.3	-13.2	-13.7	-13.4	-13.5	-14.0	-12.5	-11.4	-10.3	-8.8	-7.4	-5.9	-5.0	-4.3	-4.0	-3.8	-4.1	-4.4	-4.6	-5.1	-5.3	-6.1	-6.7	-8.4	-3.8
15-Feb	-7.2	-7.8	-8.1	-8.2	-8.5	-8.8	-9.1	-9.3	-9.2	-8.9	-8.8	-9.0	-8.6	-8.6	-8.6	-8.5	-8.9	-9.3	-9.5	-9.7	-10.0	-10.0	-10.0	-9.8	-8.9	-7.2
16-Feb	-9.8	-9.7	-8.3	-8.0	-8.0	-8.0	-8.0	-7.9	-7.9	-7.6	-7.5	-6.1	-5.2	-3.9	-3.0	-3.0	-2.5	-2.7	-3.3	-3.1	-3.3	-4.2	-4.8	-5.0	-5.9	-2.5
17-Feb	-5.3	-5.7	-6.1	-6.9	-7.7	-8.6	-10.3	-10.9	-11.6	-12.2	-12.5	-12.7	-12.5	-12.4	-12.4	-12.8	-13.2	-13.4	-13.7	-13.9	-14.0	-14.1	-14.2	-14.1	-11.3	-5.3
18-Feb	-14.2	-14.2	-14.1	-13.9	-13.6	-13.0	-12.6	-12.4	-12.2	-11.7	-10.2	-7.4	-4.5	-2.3	-1.2	-0.4	-3.7	-5.5	-5.4	-5.5	-5.6	-5.5	-5.3	-8.2	-8.4	-0.4
19-Feb	-9.9	-11.5	-12.2	-12.7	-13.2	-14.1	-15.5	-16.8	-17.7	-18.2	-17.1	-16.1	-15.2	-14.5	-13.8	-13.4	-13.9	-13.9	-13.9	-14.3	-14.8	-15.2	-15.4	-15.6	-14.5	-9.9
20-Feb	-16.0	-17.0	-19.0	-21.3	-23.7	-24.4	-25.1	-26.7	-25.4	-23.2	-21.8	-17.7	-14.6	-12.8	-10.7	-9.7	-9.3	-11.8	-13.5	-12.8	-11.5	-11.3	-11.5	-11.7	-16.8	-9.3
21-Feb	-12.0	-12.1	-12.2	-12.3	-12.3	-12.3	-12.3	-12.4	-12.5	-11.6	-9.7	-7.2	-4.8	-3.9	-3.0	-1.9	-1.7	-2.3	-3.1	-3.7	-4.1	-4.9	-7.4	-10.3	-7.9	-1.7
22-Feb	-12.0	-13.1	-14.8	-15.6	-16.5	-17.2	-17.7	-18.0	-17.1	-15.4	-12.6	-9.2	-4.4	-1.2	1.4	4.9	4.9	1.4	-2.2	-1.8	-5.3	-7.6	-9.0	-9.6	-8.7	4.9
23-Feb	-9.8	-10.3	-11.0	-11.6	-12.2	-11.7	-12.0	-12.6	-13.1	-10.3	-6.2	-0.3	1.6	1.5	1.8	1.8	1.6	0.6	-1.8	-4.0	-5.3	-6.6	-7.5	-8.8	-6.1	1.8
24-Feb	-10.6	-11.4	-11.2	-11.2	-12.0	-12.9	-12.9	-13.5	-13.6	-10.5	-7.0	-2.1	1.3	3.7	5.1	6.1	5.5	2.6	-0.7	-3.1	-4.2	-5.0	-5.0	-6.8	-5.4	6.1
25-Feb	-5.9	-5.8	-6.3	-5.4	-5.6	-4.7	-4.3	-5.6	-5.4	-4.0	0.3	4.0	5.2	7.4	9.1	9.4	9.7	8.5	7.1	6.0	5.1	4.3	2.2	0.6	1.1	9.7
26-Feb	-0.8	-1.0	-2.3	-3.4	-4.2	-4.5	-5.2	-6.1	-4.1	2.3	4.8	6.4	8.2	8.0	7.6	7.4	5.8	3.6	2.3	1.1	0.0	-0.7	-2.1	-3.6	0.8	8.2
27-Feb	-5.1	-6.3	-7.6	-9.0	-10.3	-11.4	-12.1	-12.6	-12.3	-13.0	-12.9	-11.9	-11.5	-11.4	-11.2	-11.1	-11.0	-11.2	-11.4	-11.4	-11.3	-11.0	-11.4	-12.0	-10.8	-5.1
28-Feb	-13.5	-14.7	-15.7	-17.1	-18.4	-18.4	-18.7	-20.3	-20.8	-21.0	-21.0	-20.7	-19.9	-19.3	-18.7	-18.3	-18.4	-19.3	-20.5	-21.9	-23.0	-24.2	-26.5	-27.7	-19.9	-13.5
29-Feb	-29.1	-29.9	-30.0	-30.2	-31.3	-31.3	-31.1	-30.8	-30.7	-28.2	-25.2	-21.7	-17.4	-14.4	-12.5	-11.1	-10.4	-10.4	-10.6	-10.5	-9.5	-9.3	-9.6	-10.2	-20.2	-9.3
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Athabasca Valley - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	45	6.47	6.47
-20 - 0	610	87.64	94.11
0 - 10	41	5.89	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

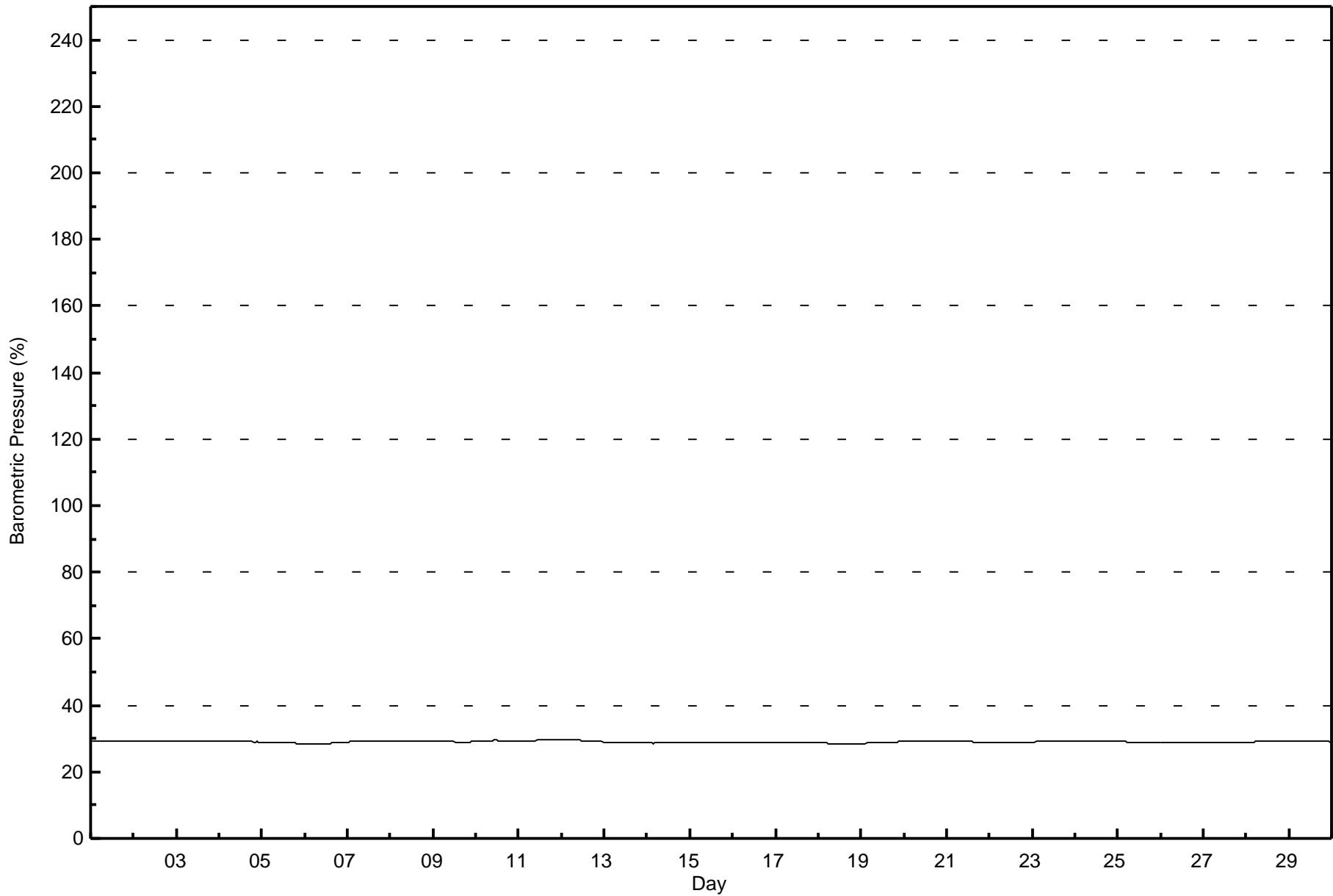
Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - February 2016

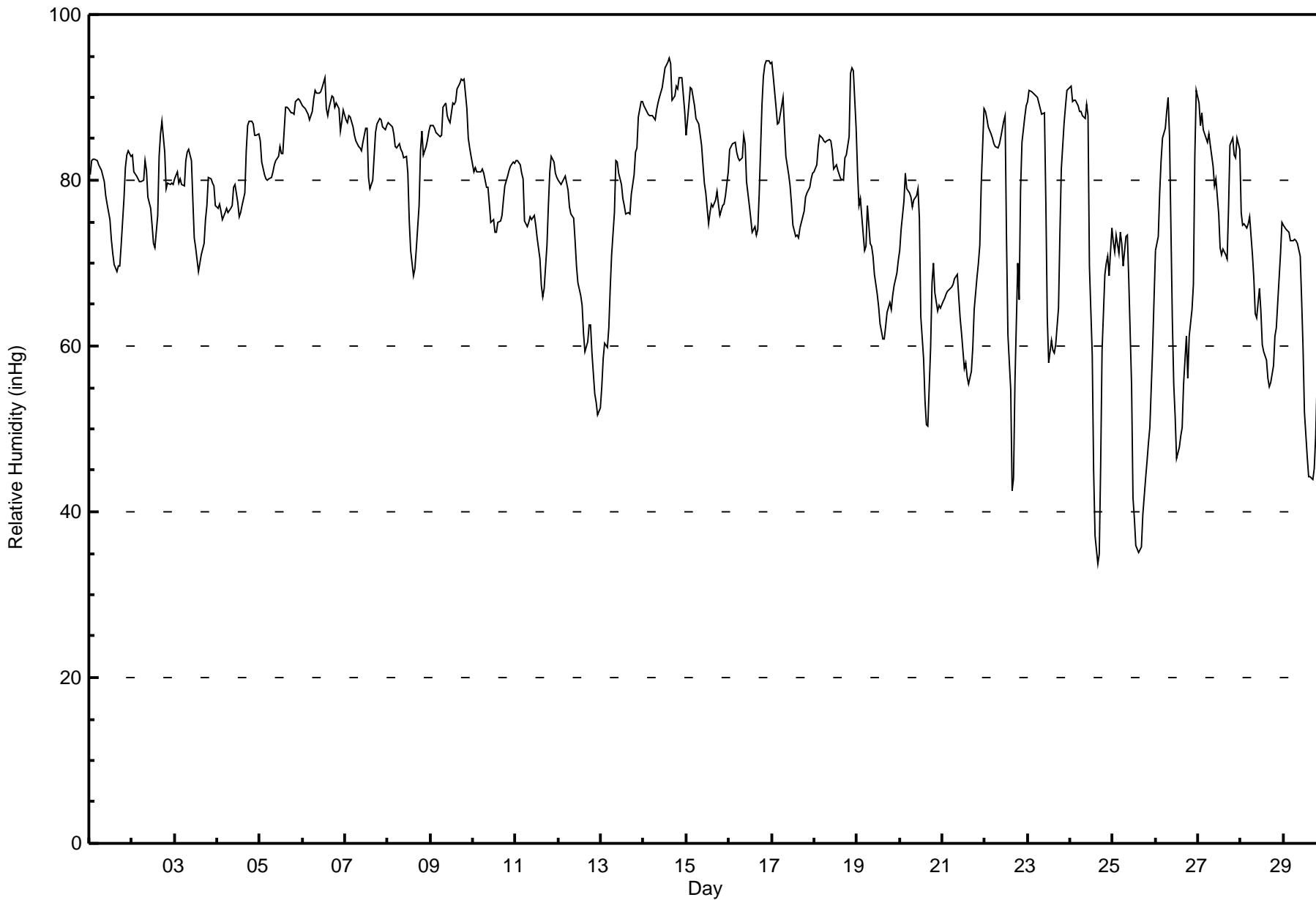




Wood Buffalo Environmental Association
Summary of Hour Averages

Relative Humidity (RH) - inHg
Athabasca Valley - February 2016

Maximum Value: 95 inHg on Feb 14 15:00																			Maximum Daily Average: 90.4 inHg on Feb 14						Hours in Service: 696																				
Minimum Value: 34 inHg on Feb 24 16:00																			Minimum Daily Average: 56.3 inHg on Feb 25						Hours of Data: 696																				
Maximum Diurnal Average: 81.5 inHg at hour 3																			Minimum Diurnal Average: 67.3 inHg at hour 16						Hours of Missing Data: 0																				
Monthly Average: 76.9 inHg																			Percentiles: P ₁ = 39 P ₁₀ = 60 Q ₁ = 71 Median = 80 Q ₃ = 85 P ₉₀ = 89 P ₉₉ = 94						Hours of Calibration: 0																				
																									Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Feb	81	82	83	82	82	82	82	81	80	78	77	75	73	71	70	69	70	70	72	78	82	83	84	83	77.9	84																			
2-Feb	83	81	81	80	80	80	80	82	81	78	77	75	72	72	76	83	86	87	83	79	80	80	80	79	79.7	87																			
3-Feb	80	81	80	80	79	79	82	83	84	82	78	73	72	69	70	71	72	75	77	80	80	80	79	77	77.7	84																			
4-Feb	77	77	76	75	76	77	76	77	77	79	80	77	76	76	77	78	83	87	87	87	87	86	85	86	79.9	87																			
5-Feb	85	82	81	80	80	80	80	81	82	82	83	84	83	83	89	89	89	88	88	88	90	90	89	89	84.8	90																			
6-Feb	89	89	88	88	87	88	90	91	90	90	91	91	92	89	88	89	90	90	89	89	89	86	87	88	89.1	92																			
7-Feb	87	87	88	88	86	85	85	84	84	84	85	86	86	80	79	80	83	86	87	88	87	86	86	87	85.2	88																			
8-Feb	87	87	86	86	84	84	84	84	83	83	83	81	75	72	69	69	72	77	84	86	83	84	85	86	81.4	87																			
9-Feb	87	87	86	86	86	85	85	89	89	88	87	87	89	89	90	91	92	92	92	92	89	85	84	83	87.9	92																			
10-Feb	81	82	81	81	81	81	81	79	79	77	75	75	74	74	75	75	76	78	79	81	81	82	82	82	78.8	82																			
11-Feb	82	82	82	81	80	75	74	75	76	75	76	75	73	71	67	66	67	72	77	81	83	82	81	80	76.4	83																			
12-Feb	80	79	80	80	80	79	77	76	75	73	70	68	66	65	62	59	61	63	62	59	54	53	52	53	67.7	80																			
13-Feb	55	59	60	60	62	67	71	76	82	81	79	78	77	76	76	76	78	81	83	84	88	89	89	89	75.4	89																			
14-Feb	89	89	88	88	88	88	87	88	89	90	91	92	94	94	95	94	90	91	91	92	92	90	88	88	90.4	95																			
15-Feb	85	89	91	91	89	88	87	87	84	82	80	79	75	76	77	77	78	79	77	76	77	77	78	81	81.6	91																			
16-Feb	84	84	84	85	83	83	82	83	86	84	80	77	75	74	74	73	74	78	89	93	94	94	94	94	83.4	94																			
17-Feb	94	93	89	87	87	88	90	86	83	81	79	77	75	73	73	73	74	76	76	78	79	79	80	81	81.3	94																			
18-Feb	81	82	84	85	85	85	85	85	85	85	83	81	82	81	81	80	80	83	83	85	93	94	93	86	84.4	94																			
19-Feb	81	77	78	74	72	72	77	72	72	71	69	66	65	63	61	61	62	64	65	64	66	67	69	70	69.1	81																			
20-Feb	71	74	77	81	79	78	78	77	78	78	79	75	64	59	53	50	50	60	68	70	66	64	65	65	69.2	81																			
21-Feb	65	66	66	67	67	67	67	68	69	66	63	62	57	58	56	55	57	60	64	68	70	72	80	89	65.8	89																			
22-Feb	88	88	86	86	85	84	84	84	84	85	87	88	73	61	55	43	44	56	70	66	79	85	88	89	76.5	89																			
23-Feb	89	91	91	90	90	90	89	89	88	88	77	64	58	61	59	59	60	65	74	81	87	89	91	91	79.6	91																			
24-Feb	91	90	90	90	89	88	88	88	88	89	88	70	59	45	37	34	35	46	59	69	70	71	68	74	71.4	91																			
25-Feb	73	71	73	71	74	72	70	73	73	68	55	42	39	36	35	35	36	40	44	46	48	50	60	66	56.3	74																			
26-Feb	72	73	78	82	85	86	88	90	85	63	55	52	46	48	49	50	55	61	56	61	64	68	83	91	68.5	91																			
27-Feb	89	87	88	86	85	85	86	84	82	79	80	76	72	71	72	71	70	77	84	85	83	83	85	84	81.0	89																			
28-Feb	76	75	75	74	75	76	71	68	64	63	67	64	60	59	58	56	55	56	58	61	62	65	71	75	66.0	76																			
29-Feb	75	74	74	74	73	73	73	73	72	71	66	60	52	47	44	44	44	45	49	56	58	60	66	77	62.4	77																			
																			81.3	81.2	81.5	81.3	81.1	80.9	81.1	81.2	80.8	79.2	77.2	74.2	70.9	68.7	67.8	67.3	68.3	71.6	74.7	76.6	77.8	78.4	80.2	81.5	Diurnal Average		
																			94	93	91	91	90	90	90	91	90	90	91	92	94	94	95	94	92	92	92	93	94	94	94	94	94	Diurnal Maximum	





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Athabasca Valley - February 2016

Maximum Speed: 26 km/h on Feb 6 14:00	Maximum Daily Speed Average: 14.2 km/h on Feb 17	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 1 22:00	Minimum Daily Speed Average: 0.4 km/h on Feb 20	Hours of Data: 692
Maximum Diurnal Speed Average: 4.0 km/h at hour 1	Minimum Diurnal Speed Average: 1.6 km/h at hour 6	Hours of Missing Data: 4
Monthly Average Velocity: 2.2 km/h 13.2 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 12 P ₉₀ = 15 P ₉₉ = 23	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	NW2	NW1	NW2	N1	E1	E4	ENE4	E4	SE9	SE10	M	SE10	SE11	SE8	SE8	SE8	ESE5	ESE5	E3	ESE2	WSW0	S0	W0	NNW1	SE3.4	SE11	
2-Feb	ESE3	SE8	SE8	SE7	SE7	SE9	ESE5	ESE5	SE8	SE11	SE7	ESE6	SE9	SE9	SE8	ESE5	NNW9	NNW7	NNW14	NNW15	NNW11	NNW12	NNW11	NNW11	E2.0	NNW15	
3-Feb	NNW9	NNW8	NW7	NNW4	NNW6	NE3	NW1	WNW1	NW1	SE3	ESE4	SE3	E2	E3	NNW2	NNE2	NNE4	NNW5	N5	N8	N12	NNW11	NNW12	NNW12	N4.1	NNW12	
4-Feb	NNW11	N9	N9	N10	N8	NNW9	N9	NNW8	N7	N8	N5	NNW4	SSE4	SSE6	SSE7	SSE6	NE3	N4	NE2	N5	N5	N7	N5	N2	N4.3	NNW11	
5-Feb	NE3	SSE7	SE9	SE11	SE10	SE10	SE11	SE12	SE11	SE13	SE11	SE12	SE12	SE12	SE15	SSE13	SE13	SE11	SE8	SE10	SE10	SE9	SE10	SE10	SE10.3	SE15	
6-Feb	SE10	SE8	SE9	SE9	SE9	SE9	SE9	SE12	SE14	SE11	SE9	SE6	NNW14	N26	NNW24	N18	NNW18	NNW14	NNW10	NNW9	NNW7	N6	NNW2	W3	NNE2.8	N26	
7-Feb	NNW3	N2	N6	NNW6	NW1	NNW1	NW2	W1	S1	NNE1	N5	NNW12	NNW14	NNW15	NNW15	NNW15	NNW9	NNW4	W3	WSW4	WSW4	NNE0	SW1	S0	NNW4.5	NNW15	
8-Feb	SSE0	SW2	ENE0	S4	SSE5	SE8	SE9	SE7	SE10	SE9	SE8	SE8	SSE5	E4	NE1	N2	AF	SE2	SE5	SE3	SE8	SE7	SE7	ESE6	SE4.7	SE10	
9-Feb	SE7	SE6	SE8	SE9	SE8	SE9	SE9	SE10	SE9	SE9	SE9	SE8	SE9	SE8	ESE5	ESE6	SE6	SE7	SE8	NE2	NNW25	N21	NNW22	NNW22	E3.6	NNW25	
10-Feb	NNW20	N20	N19	N15	N13	N12	N10	N8	N8	NNE9	N10	N12	NNW13	NNW13	NNW13	N9	N8	N6	N8	NNW11	N11	N11	N12	N10	N11.6	NNW20	
11-Feb	N7	N6	N6	N8	NNE4	E6	ENE5	ENE6	ENE4	N5	N8	NNW10	NNW12	NNW14	N12	N13	NNW12	NNW6	WNW3	N4	N5	NNW2	WNW2	NW1	N5.8	NNW14	
12-Feb	N2	NE2	ESE4	ESE8	SE11	SE15	SE17	SSE13	SE13	SSE14	SE20	SSE16	SSE11	SSE9	SE11	SE14	SE15	SSE13	SE13	SE15	SE13	SE15	SE14	SE16	SE11.9	SE20	
13-Feb	SE14	SE10	SE16	SE15	SE14	SE17	SE16	SE14	SE14	SE12	SE13	SE10	SE12	SE11	SE12	SE13	SE17	SE14	SE11	SE7	SSE6	SE3	SE2	SSW1	SE11.4	SE17	
14-Feb	SE2	E2	SSE2	SE3	SSE3	NNE4	NNE3	ENE3	AF	WNW1	WSW2	ENE3	NW0	W0	ENE4	NNW7	NNW10	NNW9	NNW8	N8	NNW10	NNW9	NNW12	NNW14	N3.5	NNW14	
15-Feb	NNW10	N10	N9	N10	NNW14	NNW17	NNW18	NNW16	NNW16	NNW14	NNW14	NNW15	N9	N9	NNW8	N9	N10	N8	N6	N5	N5	N3	N3	NNW3	NNW10.0	NNW18	
16-Feb	N4	N1	SSE7	SSE7	SSE9	SSE8	SSE6	NNE2	N4	E2	SE9	SE7	SSE7	SE7	E3	N5	ENE1	NE3	NNW3	N2	NNW6	N8	N8	N8	E1.6	SE9	
17-Feb	N8	NNW10	NNW14	NNW17	NNW14	N15	N18	NNW17	NNW20	NNW15	NNW16	NNW17	NNW15	NNW15	NNW13	NNW14	N14	NNW12	NNW13	NNW13	NNW14	NNW13	N12	N12	NNW14.2	NNW20	
18-Feb	N14	NNW14	NNW13	NNW11	NNW12	N11	N6	N7	N6	NNE4	NNE3	NNW4	ESE3	SE10	SE10	SE11	N12	N9	N7	NNW14	NNW13	NW9	NW15	NNW24	N7.4	NNW24	
19-Feb	NNW23	NNW17	NNW15	NW20	NW21	NW18	N12	NNE9	N8	N8	N4	N8	N7	N8	NNW11	NNW11	N9	N6	NNW8	N11	N10	NNW13	NNW11	NNW9	NNW10.9	NNW23	
20-Feb	N9	NNW7	NNW6	NW3	WSW5	SW3	WSW3	WSW2	NNW0	ENE1	WNW1	ENE5	E4	NE2	ENE2	WSW3	WSW2	W3	SSW1	SE1	ESE7	SE7	SE7	SE9	ENE0.4	SE9	
21-Feb	SE11	SE10	SE9	SE9	SE9	SE9	SE9	SE11	SE10	SE9	SE9	ESE6	E1	NNW2	NW2	AF	SE8	SE8	SE9	SE9	SE9	SE9	SE1	W4	SE6.9	SE11	
22-Feb	SSW2	WSW2	W3	W4	NW4	W4	SW2	SW1	SW1	S1	E1	E2	SE7	SSE8	SSE6	SW7	S5	SSE5	SSW1	W8	NW4	W5	SW3	S2	SSW1.9	W8	
23-Feb	SSE1	E2	SSW1	NNW0	SE4	SSE3	SSE4	SSE3	SE2	E2	E4	NNW11	N12	N11	N7	NNW8	NNW5	W3	WSW3	WSW2	SSE1	S1	ESE1	W2	N1.4	N12	
24-Feb	W4	SW2	SSW2	SSW1	E1	SSE2	SSW0	SSE2	SE2	SE2	SE3	SE8	SSE4	SW9	SW10	SW6	SSW5	SSE4	SSE2	S1	SE4	SE6	SSE6	SSE4	S2.9	SW10	
25-Feb	SSE7	SSE6	SSE9	SSE13	ESE6	SE7	SE11	SE7	SE7	SE6	SE4	SSW10	SW13	SW12	W20	W21	W19	W13	W13	W11	WSW12	SW11	SE8	SE9	SW5.5	W21	
26-Feb	SE7	SE6	SSE4	SE4	SE5	SSE4	SSE3	SE4	SE6	SSW7	NNE0	NNW7	N10	N11	N10	NNE8	N12	NNW14	NNW14	N13	N12	NNE10	N10	N15	N4.5	N15	
27-Feb	NNW20	NNW20	NNW21	NNW24	NNW25	NNW23	NNW18	NNW13	NNW13	NNW19	N15	NNW15	N16	N15	N12	NNW12	N7	N4	NNW5	N7	WSW3	NW3	NNW13	NNW20	NNW14.0	NNW25	
28-Feb	NNW22	NNW19	NNW18	NNW13	NNW15	NNW14	N14	N10	N16	N20	N17	NNW18	NNW16	NNW19	NNW18	NNW19	NNW19	NNW19	NNW14	NNW9	NNW6	N7	N6	NNW4	WNW2	NNW13.8	NNW22
29-Feb	NW1	NNW2	WSW2	W1	W4	SW4	SW4	SSW4	NNW2	SW4	W3	NW4	NE2	NNW2	NNW4	N4	N2	NW1	WSW1	SE5	SE9	SE9	SE11	SE13	S1.2	SE13	

N4.0	N3.4	N2.4	N2.0	NNE1.7	NE1.6	ENE2.1	ENE2.1	ENE2.3	E1.8	ENE1.9	NE2.2	NNE2.1	N2.5	N2.7	N3.1	N3.6	N2.4	NNW2.1	NNW2.8	N3.3	N2.8	N3.1	N3.7	Diurnal Average	
NNW23	N20	NNW21	NNW24	NNW25	NNW23	NNW18	NNW17	NNW20	NNW20	SE20	NNW18	N16	N26	NNW24	W21	W19	NNW14	NNW14	NNW15	NNW25	N21	NNW22	NNW24	Diurnal Maximum	

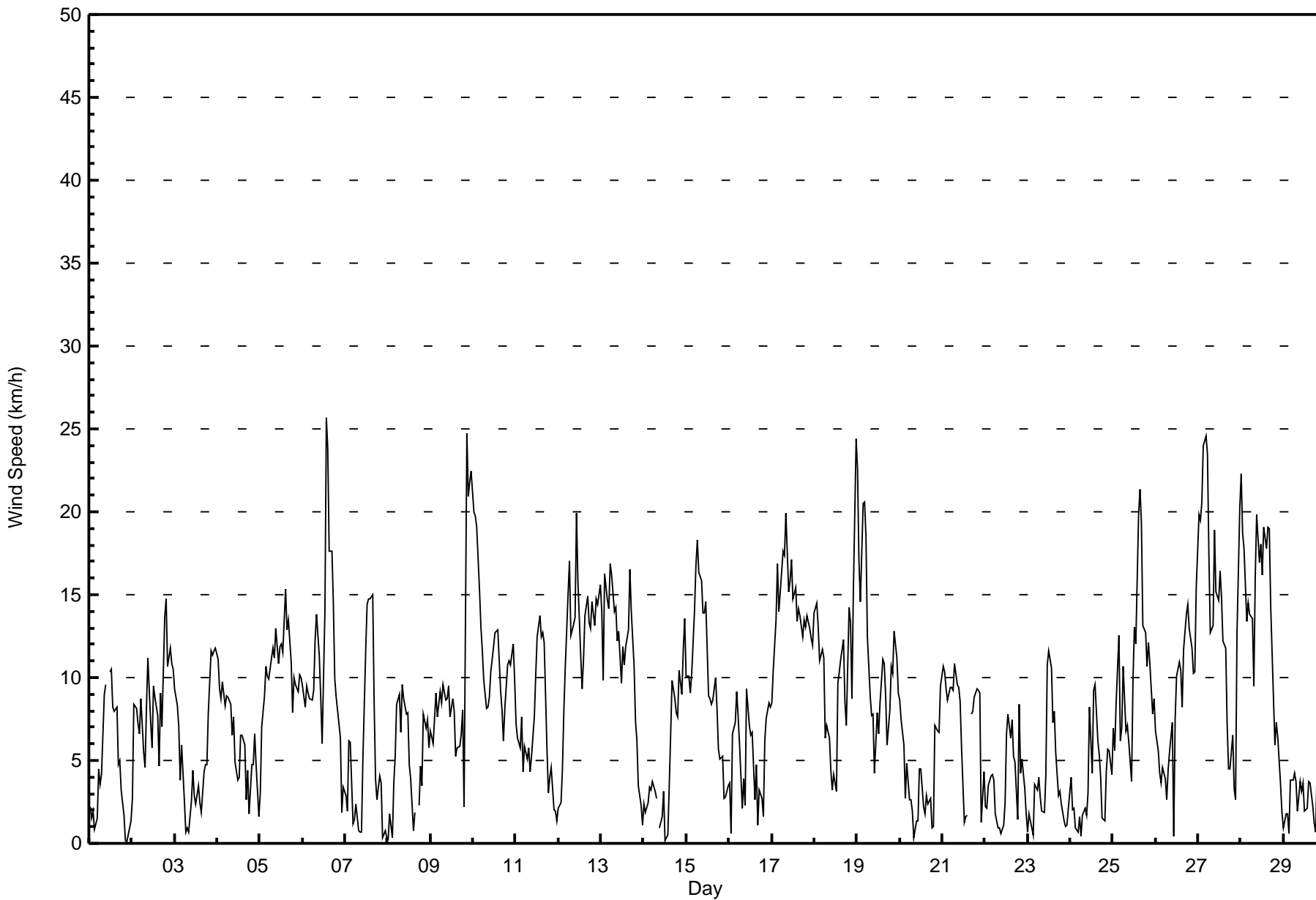
M - Maintenance AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Feb 6 13:00 Minimum Value: 1 km/h on Feb 22 06:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 3 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 696 Hours of Data: 692 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	1	1	1	1	2	1	2	2	2	2	M	2	2	2	2	2	1	2	1	2	1	1	1	1	2	2										
2-Feb	3	2	1	1	1	2	2	1	3	3	2	2	2	2	2	1	2	3	3	3	2	2	2	2	3	3										
3-Feb	2	2	1	1	2	1	1	1	1	3	2	1	2	1	1	2	1	1	2	2	3	3	2	2	3	3										
4-Feb	2	2	2	3	2	2	2	2	1	1	1	1	3	1	1	2	1	2	1	1	1	1	2	1	3	3										
5-Feb	1	2	2	2	2	2	3	3	3	3	2	4	3	2	3	3	3	3	2	2	2	2	2	2	4	4										
6-Feb	2	2	2	3	2	2	2	2	3	2	2	1	14	7	4	4	3	3	2	1	1	1	2	1	14	14										
7-Feb	1	2	2	3	1	1	1	1	1	2	3	3	3	2	2	3	3	2	1	1	1	2	1	2	3	3										
8-Feb	2	2	1	1	2	1	2	2	2	2	2	2	1	2	1	1	AF	1	2	2	2	2	2	2	2	2										
9-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	8	4	5	5	8	8										
10-Feb	4	4	5	4	4	3	3	2	2	3	2	3	2	3	2	2	2	2	3	2	2	3	2	3	5	5										
11-Feb	3	2	3	2	2	1	1	2	2	1	1	2	2	2	2	2	2	3	2	2	2	2	1	1	3	3										
12-Feb	1	2	2	2	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	4	4	4										
13-Feb	3	2	4	4	3	3	3	3	3	3	3	2	2	2	2	2	3	3	3	3	2	2	2	1	4	4										
14-Feb	1	1	2	2	2	2	2	1	AF	1	1	1	1	1	2	2	2	3	1	2	2	2	3	2	3	3										
15-Feb	2	2	2	2	3	3	2	3	3	3	2	3	2	1	2	3	2	2	1	1	1	1	1	1	3	3										
16-Feb	1	1	2	2	2	2	2	2	1	2	2	2	1	2	2	2	1	1	2	1	2	2	2	1	2	2										
17-Feb	2	2	2	4	2	4	4	4	4	5	3	4	3	3	3	2	3	2	3	2	2	3	3	2	5	5										
18-Feb	2	2	2	2	2	2	3	3	3	2	1	1	3	2	3	3	5	4	4	3	2	1	9	5	9	9										
19-Feb	4	3	3	5	4	4	4	2	2	2	2	1	1	2	2	2	3	2	2	3	2	2	2	2	5	5										
20-Feb	2	2	2	1	1	2	2	3	1	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3										
21-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	AF	3	2	2	2	2	2	3	2	1	3	3										
22-Feb	2	2	2	1	1	1	1	1	1	1	2	1	2	1	2	2	2	2	1	4	3	1	3	1	4	4										
23-Feb	2	1	1	1	2	3	1	1	2	2	2	6	4	3	2	1	2	1	2	2	1	2	1	1	6	6										
24-Feb	2	2	1	1	1	2	1	1	2	1	1	2	2	2	3	2	2	2	2	1	2	1	1	1	3	3										
25-Feb	2	1	4	2	1	2	2	1	2	2	1	3	3	4	6	5	4	2	2	2	2	2	2	2	6	6										
26-Feb	3	2	2	2	2	2	1	2	2	4	2	4	2	3	3	3	4	3	3	3	3	3	3	2	4	4										
27-Feb	3	3	3	3	3	4	4	3	3	3	3	2	3	3	2	2	2	1	1	2	2	1	4	5	5	5										
28-Feb	5	4	3	3	3	3	5	3	4	5	4	4	3	3	3	3	3	3	3	2	2	2	2	1	5	5										
29-Feb	1	1	1	1	2	2	2	2	1	2	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	2										
											Diurnal Maximum																									
											5	4	5	5	4	4	5	4	4	5	4	6	14	7	6	5	5	4	4	4	4	8	4	9	5	
M - Maintenance											AF - Analyzer Failure																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	241	34.83	34.83
6 - 11	272	39.31	74.13
12 - 19	154	22.25	96.39
20 - 28	25	3.61	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 692

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - February 2016**

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	28	11	10	12	16	13	21	22	9	10	11	15	17	7	17	22	241
6 - 11	64	4	0	1	1	8	116	20	0	2	5	0	2	0	1	48	272
12 - 19	29	0	0	0	0	0	35	7	0	0	2	1	3	0	2	75	154
20 - 28	3	0	0	0	0	0	1	0	0	0	0	0	2	0	2	17	25
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	124	15	10	13	17	21	173	49	9	12	18	16	24	7	22	162	692

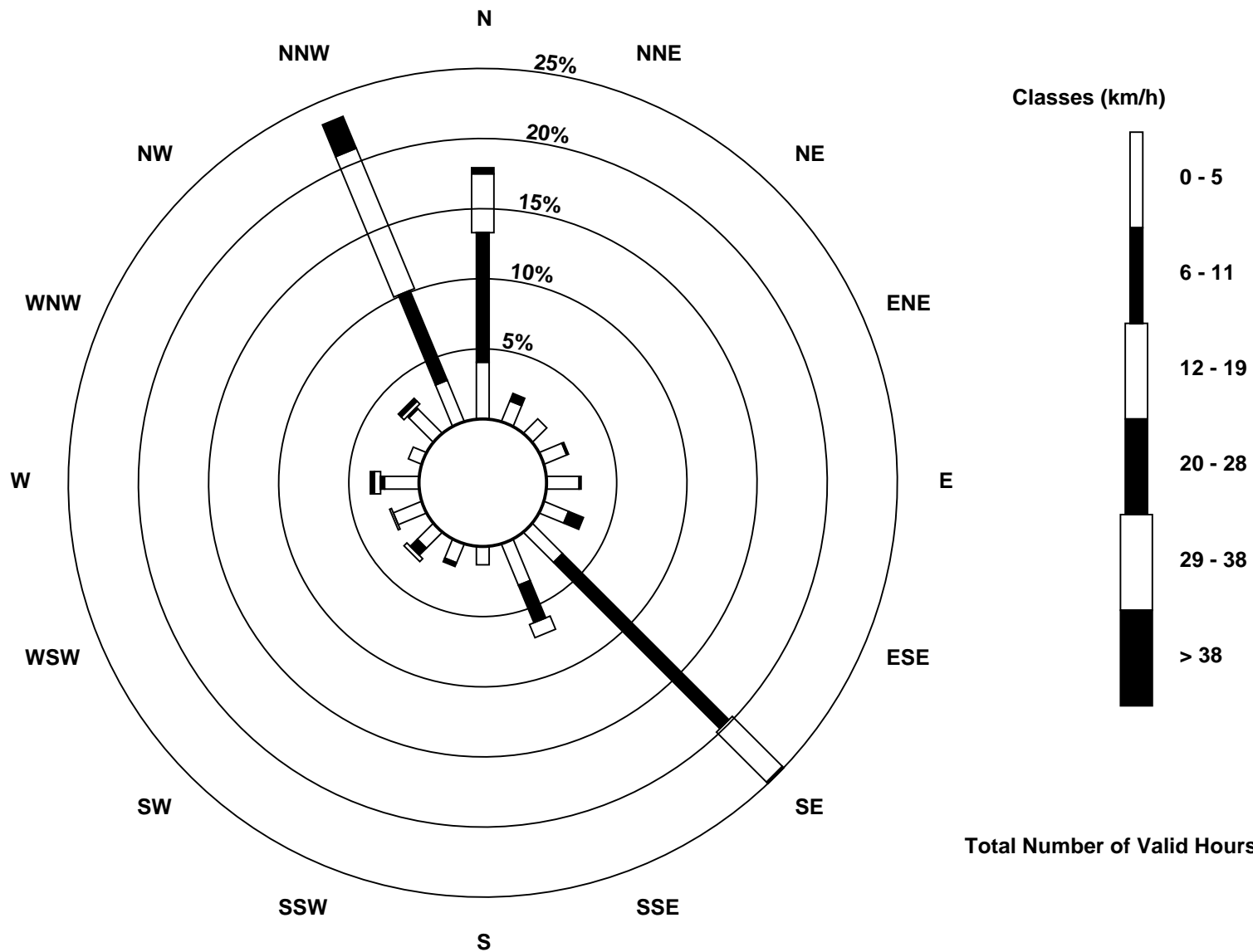
Total Number of Valid Hours: 692

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - February 2016

Direction of Maximum Speed: 353 deg on Feb 6 14:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 344.6 deg on Feb 17	Hours of Data: 692
Direction of Minimum Speed: 175 deg on Feb 1 22:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 0.4 deg on Feb 20	Percent Operational Time: 99.4
Monthly Average Direction: 343.0 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	325	310	313	355	84	80	75	101	133	134	M	136	140	137	137	139	110	123	86	112	237	175	259	339	124.0
2-Feb	103	126	127	133	141	135	118	108	133	141	135	110	140	141	138	111	345	341	331	327	336	328	341	339	83.0
3-Feb	339	334	324	342	329	52	305	292	304	126	116	143	94	99	334	21	12	339	355	354	352	344	335	344	349.9
4-Feb	348	352	357	351	358	348	349	341	358	350	350	338	153	162	154	157	43	7	34	351	355	354	358	350	356.5
5-Feb	37	147	140	140	145	140	143	134	133	142	141	138	146	142	142	148	144	146	128	132	128	135	137	134	139.1
6-Feb	131	128	135	135	139	139	139	143	142	138	142	126	338	353	345	349	345	342	336	339	343	349	298	280	31.6
7-Feb	340	5	356	343	310	333	320	265	188	17	351	343	347	341	341	347	339	329	266	244	250	14	220	182	337.2
8-Feb	160	236	72	186	153	143	143	133	140	143	144	131	148	84	44	5	AF	124	139	146	132	128	132	120	137.2
9-Feb	136	138	130	139	126	131	138	134	135	141	140	131	139	133	119	120	124	135	140	52	343	350	348	343	98.5
10-Feb	345	349	350	353	355	356	4	3	354	13	351	352	348	342	341	355	356	354	353	347	351	352	349	354	351.8
11-Feb	4	6	3	355	13	81	71	73	57	4	351	346	341	343	349	349	348	330	290	356	355	332	287	311	357.0
12-Feb	5	52	104	121	137	142	143	154	146	150	143	147	152	149	140	139	145	147	146	146	144	145	141	143	142.8
13-Feb	141	136	144	139	138	135	132	136	138	145	142	142	137	143	144	145	142	141	146	134	148	137	139	199	140.3
14-Feb	140	87	155	139	148	18	20	62	AF	284	241	76	312	277	70	333	340	347	327	352	347	347	345	339	353.3
15-Feb	341	353	353	353	348	345	340	343	345	335	346	345	349	349	347	350	349	355	3	350	350	358	11	343	347.1
16-Feb	3	9	148	150	156	156	148	29	353	83	142	135	149	135	95	5	63	43	337	355	346	351	349	350	95.3
17-Feb	351	340	335	334	331	350	349	346	345	345	341	341	347	343	345	347	352	346	347	345	344	348	351	352	344.6
18-Feb	350	347	344	346	347	350	357	350	11	15	13	339	117	138	143	132	1	356	351	340	338	326	326	345	352.3
19-Feb	339	343	347	315	311	308	2	13	353	1	3	8	11	355	342	344	358	7	346	4	355	343	342	341	343.1
20-Feb	351	345	338	309	258	232	243	253	341	78	285	78	81	51	64	254	252	273	201	128	123	124	126	135	77.9
21-Feb	134	132	131	132	133	136	137	140	135	131	129	121	80	335	312	AF	142	140	140	142	133	141	136	277	135.5
22-Feb	213	246	266	268	313	269	224	220	227	182	81	93	127	148	147	220	172	149	212	260	310	269	233	171	213.1
23-Feb	158	84	211	335	141	156	148	157	127	79	100	333	350	353	357	341	341	273	247	244	167	171	114	272	349.6
24-Feb	266	232	201	208	95	156	205	168	139	144	132	135	148	222	214	218	196	163	148	172	145	142	154	155	177.6
25-Feb	148	151	150	150	107	132	142	131	135	131	136	211	217	221	272	277	275	275	269	261	252	231	145	137	214.9
26-Feb	136	138	160	146	143	149	154	137	125	212	13	345	4	354	1	14	349	347	348	0	6	12	10	350	8.2
27-Feb	344	343	338	339	339	341	348	348	345	347	350	340	349	349	349	344	356	352	348	351	258	320	347	341	343.7
28-Feb	342	345	343	345	344	345	359	7	354	349	350	347	348	345	343	341	340	347	346	344	357	351	338	286	346.5
29-Feb	326	341	250	273	270	234	220	207	336	227	262	305	54	335	336	2	5	306	237	133	136	142	143	142	172.3
	358.2	4.5	9.4	8.9	11.8	50.2	68.8	77.1	75.8	80.6	73.9	34.6	30.5	10.0	357.3	351.2	355.0	358.6	347.1	348.3	356.1	358.3	0.4	353.8	
	Diurnal Average																								

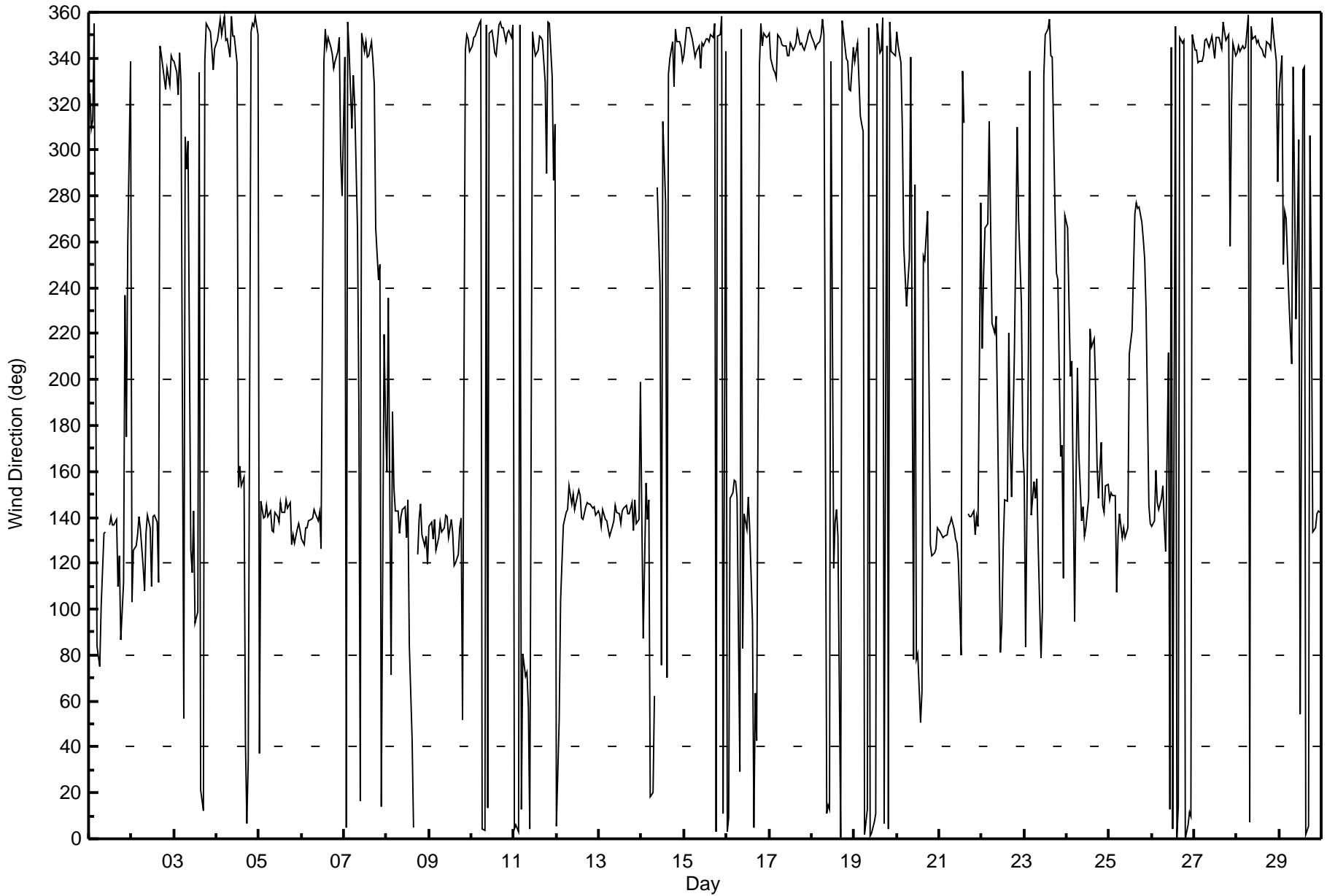
M - Maintenance AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Athabasca Valley - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 696																								
Maximum Value: 102 deg on Feb 21 23:00																			Hours of Data: 692																								
Minimum Value: 6 deg on Feb 27 04:00																			Hours of Missing Data: 4																								
Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 13 Median = 17 Q ₃ = 36 P ₉₀ = 67 P ₉₉ = 91																			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	42	45	30	43	85	17	46	40	14	11	M	12	14	16	16	18	30	29	29	63	91	90	82	35	91																		
2-Feb	49	17	12	13	17	12	29	22	19	15	27	25	17	13	15	39	13	12	8	10	10	11	12	12	49																		
3-Feb	11	11	11	40	38	37	80	46	62	48	34	68	72	46	53	50	18	23	27	21	16	22	15	15	80																		
4-Feb	13	15	17	22	17	16	15	16	15	11	19	26	88	18	20	22	56	28	34	14	18	15	28	67	88																		
5-Feb	37	20	13	14	14	18	17	16	19	14	15	13	18	14	13	14	11	16	23	29	19	16	14	14	37																		
6-Feb	16	17	14	18	14	17	14	14	13	12	11	18	65	18	12	15	11	9	9	9	11	14	45	38	65																		
7-Feb	39	86	24	22	75	78	44	84	77	78	41	12	13	10	10	12	17	43	38	15	17	87	79	95	95																		
8-Feb	96	79	90	58	27	13	14	19	14	14	17	16	36	25	76	32	AF	39	28	57	18	18	17	28	96																		
9-Feb	25	25	18	17	19	13	17	13	15	15	14	16	15	16	26	27	17	15	11	73	11	15	16	12	73																		
10-Feb	13	15	17	19	18	18	18	17	18	17	17	15	13	14	10	16	17	22	19	13	14	15	12	22	22																		
11-Feb	32	20	43	14	39	18	17	20	37	37	13	13	9	13	15	14	14	31	63	49	26	62	70	73	73																		
12-Feb	50	69	43	24	21	13	12	15	13	14	10	13	15	19	16	15	12	13	13	13	14	13	15	13	69																		
13-Feb	13	15	12	14	13	13	13	14	13	12	11	14	11	12	11	10	11	11	21	21	21	59	54	72	72																		
14-Feb	43	77	56	39	52	45	68	42	AF	33	36	18	82	48	49	17	11	15	10	15	14	13	12	8	82																		
15-Feb	12	17	15	17	15	11	7	9	10	12	12	10	14	15	12	14	14	20	22	22	14	60	35	19	60																		
16-Feb	18	90	35	18	18	20	22	67	31	63	18	23	20	20	69	18	61	39	45	81	15	19	14	14	90																		
17-Feb	16	11	9	8	11	16	16	14	12	13	11	14	13	10	14	14	16	13	14	12	11	14	13	15	16																		
18-Feb	13	8	8	11	9	11	35	25	41	35	33	14	83	17	15	17	47	38	23	9	7	9	13	12	83																		
19-Feb	9	11	13	10	11	17	18	18	16	16	35	17	21	20	12	13	18	18	16	18	17	9	11	9	35																		
20-Feb	15	16	21	51	19	77	80	86	81	85	65	15	25	54	89	20	42	25	80	81	18	15	18	12	89																		
21-Feb	12	13	13	13	12	13	14	15	15	15	14	38	50	61	30	AF	16	16	15	15	16	39	102	27	102																		
22-Feb	62	50	39	20	18	19	53	86	81	90	86	38	24	15	31	18	40	39	75	39	45	26	63	67	90																		
23-Feb	89	60	89	88	41	38	26	41	77	70	55	35	19	17	19	14	17	29	45	23	68	77	91	77	91																		
24-Feb	29	74	68	75	67	67	100	61	48	58	33	13	50	15	11	20	33	36	33	52	43	13	12	22	100																		
25-Feb	15	13	22	10	21	23	14	17	17	25	51	16	13	16	14	10	9	8	10	9	11	22	22	18	51																		
26-Feb	33	40	43	48	25	32	35	21	40	59	85	25	16	16	18	19	18	15	15	19	17	15	14	15	85																		
27-Feb	9	10	8	6	6	9	13	13	13	12	15	11	12	13	15	10	17	18	14	20	33	57	12	8	57																		
28-Feb	13	13	11	14	12	13	19	18	18	16	14	13	14	12	12	11	9	13	14	17	22	20	38	34	38																		
29-Feb	54	53	79	89	36	30	28	59	62	59	45	24	71	50	20	24	44	58	91	29	14	13	11	11	91																		
																			96	90	90	89	85	78	100	86	81	90	86	68	88	61	89	50	61	58	91	81	91	90	102	95	
Diurnal Maximum																																											
M - Maintenance AF - Analyzer Failure																																											





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 1, 2015	Last Calibration	January 7, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	14:02
Gas Cert Reference	S970259A	Station temp.	18 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

Analyzer Information

	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	0.999911	1.003014	Chamber temp	43.9	44.0
Calculated intercept	1.818601	1.418163	Pressure	703.6	699.5
Analyzer Background	18.4	18.4	Flow	0.480	0.477
Analyzer Coefficient	1.084	1.084	Intensity	43792	43372

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	60.7	607.0	597.3	1.016
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.7	607.0	604.5	1.004
second point	5000	30.4	304.0	300.7	1.011
third point	5000	15.2	152.0	149.1	1.019
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.7	607.0	600.9	1.010
Average Correction Factor					1.012

Corrected As found 597.4 Previous response 605.2 % change 1.3%

Notes:

filter changed out, no maintenance or adjustments done,

Calibration Performed By: Melissa Lemay



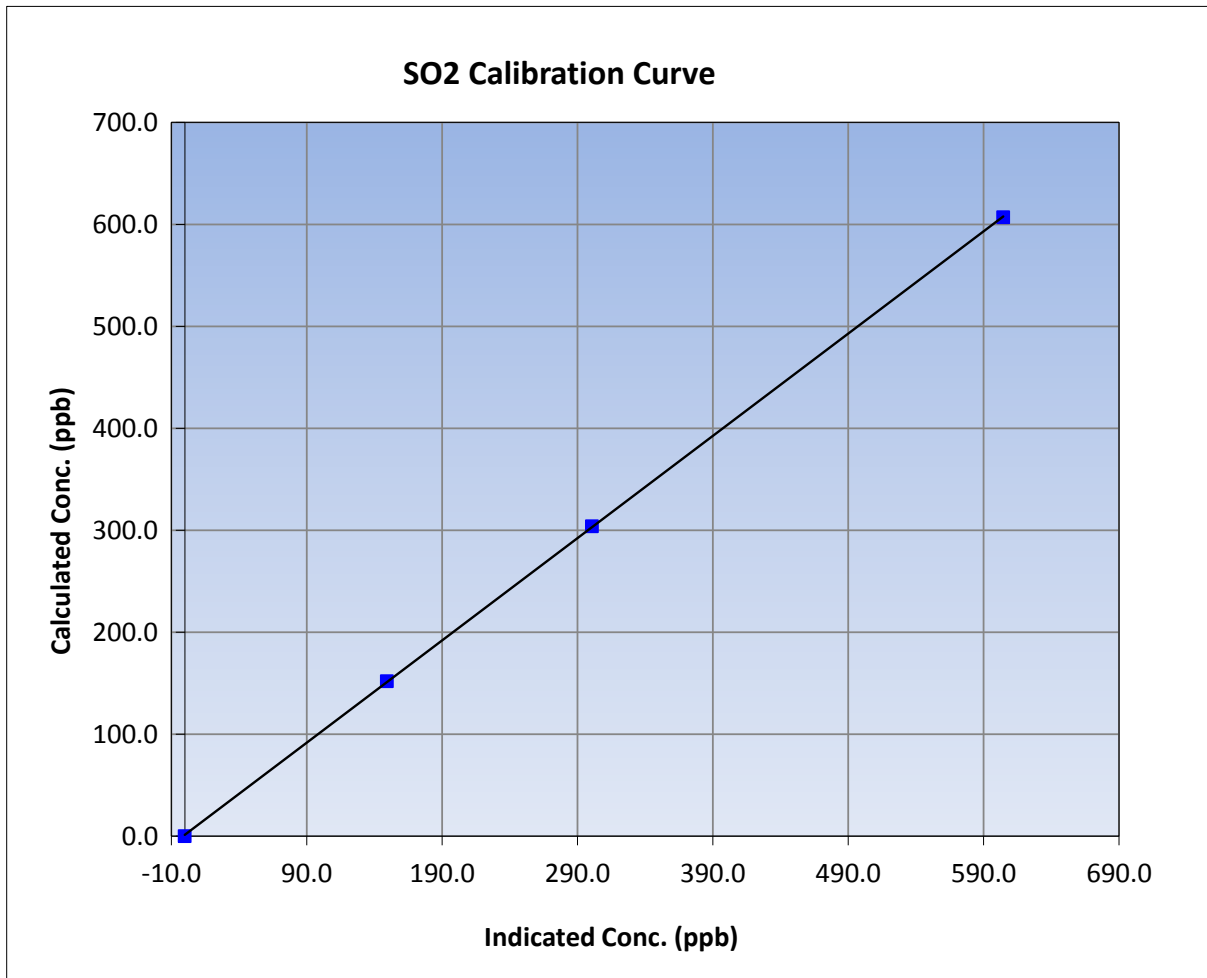
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 1, 2015	Previous Calibration	January 7, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	14:02
Analyzer make	Thermo 45C	Analyzer serial #	630718530

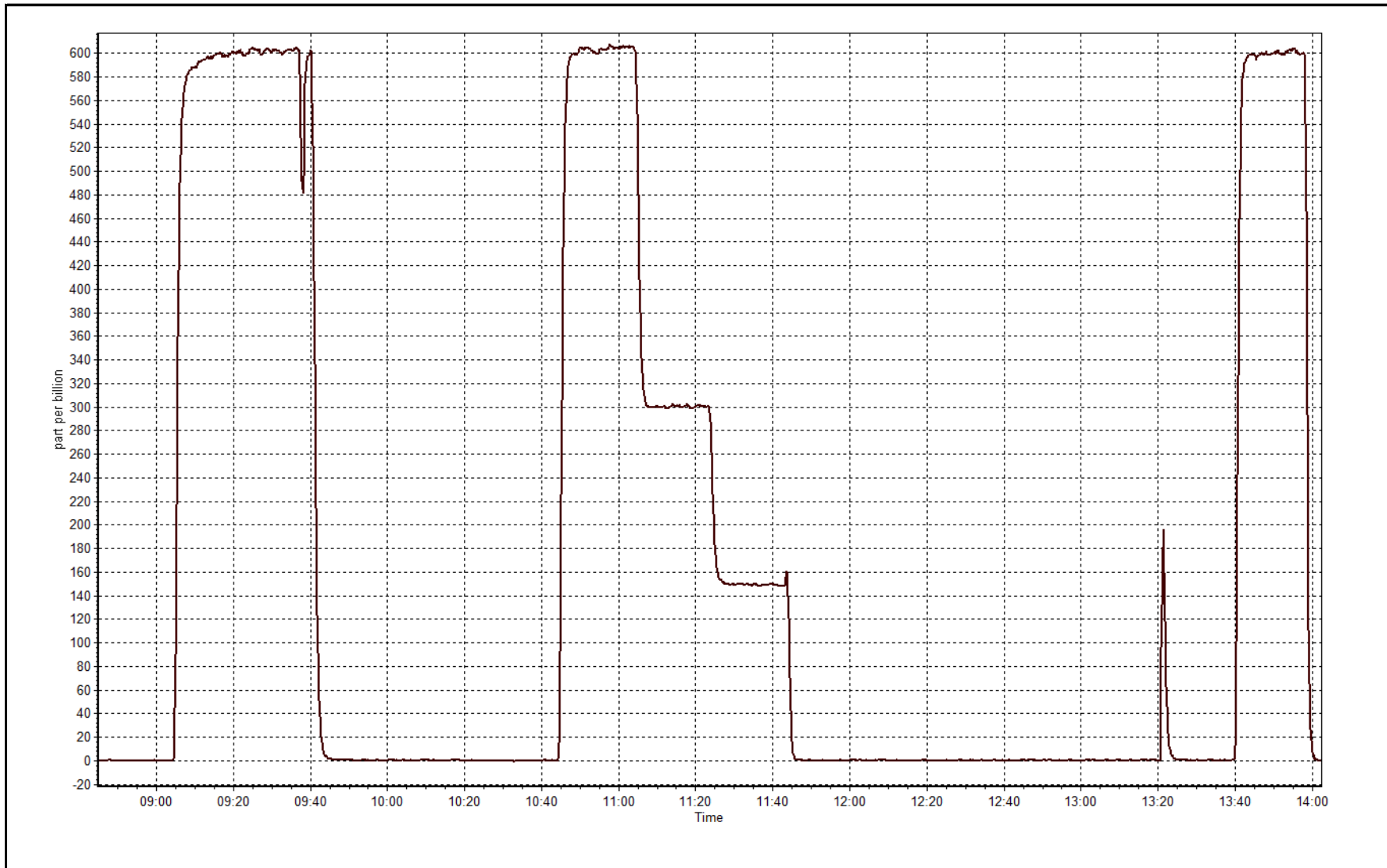
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999979
607.0	604.5	1.0041		
304.0	300.7	1.0110	Slope	1.003014
152.0	149.1	1.0195		
			Intercept	1.418163



SO2 Calibration Plot

Date: February 1, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 3, 2016	Last Calibration	January 11, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:33	End Time (MST)	13:57
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	50.8 ppm	SO2 gas cert/exp	8400311 9/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-699
Analyzer IP address	192.168.1.44		Lamp voltage	1109	1105
Calculated slope	0.984904	0.997851	Chamber temp	45	45
Calculated intercept	-0.066844	-0.182581	Pressure	708.9	707.4
Analyzer Background	2.42	2.42	Flow	0.439	0.438
Analyzer Coefficient	1.118	1.118	Intensity	72	71
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-LTE		Analyzer serial #	1507864683	
Converter make/model	CDN-101		Converter serial #	503	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	89.6	75.0	75.2	0.997
SO2 scrubber check	5000	15.2	154.4	0.6	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	89.6	75.0	75.2	0.997
second point	6000	50.2	42.0	42.5	0.988
third point	6000	29.9	25.0	25.2	0.993
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	89.6	75.0	75.7	0.990
Average Correction Factor					0.993

Corrected As found	75.1	Previous response	76.2	% change	1.5%
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Notes:

no adjustments or maintenance done, filter changed out,

Calibration Performed By:

Melissa Lemay



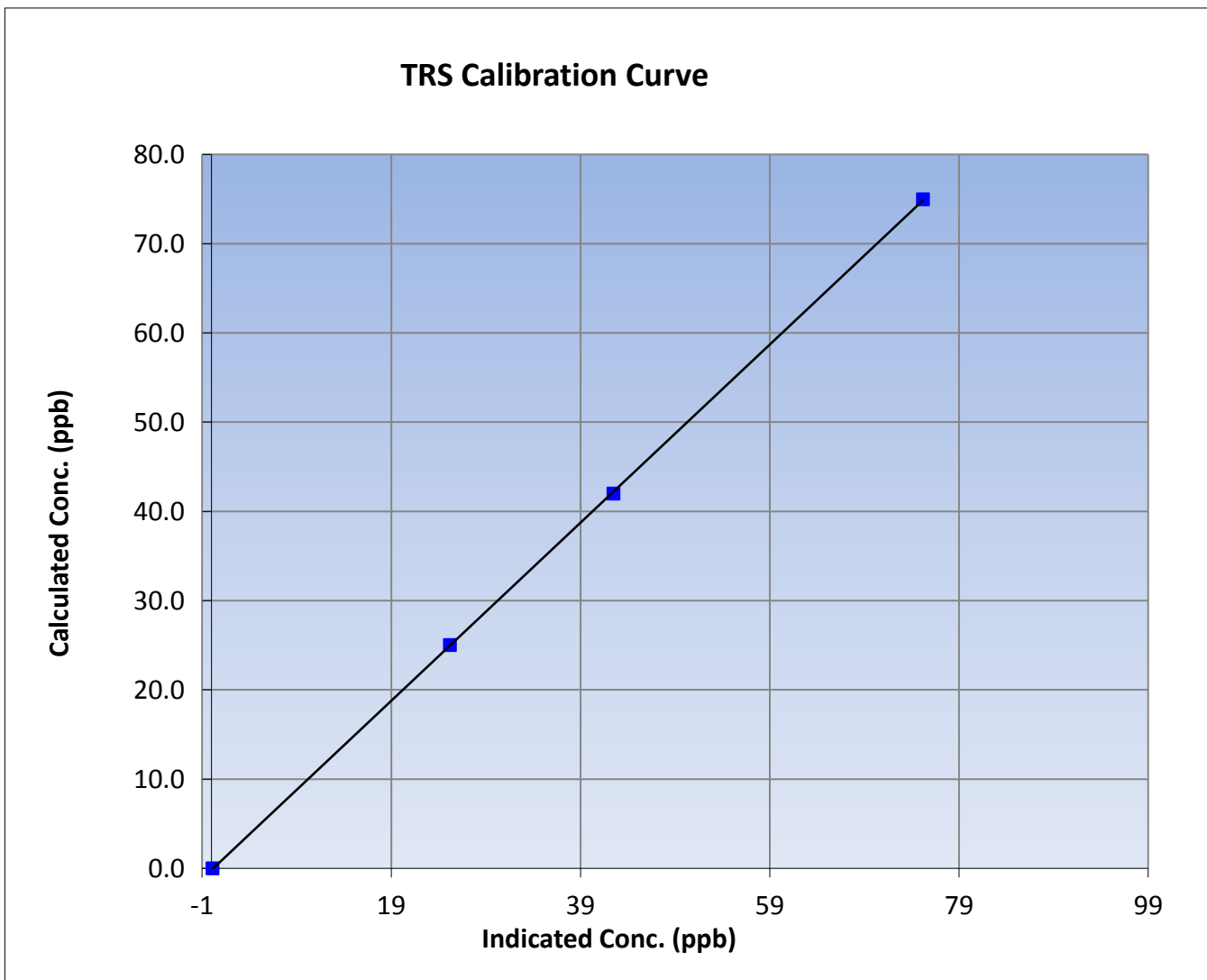
Wood Buffalo Environmental Association TRS Calibration Report

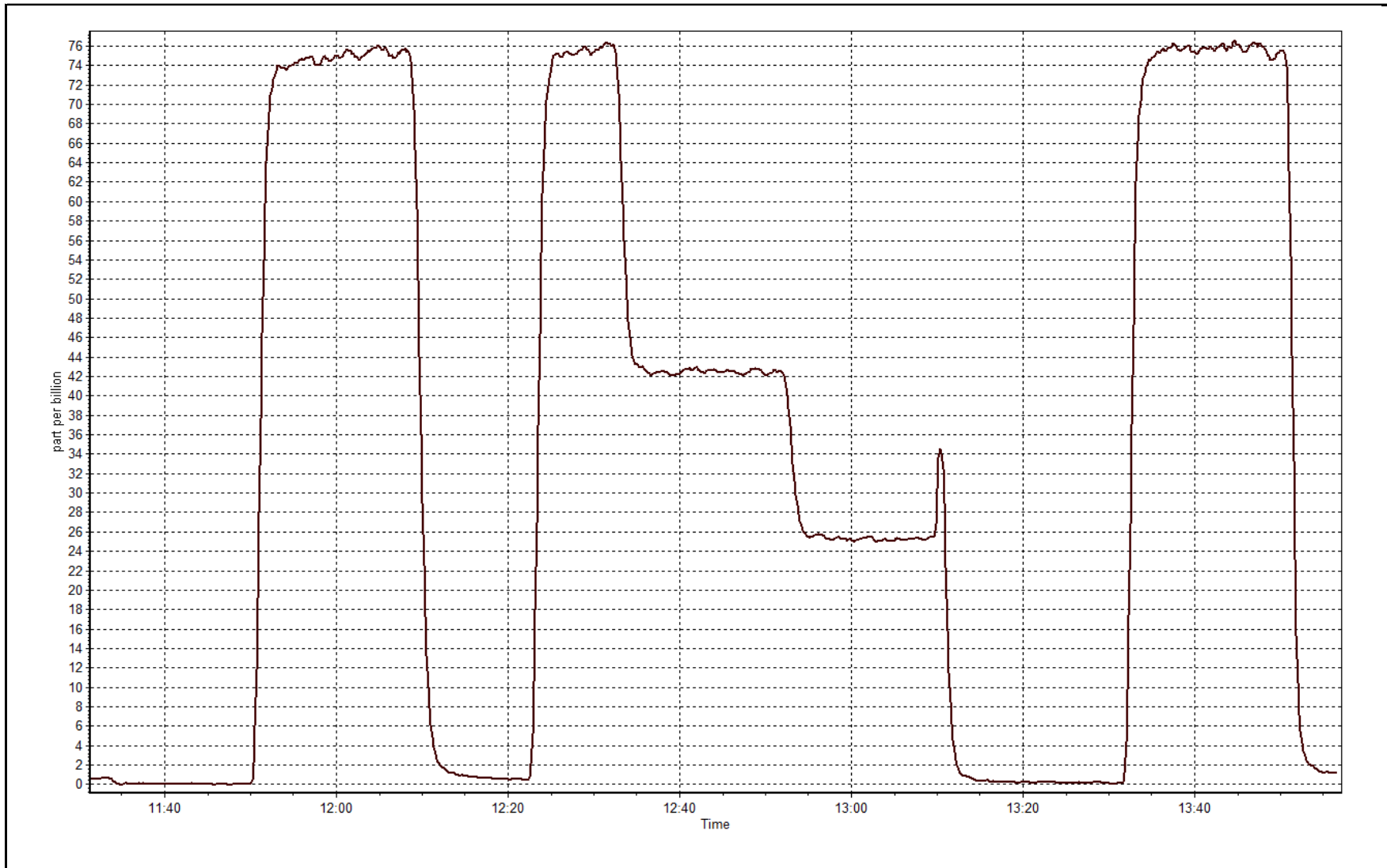
Station Information

Calibration Date	February 3, 2016	Previous Calibration	January 11, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:33	End Time (MST)	13:57
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999977
75.0	75.2	0.9969		
42.0	42.5	0.9883	Slope	0.997851
25.0	25.2	0.9927		
			Intercept	-0.182581







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February-01-15	Last Calibration	January-07-15
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	14:00
Gas Cert Reference	S970259A	Cal Gas Expiry Date	9/26/2017
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	11021107
ZAG make/model	Teledyne API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	286.6	286.2
THC Calc slope	0.997093	1.004944	Carrier Pressure	36.8	36.8
THC Calc intercept	0.058543	0.040606	Fuel Pressure	42.1	42.1
NMHC Calc slope	0.997157	1.001325	Air Pressure	32.2	32.2
NMHC Calc intercept	0.036481	0.024415			

Analyzer make Thermo 55i Analyzer serial # 1426262594

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	60.7	12.63	12.59	1.003
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.55	1.006
second point	5000	30.4	6.32	6.21	1.018
third point	5000	15.2	3.16	3.08	1.026
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	12.63	12.50	1.010
Average Correction Factor					1.017

Corrected As found 12.59 Previous response 12.60 % change 0.1%

Notes:

Hydrogen changed out, filter changed out, No adjustments done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	6.68	6.68	1.000
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.66	1.003
second point	5000	30.4	3.34	3.29	1.016
third point	5000	15.2	1.67	1.63	1.026
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	6.68	6.63	1.007
Average Correction Factor					1.015

Corrected As found 6.68 Previous response 6.66 % 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	60.7	5.95	5.91	1.007
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	5.95	5.89	1.010
second point	5000	30.4	2.98	2.92	1.020
third point	5000	15.2	1.49	1.44	1.034
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	5.95	5.86	1.015
Average Correction Factor					1.022

Corrected As found 5.91 Previous response 5.94 % change 0.6%



Wood Buffalo Environmental Association

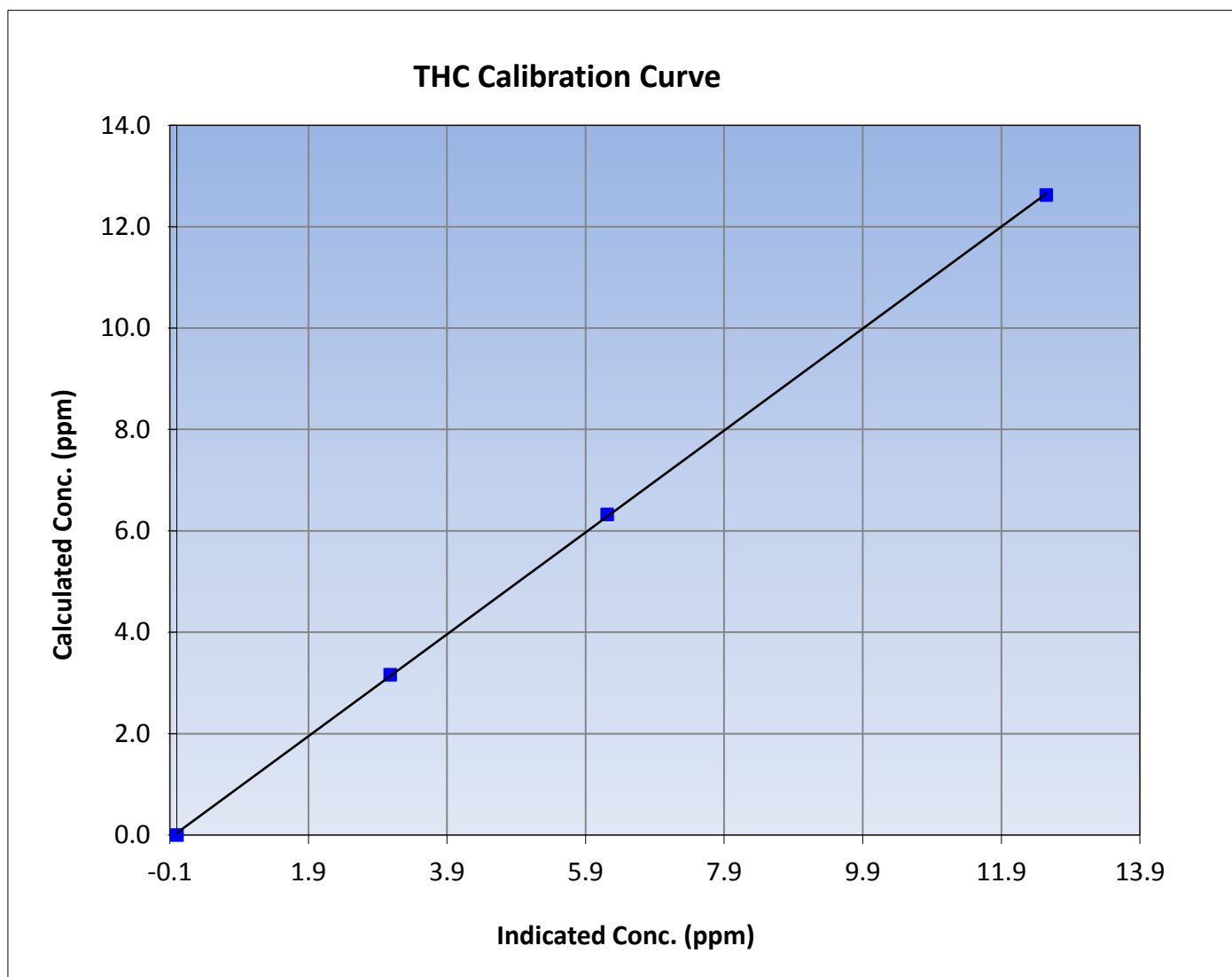
THC Calibration Summary

Station Information

Calibration Date	February 1, 2015	Previous Calibration	January 7, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	14:00
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	0.999945
12.63	12.55	1.0060		
6.32	6.21	1.0182	Slope	1.004944
3.16	3.08	1.0265		
			Intercept	0.040606





Wood Buffalo Environmental Association

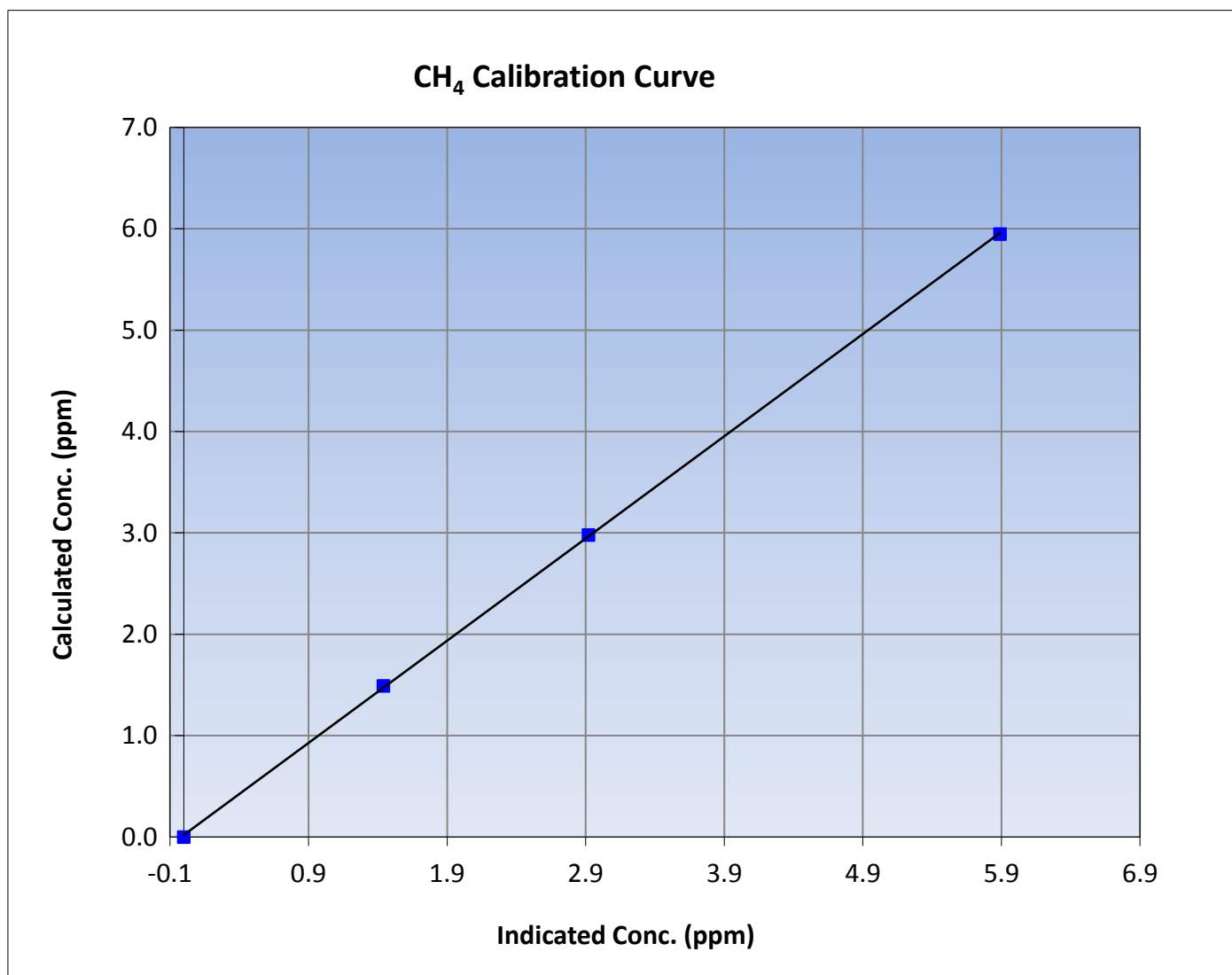
CH₄ Calibration Summary

Station Information

Calibration Date	February 1, 2015	Previous Calibration	January 7, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	14:00
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	0.999946
5.95	5.89	1.0099		
2.98	2.92	1.0203	Slope	1.008435
1.49	1.44	1.0344		
			Intercept	0.020236





Wood Buffalo Environmental Association

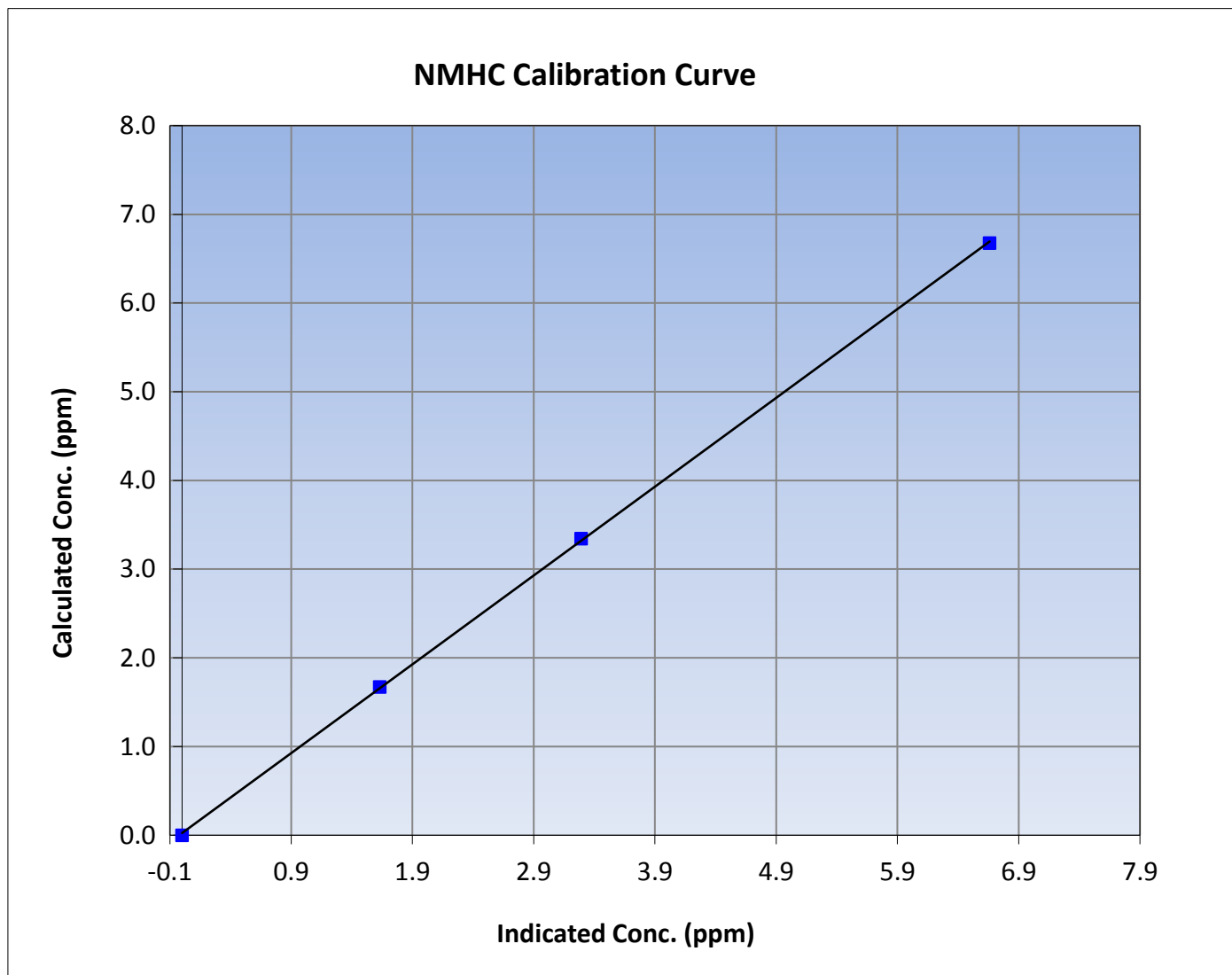
NMHC Calibration Summary

Station Information

Calibration Date	February 1, 2015	Previous Calibration	January 7, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	14:00
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

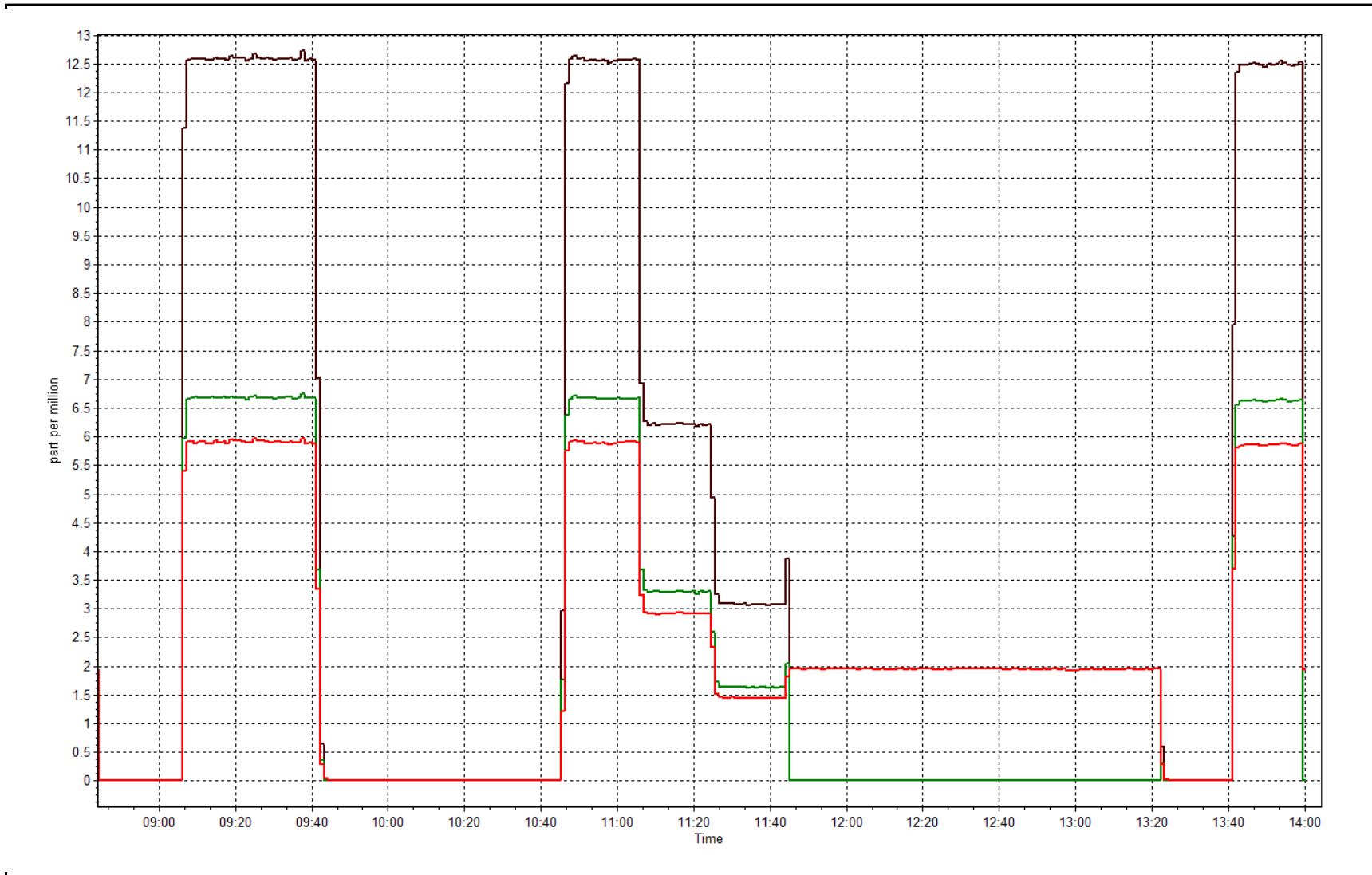
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999929
6.68	6.66	1.0026		
3.34	3.29	1.0164	Slope	1.001325
1.67	1.63	1.0258		
			Intercept	0.024415



THC Calibration Plot

Date: February 1, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 3, 2016	Previous Calibration	January 6, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:12
NO2 GPT Ref date	February-01-16	Transfer Standard	GPT
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11021107
DACS make/model	Campbell Scientific CR3000	Serial Number	1864
		Serial Number	5564

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	28.7	28.7
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	0.993235	1.001204	Pressure	762.1	721.0
Calculated intercept	0.021913	1.089850	Flow cell A	0.748	0.743
Analyzer Background	0.2	0.2	Flow cell B	0.757	0.755
Analyzer Coefficient	0.958	0.943	Cell A Intensity	85407	83229
			Cell B Intensity	75911	73279

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	-0.1	----
as found span	5000	1.22	350.1	356.7	0.981
calibrator zero	5000	0.00	0.0	-0.1	----
high point	5000	1.22	350.1	349.5	1.002
second point	5000	0.70	179.8	176.8	1.017
third point	5000	0.43	90.4	89.0	1.016
as left zero	5000	0.00	0.0	0.0	----
as left span	5000	1.22	350.1	345.1	1.014
Average Correction Factor					1.011

Corrected As found	356.8	Previous response	352.5	% change	-1.2%
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Notes:

Filter changed out, Span adjusted, No maintenance done

Calibration Performed By: Melissa Lemay



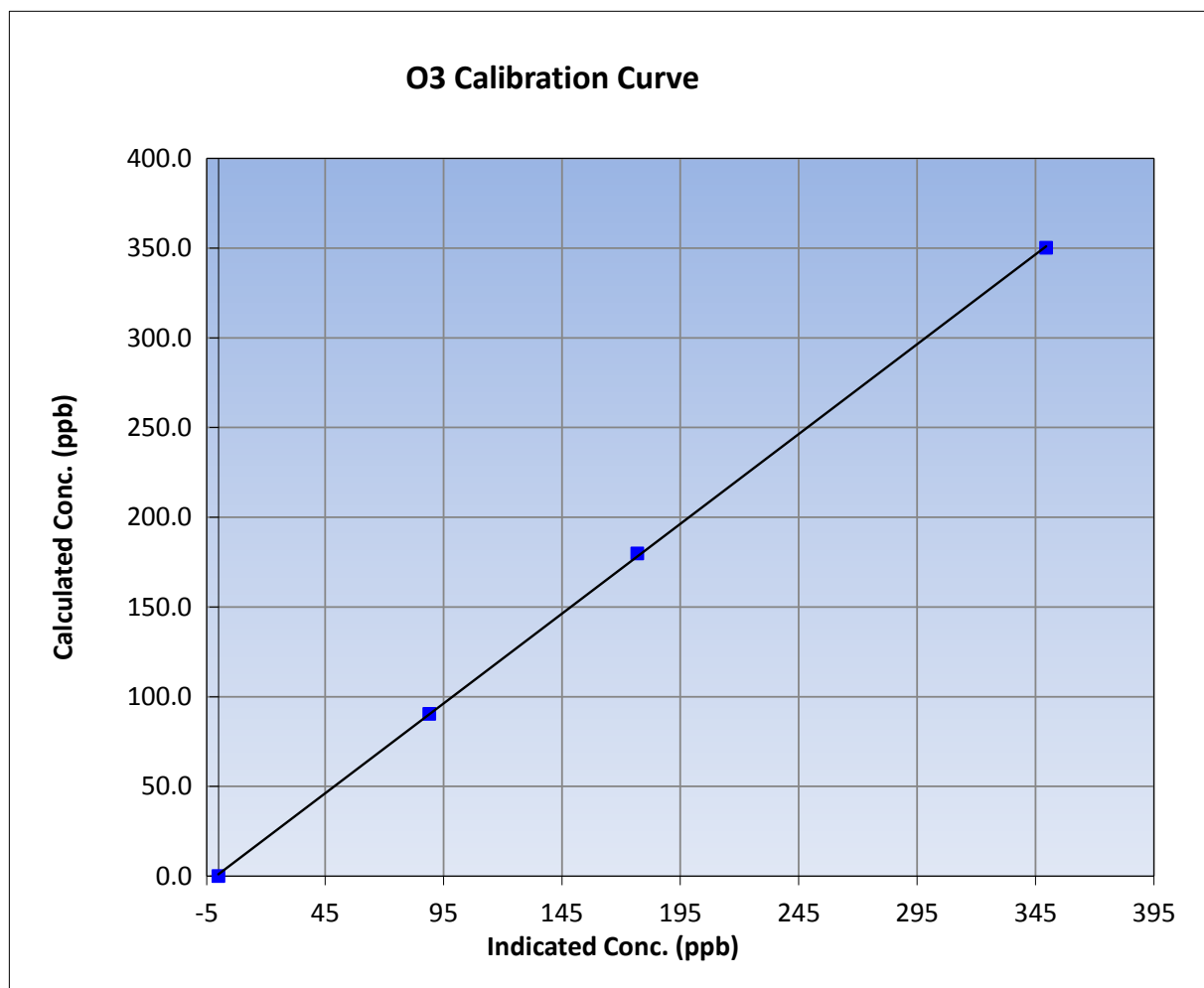
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-03-16	Previous Calibration	January 6, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:50	End Time (MST)	11:12
Analyzer make	TEI 49i	Analyzer serial #	1507964700

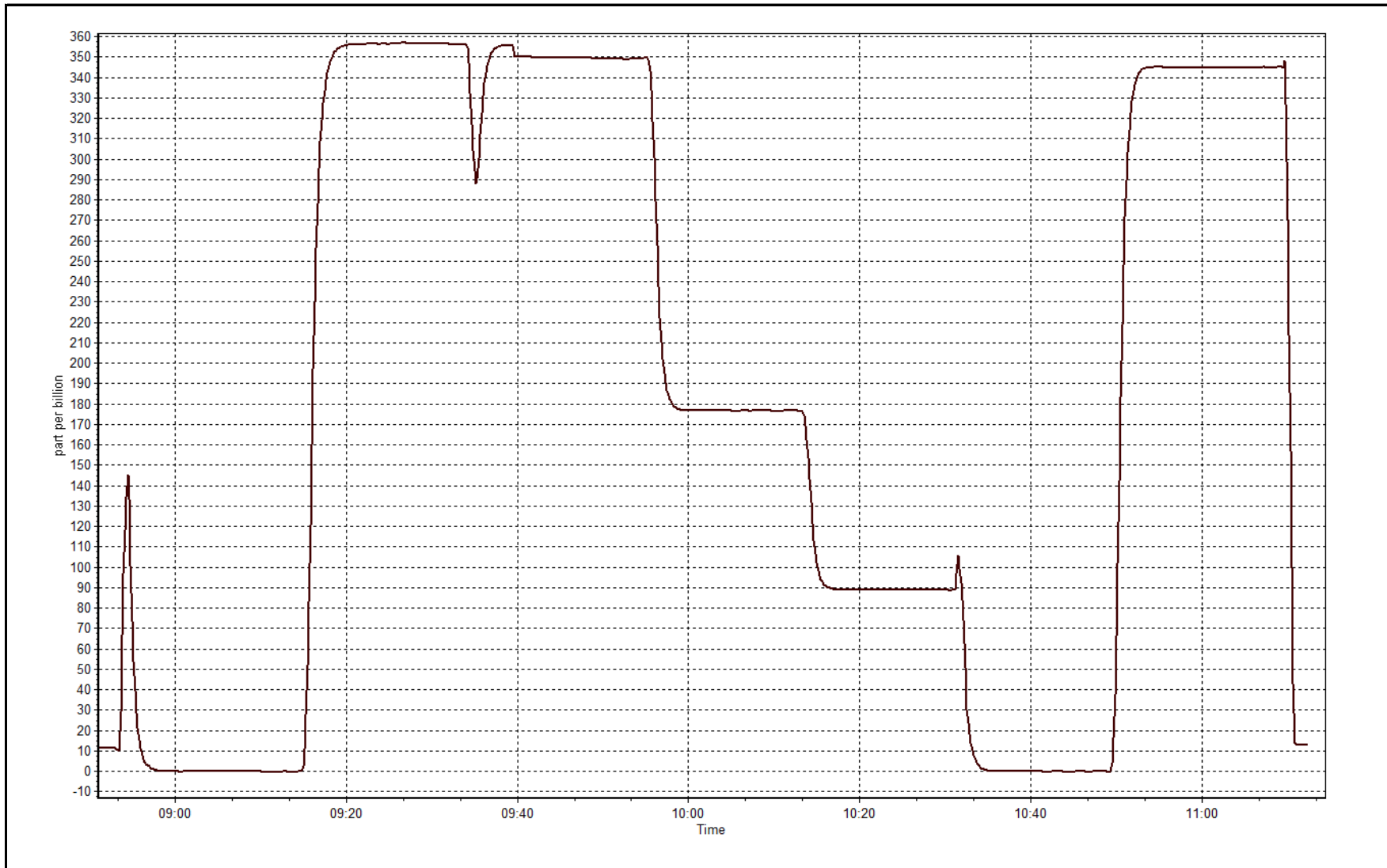
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999929
350.1	349.5	1.0017		
179.8	176.8	1.0170	Slope	1.001204
90.4	89.0	1.0157		
			Intercept	1.089850



O3 Calibration Plot

Date: February 3, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 7, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	14:00
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOx Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne PAI T701	Serial Number	1864

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	5564
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000715	0.998360	1.005612
	Data Offset	2.162494	2.358483	0.152457
Current Calibration	Data Slope	0.995917	0.998400	1.011229
	Data Offset	1.568616	1.846276	-1.129522

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	0.798		1.009	
NOx coefficient	0.997		1.003	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.7		2.8	
NOx bkgrnd	2.8		2.9	
Chamber Temp	49.6	Deg C	49.7	Deg C
Moly Temp	323	Deg C	324	Deg C
PMT voltage	-805	V	-784	V
PMT Temp	-3.7	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	144.9	mmHg	147.4	mmHg
R Cell Press Nox	144.9	mmHg	147.4	mmHg
NO sample flow	0.893	lpm	0.881	lpm
Nox sample Flow	0.893	lpm	0.881	lpm

Notes:

Pump and Charcoal changed out, PMT adjusted, filter changed out, 2nd High GPT point used due to drift during GPT



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 1, 2016

Station Number:

AMS 7

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
as found span	5000	60.7	599.7	599.7	0.0	591.5	593.6	-1.9	1.0139	1.0103
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	----	----
high point	5000	60.7	599.7	599.7	0.0	601.4	599.8	1.9	0.9972	0.9999
second point	5000	30.4	300.4	300.4	0.0	299.1	297.8	1.4	1.0042	1.0086
third point	5000	15.2	150.2	150.2	0.0	147.8	147.0	0.9	1.0161	1.0216
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	----	----
as left span	5000	60.7	599.7	255.1	344.6	603.9	264.9	339.1	0.9931	0.9630
Average Correction Factor									1.0058	1.0100

Corrected As found
Previous Response

NO_x= 591.5
NO_x= 597.1

NO= 593.7
NO= 598.3

Percent Change

NO_x= 0.9%

NO= 0.8%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 60.70 ccm NOx ref calc conc = 599.7 ppb NO ref calc conc = 599.7 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	607.6	605.2	0.2	0.9870	0.9909	----	----
1st NO2 (300)	255.1	350.1	601.9	255.1	347.0	0.9964	----	1.0089	99.1%
2nd NO2 (200)	425.4	179.8	604.2	425.4	178.9	0.9926	----	1.0050	99.5%
3rd NO2 (100)	514.8	90.4	606.4	514.8	91.8	0.9890	----	0.9847	101.5%
2nd NO ref point		0.0	602.4	600.5	2.2	0.9955	0.9987	----	----
Average Correction Factor						0.9934		0.9996	100.1%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

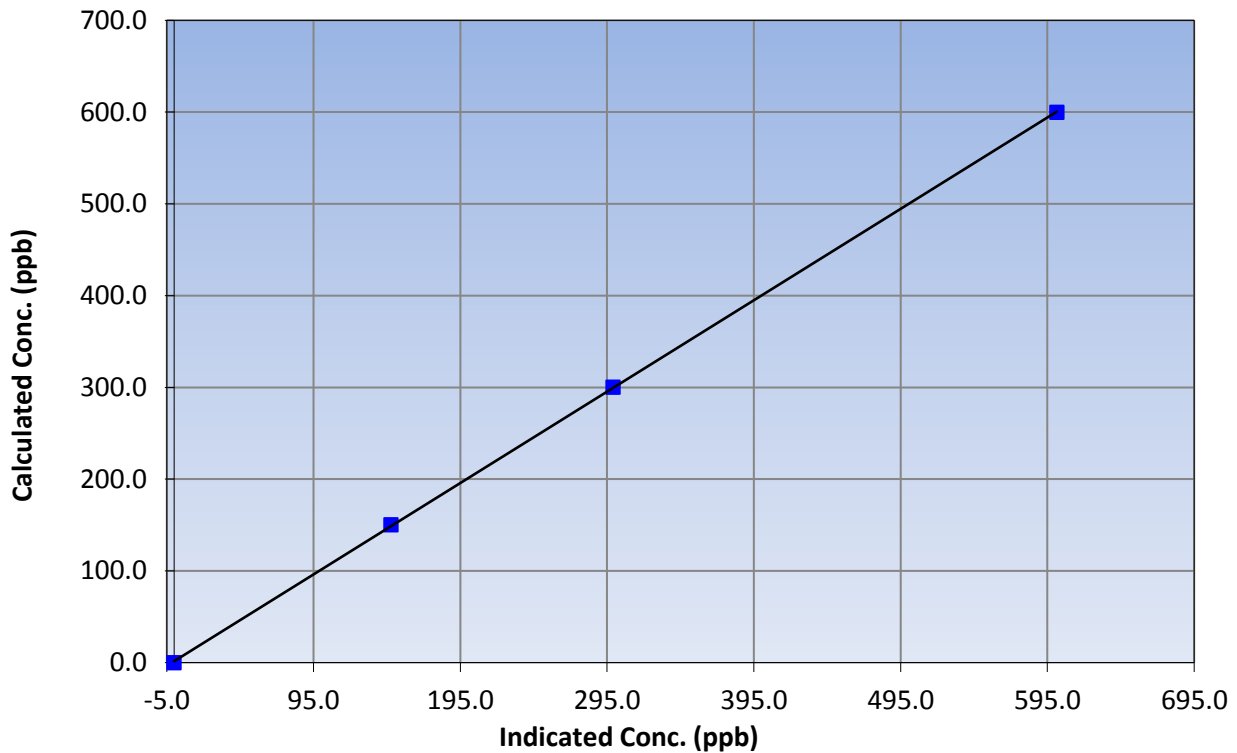
Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 7, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	14:00
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999971
599.7	601.4	0.9972		
300.4	299.1	1.0042	Slope	0.995917
150.2	147.8	1.0161		
			Intercept	1.568616

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

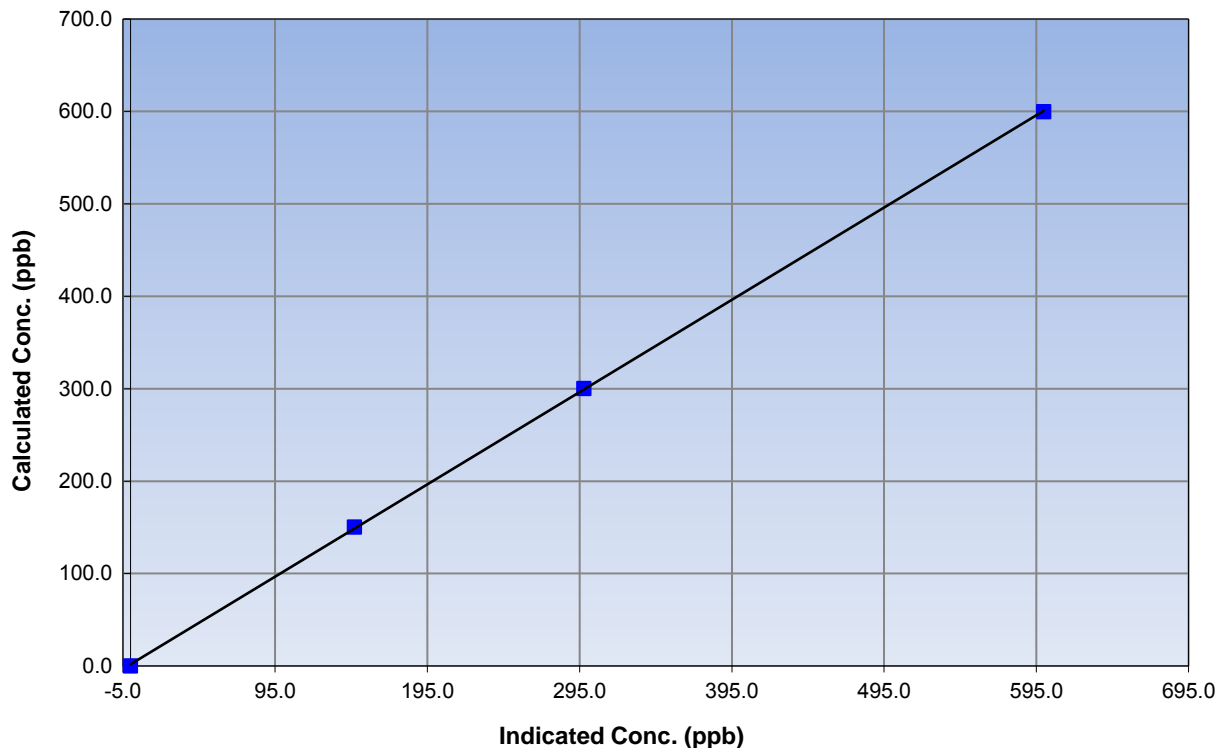
Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 7, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	14:00
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999960
599.7	599.8	0.9999		
300.4	297.8	1.0086	Slope	0.998400
150.2	147.0	1.0216		
			Intercept	1.846276

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

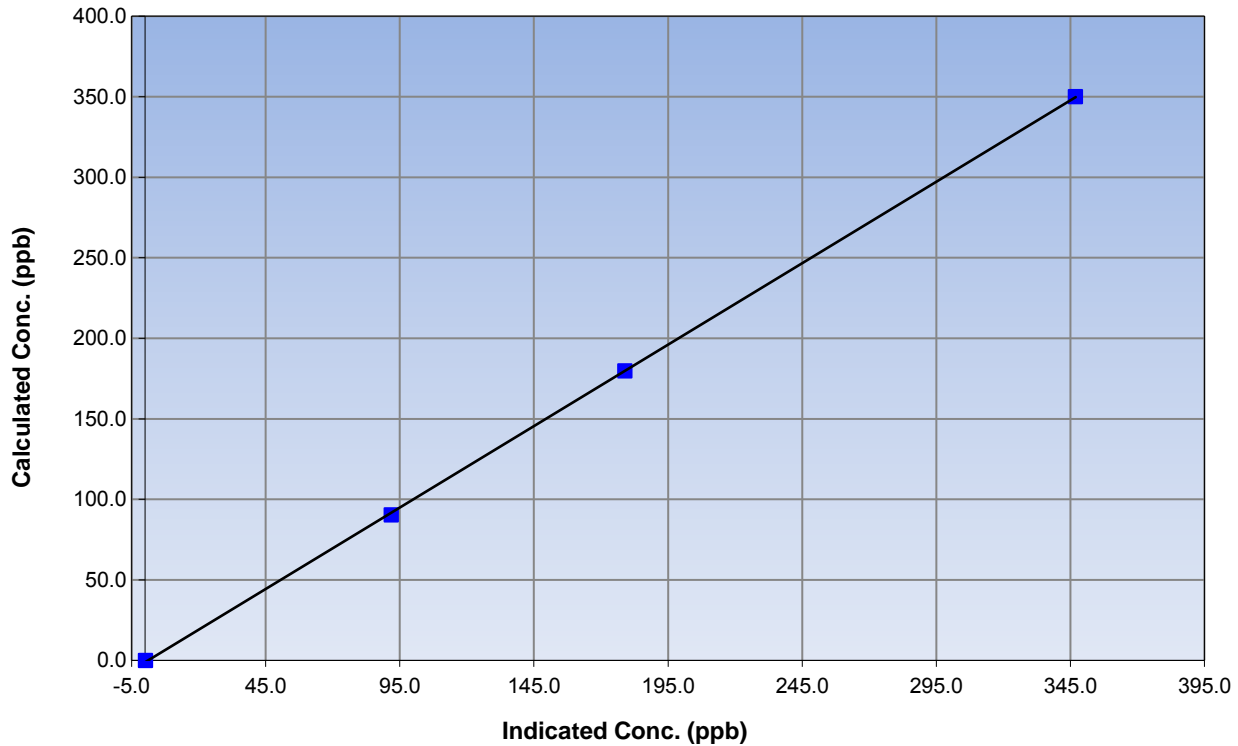
Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 7, 2016
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	14:00
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

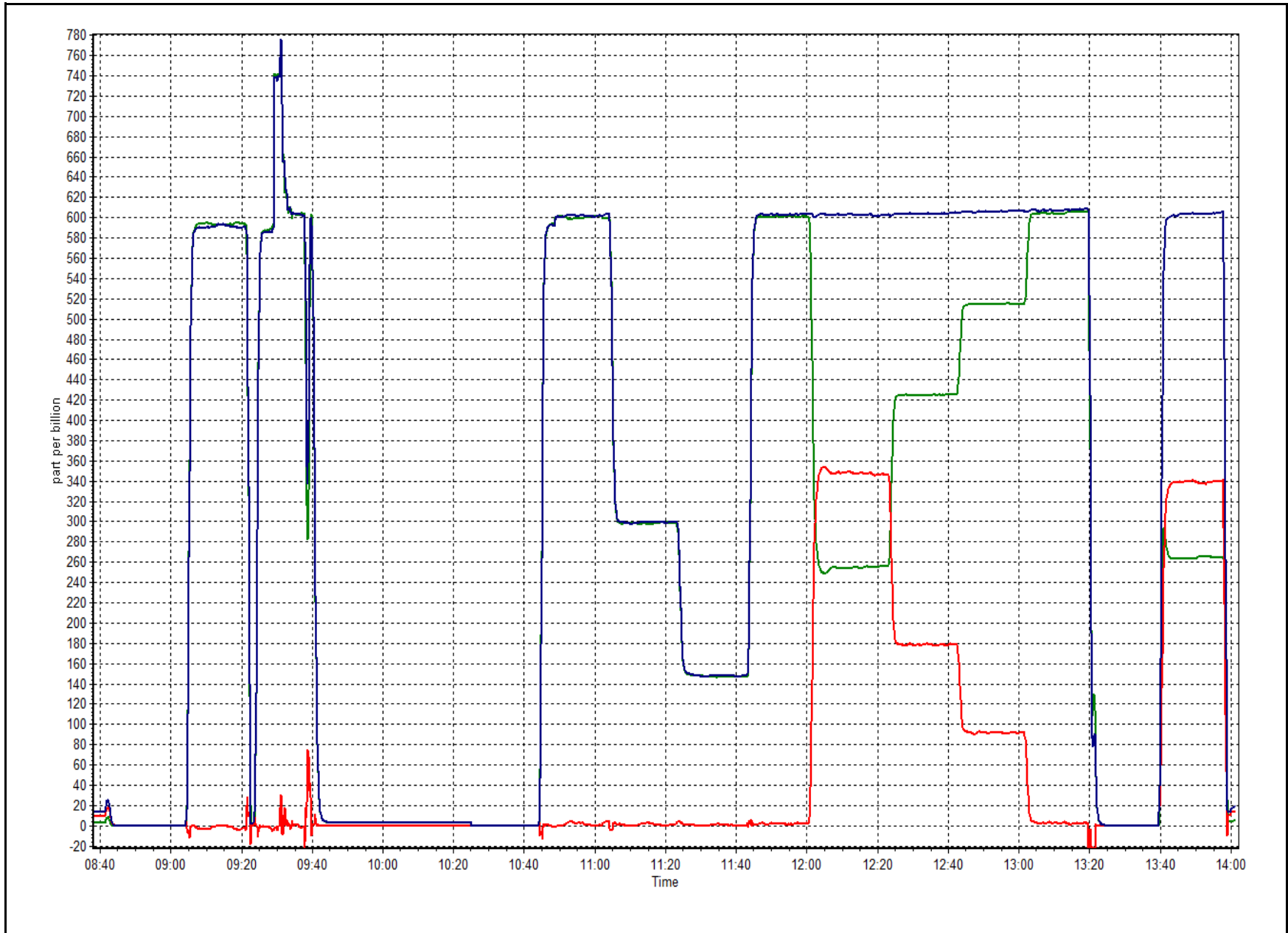
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999960
350.1	347.0	1.0089		
179.8	178.9	1.0050	Slope	1.011229
90.4	91.8	0.9847		
			Intercept	-1.129522

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 1, 2016





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	February 4, 2016	Previous Calibration:	07/01/16
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	11:20	End Time (MST):	12:08
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	E515		
C ₁₄ Source SN:	3256		
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-15.0	-14.8	0.2	-15.0
T2	12.0	na	na	12.0
T3	16.0	na	na	16.0
T4	17.0	na	na	17.0
RH (%)	5.0	na	na	5.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	989	990.0	1.0	989

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1010	10	1010	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	249		249
Neph	1.3		1.3
C14	39.4		39.4
Indicated Concentration (ug/m3)	0.7	No	0.7
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	December 1, 2015	Previous Leak Check Date:	September 23, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.90		0.13
*Flow with adaptor (LPM):	16.77		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

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

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

NOTES:

sample head cleaned. No adjustments done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	February 4, 2016	Last Calibration	January 11, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	11:16
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	02/02/2023
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		Chamber temp.	48.2	48.0
Analyzer IP address	192.168.1.48		Pressure	738.5	737.6
Calculated slope	1.006207	1.005524	Flow	0.490	0.491
Calculated intercept	0.014922	0.027020	Intensity	199488	199664
Analyzer Background	4.395	4.591	S/R ratio	1.654941	1.174198
Analyzer Coefficient	1.065	1.065			

Analyzer make Thermo 48i-TLE Analyzer serial # 1408761381

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	69.7	41.4	41.6	0.995
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.1	1.006
second point	5000	35.2	20.9	20.8	1.005
third point	5000	15.2	9.0	8.9	1.013
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	40.9	1.013
Average Correction Factor					1.008

Corrected As found 41.4 Previous response 41.1 % change -0.7%

Notes:

zero adjusted, No Maintenance done, Filter changed out

Calibration Performed By:

Melissa Lemay



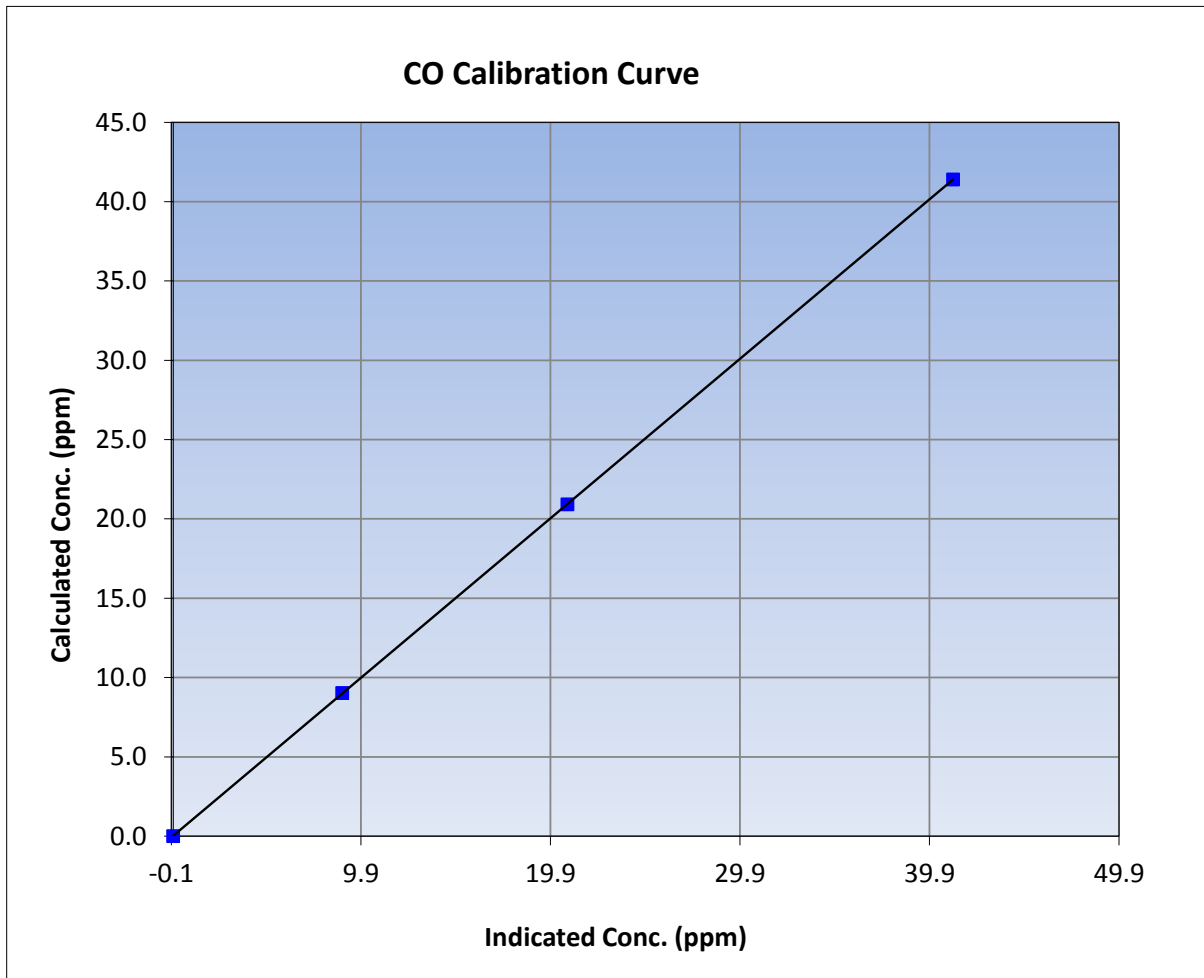
Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	February 4, 2016	Previous Calibration	January 11, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	11:16
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

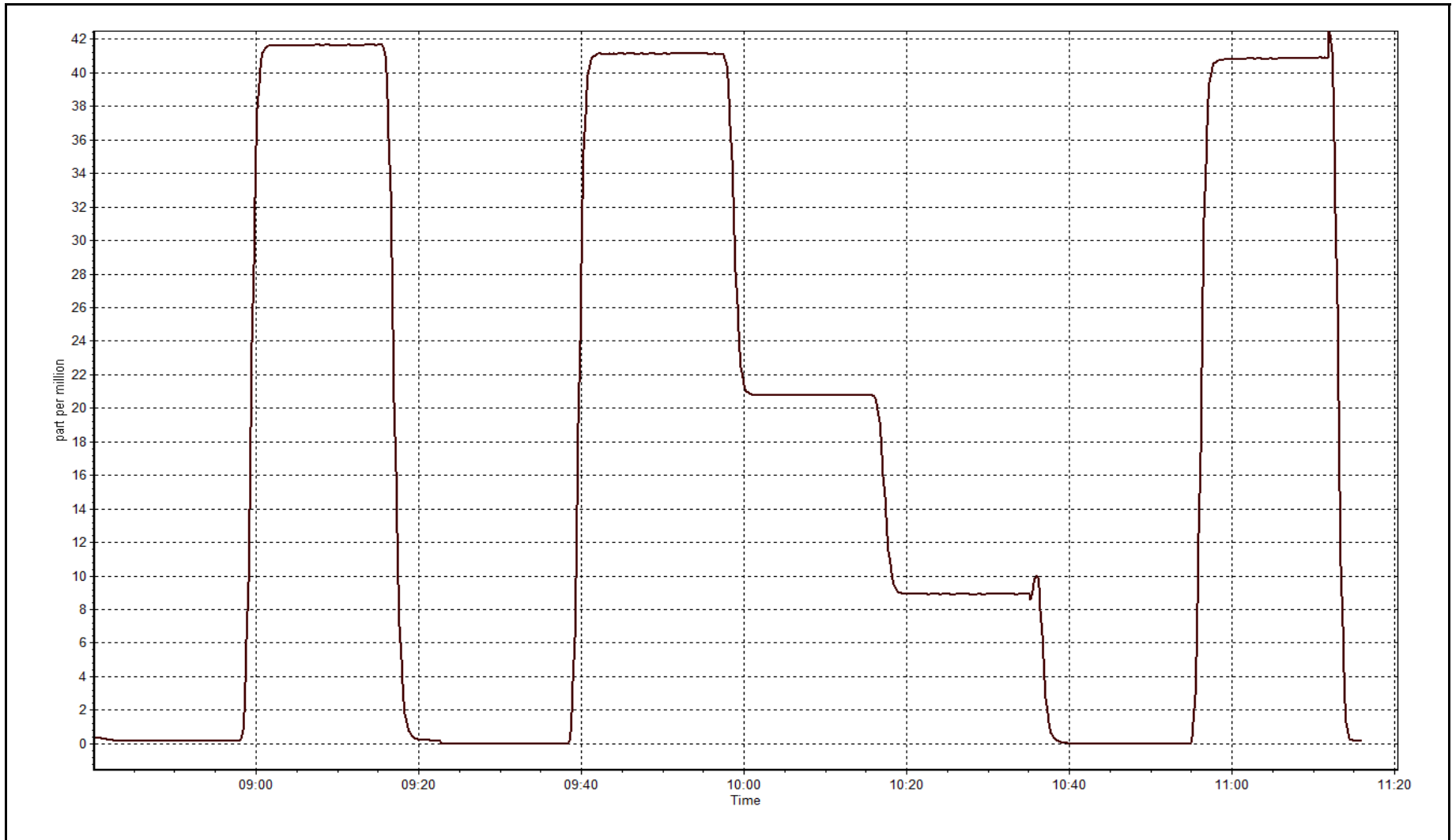
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999997
41.4	41.1	1.0064		
20.9	20.8	1.0052	Slope	1.005524
9.0	8.9	1.0133		
			Intercept	0.027020



CO Calibration Plot

Date: February 4, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
FEBRUARY 2016

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	658	38	38	100.00	2	0	1	0
O3(ppb) Average	639	34	57	96.70	43	0	39	-
NO2(ppb) Average	658	38	38	100.00	10	0	4	-
NO(ppb) Average	658	38	38	100.00	2	-	0	-
NOX(ppb) Average	658	38	38	100.00	11	-	4	-
PM2.5(ug/m3) Average	694	2	2	100.00	15.9	-	3.9	0
Wind Speed 10 m (km/h) Average	655	0	41	94.11	40	-	27	-
Wind Direction 10 m (deg) Average	655	0	41	94.11	-	-	-	-
Temperature 2 m (C) Average	696	0	0	100.00	2.6	-	-3.5	-
Relative Humidity (%) Average	696	0	0	100.00	93	-	87	-
Precipitation (mm) Total	696	0	0	100.00	0.8	-	1	-
Leaf Wetness (% of range) Average	696	0	0	100.00	18	-	10	-
Global Solar Radiation (W/m2) Average	696	0	0	100.00	504	-	130	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	658	0.2	0	-	0	0	0	0	0	0	0	2
O3(ppb) Average	639	33.5	6	-	7	29	32	34	37	39	43	43
NO2(ppb) Average	658	1.1	1	-	0	0	0	1	1	3	10	10
NO(ppb) Average	658	0.1	0	-	0	0	0	0	0	0	0	2
NOX(ppb) Average	658	1.3	1	-	0	0	0	1	1	3	11	11
PM2.5(ug/m3) Average	694	2.2	1.6	-	0	0.9	1.3	1.9	2.8	4	15.9	15.9
Wind Speed 10 m (km/h) Average	655	13.5	7	-	0	5	8	13	17	24	40	40
Wind Direction 10 m (deg) Average	655	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	696	-17.1	6.8	-	-31.6	-25.8	-22	-17.6	-12.8	-7.3	2.6	2.6
Relative Humidity (%) Average	696	78.6	7	-	53	69	74	80	83	86	93	93
Precipitation (mm) Total	696	-	-	3.3	-	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	696	8	3	-	1	1	8	9	10	10	18	18
Global Solar Radiation (W/m2) Average	696	58.8	108	-	0	0	0	0	77	209	504	504

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	02 Feb 2016 16:00	02 Feb 2016 18:00	3	Maintenance - zero/span response prior to cal cylinder change
O3	14 Feb 2016 18:00	15 Feb 2016 13:00	20	Analyzer Failure - sample pump failure
Wind Speed, Wind Direction	01 Feb 2016 01:00	02 Feb 2016 14:00	38	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	02 Feb 2016 15:00	02 Feb 2016 17:00	3	Maintenance - sensors replaced



Wood Buffalo Environmental Association

Summary of Hour Averages

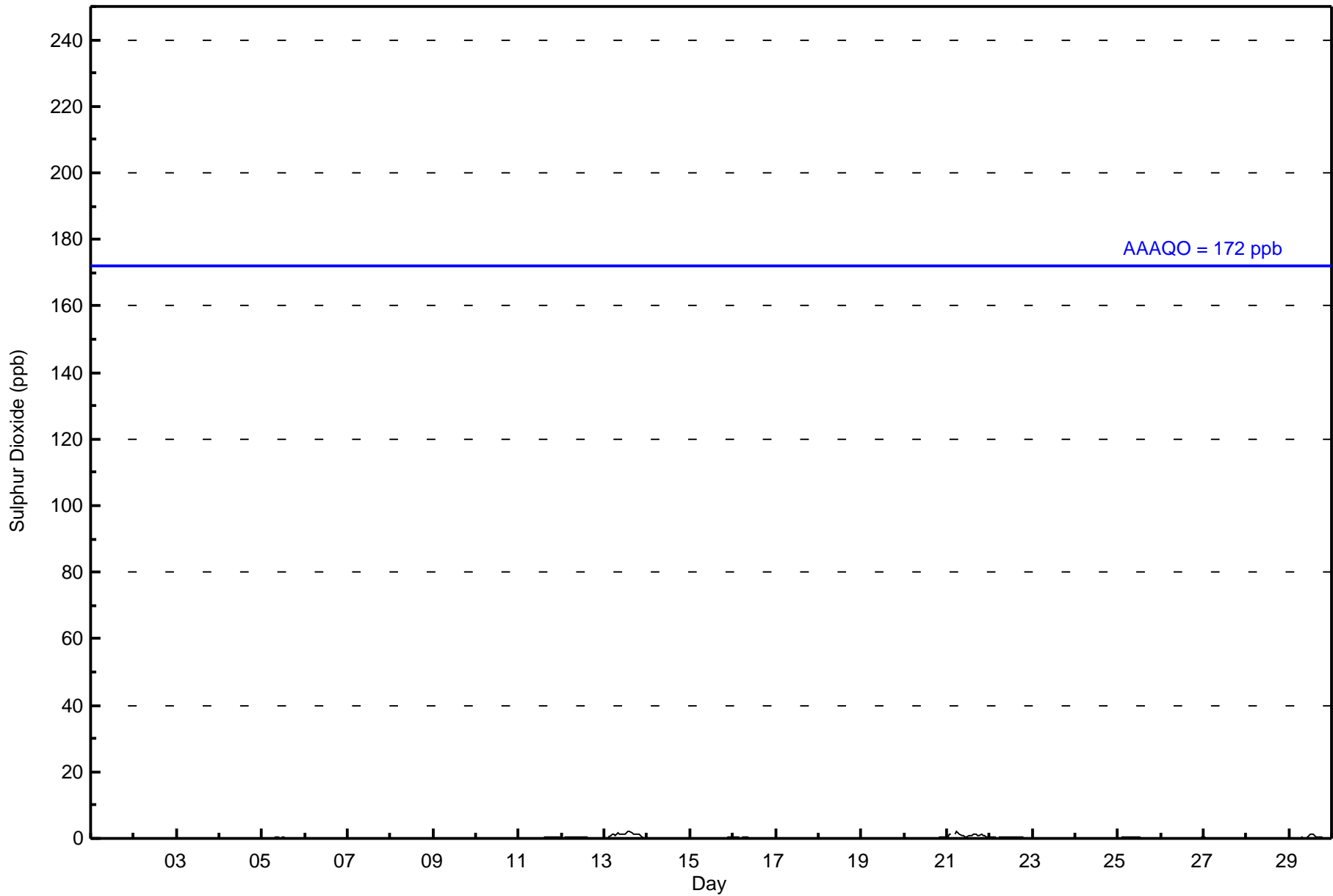
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0													Hours in Service: 696																																				
Maximum Value: 2 ppb on Feb 21 06:00													Maximum Daily Average: 1.1 ppb on Feb 13																																				
Minimum Value: 0 ppb on Feb 29 02:00													Minimum Daily Average: 0.0 ppb on Feb 4																																				
Maximum Diurnal Average: 0.2 ppb at hour 14													Minimum Diurnal Average: 0.1 ppb at hour 24																																				
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																																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	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	C	C	C	C	C	C	C	C	C	C	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	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	0.0	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	0.2	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	0.1	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	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	0.1	0																						
9-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																						
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	0																						
11-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	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	0.2	0																						
13-Feb	0	Z	0	1	1	1	1	2	1	1	1	1	2	2	2	2	1	1	1	1	1	1	0	0	0	1.1	2																						
14-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																						
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.1	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	0.1	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	0.1	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	0.1	0																						
21-Feb	1	1	1	Z	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.0	2																						
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.1	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	0.1	0																						
25-Feb	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
29-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1																						
																								0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	Diurnal Average	
																								1	1	1	1	1	2	2	2	2	1	1	1	2	2	2	2	1	1	1	1	1	1	0	0	Diurnal Maximum	
Z - zerspan 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 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	658	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: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623
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	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623

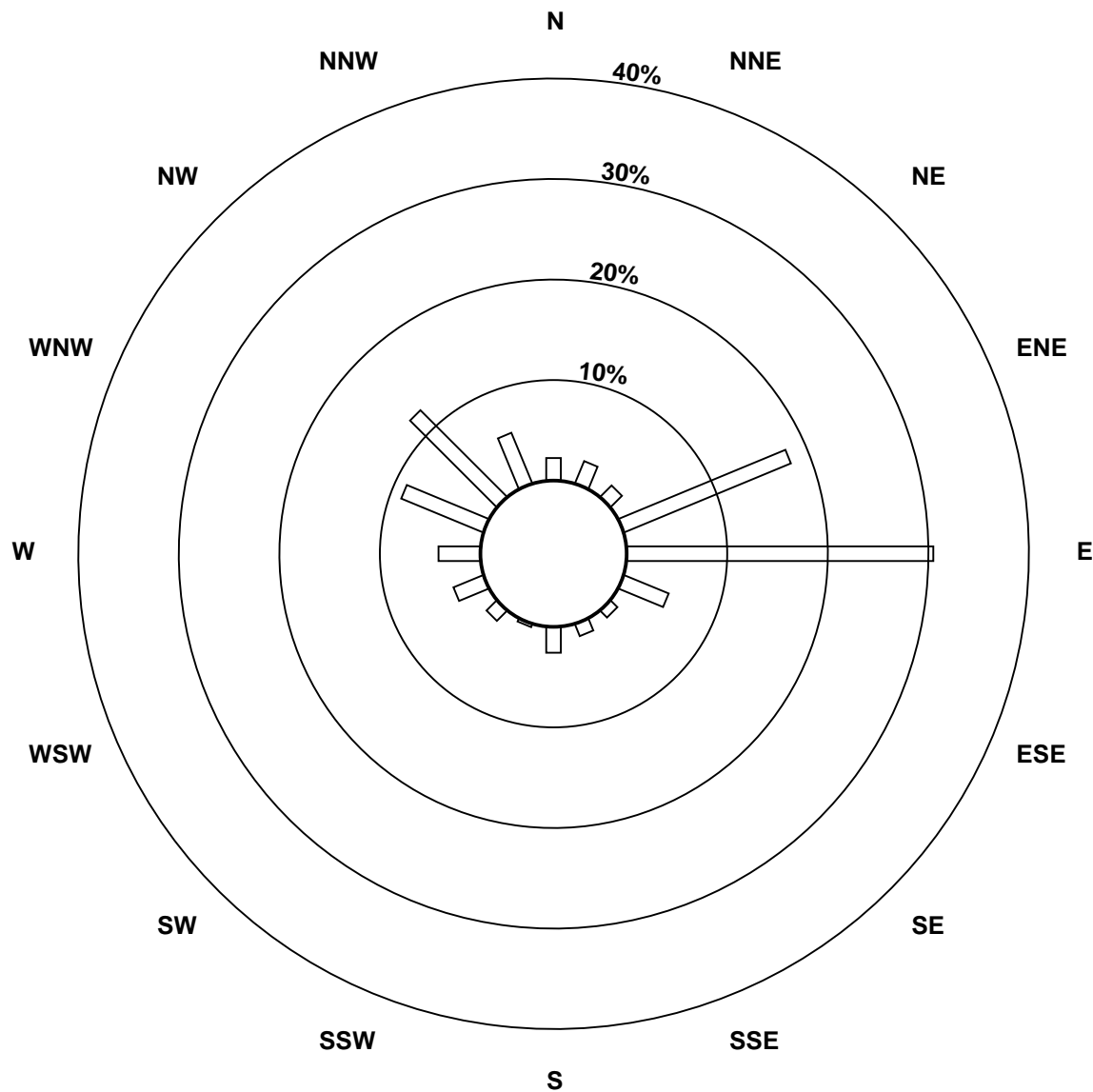
Total Number of Valid Hours: 623

Total Number of Hours: 696

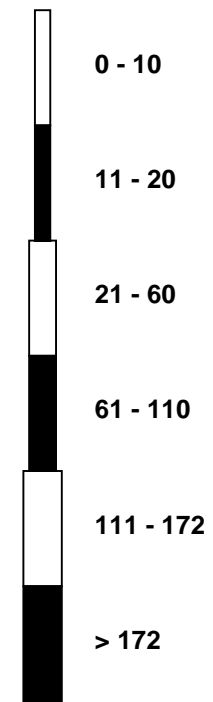


Wood Buffalo Environmental Association
Wind Rose Feb 2016

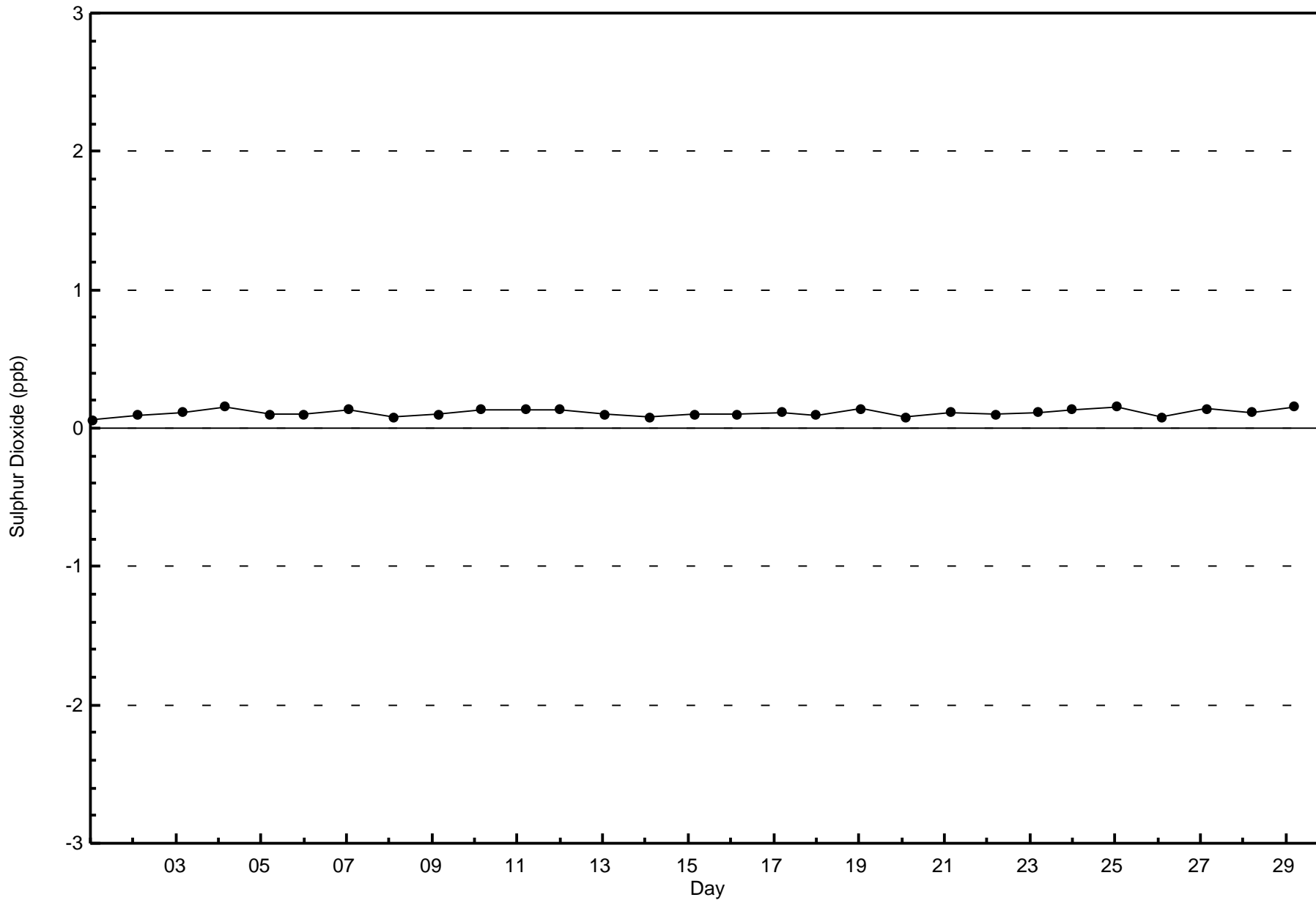
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)

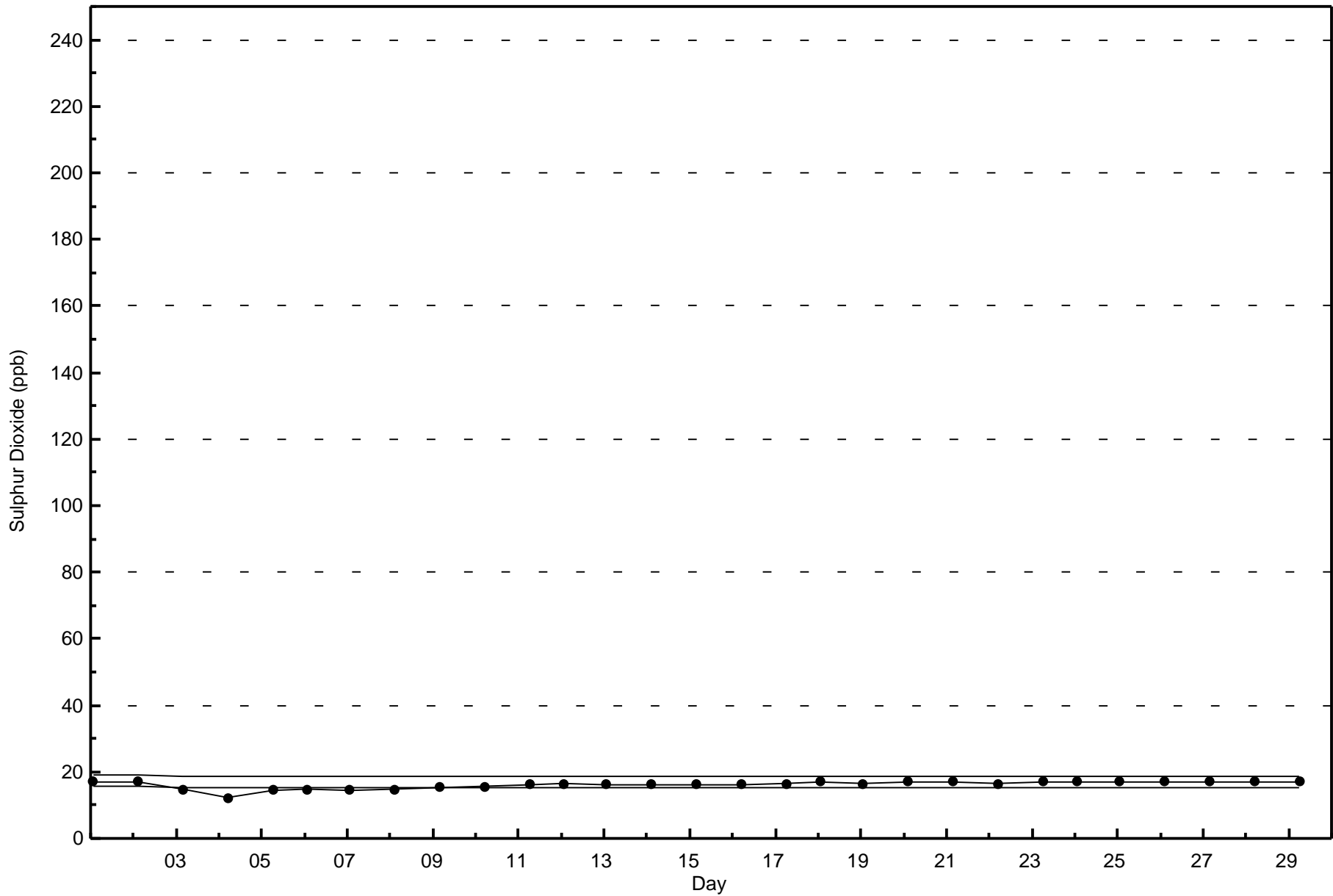


Classes (ppb)



Total Number of Valid Hours: 623





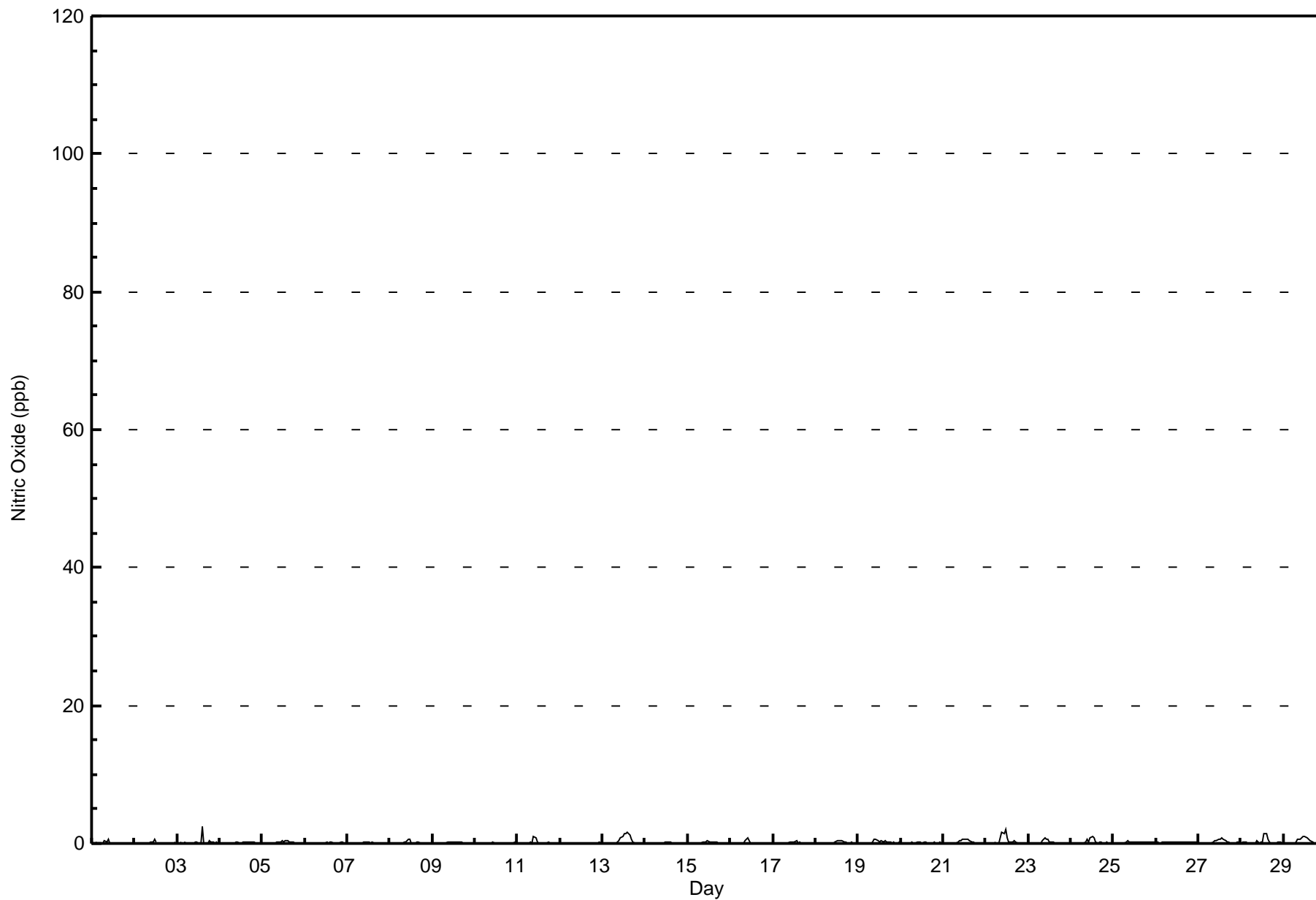


Maximum Value: 2 ppb on Feb 3 15:00														Maximum Daily Average: 0.4 ppb on Feb 13														Hours in Service: 696	
Minimum Value: 0 ppb on Feb 1 04:00														Minimum Daily Average: 0.0 ppb on Feb 12														Hours of Data: 658	
Maximum Diurnal Average: 0.4 ppb at hour 12														Minimum Diurnal Average: 0.0 ppb at hour 7														Hours of Missing Data: 38	
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: 38	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	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			
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	0	C	C	C	C	C	C	C	C	C	0	0	--	1			
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.2	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	0	0	0	0	0	0	0	0	0.1	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	0.1	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	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1			
9-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			
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	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	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	0.0	0			
13-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0.4	2			
14-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			
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	0.1	0			
16-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	0.1	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	0.1	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	0.1	0			
19-Feb	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1			
22-Feb	0	0	0	0	Z	0	0	0	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2			
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	0.2	1			
24-Feb	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	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	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	0.2	0			
27-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1			
28-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1			
29-Feb	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1			
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan C - Calibration																													



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	658	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: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623
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	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623

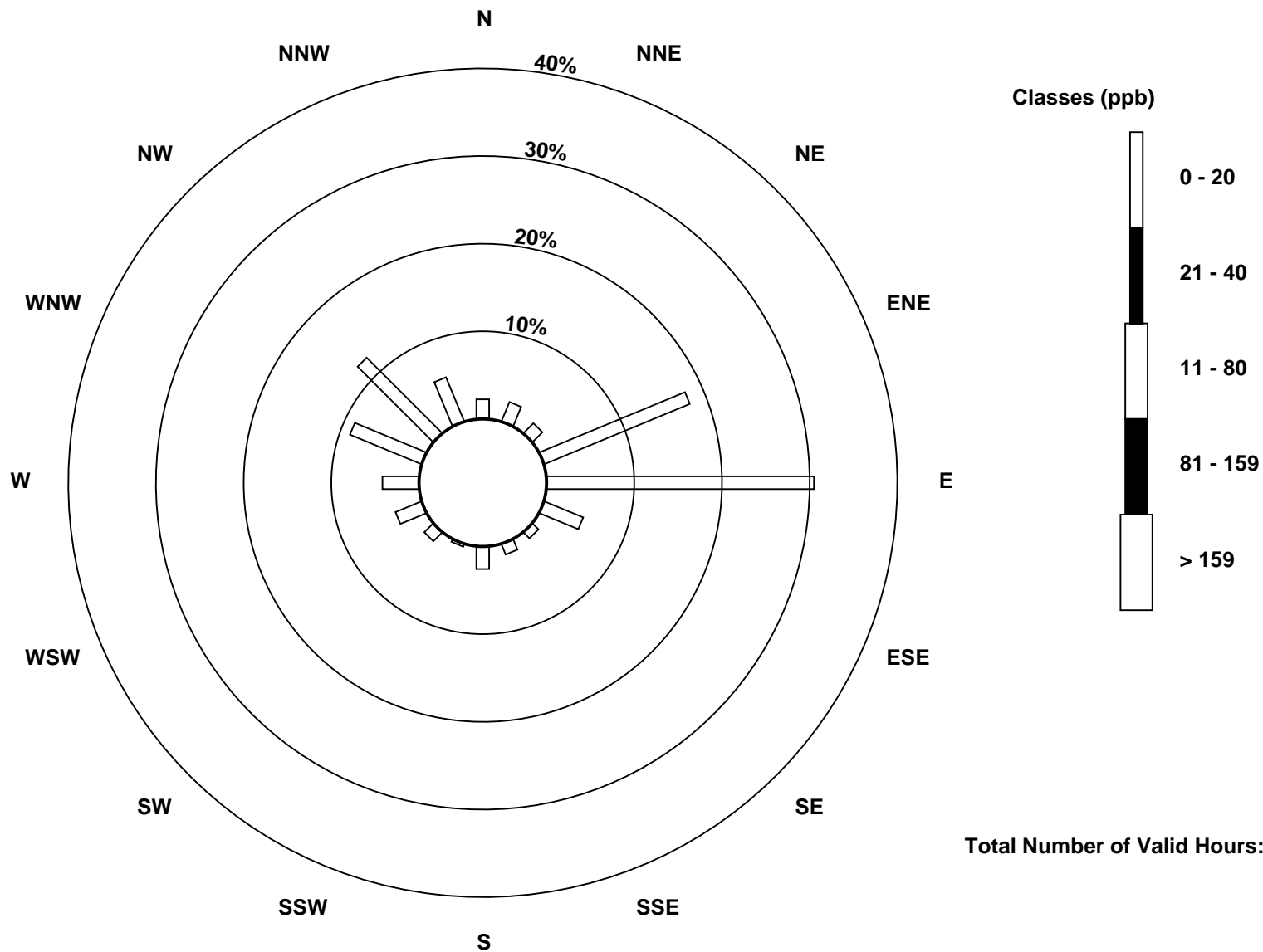
Total Number of Valid Hours: 623

Total Number of Hours: 696

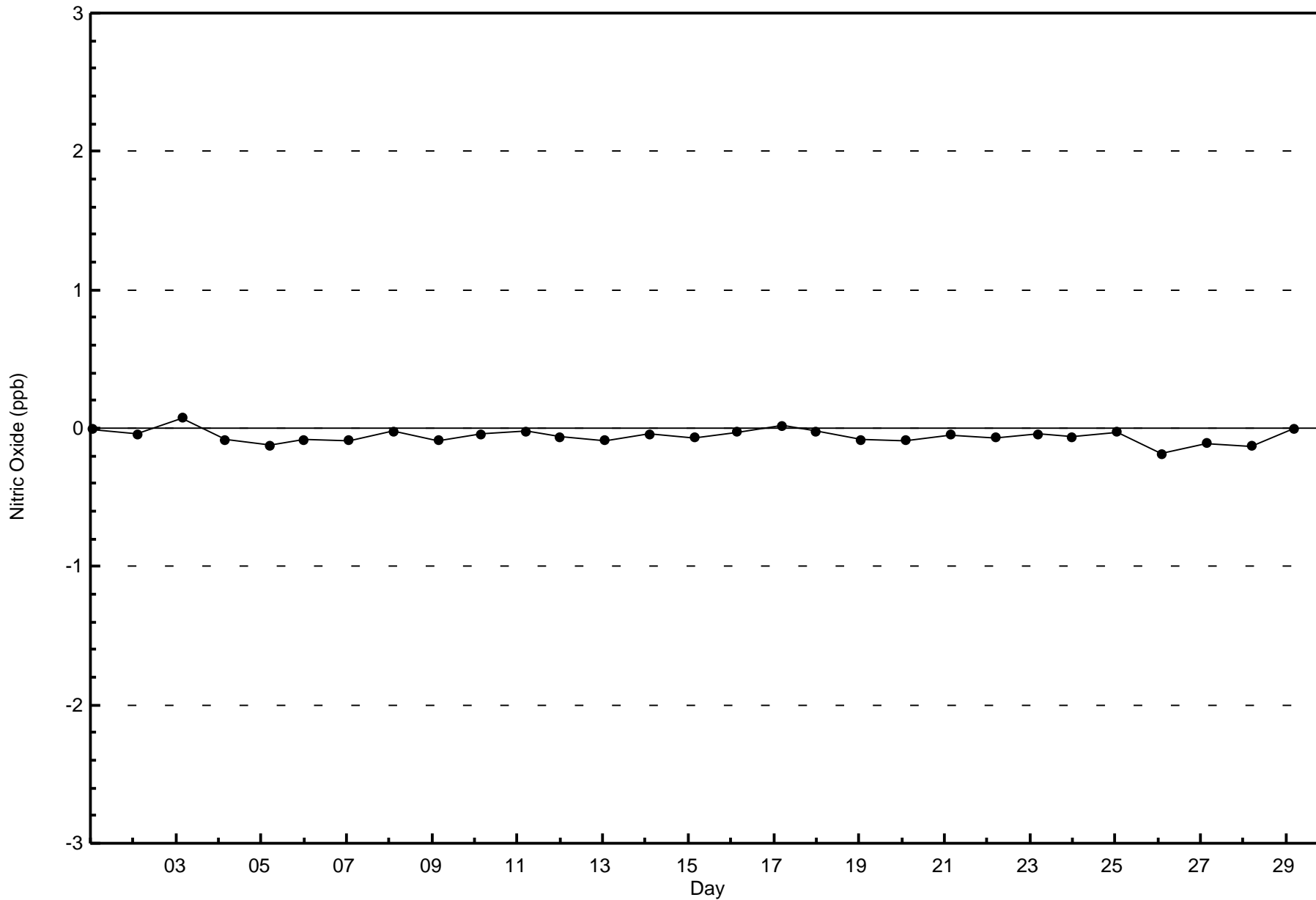


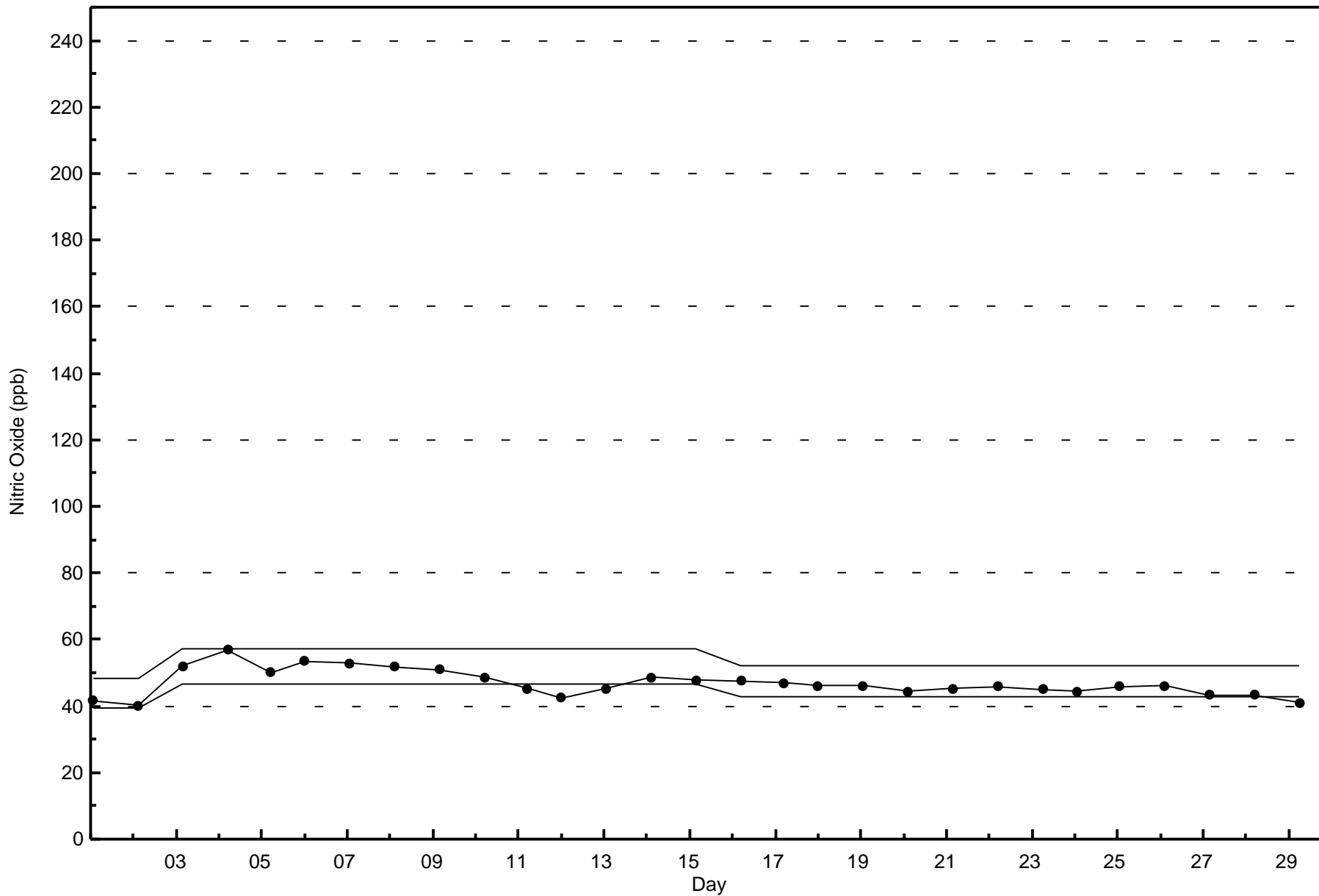
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 623







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort Chipewyan - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 696
Maximum Value: 10 ppb on Feb 20 23:00	Maximum Daily Average: 3.6 ppb on Feb 13
Minimum Value: 0 ppb on Feb 1 21:00	Hours of Data: 658
Maximum Diurnal Average: 1.7 ppb at hour 20	Hours of Missing Data: 38
Monthly Average: 1.1 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.3 ppb on Feb 12	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.7 ppb at hour 13	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 6	

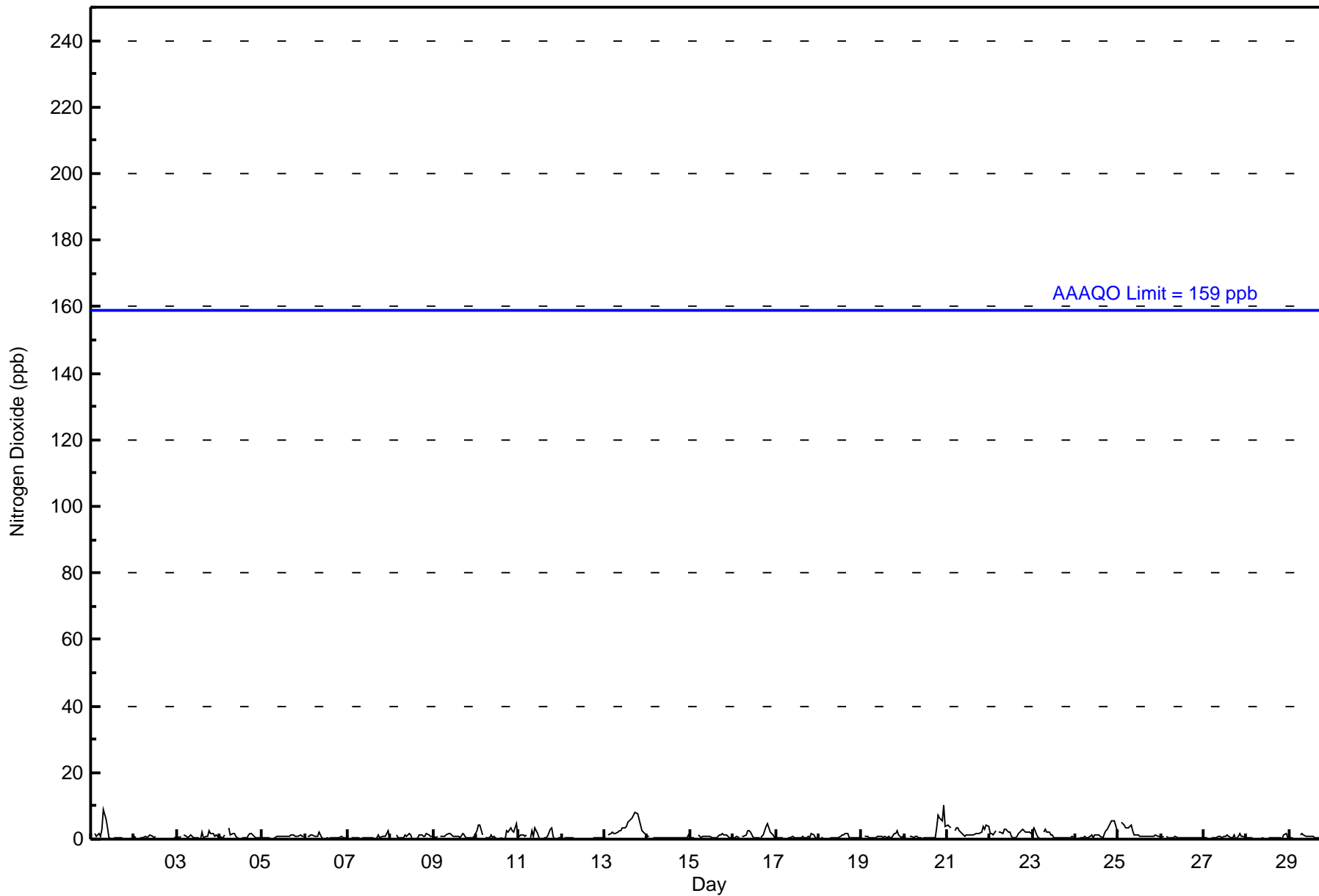
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	1	Z	2	1	2	1	3	9	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.4	9																						
2-Feb	1	0	Z	0	0	1	1	1	1	1	1	1	C	C	C	C	C	C	C	C	C	C	1	0	--	1																						
3-Feb	1	1	1	Z	1	1	1	1	1	0	1	1	0	0	2	0	1	1	3	2	2	1	1	1	0.9	3																						
4-Feb	1	0	0	1	Z	4	1	2	2	1	0	0	0	1	1	1	1	2	2	1	1	1	0	1	0.9	4																						
5-Feb	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																						
6-Feb	Z	1	1	1	1	1	1	1	2	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0.6	2																						
7-Feb	1	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	1	3	0	0.6	3																						
8-Feb	0	0	Z	1	1	0	0	1	1	1	2	1	0	0	0	0	1	1	1	1	2	1	1	1	0.8	2																						
9-Feb	1	1	1	Z	1	1	1	1	2	2	1	1	1	1	1	2	1	1	1	0	0	1	0	1	0.9	2																						
10-Feb	3	4	4	1	Z	0	0	1	1	0	1	0	0	0	0	0	0	2	2	4	2	2	5	1	1.5	5																						
11-Feb	1	1	1	1	1	Z	0	2	1	3	2	0	0	0	0	0	1	3	3	1	0	0	1	1	1.1	3																						
12-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.3	1																						
13-Feb	1	Z	1	2	2	2	2	2	3	2	3	3	4	5	6	7	7	8	8	6	4	3	2	1	3.6	8																						
14-Feb	1	1	Z	1	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1	0	1	0	1	0.5	1																						
15-Feb	0	1	0	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	1	2	1	1	1	0	1	0.8	2																						
16-Feb	1	1	1	1	Z	1	1	1	3	3	2	0	0	0	0	1	1	4	5	4	2	1	0	1	1.4	5																						
17-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	1	0	1	0	1	1	1	2	1	1	1	1	0.5	2																						
18-Feb	Z	1	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0.6	2																						
19-Feb	0	Z	1	1	1	0	0	0	0	1	1	1	0	1	1	1	0	1	2	2	3	1	1	1	0.8	3																						
20-Feb	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	4	7	6	6	10	4	2.0	10																						
21-Feb	4	4	3	Z	2	4	3	3	2	1	1	1	1	1	1	2	2	2	2	2	4	3	4	4	2.4	4																						
22-Feb	2	2	1	3	Z	2	2	2	3	3	2	2	1	1	1	2	2	3	3	2	2	2	2	2	1.9	3																						
23-Feb	3	4	1	0	0	Z	2	3	2	2	1	1	1	1	1	0	1	1	0	0	0	1	1	1	1.1	4																						
24-Feb	Z	0	0	0	1	1	1	0	1	1	1	1	1	1	1	2	3	3	5	6	5	5	2	1	1.8	6																						
25-Feb	2	Z	5	4	3	4	4	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.9	5																						
26-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0.6	1																						
27-Feb	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	2	1	1	1	0.7	2																						
28-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	1	2	0	0.4	2																						
29-Feb	1	0	0	0	0	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	2																						
																								1.0	1.0	1.1	0.9	0.9	1.0	1.0	1.4	1.4	1.2	0.9	0.8	0.7	0.7	0.8	0.8	1.1	1.3	1.6	1.7	1.6	1.4	1.6	1.0	Diurnal Average
																								4	4	5	4	3	4	4	9	6	4	3	3	4	5	6	7	7	8	8	7	6	6	10	4	Diurnal Maximum

Z - zerspan 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 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	658	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: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623
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	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623

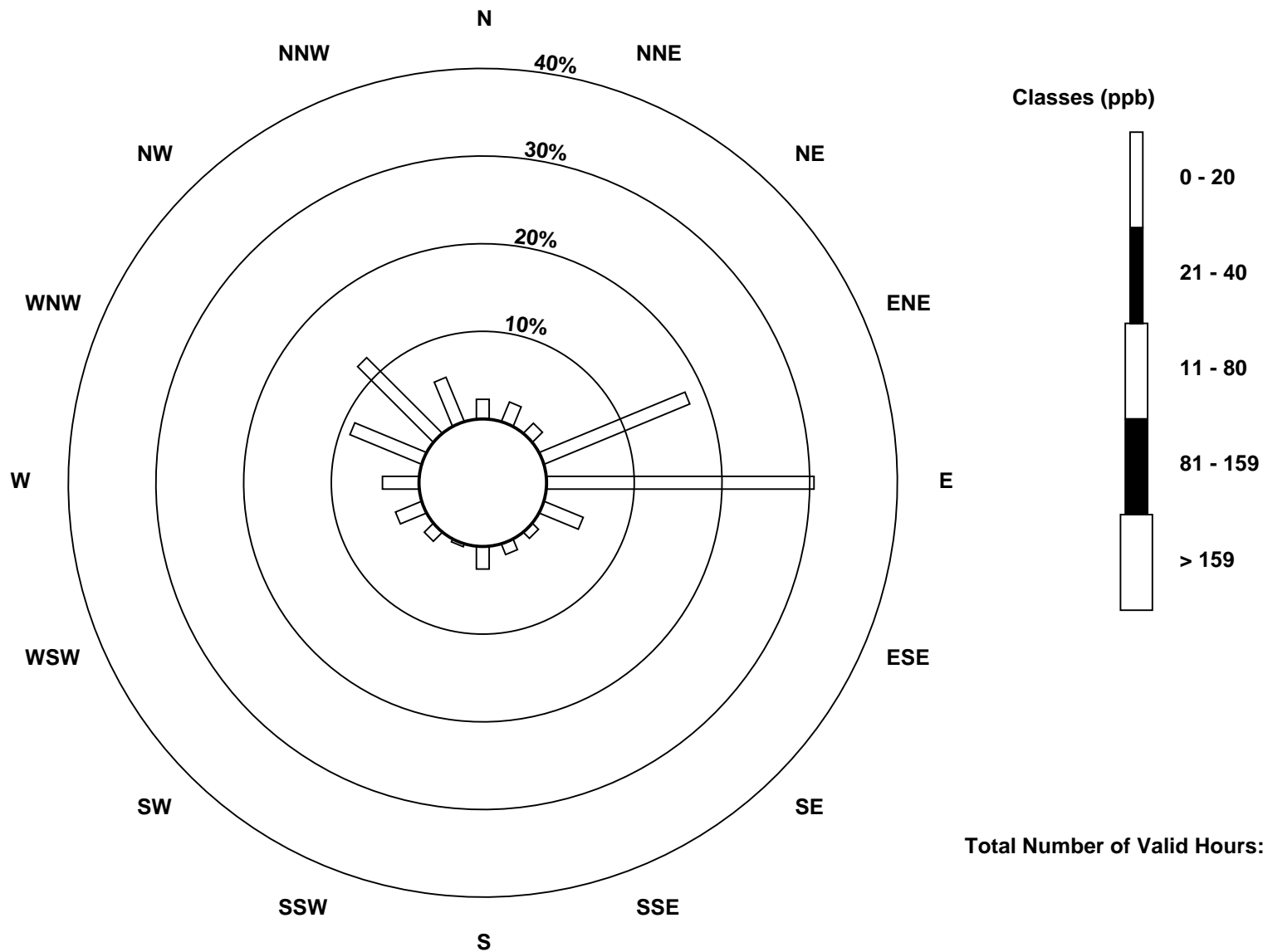
Total Number of Valid Hours: 623

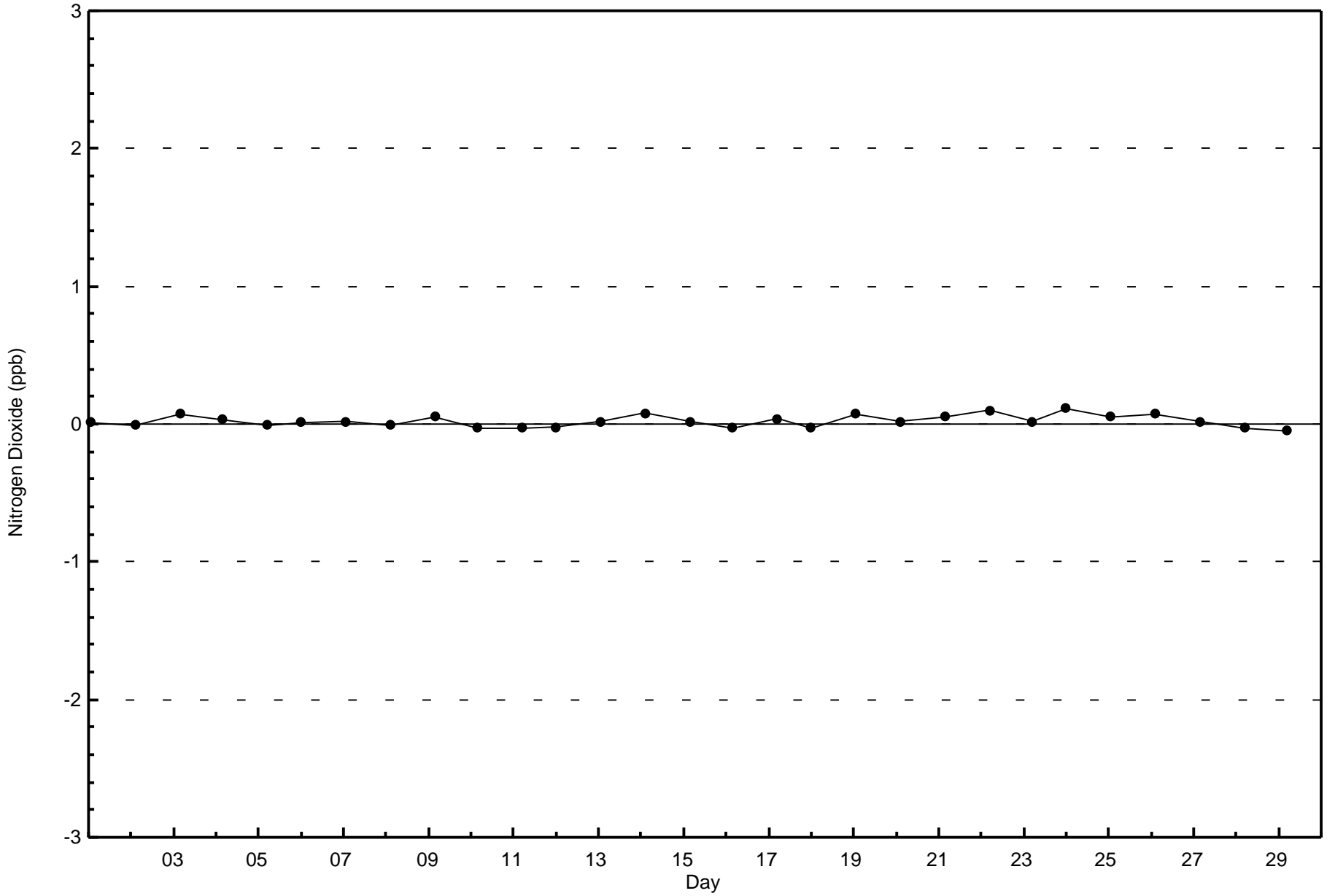
Total Number of Hours: 696

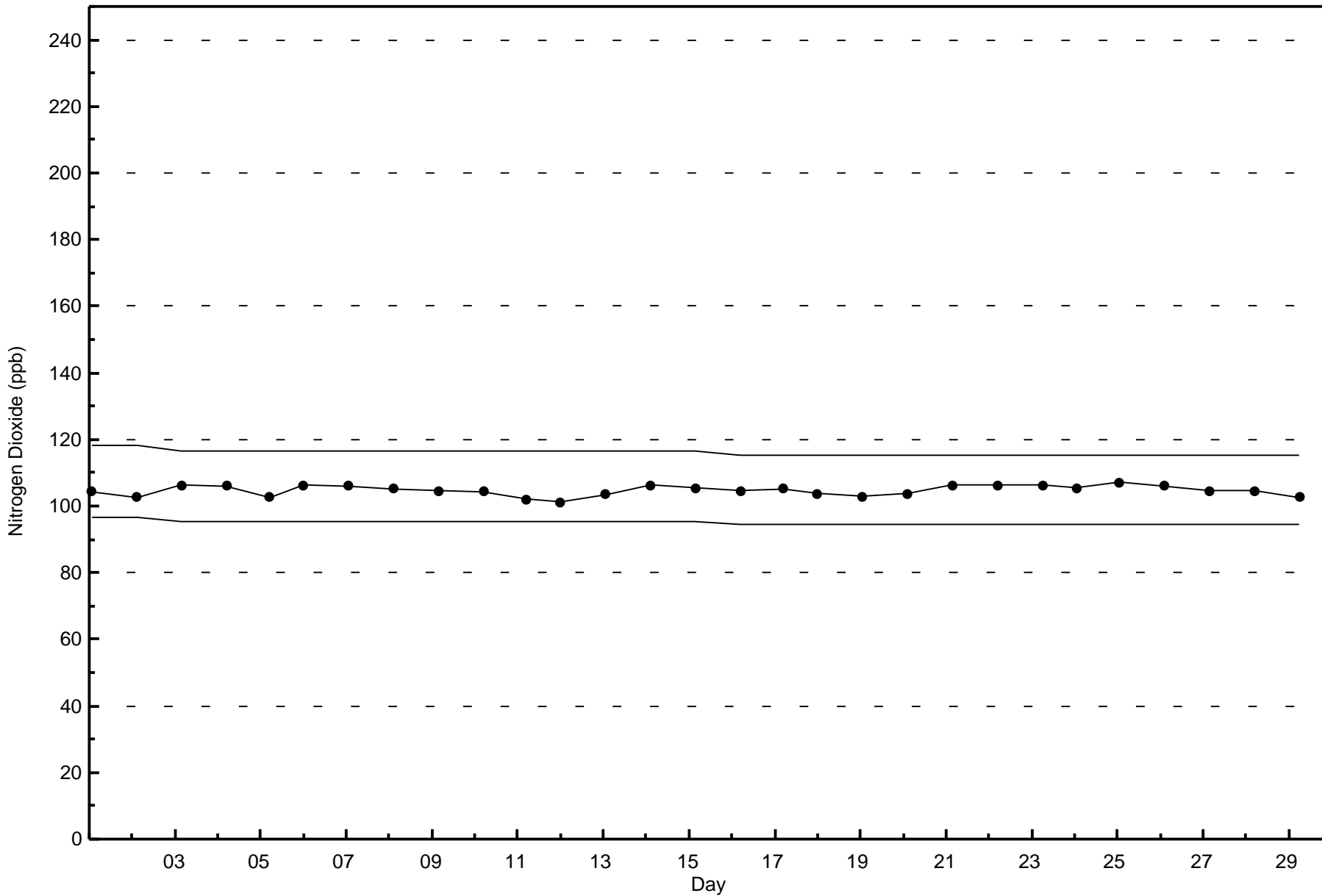


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association
Summary of Hour Averages

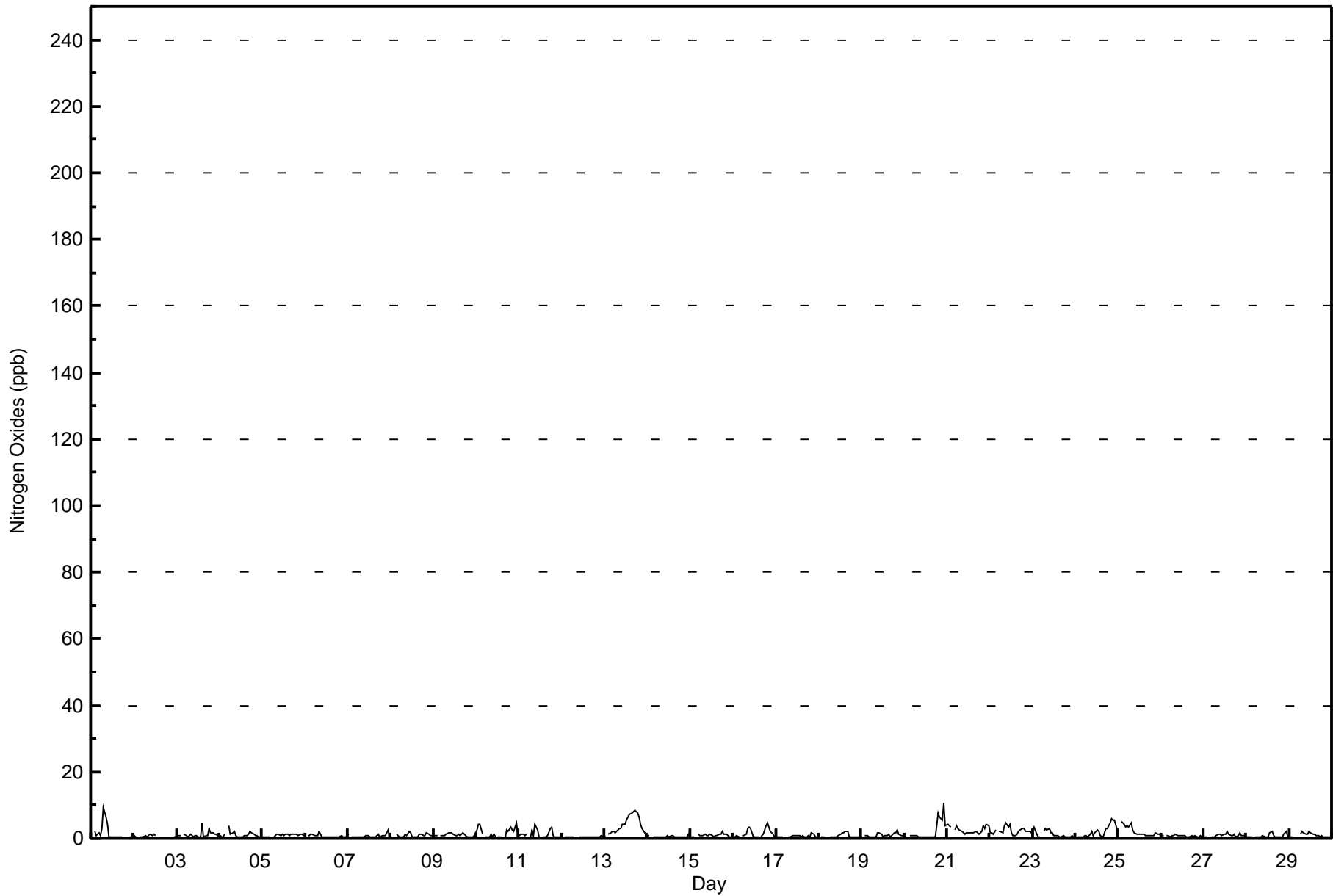
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2016

Maximum Value: 11 ppb on Feb 20 23:00														Maximum Daily Average: 4.0 ppb on Feb 13														Hours in Service: 696																				
Minimum Value: 0 ppb on Feb 29 05:00														Minimum Daily Average: 0.3 ppb on Feb 12														Hours of Data: 658																				
Maximum Diurnal Average: 1.7 ppb at hour 20														Minimum Diurnal Average: 0.9 ppb at hour 5														Hours of Missing Data: 38																				
Monthly Average: 1.3 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 7														Hours of Calibration: 38																				
																												Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	1	Z	2	1	1	1	3	9	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	9																						
2-Feb	1	0	Z	0	0	1	1	1	1	1	1	1	1	C	C	C	C	C	C	C	C	C	1	0	--	1																						
3-Feb	1	1	1	Z	1	1	1	1	1	0	1	1	0	0	5	0	1	1	3	2	2	1	1	1	1.1	5																						
4-Feb	1	0	0	1	Z	4	1	2	2	1	1	0	0	1	1	1	1	2	2	1	1	1	0	1	1.1	4																						
5-Feb	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1																						
6-Feb	Z	1	1	1	1	1	1	1	2	0	0	0	0	0	1	1	1	1	1	0	1	1	0	1	0.7	2																						
7-Feb	1	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	1	1	1	1	2	0	0.6	2																					
8-Feb	0	0	Z	1	1	0	0	0	1	1	2	2	0	0	0	1	1	1	1	1	2	1	1	1	0.9	2																						
9-Feb	1	1	1	Z	1	1	1	1	2	2	2	1	1	1	1	2	1	1	1	0	0	1	0	1	1.0	2																						
10-Feb	2	4	4	1	Z	0	0	1	1	0	1	0	0	0	0	0	0	2	2	4	2	2	5	1	1.6	5																						
11-Feb	1	1	1	1	1	Z	0	2	1	4	3	0	0	0	0	0	1	3	3	1	0	0	1	0	1.2	4																						
12-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	0.3	1																						
13-Feb	1	Z	1	2	2	2	2	2	3	3	4	4	5	6	7	8	8	8	8	6	4	3	2	1	4.0	8																						
14-Feb	1	1	Z	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0.6	1																						
15-Feb	0	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0	1	0.9	2																						
16-Feb	1	0	1	1	Z	1	1	1	3	3	3	0	0	0	0	0	1	1	4	5	4	2	1	0	1.5	5																						
17-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	0	1	0	0	1	1	2	1	0	0	0.6	2																						
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	1	1	0	1	0	0	0	0.7	2																						
19-Feb	0	Z	1	1	1	0	0	0	1	2	2	1	0	1	1	1	1	1	2	2	3	1	1	1	1.0	3																						
20-Feb	1	1	Z	1	1	1	1	1	1	0	0	0	0	1	1	0	1	0	4	7	6	6	11	4	2.1	11																						
21-Feb	4	4	3	Z	2	4	3	2	2	2	1	2	2	2	2	2	2	2	1	2	4	3	4	4	2.6	4																						
22-Feb	2	2	1	3	Z	2	2	2	4	5	3	4	2	1	1	1	2	3	3	3	2	2	2	2	2.3	5																						
23-Feb	3	4	1	0	0	Z	2	3	3	3	2	2	1	1	1	0	1	1	0	0	0	1	1	1	1.3	4																						
24-Feb	Z	0	0	0	1	1	1	0	1	2	1	2	3	2	1	1	2	3	3	5	6	5	6	2	2.0	6																						
25-Feb	2	Z	5	4	3	4	4	5	3	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2.0	5																						
26-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.7	1																						
27-Feb	0	0	0	Z	0	0	1	1	1	1	1	1	1	2	1	1	1	1	0	1	2	1	1	1	0.9	2																						
28-Feb	0	1	0	1	Z	0	0	0	0	1	0	0	1	2	2	1	0	0	1	1	0	1	2	0	0.7	2																						
29-Feb	1	0	0	0	0	Z	1	2	2	1	1	2	2	1	1	1	1	1	1	1	0	0	0	0	0.9	2																						
																								1.1	1.0	1.2	0.9	0.9	1.1	1.0	1.4	1.5	1.5	1.2	1.1	1.0	1.1	1.2	1.0	1.2	1.4	1.6	1.7	1.7	1.4	1.6	1.0	Diurnal Average
																								4	4	5	4	3	4	4	9	6	5	4	4	5	6	7	8	8	8	8	7	6	6	11	4	Diurnal Maximum
Z - zerospan C - Calibration																																																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	658	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: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623
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	14	15	10	112	190	30	6	8	16	2	9	20	26	55	76	34	623

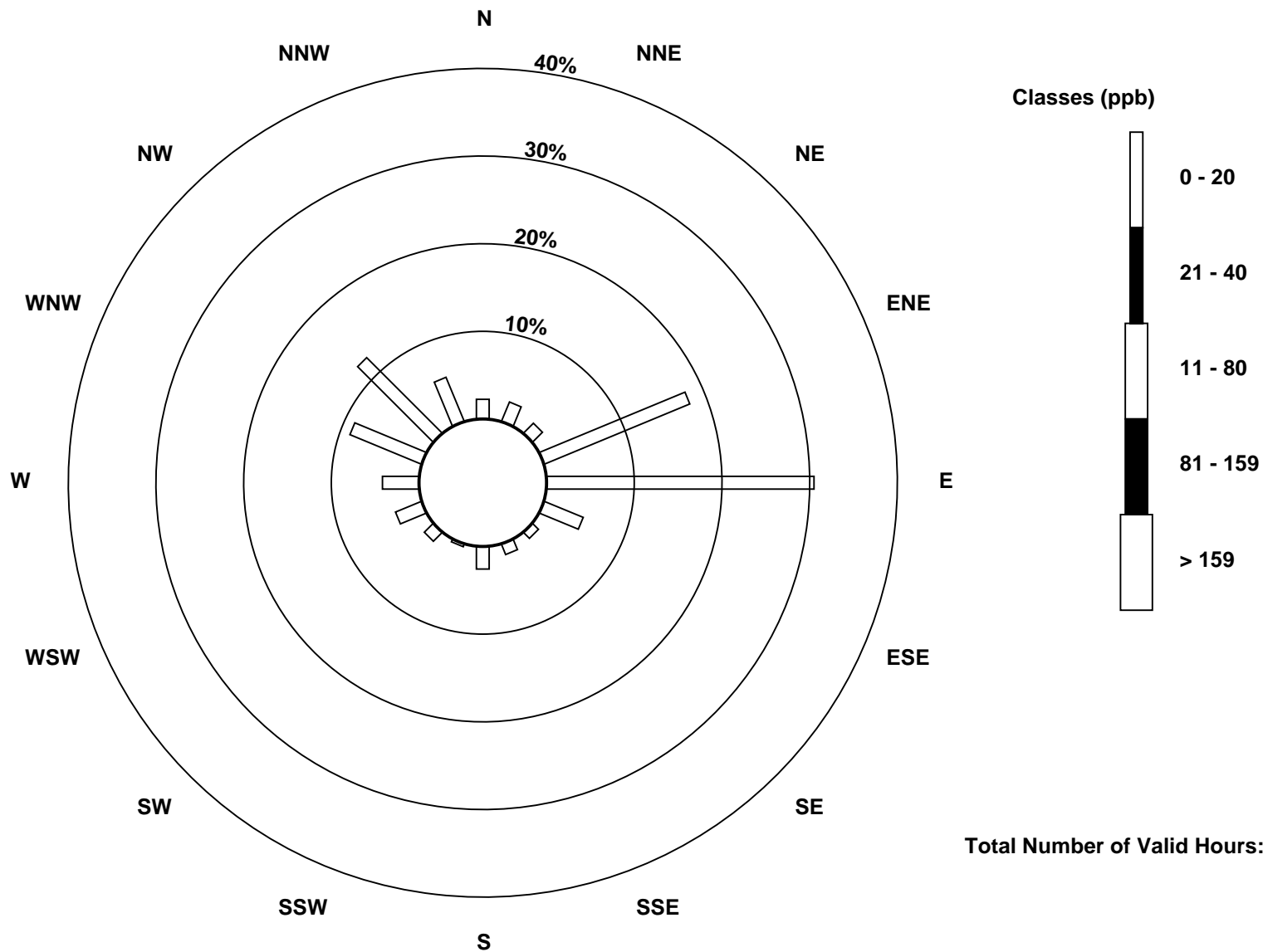
Total Number of Valid Hours: 623

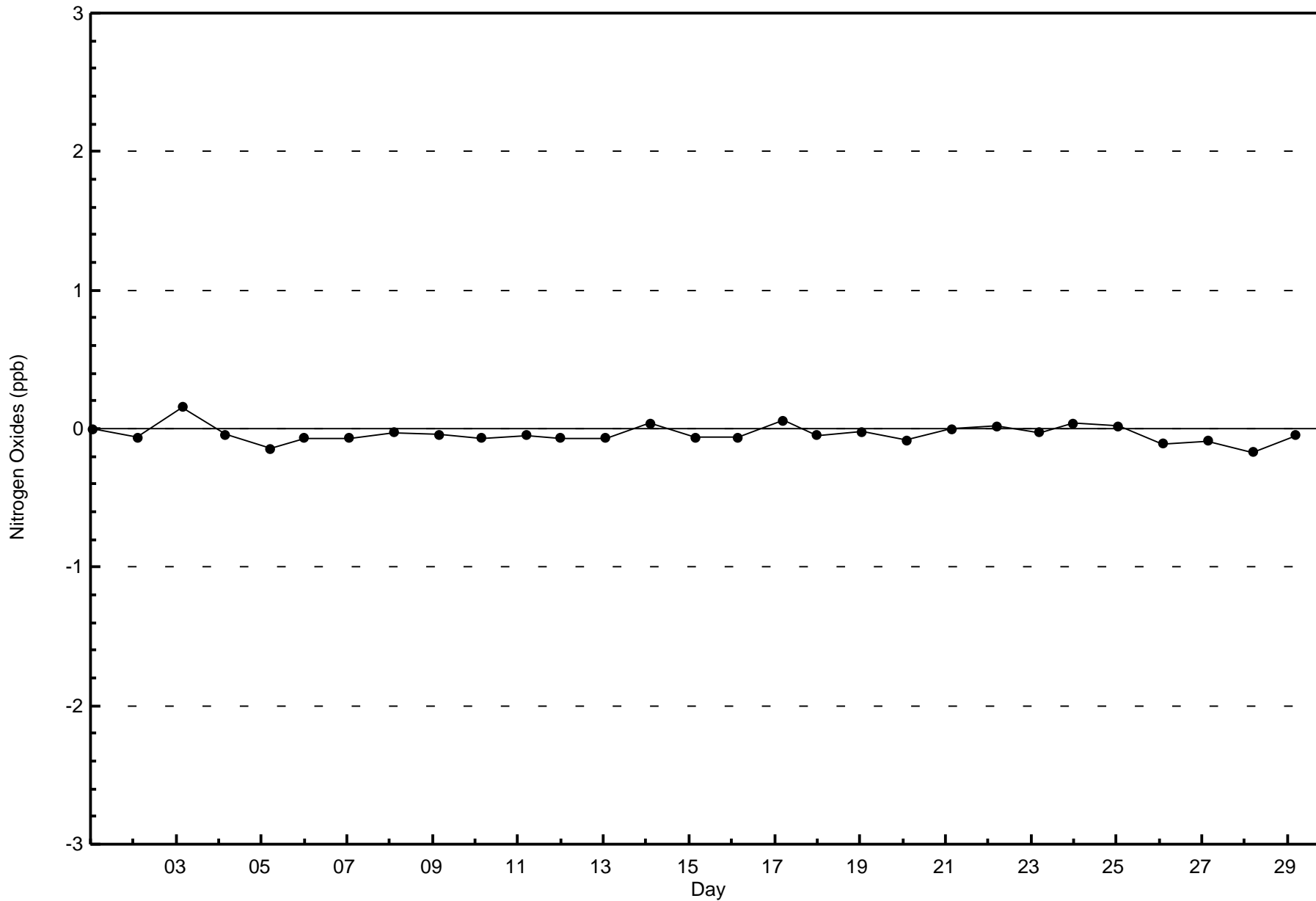
Total Number of Hours: 696

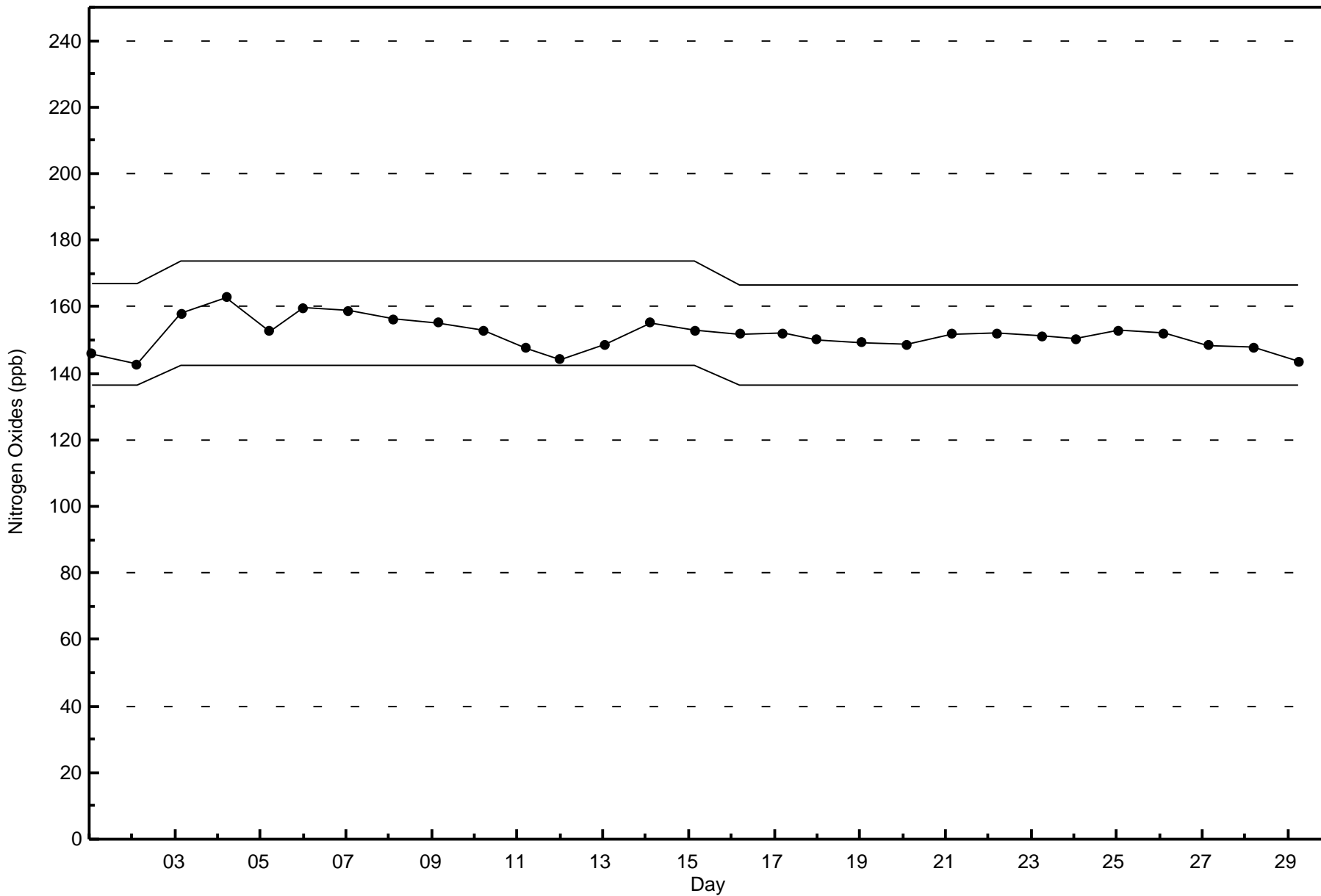


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

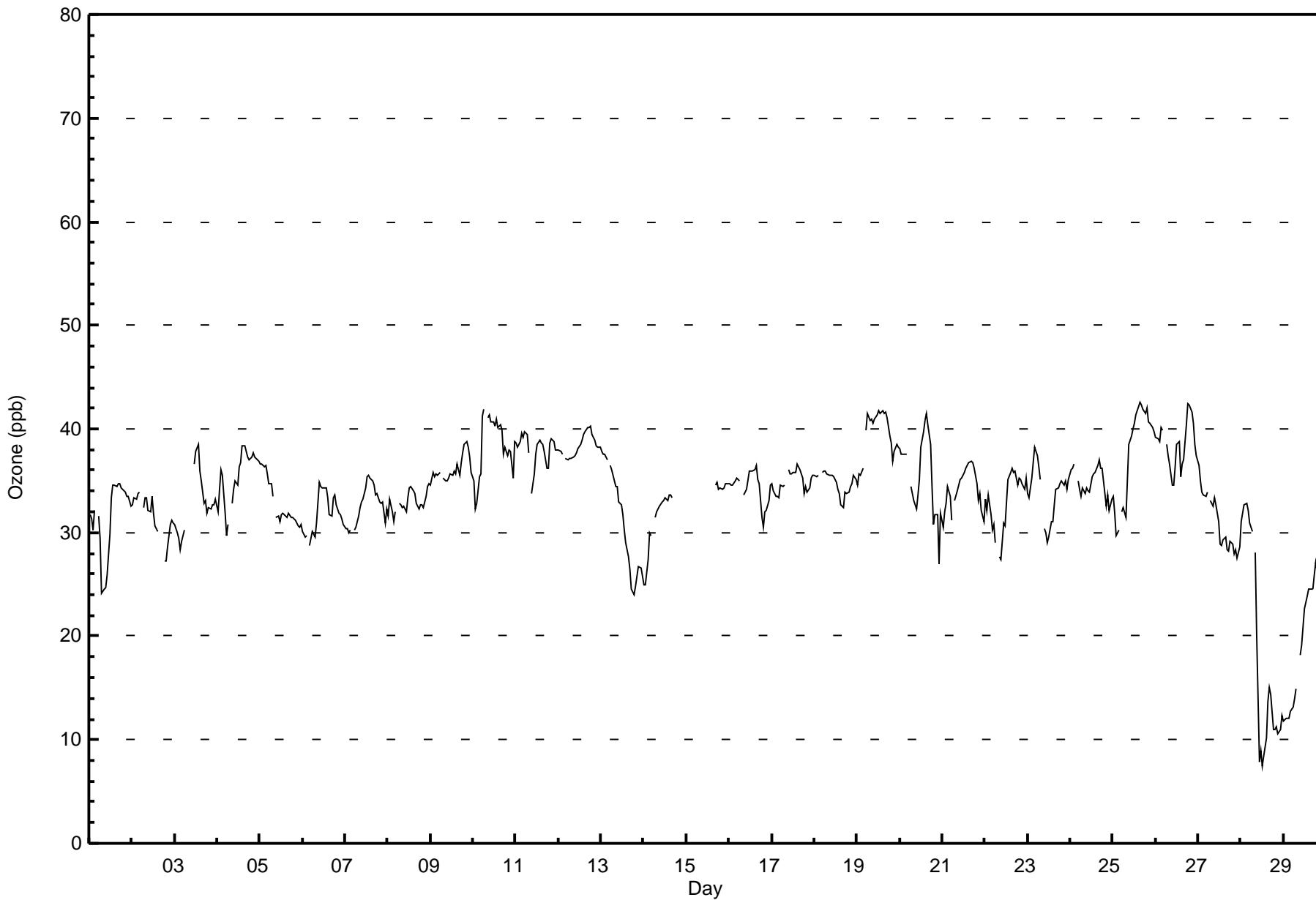
Fort Chipewyan - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 43 ppb on Feb 25 16:00 Maximum Daily Average: 39.4 ppb on Feb 19													Hours in Service: 696 Hours of Data: 639													
Minimum Value: 7 ppb on Feb 28 13:00 Minimum Daily Average: 18.4 ppb on Feb 28 Maximum Diurnal Average: 34.6 ppb at hour 16 Minimum Diurnal Average: 32.7 ppb at hour 11 Monthly Average: 33.5 ppb Percentiles: P ₁ = 11 P ₁₀ = 29 Q ₁ = 32 Median = 34 Q ₃ = 37 P ₉₀ = 39 P ₉₉ = 42													Hours of Missing Data: 57 Hours of Calibration: 34 Percent Operational Time: 96.7													
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	32	31	30	32	Z	32	29	24	25	25	26	30	33	35	35	34	35	35	34	34	34	34	33	33	31.5	35
2-Feb	33	33	33	34	34	Z	32	33	33	32	32	34	32	31	30	M	M	M	27	27	29	31	31	31	31.6	34
3-Feb	31	30	29	28	29	30	Z	32	C	C	C	37	38	38	36	35	33	33	32	32	32	33	33	33	32.7	38
4-Feb	32	34	36	36	32	30	31	Z	33	34	35	35	36	37	38	38	38	37	37	37	38	37	37	37	35.4	38
5-Feb	37	37	36	36	36	35	35	33	Z	31	32	31	32	32	32	31	32	31	31	31	31	31	31	31	32.8	37
6-Feb	30	30	30	Z	29	30	30	30	31	35	34	34	34	34	33	32	32	33	34	33	32	32	31	31	31.9	35
7-Feb	30	30	30	30	Z	30	30	32	32	33	33	34	35	35	35	35	35	34	34	33	33	33	31	32	32.6	35
8-Feb	32	33	32	31	32	Z	33	33	32	33	32	33	34	34	34	34	33	32	33	33	32	33	34	35	32.9	35
9-Feb	35	36	35	36	35	36	Z	35	35	35	35	36	36	36	36	37	35	37	38	39	39	38	37	36	36.1	39
10-Feb	35	32	33	35	36	41	42	Z	41	41	41	41	40	41	40	40	40	38	38	37	38	38	35	39	38.4	42
11-Feb	39	38	39	40	39	40	39	38	Z	34	36	38	39	39	39	39	38	36	36	39	39	39	38	38	38.1	40
12-Feb	38	38	38	Z	37	37	37	37	37	37	38	38	38	39	39	40	40	40	40	39	39	38	38	38	38.4	40
13-Feb	38	38	38	37	Z	36	36	35	34	34	33	33	32	30	29	28	26	25	24	25	26	27	27	26	31.1	38
14-Feb	25	25	27	30	30	Z	31	32	32	33	33	33	33	33	34	34	33	AF	AF	AF	AF	AF	AF	AF	--	34
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	35	35	34	34	34	34	35	35	--	35
16-Feb	35	35	35	35	35	35	35	Z	34	34	34	36	36	36	36	36	36	35	35	31	31	32	32	33	34.3	36
17-Feb	35	34	34	33	33	35	34	35	Z	36	36	36	36	36	37	36	36	36	35	34	34	34	34	35	34.9	37
18-Feb	35	35	36	Z	36	36	36	36	36	36	36	35	35	34	34	33	32	34	34	34	34	35	36	35	34.8	36
19-Feb	35	36	35	36	Z	40	41	41	41	40	41	41	42	42	42	41	42	41	39	39	37	38	39	38	39.4	42
20-Feb	38	38	38	38	38	Z	34	34	33	32	34	35	38	40	41	41	40	38	34	31	32	32	27	32	35.5	41
21-Feb	31	32	33	34	33	31	Z	33	34	35	35	35	36	36	37	37	37	37	36	35	33	34	32	31	34.2	37
22-Feb	33	32	34	32	30	31	29	Z	28	27	31	31	33	35	36	36	36	36	35	35	35	35	34	35	33.0	36
23-Feb	34	33	35	37	38	37	36	35	Z	30	30	29	30	31	31	33	34	34	35	35	35	35	34	35	33.8	38
24-Feb	36	36	37	Z	35	34	34	34	34	34	34	34	35	36	36	37	37	36	36	34	33	34	32	33	34.8	37
25-Feb	33	32	30	30	Z	32	32	31	35	39	39	40	40	41	42	43	42	42	42	42	41	40	40	40	37.8	43
26-Feb	39	39	39	40	40	Z	38	37	37	35	35	36	38	39	35	37	37	40	42	42	42	40	38	37	38.5	42
27-Feb	36	35	34	34	33	34	Z	33	33	33	33	31	29	29	29	30	28	28	29	29	28	28	27	29	31.0	36
28-Feb	31	32	33	33	32	31	30	Z	28	20	8	9	7	8	10	14	15	14	11	11	11	11	11	12	18.4	33
29-Feb	12	12	12	12	13	13	14	15	Z	18	19	21	23	24	25	24	25	26	27	26	28	29	30	30	20.8	30
33.1 33.1 33.2 33.3 33.3 33.3 33.4 33.0 33.5 32.9 32.7 33.4 34.0 34.3 34.3 34.6 34.3 34.2 33.5 33.3 33.2 33.4 32.9 33.3																								Diurnal Average		
39 39 39 40 40 41 42 41 41 41 41 41 41 42 42 42 43 42 42 42 42 42 40 40 40																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Fort Chipewyan - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	25	3.91	3.91
21 - 50	614	96.09	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort Chipewyan - February 2016**

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	1	0	16	8	0	0	0	0	0	0	0	0	0	0	25
21 - 50	13	14	8	98	173	23	6	8	15	2	8	19	24	55	80	31	577
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	13	14	9	98	189	31	6	8	15	2	8	19	24	55	80	31	602

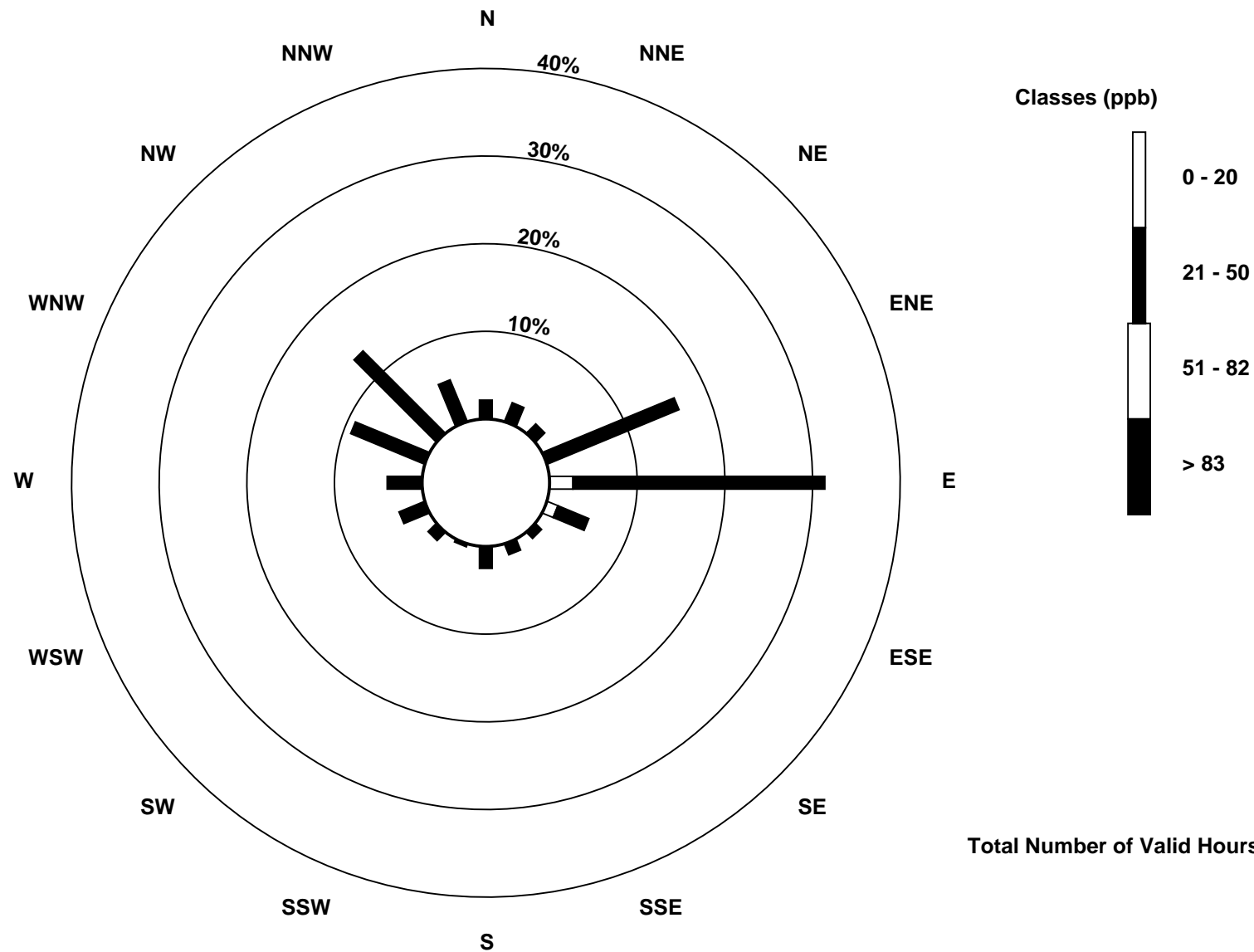
Total Number of Valid Hours: 602

Total Number of Hours: 696

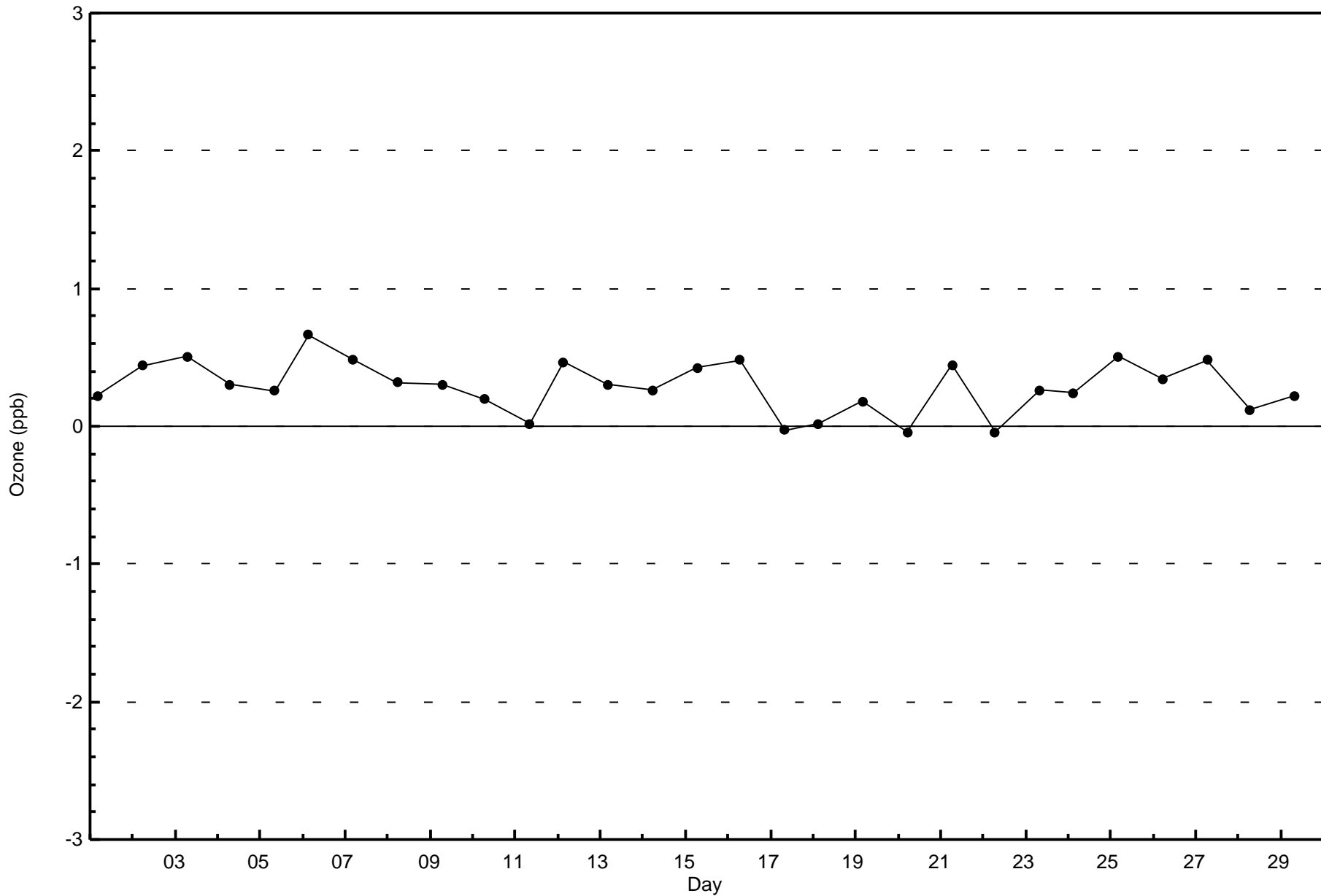


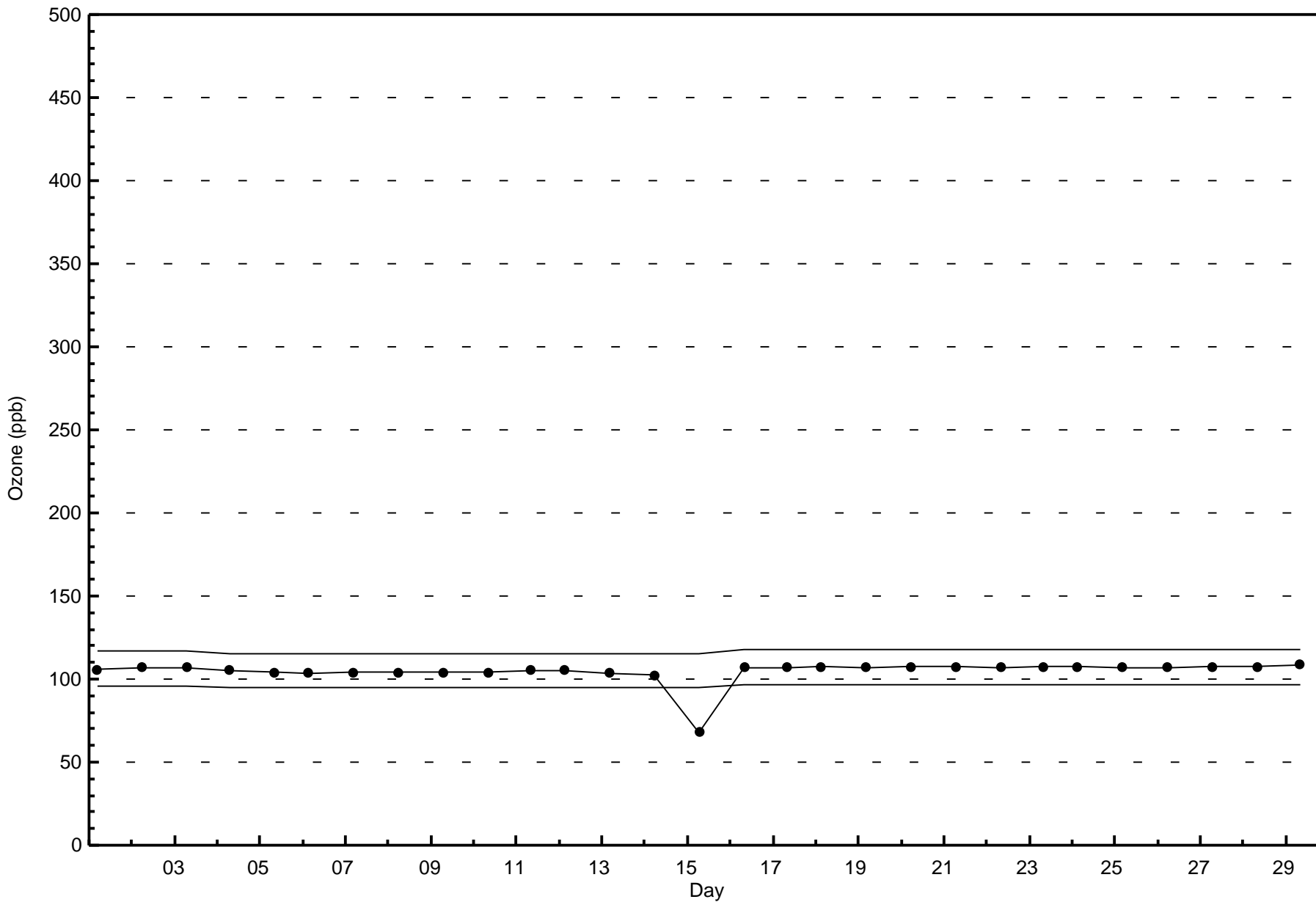
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 602





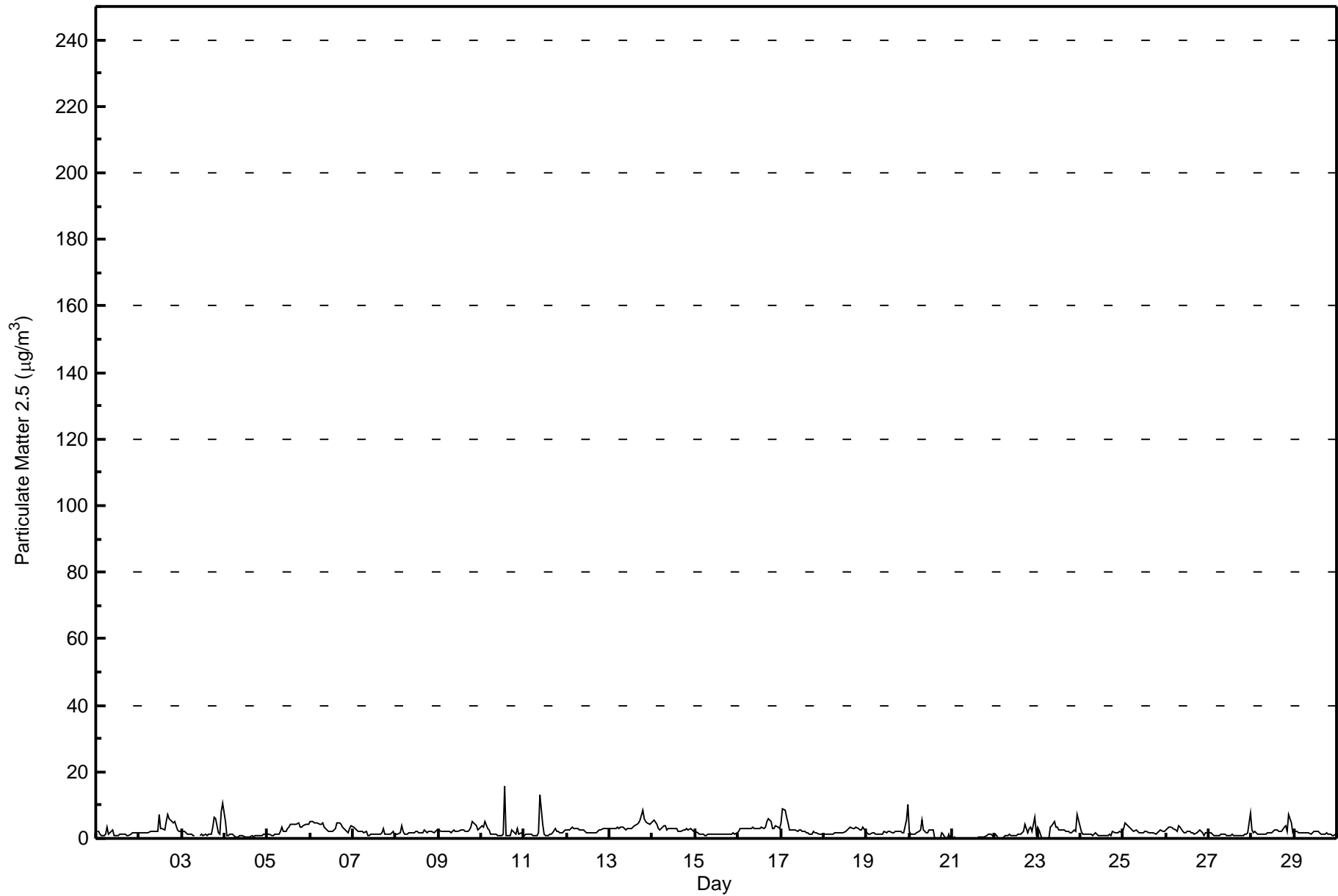


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 15.9 µg/m ³ on Feb 10 14:00 Maximum Daily Average: 3.9 µg/m ³ on Feb 13		Hours in Service: 696 Hours of Data: 694 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																																															
Minimum Value: 0.0 µg/m ³ on Feb 20 16:00 Maximum Diurnal Average: 2.9 µg/m ³ at hour 24 Monthly Average: 2.20 µg/m ³		Minimum Daily Average: 0.3 µg/m ³ on Feb 21 Minimum Diurnal Average: 1.7 µg/m ³ at hour 6 Percentiles: P ₁ = 0.0 P ₁₀ = 0.9 Q ₁ = 1.3 Median = 1.9 Q ₃ = 2.8 P ₉₀ = 4.0 P ₉₉ = 8.2																																															
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	2.0	1.9	1.2	1.0	0.9	1.2	3.4	1.3	2.2	2.4	0.8	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.6	1.6	1.7	1.9	1.4	3.4																							
2-Feb	1.9	1.7	1.7	1.6	1.6	1.8	1.9	1.9	2.1	2.0	2.1	7.4	3.1	2.8	2.6	5.3	7.2	6.1	5.2	4.8	5.0	2.3	2.2	2.1	3.2	7.4																							
3-Feb	1.9	2.0	1.6	1.2	1.1	1.3	1.1	1.0	C	C	0.8	1.1	0.8	1.3	1.0	1.1	1.1	3.3	6.5	6.1	1.8	1.3	7.9	10.7	2.5	10.7																							
4-Feb	5.2	0.9	0.7	1.4	1.2	0.9	0.6	0.6	0.8	0.9	0.7	0.6	0.6	0.6	0.7	0.6	0.8	0.9	0.9	1.0	1.0	1.1	1.2	1.0	1.0	5.2																							
5-Feb	1.3	1.1	1.0	1.0	1.1	1.5	1.3	2.0	3.2	2.2	2.2	2.8	3.5	4.2	4.2	4.4	4.4	4.8	3.3	3.4	3.9	4.0	4.3	4.1	2.9	4.8																							
6-Feb	4.9	5.0	4.7	4.8	4.8	4.1	4.3	4.7	3.4	2.7	2.3	2.2	2.2	2.6	2.8	4.7	4.5	4.1	3.6	2.9	2.2	1.8	2.9	3.6	3.6	5.0																							
7-Feb	3.3	2.8	2.6	2.3	2.2	1.9	1.7	2.0	0.9	1.0	1.1	1.3	1.2	1.3	1.3	1.4	1.8	3.1	1.1	1.3	1.3	1.1	1.9	1.0	1.7	3.3																							
8-Feb	1.1	1.3	1.5	4.0	2.3	1.5	1.4	1.6	1.7	1.7	1.8	2.1	2.0	1.8	1.9	1.9	2.4	1.9	2.0	2.0	2.1	1.9	2.3	2.4	1.9	4.0																							
9-Feb	2.7	2.2	2.1	2.0	2.0	2.1	1.9	1.9	2.4	2.3	2.1	2.1	2.4	2.4	2.3	2.2	2.2	2.4	3.3	5.3	4.4	3.8	2.4	2.8	2.6	5.3																							
10-Feb	3.7	3.4	4.9	2.8	2.6	1.4	1.1	1.1	1.3	1.0	1.0	0.8	1.4	15.9	0.8	0.8	0.8	2.4	1.9	1.4	2.9	1.5	1.7	1.0	2.4	15.9																							
11-Feb	1.0	1.3	1.3	1.4	1.2	0.8	0.7	1.0	1.6	13.0	4.4	1.3	0.9	1.0	1.1	1.3	1.6	2.8	1.9	2.1	1.5	1.6	1.9	2.4	2.0	13.0																							
12-Feb	2.5	2.7	2.9	3.3	2.9	3.0	2.9	2.7	2.6	2.5	2.0	1.7	1.7	1.7	1.6	1.6	1.8	2.0	2.4	2.4	2.8	3.2	3.2	3.2	2.5	3.3																							
13-Feb	3.0	2.8	2.9	3.1	3.4	3.2	3.2	3.3	2.8	2.7	2.8	3.0	3.0	3.4	3.7	4.1	4.5	5.4	8.6	5.9	5.1	4.6	4.2	4.6	3.9	8.6																							
14-Feb	5.1	5.4	4.0	2.9	2.6	2.9	3.8	3.8	2.5	2.8	2.8	3.0	3.0	2.8	2.0	2.0	2.1	2.6	2.5	2.9	2.7	2.8	2.6	2.3	3.0	5.4																							
15-Feb	2.0	1.6	1.4	1.3	1.1	1.0	1.0	1.2	1.3	1.4	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.4	1.4	1.4	1.4	1.5	1.4	1.6	1.4	2.0																							
16-Feb	2.3	2.8	2.8	3.0	2.9	3.0	3.0	3.1	3.2	3.1	3.1	3.0	3.0	3.2	3.1	3.4	5.0	6.0	5.2	2.8	3.0	3.9	3.2	3.1	3.3	6.0																							
17-Feb	4.6	8.9	8.3	6.4	4.7	2.5	2.4	2.5	2.4	2.2	2.3	2.3	2.1	2.2	1.6	1.5	1.4	1.3	2.3	1.8	1.5	1.4	1.4	1.4	2.9	8.9																							
18-Feb	1.2	1.4	1.3	1.4	1.4	1.4	1.5	1.6	1.7	1.8	1.7	1.8	2.0	2.7	2.9	3.3	3.0	2.9	3.2	2.8	2.5	2.7	3.2	2.1	2.2	3.3																							
19-Feb	1.7	1.3	1.4	1.6	1.5	1.2	1.4	1.3	1.4	1.3	2.0	1.8	2.0	2.1	1.8	1.6	2.1	2.0	2.0	2.2	1.8	1.8	5.3	10.2	2.2	10.2																							
20-Feb	2.1	1.5	1.2	1.2	1.6	2.1	2.6	5.3	2.4	1.9	1.7	2.4	2.7	2.4	0.1	0.0	0.0	0.1	1.9	1.4	0.3	0.0	1.3	0.0	1.5	5.3																							
21-Feb	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.6	0.6	0.2	0.7	1.1	1.2	1.3	0.5	0.3	1.3																							
22-Feb	1.4	0.7	0.0	0.0	0.2	0.5	1.0	1.0	1.2	1.0	0.7	0.8	1.0	1.3	1.3	1.5	1.9	4.4	1.8	2.8	3.5	2.2	6.4	1.6	1.6	6.4																							
23-Feb	3.4	2.6	0.1	0.0	0.0	0.1	0.1	3.4	3.8	5.1	3.5	3.4	2.5	2.4	2.5	2.4	2.1	2.0	1.8	1.8	2.4	2.2	7.0	5.3	2.5	7.0																							
24-Feb	1.9	1.4	1.4	1.3	1.2	1.5	1.2	1.0	1.8	1.3	0.8	0.8	1.1	1.0	0.9	0.8	1.1	1.0	2.0	1.5	1.6	1.5	2.1	1.5	1.3	2.1																							
25-Feb	2.9	4.8	4.3	3.4	3.2	2.7	2.3	2.5	2.1	1.7	1.9	1.8	2.3	2.1	1.8	1.6	1.9	1.7	1.3	1.6	2.3	2.5	2.3	2.2	2.4	4.8																							
26-Feb	2.6	3.4	3.5	3.5	3.1	2.5	2.3	3.8	3.5	2.2	1.8	1.9	2.1	2.3	1.8	1.9	1.3	1.8	2.3	2.6	1.8	1.1	1.7	1.9	2.4	3.8																							
27-Feb	1.8	1.5	1.2	1.0	0.9	0.8	0.8	1.4	1.1	1.3	0.8	0.8	1.0	1.2	0.9	0.9	1.0	1.0	0.9	1.0	1.3	1.2	1.6	7.7	1.4	7.7																							
28-Feb	2.3	1.7	2.2	1.3	1.3	1.3	1.2	1.2	1.4	1.8	1.8	1.8	2.2	2.4	2.4	2.2	2.1	2.1	3.3	3.7	2.2	7.2	4.5	1.8	2.3	7.2																							
29-Feb	2.0	1.9	1.7	1.7	1.8	1.8	1.7	1.9	1.9	1.4	1.6	2.0	2.1	2.0	1.5	1.2	1.2	1.3	1.7	1.1	1.1	1.0	1.0	1.1	1.6	2.1																							
																								2.5	2.4	2.2	2.1	1.9	1.7	1.8	2.1	2.0	2.3	1.8	1.9	1.9	2.5	1.8	1.9	2.1	2.5	2.6	2.5	2.3	2.2	2.9	2.9	Diurnal Average	
																								5.2	8.9	8.3	6.4	4.8	4.1	4.3	5.3	3.8	13.0	4.4	7.4	3.5	15.9	4.2	5.3	7.2	6.1	8.6	6.1	5.1	7.2	7.9	10.7	Diurnal Maximum	
C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - February 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	574	82.71	82.71
6 - 15	19	2.74	85.45
16 - 25	1	0.14	85.59
26 - 80	0	0.00	85.59
> 81.0	0	0.00	85.59

Total Number of Valid Hours: 694

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - February 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	12	14	11	103	143	22	2	8	16	2	4	18	26	49	78	32	540
6 - 15	0	0	0	1	1	0	1	0	0	0	0	0	1	5	3	5	17
16 - 25	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	14	11	104	144	23	3	8	16	2	4	18	27	54	81	37	558

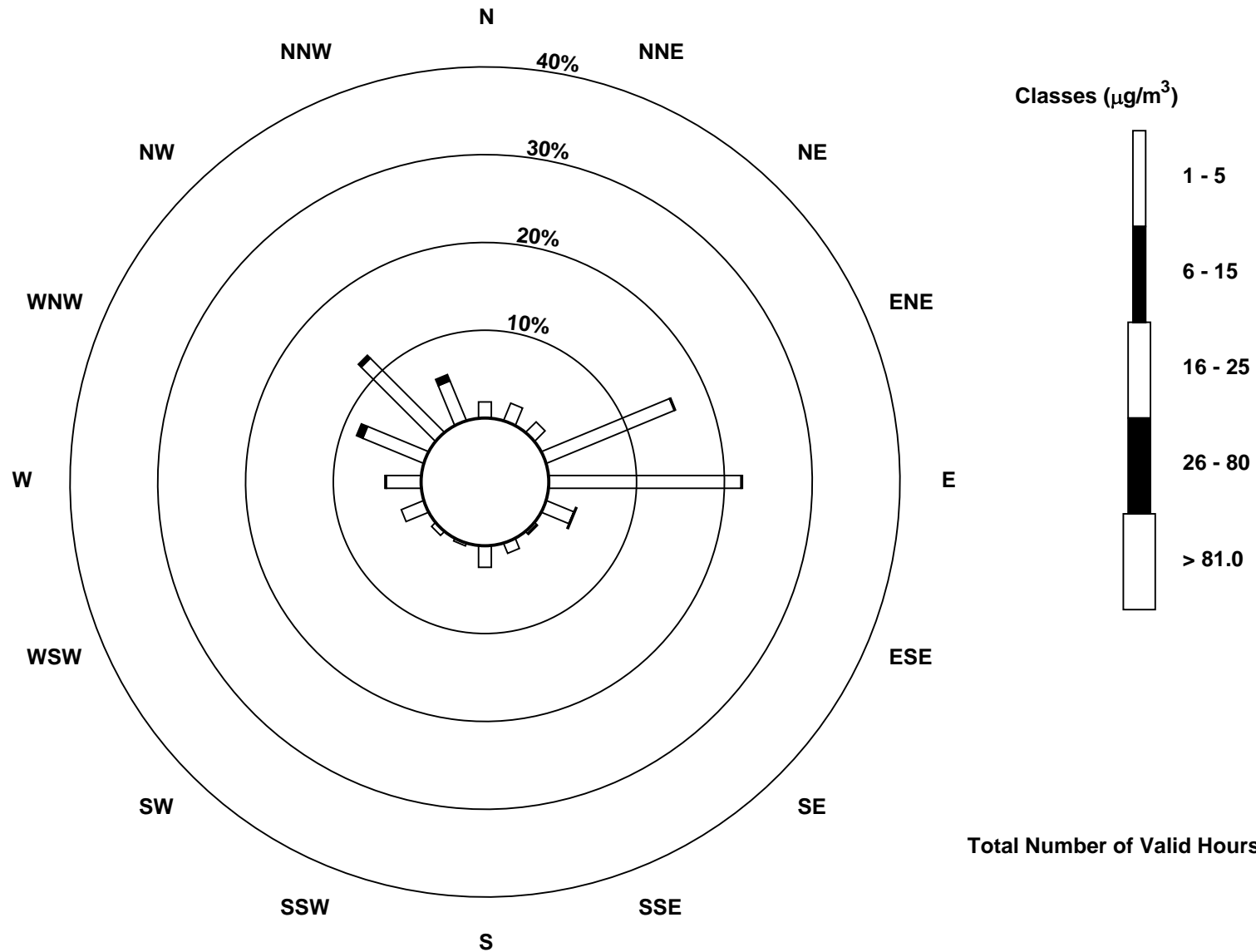
Total Number of Valid Hours: 653

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 653

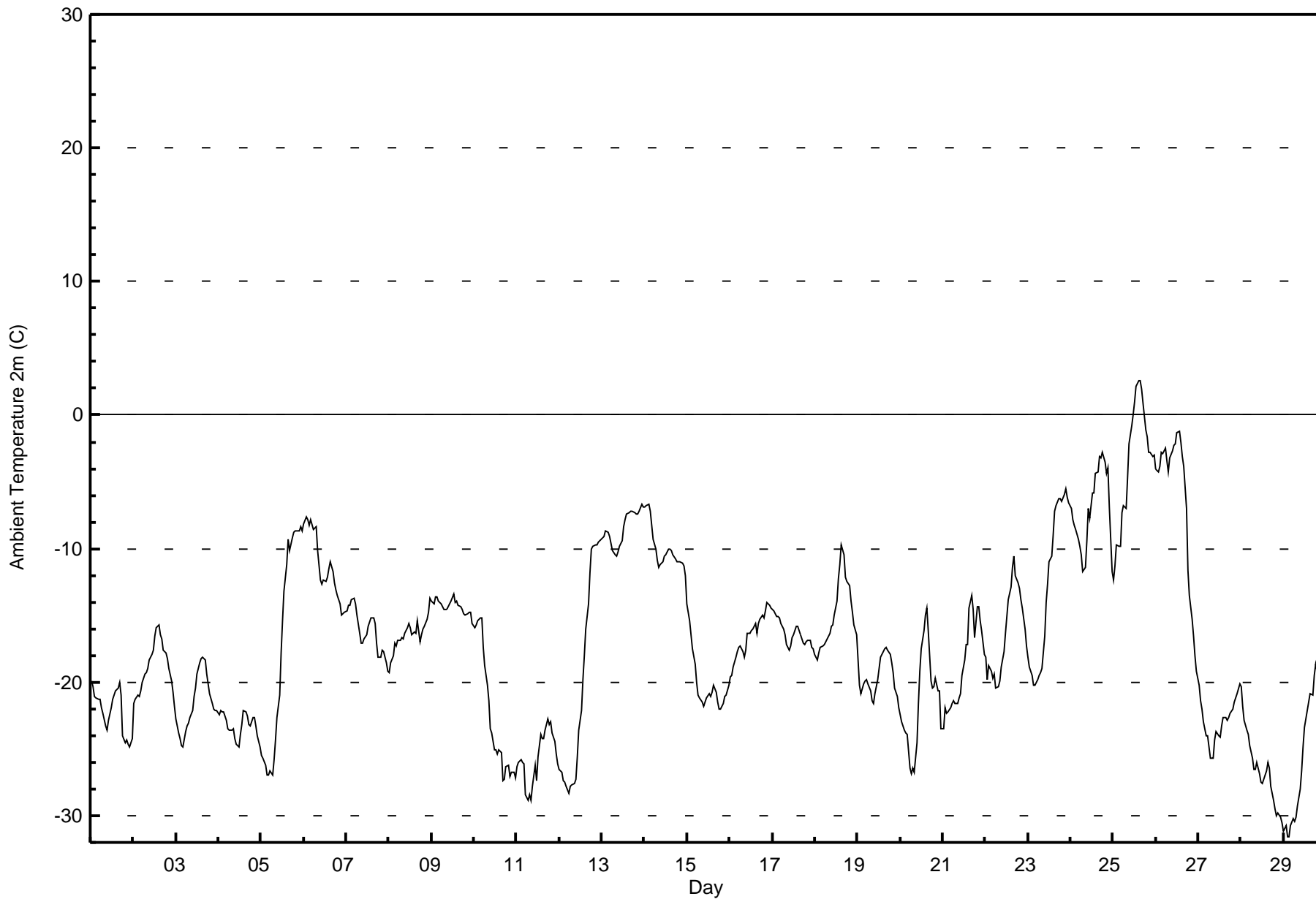


Maximum Value: 2.6 C on Feb 25 16:00 Maximum Daily Average: -3.5 C on Feb 25																						Hours in Service: 696 Hours of Data: 696				
Minimum Value: -31.6 C on Feb 29 04:00 Minimum Daily Average: -26.5 C on Feb 28 Maximum Diurnal Average: -14.8 C at hour 16 Minimum Diurnal Average: -19.1 C at hour 9 Monthly Average: -17.10 C Percentiles: P ₁ = -30.3 P ₁₀ = -25.8 Q ₁ = -22.0 Median = -17.6 Q ₃ = -12.8 P ₉₀ = -7.3 P ₉₉ = -0.3																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-19.9	-20.4	-21.1	-21.2	-21.3	-21.3	-21.9	-22.3	-23.3	-23.6	-22.8	-21.9	-21.3	-20.9	-20.7	-20.4	-20.0	-20.9	-24.0	-24.6	-24.3	-24.7	-24.9	-24.2	-22.2	-19.9
2-Feb	-21.6	-21.3	-21.0	-21.0	-20.6	-20.0	-19.4	-19.3	-19.0	-18.3	-17.9	-17.6	-16.6	-15.9	-15.7	-16.5	-16.7	-17.6	-17.8	-18.2	-18.9	-19.9	-20.7	-21.8	-18.9	-15.7
3-Feb	-22.7	-23.8	-24.2	-24.7	-24.9	-23.7	-23.3	-23.1	-22.6	-22.1	-21.1	-20.5	-19.4	-18.5	-18.2	-18.1	-18.4	-19.4	-20.2	-20.9	-21.6	-22.0	-22.1	-22.1	-21.6	-18.1
4-Feb	-22.4	-22.2	-22.2	-22.3	-22.9	-23.5	-23.6	-23.6	-23.5	-24.2	-24.6	-24.9	-23.9	-23.2	-22.1	-22.2	-22.5	-23.2	-23.3	-22.7	-22.7	-23.2	-24.0	-24.9	-23.2	-22.1
5-Feb	-25.5	-25.7	-26.2	-26.9	-27.0	-26.6	-26.9	-25.8	-24.3	-22.7	-20.9	-17.8	-15.4	-13.2	-11.2	-9.3	-10.1	-9.1	-8.8	-8.7	-8.7	-8.6	-8.3	-8.7	-17.3	-8.3
6-Feb	-8.2	-7.6	-7.9	-8.2	-7.9	-8.6	-8.5	-8.3	-10.1	-12.3	-12.6	-12.3	-12.4	-12.2	-11.5	-11.0	-11.7	-12.5	-13.1	-13.5	-14.2	-15.0	-14.9	-14.8	-11.2	-7.6
7-Feb	-14.6	-14.3	-14.2	-13.8	-13.7	-14.1	-15.0	-16.3	-17.1	-17.1	-16.8	-16.5	-15.8	-15.5	-15.2	-15.1	-15.6	-17.1	-18.1	-18.1	-17.6	-17.7	-18.6	-19.2	-16.1	-13.7
8-Feb	-19.3	-18.5	-18.0	-17.1	-17.3	-16.8	-16.8	-16.6	-16.8	-16.3	-15.9	-15.6	-15.9	-16.4	-16.3	-16.3	-15.4	-16.9	-16.5	-16.0	-15.8	-15.3	-14.7	-13.7	-16.4	-13.7
9-Feb	-13.9	-14.1	-13.6	-13.6	-13.9	-14.1	-14.4	-14.5	-14.6	-14.3	-14.1	-13.9	-13.4	-14.0	-13.9	-14.3	-14.3	-14.6	-14.8	-15.0	-14.9	-14.8	-14.8	-15.6	-14.3	-13.4
10-Feb	-16.0	-15.8	-15.4	-15.1	-15.2	-17.4	-18.7	-20.2	-21.4	-23.5	-23.9	-25.1	-25.1	-25.3	-25.0	-25.3	-27.4	-27.2	-26.3	-26.2	-27.1	-26.7	-26.7	-27.2	-22.6	-15.1
11-Feb	-26.3	-26.1	-25.7	-26.0	-26.1	-28.4	-28.9	-28.5	-28.9	-27.8	-26.2	-27.4	-25.6	-23.9	-24.2	-24.2	-23.6	-22.7	-23.2	-23.0	-23.8	-24.4	-25.4	-26.1	-25.7	-22.7
12-Feb	-26.5	-26.7	-27.3	-27.5	-27.8	-28.3	-27.8	-27.7	-27.6	-27.3	-25.6	-23.6	-22.1	-19.8	-18.0	-16.1	-14.2	-11.9	-10.0	-9.9	-9.7	-9.7	-9.5	-9.4	-20.2	-9.4
13-Feb	-9.2	-9.1	-8.7	-8.7	-9.1	-9.6	-10.2	-10.5	-10.6	-10.3	-9.8	-9.4	-8.4	-7.8	-7.4	-7.3	-7.2	-7.2	-7.3	-7.4	-7.5	-7.2	-6.7	-6.8	-8.5	-6.7
14-Feb	-6.9	-6.7	-6.6	-7.2	-8.3	-9.3	-10.0	-10.9	-11.4	-11.1	-11.0	-10.6	-10.4	-10.1	-10.0	-10.2	-10.4	-10.7	-11.0	-11.0	-11.0	-11.1	-11.3	-12.0	-10.0	-6.6
15-Feb	-14.2	-15.4	-16.4	-17.5	-18.7	-20.0	-20.9	-21.2	-21.5	-21.8	-21.5	-21.1	-20.9	-21.1	-20.8	-20.2	-20.8	-21.5	-22.0	-22.0	-21.6	-21.1	-21.0	-20.2	-20.1	-14.2
16-Feb	-19.6	-19.5	-18.9	-18.2	-17.7	-17.4	-17.3	-17.7	-18.1	-17.6	-16.4	-16.4	-16.2	-16.0	-15.7	-16.4	-15.6	-15.3	-15.0	-15.2	-14.7	-14.0	-14.2	-14.5	-16.6	-14.0
17-Feb	-14.6	-14.7	-15.1	-15.1	-15.2	-15.6	-16.0	-16.5	-17.2	-17.6	-17.3	-16.7	-16.5	-15.8	-15.8	-16.1	-16.4	-17.1	-17.2	-17.0	-16.8	-16.9	-17.4	-17.5	-16.3	-14.6
18-Feb	-17.9	-18.3	-17.8	-17.4	-17.3	-17.2	-17.0	-16.8	-16.4	-15.9	-15.7	-15.0	-13.9	-12.3	-11.2	-9.7	-10.5	-12.1	-12.5	-12.8	-13.9	-14.8	-15.7	-16.4	-14.9	-9.7
19-Feb	-18.3	-20.3	-20.9	-20.1	-19.9	-19.9	-20.1	-20.7	-21.4	-21.6	-20.9	-19.8	-19.0	-18.2	-17.7	-17.5	-17.4	-17.6	-17.9	-18.6	-19.3	-20.4	-21.1	-21.9	-19.6	-17.4
20-Feb	-22.4	-22.9	-23.6	-23.8	-23.9	-26.4	-26.8	-26.5	-26.7	-24.5	-21.6	-19.2	-17.5	-16.2	-14.9	-14.4	-16.1	-19.9	-20.4	-20.4	-19.7	-20.7	-20.7	-23.5	-21.4	-14.4
21-Feb	-23.5	-22.0	-22.3	-22.3	-21.9	-21.6	-21.4	-21.6	-21.6	-21.1	-20.9	-19.5	-18.3	-17.2	-17.2	-14.5	-13.5	-14.5	-16.6	-14.3	-14.3	-15.4	-16.1	-17.9	-18.7	-13.5
22-Feb	-18.2	-19.8	-18.7	-19.2	-19.7	-19.4	-20.4	-20.3	-19.9	-18.9	-17.7	-16.4	-15.1	-13.8	-12.8	-11.4	-10.6	-12.0	-12.6	-12.9	-13.8	-14.4	-16.0	-17.3	-16.3	-10.6
23-Feb	-18.2	-18.8	-19.5	-20.3	-20.2	-19.8	-19.5	-19.3	-19.0	-16.6	-14.0	-12.7	-11.0	-10.5	-9.0	-7.2	-6.8	-6.3	-6.3	-6.4	-6.0	-5.5	-6.2	-6.5	-12.7	-5.5
24-Feb	-7.0	-7.9	-8.3	-8.6	-9.4	-9.8	-10.5	-11.7	-11.4	-9.4	-7.0	-7.7	-5.9	-5.8	-4.3	-4.3	-3.1	-3.2	-2.8	-3.5	-4.3	-4.0	-6.9	-11.7	-7.0	-2.8
25-Feb	-12.4	-11.3	-9.7	-9.8	-9.8	-7.3	-6.7	-7.0	-4.7	-2.1	-0.7	0.1	1.0	2.1	2.5	2.6	1.9	0.9	-1.1	-1.7	-2.8	-2.8	-3.1	-3.0	-3.5	2.6
26-Feb	-4.1	-4.2	-3.9	-2.8	-2.9	-2.5	-3.4	-4.2	-3.2	-2.7	-2.2	-2.1	-1.3	-1.2	-2.0	-3.1	-3.9	-7.0	-11.6	-13.5	-15.3	-16.6	-18.0	-19.1	-6.3	-1.2
27-Feb	-20.3	-21.4	-22.0	-23.0	-24.0	-24.0	-24.9	-25.7	-25.7	-24.4	-23.8	-24.0	-24.1	-23.3	-22.6	-22.6	-22.9	-22.6	-22.3	-22.0	-21.5	-21.2	-20.8	-20.1	-22.9	-20.1
28-Feb	-20.3	-21.8	-22.8	-23.6	-23.9	-24.7	-25.7	-26.5	-26.6	-26.1	-26.9	-27.5	-27.6	-27.2	-26.7	-26.0	-26.4	-27.8	-28.9	-29.5	-30.1	-29.8	-30.1	-30.5	-26.5	-20.3
29-Feb	-31.2	-30.7	-31.6	-31.6	-30.8	-30.2	-30.4	-30.1	-29.2	-28.1	-26.7	-24.8	-23.4	-22.2	-21.5	-20.9	-21.0	-19.5	-18.7	-19.1	-18.3	-18.1	-17.7	-17.7	-24.7	-17.7
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	263	37.79	37.79
-20 - 0	426	61.21	98.99
0 - 10	7	1.01	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

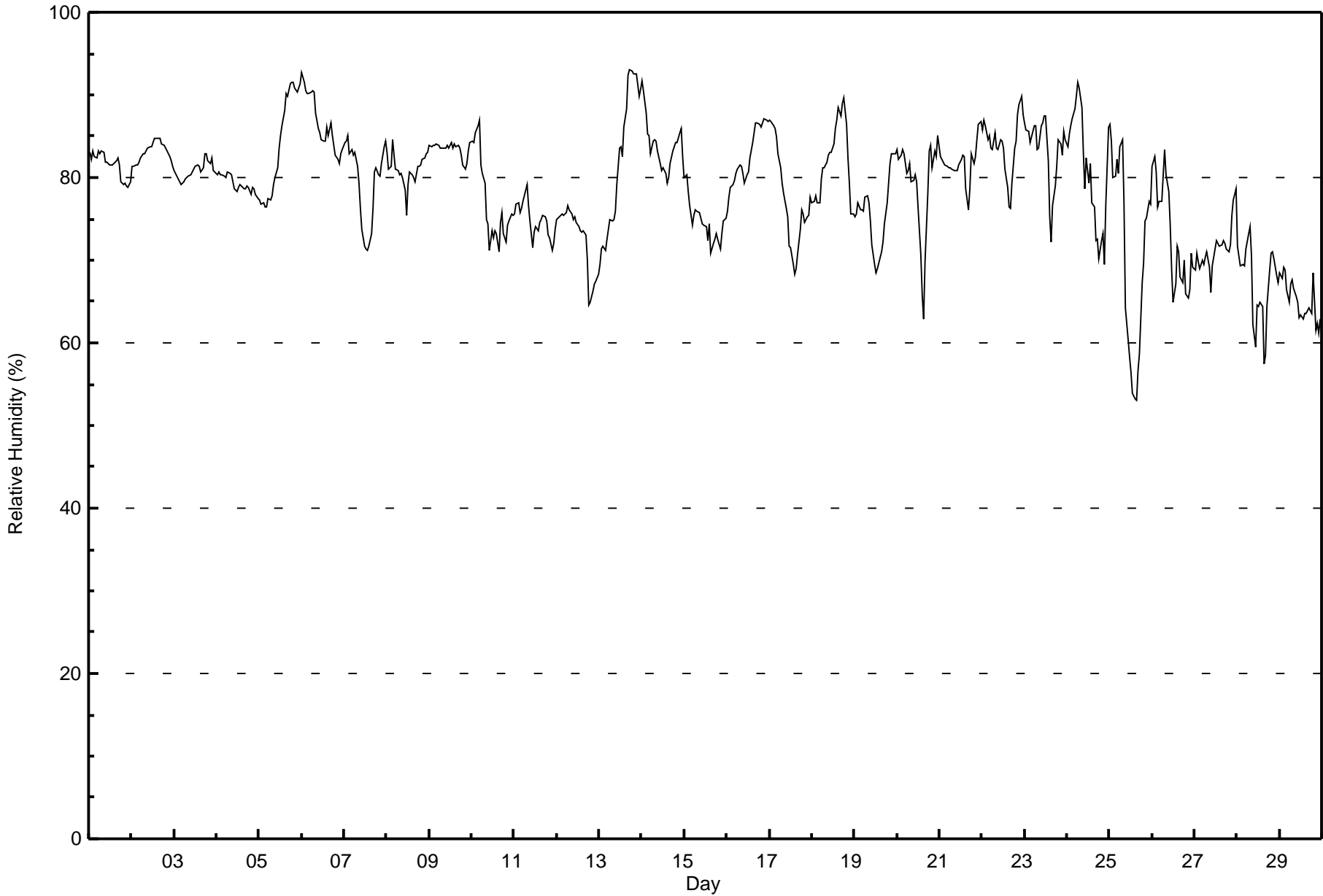


Maximum Value: 93 % on Feb 13 18:00																			Maximum Daily Average: 86.6 % on Feb 6						Hours in Service: 696	
Minimum Value: 53 % on Feb 25 16:00																			Minimum Daily Average: 65.1 % on Feb 29						Hours of Data: 696	
Maximum Diurnal Average: 80.6 % at hour 1																			Minimum Diurnal Average: 75.7 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 78.6 %																			Percentiles: P ₁ = 58 P ₁₀ = 69 Q ₁ = 74 Median = 80 Q ₃ = 83 P ₉₀ = 86 P ₉₉ = 92						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	82	83	83	82	83	83	83	83	82	82	82	82	81	82	82	82	82	79	79	79	79	79	79	81.5	83
2-Feb	81	81	82	82	82	82	83	83	83	84	84	84	84	85	85	85	85	84	84	84	83	83	82	81	83.1	85
3-Feb	81	80	80	80	79	80	80	80	80	80	81	81	81	82	81	81	81	83	83	82	82	82	81	81	80.9	83
4-Feb	80	81	80	80	80	80	81	81	80	79	79	78	79	79	79	79	79	79	79	78	79	79	78	78	79.3	81
5-Feb	77	77	77	76	76	77	77	78	79	80	81	84	85	86	88	90	90	91	92	92	91	90	91	91	84.1	92
6-Feb	93	91	91	90	90	90	90	90	88	86	85	85	84	84	86	85	87	85	84	83	82	82	83	83	86.6	93
7-Feb	84	84	85	83	83	83	83	81	79	76	74	72	71	71	72	73	76	81	81	80	80	82	84	84	79.3	85
8-Feb	83	81	81	85	83	81	81	80	81	80	78	75	79	81	80	80	79	81	81	82	82	82	83	83	81.0	85
9-Feb	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	83	81	81	82	83	84	83.4	84
10-Feb	84	84	85	86	87	82	80	79	75	74	71	74	73	74	73	71	75	76	73	72	74	75	76	75	77.0	87
11-Feb	76	77	77	76	76	77	79	79	77	75	72	73	74	73	75	75	75	75	75	73	73	71	72	74	74.9	79
12-Feb	75	75	75	76	75	76	77	76	76	75	75	75	74	74	73	74	73	70	65	65	66	67	68	68	72.6	77
13-Feb	70	71	72	71	73	74	75	75	75	76	79	84	84	83	86	88	92	93	93	92	92	93	90	91	82.1	93
14-Feb	92	90	88	85	85	83	84	85	84	83	82	81	81	81	79	80	82	83	84	84	84	85	86	83	83.9	92
15-Feb	80	80	78	77	74	75	76	76	76	75	74	74	74	72	74	71	72	72	73	73	71	73	75	75	74.7	80
16-Feb	76	78	79	79	80	80	81	82	81	81	79	80	81	82	84	85	87	87	86	86	87	87	87	87	82.6	87
17-Feb	87	87	86	86	85	83	81	79	78	76	75	72	72	69	68	69	71	74	76	76	75	75	75	78	77.2	87
18-Feb	77	77	78	77	77	80	81	81	82	83	83	83	84	86	87	88	87	89	90	86	82	79	76	76	82.1	90
19-Feb	75	76	77	76	76	76	78	78	77	75	72	69	69	69	70	71	72	74	77	79	82	83	83	83	75.7	83
20-Feb	83	82	83	83	83	80	81	82	80	80	80	80	76	71	66	63	70	78	83	84	81	83	83	85	79.2	85
21-Feb	83	82	82	82	81	81	81	81	81	81	81	82	82	83	83	79	76	79	83	82	83	85	86	87	81.8	87
22-Feb	86	87	86	85	85	83	83	85	84	83	85	84	84	81	79	76	76	79	84	84	88	89	90	88	83.9	90
23-Feb	87	86	86	84	85	86	86	83	84	86	87	88	88	82	75	72	77	79	81	85	84	83	86	85	83.4	88
24-Feb	84	85	86	87	88	90	92	91	88	83	79	82	79	82	77	76	72	73	70	72	73	70	77	86	81.0	92
25-Feb	86	84	80	80	82	81	84	85	77	64	60	58	56	54	53	53	57	59	67	70	75	75	77	77	70.6	86
26-Feb	81	83	81	76	77	77	80	83	80	78	74	69	65	67	72	71	68	67	70	66	65	66	71	69	73.3	83
27-Feb	69	71	70	69	70	69	70	71	69	66	69	71	72	72	72	72	72	72	71	71	72	76	77	79	71.4	79
28-Feb	72	70	69	70	69	71	73	74	70	62	59	65	64	65	64	58	59	64	69	71	71	70	68	67	67.3	74
29-Feb	69	68	69	69	66	65	67	68	67	66	65	63	63	63	64	64	64	64	64	69	62	62	61	63	65.1	69
80.6 80.5 80.3 79.9 79.9 79.7 80.4 80.4 79.2 77.7 76.9 76.9 76.7 76.4 76.3 75.7 76.5 77.8 78.6 78.6 78.6 78.9 79.5 80.0																			Diurnal Average							
93 91 91 90 90 90 92 91 88 86 87 88 88 86 88 90 92 93 93 92 92 93 91 91																			Diurnal Maximum							



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipewyan - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	10	1.44	1.44
60 - 80	328	47.13	48.56
80 - 100	358	51.44	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

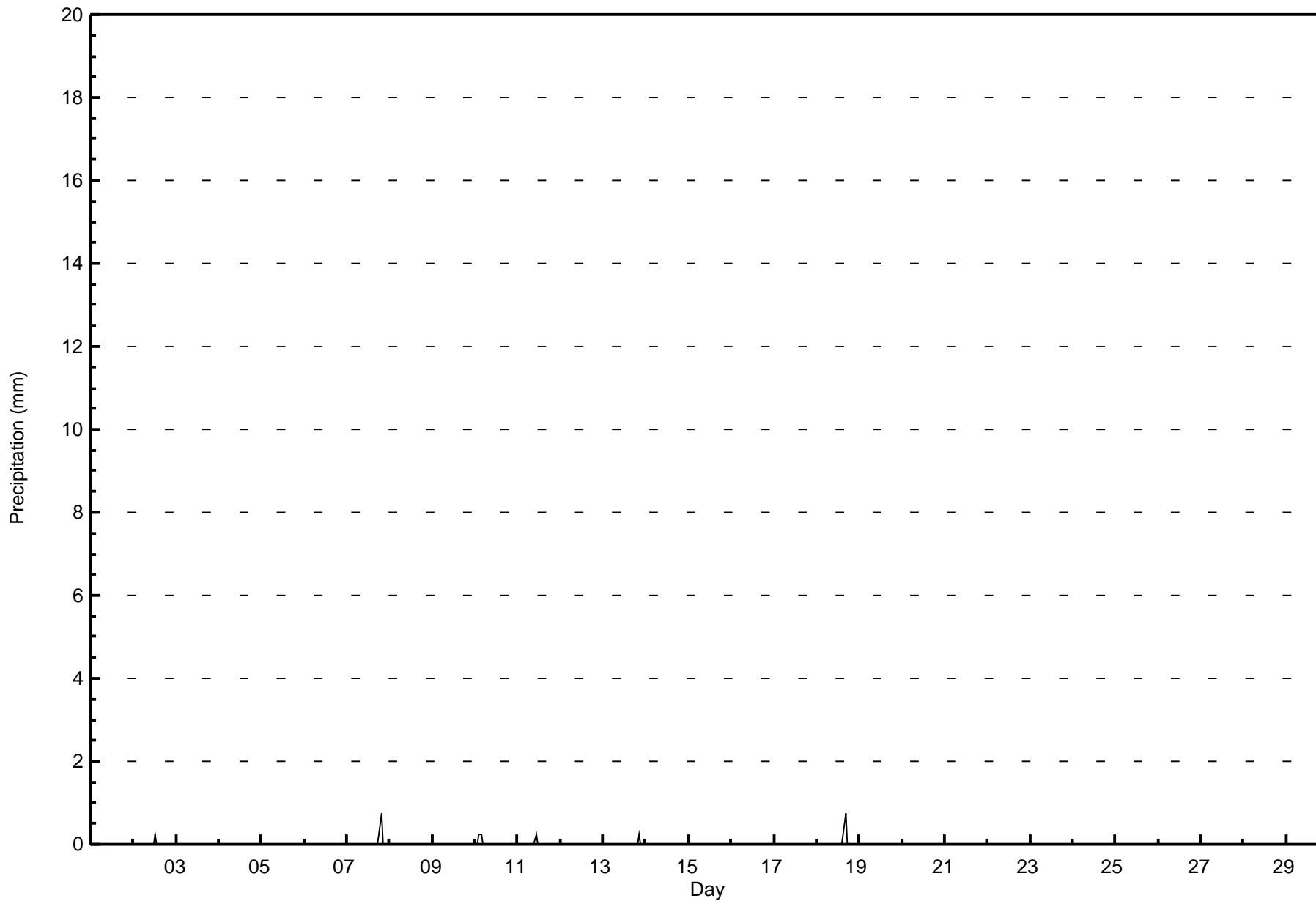


Maximum Value: 0.8 mm on Feb 7 20:00																			Maximum Daily Total: 1.0 mm on Feb 7							Hours in Service: 696											
Minimum Value: 0.0 mm on Feb 1 01:00																			Minimum Daily Total: 0.0 mm on Feb 1							Hours of Data: 696											
Maximum Diurnal Total: 0.8 mm at hour 17																			Minimum Diurnal Total: 0.0 mm at hour 1							Hours of Missing Data: 0											
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											
																										Percent Operational Time: 100.0											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	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	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
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	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	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	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	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	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8
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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Feb	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	
11-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
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	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	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	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	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	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	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	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8	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	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	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	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	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	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	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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
29-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
																			0.0 0.0 0.3 0.3 0.0 0.0 0.0 0.0 0.0 0.0 0.3 0.0 0.3 0.0 0.0 0.3 0.8 0.0 0.3 0.8 0.3 0.0 0.0 0.0							Diurnal Average											
																			0.0 0.0 0.3 0.3 0.0 0.0 0.0 0.0 0.0 0.0 0.3 0.0 0.3 0.0 0.0 0.3 0.8 0.0 0.3 0.8 0.3 0.0 0.0 0.0							Diurnal Maximum											



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - February 2016

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	694	99.71	99.71
0.4 - 0.5	0	0.00	99.71
0.6 - 0.7	0	0.00	99.71
0.8 - 1.4	2	0.29	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

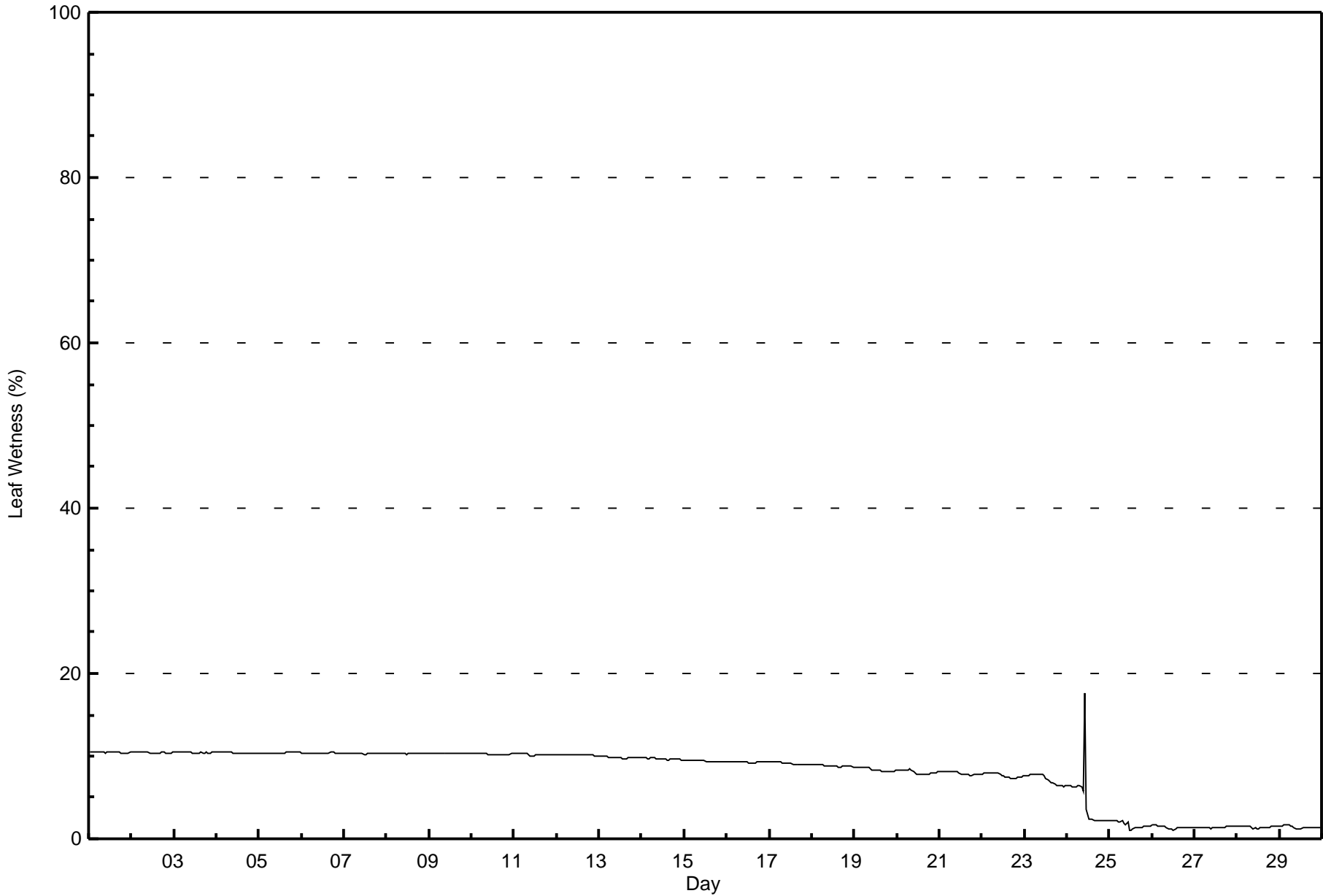


Maximum Value: 18 % on Feb 24 11:00														Maximum Daily Average: 10.4 % on Feb 1														Hours in Service: 696	
Minimum Value: 1 % on Feb 25 13:00														Minimum Daily Average: 1.4 % on Feb 27														Hours of Data: 696	
Maximum Diurnal Average: 8.4 % at hour 11														Minimum Diurnal Average: 7.8 % at hour 13														Hours of Missing Data: 0	
Monthly Average: 8.0 %														Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 8 Median = 9 Q ₃ = 10 P ₉₀ = 10 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	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10.4	10		
2-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	10	10.4	10		
3-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	10	10.4	10		
4-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	10	10.4	10		
5-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	10	10.4	10		
6-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	10	10.4	10		
7-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	10	10.4	10		
8-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	10	10.3	10		
9-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	10	10.3	10		
10-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	10	10.3	10		
11-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	10	10.2	10		
12-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	10	10.2	10		
13-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	10	9.8	10		
14-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	10	9.7	10		
15-Feb	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9.4	10		
16-Feb	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9.3	9		
17-Feb	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9.1	9		
18-Feb	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8.8	9		
19-Feb	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8.4	9		
20-Feb	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8.1	8		
21-Feb	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7.9	8		
22-Feb	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7.7	8		
23-Feb	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	6	6	6	6	6	7.2	8		
24-Feb	6	6	6	6	6	6	6	6	6	6	6	6	6	6	18	4	2	2	2	2	2	2	2	2	2	4.6	18		
25-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.7	2		
26-Feb	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2		
27-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	1.4	1		
28-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.4	2		
29-Feb	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2		
8.2														8.2														Diurnal Average	
10														10														Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Fort Chipewyan - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Fort Chipewyan - February 2016

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	73	10.49	10.49
1.5 - 10	318	45.69	56.18
> 10	290	41.67	97.84

Total Number of Valid Hours: 696

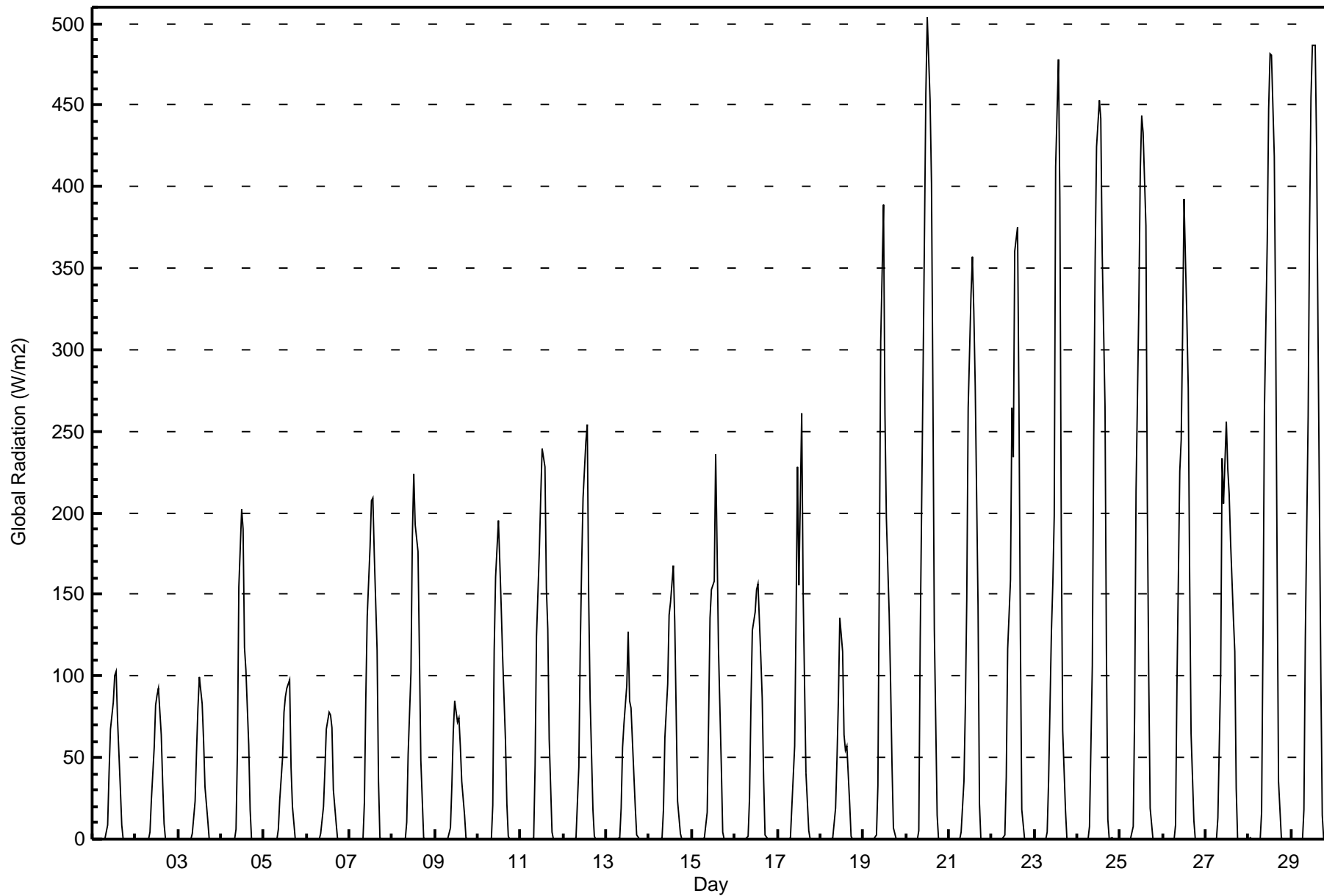
Total Number of Hours: 696



Wood Buffalo Environmental Association
Summary of Hour Averages

Global Radiation (GR) - W/m2
Fort Chipewyan - February 2016

Maximum Value: 504 W/m2 on Feb 20 13:00		Maximum Daily Average: 129.8 W/m2 on Feb 28		Hours in Service: 696																						
Minimum Value: 0 W/m2 on Feb 1 02:00		Minimum Daily Average: 16.6 W/m2 on Feb 6		Hours of Data: 696																						
Maximum Diurnal Average: 237.3 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 4		Hours of Missing Data: 0																						
Monthly Average: 58.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 77 P ₉₀ = 209 P ₉₉ = 448		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	9	41	67	84	100	103	73	31	9	0	0	0	0	0	0	0	21.6	103
2-Feb	0	0	0	0	0	0	0	0	4	25	56	82	89	92	64	34	9	0	0	0	0	0	0	0	19.0	92
3-Feb	0	0	0	0	0	0	0	0	4	24	53	80	99	83	61	32	11	0	0	0	0	0	0	0	18.6	99
4-Feb	0	0	0	0	0	0	0	0	6	54	154	202	190	118	104	58	18	0	0	0	0	0	0	0	37.7	202
5-Feb	0	0	0	0	0	0	0	0	6	24	51	78	87	92	98	44	20	0	0	0	0	0	0	0	20.8	98
6-Feb	0	0	0	0	0	0	0	0	4	20	43	68	78	76	68	30	10	0	0	0	0	0	0	0	16.6	78
7-Feb	0	0	0	0	0	0	0	0	23	86	137	179	207	209	175	116	36	1	0	0	0	0	0	0	48.6	209
8-Feb	0	0	0	0	0	0	0	0	10	52	102	186	224	192	176	114	48	1	0	0	0	0	0	0	46.1	224
9-Feb	0	0	0	0	0	0	0	0	7	33	66	85	72	74	57	35	15	1	0	0	0	0	0	0	18.5	85
10-Feb	0	0	0	0	0	0	0	0	20	115	161	196	169	142	112	60	21	1	0	0	0	0	0	0	41.6	196
11-Feb	0	0	0	0	0	0	0	1	45	124	176	210	239	229	154	129	61	4	0	0	0	0	0	0	57.2	239
12-Feb	0	0	0	0	0	0	0	1	44	116	167	209	244	255	148	86	18	1	0	0	0	0	0	0	53.7	255
13-Feb	0	0	0	0	0	0	0	1	19	56	70	94	127	85	80	40	20	2	0	0	0	0	0	0	24.8	127
14-Feb	0	0	0	0	0	0	0	1	18	62	95	137	145	168	133	78	24	4	0	0	0	0	0	0	36.0	168
15-Feb	0	0	0	0	0	0	0	1	16	72	135	153	158	236	179	117	45	4	0	0	0	0	0	0	46.5	236
16-Feb	0	0	0	0	0	0	0	1	25	82	128	139	153	157	111	86	37	3	0	0	0	0	0	0	38.4	157
17-Feb	0	0	0	0	0	0	0	1	20	57	136	228	155	261	152	96	41	5	0	0	0	0	0	0	48.0	261
18-Feb	0	0	0	0	0	0	0	1	19	49	85	136	115	64	55	57	22	2	0	0	0	0	0	0	25.1	136
19-Feb	0	0	0	0	0	0	0	2	33	162	305	389	261	197	138	96	45	7	0	0	0	0	0	0	68.1	389
20-Feb	0	0	0	0	0	0	0	5	123	284	369	457	504	453	402	274	129	15	0	0	0	0	0	0	125.6	504
21-Feb	0	0	0	0	0	0	0	4	35	82	147	264	333	357	323	277	142	22	0	0	0	0	0	0	82.8	357
22-Feb	0	0	0	0	0	0	0	3	38	117	159	265	234	360	375	266	125	18	0	0	0	0	0	0	81.7	375
23-Feb	0	0	0	0	0	0	0	4	35	127	157	198	413	478	392	190	67	17	0	0	0	0	0	0	86.6	478
24-Feb	0	0	0	0	0	0	0	8	106	245	354	424	453	441	360	265	115	12	0	0	0	0	0	0	116.0	453
25-Feb	0	0	0	0	0	0	0	7	78	213	328	409	443	433	376	205	100	19	0	0	0	0	0	0	108.8	443
26-Feb	0	0	0	0	0	0	0	9	95	225	245	311	393	320	277	161	65	11	0	0	0	0	0	0	87.9	393
27-Feb	0	0	0	0	0	0	0	13	102	234	205	256	227	212	183	136	115	31	0	0	0	0	0	0	71.4	256
28-Feb	0	0	0	0	0	0	0	17	125	263	367	448	482	480	419	309	168	36	1	0	0	0	0	0	129.8	482
29-Feb	0	0	0	0	0	0	0	18	123	259	374	455	487	486	423	310	100	15	0	0	0	0	0	0	127.2	487
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	41.1	113.9	168.8	221.4	237.3	236.3	195.4	128.7	56.3	8.0	0.1	0.0	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	0	18	125	284	374	457	504	486	423	310	168	36	1	0	0	0	0	0	Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2
Fort Chipewyan - February 2016**

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	456	65.52	65.52
21 - 100	94	13.51	79.02
101 - 300	106	15.23	94.25
301 - 600	40	5.75	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Fort Chipewyan - February 2016

Maximum Speed: 40 km/h on Feb 18 12:00	Maximum Daily Speed Average: 26.5 km/h on Feb 5	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 22 21:00	Minimum Daily Speed Average: 0.6 km/h on Feb 24	Hours of Data: 655
Maximum Diurnal Speed Average: 8.4 km/h at hour 12	Minimum Diurnal Speed Average: 4.6 km/h at hour 22	Hours of Missing Data: 41
Monthly Average Velocity: 6.5 km/h 66.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 17 P ₉₀ = 24 P ₉₉ = 34	Percent Operational Time: 94.1

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	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	M	M	M	NW8	NW7	NW6	NW6	NNW10	NNW11	NW6	----	NNW11
3-Feb	NW5	WNW8	WNW7	WNW7	NW6	WNW3	WNW5	NW3	W1	S1	WSW2	WNW5	WNW5	WNW7	NW9	NW8	NW5	WNW6	WNW6	NW6	WNW6	NW8	NNW6	NNW6	WNW5.0	NW9
4-Feb	NNW4	N5	NNE2	ENE1	E3	E4	E5	ENE7	E8	E8	E11	E13	E16	E16	E18	E18	ENE16	ENE15	ENE16	ENE18	E19	E18	E18	E17	E11.1	E19
5-Feb	E17	E19	E20	E20	E20	E23	E27	E29	E30	E29	E30	E34	E34	E32	E32	E32	E27	E27	E27	E29	E29	ENE23	E24	ENE24	E26.5	E34
6-Feb	ENE21	ENE26	ENE25	ENE26	ENE25	ENE24	ENE23	NE17	NNE11	N15	N18	N16	N13	NNW12	NW13	NW17	NW18	NW19	NW19	NW19	NW19	NW19	NW13	NW13	NNE11.3	ENE26
7-Feb	WNW8	WNW10	WNW12	WNW15	WNW14	WNW16	NW13	WNW14	WNW15	NW16	NW15	NW16	NW13	NW13	NW11	NW9	NW8	W4	SW4	WSW3	E2	E6	E9	E10	NW8.2	NW16
8-Feb	E11	E16	E16	E17	E22	E26	E25	E22	E22	E20	E18	ENE16	E17	E21	E18	E14	ENE13	ENE9	ENE12	ENE12	ENE10	ENE11	ENE13	ENE12	E16.2	E26
9-Feb	ENE14	ENE15	ENE15	ENE17	ENE13	ENE13	ENE12	ENE13	ENE15	ENE15	ENE15	ENE18	ENE14	ENE20	ENE20	NE16	NNE11	NNE10	NNE10	NNE14	NE18	NNE11	NNE6	NE7	ENE13.3	ENE20
10-Feb	NE6	NE6	ENE6	NNE4	NE7	E22	E18	ENE21	ENE21	E15	E14	E15	ESE9	ESE9	E12	E14	E10	E7	ENE10	ENE10	ENE7	ENE7	ENE9	E8	E10.6	E22
11-Feb	E10	ENE10	ENE8	ENE11	ENE11	E11	E6	E5	E3	W2	SSE2	E8	ESE15	E17	E15	E11	E9	ENE8	ENE12	E25	E30	E25	E22	E23	E12.0	E30
12-Feb	E20	E22	E24	E23	E26	E24	E22	E25	E30	E29	E26	E30	E31	E29	E26	E26	E24	ESE21	SSE22	S23	S28	S24	SSE22	SSE20	ESE20.9	E31
13-Feb	S20	S21	S22	S21	S24	S26	S21	S15	SSE13	SSE11	S15	S13	S12	S12	S9	SSW7	SW5	W5	WNW6	WNW6	W8	WNW9	WNW10	WNW11	SSW10.6	S26
14-Feb	W11	WNW14	WNW16	NW14	NW14	NNW12	NW11	NW10	NW9	WNW11	NW11	NW12	NW12	NW11	NW10	NW9	NNW7	NNW6	NNW6	NNW5	NNW5	NNW5	NNE7	ENE13	NW9.0	WNW16
15-Feb	ENE22	ENE17	NE18	ENE20	NE18	ENE19	ENE19	ENE15	ENE19	ENE20	ENE17	ENE15	ENE16	ENE17	E16	ENE15	ENE13	ENE13	ENE11	ENE13	ENE15	E18	ENE17	ENE17	ENE16.3	ENE22
16-Feb	E18	ENE18	ENE13	ENE18	ENE19	ENE14	ENE14	ENE14	ENE14	ENE11	ENE9	E13	E14	E14	E13	E18	E13	ENE8	NNE8	NNE6	NE7	N5	N6	NNE4	ENE11.2	ENE19
17-Feb	NNW8	NNW14	NNW14	NNW12	NNW12	NNW14	NNW13	NNW15	NNW15	NNW11	NW12	NW14	NW16	NW11	NNW11	NW9	NNW6	NNW5	NNW2	NNE3	ENE5	ENE9	E14	ENE16	NNW8.7	NW16
18-Feb	E19	E23	E25	E26	E30	E31	E31	E31	E31	E34	E40	E40	E34	E29	ENE18	ENE10	NNW8	NW13	NW13	NW19	NW20	NW20	NW21	WNW18	ENE15.5	E40
19-Feb	NW20	NW17	WNW14	WNW18	WNW16	NW17	NW18	NW16	NW17	NW17	NW17	NW15	WNW14	NW15	NW13	NW10	NW10	NW7	WNW6	WNW6	WNW7	WNW9	WNW9	WNW9	NW13.1	NW20
20-Feb	WNW10	WNW9	WNW9	WNW9	WNW7	W6	W6	W5	WSW4	WSW5	WSW6	WSW7	W11	W10	WSW8	SW6	ESE3	E7	E8	E8	E10	E11	E10	E10	W1.9	E11
21-Feb	E10	E11	E13	ESE15	E15	E15	E15	E16	E15	E17	E19	E21	E23	E23	E22	E20	E19	E15	E10	ENE6	ENE8	ENE4	NNE4	WNW4	E13.6	E23
22-Feb	NW6	WNW6	N3	NW4	NW3	SW1	SW3	SW4	ESE2	ESE1	E7	E10	E14	E15	E15	E17	E13	ENE8	ENE9	ENE7	ENE0	SSW3	SE2	ESE1	E4.1	E17
23-Feb	E4	ESE4	E7	ESE8	ESE8	E7	ENE6	NNW1	W2	NW5	NW5	WNW5	W9	WSW13	W14	W12	W16	W14	W14	WNW16	WNW18	WNW14	NW9	NNW11	WNW5.4	WNW18
24-Feb	NW11	NW12	NW11	NW9	WNW7	NW2	WSW6	W6	W3	WSW3	SW4	ENE5	E6	E8	ENE6	E7	SSE6	SE5	SE6	ESE8	SE6	SSE6	ESE8	E12	E0.6	NW12
25-Feb	E12	E11	E12	E12	E9	ESE6	E8	ESE6	SW11	W16	W19	WNW19	W15	W14	W13	W13	W11	WNW9	WSW4	SW6	WSW7	WSW6	WSW6	WSW5	WSW3.9	W19
26-Feb	WSW5	WSW4	W9	WSW10	WSW12	W14	WNW13	WNW11	NW13	NNW13	NNW11	NNW13	NNW14	NNW14	NNW13	N14	N12	ENE30	ENE35	ENE32	ENE33	ENE31	ENE35	ENE35	NNE9.2	ENE35
27-Feb	ENE31	ENE31	ENE27	ENE24	ENE20	ENE16	ENE15	ENE14	ENE13	ENE11	E12	E18	E17	ESE14	ESE11	SE10	ESE10	ESE8	SE4	E2	ESE1	WSW3	W4	NW7	ENE11.5	ENE31
28-Feb	N10	NNW9	NW11	NW11	NNW13	NNW12	N14	N13	N11	NE15	E28	E26	E19	E16	E17	E18	ESE14	ESE10	E15	E13	E11	E9	E10	E11	ENE9.2	E28
29-Feb	E9	E11	E13	E15	E15	ESE17	ESE15	ESE12	ESE14	ESE14	ESE14	E13	E15	E16	E16	E15	E16	E16	E14	E19	E16	E14	E13	E14	E14.3	E19

ENE6.3	ENE6.4	ENE6.2	ENE6.6	ENE7.0	ENE7.5	ENE7.2	ENE6.9	ENE6.8	ENE6.6	ENE7.0	ENE8.4	ENE7.7	ENE7.7	ENE7.1	ENE7.2	ENE5.7	ENE5.4	ENE5.2	ENE5.4	ENE5.2	NE4.6	ENE5.9	ENE6.0	Diurnal Average	
ENE31	ENE31	ENE27	ENE26	E30	E31	E31	E31	E31	E34	E40	E40	E34	E32	E32	E32	E27	ENE30	ENE35	ENE32	ENE33	ENE31	ENE35	ENE35	Diurnal Maximum	

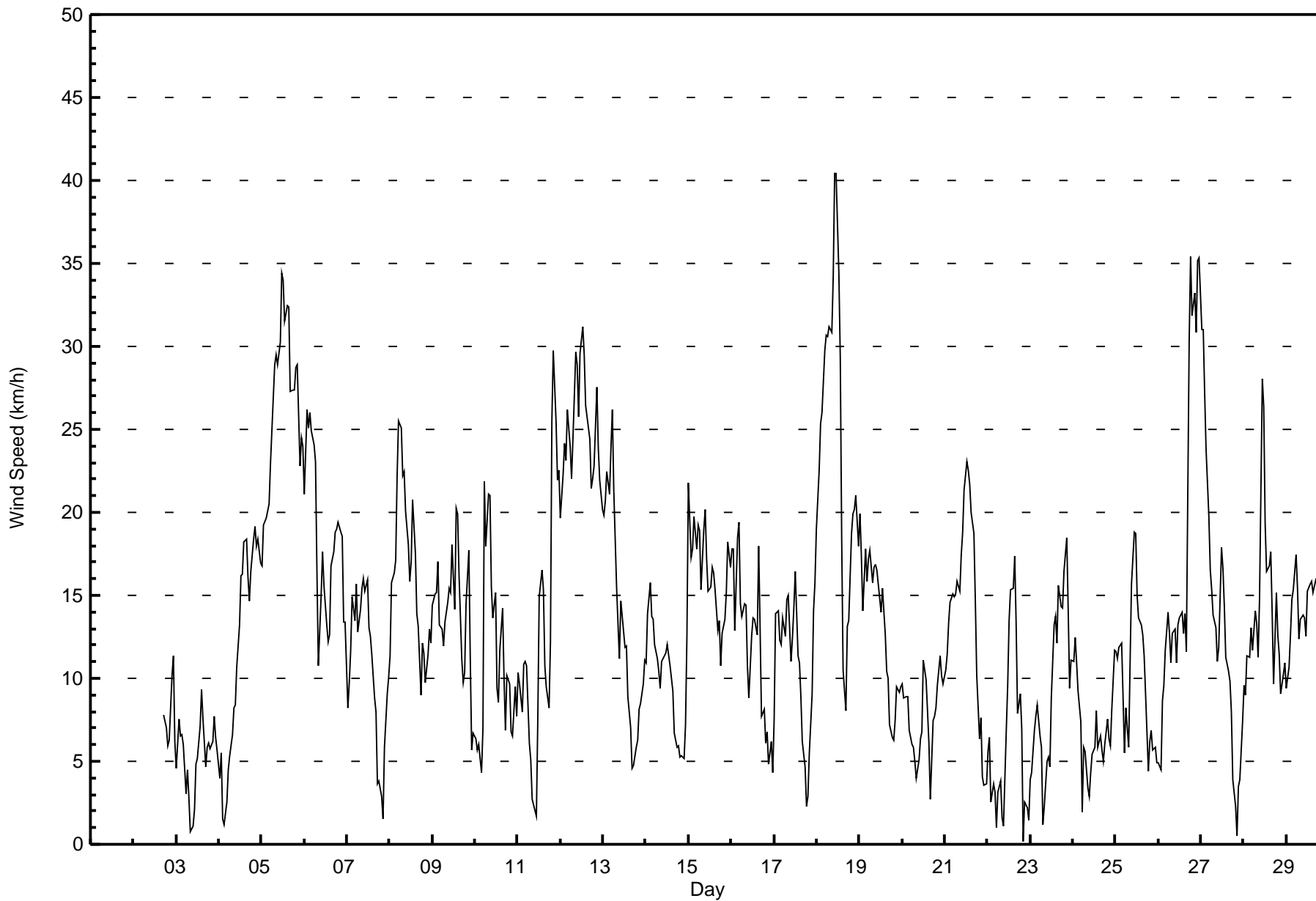
M - Maintenance AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Fort Chipewyan - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696											
Maximum Value: 11 km/h on Feb 26 18:00														Hours of Data: 655											
Minimum Value: 0 km/h on Feb 24 15:00														Hours of Missing Data: 41											
Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 6														Hours of Calibration: 0											
														Percent Operational Time: 94.1											
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	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	M	M	M	2	2	1	1	3	3	3	3
3-Feb	1	2	1	1	2	2	2	1	1	1	1	1	1	2	3	2	2	1	1	1	2	1	2	1	3
4-Feb	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1	2	2	2	2	2	3	3	2	3	3
5-Feb	2	3	2	2	2	3	3	2	3	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3	4
6-Feb	3	3	3	3	4	3	3	4	4	5	5	5	5	5	4	5	5	5	6	5	6	5	4	4	6
7-Feb	3	2	3	3	3	4	3	3	4	4	4	4	4	3	4	3	2	2	1	1	1	3	2	2	4
8-Feb	3	2	1	2	3	2	3	3	2	2	2	4	3	2	5	3	3	2	2	2	1	2	2	2	5
9-Feb	3	3	3	3	2	2	2	3	2	3	2	3	4	3	4	4	3	3	3	4	4	4	1	2	4
10-Feb	2	1	2	2	3	3	3	3	4	2	2	1	2	2	2	3	2	1	2	2	3	1	3	3	4
11-Feb	3	1	2	2	2	4	1	2	3	1	1	2	3	2	2	2	1	2	3	5	2	3	2	2	5
12-Feb	3	3	4	3	3	3	2	3	3	2	3	3	3	2	2	1	1	2	4	4	4	3	4	3	4
13-Feb	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	2	2	3	2	3
14-Feb	2	3	4	5	4	4	3	3	2	3	3	4	3	3	3	3	2	2	2	2	1	3	6	6	
15-Feb	3	3	3	4	3	3	4	4	4	4	4	3	2	2	2	2	3	3	2	2	4	5	2	3	5
16-Feb	3	3	1	3	3	2	3	3	2	2	2	2	2	2	1	2	3	2	2	2	1	2	2	3	3
17-Feb	5	3	3	4	4	5	4	4	4	4	4	4	4	4	4	3	2	1	1	2	1	2	2	2	5
18-Feb	2	2	3	3	3	2	3	3	3	4	5	4	5	3	3	3	3	3	3	4	5	5	6	4	6
19-Feb	5	4	3	4	4	5	4	4	4	4	5	4	4	4	4	3	3	2	1	1	2	1	1	1	5
20-Feb	1	1	1	1	1	1	2	1	1	2	1	2	3	2	2	1	2	3	1	1	1	1	1	2	3
21-Feb	2	1	1	1	2	1	1	2	1	2	1	2	2	2	1	2	3	4	2	1	2	4	2	2	4
22-Feb	2	1	2	2	2	1	1	1	2	1	2	1	1	1	1	2	2	2	2	2	1	1	2	2	2
23-Feb	2	1	1	1	2	1	1	1	2	2	1	4	3	3	3	3	2	2	3	3	3	2	3	4	
24-Feb	3	3	3	2	2	1	2	2	1	3	1	1	1	2	0	1	1	1	1	1	1	2	1	1	3
25-Feb	1	1	1	1	2	2	1	2	2	4	4	5	3	3	3	3	3	2	1	2	2	1	2	1	5
26-Feb	1	2	2	1	2	3	3	2	3	4	4	4	4	5	5	4	4	11	8	6	6	6	6	6	11
27-Feb	5	5	5	4	4	3	2	2	2	2	2	3	2	1	2	1	1	2	1	1	1	1	2	1	5
28-Feb	3	2	2	3	4	4	4	4	4	4	3	3	3	2	2	2	1	2	2	1	2	2	4	4	
29-Feb	2	1	2	2	2	2	2	1	2	2	1	1	1	2	1	2	1	1	1	2	2	2	1	2	2
														Diurnal Maximum											
M - Maintenance														AF - Analyzer Failure											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	78	11.91	11.91
6 - 11	207	31.60	43.51
12 - 19	254	38.78	82.29
20 - 28	80	12.21	94.50
29 - 38	34	5.19	99.69
> 38	2	0.31	100.00

Total Number of Valid Hours: 655

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - February 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	5	0	5	8	6	3	1	1	1	6	10	6	8	8	7	78
6 - 11	3	9	5	29	41	13	3	3	1	1	3	8	9	32	33	14	207
12 - 19	8	1	6	56	78	12	0	1	5	0	0	2	12	19	38	16	254
20 - 28	0	0	0	19	43	1	0	3	10	0	0	0	0	0	4	0	80
29 - 38	0	0	0	9	25	0	0	0	0	0	0	0	0	0	0	0	34
> 38	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Totals	14	15	11	118	197	32	6	8	17	2	9	20	27	59	83	37	655

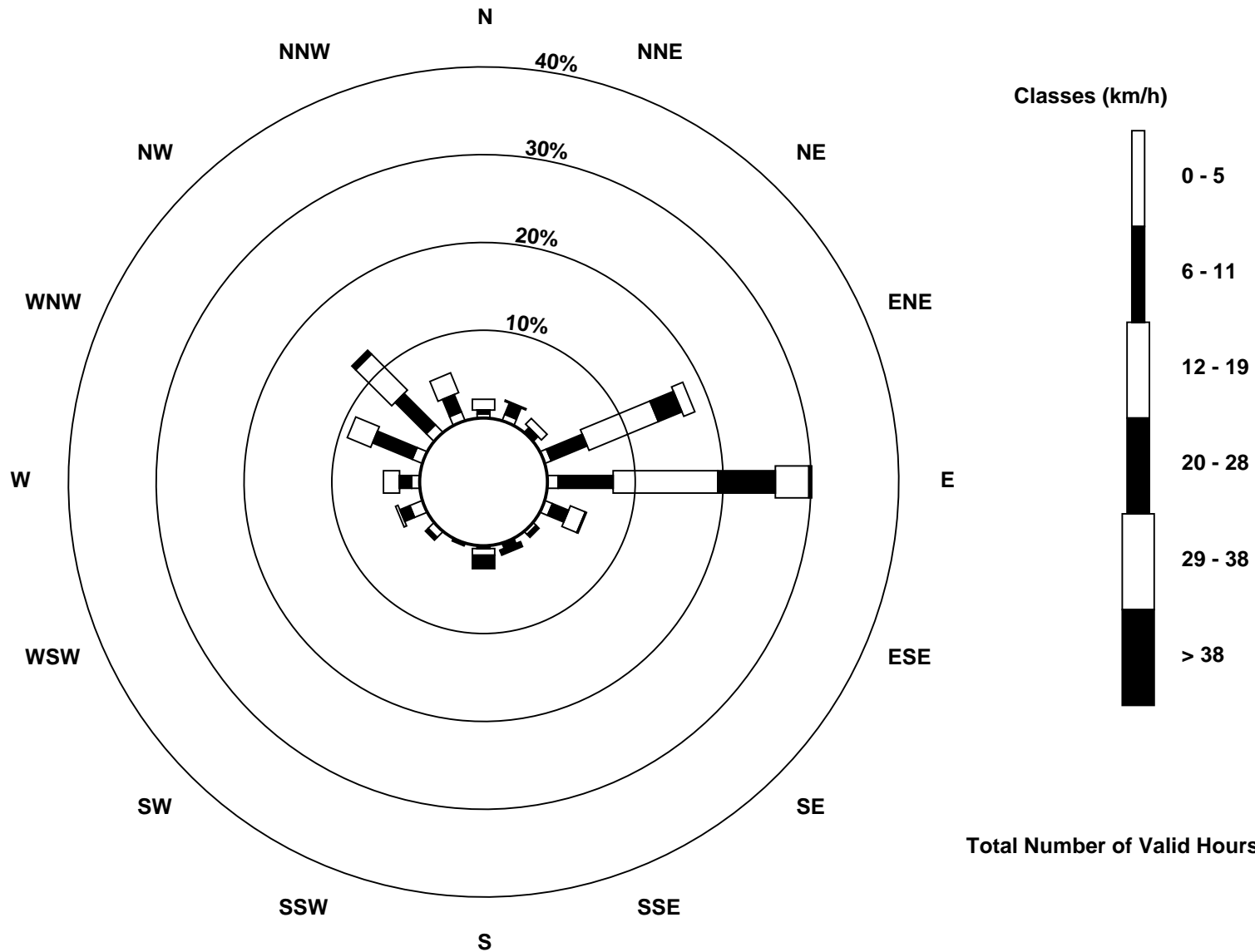
Total Number of Valid Hours: 655

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - February 2016

Direction of Maximum Speed: 83 deg on Feb 18 12:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 84.0 deg on Feb 5	Hours of Data: 655
Direction of Minimum Speed: 57 deg on Feb 22 21:00	Hours of Missing Data: 41
Direction of Minimum Daily Speed Average: 0.6 deg on Feb 24	Percent Operational Time: 94.1
Monthly Average Direction: 324.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-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	M	M	M	318	323	320	316	327	327	316	--
3-Feb	307	284	286	295	325	288	292	323	281	170	249	294	288	285	311	323	314	282	289	311	290	306	329	340	301.4
4-Feb	338	352	17	77	93	85	88	74	88	90	89	93	93	86	81	81	76	73	74	78	83	82	82	85	80.4
5-Feb	87	93	93	92	86	85	86	87	85	88	90	86	84	80	82	88	80	80	80	80	79	73	80	75	84.0
6-Feb	72	76	72	75	72	67	63	55	21	8	1	0	351	342	312	321	309	312	314	311	316	320	318	314	11.8
7-Feb	295	284	283	292	284	292	304	303	301	305	306	313	312	309	319	323	324	281	232	258	87	95	91	101	303.8
8-Feb	94	93	87	82	82	82	85	81	81	80	85	78	96	97	92	87	70	78	78	63	65	64	68	66	81.8
9-Feb	71	73	70	69	67	63	67	62	65	68	66	71	64	69	62	53	25	25	19	31	35	30	18	38	56.7
10-Feb	50	45	70	18	52	80	82	67	70	88	81	99	109	112	93	92	100	84	69	69	72	73	68	97	79.6
11-Feb	84	77	68	78	67	90	84	99	93	278	168	88	102	90	95	100	82	70	69	83	87	86	81	80	84.5
12-Feb	81	82	81	81	85	90	95	96	92	95	95	89	88	90	94	93	98	114	158	171	176	173	167	168	106.6
13-Feb	172	171	183	185	184	184	184	176	166	167	182	186	189	187	185	196	233	281	292	283	275	286	302	286	193.2
14-Feb	281	293	302	317	319	327	322	313	304	300	306	318	317	313	309	325	331	339	330	340	342	338	13	59	319.2
15-Feb	71	67	51	63	55	58	69	64	57	62	62	61	75	73	90	78	66	69	58	69	77	78	81	78	67.7
16-Feb	81	78	66	77	76	64	65	73	76	69	70	94	96	96	95	99	84	73	30	25	50	2	358	16	73.8
17-Feb	346	343	346	344	332	333	332	327	323	328	320	326	321	325	336	320	341	344	337	31	76	69	79	75	344.4
18-Feb	79	82	89	92	90	93	92	83	81	79	80	83	79	80	68	59	336	322	304	305	307	305	308	303	68.4
19-Feb	306	305	286	301	303	311	311	304	308	312	319	312	300	309	313	308	315	325	295	290	293	293	286	301	305.4
20-Feb	293	290	286	288	287	279	265	276	257	250	245	250	265	265	258	232	118	90	89	92	95	91	88	94	266.5
21-Feb	89	91	95	103	97	98	98	98	99	92	91	91	93	97	101	93	86	90	79	62	76	65	26	282	92.1
22-Feb	314	301	359	315	325	222	234	235	116	116	101	97	90	88	90	89	84	77	70	69	57	192	135	113	83.3
23-Feb	86	107	99	108	104	95	76	345	265	312	312	300	274	256	270	264	271	279	280	282	286	297	304	316	285.2
24-Feb	315	309	310	310	286	315	252	263	279	237	219	78	84	82	73	98	153	125	125	104	132	164	105	97	83.0
25-Feb	96	100	96	101	98	102	92	123	227	263	277	285	276	270	270	276	276	284	250	230	245	253	252	257	256.9
26-Feb	253	252	261	258	250	275	293	293	314	332	343	337	335	343	345	10	9	69	75	72	67	64	66	65	29.5
27-Feb	66	66	64	61	58	58	58	59	66	76	95	96	98	102	115	124	116	110	138	101	110	245	278	305	76.2
28-Feb	350	331	323	324	341	347	353	1	6	45	92	93	92	101	99	93	106	108	85	90	96	81	86	101	65.3
29-Feb	94	91	91	91	101	107	110	107	105	106	103	100	96	95	100	99	97	94	94	98	94	95	93	93	98.2
62.4 62.6 62.9 64.6 66.7 70.5 69.6 64.7 63.9 62.0 69.1 70.1 73.3 75.4 73.3 73.1 63.1 59.7 61.0 61.4 64.6 54.8 58.9 63.3																									
Diurnal Average																									

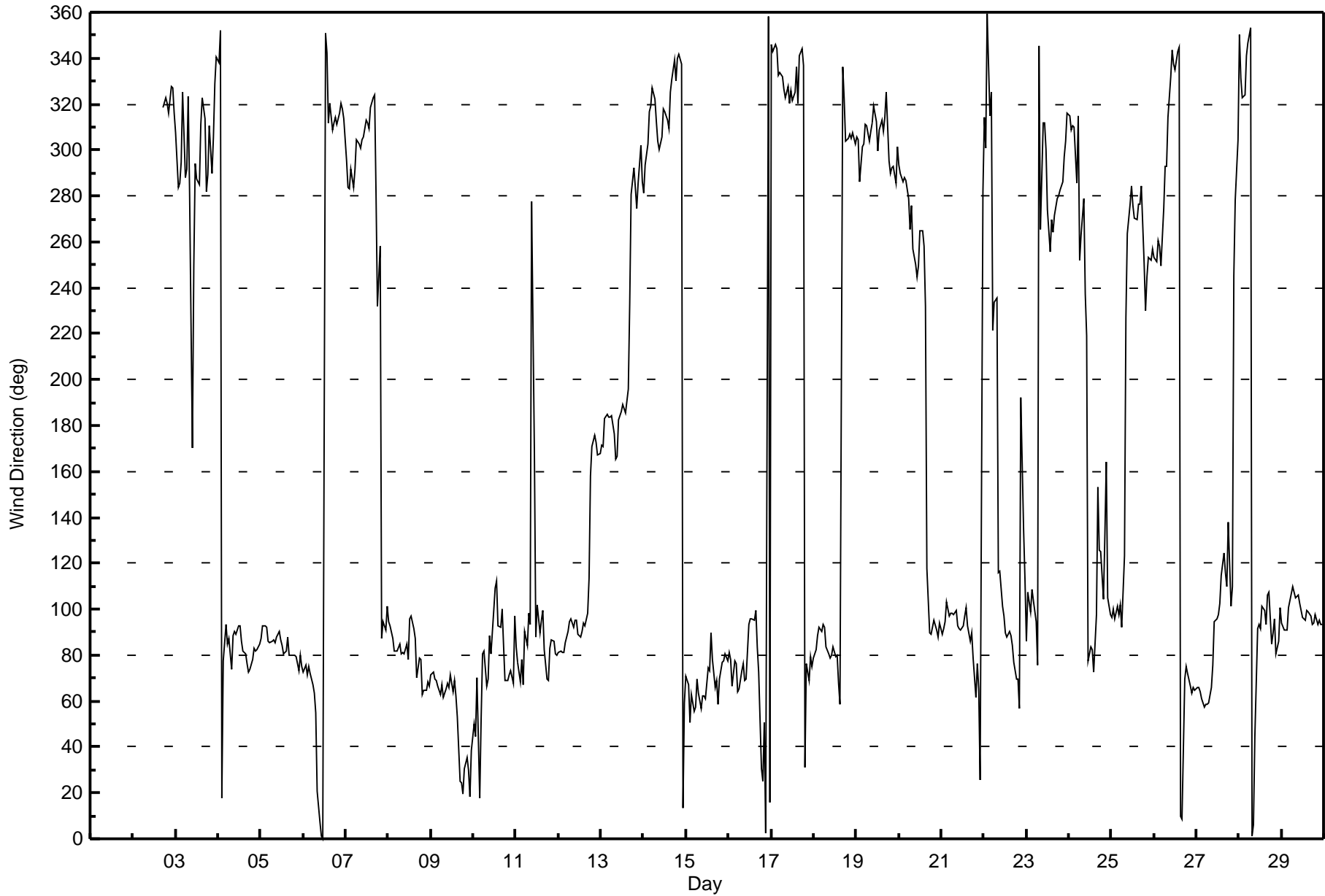
M - Maintenance AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort Chipewyan - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Feb 22 21:00 Minimum Value: 3 deg on Feb 4 12:00 Percentiles: P ₁ = 4 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 18 P ₉₀ = 24 P ₉₉ = 81																		Hours in Service: 696 Hours of Data: 655 Hours of Missing Data: 41 Hours of Calibration: 0 Percent Operational Time: 94.1							
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	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	M	M	M	14	18	16	17	15	17	28	28
3-Feb	23	11	11	9	35	62	38	41	92	76	62	17	19	18	19	20	18	10	10	20	13	15	12	19	92
4-Feb	28	20	85	62	47	32	9	17	8	6	5	3	3	6	5	5	7	7	8	7	7	7	7	7	85
5-Feb	5	4	5	6	5	7	5	5	5	5	6	7	6	6	6	4	7	5	6	6	6	8	6	7	8
6-Feb	7	7	8	8	8	8	8	14	23	27	22	21	22	24	16	18	16	16	16	15	16	17	18	17	27
7-Feb	24	14	13	13	15	15	15	17	14	15	17	19	18	19	21	21	15	42	39	41	87	29	16	9	87
8-Feb	11	6	4	6	5	6	6	6	6	6	6	10	6	3	8	10	9	14	12	11	9	9	7	9	14
9-Feb	8	9	9	8	8	9	9	9	8	9	8	8	13	8	10	12	17	17	18	17	13	16	16	27	27
10-Feb	28	25	17	36	27	7	8	8	10	11	13	4	14	11	9	5	15	16	10	7	19	14	8	14	36
11-Feb	7	7	14	9	8	14	11	26	69	57	42	13	6	6	4	11	13	11	9	7	4	5	5	5	69
12-Feb	6	5	6	7	6	6	6	6	5	5	6	6	5	5	3	3	4	10	12	10	9	9	9	10	12
13-Feb	9	8	8	8	7	6	7	11	12	14	10	8	9	8	8	9	24	21	18	15	15	15	22	13	24
14-Feb	14	14	15	17	16	18	17	16	16	15	17	18	17	20	22	22	25	22	20	31	22	19	23	14	31
15-Feb	8	9	9	8	8	10	8	11	10	10	11	13	8	10	9	7	12	11	11	8	10	8	7	7	13
16-Feb	7	9	9	8	9	10	10	9	8	9	13	6	7	6	7	4	8	20	17	19	23	22	18	59	59
17-Feb	69	16	14	18	20	20	19	18	17	22	19	19	16	22	21	23	23	15	58	40	10	11	7	7	69
18-Feb	6	5	5	5	6	4	4	6	7	6	6	6	6	6	9	12	25	14	16	16	15	14	16	14	25
19-Feb	15	15	14	14	14	15	14	14	15	13	16	17	17	16	19	17	15	17	18	16	11	10	10	11	19
20-Feb	8	9	6	8	13	11	10	17	21	17	16	16	19	19	22	36	44	7	5	7	4	5	5	7	44
21-Feb	12	5	6	5	5	5	6	6	5	6	5	4	5	5	5	5	9	9	19	23	15	49	42	32	49
22-Feb	26	14	41	43	51	69	24	17	75	81	15	7	4	4	5	5	10	19	11	10	103	31	63	75	103
23-Feb	16	18	10	25	18	12	13	81	81	21	22	34	22	18	15	13	12	11	11	11	12	13	13	14	81
24-Feb	15	14	13	17	17	68	20	18	57	73	24	24	11	12	8	16	18	23	20	13	26	24	19	4	73
25-Feb	5	8	5	5	11	48	7	31	14	16	14	14	14	15	15	15	15	10	35	6	17	11	14	12	48
26-Feb	13	14	12	11	9	14	13	16	17	21	23	21	22	21	24	23	22	23	8	9	9	10	9	8	24
27-Feb	8	9	9	9	9	10	9	10	9	15	12	5	5	5	9	10	11	8	20	46	76	11	18	12	76
28-Feb	21	17	15	17	20	20	18	19	21	19	5	4	6	6	6	6	6	18	4	6	7	6	6	13	21
29-Feb	15	6	4	6	6	6	6	8	6	7	4	4	5	6	5	5	6	7	6	4	6	5	5	5	15
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Last Calibration	January 6, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	As Found As founds before cylinder change and pump change.		
Start Time (MST)	13:30	End Time (MST)	15:10
Gas Cert Reference	LL103809	Station temp.	22 Deg C
Cal Gas Concentration	2.45 ppm	Cal Gas Exp Date	16/09/2015
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	<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	1007	1007
Calculated slope	1.006348	1.029730	Chamber temp	45.0	45.0
Calculated intercept	-0.062929	-0.123568	Pressure	721.2	711.6
Analyzer Background	1.13	1.13	Flow	0.439	0.433
Analyzer Coefficient	1.025	1.025	Intensity	91	91

Analyzer make Thermo 43i-TLE Analyzer serial # 1136451241

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	44.6	18.2	17.8	1.024
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.6	18.2	17.8	1.023
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.023

Corrected As found 17.7 Previous response 18.2 % change 2.8%

Notes:

As founds before cylinder change and pump change.

Calibration Performed By: Devin Russell



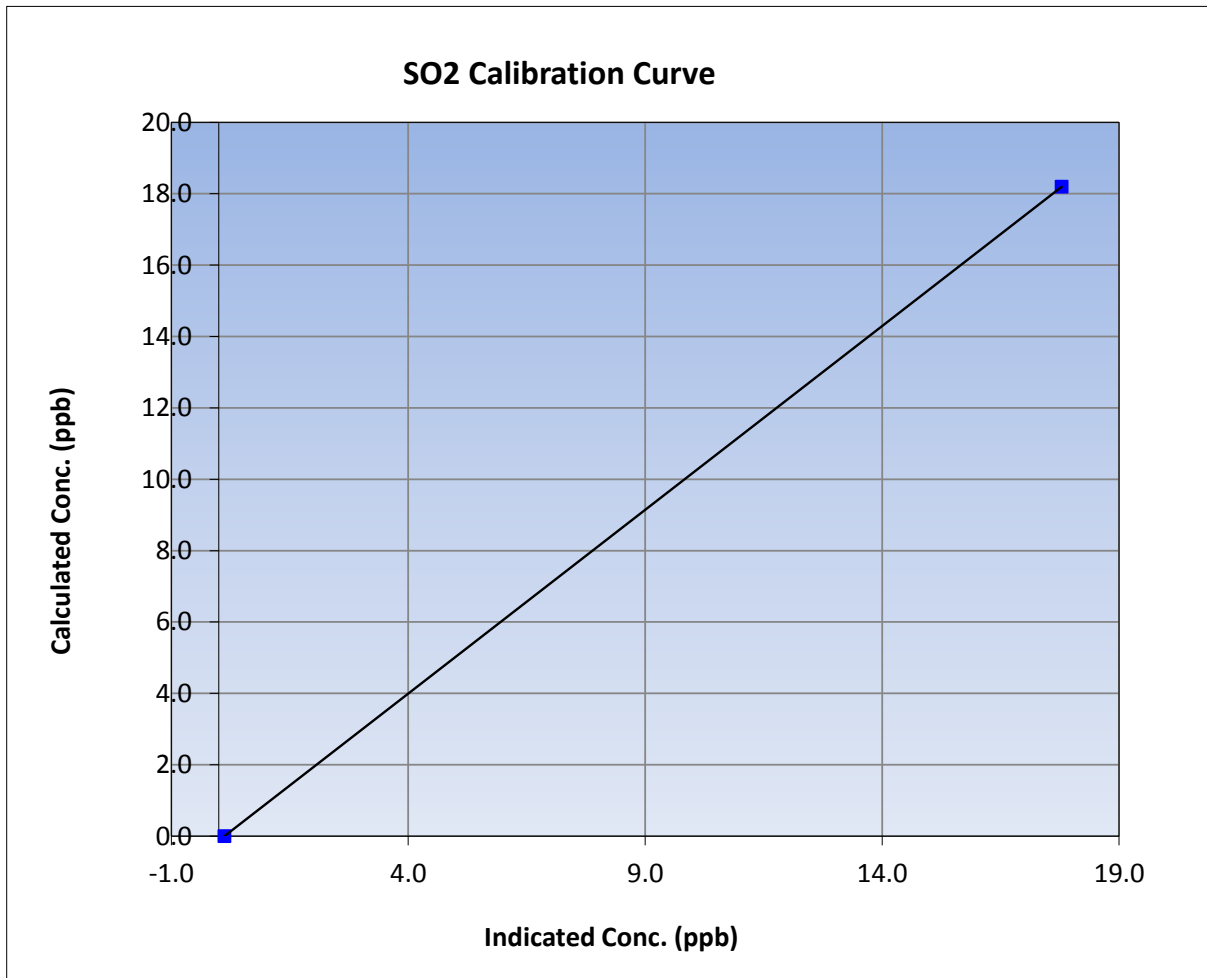
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	15:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

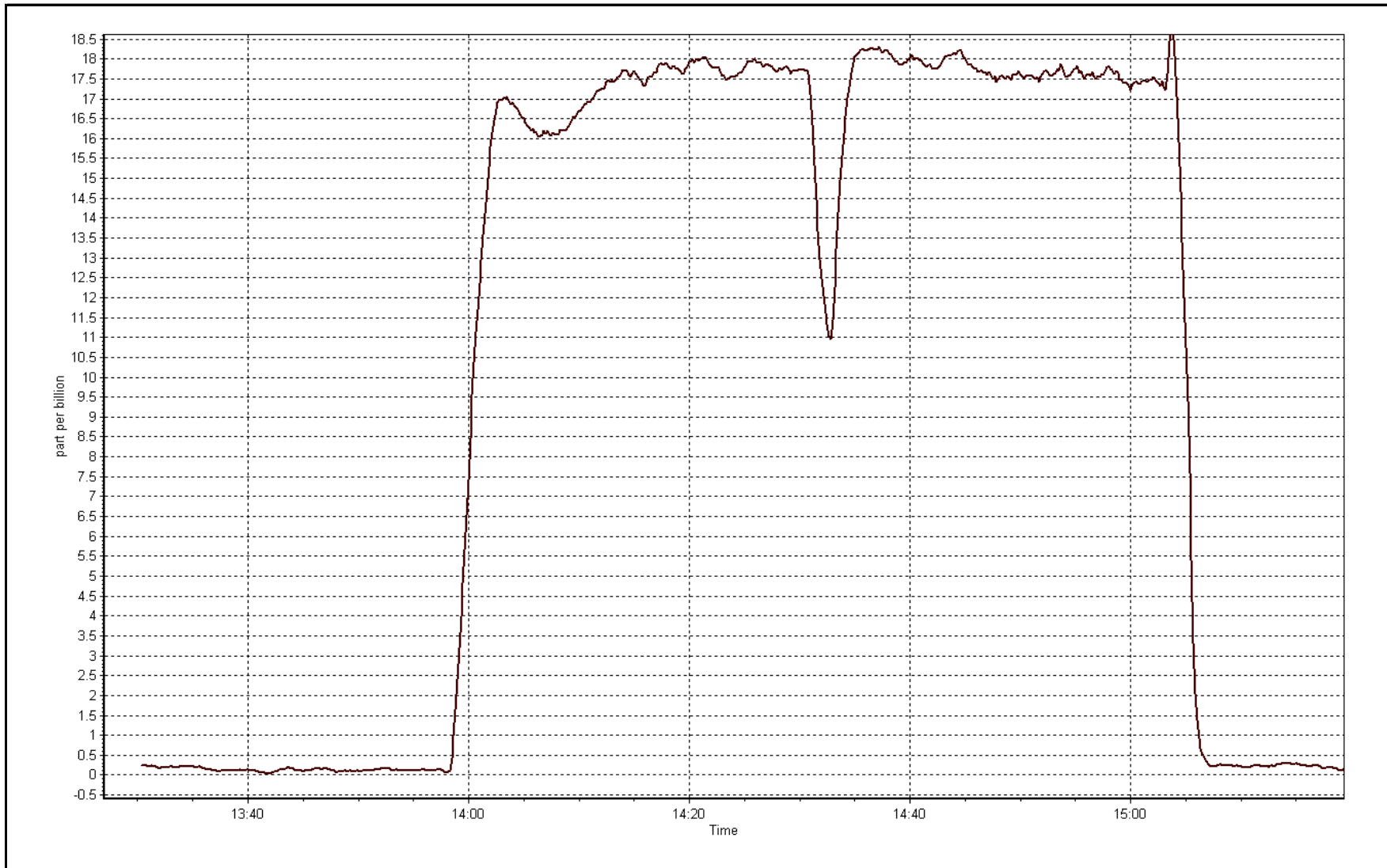
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	1.000000
18.2	17.8	1.0228		
			Slope	1.029730
			Intercept	-0.123568



SO2 Calibration Plot

Date: February 2, 2016





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Last Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	16:40	End Time (MST)	21:55
Gas Cert Reference	LL79696	Station temp.	22 Deg C
Cal Gas Concentration	2.35 ppm	Cal Gas Exp Date	2/13/16
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	<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	1007	1007
Calculated slope	1.029730	1.003678	Chamber temp	45.0	45.0
Calculated intercept	-0.123568	-0.049767	Pressure	711.6	711.6
Analyzer Background	1.13	1.13	Flow	0.433	0.433
Analyzer Coefficient	1.025	1.025	Intensity	91	91

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	15.9	1.102
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.8	17.5	17.5	1.001
second point	6000	23.9	9.4	9.4	0.994
third point	6000	12.0	4.7	4.7	1.011
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	44.8	17.5	16.8	1.042
Average Correction Factor					1.002

Corrected As found 15.8 Previous response 17.2 % change 8.4%

Notes:

New cal gas cylinder and new pump. Span was adjusted.

Calibration Performed By: Devin Russell



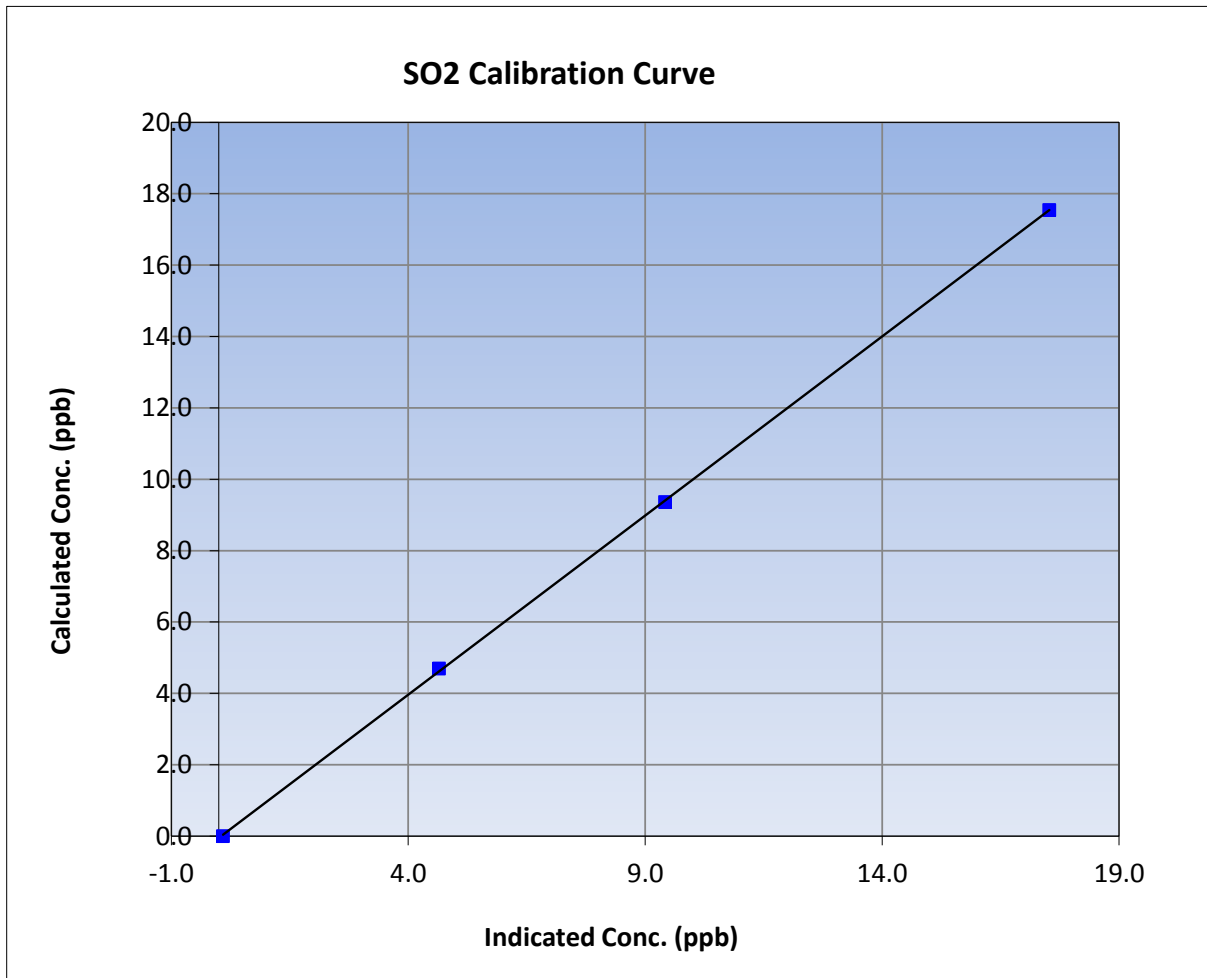
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:40	End Time (MST)	21:55
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

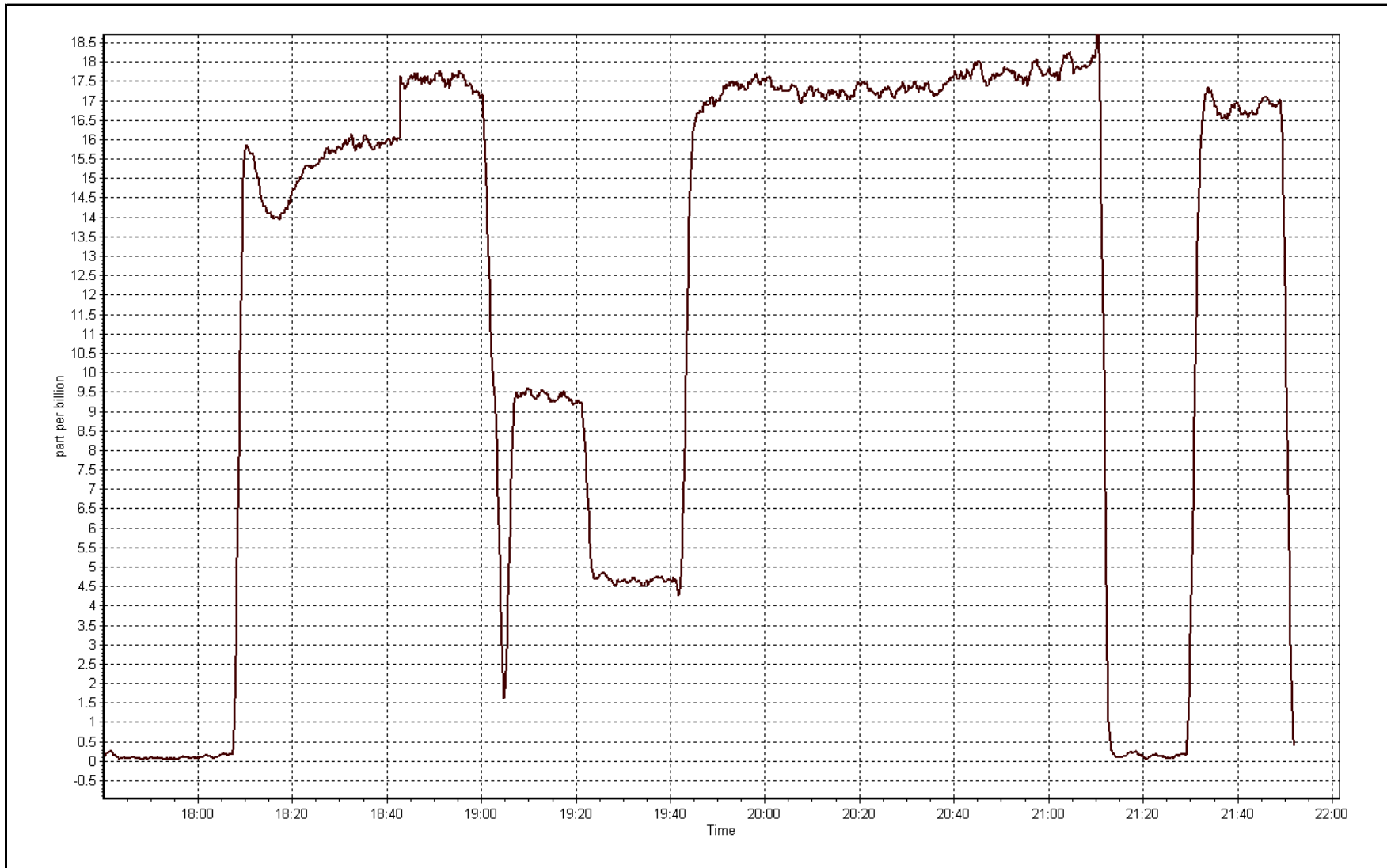
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999938
17.5	17.5	1.0010		
9.4	9.4	0.9937	Slope	1.003678
4.7	4.7	1.0108		
			Intercept	-0.049767



SO2 Calibration Plot

Date: February 2, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 7, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	As Found As founds before mix cylinder change		
Start Time (MST)	15:05	End Time (MST)	15:55
NO2 GPT Ref date	February-02-16	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	36.0	36.0
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.996238	0.963844	Pressure	27.4	27.4
Calculated intercept	0.057550	-0.404814	Flow cell A	753	753
Analyzer Background	-0.4	-0.4	Flow cell B	753	753
Analyzer Coefficient	1.016	1.016	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1107
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	0.4	----
as found span	6000	237.0 - 830.8	101.3	105.5	0.960
calibrator zero	6000	0.00	0.0	0.4	----
high point	6000	237.0 - 830.8	101.3	105.5	0.960
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.960

Corrected As found	105.1	Previous response	101.6	% change	-3.3%
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Notes:

As founds before mix cylinder change.

Calibration Performed By: Devin Russell



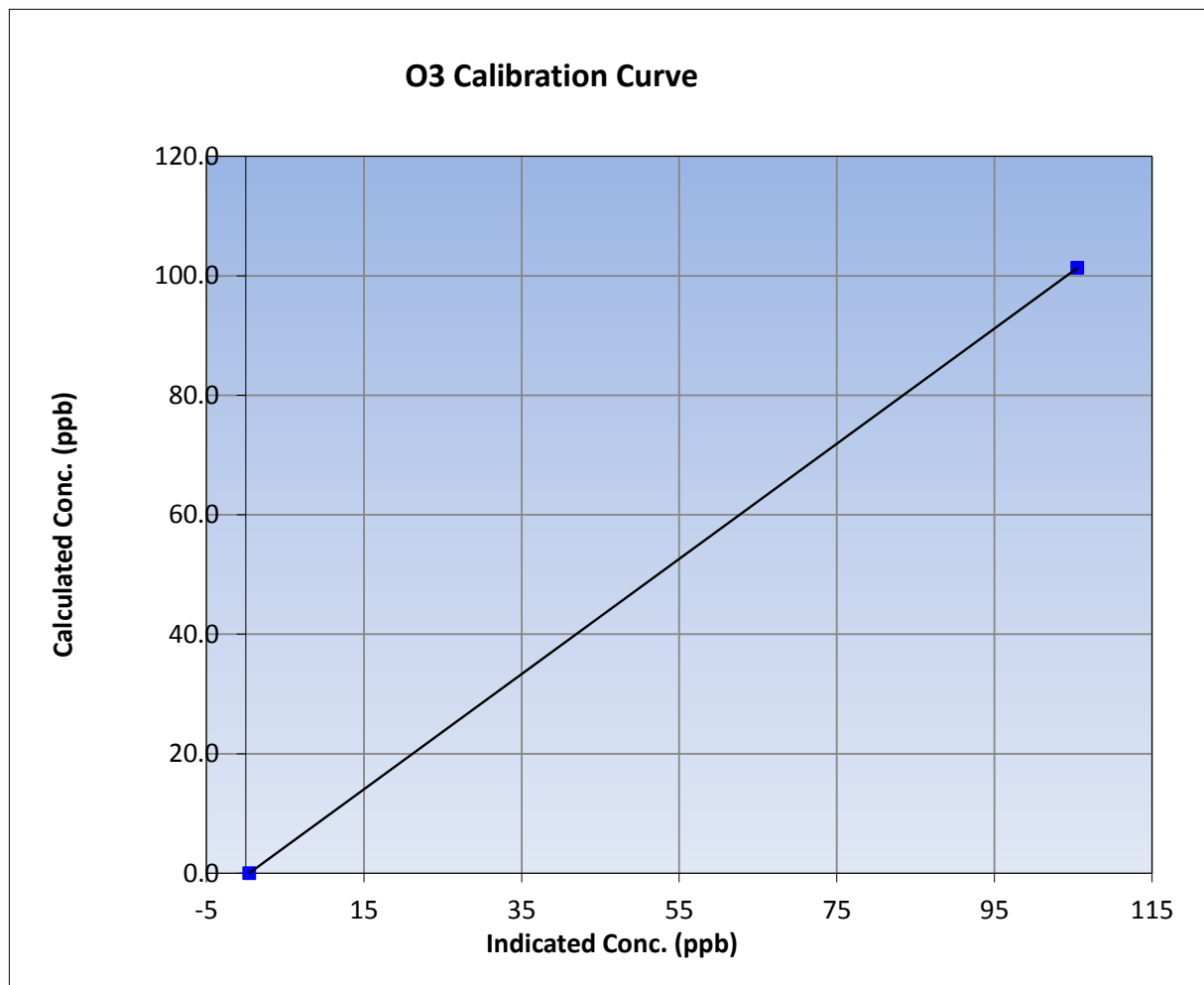
Wood Buffalo Environmental Association O3 Calibration Report

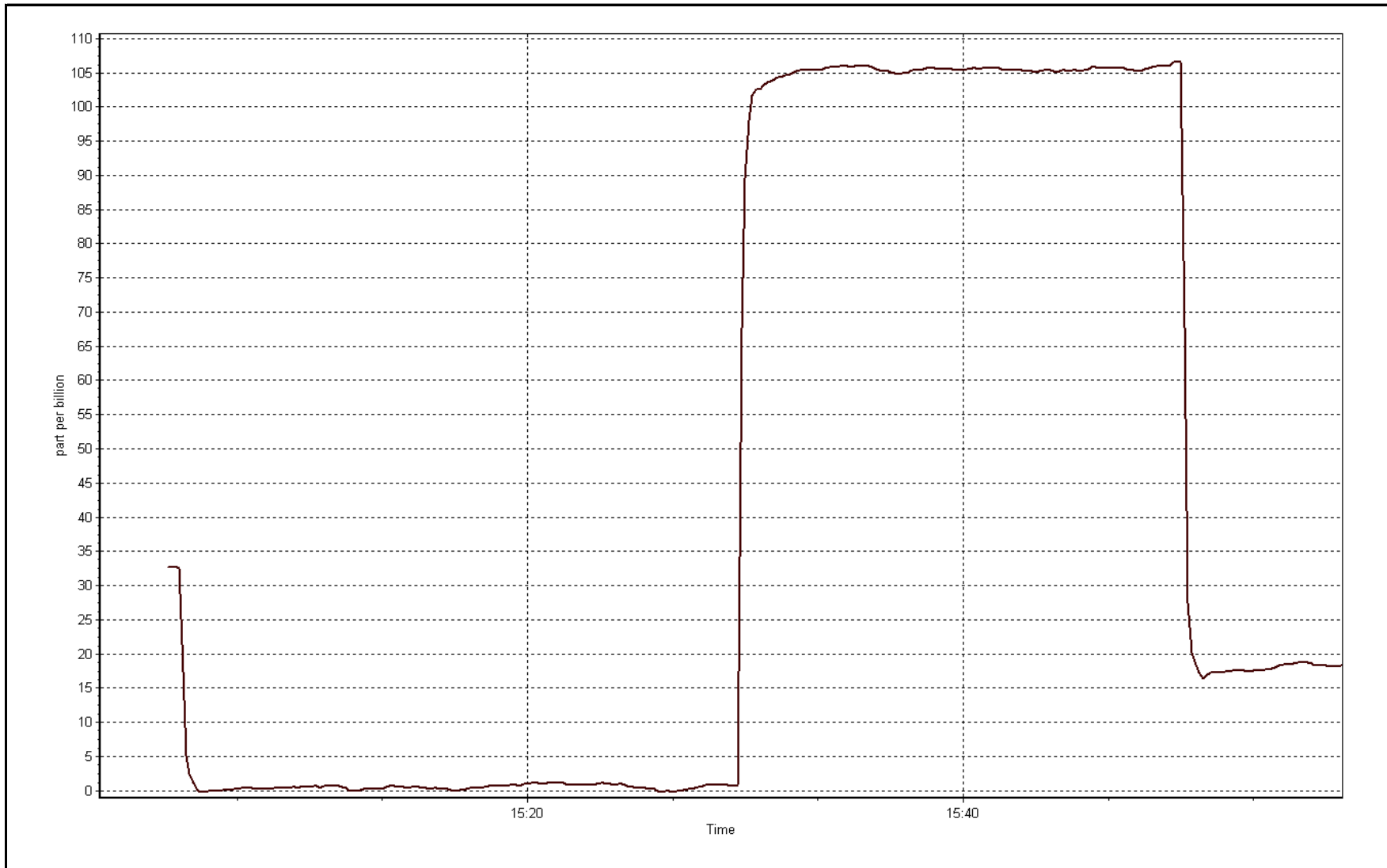
Station Information

Calibration Date	February-02-16	Previous Calibration	January 7, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	15:05	End Time (MST)	15:55
Analyzer make	Teledyne API T400	Analyzer serial #	1107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	1.000000
101.3	105.5	0.9600		
			Slope	0.963844
			Intercept	-0.404814







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 3, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	10:50
NO2 GPT Ref date	February-02-16	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	36.0	34.6
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	56.0
Calculated slope	0.963844	1.010650	Pressure	27.4	28.1
Calculated intercept	-0.404814	-0.559195	Flow cell A	753	525
Analyzer Background	-0.4	-0.3	Flow cell B	753	525
Analyzer Coefficient	1.016	1.000	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1107
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	0.7	----
as found span	6000	237.0 - 830.8	105.0	106.2	0.988
calibrator zero	6000	0.00	0.0	0.7	----
high point	6000	237.0 - 830.8	105.0	104.6	1.004
second point	6000	191.0 - 799.0	85.0	84.7	1.004
third point	6000	114.1 - 736.9	54.2	53.9	1.005
as left zero	6000	0.00	0.0	0.7	----
as left span	6000	237.0 - 830.8	105.0	104.9	1.001
Average Correction Factor					1.004

Corrected As found	105.6	Previous response	109.3	% change	3.6%
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Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



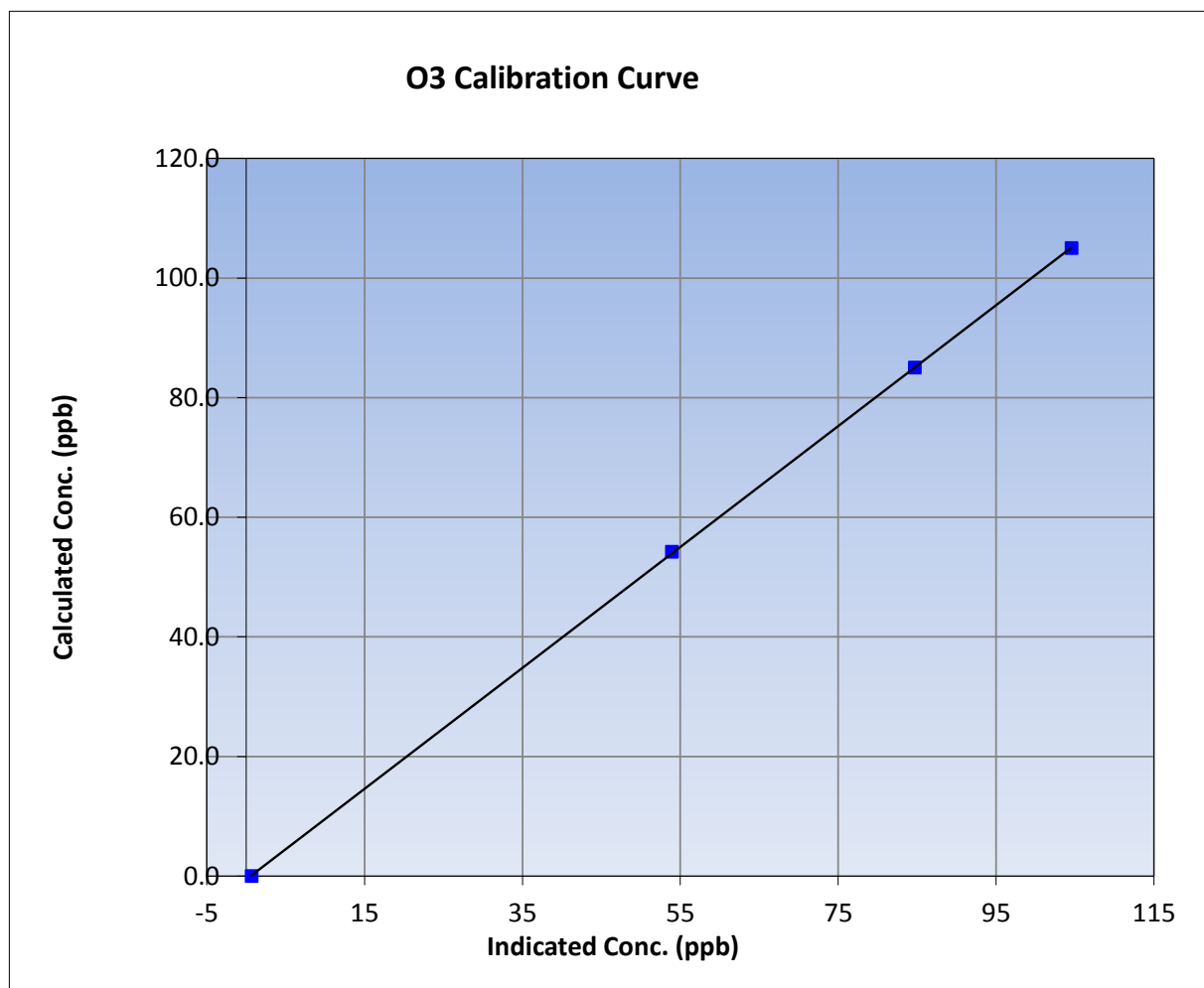
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-03-16	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:00	End Time (MST)	10:50
Analyzer make	Teledyne API T400	Analyzer serial #	1107

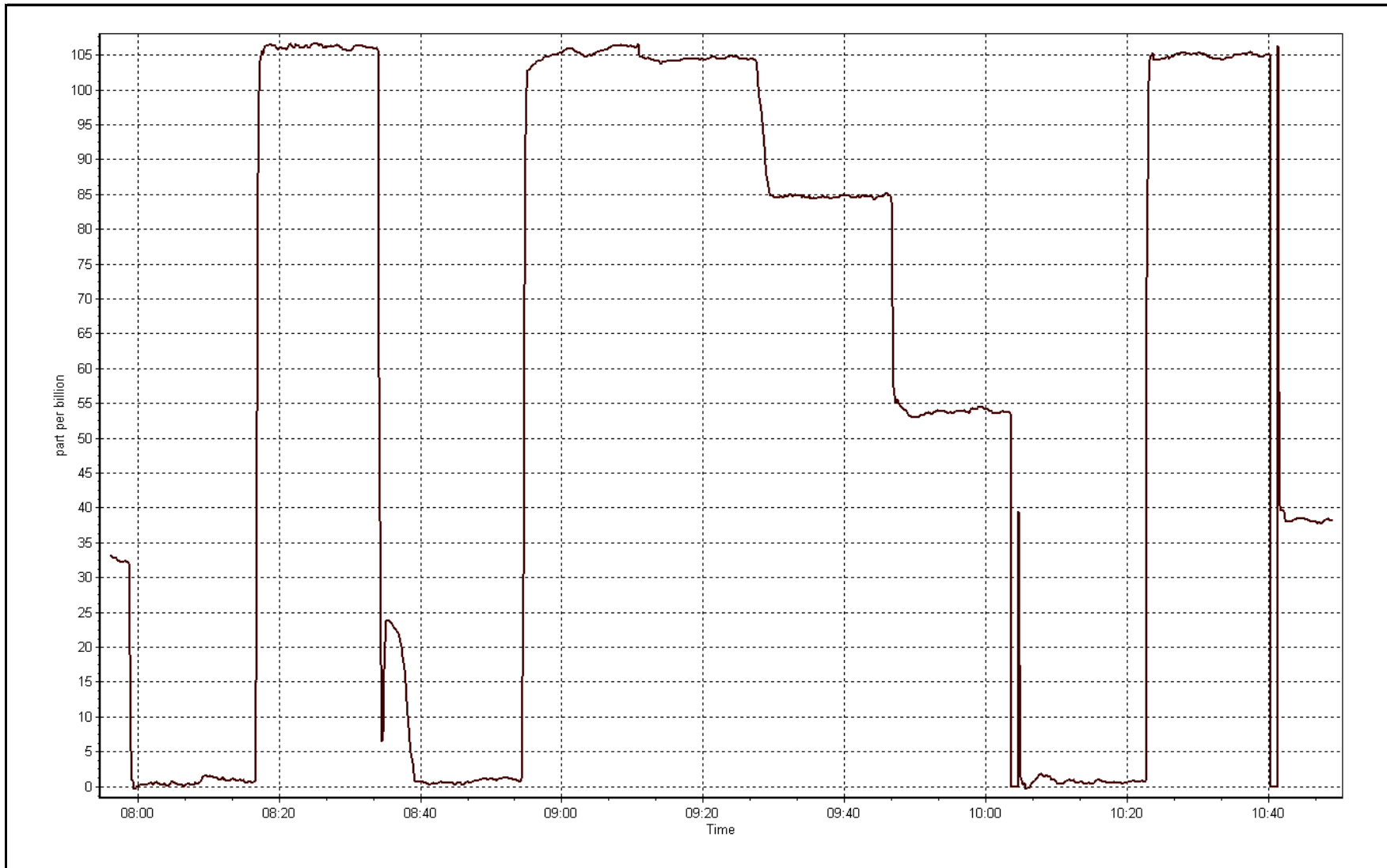
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	0.999986
105.0	104.6	1.0043		
85.0	84.7	1.0037	Slope	1.010650
54.2	53.9	1.0050		
			Intercept	-0.559195



O3 Calibration Plot

Date: February 3, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 15, 2016	Previous Calibration	February 3, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> REPAIR		
Start Time (MST)	13:05	End Time (MST)	15:21
NO2 GPT Ref date	February-02-16	Transfer Standard	NO2
Calibrator Make/Model	Teledyne API 700	Station temp.	23 Deg C
ZAG make/model	Teledyne API 701	Serial Number	735
DACS make/model	Campbell Scientific CR3000	Serial Number	4698
		Serial Number	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	36.0	34.6
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	56.0
Calculated slope	1.010650	0.993558	Pressure	27.4	28.1
Calculated intercept	-0.559195	0.102657	Flow cell A	220	762
Analyzer Background	-0.4	-0.3	Flow cell B	220	762
Analyzer Coefficient	1.016	1.000	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make Teledyne API T400 Analyzer serial # 1107

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 generator reference voltage - generator drive voltage (ppb of O3 called from from calibrator)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As found zero					
As found span					
calibrator zero	6000	0.00	0.0	0.0	----
high point	6000	237.0 - 830.8 (100ppb)	105.0	105.5	0.995
second point	6000	188. - 797.0 (80ppb)	85.0	85.8	0.991
third point	6000	113.2 - 732.9 (50ppb)	54.2	54.0	1.003
as left zero	6000	0.00	0.0	0.3	----
as left span	6000	237.0 - 827.8 (100ppb)	105.0	107.5	0.977
Average Correction Factor					0.996

Corrected As found NA Previous response NA % change NA

Notes:

Pump failure prompted repair and calibration. As founds not performed before pump replacement as instrument was down at time of arrival. Several attempts to match the O3 gen drive and ref voltages on the calibrator to the voltages indicated on the Feb 02 2016 cal sheet yielded the correct results, any instability observed on the second and third points can be traced to this activity.

Calibration Performed By: Zach Eastman



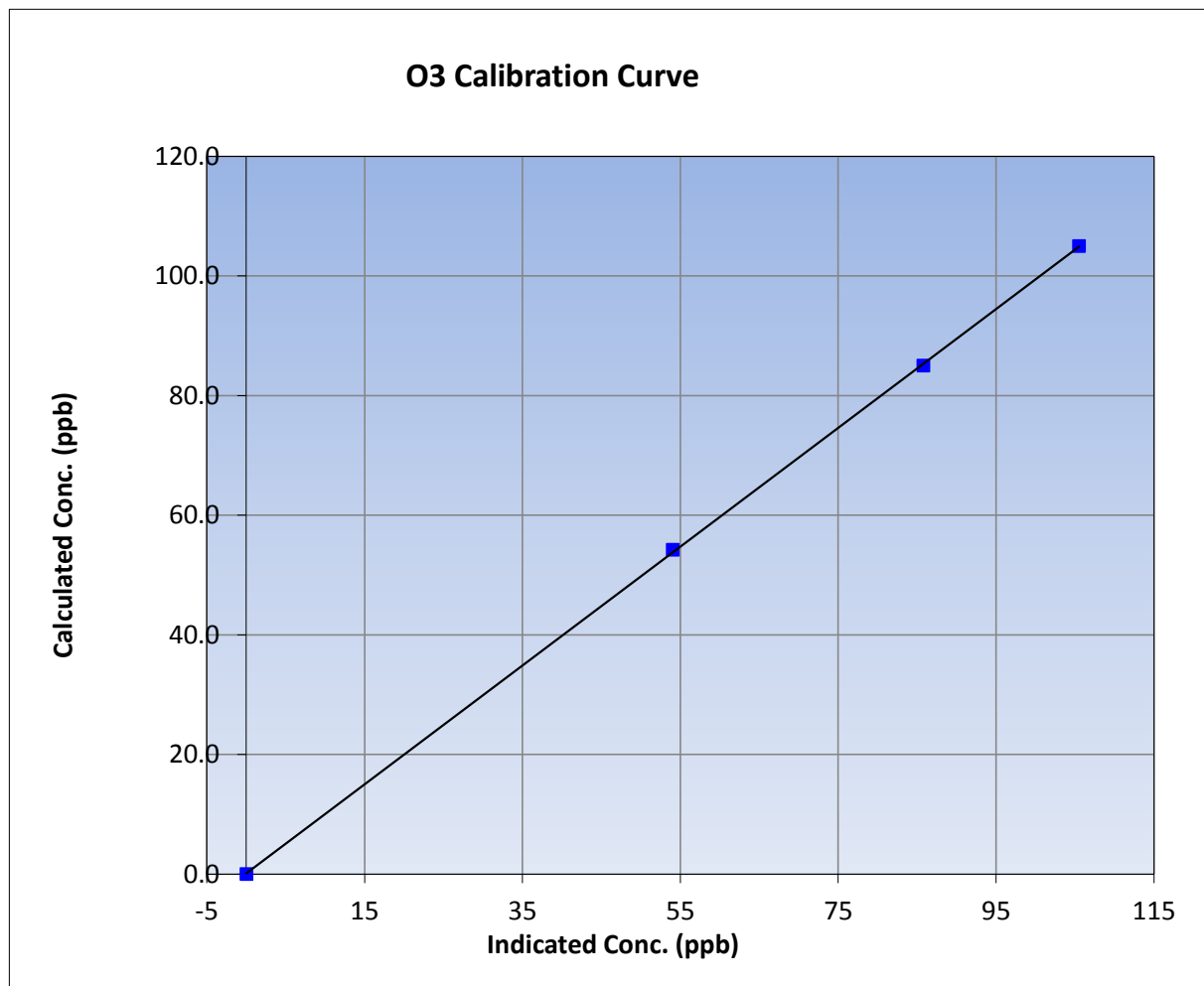
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-15-16	Previous Calibration	February 3, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:05	End Time (MST)	15:21
Analyzer make	Teledyne API T400	Analyzer serial #	1107

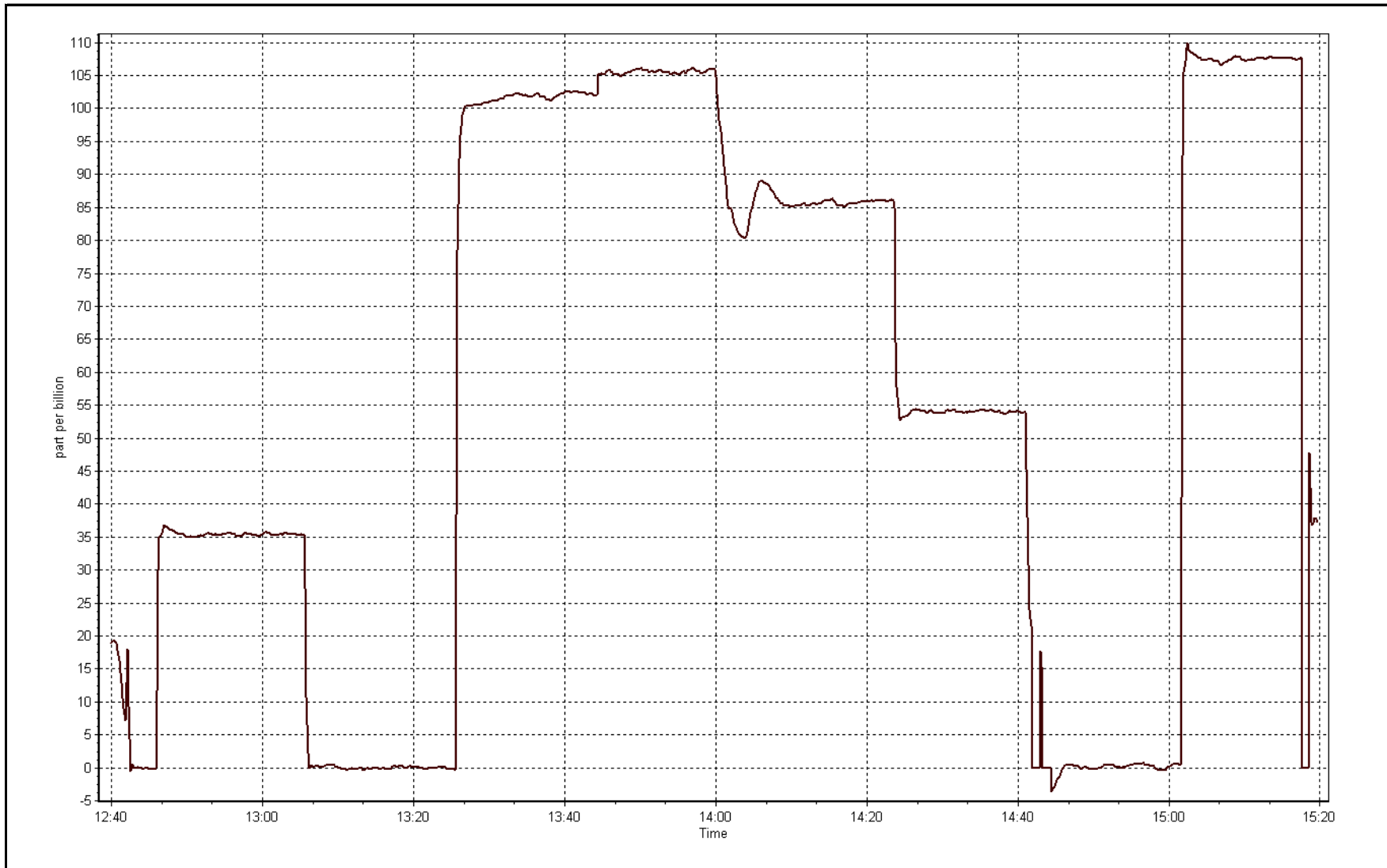
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999951
105.0	105.5	0.9953		
85.0	85.8	0.9907	Slope	0.993558
54.2	54.0	1.0030		
			Intercept	0.102657



O3 Calibration Plot

Date: February 15, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	As Found As founds before cylinder change and pump rebuild.		
Start Time (MST)	13:30	End Time (MST)	15:10
NO Cal Gas Conc	20.2 ppm	Gas Cert Reference	LL103809
NOX Cal Gas Conc	20.2 ppm	Cal Gas Expiry Date	16/09/2016
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API T701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002069	1.001382	0.997703
	Data Offset	0.244275	0.333042	-0.072050
Current Calibration	Data Slope	1.038908	1.039411	0.998226
	Data Offset	0.093502	0.093547	0.000000

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	1.169		1.169	
NOX coefficient	1.180		1.180	
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	316.6	Deg C	316.6	Deg C
HVPS	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	89	ccm	89	ccm
R Cell press NO	3.8	"Hg	3.8	"Hg
R Cell Press Nox	3.8	"Hg	3.8	"Hg
NO sample flow	1102	ccm	1102	ccm
Nox sample Flow	1102	ccm	1102	ccm

Notes:

As found zero and span and GPT point before cylinder change and pump rebuild.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 2, 2016

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	44.6	150.2	150.2	0.0	144.4	144.4	0.1	1.0396	1.0401
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	6000	44.6	150.2	150.2	0.0	144.4	144.4	0.1	1.0396	1.0401
second point										
third point										
as left zero										
as left span										
Average Correction Factor									1.0396	1.0401

Corrced As found NO_x= 144.5 NO= 144.5 Percent Change NO_x= 3.5% NO= 3.6%
 Previous Response NO_x= 149.6 NO= 149.6

GPT Calibration Data

Dilution Flow 6000 ccm Source Gas Flow 44.60 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	42.6	101.3	144.1	42.6	101.5	1.0345	1.0000	0.9982	100.2%
2nd NO2 (200)										
3rd NO2 (100)										
4th NO2 (0)	143.9	----	0.4	144.3	143.9	0.4	1.0328	1.0000	N/A	----
Average Correction Factor							1.0337	1.0000	0.9982	100.2%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

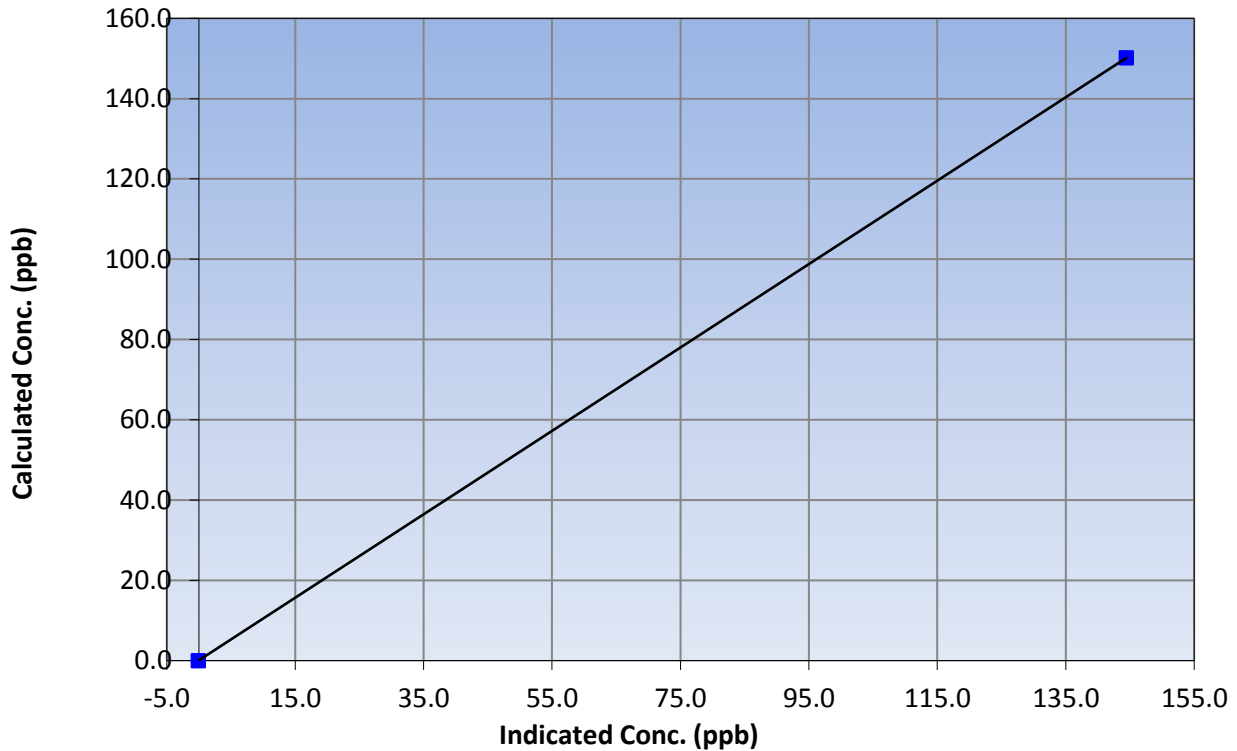
Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	15:10
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	1.000000
150.2	144.4	1.0396		
			Slope	1.038908
			Intercept	0.093502

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

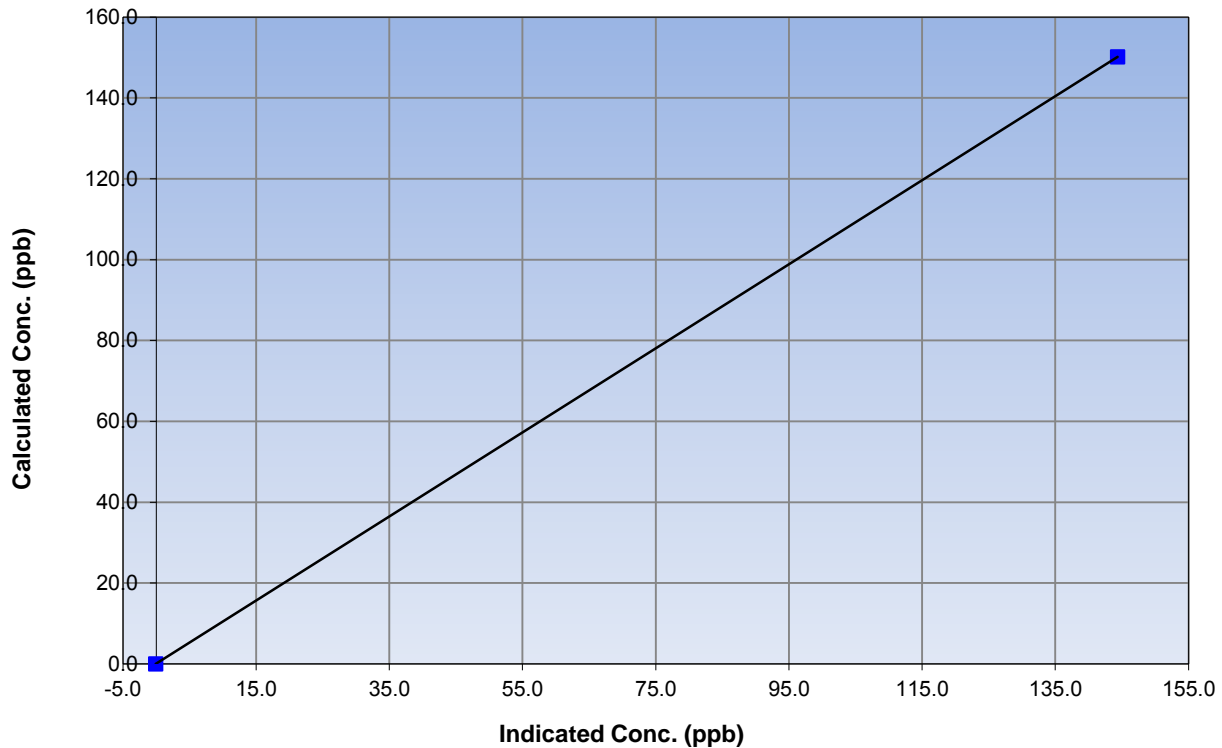
Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	15:10
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
150.2	144.4	1.0401		
			Slope	1.039411
			Intercept	0.093547

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

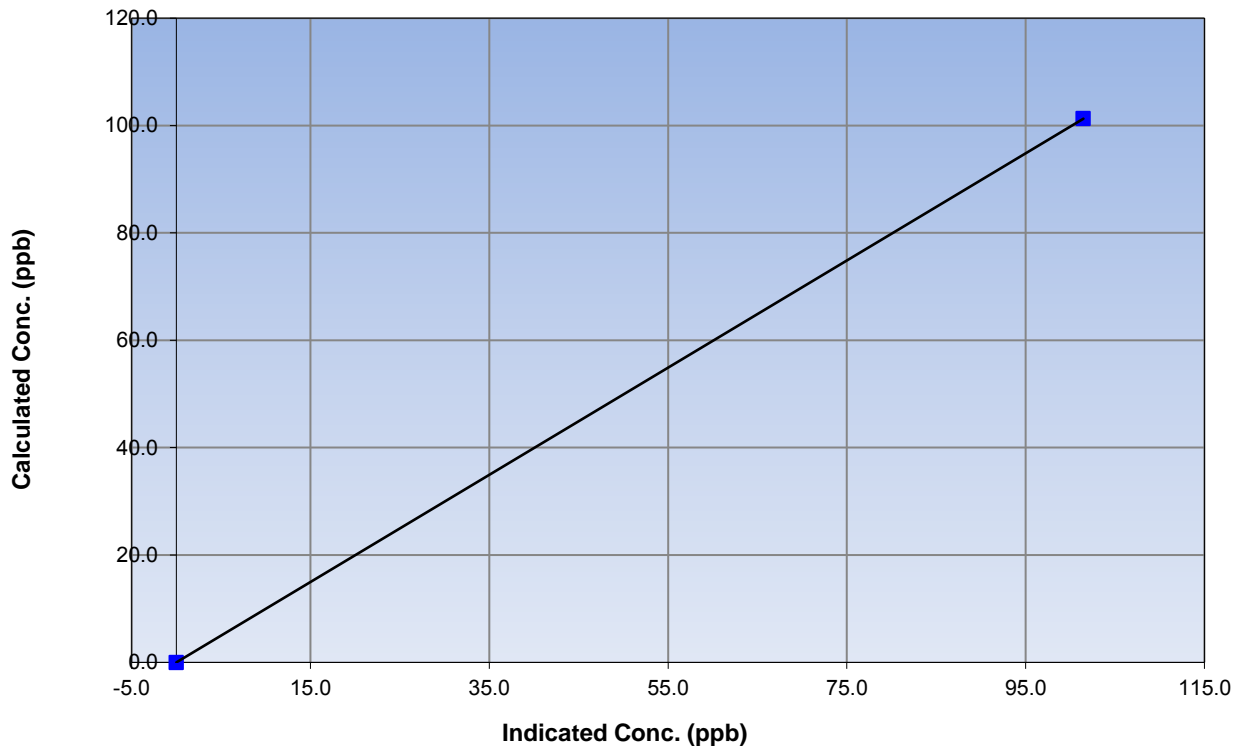
Station Information

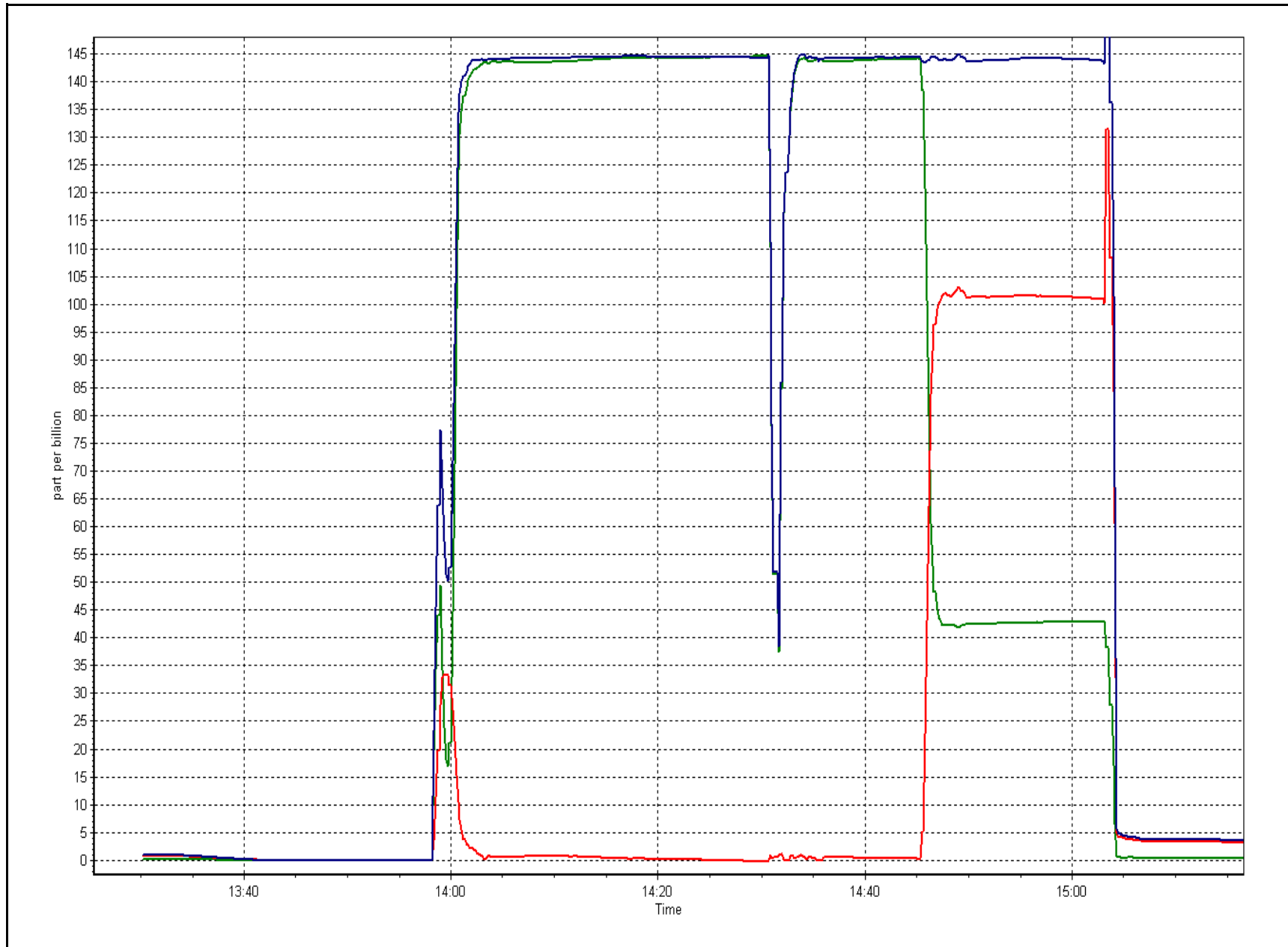
Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:30	End Time (MST)	15:10
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	1.000000
101.3	101.5	0.9982		
			Slope	0.998226
			Intercept	0.000000

NO₂ Calibration Curve







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	16:40	End Time (MST)	21:55
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 T701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.038908	1.039411	0.998226
	Data Offset	0.093502	0.093547	0.000000
Current Calibration	Data Slope	1.002768	1.005320	1.001167
	Data Offset	0.154094	0.208909	0.056382

Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172
---------------------	--------------------	-------------------	-----

Test Point	before		after	
		ppb		ppb
Concentration range	0-200		0-200	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.169		1.181	
NOx coefficient	1.180		1.204	
NO2 coefficient	1.000		1.000	
NO bkgnd	0.1		0.1	
NOx bkgnd	0.2		0.2	
Chamber Temp	40	Deg C	40.1	Deg C
Moly Temp	316.6	Deg C	316.5	Deg C
HVPS	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	89	ccm	89	ccm
R Cell press NO	3.8	"Hg	4.0	"Hg
R Cell Press Nox	3.8	"Hg	4.0	"Hg
NO sample flow	1102	ccm	1097	ccm
Nox sample Flow	1102	ccm	1097	ccm

Notes:

New cal gas cylinder and pump rebuild. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 2, 2016

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	0.0	0.0	0.0	----	----
as found span	6000	44.8	150.1	150.1	0.0	146.3	147.8	-1.5	1.0258	1.0154
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	149.0	0.5	1.0039	1.0070
second point	6000	23.8	79.7	79.7	0.0	79.5	79.4	0.2	1.0024	1.0045
third point	6000	12.0	40.2	40.2	0.0	39.7	39.4	0.3	1.0139	1.0208
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	45.4	104.7	151.5	46.4	105.1	0.9908	0.9774
Average Correction Factor									1.0067	1.0108

Corrected As found

NO_x= 146.3

NO= 147.9

Percent Change

NO_x= -1.3%

NO= -2.4%

Previous Response

NO_x= 144.4

NO= 144.3

GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

44.80

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)	----	45.4	105.0	150.2	45.4	104.9	0.9916	1.0000	1.0012	99.9%
2nd NO2 (200)	----	65.4	85.0	150.2	65.4	84.9	0.9915	1.0000	1.0014	99.9%
3rd NO2 (100)	----	96.1	54.2	150.1	96.1	54.0	0.9925	1.0000	1.0050	99.5%
4th NO2 (0)	150.4	----	1.1	151.5	150.4	1.1	0.9834	1.0000	N/A	----
Average Correction Factor							0.9898	1.0000	1.0026	99.7%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

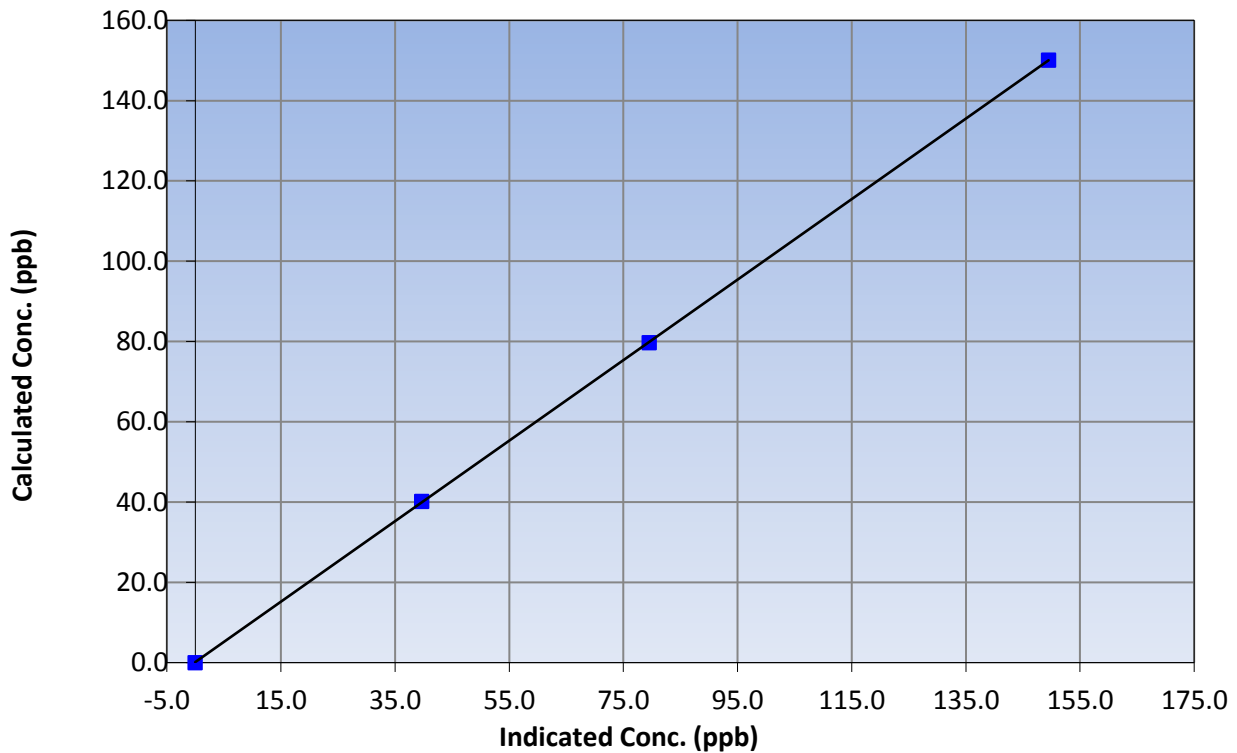
Station Information

Calibration Date	February 2, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:40	End Time (MST)	21:55
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	0.999989
150.1	149.5	1.0039		
79.7	79.5	1.0024	Slope	1.002768
40.2	39.7	1.0139		
			Intercept	0.154094

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

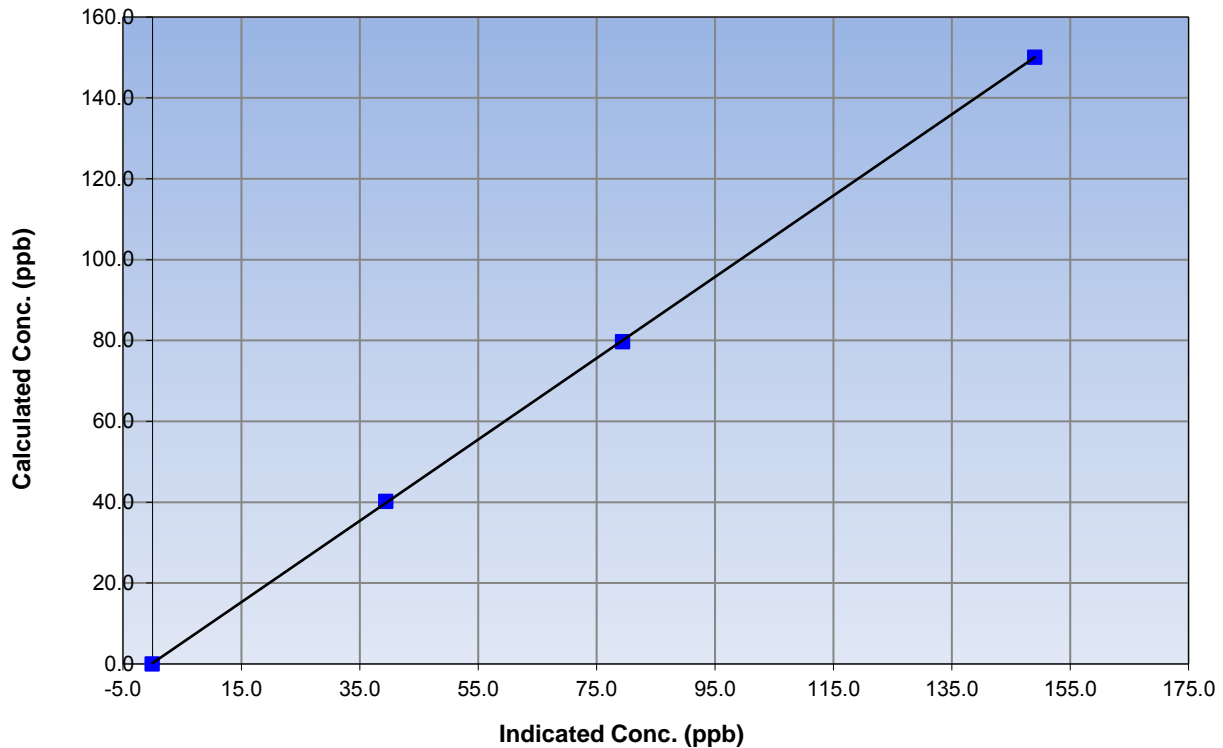
Station Information

Calibration Date	February 2, 2016	Previous Calibration	February 2, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:40	End Time (MST)	21:55
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	0.999978
150.1	149.0	1.0070		
79.7	79.4	1.0045	Slope	1.005320
40.2	39.4	1.0208		
			Intercept	0.208909

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

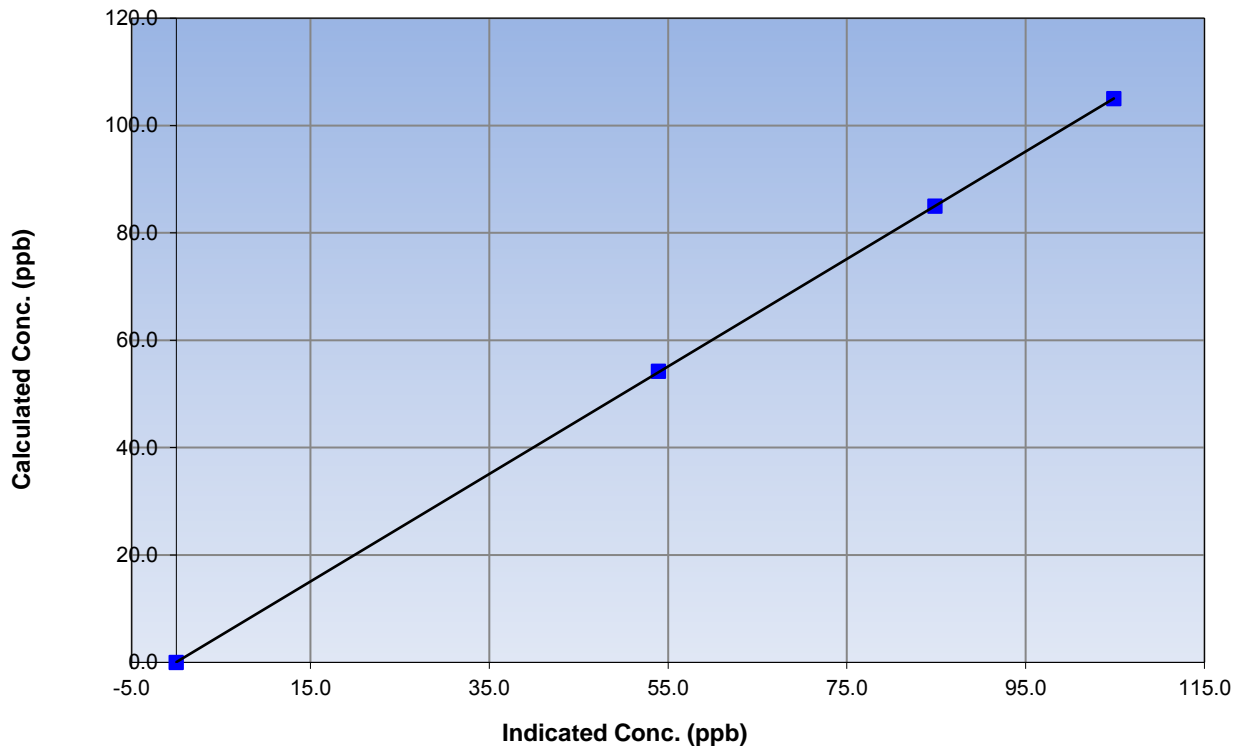
Station Information

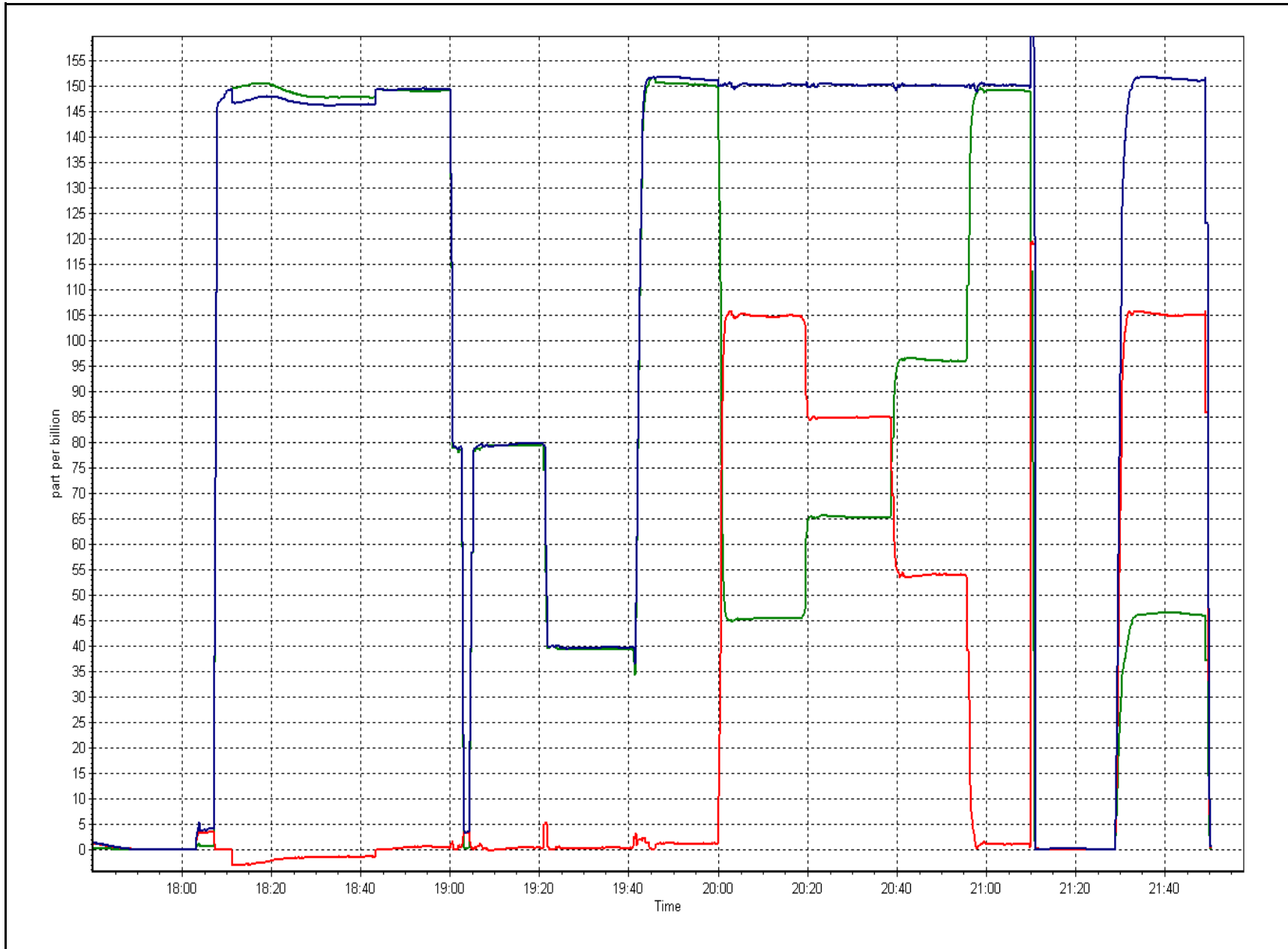
Calibration Date	February 2, 2016	Previous Calibration	February 2, 2016
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	16:40	End Time (MST)	21:55
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999995
105.0	104.9	1.0012		
85.0	84.9	1.0014	Slope	1.001167
54.2	54.0	1.0050		
			Intercept	0.056382

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	<u>February 3, 2016</u>	Previous Calibration:	<u>January 6, 2016</u>
Station Name:	<u>Fort Chipewyan</u>	Station Number:	<u>AMS 8</u>
Start Time (MST):	<u>8:00</u>	End Time (MST):	<u>9:17</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>141228</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number	<u>E-2025</u>
C ₁₄ Source SN:	<u>7414</u>
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	T1 <input checked="" type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-21.0	-22.0	-1.0	-21.0
T2	12.0	na	na	12.0
T3	16.0	na	na	16.0
T4	15.0	na	na	15.0
RH (%)	11.0	na	na	11.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	993	984.5	-8.5	993

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1005	5	1005	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	190		190
Neph	0.4		0.4
C14	9.4		9.4
Indicated Concentration (ug/m3)	0.1	no	0.1
Offset 1	191.2		191.2
Offset 2	32		32

Leak Check (Quarterly)

Leak Check Date:	<u>October 7, 2015</u>	Previous Leak Check Date:	<u>August 5, 2015</u>
------------------	------------------------	---------------------------	-----------------------

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.72	
*Flow with adaptor (LPM):	16.63	0.09

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

Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>May 6, 2015</u>	Previous Foil Calibration:	NA
Zeroed?:			
Foil Mass:	<u>1324</u>	<u>Mass foil set S/N:</u>	
Previous Correction Factor:	<u>7081</u>		
New Correction Factor:	<u>7022</u>		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	03/02/2016
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	na	NA
HEPA filter	Good	NA

NOTES:

Cyclone head cleaned. Using new Hepa filter. No adjustments made.

Calibration Performed By:	<u>Devin Russell</u>
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Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	June 3, 2015
Station Number	AMS 08	Station Location	Fort Chipewyan
Reason:	Removal	Other:	
Start Time (MST)	13:40	End Time (MST)	16:25
Barometric Pressure	739 mm Hg	Station Temperature	20 Deg C
WS Calibrator	MetOne 053-120	Serial Number	P15103

WIND SPEED

Sensor make/model	Met One 010C	Sensor serial #	G3212
DACS make	Campbel Scientific CR3000	DACS serial No.	8205
	<u>Before</u>		<u>After</u>
DACS slope	0.14396	DACS slope	0.1440
DACS intercept	0.9656	DACS intercept	0.9656
Calculated slope	0.999166034	Calculated slope	0.999812
Calculated intercept	-0.012611556	Calculated intercept	-0.033648

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0	0.0	n/a
200	20.162	20.3	0.9954
400	39.359	39.4	0.9989
600	58.555	58.5	1.0001
800	77.752	77.8	0.9989
1000	96.948	97.0	0.9996
Average Correction Factor			0.9986

WIND DIRECTION

Sensor make/model	Met One Wind 020C	Sensor serial #	G3858
DACS make	Campbel Scientific CR3000	DACS serial No.	8205
DACS voltage range		DACS channel #	
	<u>Before</u>		<u>After</u>
DACS slope	0.072	DACS slope	0.072
DACS intercept	0	DACS intercept	0
Calculated slope	0.308682416	Calculated slope	1.000714
Calculated intercept	104.3728082	Calculated intercept	0.065569

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	0.1	n/a
90	89.9	1.0009
180	180.0	0.9999
270	268.7	1.0048
360	360.3	0.9991
Average Correction Factor		1.0012

Notes:

Met sensors found at 16 degrees West of magnetic North. WS and WD removed because they have frozen numerous times.

Calibration Performed By: Devin Russell.



Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	
Station Number	AMS 08	Station Location	Fort Chipewyan
Reason:	Install	Other:	
Start Time (MST)	13:40	End Time (MST)	16:25
Barometric Pressure	739 mm Hg	Station Temperature	20 Deg C
WS Calibrator	MetOne 053-120	Serial Number	P15103

WIND SPEED

Sensor make/model	Met One 010C	Sensor serial #	G3212
DACS make	Campbel Scientific CR3000	DACS serial No.	8205
	<u>Before</u>		<u>After</u>
DACS slope		DACS slope	0.1440
DACS intercept		DACS intercept	0.9656
Calculated slope		Calculated slope	1.000859
Calculated intercept		Calculated intercept	-0.060938

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0	0.0	n/a
200	20.162	20.3	0.9954
400	39.359	39.3	1.0025
600	58.555	58.8	0.9952
800	77.752	77.7	1.0007
1000	96.948	96.8	1.0011
Average Correction Factor			0.9990

WIND DIRECTION

Sensor make/model	Met One Wind 020C	Sensor serial #	N/A
DACS make	Campbel Scientific CR3000	DACS serial No.	8205
DACS voltage range		DACS channel #	
	<u>Before</u>		<u>After</u>
DACS slope		DACS slope	0.072
DACS intercept		DACS intercept	0
Calculated slope		Calculated slope	0.990253
Calculated intercept		Calculated intercept	1.473246

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	0.8	n/a
90	88.4	1.0180
180	178.4	1.0088
270	269.0	1.0037
360	364.8	0.9869
Average Correction Factor		1.0043

Notes:

Met sensors left at 16 degrees West of magnetic North. Cannot make out WD serial number.

Calibration Performed By: Devin Russell.



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 FEBRUARY 2016

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	659	33	37	99.43	4	0	1	0
THC(ppm) Average	659	33	37	99.43	5.1	-	3.2	-
Temperature (C) Average	696	0	0	100.00	9.5	-	2.3	-
Relative Humidity (%) Average	696	0	0	100.00	97	-	92	-
Wind Speed 10 m (km/h) Average	689	0	7	98.99	13	-	8	-
Wind Direction 10 m (deg) Average	689	0	7	98.99	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	659	0.7	1	-	0	0	0	0	1	1	4
THC(ppm) Average	659	2.52	0.4	-	2.1	2.2	2.3	2.4	2.6	3	5.1
Temperature (C) Average	696	-11.49	7.3	-	-34.8	-19.4	-15.6	-12.1	-6.8	-2.1	9.5
Relative Humidity (%) Average	696	78.8	12	-	34	62	73	82	86	92	97
Wind Speed 10 m (km/h) Average	689	4.8	3	-	0	2	3	4	7	9	13
Wind Direction 10 m (deg) Average	689	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS, THC	29 Feb 2016 21:00	01 Mar 2016 00:00	4	Station power failure
Wind Speed, Wind Direction	01 Feb 2016 02:00	01 Feb 2016 02:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Feb 2016 06:00	07 Feb 2016 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Feb 2016 22:00	07 Feb 2016 22:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Feb 2016 06:00	20 Feb 2016 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Feb 2016 23:00	21 Feb 2016 00:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	29 Feb 2016 21:00	29 Feb 2016 21:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

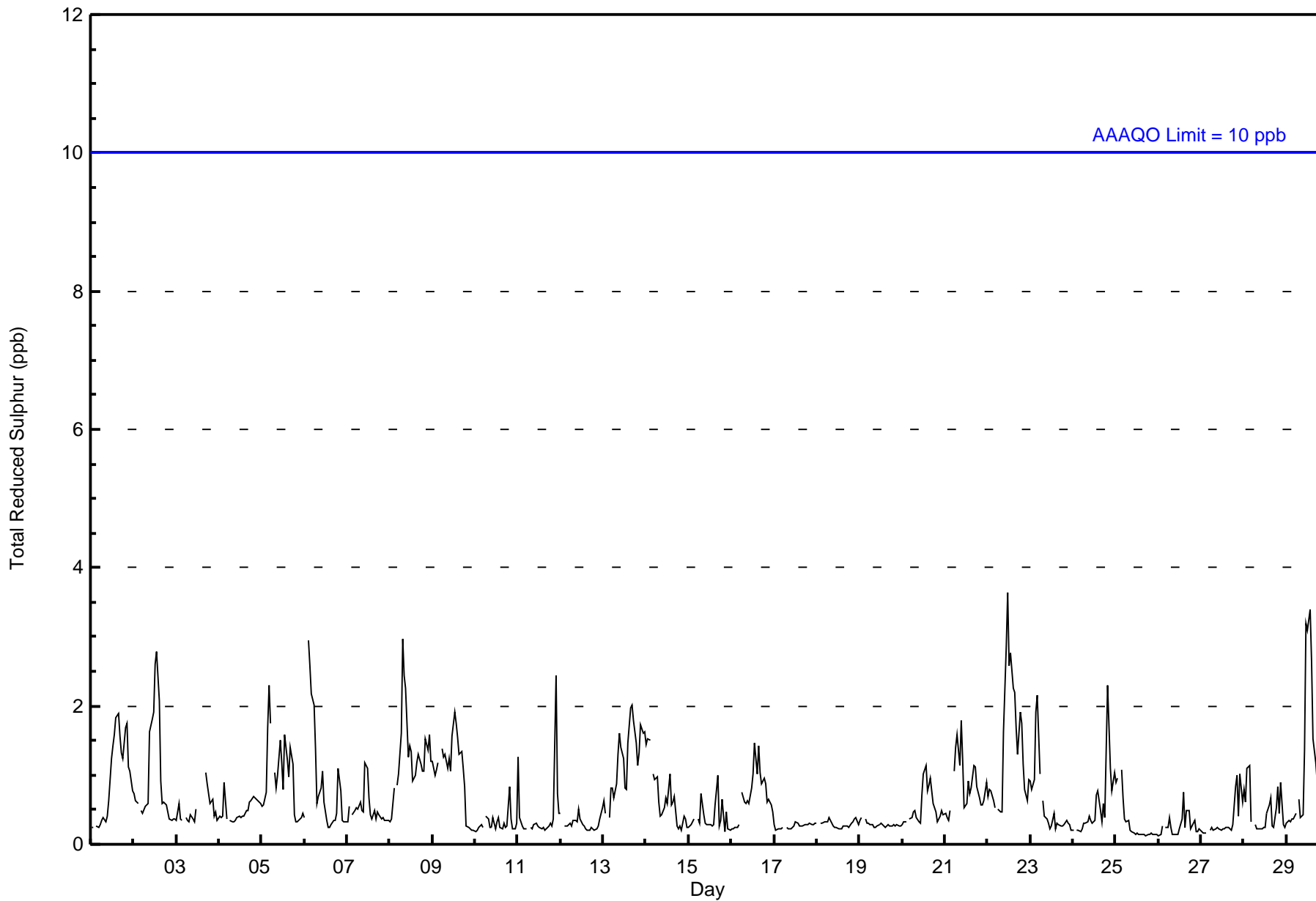
Barge Landing - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																	
Maximum Value: 4 ppb on Feb 22 12:00										Maximum Daily Average: 1.4 ppb on Feb 22										Hours of Data: 659							
Minimum Value: 0 ppb on Feb 25 18:00										Minimum Daily Average: 0.3 ppb on Feb 17										Hours of Missing Data: 37							
Maximum Diurnal Average: 0.9 ppb at hour 14										Minimum Diurnal Average: 0.5 ppb at hour 24										Hours of Calibration: 33							
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 = 3										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	0	0	Z	0	0	0	0	0	0	0	1	1	1	2	2	2	2	1	1	2	2	1	1	1	1.0	2	
2-Feb	1	1	1	Z	0	0	1	1	1	2	2	2	3	3	2	1	1	1	1	0	0	0	0	0	1.0	3	
3-Feb	0	1	0	0	Z	0	0	0	0	0	0	1	C	C	C	C	1	1	1	1	1	0	0	0	0.5	1	
4-Feb	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1	
5-Feb	1	1	1	2	2	2	Z	1	1	1	2	1	1	2	1	1	1	1	1	0	0	0	0	0	1.0	2	
6-Feb	0	Z	3	3	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0.9	3	
7-Feb	0	1	Z	0	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
8-Feb	0	0	1	Z	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1.3	3	
9-Feb	1	1	1	1	Z	1	1	1	1	1	1	2	2	2	2	1	1	1	1	0	0	0	0	0	1.1	2	
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1	
11-Feb	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0.4	2	
12-Feb	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
13-Feb	1	0	Z	0	1	1	1	1	1	2	1	1	1	1	1	2	2	2	1	1	1	2	2	2	1.2	2	
14-Feb	1	2	2	Z	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	2	
15-Feb	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0.4	1	
16-Feb	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1	
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	0.3	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	0.3	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	0.3	0	
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1	
21-Feb	0	0	0	0	Z	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
22-Feb	1	1	1	1	1	Z	1	0	0	2	3	4	3	3	2	2	2	2	1	2	2	1	1	1	1.4	4	
23-Feb	1	1	1	2	2	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	2	2	1	1	1	1	0.6	2	
25-Feb	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0.3	1	
28-Feb	1	1	1	1	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	0.5	1	
29-Feb	0	0	0	0	0	0	Z	1	0	0	1	3	3	3	3	2	1	1	1	1	1	PF	PF	PF	PF	1.2	3
0.5 0.5 0.6 0.7 0.6 0.6 0.6 0.6 0.5 0.6 0.7 0.8 0.8 0.9 0.8 0.8 0.7 0.6 0.6 0.7 0.6 0.6 0.5 0.5																								Diurnal Average			
1 2 3 3 2 2 2 2 3 2 2 3 4 3 3 3 2 2 2 2 2 2 2 2 2																								Diurnal Maximum			
Z - zerspan C - Calibration PF - Power Failure																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	646	98.03	98.03
3 - 4	13	1.97	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: 659

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	86	131	46	18	11	6	31	57	76	33	26	20	20	10	10	59	640
3 - 4	0	0	0	0	0	0	0	2	6	4	1	0	0	0	0	0	13
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	86	131	46	18	11	6	31	59	82	37	27	20	20	10	10	59	653

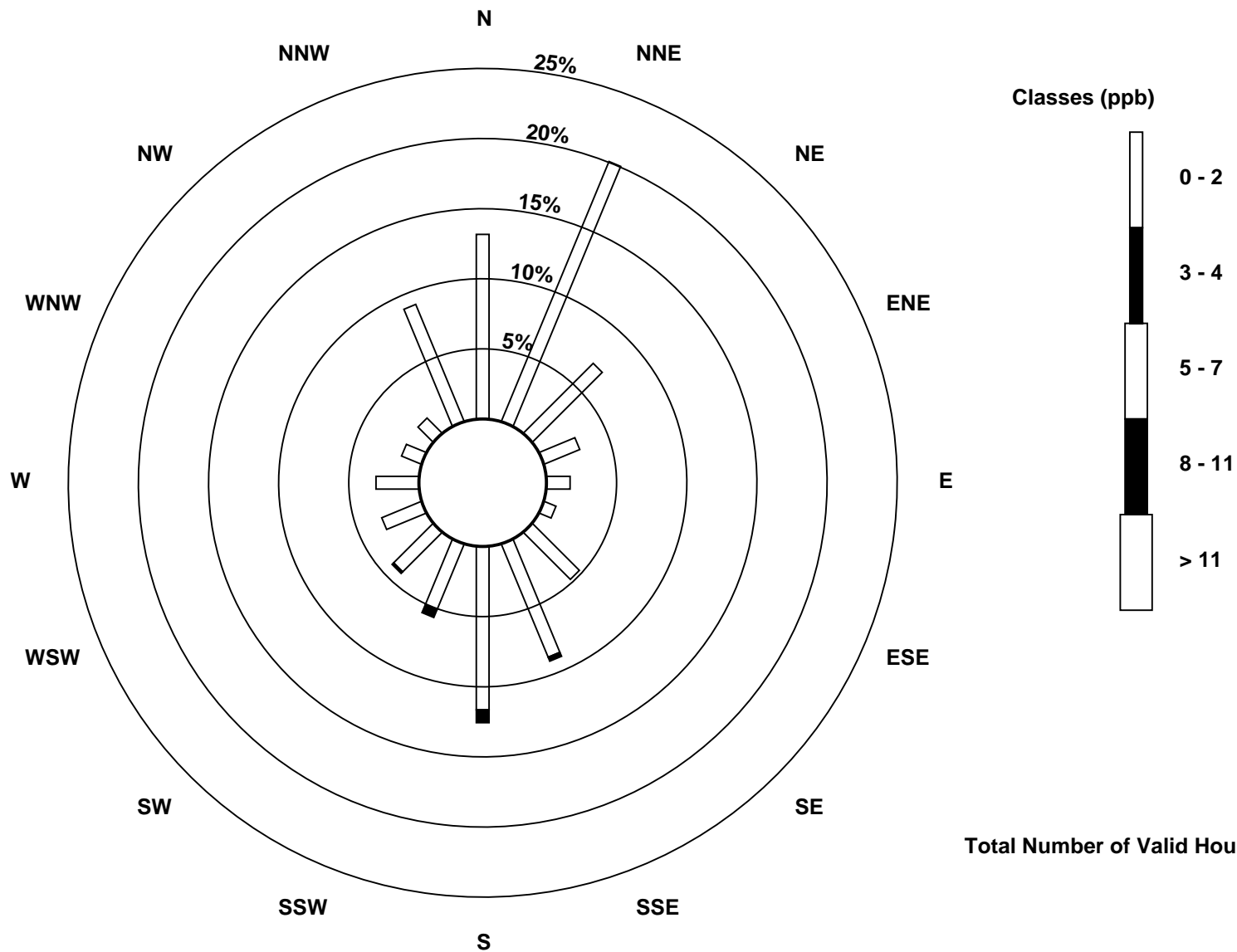
Total Number of Valid Hours: 653

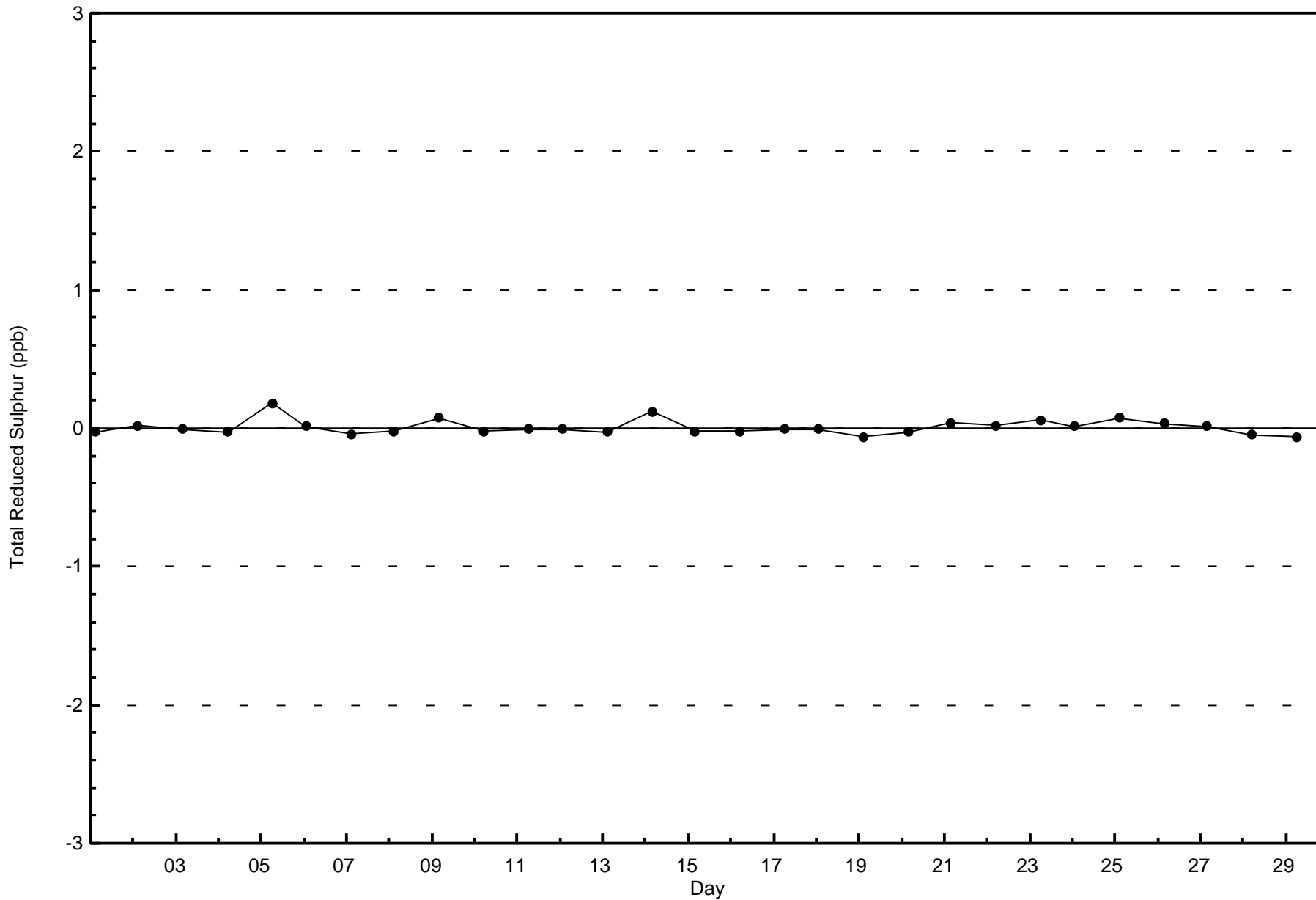
Total Number of Hours: 696

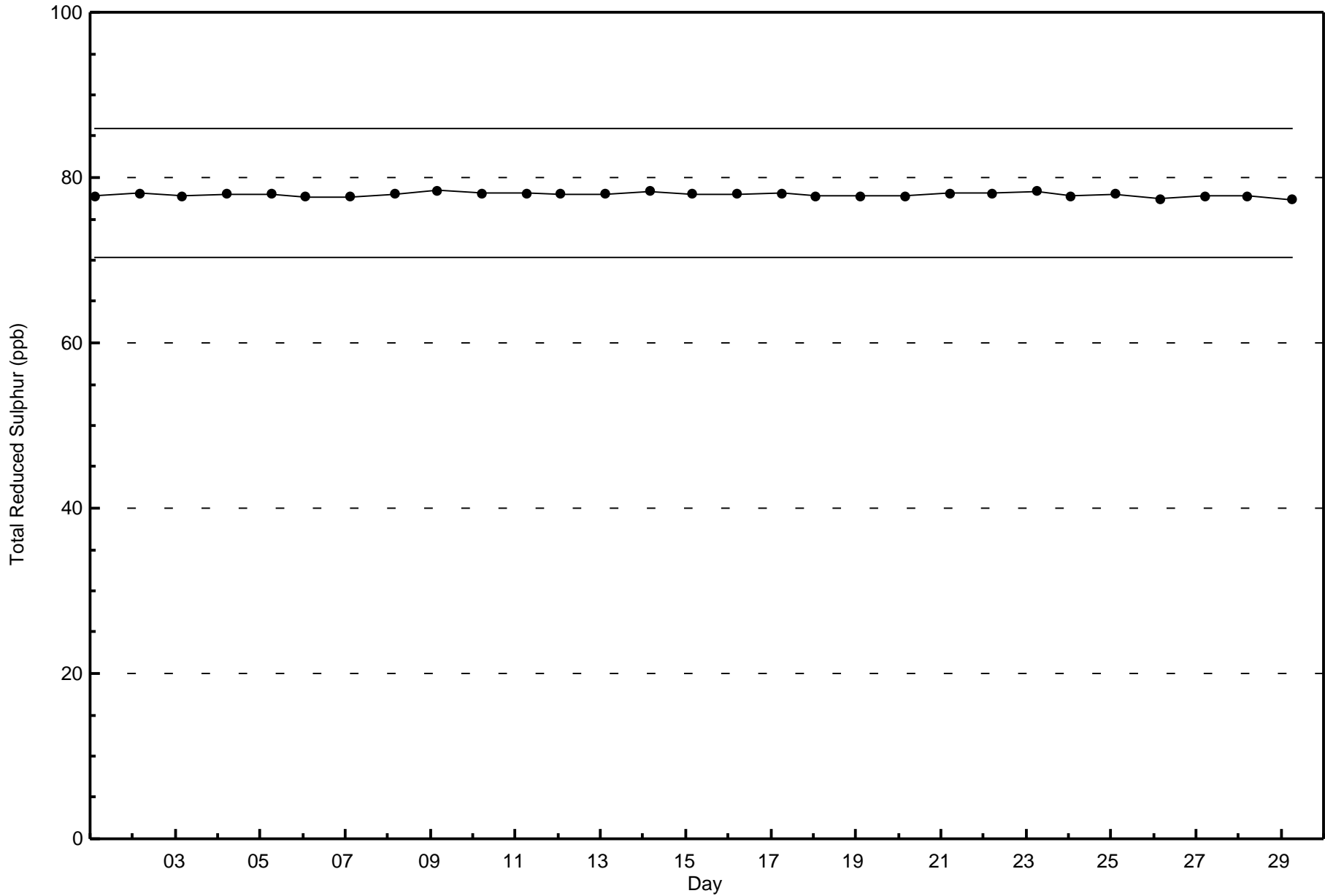


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)





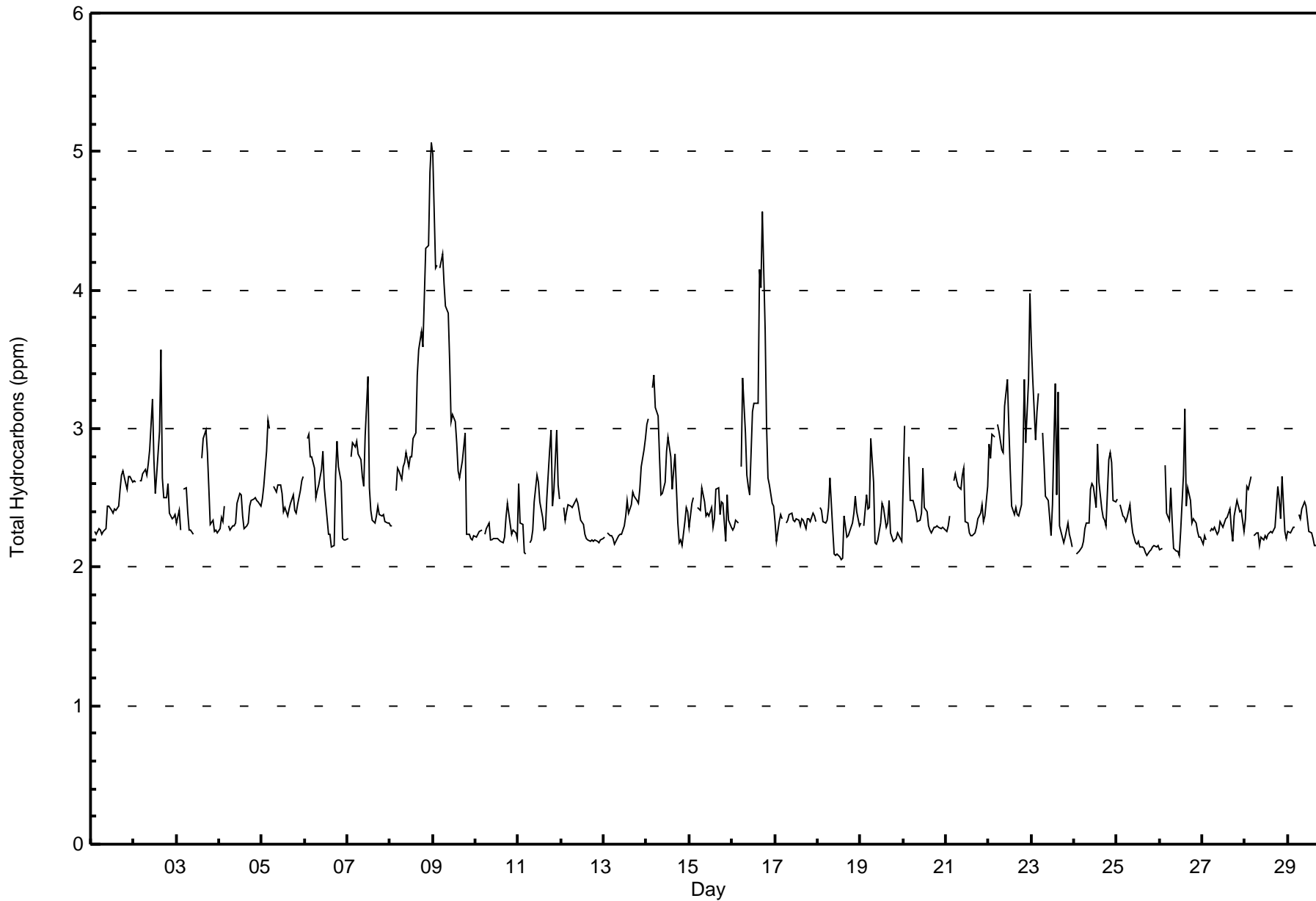




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - February 2016

Maximum Value: 5.1 ppm on Feb 9 00:00		Maximum Daily Average: 3.2 ppm on Feb 8		Hours in Service: 696																													
Minimum Value: 2.1 ppm on Feb 18 14:00		Minimum Daily Average: 2.2 ppm on Feb 25		Hours of Data: 659																													
Maximum Diurnal Average: 2.6 ppm at hour 5		Minimum Diurnal Average: 2.4 ppm at hour 15		Hours of Missing Data: 37																													
Monthly Average: 2.52 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.4 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 4.3		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	2.2	Z	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.7	2.7	2.6	2.6	2.7	2.6	2.6	2.4	2.7							
2-Feb	2.6	2.6	Z	2.6	2.6	2.7	2.7	2.7	2.7	2.8	3.2	2.8	2.5	2.7	3.0	3.6	2.6	2.5	2.5	2.6	2.4	2.4	2.4	2.4	2.4	2.7	3.6						
3-Feb	2.3	2.4	2.3	Z	2.6	2.6	2.4	2.3	2.3	2.2	C	C	C	C	2.8	2.9	3.0	2.8	2.6	2.3	2.3	2.3	2.3	2.2	2.5	3.0							
4-Feb	2.3	2.4	2.3	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.5	2.5	2.5	2.4	2.3	2.3	2.3	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.5							
5-Feb	2.5	2.6	2.8	3.1	3.0	Z	2.6	2.6	2.5	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.5	2.5	2.6	2.7	2.6	3.1						
6-Feb	Z	2.9	3.0	2.8	2.8	2.7	2.5	2.6	2.6	2.7	2.8	2.6	2.3	2.2	2.2	2.1	2.2	2.7	2.9	2.7	2.6	2.2	2.2	2.2	2.5	3.0							
7-Feb	2.2	Z	2.8	2.9	2.9	2.9	2.8	2.8	2.7	2.6	2.9	3.4	2.6	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.6	3.4							
8-Feb	2.3	2.3	Z	2.6	2.7	2.7	2.6	2.7	2.8	2.8	2.7	2.8	2.8	2.9	3.0	3.4	3.6	3.7	3.6	3.9	4.3	4.3	4.9	5.1	3.2	5.1							
9-Feb	5.0	4.2	4.2	Z	4.2	4.3	4.0	3.9	3.8	3.5	3.1	3.1	3.0	2.9	2.7	2.6	2.8	2.9	3.0	2.2	2.2	2.2	2.2	2.2	3.2	5.0							
10-Feb	2.2	2.2	2.3	2.3	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.3	2.2	2.3	2.2	2.2	2.2	2.5							
11-Feb	2.6	2.3	2.3	2.1	2.1	Z	2.2	2.2	2.3	2.5	2.7	2.6	2.5	2.4	2.3	2.3	2.5	2.9	3.0	2.4	2.6	3.0	2.6	2.5	2.5	3.0							
12-Feb	Z	2.4	2.3	2.4	2.5	2.4	2.4	2.4	2.5	2.5	2.4	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							
13-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.7	2.8	2.9	2.4	2.9							
14-Feb	3.0	3.1	Z	3.3	3.4	3.2	3.1	2.8	2.5	2.5	2.6	2.8	2.9	2.8	2.6	2.7	2.8	2.3	2.2	2.2	2.3	2.4	2.4	2.4	2.7	3.4							
15-Feb	2.3	2.5	2.5	Z	2.4	2.4	2.4	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.6	2.6	2.4	2.5	2.5	2.2	2.5	2.3	2.3	2.4	2.6							
16-Feb	2.3	2.3	2.3	2.3	Z	2.7	3.4	3.0	2.7	2.6	2.5	3.1	3.2	3.2	3.2	4.1	4.0	4.6	3.7	3.0	2.6	2.6	2.5	2.4	3.0	4.6							
17-Feb	2.3	2.2	2.3	2.4	2.4	Z	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.3	2.4							
18-Feb	Z	2.4	2.4	2.3	2.3	2.3	2.4	2.6	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.2	2.2	2.3	2.3	2.4	2.5	2.4	2.3	2.3	2.6							
19-Feb	2.3	Z	2.3	2.5	2.4	2.4	2.9	2.6	2.2	2.2	2.2	2.3	2.5	2.4	2.3	2.3	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.9							
20-Feb	2.6	3.0	Z	2.8	2.5	2.5	2.4	2.4	2.3	2.3	2.4	2.7	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	3.0							
21-Feb	2.3	2.3	2.4	Z	2.6	2.7	2.6	2.6	2.6	2.7	2.7	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.5	2.3	2.4	2.6	2.4	2.7							
22-Feb	2.9	2.8	3.0	2.9	Z	3.0	3.0	2.8	2.8	3.2	3.4	3.0	2.7	2.4	2.4	2.4	2.4	2.4	2.5	2.8	3.4	2.9	3.3	4.0	2.9	4.0							
23-Feb	3.6	3.4	2.9	3.1	3.3	Z	3.0	2.8	2.5	2.5	2.4	2.2	2.4	3.3	2.5	3.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.7	3.6							
24-Feb	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.6	2.6	2.6	2.4	2.9	2.6	2.4	2.4	2.3	2.3	2.8	2.8	2.8	2.5	2.5	2.4	2.9							
25-Feb	2.5	Z	2.4	2.4	2.4	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.5							
26-Feb	2.1	2.1	Z	2.7	2.4	2.3	2.6	2.3	2.1	2.1	2.1	2.1	2.3	2.7	3.1	2.4	2.6	2.5	2.3	2.4	2.3	2.3	2.2	2.2	2.4	3.1							
27-Feb	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.2	2.4	2.5	2.4	2.4	2.4	2.3	2.3	2.5							
28-Feb	2.3	2.6	2.6	2.7	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	2.2	2.3	2.3	2.6	2.5	2.3	2.7	2.3	2.7							
29-Feb	2.3	2.2	2.3	2.3	2.3	Z	2.4	2.3	2.4	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5							
	2.5	2.6	2.5	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	Diurnal Average						
	5.0	4.2	4.2	3.3	4.2	4.3	4.0	3.9	3.8	3.5	3.4	3.4	3.2	3.3	3.2	4.1	4.0	4.6	3.7	3.9	4.3	4.3	4.9	5.1	5.1	5.1	Diurnal Maximum						
Z - zerspan		C - Calibration				PF - Power Failure																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	609	92.41	92.41
3.1 - 10.0	50	7.59	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - February 2016**

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	80	123	42	17	10	7	28	56	78	33	25	17	19	8	12	49	604
3.1 - 10.0	7	6	3	1	1	2	5	5	4	1	2	2	1	1	0	9	50
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	87	129	45	18	11	9	33	61	82	34	27	19	20	9	12	58	654

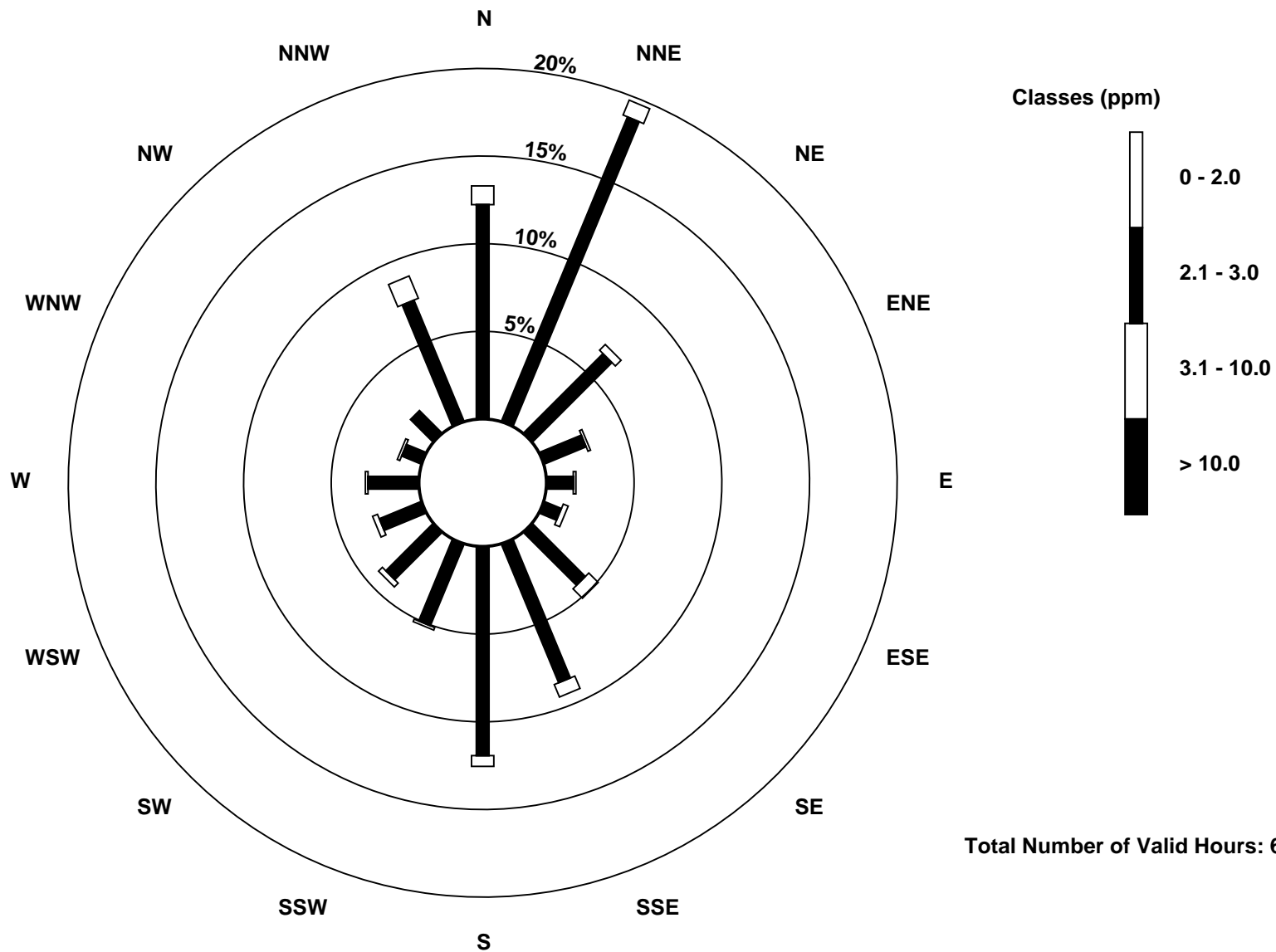
Total Number of Valid Hours: 654

Total Number of Hours: 696

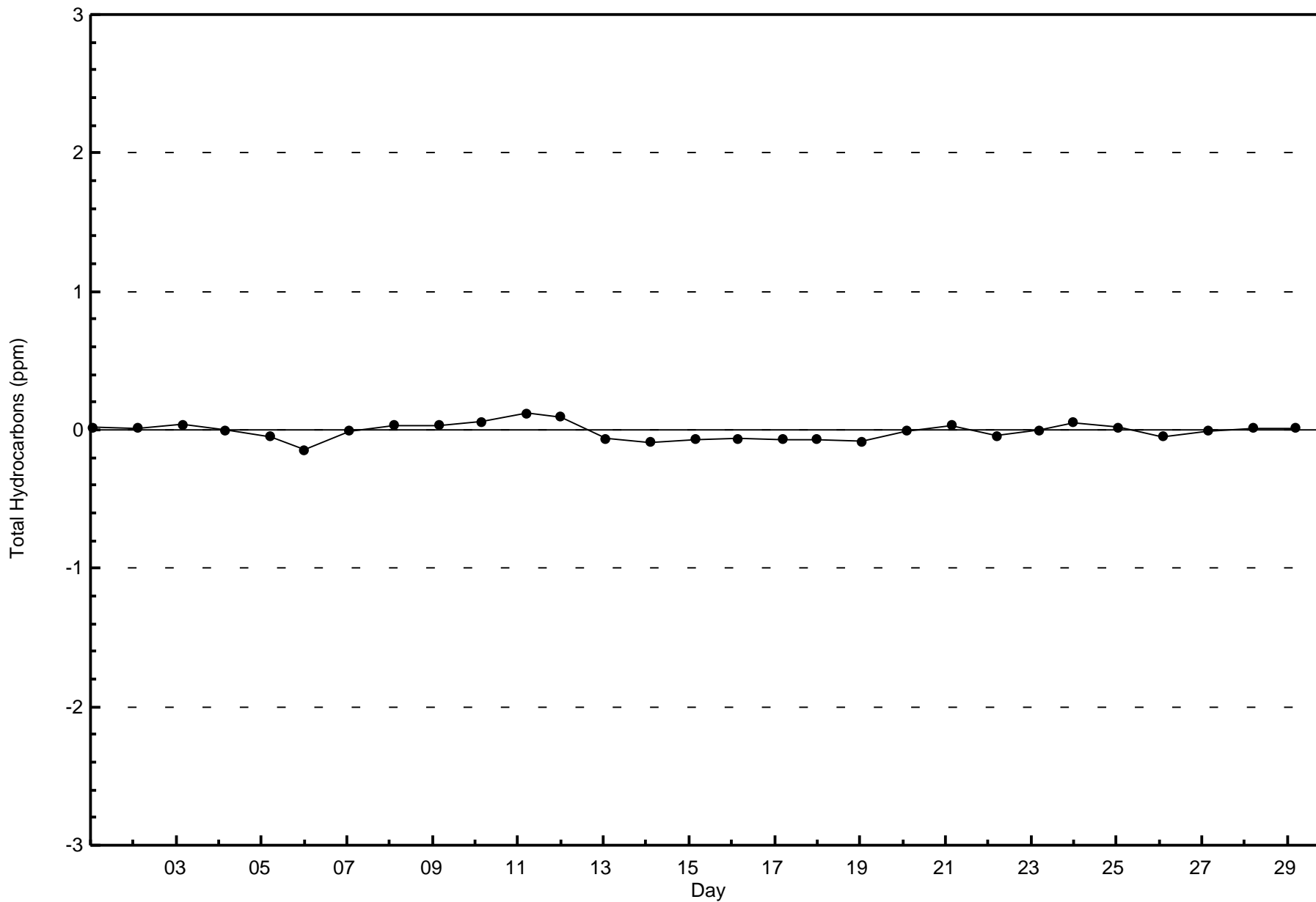


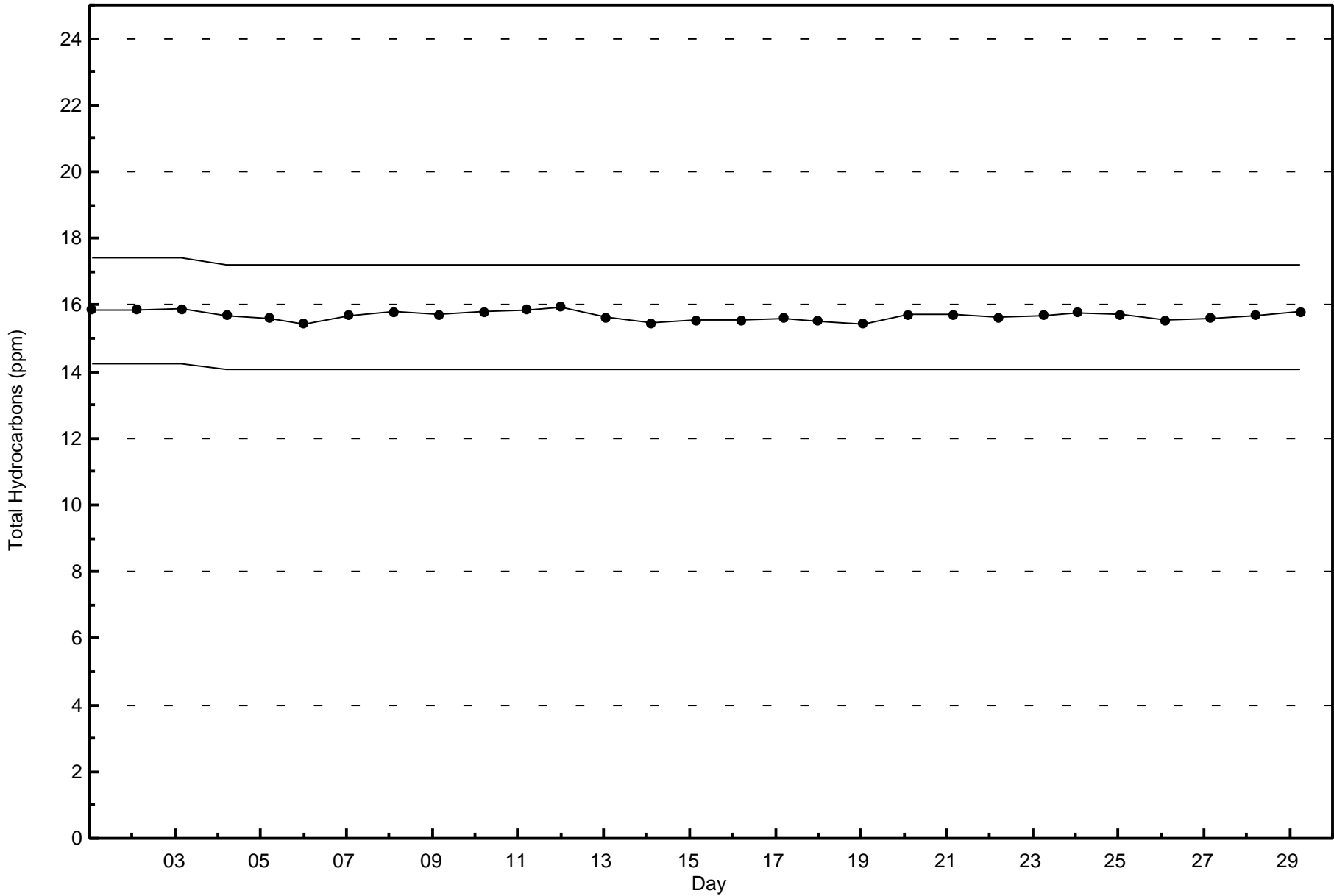
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)



Total Number of Valid Hours: 654



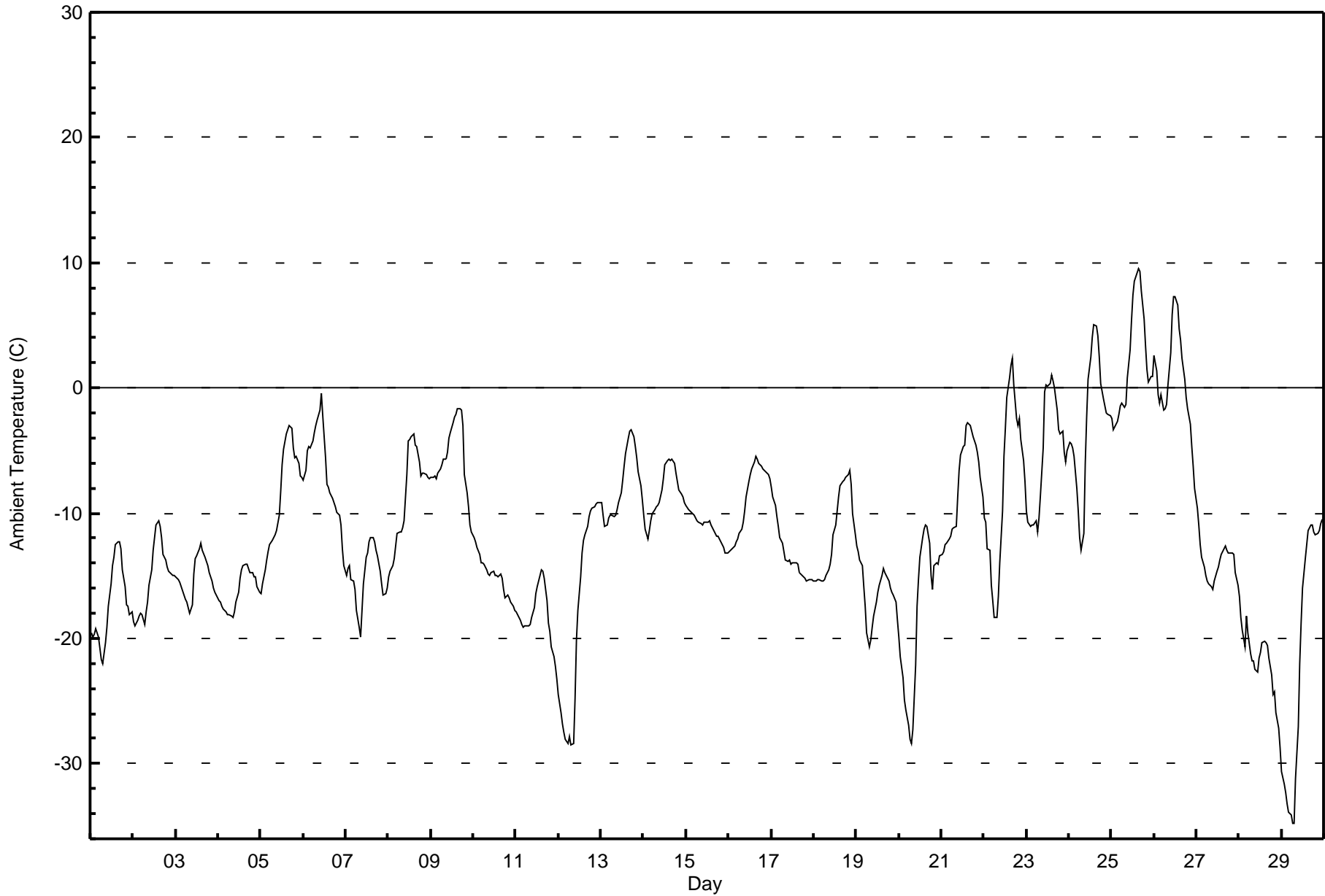




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Barge Landing - February 2016

Maximum Value: 9.5 C on Feb 25 16:00		Maximum Daily Average: 2.3 C on Feb 25		Hours in Service: 696																						
Minimum Value: -34.8 C on Feb 29 08:00		Minimum Daily Average: -21.8 C on Feb 28		Hours of Data: 696																						
Maximum Diurnal Average: -7.7 C at hour 16		Minimum Diurnal Average: -15.0 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -11.49 C		Percentiles: P ₁ = -31.4 P ₁₀ = -19.4 Q ₁ = -15.6 Median = -12.1 Q ₃ = -6.8 P ₉₀ = -2.1 P ₉₉ = 7.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-19.5	-19.9	-19.6	-19.3	-19.8	-20.7	-21.6	-22.0	-20.4	-19.1	-17.4	-15.6	-14.2	-13.5	-12.5	-12.3	-12.3	-12.9	-14.5	-15.9	-17.3	-17.5	-18.1	-17.9	-17.2	-12.3
2-Feb	-18.7	-19.0	-18.6	-18.2	-18.0	-18.1	-18.9	-17.9	-17.1	-15.8	-14.5	-13.0	-11.9	-10.9	-10.7	-11.1	-11.9	-13.3	-13.8	-14.3	-14.6	-14.9	-15.0	-15.0	-15.2	-10.7
3-Feb	-15.1	-15.4	-15.6	-15.9	-16.2	-16.8	-17.1	-17.6	-17.9	-17.3	-14.9	-13.6	-13.4	-12.9	-12.4	-12.9	-13.5	-13.8	-14.2	-14.8	-15.4	-16.0	-16.3	-16.6	-15.2	-12.4
4-Feb	-17.0	-17.1	-17.4	-17.7	-17.9	-18.1	-18.1	-18.2	-18.3	-17.9	-17.1	-16.3	-15.2	-14.6	-14.2	-14.1	-14.1	-14.5	-14.8	-14.8	-15.1	-15.1	-15.8	-16.3	-16.2	-14.1
5-Feb	-16.4	-15.7	-14.6	-13.8	-13.1	-12.5	-12.2	-12.0	-11.7	-11.4	-10.2	-8.3	-6.1	-4.9	-3.7	-3.4	-3.0	-3.3	-4.8	-5.6	-5.5	-6.1	-7.0	-7.2	-8.8	-3.0
6-Feb	-7.3	-6.6	-5.1	-4.7	-4.8	-4.2	-3.6	-3.0	-2.6	-1.7	-0.4	-2.3	-5.6	-7.7	-7.9	-8.4	-8.8	-9.2	-9.5	-9.9	-10.2	-11.0	-12.8	-14.2	-6.7	-0.4
7-Feb	-15.0	-14.4	-14.2	-15.3	-15.4	-16.1	-17.7	-19.1	-19.9	-17.8	-15.7	-13.5	-13.2	-12.3	-12.0	-11.9	-12.3	-12.9	-13.4	-14.7	-15.6	-16.5	-16.4	-15.9	-15.0	-11.9
8-Feb	-15.1	-14.6	-14.2	-13.6	-12.6	-11.6	-11.5	-11.5	-11.2	-10.6	-6.9	-4.3	-4.1	-3.9	-3.7	-4.6	-4.7	-5.9	-7.0	-6.7	-6.8	-6.9	-7.1	-7.3	-8.6	-3.7
9-Feb	-7.2	-7.1	-7.0	-7.2	-6.8	-6.4	-6.2	-5.6	-5.7	-5.1	-4.0	-3.6	-2.7	-2.3	-2.1	-1.7	-1.7	-1.8	-3.0	-6.9	-8.4	-9.5	-10.9	-11.5	-5.6	-1.7
10-Feb	-12.0	-12.2	-12.7	-13.3	-14.0	-14.0	-14.1	-14.5	-14.8	-15.0	-14.8	-14.6	-15.0	-15.0	-15.1	-14.9	-15.1	-16.1	-16.7	-16.6	-16.8	-17.1	-17.4	-17.7	-15.0	-12.0
11-Feb	-17.8	-18.1	-18.5	-18.9	-19.1	-19.0	-18.9	-19.0	-18.9	-18.3	-17.6	-16.4	-15.9	-15.0	-14.5	-14.6	-15.2	-16.9	-18.7	-19.4	-20.6	-21.5	-22.2	-23.3	-18.3	-14.5
12-Feb	-24.5	-25.9	-26.8	-27.5	-28.1	-28.4	-27.8	-28.5	-28.4	-24.9	-20.1	-17.8	-15.1	-13.2	-12.2	-11.7	-11.1	-10.3	-9.8	-9.6	-9.5	-9.3	-9.1	-9.1	-18.3	-9.1
13-Feb	-9.1	-10.1	-11.1	-10.9	-10.4	-10.2	-10.2	-10.2	-10.2	-9.7	-9.1	-8.4	-7.4	-6.3	-5.2	-4.0	-3.5	-3.3	-3.9	-4.6	-5.5	-6.7	-7.8	-8.9	-7.8	-3.3
14-Feb	-10.1	-11.3	-12.1	-11.4	-10.6	-10.1	-9.7	-9.5	-9.4	-9.2	-8.2	-7.3	-6.1	-5.8	-5.7	-5.8	-5.7	-6.0	-6.8	-7.5	-8.1	-8.5	-8.7	-9.1	-8.4	-5.7
15-Feb	-9.4	-9.7	-9.8	-9.9	-10.2	-10.4	-10.6	-10.7	-10.9	-11.0	-10.7	-10.7	-10.8	-10.7	-11.0	-11.1	-11.6	-11.8	-11.8	-12.1	-12.6	-12.8	-13.2	-13.2	-11.1	-9.4
16-Feb	-13.0	-13.0	-12.8	-12.6	-12.3	-12.1	-11.7	-11.3	-10.8	-9.8	-8.7	-7.5	-6.9	-6.4	-5.9	-5.5	-5.6	-6.0	-6.2	-6.4	-6.6	-6.7	-6.9	-7.3	-8.8	-5.5
17-Feb	-7.9	-8.7	-9.4	-10.3	-11.1	-12.0	-12.4	-13.1	-13.7	-13.8	-13.8	-14.1	-14.0	-13.9	-13.9	-14.1	-14.7	-15.0	-15.1	-15.2	-15.4	-15.3	-15.3	-15.3	-13.2	-7.9
18-Feb	-15.4	-15.4	-15.3	-15.3	-15.5	-15.5	-15.3	-14.9	-14.6	-14.0	-13.2	-11.8	-11.0	-9.8	-8.7	-7.9	-7.5	-7.4	-7.1	-6.9	-6.6	-7.7	-10.0	-11.7	-11.6	-6.6
19-Feb	-12.6	-13.1	-13.8	-14.2	-15.8	-17.5	-19.5	-20.7	-20.1	-19.2	-18.3	-17.1	-16.3	-15.7	-15.0	-14.5	-14.7	-14.9	-15.4	-16.0	-16.3	-16.5	-17.1	-18.6	-16.4	-12.6
20-Feb	-19.9	-21.5	-23.2	-24.9	-25.7	-26.9	-28.1	-28.3	-27.2	-22.1	-17.4	-15.3	-13.5	-12.0	-11.2	-10.9	-11.1	-12.4	-15.0	-16.1	-14.2	-13.9	-14.0	-13.4	-18.3	-10.9
21-Feb	-13.3	-13.1	-12.5	-12.4	-12.0	-11.8	-11.3	-11.1	-11.1	-8.6	-6.6	-5.4	-4.7	-4.5	-3.0	-2.7	-3.0	-3.5	-3.9	-4.5	-5.1	-5.9	-7.2	-8.7	-7.7	-2.7
22-Feb	-10.4	-10.8	-12.9	-13.0	-15.8	-17.0	-18.3	-18.3	-16.6	-14.0	-9.8	-5.5	-3.3	-0.8	0.8	1.8	2.3	0.3	-2.5	-3.0	-2.5	-4.1	-5.8	-7.4	-7.8	2.3
23-Feb	-9.9	-10.7	-11.0	-11.0	-10.9	-10.7	-11.5	-10.4	-8.6	-4.8	-0.4	0.2	0.4	1.0	0.5	0.0	-1.7	-3.3	-3.7	-3.4	-5.1	-5.9	-5.0	-5.2	1.0	
24-Feb	-4.3	-4.5	-4.7	-5.4	-8.0	-9.8	-12.0	-12.9	-11.6	-6.1	-2.3	0.7	2.5	4.1	5.0	4.9	4.2	2.5	0.4	-0.9	-1.4	-2.0	-2.1	-2.2	-2.8	5.0
25-Feb	-2.4	-3.3	-3.1	-2.7	-2.1	-1.5	-1.2	-1.6	-1.3	0.8	3.1	5.4	7.4	8.5	9.2	9.5	9.3	7.7	5.5	3.4	1.5	0.5	0.9	0.9	2.3	9.5
26-Feb	2.5	1.4	-0.6	-1.2	-0.6	-1.8	-1.7	-1.4	0.2	2.9	5.9	7.3	7.3	6.7	4.7	3.8	2.4	0.7	-0.7	-1.7	-2.9	-4.6	-6.3	-8.0	0.6	7.3
27-Feb	-9.6	-11.0	-12.5	-13.5	-14.3	-14.9	-15.4	-15.6	-15.9	-16.0	-15.4	-14.6	-14.4	-13.7	-13.3	-12.8	-12.6	-13.0	-13.2	-13.2	-13.1	-13.3	-14.7	-15.7	-13.8	-9.6
28-Feb	-16.7	-18.3	-19.4	-20.7	-18.3	-19.5	-21.3	-21.7	-21.8	-22.5	-22.7	-21.6	-21.1	-20.4	-20.2	-20.3	-20.6	-21.5	-22.9	-24.5	-24.2	-25.9	-27.2	-28.7	-21.8	-16.7
29-Feb	-30.6	-31.7	-32.3	-33.2	-33.9	-34.1	-34.7	-34.8	-31.1	-27.0	-22.0	-18.7	-16.0	-13.6	-12.5	-11.4	-10.9	-11.0	-11.5	-11.7	-11.6	-11.4	-10.8	-10.4	-21.1	-10.4
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	60	8.62	8.62
-20 - 0	592	85.06	93.68
0 - 10	44	6.32	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

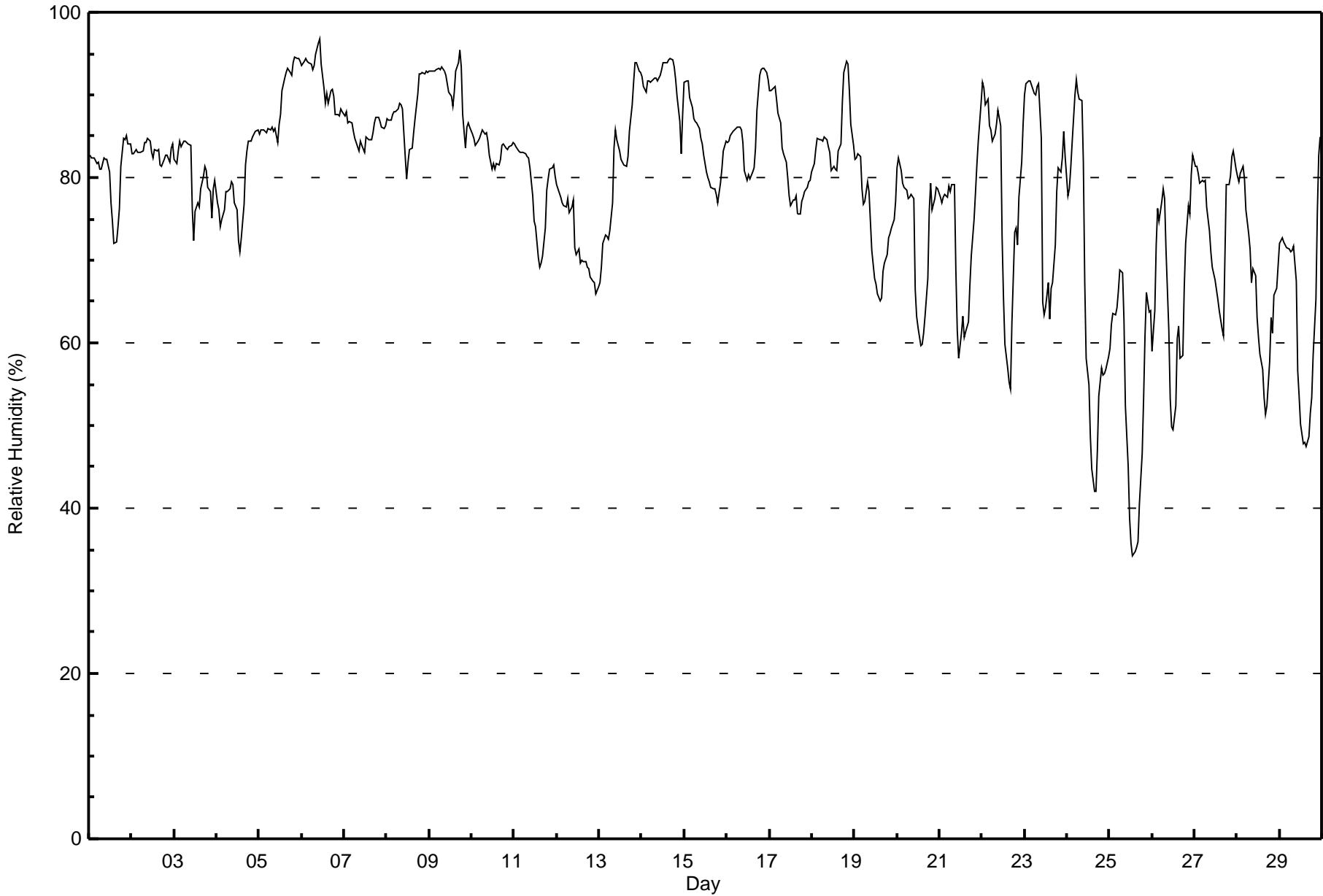
**Relative Humidity (RH) - %
Barge Landing - February 2016**

Maximum Value: 97 % on Feb 6 11:00 Maximum Daily Average: 91.7 % on Feb 6																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 34 % on Feb 25 14:00 Minimum Daily Average: 53.6 % on Feb 25 Maximum Diurnal Average: 83.1 % at hour 4 Minimum Diurnal Average: 71.5 % at hour 15 Monthly Average: 78.8 % Percentiles: P ₁ = 42 P ₁₀ = 62 Q ₁ = 73 Median = 82 O ₃ = 86 P ₉₀ = 92 P ₉₉ = 94																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	82	82	82	82	82	81	81	82	82	82	81	77	75	72	72	74	76	81	85	85	85	84	84	80.5	85
2-Feb	83	83	83	83	83	83	83	84	84	85	84	83	82	83	83	83	81	81	82	83	83	82	84	84	83.1	85
3-Feb	82	82	83	84	84	84	84	84	84	84	76	72	76	77	77	79	80	81	81	79	78	75	79	80	80.3	84
4-Feb	77	76	74	75	76	78	78	79	80	79	77	76	72	71	73	77	82	83	84	84	85	85	86	86	78.9	86
5-Feb	85	86	86	86	86	86	86	86	86	86	84	86	88	91	92	93	93	93	92	94	95	94	94	94	89.2	95
6-Feb	94	94	94	94	94	94	93	94	95	96	97	94	91	89	90	89	91	91	90	88	88	88	88	88	91.7	97
7-Feb	88	88	87	87	87	86	85	84	83	84	84	83	85	85	85	85	85	87	87	87	87	86	86	86	85.6	88
8-Feb	87	87	87	88	88	88	88	89	89	88	83	80	82	83	84	85	87	90	93	93	93	93	93	93	87.9	93
9-Feb	93	93	93	93	93	93	93	93	93	92	91	90	90	89	90	93	94	95	93	88	84	86	87	86	91.1	95
10-Feb	85	85	84	84	85	85	86	85	85	84	83	81	82	81	82	82	82	84	84	84	83	84	84	84	83.7	86
11-Feb	84	84	83	83	83	83	83	83	82	81	78	75	74	70	69	70	71	74	78	80	81	81	81	80	78.8	84
12-Feb	79	78	78	77	77	76	77	76	76	77	71	71	71	70	70	70	70	69	69	68	67	67	66	67	72.4	79
13-Feb	67	69	72	73	73	73	73	77	84	86	85	83	82	82	81	81	83	86	89	92	94	94	93	93	81.8	94
14-Feb	92	91	90	92	92	92	92	92	92	92	93	94	94	94	94	94	94	93	93	92	90	87	83	88	91.6	94
15-Feb	92	92	92	90	88	87	87	87	86	85	84	83	81	80	79	79	79	79	78	77	79	81	83	84	83.7	92
16-Feb	84	84	85	86	86	86	86	86	86	84	81	80	80	80	81	81	84	88	92	93	93	93	93	92	86.0	93
17-Feb	91	90	91	91	90	88	87	84	83	82	80	78	77	77	77	78	76	76	77	78	78	79	80	80	81.8	91
18-Feb	81	82	83	85	85	85	84	85	85	84	83	81	81	81	81	83	84	89	93	94	94	91	86	84	85.1	94
19-Feb	82	82	83	82	79	77	77	80	78	75	71	68	67	66	65	65	69	70	71	73	73	74	75	77	74.1	83
20-Feb	81	82	81	79	79	78	77	78	78	78	66	63	62	60	60	61	63	68	76	79	76	78	79	79	73.4	82
21-Feb	78	77	78	78	78	79	78	79	79	69	62	58	61	63	61	61	63	67	71	75	78	81	84	89	72.8	89
22-Feb	92	91	89	89	86	86	84	85	87	88	86	73	66	60	57	55	54	62	73	74	72	78	82	87	77.3	92
23-Feb	90	91	92	92	91	90	90	91	91	85	65	63	64	67	63	67	67	72	78	81	81	82	86	83	80.1	92
24-Feb	78	79	81	84	90	92	90	89	89	82	67	58	55	49	45	42	42	47	54	57	56	56	57	58	66.6	92
25-Feb	59	62	63	63	64	66	69	69	63	52	45	39	36	34	35	35	36	41	47	53	61	66	64	64	53.6	69
26-Feb	59	64	72	76	75	77	79	78	71	61	53	50	50	52	61	62	58	58	67	72	77	76	80	83	67.1	83
27-Feb	81	81	81	79	80	79	80	76	74	71	69	68	66	65	64	62	61	70	79	79	80	83	83	81	74.7	83
28-Feb	80	80	80	81	80	76	73	71	67	69	68	63	61	59	57	53	51	52	58	63	61	66	67	69	66.9	81
29-Feb	72	73	72	72	71	71	71	71	72	67	57	54	50	48	48	47	49	51	53	58	65	76	83	85	64.1	85
82.0 82.4 82.7 83.1 82.8 82.8 82.6 82.6 82.2 80.3 76.0 73.3 72.5 71.7 71.5 71.9 72.5 75.0 78.1 79.3 79.9 80.9 81.6 82.3																		Diurnal Average								
94 94 94 94 94 94 93 94 95 96 97 94 94 94 94 94 94 95 93 94 95 94 94 94																		Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - February 2016

Maximum Speed: 13 km/h on Feb 26 21:00	Maximum Daily Speed Average: 7.4 km/h on Feb 10	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 3 07:00	Minimum Daily Speed Average: 0.9 km/h on Feb 8	Hours of Data: 689
Maximum Diurnal Speed Average: 2.3 km/h at hour 21	Minimum Diurnal Speed Average: 0.1 km/h at hour 10	Hours of Missing Data: 7
Monthly Average Velocity: 1.0 km/h 38.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 4 Q ₃ = 7 P ₉₀ = 9 P ₉₉ = 12	Percent Operational Time: 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	WSW1	AF	SE1	SSW1	SW2	SE4	SSE2	SSE1	SE1	SSE3	S3	S5	SSW4	SSW5	SSW4	SW3	WSW2	SW3	S1	SE3	ENE1	NNW3	NNW3	NNW3	SSW1.4	S5	
2-Feb	WNW2	NW2	NNW2	NNW2	S1	WSW1	SSE2	SSE4	SSW2	S3	SSE5	S7	S6	SSE3	N6	N6	NNE7	NNE8	N6	NNE6	NNE6	N6	N3	N3	NNE1.3	NNE8	
3-Feb	NNE4	NNE4	N3	N1	N2	S1	S0	SSW1	SE2	SE2	S3	S3	SSE3	S4	WNW2	NNE5	N4	N5	NNE6	NNE7	NE7	NNE7	NNE6	N5	NNE2.1	NNE7	
4-Feb	NNE6	NNE6	NNE6	NNE5	N4	NNW4	N5	NNW4	N5	N4	NNW4	N3	NNW3	W3	NNW3	N2	N3	N3	NNW4	NNW3	NNW3	NNW2	SW1	SW3	N3.1	NNE6	
5-Feb	SSE3	SSE4	SSE6	S6	S5	SSE3	SSW2	WSW1	W2	NNW2	WSW2	SSW5	SSW7	S7	S6	S7	SSW6	W2	W2	NNW2	SW4	SW2	SSE2	SSW3	SSW3.0	S7	
6-Feb	SSW3	SSE4	S5	SSW3	SSE4	S5	SSE6	S4	SSW4	S7	SW5	N12	NNE11	NNE10	N8	N10	NNW6	NE3	NNE3	NNE4	ENE4	ENE3	E4	E3	NE1.3	N12	
7-Feb	E3	NE3	N3	NNW2	W2	AF	SE2	SW0	N1	NNW3	N2	N4	NNE5	NNE6	NNE6	NNE5	NNE5	N2	WNW2	WNW2	SSE3	AF	SSE3	SE4	NNE1.7	NNE6	
8-Feb	SSE3	S1	SSW3	SSE4	S6	SSE3	SSE5	S3	SSW1	SSE2	S6	S4	N3	NNE3	N4	N2	NNW3	N2	NNE1	N1	ENE1	NNW1	S1	NNW2	SSE0.9	S6	
9-Feb	SSE1	WSW1	ESE3	NNE1	ESE1	SE2	SE1	S1	SW1	W2	WSW2	NNW2	NNW2	NW2	SW1	SSE4	SE4	ENE1	N10	N10	NNE11	NNE12	NNE9	NNE8	NNE2.1	NNE12	
10-Feb	NNE10	NNE10	NNE10	NE10	NE10	NE10	NE9	NE9	NNE9	NNE8	NE7	NNE7	NNE7	NNE8	NNE8	NNE7	NNE6	N5	N5	NNE7	NNE6	N5	N4	N4	NNE7.4	NNE10	
11-Feb	NNE4	N4	NNW5	N5	NNW4	NNW4	NNW4	NNW4	NNW4	N4	N5	N5	NNE6	NNE6	NNE8	NNE6	N5	N5	N4	NNW3	NNE3	N1	N2	N1	N4.0	NNE8	
12-Feb	WNW1	ESE1	E1	NE1	E1	NNW2	N4	NNW2	N2	NNW3	WNW3	W3	S7	S6	SSE9	SSE9	SSE8	S9	SSE9	SSE11	SSE10	SSE10	SSE11	SSE9	SSE3.9	SSE11	
13-Feb	SSE9	SSE9	SSE9	S10	S10	S10	S9	S9	S8	S8	S9	S9	SSW8	SSW7	S7	S7	S7	SSE3	SE3	S4	S4	SSW4	WNW2	W3	S6.7	S10	
14-Feb	S0	S0	N2	NNW3	NNW2	WNW1	NNW2	NNW3	NW3	NW3	W4	W2	W3	WSW3	N1	NE3	NE2	NE3	NE4	ENE6	NE5	ENE5	NE5	NNE6	NNE5	NNE1.7	NNE6
15-Feb	N4	N4	NNE4	NNE5	NNE6	NNE6	NNE6	NNE6	NNE6	NNE7	NNE6	NNE6	NNE7	NNE8	NNE6	NNE6	NNE5	NNE4	NNE4	NE4	NE4	N3	N3	NNW2	NNE5.0	NNE8	
16-Feb	NW2	NNW3	N1	NNE2	NNW3	ESE3	SE3	W2	WSW1	W1	WSW2	SW2	NNE2	NNE3	NNE3	NNE3	NNE4	N4	N4	NNW5	NNW6	NNW6	N5	N6	N2.2	NNW6	
17-Feb	N7	N7	N7	N7	NNE8	NNE9	NNE7	NNE9	NNE8	NE9	NNE8	NNE7	NE7	NE8	NE8	NE7	NNE7	NE8	NNE6	NNE7	NNE7	NNE7	NNE7	NNE6	NNE7.2	NNE9	
18-Feb	NNE6	NNE7	NNE5	N5	N5	N5	N5	N4	N5	NNW6	NNW6	NNW5	NNW6	NNW4	N2	SE4	WNW3	NW2	NNW1	SE3	NE2	NNE8	NE9	NE9	N3.9	NE9	
19-Feb	NE8	NNE5	N4	N4	NNE7	NNE5	NNE3	ENE3	SE3	ESE4	E5	NE4	ENE5	NE6	NE6	ENE5	ENE4	ENE5	NE6	ENE5	NE5	NE5	NE4	NE2	NE4.2	NE8	
20-Feb	N3	NNW2	NNW1	NW2	NNW1	AF	SSE2	SSE4	SE4	SE3	SSW4	S6	SSW7	S6	S6	S6	S6	S6	SE5	SE5	SE5	SE2	ENE1	AF	AF	SSE2.6	SSW7
21-Feb	WSW3	SW1	SSE1	SSW3	S3	SSE4	S3	SSE4	SSE5	S6	S8	S9	S8	S7	S9	S7	S6	S5	SE3	E2	N2	SSE2	W2	N3	S3.6	S9	
22-Feb	N3	NNW4	N2	N3	NNW1	SSE1	SE3	SE3	SE2	SSW2	SSE3	S6	S8	S7	SSW5	S6	SSE4	ESE2	NNW3	N5	N5	S1	E2	NNW1	S1.0	S8	
23-Feb	SE1	SSE4	SSE4	SSE4	SE5	SSW5	SE5	SE5	S3	ESE4	W2	NNW3	NE6	NE6	ENE5	NE6	ENE5	E3	SW2	WSW3	W4	WSW4	NW2	NNW3	ESE1.1	NE6	
24-Feb	WNW5	NW5	W5	W3	N2	SW3	ESE3	SSE5	S5	S6	SSE5	S7	S8	SSW8	S7	S7	SSE7	SSE7	S7	S7	S8	S9	S9	S9	S4.5	S9	
25-Feb	SSW8	S7	S8	SSE8	SSE8	S7	S7	SSW8	SSW7	SW9	WSW9	SW9	SW10	WSW13	WSW12	W9	NW8	NW7	WNW2	SW4	ESE3	E4	SSW3	S4	SW5.2	WSW13	
26-Feb	SW5	SW5	SSE5	SSE5	SW5	SSE4	SSW6	SW8	SW7	WSW5	W5	NW5	NNW8	NNE6	NE7	NE8	NE9	NE11	NNE11	NNE12	NNE13	NNE12	NNE11	NNE10	NNE2.7	NNE13	
27-Feb	NNE12	NNE12	NNE11	NNE11	NNE11	NNE10	NNE8	NNE8	NNE8	NNE9	NNE8	NNE8	NNE6	N5	NNE5	NNE4	N2	NE2	E2	SE4	NNE1	N6	NNE8	NNE7	NNE6.7	NNE12	
28-Feb	NE7	NNE6	NNE4	N3	NNE8	N9	N7	N10	N12	NNE9	NNE9	NE9	NNE10	NNE9	NE9	NE8	NNE7	NNE6	NNE5	NE3	NE5	N4	NNW4	NNW2	NNE6.6	N12	
29-Feb	SW1	SE3	SSW2	SSE3	SSE3	WSW2	S1	S1	SW2	SSW5	SSW7	SSW8	SSW8	SSW8	SW4	SSW6	S4	WSW2	WSW2	SE2	AF	SE4	S5	S6	S3.5	SSW8	

NNE1.4 NNE1.5 NE1.1 NE0.9 NE0.9 ENE0.9 E1.0 ENE0.6 NE0.4 N0.1 SW0.6 WSW0.1 NE0.2 ENE0.5 NE0.9 ENE1.2 NE1.2 NE1.8 NNE2.0 NE2.0 NE2.3 NNE2.2 NNE1.9 NNE1.6	Diurnal Average
NNE12 NNE12 NNE11 NNE11 NNE11 NNE10 S9 N10 N12 SW9 NNE9 N12 NNE11 WSW13 WSW12 N10 NE9 NE11 NNE11 NNE12 NNE13 NNE12 SSE11 NNE10	Diurnal Maximum

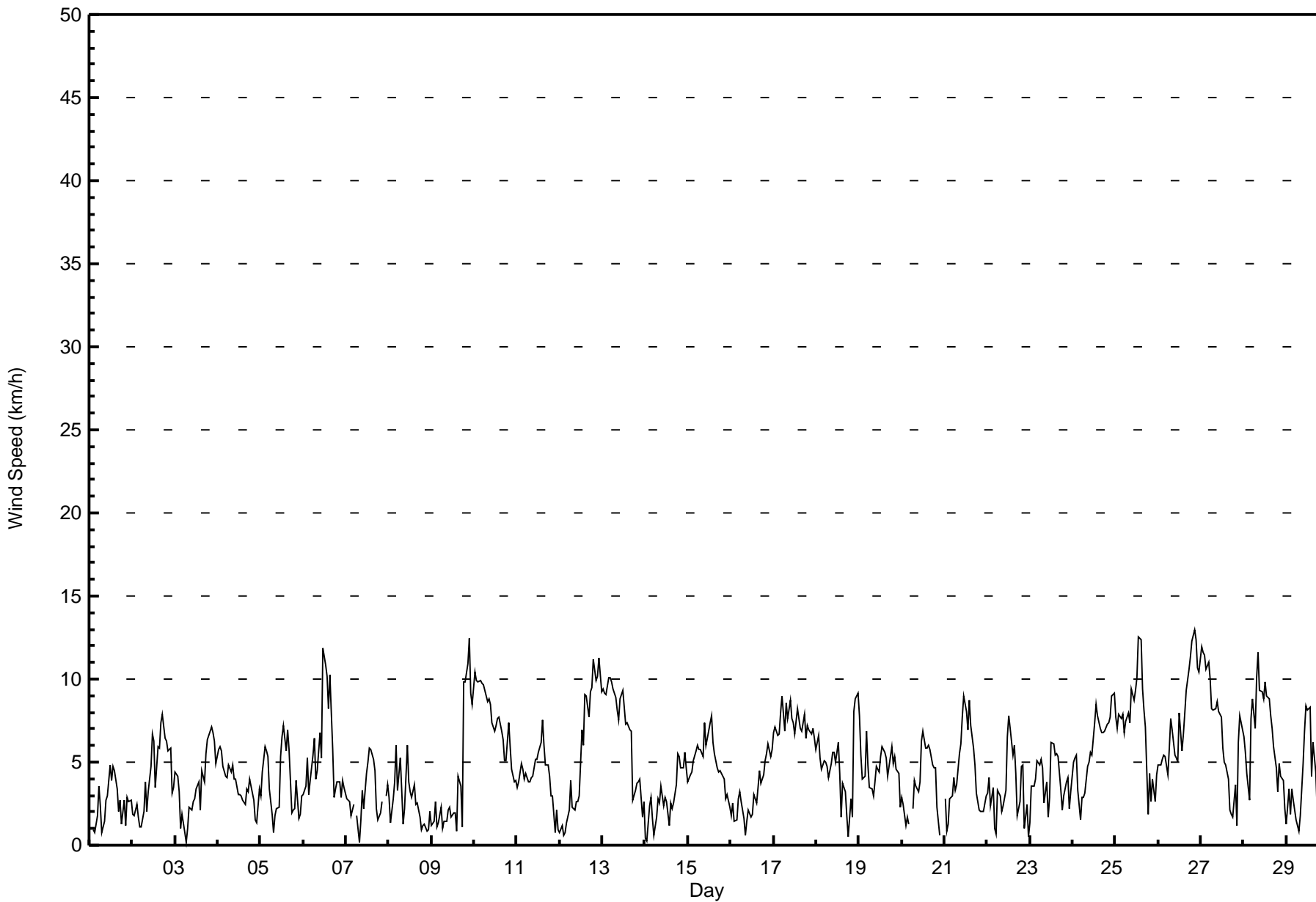
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Barge Landing - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 km/h on Feb 9 19:00 Minimum Value: 0 km/h on Feb 3 09:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 4																	Hours in Service: 696 Hours of Data: 689 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.0								
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	AF	1	1	1	1	1	1	1	1	3	2	2	2	1	1	1	1	1	1	1	1	1	1	3
2-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	3	2	2	2	2	1	1	3
3-Feb	1	1	1	1	1	1	1	1	0	1	1	1	2	1	1	2	2	1	2	2	2	2	2	2	
4-Feb	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	2
5-Feb	1	1	1	2	2	1	1	1	1	1	1	2	2	3	2	2	2	1	1	1	1	1	1	1	3
6-Feb	1	1	2	1	2	3	2	2	1	2	2	4	4	3	3	3	2	1	1	1	2	1	1	1	4
7-Feb	1	2	1	1	1	AF	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	AF	1	0	2
8-Feb	1	1	1	1	2	2	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2
9-Feb	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	5	3	4	4	4	3	5
10-Feb	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	1	1	2	2	1	1	1	3
11-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	2
12-Feb	2	1	1	1	1	1	1	1	1	1	1	1	3	2	3	3	3	3	3	4	4	3	4	3	4
13-Feb	3	3	3	4	3	3	3	3	3	3	3	3	2	3	2	2	3	2	1	1	2	1	1	1	4
14-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2
15-Feb	1	1	1	1	1	2	2	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2
16-Feb	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
17-Feb	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
18-Feb	2	2	1	1	1	1	1	1	2	1	2	2	2	2	1	1	1	1	1	1	2	3	2	3	3
19-Feb	2	2	1	1	2	2	2	1	1	1	1	1	2	2	2	1	1	2	2	2	2	1	1	2	2
20-Feb	1	0	1	1	1	AF	1	1	1	1	1	3	2	2	2	2	2	1	1	0	1	1	AF	AF	3
21-Feb	1	1	1	1	1	1	1	1	1	2	3	3	3	2	3	3	2	1	2	2	1	1	1	1	3
22-Feb	1	1	2	1	1	1	1	1	1	1	1	3	3	2	2	3	1	1	1	1	1	2	1	1	3
23-Feb	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	2	1	1	2	1	1	2
24-Feb	2	1	2	2	2	2	1	1	1	2	2	2	3	3	2	2	1	1	2	1	2	2	2	2	3
25-Feb	2	2	2	2	2	2	2	2	2	2	2	3	4	4	3	4	3	2	2	1	1	1	1	1	4
26-Feb	2	2	1	1	1	1	2	2	3	3	2	2	2	2	2	3	3	3	3	3	4	3	3	3	4
27-Feb	3	4	4	3	3	3	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	2	2	2	4
28-Feb	2	2	1	1	3	3	2	4	3	3	2	2	3	3	3	2	2	1	1	1	2	1	1	2	4
29-Feb	1	1	1	1	1	1	1	1	1	3	2	3	3	3	2	2	2	1	1	1	AF	1	1	2	3
Diurnal Maximum																								3	
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	436	63.28	63.28
6 - 11	243	35.27	98.55
12 - 19	10	1.45	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: 689

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - February 2016**

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	71	39	18	17	11	9	34	46	33	23	22	17	19	11	10	56	436
6 - 11	17	91	29	1	0	0	0	19	55	15	5	1	1	0	2	7	243
12 - 19	2	6	0	0	0	0	0	0	0	0	0	2	0	0	0	0	10
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	90	136	47	18	11	9	34	65	88	38	27	20	20	11	12	63	689

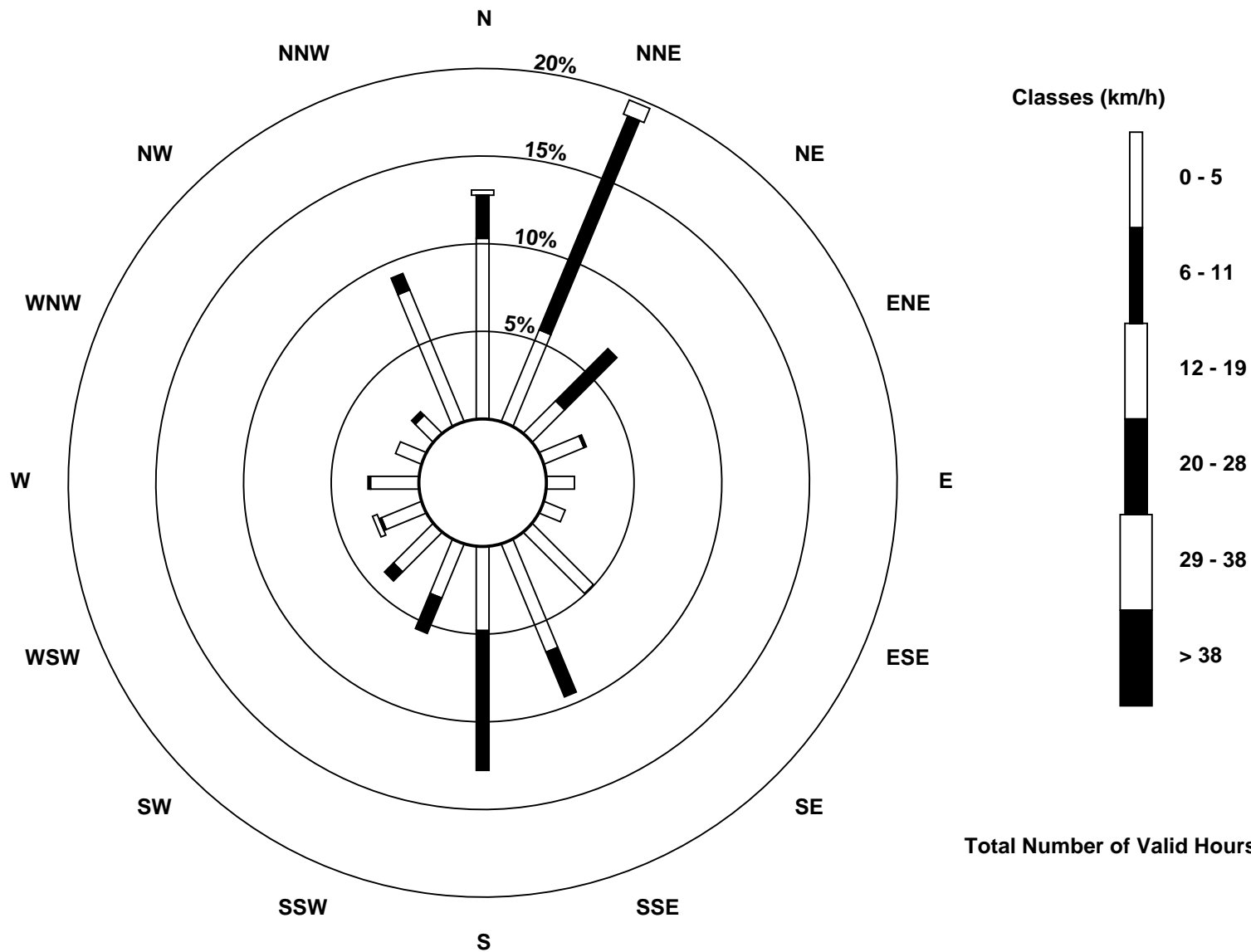
Total Number of Valid Hours: 689

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Barge Landing (AMS 9)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - February 2016

Direction of Maximum Speed: 30 deg on Feb 26 21:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 24.8 deg on Feb 10	Hours of Data: 689
Direction of Minimum Speed: 176 deg on Feb 3 07:00	Direction of Minimum Daily Speed Average: 0.9 deg on Feb 8
Direction of Minimum Speed: 176 deg on Feb 3 07:00	Hours of Missing Data: 7
Monthly Average Direction: 274.5 deg	Percent Operational Time: 99.0

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	247	AF	136	197	221	133	155	159	130	149	173	183	208	206	213	218	245	217	184	142	64	340	343	347	191.3
2-Feb	298	322	338	329	186	240	147	151	201	183	168	174	187	158	350	8	17	15	4	20	15	9	2	353	14.0
3-Feb	20	14	355	3	358	186	176	203	125	142	174	191	164	182	297	12	360	350	22	30	34	14	16	6	20.3
4-Feb	20	26	22	16	351	346	349	343	357	350	332	353	315	264	331	8	353	5	342	335	340	328	229	221	350.1
5-Feb	168	153	151	172	172	155	212	247	277	332	257	199	200	178	190	191	198	264	263	340	216	229	154	194	191.5
6-Feb	208	160	189	199	161	169	152	176	193	191	220	9	21	17	2	359	347	40	27	29	61	71	99	94	52.9
7-Feb	80	35	3	332	259	AF	140	220	11	343	9	10	22	24	28	21	13	11	286	297	167	AF	160	142	20.7
8-Feb	154	188	205	160	182	163	167	184	203	164	182	173	358	16	10	10	345	5	12	4	67	337	176	345	165.5
9-Feb	161	241	120	26	119	129	137	179	223	266	245	330	330	304	220	167	136	63	7	4	19	17	23	25	20.0
10-Feb	16	18	33	39	38	35	39	37	26	29	36	28	32	25	24	20	16	1	2	21	17	358	353	3	24.8
11-Feb	27	355	342	349	342	344	347	341	346	0	9	11	20	12	21	15	353	4	3	335	12	357	356	1	1.0
12-Feb	287	109	92	54	84	339	351	342	350	338	295	278	190	171	157	152	166	169	165	163	167	165	168	164	167.1
13-Feb	166	163	162	169	171	175	172	173	177	179	176	183	193	194	187	180	186	157	134	173	169	204	290	261	177.0
14-Feb	188	170	358	346	340	292	327	348	321	260	277	272	239	358	51	41	56	56	60	55	59	48	22	16	17.5
15-Feb	4	0	20	16	22	23	23	27	20	16	17	22	18	19	25	13	18	17	21	36	56	357	350	343	18.4
16-Feb	321	339	359	28	340	107	141	265	253	277	253	231	14	18	31	13	19	349	349	339	335	342	353	358	351.6
17-Feb	357	355	3	9	19	15	19	23	31	36	29	33	35	39	49	41	31	35	31	27	27	29	28	27	25.7
18-Feb	26	26	18	353	358	1	4	1	352	341	341	338	341	334	5	129	291	324	342	136	45	21	35	42	7.8
19-Feb	37	22	351	11	13	14	27	71	125	117	92	53	61	41	44	64	66	67	56	65	53	39	41	42	47.6
20-Feb	8	340	345	315	339	AF	155	148	145	141	193	191	193	183	178	179	175	144	132	127	138	63	AF	AF	165.6
21-Feb	247	224	164	208	179	150	171	161	148	183	189	181	184	179	177	185	185	179	143	101	7	151	275	356	178.3
22-Feb	354	342	350	349	338	150	145	126	140	195	166	185	181	180	195	188	168	102	334	8	352	184	98	335	171.8
23-Feb	137	160	148	148	144	211	127	137	190	123	280	336	49	47	57	53	74	94	232	250	260	257	316	328	114.1
24-Feb	292	306	273	276	350	226	112	164	148	180	182	168	175	186	200	182	177	151	157	174	180	178	179	182	184.6
25-Feb	192	174	173	161	168	179	185	195	205	234	244	232	231	247	256	269	305	312	283	234	119	100	212	184	218.9
26-Feb	230	225	154	165	220	166	194	225	216	240	260	321	346	29	42	48	38	39	33	33	30	26	21	18	23.5
27-Feb	15	15	13	21	20	20	12	12	15	16	20	12	13	4	24	31	358	49	82	133	17	10	28	28	19.0
28-Feb	35	31	24	11	14	11	7	4	4	22	21	34	21	29	38	36	23	22	19	52	36	355	343	330	19.9
29-Feb	231	146	205	152	152	249	187	185	225	203	204	192	197	196	218	199	187	256	239	139	AF	138	170	170	190.0
15.4 20.8 33.9 40.2 44.9 62.4 91.3 76.5 47.4 3.5 233.0 243.1 51.0 59.3 40.8 61.5 33.9 35.5 31.7 44.0 39.4 26.1 30.6 27.1																									
Diurnal Average																									

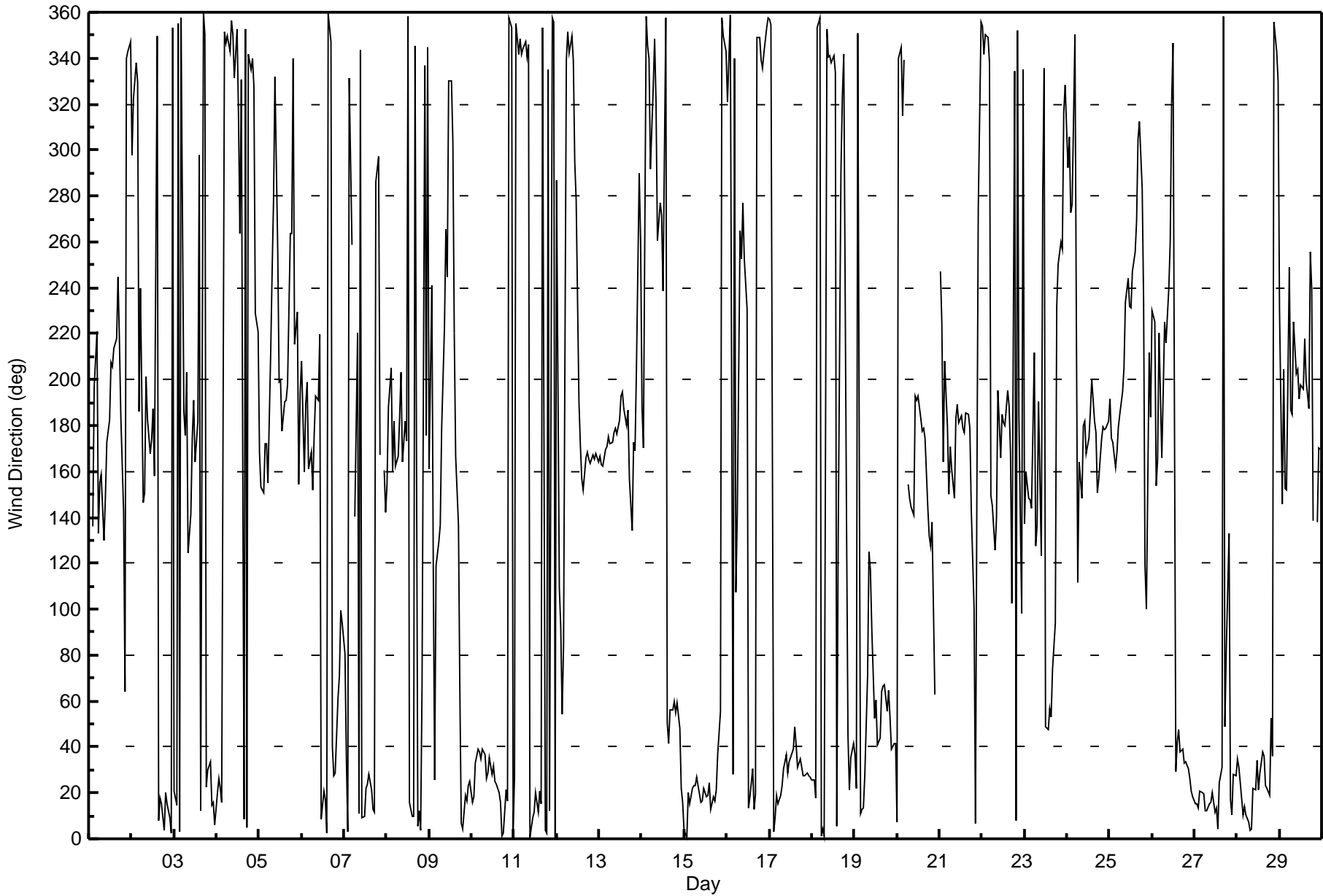
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Barge Landing - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Feb 7 08:00 Minimum Value: 10 deg on Feb 8 00:00 Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 20 Median = 29 Q ₃ = 48 P ₉₀ = 62 P ₉₉ = 78																								Hours in Service: 696 Hours of Data: 195 Hours of Missing Data: 501 Hours of Calibration: 0 Percent Operational Time: 28.0	
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	45	AF	66	83	48	13	33	77	49	42	56	34	54	37	29	40	27	21	49	48	70	13	18	29	83
2-Feb	27	56	39	47	73	60	54	33	52	28	24	26	26	62	22	22	17	19	20	17	19	19	19	23	73
3-Feb	17	19	23	80	48	67	82	52	19	32	43	54	52	41	71	25	36	20	18	20	19	18	19	20	82
4-Feb	20	18	16	21	16	17	22	22	19	20	23	36	29	58	30	33	23	23	19	15	15	41	72	22	72
5-Feb	44	17	17	24	24	29	50	85	39	27	45	30	28	27	39	24	27	56	50	59	53	74	75	27	85
6-Feb	25	28	33	43	43	36	18	37	27	23	30	25	24	19	24	21	20	25	21	20	32	26	14	18	43
7-Feb	31	48	43	39	25	AF	44	101	58	18	47	23	17	17	17	18	16	33	55	41	33	AF	31	10	101
8-Feb	24	46	27	24	27	62	23	29	72	52	26	57	25	27	27	32	31	46	55	62	54	57	73	56	73
9-Feb	66	65	16	62	80	38	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	80
10-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
11-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
12-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
13-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
14-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
15-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
16-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
17-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
18-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
19-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
20-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
21-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
22-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
23-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
24-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
25-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
26-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
27-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
28-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
29-Feb	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
66 65 66 83 80 67 82 101 72 52 56 57 54 62 71 40 36 56 55 62 70 74 75 56																									
Diurnal Maximum																									
AF - Analyzer Failure NF - Not Flagged																									





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	February 3, 2016	Last Calibration	January 6, 2016
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	12:15	End Time (MST)	15:10
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	LL104180 12/Feb/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-689	-689
Analyzer IP address	192.168.1.42		Lamp voltage	1018	1021
Calculated slope	1.007241	1.006124	Chamber temp	45	45
Calculated intercept	-0.280609	-0.191191	Pressure	697.3	691.5
Analyzer Background	1.96	1.98	Flow	0.442	0.437
Analyzer Coefficient	1.039	1.039	Intensity	90	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	519	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	83.8	79.9	78.1	1.024
SO2 scrubber check	5000	15.4	147.2	2.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	83.8	79.9	79.6	1.005
second point	5000	41.9	40.0	40.0	0.999
third point	5000	21.0	20.0	20.3	0.987
as left zero	6000	0.0	0.0	0.4	----
as left span	5000	83.8	79.9	78.6	1.017
Average Correction Factor					0.997

Corrected As found	78.1	Previous response	79.7	% change	2.0%
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Notes:

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

Calibration Performed By:

Evan Magill



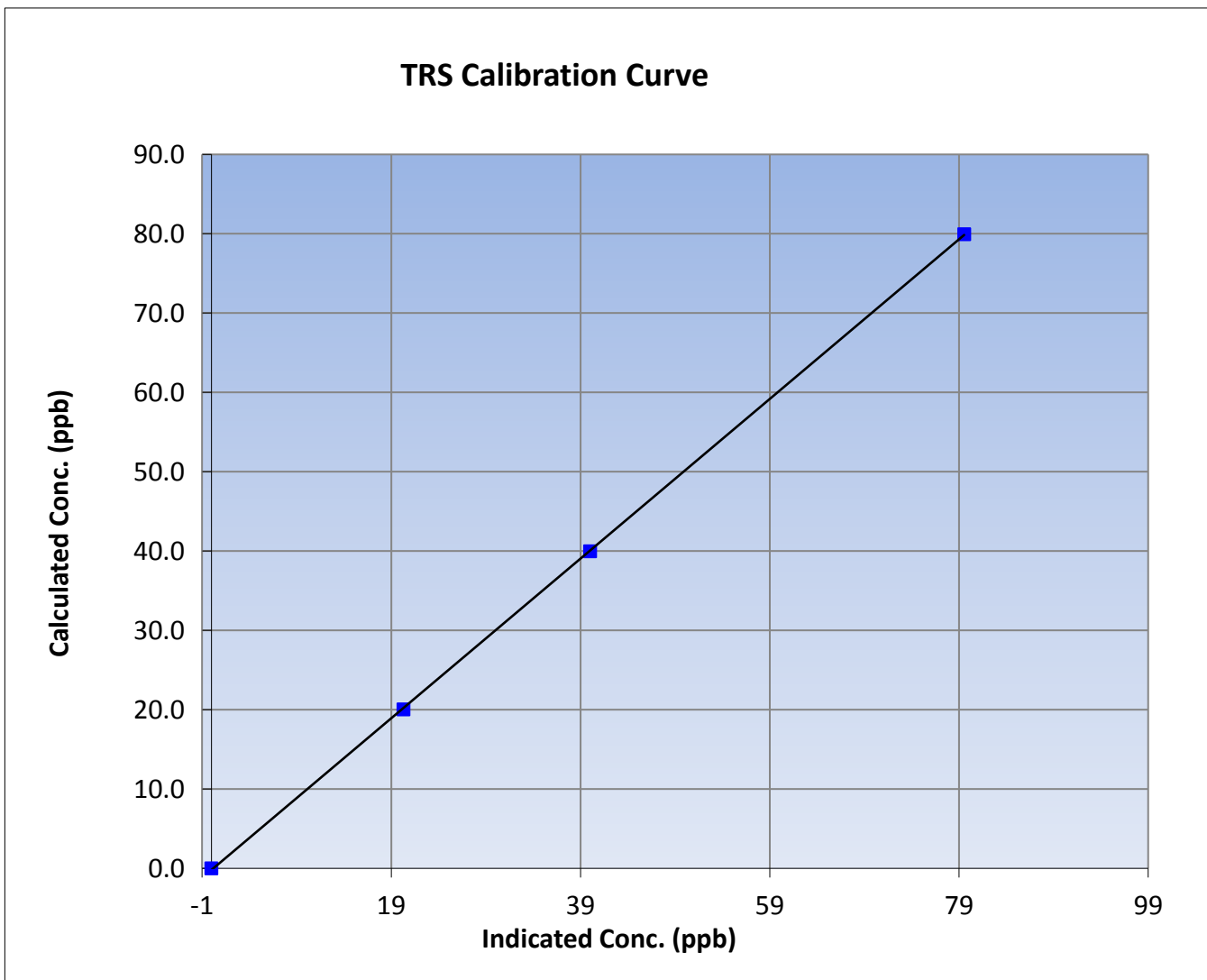
Wood Buffalo Environmental Association TRS Calibration Report

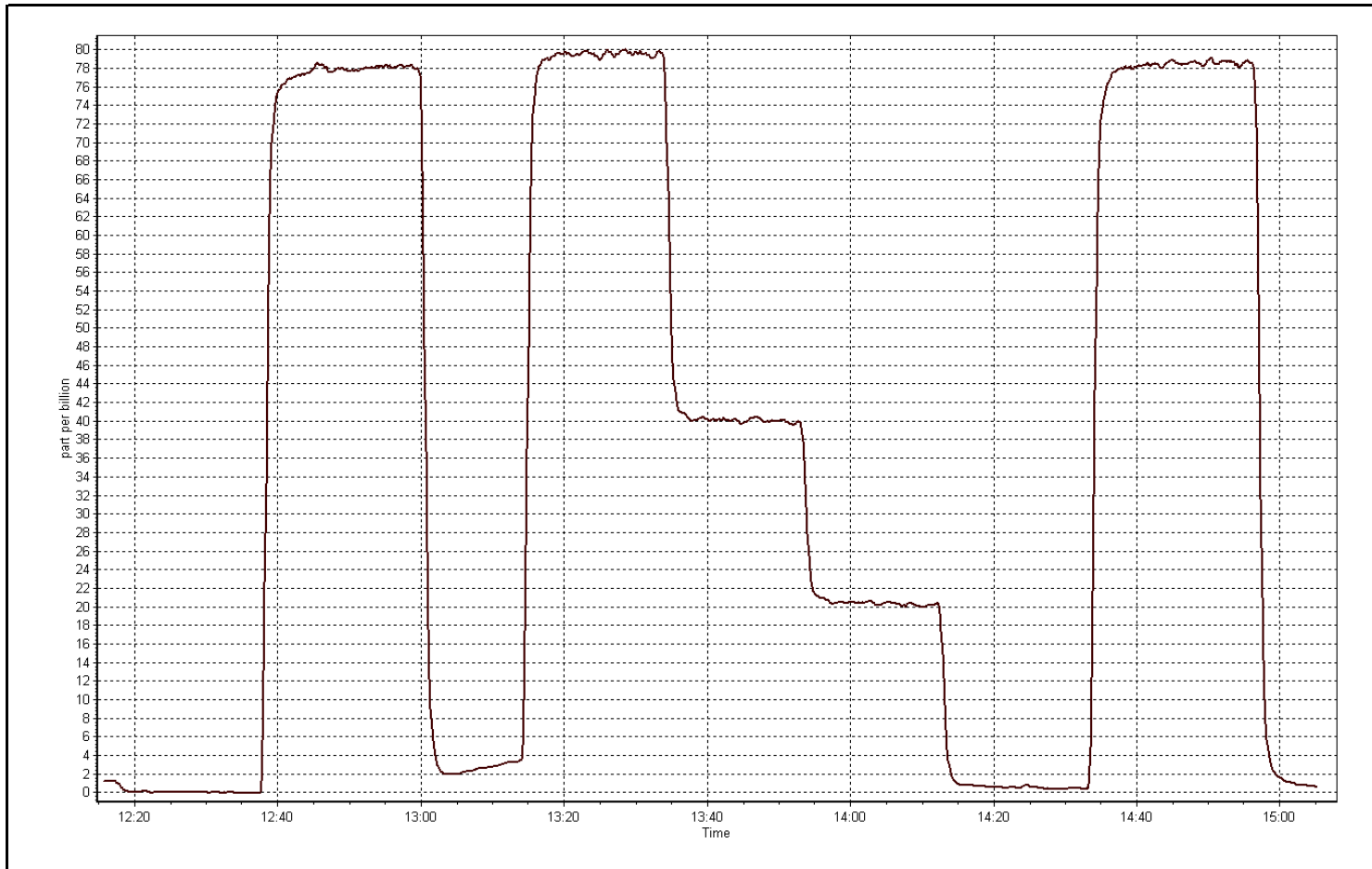
Station Information

Calibration Date	February 3, 2016	Previous Calibration	January 6, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:15	End Time (MST)	15:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999974
79.9	79.6	1.0050		
40.0	40.0	0.9988	Slope	1.006124
20.0	20.3	0.9874		
			Intercept	-0.191191







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-03-16	Last Calibration	January-06-16
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:15
Gas Cert Reference	LL104180	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

Analyzer Information

	<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	0.994647	1.001964	Fuel Pressure	24.1	24.1
Calculated intercept	0.040336	0.020582	Analyzer Coeff	4.267	4.219
			Analyzer BKG	5.56	5.49

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	-0.01	----
as found span	5000	76.7	15.70	15.87	0.989
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	76.7	15.70	15.65	1.003
second point	5000	41.0	8.39	8.36	1.004
third point	5000	15.4	3.15	3.11	1.014
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.7	15.70	15.58	1.008
Average Correction Factor					1.007

Corrected As found: 15.88 Previous response: 15.74 % change: -0.9%

Notes:

Changed inlet filter after as founds. Small adjustment on span.

Calibration Performed By:

Evan Magill



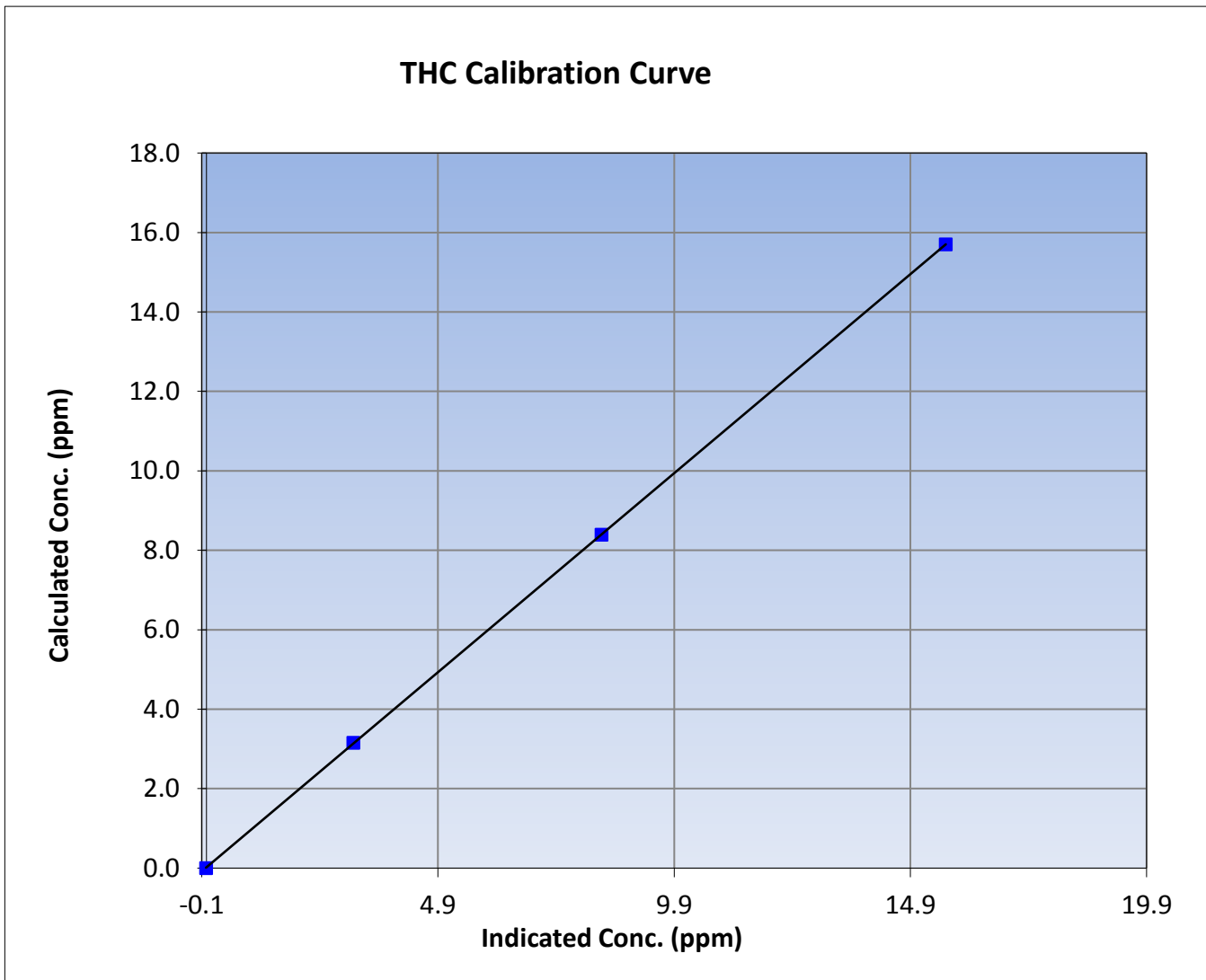
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 3, 2016	Previous Calibration	January 6, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	10:00	End Time (MST)	12:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

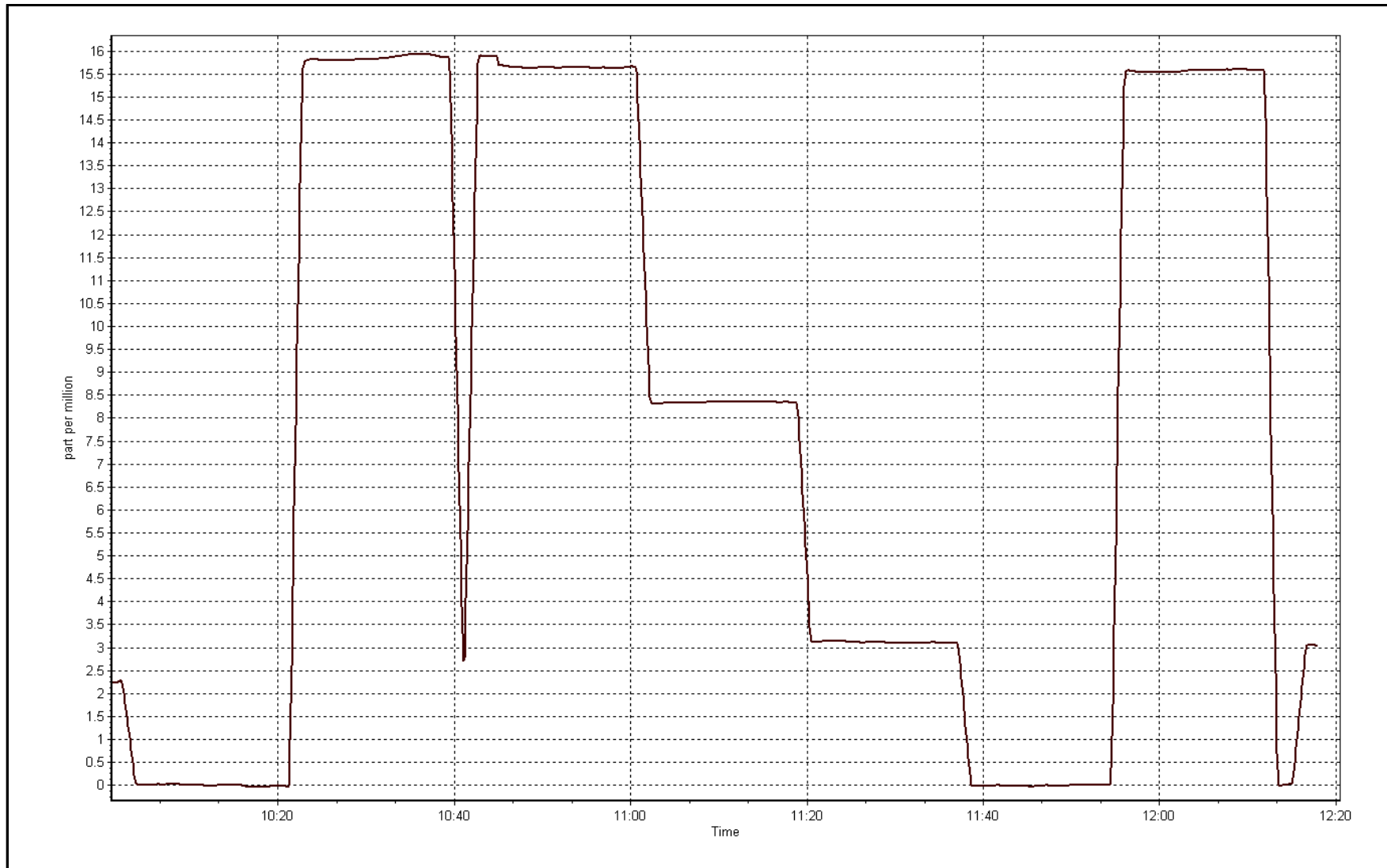
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999997
15.70	15.65	1.0032		
8.39	8.36	1.0039	Slope	1.001964
3.15	3.11	1.0136		
			Intercept	0.020582



THC Calibration Plot

Date: February 3, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 11
LOWER CAMP
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 FEBRUARY 2016

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	663	33	33	100.00	65	0	8	0
H2S (ppb) Average	662	34	34	100.00	15	2	3	0
THC (ppm) Average	663	33	33	100.00	3.8	-	3	-
Temperature (C) Average	696	0	0	100.00	8	-	1.4	-
Relative Humidity (%) Average	696	0	0	100.00	95	-	90	-
Wind Speed 10 m (km/h) Average	696	0	0	100.00	29	-	16	-
Wind Direction 10 m (deg) Average	696	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	663	1.9	5	-	0	0	0	0	1	4	65
H2S (ppb) Average	662	0.9	1	-	0	0	0	0	1	2	15
THC (ppm) Average	663	2.47	0.4	-	2	2.1	2.2	2.3	2.7	3	3.8
Temperature 2 m (C) Average	696	-11.39	7.1	-	-34	-19	-15.3	-11.8	-6.7	-2.7	8
Relative Humidity (%) Average	696	77.9	11	-	41	62	72	80	85	91	95
Wind Speed 10 m (km/h) Average	696	7.8	5	-	0	2	4	7	11	15	29
Wind Direction 10 m (deg) Average	696	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

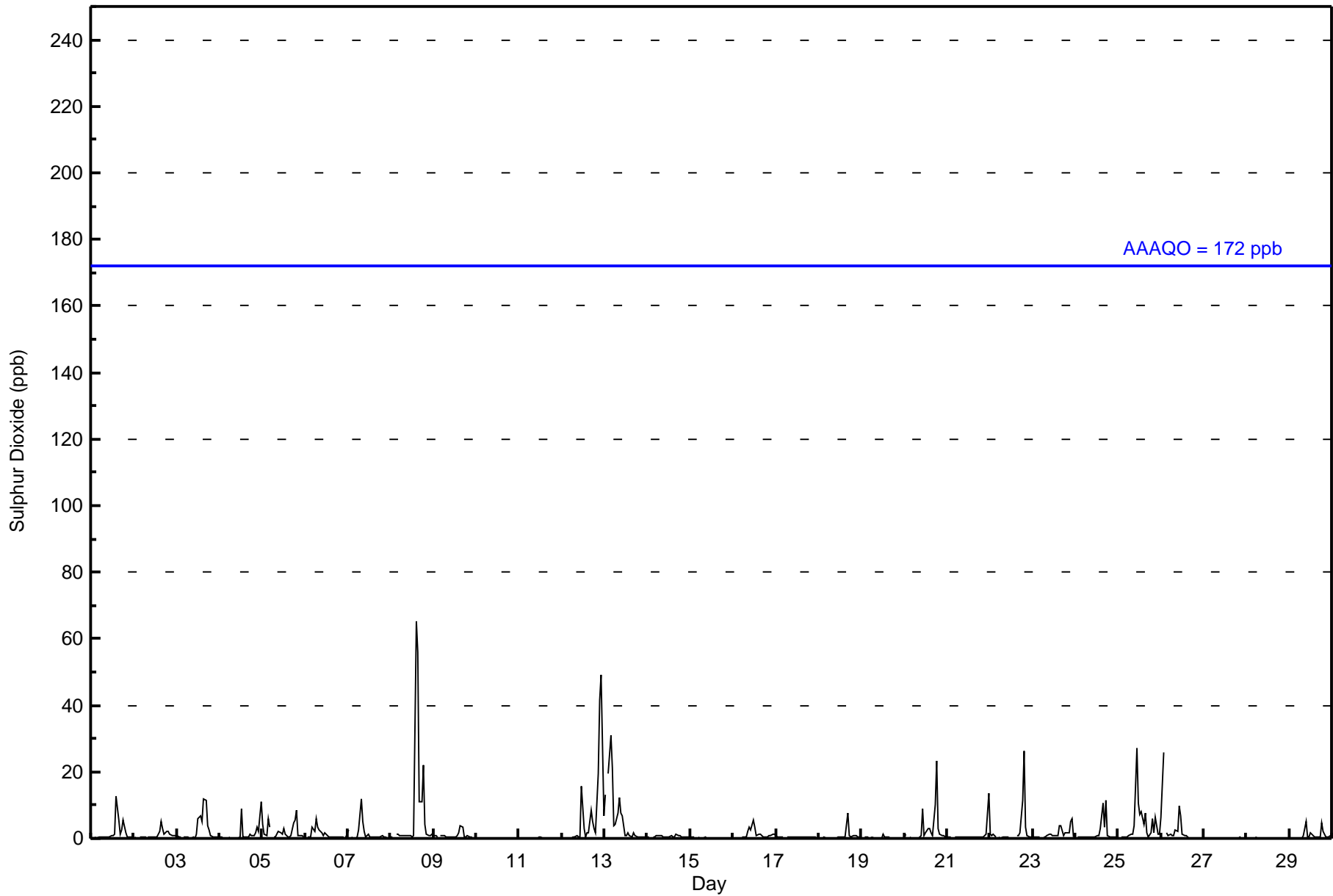
Lower Camp - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 65 ppb on Feb 8 15:00										Maximum Daily Average: 8.0 ppb on Feb 8										Hours of Data: 663						
Minimum Value: 0 ppb on Feb 20 07:00										Minimum Daily Average: 0.1 ppb on Feb 28										Hours of Missing Data: 33						
Maximum Diurnal Average: 3.9 ppb at hour 16										Minimum Diurnal Average: 0.6 ppb at hour 6										Hours of Calibration: 33						
Monthly Average: 1.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 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	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	13	6	1	3	5	2	0	0	0	0	1.6	13
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	5	3	1	2	2	1	1	1	1	1.0	5
3-Feb	1	1	0	Z	0	0	0	0	0	0	0	1	6	7	5	12	11	4	3	1	0	0	0	2.4	12	
4-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	9	0	0	0	0	1	1	1	2	3	2	11	1.5	11
5-Feb	4	1	1	6	4	Z	1	0	1	2	2	1	3	1	1	1	1	5	6	8	1	1	1	1	2.2	8
6-Feb	Z	0	1	0	3	2	6	3	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	1.2	6
7-Feb	3	Z	0	0	0	0	3	12	5	2	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1.3	12
8-Feb	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	65	56	11	11	22	4	1	1	1	1	8.0	65
9-Feb	1	1	1	Z	1	1	1	0	0	0	1	0	0	1	2	4	4	1	1	1	0	0	0	0	0.8	4
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	0	0	Z	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	1	1	0	16	3	0	2	2	8	5	3	2	20	42	49	7	7.0	49
13-Feb	13	Z	19	31	21	4	4	8	12	7	7	1	1	2	1	1	2	1	1	1	1	0	0	1	6.0	31
14-Feb	0	0	Z	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
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	0.2	0
16-Feb	0	0	0	0	Z	0	0	0	2	4	2	5	3	1	1	1	1	1	1	1	1	1	1	1	1.2	5
17-Feb	1	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	1	1	1	1	0	0	0.7	7
19-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
20-Feb	0	1	Z	0	0	0	0	0	0	1	9	1	2	3	3	2	1	10	23	3	1	1	1	1	2.7	23
21-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	13	1.0	13
22-Feb	1	1	1	1	Z	0	0	0	0	0	1	C	C	C	C	1	1	2	11	26	3	1	0	0	2.7	26
23-Feb	0	0	0	0	1	Z	0	0	1	1	1	1	1	1	4	4	1	2	2	2	5	6	0	0	1.5	6
24-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	3	11	3	11	1	0	0	0	0	1	1.6	11
25-Feb	0	Z	0	0	0	0	1	1	1	4	27	11	7	8	4	7	2	0	2	6	2	6	1	1	4.1	27
26-Feb	6	26	Z	2	1	1	1	1	3	2	10	7	1	1	0	0	0	0	0	0	0	0	0	0	2.7	26
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	0	0	0	0	0	0	0	0	0.1	0
29-Feb	0	0	0	0	0	Z	0	0	1	5	0	0	2	1	0	0	0	0	5	2	0	1	1	1	0.9	5
1.4 1.5 1.1 1.9 1.5 0.6 0.7 1.1 1.2 1.2 2.3 1.9 1.6 1.2 3.8 3.9 2.2 2.1 3.1 2.3 1.4 2.3 2.4 1.5																								Diurnal Average		
13 26 19 31 21 4 6 12 12 7 27 16 9 8 65 56 11 11 23 26 20 42 49 13																								Diurnal Maximum		
Z - zerspan 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 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	635	95.78	95.78
11 - 20	17	2.56	98.34
21 - 60	10	1.51	99.85
61 - 110	1	0.15	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	127	31	6	2	8	22	152	17	2	0	4	6	20	57	77	104	635
11 - 20	1	0	0	1	0	0	7	1	1	0	0	1	1	3	0	1	17
21 - 60	0	0	0	0	0	0	4	1	0	1	0	0	2	2	0	0	10
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	128	31	6	3	8	22	163	19	3	1	4	7	23	63	77	105	663

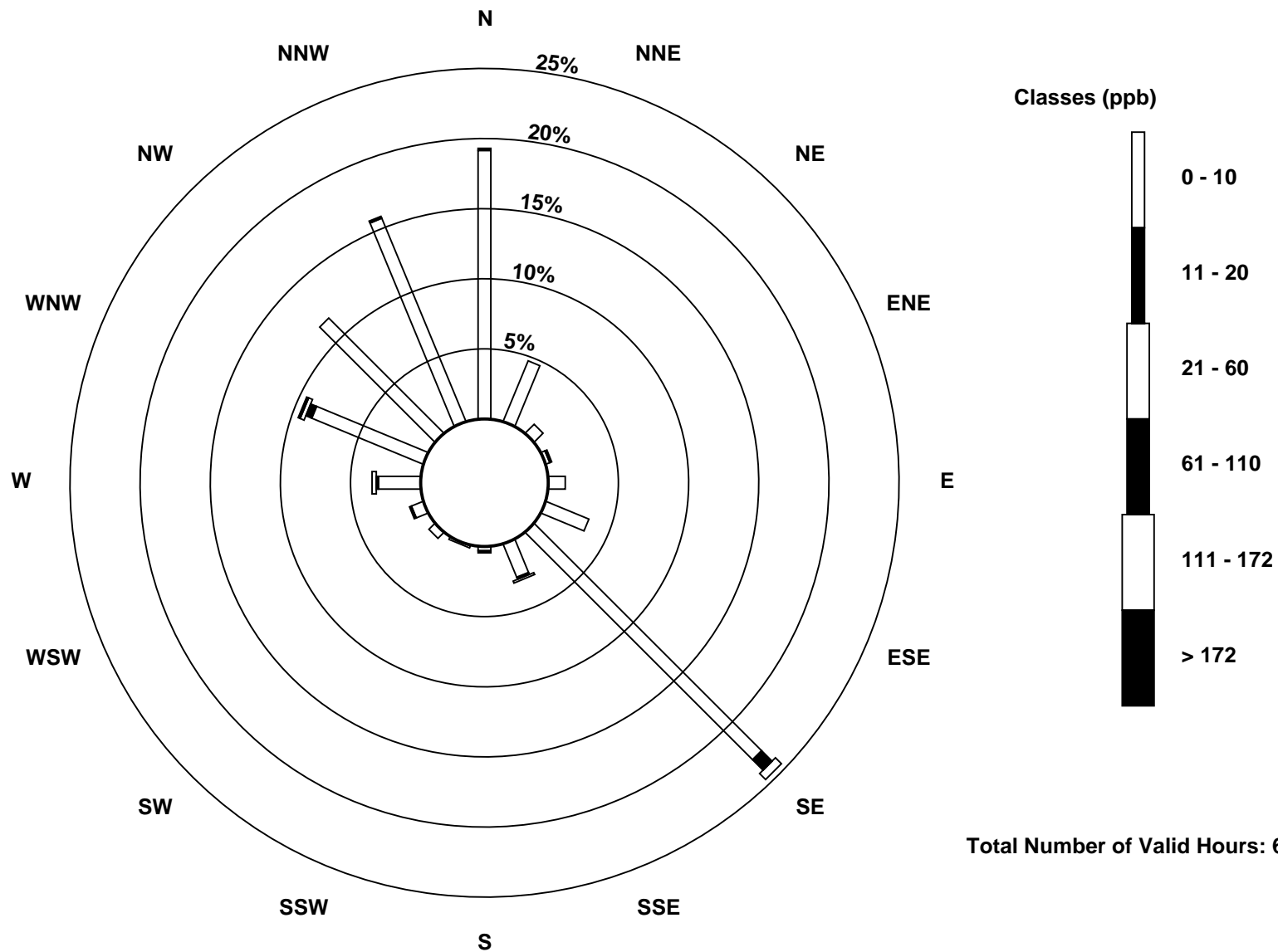
Total Number of Valid Hours: 663

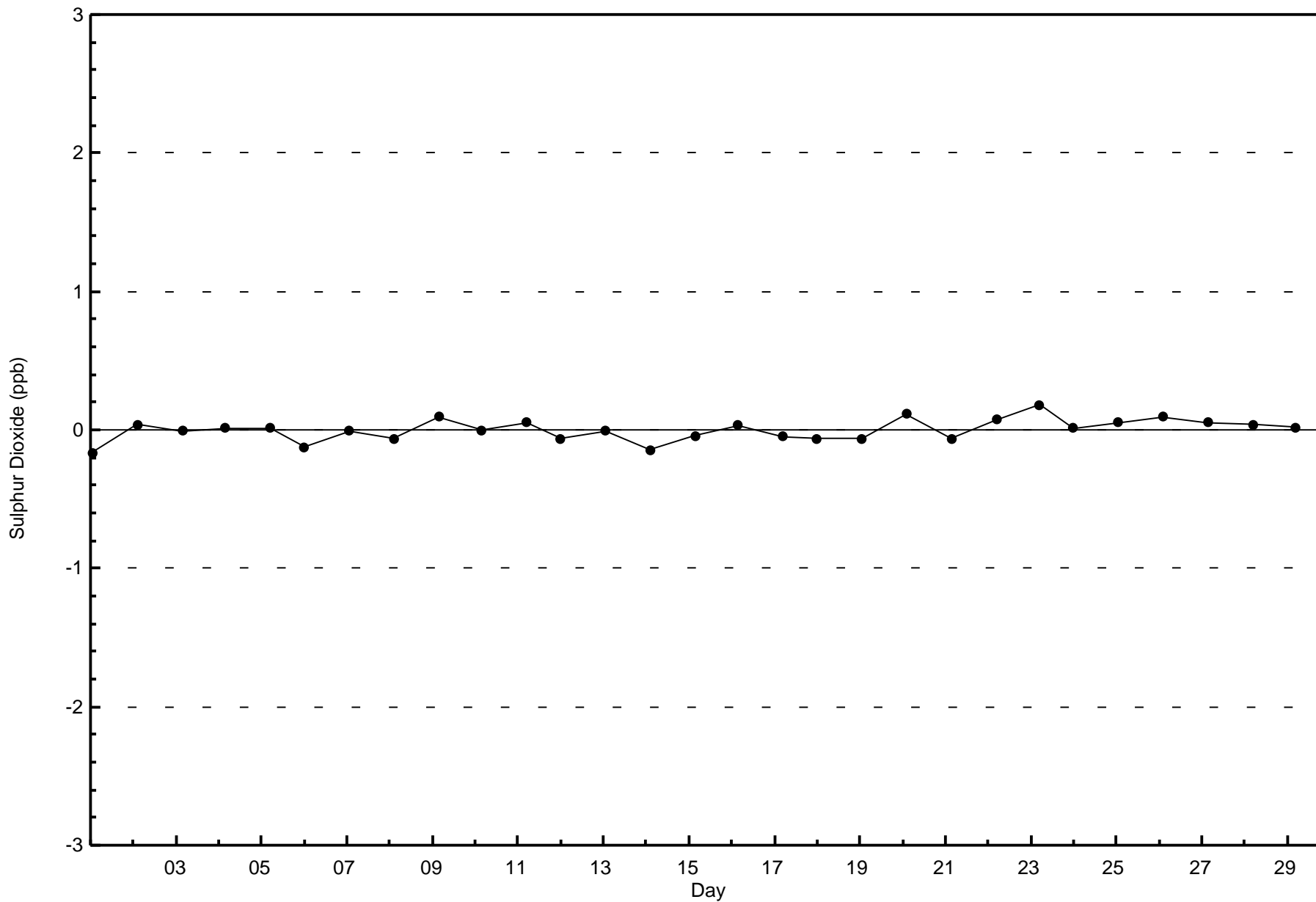
Total Number of Hours: 696

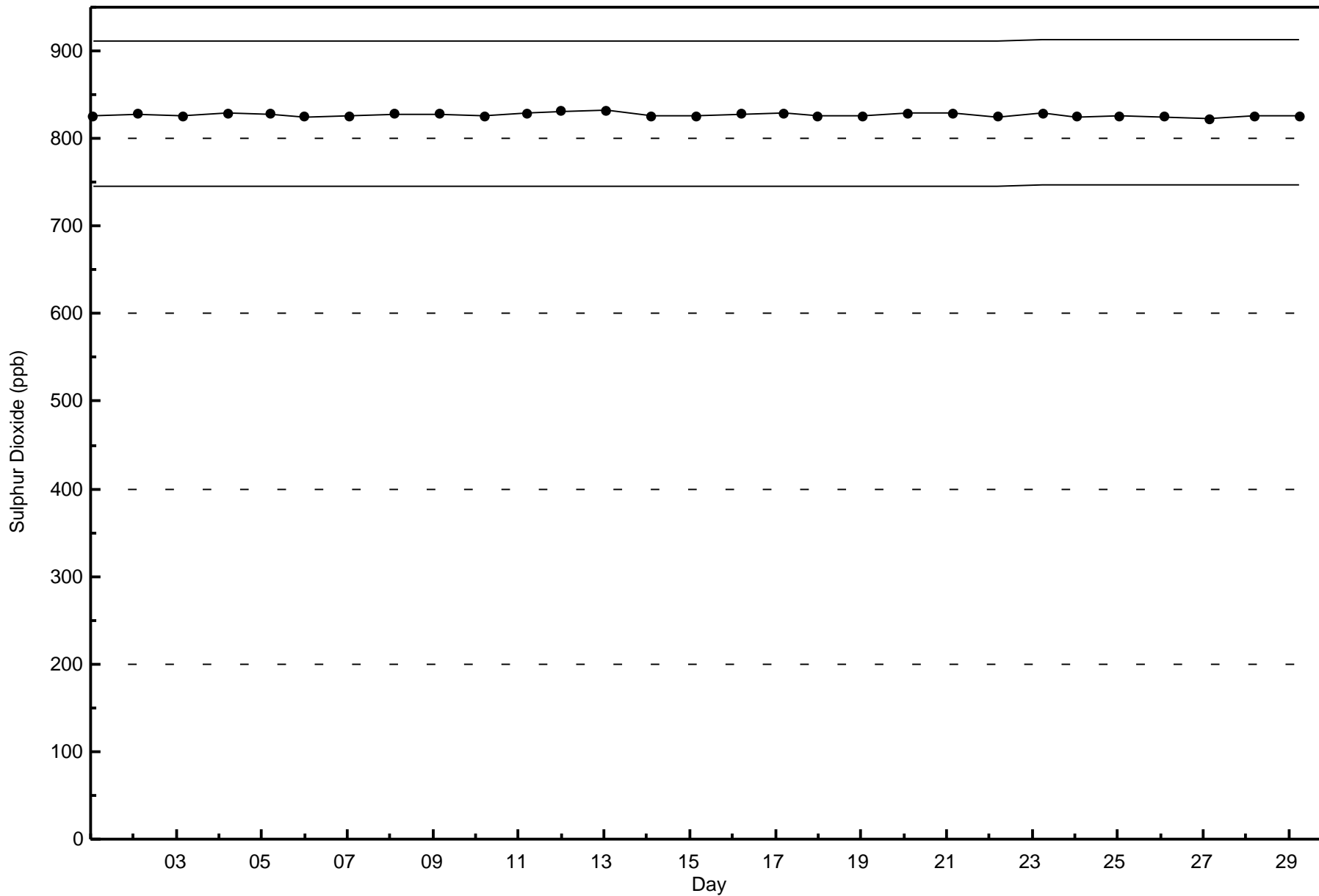


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)

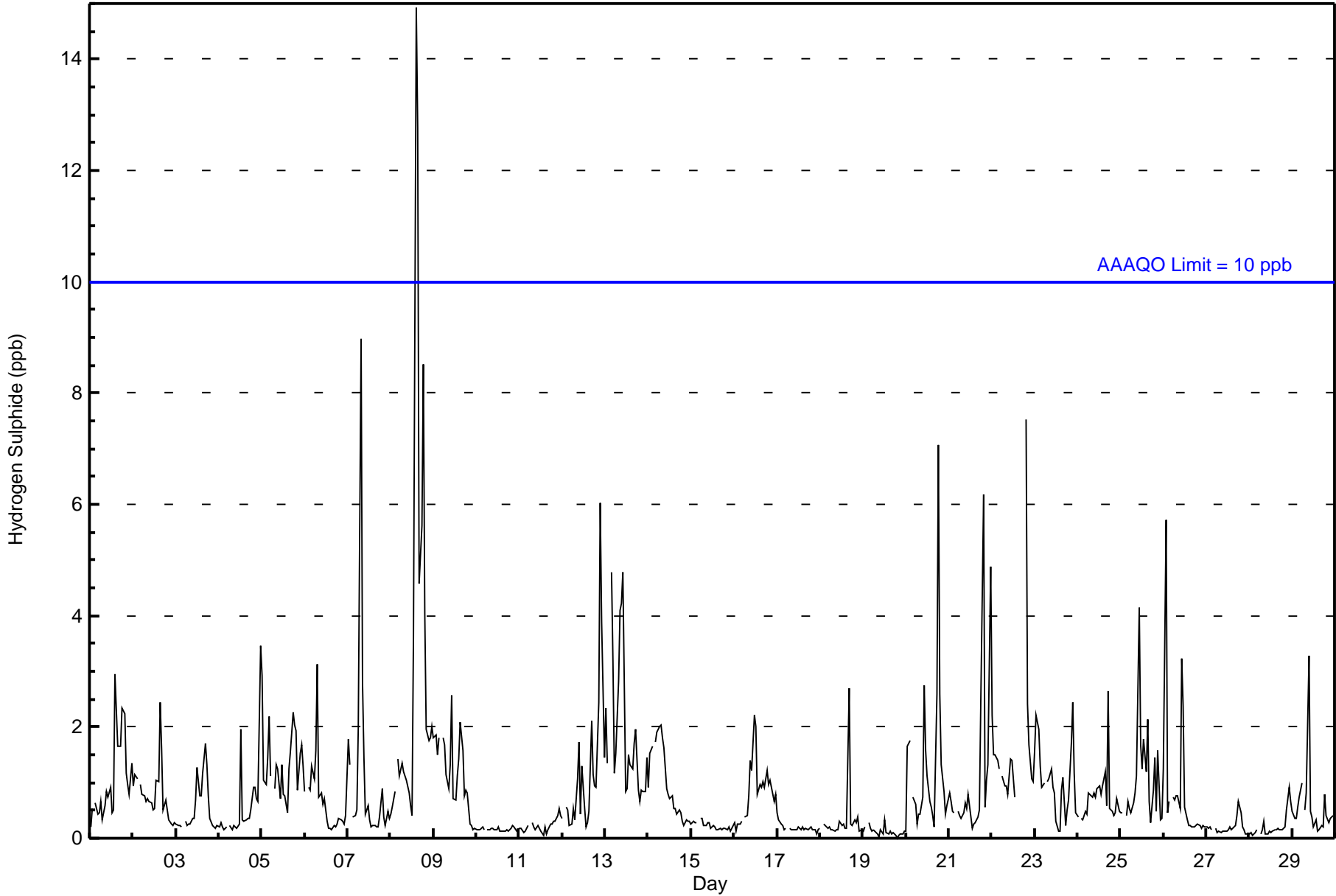








Number of Exceedences (AAAQO): 1-hr: 2 24-hr: 0 Maximum Value: 15 ppb on Feb 8 15:00 Maximum Daily Average: 3.1 ppb on Feb 8														Hours in Service: 696 Hours of Data: 662												
Minimum Value: 0 ppb on Feb 19 20:00 Minimum Daily Average: 0.1 ppb on Feb 19 Maximum Diurnal Average: 1.3 ppb at hour 20 Minimum Diurnal Average: 0.6 ppb at hour 14 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 = 6														Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	1	Z	1	0	0	1	0	1	1	1	1	0	0	3	2	2	2	2	2	1	1	1	1	1.0	3
2-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	0	0	0	0	0.8	2
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	1	1	0	0	0	0	0	0.5	2	
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	2	0	0	0	0	0	0	1	1	1	1	3	0.6	3	
5-Feb	3	1	1	1	2	1	Z	1	1	1	1	1	1	0	1	2	2	2	2	2	1	2	1	1.4	3	
6-Feb	1	Z	1	1	1	1	2	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
7-Feb	2	1	Z	0	0	1	2	9	3	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1.1	9	
8-Feb	0	1	1	Z	1	1	1	1	1	1	1	1	0	4	15	13	5	6	9	4	2	2	2	3.1	15	
9-Feb	2	2	1	2	Z	2	2	1	1	1	3	1	1	1	2	2	2	1	1	1	0	0	0	1.2	3	
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	0.2	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	1	0.2	1	
12-Feb	0	Z	1	1	0	0	1	0	1	2	0	1	1	0	0	0	2	1	1	1	2	6	4	1.2	6	
13-Feb	2	1	Z	5	3	1	2	3	4	4	5	1	1	2	1	1	2	2	1	1	1	1	1	2.0	5	
14-Feb	1	2	2	Z	2	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1.0	2	
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	0.2	0	
16-Feb	0	0	0	0	0	Z	0	0	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0.9	2	
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	0.2	0	
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0.3	3	
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	0.1	0	
20-Feb	0	2	2	Z	1	1	0	0	0	1	3	2	1	1	1	0	0	3	7	3	1	1	0	1.3	7	
21-Feb	1	1	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	1	2	6	1	1	1	1.1	6	
22-Feb	2	1	2	1	1	Z	1	1	1	1	1	1	1	1	C	C	C	C	C	8	2	2	1	1.7	8	
23-Feb	2	2	2	1	1	1	Z	1	1	1	1	1	0	0	1	1	0	1	1	1	2	2	1	1.0	2	
24-Feb	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	3	1	0	0	1	0	0	0.7	3	
25-Feb	0	0	Z	0	1	1	0	1	1	1	4	2	1	2	1	2	1	0	1	1	0	2	0	1.0	4	
26-Feb	1	6	0	1	Z	1	1	1	1	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0.9	6	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1	
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1	
29-Feb	0	0	0	1	1	1	Z	0	1	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0.6	3	
0.8 1.0 0.7 0.7 0.8 0.7 0.7 1.0 0.8 0.9 1.0 0.8 0.6 0.6 1.1 1.1 0.9 0.9 1.2 1.3 0.7 0.9 0.7 0.8																								Diurnal Average		
3 6 2 5 3 2 2 9 4 4 5 2 2 4 15 13 5 6 9 8 2 6 4 5																								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 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	627	94.71	94.71
3 - 4	21	3.17	97.89
5 - 7	9	1.36	99.24
8 - 11	3	0.45	99.70
> 11	2	0.30	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	130	32	6	2	8	24	147	15	3	0	4	6	18	52	74	106	627
3 - 4	0	1	0	0	0	1	8	3	0	1	0	0	2	5	0	0	21
5 - 7	0	0	0	0	0	0	5	0	0	0	0	1	1	2	0	0	9
8 - 11	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	3
> 11	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Totals	130	33	6	3	8	25	160	18	3	1	4	7	23	61	74	106	662

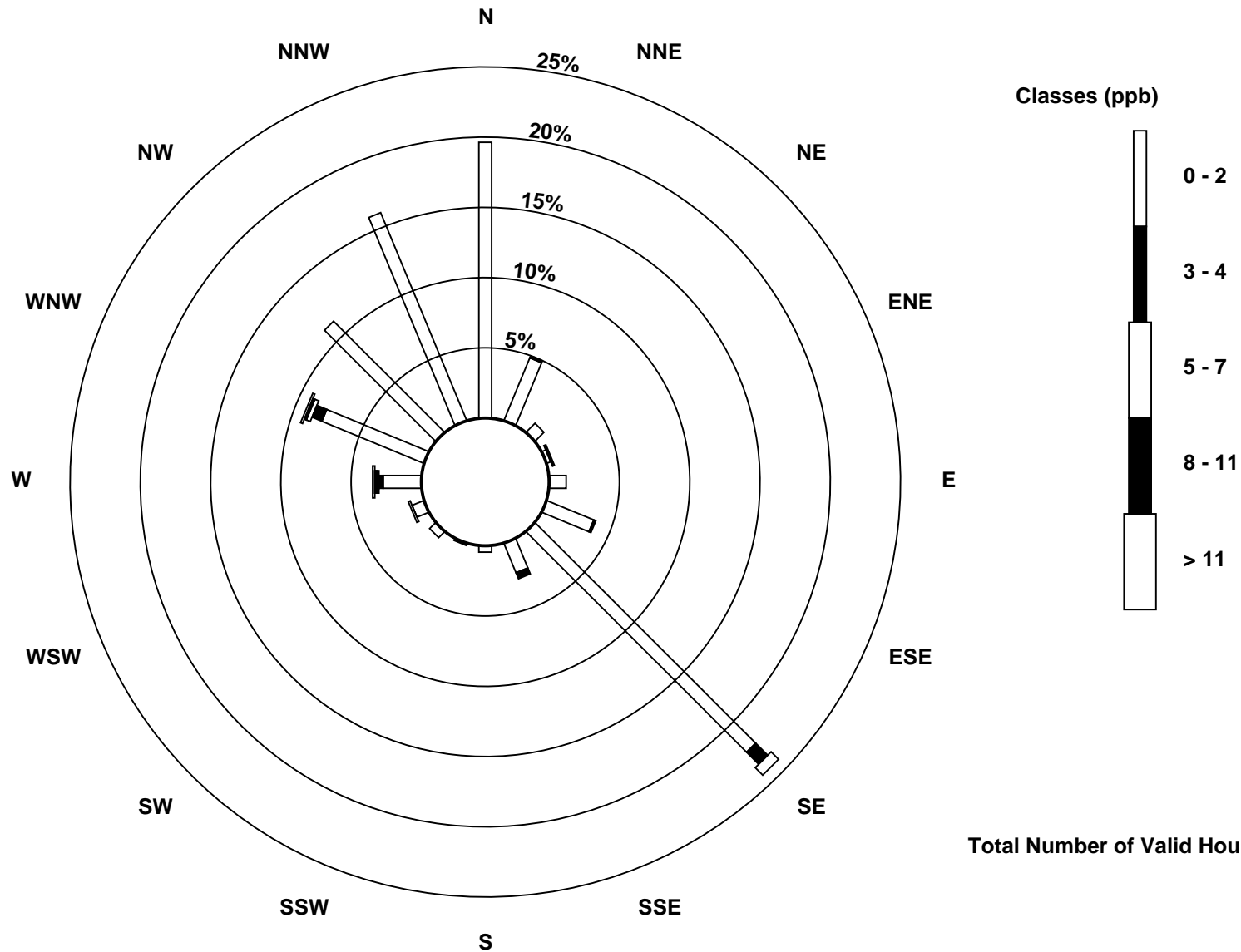
Total Number of Valid Hours: 662

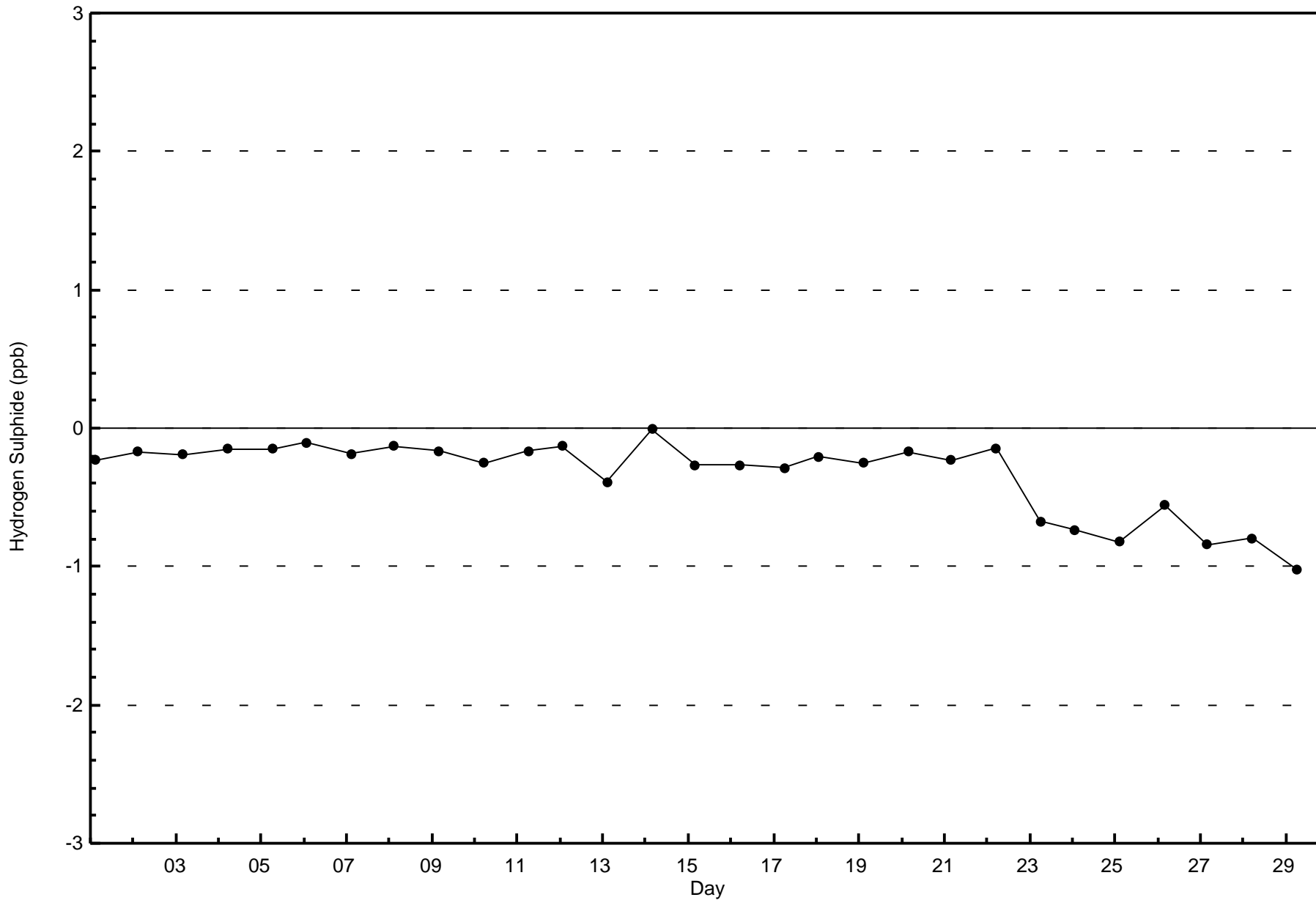
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)

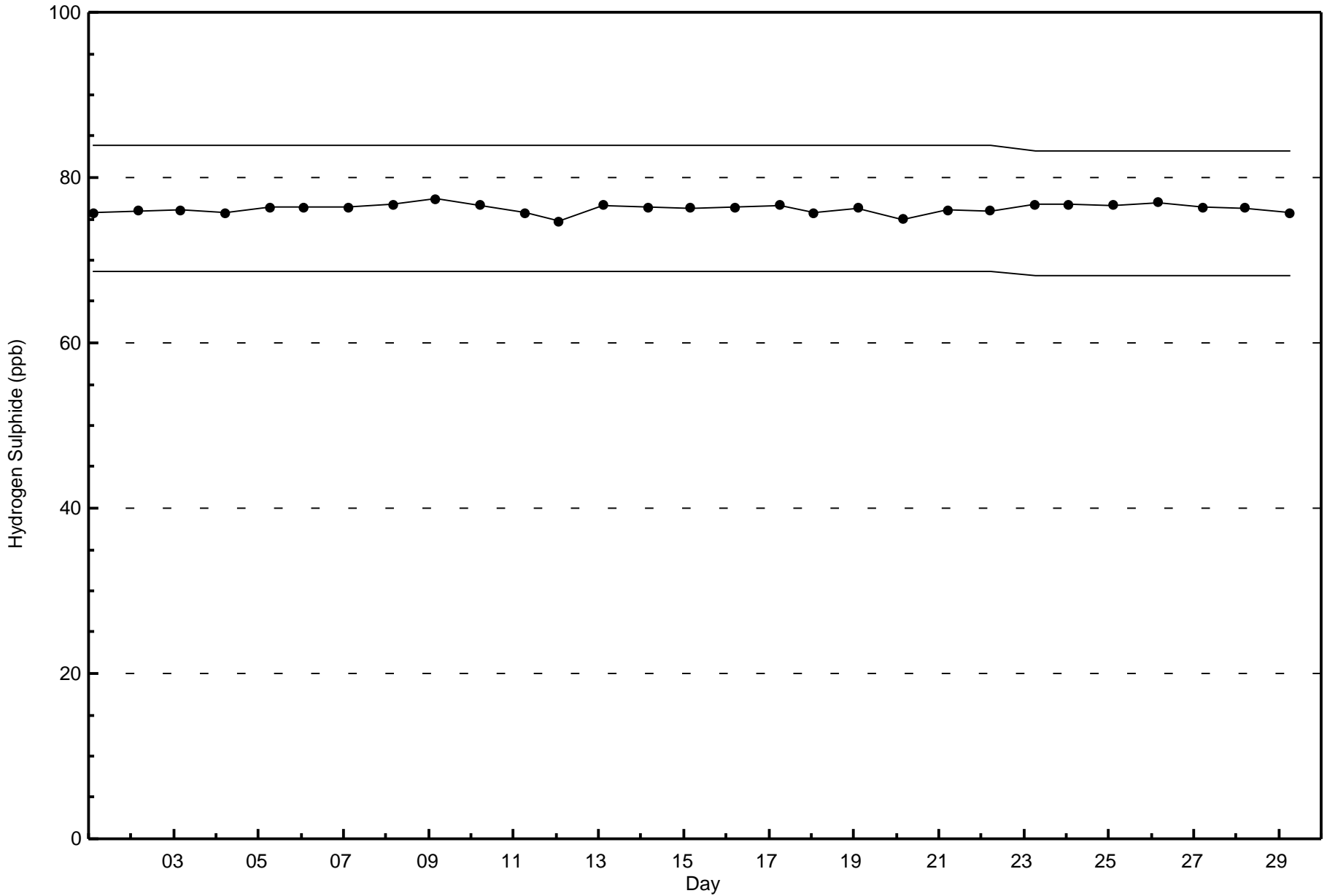






Wood Buffalo Environmental Association
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

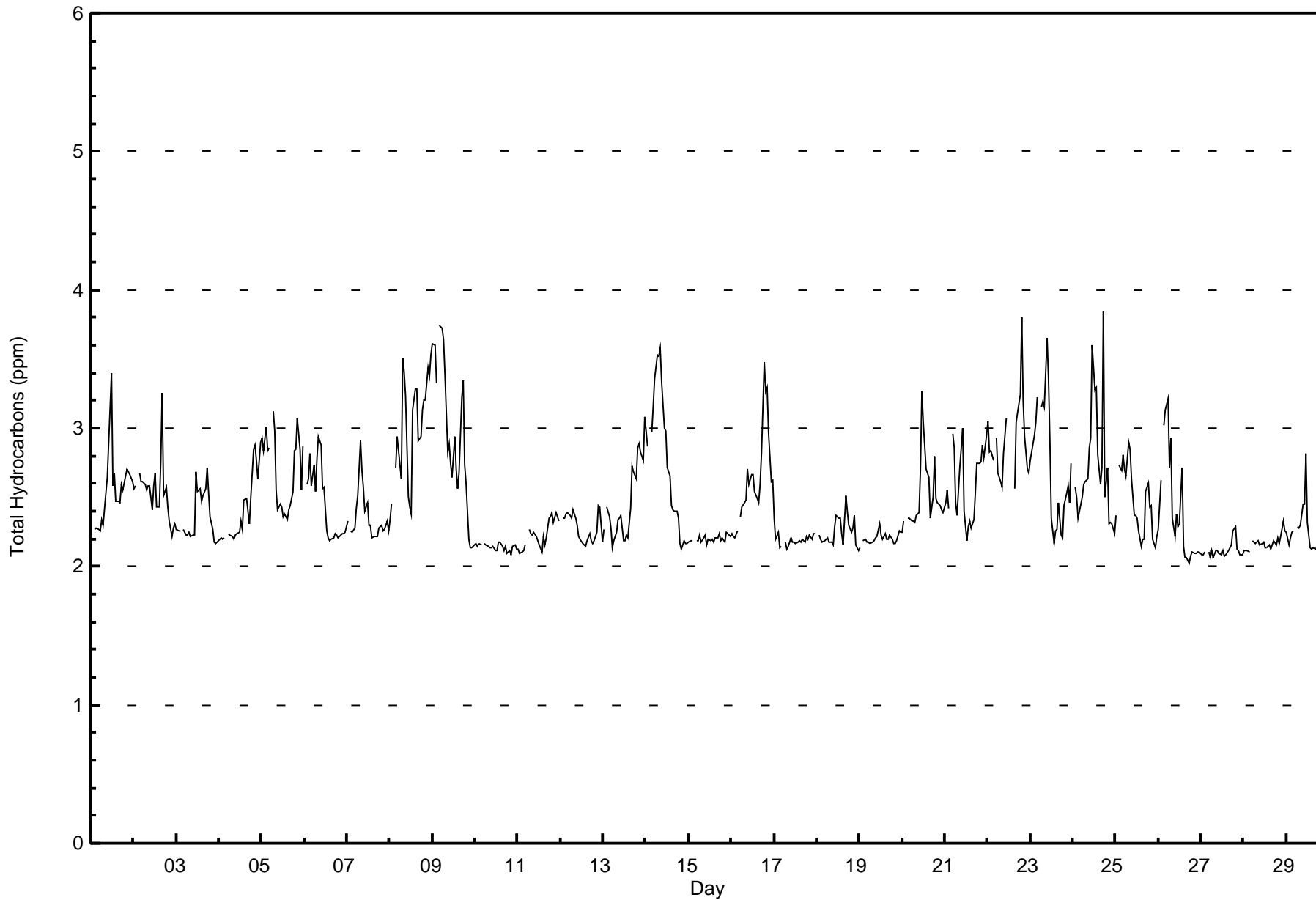
Lower Camp - February 2016

Maximum Value: 3.8 ppm on Feb 24 18:00																				Maximum Daily Average: 3.0 ppm on Feb 8					Hours in Service: 696			
Minimum Value: 2.0 ppm on Feb 26 18:00																				Minimum Daily Average: 2.1 ppm on Feb 27					Hours of Data: 663			
Maximum Diurnal Average: 2.6 ppm at hour 5																				Minimum Diurnal Average: 2.3 ppm at hour 15					Hours of Missing Data: 33			
Monthly Average: 2.47 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.7 P ₉₀ = 3.0 P ₉₉ = 3.6					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	2.3	2.3	2.3	2.3	2.3	2.5	2.6	2.9	3.4	2.6	2.7	2.5	2.5	2.5	2.6	2.6	2.7	2.7	2.7	2.7	2.6	2.5	3.4		
2-Feb	2.6	2.6	Z	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.4	2.6	2.7	2.4	2.4	2.8	3.3	2.5	2.6	2.4	2.3	2.2	2.3	2.3	2.5	3.3		
3-Feb	2.3	2.3	2.3	Z	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.7	2.5	2.6	2.5	2.5	2.6	2.7	2.5	2.4	2.3	2.2	2.2	2.2	2.4	2.7		
4-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.4	2.3	2.5	2.8	2.9	2.8	2.6	2.9	2.4	2.9			
5-Feb	2.9	2.8	3.0	2.8	2.9	Z	3.1	3.0	2.5	2.4	2.5	2.4	2.4	2.3	2.4	2.4	2.5	2.8	2.8	3.1	2.9	2.6	2.9	2.7	3.1			
6-Feb	Z	2.6	2.6	2.8	2.6	2.7	2.5	2.8	2.9	2.9	2.6	2.6	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.9			
7-Feb	2.3	Z	2.3	2.3	2.3	2.4	2.5	2.9	2.7	2.6	2.4	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.9			
8-Feb	2.3	2.5	Z	2.7	2.9	2.8	2.6	3.5	3.4	3.2	2.5	2.4	2.4	3.1	3.3	3.3	2.9	2.9	3.1	3.2	3.2	3.4	3.4	3.5	3.0	3.5		
9-Feb	3.6	3.6	3.3	Z	3.7	3.7	3.6	3.4	2.8	2.9	2.7	2.6	2.9	2.7	2.6	2.7	3.2	3.3	2.7	2.6	2.2	2.1	2.1	2.1	2.9	3.7		
10-Feb	2.2	2.1	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2		
11-Feb	2.1	2.1	2.1	2.1	2.2	Z	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.2	2.4		
12-Feb	Z	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.2	2.3	2.4		
13-Feb	2.3	Z	2.4	2.4	2.3	2.1	2.2	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.4	2.7	2.7	2.6	2.9	2.9	2.8	2.8	3.1	2.5	3.1		
14-Feb	3.0	2.9	Z	3.0	3.1	3.4	3.5	3.5	3.6	3.3	3.0	3.0	2.7	2.7	2.4	2.4	2.4	2.4	2.3	2.2	2.1	2.2	2.2	2.2	2.8	3.6		
15-Feb	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	2.2		
16-Feb	2.2	2.2	2.2	2.3	Z	2.4	2.4	2.5	2.5	2.7	2.6	2.7	2.7	2.5	2.5	2.5	2.6	2.8	3.5	3.3	3.3	3.0	2.6	2.6	2.6	3.5		
17-Feb	2.4	2.2	2.3	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	2.2	2.2	2.2	2.2	2.2	2.4		
18-Feb	Z	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	2.2	2.2	2.5	2.4	2.3	2.2	2.3	2.4	2.2	2.1	2.3	2.5		
19-Feb	2.1	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	2.2	2.2	2.2	2.3	2.2	2.2	2.3		
20-Feb	2.2	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.7	3.3	3.0	2.7	2.7	2.6	2.4	2.5	2.8	2.5	2.5	2.4	2.4	2.4	2.5	3.3		
21-Feb	2.5	2.6	2.4	Z	3.0	2.9	2.5	2.4	2.7	2.9	3.0	2.4	2.2	2.3	2.3	2.3	2.3	2.5	2.7	2.7	2.8	2.9	2.8	2.9	2.6	3.0		
22-Feb	3.1	2.8	2.8	2.8	Z	2.9	2.7	2.6	2.6	2.8	3.1	C	C	C	C	2.6	3.0	3.1	3.2	3.8	3.2	2.9	2.7	2.7	2.9	3.8		
23-Feb	2.8	2.8	3.0	3.0	3.2	Z	3.1	3.2	3.2	3.7	3.4	2.9	2.3	2.2	2.3	2.3	2.5	2.2	2.2	2.4	2.5	2.6	2.5	2.7	2.7	3.7		
24-Feb	Z	2.6	2.5	2.3	2.5	2.5	2.6	2.6	2.6	2.9	2.9	3.6	3.3	3.3	2.8	2.6	2.7	3.8	2.5	2.7	2.3	2.3	2.3	2.2	2.7	3.8		
25-Feb	2.4	Z	2.7	2.7	2.8	2.7	2.7	2.9	2.9	2.6	2.4	2.4	2.3	2.3	2.1	2.2	2.2	2.5	2.6	2.4	2.4	2.2	2.1	2.2	2.5	2.9		
26-Feb	2.3	2.6	Z	3.0	3.1	3.2	2.7	2.9	2.3	2.2	2.4	2.3	2.3	2.7	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.4	3.2		
27-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.3		
28-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3		
29-Feb	2.3	2.2	2.2	2.2	2.3	Z	2.3	2.3	2.3	2.4	2.5	2.8	2.3	2.1	2.1	2.1	2.1	2.2	2.4	2.4	2.4	2.7	2.8	2.7	2.3	2.8		
																								Diurnal Average				
																								Diurnal Maximum				
2.4 2.5 2.4 2.5 2.6 2.5 2.5 2.6 2.5 2.5 2.5 2.5 2.4 2.4 2.3 2.4 2.4 2.5 2.5 2.5 2.5 2.5 2.4 2.4 2.4 2.4																												
3.6 3.6 3.3 3.0 3.7 3.7 3.6 3.5 3.6 3.7 3.4 3.6 3.3 3.3 3.3 3.3 3.3 3.3 3.8 3.5 3.8 3.3 3.4 3.4 3.5 3.5 3.5																												
Z - zerospan C - Calibration																												



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Lower Camp - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.15	0.15
2.1 - 3.0	608	91.70	91.86
3.1 - 10.0	54	8.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Lower Camp - February 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2.1 - 3.0	127	31	6	3	7	19	142	16	3	1	3	7	19	49	73	102	608
3.1 - 10.0	0	0	0	0	1	3	21	3	0	0	1	0	4	14	4	3	54
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	128	31	6	3	8	22	163	19	3	1	4	7	23	63	77	105	663

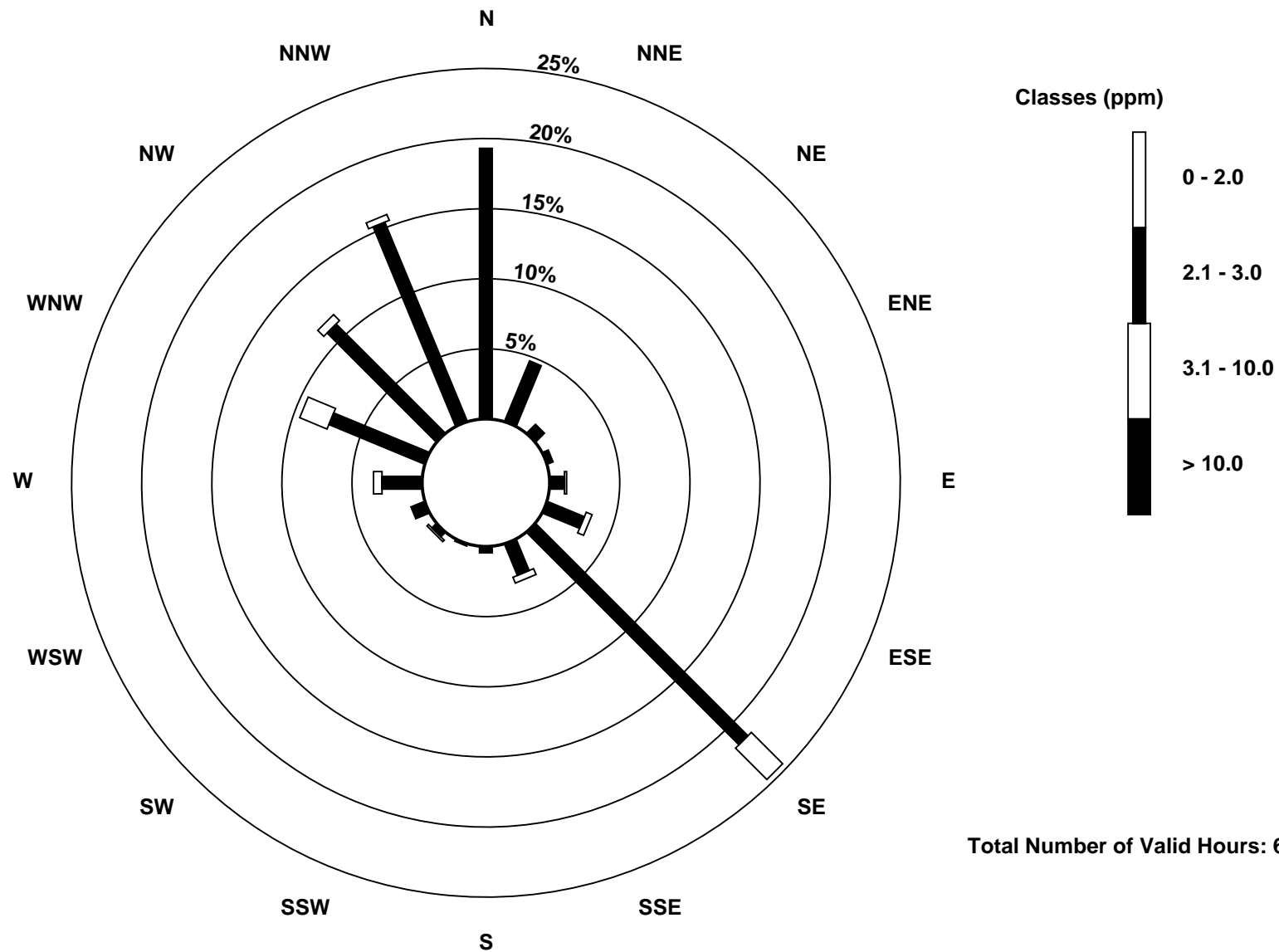
Total Number of Valid Hours: 663

Total Number of Hours: 696

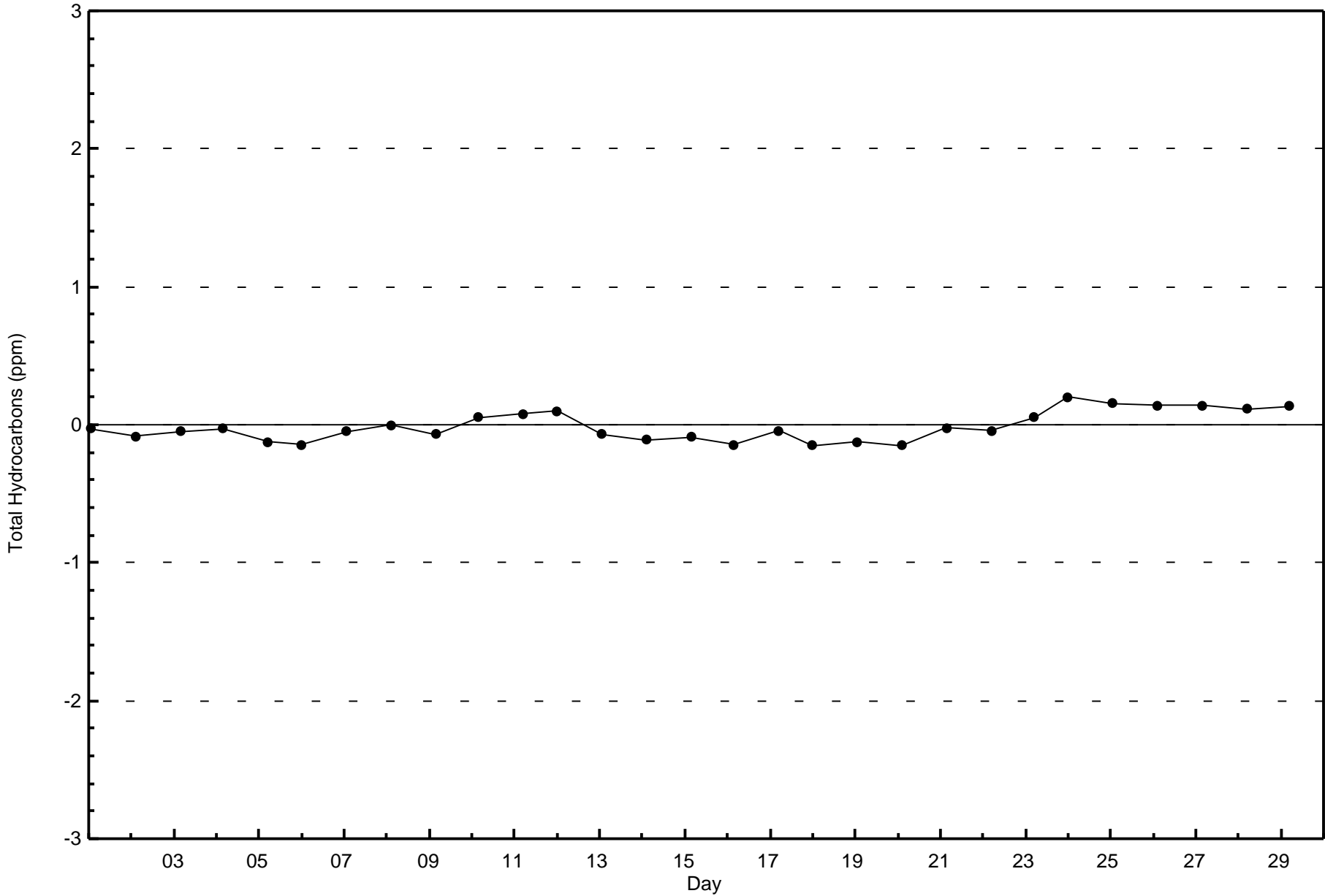


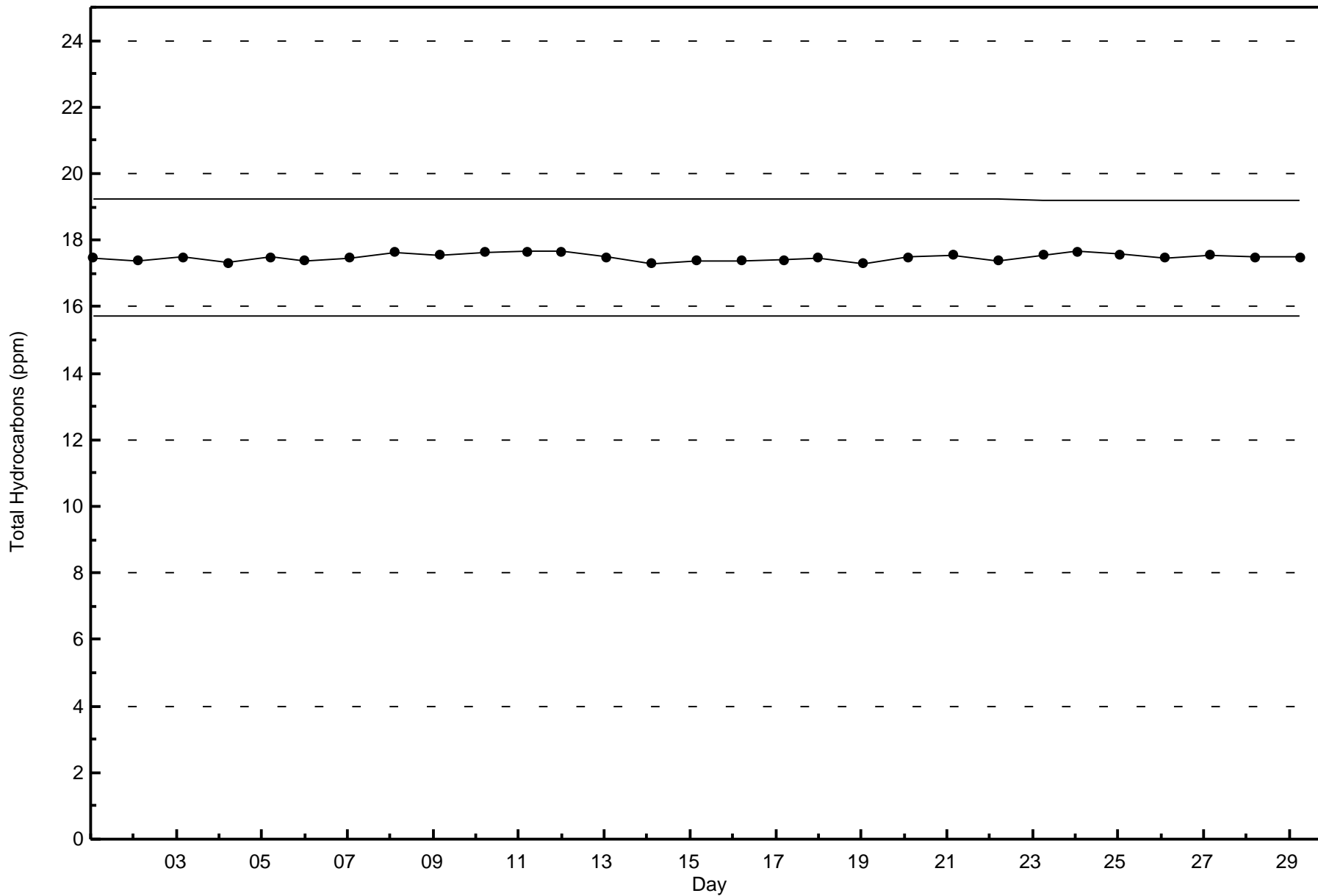
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)



Total Number of Valid Hours: 663







Wood Buffalo Environmental Association
Summary of Hour Averages

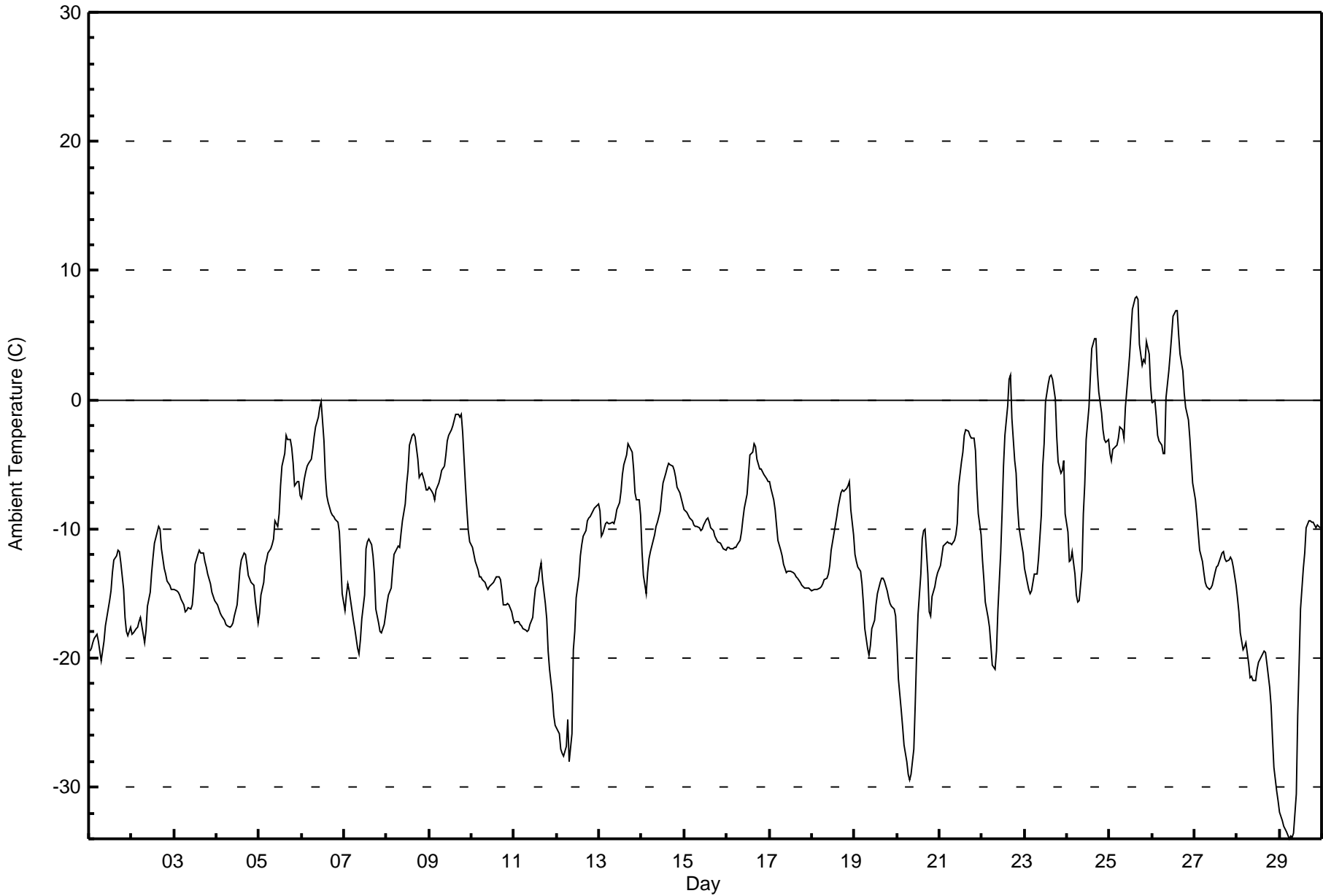
Ambient Temperature (AT) - C
Lower Camp - February 2016

Maximum Value: 8.0 C on Feb 25 16:00 Maximum Daily Average: 1.4 C on Feb 25		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -34.0 C on Feb 29 06:00 Maximum Diurnal Average: -6.9 C at hour 16 Monthly Average: -11.39 C		Minimum Daily Average: -21.5 C on Feb 28 Minimum Diurnal Average: -15.0 C at hour 8 Percentiles: P ₁ = -32.9 P ₁₀ = -19.0 Q ₁ = -15.3 Median = -11.8 Q ₃ = -6.7 P ₉₀ = -2.7 P ₉₉ = 6.3																								
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	-19.5	-19.3	-18.8	-18.5	-18.2	-18.7	-19.5	-20.3	-18.7	-17.5	-16.9	-15.6	-14.7	-13.3	-12.4	-12.1	-11.7	-11.8	-12.6	-14.7	-16.9	-18.0	-18.3	-17.6	-16.5	-11.7
2-Feb	-18.2	-18.1	-17.7	-17.6	-17.2	-16.9	-18.2	-18.8	-17.8	-16.0	-15.0	-13.4	-12.2	-11.1	-10.3	-9.9	-10.0	-11.5	-13.0	-13.5	-14.0	-14.3	-14.7	-14.7	-14.8	-9.9
3-Feb	-14.7	-14.8	-14.9	-15.2	-15.4	-15.9	-16.4	-16.3	-16.1	-16.3	-15.9	-14.6	-12.7	-12.0	-11.7	-11.9	-11.9	-12.5	-12.9	-13.5	-14.2	-14.9	-15.3	-15.6	-14.4	-11.7
4-Feb	-15.9	-16.2	-16.5	-16.7	-17.1	-17.4	-17.5	-17.6	-17.3	-16.7	-15.9	-14.6	-13.1	-12.5	-11.9	-11.9	-12.7	-13.6	-14.1	-14.3	-14.4	-15.6	-17.3	-15.3	-11.9	
5-Feb	-16.6	-15.1	-14.2	-12.8	-12.4	-11.9	-11.6	-11.2	-10.8	-9.4	-9.8	-8.8	-6.7	-5.2	-4.2	-2.8	-3.0	-3.1	-3.8	-4.9	-6.7	-6.3	-6.3	-7.4	-8.5	-2.8
6-Feb	-7.7	-6.1	-5.5	-5.2	-4.9	-4.6	-3.8	-2.9	-2.2	-1.3	-0.6	-0.1	-3.2	-5.9	-7.5	-7.9	-8.7	-9.0	-9.1	-9.2	-9.5	-10.2	-12.6	-15.1	-6.4	-0.1
7-Feb	-16.4	-15.1	-14.2	-14.8	-16.3	-17.0	-17.7	-19.3	-19.6	-18.6	-16.9	-15.2	-11.6	-11.0	-10.8	-11.2	-12.1	-13.5	-16.2	-17.3	-17.9	-18.1	-17.4	-16.6	-15.6	-10.8
8-Feb	-15.8	-15.1	-14.6	-13.2	-12.0	-11.8	-11.3	-11.4	-10.4	-9.4	-8.1	-6.6	-5.5	-3.5	-2.7	-2.7	-2.9	-4.6	-6.0	-5.8	-5.7	-6.5	-7.0	-6.9	-8.3	-2.7
9-Feb	-6.8	-7.1	-7.3	-7.7	-7.0	-6.4	-6.1	-5.5	-5.2	-4.3	-3.2	-2.7	-2.3	-2.0	-1.5	-1.1	-1.1	-1.3	-1.1	-2.6	-6.6	-8.5	-10.1	-11.0	-4.9	-1.1
10-Feb	-11.4	-12.0	-12.5	-13.1	-13.7	-13.7	-13.9	-14.1	-14.4	-14.7	-14.5	-14.3	-14.2	-14.0	-13.7	-13.8	-13.9	-14.8	-15.9	-15.9	-15.7	-15.9	-16.5	-17.0	-14.3	-11.4
11-Feb	-17.3	-17.2	-17.1	-17.4	-17.6	-17.7	-17.9	-17.9	-17.8	-17.4	-16.8	-15.6	-14.6	-14.1	-13.2	-12.6	-13.9	-15.8	-17.0	-19.4	-20.8	-22.8	-24.4	-25.2	-17.6	-12.6
12-Feb	-25.4	-25.9	-27.1	-27.3	-27.6	-26.8	-24.8	-28.1	-25.9	-19.4	-18.0	-15.3	-13.8	-12.1	-11.2	-10.6	-10.1	-9.4	-9.2	-9.0	-8.6	-8.4	-8.3	-8.1	-17.1	-8.1
13-Feb	-8.7	-10.6	-10.4	-9.6	-9.4	-9.6	-9.6	-9.5	-9.6	-9.1	-8.5	-7.9	-7.1	-5.8	-5.0	-4.3	-3.4	-3.7	-4.1	-5.4	-7.2	-7.7	-7.7	-8.9	-7.6	-3.4
14-Feb	-11.7	-13.6	-15.0	-13.4	-12.4	-11.8	-10.8	-10.4	-9.8	-9.5	-8.6	-7.4	-6.5	-5.7	-5.2	-4.9	-5.0	-5.2	-5.4	-6.0	-6.8	-7.2	-7.6	-8.1	-8.7	-4.9
15-Feb	-8.5	-8.8	-9.0	-9.2	-9.4	-9.7	-9.8	-9.8	-10.0	-10.1	-10.0	-9.7	-9.3	-9.2	-9.5	-10.0	-10.1	-10.6	-10.8	-11.0	-11.1	-11.3	-11.6	-11.6	-10.0	-8.5
16-Feb	-11.5	-11.5	-11.5	-11.5	-11.5	-11.4	-11.2	-10.9	-10.3	-9.3	-8.4	-7.3	-5.8	-4.3	-4.1	-3.5	-3.6	-4.6	-5.4	-5.4	-5.6	-5.8	-6.1	-6.4	-7.8	-3.5
17-Feb	-6.4	-6.9	-7.8	-8.5	-9.7	-10.9	-11.6	-12.1	-12.7	-13.3	-13.3	-13.3	-13.3	-13.4	-13.5	-13.8	-13.9	-14.2	-14.4	-14.5	-14.5	-14.6	-14.6	-14.7	-12.3	-6.4
18-Feb	-14.8	-14.7	-14.7	-14.7	-14.6	-14.5	-14.2	-13.9	-13.8	-13.5	-12.9	-11.6	-10.4	-9.8	-9.1	-8.3	-7.2	-7.0	-7.1	-6.9	-6.6	-6.3	-8.5	-10.4	-11.1	-6.3
19-Feb	-11.9	-12.5	-12.9	-13.3	-14.3	-15.8	-17.8	-19.3	-19.8	-19.0	-17.8	-17.0	-15.9	-15.0	-14.1	-13.8	-13.8	-14.1	-14.8	-15.3	-15.8	-16.0	-16.2	-16.8	-15.5	-11.9
20-Feb	-19.0	-21.7	-24.0	-25.4	-26.7	-28.1	-29.0	-29.5	-29.0	-27.1	-23.5	-19.7	-16.6	-13.4	-10.7	-10.2	-10.1	-13.5	-16.5	-16.7	-15.2	-14.4	-13.8	-13.4	-19.5	-10.1
21-Feb	-12.9	-12.1	-11.3	-11.2	-11.0	-11.1	-11.1	-11.2	-10.9	-10.5	-9.6	-6.6	-4.8	-4.1	-2.7	-2.4	-2.4	-2.7	-3.0	-2.9	-3.9	-6.8	-8.8	-10.4	-7.7	-2.4
22-Feb	-12.4	-13.9	-15.7	-16.8	-17.6	-19.0	-20.6	-20.8	-19.5	-16.3	-11.8	-8.7	-5.1	-2.8	-0.4	1.6	1.9	-1.5	-4.7	-5.7	-8.2	-9.8	-11.2	-11.9	-10.5	1.9
23-Feb	-13.1	-13.6	-14.7	-15.0	-14.8	-13.5	-13.5	-13.5	-12.3	-8.9	-5.1	-3.4	-0.1	1.3	1.8	1.9	1.6	0.1	-2.9	-4.8	-5.6	-5.5	-4.7	-8.8	-7.0	1.9
24-Feb	-10.2	-12.5	-12.4	-11.8	-13.5	-15.1	-15.6	-15.5	-13.2	-8.9	-6.6	-3.1	-0.6	1.8	3.9	4.7	4.7	2.3	0.6	-1.0	-2.4	-3.1	-3.3	-3.1	-5.6	4.7
25-Feb	-4.2	-4.7	-3.9	-3.6	-3.5	-3.0	-2.2	-2.4	-3.0	-0.5	2.1	3.4	5.2	7.0	7.9	8.0	7.7	4.3	2.6	3.1	2.9	4.5	3.6	1.1	1.4	8.0
26-Feb	-0.3	0.0	-1.2	-2.8	-3.2	-3.5	-4.2	-4.2	0.2	2.2	3.5	4.9	6.5	6.9	6.9	5.0	3.5	2.2	0.5	-0.6	-1.6	-2.9	-4.8	-6.4	0.3	6.9
27-Feb	-7.7	-8.9	-10.4	-11.7	-12.5	-13.4	-14.2	-14.5	-14.7	-14.5	-14.4	-13.3	-12.9	-12.9	-12.5	-11.9	-11.7	-12.3	-12.5	-12.4	-12.2	-12.4	-13.0	-14.3	-12.6	-7.7
28-Feb	-15.3	-16.4	-18.1	-19.3	-19.1	-18.8	-20.4	-21.5	-21.4	-21.7	-21.8	-20.9	-20.3	-20.1	-19.7	-19.5	-19.6	-20.4	-22.3	-23.7	-26.2	-28.4	-30.3	-31.1	-21.5	-15.3
29-Feb	-31.9	-32.6	-33.0	-33.2	-33.5	-34.0	-33.8	-33.9	-33.6	-30.5	-24.4	-20.5	-16.3	-13.1	-11.8	-9.9	-9.3	-9.4	-9.5	-9.4	-9.9	-9.7	-9.8	-10.0	-21.0	-9.3
	-13.3	-13.7	-14.0	-14.2	-14.3	-14.6	-14.8	-15.0	-14.5	-13.2	-11.8	-10.4	-8.9	-7.9	-7.2	-6.9	-7.0	-7.9	-9.0	-9.6	-10.4	-10.9	-11.5	-12.3		Diurnal Average
	-0.3	0.0	-1.2	-2.8	-3.2	-3.0	-2.2	-2.4	0.2	2.2	3.5	4.9	6.5	7.0	7.9	8.0	7.7	4.3	2.6	3.1	2.9	4.5	3.6	1.1		Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	53	7.61	7.61
-20 - 0	605	86.93	94.54
0 - 10	38	5.46	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

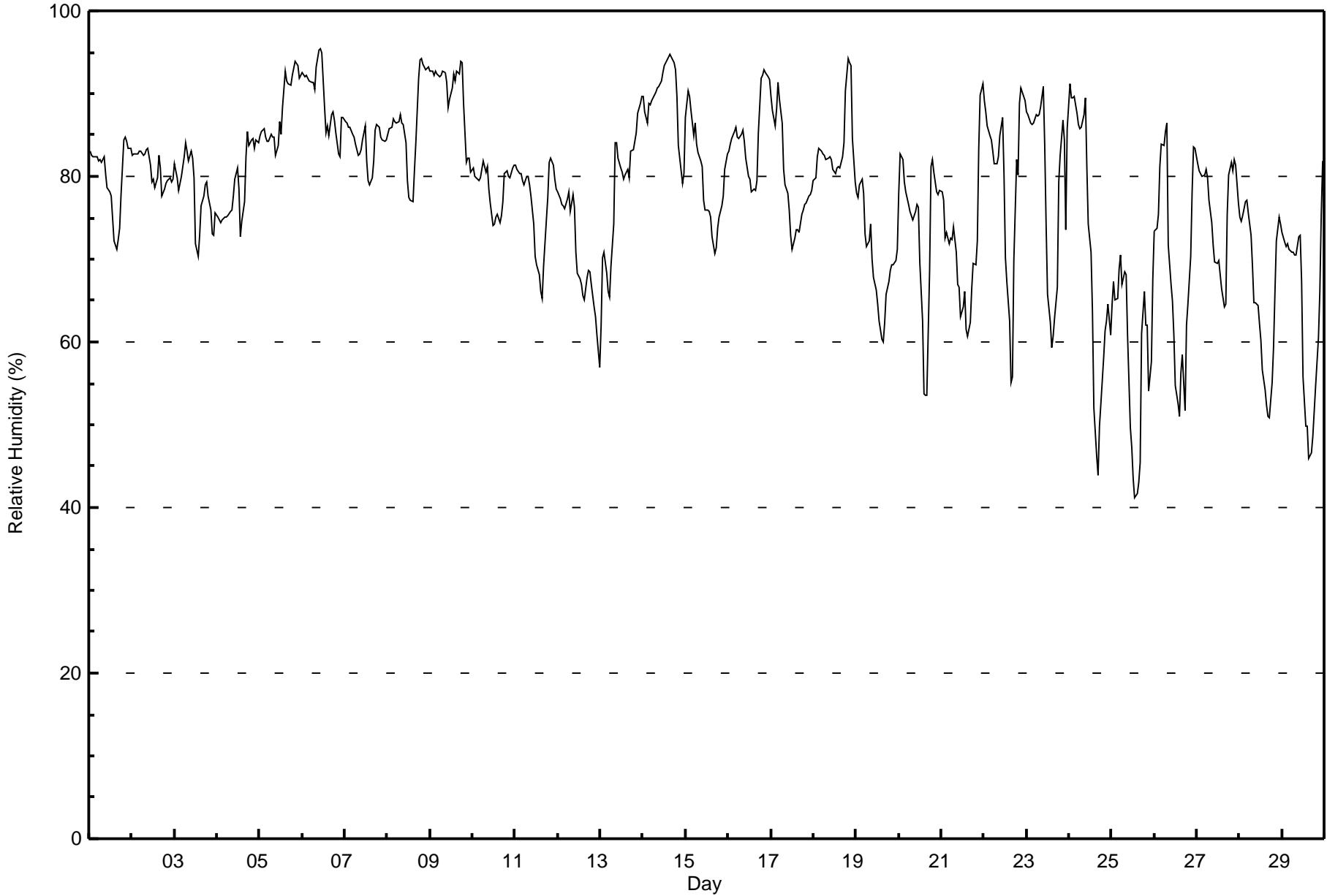
**Relative Humidity (RH) - %
Lower Camp - February 2016**

Maximum Value: 95 % on Feb 6 11:00 Maximum Daily Average: 90.2 % on Feb 9																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 41 % on Feb 25 14:00 Minimum Daily Average: 58.7 % on Feb 25 Maximum Diurnal Average: 81.7 % at hour 2 Minimum Diurnal Average: 69.7 % at hour 16 Monthly Average: 77.9 % Percentiles: P ₁ = 46 P ₁₀ = 62 Q ₁ = 72 Median = 80 Q ₃ = 85 P ₉₀ = 91 P ₉₉ = 94																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	83	82	82	82	82	82	82	82	80	79	78	78	75	72	71	72	74	78	84	85	84	83	83	79.9	85
2-Feb	83	83	83	83	83	83	83	83	83	83	81	79	80	79	80	83	81	78	78	79	80	80	79	80	81.0	83
3-Feb	82	80	78	79	80	82	84	83	82	83	82	80	72	70	73	76	78	79	79	78	76	73	73	76	78.2	84
4-Feb	75	75	74	75	75	75	75	76	76	78	80	81	78	73	75	77	82	85	84	84	85	83	84	84	78.7	85
5-Feb	85	85	86	85	84	84	85	85	85	82	84	87	85	88	93	92	91	91	92	93	94	93	92	92	88.0	94
6-Feb	93	92	92	92	91	91	91	91	93	95	95	95	88	85	86	85	87	88	87	85	83	82	87	87	89.3	95
7-Feb	87	86	86	86	85	85	84	83	83	83	84	86	82	79	79	80	82	86	86	86	85	84	84	84	84.0	87
8-Feb	85	86	86	87	87	86	87	88	86	86	84	79	77	77	77	81	84	92	94	94	94	93	93	93	86.5	94
9-Feb	93	93	92	93	92	92	92	93	93	91	88	89	91	92	92	93	92	94	94	89	82	82	82	81	90.2	94
10-Feb	81	80	80	79	80	81	82	81	81	78	77	74	74	75	75	74	75	77	80	81	80	80	81	81	78.7	82
11-Feb	81	81	80	80	79	79	80	80	79	78	74	70	69	68	66	65	69	75	77	82	82	81	80	78	76.5	82
12-Feb	78	77	77	76	76	77	78	76	78	76	71	68	68	67	66	65	68	69	68	67	64	63	61	57	70.5	78
13-Feb	62	70	71	68	66	65	69	74	84	84	82	81	81	80	80	81	80	83	83	84	85	88	89	90	78.4	90
14-Feb	90	88	86	89	89	89	90	90	91	91	92	93	93	94	94	95	94	94	93	90	84	81	79	80	89.5	95
15-Feb	87	90	90	88	85	86	84	83	82	81	77	76	76	75	73	71	71	74	75	77	78	81	83	79.9	90	
16-Feb	83	84	85	85	86	85	85	85	86	84	82	80	80	78	78	78	80	85	92	92	93	93	92	92	85.1	93
17-Feb	90	88	86	88	91	89	86	81	79	78	76	73	71	73	74	73	73	75	76	77	77	78	78	78	79.5	91
18-Feb	79	80	82	83	83	83	83	82	82	82	82	81	80	81	81	81	82	84	90	94	94	93	85	79	83.7	94
19-Feb	78	77	79	80	78	73	72	72	74	70	68	66	65	63	60	60	62	66	67	69	69	69	70	71	69.9	80
20-Feb	78	83	82	79	78	77	76	75	75	76	77	76	70	63	54	53	54	69	81	82	80	78	78	78	73.8	83
21-Feb	78	77	72	73	72	73	72	74	71	67	67	63	64	66	61	61	62	66	69	69	72	83	90	91	71.5	91
22-Feb	89	88	86	85	84	83	82	81	82	85	87	80	70	67	63	55	56	70	82	80	89	91	90	89	79.8	91
23-Feb	88	88	86	86	86	87	87	87	88	91	84	74	66	62	59	61	63	67	79	83	87	84	74	86	79.3	91
24-Feb	91	90	89	90	88	86	86	86	87	89	81	74	71	64	52	46	44	50	53	58	61	63	65	61	71.9	91
25-Feb	65	67	65	65	69	70	67	68	68	61	50	47	44	41	42	43	45	61	66	62	62	54	58	68	58.7	70
26-Feb	73	74	75	81	84	84	85	87	72	67	65	61	55	53	51	56	58	52	62	65	70	78	84	83	69.8	87
27-Feb	82	81	80	80	80	81	80	77	74	72	70	69	70	68	66	64	65	75	80	82	81	82	81	77	75.7	82
28-Feb	75	75	75	77	77	76	73	69	65	65	64	62	60	57	54	52	51	51	55	59	66	72	75	74	65.8	77
29-Feb	73	72	72	72	71	71	71	71	70	73	73	67	56	50	50	46	47	49	52	55	60	66	75	82	64.3	82
																		81.6 81.7 81.4 81.6 81.5 81.3 81.0 80.7 80.4 79.7 77.8 75.6 72.9 71.2 70.0 69.7 70.7 74.3 77.7 78.5 79.1 79.7 80.0 80.7						Diurnal Average		
																		93 93 92 93 92 92 92 93 93 95 95 95 93 94 94 95 94 94 94 94 94 93 93 93						Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - February 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Lower Camp - February 2016

Maximum Speed: 29 km/h on Feb 12 16:00 Minimum Speed Value: 0 km/h on Feb 5 03:00 Maximum Diurnal Speed Average: 3.3 km/h at hour 13 Monthly Average Velocity: 2.0 km/h 28.4 deg		Maximum Daily Speed Average: 14.0 km/h on Feb 13 Minimum Daily Speed Average: 0.8 km/h on Feb 23 Minimum Diurnal Speed Average: 1.4 km/h at hour 9 Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 23		Hours in Service: 696 Hours of Data: 696 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	NW2	NNW3	NW3	NNW2	NNW3	E2	ENE2	NE2	ESE5	SE9	SE10	SE10	ESE12	SE10	SE8	ESE6	E3	NW1	NW2	WNW2	NNW2	NW2	NNW2	WNW3	ESE2.2	ESE12
2-Feb	N2	NW4	WNW3	NW3	NW2	NW2	NNW1	NNE1	NE1	SE4	SE9	SE13	SE11	SE9	SE3	NNW9	NNW9	NNW12	NW9	NNW9	NNW8	NW8	NW7	NW7	NNW2.1	SE13
3-Feb	NW6	NNW5	NNW6	NNE3	NW3	NNE2	N3	N2	N2	NNW3	W1	SW1	SE6	SE4	NE1	N6	NNW7	N7	N7	N12	N13	N11	N10	N10	N4.4	N13
4-Feb	NNW8	NNW8	NNW7	NNW7	NNW7	NNW7	N8	NNW5	NNW6	NW5	WNW5	NNW3	SE1	SE8	SE6	ESE4	N4	NNW7	NW6	WNW5	NW5	NW5	WNW4	WNW1	NNW3.8	NNW8
5-Feb	SE3	ENE1	NNW0	ESE5	SE11	ESE7	SE7	SSE3	ESE5	SE9	SE11	SE13	SE10	SE13	SE16	SE11	SSE8	SSE3	SE5	SE5	ESE5	ESE8	SE2	ESE3	SE6.7	SE16
6-Feb	ESE5	SE12	SE12	SE10	SE5	SE9	SE16	ESE11	ESE7	SE9	SE10	NNW4	N23	NNW20	N15	N16	N13	N8	NNW7	N8	NNE6	NNE4	NNE1	W0	NE3.7	N23
7-Feb	N1	W4	WNW4	WNW3	NW2	W2	SE1	ENE1	WNW2	WNW3	NW4	NW4	NNW9	N8	N9	N11	NNW6	WNW4	NW2	N1	SE1	NNW1	NW2	NW1	NNW3.0	N11
8-Feb	NW2	WNW3	N1	SE4	ESE3	SE8	SE9	SE4	SE6	SE10	SE12	SE12	SE10	SE4	WNW2	W3	W3	W1	WNW2	W4	WNW3	NW1	W1	WNW3	SE2.5	SE12
9-Feb	WNW2	NNW1	ESE1	NNW3	W3	SW0	E1	ESE3	SE7	SE7	SE8	SE5	NNE1	N4	N5	ESE1	SE3	SE7	E2	NNW15	N19	N18	N18	N17	NNE3.1	N19
10-Feb	N14	N15	N16	N19	N14	N15	N15	NNE12	N15	NNE14	NNE9	NNE10	NNE13	N12	N13	N11	NNW11	NNW8	NW6	NW6	NNW7	NNW7	NW7	NW6	N10.9	N19
11-Feb	NW5	NNW6	NW6	NW7	NW6	NW6	NW6	NW6	NW5	NNW6	NNW8	NNW8	NNW8	NNW9	NW11	NNW10	NNW8	WNW7	WNW5	NW4	WNW4	WNW3	NNW2	NW2	NW6.1	NW11
12-Feb	NW2	NW3	NW2	WNW3	WNW4	NNW4	NNW5	NW7	ESE4	SE23	SE20	SE23	ESE21	ESE23	SE24	ESE29	SE27	SE28	SE27	SE28	SE21	SE21	SE19	SSE14	SE13.3	ESE29
13-Feb	SE18	SE17	SE18	SE17	SSE16	SSE15	SSE12	SSE12	SE11	SE11	SE13	SSE12	SE17	SE15	SE17	SE17	SE16	SE13	SE13	SE12	SE13	SE12	SE11	SE11	SE14.0	SE18
14-Feb	E4	N2	NNE2	WNW5	WNW5	WNW4	NW2	WNW2	WNW3	NNW3	NNW4	NNW4	NNW4	NNE3	NNE2	NNW6	NNE9	NNE7	NNW6	N9	N8	N9	NNW8	NNW8	NNW4.2	N9
15-Feb	NNW8	NNW7	NNW7	NNW9	NNW10	N11	NNW8	NNE11	N9	N11	N12	N8	NNW9	N12	NNW12	N10	N9	N9	NNW6	N5	N5	NW5	N5	WNW5	N8.1	NNW12
16-Feb	NNW4	N5	NW5	NW4	NW6	NW5	WNW5	WNW4	N2	NNW4	NNW3	NNW4	N3	NNE2	NNW5	NNW6	NNW6	NW7	NW7	WNW8	NW8	NW8	NW9	NW9	NW5.1	NW9
17-Feb	NW8	NNW9	NNW11	N12	N15	N16	N15	N15	N15	NNE14	N14	N15	N13	N15	N13	N12	N11	N11	N11	N12	N10	N9	N11	N9	N12.0	N16
18-Feb	N8	NNW6	NNW6	NW7	NW7	NW7	NW6	NW7	NW6	NNW6	NNW7	NNW7	NNW7	NW9	NW10	WNW5	W4	NNW6	NNW6	WNW4	W2	NW7	N17	N19	NNW6.8	N19
19-Feb	N16	N13	N10	N9	N12	N13	NNE13	N5	WNW4	NW3	NW2	N6	NNW7	N10	N9	N9	NNE10	NNE9	NE9	NNE9	N9	N7	N7	NNW6	N8.1	N16
20-Feb	WNW3	WNW3	NW3	NW1	NNW2	NNE1	N1	NNW1	WNW1	WSW1	SE6	SE7	SE9	SE10	SE9	SE7	SE5	WNW1	WNW1	WNW2	WNW2	NW3	NW1	N1	SE1.1	SE10
21-Feb	N1	ESE2	SE9	SE9	SE9	SE9	SE8	SE10	SE11	SE12	SE11	SE12	SE16	SE16	SE10	SE9	SE9	SE8	SE12	SE10	SSE1	W3	W2	WNW2	SE7.7	SE16
22-Feb	WNW4	WNW3	NW3	NW2	WNW3	WNW2	E1	E1	SE1	SE4	SE11	SE14	SE12	SE14	SE12	SE10	SE8	SSE1	WNW3	W5	WNW2	NNW1	NE1	SSE1	SE2.6	SE14
23-Feb	N0	SE1	SE3	SE6	SE7	SE9	SE10	SE9	SE10	SE11	SSE4	NW5	N10	N9	N9	WNW5	WNW4	NNW5	W2	W4	ESE3	WSW4	W10	W4	ESE0.8	SE11
24-Feb	ESE1	SE4	NE1	NNW4	SE3	SE6	SE7	SE8	SE9	SE9	SE12	SE12	SE13	SE10	SE6	SE3	SE5	SSE6	SSE8	SSE10	SE12	SE13	SE15	SE14	SE7.5	SE15
25-Feb	SE13	SE13	SE14	SE14	SE14	SE13	SE8	SE7	SE10	SE9	SSW4	S6	SW4	WSW10	WSW13	WSW14	WSW13	W9	WNW3	W7	WNW7	W14	W13	E2	SSW4.7	SE14
26-Feb	ESE4	SE7	SE7	SE8	SE7	SE9	SE9	SSE8	SW12	W8	W7	W7	WNW8	WNW8	N12	NNE15	NNE14	N18	N18	NNE18	NNE20	N19	N19	N20	NNE5.2	N20
27-Feb	N18	N15	NNW16	N15	N15	N14	NNW12	N14	N13	NNW12	NNW12	NNW11	NNW11	NNW10	NNW9	NW7	NW6	N6	N5	N2	N2	NNW9	N12	N15	NNW10.6	N18
28-Feb	N14	N14	NNW10	NW6	NW6	NNW6	NNW8	NNW8	N15	N19	N15	N13	N15	NNE17	N14	N13	N13	NNW10	WNW6	WNW6	WNW4	WNW3	NW2	NW2	N9.3	N19
29-Feb	NNE1	N1	NW3	WNW2	NNW2	NNW2	NW2	WNW2	WNW2	NNW2	SE10	SE10	SE13	SE14	SE12	SE6	S4	SSE4	S5	SSE6	SE8	SE8	SE9	SE9	SE4.1	SE14
N3.0 N2.5 N2.2 N1.8 N1.8 NNE1.8 NE2.1 NE1.8 NE1.4 E2.4 ESE2.9 E2.6 ENE3.3 ENE3.2 NE2.7 NNE2.8 NNE2.3 N2.8 N1.8 N2.3 N2.7 N2.6 N3.0 N3.0																								Diurnal Average		
N18 SE17 SE18 N19 SSE16 N16 SE16 N15 N15 SE23 SE20 SE23 N23 ESE23 SE24 ESE29 SE27 SE28 SE27 SE28 SE21 SE21 SE19 N20																								Diurnal Maximum		
All monthly, daily, and diurnal averages have been calculated using vector methods																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

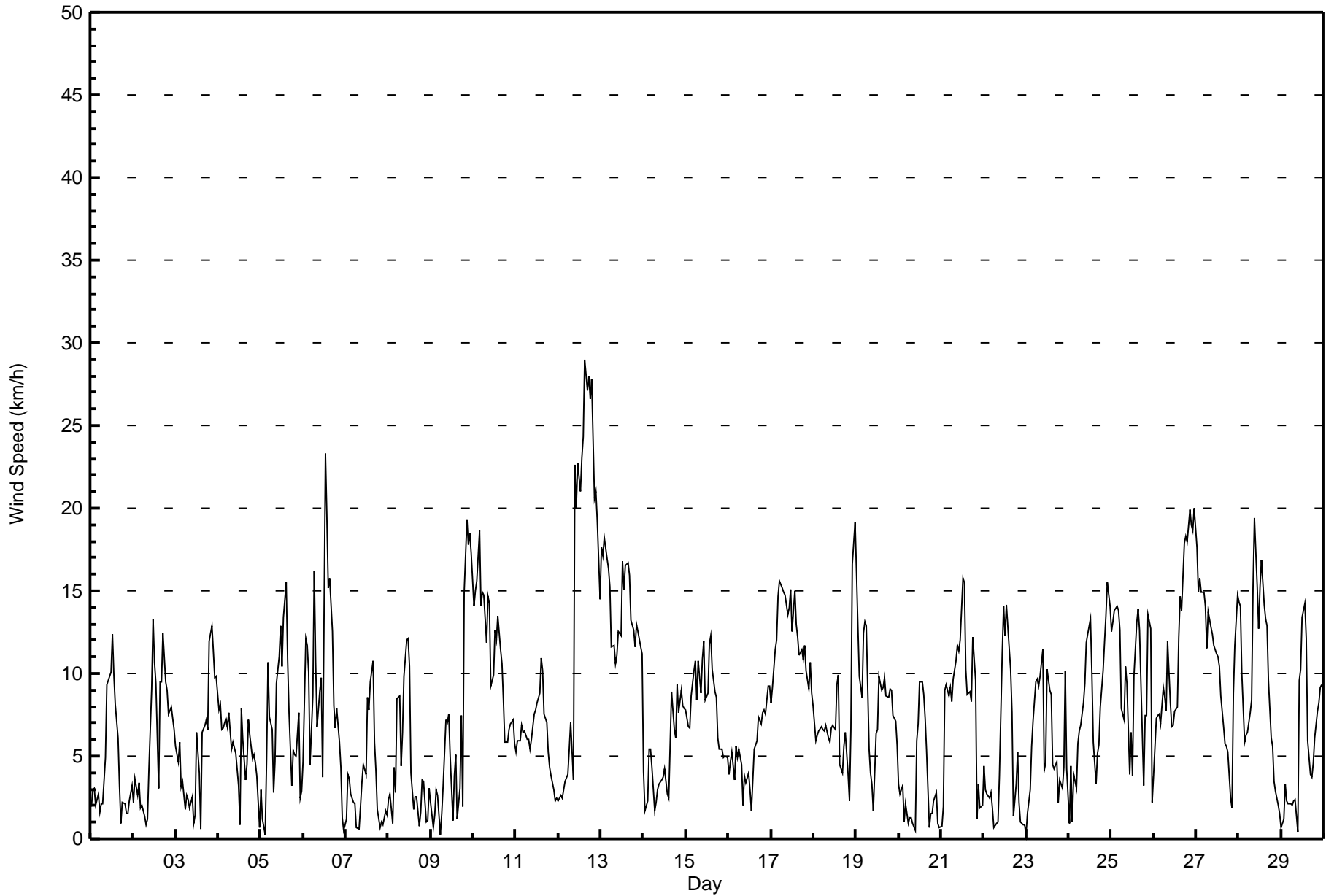
Wind Speed (WS) - km/h
Lower Camp - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 12 09:00 Minimum Value: 0 km/h on Feb 14 09:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 696 Hours of Data: 696 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	1	1	1	1	1	1	1	4	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	4
2-Feb	1	1	2	1	1	2	1	1	1	2	2	3	3	1	2	3	3	3	2	2	2	2	2	1	3
3-Feb	1	1	1	2	2	1	1	1	1	1	1	2	1	2	2	2	3	2	3	2	2	2	2	3	
4-Feb	2	2	1	2	1	1	2	1	1	1	1	3	2	1	2	3	2	2	1	2	1	1	1	3	
5-Feb	1	1	1	3	2	3	4	1	5	4	2	4	3	5	3	3	3	2	2	2	2	3	2	5	
6-Feb	2	2	3	2	3	2	3	2	1	4	3	6	5	6	3	3	3	2	1	2	2	1	1	6	
7-Feb	1	1	1	2	2	2	1	1	1	1	1	3	2	2	2	1	1	1	1	1	1	1	2	3	
8-Feb	1	2	1	1	2	2	4	1	1	3	2	2	2	2	1	1	1	1	2	1	1	1	1	4	
9-Feb	1	1	1	2	2	1	1	3	2	1	2	2	1	1	2	1	2	2	4	5	6	5	4	6	
10-Feb	3	5	4	5	4	3	4	3	4	4	2	3	3	3	2	2	2	2	1	1	1	2	1	5	
11-Feb	1	2	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	1	1	1	2	1	1	2	
12-Feb	2	1	1	2	2	2	2	2	7	4	4	5	5	4	4	4	5	5	4	5	6	5	5	7	
13-Feb	4	3	4	4	4	5	4	3	3	3	3	3	2	2	2	2	3	3	2	2	2	2	2	5	
14-Feb	2	1	2	2	1	1	1	0	1	1	1	1	1	1	2	2	2	1	1	2	2	2	2	2	
15-Feb	2	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2	1	1	2	1	3	
16-Feb	1	1	1	2	2	1	1	1	2	2	2	1	2	2	1	1	2	2	2	1	1	1	1	2	
17-Feb	2	2	3	3	4	4	4	3	5	4	3	3	3	3	3	3	2	2	2	3	2	2	2	5	
18-Feb	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	4	5	4	5	
19-Feb	3	2	2	2	3	3	3	3	1	1	1	2	2	2	2	2	3	2	2	2	2	1	2	3	
20-Feb	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	2	
21-Feb	1	3	2	1	1	1	1	2	1	1	2	2	3	3	2	2	2	2	2	4	2	1	1	4	
22-Feb	1	2	2	1	1	2	1	1	1	1	2	2	2	1	2	1	1	2	2	2	2	1	1	2	
23-Feb	1	1	1	2	1	2	2	2	2	2	4	2	3	2	3	2	1	2	2	2	2	4	2	4	
24-Feb	1	1	1	2	3	2	1	2	1	2	2	2	1	3	1	1	1	1	2	2	2	3	2	3	
25-Feb	3	2	2	2	3	2	2	2	2	3	3	3	2	4	2	2	2	2	3	3	2	3	3	4	
26-Feb	1	3	2	1	2	2	2	2	6	3	2	2	3	4	4	4	4	5	4	4	4	4	4	6	
27-Feb	4	4	5	4	3	3	3	3	3	3	2	2	2	2	2	2	1	1	2	1	2	2	5	5	
28-Feb	5	4	3	1	2	2	3	2	5	4	4	3	3	4	3	3	3	2	1	1	1	1	1	5	
29-Feb	1	1	1	1	1	1	1	1	1	1	3	2	3	3	3	2	2	1	2	2	2	2	2	3	
																	Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	265	38.07	38.07
6 - 11	270	38.79	76.87
12 - 19	144	20.69	97.56
20 - 28	16	2.30	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - February 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	26	13	5	3	8	16	25	7	2	1	3	3	16	58	43	36	265
6 - 11	44	9	1	0	0	5	86	6	1	0	0	1	6	7	39	65	270
12 - 19	62	10	0	0	0	1	51	6	0	0	1	3	2	0	0	8	144
20 - 28	2	1	0	0	0	2	10	0	0	0	0	0	0	0	0	1	16
29 - 38	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	134	33	6	3	8	25	172	19	3	1	4	7	24	65	82	110	696

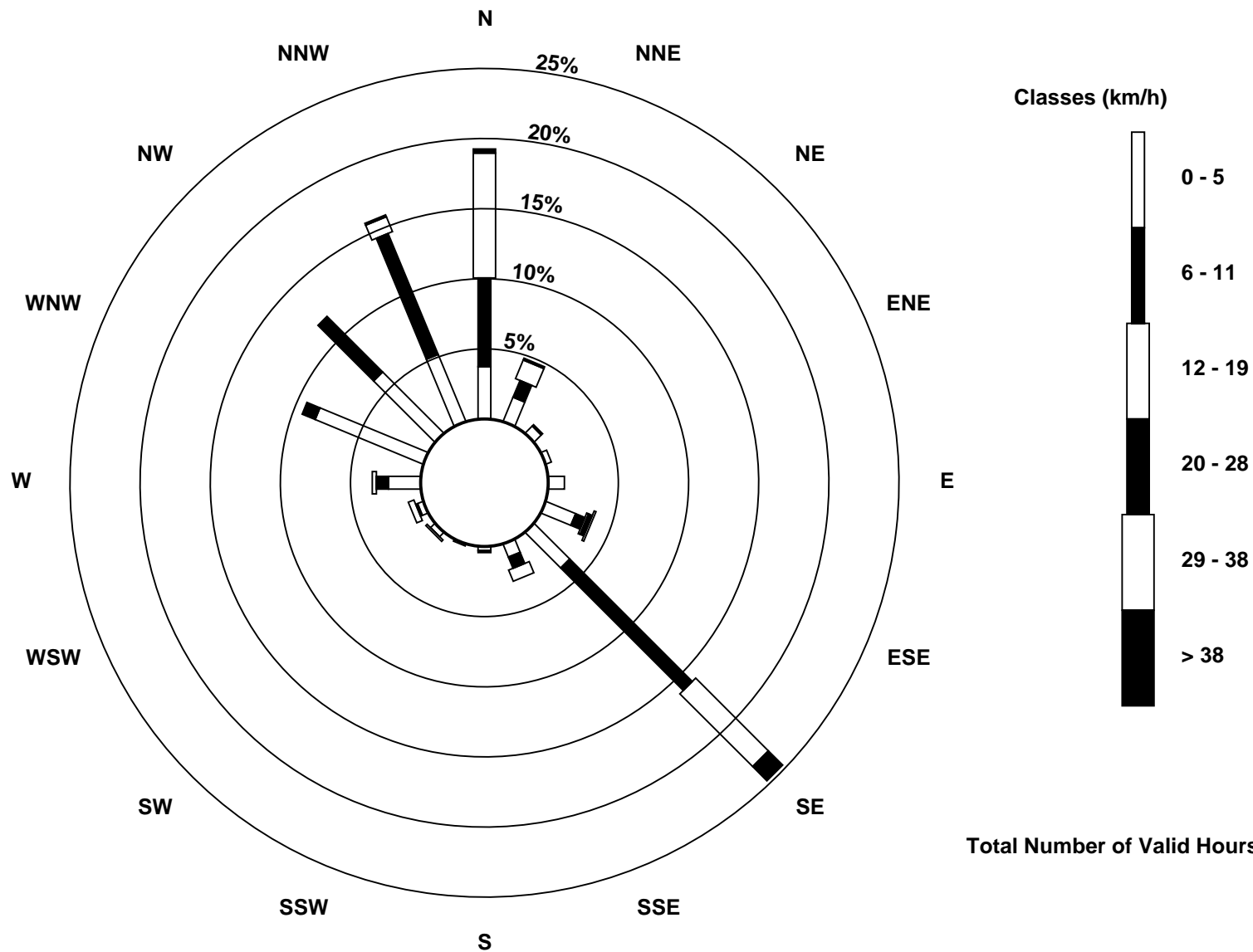
Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Lower Camp (AMS 11)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - February 2016

Direction of Maximum Speed: 123 deg on Feb 12 16:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 140.6 deg on Feb 13	Hours of Data: 696
Direction of Minimum Speed: 344 deg on Feb 5 03:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.8 deg on Feb 23	Percent Operational Time: 100.0
Monthly Average Direction: 330.3 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	315	343	309	338	329	101	71	37	122	129	127	131	120	132	136	113	84	326	319	284	346	308	329	298	113.1	
2-Feb	4	314	303	313	309	310	343	13	35	125	135	135	132	129	125	333	330	346	323	342	337	318	324	310	347.4	
3-Feb	319	335	346	18	312	33	11	351	351	345	278	223	127	128	42	350	330	354	349	358	3	1	358	357	355.4	
4-Feb	346	333	333	339	331	337	1	333	339	312	299	329	126	129	130	118	355	335	317	299	312	326	287	286	334.2	
5-Feb	130	64	344	121	130	117	126	160	121	136	135	126	126	130	125	127	149	156	143	134	121	119	132	112	129.1	
6-Feb	116	132	134	136	137	135	128	115	114	133	135	348	359	345	349	358	356	354	341	356	16	19	21	280	50.3	
7-Feb	351	277	299	303	316	267	135	78	292	295	316	312	339	354	356	359	342	301	314	355	125	330	317	313	329.7	
8-Feb	311	301	10	130	121	136	136	129	140	132	134	133	137	142	303	280	259	280	289	281	301	315	279	288	143.6	
9-Feb	283	344	113	327	262	228	84	109	138	139	133	130	31	355	351	109	130	136	90	341	352	356	6	358	16.0	
10-Feb	6	357	1	3	4	5	9	16	9	17	19	17	27	352	7	358	348	346	326	322	329	333	310	319	0.1	
11-Feb	318	327	314	312	322	323	317	307	323	328	330	337	341	339	309	335	327	295	298	310	300	298	342	306	320.8	
12-Feb	318	318	319	295	301	330	348	313	113	133	133	134	123	122	125	123	128	128	126	127	132	137	143	152	128.9	
13-Feb	140	132	137	144	148	154	153	150	143	141	140	152	133	133	134	136	135	135	139	144	141	142	144	134	140.6	
14-Feb	83	350	23	298	286	289	304	298	299	345	340	339	348	19	15	345	15	12	340	10	356	351	340	331	345.8	
15-Feb	344	331	338	341	348	350	342	24	359	355	11	359	343	349	346	357	0	349	346	2	8	314	358	299	351.1	
16-Feb	331	349	312	310	318	324	301	297	353	338	333	328	354	21	344	347	341	316	305	303	309	312	309	309	320.7	
17-Feb	325	325	342	351	6	358	354	359	360	20	6	8	352	9	11	357	4	9	5	357	354	352	7	358	359.2	
18-Feb	358	336	333	324	321	322	321	317	319	330	339	333	327	324	311	303	268	330	330	299	280	320	0	1	331.1	
19-Feb	6	356	356	350	5	356	27	2	287	304	304	354	342	358	349	350	14	28	39	15	11	2	349	329	0.7	
20-Feb	301	301	311	319	329	16	5	336	292	254	141	126	127	133	141	137	144	290	298	301	303	307	308	358	137.7	
21-Feb	358	118	137	136	141	140	140	138	137	138	131	130	127	127	135	142	142	139	138	127	153	270	268	296	136.2	
22-Feb	295	301	307	311	299	285	86	95	128	139	137	132	133	130	131	134	139	157	284	272	299	348	48	153	140.6	
23-Feb	354	131	126	131	127	129	128	130	132	134	151	325	350	4	355	298	299	338	264	279	113	245	263	280	118.3	
24-Feb	122	130	48	327	139	134	131	128	134	137	137	135	137	133	129	124	145	152	155	147	145	145	143	145	139.0	
25-Feb	141	139	137	139	135	134	140	131	138	136	202	190	215	253	253	250	247	278	282	274	287	266	266	90	192.4	
26-Feb	123	140	138	139	139	138	137	148	226	274	262	280	292	300	1	28	12	2	8	24	22	9	4	8	13.4	
27-Feb	2	354	347	350	352	350	341	353	351	347	346	334	330	337	343	320	322	352	8	9	11	344	1	357	348.3	
28-Feb	2	8	348	316	307	336	346	333	357	6	9	353	3	15	354	359	359	345	302	284	298	298	324	326	351.6	
29-Feb	23	10	326	283	334	333	309	302	301	18	133	130	130	129	130	143	177	167	175	159	131	128	133	133	136.4	
	4.1	2.9	3.3	3.1	7.0	32.6	47.2	36.5	51.4	85.6	104.0	97.6	72.2	65.1	41.9	29.9	19.2	7.2	3.8	1.1	9.9	349.8	351.0	354.6		
Diurnal Average																										

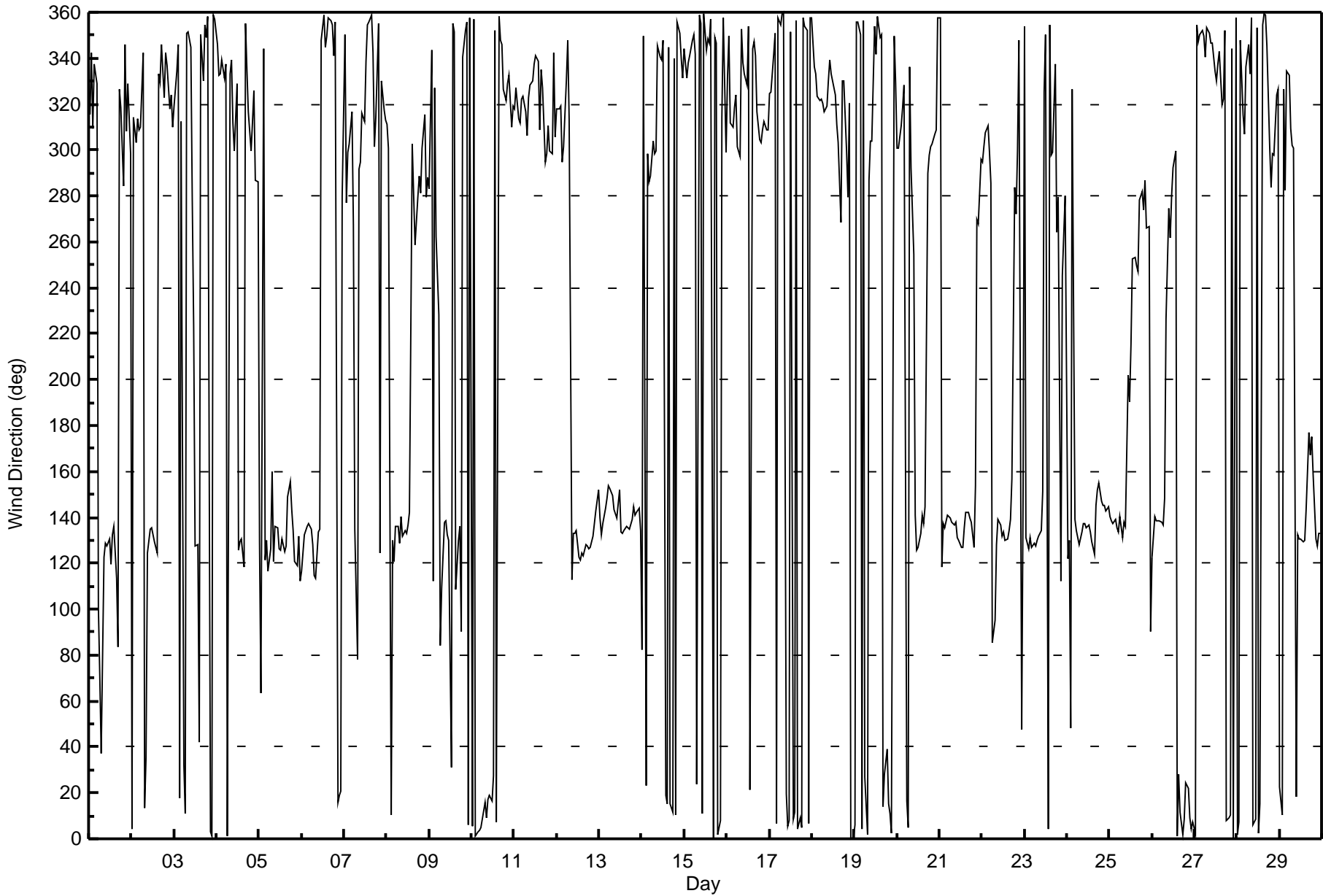
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Lower Camp - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Feb 4 13:00 Minimum Value: 5 deg on Feb 24 13:00 Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 15 Median = 19 Q ₃ = 32 P ₉₀ = 59 P ₉₉ = 92																	Hours in Service: 696 Hours of Data: 696 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	40	27	23	27	30	54	53	38	58	10	14	12	8	9	16	22	28	86	36	27	52	37	49	28	86
2-Feb	31	28	42	36	43	60	56	50	69	38	10	8	10	11	76	16	16	18	15	20	19	11	13	11	76
3-Feb	12	20	19	72	50	42	22	39	51	30	96	64	14	19	78	21	18	25	24	15	13	14	18	17	96
4-Feb	18	17	17	20	16	17	17	20	18	14	18	34	100	12	13	40	31	21	20	19	16	17	16	69	100
5-Feb	14	44	94	29	11	26	23	53	51	20	11	12	14	9	13	15	27	32	24	44	48	44	65	43	94
6-Feb	36	10	9	11	67	16	11	20	21	14	10	95	20	19	17	13	15	13	16	19	20	27	45	93	95
7-Feb	73	41	37	32	59	64	76	79	58	33	23	31	23	16	14	15	18	24	56	81	60	62	59	54	81
8-Feb	38	39	85	21	72	15	15	24	17	14	8	9	6	31	52	36	25	74	59	17	33	70	86	42	86
9-Feb	47	89	80	58	34	95	48	50	15	19	13	18	74	25	22	82	37	11	74	17	19	18	14	17	95
10-Feb	15	17	15	16	18	14	15	16	14	17	26	26	21	17	14	14	17	19	17	21	17	16	16	20	26
11-Feb	17	16	16	14	16	17	15	14	21	19	20	20	20	12	21	21	27	25	29	23	30	48	48	48	48
12-Feb	49	31	47	46	48	49	30	21	84	9	9	10	11	9	9	9	8	9	8	16	13	16	23	84	
13-Feb	16	11	12	18	18	21	23	20	17	18	13	18	9	10	7	6	6	9	9	12	11	10	12	8	23
14-Feb	43	78	57	27	18	23	47	23	15	24	21	23	21	17	30	23	16	19	19	22	25	17	17	19	78
15-Feb	16	16	17	16	17	16	19	19	17	15	19	18	17	17	17	16	12	18	21	19	23	21	18	21	23
16-Feb	26	18	20	26	26	24	18	23	77	42	39	37	53	72	20	21	16	11	15	9	9	9	10	77	
17-Feb	15	14	18	17	15	17	18	16	17	18	15	19	16	14	20	15	12	15	16	14	17	17	15	21	21
18-Feb	18	18	16	13	15	16	18	16	16	25	23	26	27	14	10	33	18	21	11	22	20	19	20	17	33
19-Feb	16	15	15	16	14	23	14	22	19	27	56	26	33	14	18	22	16	25	16	14	11	15	18	17	56
20-Feb	32	42	30	54	34	39	30	30	74	90	9	8	10	5	6	8	16	87	63	36	22	35	69	59	90
21-Feb	60	66	9	8	8	8	9	9	8	5	5	7	8	7	12	16	14	10	11	31	88	33	53	74	88
22-Feb	16	47	51	33	25	48	70	74	55	30	8	6	6	5	7	6	8	87	55	44	61	95	83	84	95
23-Feb	79	53	32	23	11	9	8	10	11	9	61	26	21	21	17	52	38	31	58	54	53	69	10	44	79
24-Feb	93	16	67	44	77	15	15	11	8	9	7	7	5	7	9	33	16	13	12	8	9	9	7	10	93
25-Feb	8	8	8	7	7	7	13	18	8	17	74	51	59	47	11	10	11	16	91	27	22	13	13	68	91
26-Feb	34	18	11	12	19	11	19	30	42	25	20	18	25	37	17	20	17	17	14	16	17	13	15	14	42
27-Feb	16	20	19	19	18	18	18	17	17	18	17	18	17	19	20	28	28	17	23	54	91	16	16	17	91
28-Feb	16	15	18	24	23	31	22	19	17	17	19	19	22	18	19	19	16	17	24	14	29	35	40	38	40
29-Feb	67	32	39	30	35	27	28	21	27	92	12	8	10	13	11	28	38	29	20	21	15	17	12	11	92
	93	89	94	72	77	95	76	79	84	92	96	95	100	72	78	82	38	87	91	81	91	95	86	93	
	Diurnal Maximum																								





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 22, 2016	Last Calibration	January 13, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	14:15
Gas Cert Reference	LL110099	Station temp.	20 Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	25/03/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	806	802
Calculated slope	0.995555	0.997403	Chamber temp	45.0	45.0
Calculated intercept	1.211378	1.147019	Pressure	702.4	711.1
Analyzer Background	11.3	11.2	Flow	0.483	0.491
Analyzer Coefficient	1.025	1.025	Intensity	91	90
Analyzer make			TEI 43i	Analyzer serial #	
				100841398	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	80.9	830.0	831.8	0.998
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	80.9	830.0	831.8	0.998
second point	5000	40.9	419.6	418.6	1.003
third point	5000	20.5	210.3	208.8	1.007
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	80.9	830.0	831.1	0.999
Average Correction Factor					1.003

Corrected As found 831.8 Previous response 832.5 % change 0.1%

Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By:

Evan Magill



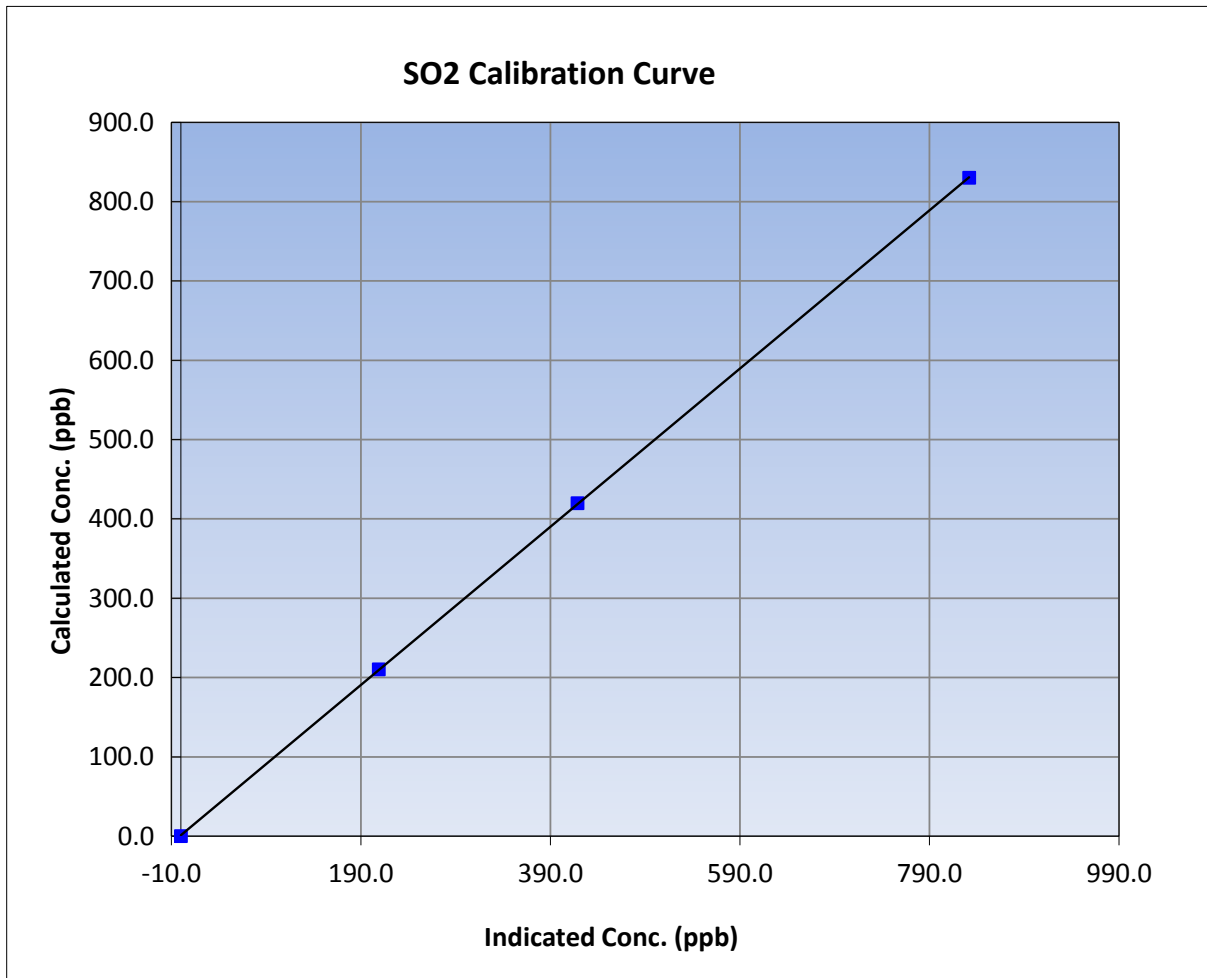
Wood Buffalo Environmental Association SO2 Calibration Report

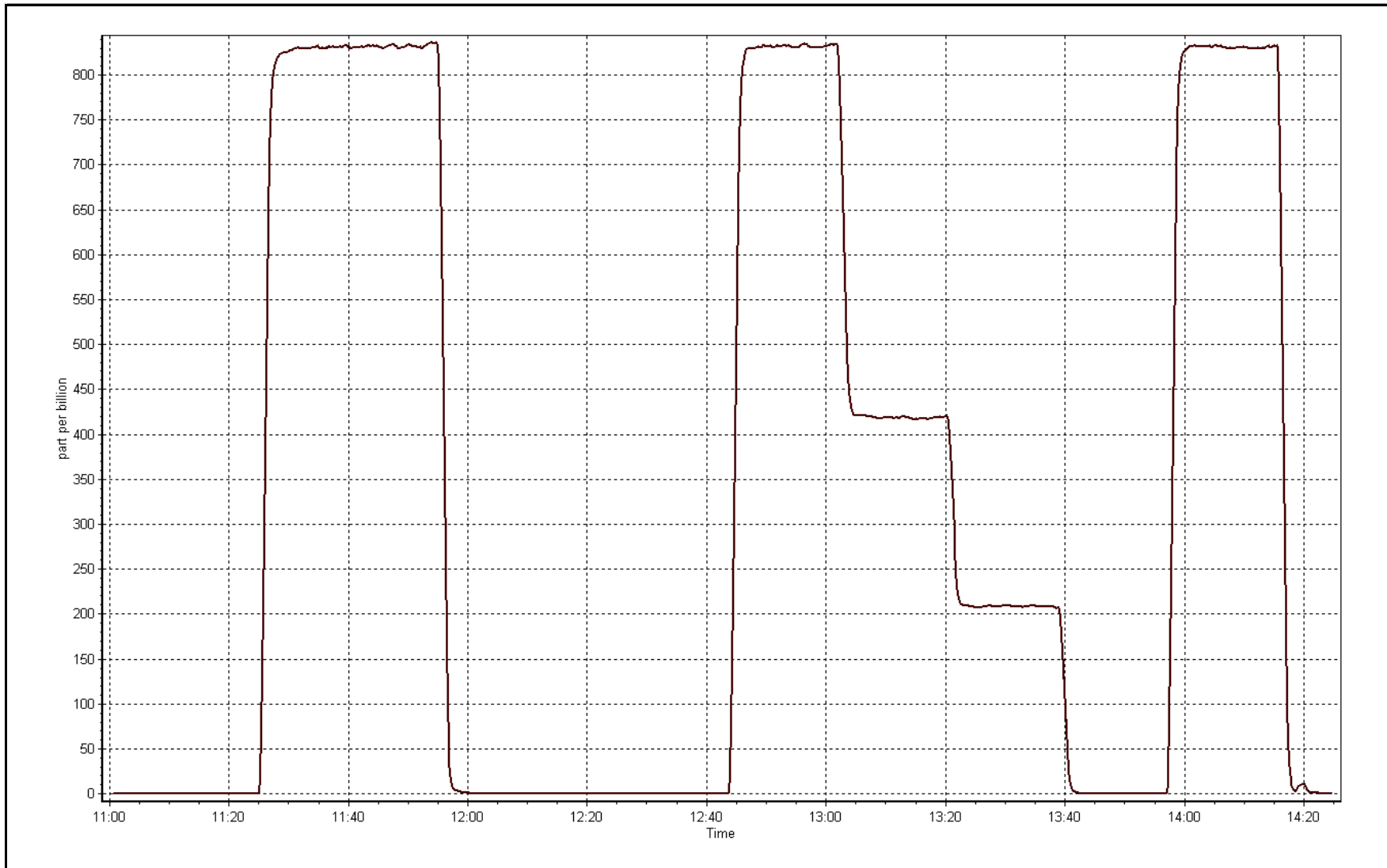
Station Information

Calibration Date	February 22, 2016	Previous Calibration	January 13, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:00	End Time (MST)	14:15
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	0.0	----	Correlation Coefficient	0.999990
830.0	831.8	0.9979		
419.6	418.6	1.0026	Slope	0.997403
210.3	208.8	1.0072		
			Intercept	1.147019







Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 22, 2016	Last Calibration	January 14, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	14:20	End Time (MST)	18:10
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-670	-671
Analyzer IP address	192.168.1.42		Lamp voltage	814	808
Calculated slope	0.990580	0.988410	Chamber temp	45	45
Calculated intercept	-0.036380	0.311886	Pressure	595.6	589.0
Analyzer Background	11.6	12.2	Flow	1.049	1.056
Analyzer Coefficient	1.231	1.225	Intensity	91	91
			Converter temp.	323	323

Analyzer make/model	Thermo 450i	Analyzer serial #	1410661328
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	72.8	75.0	76.5	0.981
SO2 scrubber check	5000	20.5	210.7	1.1	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	72.8	75.0	75.6	0.992
second point	5000	38.8	40.0	40.1	0.996
third point	5000	19.4	20.0	19.8	1.011
as left zero	5000	0.0	0.0	-0.4	----
as left span	5000	72.8	75.0	75.5	0.993
Average Correction Factor					1.000

Corrected As found	76.8	Previous response	75.7	% change	-1.4%
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Notes:

Replaced the pump and sox scrubber after as founds for preventative maintenance. Changed inlet filter after as founds. Scrubber check done after calibrator zero. Adjusted zero and span.

Calibration Performed By: Evan Magill



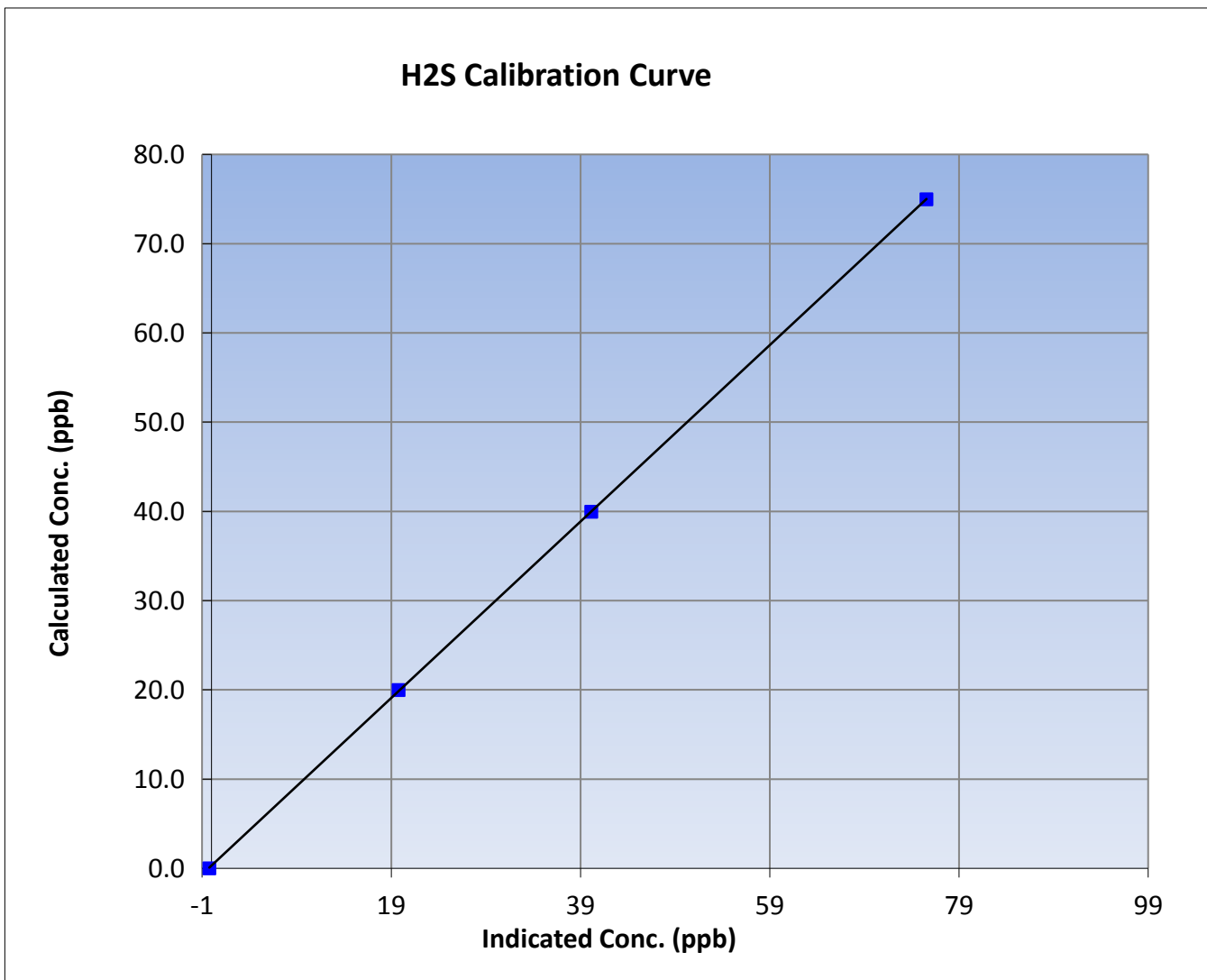
Wood Buffalo Environmental Association H2S Calibration Report

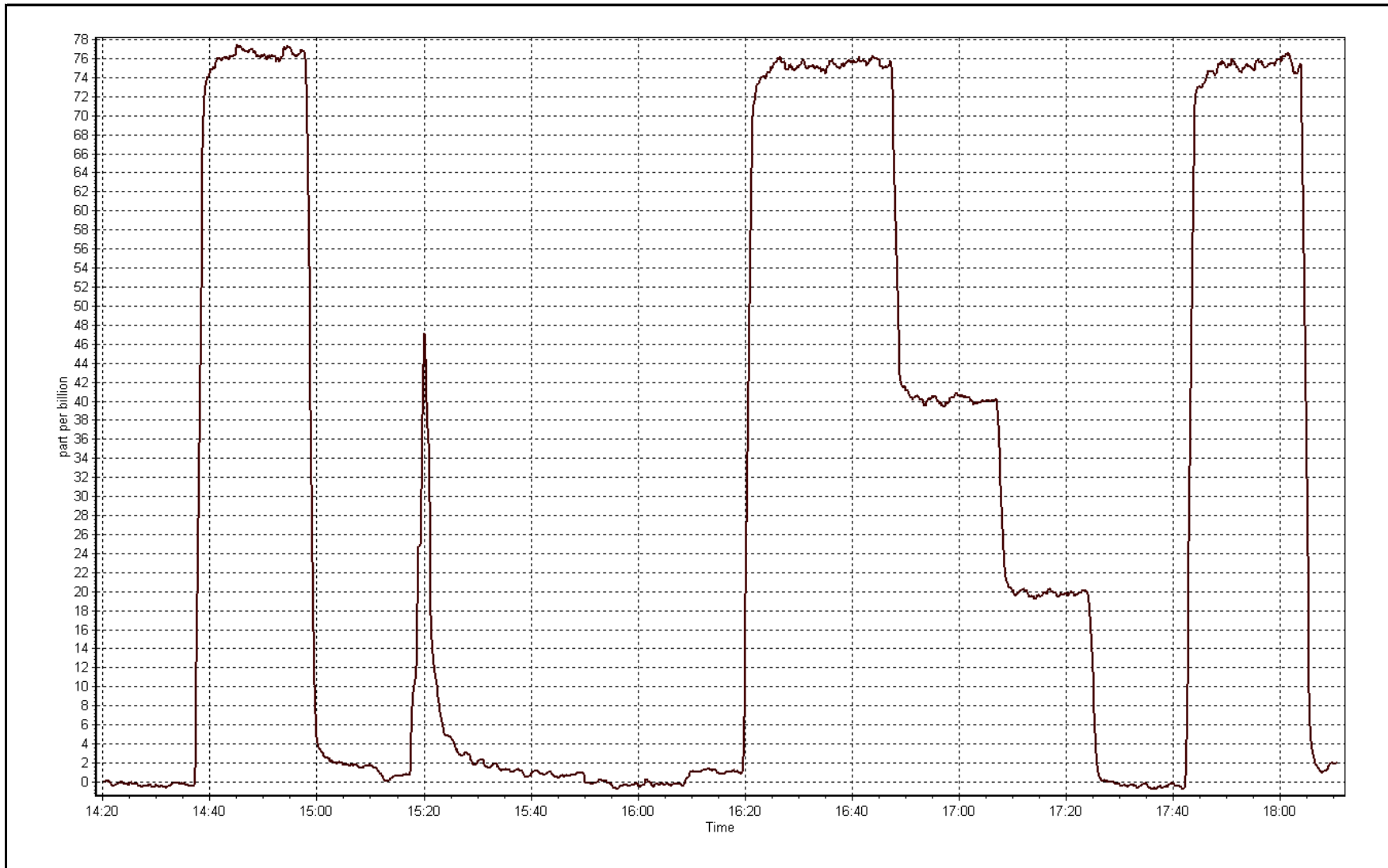
Station Information

Calibration Date	February 22, 2016	Previous Calibration	January 14, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	14:20	End Time (MST)	18:10
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999992
75.0	75.6	0.9922		
40.0	40.1	0.9956	Slope	0.988410
20.0	19.8	1.0107		
			Intercept	0.311886







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-22-16	Last Calibration	January-14-16
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	14:15
Gas Cert Reference	LL110099	Cal Gas Expiry Date	25/03/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG make/model	Teledyne API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492

Analyzer Information

	<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	37.3	37.3
Calculated slope	1.001689	1.005948	Fuel Pressure	24.0	24.0
Calculated intercept	-0.011257	-0.053747	Analyzer Coeff	4.163	4.127
			Analyzer BKG	6.09	5.89

Analyzer make	51i-LT	Analyzer serial #	1410661326
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.09	----
as found span	5000	80.9	17.32	17.19	1.008
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	80.9	17.32	17.28	1.002
second point	5000	40.9	8.76	8.73	1.003
third point	5000	20.5	4.39	4.44	0.989
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	80.9	17.32	17.26	1.004
Average Correction Factor					0.998

Corrected As found	17.28	Previous response	17.30	% change	0.1%
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Notes:

Changed Hydrogen after as founds, no change on the span and flame did not go out. Changed inlet filter after as founds.
Adjusted zero.

Calibration Performed By: Evan Magill



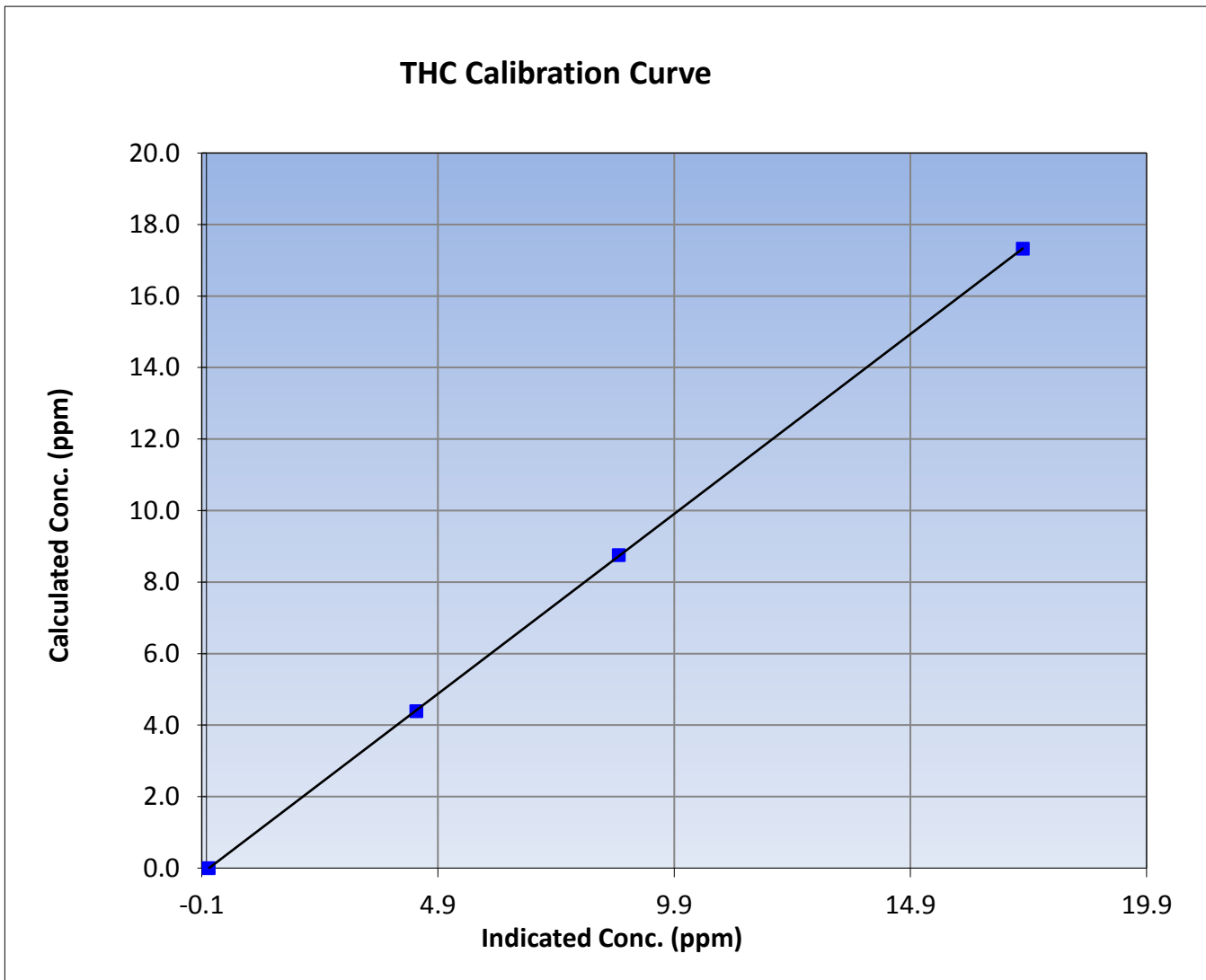
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 22, 2016	Previous Calibration	January 14, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:00	End Time (MST)	14:15
Analyzer make	51i-LT	Analyzer serial #	1410661326

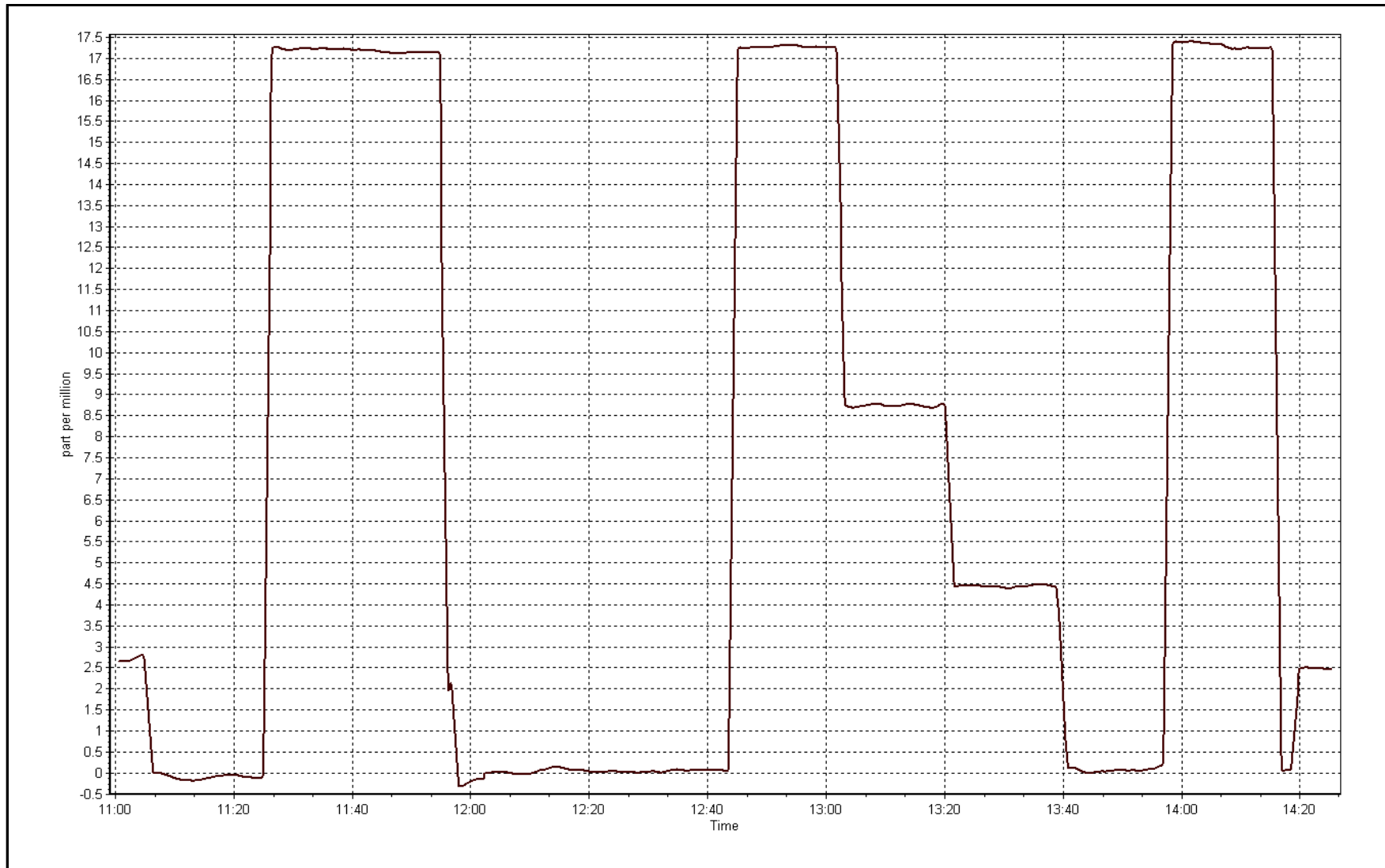
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999991
17.32	17.28	1.0024		
8.76	8.73	1.0031	Slope	1.005948
4.39	4.44	0.9885		
			Intercept	-0.053747



THC Calibration Plot

Date: February 22, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 13
FORT MCKAY SOUTH
FEBRUARY 2016

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 FEBRUARY 2016

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	657	35	39	99.43	21	0	3	0
TRS(ppb) Average	660	32	36	99.43	4	0	1	0
THC(ppm) Average	658	34	38	99.43	4	-	3	-
O3(ppb) Average	660	32	36	99.43	43	0	30	-
NO2(ppb) Average	657	35	39	99.43	36	0	18	-
NO(ppb) Average	657	35	39	99.43	67	-	36	-
NOX(ppb) Average	657	35	39	99.43	102	-	50	-
PM2.5(ug/m3) Average	691	1	5	99.43	24.6	-	10	0
ET(C) Average	696	0	0	100.00	9.9	-	0.3	-
RH(%) Average	696	0	0	100.00	96	-	91	-
WS(km/h) Average	678	0	18	97.41	15	-	8	-
WD(deg) Average	678	0	18	97.41	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	657	1	2	-	0	0	0	0	1	2	21
TRS(ppb) Average	660	0.5	1	-	0	0	0	0	1	1	4
THC(ppm) Average	658	2.47	0.3	-	2.1	2.2	2.3	2.3	2.6	2.9	4
O3(ppb) Average	660	15.4	11	-	0	1	5	14	25	32	43
NO2(ppb) Average	657	11.9	7	-	0	4	7	11	17	21	36
NO(ppb) Average	657	6.1	12	-	0	0	0	1	5	20	67
NOX(ppb) Average	657	18	16	-	0	4	8	12	23	38	102
PM2.5(ug/m3) Average	691	4.38	3.5	-	0	1	2	3.5	6	8.7	24.6
Temperature 2 m (C) Average	696	-12.19	7.5	-	-37	-20.4	-16.2	-12.6	-7.4	-3.1	9.9
Relative Humidity (%) Average	696	79.6	10	-	34	65	76	82	86	91	96
Wind Speed 10 m (km/h) Average	678	4.1	3	-	0	1	1	3	6	9	15
Wind Direction 10 m (deg) Average	678	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	29 Feb 2016 21:00	01 Mar 2016 00:00	4	Station power failure
Wind Speed, Wind Direction	01 Feb 2016 03:00	01 Feb 2016 04:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	01 Feb 2016 09:00	01 Feb 2016 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Feb 2016 08:00	07 Feb 2016 10:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Feb 2016 22:00	07 Feb 2016 23:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	08 Feb 2016 02:00	08 Feb 2016 02:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	17 Feb 2016 13:00	17 Feb 2016 13:00	1	Maintenance to access sensor serial numbers
Wind Speed, Wind Direction	20 Feb 2016 23:00	21 Feb 2016 00:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	21 Feb 2016 02:00	21 Feb 2016 02:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	29 Feb 2016 07:00	29 Feb 2016 09:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	29 Feb 2016 18:00	29 Feb 2016 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	29 Feb 2016 22:00	29 Feb 2016 22:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

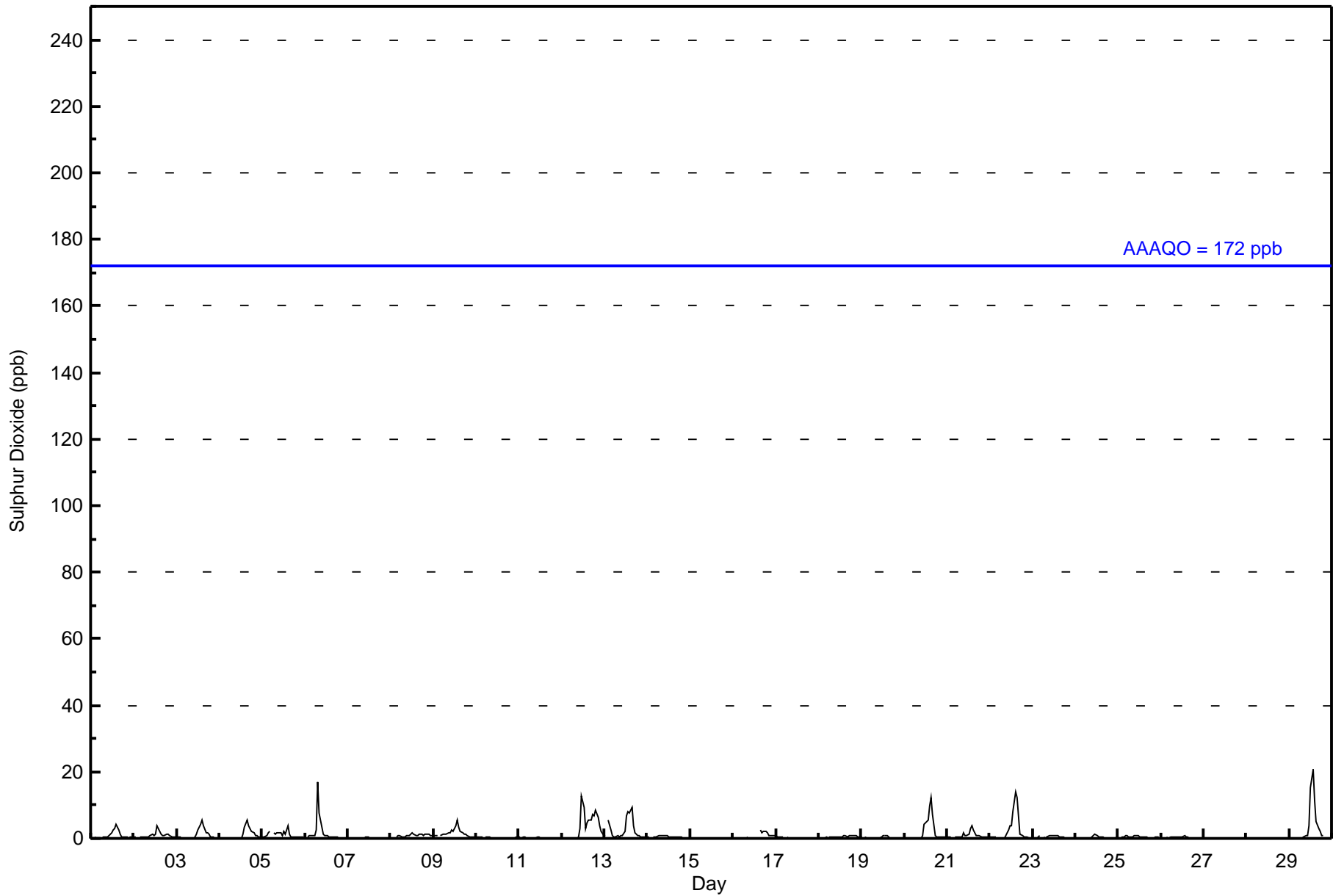
Fort McKay South - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 21 ppb on Feb 29 14:00										Maximum Daily Average: 3.5 ppb on Feb 12										Hours of Data: 657						
Minimum Value: 0 ppb on Feb 3 07:00										Minimum Daily Average: 0.0 ppb on Feb 15										Hours of Missing Data: 39						
Maximum Diurnal Average: 2.9 ppb at hour 15										Minimum Diurnal Average: 0.2 ppb at hour 2										Hours of Calibration: 35						
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 = 12										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	0	Z	0	0	0	0	0	0	0	0	1	2	2	3	4	3	1	1	0	0	0	0	0	0	0.9	4
2-Feb	0	0	Z	0	0	0	0	0	0	1	1	1	1	4	2	1	1	1	1	1	1	1	0	0	0.9	4
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	3	4	6	4	2	2	1	0	0	0	0	1.1	6	
4-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	3	6	4	3	2	2	1	1	0	0	1.1	6	
5-Feb	0	1	1	2	2	Z	2	1	1	2	2	1	2	1	4	1	1	1	0	0	0	0	0	1.2	4	
6-Feb	Z	0	1	1	1	1	3	17	8	4	1	1	1	0	0	0	0	0	0	0	0	0	0	1.8	17	
7-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
8-Feb	0	0	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	
9-Feb	1	1	1	Z	1	1	1	1	1	2	2	2	2	4	6	3	2	2	1	1	1	1	0	1.7	6	
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	0.2	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	0.1	0	
12-Feb	Z	0	0	0	0	0	0	0	0	0	3	13	9	3	5	5	6	7	7	9	6	4	2	3.5	13	
13-Feb	1	Z	5	3	1	1	1	1	1	1	1	2	7	8	8	9	4	1	1	1	1	0	0	2.5	9	
14-Feb	0	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0.5	1	
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	
16-Feb	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	2	2	2	2	2	1	1	1	--	2	
17-Feb	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0.4	1	
19-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.2	1	
20-Feb	0	0	Z	0	0	0	0	0	0	0	1	4	5	5	10	12	7	1	0	0	0	0	0	2.0	12	
21-Feb	0	0	0	Z	0	0	0	0	1	2	1	1	1	3	4	3	1	1	1	1	1	0	0	1.0	4	
22-Feb	0	0	0	0	Z	0	0	0	0	1	2	4	4	8	14	12	7	1	1	1	0	0	0	2.5	14	
23-Feb	0	0	0	0	1	Z	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1	
24-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.2	1	
25-Feb	0	Z	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1	
26-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1	
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	0.1	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	0	
29-Feb	0	0	0	0	0	Z	0	0	0	1	1	4	15	21	12	5	3	2	1	1	PF	PF	PF	PF	3.4	21
0.3 0.2 0.5 0.4 0.4 0.3 0.4 0.9 0.6 0.6 0.8 1.5 2.2 2.6 2.9 2.4 1.5 0.9 0.8 0.7 0.6 0.4 0.3 0.3																								Diurnal Average		
1 1 5 3 2 1 3 17 8 4 3 13 15 21 14 12 7 7 7 9 6 4 2 1																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	649	98.78	98.78
11 - 20	7	1.07	99.85
21 - 60	1	0.15	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: 657

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	127	139	24	5	4	7	22	51	64	46	42	46	26	7	7	15	632
11 - 20	0	0	0	0	0	1	3	3	0	0	0	0	0	0	0	0	7
21 - 60	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	127	139	24	5	4	8	26	54	64	46	42	46	26	7	7	15	640

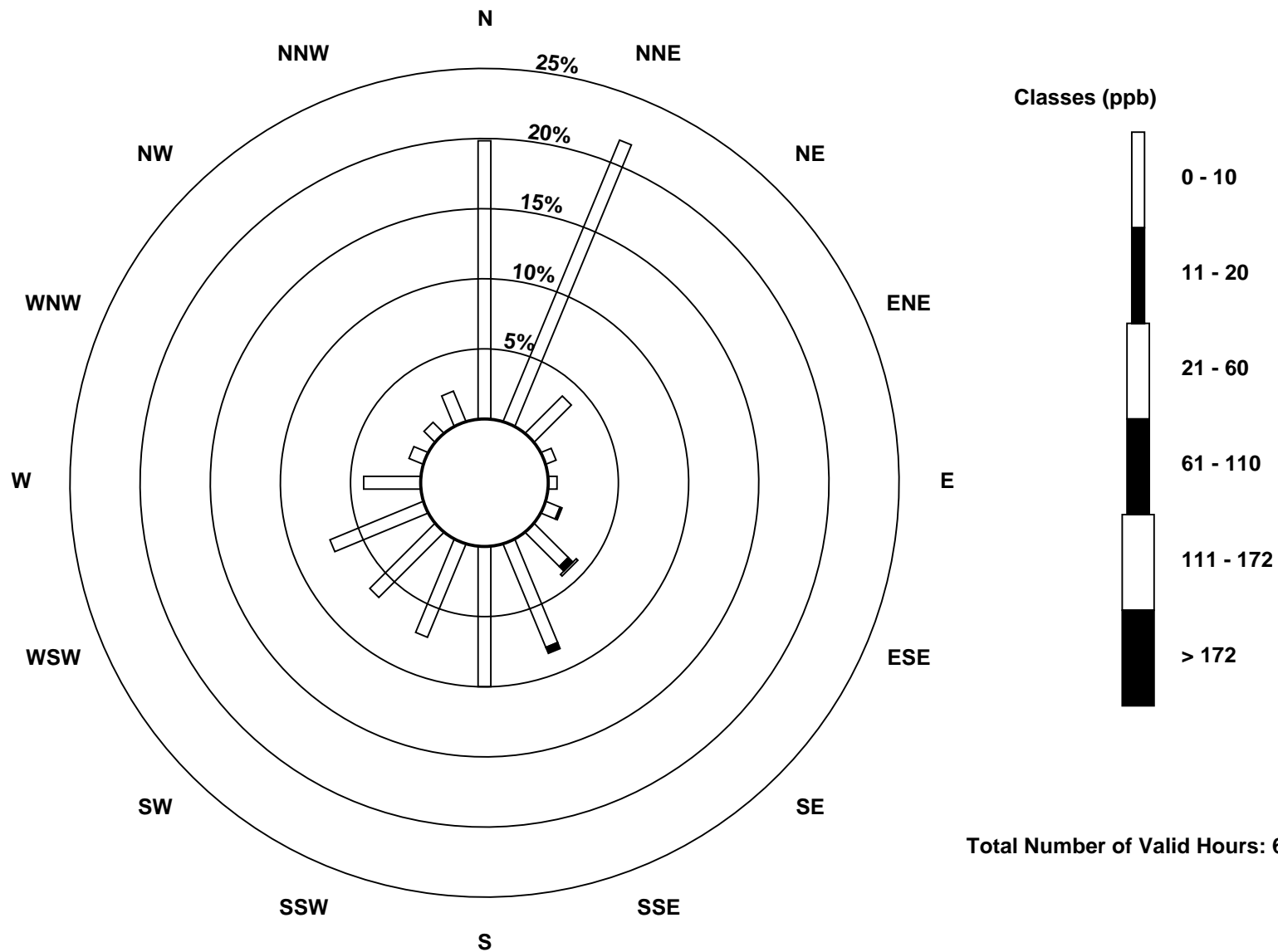
Total Number of Valid Hours: 640

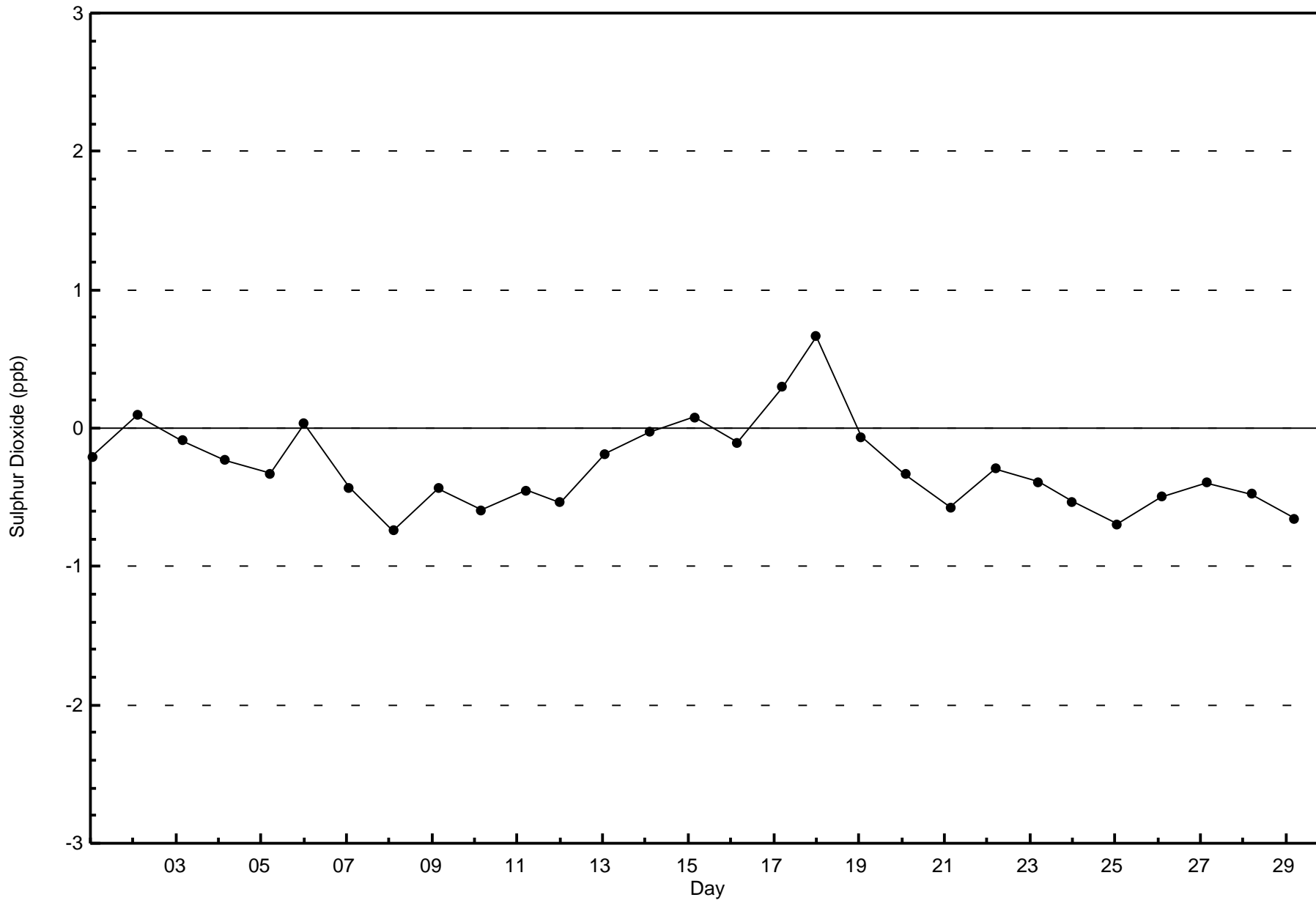
Total Number of Hours: 696

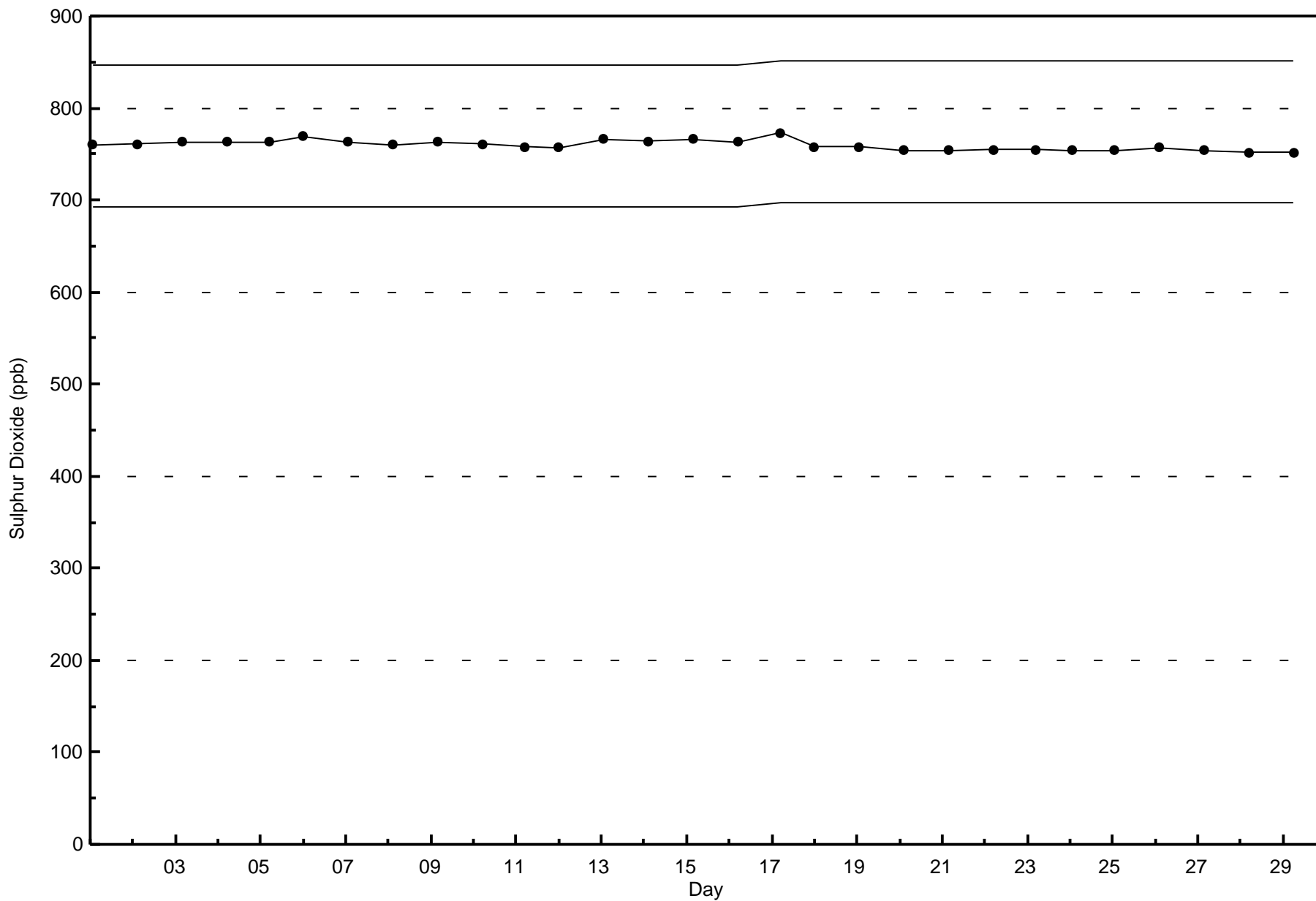


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association
Summary of Hour Averages

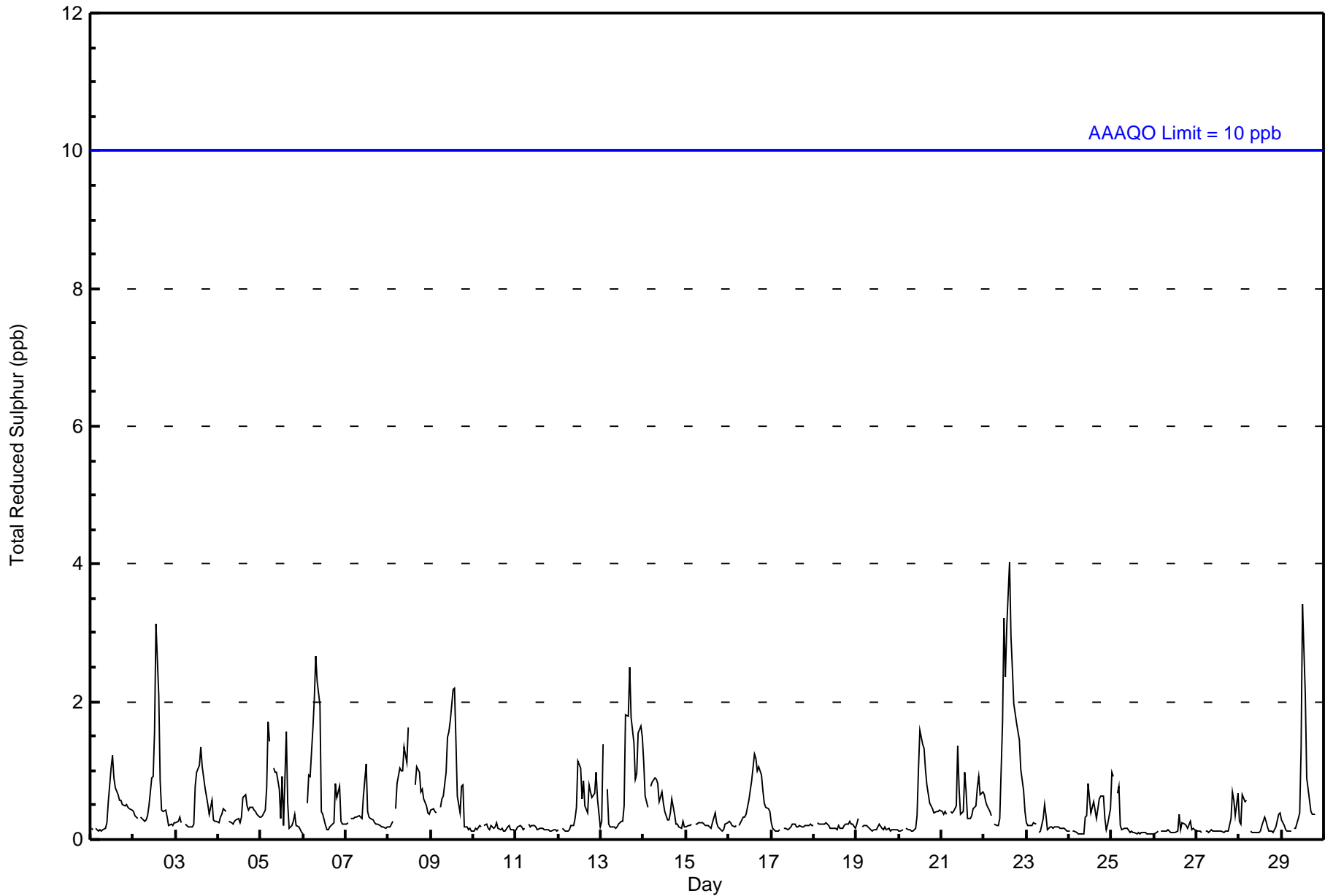
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4 ppb on Feb 22 15:00 Maximum Daily Average: 1.4 ppb on Feb 22										Hours in Service: 696 Hours of Data: 660 Hours of Missing Data: 36 Hours of Calibration: 32 Percent Operational Time: 99.4																
Minimum Value: 0 ppb on Feb 24 08:00 Minimum Daily Average: 0.2 ppb on Feb 26 Maximum Diurnal Average: 0.8 ppb at hour 15 Minimum Diurnal Average: 0.3 ppb at hour 3 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 = 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	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
2-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	2	3	2	1	0	0	0	0	0	0	0	0	0.7	3
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0.5	1	
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1	
5-Feb	0	0	0	1	2	1	Z	1	1	1	1	0	1	0	2	1	0	0	0	0	0	0	0	0.6	2	
6-Feb	0	Z	1	1	1	2	2	3	2	2	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.8	3
7-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Feb	0	0	0	Z	0	1	1	1	1	1	1	2	C	C	C	1	1	1	1	1	1	0	0	0.8	2	
9-Feb	0	0	0	0	Z	0	1	1	1	1	2	2	2	2	1	1	0	1	1	0	0	0	0	0.8	2	
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	0.2	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	0.2	0	
12-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	1	1	1	0.5	1	
13-Feb	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	1	1	2	2	0.9	2	
14-Feb	1	1	0	Z	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0.5	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	0.2	0	
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1	
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	0.2	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	0.2	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	0.2	0	
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0.5	2	
21-Feb	0	0	0	0	Z	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	1	1	1	0.6	1	
22-Feb	1	1	0	0	0	Z	0	0	0	0	2	3	2	3	4	3	2	2	2	2	1	1	1	1.4	4	
23-Feb	0	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	1	0	0	0	0.3	1	
25-Feb	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.2	0	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1	
28-Feb	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
29-Feb	0	0	0	0	0	0	Z	0	0	0	0	1	3	2	1	1	0	0	0	0	PF	PF	PF	PF	0.6	3
0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.7 0.7 0.7 0.8 0.6 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.3 0.3																								Diurnal Average		
1 1 1 1 2 2 2 3 2 2 2 3 3 3 4 3 2 2 2 2 2 1 2 2 1																								Diurnal Maximum		
Z - zerospan C - Calibration PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	653	98.94	98.94
3 - 4	7	1.06	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: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	125	142	23	6	4	8	22	52	62	45	42	50	26	7	8	16	638
3 - 4	0	0	0	0	0	1	4	2	0	0	0	0	0	0	0	0	7
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	125	142	23	6	4	9	26	54	62	45	42	50	26	7	8	16	645

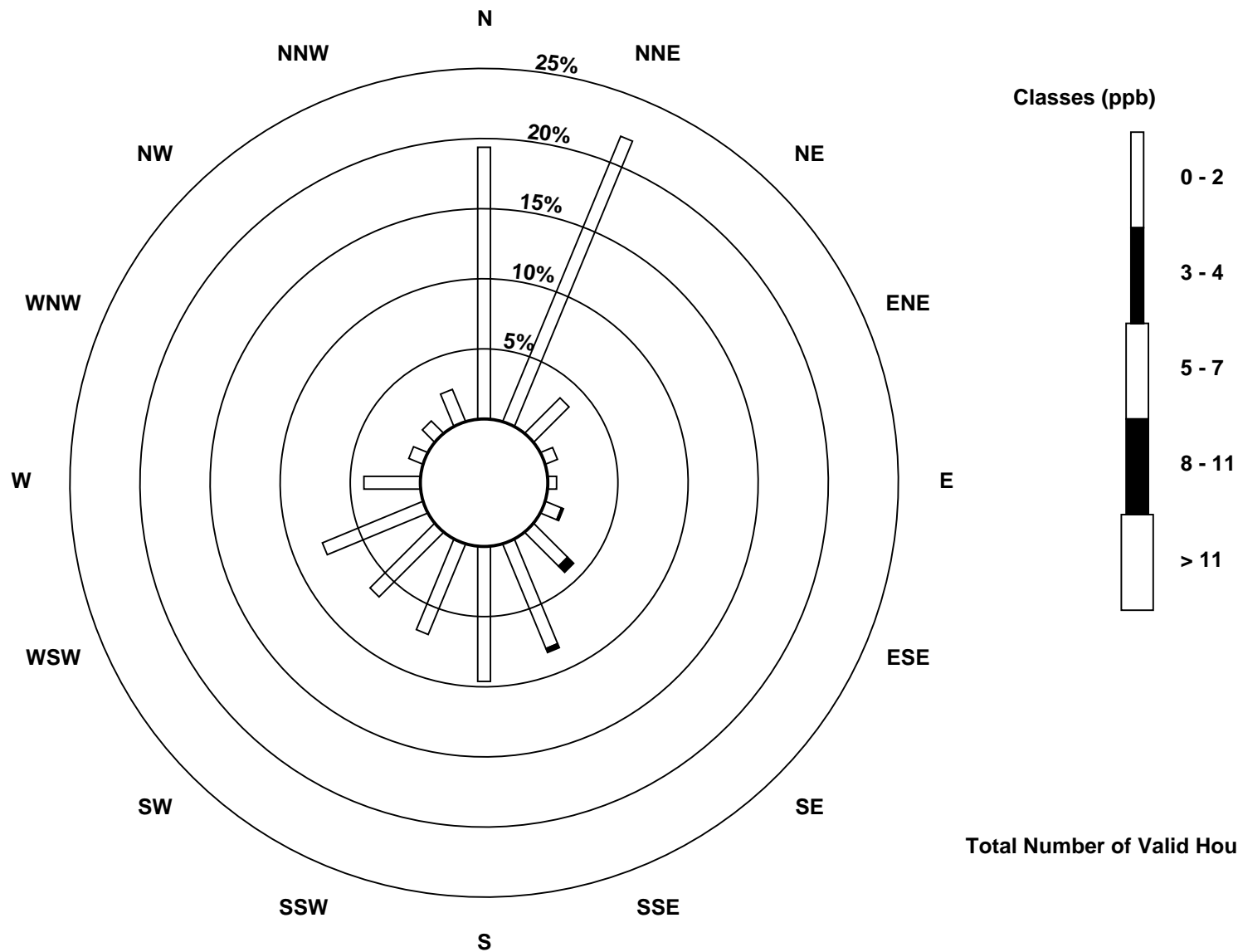
Total Number of Valid Hours: 645

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

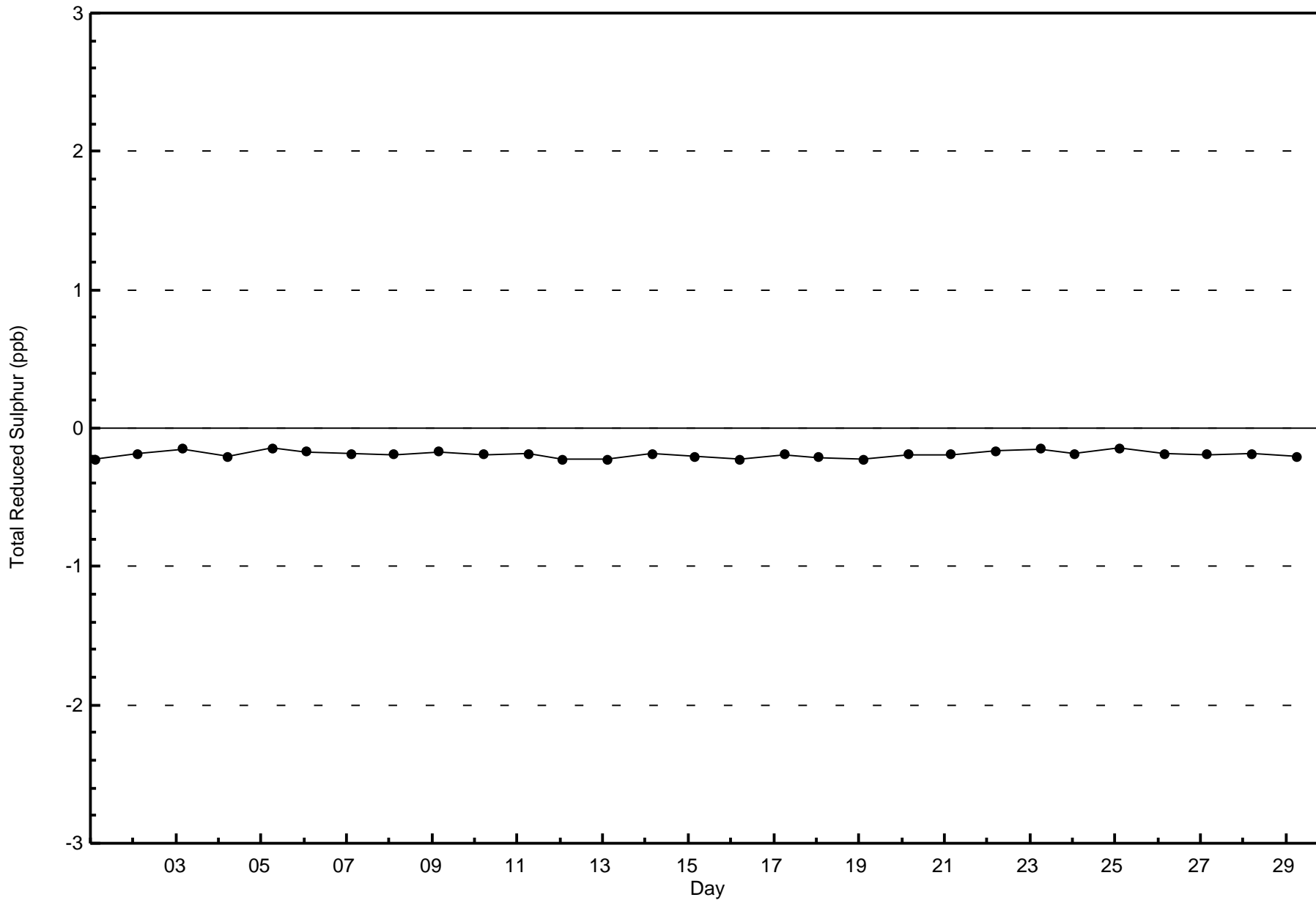
Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association
Zero Responses

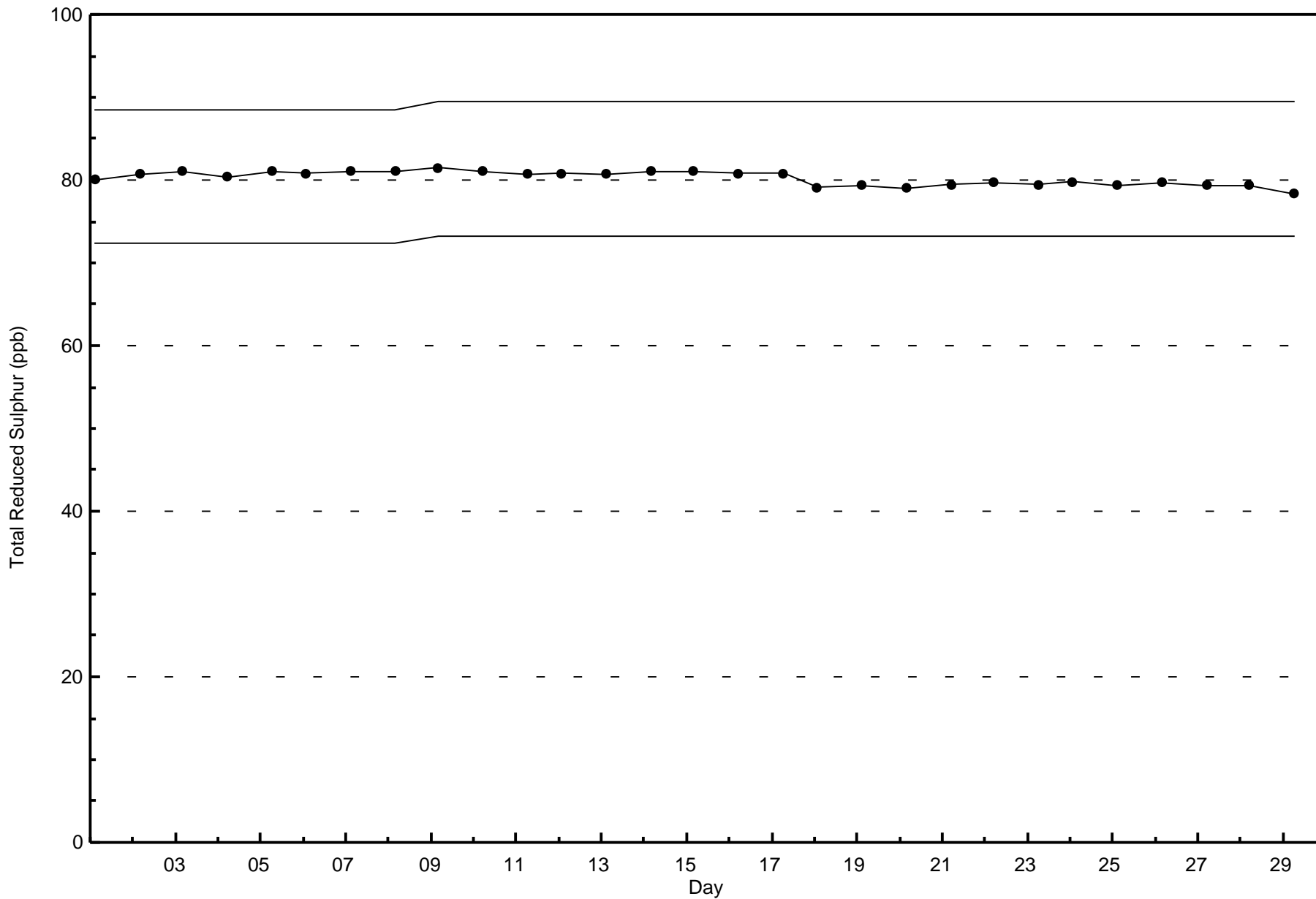
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2016





Wood Buffalo Environmental Association
Span Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - February 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

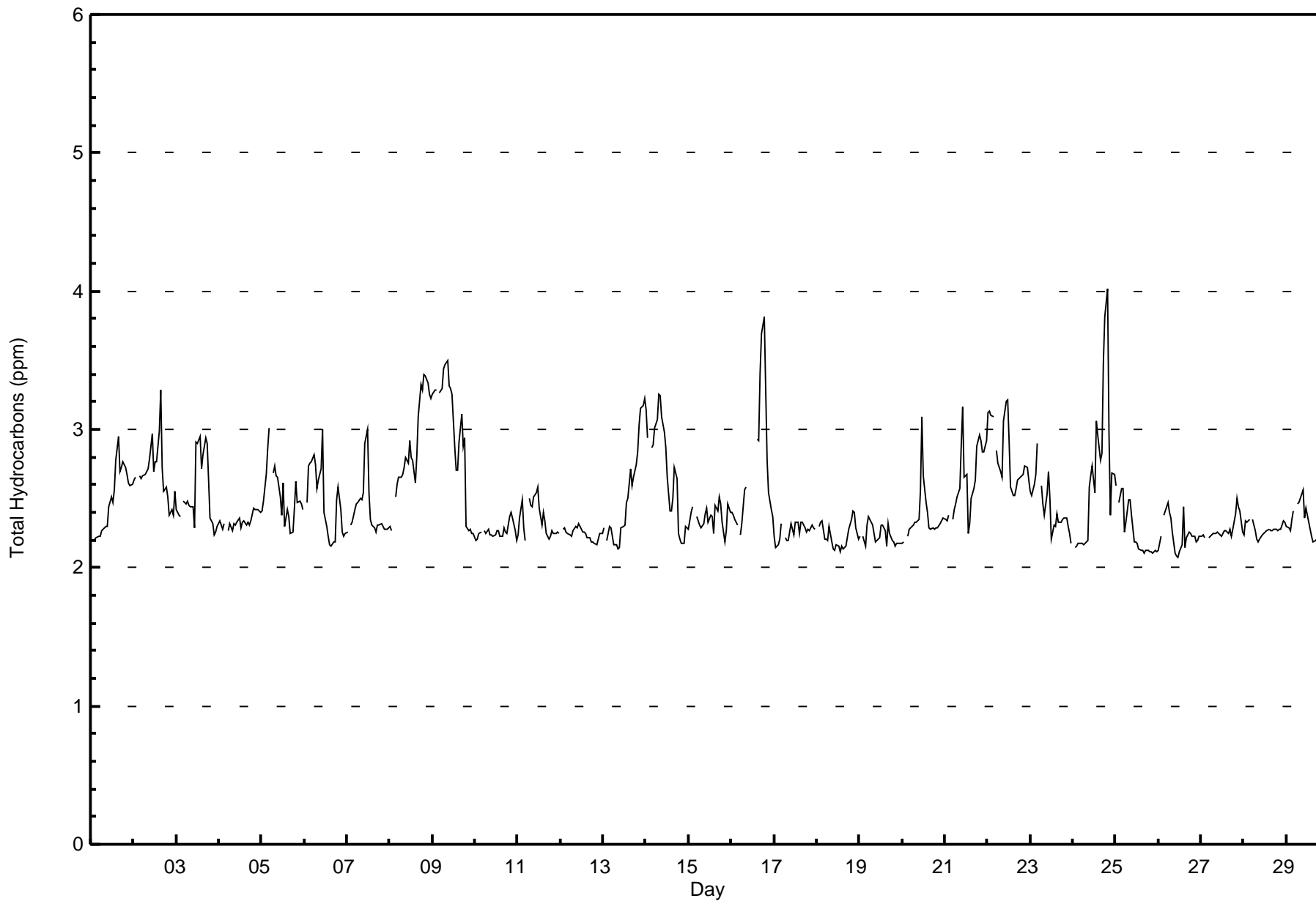
Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2016

Maximum Value: 4.0 ppm on Feb 24 20:00																				Maximum Daily Average: 3.0 ppm on Feb 9					Hours in Service: 696				
Minimum Value: 2.1 ppm on Feb 26 12:00																				Minimum Daily Average: 2.2 ppm on Feb 18					Hours of Data: 658				
Maximum Diurnal Average: 2.5 ppm at hour 11																				Minimum Diurnal Average: 2.4 ppm at hour 24					Hours of Missing Data: 38				
Monthly Average: 2.47 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.3 Q ₃ = 2.6 P ₉₀ = 2.9 P ₉₉ = 3.5					Hours of Calibration: 34				
																				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	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.6	2.8	2.9	2.7	2.7	2.8	2.7	2.7	2.6	2.6	2.6	2.5	2.9			
2-Feb	2.6	2.7	Z	2.7	2.6	2.7	2.7	2.7	2.7	2.8	3.0	2.7	2.8	2.8	3.0	3.3	2.7	2.6	2.6	2.5	2.4	2.4	2.4	2.5	2.7	3.3			
3-Feb	2.4	2.4	2.4	Z	2.5	2.5	2.5	2.4	2.4	2.3	2.9	2.9	3.0	2.7	2.8	2.9	2.9	2.6	2.4	2.3	2.2	2.3	2.3	2.5	3.0				
4-Feb	2.3	2.3	2.3	2.3	Z	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	2.4	2.4	2.4	2.4	2.4	2.3	2.4			
5-Feb	2.4	2.5	2.7	2.9	3.0	Z	2.7	2.7	2.7	2.7	2.5	2.4	2.6	2.3	2.4	2.4	2.3	2.3	2.4	2.6	2.5	2.5	2.5	2.4	2.5	3.0			
6-Feb	Z	2.5	2.7	2.8	2.8	2.8	2.7	2.6	2.6	2.7	3.0	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.5	2.6	2.4	2.3	2.2	2.2	2.5	3.0			
7-Feb	2.3	Z	2.3	2.3	2.4	2.5	2.5	2.5	2.5	2.5	2.9	3.0	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	3.0			
8-Feb	2.3	2.3	Z	2.5	2.6	2.7	2.7	2.7	2.7	2.8	2.8	2.9	2.8	2.8	2.6	2.8	3.1	3.3	3.3	3.4	3.4	3.3	3.3	3.2	2.9	3.4			
9-Feb	3.3	3.3	3.3	Z	3.3	3.3	3.4	3.5	3.5	3.3	3.3	3.3	3.3	2.9	2.7	2.7	2.9	3.1	2.9	2.9	2.3	2.3	2.3	2.2	2.2	3.5			
10-Feb	2.2	2.2	2.2	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.4	2.4	2.4	2.3	2.2	2.3	2.4			
11-Feb	2.2	2.4	2.5	2.3	2.2	Z	2.5	2.5	2.4	2.5	2.5	2.6	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.6			
12-Feb	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3			
13-Feb	2.3	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.3	2.3	2.3	2.5	2.5	2.7	2.6	2.7	2.7	2.8	3.0	3.1	3.2	3.2	2.5	3.2			
14-Feb	3.1	2.9	Z	2.9	2.9	3.0	3.1	3.2	3.2	3.1	3.0	2.9	2.7	2.4	2.4	2.5	2.7	2.6	2.3	2.2	2.2	2.3	2.3	2.3	2.7	3.2			
15-Feb	2.3	2.4	2.4	Z	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.2	2.4	2.4	2.5	2.5	2.3	2.2	2.3	2.5	2.4	2.4	2.5			
16-Feb	2.4	2.4	2.3	2.3	Z	2.2	2.3	2.6	2.6	C	C	C	C	C	2.9	2.9	3.4	3.7	3.8	3.3	2.8	2.5	2.4	2.4	2.7	3.8			
17-Feb	2.2	2.1	2.2	2.2	2.3	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3			
18-Feb	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.4			
19-Feb	2.2	Z	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	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	2.4			
20-Feb	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.6	3.1	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	3.1			
21-Feb	2.4	2.3	2.4	Z	2.4	2.4	2.5	2.5	2.6	2.9	3.2	2.7	2.7	2.2	2.3	2.5	2.6	2.6	2.9	3.0	2.9	2.8	2.8	2.9	2.6	3.2			
22-Feb	3.1	3.1	3.1	3.1	Z	2.8	2.8	2.7	2.6	3.1	3.2	3.2	2.9	2.6	2.5	2.5	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.6	2.8	3.2			
23-Feb	2.5	2.5	2.6	2.7	2.9	Z	2.6	2.5	2.4	2.5	2.7	2.5	2.2	2.3	2.3	2.4	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.4	2.9				
24-Feb	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.7	2.7	2.5	3.1	3.0	2.8	2.8	3.5	3.8	4.0	3.0	2.4	2.7	2.7	2.7	4.0			
25-Feb	2.6	Z	2.5	2.6	2.6	2.3	2.3	2.5	2.5	2.4	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	2.3	2.6			
26-Feb	2.1	2.2	Z	2.4	2.4	2.5	2.4	2.4	2.3	2.1	2.1	2.1	2.1	2.2	2.4	2.1	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5			
27-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.3	2.4	2.5	2.4	2.4	2.3	2.3	2.5			
28-Feb	2.2	2.3	2.3	2.3	Z	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	2.3	2.3	2.3	2.3	2.3			
29-Feb	2.3	2.3	2.3	2.3	2.4	Z	2.5	2.5	2.5	2.6	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.4	PF	PF	PF	PF	2.3	2.6			
2.4 2.4 2.4 2.4 2.5 2.4 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.4 2.4 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.4 2.4																								Diurnal Average					
3.3 3.3 3.3 3.1 3.3 3.3 3.4 3.5 3.5 3.3 3.3 3.3 2.9 3.1 3.0 3.3 3.4 3.7 3.8 4.0 3.4 3.3 3.3 3.2																								Diurnal Maximum					
Z - zerspan C - Calibration PF - Power Failure																													



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	612	93.01	93.01
3.1 - 10.0	46	6.99	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	121	136	24	5	3	7	25	51	59	37	37	42	25	6	6	11	595
3.1 - 10.0	6	4	0	0	1	1	1	3	5	9	5	4	1	1	1	4	46
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	127	140	24	5	4	8	26	54	64	46	42	46	26	7	7	15	641

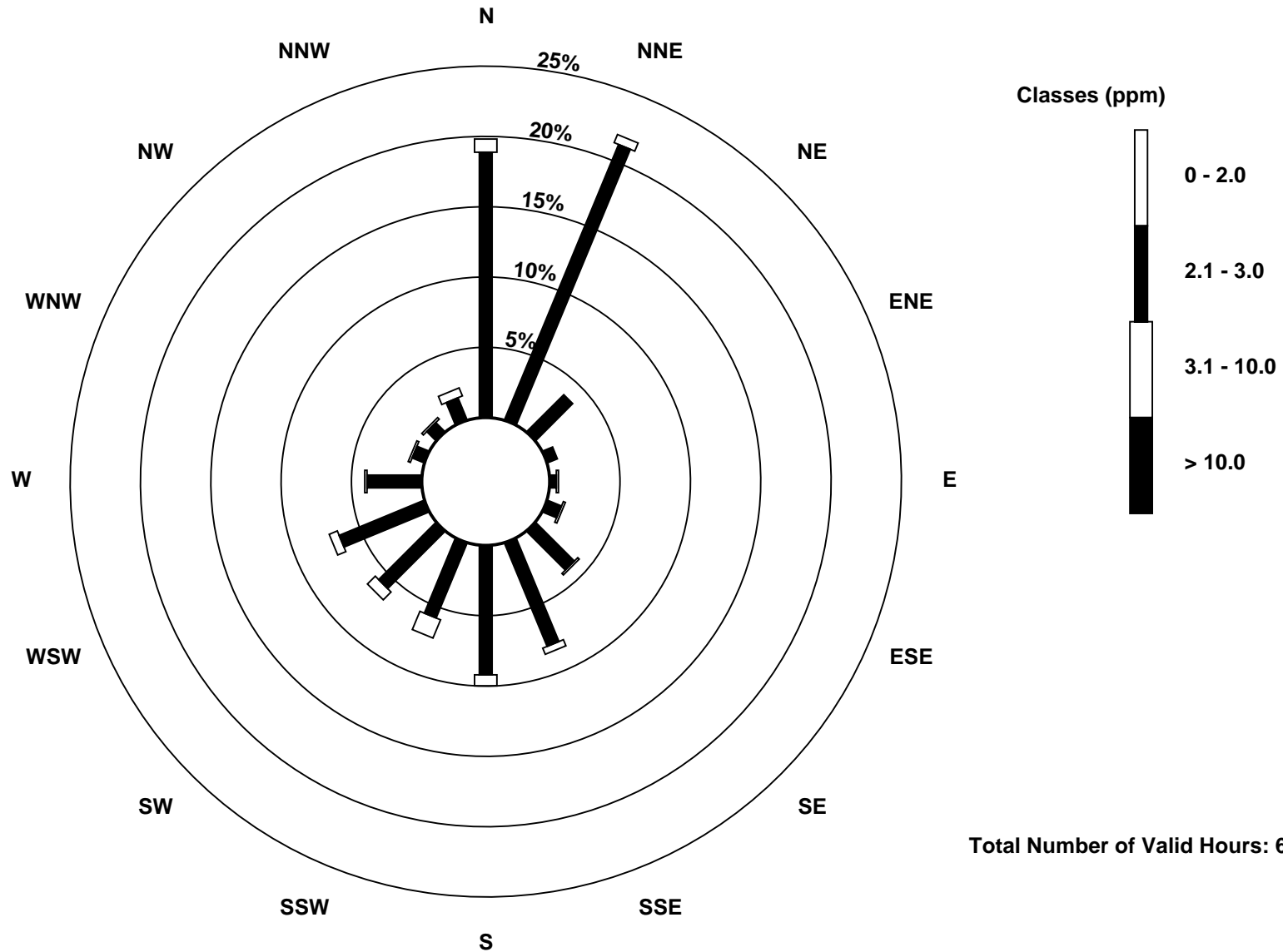
Total Number of Valid Hours: 641

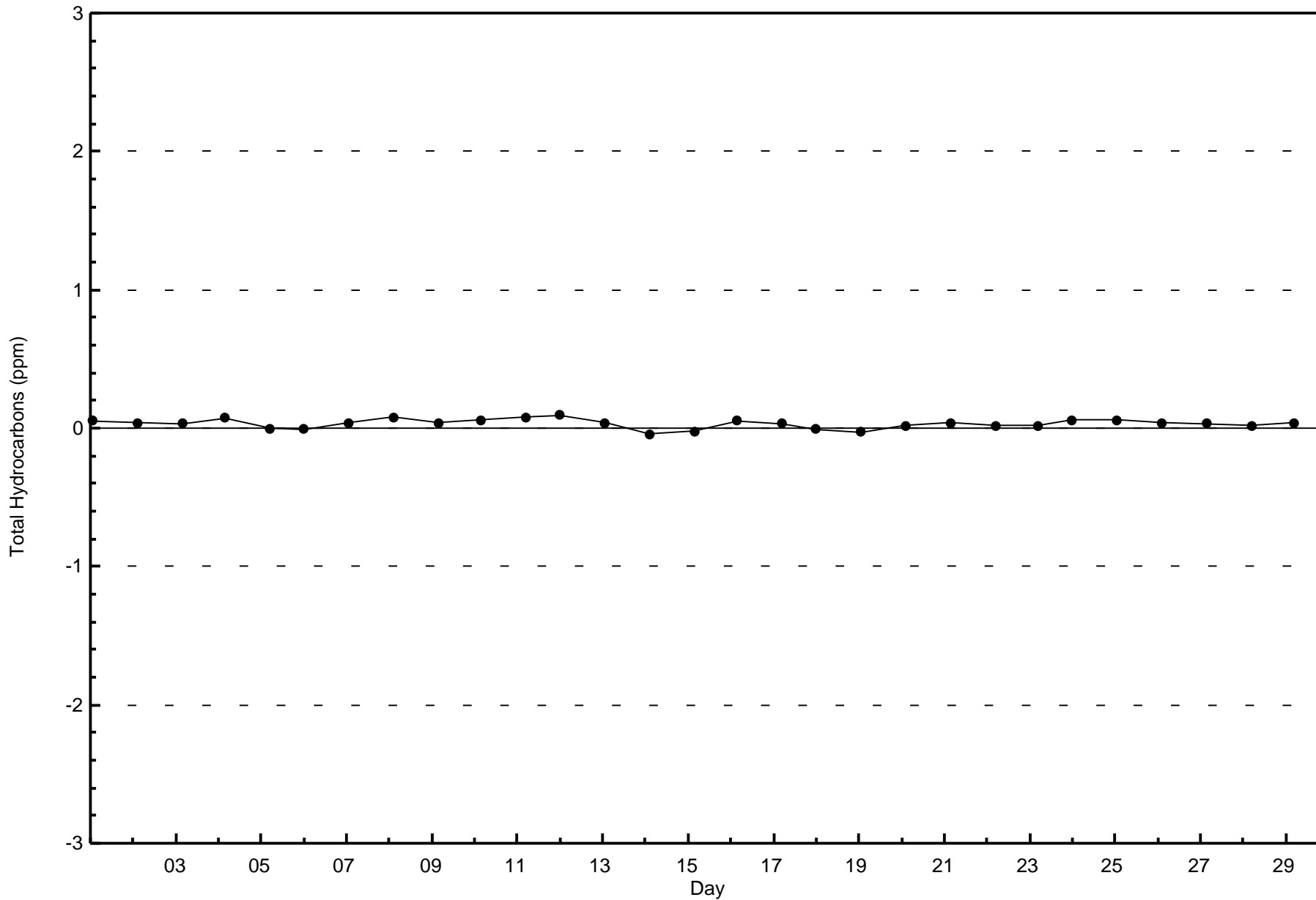
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)

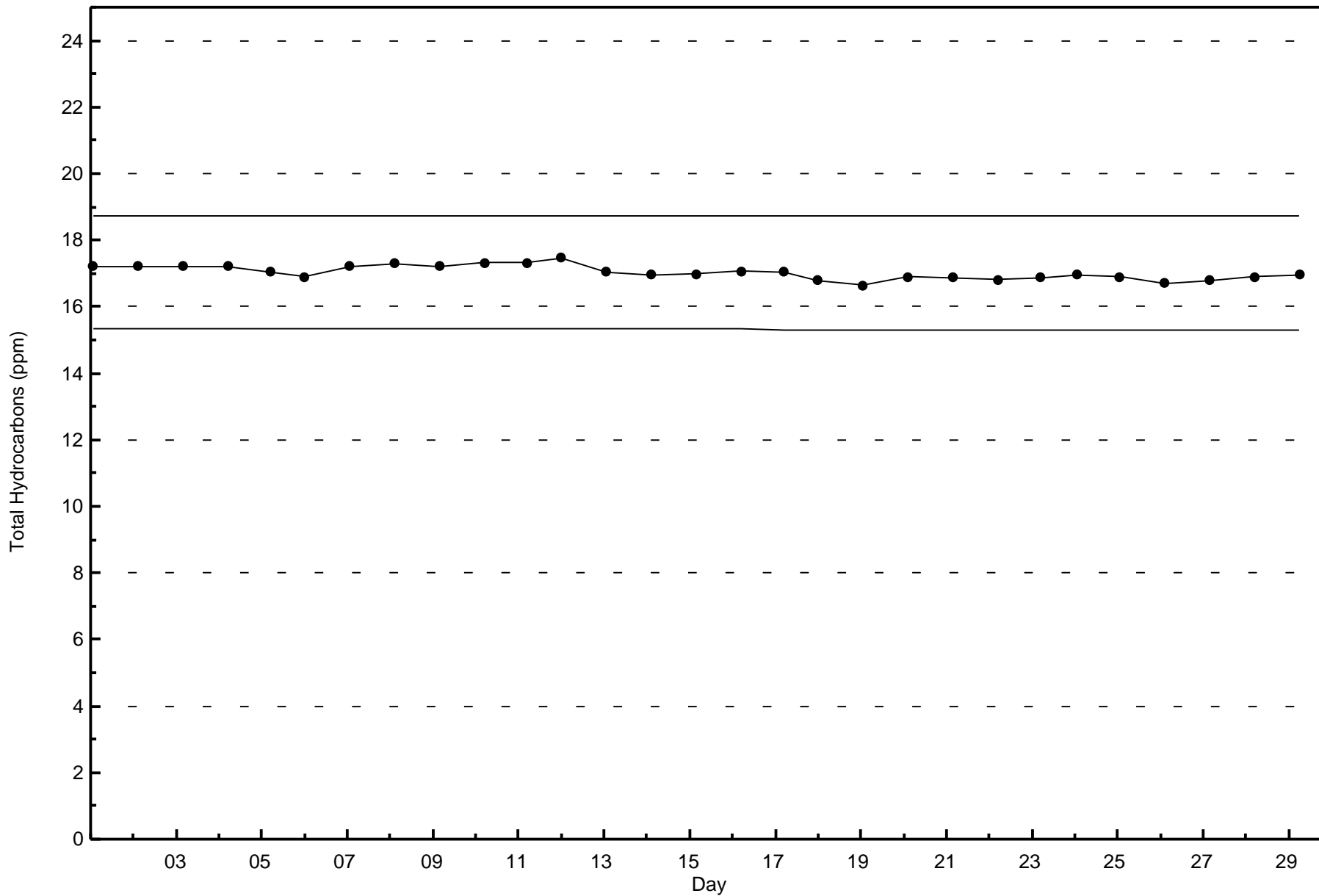






Wood Buffalo Environmental Association
Span Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

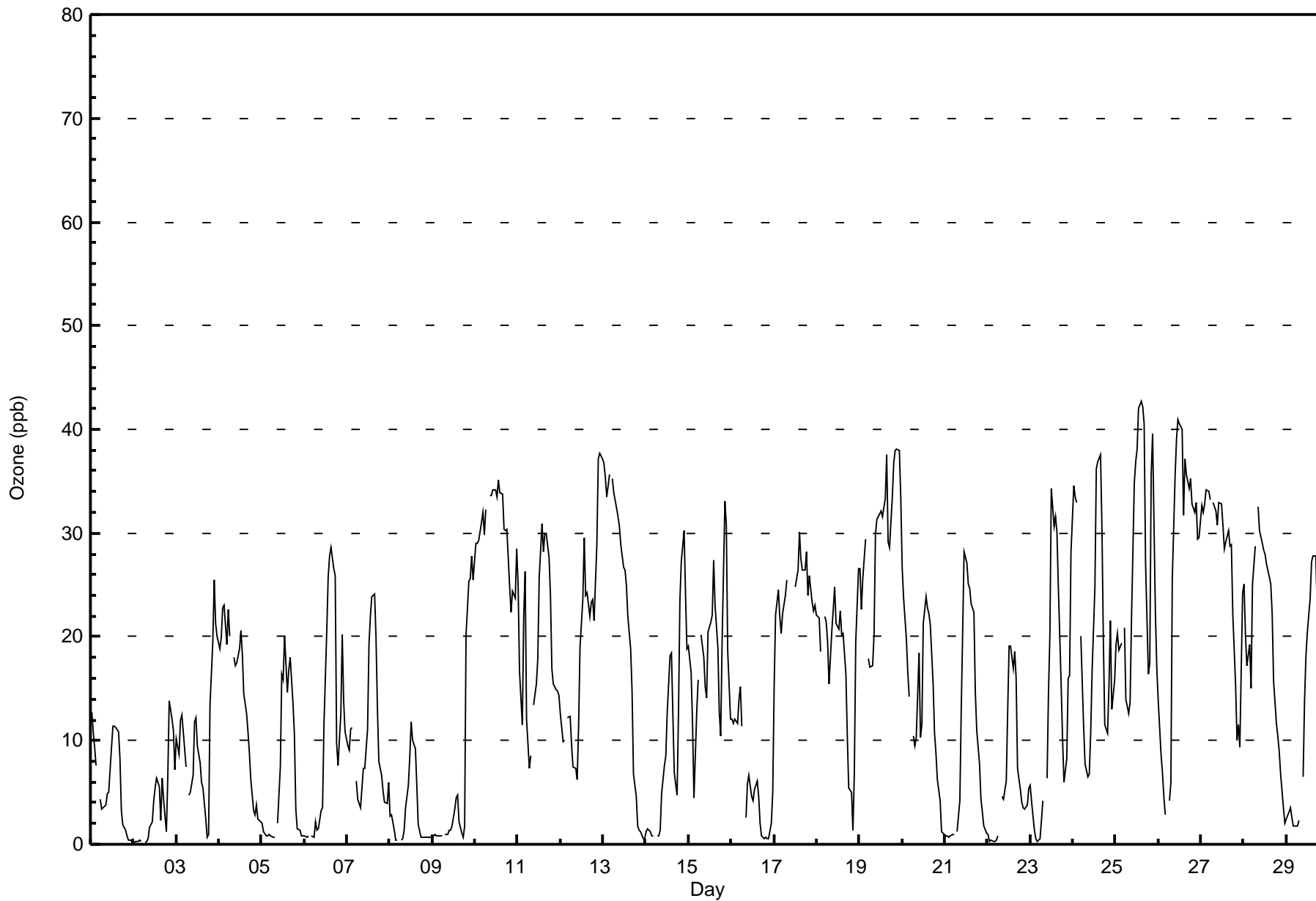
Fort McKay South - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 43 ppb on Feb 25 15:00										Maximum Daily Average: 30.4 ppb on Feb 10										Hours of Data: 660						
Minimum Value: 0 ppb on Feb 2 01:00										Minimum Daily Average: 3.1 ppb on Feb 8										Hours of Missing Data: 36						
Maximum Diurnal Average: 23.1 ppb at hour 14										Minimum Diurnal Average: 9.2 ppb at hour 8										Hours of Calibration: 32						
Monthly Average: 15.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 5 Median = 14 Q ₃ = 25 P ₉₀ = 32 P ₉₉ = 40										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	13	11	9	8	Z	4	3	4	4	5	5	9	11	11	11	11	8	3	2	1	1	0	0	0	5.9	13
2-Feb	0	0	0	0	0	Z	0	0	1	2	2	4	5	6	6	2	6	4	1	7	14	12	11	7	4.0	14
3-Feb	10	9	12	12	11	7	Z	5	5	7	12	12	9	8	6	5	2	1	1	13	20	25	21	20	10.2	25
4-Feb	19	20	23	23	19	23	20	Z	18	17	17	19	21	18	15	13	11	9	6	3	3	4	2	2	14.1	23
5-Feb	2	1	1	1	1	1	1	1	Z	2	8	16	16	20	15	17	18	14	11	3	2	1	1	1	6.6	20
6-Feb	1	1	1	Z	1	1	2	1	1	3	3	11	21	26	28	29	27	26	10	8	13	20	14	11	11.2	29
7-Feb	9	9	11	11	Z	6	4	4	5	7	7	11	19	22	24	24	20	13	8	7	5	4	4	6	10.5	24
8-Feb	3	3	1	0	0	Z	0	1	1	3	6	8	12	10	9	6	2	1	1	1	1	1	1	1	3.1	12
9-Feb	1	1	1	1	1	1	Z	1	1	1	1	2	3	4	5	2	1	1	2	20	25	26	28	26	6.7	28
10-Feb	29	29	29	31	32	30	32	Z	34	34	34	34	33	35	34	34	30	30	30	25	22	24	24	29	30.4	35
11-Feb	25	17	12	22	26	12	7	9	Z	13	15	18	26	31	28	30	30	28	24	17	15	15	15	14	19.5	31
12-Feb	13	10	10	Z	12	12	10	7	7	6	11	19	24	30	24	24	22	23	24	22	29	37	38	37	19.6	38
13-Feb	37	35	33	36	Z	35	34	32	32	31	29	27	26	25	22	19	15	7	5	2	1	1	1	1	21.1	37
14-Feb	1	1	1	1	1	Z	1	1	1	5	8	9	13	18	18	13	7	5	13	23	27	30	24	19	10.4	30
15-Feb	19	17	12	4	13	16	Z	20	18	15	14	21	21	22	27	23	19	13	10	20	33	31	19	12	18.2	33
16-Feb	12	12	12	12	14	15	11	Z	3	6	7	5	4	5	6	5	2	1	1	1	0	1	2	5	6.1	15
17-Feb	15	22	25	22	20	22	24	26	Z	C	C	C	25	26	30	27	26	26	28	24	26	23	23	23	24.2	30
18-Feb	22	22	19	Z	22	21	20	15	21	23	25	21	21	23	20	20	16	11	5	5	1	7	20	27	17.6	27
19-Feb	27	23	26	29	Z	18	17	17	20	30	31	32	32	32	33	38	29	29	33	37	38	38	38	34	29.6	38
20-Feb	27	24	20	16	14	Z	10	10	10	18	10	12	21	24	23	22	21	15	11	9	6	4	1	1	14.4	27
21-Feb	1	1	1	1	1	1	Z	1	4	13	20	28	27	25	25	23	22	15	11	8	4	3	2	1	10.4	28
22-Feb	1	0	0	0	0	0	1	Z	5	4	6	13	19	19	17	19	16	7	5	4	3	3	4	5	6.7	19
23-Feb	6	4	1	1	0	1	2	4	Z	6	15	20	34	31	32	30	25	15	10	6	8	16	16	28	13.6	34
24-Feb	35	33	33	Z	20	16	11	8	7	7	11	17	25	36	37	38	31	20	12	11	15	22	13	16	20.4	38
25-Feb	19	20	19	19	Z	21	14	13	14	22	35	37	38	42	43	42	40	27	16	18	36	40	22	17	26.7	43
26-Feb	14	9	7	5	3	Z	4	6	26	36	39	41	41	40	32	37	36	34	35	33	32	33	29	30	26.1	41
27-Feb	33	32	33	34	34	33	Z	33	32	31	33	33	31	28	29	30	29	29	22	15	10	11	9	24	27.4	34
28-Feb	25	20	17	19	15	25	29	Z	33	30	29	28	28	27	26	25	22	16	12	10	9	7	4	2	19.9	33
29-Feb	2	3	4	3	2	2	2	2	Z	7	14	18	20	24	27	28	28	23	15	6	PF	PF	PF	PF	12.1	28
14.5 13.4 12.8 12.5 11.0 13.5 10.9 9.2 12.6 13.7 16.0 18.8 21.6 23.1 22.4 21.9 19.4 15.3 12.5 12.3 14.3 15.7 13.7 14.2																								Diurnal Average		
37 35 33 36 34 35 34 33 34 36 39 41 41 42 43 42 40 34 35 37 38 40 38 37																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Fort McKay South - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	430	65.15	65.15
21 - 50	230	34.85	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	75	53	12	6	2	8	19	34	42	42	38	43	18	4	7	13	416
21 - 50	52	88	13	0	2	1	7	19	20	6	2	5	8	1	1	3	228
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	127	141	25	6	4	9	26	53	62	48	40	48	26	5	8	16	644

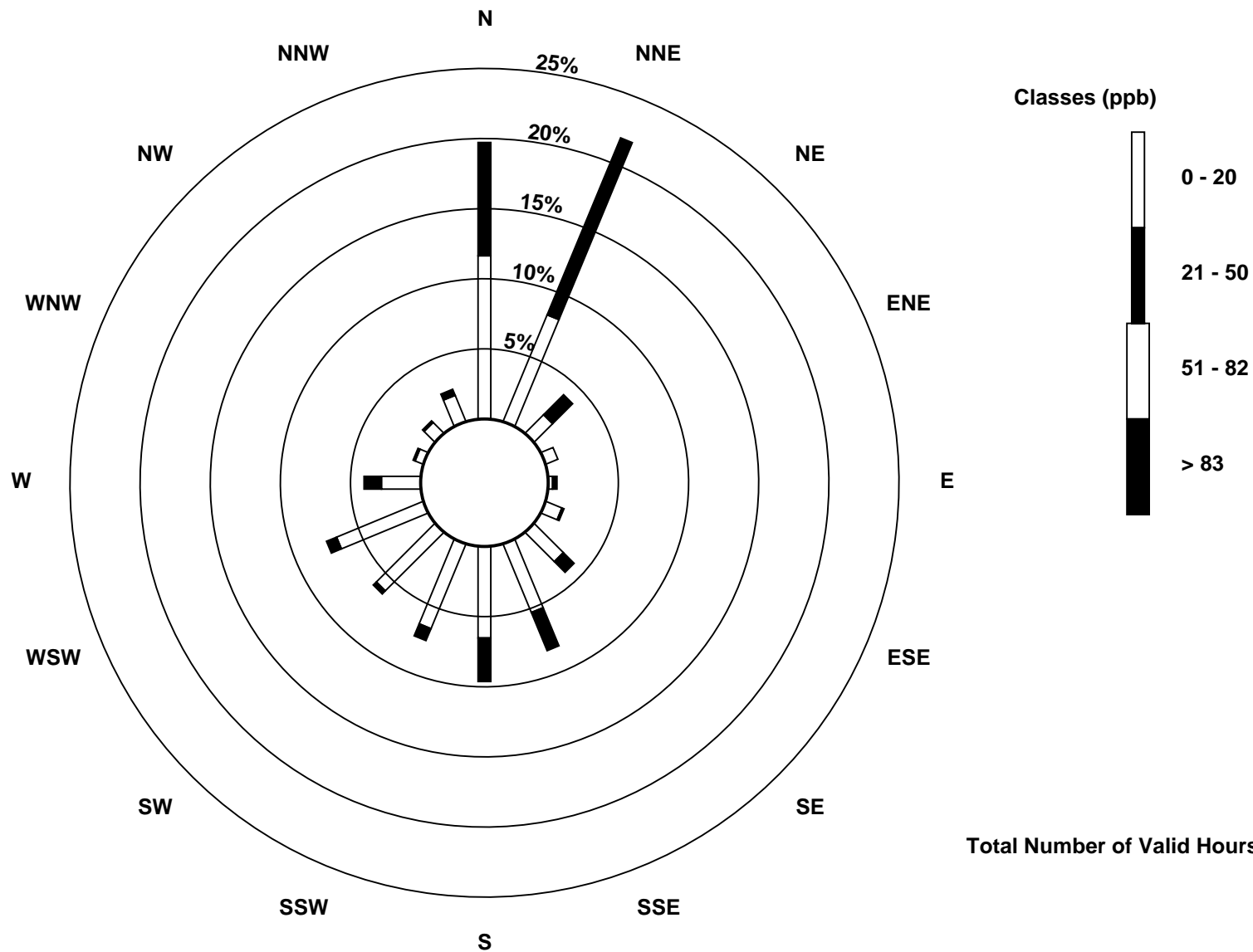
Total Number of Valid Hours: 644

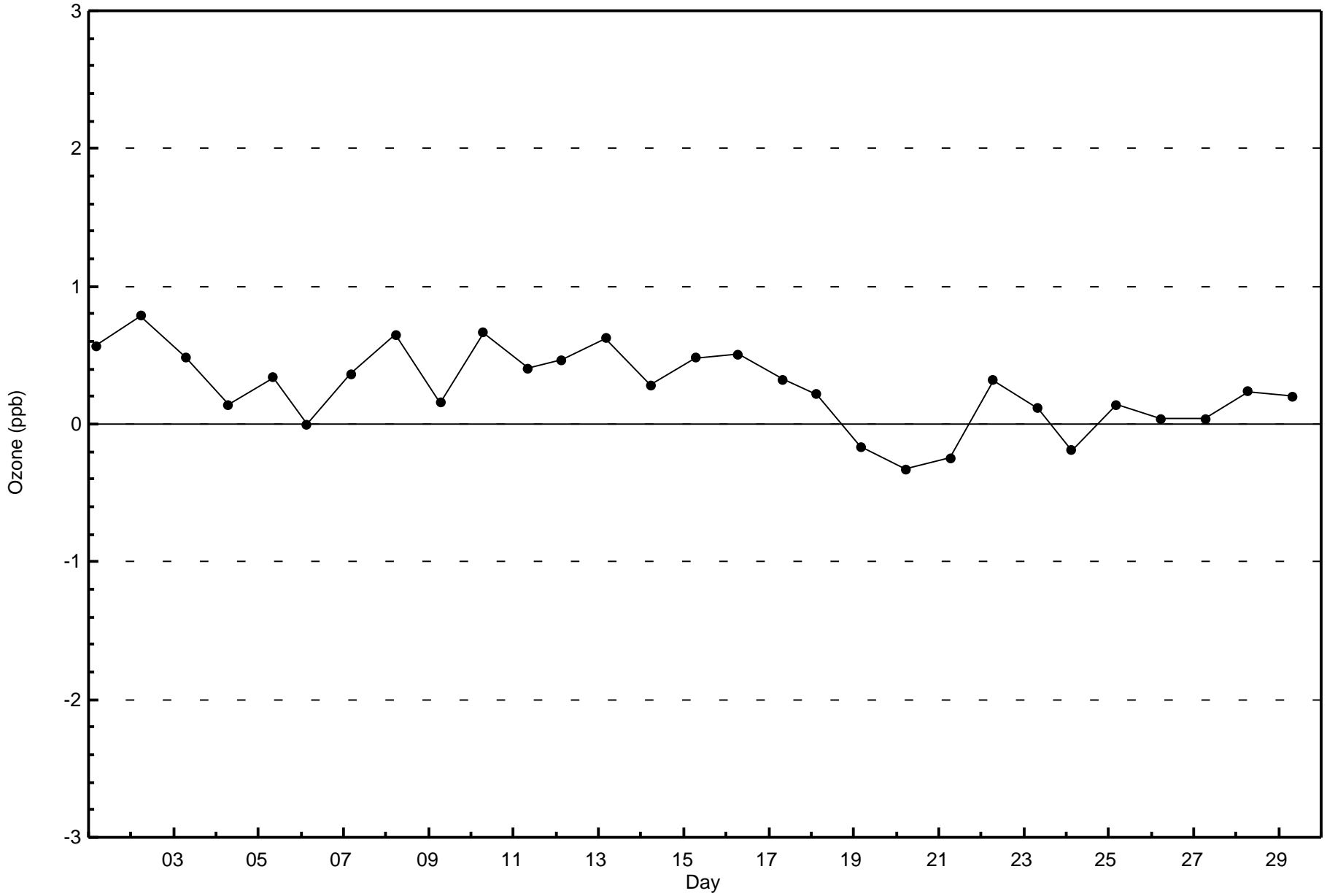
Total Number of Hours: 696

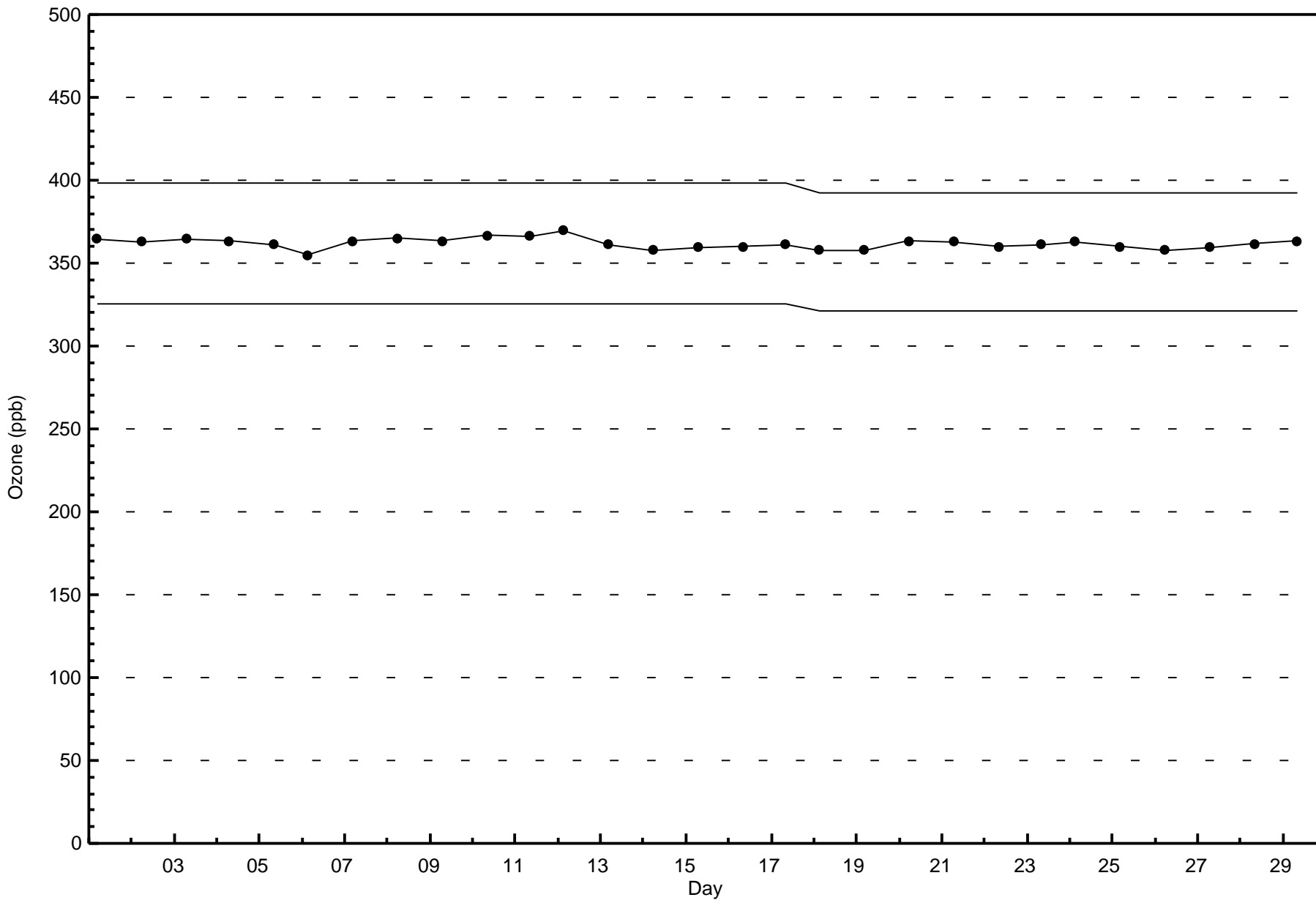


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Ozone (O₃) - ppb
Fort McKay South (AMS 13)

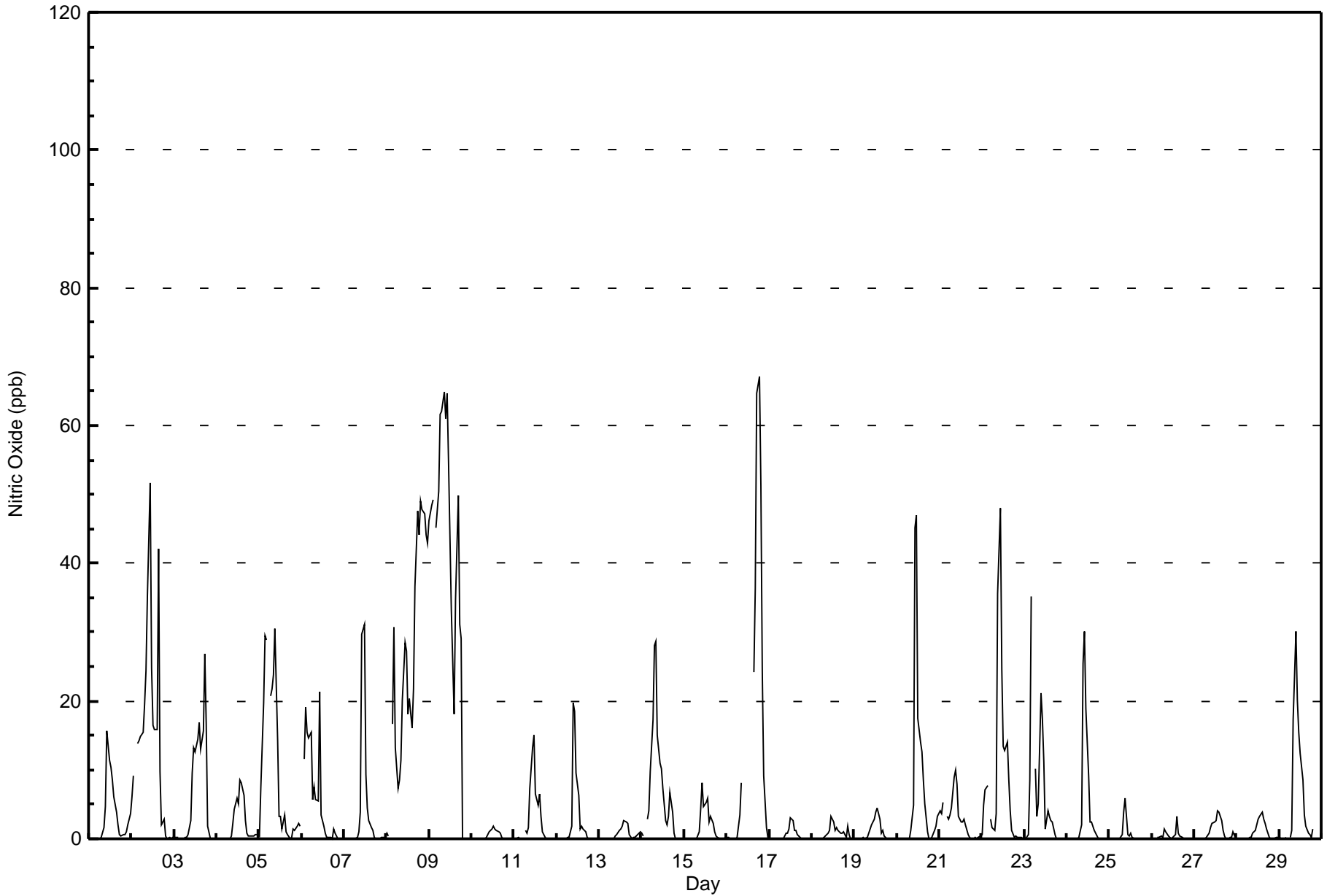








Maximum Value: 67 ppb on Feb 16 19:00		Maximum Daily Average: 36.1 ppb on Feb 9		Hours in Service: 696																																													
Minimum Value: 0 ppb on Feb 10 01:00		Minimum Daily Average: 0.4 ppb on Feb 26		Hours of Data: 657																																													
Maximum Diurnal Average: 16.7 ppb at hour 11		Minimum Diurnal Average: 2.0 ppb at hour 24		Hours of Missing Data: 39																																													
Monthly Average: 6.1 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 5 P ₉₀ = 20 P ₉₉ = 61		Hours of Calibration: 35																																													
				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	0	Z	0	0	0	0	0	0	2	5	16	11	10	9	6	4	2	1	0	1	1	1	2	4	3.2	16																							
2-Feb	6	9	Z	14	14	15	15	20	24	35	52	25	17	16	16	42	10	2	3	0	0	0	0	0	14.6	52																							
3-Feb	0	0	0	Z	0	0	0	0	1	3	10	13	13	14	17	13	16	27	17	2	0	0	0	0	6.3	27																							
4-Feb	0	0	0	0	Z	0	0	0	0	2	4	6	5	8	8	6	3	1	1	0	1	0	1	1	2.1	8																							
5-Feb	0	8	20	29	29	Z	21	22	24	31	14	3	3	1	3	1	1	0	0	2	1	2	2	2	9.6	31																							
6-Feb	Z	12	19	15	15	16	6	7	6	5	21	3	2	1	0	0	0	0	1	1	0	0	0	0	5.7	21																							
7-Feb	0	Z	0	0	0	0	0	0	1	4	30	31	9	5	3	2	1	0	0	0	0	0	0	0	3.7	31																							
8-Feb	1	0	Z	17	31	13	7	9	11	20	28	27	18	20	16	22	37	48	44	49	48	47	44	43	26.1	49																							
9-Feb	46	48	49	Z	45	50	62	62	65	61	65	55	33	26	18	35	50	31	29	0	0	0	0	0	36.1	65																							
10-Feb	0	0	0	0	Z	0	0	0	0	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0.4	2																							
11-Feb	0	0	0	0	0	Z	1	1	2	7	13	15	7	5	7	3	1	0	0	0	0	0	0	0	2.7	15																							
12-Feb	Z	0	0	0	0	0	0	0	2	20	18	10	6	1	2	1	1	0	0	0	0	0	0	0	2.7	20																							
13-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	2	2	3	2	2	1	0	0	0	0	1	1	0.7	3																							
14-Feb	1	0	Z	3	4	10	17	28	29	15	11	10	7	3	2	3	7	4	1	0	0	0	0	0	6.7	29																							
15-Feb	0	0	0	Z	0	0	0	0	1	4	8	5	5	6	2	3	2	1	0	0	0	0	0	0	1.7	8																							
16-Feb	0	0	0	0	Z	0	0	3	8	C	C	C	C	C	C	24	36	65	67	51	24	9	2	0	--	67																							
17-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	3	3	1	1	1	0	0	0	0	0	0	0	0.5	3																							
18-Feb	Z	0	0	0	0	0	0	0	1	1	1	3	3	1	2	1	1	1	1	0	2	1	0	0	0.8	3																							
19-Feb	0	Z	0	0	0	0	0	0	1	1	2	3	4	5	3	1	1	0	0	0	0	0	0	0	0.9	5																							
20-Feb	0	0	Z	0	0	0	0	0	1	5	45	47	18	14	13	9	5	1	0	0	0	1	2	3	7.1	47																							
21-Feb	4	4	5	Z	3	3	3	5	9	10	8	3	3	3	3	2	1	0	0	0	0	0	0	0	3.0	10																							
22-Feb	1	5	7	8	Z	3	2	1	4	36	48	25	13	13	14	8	4	1	0	0	0	0	0	0	8.4	48																							
23-Feb	0	0	1	9	35	Z	10	3	5	21	17	11	1	4	3	3	2	1	0	0	0	0	0	0	5.5	35																							
24-Feb	Z	0	0	0	0	0	0	0	2	25	30	19	9	2	2	1	1	0	0	0	0	0	0	0	4.1	30																							
25-Feb	0	Z	0	0	0	0	0	1	4	6	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.6	6																							
26-Feb	0	0	Z	0	0	0	0	1	1	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0.4	3																							
27-Feb	0	0	0	Z	0	0	0	0	1	2	2	2	3	4	4	3	1	0	0	0	0	0	1	0	1.0	4																							
28-Feb	0	0	0	0	Z	0	0	0	0	1	1	2	3	3	4	3	2	1	0	0	0	0	0	0	0.9	4																							
29-Feb	0	0	0	0	0	Z	0	1	17	30	20	15	12	9	3	2	1	1	0	1	PF	PF	PF	PF	6.0	30																							
																								2.4	3.6	4.3	4.0	7.4	4.6	5.0	5.7	7.6	12.6	16.7	12.5	7.5	6.4	5.7	6.8	6.5	6.5	5.7	3.8	2.8	2.2	2.0	2.0	Diurnal Average	
																								46	48	49	29	45	50	62	62	65	61	65	55	33	26	18	42	50	65	67	51	48	47	44	43	Diurnal Maximum	
Z - zerospan																								C - Calibration				PF - Power Failure																					





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	595	90.56	90.56
21 - 40	35	5.33	95.89
41 - 80	27	4.11	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 657

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	117	131	24	4	3	5	23	46	56	38	39	46	26	5	6	9	578
21 - 40	6	6	0	1	0	1	1	7	6	3	1	0	0	1	0	2	35
11 - 80	4	2	0	0	1	2	2	1	2	5	2	0	0	1	1	4	27
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	127	139	24	5	4	8	26	54	64	46	42	46	26	7	7	15	640

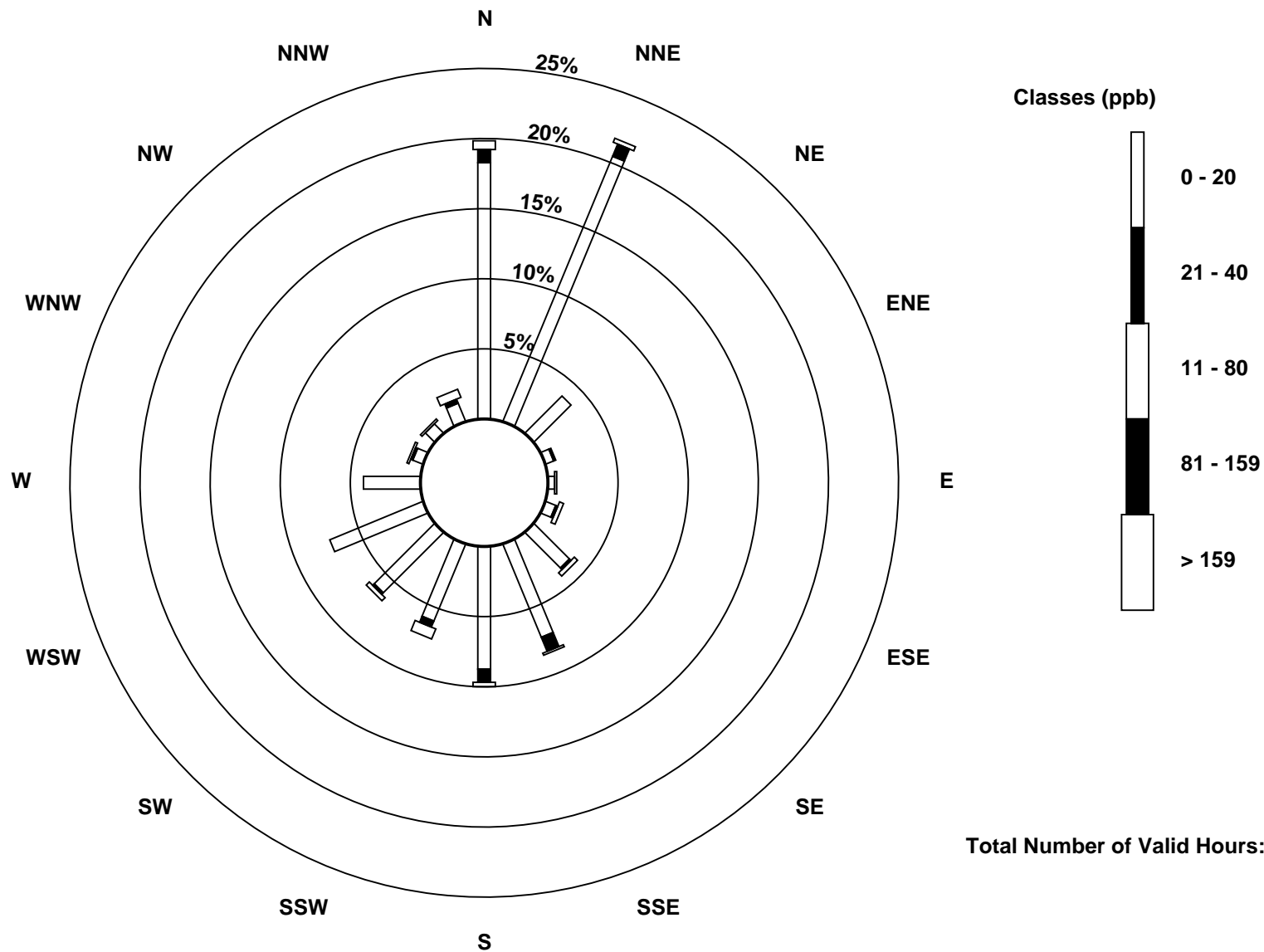
Total Number of Valid Hours: 640

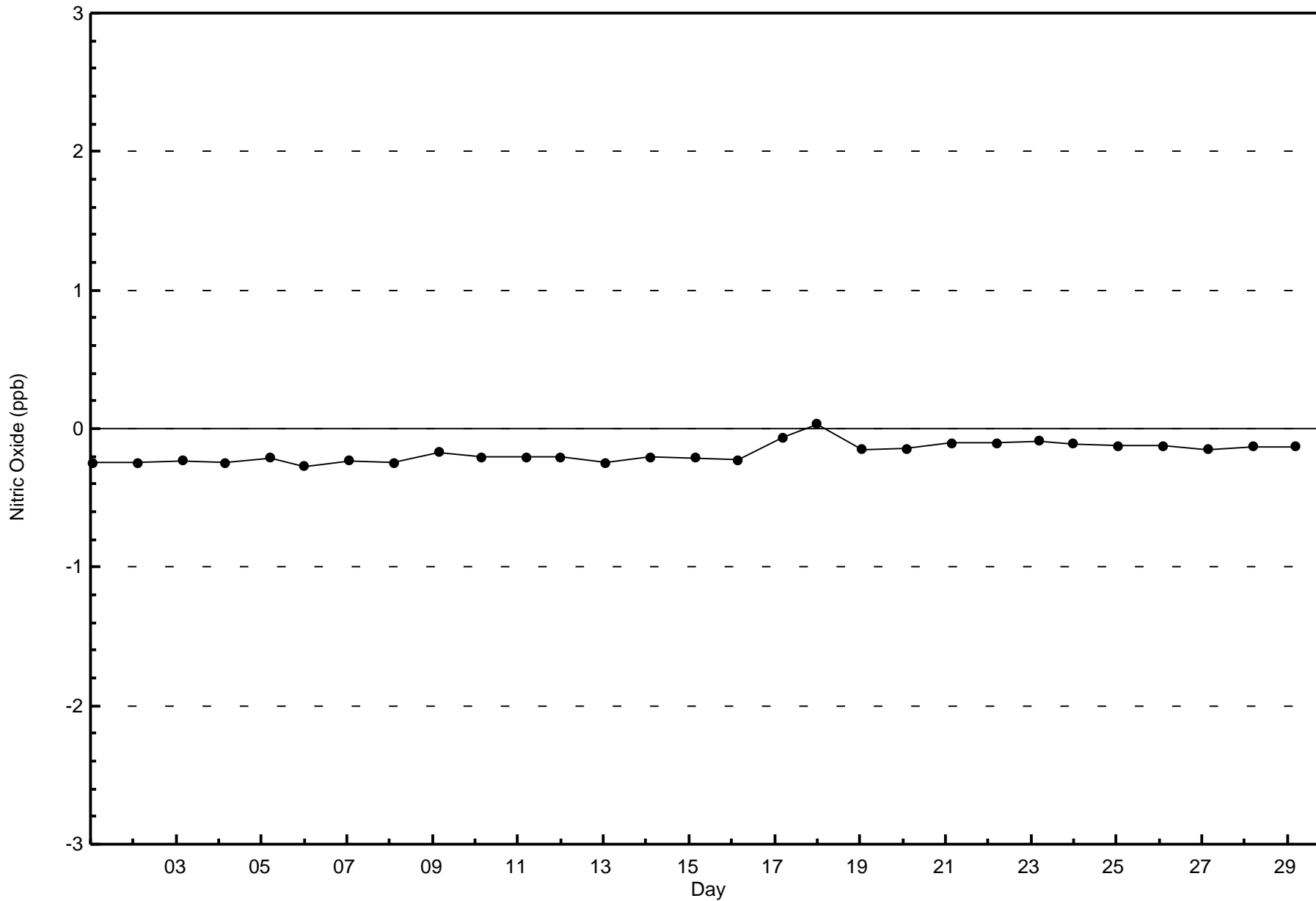
Total Number of Hours: 696

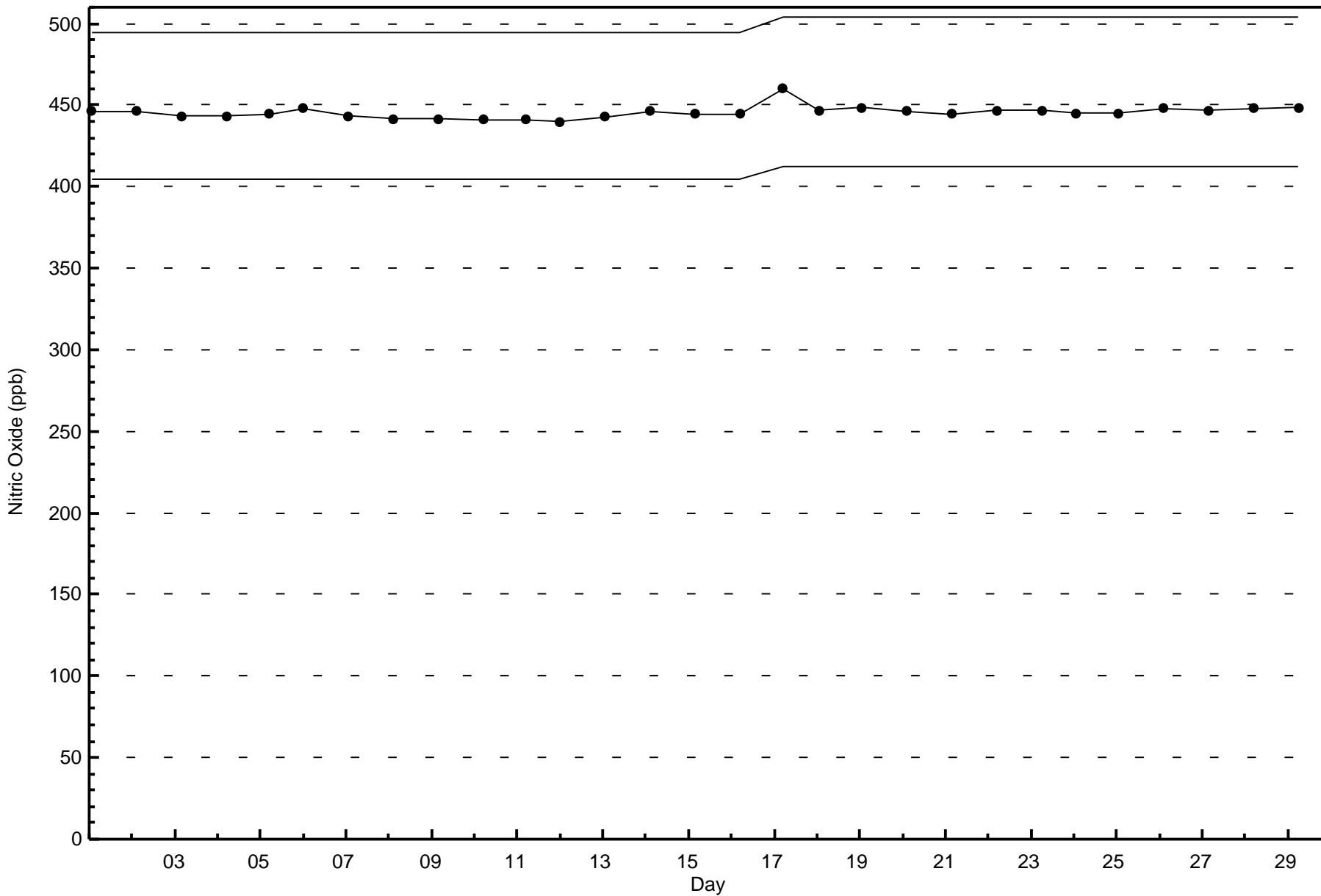


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association
Summary of Hour Averages

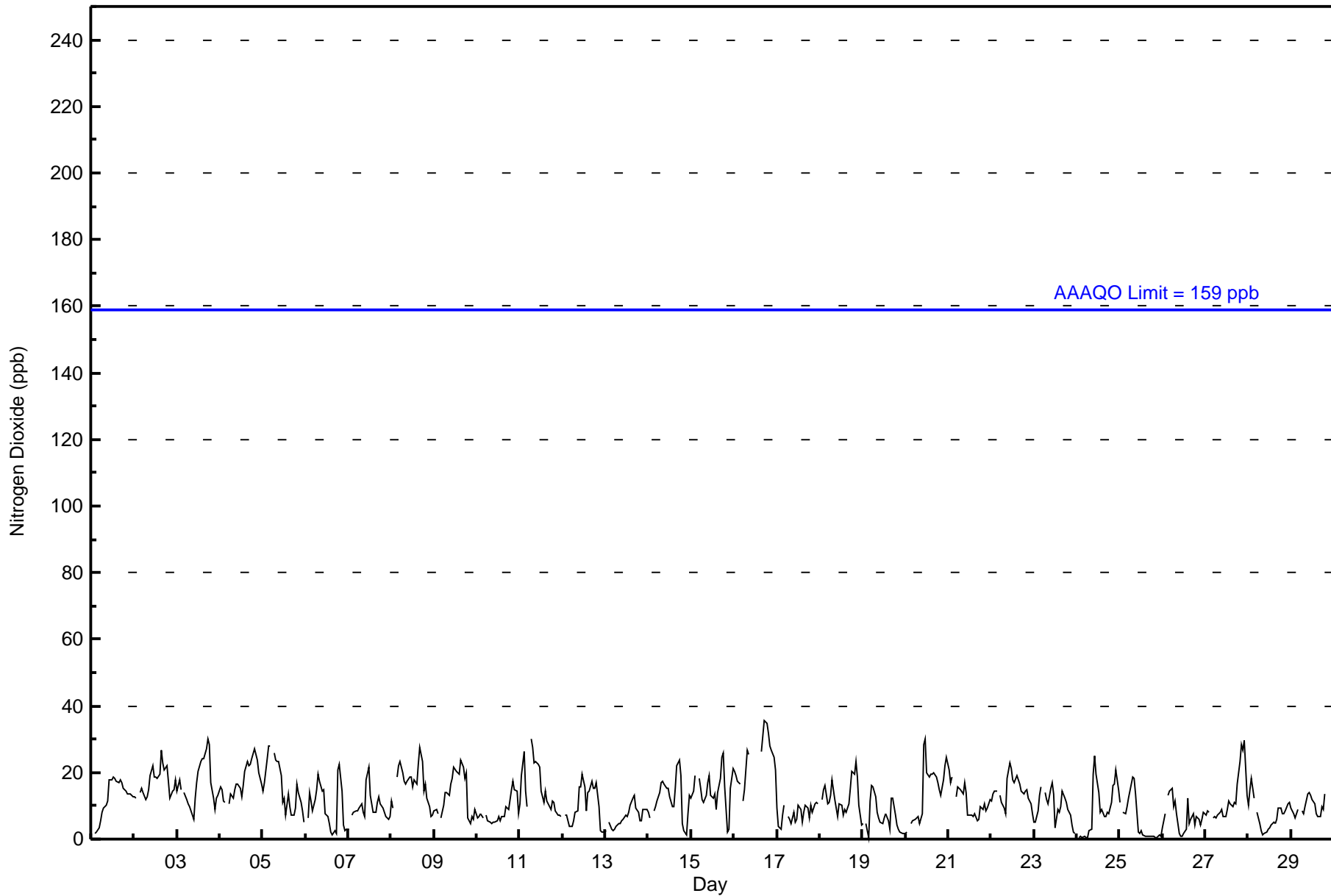
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 36 ppb on Feb 16 18:00										Maximum Daily Average: 17.6 ppb on Feb 4																
Minimum Value: 0 ppb on Feb 24 07:00										Minimum Daily Average: 5.7 ppb on Feb 25																
Maximum Diurnal Average: 14.5 ppb at hour 19										Minimum Diurnal Average: 9.4 ppb at hour 1																
Monthly Average: 11.9 ppb										Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 11 Q ₃ = 17 P ₉₀ = 21 P ₉₉ = 30																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	2	3	6	8	9	10	12	18	18	19	18	17	17	18	17	15	14	14	14	13	13	12.1	19
2-Feb	13	12	Z	14	15	14	12	13	15	19	22	19	19	18	19	27	23	21	22	17	12	14	15	18	17.0	27
3-Feb	15	18	15	Z	14	12	11	10	8	6	12	17	20	23	24	24	27	30	29	17	12	9	12	13	16.4	30
4-Feb	16	15	11	11	Z	10	13	12	15	17	17	15	13	16	20	23	22	22	24	27	25	24	20	17	17.6	27
5-Feb	15	17	24	28	28	Z	26	24	24	23	19	11	12	7	13	10	7	7	9	17	14	11	8	5	15.6	28
6-Feb	Z	6	14	12	8	12	15	19	17	15	15	8	7	5	2	1	2	2	21	23	15	4	3	3	9.9	23
7-Feb	3	Z	7	8	8	8	9	10	8	7	18	22	13	10	8	8	11	13	11	10	8	7	6	7	9.6	22
8-Feb	12	9	Z	19	22	23	20	18	17	17	19	19	16	18	17	23	28	23	14	17	12	10	7	7	16.7	28
9-Feb	9	9	8	Z	7	10	14	14	13	17	18	21	21	20	20	24	22	18	20	6	5	7	6	9	13.7	24
10-Feb	6	7	8	6	Z	7	5	5	5	5	5	5	7	6	7	7	10	9	9	15	17	15	14	8	8.1	17
11-Feb	10	19	26	15	10	Z	30	28	23	23	22	22	15	11	15	12	10	9	12	11	9	7	7	7	15.3	30
12-Feb	Z	7	7	5	4	4	6	8	9	16	16	20	16	8	14	14	17	15	15	17	10	3	2	2	10.2	20
13-Feb	2	Z	5	3	3	3	4	5	5	5	6	7	7	8	10	12	13	10	8	5	6	9	9	9	6.7	13
14-Feb	8	6	Z	9	10	12	14	17	17	17	15	15	13	10	10	15	22	24	19	5	3	1	8	13	12.2	24
15-Feb	12	14	19	Z	18	15	12	11	13	17	19	13	12	14	9	14	18	24	26	16	2	3	15	21	14.7	26
16-Feb	20	19	18	16	Z	11	15	27	25	C	C	C	C	C	C	26	31	36	35	32	28	27	25	21	--	36
17-Feb	9	4	3	7	10	Z	7	6	5	8	5	6	10	9	5	8	10	10	7	10	8	11	11	11	7.8	11
18-Feb	Z	12	15	16	11	11	13	18	12	9	7	11	10	7	9	8	11	15	20	20	24	19	10	4	12.6	24
19-Feb	5	Z	5	1	11	16	16	13	8	6	5	5	6	8	6	3	12	12	7	4	3	2	2	2	6.8	16
20-Feb	2	2	Z	5	5	6	6	7	5	8	28	30	20	19	19	19	20	19	17	15	13	18	22	25	14.3	30
21-Feb	21	17	19	Z	13	16	15	15	14	17	14	7	7	7	7	8	5	6	10	9	10	9	9	12	11.5	21
22-Feb	11	14	14	14	Z	13	11	9	8	18	23	21	18	17	19	18	16	14	13	14	15	12	11	8	14.4	23
23-Feb	5	5	9	13	16	Z	14	12	10	15	17	14	4	9	8	10	14	12	11	9	7	4	2	2	9.6	17
24-Feb	Z	1	1	1	1	1	0	3	3	19	25	19	14	8	9	7	7	8	8	11	16	17	21	15	9.2	25
25-Feb	11	Z	8	8	10	12	14	19	18	14	2	2	3	1	1	1	1	1	1	1	1	1	1	1	5.7	19
26-Feb	3	8	Z	13	14	15	10	11	8	2	1	1	2	3	12	5	6	8	4	7	6	4	6	8	6.8	15
27-Feb	7	8	8	Z	6	7	6	7	8	9	7	7	9	11	11	10	11	11	17	23	28	27	30	13	12.1	30
28-Feb	10	15	18	12	Z	8	5	3	1	2	2	3	4	4	5	5	6	9	9	8	8	9	11	11	7.2	18
29-Feb	10	8	6	8	9	Z	8	8	10	14	14	13	12	11	8	7	7	10	9	14	PF	PF	PF	PF	9.6	14
9.4 10.4 11.2 10.2 10.6 10.5 11.7 12.3 11.5 12.7 13.9 13.2 11.6 10.9 11.5 12.6 14.1 14.3 14.5 13.5 11.8 10.5 10.9 10.0																								Diurnal Average		
21 19 26 28 28 23 30 28 25 23 28 30 21 23 24 27 31 36 35 32 28 27 30 25																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	583	88.74	88.74
21 - 40	74	11.26	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: 657

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	104	121	22	3	3	6	23	50	58	45	40	46	25	6	6	10	568
21 - 40	23	18	2	2	1	2	3	4	6	1	2	0	1	1	1	5	72
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	127	139	24	5	4	8	26	54	64	46	42	46	26	7	7	15	640

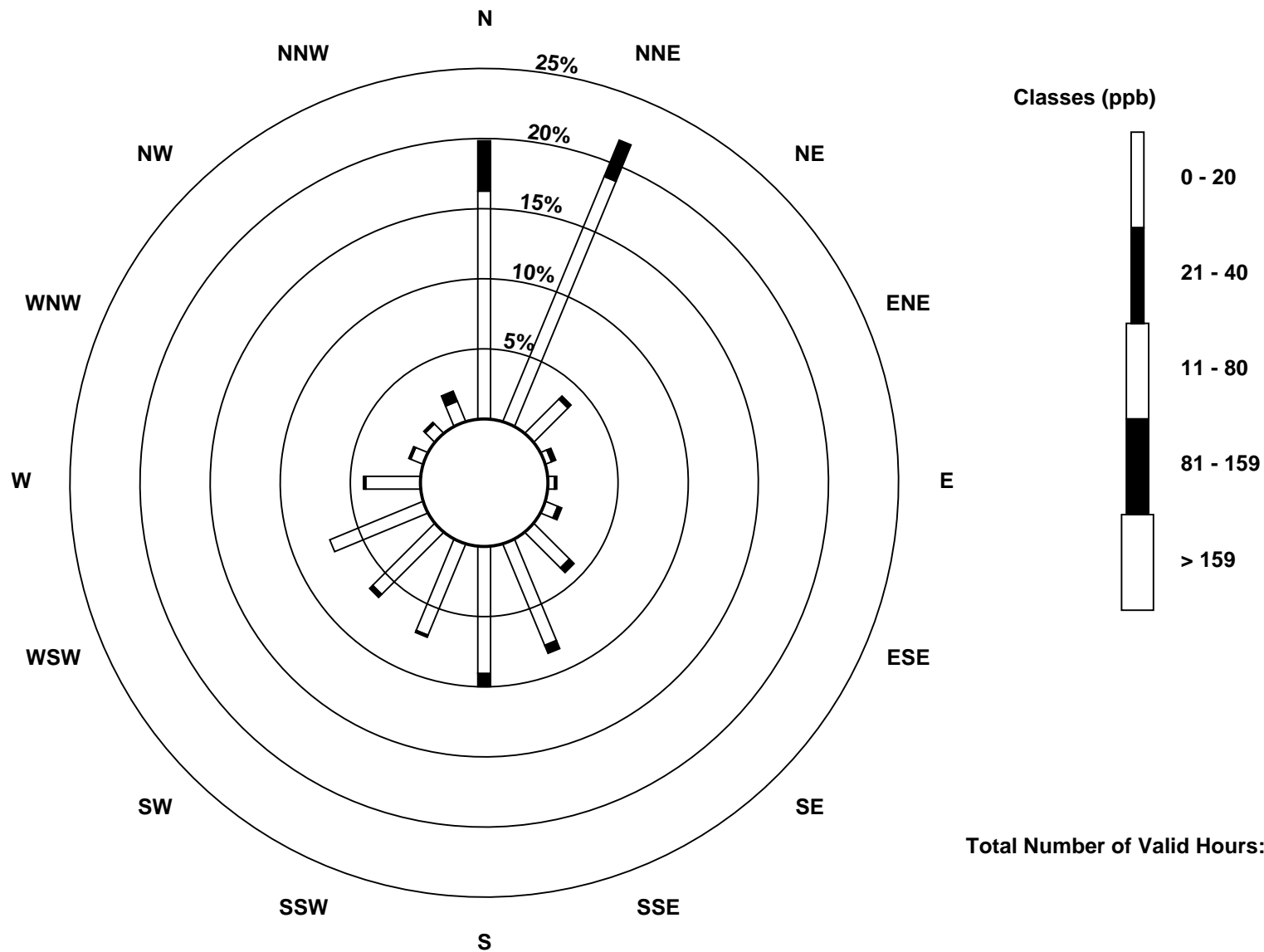
Total Number of Valid Hours: 640

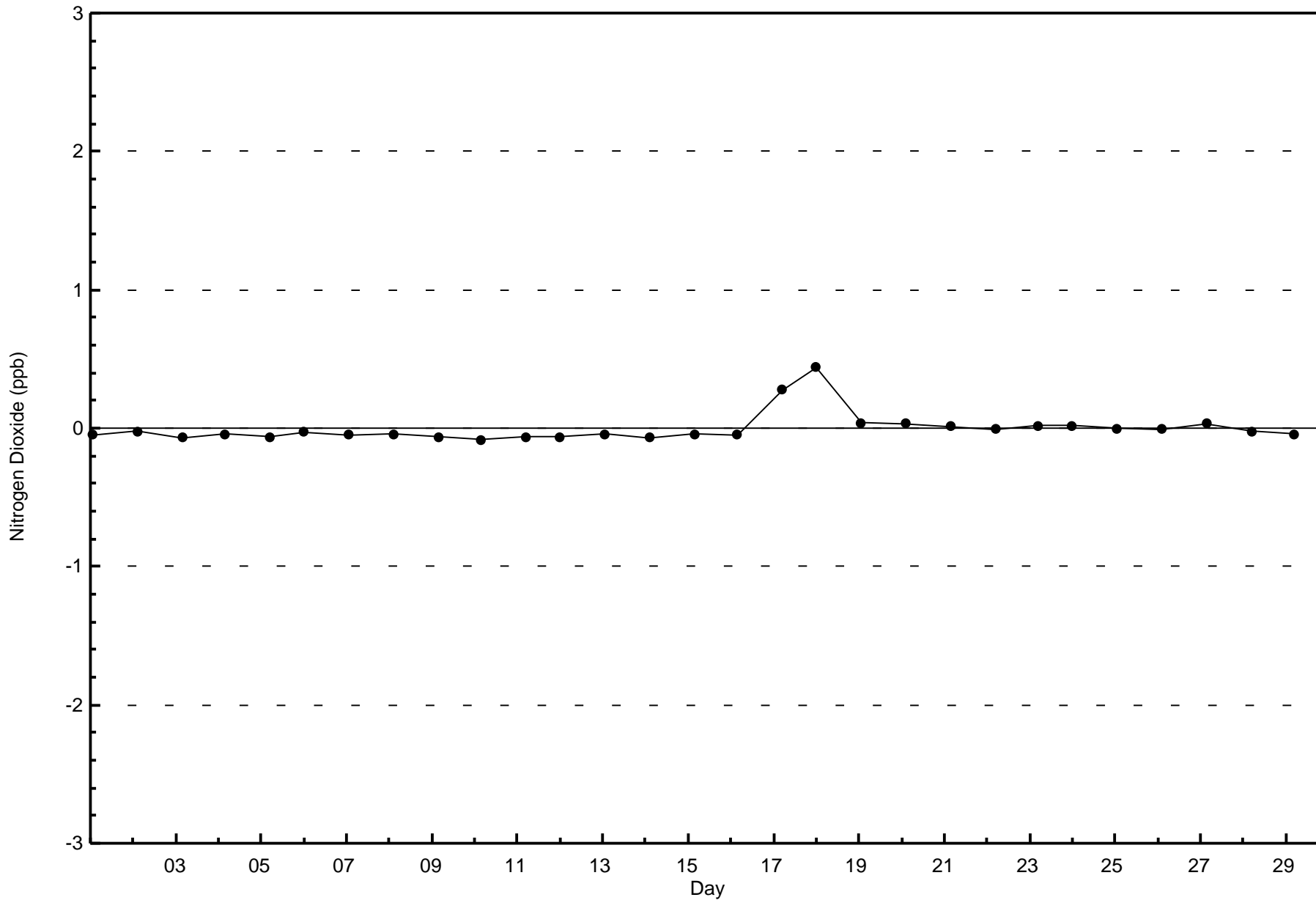
Total Number of Hours: 696

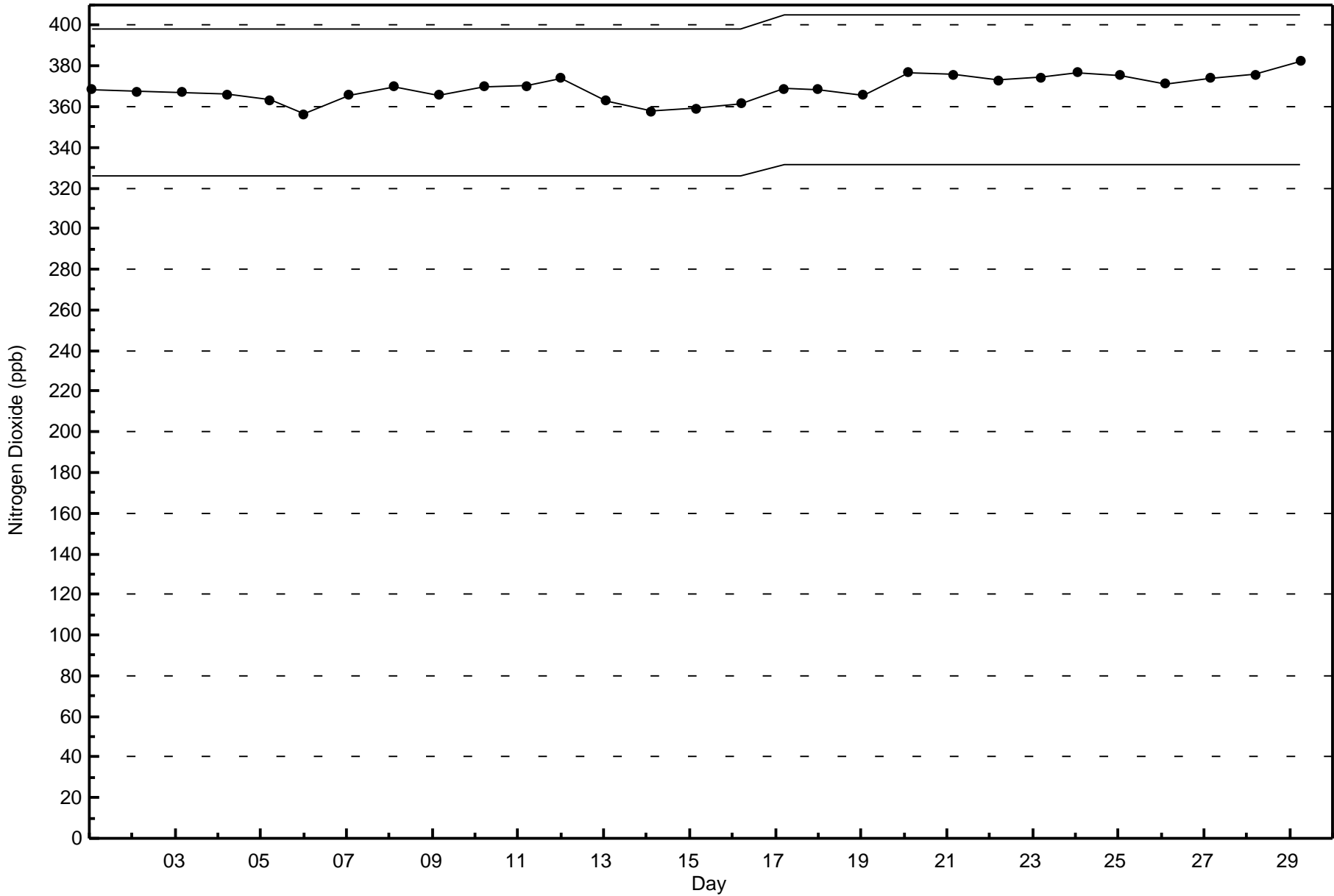


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association
Summary of Hour Averages

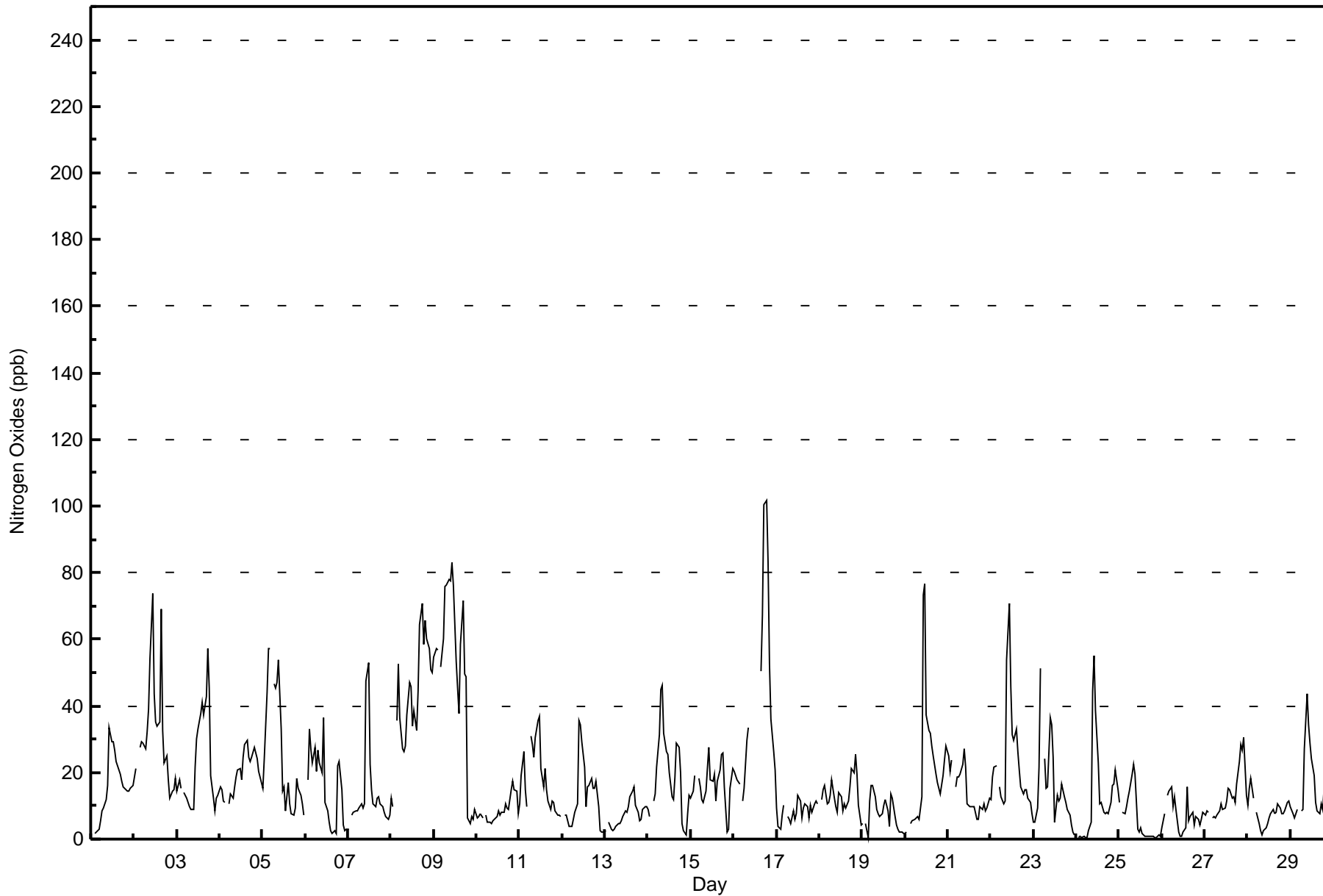
Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 2016

Maximum Value: 102 ppb on Feb 16 19:00																			Maximum Daily Average: 49.8 ppb on Feb 9						Hours in Service: 696	
Minimum Value: 0 ppb on Feb 24 07:00																			Minimum Daily Average: 6.2 ppb on Feb 25						Hours of Data: 657	
Maximum Diurnal Average: 30.7 ppb at hour 11																			Minimum Diurnal Average: 11.8 ppb at hour 1						Hours of Missing Data: 39	
Monthly Average: 18.0 ppb																			Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 8 Median = 12 Q ₃ = 23 P ₉₀ = 38 P ₉₉ = 77						Hours of Calibration: 35	
																									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	Z	2	2	3	6	8	9	12	16	33	29	29	27	23	21	20	17	16	15	14	14	15	16	15.3	33
2-Feb	19	21	Z	28	29	29	27	32	39	54	74	44	35	34	35	69	33	23	25	18	12	14	15	18	31.6	74
3-Feb	15	18	15	Z	14	12	11	10	9	9	22	30	33	38	41	37	43	57	45	19	12	9	12	13	22.7	57
4-Feb	16	15	11	11	Z	10	13	12	16	19	21	21	18	24	29	30	25	23	25	28	26	24	21	17	19.7	30
5-Feb	15	24	44	57	57	Z	47	46	47	54	33	14	16	9	17	11	8	7	9	18	15	13	11	7	25.2	57
6-Feb	Z	18	33	27	23	28	20	27	23	20	36	11	9	5	2	2	3	2	22	23	15	4	2	3	15.6	36
7-Feb	3	Z	7	8	8	8	9	11	9	10	47	53	22	15	11	10	12	13	11	10	8	7	6	7	13.3	53
8-Feb	12	10	Z	35	53	36	27	26	28	37	47	46	34	38	33	44	64	71	58	66	60	57	51	50	42.8	71
9-Feb	55	57	57	Z	52	60	76	76	78	78	83	76	54	46	38	59	71	50	49	6	5	7	6	9	49.8	83
10-Feb	6	7	7	6	Z	7	5	5	5	5	6	7	9	7	8	8	10	9	9	15	17	15	14	7	8.5	17
11-Feb	10	19	26	15	10	Z	31	28	25	30	36	37	21	16	21	15	12	9	12	11	8	7	7	7	18.0	37
12-Feb	Z	7	7	5	4	4	6	8	10	35	34	29	22	10	16	16	18	15	15	17	10	2	2	2	12.9	35
13-Feb	2	Z	5	3	3	3	4	5	5	6	7	9	8	10	13	15	15	10	8	6	6	9	10	10	7.4	15
14-Feb	9	7	Z	11	14	21	31	45	46	32	26	25	20	13	12	19	29	27	20	5	3	1	8	13	19.0	46
15-Feb	12	14	19	Z	18	15	12	11	14	21	27	18	17	19	12	17	21	25	26	16	2	3	15	21	16.4	27
16-Feb	20	19	18	16	Z	11	15	30	34	C	C	C	C	C	C	51	67	101	102	83	52	36	26	21	--	102
17-Feb	9	4	3	7	10	Z	7	6	5	9	6	7	13	11	6	9	11	10	6	10	8	11	11	10	8.3	13
18-Feb	Z	12	15	16	10	11	13	18	12	10	8	14	13	8	10	9	12	16	21	20	25	19	10	4	13.4	25
19-Feb	4	Z	5	1	11	16	16	13	9	8	7	8	10	12	8	4	14	12	7	4	3	2	2	2	7.7	16
20-Feb	2	2	Z	4	5	6	6	7	6	13	73	77	37	33	32	28	25	20	17	15	13	19	24	28	21.4	77
21-Feb	25	20	24	Z	16	19	19	20	23	27	22	11	10	10	10	10	6	6	10	9	11	9	9	12	14.5	27
22-Feb	12	18	21	22	Z	16	13	11	11	54	71	46	31	30	33	26	21	16	14	15	15	12	11	8	22.8	71
23-Feb	5	5	9	22	51	Z	24	15	16	36	34	25	5	13	11	12	17	13	11	9	7	4	2	1	15.2	51
24-Feb	Z	1	1	0	1	1	0	3	5	45	55	38	23	11	11	8	8	8	7	11	16	17	21	15	13.3	55
25-Feb	11	Z	8	8	10	12	14	19	22	20	3	2	3	2	1	1	1	1	1	1	1	1	1	1	6.2	22
26-Feb	3	8	Z	13	14	16	10	13	9	2	1	1	2	4	16	5	7	8	4	7	6	4	6	8	7.2	16
27-Feb	7	8	8	Z	6	7	6	7	9	10	9	9	12	15	15	12	13	11	17	23	28	27	31	13	13.2	31
28-Feb	10	15	18	12	Z	8	5	3	1	3	3	5	6	8	9	8	8	11	9	8	8	9	11	11	8.2	18
29-Feb	10	8	6	8	9	Z	8	9	27	44	34	29	24	19	11	8	8	10	9	15	PF	PF	PF	PF	15.6	44
11.8 14.1 15.4 14.1 18.0 15.1 16.7 18.0 19.1 25.2 30.7 25.7 19.1 17.3 17.2 19.4 20.6 20.7 20.2 17.3 14.6 12.7 12.9 12.0																			Diurnal Average							
55 57 57 57 57 60 76 76 78 78 83 77 54 46 41 69 71 101 102 83 60 57 51 50																			Diurnal Maximum							
Z - zerspan			C - Calibration			PF - Power Failure																				



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	467	71.08	71.08
21 - 40	127	19.33	90.41
41 - 80	59	8.98	99.39
81 - 159	4	0.61	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 657

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	98	108	18	1	2	1	6	30	43	28	35	44	23	4	5	7	453
21 - 40	18	22	6	3	1	4	17	16	13	10	5	2	3	1	1	2	124
11 - 80	9	9	0	1	0	3	3	8	8	8	2	0	0	2	1	5	59
81 - 159	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	127	139	24	5	4	8	26	54	64	46	42	46	26	7	7	15	640

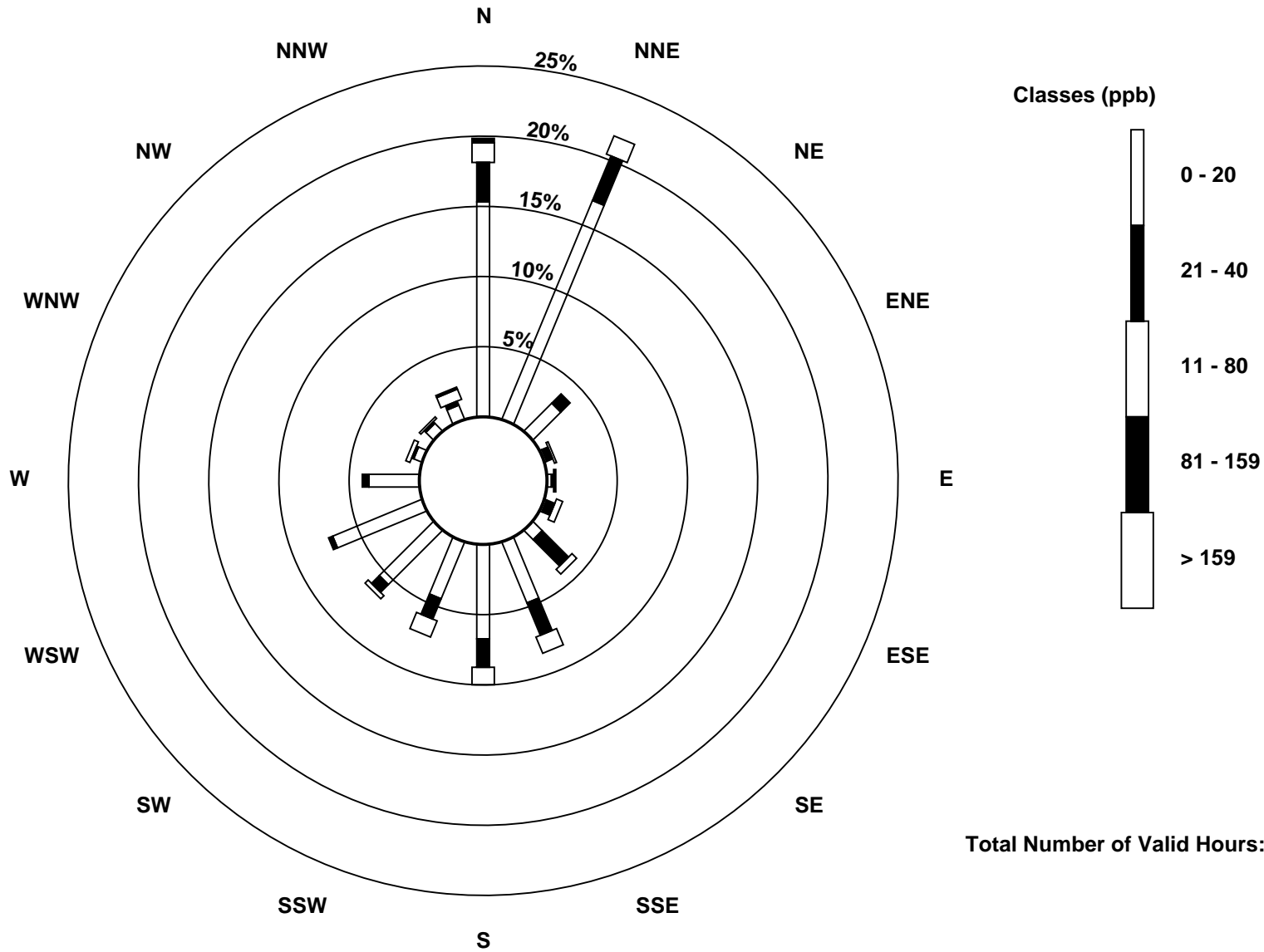
Total Number of Valid Hours: 640

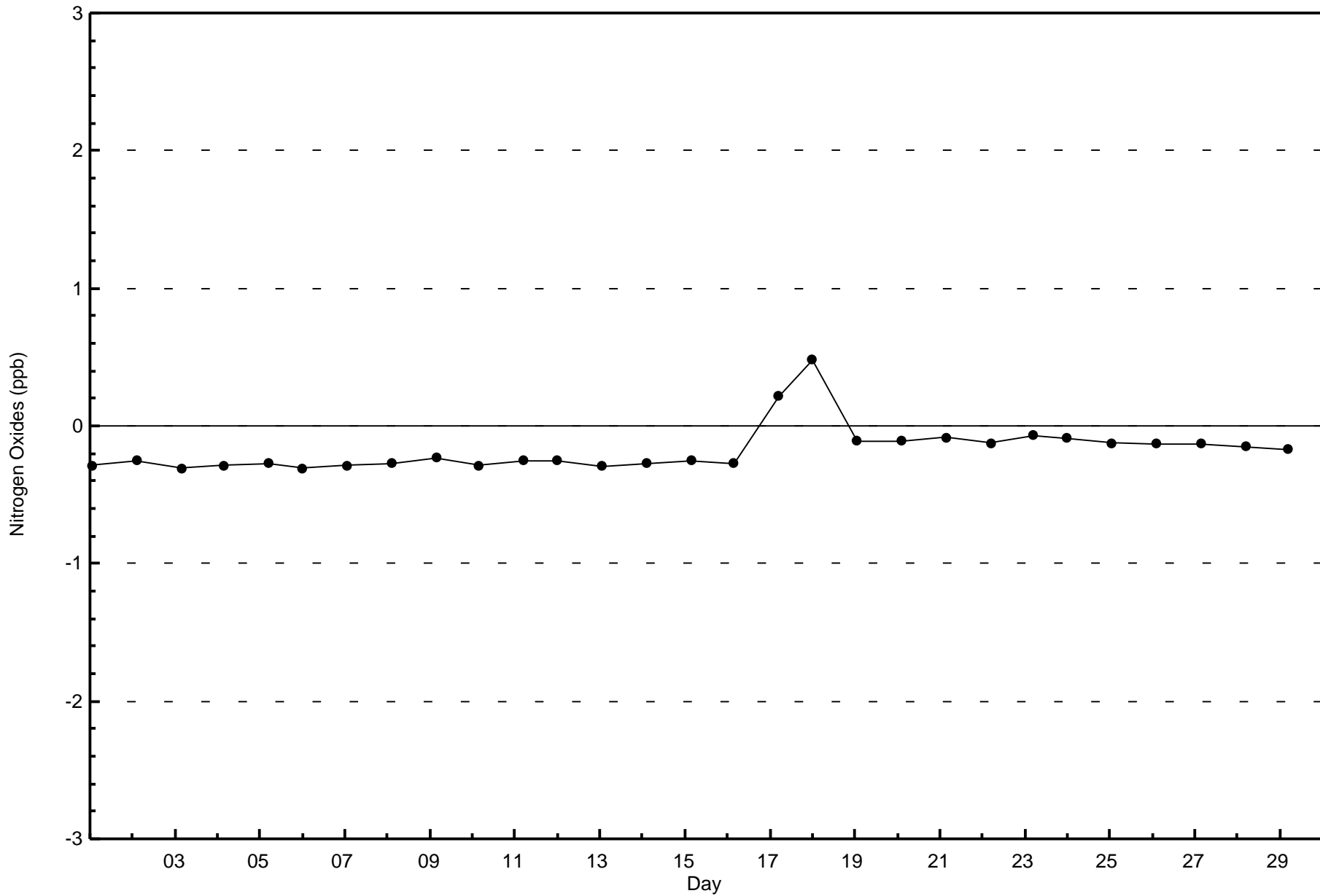
Total Number of Hours: 696

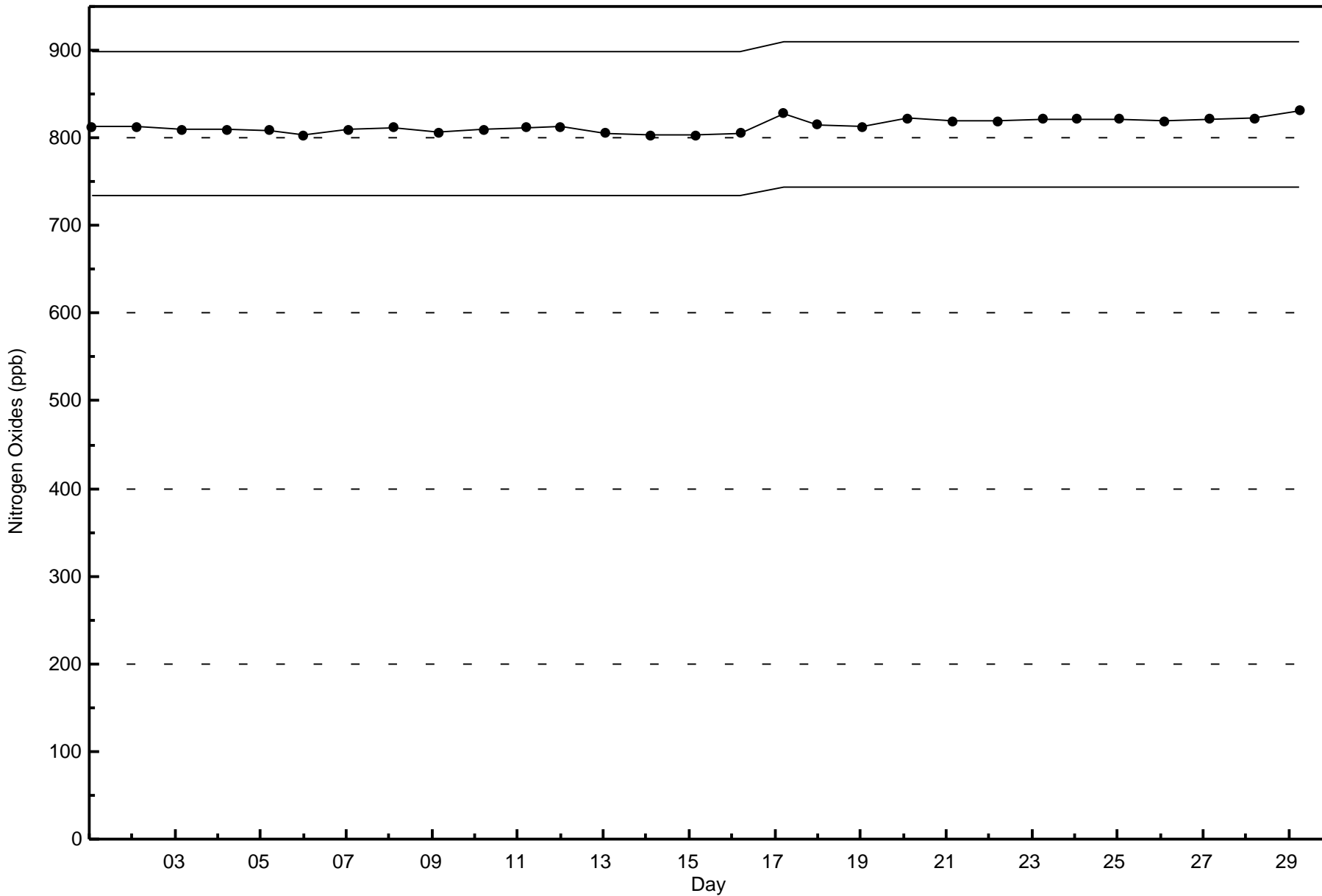


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

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

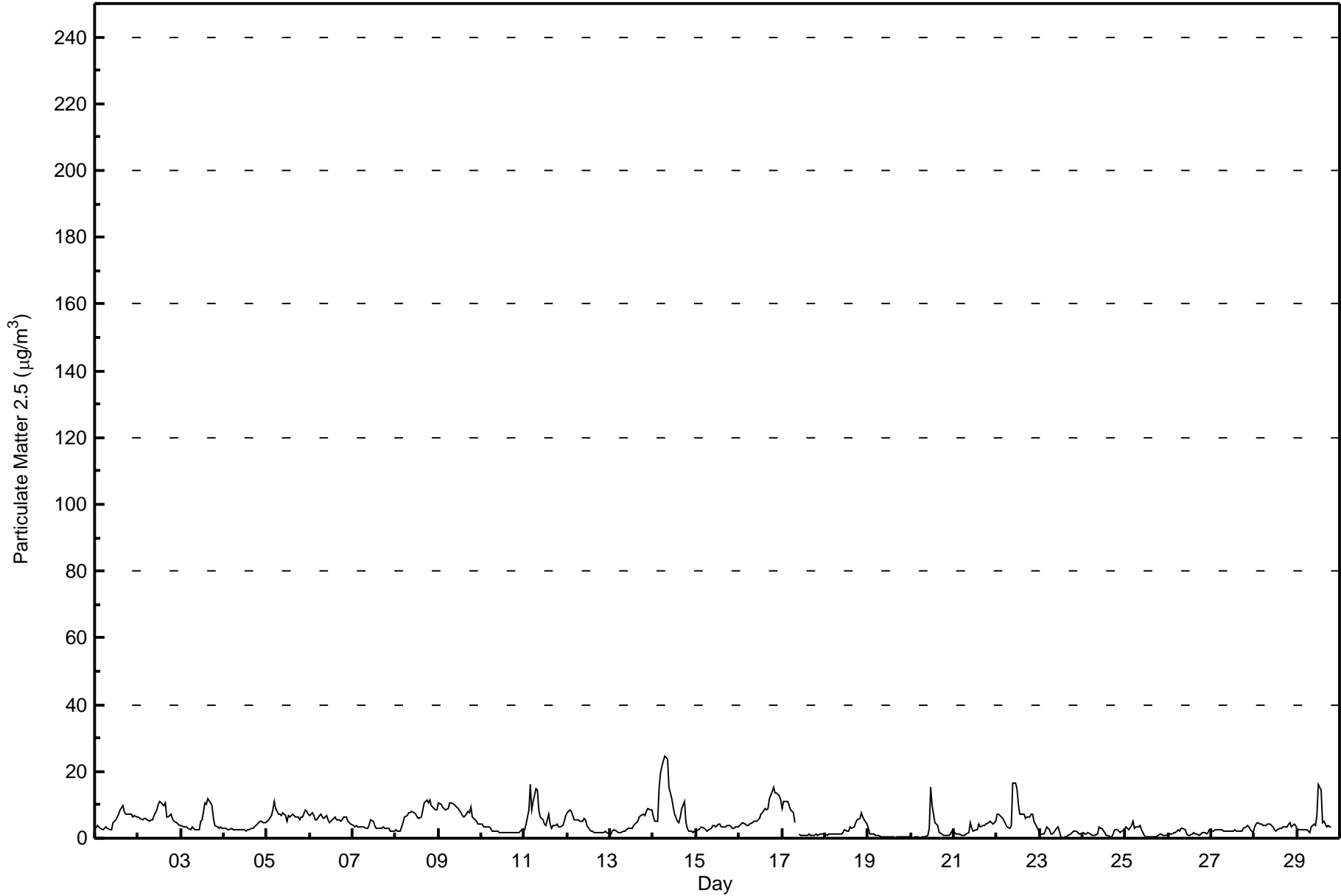
Fort McKay South - February 2016

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 696																								
Maximum Value: 24.6 µg/m ³ on Feb 14 07:00		Maximum Daily Average: 10.0 µg/m ³ on Feb 14																								
Minimum Value: 0.0 µg/m ³ on Feb 20 02:00		Hours of Data: 691																								
Maximum Diurnal Average: 4.8 µg/m ³ at hour 12		Hours of Missing Data: 5																								
Monthly Average: 4.38 µg/m ³		Hours of Calibration: 1																								
Minimum Daily Average: 0.7 µg/m ³ on Feb 19		Percent Operational Time: 99.4																								
Minimum Diurnal Average: 3.8 µg/m ³ at hour 1		Percentiles: P ₁ = 0.2 P ₁₀ = 1.0 Q ₁ = 2.0 Median = 3.5 Q ₃ = 6.0 P ₉₀ = 8.7 P ₉₉ = 16.5																								
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	3.1	3.7	3.4	2.9	2.7	2.9	3.4	2.9	2.7	2.6	4.7	5.3	6.2	7.0	8.7	9.7	7.9	7.3	7.2	7.3	7.2	6.4	6.6	6.2	5.3	9.7
2-Feb	6.3	6.0	5.6	5.8	6.1	5.3	5.0	5.5	5.7	6.8	8.7	10.0	11.2	10.4	9.8	10.5	6.3	6.2	7.1	6.0	4.9	4.7	4.4	3.9	6.8	11.2
3-Feb	3.9	3.5	3.2	3.3	3.1	2.7	3.3	2.8	2.8	2.7	2.7	5.2	5.6	10.8	10.4	11.9	10.6	9.7	6.0	4.0	3.3	3.1	3.2	3.1	5.0	11.9
4-Feb	3.1	2.8	2.7	2.7	2.8	2.6	2.6	2.5	2.5	2.4	2.6	2.6	2.0	2.4	2.7	3.1	3.1	3.3	3.9	4.8	5.0	5.1	4.8	4.6	3.2	5.1
5-Feb	5.2	5.4	6.9	8.6	11.2	8.9	7.3	7.2	6.8	7.8	6.7	5.1	6.9	6.5	7.4	6.9	6.3	6.2	5.4	6.2	6.2	8.6	8.2	7.2	7.0	11.2
6-Feb	6.7	7.7	7.0	5.6	5.6	6.6	7.2	6.2	6.0	6.7	5.7	4.7	5.4	5.9	6.2	5.4	5.5	5.1	5.6	6.3	6.5	5.0	4.6	4.4	5.9	7.7
7-Feb	3.7	3.4	3.9	3.5	3.5	3.2	3.4	3.1	3.1	3.7	5.6	5.1	3.8	3.0	3.0	3.1	3.1	3.6	2.9	3.0	2.8	2.3	2.2	2.0	3.3	5.6
8-Feb	2.4	2.0	2.3	3.5	4.6	6.5	6.9	7.7	7.8	8.1	7.5	7.4	6.4	6.0	6.4	8.4	10.6	11.5	10.5	11.3	9.8	9.1	8.3	8.7	7.2	11.5
9-Feb	10.7	10.1	9.2	8.9	8.4	9.1	10.5	10.6	10.1	9.6	9.5	9.0	7.6	6.6	6.5	6.8	8.0	7.7	9.4	6.4	5.6	4.9	4.4	4.3	8.1	10.7
10-Feb	4.1	3.2	3.4	3.2	3.6	3.0	2.3	2.2	2.1	2.1	1.9	1.6	1.7	1.6	1.6	1.8	1.8	1.9	1.9	1.9	1.8	1.9	2.7	2.2	2.3	4.1
11-Feb	2.7	4.0	8.4	15.9	8.5	11.1	14.8	14.2	8.6	6.5	5.4	4.1	3.9	7.1	4.3	3.1	3.9	3.7	4.2	3.5	3.2	3.6	5.1	6.8	6.5	15.9
12-Feb	7.8	8.6	8.0	6.6	5.7	5.4	5.5	4.9	5.0	6.0	5.4	3.7	2.5	2.0	1.9	1.8	1.8	1.7	1.8	1.7	1.7	1.9	1.7	1.4	3.9	8.6
13-Feb	1.5	2.3	2.6	2.0	1.8	1.7	1.8	1.9	2.1	2.7	2.9	3.0	2.8	3.9	4.4	5.3	6.2	6.6	7.3	6.8	7.9	9.0	8.6	8.3	4.3	9.0
14-Feb	6.4	4.9	5.1	14.6	19.5	21.7	24.6	24.1	23.7	15.2	11.8	9.4	7.3	4.9	4.6	6.2	9.1	11.2	4.6	3.1	2.0	1.9	1.8	2.0	10.0	24.6
15-Feb	2.1	2.7	3.0	3.5	3.0	2.7	2.2	2.3	3.0	4.0	3.8	3.4	4.2	4.1	3.3	3.5	3.5	4.0	3.7	4.0	3.1	2.8	3.3	3.5	3.3	4.2
16-Feb	4.0	4.2	4.6	4.2	3.9	3.7	4.4	4.7	5.2	5.1	5.1	5.9	7.2	7.7	8.8	8.6	8.9	12.0	14.2	15.4	13.7	13.4	12.7	11.4	7.9	15.4
17-Feb	9.0	11.1	10.9	10.8	9.8	8.4	7.8	4.7	C	1.4	1.0	0.9	0.9	0.9	0.9	1.1	1.0	1.1	1.0	1.1	0.9	1.2	1.2	1.3	3.8	11.1
18-Feb	1.2	1.0	1.2	1.4	1.4	1.2	1.4	1.4	1.4	1.4	1.5	2.3	2.1	2.3	3.3	2.8	3.3	4.6	5.4	6.0	7.6	6.3	5.7	4.2	2.9	7.6
19-Feb	3.0	1.1	1.2	1.3	1.0	0.8	0.7	0.5	0.4	0.6	0.5	0.6	0.5	0.5	0.3	0.1	0.3	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.7	3.0
20-Feb	0.1	0.0	0.3	0.2	0.2	0.2	0.4	0.3	0.3	0.7	2.9	15.4	9.8	4.5	4.2	3.7	1.5	1.1	1.0	0.9	0.8	1.0	1.2	2.0	2.2	15.4
21-Feb	1.6	1.1	1.4	1.1	0.8	1.0	1.0	1.2	1.6	4.8	2.9	2.3	2.4	2.5	4.4	3.6	3.7	3.8	4.1	4.5	5.0	4.7	4.3	5.1	2.9	5.1
22-Feb	7.3	7.0	6.7	5.9	5.1	4.3	3.6	3.1	3.8	16.5	16.6	14.9	10.1	7.0	7.2	7.0	5.9	6.2	6.4	7.0	7.1	5.1	3.5	2.4	7.1	16.6
23-Feb	1.3	1.2	1.3	2.3	3.6	2.7	1.4	1.4	1.8	3.2	3.6	2.0	0.3	0.2	0.2	0.5	0.9	1.1	1.7	2.1	2.2	1.7	1.3	1.4	1.6	3.6
24-Feb	1.6	1.4	1.5	1.5	1.2	0.8	1.0	0.9	1.1	3.4	2.9	3.2	1.8	0.9	0.9	0.2	0.4	1.4	2.5	2.6	2.0	1.5	1.9	2.4	1.6	3.4
25-Feb	3.3	3.0	2.5	4.0	5.1	3.1	3.3	3.6	3.8	2.7	0.9	0.5	0.3	0.3	0.3	0.3	0.2	0.4	0.9	1.2	1.1	1.1	0.9	0.9	1.8	5.1
26-Feb	1.1	1.3	1.3	1.5	1.8	2.4	2.3	2.9	3.0	2.4	1.5	1.0	1.0	1.1	1.6	1.3	1.1	0.7	1.3	1.5	1.6	1.4	1.9	2.5	1.6	3.0
27-Feb	2.0	2.0	2.4	2.7	2.7	2.6	2.4	2.1	2.1	2.2	2.3	2.3	2.3	2.4	2.3	2.1	2.1	2.1	2.8	3.3	3.7	3.2	2.4	1.9	2.4	3.7
28-Feb	3.5	4.4	4.6	4.1	4.0	3.9	3.7	4.2	4.4	4.0	3.2	2.6	2.1	2.6	3.1	2.8	3.3	3.5	3.6	4.2	4.6	3.5	4.2	3.8	3.7	4.6
29-Feb	2.6	2.4	2.4	2.6	2.6	2.6	2.1	1.8	3.5	4.1	3.8	6.9	16.1	14.5	4.5	5.1	3.3	3.8	3.5	3.6	PF	PF	PF	PF	4.6	16.1
																								Diurnal Average		
																								Diurnal Maximum		
																								3.8 10.7		
																								3.8 11.1		
																								4.0 10.9		
																								4.6 15.9		
																								4.6 19.5		
																								4.5 21.7		
																								4.7 24.6		
																								4.5 24.1		
																								4.4 23.7		
																								4.8 16.5		
																								4.6 16.6		
																								4.8 15.4		
																								4.6 16.1		
																								4.5 14.5		
																								4.2 10.4		
																								4.4 11.9		
																								4.3 10.6		
																								4.6 12.0		
																								4.5 14.2		
																								4.5 15.4		
																								4.3 13.7		
																								4.1 13.4		
																								4.0 12.7		
																								3.9 11.4		
																								C - Calibration PF - Power Failure		
																								Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³		



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - February 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	429	62.08	62.08
6 - 15	188	27.21	89.29
16 - 25	9	1.30	90.59
26 - 80	0	0.00	90.59
> 81.0	0	0.00	90.59

Total Number of Valid Hours: 691

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay South - February 2016

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	95	103	9	4	1	4	12	33	38	25	24	33	13	5	5	9	413
6 - 15	36	24	7	2	1	5	12	20	20	16	13	12	9	2	2	7	188
16 - 25	2	1	0	0	0	0	2	2	1	1	0	0	0	0	0	0	9
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	133	128	16	6	2	9	26	55	59	42	37	45	22	7	7	16	610

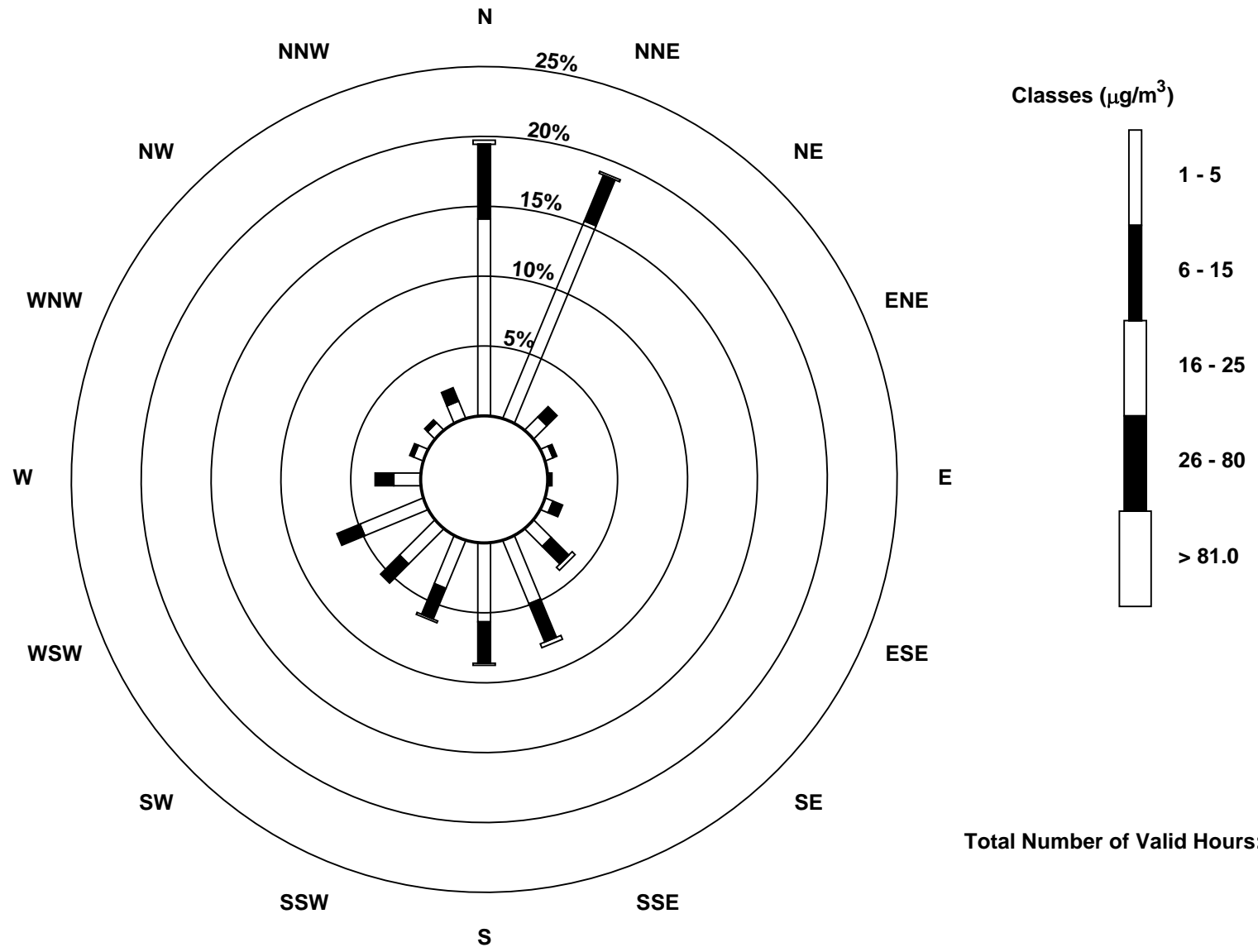
Total Number of Valid Hours: 674

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South (AMS 13)

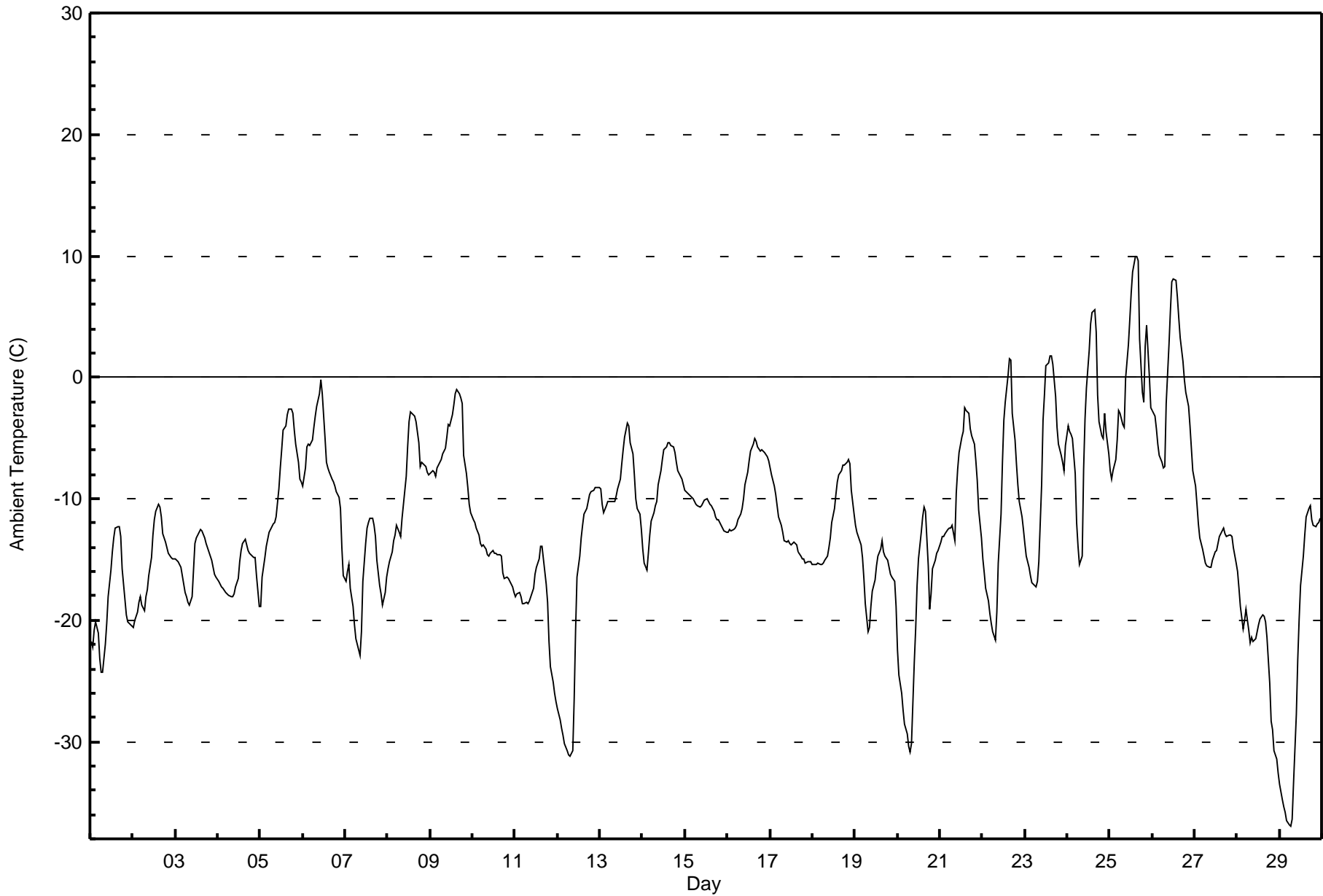




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Fort McKay South - February 2016

Maximum Value: 9.9 C on Feb 25 15:00 Maximum Daily Average: 0.3 C on Feb 25																								Hours in Service:	696	
Minimum Value: -37.0 C on Feb 29 07:00 Minimum Daily Average: -22.5 C on Feb 29																								Hours of Data:	696	
Maximum Diurnal Average: -7.2 C at hour 16 Minimum Diurnal Average: -16.3 C at hour 8																								Hours of Missing Data:	0	
Monthly Average: -12.19 C Percentiles: P₁ = -33.7 P₁₀ = -20.4 Q₁ = -16.2 Median = -12.6 Q₃ = -7.4 P₉₀ = -3.1 P₉₉ = 7.9																								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	-21.7	-22.2	-20.8	-20.2	-21.1	-23.1	-24.3	-24.2	-22.0	-20.3	-18.1	-15.9	-14.4	-13.2	-12.4	-12.3	-12.3	-13.1	-15.8	-18.3	-19.5	-20.1	-20.2	-20.5	-18.6	-12.3
2-Feb	-20.6	-20.1	-19.3	-18.5	-18.1	-18.8	-19.2	-18.1	-17.5	-16.3	-14.8	-13.0	-11.8	-11.0	-10.5	-10.7	-11.5	-12.9	-13.6	-14.0	-14.5	-14.8	-14.9	-14.9	-15.4	-10.5
3-Feb	-15.0	-15.2	-15.4	-15.7	-16.3	-17.7	-18.0	-18.5	-18.8	-18.0	-15.8	-13.7	-13.2	-12.8	-12.5	-12.6	-13.2	-13.7	-14.0	-14.4	-15.0	-15.7	-16.2	-16.5	-15.3	-12.5
4-Feb	-16.8	-17.0	-17.2	-17.4	-17.7	-17.9	-17.9	-18.1	-18.1	-17.8	-17.3	-16.5	-15.2	-14.3	-13.7	-13.3	-13.8	-14.3	-14.5	-14.7	-14.8	-14.8	-16.4	-18.8	-16.2	-13.3
5-Feb	-18.8	-16.5	-14.8	-13.9	-13.3	-12.8	-12.3	-12.1	-11.9	-11.4	-9.2	-7.5	-5.9	-4.4	-4.0	-3.1	-2.6	-2.7	-2.9	-4.4	-5.4	-7.0	-8.4	-8.6	-8.9	-2.6
6-Feb	-8.9	-7.5	-5.8	-5.5	-5.6	-5.1	-4.1	-3.2	-2.4	-1.4	-0.2	-1.3	-5.1	-7.0	-7.4	-7.9	-8.4	-8.7	-9.0	-9.4	-9.8	-10.8	-14.1	-16.4	-6.9	-0.2
7-Feb	-16.8	-16.0	-15.5	-17.4	-18.9	-20.3	-21.5	-22.4	-22.9	-20.9	-16.8	-13.7	-12.4	-12.0	-11.6	-11.7	-12.2	-13.1	-15.1	-17.1	-17.9	-18.8	-17.8	-16.5	-16.6	-11.6
8-Feb	-15.8	-15.2	-14.4	-13.5	-13.0	-12.1	-12.8	-13.2	-11.7	-10.4	-8.1	-5.8	-3.6	-2.8	-3.1	-3.2	-3.7	-5.4	-7.4	-7.0	-7.1	-7.4	-7.8	-8.1	-8.9	-2.8
9-Feb	-7.9	-7.7	-7.8	-8.2	-7.4	-7.0	-6.7	-6.3	-5.9	-4.9	-3.9	-4.0	-3.1	-2.3	-1.3	-1.1	-1.3	-1.7	-2.2	-6.4	-7.9	-9.1	-10.4	-11.2	-5.7	-1.1
10-Feb	-11.7	-12.0	-12.4	-13.0	-13.7	-13.9	-13.8	-14.2	-14.6	-14.7	-14.5	-14.3	-14.5	-14.4	-14.6	-14.6	-14.8	-16.1	-16.6	-16.5	-16.6	-16.8	-17.2	-17.7	-14.7	-11.7
11-Feb	-18.1	-17.8	-17.7	-18.1	-18.6	-18.6	-18.6	-18.6	-18.4	-18.0	-17.3	-16.3	-15.6	-15.0	-13.9	-13.9	-14.9	-17.0	-18.5	-21.7	-23.8	-25.1	-26.0	-26.8	-18.7	-13.9
12-Feb	-27.3	-28.2	-28.9	-29.5	-30.1	-30.7	-31.1	-31.2	-30.7	-26.4	-20.8	-16.4	-14.7	-13.2	-12.2	-11.3	-10.8	-10.2	-9.6	-9.4	-9.3	-9.1	-9.1	-9.0	-19.1	-9.0
13-Feb	-9.1	-10.4	-11.2	-10.6	-10.3	-10.2	-10.2	-10.2	-10.2	-9.8	-9.1	-8.3	-7.2	-5.9	-5.0	-3.7	-4.0	-5.4	-6.3	-8.1	-10.0	-10.8	-11.3	-12.5	-8.7	-3.7
14-Feb	-14.2	-15.3	-15.9	-14.5	-13.0	-11.8	-11.1	-10.6	-10.2	-8.8	-7.7	-6.7	-5.9	-5.7	-5.4	-5.4	-5.6	-5.7	-6.2	-7.0	-7.6	-8.1	-8.4	-8.8	-9.2	-5.4
15-Feb	-9.3	-9.5	-9.7	-9.8	-10.0	-10.2	-10.4	-10.6	-10.7	-10.6	-10.3	-10.1	-10.0	-10.2	-10.4	-10.5	-11.0	-11.5	-11.7	-11.7	-12.1	-12.4	-12.6	-12.8	-10.8	-9.3
16-Feb	-12.7	-12.5	-12.6	-12.6	-12.5	-12.2	-11.8	-11.2	-10.8	-10.0	-8.9	-7.8	-6.9	-6.1	-5.5	-5.1	-5.3	-5.8	-6.0	-6.0	-6.1	-6.2	-6.5	-6.8	-8.7	-5.1
17-Feb	-7.4	-8.1	-8.9	-9.7	-10.6	-11.5	-12.1	-12.8	-13.5	-13.6	-13.5	-13.7	-13.7	-13.6	-13.7	-13.8	-14.3	-14.8	-14.9	-15.0	-15.2	-15.2	-15.1	-15.2	-12.9	-7.4
18-Feb	-15.4	-15.4	-15.4	-15.3	-15.4	-15.5	-15.3	-15.1	-14.7	-14.1	-13.3	-11.9	-10.8	-9.6	-8.6	-8.0	-7.6	-7.3	-7.2	-6.9	-6.7	-7.1	-9.3	-11.2	-11.5	-6.7
19-Feb	-12.2	-12.7	-13.1	-13.8	-14.8	-16.6	-18.6	-21.0	-20.6	-18.9	-17.7	-16.7	-15.5	-14.8	-14.2	-13.4	-14.4	-14.7	-15.1	-15.6	-16.2	-16.5	-16.8	-18.8	-15.9	-12.2
20-Feb	-22.5	-24.6	-26.1	-27.4	-28.5	-29.4	-30.4	-30.9	-30.1	-23.5	-20.7	-17.2	-14.9	-12.7	-11.5	-10.7	-11.1	-15.5	-19.0	-17.8	-15.8	-15.0	-14.4	-14.2	-20.2	-10.7
21-Feb	-13.6	-13.1	-13.1	-12.8	-12.6	-12.4	-12.4	-12.2	-13.5	-9.5	-7.5	-6.1	-4.9	-4.4	-2.5	-2.7	-3.0	-4.3	-4.8	-5.5	-6.8	-8.5	-11.0	-13.2	-8.8	-2.5
22-Feb	-15.0	-16.2	-17.4	-18.4	-19.5	-20.3	-20.9	-21.6	-19.3	-15.3	-11.3	-7.0	-3.5	-2.1	0.1	1.5	1.4	-3.0	-5.2	-7.1	-8.9	-10.3	-11.4	-12.5	-11.0	1.5
23-Feb	-13.7	-14.8	-15.6	-16.3	-16.9	-17.1	-17.2	-16.8	-15.2	-8.9	-3.5	-1.5	0.9	1.2	1.8	1.8	1.1	-1.6	-4.1	-5.5	-6.4	-7.0	-7.6	-5.6	-7.9	1.8
24-Feb	-4.0	-4.4	-4.7	-5.0	-7.9	-11.9	-13.9	-15.4	-14.7	-7.6	-3.5	-0.9	2.2	4.4	5.4	5.6	3.7	-1.5	-3.7	-4.8	-5.1	-3.0	-4.4	-6.3	-4.2	5.6
25-Feb	-7.7	-8.4	-7.7	-6.7	-5.1	-2.8	-2.9	-3.9	-4.1	-0.1	2.7	4.8	6.9	8.7	9.9	9.9	9.6	3.1	-1.3	-2.1	2.5	4.3	0.0	-2.5	0.3	9.9
26-Feb	-2.8	-3.1	-4.3	-5.5	-6.4	-7.0	-7.5	-7.3	-2.1	2.7	5.4	7.9	8.1	8.0	6.6	4.9	3.3	1.3	-0.3	-1.3	-2.3	-4.0	-5.8	-7.7	-0.8	8.1
27-Feb	-9.0	-10.5	-12.0	-13.3	-14.1	-14.7	-15.3	-15.5	-15.6	-15.6	-15.0	-14.4	-14.2	-13.7	-13.1	-12.7	-12.5	-12.9	-13.1	-13.0	-13.0	-13.1	-14.0	-15.3	-13.6	-9.0
28-Feb	-16.0	-17.4	-18.9	-20.7	-20.1	-19.1	-20.8	-21.9	-21.4	-21.8	-21.5	-20.9	-20.3	-19.9	-19.5	-19.6	-20.1	-21.4	-25.2	-28.3	-29.0	-30.7	-31.4	-32.5	-22.4	-16.0
29-Feb	-33.6	-34.7	-35.3	-35.8	-36.5	-36.8	-37.0	-36.4	-33.3	-27.8	-23.2	-19.9	-17.1	-14.8	-13.0	-11.5	-10.8	-10.6	-11.7	-12.2	-12.3	-12.1	-11.9	-11.6	-22.5	-10.6
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort McKay South - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	80	11.49	11.49
-20 - 0	584	83.91	95.40
0 - 10	32	4.60	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

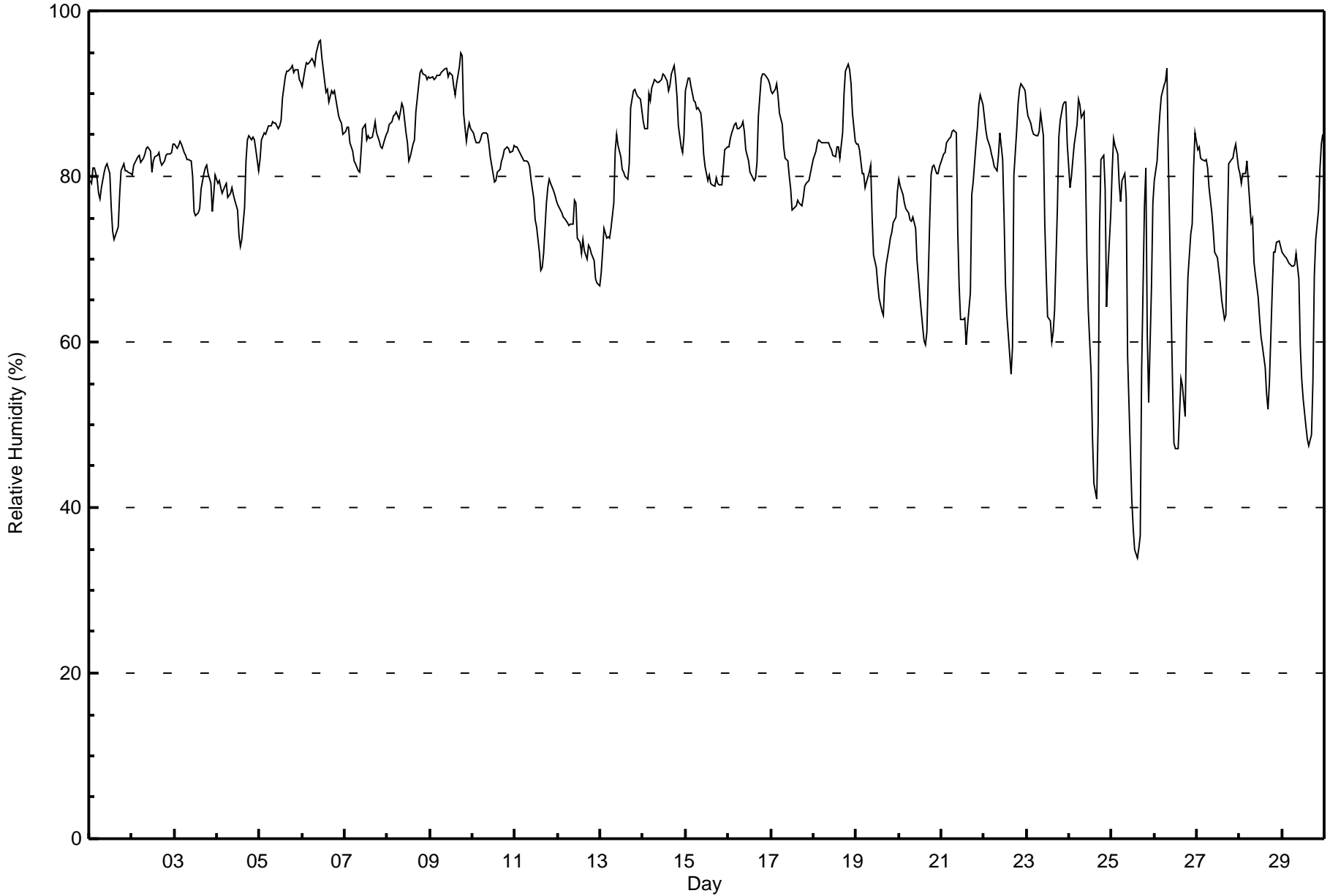
Fort McKay South - February 2016

Maximum Value: 96 % on Feb 6 11:00 Maximum Daily Average: 91.5 % on Feb 6																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 34 % on Feb 25 15:00 Minimum Daily Average: 63.3 % on Feb 25 Maximum Diurnal Average: 83.5 % at hour 4 Minimum Diurnal Average: 70.9 % at hour 15 Monthly Average: 79.6 % Percentiles: P ₁ = 41 P ₁₀ = 65 Q ₁ = 76 Median = 82 Q ₃ = 86 P ₉₀ = 91 P ₉₉ = 94																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	79	81	81	80	78	77	79	80	81	81	80	76	73	72	73	74	78	81	82	81	81	80	80	78.7	82
2-Feb	80	81	82	82	82	82	82	83	83	84	83	81	82	82	83	83	82	81	82	83	83	83	83	84	82.3	84
3-Feb	84	83	84	84	84	83	83	82	82	82	80	76	75	76	76	79	80	81	81	80	79	76	78	80	80.3	84
4-Feb	79	79	79	78	79	79	77	78	79	78	77	76	73	71	72	76	82	84	85	84	85	84	83	81	79.2	85
5-Feb	82	84	85	85	86	86	86	87	86	86	86	86	87	89	92	93	93	93	93	93	93	93	92	91	88.7	93
6-Feb	91	93	94	94	94	94	94	93	95	96	96	94	91	90	90	89	90	90	90	89	87	87	86	85	91.5	96
7-Feb	85	86	86	84	83	82	82	81	80	83	86	86	84	85	85	85	86	87	85	84	84	83	85	85	84.2	87
8-Feb	85	86	87	87	88	88	87	88	89	88	85	84	82	82	84	84	88	91	93	93	92	92	92	92	87.8	93
9-Feb	92	92	92	92	92	92	93	93	93	93	92	93	92	91	90	91	93	95	95	88	84	86	86	86	91.0	95
10-Feb	85	85	84	84	84	85	85	85	85	84	82	80	79	79	80	81	82	82	83	84	83	83	83	84	83.1	85
11-Feb	84	84	83	82	82	82	82	82	81	80	77	75	74	71	69	69	71	77	79	80	79	78	78	77	78.1	84
12-Feb	77	76	76	75	75	74	74	74	74	77	77	72	72	71	72	71	70	72	71	71	70	68	67	67	72.6	77
13-Feb	68	71	74	73	73	73	74	77	83	85	84	82	81	80	80	80	81	88	90	90	90	90	89	88	81.0	90
14-Feb	87	86	86	90	89	91	92	92	91	91	92	92	92	90	91	92	93	92	90	86	84	83	85	85	89.5	93
15-Feb	90	92	92	91	89	89	88	88	88	86	83	81	79	80	79	79	80	79	79	79	81	83	84	84	84.1	92
16-Feb	83	85	85	86	86	86	86	86	87	86	83	82	80	80	80	80	82	87	92	92	92	92	92	91	85.9	92
17-Feb	90	90	90	91	90	88	86	84	82	82	80	78	76	76	76	77	77	77	77	79	79	80	80	81	82.0	91
18-Feb	82	83	84	84	84	84	84	84	84	84	83	83	82	84	84	82	85	90	93	94	93	91	88	84	85.5	94
19-Feb	84	84	83	80	80	79	79	81	81	75	70	69	67	65	64	63	67	69	71	73	73	74	75	78	74.4	84
20-Feb	80	79	78	77	76	76	75	75	75	74	70	68	66	62	60	60	61	74	80	81	81	80	80	81	73.7	81
21-Feb	82	83	83	84	85	85	85	86	85	73	67	63	63	63	60	62	66	78	79	84	86	89	90	89	77.8	90
22-Feb	87	86	85	84	83	82	81	81	83	85	82	75	67	63	59	56	59	80	86	89	90	91	91	90	79.7	91
23-Feb	88	87	86	86	85	85	85	86	88	85	74	68	63	63	60	61	64	76	85	87	89	89	89	84	79.7	89
24-Feb	79	80	82	84	86	89	89	87	88	81	70	64	56	48	43	41	50	73	82	83	79	64	69	75	72.6	89
25-Feb	81	85	84	83	79	77	80	80	78	58	46	41	38	35	34	35	37	57	76	81	61	53	67	77	63.3	85
26-Feb	79	82	85	88	90	91	92	93	82	64	55	48	47	47	51	56	55	51	62	68	73	74	81	85	70.8	93
27-Feb	83	83	82	82	82	82	81	79	76	73	71	70	69	67	65	63	63	73	82	82	82	83	84	81	76.6	84
28-Feb	80	79	80	80	82	79	74	75	70	68	65	63	61	60	57	54	52	55	66	71	71	72	72	72	69.1	82
29-Feb	71	70	70	70	69	69	69	69	71	68	59	56	53	50	48	48	49	55	68	72	76	81	84	85	65.9	85
82.7 83.2 83.5 83.5 83.3 83.1 82.8 82.9 82.7 80.4 77.2 74.7 72.7 71.6 70.9 71.1 72.8 78.3 82.0 82.9 82.1 81.4 82.4 82.9																		Diurnal Average								
92 93 94 94 94 94 94 93 95 96 96 94 92 92 92 93 93 95 95 94 93 93 92 92																		Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - February 2016





Maximum Speed: 15 km/h on Feb 9 20:00 Maximum Daily Speed Average: 8.1 km/h on Feb 10		Hours in Service: 696 Hours of Data: 678 Hours of Missing Data: 18 Percent Operational Time: 97.4																									
Minimum Speed Value: 0 km/h on Feb 21 03:00 Maximum Diurnal Speed Average: 2.5 km/h at hour 14 Monthly Average Velocity: 1.6 km/h 18.2 deg		Minimum Daily Speed Average: 0.4 km/h on Feb 8 Minimum Diurnal Speed Average: 1.0 km/h at hour 8 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 13																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	WSW1	SW1	AF	AF	WSW0	SW1	WSW2	WSW1	AF	NNW0	SSE0	SE2	ESE3	SSE3	S4	S3	S1	SW1	WSW1	SW2	W1	W2	W1	SW1	SSW1.0	S4	
2-Feb	W1	SSW1	N1	SSW0	S1	WNW0	SSW0	SSW2	SSW1	SE1	SE2	SSE4	SE3	ESE3	NNE5	N7	N8	N8	N6	N6	N6	N5	N3	NNW2	N1.9	N8	
3-Feb	N4	N3	N2	NNE1	N0	WSW1	SW1	WSW1	WSW1	WSW0	SE2	SSE3	SSE2	SE3	ENE1	NNE4	NNE5	N4	N6	NNE7	NNE7	NNE7	N6	N5	NNE2.3	NNE7	
4-Feb	N6	N5	N4	N4	N3	N4	N4	N4	N4	N4	N3	NNE2	S2	SE3	SE2	ENE2	NNE4	NNE4	N3	NNW1	NW1	W0	SW1	SSW2	N2.1	N6	
5-Feb	SSW1	S2	SSW2	S2	S1	SSE1	S1	NNW0	WNW0	N1	S3	SSE4	SSE4	SSE5	SSE4	S6	SSE5	S2	SSW4	WSW3	S2	SSW1	SSW0	SW2	S2.0	S6	
6-Feb	SSW2	SSE1	S1	WSW1	SE0	S1	SSE3	SSE3	S3	S3	SW4	N12	NNE14	NNE11	NNE9	N9	N5	N4	NE3	NNE3	NE3	NE2	WSW1	WSW1	NNE2.2	NNE14	
7-Feb	WSW1	N1	N3	WNW1	SW2	SW1	SW1	AF	AF	AF	NNE3	N6	N7	N6	N7	N6	NNE4	N2	WSW1	SW2	SSW1	AF	AF	S1	N1.9	N7	
8-Feb	S0	AF	SSE0	SSE1	S3	SSE1	SSW1	S2	SSW2	ESE0	SSE2	SSE3	NE2	NE4	NNE5	NNE4	N2	NNW0	NW1	NNW2	NNW0	SSW1	SSW1	N1	ENE0.4	NNE5	
9-Feb	SW1	SSW1	WNW1	NW1	SSW1	SSW1	NNE1	SW1	S1	S1	E1	NNE3	N2	NNE1	S2	S3	SSE2	SSE1	N9	N15	NNE12	NNE13	NNE13	NNE9	NNE2.7	N15	
10-Feb	NNE11	NNE9	NNE11	NNE12	NNE10	NNE10	NNE10	NNE9	NNE10	NNE9	NNE8	NNE8	NNE9	NNE10	NNE9	N8	N7	N5	N6	N6	N6	N5	N4	N3	NNE8.1	NNE12	
11-Feb	N3	N3	N4	N4	NNE5	N4	N4	N4	N4	N5	N6	NNE7	NNE8	NNE8	NNE8	NNE8	N6	N5	N4	W1	WNW1	WSW1	WSW2	WSW1	N4.1	NNE8	
12-Feb	WSW2	SW1	WSW1	WSW0	WSW1	NW0	N0	WSW1	N0	N1	ESE2	SSE5	S7	SSE4	SSE3	SSE5	SSE7	SSE6	SSE7	SSE7	SSE8	SSE9	SSE8	SSE7	SSE3.5	SSE9	
13-Feb	SSE7	S8	S7	S8	SSE8	S8	S7	S6	S7	S7	S7	SSE6	SSE6	SE5	SSE5	SSE5	SSE3	SW1	W2	SW2	SSW2	SSW2	SW1	SW2	S4.8	S8	
14-Feb	WSW1	WSW1	NNW2	N1	S1	SSE1	N0	NNE0	SSW0	W1	NE1	NNW1	NE1	ENE2	NE3	NNE4	NNE4	NNE4	NNE5	NNE6	NE5	NE5	NNE5	N6	NNE2.0	N6	
15-Feb	N5	N5	N6	N5	N6	N6	N6	N6	NNE5	N4	N6	NNE7	NNE7	N8	NNE9	NNE7	N6	NNE6	NNE5	NNE4	NNE4	NNE5	NNE2	NNE3	NNE2	NNE5.3	NNE9
16-Feb	N1	NNE2	NNE2	NNE1	N3	NNE1	SW1	SW1	NNE1	NNE1	NE1	ESE1	ENE3	NNE3	NNE3	NNE4	NNE6	N4	N4	NNW4	NNW4	N4	N5	N7	N2.5	N7	
17-Feb	N7	N7	N8	NNE8	N8	N10	N9	NNE10	N9	NNE8	NNE9	NNE9	M	NNE10	NE8	NNE7	NNE7	NNE8	NNE6	NNE6	NNE7	NNE6	NNE6	NNE6	NNE7.7	N10	
18-Feb	NNE7	N6	N5	N5	N6	N6	N6	N6	N5	N5	N5	NNE5	NNE4	N4	NNE2	SE2	NW1	NNE1	NE1	SE1	NE1	N7	NNE9	NNE9	NNE4.4	NNE9	
19-Feb	NNE6	NNE4	N4	NNW5	N8	NNE6	NNE3	NE1	SW1	E2	E3	NE5	NE7	NNE6	NE6	NNE7	NE5	NE3	NE5	NNE5	NE5	NNE4	NNE3	NNE1	NNE4.0	N8	
20-Feb	W2	WSW2	SW1	SW2	WSW1	SW1	SSW1	SW1	SW1	SSE2	ESE4	ESE5	SE6	SE5	SE6	SSE5	SSE4	SW2	SW3	SSW1	W1	N1	AF	AF	SSE1.6	SE6	
21-Feb	SW1	AF	W0	SW1	SSW2	S1	SSW2	S2	SSW2	SSE3	S6	S6	S6	SE5	S7	S6	SSW4	SSW3	S3	N1	NW1	W2	SW2	WSW2	S2.5	S7	
22-Feb	WSW2	WSW2	WSW2	SW1	WSW1	SW1	SSW1	SW1	SSE0	SSE2	SE4	SSE6	SSE6	SE6	SE5	SE4	SSE3	W1	W2	N3	W2	SW2	W2	WSW2	S1.4	SE6	
23-Feb	WSW1	SSW2	SW2	SSW1	SSW2	SSW2	SSW1	SSW2	S2	ENE2	ENE1	NNE5	NNE7	NNE7	NNE5	NNE6	NNE5	NNW1	WSW2	SSW2	WSW4	W4	W4	WNW6	NNW0.8	NNE7	
24-Feb	W8	W7	W8	W7	WNW0	WSW2	S0	SSW1	S2	SSE3	S4	SE4	SSE6	S8	SSW8	S7	S4	SSW3	SSW3	S3	SSW5	SSW5	SSE2	SSE3	SSW3.2	SSW8	
25-Feb	SSE3	SSW3	S3	S4	S4	S5	S4	S4	S4	SSW3	SW7	SSW7	SSW9	WSW10	WSW9	W8	W5	W3	WSW3	WSW3	WSW6	WSW5	S1	S2	SW4.0	WSW10	
26-Feb	W1	SW2	WSW1	WSW1	S2	S3	SSW1	S2	SW6	NNW1	W7	NW5	NNW8	N7	NNE10	NNE10	NNE10	NNE13	NNE12	NNE12	NNE14	NNE14	NNE12	N11	N4.9	NNE14	
27-Feb	N12	NNE13	N13	N11	N10	N10	N10	N10	N10	N9	NNE10	N9	N8	N6	NNE6	NNE5	NE2	NE2	NE2	E1	NNE1	N6	NNE8	NNE9	NNE7.6	NNE13	
28-Feb	NNE7	NNE7	NNE5	N0	WSW1	NNE8	NNE7	N7	N13	NNE13	NNE10	NNE11	NNE11	NNE11	NNE10	NNE9	NNE8	NNE6	N2	NW1	N2	NNW2	W0	SW1	NNE6.1	N13	
29-Feb	SW1	SW1	WSW0	WSW1	WSW1	WSW0	AF	AF	AF	ESE2	SE5	SE6	SE6	SE5	ESE4	SE3	SSE3	AF	SW2	S1	W1	AF	SW1	SSE1	SE1.8	SE6	
N1.7 N1.6 N1.9 N1.3 N1.2 N1.3 NNE1.3 N1.0 N1.3 NNE1.5 NE1.1 NE1.9 NE2.1 NE2.5 NE2.4 NE2.2 NNE2.2 NNE2.0 N1.7 N1.9 N1.9 N2.1 N2.2 N1.8																								Diurnal Average			
N12 NNE13 N13 NNE12 N10 N10 NNE10 N10 N13 NNE13 NNE10 N12 NNE14 NNE11 NNE10 NNE10 NNE10 NNE10 NNE13 NNE12 N15 NNE14 NNE14 NNE13 N11																								Diurnal Maximum			
M - Maintenance AF - Analyzer Failure All monthly, daily, and diurnal averages have been calculated using vector methods																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

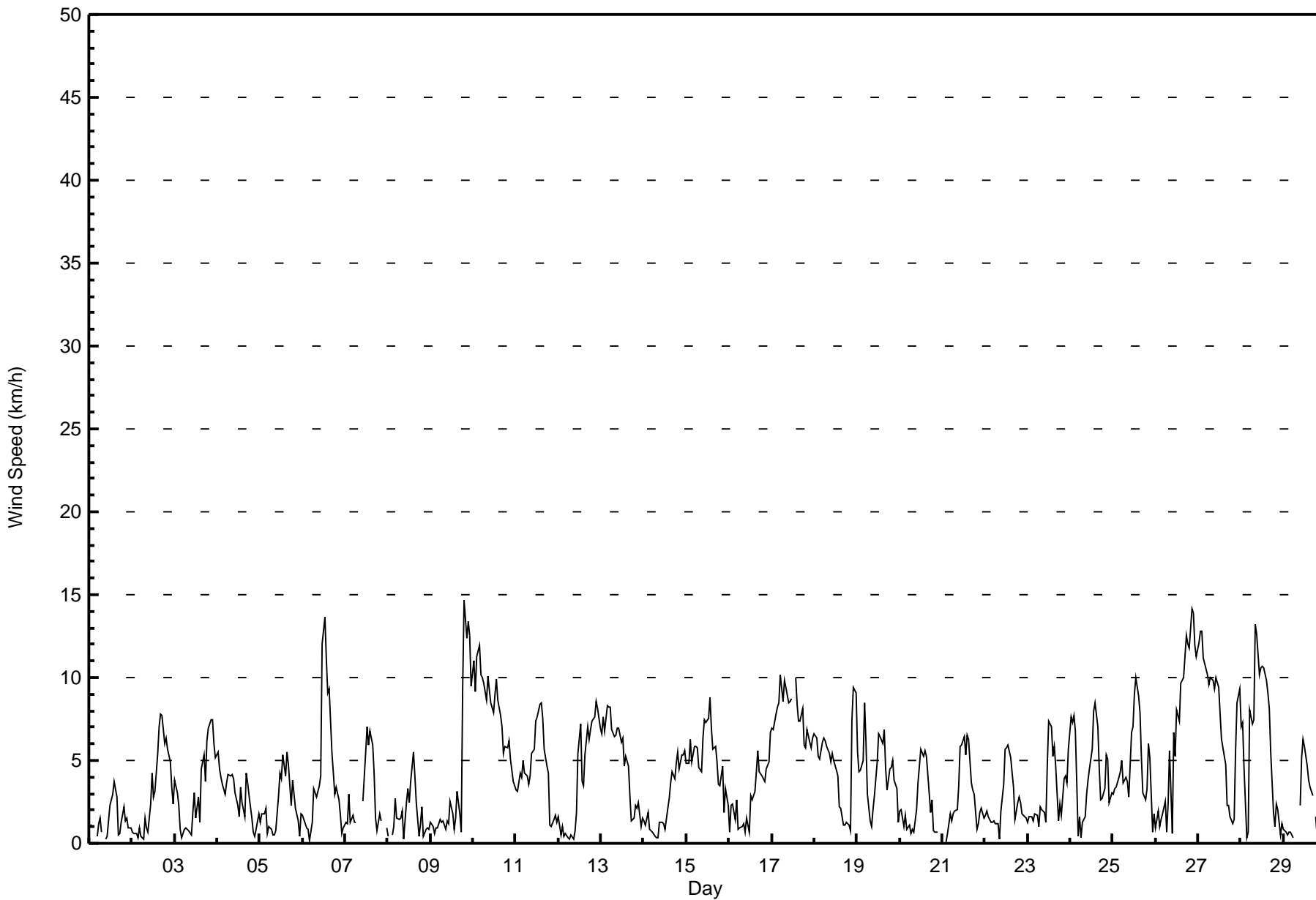
Wind Speed (WS) - km/h
Fort McKay South - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 6 12:00 Minimum Value: 0 km/h on Feb 21 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: 696 Hours of Data: 678 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.4								
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	1	AF	AF	1	1	1	1	AF	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2
2-Feb	1	1	1	1	1	1	1	1	1	1	1	2	1	1	3	2	2	3	2	2	2	2	1	1	3
3-Feb	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	2	2	2	3	2	2	3
4-Feb	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0	2
5-Feb	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	2
6-Feb	1	1	1	1	1	1	1	2	1	1	2	6	5	4	3	3	2	1	1	1	1	1	1	1	6
7-Feb	1	2	1	1	1	1	1	AF	AF	AF	1	2	2	2	2	2	1	1	1	1	1	AF	AF	1	2
8-Feb	1	AF	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2
9-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	5	5	5	5	5	3	5
10-Feb	4	3	4	4	4	4	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	1	4
11-Feb	1	1	1	1	2	2	2	1	1	2	2	2	2	3	2	2	2	1	2	1	1	1	1	1	3
12-Feb	1	1	1	1	1	1	1	1	1	1	2	3	3	2	1	2	3	2	3	3	3	4	3	3	4
13-Feb	3	3	2	3	3	3	3	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	3
14-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
15-Feb	2	1	2	1	2	2	2	2	2	2	2	2	3	2	2	2	2	2	1	1	1	1	1	1	3
16-Feb	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	2	2	2
17-Feb	2	2	2	3	3	3	3	3	3	3	3	3	M	3	3	3	2	3	2	2	2	2	2	2	3
18-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	4	3	3	4
19-Feb	2	2	2	2	3	2	2	1	1	1	1	1	2	2	2	2	2	1	2	2	2	1	1	1	3
20-Feb	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	AF	AF	2	
21-Feb	1	AF	1	1	0	1	1	1	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	2
22-Feb	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	2
23-Feb	1	1	1	1	1	1	1	2	1	1	2	1	2	2	2	2	2	2	1	1	1	1	1	3	3
24-Feb	3	2	2	2	2	1	1	1	1	1	2	2	2	3	3	2	1	1	0	1	2	2	1	1	3
25-Feb	1	1	1	1	1	1	1	1	1	2	3	3	3	4	4	3	2	1	1	1	2	3	1	1	4
26-Feb	1	1	1	1	1	1	1	2	2	1	3	3	3	3	3	3	4	4	4	4	4	5	4	4	5
27-Feb	4	4	4	4	3	3	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	3	3	3	4
28-Feb	3	3	2	1	1	4	3	3	5	5	4	4	3	3	4	3	3	2	1	1	1	1	1	1	5
29-Feb	1	1	1	1	1	1	AF	AF	AF	1	2	2	2	2	2	1	1	AF	1	1	1	AF	1	1	2
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	467	68.88	68.88
6 - 11	193	28.47	97.35
12 - 19	18	2.65	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: 678

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - February 2016**

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	70	57	22	6	4	9	21	42	47	46	44	48	22	6	8	15	467
6 - 11	60	76	3	0	0	0	5	15	18	3	2	3	6	1	0	1	193
12 - 19	5	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
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	135	146	25	6	4	9	26	57	65	49	46	51	28	7	8	16	678

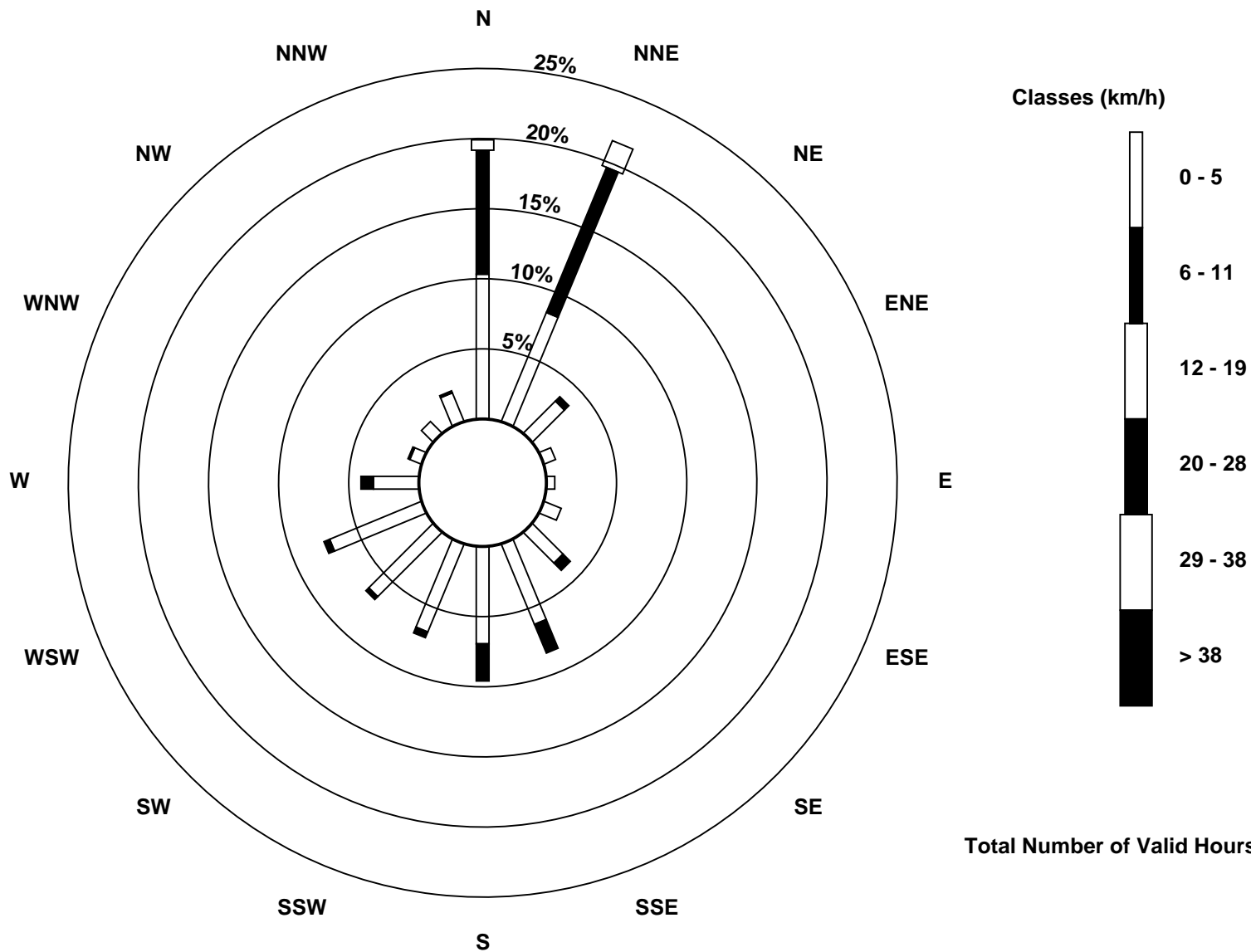
Total Number of Valid Hours: 678

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Fort McKay South (AMS 13)



Total Number of Valid Hours: 678



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay South - February 2016

Direction of Maximum Speed: 7 deg on Feb 9 20:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 14.0 deg on Feb 10	Hours of Data: 678
Direction of Minimum Speed: 279 deg on Feb 21 03:00	Hours of Missing Data: 18
Direction of Minimum Daily Speed Average: 0.4 deg on Feb 8	Percent Operational Time: 97.4
Monthly Average Direction: 235.4 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	240	229	AF	AF	242	232	237	255	AF	328	147	142	117	152	179	175	185	219	246	232	261	264	270	222	200.2
2-Feb	269	197	350	195	182	284	201	197	194	125	141	147	132	102	12	3	2	359	355	10	359	355	357	346	10.9
3-Feb	10	3	358	17	360	251	232	237	242	240	125	162	166	137	71	22	13	355	9	12	19	15	5	8	15.1
4-Feb	9	4	7	9	359	351	357	0	5	2	11	22	170	130	136	73	22	15	358	337	321	280	230	213	9.9
5-Feb	201	187	194	184	173	167	191	329	303	8	176	148	161	166	147	173	165	178	195	247	187	198	204	216	177.7
6-Feb	198	158	178	244	139	187	149	168	185	182	219	3	18	15	13	1	359	3	39	25	48	52	245	248	15.2
7-Feb	257	9	1	285	235	216	230	AF	AF	AF	21	7	9	10	4	5	12	4	237	230	192	AF	AF	176	357.5
8-Feb	186	AF	161	168	173	150	200	190	195	110	151	150	53	38	24	12	9	339	325	348	337	213	204	359	68.5
9-Feb	234	207	297	316	193	198	15	216	184	171	99	17	353	13	187	181	163	164	10	7	13	20	14	15	13.5
10-Feb	13	16	15	24	24	17	23	18	14	15	13	17	20	14	15	9	5	359	7	11	10	358	356	1	14.0
11-Feb	359	359	5	8	16	5	7	0	355	360	8	19	16	20	14	15	5	360	354	279	300	249	247	247	5.1
12-Feb	240	235	245	240	251	308	350	258	1	357	113	163	172	168	161	156	158	166	162	162	164	168	167	168	166.6
13-Feb	168	169	174	169	167	169	170	169	170	173	170	164	167	144	157	159	149	235	260	226	213	213	225	232	171.8
14-Feb	250	245	330	2	177	164	1	26	201	278	49	344	50	59	41	33	28	28	30	21	35	35	12	7	22.5
15-Feb	6	4	11	2	3	9	10	22	7	10	14	13	11	18	19	9	16	21	12	27	23	20	28	16	13.3
16-Feb	350	24	31	28	1	32	229	231	18	24	50	117	57	20	16	31	19	11	1	345	343	351	355	358	9.5
17-Feb	2	359	4	12	6	10	10	13	9	23	18	17	M	27	34	33	28	23	26	20	15	22	21	17	16.7
18-Feb	13	11	11	4	4	6	8	4	1	351	2	18	23	358	26	140	324	28	55	140	44	7	21	27	12.0
19-Feb	31	20	356	332	11	12	23	40	229	98	93	51	42	27	36	31	36	41	39	30	34	28	33	24	28.4
20-Feb	268	248	230	236	246	234	202	231	216	158	111	123	132	135	139	158	149	221	236	200	265	11	AF	AF	162.7
21-Feb	222	AF	279	221	209	173	198	185	201	153	189	184	173	137	174	185	196	196	189	4	324	260	230	254	186.2
22-Feb	258	242	242	232	251	226	212	232	160	156	129	149	161	136	129	132	156	264	260	351	260	236	259	238	179.1
23-Feb	237	210	217	212	198	212	208	210	184	76	77	32	26	33	33	22	31	335	240	198	256	265	279	285	338.9
24-Feb	277	272	269	266	297	247	183	208	179	152	187	144	162	187	195	186	186	200	195	181	195	192	166	154	205.4
25-Feb	163	193	191	184	182	191	177	182	180	196	234	211	200	245	250	260	276	259	240	240	255	250	185	191	221.6
26-Feb	267	226	245	239	187	178	213	179	230	333	276	312	346	358	24	30	29	26	24	23	23	17	15	8	10.3
27-Feb	9	12	9	8	6	9	9	10	9	8	18	11	5	11	25	17	55	54	46	99	17	9	14	14	12.3
28-Feb	17	18	16	355	242	15	12	8	9	14	20	26	23	12	31	24	19	12	4	304	1	328	277	229	15.4
29-Feb	227	229	246	241	248	241	AF	AF	AF	116	125	131	133	125	121	133	154	AF	222	173	275	AF	217	164	141.6
351.9 355.3 355.6 350.7 7.4 8.4 12.9 9.5 2.1 28.8 47.8 52.8 55.4 44.5 44.1 37.1 29.4 11.8 6.7 8.0 4.9 2.1 7.2 2.1																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

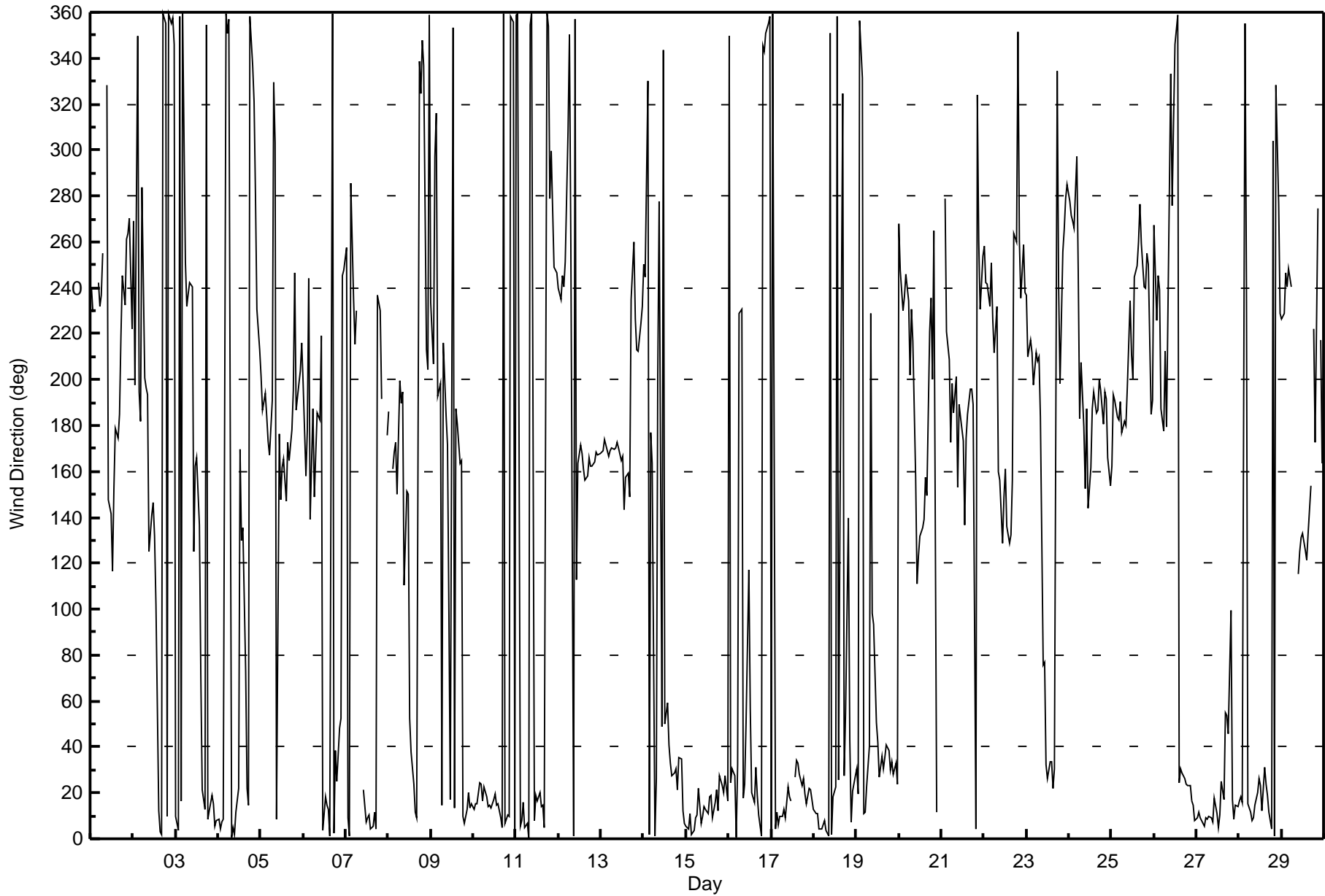
Wind Direction (WD) - deg
Fort McKay South - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 696
Maximum Value: 109 deg on Feb 26 10:00	Hours of Data: 678
Minimum Value: 7 deg on Feb 29 06:00	Hours of Missing Data: 18
Percentiles: P ₁ = 13 P ₁₀ = 21 Q ₁ = 24 Median = 29 Q ₃ = 46 P ₉₀ = 69 P ₉₉ = 93	Hours of Calibration: 0
	Percent Operational Time: 97.4

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	35	8	AF	AF	53	42	30	55	AF	51	93	47	40	43	38	49	93	68	12	16	61	32	45	56	93
2-Feb	57	73	63	77	19	66	80	22	60	80	42	29	32	37	32	27	24	25	30	23	24	24	24	32	80
3-Feb	21	24	28	82	91	35	63	53	60	21	80	54	75	36	77	25	23	26	23	24	23	24	24	24	91
4-Feb	25	24	23	26	26	23	29	25	25	30	37	64	56	44	41	52	20	26	23	31	37	57	50	20	64
5-Feb	56	24	21	18	29	42	66	55	78	70	37	32	34	29	42	31	33	39	22	61	33	74	91	19	91
6-Feb	24	57	82	86	93	77	32	36	22	36	37	50	26	24	23	26	27	25	25	27	35	34	67	40	93
7-Feb	60	68	24	49	37	33	62	AF	AF	AF	29	25	25	27	25	25	19	26	46	43	20	AF	AF	19	68
8-Feb	86	AF	55	68	57	81	73	27	22	96	32	37	75	30	21	21	38	70	49	22	82	50	38	67	96
9-Feb	60	77	79	45	69	33	72	23	64	58	57	27	34	71	74	26	31	75	22	26	23	25	23	26	79
10-Feb	26	25	24	24	26	25	25	27	26	25	26	25	23	25	25	24	26	23	23	23	24	23	24	20	27
11-Feb	19	22	22	25	19	24	22	25	25	26	27	22	23	21	24	21	21	16	28	56	53	43	22	37	56
12-Feb	20	73	48	71	47	49	74	51	40	23	48	37	31	42	29	31	28	28	27	28	28	27	30	31	74
13-Feb	29	25	27	28	27	27	26	25	26	28	24	27	28	32	33	29	35	73	56	18	26	33	71	34	73
14-Feb	43	62	52	78	69	67	61	78	81	53	78	75	81	51	44	31	27	22	27	29	29	27	24	23	81
15-Feb	24	24	21	24	23	23	21	23	26	23	24	26	25	25	26	26	24	22	27	31	23	53	25	41	53
16-Feb	61	29	32	49	37	72	54	87	69	91	41	80	50	45	38	24	19	23	21	26	29	23	24	25	91
17-Feb	24	25	24	24	25	23	24	26	23	25	27	29	M	27	28	28	27	26	27	25	22	23	24	24	29
18-Feb	23	21	23	22	24	21	25	24	26	29	26	24	24	25	54	32	85	62	35	51	69	30	26	27	85
19-Feb	27	26	34	30	24	26	21	52	62	39	47	36	32	33	34	32	37	38	34	25	29	24	28	57	62
20-Feb	22	16	43	37	47	38	65	21	55	27	29	31	38	41	35	38	32	30	12	59	78	29	AF	AF	78
21-Feb	18	AF	88	67	21	13	22	16	23	27	35	38	30	30	32	24	19	20	34	96	64	41	26	31	96
22-Feb	45	15	40	40	44	44	20	49	95	41	30	32	38	29	32	30	35	32	48	47	48	81	73	60	95
23-Feb	56	50	45	43	36	41	73	62	30	49	83	25	26	32	36	27	28	58	23	40	13	19	22	30	83
24-Feb	25	21	20	20	85	61	84	36	48	40	53	40	37	29	25	23	19	14	12	10	13	16	17	26	85
25-Feb	25	19	18	14	18	18	19	17	27	68	35	34	26	33	33	30	37	24	17	29	27	70	68	61	70
26-Feb	77	30	47	45	47	33	86	67	48	109	38	62	34	36	27	27	28	25	27	26	26	24	23	25	109
27-Feb	25	25	25	25	25	23	21	23	25	25	24	25	31	32	33	34	46	34	44	53	75	24	23	23	75
28-Feb	25	25	21	74	63	23	20	22	24	26	28	27	29	29	31	28	25	21	32	42	29	16	44	17	74
29-Feb	13	22	56	36	45	7	AF	AF	AF	35	25	30	40	45	40	38	31	AF	22	90	27	AF	53	52	90
	86	77	88	86	93	81	86	87	95	109	93	80	81	71	77	52	93	75	56	96	82	81	91	67	

Diurnal Maximum

M - Maintenance AF - Analyzer Failure





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 16, 2016	Last Calibration	January 12, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:07
Gas Cert Reference	LL110515	Station temp.	22 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	08/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		HVPS voltage	547	547
Analyzer IP address	192.168.1.44		Lamp voltage	1644	1604
Calculated slope	1.001898	0.998095	Box temp	30.7	30.8
Calculated intercept	2.095355	1.947014	Pressure	26.0	26.0
Analyzer Background	42.1	42.1	Flow	680	680
Analyzer Coefficient	0.953	0.965	Lamp Ratio	56	54

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	776.6	1.012
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.9	785.8	786.5	0.999
second point	5000	39.4	392.4	389.7	1.007
third point	5000	19.7	196.2	193.2	1.016
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.9	785.8	780.2	1.007
Average Correction Factor					1.007

Corrected As found 776.7 Previous response 782.3 % change 0.7%

Notes:

No maintenance done, filter changed out, span adjusted

Calibration Performed By: Melissa Lemay



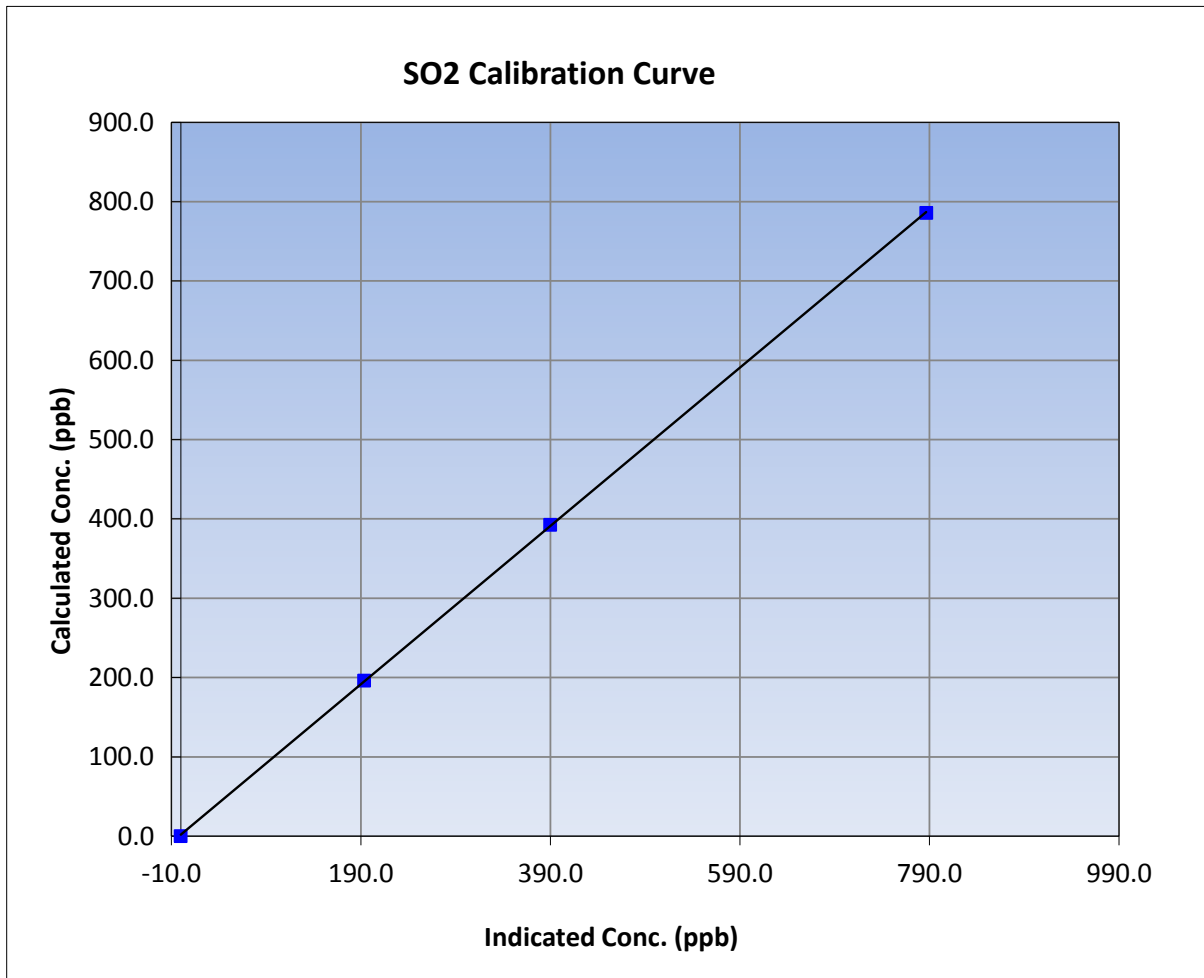
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 12, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:07
Analyzer make	API T100	Analyzer serial #	599

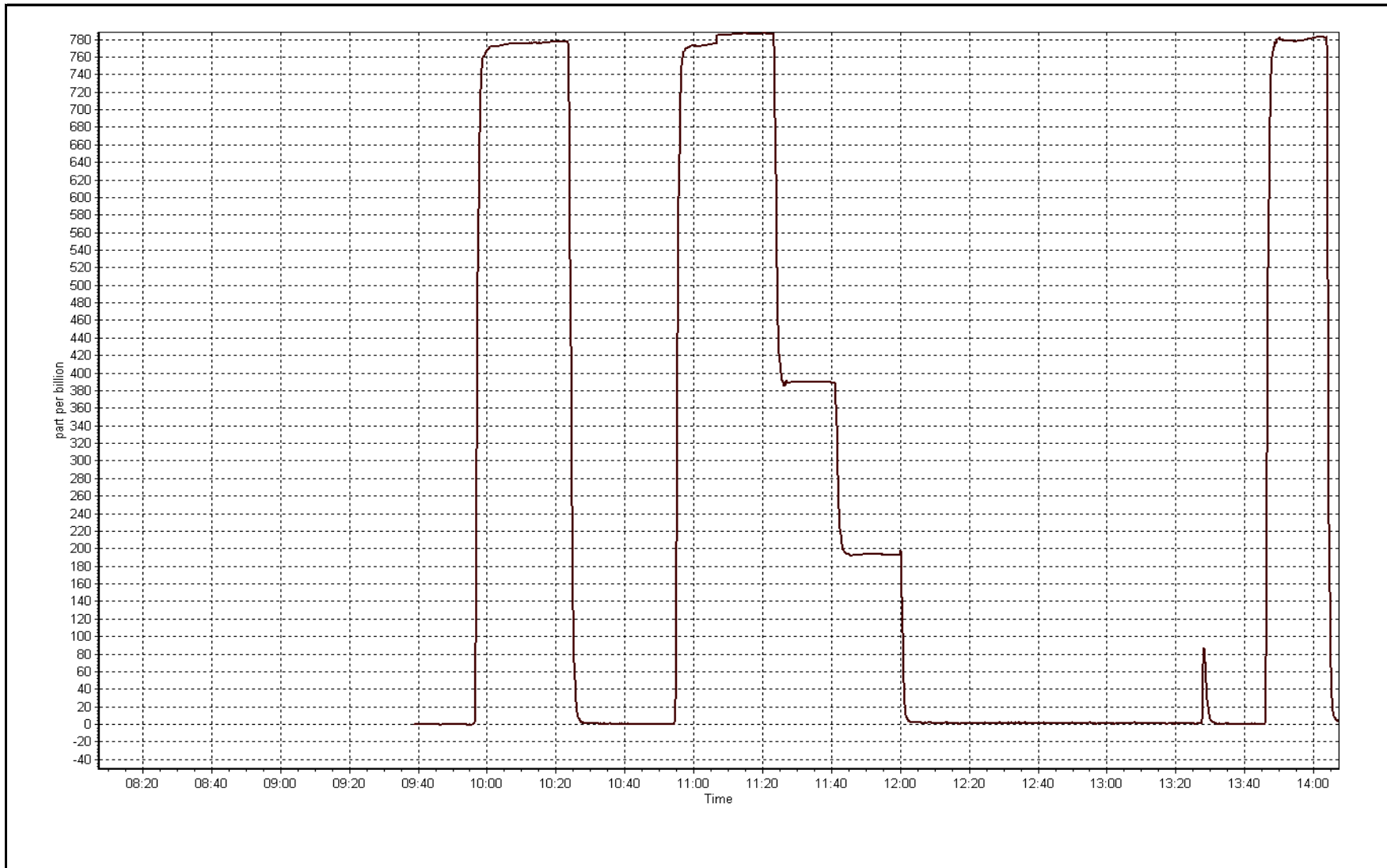
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999973
785.8	786.5	0.9992		
392.4	389.7	1.0070	Slope	0.998095
196.2	193.2	1.0156		
			Intercept	1.947014



SO2 Calibration Plot

Date: February 16, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 8, 2016	Last Calibration	January 14, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	14:08
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	30/05/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	S980455A 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-727
Analyzer IP address	192.168.1.44		Lamp voltage	1007	1009
Calculated slope	0.989627	0.981667	Chamber temp	45	45
Calculated intercept	0.548938	0.354708	Pressure	690.2	697.1
Analyzer Background	2.13	2.13	Flow	0.450	0.453
Analyzer Coefficient	1.038	1.038	Intensity	90	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	78.9	80.0	81.3	0.984
SO2 scrubber check	5000	17.6	179.9	0.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.9	80.0	81.3	0.984
second point	5000	39.4	40.0	40.1	0.996
third point	5000	19.7	20.0	19.8	1.009
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	78.9	80.0	81.3	0.984
Average Correction Factor					0.996

Corrected As found	81.4	Previous response	80.3	% change	-1.4%
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Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



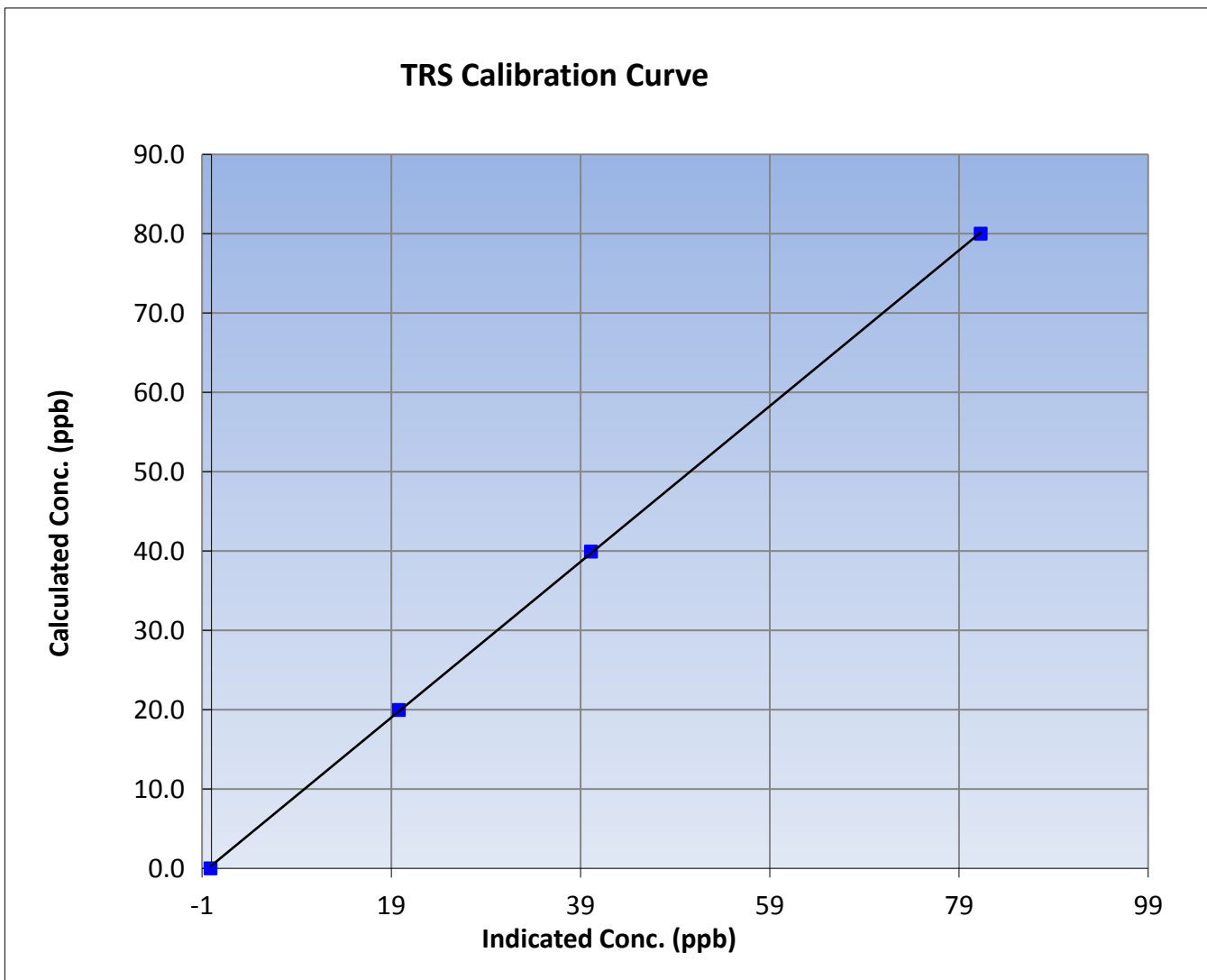
Wood Buffalo Environmental Association TRS Calibration Report

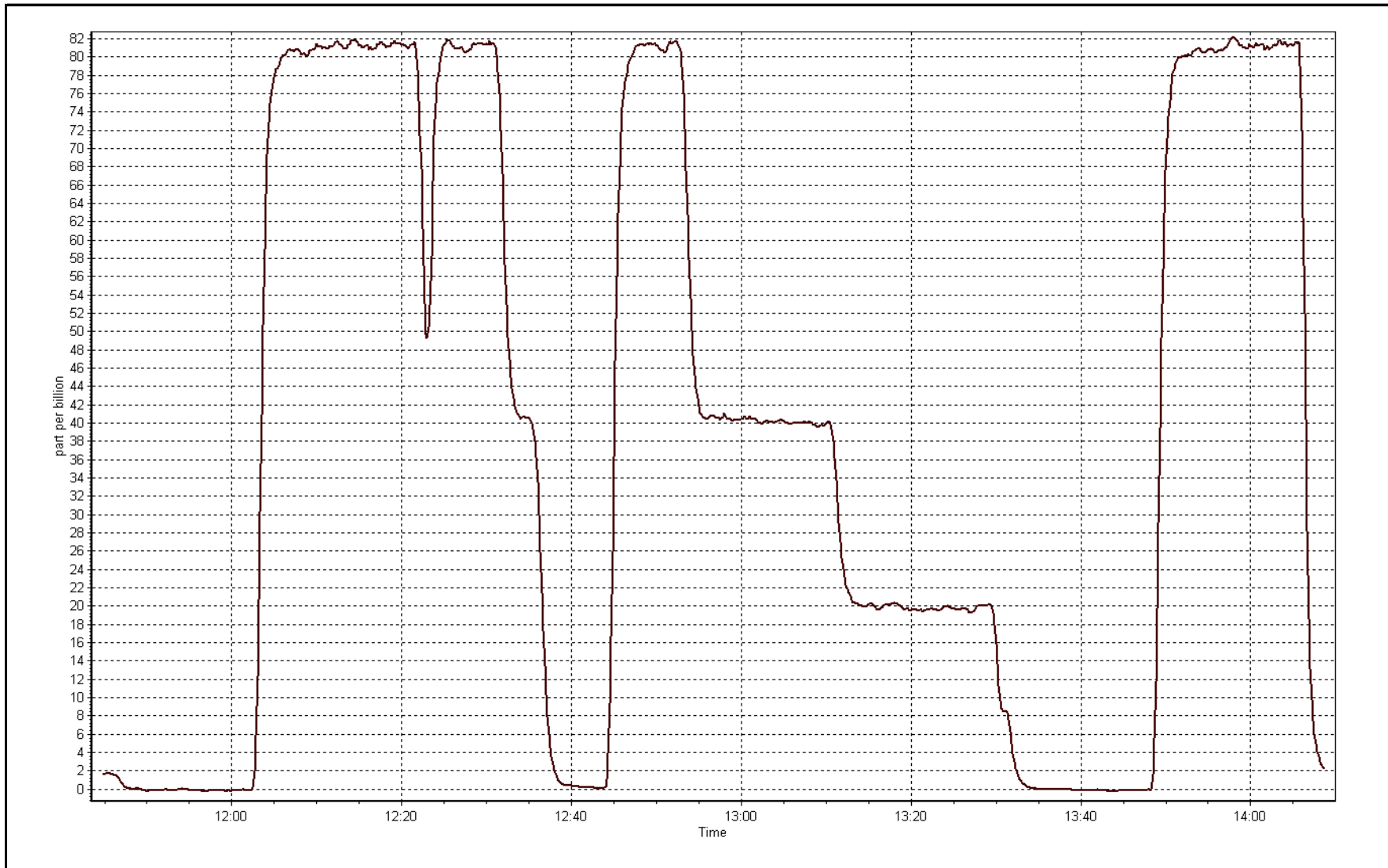
Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 14, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:45	End Time (MST)	14:08
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	0.999949
80.0	81.3	0.9841		
40.0	40.1	0.9963	Slope	0.981667
20.0	19.8	1.0089		
			Intercept	0.354708







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-16-16	Last Calibration	January-12-16
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:07
Gas Cert Reference	LL110515	Cal Gas Expiry Date	08/09/2018
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	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.2	34.2
Calculated slope	0.998432	0.996770	Fuel Pressure	23.1	23.1
Calculated intercept	0.043792	0.055973	Analyzer Coeff	3.104	3.104
			Analyzer BKG	1.300	1.300

Analyzer make	51i-LT	Analyzer serial #	1505164380
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.01	----
as found span	5000	78.9	16.84	16.91	0.996
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.9	16.84	16.87	0.998
second point	5000	39.4	8.41	8.33	1.009
third point	5000	19.7	4.20	4.12	1.020
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	78.9	16.84	16.92	0.995
Average Correction Factor					1.009

Corrected As found	16.92	Previous response	16.82	% change	-0.6%
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Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

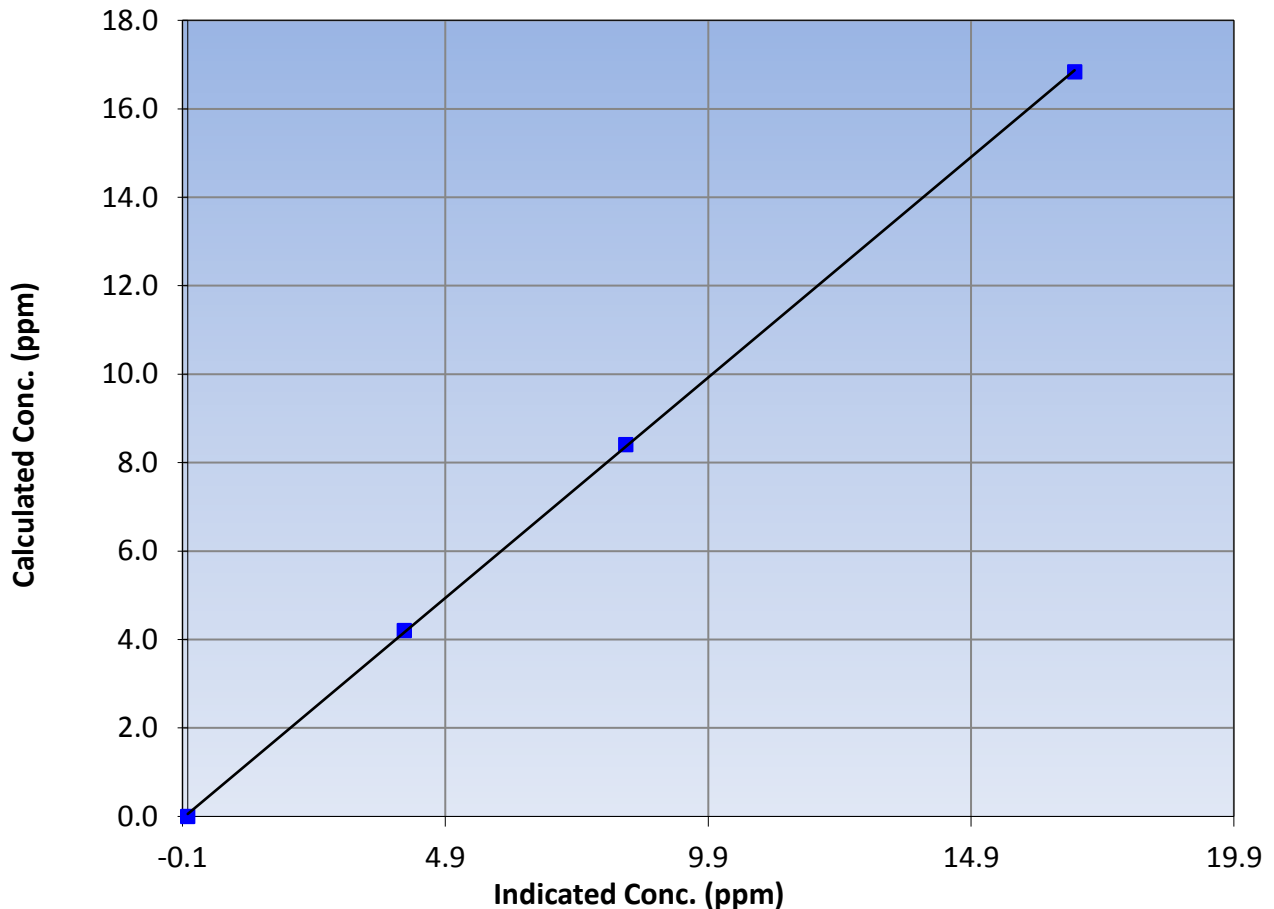
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 12, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:07
Analyzer make	51i-LT	Analyzer serial #	1505164380

Calibration Data

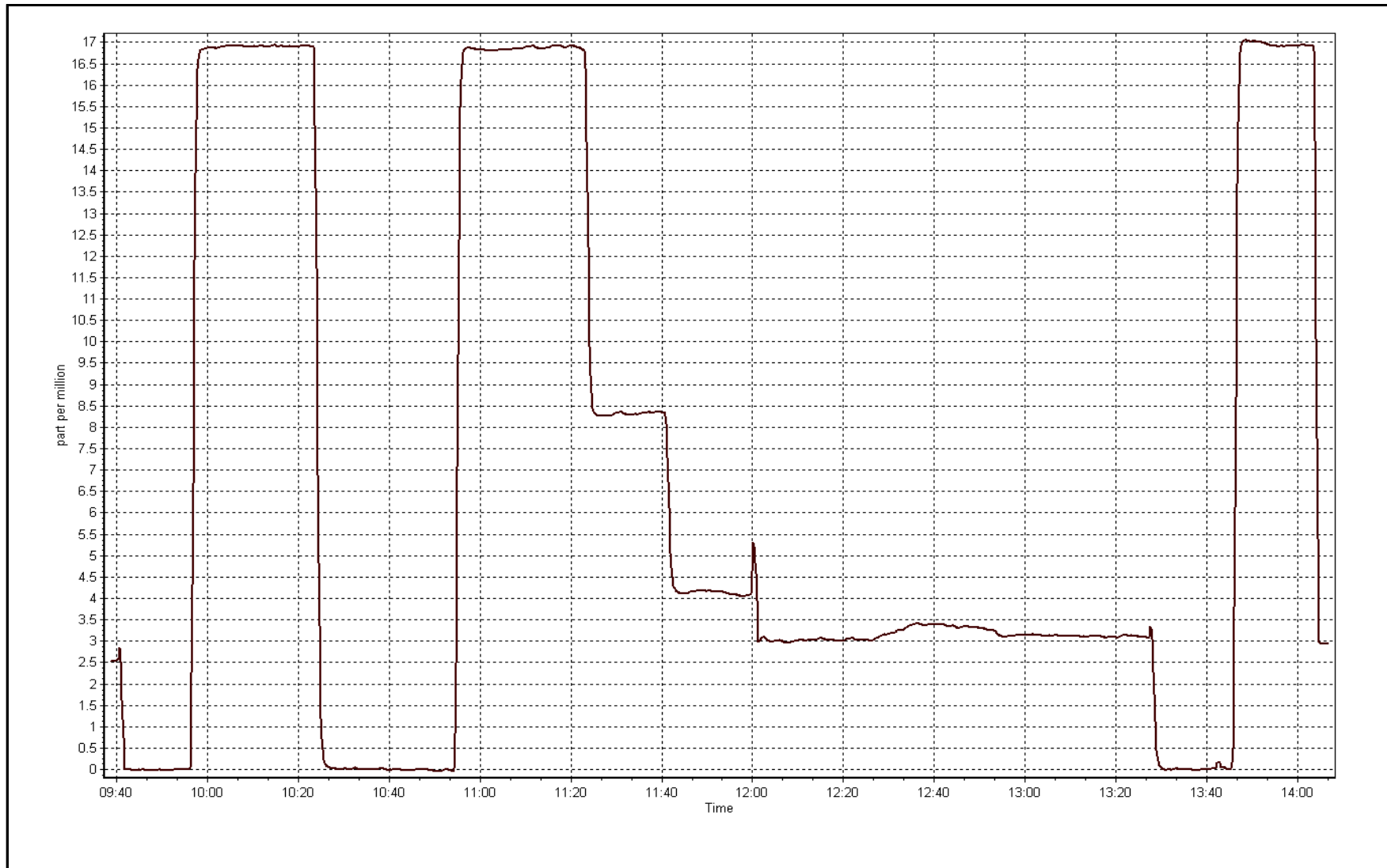
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999946
16.84	16.87	0.9981		
8.41	8.33	1.0094	Slope	0.996770
4.20	4.12	1.0204		
			Intercept	0.055973

THC Calibration Curve



THC Calibration Plot

Date: February 16, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 13, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	11:19
NO2 GPT Ref date	February-17-15	Transfer Standard	Sabio 4010
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11041107
DACS make/model	Campbell Scientific CR3000	Serial Number	3410
		Serial Number	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	24.8	26.5
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.012761	0.998026	Pressure	26.4	26.5
Calculated intercept	-0.508394	-1.117429	Flow	744.0	749.0
Analyzer Background	0.2	0.8	Intensity	2625.5	2593.0
Analyzer Coefficient	1.009	1.011			

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	0.9	----
as found span	5000	0.89	351.8	353.8	0.994
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	0.89	351.8	353.3	0.996
second point	5000	0.47	208.7	210.1	0.993
third point	5000	0.36	107.5	110.1	0.976
as left zero	5000	0.00	0.0	0.7	----
as left span	5000	0.89	351.8	359.7	0.978
Average Correction Factor					0.988

Corrected As found	352.9	Previous response	347.9	% change	-1.4%
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Notes:

Zero adjusted, no maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



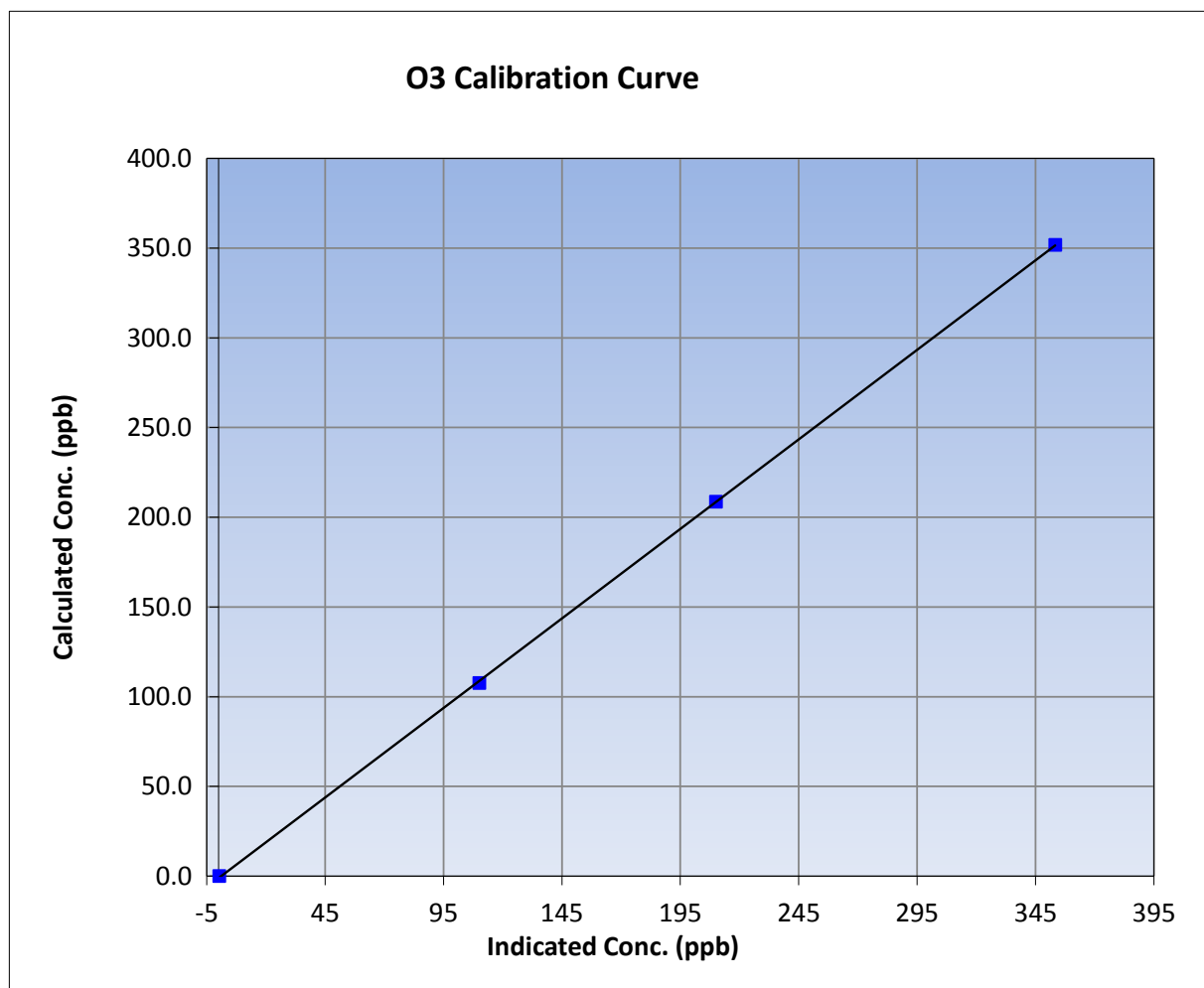
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-17-16	Previous Calibration	January 13, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:45	End Time (MST)	11:19
Analyzer make	API T400	Analyzer serial #	825

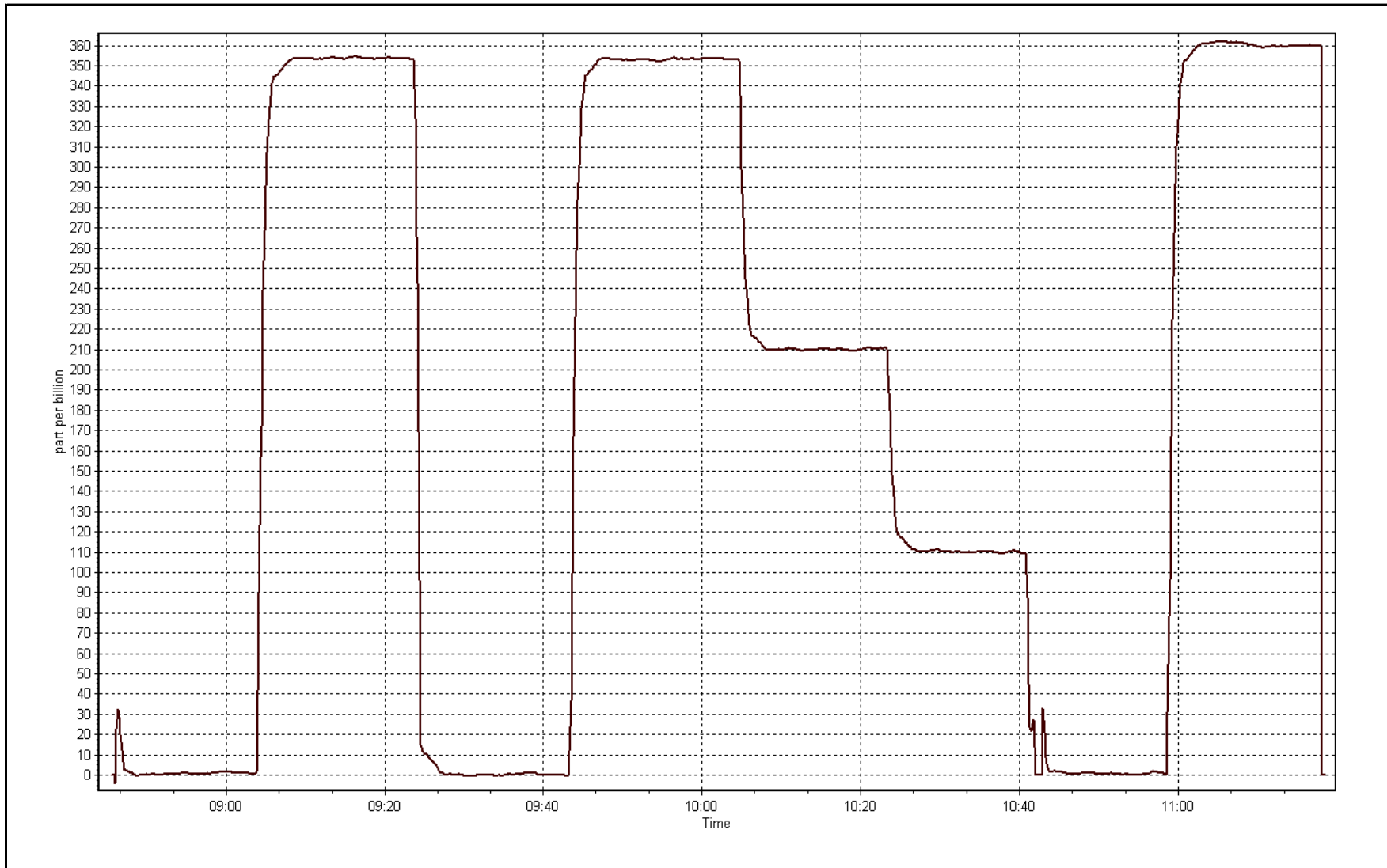
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999965
351.8	353.3	0.9958		
208.7	210.1	0.9933	Slope	0.998026
107.5	110.1	0.9764		
			Intercept	-1.117429



O3 Calibration Plot

Date: February 17, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 12, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:06
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL110515
NOX Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	08/09/2018
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.	1850
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998418	0.998704	1.000380
	Data Offset	1.948488	1.964085	0.304547
Current Calibration	Data Slope	0.997669	0.996970	1.001444
	Data Offset	1.362468	1.396515	-1.103867

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	0.848		1.007	
NOX coefficient	1.003		1.002	
NO2 coefficient	0.998		1.000	
NO bkgrnd	7.5		7.6	
NOX bkgrnd	7.7		7.7	
Chamber Temp	50.2	Deg C	50.6	Deg C
Moly Temp	323.9	Deg C	324.7	Deg C
PMT voltage	-846.2	V	-827.3	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	181.2	mmHg	177.9	mmHg
R Cell Press Nox	181.2	mmHg	177.9	mmHg
NO sample flow	0.87	lpm	0.896	lpm
Nox sample Flow	0.870	lpm	0.896	lpm

Notes:

Pump and charcoal changed out, Factory calibration done, Zero and span adjusted



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 16, 2016

Station Number:

AMS 13

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	0.0	----	----
as found span	5000	78.9	803.2	800.0	3.2	799.4	795.3	4.1	1.0048	1.0060
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.1	----	----
high point	5000	78.9	803.2	800.0	3.2	804.6	802.0	3.0	0.9983	0.9976
second point	5000	39.4	401.1	399.5	1.6	399.2	397.8	1.4	1.0047	1.0043
third point	5000	19.7	200.5	199.8	0.8	199.0	198.3	0.7	1.0078	1.0074
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.2	----	----
as left span	5000	78.9	803.2	452.6	350.6	819.8	458.2	361.6	0.9798	0.9878
Average Correction Factor									1.0036	1.0031

Corrected As found
Previous Response

NO_x= 799.7
NO_x= 802.5

NO= 795.5
NO= 799.1

Percent Change

NO_x= 0.4%

NO= 0.5%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.90 ccm NOx ref calc conc = 803.2 ppb NO ref calc conc = 800.0 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		3.2	807.1	804.4	0.1	0.9952	0.9946	----	----
1st NO2 (300)	452.6	355.0	807.6	452.6	355.1	0.9946	----	0.9996	100.0%
2nd NO2 (200)	595.7	211.9	808.3	595.7	212.6	0.9937	----	0.9965	100.4%
3rd NO2 (100)	696.9	110.7	810.1	696.9	113.1	0.9915	----	0.9784	102.2%
2nd NO ref point		3.2	810.8	808.2	2.7	0.9906	0.9899	----	----
Average Correction Factor						0.9926		0.9915	100.9%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

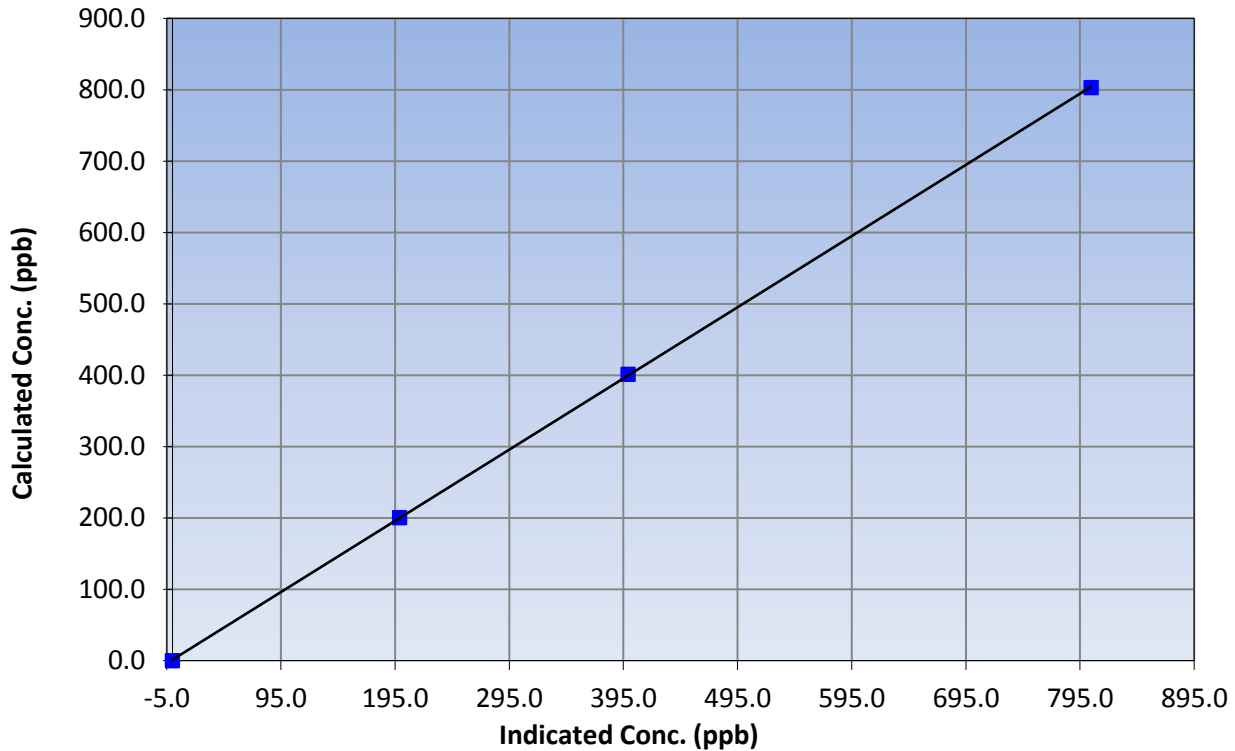
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 12, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:06
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	----	Correlation Coefficient	0.999986
803.2	804.6	0.9983		
401.1	399.2	1.0047	Slope	0.997669
200.5	199.0	1.0078		
			Intercept	1.362468

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

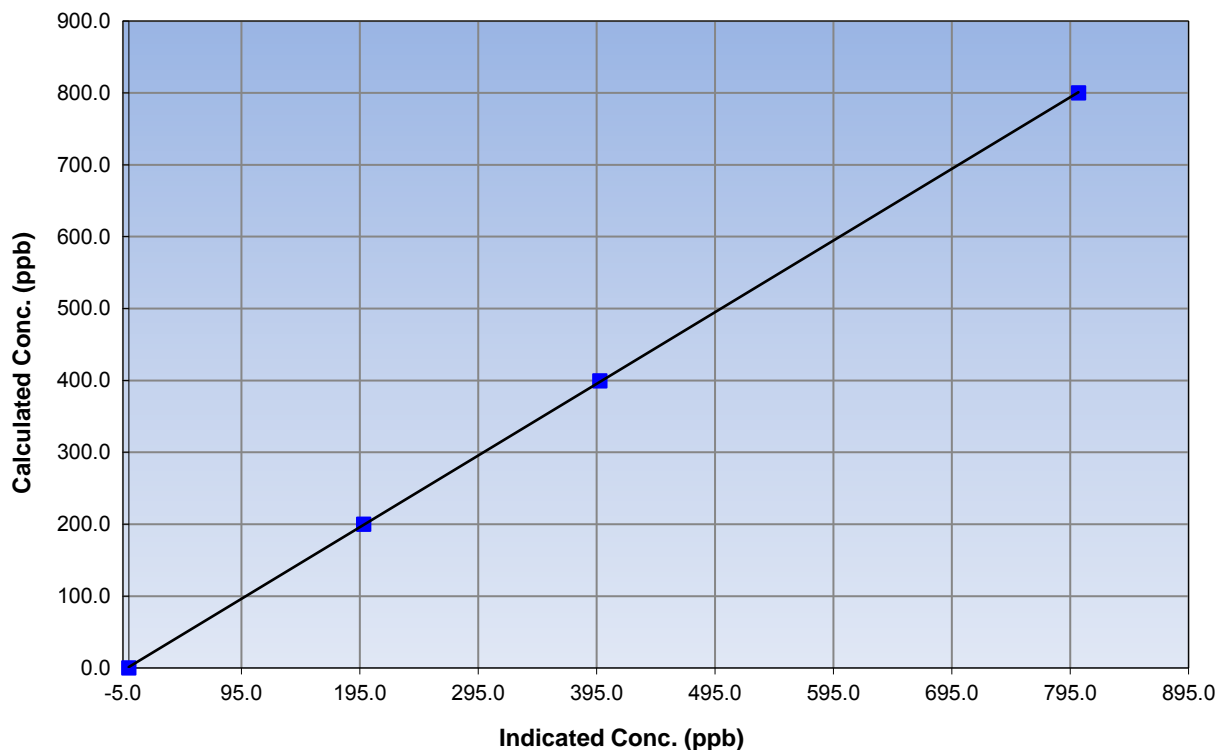
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 12, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:06
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	0.999985
800.0	802.0	0.9976		
399.5	397.8	1.0043	Slope	0.996970
199.8	198.3	1.0074		
			Intercept	1.396515

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

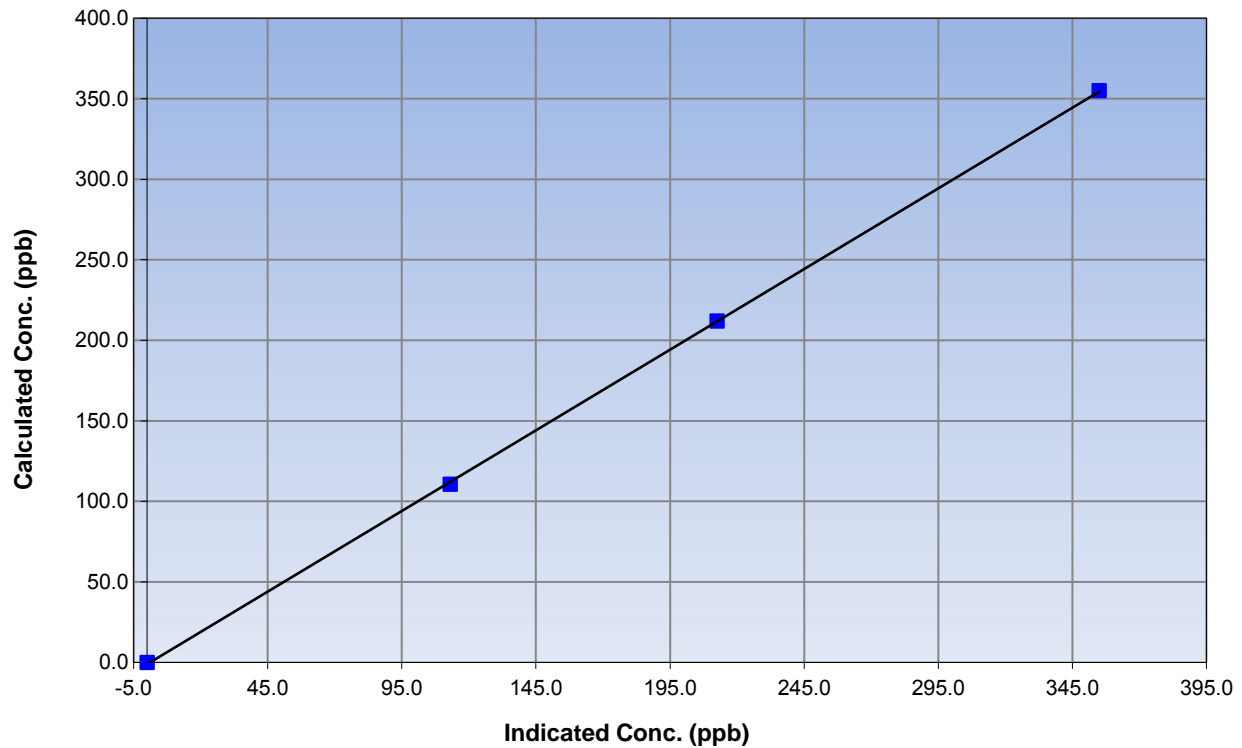
Station Information

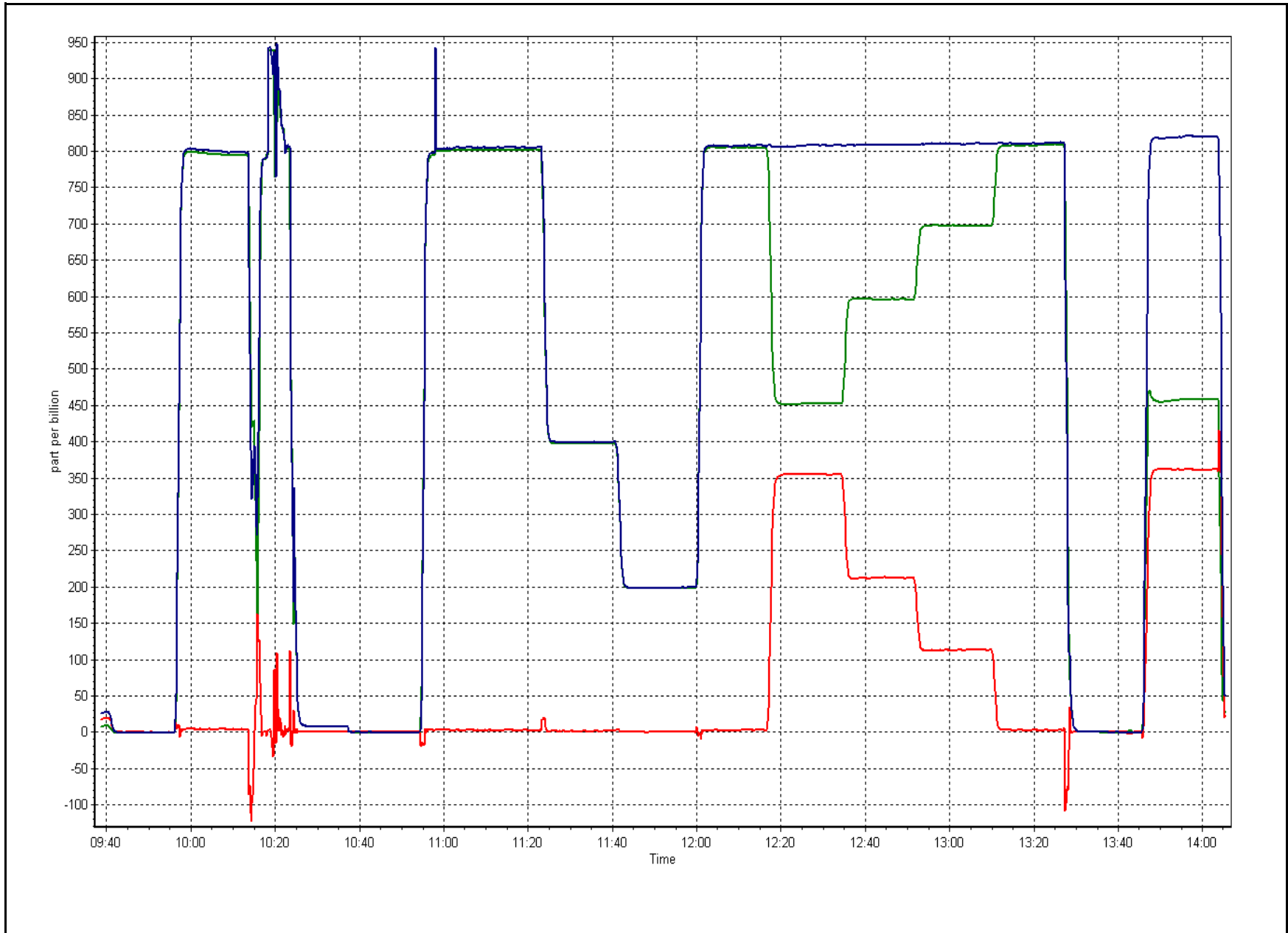
Calibration Date	February 16, 2016	Previous Calibration	January 12, 2016
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	14:06
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999949
355.0	355.1	0.9996		
211.9	212.6	0.9965	Slope	1.001444
110.7	113.1	0.9784		
			Intercept	-1.103867

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	February 17, 2016	Previous Calibration:	January 14, 2016
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	8:04	End Time (MST):	9:02
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	E-803		
C ₁₄ Source SN:	4066		
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-13.0	-13.4	-0.4	-13.0
T2	20.0	na	na	20.0
T3	22.0	na	na	22.0
T4	18.0	na	na	18.0
RH (%)	15.0	na	na	15.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	976	974.0	-2.0	976

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	980	-20	1000	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	393		396
Neph	4.3		0.1
C14	324.1		174
Indicated Concentration (ug/m3)	1.8	Yes	0
Offset 1	395		395.7
Offset 2	50.6		51.5

Leak Check (Quarterly)			
Leak Check Date:	December 8, 2015	Previous Leak Check Date:	September 28, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	17.40	
*Flow with adaptor (LPM):	17.32	0.08

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	July 14, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337		Mass foil set S/N:
Previous Correction Factor:	6970		
New Correction Factor:	7080		

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

NOTES:

Flow and Nephelometer adjusted, Sample head cleaned

Calibration Performed By:	Melissa Lemay
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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 14
ANZAC
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
FEBRUARY 2016

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	656	35	40	99.28	8	0	2	0
TRS(ppb) Average	660	33	36	99.57	5	0	1	0
THC(ppm) Average	660	35	36	99.86	2.8	-	2.1	-
NMHC(ppm) Average	660	35	36	99.86	0.199	-	0.045	-
CH4(ppm) Average	660	35	36	99.86	2.7	-	2.1	-
NO2(ppb) Average	660	35	36	99.86	27	0	10	-
NO(ppb) Average	660	35	36	99.86	24	-	3	-
NOX(ppb) Average	660	35	36	99.86	47	-	12	-
O3(ppb) Average	660	33	36	99.57	47	0	43	-
PM2.5(ug/m3) Average	694	2	2	100.00	56.4	-	7.8	0
AT 2m(C) Average	696	0	0	100.00	8.8	-	2.8	-
RH(%) Average	696	0	0	100.00	98	-	94	-
Leaf Wetness (% of range) Average	696	0	0	100.00	47	-	10	-
WS(km/h) Average	687	0	9	98.71	22	-	15	-
WD(deg) Average	687	0	9	98.71	-	-	-	-
PC(mm) Total	696	0	0	100.00	0.8	-	1.3	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	656	0.6	1	-	0	0	0	0	1	1	8
TRS(ppb) Average	660	0.3	0	-	0	0	0	0	0	0	5
THC(ppm) Average	660	2.01	0.1	-	1.9	1.9	2	2	2	2.1	2.8
NMHC (ppm) Average	660	0.008	0.024	-	0	0	0	0	0	0	0.199
CH4(ppm) Average	660	2	0.1	-	1.9	1.9	2	2	2	2.1	2.7
NO2(ppb) Average	660	3.9	5	-	0	1	1	2	5	9	27
NO(ppb) Average	660	0.7	2	-	0	0	0	0	0	1	24
NOX(ppb) Average	660	4.5	6	-	0	1	1	3	6	10	47
O3(ppb) Average	660	29.5	10	-	3	14	23	30	38	42	47
PM2.5(ug/m3) Average	694	3.5	4	-	0.5	0.9	1.3	2.3	4	7	56.4
Temperature 2 m (C) Average	696	-8.53	7.1	-	-29.3	-16.9	-13.5	-9	-2.8	0.2	8.8
Relative Humidity (%) Average	696	78.8	14	-	35	57	72	83	89	92	98
Leaf Wetness (% of range) Average	696	2.2	4	-	0	0	1	1	2	4	47
Wind Speed 20 m (km/h) Average	687	7.4	4	-	1	3	4	7	10	12	22
Wind Direction 20 m (deg) Average	687	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	696	-	-	3.05	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC, NO2	28 Feb 2016 13:00	28 Feb 2016 13:00	1	Maintenance - verified operation of the daily QA checks
SO2	12 Feb 2016 07:00	12 Feb 2016 10:00	4	Unstable operation - excessive baseline drift
TRS	19 Feb 2016 08:00	19 Feb 2016 08:00	1	Maintenance - verified operation of the daily QA checks
TRS	28 Feb 2016 12:00	28 Feb 2016 13:00	2	Maintenance - verified operation of the daily QA checks
O3	19 Feb 2016 08:00	19 Feb 2016 09:00	2	Maintenance - verified operation of the daily QA checks
O3	28 Feb 2016 14:00	28 Feb 2016 14:00	1	Maintenance - verified operation of the daily QA checks
Wind Speed, Wind Direction	01 Feb 2016 07:00	01 Feb 2016 07:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	01 Feb 2016 22:00	01 Feb 2016 22:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	15 Feb 2016 00:00	15 Feb 2016 01:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Feb 2016 23:00	17 Feb 2016 01:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Feb 2016 12:00	22 Feb 2016 13:00	2	Maintenance - sensors replaced



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

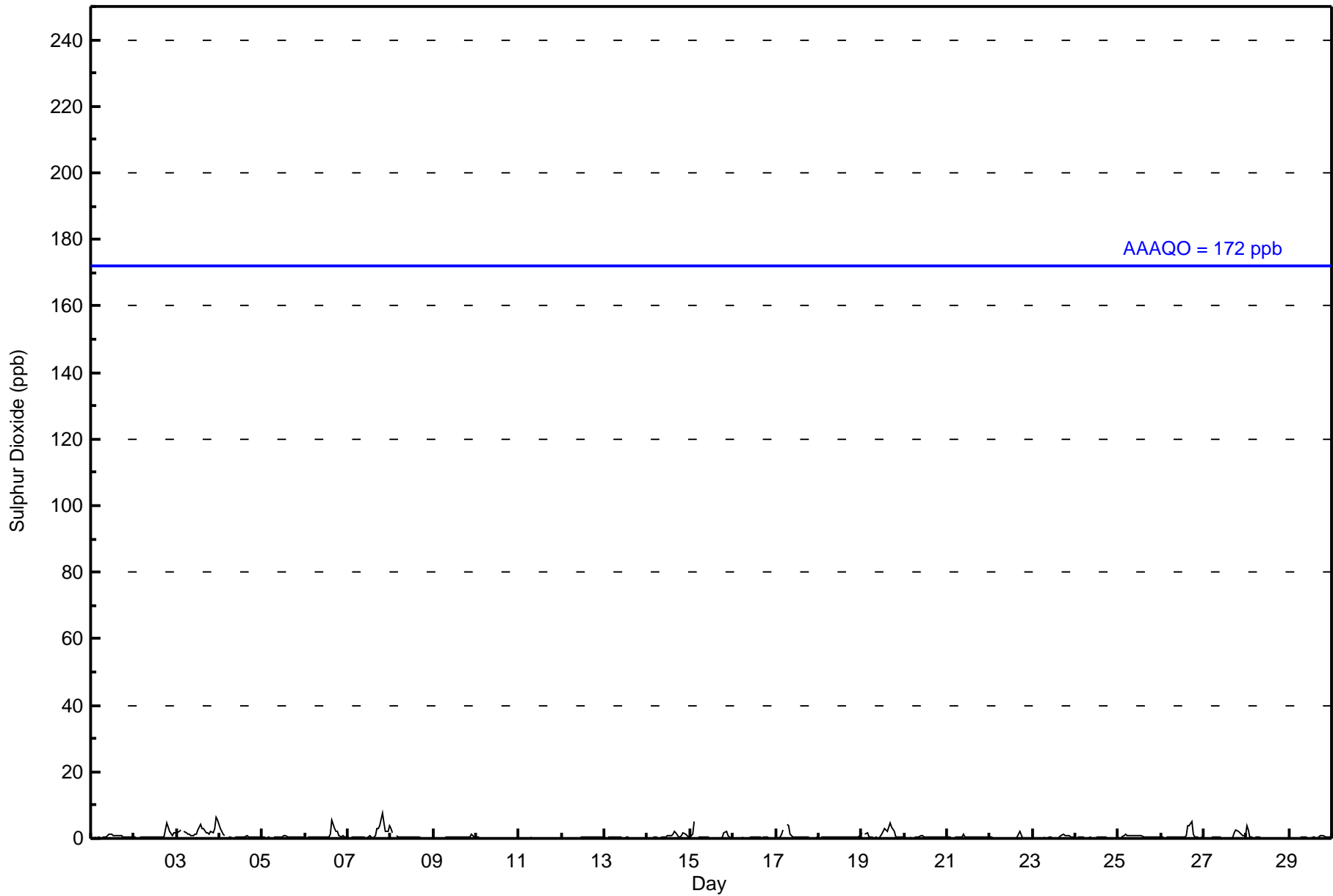
Anzac - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 ppb on Feb 7 20:00 Maximum Daily Average: 2.3 ppb on Feb 3										Hours in Service: 696 Hours of Data: 656 Hours of Missing Data: 40 Hours of Calibration: 35 Percent Operational Time: 99.3																																							
Minimum Value: 0 ppb on Feb 11 15:00 Maximum Diurnal Average: 0.9 ppb at hour 18 Monthly Average: 0.6 ppb										Minimum Daily Average: 0.1 ppb on Feb 10 Minimum Diurnal Average: 0.3 ppb at hour 9 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 5																																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1																							
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	2	1	2	2	0.9	5																							
3-Feb	2	2	2	Z	2	2	1	1	1	1	1	3	4	3	3	2	1	1	2	2	3	6	5	2.3	6																								
4-Feb	3	2	1	1	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.6	3																								
5-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0.4	1																								
6-Feb	Z	0	0	0	1	1	0	0	0	0	0	0	1	1	6	3	2	2	1	0	1	0	0	1.0	6																								
7-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	3	3	4	8	5	2	2	4	1.5	8																								
8-Feb	3	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3																								
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																								
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	0.1	0																								
11-Feb	0	0	0	0	0	Z	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0																								
12-Feb	Z	0	0	0	0	0	UO	UO	UO	UO	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	0.2	0																								
14-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	2	2	1	0	1	2	1	1	0.7	2																								
15-Feb	1	1	5	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0.7	5																								
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	0.2	0																								
17-Feb	0	0	0	1	2	Z	4	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	4																								
18-Feb	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
19-Feb	2	Z	1	2	0	0	0	0	0	0	0	1	2	3	2	3	5	4	2	1	0	0	0	1.3	5																								
20-Feb	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
21-Feb	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
22-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0.3	2																								
23-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0.3	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	0.2	0																								
25-Feb	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1																								
26-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	4	4	5	1	0	0	0	0	0	0.9	5																								
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	1	0.6	2																								
28-Feb	4	3	1	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0.4	4																								
29-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0.3	1																								
																								0.7	0.6	0.6	0.4	0.5	0.4	0.5	0.4	0.3	0.4	0.4	0.4	0.5	0.6	0.5	0.9	0.9	0.9	0.9	0.9	0.9	0.7	0.6	0.6	0.6	Diurnal Average
																								4	3	5	2	2	2	4	4	1	1	1	1	3	4	3	6	5	5	5	5	8	5	3	6	5	Diurnal Maximum
Z - zerspan C - Calibration M - Maintenance 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
Anzac - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	656	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: 656

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Anzac - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	33	15	16	18	31	30	71	91	36	21	20	7	19	98	70	71	647
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	33	15	16	18	31	30	71	91	36	21	20	7	19	98	70	71	647

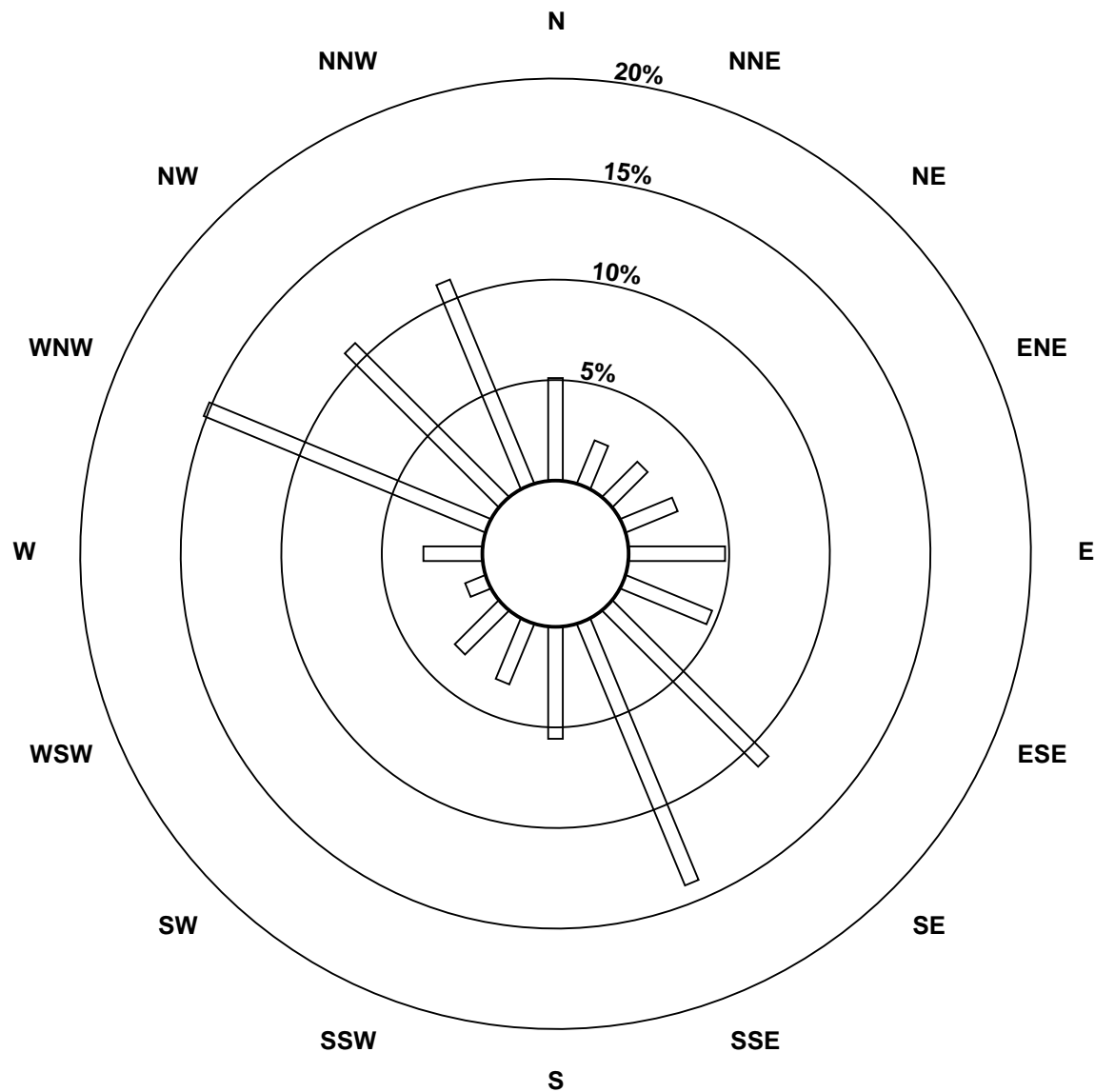
Total Number of Valid Hours: 647

Total Number of Hours: 696

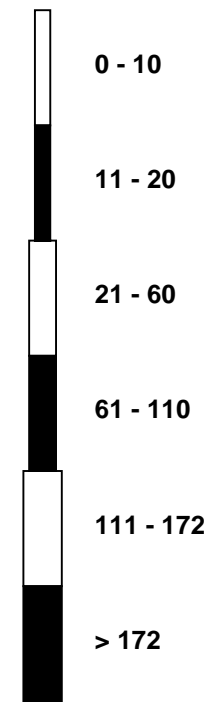


Wood Buffalo Environmental Association
Wind Rose Feb 2016

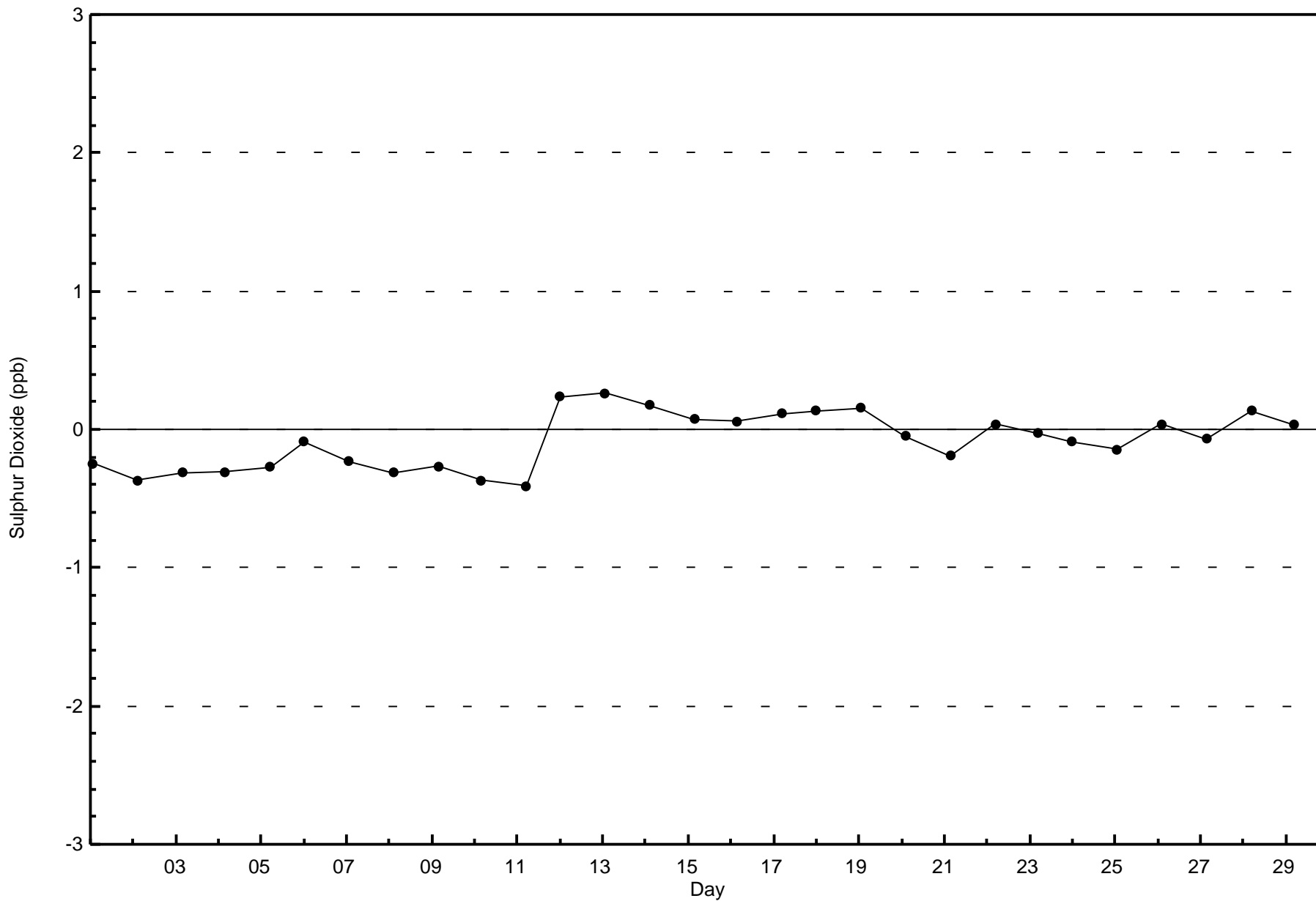
Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)

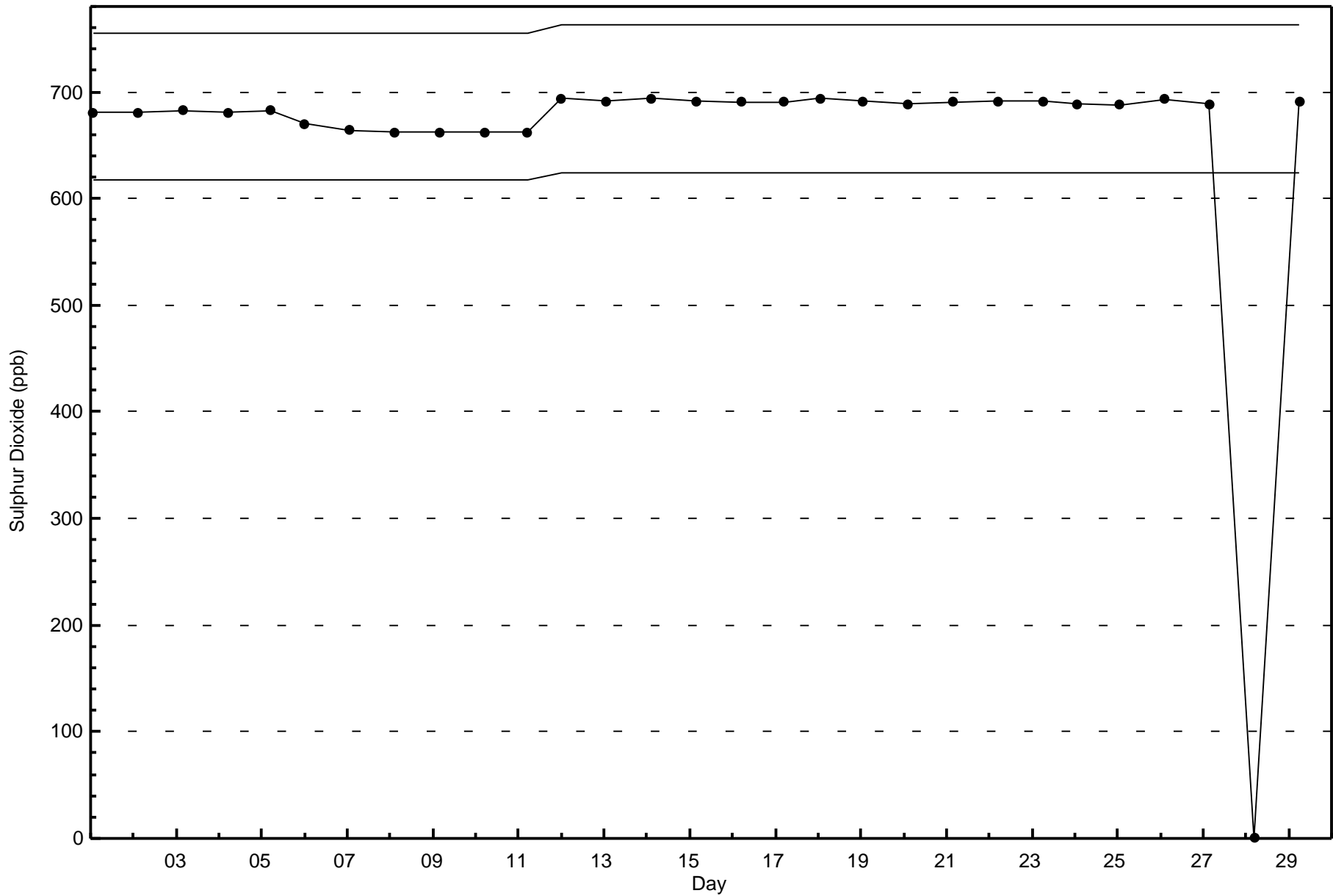


Classes (ppb)



Total Number of Valid Hours: 647



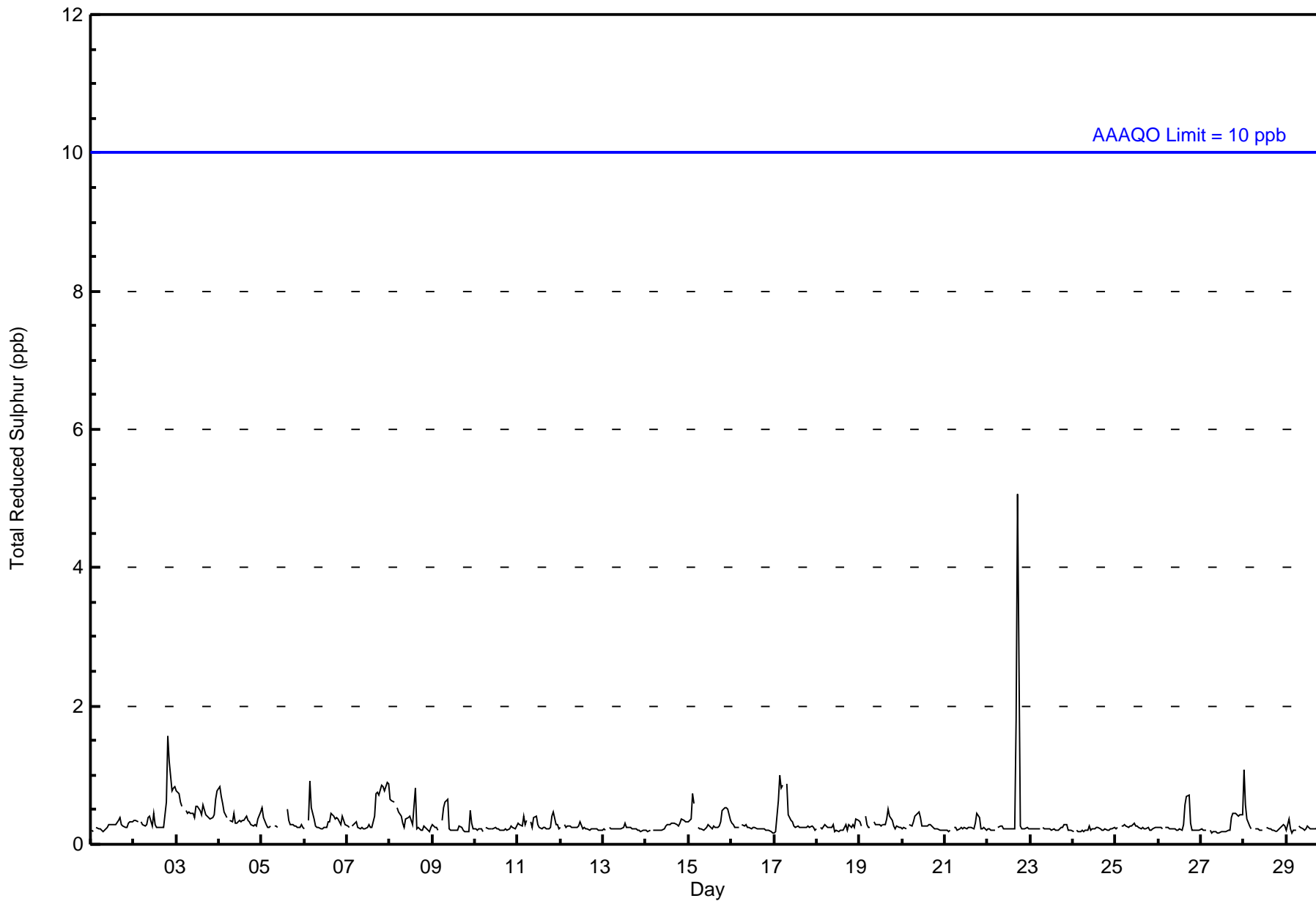




Summary of Hour Averages

Anzac - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 ppb on Feb 22 18:00 Maximum Daily Average: 0.5 ppb on Feb 3																	Hours in Service: 696 Hours of Data: 660 Hours of Missing Data: 36 Hours of Calibration: 33 Percent Operational Time: 99.6									
Minimum Value: 0 ppb on Feb 17 00:00 Minimum Daily Average: 0.2 ppb on Feb 24 Maximum Diurnal Average: 0.5 ppb at hour 18 Minimum Diurnal Average: 0.3 ppb at hour 14 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-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
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	0.5	2
3-Feb	1	1	1	1	Z	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	1	1	0.5	1
4-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	0.4	1
5-Feb	1	0	0	0	0	0	Z	0	0	0	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0.3	1
6-Feb	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
8-Feb	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1
9-Feb	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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	0.2	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	0.3	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	0.3	0
15-Feb	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
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	0.2	0
17-Feb	0	0	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
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	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.3	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	0.2	0
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0.5	5
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	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	0.2	0
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.3	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	0.3	0
28-Feb	1	1	0	0	0	Z	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-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
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.5 0.3 0.3 0.3 0.3 0.3 0.3 0.3																								Diurnal Average		
1 1 1 1 1 1 1 1 1 1 0 0 1 1 0 1 1 2 5 1 2 1 1 1 1																								Diurnal Maximum		
Z - zerspan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	659	99.85	99.85
3 - 4	0	0.00	99.85
5 - 7	1	0.15	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Anzac - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	32	17	15	20	35	30	70	91	37	20	20	8	17	97	71	70	650
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	1	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	32	17	15	20	35	30	70	91	37	20	20	8	18	97	71	70	651

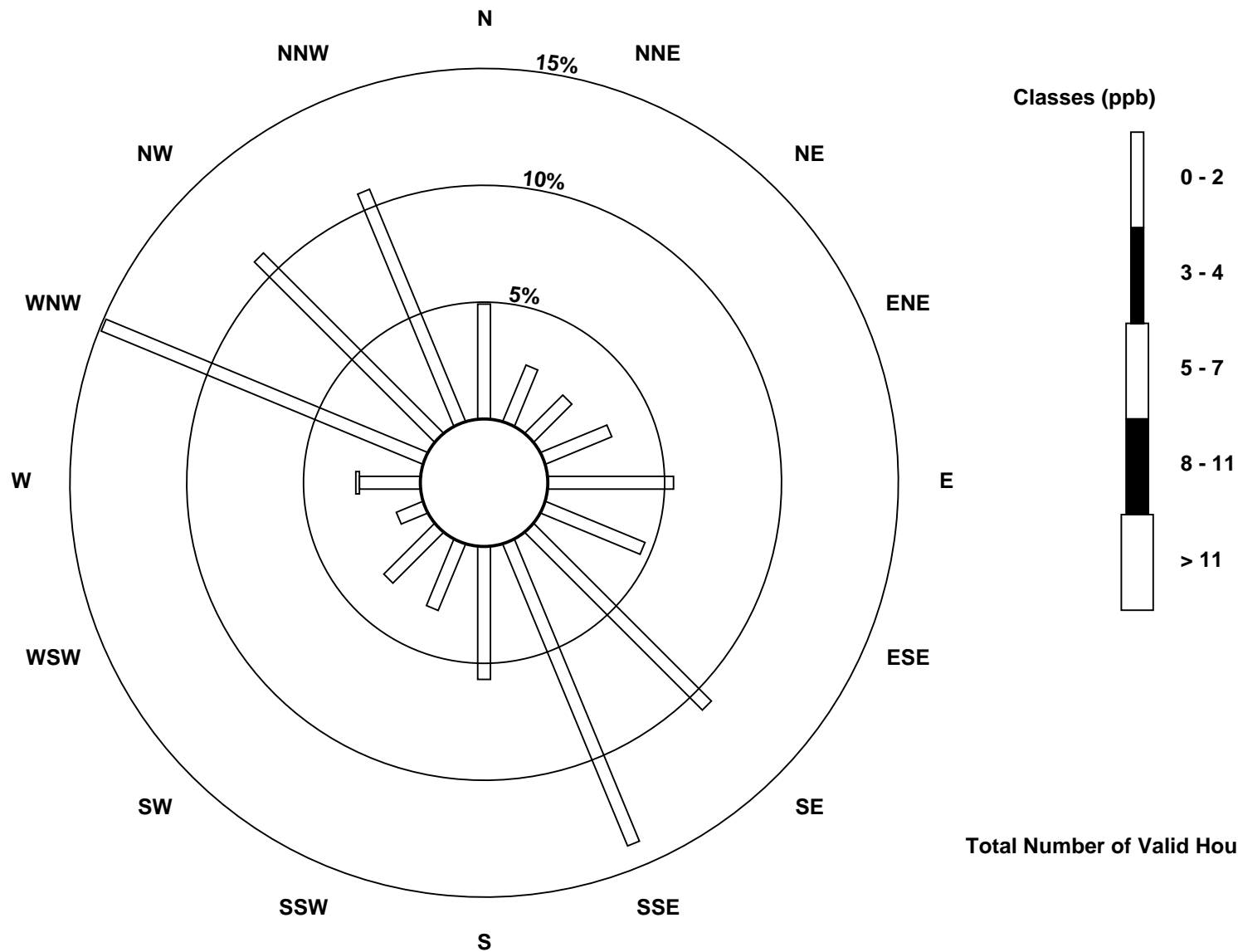
Total Number of Valid Hours: 651

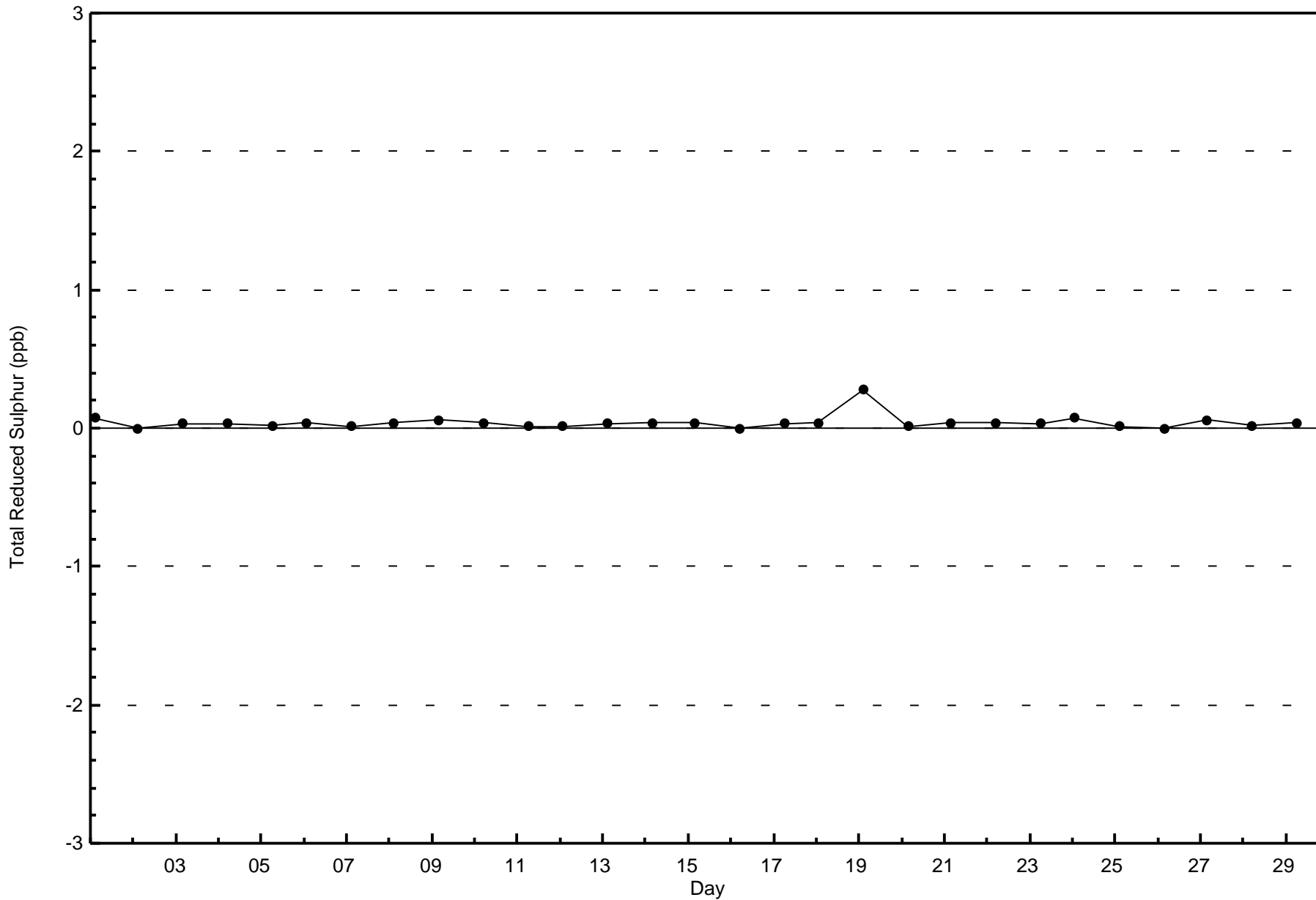
Total Number of Hours: 696

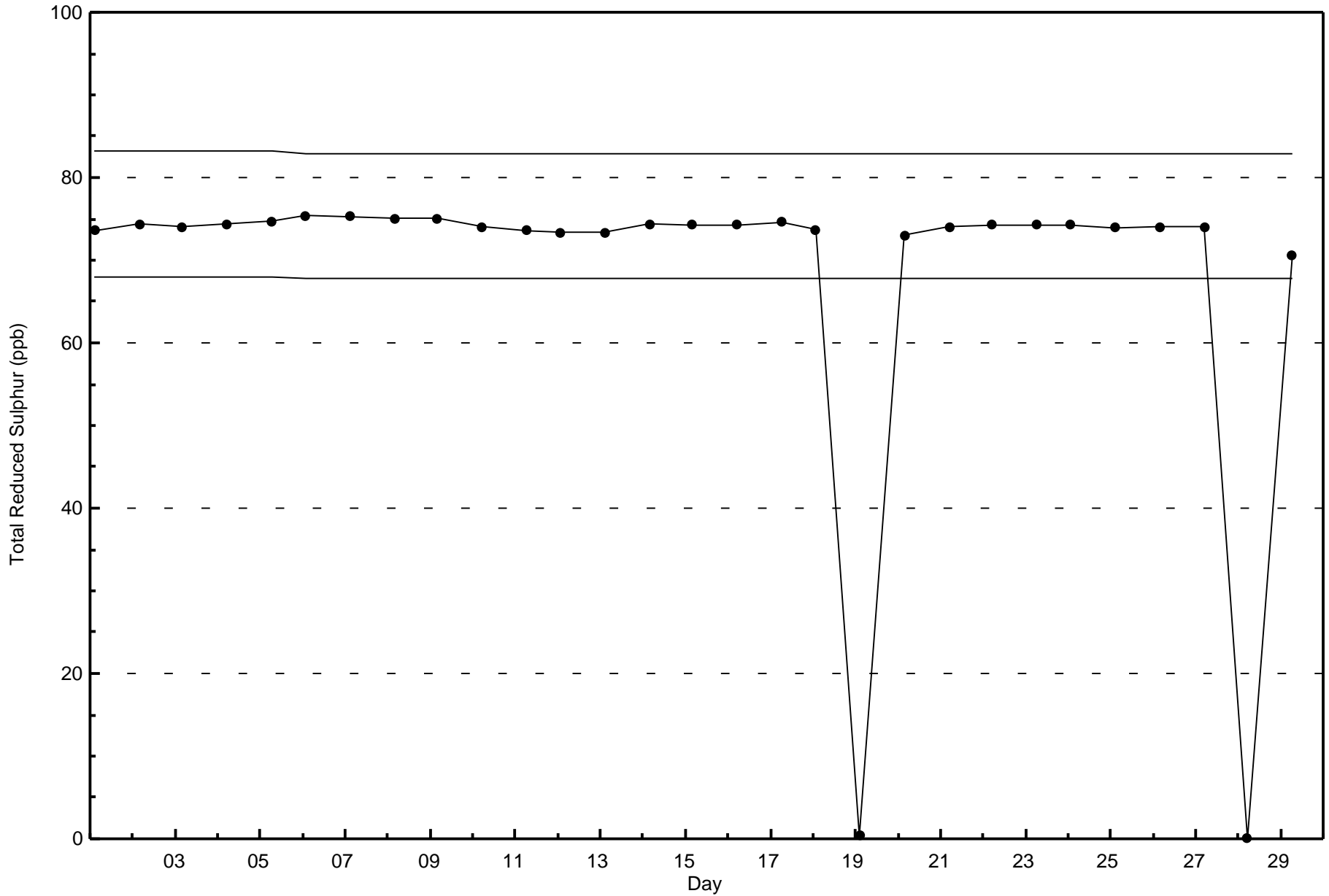


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)

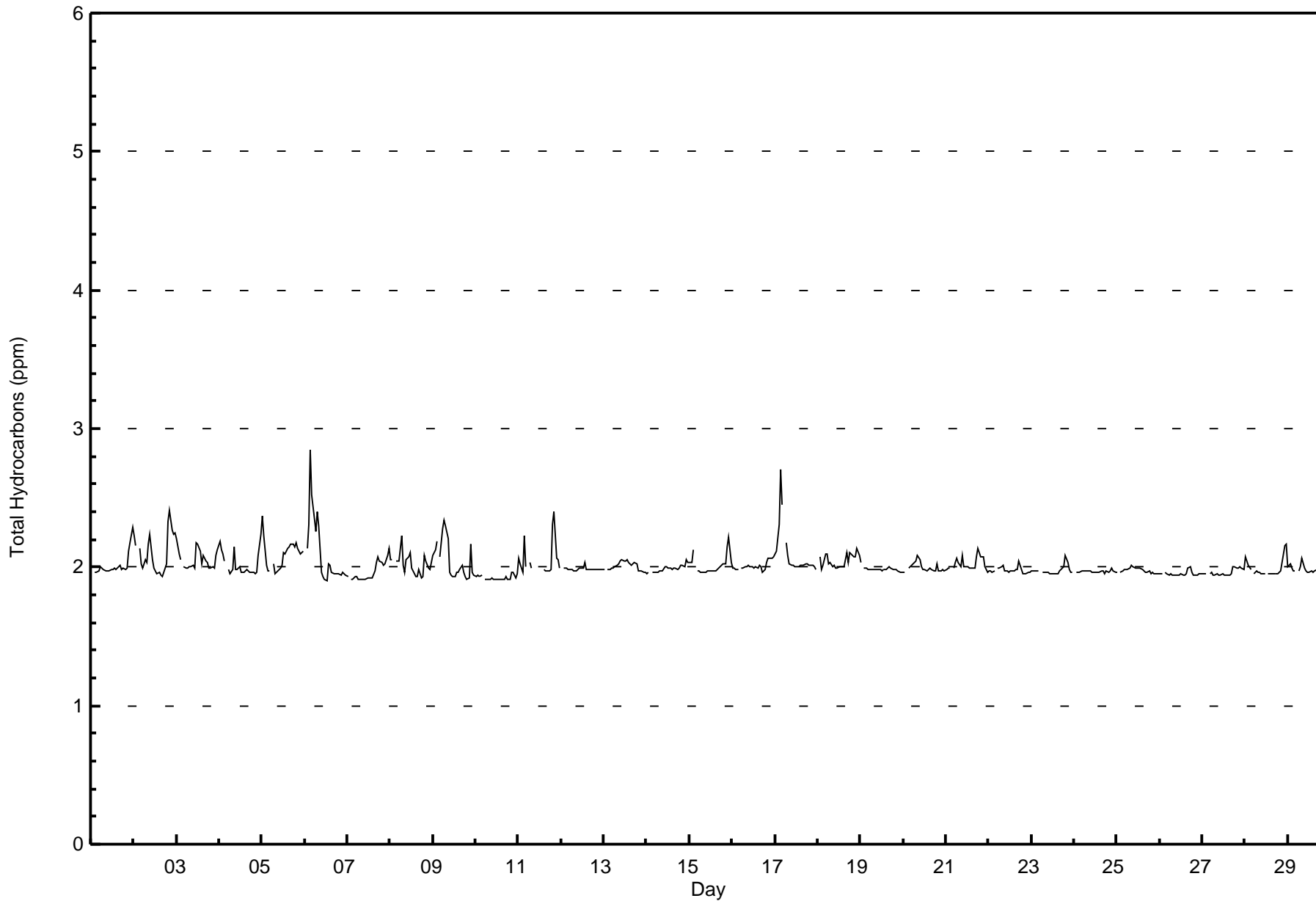








Maximum Value: 2.8 ppm on Feb 6 04:00		Maximum Daily Average: 2.1 ppm on Feb 6		Hours in Service:	696																						
Minimum Value: 1.9 ppm on Feb 6 13:00		Minimum Daily Average: 1.9 ppm on Feb 10		Hours of Data:	660																						
Maximum Diurnal Average: 2.1 ppm at hour 4		Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Missing Data:	36																						
Monthly Average: 2.01 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 = 2.4		Hours of Calibration:	35																						
				Percent Operational Time:	99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-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	2.1	2.2	2.3	2.0	2.3		
2-Feb	2.2	2.2	Z	2.1	2.0	2.0	2.1	2.0	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.3	2.4	2.3	2.2	2.2	2.1	2.4	
3-Feb	2.2	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	
4-Feb	2.2	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.2		
5-Feb	2.4	2.2	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.4	
6-Feb	Z	2.1	2.3	2.8	2.5	2.3	2.3	2.4	2.3	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	1.9	2.1	2.8	
7-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	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	
8-Feb	2.1	2.1	Z	2.0	2.0	2.0	2.2	2.0	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.2	
9-Feb	2.1	2.1	2.2	Z	2.1	2.3	2.3	2.3	2.2	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.2	2.0	1.9	2.0	2.3	
10-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	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	
11-Feb	2.1	2.0	2.0	2.2	2.0	Z	2.0	2.0	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.3	2.4	2.1	2.1	2.0	--	2.4	
12-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
13-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
14-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	2.1	2.0	2.1	2.0	2.1	2.1
15-Feb	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.2	
16-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	2.1	2.1	2.1	2.1	2.0	2.1	2.1
17-Feb	2.1	2.1	2.3	2.7	2.5	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.7
18-Feb	Z	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1
19-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
20-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1
22-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
23-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	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
24-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
25-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
26-Feb	2.0	1.9	Z	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0
27-Feb	2.0	2.0	1.9	Z	2.0	2.0	1.9	1.9	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	2.0
28-Feb	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	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	2.2	2.2	2.0	2.2	2.2
29-Feb	2.0	2.0	2.0	2.0	2.0	Z	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	2.1
																								Diurnal Average			
																								Diurnal Maximum			
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	542	82.12	82.12
2.1 - 3.0	118	17.88	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - February 2016

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	29	14	16	17	23	21	58	74	18	13	14	6	19	95	57	63	537
2.1 - 3.0	4	1	0	1	8	9	17	17	18	8	6	1	0	3	13	8	114
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	33	15	16	18	31	30	75	91	36	21	20	7	19	98	70	71	651

Total Number of Valid Hours: 651

Total Number of Hours: 696

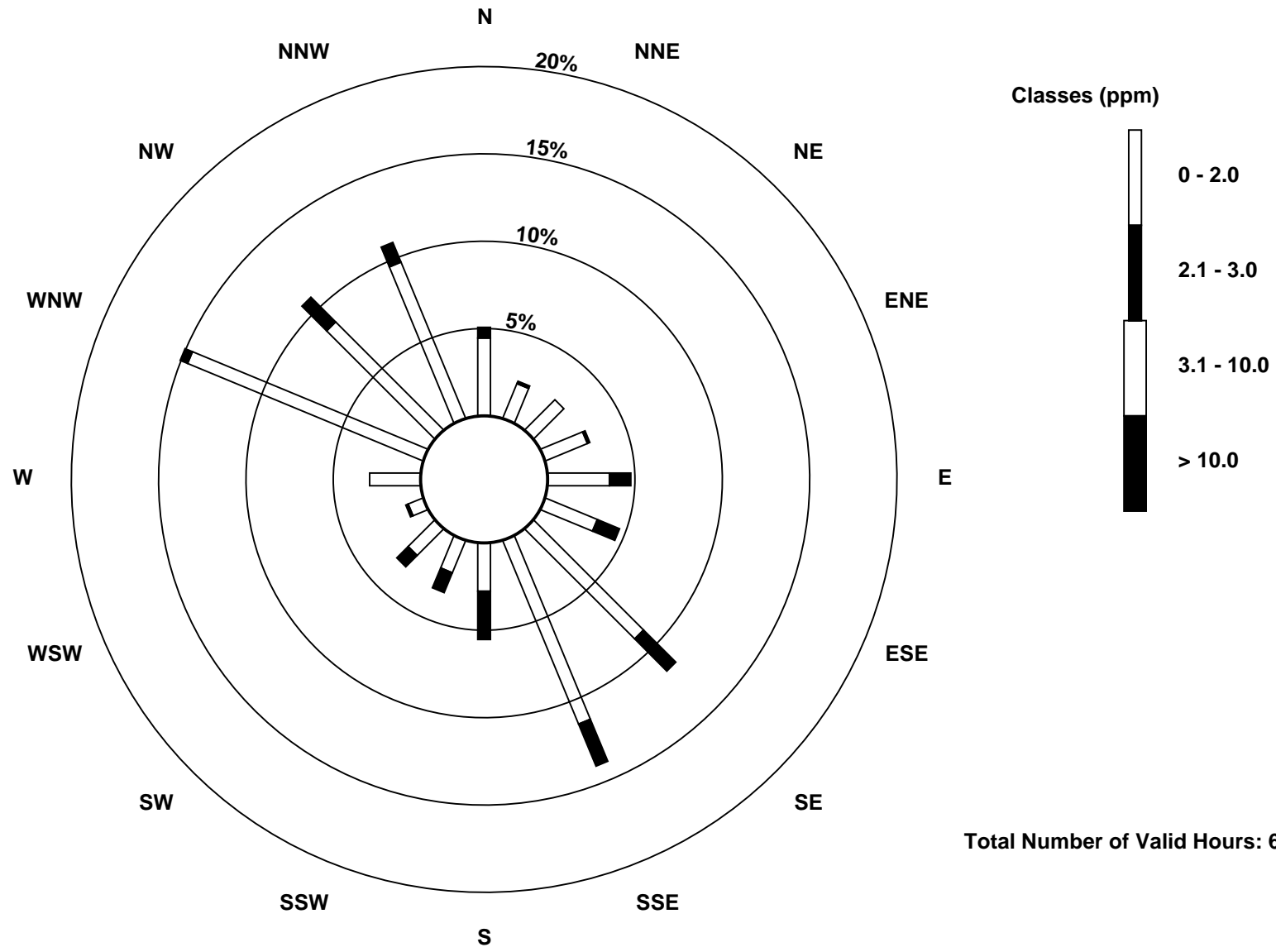


Wood Buffalo Environmental Association

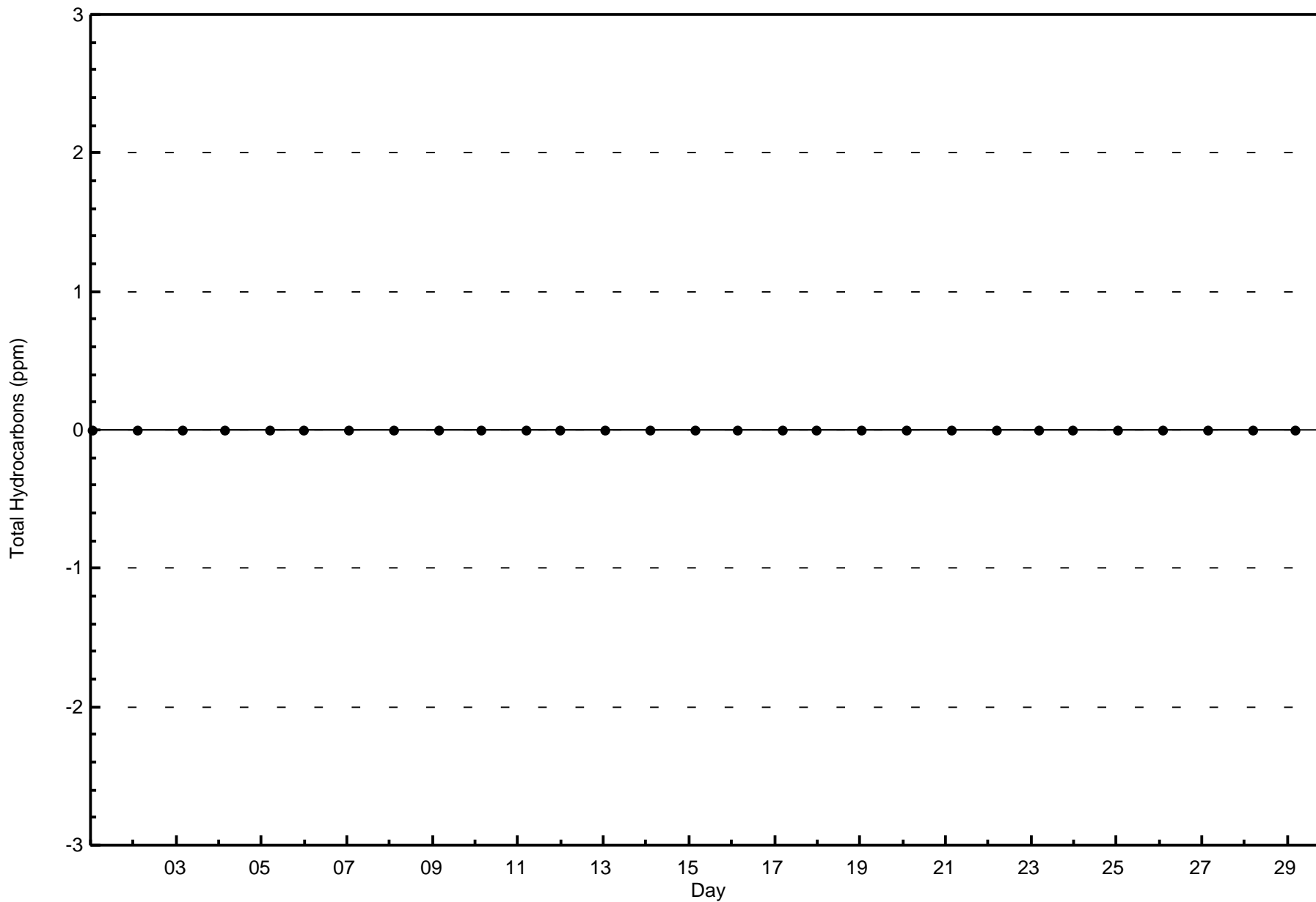
Wind Rose Feb 2016

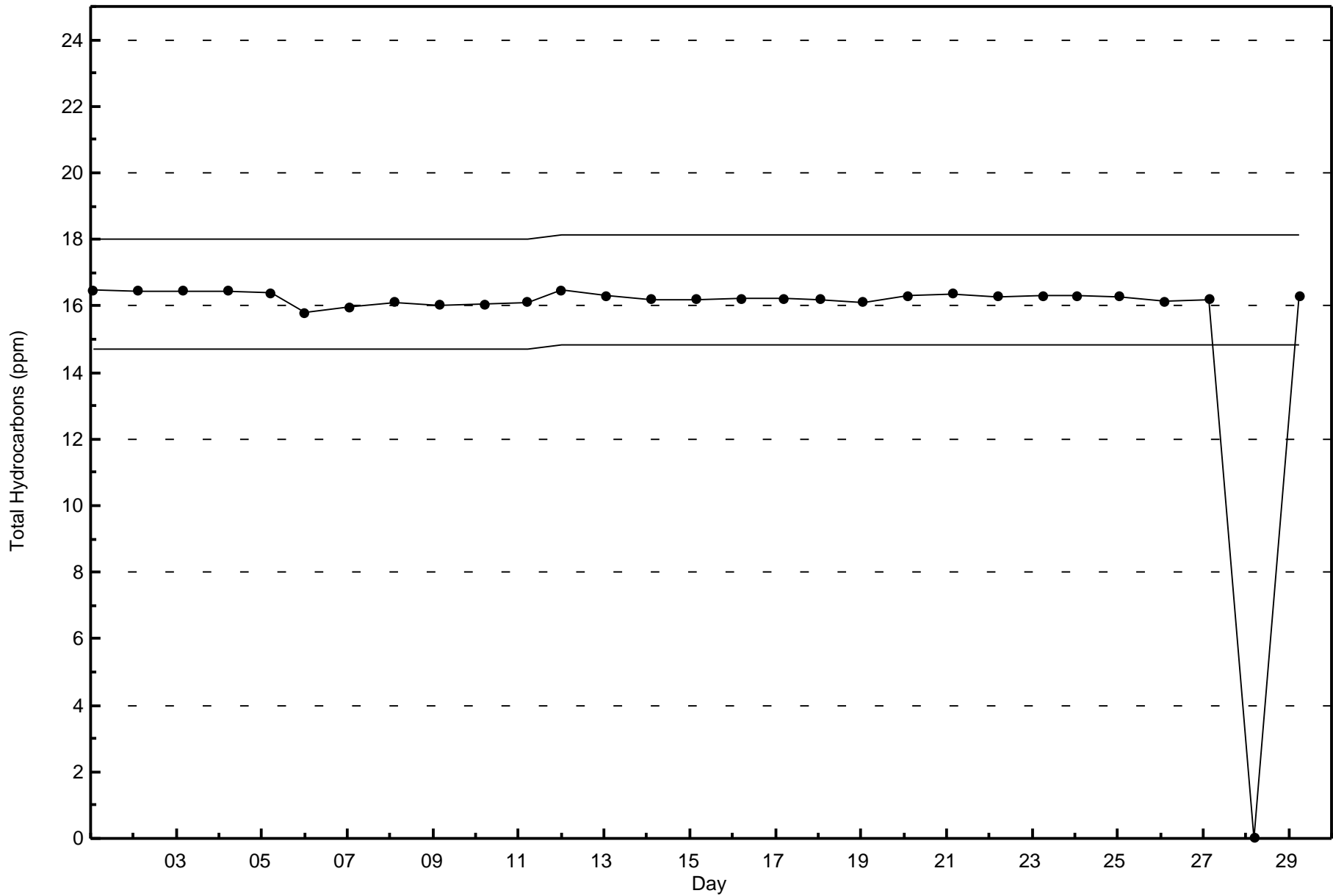
Total Hydrocarbons (THC) - ppm

Anzac (AMS 14)



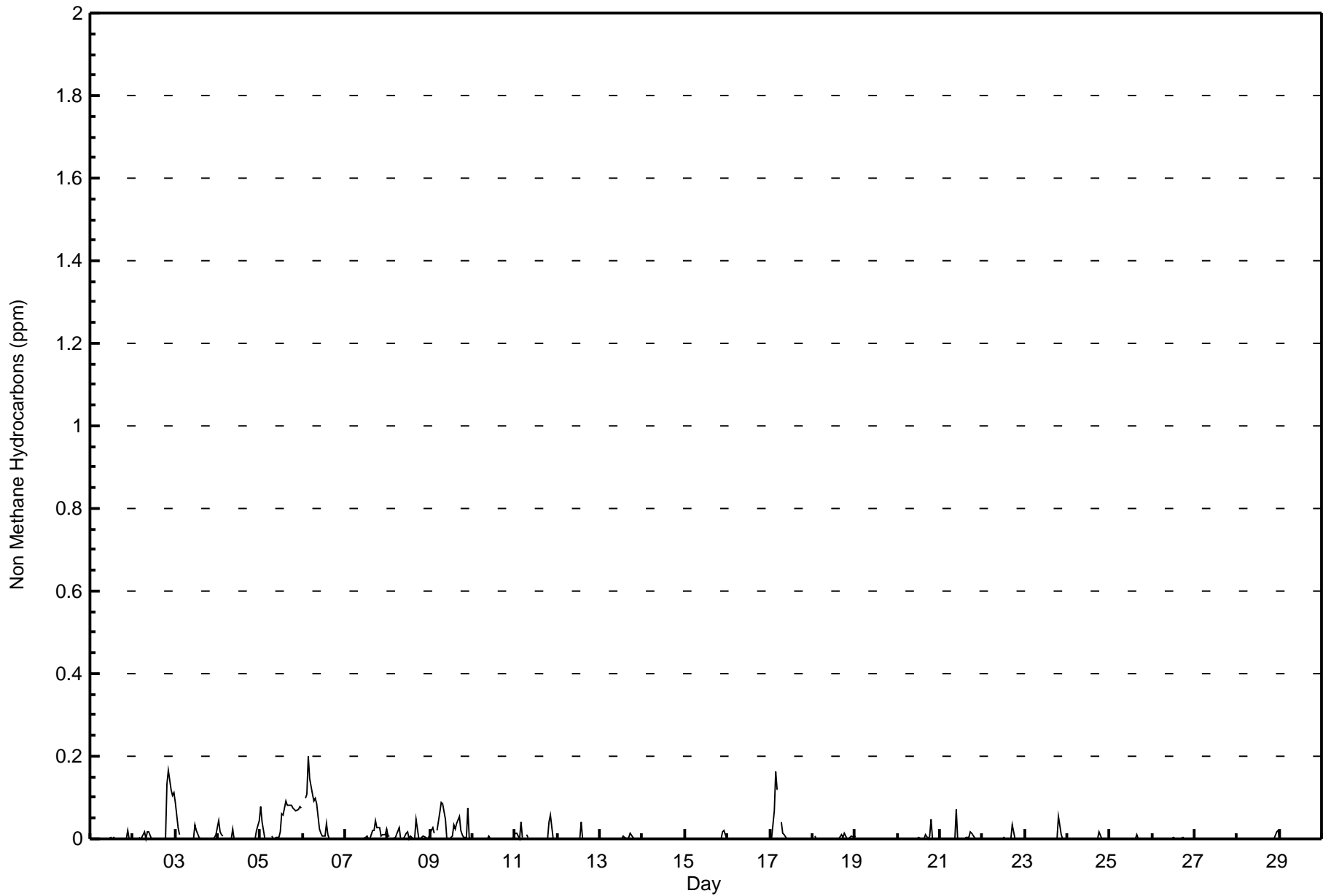
Total Number of Valid Hours: 651







Maximum Value: 0.199 ppm on Feb 6 04:00																								Maximum Daily Average: 0.045 ppm on Feb 5																								Hours in Service: 696	
Minimum Value: 0.000 ppm on Feb 1 01:00																								Minimum Daily Average: 0.000 ppm on Feb 29																								Hours of Data: 660	
Maximum Diurnal Average: 0.017 ppm at hour 4																								Minimum Diurnal Average: 0.001 ppm at hour 11																								Hours of Missing Data: 36	
Monthly Average: 0.008 ppm																								Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1																								Hours of Calibration: 35	
																								Percent Operational Time: 99.9																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.001	0.000	0.001	0.021																							
2-Feb	0.001	0.000	Z	0.003	0.000	0.003	0.018	0.000	0.018	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.131	0.166	0.119	0.105	0.111	0.030	0.166																							
3-Feb	0.088	0.026	0.009	Z	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.033	0.019	0.005	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.003	0.011	0.009	0.088																							
4-Feb	0.043	0.017	0.011	0.008	Z	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.045	0.007	0.045																								
5-Feb	0.077	0.039	0.001	0.000	0.000	Z	0.007	0.000	0.000	0.004	0.005	0.016	0.060	0.058	0.091	0.082	0.080	0.081	0.075	0.070	0.069	0.072	0.077	0.076	0.045	0.091																							
6-Feb	Z	0.099	0.108	0.199	0.145	0.108	0.092	0.097	0.085	0.023	0.015	0.008	0.008	0.038	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.045	0.199																							
7-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.006	0.000	0.000	0.021	0.022	0.045	0.029	0.026	0.008	0.010	0.009	0.024	0.009	0.045																							
8-Feb	0.007	0.008	Z	0.003	0.000	0.009	0.028	0.000	0.000	0.001	0.014	0.017	0.001	0.006	0.000	0.000	0.048	0.000	0.000	0.005	0.007	0.003	0.000	0.003	0.007	0.048																							
9-Feb	0.013	0.029	0.014	Z	0.020	0.066	0.088	0.086	0.049	0.001	0.001	0.001	0.007	0.035	0.023	0.037	0.054	0.019	0.011	0.005	0.003	0.075	0.005	0.000	0.028	0.088																							
10-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.005	0.001	0.008																							
11-Feb	0.014	0.013	0.000	0.040	0.003	Z	0.010	0.002	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.042	0.056	0.002	0.001	0.000	--	0.056																							
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	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.042																							
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	0.001	0.006	0.003	0.001	0.002	0.015	0.004	0.000	0.000	0.000	0.000	0.000	0.001	0.015																							
14-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.000	0.001																							
15-Feb	0.001	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	0.017	0.021	0.000	0.002	0.021																							
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	0.001	0.001	0.000	0.000	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.001																							
17-Feb	0.000	0.001	0.067	0.161	0.117	Z	0.042	0.012	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.161																							
18-Feb	Z	0.006	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.003	0.013	0.001	0.001	0.003	0.005	0.004	0.002	0.013																							
19-Feb	0.005	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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005																							
20-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.004	0.000	0.000	0.000	0.009	0.000	0.007	0.049	0.000	0.000	0.000	0.000	0.003	0.049																							
21-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.071	0.000	0.001	0.000	0.000	0.000	0.004	0.003	0.018	0.015	0.002	0.001	0.000	0.001	0.000	0.005	0.071																							
22-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.001	0.034	0.001	0.000	0.000	0.000	0.001	0.000	0.002	0.034																							
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	0.001	0.056	0.010	0.000	0.000	0.000	0.003	0.056																							
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	0.018	0.000	0.000	0.000	0.000	0.000	0.001	0.018																							
25-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.001	0.000	0.000	0.010	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.010																							
26-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003	0.000	0.000	0.000	0.001	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004																							
27-Feb	0.001	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	0.001																							
28-Feb	0.000	0.000	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.016	0.020	0.002	0.020																						
29-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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																						
																								0.010	0.010	0.009	0.017	0.012	0.008	0.010	0.007	0.007	0.005	0.001	0.003	0.004	0.007	0.004	0.005	0.008	0.008	0.006	0.013	0.011	0.011	0.009	0.010	Diurnal Average	
																								0.088	0.099	0.108	0.199	0.145	0.108	0.092	0.097	0.085	0.071	0.015	0.033	0.060	0.058	0.091	0.082	0.080	0.081	0.075	0.131	0.166	0.119	0.105	0.111	Diurnal Maximum	
Z - zerspan																								C - Calibration						M - Maintenance																			





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	540	81.82	81.82
0.006 - 0.05	83	12.58	94.39
0.06 - 0.1	34	5.15	99.55
> 0.1	3	0.45	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



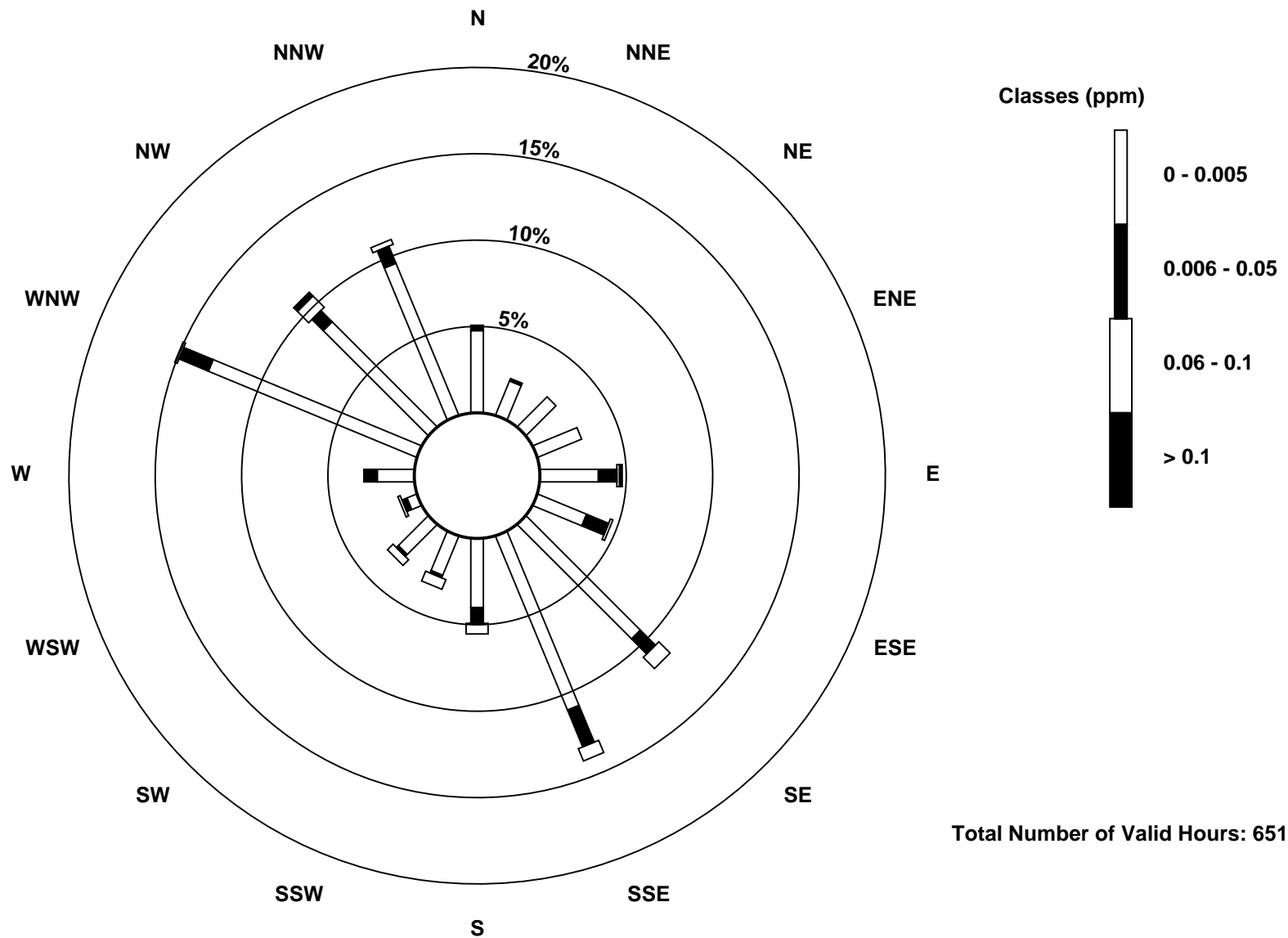
**Wood Buffalo Environmental Association
Frequency Distribution**

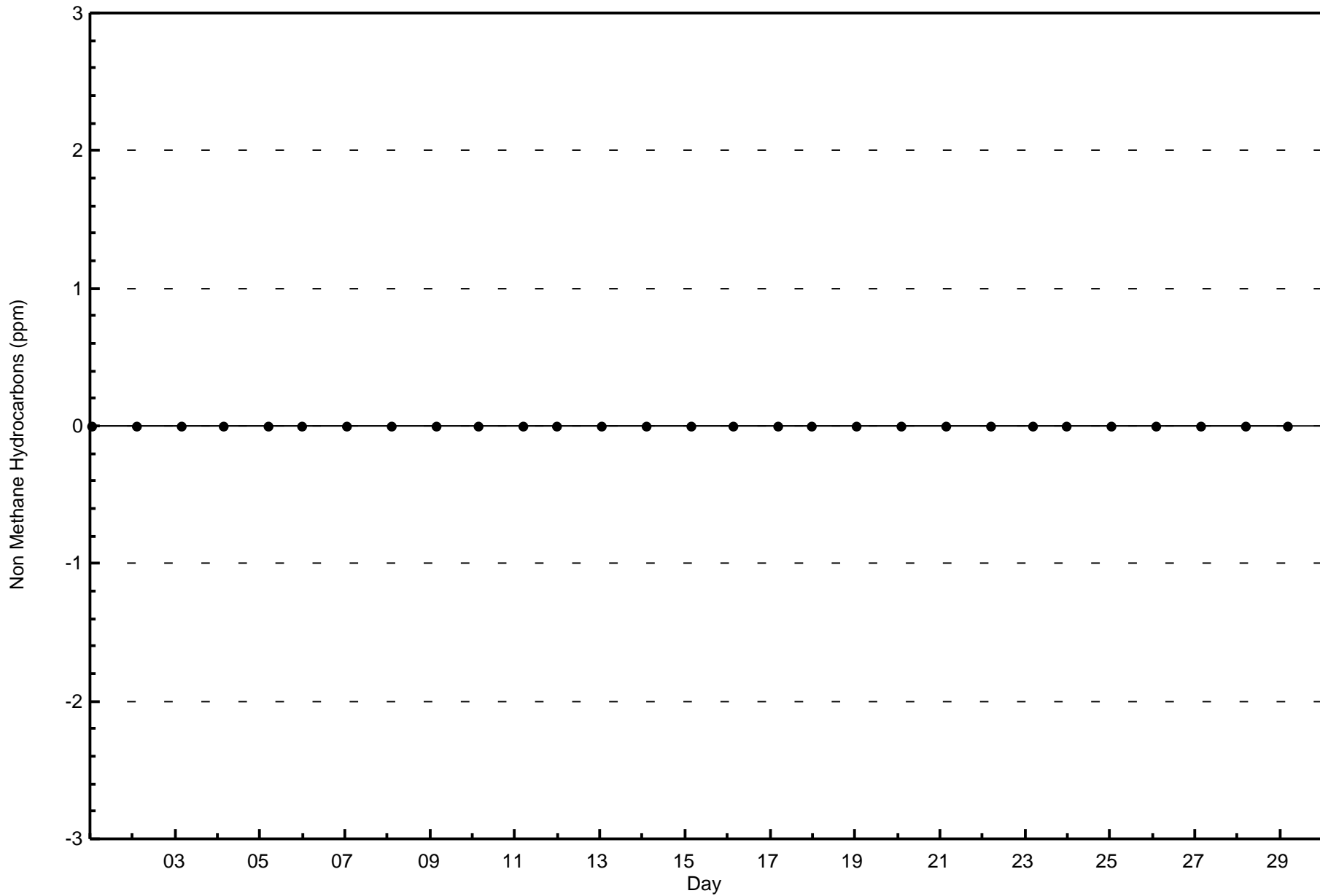
**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - February 2016**

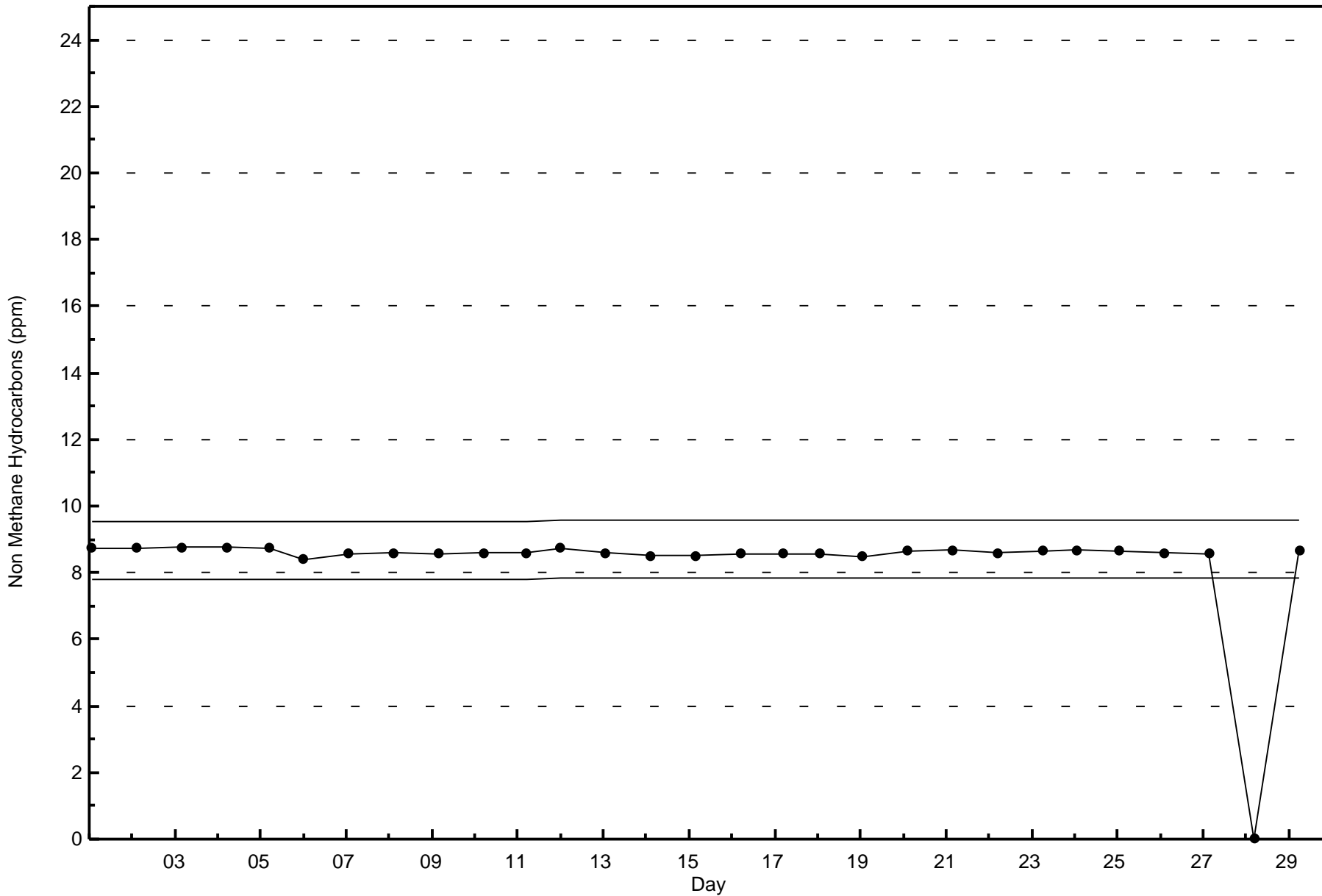
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	31	14	16	18	22	20	61	71	26	16	16	4	14	85	56	62	532
0.006 - 0.05	2	1	0	0	7	9	8	15	6	1	1	2	5	12	6	7	82
0.06 - 0.1	0	0	0	0	1	1	6	5	4	4	3	1	0	1	6	2	34
> 0.1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	3
Totals	33	15	16	18	31	30	75	91	36	21	20	7	19	98	70	71	651

Total Number of Valid Hours: 651

Total Number of Hours: 696









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

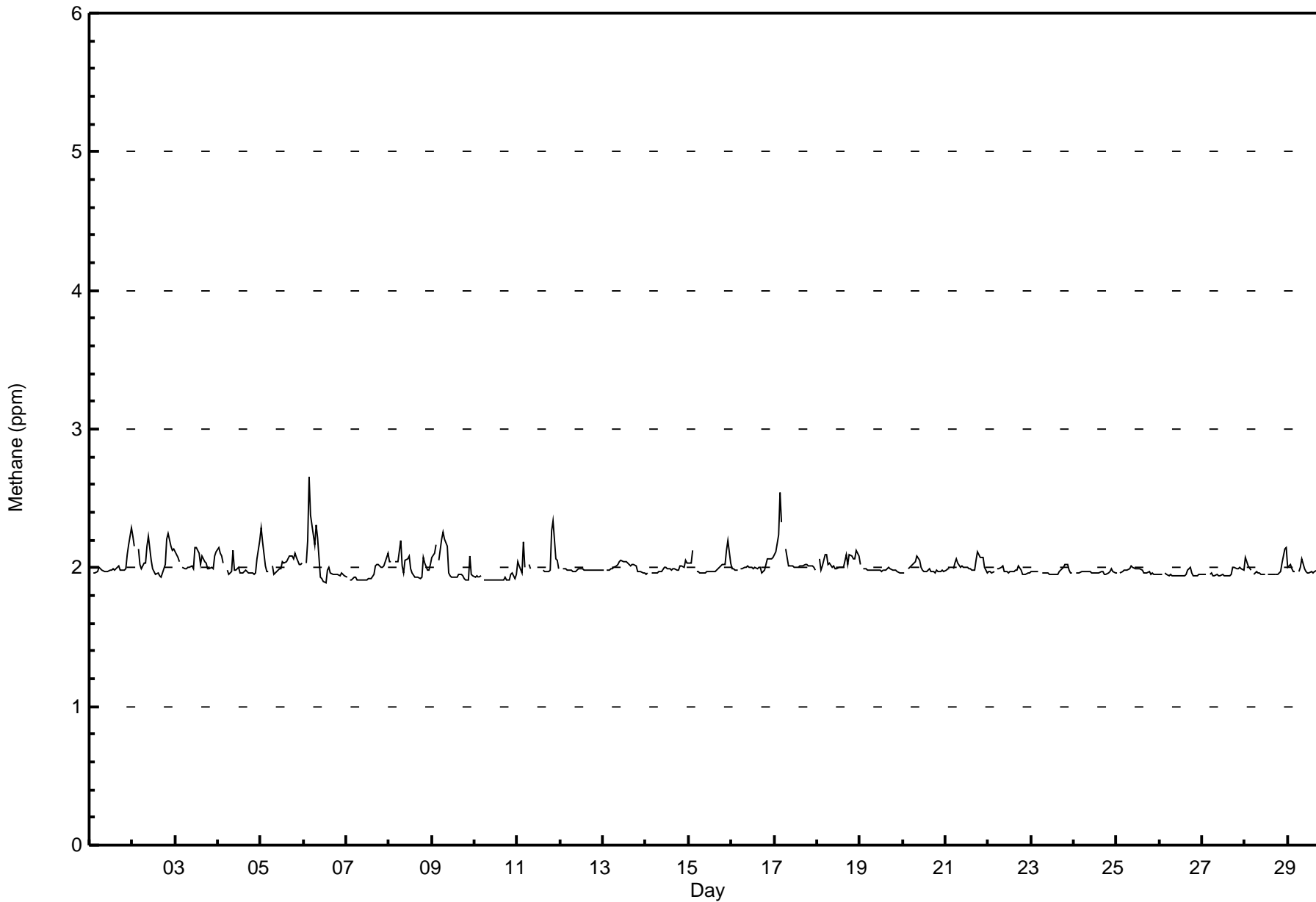
Anzac - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2.7 ppm on Feb 6 04:00 Maximum Daily Average: 2.1 ppm on Feb 17														Hours in Service: 696 Hours of Data: 660 Hours of Missing Data: 36 Hours of Calibration: 35 Percent Operational Time: 99.9													
Minimum Value: 1.9 ppm on Feb 6 13:00 Minimum Daily Average: 1.9 ppm on Feb 10 Maximum Diurnal Average: 2.0 ppm at hour 4 Minimum Diurnal Average: 2.0 ppm at hour 15 Monthly Average: 2.00 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 = 2.3																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-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	2.1	2.2	2.3	2.0	2.3		
2-Feb	2.2	Z	Z	2.1	2.0	2.0	2.0	2.0	2.2	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.2	2.2	2.2	2.1	2.1	2.1	2.1	
3-Feb	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	
4-Feb	2.1	2.1	2.1	2.0	Z	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	2.1	2.2	2.2	2.0	2.2	
5-Feb	2.3	2.2	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	2.0	2.0	2.0	2.0	2.3	
6-Feb	Z	2.0	2.2	2.7	2.4	2.2	2.3	2.2	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	1.9	2.1	2.7	
7-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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1		
8-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.2	2.0	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.2	
9-Feb	2.1	2.1	2.2	Z	2.1	2.2	2.3	2.2	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.0	1.9	2.0	2.3	
10-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	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	
11-Feb	2.0	2.0	2.0	2.2	2.0	Z	2.0	2.0	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.1	2.1	2.0	--	2.3	
12-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
13-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
14-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	2.1	2.0	2.0	2.0	2.1	2.1
15-Feb	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.2	
16-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	2.1	2.1	2.1	2.1	2.0	2.1	2.1
17-Feb	2.1	2.1	2.2	2.5	2.3	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	2.1	2.5
18-Feb	Z	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1
19-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
20-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.1	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	2.0	2.0	2.0	2.1	2.1
22-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
23-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	2.0	2.0	2.0	2.0	2.0	2.0
24-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
25-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
26-Feb	2.0	1.9	Z	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0
27-Feb	2.0	2.0	1.9	Z	2.0	2.0	1.9	1.9	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	2.0
28-Feb	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	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	2.1	2.1	2.0	2.1	2.1
29-Feb	2.0	2.0	2.0	2.0	2.0	Z	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	2.1
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Anzac - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Anzac - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	558	84.55	84.55
2.1 - 3.0	102	15.45	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - February 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	29	14	16	17	23	22	60	79	19	14	16	6	19	98	57	64	553
2.1 - 3.0	4	1	0	1	8	8	15	12	17	7	4	1	0	0	13	7	98
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	33	15	16	18	31	30	75	91	36	21	20	7	19	98	70	71	651

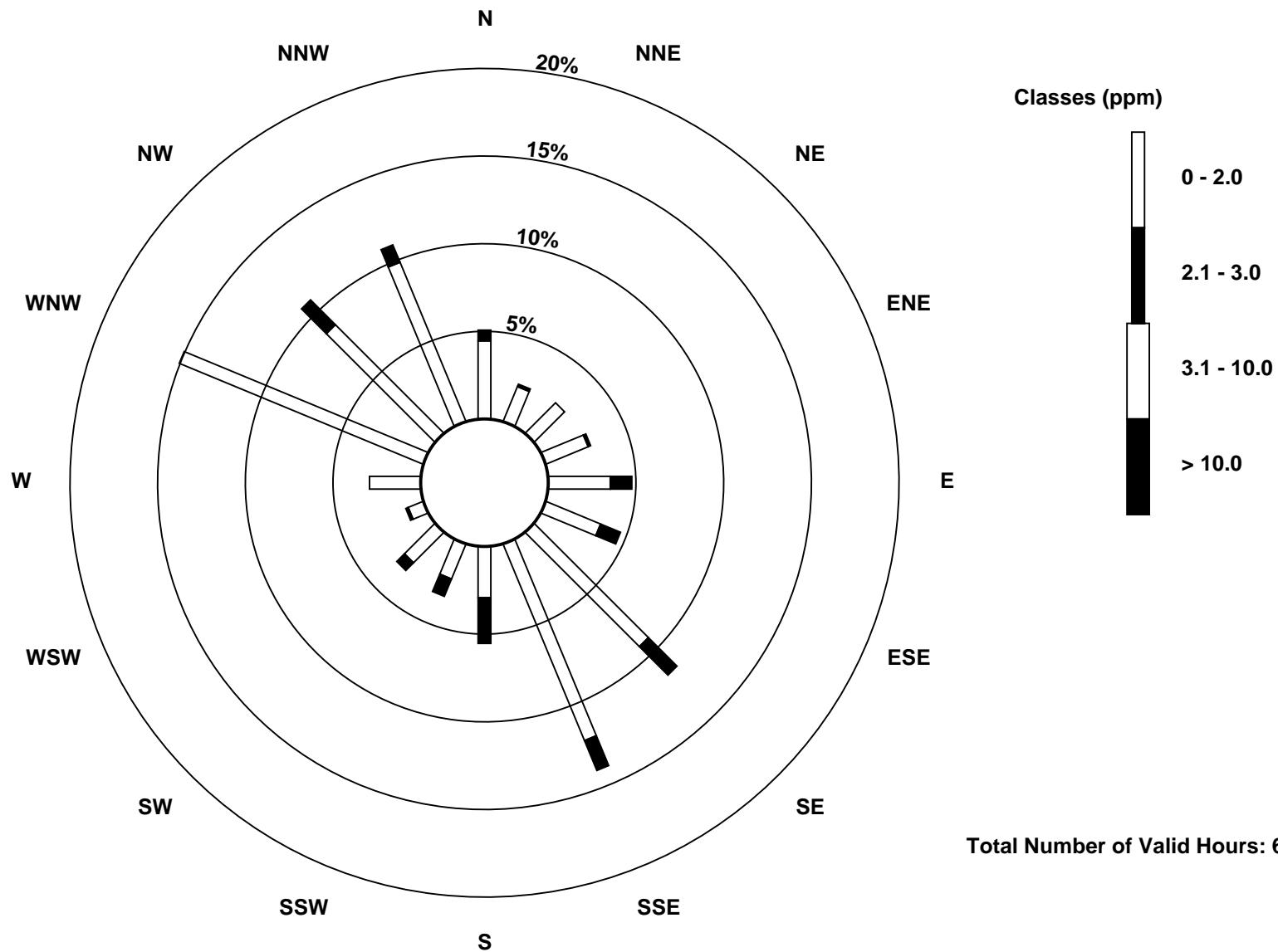
Total Number of Valid Hours: 651

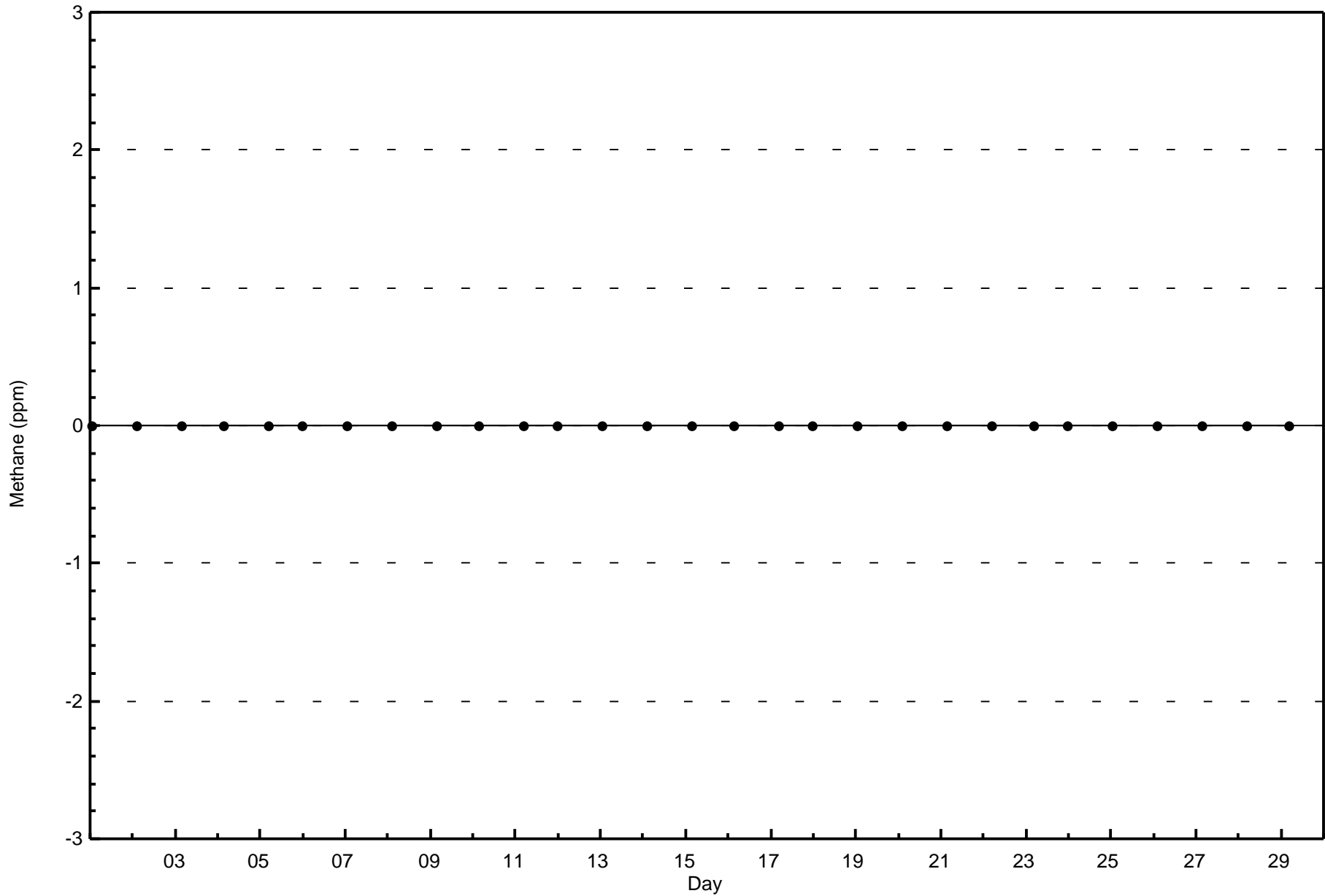
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Methane (CH₄) - ppm
Anzac (AMS 14)

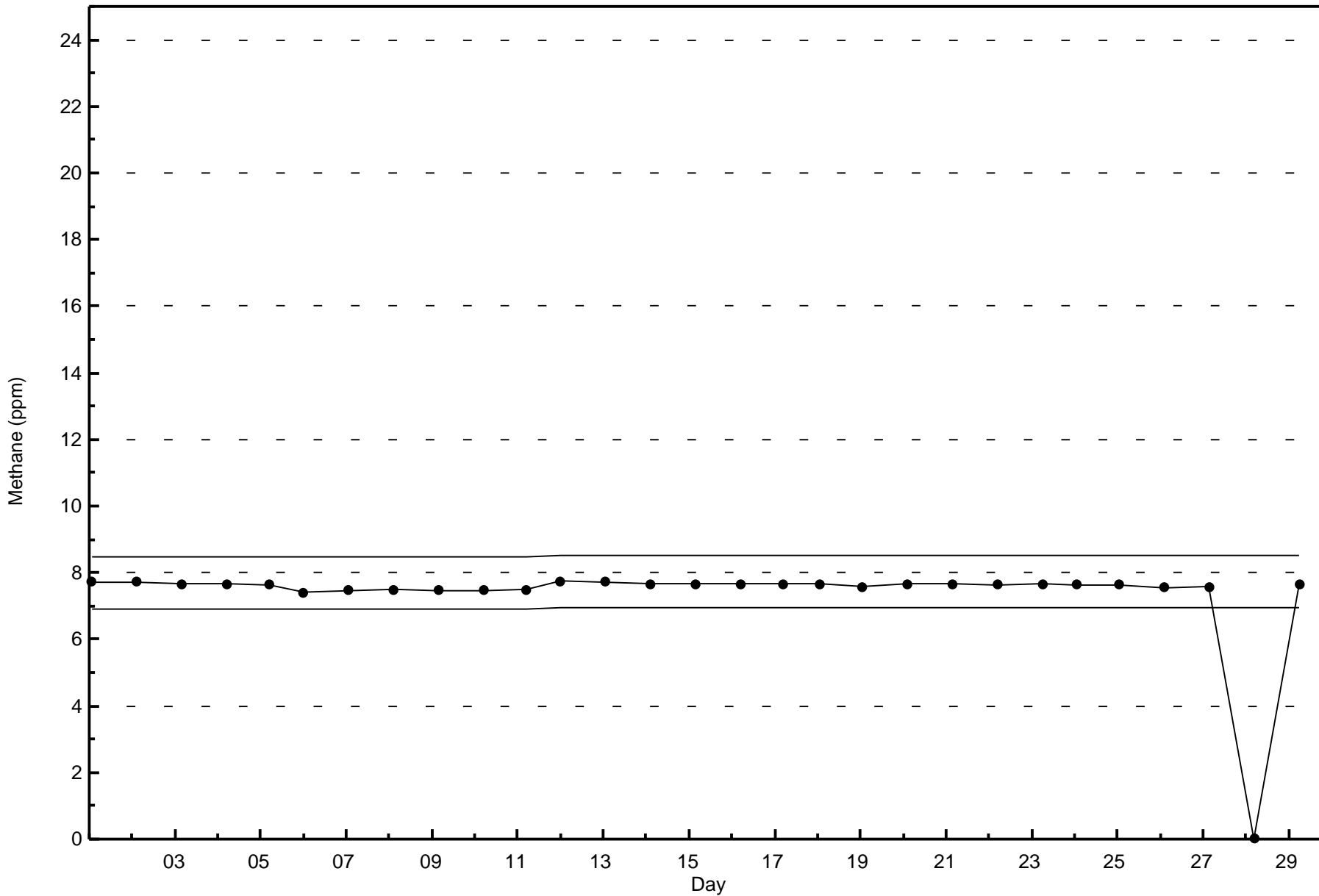






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Anzac - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

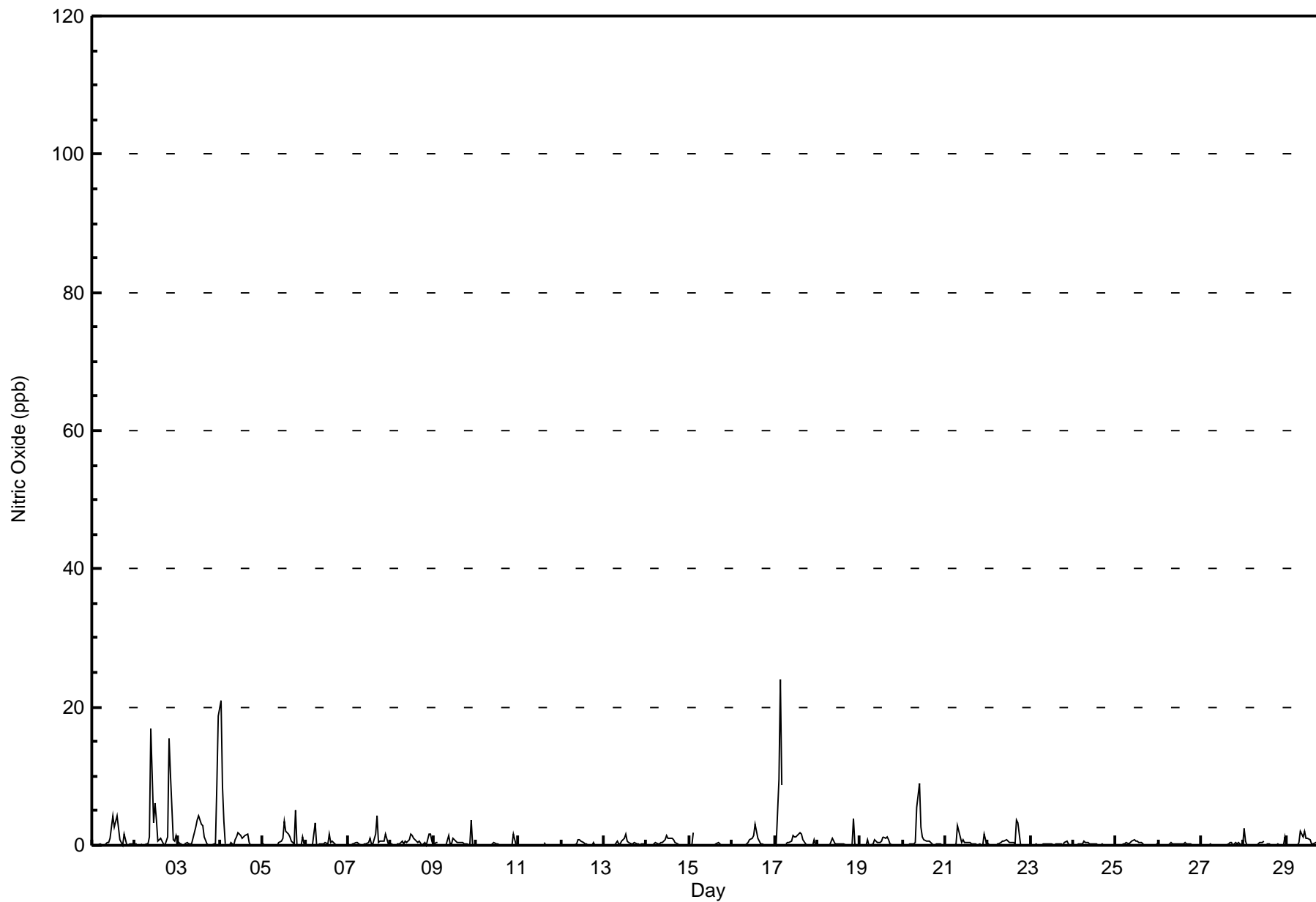
Anzac - February 2016

Maximum Value: 24 ppb on Feb 17 04:00																		Maximum Daily Average: 2.8 ppb on Feb 2						Hours in Service: 696																																															
Minimum Value: 0 ppb on Feb 1 01:00																		Minimum Daily Average: 0.1 ppb on Feb 27						Hours of Data: 660																																															
Maximum Diurnal Average: 1.4 ppb at hour 10																		Minimum Diurnal Average: 0.1 ppb at hour 7						Hours of Missing Data: 36																																															
Monthly Average: 0.7 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 9						Hours of Calibration: 35																																															
																								Percent Operational Time: 99.9																																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																															
1-Feb	0	Z	0	0	0	0	0	0	0	0	1	4	3	4	4	1	0	0	2	0	0	0	0	0	0.9	4																																													
2-Feb	0	0	Z	0	0	0	0	0	1	17	3	6	4	1	1	1	0	0	1	15	10	1	1	1	2.8	17																																													
3-Feb	1	0	0	Z	0	0	0	0	0	2	3	4	4	3	3	1	0	0	0	0	0	0	9	19	2.2	19																																													
4-Feb	21	9	3	0	Z	0	0	0	1	1	2	1	1	1	1	2	0	0	0	0	0	0	0	0	2.0	21																																													
5-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	3	2	2	1	1	0	5	0	0	0	1	0	0.8	5																																													
6-Feb	Z	0	0	0	0	3	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0.3	3																																													
7-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	2	4	0	1	1	1	2	0	0	0.6	4																																													
8-Feb	0	0	Z	0	0	0	1	0	1	0	1	2	1	1	1	0	1	0	0	0	0	2	2	1	0.6	2																																													
9-Feb	0	0	0	Z	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	4	0	0	0.4	4																																													
10-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	2																																													
11-Feb	0	0	0	0	0	Z	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0																																													
12-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																																													
13-Feb	0	Z	0	0	0	0	0	1	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2																																													
14-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																																													
15-Feb	0	0	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2																																													
16-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	3	1	1	0	0	0	0	0	0	0	0	0.4	3																																													
17-Feb	0	0	10	24	9	Z	0	0	0	1	1	1	1	2	2	2	1	0	0	0	0	0	1	0	2.4	24																																													
18-Feb	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0.3	4																																													
19-Feb	0	Z	0	0	1	0	0	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1																																													
20-Feb	0	0	Z	0	0	0	0	0	5	9	3	1	1	1	1	1	0	0	0	0	0	0	0	0	1.0	9																																													
21-Feb	0	0	0	Z	0	0	0	3	1	0	1	0	1	0	0	0	0	0	0	0	0	0	2	0	0.4	3																																													
22-Feb	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	4	3	0	0	0	0	0	0	0.5	4																																													
23-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1																																													
24-Feb	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																																													
25-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	0.2	1																																													
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	0	0	0	0	0	0	0	0	0	0	0.1	0																																													
28-Feb	2	1	0	0	Z	0	0	0	0	0	0	1	M	0	0	0	0	0	0	0	0	0	0	1	0.3	2																																													
29-Feb	0	0	0	0	0	Z	0	0	2	1	2	1	1	1	0	0	0	0	0	0	0	0	0	1	0.5	2																																													
1.0																		0.5						0.7		1.1		0.5		0.3		0.1		0.3		0.7		1.4		0.9		1.1		1.1		0.9		0.7		0.6		0.6		0.2		0.4		0.6		0.6		0.4		0.5		0.8		Diurnal Average			
21																		9						10		24		9		3		1		3		5		17		3		6		4		4		4		4		2		4		3		5		15		10		4		9		19		Diurnal Maximum	
Z - zerospan			C - Calibration			M - Maintenance																																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	658	99.70	99.70
21 - 40	2	0.30	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: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	33	15	16	18	31	30	75	91	36	21	20	7	19	98	69	70	649
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	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	33	15	16	18	31	30	75	91	36	21	20	7	19	98	70	71	651

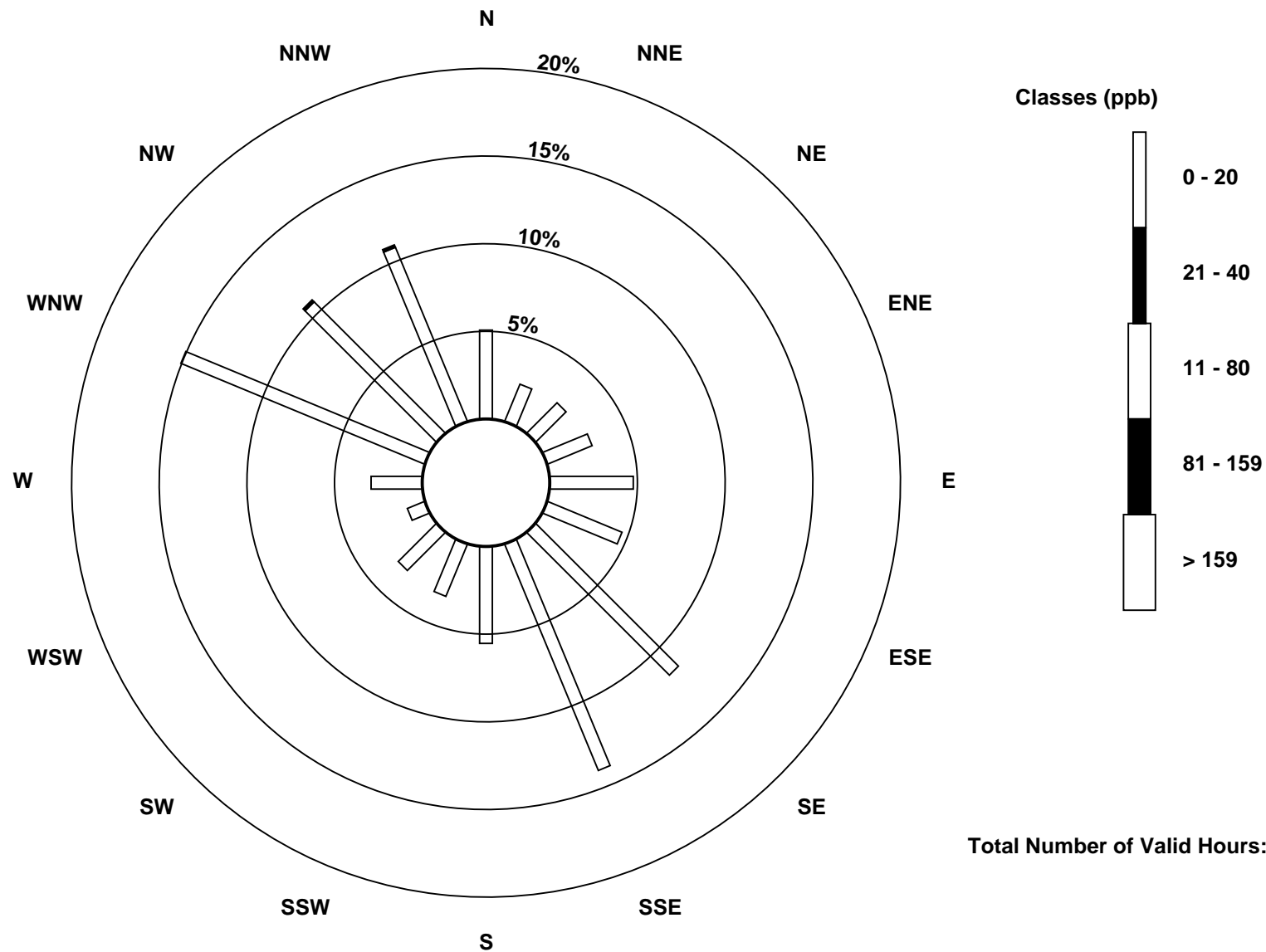
Total Number of Valid Hours: 651

Total Number of Hours: 696

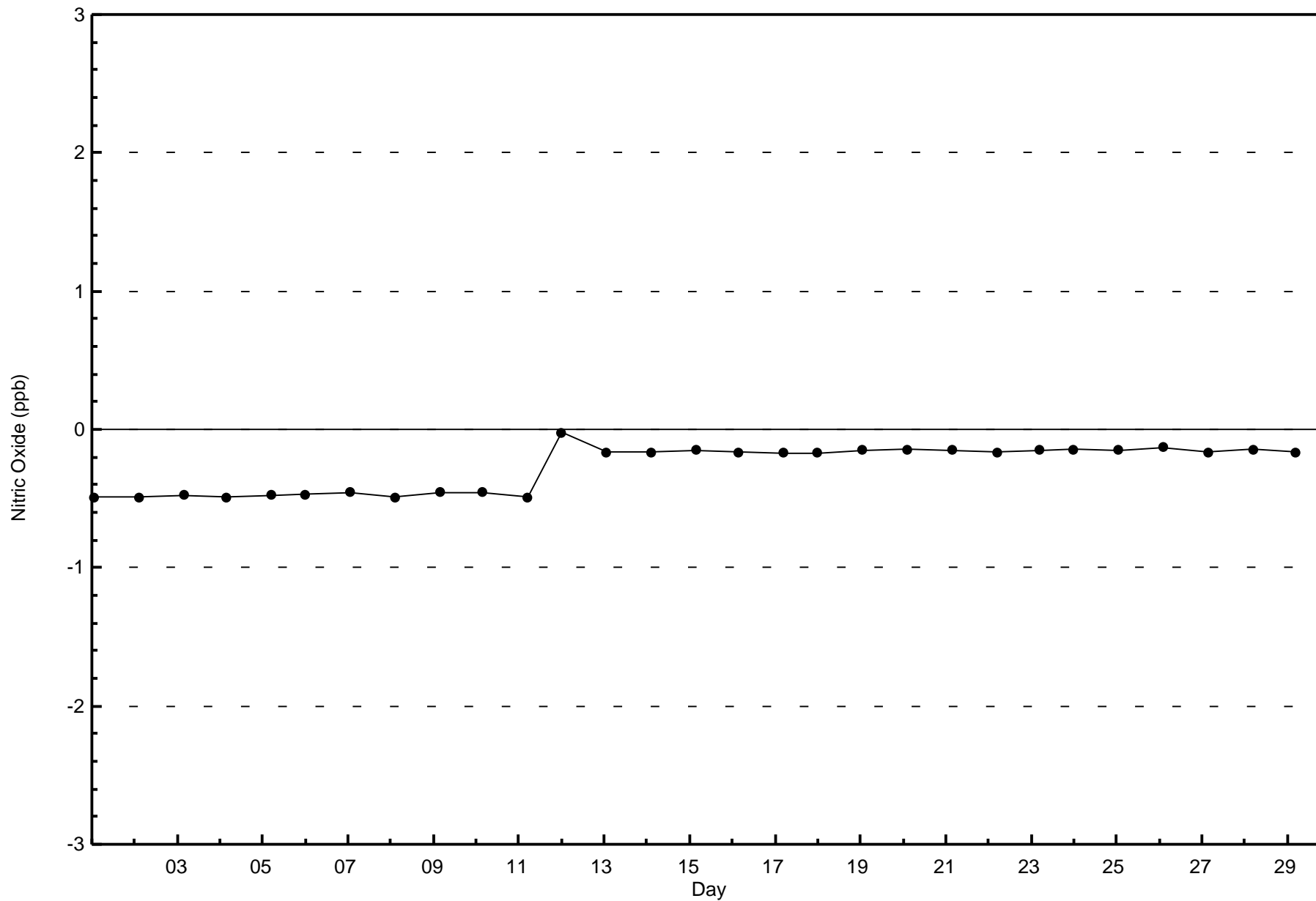


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



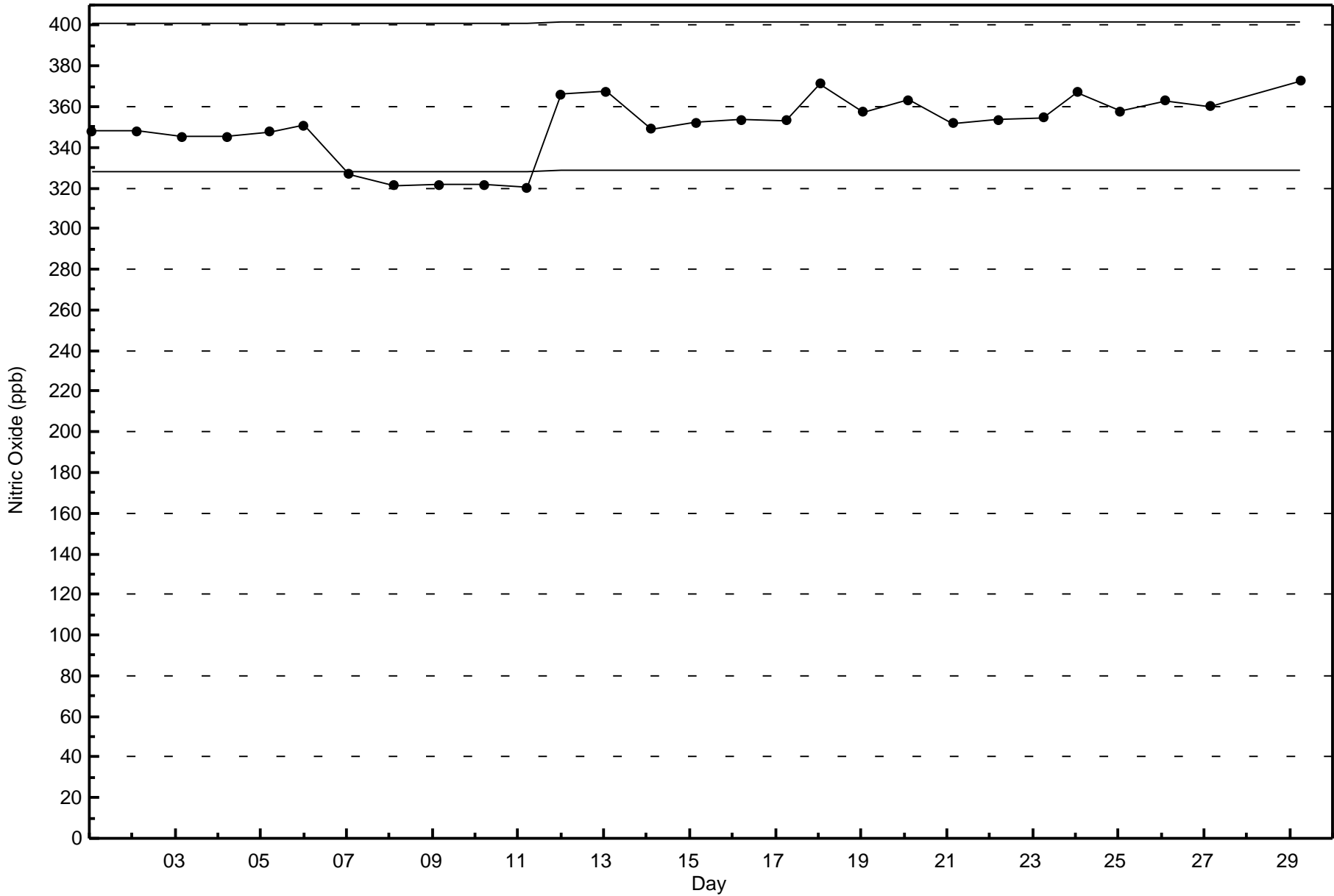
Total Number of Valid Hours: 651





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Anzac - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

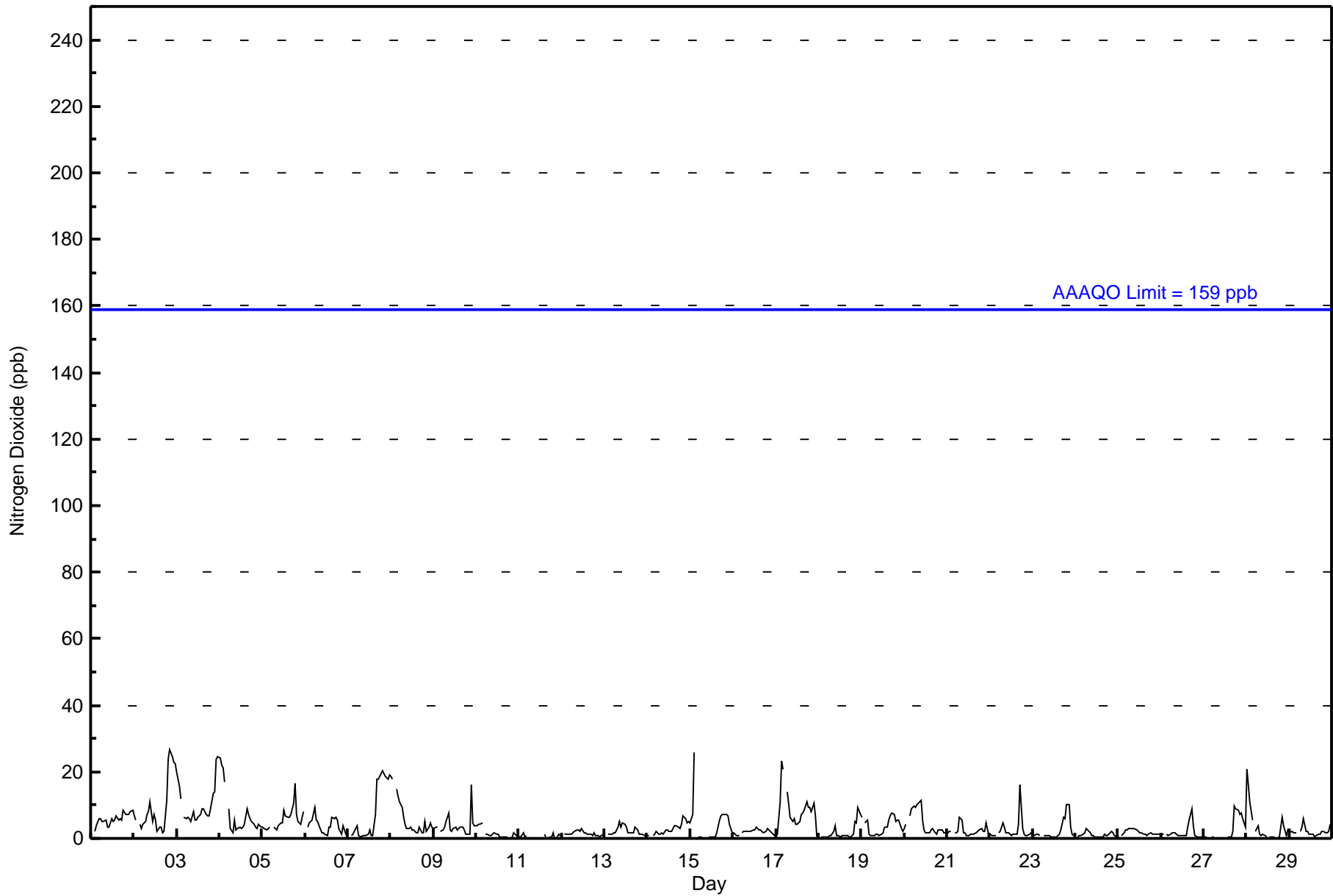
Anzac - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 27 ppb on Feb 2 21:00										Maximum Daily Average: 10.1 ppb on Feb 3										Hours of Data: 660						
Minimum Value: 0 ppb on Feb 10 20:00										Minimum Daily Average: 1.1 ppb on Feb 24										Hours of Missing Data: 36						
Maximum Diurnal Average: 5.5 ppb at hour 22										Minimum Diurnal Average: 2.2 ppb at hour 14										Hours of Calibration: 35						
Monthly Average: 3.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 9 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	1	Z	2	4	6	6	5	5	5	3	4	6	5	6	7	5	6	5	9	7	7	7	8	8	5.5	9
2-Feb	7	6	Z	4	3	4	5	7	8	11	5	7	6	2	3	3	2	2	12	24	27	24	23	22	9.5	27
3-Feb	20	16	12	Z	7	6	6	6	5	8	5	6	6	7	9	9	7	7	7	9	14	14	24	25	10.1	25
4-Feb	24	22	21	17	Z	9	3	2	5	3	3	3	3	3	4	9	7	6	5	4	3	3	4	3	7.3	24
5-Feb	3	3	3	3	3	Z	3	3	3	4	5	5	8	7	7	6	7	11	16	7	5	4	6	8	5.7	16
6-Feb	Z	3	5	5	6	9	6	5	4	2	2	1	1	4	3	7	6	6	6	3	1	4	3	1	4.0	9
7-Feb	1	Z	1	1	3	4	1	1	1	1	1	1	3	1	1	7	18	18	19	21	20	19	18	19	7.6	21
8-Feb	19	18	Z	15	13	11	10	6	4	3	3	3	3	2	2	2	3	2	2	5	2	3	5	3	6.0	19
9-Feb	3	3	4	Z	2	2	3	5	8	3	2	3	4	2	3	3	3	3	1	1	1	16	5	4	3.7	16
10-Feb	4	4	4	5	Z	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	1	2	1	1	1.4	5
11-Feb	1	0	2	0	1	Z	0	0	C	C	C	C	C	C	1	0	0	0	1	2	0	0	1	1	--	2
12-Feb	Z	1	1	1	1	1	2	2	3	2	2	3	2	2	1	1	1	1	2	1	1	1	1	1	1.5	3
13-Feb	1	Z	1	1	1	2	2	4	5	4	5	4	3	2	2	2	2	3	2	1	1	1	1	1	2.3	5
14-Feb	1	1	Z	1	1	2	1	1	2	1	3	3	2	2	3	4	4	4	3	4	7	6	5	5	2.8	7
15-Feb	5	7	26	Z	1	0	0	0	0	0	0	0	0	0	1	2	6	7	7	7	7	7	4	2	3.9	26
16-Feb	2	1	1	1	Z	2	2	2	2	2	2	3	3	3	3	3	2	2	2	3	3	2	1	1	2.0	3
17-Feb	1	1	11	24	21	Z	14	11	6	5	6	4	4	5	7	8	8	11	10	9	8	11	7	1	8.4	24
18-Feb	Z	0	0	0	0	0	1	1	2	4	1	1	1	1	1	1	1	0	1	1	5	5	10	7	1.9	10
19-Feb	6	Z	5	5	1	1	1	1	1	1	1	1	2	4	3	6	7	8	7	5	6	6	3	2	3.6	8
20-Feb	3	4	Z	7	9	10	9	10	11	12	5	3	2	2	2	3	3	2	1	3	2	3	2	2	4.7	12
21-Feb	2	2	2	Z	2	2	2	6	6	2	2	1	1	1	1	1	2	2	3	3	2	2	5	1	2.3	6
22-Feb	1	1	1	1	Z	2	2	5	4	2	2	1	1	1	1	1	4	16	3	1	1	1	1	2	2.4	16
23-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	0	1	1	3	6	6	10	10	3	1	1	2.3	10
24-Feb	Z	1	1	1	1	2	3	3	2	1	1	1	1	1	0	0	1	1	1	2	2	2	1	1	1.1	3
25-Feb	1	Z	1	2	2	2	3	3	3	3	3	2	2	2	1	1	1	1	2	1	1	1	1	1	1.8	3
26-Feb	1	1	Z	1	1	1	2	2	2	1	1	1	1	1	1	3	5	9	4	1	0	0	0	0	1.7	9
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	10	9	9	7	8	6	4	2.5	10
28-Feb	21	16	11	6	Z	2	4	1	1	1	1	1	M	0	0	0	0	0	1	3	6	4	1	3	3.8	21
29-Feb	2	2	2	2	2	Z	2	3	6	2	2	1	1	1	1	1	1	1	2	2	2	2	2	4	2.0	6
5.2 4.9 4.9 4.5 3.6 3.4 3.3 3.3 3.6 2.9 2.4 2.4 2.4 2.2 2.4 3.1 3.9 5.0 4.9 5.2 5.3 5.5 5.1 4.6																								Diurnal Average		
24 22 26 24 21 11 14 11 11 12 6 7 8 7 9 9 18 18 19 24 27 24 24 25																								Diurnal Maximum		
Z - zerspan 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 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	645	97.73	97.73
21 - 40	15	2.27	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	14	16	18	31	30	75	91	36	21	20	7	19	97	64	66	636
21 - 40	2	1	0	0	0	0	0	0	0	0	0	0	0	1	6	5	15
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	15	16	18	31	30	75	91	36	21	20	7	19	98	70	71	651

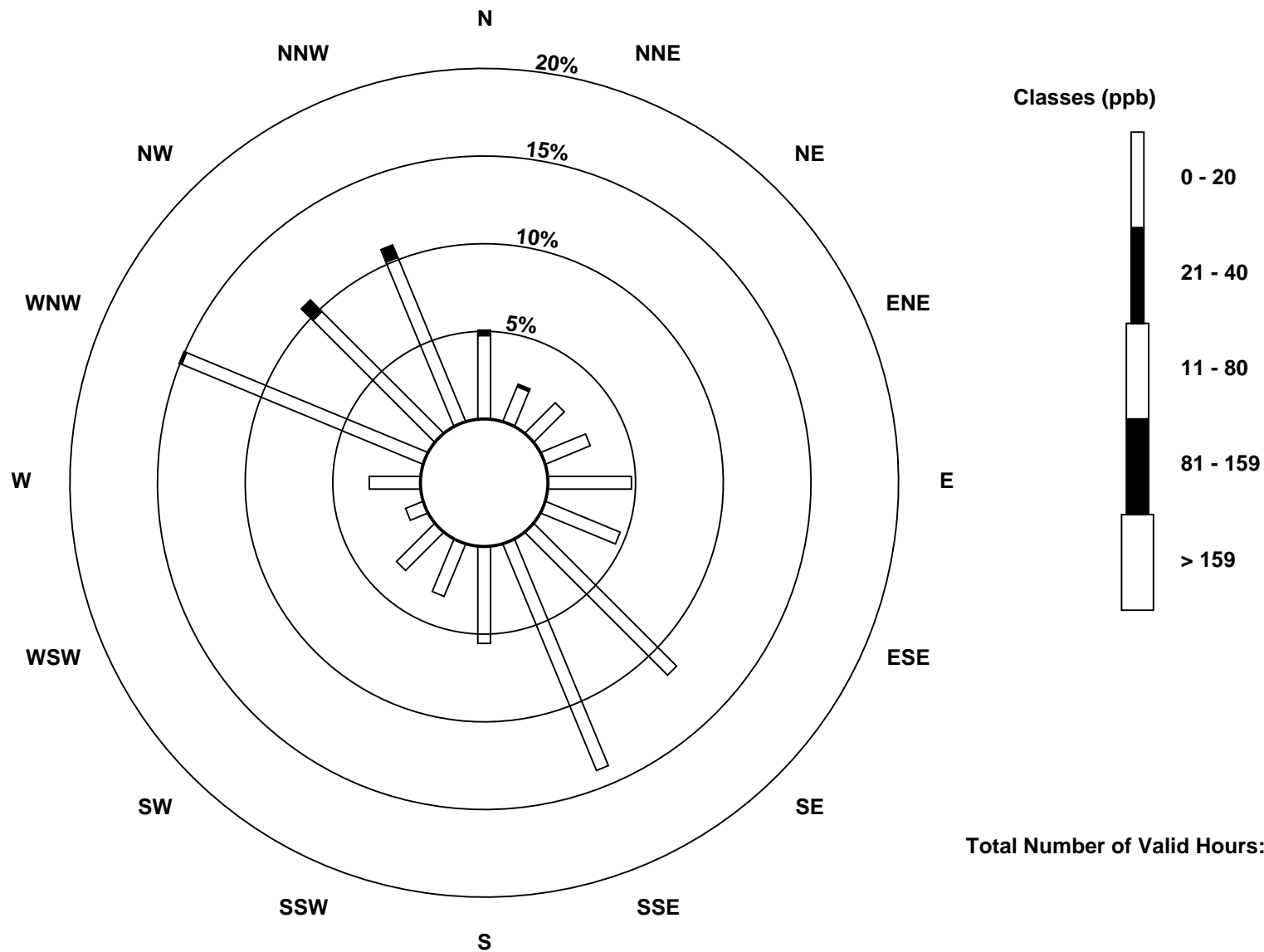
Total Number of Valid Hours: 651

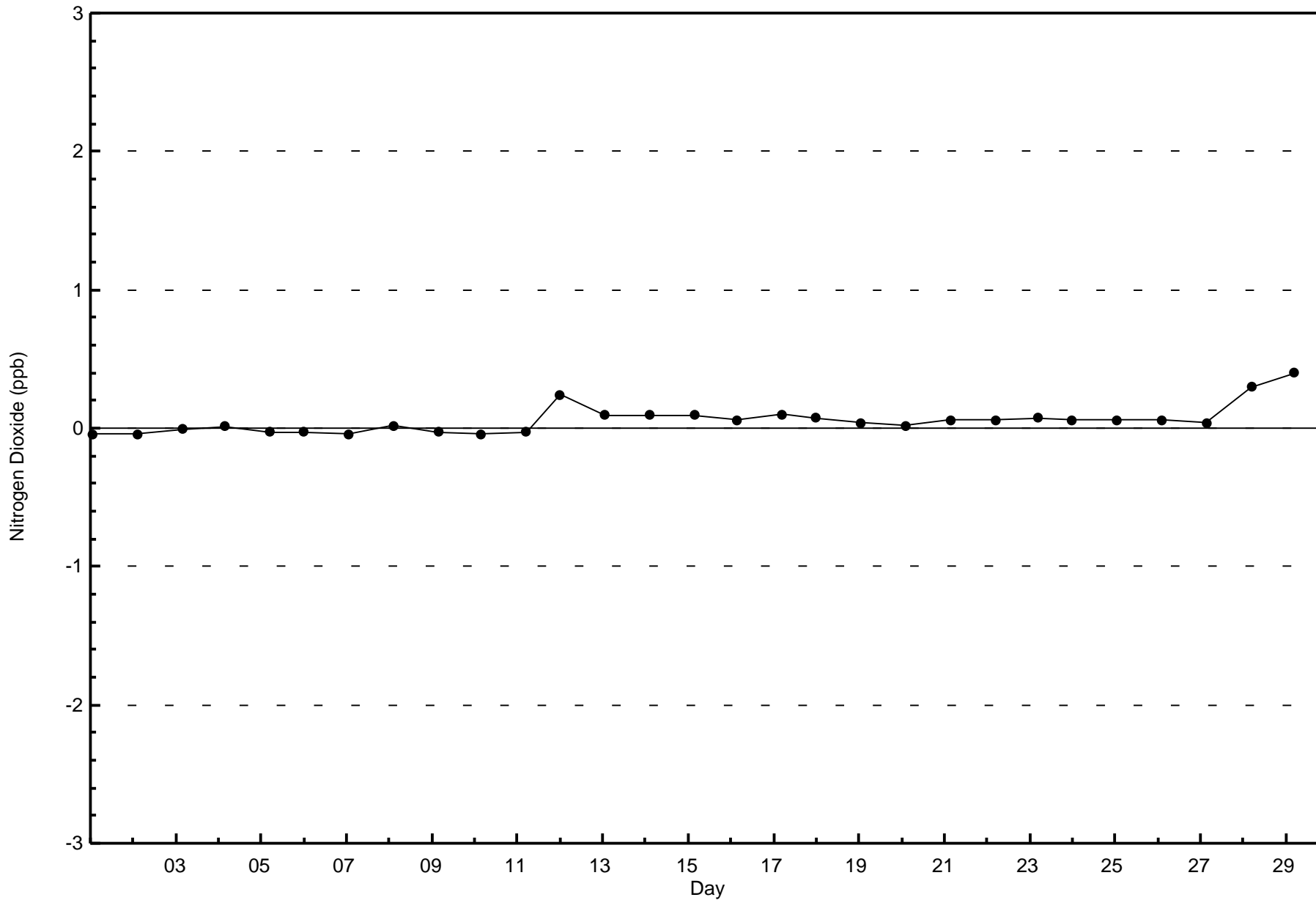
Total Number of Hours: 696

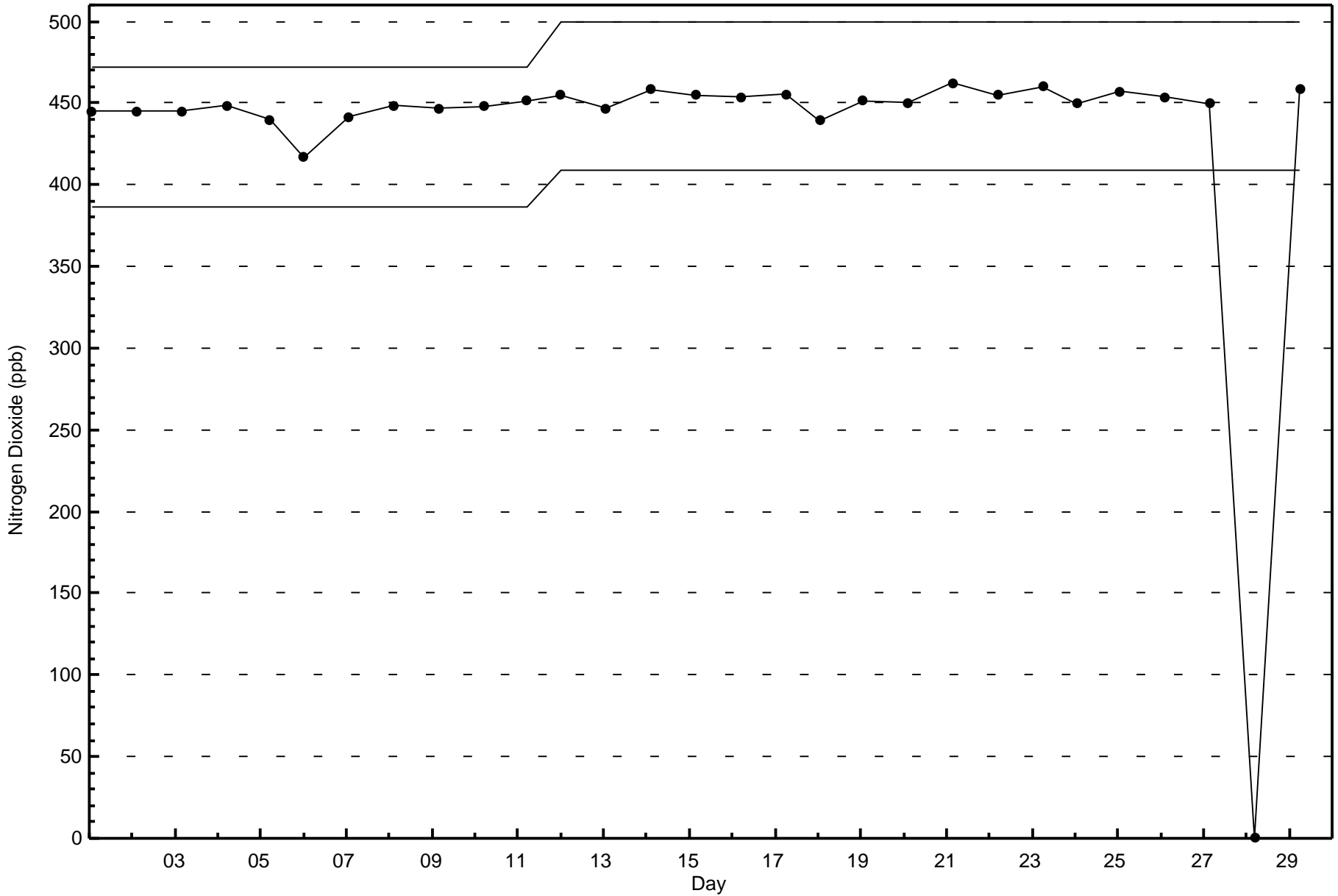


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)







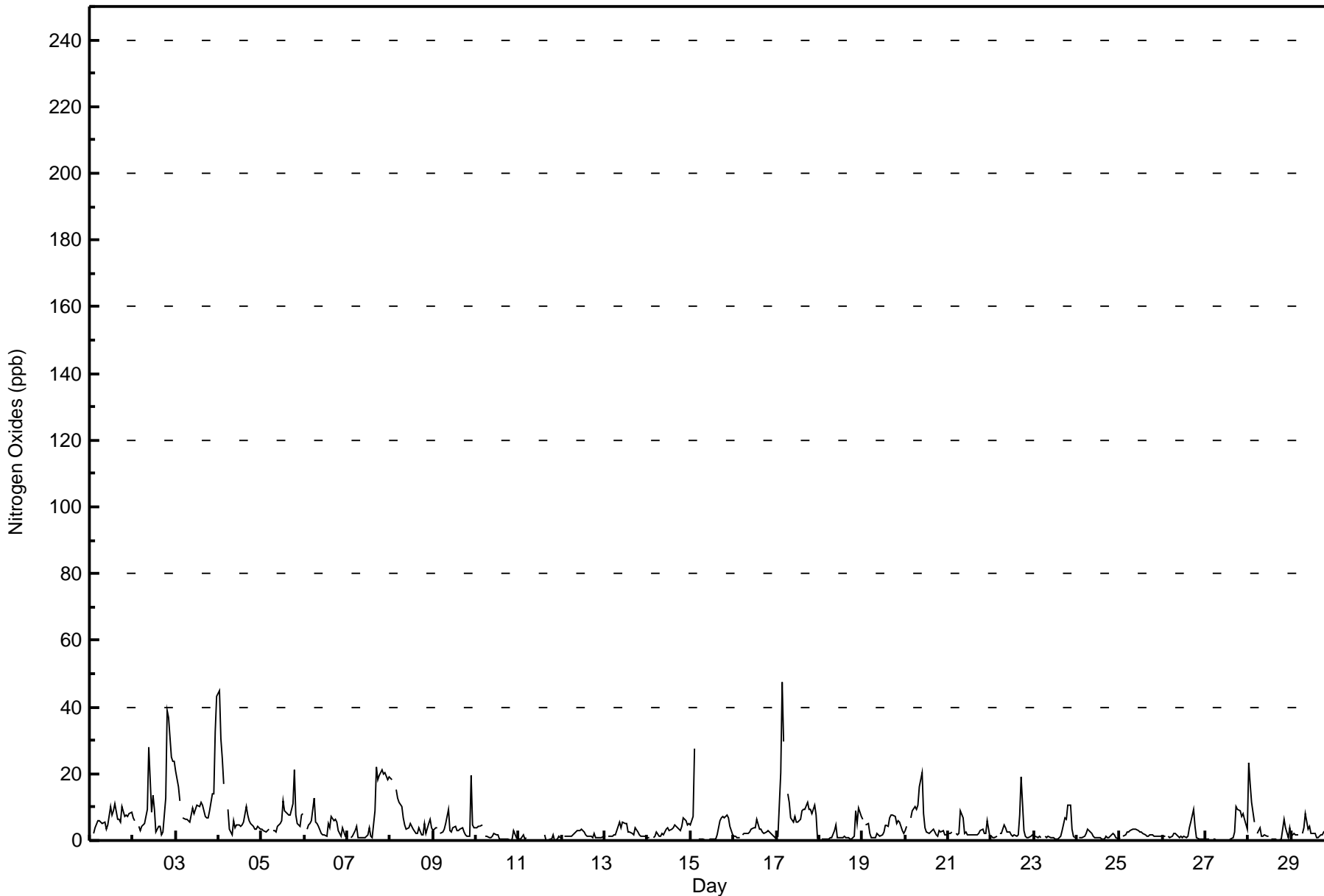


Maximum Value: 47 ppb on Feb 17 04:00		Maximum Daily Average: 12.3 ppb on Feb 3		Hours in Service: 696																							
Minimum Value: 0 ppb on Feb 28 18:00		Minimum Daily Average: 1.3 ppb on Feb 24		Hours of Data: 660																							
Maximum Diurnal Average: 6.2 ppb at hour 1		Minimum Diurnal Average: 3.1 ppb at hour 14		Hours of Missing Data: 36																							
Monthly Average: 4.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 10 P ₉₉ = 30		Hours of Calibration: 35																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	1	Z	2	4	6	6	5	5	6	4	5	10	8	9	11	6	6	5	10	7	7	7	8	8	6.4	11	
2-Feb	7	6	Z	4	3	4	5	7	9	28	8	13	9	3	4	4	2	2	13	39	37	25	24	24	12.2	39	
3-Feb	21	16	12	Z	7	6	7	6	5	10	8	9	11	10	11	10	7	7	9	14	14	32	43	12.3	43		
4-Feb	45	31	25	17	Z	9	4	2	6	4	5	5	4	5	6	10	8	6	5	4	3	3	4	3	9.3	45	
5-Feb	3	3	3	3	3	Z	3	3	3	3	4	5	6	12	9	8	8	8	11	21	7	5	4	8	8	6.4	21
6-Feb	Z	3	5	5	6	13	6	5	4	2	2	2	1	5	4	7	6	6	6	3	1	4	3	1	4.3	13	
7-Feb	1	Z	1	1	3	4	1	1	1	1	1	2	4	1	1	9	22	18	19	21	20	20	18	19	8.3	22	
8-Feb	19	18	Z	15	13	11	10	7	5	3	4	5	4	4	2	2	4	2	2	5	2	5	6	4	6.6	19	
9-Feb	3	4	4	Z	2	2	4	5	9	3	2	4	4	3	3	4	4	3	2	1	1	20	5	4	4.1	20	
10-Feb	4	4	4	5	Z	1	1	1	1	1	2	2	2	0	0	0	0	0	0	0	1	3	1	1	1.5	5	
11-Feb	1	0	2	0	1	Z	0	0	C	C	C	C	C	C	2	0	0	0	1	2	0	0	1	1	--	2	
12-Feb	Z	1	1	1	1	1	2	2	3	3	3	4	2	2	1	1	1	1	2	1	1	1	1	1	1.6	4	
13-Feb	1	Z	1	1	1	2	2	4	5	4	5	5	5	2	2	2	2	4	3	2	1	1	1	1	2.6	5	
14-Feb	1	1	Z	1	1	3	1	1	2	2	3	4	3	3	4	5	4	4	3	4	7	6	5	5	3.2	7	
15-Feb	5	7	27	Z	1	0	0	0	0	0	0	0	0	0	0	2	6	7	7	7	7	7	4	2	4.0	27	
16-Feb	1	1	1	1	Z	1	2	2	2	3	3	4	4	7	4	3	3	2	2	3	3	2	1	1	2.5	7	
17-Feb	1	1	21	47	30	Z	14	11	7	6	7	5	5	6	9	9	9	11	9	9	8	11	8	1	10.7	47	
18-Feb	Z	0	0	0	0	0	1	1	3	4	1	1	1	1	1	1	1	0	0	1	9	5	10	7	2.2	10	
19-Feb	6	Z	5	5	2	1	1	1	2	2	1	2	3	5	4	7	8	8	7	5	6	6	3	2	3.9	8	
20-Feb	3	4	Z	7	9	10	9	11	16	21	8	4	3	2	3	3	3	2	1	3	3	3	2	2	5.7	21	
21-Feb	2	2	2	Z	2	2	2	9	7	2	2	2	2	2	2	1	2	2	3	3	2	2	6	1	2.7	9	
22-Feb	1	1	1	1	Z	2	2	5	4	2	3	2	1	1	1	1	8	19	3	1	1	1	1	2	2.9	19	
23-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	0	1	1	3	7	6	10	11	4	1	1	2.5	11	
24-Feb	Z	1	1	1	1	2	3	3	2	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1.3	3	
25-Feb	1	Z	1	2	3	3	3	3	4	3	3	3	2	2	2	1	1	1	2	2	1	1	1	1	2.0	4	
26-Feb	1	1	Z	1	1	1	2	2	2	1	1	1	1	1	1	4	6	9	4	1	0	0	0	0	1.9	9	
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	10	9	9	7	8	6	4	2.6	10	
28-Feb	23	17	11	6	Z	2	4	1	1	2	1	1	M	0	1	0	0	0	0	4	6	4	1	4	4.1	23	
29-Feb	1	2	2	2	2	Z	2	4	8	3	4	2	2	2	1	1	2	2	3	2	2	2	2	6	2.5	8	
		6.2	5.3	5.5	5.5	4.1	3.7	3.4	3.6	4.2	4.3	3.3	3.5	3.5	3.1	3.1	3.6	4.5	5.2	5.2	5.8	5.8	5.9	5.7	5.4	Diurnal Average	
		45	31	27	47	30	13	14	11	16	28	8	13	12	10	11	10	22	19	21	39	37	25	32	43	Diurnal Maximum	
Z - zerospan		C - Calibration			M - Maintenance																						



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	639	96.82	96.82
21 - 40	18	2.73	99.55
41 - 80	3	0.45	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Anzac - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	14	16	18	31	30	75	91	34	21	19	7	19	97	62	66	630
21 - 40	3	1	0	0	0	0	0	0	2	0	1	0	0	1	7	3	18
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	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	33	15	16	18	31	30	75	91	36	21	20	7	19	98	70	71	651

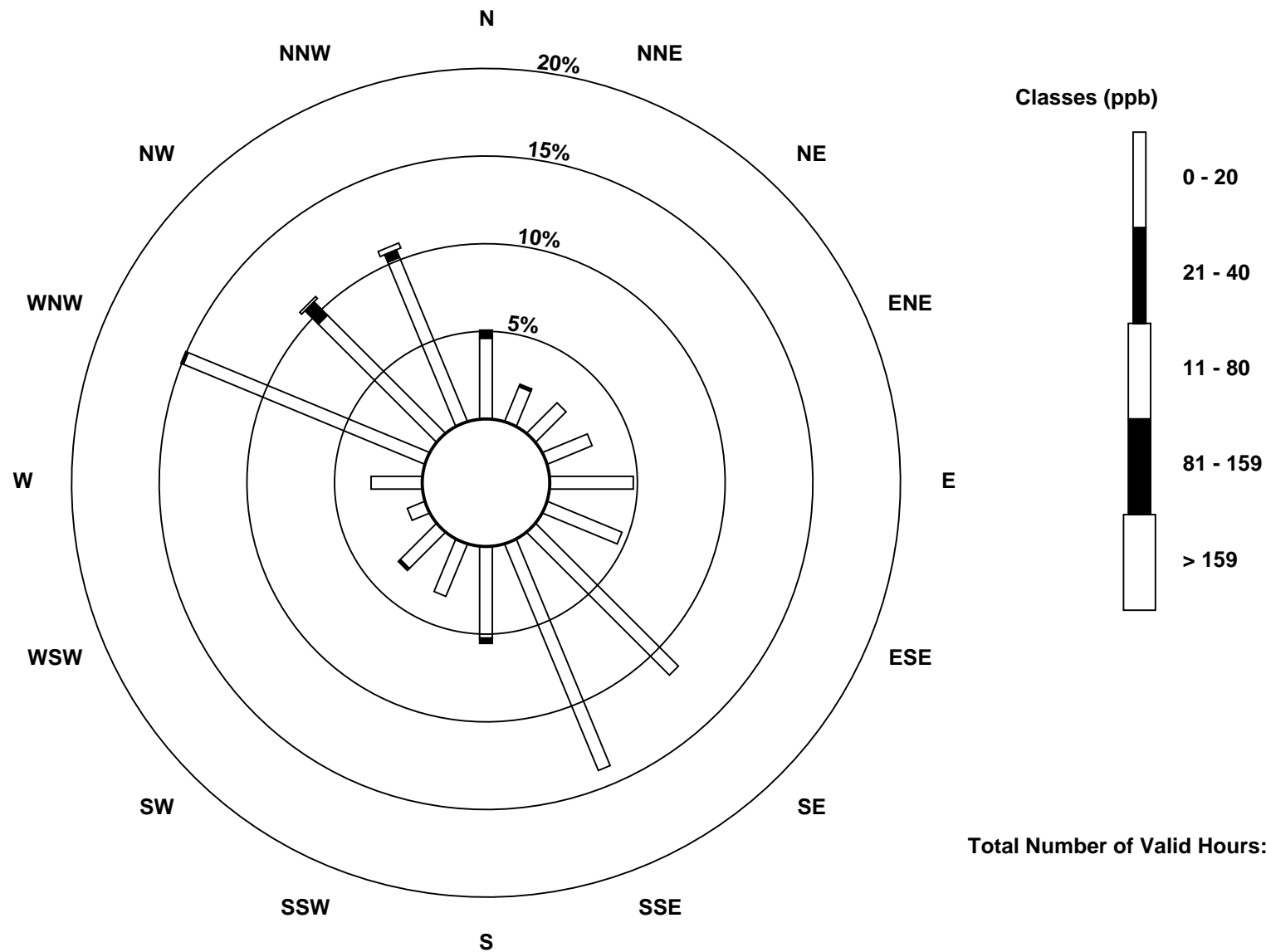
Total Number of Valid Hours: 651

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

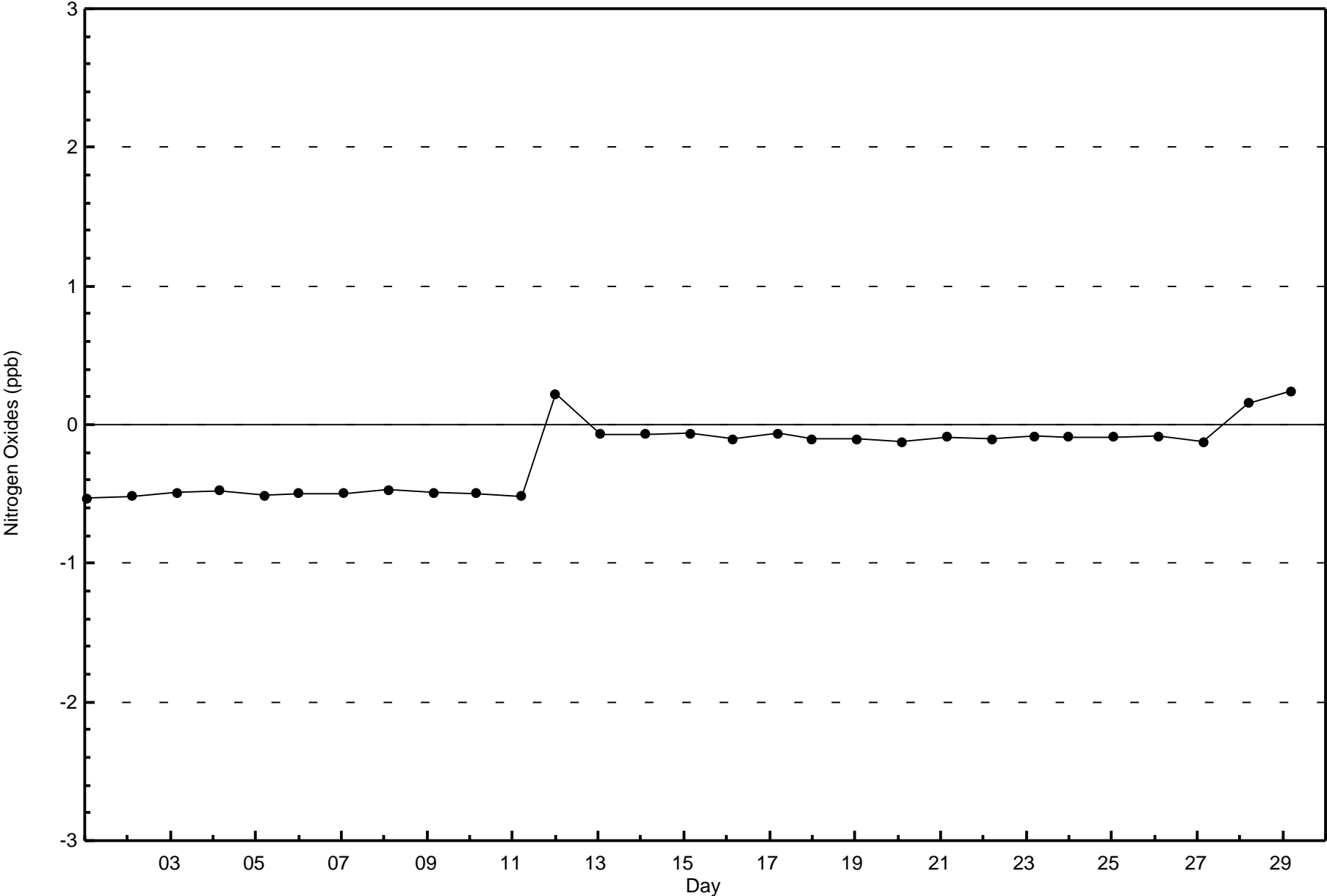
Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)

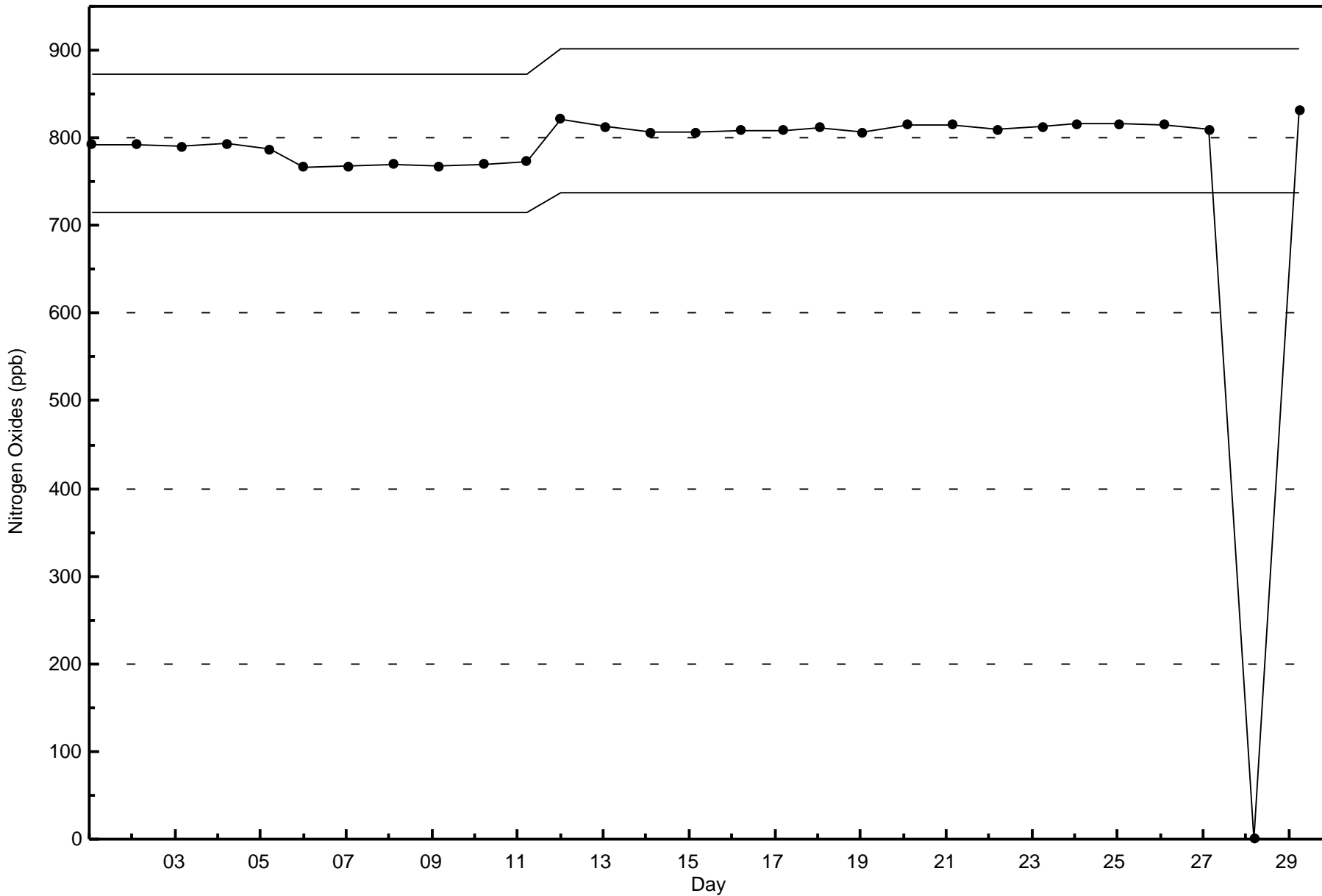




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - February 2016







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

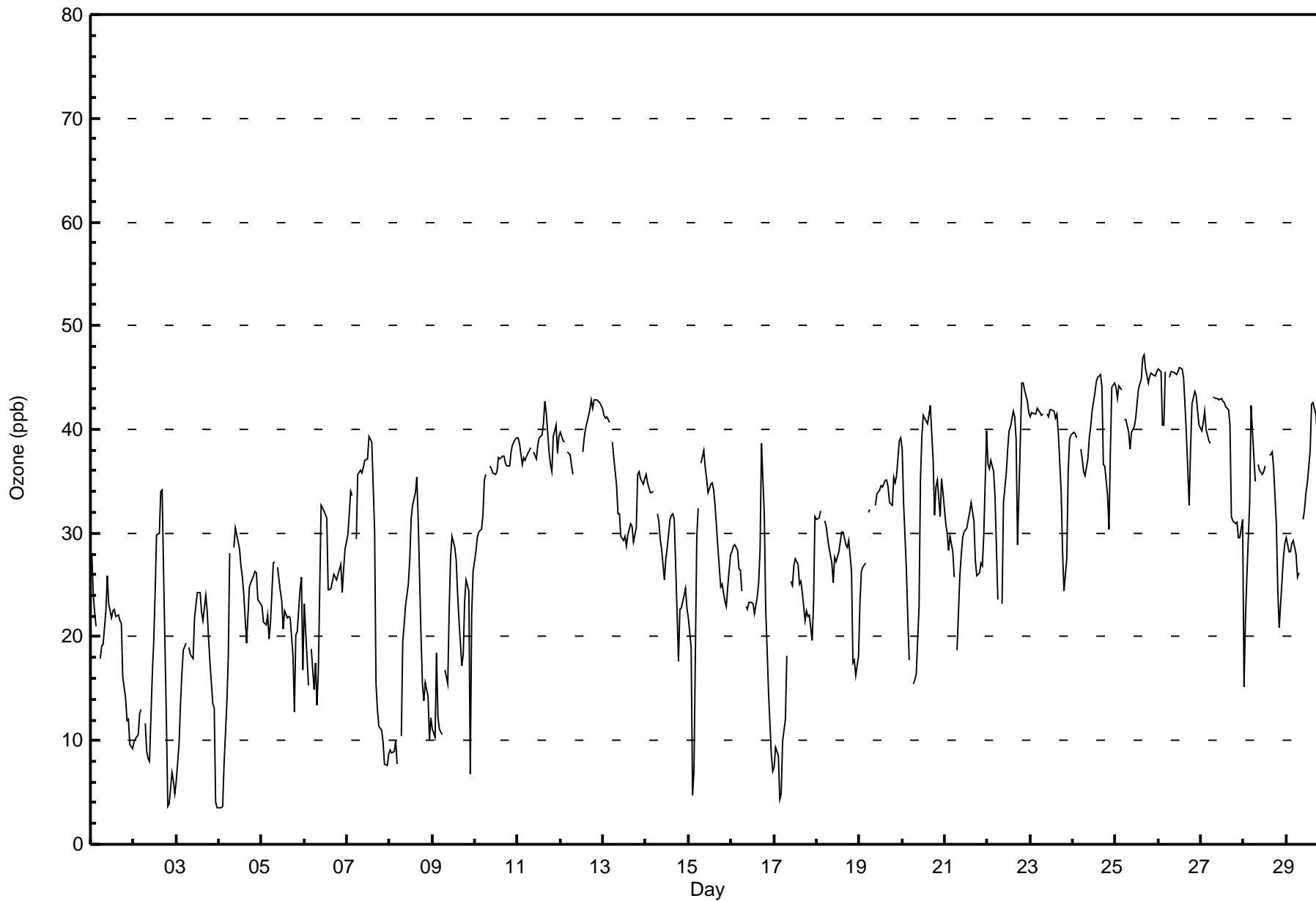
Anzac - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 47 ppb on Feb 25 17:00 Maximum Daily Average: 43.4 ppb on Feb 25										Hours in Service: 696 Hours of Data: 660 Hours of Missing Data: 36 Hours of Calibration: 33 Percent Operational Time: 99.6																
Minimum Value: 3 ppb on Feb 4 02:00 Maximum Diurnal Average: 33.8 ppb at hour 15 Monthly Average: 29.5 ppb										Minimum Daily Average: 15.0 ppb on Feb 2 Minimum Diurnal Average: 26.4 ppb at hour 4 Percentiles: P ₁ = 4 P ₁₀ = 14 Q ₁ = 23 Median = 30 Q ₃ = 38 P ₉₀ = 42 P ₉₉ = 46																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	28	24	22	21	Z	18	19	19	22	26	23	22	22	23	22	22	22	21	16	14	12	12	10	9	19.6	28
2-Feb	10	10	11	13	13	Z	12	9	8	8	16	20	24	30	30	34	34	26	12	4	4	7	6	5	15.0	34
3-Feb	6	10	13	16	19	19	Z	19	18	18	22	23	24	24	22	21	24	22	20	18	14	13	4	4	17.1	24
4-Feb	3	3	4	8	14	18	28	Z	29	31	30	28	27	26	24	19	22	25	25	26	26	26	24	23	21.3	31
5-Feb	23	21	21	22	20	21	27	Z	27	27	24	23	21	22	22	22	22	18	13	20	21	25	26	17	22.0	27
6-Feb	23	18	15	Z	19	15	17	13	17	33	32	32	31	25	24	25	26	26	26	26	27	24	27	28	23.9	33
7-Feb	30	32	34	34	Z	29	36	36	36	36	37	37	39	39	39	30	16	13	11	11	10	8	8	9	26.5	39
8-Feb	9	9	9	10	8	Z	10	20	21	23	25	27	31	33	34	35	31	20	15	14	16	14	10	12	19.0	35
9-Feb	11	10	18	12	11	11	Z	17	15	23	28	30	29	27	24	22	17	18	23	25	24	7	22	26	19.6	30
10-Feb	28	29	30	30	32	35	36	Z	37	36	36	36	36	37	37	37	37	37	36	36	38	39	39	39	35.4	39
11-Feb	39	39	37	37	37	37	38	38	Z	38	37	38	39	39	41	43	42	38	37	36	39	40	38	39	38.5	43
12-Feb	40	39	39	Z	38	38	36	36	C	C	C	C	38	39	40	41	42	43	42	43	43	43	43	42	40.1	43
13-Feb	41	41	41	41	Z	39	37	35	32	32	30	29	30	29	30	31	31	29	30	36	36	35	35	35	34.1	41
14-Feb	36	35	34	34	34	Z	32	31	29	29	25	28	29	31	32	32	31	22	18	23	23	24	25	23	28.6	36
15-Feb	22	19	5	7	30	32	Z	37	38	36	35	34	35	35	34	33	29	27	25	25	24	23	25	28	27.6	38
16-Feb	28	29	29	28	27	26	24	Z	23	23	23	23	23	22	24	25	28	39	32	23	19	15	9	7	23.9	39
17-Feb	8	9	9	4	5	10	12	18	Z	25	25	27	28	27	25	25	24	22	22	22	22	20	23	32	19.3	32
18-Feb	31	31	32	Z	31	31	30	29	27	25	28	27	28	29	30	30	29	29	29	26	18	18	16	18	27.1	32
19-Feb	23	26	27	27	Z	32	32	M	M	33	34	34	35	34	35	35	34	33	33	35	35	36	39	39	32.9	39
20-Feb	38	33	26	22	18	Z	15	16	16	23	35	39	41	41	41	41	42	37	32	34	35	32	35	34	31.6	42
21-Feb	31	30	28	30	28	26	Z	19	26	28	30	30	30	31	32	33	31	27	26	26	27	27	30	40	29.0	40
22-Feb	37	36	37	36	33	29	24	Z	23	33	36	38	40	40	42	41	39	29	39	44	44	44	43	42	36.9	44
23-Feb	41	42	42	42	42	42	41	41	Z	42	41	42	42	42	41	42	40	34	28	24	28	36	39	40	38.8	42
24-Feb	40	40	39	Z	38	37	36	36	37	39	40	42	44	45	45	44	37	36	34	30	38	44	44	44	39.5	45
25-Feb	44	43	44	44	Z	41	41	40	38	40	40	41	43	44	45	47	47	46	45	45	45	45	45	45	43.4	47
26-Feb	46	46	40	40	46	Z	45	46	46	45	45	46	46	46	45	42	40	33	38	42	44	43	42	40	43.1	46
27-Feb	40	41	42	40	39	39	Z	43	43	43	43	43	43	43	42	42	40	32	31	31	31	30	30	31	38.3	43
28-Feb	15	22	26	33	42	40	35	Z	37	36	36	36	37	M	38	38	38	36	31	24	21	23	28	29	31.8	42
29-Feb	30	28	28	29	29	28	26	Z	31	32	34	35	38	42	43	42	40	37	36	35	35	34	32	32	33.5	43
27.6 27.4 27.0 26.4 27.2 28.8 28.8 28.2 28.1 30.7 31.8 32.5 33.4 33.6 33.8 33.7 32.5 29.6 27.9 27.7 27.2 26.9 27.4 28.1																								Diurnal Average		
46 46 44 44 46 42 45 46 46 45 45 46 46 46 45 47 47 46 45 45 45 45 45 45																								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 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	120	18.18	18.18
21 - 50	540	81.82	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	4	0	3	4	2	10	17	20	7	2	2	2	4	19	10	115
21 - 50	25	12	15	18	29	27	60	76	18	14	17	4	17	92	50	62	536
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	34	16	15	21	33	29	70	93	38	21	19	6	19	96	69	72	651

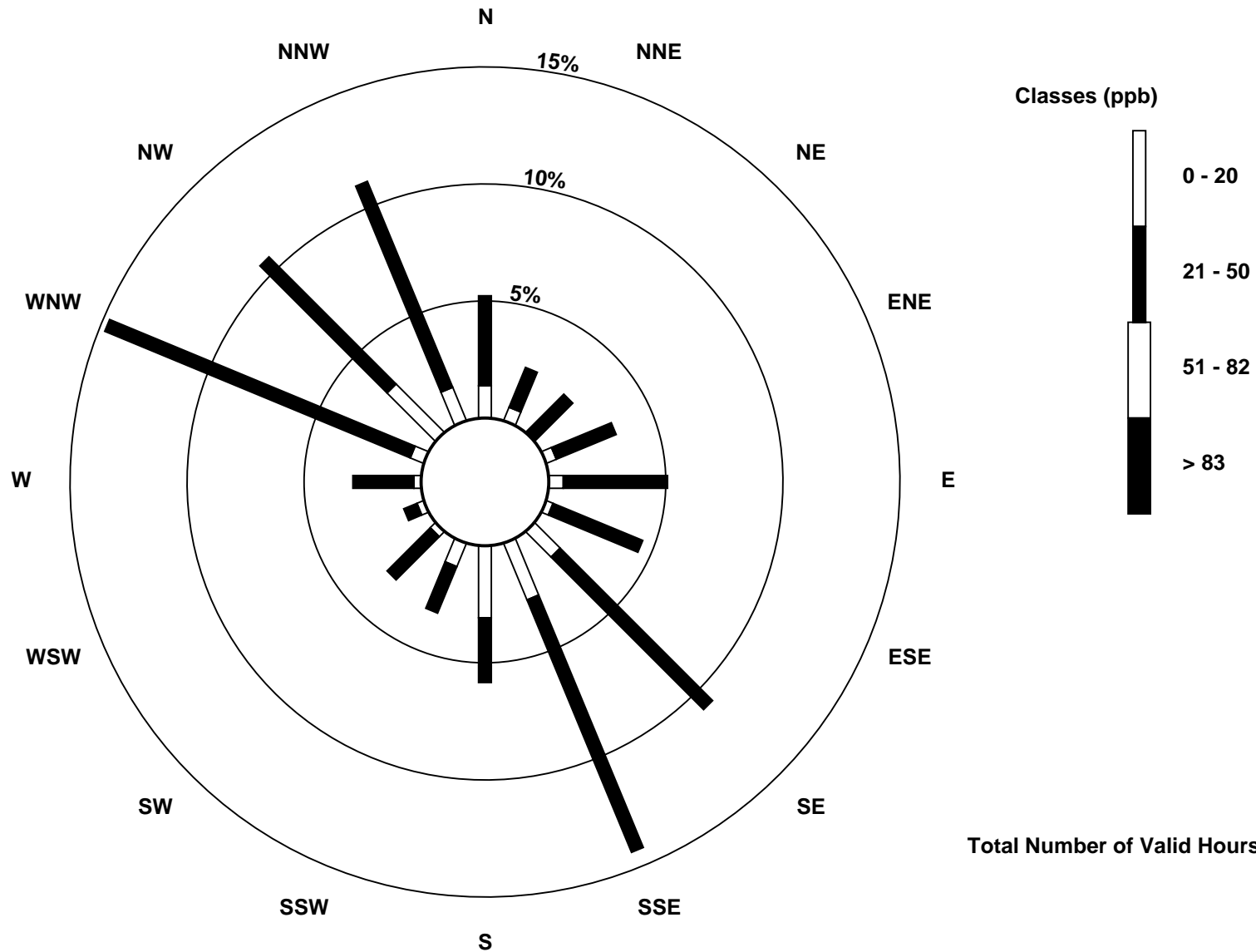
Total Number of Valid Hours: 651

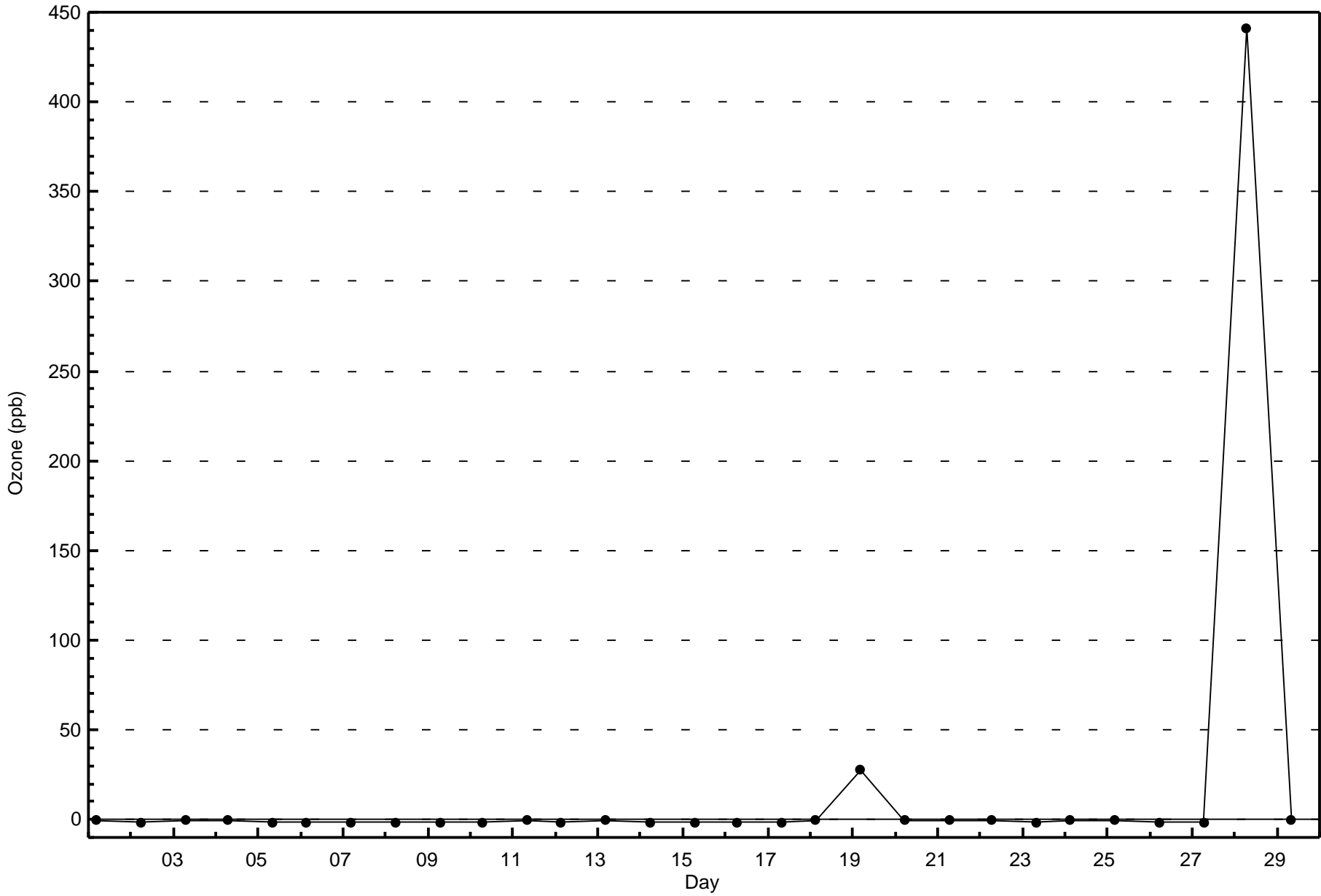
Total Number of Hours: 696

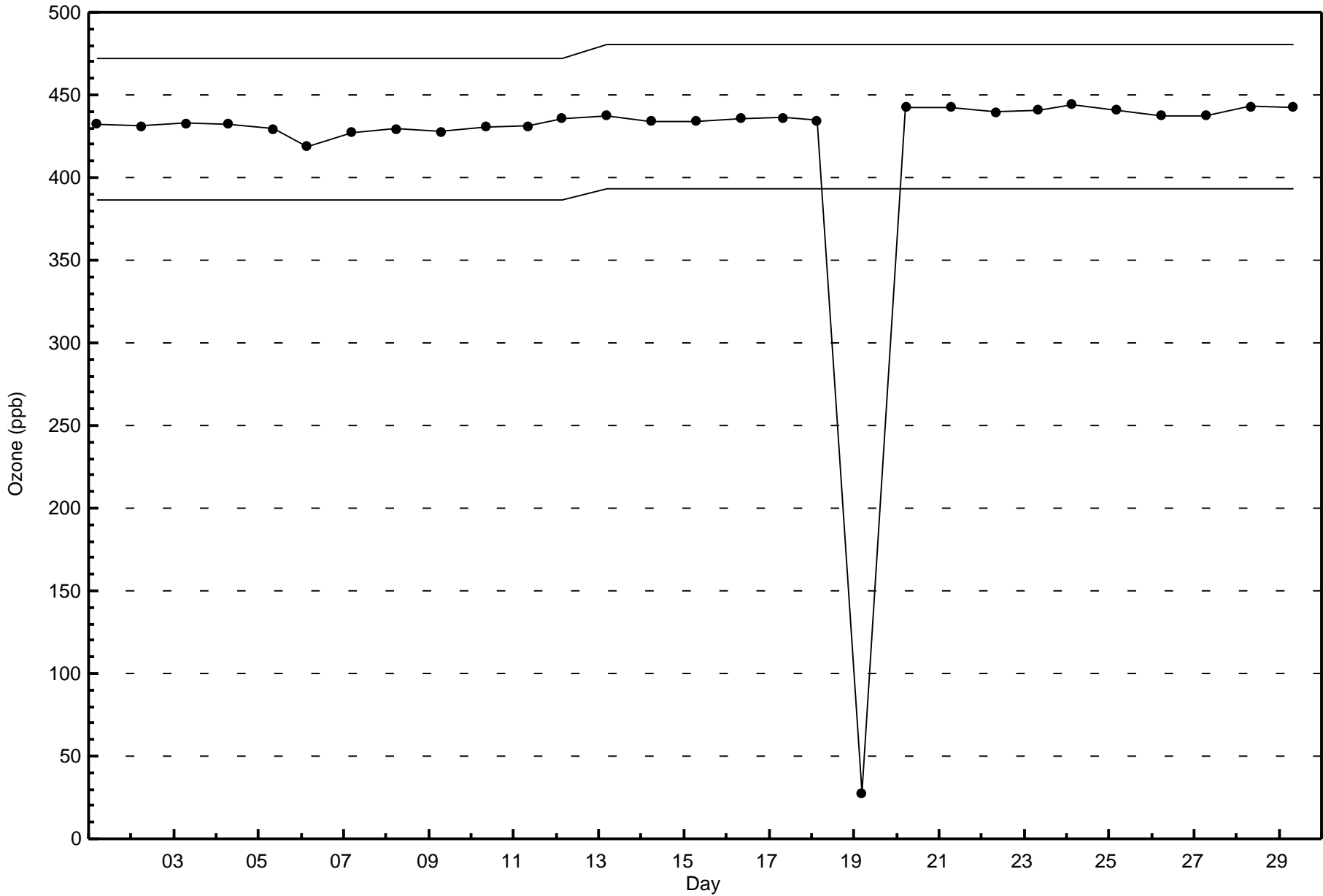


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Ozone (O₃) - ppb
Anzac (AMS 14)







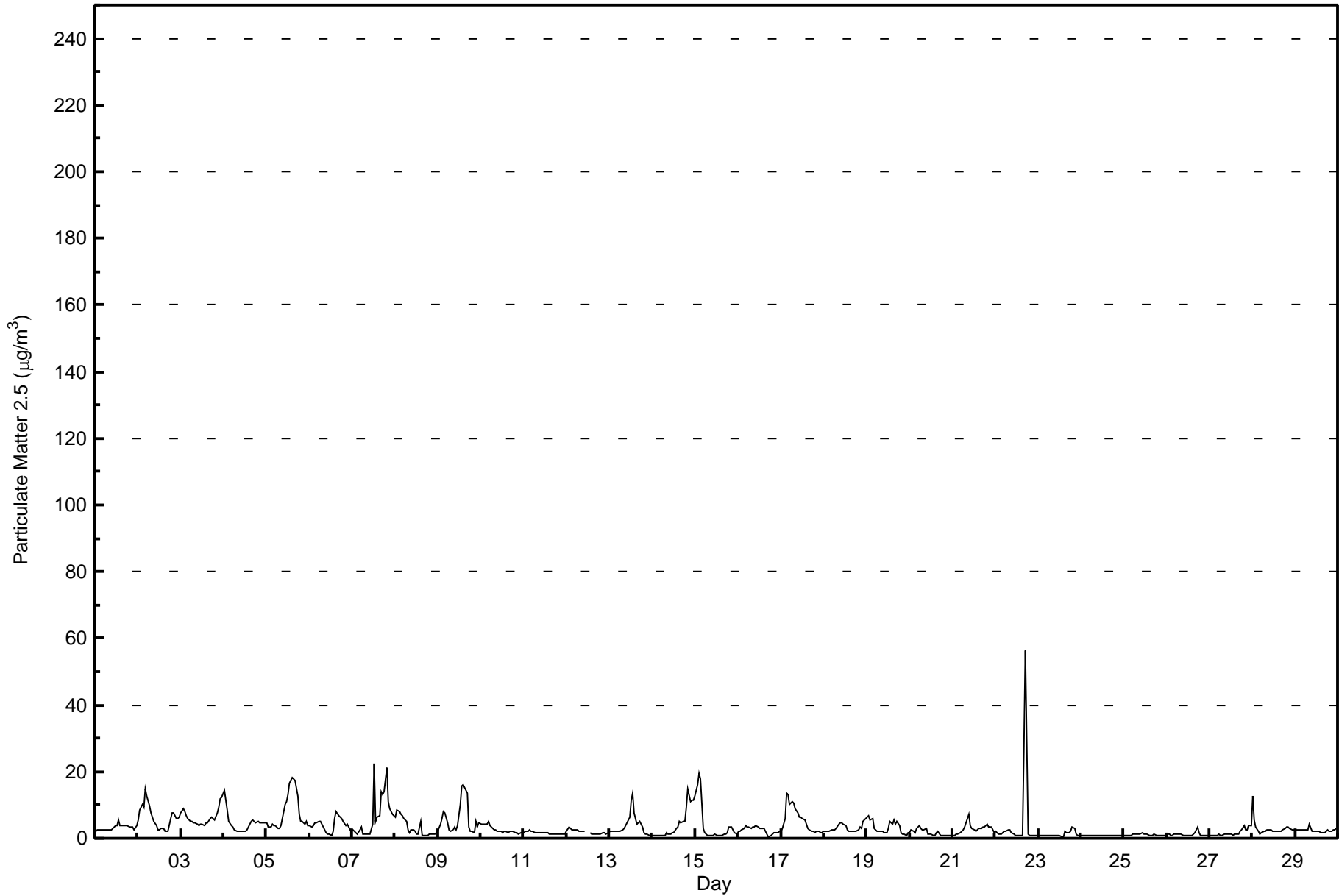


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 696																									
Maximum Value: 56.4 µg/m ³ on Feb 22 18:00		Maximum Daily Average: 7.8 µg/m ³ on Feb 5																									
Minimum Value: 0.5 µg/m ³ on Feb 16 18:00		Hours of Data: 694																									
Maximum Diurnal Average: 5.3 µg/m ³ at hour 18		Hours of Missing Data: 2																									
Monthly Average: 3.50 µg/m ³		Hours of Calibration: 2																									
Minimum Daily Average: 0.8 µg/m ³ on Feb 24		Percent Operational Time: 100.0																									
Minimum Diurnal Average: 2.7 µg/m ³ at hour 11		Percentiles: P ₁ = 0.7 P ₁₀ = 0.9 Q ₁ = 1.3 Median = 2.3 Q ₃ = 4.0 P ₉₀ = 7.0 P ₉₉ = 18.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	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	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.6	2.7	3.1	3.7	3.9	5.4	3.7	3.7	3.9	3.9	3.9	3.6	3.4	3.2	2.7	3.7	3.2	5.4	
2-Feb	5.4	8.4	10.2	9.2	14.8	12.6	9.8	7.7	6.2	4.9	3.8	2.5	2.7	2.9	2.8	2.3	1.9	2.2	5.7	7.7	7.5	5.9	6.1	6.4	6.2	14.8	
3-Feb	7.7	8.8	7.9	7.0	5.9	5.1	4.9	4.9	4.7	4.3	3.9	4.2	4.1	3.7	4.6	4.7	6.1	6.5	5.8	5.7	7.7	9.2	11.8	12.2	6.3	12.2	
4-Feb	14.3	11.3	8.6	5.3	4.0	3.4	2.5	2.2	2.3	2.3	1.9	1.9	2.3	2.7	3.5	5.1	5.5	4.9	4.8	5.1	4.7	4.7	4.7	4.5	4.7	14.3	
5-Feb	4.6	3.5	3.6	4.1	4.0	3.7	3.1	3.1	3.7	5.7	10.3	11.1	13.3	16.3	18.1	17.8	17.6	12.7	7.0	5.2	5.0	4.4	4.9	3.9	7.8	18.1	
6-Feb	3.8	3.6	4.0	4.7	4.7	5.3	4.9	4.3	3.5	1.8	1.5	1.1	0.9	2.0	5.8	8.0	6.8	6.2	5.9	4.9	3.8	4.0	3.4	2.6	4.1	8.0	
7-Feb	2.4	2.1	1.6	1.4	2.7	3.5	1.4	1.4	1.4	1.3	1.3	4.4	22.6	5.3	6.3	6.7	13.9	13.1	14.1	21.0	11.2	9.0	7.2	6.6	6.8	22.6	
8-Feb	6.5	8.7	8.1	7.3	6.9	5.9	5.3	2.6	1.6	2.5	2.6	2.2	1.4	1.1	4.9	0.7	0.7	0.9	1.0	1.1	1.1	1.2	1.3	1.6	3.2	8.7	
9-Feb	2.2	4.3	6.1	8.0	7.6	4.8	2.7	2.0	2.6	3.3	2.4	3.6	10.3	15.6	15.9	15.3	13.6	3.2	2.3	2.2	1.8	5.1	3.2	4.6	5.9	15.9	
10-Feb	4.3	4.1	4.0	4.3	5.1	3.7	3.3	2.7	2.6	2.3	2.3	2.1	1.9	2.0	2.0	1.8	1.9	2.0	1.9	1.9	1.6	1.5	1.5	1.7	2.6	5.1	
11-Feb	1.8	2.1	2.2	2.4	2.1	2.0	1.8	1.7	1.6	1.7	1.8	1.7	1.7	1.7	1.5	1.3	1.3	1.3	1.3	1.4	1.3	1.2	1.3	1.3	1.6	2.4	
12-Feb	2.0	3.5	2.8	2.5	2.7	2.4	2.5	2.2	1.9	2.0	2.0	C	C	1.7	1.3	1.3	1.2	1.3	1.4	1.4	1.6	1.6	1.5	1.7	1.9	3.5	
13-Feb	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.4	3.0	3.7	4.8	6.4	11.4	13.4	7.8	4.4	4.8	5.1	3.2	1.8	1.3	1.1	1.0	0.9	3.8	13.4	
14-Feb	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.7	1.1	1.2	1.5	1.8	2.8	3.2	4.9	4.5	5.0	5.0	9.2	14.8	10.9	11.6	11.6	4.1	14.8	
15-Feb	12.7	16.2	19.6	18.0	2.9	1.7	1.1	0.9	0.9	0.9	1.0	1.2	1.0	0.9	0.9	0.9	1.1	1.4	1.7	3.2	3.5	2.7	1.6	1.3	4.1	19.6	
16-Feb	1.9	2.1	2.6	2.9	3.9	3.5	3.3	3.1	3.3	3.6	3.7	3.3	2.8	3.1	3.0	2.0	1.2	0.5	0.8	1.2	1.5	1.9	1.9	2.0	2.5	3.9	
17-Feb	2.3	2.8	6.1	13.5	13.2	10.2	11.1	10.7	9.0	7.6	6.4	6.6	6.0	5.3	4.2	3.1	2.3	2.1	2.0	1.9	2.0	2.1	1.9	1.9	5.6	13.5	
18-Feb	1.9	2.1	2.2	2.2	2.5	2.5	2.4	3.0	4.2	4.8	4.6	4.3	3.7	2.7	2.3	2.2	2.3	2.3	2.2	2.5	3.5	3.2	5.0	6.0	3.1	6.0	
19-Feb	6.5	6.7	5.6	5.8	3.1	2.7	2.2	2.2	2.0	2.0	1.7	1.8	3.2	5.1	4.0	5.6	4.1	5.1	3.7	1.7	1.4	1.3	1.0	1.6	3.3	6.7	
20-Feb	1.8	2.4	2.1	1.9	2.8	3.8	2.9	2.7	2.6	3.0	1.4	1.1	1.1	0.8	0.9	1.7	1.9	1.0	0.8	0.9	0.8	0.9	1.0	1.0	1.7	3.8	
21-Feb	1.0	1.0	1.1	1.3	1.7	2.3	2.6	3.2	5.9	7.1	4.0	2.9	2.4	2.1	2.5	2.8	2.9	3.3	3.5	4.1	3.5	3.2	3.5	1.8	2.9	7.1	
22-Feb	2.1	1.9	1.4	1.3	1.5	2.1	2.0	2.7	2.7	1.9	1.4	1.0	0.9	0.9	0.9	0.9	27.6	56.4	1.2	0.8	0.9	0.9	0.8	0.9	4.8	56.4	
23-Feb	0.8	0.8	0.8	0.8	0.9	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	2.2	1.8	1.6	2.3	3.2	2.9	1.2	0.8	0.8	1.2	3.2	3.2	
24-Feb	0.8	0.7	0.7	0.7	0.8	0.9	0.9	1.1	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.8	0.8	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.8	1.1	1.1
25-Feb	0.8	0.9	0.9	1.0	1.1	1.1	1.1	1.2	1.2	1.4	1.8	1.2	1.3	1.1	1.0	0.9	0.9	1.1	1.0	0.9	0.9	0.9	0.9	0.9	1.1	1.8	1.8
26-Feb	1.1	1.1	0.9	0.9	1.2	1.3	1.4	1.2	1.1	1.0	1.0	1.0	0.9	0.9	0.9	1.5	1.9	3.3	1.8	0.8	0.7	0.7	0.7	0.7	1.2	3.3	
27-Feb	0.7	0.7	0.7	0.8	1.0	1.2	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.3	1.3	2.1	2.4	3.8	2.4	2.6	3.7	3.9	1.6	3.9	
28-Feb	12.9	5.7	3.3	2.2	1.1	1.7	2.0	2.2	2.5	2.4	2.6	2.2	2.0	2.0	1.9	2.0	2.2	2.7	2.9	3.3	3.3	3.0	2.4	2.5	2.9	12.9	
29-Feb	2.5	2.7	2.5	2.5	2.6	2.5	2.4	2.5	4.3	2.0	2.0	2.1	2.1	2.1	1.7	1.7	1.9	2.0	2.5	2.3	2.1	2.4	2.7	2.9	2.4	4.3	
3.8 3.9 4.0 4.0 3.7 3.3 2.9 2.7 2.8 2.8 2.7 2.8 3.9 3.6 3.7 3.7 4.8 5.3 3.2 3.6 3.3 3.1 3.1 3.2																								Diurnal Average			
14.3 16.2 19.6 18.0 14.8 12.6 11.1 10.7 9.0 7.6 10.3 11.1 22.6 16.3 18.1 17.8 27.6 56.4 14.1 21.0 14.8 10.9 11.8 12.2																								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}) - $\mu\text{g}/\text{m}^3$
Anzac - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - February 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	476	68.59	68.59
6 - 15	93	13.40	81.99
16 - 25	11	1.59	83.57
26 - 80	2	0.29	83.86
> 81.0	0	0.00	83.86

Total Number of Valid Hours: 694

Total Number of Hours: 696



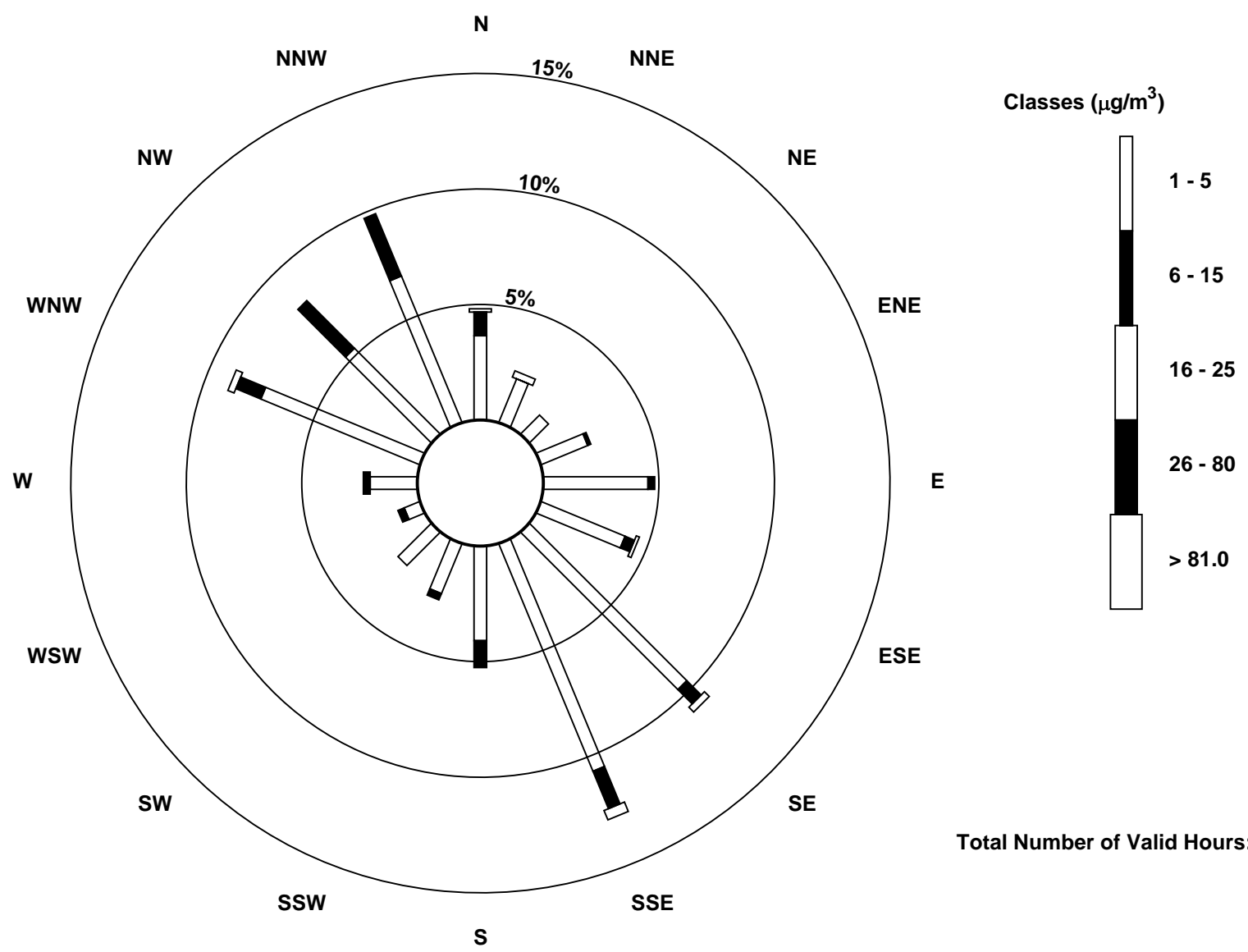
**Wood Buffalo Environmental Association
Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - February 2016**

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	25	14	8	15	31	27	66	73	28	16	14	5	14	51	36	47	470
6 - 15	7	0	0	1	2	3	6	12	8	2	0	2	0	8	20	20	91
16 - 25	1	2	0	0	0	1	2	3	0	0	0	0	0	2	0	0	11
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	16	8	16	33	31	74	88	36	18	14	7	16	61	56	67	574

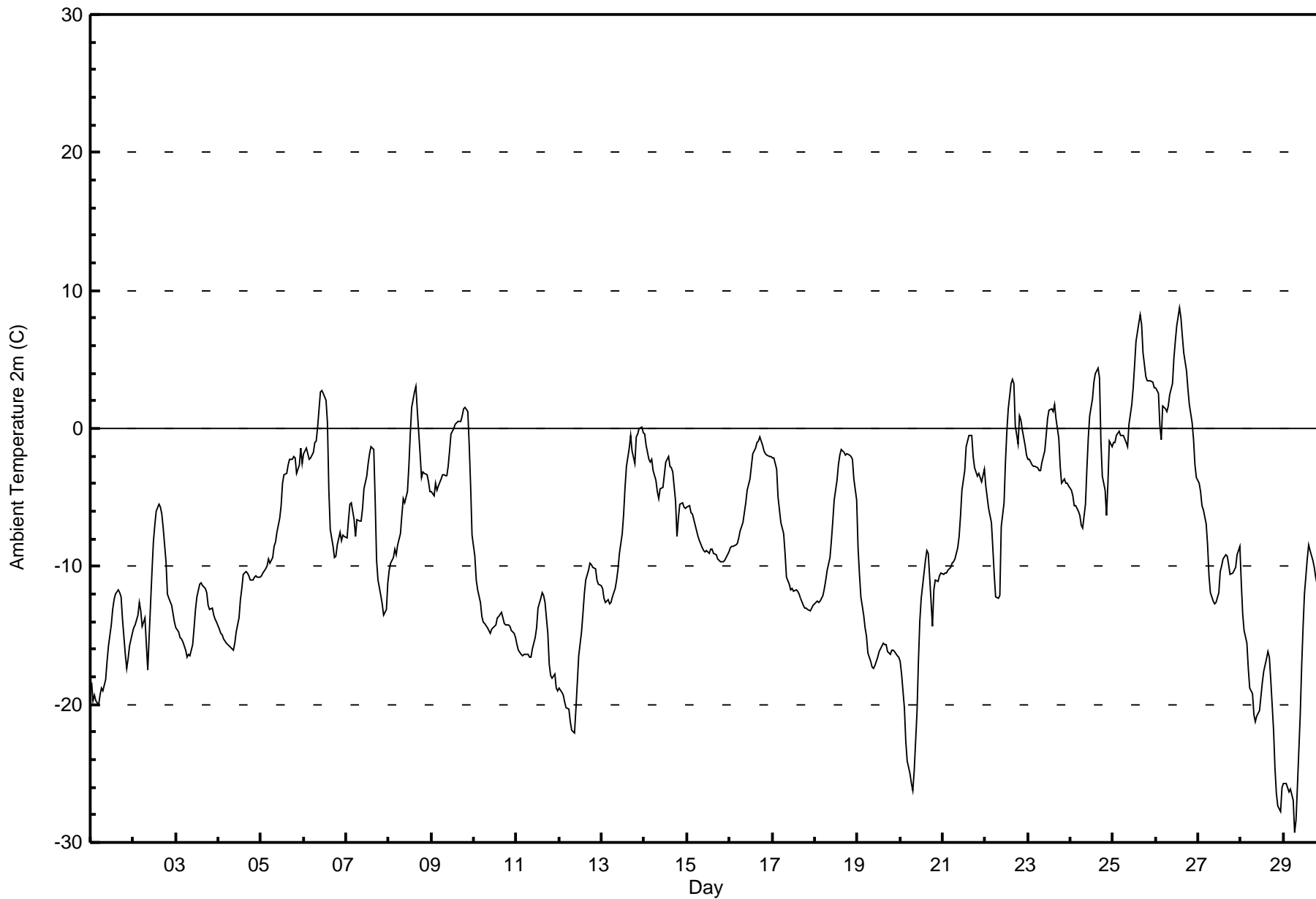
Total Number of Valid Hours: 685

Total Number of Hours: 696





Maximum Value: 8.8 C on Feb 26 14:00																				Maximum Daily Average: 2.8 C on Feb 26					Hours in Service: 696				
Minimum Value: -29.3 C on Feb 29 07:00																				Minimum Daily Average: -19.6 C on Feb 28					Hours of Data: 696				
Maximum Diurnal Average: -5.0 C at hour 16																				Minimum Diurnal Average: -11.4 C at hour 8					Hours of Missing Data: 0				
Monthly Average: -8.53 C																				Percentiles: P ₁ = -26.2 P ₁₀ = -16.9 Q ₁ = -13.5 Median = -9.0 Q ₃ = -2.8 P ₉₀ = 0.2 P ₉₉ = 6.4					Hours of Calibration: 0				
																				Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	-18.4	-19.7	-19.3	-19.7	-20.0	-19.3	-18.8	-19.0	-18.2	-16.9	-15.8	-14.3	-13.2	-12.4	-12.0	-11.7	-11.9	-12.2	-13.9	-16.4	-17.4	-16.6	-15.8	-14.9	-16.2	-11.7			
2-Feb	-14.5	-14.2	-13.5	-12.6	-13.2	-14.3	-13.7	-15.7	-17.5	-15.1	-10.3	-8.3	-7.0	-6.0	-5.5	-5.6	-6.2	-7.2	-9.7	-12.0	-12.3	-12.8	-13.5	-14.1	-11.4	-5.5			
3-Feb	-14.5	-14.7	-15.1	-15.2	-15.4	-16.1	-16.5	-16.4	-16.5	-15.7	-14.5	-13.1	-12.2	-11.2	-11.1	-11.3	-11.6	-11.9	-12.8	-13.1	-13.0	-13.5	-13.8	-14.1	-13.9	-11.1			
4-Feb	-14.5	-14.8	-14.9	-15.3	-15.6	-15.6	-15.7	-15.9	-16.0	-15.5	-14.8	-13.7	-12.5	-11.6	-10.6	-10.4	-10.5	-10.7	-11.0	-11.0	-10.8	-10.7	-10.8	-10.8	-13.1	-10.4			
5-Feb	-10.7	-10.5	-10.2	-9.9	-9.5	-9.8	-9.3	-8.6	-8.3	-7.5	-6.6	-5.6	-3.9	-3.4	-3.3	-2.7	-2.2	-2.2	-2.1	-2.1	-3.2	-2.6	-1.4	-2.5	-5.7	-1.4			
6-Feb	-1.8	-1.5	-1.8	-2.2	-2.1	-1.7	-1.0	-0.9	0.1	2.7	2.7	2.6	2.1	0.4	-4.4	-7.3	-8.5	-9.3	-9.3	-8.4	-7.5	-8.2	-7.7	-7.8	-3.4	2.7			
7-Feb	-7.9	-6.6	-5.5	-5.4	-6.6	-7.8	-6.7	-6.7	-6.7	-5.8	-4.4	-3.5	-2.6	-1.9	-1.3	-1.5	-5.2	-9.6	-11.0	-12.1	-12.7	-13.6	-13.1	-11.2	-7.1	-1.3			
8-Feb	-10.2	-9.7	-9.3	-8.8	-9.1	-8.4	-7.6	-6.3	-5.1	-5.4	-4.5	-2.8	-0.4	1.6	2.7	3.0	1.4	-1.9	-3.5	-3.2	-3.2	-3.4	-3.9	-4.6	-4.3	3.0			
9-Feb	-4.5	-4.9	-4.0	-4.5	-4.2	-3.7	-3.4	-3.4	-3.4	-2.8	-1.6	-0.4	0.0	0.3	0.4	0.5	0.5	0.9	1.4	1.5	1.2	-1.2	-4.2	-7.8	-2.0	1.5			
10-Feb	-9.2	-11.0	-11.7	-12.6	-13.7	-14.0	-14.2	-14.4	-14.7	-14.8	-14.5	-14.3	-14.2	-13.7	-13.6	-13.3	-13.7	-14.2	-14.2	-14.3	-14.3	-14.6	-14.9	-15.2	-13.7	-9.2			
11-Feb	-15.7	-16.0	-16.4	-16.5	-16.4	-16.4	-16.4	-16.5	-16.5	-16.0	-15.1	-14.4	-13.0	-12.3	-11.9	-12.1	-12.6	-14.9	-17.1	-17.9	-18.1	-17.8	-18.8	-19.0	-15.7	-11.9			
12-Feb	-18.8	-19.1	-19.3	-19.8	-20.2	-20.4	-21.2	-21.8	-22.0	-20.4	-18.4	-16.4	-14.7	-13.4	-12.0	-11.0	-10.3	-9.8	-9.9	-10.1	-10.2	-10.9	-11.3	-11.4	-15.5	-9.8			
13-Feb	-11.6	-12.3	-12.6	-12.4	-12.7	-12.6	-12.2	-11.6	-11.0	-10.2	-9.0	-7.6	-6.2	-4.2	-2.7	-1.4	-0.5	-1.7	-2.6	-0.6	-0.4	0.0	0.1	-0.3	-6.5	0.1			
14-Feb	-0.4	-1.2	-2.3	-2.5	-2.2	-3.1	-3.8	-4.5	-5.1	-4.4	-4.3	-3.4	-2.4	-2.0	-2.8	-2.9	-3.2	-5.3	-7.8	-6.6	-5.5	-5.4	-5.7	-5.7	-3.9	-0.4			
15-Feb	-5.7	-5.6	-6.1	-6.2	-7.0	-7.4	-7.8	-8.2	-8.6	-8.9	-9.0	-8.9	-9.0	-8.8	-8.8	-9.1	-9.1	-9.4	-9.6	-9.7	-9.7	-9.6	-9.4	-8.9	-8.4	-5.6			
16-Feb	-8.6	-8.6	-8.5	-8.5	-8.3	-7.9	-7.4	-6.8	-6.1	-5.4	-4.5	-3.6	-2.7	-1.8	-1.4	-1.0	-0.9	-0.6	-1.2	-1.7	-1.8	-1.9	-2.1	-2.0	-4.3	-0.6			
17-Feb	-2.1	-2.2	-3.0	-5.0	-5.9	-6.8	-7.6	-9.1	-10.8	-11.3	-11.7	-11.6	-11.8	-11.7	-11.8	-12.0	-12.3	-12.8	-13.0	-13.0	-13.1	-13.2	-13.0	-12.8	-9.9	-2.1			
18-Feb	-12.7	-12.5	-12.6	-12.5	-12.1	-11.6	-11.0	-10.2	-9.3	-8.2	-6.7	-5.2	-3.8	-2.7	-1.9	-1.5	-1.7	-1.9	-1.9	-1.9	-2.0	-2.2	-3.7	-5.2	-6.5	-1.5			
19-Feb	-8.7	-10.5	-12.2	-13.5	-14.4	-15.1	-16.3	-16.9	-17.3	-17.4	-17.2	-16.6	-16.1	-16.0	-15.6	-15.7	-15.7	-16.2	-16.4	-16.1	-16.0	-16.1	-16.5	-16.5	-15.4	-8.7			
20-Feb	-16.9	-17.8	-20.2	-22.7	-24.1	-25.1	-25.7	-26.2	-24.8	-20.6	-16.9	-14.0	-12.3	-10.5	-9.6	-8.8	-9.1	-12.5	-14.4	-11.7	-11.0	-11.0	-10.7	-10.4	-16.1	-8.8			
21-Feb	-10.5	-10.4	-10.5	-10.2	-10.0	-9.8	-9.7	-9.5	-8.7	-7.9	-6.3	-4.4	-3.0	-1.4	-0.9	-0.5	-0.5	-2.0	-2.8	-3.4	-3.2	-3.6	-3.9	-3.0	-5.7	-0.5			
22-Feb	-4.1	-5.0	-5.8	-6.8	-8.6	-10.6	-12.2	-12.3	-12.1	-7.1	-5.4	-2.4	-0.2	1.4	3.2	3.5	3.2	0.2	-1.1	0.9	0.6	-0.1	-1.3	-1.9	-3.5	3.5			
23-Feb	-2.2	-2.2	-2.6	-2.7	-2.7	-2.9	-3.0	-3.0	-2.5	-1.6	-0.5	0.7	1.3	1.4	1.3	1.8	0.7	-0.7	-2.7	-3.9	-3.7	-4.0	-3.9	-4.2	-1.7	1.8			
24-Feb	-4.5	-4.9	-5.6	-5.6	-6.0	-6.3	-7.0	-7.2	-5.5	-3.0	-0.7	0.9	2.1	3.3	3.9	4.4	3.7	-0.9	-3.5	-4.5	-6.3	-3.9	-0.9	-1.4	-2.5	4.4			
25-Feb	-1.0	-1.0	-0.6	-0.2	-0.5	-0.5	-0.5	-1.1	-1.3	0.3	1.7	3.0	4.6	6.3	7.6	8.2	7.5	5.4	3.8	3.5	3.5	3.4	3.3	3.0	2.4	8.2			
26-Feb	3.0	2.5	0.2	-0.8	1.7	1.5	1.2	1.6	2.4	3.3	5.1	6.3	7.5	8.8	8.0	6.8	5.4	4.2	2.9	1.7	0.5	-0.9	-2.6	-3.6	2.8	8.8			
27-Feb	-4.0	-4.5	-5.6	-5.9	-6.9	-8.4	-10.6	-11.9	-12.5	-12.7	-12.6	-11.9	-10.4	-10.0	-9.5	-9.1	-9.3	-9.9	-10.6	-10.5	-10.2	-10.0	-9.2	-8.5	-9.4	-4.0			
28-Feb	-11.2	-13.4	-14.7	-15.6	-17.4	-18.9	-19.3	-20.8	-21.3	-20.8	-20.4	-19.4	-18.4	-17.5	-16.7	-16.2	-16.6	-18.2	-21.9	-24.6	-26.4	-27.4	-27.8	-26.0	-19.6	-11.2			
29-Feb	-25.8	-25.8	-26.0	-26.3	-26.1	-26.9	-29.3	-28.4	-26.0	-20.7	-17.3	-14.5	-12.0	-9.4	-8.4	-8.8	-9.6	-10.1	-10.8	-11.3	-11.5	-11.2	-11.0	-11.0	-17.4	-8.4			
																								Diurnal Average					
																								Diurnal Maximum					





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Anzac - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	35	5.03	5.03
-20 - 0	586	84.20	89.22
0 - 10	75	10.78	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

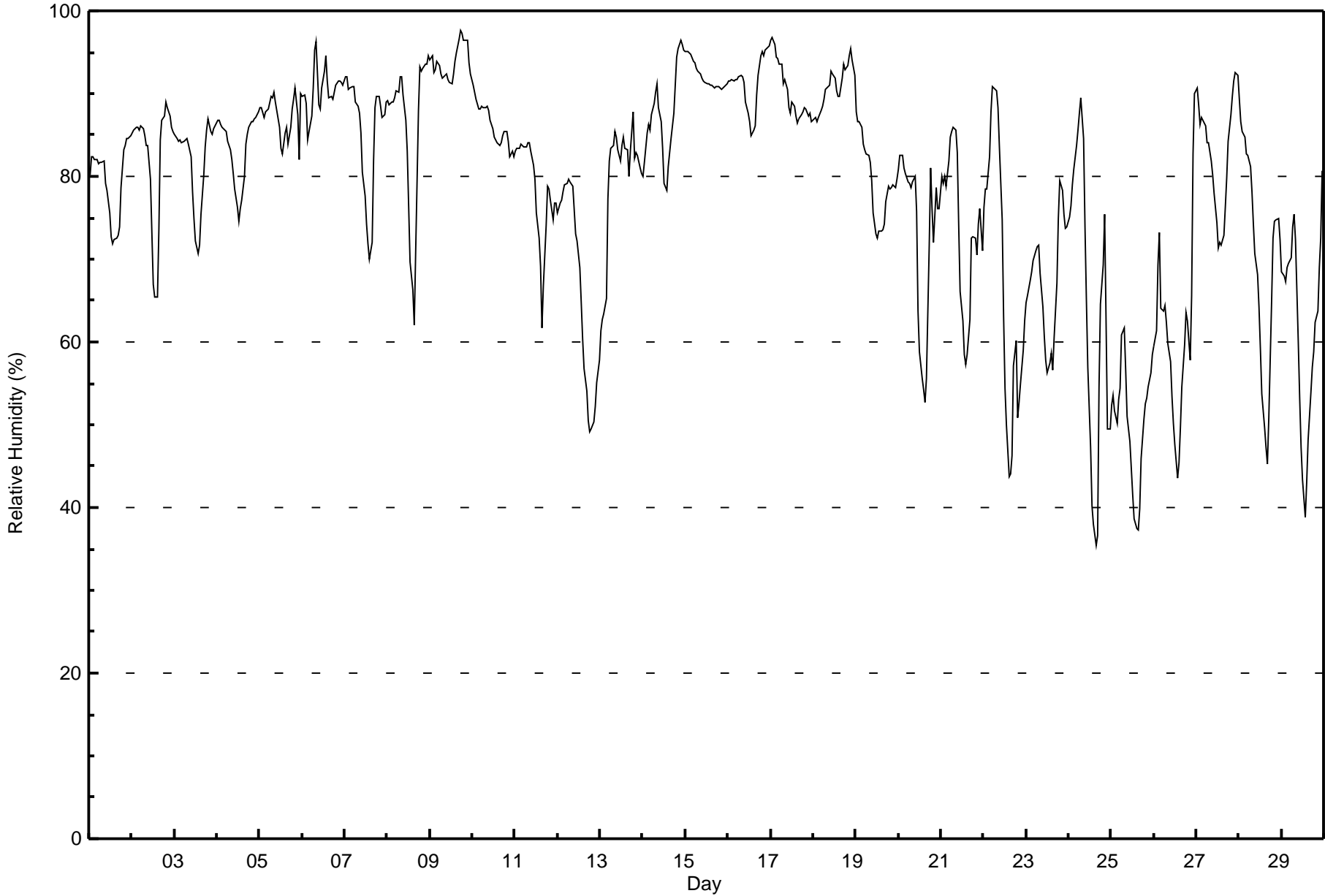
Anzac - February 2016

Maximum Value: 98 % on Feb 9 18:00 Maximum Daily Average: 93.9 % on Feb 9																	Hours in Service: 696									
Minimum Value: 35 % on Feb 24 16:00 Minimum Daily Average: 50.2 % on Feb 25																	Hours of Data: 696									
Maximum Diurnal Average: 84.3 % at hour 8 Minimum Diurnal Average: 68.9 % at hour 15																	Hours of Missing Data: 0									
Monthly Average: 78.8 % Percentiles: P ₁ = 40 P ₁₀ = 57 Q ₁ = 72 Median = 83 O ₃ = 89 P ₉₀ = 92 P ₉₉ = 96																	Hours of Calibration: 0									
																	Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	80	82	82	82	82	82	82	82	82	79	78	76	73	72	72	73	73	74	79	83	84	84	85	85	79.4	85
2-Feb	85	86	86	86	86	86	86	85	84	84	80	73	67	65	65	74	84	87	87	89	88	87	86	85	82.1	89
3-Feb	85	85	84	84	84	84	84	85	84	82	78	75	72	71	72	76	80	83	86	87	85	85	86	86	81.8	87
4-Feb	87	87	86	86	86	85	84	83	82	80	78	76	75	76	77	80	84	85	86	87	87	87	87	88	83.3	88
5-Feb	88	88	87	88	88	88	90	90	90	89	87	86	83	83	85	86	84	86	88	89	91	88	82	90	87.3	91
6-Feb	90	90	89	84	85	87	91	95	96	89	88	91	93	95	92	89	90	89	90	91	92	91	91	91	90.4	96
7-Feb	92	92	91	91	91	91	89	88	88	85	81	78	74	72	70	72	82	88	90	90	88	87	87	89	85.2	92
8-Feb	89	89	89	89	90	90	90	92	92	90	87	83	76	70	66	62	71	88	93	93	93	94	94	95	86.0	95
9-Feb	94	95	93	93	94	93	92	92	92	92	92	91	91	92	94	95	97	98	97	97	96	96	94	92	93.9	98
10-Feb	91	90	89	88	88	88	88	88	88	88	87	86	85	84	84	84	84	85	85	85	84	82	83	82	86.2	91
11-Feb	83	83	83	84	84	84	84	84	84	83	81	80	76	73	69	62	67	74	79	78	77	75	77	77	78.3	84
12-Feb	76	77	77	78	79	79	80	79	79	76	73	72	69	65	60	57	54	50	49	49	50	52	55	58	66.4	80
13-Feb	61	63	63	65	77	82	83	84	85	85	83	82	84	85	83	83	80	83	88	82	83	83	81	80	79.6	88
14-Feb	80	82	85	86	86	88	89	90	91	88	87	83	79	78	81	83	85	88	91	94	95	96	96	95	87.4	96
15-Feb	95	95	95	95	94	94	93	93	92	92	92	91	91	91	91	91	91	91	91	91	91	91	91	91	92.1	95
16-Feb	92	92	92	92	92	92	92	92	92	91	89	88	87	85	86	86	90	92	95	95	95	95	96	96	91.3	96
17-Feb	96	97	96	94	94	94	94	91	92	91	88	88	89	88	87	86	87	87	88	88	88	87	88	87	90.2	97
18-Feb	87	87	87	87	88	88	89	90	91	91	93	92	92	90	90	90	92	94	93	93	95	95	94	92	90.9	95
19-Feb	88	87	87	86	84	83	83	83	82	80	76	73	73	73	73	74	74	77	79	79	79	79	79	80	79.4	88
20-Feb	81	83	82	81	80	79	79	79	79	80	76	64	59	56	54	53	56	72	81	76	72	79	76	76	73.0	83
21-Feb	80	79	80	79	82	85	86	86	86	83	74	66	63	58	57	59	63	73	73	72	71	74	76	71	73.9	86
22-Feb	76	78	79	82	88	91	91	90	88	84	75	63	54	50	44	44	46	57	60	51	53	55	59	62	67.5	91
23-Feb	65	66	68	69	70	71	72	72	68	64	61	58	56	57	59	57	60	67	75	80	78	75	74	74	67.3	80
24-Feb	75	76	79	81	84	86	88	90	85	74	65	57	47	40	38	35	37	55	65	69	75	63	50	49	65.1	90
25-Feb	52	54	52	50	53	54	61	62	57	51	48	45	42	39	37	37	40	46	51	53	53	55	56	58	50.2	62
26-Feb	59	61	69	73	64	64	64	62	60	58	53	50	48	44	45	50	55	60	64	63	58	66	83	90	60.9	90
27-Feb	91	89	86	87	86	86	84	84	82	80	78	74	71	72	72	73	76	80	84	88	90	92	92	92	82.9	92
28-Feb	89	87	85	85	83	82	81	78	74	71	68	64	59	54	50	47	45	51	65	73	75	75	75	72	70.3	89
29-Feb	68	68	67	69	69	70	74	75	72	60	53	47	43	39	43	48	54	57	59	62	64	69	72	81	61.9	81
																	Diurnal Average									
																	Diurnal Maximum									



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Anzac - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	8	1.15	1.15
40 - 60	83	11.93	13.07
60 - 80	193	27.73	40.80
80 - 100	412	59.20	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

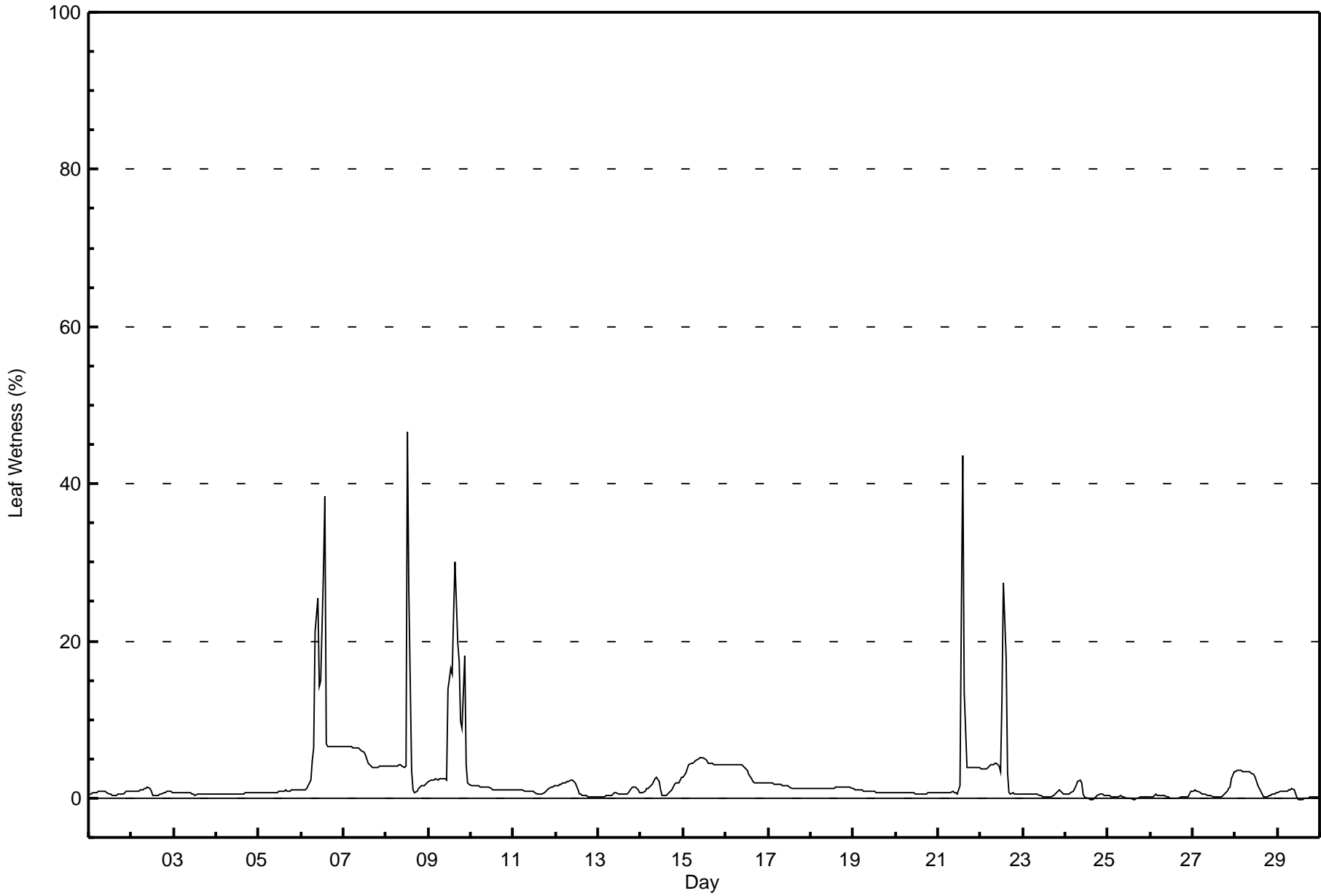
Anzac - February 2016

Maximum Value: 47 % on Feb 8 13:00														Maximum Daily Average: 9.5 % on Feb 6														Hours in Service: 696	
Minimum Value: 0 % on Feb 29 14:00														Minimum Daily Average: 0.1 % on Feb 25														Hours of Data: 696	
Maximum Diurnal Average: 5.4 % at hour 14														Minimum Diurnal Average: 1.5 % at hour 23														Hours of Missing Data: 0	
Monthly Average: 2.2 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 26														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	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			
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	0.8	1			
3-Feb	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1			
4-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			
5-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	0.8	1			
6-Feb	1	1	1	1	2	2	5	6	21	25	14	15	29	38	7	7	7	7	7	7	7	7	7	7	9.5	38			
7-Feb	7	7	7	7	6	6	6	6	6	6	6	6	5	5	4	4	4	4	4	4	4	4	4	4	5.3	7			
8-Feb	4	4	4	4	4	4	4	4	4	4	4	4	47	26	4	1	1	1	1	1	2	2	2	2	5.7	47			
9-Feb	2	2	2	2	2	2	2	3	3	2	2	14	17	16	23	30	20	18	10	9	18	4	2	2	8.7	30			
10-Feb	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2			
11-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	2	0.9	2			
12-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	1.2	2			
13-Feb	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1			
14-Feb	1	1	1	1	1	1	2	2	3	3	2	1	0	0	0	0	1	1	1	2	2	2	2	3	1.4	3			
15-Feb	3	3	4	4	4	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4.4	5			
16-Feb	4	4	4	4	4	4	4	4	4	4	4	4	4	3	2	2	2	2	2	2	2	2	2	2	3.2	4			
17-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	1.5	2			
18-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	1.3	1			
19-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	0.9	1			
20-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			
21-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	24	44	14	4	4	4	4	4	4	4	4	5.1	44			
22-Feb	4	4	4	4	4	4	4	4	4	4	4	3	13	27	18	3	1	1	1	1	1	0	0	0	4.7	27			
23-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1			
24-Feb	1	1	1	1	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.6	2			
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	0.1	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	1	1	0.2	1			
27-Feb	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	3	0.8	3			
28-Feb	3	3	4	3	3	3	3	3	3	3	3	3	2	2	1	0	0	0	0	0	0	0	1	1	2.0	4			
29-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	0.4	1			
1.6 1.6 1.6 1.7 1.7 1.7 1.9 2.0 2.5 2.6 2.1 2.3 4.6 5.4 4.0 2.6 1.8 1.8 1.6 1.6 2.0 1.5 1.5 1.6														Diurnal Average															
7 7 7 7 6 6 6 6 21 25 14 15 47 38 44 30 20 18 10 9 18 7 7 7														Diurnal Maximum															



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Anzac - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %
Anzac - February 2016**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	83	12.26	12.26
0.4 - 0.5	76	11.23	23.49
0.6 - 0.7	110	16.25	39.73
0.8 - 1.4	179	26.44	66.17
1.5 - 10	199	29.39	95.57
> 10	22	3.25	98.82

Total Number of Valid Hours: 677

Total Number of Hours: 696



Maximum Speed: 22 km/h on Feb 6 15:00	Maximum Daily Speed Average: 14.7 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 1 km/h on Feb 27 21:00	Minimum Daily Speed Average: 0.4 km/h on Feb 9	Hours of Data: 687
Maximum Diurnal Speed Average: 1.9 km/h at hour 15	Minimum Diurnal Speed Average: 0.2 km/h at hour 18	Hours of Missing Data: 9
Monthly Average Velocity: 0.9 km/h 290.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 7 Q ₃ = 10 P ₉₀ = 12 P ₉₉ = 19	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	NNW3	NW3	NNW3	N1	SW1	SE1	AF	S3	S5	S6	SSE5	SE5	SE5	SE6	SE6	SE7	SSE6	SSE4	SSE4	ESE3	E2	AF	S2	S2	SSE2.6	SE7	
2-Feb	SSW2	SSE1	S2	S3	SSE2	ESE2	SSE4	S4	S1	S4	S1	ENE2	W3	W1	SSW2	WNW3	NW6	NNW9	NNW9	NNW10	NW7	NW5	NW6	NW6	NW1.7	NNW10	
3-Feb	NW5	NW4	WNW5	NW5	NW3	NW3	WNW1	NW2	N1	SSE2	S5	SE5	E5	ESE4	SE1	N2	WNW4	NW4	N4	N4	NNW5	N5	NNW4	NNW4	NNW1.8	N5	
4-Feb	NNW5	NNW3	N4	NNE3	NNE4	ENE5	ENE6	E6	ESE5	ESE7	SE7	SE8	SE8	SE8	SE10	SE9	SE8	SE9	SSE8	SSE8	SE4	SSE3	E2	S2	ESE4.2	SE10	
5-Feb	SSW2	SSW3	SSE3	SSE5	SSE4	SE7	SE10	SE10	SE12	SE12	SE9	SSE8	SE8	SE8	SE8	SE9	SE10	SSE11	SSE8	S5	SSW6	SW6	SW8	SW7	SSW5	SSE6.5	SE12
6-Feb	S5	SSE4	E4	E6	SSE5	S5	S6	SSW4	WSW5	WNW15	W16	W15	WNW14	NW18	NNW22	NNW21	NNW16	NNW15	NNW11	NNW12	NNW12	NNW9	NW11	NW10	NW7.1	NNW22	
7-Feb	WNW9	WNW10	WNW11	NW12	NW10	WNW11	WNW13	WNW13	WNW14	WNW15	WNW15	WNW13	WNW13	WNW14	WNW11	WNW9	N7	NNW6	WNW3	WNW3	WSW1	SSE3	SE5	SSE7	WNW8.1	WNW15	
8-Feb	SSE7	SSE5	SSE5	S5	SSW1	WSW4	SW6	SW5	SSE1	ENE5	E4	ESE4	E2	NNW3	NW4	WNW5	NNW3	E4	SE3	S5	SSE5	SE4	SSE4	S5	SSE1.9	SSE7	
9-Feb	SSE4	S4	S6	ESE3	SE3	SE4	SE4	SE5	SE7	SSE8	SSE10	SSE8	SSE8	SSE6	ESE2	ESE1	NW3	WNW8	WNW10	NW11	NNW12	NNW15	NNW15	NNW12	WSW0.4	NNW15	
10-Feb	NNW10	NNW11	NW9	NNW9	NNW9	N8	NNW7	NNW7	NNW7	NNW6	NNW5	NNW5	NNE5	NE4	ENE5	ENE5	E5	E5	E5	E6	ESE7	ESE7	ESE7	ESE8	NNE3.6	NNW11	
11-Feb	ESE8	ESE8	ESE5	E6	E6	E7	E6	E6	E7	E5	E4	ENE6	E5	ENE7	ENE7	E8	ESE5	ESE4	ESE6	E7	ESE7	SE8	SSE6	SSE9	E5.8	SSE9	
12-Feb	SSE9	SE10	SE12	SE11	SE12	SE14	SE14	SE15	SE13	SE12	SE12	SE13	SSE18	SSE20	SSE19	SSE17	SSE17	SSE19	SSE19	SSE20	SSE19	SSE16	SSE14	SSE16	SSE14.7	SSE20	
13-Feb	SSE15	SSE11	SSE12	SE12	SSE11	SSE11	SSE11	SE9	SSE9	SSE6	SE4	SE2	WNW5	WNW9	WNW10	WNW9	W9	W7	WNW8	WNW10	WNW8	WNW9	WNW11	WNW11	SW3.3	SSE15	
14-Feb	WNW10	WNW8	WNW9	WNW9	WNW10	WNW9	WNW10	NW9	WNW8	NW7	NW7	NW7	N8	NNW9	N9	N7	NNE3	ESE2	E5	ENE6	E2	E3	SSW2	AF	NW4.9	WNW10	
15-Feb	AF	N1	NNE3	NNE4	NE6	NE6	NE6	NE5	NE5	NNE4	NE4	N4	N4	N3	NNW4	NNW4	N3	N3	NNW1	NNW1	E2	SE3	ESE5	SE5	NE2.7	NE6	
16-Feb	SE6	SE6	SSE7	SE6	SE5	SE5	SSE5	S6	SSE6	SE4	SSE6	SSE5	SSE6	SE8	SSE8	SE7	SSE6	S8	SSE7	SSE5	S3	S3	AF	AF	SSE5.7	SSE8	
17-Feb	AF	N3	NW5	NW7	NW6	NW6	NW6	NW8	NW7	NW8	NW7	NNW7	NNW6	NNW5	NNW6	NW4	NNW5	N3	N3	N2	NNE2	ENE3	E5	E6	NNW4.2	NW8	
18-Feb	E6	ESE8	ESE9	ESE8	SE9	ESE11	SE12	SE15	SE14	SE14	SSE15	SE14	SE13	SE12	SE10	SE6	E5	E6	ESE7	SE2	SE1	NW5	NNW11	NW12	SE6.7	SSE15	
19-Feb	NNW18	NNW14	NNW13	NNW14	NW13	NW12	NW11	NW10	NW11	NW10	NW9	NW9	NNW10	NNW11	NNW10	NNW8	NNW8	NNW6	NNW6	NNW6	NNW7	NNW7	NNW5	NNW4	NNW9.4	NNW18	
20-Feb	NNW4	NNW4	NW3	WNW3	W3	WNW2	W2	SSW1	SSW3	SW2	SSW4	S3	SSE2	ENE3	NE4	NNE4	W3	SSW4	SE5	SSE5	S3	SSE3	S4	SSE4	SSW0.9	SE5	
21-Feb	SSE4	SSE4	SSE4	S3	SSW3	S3	SW2	S3	SSE5	S4	S3	S5	SSE3	SSW1	NE4	ESE2	SSE2	SSE6	SE6	SSE6	S7	S6	W7	WNW9	S2.8	WNW9	
22-Feb	WNW9	WNW9	WNW10	NW8	NW6	NW5	WNW5	WNW5	NW5	NW8	WNW8	M	M	WNW9	WNW7	WNW9	W8	W6	WNW8	WNW13	NW13	NW13	NW10	NW10	WNW8.1	NW13	
23-Feb	NW11	NW12	WNW11	WNW10	WNW11	WNW12	WNW12	NW12	NW13	WNW12	WNW13	WNW13	NW12	NNW13	NNW13	NNW12	NNW8	N7	NNW5	WNW5	WNW7	WNW8	WNW9	NW10	NW10.0	WNW13	
24-Feb	NW11	NW11	NW10	NW10	NW8	WNW7	WNW7	WNW8	WNW8	WNW9	WNW9	WNW9	NW8	NW7	NW7	WNW6	W4	SW3	S5	SSW5	SW6	SW10	SSW10	SSW10	WNW6.0	NW11	
25-Feb	SW15	SW14	SW14	SW17	WSW12	WSW10	SW11	SW11	WSW7	W12	WNW13	WNW11	WNW12	W13	WNW11	WNW12	WNW12	WNW7	WNW9	WNW9	WNW9	WNW10	WNW10	W9	W9.8	SW17	
26-Feb	W9	W7	WSW6	W6	WNW11	WNW10	WNW10	WNW11	WNW13	WNW13	WNW13	WNW12	WNW12	NW11	N12	N10	NNE6	N4	NNE9	NE8	NE7	NE9	NE9	NE9	NW6.2	WNW13	
27-Feb	ENE10	ENE12	E12	ENE12	E13	ENE13	E13	E9	E10	ENE8	ENE8	ENE7	NE5	NNE6	NNE5	WNW4	WNW4	NW5	NW5	WNW3	SW1	SSW4	NW5	NNW10	ENE5.0	E13	
28-Feb	N12	N11	NNW9	N9	N9	NNW9	N10	N12	N11	N12	N12	N11	N10	NNE11	NNE9	NNE8	NE8	ENE6	NNE3	NW1	ESE2	ESE5	SE7	SSE8	N6.6	N12	
29-Feb	SE8	SE10	SSE8	SSE9	SSE12	SSE7	SSE4	SSE8	SSE7	SSE7	SE6	SE7	SE9	SSE8	SW10	SSW8	WSW12	SW9	SW10	SSW4	S6	SSE7	S6	SSE4	S6.6	WSW12	

WNW1.6	NNW1.1	W1.1	WNW0.8	NNW0.8	WNW0.6	WSW0.8	SW0.7	SW0.7	W1.3	W1.4	NNW0.7	NW0.8	NW1.5	NNW1.9	NNW1.7	NW1.2	NW0.2	WSW0.3	W0.8	W0.8	W0.7	WNW1.4	W1.5	Diurnal Average
NNW18	SW14	SW14	SW17	E13	SE14	SE14	SE15	SE14	WNW15	W16	W15	SSE18	SSE20	NNW22	NNW21	SSE17	SSE19	SSE19	SSE20	SSE19	SSE16	NNW15	SSE16	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

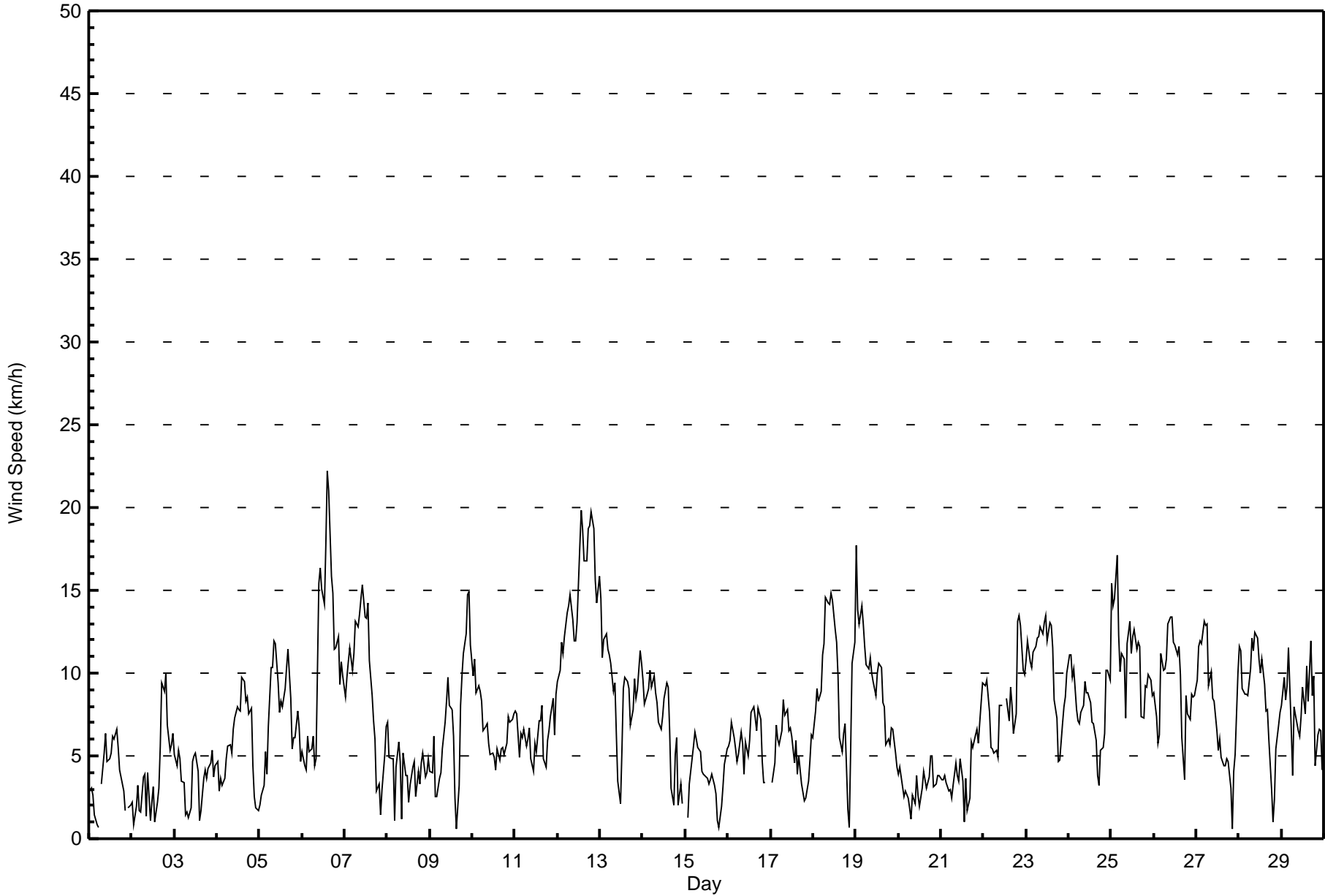
Wind Speed (WS) - km/h
Anzac - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 6 15:00 Minimum Value: 1 km/h on Feb 21 05:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 696 Hours of Data: 687 Hours of Missing Data: 9 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	1	1	1	1	1	AF	1	1	1	1	1	1	2	2	2	3	2	2	1	1	AF	1	1	3
2-Feb	1	1	1	1	2	2	1	1	1	1	2	2	2	1	1	2	2	3	3	3	2	2	2	2	3
3-Feb	2	2	2	2	2	2	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	2	1	1	2
4-Feb	1	1	1	2	1	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	1	1	3
5-Feb	1	1	1	1	1	2	3	3	3	3	2	2	2	3	2	3	3	2	2	1	2	2	3	3	3
6-Feb	1	1	2	2	2	2	1	1	3	6	6	5	5	7	7	7	5	4	3	3	4	3	3	3	7
7-Feb	3	4	4	4	4	4	5	5	5	5	6	5	5	5	4	3	2	2	1	1	1	1	1	2	6
8-Feb	2	2	1	2	1	2	1	1	1	2	1	1	1	2	2	2	1	2	1	1	1	1	1	1	2
9-Feb	1	1	2	1	1	1	2	1	1	2	3	3	2	2	2	1	2	3	3	3	4	5	5	4	5
10-Feb	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
11-Feb	2	3	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	1	1	2	2	2	1	2	3
12-Feb	2	3	3	3	3	3	4	4	4	3	4	4	6	6	5	5	5	5	5	5	5	4	5	4	6
13-Feb	4	3	3	4	3	3	3	2	2	3	1	1	3	4	4	3	3	2	2	3	3	3	4	4	4
14-Feb	4	3	3	3	3	3	3	3	3	3	2	3	2	3	3	2	2	1	2	2	2	1	1	AF	4
15-Feb	AF	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
16-Feb	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1	1	1	AF	AF	2
17-Feb	AF	1	2	3	2	2	2	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	2	3
18-Feb	2	3	3	3	3	3	3	4	4	4	4	4	3	4	3	2	1	2	2	3	1	4	3	5	5
19-Feb	5	4	4	4	5	4	4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	2	1	1	5
20-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1	1	1	2
21-Feb	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	1	1	1	2	1	2	1	3	3	3
22-Feb	3	3	3	2	2	2	1	1	1	2	3	M	M	3	3	3	3	2	2	5	4	5	3	3	5
23-Feb	3	4	4	4	4	4	4	4	5	4	5	5	4	4	4	4	3	2	1	1	2	2	3	3	5
24-Feb	3	3	3	3	2	2	2	2	3	3	3	3	2	2	2	2	2	1	1	1	2	3	5	5	5
25-Feb	4	4	4	6	5	3	3	4	3	4	5	4	4	5	4	5	4	2	2	3	3	3	3	3	6
26-Feb	3	2	2	2	4	3	3	4	5	5	5	4	4	4	3	3	2	2	3	3	3	3	3	3	5
27-Feb	3	4	4	3	4	4	4	3	3	3	2	3	2	2	2	2	2	2	1	1	1	1	3	3	4
28-Feb	4	4	3	3	3	3	3	3	4	4	4	3	3	3	3	3	3	2	1	1	2	1	1	2	4
29-Feb	2	2	2	2	3	4	3	2	2	2	2	3	3	3	3	3	3	2	3	1	1	2	2	1	4
Diurnal Maximum																								5	
M - Maintenance AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Anzac - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	258	37.55	37.55
6 - 11	320	46.58	84.13
12 - 19	105	15.28	99.42
20 - 28	4	0.58	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - February 2016**

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	11	7	7	19	16	22	37	30	17	6	3	6	16	21	23	258
6 - 11	13	6	9	10	16	15	37	41	9	4	11	3	9	60	44	33	320
12 - 19	5	0	0	4	2	0	18	15	0	0	4	2	4	25	11	15	105
20 - 28	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	4
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	17	16	21	37	31	77	95	39	21	21	8	19	101	76	73	687

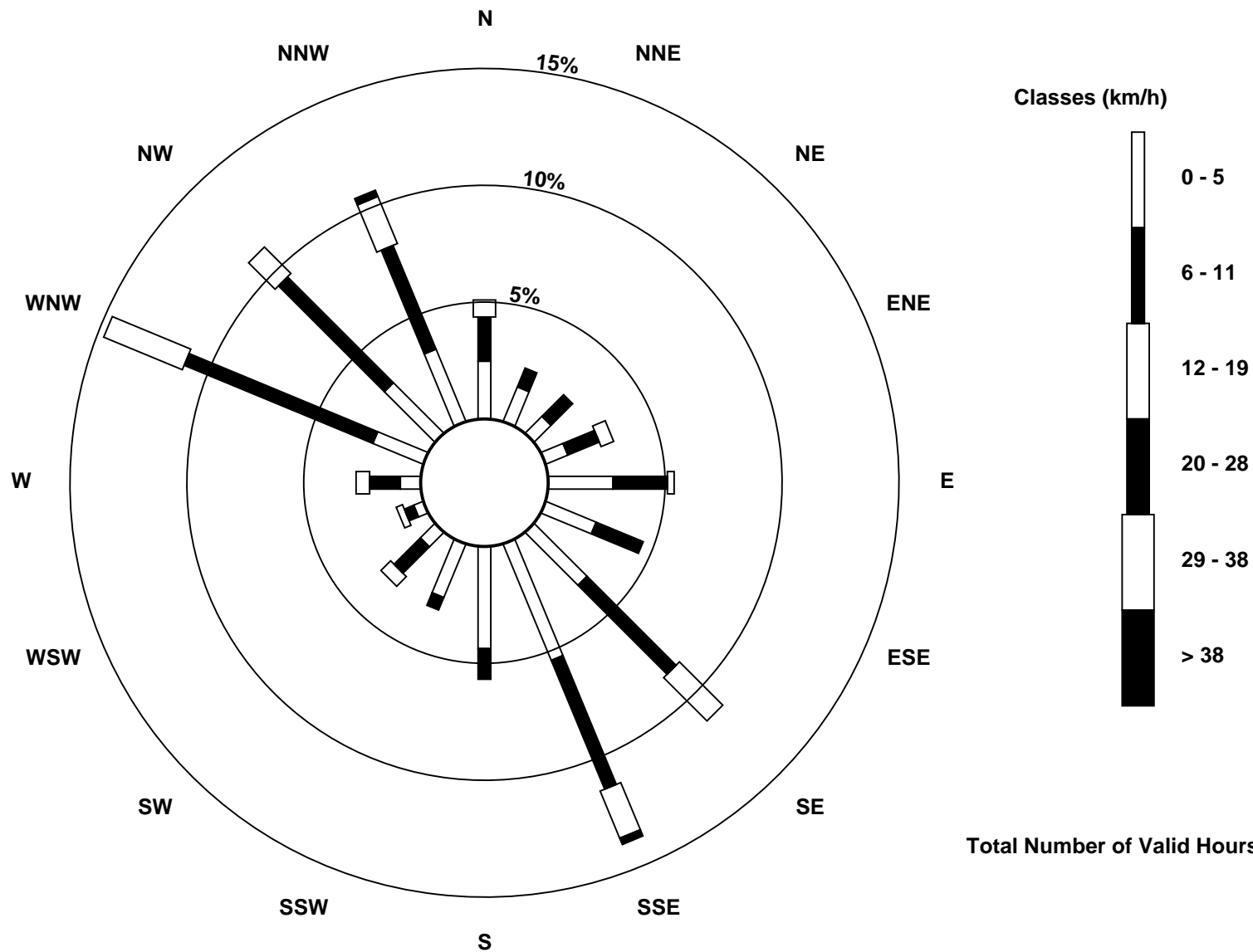
Total Number of Valid Hours: 687

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Anzac (AMS 14)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - February 2016

Direction of Maximum Speed: 346 deg on Feb 6 15:00																						Hours in Service: 696			
Direction of Maximum Daily Speed Average: 151.0 deg on Feb 12																						Hours of Data: 687			
Direction of Minimum Speed: 227 deg on Feb 27 21:00											Direction of Minimum Daily Speed Average: 0.4 deg on Feb 9											Hours of Missing Data: 9			
Monthly Average Direction: 299.0 deg																						Percent Operational Time: 98.7			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	330	311	330	349	230	138	AF	176	173	170	166	139	133	137	143	136	152	153	154	115	99	AF	171	176	151.1
2-Feb	207	160	181	170	158	111	152	171	183	186	182	70	276	265	207	289	319	346	341	331	324	322	326	323	311.3
3-Feb	324	307	302	310	319	318	291	307	357	154	169	129	94	109	142	10	299	324	350	351	347	6	337	341	337.8
4-Feb	342	342	352	29	14	58	74	92	102	119	124	125	136	133	131	135	141	140	149	149	134	161	92	185	119.4
5-Feb	203	197	153	163	158	135	144	142	138	145	144	148	130	143	150	143	153	151	182	196	223	228	236	196	158.4
6-Feb	182	161	87	89	155	176	179	206	247	283	280	279	294	319	346	341	340	341	332	329	328	337	320	314	314.8
7-Feb	302	295	298	305	309	295	293	295	297	297	301	297	296	299	298	302	349	346	298	283	237	155	137	162	298.4
8-Feb	166	156	161	175	201	256	225	215	158	72	97	107	83	327	319	285	336	80	137	171	162	140	165	173	165.2
9-Feb	162	175	178	123	133	128	129	125	145	157	160	154	148	156	106	120	313	298	302	307	327	335	338	335	258.7
10-Feb	324	335	318	331	340	359	335	346	334	343	331	346	24	47	63	69	88	87	85	88	115	122	118	112	17.0
11-Feb	107	118	105	91	92	100	99	90	92	97	92	63	81	69	62	81	103	106	106	97	112	132	156	154	100.9
12-Feb	150	146	146	144	137	139	139	135	140	141	135	131	155	163	160	161	160	158	159	159	159	157	152	159	151.0
13-Feb	162	149	150	143	152	154	152	145	148	147	145	143	287	282	289	282	277	270	286	297	296	289	295	289	213.9
14-Feb	289	291	283	285	289	298	301	307	301	307	326	308	349	343	1	358	22	120	83	70	87	85	209	AF	317.5
15-Feb	AF	4	26	33	51	50	46	49	49	32	46	8	359	354	346	346	358	349	334	339	101	152	109	138	38.0
16-Feb	135	141	148	143	139	144	167	174	163	131	157	156	156	144	149	140	159	170	165	168	188	176	AF	AF	154.4
17-Feb	AF	352	312	314	325	318	321	320	310	318	320	331	346	342	336	312	344	352	360	358	14	60	79	97	336.0
18-Feb	100	111	118	119	125	122	127	126	132	145	147	142	143	145	145	135	86	81	114	126	133	319	331	322	126.4
19-Feb	337	340	341	333	324	316	313	314	316	319	314	323	335	334	330	337	344	342	339	340	342	345	346	333	330.4
20-Feb	339	333	309	285	272	295	272	206	208	233	213	182	166	62	38	15	259	196	144	167	178	163	169	163	209.7
21-Feb	164	161	165	183	197	187	227	179	159	171	178	172	160	208	43	121	152	149	145	155	175	180	279	292	178.0
22-Feb	294	300	302	318	317	307	302	291	311	305	292	M	M	302	287	287	261	259	283	300	309	314	310	305	299.1
23-Feb	306	307	302	301	292	302	299	305	304	297	302	299	305	332	348	332	344	355	332	294	291	302	300	305	309.9
24-Feb	312	308	305	305	307	303	291	301	297	299	302	302	307	306	307	296	268	214	187	193	218	217	212	210	282.3
25-Feb	223	226	227	226	244	241	232	226	249	279	283	287	293	278	285	298	297	287	289	293	299	298	292	274	265.1
26-Feb	276	272	249	261	290	291	284	286	288	294	297	298	296	307	359	9	25	357	28	37	54	45	41	45	318.4
27-Feb	59	74	79	78	83	75	84	89	94	70	60	68	39	32	24	283	293	321	317	300	227	201	319	331	59.1
28-Feb	352	349	338	349	355	348	355	2	353	351	352	354	2	16	23	30	51	58	24	318	117	117	131	152	7.2
29-Feb	146	142	161	151	158	167	154	162	167	152	142	143	137	164	214	212	237	227	234	197	179	163	174	153	173.5
285.1	293.8	268.0	288.7	293.9	301.9	244.7	217.9	230.4	273.8	273.6	285.9	317.5	322.8	347.3	329.8	313.7	321.2	248.6	276.2	268.6	264.6	291.4	272.5		
Diurnal Average																									
M - Maintenance AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

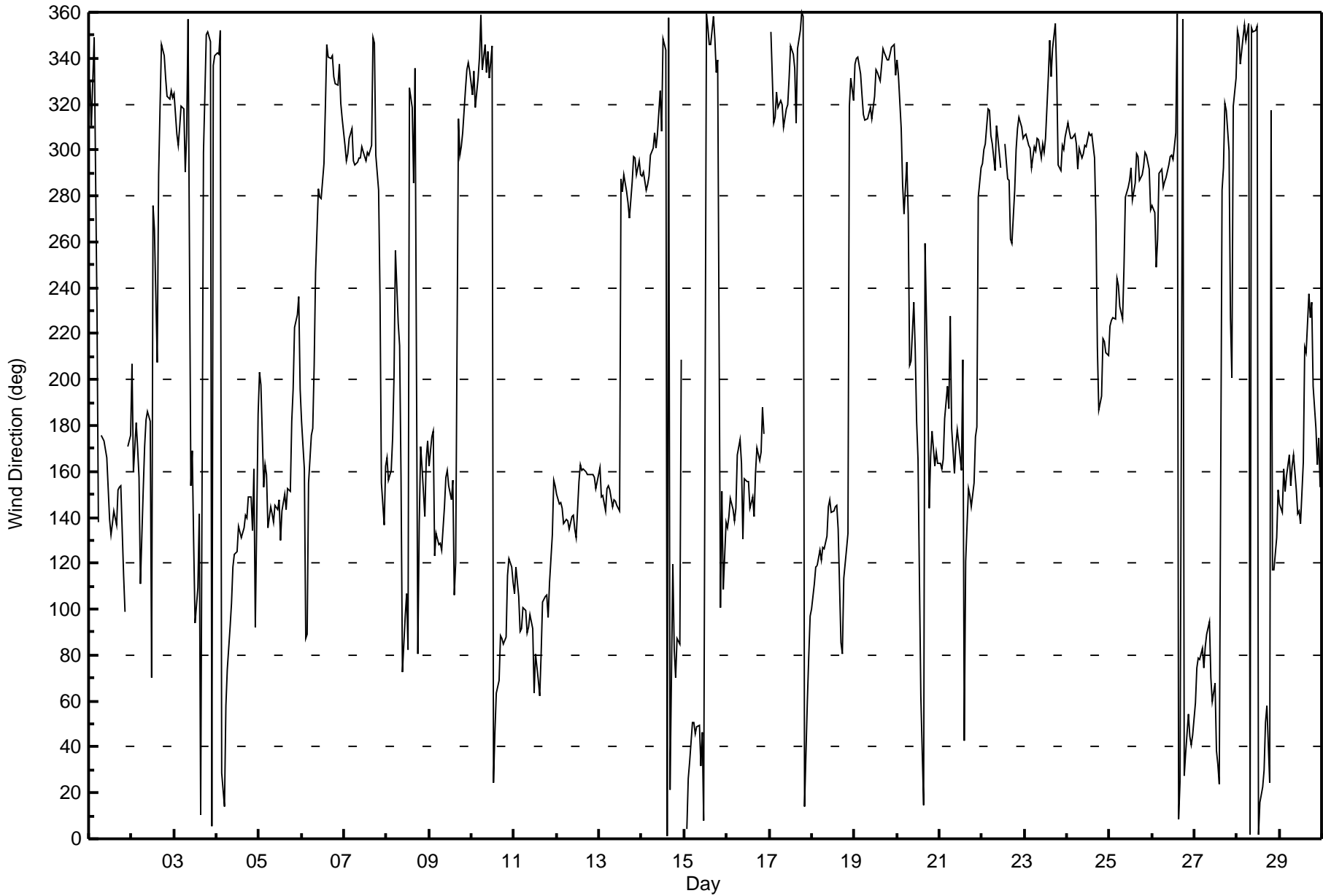
Wind Direction (WD) - deg
Anzac - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Feb 21 14:00																	Hours in Service: 696 Hours of Data: 687 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.7								
Minimum Value: 12 deg on Feb 24 19:00																									
Percentiles: P ₁ = 13 P ₁₀ = 17 Q ₁ = 19 Median = 22 Q ₃ = 27 P ₉₀ = 37 P ₉₉ = 77																									
Day	Hourly Period Ending At (MST)																					Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		22	23	24
1-Feb	19	22	21	15	62	64	AF	26	16	17	21	26	22	27	25	22	27	24	30	21	34	AF	65	52	65
2-Feb	14	74	58	30	38	51	20	29	73	16	95	51	40	78	32	37	24	18	16	18	20	19	20	19	95
3-Feb	20	23	23	20	46	22	32	41	55	21	26	38	31	34	72	35	22	16	17	17	22	19	38	22	72
4-Feb	17	22	19	41	28	24	22	22	25	20	19	20	26	24	19	20	20	21	18	16	29	55	39	28	55
5-Feb	28	25	26	22	23	17	19	22	21	20	21	23	20	22	18	19	16	21	25	20	22	24	24	27	28
6-Feb	15	21	44	45	39	23	19	16	36	27	28	29	28	29	18	18	17	16	17	16	17	17	19	21	45
7-Feb	26	26	25	22	26	26	24	27	26	25	24	25	28	23	24	25	26	15	39	27	66	35	15	19	66
8-Feb	18	20	23	15	62	20	16	17	77	24	27	24	51	65	42	32	39	23	32	21	15	25	26	21	77
9-Feb	20	24	12	40	35	20	18	19	17	18	18	22	18	22	41	62	24	23	23	22	20	19	18	20	62
10-Feb	21	16	22	20	17	19	20	19	20	19	24	24	35	42	31	29	29	23	22	25	23	22	23	23	42
11-Feb	23	21	27	21	22	21	22	21	20	23	30	26	40	31	26	24	27	20	18	18	18	16	18	19	40
12-Feb	20	20	18	20	18	19	18	20	20	21	23	24	21	18	18	18	18	17	18	17	19	19	22	19	24
13-Feb	19	20	18	19	21	19	17	17	16	30	24	46	34	29	27	26	24	19	21	24	22	27	28	28	46
14-Feb	29	28	22	24	24	23	22	20	21	24	24	30	20	21	18	20	52	49	14	19	38	27	40	AF	52
15-Feb	AF	29	21	26	21	17	22	27	26	34	28	29	25	26	25	19	23	20	37	51	27	22	32	20	51
16-Feb	23	21	19	22	28	28	23	19	30	32	22	25	24	19	18	19	19	20	16	17	25	17	AF	AF	32
17-Feb	AF	15	31	25	22	20	22	20	22	21	23	24	24	30	20	31	22	21	31	28	21	32	27	27	32
18-Feb	23	25	20	23	21	21	20	18	20	20	20	21	22	21	23	25	21	23	23	93	92	56	18	21	93
19-Feb	17	17	16	16	18	22	21	22	21	20	26	26	20	20	22	19	17	16	16	19	17	16	18	19	26
20-Feb	16	14	22	20	18	24	24	59	17	36	28	37	61	67	43	42	56	19	13	18	28	18	16	16	67
21-Feb	15	14	16	14	15	15	14	18	16	28	44	35	59	95	39	52	51	13	16	20	15	13	33	23	95
22-Feb	22	22	25	19	21	18	15	18	19	22	24	M	M	30	34	28	26	19	23	25	22	20	19	21	34
23-Feb	21	20	24	25	23	25	26	23	24	27	24	26	24	26	20	19	24	15	16	17	18	19	21	21	27
24-Feb	19	19	22	21	24	24	19	19	22	24	27	28	26	29	30	33	33	19	12	17	14	18	31	31	33
25-Feb	20	19	21	19	21	23	17	18	29	27	27	29	27	28	31	28	27	27	21	24	23	23	25	23	31
26-Feb	27	24	19	23	25	24	24	27	30	30	30	25	26	27	23	19	20	34	19	23	25	21	22	21	34
27-Feb	20	24	20	19	20	21	21	23	22	22	22	39	43	30	37	50	43	34	24	35	91	27	60	18	91
28-Feb	17	17	18	19	17	18	18	17	18	19	22	20	22	25	27	31	23	17	26	51	69	19	13	17	69
29-Feb	15	14	17	14	13	24	46	14	18	22	27	31	24	41	30	33	19	17	17	24	17	17	17	19	46
																	29 74 58 45 62 64 46 59 77 36 95 51 61 95 72 62 56 49 39 93 92 56 65 52								
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Anzac - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

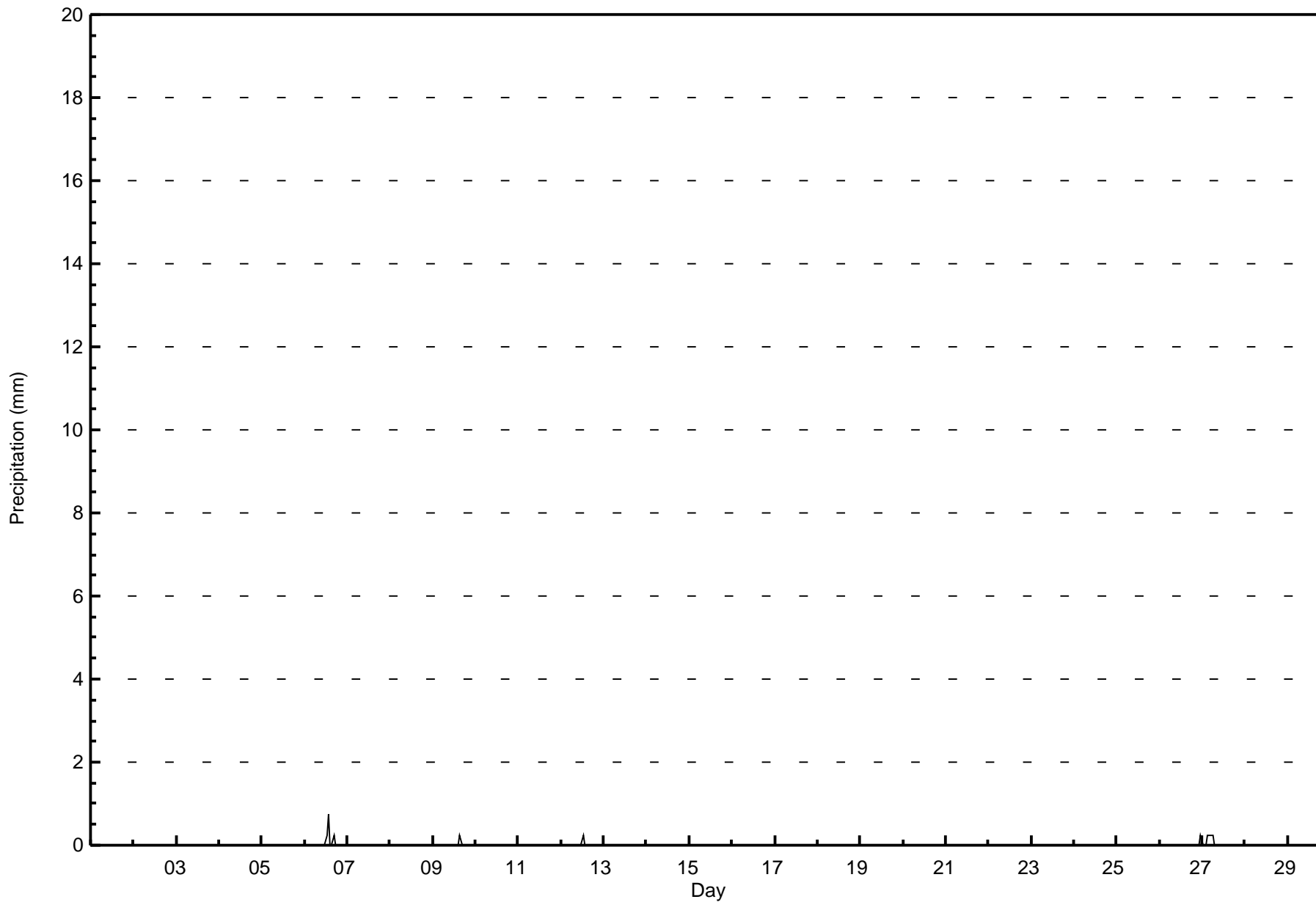
Anzac - February 2016

Maximum Value: 0.8 mm on Feb 6 14:00		Maximum Daily Total: 1.3 mm on Feb 6		Hours in Service: 696																																
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1		Hours of Data: 696																																
Maximum Diurnal Total: 0.8 mm at hour 14		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																																
Monthly Total: 3.05 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.3		Hours of Calibration: 0																																
				Percent Operational Time: 100.0																																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum										
	1	2	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	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	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	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	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	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	0.3	0.8	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	1.3	0.8
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	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	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	0.3	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	0.3	0.3	0.3
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	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	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	0.3	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	0.3	0.3	0.3
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	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	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	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	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	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	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	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	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	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	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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
27-Feb	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.3
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.5	0.8	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	0.3	Diurnal Average		
		0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.8	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	0.3	Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - February 2016





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 11, 2016	Last Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	13:20
Gas Cert Reference	SA130026A	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG Make/Model	API 701	Serial Number	764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	2607	2563
Calculated slope	1.002282	0.998132	Chamber temp	50.0	50.0
Calculated intercept	1.795576	-0.099689	Pressure	25.1	25.7
Analyzer Background	19.4	18.8	Flow	652	675
Analyzer Coefficient	1.021	1.063	Intensity	64	63
Analyzer make	API T100		Analyzer serial #	723	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	74.9	707.1	679.4	1.041
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.9	707.1	708.6	0.998
second point	5000	37.5	354.0	354.3	0.999
third point	5000	18.7	176.5	177.4	0.995
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	74.9	707.1	699.0	1.012
Average Correction Factor					0.997

Corrected As found 679.9 Previous response 703.7 % change 3.5%

Notes:

zero and span adjusted, filter changed out, no maintenance done

Calibration Performed By:

Melissa Lemay



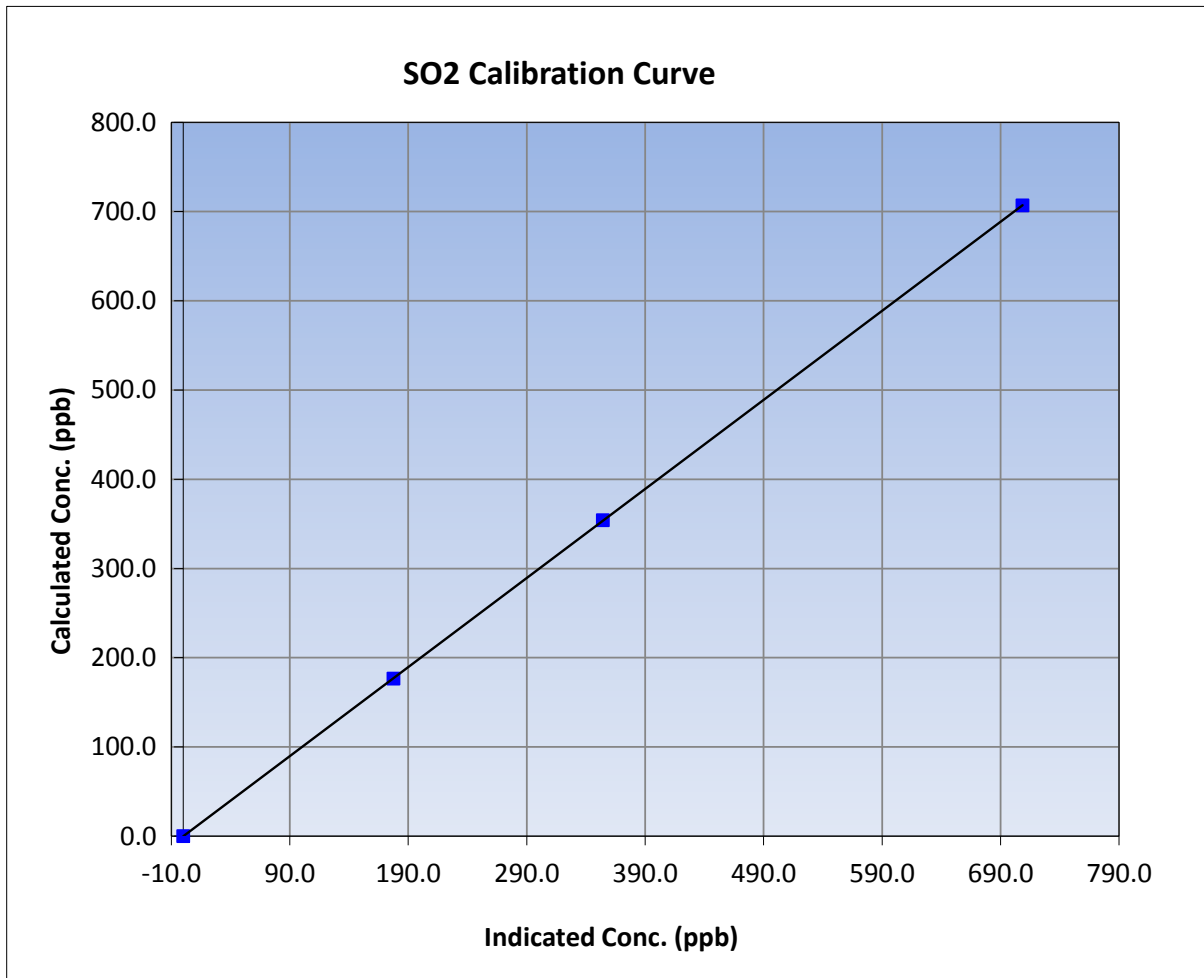
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:40	End Time (MST)	13:20
Analyzer make	API T100	Analyzer serial #	723

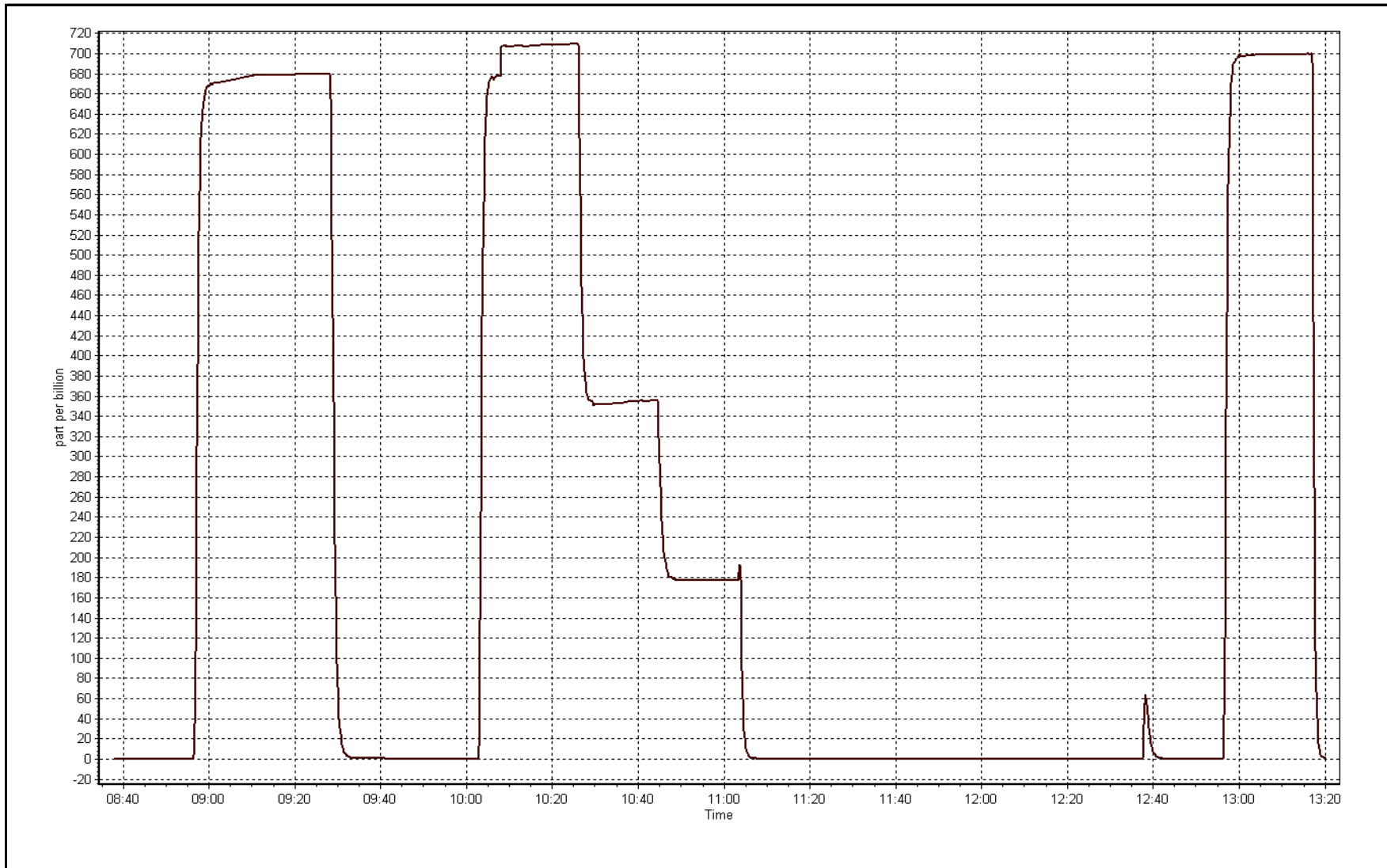
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999998
707.1	708.6	0.9978		
354.0	354.3	0.9992	Slope	0.998132
176.5	177.4	0.9951		
			Intercept	-0.099689



SO2 Calibration Plot

Date: February 11, 2016





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	February 5, 2016	Last Calibration	January 6, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	13:22
Gas Cert Reference	ALM033528	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/Dec/16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.42		Lamp voltage	997	997
Calculated slope	1.004493	0.997497	Chamber temp	45	45
Calculated intercept	-0.220240	-0.135682	Pressure	660.0	653.5
Analyzer Background	1.17	1.7	Flow	0.407	0.403
Analyzer Coefficient	1.168	1.192	Intensity	98	98
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	74.3	75.0	72.0	1.042
SO2 scrubber check	5000	18.7	176.5	1.1	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	75.3	0.997
second point	5000	39.6	40.0	40.3	0.992
third point	5000	19.8	20.0	20.3	0.985
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.3	75.0	75.6	0.993
Average Correction Factor					0.991

Corrected As found	72.0	Previous response	74.9	% change	4.1%
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Notes:

Scrubber test done after 1st high point, redid high point after scrubber test, filter changed out, no maintenance done, span adjusted

Calibration Performed By:

Melissa Lemay



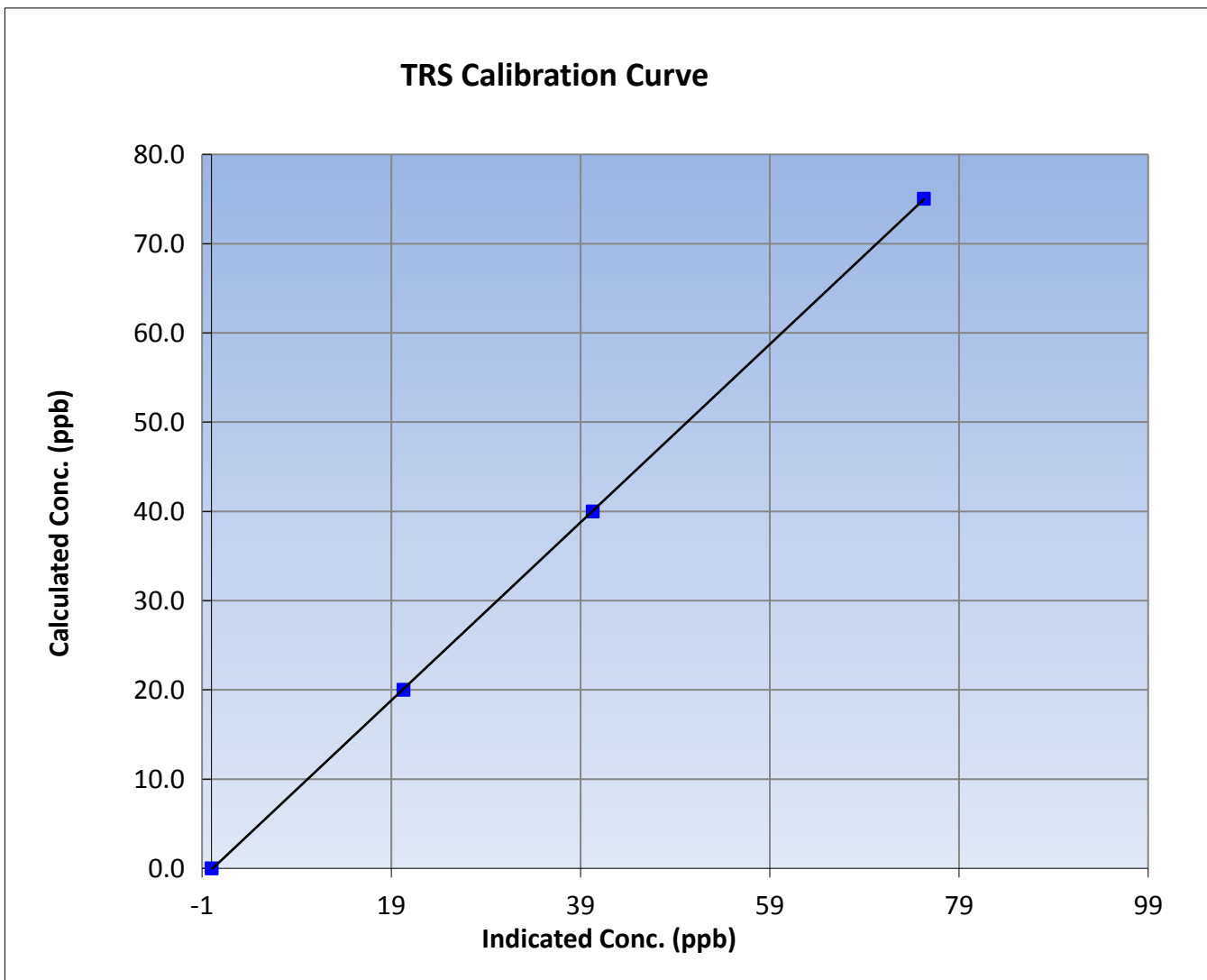
Wood Buffalo Environmental Association TRS Calibration Report

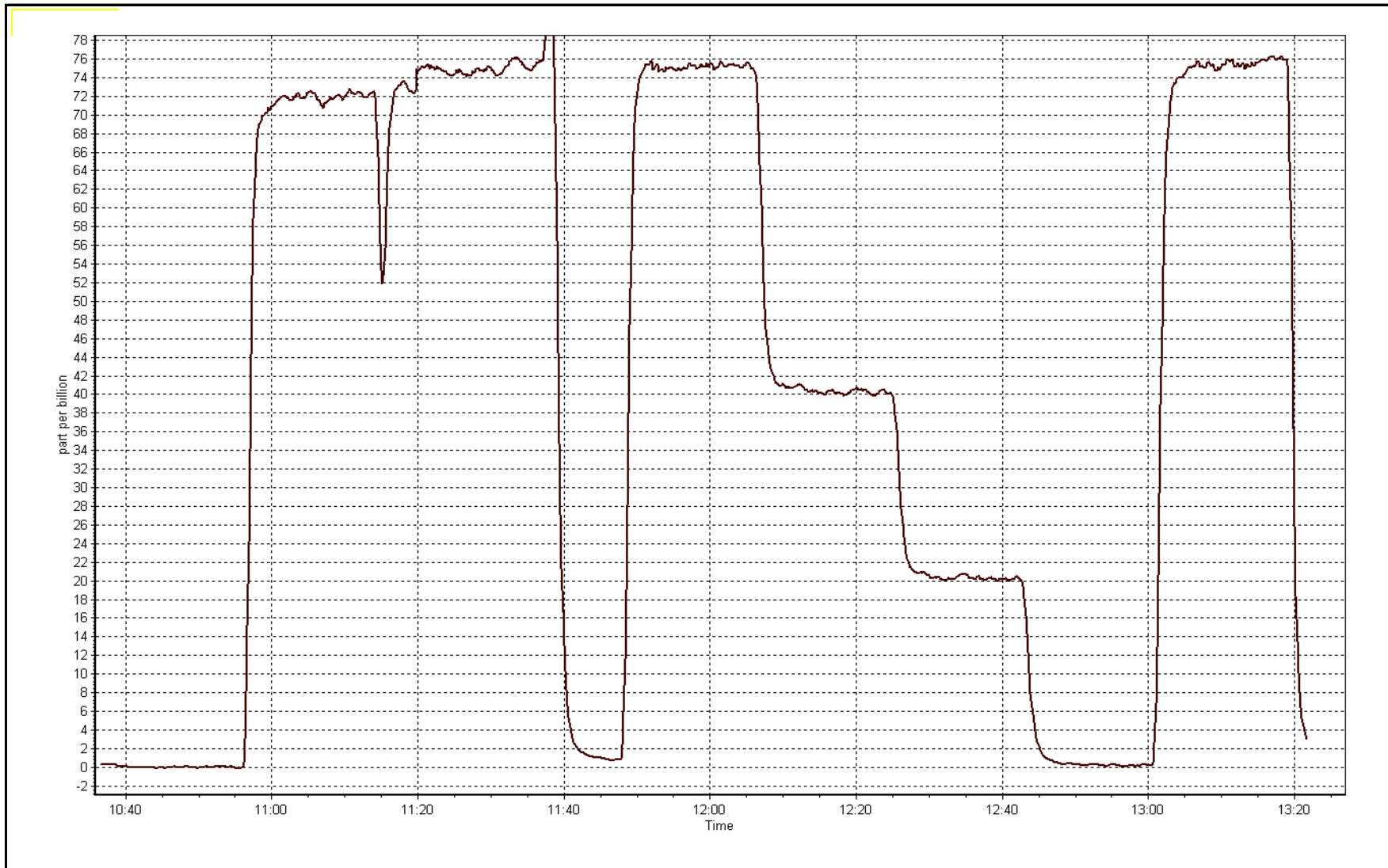
Station Information

Calibration Date	February 5, 2016	Previous Calibration	January 6, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:35	End Time (MST)	13:22
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	0.999988
75.0	75.3	0.9966		
40.0	40.3	0.9925	Slope	0.997497
20.0	20.3	0.9851		
			Intercept	-0.135682







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February-11-16	Last Calibration	January-25-16
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	13:20
Gas Cert Reference	SA130026A	Cal Gas Expiry Date	December-12-16
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	74.9	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	403.1	403.6
THC Calc slope	0.998669	0.998416	Carrier Pressure	31.8	31.8
THC Calc intercept	0.034197	0.025768	Fuel Pressure	41.4	41.4
NMHC Calc slope	1.001966	1.001844	Air Pressure	32.5	32.5
NMHC Calc intercept	0.006087	0.004044			

Analyzer make Thermo 55i Analyzer serial # 1218153355

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	74.9	16.36	16.10	1.016
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.39	0.998
second point	5000	37.5	8.19	8.12	1.009
third point	5000	18.7	4.09	4.07	1.003
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.43	0.996
Average Correction Factor					1.004

Corrected As found 16.10 Previous response 16.35 % change 1.5%

Notes:

Span adjusted, filter changed out, no 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	74.9	8.69	8.61	1.010
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.68	1.001
second point	5000	37.5	4.35	4.32	1.007
third point	5000	18.7	2.17	2.17	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.69	1.000
Average Correction Factor					1.003

Corrected As found 8.61 Previous response 8.67 % change 0.7%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	7.45	1.029
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.71	0.995
second point	5000	37.5	3.84	3.80	1.011
third point	5000	18.7	1.91	1.90	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	7.67	7.72	0.993
Average Correction Factor					1.004

Corrected As found 7.45 Previous response 7.68 % change 3.1%



Wood Buffalo Environmental Association

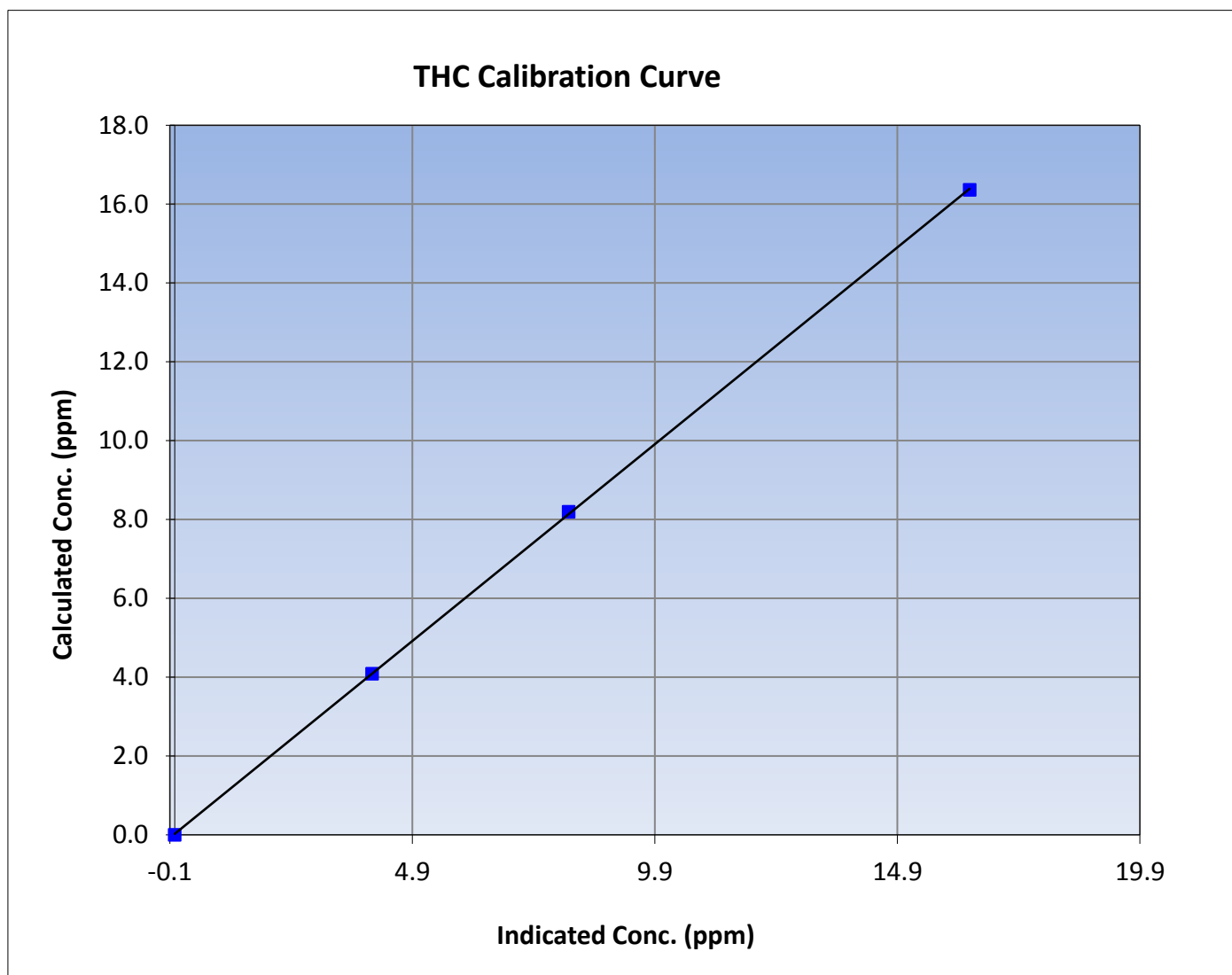
THC Calibration Summary

Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 25, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:40	End Time (MST)	13:20
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	0.999966
16.36	16.39	0.9983		
8.19	8.12	1.0089	Slope	0.998416
4.09	4.07	1.0034		
			Intercept	0.025768





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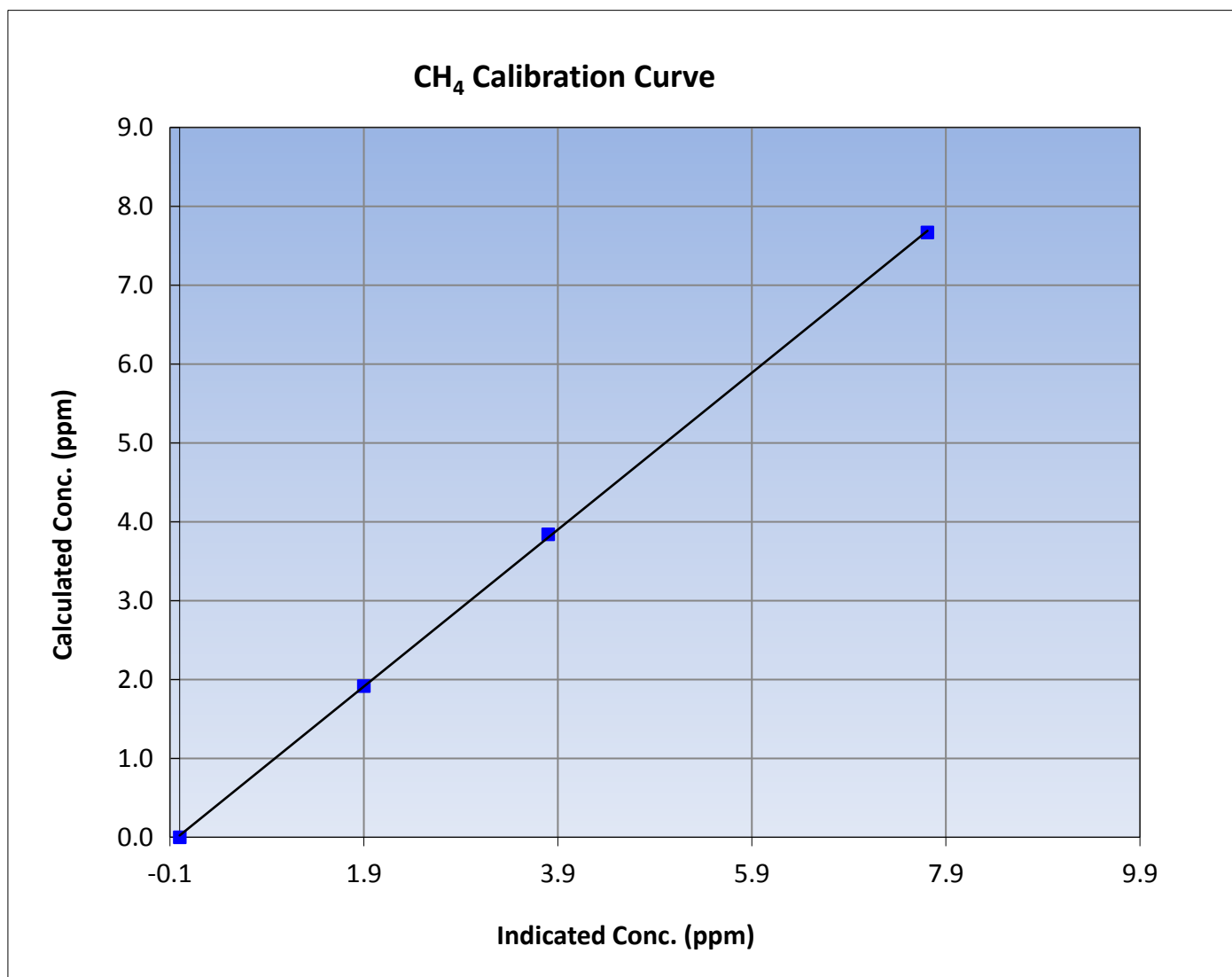
CH₄ Calibration Summary

Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 25, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:40	End Time (MST)	13:20
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	0.999925
7.67	7.71	0.9948		
3.84	3.80	1.0105	Slope	0.994497
1.91	1.90	1.0078		
			Intercept	0.022110





Wood Buffalo Environmental Association

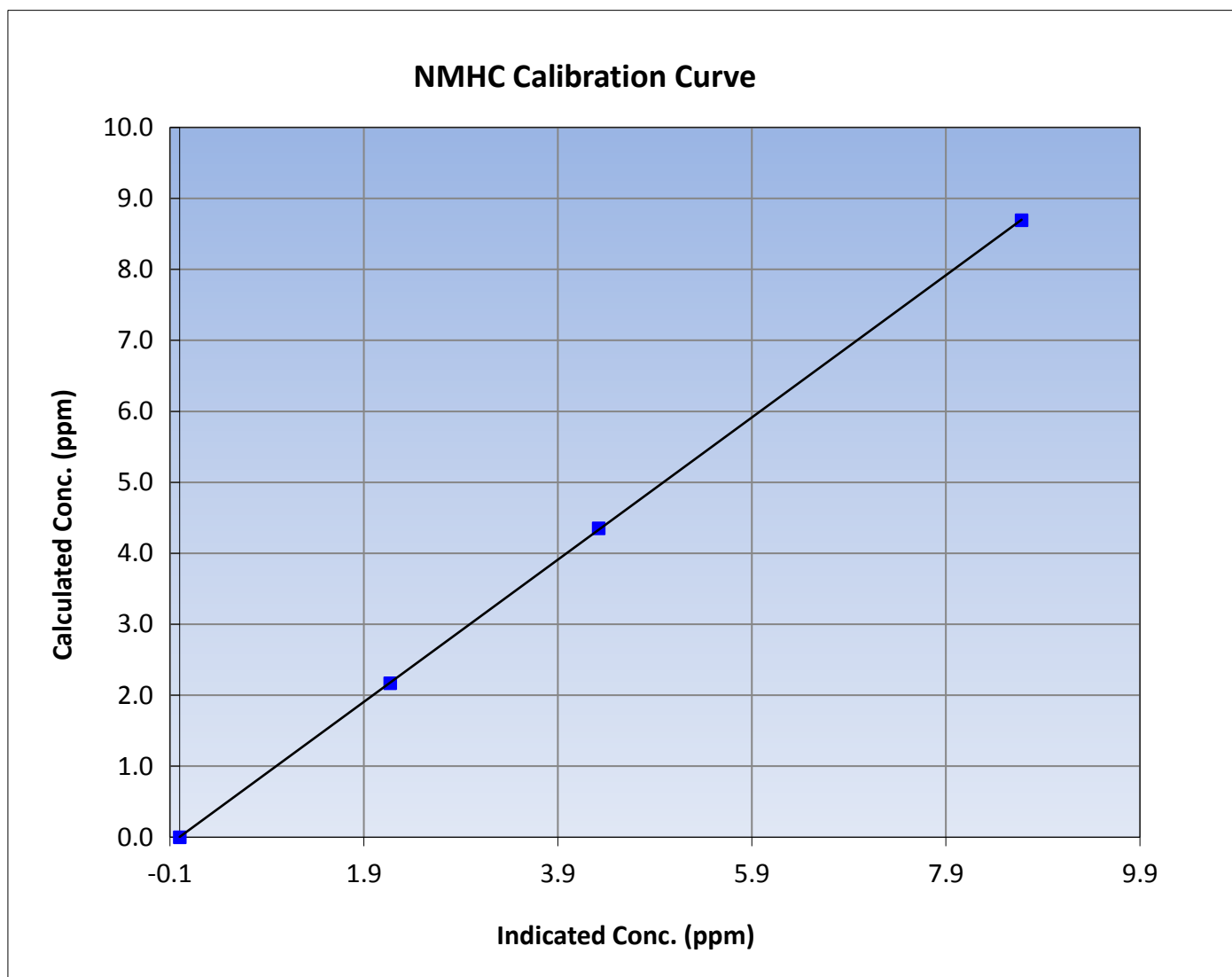
NMHC Calibration Summary

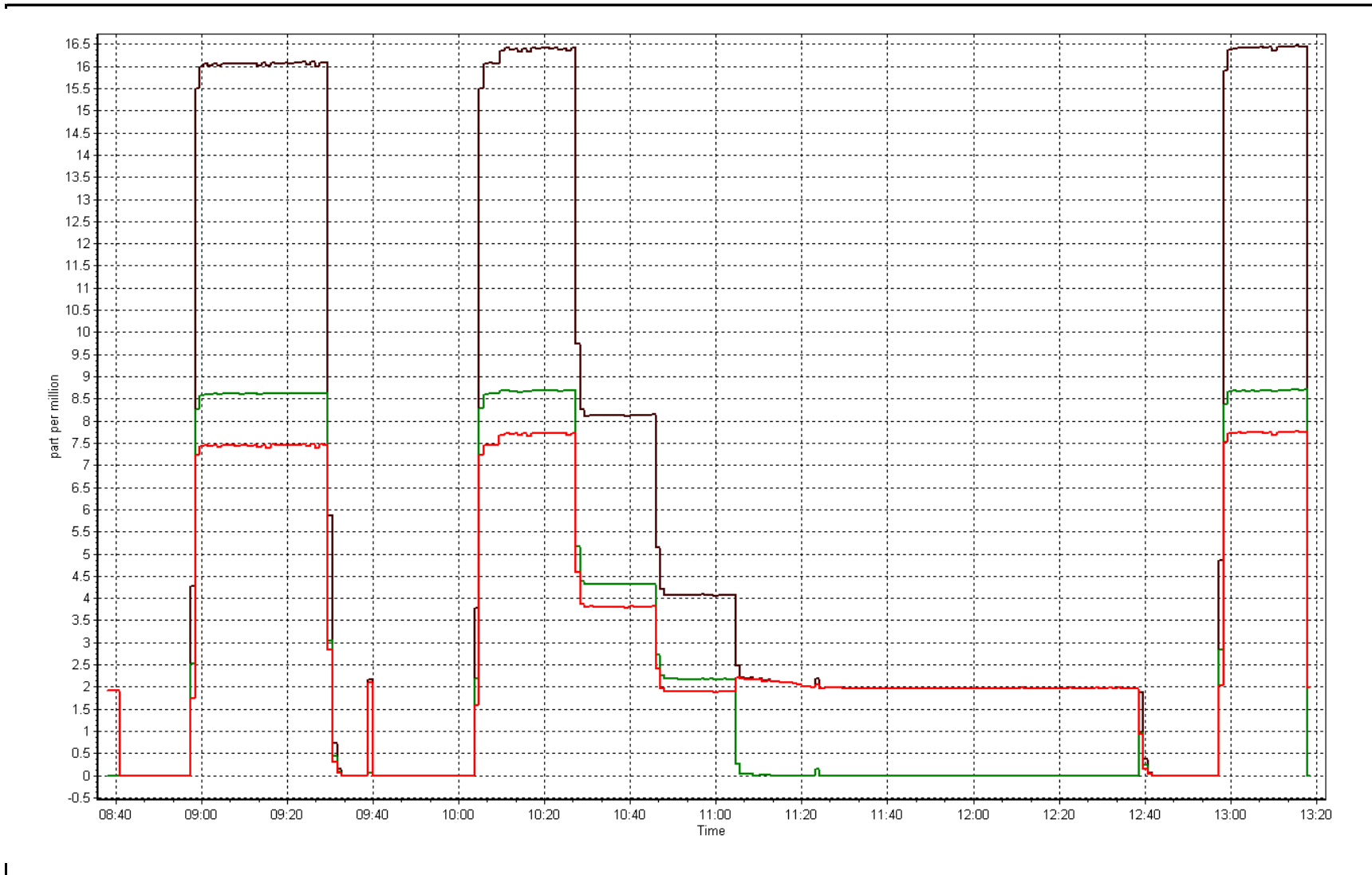
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 25, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:40	End Time (MST)	13:20
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	0.999987
8.69	8.68	1.0014		
4.35	4.32	1.0074	Slope	1.001844
2.17	2.17	1.0001		
			Intercept	0.004044







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 12, 2016	Previous Calibration	January 6, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:28	End Time (MST)	11:20
NO2 GPT Ref date	February-11-16	Transfer Standard	NO2 GPT transfer
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.4	26.3
Analyzer IP address	192.168.1.48		Lamp temp.	53.9	53.8
Calculated slope	0.987491	0.998456	Pressure	684.1	665.0
Calculated intercept	-0.818368	-1.447678	Flow cell A	0.723	0.710
Analyzer Background	-2.0	-2.0	Flow cell B	0.728	0.712
Analyzer Coefficient	0.980	1.006	Cell A Intensity	116772	114407
			Cell B Intensity	121117	119823

Analyzer make	Thermo 49i	Analyzer serial #	1426262596
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.3	----
as found span	5000	1.19	444.8	435.7	1.021
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	1.19	444.8	446.2	0.997
second point	5000	0.85	303.4	305.5	0.993
third point	5000	0.51	157.3	160.7	0.979
as left zero	5000	0.00	0.0	0.9	----
as left span	5000	1.19	444.8	446.2	0.997
Average Correction Factor					0.990

Corrected As found	435.4	Previous response	451.3	% change	3.6%
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Notes:

No maintenance done, filter changed out, span adjusted

Calibration Performed By:

Melissa Lemay



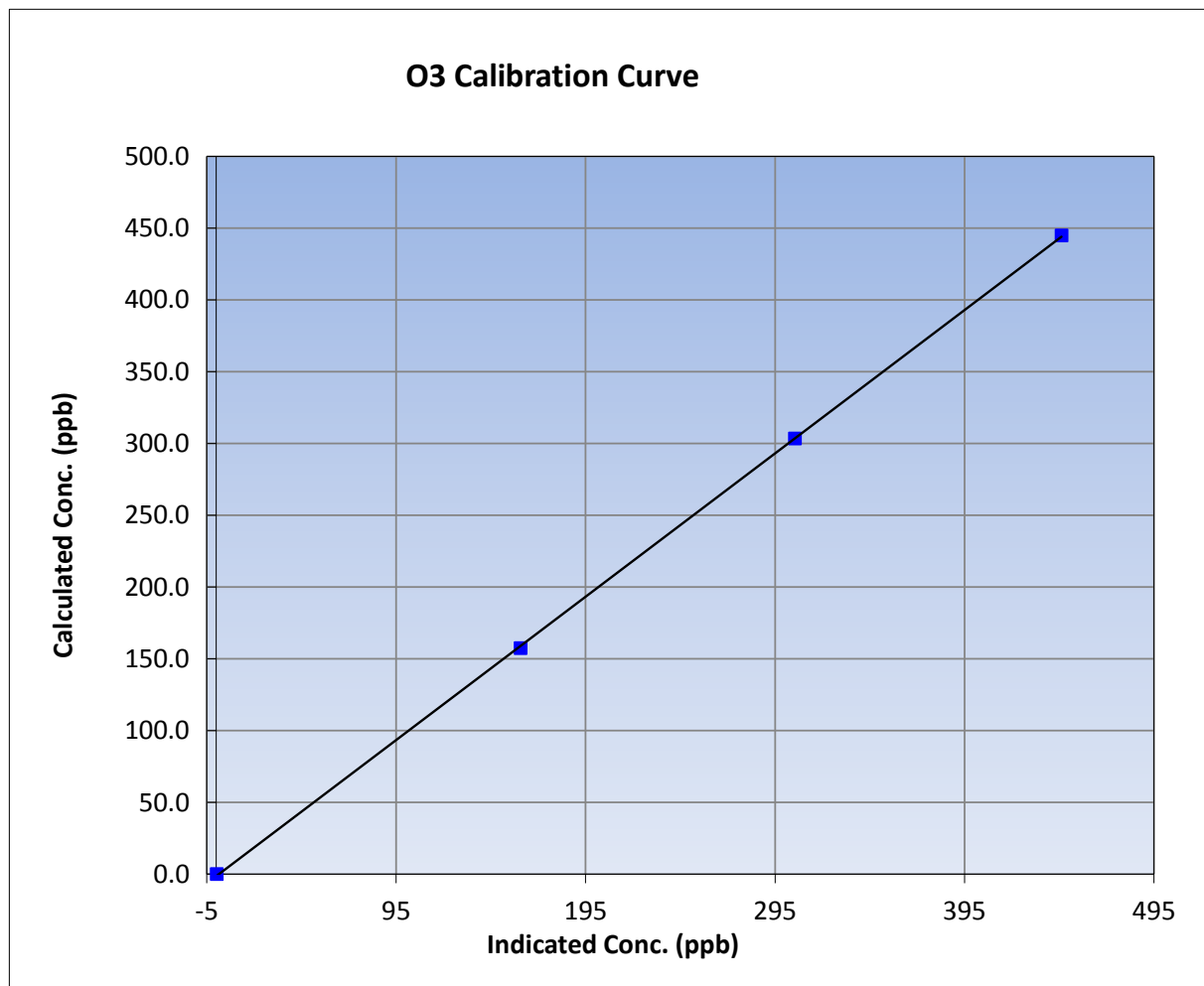
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-12-16	Previous Calibration	January 6, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:28	End Time (MST)	11:20
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

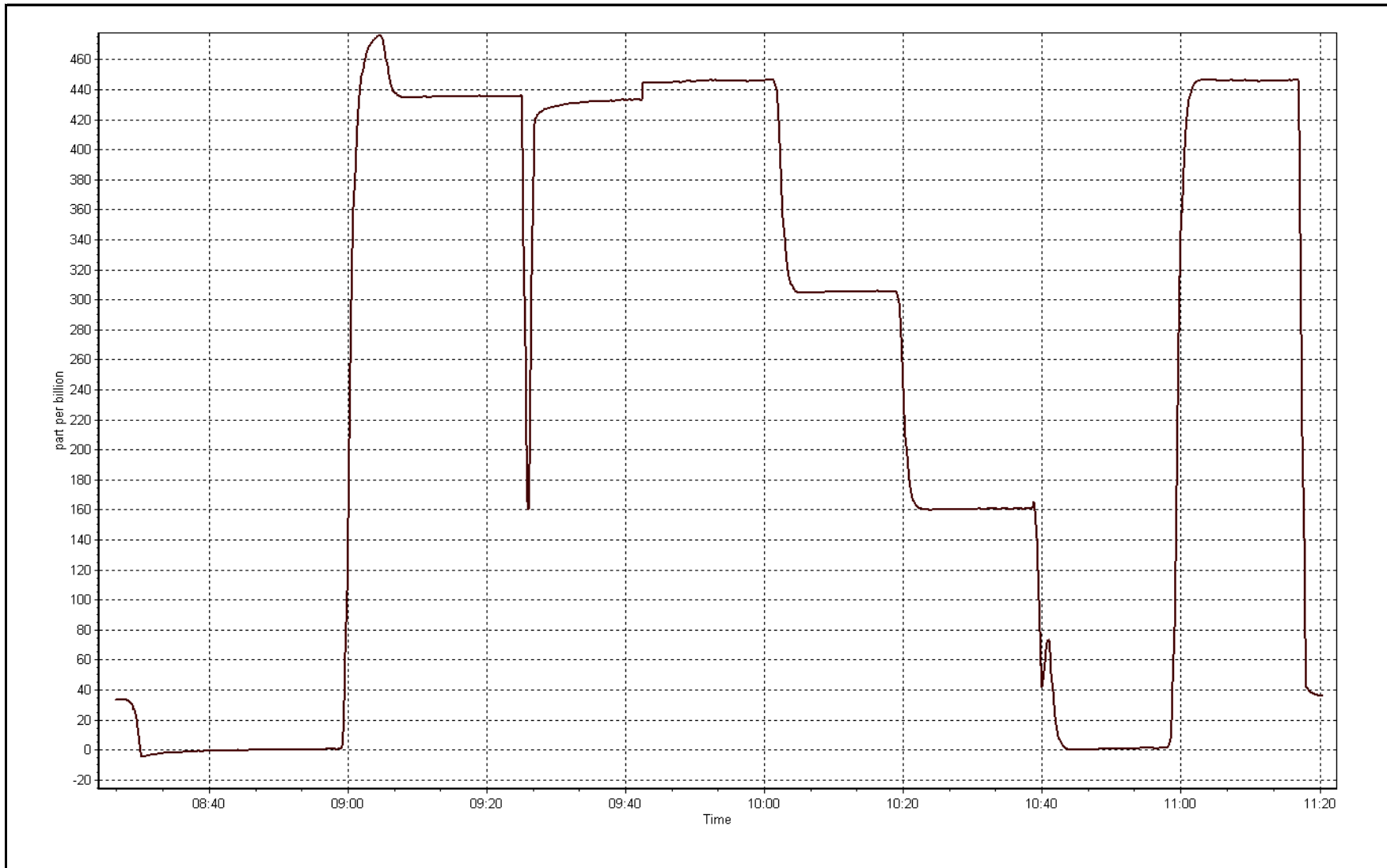
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999956
444.8	446.2	0.9969		
303.4	305.5	0.9931	Slope	0.998456
157.3	160.7	0.9788		
			Intercept	-1.447678



O3 Calibration Plot

Date: February 12, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:38	End Time (MST)	13:20
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOX Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne PAI T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996585	0.996594	1.002849
	Data Offset	2.503043	2.624465	0.262950
Current Calibration	Data Slope	0.993969	0.995765	0.995997
	Data Offset	0.557513	0.498696	-1.284968

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	192.168.1.43		192.168.1.43	
NO coefficient	0.966		1.000	
NOX coefficient	0.998		1.000	
NO2 coefficient	1.000		1.000	
NO bkgnd	3.7		3.6	
NOX bkgnd	3.8		3.7	
Chamber Temp	49.9	Deg C	50.3	Deg C
Moly Temp	326.3	Deg C	325.3	Deg C
PMT voltage	-802.5	V	-808.1	V
PMT Temp	-2.8	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	154.2	mmHg	162.2	mmHg
R Cell Press Nox	154.2	mmHg	162.2	mmHg
NO sample flow	0.83	lpm	0.792	lpm
Nox sample Flow	0.832	lpm	0.792	lpm

Notes:

Pump and charcoal changed out for preventive maintenance, PMT adjusted, Zero adjusted, filter changed out



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 11, 2016

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	-0.5	-0.5	0.0	----	----
as found span	5000	74.9	799.9	799.9	0.0	775.1	775.4	-0.3	1.0320	1.0316
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	5000	74.9	799.9	799.9	0.0	804.7	803.3	1.4	0.9941	0.9958
second point	5000	37.5	400.5	400.5	0.0	401.5	400.8	0.7	0.9975	0.9993
third point	5000	18.7	199.7	199.7	0.0	200.2	200.0	0.2	0.9976	0.9986
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	74.9	799.9	359.9	440.0	809.4	361.9	447.5	0.9883	0.9945
									0.9964	0.9979

Corrected As found
Previous Response

NO_x= 775.6
NO_x= 800.2

NO= 775.9
NO= 800.0

Percent Change

NO_x= 3.2%

NO= 3.1%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 74.90 ccm NOx ref calc conc = 799.9 ppb NO ref calc conc = 799.9 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	806.0	804.7	0.0	0.9925	0.9941	----	----
1st NO2 (300)	359.9	444.8	806.7	359.9	446.8	0.9916	----	0.9955	100.4%
2nd NO2 (200)	501.3	303.4	807.9	501.3	306.6	0.9901	----	0.9896	101.1%
3rd NO2 (100)	647.4	157.3	808.4	647.4	160.9	0.9895	----	0.9776	102.3%
2nd NO ref point		0.0	808.6	807.1	1.5	0.9893	0.9911	----	----
Average Correction Factor						0.9901		0.9876	101.3%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

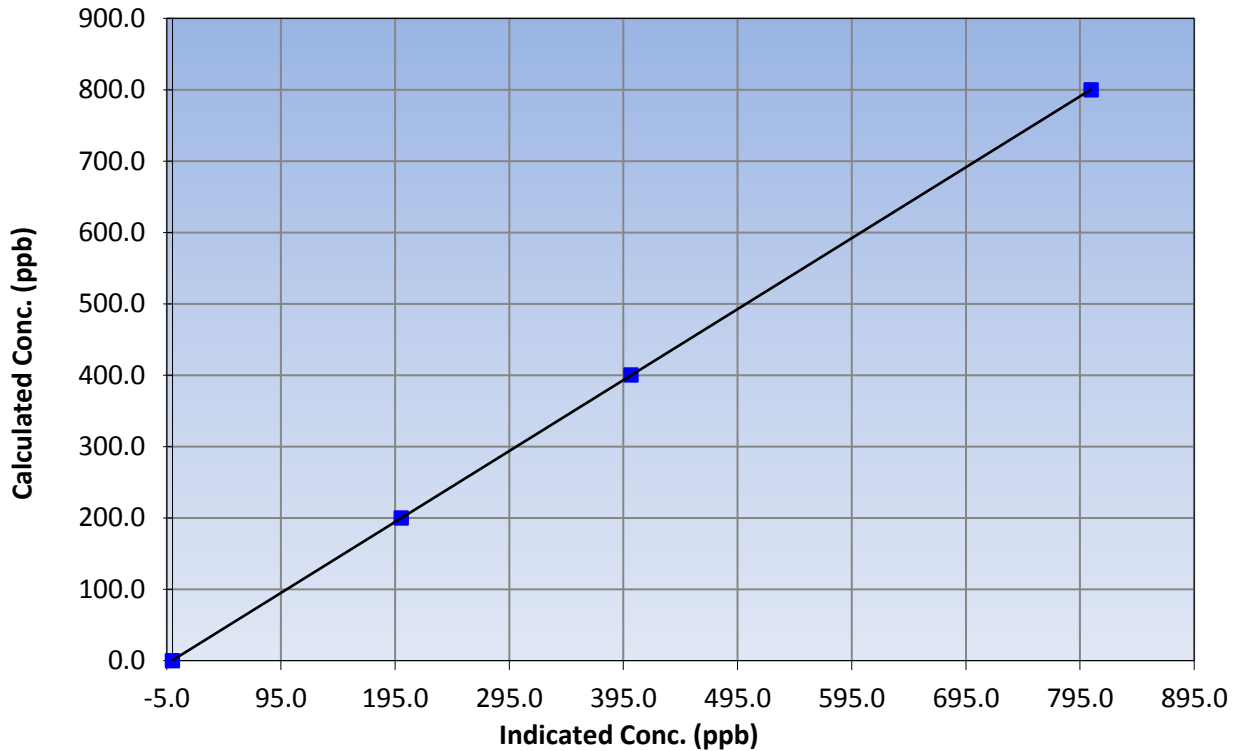
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:38	End Time (MST)	13:20
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	0.999996
799.9	804.7	0.9941		
400.5	401.5	0.9975	Slope	0.993969
199.7	200.2	0.9976		
			Intercept	0.557513

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

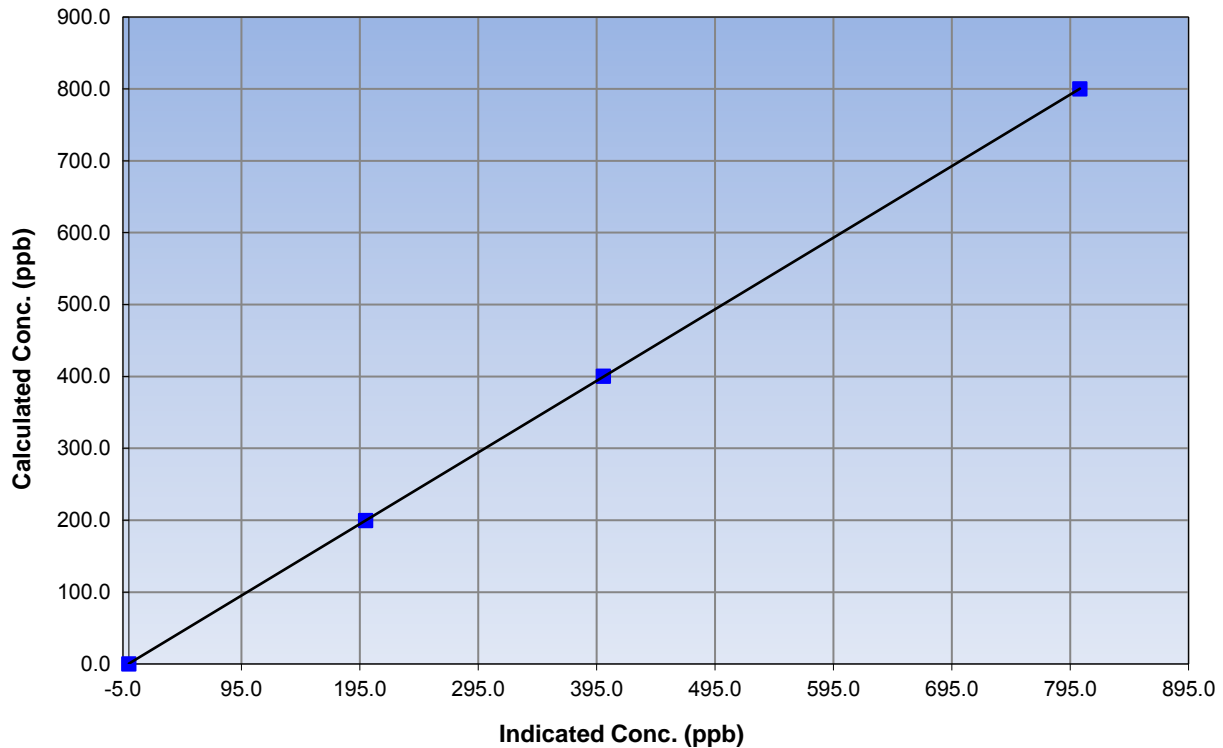
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 5, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:38	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999996
799.9	803.3	0.9958		
400.5	400.8	0.9993	Slope	0.995765
199.7	200.0	0.9986		
			Intercept	0.498696

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

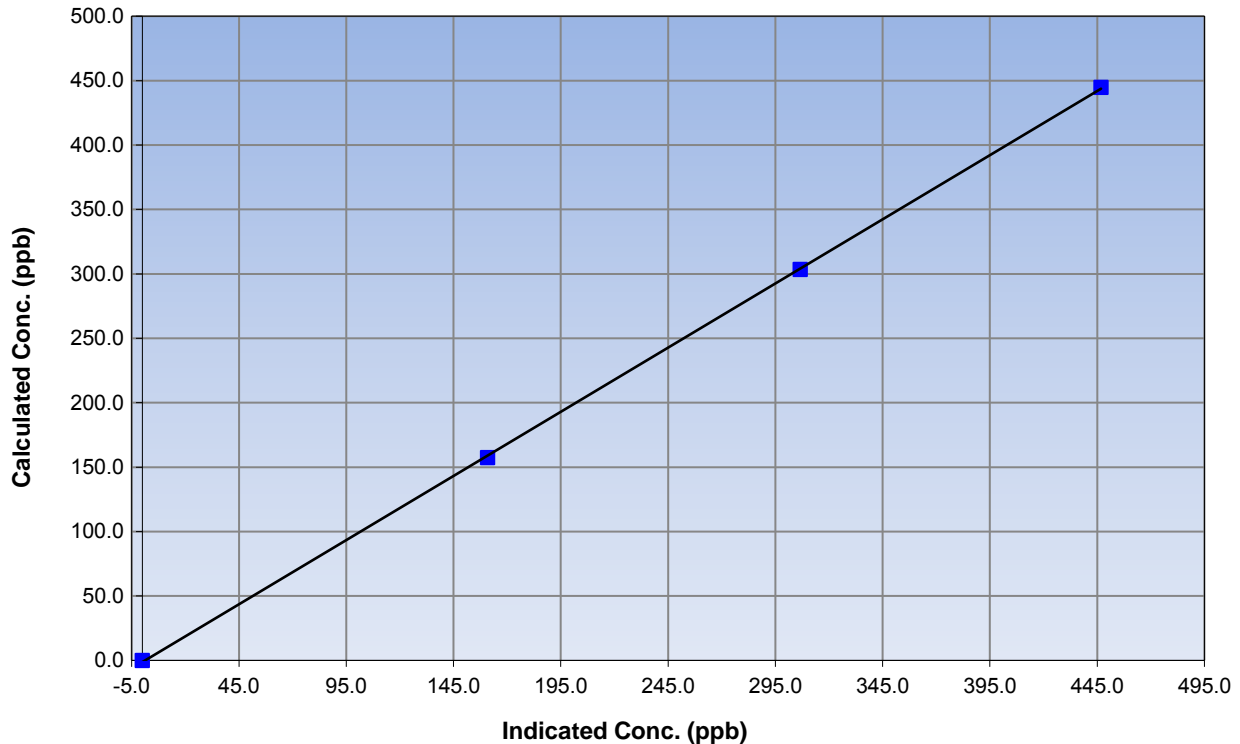
Station Information

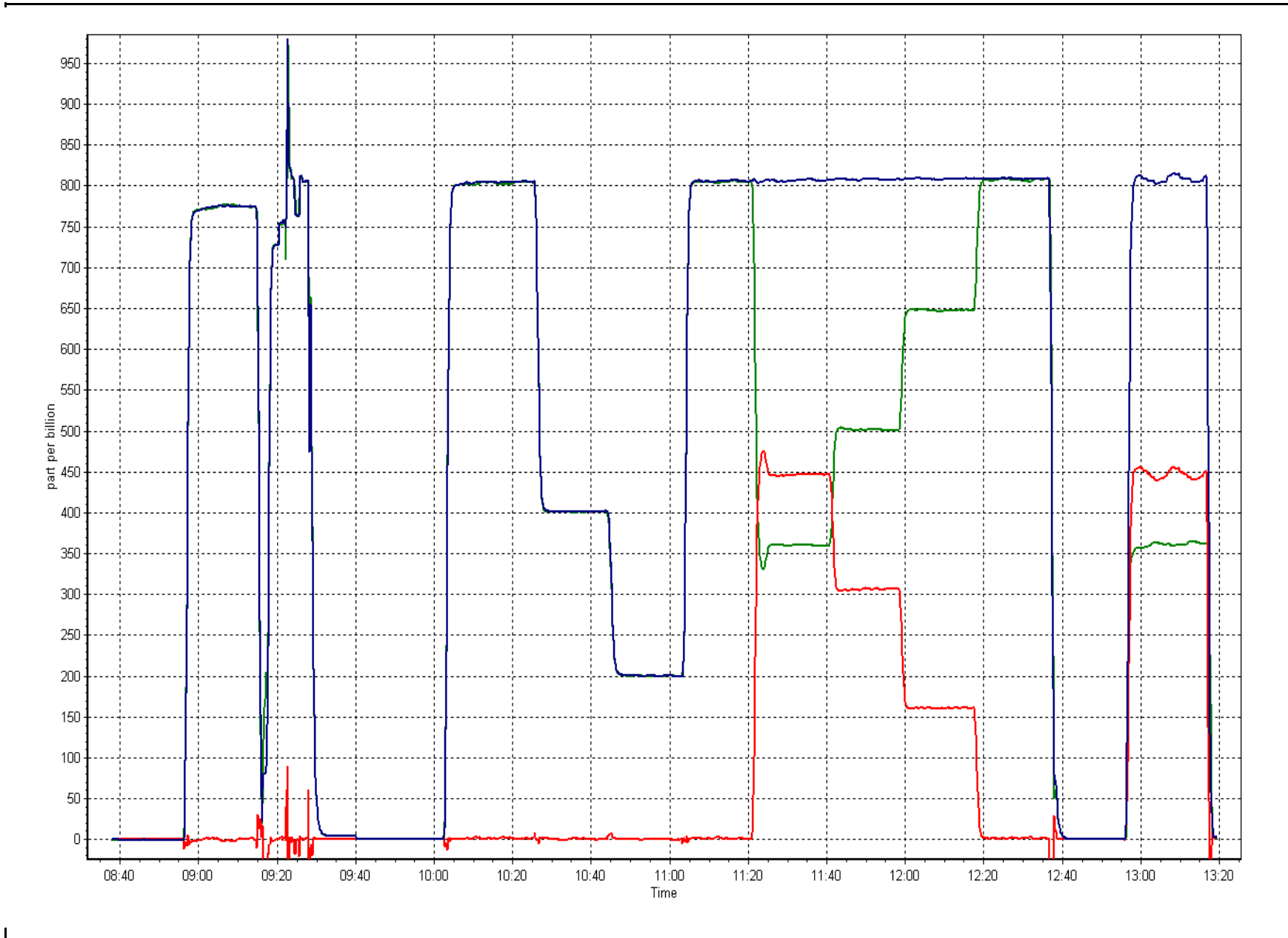
Calibration Date	February 11, 2016	Previous Calibration	January 5, 2016
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	8:38	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999945
444.8	446.8	0.9955		
303.4	306.6	0.9896	Slope	0.995997
157.3	160.9	0.9776		
			Intercept	-1.284968

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	February 12, 2016	Previous Calibration:	January 6, 2015
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	11:18	End Time (MST):	12:46
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	E1093		
C ₁₄ Source SN:	4933		
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-14.0	-16.0	-2.0	-16.0
T2	20.0	na	na	20.0
T3	20.0	na	na	20.0
T4	15.0	na	na	15.0
RH (%)	7.0	na	na	7.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	966	962.0	-4.0	966

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	989	-11	989	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	191		190
Neph	-0.6		-0.3
C14	293.5		-2.4
Indicated Concentration (ug/m3)	-0.6	Yes	-0.3
Offset 1	190		192.3
Offset 2	31.9		31.9

Leak Check (Quarterly)			
Leak Check Date:	February 12, 2016	Previous Leak Check Date:	November 16, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.52		0.05
*Flow with adaptor (LPM):	16.47		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	June 17, 2015	Previous Foil Calibration:	
Zeroed?:			
Foil Mass:	1278	Mass foil set S/N:	2520
Previous Correction Factor:	7020		
New Correction Factor:	6936		

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

NOTES:

T1 and Nephelometer adjusted. Cyclone head cleaned.

Melissa Lemay



Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	February-22-16	Previous Calibration	
Station Name	Anzac	Station Number	AMS 14
Reason:	<input type="radio"/> Routine <input checked="" type="radio"/> Installation <input type="radio"/> Removal		
Start Time (MST)	11:05	End Time (MST)	12:54
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	P15103

WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	D6359
DACS make	Campbel Scientific CR3000	DACS serial No.	8790
DACS voltage range	5000	DACS channel #	P2
	<u>Before</u>		<u>After</u>
Calculated slope		Calculated slope	0.988633
Calculated intercept		Calculated intercept	0.173902

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.1	1.0031
400	39.4	39.8	0.9889
600	58.6	58.4	1.0027
800	77.8	78.9	0.9854
Average Correction Factor			0.9950

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	Z1048
DACS make	Campbel Scientific CR3000	DACS serial No.	8079
DACS voltage range	5000	DACS channel #	SE 24
	<u>Before</u>		<u>After</u>
Calculated slope		Calculated slope	0.996830
Calculated intercept		Calculated intercept	-1.201723
As Found Declination (west of North)	14	As Left Declination (west of North)	14

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	2.0	n/a
90	91.3	0.9858
180	181.1	0.9939
270	270.9	0.9967
357	360.6	0.9900
Average Correction Factor		0.9916

Notes:

Declination confirmed with compass, 14degrees west of Magnetic North

Calibration Performed By: Melissa Lemay and Asad Hidayat



Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	February-22-16	Previous Calibration	August-17-15
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine Installation	Removal	
Start Time (MST)	11:05	End Time (MST)	12:56
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	P15103

WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	B4129
DACS make	Campbel Scientific CR3000	DACS serial No.	8790
DACS voltage range	5000	DACS channel #	P2
	<u>Before</u>		<u>After</u>
Calculated slope	0.987754732	Calculated slope	0.982700
Calculated intercept	0.116655049	Calculated intercept	0.191717

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	20.4	0.9883
400	39.4	39.5	0.9964
600	58.6	59.1	0.9908
800	77.8	79.3	0.9805
Average Correction Factor			0.9890

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	P22886
DACS make	Campbel Scientific CR3000	DACS serial No.	8079
DACS voltage range	5000	DACS channel #	SE 24
	<u>Before</u>		<u>After</u>
Calculated slope	0.271375	Calculated slope	0.275212
Calculated intercept	110.52123	Calculated intercept	109.952960
As Found Declination (west of North)	14	As Left Declination (west of North)	14

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	362.0	n/a
90	89.7	1.0033
180	183.0	0.9836
270	270.0	1.0000
357	357.0	1.0000
Average Correction Factor		0.9967

Notes:

Declination confirmed with compass, 14degrees west of Magnetic North

Calibration Performed By: Melissa Lemay and Asad Hidayat



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 FEBRUARY 2016

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	660	36	36	100.00	31	0	5	0
TRS (ppb) Average	662	34	34	100.00	4	0	1	0
THC (ppm) Average	660	36	36	100.00	6.5	-	3.3	-
NO2 (ppb) Average	660	36	36	100.00	45	0	25	-
NO (ppb) Average	660	36	36	100.00	159	-	55	-
NOX (ppb) Average	660	36	36	100.00	199	-	77	-
PM2.5 (ug/m3) Average	694	2	2	100.00	35.6	-	10.1	0
Temperature 2 m (C) Average	696	0	0	100.00	9.5	-	1.9	-
Wind Speed 10 m (km/h) Average	689	0	7	98.99	20	-	13	-
Wind Direction 10 m (deg) Average	689	0	7	98.99	-	-	-	-
Precipitation (mm) Total	696	0	0	100.00	1.5	-	6.1	-
Relative Humidity (%) Average	696	0	0	100.00	97	-	92	-
Global Solar Radiation (W/m2) Average	696	0	0	100.00	490	-	133	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	660	0.9	2	-	0	0	0	0	1	2	31
TRS (ppb) Average	662	0.4	0	-	0	0	0	0	0	1	4
THC (ppm) Average	660	2.36	0.6	-	2	2	2.1	2.1	2.4	2.9	6.5
NO2 (ppb) Average	660	10.7	10	-	0	1	2	8	17	25	45
NO (ppb) Average	660	7.2	19	-	0	0	0	0	5	19	159
NOX (ppb) Average	660	17.9	26	-	0	1	2	8	22	44	199
PM2.5 (ug/m3) Average	694	4.79	4	-	0.7	1.4	2	3.7	6.2	9.6	35.6
Temperature 2 m (C) Average	696	-11.89	7.4	-	-37.5	-19.9	-16.1	-12.5	-7	-2.3	9.5
Wind Speed 10 m (km/h) Average	689	6.9	4	-	0	3	4	6	9	12	20
Wind Direction 10 m (deg) Average	689	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	696	-	-	13.72	-	-	-	-	-	-	-
Relative Humidity (%) Average	696	78.3	12	-	33	62	74	81	86	91	97
Global Solar Radiation (W/m2) Average	696	50.2	101	-	0	0	0	0	51	181	490

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	03 Feb 2016 08:00	03 Feb 2016 09:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Feb 2016 21:00	04 Feb 2016 21:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	09 Feb 2016 07:00	09 Feb 2016 09:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Feb 2016 22:00	20 Feb 2016 22:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

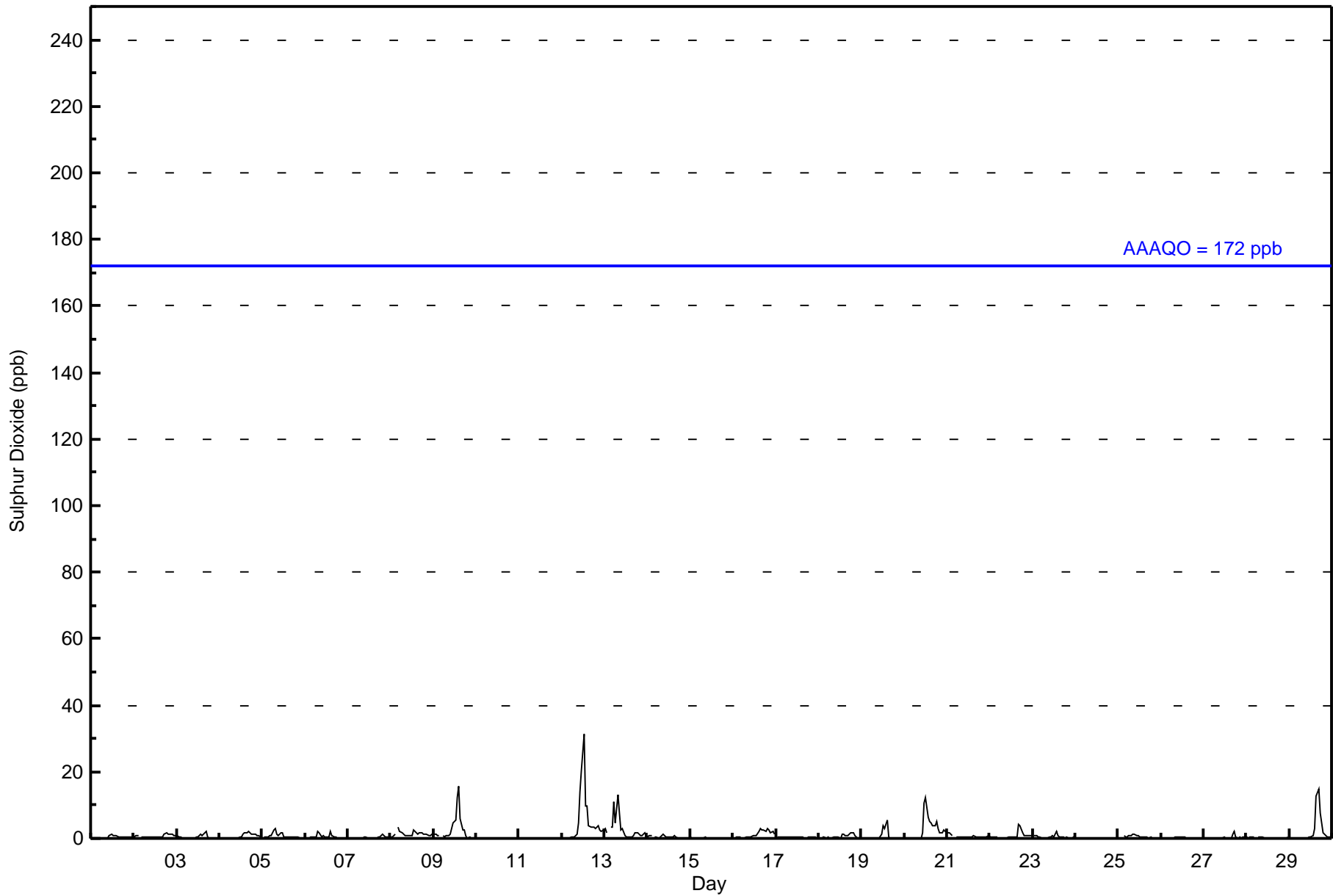
**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - February 2016**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 31 ppb on Feb 12 13:00 Maximum Daily Average: 5.2 ppb on Feb 12														Hours in Service: 696 Hours of Data: 660 Hours of Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0												
Minimum Value: 0 ppb on Feb 1 01:00 Minimum Daily Average: 0.0 ppb on Feb 24 Maximum Diurnal Average: 2.2 ppb at hour 13 Minimum Diurnal Average: 0.4 ppb at hour 3 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 = 12																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0.4	1
2-Feb	0	1	1	Z	0	0	0	0	0	0	1	0	0	1	1	0	1	1	2	1	1	1	1	1	0.7	2
3-Feb	1	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0.4	2	
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	2	2	2	2	2	1	1	1	1	1	0.7	2	
5-Feb	Z	0	0	1	1	1	2	3	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0.8	3	
6-Feb	0	Z	0	0	0	0	0	2	2	1	1	1	0	0	2	1	0	0	0	0	0	0	0	0.5	2	
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1	
8-Feb	1	0	1	Z	3	2	2	1	1	1	1	1	1	3	2	1	2	2	1	1	1	1	1	1.3	3	
9-Feb	1	1	1	1	Z	1	1	1	1	1	3	4	6	12	16	6	3	3	1	0	0	0	0	2.7	16	
10-Feb	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	--	0	
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	0.1	0	
12-Feb	0	Z	0	0	0	0	0	0	1	5	14	20	31	10	10	4	4	4	3	3	4	3	2	5.2	31	
13-Feb	3	2	Z	3	3	11	5	13	8	3	3	1	0	0	0	0	1	2	2	1	1	2	1	2.9	13	
14-Feb	1	1	1	Z	1	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0.4	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	0.1	0	
16-Feb	0	0	0	1	0	Z	0	0	0	0	1	1	1	1	2	3	3	3	2	3	3	2	2	1.2	3	
17-Feb	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	1	0	0	0.5	2	
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	4	3	6	0	0	0	0	0	0	0	0	0.7	6	
20-Feb	0	0	0	Z	0	0	0	0	0	0	2	11	12	6	5	5	4	4	5	3	2	2	3	2.8	12	
21-Feb	2	2	1	1	Z	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1	0.6	2	
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	4	4	2	1	1	1	1	0.8	4	
23-Feb	Z	1	1	0	0	0	0	0	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0	0.5	2	
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	
25-Feb	0	0	Z	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0.3	2	
28-Feb	0	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
29-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	3	13	15	8	5	2	1	1	0	2.1	15	
0.4 0.4 0.4 0.4 0.5 0.8 0.5 0.8 0.7 0.6 1.1 1.7 2.2 1.6 1.9 1.5 1.6 1.3 1.0 0.8 0.6 0.5 0.5 0.5																								Diurnal Average		
3 2 1 3 3 11 5 13 8 5 14 20 31 12 16 13 15 8 5 3 4 3 3 2																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	649	98.33	98.33
11 - 20	10	1.52	99.85
21 - 60	1	0.15	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: 660

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	62	177	31	18	10	7	13	42	102	58	42	22	14	12	14	18	642
11 - 20	0	0	0	0	0	0	0	3	5	2	0	0	0	0	0	0	10
21 - 60	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	177	31	18	10	7	13	45	107	61	42	22	14	12	14	18	653

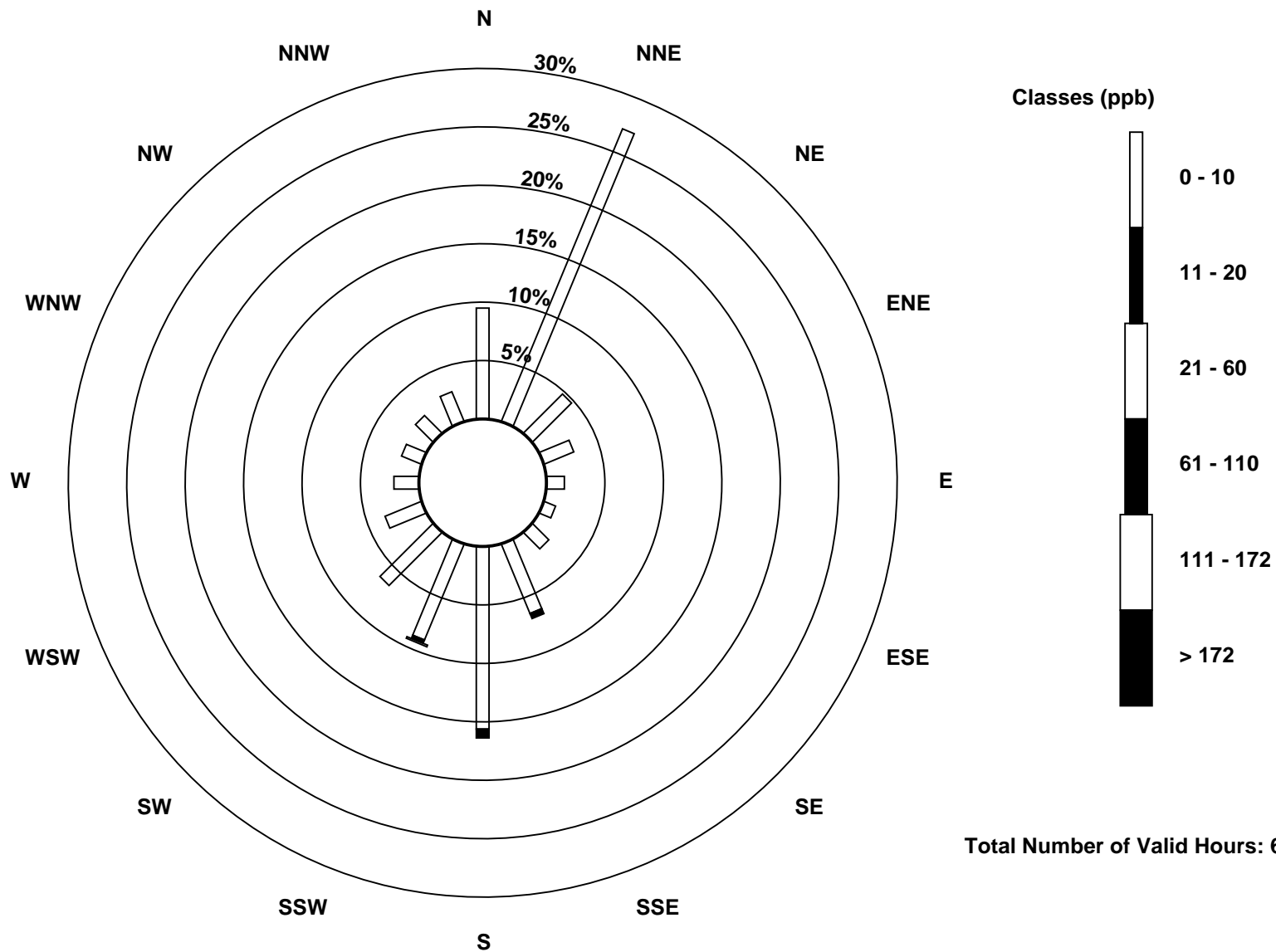
Total Number of Valid Hours: 653

Total Number of Hours: 696

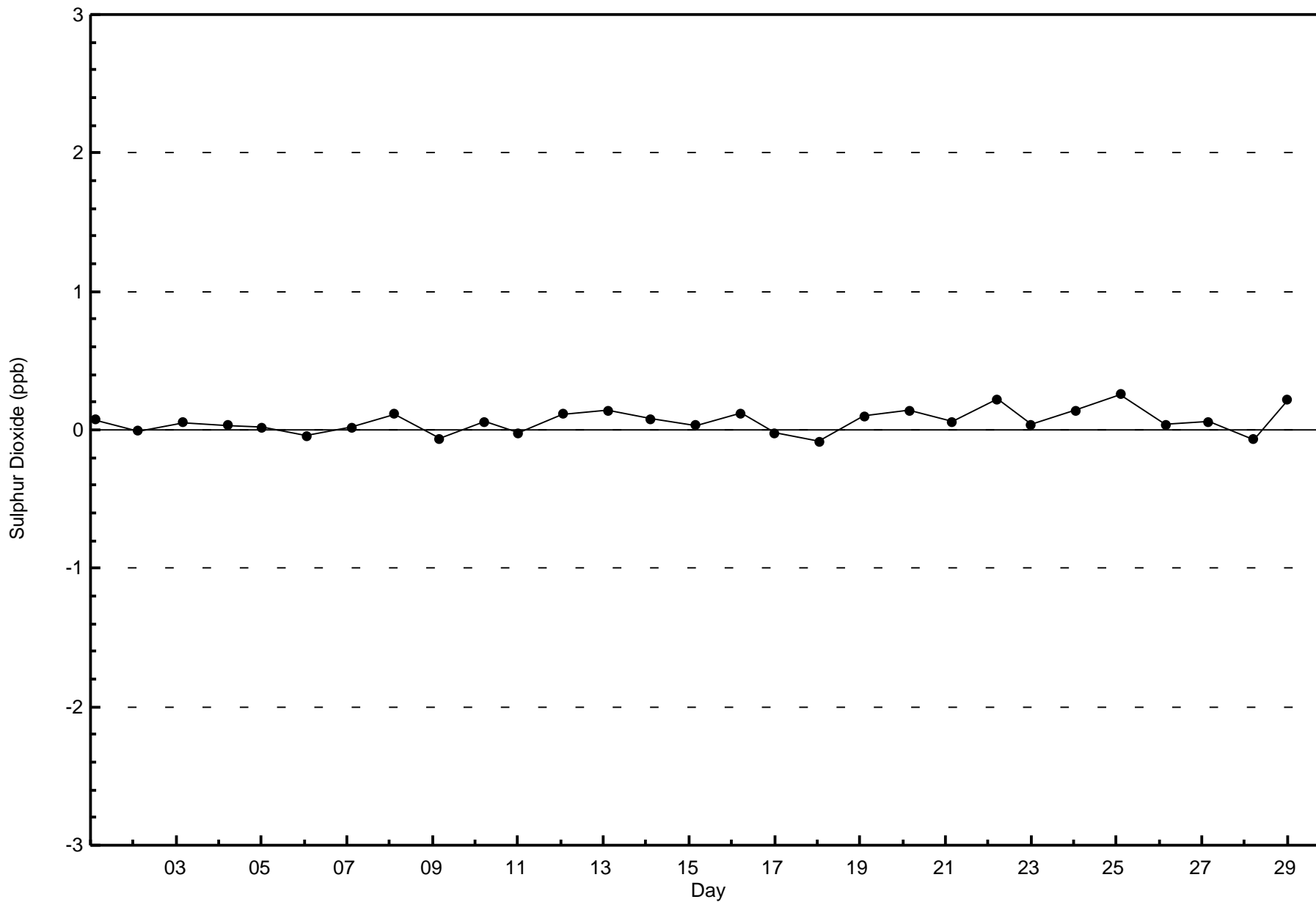


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)



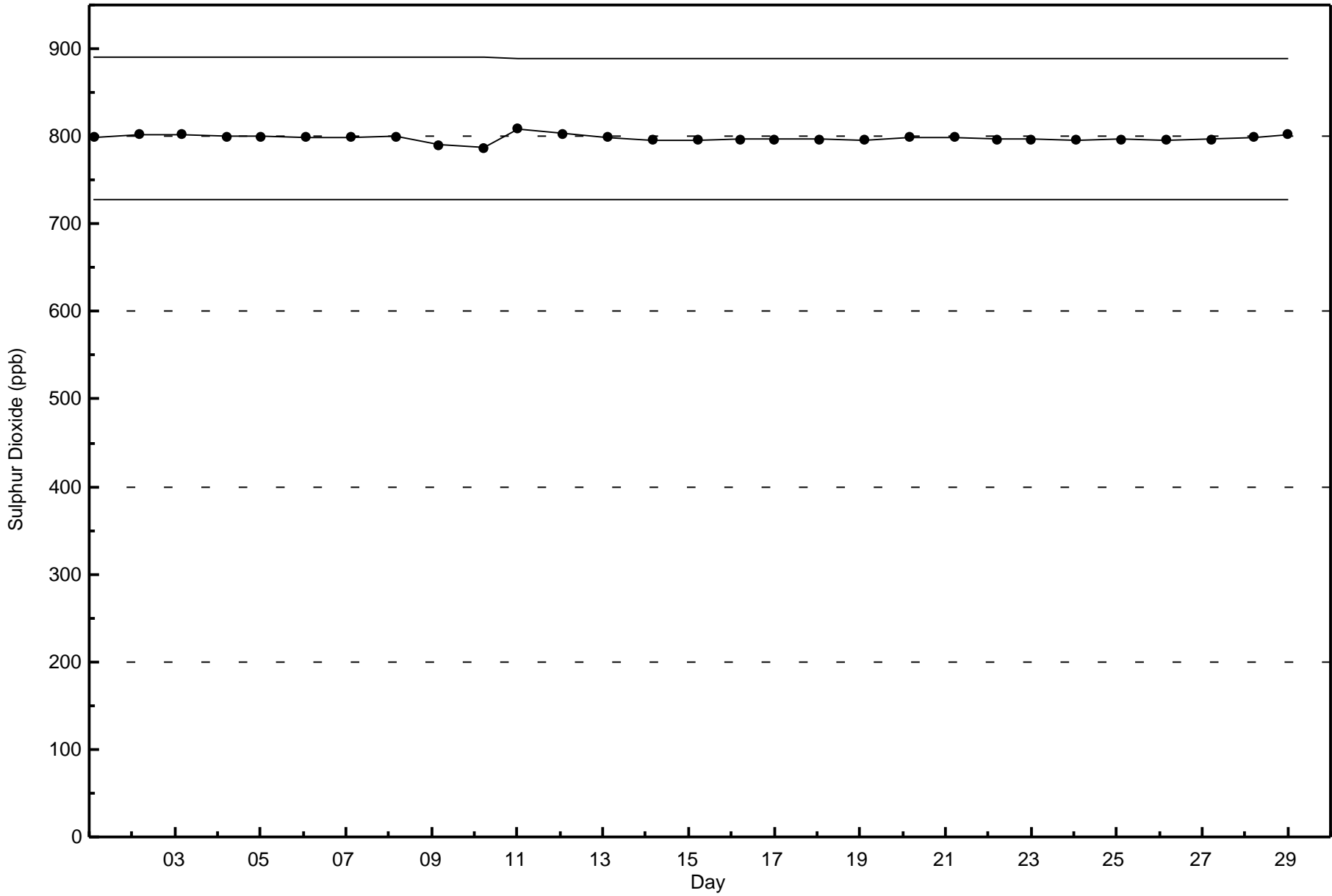
Total Number of Valid Hours: 653





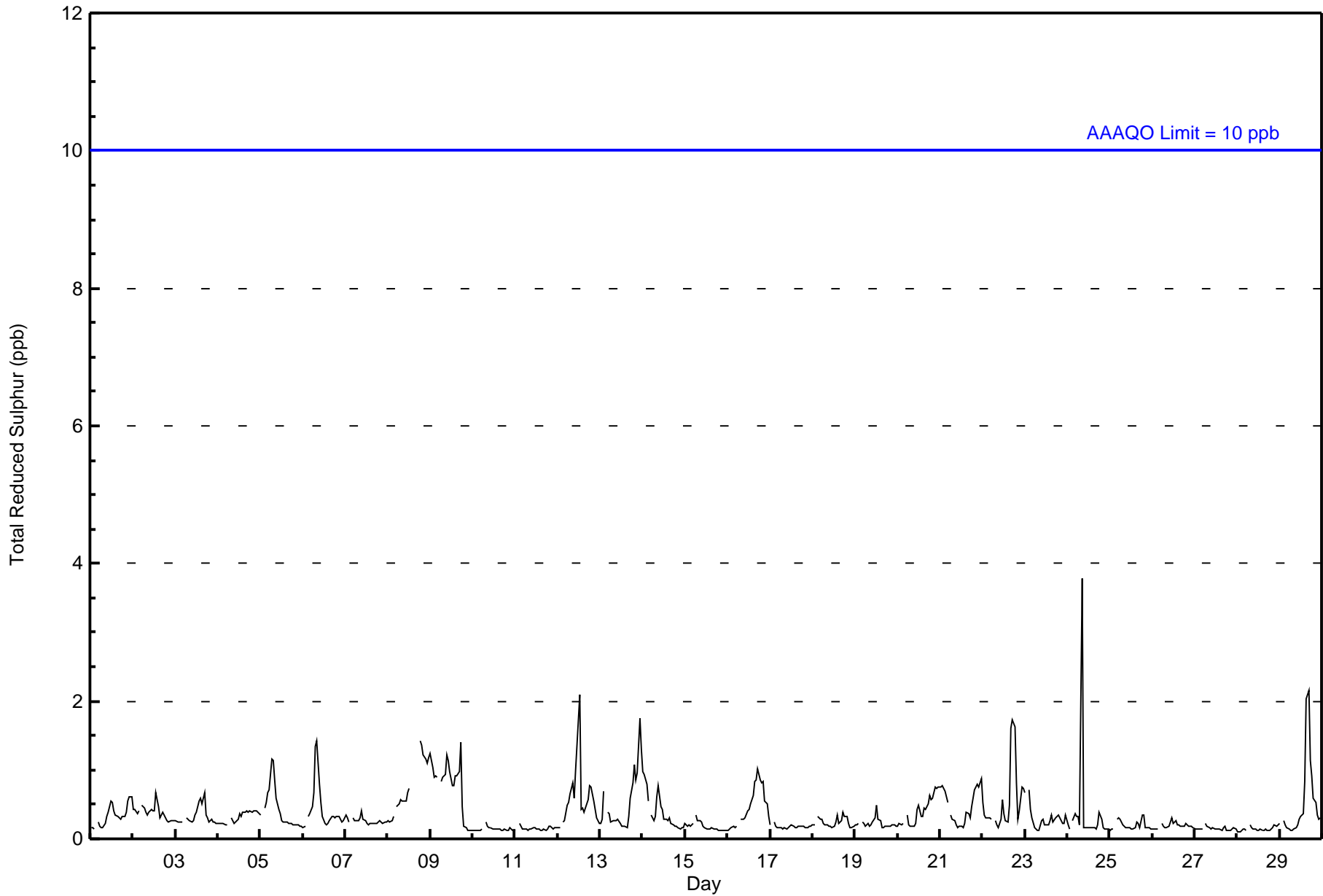
Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - February 2016





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																																							
Maximum Value: 4 ppb on Feb 24 09:00										Maximum Daily Average: 0.8 ppb on Feb 9										Hours of Data: 662																													
Minimum Value: 0 ppb on Feb 28 01:00										Minimum Daily Average: 0.1 ppb on Feb 10										Hours of Missing Data: 34																													
Maximum Diurnal Average: 0.5 ppb at hour 9										Minimum Diurnal Average: 0.3 ppb at hour 14										Hours of Calibration: 34																													
Monthly Average: 0.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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	1	1	0	0	0	0	0	0	0	0	1	1	1	0.3	1																							
2-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1																							
3-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	0.3	1																							
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	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
6-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																							
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	0.3	0																							
8-Feb	0	0	0	0	Z	0	1	1	1	1	1	1	1	C	C	C	C	C	1	1	1	1	1	1	0.7	1																							
9-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.8	1																							
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	0.1	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	0.2	0																							
12-Feb	0	0	Z	0	0	0	1	1	1	1	1	1	2	0	0	0	1	1	1	1	1	0	0	0	0.6	2																							
13-Feb	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	0.5	2																							
14-Feb	1	1	1	1	Z	0	0	0	1	1	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	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	1	1	1	1	1	1	1	1	1	1	0	0.5	1																							
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	0.2	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	0.2	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	0.2	0																							
20-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1																							
21-Feb	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1																							
22-Feb	1	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	2	2	2	2	1	0	0	1	0.6	2																							
23-Feb	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
24-Feb	0	0	Z	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4																							
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	0	Z	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	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
29-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0.5	2																							
																								0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	Diurnal Average	
																								1	1	1	1	1	1	1	1	4	1	1	1	2	1	1	2	2	2	2	2	1	1	1	2	1	Diurnal Maximum
Z - zerspan 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 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	661	99.85	99.85
3 - 4	1	0.15	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: 662

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	61	185	31	17	10	8	13	46	106	60	39	22	12	13	13	18	654
3 - 4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	185	31	17	10	8	13	46	106	61	39	22	12	13	13	18	655

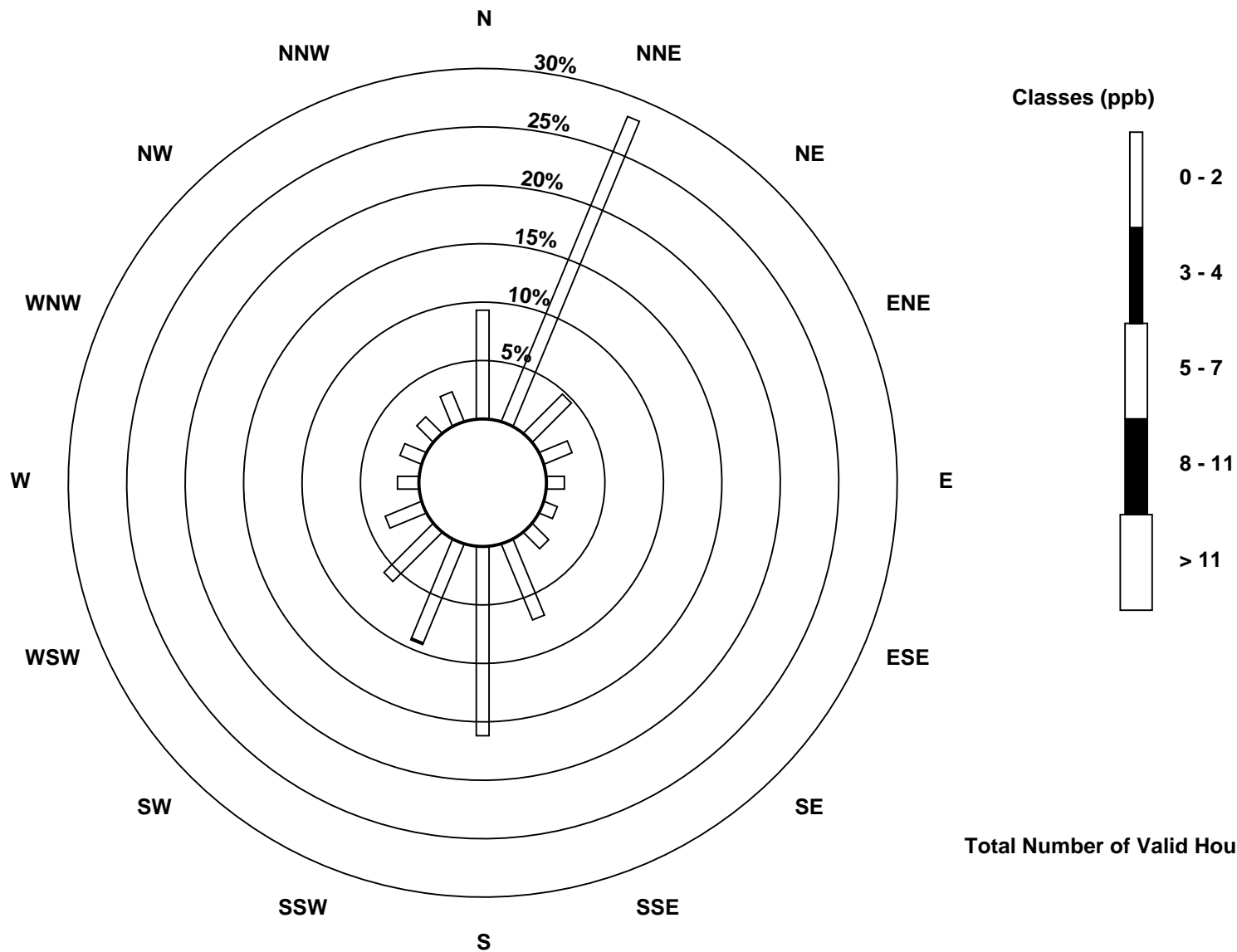
Total Number of Valid Hours: 655

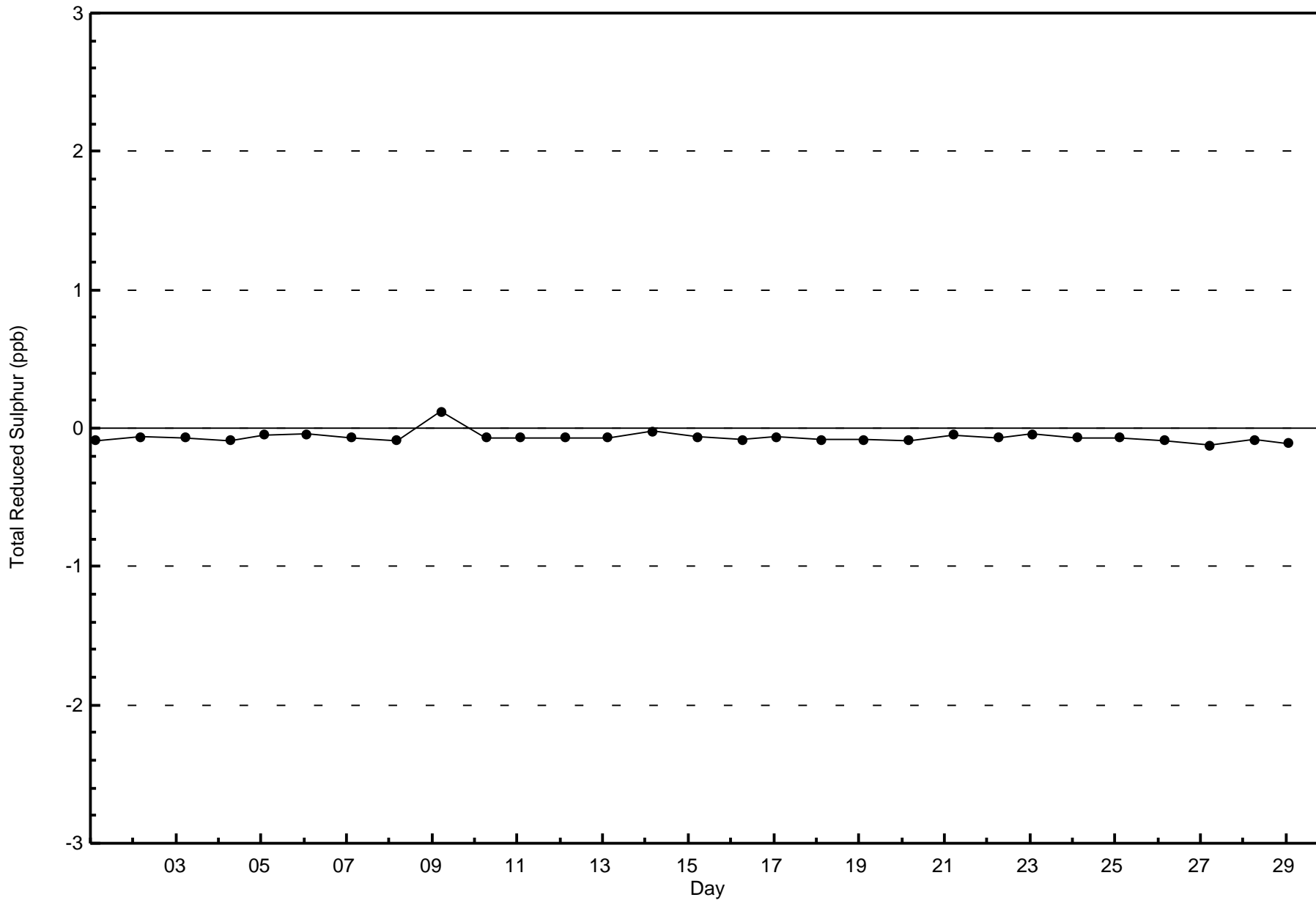
Total Number of Hours: 696

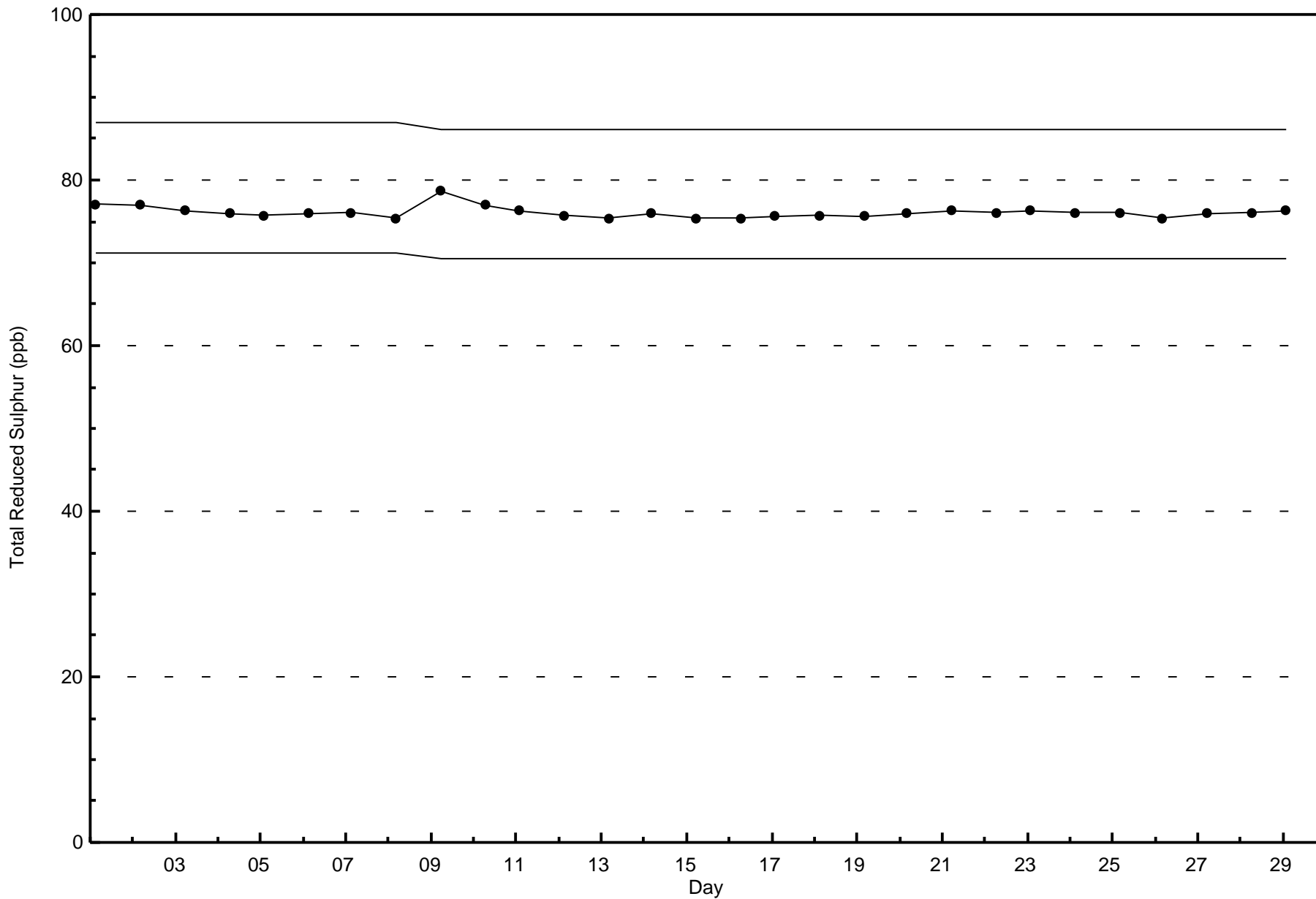


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)









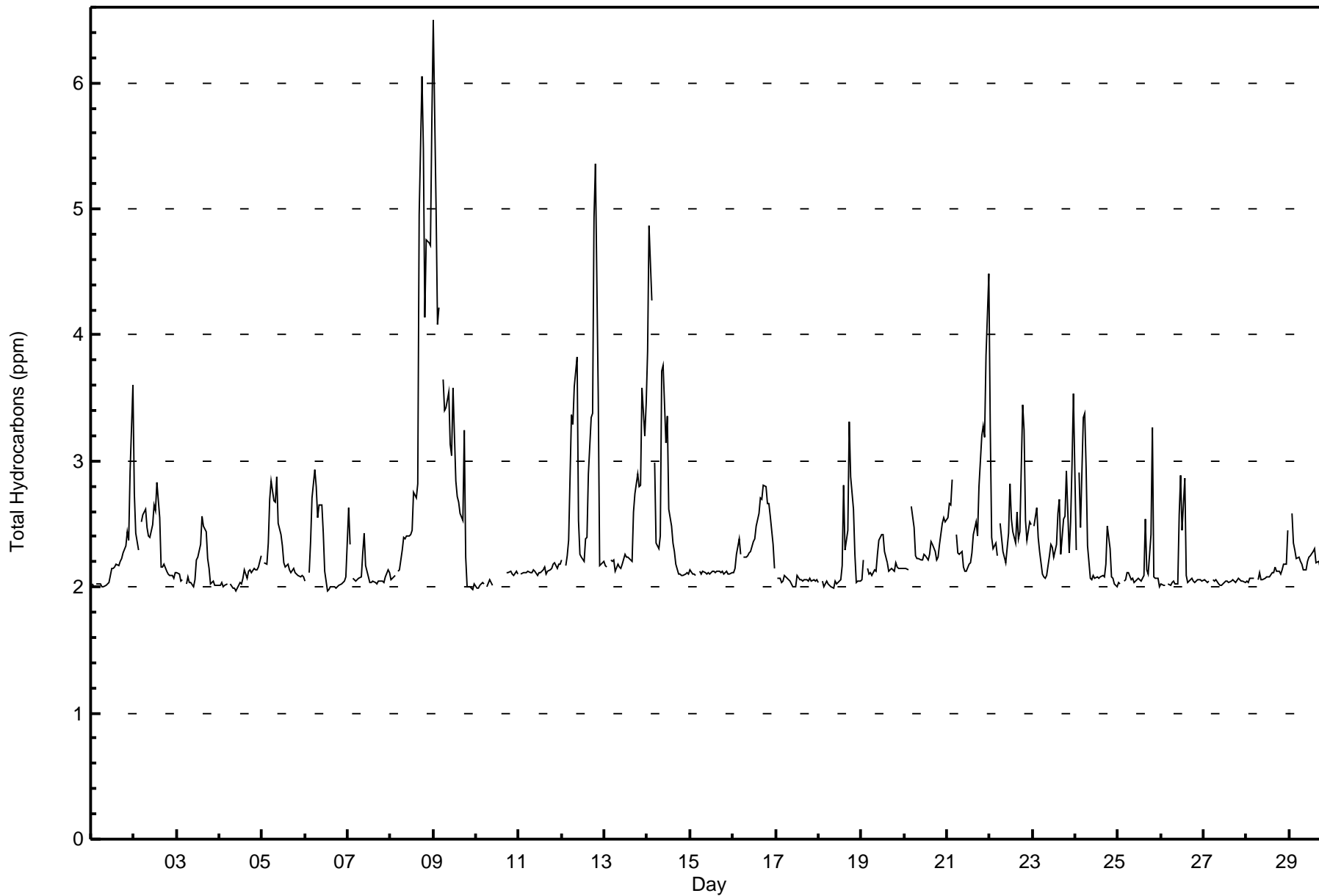
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

CNRL Horizon - February 2016

Maximum Value: 6.5 ppm on Feb 9 01:00																			Maximum Daily Average: 3.3 ppm on Feb 8						Hours in Service: 696				
Minimum Value: 2.0 ppm on Feb 6 13:00																			Minimum Daily Average: 2.0 ppm on Feb 27						Hours of Data: 660				
Maximum Diurnal Average: 2.5 ppm at hour 19																			Minimum Diurnal Average: 2.2 ppm at hour 13						Hours of Missing Data: 36				
Monthly Average: 2.36 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.4 P ₉₀ = 2.9 P ₉₉ = 5.0						Hours of Calibration: 36				
																									Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.9	3.6	2.2	3.6			
2-Feb	2.7	2.4	2.3	Z	2.5	2.6	2.6	2.5	2.4	2.4	2.5	2.7	2.6	2.8	2.5	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.8			
3-Feb	2.1	2.1	2.1	2.1	Z	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.6	2.5	2.4	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.6			
4-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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.3			
5-Feb	Z	2.2	2.2	2.3	2.7	2.8	2.7	2.7	2.9	2.5	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.9			
6-Feb	2.0	Z	2.1	2.4	2.7	2.9	2.8	2.5	2.7	2.6	2.4	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	2.9			
7-Feb	2.6	2.3	Z	2.1	2.0	2.1	2.1	2.1	2.3	2.4	2.2	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.6			
8-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.7	2.7	2.8	5.0	6.1	5.5	4.1	4.8	4.7	4.7	5.7	3.3	6.1			
9-Feb	6.5	5.0	4.1	4.2	Z	3.7	3.4	3.4	3.6	3.1	3.0	3.6	2.8	2.7	2.7	2.6	2.5	3.2	2.2	2.0	2.0	2.0	2.0	2.0	3.1	6.5			
10-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	C	C	C	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	--	2.1			
11-Feb	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.2			
12-Feb	2.2	Z	2.2	2.2	2.4	3.4	3.3	3.6	3.8	2.5	2.3	2.2	2.2	2.4	2.4	2.9	3.3	3.4	4.9	5.4	3.5	2.2	2.2	2.2	2.9	5.4			
13-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.2	2.2	2.6	2.7	2.9	2.8	2.8	3.6	3.2	3.5	2.5	3.6			
14-Feb	3.9	4.9	4.3	Z	3.0	2.4	2.3	2.4	3.7	3.8	3.1	3.4	2.6	2.5	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.8	4.9			
15-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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
16-Feb	2.1	2.1	2.3	2.4	2.3	Z	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.7	2.7	2.8	2.8	2.7	2.7	2.6	2.3	2.1	2.4	2.8			
17-Feb	Z	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1			
18-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	2.2	2.8	2.3	2.4	3.3	2.9	2.6	2.3	2.0	2.0	2.1	2.2	3.3			
19-Feb	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.4			
20-Feb	2.1	2.1	2.1	Z	2.6	2.5	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.4	2.3	2.3	2.2	2.2	2.3	2.5	2.5	2.5	2.3	2.6			
21-Feb	2.6	2.7	2.6	2.8	Z	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.3	2.4	2.5	2.4	2.8	3.2	3.3	3.2	3.8	4.5	2.7	4.5			
22-Feb	3.3	2.4	2.3	2.3	2.2	Z	2.5	2.3	2.2	2.2	2.4	2.8	2.5	2.4	2.4	2.6	2.4	2.4	3.4	3.2	2.5	2.4	2.5	2.5	2.5	3.4			
23-Feb	Z	2.5	2.6	2.4	2.3	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.3	2.6	2.7	2.3	2.5	2.6	2.9	2.3	2.5	3.0	3.5	2.5	3.5			
24-Feb	2.3	Z	2.9	2.5	3.3	3.4	2.9	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.3	2.1	2.1	2.0	2.0	2.3	3.4			
25-Feb	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.5	2.1	2.1	2.4	3.3	2.1	2.1	2.1	2.0	2.2	3.3			
26-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.6	2.9	2.5	2.9	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.2	2.9			
27-Feb	2.1	2.1	2.0	2.0	Z	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1			
28-Feb	2.0	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.5	2.1	2.5			
29-Feb	Z	2.6	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.4	2.3	2.3	2.3	2.4	2.3	2.6			
																			2.5 2.4 2.4 2.3 2.3 2.4 2.3 2.3 2.3 2.3 2.3 2.3 2.2 2.3 2.3 2.3 2.3 2.4 2.5 2.5 2.5 2.4 2.3 2.4 2.5						Diurnal Average				
																			6.5 5.0 4.3 4.2 3.3 3.7 3.4 3.6 3.8 3.8 3.1 3.6 2.8 2.9 2.8 2.9 5.0 6.1 5.5 5.4 4.8 4.7 4.7 5.7						Diurnal Maximum				
Z - zerospan			C - Calibration																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	120	18.18	18.18
2.1 - 3.0	488	73.94	92.12
3.1 - 10.0	52	7.88	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
CNRL Horizon - February 2016**

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	12	61	7	2	3	0	0	2	9	10	10	1	1	0	0	0	118
2.1 - 3.0	47	115	23	15	7	6	12	41	94	49	26	13	9	5	9	15	486
3.1 - 10.0	3	1	1	1	0	1	1	2	4	2	6	8	4	7	5	3	49
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	177	31	18	10	7	13	45	107	61	42	22	14	12	14	18	653

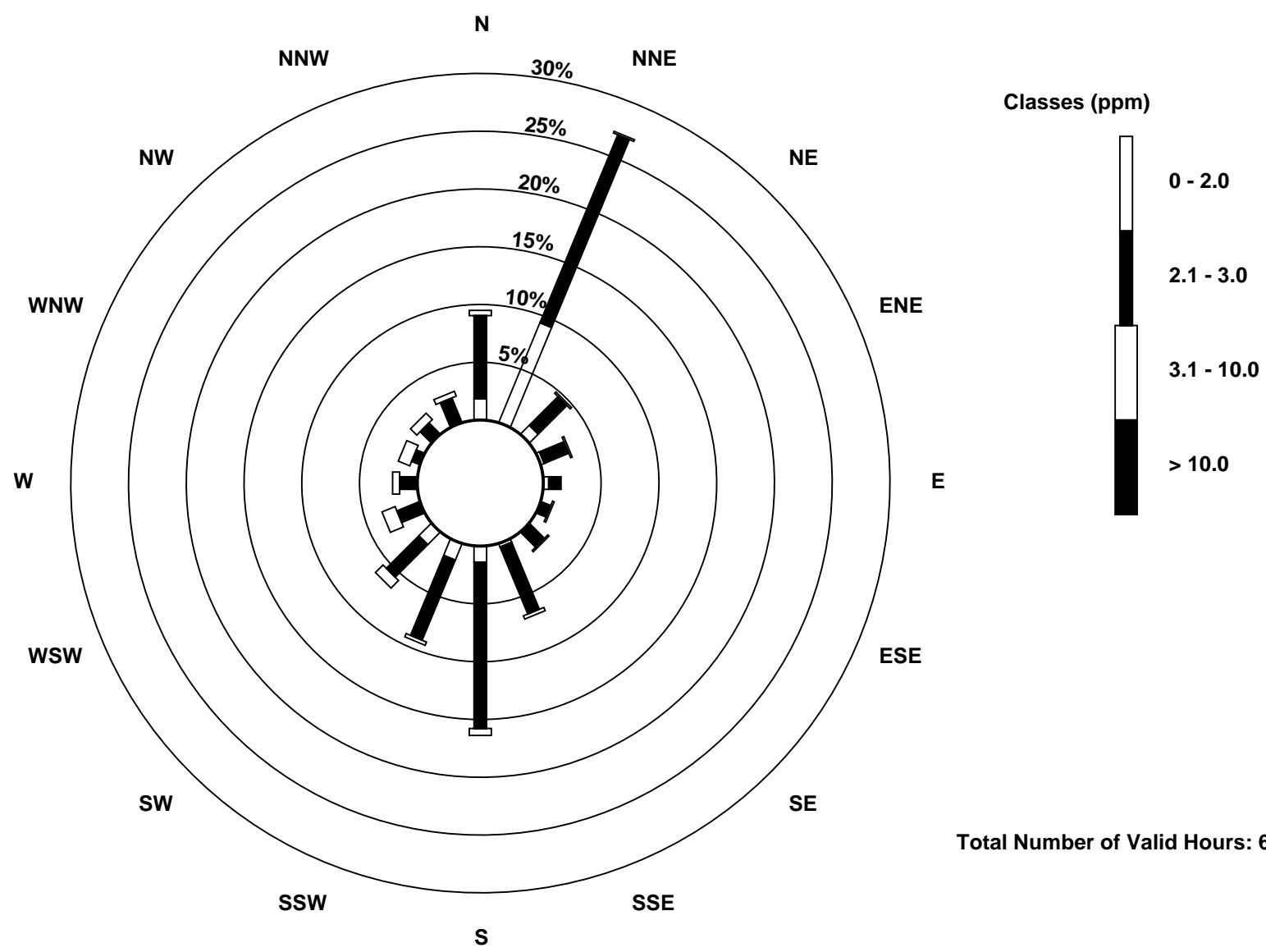
Total Number of Valid Hours: 653

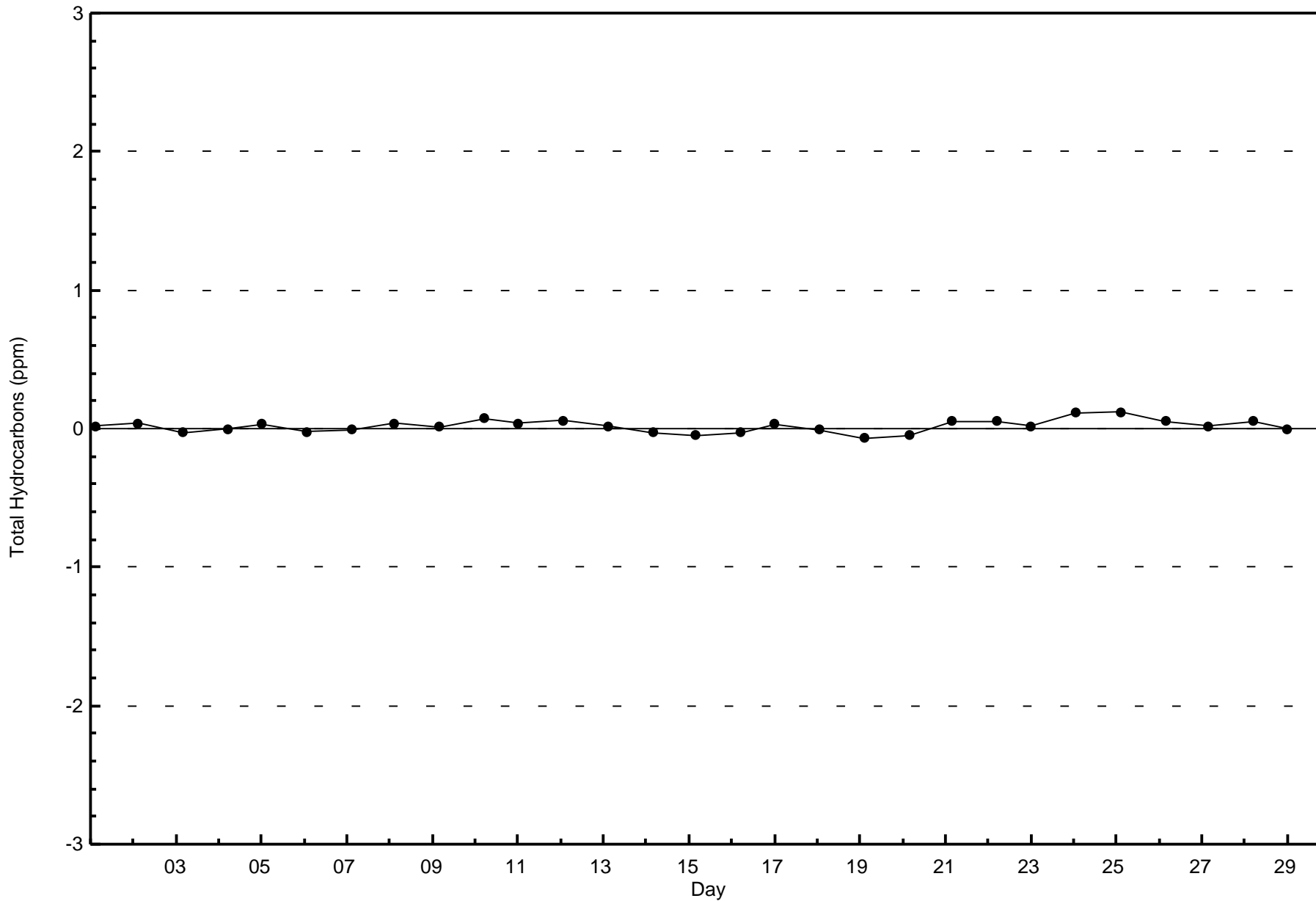
Total Number of Hours: 696

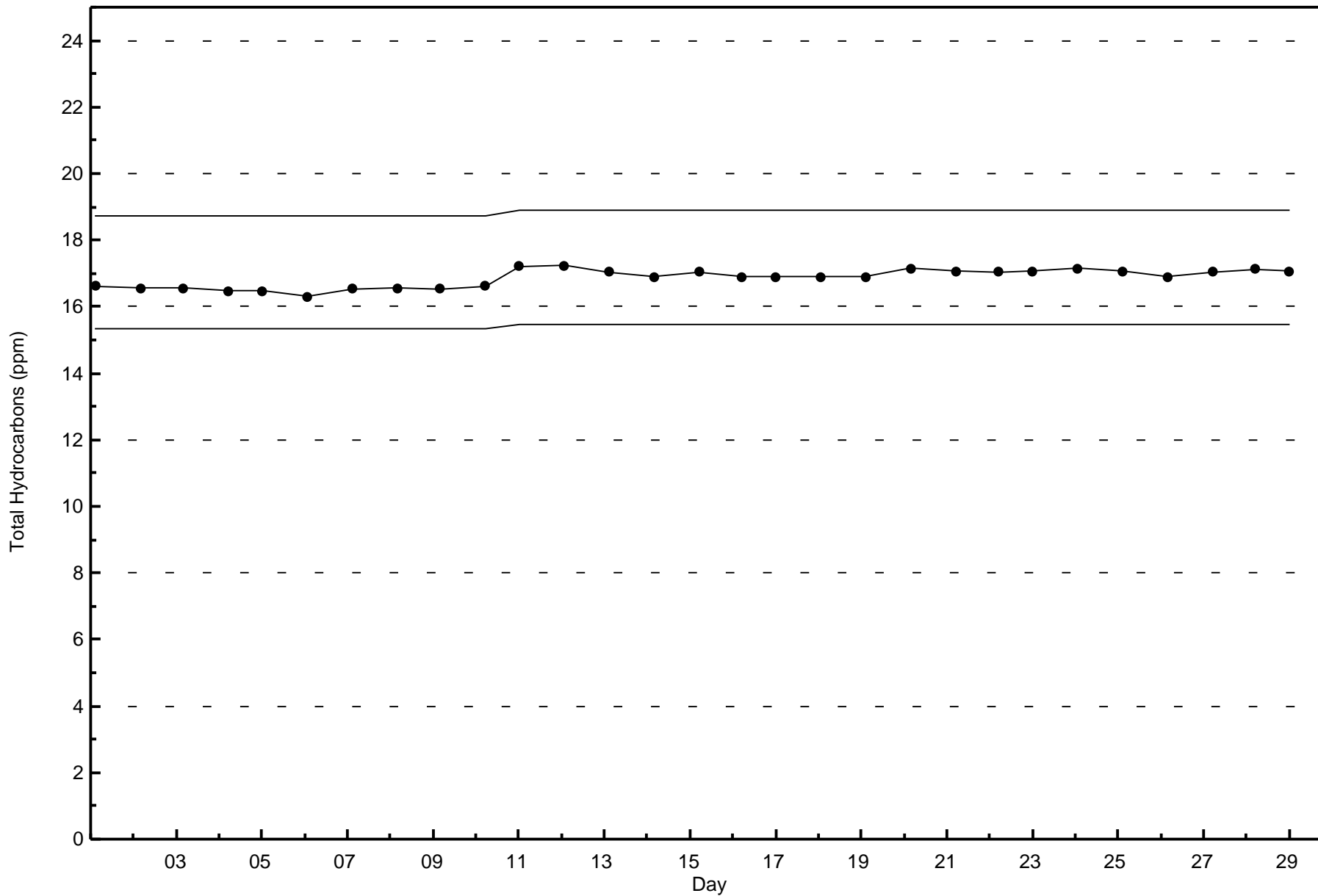


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)

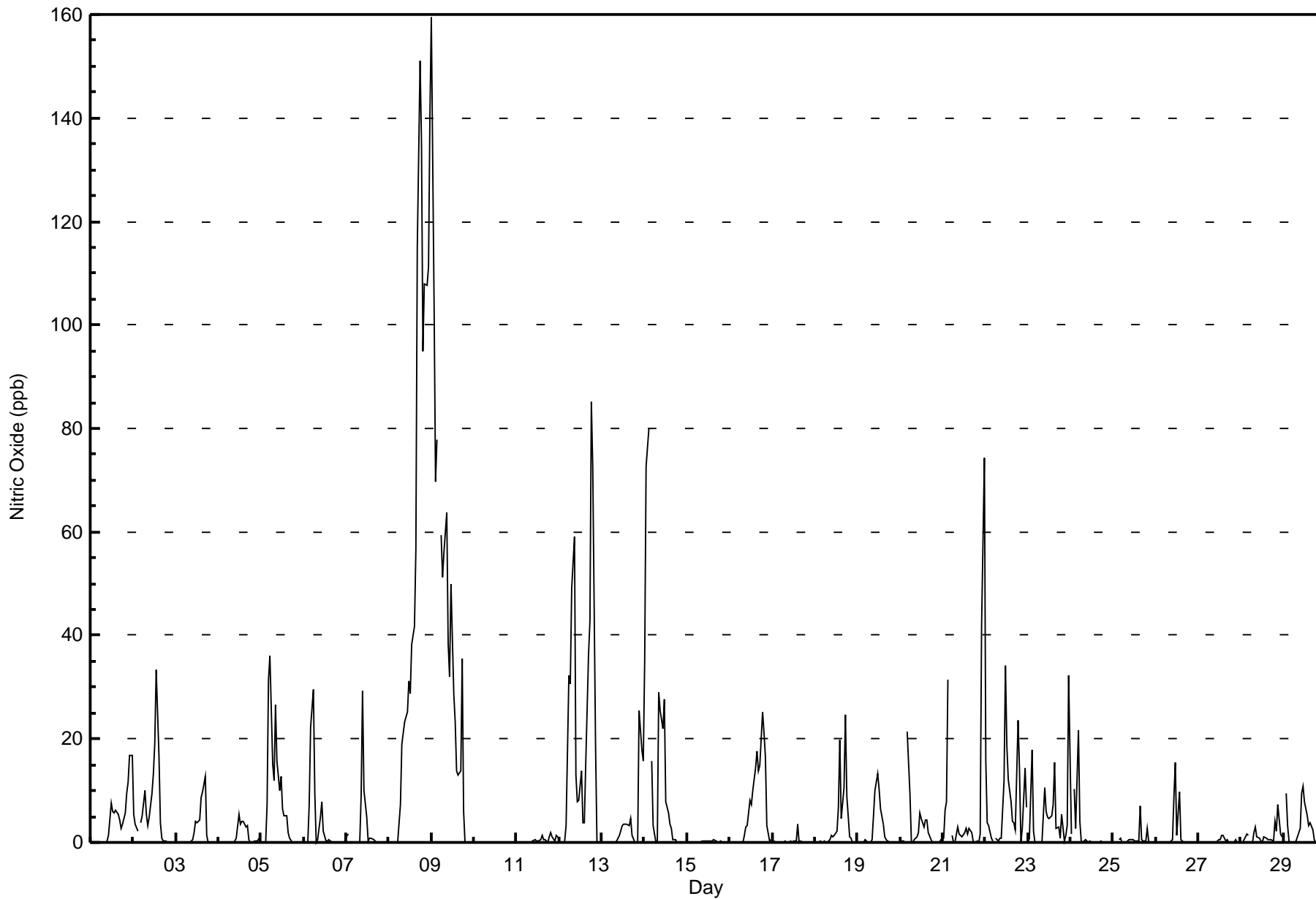








Maximum Value: 159 ppb on Feb 9 01:00		Maximum Daily Average: 54.6 ppb on Feb 8		Hours in Service:	696																					
Minimum Value: 0 ppb on Feb 1 08:00		Minimum Daily Average: 0.2 ppb on Feb 15		Hours of Data:	660																					
Maximum Diurnal Average: 10.1 ppb at hour 24		Minimum Diurnal Average: 4.3 ppb at hour 7		Hours of Missing Data:	36																					
Monthly Average: 7.2 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 5 P ₉₀ = 19 P ₉₉ = 108		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	0	Z	0	0	0	0	0	0	0	1	8	6	6	6	5	4	3	4	6	10	12	17	17	4.5	17
2-Feb	5	4	Z	Z	4	5	10	5	3	5	10	13	19	33	17	4	1	0	0	0	0	0	0	0	6.1	33
3-Feb	0	0	0	0	Z	0	0	0	0	1	2	4	4	4	9	10	13	1	0	0	0	0	0	0	2.1	13
4-Feb	0	0	0	0	0	Z	0	0	0	0	1	5	4	4	4	3	3	0	0	0	0	0	0	1	1.2	5
5-Feb	Z	0	0	7	32	36	15	12	26	16	10	13	6	5	5	2	1	0	0	0	0	0	0	0	8.1	36
6-Feb	0	Z	0	7	22	30	9	0	1	5	8	2	0	0	0	0	0	0	0	0	0	0	0	0	3.7	30
7-Feb	1	Z	Z	0	0	0	0	0	9	29	10	5	0	1	1	1	0	0	0	0	0	0	0	0	2.6	29
8-Feb	0	0	0	Z	0	0	7	19	21	23	25	31	29	38	42	57	115	151	135	95	108	108	111	140	54.6	151
9-Feb	159	103	70	78	Z	59	51	56	64	39	32	50	29	23	14	13	14	35	6	0	0	0	0	0	38.9	159
10-Feb	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
11-Feb	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	1	2	1	0	1	1	0.5	2
12-Feb	0	Z	0	0	3	32	31	49	59	13	8	8	14	4	4	15	36	43	85	72	19	0	0	0	21.6	85
13-Feb	0	0	Z	0	0	0	0	0	0	1	1	3	4	3	4	3	5	1	0	0	0	26	18	16	3.7	26
14-Feb	35	73	80	Z	16	3	0	0	29	25	22	28	8	6	4	3	0	0	0	0	0	0	0	0	14.5	80
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	1	3	3	8	7	10	14	18	14	15	25	21	17	3	0	0	7.0	25
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0.2	3
18-Feb	0	Z	0	0	0	0	0	0	1	1	1	1	2	7	20	4	11	25	9	1	1	0	0	0	3.7	25
19-Feb	0	0	Z	0	0	0	0	0	0	5	10	13	10	7	4	1	1	0	0	0	0	0	0	0	2.3	13
20-Feb	0	0	0	Z	22	9	0	0	1	1	2	6	5	3	4	4	2	0	0	0	0	0	0	0	2.6	22
21-Feb	1	6	8	31	Z	1	0	0	3	2	1	1	2	3	2	3	2	0	0	0	0	2	42	74	8.0	74
22-Feb	16	4	3	1	0	Z	1	0	1	1	12	34	19	12	8	4	4	2	23	14	0	3	14	7	8.0	34
23-Feb	Z	0	18	2	0	0	0	0	0	10	6	5	4	5	7	15	3	3	1	6	0	1	3	32	5.4	32
24-Feb	2	Z	10	3	22	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	22
25-Feb	0	0	Z	0	1	0	0	0	0	1	1	1	0	0	0	7	0	0	0	3	0	0	0	0	0.7	7
26-Feb	0	0	0	Z	0	0	0	0	0	1	9	15	1	10	1	0	0	0	0	0	0	0	0	0	1.6	15
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1
28-Feb	0	0	1	2	1	Z	0	2	3	1	1	0	0	1	1	1	0	1	0	4	2	7	2	1	1.3	7
29-Feb	Z	10	3	0	0	0	0	0	1	3	9	11	8	5	3	4	3	1	0	0	0	0	0	0	2.7	11
																								Diurnal Average		
																								Diurnal Maximum		
9.2 8.1 8.2 5.6 5.1 7.6 4.3 5.0 7.8 6.4 6.6 9.6 6.5 6.9 6.4 6.4 8.3 9.8 10.0 7.8 5.5 5.6 7.2 10.1																										
159 103 80 78 32 59 51 56 64 39 32 50 29 38 42 57 115 151 135 95 108 108 111 140																										
Z - zerospan C - Calibration																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
CNRL Horizon - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	596	90.30	90.30
21 - 40	36	5.45	95.76
41 - 80	17	2.58	98.33
81 - 159	11	1.67	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
CNRL Horizon - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	174	30	17	9	6	11	41	98	60	35	15	10	7	8	14	592
21 - 40	4	3	0	1	1	0	1	2	7	1	4	4	2	2	2	2	36
11 - 80	1	0	1	0	0	0	0	1	1	0	1	2	0	2	4	1	14
81 - 159	0	0	0	0	0	1	1	1	1	0	2	1	2	1	0	1	11
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	177	31	18	10	7	13	45	107	61	42	22	14	12	14	18	653

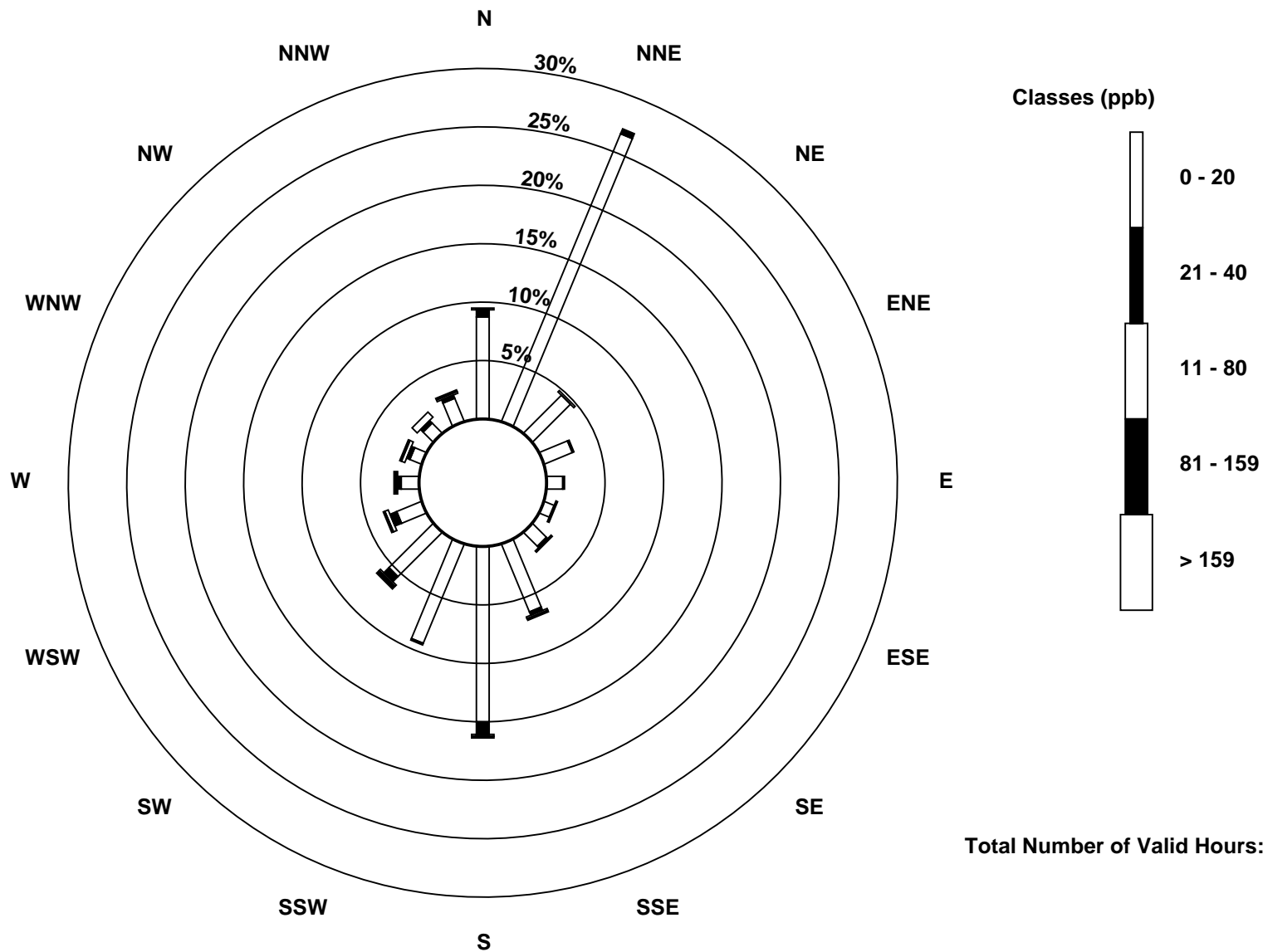
Total Number of Valid Hours: 653

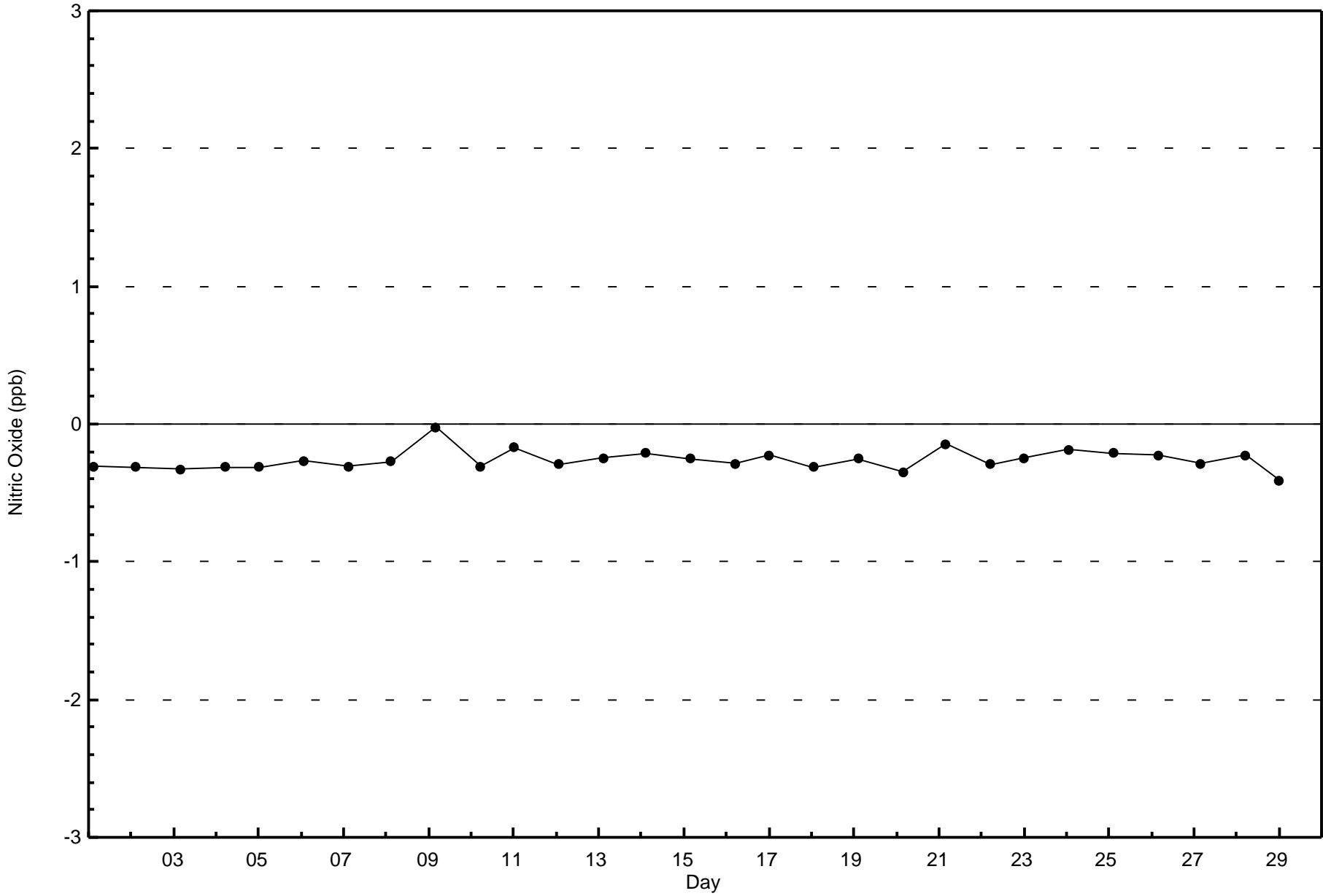
Total Number of Hours: 696

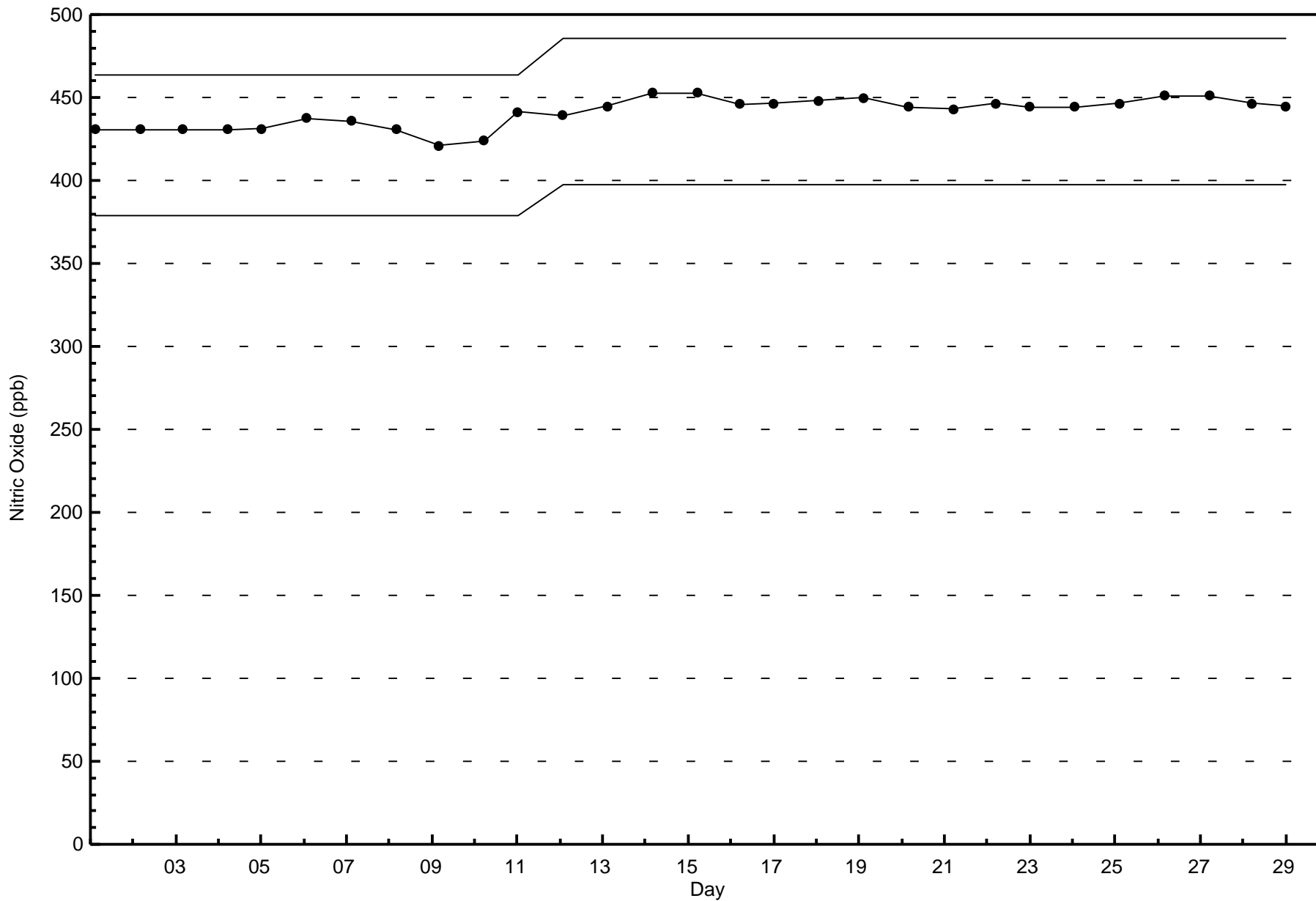


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association
Summary of Hour Averages

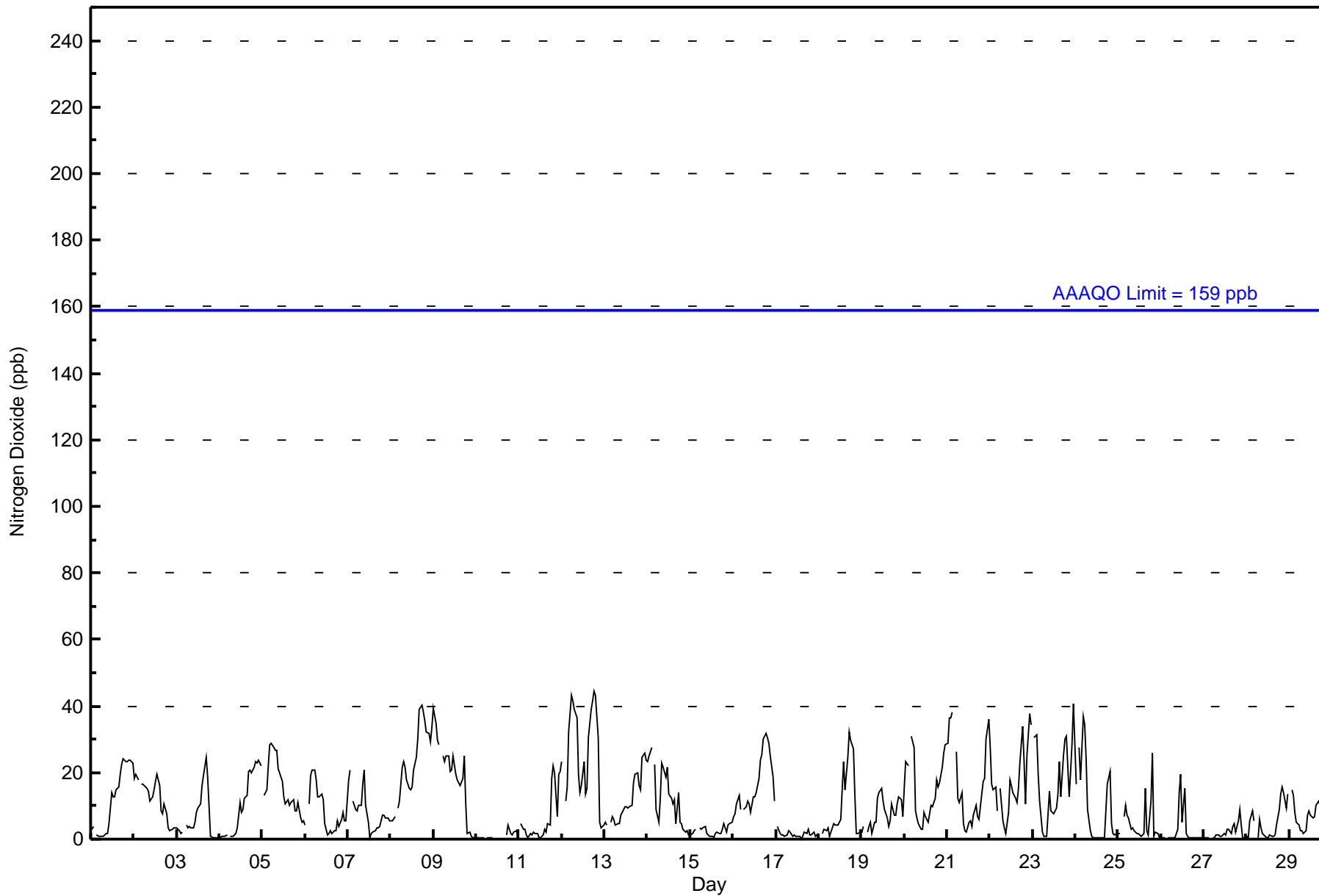
Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 45 ppb on Feb 12 19:00										Maximum Daily Average: 25.5 ppb on Feb 12										Hours of Data: 660						
Minimum Value: 0 ppb on Feb 17 15:00										Minimum Daily Average: 1.5 ppb on Feb 17										Hours of Missing Data: 36						
Maximum Diurnal Average: 14.9 ppb at hour 19										Minimum Diurnal Average: 7.9 ppb at hour 10										Hours of Calibration: 36						
Monthly Average: 10.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 8 Q ₃ = 17 P ₉₀ = 25 P ₉₉ = 40										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	3	4	Z	1	1	1	1	1	2	2	5	14	13	13	15	16	20	23	24	23	23	24	24	23	11.9	24
2-Feb	18	20	18	Z	16	17	16	15	14	11	13	15	17	19	16	9	8	11	8	4	3	3	3	4	12.0	20
3-Feb	3	2	2	2	Z	4	3	4	3	3	5	8	9	11	16	19	24	19	10	1	1	1	1	1	6.6	24
4-Feb	1	1	1	1	1	Z	1	1	1	2	3	11	8	9	12	13	20	21	20	22	23	23	24	22	10.5	24
5-Feb	Z	13	15	22	28	29	28	27	27	21	19	17	13	11	12	10	11	12	9	8	11	7	5	6	15.6	29
6-Feb	4	Z	11	19	21	21	18	13	13	13	12	5	1	2	3	2	3	3	6	4	6	8	6	6	8.5	21
7-Feb	18	21	Z	11	9	9	10	10	17	21	10	5	1	2	2	3	3	3	4	7	7	7	6	6	8.3	21
8-Feb	5	6	7	Z	9	12	22	23	21	18	15	15	16	21	25	30	39	40	38	35	32	32	29	33	22.7	40
9-Feb	39	35	30	29	Z	25	23	25	25	21	21	25	19	18	17	16	18	25	11	2	2	1	1	0	18.5	39
10-Feb	0	0	0	1	0	Z	0	1	0	1	C	C	C	C	C	C	C	1	4	2	1	2	3	1	--	4
11-Feb	Z	5	3	3	1	1	2	1	2	2	2	1	1	1	3	2	5	4	18	22	20	7	20	20	6.3	22
12-Feb	23	Z	11	16	32	43	42	39	36	20	14	16	23	14	15	30	39	41	45	43	31	5	3	4	25.5	45
13-Feb	5	4	Z	5	7	6	4	5	5	7	8	10	10	9	10	10	17	20	20	16	15	25	26	24	11.6	26
14-Feb	23	25	27	Z	22	9	5	12	23	22	19	22	14	12	11	12	5	14	5	5	3	2	3	1	12.8	27
15-Feb	1	2	2	3	Z	4	3	3	4	2	1	1	1	1	2	2	2	2	3	5	2	4	5	5	2.5	5
16-Feb	7	8	11	13	9	Z	9	10	12	10	8	13	13	14	18	24	26	30	32	31	29	25	19	11	16.5	32
17-Feb	Z	4	2	1	1	1	1	3	2	1	1	1	1	1	0	1	2	2	3	1	1	2	1	1	1.5	4
18-Feb	2	Z	2	3	3	3	1	2	5	4	4	4	6	15	23	15	24	32	30	27	13	2	2	2	9.7	32
19-Feb	2	4	Z	2	4	5	2	5	5	12	14	15	12	9	6	4	5	11	7	7	11	13	12	7	7.5	15
20-Feb	15	23	22	Z	31	28	9	6	5	3	3	8	7	5	8	10	10	12	18	16	17	22	26	28	14.4	31
21-Feb	29	37	36	38	Z	26	12	11	14	5	3	2	5	6	4	7	10	7	6	13	17	18	30	36	16.2	38
22-Feb	28	16	15	16	8	Z	15	6	3	2	8	18	16	14	12	11	15	23	34	23	11	25	38	34	17.0	38
23-Feb	Z	30	31	20	11	2	1	1	1	14	9	8	8	9	14	24	13	25	30	31	13	20	29	41	16.7	41
24-Feb	17	Z	27	18	37	34	24	9	3	1	1	0	0	0	0	0	9	17	20	5	2	1	2	2	9.9	37
25-Feb	2	2	Z	7	10	7	6	3	3	3	2	2	1	1	2	15	3	1	11	26	1	2	2	1	4.9	26
26-Feb	1	1	1	Z	1	1	1	1	1	3	14	20	5	15	2	1	1	1	0	0	1	1	1	0	2.9	20
27-Feb	1	0	0	0	Z	0	1	1	1	1	1	2	1	3	3	2	4	5	2	6	9	4	0	0	2.0	9
28-Feb	1	0	6	8	6	Z	1	6	4	2	1	1	0	1	1	1	1	4	9	13	16	14	9	13	5.1	16
29-Feb	Z	15	13	8	5	4	2	2	2	3	7	9	7	6	7	10	12	10	9	10	11	12	14	21	8.6	21
10.3 11.1 12.2 10.3 11.5 12.1 9.0 8.4 8.7 7.9 7.9 9.5 8.1 8.6 9.2 10.7 12.1 14.0 14.9 14.6 11.5 10.7 11.7 12.2																								Diurnal Average		
39 37 36 38 37 43 42 39 36 22 21 25 23 21 25 30 39 41 45 43 32 32 38 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
CNRL Horizon - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	538	81.52	81.52
21 - 40	116	17.58	99.09
41 - 80	6	0.91	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - February 2016**

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	171	29	16	10	5	9	40	85	54	31	12	7	4	5	7	536
21 - 40	11	6	2	2	0	2	4	5	22	7	11	9	6	5	8	11	111
41 - 80	0	0	0	0	0	0	0	0	0	0	0	1	1	3	1	0	6
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	177	31	18	10	7	13	45	107	61	42	22	14	12	14	18	653

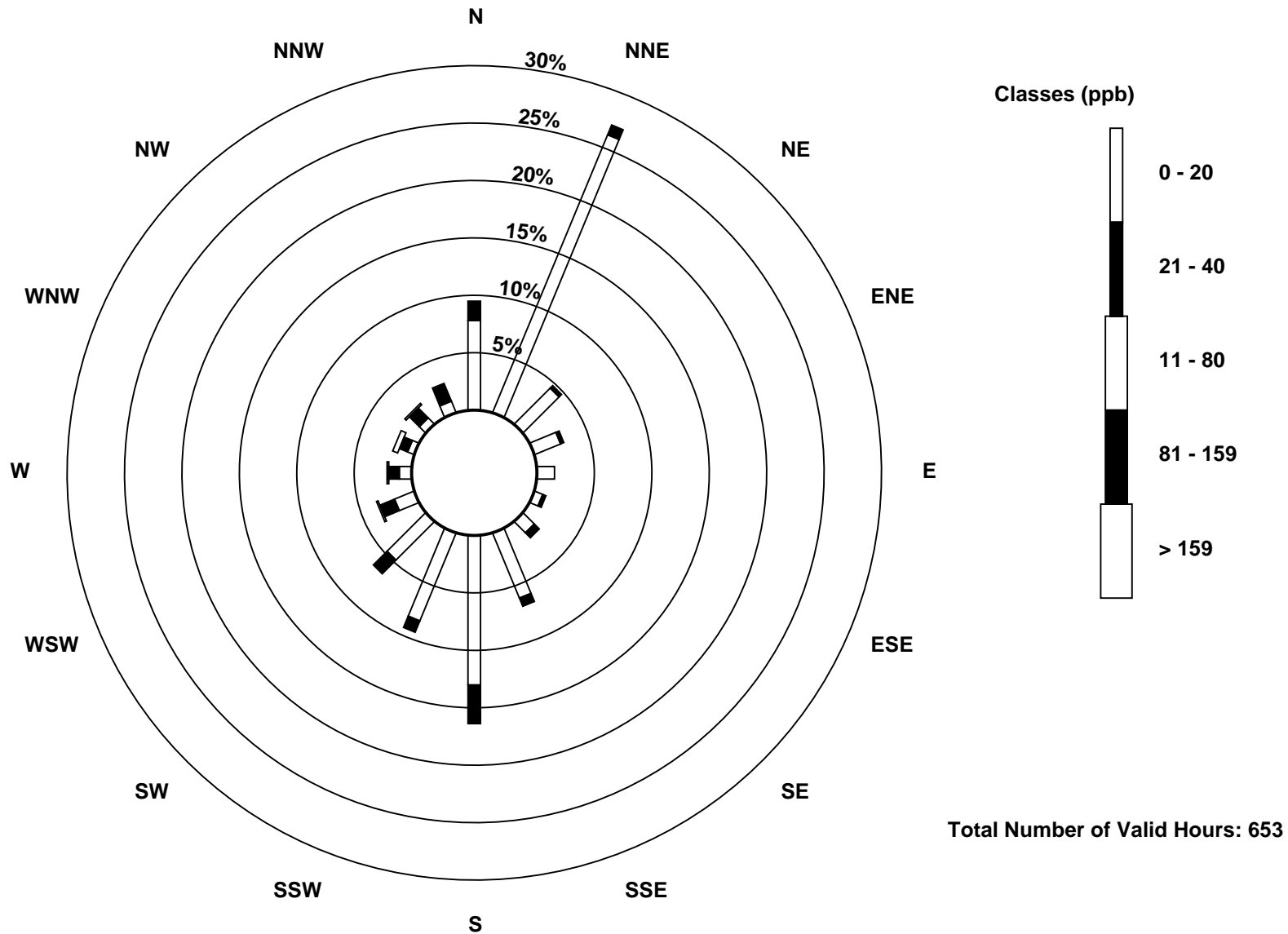
Total Number of Valid Hours: 653

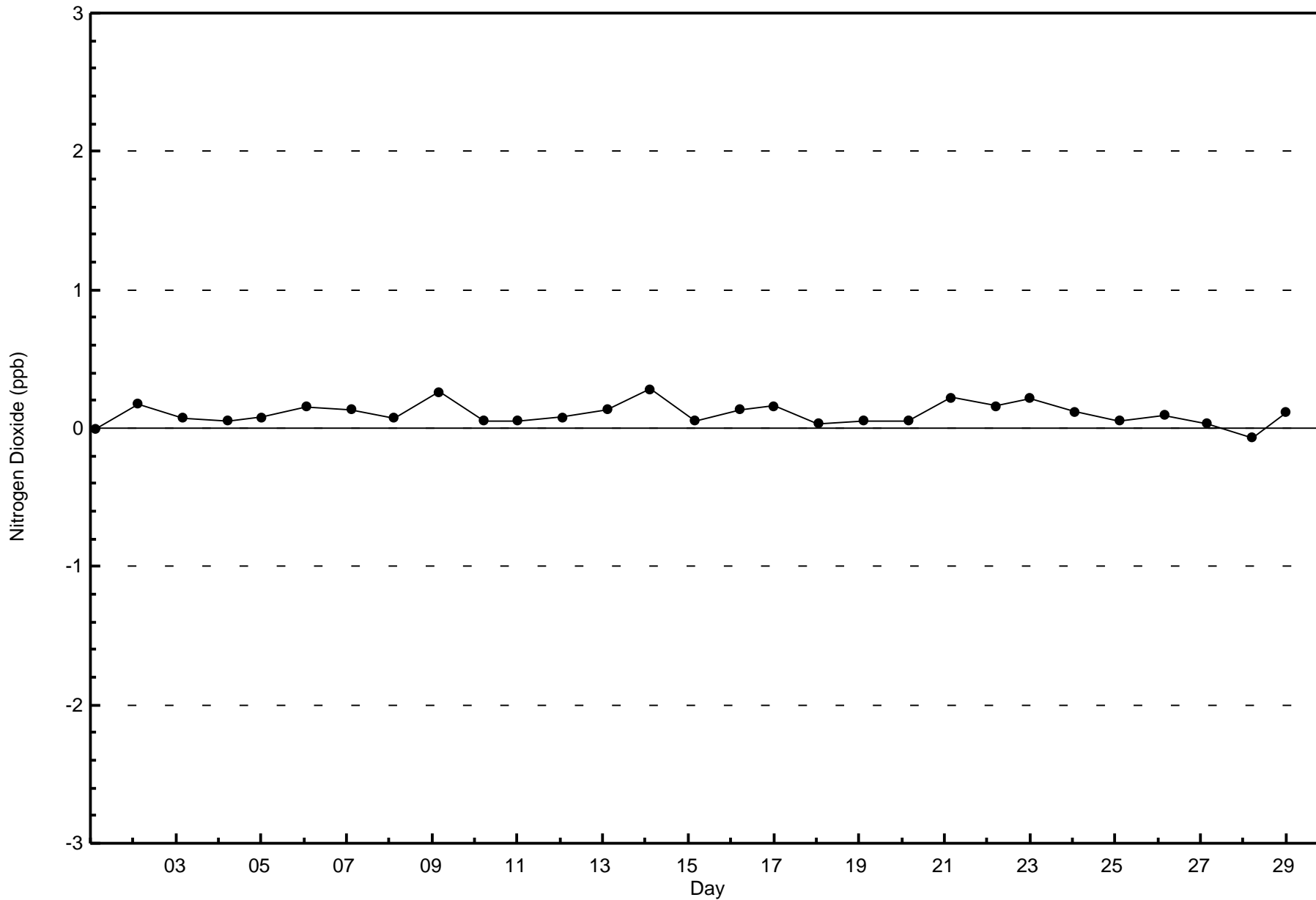
Total Number of Hours: 696

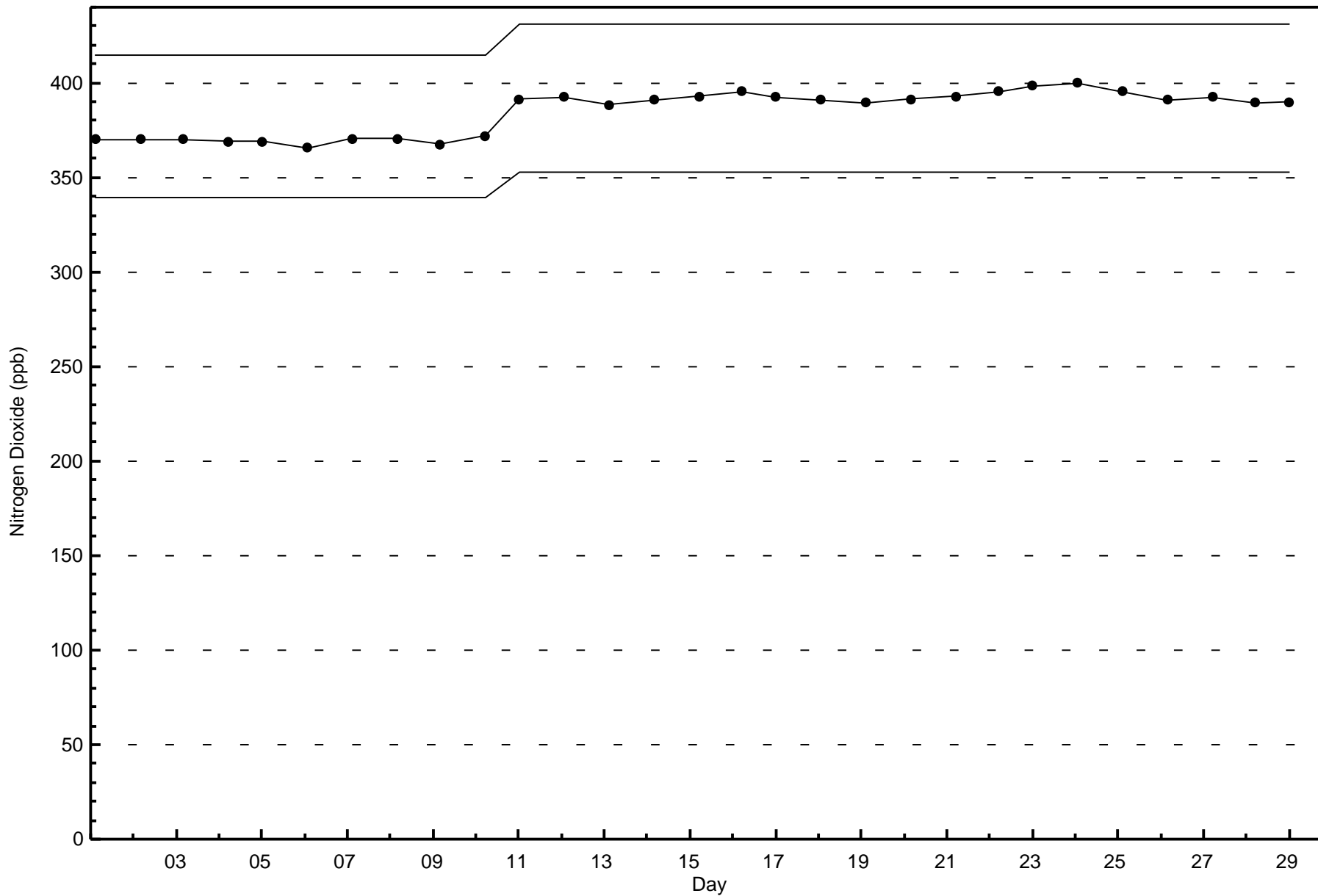


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)





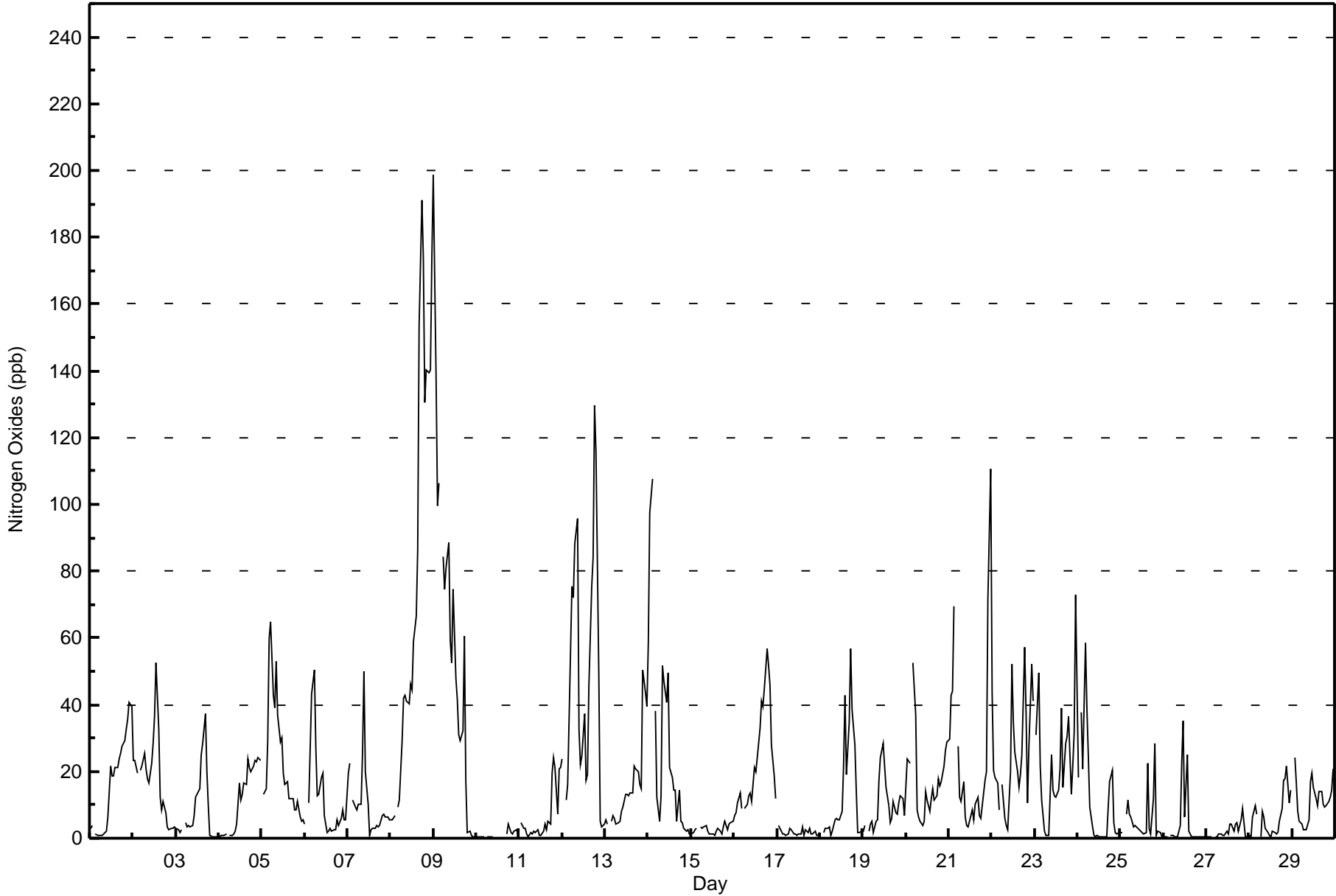




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 2016

Maximum Value: 199 ppb on Feb 9 01:00 Maximum Daily Average: 77.3 ppb on Feb 8 Minimum Value: 0 ppb on Feb 27 04:00 Minimum Daily Average: 1.7 ppb on Feb 17 Maximum Diurnal Average: 24.9 ppb at hour 19 Minimum Diurnal Average: 13.3 ppb at hour 7 Monthly Average: 17.9 ppb Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 8 Q ₃ = 22 P ₉₀ = 44 P ₉₉ = 140																								Hours in Service: 696 Hours of Data: 660 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	3	4	Z	1	1	1	1	1	1	2	6	21	19	18	21	21	24	25	28	29	33	36	41	39	16.4	41
2-Feb	23	23	20	Z	20	22	26	21	18	16	22	28	36	53	33	12	8	11	8	4	3	3	3	4	18.1	53
3-Feb	3	2	2	2	Z	4	3	4	3	4	7	12	13	15	25	29	37	20	10	1	1	0	1	1	8.7	37
4-Feb	1	1	1	1	1	Z	1	1	1	1	2	4	17	11	13	16	24	21	20	22	23	23	24	23	11.6	24
5-Feb	Z	13	15	29	60	65	43	39	53	37	29	30	19	16	17	12	12	12	8	8	11	7	5	6	23.7	65
6-Feb	4	Z	11	27	43	50	27	13	13	18	19	7	2	2	3	2	3	3	6	4	6	8	6	6	12.2	50
7-Feb	19	22	Z	11	9	9	10	10	26	50	20	10	1	3	3	3	4	3	4	7	7	7	6	6	10.9	50
8-Feb	5	5	7	Z	9	12	29	42	43	41	40	46	45	59	66	87	154	191	173	130	140	139	140	174	77.3	191
9-Feb	199	138	99	106	Z	84	75	81	88	59	53	75	48	41	31	29	32	60	17	2	2	1	0	0	57.5	199
10-Feb	0	0	0	0	0	Z	0	1	0	1	C	C	C	C	C	C	C	1	4	2	1	2	3	1	--	4
11-Feb	Z	5	3	3	1	1	2	1	2	2	2	1	1	2	4	3	5	4	19	24	21	7	21	21	6.8	24
12-Feb	24	Z	11	16	36	76	72	88	96	32	22	25	37	17	19	46	75	84	130	115	49	5	4	4	47.1	130
13-Feb	5	4	Z	5	7	6	4	5	5	8	9	13	13	13	13	22	21	20	16	15	50	44	40	15.3	50	
14-Feb	59	97	107	Z	38	12	5	13	52	47	41	50	21	18	14	15	5	14	5	5	3	2	3	1	27.3	107
15-Feb	1	2	2	3	Z	4	3	3	4	2	1	1	1	1	2	3	2	1	3	5	2	4	5	5	2.7	5
16-Feb	7	8	11	13	9	Z	9	10	13	14	11	21	20	24	33	41	39	45	57	52	46	28	19	12	23.5	57
17-Feb	Z	4	2	1	1	1	1	3	2	1	1	1	1	1	3	1	2	2	3	1	1	2	1	1	1.7	4
18-Feb	2	Z	2	3	3	3	1	2	5	6	6	6	8	22	43	19	35	57	39	28	14	2	2	2	13.4	57
19-Feb	2	4	Z	2	4	5	2	5	6	18	24	28	22	15	10	5	6	11	7	7	11	13	12	7	9.8	28
20-Feb	15	24	22	Z	52	37	8	6	5	4	5	14	11	8	12	15	11	13	18	16	17	22	26	29	17.0	52
21-Feb	30	43	44	70	Z	28	12	11	17	6	4	4	7	8	5	10	12	7	6	14	18	20	72	110	24.2	110
22-Feb	43	20	18	17	9	Z	16	6	4	3	20	52	35	26	20	15	19	25	57	37	11	28	52	41	24.9	57
23-Feb	Z	31	49	22	11	2	1	1	1	25	15	13	12	15	21	39	15	28	31	36	13	22	32	73	22.1	73
24-Feb	18	Z	38	21	58	38	24	9	3	1	1	1	0	0	0	1	9	17	20	4	2	1	2	11.7	58	
25-Feb	2	2	Z	7	11	7	6	3	4	3	3	2	2	1	2	22	3	1	12	29	1	2	2	1	5.6	29
26-Feb	1	1	1	Z	1	1	1	1	1	4	23	35	6	25	2	1	1	1	0	0	1	0	0	0	4.6	35
27-Feb	1	0	0	0	Z	0	0	1	1	1	1	2	1	4	4	2	4	5	2	5	9	4	0	0	2.3	9
28-Feb	1	0	6	10	7	Z	1	8	7	3	2	1	0	2	2	1	2	5	9	17	18	21	11	15	6.5	21
29-Feb	Z	24	16	8	5	4	2	3	3	5	17	19	15	12	10	14	14	10	9	10	11	12	14	21	11.3	24
19.5 19.1 20.3 15.8 16.6 19.7 13.3 13.5 16.4 14.3 14.5 19.1 14.6 15.5 15.6 17.0 20.4 23.8 24.9 22.3 17.0 16.3 18.9 22.2																								Diurnal Average		
199 138 107 106 60 84 75 88 96 59 53 75 48 59 66 87 154 191 173 130 140 139 140 174																								Diurnal Maximum		
Z - zerospan C - Calibration																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	476	72.12	72.12
21 - 40	105	15.91	88.03
41 - 80	55	8.33	96.36
81 - 159	19	2.88	99.24
> 159	4	0.61	99.85

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	166	28	14	8	4	6	32	74	47	29	11	5	2	3	4	474
21 - 40	13	7	2	3	1	2	4	8	20	13	5	4	5	4	3	9	103
11 - 80	7	4	1	1	1	0	2	3	11	1	5	4	2	3	6	3	54
81 - 159	1	0	0	0	0	1	0	1	2	0	2	2	2	3	2	2	18
> 159	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	4
Totals	62	177	31	18	10	7	13	45	107	61	42	22	14	12	14	18	653

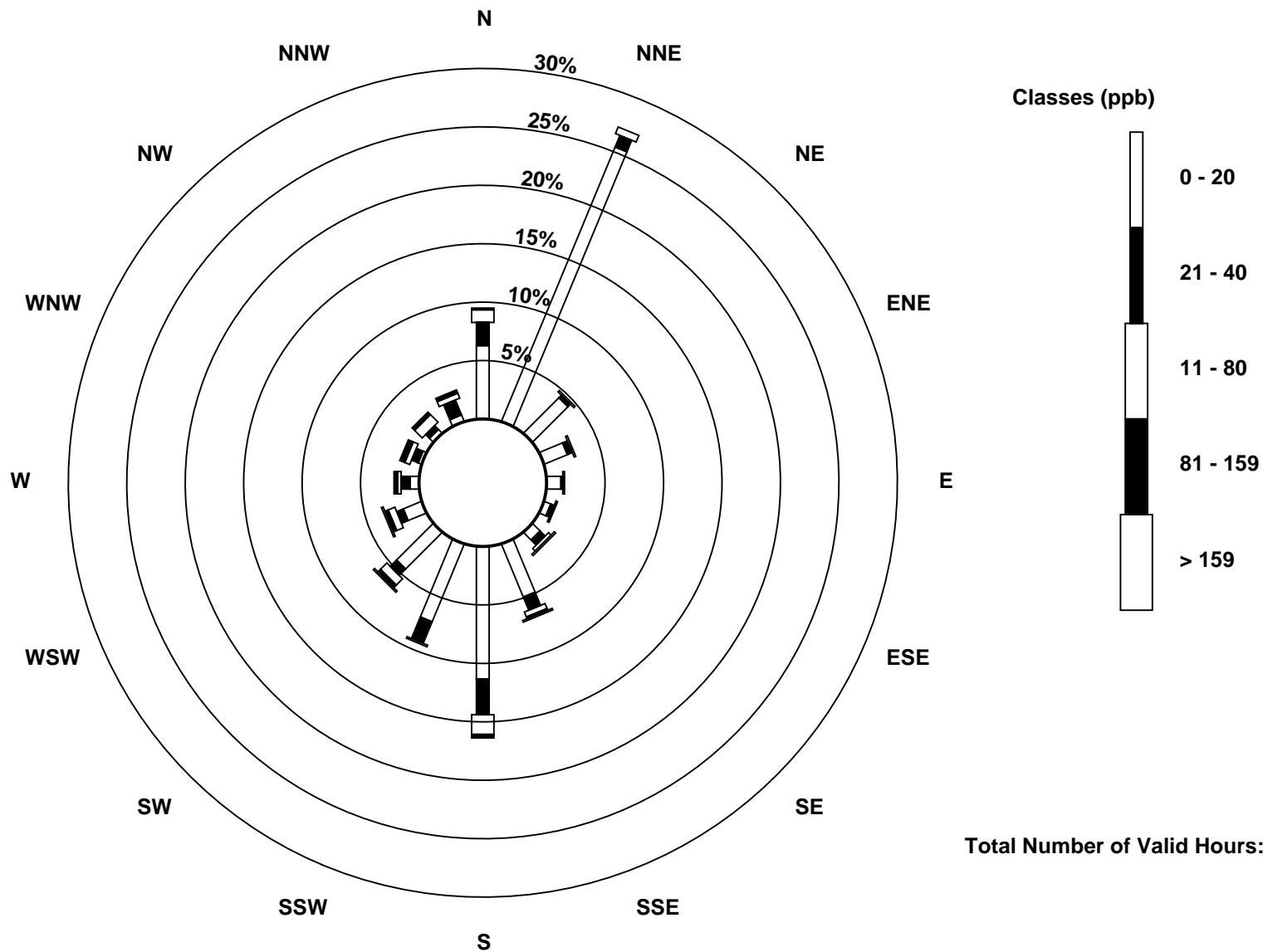
Total Number of Valid Hours: 653

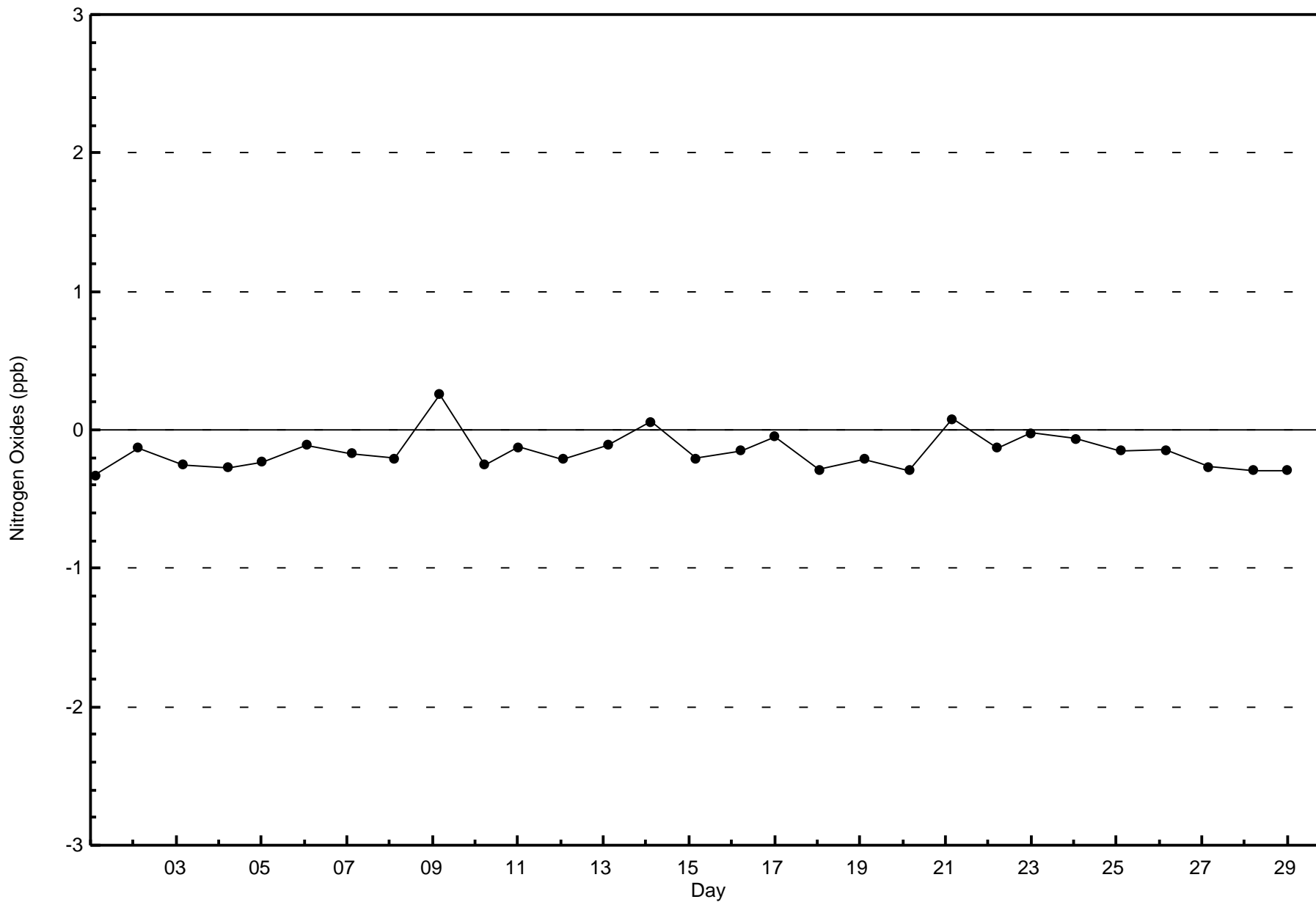
Total Number of Hours: 696

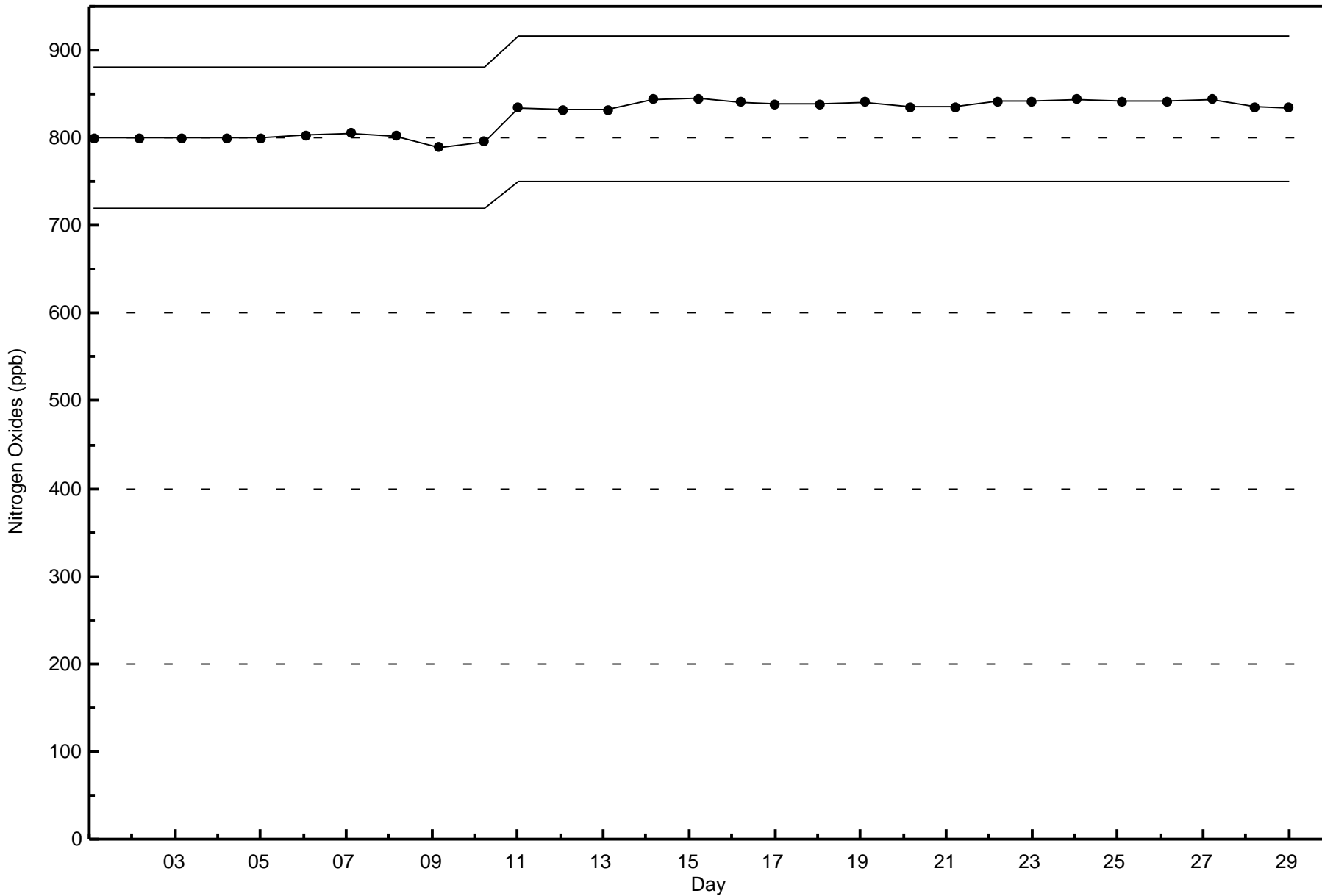


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)







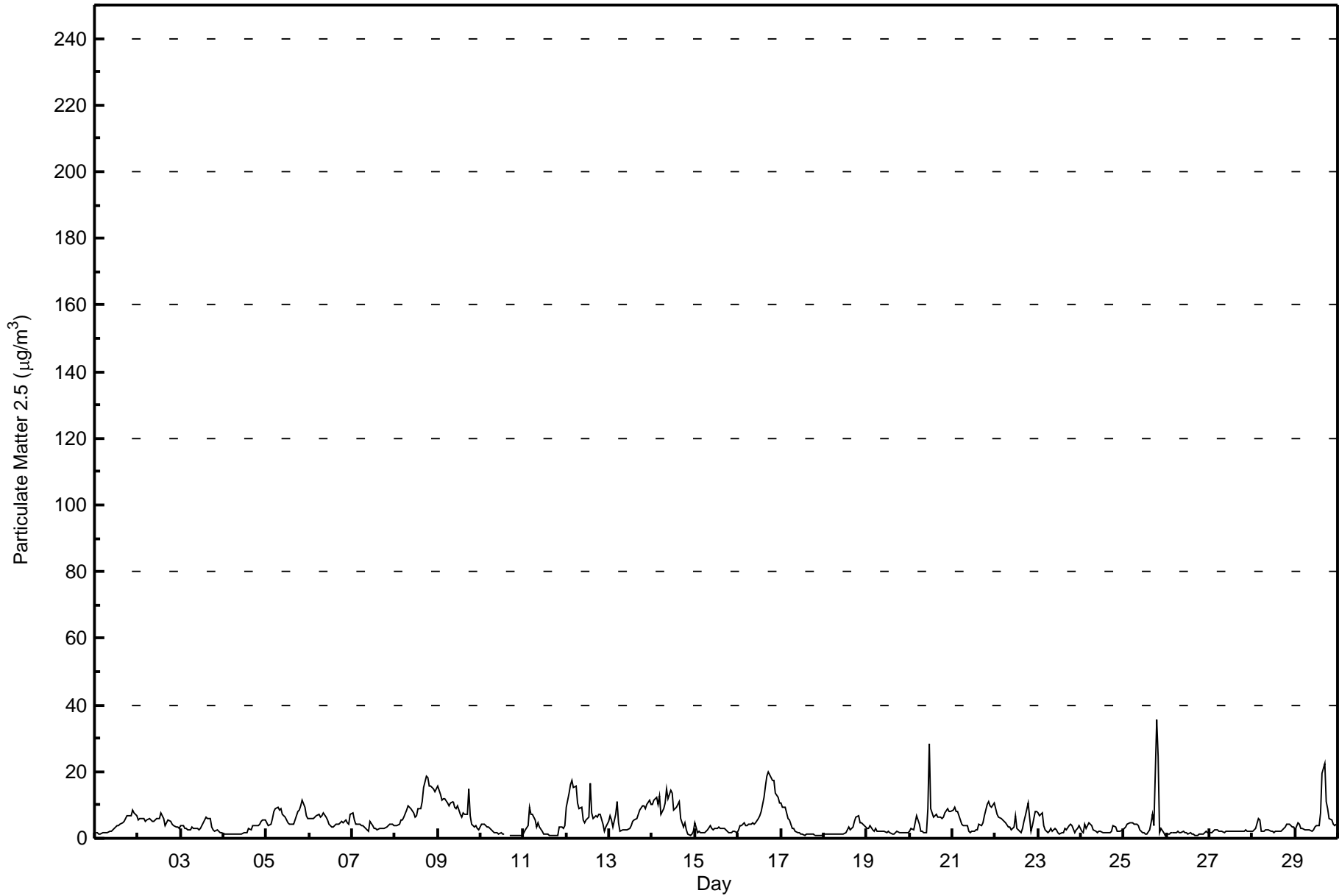


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 35.6 µg/m ³ on Feb 25 19:00 Minimum Value: 0.7 µg/m ³ on Feb 11 18:00 Maximum Diurnal Average: 6.7 µg/m ³ at hour 19 Monthly Average: 4.79 µg/m ³		Maximum Daily Average: 10.1 µg/m ³ on Feb 8 Minimum Daily Average: 1.6 µg/m ³ on Feb 26 Minimum Diurnal Average: 3.6 µg/m ³ at hour 13 Percentiles: P ₁ = 0.9 P ₁₀ = 1.4 Q ₁ = 2.0 Median = 3.7 Q ₃ = 6.2 P ₉₀ = 9.6 P ₉₉ = 18.5		Hours in Service: 696 Hours of Data: 694 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	1.9	1.8	1.5	1.4	1.6	1.7	1.8	1.9	2.3	2.1	2.6	3.6	3.9	4.0	4.2	4.5	5.1	5.8	6.6	6.6	6.8	8.4	7.6	6.9	3.9	8.4	
2-Feb	5.3	5.8	5.8	5.8	5.3	5.5	6.0	5.5	5.1	5.2	6.0	5.8	5.8	7.8	5.9	3.6	4.5	5.6	5.1	4.3	4.0	3.6	3.4	3.2	5.2	7.8	
3-Feb	3.9	4.0	3.1	2.8	2.7	2.7	3.2	3.0	2.8	3.1	2.4	3.1	3.8	5.6	5.8	5.8	3.6	2.7	2.1	2.7	2.0	1.8	1.7	3.4	6.5		
4-Feb	1.3	1.2	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.4	1.4	1.8	1.6	1.9	3.1	2.7	3.9	3.8	4.0	4.0	4.4	5.2	5.4	5.4	2.6	5.4	
5-Feb	4.7	3.9	4.3	6.0	8.2	9.1	9.4	8.6	8.8	7.2	6.5	5.5	4.5	4.1	4.4	4.1	5.7	7.8	8.3	9.9	11.4	9.4	6.8	6.0	6.9	11.4	
6-Feb	5.8	5.9	6.1	6.3	6.6	7.0	6.3	6.7	7.7	6.2	5.4	4.3	3.4	3.6	3.7	4.1	4.4	4.5	5.3	4.9	5.7	4.8	4.3	7.3	5.4	7.7	
7-Feb	7.5	5.7	4.3	4.3	4.2	3.9	4.0	3.1	2.5	2.3	5.2	3.9	2.8	2.9	2.6	2.8	3.0	3.1	3.1	3.2	3.7	4.1	4.1	3.7	3.8	7.5	
8-Feb	3.7	3.7	4.3	5.4	5.6	6.3	8.5	9.8	9.4	8.7	7.5	6.5	6.8	8.9	8.7	11.2	15.3	18.5	18.2	15.6	15.6	14.9	14.1	15.0	10.1	18.5	
9-Feb	15.8	13.3	11.4	12.0	11.8	10.7	9.6	10.5	11.0	9.3	8.9	9.7	7.2	6.4	7.6	7.1	7.3	14.8	6.8	4.3	3.3	3.8	2.8	2.7	8.7	15.8	
10-Feb	4.1	4.2	4.2	3.4	3.2	3.1	2.6	1.9	1.5	1.6	1.4	1.5	1.3	1.4	C	C	1.0	0.9	0.9	0.9	1.0	1.0	1.0	1.0	2.0	4.2	
11-Feb	1.7	2.4	3.8	9.1	7.1	7.3	5.4	3.6	4.8	3.6	2.0	1.2	1.3	1.2	1.0	0.8	0.7	0.7	0.7	1.0	3.4	3.4	3.1	3.8	3.0	9.1	
12-Feb	9.4	13.5	16.0	17.2	15.2	15.7	10.7	8.8	9.4	5.6	4.8	5.6	6.3	16.3	7.5	5.8	6.7	6.1	7.4	7.0	4.2	2.3	3.5	5.0	8.7	17.2	
13-Feb	6.6	5.5	3.4	7.0	11.0	4.7	2.2	2.5	2.5	2.5	2.7	3.1	4.0	5.0	5.5	5.8	7.0	8.7	9.9	9.7	8.7	10.0	11.6	10.1	6.2	11.6	
14-Feb	10.2	11.3	12.2	10.3	12.9	7.3	8.8	10.7	14.9	11.7	14.2	13.7	8.6	9.3	10.3	10.9	5.8	3.5	4.8	2.5	1.1	0.9	1.2	2.1	8.3	14.9	
15-Feb	4.6	1.8	2.0	1.5	1.6	1.5	2.0	2.4	3.9	3.2	2.5	2.8	2.9	3.2	3.2	3.1	2.8	2.4	1.9	1.8	1.7	1.9	2.0	1.8	2.4	4.6	
16-Feb	2.7	3.7	4.0	4.7	3.9	4.0	4.1	4.3	4.5	4.2	4.5	5.8	6.6	8.0	12.3	15.7	18.9	20.0	18.1	17.5	17.3	13.6	12.4	10.8	9.2	20.0	
17-Feb	10.6	9.4	9.3	7.6	5.7	5.6	3.1	3.0	2.3	1.9	1.6	1.5	1.2	1.0	1.1	1.2	1.3	1.1	1.1	1.0	1.0	0.9	1.0	1.0	3.1	10.6	
18-Feb	1.1	1.1	1.1	1.4	1.1	1.4	1.1	1.2	1.4	1.3	1.4	1.4	1.5	2.3	3.4	2.6	3.5	5.2	6.3	6.7	4.6	4.5	4.0	3.5	2.6	6.7	
19-Feb	3.2	3.0	4.0	2.7	2.2	3.0	2.1	2.3	2.1	2.3	2.2	1.8	2.3	1.6	1.4	1.3	1.7	2.2	1.8	1.7	1.8	1.7	1.7	1.6	2.2	4.0	
20-Feb	2.3	3.0	2.7	4.5	6.6	4.1	2.0	2.0	1.8	1.6	8.9	28.3	8.7	6.2	6.7	7.3	6.2	6.3	5.8	6.4	7.6	8.7	7.9	7.9	6.4	28.3	
21-Feb	8.6	9.2	8.2	7.9	5.5	4.3	3.8	3.9	3.6	2.2	1.7	2.1	2.1	2.5	2.6	4.4	3.9	4.7	6.9	10.0	11.0	9.7	9.3	10.5	5.8	11.0	
22-Feb	8.7	7.2	6.4	6.0	5.7	5.1	4.8	3.3	3.2	2.4	3.4	7.0	2.9	2.4	1.9	3.0	5.0	6.8	10.8	6.4	2.2	3.8	7.9	8.1	5.2	10.8	
23-Feb	7.5	6.7	7.5	3.8	2.7	1.5	2.3	2.8	2.0	3.2	2.5	1.5	1.4	1.6	1.8	2.9	2.3	3.6	4.2	3.9	1.8	2.6	2.9	3.6	3.2	7.5	
24-Feb	2.0	1.7	4.0	2.8	4.5	4.4	3.7	2.4	1.9	1.8	2.0	1.9	1.9	1.7	1.7	1.7	1.7	2.3	4.0	3.5	2.2	2.1	2.2	2.6	2.5	4.5	
25-Feb	3.1	3.6	4.1	4.5	4.5	4.5	4.4	4.2	4.0	2.5	1.7	1.6	1.4	1.4	2.6	4.8	7.4	3.7	35.6	24.4	1.7	3.2	1.9	1.0	5.5	35.6	
26-Feb	1.2	1.3	1.6	1.7	1.8	1.9	2.0	1.9	1.5	2.0	1.6	1.9	1.2	1.7	1.3	1.3	1.0	1.0	1.1	1.3	1.4	1.8	2.0	1.7	1.6	2.0	
27-Feb	1.8	1.9	2.3	2.6	2.6	2.1	2.0	1.9	1.9	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.3	2.0	2.2	2.6	2.3	2.0	2.0	2.1	2.6	
28-Feb	2.3	2.4	3.0	6.1	5.4	2.1	2.3	2.7	2.6	2.4	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.3	3.2	4.2	4.4	4.2	3.3	3.2	2.9	6.1	
29-Feb	2.7	4.6	4.1	3.1	2.9	2.5	2.6	2.5	2.5	2.0	2.5	3.3	3.8	4.0	7.5	19.7	22.3	11.2	9.1	5.8	5.3	4.3	3.9	4.3	5.7	22.3	
																								Diurnal Average			
																								Diurnal Maximum			
5.0 4.9 5.0 5.3 5.3 4.6 4.2 4.1 4.2 3.6 3.8 4.6 3.6 4.1 4.4 5.1 5.5 5.6 6.7 6.0 4.9 4.8 4.7 4.7 15.8 13.5 16.0 17.2 15.2 15.7 10.7 10.7 14.9 11.7 14.2 28.3 8.7 16.3 12.3 19.7 22.3 20.0 35.6 24.4 17.3 14.9 14.1 15.0																								Diurnal Average		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}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - February 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	467	67.29	67.29
6 - 15	193	27.81	95.10
16 - 25	18	2.59	97.69
26 - 80	2	0.29	97.98
> 81.0	0	0.00	97.98

Total Number of Valid Hours: 694

Total Number of Hours: 696



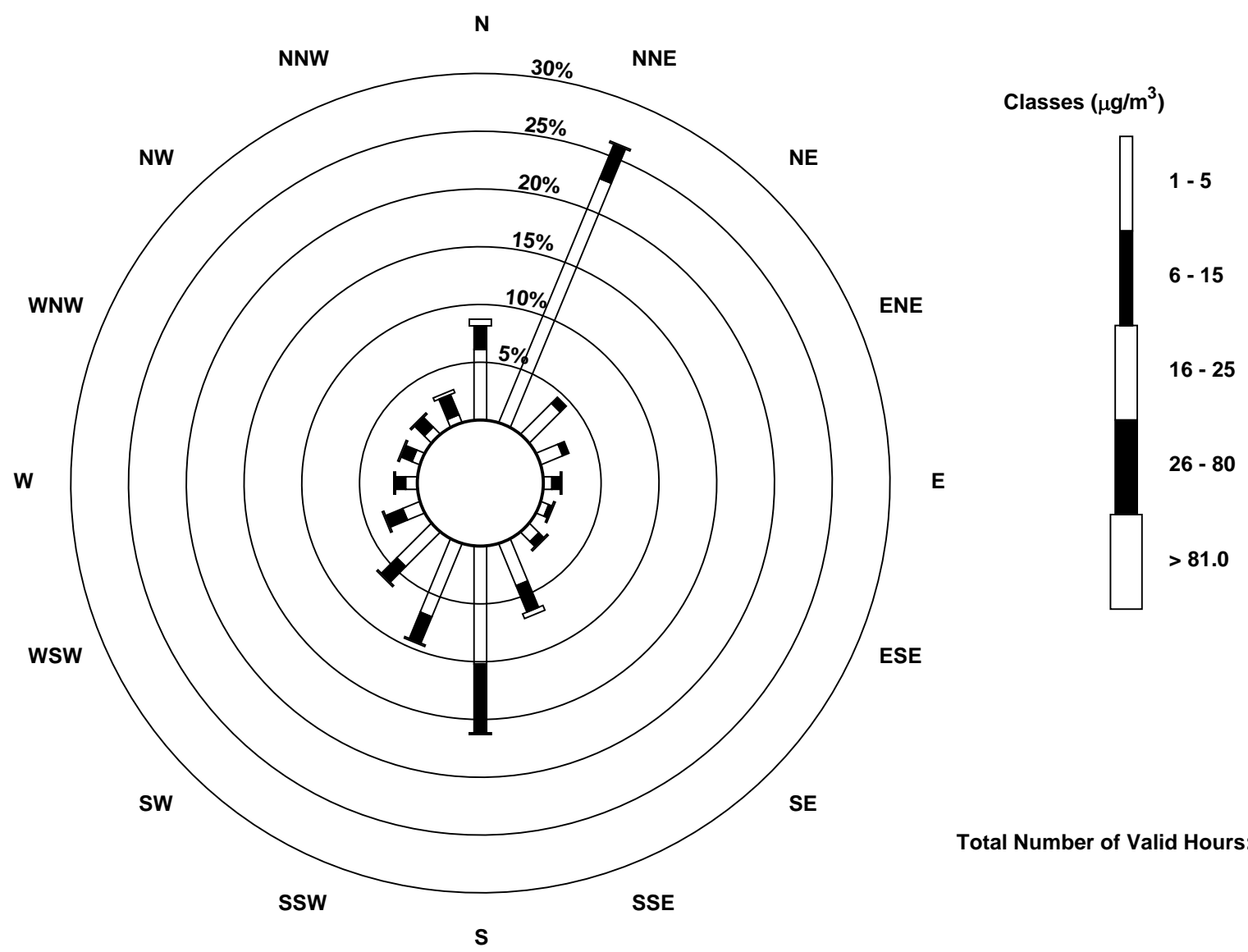
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - February 2016

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	42	157	26	14	5	5	8	27	70	47	29	11	7	5	6	5	464
6 - 15	14	22	5	4	5	2	4	17	41	17	13	11	6	7	8	13	189
16 - 25	4	1	0	0	1	1	1	3	0	1	1	1	0	1	1	2	18
26 - 80	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	180	31	18	11	8	13	47	112	65	43	23	14	13	15	20	673

Total Number of Valid Hours: 687

Total Number of Hours: 696

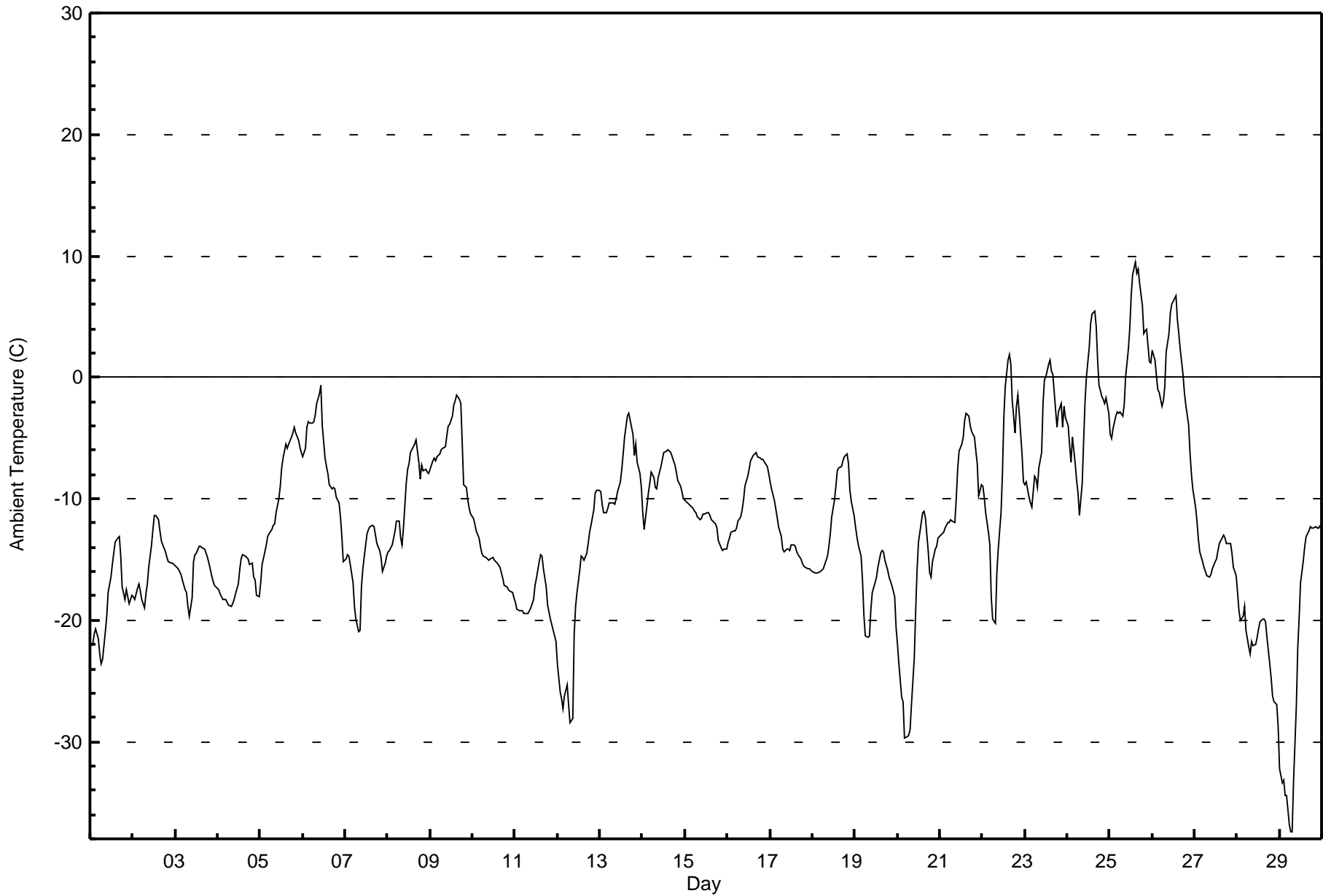




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
CNRL Horizon - February 2016

Maximum Value: 9.5 C on Feb 25 15:00 Maximum Daily Average: 1.9 C on Feb 25		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -37.5 C on Feb 29 08:00 Maximum Diurnal Average: -8.2 C at hour 15 Monthly Average: -11.89 C		Minimum Daily Average: -22.5 C on Feb 29 Minimum Diurnal Average: -15.6 C at hour 8 Percentiles: P ₁ = -33.7 P ₁₀ = -19.9 Q ₁ = -16.1 Median = -12.5 Q ₃ = -7.0 P ₉₀ = -2.3 P ₉₉ = 6.7																								
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	-22.2	-21.9	-21.2	-20.7	-21.5	-22.8	-23.6	-23.2	-20.9	-19.6	-17.8	-16.5	-15.4	-14.5	-13.5	-13.2	-13.1	-14.7	-17.3	-18.3	-17.4	-18.1	-18.7	-17.9	-18.5	-13.1
2-Feb	-18.1	-18.2	-17.4	-17.1	-17.6	-18.3	-18.9	-17.8	-17.0	-15.7	-13.8	-12.5	-11.4	-11.4	-11.7	-12.6	-13.5	-13.8	-14.3	-14.8	-15.2	-15.3	-15.3	-15.4	-15.3	-11.4
3-Feb	-15.5	-15.7	-16.0	-16.2	-16.7	-17.5	-17.8	-18.8	-19.7	-18.2	-15.2	-14.5	-14.5	-13.9	-13.9	-14.0	-14.1	-14.5	-14.8	-15.3	-16.3	-16.8	-17.1	-17.3	-16.0	-13.9
4-Feb	-17.5	-17.8	-18.1	-18.3	-18.3	-18.6	-18.7	-18.8	-18.6	-18.3	-17.8	-17.0	-15.8	-15.0	-14.6	-14.7	-14.8	-15.0	-15.4	-15.2	-16.4	-16.7	-17.9	-18.0	-17.0	-14.6
5-Feb	-16.9	-15.4	-14.4	-13.8	-13.2	-12.9	-12.5	-12.2	-12.0	-11.2	-10.0	-9.0	-7.5	-6.7	-5.5	-5.8	-5.5	-5.0	-4.5	-4.1	-4.5	-5.1	-5.7	-6.2	-9.2	-4.1
6-Feb	-6.5	-5.8	-4.1	-3.7	-3.8	-3.8	-3.7	-3.1	-2.2	-1.4	-0.7	-4.0	-6.7	-7.4	-7.9	-8.8	-9.1	-9.1	-9.2	-9.9	-10.4	-11.5	-13.1	-15.1	-6.7	-0.7
7-Feb	-14.9	-14.6	-14.8	-15.4	-16.9	-18.9	-19.9	-20.9	-20.8	-17.3	-15.7	-13.8	-12.8	-12.5	-12.3	-12.1	-12.3	-13.0	-13.7	-14.2	-14.9	-16.0	-15.3	-14.7	-15.3	-12.1
8-Feb	-14.4	-14.2	-13.8	-13.2	-12.6	-11.8	-11.9	-13.2	-13.8	-12.4	-8.7	-7.6	-7.1	-6.2	-5.7	-5.5	-5.2	-7.0	-8.4	-7.3	-7.7	-7.6	-7.8	-8.0	-9.6	-5.2
9-Feb	-7.6	-6.9	-6.7	-6.9	-6.6	-6.3	-6.0	-5.9	-5.7	-4.8	-4.0	-3.8	-3.2	-2.3	-1.9	-1.5	-1.8	-2.2	-5.4	-8.8	-9.1	-10.1	-10.8	-11.3	-5.8	-1.5
10-Feb	-11.6	-12.0	-12.6	-13.2	-13.9	-14.5	-14.7	-14.8	-14.9	-15.1	-14.9	-14.9	-15.1	-15.2	-15.3	-15.6	-16.1	-16.6	-17.2	-17.3	-17.5	-17.6	-17.7	-18.1	-15.3	-11.6
11-Feb	-18.6	-19.1	-19.2	-19.2	-19.2	-19.4	-19.4	-19.4	-19.2	-19.0	-18.3	-17.2	-16.6	-15.2	-14.6	-14.7	-15.8	-17.3	-18.8	-19.4	-19.9	-20.9	-21.3	-21.7	-18.5	-14.6
12-Feb	-23.6	-25.9	-26.5	-27.3	-26.3	-25.3	-26.9	-28.5	-28.1	-21.2	-18.9	-17.8	-15.8	-14.7	-14.8	-15.1	-14.5	-13.7	-12.8	-12.1	-11.0	-9.5	-9.3	-9.3	-18.7	-9.3
13-Feb	-9.4	-10.5	-11.1	-11.1	-10.8	-10.4	-10.4	-10.4	-10.5	-10.0	-9.4	-8.6	-7.6	-6.3	-4.9	-3.2	-3.0	-3.6	-4.7	-6.4	-5.5	-7.0	-7.9	-9.0	-8.0	-3.0
14-Feb	-11.1	-12.6	-10.6	-9.5	-8.7	-7.8	-8.2	-9.1	-9.2	-8.3	-7.4	-6.7	-6.2	-6.1	-6.0	-6.1	-6.2	-6.9	-7.2	-7.8	-8.5	-9.0	-9.4	-9.9	-8.3	-6.0
15-Feb	-10.1	-10.3	-10.4	-10.6	-10.8	-11.0	-11.2	-11.5	-11.7	-11.6	-11.3	-11.3	-11.1	-11.2	-11.4	-11.7	-11.9	-12.1	-12.4	-13.4	-14.1	-14.2	-14.2	-14.1	-11.8	-10.1
16-Feb	-13.6	-13.3	-12.8	-12.6	-12.7	-12.5	-11.9	-11.5	-11.0	-10.1	-9.0	-8.2	-7.6	-6.9	-6.4	-6.3	-6.2	-6.6	-6.7	-6.8	-6.8	-7.0	-7.4	-7.9	-9.2	-6.2
17-Feb	-8.6	-9.1	-10.1	-10.8	-11.5	-12.3	-13.1	-14.1	-14.3	-14.1	-14.2	-14.2	-13.8	-13.8	-13.9	-14.4	-14.6	-15.0	-15.2	-15.5	-15.6	-15.7	-15.8	-15.9	-13.6	-8.6
18-Feb	-15.9	-16.1	-16.1	-16.1	-16.0	-15.9	-15.7	-15.4	-14.8	-13.9	-12.9	-11.5	-10.2	-9.0	-7.7	-7.5	-7.3	-6.8	-6.5	-6.3	-7.2	-9.3	-10.3	-11.4	-11.6	-6.3
19-Feb	-12.3	-13.1	-13.8	-14.7	-16.6	-19.6	-21.3	-21.4	-21.2	-19.1	-17.7	-16.9	-16.4	-15.6	-14.5	-14.3	-14.4	-15.0	-15.8	-16.5	-16.8	-17.1	-18.0	-20.6	-16.8	-12.3
20-Feb	-22.0	-23.6	-26.3	-26.7	-29.7	-29.6	-29.5	-29.0	-26.9	-23.1	-19.2	-15.8	-13.5	-12.0	-11.2	-11.0	-11.6	-14.4	-16.1	-16.5	-15.2	-14.1	-14.0	-13.3	-19.3	-11.0
21-Feb	-13.0	-12.9	-12.8	-12.4	-11.9	-11.9	-11.8	-11.8	-11.9	-10.0	-7.6	-6.1	-5.5	-4.9	-3.6	-2.9	-3.1	-4.0	-4.5	-4.9	-6.1	-7.1	-9.7	-8.9	-8.3	-2.9
22-Feb	-8.9	-9.8	-11.1	-12.8	-13.8	-18.1	-20.0	-20.2	-16.1	-14.2	-11.1	-7.9	-3.3	-0.7	1.4	1.9	1.1	-1.9	-4.6	-2.4	-1.5	-3.0	-6.3	-8.6	-8.0	1.9
23-Feb	-8.9	-8.6	-9.9	-10.4	-10.7	-8.1	-8.4	-9.1	-7.5	-6.2	-2.1	-0.2	0.0	1.1	1.4	0.5	0.2	-2.7	-4.1	-2.9	-2.2	-4.1	-2.4	-3.3	-4.5	1.4
24-Feb	-4.0	-5.7	-7.0	-4.9	-7.1	-8.5	-9.5	-11.4	-8.8	-5.2	-2.1	0.1	2.5	4.4	5.2	5.5	4.1	1.4	-0.7	-1.5	-1.8	-2.1	-1.7	-2.9	-2.6	5.5
25-Feb	-4.7	-5.1	-4.2	-3.2	-2.9	-3.0	-2.9	-3.2	-2.2	0.0	2.3	4.0	6.7	8.4	9.5	8.6	8.9	7.7	6.0	3.6	3.9	4.0	1.3	1.1	1.9	9.5
26-Feb	2.2	1.5	0.2	-1.0	-1.2	-2.4	-2.0	-0.8	2.2	3.6	5.3	6.0	6.3	6.7	4.7	3.6	2.3	0.2	-1.3	-2.3	-3.9	-6.1	-7.9	-9.2	0.3	6.7
27-Feb	-10.6	-11.9	-13.3	-14.4	-15.2	-15.7	-16.0	-16.3	-16.4	-16.2	-15.7	-15.2	-14.9	-14.3	-13.7	-13.2	-13.0	-13.3	-13.7	-13.7	-13.7	-14.5	-15.6	-16.4	-14.5	-10.6
28-Feb	-17.7	-19.2	-20.0	-19.7	-18.9	-20.9	-22.2	-22.8	-21.7	-22.1	-22.0	-21.4	-20.7	-20.2	-19.9	-19.9	-20.2	-21.4	-23.6	-24.7	-26.2	-26.7	-27.0	-28.8	-22.0	-17.7
29-Feb	-32.3	-33.4	-33.2	-34.4	-34.5	-36.8	-37.4	-37.5	-33.2	-27.1	-22.3	-19.8	-16.9	-15.0	-13.9	-13.1	-12.6	-12.3	-12.4	-12.4	-12.3	-12.4	-12.4	-12.2	-22.5	-12.2
	-13.4	-13.8	-14.0	-14.1	-14.5	-15.0	-15.4	-15.6	-14.8	-13.2	-11.5	-10.4	-9.5	-8.6	-8.2	-8.2	-8.4	-9.3	-10.2	-10.6	-10.8	-11.4	-12.0	-12.6	Diurnal Average	
	2.2	1.5	0.2	-1.0	-1.2	-2.4	-2.0	-0.8	2.2	3.6	5.3	6.0	6.7	8.4	9.5	8.6	8.9	7.7	6.0	3.6	3.9	4.0	1.3	1.1	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
CNRL Horizon - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	67	9.63	9.63
-20 - 0	586	84.20	93.82
0 - 10	43	6.18	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

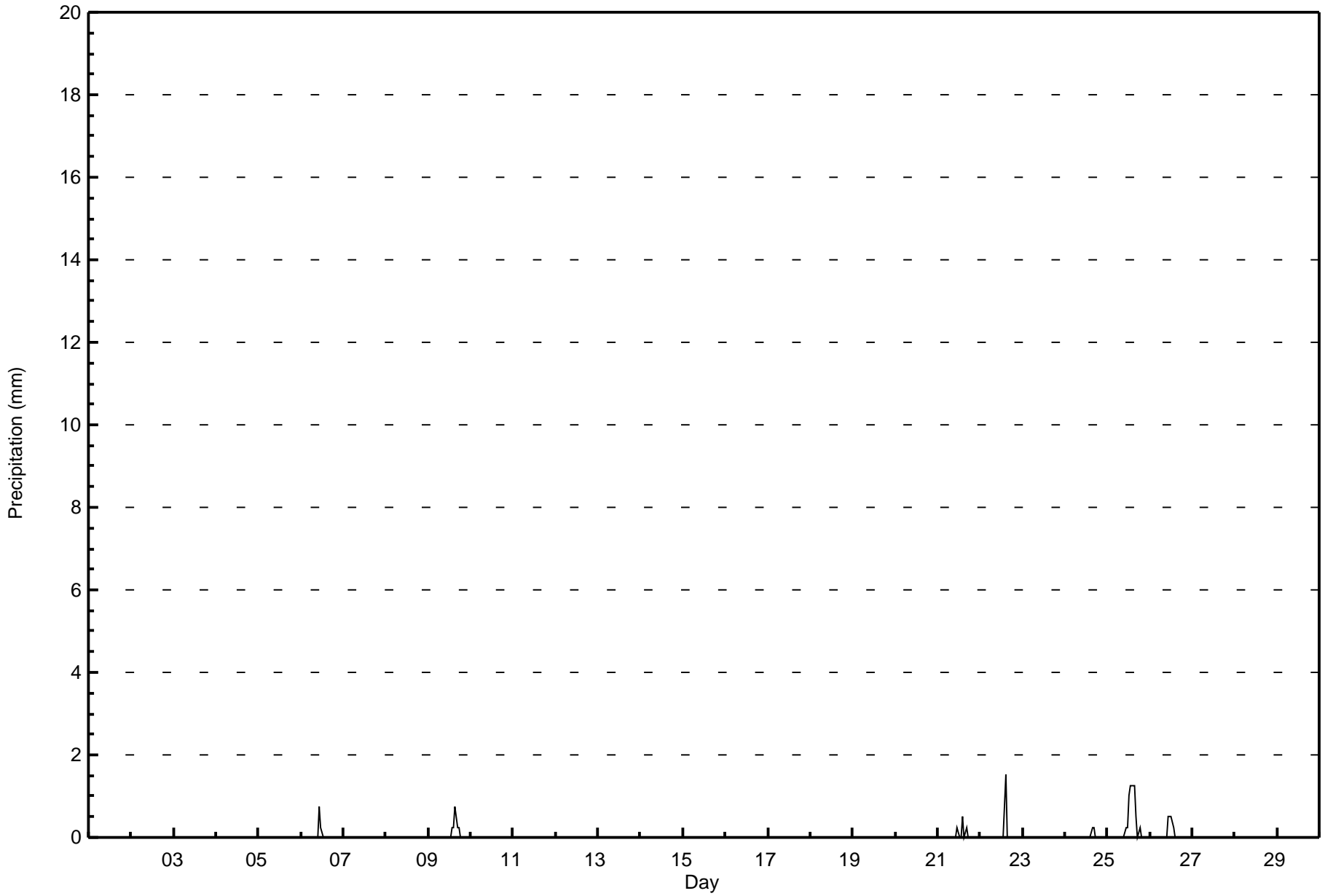
CNRL Horizon - February 2016

Maximum Value: 1.5 mm on Feb 22 15:00 Maximum Daily Total: 6.1 mm on Feb 25		Hours in Service: 696 Hours of Data: 696 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: 3.6 mm at hour 15 Monthly Total: 13.72 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 = 0.8																																	
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	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	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	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.8
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	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	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	0.3	0.3	0.8	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	1.8	0.8
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	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	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	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	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	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	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	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	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	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	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	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	0.3	0.0	0.0	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	1.0	0.5
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	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5
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	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	0.3	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	0.5	0.3
25-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	1.0	1.3	1.3	1.3	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	6.1	1.3
26-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.5
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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-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	0.0	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 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

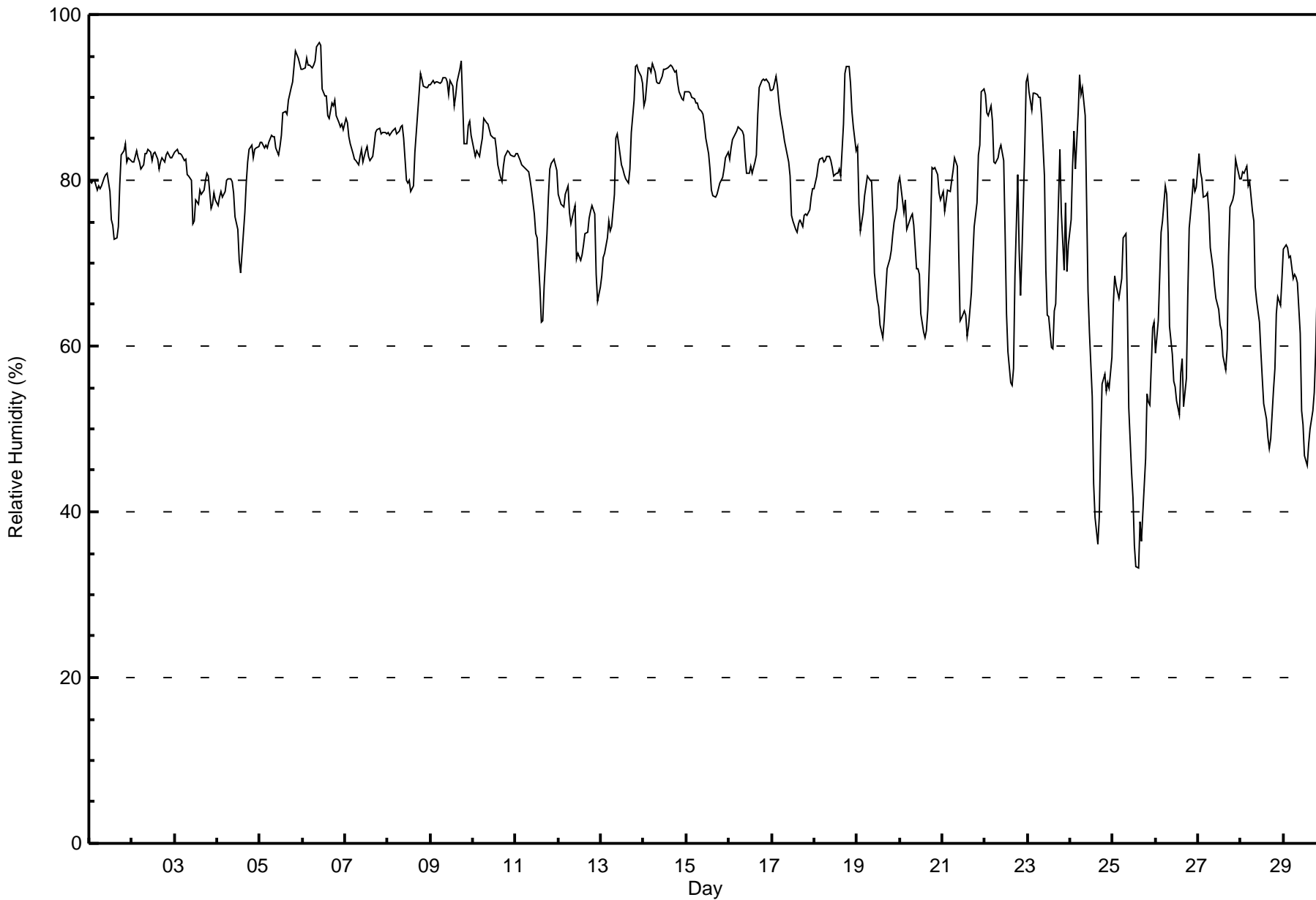
**Relative Humidity (RH) - %
CNRL Horizon - February 2016**

Maximum Value: 97 % on Feb 6 10:00 Maximum Daily Average: 92.3 % on Feb 14																		Hours in Service: 696 Hours of Data: 696																																																	
Minimum Value: 33 % on Feb 25 15:00 Minimum Daily Average: 54.2 % on Feb 25 Maximum Diurnal Average: 82.6 % at hour 6 Minimum Diurnal Average: 69.9 % at hour 15 Monthly Average: 78.3 % Percentiles: P ₁ = 39 P ₁₀ = 62 Q ₁ = 74 Median = 81 Q ₃ = 86 P ₉₀ = 91 P ₉₉ = 94																		Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																											
1-Feb	80	80	80	80	79	79	79	79	80	81	81	79	75	75	73	73	74	80	83	84	84	82	83	82	79.4	84																																									
2-Feb	82	82	84	83	82	81	82	83	83	84	83	82	83	83	83	81	82	83	82	83	83	83	83	83	82.7	84																																									
3-Feb	83	84	83	83	83	82	83	81	81	80	75	75	78	77	79	78	79	80	81	80	77	77	78	78	79.8	84																																									
4-Feb	77	78	79	78	79	80	80	80	80	78	76	74	70	69	71	76	80	82	84	84	83	84	84	84	78.7	84																																									
5-Feb	85	85	84	84	84	85	85	85	85	84	83	84	85	88	88	88	90	91	92	94	96	95	94	93	87.8	96																																									
6-Feb	93	94	95	94	94	94	94	94	96	97	96	91	90	90	88	87	89	89	90	88	87	86	87	86	91.2	97																																									
7-Feb	87	87	85	84	83	83	82	82	83	84	82	84	84	83	82	83	84	86	86	86	86	86	86	86	84.3	87																																									
8-Feb	86	85	86	86	86	86	86	86	87	85	80	80	80	79	79	83	86	90	93	92	91	91	91	91	86.1	93																																									
9-Feb	92	92	92	92	92	92	92	92	92	92	90	92	91	89	90	92	93	94	89	84	84	87	87	85	90.4	94																																									
10-Feb	84	83	83	83	84	85	87	87	87	86	85	85	85	84	82	80	80	82	83	84	83	83	83	83	83.8	87																																									
11-Feb	83	83	82	82	82	82	81	81	80	79	76	74	73	67	63	63	67	74	78	81	82	83	82	81	77.4	83																																									
12-Feb	78	77	77	77	78	79	76	75	76	77	71	71	70	71	72	74	74	75	76	77	76	69	65	67	74.1	79																																									
13-Feb	69	71	71	73	75	74	74	78	85	86	84	82	81	81	80	80	81	86	90	94	94	93	93	92	81.9	94																																									
14-Feb	89	90	94	94	93	94	93	92	92	93	93	93	94	94	94	94	93	93	93	92	91	90	90	91	92.3	94																																									
15-Feb	91	91	91	90	90	89	89	89	88	88	87	85	83	81	79	78	78	78	79	80	80	81	83	83	84.6	91																																									
16-Feb	83	84	85	86	86	86	86	86	85	83	81	81	82	81	82	83	88	91	92	92	92	92	92	91	86.2	92																																									
17-Feb	91	91	93	91	89	88	86	85	84	82	80	76	75	74	74	75	75	74	76	76	76	76	78	79	81.0	93																																									
18-Feb	79	80	82	83	83	82	82	83	83	82	82	81	81	81	81	81	87	93	94	94	92	88	86	84	84.2	94																																									
19-Feb	84	77	74	76	78	79	80	80	80	76	69	66	65	62	61	63	66	69	71	72	73	75	77	80	73.0	84																																									
20-Feb	80	79	76	78	74	75	76	76	75	69	69	69	64	62	61	62	64	75	81	81	82	81	78	78	73.5	82																																									
21-Feb	79	76	77	79	79	80	81	83	82	71	63	63	64	64	61	62	66	71	74	77	83	84	91	91	75.1	91																																									
22-Feb	90	88	88	89	87	82	82	83	84	84	82	74	64	59	56	55	57	68	81	72	66	71	84	92	76.6	92																																									
23-Feb	92	91	89	91	91	90	90	90	88	81	69	64	64	60	60	64	65	78	84	76	69	77	69	72	77.6	92																																									
24-Feb	75	82	86	81	88	93	90	91	88	77	67	62	54	43	39	36	39	48	55	57	55	56	55	59	65.7	93																																									
25-Feb	65	69	67	66	67	68	73	73	65	53	45	42	36	33	33	39	36	40	46	54	53	53	62	63	54.2	73																																									
26-Feb	59	63	68	74	75	79	78	74	62	59	56	55	53	52	57	58	53	56	66	74	78	80	79	79	66.2	80																																									
27-Feb	83	81	80	78	78	78	76	72	69	67	66	64	62	62	59	57	60	71	77	78	79	83	82	80	72.6	83																																									
28-Feb	80	81	81	82	79	80	76	75	67	65	63	59	56	53	51	49	48	49	55	57	64	66	65	68	65.4	82																																									
29-Feb	72	72	72	71	71	68	69	68	68	62	52	51	47	46	48	50	52	54	59	67	74	81	84	85	64.2	85																																									
																		81.8		81.9		82.2		82.2		82.4		82.6		82.4		82.2		81.2		78.7		75.4		73.6		72.1		70.4		69.9		70.5		72.0		75.9		79.0		79.6		79.7		80.5		81.0		81.6		Diurnal Average	
																		93		94		95		94		94		94		94		96		97		96		93		93		94		94		94		94		94		94		94		96		95		94		93		Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
CNRL Horizon - February 2016**

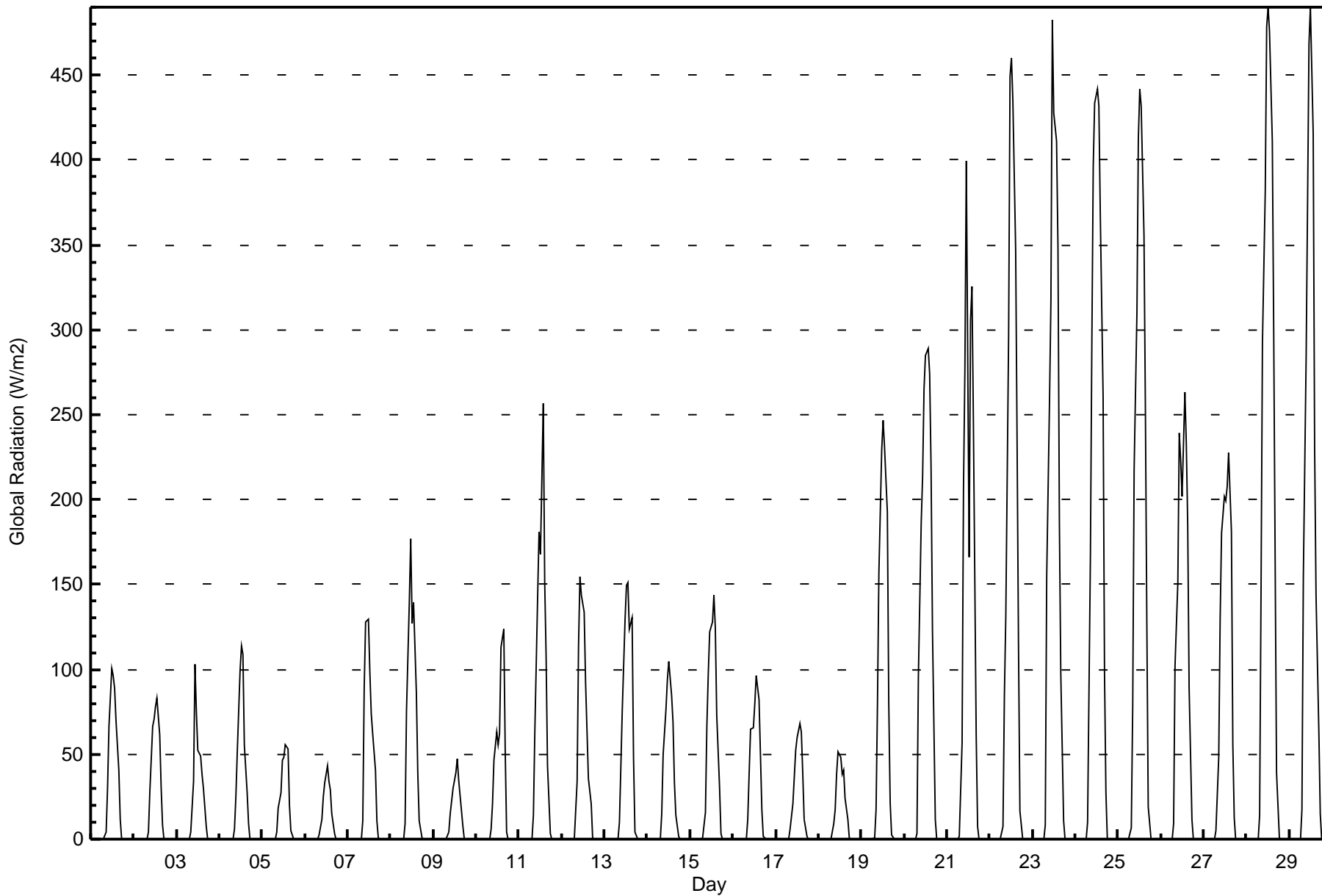
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	9	1.29	1.29
40 - 60	53	7.61	8.91
60 - 80	248	35.63	44.54
80 - 100	386	55.46	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Value: 490 W/m2 on Feb 28 13:00																			Maximum Daily Average: 133.0 W/m2 on Feb 28						Hours in Service: 696	
Minimum Value: 0 W/m2 on Feb 1 01:00																			Minimum Daily Average: 8.2 W/m2 on Feb 6						Hours of Data: 696	
Maximum Diurnal Average: 196.8 W/m2 at hour 12																			Minimum Diurnal Average: 0.0 W/m2 at hour 1						Hours of Missing Data: 0	
Monthly Average: 50.2 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 51 P ₉₀ = 181 P ₉₉ = 457						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	5	30	67	100	97	89	70	40	12	0	0	0	0	0	0	0	21.2	100
2-Feb	0	0	0	0	0	0	0	0	4	28	66	71	78	83	61	31	8	0	0	0	0	0	0	0	17.9	83
3-Feb	0	0	0	0	0	0	0	0	4	34	103	74	53	49	38	30	8	0	0	0	0	0	0	0	16.4	103
4-Feb	0	0	0	0	0	0	0	0	6	25	51	100	113	109	56	27	9	0	0	0	0	0	0	0	20.7	113
5-Feb	0	0	0	0	0	0	0	0	4	18	27	47	48	56	53	20	5	0	0	0	0	0	0	0	11.6	56
6-Feb	0	0	0	0	0	0	0	0	2	12	25	34	44	34	29	15	3	0	0	0	0	0	0	0	8.2	44
7-Feb	0	0	0	0	0	0	0	0	11	89	128	130	99	74	63	41	11	0	0	0	0	0	0	0	26.9	130
8-Feb	0	0	0	0	0	0	0	0	9	75	140	177	127	140	87	39	11	0	0	0	0	0	0	0	33.5	177
9-Feb	0	0	0	0	0	0	0	0	4	15	22	30	39	47	34	26	7	0	0	0	0	0	0	0	9.3	47
10-Feb	0	0	0	0	0	0	0	0	6	21	46	63	55	63	113	124	53	4	0	0	0	0	0	0	22.8	124
11-Feb	0	0	0	0	0	0	0	0	14	63	143	181	168	256	152	108	43	3	0	0	0	0	0	0	47.1	256
12-Feb	0	0	0	0	0	0	0	0	34	114	154	144	134	92	64	35	21	1	0	0	0	0	0	0	33.0	154
13-Feb	0	0	0	0	0	0	0	0	10	43	76	129	150	151	124	130	48	4	0	0	0	0	0	0	36.0	151
14-Feb	0	0	0	0	0	0	0	0	15	50	77	94	104	85	69	33	14	1	0	0	0	0	0	0	22.6	104
15-Feb	0	0	0	0	0	0	0	1	15	66	97	122	128	144	125	73	31	3	0	0	0	0	0	0	33.6	144
16-Feb	0	0	0	0	0	0	0	0	12	39	65	66	80	97	83	50	18	2	0	0	0	0	0	0	21.3	97
17-Feb	0	0	0	0	0	0	0	0	6	20	37	52	60	68	63	39	11	2	0	0	0	0	0	0	14.9	68
18-Feb	0	0	0	0	0	0	0	0	9	18	38	51	48	38	41	24	12	1	0	0	0	0	0	0	11.7	51
19-Feb	0	0	0	0	0	0	0	1	17	81	157	229	246	231	192	79	22	3	0	0	0	0	0	0	52.4	246
20-Feb	0	0	0	0	0	0	0	3	96	186	214	265	285	289	274	219	123	11	0	0	0	0	0	0	81.9	289
21-Feb	0	0	0	0	0	0	0	1	57	207	277	399	166	306	326	248	62	8	0	0	0	0	0	0	85.7	399
22-Feb	0	0	0	0	0	0	0	8	84	131	296	449	460	435	346	235	114	17	0	0	0	0	0	0	107.3	460
23-Feb	0	0	0	0	0	0	0	8	154	258	318	483	428	411	348	187	97	11	0	0	0	0	0	0	112.6	483
24-Feb	0	0	0	0	0	0	0	10	167	290	396	434	442	432	369	260	98	28	0	0	0	0	0	0	121.9	442
25-Feb	0	0	0	0	0	0	0	7	78	217	311	413	442	432	356	253	129	19	0	0	0	0	0	0	110.6	442
26-Feb	0	0	0	0	0	0	0	9	102	151	239	223	201	263	234	185	89	12	0	0	0	0	0	0	71.2	263
27-Feb	0	0	0	0	0	0	0	5	48	130	180	202	200	207	228	181	56	13	0	0	0	0	0	0	60.4	228
28-Feb	0	0	0	0	0	0	0	14	146	292	382	478	490	476	411	297	165	39	1	0	0	0	0	0	133.0	490
29-Feb	0	0	0	0	0	0	0	17	154	285	374	468	490	415	231	143	63	15	0	0	0	0	0	0	110.7	490
0.0																			0.0						Diurnal Average	
0																			0						Diurnal Maximum	





Maximum Speed: 20 km/h on Feb 9 19:00	Maximum Daily Speed Average: 11.5 km/h on Feb 10	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 18 17:00	Minimum Daily Speed Average: 0.9 km/h on Feb 7	Hours of Data: 689
Maximum Diurnal Speed Average: 3.1 km/h at hour 22	Minimum Diurnal Speed Average: 0.3 km/h at hour 7	Hours of Missing Data: 7
Monthly Average Velocity: 1.1 km/h 33.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 18	Percent Operational Time: 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	SSW4	SW5	SW5	SW6	SW7	SW7	SSW6	SSW6	S5	S4	S5	S6	SSW5	S7	S6	S6	S5	S3	SSW1	SW3	NNW4	NNW1	NW4	N3	SSW3.7	S7
2-Feb	NNE4	N3	NNE4	NNW1	SSW4	SSW5	SSW4	S6	S7	S9	S10	S8	SSE6	NNE6	NNE11	NNE10	NNE9	NNE9	N10	NNE10	NNE8	N6	N5	NNE5	NE1.9	NNE11
3-Feb	NE4	NNE4	NNE4	NE3	E3	ENE3	NNE3	AF	AF	SSW4	S5	S3	E4	ENE2	N6	NNE7	NNE5	NNE8	NNE8	NNE10	NNE11	NNE9	N8	NNE7	NNE4.3	NNE11
4-Feb	NNE7	NNE7	NNE7	NNE7	N6	NNE6	NNE5	NNE6	NNE6	NNE5	NNE3	N3	SSE2	SSW5	S3	NNE3	NNW3	NNE3	N1	NNE2	AF	S4	S6	S7	NNE2.2	NNE7
5-Feb	S8	S9	SSE7	S7	S8	S8	S7	S5	SW3	SW4	SSW5	SSW6	SSW6	SSW6	SW5	WSW6	WSW5	WSW4	SW5	SW9	SSE4	S6	S6	SSW7	SSW5.4	SW9
6-Feb	SSW7	S8	S9	S8	S9	S9	SSE8	S8	S7	S6	N3	NNE18	NNE13	NNE10	N13	N12	N5	NNE1	E2	ENE5	E4	E4	ESE5	E4	E1.5	NNE18
7-Feb	ENE3	NE5	NNE4	NNE1	SW2	SSW3	SSW3	NNW1	N3	N3	NNE3	NNE5	NNE6	NNE6	NNE6	NNE5	NNE3	NE2	S2	SW4	SW5	WSW5	SW6	S5	NNE0.9	NNE6
8-Feb	SSE5	S5	S7	S5	S10	SSE6	S4	S3	SSW3	S6	SSE5	N2	N4	NNW4	NW4	NW3	W3	SW2	SE3	ESE2	NNW2	W3	SW3	WSW2	S2.1	S10
9-Feb	SSE3	S3	S2	SSE3	SE1	SW2	AF	AF	AF	SW2	WSW1	NE2	E2	SSE4	S6	SSE6	E4	NNE7	NNE20	NNE19	NNE16	NNE17	NNE16	NE17	NE4.2	NNE20
10-Feb	NE14	NNE14	NNE15	NNE17	NNE14	NNE15	NE16	NNE13	NNE11	NNE13	NNE12	NE10	NNE12	NNE10	NNE12	NE12	NNE9	NNE10	NNE8	NNE8	NNE9	N9	N8	NNE7	NNE11.5	NNE17
11-Feb	NNE8	N8	N7	N7	NNE7	NNE7	NNE8	NNE7	NNE7	NNE7	N8	NNE9	NNE10	NNE10	N9	NNE10	NNE9	NNE10	N8	N7	N7	NNE6	N7	N7	NNE7.8	NNE10
12-Feb	NNW4	N1	E1	WNW1	NW4	NW5	WSW3	WSW2	WSW5	SW5	SSW6	SSW6	SSW7	SSW6	W4	NW5	WNW4	WNW4	WNW2	WNW2	S6	SSE10	SSE14	SSE12	SW2.6	SSE14
13-Feb	SSE11	SSE11	SSE12	S13	SSE10	S13	S13	S11	S10	S11	S10	S11	S12	S10	SSE8	S9	S8	SSE5	S5	SE4	SSW8	NNW4	NNW4	NNW5	S8.1	S13
14-Feb	W3	NW4	N4	NNW3	NNW1	NNE4	NNW2	NNW1	WSW2	SW3	NW2	NNW2	ENE1	NNE2	ENE3	NE3	NE4	NE5	NNE5	NE5	NE5	NE6	NNE6	NNE5	NNE2.5	NNE6
15-Feb	NNE5	N5	NNE5	NNE5	NNE6	NNE6	NNE7	NNE6	N6	NNE7	NNE6	NNE5	NNE6	NNE8	NE7	NNE6	NE6	NE5	NNE6	NNE7	N6	N4	NE2	SE1	NNE5.3	NNE8
16-Feb	SSW3	SW3	SW1	SSE3	ESE3	SSE5	S5	SSE3	S4	SSW1	S4	W1	E3	ESE3	N4	N4	N4	N6	NNE7	N7	N7	N7	N9	NNE11	NNE1.4	NNE11
17-Feb	NNE11	N9	NNE10	NNE11	NNE11	NNE11	NNE13	NNE13	NNE10	NNE11	NNE11	NNE9	NNE9	NNE12	NNE12	NNE11	NNE10	NE10	NE9	NE9	NNE9	NNE9	NNE10	NNE10	NNE10.4	NNE13
18-Feb	NNE8	NNE10	NNE10	N10	NNE10	NNE11	NNE12	NNE11	N10	N9	N7	N7	N6	NNW3	SE3	NNE1	ESE0	S2	SSE3	S4	NNE11	NNE12	NNE11	NNE11	NNE6.6	NNE12
19-Feb	NNE7	NW8	NW12	N9	N6	NNE3	ENE3	NE3	S5	SE4	SE5	SE4	NE6	NNE5	N4	NE5	NE6	ENE6	ENE7	ENE6	ENE6	ENE4	NE4	E3	NE3.4	NW12
20-Feb	ENE1	NW3	SW2	WNW3	WSW6	WSW6	SW7	SSW7	SSW6	S6	S10	S12	S11	S10	S8	SSE8	SSE7	S6	SSW7	SW5	WSW1	AF	SE2	SE2	S5.0	S12
21-Feb	SSW2	SSE4	S6	S8	S5	S5	S4	SSE5	SSE6	S8	S8	S11	SSE9	SSE10	S10	S9	SSE8	SSE8	S6	WSW1	SSW1	SSW4	NW4	NNW6	S5.2	S11
22-Feb	N7	N8	N7	NE5	NNE4	SSW3	SW5	SSW4	SSW4	SSW8	SE5	SE6	SSE7	SSE8	S8	SSE8	ESE6	NNW3	SW4	NW5	NW5	N6	NNE2	SSE2	SSE1.0	SSE8
23-Feb	SSW7	SSW7	SW4	SW6	SW7	SSW10	SSW10	SSW7	SW7	ENE2	SSE2	NNE3	NNE7	NNE4	NNE5	ENE8	ENE5	S4	SSW6	W8	SW7	WSW7	W8	W9	SW3.1	SSW10
24-Feb	WSW10	SW6	W6	W8	ENE2	WSW4	NNW4	SW7	SSW6	SSW7	SSW9	S9	S10	S11	SSW11	SSW9	S8	SSE7	S8	S10	S10	S13	S12	S9	SSW7.0	S13
25-Feb	S8	S10	S9	SSE7	S6	SSE4	SSW7	SSW8	SSW8	SSW11	SSW11	SSW11	SW14	SW14	WSW12	WNW11	W10	W10	W8	WSW7	WSW11	WSW10	SE5	S7	SW7.2	SW14
26-Feb	SSW9	SW13	S9	S9	SSW12	SSW9	SSW9	SW13	WSW17	W11	NNW10	NW8	NW7	NNW6	NNE13	NNE14	NNE16	NNE20	NNE17	NNE17	NNE19	NNE19	N18	NNE17	NNW4.1	NNE20
27-Feb	NNE18	NNE17	NNE18	NNE20	NNE17	NNE15	NNE14	NNE16	NNE15	NNE14	NNE10	NNE10	NNE10	NNE7	N8	N4	N1	ESE2	NE4	SE3	NNE4	NNE12	NNE12	NNE11	NNE10.6	NNE20
28-Feb	NNE8	NE7	N6	NNE9	NNE8	NNE9	NNE9	N9	N17	NNE12	NNE11	NNE11	NNE14	NNE12	NNE11	NNE10	NE9	ENE7	NE7	NE6	N6	N6	NNW7	NNW5	NNE8.5	N17
29-Feb	WSW4	SSW5	SW8	SSW7	SW6	SW5	SSW7	SSW7	S8	S9	S9	SSE10	SSE10	S9	SSE7	SSE8	SSE7	S4	S5	S4	SW3	S1	SSW2	SSW4	S5.7	SSE10

NNE1.1	N0.7	NNE0.9	NNE1.0	ENE0.5	ESE0.4	SSE0.3	SSW0.4	SW0.7	SSW0.8	S1.0	ESE1.0	E1.4	E1.0	NNE1.7	NNE2.2	NE2.0	NE2.3	NNE2.3	NNE2.3	N2.9	N3.1	NNE2.6	NNE2.3		Diurnal Average
NNE18	NNE17	NNE18	NNE20	NNE17	NNE15	NE16	NNE16	WSW17	NNE14	NNE12	NNE18	SW14	SW14	N13	NNE14	NNE16	NNE20	NNE20	NNE19	NNE19	NNE19	NNE18	NE17		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

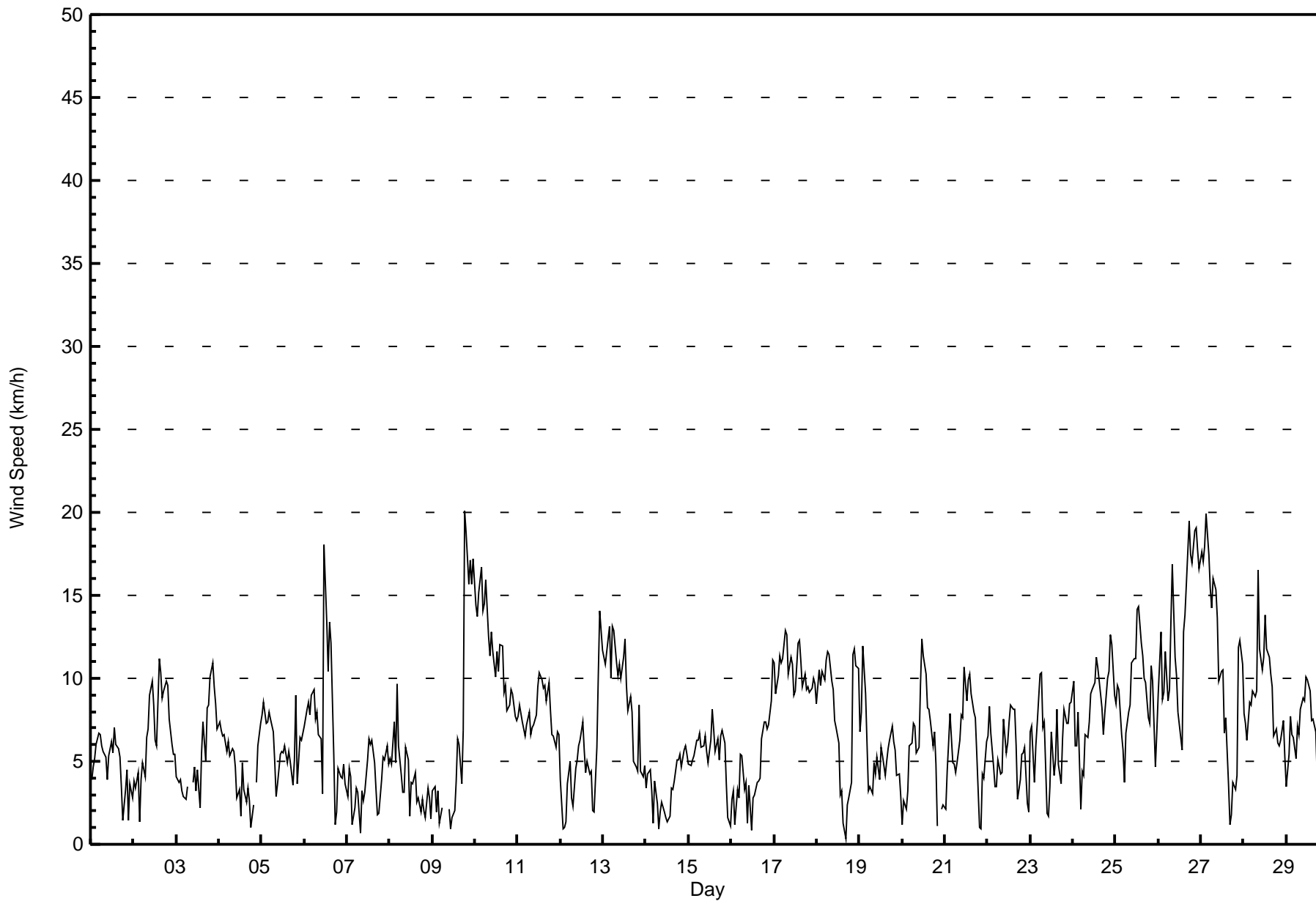
Wind Speed (WS) - km/h
CNRL Horizon - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 9 19:00 Minimum Value: 0 km/h on Feb 3 10:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 696 Hours of Data: 689 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.0																															
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	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	1	1	2	1	1	2	2																						
2-Feb	1	2	1	2	1	1	1	1	1	2	2	2	2	3	3	2	2	3	2	3	2	1	1	1	3	3																						
3-Feb	1	2	1	2	1	1	1	AF	AF	0	1	1	1	2	1	2	2	2	2	3	2	2	2	2	3																							
4-Feb	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	AF	1	1	1	2																						
5-Feb	1	1	1	1	2	1	1	1	1	1	2	1	1	2	2	2	1	1	1	5	3	2	1	1	5	5																						
6-Feb	1	1	2	2	2	2	2	2	1	1	5	5	3	3	4	3	2	1	2	1	1	1	1	1	5	5																						
7-Feb	1	1	1	1	2	1	1	1	1	1	1	2	1	1	2	1	1	2	1	2	1	1	1	1	2	2																						
8-Feb	1	1	1	1	3	2	3	1	2	2	2	1	1	1	1	1	2	2	1	2	2	1	1	2	3	3																						
9-Feb	1	2	1	1	1	2	AF	AF	AF	1	1	1	1	1	1	1	1	2	6	5	4	4	4	4	6	6																						
10-Feb	4	3	4	5	3	3	4	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	5	5																						
11-Feb	1	2	2	2	1	1	2	2	2	2	2	3	3	2	2	2	2	2	2	1	1	1	1	1	3	3																						
12-Feb	1	1	1	1	1	1	1	2	1	1	2	2	2	2	1	1	1	1	2	1	3	3	4	3	4	4																						
13-Feb	3	3	2	3	2	3	3	2	2	2	2	3	2	2	2	2	3	2	3	1	1	2	1	1	3	3																						
14-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	2	2																						
15-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2	2	1	2	2	1	2	2																						
16-Feb	2	1	2	2	2	2	2	1	2	2	1	2	2	1	1	1	1	1	2	2	1	1	2	2	2	2																						
17-Feb	3	2	3	3	3	3	3	4	3	3	3	2	2	3	3	3	2	3	2	2	2	2	3	3	4	4																						
18-Feb	2	3	2	2	2	2	2	2	2	2	2	2	1	1	3	2	1	1	2	2	3	3	3	3	3	3																						
19-Feb	2	2	2	3	2	2	2	2	2	1	2	2	1	1	1	2	2	2	2	1	1	1	1	1	3	3																						
20-Feb	1	1	1	1	1	1	1	1	1	1	3	2	2	2	2	2	1	1	1	1	1	AF	1	1	3	3																						
21-Feb	1	1	1	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	2	2	1	1	3	3																						
22-Feb	1	1	2	2	2	1	1	1	1	2	1	1	2	2	2	3	2	2	2	4	3	1	2	1	4	4																						
23-Feb	1	2	3	3	2	2	2	2	3	2	1	1	1	2	2	2	1	2	1	2	1	2	3	2	3	3																						
24-Feb	2	2	3	2	1	2	1	2	2	2	2	2	2	2	3	2	2	1	1	2	2	2	2	2	3	3																						
25-Feb	1	1	2	2	1	1	2	2	2	3	4	3	5	4	4	3	3	3	2	2	3	4	1	2	5	5																						
26-Feb	2	2	2	2	2	3	3	4	5	6	5	5	2	3	3	3	4	5	5	5	5	5	4	5	6	6																						
27-Feb	4	5	5	5	5	4	3	4	4	4	2	3	3	2	2	1	1	1	1	1	2	3	3	3	5	5																						
28-Feb	2	1	1	2	2	2	2	2	5	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	5	5																						
29-Feb	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2																						
Diurnal Maximum																								4	5	5	5	5	4	4	4	4	5	6	5	5	5	4	4	3	4	5	6	5	5	5	4	5
AF - Analyzer Failure																																																



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	271	39.33	39.33
6 - 11	345	50.07	89.41
12 - 19	70	10.16	99.56
20 - 28	3	0.44	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 689

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - February 2016**

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	20	37	17	12	11	7	12	17	32	26	23	13	5	11	11	17	271
6 - 11	40	107	11	6	0	1	1	27	73	38	16	8	9	2	3	3	345
12 - 19	3	45	4	0	0	0	0	3	7	1	4	2	0	0	1	0	70
20 - 28	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	192	32	18	11	8	13	47	112	65	43	23	14	13	15	20	689

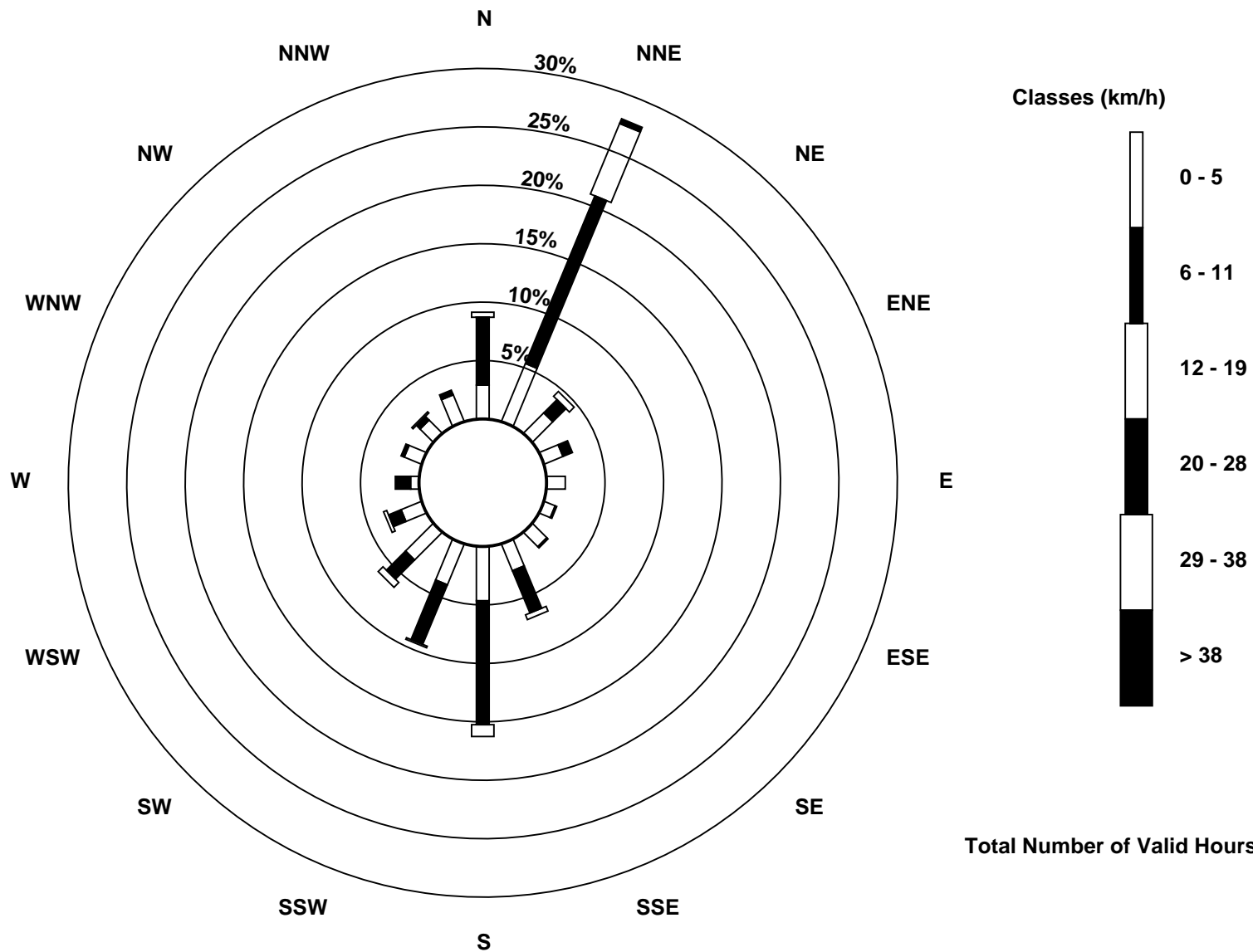
Total Number of Valid Hours: 689

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - February 2016

Direction of Maximum Speed: 19 deg on Feb 9 19:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 26.1 deg on Feb 10	Hours of Data: 689
Direction of Minimum Speed: 118 deg on Feb 18 17:00	Hours of Missing Data: 7
Direction of Minimum Daily Speed Average: 0.9 deg on Feb 7	Percent Operational Time: 99.0
Monthly Average Direction: 218.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	209	226	214	220	221	214	211	203	189	175	182	178	201	186	190	184	171	174	196	232	348	337	320	352	203.9
2-Feb	23	2	18	347	194	204	202	186	184	181	177	178	167	21	12	13	28	22	11	26	21	11	11	19	34.0
3-Feb	36	21	31	36	83	57	22	AF	AF	209	188	170	83	65	6	17	20	18	16	19	29	18	11	21	27.2
4-Feb	26	21	28	17	10	21	22	13	17	17	16	355	156	206	187	19	337	31	9	33	AF	180	183	189	22.5
5-Feb	185	180	168	179	171	171	179	183	233	230	203	195	204	203	228	248	238	225	217	156	169	172	192	194.9	
6-Feb	194	188	181	174	175	171	167	177	173	184	353	20	20	18	354	358	357	32	81	61	97	85	103	91	93.3
7-Feb	75	54	22	13	235	213	204	336	355	4	22	14	31	29	29	25	22	51	172	222	235	242	214	184	12.4
8-Feb	167	180	178	173	185	158	175	174	201	170	165	1	356	339	319	305	275	214	136	111	336	277	229	242	190.0
9-Feb	163	180	170	160	124	221	AF	AF	AF	232	253	38	98	158	179	163	81	22	19	14	16	20	24	37	34.4
10-Feb	36	33	27	24	27	32	35	29	25	25	18	34	26	31	29	34	29	16	13	18	15	11	9	21	26.1
11-Feb	18	3	4	8	19	20	21	17	27	24	9	19	22	13	11	15	20	15	5	354	6	17	6	10	13.7
12-Feb	348	6	86	298	326	315	240	248	241	217	201	208	194	211	277	315	299	300	294	293	181	166	166	158	216.4
13-Feb	161	163	166	169	167	171	175	174	174	175	176	181	185	174	164	176	176	158	175	144	202	327	296	295	175.3
14-Feb	267	309	354	348	337	12	333	330	255	228	316	302	73	32	58	51	42	36	33	51	34	34	20	14	13.3
15-Feb	13	11	18	17	26	21	16	15	11	15	15	31	22	25	45	25	35	41	28	12	4	10	40	145	21.7
16-Feb	196	216	214	165	115	164	182	149	176	196	173	263	101	123	354	349	359	10	17	358	353	3	9	14	23.2
17-Feb	12	11	23	25	26	31	26	19	22	30	21	32	28	29	31	33	31	43	36	35	28	22	26	24	26.8
18-Feb	24	17	15	9	14	15	16	16	5	1	4	1	6	332	127	16	118	183	167	183	20	18	28	24	15.9
19-Feb	26	311	308	352	10	28	64	48	182	126	127	127	38	30	3	35	47	73	57	64	63	72	48	90	38.6
20-Feb	63	309	216	296	238	240	219	208	208	188	181	181	179	177	169	157	165	177	192	223	248	AF	127	135	191.0
21-Feb	207	155	173	190	191	177	181	165	163	191	188	178	163	160	180	180	165	166	179	252	197	212	312	348	178.8
22-Feb	349	355	5	46	13	203	225	194	192	198	146	138	157	160	169	162	119	328	236	314	313	10	12	147	165.6
23-Feb	193	200	215	214	216	211	212	213	215	70	162	33	31	26	26	75	78	182	211	259	235	248	273	268	222.0
24-Feb	245	218	268	275	69	240	303	219	204	202	193	181	177	178	201	198	191	164	171	189	188	187	186	188	199.1
25-Feb	181	182	180	163	174	150	192	193	196	222	221	204	217	236	256	289	268	268	274	254	253	257	137	182	221.9
26-Feb	204	217	191	186	206	203	207	234	253	265	283	305	308	348	33	29	28	27	26	23	23	18	11	15	346.2
27-Feb	15	18	16	18	17	19	16	12	15	17	20	17	19	14	7	3	3	113	52	125	20	22	22	28	18.8
28-Feb	25	34	4	15	14	19	22	9	10	21	28	32	28	25	25	30	42	66	53	38	355	357	344	303	21.0
29-Feb	251	205	216	202	216	224	212	203	190	187	173	165	163	171	164	162	165	177	183	178	232	190	204	203	188.2
	31.1	3.4	14.2	26.4	64.6	118.1	152.7	198.1	231.7	195.0	171.4	104.0	83.7	80.9	29.3	32.9	43.6	38.7	30.6	13.6	6.9	10.7	17.6	25.2	
	Diurnal Average																								

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

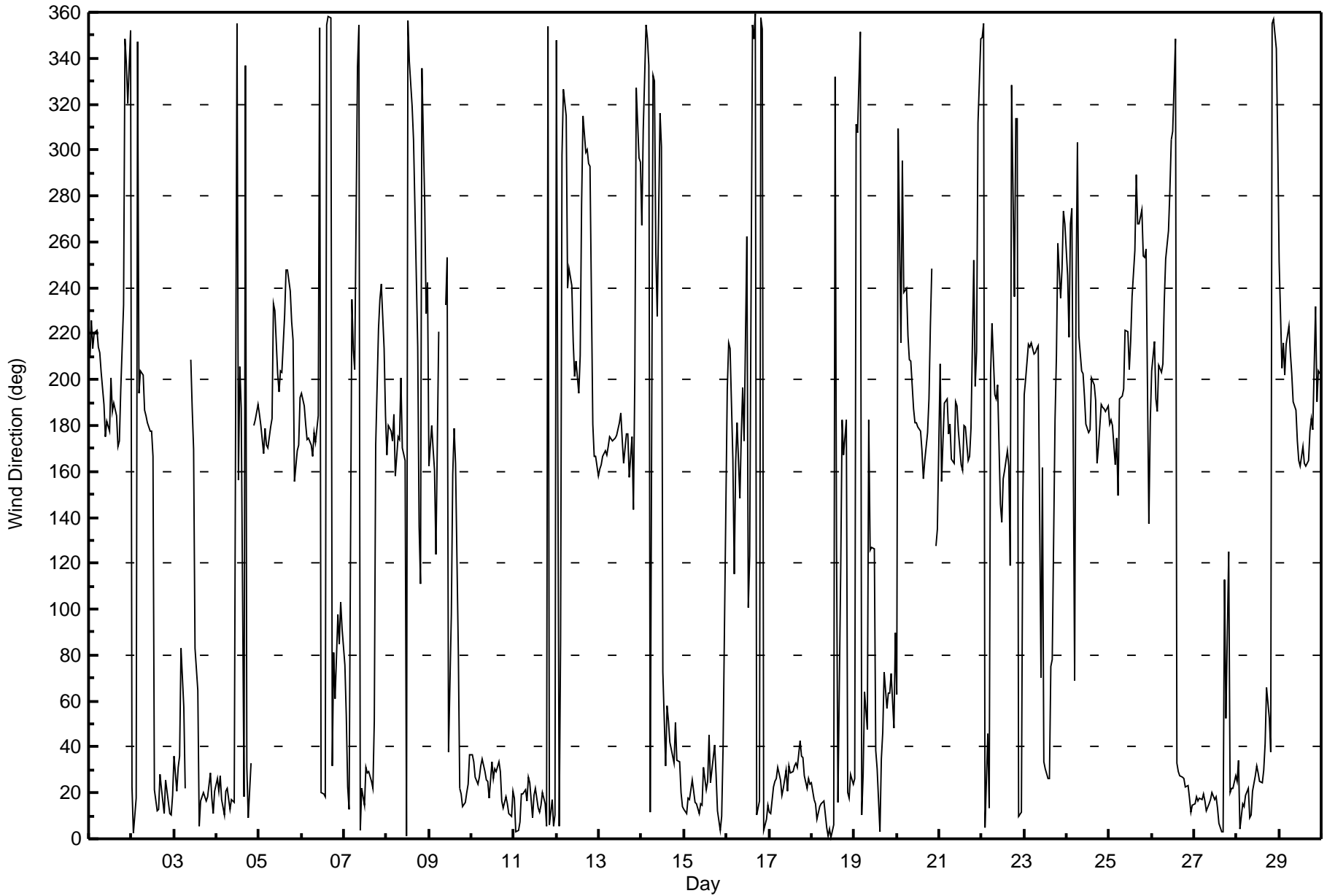
Wind Direction (WD) - deg
CNRL Horizon - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 90 deg on Feb 7 08:00 Minimum Value: 5 deg on Feb 1 02:00 Percentiles: P ₁ = 7 P ₁₀ = 13 Q ₁ = 16 Median = 19 Q ₃ = 26 P ₉₀ = 45 P ₉₉ = 77																	Hours in Service: 696 Hours of Data: 689 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.0								
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	15	5	7	8	8	8	15	17	12	18	19	20	24	16	21	19	15	51	77	55	21	64	19	35	77
2-Feb	24	43	13	67	21	14	41	15	15	13	14	15	21	37	17	21	17	21	19	16	18	17	19	17	67
3-Feb	13	19	18	65	29	18	12	AF	AF	11	25	32	34	52	22	19	33	17	16	17	17	17	17	65	
4-Feb	18	16	16	17	18	17	16	17	17	20	39	30	79	28	41	45	30	18	66	29	AF	22	16	11	79
5-Feb	15	13	16	14	13	12	17	16	41	25	24	22	25	28	31	22	21	27	23	24	72	25	11	16	72
6-Feb	15	15	14	15	13	17	18	17	16	16	83	20	17	20	22	20	20	33	53	19	19	20	17	23	83
7-Feb	53	25	35	59	52	19	22	90	28	19	21	21	21	19	20	21	18	36	29	24	13	14	17	17	90
8-Feb	12	13	14	19	15	30	30	31	25	11	17	77	24	31	13	38	30	44	37	55	29	25	42	58	77
9-Feb	49	36	49	18	59	33	AF	AF	AF	43	48	37	51	24	16	16	27	20	18	19	18	18	19	15	59
10-Feb	16	16	17	18	17	16	15	17	19	18	19	20	21	18	19	16	17	15	14	16	15	17	15	14	21
11-Feb	16	16	16	15	17	16	16	18	16	17	18	20	19	20	17	18	15	13	13	11	10	21	9	9	21
12-Feb	29	44	50	59	15	14	41	39	12	17	25	24	25	27	44	16	17	19	37	20	29	15	15	16	59
13-Feb	15	13	13	14	14	15	14	15	15	15	16	16	14	16	16	17	14	30	58	37	11	55	35	11	58
14-Feb	41	34	15	16	56	19	29	45	41	28	22	63	71	55	25	24	17	17	18	16	17	15	18	18	71
15-Feb	17	17	17	17	18	18	18	17	17	17	18	19	20	19	21	19	16	23	18	20	18	16	46	64	64
16-Feb	27	29	76	29	38	23	21	24	26	83	26	75	68	51	38	29	28	15	16	19	17	16	17	18	83
17-Feb	18	18	18	19	17	17	18	18	19	17	21	19	18	18	18	16	16	14	17	15	16	18	18	17	21
18-Feb	17	17	16	17	17	15	16	17	18	18	19	17	18	23	68	73	74	22	54	37	19	19	19	18	74
19-Feb	16	21	14	40	21	50	63	59	23	29	30	56	28	24	42	28	28	19	15	15	16	19	17	35	63
20-Feb	59	19	29	39	7	8	10	6	14	16	13	14	15	16	24	20	16	6	12	13	57	AF	21	8	59
21-Feb	30	24	16	12	17	12	17	11	13	17	19	17	20	17	18	16	15	12	20	74	87	63	34	16	87
22-Feb	12	15	22	30	41	27	8	14	18	20	22	26	22	18	21	19	25	62	49	52	52	15	71	69	71
23-Feb	15	26	59	44	31	13	13	23	46	63	60	54	20	53	37	19	21	43	11	27	16	24	19	19	63
24-Feb	14	34	40	21	73	36	24	20	29	19	19	17	16	16	23	21	16	14	10	11	11	13	13	12	73
25-Feb	13	9	9	22	16	21	17	17	22	20	25	22	22	22	26	19	21	16	15	16	16	26	35	33	35
26-Feb	15	13	18	14	14	23	22	25	19	59	66	39	19	45	16	16	18	19	18	18	20	18	18	19	66
27-Feb	18	19	18	19	19	18	18	18	18	20	19	20	20	25	26	39	73	49	31	22	39	18	17	19	73
28-Feb	15	13	22	16	17	13	11	15	18	18	19	19	19	21	19	19	18	15	11	9	14	11	8	24	24
29-Feb	38	13	7	12	10	8	13	8	11	16	18	17	18	20	24	19	15	17	13	22	16	34	20	16	38
																	Diurnal Maximum								
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
CNRL Horizon - February 2016





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 10, 2016	Last Calibration	January 11, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:52	End Time (MST)	16:34
Gas Cert Reference	S0002486	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	855	855
Calculated slope	0.999001	1.001651	Chamber temp	45.0	45.0
Calculated intercept	0.432818	0.023638	Pressure	710.6	716.7
Analyzer Background	18.1	18.3	Flow	0.431	0.432
Analyzer Coefficient	0.978	0.990	Intensity	90	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	0.1	----
as found span	5000	81.5	815.0	796.4	1.023
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	81.5	815.0	813.7	1.002
second point	5000	40.6	406.0	405.6	1.001
third point	5000	20.2	202.0	200.8	1.006
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	81.5	815.0	812.0	1.004
Average Correction Factor					1.003

Corrected As found 796.3 Previous response 815.4 % change 2.4%

Notes:

Sample inlet filter replaced after as founds. Performed preventative maintenance on NOx while calibrating SO2 as well; hence multiple spans and zeros points seen on the graph. Adjusted span. As lefts began at 15:55 MST.

Calibration Performed By:

Asad Hidayat



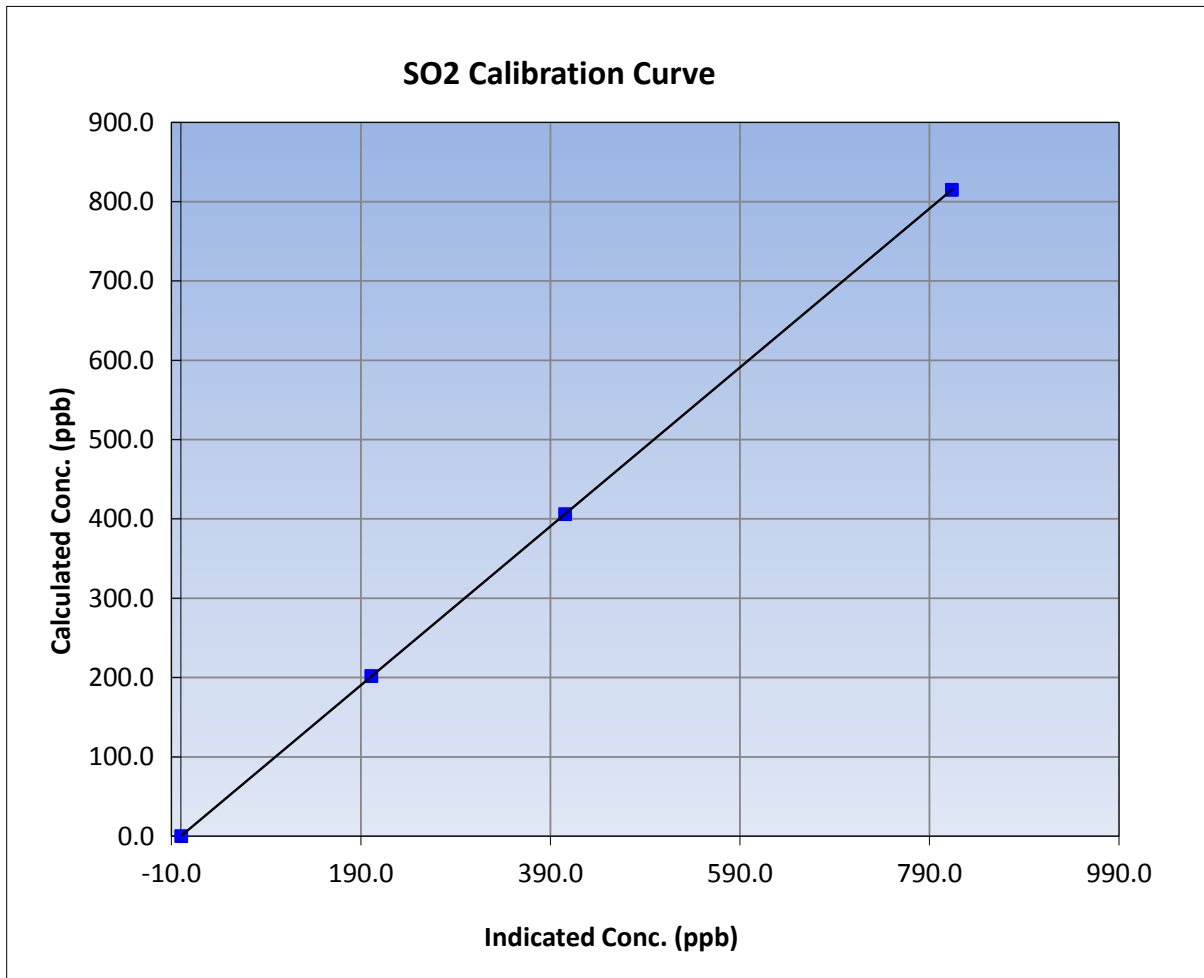
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 11, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:52	End Time (MST)	16:34
Analyzer make	Thermo 43i	Analyzer serial #	710321322

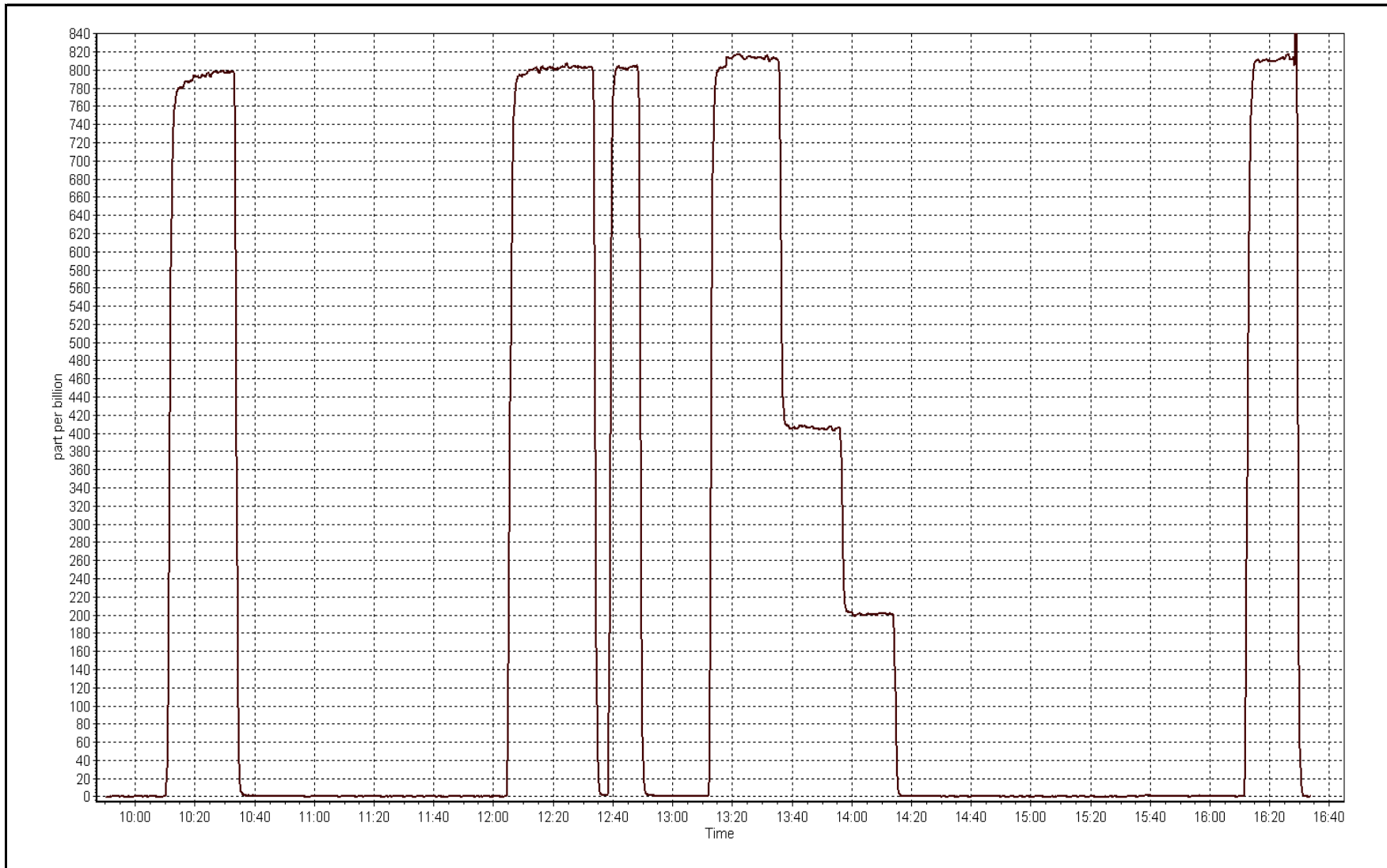
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999997
815.0	813.7	1.0016		
406.0	405.6	1.0011	Slope	1.001651
202.0	200.8	1.0058		
			Intercept	0.023638



SO2 Calibration Plot

Date: February 10, 2016





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	February 8, 2016	Last Calibration	January 27, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	13:43	End Time (MST)	16:50
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-694	-694
Analyzer IP address	192.168.1.44		Lamp voltage	995	988
Calculated slope	0.998575	0.993795	Chamber temp	45	45
Calculated intercept	-0.139361	0.084340	Pressure	681.7	690.5
Analyzer Background	1.44	1.47	Flow	0.428	0.437
Analyzer Coefficient	1.049	1.076	Intensity	90	91
			Converter temp.	800	809
Analyzer make/model	Thermo 43i TLE		Analyzer serial #	1150840012	
Converter make/model	CDN-101		Converter serial #	461	

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	41.4	79.5	76.0	1.046
SO2 scrubber check	5000	19.8	198.0	1.0	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	41.4	79.5	80.0	0.994
second point	5000	20.6	39.6	39.6	0.999
third point	5000	10.2	19.6	19.5	1.006
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	41.4	79.5	80.1	0.992
Average Correction Factor					1.000

Corrected As found	76.0	Previous response	79.7	% change	5.0%
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Notes:

Inlet filter replaced and scrubber check done after as founds. Sample pump changed after as founds as well for preventative maintenance. Adjusted span.

Calibration Performed By:

Asad Hidayat



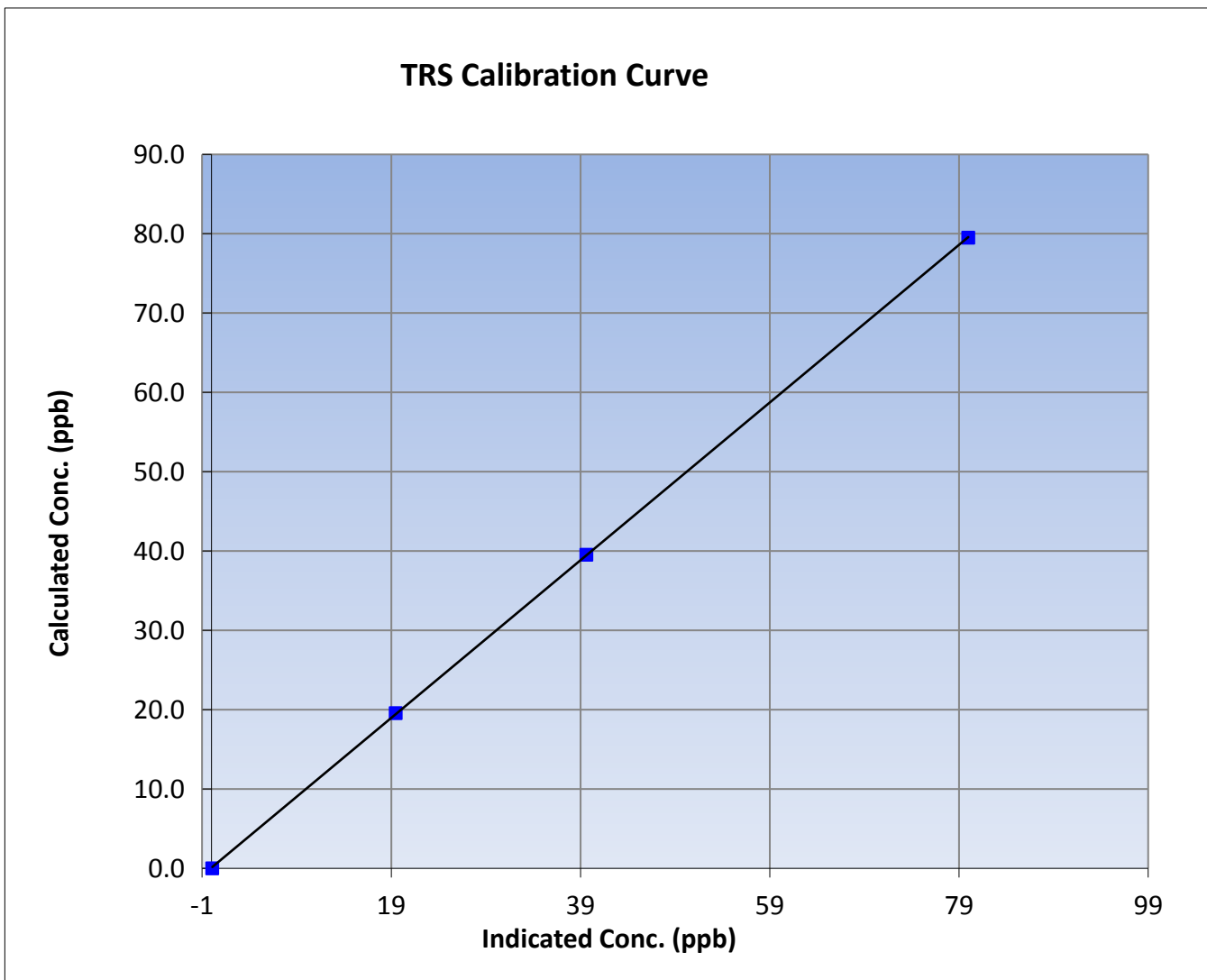
Wood Buffalo Environmental Association TRS Calibration Report

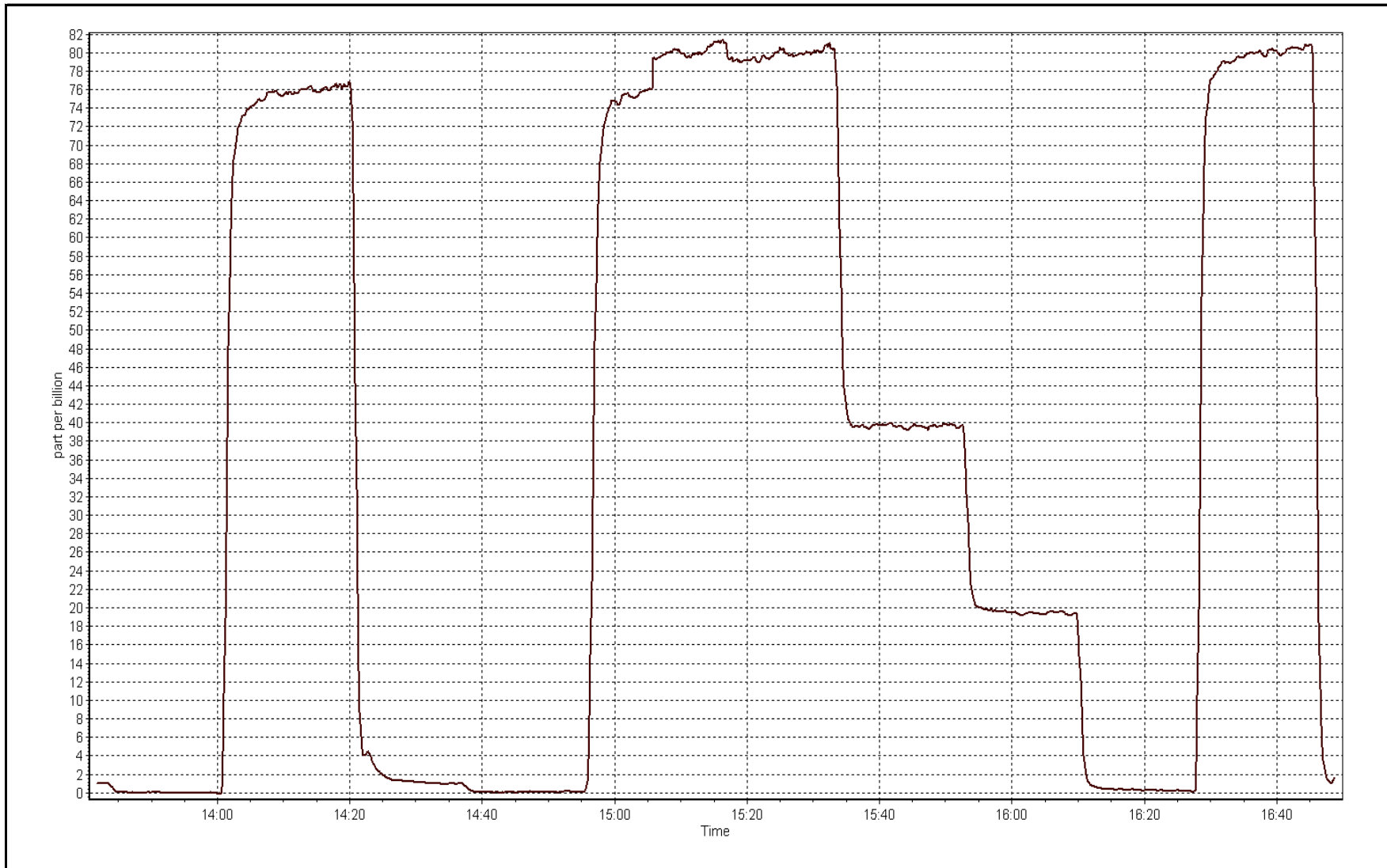
Station Information

Calibration Date	February 8, 2016	Previous Calibration	January 27, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	13:43	End Time (MST)	16:50
Analyzer make	Thermo 43i TLE	Analyzer serial #	1150840012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999978
79.5	80.0	0.9937		
39.6	39.6	0.9985	Slope	0.993795
19.6	19.5	1.0064		
			Intercept	0.084340







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-10-16	Last Calibration	January-11-16
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:52	End Time (MST)	16:32
Gas Cert Reference	S0002486	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1046.8 ppm
C3H8 Cal Gas Conc.	197 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

Analyzer Information

	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	1.002419	1.001544	Fuel Pressure	26.3	26.3
Calculated intercept	-0.032922	-0.058949	Analyzer Coeff	3.0	3.1
			Analyzer BKG	1.790	1.850

Analyzer make Thermo 51i-LT Analyzer serial # 1327059295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.05	----
as found span	5000	81.5	17.06	16.51	1.033
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	81.5	17.06	17.08	0.999
second point	5000	40.6	8.50	8.58	0.991
third point	5000	20.2	4.23	4.27	0.990
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	81.5	17.06	17.16	0.994
Average Correction Factor					0.993

Corrected As found 16.46 Previous response 17.05 % change 3.6%

Notes:

Sample inlet filter replaced after as founds. Performed preventative maintenance on Nox while calibrating THC as well; hence multiple spans and zeros points seen on the graph. Adjusted span. As lefts began at 13:55.

Calibration Performed By:

Asad Hidayat



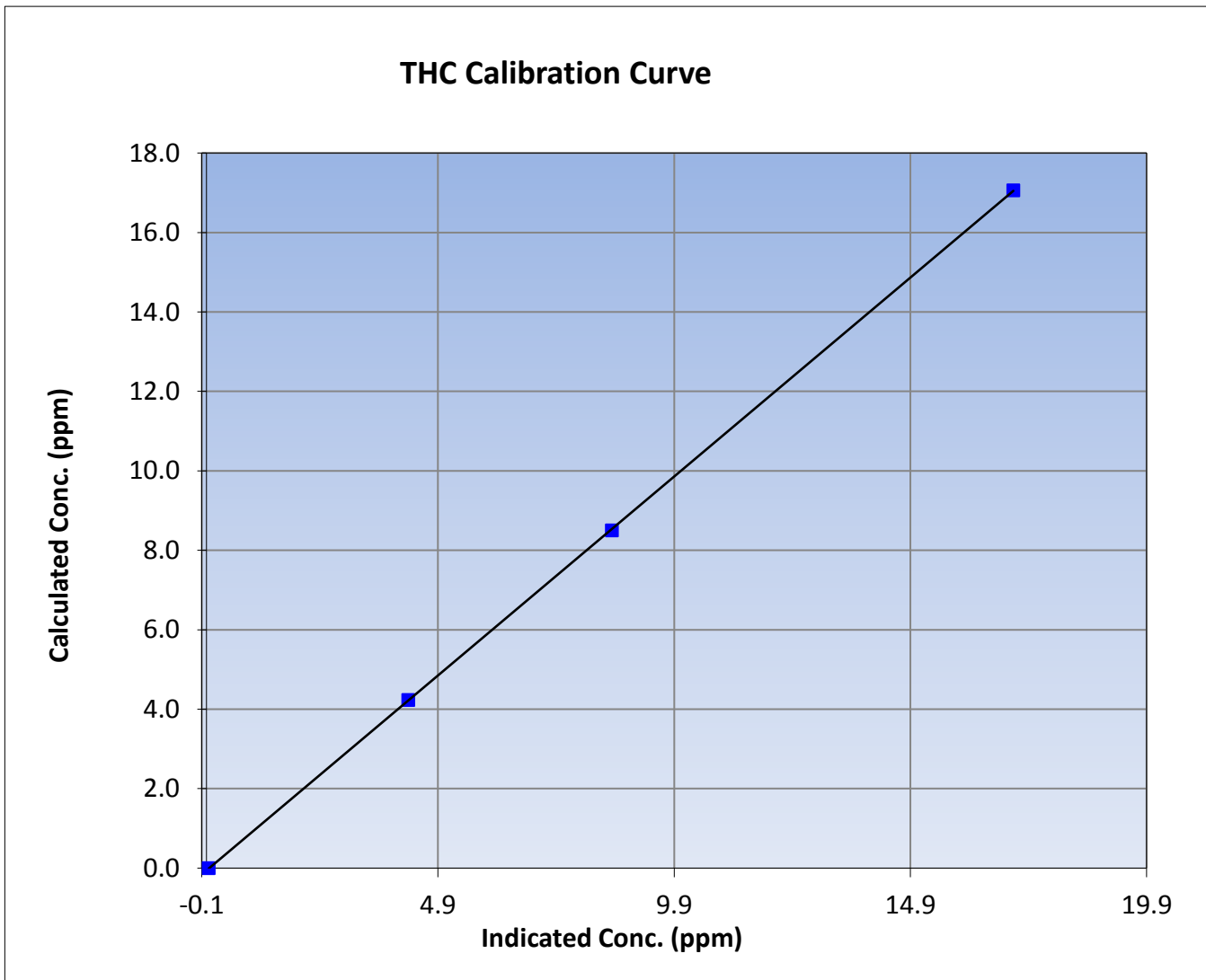
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 11, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:52	End Time (MST)	16:32
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

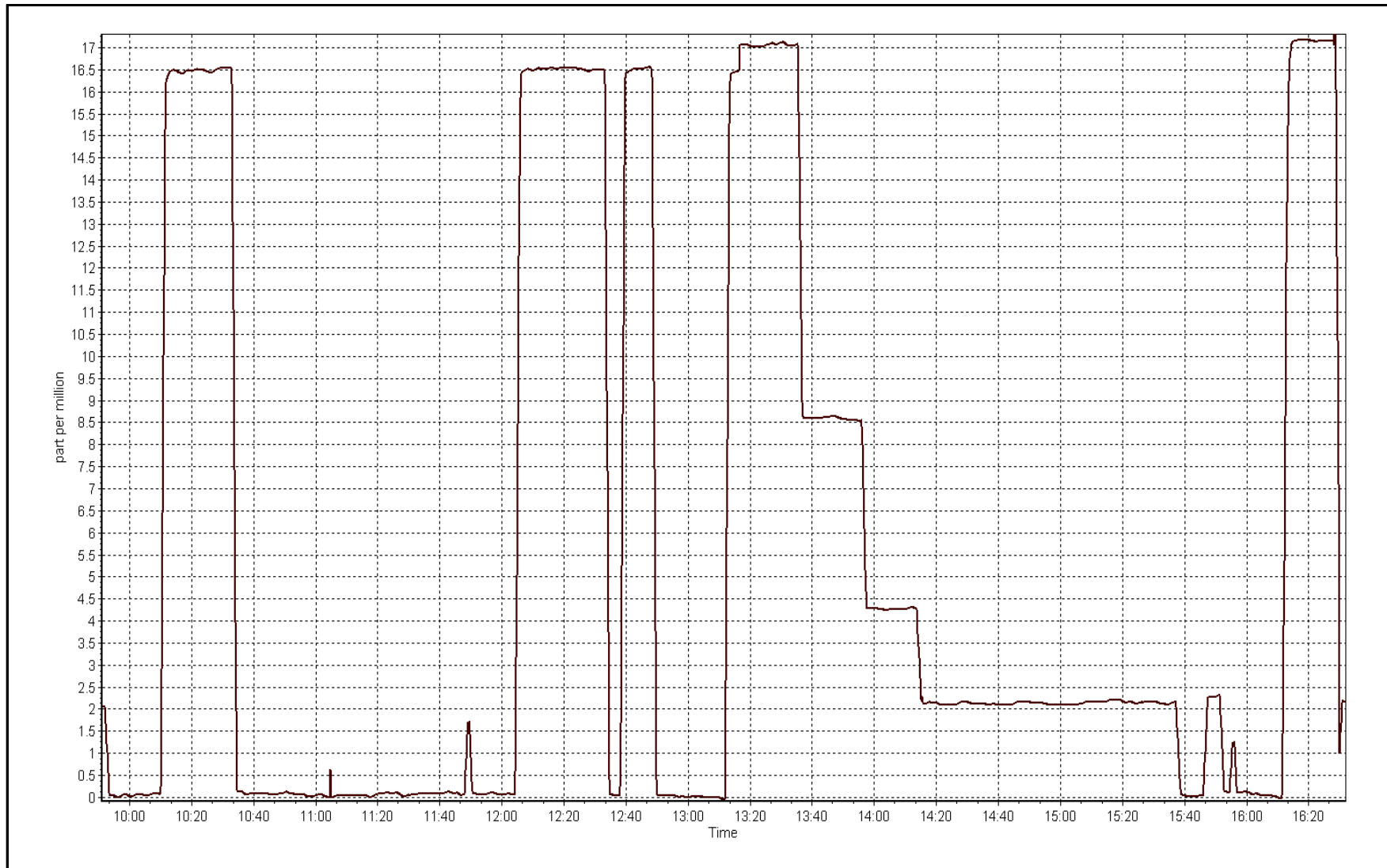
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999990
17.06	17.08	0.9989		
8.50	8.58	0.9906	Slope	1.001544
4.23	4.27	0.9904		
			Intercept	-0.058949



THC Calibration Plot

Date: February 10, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 12, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:52	End Time (MST)	16:33
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002486
NOX Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	26/09/2017
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996965	0.996190	0.997427
	Data Offset	0.461226	0.651581	-0.080548
Current Calibration	Data Slope	0.995237	0.995420	1.001867
	Data Offset	-0.237748	-0.060559	-1.288427

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	1.009		1.010	
NOX coefficient	0.999		1.005	
NO2 coefficient	1.000		1.000	
NO bkgnd	9.7		11.4	
NOX bkgnd	9.8		11.5	
Chamber Temp	49.7	Deg C	50	Deg C
Moly Temp	325.3	Deg C	325.3	Deg C
PMT voltage	-752.6	V	-778.9	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	158.4	mmHg	178.5	mmHg
R Cell Press Nox	158.7	mmHg	179.1	mmHg
NO sample flow	0.680	lpm	0.630	lpm
Nox sample Flow	0.681	lpm	0.632	lpm

Notes:

Inlet filter replaced after as founds. New pump and charcoal cannister was replaced after as founds as well. Adjusted PMT after replacing the pump since the NO respose had dropped. As lefts began at 13:55 MST.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 10, 2016

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	-0.3	-0.3	0.0	----	----
as found span	5000	81.5	797.1	797.1	0.0	789.8	790.3	-0.6	1.0093	1.0085
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
high point	5000	81.5	797.1	797.1	0.0	800.6	800.3	0.3	0.9956	0.9960
second point	5000	40.6	397.1	397.1	0.0	400.6	400.3	0.4	0.9911	0.9920
third point	5000	20.2	197.6	197.6	0.0	198.1	197.9	0.3	0.9973	0.9985
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as left span	5000	81.5	797.1	430.8	366.3	812.8	433.4	379.4	0.9806	0.9940
Average Correction Factor									0.9947	0.9955

Corrected As found
Previous Response

NO_x= 790.0
NO_x= 799.0

NO= 790.6
NO= 799.5

Percent Change

NO_x= 1.1%

NO= 1.1%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 81.50 ccm NOx ref calc conc = 797.1 ppb NO ref calc conc = 797.1 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	808.4	804.2	0.1	0.9859	0.9911	----	----
1st NO2 (300)	430.8	373.4	804.1	430.8	373.3	0.9913	----	1.0004	100.0%
2nd NO2 (200)	550.5	253.8	805.1	550.5	254.7	0.9901	----	0.9963	100.4%
3rd NO2 (100)	672.6	131.6	807.0	672.6	134.4	0.9877	----	0.9791	102.1%
2nd NO ref point		0.0	804.3	800.3	4.0	0.9911	0.9960	----	----
Average Correction Factor						0.9900		0.9919	100.8%

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

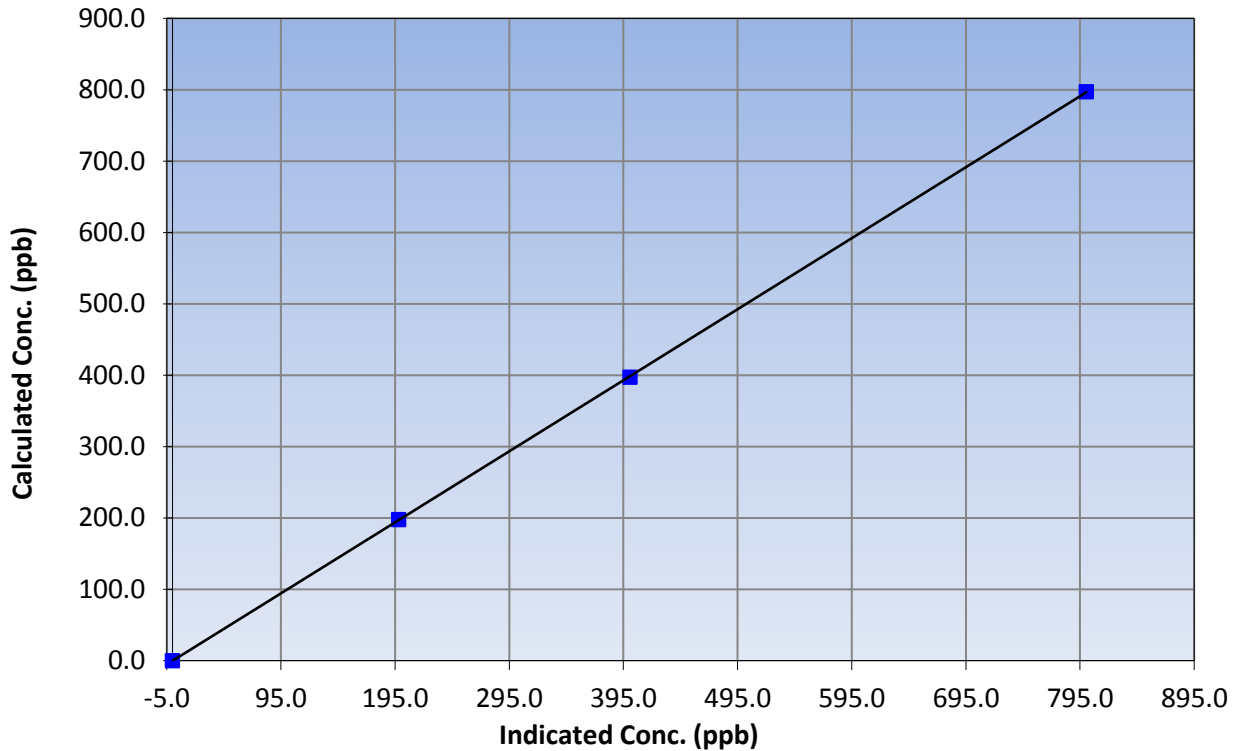
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 12, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:52	End Time (MST)	16:33
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999992
797.1	800.6	0.9956		
397.1	400.6	0.9911	Slope	0.995237
197.6	198.1	0.9973		
			Intercept	-0.237748

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

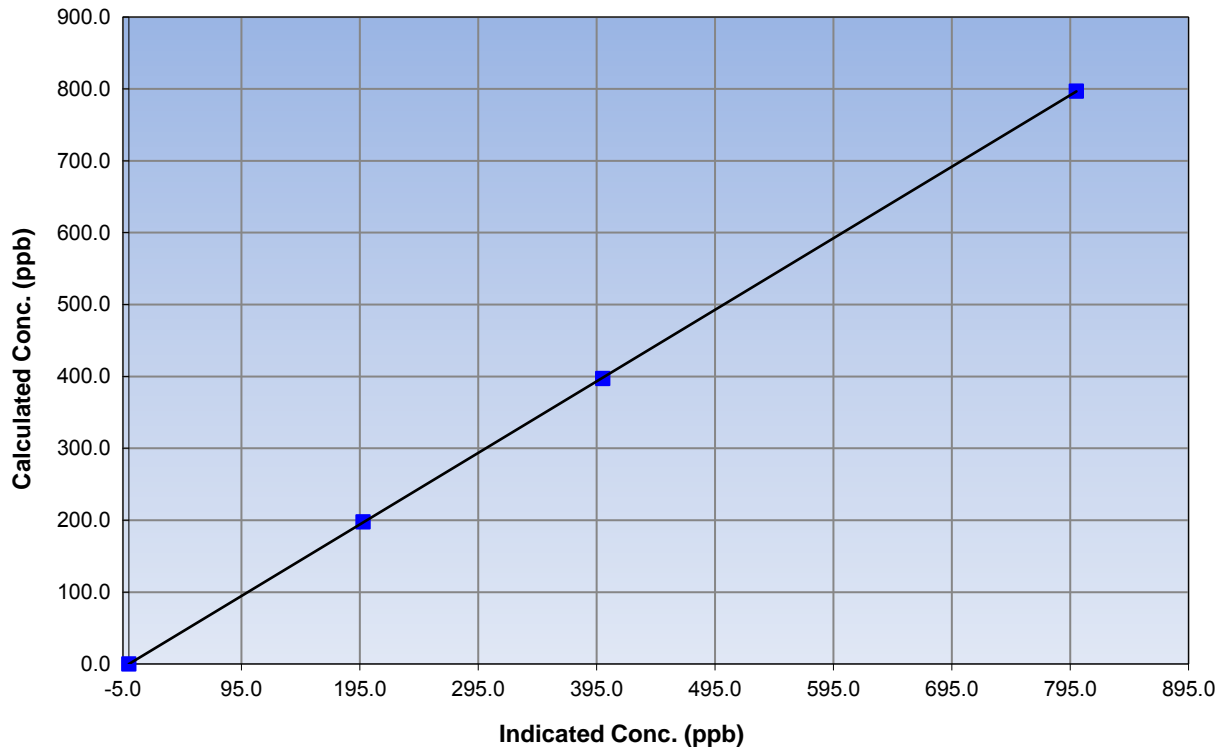
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 12, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:52	End Time (MST)	16:33
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999993
797.1	800.3	0.9960		
397.1	400.3	0.9920	Slope	0.995420
197.6	197.9	0.9985		
			Intercept	-0.060559

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

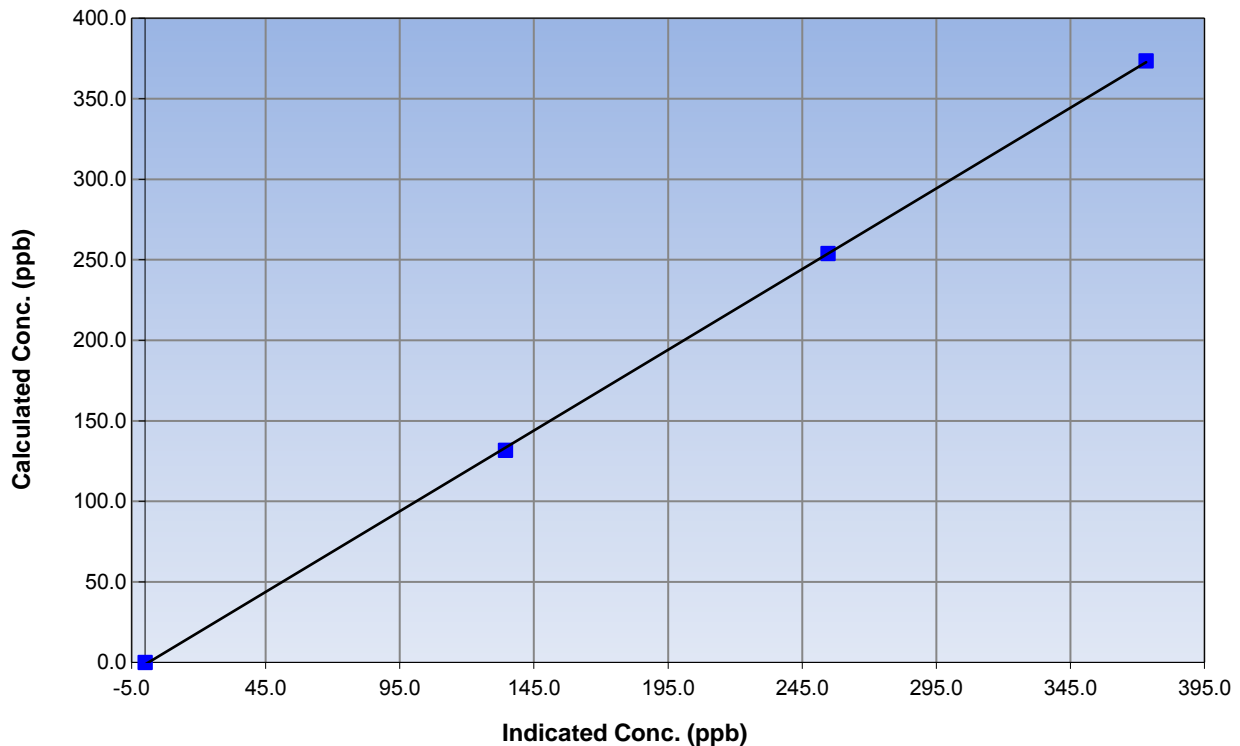
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 12, 2016
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:52	End Time (MST)	16:33
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

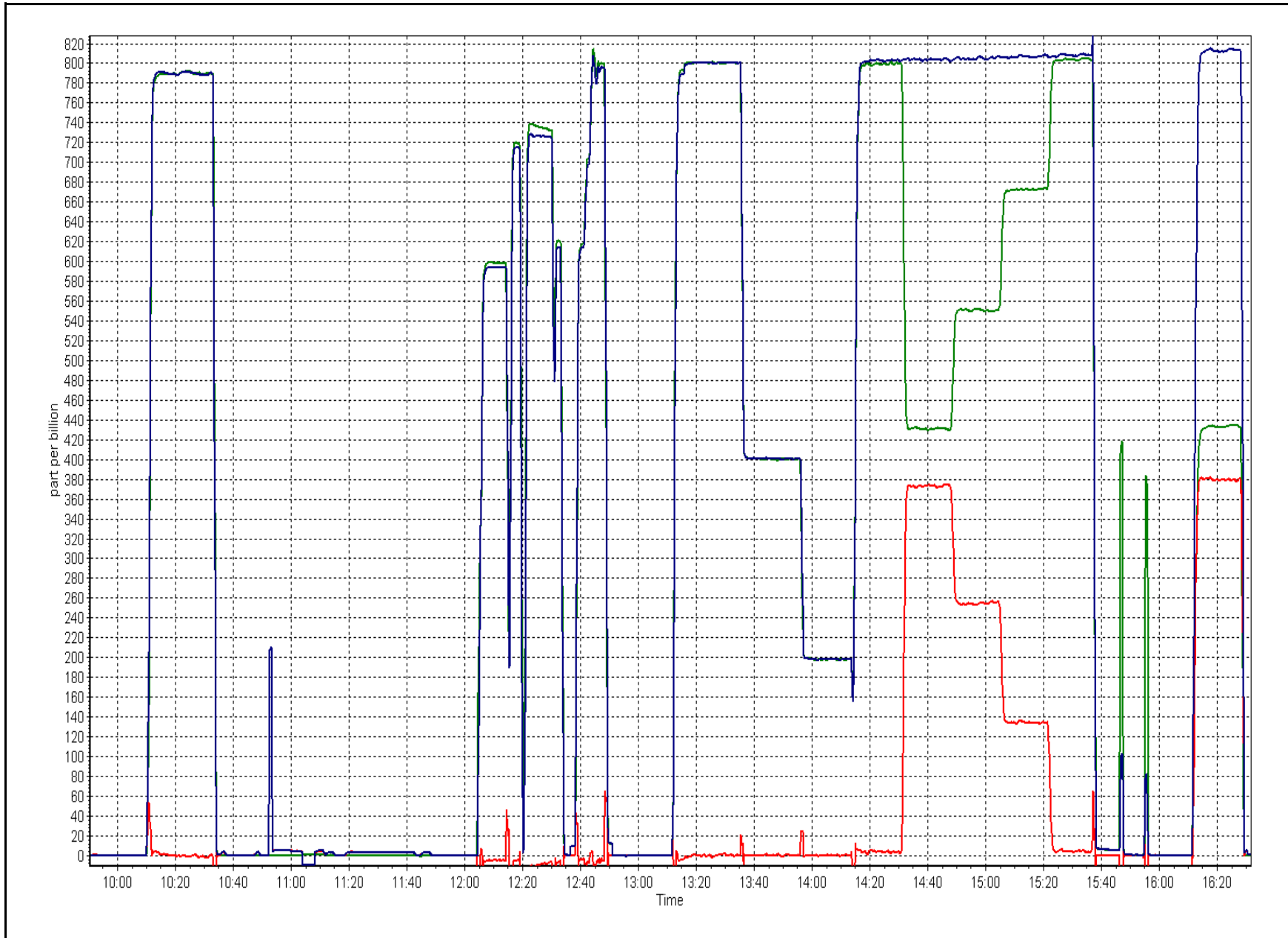
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999934
373.4	373.3	1.0004		
253.8	254.7	0.9963	Slope	1.001867
131.6	134.4	0.9791		
			Intercept	-1.288427

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 10, 2016





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	February 10, 2016	Previous Calibration:	January 13, 2016
Station Name:	CNRL Horizon	Station Number:	AMS 15
Start Time (MST):	14:15	End Time (MST):	15:24
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	E-2020		
C ₁₄ Source SN:	7409		
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input checked="" type="checkbox"/>	T3 <input checked="" type="checkbox"/> T4 <input checked="" type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input checked="" type="checkbox"/> Neph <input checked="" type="checkbox"/>

CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-14.0	-14.8	-0.8	-14.0
T2	16.0	na	na	16.0
T3	18.0	na	na	18.0
T4	13.0	na	na	13.0
RH (%)	13.0	na	na	13.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	989	990.5	1.5	989

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
997	992	-5	992	997

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	166		166
Neph	0.7		0.7
C14	11.7		11.7
Indicated Concentration (ug/m3)	0.3	No	0.3
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	January 13, 2016	Previous Leak Check Date:	August 26, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.61		0.06
*Flow with adaptor (LPM):	16.55		

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	June 22, 2015	Previous Foil Calibration:	NA
Zeroed?:	Yes		
Foil Mass:	1507		Mass foil set S/N: 2022
Previous Correction Factor:	7091		
New Correction Factor:	7029		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	10/02/2016
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	Good	NA
HEPA filter	Good	09/06/2014

NOTES:

No adjustments. Cleaned cyclone head.

Calibration Performed By:	Asad Hidayat
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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 16
SHELL MUSKEG RIVER
FEBRUARY 2016

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 FEBRUARY 2016

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	663	33	33	100.00	35	0	9	0
THC (ppm) Average	663	33	33	100.00	6.9	-	4	-
NO2 (ppb) Average	661	35	35	100.00	66	0	33	-
NO (ppb) Average	661	35	35	100.00	351	-	114	-
NOX (ppb) Average	661	35	35	100.00	417	-	147	-
PM2.5 (ug/m3) Average	695	1	1	100.00	35.4	-	15.9	0
Temperature 2 m (C) Average	696	0	0	100.00	8.7	-	0.6	-
Relative Humidity (%) Average	696	0	0	100.00	97	-	92	-
Barometric Pressure (inHg) Average	696	0	0	100.00	29.5	-	29.4	-
Wind Speed 10 m (km/h) Average	695	0	1	99.86	29	-	18	-
Wind Direction 10 m (deg) Average	695	0	1	99.86	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	663	1.4	3	-	0	0	0	0	1	3	35
THC (ppm) Average	663	2.61	0.6	-	2	2.2	2.3	2.4	2.7	3.2	6.9
NO2 (ppb) Average	661	13.9	11	-	0	2	6	11	19	29	66
NO (ppb) Average	661	17.3	38	-	0	0	1	5	15	38	351
NOX (ppb) Average	661	31.2	47	-	0	3	8	17	32	65	417
PM2.5 (ug/m3) Average	695	5.23	4.7	-	0	1.3	2.1	3.8	7	10.5	35.4
Temperature 2 m (C) Average	696	-12.19	7.3	-	-37.2	-19.7	-16.2	-12.7	-7.3	-2.9	8.7
Relative Humidity (%) Average	696	79.8	11	-	38	65	75	82	87	92	97
Barometric Pressure (inHg) Average	696	28.91	0.3	-	28.1	28.6	28.7	28.9	29.1	29.2	29.5
Wind Speed 10 m (km/h) Average	695	8.8	6	-	0	3	4	7	13	17	29
Wind Direction 10 m (deg) Average	695	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	12 Feb 2016 09:00	12 Feb 2016 09:00	1	Flat line in sensor output signal -sensor frozen

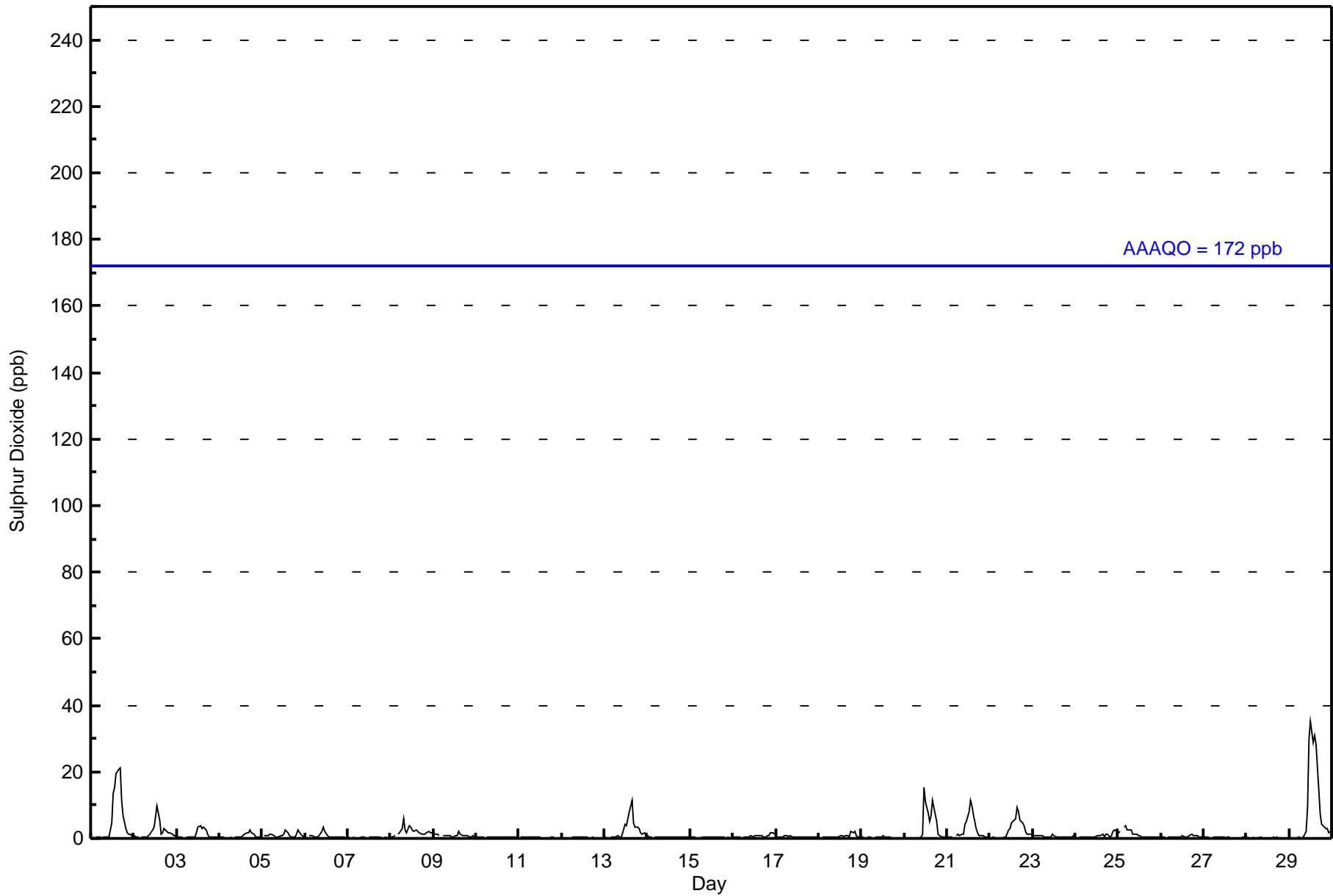


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 35 ppb on Feb 29 13:00 Maximum Daily Average: 8.9 ppb on Feb 29														Hours in Service: 696 Hours of Data: 663 Hours of Missing Data: 33 Hours of Calibration: 33 Percent Operational Time: 100.0												
Minimum Value: 0 ppb on Feb 28 20:00 Minimum Daily Average: 0.2 ppb on Feb 28 Maximum Diurnal Average: 3.6 ppb at hour 16 Minimum Diurnal Average: 0.4 ppb at hour 1 Monthly Average: 1.4 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 21																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	5	14	15	19	21	21	12	7	3	2	1	1	1	5.4	21
2-Feb	1	1	0	Z	0	0	0	1	1	1	2	4	6	10	6	1	2	3	2	2	2	1	1	1	2.1	10
3-Feb	1	0	0	0	Z	0	0	0	0	0	0	2	3	4	3	3	2	1	1	0	0	0	0	1.1	4	
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	2	2	3	2	1	1	1	0	0.7	3	
5-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	0	1	3	1	1	1.0	3	
6-Feb	0	Z	1	1	1	0	0	0	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0.7	3	
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	0.2	0	
8-Feb	0	1	1	Z	1	2	3	6	3	2	4	3	2	2	3	2	2	1	1	1	2	2	2	2.0	6	
9-Feb	1	1	1	1	Z	1	1	1	1	1	0	0	1	1	2	1	1	1	1	1	0	0	1	0.9	2	
10-Feb	1	1	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
11-Feb	Z	0	0	0	0	0	0	0	0	1	0	0	0	C	C	C	C	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	0.2	0	
13-Feb	0	0	Z	0	0	0	1	1	0	0	1	4	4	6	8	12	5	3	3	3	2	1	2	2.5	12	
14-Feb	1	1	0	Z	1	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	Z	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	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	2	2	0.7	2	
17-Feb	Z	1	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1	
18-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	2	2	2	1	1	0.7	2	
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
20-Feb	0	0	0	Z	0	0	0	0	0	0	1	15	11	7	5	7	11	7	5	1	1	1	0	3.3	15	
21-Feb	0	0	0	0	Z	1	1	1	1	1	4	5	8	12	10	7	3	2	1	1	1	0	0	2.7	12	
22-Feb	0	0	0	0	0	Z	0	0	0	0	2	3	5	5	6	9	8	6	5	4	2	1	1	2.7	9	
23-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0.6	1	
24-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	2	2	2	0.8	2	
25-Feb	2	2	Z	3	4	3	3	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1.2	4	
26-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	0	0	0.5	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	0.3	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	0.2	0	
29-Feb	Z	0	0	0	0	0	0	0	0	2	9	30	35	29	31	28	14	7	4	4	3	3	2	8.9	35	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerspan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	646	97.44	97.44
11 - 20	10	1.51	98.94
21 - 60	7	1.06	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: 663

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - February 2016

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	79	115	46	13	14	12	42	121	71	35	16	16	13	10	15	645
11 - 20	0	0	0	0	0	0	0	0	2	5	3	0	0	0	0	0	10
21 - 60	0	0	0	0	0	0	0	0	0	1	4	2	0	0	0	0	7
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	79	115	46	13	14	12	42	123	77	42	18	16	13	10	15	662

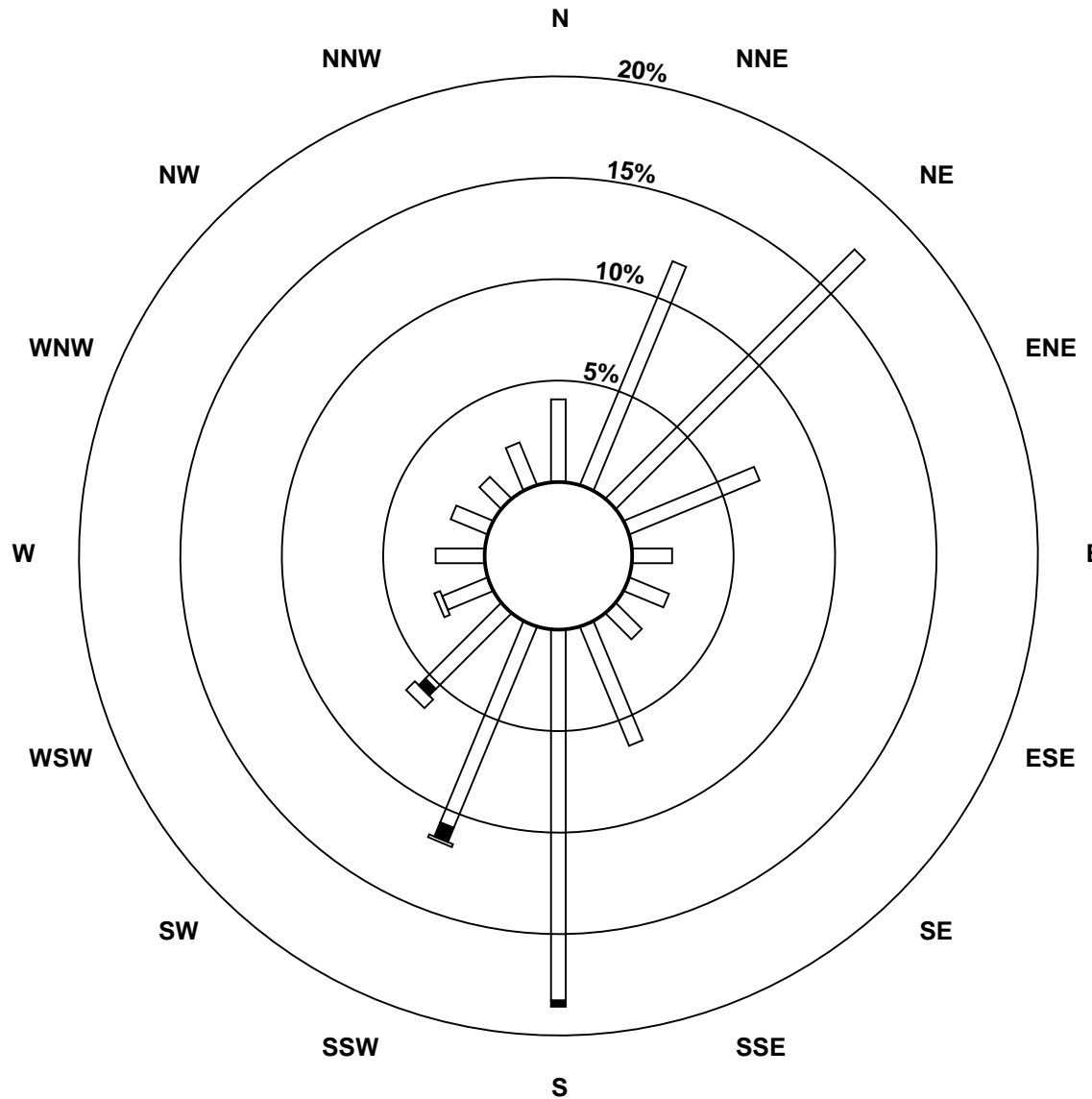
Total Number of Valid Hours: 662

Total Number of Hours: 696

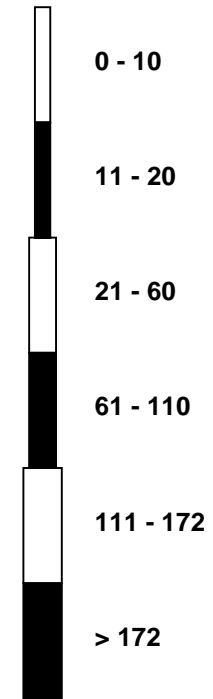


Wood Buffalo Environmental Association
Wind Rose Feb 2016

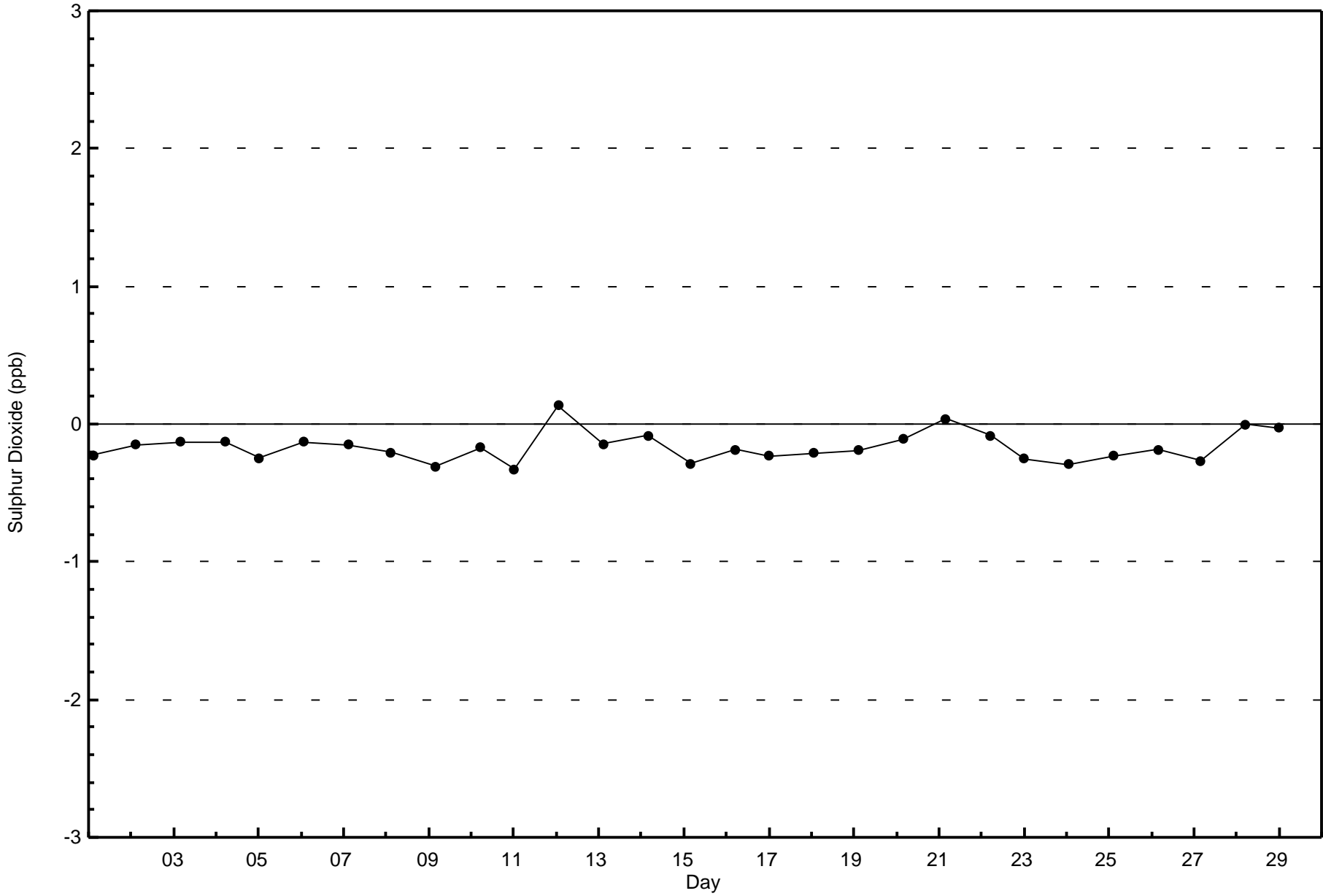
Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)

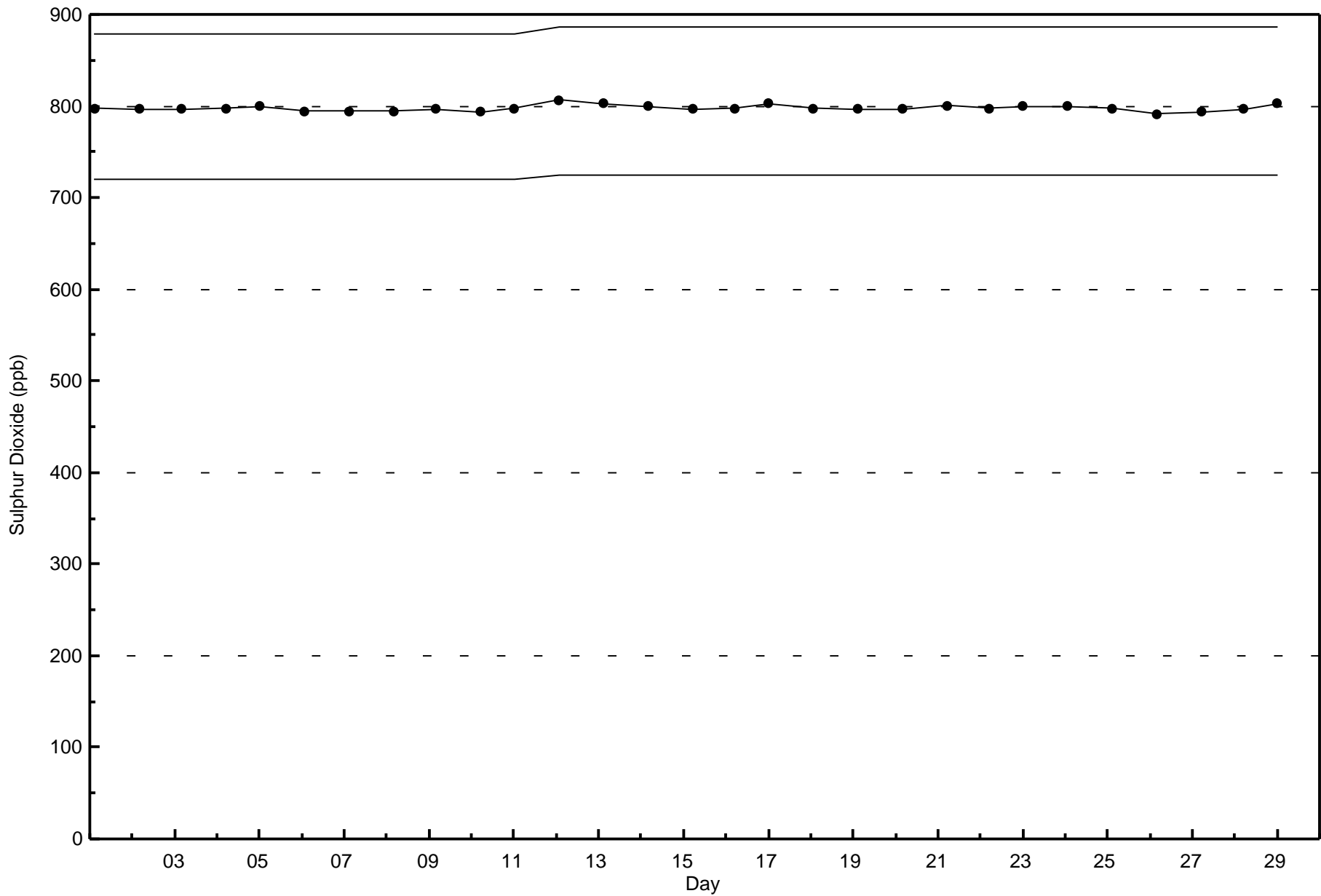


Classes (ppb)



Total Number of Valid Hours: 662





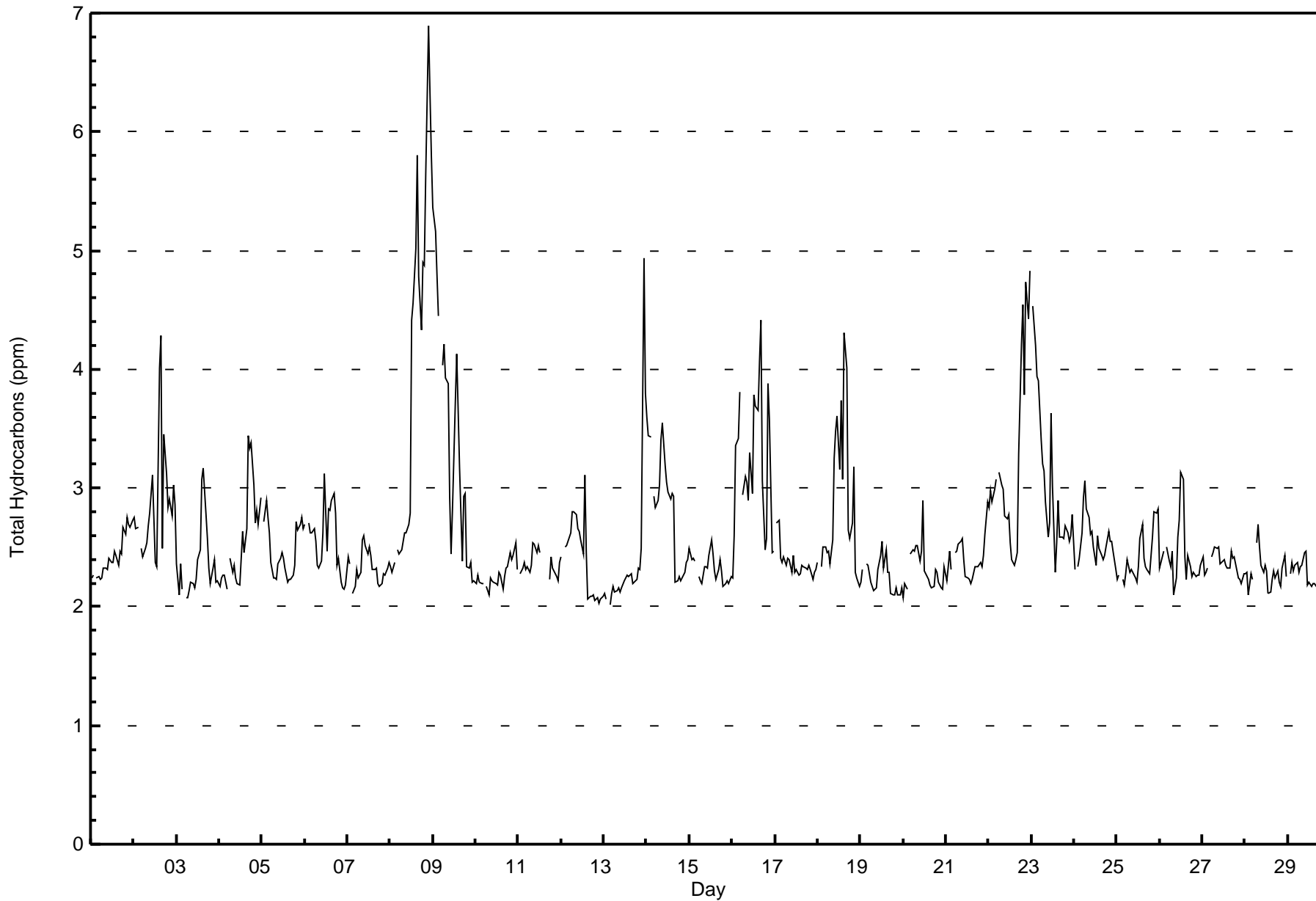


Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm Shell Muskeg River - February 2016

Maximum Value: 6.9 ppm on Feb 8 22:00		Maximum Daily Average: 4.0 ppm on Feb 8		Hours in Service: 696																						
Minimum Value: 2.0 ppm on Feb 13 04:00		Minimum Daily Average: 2.2 ppm on Feb 19		Hours of Data: 663																						
Maximum Diurnal Average: 2.8 ppm at hour 16		Minimum Diurnal Average: 2.5 ppm at hour 10		Hours of Missing Data: 33																						
Monthly Average: 2.61 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.3 Median = 2.4 Q ₃ = 2.7 P ₉₀ = 3.2 P ₉₉ = 5.1		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	2.2	2.3	Z	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.4	2.3	2.5	2.4	2.7	2.6	2.7	2.7	2.7	2.7	2.4	2.7
2-Feb	2.8	2.7	2.7	Z	2.5	2.4	2.5	2.5	2.7	2.8	3.1	2.7	2.4	2.3	4.0	4.3	2.5	3.4	3.1	2.8	2.9	2.8	3.0	2.9	2.9	4.3
3-Feb	2.4	2.1	2.4	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.5	3.1	3.2	2.8	2.6	2.3	2.2	2.3	2.4	2.2	2.2	2.4	3.2
4-Feb	2.2	2.2	2.3	2.3	2.2	Z	2.4	2.3	2.4	2.2	2.2	2.2	2.4	2.6	2.5	2.7	3.4	3.3	3.4	3.0	2.7	2.8	2.7	2.9	2.6	3.4
5-Feb	Z	2.7	2.9	2.8	2.6	2.4	2.2	2.2	2.2	2.4	2.4	2.5	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.7	2.6	2.7	2.8	2.7	2.5	2.9
6-Feb	2.7	Z	2.7	2.6	2.6	2.7	2.5	2.3	2.3	2.4	2.6	3.1	2.5	2.8	2.8	2.9	3.0	2.8	2.3	2.4	2.2	2.2	2.1	2.2	2.6	3.1
7-Feb	2.4	2.4	Z	2.1	2.2	2.3	2.2	2.3	2.6	2.6	2.5	2.4	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.6
8-Feb	2.3	2.3	2.4	Z	2.5	2.4	2.5	2.6	2.6	2.6	2.7	2.8	4.4	4.6	5.0	5.8	4.8	4.3	4.9	4.9	5.6	6.9	6.3	5.8	4.0	6.9
9-Feb	5.4	5.2	4.8	4.5	Z	4.0	4.2	3.9	3.9	2.9	2.4	2.8	3.7	4.1	3.7	3.2	2.4	2.9	2.9	2.3	2.3	2.4	2.2	2.2	3.4	5.4
10-Feb	2.2	2.3	2.2	2.2	2.2	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.1	2.3	2.3	2.3	2.5	2.4	2.4	2.5	2.3	2.3	2.5
11-Feb	Z	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.5	2.5	2.5	2.5	2.5	C	C	C	C	2.2	2.4	2.3	2.3	2.3	2.2	2.4	2.4	2.5
12-Feb	2.4	Z	2.5	2.5	2.6	2.6	2.8	2.8	2.8	2.7	2.6	2.6	2.4	3.1	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.4	3.1
13-Feb	2.1	2.1	Z	2.0	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.5	4.9	3.8	2.4	4.9
14-Feb	3.6	3.4	3.4	Z	2.9	2.8	2.9	3.0	3.4	3.5	3.2	3.0	3.0	2.9	3.0	2.9	2.2	2.2	2.3	2.2	2.3	2.4	2.4	2.4	2.8	3.6
15-Feb	2.5	2.4	2.4	2.4	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.6	2.4	2.3	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.6
16-Feb	2.2	2.6	3.4	3.4	3.8	Z	2.9	3.1	3.1	2.9	3.3	3.0	3.8	3.7	3.7	4.1	4.4	3.1	2.5	2.6	3.9	3.6	2.5	2.5	3.2	4.4
17-Feb	Z	2.7	2.7	2.4	2.4	2.4	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.3	2.3	2.4	2.7
18-Feb	2.4	Z	2.3	2.5	2.5	2.5	2.5	2.4	2.6	3.3	3.5	3.6	3.2	3.7	3.1	4.3	4.0	2.6	2.6	2.7	3.2	2.3	2.2	2.2	2.9	4.3
19-Feb	2.2	2.3	Z	2.4	2.3	2.3	2.2	2.1	2.1	2.2	2.3	2.4	2.5	2.3	2.5	2.3	2.3	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.5
20-Feb	2.1	2.2	2.2	Z	2.4	2.5	2.5	2.5	2.5	2.4	2.5	2.9	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.3	2.3	2.9
21-Feb	2.2	2.3	2.5	2.3	Z	2.5	2.5	2.5	2.6	2.6	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.4	2.6	2.9	2.4	2.9
22-Feb	2.8	3.0	2.9	3.0	3.1	Z	3.1	3.0	3.0	2.8	2.7	2.8	2.5	2.4	2.3	2.4	2.5	3.3	4.2	4.5	3.8	4.7	4.4	4.8	3.2	4.8
23-Feb	Z	4.5	4.2	3.9	3.9	3.4	3.2	3.1	2.9	2.6	2.7	3.6	3.0	2.3	2.5	2.9	2.6	2.6	2.6	2.7	2.6	2.5	2.6	2.8	3.0	4.5
24-Feb	2.3	Z	2.3	2.4	2.6	2.9	3.1	2.8	2.8	2.6	2.6	2.5	2.3	2.6	2.5	2.4	2.4	2.4	2.5	2.6	2.5	2.5	2.5	2.3	2.6	3.1
25-Feb	2.2	2.3	Z	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.6	2.7	2.4	2.3	2.3	2.3	2.4	2.6	2.8	2.8	2.8	2.4	2.8
26-Feb	2.3	2.4	2.5	Z	2.5	2.4	2.3	2.5	2.1	2.2	2.6	2.7	3.1	3.1	2.4	2.2	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	3.1
27-Feb	2.4	2.3	2.3	2.3	Z	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.3	2.4	2.5
28-Feb	2.3	2.3	2.1	2.3	2.2	Z	2.5	2.7	2.5	2.3	2.3	2.3	2.3	2.3	2.1	2.1	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.4	2.3	2.7
29-Feb	Z	2.3	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.5	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	2.5
																								Diurnal Average		
																								Diurnal Maximum		
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerspan C - Calibration																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.30	0.30
2.1 - 3.0	574	86.58	86.88
3.1 - 10.0	87	13.12	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River - February 2016**

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	2	0	0	0	0	0	0	0	0	2
2.1 - 3.0	18	70	109	43	13	10	8	33	111	72	39	14	13	12	6	2	573
3.1 - 10.0	9	9	6	3	0	4	4	7	12	5	3	4	3	1	4	13	87
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	79	115	46	13	14	12	42	123	77	42	18	16	13	10	15	662

Total Number of Valid Hours: 662

Total Number of Hours: 696

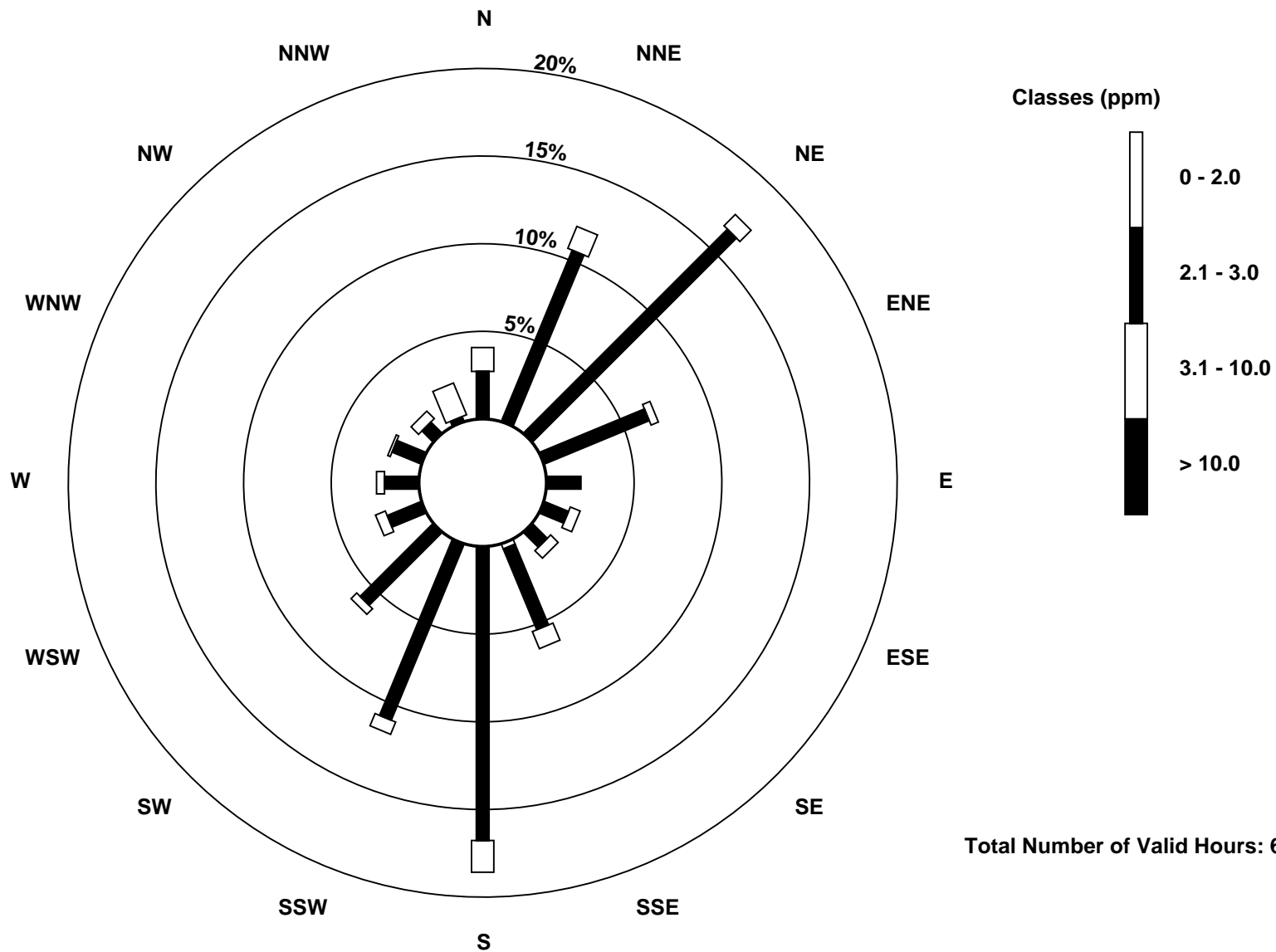


Wood Buffalo Environmental Association

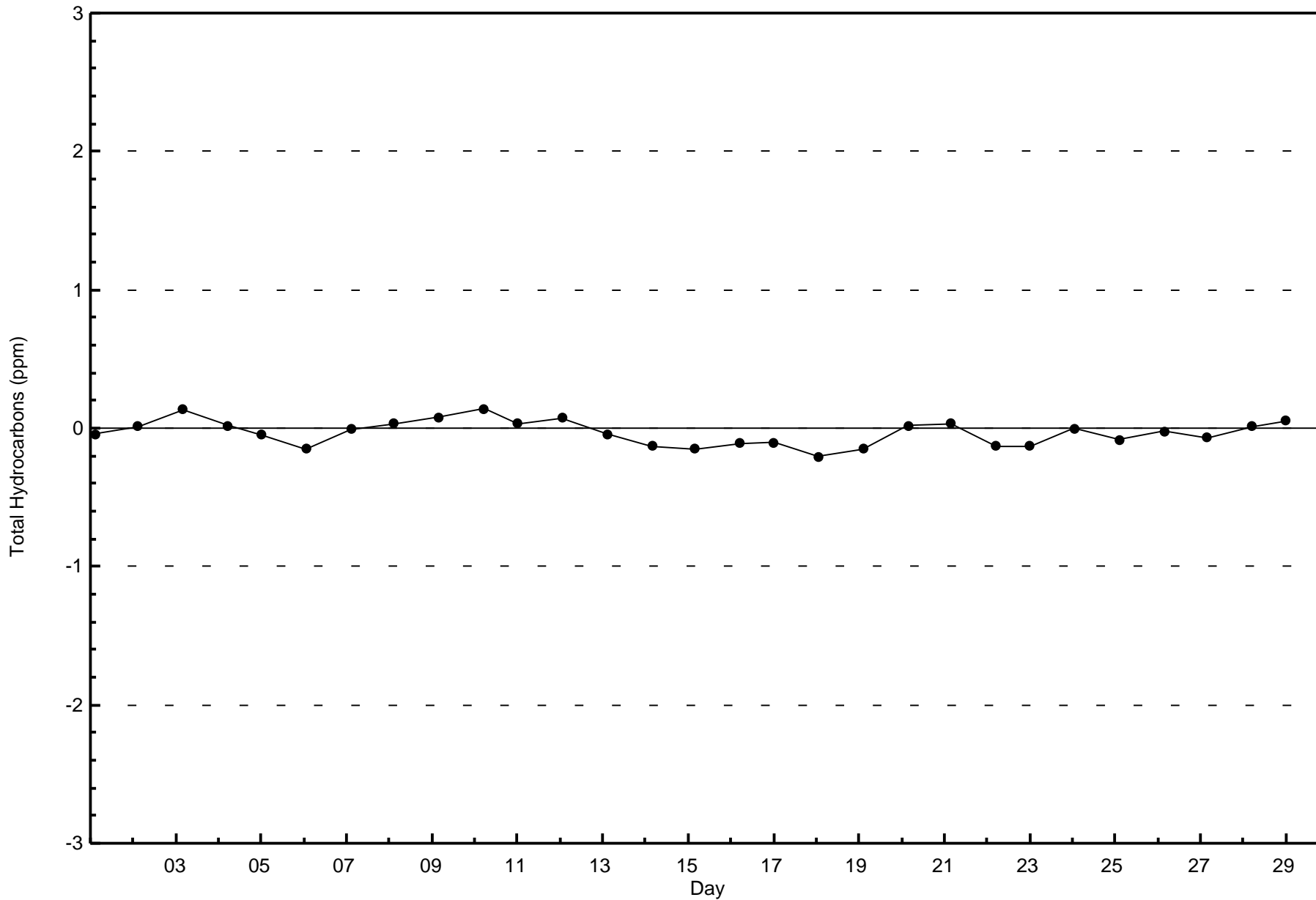
Wind Rose Feb 2016

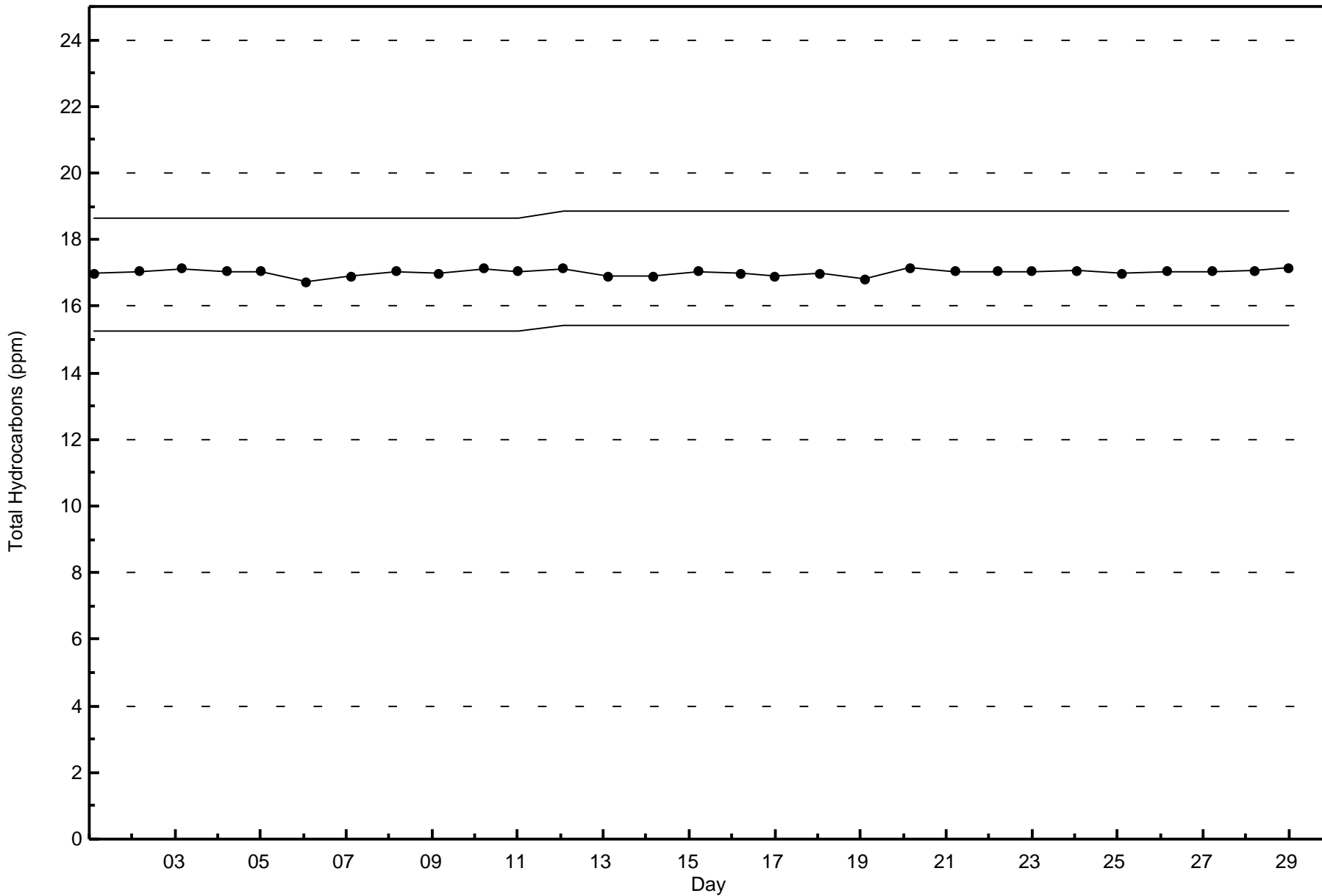
Total Hydrocarbons (THC) - ppm

Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 662





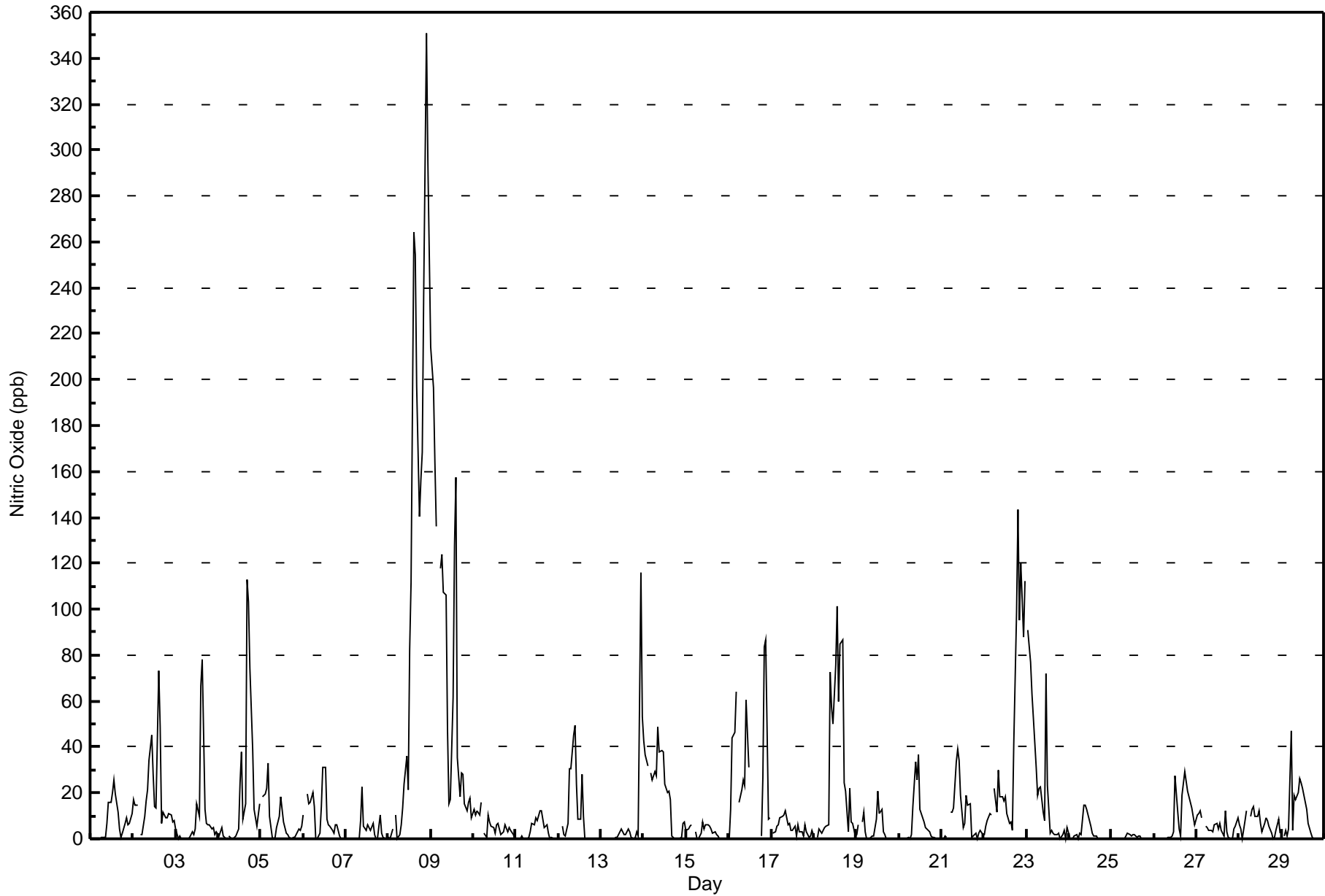


Maximum Value: 351 ppb on Feb 8 22:00		Maximum Daily Average: 114.3 ppb on Feb 8		Hours in Service: 696																							
Minimum Value: 0 ppb on Feb 11 22:00		Minimum Daily Average: 0.6 ppb on Feb 25		Hours of Data: 661																							
Maximum Diurnal Average: 28.5 ppb at hour 15		Minimum Diurnal Average: 10.8 ppb at hour 8		Hours of Missing Data: 35																							
Monthly Average: 17.3 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 5 Q ₃ = 15 P ₉₀ = 38 P ₉₉ = 212		Hours of Calibration: 35																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	0	Z	0	0	0	0	0	1	7	16	16	20	26	20	11	4	1	3	7	9	6	7	11	7.1	26	
2-Feb	17	14	15	Z	2	2	10	16	22	34	45	28	14	13	73	49	7	11	9	9	11	10	8	8	18.6	73	
3-Feb	4	0	1	0	Z	0	0	0	1	3	2	4	15	10	67	78	13	7	6	6	5	5	2	3	10.0	78	
4-Feb	1	3	5	1	0	Z	1	0	0	0	1	4	24	38	9	15	113	103	74	39	13	9	6	15	20.7	113	
5-Feb	Z	19	20	22	33	10	1	0	1	5	10	18	13	7	2	2	0	0	0	1	2	4	4	6	7.7	33	
6-Feb	11	Z	20	15	16	20	14	0	0	2	14	31	31	9	6	6	4	3	6	6	1	0	0	0	9.3	31	
7-Feb	0	0	Z	0	0	0	0	0	8	23	6	4	6	5	3	6	2	0	0	11	2	0	0	0	3.4	23	
8-Feb	1	0	4	Z	11	0	2	6	14	24	36	22	82	111	264	255	197	140	156	168	237	351	295	254	114.3	351	
9-Feb	214	197	164	136	Z	118	124	107	106	47	15	17	62	128	157	35	18	28	28	15	12	16	17	9	77.1	214	
10-Feb	13	11	12	10	16	Z	2	1	10	7	6	5	2	6	7	2	2	3	6	3	5	4	2	0	5.9	16	
11-Feb	Z	0	0	1	0	0	0	0	3	6	6	9	8	12	12	9	5	6	2	0	0	0	0	0	3.5	12	
12-Feb	0	Z	5	2	1	7	30	30	45	50	24	9	8	28	10	0	0	0	0	0	0	0	0	0	10.8	50	
13-Feb	0	0	Z	0	0	0	0	0	1	0	2	4	3	2	2	4	3	0	0	0	3	1	116	53	8.5	116	
14-Feb	43	37	32	Z	29	26	29	28	49	38	39	38	24	20	21	17	1	0	0	0	0	1	7	7	21.0	49	
15-Feb	3	4	6	6	Z	3	0	0	2	7	4	6	6	6	4	3	3	2	1	0	0	0	0	0	2.9	7	
16-Feb	0	13	44	47	64	Z	16	21	26	23	60	31	C	C	C	C	C	C	1	27	83	86	8	9	--	86	
17-Feb	Z	2	3	5	6	9	10	11	12	6	7	4	4	5	1	6	3	3	1	6	3	0	1	3	4.9	12	
18-Feb	2	Z	1	4	2	4	5	5	6	72	57	50	76	101	60	85	87	24	21	3	22	7	6	1	30.5	101	
19-Feb	2	6	Z	7	12	3	0	0	0	2	1	9	20	11	13	3	2	0	0	0	0	0	0	0	3.9	20	
20-Feb	0	0	0	Z	0	0	0	2	14	34	26	36	13	9	7	5	4	3	1	1	1	0	0	0	6.8	36	
21-Feb	0	0	1	1	Z	12	11	14	34	39	34	19	5	7	19	15	15	0	1	3	0	2	4	2	10.3	39	
22-Feb	2	6	8	11	11	Z	22	11	30	19	18	17	18	11	7	7	4	42	99	144	95	120	88	112	39.1	144	
23-Feb	Z	91	77	63	53	31	19	22	22	12	8	72	23	3	3	2	2	2	2	0	2	4	0	5	22.5	91	
24-Feb	1	Z	0	1	2	0	2	2	15	14	13	10	5	2	1	1	0	0	0	0	0	0	0	0	3.1	15	
25-Feb	0	0	Z	0	0	0	0	0	1	3	2	1	2	2	1	1	1	1	0	0	0	0	0	0	0.6	3	
26-Feb	0	0	0	Z	0	0	0	0	1	1	1	3	28	11	5	1	19	29	25	21	16	13	10	6	8.3	29	
27-Feb	10	11	12	9	Z	5	5	4	4	3	6	7	4	7	4	1	12	3	0	0	0	4	5	9	5.5	12	
28-Feb	6	4	0	8	12	Z	10	13	14	10	10	12	7	3	7	9	8	6	3	0	0	4	8	3	6.8	14	
29-Feb	Z	1	4	1	4	47	3	19	17	20	26	24	22	16	13	7	2	1	0	0	0	0	0	0	9.9	47	
		13.8	16.8	18.0	14.6	11.4	12.4	11.0	10.8	15.8	17.6	17.1	17.6	19.5	21.8	28.5	22.8	19.0	14.9	15.4	16.2	18.0	22.4	20.4	17.8	Diurnal Average	
		214	197	164	136	64	118	124	107	106	72	60	72	82	128	264	255	197	140	156	168	237	351	295	254	Diurnal Maximum	
Z - zerospan		C - Calibration																									



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Shell Muskeg River - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	536	81.09	81.09
21 - 40	60	9.08	90.17
41 - 80	28	4.24	94.40
81 - 159	26	3.93	98.34
> 159	11	1.66	100.00

Total Number of Valid Hours: 661

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Shell Muskeg River - February 2016**

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	69	107	42	13	11	8	35	99	66	32	10	11	8	4	2	536
21 - 40	1	6	5	1	0	1	0	3	16	7	7	5	1	4	2	1	60
11 - 80	6	3	0	0	0	2	1	1	5	0	3	1	1	0	1	3	27
81 - 159	1	2	1	2	0	0	3	1	2	2	0	1	3	0	2	6	26
> 159	0	1	0	1	0	0	0	2	1	2	0	1	0	1	1	1	11
Totals	27	81	113	46	13	14	12	42	123	77	42	18	16	13	10	13	660

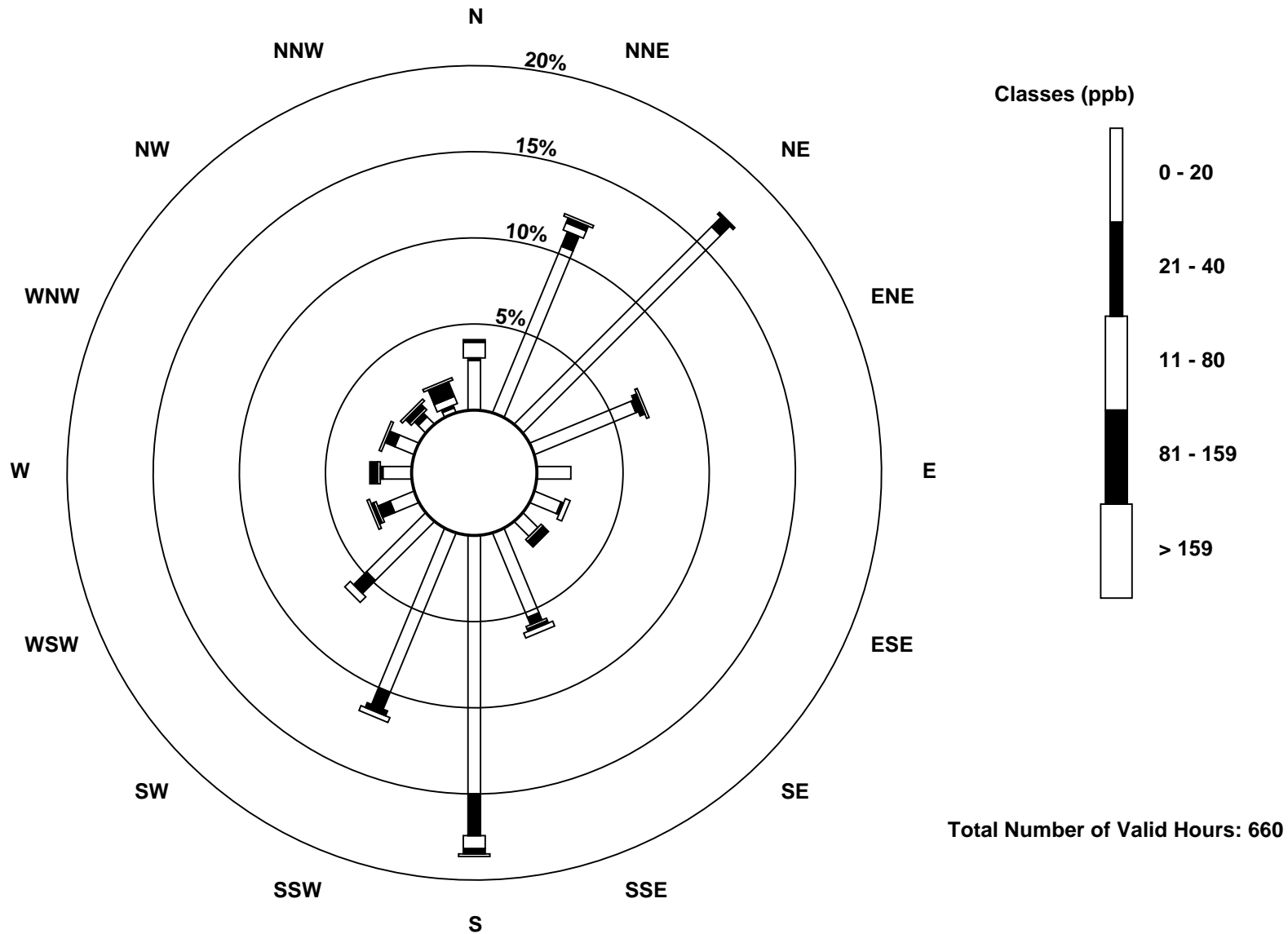
Total Number of Valid Hours: 660

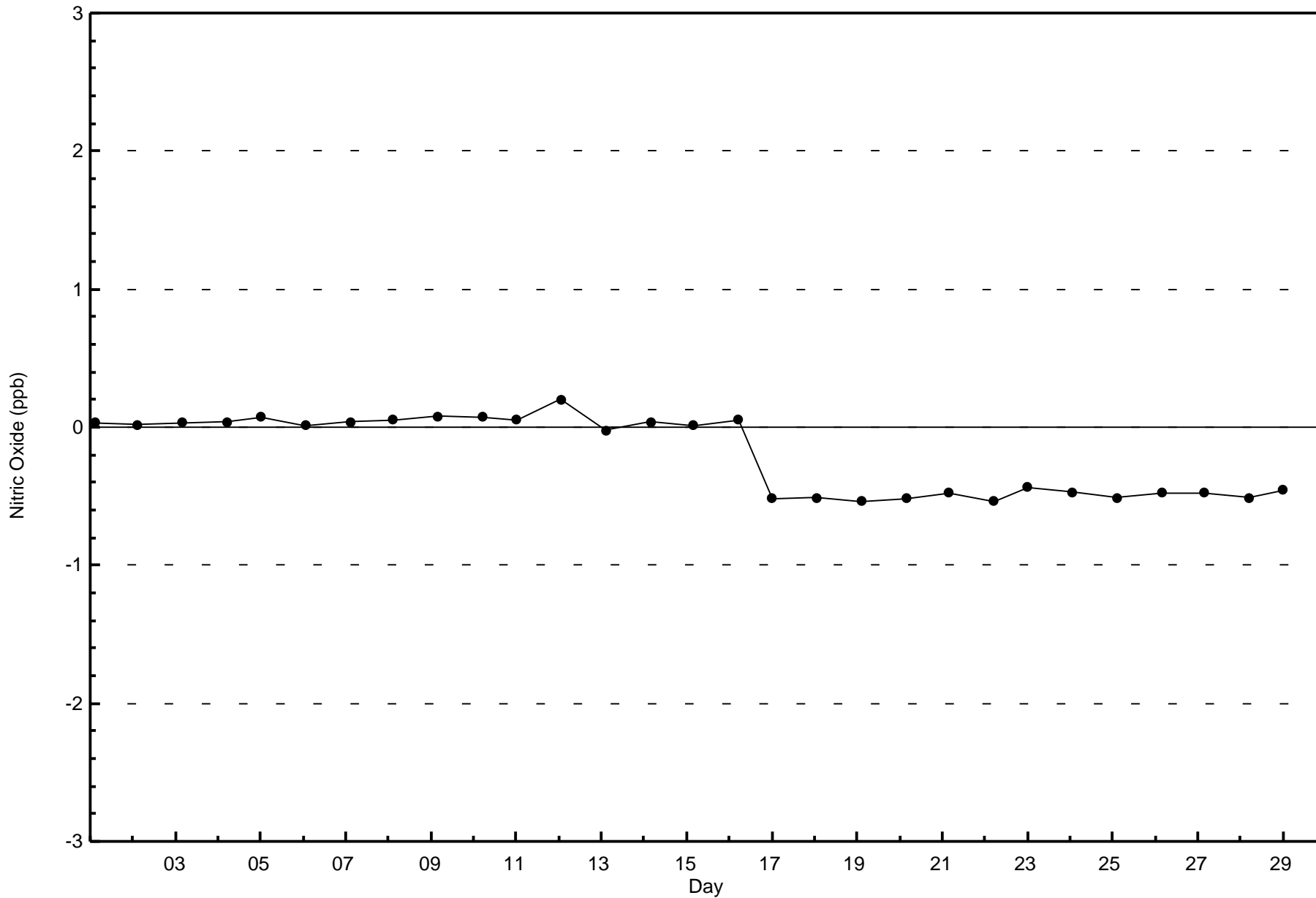
Total Number of Hours: 696

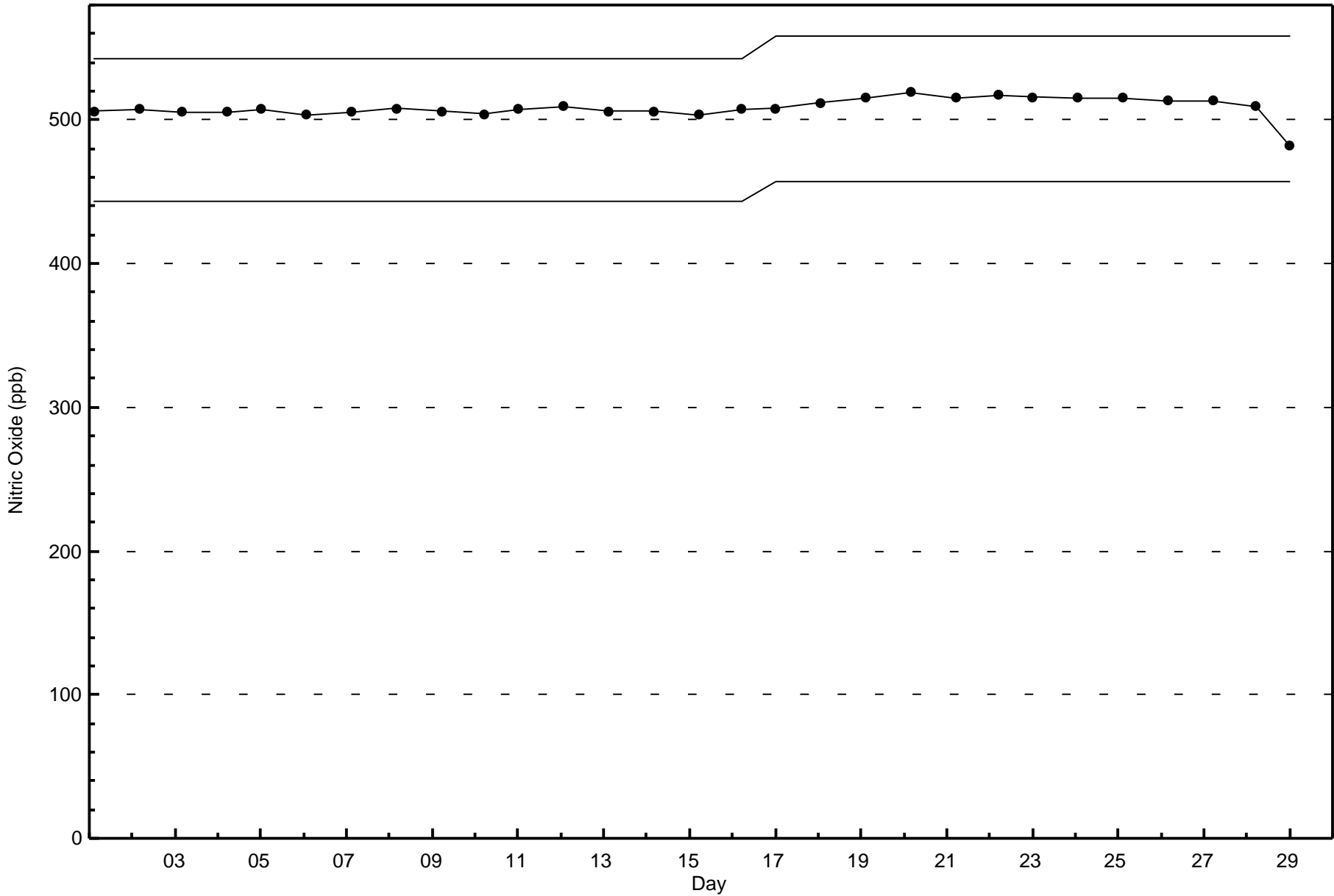


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

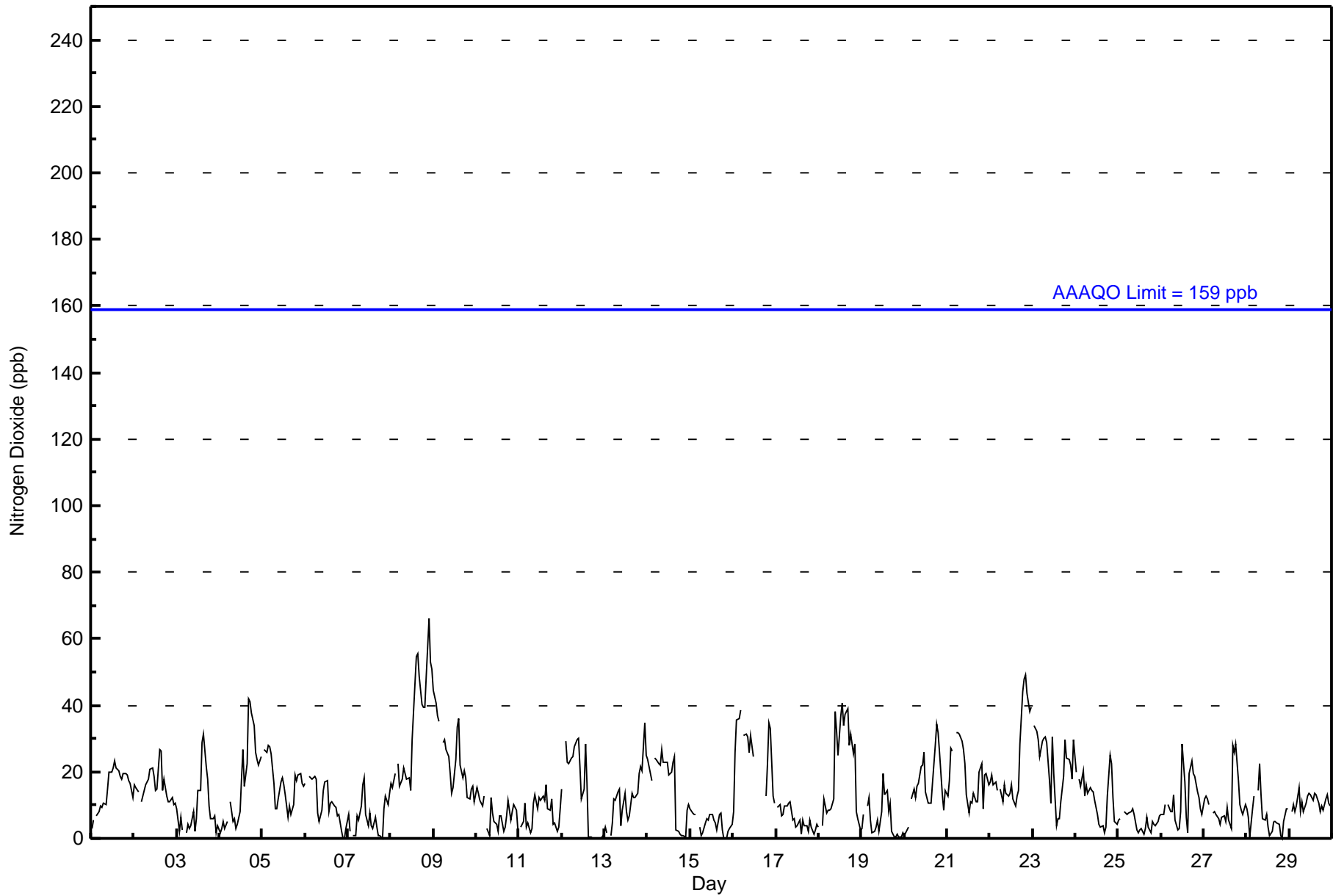
Shell Muskeg River - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 66 ppb on Feb 8 22:00										Maximum Daily Average: 33.2 ppb on Feb 8																
Minimum Value: 0 ppb on Feb 6 22:00										Minimum Daily Average: 4.7 ppb on Feb 15																
Maximum Diurnal Average: 15.7 ppb at hour 19										Minimum Diurnal Average: 11.6 ppb at hour 1																
Monthly Average: 13.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 6 Median = 11 Q ₃ = 19 P ₉₀ = 29 P ₉₉ = 49																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	Z	7	8	10	10	11	10	15	20	20	21	23	21	20	19	18	20	20	19	17	17	12	15.0	23
2-Feb	16	15	14	Z	11	13	16	17	18	21	21	19	14	15	27	26	14	18	13	11	11	12	10	11	15.8	27
3-Feb	9	2	6	2	Z	2	4	3	4	8	2	6	14	15	29	32	22	18	10	6	6	7	2	4	9.2	32
4-Feb	2	3	5	3	5	Z	11	5	6	3	4	8	18	27	16	22	42	41	38	34	26	24	22	25	16.9	42
5-Feb	Z	27	26	28	28	Z	26	17	9	9	12	17	18	16	13	7	10	7	10	19	18	19	16	16	16.8	28
6-Feb	17	Z	19	18	18	19	18	8	5	9	15	17	17	8	11	11	10	9	7	7	2	0	0	3	10.7	19
7-Feb	7	2	Z	1	1	7	6	10	16	18	7	4	8	4	3	6	4	1	1	0	9	13	10	14	6.5	18
8-Feb	17	15	19	Z	23	16	18	21	19	18	18	15	30	38	55	56	49	40	39	40	49	66	53	51	33.2	66
9-Feb	44	41	37	35	Z	29	30	27	25	19	13	15	24	33	36	22	18	20	18	12	12	15	16	11	24.0	44
10-Feb	15	14	11	10	13	Z	3	1	12	8	5	4	2	7	7	2	3	7	12	5	8	10	8	3	7.4	15
11-Feb	Z	3	5	11	3	5	2	3	11	13	9	12	12	13	11	16	9	9	12	4	5	2	4	9	7.9	16
12-Feb	15	Z	29	23	22	24	25	28	30	30	21	12	15	28	17	1	0	0	0	0	0	0	0	1	13.9	30
13-Feb	4	2	Z	1	5	12	12	14	15	4	8	13	8	5	7	13	12	12	14	20	22	20	35	25	12.2	35
14-Feb	24	22	18	Z	24	24	23	22	27	23	23	19	20	23	24	3	2	1	1	1	1	9	10	10	15.8	27
15-Feb	9	8	7	7	Z	3	1	2	5	6	5	7	7	5	5	3	7	8	3	0	0	2	3	4	4.7	9
16-Feb	8	26	36	36	38	Z	31	31	31	26	31	25	C	C	C	C	C	C	13	23	35	33	13	10	--	38
17-Feb	Z	9	10	7	7	10	10	10	11	6	6	4	4	5	1	5	4	4	2	6	3	1	2	4	5.8	11
18-Feb	3	Z	4	12	8	8	8	9	12	38	32	25	37	41	34	37	39	28	31	26	28	8	6	3	20.7	41
19-Feb	3	7	Z	10	12	5	2	2	4	5	2	8	19	13	14	8	11	2	0	0	1	1	1	2	5.8	19
20-Feb	1	2	4	Z	12	15	12	16	16	22	22	26	14	11	11	11	17	28	34	32	26	13	9	14	15.9	34
21-Feb	13	18	27	26	Z	32	32	31	29	27	22	13	8	11	10	13	11	11	20	23	9	19	19	16	19.1	32
22-Feb	17	19	16	17	15	Z	15	11	16	13	13	13	16	12	10	13	14	28	44	48	49	44	38	39	22.6	49
23-Feb	Z	34	32	30	25	29	30	31	29	17	11	31	19	4	6	6	11	19	30	24	24	22	18	30	22.2	34
24-Feb	20	Z	18	16	21	13	16	13	15	14	14	12	7	4	3	4	2	4	13	25	22	12	5	4	12.1	25
25-Feb	5	6	Z	8	8	7	8	8	9	7	3	2	3	3	1	3	6	4	2	5	4	4	5	7	5.1	9
26-Feb	7	7	10	Z	10	8	8	13	6	3	3	8	29	17	6	2	19	23	19	19	14	12	9	7	11.3	29
27-Feb	12	13	12	10	Z	8	8	7	6	4	6	7	5	9	6	3	28	26	28	17	10	8	7	10	10.9	28
28-Feb	9	6	0	9	13	Z	14	23	13	6	6	7	3	1	2	5	5	5	4	1	0	5	9	9	6.7	23
29-Feb	Z	8	10	8	10	15	8	11	8	11	13	13	13	12	14	13	11	8	10	9	12	13	10	10	10.8	15
11.6 12.5 15.6 13.9 14.1 14.1 13.6 13.6 14.3 13.9 12.8 13.3 14.4 14.2 14.0 13.8 14.2 14.4 15.7 14.9 14.7 13.9 12.2 12.5																								Diurnal Average		
44 41 37 36 38 32 32 31 31 38 32 31 37 41 55 56 49 41 44 48 49 66 53 51																								Diurnal Maximum		
Z - zerspan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	514	77.76	77.76
21 - 40	131	19.82	97.58
41 - 80	16	2.42	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 661

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - February 2016**

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	74	106	43	13	9	7	31	90	57	35	11	9	7	2	1	514
21 - 40	8	6	6	2	0	5	5	10	32	18	7	6	6	5	7	7	130
11 - 80	0	1	1	1	0	0	0	1	1	2	0	1	1	1	1	5	16
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	81	113	46	13	14	12	42	123	77	42	18	16	13	10	13	660

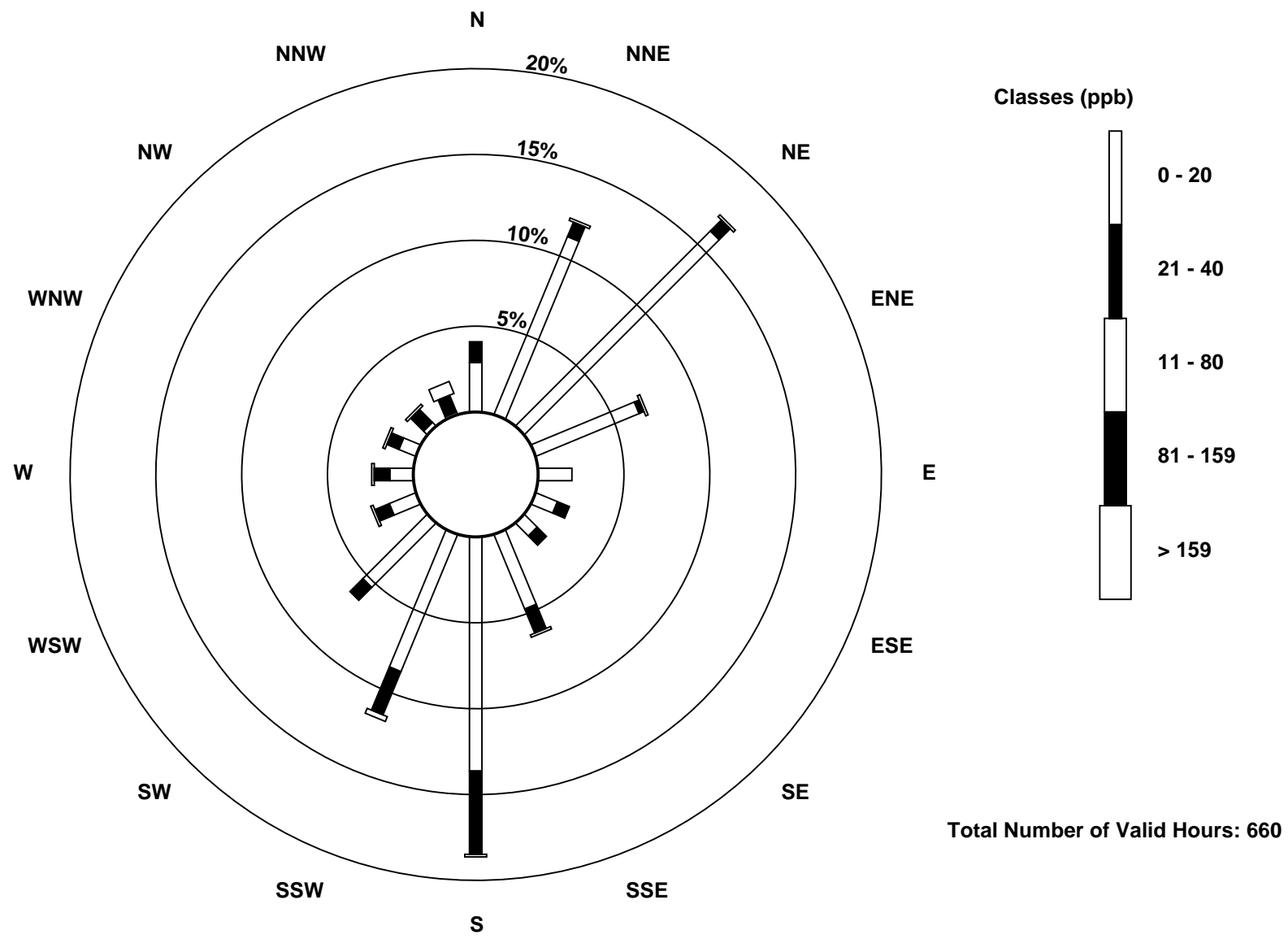
Total Number of Valid Hours: 660

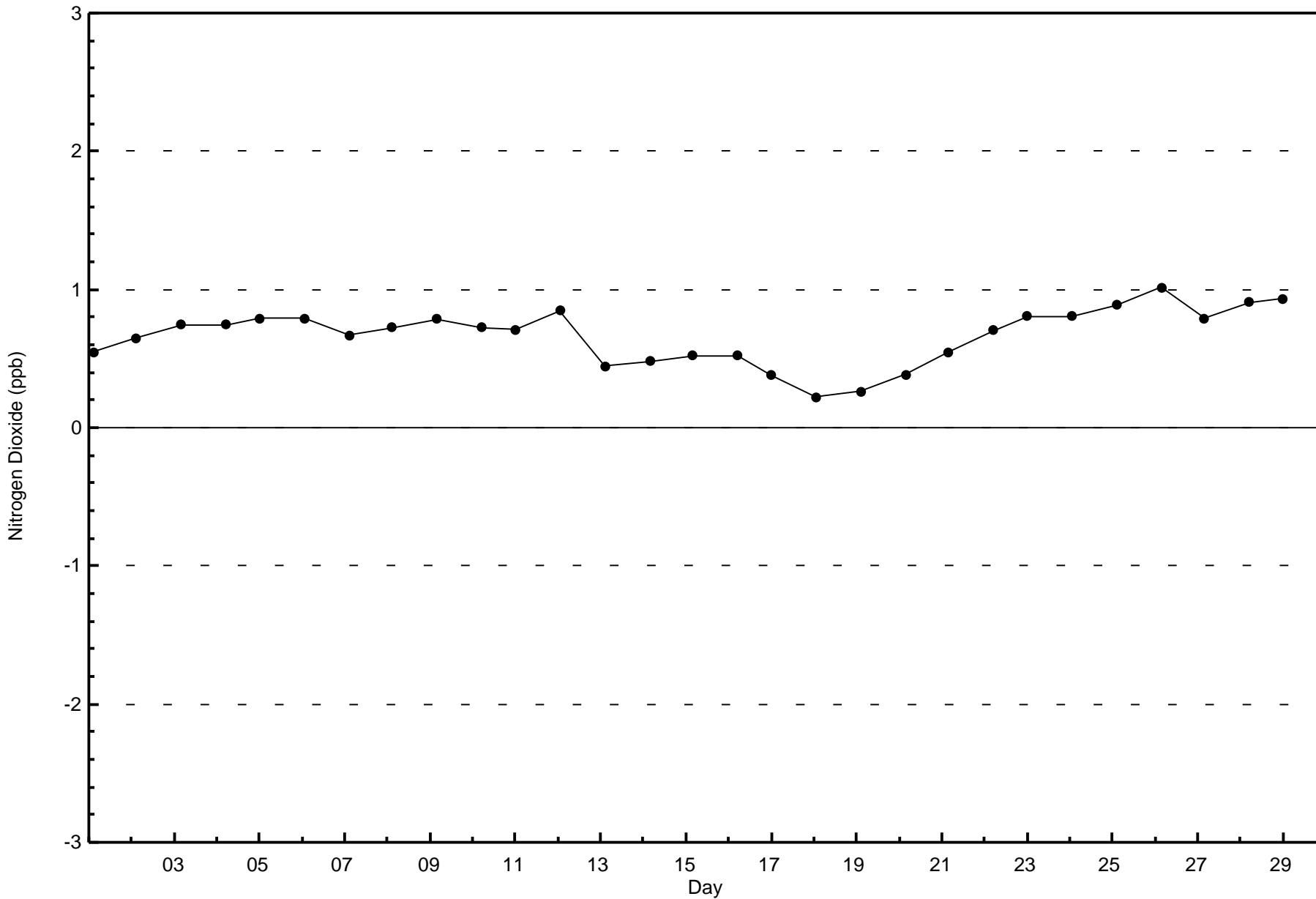
Total Number of Hours: 696

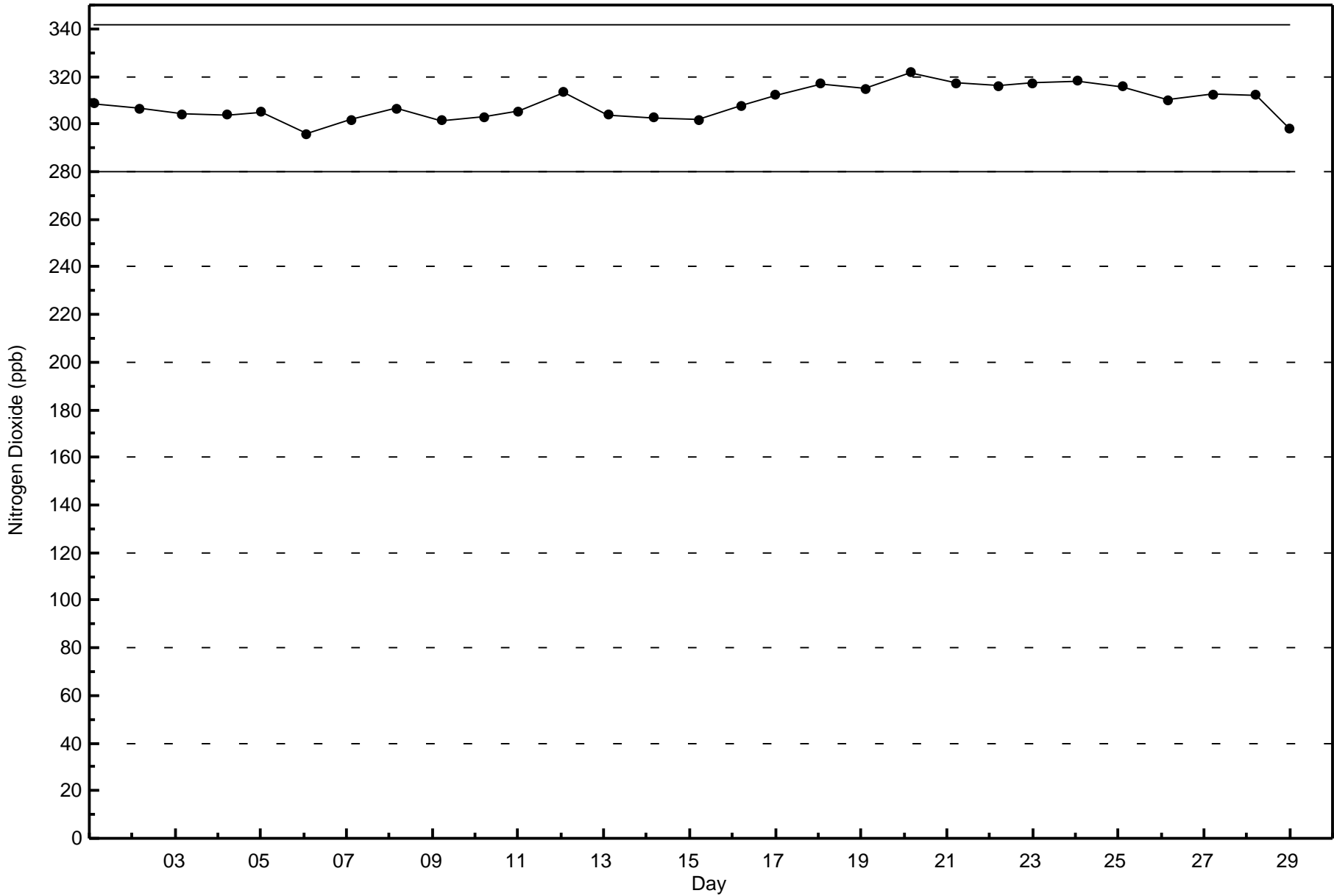


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)









Wood Buffalo Environmental Association
Summary of Hour Averages

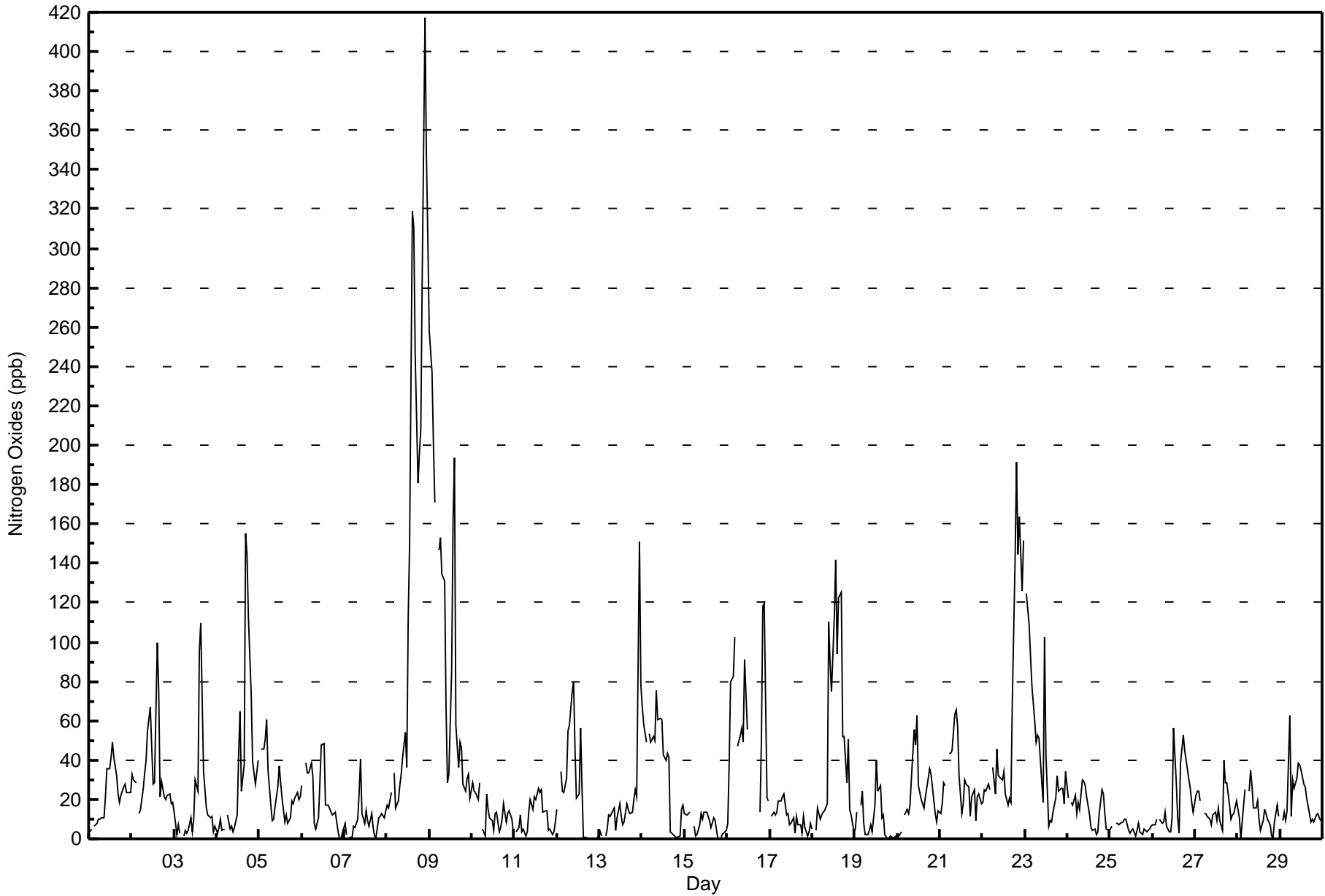
Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - February 2016

Maximum Value: 417 ppb on Feb 8 22:00 Maximum Daily Average: 147.5 ppb on Feb 8		Hours in Service: 696 Hours of Data: 661 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0																								
Minimum Value: 0 ppb on Feb 6 22:00 Maximum Diurnal Average: 42.4 ppb at hour 15 Monthly Average: 31.2 ppb		Minimum Daily Average: 5.6 ppb on Feb 25 Minimum Diurnal Average: 24.5 ppb at hour 8 Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 8 Median = 17 Q ₃ = 32 P ₉₀ = 65 P ₉₉ = 256																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	Z	7	8	10	10	11	11	22	36	36	42	49	41	32	23	18	22	26	28	23	23	23	22.1	49
2-Feb	33	30	28	Z	13	15	26	33	40	55	67	47	28	28	100	75	21	29	22	20	22	23	18	18	34.4	100
3-Feb	13	2	7	3	Z	2	4	3	4	11	4	10	30	24	96	110	34	25	16	12	11	12	3	7	19.2	110
4-Feb	3	6	10	4	5	Z	12	5	6	4	5	12	42	65	24	38	155	144	112	73	39	33	28	40	37.6	155
5-Feb	Z	45	46	50	60	35	17	9	10	17	26	37	29	20	9	12	8	10	19	18	21	23	20	21	24.5	60
6-Feb	27	Z	38	34	34	39	32	8	5	11	29	48	48	17	17	17	13	12	13	13	4	0	0	3	20.1	48
7-Feb	8	2	Z	1	1	7	6	10	24	41	13	8	14	9	6	13	5	1	1	11	11	13	11	14	9.9	41
8-Feb	17	16	23	Z	33	16	19	27	33	42	54	36	112	150	319	310	246	181	195	208	285	417	347	306	147.5	417
9-Feb	259	237	201	171	Z	147	153	134	131	67	29	33	86	161	194	57	37	49	47	28	24	30	33	20	101.1	259
10-Feb	28	24	23	20	29	Z	5	1	23	15	11	9	5	13	13	4	6	10	18	9	13	14	10	3	13.2	29
11-Feb	Z	3	5	12	3	5	2	3	14	20	15	21	20	25	23	25	14	15	14	4	5	2	4	9	11.4	25
12-Feb	15	Z	34	24	24	31	55	58	75	80	45	20	23	56	26	1	1	0	0	0	0	0	0	2	24.8	80
13-Feb	4	2	Z	1	5	12	12	14	15	4	10	18	11	7	9	18	15	13	14	20	25	22	151	78	20.8	151
14-Feb	67	58	49	Z	53	49	52	50	75	60	61	60	43	40	44	42	4	2	1	1	1	1	15	17	36.8	75
15-Feb	12	12	13	13	Z	6	1	2	7	13	10	13	13	11	9	5	10	9	4	0	0	2	3	4	7.6	13
16-Feb	8	38	80	83	102	Z	47	52	56	49	91	56	C	C	C	C	C	C	14	49	118	119	21	19	--	119
17-Feb	Z	11	13	12	13	19	19	21	23	12	13	7	8	11	3	11	7	7	3	12	6	2	4	8	10.6	23
18-Feb	5	Z	4	16	10	12	14	14	18	111	89	75	113	142	94	122	125	52	52	29	50	15	12	3	51.2	142
19-Feb	5	13	Z	17	24	8	2	2	4	7	3	17	40	24	27	11	12	2	0	0	1	0	0	2	9.7	40
20-Feb	1	2	3	Z	12	15	13	17	31	55	48	62	27	20	18	15	21	31	36	33	27	13	9	14	22.7	62
21-Feb	13	18	28	27	Z	43	43	45	63	65	57	32	13	17	30	28	26	11	21	25	9	21	23	18	29.4	65
22-Feb	19	25	24	28	25	Z	37	23	46	32	31	30	34	22	17	20	18	70	143	191	144	164	126	152	61.7	191
23-Feb	Z	125	109	92	77	60	49	53	51	29	19	102	42	6	9	8	13	20	32	24	26	25	18	34	44.6	125
24-Feb	21	Z	18	17	22	13	18	15	30	29	27	22	13	7	4	5	2	4	13	25	23	13	5	4	15.1	30
25-Feb	5	6	Z	8	8	7	7	8	10	10	4	3	4	5	2	4	8	4	2	5	4	4	5	7	5.6	10
26-Feb	7	7	10	Z	10	8	8	14	6	3	4	11	56	28	11	3	38	53	44	40	30	26	18	13	19.5	56
27-Feb	22	24	24	19	Z	13	13	11	10	7	12	13	9	16	10	4	40	29	29	17	10	12	13	19	16.3	40
28-Feb	15	11	0	17	25	Z	25	35	27	16	16	19	10	4	9	15	13	10	7	1	0	9	17	12	13.6	35
29-Feb	Z	9	14	9	14	63	11	30	25	31	39	38	35	28	26	20	13	8	10	9	12	13	10	10	20.7	63
																								Diurnal Average		
																								Diurnal Maximum		
25.4 29.3 33.6 28.5 25.4 26.4 24.6 24.5 30.1 31.6 29.9 30.9 33.8 35.9 42.4 36.6 33.2 29.3 31.1 31.2 32.7 36.3 32.7 30.4 259 237 201 171 102 147 153 134 131 111 91 102 113 161 319 310 246 181 195 208 285 417 347 306																										
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	380	57.49	57.49
21 - 40	153	23.15	80.64
41 - 80	76	11.50	92.13
81 - 159	34	5.14	97.28
> 159	18	2.72	100.00

Total Number of Valid Hours: 661

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	44	100	42	12	7	3	24	62	39	20	5	7	1	1	0	380
21 - 40	6	26	7	0	1	4	5	10	31	28	13	6	4	7	3	2	153
11 - 80	2	6	5	1	0	2	1	5	25	6	9	4	2	4	2	1	75
81 - 159	6	3	1	1	0	1	2	1	4	2	0	1	2	0	3	7	34
> 159	0	2	0	2	0	0	1	2	1	2	0	2	1	1	1	3	18
Totals	27	81	113	46	13	14	12	42	123	77	42	18	16	13	10	13	660

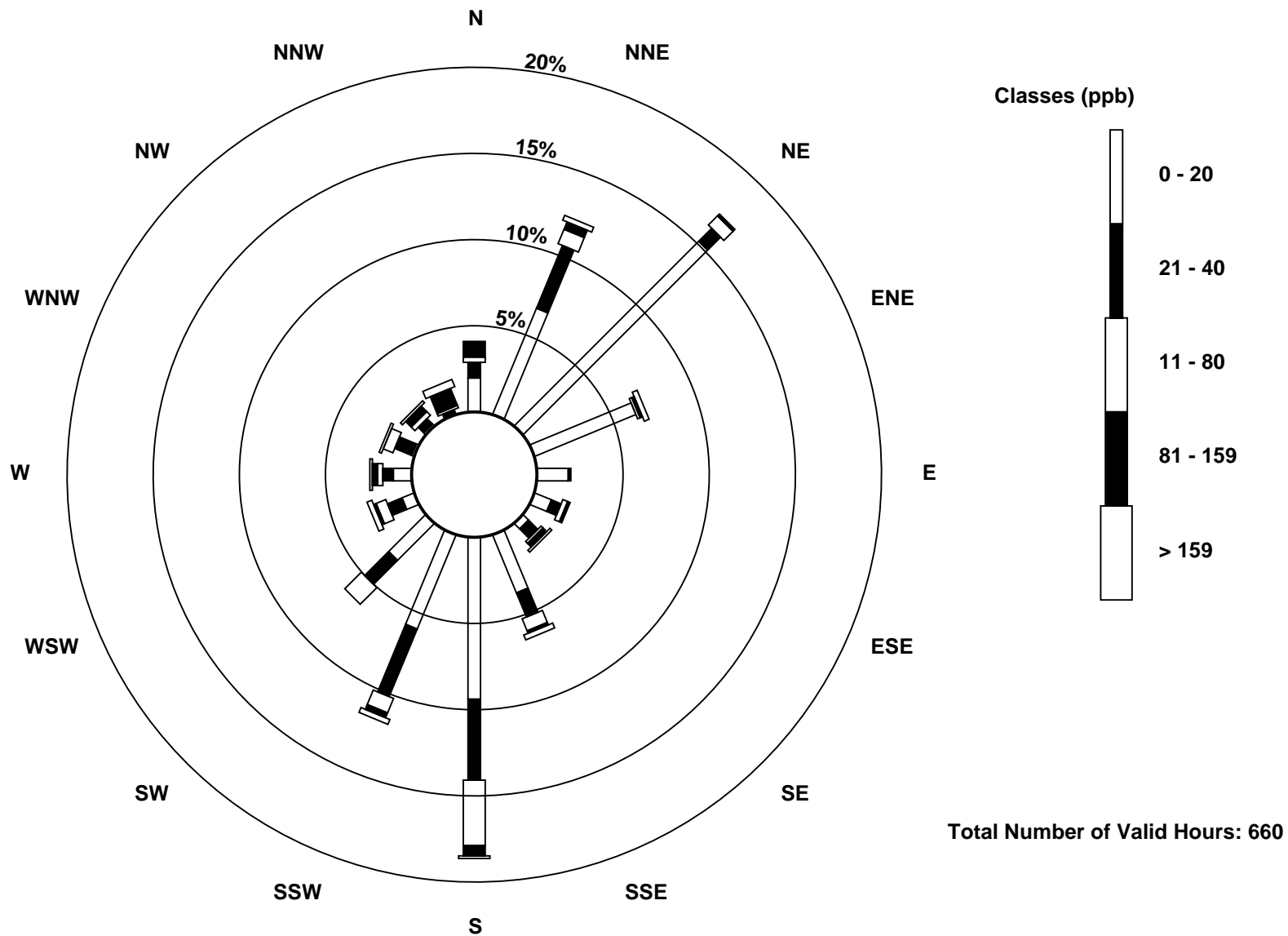
Total Number of Valid Hours: 660

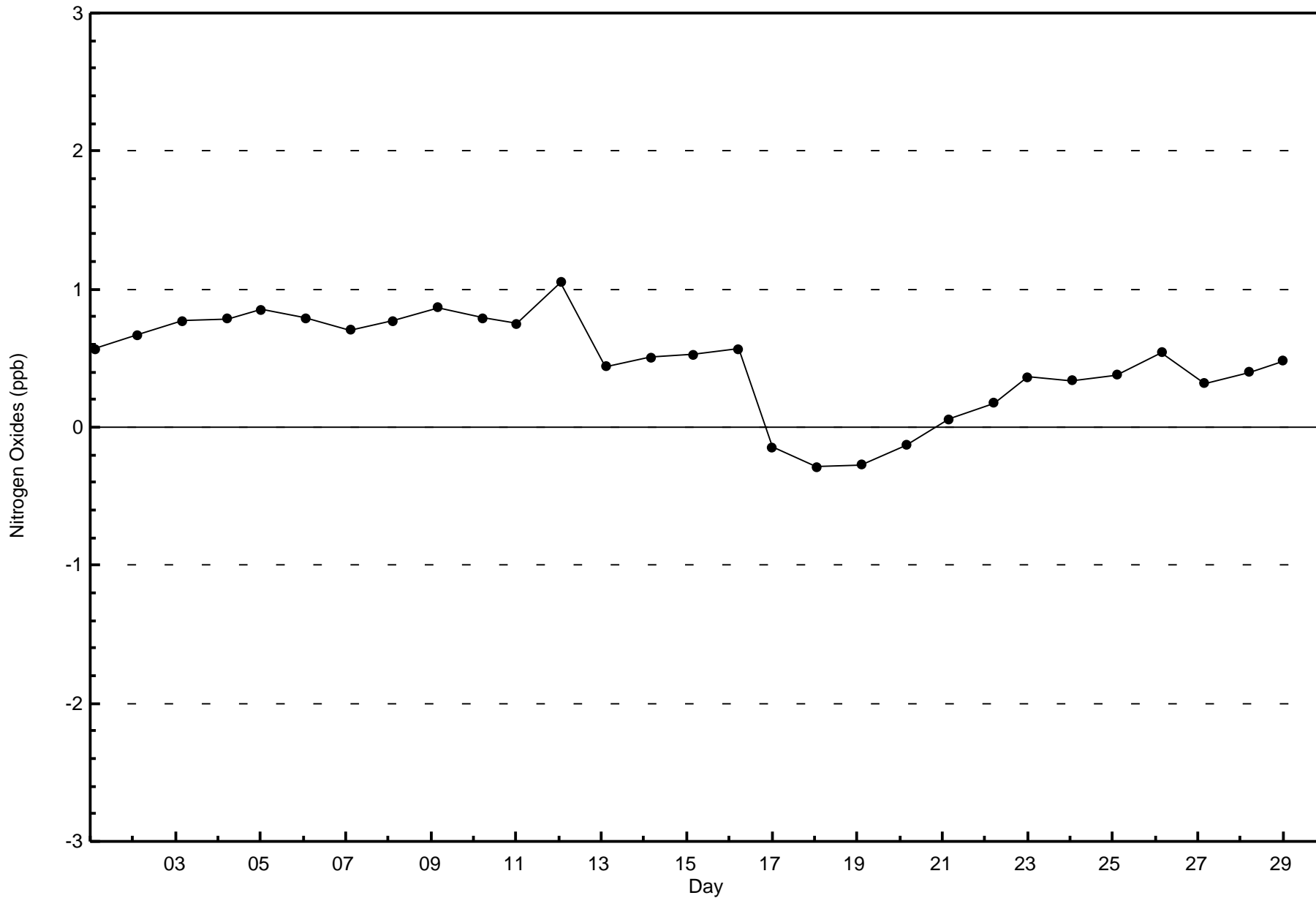
Total Number of Hours: 696

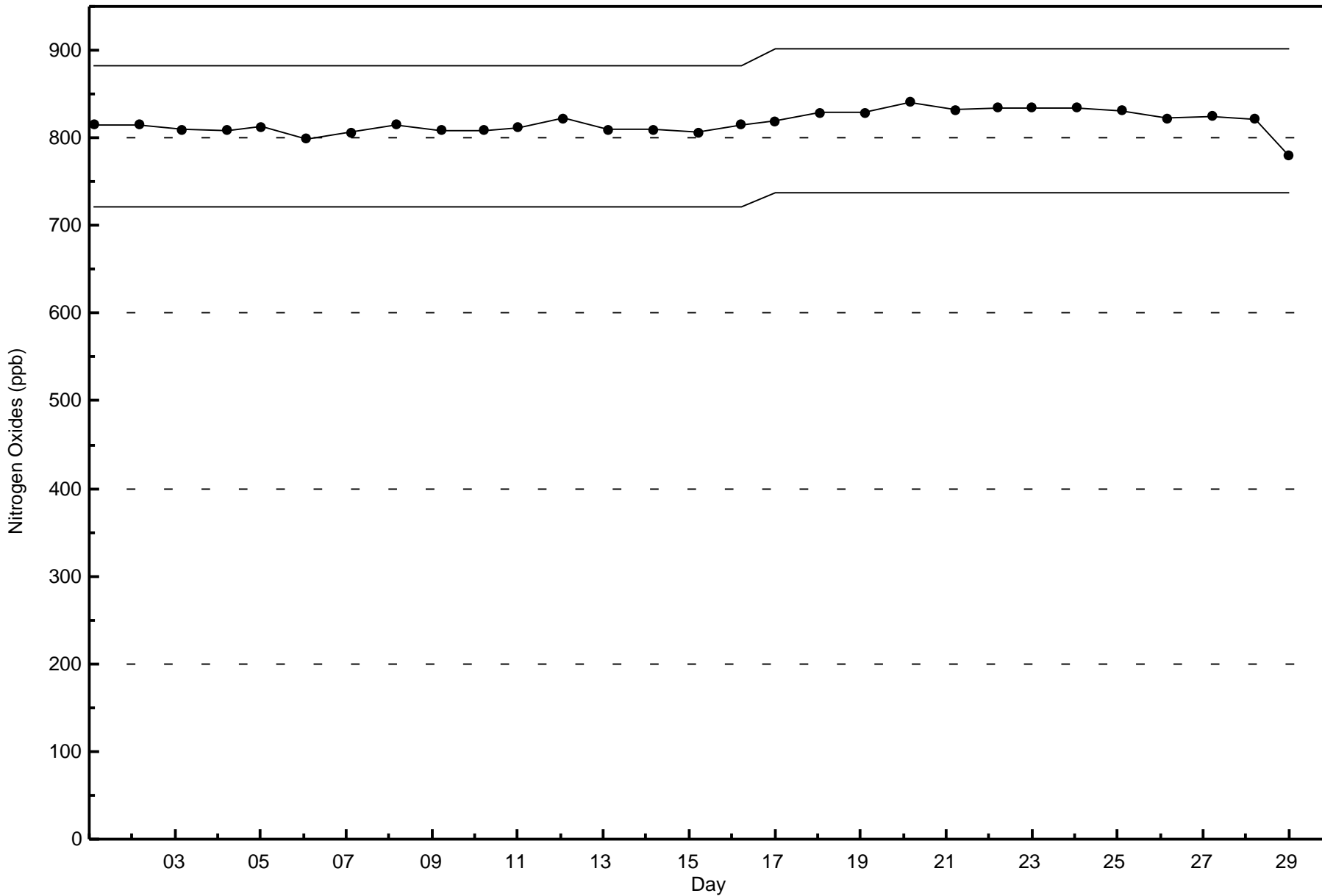


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)







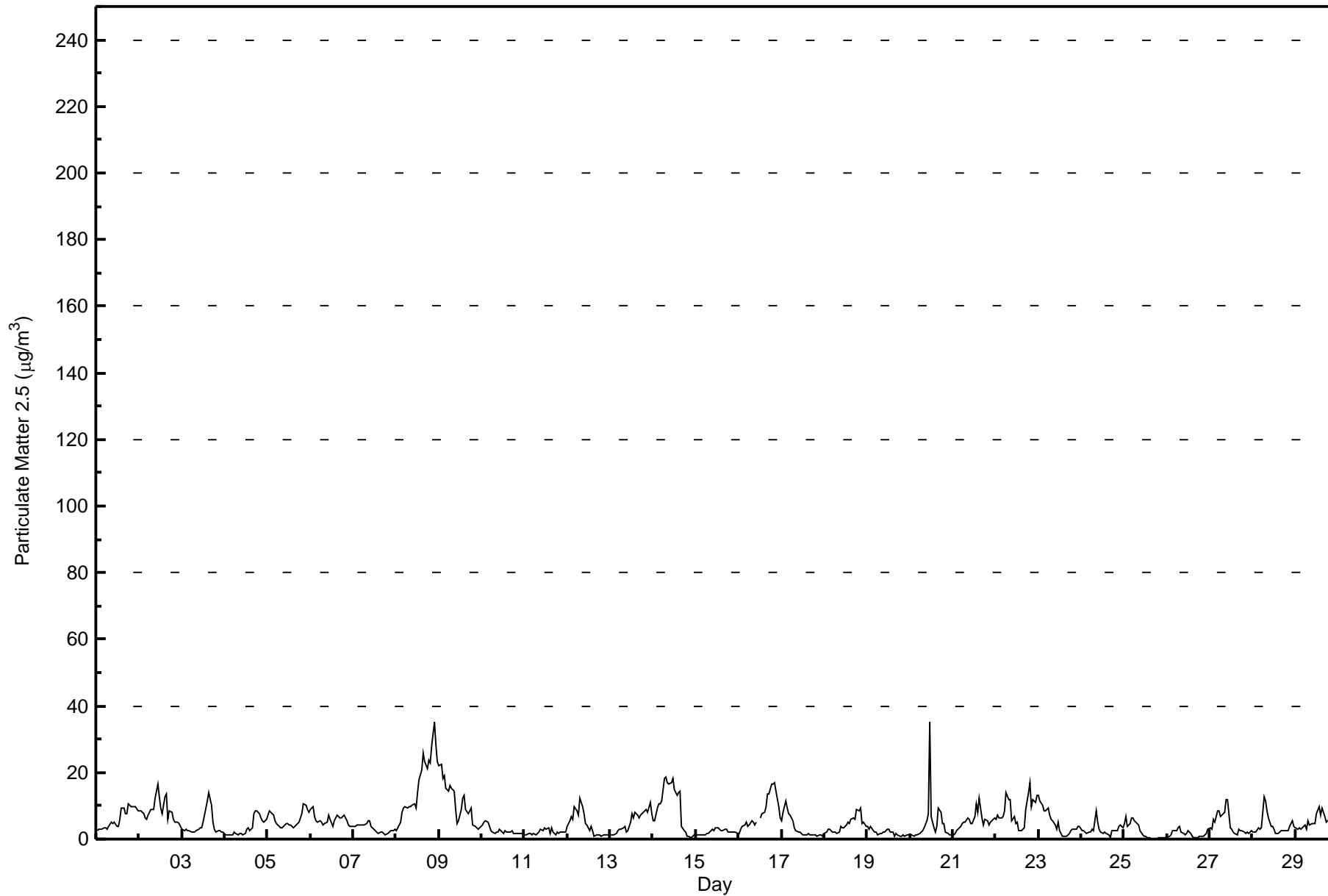


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 35.4 µg/m ³ on Feb 20 12:00 Minimum Value: 0.0 µg/m ³ on Feb 25 19:00 Maximum Diurnal Average: 5.9 µg/m ³ at hour 16 Monthly Average: 5.23 µg/m ³		Maximum Daily Average: 15.9 µg/m ³ on Feb 8 Minimum Daily Average: 1.6 µg/m ³ on Feb 26 Minimum Diurnal Average: 4.4 µg/m ³ at hour 1 Percentiles: P ₁ = 0.4 P ₁₀ = 1.3 Q ₁ = 2.1 Median = 3.8 Q ₃ = 7.0 P ₉₀ = 10.5 P ₉₉ = 23.3		Hours in Service: 696 Hours of Data: 695 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.5	2.9	2.9	3.1	3.5	3.2	2.8	4.0	5.0	4.6	4.9	3.9	3.9	6.0	9.2	9.4	7.8	7.8	10.7	9.6	9.7	9.6	9.9	8.5	6.1	10.7
2-Feb	8.5	8.3	7.7	6.2	5.9	7.1	8.9	8.7	9.1	12.5	16.4	12.5	9.3	7.5	12.6	13.5	6.1	8.5	8.2	5.8	5.2	4.9	4.8	3.9	8.4	16.4
3-Feb	3.0	2.6	3.0	2.6	2.4	2.3	2.2	2.3	2.5	3.1	3.3	3.6	5.3	9.4	11.3	14.1	10.1	5.0	2.9	2.2	2.5	2.6	2.0	1.9	4.3	14.1
4-Feb	1.2	1.2	1.3	1.2	1.4	2.0	1.7	1.5	1.7	1.5	1.4	1.8	2.9	3.6	2.6	3.4	7.8	8.5	8.6	7.5	6.2	5.6	5.2	5.9	3.6	8.6
5-Feb	7.1	8.4	7.6	7.4	5.5	4.7	3.8	3.4	3.5	4.0	4.5	4.6	4.1	4.3	3.5	4.0	4.0	5.0	6.2	7.5	10.4	10.1	8.9	8.1	5.9	10.4
6-Feb	9.1	9.9	6.9	5.3	5.2	5.7	5.1	4.3	4.5	5.2	7.0	6.1	3.7	5.6	6.2	7.1	6.4	6.4	6.8	7.4	5.4	4.4	3.7	3.8	5.9	9.9
7-Feb	3.9	3.9	4.3	4.3	4.1	4.4	4.4	4.6	5.5	5.7	4.0	3.1	2.5	2.0	1.8	1.9	1.9	1.5	1.4	1.6	2.1	2.7	2.6	2.9	3.2	5.7
8-Feb	2.6	3.3	5.0	8.0	9.2	9.6	9.5	9.8	9.8	10.0	10.5	9.3	14.0	17.7	20.6	25.8	23.5	21.1	23.9	23.1	28.1	35.3	28.3	23.3	15.9	35.3
9-Feb	22.2	22.4	18.3	18.9	15.4	14.4	16.0	15.3	14.6	9.1	4.9	5.5	8.9	12.4	13.0	8.7	7.8	8.6	9.4	4.1	3.7	3.3	2.9	3.2	11.0	22.4
10-Feb	4.3	5.0	5.4	5.1	4.0	2.4	2.1	1.7	2.1	2.2	3.0	2.1	1.7	2.6	2.2	2.0	2.1	2.5	1.9	1.6	1.6	1.8	1.9	1.4	2.6	5.4
11-Feb	1.3	1.5	1.6	1.6	1.5	1.6	1.5	1.5	2.2	2.8	2.5	3.4	3.0	3.5	1.9	3.2	2.1	1.3	2.1	1.8	2.0	2.0	2.2	2.2	2.1	3.5
12-Feb	3.6	5.3	6.7	5.9	9.8	8.6	7.4	12.2	9.7	7.8	4.8	4.4	2.4	3.7	2.5	1.0	1.1	1.1	1.1	1.0	1.1	1.1	1.2	1.3	4.4	12.2
13-Feb	1.4	1.3	1.4	1.9	2.5	3.0	3.0	3.5	3.9	2.0	2.4	4.9	7.5	6.6	8.0	7.1	6.3	7.2	8.1	8.5	8.7	8.2	10.9	7.6	5.2	10.9
14-Feb	5.5	5.4	9.3	10.4	10.6	11.6	18.2	18.8	16.8	16.6	17.0	18.1	14.6	13.2	13.9	14.5	3.7	2.3	1.9	0.9	0.6	0.6	0.9	1.1	9.4	18.8
15-Feb	1.1	1.1	1.1	1.2	1.3	1.3	1.5	1.6	2.7	2.9	2.7	3.3	3.6	3.1	2.6	2.3	3.0	3.0	2.3	2.0	2.0	2.1	2.1	1.9	2.2	3.6
16-Feb	1.7	2.8	3.9	4.3	5.2	4.0	4.3	5.4	5.2	4.2	5.0	C	6.2	7.7	7.8	9.9	13.5	13.8	16.5	16.3	16.8	14.3	9.9	6.4	8.0	16.8
17-Feb	5.6	8.2	11.6	9.3	7.7	7.1	5.3	3.3	2.6	1.9	2.0	1.5	1.3	1.3	1.3	1.6	1.4	1.2	1.2	1.3	1.0	1.1	1.1	1.0	3.4	11.6
18-Feb	1.8	1.9	3.1	2.9	2.2	2.3	2.2	1.6	2.3	3.9	3.5	3.4	4.1	5.0	4.7	6.1	6.5	5.9	8.9	8.4	9.5	4.5	5.2	4.0	4.3	9.5
19-Feb	3.7	2.8	3.7	2.4	2.1	2.0	1.5	1.6	1.9	2.0	2.2	3.2	2.8	2.0	1.9	0.9	1.5	1.1	0.9	0.9	1.1	1.0	1.1	1.1	1.9	3.7
20-Feb	1.1	1.1	0.9	1.2	1.3	1.7	2.1	2.8	3.3	5.3	7.7	35.4	6.8	3.6	2.3	3.9	9.4	8.0	4.8	4.5	2.1	1.9	1.1	1.3	4.7	35.4
21-Feb	1.1	1.7	2.7	3.2	3.9	4.7	5.0	5.1	6.3	6.1	4.5	4.8	6.7	10.5	8.0	12.4	6.3	4.4	5.8	5.5	4.4	5.2	5.7	6.3	5.4	12.4
22-Feb	6.0	7.0	6.4	6.2	6.8	8.3	14.1	11.9	12.0	5.3	6.6	4.8	4.9	2.7	2.7	3.0	3.2	9.0	13.9	16.8	9.8	12.0	10.9	13.3	8.2	16.8
23-Feb	13.2	11.6	10.0	8.5	8.3	9.3	7.1	5.9	5.5	4.4	2.8	4.9	2.4	0.7	0.6	1.0	1.7	2.6	2.9	2.8	3.0	3.8	3.9	4.9	13.2	
24-Feb	2.7	2.3	2.2	1.7	2.2	2.1	2.8	2.4	8.4	4.9	3.2	2.3	1.6	1.9	1.6	1.4	0.4	2.7	2.6	2.6	2.6	3.8	4.0	3.5	2.7	8.4
25-Feb	4.7	6.9	4.0	4.7	6.5	6.4	5.6	4.7	4.1	2.3	1.3	1.0	0.9	0.6	0.3	0.2	0.1	0.2	0.0	0.3	0.3	0.4	0.5	0.6	2.4	6.9
26-Feb	0.6	0.8	1.4	2.5	2.7	2.4	3.6	3.9	2.1	1.5	1.4	1.7	2.4	1.6	0.8	0.4	0.5	0.5	0.7	0.9	1.1	1.2	1.7	2.8	1.6	3.9
27-Feb	3.6	3.1	5.9	5.0	8.3	8.4	6.8	7.4	7.9	12.0	11.7	3.4	2.8	2.2	1.7	1.1	2.9	2.4	2.7	2.1	1.8	1.9	1.9	2.5	4.6	12.0
28-Feb	2.2	2.3	2.1	3.6	3.2	3.2	12.8	11.2	8.5	6.4	3.6	3.7	3.1	1.6	1.6	1.9	2.6	2.6	2.4	2.3	2.6	3.8	5.4	3.9	4.0	12.8
29-Feb	3.5	3.0	3.5	2.9	3.4	4.1	3.1	5.6	4.3	4.6	4.6	4.7	7.6	9.9	7.2	9.4	6.8	5.0	5.4	6.0	7.0	7.8	6.0	4.7	5.4	9.9
																								Diurnal Average		
																								Diurnal Maximum		
4.4 4.8 5.0 4.9 5.0 5.1 5.7 5.7 5.8 5.3 5.1 5.8 4.9 5.3 5.3 5.9 5.2 5.1 5.7 5.4 5.2 5.4 5.0 4.6 22.2 22.4 18.3 18.9 15.4 14.4 18.2 18.8 16.8 16.6 17.0 35.4 14.6 17.7 20.6 25.8 23.5 21.1 23.9 23.1 28.1 35.3 28.3 23.3																										
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 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - February 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	431	62.01	62.01
6 - 15	203	29.21	91.22
16 - 25	23	3.31	94.53
26 - 80	5	0.72	95.25
> 81.0	0	0.00	95.25

Total Number of Valid Hours: 695

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - February 2016

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	11	56	101	36	12	12	6	26	72	42	20	12	8	8	4	5	431
6 - 15	19	24	10	3	3	4	6	17	46	33	16	2	5	3	4	7	202
16 - 25	0	2	1	1	0	0	1	1	5	3	2	2	0	1	1	3	23
26 - 80	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	82	112	41	15	16	13	45	124	78	39	16	13	12	10	15	661

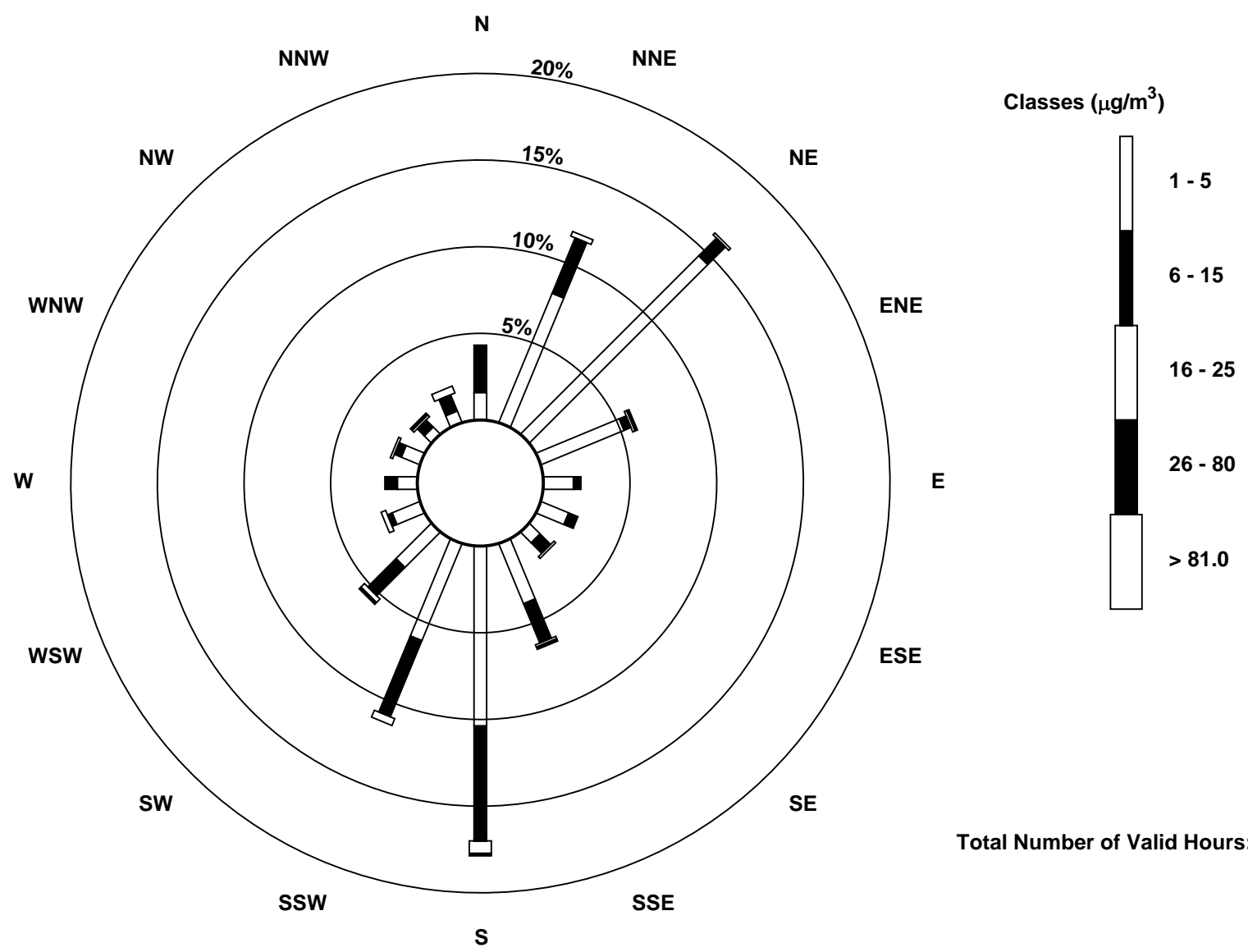
Total Number of Valid Hours: 694

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River (AMS 16)





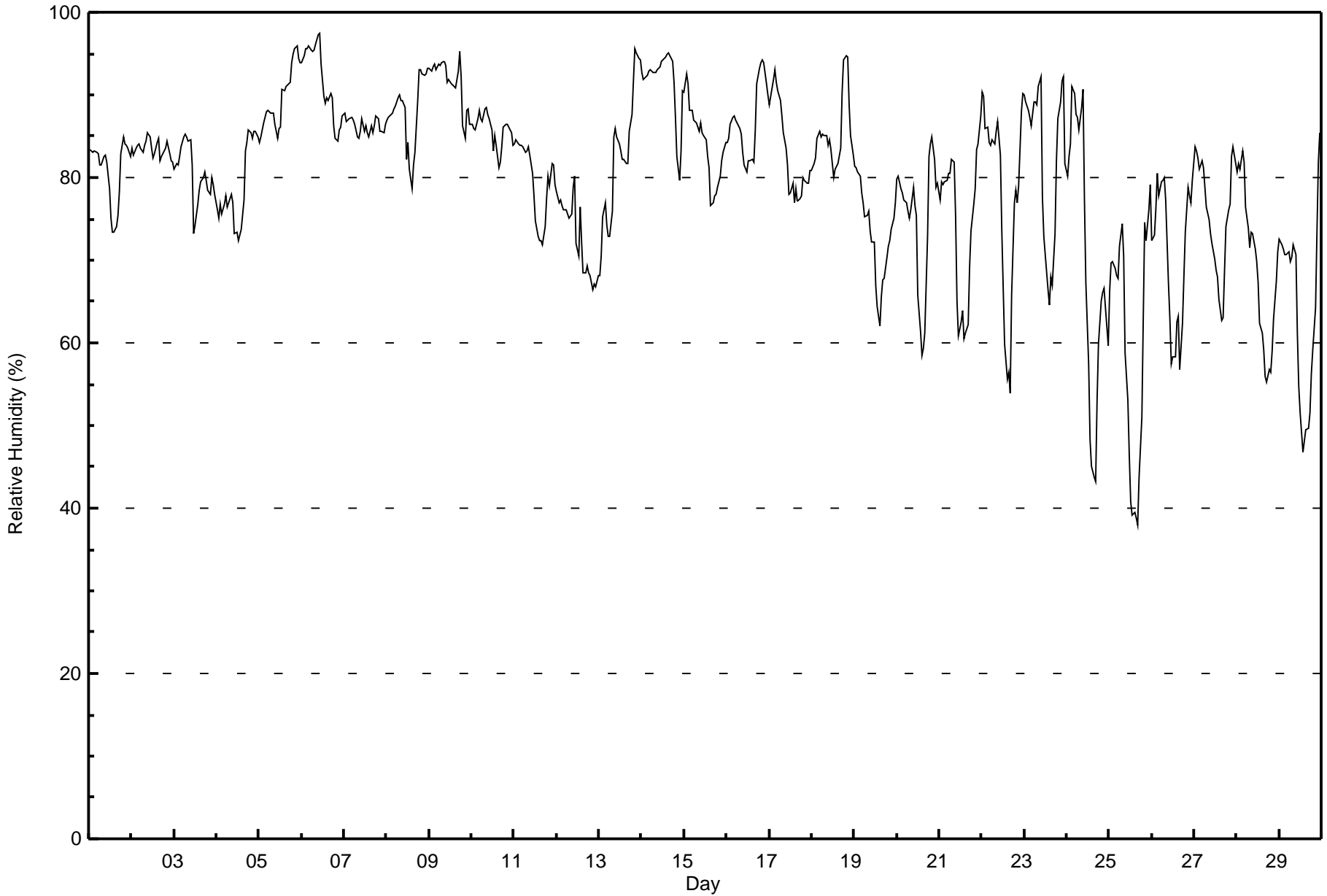
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Shell Muskeg River - February 2016

Maximum Value: 97 % on Feb 6 11:00 Maximum Daily Average: 91.6 % on Feb 6																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 38 % on Feb 25 17:00 Minimum Daily Average: 60.1 % on Feb 25 Maximum Diurnal Average: 83.9 % at hour 4 Minimum Diurnal Average: 72.2 % at hour 15 Monthly Average: 79.8 % Percentiles: P ₁ = 43 P ₁₀ = 65 Q ₁ = 75 Median = 82 O ₃ = 87 P ₉₀ = 92 P ₉₉ = 96																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	83	83	83	83	83	83	82	82	83	83	82	79	75	73	73	74	75	78	83	85	84	84	84	83	80.8	85
2-Feb	84	83	84	84	84	84	83	84	84	85	85	84	82	83	84	85	82	83	83	84	84	83	82	82	83.5	85
3-Feb	81	82	82	83	84	85	85	85	84	85	82	73	74	77	78	79	80	81	80	78	78	80	79	78	80.5	85
4-Feb	76	75	77	76	77	78	77	77	78	77	73	73	72	73	74	77	83	84	86	85	85	86	86	85	78.7	86
5-Feb	84	85	87	87	88	88	88	88	88	88	86	85	86	86	91	91	91	92	94	95	96	96	94	94	89.5	96
6-Feb	94	95	96	96	96	95	95	95	96	97	97	94	90	89	90	89	90	90	86	85	84	86	86	87	91.6	97
7-Feb	88	87	87	87	87	87	86	85	85	86	87	86	86	85	85	86	85	86	87	87	86	86	85	86	86.2	88
8-Feb	87	87	88	88	88	89	90	90	89	89	88	82	84	81	79	81	83	89	93	93	92	92	93	93	87.9	93
9-Feb	93	93	93	94	93	94	94	94	94	94	92	92	91	91	91	91	93	95	92	86	85	88	88	86	91.6	95
10-Feb	86	86	86	87	88	87	87	88	89	88	87	86	83	85	84	81	82	84	86	86	87	86	85	84	85.8	89
11-Feb	84	85	84	84	84	84	83	83	84	83	80	78	75	73	72	72	72	74	77	80	79	82	81	79	79.7	85
12-Feb	78	77	77	77	76	76	76	75	76	79	80	72	70	76	72	68	69	69	68	68	66	67	67	68	72.9	80
13-Feb	68	70	75	77	74	73	73	76	85	86	85	84	83	82	82	82	86	88	92	96	95	94	94	94	82.6	96
14-Feb	93	92	92	92	93	93	93	93	93	93	93	94	94	95	95	95	94	91	87	83	80	83	91	91	91.5	95
15-Feb	90	93	91	88	88	87	87	87	86	87	86	85	85	83	81	77	77	78	78	79	80	82	83	84	84.2	93
16-Feb	84	85	87	87	87	87	87	86	85	83	82	81	82	82	82	86	91	93	94	94	94	91	90	90	86.7	94
17-Feb	89	90	92	93	92	91	89	88	85	84	82	78	78	79	77	79	77	78	78	80	80	79	79	81	83.2	93
18-Feb	81	82	82	85	86	85	85	85	85	84	85	83	80	81	81	82	83	90	94	95	95	89	85	83	85.2	95
19-Feb	81	81	81	80	78	77	75	75	76	74	72	72	67	64	62	66	68	68	70	72	72	74	75	77	73.2	81
20-Feb	80	80	79	78	77	77	76	75	76	79	77	75	66	61	58	59	61	73	83	84	85	82	79	79	75.0	85
21-Feb	77	80	79	79	80	80	81	82	82	75	65	61	63	64	61	61	62	69	74	77	79	83	84	87	74.4	87
22-Feb	90	90	86	86	84	84	85	84	86	87	83	74	67	60	56	56	54	66	77	78	77	79	88	90	77.7	90
23-Feb	90	89	88	87	86	89	89	89	91	92	78	73	71	66	65	68	67	73	82	87	89	92	92	82	82.3	92
24-Feb	80	82	84	91	90	88	87	86	88	91	77	67	57	48	45	44	43	53	60	65	66	67	64	60	70.2	91
25-Feb	66	70	70	69	68	68	72	74	70	59	53	47	41	39	39	39	38	44	51	63	75	72	76	79	60.1	79
26-Feb	72	73	76	80	78	79	80	80	77	67	63	57	58	58	62	63	57	62	68	73	79	78	77	80	70.8	80
27-Feb	84	83	82	81	82	81	79	76	75	73	72	70	69	68	65	63	63	69	74	76	77	83	84	82	75.5	84
28-Feb	81	82	81	83	82	77	74	72	73	73	71	70	67	62	61	59	56	55	57	56	59	63	67	71	68.9	83
29-Feb	72	72	71	71	71	71	70	70	72	71	61	55	52	47	48	49	50	52	56	59	64	73	82	86	64.4	86
82.7 83.1 83.4 83.9 83.6 83.3 82.9 82.9 83.3 82.3 79.4 76.2 74.1 73.0 72.2 72.4 72.6 76.0 79.0 80.4 81.2 82.1 82.6 82.8																		Diurnal Average								
94 95 96 96 96 95 95 95 96 97 97 94 94 95 95 95 95 95 94 95 96 96 96 94 94																		Diurnal Maximum								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	4	0.57	0.57
40 - 60	39	5.60	6.18
60 - 80	243	34.91	41.09
80 - 100	410	58.91	100.00

Total Number of Valid Hours: 696

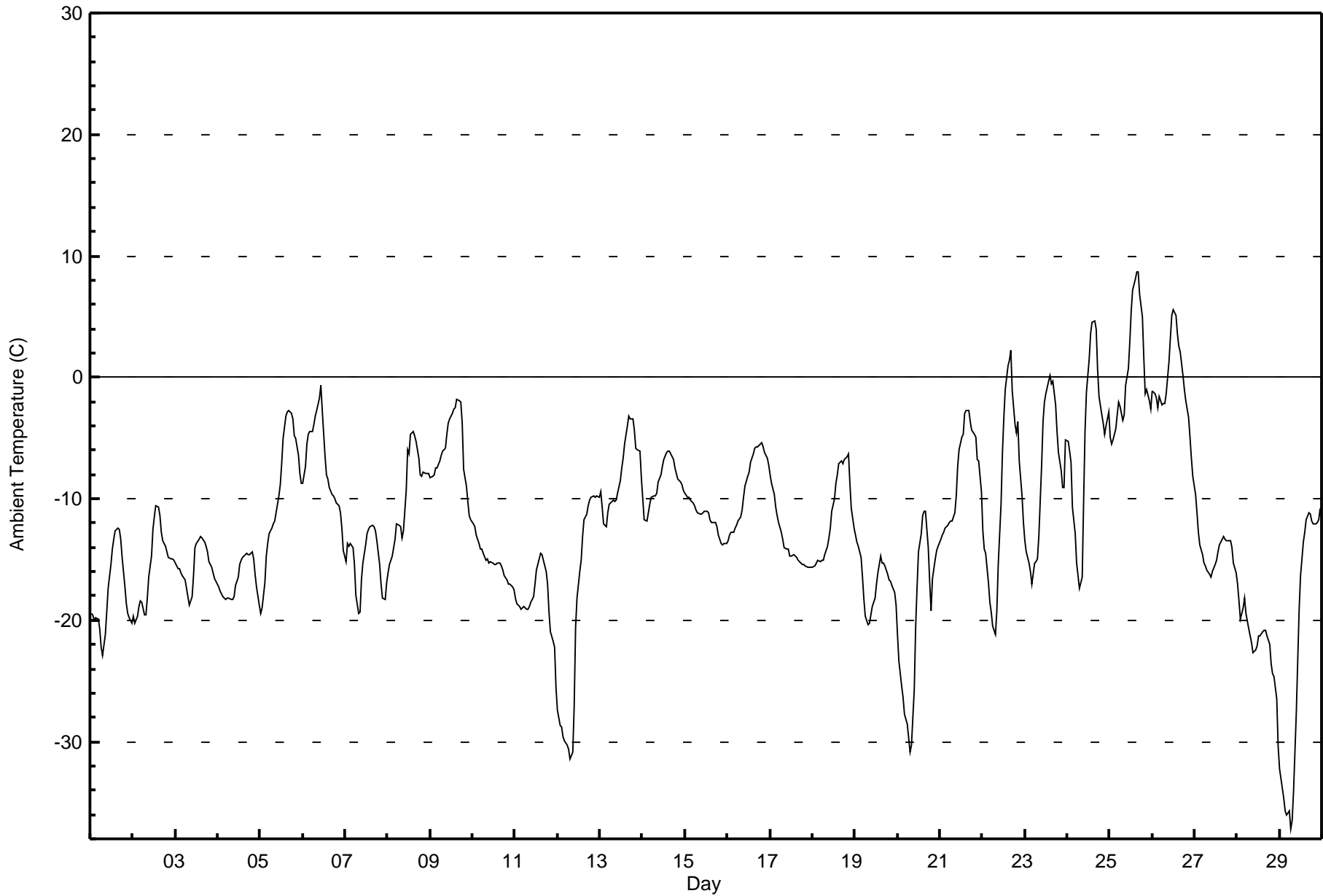
Total Number of Hours: 696



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Shell Muskeg River - February 2016

Maximum Value: 8.7 C on Feb 25 17:00		Maximum Daily Average: 0.6 C on Feb 25		Hours in Service: 696																						
Minimum Value: -37.2 C on Feb 29 07:00		Minimum Daily Average: -22.2 C on Feb 29		Hours of Data: 696																						
Maximum Diurnal Average: -8.0 C at hour 16		Minimum Diurnal Average: -16.0 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -12.19 C		Percentiles: P ₁ = -34.7 P ₁₀ = -19.7 Q ₁ = -16.2 Median = -12.7 Q ₃ = -7.3 P ₉₀ = -2.9 P ₉₉ = 5.3		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	-19.5	-19.6	-20.0	-19.8	-19.9	-20.7	-22.2	-22.9	-21.2	-19.4	-17.4	-15.4	-14.1	-13.3	-12.7	-12.4	-12.5	-13.3	-14.8	-17.2	-18.6	-19.4	-19.8	-20.3	-17.8	-12.4
2-Feb	-19.7	-20.2	-19.7	-18.8	-18.4	-18.5	-19.5	-19.6	-18.2	-16.5	-14.8	-12.6	-11.5	-10.6	-10.7	-11.4	-12.7	-13.4	-13.9	-14.4	-14.8	-15.0	-15.0	-15.1	-15.6	-10.6
3-Feb	-15.3	-15.7	-15.8	-16.1	-16.3	-16.7	-17.4	-18.1	-18.7	-18.1	-16.3	-14.1	-13.7	-13.3	-13.1	-13.3	-13.6	-13.9	-14.4	-15.2	-15.7	-16.2	-16.6	-16.8	-15.6	-13.1
4-Feb	-17.3	-17.6	-17.9	-18.0	-18.3	-18.1	-18.1	-18.3	-18.3	-18.0	-17.2	-16.4	-15.4	-15.1	-14.9	-14.6	-14.5	-14.5	-14.6	-14.3	-14.9	-16.2	-17.3	-18.7	-16.6	-14.3
5-Feb	-19.5	-19.0	-16.9	-14.7	-13.7	-12.8	-12.5	-12.1	-11.8	-11.1	-9.8	-8.9	-7.1	-5.1	-3.2	-2.8	-2.7	-2.9	-3.4	-4.8	-5.1	-6.5	-7.9	-8.8	-9.3	-2.7
6-Feb	-8.7	-7.3	-5.5	-4.7	-4.5	-4.4	-3.9	-3.2	-2.7	-1.7	-0.7	-2.7	-6.5	-8.0	-8.4	-9.1	-9.6	-9.8	-9.9	-10.4	-10.5	-11.2	-12.4	-14.2	-7.1	-0.7
7-Feb	-15.1	-13.6	-13.9	-13.7	-14.0	-15.5	-18.0	-19.5	-19.3	-16.7	-15.3	-13.8	-12.9	-12.6	-12.3	-12.2	-12.4	-12.6	-13.4	-15.4	-17.0	-18.2	-18.3	-16.9	-15.1	-12.2
8-Feb	-16.1	-15.4	-14.7	-14.1	-13.4	-12.1	-12.2	-12.3	-13.2	-12.7	-9.3	-6.0	-6.3	-4.7	-4.5	-4.8	-5.2	-6.6	-8.1	-8.1	-7.8	-7.9	-8.0	-7.9	-9.6	-4.5
9-Feb	-8.2	-8.2	-8.0	-7.5	-7.4	-6.9	-6.4	-6.1	-5.8	-4.7	-3.7	-3.4	-3.0	-2.7	-2.5	-1.8	-1.9	-2.0	-3.8	-7.6	-9.0	-10.3	-11.3	-11.7	-6.0	-1.8
10-Feb	-12.0	-12.3	-13.0	-13.6	-14.2	-14.2	-14.5	-15.1	-15.0	-15.3	-15.2	-15.3	-15.4	-15.4	-15.2	-15.3	-15.5	-15.8	-16.4	-16.7	-17.0	-17.1	-17.2	-17.5	-15.2	-12.0
11-Feb	-18.2	-18.6	-18.9	-19.1	-18.9	-18.8	-19.0	-19.1	-18.9	-18.6	-18.1	-17.0	-15.9	-14.9	-14.5	-14.6	-15.1	-16.0	-17.0	-19.3	-21.0	-21.7	-22.2	-25.5	-18.4	-14.5
12-Feb	-27.4	-28.7	-28.8	-29.5	-30.0	-30.3	-30.7	-31.4	-30.9	-27.1	-20.6	-18.2	-16.0	-15.1	-13.1	-11.8	-11.3	-10.6	-10.1	-9.9	-9.7	-9.9	-9.8	-9.8	-19.6	-9.7
13-Feb	-9.5	-10.7	-12.1	-12.3	-11.2	-10.5	-10.3	-10.2	-10.2	-10.1	-9.5	-8.5	-7.5	-6.6	-5.5	-4.0	-3.2	-3.4	-3.4	-4.3	-5.9	-6.0	-6.1	-8.3	-7.9	-3.2
14-Feb	-10.1	-11.7	-11.9	-11.1	-10.5	-9.9	-9.8	-9.7	-9.6	-8.6	-8.0	-7.4	-6.8	-6.2	-6.1	-6.1	-6.3	-6.8	-7.4	-7.9	-8.3	-8.6	-8.8	-9.3	-8.6	-6.1
15-Feb	-9.5	-9.8	-9.9	-10.2	-10.3	-10.6	-10.9	-11.1	-11.2	-11.3	-11.2	-11.1	-11.1	-11.1	-11.8	-12.0	-11.9	-11.9	-12.3	-13.0	-13.6	-13.8	-13.7	-13.7	-11.5	-9.5
16-Feb	-13.4	-13.0	-12.7	-12.7	-12.4	-12.2	-11.9	-11.5	-11.0	-9.9	-8.9	-8.1	-7.8	-7.0	-6.3	-5.8	-5.7	-5.7	-5.5	-5.4	-5.7	-6.2	-6.6	-7.2	-8.9	-5.4
17-Feb	-8.0	-8.8	-9.7	-10.7	-11.3	-12.0	-12.8	-13.4	-14.0	-14.1	-14.2	-14.7	-14.7	-14.6	-14.7	-14.9	-15.1	-15.3	-15.5	-15.4	-15.6	-15.6	-15.6	-15.7	-13.6	-8.0
18-Feb	-15.7	-15.6	-15.3	-15.1	-15.1	-15.1	-15.1	-14.7	-13.9	-13.3	-12.4	-11.0	-10.0	-8.8	-8.1	-7.1	-6.9	-7.2	-6.8	-6.6	-6.3	-8.7	-10.8	-12.4	-11.3	-6.3
19-Feb	-13.0	-13.6	-13.9	-14.8	-16.4	-18.3	-19.6	-20.4	-20.2	-19.5	-18.8	-18.2	-17.1	-16.1	-14.7	-15.3	-15.3	-15.5	-16.2	-16.7	-16.8	-17.1	-17.7	-18.8	-16.8	-13.0
20-Feb	-21.2	-23.3	-25.4	-26.4	-27.8	-28.6	-29.7	-30.9	-30.3	-25.7	-20.5	-17.3	-14.3	-12.8	-11.4	-11.0	-11.1	-14.0	-16.8	-19.2	-16.6	-15.0	-14.2	-13.9	-19.9	-11.0
21-Feb	-13.3	-13.0	-12.8	-12.5	-12.2	-12.0	-11.9	-11.8	-11.2	-9.8	-7.3	-5.9	-5.0	-4.7	-3.0	-2.7	-2.7	-3.7	-4.3	-4.7	-4.9	-6.7	-6.9	-9.4	-8.0	-2.7
22-Feb	-12.7	-14.1	-14.5	-16.9	-18.6	-19.4	-20.5	-21.1	-19.2	-15.4	-10.5	-6.2	-3.3	-1.0	1.0	1.5	2.2	-1.2	-3.9	-4.5	-3.7	-6.8	-9.7	-12.0	-9.6	2.2
23-Feb	-13.4	-14.4	-15.3	-16.0	-17.1	-15.3	-15.2	-14.9	-13.1	-7.3	-3.6	-2.0	-1.3	-0.3	0.2	-0.6	-0.3	-2.3	-4.4	-6.2	-7.7	-9.1	-9.1	-5.1	-8.1	0.2
24-Feb	-5.3	-6.0	-7.0	-10.7	-12.9	-15.4	-16.3	-17.4	-16.5	-10.2	-4.5	-1.3	1.6	3.6	4.6	4.6	3.9	0.6	-1.5	-3.1	-3.7	-4.6	-4.0	-2.9	-5.2	4.6
25-Feb	-4.9	-5.5	-5.1	-4.2	-3.1	-2.1	-2.3	-3.5	-3.1	-0.7	0.7	2.9	5.4	7.2	8.1	8.6	8.7	6.8	5.0	1.6	-1.4	-1.0	-1.9	-2.6	0.6	8.7
26-Feb	-1.2	-1.4	-1.7	-2.5	-1.6	-2.3	-2.1	-2.2	-1.4	1.4	3.3	5.1	5.6	5.1	3.7	2.6	2.1	0.2	-1.0	-1.9	-3.4	-4.9	-6.7	-8.2	-0.6	5.6
27-Feb	-9.7	-11.2	-12.8	-13.8	-14.6	-15.2	-15.5	-15.9	-16.3	-16.5	-16.0	-15.4	-15.1	-14.4	-13.8	-13.4	-13.1	-13.3	-13.4	-13.4	-13.5	-14.0	-15.3	-16.1	-14.2	-9.7
28-Feb	-17.1	-18.4	-19.9	-19.0	-18.2	-19.4	-20.7	-21.3	-21.8	-22.6	-22.4	-22.1	-21.3	-21.3	-20.9	-20.8	-20.8	-21.3	-22.0	-23.6	-24.4	-24.6	-26.5	-30.4	-21.7	-17.1
29-Feb	-32.3	-33.9	-34.7	-35.7	-36.0	-35.7	-37.2	-36.5	-34.1	-27.5	-23.3	-19.1	-16.3	-13.6	-12.7	-11.7	-11.2	-11.2	-11.8	-12.1	-12.0	-12.0	-11.7	-10.8	-22.2	-10.8
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Shell Muskeg River - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	65	9.34	9.34
-20 - 0	602	86.49	95.83
0 - 10	29	4.17	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Summary of Hour Averages

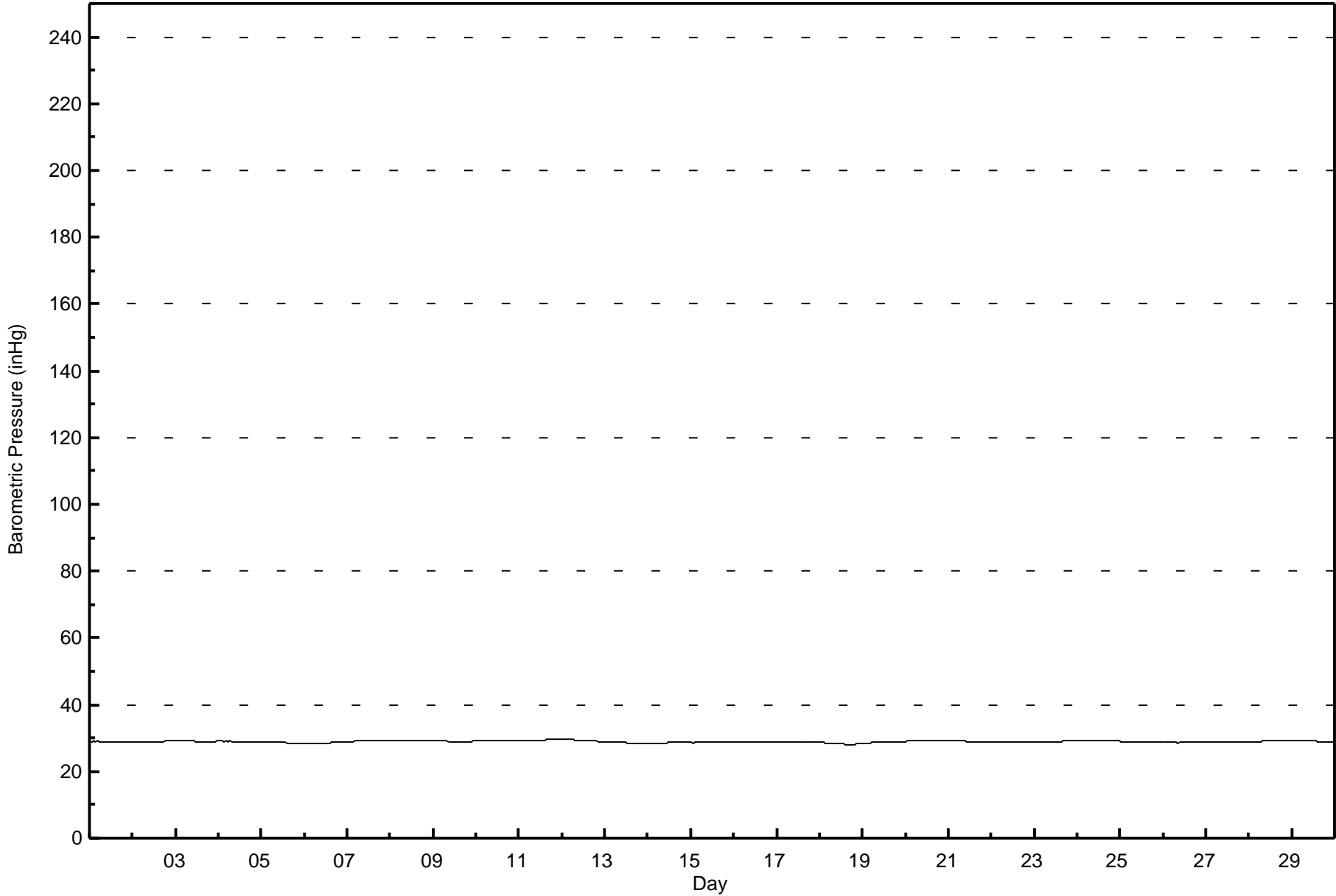
Barometric Pressure (BP) - inHg
Shell Muskeg River - February 2016

Maximum Value: 29.5 inHg on Feb 11 23:00		Maximum Daily Average: 29.4 inHg on Feb 11		Hours in Service: 696																								
Minimum Value: 28.1 inHg on Feb 18 17:00		Minimum Daily Average: 28.3 inHg on Feb 18		Hours of Data: 696																								
Maximum Diurnal Average: 28.9 inHg at hour 5		Minimum Diurnal Average: 28.9 inHg at hour 15		Hours of Missing Data: 0																								
Monthly Average: 28.91 inHg		Percentiles: P ₁ = 28.2 P ₁₀ = 28.6 Q ₁ = 28.7 Median = 28.9 Q 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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
2-Feb	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1
3-Feb	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
4-Feb	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
5-Feb	28.9	28.9	28.9	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	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.7
6-Feb	28.4	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.3	28.4	28.5	28.5	28.6	28.7	28.7	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.5
7-Feb	28.9	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2
8-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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2
9-Feb	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.1	29.1	29.1	29.1	29.0
10-Feb	29.1	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	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	29.3	29.3
11-Feb	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4
12-Feb	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.9	29.3
13-Feb	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6
14-Feb	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6
15-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	28.8	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	28.7
16-Feb	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	28.6	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
17-Feb	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	28.8	28.8	28.8	28.8	28.7	28.7	28.8
18-Feb	28.7	28.6	28.6	28.6	28.5	28.5	28.5	28.4	28.4	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3
19-Feb	28.4	28.4	28.5	28.5	28.6	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.7	29.0
20-Feb	29.0	29.0	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
21-Feb	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	29.0
22-Feb	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.8
23-Feb	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0
24-Feb	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.2
25-Feb	29.0	29.0	29.0	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7
26-Feb	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	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8
27-Feb	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	28.8
28-Feb	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	29.2	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	29.1
29-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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	29.1
																								Diurnal Average				
																								Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Shell Muskeg River - February 2016

Maximum Speed: 29 km/h on Feb 9 20:00	Maximum Daily Speed Average: 17.3 km/h on Feb 10	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 12 06:00	Minimum Daily Speed Average: 1.5 km/h on Feb 22	Hours of Data: 695
Maximum Diurnal Speed Average: 5.4 km/h at hour 21	Minimum Diurnal Speed Average: 0.4 km/h at hour 11	Hours of Missing Data: 1
Monthly Average Velocity: 2.9 km/h 54.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 7 Q ₃ = 13 P ₉₀ = 17 P ₉₉ = 26	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	SSW3	SSW3	SSW5	SSW6	SSW5	S6	SSE5	S5	S5	S4	S5	S7	SSW5	SSW7	SW6	SW6	SW6	SW5	SW5	S5	SSE3	E4	SSE2	SE4	S4.3	SSW7
2-Feb	SE4	SSE3	SE4	SSE3	S6	SSW5	S6	S6	SSW6	SSW6	S6	S9	SW6	S2	N10	NNE14	NE18	NNE16	NNE15	NNE18	NNE15	NNE13	NNE11	NNE10	NE3.5	NNE18
3-Feb	NE12	ENE7	NNE7	ENE5	SSE2	SE3	SSE3	S3	S3	S3	S4	S4	WNW0	SSE2	NNW6	N7	NE6	NNE11	NE17	NE18	NNE15	NE14	NE14	NE12	NE5.3	NE18
4-Feb	NE15	NE14	NE14	NE13	ENE8	NE9	NE5	ENE9	ENE6	E3	E1	E2	WNW3	WNW5	WSW4	NW1	NNW4	NE3	NNE2	NE4	NE4	ESE4	SE3	SSW6	NE4.1	NE15
5-Feb	S7	S6	SE6	S7	S6	SSE5	SSE3	SW4	SW3	SW4	SSW5	SW4	WSW5	SSW7	S8	SSW9	S8	SSW3	SSW5	SW7	S2	S2	SSW4	SSW5	S4.7	SSW9
6-Feb	S5	SSW6	SSW5	SW2	SSW5	SSW6	S6	S8	S7	SSW8	SW4	NNE20	NNE24	N18	N17	N15	N11	NNE9	NNE14	NNE13	ENE9	ENE7	ENE7	E4	NNE3.9	NNE24
7-Feb	E6	ENE11	NE14	ENE6	SW2	SW4	SSW3	ESE3	ESE1	ENE4	ENE8	NE10	ENE9	NE13	NE14	NE14	ENE11	ENE10	E2	WSW3	S5	SSW5	S6	S5	ENE4.6	NE14
8-Feb	S4	SW3	SSW5	S5	S8	S5	S6	SSW5	S2	S3	S3	SW5	NNE4	NW3	NNW4	NW2	WNW3	SE1	ENE1	NNE2	ENE1	S1	SSE3	WSW4	SSW1.9	S8
9-Feb	SSW3	SSW1	SSE4	WSW2	E4	SE3	S3	SSW3	S3	SW3	WSW2	WNW3	N2	NNW2	W3	SSE5	SSE3	NNE4	N19	NNE29	NNE24	NNE25	NNE24	NNE21	NNE5.1	NNE29
10-Feb	NNE20	NNE19	NNE26	NE24	NNE25	NNE22	NE22	NE21	NNE21	NE21	NE18	NE15	NE17	NNE14	NE18	NE20	NE15	NNE15	NE15	NE15	NE13	NE9	NE8	ENE8	NE17.3	NNE26
11-Feb	NE10	NE8	E2	S2	E3	NE6	ENE3	NE7	NE6	NNE7	NE8	N7	N8	N9	NNE13	N7	NNE14	NNE19	NE16	NE7	NE9	NE11	ENE6	ENE4	NE7.4	NNE19
12-Feb	E3	ESE4	S2	SSW4	ESE2	NNW0	NW4	WNW2	AF	W2	W3	W4	WNW4	NE4	SE6	SSE10	SSE9	SSE9	SSE13	SSE13	S15	SSE17	SSE18	SSE14	SSE5.4	SSE18
13-Feb	SSE15	SSE11	SSE11	SSE10	S12	S13	S13	S11	S10	SSE9	SSE12	S12	SSW11	SSW10	S9	S9	S7	S5	SSW6	SSW6	SSW6	SW9	NW3	ESE3	S8.8	SSE15
14-Feb	SW2	SSE1	ESE1	E2	S2	SSW1	SSW2	S2	S2	S3	SW3	SW4	WSW5	SW4	S2	SW2	ENE7	ENE11	NE14	ENE13	NE15	NE16	NE15	NE11	ENE3.1	NE16
15-Feb	NE11	NE12	NE12	NE15	NE16	NE17	NE17	NE16	NE14	NE15	NE12	NNE10	NNE9	NNE13	NE13	NE12	NE9	NE7	ENE11	ENE8	ENE7	E3	ESE3	ESE3	NE10.7	NE17
16-Feb	SW2	NW2	SSE1	ESE1	NNE2	SE4	S2	SSE1	WSW2	WSW1	WSW3	WSW3	NE4	NNW1	N3	NNW5	N6	NE10	NE12	NNE8	NNW6	N8	NNE16	NNE17	NNE3.3	NNE17
17-Feb	NNE12	N12	N12	NNE17	NNE16	NNE17	NNE17	NNE18	NNE19	NE20	NE17	NE17	NE17	NE19	NE18	NE18	NE15	NE18	NE17	NE17	NE18	NE18	NE19	NE16	NE16.4	NE20
18-Feb	NE16	NE17	NE15	NE11	NE12	NNE11	NNE14	NNE13	NNE9	NNW6	N5	N5	NNW5	NNW4	NW3	SE4	W4	NW7	WNW2	S3	NE6	NE21	NE24	NE25	NNE8.3	NE25
19-Feb	NE21	NNE14	N10	NNE16	NNE21	NE14	ENE11	ENE10	SSE3	ESE3	ENE5	NNE4	NNW5	WNW8	NW5	ENE7	ENE8	ENE13	ENE11	ENE10	ENE13	ENE9	ENE10	ENE9	NE8.4	NNE21
20-Feb	ENE6	ENE3	S3	ESE2	SSW5	S5	S4	S4	S4	S5	SSW6	SW10	SSW9	SW9	SSW8	SSW8	SSW7	SSE5	S4	S3	SSW4	SSW4	SSE3	SSE4	S4.3	SW10
21-Feb	SSW4	E3	SSW4	SSW5	S5	S4	S4	S5	S7	S6	S9	SSW10	SSW12	S9	S11	SSW9	SSW8	S8	SSE5	SSE4	E3	SSW8	W5	NW3	S5.5	SSW12
22-Feb	ENE3	NE3	NE7	WNW1	S1	SSE4	SSW3	SSW2	S2	SSW3	SSE3	S8	S9	S9	SSW8	SSW8	S5	SE3	W5	NNW8	NNW11	NNE5	ENE2	S2	SSW1.5	NNW11
23-Feb	SSW5	SSE4	S7	S6	S7	SW8	S6	S7	S5	S3	WSW5	N4	NE8	NE9	NE6	NE9	ESE5	SE4	SSW4	SW4	SSW4	WSW8	W9	WNW8	SSW2.0	ENE9
24-Feb	W13	W11	W10	WSW6	W5	ENE3	ESE3	SSE3	S6	S6	S7	S8	S9	S10	SSW11	SSW10	S8	SSE9	S7	S10	S11	S12	S14	S14	SSW6.8	S14
25-Feb	S9	S9	S9	S10	S10	S9	SSE8	S9	SSW10	SSW13	SW17	SW16	SSW13	SW17	WSW15	W12	W10	W11	WNW10	W7	S3	SW2	SW3	S7	SW8.4	SW17
26-Feb	SSW8	SSW10	SSW11	SSW10	SSW11	SSW10	SW17	SW12	S9	SW7	SW9	WSW6	NNW9	NE11	NE17	NE19	NNE20	NE23	NNE26	NNE26	NNE26	NE25	NE23	NNE21	NE5.3	NNE26
27-Feb	NNE22	NNE27	NNE26	NNE23	NNE22	NNE22	NNE18	N17	N17	N17	NNE14	NNE16	N14	N9	NNE8	NE5	WNW5	W2	ESE3	SE5	E3	NE16	NE20	NE20	NNE13.5	NNE27
28-Feb	NE16	NE14	ENE12	NE15	NNE22	NNE24	N20	N21	N23	NNE22	NNE15	N15	NNE17	NE23	NE19	NNE16	NNE14	NE14	NE15	NE17	NE17	NE13	NNE7	S3	NNE15.4	NNE24
29-Feb	S6	S6	S5	S6	S6	SW4	S7	S6	SSW7	SSW7	SW7	WSW9	SW9	SW9	WSW8	SSW7	SSW6	SSW4	SW5	SSW5	SSE4	SSE6	S6	S7	SSW5.8	SW9

ENE3.6	ENE3.8	ENE3.0	ENE2.7	ENE2.6	ENE2.5	E2.1	E1.9	E1.5	ENE1.0	SE0.4	NNW0.5	NNE1.7	NNE1.7	NE2.4	NE2.8	NE3.0	NE4.7	NE5.1	NE5.1	NE5.4	NE5.3	NE5.4	ENE4.4	Diurnal Average
NNE22	NNE27	NNE26	NE24	NNE25	NNE24	NE22	NE21	N23	NNE22	NE18	NNE20	NNE24	NE23	NE19	NE20	NNE20	NE23	NNE26	NNE29	NNE26	NNE25	NNE24	NE25	Diurnal Maximum

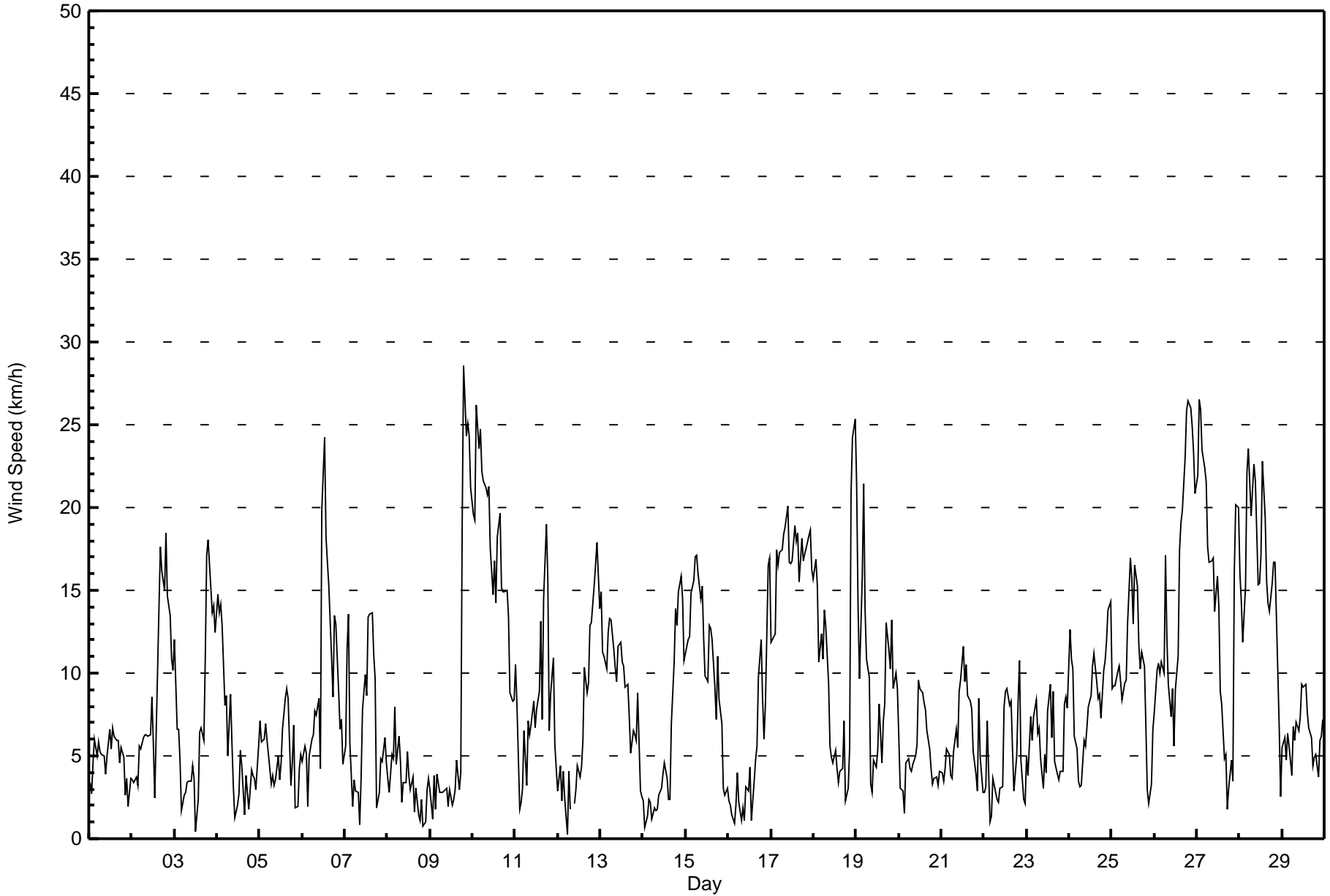
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Shell Muskeg River - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 9 19:00 Minimum Value: 0 km/h on Feb 22 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: 696 Hours of Data: 695 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	1	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2	1	1	1	1	2	1	1	2	2	2
2-Feb	1	1	1	1	1	1	1	2	1	1	2	2	2	1	4	4	3	4	4	4	3	3	3	3	3	4
3-Feb	2	2	2	2	2	1	0	1	1	1	1	1	1	1	2	3	3	3	3	3	4	3	3	2	4	4
4-Feb	2	2	2	2	2	2	3	2	2	2	1	1	2	1	1	1	1	2	1	1	2	1	1	1	1	3
5-Feb	1	1	1	2	1	1	1	1	2	1	2	2	3	2	3	3	3	3	2	4	3	2	2	1	4	4
6-Feb	1	1	1	2	2	1	2	2	2	2	4	6	6	5	4	4	3	3	3	2	5	2	2	1	6	6
7-Feb	3	3	3	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	3	3
8-Feb	1	2	1	1	2	3	1	1	2	1	1	1	2	2	1	2	2	1	2	1	1	1	1	1	3	3
9-Feb	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	3	7	7	6	6	7	6	7	7
10-Feb	4	4	4	4	5	5	4	4	5	4	3	3	3	4	3	2	4	4	3	2	2	2	2	2	5	5
11-Feb	2	4	2	1	2	2	1	2	2	2	2	2	3	2	3	2	5	4	2	4	3	2	2	2	5	5
12-Feb	1	1	1	1	1	1	2	1	AF	1	1	1	1	1	5	3	3	3	3	4	5	5	5	4	5	5
13-Feb	4	3	3	3	4	3	4	3	3	3	3	3	3	3	2	3	2	1	1	1	2	2	2	1	4	4
14-Feb	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	3	3	3
15-Feb	2	2	2	2	2	2	4	2	2	1	3	3	3	4	2	3	4	4	2	2	2	2	1	1	4	4
16-Feb	1	1	1	1	2	1	2	1	1	1	1	1	3	1	1	2	2	2	2	2	2	3	4	5	5	5
17-Feb	4	4	3	4	4	5	3	5	4	4	4	3	2	3	3	3	3	2	2	2	2	2	3	3	5	5
18-Feb	3	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	1	2	1	1	6	4	5	3	6	6
19-Feb	4	4	3	5	4	4	4	4	1	1	2	1	2	1	2	2	2	2	2	2	3	2	3	2	5	5
20-Feb	3	2	1	2	1	1	1	1	1	1	2	2	3	2	3	2	2	1	1	1	1	1	1	1	3	3
21-Feb	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	2	3	3	1	2	2	2	3	3
22-Feb	1	2	5	1	1	1	1	0	0	1	1	2	2	3	2	3	1	1	2	2	1	3	1	1	5	5
23-Feb	1	2	2	1	1	2	2	1	2	1	1	1	2	2	2	1	1	1	2	1	1	1	3	2	3	3
24-Feb	2	2	2	1	2	2	1	1	2	2	2	2	3	3	3	2	2	1	1	2	1	2	3	3	3	3
25-Feb	2	2	2	2	2	2	2	2	2	5	3	3	4	3	3	2	2	3	4	2	1	1	1	1	5	5
26-Feb	1	3	2	2	2	3	6	4	2	3	2	2	3	5	2	3	4	4	5	4	4	5	3	4	6	6
27-Feb	5	5	5	5	4	4	3	3	3	4	3	3	4	3	2	2	1	1	1	1	2	5	3	4	5	5
28-Feb	3	3	3	4	4	5	5	5	6	5	4	4	4	3	3	3	3	2	2	3	2	3	2	1	6	6
29-Feb	1	1	1	1	1	1	1	1	1	2	1	2	2	2	1	2	2	1	1	1	1	1	1	1	2	2
Diurnal Maximum																										
AF - Analyzer Failure																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	267	38.42	38.42
6 - 11	233	33.53	71.94
12 - 19	149	21.44	93.38
20 - 28	45	6.47	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Shell Muskeg River - February 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	7	8	11	14	16	12	28	55	39	23	12	9	10	9	9	267
6 - 11	11	14	25	31	1	0	1	11	65	39	14	5	6	3	1	6	233
12 - 19	11	37	71	4	0	0	0	7	8	3	5	1	2	0	0	0	149
20 - 28	3	26	16	0	0	0	0	0	0	0	0	0	0	0	0	0	45
29 - 38	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	85	120	46	15	16	13	46	128	81	42	18	17	13	10	15	695

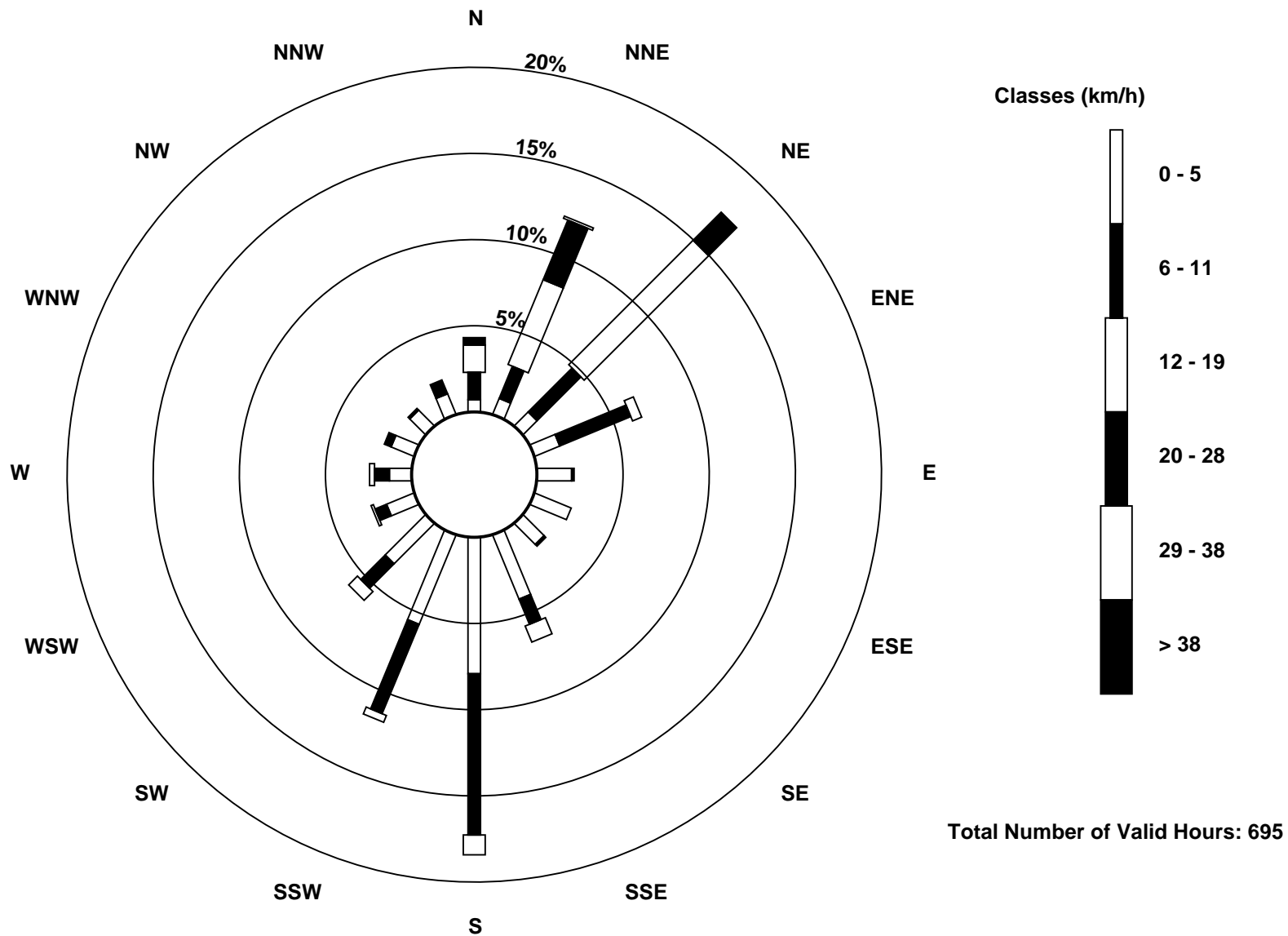
Total Number of Valid Hours: 695

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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 2016

Direction of Maximum Speed: 23 deg on Feb 9 20:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 38.8 deg on Feb 10	Hours of Data: 695
Direction of Minimum Speed: 337 deg on Feb 12 06:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 1.5 deg on Feb 22	Percent Operational Time: 99.9
Monthly Average Direction: 202.0 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	193	194	200	209	203	173	158	188	185	188	175	170	194	193	215	221	221	219	224	171	157	86	154	136	189.7
2-Feb	140	154	140	154	187	195	176	176	195	196	182	176	214	188	355	32	48	30	24	31	30	27	23	22	50.7
3-Feb	42	61	32	71	162	133	151	171	172	190	183	186	298	158	342	350	38	32	44	40	32	37	54	55	47.7
4-Feb	53	53	51	56	67	55	46	59	62	83	95	97	285	297	248	310	339	36	17	36	49	103	138	208	52.6
5-Feb	177	172	146	177	171	162	162	219	234	223	213	216	248	196	172	195	183	204	194	221	181	184	193	196	190.6
6-Feb	189	195	201	232	200	206	178	176	183	202	227	13	25	8	2	4	7	15	32	27	61	78	72	93	28.7
7-Feb	80	58	53	69	225	225	209	118	103	59	64	56	57	56	52	50	60	65	98	244	183	197	184	180	69.8
8-Feb	175	216	193	178	179	178	176	212	174	177	191	220	15	318	331	320	302	139	74	32	64	189	167	245	196.8
9-Feb	200	211	149	251	89	145	183	213	191	227	258	289	6	339	277	166	153	14	2	23	16	18	28	26	20.0
10-Feb	28	31	29	37	31	29	45	51	30	37	42	41	50	33	41	52	47	31	36	45	46	42	49	57	38.8
11-Feb	56	50	79	189	85	53	69	56	44	22	34	359	353	10	32	3	24	30	37	49	47	56	63	74	37.4
12-Feb	101	116	177	195	120	337	322	295	AF	281	275	259	282	44	146	156	167	163	165	164	170	166	167	162	167.1
13-Feb	164	162	160	166	170	175	174	176	174	152	165	189	198	201	188	178	173	181	192	196	195	221	316	113	177.6
14-Feb	231	157	122	88	181	213	198	184	188	181	230	222	246	231	174	229	68	61	52	59	51	50	40	47	62.4
15-Feb	48	47	49	41	47	50	52	52	50	47	46	32	15	26	47	47	34	38	59	73	70	84	114	114	47.9
16-Feb	230	309	161	119	22	130	178	160	247	248	238	251	39	330	0	332	359	47	50	14	338	359	28	26	18.9
17-Feb	14	4	4	20	28	24	28	30	28	45	37	48	49	46	52	41	48	48	52	47	50	52	50	51	38.7
18-Feb	54	53	53	38	46	26	28	25	20	340	5	357	332	335	320	130	266	308	290	174	56	40	43	46	33.4
19-Feb	47	27	353	28	26	46	61	63	157	107	67	33	334	300	311	65	73	66	69	72	60	76	68	63	47.0
20-Feb	71	67	179	102	205	181	180	169	174	185	196	219	195	216	199	205	192	155	173	180	193	192	156	168	185.9
21-Feb	193	99	195	196	189	177	190	180	182	184	187	202	200	191	182	199	192	182	167	149	89	197	267	324	188.9
22-Feb	57	52	44	303	185	152	197	194	186	194	155	180	188	191	206	209	178	144	269	333	339	19	68	184	192.9
23-Feb	212	166	191	179	190	223	176	186	186	183	246	353	52	56	41	49	109	133	206	214	212	243	277	300	195.4
24-Feb	270	278	268	256	270	71	112	161	190	191	191	181	187	190	201	193	189	164	182	188	182	180	184	188	199.6
25-Feb	189	186	185	189	183	191	167	189	192	211	226	220	212	223	237	267	272	279	284	265	175	234	216	171	217.0
26-Feb	192	206	196	200	197	210	225	216	172	216	231	254	334	38	45	46	33	35	28	26	32	35	38	26	34.9
27-Feb	21	26	22	21	20	17	15	9	5	2	14	12	4	2	15	47	291	268	111	139	92	36	41	34	20.1
28-Feb	36	49	70	34	24	23	7	358	9	12	13	6	31	48	47	30	27	37	47	50	48	44	24	177	29.8
29-Feb	186	175	184	189	180	215	188	183	194	201	230	239	232	222	237	207	200	204	215	196	167	160	176	181	201.1
61.7 57.7 63.1 61.1 66.9 66.2 84.3 81.0 83.3 74.9 133.8 347.4 11.4 27.3 34.3 51.0 51.4 47.9 45.2 48.0 51.4 53.4 54.4 58.5																									
Diurnal Average																									

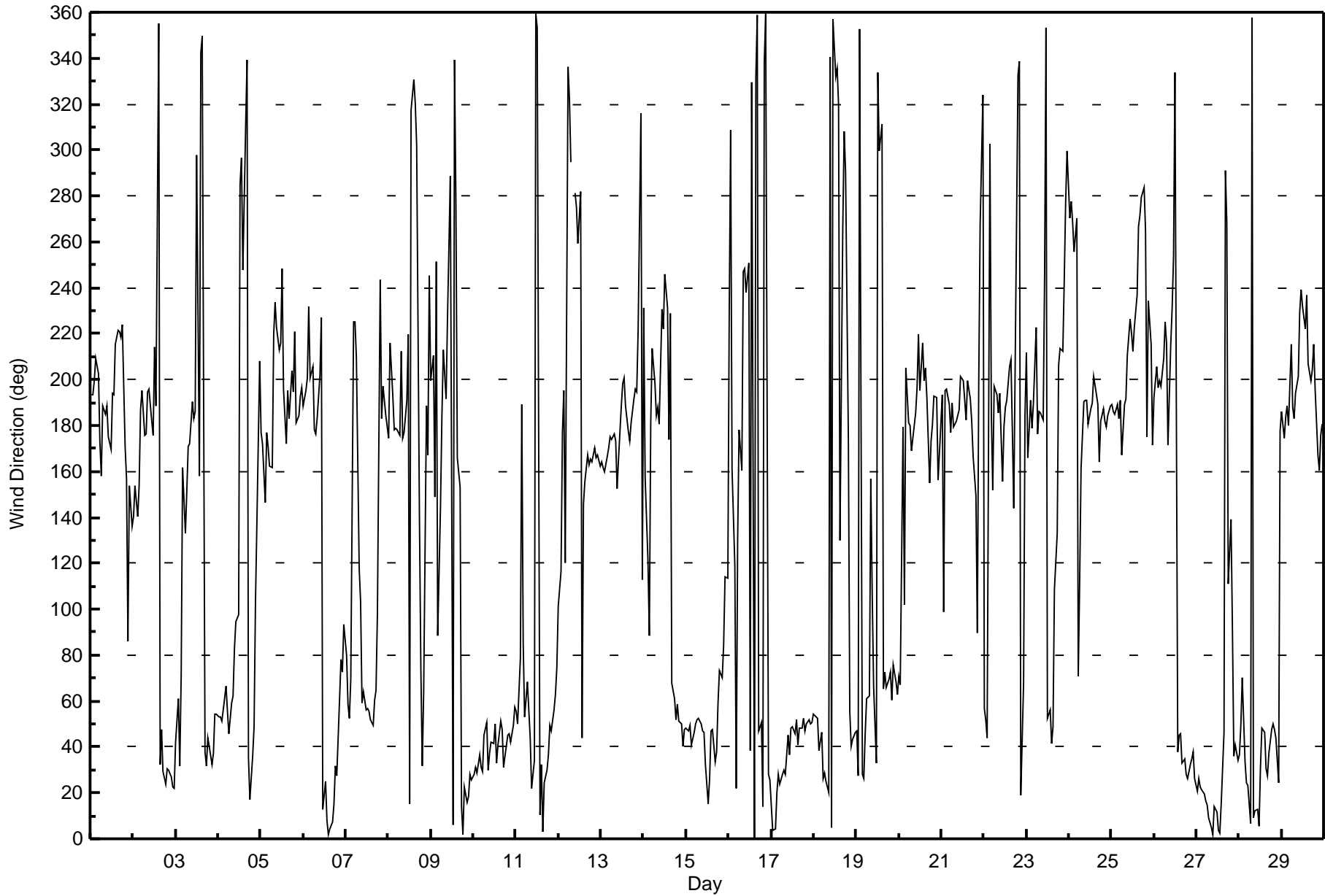
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Shell Muskeg River - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Feb 3 13:00 Minimum Value: 6 deg on Feb 1 06:00 Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 13 Median = 19 Q ₃ = 29 P ₉₀ = 53 P ₉₉ = 88		Hours in Service: 696 Hours of Data: 695 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	26	39	12	10	12	6	11	15	15	25	22	19	36	25	26	24	13	14	8	20	49	33	48	29	49																						
2-Feb	24	29	20	46	12	15	10	16	20	17	22	17	26	69	26	15	9	19	21	13	13	16	22	21	69																						
3-Feb	19	28	27	56	76	29	24	25	21	23	24	50	103	69	24	32	44	23	12	13	18	17	13	15	103																						
4-Feb	10	11	8	10	13	20	30	9	20	30	64	65	73	23	18	67	41	65	69	35	39	23	44	15	73																						
5-Feb	11	15	17	12	14	15	31	27	35	28	19	36	27	30	25	22	17	45	25	32	88	76	26	15	88																						
6-Feb	17	18	25	77	34	29	21	16	17	16	57	20	14	17	17	20	22	15	15	25	18	15	17	77																							
7-Feb	33	15	12	26	56	16	37	36	92	53	12	14	14	9	12	10	10	13	74	32	20	19	13	16	92																						
8-Feb	22	16	24	22	18	54	15	16	66	51	48	26	43	58	25	56	35	52	91	61	88	70	17	22	91																						
9-Feb	53	84	22	48	33	31	27	19	30	42	45	29	53	42	42	23	27	35	16	12	15	15	12	15	84																						
10-Feb	15	15	11	15	13	12	11	9	15	14	15	15	11	21	14	7	18	16	13	12	12	17	16	11	21																						
11-Feb	11	16	69	37	51	18	40	13	16	22	21	27	24	23	15	27	17	8	9	54	24	11	18	25	69																						
12-Feb	43	19	45	21	24	84	37	73	AF	29	39	25	36	28	47	15	15	17	14	15	15	15	14	14	84																						
13-Feb	13	14	13	13	15	15	14	14	16	14	17	22	20	18	17	19	20	18	13	20	35	67	55	67																							
14-Feb	42	100	69	44	42	80	33	37	49	22	13	15	18	21	31	34	18	10	10	12	9	7	13	13	100																						
15-Feb	13	12	10	11	9	8	9	8	13	10	18	23	22	22	14	14	29	55	14	15	13	48	25	28	55																						
16-Feb	51	69	64	89	61	38	85	89	55	88	29	34	63	85	36	26	30	11	7	17	19	25	10	14	89																						
17-Feb	20	17	20	17	13	15	13	18	12	11	22	13	10	11	11	13	13	12	8	10	9	7	10	10	22																						
18-Feb	8	8	7	16	12	14	11	11	19	45	39	47	39	41	78	48	23	15	58	25	51	13	11	7	78																						
19-Feb	10	23	20	20	10	21	33	36	41	66	46	43	35	15	53	17	15	8	12	12	13	15	14	9	66																						
20-Feb	39	68	29	64	16	12	15	28	17	18	25	16	25	22	25	24	21	11	8	10	34	18	24	10	68																						
21-Feb	23	22	24	13	11	14	22	17	14	25	24	24	22	24	21	23	19	14	28	59	44	15	34	58	59																						
22-Feb	60	32	57	82	60	27	10	17	14	19	23	20	24	24	24	24	23	58	40	13	12	72	62	75	82																						
23-Feb	14	46	13	13	15	21	23	23	38	30	26	50	11	10	23	7	25	39	61	21	30	14	18	17	61																						
24-Feb	8	10	12	12	21	60	40	21	21	19	24	18	23	22	23	21	18	11	16	14	10	10	13	15	60																						
25-Feb	13	13	14	16	15	19	14	15	16	21	7	10	20	10	9	16	13	15	20	30	56	65	35	17	65																						
26-Feb	18	23	16	14	13	17	11	20	25	27	10	39	31	28	11	8	11	12	10	9	12	12	12	18	39																						
27-Feb	15	8	13	15	14	15	16	17	17	14	18	18	16	32	32	34	31	69	37	16	48	19	11	12	69																						
28-Feb	13	21	14	20	10	11	15	16	17	17	20	20	24	9	12	20	21	18	10	8	8	8	30	55	55																						
29-Feb	9	11	16	8	12	21	11	11	10	19	17	7	22	21	13	24	21	17	12	18	15	10	11	14	24																						
Diurnal Maximum																								60	100	69	89	76	84	85	89	92	88	64	65	103	85	78	67	44	69	91	61	88	76	67	75
AF - Analyzer Failure																																															





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 11, 2016	Last Calibration	January 25, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	13:40	End Time (MST)	16:15
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	778	779
Calculated slope	1.001020	0.997511	Chamber temp	45.2	45.1
Calculated intercept	1.140698	2.306207	Pressure	705.7	726.4
Analyzer Background	8.7	8.6	Flow	0.448	0.461
Analyzer Coefficient	1.215	1.215	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 1118148498

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	83.6	807.6	808.7	0.999
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	83.6	807.6	808.7	0.999
second point	5000	42.0	405.7	402.4	1.008
third point	5000	21.1	203.8	200.6	1.016
as left zero	6000	0.0	0.0	-0.1	----
as left span	5000	83.6	807.6	807.4	1.000
Average Correction Factor					1.008

Corrected As found 808.9 Previous response 805.6 % change -0.4%

Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By: Evan Magill



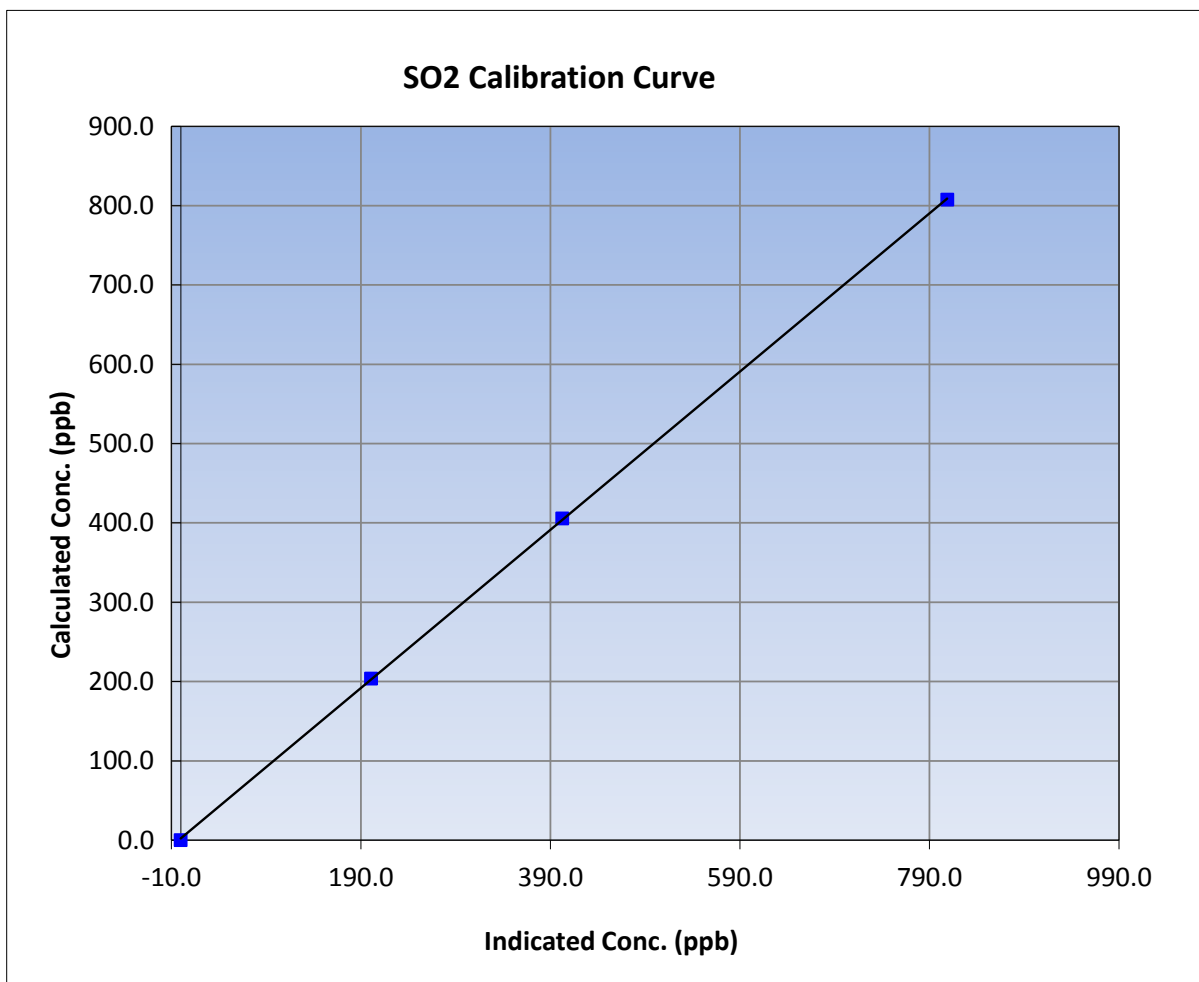
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 25, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	13:40	End Time (MST)	16:15
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

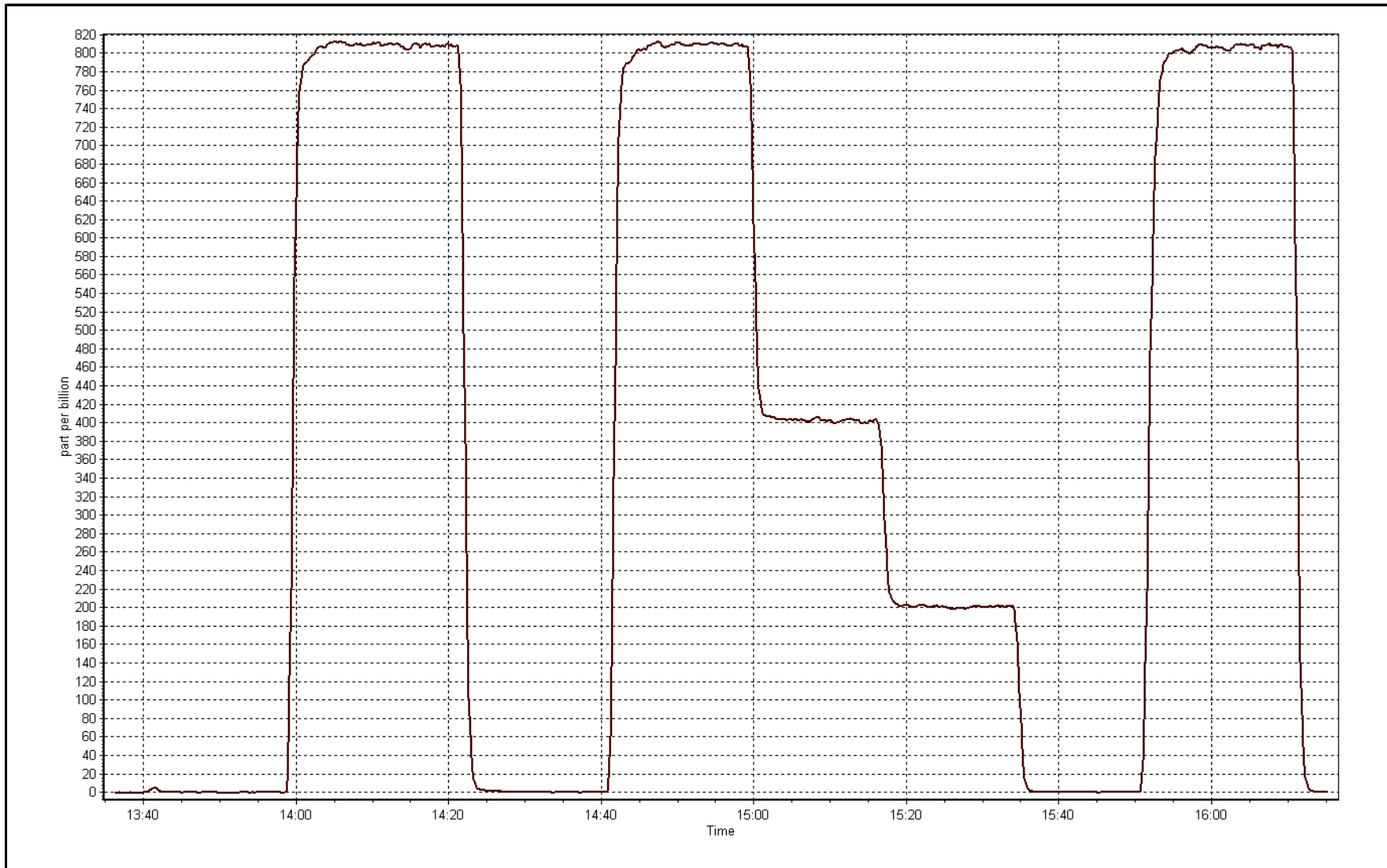
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999964
807.6	808.7	0.9987		
405.7	402.4	1.0083	Slope	0.997511
203.8	200.6	1.0162		
			Intercept	2.306207



SO2 Calibration Plot

Date: February 11, 2016





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-11-16	Last Calibration	January-25-16
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	13:40	End Time (MST)	16:15
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.6	34.8
Calculated slope	1.006309	0.992161	Fuel Pressure	24.2	24.2
Calculated intercept	-0.051933	0.016547	Analyzer Coeff	4.574	4.586
			Analyzer BKG	2.24	2.29

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.09	----
as found span	5000	83.6	17.02	17.13	0.993
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	83.6	17.02	17.13	0.993
second point	5000	42.0	8.55	8.60	0.994
third point	5000	21.1	4.29	4.33	0.992
as left zero	6000	0.0	0.00	0.04	----
as left span	5000	83.6	17.02	17.18	0.990
Average Correction Factor					0.993

Corrected As found	17.04	Previous response	16.96	% change	-0.5%
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Notes:

Changed inlet filter after as founds. Adjusted zero.

Calibration Performed By:

Evan Magill



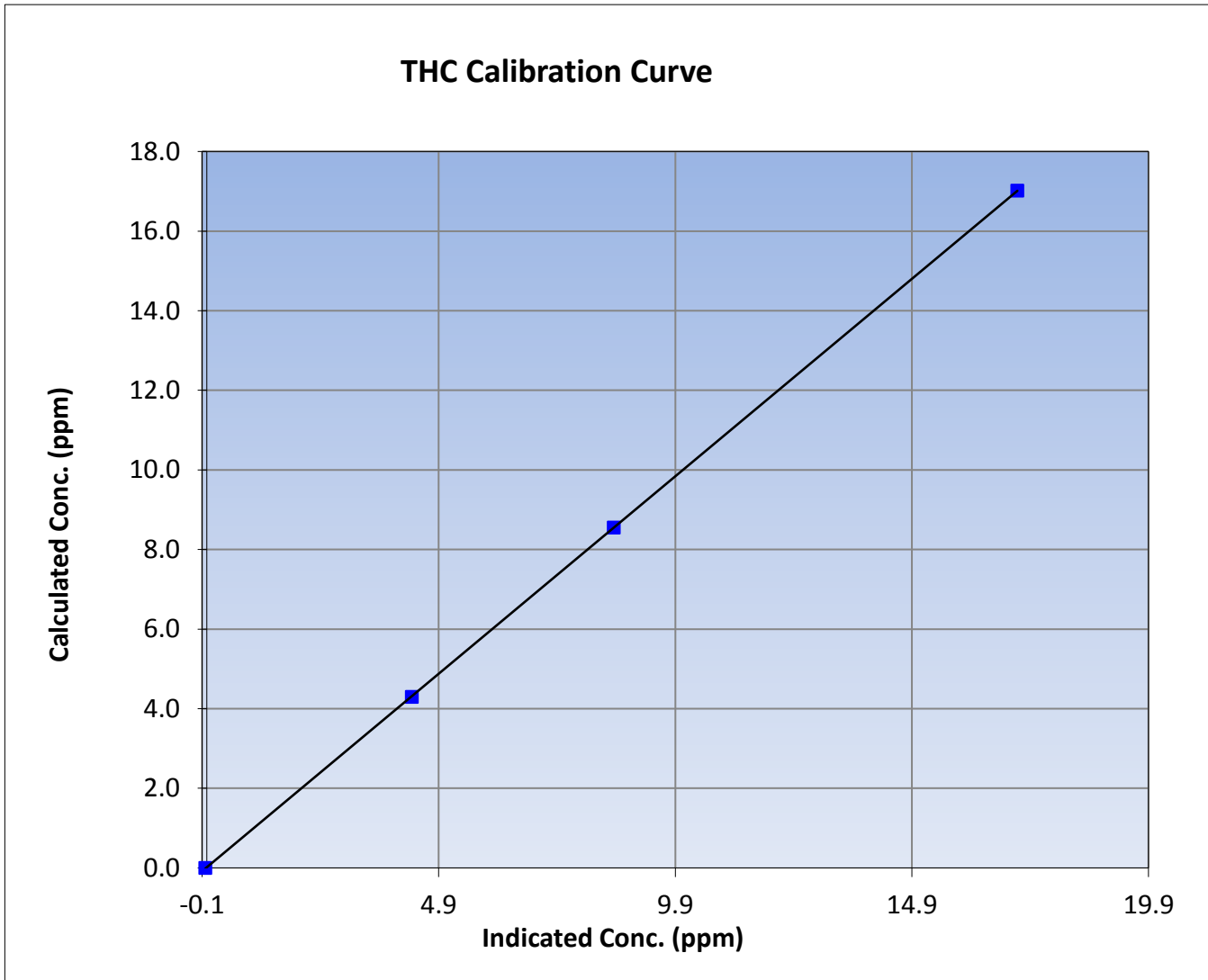
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 25, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	13:40	End Time (MST)	16:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

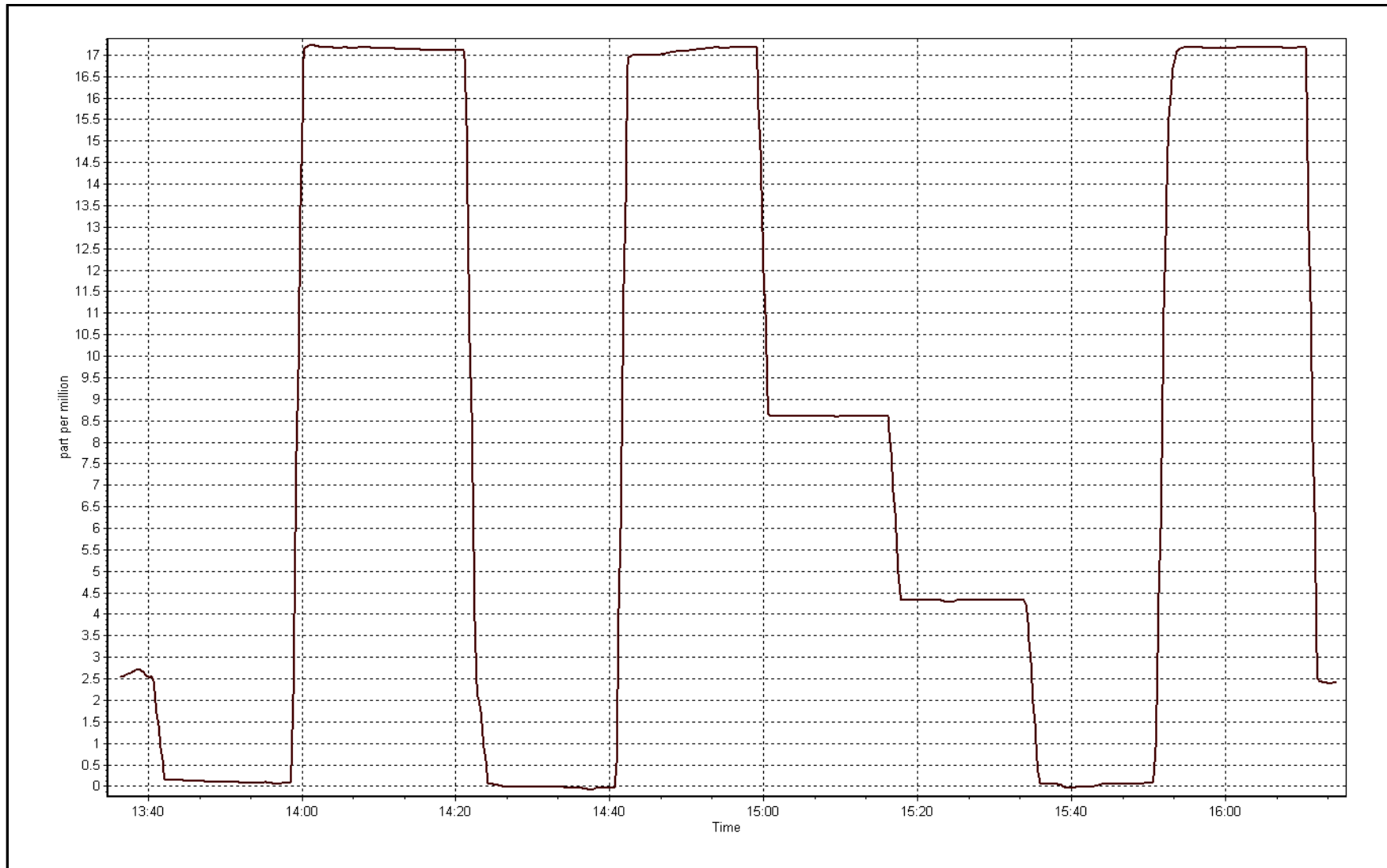
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999997
17.02	17.13	0.9934		
8.55	8.60	0.9941	Slope	0.992161
4.29	4.33	0.9919		
			Intercept	0.016547



THC Calibration Plot

Date: February 11, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	12:02	End Time (MST)	17:25
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	API T700	Serial Number	493
Zero air Generator	Teledyne API T701	Serial Number	2155

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000617	1.000095	0.993246
	Data Offset	0.493340	1.349049	0.175134
Current Calibration	Data Slope	1.000092	1.000355	0.981269
	Data Offset	1.807861	2.323461	1.112203

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.826		1.016	
NOx coefficient	0.997		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.1		8.7	
NOx bkgrnd	9.4		9.0	
Chamber Temp	50.4	Deg C	50.5	Deg C
Moly Temp	322.6	Deg C	324.5	Deg C
PMT voltage	-774	V	-744.4	V
PMT Temp	-2.7	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	178.9	mmHg	164.3	mmHg
R Cell Press Nox	178.6	mmHg	164	mmHg
NO sample flow	0.829	lpm	0.901	lpm
Nox sample Flow	0.831	lpm	0.904	lpm

Notes:

Changed inlet filter after as founds. Replaced pump and charcoal after as founds for preventative maintenance. A PMT adjustment was done after the span adjustment brought the coefficient down to 0.751. Used the 2nd GPT points.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 16, 2016

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.3	----	----
as found span	5000	83.6	802.6	802.6	0.0	805.9	804.4	1.6	0.9958	0.9977
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.4	0.0	----	----
high point	5000	83.6	802.6	802.6	0.0	801.7	801.3	0.4	1.0011	1.0016
second point	5000	42.0	403.2	403.2	0.0	399.8	398.7	1.1	1.0086	1.0113
third point	5000	21.1	202.6	202.6	0.0	199.8	198.9	0.9	1.0138	1.0184
as left zero	6000	0.0	0.0	0.0	0.0	0.2	-0.4	0.6	----	----
as left span	5000	83.6	802.6	500.7	301.9	801.2	500.4	300.8	1.0017	1.0007
Average Correction Factor									1.0078	1.0104

Corrected As found

NO_x= 805.6

NO= 804.4

Percent Change

NO_x= -0.5%

NO= -0.4%

Previous Response

NO_x= 801.6

NO= 801.1

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

83.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	500.7	288.6	797.0	500.7	295.3	0.9905	1.0000	0.9772	102.3%
2nd NO2 (200)	----	588.4	200.8	788.5	588.4	200.1	1.0011	1.0000	1.0035	99.7%
3rd NO2 (100)	----	686.4	102.8	789.9	686.4	103.5	0.9993	1.0000	0.9931	100.7%
4th NO2 (0)	789.2	----	1.8	791.0	789.2	1.8	0.9979	1.0000	N/A	----
Average Correction Factor							0.9972	1.0000	0.9913	100.9%

Calibration Performed By:

Evan Magill



Wood Buffalo Environmental Association

NO_x Calibration Summary

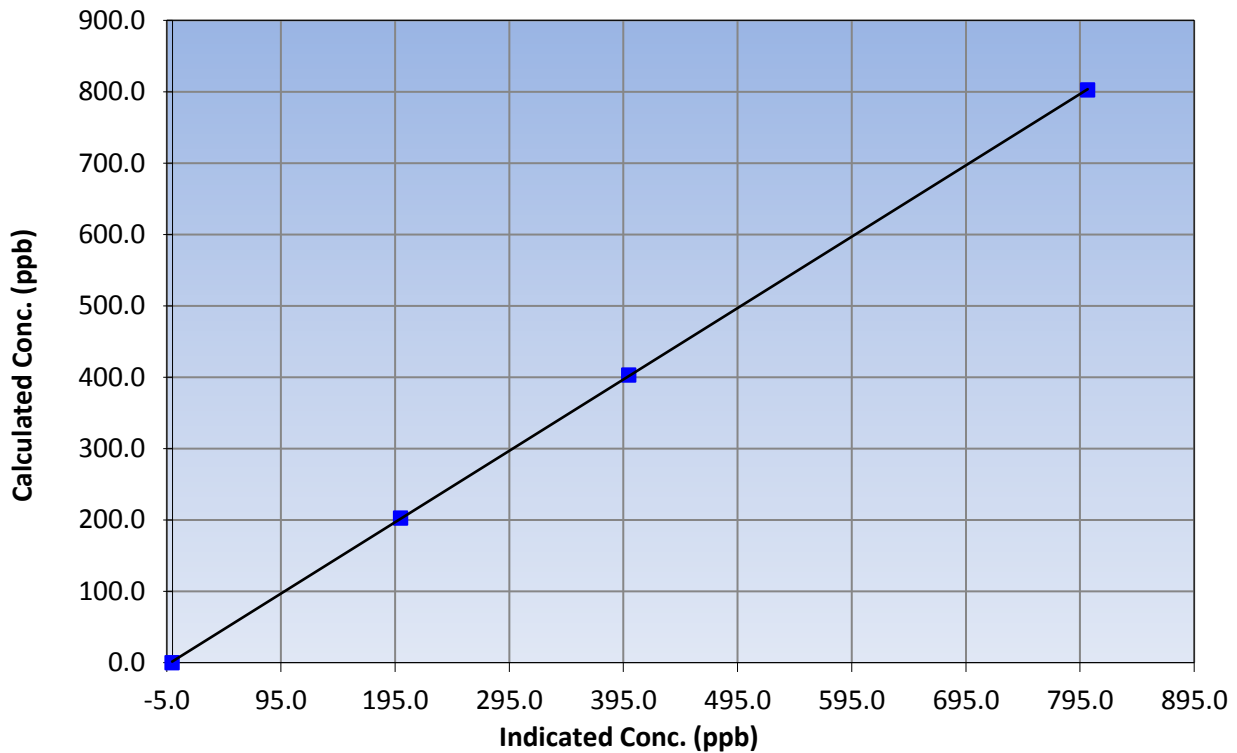
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	12:02	End Time (MST)	17:25
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999981
802.6	801.7	1.0011		
403.2	399.8	1.0086	Slope	1.000092
202.6	199.8	1.0138		
			Intercept	1.807861

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

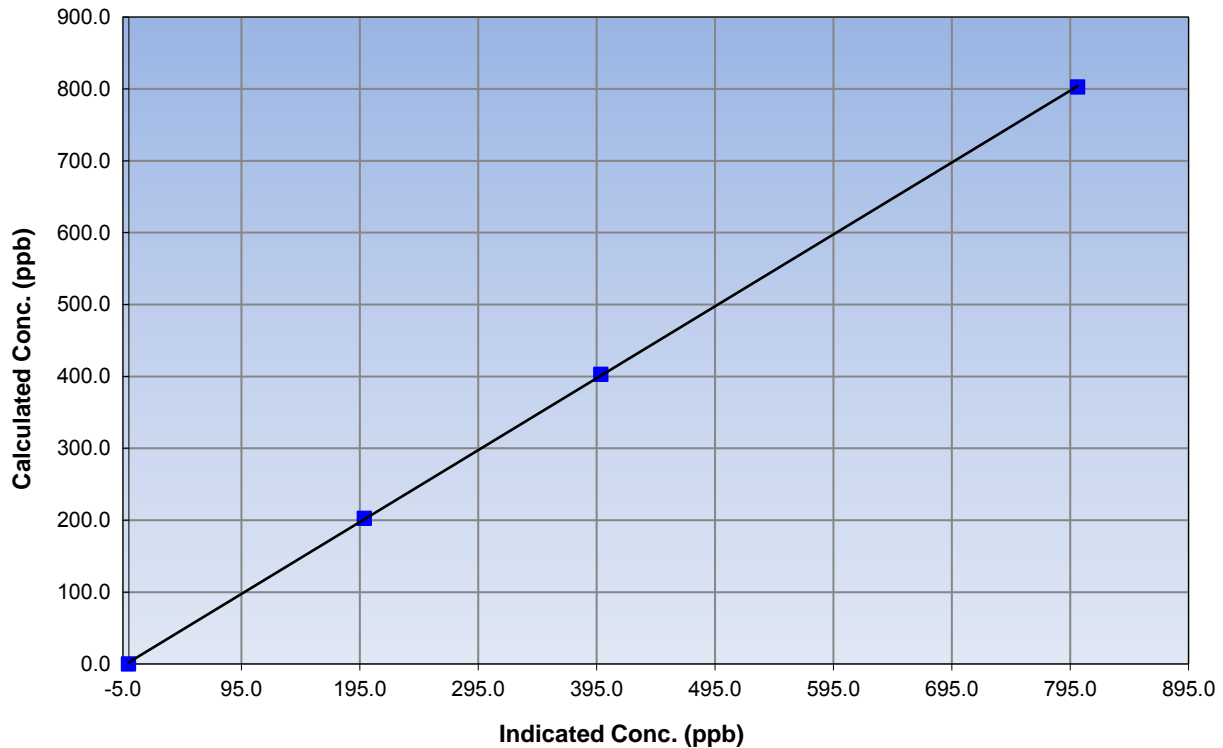
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	12:02	End Time (MST)	17:25
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	-0.4	N/A	Correlation Coefficient	0.999968
802.6	801.3	1.0016		
403.2	398.7	1.0113	Slope	1.000355
202.6	198.9	1.0184		
			Intercept	2.323461

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

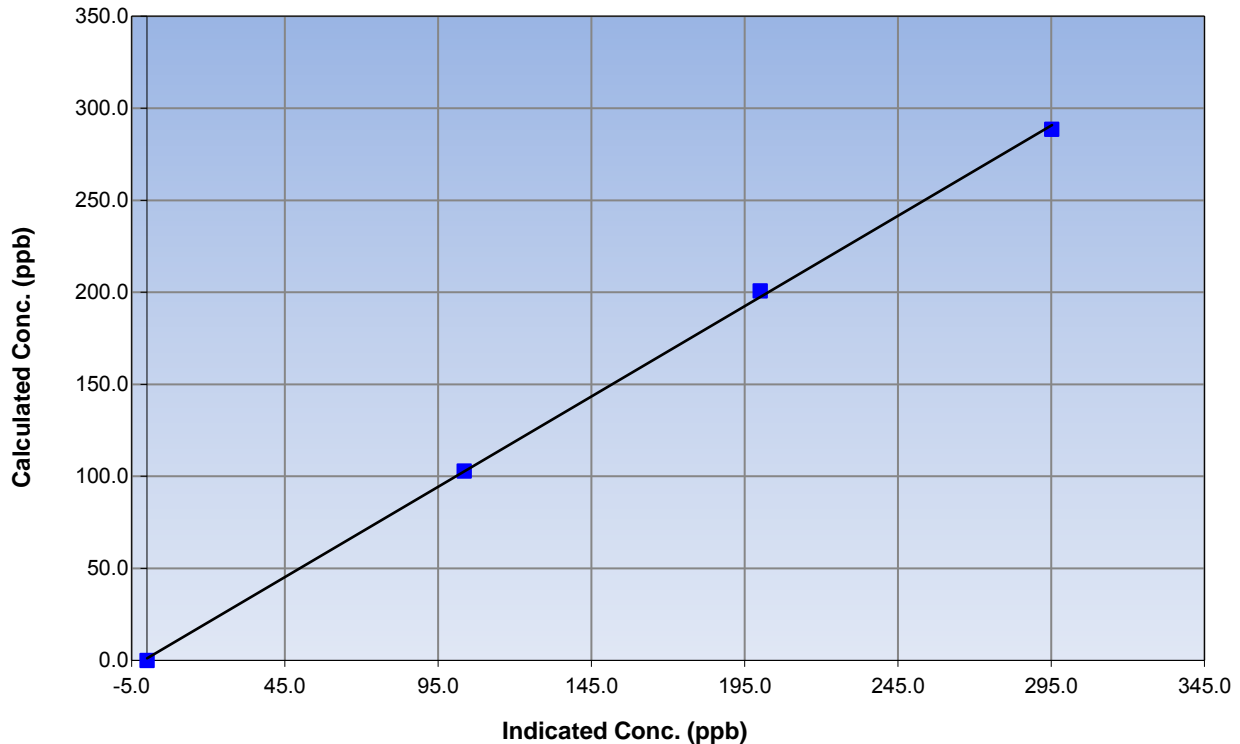
Station Information

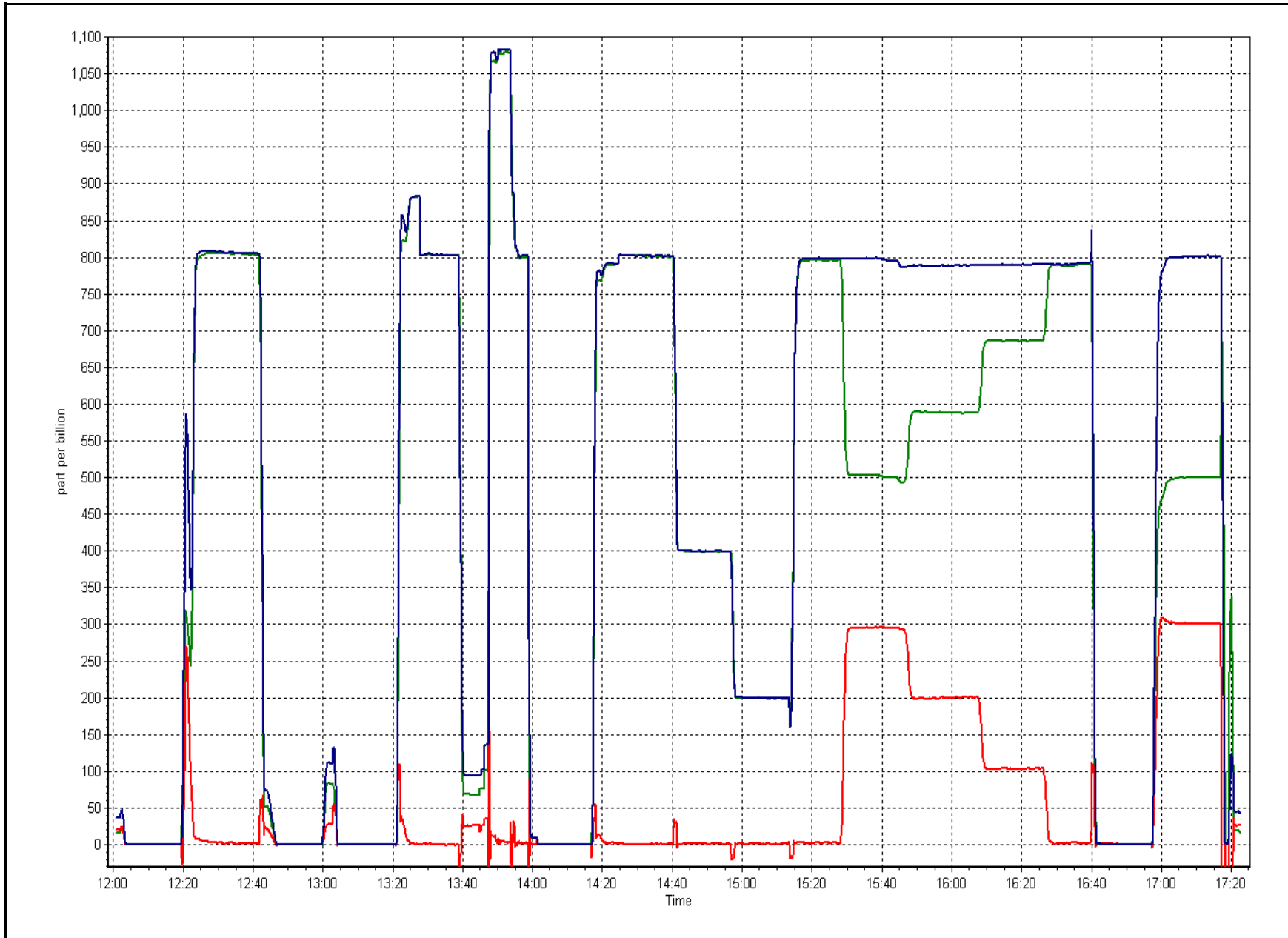
Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	12:02	End Time (MST)	17:25
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999618
288.6	295.3	0.9772		
200.8	200.1	1.0035	Slope	0.981269
102.8	103.5	0.9931		
			Intercept	1.112203

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	February 16, 2016	Previous Calibration:	January 25, 2016
Station Name:	Shell Muskeg River	Station Number:	AMS 16
Start Time (MST):	11:02	End Time (MST):	11:55
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1102

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number:	E-798		
C ₁₄ Source SN:	4142		
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-6.0	-5.5	0.5	-6.0
T2		na	na	
T3		na	na	
T4		na	na	
RH (%)		na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	972	971.0	-1.0	972

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1012	12	1012	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	549		546
Neph	1.5		0
C14	19		20.4
Indicated Concentration (ug/m3)	0.3	yes	0.0
Offset 1	546.5		546.5
Offset 2	68.9		68.9

Leak Check (Quarterly)			
Leak Check Date:	January 25, 2016	Previous Leak Check Date:	October 29, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.70		0.09
*Flow with adaptor (LPM):	16.61		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	May 25, 2015	Previous Foil Calibration:	na
Zeroed?:	yes		
Foil Mass:	1337		Mass foil set S/N: 2518
Previous Correction Factor:	7029		
New Correction Factor:	7067		

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

NOTES:

Adjusted zero. Replaced cyclone head with a clean one.

Calibration Performed By: Evan Magill



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 17
WAPASU
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 FEBRUARY 2016

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	662	34	34	100.00	16	0	4	0
H2S (ppb) Average	663	33	33	100.00	2	0	1	0
THC (ppm) Average	660	34	36	99.71	3	-	2.4	-
O3 (ppb) Average	664	32	32	100.00	43	0	39	-
NO2 (ppb) Average	662	34	34	100.00	25	0	11	-
NO (ppb) Average	662	34	34	100.00	33	-	5	-
NOX (ppb) Average	662	34	34	100.00	58	-	14	-
PM2.5 (ug/m3) Average	694	2	2	100.00	21.2	-	6.4	0
Temperature 2 m (C) Average	696	0	0	100.00	7	-	-0.3	-
Relative Humidity (%) Average	696	0	0	100.00	98	-	93	-
Precipitation (mm) Total	696	0	0	100.00	1.2	-	10	-
Wind Speed 10 m (km/h) Average	694	0	2	99.71	23	-	17	-
Wind Direction 10 m (deg) Average	694	0	2	99.71	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	662	1	2	-	0	0	0	0	1	2	16
H2S (ppb) Average	663	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	660	2.22	0.1	-	2.1	2.1	2.2	2.2	2.2	2.3	3
O3 (ppb) Average	664	27.5	9	-	1	15	22	29	34	38	43
NO2 (ppb) Average	662	3.7	5	-	0	0	1	2	5	10	25
NO (ppb) Average	662	0.8	2	-	0	0	0	0	1	2	33
NOX (ppb) Average	662	4.5	6	-	0	0	1	2	6	12	58
PM2.5 (ug/m3) Average	694	2.89	2.7	-	0.1	0.6	0.9	2.2	3.7	5.8	21.2
Temperature 2 m (C) Average	696	-11.88	7.1	-	-31.2	-20.3	-17	-12.6	-5.8	-2.1	7
Relative Humidity (%) Average	696	81	12	-	36	64	77	84	89	93	98
Precipitation (mm) Total	696	-	-	25.73	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	694	7	4	-	1	3	4	6	9	12	23
Wind Direction 10 m (deg) Average	694	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	24 Feb 2016 15:00	24 Feb 2016 16:00	2	Maintenance - replaced fuel cylinder
Wind Speed, Wind Direction	08 Feb 2016 15:00	08 Feb 2016 15:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Feb 2016 22:00	16 Feb 2016 22:00	1	Flat line in sensor output signal -sensor frozen

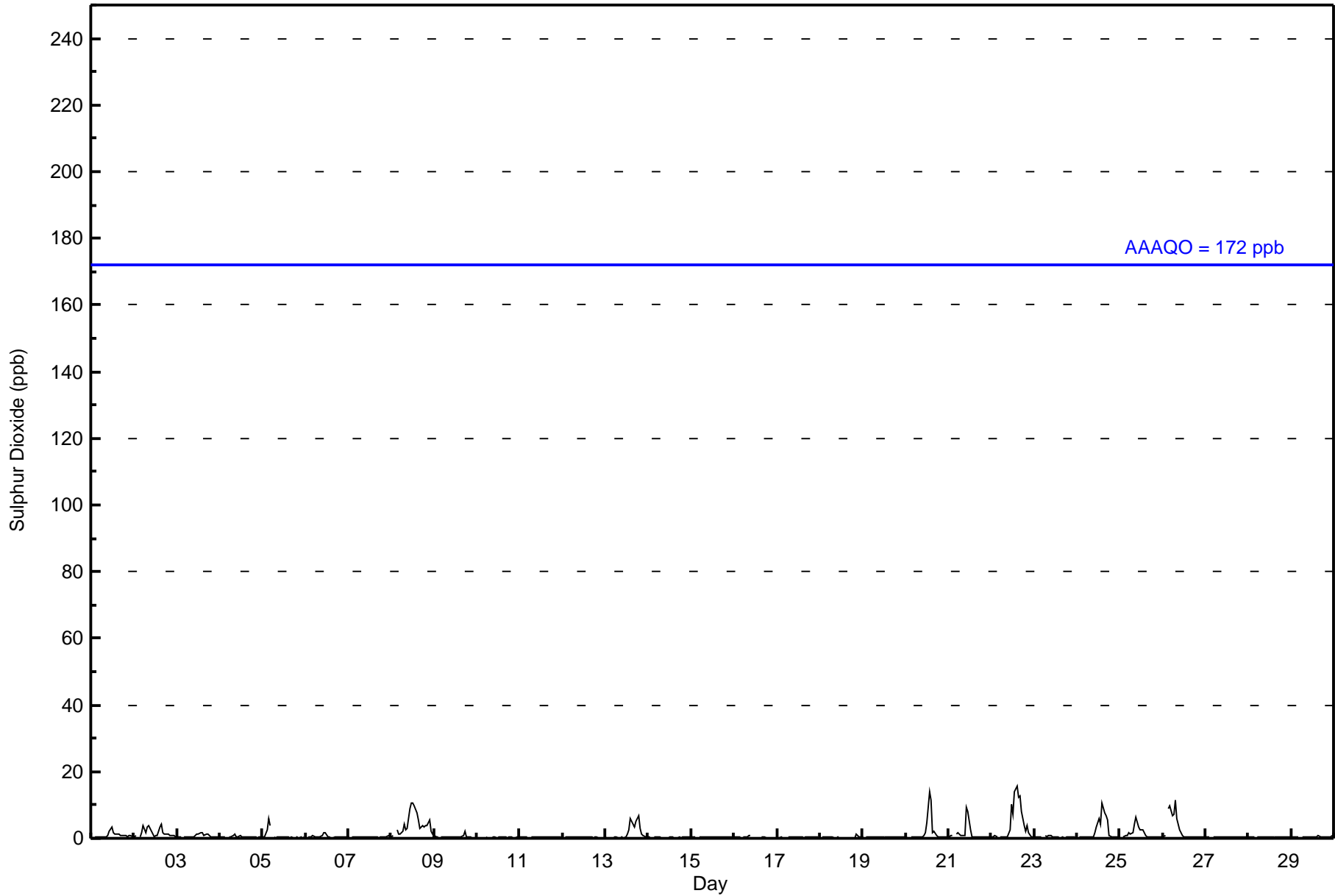


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																																						
Maximum Value: 16 ppb on Feb 22 15:00										Maximum Daily Average: 4.3 ppb on Feb 22										Hours of Data: 662																												
Minimum Value: 0 ppb on Feb 18 15:00										Minimum Daily Average: 0.2 ppb on Feb 10										Hours of Missing Data: 34																												
Maximum Diurnal Average: 2.3 ppb at hour 15										Minimum Diurnal Average: 0.4 ppb at hour 24										Hours of Calibration: 34																												
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 = 11										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	0	Z	0	0	0	0	0	0	0	1	2	3	2	1	1	1	1	1	1	1	1	1	1	0	0.9	3																						
2-Feb	1	1	Z	0	2	4	2	4	4	3	1	1	1	1	4	4	2	1	1	1	1	1	1	1	1.7	4																						
3-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	1	2	2	1	1	1	1	0	0	0	0	0	0.7	2																						
4-Feb	0	0	0	0	Z	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1																						
5-Feb	0	0	3	6	4	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	6																						
6-Feb	Z	0	0	0	1	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0.5	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	1	0.3	1																						
8-Feb	0	1	Z	3	1	1	2	4	3	3	9	11	11	10	8	5	3	4	3	4	4	4	5	2	4.2	11																						
9-Feb	1	1	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0.5	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	0.2	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	1	0	0.3	1																						
12-Feb	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	2	6	4	3	5	7	3	1	1	0	0	1.6	7																							
14-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																						
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	0.3	0																						
16-Feb	1	1	0	0	Z	0	0	0	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.4	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	0.3	0																						
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1																						
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	0	0	0	0	0	0	0	1	2	5	14	11	2	2	1	0	0	0	0	0	0	1.8	14																						
21-Feb	1	1	1	Z	1	2	1	1	1	1	9	8	2	1	0	0	0	0	0	0	0	0	0	0	1.5	9																						
22-Feb	0	1	1	1	Z	0	0	0	0	1	3	10	7	14	16	12	13	8	4	2	4	2	1	0	4.3	16																						
23-Feb	0	0	0	0	1	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
24-Feb	Z	0	0	0	0	0	0	0	0	1	2	3	6	4	11	8	7	5	1	1	0	0	0	1	2.3	11																						
25-Feb	0	Z	1	1	1	2	1	2	4	6	4	3	3	2	1	1	0	0	0	0	0	1	0	0	1.5	6																						
26-Feb	0	1	Z	9	10	7	7	12	6	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2.6	12																						
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	0.4	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	0.4	0																						
29-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.4	1																						
																								0.4	0.4	0.5	1.0	1.1	0.9	0.8	1.0	0.9	0.9	1.4	1.8	1.6	2.0	2.3	1.5	1.3	1.2	0.9	0.6	0.7	0.6	0.4	0.4	Diurnal Average
																								1	1	3	9	10	7	7	12	6	6	9	11	11	14	16	12	13	8	7	4	4	5	2	1	Diurnal Maximum
Z - zerspan 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 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	652	98.49	98.49
11 - 20	10	1.51	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	72	58	33	16	18	22	134	98	53	21	25	10	5	7	12	66	650
11 - 20	0	0	0	0	0	0	0	0	0	4	5	1	0	0	0	0	10
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	58	33	16	18	22	134	98	53	25	30	11	5	7	12	66	660

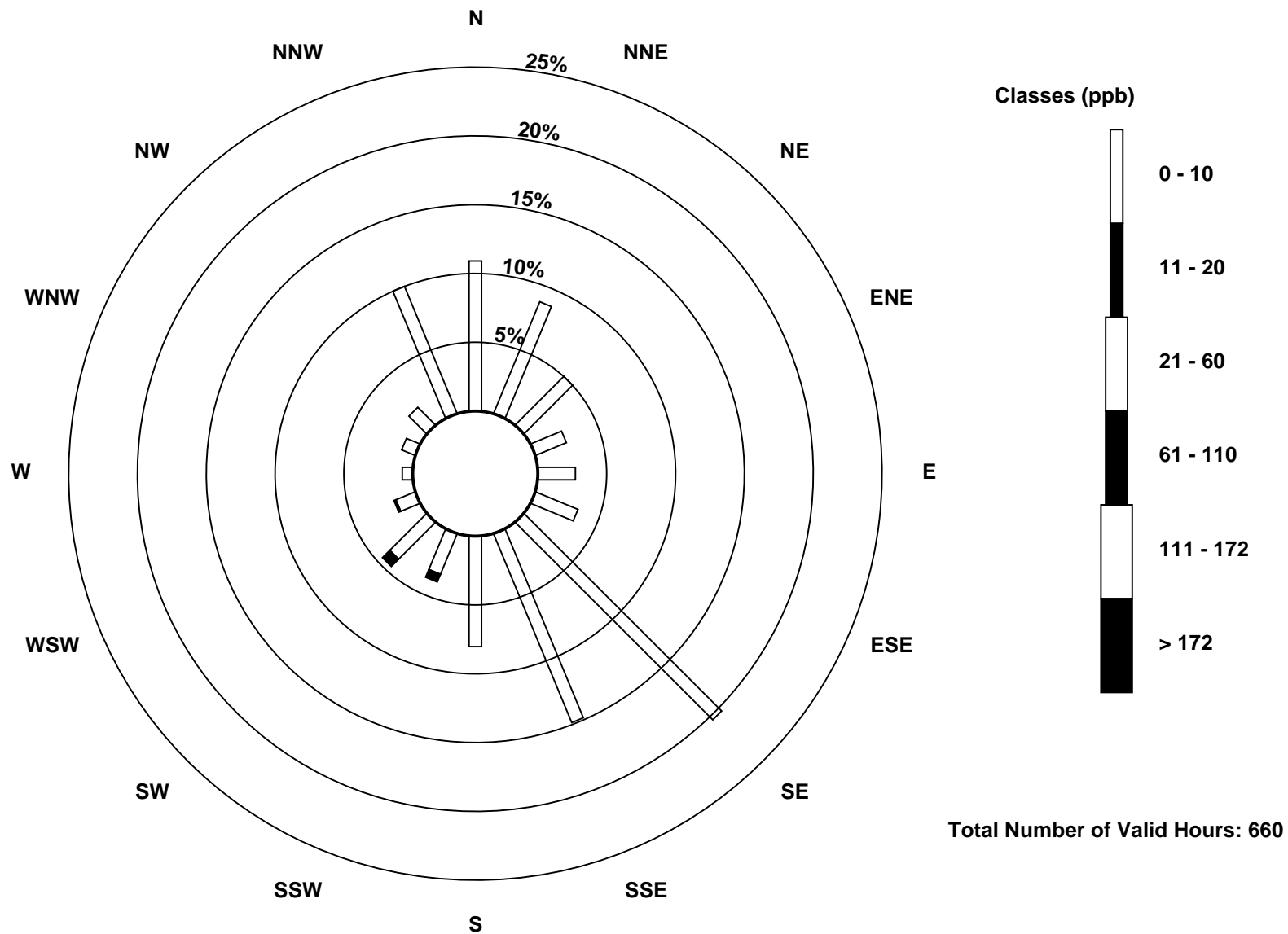
Total Number of Valid Hours: 660

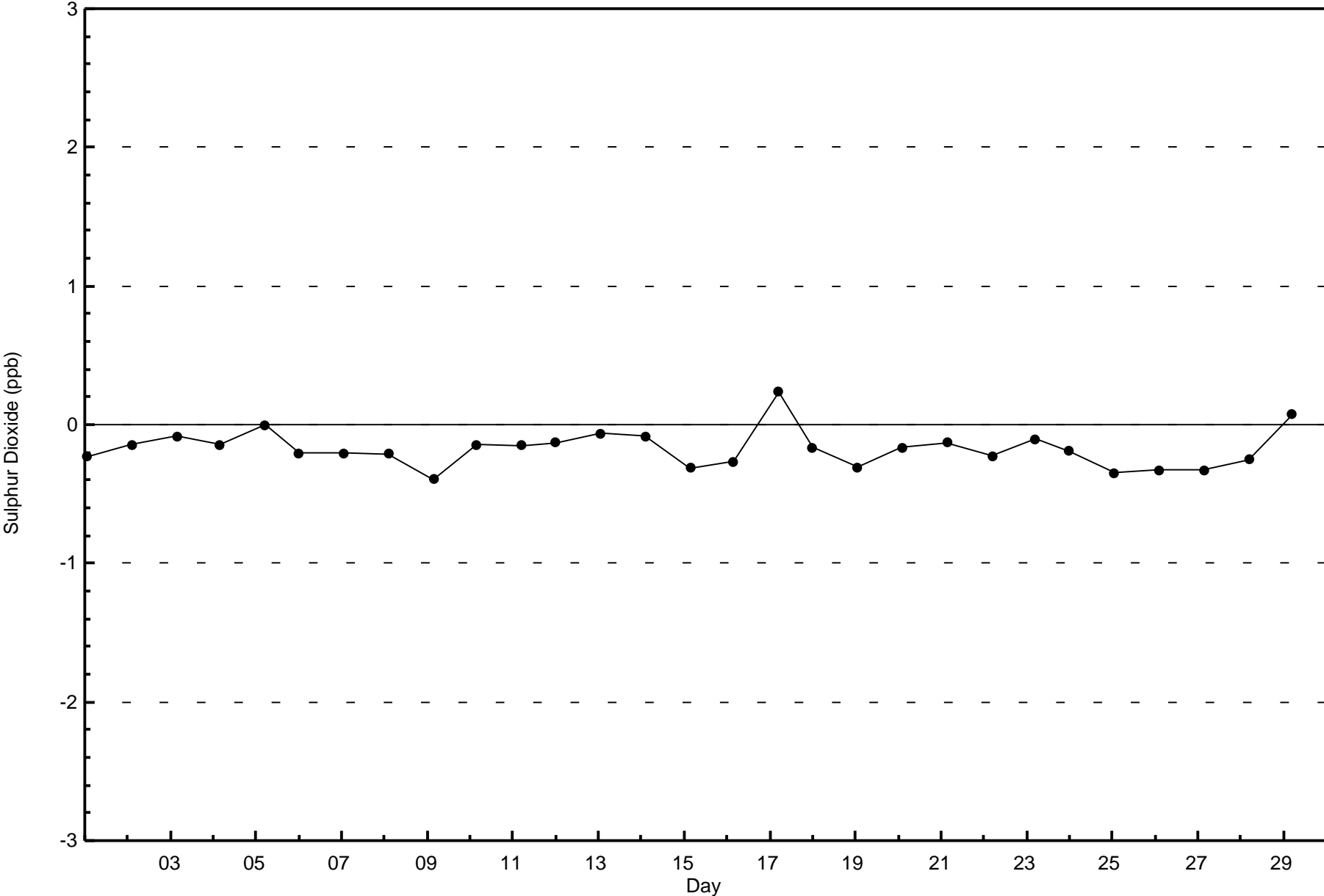
Total Number of Hours: 696

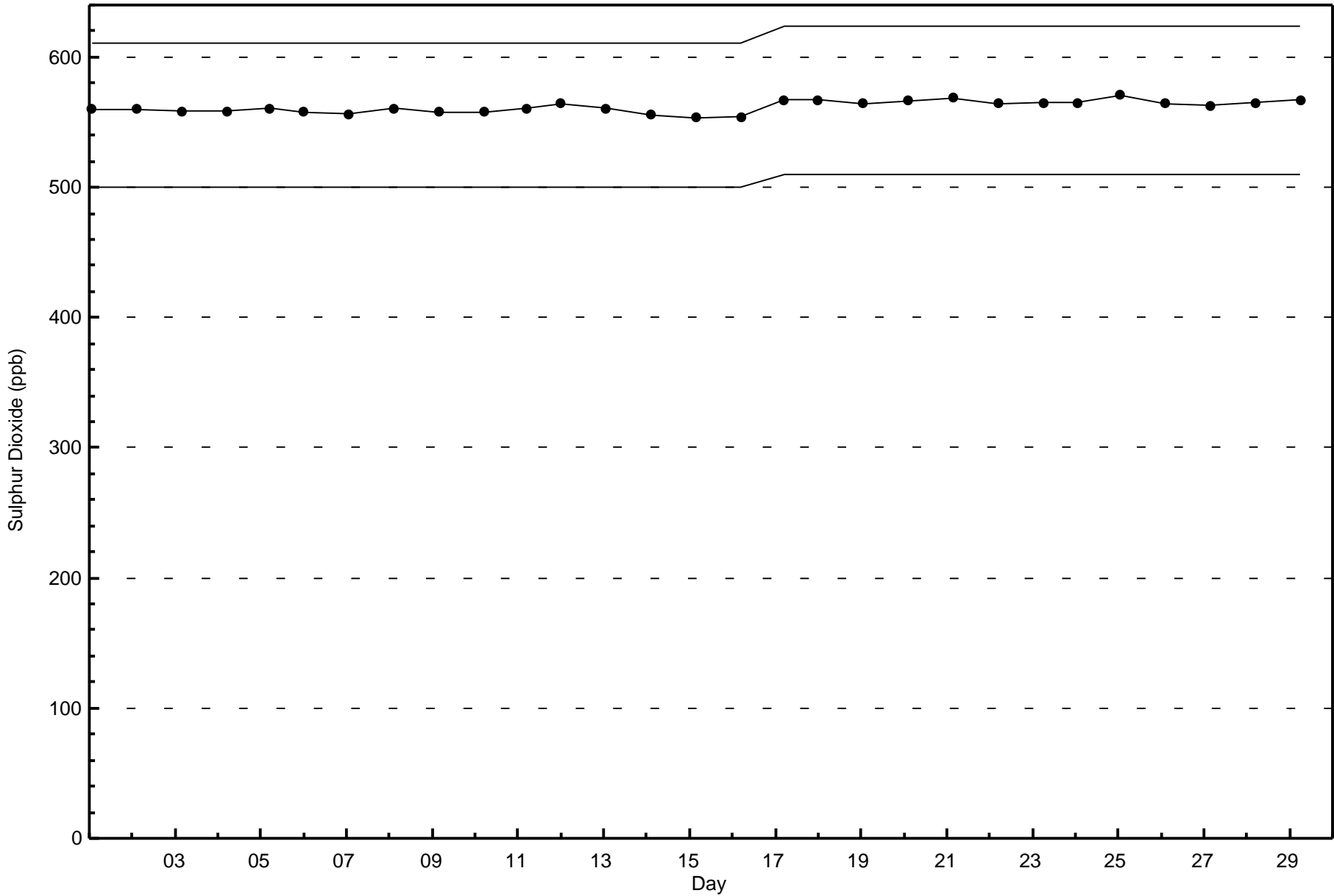


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)

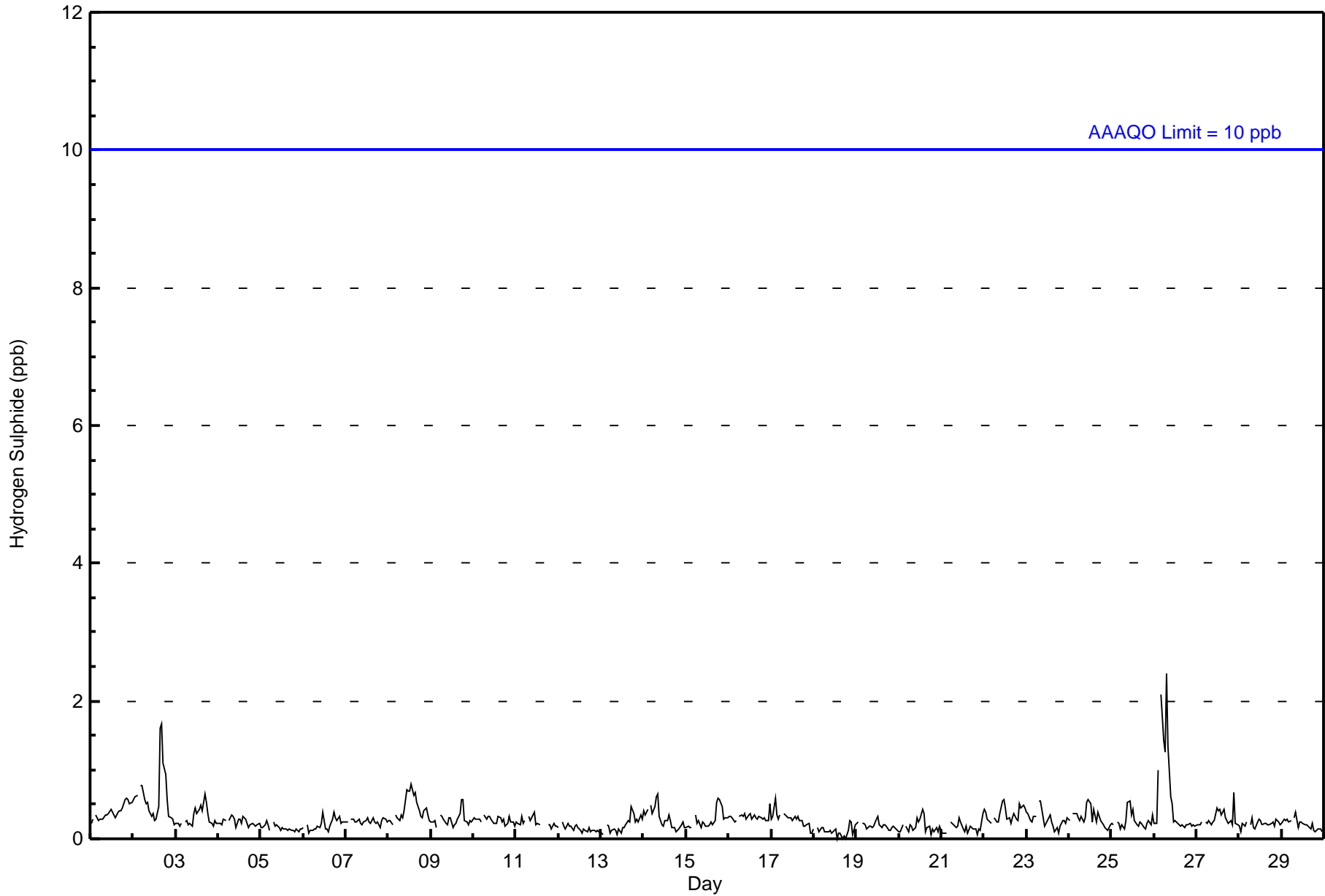








Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Feb 26 08:00 Maximum Daily Average: 0.6 ppb on Feb 2														Hours in Service: 696 Hours of Data: 663 Hours of Missing Data: 33 Hours of Calibration: 33 Percent Operational Time: 100.0												
Minimum Value: 0 ppb on Feb 18 14:00 Minimum Daily Average: 0.1 ppb on Feb 18 Maximum Diurnal Average: 0.4 ppb at hour 8 Minimum Diurnal Average: 0.2 ppb at hour 23 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
2-Feb	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	2	2	1	1	1	0	0	0	0	0.6	2
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	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	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	0.2	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	0.2	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	0.3	0	
8-Feb	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	
9-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	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	0.3	0	
11-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	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	0.1	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	0.2	0	
14-Feb	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	
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.3	1	
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
17-Feb	0	0	1	0	0	0	Z	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	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	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	0.2	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	0.2	0	
22-Feb	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1	
23-Feb	0	0	0	0	0	0	Z	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	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-Feb	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
26-Feb	0	0	1	Z	2	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	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	0.2	0	
29-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
0.2 0.2 0.3 0.2 0.4 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.3 0.2 0.2																								Diurnal Average		
1 1 1 0 2 1 1 2 1 1 1 1 1 1 1 2 2 1 1 1 1 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	663	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	72	58	34	14	17	23	132	101	55	25	30	10	6	7	12	65	661
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	58	34	14	17	23	132	101	55	25	30	10	6	7	12	65	661

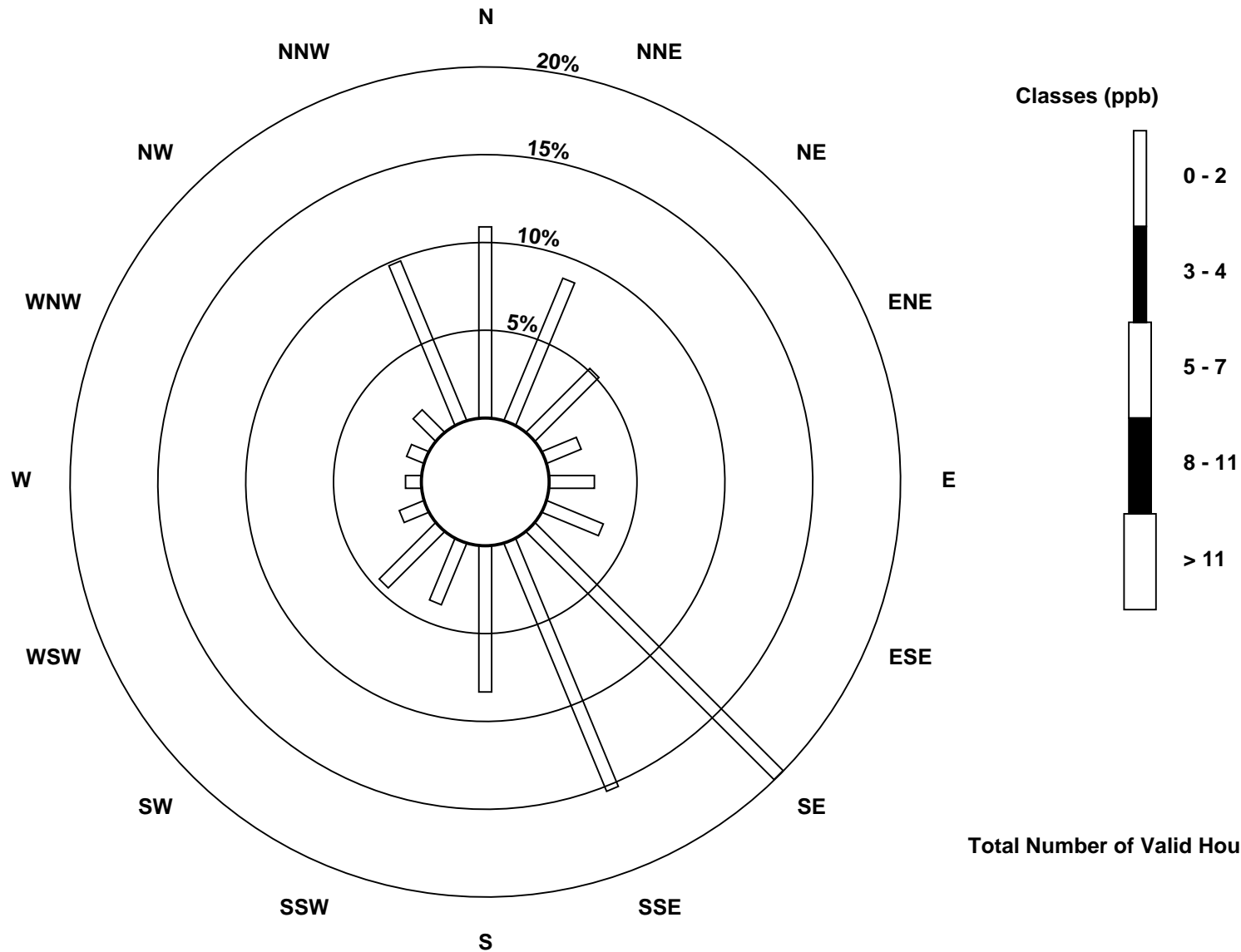
Total Number of Valid Hours: 661

Total Number of Hours: 696

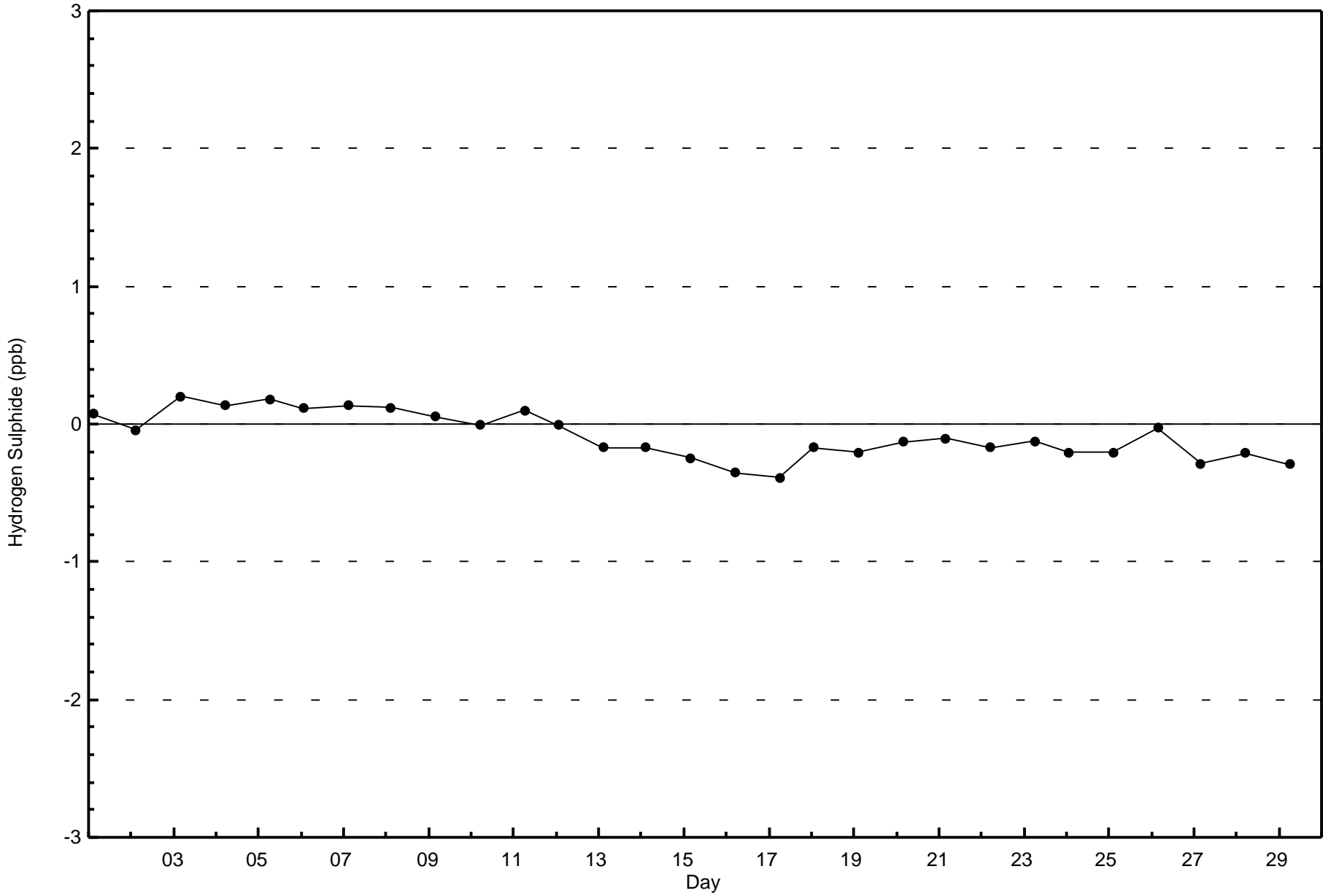


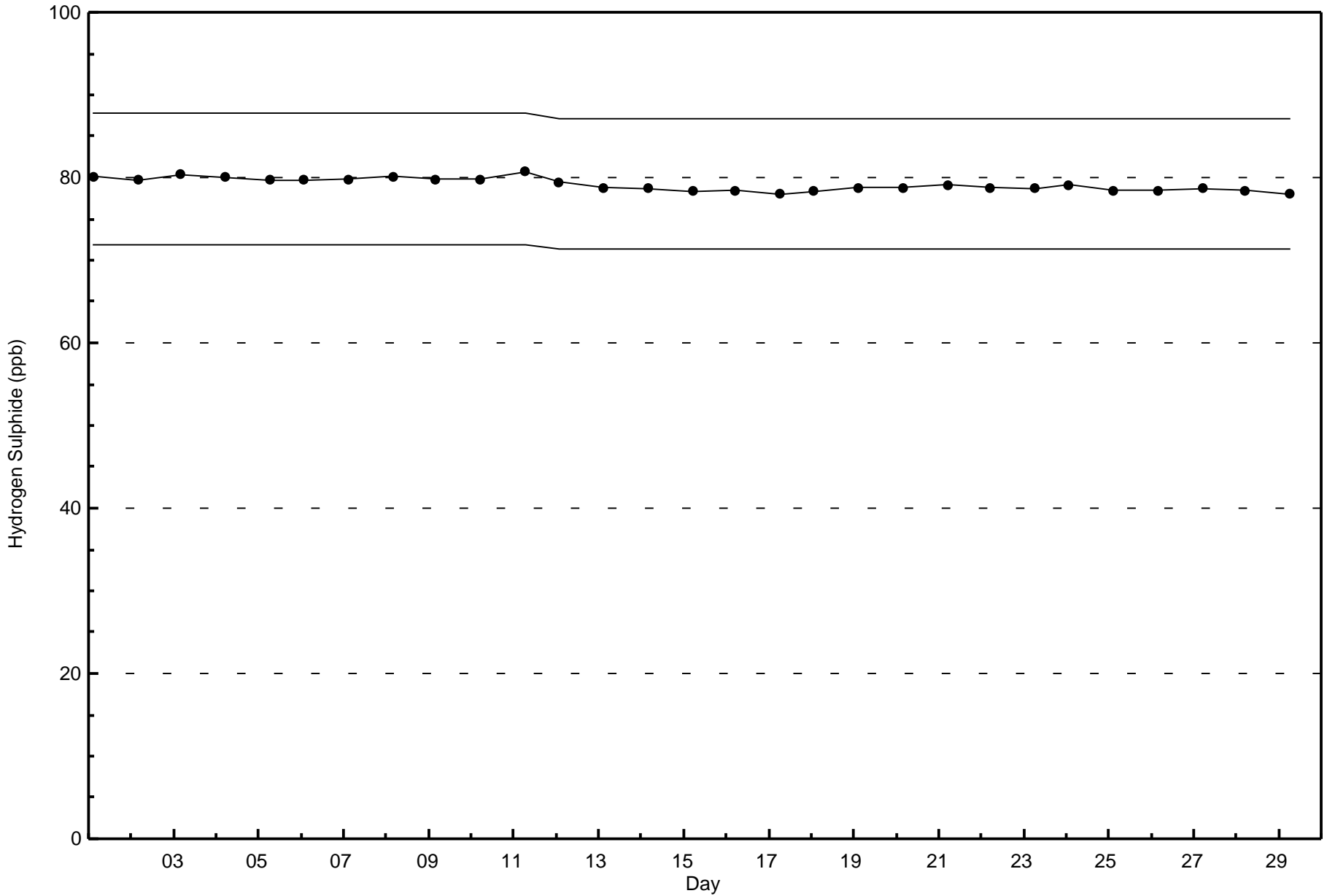
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 661







Wood Buffalo Environmental Association

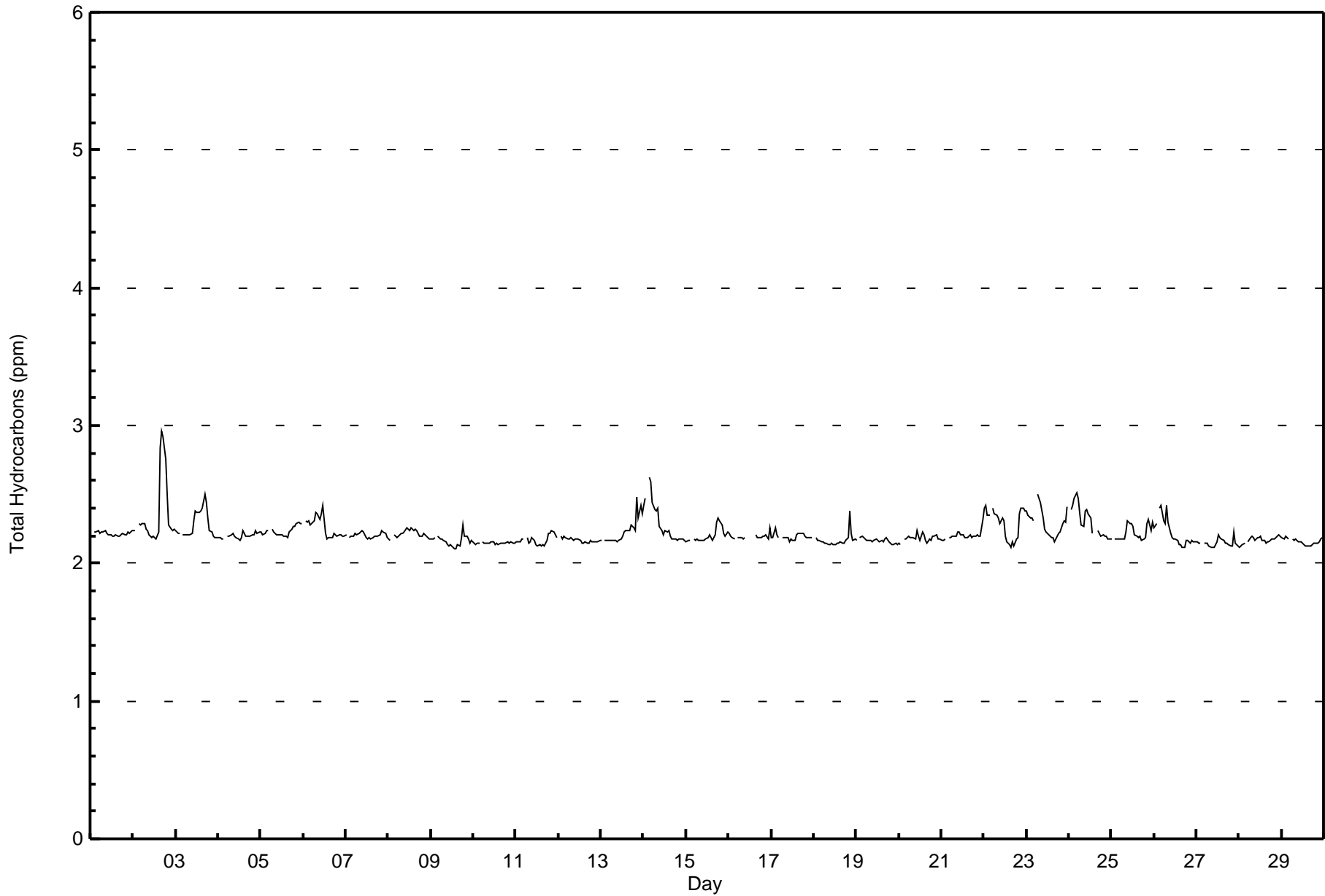
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Wapasu - February 2016

Maximum Value: 3.0 ppm on Feb 2 17:00		Maximum Daily Average: 2.4 ppm on Feb 2		Hours in Service: 696																							
Minimum Value: 2.1 ppm on Feb 9 15:00		Minimum Daily Average: 2.1 ppm on Feb 10		Hours of Data: 660																							
Maximum Diurnal Average: 2.2 ppm at hour 4		Minimum Diurnal Average: 2.2 ppm at hour 15		Hours of Missing Data: 36																							
Monthly Average: 2.22 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.5		Hours of Calibration: 34																							
				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	2.2	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	2.2	2.2
2-Feb	2.2	2.2	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	2.8	3.0	2.9	2.8	2.5	2.3	2.2	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	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
4-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	2.2
5-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3
6-Feb	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4
7-Feb	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	2.2	2.2
8-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.2	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	2.2	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	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.3
10-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2
11-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
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	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
13-Feb	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	2.2	2.5	2.3	2.4	2.4	2.2	2.5
14-Feb	2.4	2.5	Z	2.6	2.6	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6
15-Feb	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	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3
16-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
17-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	2.2	2.2	2.2	2.2	2.2	2.3
18-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.4
19-Feb	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	2.1	2.1	2.1	2.1	2.1	2.2	2.2
20-Feb	2.1	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	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
21-Feb	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	2.2	2.3
22-Feb	2.4	2.4	2.3	2.3	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.4	2.4	2.4	2.4	2.4	2.3	2.4
23-Feb	2.4	2.4	2.3	2.3	2.3	Z	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.5
24-Feb	Z	2.4	2.4	2.5	2.5	2.5	2.4	2.3	2.3	2.4	2.4	2.3	2.2	2.2	M	M	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5
25-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.3
26-Feb	2.3	2.3	Z	2.4	2.4	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.4
27-Feb	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
28-Feb	2.1	2.1	2.1	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	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
29-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	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
																								Diurnal Average	Diurnal Maximum		
																								2.2	2.4		
																								2.4	2.5		
																								2.4	2.6		
																								2.6	2.6		
																								2.5	2.5		
																								2.5	2.5		
																								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		
																								2.4	2.4		
																								2.8	3.0		
																								2.9	2.8		
																								2.8	2.5		
																								2.5	2.4		
																								2.4	2.4		
																								2.4	2.4		

Z - zerospan C - Calibration M - Maintenance





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	660	100.00	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Wapasu - February 2016**

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	72	58	33	16	18	22	134	98	53	25	28	11	5	7	12	66	658
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	72	58	33	16	18	22	134	98	53	25	28	11	5	7	12	66	658

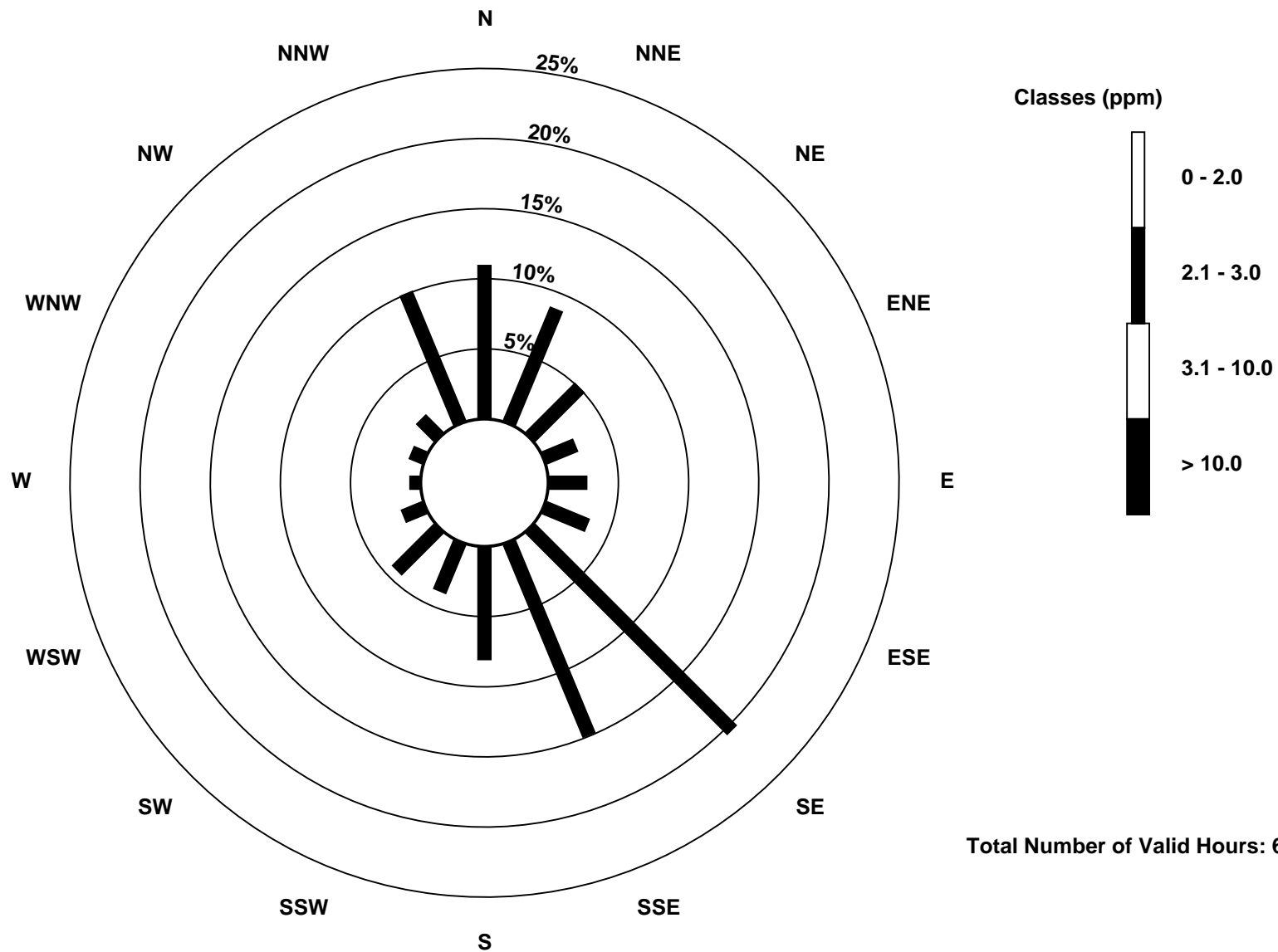
Total Number of Valid Hours: 658

Total Number of Hours: 696

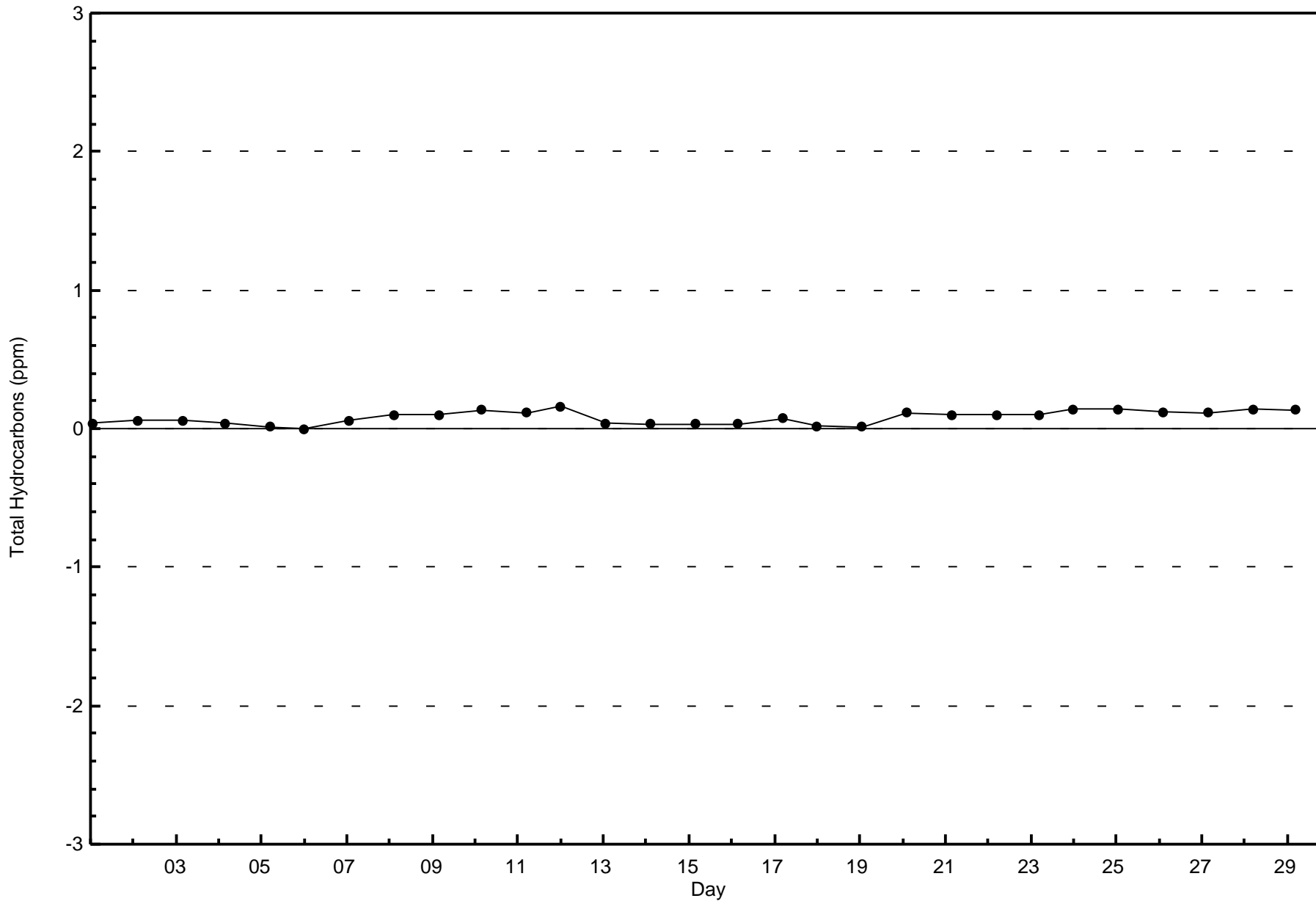


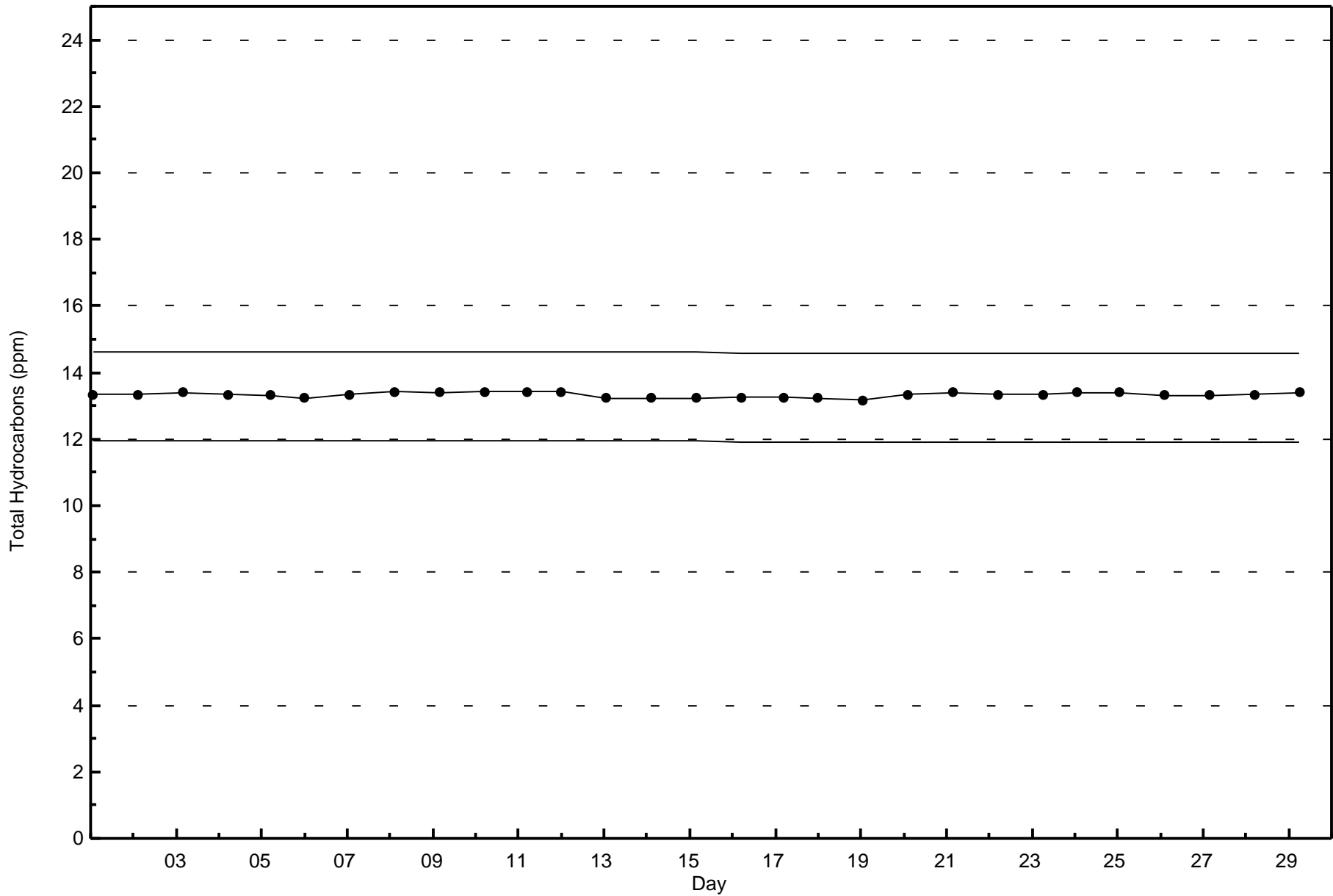
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)



Total Number of Valid Hours: 658







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

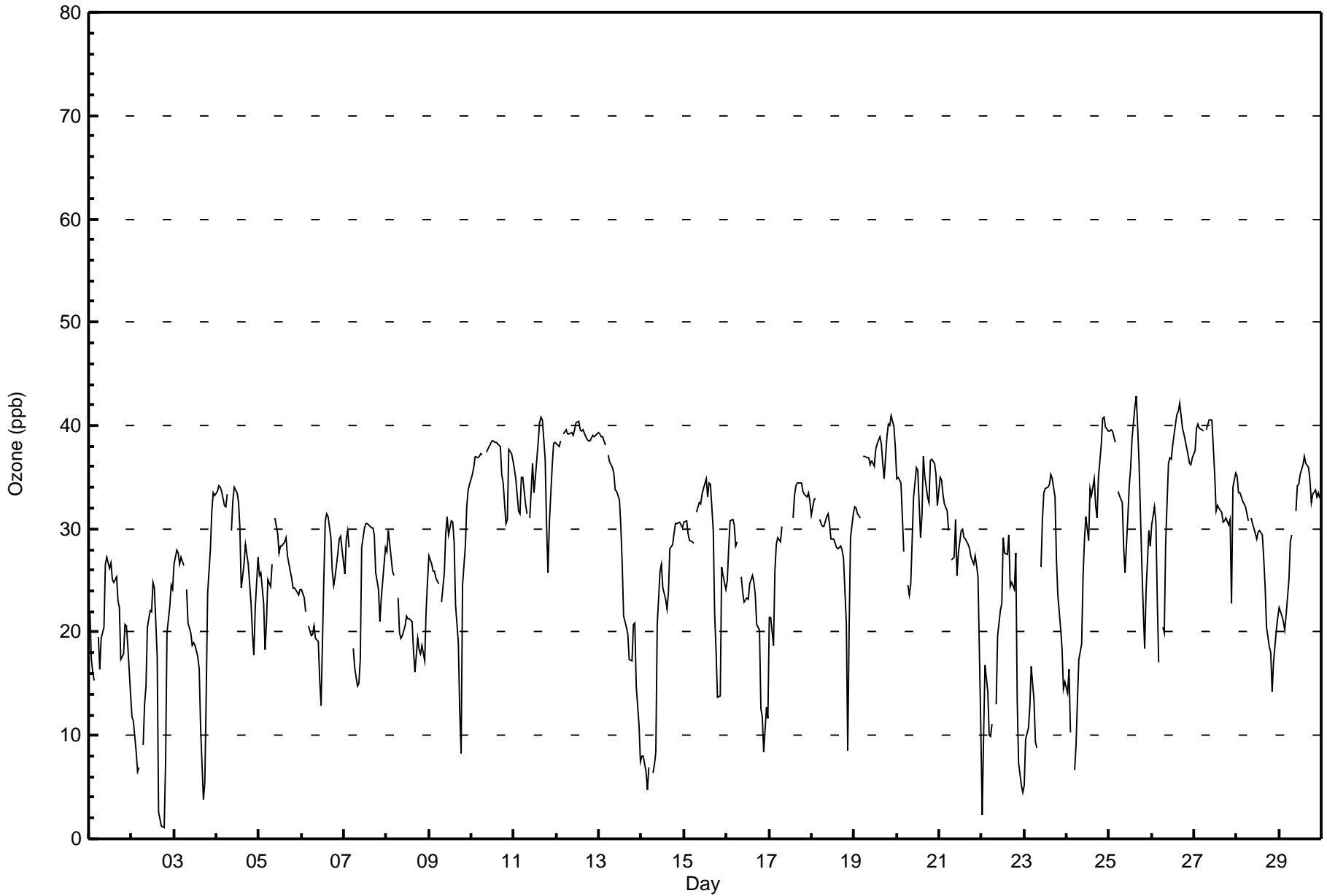
Wapasu - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																																							
Maximum Value: 43 ppb on Feb 25 16:00										Maximum Daily Average: 39.1 ppb on Feb 12										Hours of Data: 664																													
Minimum Value: 1 ppb on Feb 2 19:00										Minimum Daily Average: 13.9 ppb on Feb 2										Hours of Missing Data: 32																													
Maximum Diurnal Average: 30.8 ppb at hour 14										Minimum Diurnal Average: 24.6 ppb at hour 7										Hours of Calibration: 32																													
Monthly Average: 27.5 ppb										Percentiles: P ₁ = 4 P ₁₀ = 15 Q ₁ = 22 Median = 29 Q ₃ = 34 P ₉₀ = 38 P ₉₉ = 41										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	22	17	16	15	Z	19	16	19	21	27	27	26	27	25	25	25	23	22	17	18	21	21	19	14	21.0	27																							
2-Feb	12	11	8	7	7	Z	9	13	15	21	22	22	25	24	18	3	2	1	1	7	20	23	25	24	13.9	25																							
3-Feb	27	28	28	27	27	26	Z	24	21	20	19	19	18	16	11	4	5	14	24	28	32	33	33	21.8	33																								
4-Feb	34	34	34	34	32	32	33	Z	30	33	34	34	33	30	24	27	28	28	27	23	20	18	22	27	29.1	34																							
5-Feb	26	26	23	18	21	25	24	27	Z	31	30	28	28	28	29	29	27	26	25	24	24	24	24	24	25.7	31																							
6-Feb	24	23	22	Z	21	20	20	21	19	19	15	13	25	31	31	31	29	26	25	25	28	29	29	28	24.1	31																							
7-Feb	26	29	30	28	Z	18	17	15	15	17	28	30	31	31	30	30	30	29	26	24	21	23	27	28	25.4	31																							
8-Feb	28	30	27	26	25	Z	23	20	19	20	21	22	21	21	21	18	16	19	18	18	19	17	22	25	21.6	30																							
9-Feb	27	27	26	26	25	25	Z	23	26	30	31	29	31	31	29	23	19	12	8	24	28	32	34	34	26.1	34																							
10-Feb	35	36	37	37	37	37	37	Z	37	38	38	38	39	38	38	38	38	35	34	31	31	38	37	37	36.6	39																							
11-Feb	36	35	32	31	35	35	32	31	Z	31	36	33	35	38	40	41	41	37	30	26	31	36	38	38	34.8	41																							
12-Feb	38	38	39	Z	39	40	39	39	39	39	40	40	40	40	40	40	39	39	39	39	39	39	39	39	39.1	40																							
13-Feb	39	39	39	38	Z	37	36	36	35	34	34	33	30	27	22	21	20	17	17	21	21	15	11	7	27.3	39																							
14-Feb	8	8	7	5	7	Z	6	7	8	21	26	27	24	23	22	24	28	28	30	30	31	30	30	30	20.0	31																							
15-Feb	31	31	30	29	29	29	Z	32	33	32	33	34	35	33	34	34	30	22	18	14	14	26	25	24	28.3	35																							
16-Feb	25	28	31	31	30	28	29	Z	25	24	23	23	23	25	26	25	24	21	20	13	12	8	13	12	22.5	31																							
17-Feb	21	21	19	26	28	29	29	30	Z	31	C	C	C	31	33	34	34	34	35	34	33	33	34	33	30.2	35																							
18-Feb	31	33	33	Z	31	31	30	30	31	32	31	29	29	29	28	28	28	28	27	21	9	20	29	32	28.2	33																							
19-Feb	32	32	31	31	Z	37	37	37	37	36	37	36	38	38	39	38	36	35	39	40	40	41	40	38	36.7	41																							
20-Feb	35	35	34	31	28	Z	24	24	25	33	34	36	36	29	31	37	35	33	33	37	37	36	35	32	32.6	37																							
21-Feb	35	35	33	32	32	30	Z	27	27	31	25	28	30	30	29	29	28	28	27	27	27	26	25	11	28.4	35																							
22-Feb	2	10	17	14	10	10	11	Z	13	20	22	23	29	28	28	29	24	25	24	28	13	7	5	4	17.3	29																							
23-Feb	5	10	11	13	17	13	9	9	Z	26	31	34	34	34	35	35	33	27	24	20	18	14	15	21.8	35																								
24-Feb	14	16	10	Z	7	9	13	17	19	25	29	31	29	34	33	35	32	31	35	38	41	41	40	39	26.9	41																							
25-Feb	40	40	39	38	Z	34	33	33	28	26	31	34	36	39	42	43	40	36	26	22	18	24	30	28	33.1	43																							
26-Feb	30	32	31	23	17	Z	20	20	29	36	37	37	38	40	41	41	42	40	39	38	37	36	36	37	33.9	42																							
27-Feb	38	40	40	40	40	40	Z	40	41	41	41	41	35	32	32	32	32	31	31	31	30	31	23	34	35.0	41																							
28-Feb	35	34	33	33	32	32	31	Z	31	31	30	29	30	30	29	27	24	20	19	18	14	17	20	21	27.0	35																							
29-Feb	22	22	21	20	22	25	29	29	Z	32	34	34	35	36	37	36	36	35	33	33	34	33	33	33	30.7	37																							
																								26.8	27.5	26.9	26.1	24.9	27.5	24.6	25.1	26.0	28.8	29.9	29.9	30.7	30.8	30.4	29.8	28.5	26.8	25.7	25.9	25.6	26.5	27.8	27.1	Diurnal Average	
																								40	40	40	40	40	40	39	40	41	41	41	40	40	40	42	43	42	40	39	40	41	41	40	39	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Wapasu - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	133	20.03	20.03
21 - 50	531	79.97	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Wapasu - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	7	7	3	8	10	28	16	6	4	10	4	1	3	3	10	132
21 - 50	63	53	28	12	9	15	99	86	49	21	20	7	5	4	9	50	530
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	75	60	35	15	17	25	127	102	55	25	30	11	6	7	12	60	662

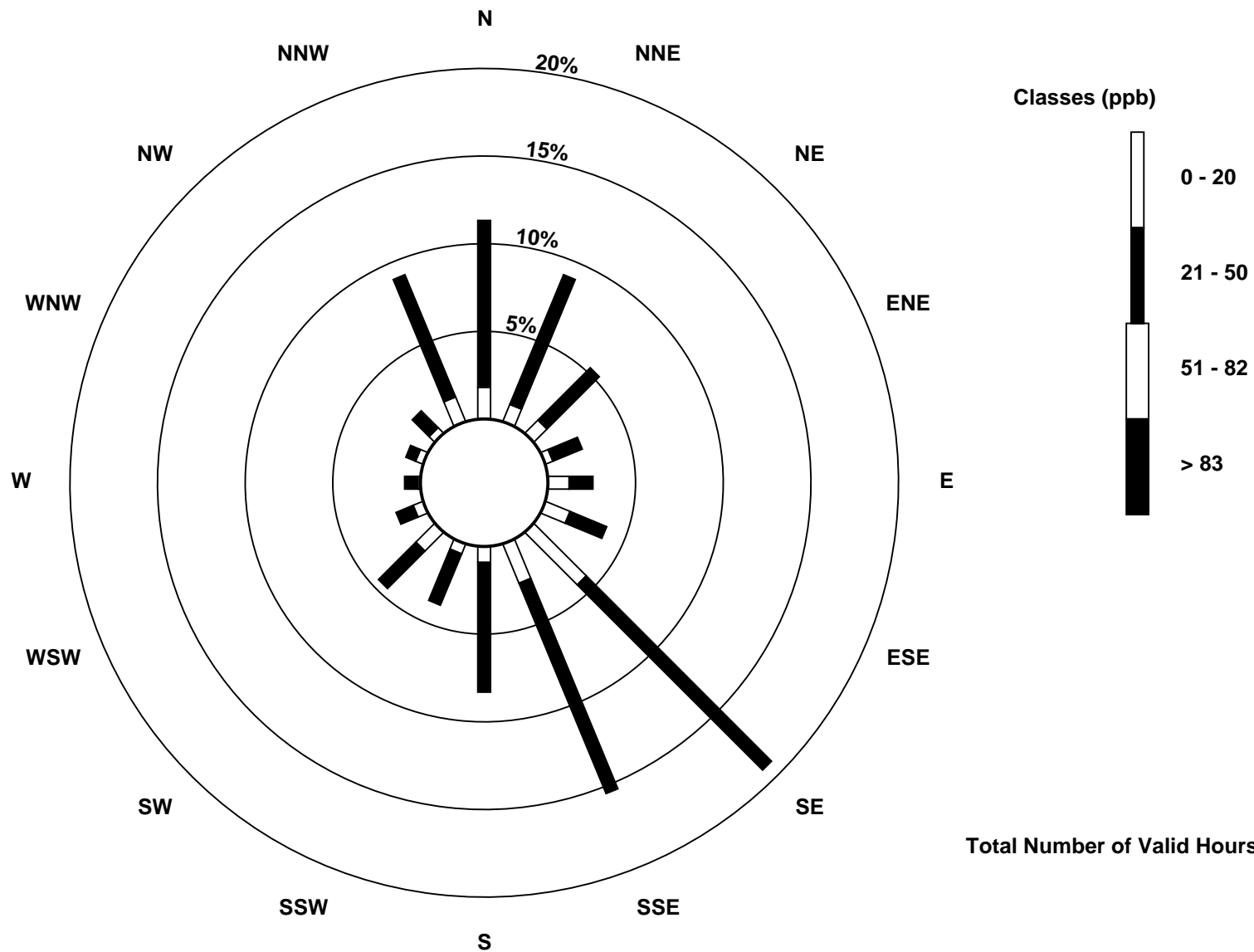
Total Number of Valid Hours: 662

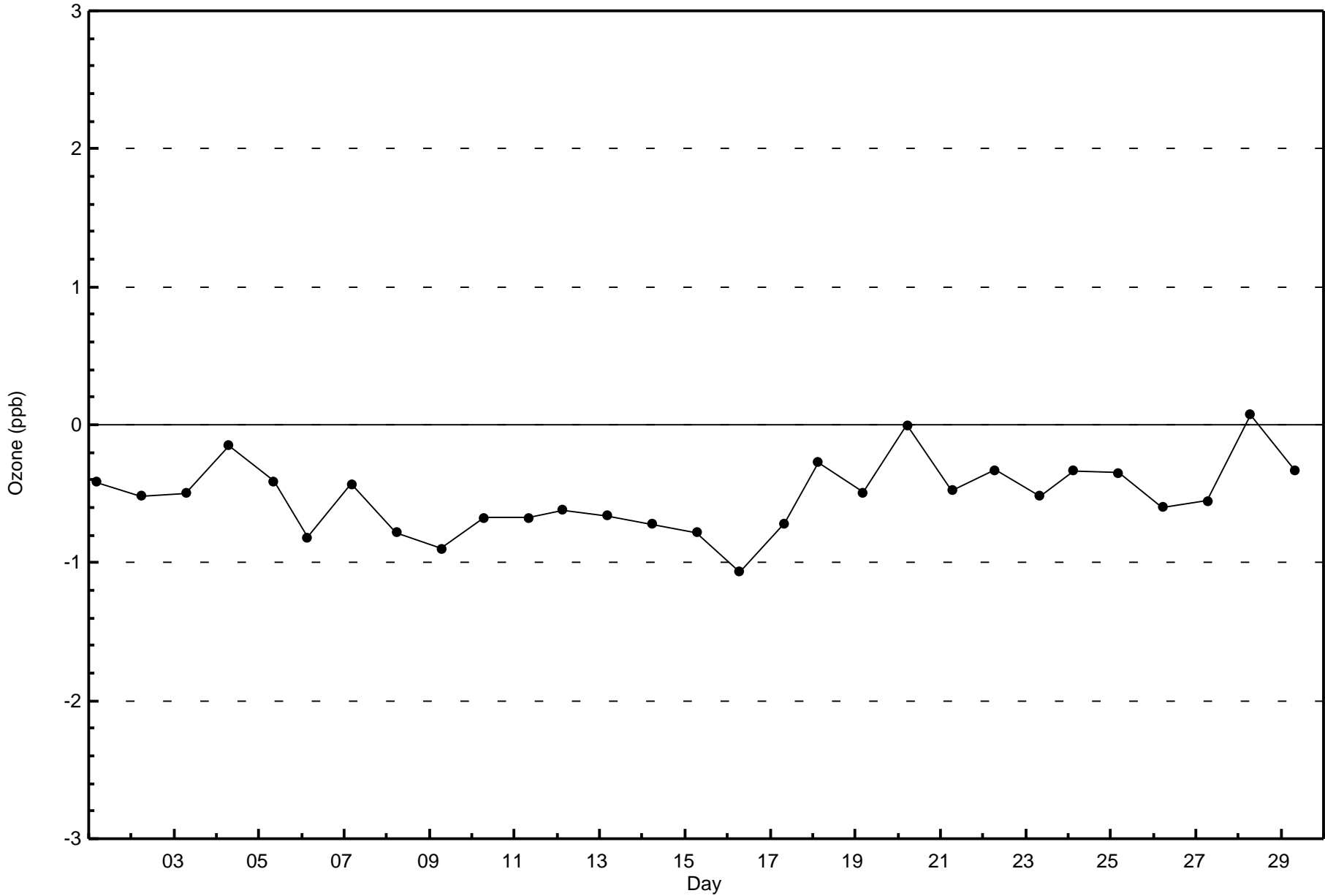
Total Number of Hours: 696

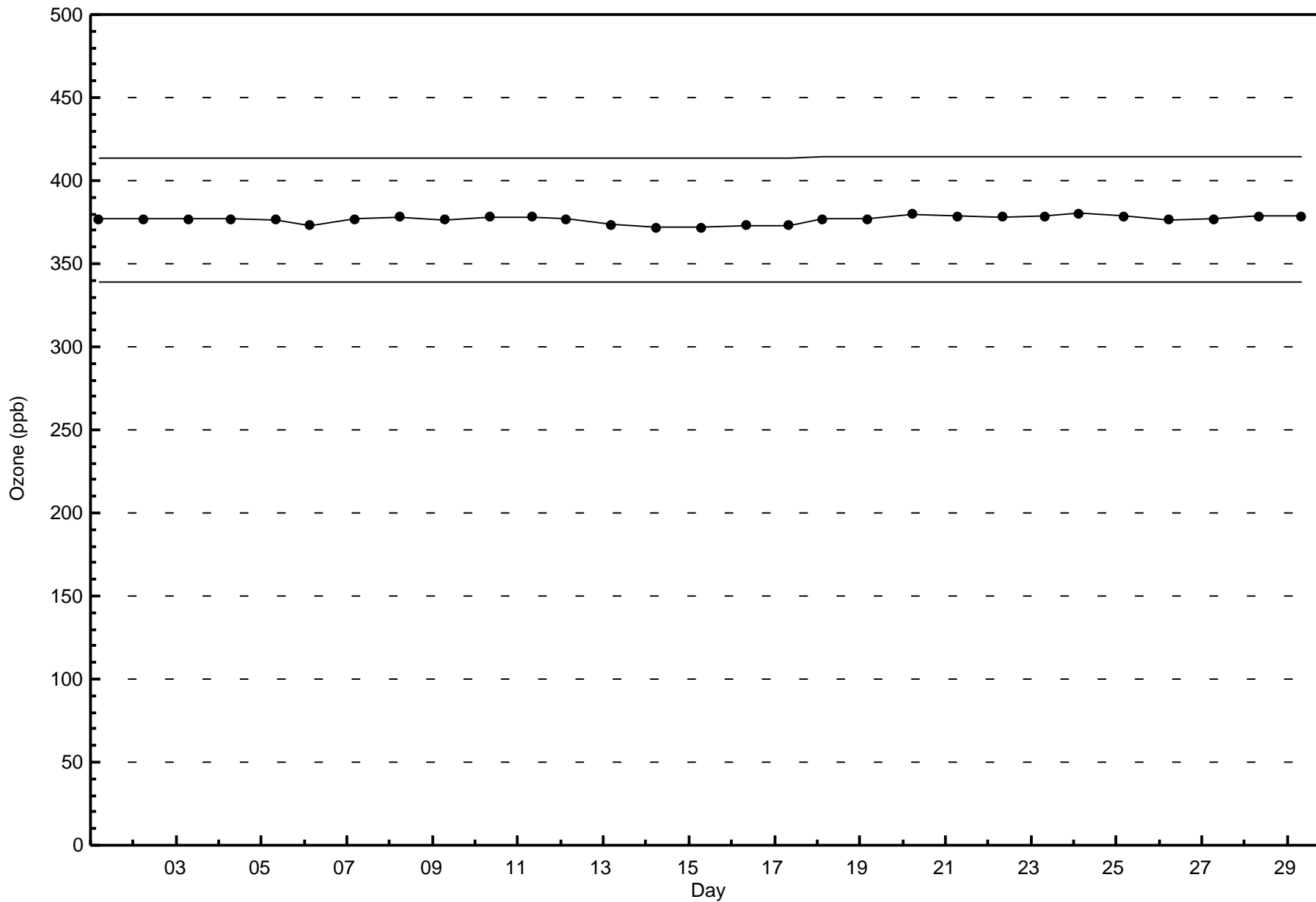


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Ozone (O₃) - ppb
Wapasu (AMS 17)









Wood Buffalo Environmental Association
Summary of Hour Averages

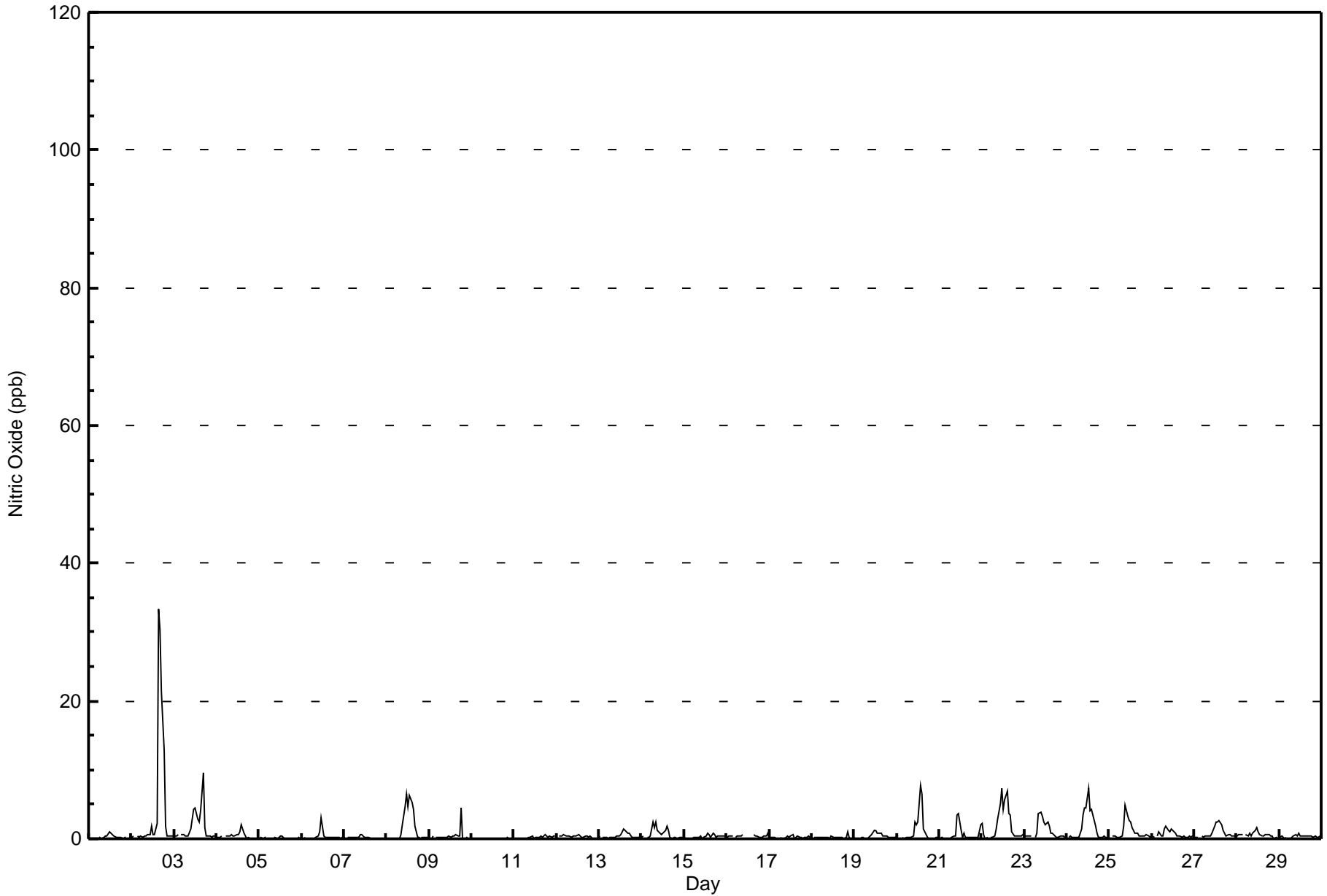
Nitric Oxide (NO) - ppb
Wapasu - February 2016

Maximum Value: 33 ppb on Feb 2 16:00		Maximum Daily Average: 4.8 ppb on Feb 2		Hours in Service: 696																																												
Minimum Value: 0 ppb on Feb 1 01:00		Minimum Daily Average: 0.0 ppb on Feb 10		Hours of Data: 662																																												
Maximum Diurnal Average: 2.1 ppb at hour 16		Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Missing Data: 34																																												
Monthly Average: 0.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7		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	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1																						
2-Feb	0	0	Z	0	0	0	0	0	1	1	1	2	1	1	2	33	30	21	13	2	0	0	0	0	4.8	33																						
3-Feb	0	0	1	Z	1	1	0	0	0	1	3	4	4	3	3	4	10	2	0	0	0	0	0	0	1.7	10																						
4-Feb	0	0	0	0	Z	0	0	0	1	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0	0.4	2																						
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	0.1	0																						
6-Feb	Z	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3																						
7-Feb	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
8-Feb	0	0	Z	0	0	0	0	0	1	2	5	6	5	6	5	4	2	0	0	0	0	0	0	0	1.6	6																						
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	0	0	0	0	0	0.4	4																						
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	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1																						
12-Feb	Z	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1																						
14-Feb	0	0	Z	0	0	0	2	2	2	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0.7	2																						
15-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0.3	1																						
16-Feb	0	0	0	0	Z	0	0	0	0	1	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0.4	1																						
17-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1																						
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1																						
19-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																						
20-Feb	1	0	Z	0	0	0	0	0	0	0	2	2	2	8	7	1	1	0	0	0	0	0	0	0	1.2	8																						
21-Feb	0	0	0	Z	0	0	0	0	0	0	3	4	1	0	1	0	0	0	0	0	0	0	0	0	0.6	4																						
22-Feb	2	1	0	0	Z	0	0	0	1	3	5	7	4	6	7	4	3	1	0	0	1	0	0	1	2.1	7																						
23-Feb	0	0	0	0	0	Z	0	1	4	4	3	2	2	2	2	1	1	0	0	0	0	0	0	0	1.1	4																						
24-Feb	Z	0	0	0	0	0	0	0	1	3	4	4	7	4	4	3	2	1	0	0	0	0	0	0	1.6	7																						
25-Feb	0	Z	0	0	0	0	0	0	2	5	3	3	3	2	1	1	1	0	0	0	0	1	0	0	1.1	5																						
26-Feb	0	0	Z	0	1	0	0	1	2	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.7	2																						
27-Feb	0	0	0	Z	0	0	0	0	0	1	2	2	2	3	2	1	1	0	1	1	0	0	0	0	0.8	3																						
28-Feb	0	1	1	1	Z	1	0	1	0	1	1	2	1	1	0	0	1	1	1	0	0	0	0	0	0.6	2																						
29-Feb	0	0	0	0	0	Z	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
																								0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.7	1.0	1.4	1.8	1.5	1.6	1.6	2.1	2.0	1.1	0.8	0.3	0.3	0.2	0.2	0.3	Diurnal Average
																								2	1	1	1	1	1	2	2	4	5	5	7	7	8	7	33	30	21	13	2	1	1	0	2	Diurnal Maximum
Z - zerospan		C - Calibration																																														



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	99.55	99.55
21 - 40	3	0.45	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	71	58	33	16	18	22	134	98	53	25	30	11	5	7	12	64	657
21 - 40	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	72	58	33	16	18	22	134	98	53	25	30	11	5	7	12	66	660

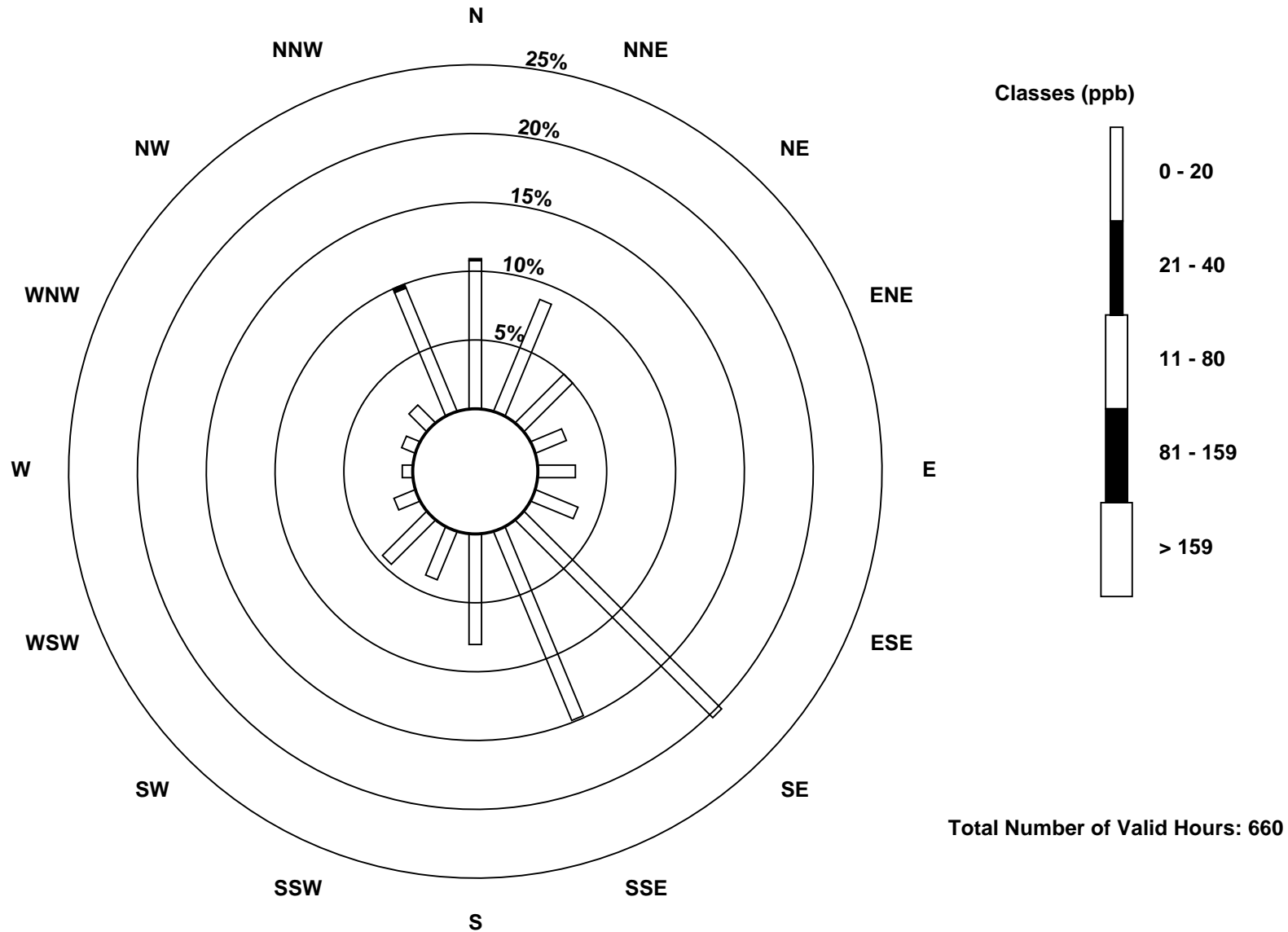
Total Number of Valid Hours: 660

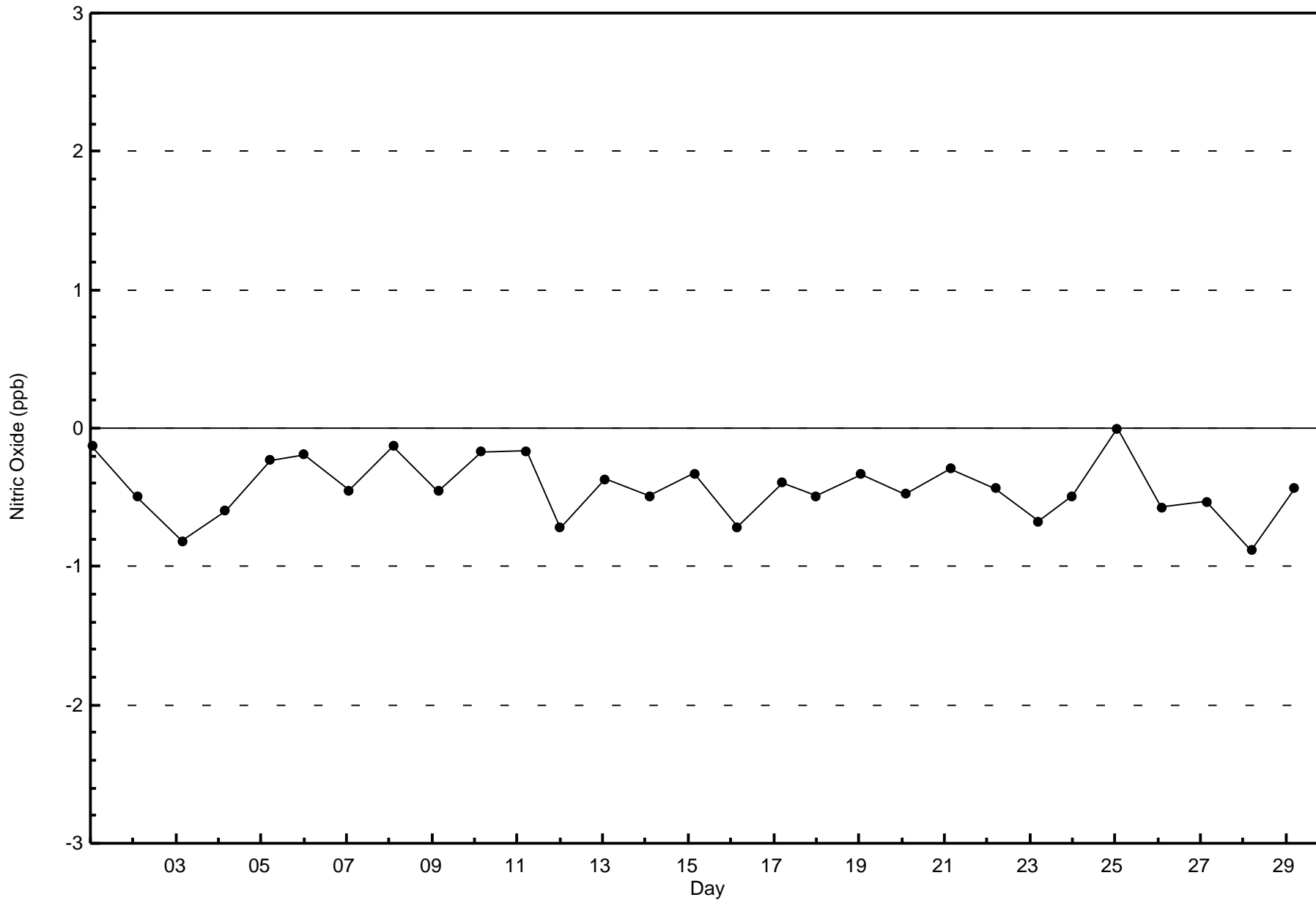
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)

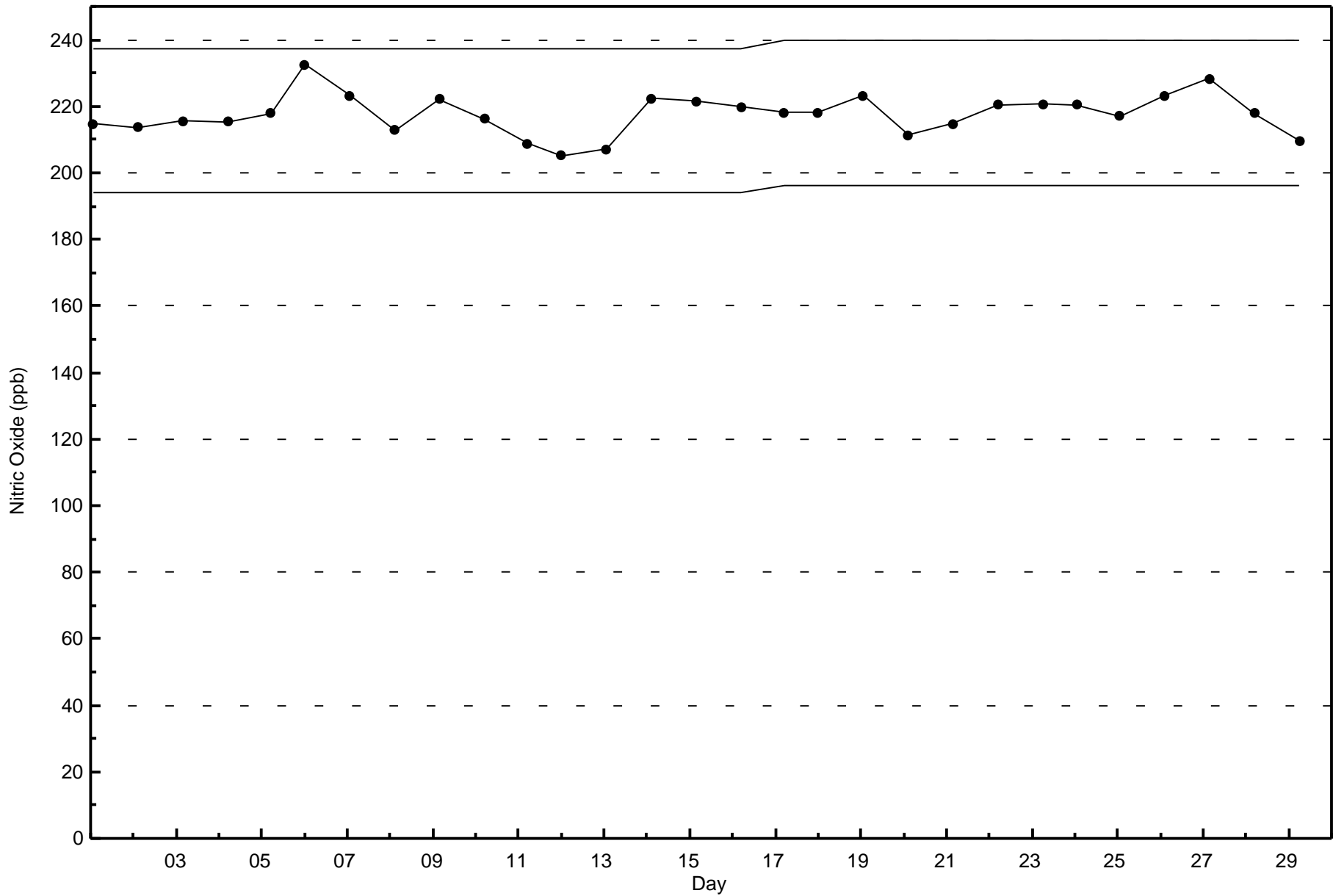






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

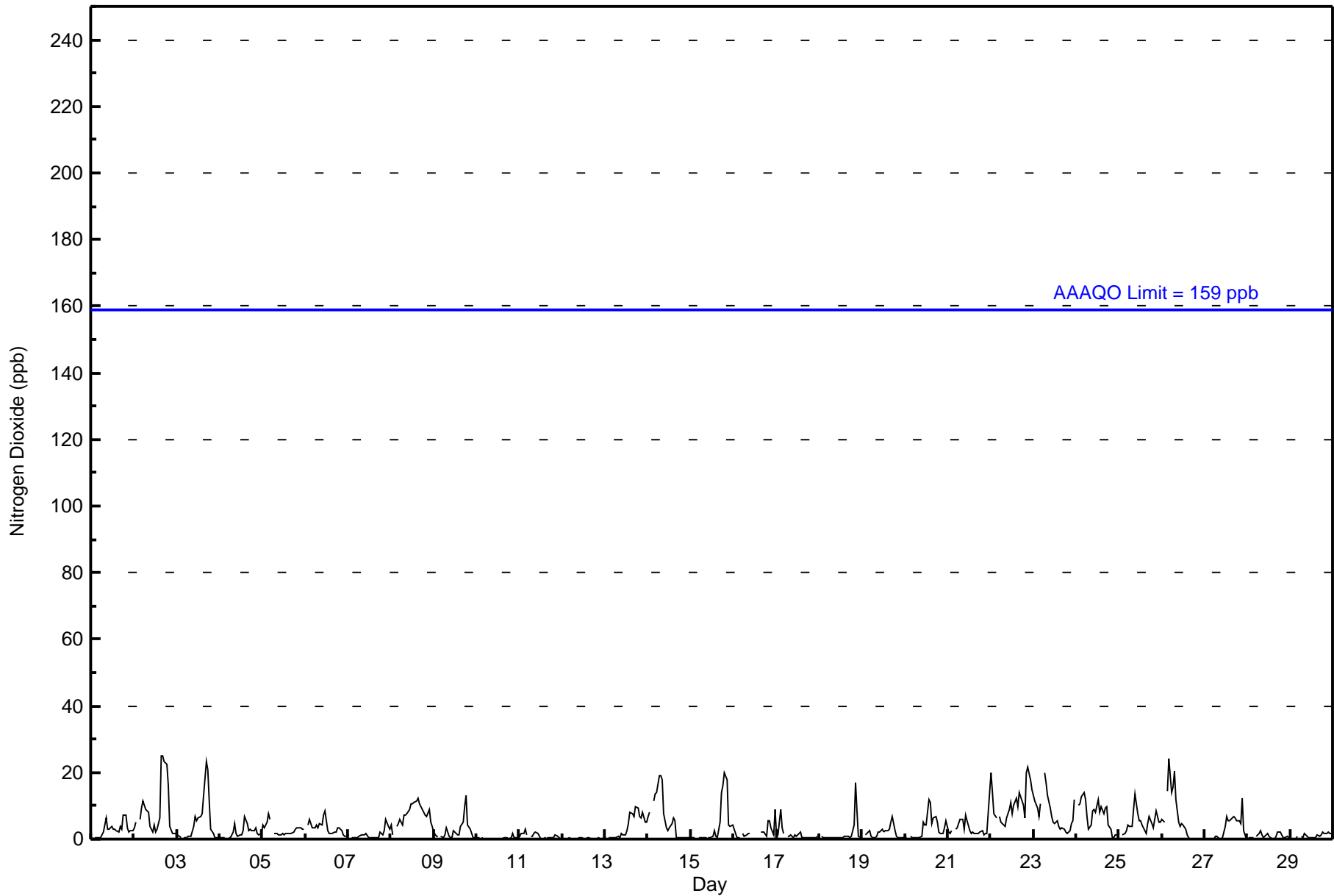
Wapasu - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 25 ppb on Feb 2 16:00 Maximum Daily Average: 10.9 ppb on Feb 22																	Hours in Service: 696 Hours of Data: 662 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0									
Minimum Value: 0 ppb on Feb 10 07:00 Minimum Daily Average: 0.2 ppb on Feb 12 Maximum Diurnal Average: 5.5 ppb at hour 18 Minimum Diurnal Average: 2.5 ppb at hour 23 Monthly Average: 3.7 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 21																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	2	7	3	3	4	3	3	2	2	4	3	7	7	4	2	3	3	2.8	7
2-Feb	4	5	Z	6	10	11	9	9	8	4	2	4	2	3	6	25	25	23	22	16	4	2	2	2	8.8	25
3-Feb	1	1	1	Z	1	0	1	1	1	4	7	6	6	7	8	13	23	21	11	3	2	1	0	1	5.1	23
4-Feb	0	1	1	1	Z	0	1	2	5	2	1	1	1	3	7	5	3	3	3	3	2	1	2	2	2.1	7
5-Feb	4	3	5	8	6	Z	2	2	2	1	1	2	1	2	2	2	2	2	3	4	4	3	3	3	2.8	8
6-Feb	Z	4	6	5	3	4	4	3	5	4	7	9	3	2	2	2	2	2	3	4	3	1	1	1	3.4	9
7-Feb	1	Z	1	0	1	0	1	1	1	1	2	1	1	1	0	0	1	1	2	1	3	6	4	3	1.4	6
8-Feb	4	1	Z	4	5	6	4	7	7	8	9	11	11	11	12	12	11	9	8	7	7	9	5	4	7.5	12
9-Feb	2	1	1	Z	1	1	1	3	1	1	1	2	2	1	1	4	5	10	13	4	3	2	0	1	2.6	13
10-Feb	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0.3	2
11-Feb	1	2	2	3	1	Z	1	1	2	2	2	1	0	0	0	0	0	1	0	0	1	1	0	0	0.9	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	0.2	0
13-Feb	0	Z	0	0	0	1	1	1	1	2	1	1	3	5	8	8	7	10	9	7	6	8	5	5	3.8	10
14-Feb	7	8	Z	12	14	14	19	19	18	8	3	2	3	5	7	6	1	0	0	0	0	0	0	0	6.3	19
15-Feb	0	0	0	Z	1	0	0	0	0	0	0	0	1	2	1	1	5	14	16	20	18	4	4	4	4.1	20
16-Feb	3	2	0	1	Z	2	1	1	2	2	C	C	C	C	C	2	2	2	1	6	6	4	1	9	2.5	9
17-Feb	1	1	9	4	2	Z	1	1	1	1	1	1	1	2	0	0	0	0	0	0	0	1	1	1	1.3	9
18-Feb	Z	1	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	4	17	8	1	1	1.8	17
19-Feb	0	Z	1	2	2	1	1	0	1	2	2	3	2	3	2	3	5	7	3	1	1	1	0	0	1.9	7
20-Feb	1	1	Z	1	0	0	0	0	0	1	5	4	4	12	11	5	7	7	5	2	2	2	3	6	3.4	12
21-Feb	2	2	3	Z	3	4	5	6	6	3	7	6	2	2	2	2	2	2	2	3	1	2	2	14	3.5	14
22-Feb	20	14	8	7	Z	7	5	4	4	6	9	11	8	10	12	10	14	13	10	7	20	22	18	15	10.9	22
23-Feb	13	11	9	7	11	Z	20	17	13	9	7	5	5	5	4	3	3	3	2	2	2	5	6	12	7.5	20
24-Feb	Z	10	11	13	14	12	7	3	4	9	9	8	12	8	10	8	10	10	4	3	0	1	1	1	7.2	14
25-Feb	2	Z	1	2	2	4	4	4	9	13	8	6	5	4	2	2	5	7	5	3	6	8	5	5	4.8	13
26-Feb	6	5	Z	14	24	14	16	20	12	5	4	5	4	3	1	1	0	0	0	0	0	0	0	0	5.8	24
27-Feb	0	0	0	Z	0	0	1	1	0	0	0	4	7	6	6	6	7	6	6	6	5	12	3	0	3.2	12
28-Feb	0	0	0	0	Z	1	2	2	1	1	1	2	1	0	0	0	1	2	2	1	0	1	1	0	0.9	2
29-Feb	0	0	0	0	1	Z	1	1	2	1	1	1	0	0	1	1	1	1	2	2	2	2	2	2	0.9	2
3.0 3.1 2.5 3.7 4.2 3.4 3.7 3.9 3.8 3.2 3.3 3.5 3.2 3.6 3.9 4.2 5.0 5.5 4.9 4.0 4.2 3.7 2.5 3.2																								Diurnal Average		
20 14 11 14 24 14 20 20 18 13 9 11 12 12 12 25 25 23 22 20 20 22 18 15																								Diurnal Maximum		
Z - zerspan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	654	98.79	98.79
21 - 40	8	1.21	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	70	57	32	16	18	22	134	98	53	24	30	11	5	7	12	63	652
21 - 40	2	1	1	0	0	0	0	0	0	1	0	0	0	0	0	3	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	72	58	33	16	18	22	134	98	53	25	30	11	5	7	12	66	660

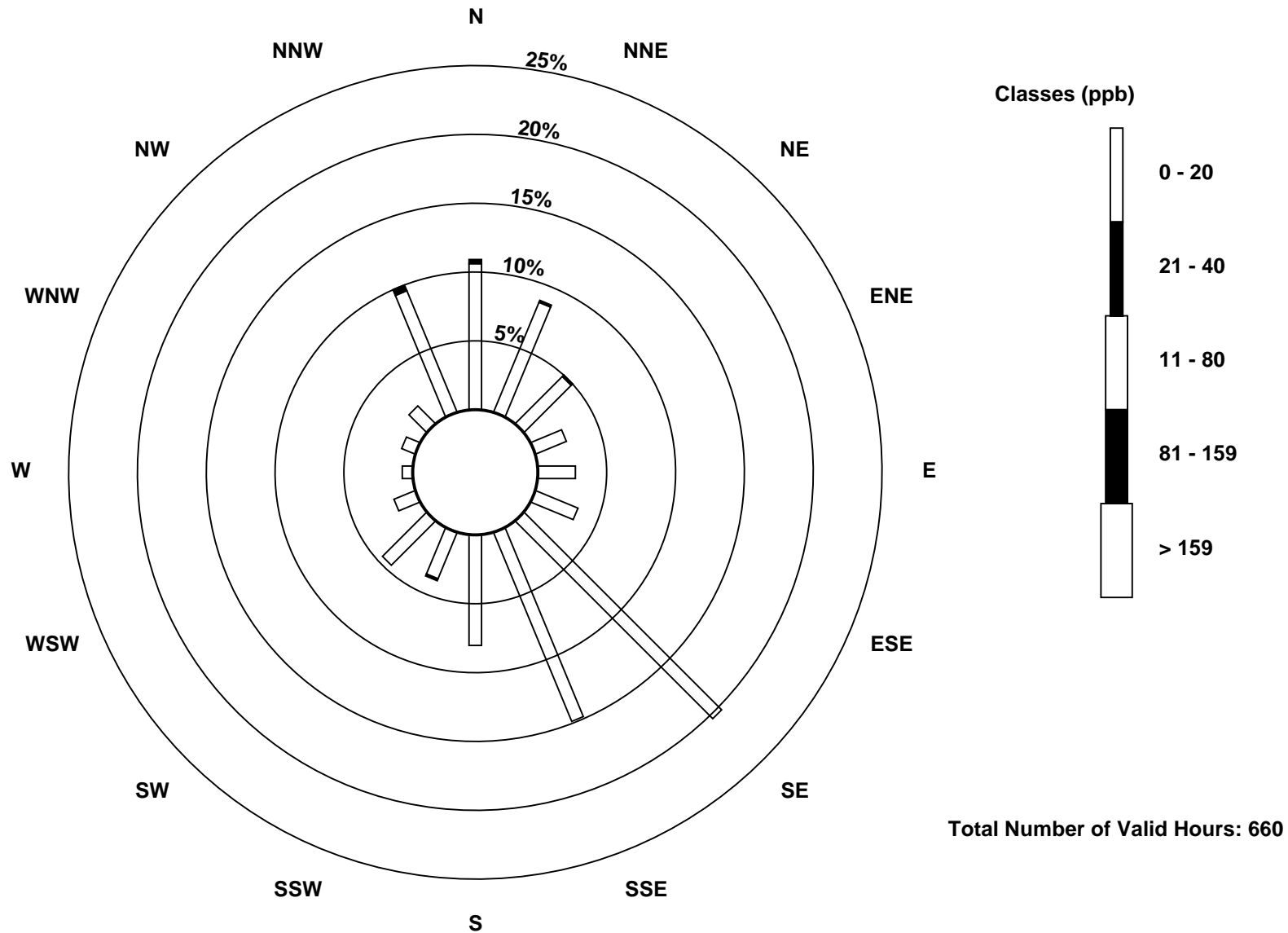
Total Number of Valid Hours: 660

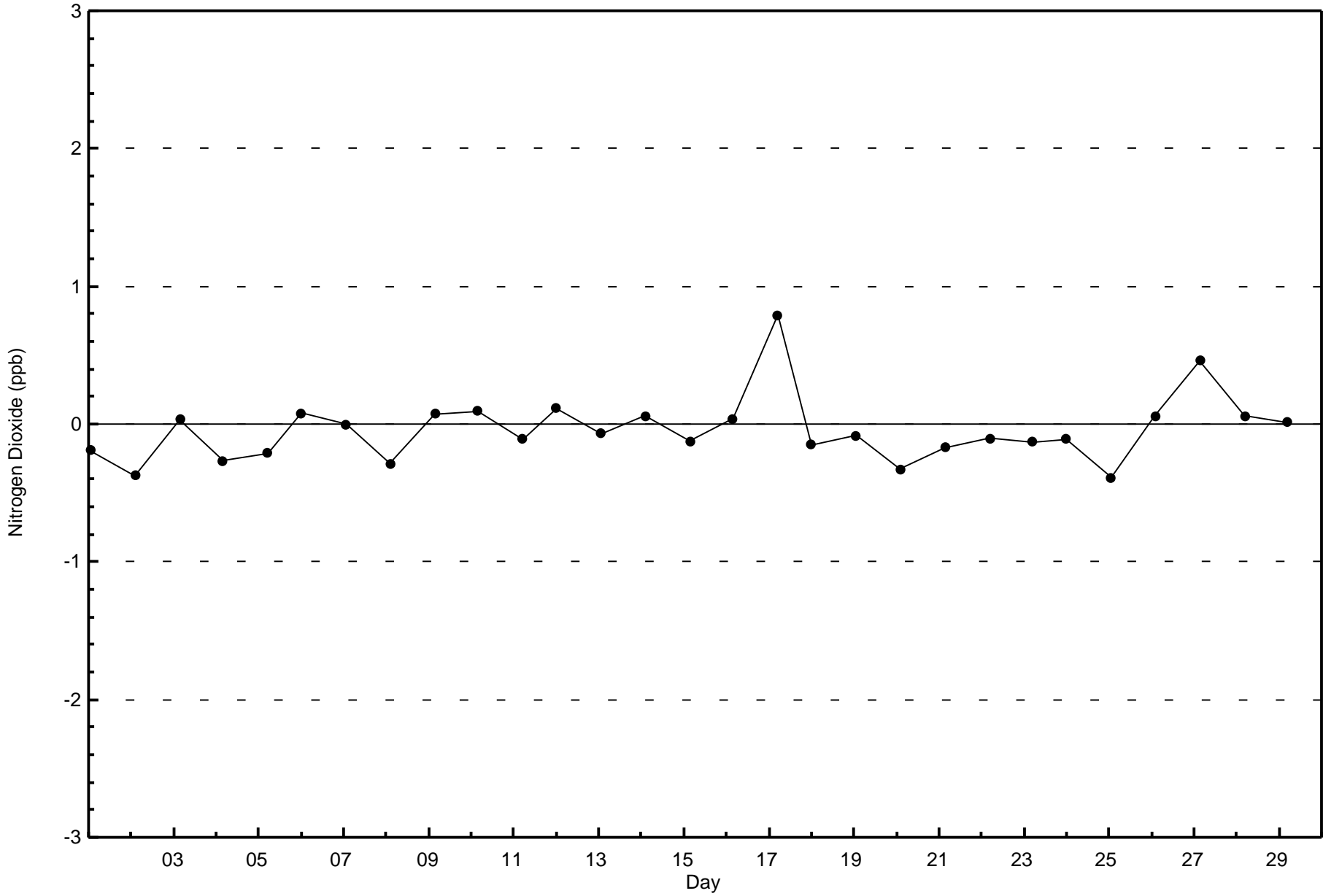
Total Number of Hours: 696

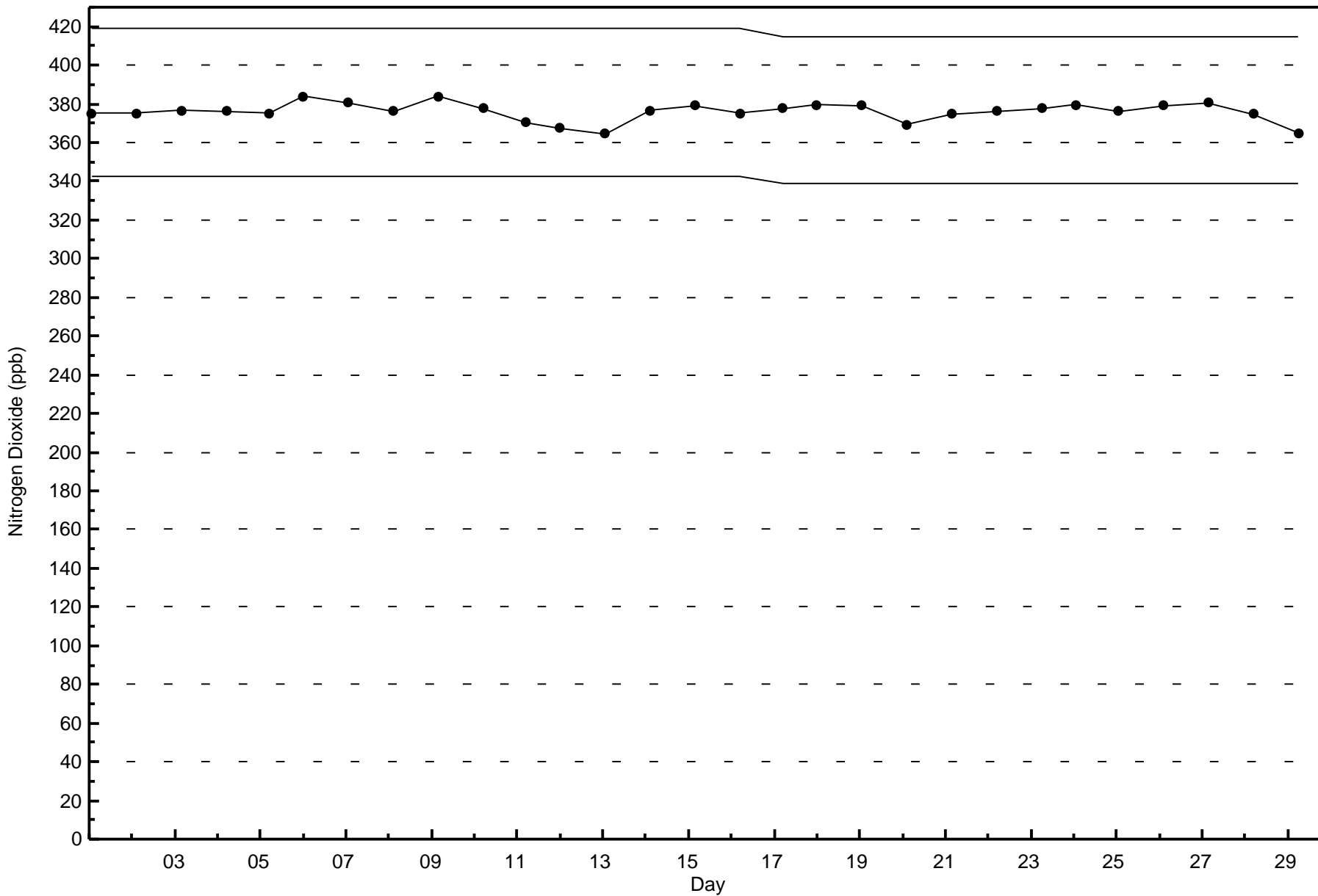


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)





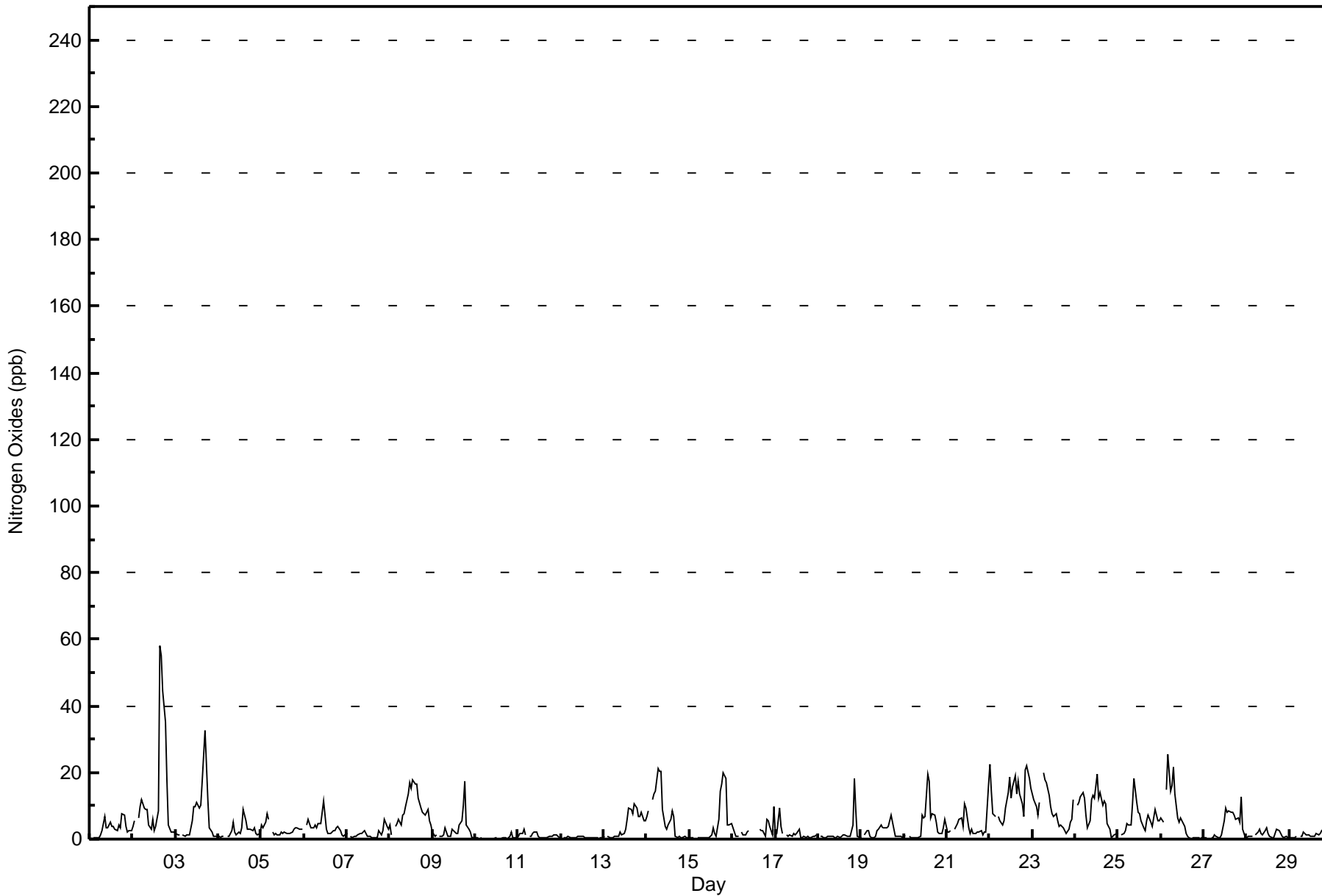




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - February 2016

Maximum Value: 58 ppb on Feb 2 16:00		Maximum Daily Average: 13.6 ppb on Feb 2		Hours in Service: 696																						
Minimum Value: 0 ppb on Feb 10 07:00		Minimum Daily Average: 0.3 ppb on Feb 10		Hours of Data: 662																						
Maximum Diurnal Average: 7.0 ppb at hour 17		Minimum Diurnal Average: 2.7 ppb at hour 23		Hours of Missing Data: 34																						
Monthly Average: 4.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 6 P ₉₀ = 12 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	Z	0	0	0	0	1	2	7	3	3	5	4	4	3	2	4	3	8	7	4	2	2	3	3.0	8
2-Feb	4	5	Z	6	10	12	9	9	9	4	3	6	3	4	9	58	55	44	35	18	4	2	2	2	13.6	58
3-Feb	2	1	1	Z	1	1	1	1	1	5	10	10	11	9	10	17	33	22	12	3	2	1	1	1	6.8	33
4-Feb	1	1	1	1	Z	1	1	3	5	2	1	2	2	4	9	5	3	3	3	3	2	1	2	2	2.5	9
5-Feb	4	3	5	8	6	Z	2	1	2	1	1	2	2	2	2	2	2	2	3	4	4	3	3	3	2.9	8
6-Feb	Z	4	6	5	3	4	4	3	5	5	8	11	3	2	2	2	2	2	4	4	3	1	1	1	3.7	11
7-Feb	2	Z	1	1	1	1	1	2	2	2	2	1	1	1	1	1	0	0	2	1	3	6	4	3	1.6	6
8-Feb	4	1	Z	4	5	6	4	7	8	10	14	17	15	18	17	16	12	9	8	7	7	9	5	4	9.1	18
9-Feb	2	1	1	Z	1	1	1	3	1	1	1	3	2	2	2	4	5	10	17	4	3	2	0	1	3.0	17
10-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0.3	2
11-Feb	1	2	2	3	1	Z	1	1	2	2	2	1	0	0	0	1	0	1	1	1	1	1	1	1	1.1	3
12-Feb	Z	1	0	0	1	1	0	1	0	1	1	1	1	1	0	0	1	1	0	1	0	0	0	0	0.5	1
13-Feb	1	Z	1	1	1	1	1	1	1	2	1	1	3	6	9	9	8	11	9	7	7	8	5	6	4.3	11
14-Feb	7	9	Z	12	14	14	21	20	20	9	4	3	4	6	8	7	1	1	1	0	0	1	1	1	7.1	21
15-Feb	0	0	0	Z	1	1	1	0	1	1	0	1	1	3	2	1	6	14	16	20	18	4	4	5	4.4	20
16-Feb	3	2	1	1	Z	2	1	1	2	3	C	C	C	C	C	3	3	2	1	6	6	4	1	10	2.9	10
17-Feb	1	2	9	4	2	Z	1	1	1	1	2	1	2	3	0	1	1	1	1	0	1	1	1	1	1.5	9
18-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	18	9	1	0	2.0	18
19-Feb	0	Z	1	2	3	1	1	0	1	3	3	4	4	3	3	4	5	7	3	1	1	1	1	1	2.3	7
20-Feb	1	1	Z	1	1	1	1	1	1	1	7	6	7	20	18	6	7	7	5	2	2	2	3	6	4.6	20
21-Feb	2	2	3	Z	3	4	5	6	6	4	11	9	4	2	3	2	2	2	2	3	1	2	2	16	4.1	16
22-Feb	22	15	8	7	Z	7	5	4	5	9	14	19	12	16	19	13	17	14	11	7	21	22	18	15	13.0	22
23-Feb	14	12	10	7	11	Z	20	18	17	13	10	7	7	8	5	4	4	3	3	2	3	5	6	12	8.7	20
24-Feb	Z	10	11	13	14	12	7	3	6	12	13	12	19	12	14	10	11	10	5	3	1	1	1	2	8.9	19
25-Feb	2	Z	1	2	3	5	4	4	11	18	11	8	8	6	3	2	6	7	5	4	6	9	5	5	5.9	18
26-Feb	6	5	Z	15	25	14	16	22	14	6	5	6	6	4	2	1	0	0	0	0	0	0	0	0	6.5	25
27-Feb	0	0	0	Z	0	0	1	1	0	0	1	6	9	8	8	8	8	7	6	6	5	13	3	1	4.0	13
28-Feb	0	1	1	1	Z	1	2	3	2	1	2	3	2	1	1	0	2	3	3	2	1	1	1	0	1.5	3
29-Feb	0	0	0	0	1	Z	1	1	2	1	1	1	1	1	1	2	1	2	3	2	2	2	2	2	1.3	3
3.3 3.3 2.7 3.9 4.4 3.7 4.0 4.2 4.5 4.2 4.7 5.3 4.7 5.1 5.4 6.3 7.0 6.6 5.8 4.3 4.4 3.9 2.7 3.5																								Diurnal Average		
22 15 11 15 25 14 21 22 20 18 14 19 19 20 19 58 55 44 35 20 21 22 18 16																								Diurnal Maximum		
Z - zerspan C - Calibration																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	650	98.19	98.19
21 - 40	9	1.36	99.55
41 - 80	3	0.45	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Wapasu - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	70	56	32	16	18	22	134	98	53	24	29	11	5	6	11	63	648
21 - 40	1	2	1	0	0	0	0	0	0	1	1	0	0	1	1	1	9
11 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	72	58	33	16	18	22	134	98	53	25	30	11	5	7	12	66	660

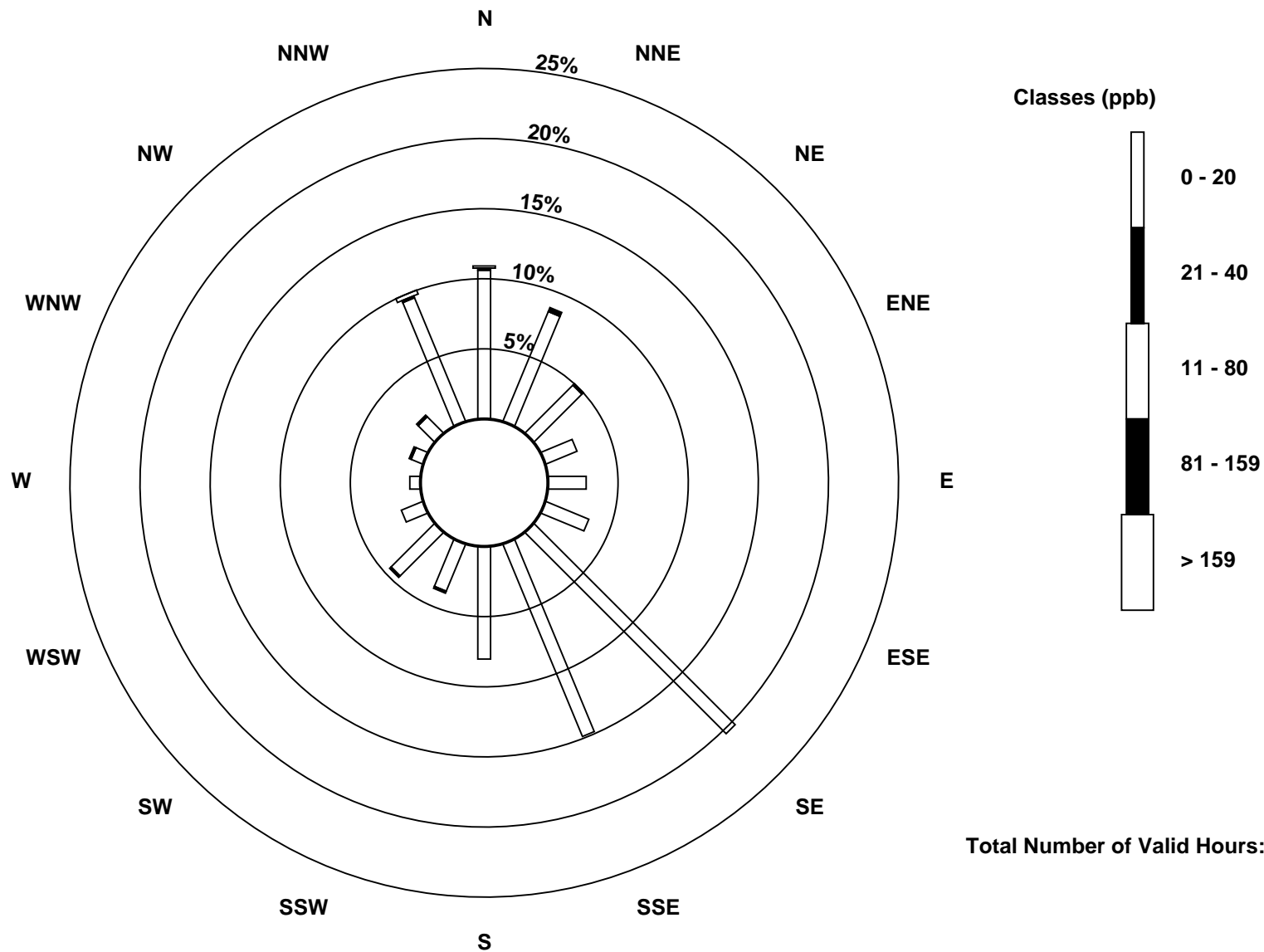
Total Number of Valid Hours: 660

Total Number of Hours: 696

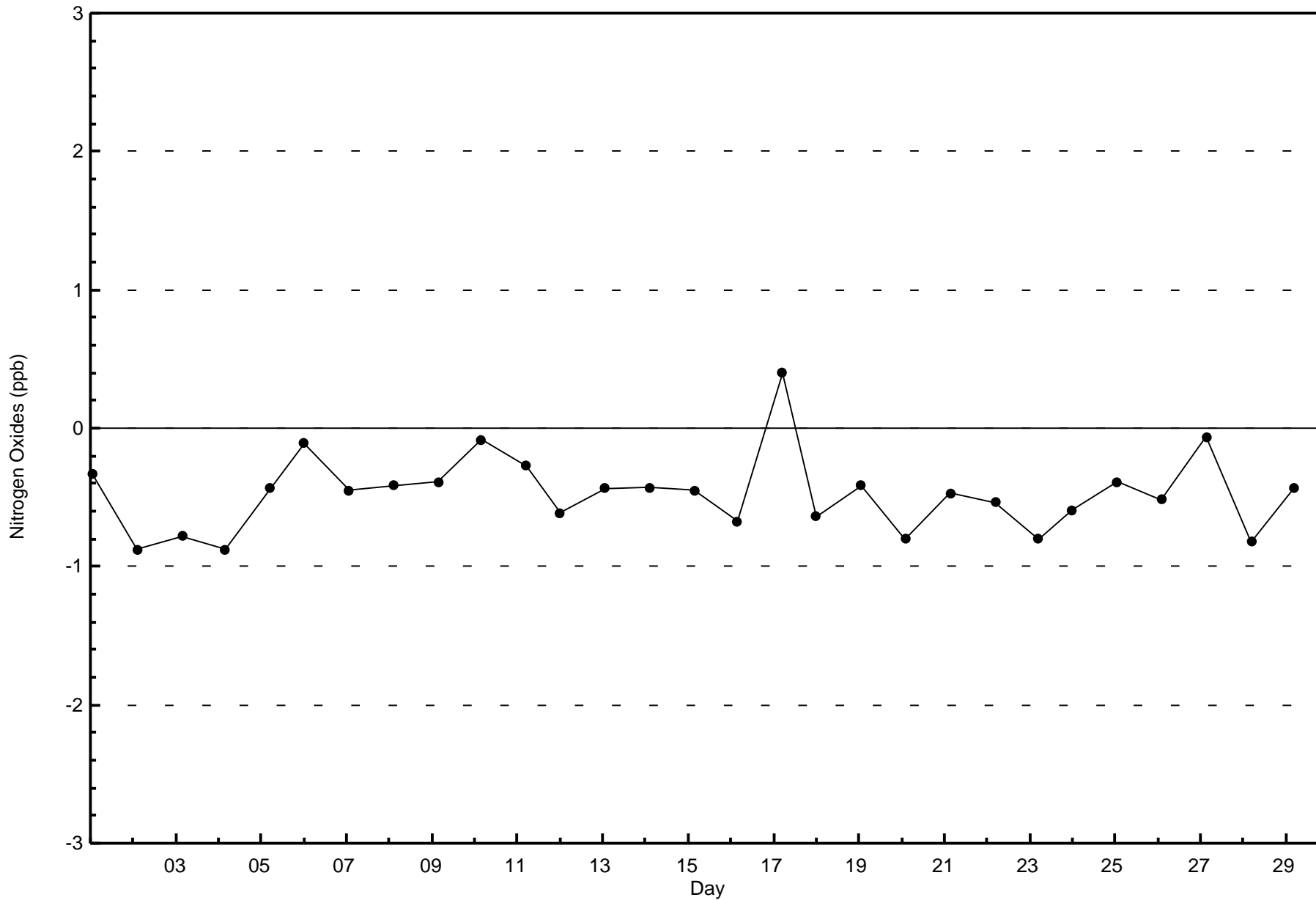


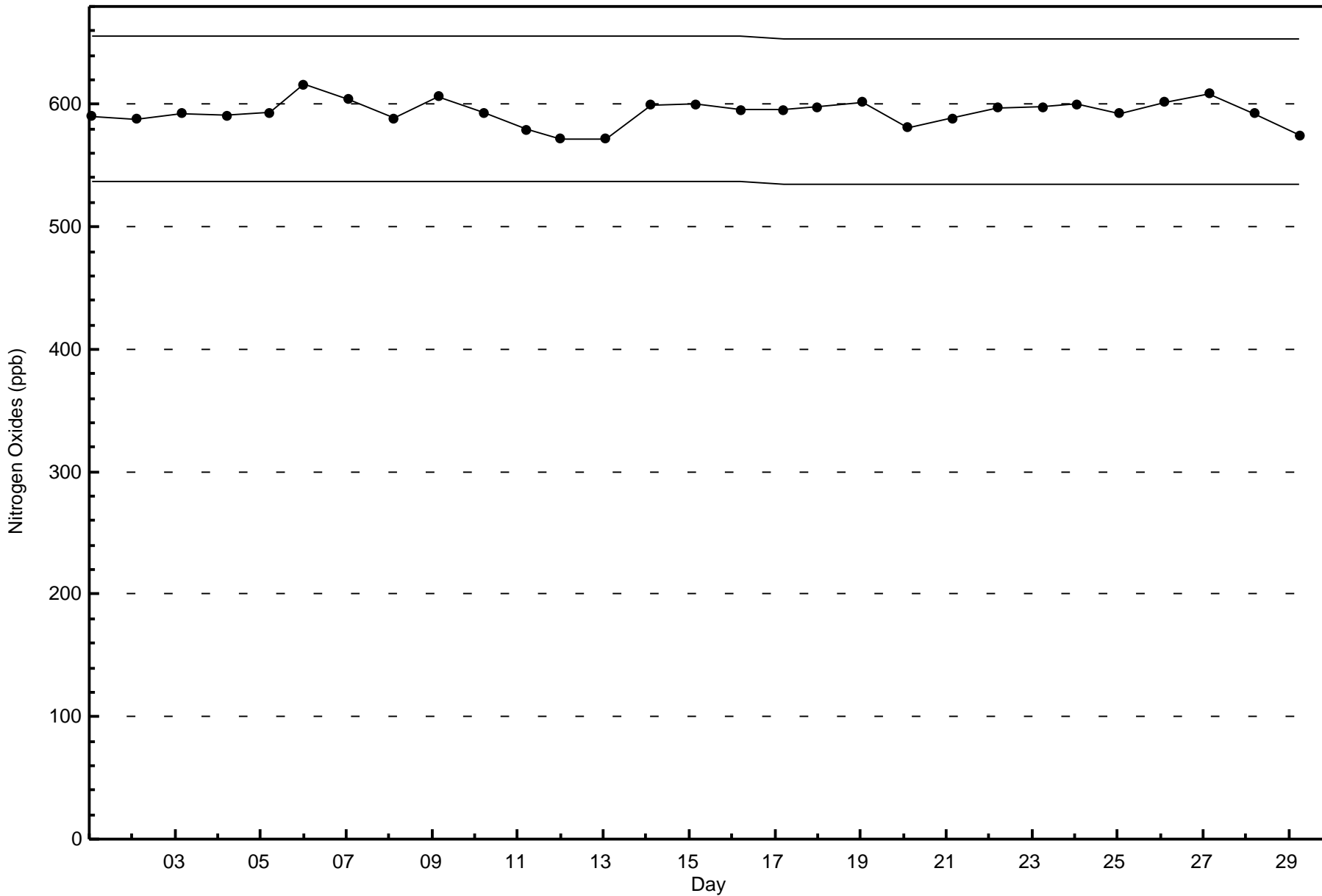
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 660







Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 21.2 µg/m ³ on Feb 24 13:00 Maximum Daily Average: 6.4 µg/m ³ on Feb 2		Hours in Service: 696 Hours of Data: 694 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																								
Minimum Value: 0.1 µg/m ³ on Feb 14 21:00 Maximum Diurnal Average: 4.1 µg/m ³ at hour 13 Monthly Average: 2.89 µg/m ³		Minimum Daily Average: 0.6 µg/m ³ on Feb 12 Minimum Diurnal Average: 2.0 µg/m ³ at hour 1 Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 2.2 Q ₃ = 3.7 P ₉₀ = 5.8 P ₉₉ = 12.4																								
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	1.0	0.9	0.9	1.0	1.1	1.1	1.7	2.2	2.2	2.7	3.5	3.7	3.7	3.8	3.3	3.4	3.5	3.8	3.7	3.7	3.4	3.4	2.9	2.6	3.8
2-Feb	3.4	4.1	3.6	4.4	6.7	10.8	8.4	9.5	10.0	5.5	3.9	3.0	3.4	3.7	7.4	10.4	10.9	12.3	11.3	8.2	4.5	3.4	2.6	2.3	6.4	12.3
3-Feb	2.2	2.3	2.2	2.3	2.2	2.0	2.0	1.9	1.6	2.0	3.5	4.3	3.2	6.2	9.8	4.7	5.8	5.3	3.8	2.4	1.8	1.4	1.3	1.3	3.1	9.8
4-Feb	1.1	0.9	0.9	0.8	0.8	0.8	0.8	1.1	1.0	1.1	1.9	3.3	3.3	3.8	3.7	3.1	3.5	3.1	2.8	2.4	2.0	2.0	2.1	2.5	2.0	3.8
5-Feb	2.3	2.2	4.6	7.5	5.4	4.8	6.2	6.0	4.1	2.9	2.8	4.1	3.8	3.7	3.6	3.4	4.0	4.3	4.3	4.2	4.1	4.0	3.8	3.4	4.1	7.5
6-Feb	3.8	4.2	4.1	3.8	3.5	3.7	4.1	5.3	5.6	5.1	5.8	4.0	3.6	3.4	3.1	3.7	4.6	6.2	6.4	5.2	3.5	3.5	3.7	4.0	4.3	6.4
7-Feb	3.8	3.6	4.0	3.3	2.9	2.5	2.1	1.9	1.9	2.0	1.9	1.6	1.6	1.4	1.5	1.4	1.3	1.3	1.0	0.7	0.8	0.9	1.1	0.8	1.9	4.0
8-Feb	0.7	1.0	1.9	2.8	2.0	2.0	3.1	3.9	3.6	4.2	10.3	9.4	9.8	11.4	11.4	12.6	11.8	9.2	10.3	7.9	5.1	7.8	3.9	2.1	6.2	12.6
9-Feb	2.6	2.9	2.5	2.2	1.9	1.6	1.6	1.8	1.3	0.9	0.8	1.2	1.0	0.9	1.1	1.5	2.4	5.2	3.6	3.9	4.2	2.4	1.6	2.0	2.1	5.2
10-Feb	3.1	4.4	3.5	2.5	2.2	2.8	2.7	1.9	2.2	1.6	1.1	0.8	0.7	0.7	0.7	0.7	0.5	0.5	0.6	0.5	0.6	0.6	0.7	0.7	1.5	4.4
11-Feb	0.8	0.9	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.8	0.7	0.3	0.4	0.7	0.6	0.6	0.6	0.2	0.2	0.2	0.7	1.0	0.9	0.8	0.7	1.0
12-Feb	0.9	0.9	0.8	0.8	0.8	0.7	0.9	0.8	0.7	0.8	0.6	0.4	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.6	0.9
13-Feb	0.5	0.6	0.8	0.8	0.9	0.8	0.9	0.9	1.1	1.3	1.5	2.7	6.2	9.0	11.9	9.5	7.9	8.1	8.3	5.3	4.0	4.4	3.7	3.1	3.9	11.9
14-Feb	1.1	0.2	0.3	3.0	5.3	5.8	9.0	9.2	10.1	5.4	4.5	5.3	8.3	7.7	6.3	4.1	2.6	2.0	0.5	0.2	0.1	0.3	0.4	0.3	3.8	10.1
15-Feb	0.4	0.6	0.6	1.1	1.3	1.0	0.6	1.0	1.6	2.8	2.7	2.3	1.6	3.8	3.8	3.4	3.5	4.0	3.8	3.9	3.7	3.0	2.6	3.0	2.3	4.0
16-Feb	2.5	1.7	1.9	2.0	2.1	2.3	3.6	5.1	6.2	5.4	4.6	5.5	5.3	4.1	3.4	3.2	2.2	4.0	3.6	3.4	2.6	2.6	3.2	5.1	3.6	6.2
17-Feb	5.0	4.8	3.2	6.4	8.1	5.2	5.4	5.4	3.6	2.9	C	C	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.8	2.8	8.1	
18-Feb	0.8	1.0	1.4	1.5	1.7	1.3	1.3	1.6	2.0	1.7	2.3	3.4	3.9	3.5	3.1	2.9	3.3	3.4	3.1	3.2	4.5	3.7	3.3	1.7	2.5	4.5
19-Feb	1.3	1.2	1.2	1.1	1.1	0.9	0.8	0.8	0.9	1.0	0.9	1.1	0.8	0.8	0.6	0.8	0.9	1.0	0.6	0.4	0.4	0.4	0.4	0.4	0.8	1.3
20-Feb	0.5	0.5	0.6	0.6	0.5	0.4	0.5	0.4	0.4	0.5	1.2	2.4	8.2	4.1	2.5	1.4	1.7	0.7	0.5	0.4	0.4	0.4	0.3	0.4	1.2	8.2
21-Feb	0.3	0.3	0.3	0.4	0.5	0.7	1.2	1.9	2.2	3.6	8.6	4.8	3.4	3.4	3.7	3.5	3.5	3.3	3.6	3.3	3.5	3.4	3.1	4.2	2.8	8.6
22-Feb	5.6	6.3	4.5	4.1	4.1	4.8	3.8	2.8	3.1	2.9	6.5	7.7	4.7	6.9	3.6	3.3	3.0	1.7	2.2	2.7	5.8	7.2	5.9	5.0	4.5	7.7
23-Feb	4.3	2.7	1.3	1.0	2.1	2.0	3.8	3.0	4.9	4.4	2.8	1.6	1.6	1.6	1.4	1.0	0.9	1.2	1.2	0.8	0.3	0.8	0.8	1.3	2.0	4.9
24-Feb	1.2	0.7	0.7	2.1	0.8	0.4	0.7	1.3	1.0	2.3	5.0	9.7	21.2	10.5	1.9	1.5	1.7	1.6	0.9	0.9	0.8	1.0	1.7	1.5	3.0	21.2
25-Feb	1.5	1.4	1.8	2.1	2.5	3.1	3.4	3.3	4.4	7.2	6.5	7.5	8.1	6.6	2.5	0.8	0.9	0.7	0.7	0.7	1.3	1.1	0.9	0.9	2.9	8.1
26-Feb	1.6	4.6	13.0	15.8	16.3	13.2	11.9	20.4	11.3	4.1	2.5	1.3	0.9	0.8	0.6	0.5	0.4	0.5	0.6	0.6	0.7	0.8	1.0	0.8	5.2	20.4
27-Feb	0.4	0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	2.2	3.6	3.5	3.6	3.4	3.2	2.9	2.8	2.0	1.8	3.1	1.5	1.4	1.7	3.6
28-Feb	1.3	1.3	1.5	1.8	1.9	2.2	2.6	2.9	3.0	2.3	2.6	2.5	2.3	1.8	1.6	1.7	2.4	3.0	3.4	2.9	2.6	2.4	2.2	2.1	2.3	3.4
29-Feb	4.1	5.4	5.4	5.0	4.2	3.6	3.1	2.9	2.6	1.7	1.5	1.6	2.2	2.2	2.2	2.7	2.1	2.1	2.1	2.2	2.2	2.5	2.9	3.6	2.9	5.4
2.0 2.1 2.4 2.8 2.9 2.8 3.0 3.5 3.2 2.7 3.2 3.5 4.1 3.8 3.5 3.1 3.1 3.2 3.0 2.5 2.3 2.4 2.1 2.0																								Diurnal Average		
5.6 6.3 13.0 15.8 16.3 13.2 11.9 20.4 11.3 7.2 10.3 9.7 21.2 11.4 11.9 12.6 11.8 12.3 11.3 8.2 5.8 7.8 5.9 5.1																								Diurnal Maximum		
C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										

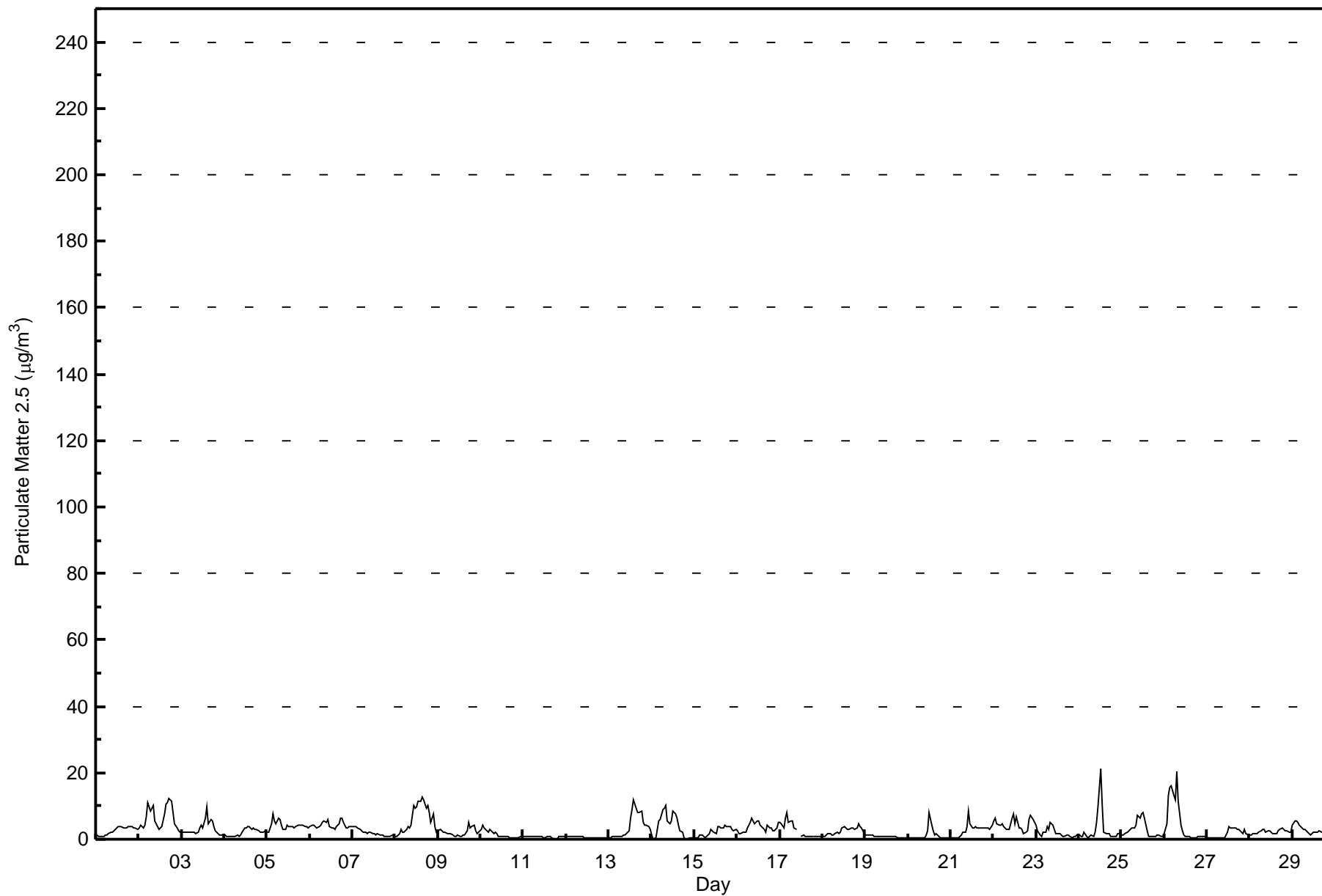


Wood Buffalo Environmental Association

Hourly Averages

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

Wapasu - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - February 2016

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	425	61.24	61.24
6 - 15	71	10.23	71.47
16 - 25	4	0.58	72.05
26 - 80	0	0.00	72.05
> 81.0	0	0.00	72.05

Total Number of Valid Hours: 694

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - February 2016

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	56	32	15	3	7	14	79	77	46	16	15	7	3	5	8	41	424
6 - 15	5	2	1	1	0	0	11	8	8	5	12	2	0	2	3	10	70
16 - 25	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	4
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	61	34	16	4	7	14	90	85	55	23	28	9	3	7	11	51	498

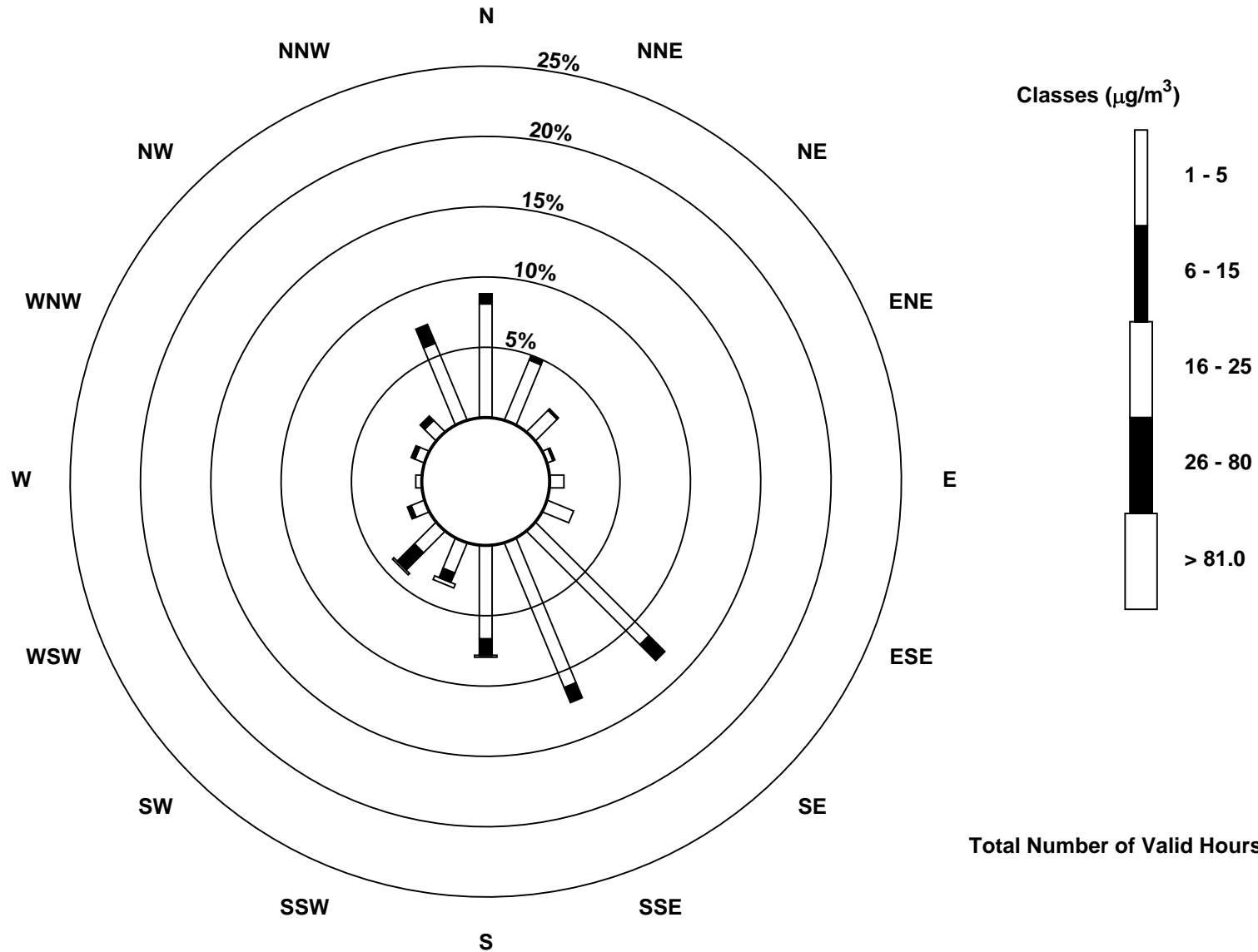
Total Number of Valid Hours: 692

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu (AMS 17)



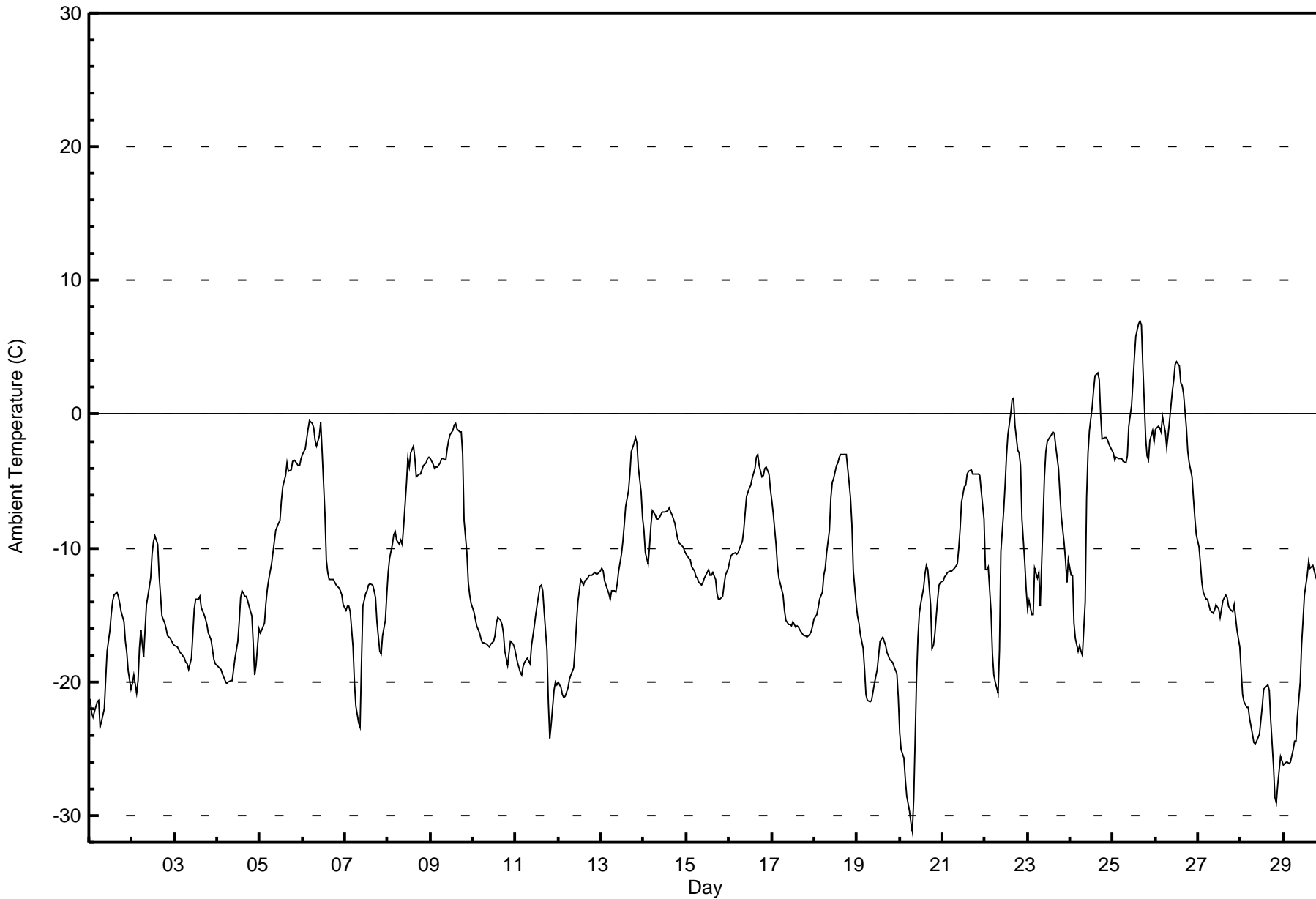
Total Number of Valid Hours: 692



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Wapasu - February 2016

Maximum Value: 7.0 C on Feb 25 16:00 Maximum Daily Average: -0.3 C on Feb 25		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Minimum Value: -31.2 C on Feb 20 08:00 Maximum Diurnal Average: -8.3 C at hour 15 Monthly Average: -11.88 C		Minimum Daily Average: -23.4 C on Feb 28 Minimum Diurnal Average: -15.0 C at hour 8 Percentiles: P ₁ = -27.9 P ₁₀ = -20.3 Q ₁ = -17.0 Median = -12.6 Q ₃ = -5.8 P ₉₀ = -2.1 P ₉₉ = 3.6																									
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	-21.3	-22.4	-22.6	-22.3	-21.5	-21.4	-23.4	-23.0	-22.0	-19.9	-17.8	-16.1	-14.8	-13.9	-13.5	-13.3	-13.6	-14.1	-14.8	-15.6	-16.9	-17.8	-19.2	-20.6	-18.4	-13.3	
2-Feb	-20.1	-19.5	-20.9	-19.9	-17.5	-16.1	-18.2	-16.2	-14.3	-13.6	-12.3	-10.5	-9.5	-9.1	-9.8	-12.0	-13.5	-15.1	-15.6	-16.1	-16.5	-16.7	-17.0	-17.2	-15.3	-9.1	
3-Feb	-17.3	-17.4	-17.6	-17.8	-17.9	-18.3	-18.5	-18.7	-19.1	-18.2	-16.4	-14.6	-13.8	-13.8	-13.6	-14.5	-15.0	-15.3	-15.7	-16.3	-16.8	-17.6	-18.3	-18.7	-16.7	-13.6	
4-Feb	-18.9	-19.0	-19.1	-19.3	-19.9	-20.1	-20.0	-19.9	-19.9	-19.1	-18.2	-17.0	-15.5	-13.7	-13.2	-13.6	-13.6	-13.9	-14.4	-15.1	-17.2	-19.5	-18.7	-16.1	-17.3	-13.2	
5-Feb	-16.3	-16.1	-15.6	-14.1	-13.1	-12.4	-11.2	-10.3	-9.5	-8.6	-8.2	-7.9	-6.5	-5.4	-4.5	-3.7	-4.3	-4.2	-3.5	-3.4	-3.5	-3.8	-3.9	-3.3	-8.1	-3.3	
6-Feb	-3.0	-2.6	-1.8	-1.1	-0.5	-0.7	-1.0	-1.9	-2.3	-1.6	-0.6	-2.8	-7.4	-10.9	-11.8	-12.4	-12.4	-12.3	-12.6	-12.8	-13.0	-13.2	-13.5	-14.3	-6.9	-0.5	
7-Feb	-14.6	-14.3	-14.4	-14.8	-17.4	-20.0	-21.8	-23.0	-23.4	-18.7	-14.4	-13.5	-13.2	-12.8	-12.7	-12.8	-13.2	-13.7	-15.5	-17.7	-17.9	-16.5	-15.4	-13.5	-16.1	-12.7	
8-Feb	-11.8	-10.8	-9.7	-9.0	-8.7	-9.4	-9.7	-9.4	-9.7	-8.3	-5.2	-3.3	-3.9	-2.9	-2.4	-3.3	-4.6	-4.4	-4.5	-4.1	-3.9	-3.7	-3.3	-3.2	-6.2	-2.4	
9-Feb	-3.4	-3.7	-4.0	-4.0	-4.0	-3.7	-3.4	-3.3	-3.4	-2.6	-1.9	-1.6	-1.2	-0.8	-0.7	-1.1	-1.3	-1.3	-3.0	-7.9	-10.3	-12.5	-13.5	-14.2	-4.4	-0.7	
10-Feb	-14.8	-15.3	-15.8	-16.4	-16.8	-17.1	-17.1	-17.2	-17.3	-17.3	-17.2	-17.0	-16.5	-15.6	-15.2	-15.4	-15.7	-16.3	-17.7	-18.7	-17.8	-17.0	-17.2	-17.5	-16.7	-14.8	
11-Feb	-18.0	-18.5	-19.2	-19.5	-18.9	-18.6	-18.2	-18.4	-18.6	-17.3	-15.8	-15.0	-14.2	-12.9	-12.8	-13.2	-14.8	-17.6	-21.6	-24.2	-23.2	-20.6	-20.0	-20.2	-18.0	-12.8	
12-Feb	-20.0	-20.5	-20.9	-21.2	-21.1	-20.5	-19.8	-19.5	-19.0	-17.5	-15.8	-14.0	-12.4	-12.5	-12.8	-12.4	-12.3	-12.0	-12.0	-12.1	-11.8	-11.9	-11.9	-11.7	-15.6	-11.7	
13-Feb	-11.5	-11.7	-12.5	-13.1	-13.4	-13.8	-13.2	-13.1	-13.3	-12.7	-11.7	-10.4	-9.5	-8.3	-6.9	-5.8	-4.5	-2.8	-2.1	-1.8	-2.1	-4.0	-5.9	-7.7	-8.8	-1.8	
14-Feb	-8.7	-10.3	-11.2	-9.8	-8.3	-7.1	-7.6	-7.8	-7.9	-7.7	-7.3	-7.3	-7.2	-7.0	-7.3	-7.5	-8.2	-8.8	-9.3	-9.6	-9.8	-10.0	-10.2	-8.5	-7.0		
15-Feb	-10.4	-10.8	-10.9	-11.4	-11.7	-12.1	-12.2	-12.6	-12.7	-12.5	-12.2	-12.0	-11.6	-12.0	-12.0	-11.8	-12.4	-13.4	-13.8	-13.8	-13.6	-12.7	-12.0	-11.5	-12.2	-10.4	
16-Feb	-10.9	-10.6	-10.5	-10.3	-10.5	-10.4	-10.0	-9.5	-8.7	-7.4	-6.1	-5.5	-5.3	-4.8	-4.1	-3.3	-3.0	-3.9	-4.7	-4.5	-4.1	-4.0	-4.5	-5.6	-6.8	-3.0	
17-Feb	-6.4	-7.4	-9.7	-11.2	-12.3	-12.7	-13.5	-14.7	-15.4	-15.7	-15.7	-15.8	-15.5	-15.9	-15.8	-15.9	-16.1	-16.4	-16.6	-16.6	-16.6	-16.4	-16.2	-15.8	-14.4	-6.4	
18-Feb	-15.3	-15.0	-14.5	-13.8	-13.2	-12.0	-11.5	-10.3	-8.7	-6.2	-5.1	-4.8	-3.9	-3.7	-3.2	-3.0	-2.9	-3.0	-3.0	-5.1	-6.2	-8.2	-11.8	-14.1	-8.3	-2.9	
19-Feb	-15.1	-15.6	-16.5	-17.5	-19.1	-21.0	-21.4	-21.5	-21.4	-20.8	-20.1	-19.1	-18.0	-17.0	-16.7	-17.0	-17.3	-17.8	-18.3	-18.4	-18.6	-18.9	-19.4	-21.2	-18.6	-15.1	
20-Feb	-23.8	-25.1	-25.7	-27.2	-28.6	-29.7	-30.6	-31.2	-28.7	-19.7	-16.6	-14.9	-14.1	-13.0	-11.9	-11.3	-11.6	-14.2	-17.5	-17.2	-16.5	-13.8	-12.8	-12.6	-19.5	-11.3	
21-Feb	-12.4	-12.1	-12.1	-11.9	-11.7	-11.7	-11.6	-11.5	-11.1	-10.0	-8.6	-6.6	-5.4	-5.3	-4.5	-4.3	-4.1	-4.5	-4.5	-4.5	-4.5	-4.5	-5.8	-7.9	-8.0	-4.1	
22-Feb	-11.6	-11.6	-11.4	-14.8	-17.9	-19.5	-20.0	-20.9	-17.6	-10.2	-7.2	-5.3	-3.1	-1.5	0.0	1.1	1.2	-0.8	-2.6	-2.9	-3.8	-7.8	-11.1	-13.1	-8.9	1.2	
23-Feb	-14.5	-13.9	-14.9	-15.0	-11.5	-12.2	-11.9	-14.4	-11.2	-4.7	-2.8	-2.1	-1.8	-1.6	-1.3	-1.4	-2.3	-4.1	-5.9	-7.6	-9.6	-10.9	-12.6	-10.9	-8.3	-1.3	
24-Feb	-12.0	-12.0	-15.6	-16.8	-17.7	-17.3	-17.7	-18.0	-14.1	-6.2	-2.9	-1.2	0.6	1.9	2.9	3.1	2.6	0.0	-1.8	-1.7	-1.8	-1.9	-2.3	-2.7	-6.4	3.1	
25-Feb	-2.9	-3.4	-3.2	-3.3	-3.3	-3.3	-3.5	-3.6	-3.1	-0.9	0.7	2.5	4.2	5.9	6.7	7.0	6.7	3.7	3.7	-1.8	-3.1	-3.4	-1.9	-1.2	-2.1	-0.3	7.0
26-Feb	-1.1	-0.9	-1.0	-1.3	-0.2	-1.4	-2.5	-1.5	-0.5	1.7	2.6	3.7	3.9	3.6	2.4	2.2	1.5	-1.0	-2.8	-3.7	-4.7	-6.3	-7.7	-9.0	-1.0	3.9	
27-Feb	-10.0	-11.2	-12.5	-13.3	-13.8	-13.8	-14.2	-14.6	-14.8	-14.7	-14.2	-14.5	-15.2	-14.6	-14.0	-13.5	-13.7	-14.3	-14.6	-14.8	-14.3	-15.2	-16.1	-17.4	-14.1	-10.0	
28-Feb	-19.2	-20.9	-21.5	-21.9	-21.9	-22.7	-23.9	-24.5	-24.7	-24.4	-23.9	-22.8	-21.9	-20.5	-20.4	-20.2	-20.7	-22.8	-26.3	-28.6	-29.1	-27.7	-25.6	-25.9	-23.4	-19.2	
29-Feb	-26.2	-26.0	-26.1	-26.1	-26.0	-25.1	-24.4	-24.4	-22.5	-20.0	-17.1	-15.4	-13.6	-12.1	-11.0	-11.5	-11.2	-11.7	-12.1	-12.4	-12.1	-12.0	-11.8	-11.6	-17.6	-11.0	
	-13.5	-13.7	-14.2	-14.4	-14.4	-14.6	-14.9	-15.0	-14.3	-12.2	-10.8	-9.8	-9.2	-8.6	-8.3	-8.3	-8.6	-9.5	-10.6	-11.4	-11.7	-12.0	-12.4	-12.8	Diurnal Average		
	-1.1	-0.9	-1.0	-1.1	-0.2	-0.7	-1.0	-1.5	-0.5	1.7	2.6	3.7	4.2	5.9	6.7	7.0	6.7	3.7	-1.8	-1.7	-1.8	-1.9	-1.2	-2.1	Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Wapasu - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	78	11.21	11.21
-20 - 0	594	85.34	96.55
0 - 10	24	3.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

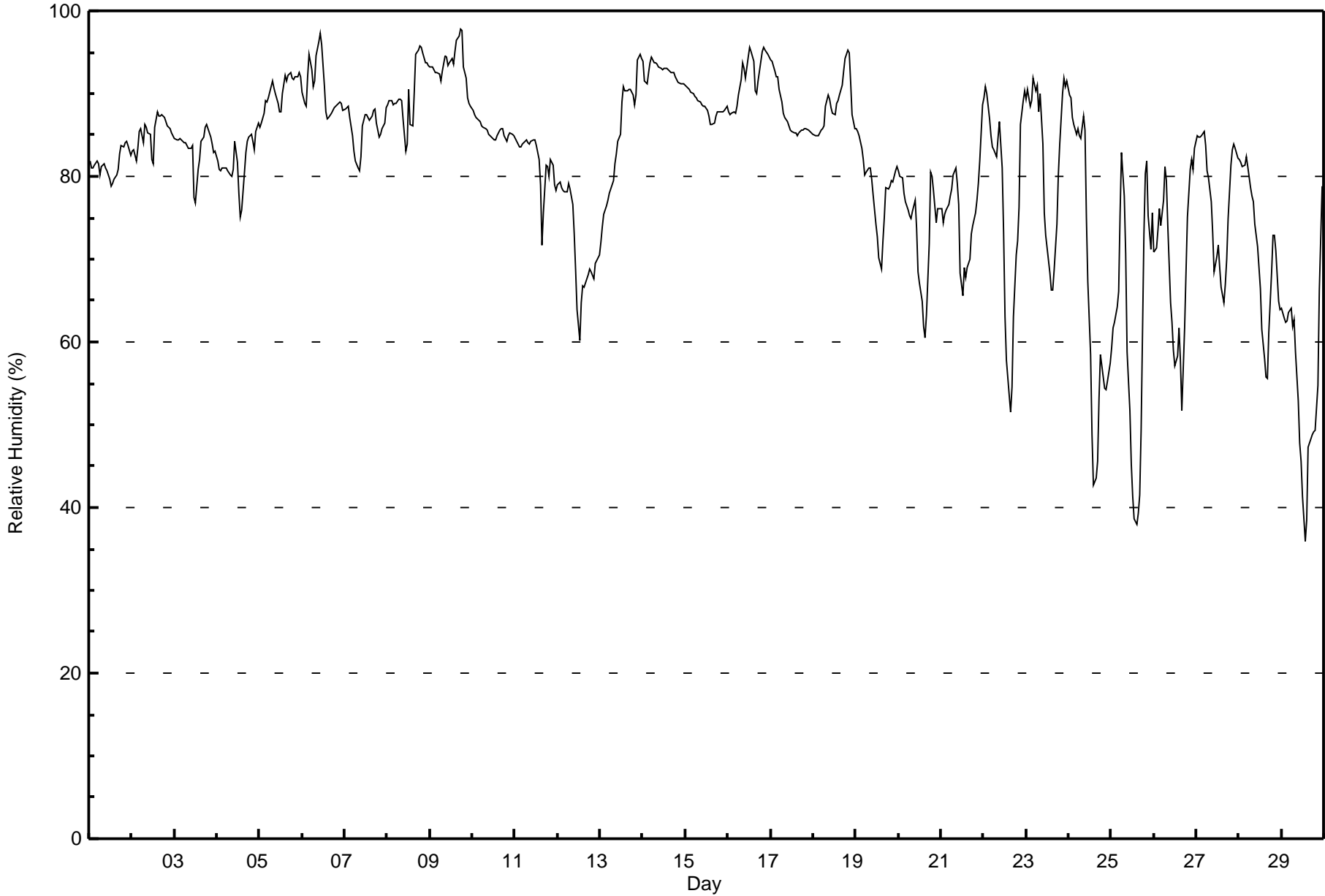
Wapasu - February 2016

Maximum Value: 98 % on Feb 9 18:00 Maximum Daily Average: 93.4 % on Feb 9																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 36 % on Feb 29 14:00 Minimum Daily Average: 55.8 % on Feb 29 Maximum Diurnal Average: 83.8 % at hour 6 Minimum Diurnal Average: 74.6 % at hour 15 Monthly Average: 81.0 % Percentiles: P ₁ = 41 P ₁₀ = 64 Q ₁ = 77 Median = 84 O ₃ = 89 P ₉₀ = 93 P ₉₉ = 96																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	82	81	81	81	82	81	80	81	81	81	81	80	79	79	80	80	81	83	84	84	84	84	84	83	81.5	84
2-Feb	83	83	82	83	85	86	84	86	86	85	85	82	81	86	88	87	87	87	87	87	86	86	85	85	85.2	88
3-Feb	85	84	84	85	84	84	84	84	83	83	84	77	77	81	82	84	85	86	86	86	85	84	83	83	83.5	86
4-Feb	82	81	81	81	81	81	81	80	80	81	84	82	78	75	76	81	83	84	85	85	84	83	85	86	81.7	86
5-Feb	86	87	88	89	89	89	91	91	91	90	89	88	88	90	92	91	92	93	92	92	92	92	93	92	90.2	93
6-Feb	90	89	88	92	95	93	91	92	95	96	97	96	91	88	87	87	88	88	88	89	89	89	89	88	90.6	97
7-Feb	88	88	88	87	85	83	82	81	81	82	86	87	87	87	87	88	88	88	86	85	85	86	87	88	85.9	88
8-Feb	89	89	89	89	89	89	89	89	89	87	83	84	90	86	86	90	95	95	96	96	95	94	94	93	90.2	96
9-Feb	93	93	93	93	93	92	92	93	95	94	93	94	94	94	95	97	97	98	98	93	92	90	89	88	93.4	98
10-Feb	88	88	87	87	87	86	86	86	86	85	85	85	84	84	85	86	86	86	85	84	85	85	85	85	85.6	88
11-Feb	85	84	84	84	84	84	84	84	84	84	84	84	84	82	79	72	76	81	81	80	82	81	79	78	81.8	85
12-Feb	79	79	79	78	78	78	79	79	77	73	69	64	60	65	67	67	68	68	69	68	68	70	70	71	71.7	79
13-Feb	72	74	75	76	77	78	78	79	81	83	84	85	89	91	90	90	91	91	90	89	90	94	95	94	84.9	95
14-Feb	94	91	91	93	94	94	94	94	93	93	93	93	93	93	93	93	93	93	92	92	91	91	91	91	92.6	94
15-Feb	91	91	91	90	90	90	89	89	89	89	88	88	88	87	86	86	87	87	88	88	88	88	88	88	88.5	91
16-Feb	88	87	88	88	88	89	90	92	94	93	92	94	96	95	94	90	90	92	94	95	96	95	95	94	91.9	96
17-Feb	94	94	93	92	92	90	89	88	87	87	86	86	85	85	85	85	86	86	86	86	86	86	85	85	87.6	94
18-Feb	85	85	85	85	86	86	86	88	90	89	88	88	88	89	89	90	91	93	94	95	95	91	88	86	88.7	95
19-Feb	86	85	85	83	82	80	81	81	81	80	78	74	73	70	69	72	75	79	78	79	79	79	81	81	78.8	86
20-Feb	81	80	80	78	77	76	75	75	76	77	74	68	67	65	62	61	63	72	81	80	78	74	76	76	73.8	81
21-Feb	76	74	75	76	77	78	79	80	81	79	77	68	66	69	68	69	70	73	74	76	77	79	82	89	75.5	89
22-Feb	89	91	90	87	85	84	83	82	85	87	81	73	63	58	53	52	55	63	70	72	76	86	89	90	76.9	91
23-Feb	89	90	88	89	92	90	91	88	90	84	76	73	71	68	66	66	69	74	80	84	90	92	91	91	82.7	92
24-Feb	90	90	87	86	85	86	85	85	87	86	75	67	59	49	43	44	46	53	58	56	54	54	55	57	68.2	90
25-Feb	59	62	62	64	66	75	83	78	71	59	52	45	41	39	38	39	42	49	73	80	82	75	71	76	61.7	83
26-Feb	71	71	74	76	74	77	81	80	74	65	62	59	57	58	62	58	52	62	68	75	81	82	81	83	70.1	83
27-Feb	85	85	85	85	86	84	81	80	77	73	68	70	72	69	67	65	67	70	75	81	83	84	83	82	77.3	86
28-Feb	82	82	81	81	82	81	79	78	77	74	72	69	66	62	58	56	56	61	68	73	73	71	65	64	71.3	82
29-Feb	64	63	62	62	64	64	62	63	59	53	48	46	41	36	39	47	48	49	49	49	55	66	72	79	55.8	79
83.6 83.5 83.3 83.5 83.7 83.8 83.7 83.6 83.4 81.8 79.8 77.6 76.2 75.1 74.6 74.9 75.9 78.7 81.3 82.0 82.8 83.2 83.1 83.7																		Diurnal Average								
94 94 93 93 95 94 94 94 94 95 96 97 96 96 95 95 97 97 98 98 96 96 95 95 94																		Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Wapasu - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	5	0.72	0.72
40 - 60	42	6.03	6.75
60 - 80	179	25.72	32.47
80 - 100	470	67.53	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Summary of Hour Averages

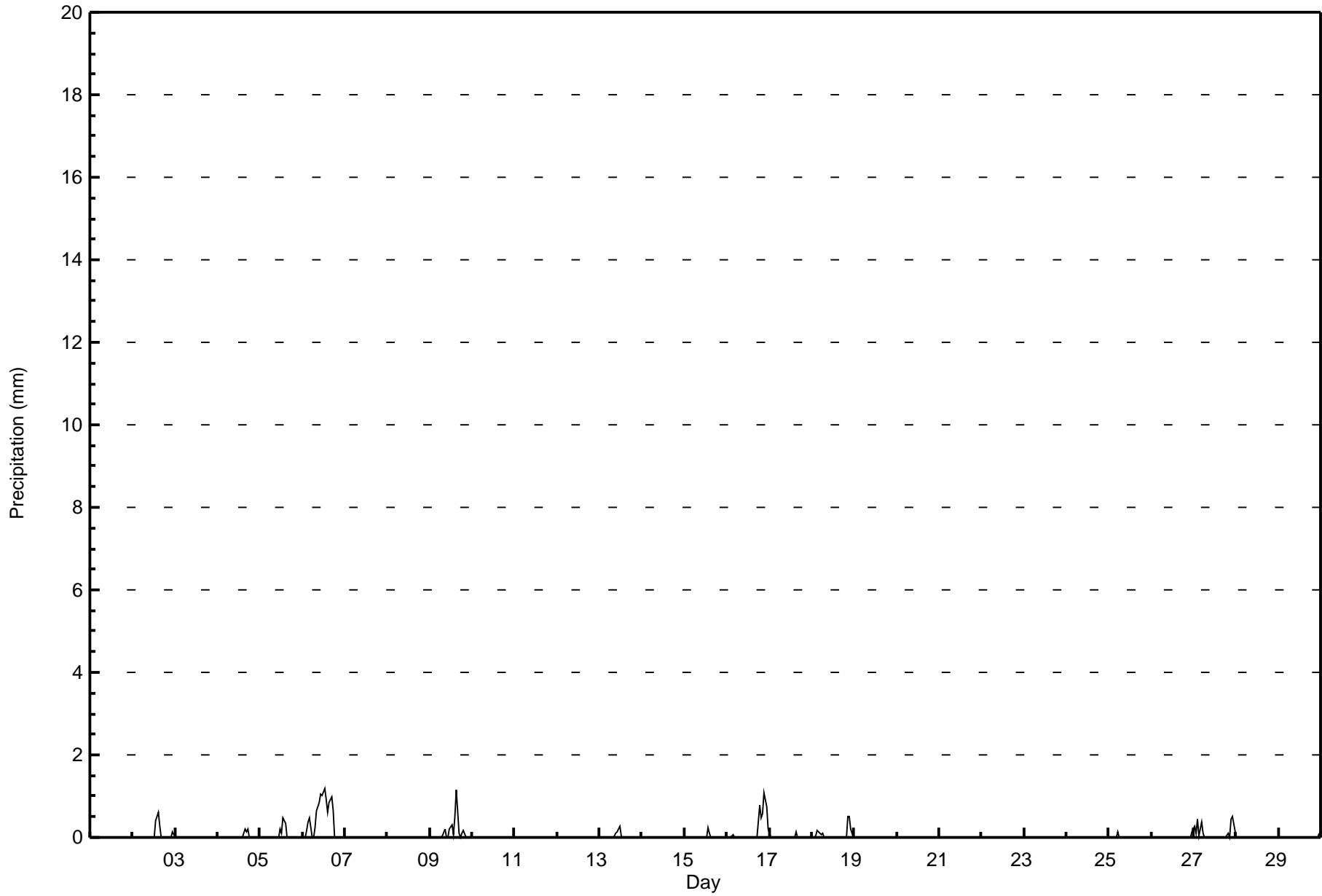
Precipitation (PC) - mm
Wapasu - February 2016

Maximum Value: 1.2 mm on Feb 6 13:00 Maximum Daily Total: 10.0 mm on Feb 6 Minimum Value: 0.0 mm on Feb 1 01:00 Minimum Daily Total: 0.0 mm on Feb 1 Maximum Diurnal Total: 2.6 mm at hour 16 Minimum Diurnal Total: 0.1 mm at hour 2 Monthly Total: 25.73 mm Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 0.9																								Hours in Service: 696 Hours of Data: 696 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.4	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.6	
3-Feb	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	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	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	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	0.2	0.1	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.5	0.0	0.0
6-Feb	0.0	0.0	0.2	0.4	0.5	0.0	0.0	0.2	0.6	0.9	1.1	1.0	1.2	0.9	0.6	0.9	1.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	1.2	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	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	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	0.1	0.2	0.0	0.0	0.2	0.3	0.1	0.5	1.2	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.2	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	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	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	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	0.1	0.1	0.1	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	0.6	0.3	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	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	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	
16-Feb	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	0.8	0.5	0.6	1.1	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	3.9	1.1	0.0	0.0		
17-Feb	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	0.1	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	0.3	0.1	0.0	0.0		
18-Feb	0.0	0.0	0.1	0.2	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	0.5	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.5	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	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	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	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	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	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	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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	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	0.0	0.0	0.2	0.2	0.0	0.0		
27-Feb	0.3	0.1	0.4	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.5	0.1	0.0	0.0	0.0	0.0	0.0	2.5	0.5	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
29-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	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	
	0.4	0.1	0.7	0.6	1.0	0.3	0.1	0.3	0.9	1.0	1.2	1.7	1.6	2.1	2.1	2.6	1.2	0.8	0.9	0.8	1.1	2.0	1.6	0.6		Diurnal Average										
	0.3	0.1	0.4	0.4	0.5	0.1	0.1	0.2	0.6	0.9	1.1	1.0	1.2	0.9	0.6	1.2	1.0	0.6	0.8	0.5	0.6	1.1	0.8	0.2		Diurnal Maximum										



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Wapasu - February 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Wapasu - February 2016

Maximum Speed: 23 km/h on Feb 12 19:00	Maximum Daily Speed Average: 17.2 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 1 km/h on Feb 4 21:00	Minimum Daily Speed Average: 0.6 km/h on Feb 23	Hours of Data: 694
Maximum Diurnal Speed Average: 3.7 km/h at hour 9	Minimum Diurnal Speed Average: 0.7 km/h at hour 16	Hours of Missing Data: 2
Monthly Average Velocity: 1.9 km/h 130.5 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 19	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	NE3	ESE2	ESE3	SE4	SE3	SE3	SE5	SE5	SE6	SSE6	SSE6	SSE7	SSE7	S6	S6	S6	S6	SSE4	SSE5	SSE5	SE5	SE6	SE6	SE5	SSE4.6	SSE7
2-Feb	SE4	E3	ESE3	SE4	SE5	SE5	SE5	SSE6	SSE6	SSE6	S6	S7	S6	SW5	NW6	NNW6	NNW8	N6	NNE6	N6	NNE6	N6	NNW6	NNW6	E0.7	NNW8
3-Feb	N5	NNE5	N4	NNE3	N2	NE1	E3	SSE2	SE3	SE4	S3	SSE2	SW3	WSW5	WNW4	NNW6	NNW4	N3	N4	N5	NNE4	NNE6	NNE5	NE5	N1.9	NNW6
4-Feb	NE5	NE5	ENE4	ENE4	ENE3	ENE4	E5	E5	ESE4	SE5	SE5	SSE5	SSE6	S5	SSW5	SSE5	SE4	SE4	S3	SSE2	NNE1	SSE2	SE5	SSE5	ESE3.0	SSE6
5-Feb	SSE5	SE5	SE5	SE6	SE7	SSE8	SE8	SE10	SE13	SE16	SE16	SSE14	SE15	SSE11	SE15	SE14	SSE13	SSE12	SSE11	SSE10	SSE10	SE9	SE9	SE8	SE10.4	SE16
6-Feb	SSE8	SSE9	SSE8	SE8	SSE5	SE6	SSE7	SSE8	SSE8	S6	SW6	NW16	NNW16	NNW18	NNW19	NNW18	NW16	NNW14	NNW12	NNW12	NNW10	N7	N6	N4	NNW3.8	NNW19
7-Feb	NNE4	NNE6	NNE6	NE3	SE2	ESE3	ESE3	ESE3	E3	NE4	NNE7	NNE6	N6	N5	NNE5	NNE4	NE5	NE4	ENE3	ENE2	SSE2	SE6	SE5	SSE4	NE2.8	NNE7
8-Feb	SSE7	SE7	SSE7	SSE8	SSE8	SSE7	SE7	SE6	SSE7	SSE7	SSE6	SW6	WSW4	SE2	AF	S2	SSE4	SE5	SE4	SE6	SE6	SE6	SSE7	SSE7	SSE5.3	SSE8
9-Feb	SE8	SE6	SE6	SE6	SE5	SE6	SE5	SSE6	SE7	SE7	SSE8	SSE8	SSE9	SSE9	S5	SW6	SW6	SW5	NNW10	NNW12	NNW11	N12	N10	N11	SE1.8	N12
10-Feb	NNW10	N9	N10	N10	N9	N6	N5	NNE6	N6	NNE5	NNE5	NNE5	N4	NNE5	NNE4	NE4	NE4	N2	NNE2	ENE3	E2	SE4	SE5	ESE4	NNE4.4	NNW10
11-Feb	ESE4	E3	E2	SSE2	SE3	ESE1	E2	NE3	ENE2	NNE1	NE3	NNW3	N4	N6	NNE6	ENE6	NE6	ENE3	E2	ESE4	ESE6	ESE8	ESE9	SE8	E2.9	ESE9
12-Feb	SE9	SE10	SE11	SE13	SE14	SE14	SE16	SE16	SE17	SE19	SE17	SE17	SE18	SE19	SE18	SE17	SE21	SE22	SE23	SE21	SE22	SE19	SE21	SE19	SE17.2	SE23
13-Feb	SE18	SSE17	SE17	SE16	SE15	SE15	SSE14	SSE14	SE14	SSE12	SSE11	S10	S10	S8	SSW8	S8	S8	SW11	SW9	WSW8	WSW4	SSW3	WSW2	SSW2	SSE9.1	SE18
14-Feb	SW3	S2	E2	SE3	NNE3	NNW4	NNW3	NNW3	NNW4	NNW4	NNE4	N5	NNW4	NW4	NNW4	NNE3	NNE4	NE5	NE5	NNE4	NE4	NNE4	NNE4	NNE3	N2.7	NE5
15-Feb	NNE4	NNE3	N3	NNE4	NNE5	NE4	NNE5	NNE5	NE4	N4	N4	N3	NW5	NNW8	N6	NNW5	NNW5	NNW3	N3	N1	E4	SE5	SSE6	SSE8	NNE2.6	SSE8
16-Feb	SE10	SE10	SE11	SE11	SE6	SSE6	SSE9	SE6	SSE7	SE6	SSE5	S4	S4	SSE5	SE5	S5	S4	N2	NE4	ENE4	ENE2	AF	NNW3	N4	SE4.4	SE11
17-Feb	NNE5	N5	NNW7	N6	N7	N7	N7	N7	NNW7	N7	NNW7	NNW6	NNW6	N6	N6	NNE7	NNE5	NNE6	NE7	NNE6	NE5	NE5	NE5	ENE5	N5.6	N7
18-Feb	E4	E5	ESE6	SE4	ESE4	SE6	ESE7	SE11	SE12	SE10	SE17	SE17	SSE15	SSE12	SSE10	SSE11	SE13	SE12	SSE6	WNW6	N5	N10	N13	N12	SE6.1	SE17
19-Feb	N11	N10	NNW10	NNW10	NNW13	NNW12	N9	N8	NNW9	NNW9	NNW12	NNW10	NW13	NNW11	NNW10	NNW9	NNW6	NNW6	N5	N5	N5	N6	NNE4	NE4	NNW8.3	NNW13
20-Feb	ENE4	NE5	NE5	E2	ESE3	SE4	SE4	SE4	ESE4	SSE4	SW5	SW6	SW9	SW9	SSW8	SSW7	SSW6	SSE4	SE5	SE6	SE7	SE8	SSE6	SSE5	SSE3.5	SW9
21-Feb	SE5	SE5	SE5	SSE5	SSE4	SSE4	S5	SSE5	SSE6	SSE6	SSE7	S9	SSW8	SSW8	SSW9	S8	S8	S8	SSE8	SSE8	SE7	SE7	ESE3	N4	SSE5.5	S9
22-Feb	NNE3	N5	NNE5	N3	NE2	ESE4	ESE3	SE3	SE5	SSE4	SSW6	SSW6	SSW7	SSW8	SSW8	SW9	SSW6	S4	SSW4	W5	WNW5	NE1	ENE3	SE4	S1.8	SW9
23-Feb	ESE4	SE6	SE5	SE6	SSE5	SSE4	SSE4	SE4	SSE4	WSW3	WNW6	NW10	NNW12	NNW13	N9	NNW8	N5	N1	SE3	SSE4	SSW4	SW3	WSW3	WNW4	NW0.6	NNW13
24-Feb	W3	WSW2	E3	E1	E4	NE2	E4	SE4	SE5	SSE5	SSW6	SW8	SSW8	SW9	SW9	SSW7	SSE5	SSE7	SSE9	SSE9	S10	S11	S10	S10	S4.8	S11
25-Feb	S11	S10	S11	S10	S10	S9	S9	S8	SSW9	SSW11	SW10	SW12	SW11	SW14	WSW13	W13	W9	W3	SSE1	SW2	SW4	SW5	SSW4	S4	SSW7.1	SW14
26-Feb	SSE6	SSE7	S8	S7	SSW8	SSE6	S7	SW10	SW12	WSW10	WSW8	WNW9	NNW10	NNW10	NNW11	NNW11	N11	NNE12	NNE14	NNE13	NNE13	NNE12	NNE10	NNE7	NNW2.5	NNE14
27-Feb	NNE8	NNE10	NNE9	NNE8	NNE7	NE7	ENE7	NE7	NE8	NE8	NE6	NNW7	NW8	NNW7	NW6	NNW4	WNW5	NW4	W2	S2	SW1	N6	N8	N8	N5.1	NNE10
28-Feb	N6	N4	N5	N6	NNW6	NNW8	NNW8	NNW11	N11	NNW10	NW10	NNW11	NNW10	N9	NNE10	NNE8	NNW8	NNW5	NNE4	NE5	NE6	E8	ESE8	SE9	N5.9	N11
29-Feb	SE9	SE11	SE12	SE11	SSE11	SE12	SE12	SSE12	SSE8	S9	S10	S10	S9	S10	S10	S8	S8	SSE7	SSE8	SSE8	S8	S8	S8	S8	SSE8.9	SSE12

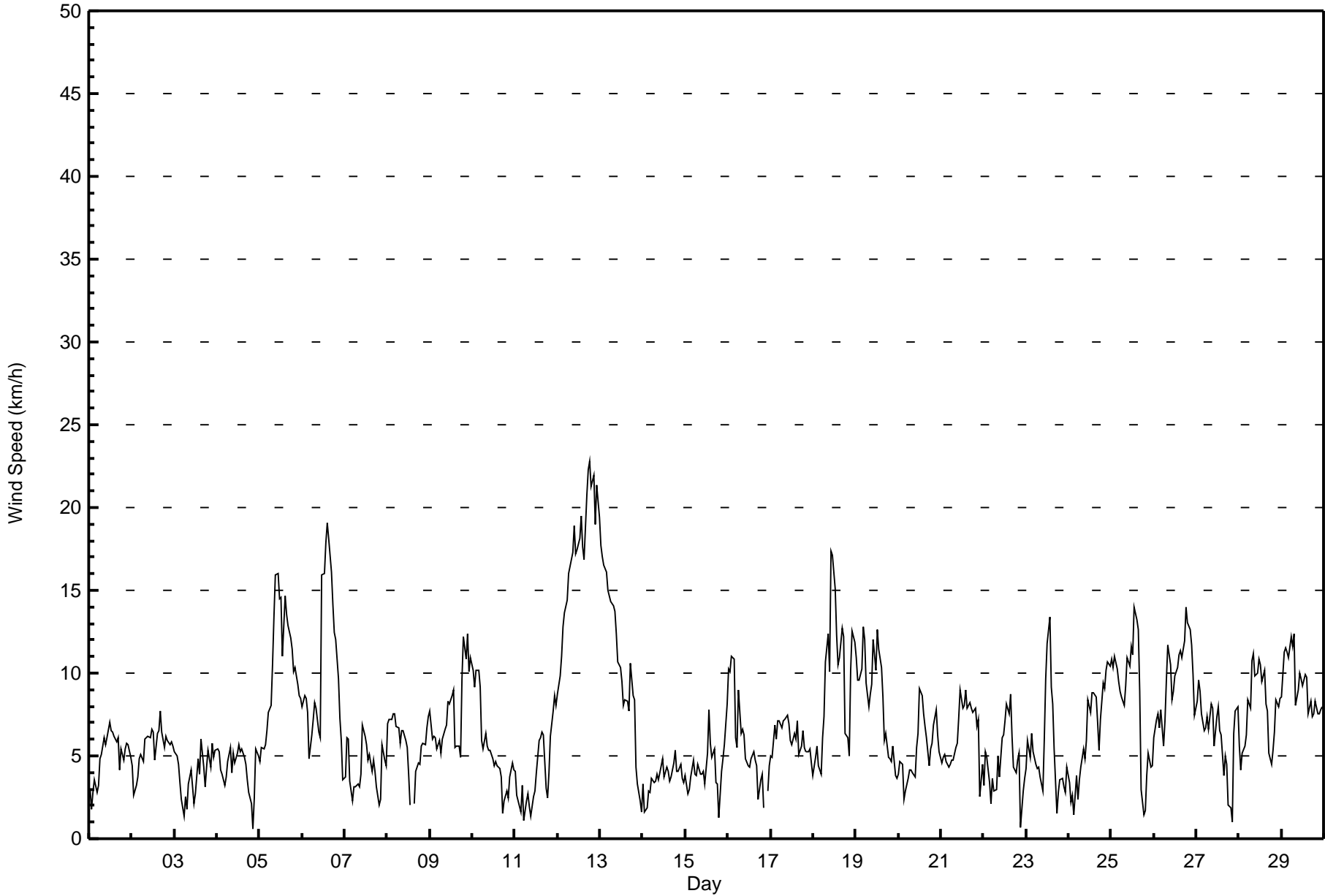
ESE2.7 ESE2.9 ESE3.0 ESE3.1 ESE2.7 ESE3.2 SE3.7 SE3.7 SE3.7 SSE3.2 SSE2.8 SSW2.0 SW1.8 SW1.6WSW0.9 SW0.7SSW0.8 SE1.2 ESE1.6 E1.3 E1.9 ESE2.3 ESE2.5 ESE2.4	Diurnal Average
SE18 SSE17 SE17 SE16 SE15 SE15 SE16 SE16 SE17 SE19 SE17 SE17 SE18 SE19NNW19NNW18 SE21 SE22 SE23 SE21 SE22 SE19 SE21 SE19	Diurnal Maximum

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 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	295	42.51	42.51
6 - 11	319	45.97	88.47
12 - 19	74	10.66	99.14
20 - 28	6	0.86	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - February 2016**

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	33	36	27	15	19	19	48	35	14	6	10	7	4	4	4	14	295
6 - 11	39	21	8	2	1	6	50	61	43	19	17	3	1	3	5	40	319
12 - 19	3	5	0	0	0	0	35	10	0	0	3	1	1	0	3	13	74
20 - 28	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	75	62	35	17	20	25	139	106	57	25	30	11	6	7	12	67	694

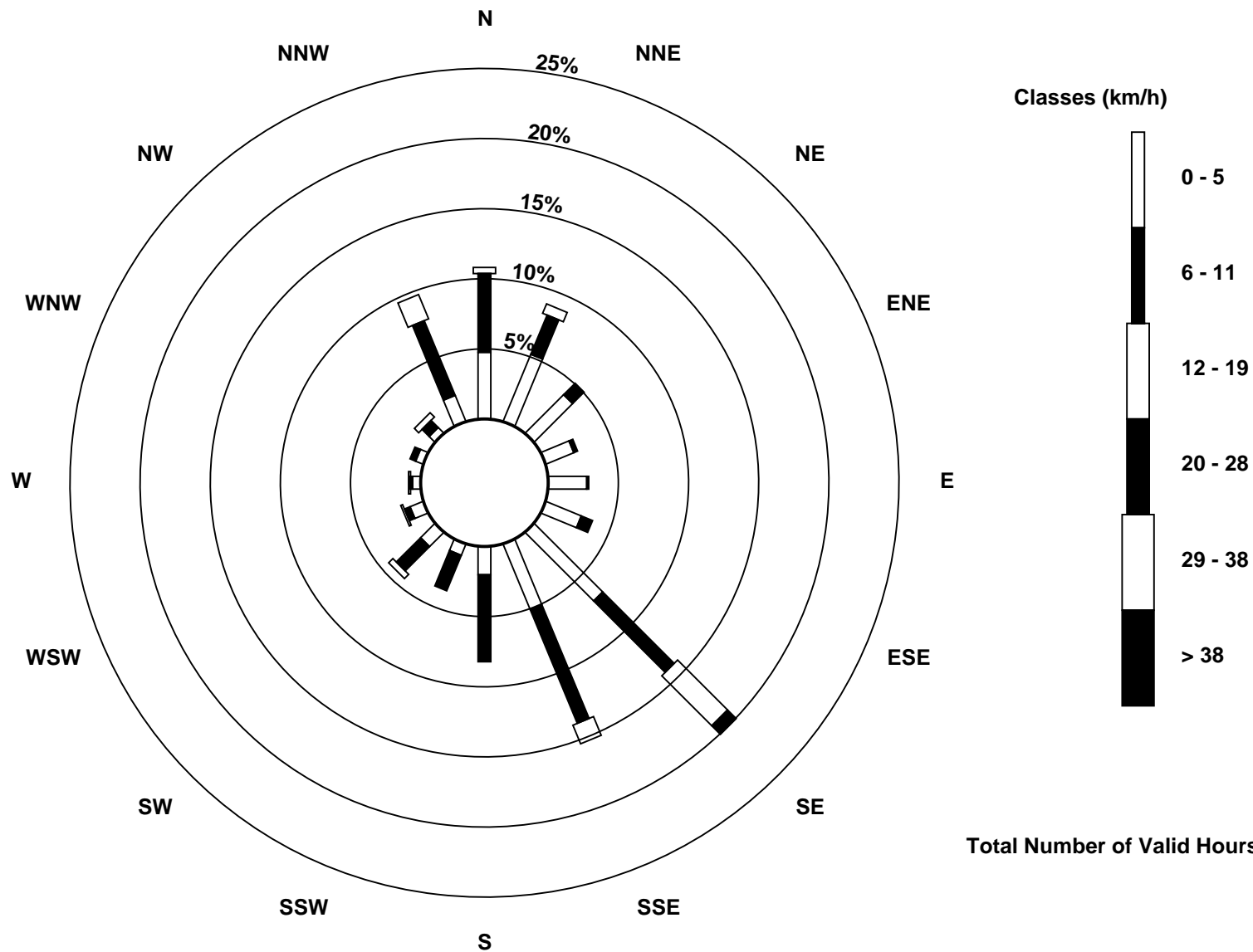
Total Number of Valid Hours: 694

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Wapasu (AMS 17)



Total Number of Valid Hours: 694



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 6 15:00 Minimum Value: 0 km/h on Feb 11 08:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 696 Hours of Data: 694 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	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	
2-Feb	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	3	3	
3-Feb	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	2	2	1	2	2	2	2	2	
4-Feb	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	
5-Feb	1	1	1	1	2	2	2	3	4	4	4	4	4	3	5	4	4	4	3	4	3	2	2	2	5	5	
6-Feb	2	2	2	2	1	2	3	2	2	2	2	6	6	6	7	6	4	4	4	4	3	2	2	1	7	7	
7-Feb	1	2	2	1	1	1	1	1	1	1	2	2	2	2	2	1	2	1	1	1	1	1	1	1	2	2	
8-Feb	2	1	2	2	2	2	1	1	1	1	1	2	2	1	AF	1	1	1	1	1	1	1	2	2	2	2	
9-Feb	2	1	2	1	1	1	1	1	1	2	3	2	3	3	2	2	2	2	3	4	4	5	3	4	5	5	
10-Feb	4	3	4	4	3	2	2	2	2	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	4	4	
11-Feb	1	1	1	1	1	1	0	0	1	1	1	1	1	2	2	2	2	2	1	2	1	2	2	2	2	2	
12-Feb	2	2	3	3	3	3	4	4	5	5	5	5	5	6	6	5	6	6	6	6	6	6	6	6	6	6	
13-Feb	5	5	4	4	4	4	4	4	4	4	3	4	3	3	3	3	3	3	2	2	2	1	1	1	5	5	
14-Feb	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	2	1	1	1	1	1	2	2	
15-Feb	1	1	1	1	2	1	1	2	1	1	1	1	2	2	2	1	2	1	1	1	1	1	2	2	2	2	
16-Feb	3	3	3	3	2	2	3	2	2	2	2	2	2	2	1	2	2	1	1	1	1	AF	1	2	3	3	
17-Feb	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	3	2	2	2	2	2	2	2	2	3	3	
18-Feb	1	2	2	2	2	2	2	3	4	4	6	6	6	5	4	4	4	4	4	2	3	4	5	5	6	6	
19-Feb	4	3	3	4	5	4	3	3	3	3	4	3	4	4	3	3	2	2	2	2	2	2	1	1	5	5	
20-Feb	1	1	1	1	0	1	1	1	1	1	2	3	3	3	2	2	2	1	1	1	2	2	2	1	3	3	
21-Feb	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	2	2	2	1	3	3	
22-Feb	1	1	1	1	1	1	1	1	1	2	3	2	3	3	3	3	2	1	2	2	2	1	1	1	3	3	
23-Feb	1	1	1	1	1	1	1	1	1	1	2	3	4	5	3	3	2	1	1	1	1	1	1	1	5	5	
24-Feb	1	1	1	1	1	1	0	1	1	1	2	3	2	3	3	3	3	1	2	2	2	3	3	3	3	3	
25-Feb	3	4	4	3	3	3	3	2	4	4	4	3	3	4	4	4	4	2	1	1	1	2	1	1	4	4	
26-Feb	1	2	2	2	3	2	2	3	4	4	2	3	4	4	4	4	4	5	5	5	5	4	4	3	5	5	
27-Feb	3	3	3	3	2	2	2	2	3	3	2	3	2	2	2	2	1	1	2	1	2	2	3	3	3	3	
28-Feb	3	1	2	2	2	3	3	4	4	3	3	3	4	3	3	3	2	2	1	1	1	2	2	2	4	4	
29-Feb	2	3	3	3	3	4	3	3	3	3	3	3	3	3	4	3	3	2	3	3	2	2	2	2	4	4	
																	Diurnal Maximum										
																	5 5 4 4 5 4 4 4 5 5 6 6 6 6 7 6 6 6 6 6 6 6 6 6										
AF - Analyzer Failure																											



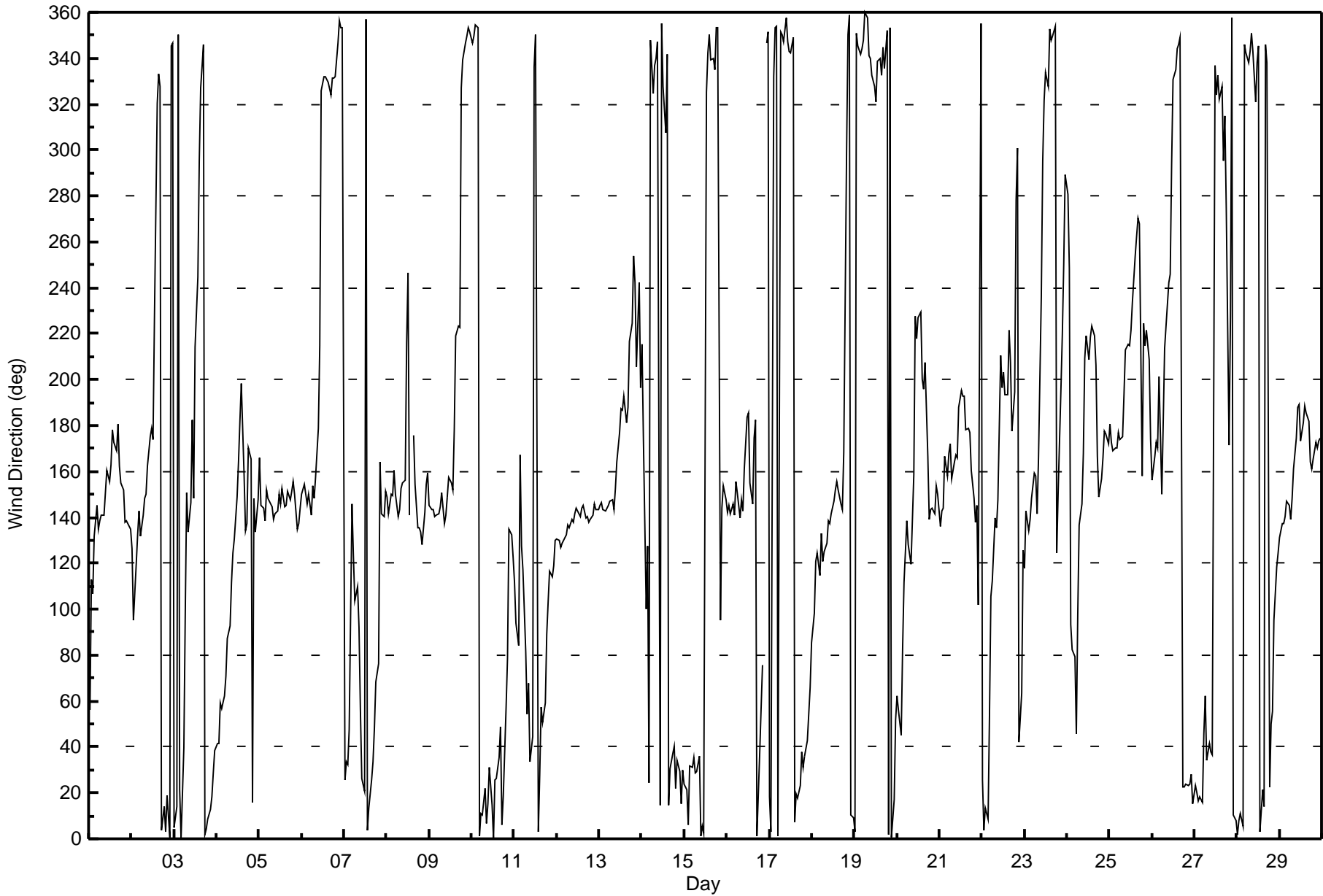
Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Wapasu - February 2016

Direction of Maximum Speed: 138 deg on Feb 12 19:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 139.1 deg on Feb 12	Hours of Data: 694
Direction of Minimum Speed: 16 deg on Feb 4 21:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.6 deg on Feb 23	Percent Operational Time: 99.7
Monthly Average Direction: 166.1 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	56	113	107	132	145	135	139	141	141	151	161	155	163	178	173	169	180	162	155	152	138	138	137	135	149.8
2-Feb	126	95	120	132	143	132	141	148	150	162	175	179	174	226	320	333	328	4	14	3	19	1	345	347	86.7
3-Feb	5	14	350	22	0	40	98	151	133	146	183	148	214	245	296	327	346	2	4	8	13	18	29	39	9.9
4-Feb	41	42	59	57	63	71	87	93	112	124	131	149	164	182	198	158	134	137	170	165	16	148	134	148	121.6
5-Feb	166	145	144	139	152	148	146	145	139	142	143	150	146	153	145	145	151	148	152	156	150	135	137	144	146.2
6-Feb	150	154	150	146	150	141	154	149	157	179	215	326	332	332	331	330	324	332	332	332	347	356	353	353	330.2
7-Feb	26	33	32	47	146	123	104	110	92	56	26	21	357	4	13	26	34	48	68	76	164	141	140	152	55.8
8-Feb	149	141	150	149	161	150	140	143	153	155	156	216	247	141	AF	175	155	135	135	134	128	142	155	159	152.1
9-Feb	145	143	143	140	141	142	145	151	137	141	149	157	155	152	178	219	223	223	327	339	347	350	353	351	143.9
10-Feb	347	350	355	353	1	11	10	22	7	15	31	15	0	26	27	35	49	6	19	57	79	135	132	123	16.0
11-Feb	112	94	84	167	127	117	82	54	68	33	45	336	350	3	28	57	51	59	89	103	117	114	119	130	80.9
12-Feb	131	130	127	129	130	132	137	136	139	138	141	144	142	140	144	145	140	141	138	139	141	146	143	144	139.1
13-Feb	145	147	143	143	144	145	147	148	143	152	164	177	187	187	193	181	188	217	224	254	242	206	242	196	165.2
14-Feb	215	174	100	127	25	348	324	337	340	347	15	355	328	307	341	15	30	37	40	22	34	29	15	30	8.0
15-Feb	24	22	6	32	31	36	29	29	36	1	6	2	325	342	351	340	340	335	353	353	95	144	154	147	17.1
16-Feb	142	146	141	146	141	155	151	140	148	143	161	184	186	155	146	175	183	1	37	57	76	AF	346	352	144.7
17-Feb	18	3	332	353	354	1	352	350	347	358	347	343	342	349	7	20	18	23	38	31	36	42	54	66	6.8
18-Feb	85	98	121	124	115	133	121	125	129	139	137	142	147	152	155	152	146	144	168	299	351	359	11	9	127.8
19-Feb	3	351	345	342	344	348	360	358	341	340	332	328	321	339	340	332	344	336	352	2	353	1	17	52	345.1
20-Feb	62	56	45	83	111	139	128	124	120	159	227	218	227	229	200	196	208	167	139	144	144	142	154	150	163.8
21-Feb	136	143	144	167	158	168	172	157	164	167	166	188	195	193	193	178	179	177	160	148	138	145	102	355	166.6
22-Feb	26	4	13	8	54	106	112	140	135	148	211	196	203	194	193	222	207	177	194	279	301	42	64	125	186.9
23-Feb	118	143	134	139	148	159	158	141	166	237	295	322	334	328	353	348	349	354	124	151	196	219	250	289	310.3
24-Feb	281	248	93	82	79	46	98	137	146	168	209	219	208	219	223	219	206	167	149	157	166	177	177	172	181.9
25-Feb	181	172	169	170	170	177	174	175	193	213	215	215	222	234	254	262	270	268	158	224	215	221	209	174	206.3
26-Feb	156	166	173	170	201	150	181	214	223	242	246	293	331	335	344	346	349	22	23	24	23	24	28	15	342.6
27-Feb	23	20	16	19	16	46	62	34	41	38	37	337	324	332	322	328	296	315	275	171	228	357	11	8	8.2
28-Feb	2	8	11	5	346	343	338	343	351	343	321	338	345	3	22	14	346	338	22	50	56	95	118	124	4.2
29-Feb	131	137	137	140	147	145	139	148	161	175	188	189	173	181	189	185	182	164	161	165	173	171	173	174	162.1
107.6 110.4 109.9 118.8 121.4 122.1 126.7 129.4 135.8 148.0 168.7 200.5 219.4 232.6 244.7 234.4 193.0 126.4 104.6 92.3 99.5 103.8 105.3 109.2																									
Diurnal Average																									

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 83 deg on Feb 22 22:00		Hours in Service: 696 Hours of Data: 694 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																								
Minimum Value: 6 deg on Feb 1 07:00																										
Percentiles: P ₁ = 9 P ₁₀ = 17 Q ₁ = 22 Median = 29 Q ₃ = 35 P ₉₀ = 39 P ₉₉ = 73																										
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	13	16	14	13	12	16	6	15	12	24	24	26	32	32	31	35	31	26	21	20	10	9	7	8	35	
2-Feb	12	35	15	23	16	11	19	15	24	30	30	33	35	43	31	31	29	36	37	37	34	38	34	37	43	
3-Feb	32	32	34	37	64	71	26	31	18	20	42	61	59	29	45	25	43	51	40	39	38	31	39	27	71	
4-Feb	25	27	24	19	19	20	22	19	19	18	26	29	31	44	34	27	23	23	31	27	79	25	11	16	79	
5-Feb	25	19	19	20	26	24	23	23	20	20	21	25	22	25	23	23	27	25	25	34	23	18	18	21	34	
6-Feb	23	25	22	22	34	19	28	24	27	34	37	27	28	28	25	23	26	27	28	34	36	36	25	37		
7-Feb	26	34	27	35	57	31	21	32	26	24	30	41	39	42	45	39	36	21	18	17	53	17	13	16	57	
8-Feb	21	15	22	22	27	24	15	16	11	19	25	35	46	51	AF	33	14	19	14	13	14	17	22	27	51	
9-Feb	23	18	21	18	17	14	18	22	16	19	23	29	26	25	40	27	30	38	30	30	33	35	33	37	40	
10-Feb	31	37	36	34	36	40	35	33	36	36	35	36	38	38	36	34	23	31	21	17	26	22	17	15	40	
11-Feb	19	24	56	47	16	51	20	10	25	31	33	46	35	36	36	28	23	29	29	33	18	14	16	14	56	
12-Feb	14	13	16	18	17	18	18	18	18	20	20	21	22	20	24	24	20	19	19	21	21	24	22	23	24	
13-Feb	21	22	20	20	20	21	22	22	22	25	29	35	35	36	33	33	36	29	23	24	31	25	42	45	45	
14-Feb	31	80	56	22	31	36	38	37	35	44	40	41	35	29	43	45	36	29	25	30	28	30	37	36	80	
15-Feb	30	32	32	30	29	30	34	33	32	36	41	44	32	34	37	31	30	27	44	59	28	25	21	24	59	
16-Feb	19	21	21	23	33	27	31	20	19	23	30	38	42	39	25	33	32	71	28	15	53	AF	27	36	71	
17-Feb	35	35	27	35	32	33	34	37	36	39	35	39	33	39	41	35	34	34	27	30	27	25	26	32	41	
18-Feb	36	30	24	25	25	24	23	21	21	26	23	25	28	29	28	26	23	21	48	31	36	37	35	35	48	
19-Feb	36	35	36	34	34	35	33	34	33	31	29	29	26	35	33	27	34	28	33	35	37	38	36	27	38	
20-Feb	9	8	10	32	31	13	12	10	24	34	36	43	30	26	38	37	35	20	12	14	19	19	22	18	43	
21-Feb	16	18	20	25	20	23	26	22	25	28	33	36	39	38	36	32	29	34	32	26	19	18	72	24	72	
22-Feb	31	20	25	26	42	12	22	27	16	32	30	39	40	33	34	28	31	21	29	44	26	83	40	25	83	
23-Feb	34	13	13	8	17	17	22	13	24	47	26	27	31	29	36	37	31	53	45	19	24	32	33	22	53	
24-Feb	26	55	28	75	25	62	19	11	10	26	37	29	36	29	30	31	34	24	16	23	26	30	32	30	75	
25-Feb	32	33	30	30	29	33	32	30	35	36	29	27	28	24	26	26	26	48	78	74	27	22	23	23	78	
26-Feb	15	20	27	27	37	23	29	27	23	26	24	33	33	31	35	33	35	32	33	32	33	32	30	32	37	
27-Feb	33	30	34	33	36	32	23	28	28	30	38	40	26	37	33	51	25	29	52	72	82	34	35	35	82	
28-Feb	38	25	32	32	32	32	32	36	36	32	29	33	34	40	39	43	35	28	25	13	13	20	19	14	43	
29-Feb	14	18	18	21	25	24	21	22	31	32	36	37	37	32	37	39	37	27	29	31	30	31	29	28	39	
		38	80	56	75	64	71	38	37	36	47	42	61	59	51	45	51	43	71	78	74	82	83	72	45	
		Diurnal Maximum																								
AF - Analyzer Failure																										



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 16, 2016	Last Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	14:25
Gas Cert Reference	SA130010A	Station temp.	Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-702
Analyzer IP address	192.168.1.43		Lamp voltage	884	884
Calculated slope	0.999479	0.996022	Chamber temp	45.0	45.1
Calculated intercept	1.720405	1.929258	Pressure	700.0	685.9
Analyzer Background	8.7	9.0	Flow	0.458	0.449
Analyzer Coefficient	0.840	0.855	Intensity	82	82
Analyzer make	Thermo 43i		Analyzer serial #	1218153459	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	60.4	577.4	563.3	1.025
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.4	577.4	578.4	0.998
second point	5000	30.2	288.7	287.9	1.003
third point	5000	15.2	145.3	141.7	1.026
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	60.4	577.4	580.1	0.995
Average Correction Factor					1.009

Corrected As found 563.5 Previous response 576.0 % change 2.2%

Notes:

Span adjusted. No maintenance completed.

Calibration Performed By:

Devin Russell



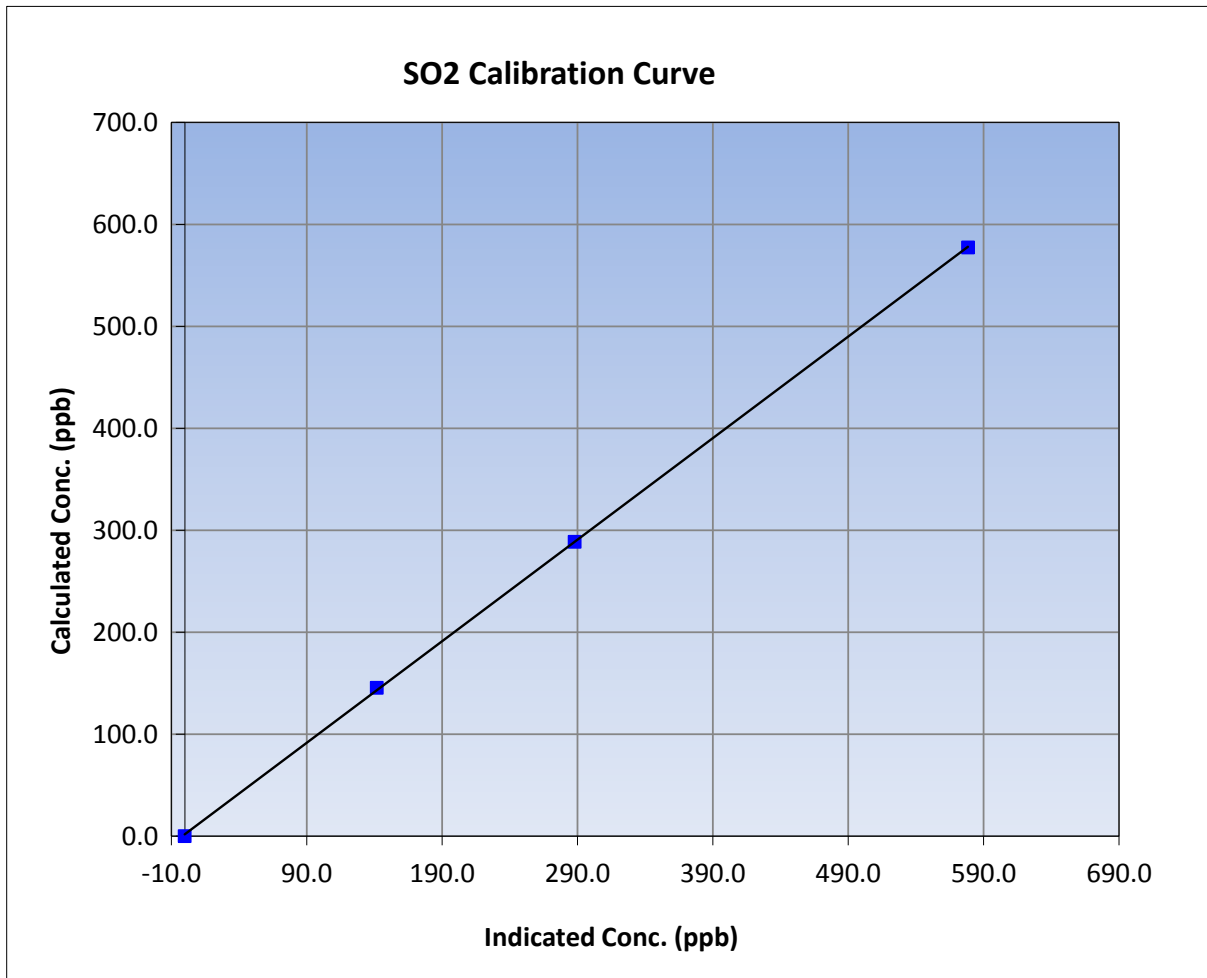
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	14:25
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

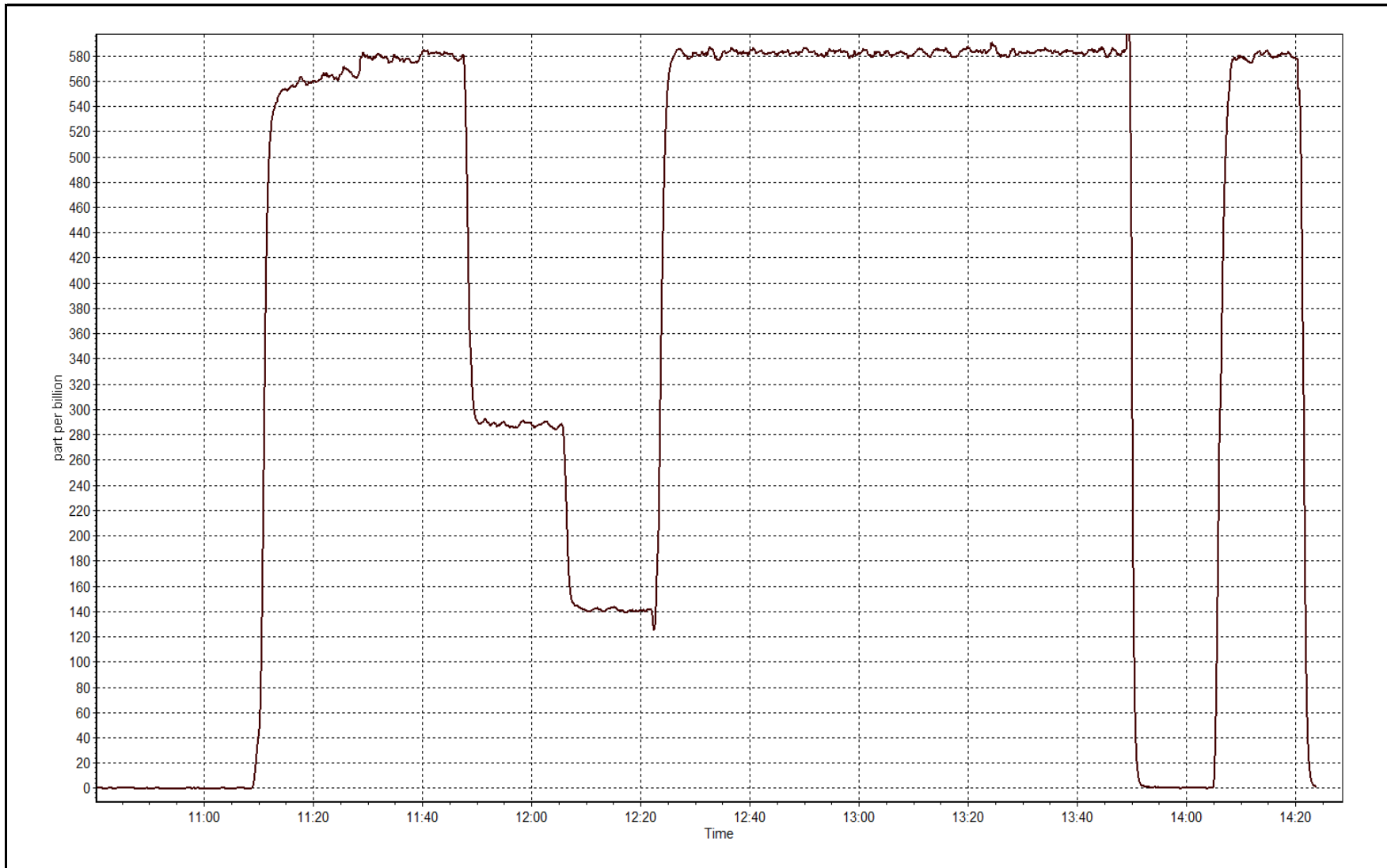
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999952
577.4	578.4	0.9983		
288.7	287.9	1.0030	Slope	0.996022
145.3	141.7	1.0258		
			Intercept	1.929258



SO2 Calibration Plot

Date: February 16, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 11, 2016	Last Calibration	January 26, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	13:55	End Time (MST)	16:58
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12-Dec-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.45		Lamp voltage	800	800
Calculated slope	0.996789	1.000275	Chamber temp	45	45
Calculated intercept	-0.162105	0.117383	Pressure	551.3	566.0
Analyzer Background	14.4	14.4	Flow	0.979	1.001
Analyzer Coefficient	1.229	1.222	Intensity	113	112
			Converter temp.	342	341

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	0.3	----
as found span	5000	78.4	80.0	80.7	0.991
SO2 scrubber check	5000	20.9	199.8	1.7	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	78.4	80.0	79.8	1.002
second point	5000	39.3	40.1	40.0	1.001
third point	5000	19.7	20.1	20.0	1.007
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	78.5	80.1	80.4	0.996
Average Correction Factor					1.003

Corrected As found	80.5	Previous response	80.4	% change	-0.1%
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Notes:

Inlet filter changed after as founds. Scrubber check completed after as founds. Slightly adjusted zero and span.

Calibration Performed By: Asad Hidayat



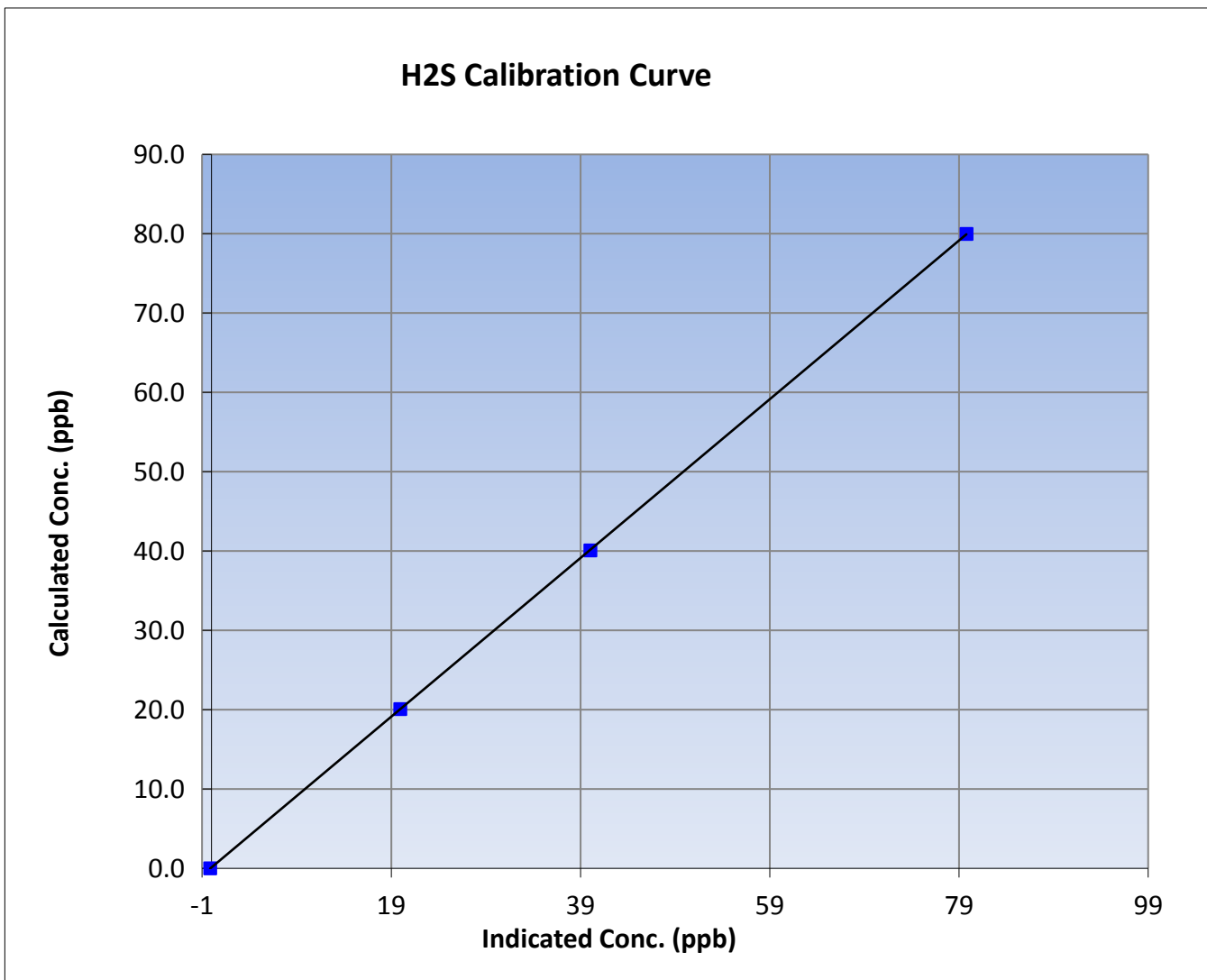
Wood Buffalo Environmental Association H2S Calibration Report

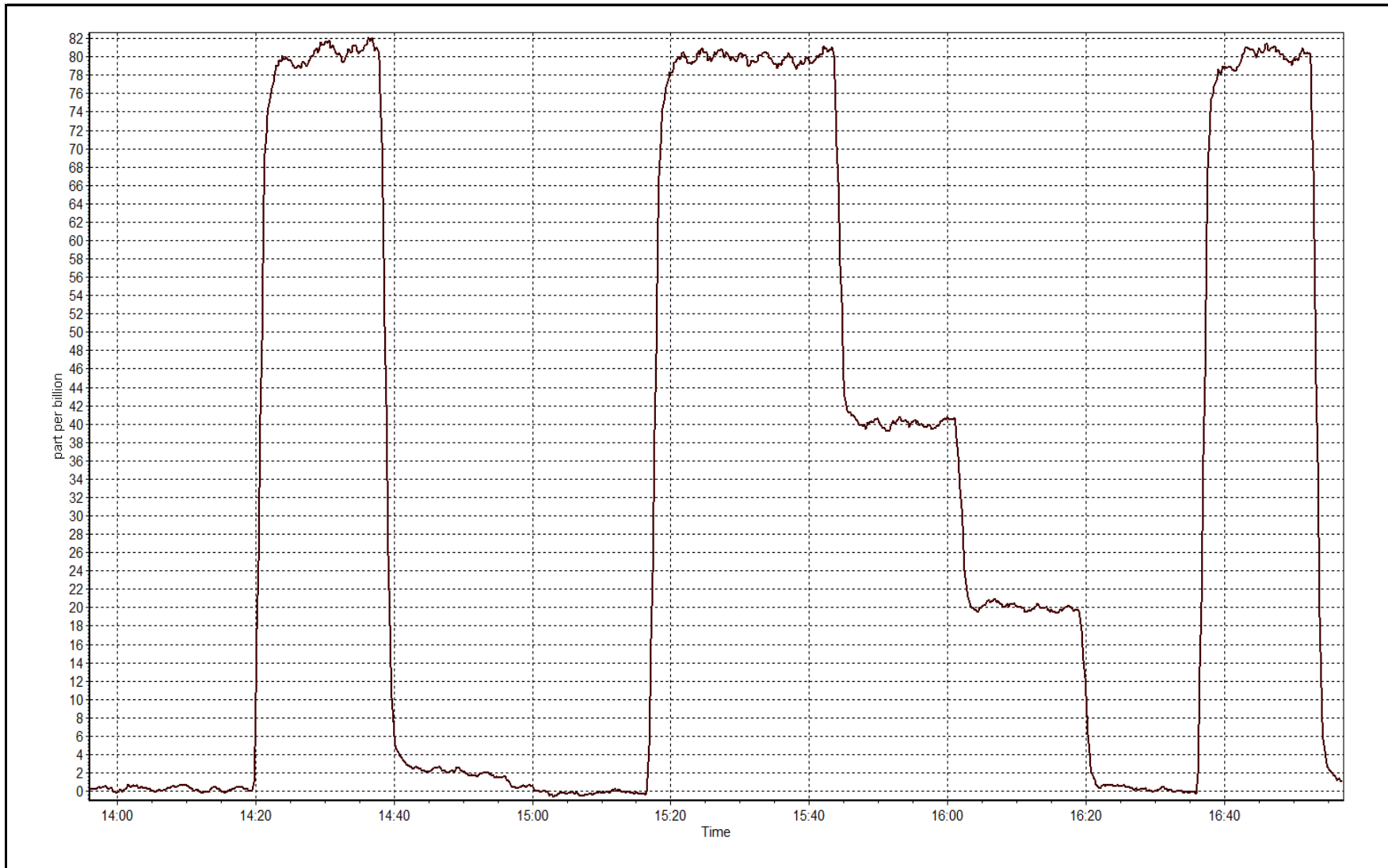
Station Information

Calibration Date	February 11, 2016	Previous Calibration	January 26, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	13:55	End Time (MST)	16:58
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999997
80.0	79.8	1.0022		
40.1	40.0	1.0011	Slope	1.000275
20.1	20.0	1.0067		
			Intercept	0.117383







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 16, 2016	Last Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	14:25
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	41.0	41.0
Calculated slope	1.000825	1.005271	Fuel Pressure	24.8	24.8
Calculated intercept	-0.009266	-0.037492	Analyzer Coeff	4.3	4.3
			Analyzer BKG	2.720	2.720

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	0.05	----
as found span	5000	60.4	13.19	13.17	1.002
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	60.4	13.19	13.17	1.002
second point	5000	30.2	6.60	6.59	1.001
third point	5000	15.2	3.32	3.33	0.997
as left zero	5000	0.0	0.00	0.08	----
as left span	5000	60.4	13.19	13.14	1.004
Average Correction Factor					1.000

Corrected As found 13.12 Previous response 13.19 % change 0.6%

Notes:

No adjustments made. No maintenance completed.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association THC Calibration Report

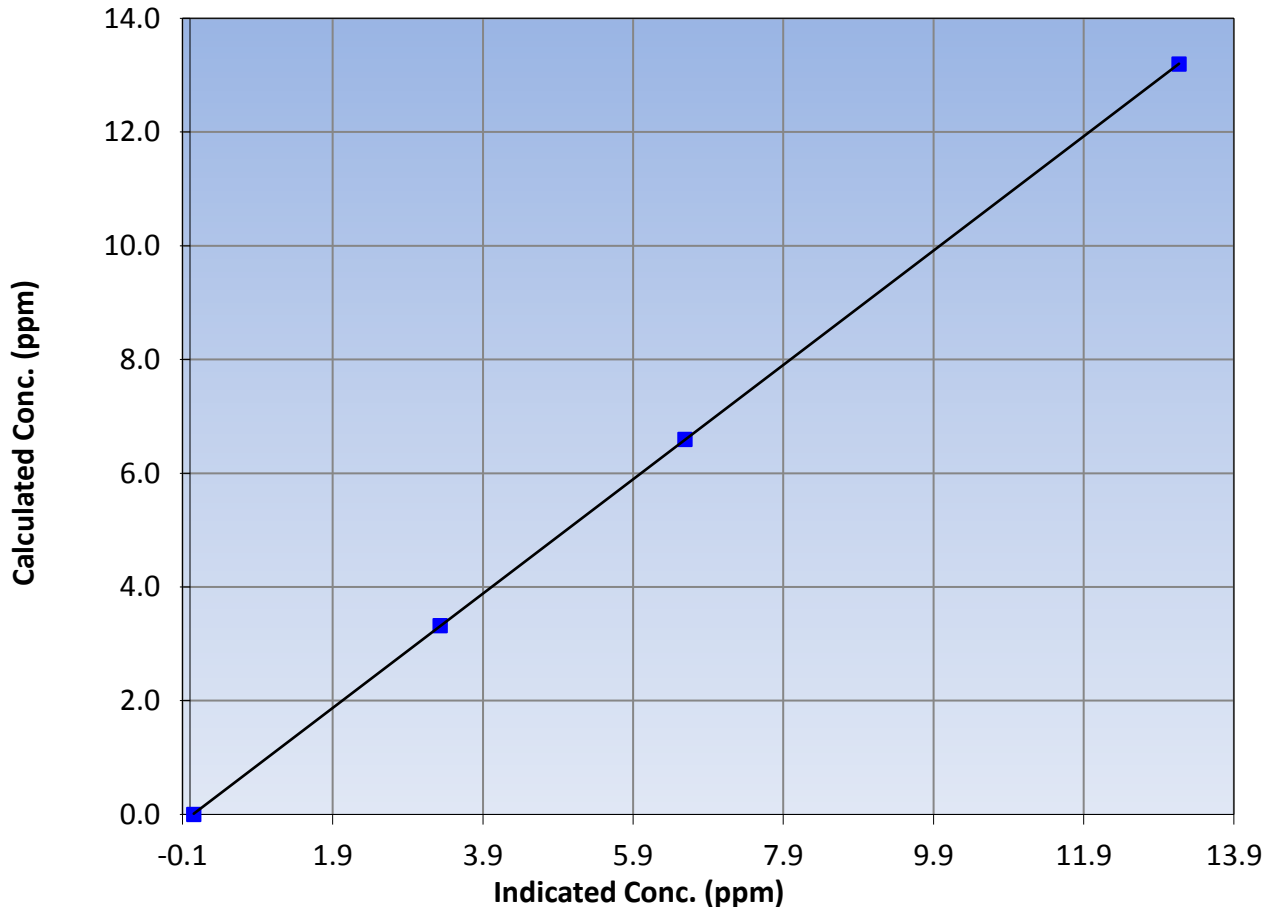
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	14:25
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

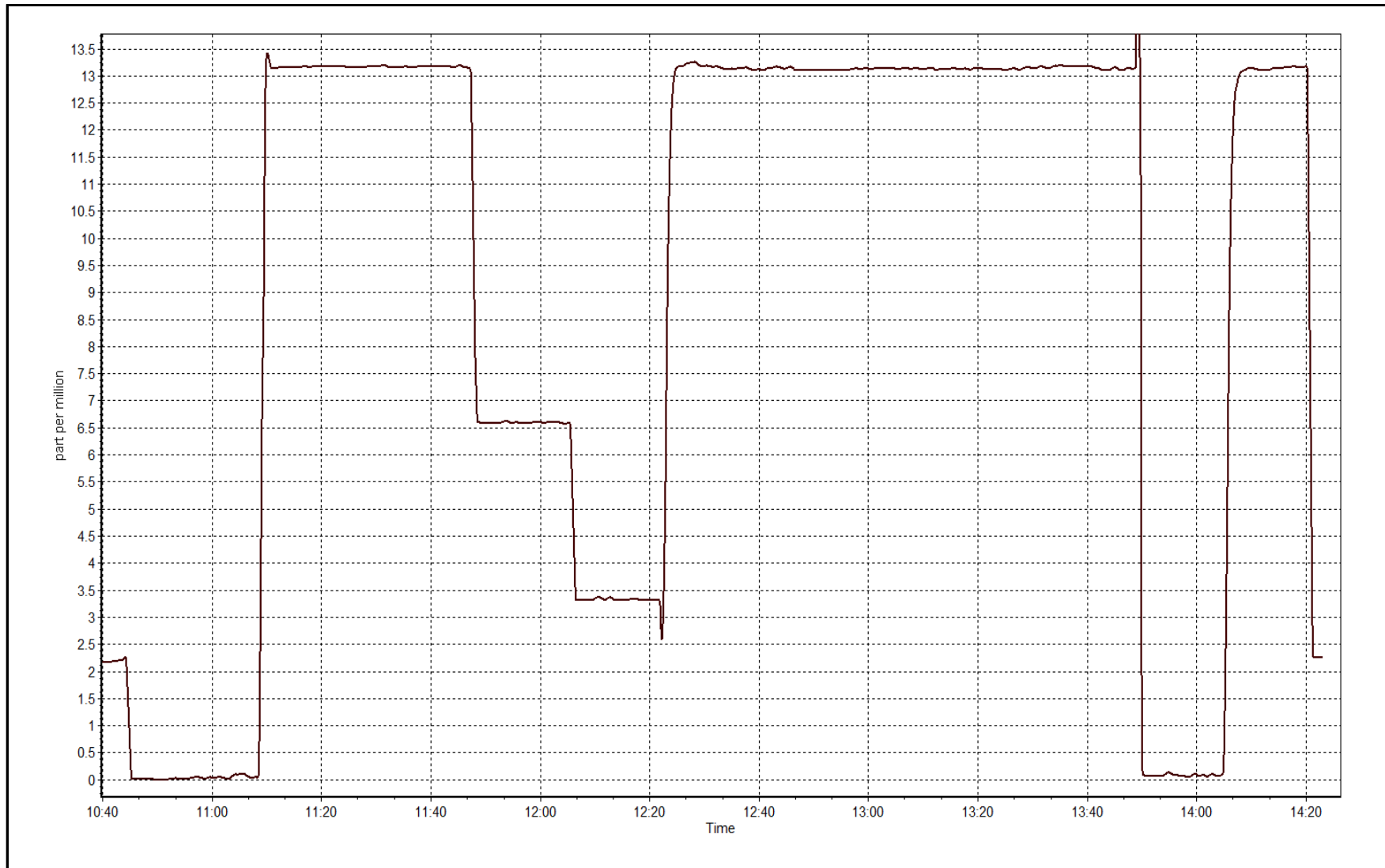
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999996
13.19	13.17	1.0019		
6.60	6.59	1.0011	Slope	1.005271
3.32	3.33	0.9971		
			Intercept	-0.037492

THC Calibration Curve



THC Calibration Plot

Date: February 16, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	12:50
NO2 GPT Ref date	February 16, 2016	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.7	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	1.000427	0.997619	Pressure	25.8	25.8
Calculated intercept	-0.344141	0.093749	Flow cell A	738	738
Analyzer Background	6.5	6.5	Flow cell B	723	723
Analyzer Coefficient	0.979	0.979	O3 measure	4527.3	4527.3
			O3 reference	4544.3	4544.3

Analyzer make	Teledyne API T400	Analyzer serial #	824
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000		0.0	-0.5	----
as found span	5000	713.6/1082.0	376.7	373.4	1.009
calibrator zero	5000		0.0	-0.2	----
high point	5000	713.6/1082.0	376.7	377.2	0.999
second point	5000	496.5/973.6	253.4	254.4	0.996
third point	5000	260.3/849.3	130.6	130.7	1.000
as left zero	5000		0.0	0.2	----
as left span	5000	713.6/1082.0	376.7	377.6	0.998
Average Correction Factor					0.998

Corrected As found	373.9	Previous response	376.9	% change	0.8%
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Notes:

Inlet filter changed after as founds. Zero and Span were adjusted.

Calibration Performed By: Devin Russell



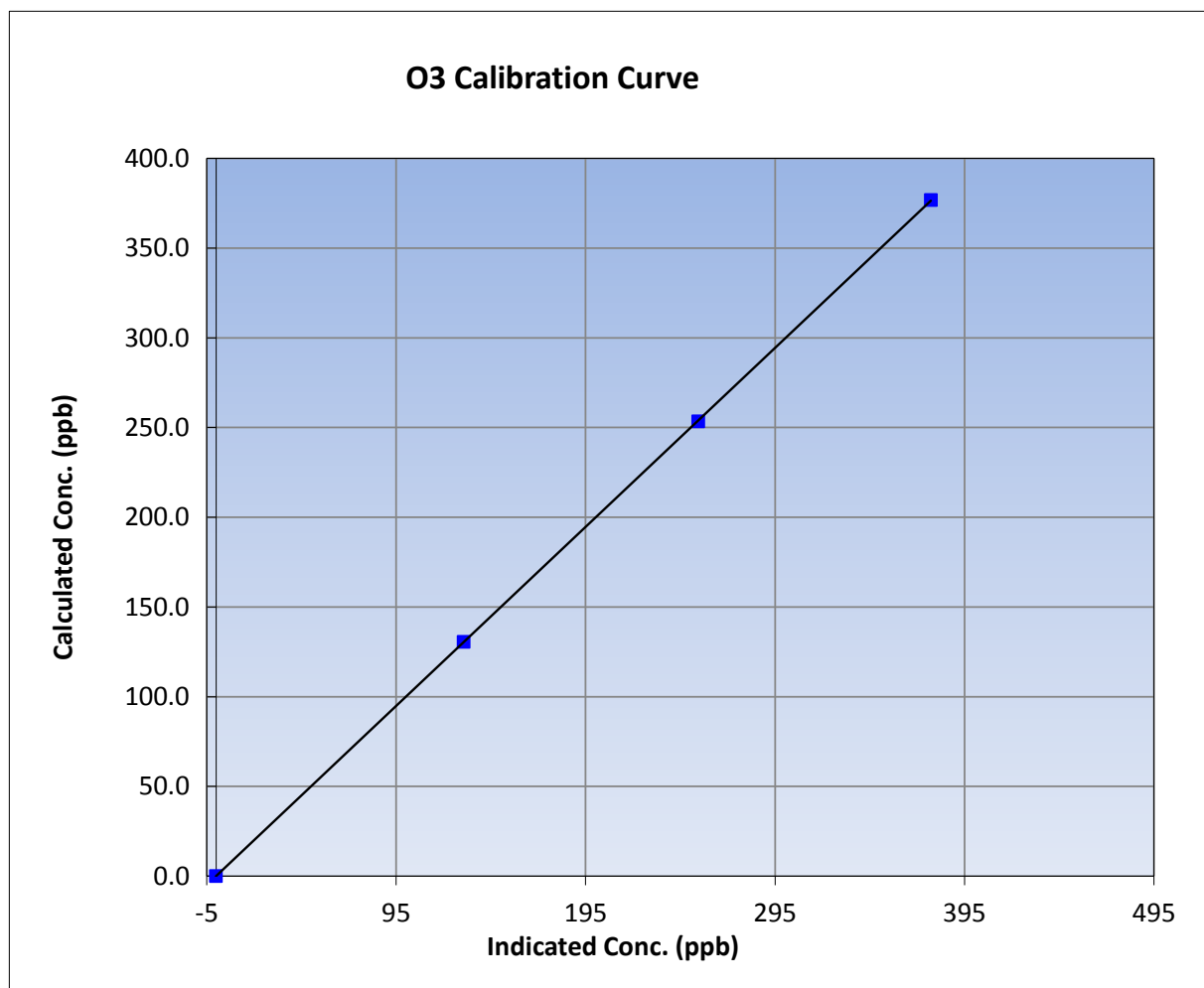
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-17-16	Previous Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:05	End Time (MST)	12:50
Analyzer make	Teledyne API T400	Analyzer serial #	824

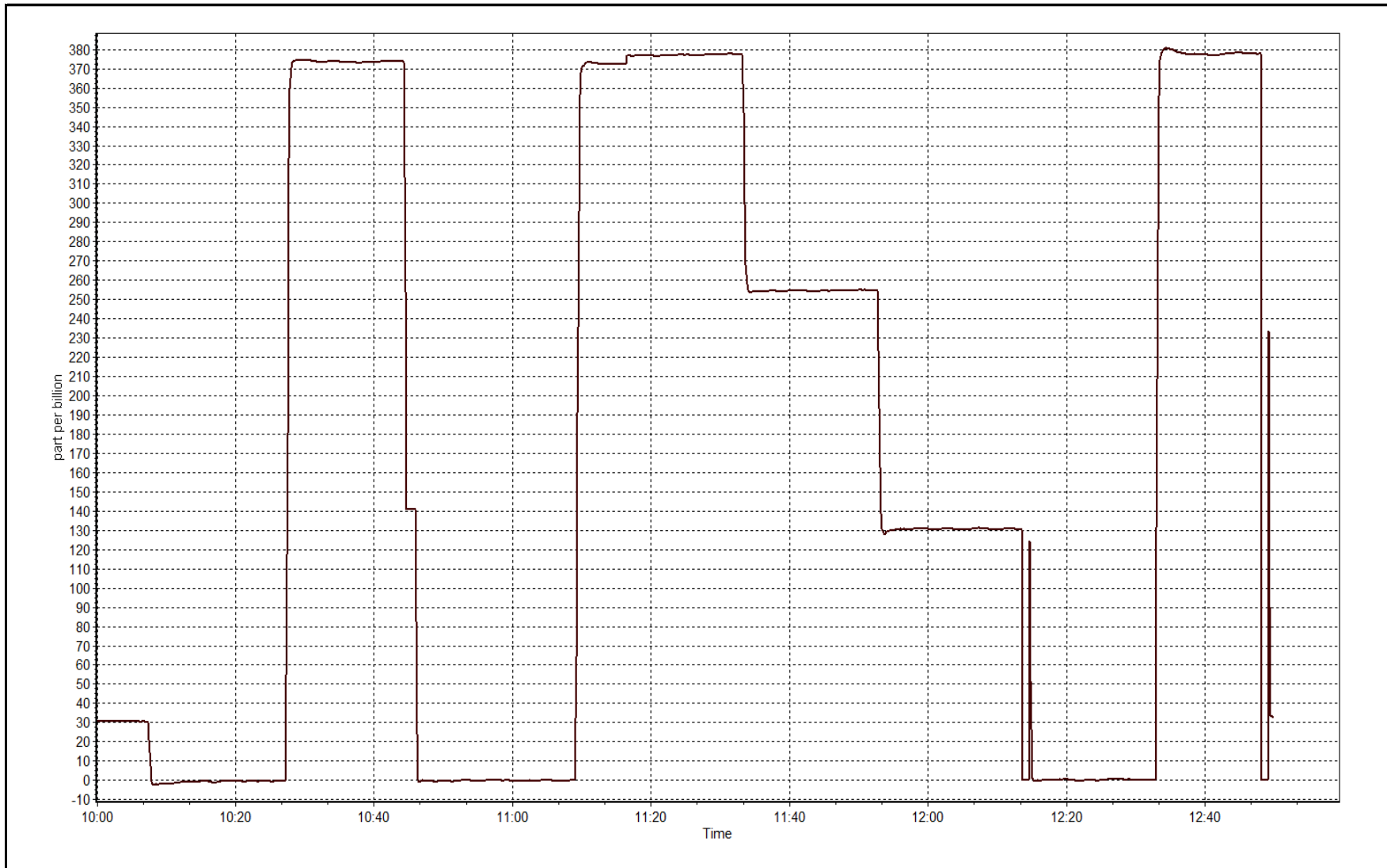
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999995
376.7	377.2	0.9986		
253.4	254.4	0.9960	Slope	0.997619
130.6	130.7	0.9996		
			Intercept	0.093749



O3 Calibration Plot

Date: February 17, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	14:25
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	12/1216
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000198	0.996879	1.006152
	Data Offset	2.834079	2.779881	0.422816
Current Calibration	Data Slope	0.999477	0.996700	1.010320
	Data Offset	2.376955	2.634685	-0.143885

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	0.964		0.976	
NOx coefficient	0.960		0.966	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.6		0.6	
NOx bkgrnd	1.1		1.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	316.2	Deg C	316.3	Deg C
PMT voltage	781	V	781	V
PMT Temp	7	Deg C	7	Deg C
O3 flow	72	ccm	71	ccm
R Cell press NO	5.1	mmHg	5.1	mmHg
R Cell Press Nox	5.1	mmHg	5.1	mmHg
NO sample flow	0.45	lpm	0.441	lpm
Nox sample Flow	0.446	lpm	0.436	lpm

Notes:

Span adjusted. No maintenance completed.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 16, 2016

Station Number:

AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.4	0.0	----	----
as found span	5000	60.4	600.4	600.4	0.0	600.0	598.8	1.2	1.0006	1.0027
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.4	0.0	----	----
high point	5000	60.4	600.4	600.4	0.0	599.3	600.5	-1.2	1.0018	0.9997
second point	5000	30.2	300.2	300.2	0.0	297.0	298.3	-1.3	1.0107	1.0064
third point	5000	15.2	151.1	151.1	0.0	146.8	146.1	0.6	1.0292	1.0339
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.5	0.4	----	----
as left span	5000	60.4	600.4	221.2	379.1	593.7	220.3	373.4	1.0113	1.0041
Average Correction Factor									1.0139	1.0133

Corrected As found

NO_x= 600.4

NO= 599.1

Percent Change

NO_x= -0.5%

NO= 0.1%

Previous Response

NO_x= 597.4

NO= 599.5

GPT Calibration Data

Dilution Flow (total) 5000 ccm

Source Gas Flow 60.40 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	597.4	598.0	0.0	1.0050	1.0041	----	----
1st NO2 (300)	221.2	376.7	594.3	221.2	373.1	1.0102	----	1.0098	99.0%
2nd NO2 (200)	344.6	253.4	595.3	344.6	250.7	1.0086	----	1.0107	98.9%
3rd NO2 (100)	467.4	130.6	597.2	467.4	129.7	1.0054	----	1.0066	99.3%
2nd NO ref point	----	0.0	596.0	597.7	-1.7	1.0073	1.0046	----	----
Average Correction Factor						1.0079		1.0090	99.1%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

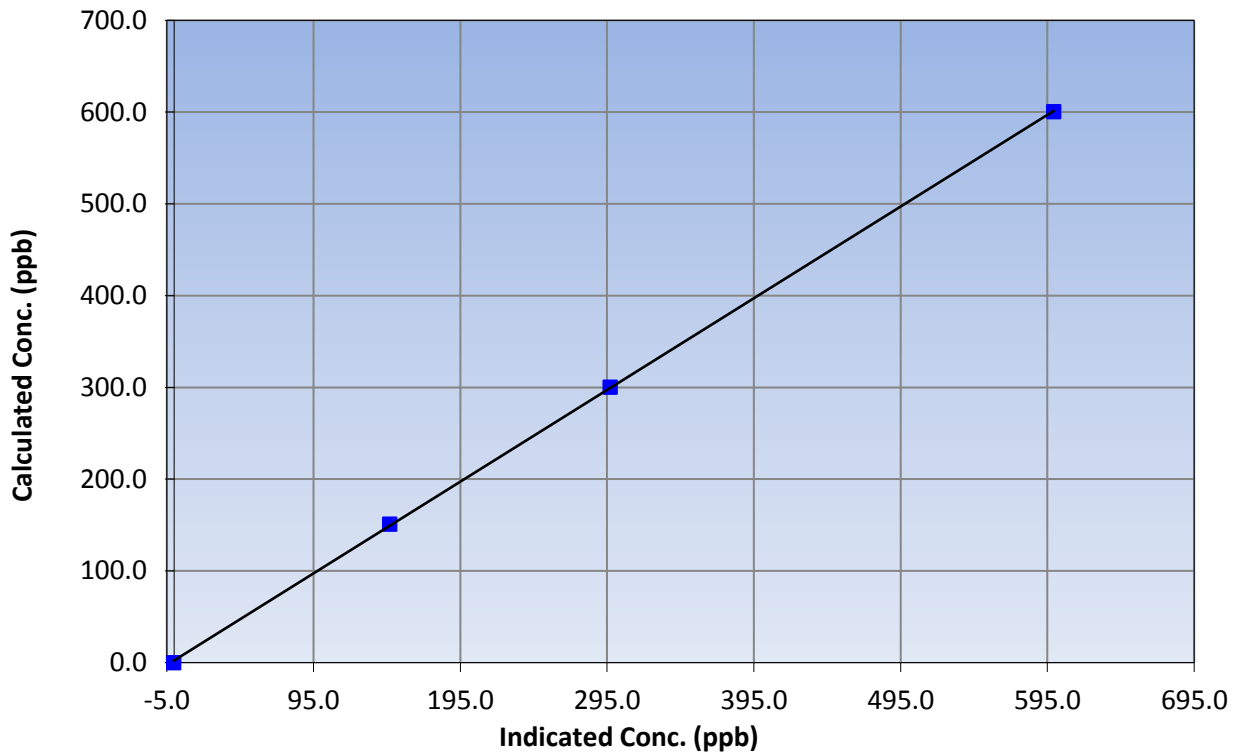
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	14:25
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999950
600.4	599.3	1.0018		
300.2	297.0	1.0107	Slope	0.999477
151.1	146.8	1.0292		
			Intercept	2.376955

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

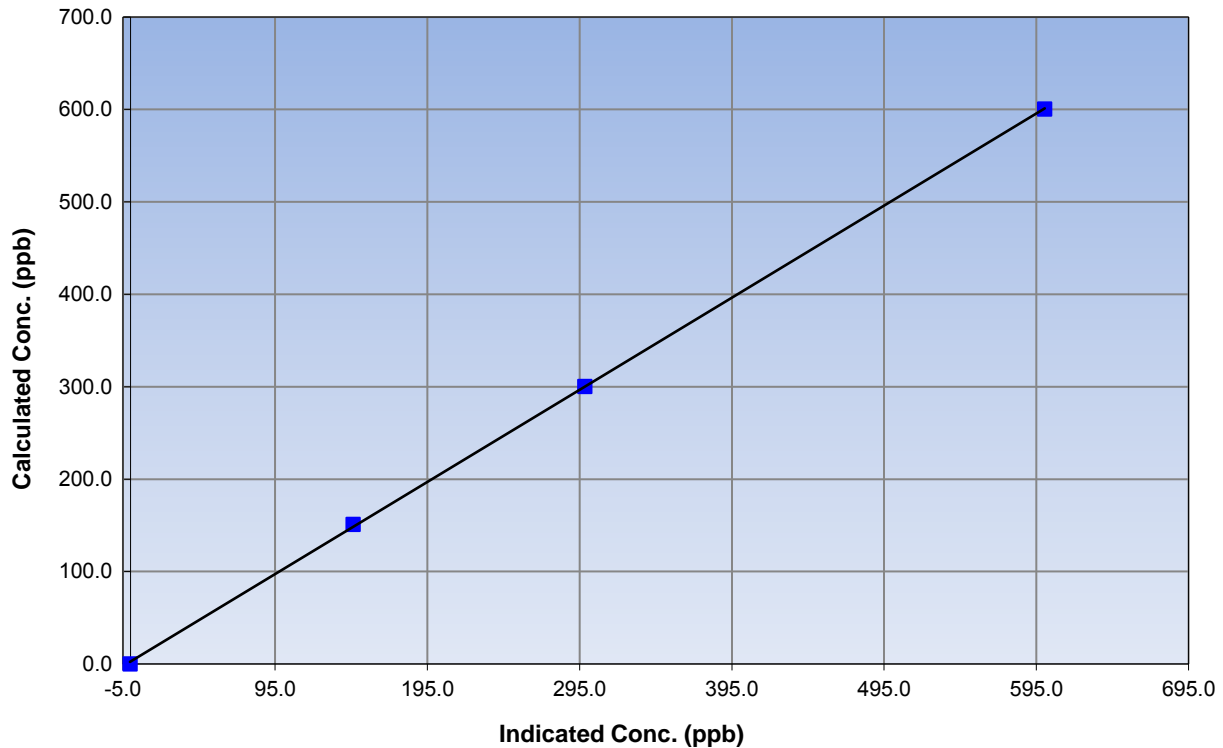
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	14:25
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999931
600.4	600.5	0.9997		
300.2	298.3	1.0064	Slope	0.996700
151.1	146.1	1.0339		
			Intercept	2.634685

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

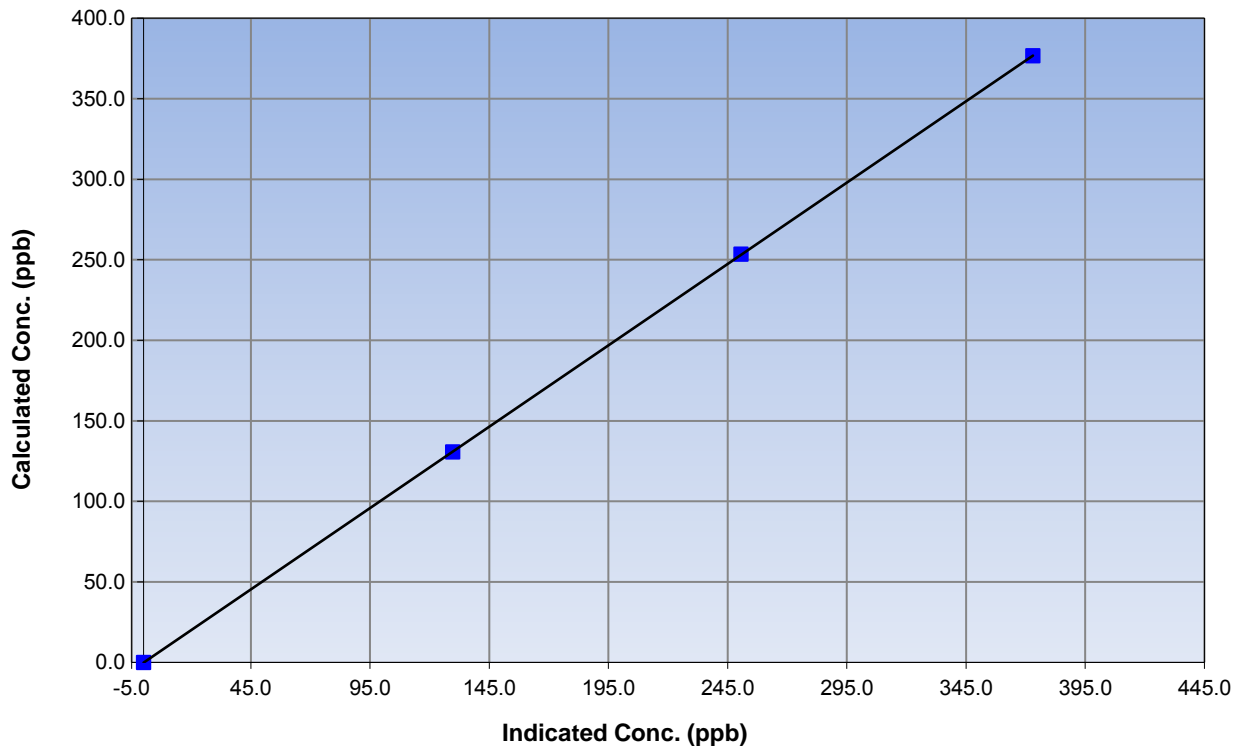
Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 25, 2016
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	14:25
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

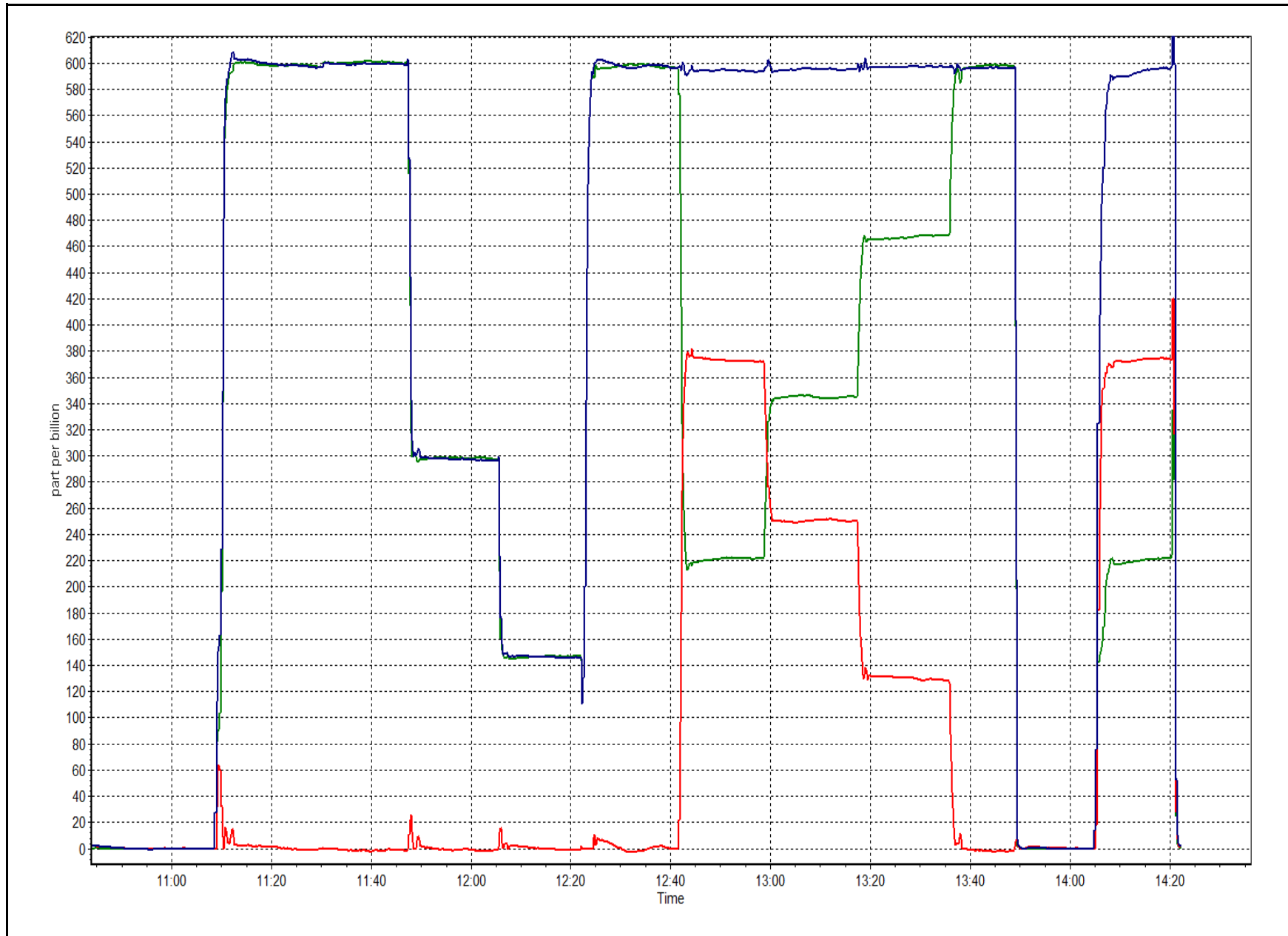
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999997
376.7	373.1	1.0098		
253.4	250.7	1.0107	Slope	1.010320
130.6	129.7	1.0066		
			Intercept	-0.143885

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 16, 2016





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date: February 17, 2016 Previous Calibration: January 26, 2016
 Station Name: Wapasu Station Number: AMS 17
 Start Time (MST): 10:07 End Time (MST): 12:10
 Calibrator Make/Model: Delta Cal Calibrator Serial Number: 141228

SHARP INFORMATION

Particulate Fraction: PM2.5
 Make/Model: Thermo / SHARP 5030
 Serial Number: E-1107
 C₁₄ Source SN: 2518
 Confirmation of Time settings: Yes No
 Parameters Checked: T1 T2 T3 T4 P3 Main Flow Beta Neph

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-15.0	-15.8	-0.8	-15.0
T2	15.0	na	na	
T3	18.0	na	na	
T4	15.0	na	na	
RH (%)	9.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	947	942.9	-4.1	947

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1002	2	1002	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	200		200
Neph	-0.2		-0.2
C14	14.5		14.5
Indicated Concentration (ug/m3)	0	no	0
Offset 1	199.8		199.8
Offset 2	32		32

Leak Check (Quarterly)

Leak Check Date: February 17, 2016 Previous Leak Check Date: June 10, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.70	
*Flow with adaptor (LPM):	16.60	0.10

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

Mass Foil Calibration (Annualy)

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

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	26/01/2016
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head cleaned. Leak check completed. Filter tape has about 25% of the roll left.

Calibration Performed By: Devin Russell



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 18
CONKLIN LOOKOUT
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
FEBRUARY 2016

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	662	34	34	100.00	5	0	2	0
TRS(ppb) Average	663	33	33	100.00	1	0	0	0
THC(ppm) Average	662	34	34	100.00	2.4	-	2.3	-
NMHC(ppm) Average	662	34	34	100.00	0.073	-	0.047	-
CH4(ppm) Average	662	34	34	100.00	2.4	-	2.2	-
O3 (ppb) Average	664	32	32	100.00	50	0	48	-
NO2 (ppb) Average	662	34	34	100.00	9	0	7	-
NO (ppb) Average	662	34	34	100.00	3	-	0	-
NOX (ppb) Average	662	34	34	100.00	11	-	7	-
PM2.5 (ug/m3) Average	695	1	1	100.00	20.4	-	9.1	0
Wind Speed 10 m (km/h) Average	696	0	0	100.00	26	-	16	-
Wind Direction 10 m (deg) Average	696	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	696	0	0	100.00	9.9	-	4.6	-
Relative Humidity (%) Average	696	0	0	100.00	98	-	94.0	-
Precipitation (mm) Total	696	0	0	100.00	1	-	6.3	-
Leaf Wetness (% of range) Average	696	0	0	100.00	58	-	11.0	-
Global Solar Radiation (W/m2) Average	696	0	0	100.00	565	-	143.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	662	0.3	0	-	0	0	0	0	0	1	5
TRS (ppb) Average	663	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	662	2.03	0.1	-	1.9	1.9	2	2	2.1	2.1	2.4
NMHC(ppm) Average	662	0.003	0.012	-	0	0	0	0	0	0	0.073
CH4(ppm) Average	662	2.03	0.1	-	1.9	1.9	2	2	2.1	2.1	2.4
O3 (ppb) Average	664	36.9	6	-	17	28	32	37	42	45	50
NO2 (ppb) Average	662	2.2	2	-	0	1	1	2	3	4	9
NO (ppb) Average	662	0.2	0	-	0	0	0	0	0	0	3
NOX (ppb) Average	662	2.4	2	-	0	1	1	2	3	5	11
PM2.5 (ug/m3) Average	695	2.93	2.6	-	0.5	0.9	1.4	2.2	3.3	6	20.4
Wind Speed 10 m (km/h) Average	696	8.9	4	-	1	4	6	8	12	14	26
Wind Direction 10 m (deg) Average	696	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	696	-6.8	6.9	-	-26.8	-15.8	-11.8	-6.6	-1.4	2	9.9
Relative Humidity (%) Average	696	75.4	15	-	35	53	65	79	87	92	98
Precipitation (mm) Total	696	-	-	13.01	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	696	2.7	5	-	1	1	2	2	2	4	58
Global Solar Radiation (W/m2) Average	696	67	125	-	0	0	0	0	77	277	565

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report

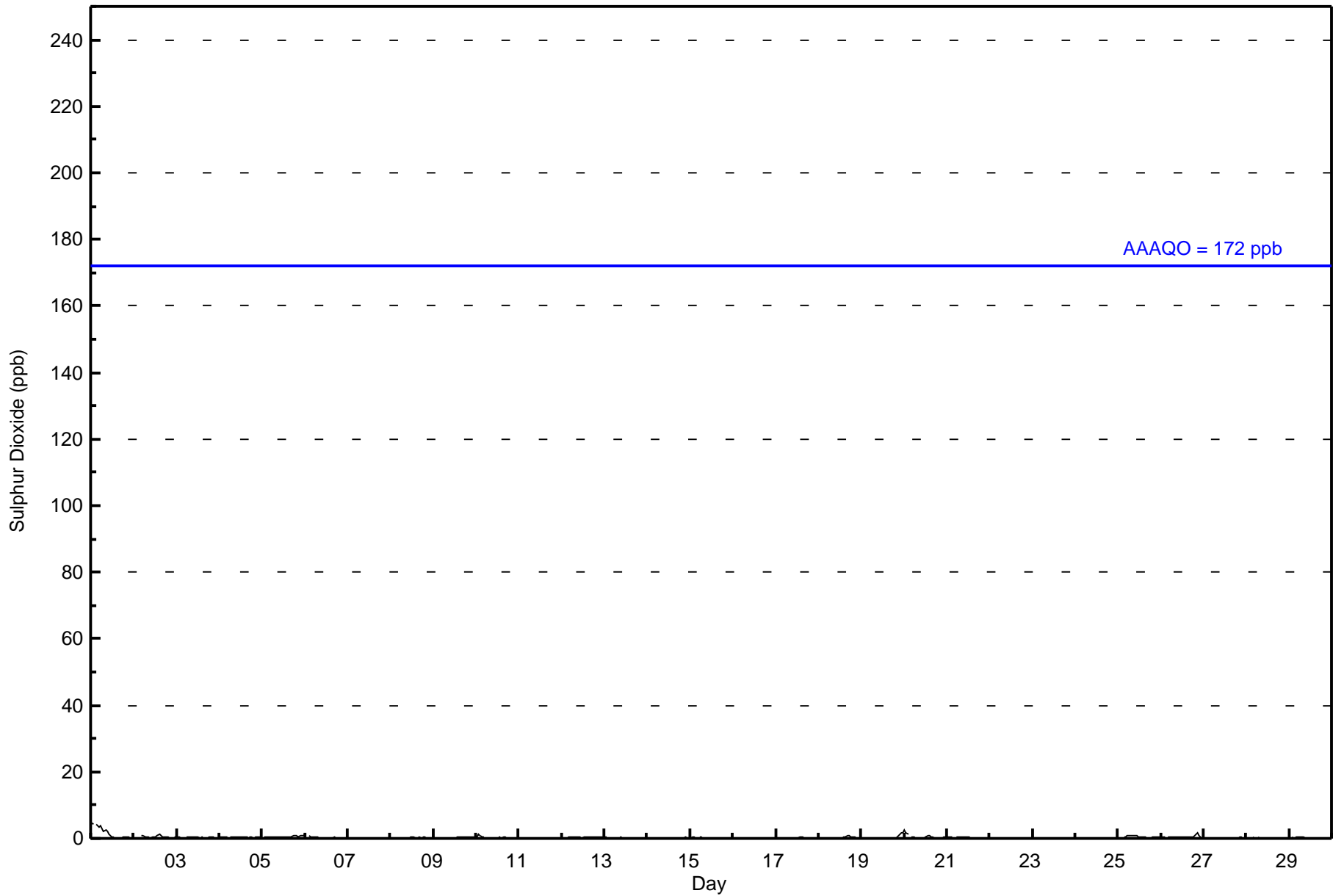


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696													
Maximum Value: 5 ppb on Feb 1 01:00														Maximum Daily Average: 1.5 ppb on Feb 1										Hours of Data: 662			
Minimum Value: 0 ppb on Feb 9 04:00														Minimum Daily Average: 0.0 ppb on Feb 24										Hours of Missing Data: 34			
Maximum Diurnal Average: 0.5 ppb at hour 1														Minimum Diurnal Average: 0.2 ppb at hour 18										Hours of Calibration: 34			
Monthly Average: 0.3 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 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	5	4	Z	4	3	4	3	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	5	
2-Feb	0	0	0	Z	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	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	0	0	0	0	0.3	0	
4-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	0.3	1	
5-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0.5	1	
6-Feb	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
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	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	0	0	0	0	0	0.2	0	
10-Feb	0	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
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	0.1	0	
12-Feb	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.1	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	0.1	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	0.1	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	0	
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.1	1	
18-Feb	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	1	1	1	0	0	0	0	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	1	2	2	0.3	2	
20-Feb	3	2	1	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.5	3	
21-Feb	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.0	0	
23-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	
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	0	
25-Feb	0	0	Z	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0.4	2	
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	
29-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	
														0.5 0.4 0.2 0.3 0.3 0.4 0.3 0.2 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2										Diurnal Average			
														5 4 1 4 3 4 3 2 3 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1										Diurnal Maximum			
Z - zerspan 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 Lookout - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Conklin Lookout - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	662	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: 662

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin Lookout - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662
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	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662

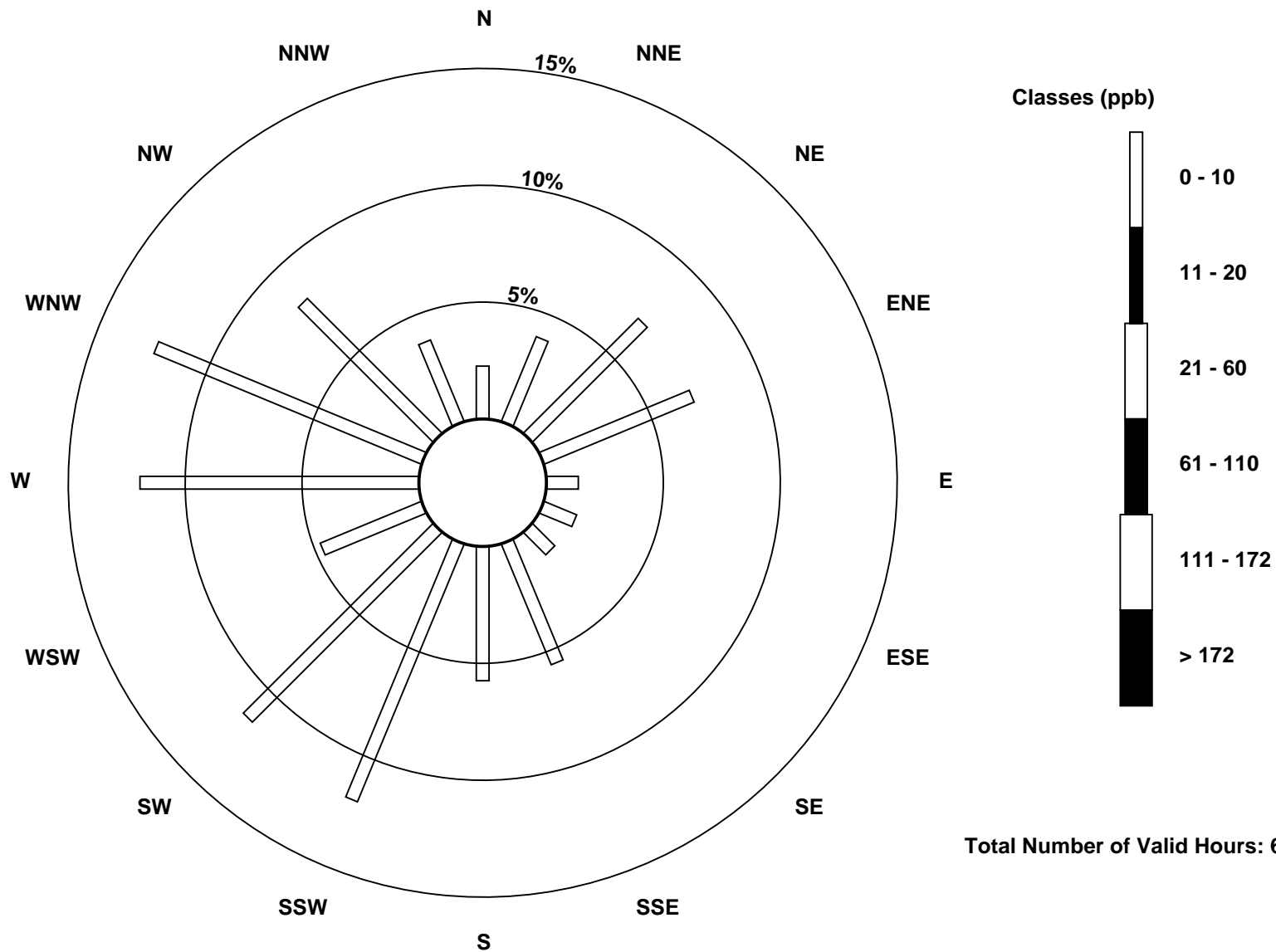
Total Number of Valid Hours: 662

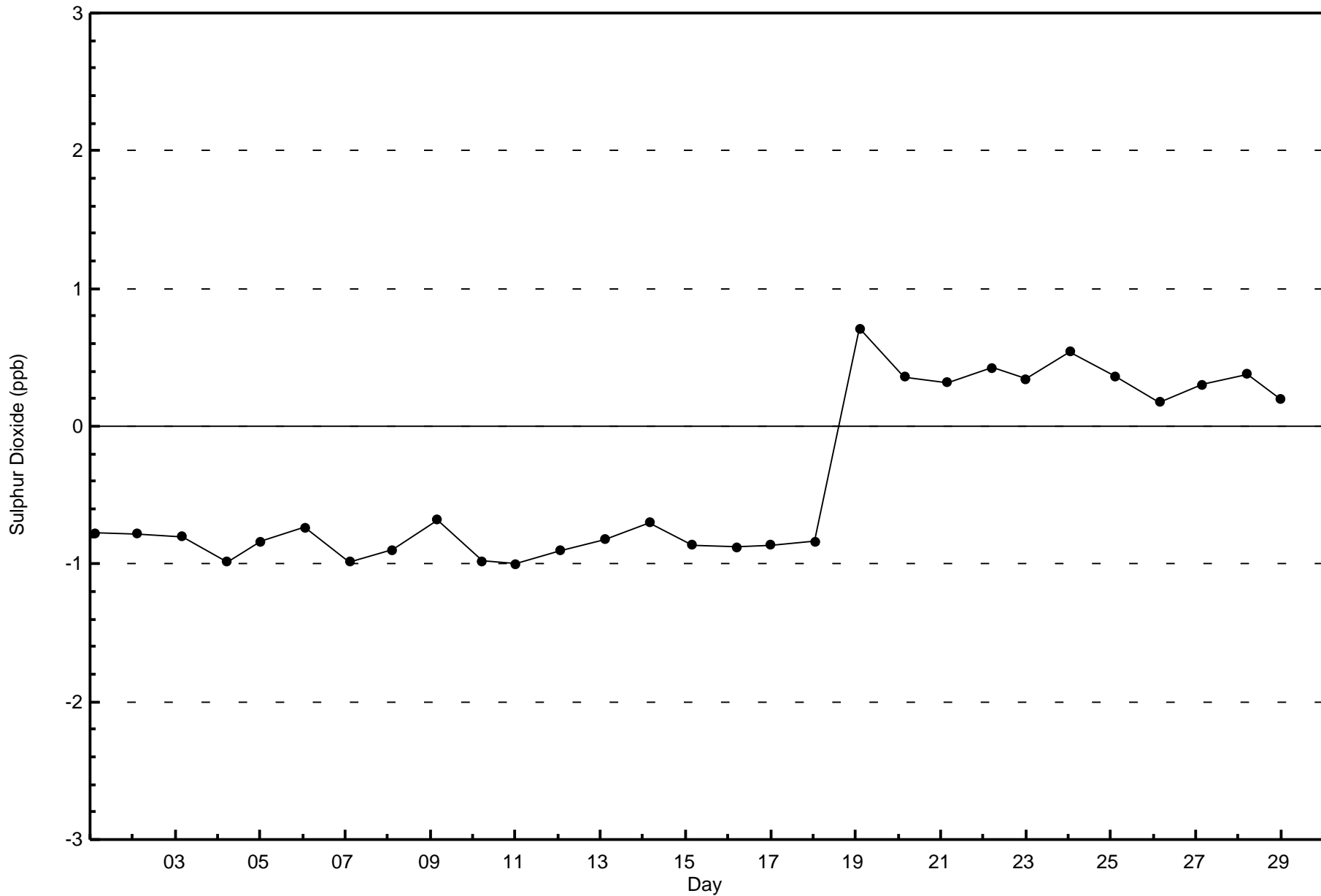
Total Number of Hours: 696

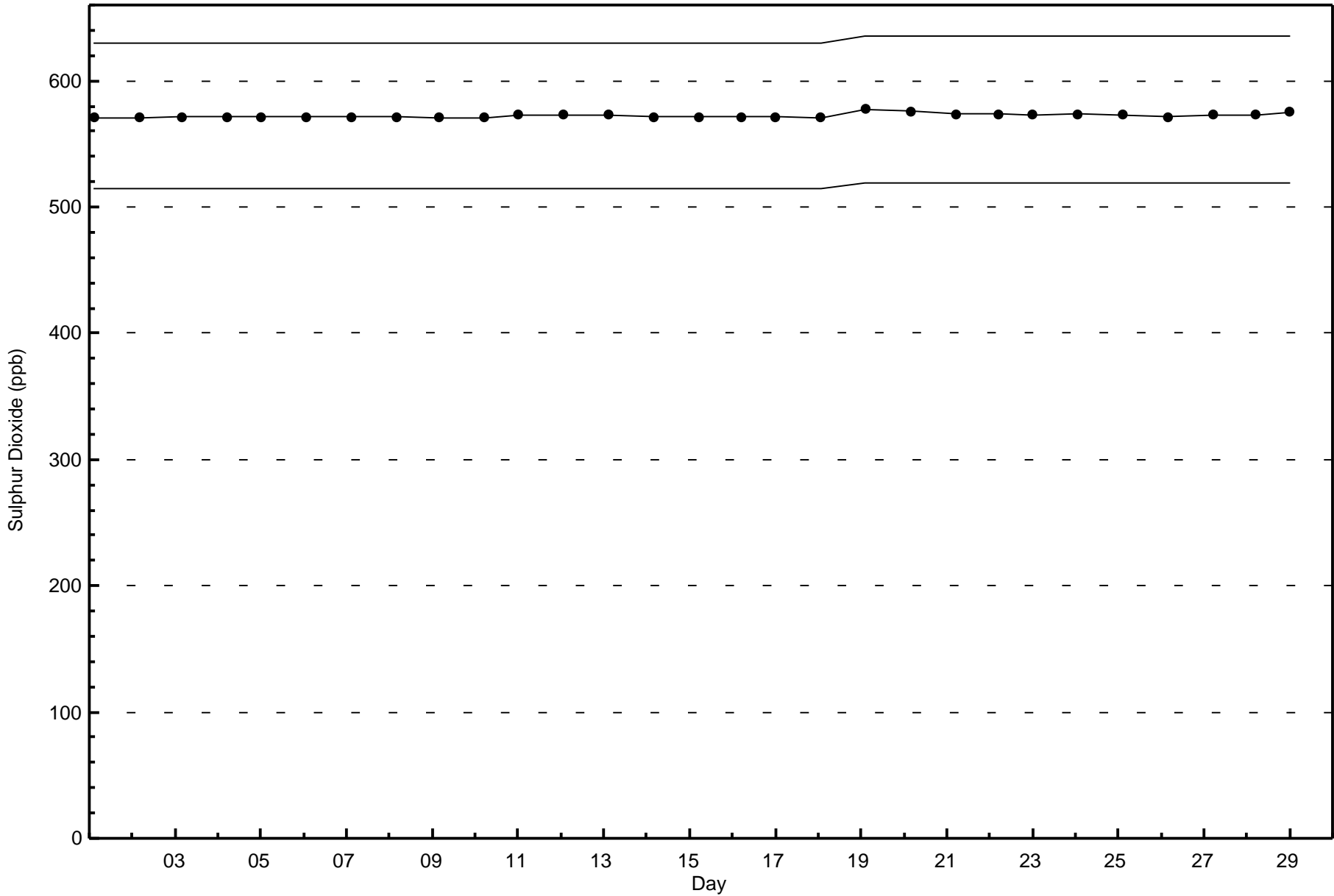


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
Conklin Lookout (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

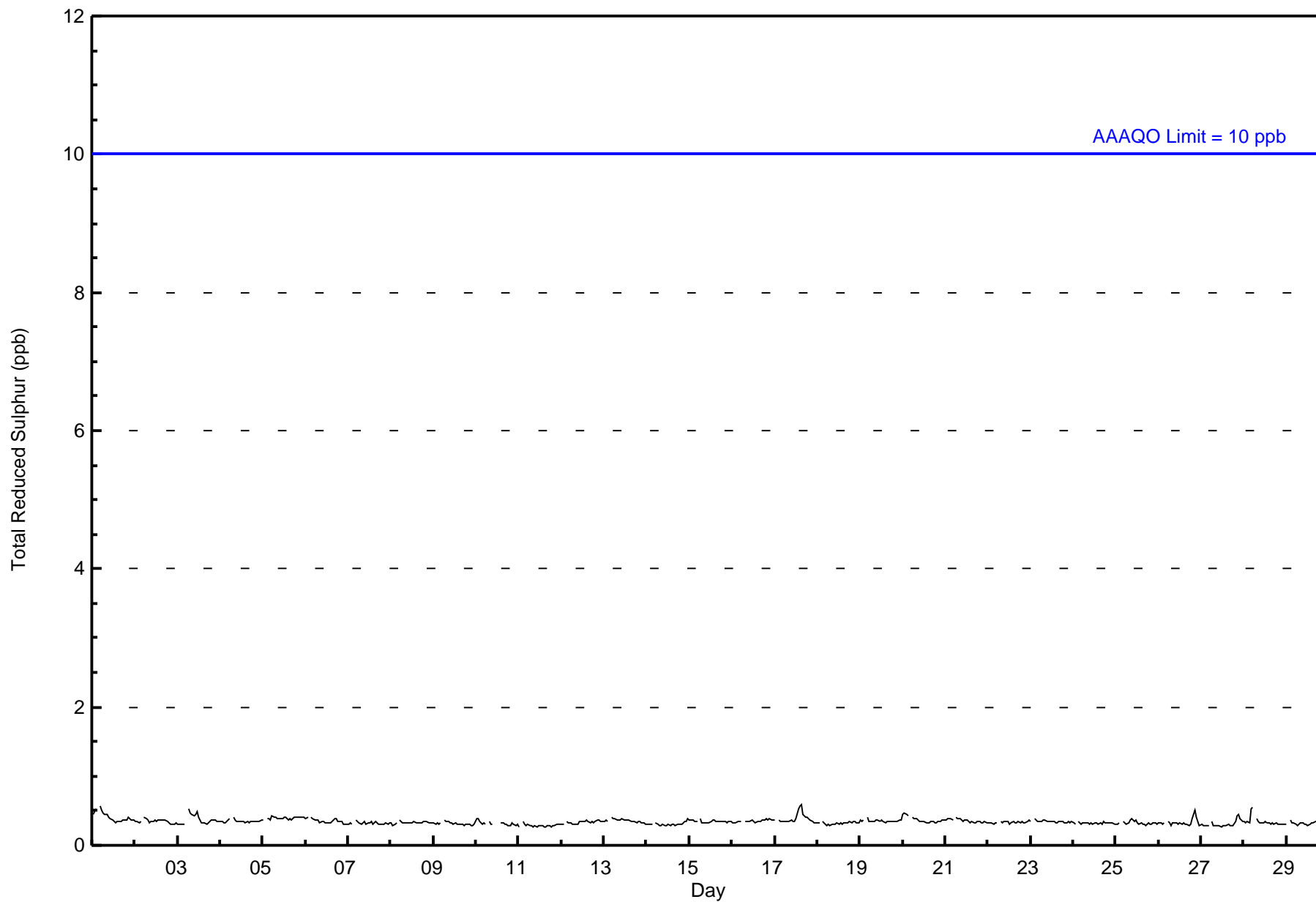
Conklin Lookout - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Feb 17 16:00 Maximum Daily Average: 0.4 ppb on Feb 1														Hours in Service: 696 Hours of Data: 663 Hours of Missing Data: 33 Hours of Calibration: 33 Percent Operational Time: 100.0																																				
Minimum Value: 0 ppb on Feb 11 15:00 Minimum Daily Average: 0.3 ppb on Feb 11 Maximum Diurnal Average: 0.4 ppb at hour 6 Minimum Diurnal Average: 0.3 ppb at hour 17 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																																																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Feb	0	0	1	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																							
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	0.3	0																							
3-Feb	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
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	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	0.4	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	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	0.3	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	0.3	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	0.3	0																							
10-Feb	0	0	0	0	0	0	Z	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.3	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	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	0.3	0																							
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	0.4	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	0.3	0																							
15-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	0.3	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	0.4	0																							
17-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1																							
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	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	0.4	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	0.4	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	0.4	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	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	0.3	0																							
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	0.3	0																							
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	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	1	0	0	0	0.3	1																							
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	0.3	0																							
28-Feb	0	0	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
29-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																							
																								0.3	0.3	0.4	0.3	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	0.3	0.3	0.3	0.3
																								0	0	1	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0
Z - zerspan C - Calibration																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																		



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Conklin Lookout - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Conklin Lookout - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	663	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin Lookout - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	15	27	42	46	7	13	12	38	36	80	78	30	78	82	55	24	663
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	15	27	42	46	7	13	12	38	36	80	78	30	78	82	55	24	663

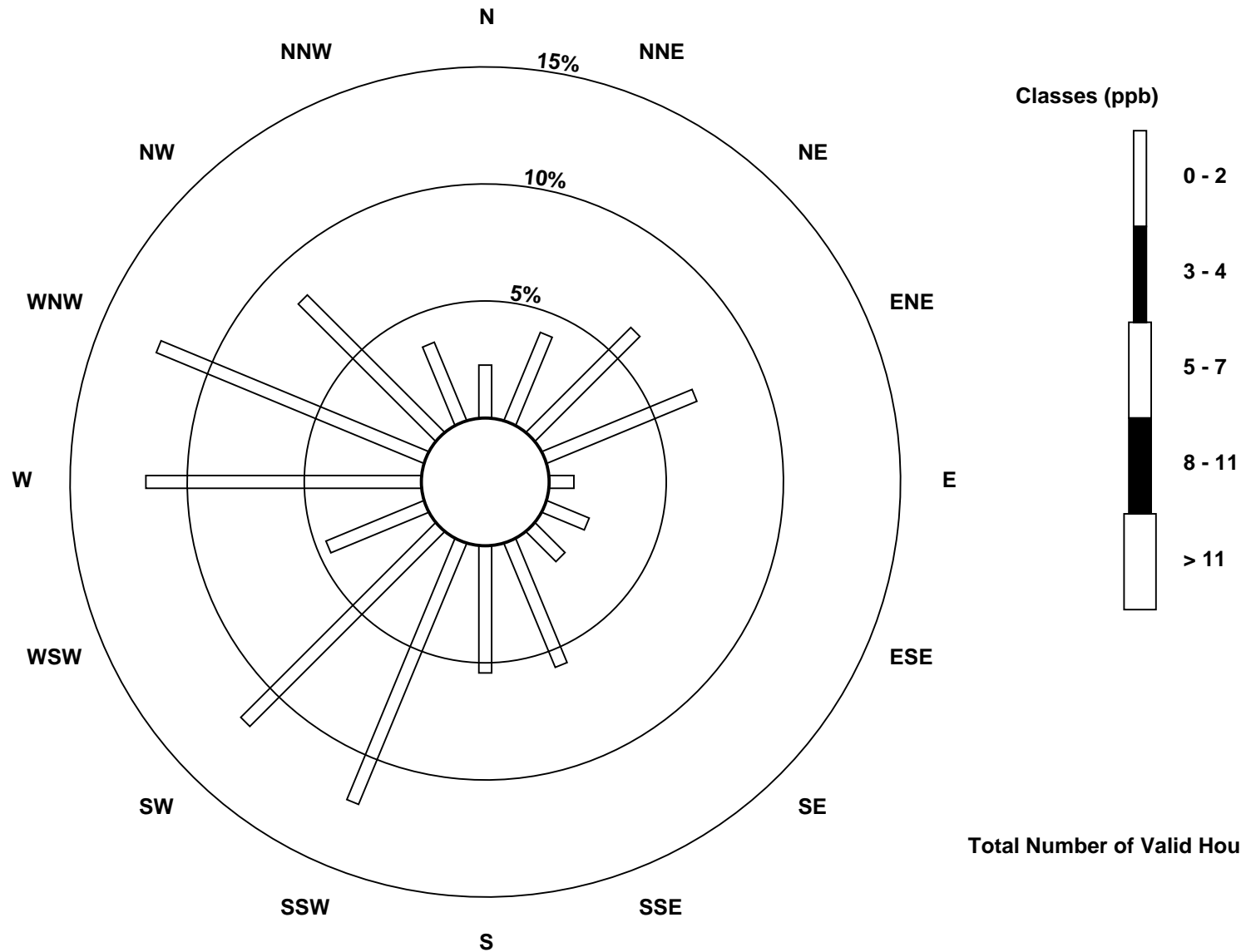
Total Number of Valid Hours: 663

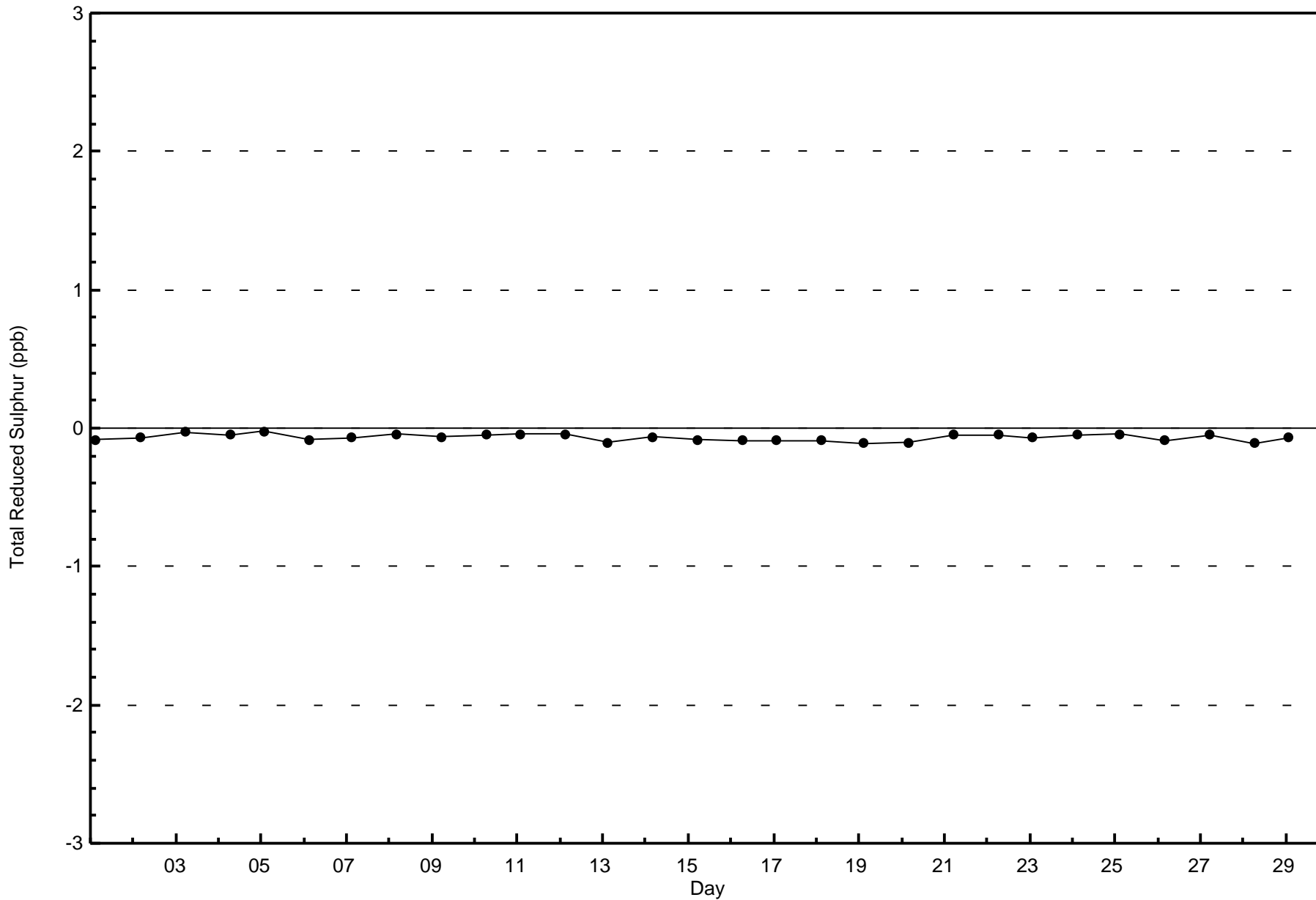
Total Number of Hours: 696

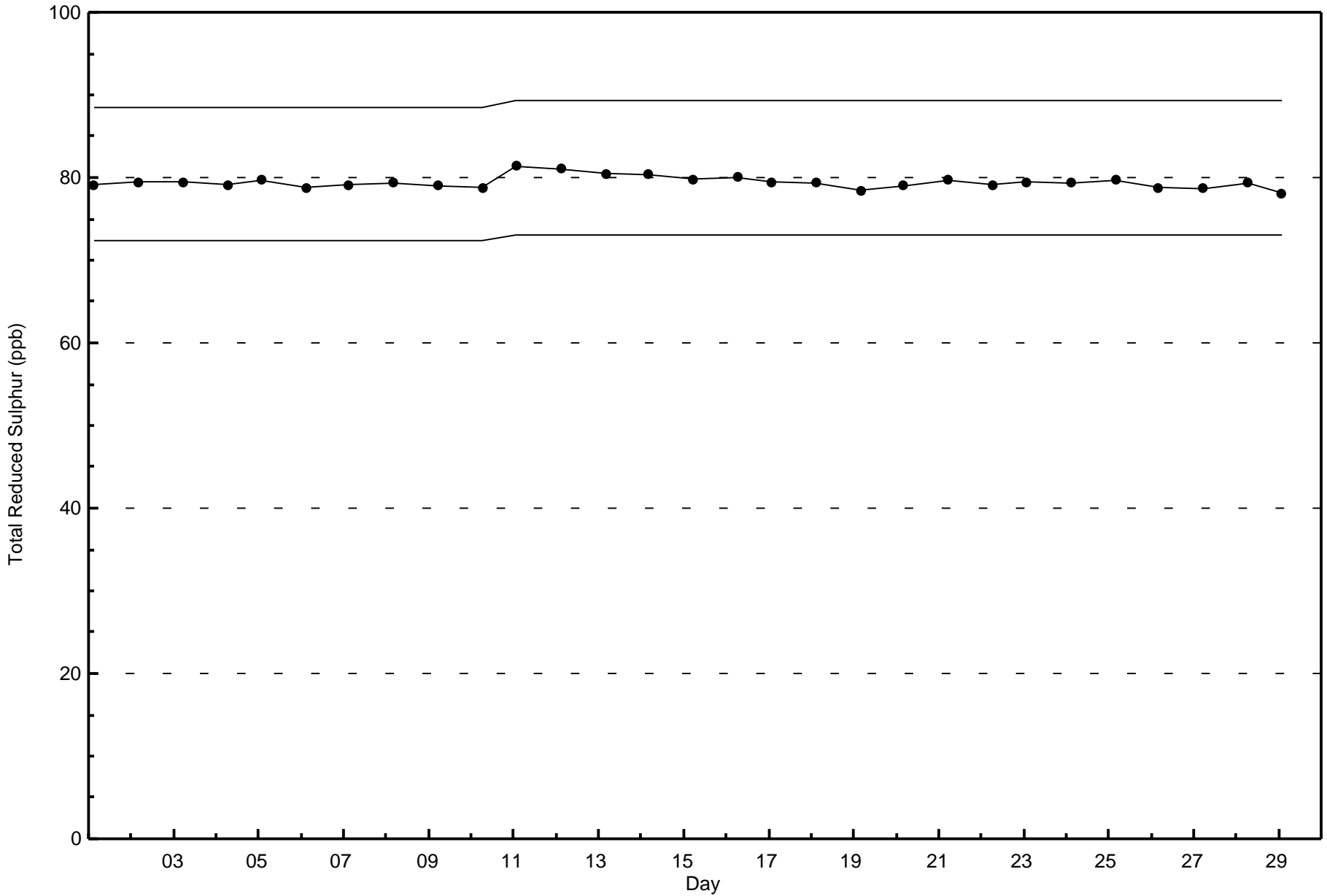


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Reduced Sulphur (TRS) - ppb
Conklin Lookout (AMS 18)









Wood Buffalo Environmental Association
Summary of Hour Averages

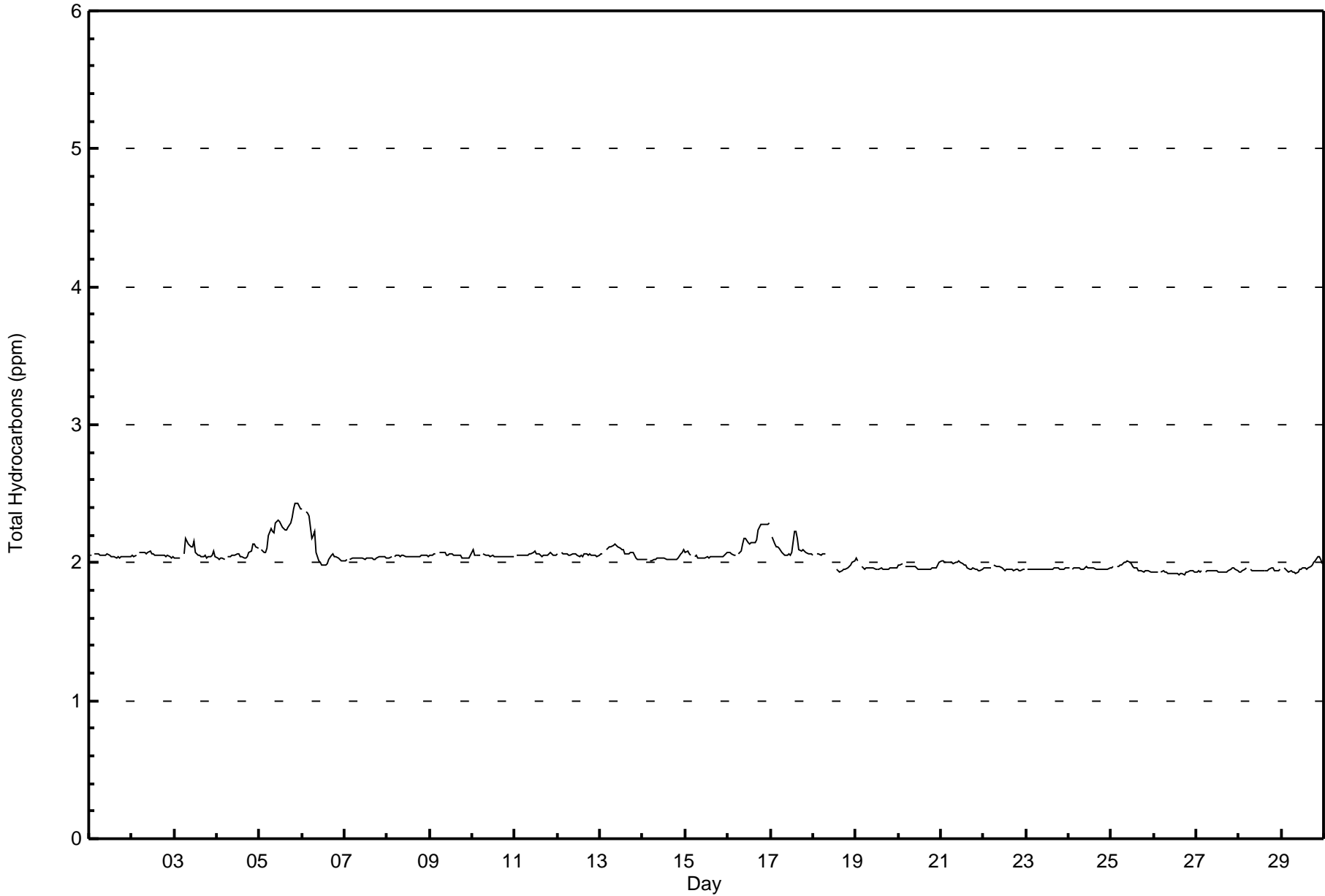
Total Hydrocarbons (THC) - ppm
Conklin Lookout - February 2016

Maximum Value: 2.4 ppm on Feb 5 21:00 Maximum Daily Average: 2.3 ppm on Feb 5		Hours in Service: 696 Hours of Data: 662 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																																
Minimum Value: 1.9 ppm on Feb 26 15:00 Maximum Diurnal Average: 2.0 ppm at hour 7 Monthly Average: 2.03 ppm		Minimum Daily Average: 1.9 ppm on Feb 26 Minimum Diurnal Average: 2.0 ppm at hour 17 Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.1 P ₉₉ = 2.4																																
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	2.1	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
2-Feb	2.1	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	
3-Feb	2.0	2.0	2.0	2.0	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.2	
4-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
5-Feb	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.4		
6-Feb	2.4	Z	2.4	2.4	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4		
7-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	2.0		
8-Feb	2.0	2.0	2.0	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1		
9-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	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1		
10-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1		
11-Feb	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
12-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1		
13-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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	
14-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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1		
15-Feb	2.1	2.1	2.1	2.1	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1		
16-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3			
17-Feb	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	2.2	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		
18-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	C	C	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	2.1		
19-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	2.0		
20-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	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		
21-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
22-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
23-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
24-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	2.0	2.0	2.0	2.0	2.0		
25-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	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		
27-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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
28-Feb	1.9	1.9	1.9	1.9	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	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0		
29-Feb	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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										
Z - zerospan C - Calibration																																		



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Conklin Lookout - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Conklin Lookout - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	426	64.35	64.35
2.1 - 3.0	236	35.65	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin Lookout - February 2016**

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	10	15	25	29	5	4	4	15	17	36	43	21	64	73	45	20	426
2.1 - 3.0	5	11	21	17	4	6	5	22	21	43	33	10	15	9	9	5	236
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	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662

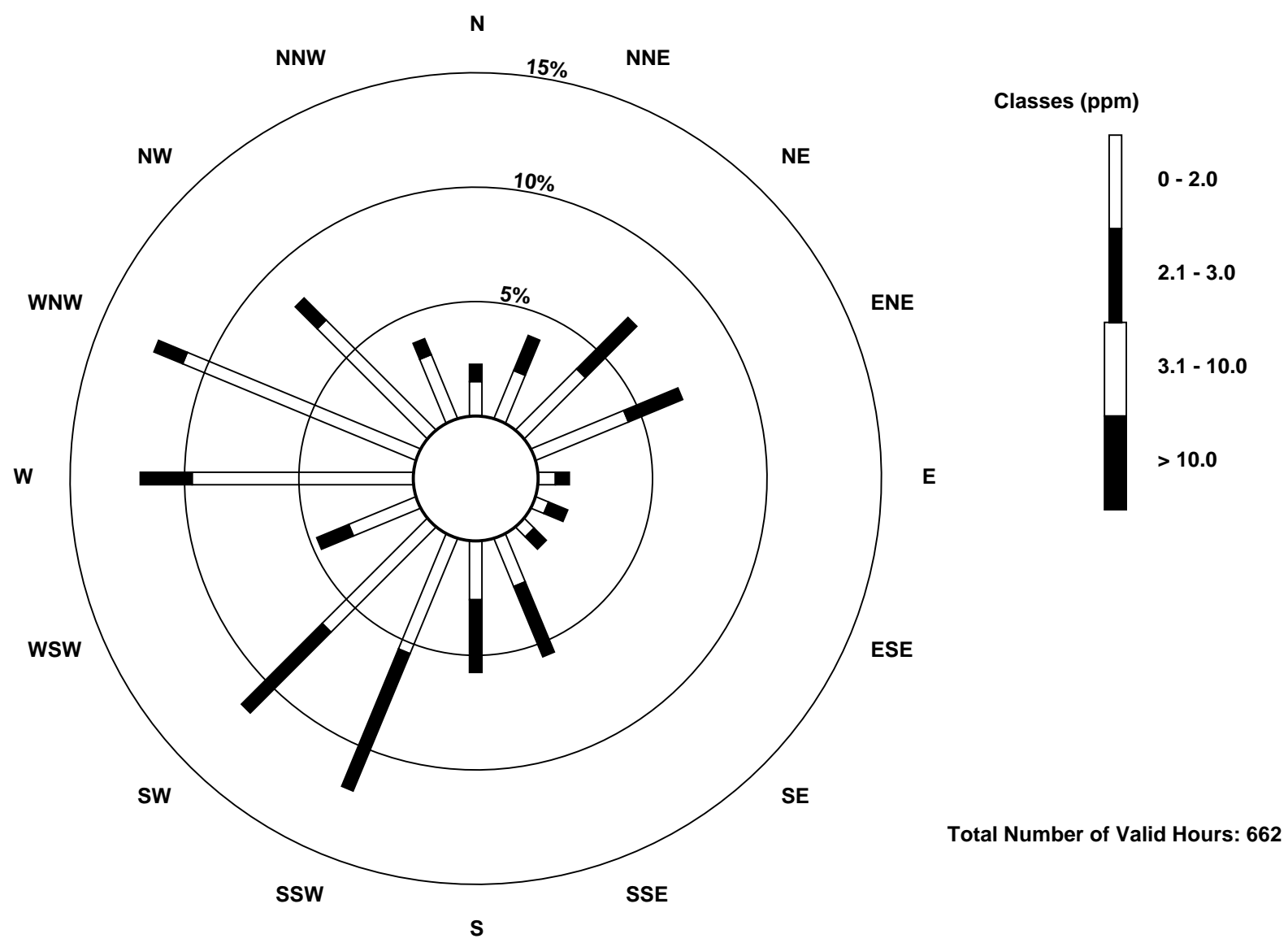
Total Number of Valid Hours: 662

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

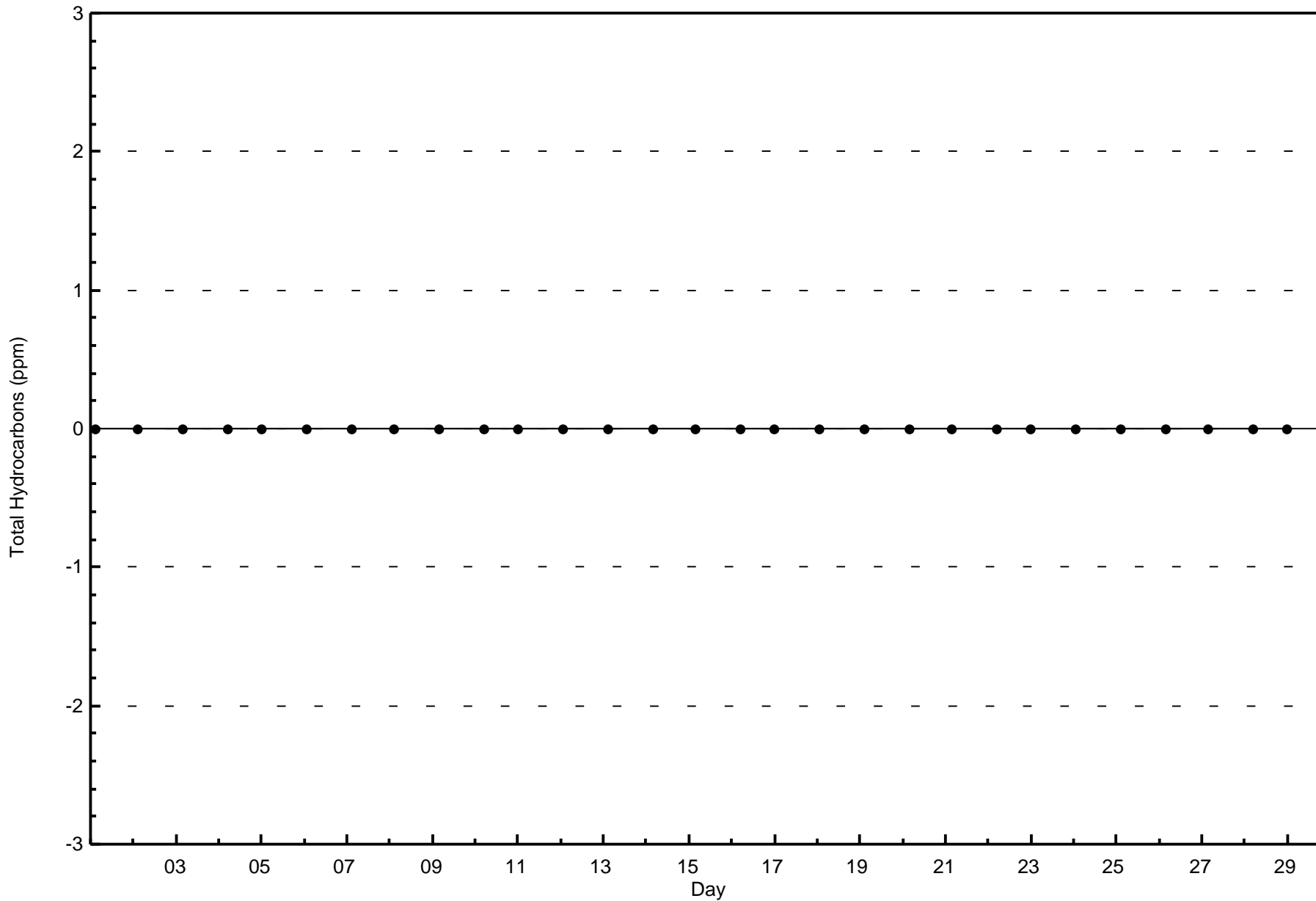
Total Hydrocarbons (THC) - ppm
Conklin Lookout (AMS 18)

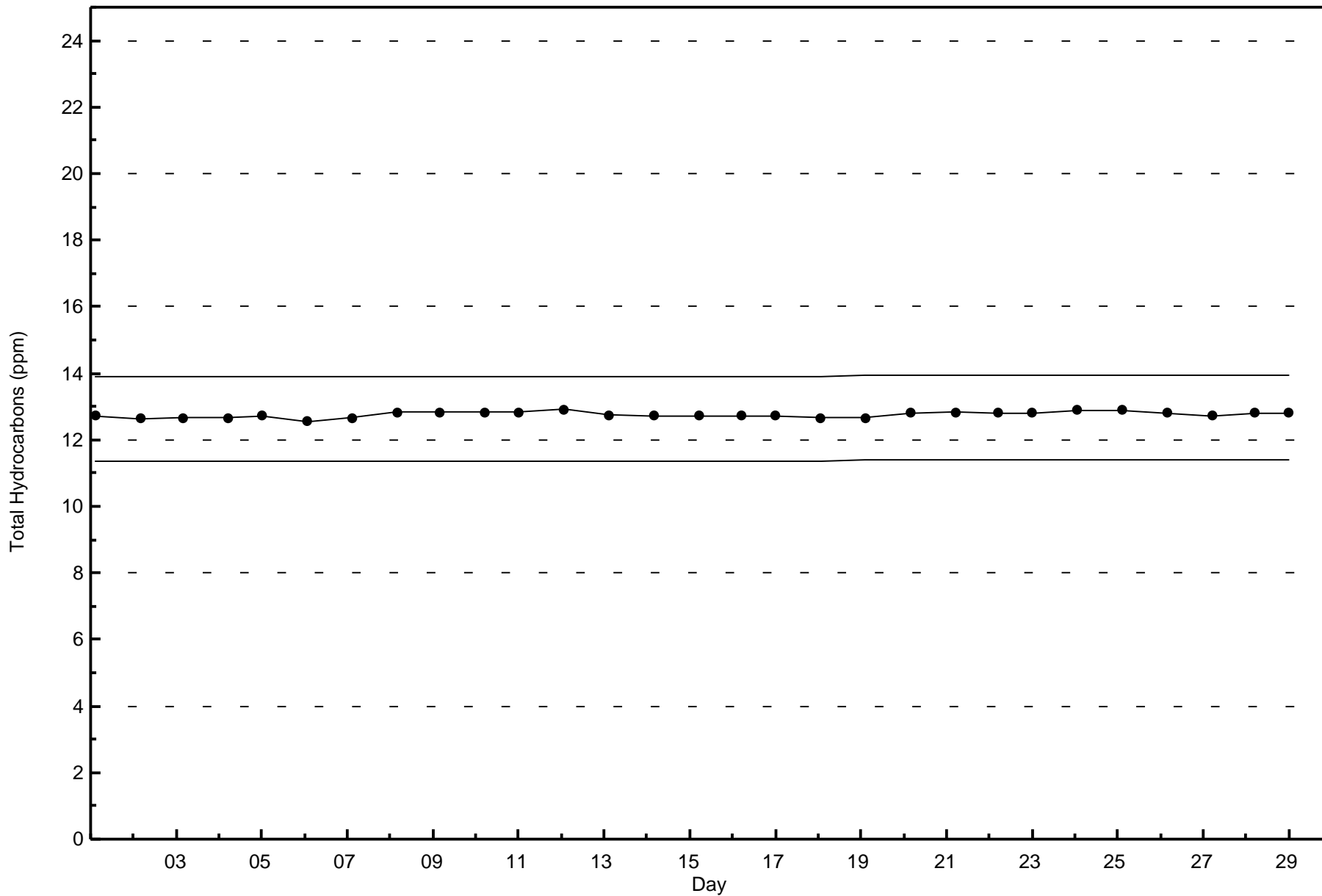


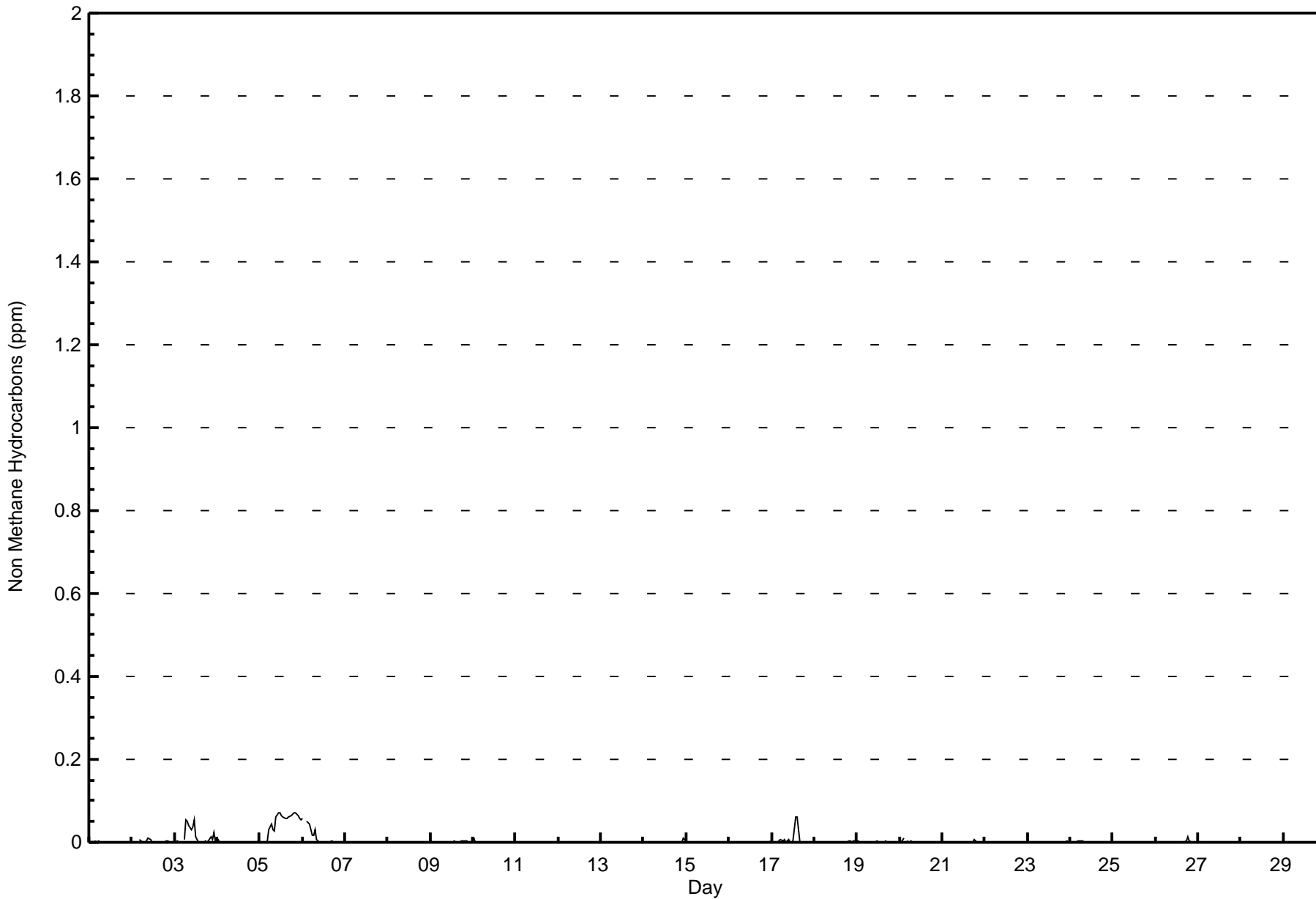


Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Conklin Lookout - February 2016









**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Lookout - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	610	92.15	92.15
0.006 - 0.05	35	5.29	97.43
0.06 - 0.1	17	2.57	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



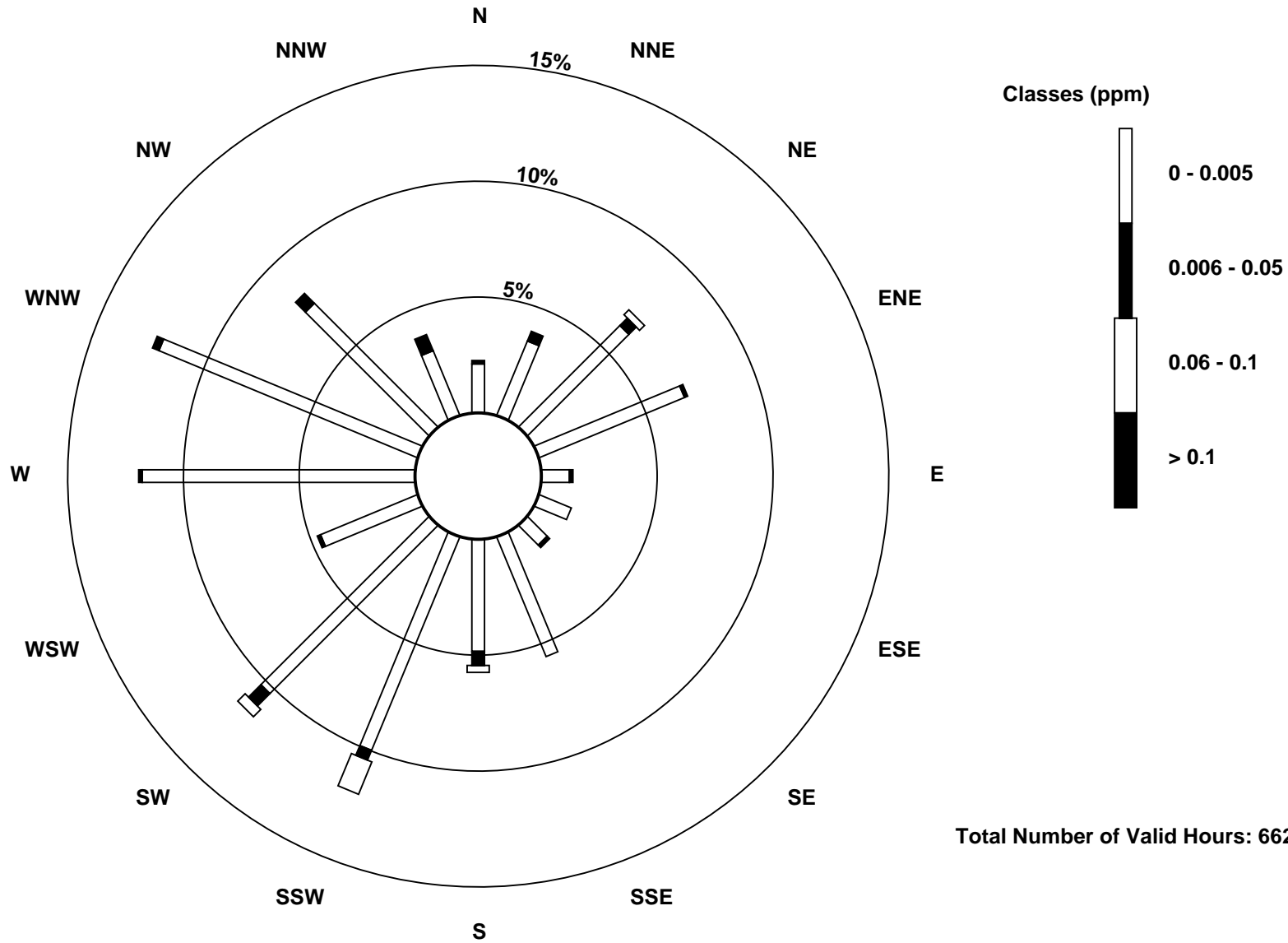
**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Conklin Lookout - February 2016**

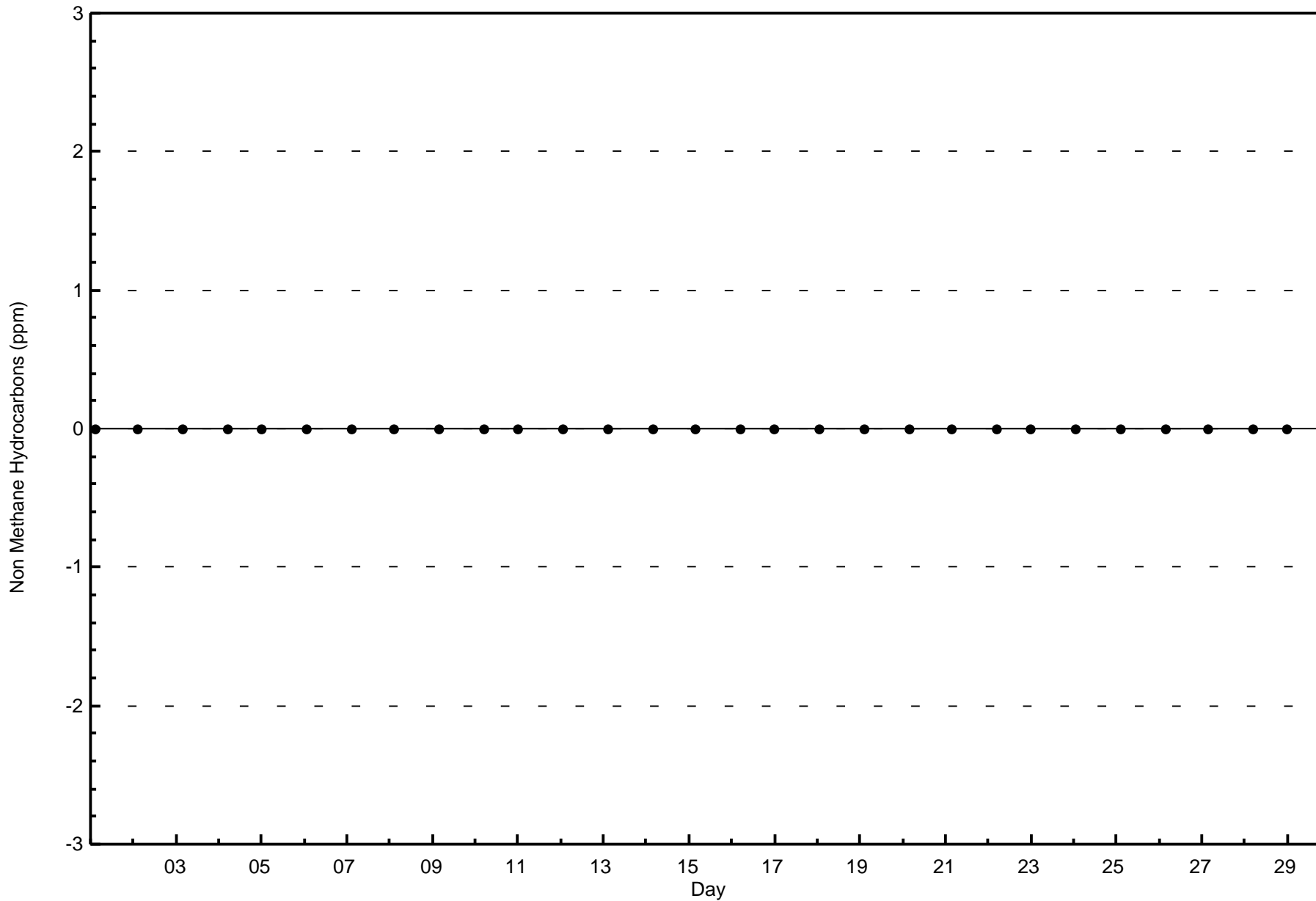
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	14	23	41	45	8	10	8	37	32	66	68	30	78	80	50	20	610
0.006 - 0.05	1	3	3	1	1	0	1	0	4	3	5	1	1	2	4	5	35
0.06 - 0.1	0	0	2	0	0	0	0	0	2	10	3	0	0	0	0	0	17
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662

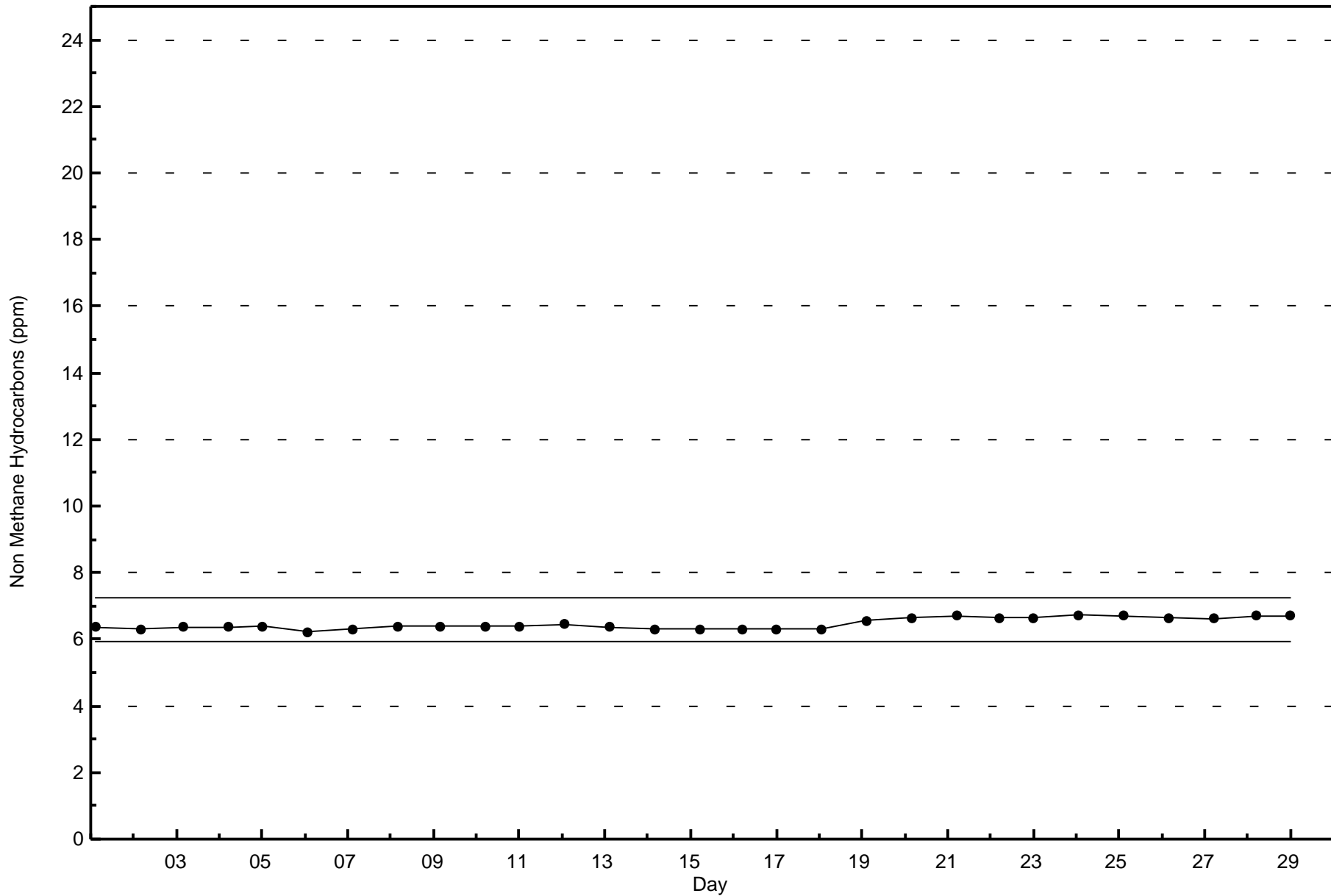
Total Number of Valid Hours: 662

Total Number of Hours: 696



Total Number of Valid Hours: 662







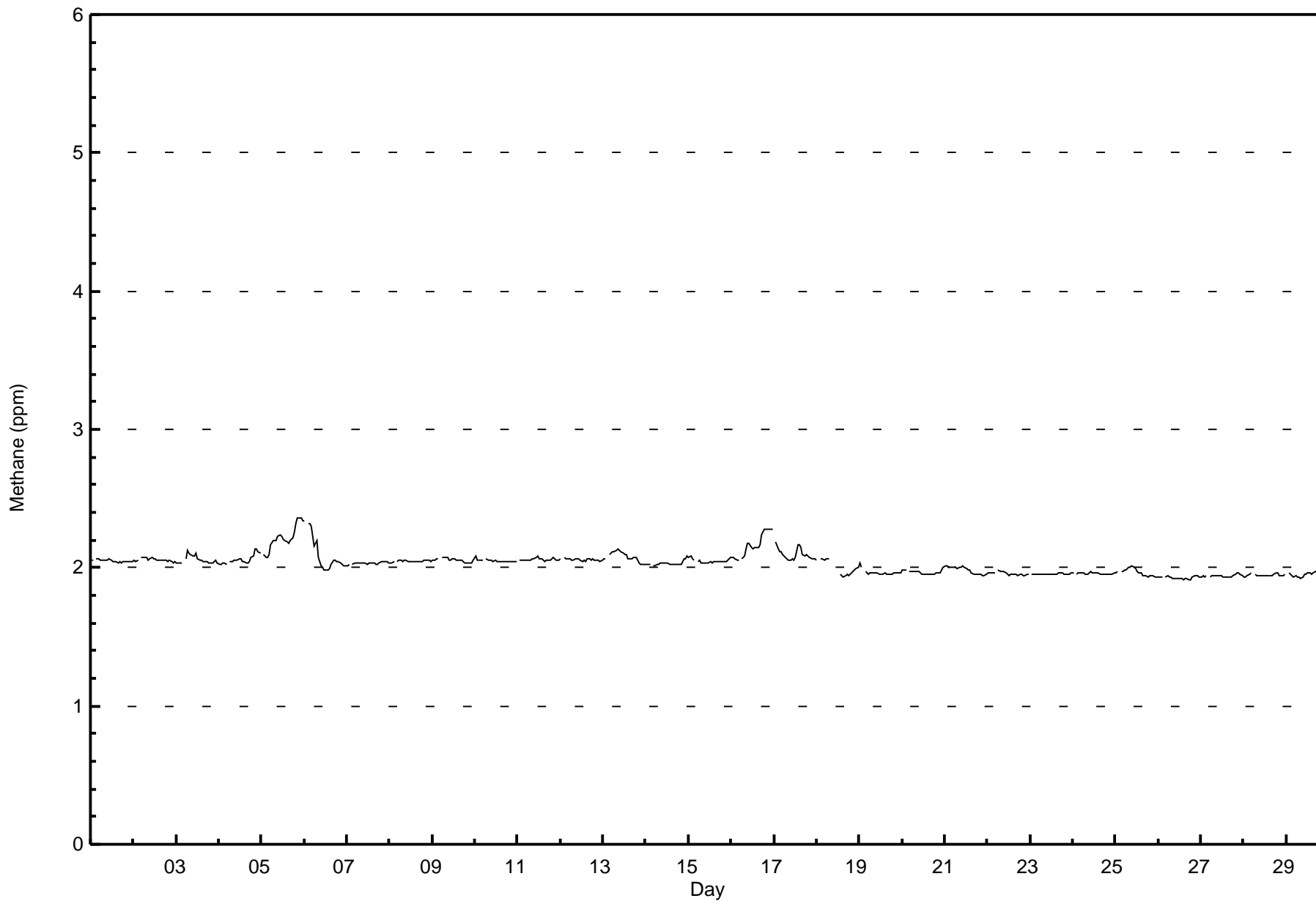
Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Conklin Lookout - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696																	
Maximum Value: 2.4 ppm on Feb 5 22:00														Maximum Daily Average: 2.2 ppm on Feb 5																	
Minimum Value: 1.9 ppm on Feb 26 19:00														Minimum Daily Average: 1.9 ppm on Feb 26																	
Maximum Diurnal Average: 2.0 ppm at hour 4														Minimum Diurnal Average: 2.0 ppm at hour 16																	
Monthly Average: 2.03 ppm														Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.1 P ₉₉ = 2.3																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	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-Feb	2.1	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	
3-Feb	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	
4-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
5-Feb	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	2.3	2.3	2.4	2.4	2.4	2.3	2.2	2.2	2.4	2.4	2.4	
6-Feb	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.3
7-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
8-Feb	2.0	2.0	2.0	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1
9-Feb	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
10-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
11-Feb	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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
12-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	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	2.1
13-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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	2.1
14-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	2.1	2.1	2.1	2.1	2.1
15-Feb	2.1	2.1	2.1	2.1	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
16-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
17-Feb	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
18-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	C	C	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	2.1
19-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
20-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	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
21-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
22-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
23-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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
24-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	2.0	2.0	2.0	2.0
25-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	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
27-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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0
28-Feb	1.9	1.9	1.9	1.9	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	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0
29-Feb	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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							
2.3																								Diurnal Maximum							
Z - zerospan C - Calibration																															





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Conklin Lookout - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	432	65.26	65.26
2.1 - 3.0	230	34.74	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Conklin Lookout - February 2016**

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	10	15	25	29	5	4	4	15	17	36	43	21	64	74	48	22	432
2.1 - 3.0	5	11	21	17	4	6	5	22	21	43	33	10	15	8	6	3	230
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	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662

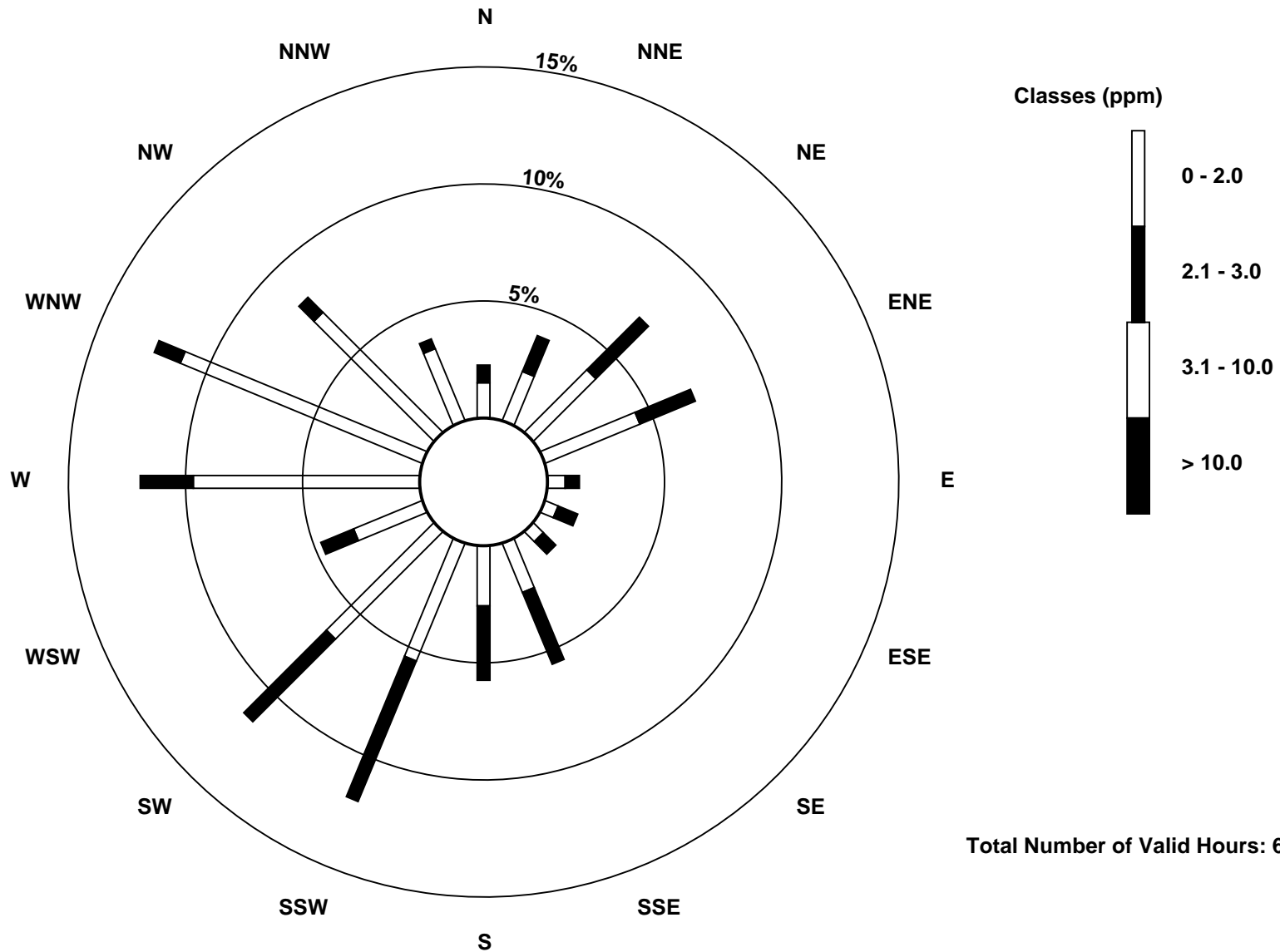
Total Number of Valid Hours: 662

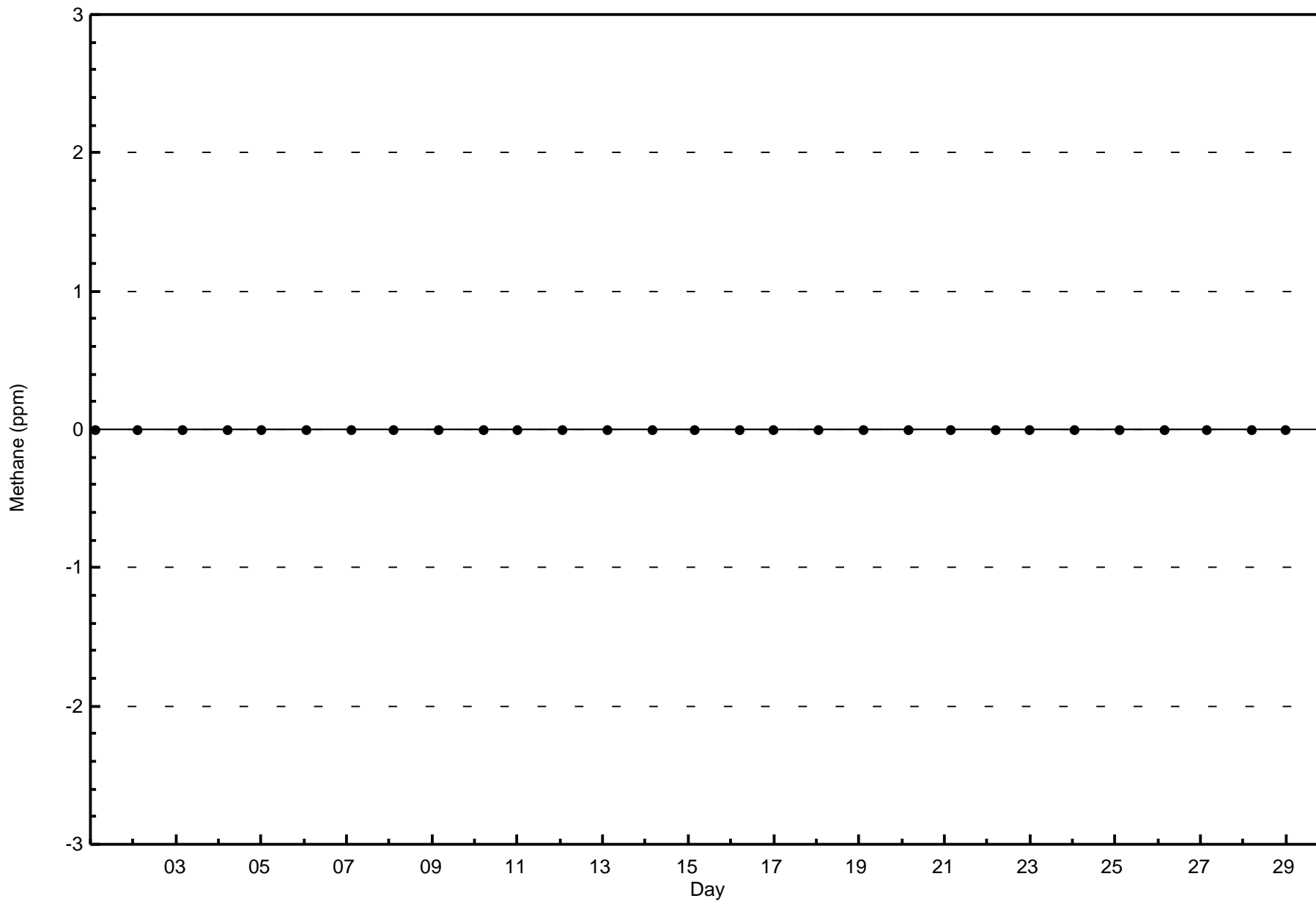
Total Number of Hours: 696

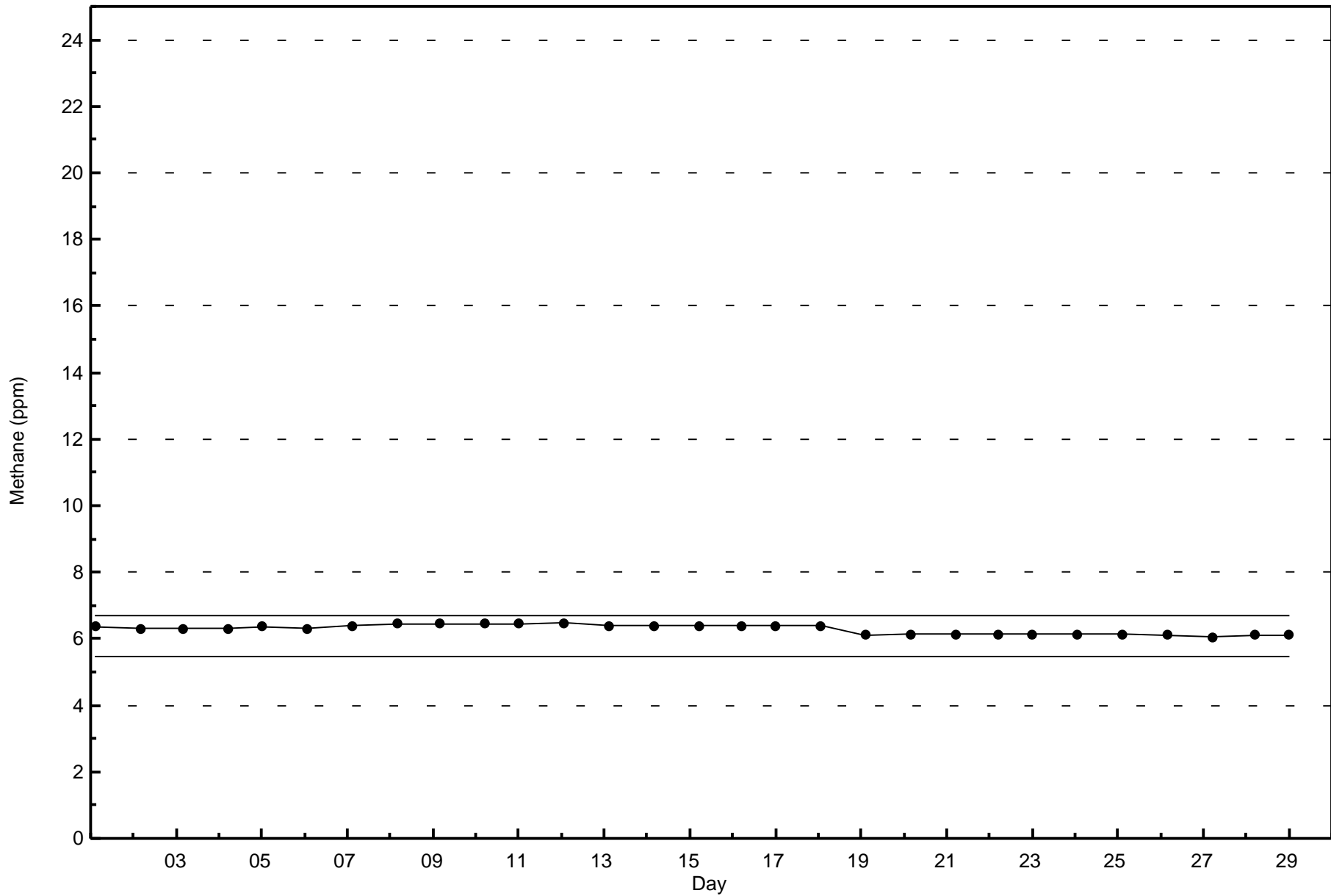


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Methane (CH₄) - ppm
Conklin Lookout (AMS 18)







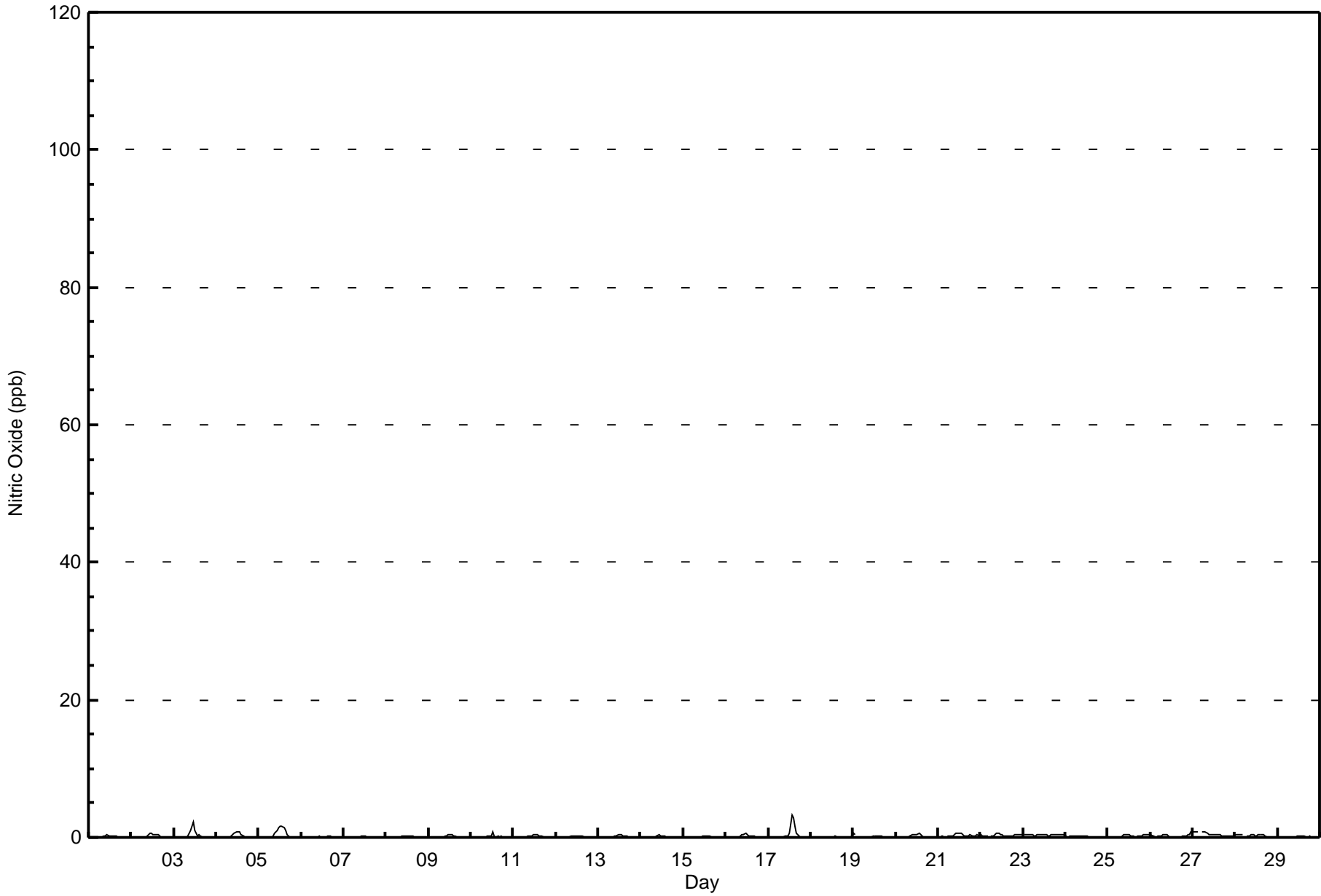


Maximum Value: 3 ppb on Feb 17 14:00																	Maximum Daily Average: 0.5 ppb on Feb 27																	Hours in Service: 696																	
Minimum Value: 0 ppb on Feb 19 05:00																	Minimum Daily Average: 0.1 ppb on Feb 7																	Hours of Data: 662																	
Maximum Diurnal Average: 0.4 ppb at hour 12																	Minimum Diurnal Average: 0.1 ppb at hour 19																	Hours of Missing Data: 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																	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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																									
2-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																									
3-Feb	0	0	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2																									
4-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																									
5-Feb	Z	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0.5	2																									
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	0.1	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	0.1	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	0.1	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	0.1	0																									
10-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	0.1	1																									
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	0.1	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	0.1	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	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	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	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																									
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	3	2	1	0	0	0	0	0	0	0	0.4	3																									
18-Feb	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0																									
19-Feb	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																									
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1																									
21-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																									
22-Feb	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																									
23-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	0.4	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	0.1	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	0.2	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	1	0.2	1																									
27-Feb	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	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																									
29-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																									
																								0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average	
																								1	1	1	1	0	1	1	1	1	1	1	2	2	2	3	3	2	1	0	0	0	0	0	0	0	0	1	Diurnal Maximum
Z - zerospan																								C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Conklin Lookout - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin Lookout - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	662	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Conklin Lookout - February 2016**

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	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662
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	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662

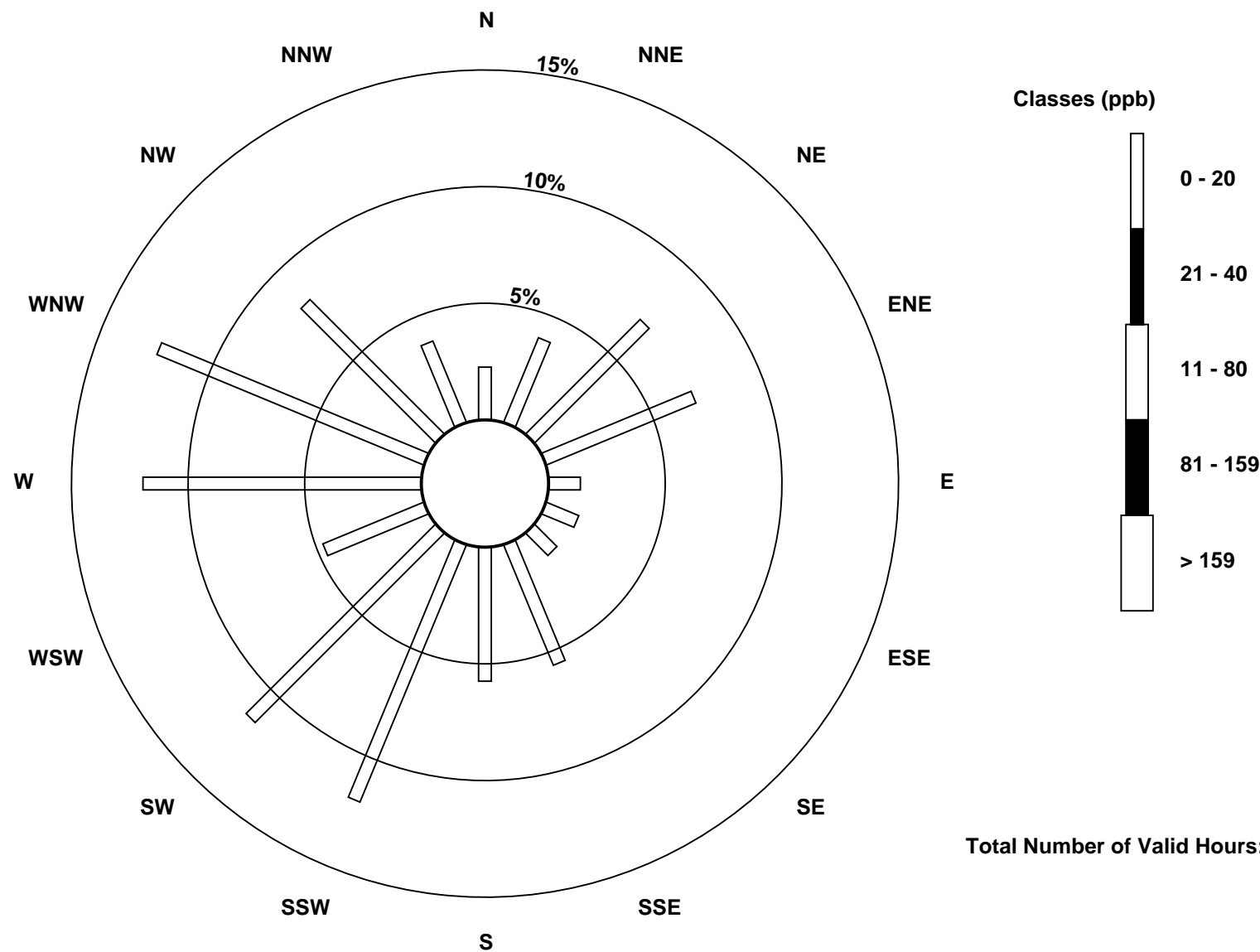
Total Number of Valid Hours: 662

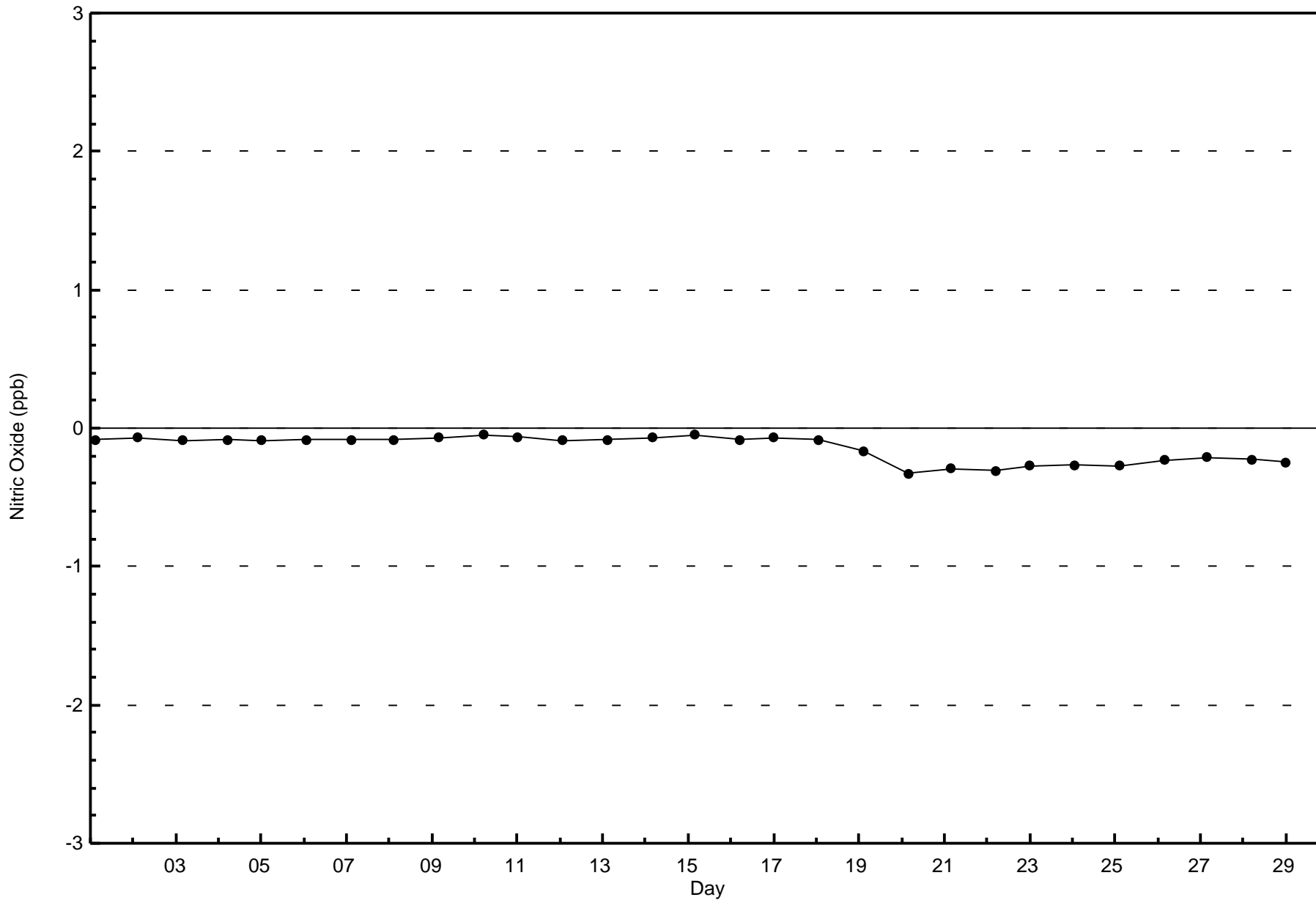
Total Number of Hours: 696

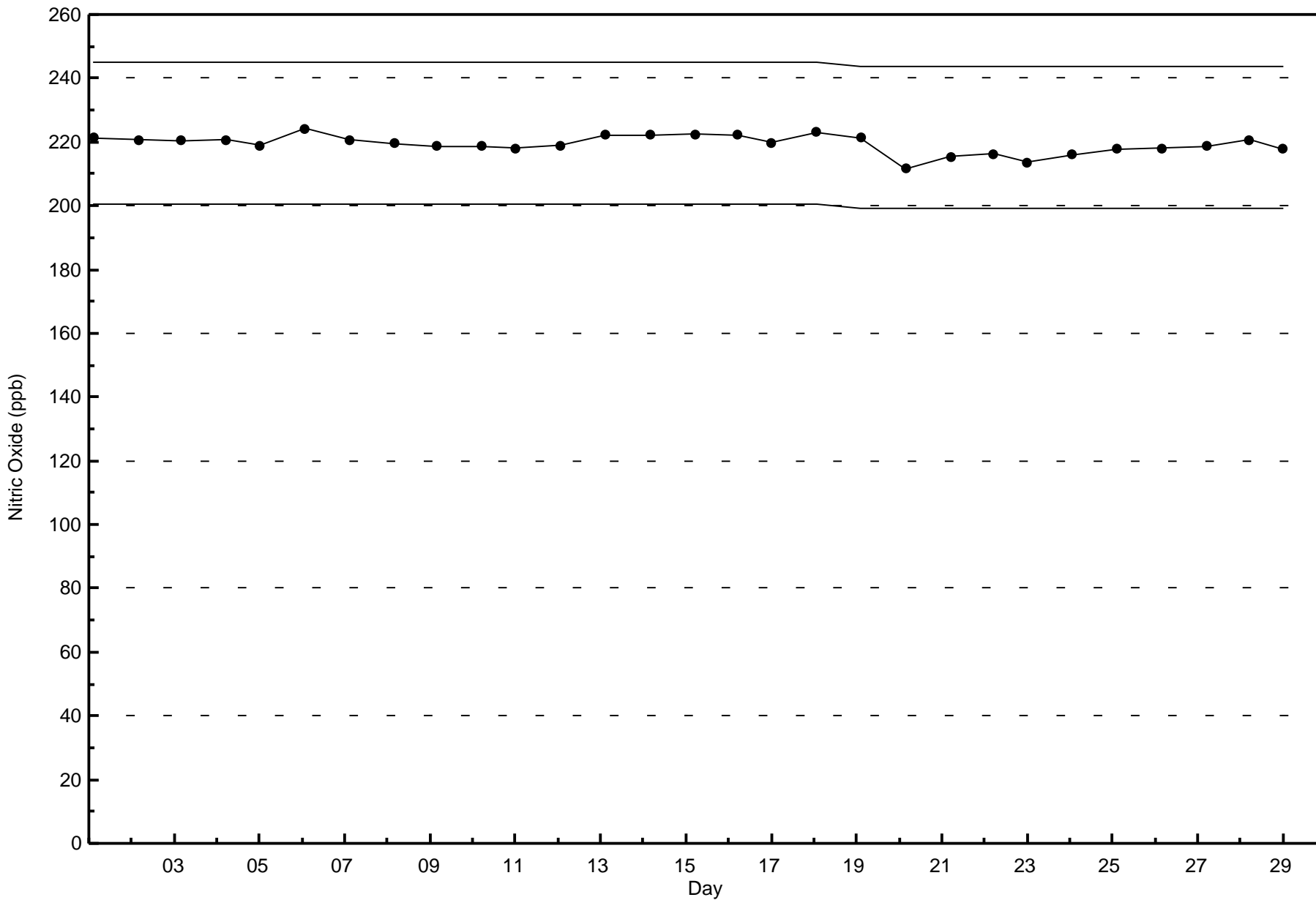


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitric Oxide (NO) - ppb
Conklin Lookout (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

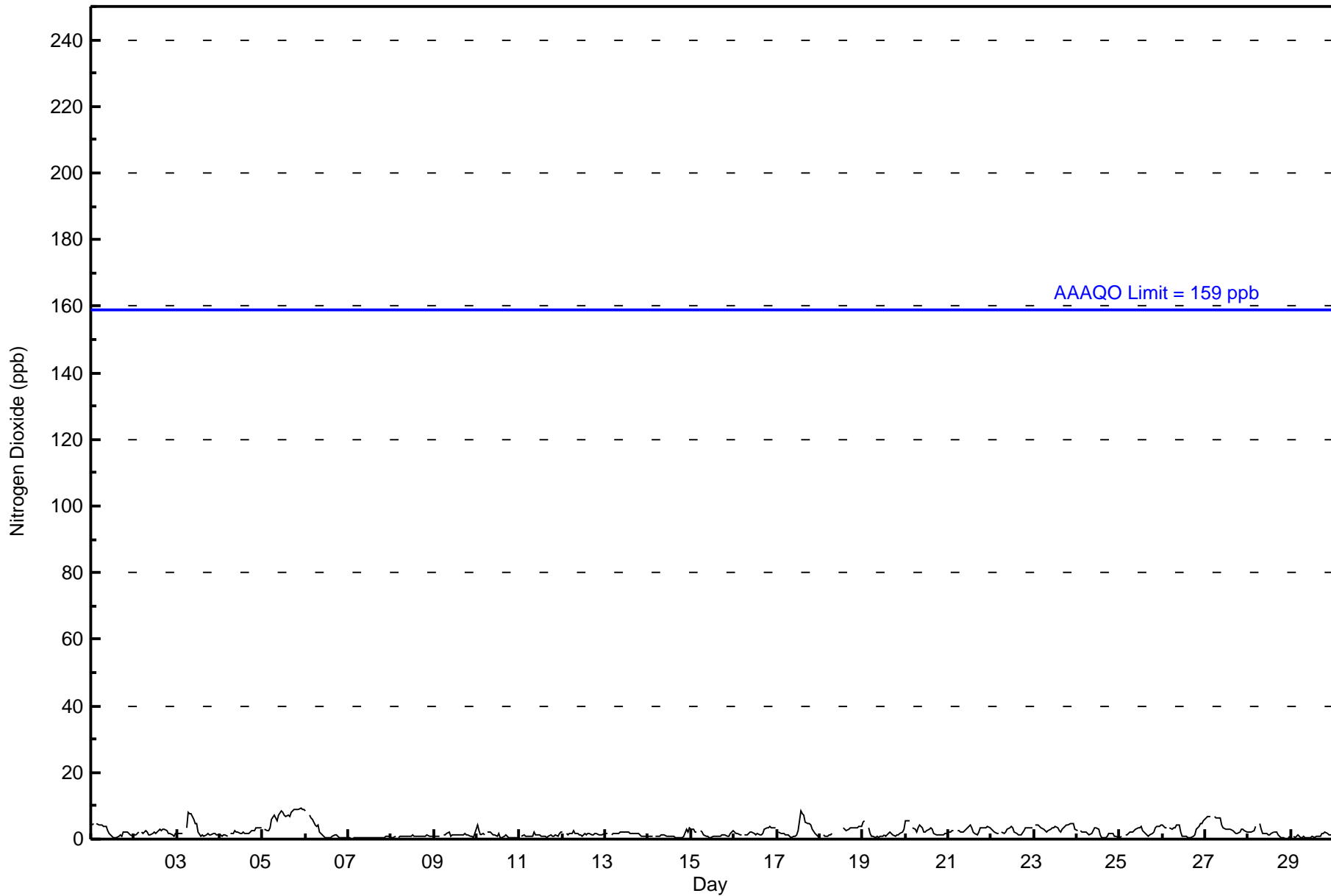
Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout - February 2016

Number of Exceedences (AAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696																																			
Maximum Value: 9 ppb on Feb 5 22:00														Maximum Daily Average: 6.9 ppb on Feb 5																																			
Minimum Value: 0 ppb on Feb 28 22:00														Minimum Daily Average: 0.5 ppb on Feb 7																																			
Maximum Diurnal Average: 2.7 ppb at hour 1														Minimum Diurnal Average: 1.7 ppb at hour 17																																			
Monthly Average: 2.2 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P 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	4	5	Z	5	4	4	4	4	4	2	2	1	1	1	1	1	1	1	2	2	2	2	1	1	2.3	5																							
2-Feb	1	1	2	Z	2	2	2	2	1	1	2	2	2	2	3	3	3	3	3	2	2	1	1	2	1.9	3																							
3-Feb	2	2	2	2	Z	3	8	8	8	6	5	5	2	1	1	1	2	1	1	2	2	1	1	2.9	8																								
4-Feb	1	1	1	1	1	Z	2	2	2	2	2	2	2	2	2	2	2	2	3	3	4	4	3	4	2.1	4																							
5-Feb	Z	3	3	3	4	6	7	7	6	7	8	8	7	7	7	7	8	9	9	9	9	9	9	9	6.9	9																							
6-Feb	9	Z	7	6	6	4	4	4	2	1	1	1	0	0	0	1	1	1	1	1	1	0	0	2.3	9																								
7-Feb	0	0	Z	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	0.5	1																								
8-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																								
9-Feb	1	1	1	1	Z	1	1	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1.2	2																								
10-Feb	4	2	1	2	1	Z	2	2	2	1	1	1	2	1	0	1	1	1	1	1	1	1	1	1.2	4																								
11-Feb	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.1	2																							
12-Feb	2	Z	2	1	2	2	3	2	2	1	1	1	2	1	2	2	1	1	2	2	1	1	1	2	1.5	3																							
13-Feb	2	2	Z	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1.6	2																								
14-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	1.1	3																							
15-Feb	3	3	2	2	Z	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1.5	3																							
16-Feb	2	2	2	1	1	Z	1	1	2	2	2	2	1	2	1	1	2	3	4	4	4	4	3	3	2.1	4																							
17-Feb	Z	2	2	2	2	1	1	1	1	1	1	1	3	8	8	7	5	5	5	4	3	2	1	1	2.8	8																							
18-Feb	1	Z	1	1	1	1	1	2	C	C	C	C	C	3	3	3	3	3	4	4	3	4	4	4	2.5	4																							
19-Feb	5	5	Z	4	2	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	2	2	3	1.7	5																							
20-Feb	5	6	5	Z	3	3	2	3	4	3	2	2	3	3	4	3	2	1	1	1	1	1	2	2	2.8	6																							
21-Feb	2	2	3	3	Z	3	3	2	2	3	3	4	4	4	2	2	1	2	3	4	4	4	4	3	2.8	4																							
22-Feb	3	3	2	2	2	Z	2	2	2	3	4	4	3	2	2	1	1	1	3	3	3	3	4	4	2.5	4																							
23-Feb	Z	4	4	4	3	3	3	2	2	3	3	4	4	3	3	2	3	4	4	4	5	5	5	3	3.4	5																							
24-Feb	2	Z	3	2	2	2	2	1	2	3	3	4	3	1	1	0	1	2	2	2	2	1	1	1	1.7	4																							
25-Feb	1	1	Z	1	1	2	2	2	3	3	3	4	4	2	2	1	1	1	2	2	3	4	4	4	2.3	4																							
26-Feb	4	3	3	Z	3	3	3	4	4	4	2	1	1	1	0	1	1	1	1	3	4	5	5	6	2.7	6																							
27-Feb	6	7	7	7	Z	7	7	6	6	4	3	3	3	3	3	3	2	2	2	2	3	3	3	2	4.0	7																							
28-Feb	2	2	2	2	4	Z	5	3	2	2	2	1	1	2	2	2	2	1	0	1	1	0	0	1	1.8	5																							
29-Feb	Z	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1	2	2	2	2	1	1	1	1.0	2																							
																								2.7	2.4	2.4	2.3	2.1	2.3	2.5	2.4	2.4	2.2	2.1	2.1	2.0	2.0	1.9	1.8	1.7	1.9	2.0	2.2	2.2	2.2	2.2	2.2	2.4	Diurnal Average
																								9	7	7	7	6	7	8	8	8	7	8	8	7	8	8	7	8	9	9	9	9	9	9	9	9	Diurnal Maximum
Z - zerspan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAQO): 1-hr 159 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	662	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout - February 2016**

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	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662
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	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662

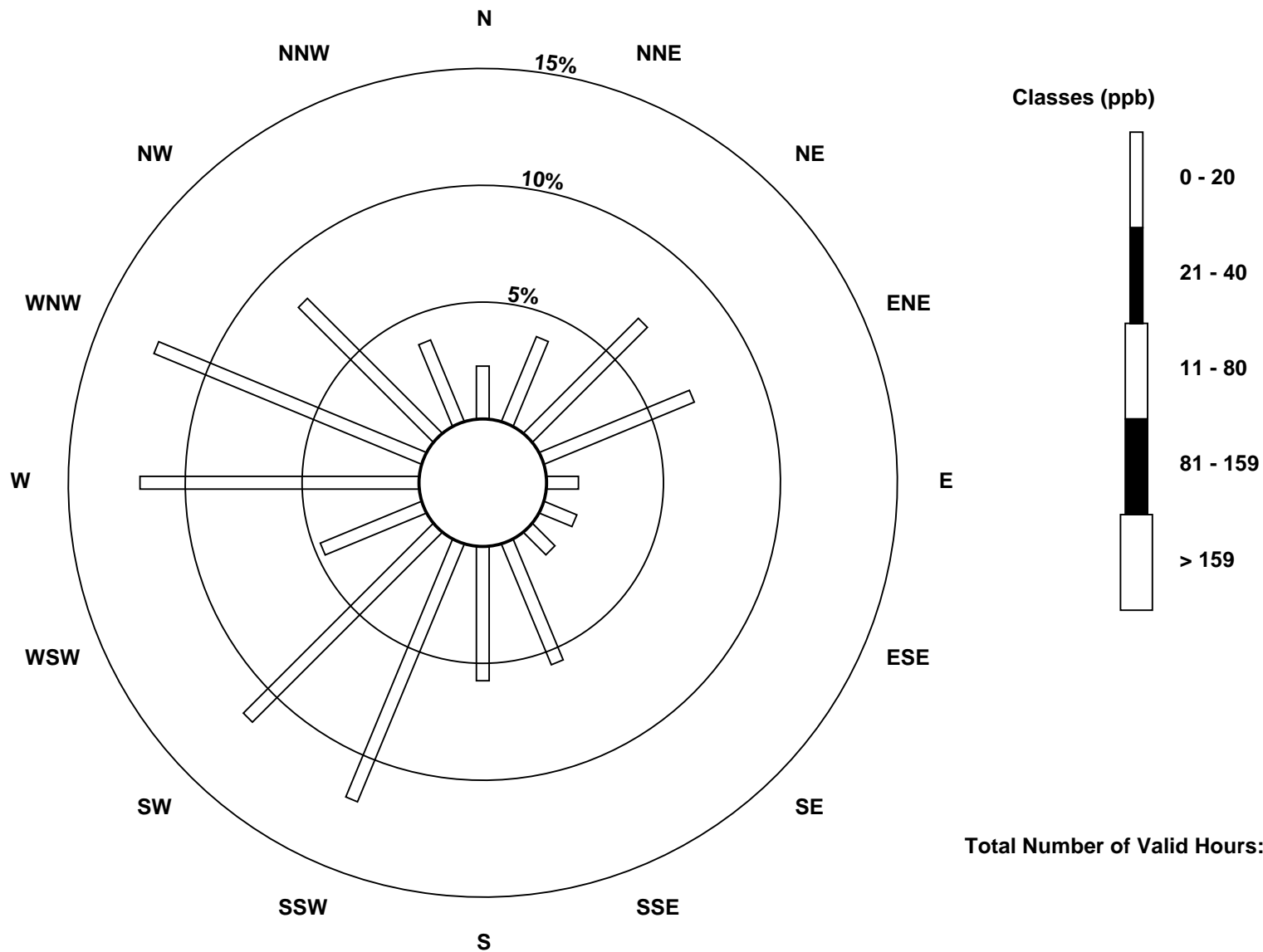
Total Number of Valid Hours: 662

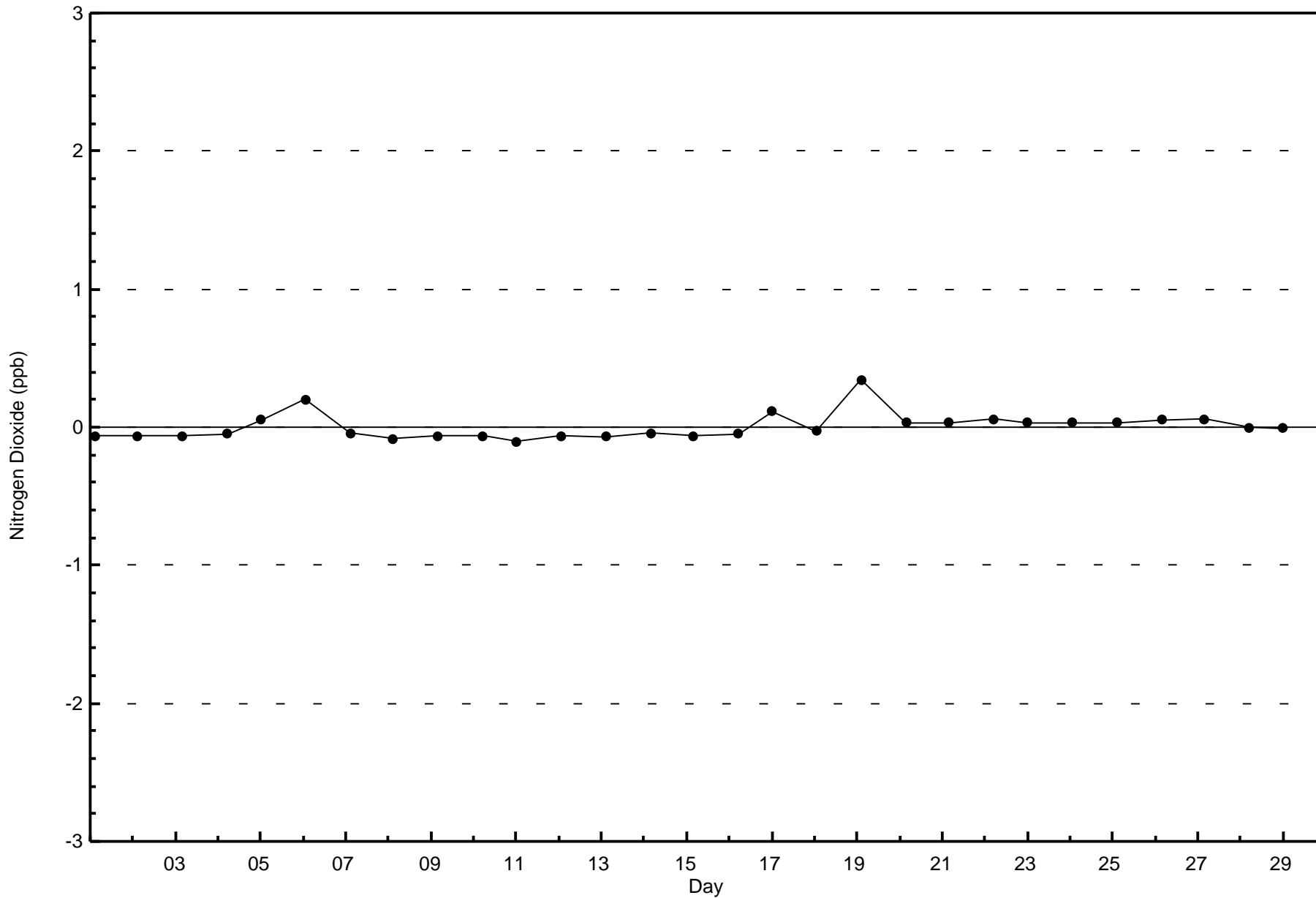
Total Number of Hours: 696

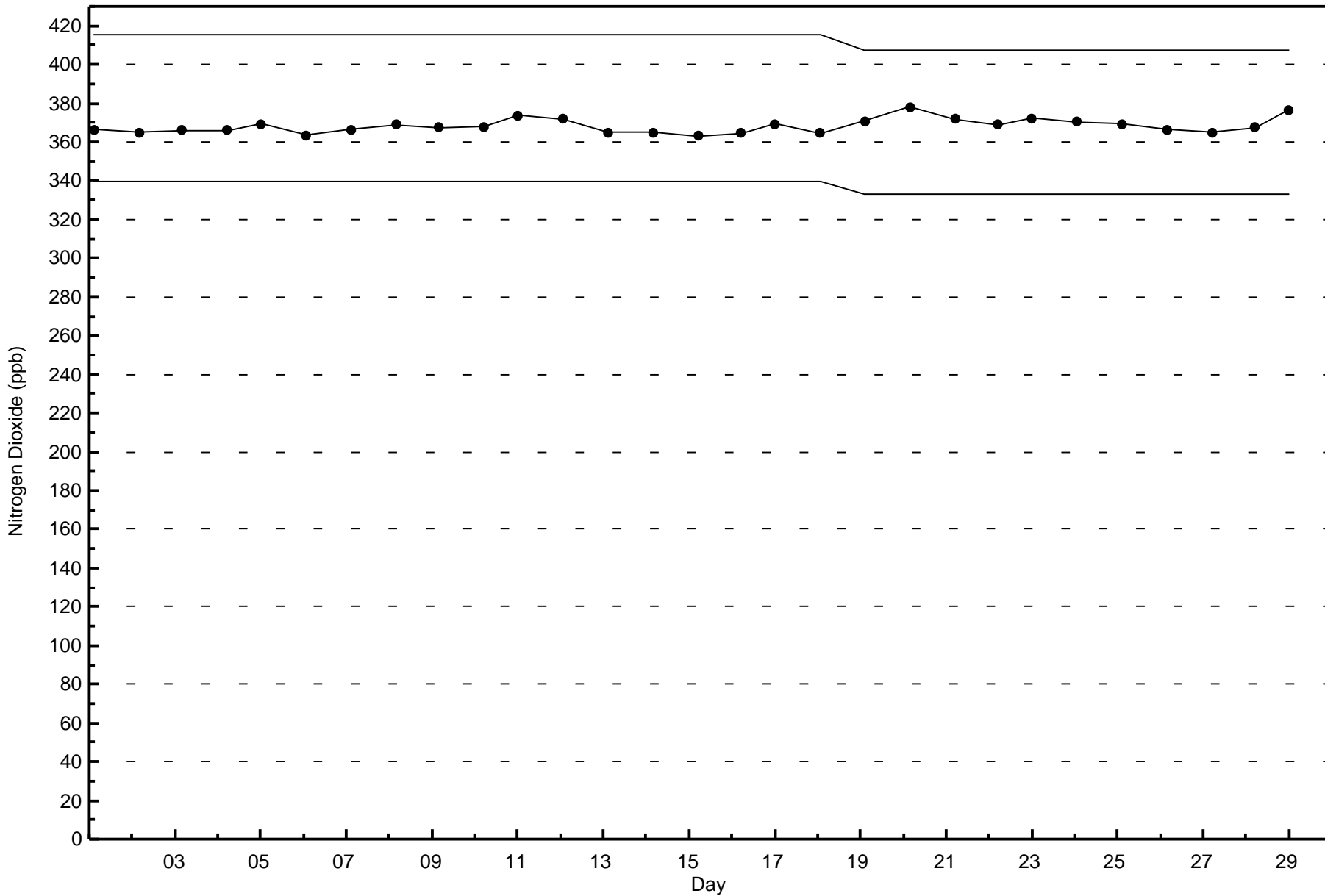


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout (AMS 18)









Wood Buffalo Environmental Association
Summary of Hour Averages

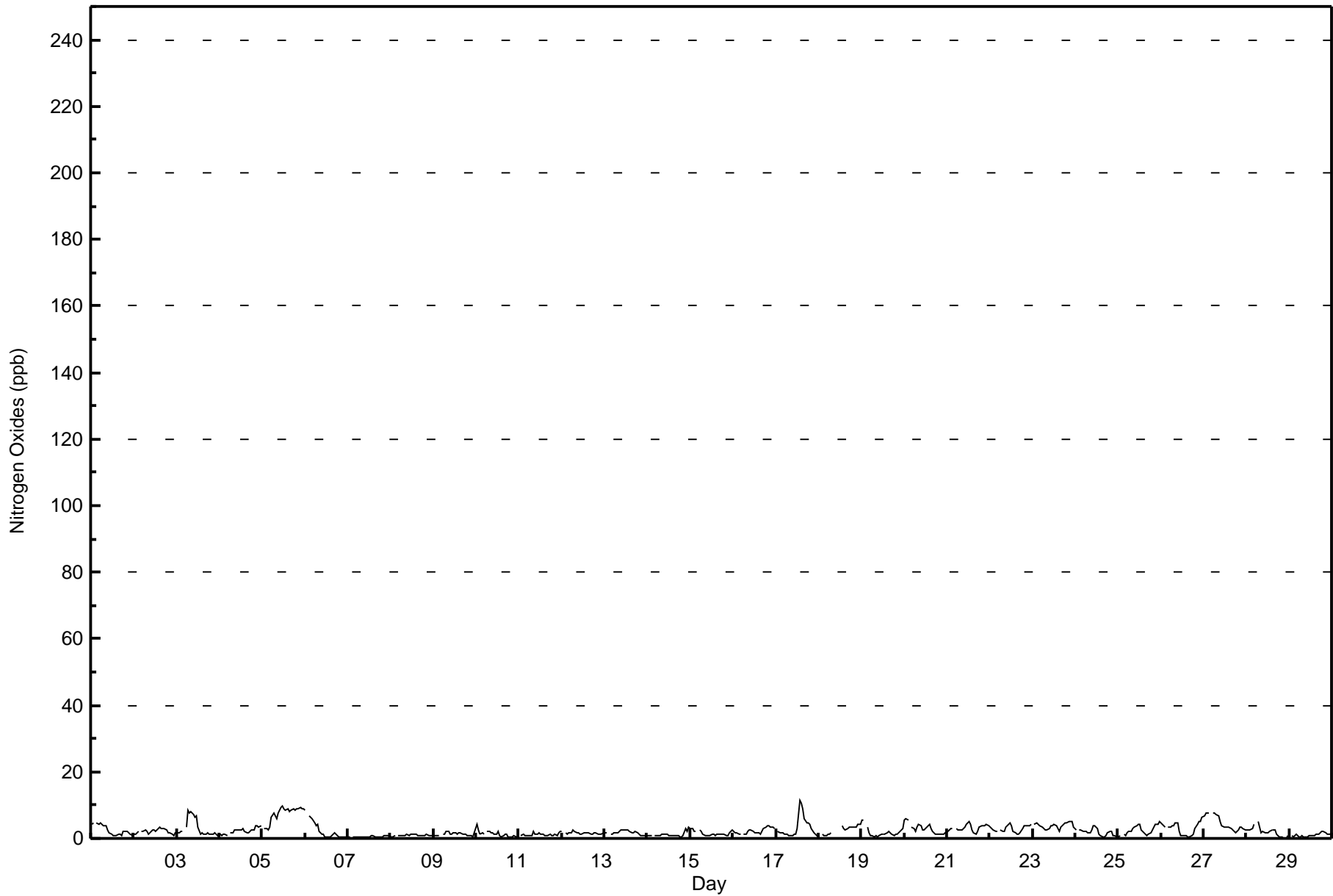
Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - February 2016

Maximum Value: 11 ppb on Feb 17 14:00																	Maximum Daily Average: 7.4 ppb on Feb 5																	Hours in Service: 696	
Minimum Value: 0 ppb on Feb 28 22:00																	Minimum Daily Average: 0.5 ppb on Feb 7																	Hours of Data: 662	
Maximum Diurnal Average: 2.8 ppb at hour 1																	Minimum Diurnal Average: 1.9 ppb at hour 17																	Hours of Missing Data: 34	
Monthly Average: 2.4 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 9																	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	4	5	Z	5	4	5	4	4	4	3	2	1	1	1	1	1	1	1	2	2	2	2	1	1	2.4	5									
2-Feb	1	1	2	Z	2	2	2	2	1	1	3	3	2	2	3	3	3	3	3	2	2	1	1	2	2.1	3									
3-Feb	1	2	2	2	Z	4	8	8	8	7	6	7	3	1	2	1	1	2	1	1	1	2	1	1	3.2	8									
4-Feb	1	1	1	1	1	Z	2	2	2	3	3	3	3	3	2	2	2	2	2	3	4	4	3	4	2.3	4									
5-Feb	Z	3	3	3	4	6	7	7	6	8	9	10	9	8	9	8	8	9	9	9	9	9	9	9	7.4	10									
6-Feb	9	Z	7	6	6	5	4	4	2	1	1	1	0	0	0	1	2	1	1	1	0	0	0	0	2.3	9									
7-Feb	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0.5	1									
8-Feb	1	0	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									
9-Feb	1	1	1	1	Z	1	1	2	2	1	1	2	2	1	2	2	1	1	1	1	1	1	1	2	1.3	2									
10-Feb	4	2	1	2	1	Z	2	2	2	2	1	1	2	1	0	1	1	1	1	0	0	1	1	1	1.3	4									
11-Feb	Z	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1.2	2									
12-Feb	2	Z	1	1	2	2	3	2	2	2	1	1	2	2	2	2	1	1	2	2	1	1	1	2	1.6	3									
13-Feb	2	1	Z	1	1	2	2	2	2	3	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1.7	3									
14-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	3	1.1	3									
15-Feb	3	3	2	2	Z	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1.5	3									
16-Feb	2	2	2	1	1	Z	1	1	2	3	3	2	2	2	2	1	2	3	4	4	4	3	3	3	2.2	4									
17-Feb	Z	2	2	2	2	1	1	1	1	1	1	1	3	11	11	9	6	5	5	4	3	2	1	1	3.3	11									
18-Feb	1	Z	1	1	1	1	1	2	C	C	C	C	C	4	3	3	3	4	4	4	3	4	4	4	2.6	4									
19-Feb	6	6	Z	4	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	2	2	3	1.8	6									
20-Feb	5	6	5	Z	3	3	2	3	4	4	3	2	3	4	4	3	2	1	1	1	1	1	1	2	2.9	6									
21-Feb	2	2	3	3	Z	3	3	2	2	3	3	4	5	4	3	2	1	2	3	4	4	4	4	4	3.1	5									
22-Feb	3	3	3	2	2	Z	2	2	2	3	4	4	4	2	2	1	1	2	3	4	4	4	4	4	2.9	4									
23-Feb	Z	4	5	4	4	3	3	3	3	3	4	4	4	4	3	2	3	4	5	5	5	5	3	3	3.8	5									
24-Feb	3	Z	3	3	2	2	2	2	2	3	4	4	4	3	1	1	1	1	2	2	2	1	1	0	1.9	4									
25-Feb	1	1	Z	1	1	2	2	2	3	3	4	4	4	4	3	2	1	1	1	2	2	4	4	5	2.5	5									
26-Feb	5	4	3	Z	4	3	4	4	4	5	2	1	1	1	1	0	1	1	1	3	4	5	5	6	2.9	6									
27-Feb	7	7	8	8	Z	7	7	7	7	5	4	4	3	3	3	3	2	2	2	2	3	3	3	2	4.5	8									
28-Feb	2	2	3	3	4	Z	5	3	2	2	2	2	2	2	2	2	2	1	0	1	1	0	0	1	2.0	5									
29-Feb	Z	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1	2	2	2	2	1	1	1	1.0	2									
																																		Diurnal Average	
																																		Diurnal Maximum	
Z - zerospan																	C - Calibration																		



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	662	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - February 2016**

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	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662
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	15	26	46	46	9	10	9	37	38	79	76	31	79	82	54	25	662

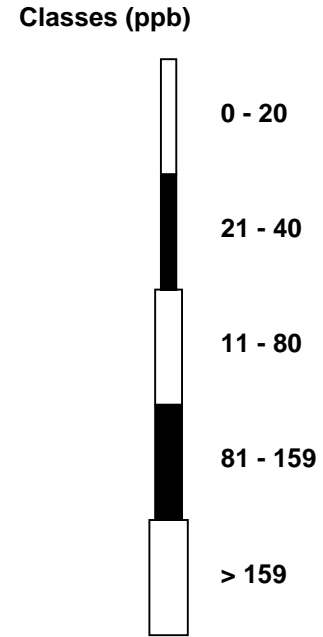
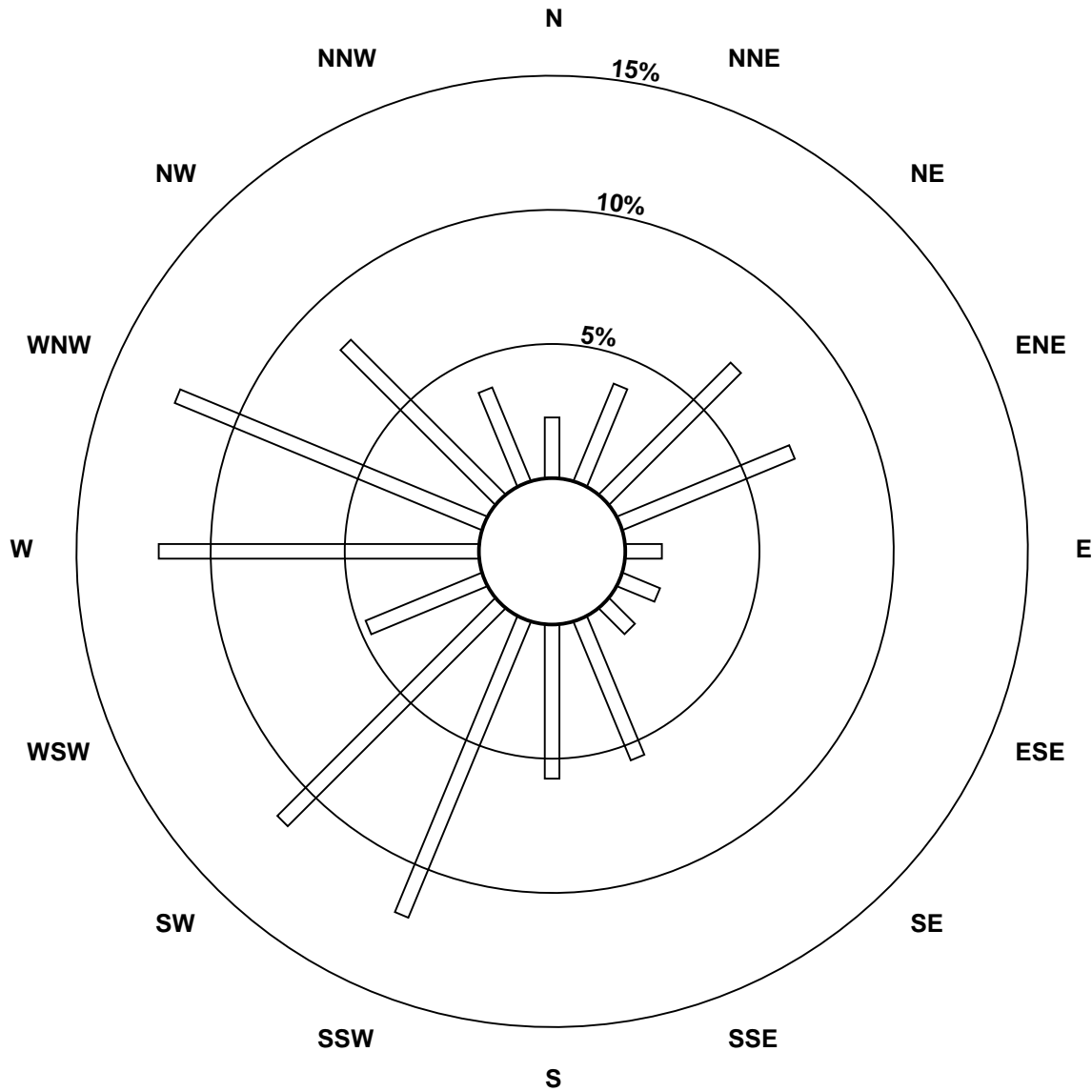
Total Number of Valid Hours: 662

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Conklin Lookout (AMS 18)

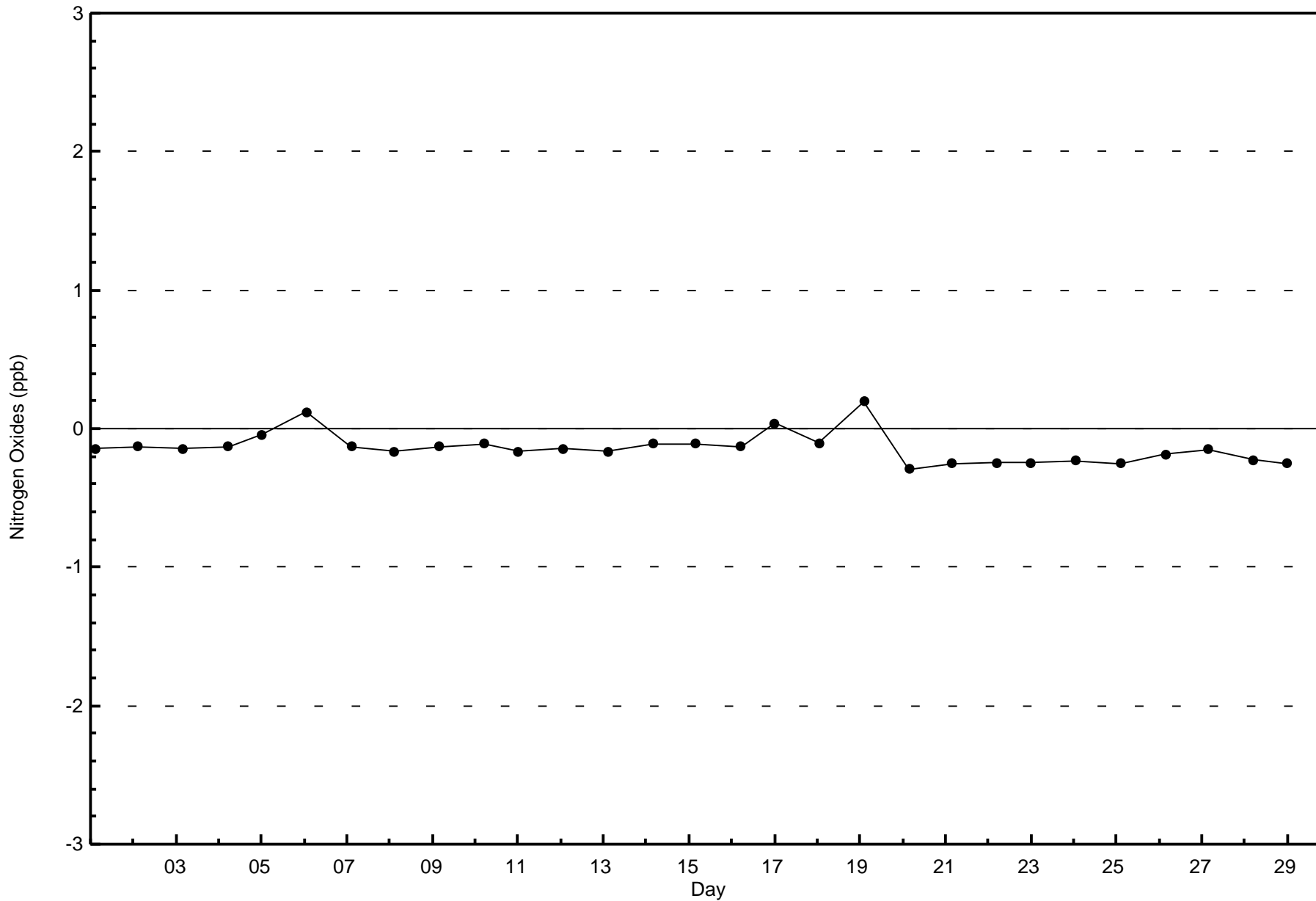


Total Number of Valid Hours: 662



Wood Buffalo Environmental Association
Zero Responses

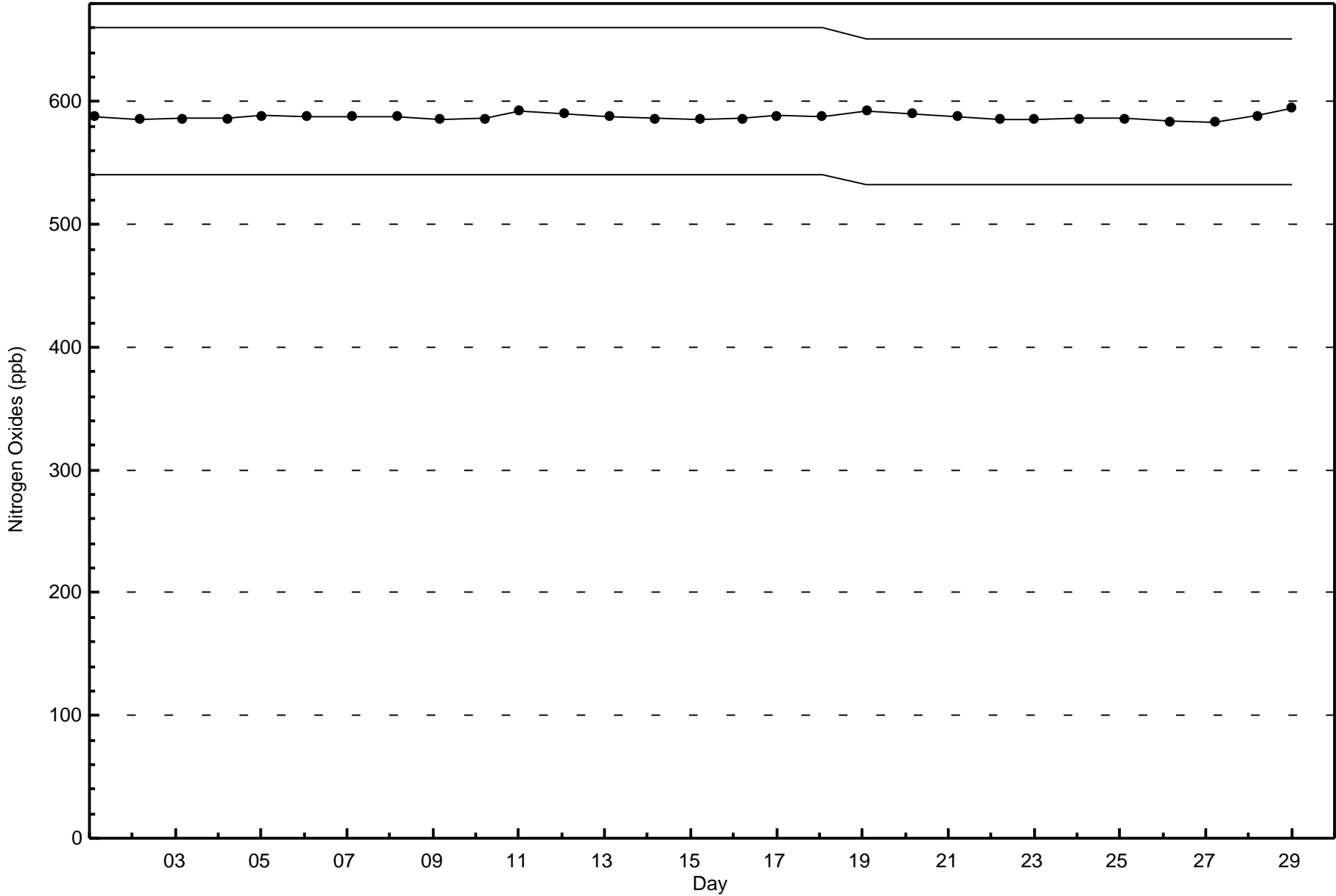
Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - February 2016





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - February 2016



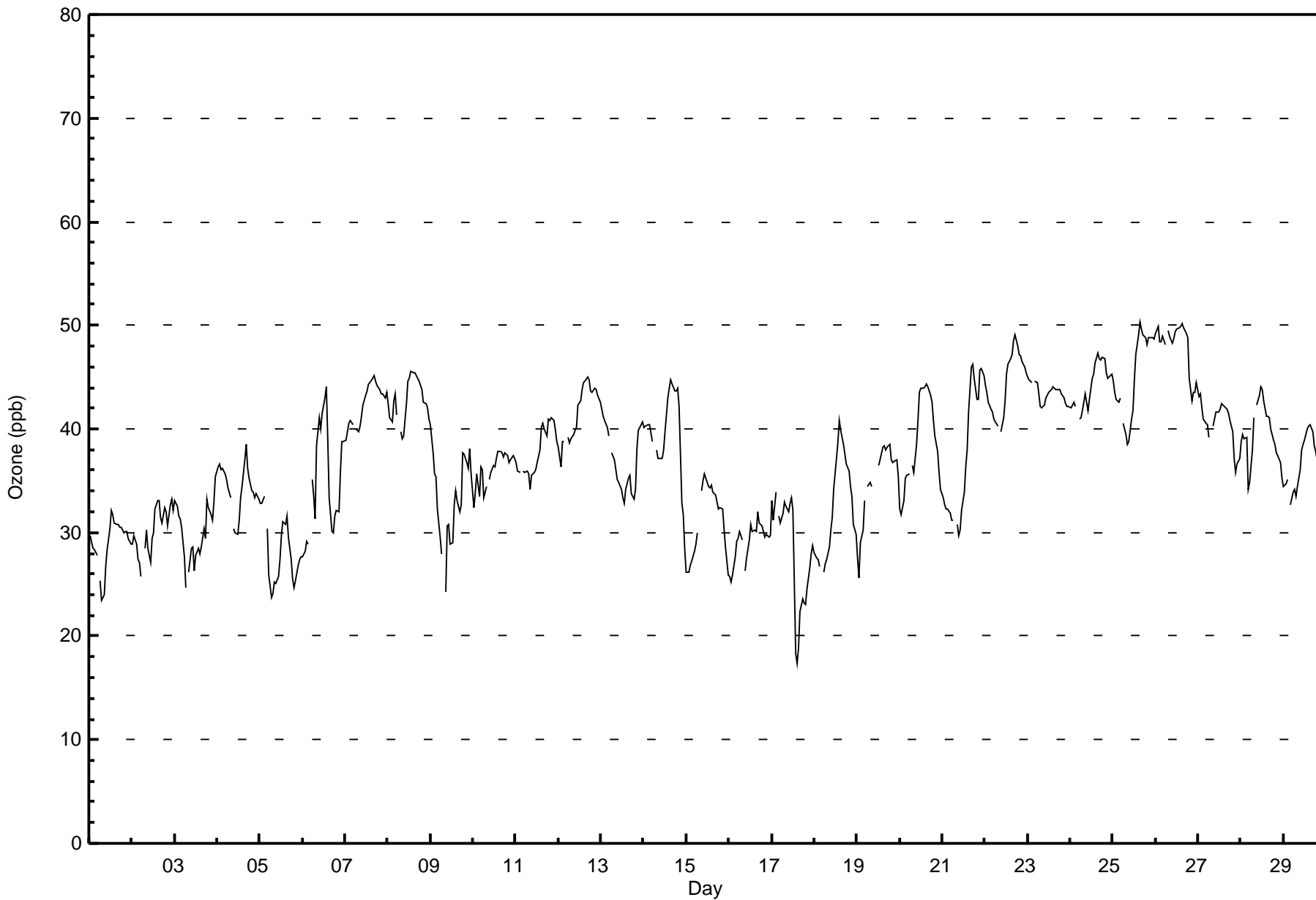


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																	
Maximum Value: 50 ppb on Feb 25 16:00										Maximum Daily Average: 48.0 ppb on Feb 26										Hours of Data: 664							
Minimum Value: 17 ppb on Feb 17 15:00										Minimum Daily Average: 28.0 ppb on Feb 17										Hours of Missing Data: 32							
Maximum Diurnal Average: 39.0 ppb at hour 17										Minimum Diurnal Average: 34.0 ppb at hour 7										Hours of Calibration: 32							
Monthly Average: 36.9 ppb										Percentiles: P ₁ = 23 P ₁₀ = 28 Q ₁ = 32 Median = 37 Q ₃ = 42 P ₉₀ = 45 P ₉₉ = 50										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	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	29	28	28	28	Z	25	23	24	27	28	30	32	32	31	31	31	30	31	30	30	30	29	29	29.0	32	
2-Feb	29	30	29	27	27	26	Z	28	30	28	27	29	30	32	33	33	31	31	32	32	31	33	33	32	30.2	33	
3-Feb	33	33	32	31	30	28	25	Z	26	28	29	26	28	28	29	30	29	33	32	32	31	33	35	35	30.0	35	
4-Feb	36	37	36	36	36	35	34	33	Z	30	30	30	31	33	34	37	39	36	35	34	34	33	34	33	34.3	39	
5-Feb	33	33	34	Z	30	26	24	24	25	25	26	27	30	31	31	32	30	27	26	25	25	27	27	28	28.0	34	
6-Feb	28	28	29	29	Z	35	33	31	38	41	40	42	43	44	39	33	30	30	32	32	32	36	39	39	34.9	44	
7-Feb	39	40	41	41	40	Z	40	40	40	41	42	43	44	44	44	45	45	45	44	44	43	43	43	44	42.4	45	
8-Feb	42	41	41	43	43	41	Z	40	39	39	42	45	45	46	45	45	45	45	44	44	43	42	42	41	42.8	46	
9-Feb	40	38	36	35	32	30	28	Z	24	31	31	29	29	33	34	33	32	33	38	38	37	36	38	36	33.4	40	
10-Feb	32	34	36	33	36	36	33	34	Z	35	36	36	36	37	38	38	38	37	38	37	37	37	37	37	36.1	38	
11-Feb	37	36	36	Z	36	36	36	36	34	36	36	36	37	38	40	41	40	39	41	41	41	41	40	39	37.8	41	
12-Feb	38	36	39	39	Z	39	39	39	39	40	40	42	43	44	45	45	45	45	44	43	44	44	43	43	41.6	45	
13-Feb	42	41	41	40	39	Z	38	37	36	35	35	34	33	33	34	35	36	34	33	34	38	40	40	41	37.0	42	
14-Feb	40	40	40	40	40	39	Z	38	37	37	37	38	40	43	44	45	44	44	44	44	42	33	32	28	39.5	45	
15-Feb	26	26	27	27	28	29	30	Z	34	35	36	35	34	34	35	34	34	33	32	32	32	30	29	26	31.3	36	
16-Feb	26	25	26	28	29	29	30	29	Z	26	27	29	31	30	30	30	32	31	31	30	30	30	30	30	29.1	32	
17-Feb	33	31	34	Z	32	31	32	33	33	32	33	33	32	18	17	19	22	24	23	23	25	27	28	29	28.0	34	
18-Feb	28	28	27	27	Z	26	27	27	29	30	31	34	37	39	41	40	39	38	37	36	34	33	31	30	32.5	41	
19-Feb	28	26	29	30	33	Z	34	35	34	C	C	C	36	37	38	38	38	38	38	37	37	37	37	35	34.9	38	
20-Feb	32	32	33	35	36	36	Z	37	36	38	41	44	44	44	44	44	44	43	43	41	39	38	36	34	38.8	44	
21-Feb	33	33	32	32	32	31	31	Z	31	30	30	32	34	36	38	42	46	46	45	43	43	46	46	45	37.3	46	
22-Feb	44	44	43	42	42	41	41	40	Z	40	41	43	45	46	47	47	49	49	48	47	47	47	46	45	44.5	49	
23-Feb	45	45	44	Z	45	44	43	42	42	42	43	43	43	44	44	44	44	44	44	43	43	42	42	42	43.4	45	
24-Feb	42	42	43	42	Z	41	41	42	43	43	42	43	45	45	46	47	47	47	47	47	45	45	45	45	44.1	47	
25-Feb	45	44	43	43	43	Z	40	39	38	39	41	42	45	47	49	50	50	49	49	48	49	49	49	49	45.1	50	
26-Feb	49	50	48	48	49	48	Z	50	49	48	49	49	50	50	50	50	50	49	49	45	43	44	44	44	48.0	50	
27-Feb	43	43	42	41	41	40	39	Z	40	41	42	42	42	42	42	42	42	42	41	41	40	37	36	37	37	40.6	43
28-Feb	39	39	39	39	34	35	38	41	Z	42	43	44	44	43	41	41	41	40	39	38	38	37	37	35	39.5	44	
29-Feb	34	35	35	Z	33	34	34	33	34	36	38	39	39	40	40	40	40	38	38	37	37	39	39	38	37.0	40	
36.1 35.8 35.9 35.8 35.7 34.8 34.0 35.5 34.9 35.6 36.3 37.2 38.0 38.4 38.8 39.0 39.0 38.5 38.5 37.9 37.5 37.4 37.4 36.9																								Diurnal Average			
49 50 48 48 49 48 43 50 49 48 49 49 50 50 50 50 50 49 49 48 49 49 49 49																								Diurnal Maximum			
Z - zerspan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Conklin Lookout - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Conklin Lookout - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	3	0.45	0.45
21 - 50	661	99.55	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Conklin Lookout - February 2016

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	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
21 - 50	14	26	45	44	9	13	11	37	37	81	75	32	77	82	55	23	661
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	14	26	48	44	9	13	11	37	37	81	75	32	77	82	55	23	664

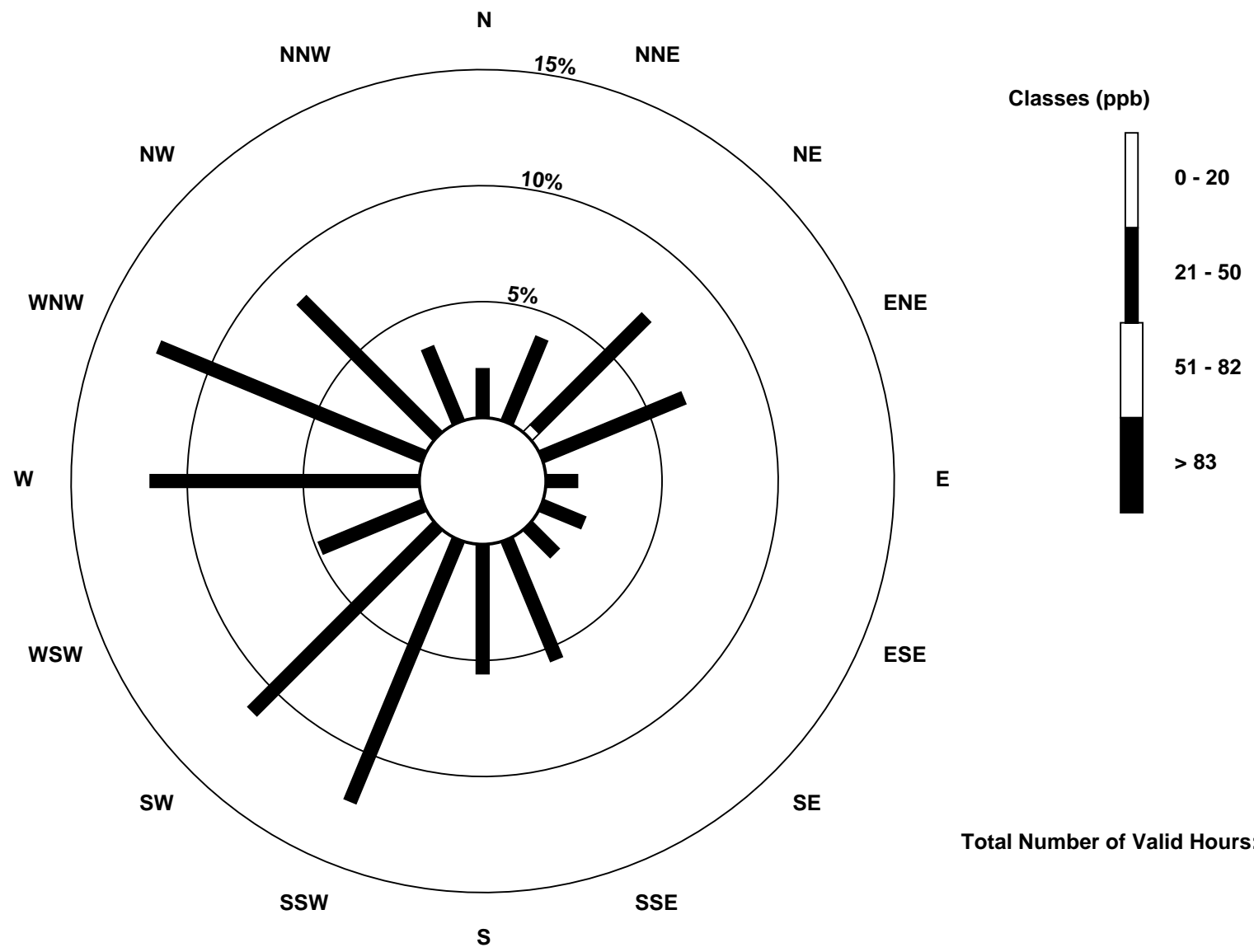
Total Number of Valid Hours: 664

Total Number of Hours: 696

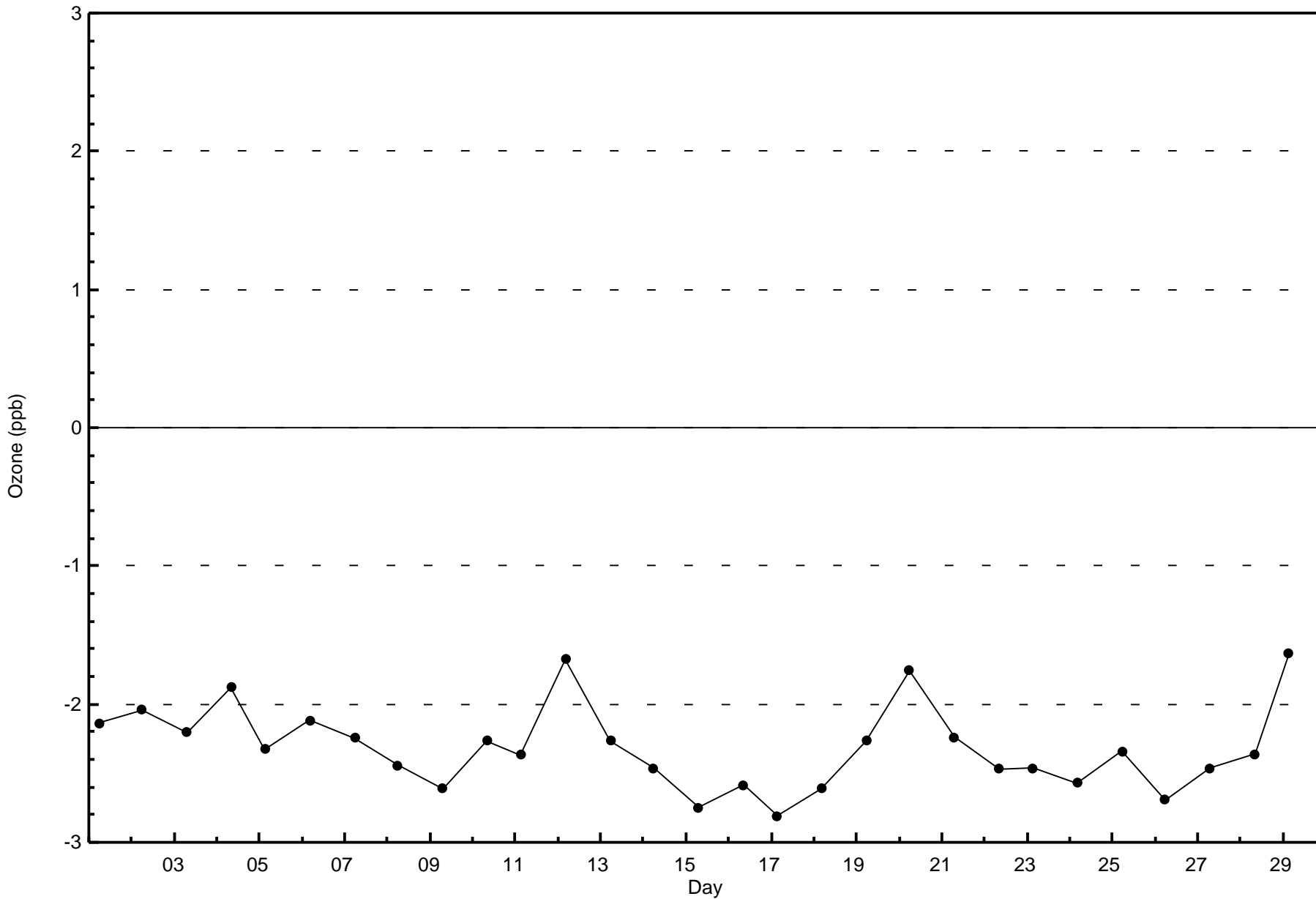


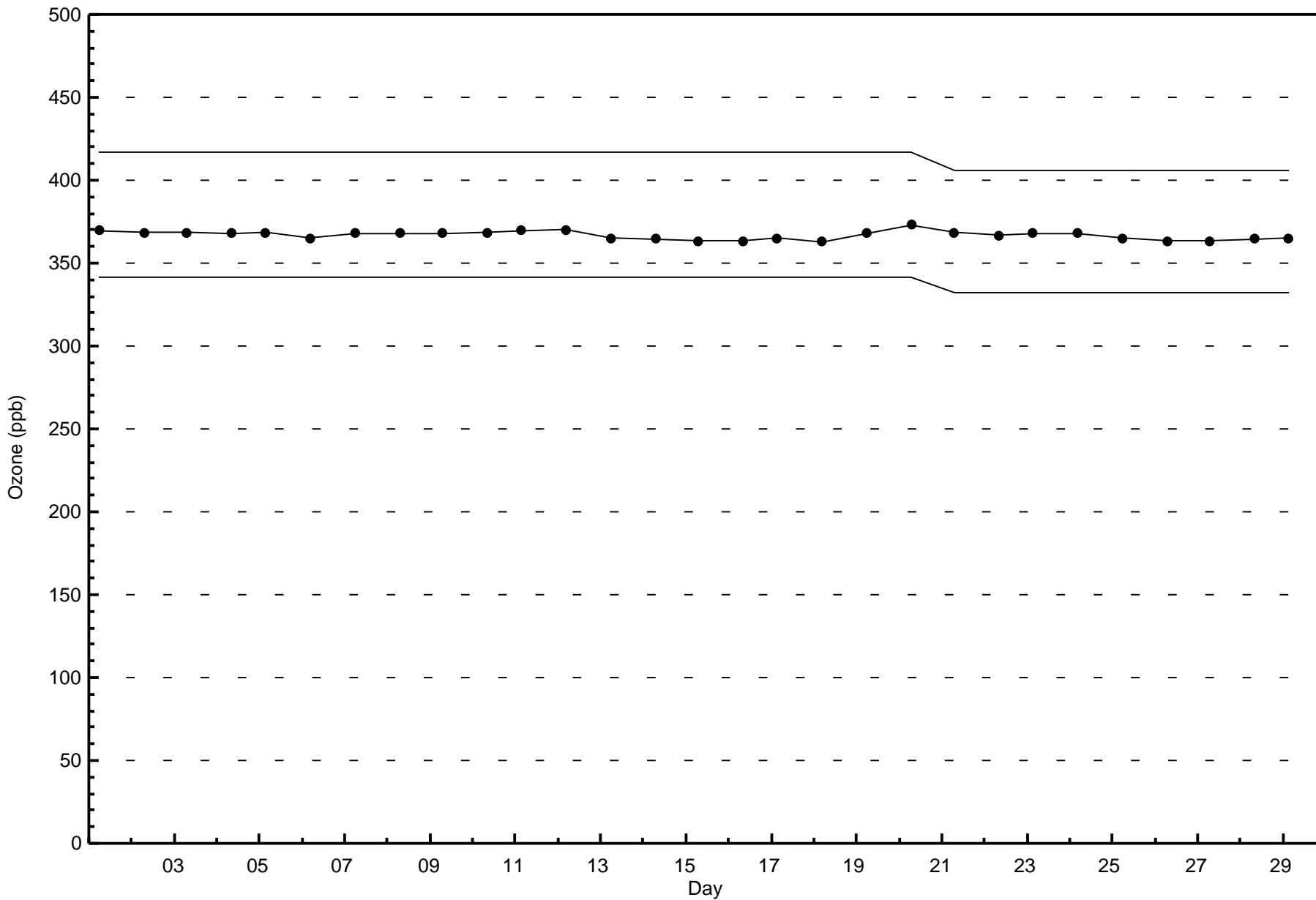
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Ozone (O₃) - ppb
Conklin Lookout (AMS 18)



Total Number of Valid Hours: 664





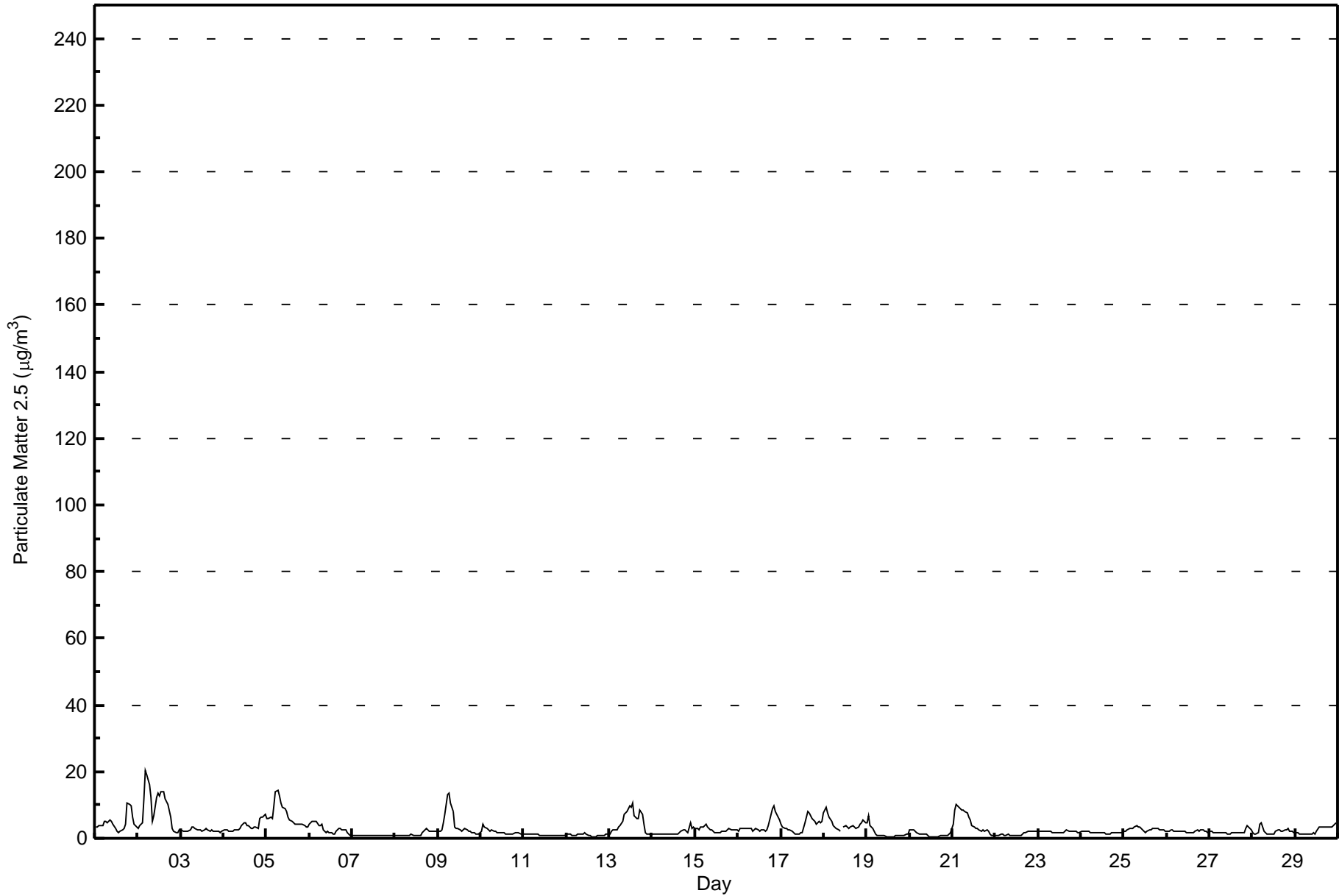


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 20.4 µg/m ³ on Feb 2 05:00 Minimum Value: 0.5 µg/m ³ on Feb 20 14:00 Maximum Diurnal Average: 3.9 µg/m ³ at hour 6 Monthly Average: 2.93 µg/m ³		Maximum Daily Average: 9.1 µg/m ³ on Feb 2 Minimum Daily Average: 0.8 µg/m ³ on Feb 7 Minimum Diurnal Average: 2.5 µg/m ³ at hour 24 Percentiles: P ₁ = 0.6 P ₁₀ = 0.9 Q ₁ = 1.4 Median = 2.2 Q ₃ = 3.3 P ₉₀ = 6.0 P ₉₉ = 13.9		Hours in Service: 696 Hours of Data: 695 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	3.6	3.5	3.7	3.7	3.9	5.1	5.2	4.8	5.4	5.1	4.2	3.0	2.0	1.9	2.1	2.3	2.8	4.1	10.5	10.1	9.7	6.2	4.2	3.2	4.6	10.5
2-Feb	3.1	3.6	4.5	11.7	20.4	18.9	16.0	12.4	5.2	6.7	12.4	13.7	12.7	14.0	13.9	11.8	11.0	10.2	6.2	2.9	2.3	1.8	1.7	2.4	9.1	20.4
3-Feb	2.4	2.2	2.2	2.3	2.3	2.5	3.4	3.2	2.9	2.6	2.6	2.7	2.2	2.5	2.9	2.6	2.1	2.7	2.0	2.1	2.2	2.2	1.8	2.1	2.5	3.4
4-Feb	2.7	2.7	2.7	2.3	2.2	2.2	2.4	2.4	2.5	3.0	3.7	4.5	4.7	3.8	4.0	3.0	2.8	3.2	3.2	3.0	5.8	6.5	6.6	7.2	3.6	7.2
5-Feb	6.0	5.8	6.2	6.1	9.5	13.9	14.4	12.7	10.4	9.4	9.0	8.1	6.6	5.5	5.2	4.5	4.3	4.4	4.4	4.4	4.2	3.7	3.3	3.3	6.9	14.4
6-Feb	4.2	4.9	5.1	4.9	4.9	3.8	3.8	4.4	2.6	1.8	1.9	1.9	1.7	1.4	1.4	2.1	2.9	3.2	2.5	2.6	2.4	1.5	1.1	1.0	2.8	5.1
7-Feb	1.0	0.9	0.9	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.8	0.9	0.9	0.8	0.7	0.7	0.8	1.0
8-Feb	0.7	0.7	0.7	0.7	0.8	0.9	1.0	0.9	1.0	1.1	1.0	0.9	1.0	1.0	1.0	1.5	2.2	2.8	2.6	2.2	2.1	2.0	1.9	2.0	1.4	2.8
9-Feb	2.1	2.2	2.5	4.7	7.1	13.1	13.5	10.6	8.0	3.3	3.0	3.0	2.6	2.0	2.6	2.8	2.5	2.2	2.2	1.7	1.5	1.3	1.3	1.2	4.1	13.5
10-Feb	2.0	4.3	3.5	3.0	2.4	2.3	2.5	2.3	1.9	1.8	1.7	1.7	1.7	1.5	1.4	1.3	1.4	1.5	1.4	1.7	1.8	1.7	1.4	1.4	2.0	4.3
11-Feb	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.9	1.0	0.9	0.7	0.7	0.7	0.8	1.0	1.2
12-Feb	1.2	1.2	1.1	1.0	1.0	1.0	1.2	1.2	1.1	1.1	1.5	1.3	0.9	0.7	0.5	0.6	0.6	0.7	0.9	1.0	0.9	1.0	1.3	1.4	1.0	1.5
13-Feb	1.4	2.2	2.4	2.6	2.7	3.4	3.7	5.1	7.2	7.8	8.0	9.6	9.4	10.5	6.9	5.7	6.0	8.6	7.1	4.1	1.7	1.2	1.1	1.1	5.0	10.5
14-Feb	1.3	1.4	1.5	1.3	1.4	1.4	1.4	1.4	1.3	1.1	1.1	1.1	1.1	1.1	1.4	1.7	2.0	2.5	2.5	2.1	1.6	4.7	2.9	3.5	1.8	4.7
15-Feb	3.0	2.8	2.7	3.6	3.6	3.8	4.1	3.3	2.6	2.5	2.2	1.9	1.6	1.7	1.8	2.0	2.2	2.2	2.4	2.8	2.6	2.6	2.6	2.4	2.6	4.1
16-Feb	2.2	3.1	2.9	2.8	2.9	2.8	2.9	2.8	2.3	2.6	2.8	2.5	2.3	2.4	2.4	2.3	2.7	3.9	7.1	9.0	9.9	7.9	6.3	5.6	3.9	9.9
17-Feb	4.1	3.6	2.9	2.8	2.5	2.4	2.0	1.7	1.4	1.3	1.4	1.5	1.6	4.7	6.4	7.9	7.5	5.9	5.4	5.0	4.2	4.9	4.8	5.1	3.8	7.9
18-Feb	7.5	9.3	7.5	6.4	5.0	4.0	3.2	2.9	2.5	2.3	C	3.4	3.7	3.3	2.8	3.3	3.6	3.4	3.1	3.3	4.0	4.6	5.5	4.8	4.3	9.3
19-Feb	4.8	6.8	4.0	3.2	1.9	1.2	1.0	0.9	0.9	0.9	0.8	0.6	0.6	0.6	0.5	0.6	0.6	0.7	0.7	0.7	0.8	1.0	1.2	1.5	1.5	6.8
20-Feb	2.4	2.3	2.5	2.0	1.7	1.5	1.1	1.1	1.3	1.3	0.8	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.8	1.0	1.0	1.4	1.9	1.2	2.5
21-Feb	4.2	8.6	10.4	9.8	8.8	8.6	8.4	8.0	7.4	6.3	5.4	3.9	3.3	3.0	3.1	2.7	2.2	2.3	2.3	2.3	2.0	1.4	1.0	1.0	4.8	10.4
22-Feb	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.1	1.0	1.0	1.0	0.9	0.8	0.9	1.0	1.3	1.7	1.8	2.2	2.2	2.0	2.0	2.1	2.1	1.4	2.2
23-Feb	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	1.9	1.7	1.7	1.7	1.7	1.8	1.9	2.2	2.4	2.1	2.1	1.9	1.9	2.0	1.9	1.9	2.0	2.4
24-Feb	2.2	2.3	2.0	1.9	1.9	1.9	1.9	1.8	1.7	1.6	1.7	1.6	1.5	1.5	1.4	1.3	1.4	1.5	1.5	1.5	1.5	1.6	1.7	1.7	1.7	2.3
25-Feb	2.0	2.3	2.8	2.9	2.8	3.0	3.4	4.0	3.5	3.5	2.6	2.2	1.8	2.2	2.5	2.6	2.8	3.2	3.1	2.9	2.7	2.5	2.4	2.2	2.7	4.0
26-Feb	2.2	2.3	2.3	2.4	2.2	2.3	2.2	2.0	2.0	2.0	1.9	1.8	1.9	1.9	1.8	1.7	2.2	2.4	2.2	2.4	2.7	2.3	2.0	1.9	2.1	2.7
27-Feb	1.9	2.0	1.8	1.8	1.7	1.7	1.6	1.8	1.6	1.5	1.4	1.4	1.5	1.6	1.6	1.7	1.6	1.6	1.6	1.8	3.1	3.6	3.2	2.5	1.9	3.6
28-Feb	1.8	1.4	1.5	1.6	4.1	4.6	2.3	1.5	1.1	1.3	1.2	1.3	1.4	2.1	2.4	2.4	2.0	2.0	2.5	2.7	3.0	2.2	2.0	1.9	2.1	4.6
29-Feb	1.7	1.5	1.4	1.2	1.2	1.1	1.1	1.2	1.3	1.5	1.6	1.4	2.1	3.3	3.4	3.4	3.3	3.5	3.4	3.3	3.3	3.7	4.2	4.5	2.4	4.5
																								Diurnal Average		
																								Diurnal Maximum		
2.6 3.0 3.0 3.2 3.6 3.9 3.8 3.4 2.9 2.7 2.8 2.7 2.6 2.7 2.7 2.7 2.7 2.9 3.0 2.8 2.8 2.7 2.5 2.5 7.5 9.3 10.4 11.7 20.4 18.9 16.0 12.7 10.4 9.4 12.4 13.7 12.7 14.0 13.9 11.8 11.0 10.2 10.5 10.1 9.9 7.9 6.6 7.2																										
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}) - $\mu\text{g}/\text{m}^3$
Conklin Lookout - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Lookout - February 2016**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	524	75.40	75.40
6 - 15	75	10.79	86.19
16 - 25	3	0.43	86.62
26 - 80	0	0.00	86.62
> 81.0	0	0.00	86.62

Total Number of Valid Hours: 695

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Conklin Lookout - February 2016

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	12	25	33	45	8	10	9	24	32	66	48	22	68	61	44	17	524
6 - 15	0	2	6	1	1	0	1	3	6	10	23	9	6	3	2	2	75
16 - 25	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	3
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	27	39	46	9	10	10	29	38	76	71	31	74	64	46	20	602

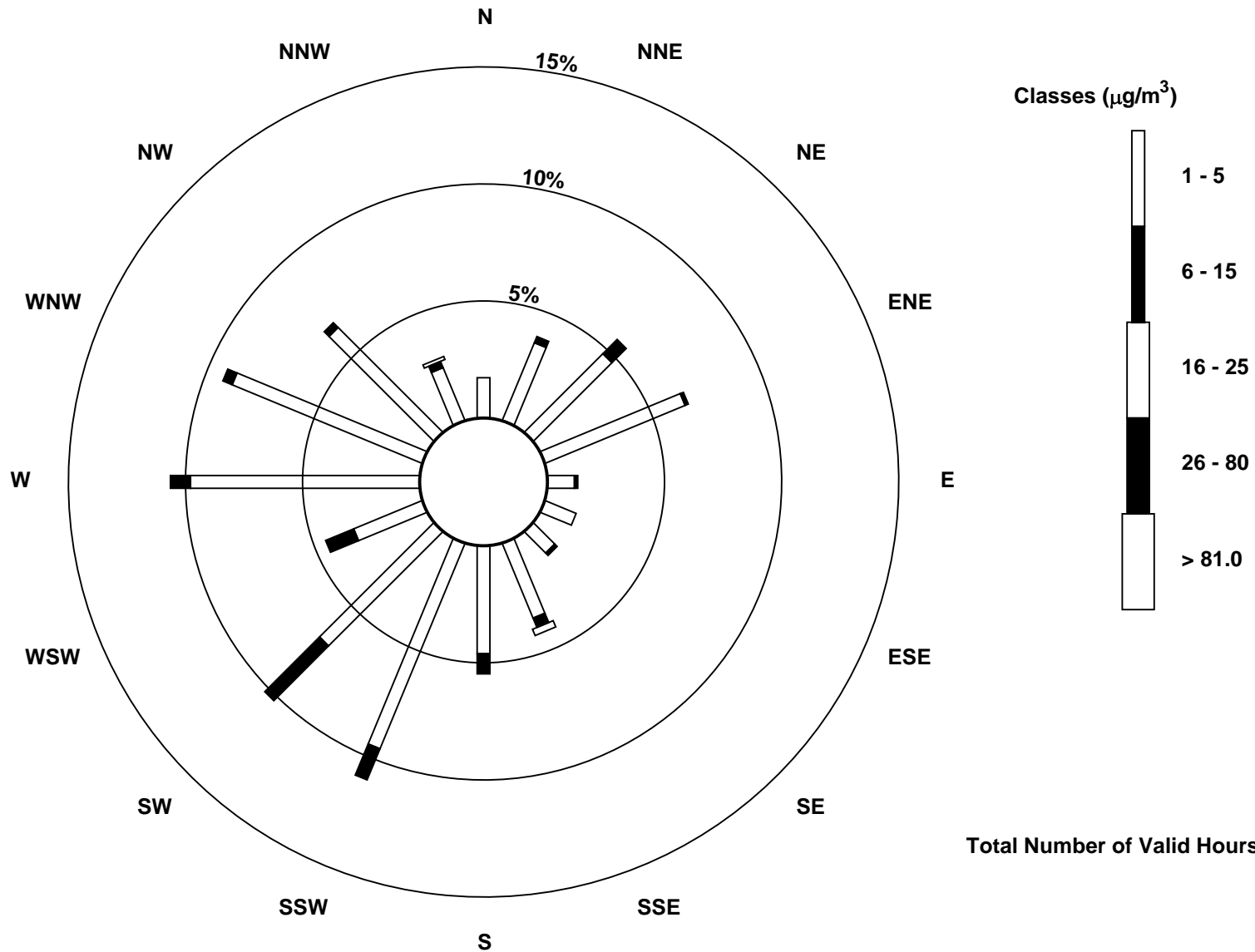
Total Number of Valid Hours: 695

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Lookout (AMS 18)



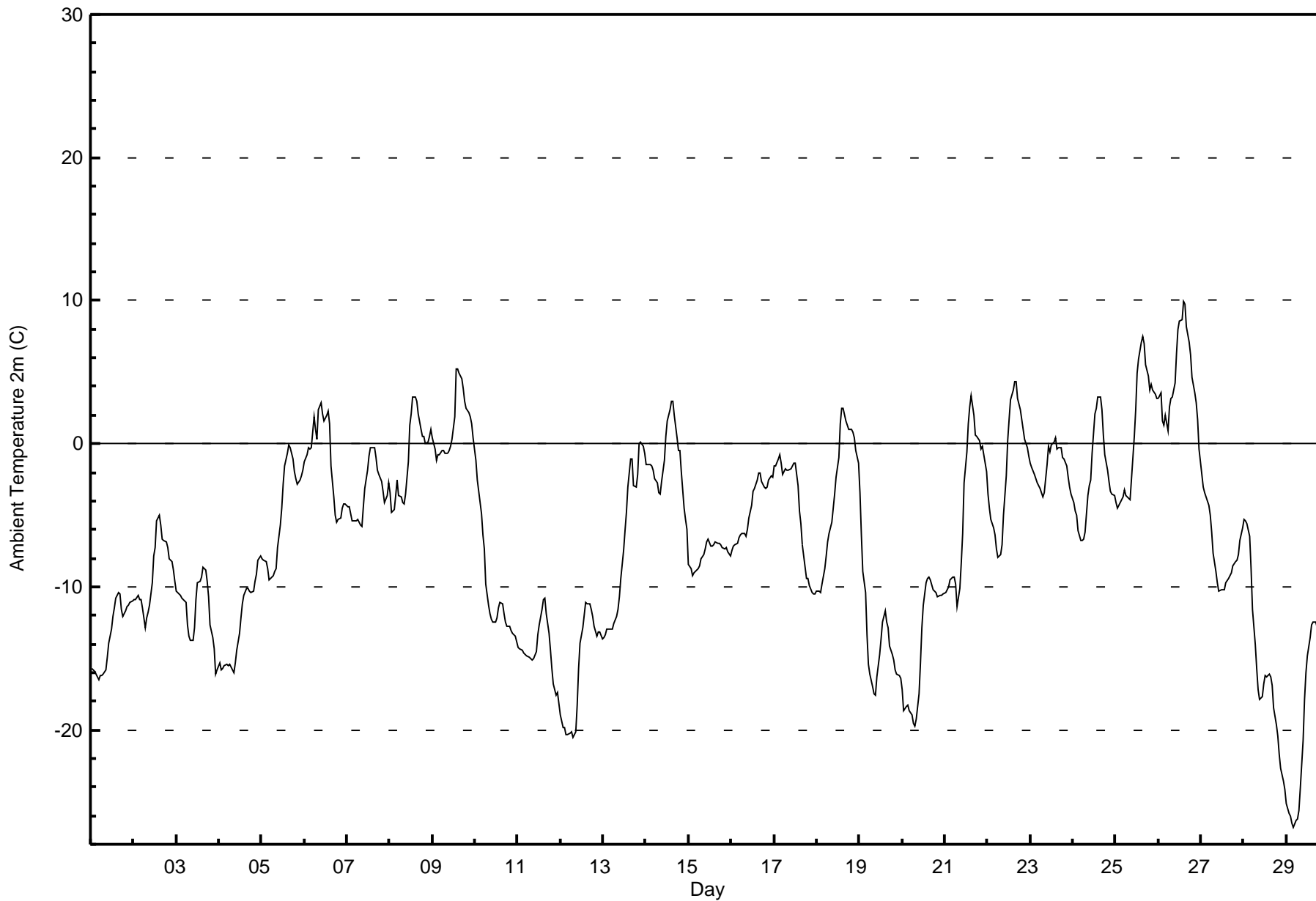


Maximum Value: 9.9 C on Feb 26 15:00																				Maximum Daily Average: 4.6 C on Feb 26					Hours in Service: 696				
Minimum Value: -26.8 C on Feb 29 05:00																				Minimum Daily Average: -18.5 C on Feb 29					Hours of Data: 696				
Maximum Diurnal Average: -3.6 C at hour 15																				Minimum Diurnal Average: -9.5 C at hour 8					Hours of Missing Data: 0				
Monthly Average: -6.80 C																				Percentiles: P ₁ = -25.7 P ₁₀ = -15.8 Q ₁ = -11.8 Median = -6.6 Q ₃ = -1.4 P ₉₀ = 2.0 P ₉₉ = 7.2					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	-15.7	-15.8	-16.0	-16.1	-16.5	-16.2	-16.2	-16.1	-15.9	-15.0	-13.9	-12.9	-12.1	-11.5	-10.7	-10.4	-10.5	-11.6	-12.1	-11.7	-11.4	-11.3	-11.1	-10.9	-13.4	-10.4			
2-Feb	-10.9	-10.9	-10.6	-10.9	-10.9	-11.4	-12.9	-12.2	-11.8	-11.3	-9.7	-7.9	-7.3	-5.4	-5.0	-5.7	-6.6	-6.8	-6.9	-7.3	-8.0	-8.2	-8.8	-9.7	-9.1	-5.0			
3-Feb	-10.3	-10.5	-10.6	-10.8	-10.9	-11.1	-12.6	-13.5	-13.7	-13.8	-12.8	-10.9	-9.7	-9.6	-9.3	-8.7	-8.8	-9.6	-10.7	-12.6	-13.5	-14.4	-16.2	-15.8	-11.7	-8.7			
4-Feb	-15.3	-15.8	-15.7	-15.5	-15.4	-15.5	-15.4	-15.8	-16.0	-15.3	-14.4	-13.2	-12.2	-11.2	-10.6	-10.1	-10.1	-10.3	-10.4	-10.3	-9.6	-9.1	-8.2	-7.8	-12.6	-7.8			
5-Feb	-8.1	-8.1	-8.2	-8.7	-9.5	-9.5	-9.2	-8.9	-8.7	-7.3	-5.7	-4.6	-2.8	-1.5	-0.6	-0.1	-0.3	-1.1	-1.9	-2.4	-2.8	-2.6	-2.3	-1.9	-4.9	-0.1			
6-Feb	-1.3	-0.7	-0.3	-0.4	-0.2	1.8	1.0	0.3	2.3	2.9	2.1	1.6	2.0	2.3	1.4	-1.5	-3.7	-5.0	-5.5	-5.3	-5.2	-4.5	-4.2	-4.3	-1.0	2.9			
7-Feb	-4.4	-4.4	-4.9	-5.4	-5.4	-5.4	-5.3	-5.6	-5.8	-4.4	-3.1	-1.8	-0.9	-0.3	-0.2	-0.3	-1.0	-1.8	-2.1	-2.7	-3.4	-4.1	-3.6	-2.8	-3.3	-0.2			
8-Feb	-3.4	-4.8	-4.6	-3.6	-2.5	-3.6	-3.8	-4.2	-4.2	-3.6	-1.2	1.3	2.1	3.3	3.2	3.0	2.1	1.0	0.5	0.5	0.0	0.2	0.5	1.0	-0.9	3.3			
9-Feb	0.5	-0.4	-1.2	-0.8	-0.7	-0.5	-0.5	-0.7	-0.7	-0.4	-0.2	0.3	1.9	5.2	5.3	4.9	4.5	3.8	3.0	2.5	2.2	1.9	1.4	0.5	1.3	5.3			
10-Feb	-1.1	-2.5	-3.4	-4.9	-6.4	-7.4	-9.8	-11.3	-11.9	-12.3	-12.5	-12.4	-12.1	-11.5	-11.1	-11.2	-11.8	-12.4	-12.7	-12.8	-13.0	-13.2	-13.4	-13.8	-10.2	-1.1			
11-Feb	-14.2	-14.4	-14.5	-14.6	-14.7	-14.8	-14.9	-15.0	-15.2	-15.0	-14.6	-13.4	-12.6	-11.6	-10.9	-10.8	-11.9	-13.3	-14.5	-15.8	-16.8	-17.6	-17.3	-18.1	-14.4	-10.8			
12-Feb	-18.9	-19.9	-19.9	-20.3	-20.3	-20.2	-20.1	-20.5	-20.1	-18.3	-15.7	-13.9	-12.9	-12.0	-11.1	-11.2	-11.2	-11.6	-12.1	-12.7	-13.4	-13.2	-13.1	-13.6	-15.7	-11.1			
13-Feb	-13.5	-13.3	-13.0	-13.0	-13.0	-13.0	-12.5	-12.1	-11.6	-10.7	-9.4	-7.5	-6.1	-4.8	-3.0	-1.0	-1.0	-2.9	-3.1	-2.2	0.0	0.1	-0.2	-0.7	-7.0	0.1			
14-Feb	-1.4	-1.5	-1.5	-1.5	-1.9	-2.5	-2.8	-3.4	-3.5	-2.6	0.5	1.6	2.4	3.0	3.0	2.0	0.4	-0.5	-0.5	-2.0	-4.5	-5.3	-6.0	-1.2	3.0				
15-Feb	-8.4	-8.7	-9.2	-9.0	-8.8	-8.8	-8.5	-8.0	-7.8	-7.3	-6.8	-6.7	-7.2	-7.1	-7.0	-6.9	-6.9	-7.0	-7.1	-7.2	-7.4	-7.3	-7.6	-7.8	-7.7	-6.7			
16-Feb	-7.4	-7.1	-7.1	-6.9	-6.6	-6.4	-6.3	-6.3	-6.5	-6.0	-5.2	-4.3	-3.3	-3.1	-2.6	-2.0	-2.0	-2.6	-3.0	-3.1	-3.0	-2.6	-2.2	-2.3	-4.5	-2.0			
17-Feb	-1.6	-1.6	-1.0	-0.8	-1.4	-2.2	-1.8	-1.9	-1.9	-1.7	-1.6	-1.4	-1.4	-3.0	-4.7	-5.6	-7.1	-8.7	-9.4	-9.4	-9.9	-10.4	-10.5	-10.5	-4.6	-0.8			
18-Feb	-10.3	-10.3	-10.4	-9.8	-8.7	-7.8	-6.8	-6.2	-5.4	-4.5	-3.5	-2.3	-1.0	1.4	2.5	2.5	1.6	1.3	1.0	1.0	0.8	0.4	-0.4	-1.4	-3.2	2.5			
19-Feb	-3.4	-6.4	-8.9	-10.4	-13.3	-15.4	-16.1	-17.0	-17.5	-17.6	-16.3	-14.8	-13.6	-12.4	-11.6	-12.4	-12.9	-14.1	-14.7	-15.2	-15.8	-16.1	-16.2	-16.4	-13.7	-3.4			
20-Feb	-17.2	-18.6	-18.4	-18.3	-18.7	-18.9	-19.5	-19.7	-19.2	-17.5	-15.3	-12.9	-11.2	-9.7	-9.4	-9.3	-9.5	-10.2	-10.3	-10.4	-10.7	-10.6	-10.6	-10.5	-14.0	-9.3			
21-Feb	-10.4	-10.2	-10.0	-9.5	-9.3	-9.4	-9.8	-11.3	-10.1	-8.3	-6.3	-2.8	-0.5	1.4	2.6	3.4	2.0	0.6	0.5	0.2	-0.4	-0.2	-0.7	-1.9	-4.2	3.4			
22-Feb	-3.5	-4.5	-5.3	-5.9	-6.4	-7.4	-7.9	-7.8	-7.0	-5.0	-2.3	0.2	1.6	3.0	3.7	4.3	4.4	3.2	2.4	1.7	1.0	0.3	-0.3	-0.8	-1.6	4.4			
23-Feb	-1.3	-1.6	-2.1	-2.5	-2.7	-3.1	-3.4	-3.7	-3.4	-1.5	-0.2	-0.6	-0.1	0.1	0.4	-0.4	-0.3	-0.3	-0.9	-1.1	-1.5	-2.4	-3.1	-3.5	-1.6	0.4			
24-Feb	-4.1	-4.7	-5.0	-6.0	-6.8	-6.8	-6.7	-6.2	-3.6	-2.9	-2.5	-0.7	2.1	2.5	3.3	3.3	2.4	0.6	-0.8	-1.8	-2.7	-3.3	-3.5	-3.6	-2.4	3.3			
25-Feb	-4.1	-4.5	-4.3	-3.9	-3.7	-3.3	-3.6	-3.8	-3.9	-2.4	0.5	2.4	5.0	5.9	7.1	7.5	7.0	5.5	4.7	3.7	4.1	3.8	3.4	3.1	1.1	7.5			
26-Feb	3.2	3.6	1.6	1.3	2.0	0.9	2.6	3.2	3.2	4.2	6.3	8.0	8.6	8.7	9.9	9.7	8.2	7.1	6.2	4.7	3.5	2.8	1.7	-0.3	4.6	9.9			
27-Feb	-2.2	-3.1	-3.5	-3.7	-4.3	-5.0	-6.1	-7.6	-8.9	-9.7	-10.3	-10.2	-10.3	-10.2	-9.7	-9.4	-9.2	-9.0	-8.5	-8.2	-8.2	-7.8	-6.8	-5.8	-7.4	-2.2			
28-Feb	-5.3	-5.4	-5.5	-6.5	-8.7	-11.6	-14.0	-15.7	-17.2	-17.9	-17.7	-16.8	-16.2	-16.3	-16.1	-16.3	-16.9	-18.4	-19.6	-20.4	-21.7	-22.7	-23.6	-24.2	-15.6	-5.3			
29-Feb	-25.2	-25.8	-26.0	-26.5	-26.8	-26.4	-26.2	-25.6	-24.1	-20.7	-17.9	-16.0	-14.8	-13.6	-12.7	-12.5	-12.5	-12.8	-13.1	-13.2	-13.1	-12.9	-12.7	-12.3	-18.5	-12.3			
																								Diurnal Average					
																								Diurnal Maximum					



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Conklin Lookout - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Conklin Lookout - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	21	3.02	3.02
-20 - 0	558	80.17	83.19
0 - 10	117	16.81	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

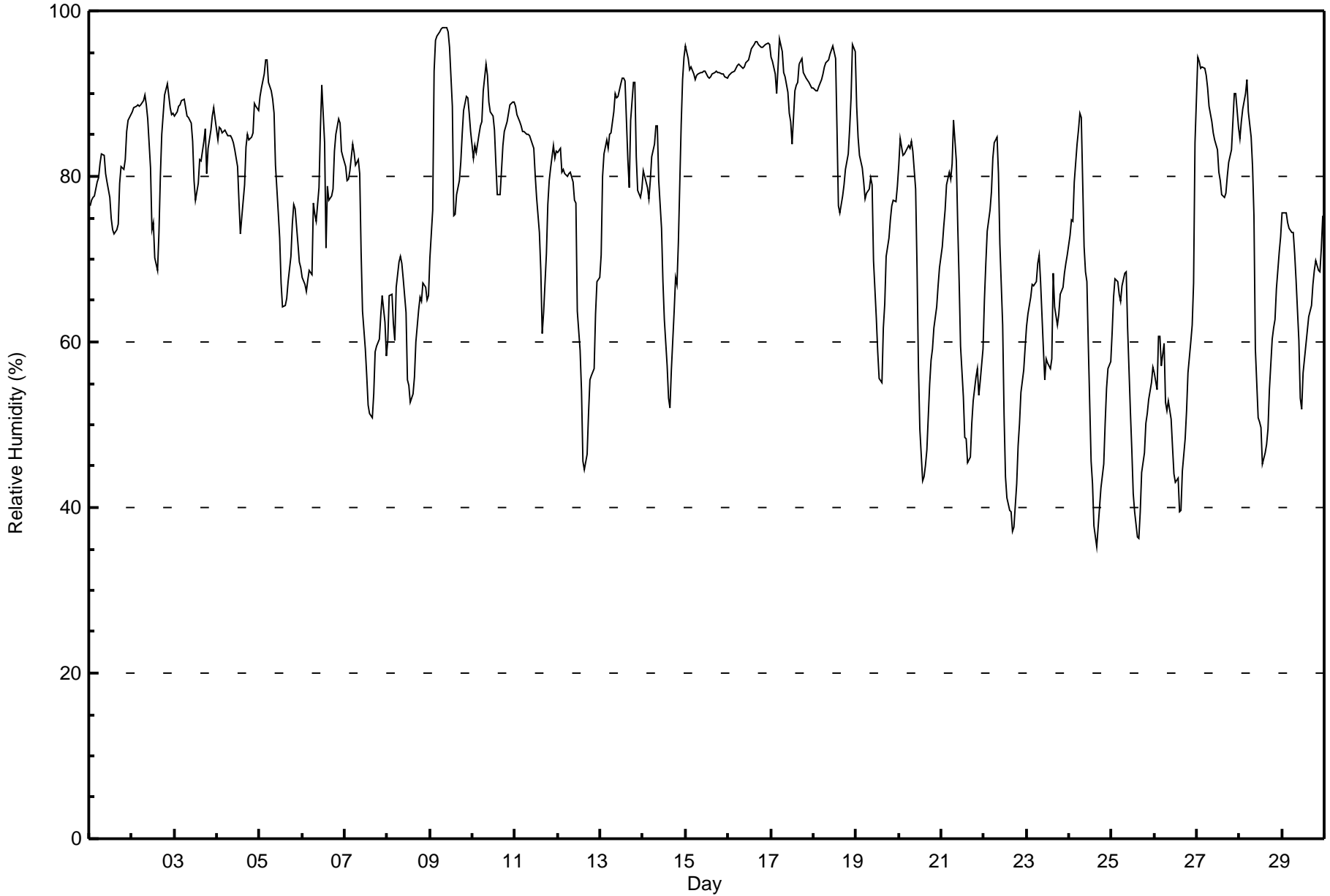
Conklin Lookout - February 2016

Maximum Value: 98 % on Feb 9 09:00 Maximum Daily Average: 94.4 % on Feb 16																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 35 % on Feb 24 16:00 Minimum Daily Average: 53.7 % on Feb 26 Maximum Diurnal Average: 83.3 % at hour 8 Minimum Diurnal Average: 64.1 % at hour 15 Monthly Average: 75.4 % Percentiles: P₁ = 39 P₁₀ = 53 Q₁ = 65 Median = 79 Q₃ = 87 P₉₀ = 92 P₉₉ = 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	77	77	78	79	80	81	83	83	80	79	77	75	74	73	74	74	79	81	81	82	85	87	87	79.3	87
2-Feb	88	88	89	89	88	89	89	90	89	87	81	74	74	70	69	73	80	85	90	91	91	88	87	88	84.4	91
3-Feb	87	88	88	89	89	89	88	87	87	86	84	80	77	79	82	82	84	86	80	83	86	87	88	87	85.3	89
4-Feb	84	86	86	85	86	85	85	85	84	83	81	77	73	75	79	84	85	84	85	85	89	88	88	88	83.6	89
5-Feb	90	91	92	94	94	91	90	89	88	81	76	72	67	64	64	65	67	70	74	77	76	72	70	69	78.5	94
6-Feb	68	67	66	68	69	68	77	76	75	79	86	91	84	71	79	77	78	79	83	85	87	86	83	82	77.6	91
7-Feb	81	79	80	81	84	83	81	82	80	71	64	59	56	52	51	51	54	59	60	60	63	66	62	58	67.4	84
8-Feb	60	66	66	62	60	67	70	70	70	68	63	55	55	53	54	56	60	64	65	65	67	67	65	66	63.0	70
9-Feb	70	76	93	97	97	97	98	98	98	98	97	96	88	75	75	78	79	82	85	88	90	89	88	85	88.2	98
10-Feb	82	84	83	85	86	87	90	94	92	89	88	87	86	82	78	78	81	84	85	87	88	89	89	89	85.8	94
11-Feb	88	88	87	86	85	85	85	85	85	84	83	80	78	73	69	61	64	71	77	79	81	84	82	83	80.1	88
12-Feb	83	83	81	81	80	80	80	80	79	77	77	64	59	54	46	45	46	51	55	56	57	63	67	68	67.2	83
13-Feb	71	80	83	84	83	85	85	88	90	90	90	91	92	92	92	82	79	87	91	91	82	78	77	79	85.1	92
14-Feb	81	80	79	77	79	82	84	86	86	80	74	67	63	57	53	52	57	64	68	67	72	86	92	94	74.2	94
15-Feb	96	94	93	93	92	92	92	92	92	92	93	93	92	92	92	92	93	93	93	93	92	92	92	92	92.6	96
16-Feb	92	92	92	93	93	93	94	93	93	93	94	94	95	95	96	96	96	96	96	96	96	96	96	96	94.4	96
17-Feb	94	94	92	90	93	97	95	93	92	90	88	87	84	90	91	91	94	94	93	92	92	91	91	91	91.6	97
18-Feb	91	90	90	91	92	92	93	94	94	95	95	96	94	86	77	76	78	79	81	83	86	89	96	95	88.8	96
19-Feb	89	85	83	81	79	77	78	78	80	79	70	63	59	56	55	62	65	70	73	75	76	77	77	79	73.5	89
20-Feb	81	85	82	83	83	84	83	84	83	78	69	57	50	43	44	45	47	55	58	59	62	64	67	69	67.3	85
21-Feb	72	74	76	79	81	80	81	87	82	74	67	59	53	49	48	46	46	50	53	56	57	54	55	59	64.0	87
22-Feb	65	70	73	76	78	82	84	85	80	72	62	51	44	41	40	39	37	38	43	47	50	54	57	59	59.5	85
23-Feb	62	63	65	67	67	67	69	71	67	59	55	58	57	57	58	68	64	62	63	66	67	68	69	70	64.3	71
24-Feb	73	75	75	79	84	86	88	87	72	68	67	60	46	43	38	35	38	40	42	45	50	54	57	58	60.8	88
25-Feb	61	65	68	67	66	65	67	68	69	62	52	47	42	40	36	36	40	44	47	50	51	53	55	57	54.5	69
26-Feb	56	54	61	61	57	60	53	52	53	51	47	44	43	44	39	40	44	48	52	56	60	62	67	84	53.7	84
27-Feb	94	94	93	93	93	92	91	88	87	85	84	83	80	79	78	78	78	80	82	83	87	90	90	86	86.2	94
28-Feb	85	87	88	90	92	88	85	81	75	59	51	50	50	45	47	48	50	54	60	62	63	66	71	73	67.4	92
29-Feb	76	76	76	74	74	73	73	71	67	60	53	52	56	60	61	63	64	67	69	70	69	68	71	75	67.4	76
	79.2	80.4	81.2	81.8	82.2	82.6	83.1	83.3	81.8	78.3	74.9	71.3	68.1	65.1	64.1	64.4	66.2	69.5	71.8	73.3	74.6	76.2	77.2	78.2	Diurnal Average	
	96	94	93	97	97	97	98	98	98	98	97	96	95	95	96	96	96	96	96	96	96	96	96	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Conklin Lookout - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

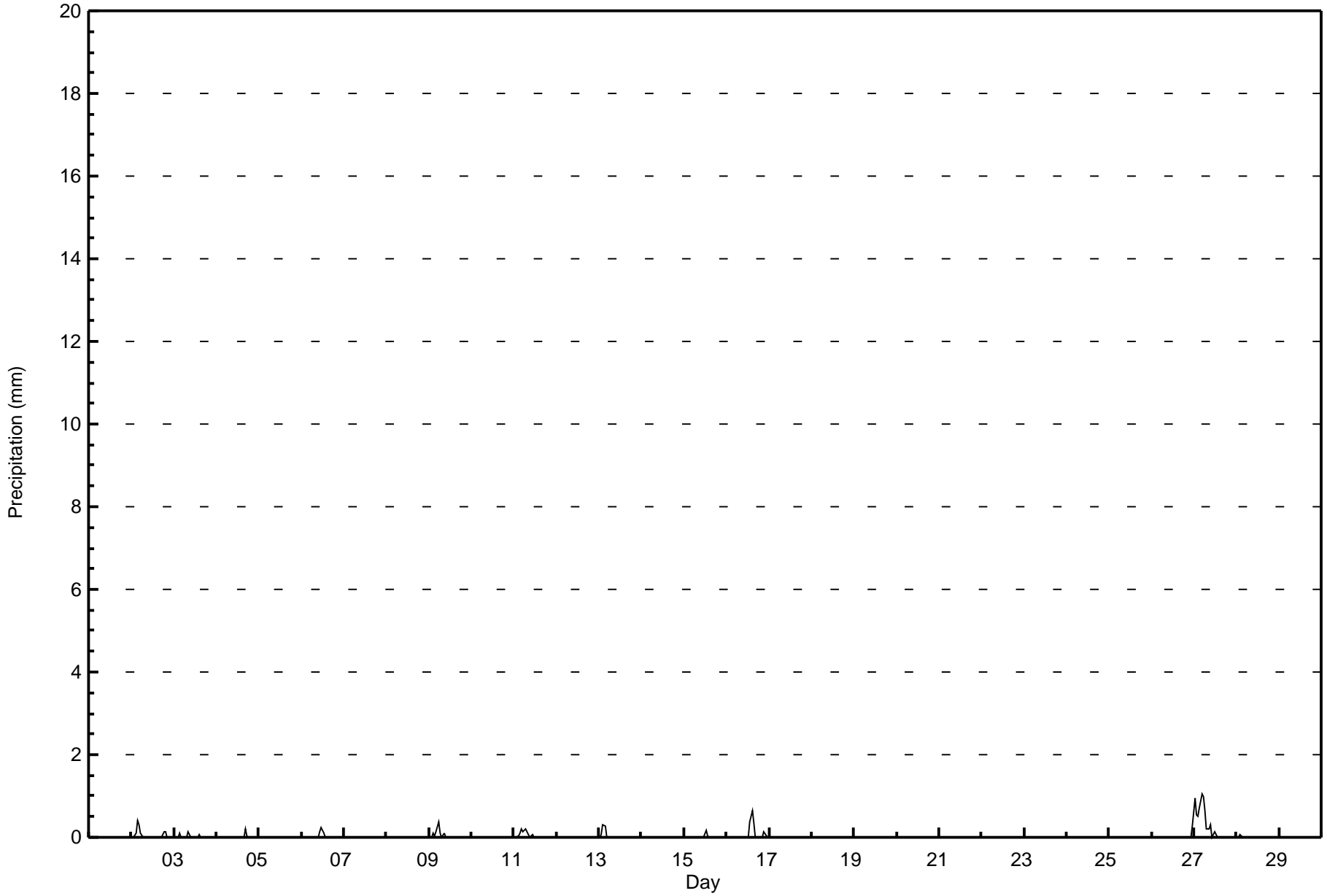
Conklin Lookout - February 2016

Maximum Value: 1.0 mm on Feb 27 05:00 Maximum Daily Total: 6.3 mm on Feb 27		Hours in Service: 696 Hours of Data: 696 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: 1.7 mm at hour 5 Monthly Total: 13.01 mm		Minimum Daily Total: 0.0 mm on Feb 1 Minimum Diurnal Total: 0.0 mm at hour 21 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 = 0.5																										
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.4
3-Feb	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	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	0.3	0.1
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	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2
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	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3
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	0.1	0.0	0.1	0.4	0.1	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	0.8	0.4
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	0.1	0.1	0.2	0.1	0.2	0.2	0.1	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	1.0	0.2
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	0.1	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3
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	0.2	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	0.2	0.2
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	0.4	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.5	0.6
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	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	0.3	0.0	0.3	0.3
27-Feb	1.0	0.6	0.5	0.7	1.0	1.0	0.6	0.2	0.2	0.3	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	6.3	1.0
28-Feb	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
29-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
	1.0	0.6	1.1	1.6	1.7	1.6	0.9	0.4	0.5	0.3	0.2	0.4	0.3	0.4	0.7	0.3	0.2	0.1	0.2	0.1	0.0	0.1	0.0	0.3			Diurnal Average	
	1.0	0.6	0.5	0.7	1.0	1.0	0.6	0.2	0.2	0.3	0.2	0.3	0.2	0.4	0.6	0.3	0.2	0.1	0.2	0.1	0.0	0.1	0.0	0.3			Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Conklin Lookout - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Conklin Lookout - February 2016

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	685	98.42	98.42
0.4 - 0.5	4	0.57	98.99
0.6 - 0.7	4	0.57	99.57
0.8 - 1.4	3	0.43	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



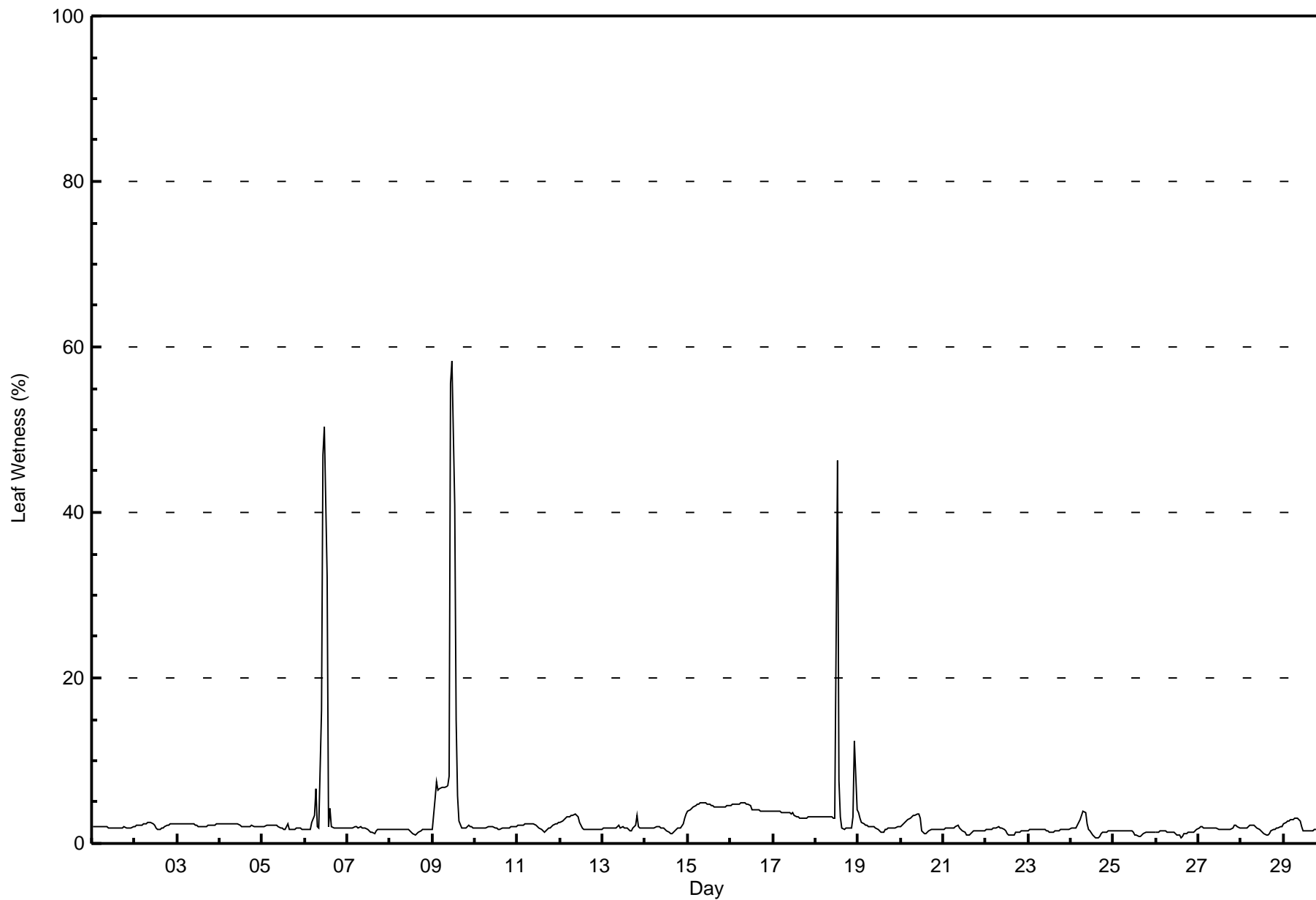
Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (LW) - %

Conklin Lookout - February 2016

Maximum Value: 58 % on Feb 9 12:00														Maximum Daily Average: 10.7 % on Feb 9														Hours in Service: 696	
Minimum Value: 1 % on Feb 24 16:00														Minimum Daily Average: 1.3 % on Feb 26														Hours of Data: 696	
Maximum Diurnal Average: 5.8 % at hour 13														Minimum Diurnal Average: 1.7 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 2.7 %														Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 2 P ₉₀ = 4 P ₉₉ = 28														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	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2			
2-Feb	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	3			
3-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	2.3	2			
4-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	2.2	2			
5-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			
6-Feb	2	2	2	2	2	3	7	2	2	16	47	50	32	2	4	2	2	2	2	2	2	2	2	2	8.0	50			
7-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	1.7	2			
8-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1.6	2			
9-Feb	2	5	8	6	7	7	7	7	7	8	56	58	41	15	6	3	2	2	2	2	2	2	2	2	10.7	58			
10-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	1.9	2			
11-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2.1	2			
12-Feb	3	3	3	3	3	3	3	3	4	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2.4	4			
13-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2.0	3			
14-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	3	4	1.9	4				
15-Feb	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	5	5	4.6	5			
16-Feb	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4.4	5			
17-Feb	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3.5	4			
18-Feb	3	3	3	3	3	3	3	3	3	3	3	3	46	8	3	2	2	2	2	2	2	3	12	4	5.3	46			
19-Feb	4	3	3	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2.0	4			
20-Feb	2	2	2	3	3	3	3	3	3	4	3	3	2	1	1	1	2	2	2	2	2	2	2	2	2.3	4			
21-Feb	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1.6	2			
22-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1.5	2			
23-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	1.6	2			
24-Feb	2	2	2	2	2	3	3	4	4	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.8	4			
25-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			
26-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.3	2				
27-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	1.8	2			
28-Feb	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	1.7	2			
29-Feb	2	2	3	3	3	3	3	3	3	3	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2.1	3			
2.2														2.4														Diurnal Average	
5														8														Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Conklin Lookout - February 2016

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	3	0.43	0.43
0.8 - 1.4	77	11.06	11.49
1.5 - 10	587	84.34	95.83
> 10	10	1.44	97.27

Total Number of Valid Hours: 696

Total Number of Hours: 696



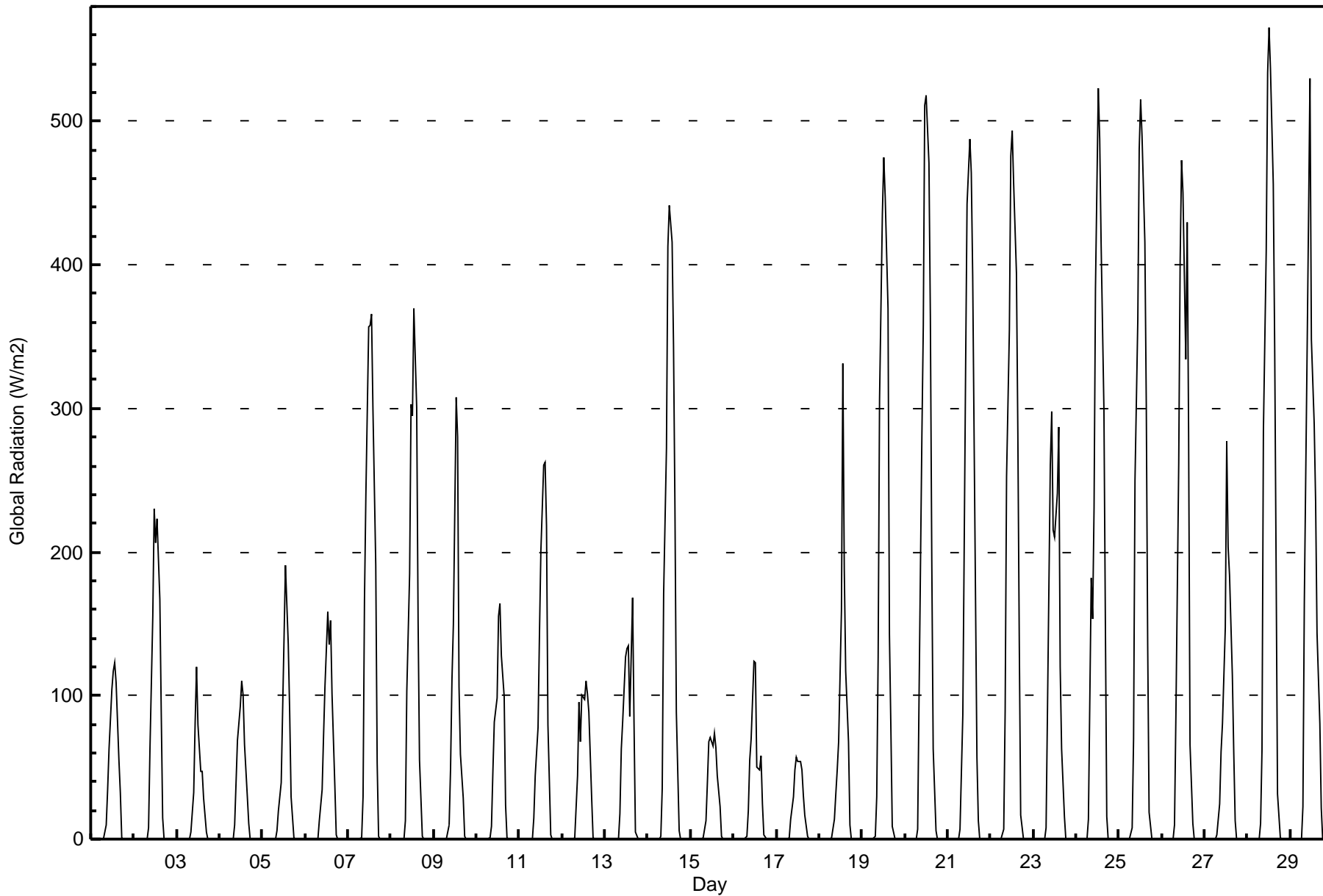
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

Conklin Lookout - February 2016

Maximum Value: 565 W/m2 on Feb 28 13:00		Maximum Daily Average: 142.7 W/m2 on Feb 28		Hours in Service: 696																						
Minimum Value: 0 W/m2 on Feb 1 02:00		Minimum Daily Average: 14.8 W/m2 on Feb 17		Hours of Data: 696																						
Maximum Diurnal Average: 277.9 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 3		Hours of Missing Data: 0																						
Monthly Average: 67.0 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 77 P ₉₀ = 277 P ₉₉ = 514		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	10	34	62	104	117	123	110	55	32	1	0	0	0	0	0	0	27.0	123
2-Feb	0	0	0	0	0	0	0	0	8	62	155	230	206	223	167	88	15	0	0	0	0	0	0	0	48.1	230
3-Feb	0	0	0	0	0	0	0	0	5	32	81	120	80	48	47	29	5	0	0	0	0	0	0	0	18.6	120
4-Feb	0	0	0	0	0	0	0	0	10	40	68	93	110	100	66	30	11	0	0	0	0	0	0	0	22.0	110
5-Feb	0	0	0	0	0	0	0	0	6	19	40	89	140	190	136	88	30	1	0	0	0	0	0	0	30.8	190
6-Feb	0	0	0	0	0	0	0	0	13	35	72	106	158	136	152	101	38	3	0	0	0	0	0	0	33.9	158
7-Feb	0	0	0	0	0	0	0	1	29	166	240	356	357	366	299	191	53	2	0	0	0	0	0	0	85.9	366
8-Feb	0	0	0	0	0	0	0	0	13	103	185	303	295	369	301	152	55	2	0	0	0	0	0	0	74.1	369
9-Feb	0	0	0	0	0	0	0	0	10	49	111	150	308	280	106	59	28	2	0	0	0	0	0	0	46.0	308
10-Feb	0	0	0	0	0	0	0	1	8	47	82	98	155	164	128	99	23	1	0	0	0	0	0	0	33.6	164
11-Feb	0	0	0	0	0	0	0	0	15	44	77	143	201	260	263	219	80	3	0	0	0	0	0	0	54.4	263
12-Feb	0	0	0	0	0	0	0	1	44	96	68	100	97	110	102	88	28	1	0	0	0	0	0	0	30.7	110
13-Feb	0	0	0	0	0	0	0	0	18	63	82	127	132	135	86	168	82	5	0	0	0	0	0	0	37.5	168
14-Feb	0	0	0	0	0	0	0	2	36	171	272	412	441	416	344	232	89	6	0	0	0	0	0	0	100.9	441
15-Feb	0	0	0	0	0	0	0	1	13	40	68	70	65	74	64	44	23	2	0	0	0	0	0	0	19.3	74
16-Feb	0	0	0	0	0	0	0	2	20	55	70	124	123	50	49	58	24	2	0	0	0	0	0	0	24.0	124
17-Feb	0	0	0	0	0	0	0	1	14	30	48	57	54	54	48	30	17	2	0	0	0	0	0	0	14.8	57
18-Feb	0	0	0	0	0	0	0	1	13	32	48	68	159	331	188	117	68	10	0	0	0	0	0	0	43.1	331
19-Feb	0	0	0	0	0	0	0	2	29	127	306	436	475	448	369	143	79	9	0	0	0	0	0	0	100.9	475
20-Feb	0	0	0	0	0	0	0	6	100	281	358	512	518	471	364	196	63	6	0	0	0	0	0	0	119.7	518
21-Feb	0	0	0	0	0	0	0	7	86	207	331	443	487	464	392	281	57	13	0	0	0	0	0	0	115.3	487
22-Feb	0	0	0	0	0	0	0	7	89	252	355	476	493	457	394	282	138	17	0	0	0	0	0	0	123.4	493
23-Feb	0	0	0	0	0	0	0	8	91	260	298	216	210	240	287	120	63	15	0	0	0	0	0	0	75.4	298
24-Feb	0	0	0	0	0	0	0	14	182	153	231	384	523	487	415	298	154	16	0	0	0	0	0	0	119.1	523
25-Feb	0	0	0	0	0	0	0	8	69	249	362	481	515	490	416	304	136	18	0	0	0	0	0	0	127.0	515
26-Feb	0	0	0	0	0	0	0	10	87	262	402	473	450	334	430	284	65	11	0	0	0	0	0	0	117.0	473
27-Feb	0	0	0	0	0	0	0	3	24	61	81	147	278	204	183	114	60	13	0	0	0	0	0	0	48.7	278
28-Feb	0	0	0	0	0	0	0	11	62	284	410	534	565	537	457	342	191	31	1	0	0	0	0	0	142.7	565
29-Feb	0	0	0	0	0	0	0	22	165	342	434	530	348	289	235	144	81	21	0	0	0	0	0	0	108.8	530
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	43.8	124.0	186.1	254.5	277.9	270.7	227.4	150.1	61.6	7.4	0.1	0.0	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	0	22	182	342	434	534	565	537	457	342	191	31	1	0	0	0	0	0	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Conklin Lookout - February 2016

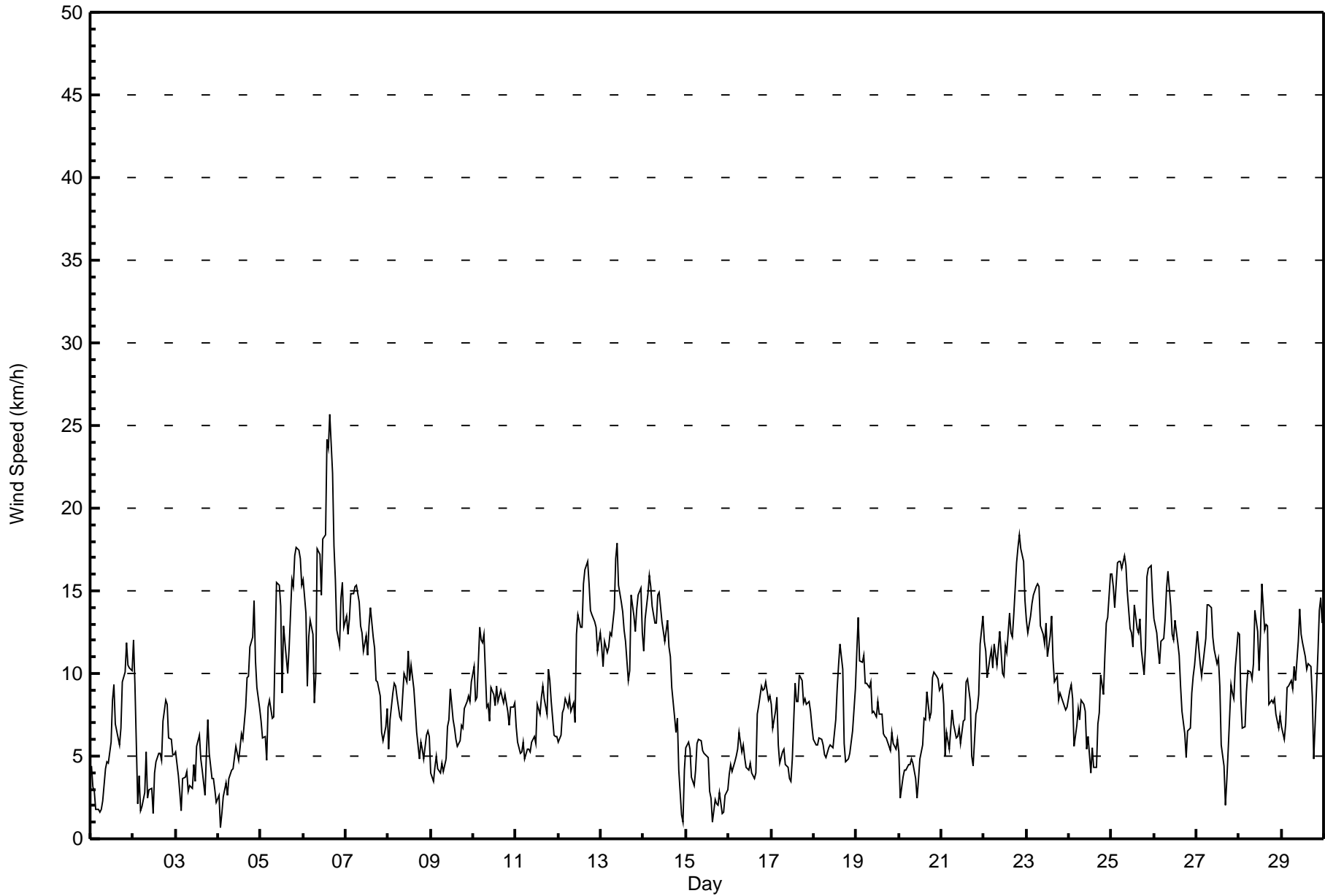
Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	452	64.94	64.94
21 - 100	98	14.08	79.02
101 - 300	89	12.79	91.81
301 - 600	57	8.19	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Speed: 26 km/h on Feb 6 16:00		Maximum Daily Speed Average: 12.7 km/h on Feb 6		Hours in Service: 696																							
Minimum Speed Value: 1 km/h on Feb 4 02:00		Minimum Daily Speed Average: 1.4 km/h on Feb 3		Hours of Data: 696																							
Maximum Diurnal Speed Average: 4.2 km/h at hour 14		Minimum Diurnal Speed Average: 2.2 km/h at hour 7		Hours of Missing Data: 0																							
Monthly Average Velocity: 3.4 km/h 258.8 deg		Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 14 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	N4	N3	NW3	WNW2	WSW2	W2	SSW2	S2	SSW4	SSW5	SSW5	SSW6	SW8	SW9	SW7	SW6	SW6	SSW7	SSW10	SW10	SW12	SW11	SW10	SW10	SW5.2	SW12	
2-Feb	SW12	SW9	NNW2	NNE4	NNW2	SSE2	SSE3	SW5	W2	NW3	NNW3	NNE1	S4	WSW5	WNW5	W5	WSW5	WSW7	WNW8	WNW8	NW6	NNW6	N5	N5	W2.8	SW12	
3-Feb	NNW5	NNW4	NNE3	E2	SW4	NE4	ENE4	NNE3	E3	SE3	S5	SW3	SW6	SW6	SW5	WSW4	NNW3	NW5	NW7	WNW5	NNW4	NNW4	NW3	NNW2	WNW1.4	NW7	
4-Feb	NNE3	SSW1	S2	SSE3	S3	SSW3	SSE4	S4	S4	S5	S6	S5	SSW6	SSW6	S6	S8	S10	S10	SSW12	SSW12	SW14	WSW11	WSW9	W8	SSW5.3	SW14	
5-Feb	WNW7	W6	WSW6	SW5	S8	S8	S7	S7	SSW12	SSW16	SSW15	SSW14	SSW9	SSW13	SSW11	S10	S12	SSW16	SSW15	SSW17	SSW18	SW17	SW17	SW15	SSW11.0	SSW18	
6-Feb	SW16	SW14	SW9	SSW12	SW13	W12	WSW8	SW10	W18	W17	W15	W18	W18	W24	WNW24	NW26	NW22	NW18	NW16	NW13	NW12	NW15	NW16	NW13	WNW12.7	NW26	
7-Feb	NW13	WNW12	WNW13	WNW13	WNW15	WNW15	WNW15	WNW15	WNW14	WNW13	WNW12	WNW11	NW12	WNW11	WNW13	WNW14	NW12	NW12	WNW10	WNW9	WNW9	WNW6	W6	W7	W8	WNW11.5	WNW15
8-Feb	SW5	SW7	SW9	WSW9	WSW9	SW9	SW7	SW7	SSW9	SW10	WSW9	W11	WNW10	WNW11	NW9	NW8	WNW6	W5	W6	W5	SW5	WSW6	WSW7	WSW6	WSW6.7	W11	
9-Feb	WNW4	SSW3	S4	SSW5	SSE4	S4	SSE5	SE4	SSE5	S7	SSW7	SSW9	SW7	W7	W6	WSW6	W6	NW7	NNW7	NW8	NW8	NW9	NNW8	NNW9	WSW2.9	NNW9	
10-Feb	NNW10	N8	N9	NNE13	NNE12	NE12	NE12	NNE8	NNE8	NNE7	NE9	NE9	NE8	ENE9	ENE8	ENE9	ENE9	ENE8	ENE9	ENE8	ENE7	E8	ENE8	ENE8	NE8.0	NNE13	
11-Feb	ENE7	E6	ENE5	ENE5	ENE6	ENE5	ENE5	ENE5	NE5	NE6	NE6	NE6	NE8	NE8	NE9	NE9	NE9	NE8	NE10	NE10	ENE8	ESE6	ESE6	ESE6	ENE6.4	NE10	
12-Feb	SE6	SSE6	SSE8	SSE8	SSE8	SSE8	SSE9	SSE8	SSE8	SSE7	SSE12	SSE14	SSE13	SSE13	SSE15	S16	SSE17	SSE15	SSE14	SSE14	SSE13	SSE13	SSE11	S12	SSE11.1	SSE17	
13-Feb	S12	S10	S12	S11	S12	S12	SSW12	SSW14	SW17	SW18	SW15	SW14	WSW14	W13	W12	W10	SW10	SW15	SW13	SW13	WSW14	W15	W15	W12	SW11.3	SW18	
14-Feb	W11	W13	W15	W16	W15	W14	W13	W13	W15	W15	W13	WNW13	WNW12	WNW13	WNW12	NW11	WNW9	WNW7	W6	W7	NW4	SE1	N1	NNE4	WNW10.1	W16	
15-Feb	NE6	ENE6	E5	ESE4	ESE3	E4	ENE6	ENE6	ENE6	ENE5	NE5	NE5	NE3	NNE2	N1	SE2	SE2	ESE2	ESE3	SSE2	SSE2	SE2	SE3	S3	ENE3.1	ENE6	
16-Feb	SW4	SW5	SSW4	SSW5	SSW5	SSW5	SSW6	SW5	SSW6	SSW5	SSW4	SSW4	SSW5	SSW4	SSW4	S4	SSW8	SSW8	SW9	SSW9	SSW9	SW9	SW8	SW9	SSW5.9	SW9	
17-Feb	WSW8	SW7	W8	WNW9	WNW6	WNW5	WNW5	NW5	WNW4	NW4	NNE4	NNE3	NNE5	NE9	NE8	NE8	NE10	NE10	ENE8	ENE8	NE8	NE8	NE8	ENE7	NNE3.3	NE10	
18-Feb	E6	NE6	NE6	ENE6	ENE6	E6	ESE5	ESE5	ESE6	ESE6	SE6	SE6	SSE7	SSE9	SSE11	SSE12	SSE10	SSE6	S5	W5	W5	WNW6	NW6	NW9	SE2.8	SSE12	
19-Feb	NW11	NW13	NNW11	NNW11	NNW11	NNW9	NNW9	NNW9	NNW9	NNW8	NW8	NNW7	NW8	NW8	NW8	NNW6	NW6	N6	N6	N5	NNE6	NNE6	NNE5	NE6	NNW7.5	NW13	
20-Feb	NE5	ENE2	NE4	NE4	NE4	NNE4	NE5	NE5	ENE5	ENE4	SE2	SSE4	S5	SW6	SSW7	SW7	SW9	SSW7	SSW8	SSW10	SSW10	SSW10	SSW10	SW9	SSW2.6	SSW10	
21-Feb	SW9	SW8	SW5	WSW6	SW5	SW7	SW8	SW7	SW6	SSW6	SSW7	W6	W7	W7	W10	W10	W8	WSW5	WSW4	SW8	WSW8	W9	W12	WNW13	WSW7.0	WNW13	
22-Feb	WNW12	WNW11	WNW10	WNW11	WNW11	WNW10	WNW12	WNW11	W12	W13	WNW10	W10	WNW12	WNW11	WNW14	WNW12	W12	W14	W17	WNW18	WNW18	WNW18	WNW17	WNW14	WNW12.7	WNW18	
23-Feb	WNW13	WNW12	WNW13	WNW14	WNW15	WNW15	WNW15	WNW15	WNW13	WNW12	WNW12	WNW13	NW11	NW12	NW13	NW11	NW10	NW10	NW8	NW9	NW8	NW8	NW8	NW8	WNW11.4	WNW15	
24-Feb	NW9	NW9	NW8	NW6	WNW7	NW8	NW7	WNW8	WNW8	W8	WSW5	W6	W4	SW6	SW4	WSW4	SW7	SW8	SW10	SSW9	SSW11	SSW13	SSW13	SSW16	WSW5.7	SSW16	
25-Feb	SSW16	SSW15	SSW14	SSW17	SSW17	SW17	SSW16	SW17	SW16	SW15	WSW13	W12	W12	W14	W13	W12	WNW13	W11	WSW10	WSW12	W16	W16	W16	W15	WSW12.5	SW17	
26-Feb	WSW13	WSW12	SW11	SW11	WSW12	SW12	WSW13	W15	W16	WNW14	WNW12	WNW12	W13	WNW12	WNW11	W9	WNW8	WNW6	WNW5	NE6	E7	ENE9	ENE10	NE11	W7.0	W16	
27-Feb	NE13	ENE12	ENE11	ENE10	ENE11	ENE12	ENE14	ENE14	ENE14	ENE12	NE11	NE11	NE11	NNE9	NNE6	N4	N2	SW4	W5	WNW9	W9	W8	W10	W12	NE5.1	ENE14	
28-Feb	WNW12	NW9	NW7	NNW7	NNE9	NNE10	NNE10	NNE10	N11	NNE14	NNE13	N10	NNE12	NE15	ENE13	NE13	ENE13	NE8	NE8	ENE8	E8	ESE8	ESE7	SE7	NNE7.5	NE15	
29-Feb	SE7	S6	SSE7	SSE9	S9	S10	SSW9	SSW10	S10	SSW12	SSW14	SSW12	SSW12	SSW11	S10	SSW11	SSW10	SSW9	S5	SSW7	SSW11	SW14	SW15	SW13	SSW9.6	SW15	
W3.5 W3.3 W2.6WSW2.8WSW2.9WSW2.6WSW2.2WSW2.9WSW3.3WSW3.6WSW3.5 W3.7 W3.9 W4.2 W4.1 W3.5WSW3.2WSW3.5WSW3.5WSW3.6WSW4.0WSW4.1 W4.0 W3.8																								Diurnal Average			
SSW16 SSW15 W15 SSW17 SSW17 SW17 SSW16 SW17 W18 SW18 SW15 W18 W18 W24WNW24 NW26 NW22 NW18 W17WNW18WNW18WNW18 SW17 SSW16																								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
Conklin Lookout - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	159	22.84	22.84
6 - 11	339	48.71	71.55
12 - 19	194	27.87	99.43
20 - 28	4	0.57	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Conklin Lookout - February 2016**

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	12	12	11	3	6	7	10	15	20	13	8	9	8	7	9	159
6 - 11	6	11	32	29	6	7	5	17	18	35	43	17	30	33	33	17	339
12 - 19	0	5	5	8	0	0	0	13	6	27	24	8	40	44	14	0	194
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	4
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	15	28	49	48	9	13	12	40	39	82	80	33	80	86	56	26	696

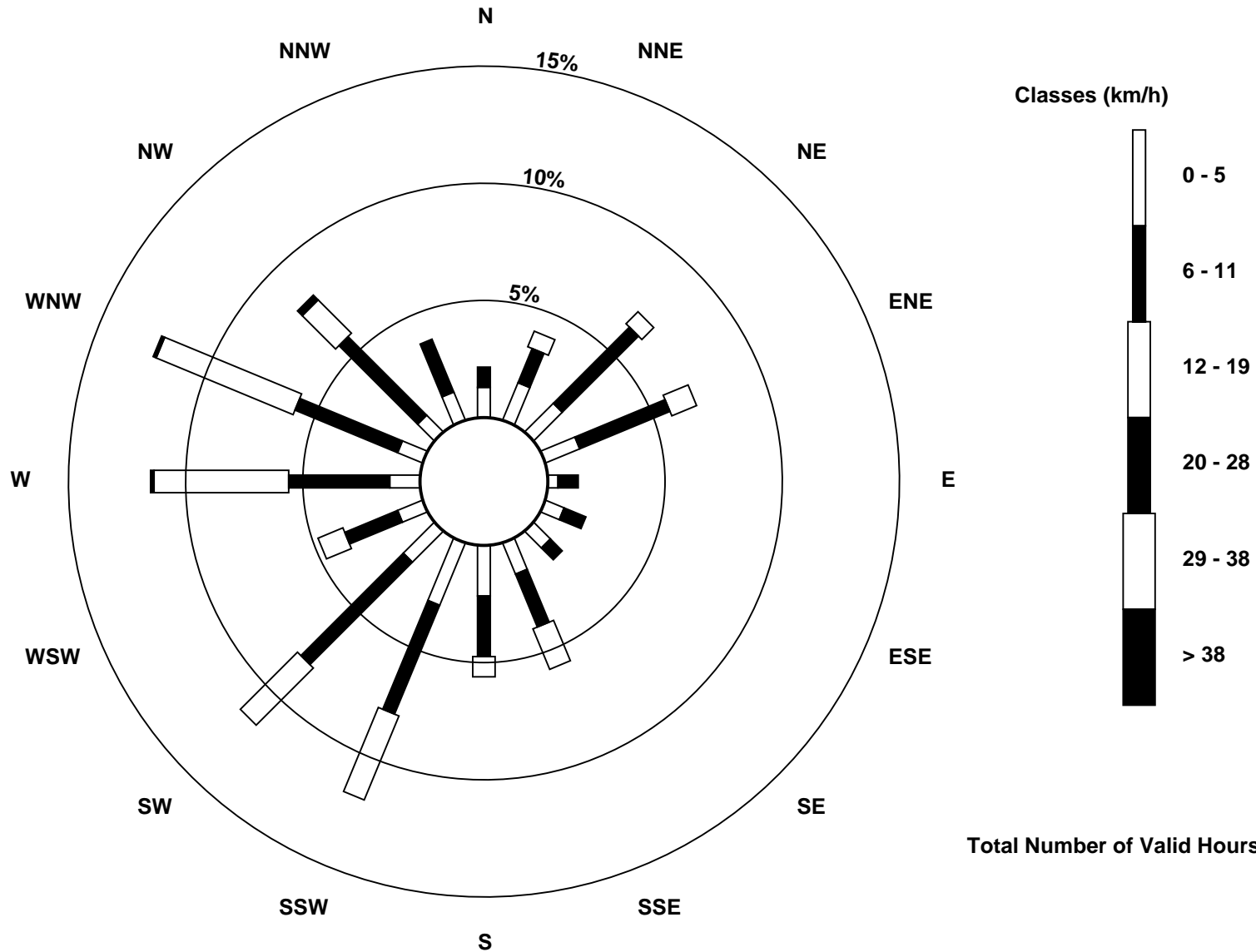
Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Conklin Lookout (AMS 18)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Conklin Lookout - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 6 16:00 Minimum Value: 1 km/h on Feb 15 23:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 4 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 696 Hours of Data: 696 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	1	1	1	1	1	1	1	1	1	1	2	3	3	2	2	1	1	2	2	3	2	2	3	3
2-Feb	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	2	2	2	2	2	2	2	2
3-Feb	2	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2	2	3	3	1	1	1	1	1	
4-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	4	3	3	3	
5-Feb	3	2	2	2	2	2	2	2	3	4	4	4	3	3	2	3	3	4	4	4	4	4	4	3	
6-Feb	4	4	3	4	3	4	2	3	6	6	5	6	7	8	8	9	8	6	6	5	4	6	6	4	
7-Feb	4	4	4	4	5	5	5	4	4	4	4	4	4	4	4	4	4	3	3	3	2	2	2	2	
8-Feb	1	1	2	2	3	2	2	2	2	2	3	4	3	4	3	3	2	1	1	2	1	2	2	2	
9-Feb	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	2	2	2	3	3	4	
10-Feb	4	3	3	4	4	3	4	2	3	3	2	2	3	3	2	3	2	2	2	2	2	2	2	2	
11-Feb	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	2	1	
12-Feb	1	1	1	2	2	2	2	2	2	2	4	4	4	4	5	5	5	5	4	4	3	4	3	4	
13-Feb	4	3	3	3	3	4	4	5	4	5	5	4	4	4	4	3	3	3	3	3	4	5	5	4	
14-Feb	3	4	4	4	4	3	3	4	4	4	4	4	4	4	4	4	3	2	1	2	2	1	1	2	
15-Feb	1	2	2	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	
16-Feb	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	1	2	2	3	2	2	3	2	2	
17-Feb	2	2	3	2	2	1	1	2	1	2	2	1	2	3	2	2	2	2	2	2	2	2	2	2	
18-Feb	2	1	1	2	2	2	1	1	1	1	1	1	2	3	3	3	4	2	1	2	1	2	2	3	
19-Feb	4	5	5	4	4	4	4	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2	2	2	
20-Feb	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	3	3	3	3	3	3	
21-Feb	2	2	1	2	2	2	2	1	2	2	2	3	3	3	3	4	3	1	1	2	2	3	3	4	
22-Feb	4	3	3	3	3	3	4	3	3	3	4	3	4	4	5	4	4	4	5	5	6	5	5	4	
23-Feb	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4	3	3	3	2	2	2	2	2	
24-Feb	3	3	3	2	2	2	2	2	3	3	2	2	2	3	3	2	2	2	2	2	3	3	3	4	
25-Feb	4	4	3	4	4	4	4	4	4	4	4	4	4	5	4	4	4	3	2	3	5	5	5	4	
26-Feb	4	4	3	3	4	3	4	5	5	5	4	4	4	4	3	3	2	2	1	4	2	3	3	3	
27-Feb	3	3	3	3	3	3	4	4	4	4	3	3	3	3	2	2	1	1	2	3	3	3	3	4	
28-Feb	4	3	3	3	3	3	3	3	3	4	5	4	4	4	4	4	3	2	2	2	2	2	2	2	
29-Feb	1	1	1	2	2	2	2	2	3	4	4	4	3	3	3	3	3	3	1	2	3	4	4	3	
																	Diurnal Maximum								



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Conklin Lookout - February 2016

Direction of Maximum Speed: 309 deg on Feb 6 16:00 Direction of Maximum Daily Speed Average: 282.6 deg on Feb 6	Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0
Direction of Minimum Speed: 202 deg on Feb 4 02:00 Direction of Minimum Daily Speed Average: 1.4 deg on Feb 3	Percent Operational Time: 100.0
Monthly Average Direction: 262.7 deg	

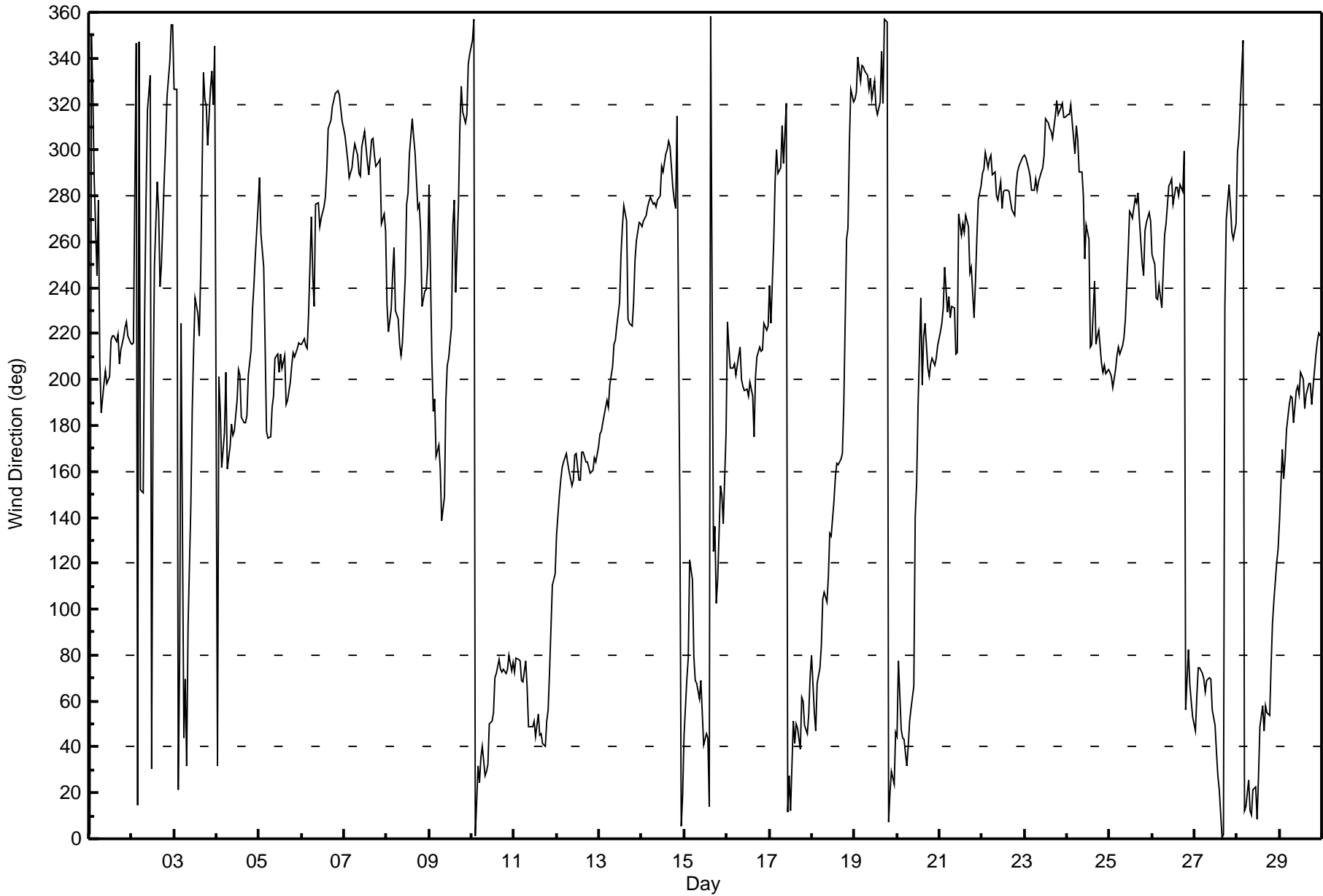
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	2	350	325	287	245	278	208	185	198	204	198	201	217	219	219	216	220	207	213	218	223	225	219	216	220.1
2-Feb	215	216	347	15	347	152	151	228	278	317	332	31	188	249	286	273	241	250	288	303	323	338	354	355	276.8
3-Feb	327	327	21	79	225	44	69	32	93	146	187	214	235	229	219	246	334	322	319	302	327	334	320	345	299.2
4-Feb	31	202	186	162	177	203	161	171	181	175	177	191	205	202	184	181	184	202	213	231	241	254	276	204.1	
5-Feb	288	264	249	215	178	175	175	188	193	209	211	203	211	205	210	189	191	199	206	212	210	214	216	215	207.4
6-Feb	215	218	215	213	228	271	245	232	276	277	266	271	275	279	291	309	313	319	322	324	326	324	318	312	282.6
7-Feb	306	301	296	288	292	299	303	298	290	289	301	308	301	295	289	304	305	298	293	295	296	268	272	265	295.3
8-Feb	233	221	231	246	258	230	226	215	211	216	244	277	282	298	314	306	299	275	277	265	232	238	239	250	253.6
9-Feb	285	209	186	192	167	171	161	139	149	191	206	209	222	267	278	238	276	310	328	316	312	316	337	342	257.9
10-Feb	348	357	1	32	25	36	40	27	30	32	50	51	55	70	72	78	74	72	74	72	74	80	73	77	48.0
11-Feb	73	79	78	77	69	68	77	66	49	49	49	51	45	54	45	46	42	41	51	56	73	111	113	115	63.0
12-Feb	133	150	157	162	164	168	164	160	154	156	167	168	156	156	168	169	164	164	161	159	161	166	164	171	162.2
13-Feb	176	177	181	188	191	188	198	206	215	217	223	234	254	266	276	269	227	225	224	234	252	261	268	268	226.5
14-Feb	266	269	272	275	278	280	276	277	275	278	280	293	291	298	300	304	302	284	278	274	315	145	5	19	283.4
15-Feb	45	70	79	121	113	79	69	68	61	69	55	41	46	44	14	358	125	136	102	113	154	150	137	177	76.2
16-Feb	225	214	205	205	207	202	206	214	200	197	195	196	193	199	193	175	201	210	214	213	213	224	221	223	208.5
17-Feb	241	225	260	287	301	290	292	310	294	320	12	27	12	51	41	50	48	39	62	60	49	46	54	71	16.6
18-Feb	80	55	47	68	74	84	104	107	103	114	133	132	147	158	164	163	166	168	188	261	266	303	326	321	128.8
19-Feb	322	325	341	330	337	336	335	333	327	331	322	330	319	316	321	343	320	357	356	7	20	29	24	46	338.2
20-Feb	45	77	48	44	43	32	40	51	57	67	140	154	188	236	198	219	225	205	202	207	209	206	209	215	192.7
21-Feb	221	225	231	249	230	236	227	232	231	211	212	272	263	268	264	271	267	246	249	227	243	262	278	285	248.8
22-Feb	290	292	299	292	296	298	289	290	280	278	286	275	282	283	282	282	278	274	271	284	290	293	296	297	286.6
23-Feb	298	297	292	289	282	283	288	283	286	290	292	298	314	312	309	308	305	315	322	316	319	320	314	314	299.4
24-Feb	315	316	320	312	299	311	304	291	290	280	253	267	261	214	216	243	215	219	222	207	203	206	203	204	250.7
25-Feb	203	201	196	204	211	214	211	215	218	226	256	273	272	270	279	277	282	270	251	245	265	269	273	269	241.6
26-Feb	254	250	236	235	241	232	247	263	268	284	286	288	277	284	284	280	285	282	299	56	83	67	60	53	270.8
27-Feb	47	62	74	74	72	70	64	69	70	70	56	50	38	28	21	1	2	231	270	285	276	264	261	268	44.4
28-Feb	299	306	320	348	13	14	26	12	10	22	23	9	27	49	58	47	58	55	53	76	94	104	120	126	33.1
29-Feb	139	170	157	165	178	189	193	192	181	196	197	194	203	200	187	193	199	198	189	197	211	217	220	219	194.5
	272.4	259.6	262.4	254.6	253.5	258.7	249.9	251.3	252.6	251.7	250.4	263.3	267.6	269.8	272.3	272.3	258.7	250.6	253.9	252.0	251.1	253.0	259.6	260.4	
	Diurnal Average																								

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Conklin Lookout - February 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Conklin Lookout - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Feb 4 02:00 Minimum Value: 11 deg on Feb 12 02:00 Percentiles: P ₁ = 13 P ₁₀ = 17 Q ₁ = 19 Median = 21 Q ₃ = 25 P ₉₀ = 30 P ₉₉ = 71																			Hours in Service: 696 Hours of Data: 696 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	26	25	28	41	41	44	33	27	19	22	25	29	23	25	28	27	21	13	14	17	17	16	17	18	44
2-Feb	17	18	64	22	39	73	23	16	48	31	25	72	41	40	33	25	20	21	18	19	19	24	26	32	73
3-Feb	25	30	40	48	15	46	36	30	23	26	23	42	30	30	27	35	47	27	22	20	19	16	21	28	48
4-Feb	59	91	57	53	19	36	19	12	16	18	24	29	34	27	28	25	22	22	19	19	19	23	23	28	91
5-Feb	24	23	28	32	19	17	17	17	15	17	17	18	30	19	20	20	17	17	16	17	16	17	16	16	32
6-Feb	17	18	19	19	20	23	26	26	24	22	23	24	26	22	24	23	22	24	24	25	24	24	22	22	26
7-Feb	21	22	22	20	21	22	22	22	21	23	23	25	27	25	23	24	22	20	20	21	23	17	19	22	27
8-Feb	28	12	17	19	24	20	19	15	15	18	28	22	22	25	23	23	21	20	18	24	22	28	23	24	28
9-Feb	32	25	24	17	25	30	17	18	19	23	20	21	24	28	26	21	21	29	24	19	20	25	27	32	32
10-Feb	29	28	25	21	22	22	20	26	21	26	20	18	23	22	24	23	21	19	17	17	17	18	18	18	29
11-Feb	19	19	22	21	17	22	18	19	17	18	21	24	20	26	24	19	17	16	13	14	18	17	24	15	26
12-Feb	16	11	12	14	14	14	15	14	15	18	21	21	19	19	21	21	21	21	20	19	18	20	22	21	22
13-Feb	21	20	21	20	20	20	21	22	19	19	20	22	22	24	22	25	27	18	16	22	21	23	22	22	27
14-Feb	24	22	20	19	20	19	19	19	18	18	19	20	22	24	24	25	22	16	14	16	46	64	87	23	87
15-Feb	20	17	22	29	30	23	20	20	21	23	21	23	22	35	45	73	33	42	27	22	24	50	21	43	73
16-Feb	19	18	18	22	22	20	20	25	20	19	20	27	25	23	23	25	23	23	21	19	18	21	17	17	27
17-Feb	21	21	26	23	21	21	19	22	25	34	31	34	41	18	15	18	14	18	19	21	14	15	16	20	41
18-Feb	19	20	17	20	19	22	21	21	18	18	21	20	24	26	24	21	22	23	27	29	23	28	23	24	29
19-Feb	23	24	25	26	27	26	24	26	25	27	27	35	32	33	31	31	25	27	29	23	24	25	24	21	35
20-Feb	26	20	25	13	16	13	13	12	14	23	44	58	57	47	38	28	20	20	19	19	21	19	21	21	58
21-Feb	19	20	27	24	22	18	16	16	19	16	26	44	35	35	27	28	24	17	29	14	19	21	19	19	44
22-Feb	19	19	20	19	20	20	20	19	18	19	23	25	25	26	24	23	22	20	20	21	21	21	21	21	26
23-Feb	21	21	19	21	19	19	18	19	21	21	24	22	26	24	23	24	23	21	20	19	18	18	16	15	26
24-Feb	18	19	20	23	19	15	18	18	20	27	38	41	58	41	79	72	30	16	17	15	17	17	17	18	79
25-Feb	18	17	17	18	17	18	17	19	18	23	28	25	26	25	25	23	21	21	20	18	21	21	21	20	28
26-Feb	23	22	18	18	21	18	23	25	23	22	24	25	24	24	27	29	21	18	20	43	16	16	17	18	43
27-Feb	15	19	20	20	19	17	17	17	19	20	16	19	22	23	30	39	63	45	32	21	21	24	23	24	63
28-Feb	24	24	28	27	23	22	19	23	22	23	24	26	26	20	23	23	18	17	14	20	18	16	15	18	28
29-Feb	16	14	11	13	15	13	15	16	19	22	20	24	24	25	26	24	22	20	23	19	21	19	19	18	26
Diurnal Maximum																									
59 91 64 53 41 73 36 30 48 34 44 72 58 47 79 73 63 45 32 43 46 64 87 43																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 18, 2016	Last Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	12:24
Gas Cert Reference	EY0000368	Station temp.	22 Deg C
Cal Gas Concentration	49 ppm	Cal Gas Exp Date	10/06/2016
Calibrator Make/Model	API T700	Serial Number	1222
ZAG Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-602	-601
Analyzer IP address	192.168.1.43		Lamp voltage	901	898
Calculated slope	0.992736	0.985514	Chamber temp	45.0	45.3
Calculated intercept	1.561202	-0.649142	Pressure	658.4	644.7
Analyzer Background	23.0	21.6	Flow	0.428	0.414
Analyzer Coefficient	0.918	0.918	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	58.6	574.3	578.4	0.993
calibrator zero	5000	0.0	0.0	0.6	----
high point	5000	58.6	574.3	583.5	0.984
second point	5000	29.3	287.1	291.6	0.985
third point	5000	14.6	143.1	146.2	0.979
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	58.6	574.3	581.0	0.988
Average Correction Factor					0.983

Corrected As found 579.4 Previous response 576.9 % change -0.4%

Notes:

No maintenance done, filter changed out, zero adjusted

Calibration Performed By: Melissa Lemay



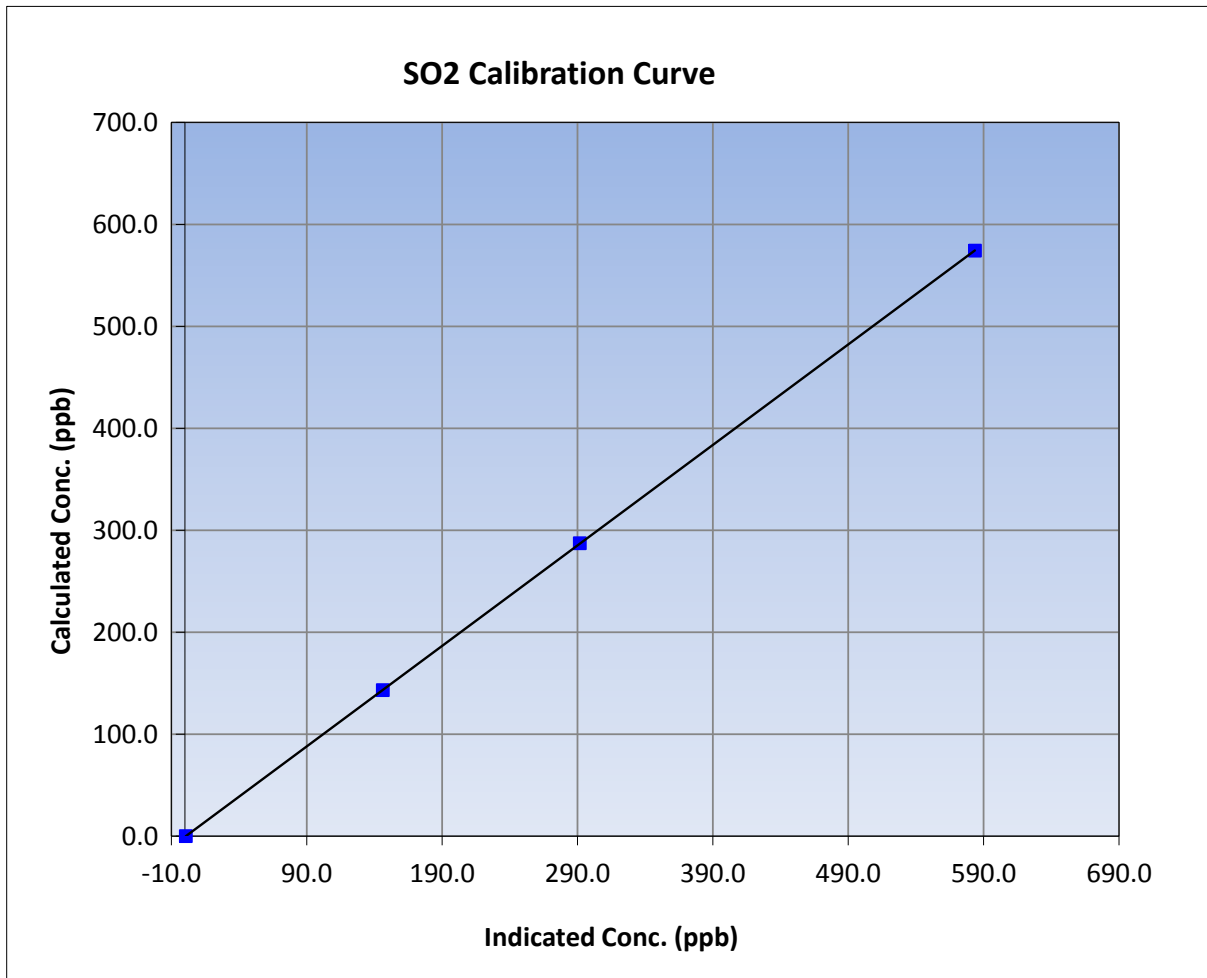
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:50	End Time (MST)	12:24
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

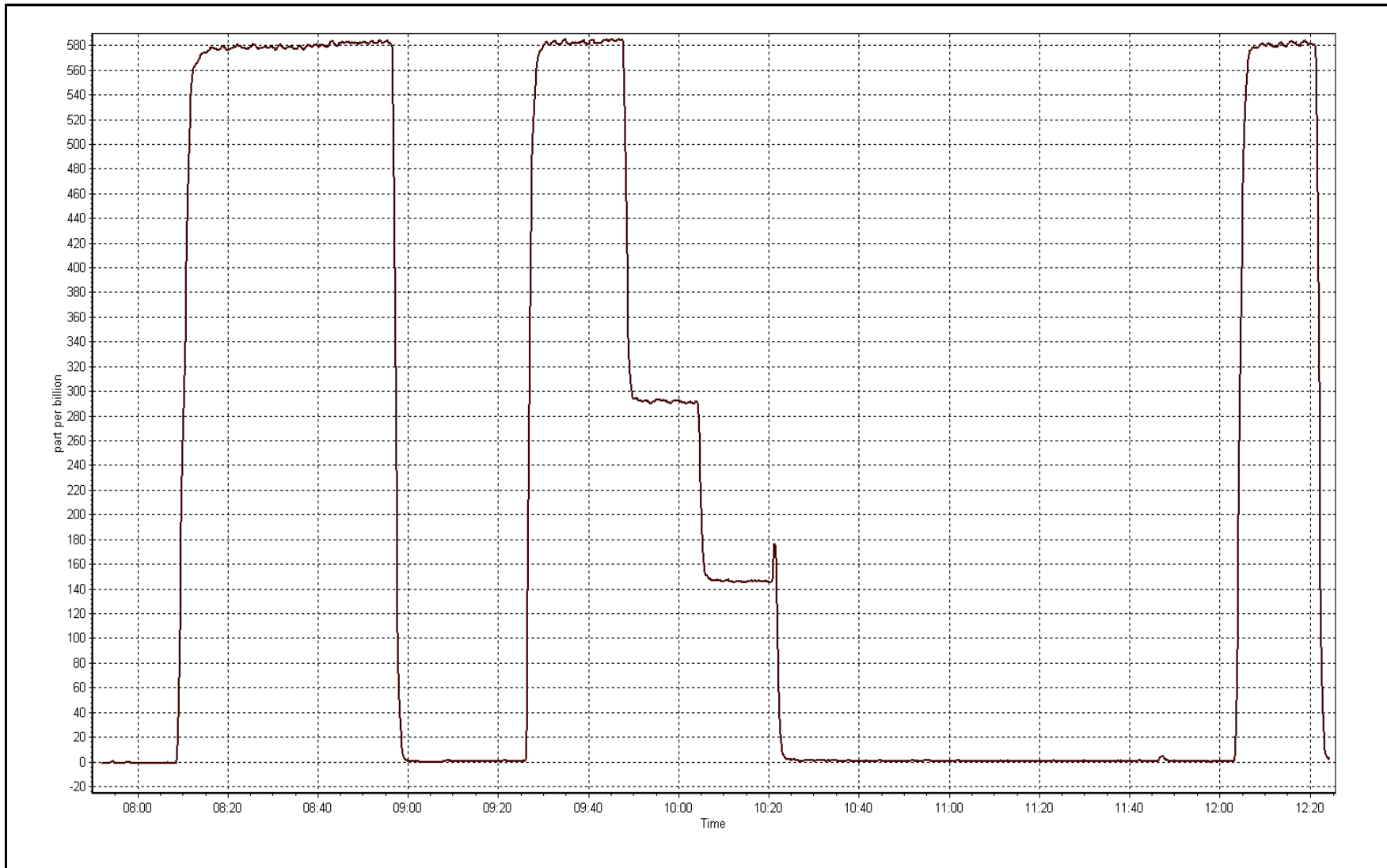
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999998
574.3	583.5	0.9842		
287.1	291.6	0.9847	Slope	0.985514
143.1	146.2	0.9787		
			Intercept	-0.649142



SO2 Calibration Plot

Date: February 18, 2016





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	February 10, 2016	Last Calibration	January 20, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	12:50
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	06/10/2014
Calibrator Make/Model	API 700	Serial Number	1222
Dil air Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000368 10/Jun/15

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-700
Analyzer IP address	192.168.1.42		Lamp voltage	1025	1017
Calculated slope	1.011644	0.999644	Chamber temp	45	45
Calculated intercept	-0.082451	-0.198473	Pressure	639.6	642.9
Analyzer Background	2.99	2.99	Flow	0.411	0.413
Analyzer Coefficient	1.121	1.121	Intensity	92	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	80.1	0.999
SO2 scrubber check	5000	19.5	191.1	1.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.0	80.0	80.1	0.999
second point	5000	41.0	40.0	40.5	0.988
third point	5000	20.5	20.0	20.3	0.986
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	82.0	80.0	81.4	0.983
Average Correction Factor					0.991

Corrected As found	80.1	Previous response	79.2	% change	-1.1%
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Notes:

no maintenance or adjustments done, filter changed out,

Calibration Performed By:

Melissa Lemay



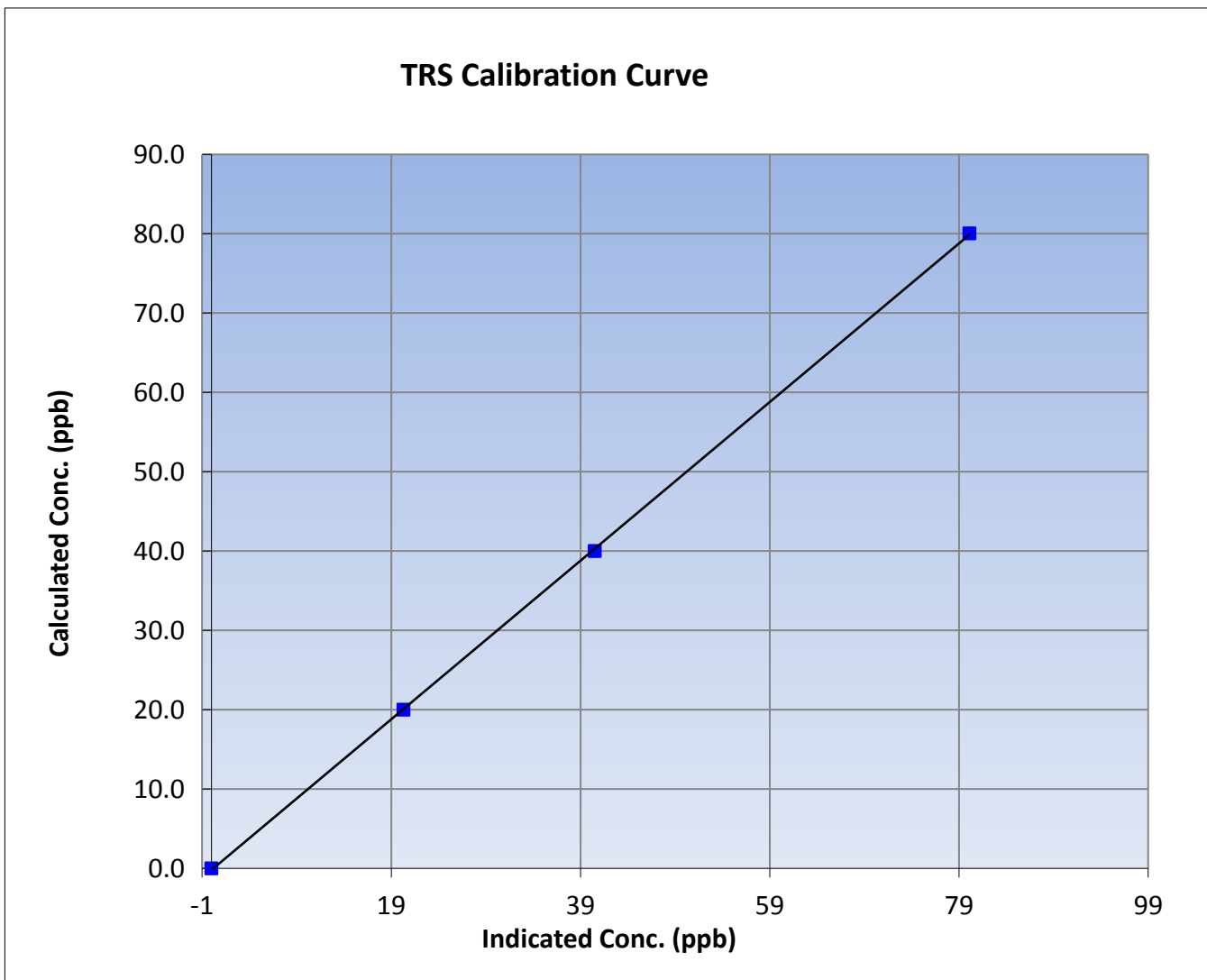
Wood Buffalo Environmental Association TRS Calibration Report

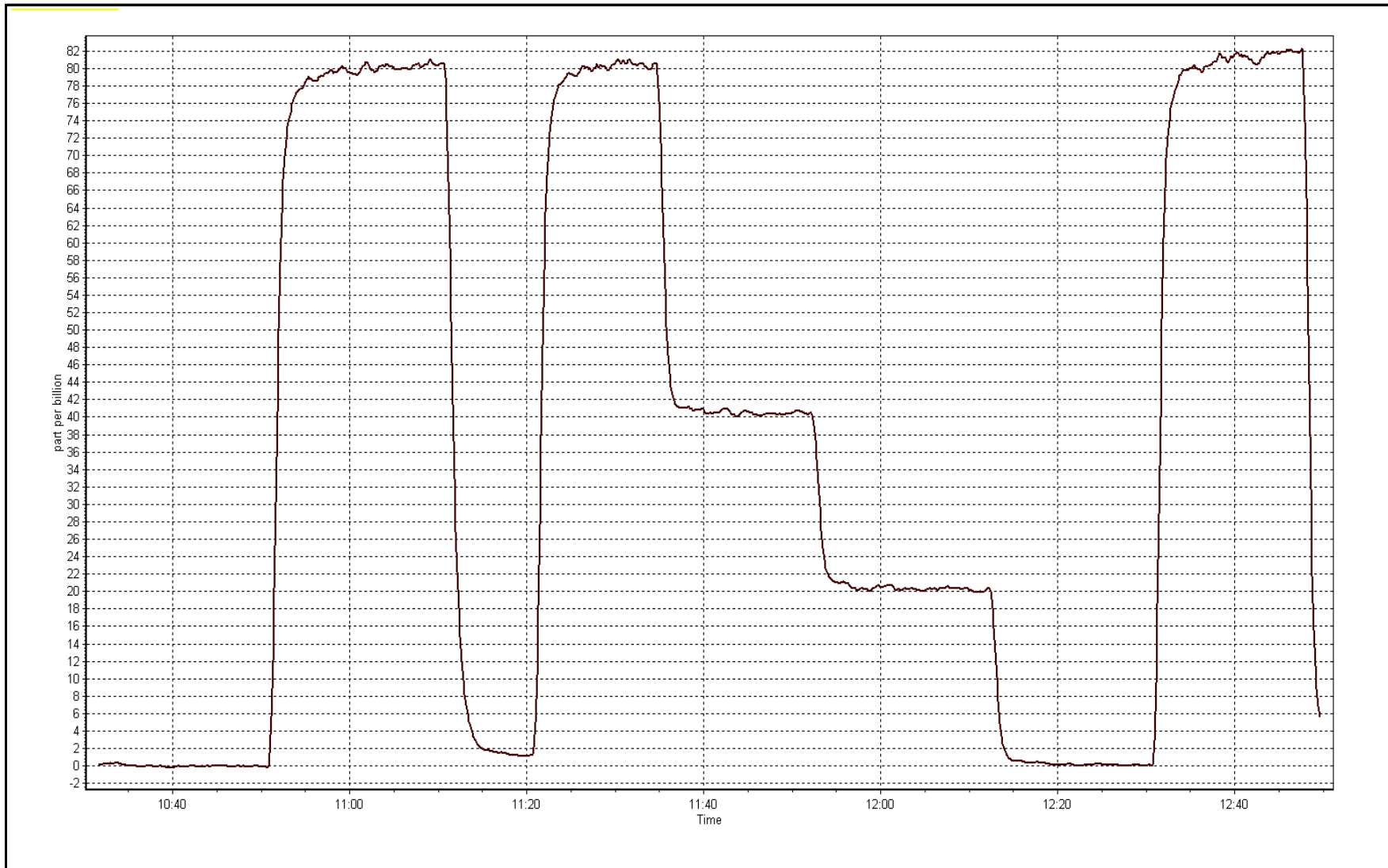
Station Information

Calibration Date	February 10, 2016	Previous Calibration	January 20, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	10:30	End Time (MST)	12:50
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	0.999958
80.0	80.1	0.9992		
40.0	40.5	0.9880	Slope	0.999644
20.0	20.3	0.9856		
			Intercept	-0.198473







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	February 18, 2016	Last Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	12:23
Gas Cert Reference	EY0000368	Cal Gas Expiry Date	June 10, 2016
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1076.3 ppm
C3H8 Cal Gas Conc.	203.0 ppm	Station temp.	22 Deg C
Calibrator Model	API T700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9035

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.4
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.999347	1.000648	Carrier Pressure	31.7	31.7
THC Calc intercept	0.031863	-0.000291	Fuel Pressure	42.2	42.2
NMHC Calc slope	1.000255	1.000965	Air Pressure	32.4	32.5
NMHC Calc intercept	0.007804	-0.004230			

Analyzer make Thermo 55i Analyzer serial # 1218153354

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	58.6	12.61	12.59	1.002
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	12.61	12.61	1.000
second point	5000	29.3	6.31	6.29	1.003
third point	5000	14.6	3.14	3.15	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	12.61	12.62	0.999
Average Correction Factor					1.000

Corrected As found 12.59 Previous response 12.59 % change 0.0%

Notes:

NMHC and CH4 5% out THC was <1%, span adjusted, filter changed out

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.6	6.54	6.23	1.050
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.54	6.54	1.000
second point	5000	29.3	3.27	3.27	1.000
third point	5000	14.6	1.63	1.64	0.994
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.54	6.54	1.000
Average Correction Factor					0.998

Corrected As found 6.23 Previous response 6.53 % change 4.9%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.6	6.07	6.38	0.952
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.07	6.07	1.000
second point	5000	29.3	3.04	3.02	1.005
third point	5000	14.6	1.51	1.50	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.07	6.08	0.999
Average Correction Factor					1.005

Corrected As found 6.38 Previous response 6.06 % change -5.1%



Wood Buffalo Environmental Association

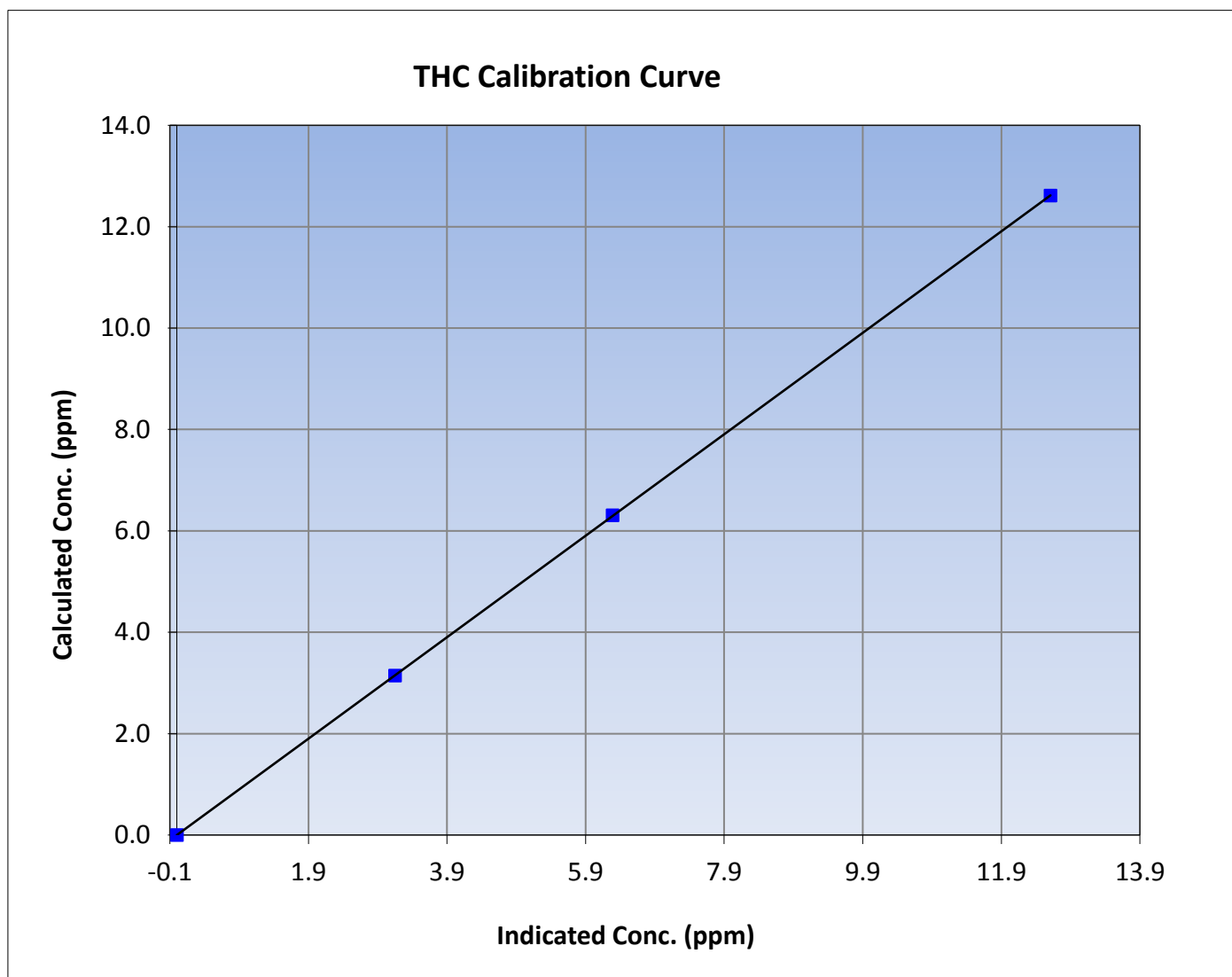
THC Calibration Summary

Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:50	End Time (MST)	12:23
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999997
12.61	12.61	1.0003		
6.31	6.29	1.0027	Slope	1.000648
3.14	3.15	0.9977		
			Intercept	-0.000291





Wood Buffalo Environmental Association

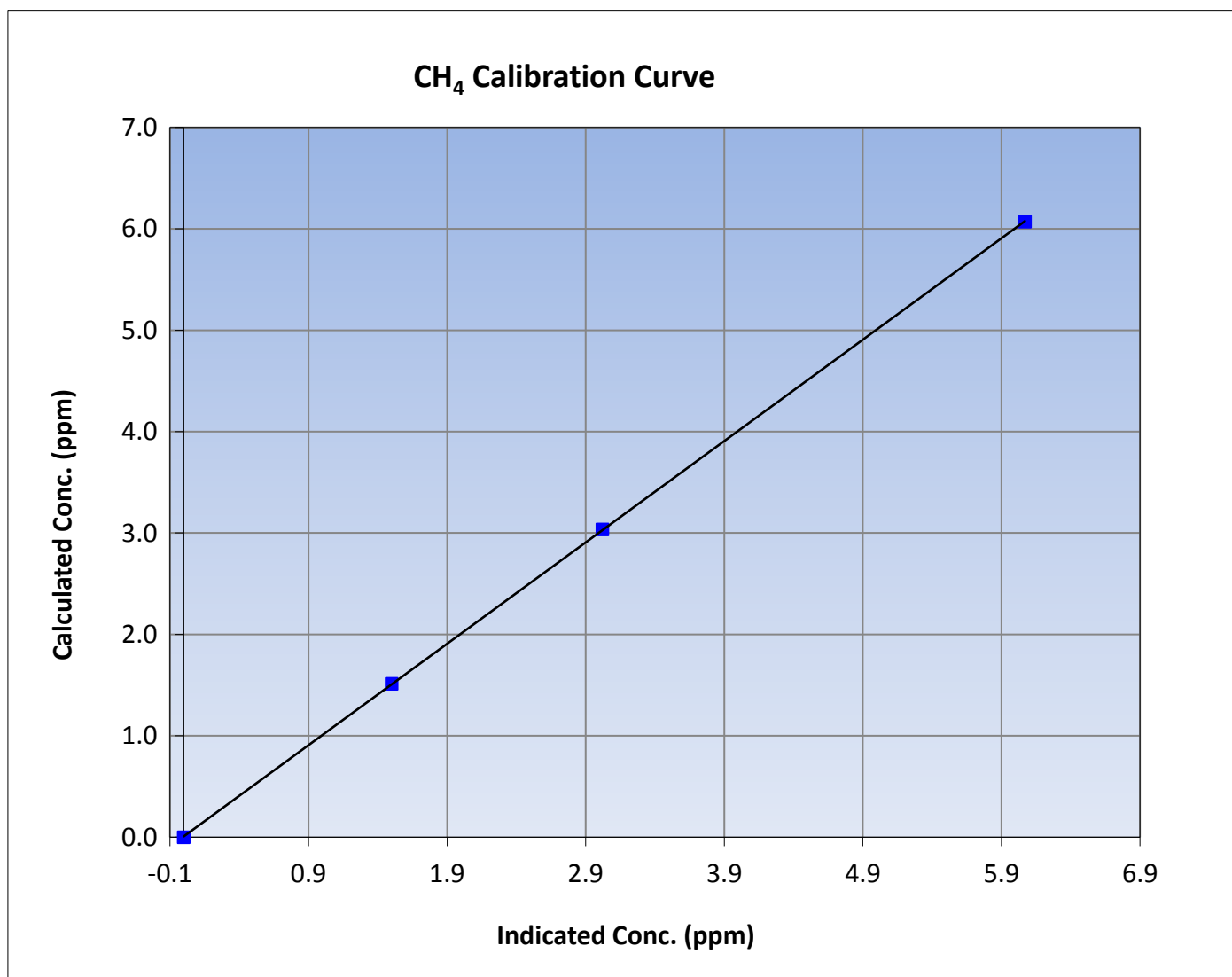
CH₄ Calibration Summary

Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:50	End Time (MST)	12:23
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999991
6.07	6.07	1.0002		
3.04	3.02	1.0051	Slope	0.999734
1.51	1.50	1.0084		
			Intercept	0.007953





Wood Buffalo Environmental Association

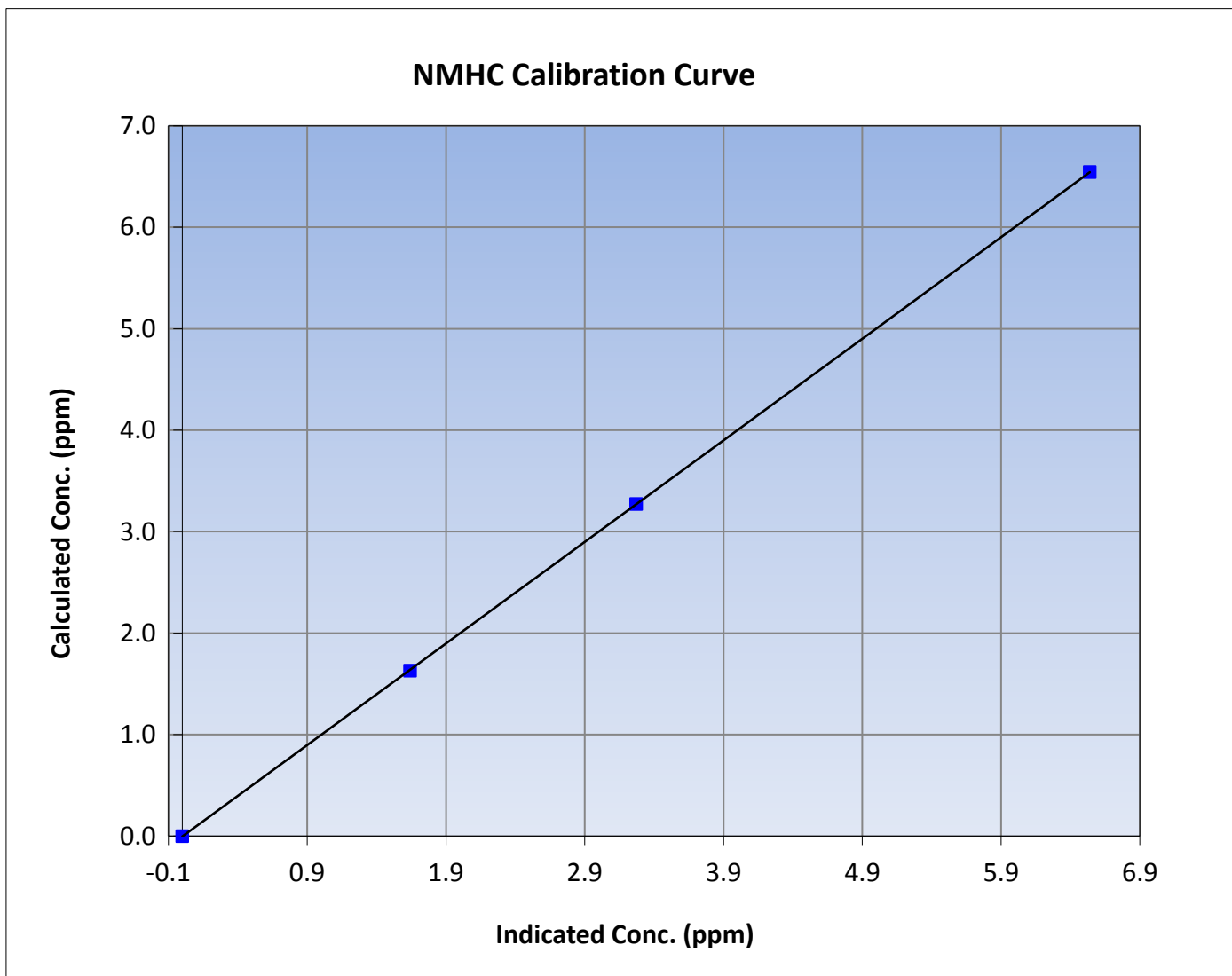
NMHC Calibration Summary

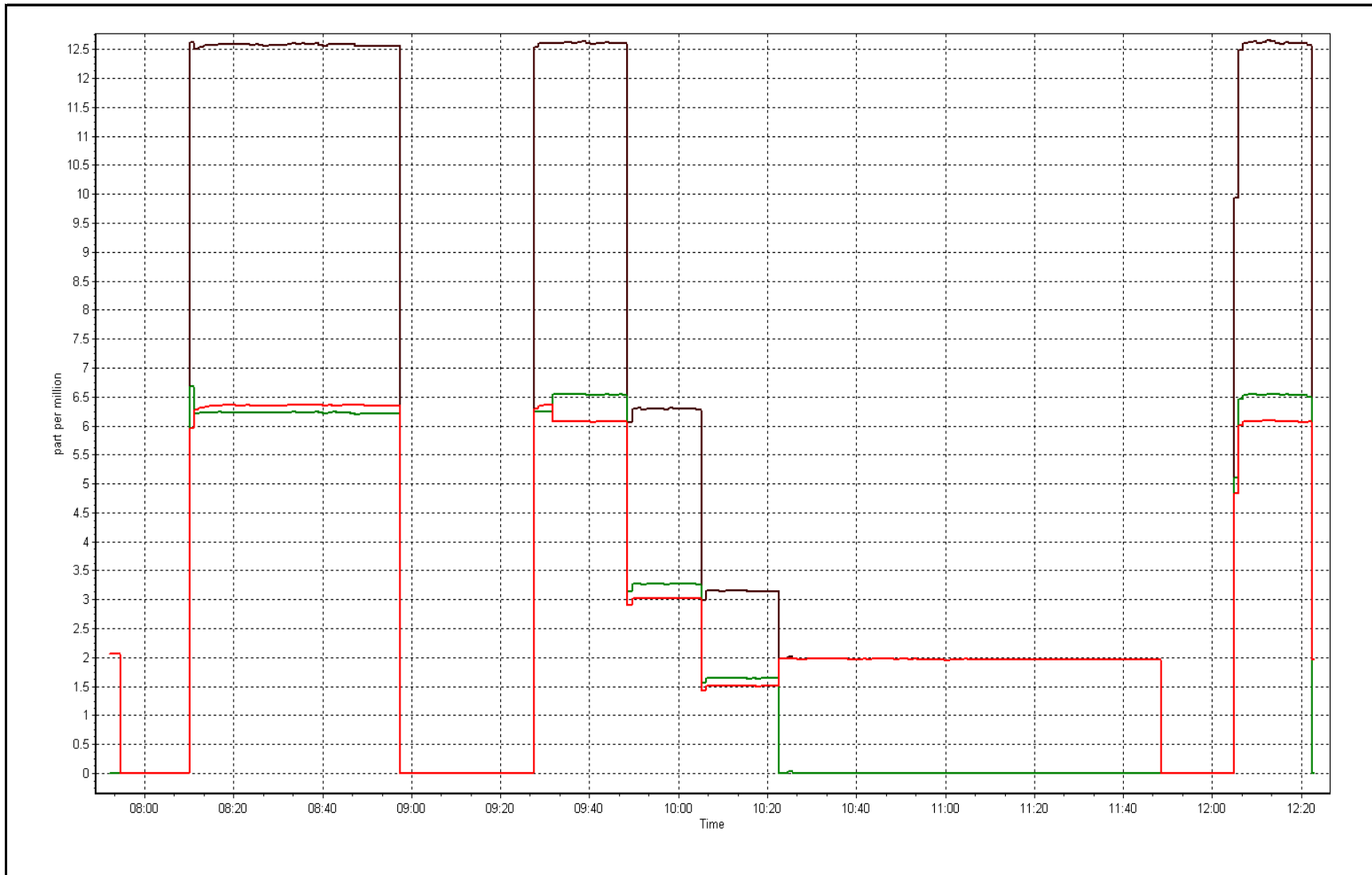
Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:50	End Time (MST)	12:23
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999997
6.54	6.54	1.0004		
3.27	3.27	1.0004	Slope	1.000965
1.63	1.64	0.9940		
			Intercept	-0.004230







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	February 19, 2016	Previous Calibration	January 20, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	12:12
NO2 GPT Ref date	February-18-16	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9305

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.9	28.3
Analyzer IP address	192.168.1.48		Lamp temp.	53.3	53.3
Calculated slope	0.994101	0.992035	Pressure	614.0	607.7
Calculated intercept	0.260127	0.453184	Flow cell A	0.693	0.689
Analyzer Background	-1.7	-1.7	Flow cell B	0.691	0.688
Analyzer Coefficient	1.092	1.092	Cell A Intensity	75894	74950
			Cell B Intensity	71582	71030

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.6	----
as found span	5000	757.00	368.1	368.1	1.000
calibrator zero	5000	0.00	0.0	0.5	----
high point	5000	757.00	368.1	371.5	0.991
second point	5000	520.00	251.3	252.1	0.997
third point	5000	270.00	131.3	130.8	1.004
as left zero	5000	0.00	0.0	0.3	----
as left span	5000	757.00	368.1	373.7	0.985
Average Correction Factor					0.997

Corrected As found	368.7	Previous response	370.0	% change	0.4%
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Notes:

No adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay



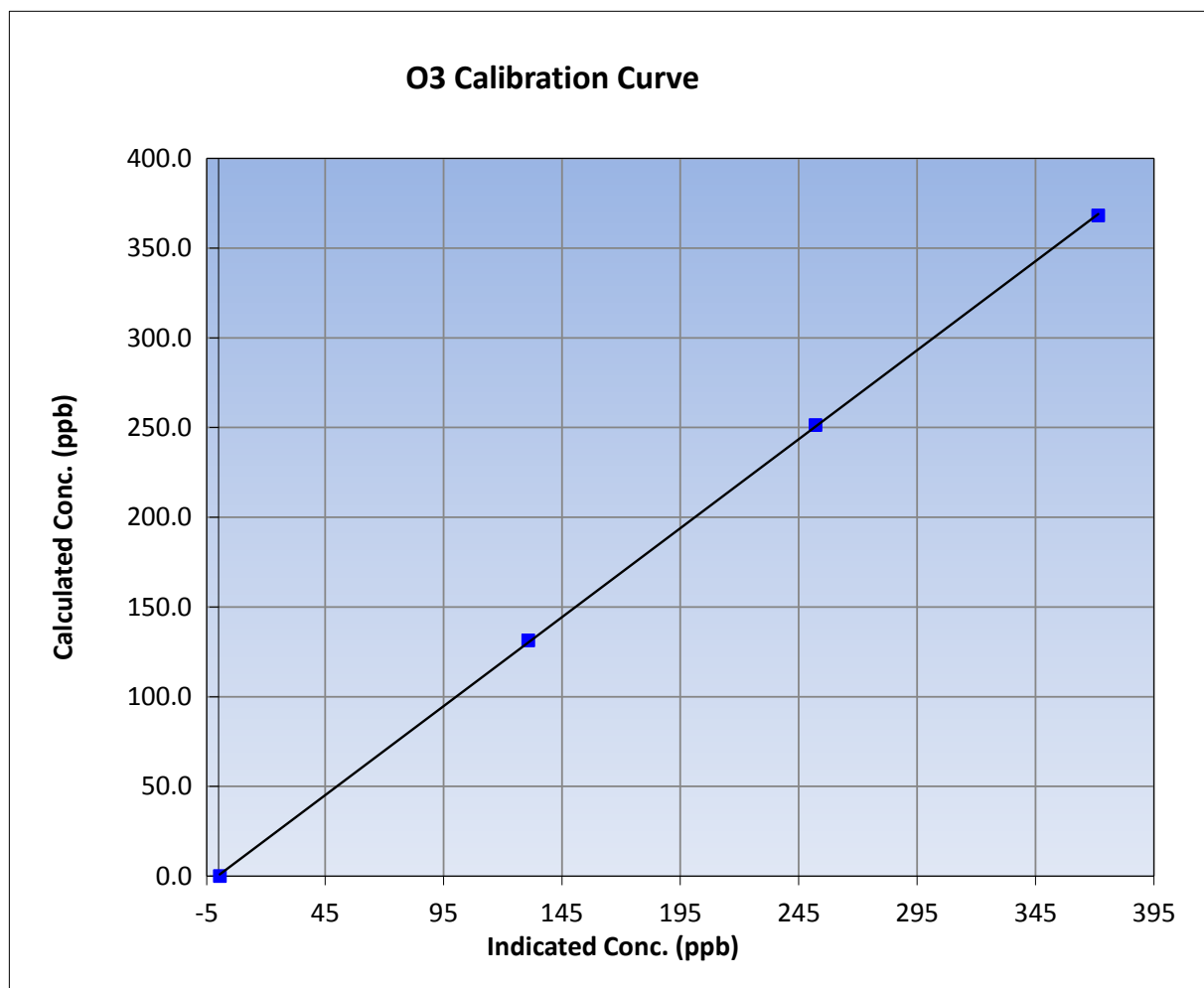
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	February-19-16	Previous Calibration	January 20, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:25	End Time (MST)	12:12
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

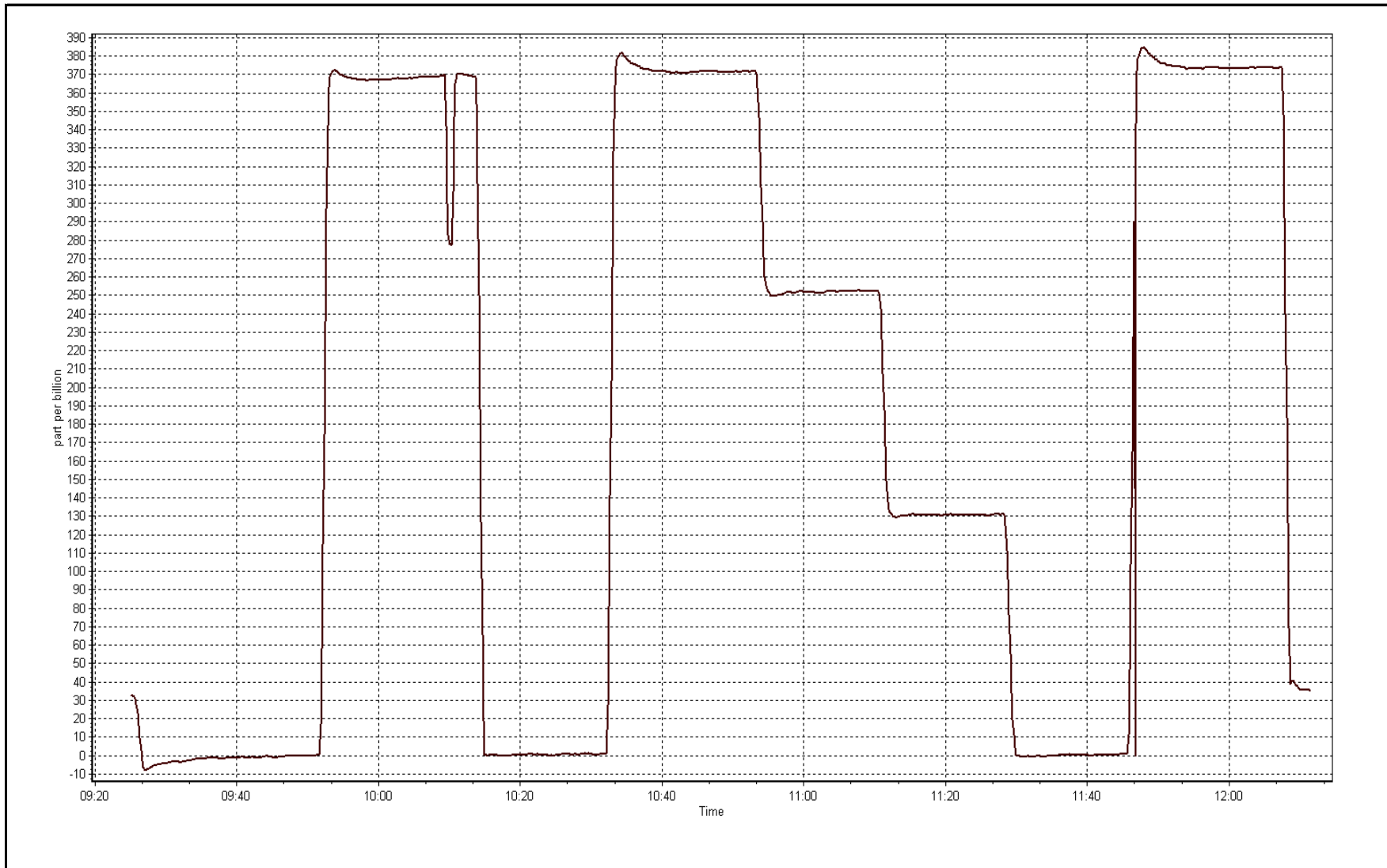
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999954
368.1	371.5	0.9908		
251.3	252.1	0.9968	Slope	0.992035
131.3	130.8	1.0038		
			Intercept	0.453184



O3 Calibration Plot

Date: February 19, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 15, 2016	Previous Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	<input type="text"/>		
Start Time (MST)	7:50	End Time (MST)	12:24
NO Cal Gas Conc	51.2 ppm	Gas Cert Reference	EY0000368
NOX Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	10/06/2016
Calibrator	API T700	Serial Number	1222
Zero air Generator	Teledyne API T701	Serial Number	5610

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9035
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998149	0.996916	1.004753
	Data Offset	0.435719	0.903901	0.099397
Current Calibration	Data Slope	1.001387	1.000895	1.002846
	Data Offset	-0.463974	0.115591	0.569079

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.771		1.005	
NOX coefficient	0.997		0.997	
NO2 coefficient	0.999		0.999	
NO bkgrnd	1.6		1.8	
NOX bkgrnd	1.7		1.9	
Chamber Temp	50.2	Deg C	50	Deg C
Moly Temp	326	Deg C	324.5	Deg C
PMT voltage	-843.2	V	-813.6	V
PMT Temp	-3.2	Deg C	-3.1	Deg C
O3 flow	Ok	ccm	Ok	ccm
R Cell press NO	150.3	mmHg	149.7	mmHg
R Cell Press Nox	155	mmHg	149.7	mmHg
NO sample flow	0.957	lpm	0.945	lpm
Nox sample Flow	0.956	lpm	0.945	lpm

Notes:

O rings replaced, Factory Calibration done, zero and span adjusted, filter changed out



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 15, 2016

Station Number:

AMS 18

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as found span	5000	58.6	600.1	600.1	0.0	591.4	590.5	0.9	1.0146	1.0162
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	58.6	600.1	600.1	0.0	599.5	599.5	0.0	1.0009	1.0009
second point	5000	29.3	300.0	300.0	0.0	300.0	299.3	0.7	1.0001	1.0024
third point	5000	14.6	149.5	149.5	0.0	150.7	149.6	1.2	0.9921	0.9994
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	----	----
as left span	5000	58.6	600.1	229.0	371.1	596.1	220.7	375.3	1.0066	1.0376
Average Correction Factor									0.9977	1.0009

Corrected As found
Previous Response

NO_x= 591.6
NO_x= 600.7

NO= 590.6
NO= 601.0

Percent Change

NO_x= 1.6%

NO= 1.8%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.60 ccm NOx ref calc conc = 600.1 ppb NO ref calc conc = 600.1 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	596.6	597.1	0.0	1.0058	1.0050	----	----
1st NO2 (300)	229.0	368.1	595.4	229.0	366.5	1.0078	----	1.0044	99.6%
2nd NO2 (200)	345.8	251.3	596.4	345.8	250.6	1.0061	----	1.0028	99.7%
3rd NO2 (100)	465.8	131.3	595.0	465.8	129.2	1.0085	----	1.0163	98.4%
2nd NO ref point		0.0	595.0	595.5	-0.4	1.0085	1.0077	----	----
Average Correction Factor						1.0077		1.0078	99.2%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

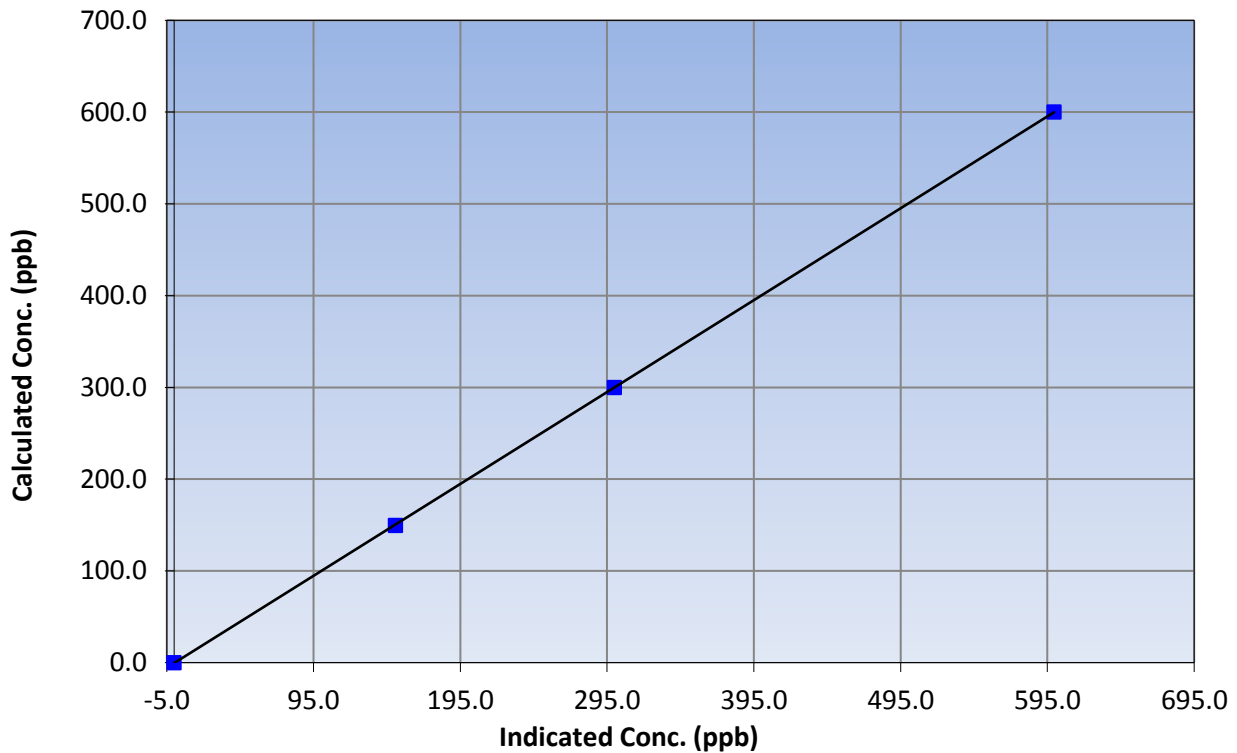
Station Information

Calibration Date	January 15, 2016	Previous Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:50	End Time (MST)	12:24
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999993
600.1	599.5	1.0009		
300.0	300.0	1.0001	Slope	1.001387
149.5	150.7	0.9921		
			Intercept	-0.463974

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

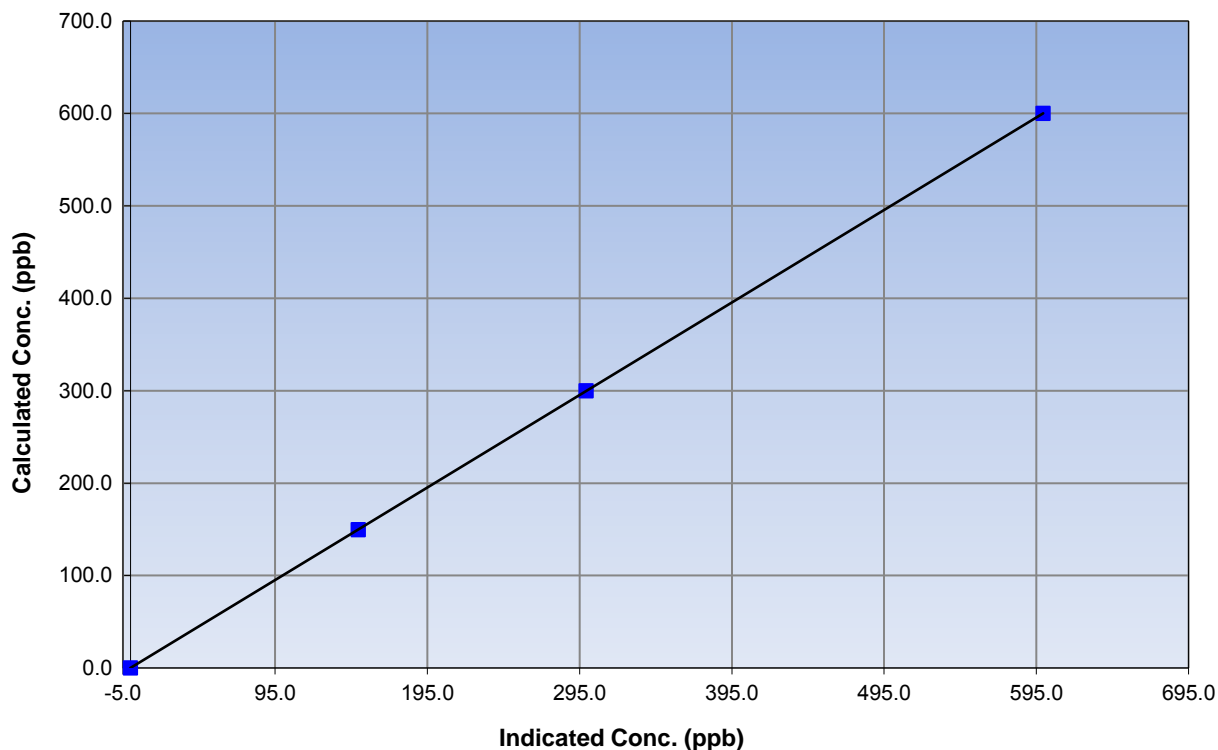
Station Information

Calibration Date	January 15, 2016	Previous Calibration	January 15, 2016
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:50	End Time (MST)	12:24
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999999
600.1	599.5	1.0009		
300.0	299.3	1.0024	Slope	1.000895
149.5	149.6	0.9994		
			Intercept	0.115591

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

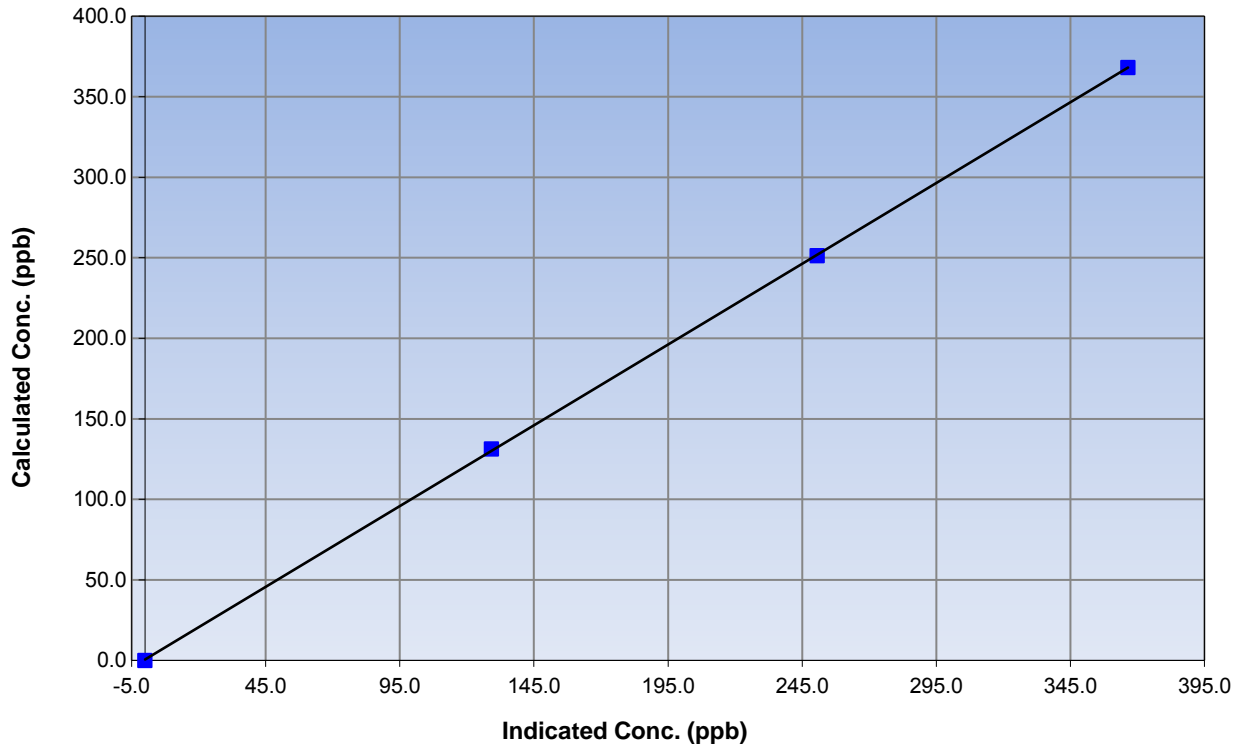
Station Information

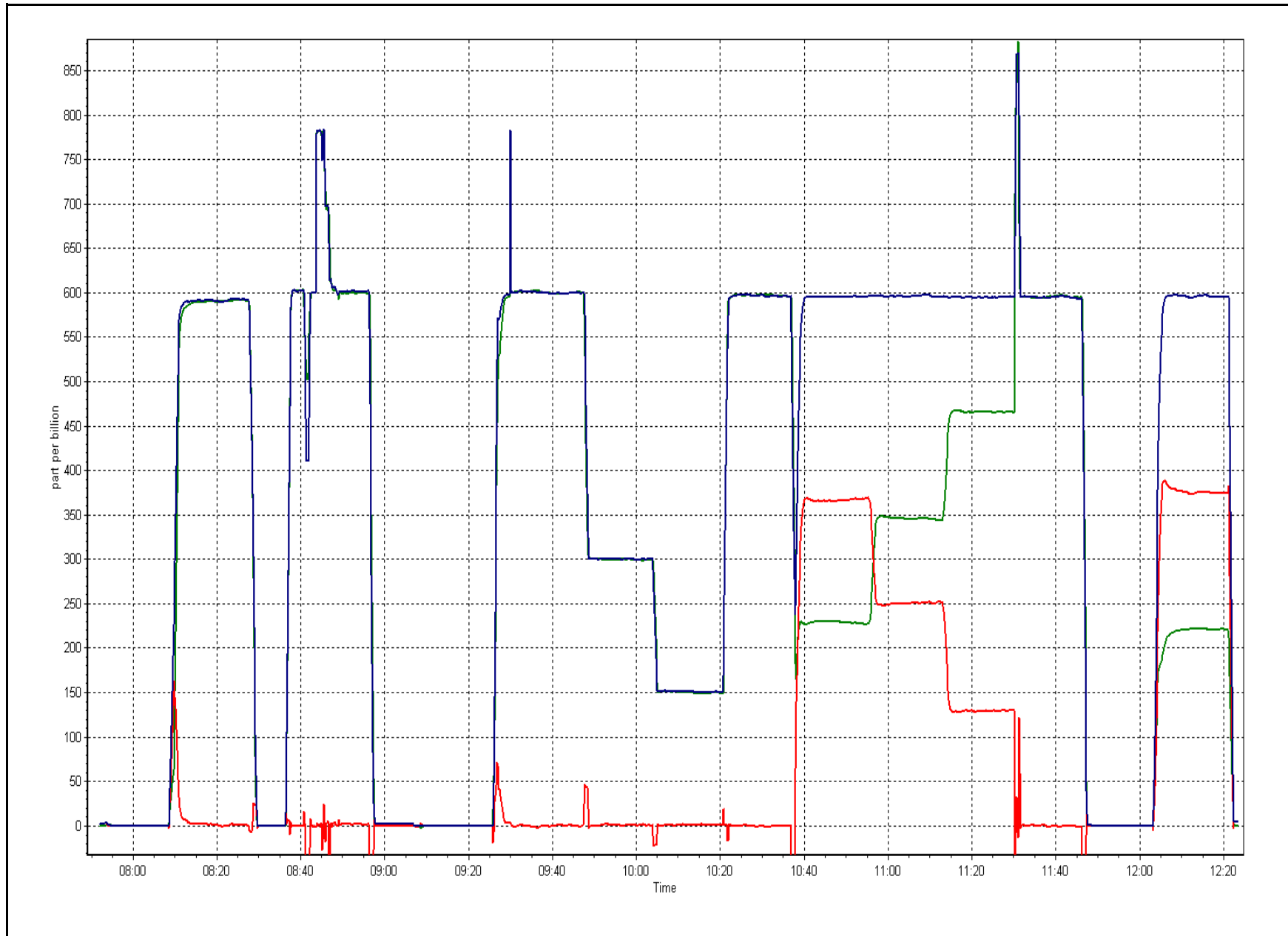
Calibration Date	January 15, 2016	Previous Calibration	January 15, 2016
Station Number	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:50	End Time (MST)	12:24
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999973
368.1	366.5	1.0044		
251.3	250.6	1.0028	Slope	1.002846
131.3	129.2	1.0163		
			Intercept	0.569079

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	February 18, 2016	Previous Calibration:	January 20, 2016
Station Name:	Conklin Lookout	Station Number:	AMS 18
Start Time (MST):	10:21	End Time (MST):	10:56
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number:	E-781		
C ₁₄ Source SN:			
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-4.0	-3.6	0.4	-4.0
T2	19.0	na	na	19.0
T3	28.0	na	na	28.0
T4	17.0	na	na	17.0
RH (%)	18.0	na	na	18.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	916	909.0	-7.0	916

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1011	11	1011	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	290		290
Neph	1.8		1.8
C14	54.3		54.3
Indicated Concentration (ug/m3)	0.6	No	0.6
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	February 18, 2016	Previous Leak Check Date:	November 29, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.89		0.05
*Flow with adaptor (LPM):	16.84		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	June 30, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337		Mass foil set S/N: 12111
Previous Correction Factor:	6983		
New Correction Factor:	7050		

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

NOTES:

sample head cleaned

Calibration Performed By: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 19
SUNCOR FIREBAG
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 FEBRUARY 2016
 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	662	34	34	100.00	16	0	4	0
H2S (ppb) Average	663	33	33	100.00	3	0	1	0
THC (ppm) Average	664	32	32	100.00	2.9	-	2.4	-
NO2 (ppb) Average	662	34	34	100.00	38	0	13	-
NO (ppb) Average	662	34	34	100.00	38	-	7	-
NOX (ppb) Average	662	34	34	100.00	77	-	20	-
Temperature 2 m (C) Average	696	0	0	100.00	6.1	-	0	-
Relative Humidity (%) Average	696	0	0	100.00	98	-	93	-
Wind Speed 10 m (km/h) Average	687	0	9	98.71	36	-	21	-
Wind Direction 10 m (deg) Average	687	0	9	98.71	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	662	1	2	-	0	0	0	0	1	3	16
H2S (ppb) Average	663	0.3	0	-	0	0	0	0	0	0	3
THC (ppm) Average	664	2.21	0.1	-	2	2.1	2.2	2.2	2.2	2.3	2.9
NO2 (ppb) Average	662	5.1	6	-	0	0	1	3	7	14	38
NO (ppb) Average	662	1.6	3	-	0	0	0	1	1	4	38
NOX (ppb) Average	662	6.7	8	-	0	0	1	4	9	16	77
Temperature 2 m (C) Average	696	-11.92	6.8	-	-27.6	-20.4	-16.7	-12.8	-5.9	-2.7	6.1
Relative Humidity (%) Average	696	81.5	12	-	36	63	78	84	89	93	98
Wind Speed 10 m (km/h) Average	687	10.5	7	-	0	3	5	9	14	21	36
Wind Direction 10 m (deg) Average	687	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	01 Feb 2016 05:00	01 Feb 2016 05:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	07 Feb 2016 05:00	07 Feb 2016 05:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	07 Feb 2016 20:00	07 Feb 2016 20:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	11 Feb 2016 06:00	11 Feb 2016 08:00	3	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	11 Feb 2016 10:00	11 Feb 2016 10:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	20 Feb 2016 07:00	20 Feb 2016 08:00	2	Flat line in sensor output signal - sensor frozen

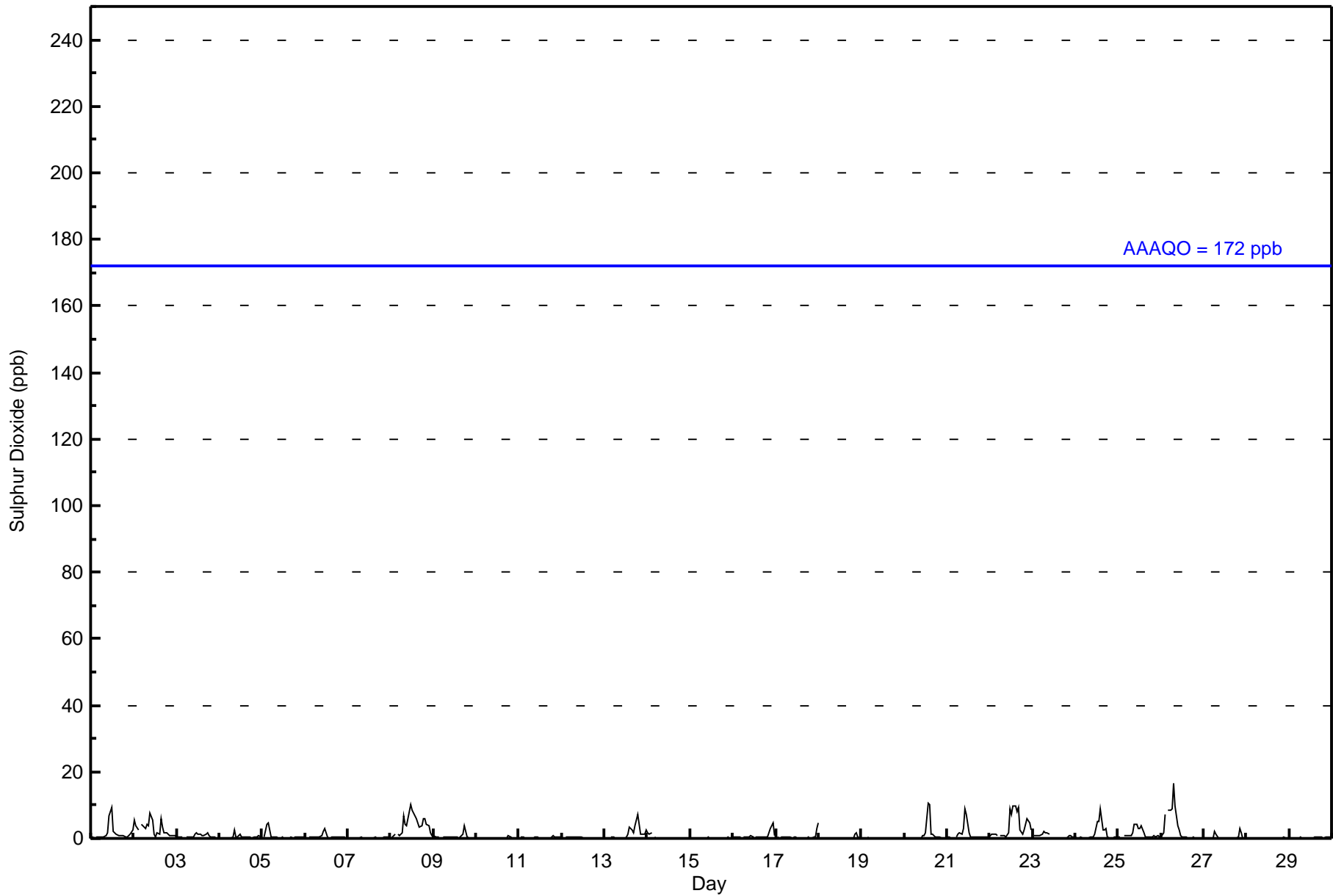


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 16 ppb on Feb 26 08:00 Maximum Daily Average: 4.2 ppb on Feb 8														Hours in Service: 696 Hours of Data: 662 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																																		
Minimum Value: 0 ppb on Feb 20 01:00 Minimum Daily Average: 0.1 ppb on Feb 19 Maximum Diurnal Average: 1.9 ppb at hour 12 Minimum Diurnal Average: 0.5 ppb at hour 4 Monthly Average: 1.0 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 10																																																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	0	0	Z	0	0	0	0	0	1	2	7	9	2	2	1	1	1	1	1	1	1	1	1	3	1.6	9																						
2-Feb	5	4	3	Z	4	4	3	4	4	8	6	1	1	2	1	6	3	2	2	1	1	1	1	2.9	8																							
3-Feb	0	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	1	1	2	1	0	0	0	0	0.7	2																							
4-Feb	0	0	0	0	0	Z	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0.4	2																							
5-Feb	Z	0	4	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	5																							
6-Feb	0	Z	0	0	1	0	1	1	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0.5	3																							
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	0.2	0																							
8-Feb	0	0	1	Z	1	1	2	7	4	4	8	10	9	8	6	5	3	4	6	6	4	4	2	4.2	10																							
9-Feb	1	1	0	0	Z	1	0	0	0	0	0	0	0	0	0	1	4	2	0	0	0	0	0	0.6	4																							
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1																							
11-Feb	Z	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	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	0.2	0																							
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	3	3	2	4	7	4	1	1	1	2	1.4	7																							
14-Feb	2	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
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	0.2	0																							
16-Feb	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	3	5	0.7	5																							
17-Feb	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.4	3																							
18-Feb	4	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0.4	4																							
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	0.1	0																							
20-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	2	10	10	1	1	0	0	0	0	0	0	1.3	10																							
21-Feb	0	0	0	0	Z	1	1	2	1	3	9	7	2	0	0	0	0	0	0	0	0	0	0	1.3	9																							
22-Feb	1	1	1	1	1	Z	1	1	1	1	2	9	7	10	10	8	9	3	1	2	4	6	5	3.8	10																							
23-Feb	Z	1	1	1	1	1	2	2	2	1	C	C	C	C	C	0	0	0	0	1	1	0	0	0.8	2																							
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	5	5	9	3	2	3	0	0	0	0	0	1.4	9																							
25-Feb	0	0	Z	1	1	1	1	1	2	4	4	3	3	4	2	1	0	0	0	0	1	1	1	1.3	4																							
26-Feb	1	2	7	Z	8	9	9	16	10	4	3	1	0	0	0	0	0	0	0	0	0	0	0	3.1	16																							
27-Feb	0	0	0	0	Z	0	2	1	0	0	0	0	0	0	0	0	0	0	0	1	3	2	0	0.5	3																							
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	0.1	0																							
29-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1																							
																								Diurnal Average	Diurnal Maximum																							
																								0.7	0.5	1.0	0.5	0.9	0.9	0.9	1.3	1.1	1.1	1.7	1.9	1.2	1.6	1.7	1.1	1.0	0.9	0.9	0.7	0.8	0.9	0.7	0.6	
																								5	4	7	5	8	9	9	16	10	8	9	10	9	10	10	8	9	4	7	6	4	6	5	3	
Z - zerspan 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
Firebag - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	661	99.85	99.85
11 - 20	1	0.15	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Firebag - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	87	61	32	24	4	12	24	84	92	65	42	35	21	16	11	42	652
11 - 20	0	0	0	0	0	0	0	0	0	0	1	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	87	61	32	24	4	12	24	84	92	65	43	35	21	16	11	42	653

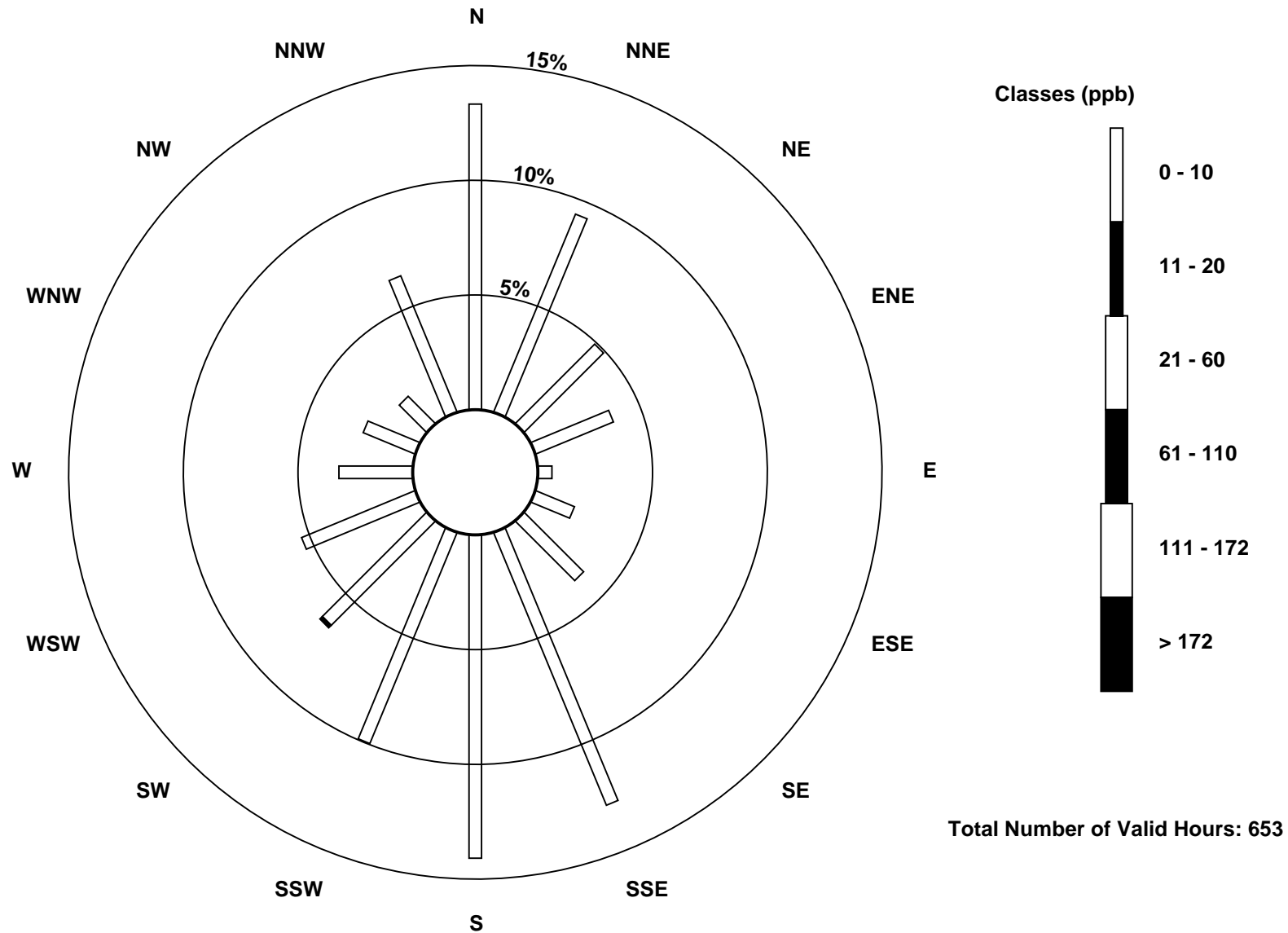
Total Number of Valid Hours: 653

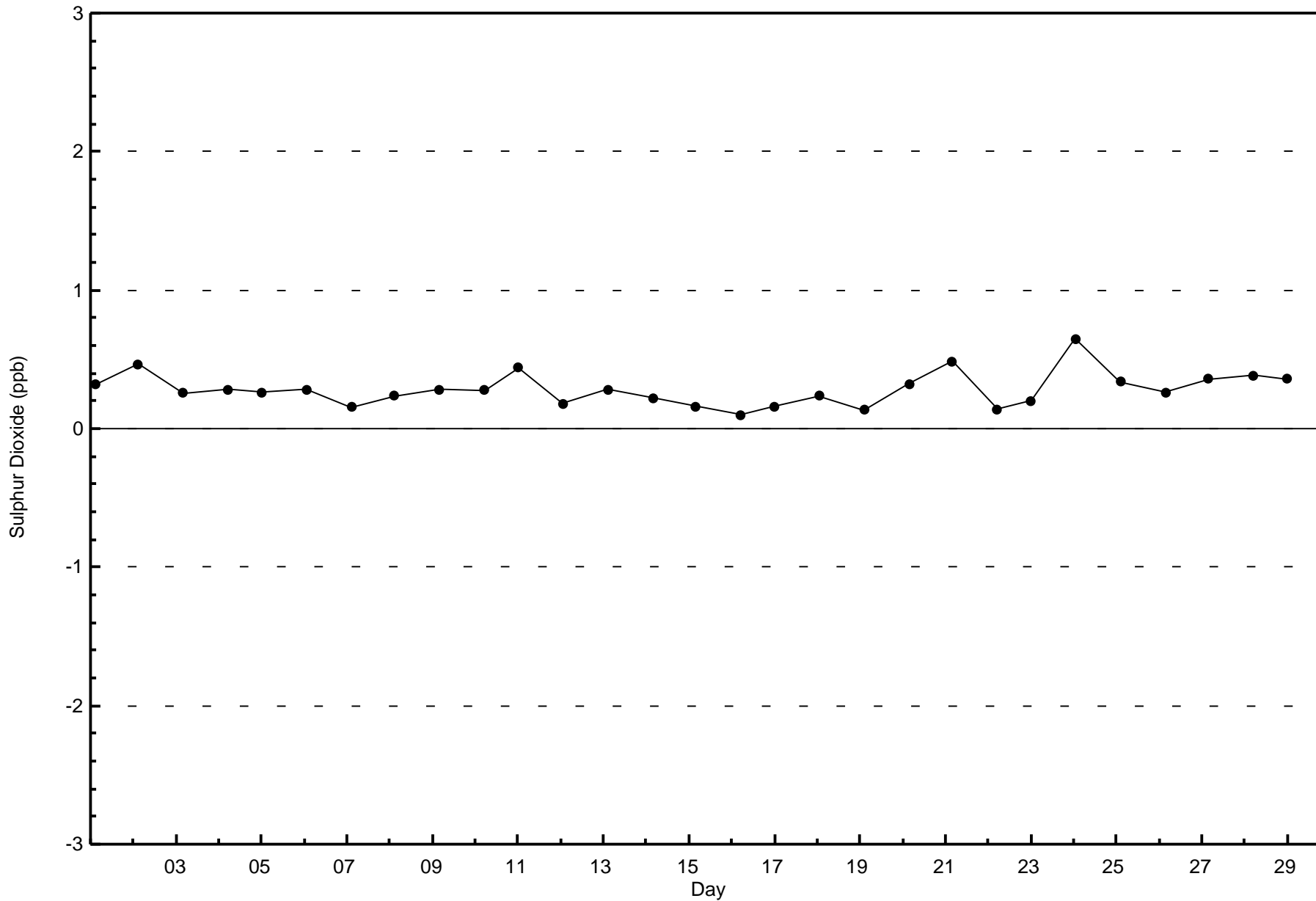
Total Number of Hours: 696

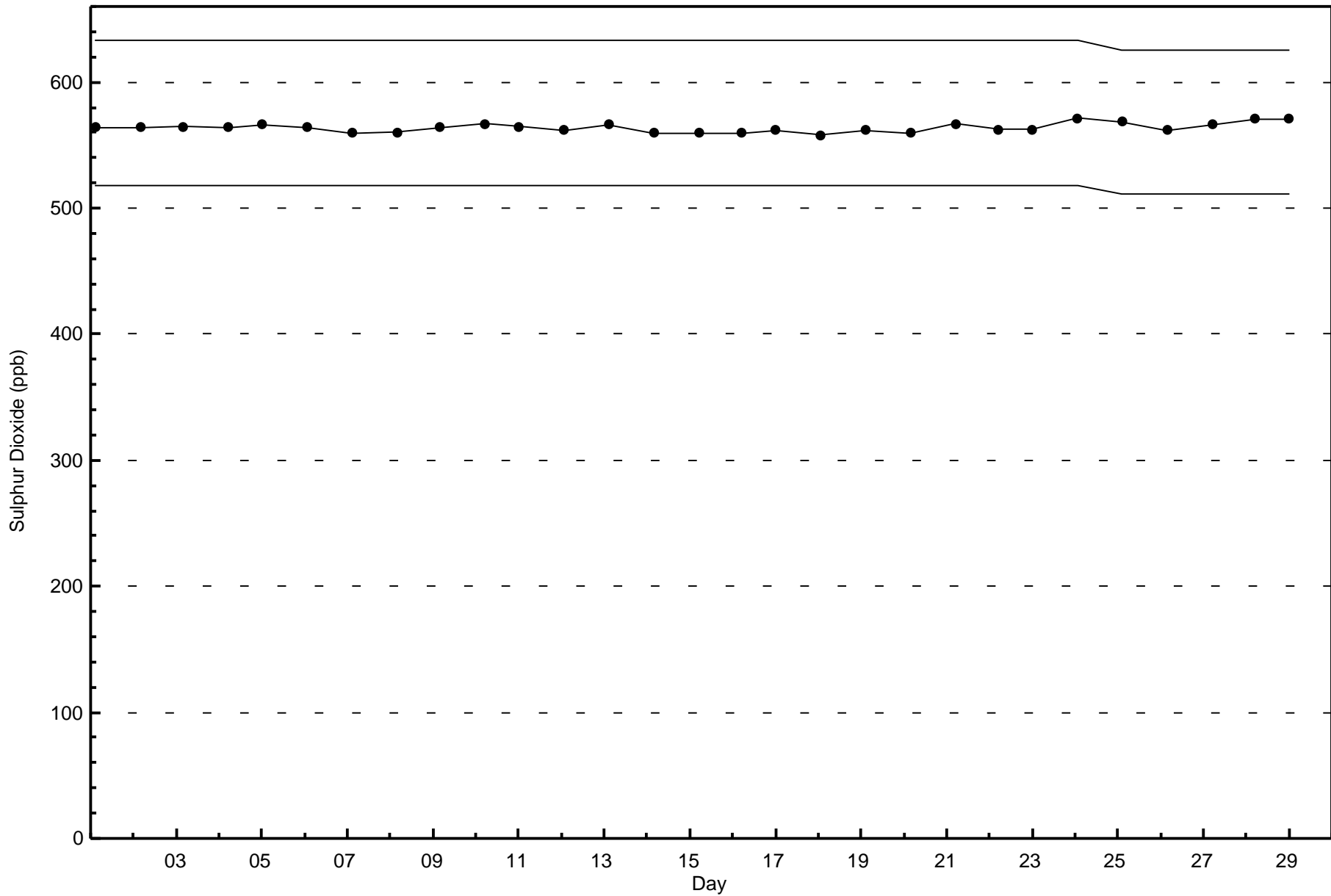


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)

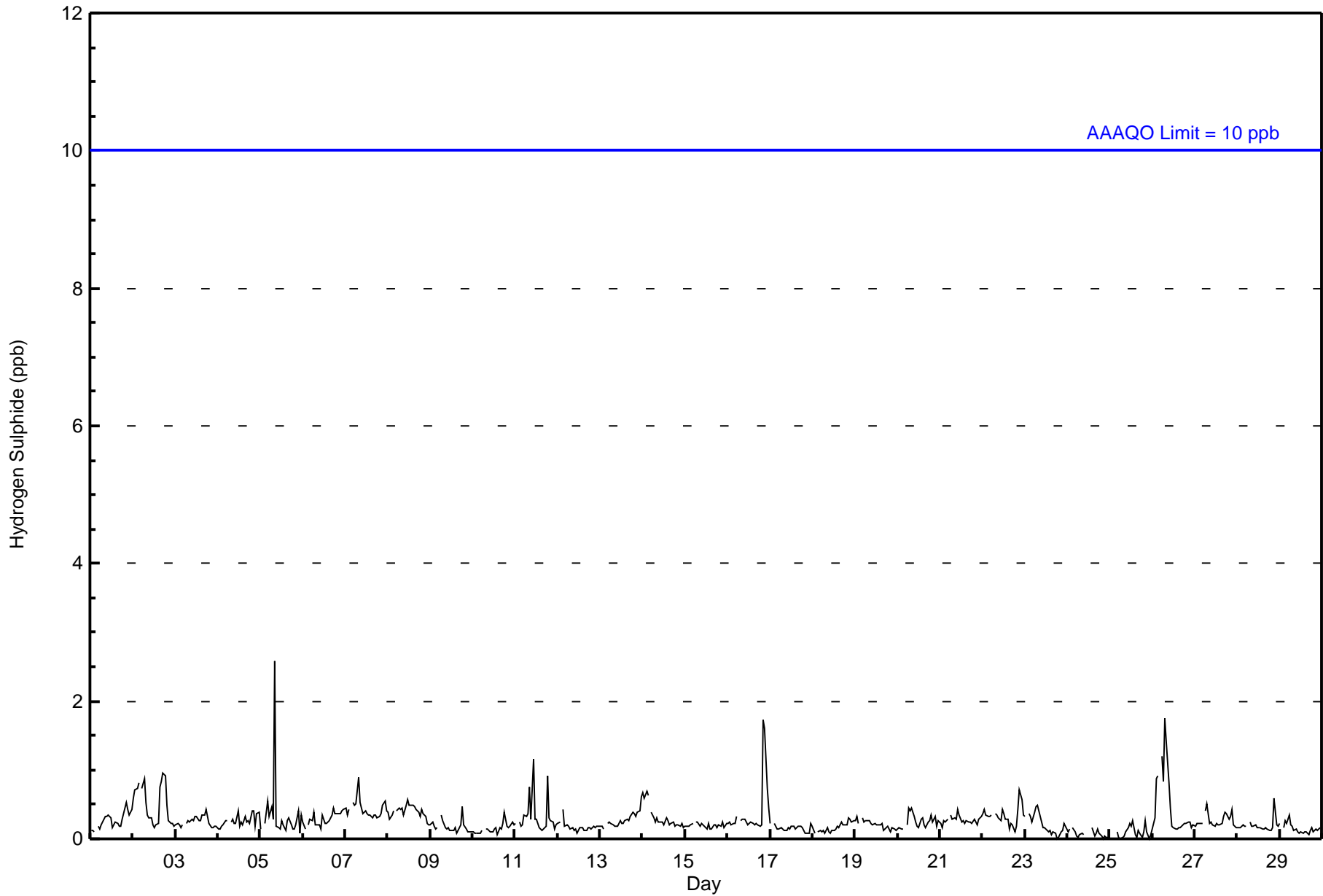








Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																																						
Maximum Value: 3 ppb on Feb 5 09:00										Maximum Daily Average: 0.5 ppb on Feb 2										Hours of Data: 663																												
Minimum Value: 0 ppb on Feb 23 19:00										Minimum Daily Average: 0.1 ppb on Feb 24										Hours of Missing Data: 33																												
Maximum Diurnal Average: 0.4 ppb at hour 9										Minimum Diurnal Average: 0.2 ppb at hour 15										Hours of Calibration: 33																												
Monthly Average: 0.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-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	0.3	1																						
2-Feb	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.5	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	0.3	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	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3																						
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	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1																						
8-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																						
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	0.2	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	0.1	0																						
11-Feb	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	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	0.2	0																						
13-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	0.3	1																						
14-Feb	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
15-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																						
16-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0.4	2																						
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	0.2	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	0.2	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	0.2	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	1	1	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	0.2	0																						
24-Feb	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0																						
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	0.1	0																						
26-Feb	0	0	1	1	Z	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																						
27-Feb	0	0	0	0	0	Z	0	1	0	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	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																						
29-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																						
																								0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.2	0.2	Diurnal Average
																								1	1	1	1	1	1	1	2	3	1	1	1	0	0	0	1	1	1	1	0	2	2	1	1	Diurnal Maximum
Z - zerspan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	662	99.85	99.85
3 - 4	1	0.15	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Firebag - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	88	63	31	24	4	11	23	84	92	65	43	30	21	16	12	46	653
3 - 4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	63	31	24	4	11	23	85	92	65	43	30	21	16	12	46	654

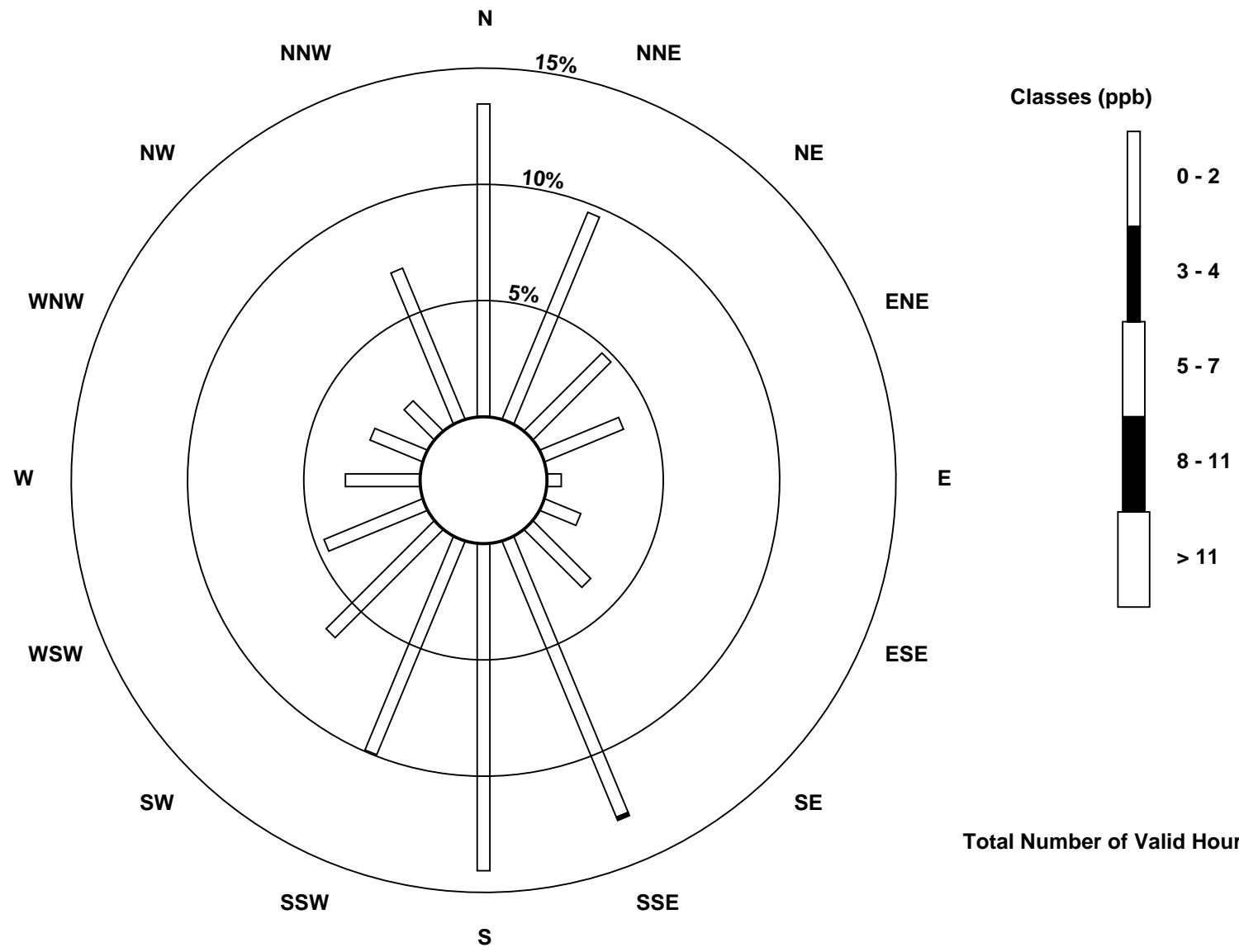
Total Number of Valid Hours: 654

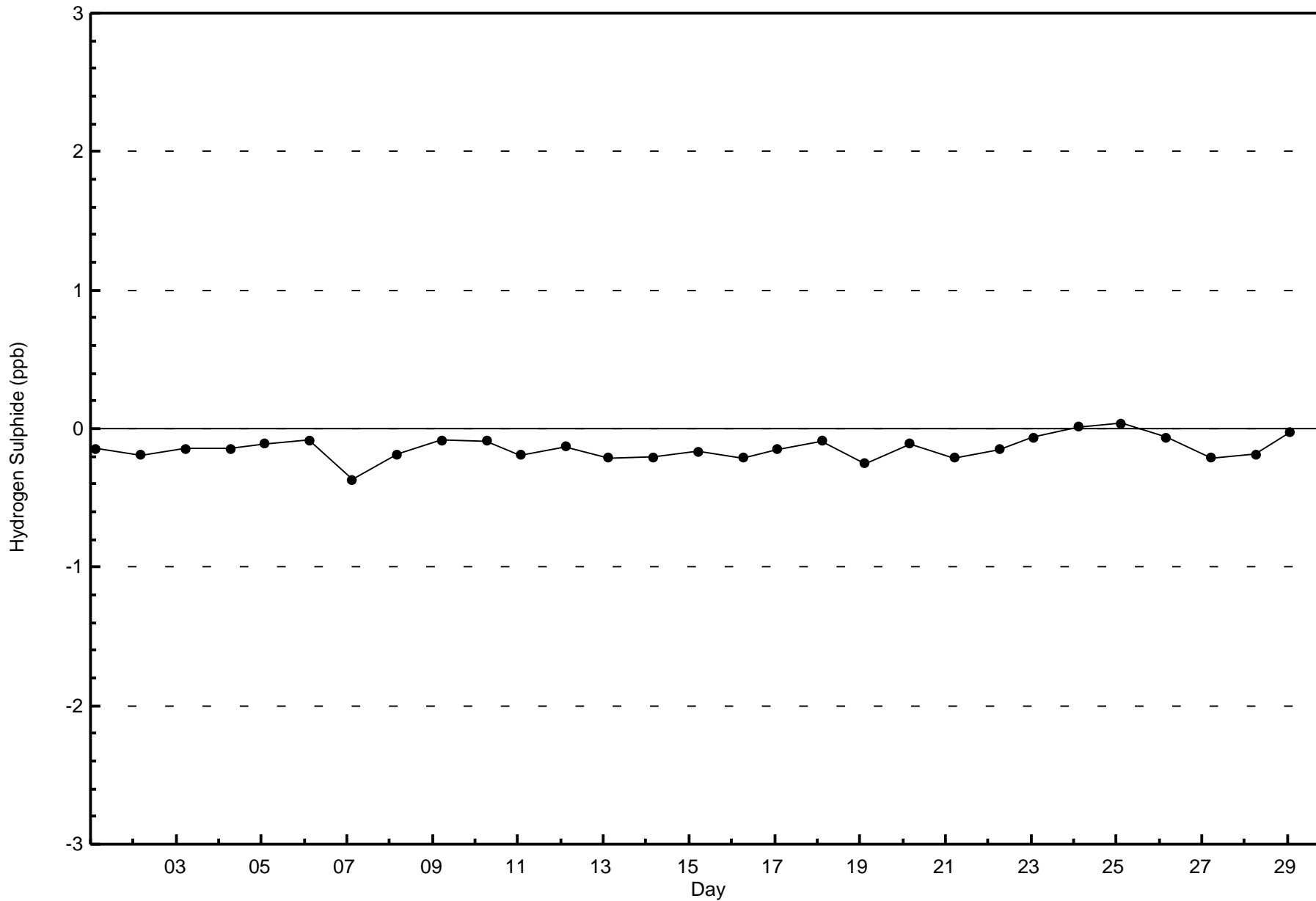
Total Number of Hours: 696

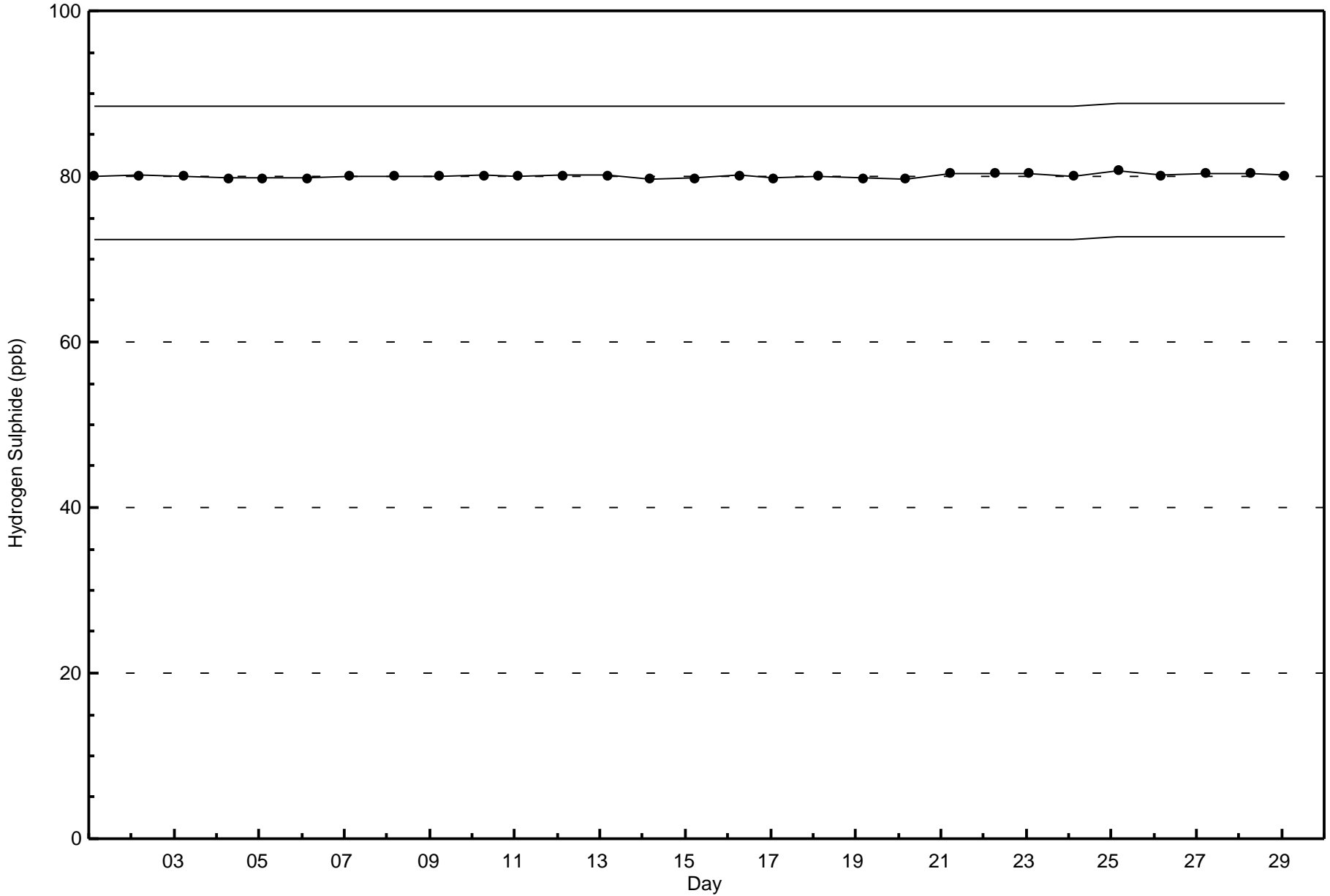


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

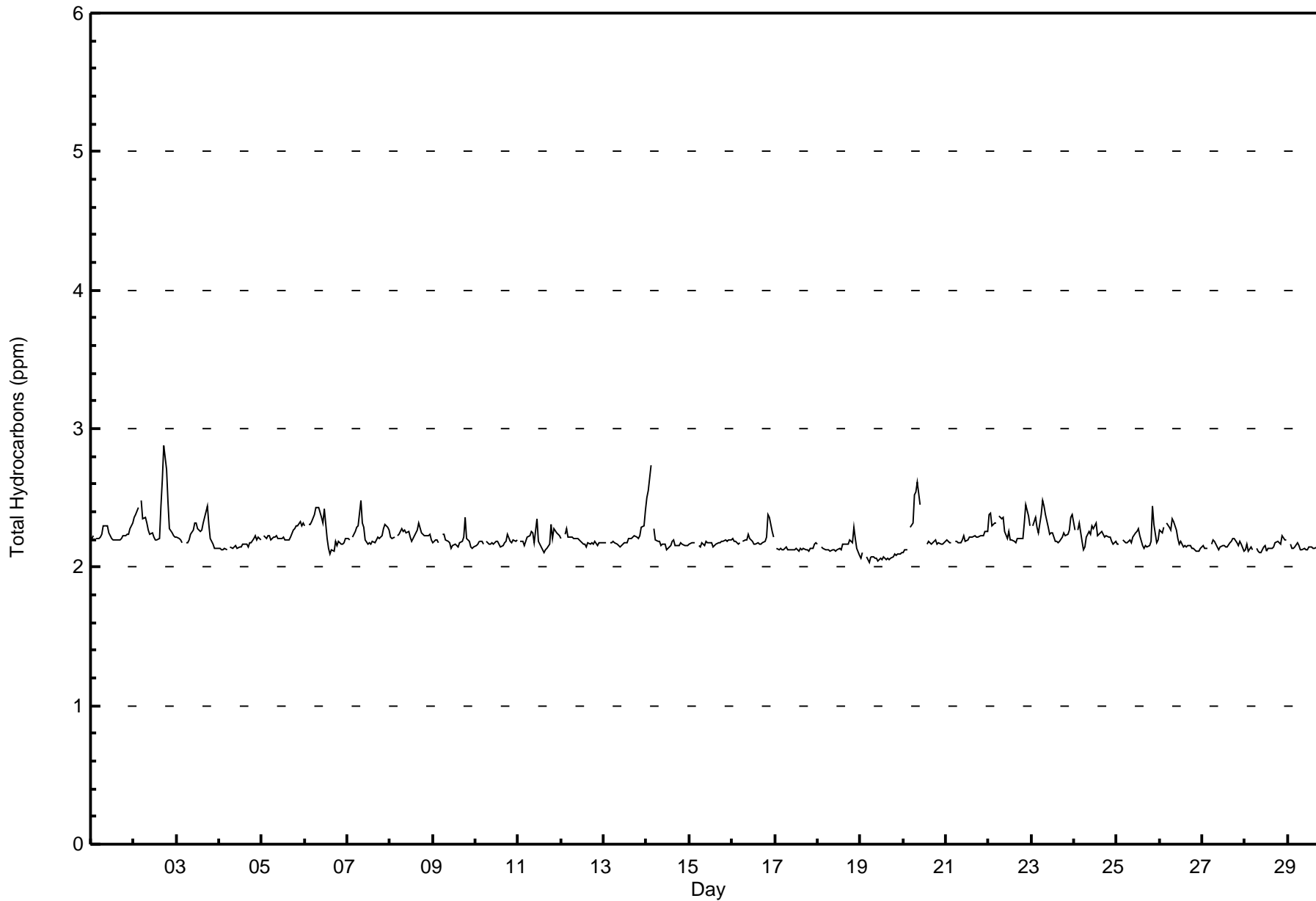
Firebag - February 2016

Maximum Value: 2.9 ppm on Feb 2 18:00		Maximum Daily Average: 2.4 ppm on Feb 2		Hours in Service:	696																						
Minimum Value: 2.0 ppm on Feb 19 06:00		Minimum Daily Average: 2.1 ppm on Feb 19		Hours of Data:	664																						
Maximum Diurnal Average: 2.2 ppm at hour 8		Minimum Diurnal Average: 2.2 ppm at hour 14		Hours of Missing Data:	32																						
Monthly Average: 2.21 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 2.5		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	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	
2-Feb	2.4	2.4	2.4	Z	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.6	2.9	2.7	2.5	2.3	2.2	2.2	2.2	2.4	2.9	
3-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.4	
4-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
5-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	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	
6-Feb	2.3	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	
7-Feb	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.5	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	2.3	2.3	2.3	2.2	2.5	
8-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
9-Feb	2.2	2.2	2.2	2.2	Z	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	2.4	2.2	2.2	2.1	2.1	2.1	2.2	2.4	
10-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
11-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.3	
12-Feb	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	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
13-Feb	2.2	2.2	Z	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	2.2	2.3	2.3	2.4	2.2	2.4	
14-Feb	2.5	2.6	2.7	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.7	
15-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	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
16-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.2	2.2	2.4	
17-Feb	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	
18-Feb	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.3	
19-Feb	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
20-Feb	2.1	2.1	2.1	Z	2.3	2.3	2.5	2.5	2.6	2.5	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	2.3	2.6	
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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	
22-Feb	2.4	2.4	2.3	2.3	2.3	Z	2.4	2.3	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.4	
23-Feb	Z	2.3	2.4	2.3	2.2	2.4	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.5	
24-Feb	2.3	Z	2.3	2.3	2.2	2.1	2.1	2.2	2.3	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	2.2	2.2	2.3	
25-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.2	2.4	
26-Feb	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
27-Feb	2.2	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	
28-Feb	2.1	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	
29-Feb	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerspan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - February 2016

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	2	0.30	0.30
2.1 - 3.0	662	99.70	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Firebag - February 2016**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
2.1 - 3.0	86	61	32	24	4	12	24	84	92	64	43	33	21	16	12	45	653
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	87	61	32	24	4	12	24	84	92	64	43	33	21	16	12	46	655

Total Number of Valid Hours: 655

Total Number of Hours: 696

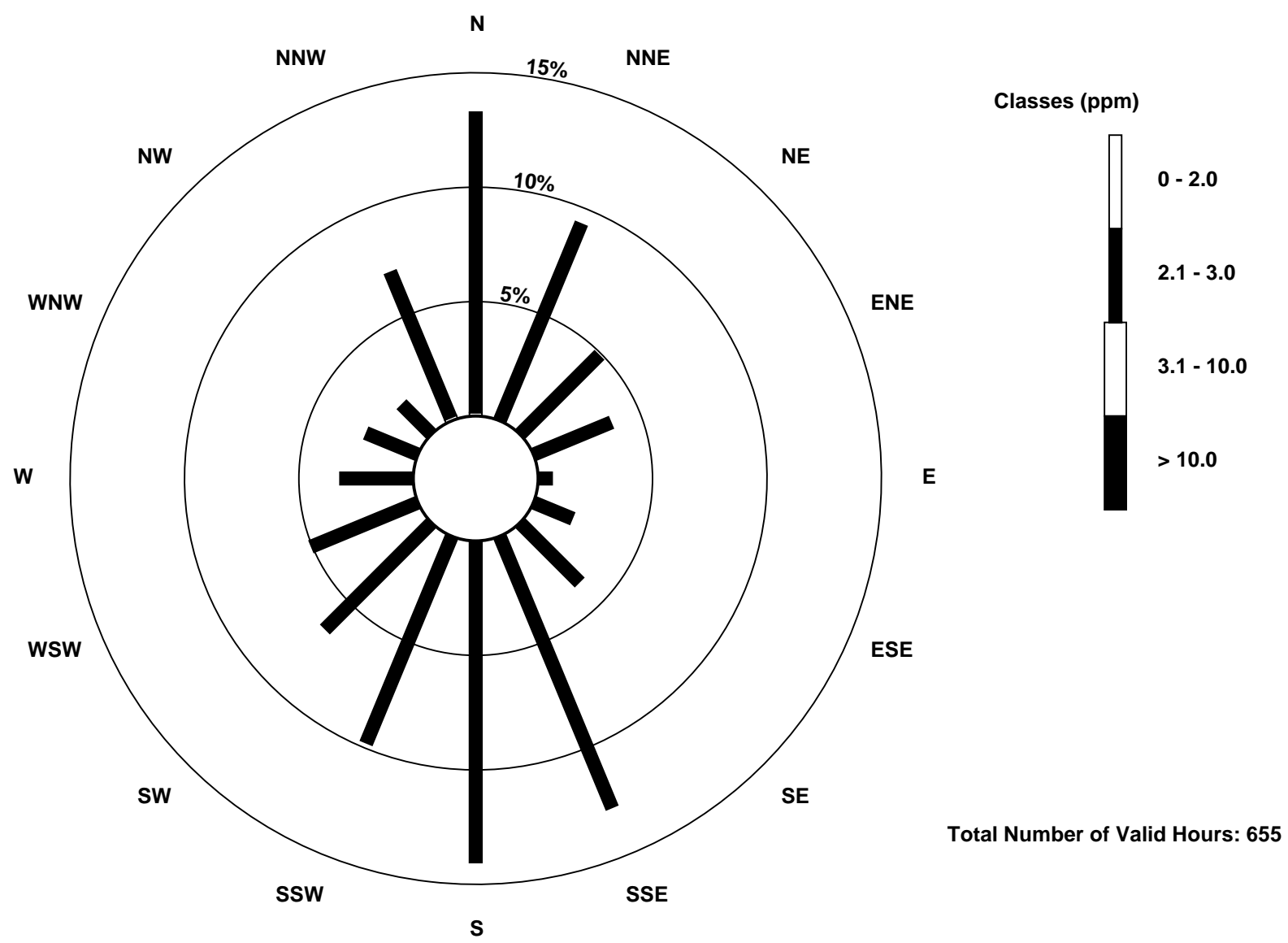


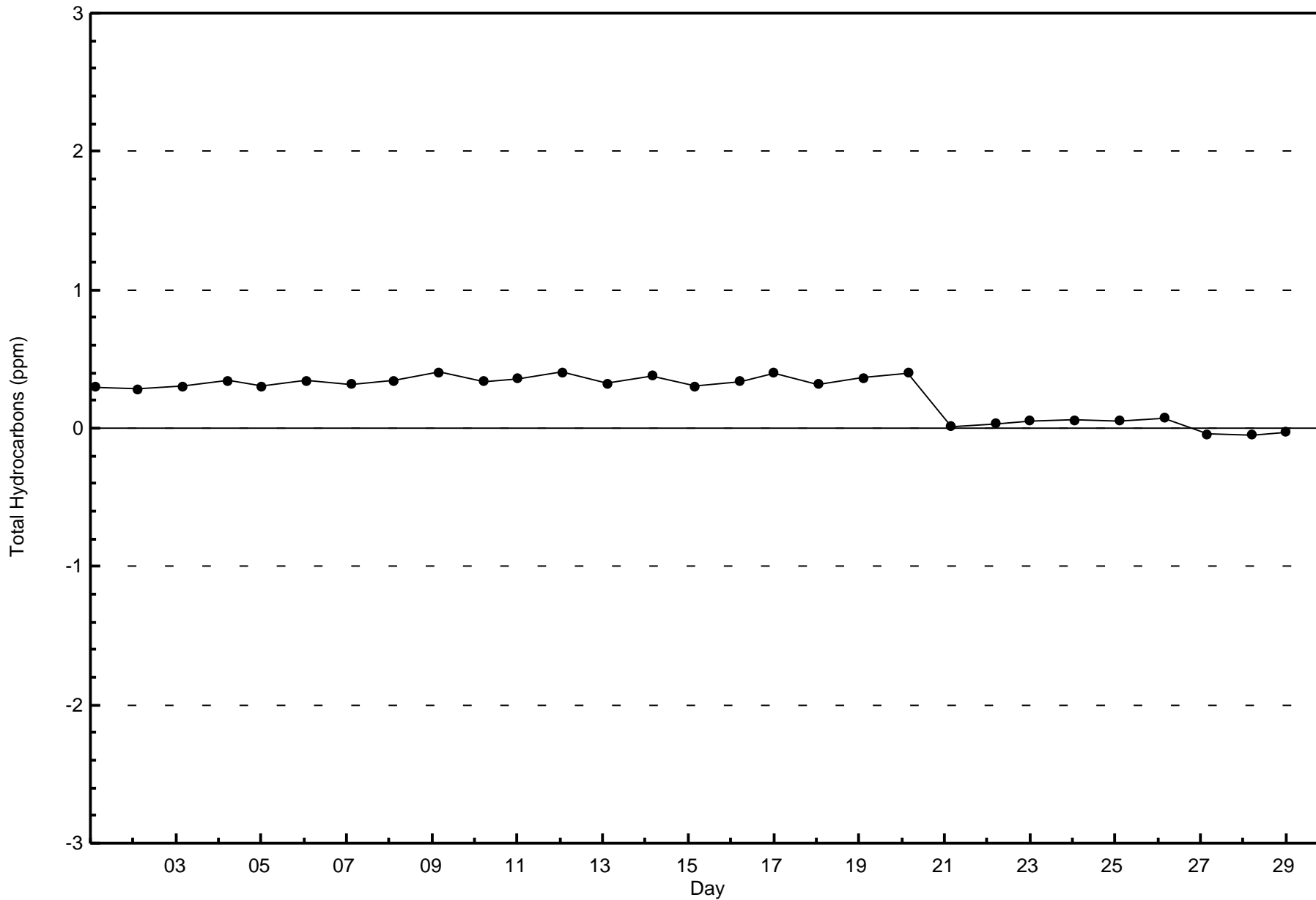
Wood Buffalo Environmental Association

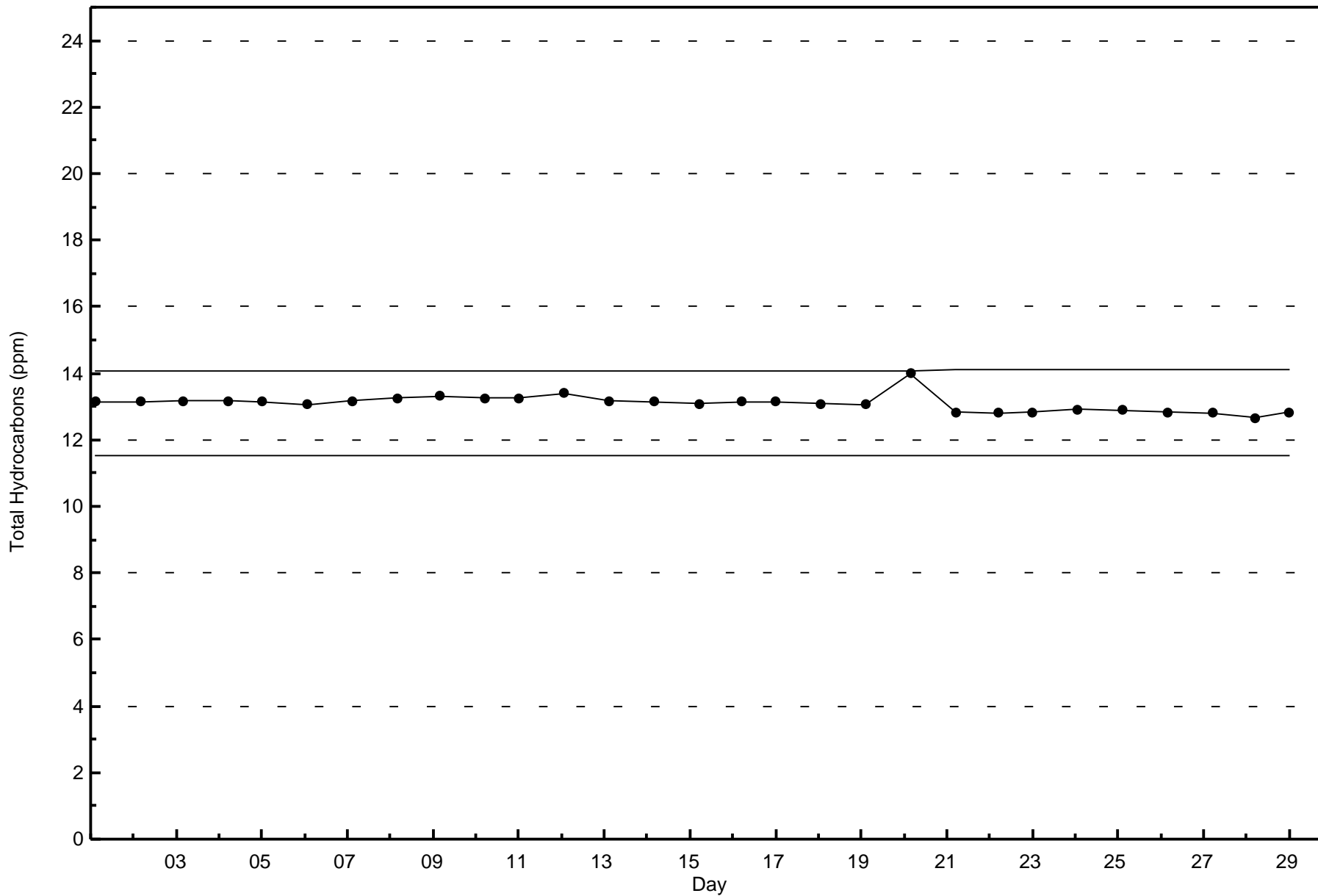
Wind Rose Feb 2016

Total Hydrocarbons (THC) - ppm

Firebag (AMS 19)







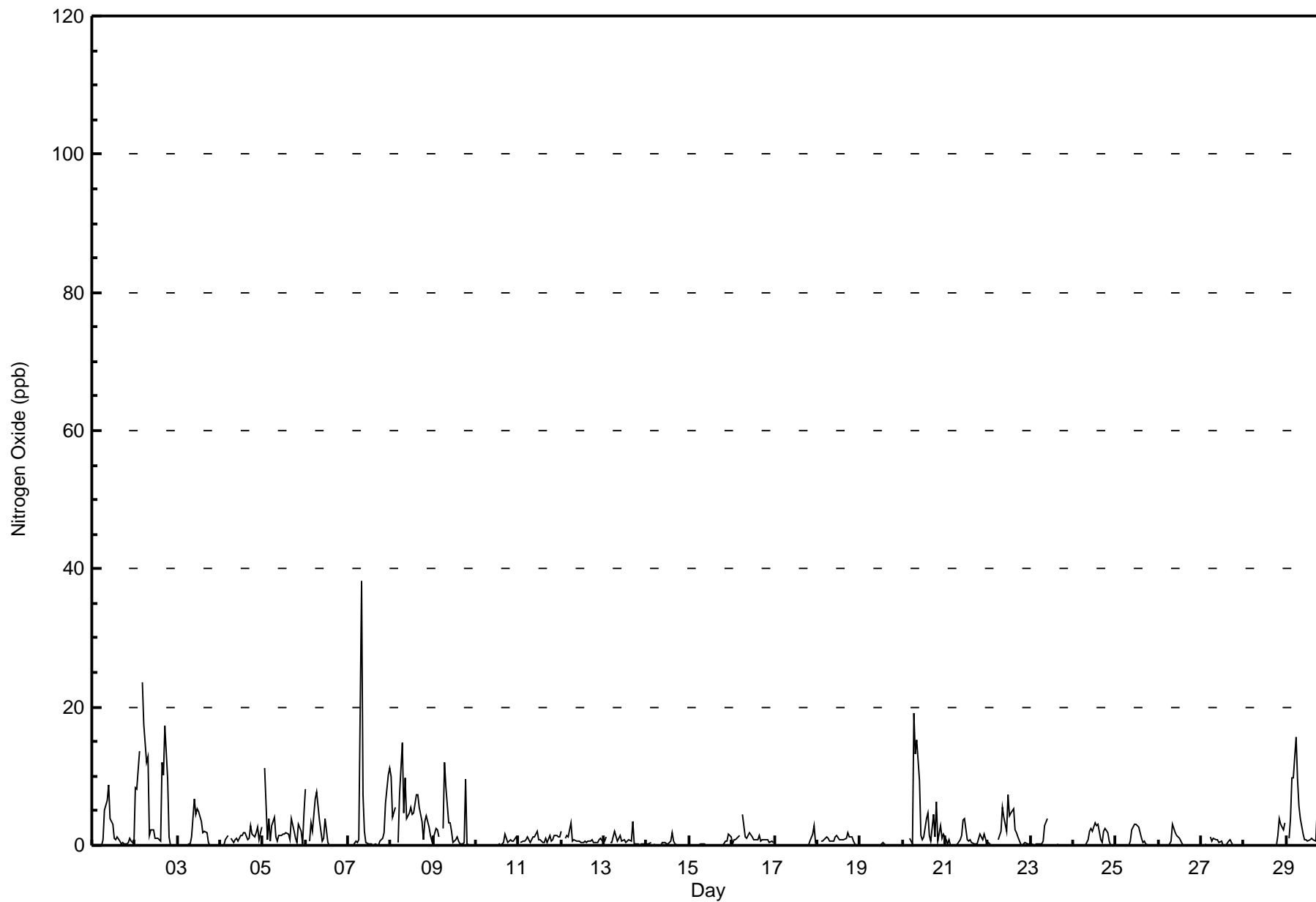


Maximum Value: 38 ppb on Feb 7 08:00		Maximum Daily Average: 6.8 ppb on Feb 2		Hours in Service: 696																						
Minimum Value: 0 ppb on Feb 3 23:00		Minimum Daily Average: 0.0 ppb on Feb 19		Hours of Data: 662																						
Maximum Diurnal Average: 3.6 ppb at hour 8		Minimum Diurnal Average: 0.8 ppb at hour 20		Hours of Missing Data: 34																						
Monthly Average: 1.6 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 15		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	Z	0	0	0	1	5	6	9	4	3	1	1	1	1	0	0	0	0	0	1	1	0	1.5	9
2-Feb	8	8	14	Z	24	17	12	13	1	2	2	1	1	1	1	12	10	17	9	1	0	0	0	0	6.8	24
3-Feb	0	0	0	0	Z	0	0	0	1	7	4	5	5	3	2	2	2	0	0	0	0	0	0	0	1.4	7
4-Feb	0	0	0	1	1	Z	1	0	1	1	1	1	1	2	2	1	1	3	2	1	2	3	1	3	1.2	3
5-Feb	Z	11	1	4	1	3	4	1	1	1	1	2	2	2	2	1	4	2	1	0	3	2	0	5	2.3	11
6-Feb	8	Z	1	3	2	7	8	6	4	1	1	4	0	0	0	0	0	0	0	0	0	0	0	0	1.9	8
7-Feb	0	0	Z	0	1	1	1	38	7	2	0	0	0	0	0	0	0	0	1	1	2	6	10	11	3.6	38
8-Feb	10	4	5	Z	0	7	15	5	10	4	5	6	4	5	7	7	6	4	1	3	4	3	1	1	5.1	15
9-Feb	1	3	2	1	Z	2	12	8	3	3	2	0	1	1	1	0	0	0	10	0	0	0	0	0	2.3	12
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	0	1	1	1	1	1	0.3	2
11-Feb	Z	0	1	1	1	1	0	1	1	1	2	1	1	0	0	1	0	1	1	1	1	1	1	1	0.9	2
12-Feb	2	Z	1	1	1	3	1	1	1	1	1	0	0	1	0	1	1	1	0	0	0	1	1	0	0.9	3
13-Feb	1	1	Z	0	0	1	2	1	1	1	1	1	0	1	1	1	3	0	0	0	0	0	0	0	0.7	3
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0.3	2
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0.2	2
16-Feb	0	1	1	1	1	Z	4	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	1	0	1.1	4
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0.3	3
18-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0	0	0	0.8	2
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
20-Feb	0	0	0	Z	1	0	19	13	15	9	1	1	1	4	5	1	1	4	1	6	1	3	1	2	3.9	19
21-Feb	1	0	1	0	Z	0	0	0	1	2	4	4	1	1	1	0	0	0	0	2	1	1	2	0	0.9	4
22-Feb	0	0	0	0	0	Z	1	2	5	4	2	7	4	5	5	2	2	1	0	0	0	0	0	0	1.9	7
23-Feb	Z	0	0	0	0	0	0	1	3	4	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.5	4
24-Feb	0	Z	0	0	0	0	0	0	1	2	3	2	3	3	3	1	0	2	2	2	1	0	0	0	1.1	3
25-Feb	0	0	Z	0	0	0	0	0	1	2	3	3	3	3	1	0	1	0	0	0	0	0	0	0	0.8	3
26-Feb	0	0	0	Z	0	0	0	1	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	3
27-Feb	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	3	2	3	0.6	4
29-Feb	Z	1	4	10	10	16	10	6	4	2	1	1	1	1	1	1	1	5	3	0	0	0	0	0	3.3	16
		1.4	1.2	1.3	1.0	1.9	2.6	3.2	3.6	2.5	2.2	1.5	1.7	1.2	1.3	1.3	1.3	1.2	1.6	1.2	0.8	0.8	0.9	0.9	1.0	Diurnal Average
		10	11	14	10	24	17	19	38	15	9	5	7	5	5	7	12	10	17	10	6	4	6	10	11	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	660	99.70	99.70
21 - 40	2	0.30	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	87	61	32	24	4	12	24	83	92	65	43	34	21	16	11	42	651
21 - 40	0	0	0	0	0	0	0	1	0	0	0	1	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	87	61	32	24	4	12	24	84	92	65	43	35	21	16	11	42	653

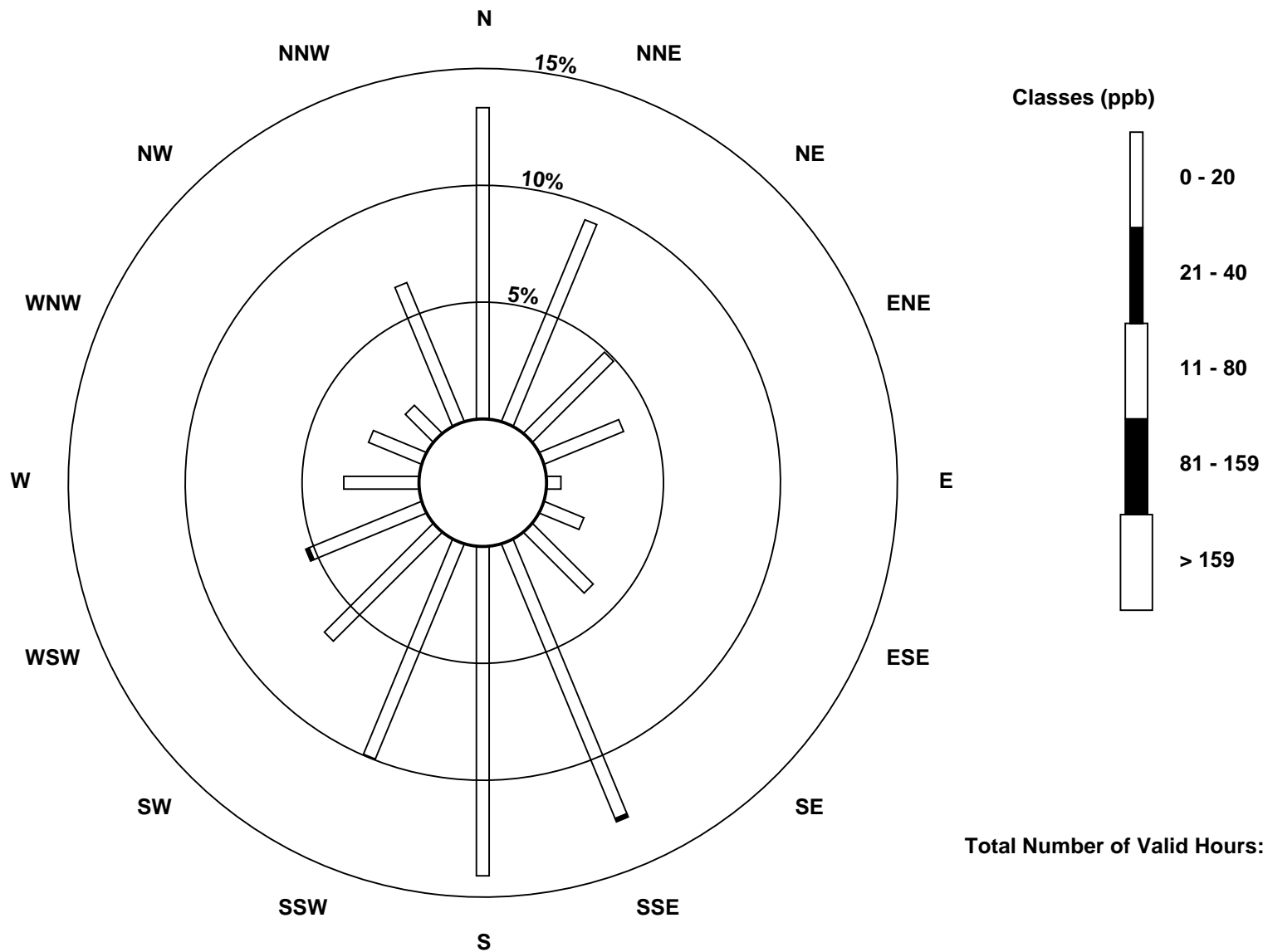
Total Number of Valid Hours: 653

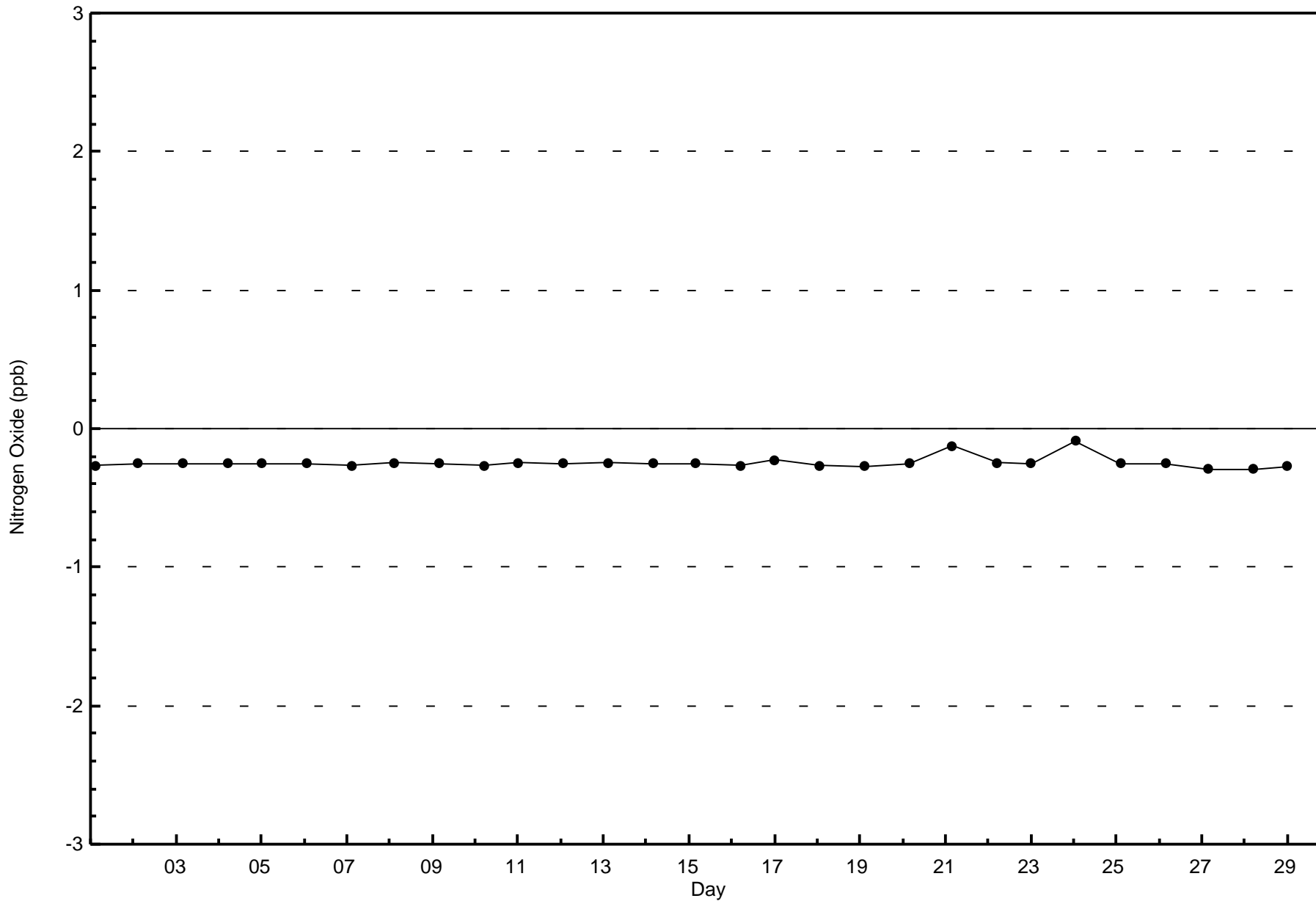
Total Number of Hours: 696

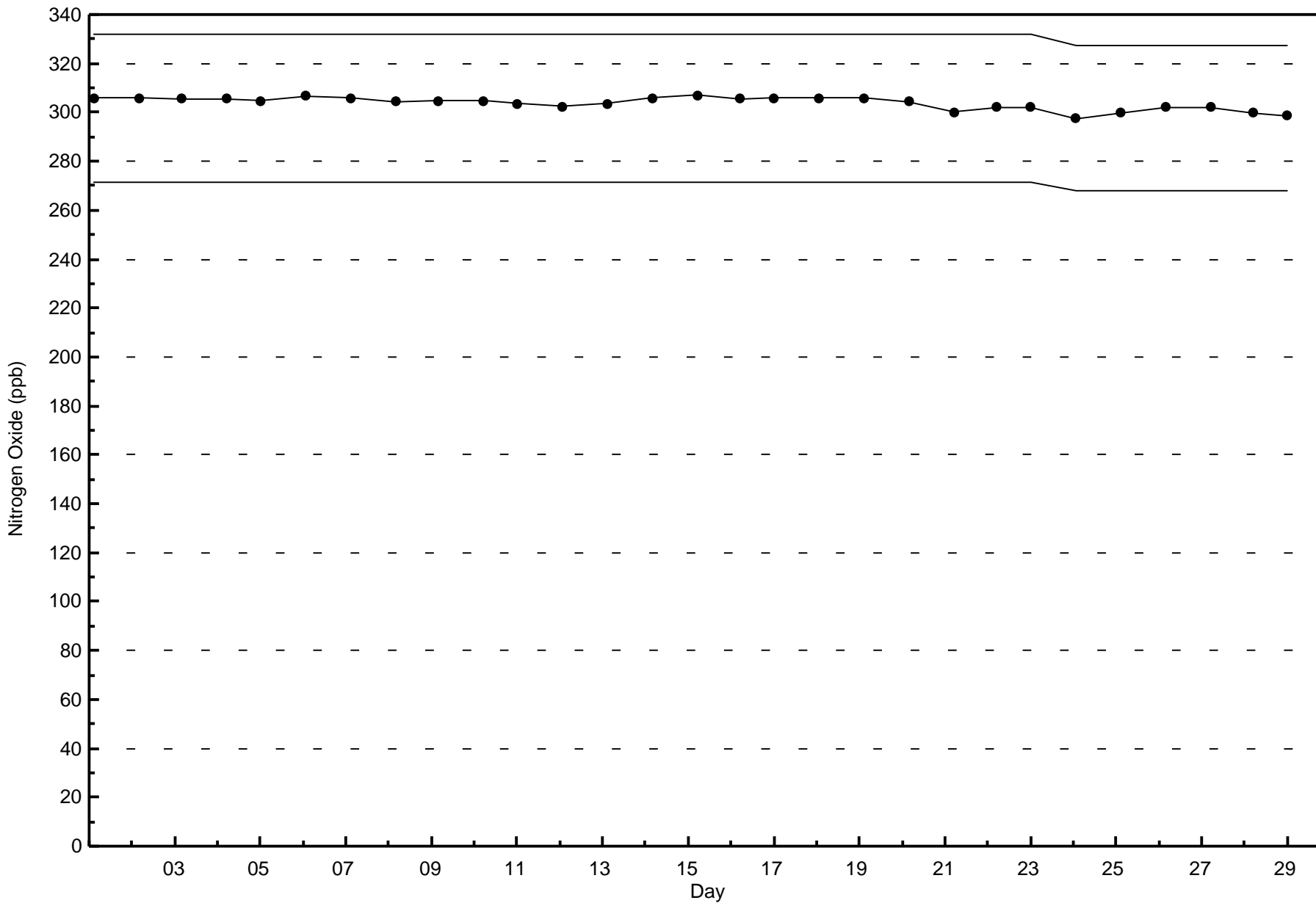


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

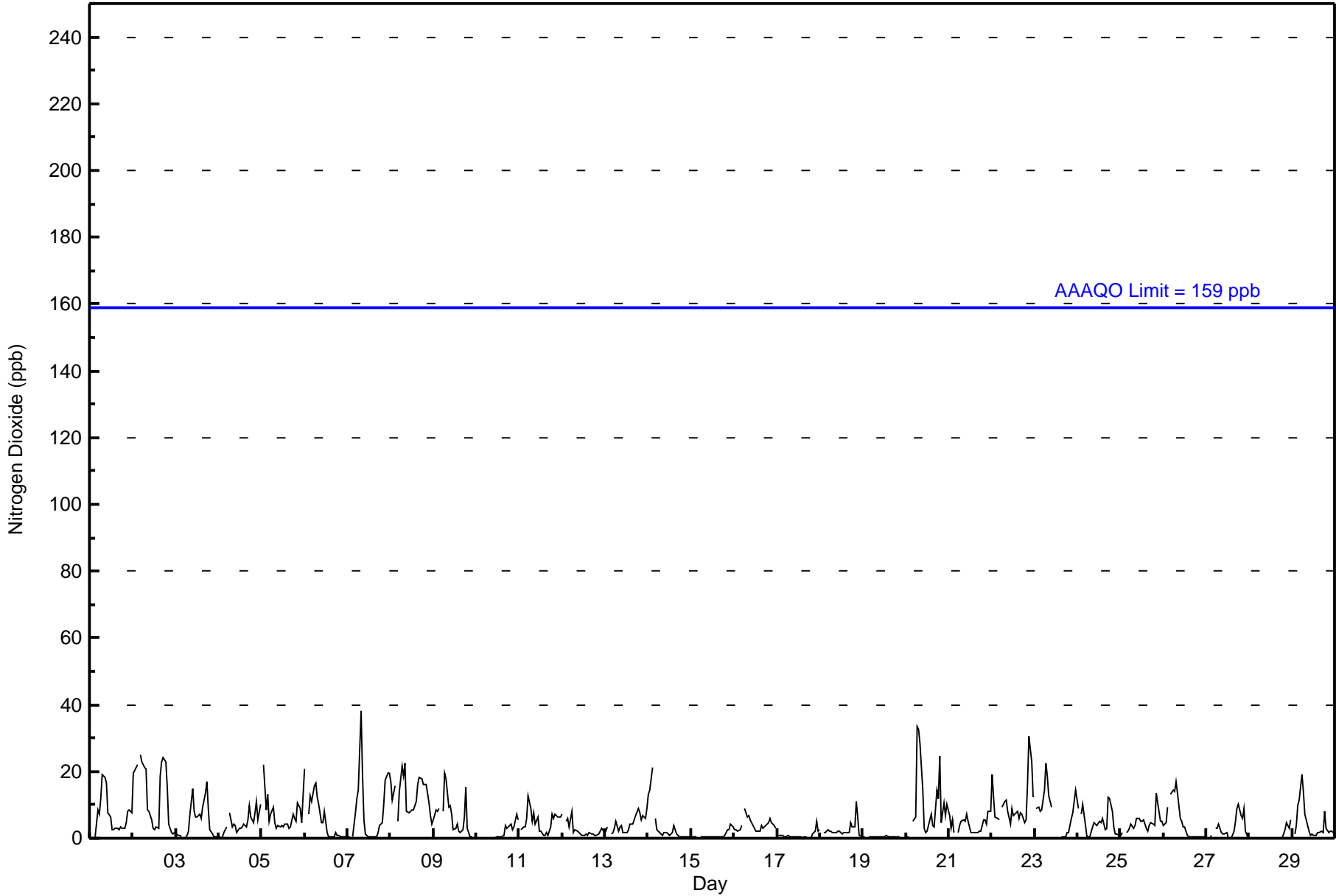
Firebag - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696																																			
Maximum Value: 38 ppb on Feb 7 08:00														Maximum Daily Average: 13.0 ppb on Feb 2										Hours of Data: 662																									
Minimum Value: 0 ppb on Feb 27 13:00														Minimum Daily Average: 0.3 ppb on Feb 19										Hours of Missing Data: 34																									
Maximum Diurnal Average: 8.9 ppb at hour 7														Minimum Diurnal Average: 2.4 ppb at hour 13										Hours of Calibration: 34																									
Monthly Average: 5.1 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 14 P ₉₉ = 24										Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	0	0	Z	1	9	7	12	19	18	17	8	6	3	3	3	3	3	3	3	3	5	8	8	8	6.4	19																							
2-Feb	20	21	22	Z	25	23	21	21	9	8	6	3	3	4	3	19	23	24	23	15	4	2	1	2	13.0	25																							
3-Feb	1	1	1	1	Z	0	1	2	7	15	8	6	6	7	6	9	14	17	9	3	1	0	0	0	5.1	17																							
4-Feb	0	0	0	2	3	Z	8	4	4	4	2	3	3	3	4	4	5	10	6	5	8	11	6	10	4.6	11																							
5-Feb	Z	22	9	13	5	7	9	5	3	4	4	4	3	4	4	3	4	7	6	5	11	9	5	13	6.9	22																							
6-Feb	21	Z	7	13	11	16	16	12	10	5	5	8	2	1	0	0	1	2	1	1	1	1	1	1	5.8	21																							
7-Feb	1	1	Z	0	8	12	14	38	19	5	1	1	0	1	1	1	1	2	4	5	10	17	20	20	7.8	38																							
8-Feb	17	12	16	Z	5	14	22	19	22	8	8	8	8	9	11	16	18	18	16	16	16	11	7	4	13.0	22																							
9-Feb	5	9	8	9	Z	8	19	18	9	10	7	3	3	4	2	2	3	6	15	3	1	0	0	0	6.2	19																							
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	4	3	3	4	3	3	7	6	1.6	7																							
11-Feb	Z	3	3	4	6	13	9	5	8	4	7	2	2	1	1	2	1	4	7	6	7	6	6	7	4.9	13																							
12-Feb	7	Z	5	6	3	8	2	2	2	2	1	1	1	1	2	1	1	1	1	1	1	2	3	2	2.5	8																							
13-Feb	2	3	Z	1	2	3	5	2	4	4	2	2	2	3	4	4	5	7	9	8	5	7	6	9	4.3	9																							
14-Feb	13	14	21	Z	6	3	2	1	1	2	2	1	1	2	4	3	1	1	1	1	0	0	0	0	3.4	21																							
15-Feb	1	1	1	1	Z	0	1	1	1	1	0	1	1	1	1	0	0	0	1	3	2	4	3	3	0.9	4																							
16-Feb	3	3	2	3	4	Z	9	6	7	6	5	3	2	2	2	4	3	4	4	5	6	5	4	3	4.0	9																							
17-Feb	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	5	2	0.8	5																							
18-Feb	3	Z	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	5	3	4	11	6	1	0	2.6	11																							
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																							
20-Feb	1	0	0	Z	5	6	33	33	29	15	3	2	2	5	7	4	4	14	12	24	5	11	7	10	10.0	33																							
21-Feb	7	3	5	2	Z	2	4	5	5	5	7	5	2	2	2	2	2	2	2	5	5	4	8	8	4.1	8																							
22-Feb	19	12	6	6	5	Z	9	11	11	8	4	9	7	7	8	6	8	7	5	5	16	31	23	12	10.3	31																							
23-Feb	Z	9	9	8	8	15	22	19	13	9	C	C	C	C	C	1	0	1	2	2	6	8	11	15	8.7	22																							
24-Feb	9	Z	7	10	4	1	0	1	3	5	4	4	5	5	6	3	3	12	12	8	3	1	1	1	4.7	12																							
25-Feb	1	2	Z	2	2	3	4	3	4	6	6	5	5	5	3	2	4	5	4	4	14	11	5	5	4.5	14																							
26-Feb	4	5	9	Z	13	14	14	17	14	6	5	4	3	1	1	0	1	0	0	0	0	0	0	0	4.9	17																							
27-Feb	0	0	0	1	Z	3	3	4	2	1	1	2	0	0	0	2	5	9	10	7	6	9	2	0	3.0	10																							
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	5	3	5	0.9	5																							
29-Feb	Z	1	4	10	11	19	14	7	6	2	1	1	1	1	2	2	2	2	8	3	2	2	2	2	4.5	19																							
																								5.6	4.8	5.8	3.9	5.8	7.5	8.9	8.9	7.3	5.2	3.5	3.0	2.4	2.6	2.8	3.3	4.0	5.7	5.8	5.0	5.3	6.0	5.1	5.1	Diurnal Average	
																								21	22	22	13	25	23	33	38	29	17	8	9	8	9	11	19	23	24	23	24	16	31	23	20	Diurnal Maximum	
Z - zerspan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	640	96.68	96.68
21 - 40	22	3.32	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	85	61	32	24	4	12	24	80	86	64	43	33	20	15	10	40	633
21 - 40	2	0	0	0	0	0	0	4	6	1	0	2	1	1	1	2	20
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	87	61	32	24	4	12	24	84	92	65	43	35	21	16	11	42	653

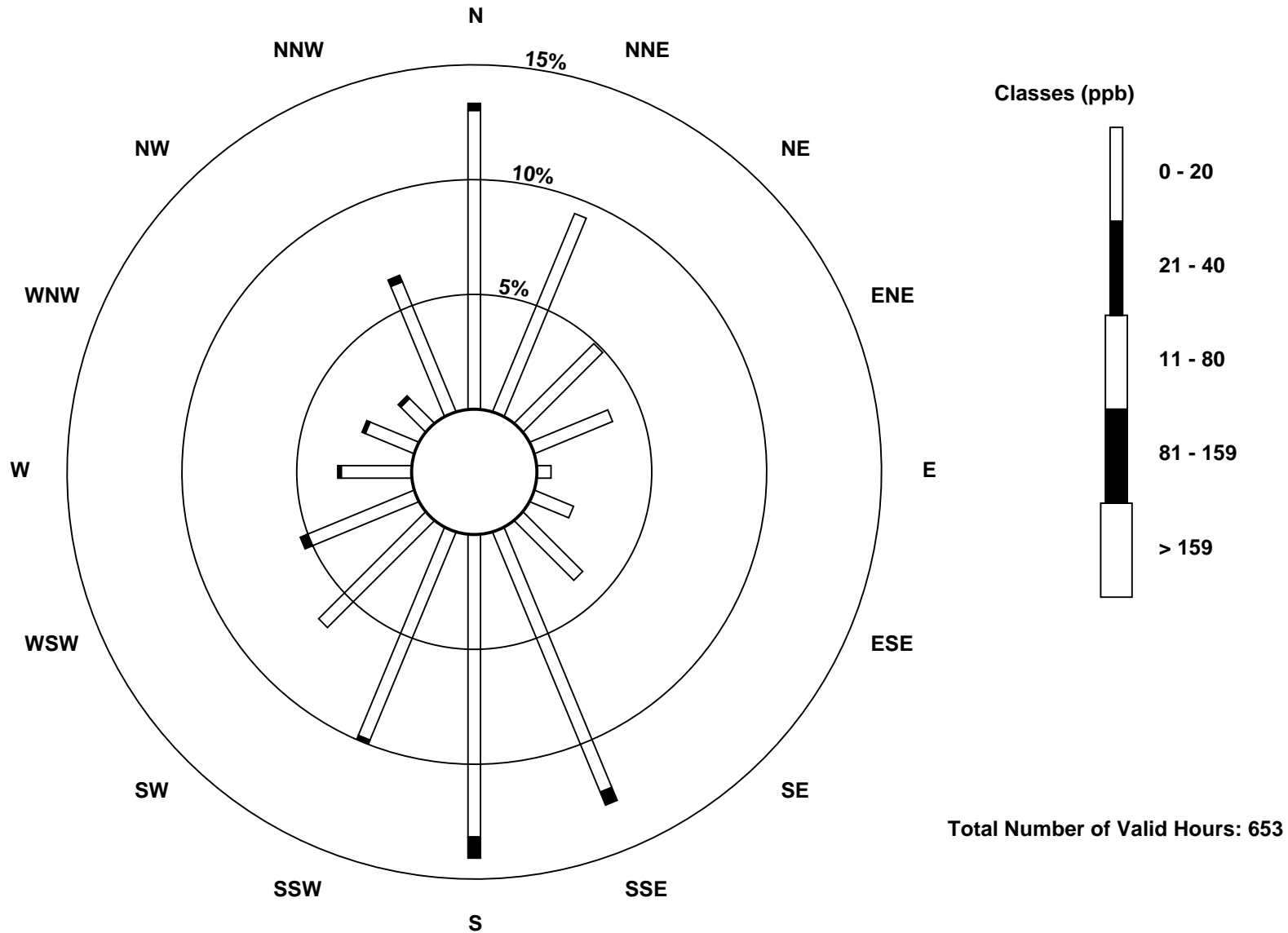
Total Number of Valid Hours: 653

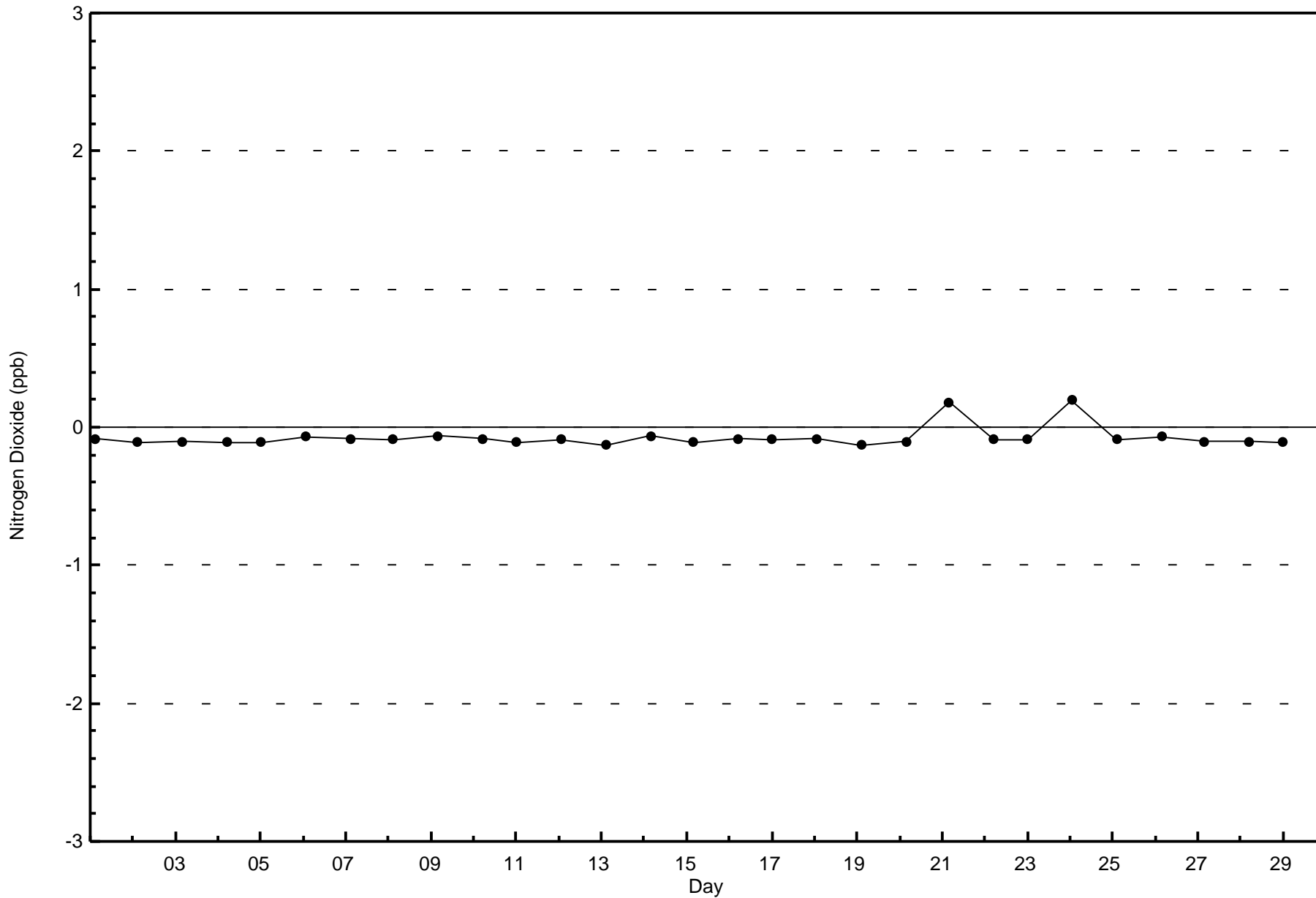
Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)

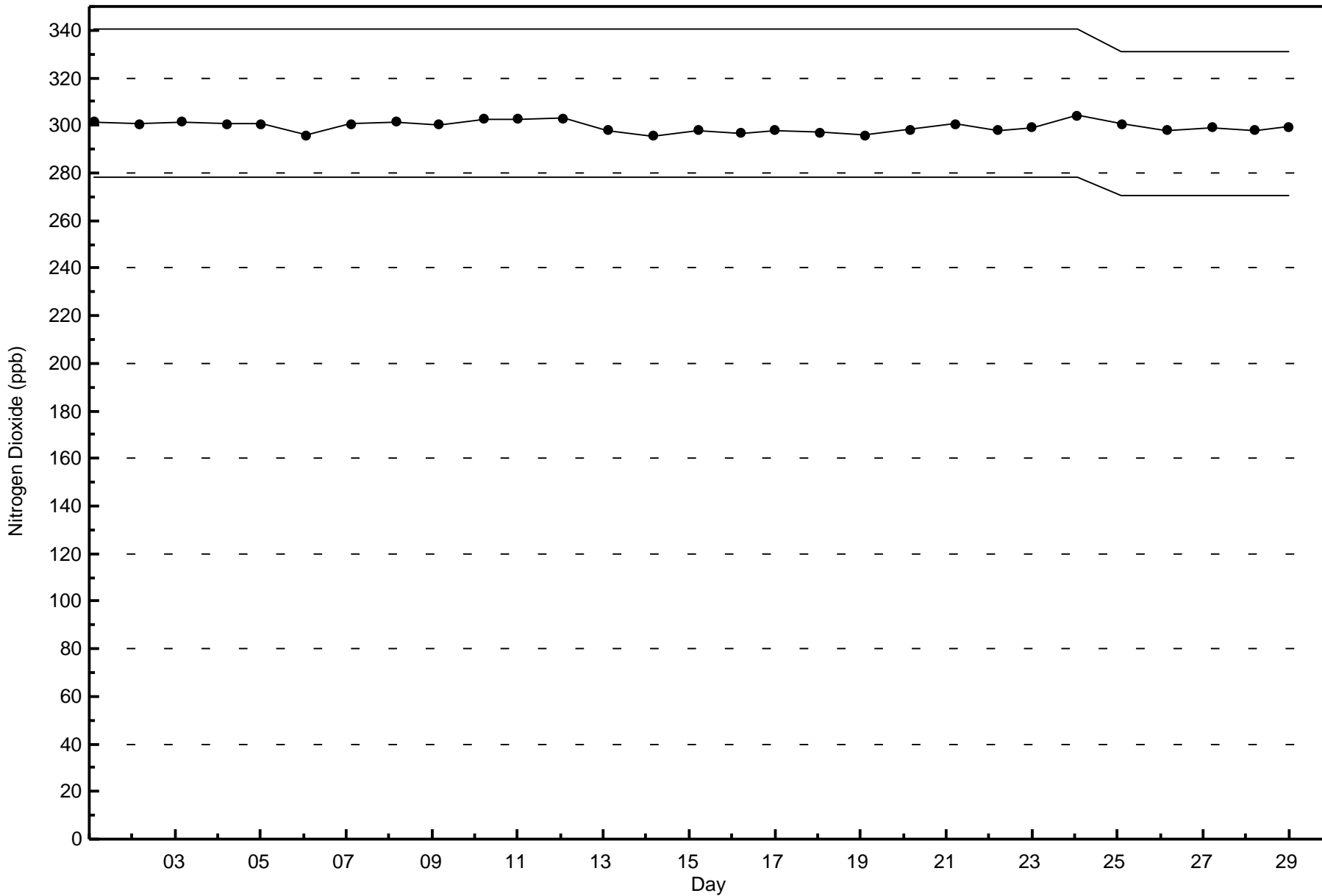






Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Firebag - February 2016





Wood Buffalo Environmental Association
Summary of Hour Averages

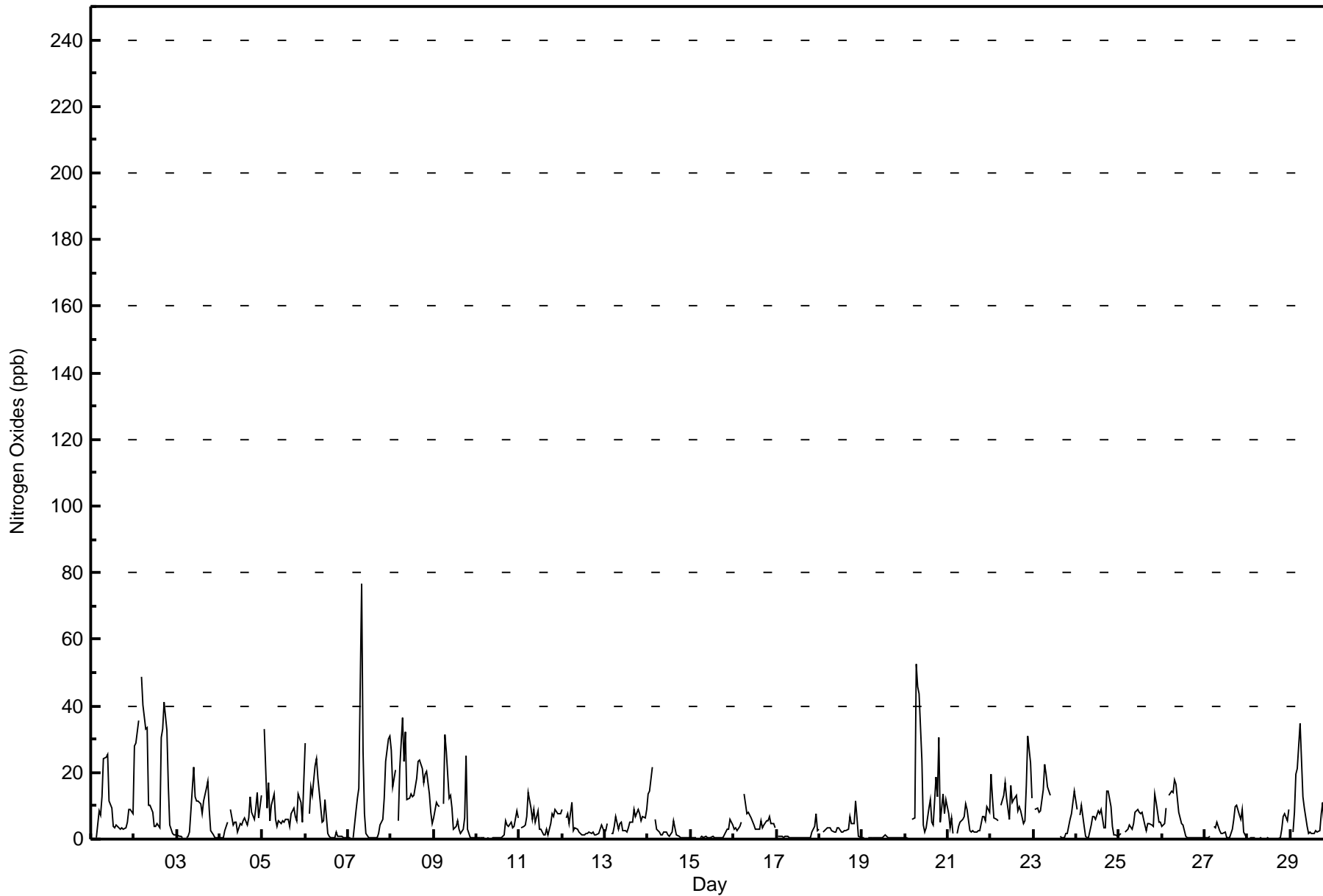
Nitrogen Oxides (NO_x) - ppb
Firebag - February 2016

Maximum Value: 77 ppb on Feb 7 08:00		Maximum Daily Average: 19.7 ppb on Feb 2		Hours in Service: 696																																													
Minimum Value: 0 ppb on Feb 28 10:00		Minimum Daily Average: 0.4 ppb on Feb 19		Hours of Data: 662																																													
Maximum Diurnal Average: 12.5 ppb at hour 8		Minimum Diurnal Average: 3.6 ppb at hour 13		Hours of Missing Data: 34																																													
Monthly Average: 6.7 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 9 P ₉₀ = 16 P ₉₉ = 40		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	Z	1	8	7	13	24	25	25	11	9	4	3	4	3	3	3	3	3	5	9	9	8	7.9	25																							
2-Feb	28	29	35	Z	49	40	33	34	10	10	8	4	4	5	3	31	33	41	32	16	4	2	1	1	19.7	49																							
3-Feb	1	1	1	1	Z	0	1	2	9	22	13	12	11	10	8	11	15	17	9	3	1	0	0	0	6.5	22																							
4-Feb	0	0	0	2	5	Z	9	4	5	5	2	4	4	5	6	4	6	13	8	6	9	14	6	13	5.8	14																							
5-Feb	Z	33	9	17	5	10	13	6	4	5	5	5	5	6	6	4	7	9	7	5	14	11	5	17	9.1	33																							
6-Feb	29	Z	8	16	13	22	24	18	14	5	6	12	2	1	0	0	1	2	1	1	1	1	1	1	7.6	29																							
7-Feb	1	0	Z	0	8	12	15	77	26	7	2	1	1	1	1	1	0	2	4	6	12	23	30	31	11.3	77																							
8-Feb	27	16	21	Z	6	21	37	23	32	12	12	14	13	13	18	23	24	21	17	19	20	14	8	5	18.1	37																							
9-Feb	6	11	10	10	Z	11	31	26	12	13	9	3	4	5	3	2	3	7	25	3	1	0	0	0	8.5	31																							
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	5	4	4	5	3	4	8	6	2.0	8																							
11-Feb	Z	3	4	4	7	14	9	6	9	5	9	3	3	1	1	3	1	5	8	7	9	8	8	8	5.8	14																							
12-Feb	9	Z	6	7	5	11	3	3	3	2	2	1	1	2	1	2	2	2	1	1	2	3	4	2	3.3	11																							
13-Feb	3	4	Z	2	2	4	7	3	5	5	3	3	2	3	5	5	9	7	9	8	5	7	6	9	5.0	9																							
14-Feb	13	14	22	Z	6	3	2	1	1	2	2	1	1	2	6	3	1	1	1	0	0	0	0	0	3.7	22																							
15-Feb	0	0	0	0	Z	0	1	1	1	1	0	1	1	1	1	0	1	1	0	1	3	3	6	4	1.2	6																							
16-Feb	3	3	3	4	5	Z	14	8	8	7	6	4	3	3	3	5	3	4	5	6	7	5	4	3	5.1	14																							
17-Feb	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	4	8	2	1.1	8																							
18-Feb	3	Z	2	2	3	4	3	2	2	2	4	3	2	2	3	3	3	7	5	5	11	6	1	0	3.4	11																							
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1																							
20-Feb	1	0	0	Z	6	7	52	46	44	24	4	2	3	9	12	5	4	19	13	31	5	13	8	12	13.9	52																							
21-Feb	8	3	6	2	Z	2	4	5	6	7	11	9	3	2	3	2	2	2	3	7	7	5	10	8	5.0	11																							
22-Feb	19	12	6	6	5	Z	10	13	17	12	6	16	11	12	13	8	10	8	5	5	16	31	23	12	12.1	31																							
23-Feb	Z	9	9	8	9	15	23	19	15	13	C	C	C	C	C	1	0	0	2	2	6	8	11	15	9.1	23																							
24-Feb	9	Z	7	10	4	1	0	1	4	7	7	6	8	7	9	3	3	14	14	10	4	1	1	1	5.8	14																							
25-Feb	1	2	Z	2	2	3	4	3	5	8	9	8	8	8	4	3	4	5	4	4	14	11	5	5	5.3	14																							
26-Feb	4	5	9	Z	13	14	14	18	16	8	6	5	4	1	1	1	0	0	0	0	0	0	0	0	5.3	18																							
27-Feb	0	0	0	1	Z	4	3	5	3	2	2	2	0	0	0	3	6	10	10	7	6	9	2	0	3.3	10																							
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	8	5	9	1.5	9																							
29-Feb	Z	2	8	20	21	35	24	13	9	4	2	2	2	2	2	2	3	7	11	3	2	2	2	2	7.8	35																							
																								6.9	6.0	7.1	4.9	7.7	10.0	12.1	12.5	9.8	7.4	5.1	4.7	3.6	3.9	4.1	4.5	5.2	7.3	7.0	5.8	6.1	7.0	6.0	6.1	Diurnal Average	
																								29	33	35	20	49	40	52	77	44	25	13	16	13	13	18	31	33	41	32	31	20	31	30	31	Diurnal Maximum	
Z - zerospan		C - Calibration																																															



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	614	92.75	92.75
21 - 40	42	6.34	99.09
41 - 80	6	0.91	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	85	60	32	24	4	12	24	79	69	59	43	33	20	15	10	38	607
21 - 40	1	1	0	0	0	0	0	4	22	6	0	1	1	1	1	4	42
11 - 80	1	0	0	0	0	0	0	1	1	0	0	1	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	87	61	32	24	4	12	24	84	92	65	43	35	21	16	11	42	653

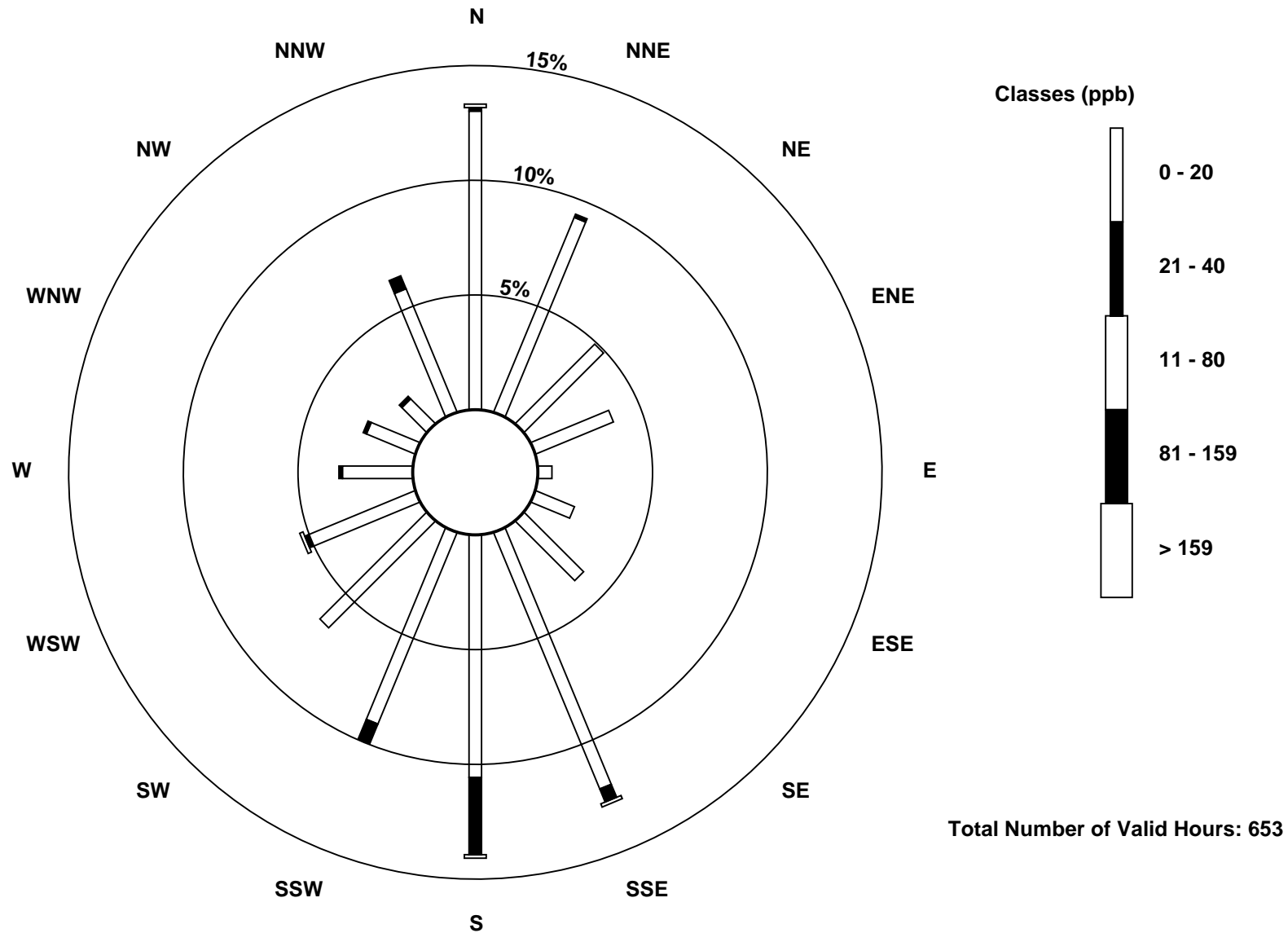
Total Number of Valid Hours: 653

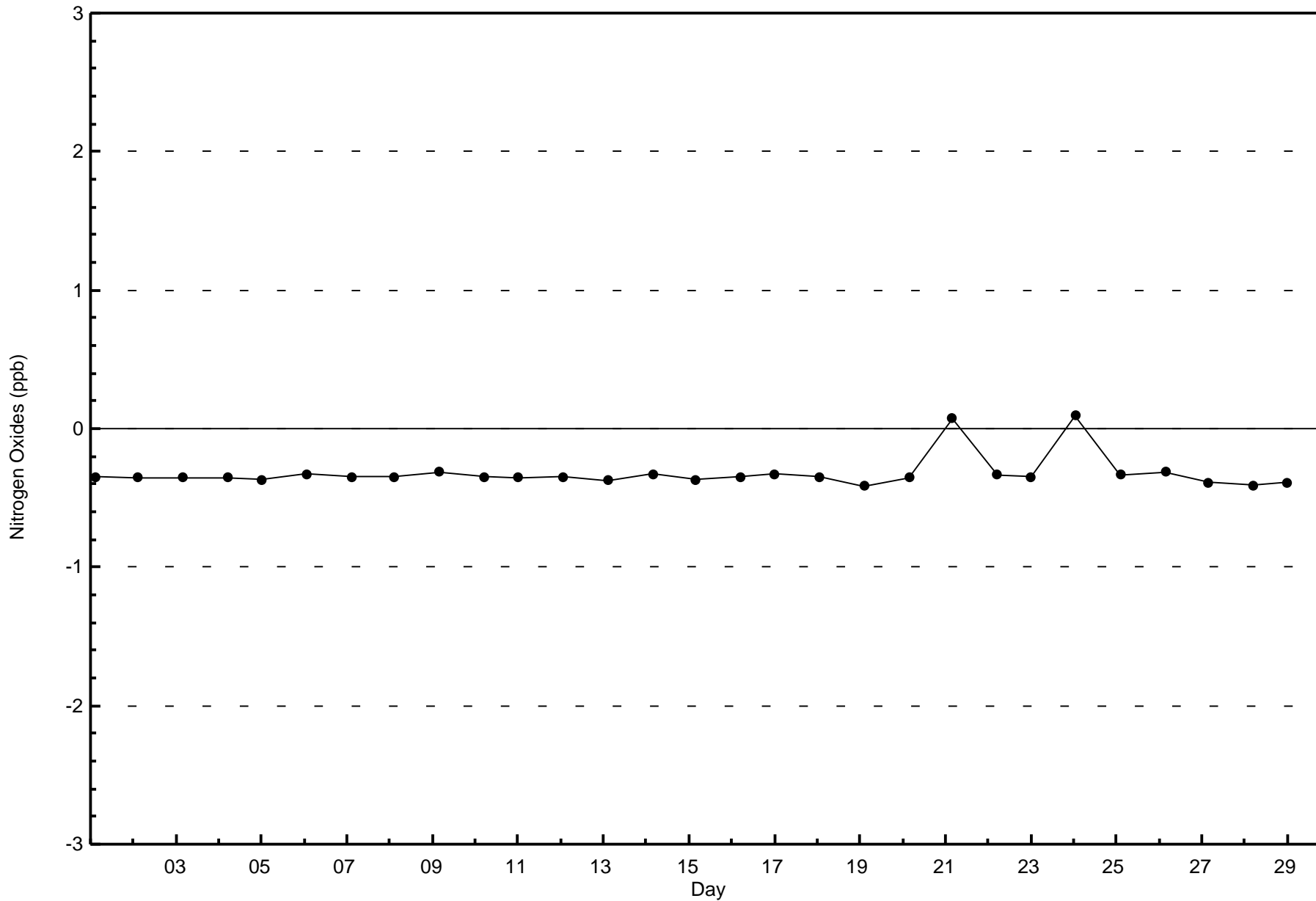
Total Number of Hours: 696

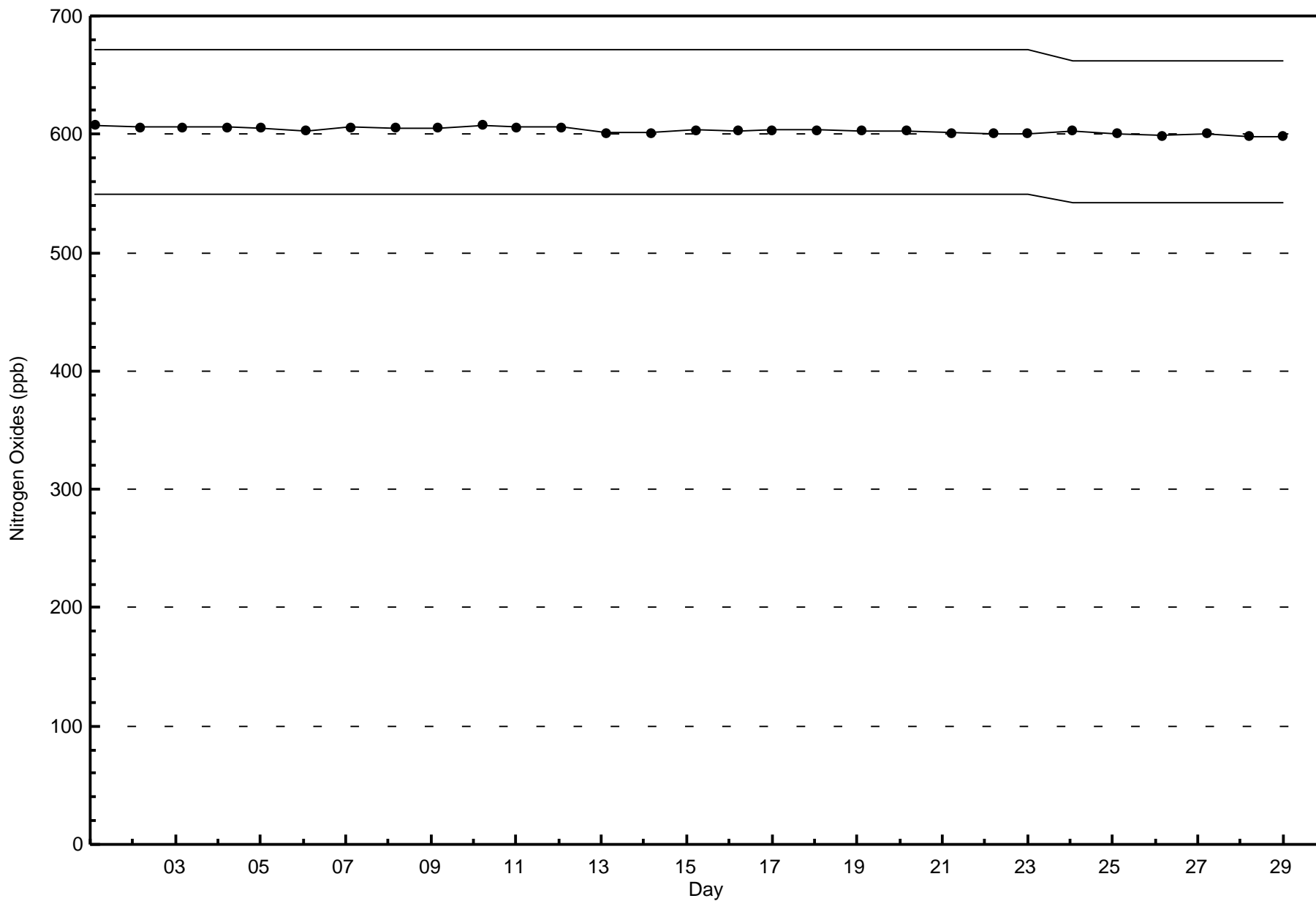


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)









Wood Buffalo Environmental Association
Summary of Hour Averages

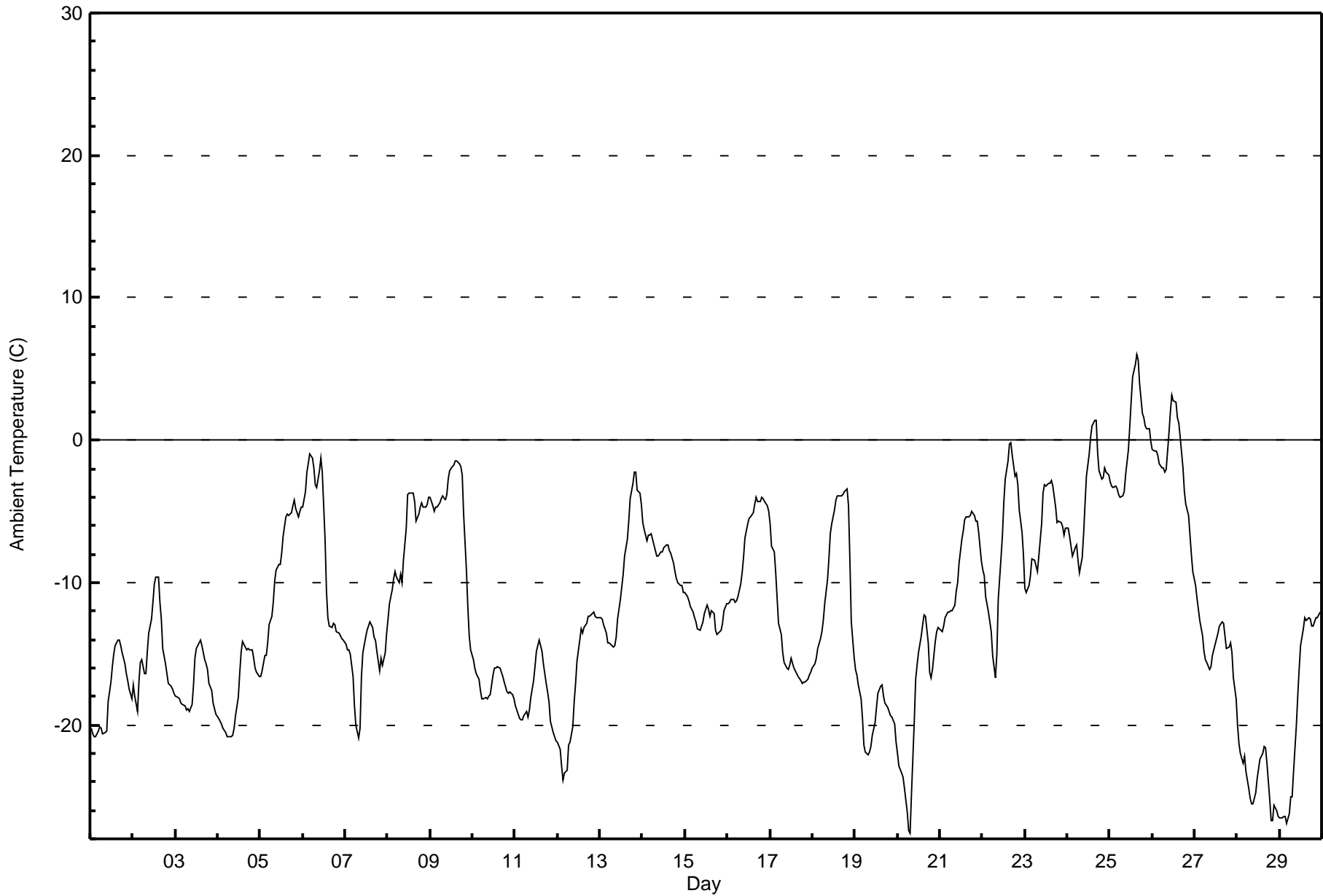
Ambient Temperature (AT) - C
Firebag - February 2016

Maximum Value: 6.1 C on Feb 25 16:00 Maximum Daily Average: 0.0 C on Feb 25		Hours in Service: 696 Hours of Data: 696																								
Minimum Value: -27.6 C on Feb 20 08:00 Minimum Daily Average: -23.8 C on Feb 28 Maximum Diurnal Average: -9.1 C at hour 16 Minimum Diurnal Average: -14.7 C at hour 8 Monthly Average: -11.92 C Percentiles: P ₁ = -26.5 P ₁₀ = -20.4 Q ₁ = -16.7 Median = -12.8 Q ₃ = -5.9 P ₉₀ = -2.7 P ₉₉ = 2.5		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	-20.2	-20.6	-20.9	-20.8	-20.4	-20.2	-20.2	-20.7	-20.5	-20.4	-18.4	-17.0	-15.9	-15.0	-14.4	-14.0	-14.0	-14.4	-14.9	-15.7	-16.4	-16.9	-17.5	-18.2	-17.8	-14.0
2-Feb	-17.2	-18.0	-19.1	-17.0	-15.6	-15.4	-16.4	-16.4	-14.8	-13.6	-12.5	-11.4	-10.1	-9.6	-9.6	-11.4	-12.6	-14.6	-15.7	-16.4	-17.0	-17.3	-17.5	-17.8	-14.9	-9.6
3-Feb	-17.9	-18.1	-18.2	-18.4	-18.5	-18.6	-19.0	-18.8	-19.0	-18.6	-17.2	-15.3	-14.6	-14.3	-14.0	-14.5	-15.4	-15.7	-16.1	-17.0	-17.6	-18.4	-18.8	-19.3	-17.2	-14.0
4-Feb	-19.6	-19.7	-20.0	-20.3	-20.5	-20.9	-20.9	-20.8	-20.7	-20.2	-19.3	-18.0	-16.4	-14.9	-14.2	-14.5	-14.7	-14.6	-14.7	-14.7	-15.3	-16.0	-16.3	-16.6	-17.7	-14.2
5-Feb	-16.6	-16.2	-15.1	-15.1	-14.2	-13.0	-12.3	-11.4	-9.9	-9.1	-8.7	-8.7	-8.0	-6.7	-5.4	-5.2	-5.3	-5.1	-4.6	-4.2	-4.8	-5.4	-5.0	-4.7	-8.9	-4.2
6-Feb	-4.7	-3.7	-2.3	-1.7	-1.0	-1.3	-1.9	-3.1	-3.3	-2.2	-1.3	-2.2	-6.9	-10.6	-12.5	-13.1	-13.2	-12.9	-13.0	-13.4	-13.5	-13.8	-13.9	-14.1	-7.5	-1.0
7-Feb	-14.4	-14.7	-14.8	-15.0	-16.5	-18.6	-20.1	-20.9	-20.2	-16.6	-15.0	-13.9	-13.3	-13.1	-12.7	-13.1	-13.9	-14.0	-14.8	-16.2	-15.3	-15.9	-15.0	-13.5	-15.5	-12.7
8-Feb	-12.5	-11.5	-10.5	-9.7	-9.3	-9.6	-10.0	-9.5	-10.0	-8.4	-6.1	-3.8	-3.8	-3.7	-3.7	-4.3	-5.7	-5.2	-4.7	-4.4	-4.7	-4.7	-4.5	-4.0	-6.9	-3.7
9-Feb	-4.1	-4.7	-5.0	-4.7	-4.7	-4.5	-4.1	-3.9	-4.2	-3.8	-2.7	-2.1	-1.8	-1.8	-1.5	-1.5	-1.7	-1.8	-2.4	-5.2	-9.1	-11.7	-13.8	-14.7	-4.8	-1.5
10-Feb	-15.4	-16.0	-16.4	-16.7	-17.6	-18.2	-18.1	-18.1	-18.1	-18.0	-17.9	-16.5	-16.0	-16.0	-15.9	-16.0	-16.3	-16.6	-16.9	-17.7	-17.8	-17.7	-17.9	-18.1	-17.1	-15.4
11-Feb	-18.7	-18.9	-19.6	-19.6	-19.6	-19.4	-19.0	-19.4	-18.9	-18.0	-16.9	-15.9	-14.8	-14.0	-14.4	-14.8	-15.8	-17.1	-17.6	-18.4	-19.8	-20.5	-20.8	-21.1	-18.0	-14.0
12-Feb	-21.2	-21.7	-22.8	-23.9	-23.4	-23.2	-21.4	-21.2	-20.1	-18.4	-17.0	-15.5	-14.0	-13.3	-13.5	-13.2	-12.9	-12.4	-12.4	-12.2	-12.1	-12.3	-12.5	-12.5	-16.8	-12.1
13-Feb	-12.5	-12.6	-13.0	-13.6	-14.3	-14.2	-14.4	-14.5	-14.5	-13.8	-12.6	-11.1	-10.3	-9.4	-8.2	-6.9	-5.7	-4.1	-3.1	-2.3	-2.2	-3.6	-3.7	-4.5	-9.4	-2.2
14-Feb	-5.8	-6.3	-7.0	-6.6	-6.6	-6.6	-7.4	-7.8	-8.1	-8.2	-7.9	-7.9	-7.5	-7.4	-7.4	-7.7	-8.0	-8.6	-9.3	-9.7	-10.0	-10.2	-10.2	-10.7	-8.0	-5.8
15-Feb	-10.7	-11.0	-11.3	-11.7	-12.1	-12.5	-12.8	-13.2	-13.3	-13.0	-12.7	-12.2	-11.6	-11.9	-12.4	-11.9	-12.2	-13.3	-13.7	-13.6	-13.3	-12.8	-12.0	-11.5	-12.4	-10.7
16-Feb	-11.5	-11.4	-11.2	-11.2	-11.4	-11.3	-11.0	-10.2	-9.3	-8.2	-6.9	-5.8	-5.5	-5.4	-5.1	-4.5	-4.0	-4.3	-4.3	-4.0	-4.1	-4.3	-4.6	-5.0	-7.3	-4.0
17-Feb	-5.8	-7.5	-7.9	-9.3	-11.1	-12.9	-13.7	-15.0	-15.6	-16.0	-16.1	-15.8	-15.4	-16.0	-16.3	-16.4	-16.6	-16.9	-17.0	-17.0	-17.0	-16.8	-16.5	-16.3	-14.4	-5.8
18-Feb	-16.0	-15.7	-15.3	-14.6	-14.0	-13.4	-12.7	-11.4	-9.9	-8.3	-6.6	-5.9	-4.9	-4.2	-3.9	-3.9	-4.0	-3.9	-3.6	-3.5	-4.6	-8.4	-12.8	-15.2	-9.0	-3.5
19-Feb	-16.1	-16.5	-17.2	-18.2	-19.6	-21.4	-21.9	-22.1	-21.9	-21.5	-20.7	-19.8	-18.7	-17.8	-17.2	-17.2	-17.9	-18.4	-18.7	-19.0	-19.3	-19.5	-20.0	-21.3	-19.3	-16.1
20-Feb	-22.0	-22.9	-23.4	-23.7	-24.4	-26.2	-27.4	-27.6	-24.8	-19.7	-16.8	-15.8	-15.0	-13.7	-12.9	-12.3	-12.4	-14.2	-16.3	-16.7	-16.1	-14.1	-13.5	-13.1	-18.5	-12.3
21-Feb	-13.3	-13.4	-13.0	-12.5	-12.1	-12.1	-12.0	-11.9	-11.5	-10.6	-10.0	-8.6	-7.0	-6.3	-5.6	-5.4	-5.3	-5.3	-5.0	-5.3	-5.7	-5.7	-6.5	-8.5	-8.9	-5.0
22-Feb	-9.2	-9.5	-11.0	-12.1	-12.8	-13.5	-15.2	-16.7	-15.0	-11.2	-8.2	-6.7	-4.3	-2.7	-1.5	-0.2	-0.2	-1.0	-2.5	-2.3	-3.2	-4.9	-6.5	-8.0	-7.4	-0.2
23-Feb	-10.4	-10.7	-10.2	-9.5	-8.4	-8.5	-8.8	-9.3	-8.2	-5.9	-3.8	-3.1	-3.2	-3.0	-3.1	-2.8	-3.3	-4.7	-5.7	-5.7	-5.8	-6.1	-6.7	-6.2	-6.4	-2.8
24-Feb	-6.2	-6.7	-7.4	-8.1	-7.5	-7.3	-8.5	-9.3	-8.3	-6.5	-4.5	-2.6	-1.0	0.2	1.0	1.4	1.3	-0.8	-2.1	-2.8	-2.7	-1.9	-2.2	-2.5	-4.0	1.4
25-Feb	-2.9	-3.2	-3.3	-3.3	-3.4	-3.8	-4.0	-3.9	-3.6	-2.5	-0.7	1.0	2.8	4.4	5.3	6.1	5.6	4.0	1.9	1.6	1.0	0.8	0.9	-0.1	0.0	6.1
26-Feb	-0.7	-0.8	-0.8	-1.1	-1.6	-1.9	-2.0	-2.3	-2.1	0.5	2.0	3.2	2.7	2.7	1.6	1.2	0.2	-1.9	-3.7	-4.5	-5.3	-6.7	-8.1	-9.3	-1.6	3.2
27-Feb	-10.2	-11.1	-11.9	-12.7	-13.8	-14.8	-15.4	-15.6	-16.1	-16.0	-15.1	-14.3	-13.9	-13.6	-13.0	-12.7	-12.9	-13.7	-14.6	-14.6	-14.3	-14.9	-16.7	-18.2	-14.2	-10.2
28-Feb	-20.1	-21.4	-22.0	-22.7	-22.2	-23.2	-24.5	-25.2	-25.5	-25.5	-24.7	-23.7	-23.1	-22.4	-22.0	-21.5	-21.6	-22.7	-25.3	-26.7	-26.7	-25.6	-26.0	-26.4	-23.8	-20.1
29-Feb	-26.5	-26.5	-26.5	-26.4	-26.9	-26.2	-25.0	-25.1	-23.3	-20.1	-18.0	-16.1	-14.5	-13.2	-12.5	-12.7	-12.5	-12.6	-13.1	-13.1	-12.4	-12.5	-12.3	-12.1	-18.3	-12.1
	-13.2	-13.5	-13.7	-13.8	-13.9	-14.2	-14.5	-14.7	-14.2	-12.9	-11.6	-10.5	-9.9	-9.4	-9.1	-9.1	-9.3	-9.9	-10.5	-10.9	-11.2	-11.6	-12.1	-12.5	Diurnal Average	
	-0.7	-0.8	-0.8	-1.1	-1.0	-1.3	-1.9	-2.3	-2.1	0.5	2.0	3.2	2.8	4.4	5.3	6.1	5.6	4.0	1.9	1.6	1.0	0.8	0.9	-0.1	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Firebag - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Firebag - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	82	11.78	11.78
-20 - 0	590	84.77	96.55
0 - 10	24	3.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

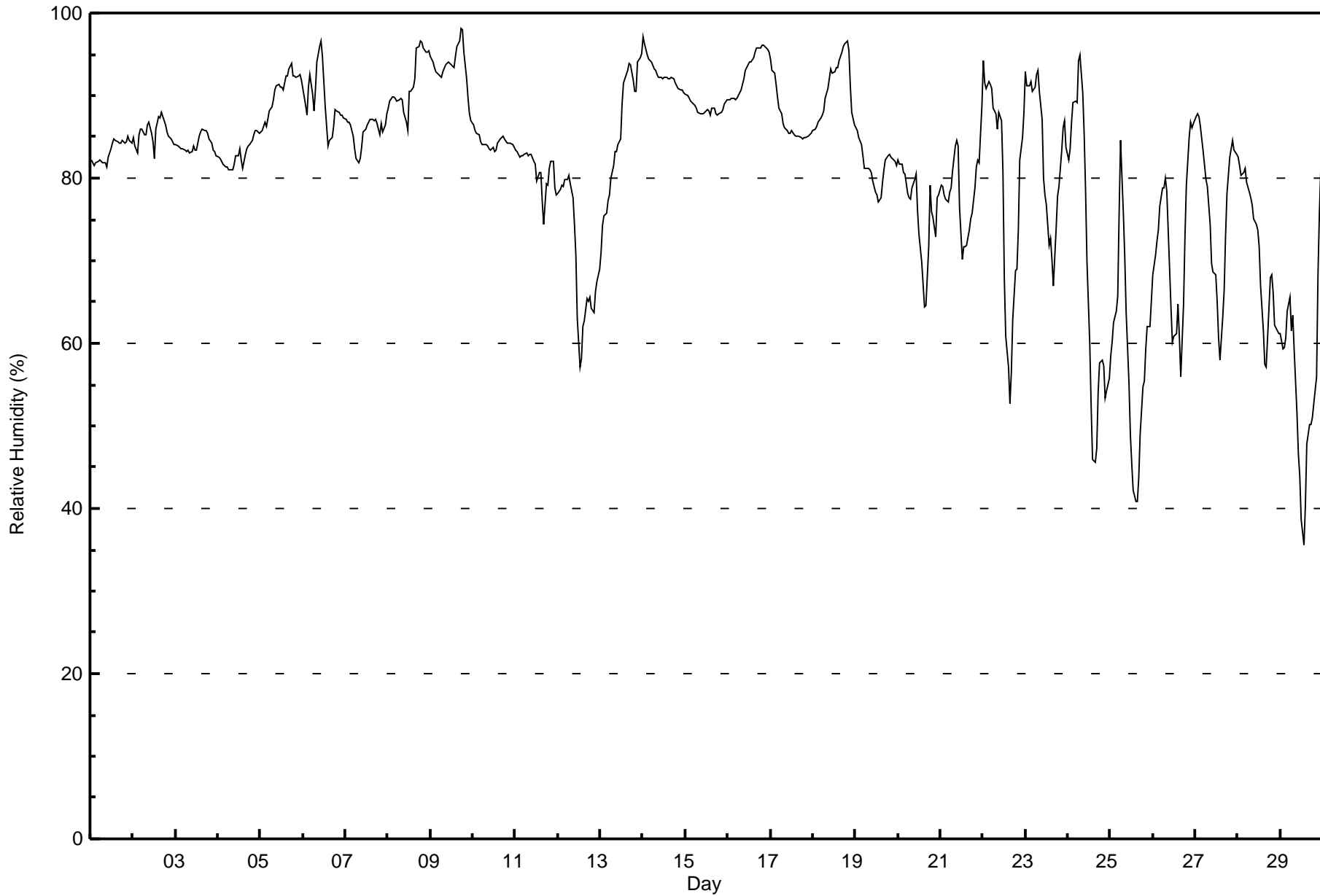
Firebag - February 2016

Maximum Value: 98 % on Feb 9 18:00 Maximum Daily Average: 93.5 % on Feb 9																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 36 % on Feb 29 14:00 Minimum Daily Average: 56.0 % on Feb 29 Maximum Diurnal Average: 84.3 % at hour 7 Minimum Diurnal Average: 76.5 % at hour 15 Monthly Average: 81.5 % Percentiles: P ₁ = 43 P ₁₀ = 63 Q ₁ = 78 Median = 84 O ₃ = 89 P ₉₀ = 93 P ₉₉ = 97																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	82	82	82	82	82	82	82	82	82	81	82	84	84	85	85	84	84	84	85	84	84	85	85	84	83.3	85
2-Feb	85	84	83	85	86	86	85	85	86	87	85	84	82	86	88	87	88	87	86	86	85	85	84	84	85.5	88
3-Feb	84	84	84	84	84	83	83	83	83	83	84	83	83	85	86	86	86	86	85	85	84	83	83	83	84.1	86
4-Feb	82	82	82	82	81	81	81	81	81	82	83	83	84	82	81	83	84	84	84	85	85	86	86	85	82.9	86
5-Feb	86	86	87	86	87	88	89	89	91	91	91	91	91	91	92	92	93	94	92	92	92	92	93	92	90.4	94
6-Feb	91	89	88	91	93	90	88	91	94	96	97	95	89	86	84	85	85	86	88	88	88	88	88	87	89.3	97
7-Feb	87	87	87	86	85	84	82	82	82	84	86	86	87	87	87	87	87	87	87	85	87	86	87	88	85.7	88
8-Feb	88	89	90	90	90	89	90	90	89	88	87	86	91	91	91	92	96	96	97	96	96	95	95	95	91.5	97
9-Feb	95	94	93	93	93	92	92	93	94	94	94	94	94	93	95	96	97	98	98	95	92	90	88	87	93.5	98
10-Feb	86	86	86	85	84	84	84	84	84	84	83	84	83	83	84	85	85	85	85	84	84	84	84	84	84.4	86
11-Feb	83	83	83	83	83	83	83	83	83	83	82	82	80	81	81	77	74	79	79	81	82	82	79	78	81.1	83
12-Feb	78	79	79	79	80	80	80	79	78	74	71	63	57	58	62	63	65	65	66	64	64	66	68	69	70.3	80
13-Feb	71	74	75	76	77	78	80	82	83	83	84	85	89	91	92	93	94	94	92	91	91	90	94	95	85.8	95
14-Feb	97	96	95	94	94	94	93	93	93	92	92	92	92	92	92	92	92	92	91	91	91	91	91	90	92.7	97
15-Feb	90	90	90	89	89	89	88	88	88	88	88	88	88	88	88	89	89	88	88	88	88	88	89	89	88.5	90
16-Feb	89	89	90	90	90	90	90	91	91	92	93	94	94	94	95	95	96	96	96	96	96	96	96	95	93.0	96
17-Feb	94	93	93	91	90	88	88	87	86	86	85	86	86	85	85	85	85	85	85	85	85	85	85	85	87.0	94
18-Feb	86	86	86	87	87	88	88	90	91	92	93	93	93	93	93	94	95	96	96	97	95	91	88	86	91.1	97
19-Feb	86	86	85	84	83	81	81	81	81	81	80	78	78	77	78	80	81	82	83	83	83	82	82	82	81.5	86
20-Feb	82	82	82	81	80	78	78	77	79	80	80	76	73	70	67	64	65	72	79	76	75	73	78	78	76.1	82
21-Feb	79	79	78	77	77	78	79	81	84	85	84	77	70	72	72	74	75	76	79	81	82	82	89	78.4	89	
22-Feb	94	91	91	92	91	91	88	88	86	88	87	81	68	61	57	53	57	63	69	69	74	82	85	88	78.9	94
23-Feb	93	91	91	92	91	91	93	93	90	87	80	78	77	72	73	70	67	74	78	79	83	86	87	84	83.3	93
24-Feb	82	84	87	89	89	89	94	95	90	86	79	70	60	52	46	46	47	54	58	58	57	53	54	56	69.8	95
25-Feb	58	60	63	64	66	76	85	76	70	64	55	49	45	42	41	41	44	49	55	55	59	62	62	65	58.6	85
26-Feb	68	71	72	74	77	79	79	80	79	69	64	60	61	61	65	61	56	65	73	79	85	87	86	87	72.3	87
27-Feb	87	88	87	86	83	81	80	79	74	70	69	68	65	61	58	63	66	73	78	83	83	85	83	83	76.4	88
28-Feb	82	82	80	81	81	79	78	78	77	75	74	74	72	67	62	57	57	61	68	68	66	62	61	61	71.0	82
29-Feb	61	59	59	61	64	66	62	63	59	52	47	44	39	36	40	48	50	50	51	53	56	68	76	81	56.0	81
83.8 83.6 83.7 83.9 84.0 84.1 84.3 84.2 83.8 82.6 81.4 79.5 77.7 76.6 76.5 76.5 77.2 79.3 80.9 81.2 81.8 82.4 82.7 83.1																		Diurnal Average								
97 96 95 94 94 94 94 95 94 96 97 95 94 94 95 96 97 98 98 97 96 96 96 95																		Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Firebag - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	2	0.29	0.29
40 - 60	46	6.61	6.90
60 - 80	158	22.70	29.60
80 - 100	490	70.40	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Firebag - February 2016

Maximum Speed: 36 km/h on Feb 6 15:00	Maximum Daily Speed Average: 20.5 km/h on Feb 12	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 10 19:00	Minimum Daily Speed Average: 1.7 km/h on Feb 2	Hours of Data: 687
Maximum Diurnal Speed Average: 4.3 km/h at hour 11	Minimum Diurnal Speed Average: 0.4 km/h at hour 1	Hours of Missing Data: 9
Monthly Average Velocity: 1.8 km/h 216.5 deg	Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 14 P ₉₀ = 21 P ₉₉ = 32	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	NNW4	N3	NNW3	NE2	AF	WSW4	SW4	SSW5	SSW5	S7	SSW8	SSW9	SSW10	SSW10	SSW10	SSW9	SSW11	SSW9	SSW9	SSW7	SSW7	SSW6	SW5	SW3	SSW5.4	SSW11	
2-Feb	SSW3	SSE2	W2	S1	SSE5	SSE4	SSE4	S5	SSW8	SSW9	SSW10	SW11	SW12	SW7	WNW7	NNW11	NNW8	N12	N10	NNE10	NNE10	NNE9	N9	N9	WNW1.7	N12	
3-Feb	N8	N9	N7	N7	NNE5	NNW3	NNE1	SE0	S1	S4	SW4	NNW2	S2	WSW5	WNW5	NNW8	N8	N3	N8	NNE9	NNE8	NNE10	NNE7	NE6	N3.9	NNE10	
4-Feb	NE7	NE8	NE8	ENE6	ENE5	E4	SE5	ESE6	SE6	SSE6	SSE5	S6	S7	S9	SSW9	S8	SSE8	SSE9	SSE11	SSE10	SSE9	SSE8	SSE10	S9	SSE5.4	SSE11	
5-Feb	SSW9	S8	SSW8	SSE6	SSE6	SSE7	SSE7	SSE10	SSE15	S17	S17	S22	SSE21	S18	S21	SSE22	SSE23	S18	S19	S17	S15	S12	SSW15	S13	S14.2	SSE23	
6-Feb	S11	S14	S14	S12	SSE6	S11	S12	S16	S13	SW15	WSW14	NNW19	NNW30	NNW31	NNW36	NNW33	NNW29	NNW26	NNW28	NNW25	NNW20	N16	N12	N6	NNW8.3	NNW36	
7-Feb	N6	NNE9	NNE6	NNE3	AF	WSW2	W1	WSW2	NNE3	NNE3	NNE7	NNE7	N5	NNE4	N4	NNE3	NNE3	NNE3	ENE1	AF	SE1	S2	SSE2	S3	NNE2.5	NNE9	
8-Feb	S4	S4	S4	S5	SSW8	S5	S5	SSW4	SSW5	SW6	SW7	WSW6	WNW7	W3	S3	S3	SSW5	S6	S4	SSE6	SE6	SSE7	SSE8	S9	SSW4.7	S9	
9-Feb	S8	S8	S8	SSE7	SSE7	SSE7	S7	S8	SSE8	SSE11	S13	S14	S15	S13	SSW13	SW11	WSW10	WSW9	NNW13	N16	N19	N22	N17	N15	SSW2.6	N22	
10-Feb	N12	N10	N10	N9	NNE10	NNE6	NNE6	NNE6	NNE5	NNE5	NE4	NNE3	NE3	NE3	NE3	ENE2	E1	ENE0	ESE0	SE1	SE1	SSE1	SSE1	SE0	NNE3.8	N12	
11-Feb	SE0	ESE0	ESE0	SSE0	SSE1	AF	AF	AF	SE0	AF	ENE0	ENE1	ENE1	ENE3	ENE3	ENE3	ENE5	ENE4	ESE3	SE4	SE4	SE5	SE5	SSE5	ESE2.0	SE5	
12-Feb	SSE5	SSE6	SE6	SE6	SSE8	SSE8	SSE10	SSE9	SSE10	SSE13	SSE15	SSE21	SSE28	SSE29	SSE31	SSE31	SSE30	SSE32	SSE32	SSE34	SSE34	SSE35	SSE33	SSE30	SSE20.5	SSE35	
13-Feb	SSE28	S27	SSE26	SSE26	SSE22	SSE23	SSE22	S21	S19	S20	SSW20	SSW20	SW20	SW17	SW17	SW17	SW17	WSW17	WSW15	W15	W12	W10	W8	W8	SSW15.0	SSE28	
14-Feb	W8	W8	WNW4	NNW4	N6	N8	N8	N9	NNW6	N7	N9	NNW6	NW5	NNW6	N4	N4	NNE4	NE5	NE4	NE5	NE6	NNE6	NNE5	N4.8	N9		
15-Feb	NNE3	NE3	NNE3	NE3	NE5	NE5	NE6	NE5	NE4	NNE4	NNE4	N3	N4	N5	NNE5	N3	N4	N4	NNE3	ENE2	ESE2	SSE5	S6	S8	NE2.4	S8	
16-Feb	SSE9	SSE9	SSE10	S10	SSE8	S7	S8	S5	S5	S5	S5	SSW5	SW4	SSE4	S4	S4	S6	S5	SSE4	SE3	E3	ESE4	ESE4	ENE2	SSE5.1	S10	
17-Feb	NNE5	NE5	N7	NNE7	NNE8	NNE8	NNE7	N8	N7	N7	N6	N5	N4	N6	NNE5	NNE5	NE4	NNE4	NE4	NE4	ENE3	ENE3	ENE1	ESE0	NNE4.8	NNE8	
18-Feb	ESE0	SE0	SE1	SE1	SE1	SE2	SE4	SE4	SE5	SE5	SSE15	SSE28	SSE29	SSE25	SSE25	SSE20	SSE20	S17	S16	S8	NNW8	NNE19	NNE25	N27	SSE6.6	SSE29	
19-Feb	N22	N18	N21	NNW21	N25	N26	N21	N21	NNW22	NNW19	NNW21	NNW21	NNW19	NNW19	N14	N12	NNW11	N10	N11	N8	N9	N8	NNE8	NNE7	N16.2	N26	
20-Feb	NE5	NE6	NE7	NE5	ENE5	ENE2	AF	AF	S3	S3	SSW4	WSW8	WSW11	SW11	SW11	SW11	SW11	SSW7	S9	S9	S13	S12	S9	S7	SSW4.6	S13	
21-Feb	SSE7	SSE7	S8	SSW9	SSW8	SSW8	SSW8	SSW9	SSW9	SSW10	SSW13	SSW13	SW14	SSW14	SSW17	SSW16	SSW16	SSW16	SSW16	SSW15	S13	SSE9	SSE10	S6	NNW8	SSW9.9	SSW17
22-Feb	NNW10	N12	N13	N10	N11	N8	NNW3	N3	W5	WSW4	WSW10	SW10	SW11	SW12	SW14	WSW14	WSW11	SW9	WSW10	WNW11	NNW9	NW5	NNW7	NNW6	WNW5.1	WSW14	
23-Feb	NNW4	WSW6	W6	SW9	SW10	WSW8	WSW9	WSW11	WSW10	W9	NNW9	NNW13	NNW21	NNW24	NNW20	NNW18	NNW14	NW6	WNW5	WNW9	W10	W10	WNW11	NNW12	WNW8.4	NNW24	
24-Feb	NW10	NW11	NW8	NNW10	N14	N12	NNW8	NW6	WNW5	WSW9	WSW12	WSW14	WSW13	WSW13	WSW14	SW14	SW13	SSW9	S12	S13	S15	SSW19	SSW22	SSW24	WSW7.7	SSW24	
25-Feb	SSW23	SSW23	SSW22	SSW23	SSW22	SW18	SSW18	SW18	SSW22	SW20	WSW18	WSW20	WSW20	WSW22	W23	WNW22	WNW19	WNW10	WNW8	WNW9	W10	W12	W13	WSW11	WSW15.4	SSW23	
26-Feb	SW12	SW16	SW17	SW15	SW15	SW17	SW15	SW14	SW12	W14	W17	NNW18	NNW22	N19	NNW18	N19	N20	NNE23	NNE26	NNE22	NNE23	NE19	NE16	NNE14	NNW6.5	NNE26	
27-Feb	NNE15	NNE14	NNE14	NE12	ENE14	E12	E11	ENE9	ENE12	ENE12	NE6	N7	NNE9	NNE8	N6	NW4	WNW6	NW6	WNW5	WSW6	WSW6	NNW9	NNE13	NNE14	NNE6.7	NNE15	
28-Feb	N14	NNW11	N15	N14	N17	N18	N14	N18	N21	N19	N15	N19	N20	NNE17	NNE16	NNE14	NNE11	NNE9	NE6	NE8	ENE8	ESE11	SE14	SE12	NNE11.5	N21	
29-Feb	SSE14	SSE18	SSE17	S18	S12	S11	S16	S19	S15	SSW15	SSW15	SSW16	SSW15	S14	SSW17	SSW16	SSW16	S15	S14	S14	SSW13	SSW14	SSW15	SSW15	S14.7	S19	

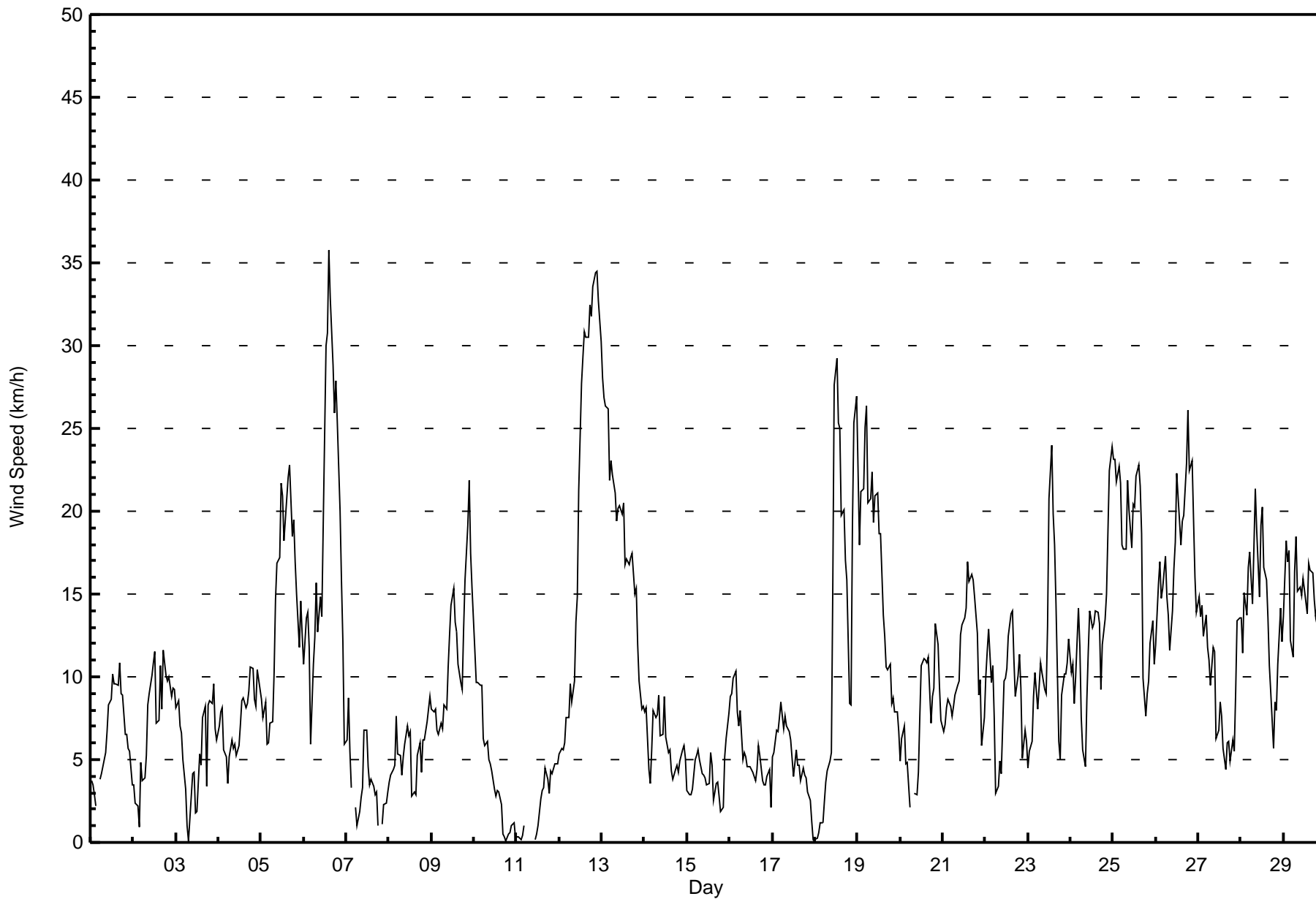
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SSE28	SSE27	SSE26	SSE26	N25	N26	SSE22	S21	NNW22	S20	NNW21	SSE28	NNW30	NNW31	NNW36	NNW33	SSE30	SSE32	SSE32	SSE34	SSE34	SSE35	SSE33	SSE30		Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Firebag - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - February 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	189	27.51	27.51
6 - 11	252	36.68	64.19
12 - 19	163	23.73	87.92
20 - 28	66	9.61	97.53
29 - 38	17	2.47	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - February 2016**

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	24	20	19	3	10	21	15	25	8	5	5	4	5	3	7	189
6 - 11	37	26	11	3	1	2	3	38	29	28	14	17	10	9	8	16	252
12 - 19	27	10	3	3	1	0	2	7	37	23	22	10	6	1	2	9	163
20 - 28	11	5	0	0	0	0	0	17	4	9	3	3	1	1	0	12	66
29 - 38	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	5	17
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	65	34	25	5	12	26	89	95	68	44	35	21	16	13	49	687

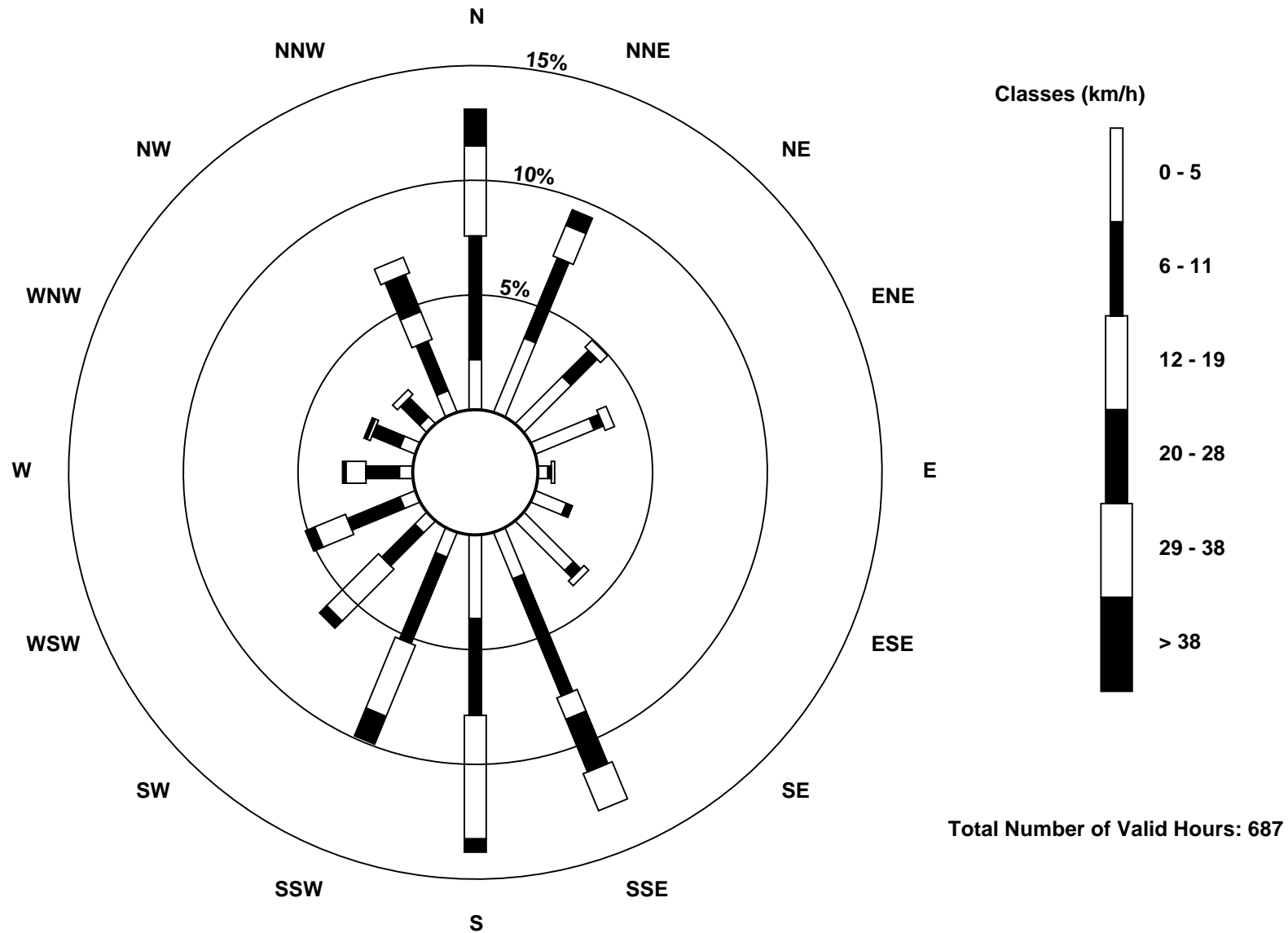
Total Number of Valid Hours: 687

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Firebag (AMS 19)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 696
Maximum Value: 10 km/h on Feb 18 11:00	Hours of Data: 687
Minimum Value: 0 km/h on Feb 10 19:00	Hours of Missing Data: 9
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	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	1	0	1	AF	1	1	1	1	1	1	1	2	1	1	1	2	2	1	2	1	1	1	1	2
2-Feb	0	1	2	1	1	1	1	2	1	2	2	1	2	1	2	2	1	3	3	2	2	1	2	2	3
3-Feb	2	2	1	2	1	1	1	1	1	1	1	1	2	1	1	2	2	1	2	1	2	2	2	1	2
4-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	2	2	1	2
5-Feb	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	2	3	2	1	2	3
6-Feb	1	2	2	1	3	1	3	3	2	2	2	7	6	6	6	7	6	5	6	5	4	3	3	1	7
7-Feb	2	3	1	1	AF	1	1	1	0	1	2	1	1	1	1	1	0	1	AF	1	0	1	0	3	
8-Feb	1	0	0	0	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1	1	2	1	1	1	2
9-Feb	1	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	1	1	4	4	3	4	3	2	4
10-Feb	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	3
11-Feb	1	1	0	1	1	AF	AF	AF	0	AF	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
12-Feb	1	1	1	1	1	1	1	1	1	2	2	5	4	4	5	5	4	5	5	5	5	5	5	5	5
13-Feb	4	4	4	4	3	3	3	3	3	3	2	3	3	2	2	2	3	4	2	2	2	1	1	1	4
14-Feb	2	1	2	1	1	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2
15-Feb	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
16-Feb	1	1	1	2	2	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	2
17-Feb	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	2
18-Feb	0	1	1	1	1	2	1	1	1	1	10	5	5	4	4	3	3	3	3	4	4	4	4	5	10
19-Feb	5	3	4	4	6	5	3	3	4	4	4	5	4	3	3	2	2	2	2	1	2	2	2	2	6
20-Feb	1	0	1	1	1	1	AF	AF	1	1	1	2	2	3	2	2	2	1	1	1	2	2	1	1	3
21-Feb	1	1	1	1	1	1	1	2	1	1	2	2	3	2	3	3	2	2	2	3	2	2	3	3	3
22-Feb	1	1	1	1	1	2	1	1	1	2	3	2	2	2	2	2	2	1	2	3	4	1	1	1	4
23-Feb	1	1	1	2	1	2	1	1	1	2	2	3	4	5	4	4	5	1	1	1	1	1	1	2	5
24-Feb	2	1	1	1	2	3	1	1	1	2	3	3	3	3	2	2	3	1	1	2	2	3	3	3	3
25-Feb	3	3	3	4	4	3	3	2	3	3	3	3	3	4	4	4	5	2	1	1	1	2	2	1	5
26-Feb	1	2	2	2	2	3	2	2	3	3	3	5	5	4	4	4	3	5	4	4	4	3	3	2	5
27-Feb	2	2	2	2	2	2	2	2	2	2	2	2	3	2	1	1	1	1	1	2	2	3	3	3	3
28-Feb	4	2	3	2	3	3	3	3	5	4	3	4	4	4	3	4	2	2	2	1	1	3	2	2	5
29-Feb	2	2	2	3	2	2	3	2	2	3	2	3	3	2	3	3	2	2	2	1	2	2	2	2	3
	5	4	4	4	6	5	3	3	5	4	10	7	6	6	6	7	6	5	6	5	5	5	5	5	5
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - February 2016

Direction of Maximum Speed: 348 deg on Feb 6 15:00 Direction of Maximum Daily Speed Average: 162.3 deg on Feb 12	Hours in Service: 696 Hours of Data: 687 Hours of Missing Data: 9
Direction of Minimum Speed: 109 deg on Feb 10 19:00 Direction of Minimum Daily Speed Average: 1.7 deg on Feb 2	Percent Operational Time: 98.7
Monthly Average Direction: 237.5 deg	

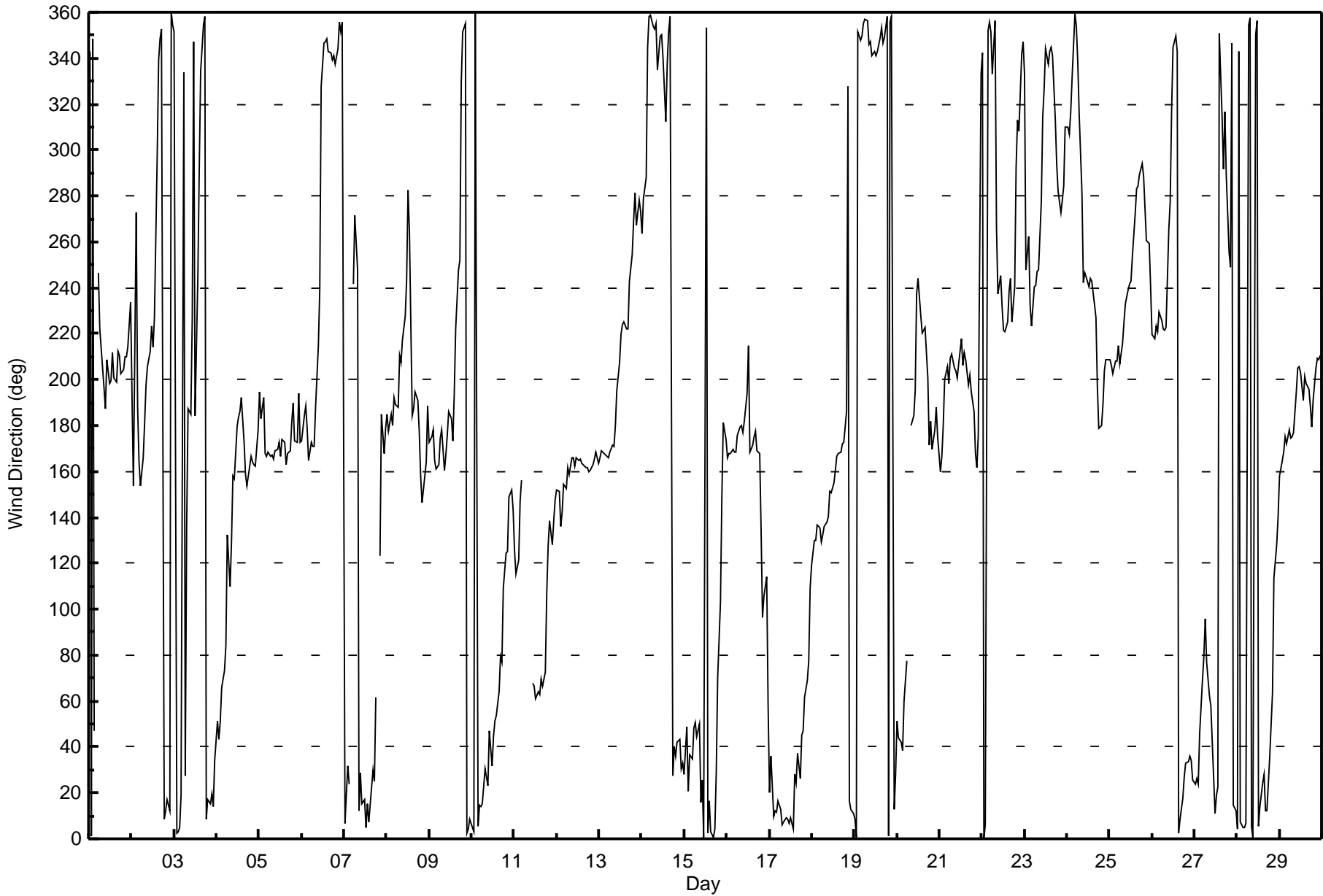
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	343	1	348	47	AF	247	222	213	196	187	209	198	199	212	201	199	213	211	202	205	210	210	214	234	209.5
2-Feb	193	154	273	188	164	154	166	181	197	206	213	223	214	227	298	340	348	352	9	12	17	12	360	354	297.9
3-Feb	351	2	3	5	19	334	27	136	188	185	227	347	184	246	292	334	354	358	9	17	15	20	14	34	358.5
4-Feb	52	43	51	66	73	84	132	110	129	158	157	179	184	186	192	173	158	154	158	167	164	163	162	178	147.8
5-Feb	194	183	192	168	166	168	167	167	165	169	169	173	167	174	173	163	168	169	181	190	173	173	194	173	173.5
6-Feb	173	184	189	179	165	173	171	171	188	215	239	327	346	347	348	343	342	339	341	338	344	356	351	356	328.9
7-Feb	7	19	32	24	AF	242	272	248	12	29	15	17	5	15	7	22	30	25	62	AF	124	185	168	178	18.6
8-Feb	185	177	185	180	192	189	188	211	208	217	227	244	282	265	184	187	195	191	178	158	146	158	164	188	193.3
9-Feb	173	175	178	165	161	163	175	178	160	167	176	186	183	173	194	222	248	252	329	352	355	2	4	8	199.3
10-Feb	5	3	360	6	14	14	15	30	27	23	47	31	44	51	54	64	79	77	109	124	125	149	152	144	20.4
11-Feb	126	115	121	147	156	AF	AF	AF	124	AF	68	66	61	64	63	70	67	72	107	128	138	128	139	147	106.7
12-Feb	152	151	136	142	155	153	161	159	166	166	163	166	165	165	163	163	162	162	160	161	163	166	168	164	162.3
13-Feb	166	169	168	167	166	166	168	171	171	180	195	207	220	224	225	222	222	243	254	269	281	267	278	273	198.2
14-Feb	263	279	288	345	358	359	354	352	355	335	350	350	312	337	351	358	28	40	36	42	43	31	33	351.1	
15-Feb	28	49	21	37	35	48	51	45	50	16	25	0	353	3	16	3	1	4	29	70	103	149	181	174	39.4
16-Feb	166	168	168	170	168	169	176	179	180	177	182	194	215	168	171	175	177	169	168	134	97	106	114	58	167.0
17-Feb	20	36	10	12	12	17	13	6	7	9	9	7	9	5	28	25	37	26	45	47	62	69	78	109	19.5
18-Feb	119	130	130	137	136	130	132	136	138	140	151	151	155	160	167	168	168	172	172	186	328	16	13	11	146.6
19-Feb	9	1	351	348	350	355	357	356	346	347	341	343	341	343	349	353	347	349	358	1	356	358	13	28	352.4
20-Feb	51	44	42	39	60	77	AF	AF	180	184	195	237	244	228	221	221	223	200	171	182	169	178	188	175	194.1
21-Feb	160	167	180	200	206	198	209	211	205	204	201	207	218	206	212	209	198	202	194	186	168	161	176	333	198.8
22-Feb	343	0	6	352	356	351	333	357	267	237	245	232	222	221	225	238	244	225	240	292	313	308	342	347	284.5
23-Feb	333	248	262	233	223	240	241	247	248	278	314	327	344	337	343	345	341	313	294	282	273	278	284	310	300.7
24-Feb	310	307	316	332	359	354	339	316	282	242	246	245	240	244	243	232	227	197	179	180	189	204	208	209	240.3
25-Feb	209	206	202	208	208	215	207	216	225	233	239	241	243	254	272	283	285	289	294	289	274	261	259	240	238.0
26-Feb	220	218	223	221	229	226	222	222	223	266	277	317	345	350	343	2	9	18	27	33	33	36	34	26	332.4
27-Feb	24	26	24	46	69	79	96	77	62	58	42	11	19	22	351	315	292	317	289	256	249	347	14	12	28.5
28-Feb	4	343	8	5	5	7	355	358	6	0	350	356	5	14	24	28	12	12	35	49	64	113	128	140	14.6
29-Feb	158	165	168	175	172	178	175	175	177	195	205	206	203	191	201	198	196	189	179	191	205	209	209	210	188.7
173.6 184.8 193.7 178.0 147.3 176.0 181.3 187.7 195.6 210.7 223.1 236.2 239.9 241.5 242.7 245.9 235.4 220.7 200.3 213.2 200.2 147.6 186.6 206.7																									
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
Firebag - February 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Firebag - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 696
Maximum Value: 94 deg on Feb 3 08:00	Hours of Data: 687
Minimum Value: 4 deg on Feb 20 03:00	Hours of Missing Data: 9
Percentiles: P ₁ = 5 P ₁₀ = 8 Q ₁ = 9 Median = 11 Q ₃ = 14 P ₉₀ = 20 P ₉₉ = 62	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	17	9	17	19	AF	16	12	20	21	8	9	10	12	10	13	11	8	9	9	10	9	7	15	12	21
2-Feb	20	34	64	65	16	21	27	13	10	15	10	11	10	21	22	11	12	18	13	11	11	11	12	12	65
3-Feb	11	13	11	14	32	30	81	94	68	17	27	62	44	34	30	12	12	41	15	13	14	12	12	13	94
4-Feb	10	10	10	12	15	28	14	11	13	13	13	12	10	14	11	11	11	9	10	8	9	11	9	7	28
5-Feb	6	6	10	7	7	7	9	8	8	8	8	9	8	9	10	7	7	8	11	9	9	16	5	10	16
6-Feb	7	8	7	7	33	10	12	8	11	10	10	34	13	14	13	12	11	13	11	10	13	12	11	10	34
7-Feb	18	13	12	22	AF	39	33	49	20	18	12	13	16	23	17	20	19	12	24	AF	45	22	14	9	49
8-Feb	9	6	7	9	5	9	10	12	9	9	8	19	21	44	14	25	18	8	15	10	10	9	10	9	44
9-Feb	10	8	8	13	9	9	7	7	10	7	8	7	9	9	13	11	10	11	29	13	11	14	13	13	29
10-Feb	13	14	13	13	12	14	13	13	16	14	10	18	15	17	10	11	10	27	8	7	9	16	10	13	27
11-Feb	5	7	9	39	16	AF	AF	AF	6	AF	34	27	29	13	14	11	8	13	13	13	15	11	11	13	39
12-Feb	10	10	12	11	8	9	8	9	8	9	9	8	9	8	8	9	8	8	8	9	9	8	8	9	12
13-Feb	9	8	8	8	8	8	8	8	8	9	9	12	10	9	8	10	13	9	14	9	6	11	12	14	
14-Feb	7	12	40	22	10	11	12	11	12	16	15	14	16	18	18	20	13	12	11	11	9	11	12	40	
15-Feb	23	10	13	9	9	11	14	14	14	15	19	24	23	16	15	19	12	9	19	50	67	17	11	11	67
16-Feb	8	8	8	7	10	9	8	14	8	8	8	16	12	9	14	14	8	9	14	25	10	11	10	50	50
17-Feb	14	12	16	13	11	12	13	12	13	14	13	12	16	13	13	17	14	11	12	11	12	11	9	9	17
18-Feb	9	10	9	10	10	9	11	11	11	11	11	11	10	9	10	9	9	8	11	38	28	15	12	12	38
19-Feb	13	14	10	12	12	15	13	12	10	13	11	14	13	13	15	13	11	11	11	13	11	12	13	12	15
20-Feb	6	6	4	5	9	15	AF	AF	20	11	16	20	17	14	13	12	9	17	8	6	6	8	7	10	20
21-Feb	10	9	8	8	9	6	9	9	8	10	12	17	12	13	10	9	8	10	8	8	16	9	36	56	56
22-Feb	5	9	9	8	9	13	25	32	21	34	14	22	15	14	12	13	8	9	22	14	14	8	16	8	34
23-Feb	31	47	12	7	9	9	16	5	7	23	17	16	13	11	14	12	15	19	7	6	7	7	12	47	
24-Feb	15	10	9	6	14	25	9	15	17	9	8	9	12	17	13	14	9	11	6	7	7	8	8	8	25
25-Feb	8	8	9	9	9	10	10	9	8	11	9	9	11	10	13	11	11	9	8	8	7	10	9	14	14
26-Feb	8	8	10	9	8	12	9	10	12	19	13	17	11	14	12	13	15	10	10	10	10	10	9	8	19
27-Feb	8	9	9	19	14	14	13	18	12	12	21	20	18	18	20	26	13	16	24	18	22	34	11	12	34
28-Feb	16	17	11	12	13	12	13	14	13	12	15	14	14	17	16	16	18	9	19	13	8	17	12	10	19
29-Feb	8	6	7	7	8	9	8	7	7	9	11	10	13	17	12	12	10	9	9	8	11	9	8	8	17
	31	47	64	65	33	39	81	94	68	34	34	62	44	44	30	26	20	41	29	50	67	34	36	56	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 23, 2016	Last Calibration	January 12, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	14:05
Gas Cert Reference	SA130123A	Station temp.	Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-606
Analyzer IP address	192.168.1.43		Lamp voltage	804	804
Calculated slope	0.994510	1.005702	Chamber temp	45.0	45.2
Calculated intercept	-1.022875	-0.882674	Pressure	678.6	689.5
Analyzer Background	8.0	7.3	Flow	0.442	0.450
Analyzer Coefficient	0.950	0.950	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 1410661308

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	58.3	574.8	567.6	1.013
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	58.3	574.8	572.2	1.005
second point	5000	29.3	288.9	288.6	1.001
third point	5000	14.7	144.9	145.2	0.998
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	58.3	574.8	569.9	1.009
Average Correction Factor					1.001

Corrected As found 567.5 Previous response 579.0 % change 2.0%

Notes:

Inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



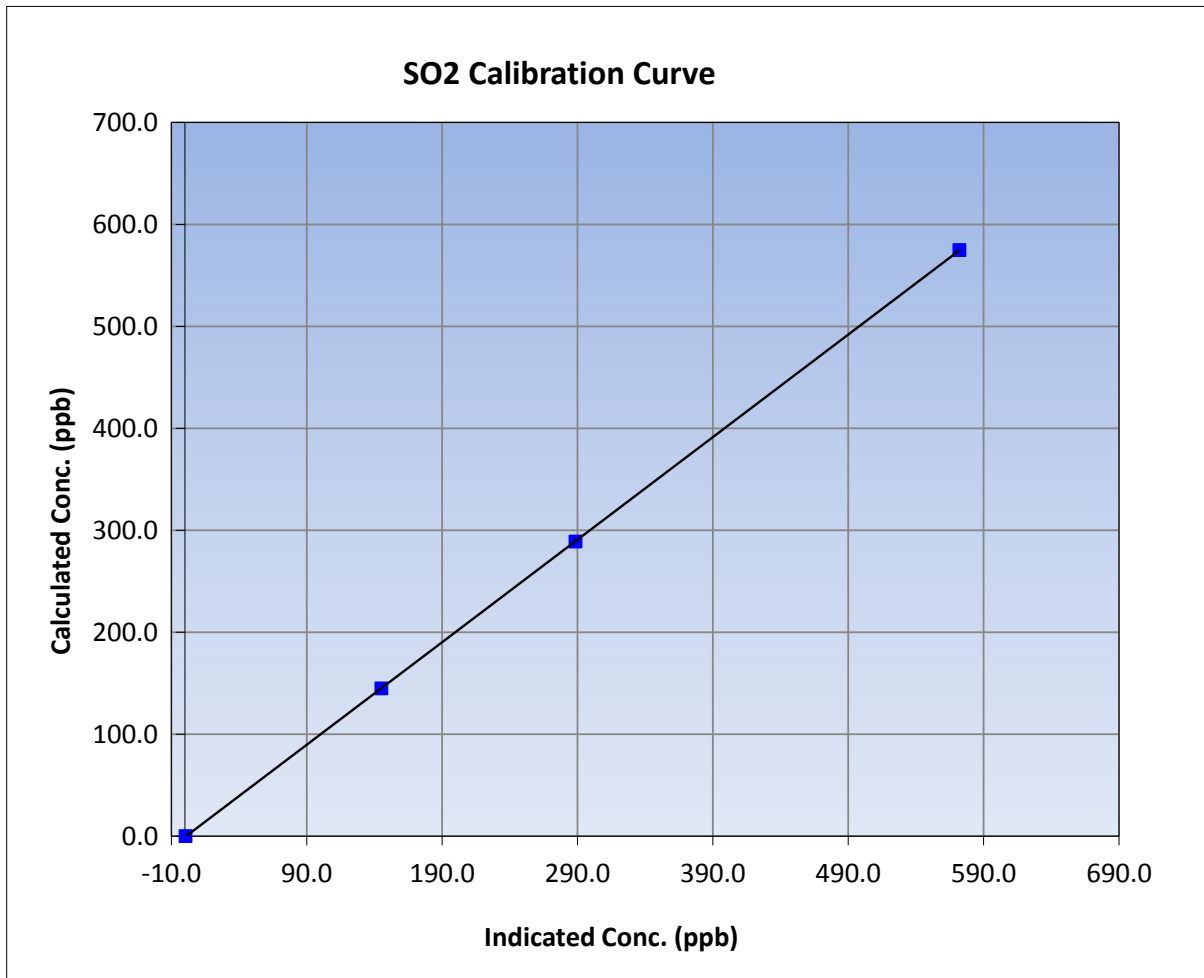
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 23, 2016	Previous Calibration	January 12, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	14:05
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

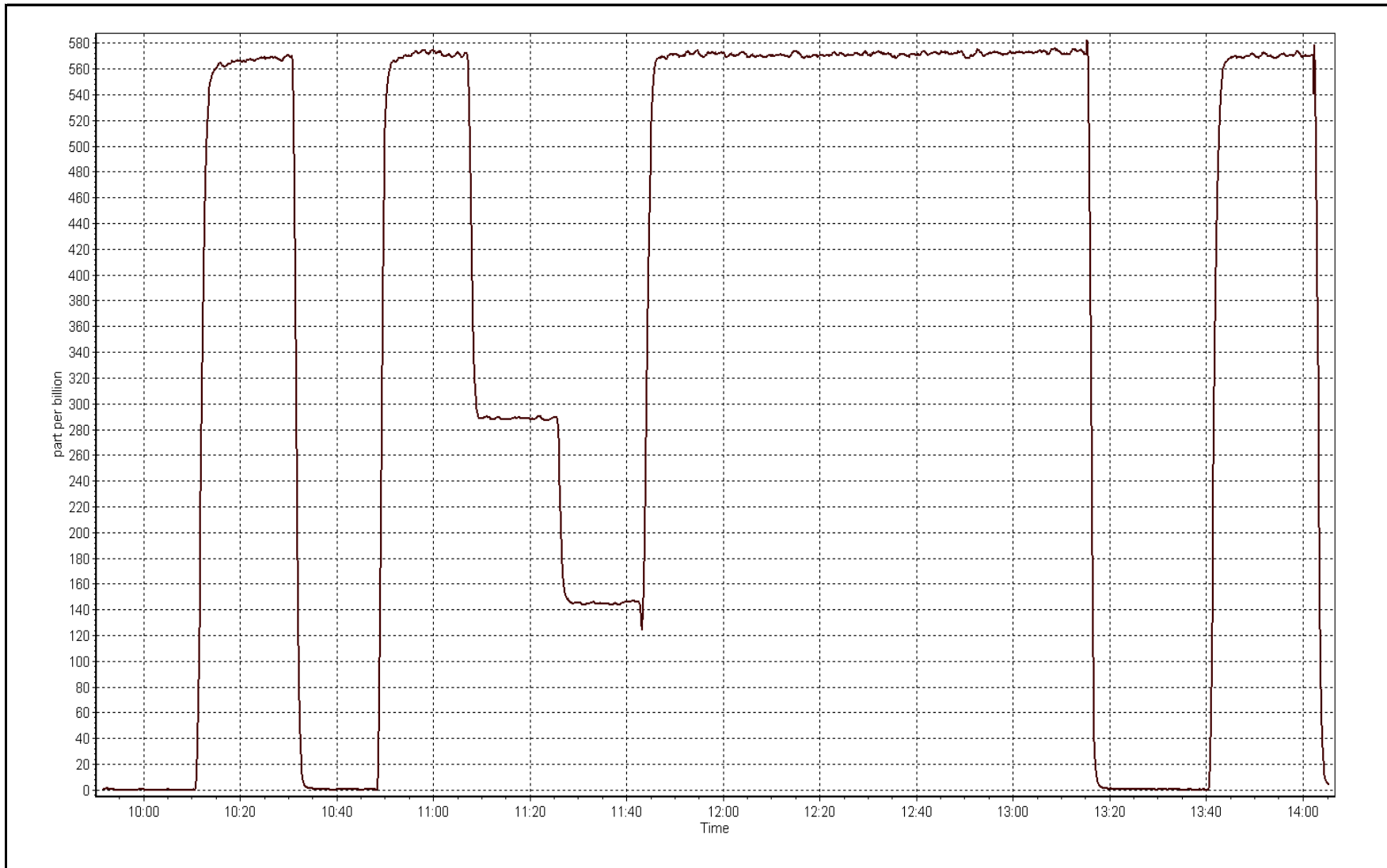
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999997
574.8	572.2	1.0047		
288.9	288.6	1.0010	Slope	1.005702
144.9	145.2	0.9982		
			Intercept	-0.882674



SO2 Calibration Plot

Date: February 23, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 24, 2016	Last Calibration	January 26, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	13:10
Gas Cert Reference	ALM066720	Station temp.	22 Deg C
Cal Gas Concentration	4.85 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	API T700	Serial Number	996
ZAG air Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037
SO2 gas concentration	49.3 ppm	SO2 gas cert/exp	SA130123A December-12-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-574	-574
Analyzer IP address	192.168.1.45		Lamp voltage	933	931
Calculated slope	0.998896	0.998275	Chamber temp	45	45
Calculated intercept	-0.007297	-0.303998	Pressure	527.4	549.7
Analyzer Background	13	12.7	Flow	0.934	0.970
Analyzer Coefficient	1.146	1.146	Intensity	85	85
			Converter temp.	336	334

Analyzer make/model	Thermo 450i	Analyzer serial #	815129098
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	83.4	80.9	80.7	1.002
SO2 scrubber check	5000	15.2	149.9	1.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	83.4	80.9	81.0	0.999
second point	5000	41.8	40.5	40.9	0.991
third point	5000	21.0	20.4	20.5	0.996
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	83.4	80.9	80.9	1.000
Average Correction Factor					0.995

Corrected As found	80.9	Previous response	81.0	% change	0.2%
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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



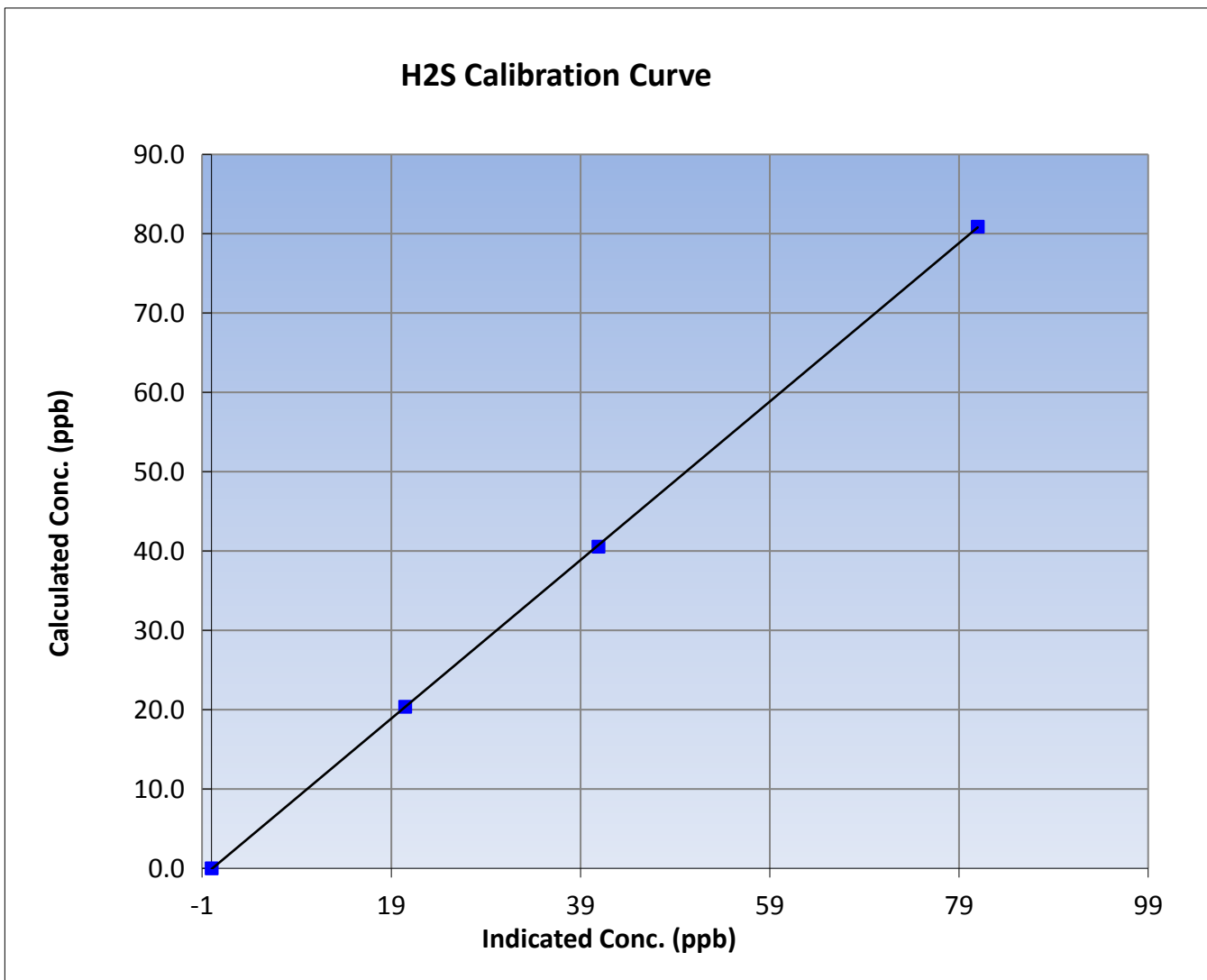
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 24, 2016	Previous Calibration	January 26, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:15	End Time (MST)	13:10
Analyzer make	Thermo 450i	Analyzer serial #	815129098

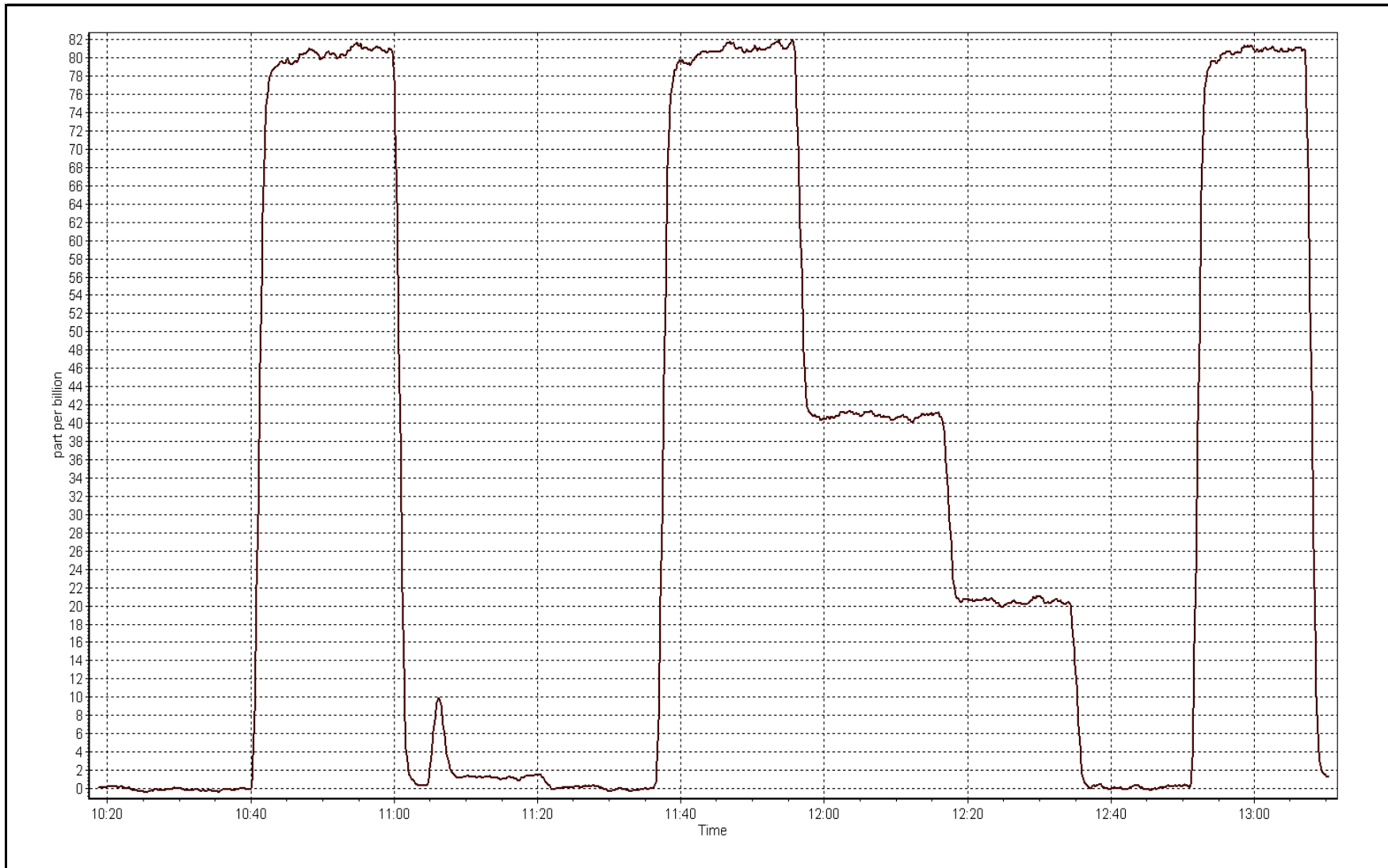
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999982
80.9	81.0	0.9990		
40.5	40.9	0.9913	Slope	0.998916
20.4	20.5	0.9956		
			Intercept	-0.095411



H2S Calibration Plot

Date: February 24, 2016





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 20, 2016	Last Calibration	January 12, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:40
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.001968	0.998704	Fuel Pressure	23.0	23.0
Calculated intercept	-0.074261	-0.048330	Analyzer Coeff	3.5	3.5
			Analyzer BKG	4.660	4.930

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.36	----
as found span	5000	58.3	12.74	14.10	0.903
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	58.3	12.74	12.79	0.996
second point	5000	29.3	6.40	6.47	0.989
third point	5000	14.7	3.21	3.28	0.979
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	58.3	12.74	12.84	0.992
Average Correction Factor					0.988

Corrected As found	13.74	Previous response	12.78	% change	-7.0%
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Notes:

As founds completed. Leak found just before air pressure sensor. Fitting tightened, air pressure back to 34.9 psi. Zero and span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association THC Calibration Report

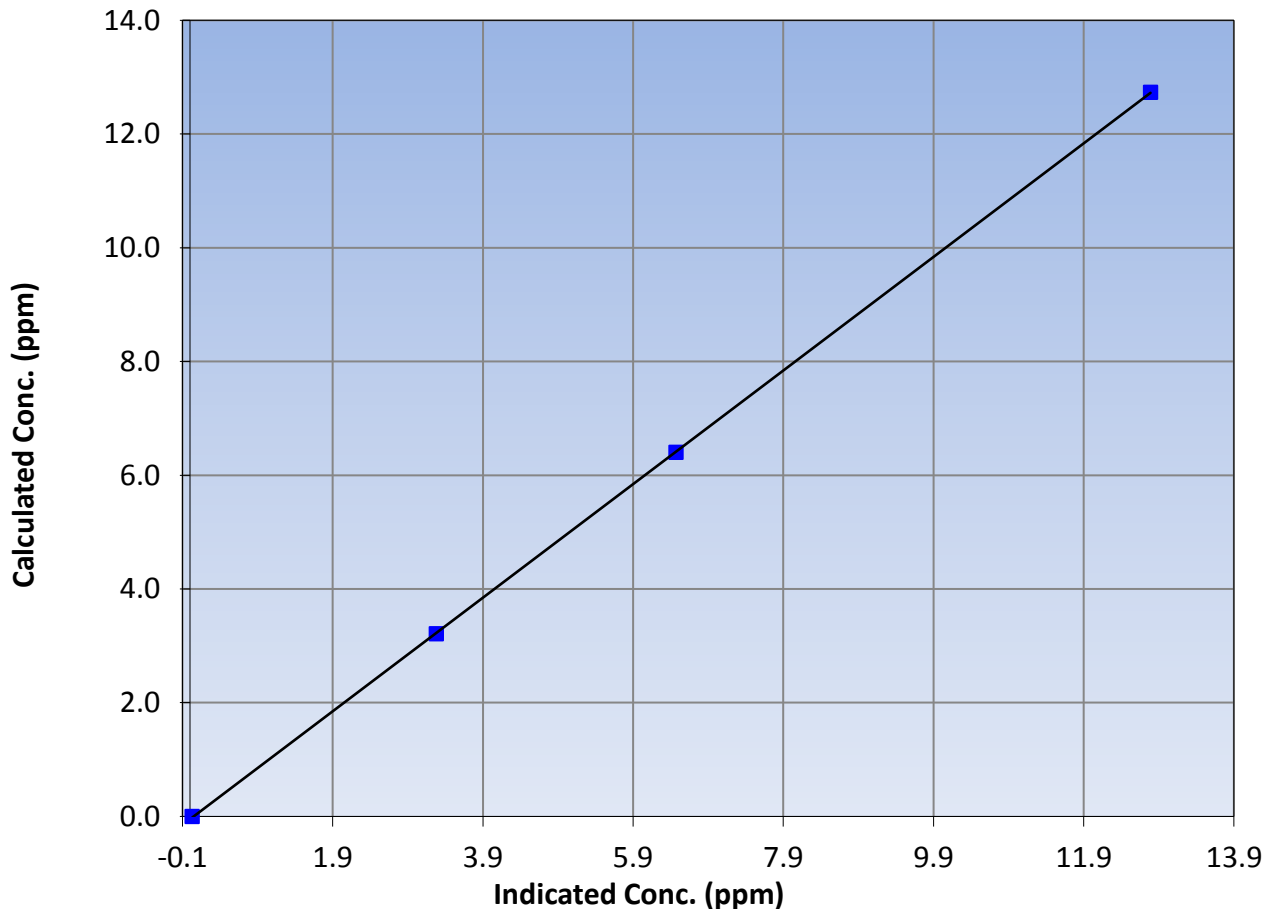
Station Information

Calibration Date	February 20, 2016	Previous Calibration	January 12, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:00	End Time (MST)	12:40
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

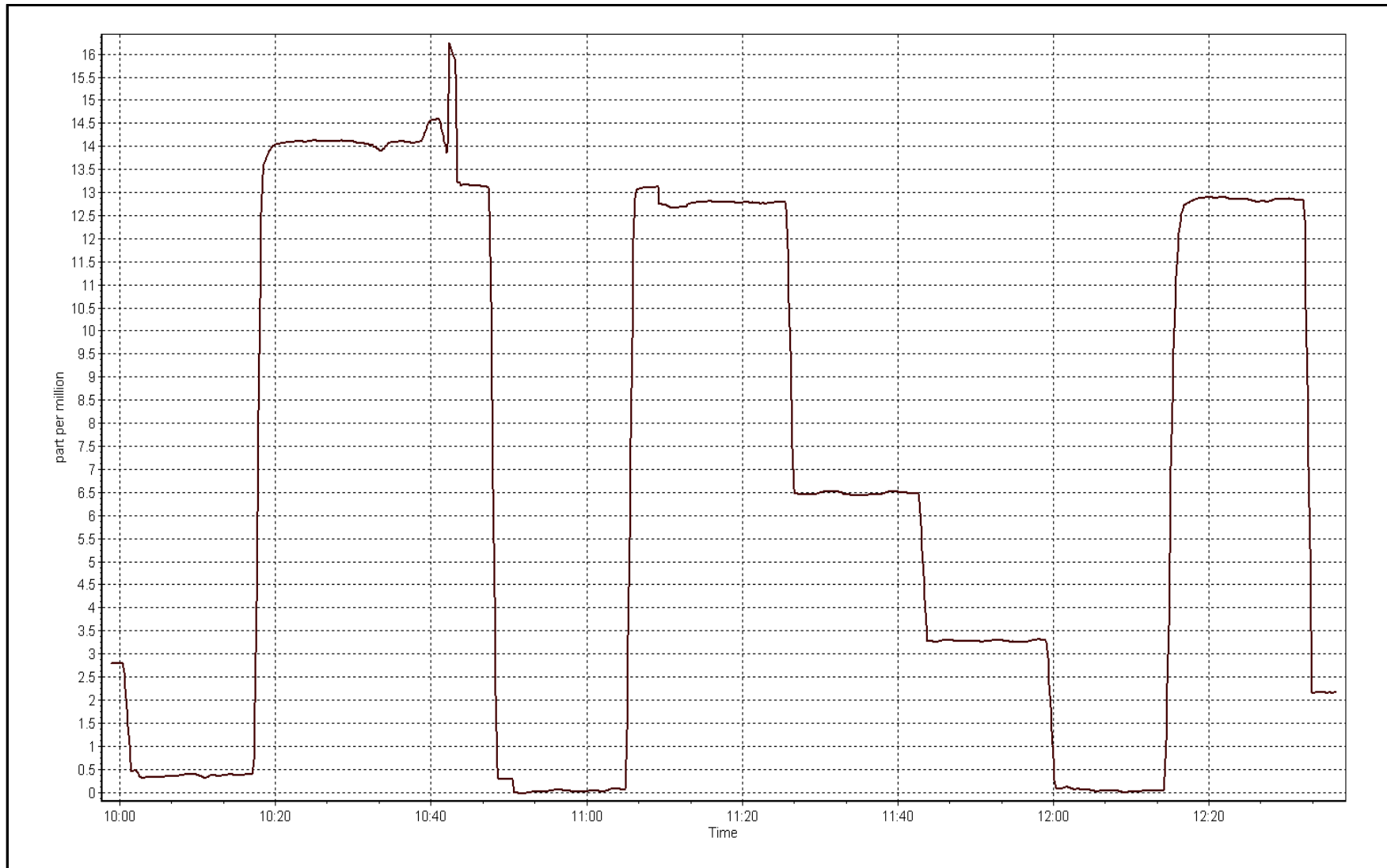
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999990
12.74	12.79	0.9957		
6.40	6.47	0.9893	Slope	0.998704
3.21	3.28	0.9790		
			Intercept	-0.048330

THC Calibration Curve



THC Calibration Plot

Date: February 20, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 23, 2016	Previous Calibration	January 14, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	14:05
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOX Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9037
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000913	0.999663	0.997766
	Data Offset	-1.569337	-1.238367	-1.034755
Current Calibration	Data Slope	0.994162	0.993412	0.997251
	Data Offset	-1.014624	-0.745613	-0.441121

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.926		0.926	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.2		4.2	
NOX bkgrnd	4.3		4.3	
Chamber Temp	50.8	Deg C	50.3	Deg C
Moly Temp	322.9	Deg C	325.8	Deg C
PMT voltage	-780.3	V	-780	V
PMT Temp	-2.6	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	166.7	mmHg	167.3	mmHg
R Cell Press Nox	166.7	mmHg	167.3	mmHg
NO sample flow	0.618	lpm	0.614	lpm
Nox sample Flow	0.618	lpm	0.614	lpm

Notes:

Inlet filter changed after as founds. No adjustments made.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 23, 2016 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	-0.3	-0.2	0.0	----	----
as found span	5000	58.3	600.5	600.5	0.0	602.6	601.9	0.7	0.9966	0.9977
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	58.3	600.5	600.5	0.0	604.3	604.6	-0.3	0.9937	0.9932
second point	5000	29.3	301.8	301.8	0.0	305.6	305.5	0.1	0.9875	0.9878
third point	5000	14.7	151.4	151.4	0.0	154.2	153.7	0.5	0.9820	0.9853
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as left span	5000	58.3	600.5	306.5	294.0	605.0	300.9	304.1	0.9926	1.0185
Average Correction Factor									0.9877	0.9888

Corrected As found NO_x= 602.8 NO= 602.1 Percent Change NO_x= -0.2% NO= 0.0%
 Previous Response NO_x= 601.5 NO= 601.9

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.30 ccm NOx ref calc conc = 600.5 ppb NO ref calc conc = 600.5 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		0.0	603.7	603.0	0.0	0.9947	0.9958	----	----
1st NO2 (300)	306.5	296.6	603.7	306.5	297.3	0.9947	----	0.9977	100.2%
2nd NO2 (200)	403.1	200.0	604.7	403.1	201.6	0.9931	----	0.9918	100.8%
3rd NO2 (100)	500.7	102.3	604.2	500.7	103.5	0.9939	----	0.9892	101.1%
2nd NO ref point	----	0.0	603.6	602.8	0.8	0.9949	0.9961	----	----
Average Correction Factor						0.9942		0.9929	100.7%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

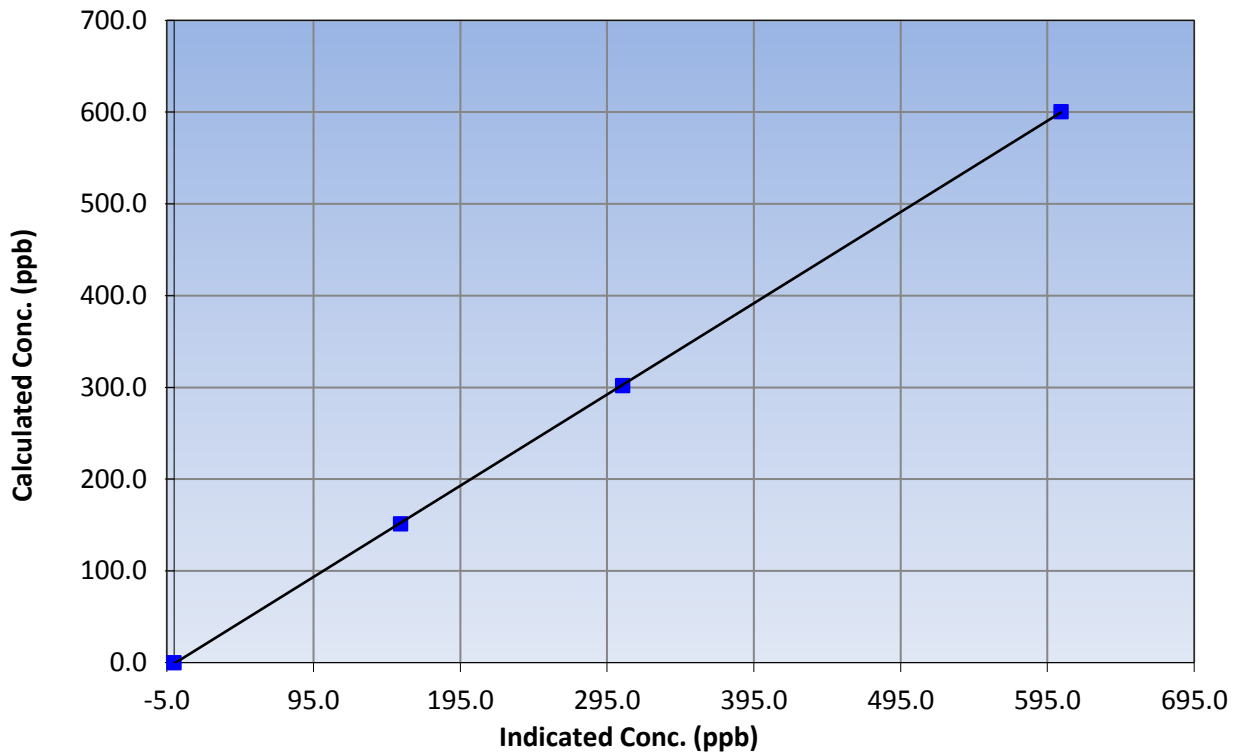
Station Information

Calibration Date	February 23, 2016	Previous Calibration	January 14, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	14:05
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	0.999981
600.5	604.3	0.9937		
301.8	305.6	0.9875	Slope	0.994162
151.4	154.2	0.9820		
			Intercept	-1.014624

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

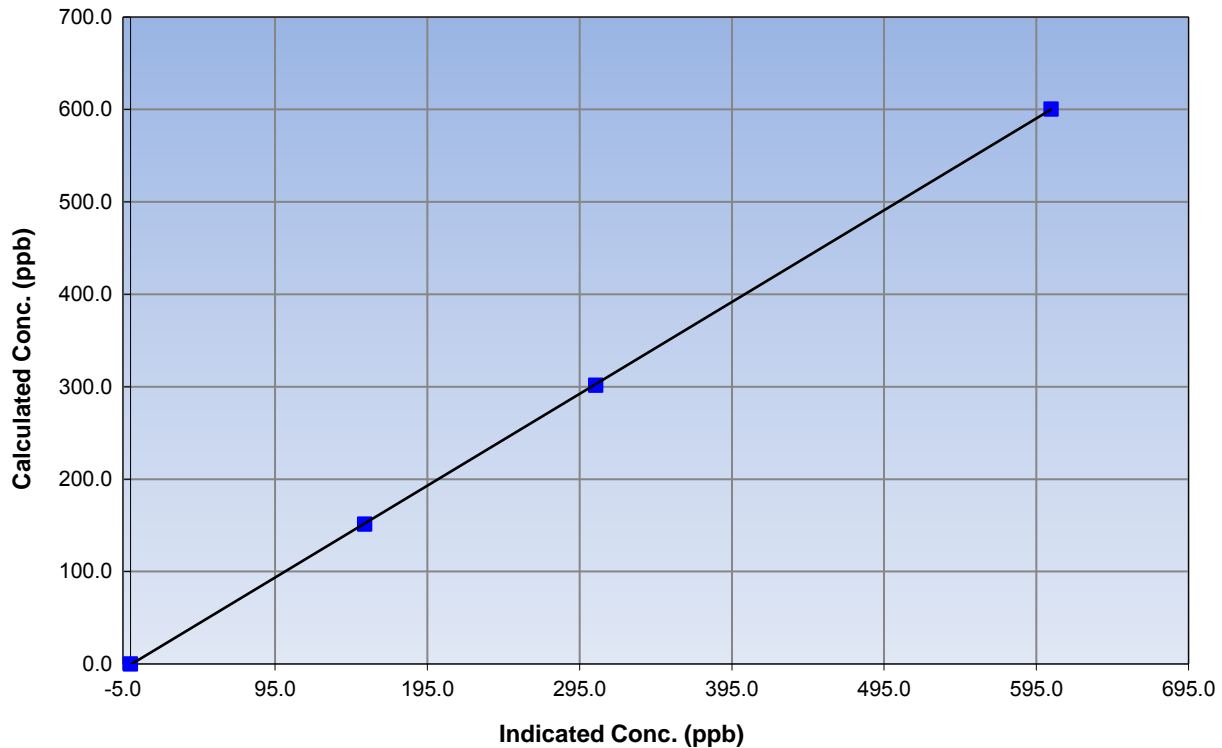
Station Information

Calibration Date	February 23, 2016	Previous Calibration	January 14, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	14:05
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	0.999988
600.5	604.6	0.9932		
301.8	305.5	0.9878	Slope	0.993412
151.4	153.7	0.9853		
			Intercept	-0.745613

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

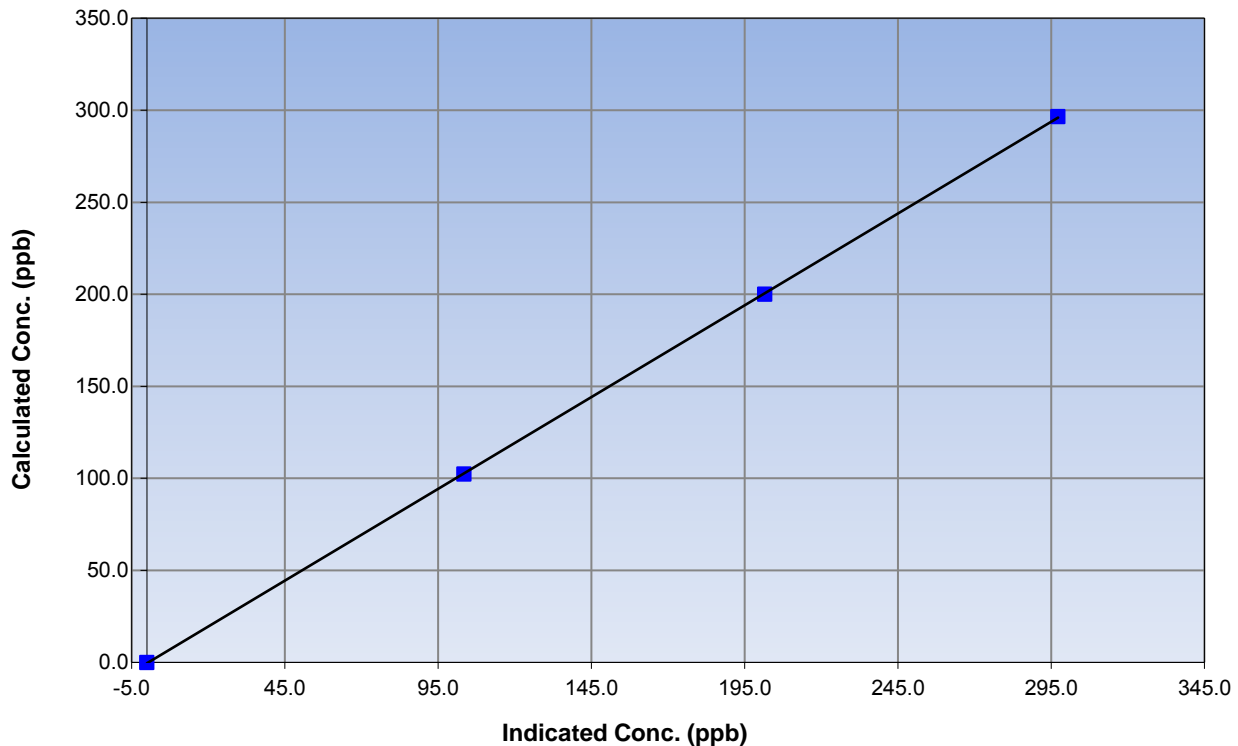
Station Information

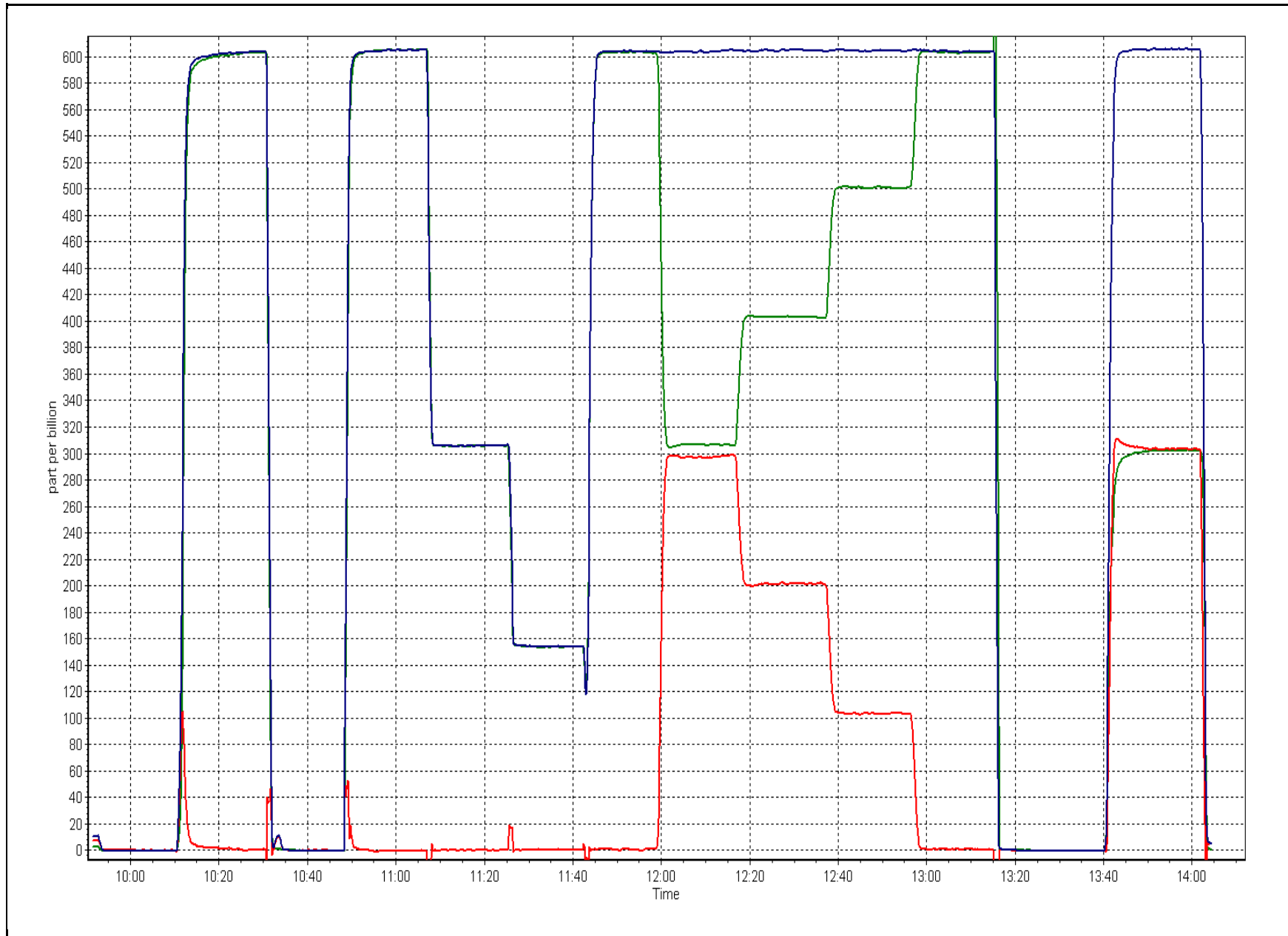
Calibration Date	February 23, 2016	Previous Calibration	January 14, 2016
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	9:50	End Time (MST)	14:05
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999976
296.6	297.3	0.9977		
200.0	201.6	0.9918	Slope	0.997251
102.3	103.5	0.9892		
			Intercept	-0.441121

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 20
BRION MACKAY RIVER
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
 FEBRUARY 2016
 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	662	34	34	100.00	14	0	4	0
H2S (ppb) Average	663	33	33	100.00	2	0	1	0
THC (ppm) Average	662	34	34	100.00	3.2	-	2.4	-
NO2 (ppb) Average	662	34	34	100.00	35	0	20	-
NO (ppb) Average	662	34	34	100.00	31	-	4	-
NOX (ppb) Average	662	34	34	100.00	58	-	23	-
Temperature 2 m (C) Average	696	0	0	100.00	9	-	1.8	-
Relative Humidity (%) Average	696	0	0	100.00	98	-	95	-
Wind Speed 10 m (km/h) Average	672	0	24	96.55	15	-	9	-
Wind Direction 10 m (deg) Average	672	0	24	96.55	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	662	1	2	-	0	0	0	0	1	3	14
H2S (ppb) Average	663	0.3	0	-	0	0	0	0	0	1	2
THC (ppm) Average	662	2.26	0.1	-	2.1	2.2	2.2	2.2	2.3	2.4	3.2
NO2 (ppb) Average	662	5.7	6	-	0	1	1	3	8	13	35
NO (ppb) Average	662	0.9	3	-	0	0	0	0	0	2	31
NOX (ppb) Average	662	6.6	8	-	0	1	2	4	9	16	58
Temperature 2 m (C) Average	696	-9.59	7.5	-	-32	-17.6	-14.8	-10.3	-3.4	0.3	9
Relative Humidity (%) Average	696	79.5	13	-	32	60	74	83	89	93	98
Wind Speed 10 m (km/h) Average	672	6	3	-	0	2	4	6	8	10	15
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	06 Feb 2016 14:00	07 Feb 2016 13:00	24	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

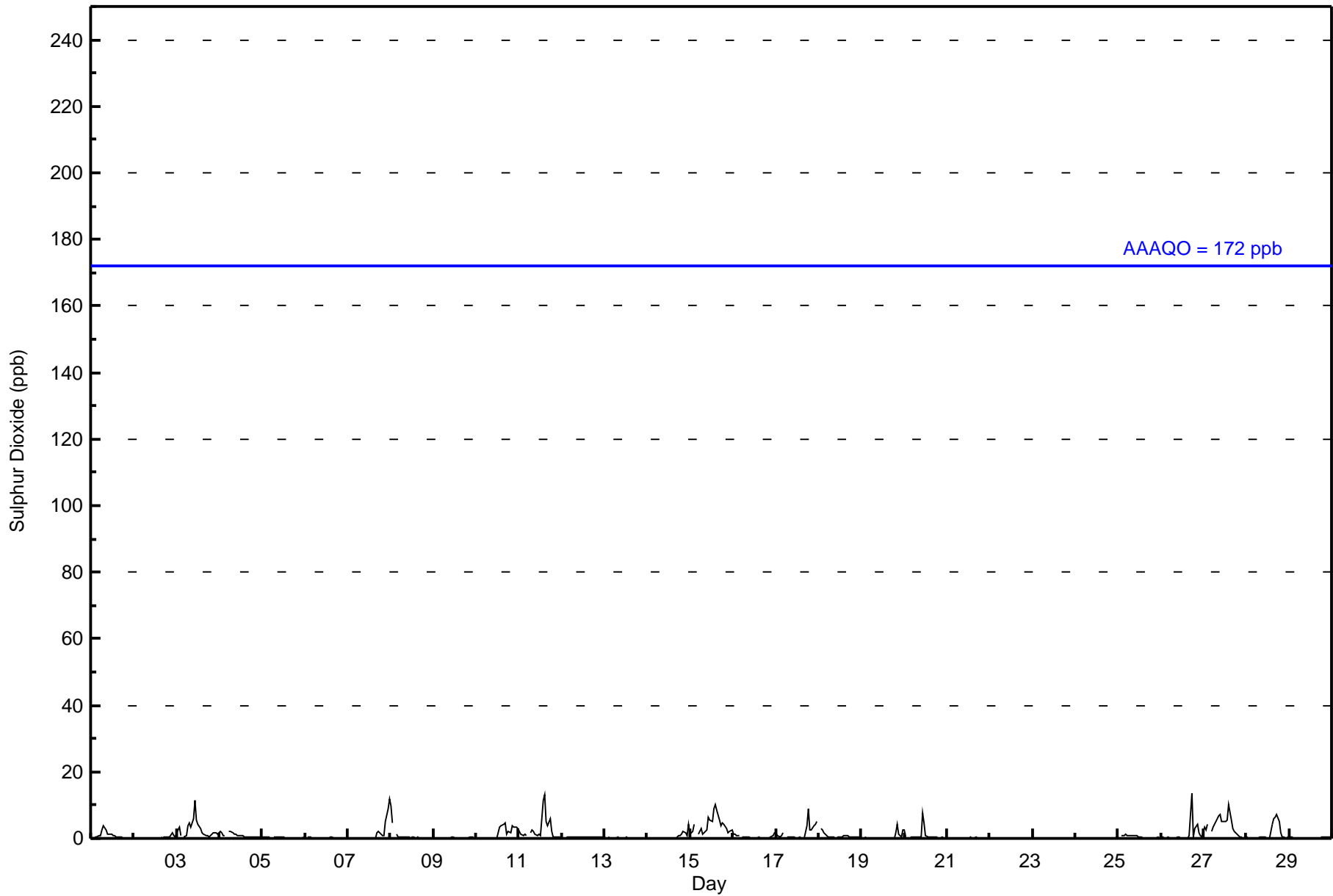
Brion MacKay River - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																																						
Maximum Value: 14 ppb on Feb 26 18:00										Maximum Daily Average: 4.0 ppb on Feb 15										Hours of Data: 662																												
Minimum Value: 0 ppb on Feb 9 00:00										Minimum Daily Average: 0.0 ppb on Feb 22										Hours of Missing Data: 34																												
Maximum Diurnal Average: 1.7 ppb at hour 15										Minimum Diurnal Average: 0.4 ppb at hour 4										Hours of Calibration: 34																												
Monthly Average: 1.0 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 10										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	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	0	1	1	3	4	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.8	4																						
2-Feb	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	1	0	1	2	1	1	0.4	2																						
3-Feb	2	4	1	Z	0	1	4	5	3	6	12	6	4	3	2	1	1	1	1	1	2	2	2	1	2.7	12																						
4-Feb	2	2	1	1	Z	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.9	2																						
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	0.2	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	0.1	0																						
7-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	1	5	9	12	1.5	12																						
8-Feb	10	5	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	10																						
9-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																						
10-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	2	4	4	4	5	1	2	2	4	3	3	3	1.6	5																						
11-Feb	2	1	1	1	1	Z	2	3	2	1	1	1	1	12	13	5	4	6	2	1	1	1	0	0	2.7	13																						
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	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	0	0	0	0	0	0	0	1	1	1	2	1	1	4	0.6	4																						
15-Feb	1	2	4	Z	1	2	3	1	2	3	6	6	5	9	10	9	5	4	5	4	3	2	2	3	4.0	10																						
16-Feb	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.4	2																						
17-Feb	2	1	1	1	2	Z	0	1	0	0	0	0	0	0	0	0	0	4	9	2	3	4	4	5	1.7	9																						
18-Feb	Z	3	3	2	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.7	3																						
19-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	1	1	2	0.5	4																						
20-Feb	3	0	Z	0	0	0	1	1	0	1	7	5	1	0	0	1	0	0	0	0	0	0	0	0	0.9	7																						
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	0.0	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	0.1	0																						
25-Feb	0	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
26-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	14	0	3	4	2	1	1	1	1.2	14																						
27-Feb	3	3	4	Z	2	3	4	5	7	7	5	5	5	5	10	5	3	2	2	1	0	0	0	0	3.7	10																						
28-Feb	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	4	6	6	7	5	2	0	0	0	0	1.5	7																						
29-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																						
																								1.2	1.0	0.8	0.4	0.5	0.6	0.8	0.8	0.8	0.9	1.4	1.0	0.8	1.3	1.7	1.2	1.1	1.6	1.1	0.8	0.9	0.9	0.9	1.3	Diurnal Average
																								10	5	4	2	2	3	4	5	7	7	12	6	5	12	13	9	6	14	9	4	4	5	9	12	Diurnal Maximum
Z - zerspan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	657	99.24	99.24
11 - 20	5	0.76	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: 662

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	20	68	91	17	6	18	63	54	72	43	24	44	47	30	21	16	634
11 - 20	0	2	1	0	0	0	0	2	0	0	0	0	0	0	0	0	5
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	70	92	17	6	18	63	56	72	43	24	44	47	30	21	16	639

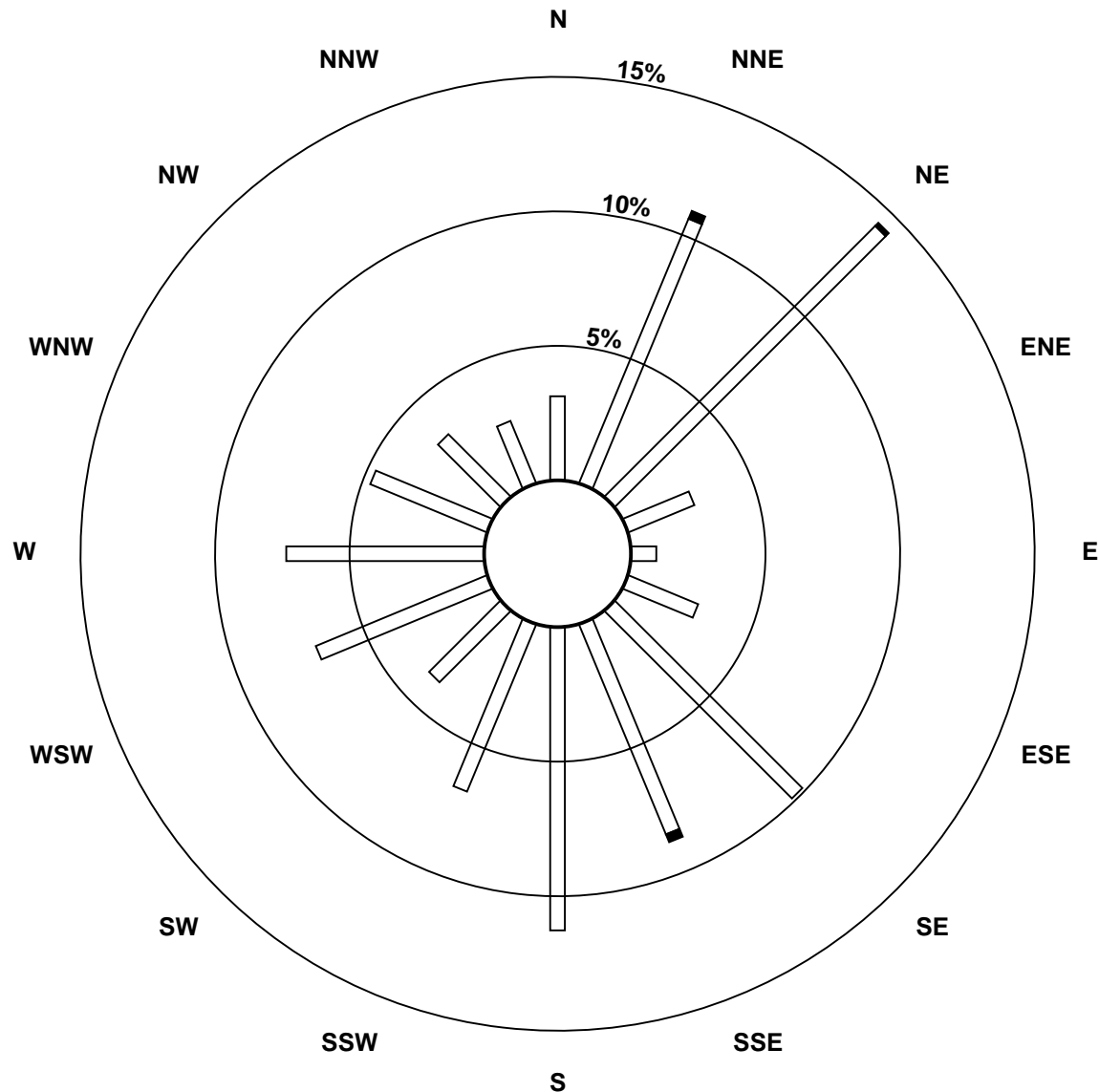
Total Number of Valid Hours: 639

Total Number of Hours: 696

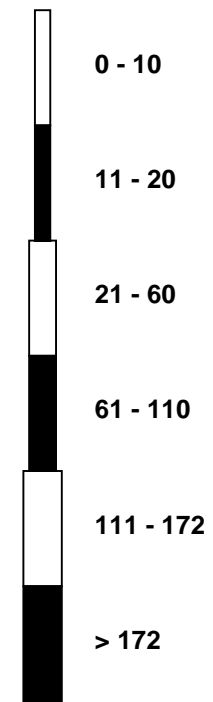


Wood Buffalo Environmental Association
Wind Rose Feb 2016

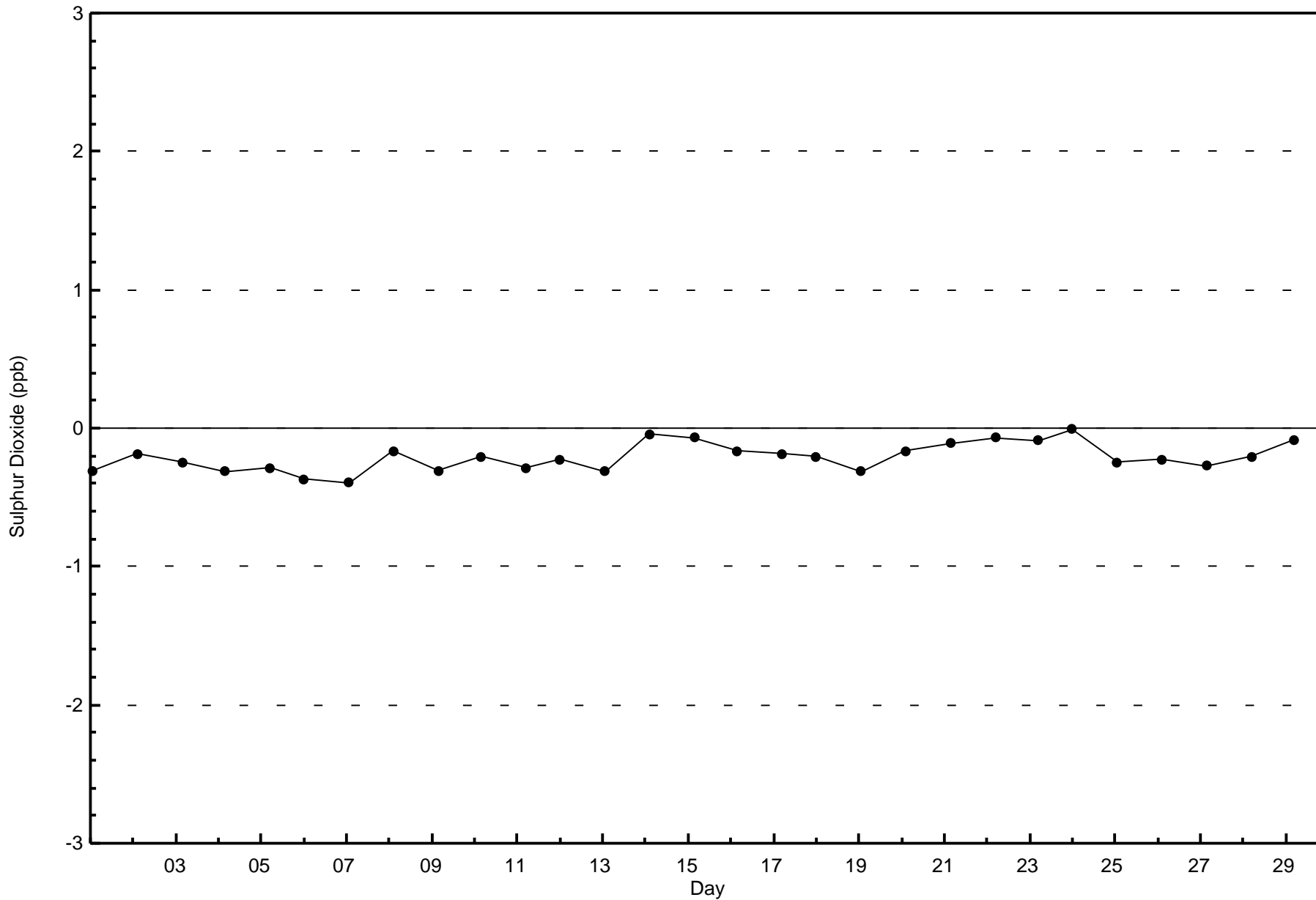
Sulphur Dioxide (SO₂) - ppb
Brion MacKay River (AMS 20)

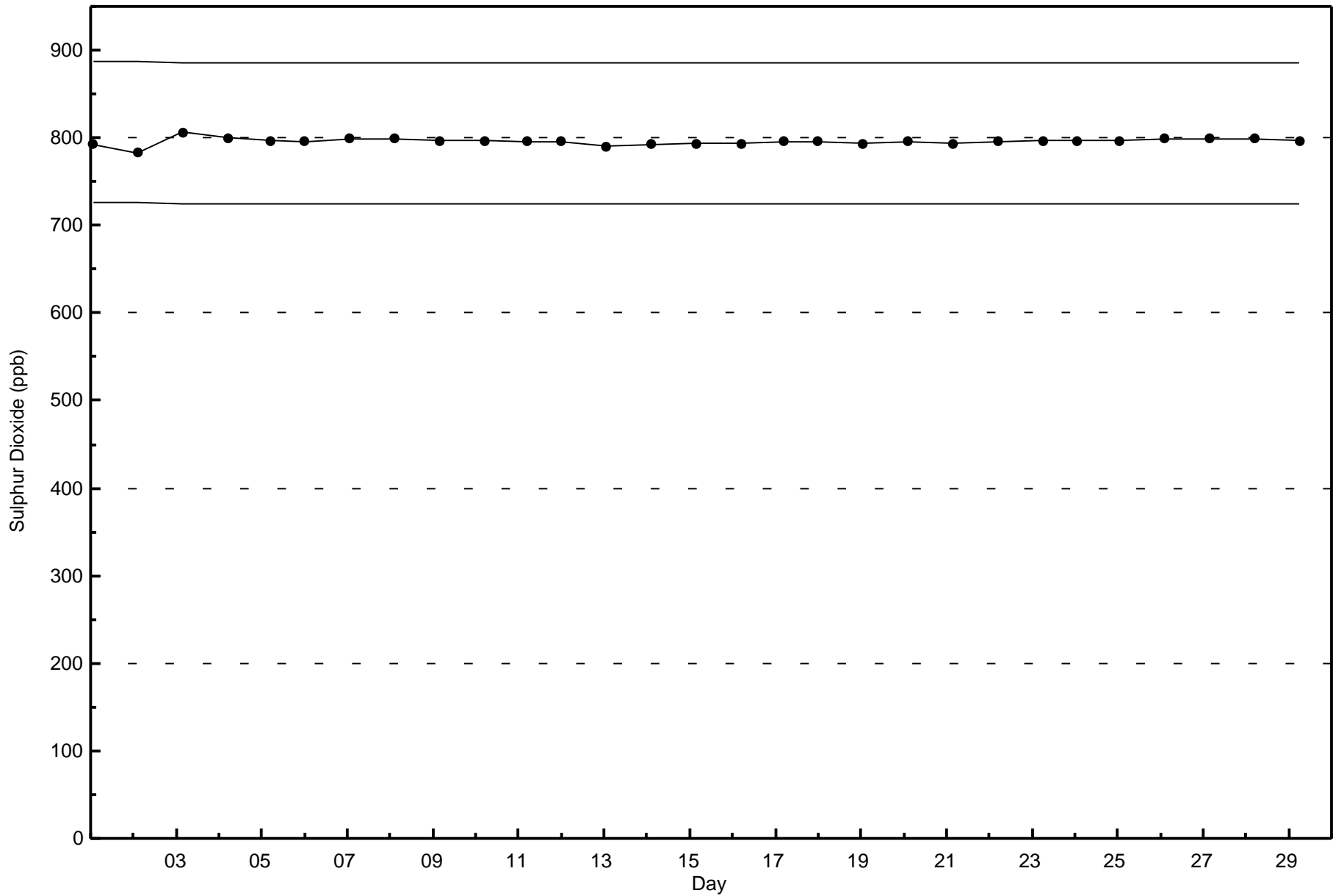


Classes (ppb)



Total Number of Valid Hours: 639





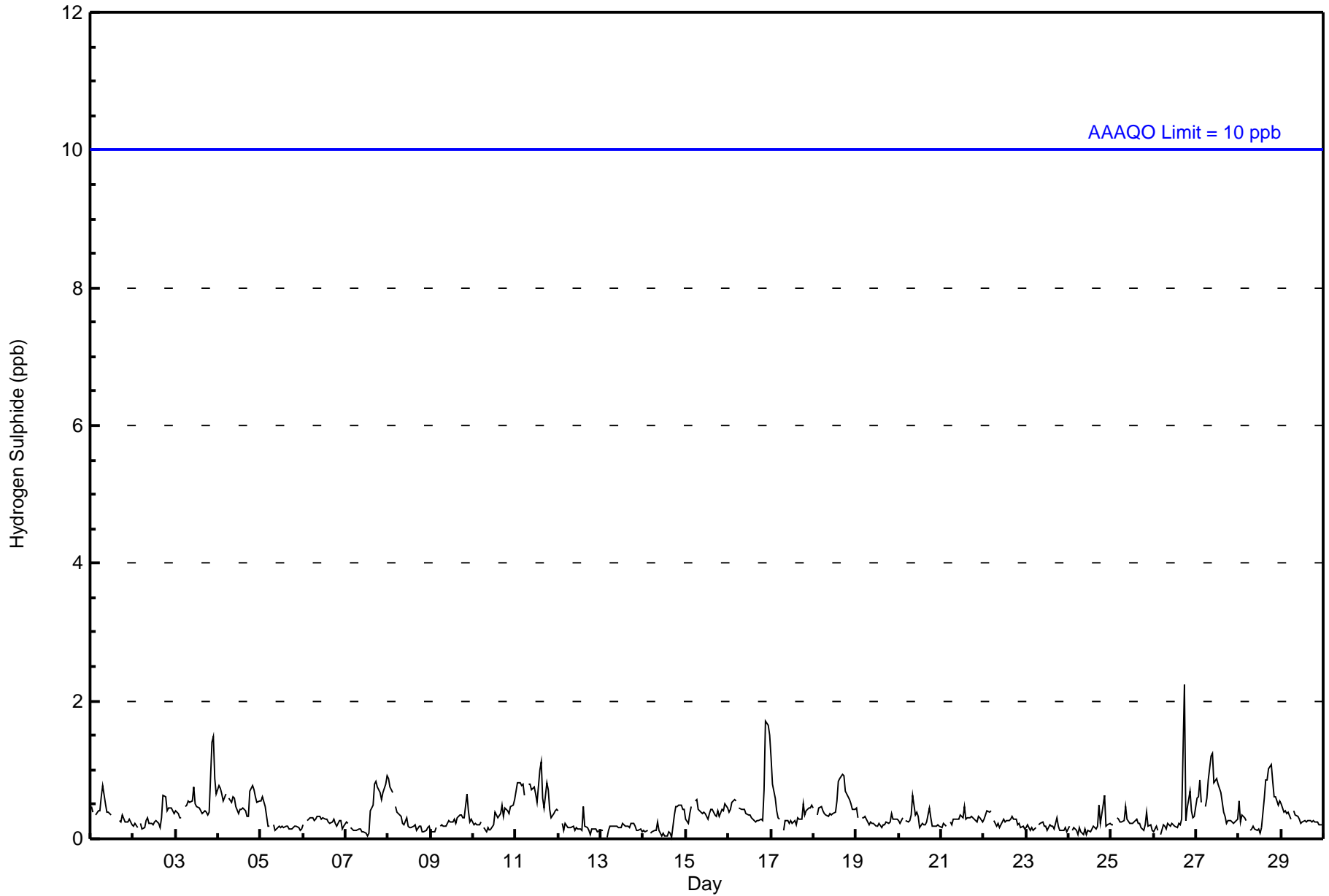


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Feb 26 18:00 Maximum Daily Average: 0.7 ppb on Feb 11												Hours in Service: 696 Hours of Data: 663														
Minimum Value: 0 ppb on Feb 14 17:00 Minimum Daily Average: 0.2 ppb on Feb 13 Maximum Diurnal Average: 0.4 ppb at hour 18 Minimum Diurnal Average: 0.3 ppb at hour 13 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 = 1												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	0	Z	0	0	0	1	1	1	0	0	0	C	C	C	C	0	0	0	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	1	1	0	0	0	0	0	0.3	1
3-Feb	0	0	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.6	1
4-Feb	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.6	1
5-Feb	1	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.3	0
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1
8-Feb	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-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	0.3	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	1	0.3	1
11-Feb	1	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0.7	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	0.2	0
15-Feb	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
16-Feb	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0.6	2
17-Feb	1	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0.5	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	0.3	0
20-Feb	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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	0	0	0	0	0	0	0.3	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	0	0	0	0	0	0	0	0	0	0	0	1	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	0.2	0
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0.3	2
27-Feb	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	1
28-Feb	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0.4	1
29-Feb	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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 0.4 0.4 0.3 0.4 0.4 0.4 0.4																								Diurnal Average		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 2 2 1																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	663	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	20	69	93	16	6	17	66	54	70	43	25	43	49	32	21	16	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	20	69	93	16	6	17	66	54	70	43	25	43	49	32	21	16	640

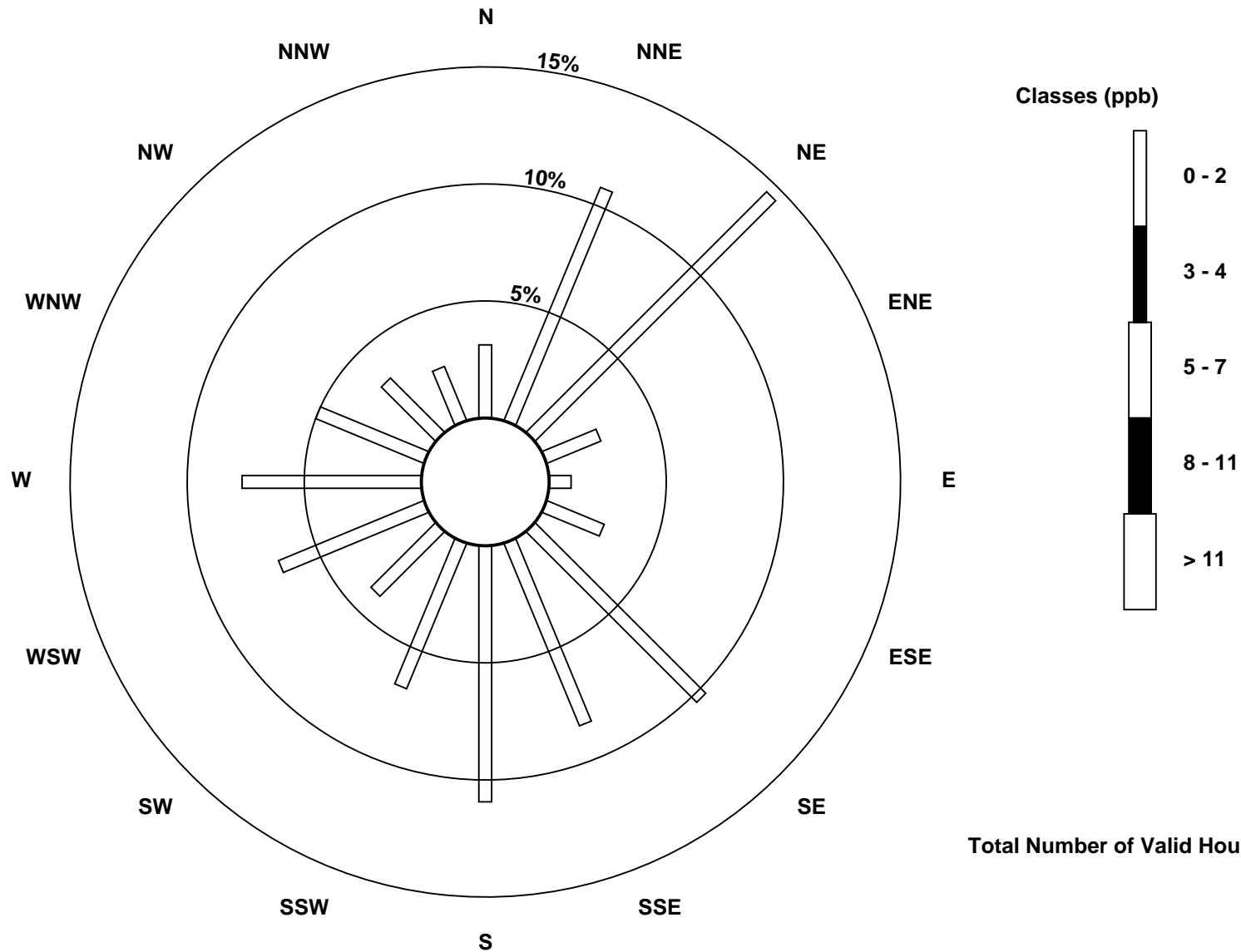
Total Number of Valid Hours: 640

Total Number of Hours: 696

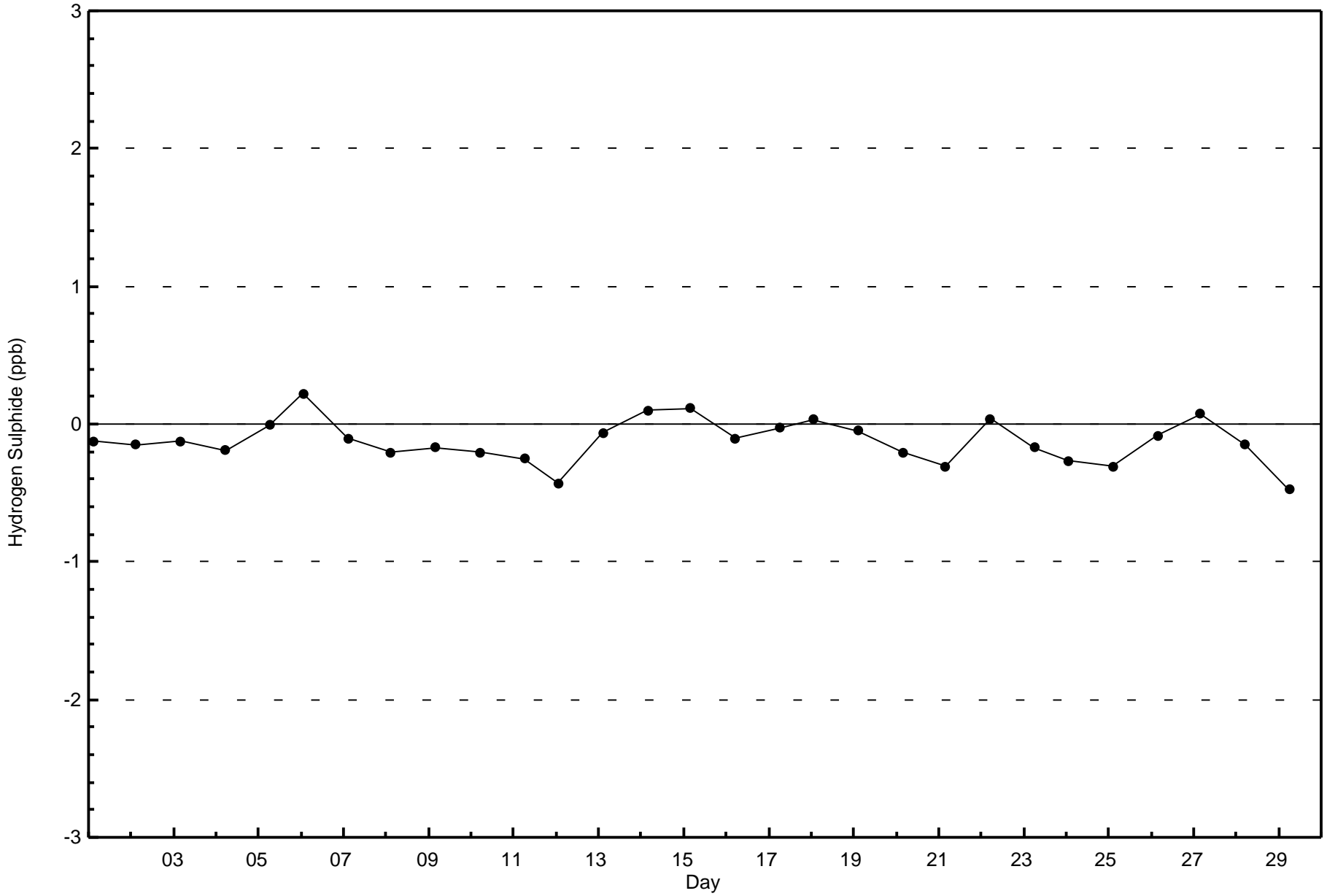


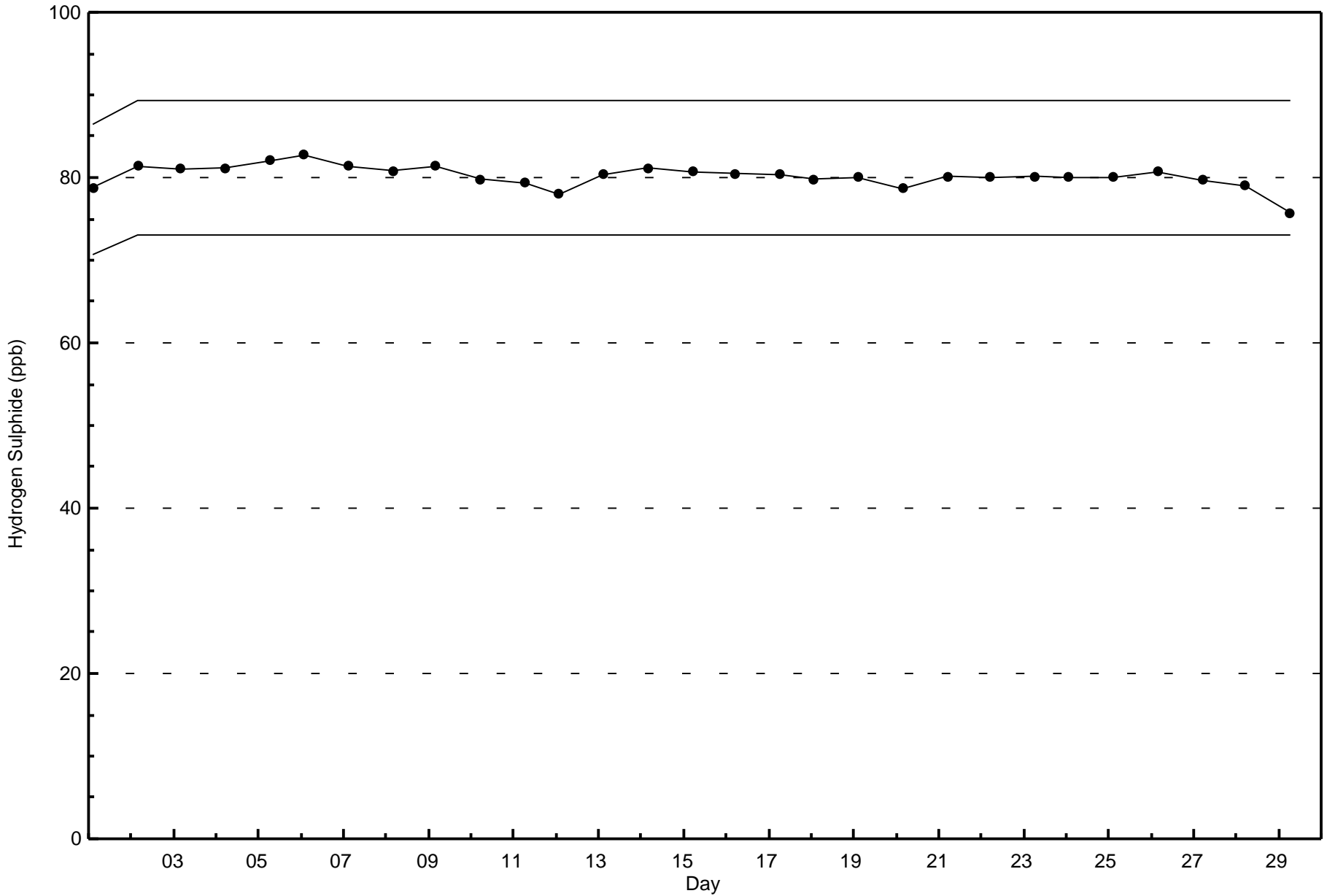
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 640







Wood Buffalo Environmental Association

Summary of Hour Averages

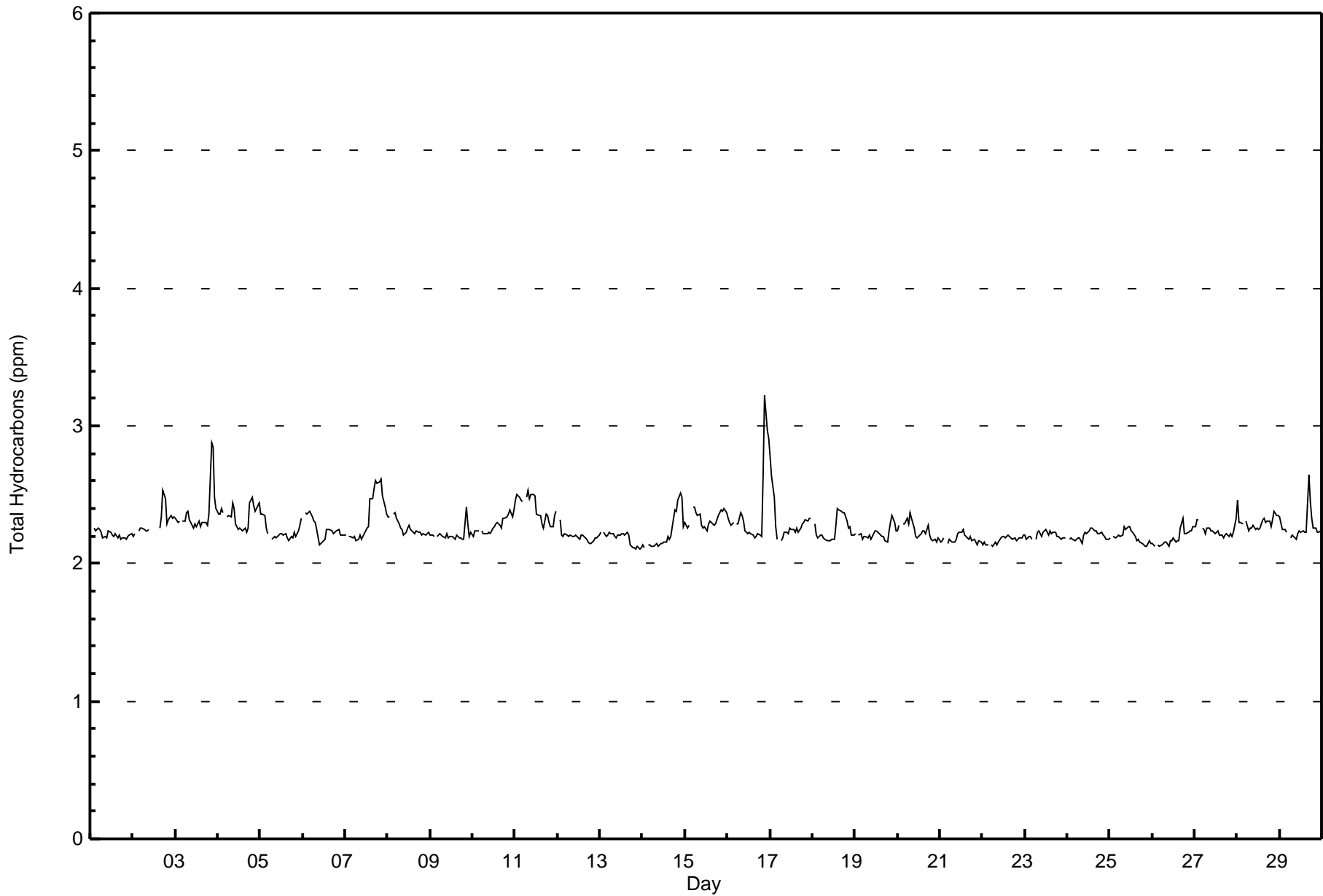
Total Hydrocarbons (THC) - ppm Brion MacKay River - February 2016

Maximum Value: 3.2 ppm on Feb 16 22:00																				Maximum Daily Average: 2.4 ppm on Feb 11					Hours in Service: 696	
Minimum Value: 2.1 ppm on Feb 13 21:00																				Minimum Daily Average: 2.2 ppm on Feb 22					Hours of Data: 662	
Maximum Diurnal Average: 2.3 ppm at hour 22																				Minimum Diurnal Average: 2.2 ppm at hour 11					Hours of Missing Data: 34	
Monthly Average: 2.26 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 O ₁ = 2.2 Median = 2.2 O ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 2.6					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	2.4	Z	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
2-Feb	2.2	2.2	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.2	C	C	C	C	C	2.3	2.3	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3
3-Feb	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.9	2.8	2.5	2.4	2.4	2.4
4-Feb	2.4	2.4	2.4	2.4	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.3	2.3	2.2	2.3	2.2	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.3
5-Feb	2.4	2.4	2.4	2.3	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	2.2
6-Feb	Z	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
7-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.5	2.4	2.4	2.4	2.3
8-Feb	2.3	2.3	Z	2.4	2.4	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	2.3
9-Feb	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	2.4	2.3	2.2	2.2	2.2	2.2
10-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.3
11-Feb	2.5	2.5	2.5	2.5	2.4	Z	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4
12-Feb	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
14-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.5	2.3	2.2	2.5	2.2
15-Feb	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3
16-Feb	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	3.2	3.0	2.9	2.4	3.2
17-Feb	2.8	2.6	2.5	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
18-Feb	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2
19-Feb	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	2.3	2.3	2.3	2.2	2.2	2.3
20-Feb	2.2	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
21-Feb	2.2	2.2	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2
22-Feb	2.1	2.2	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
23-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
24-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	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
25-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2
26-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.1	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	2.3	2.2	2.3
27-Feb	2.3	2.3	2.3	Z	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	2.2	2.3
28-Feb	2.5	2.3	2.3	2.3	Z	2.3	2.2	2.3	2.3	2.3	2.2	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	2.3	2.5
29-Feb	2.3	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	2.6	2.5	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2
2.3																								Diurnal Average		
2.8																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 2016**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	661	99.85	99.85
3.1 - 10.0	1	0.15	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Brion MacKay River - February 2016**

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	19	70	92	17	6	18	63	56	72	43	24	44	47	30	21	16	638
3.1 - 10.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	70	92	17	6	18	63	56	72	43	24	44	47	30	21	16	639

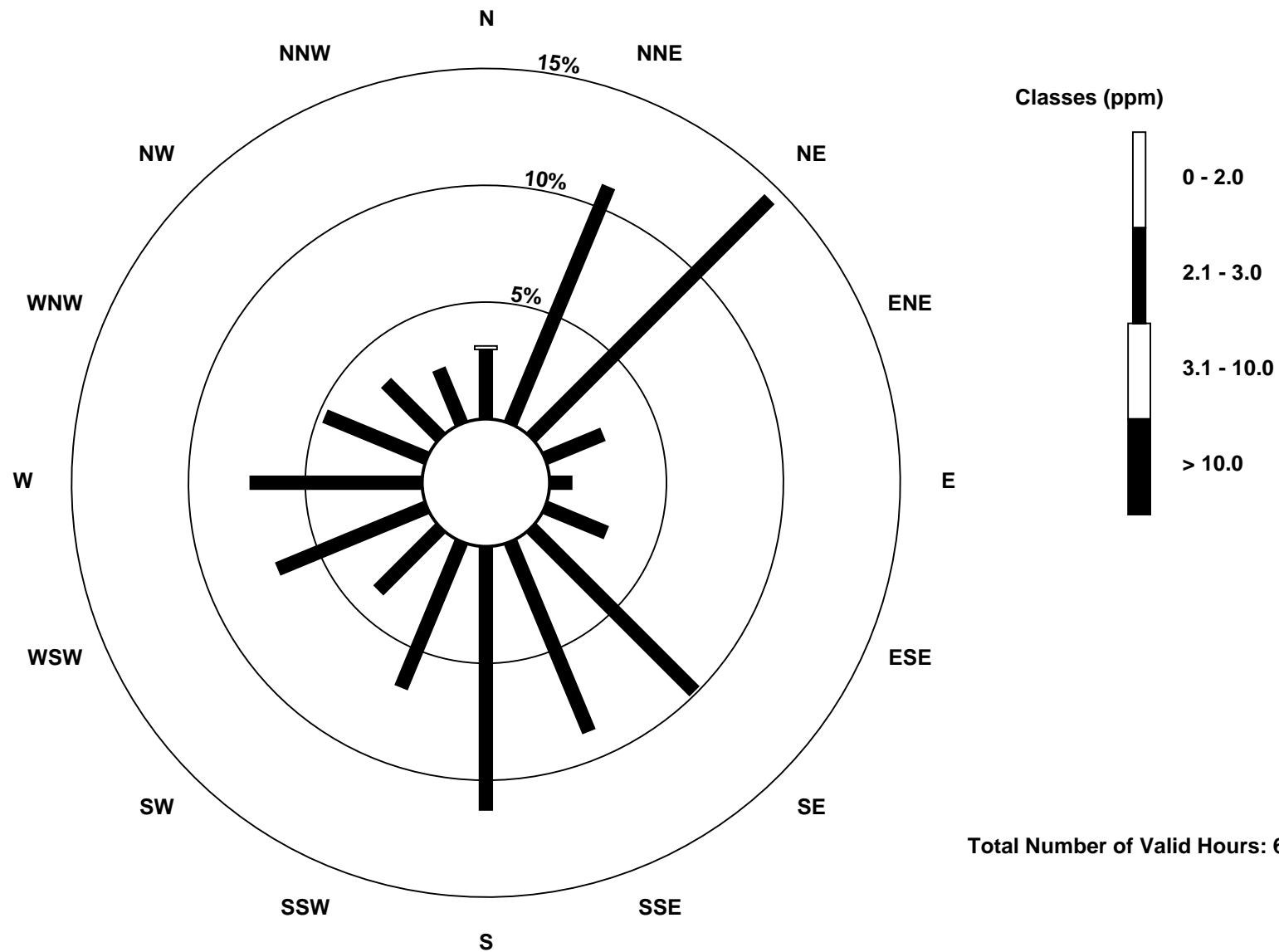
Total Number of Valid Hours: 639

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Total Hydrocarbons (THC) - ppm
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 639

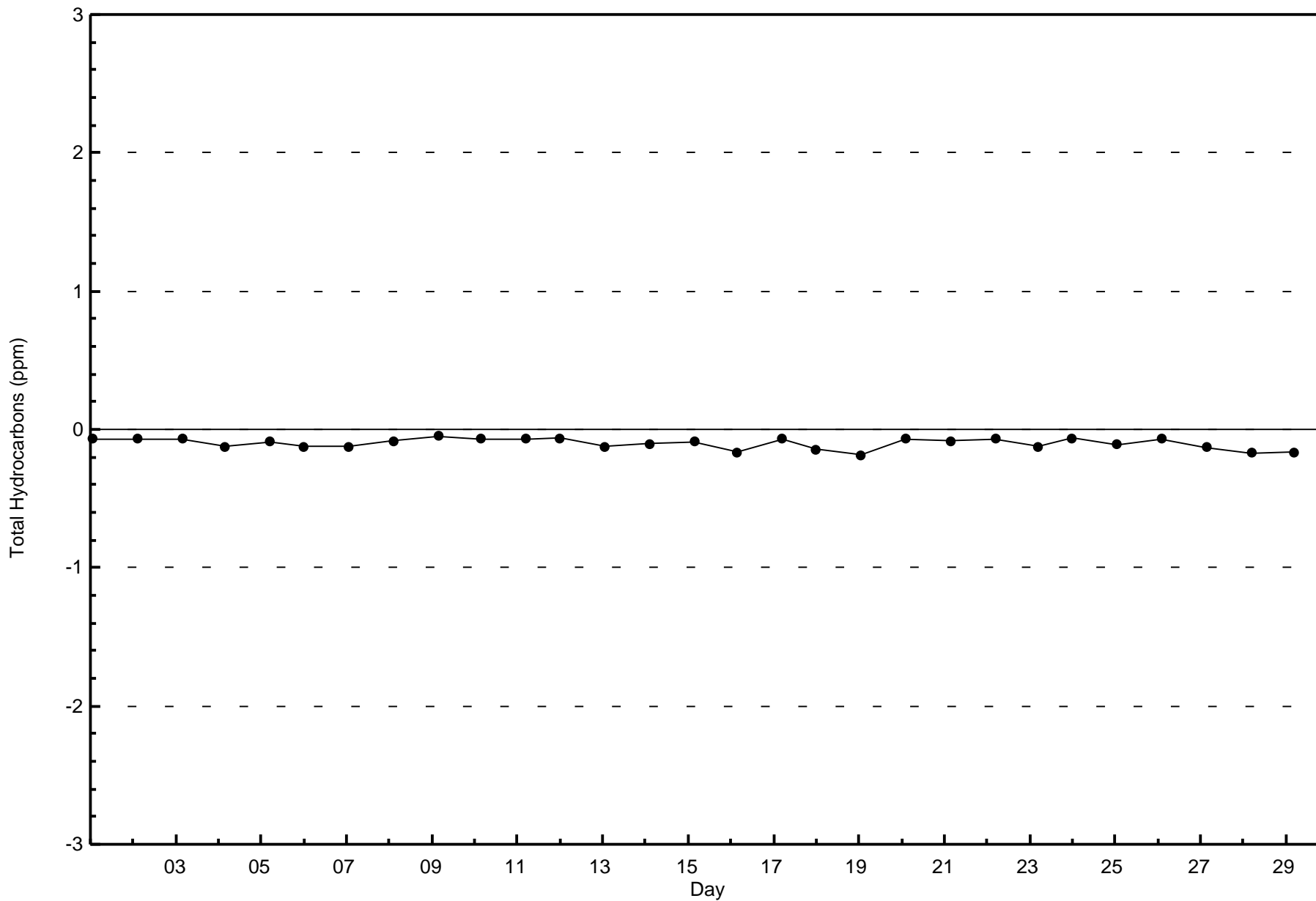


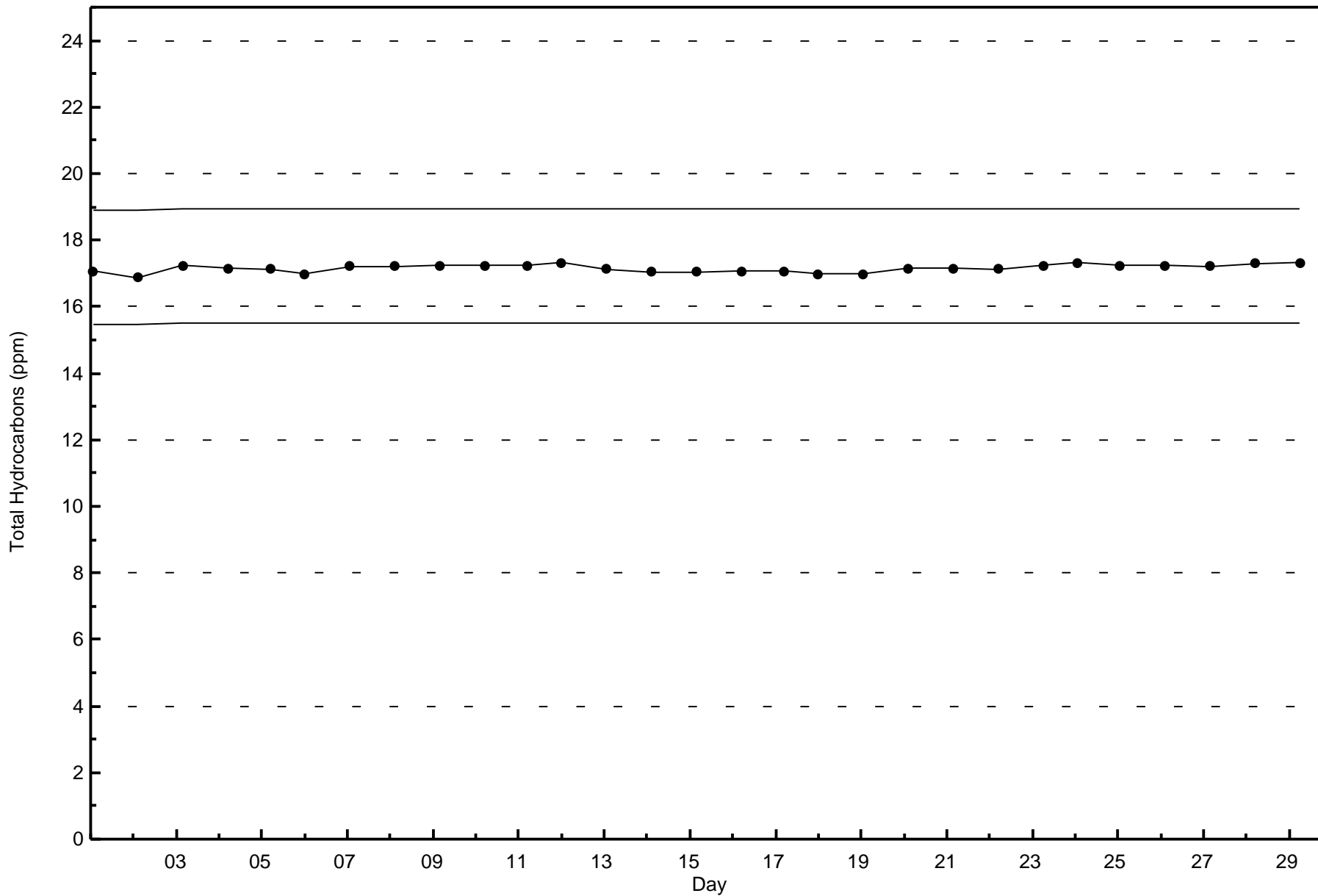
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Brion MacKay River - February 2016





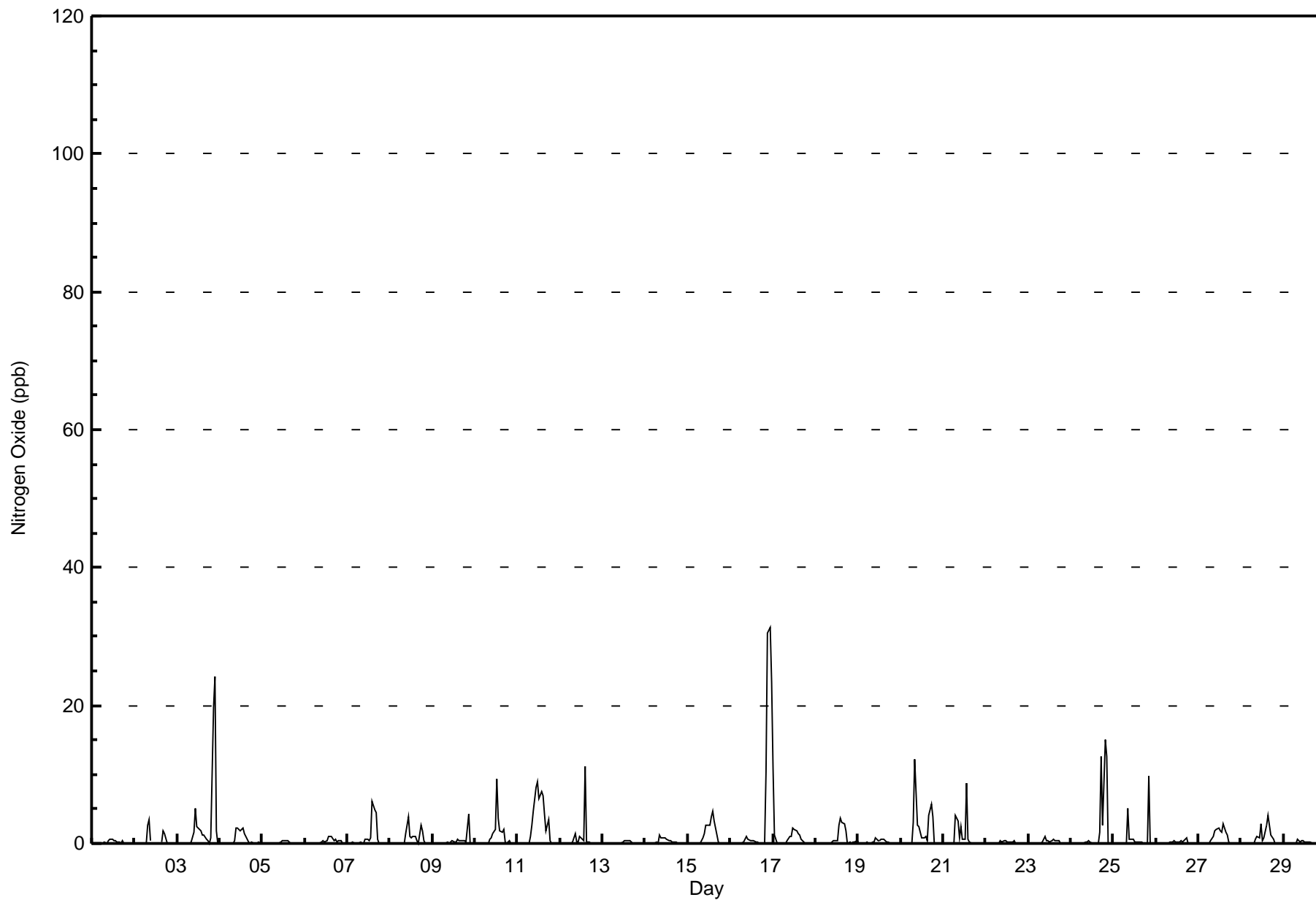


Maximum Value: 31 ppb on Feb 16 23:00		Maximum Daily Average: 4.3 ppb on Feb 16		Hours in Service: 696																						
Minimum Value: 0 ppb on Feb 2 20:00		Minimum Daily Average: 0.1 ppb on Feb 13		Hours of Data: 662																						
Maximum Diurnal Average: 2.0 ppb at hour 21		Minimum Diurnal Average: 0.0 ppb at hour 5		Hours of Missing Data: 34																						
Monthly Average: 0.9 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 12		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	0	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	3	3	0	C	C	C	C	C	0	2	2	0	0	0	0	0	0	0.6	3
3-Feb	0	0	0	Z	0	0	0	0	0	2	5	2	2	2	1	1	1	0	0	1	20	24	2	0	2.8	24
4-Feb	0	0	0	0	Z	0	0	0	0	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0.6	2
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	0.1	0
6-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0.3	1
7-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	0	1	6	5	5	1	0	0	0	0	0	0	0.9	6
8-Feb	0	0	Z	0	0	0	0	0	0	1	4	1	1	1	1	0	0	3	2	0	0	0	0	0	0.6	4
9-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0.3	4
10-Feb	0	0	0	0	Z	0	0	0	1	1	2	2	9	4	2	2	2	0	0	0	0	0	0	0	1.1	9
11-Feb	0	0	0	0	0	Z	0	1	3	5	8	9	7	8	7	4	2	4	0	0	0	0	0	0	2.5	9
12-Feb	Z	0	0	0	0	0	0	0	1	0	0	1	1	0	11	0	0	0	0	0	0	0	0	0	0.7	11
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	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Feb	0	0	0	Z	0	0	0	0	1	1	3	3	3	4	5	3	1	0	0	0	0	0	0	0	1.0	5
16-Feb	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	10	30	31	23	4.3	31
17-Feb	11	1	0	0	0	Z	0	0	0	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	1.1	11
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	3	2	0	0	0	0	0	1	0.7	4
19-Feb	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1
20-Feb	0	0	Z	0	0	0	0	3	12	3	2	2	1	1	1	0	4	6	4	0	0	0	0	0	1.7	12
21-Feb	0	0	0	Z	0	0	0	4	3	1	2	1	1	9	1	0	0	0	0	0	0	0	0	0	0.9	9
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	1	0	0	0	0	1	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	2	13	3	15	13	0	0	0	2.0	15
25-Feb	0	Z	0	0	0	0	0	0	5	1	1	1	0	0	0	0	0	0	0	0	10	0	0	0	0.8	10
26-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
27-Feb	0	0	0	Z	0	0	0	0	1	2	2	2	2	2	3	2	1	0	0	0	0	0	0	0	0.7	3
28-Feb	0	0	0	0	Z	0	0	0	1	1	1	3	1	1	3	4	3	1	1	0	0	0	0	0	0.8	4
29-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	0.1	1
		0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.4	1.2	0.9	1.4	1.3	1.3	1.5	1.9	1.1	1.0	1.2	0.4	0.6	2.0	1.9	1.2	0.8	Diurnal Average
		11	1	0	0	0	0	0	4	12	5	8	9	9	9	11	5	5	13	4	15	20	30	31	23	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Brion MacKay River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Brion MacKay River - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	658	99.40	99.40
21 - 40	4	0.60	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Brion MacKay River - February 2016**

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	68	91	17	6	18	63	56	72	43	24	44	47	30	21	16	635
21 - 40	1	2	1	0	0	0	0	0	0	0	0	0	0	0	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	20	70	92	17	6	18	63	56	72	43	24	44	47	30	21	16	639

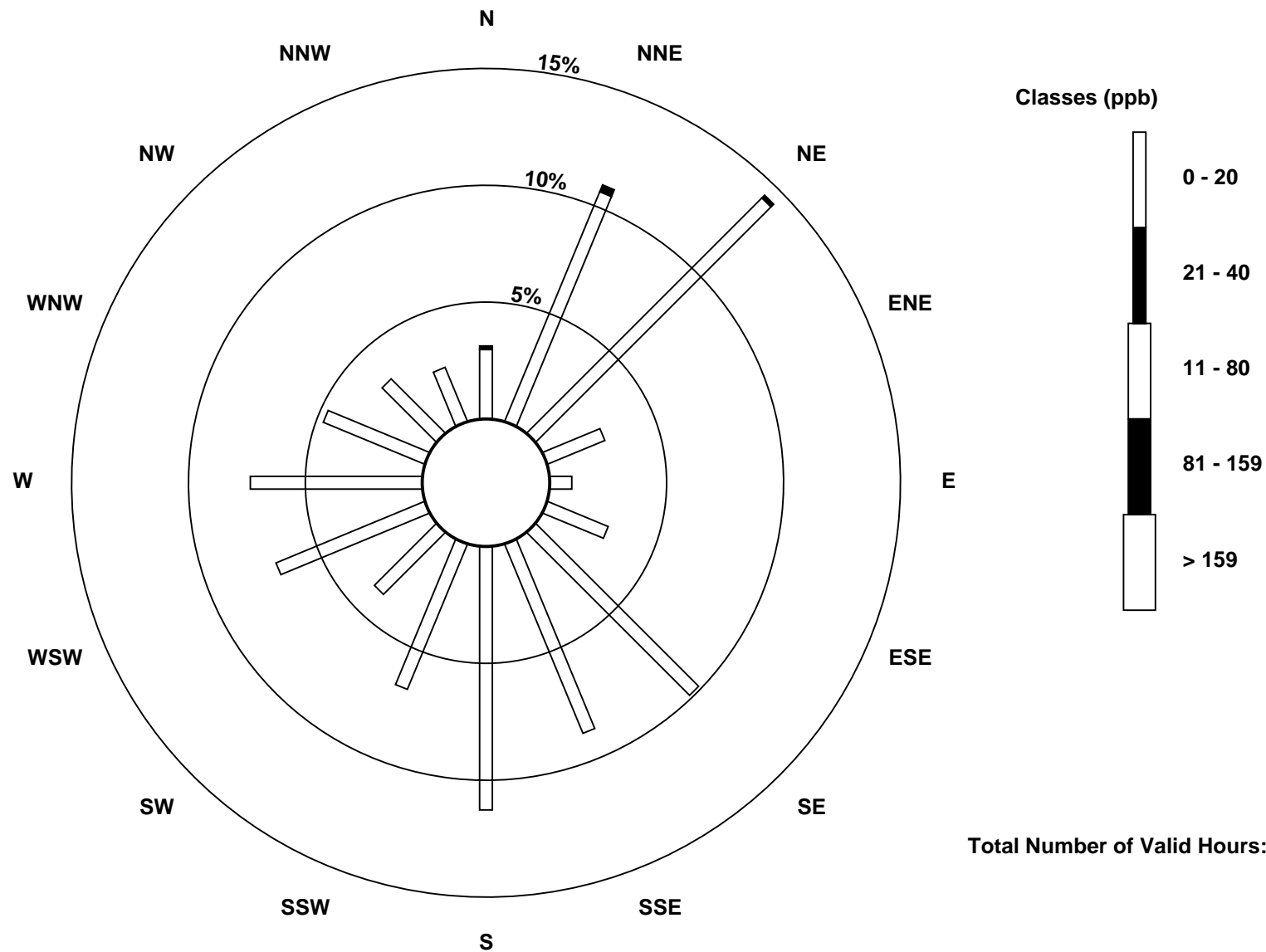
Total Number of Valid Hours: 639

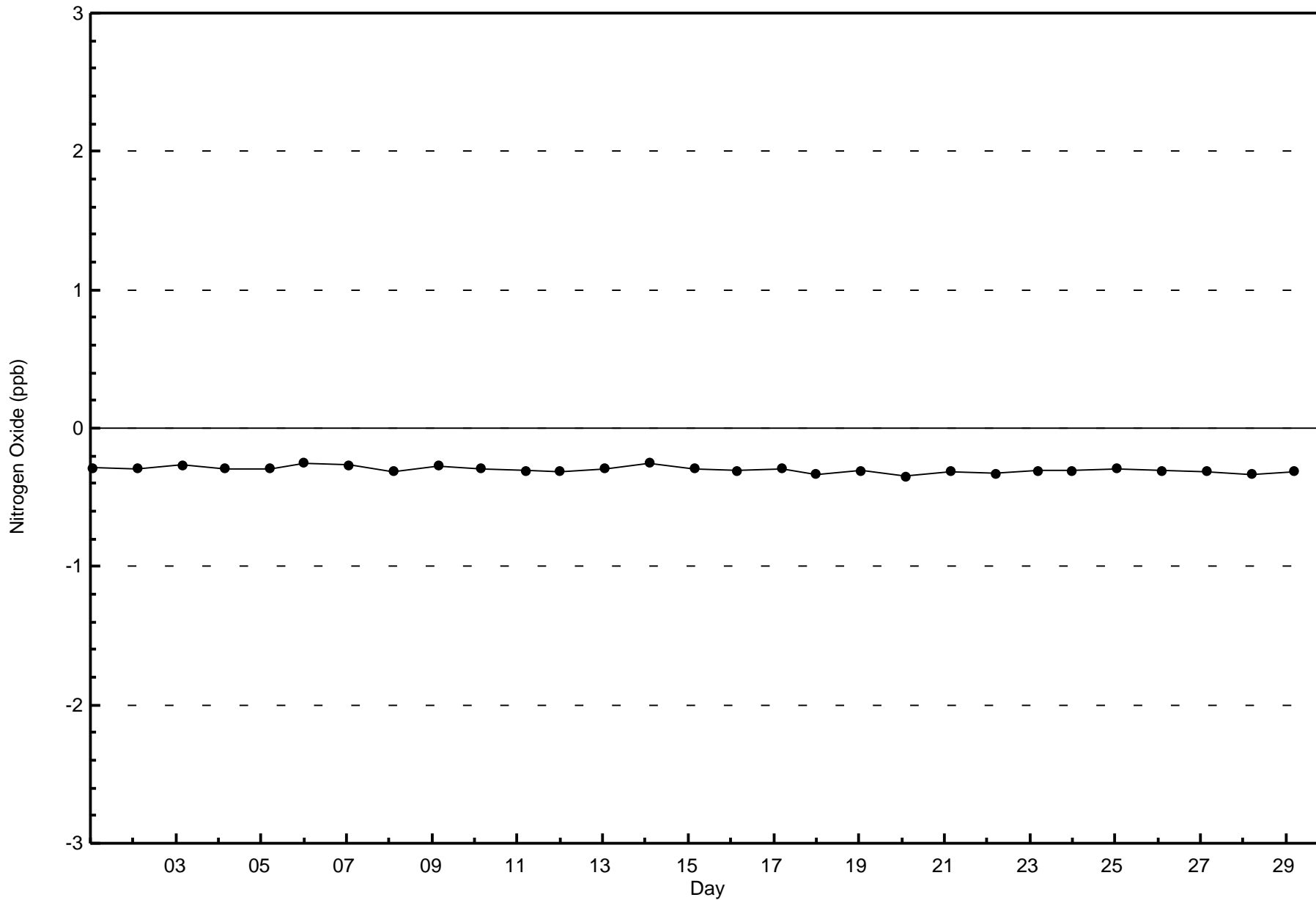
Total Number of Hours: 696

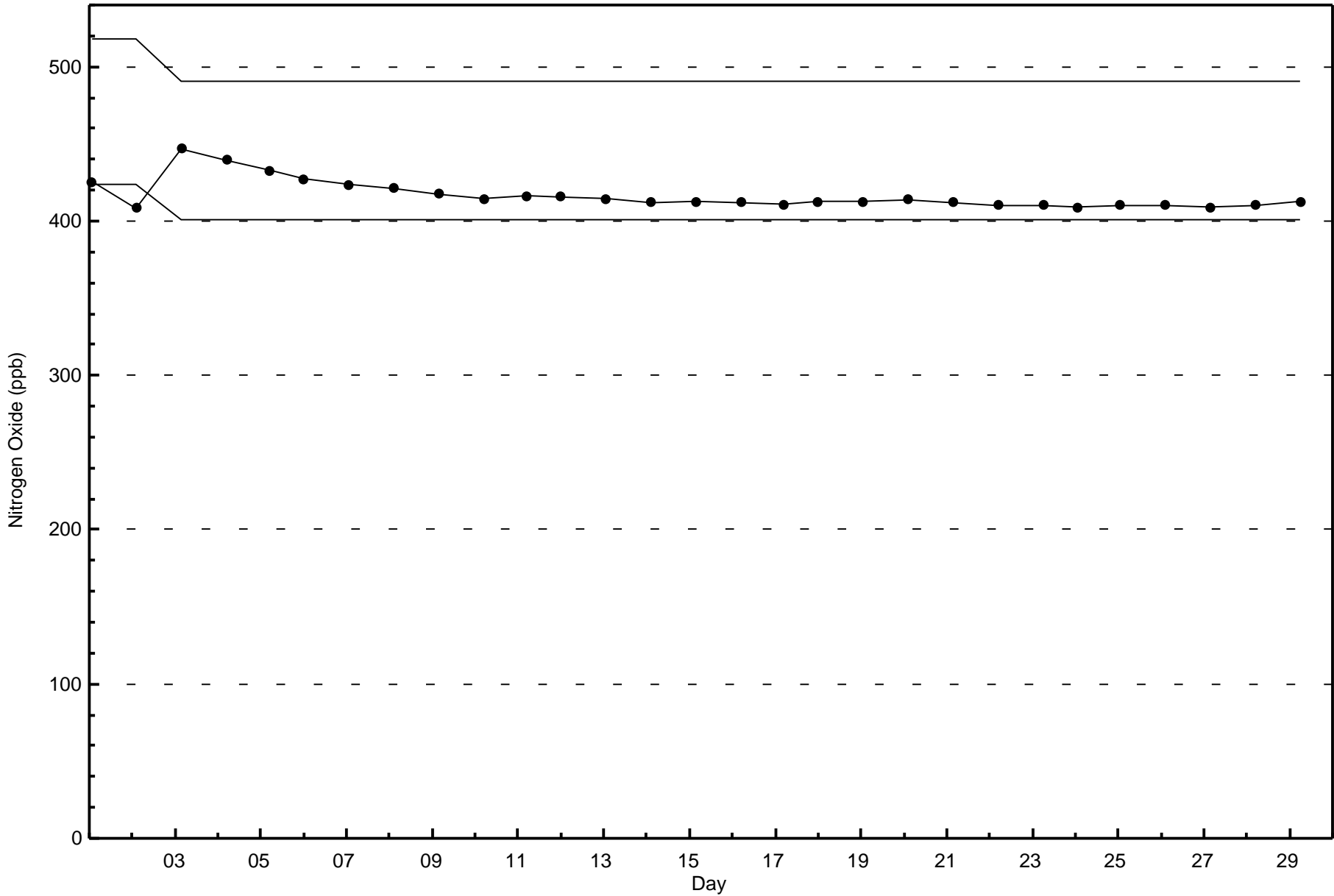


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxide (NO) - ppb
Brion MacKay River (AMS 20)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

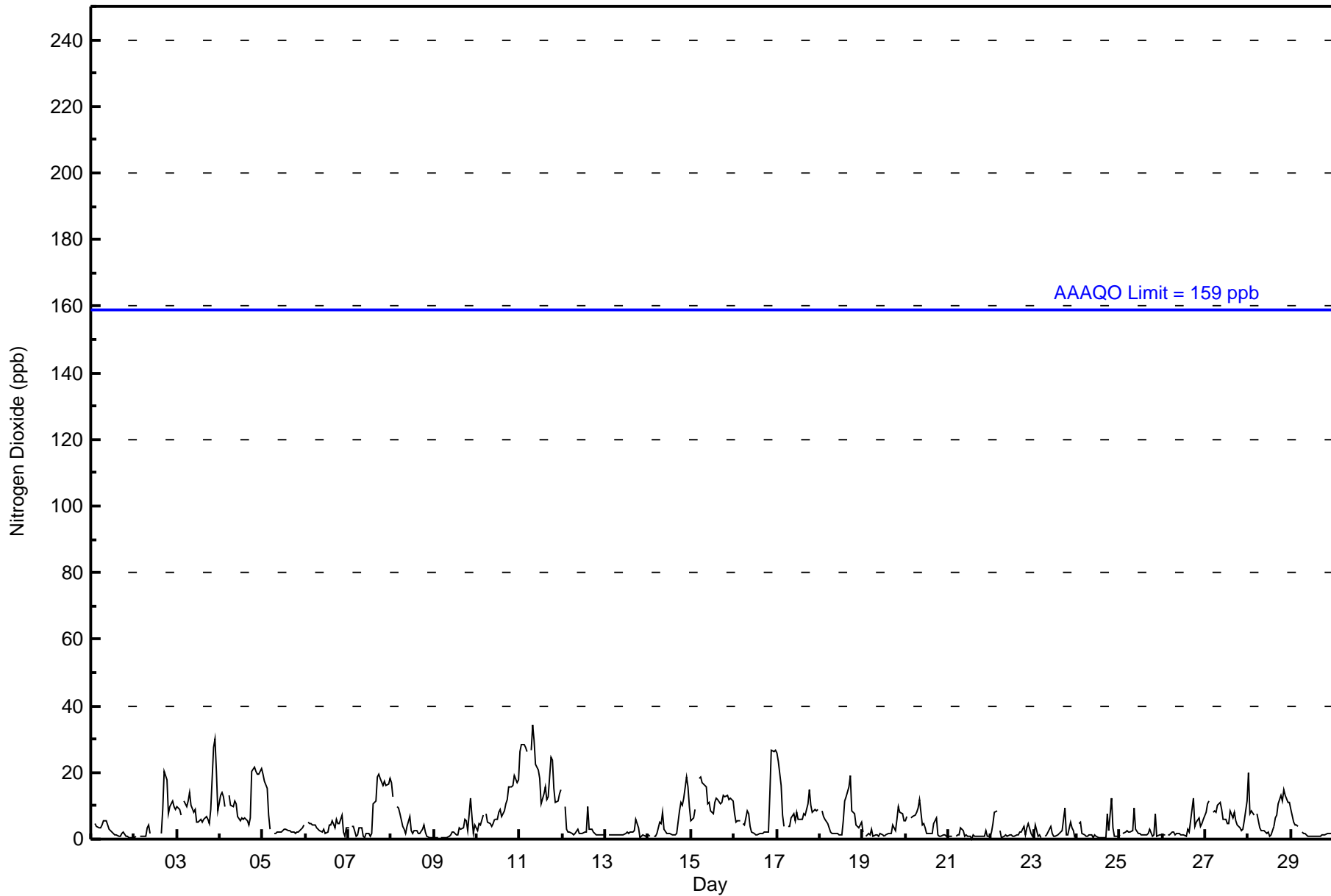
Brion MacKay River - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 35 ppb on Feb 11 08:00										Maximum Daily Average: 20.4 ppb on Feb 11										Hours of Data: 662						
Minimum Value: 0 ppb on Feb 21 14:00										Minimum Daily Average: 1.2 ppb on Feb 21										Hours of Missing Data: 34						
Maximum Diurnal Average: 8.1 ppb at hour 22										Minimum Diurnal Average: 2.8 ppb at hour 13										Hours of Calibration: 34						
Monthly Average: 5.7 ppb										Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 8 P ₉₀ = 13 P ₉₉ = 27										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	13	Z	5	4	4	3	4	6	6	4	3	2	2	1	1	1	1	2	2	1	1	1	1	1	2.9	13
2-Feb	1	1	Z	1	1	1	1	4	4	2	C	C	C	C	C	2	9	21	18	8	10	12	10	9	6.2	21
3-Feb	10	9	7	Z	12	10	12	14	10	8	9	5	5	6	5	6	7	6	5	9	28	30	20	9	10.4	30
4-Feb	13	14	13	10	Z	13	10	10	12	11	7	6	6	6	6	5	4	6	20	22	20	20	19	21	12.0	22
5-Feb	19	17	15	7	3	Z	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	3	3	4	4.6	19
6-Feb	Z	5	5	5	4	4	3	3	3	2	3	2	2	4	4	5	4	6	5	5	7	2	1	3	3.8	7
7-Feb	4	Z	4	4	1	1	4	4	1	1	2	2	1	2	11	11	19	20	18	16	17	16	17	18	8.3	20
8-Feb	17	13	Z	10	10	8	4	3	2	4	7	3	2	2	3	2	2	3	4	2	1	1	1	1	4.3	17
9-Feb	1	1	1	Z	1	1	1	1	1	1	2	2	1	1	3	3	4	6	6	2	12	7	2	4	2.6	12
10-Feb	2	5	4	7	Z	8	5	5	4	5	6	6	8	9	7	8	11	12	16	16	16	19	17	18	9.2	19
11-Feb	26	29	28	28	26	Z	27	35	30	22	21	18	11	13	16	12	13	25	24	15	11	12	13	15	20.4	35
12-Feb	Z	10	3	2	2	2	1	2	3	2	2	2	2	2	10	3	3	2	2	1	1	1	1	1	2.6	10
13-Feb	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	6	4	1	1	1	1	1	1.7	6
14-Feb	1	1	Z	1	1	2	5	5	8	3	2	2	2	1	1	1	2	9	11	10	12	19	16	10	5.4	19
15-Feb	5	6	9	Z	18	19	17	17	16	11	11	9	8	11	12	12	11	11	13	13	13	12	12	12	12.0	19
16-Feb	8	5	5	5	Z	5	4	9	8	4	2	2	1	1	2	2	2	2	2	2	14	27	26	27	7.1	27
17-Feb	26	24	16	7	4	Z	4	4	6	8	5	8	6	6	6	8	7	10	15	10	8	9	9	9	9.3	26
18-Feb	Z	8	7	6	5	3	2	2	2	2	2	1	1	6	11	13	16	19	9	8	4	4	3	5	6.0	19
19-Feb	2	Z	1	2	1	3	1	1	1	1	2	1	1	1	2	2	2	4	3	6	10	8	8	5	2.9	10
20-Feb	6	7	Z	6	7	7	8	9	12	4	5	3	2	2	2	2	5	7	1	1	1	1	1	1	4.3	12
21-Feb	1	1	1	Z	1	1	1	3	2	1	1	1	1	0	1	1	1	1	1	1	1	3	1	1	1.2	3
22-Feb	2	5	8	9	Z	3	1	1	1	1	1	1	1	1	1	1	2	2	4	1	3	5	2	1	2.4	9
23-Feb	1	4	1	1	1	Z	1	1	2	4	2	1	1	1	2	2	3	9	1	1	5	3	3	1	2.2	9
24-Feb	Z	5	5	2	1	1	1	1	1	1	1	1	0	0	0	0	8	3	12	4	1	1	1	1	2.2	12
25-Feb	1	Z	2	2	2	2	2	2	10	3	2	2	1	1	1	1	2	3	1	1	8	1	1	1	2.3	10
26-Feb	1	1	Z	1	1	2	2	1	2	2	1	1	1	1	3	2	5	12	4	5	6	4	5	6	3.1	12
27-Feb	8	11	11	Z	8	8	8	10	11	9	6	6	5	5	9	6	8	6	4	3	3	3	5	11	7.1	11
28-Feb	20	8	9	7	Z	8	3	3	3	3	2	2	1	1	4	7	7	10	13	11	15	13	11	11	7.4	20
29-Feb	9	5	4	4	4	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2.1	9
7.9 8.0 6.9 5.5 4.9 4.7 4.7 5.4 5.6 4.1 3.9 3.3 2.8 3.3 4.5 4.3 5.3 7.9 7.2 6.4 8.1 8.1 7.2 7.2																								Diurnal Average		
26 29 28 28 26 19 27 35 30 22 21 18 11 13 16 13 19 25 24 22 28 30 26 27																								Diurnal Maximum		
Z - zerspan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	640	96.68	96.68
21 - 40	22	3.32	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: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - February 2016**

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	64	80	17	6	18	63	56	72	42	24	44	47	30	21	16	617
21 - 40	3	6	12	0	0	0	0	0	0	1	0	0	0	0	0	0	22
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	70	92	17	6	18	63	56	72	43	24	44	47	30	21	16	639

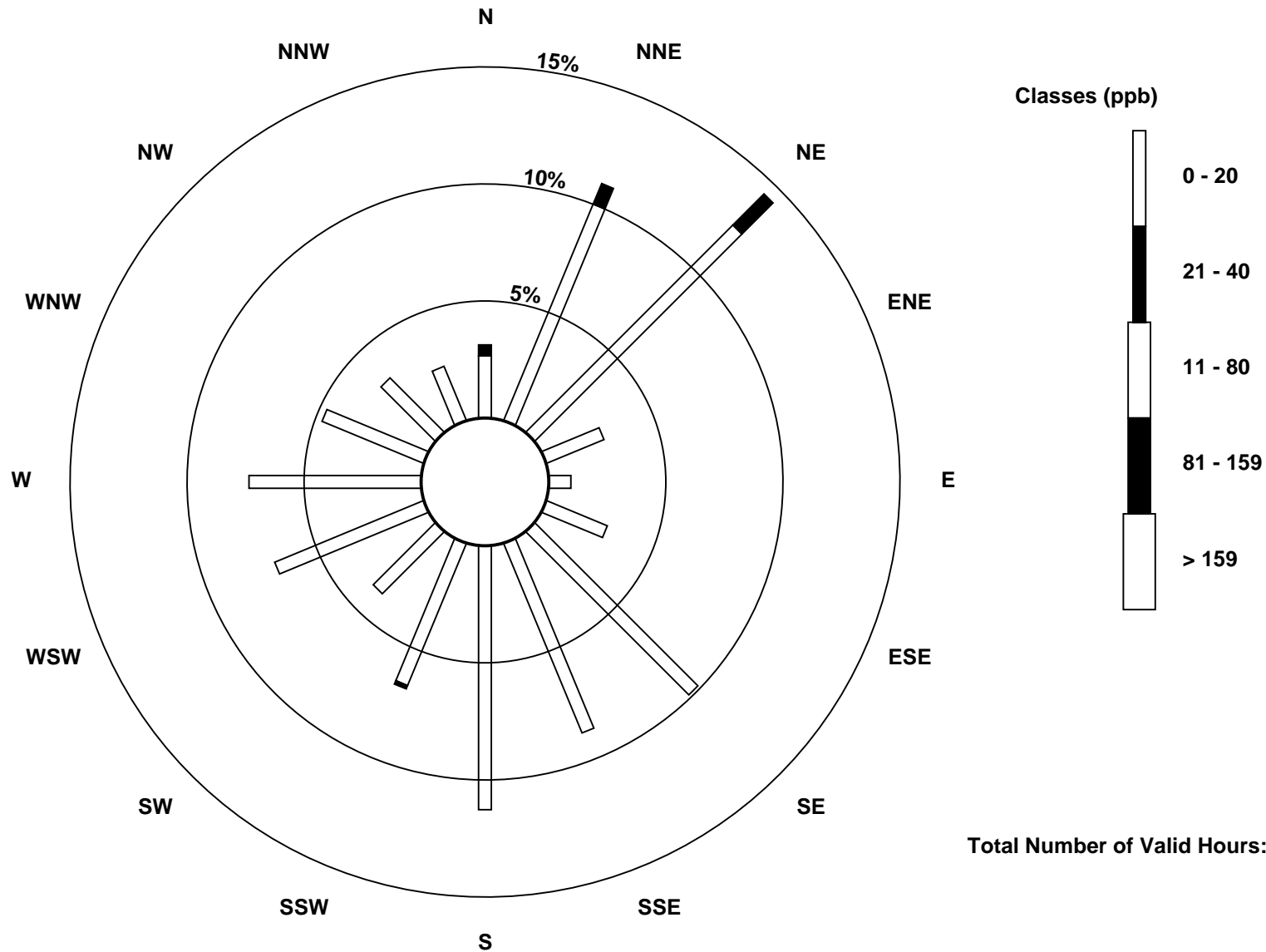
Total Number of Valid Hours: 639

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River (AMS 20)

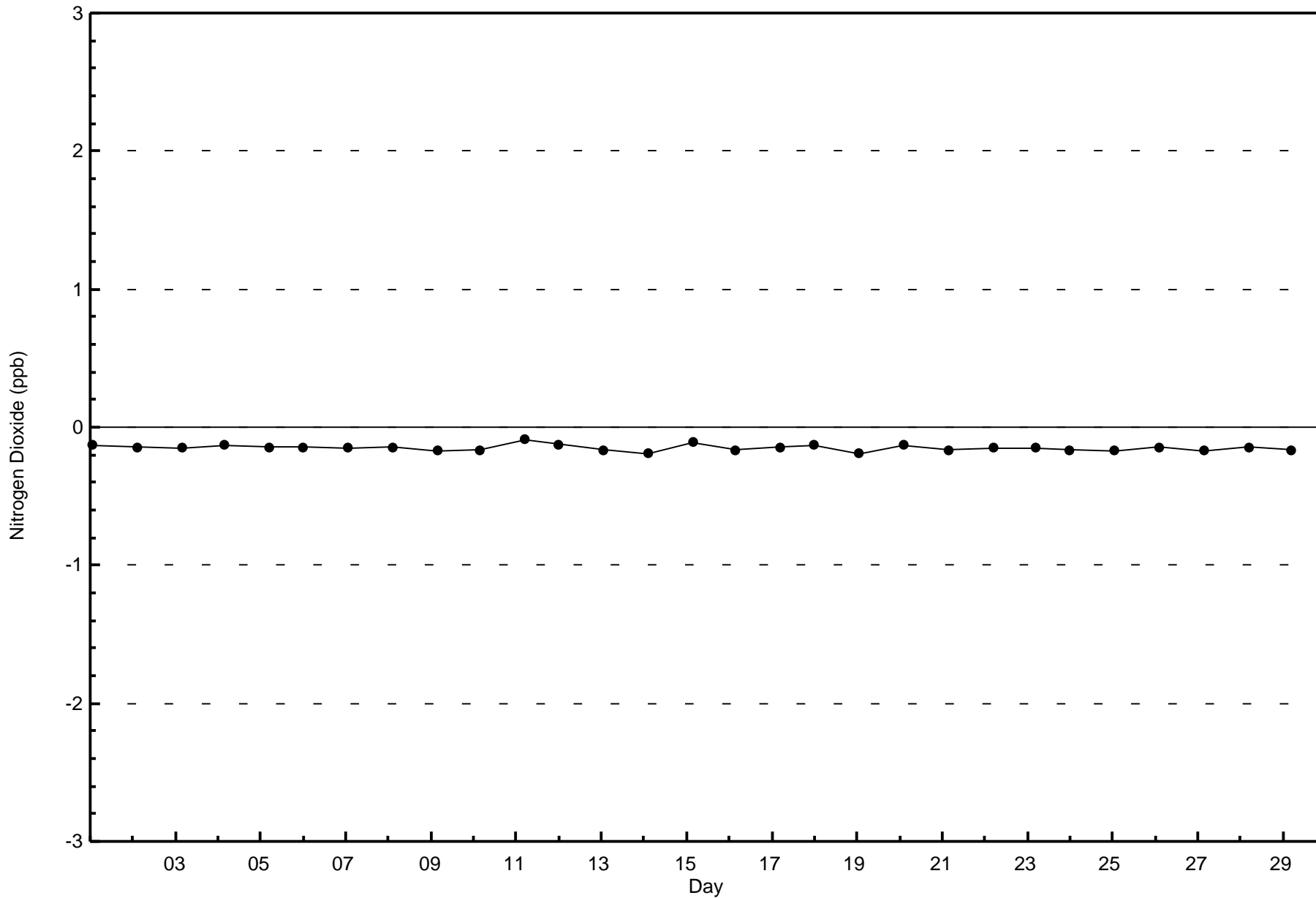


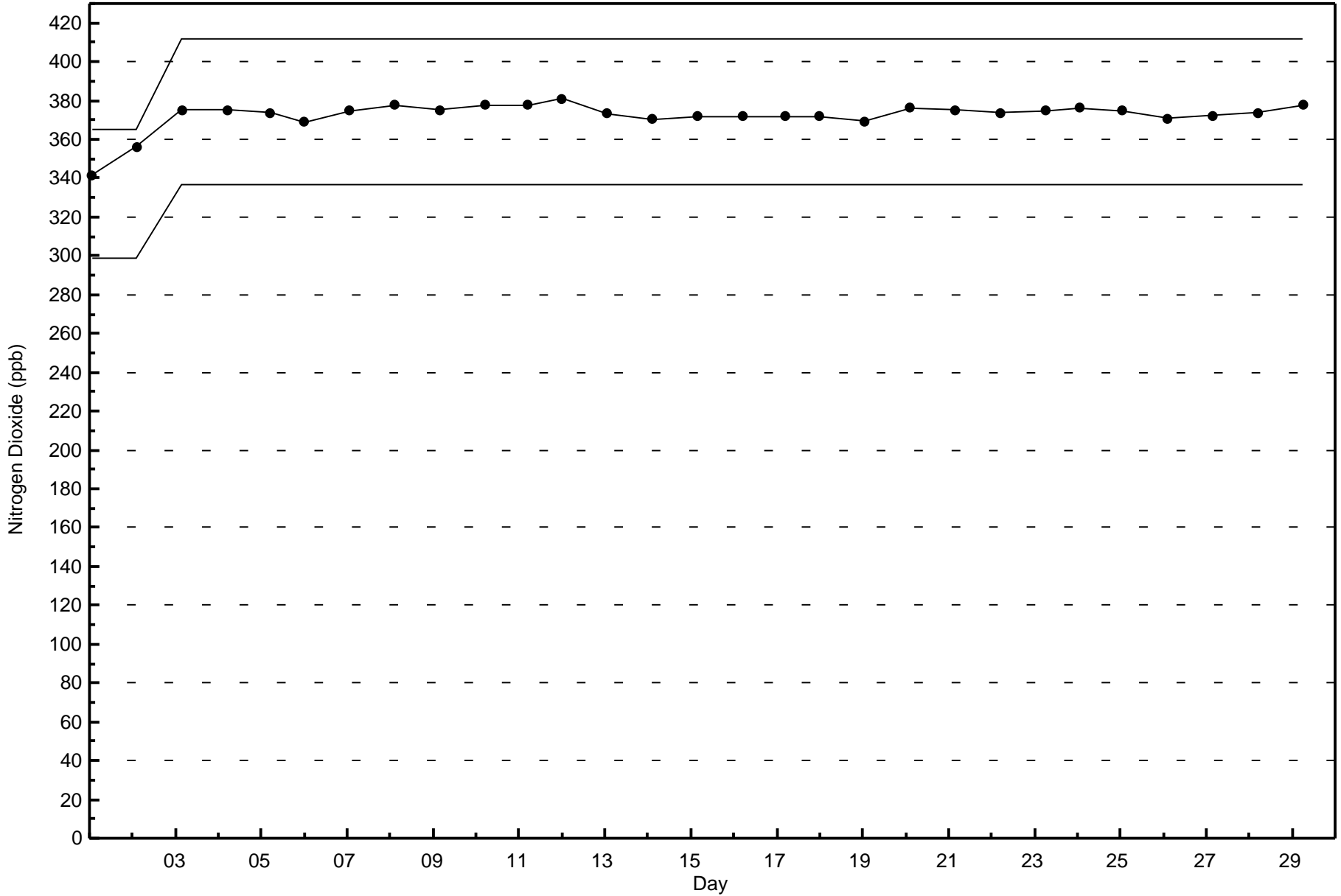
Total Number of Valid Hours: 639



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - February 2016







Wood Buffalo Environmental Association
Summary of Hour Averages

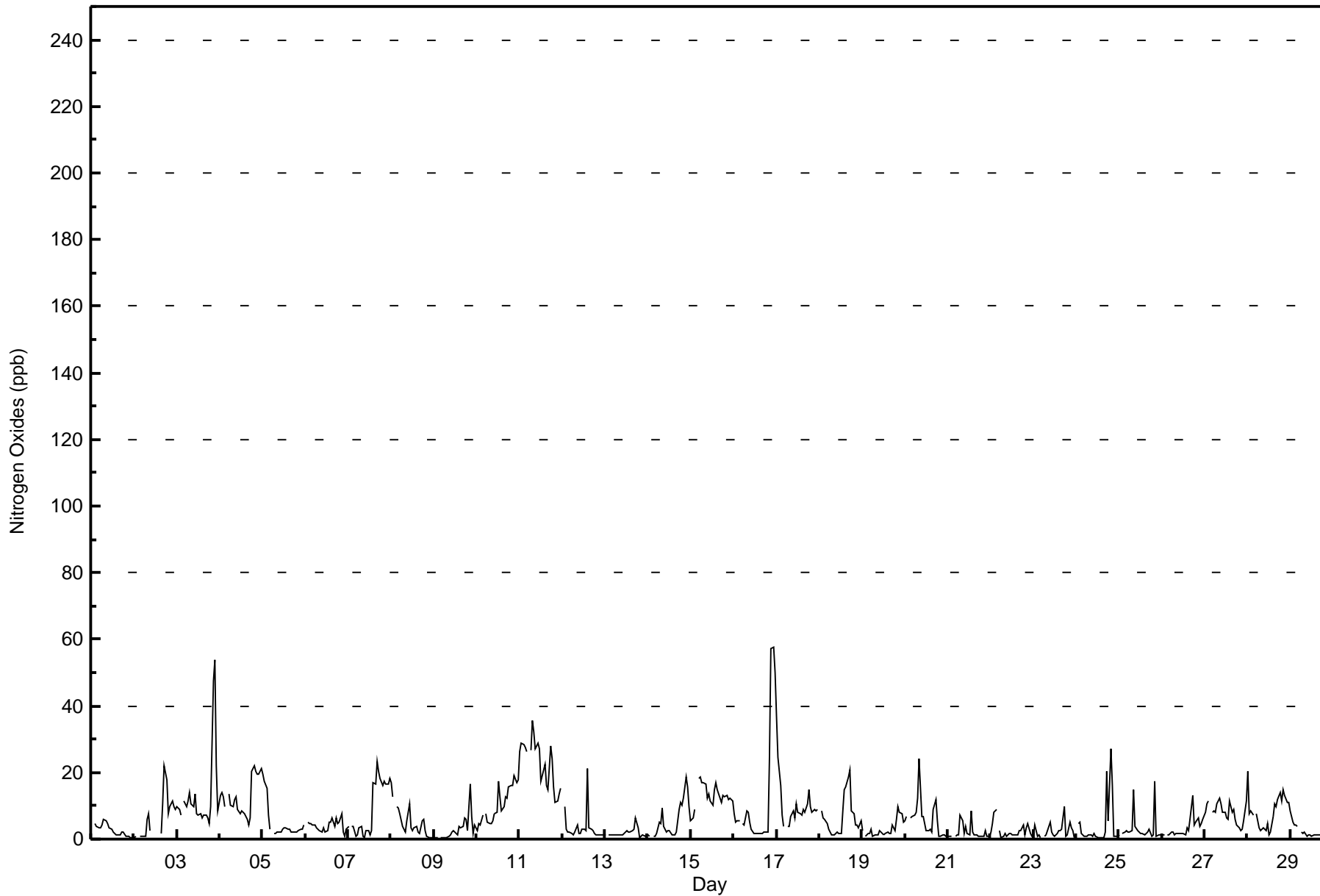
Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 2016

Maximum Value: 58 ppb on Feb 16 23:00		Maximum Daily Average: 22.9 ppb on Feb 11		Hours in Service: 696																																												
Minimum Value: 0 ppb on Feb 24 15:00		Minimum Daily Average: 1.7 ppb on Feb 13		Hours of Data: 662																																												
Maximum Diurnal Average: 10.1 ppb at hour 21		Minimum Diurnal Average: 4.0 ppb at hour 13		Hours of Missing Data: 34																																												
Monthly Average: 6.6 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 9 P ₉₀ = 16 P ₉₉ = 35		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	13	Z	5	4	4	3	4	6	6	5	4	3	2	2	1	1	1	2	2	1	1	1	1	1	3.0	13																						
2-Feb	1	1	Z	1	1	1	1	6	8	2	C	C	C	C	C	2	11	22	18	8	10	11	10	9	6.7	22																						
3-Feb	10	9	7	Z	11	10	12	14	11	10	14	8	7	8	6	7	7	7	5	10	47	54	22	9	13.2	54																						
4-Feb	13	14	13	10	Z	13	10	10	12	13	9	8	8	8	8	6	4	7	20	22	20	20	20	21	12.6	22																						
5-Feb	20	17	15	7	3	Z	2	2	2	2	2	3	3	3	3	3	2	2	2	2	2	3	3	4	4.7	20																						
6-Feb	Z	5	5	5	4	4	3	3	3	2	3	2	3	5	5	6	4	6	5	5	8	2	1	3	4.0	8																						
7-Feb	4	Z	4	4	1	1	4	4	1	1	2	2	1	3	17	16	23	20	18	16	17	16	17	18	9.2	23																						
8-Feb	17	13	Z	10	10	8	4	3	2	5	10	4	2	3	4	2	2	5	6	3	1	1	1	1	5.0	17																						
9-Feb	1	1	1	Z	1	1	1	1	1	1	2	2	2	1	4	3	4	6	6	3	17	7	2	4	3.0	17																						
10-Feb	2	5	4	7	Z	8	5	4	4	5	8	8	17	13	9	10	13	12	16	16	16	19	17	18	10.3	19																						
11-Feb	26	29	28	28	26	Z	27	36	32	27	29	27	17	21	22	16	15	28	24	16	11	12	14	15	22.9	36																						
12-Feb	Z	10	3	2	2	2	1	2	4	2	2	3	3	2	21	3	3	2	2	1	1	1	1	1	3.3	21																						
13-Feb	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	6	4	1	1	1	1	1	1.7	6																						
14-Feb	1	1	Z	1	1	2	5	5	9	4	2	2	2	1	1	1	2	9	11	10	12	19	15	10	5.6	19																						
15-Feb	5	6	9	Z	18	18	17	17	17	12	14	11	10	15	17	15	12	11	13	13	13	12	12	12	13.0	18																						
16-Feb	8	5	5	5	Z	5	4	9	8	5	3	2	2	2	2	2	2	2	2	2	24	57	58	50	11.4	58																						
17-Feb	37	25	16	7	4	Z	4	4	7	9	6	10	8	8	7	9	8	11	15	10	8	9	8	9	10.3	37																						
18-Feb	Z	8	7	6	5	3	2	1	1	2	2	2	2	8	15	16	19	21	9	8	4	4	4	6	6.7	21																						
19-Feb	2	Z	1	2	2	3	1	1	1	1	3	2	1	2	2	2	2	4	3	6	10	8	8	5	3.1	10																						
20-Feb	6	7	Z	6	7	7	8	12	24	7	7	5	3	2	3	2	9	12	5	1	1	1	1	1	6.0	24																						
21-Feb	1	1	1	Z	1	1	1	7	6	2	4	2	1	9	2	1	1	1	1	1	1	2	1	1	2.1	9																						
22-Feb	2	5	8	9	Z	3	1	1	2	1	2	2	1	1	1	1	3	2	4	1	3	5	2	1	2.6	9																						
23-Feb	1	4	1	1	0	Z	1	1	3	5	2	1	1	2	2	3	3	10	1	1	5	3	1	1	2.4	10																						
24-Feb	Z	5	5	2	1	1	1	1	1	1	2	1	1	0	0	0	2	20	5	27	16	1	1	1	4.2	27																						
25-Feb	1	Z	2	2	2	2	2	2	15	4	3	2	2	2	1	2	2	3	1	1	18	1	1	1	3.1	18																						
26-Feb	1	1	Z	1	1	2	2	1	2	2	2	2	2	1	3	3	6	13	4	5	6	4	5	6	3.2	13																						
27-Feb	8	11	11	Z	8	8	8	11	12	11	8	8	7	6	11	8	9	6	4	3	3	3	5	11	7.9	12																						
28-Feb	20	7	9	7	Z	8	3	3	3	3	2	5	1	2	7	11	10	12	14	11	15	13	11	11	8.2	20																						
29-Feb	9	5	4	4	4	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2.2	9																						
																								8.4	8.1	6.9	5.5	4.9	4.8	4.7	5.8	6.9	5.0	5.3	4.6	4.0	4.8	6.4	5.4	6.2	9.1	7.6	7.1	10.1	10.0	8.4	8.0	Diurnal Average
																								37	29	28	28	26	18	27	36	32	27	29	27	17	21	22	16	23	28	24	27	47	57	58	50	Diurnal Maximum
Z - zerospan																								C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	630	95.17	95.17
21 - 40	27	4.08	99.24
41 - 80	5	0.76	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 662

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	60	79	17	6	18	61	56	71	42	24	44	47	29	21	16	607
21 - 40	3	7	12	0	0	0	2	0	1	1	0	0	0	1	0	0	27
11 - 80	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	70	92	17	6	18	63	56	72	43	24	44	47	30	21	16	639

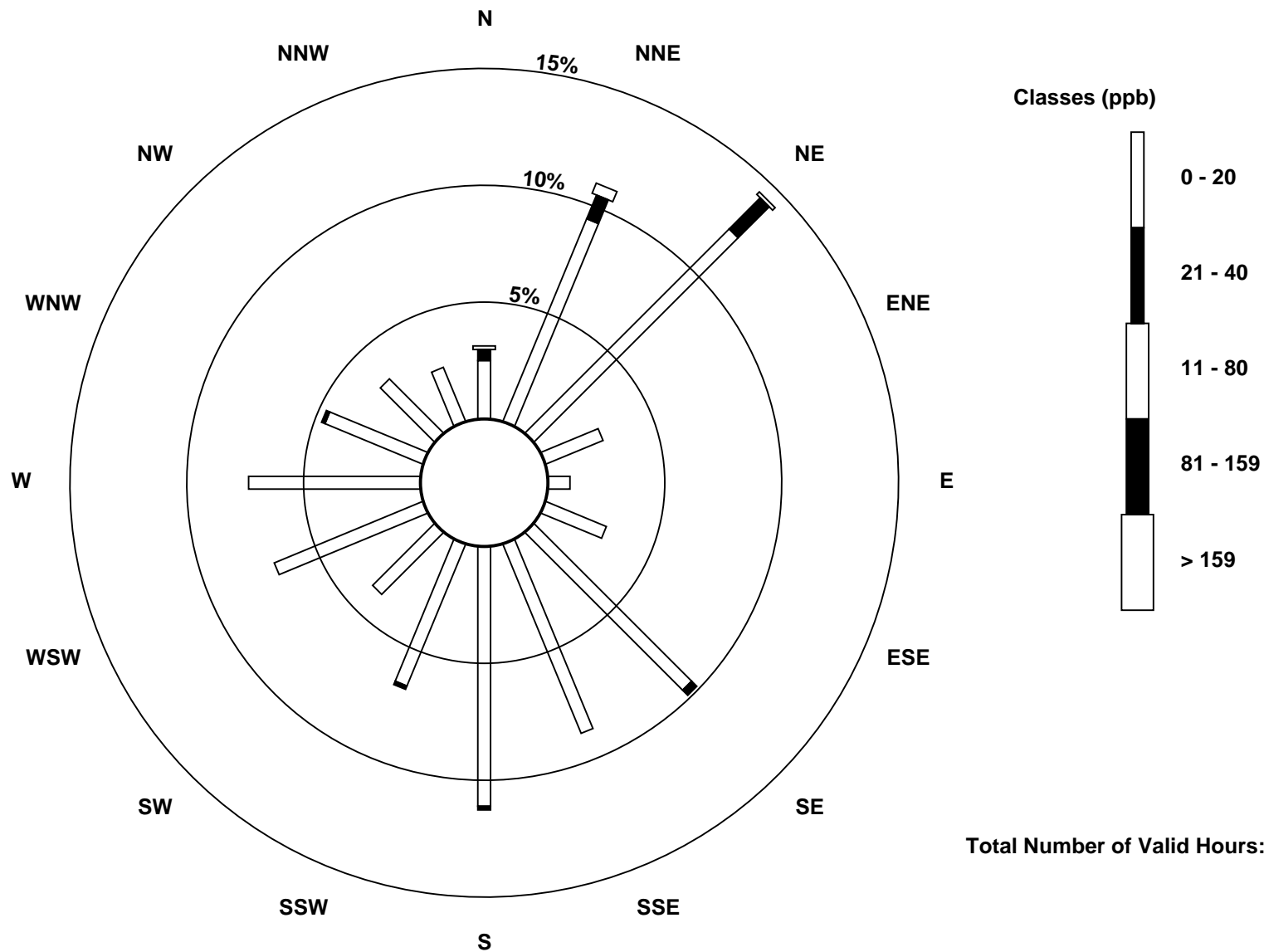
Total Number of Valid Hours: 639

Total Number of Hours: 696

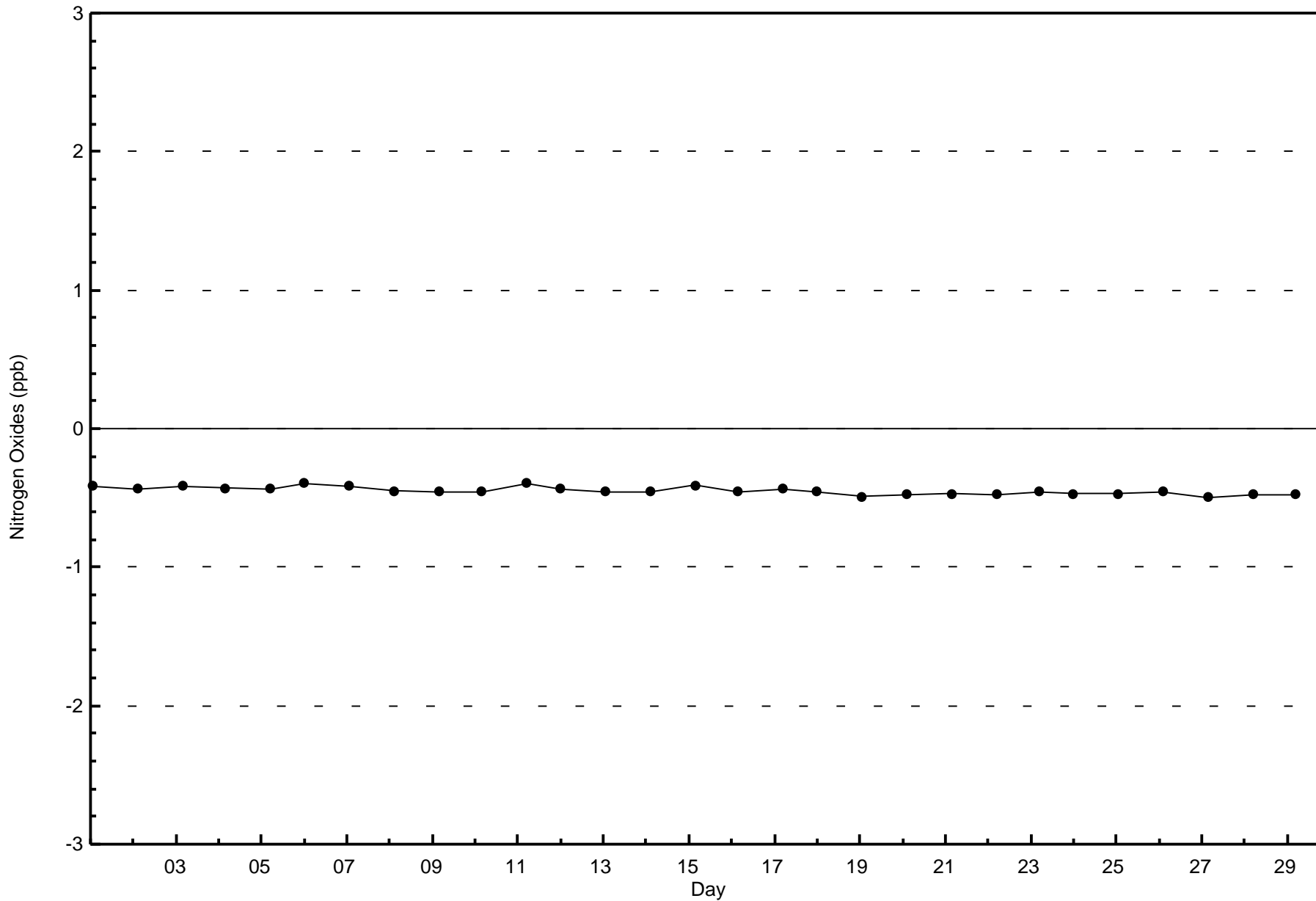


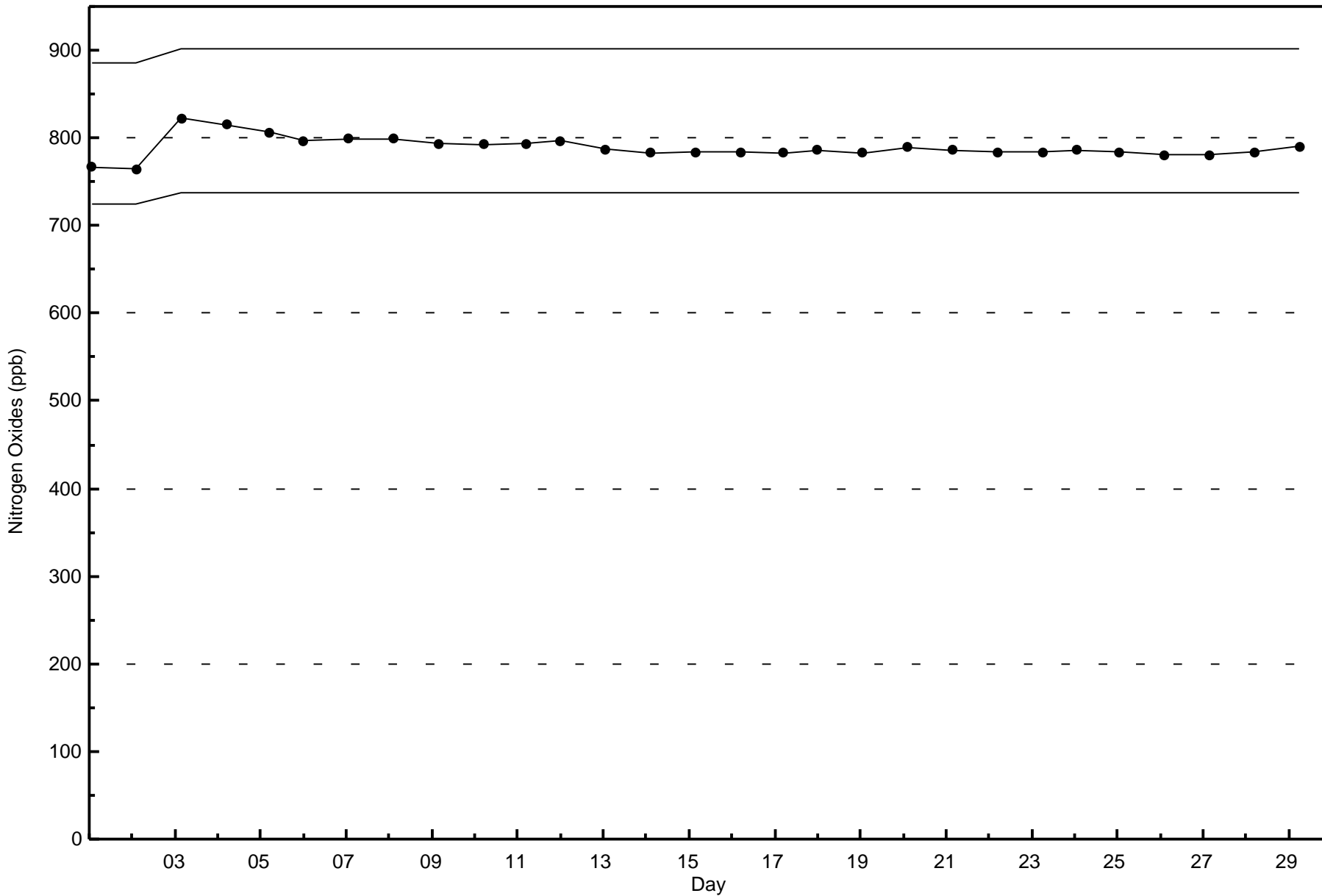
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 639



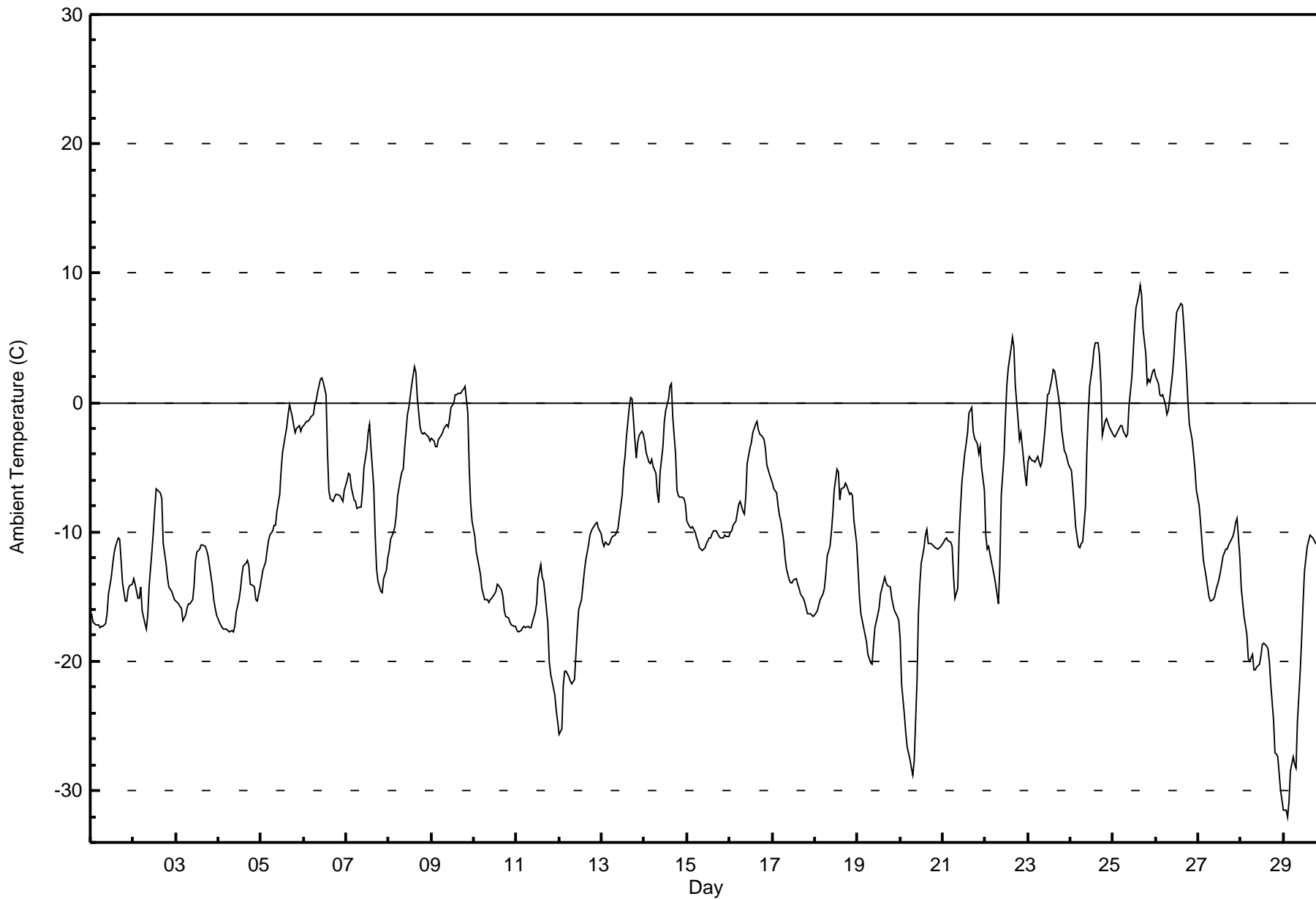




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Brion MacKay River - February 2016

Maximum Value: 9.0 C on Feb 25 16:00 Maximum Daily Average: 1.8 C on Feb 25																						Hours in Service:	696			
Minimum Value: -32.0 C on Feb 29 03:00 Minimum Daily Average: -21.2 C on Feb 28																						Hours of Data:	696			
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: -9.59 C Percentiles: P ₁ = -28.6 P ₁₀ = -17.6 Q ₁ = -14.8 Median = -10.3 Q ₃ = -3.4 P ₉₀ = 0.3 P ₉₉ = 7.2																						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	-16.3	-17.0	-17.1	-17.2	-17.1	-17.4	-17.3	-17.3	-17.1	-16.3	-14.8	-13.5	-12.5	-11.7	-11.1	-10.5	-10.6	-12.2	-13.9	-15.4	-15.4	-14.4	-14.2	-14.0	-14.8	-10.5
2-Feb	-13.6	-14.1	-15.1	-15.1	-14.3	-16.1	-17.0	-17.5	-16.4	-14.1	-11.4	-10.0	-8.2	-6.7	-6.9	-6.9	-7.5	-10.9	-12.4	-13.5	-14.3	-14.6	-14.9	-15.2	-12.8	-6.7
3-Feb	-15.4	-15.6	-15.8	-15.9	-16.8	-16.4	-15.9	-15.5	-15.5	-15.2	-14.1	-12.2	-11.6	-11.4	-11.0	-11.0	-11.1	-11.4	-11.9	-12.6	-14.2	-15.2	-15.9	-16.4	-14.1	-11.0
4-Feb	-16.9	-17.2	-17.4	-17.5	-17.6	-17.6	-17.7	-17.7	-17.3	-16.2	-15.2	-14.5	-13.4	-12.6	-12.4	-12.2	-12.6	-14.0	-14.2	-14.3	-15.2	-15.3	-14.2	-15.5	-12.2	-12.2
5-Feb	-13.6	-13.0	-12.3	-11.4	-10.7	-10.2	-10.0	-9.5	-9.5	-8.4	-7.0	-5.3	-3.8	-3.2	-1.9	-0.9	-0.2	-1.1	-1.8	-2.3	-2.0	-1.8	-2.2	-1.9	-6.0	-0.2
6-Feb	-1.8	-1.5	-1.5	-1.3	-1.1	-0.9	-0.2	0.2	0.8	1.8	1.9	1.6	0.6	-3.8	-6.8	-7.5	-7.6	-7.3	-7.2	-7.1	-7.2	-7.4	-7.6	-6.8	-3.2	1.9
7-Feb	-6.0	-5.4	-5.6	-6.5	-7.5	-7.6	-8.2	-8.1	-8.1	-6.9	-5.0	-3.6	-2.3	-1.6	-3.5	-6.6	-10.3	-12.9	-13.8	-14.6	-14.7	-13.6	-12.9	-12.0	-8.2	-1.6
8-Feb	-11.4	-10.6	-10.0	-9.6	-8.8	-7.3	-5.9	-5.4	-5.1	-3.5	-0.9	-0.3	0.5	1.4	2.8	2.4	0.4	-1.9	-2.4	-2.4	-2.4	-2.5	-2.7	-3.0	-3.7	2.8
9-Feb	-2.8	-3.0	-3.4	-3.4	-2.8	-2.5	-2.3	-2.0	-1.6	-1.9	-1.2	-0.4	0.0	0.6	0.6	0.7	0.8	0.9	1.1	1.3	-0.8	-5.0	-7.7	-9.2	-1.8	1.3
10-Feb	-10.4	-11.6	-12.1	-13.3	-14.4	-14.8	-15.3	-15.3	-15.4	-15.3	-15.1	-14.8	-14.5	-14.1	-14.2	-14.4	-15.1	-16.1	-16.5	-16.7	-16.9	-17.2	-17.2	-17.3	-14.9	-10.4
11-Feb	-17.6	-17.7	-17.6	-17.4	-17.3	-17.4	-17.3	-17.4	-17.4	-17.0	-16.2	-15.6	-13.6	-12.5	-13.5	-13.8	-14.8	-17.0	-20.0	-21.0	-21.5	-22.6	-23.8	-24.6	-17.7	-12.5
12-Feb	-25.6	-25.2	-21.8	-20.7	-20.8	-21.2	-21.5	-21.7	-21.5	-19.5	-17.6	-16.0	-15.2	-14.1	-13.0	-12.2	-11.0	-10.2	-9.9	-9.7	-9.4	-9.3	-9.7	-10.1	-16.1	-9.3
13-Feb	-10.8	-11.1	-10.8	-11.0	-10.9	-10.6	-10.3	-10.3	-10.1	-9.7	-8.8	-7.1	-5.1	-4.1	-2.7	-0.4	0.4	0.3	-2.8	-4.3	-3.1	-2.5	-2.2	-2.5	-6.3	0.4
14-Feb	-2.9	-3.9	-4.6	-4.7	-4.4	-4.9	-5.5	-7.0	-7.8	-5.3	-3.4	-1.5	-0.5	0.3	1.3	1.5	-1.1	-4.0	-6.8	-7.2	-7.3	-7.4	-7.9	-4.3	1.5	
15-Feb	-9.1	-9.6	-9.7	-9.6	-10.0	-10.4	-10.8	-11.2	-11.5	-11.3	-11.2	-10.9	-10.4	-10.4	-10.2	-9.9	-9.9	-10.2	-10.4	-10.5	-10.4	-10.3	-10.3	-10.3	-10.4	-9.1
16-Feb	-10.0	-10.0	-9.5	-9.2	-8.6	-7.9	-7.7	-8.4	-8.6	-7.3	-4.7	-3.5	-3.1	-2.3	-1.7	-1.5	-2.1	-2.4	-2.6	-2.9	-3.5	-4.8	-5.6	-5.9	-5.6	-1.5
17-Feb	-6.2	-6.7	-7.0	-7.9	-8.7	-9.2	-10.6	-12.0	-12.9	-13.8	-14.0	-14.0	-13.7	-13.7	-14.0	-14.4	-14.8	-15.2	-15.5	-15.9	-16.3	-16.3	-16.4	-16.5	-12.7	-6.2
18-Feb	-16.4	-16.1	-15.6	-15.2	-14.8	-14.4	-13.3	-11.9	-11.1	-10.0	-8.6	-6.7	-5.2	-5.4	-7.5	-6.7	-6.6	-6.3	-6.4	-7.1	-7.0	-7.2	-9.1	-10.9	-10.0	-5.2
19-Feb	-12.8	-15.0	-16.3	-17.4	-18.0	-18.5	-19.4	-20.1	-20.2	-18.7	-17.4	-16.5	-15.9	-14.8	-13.9	-13.5	-13.9	-14.1	-14.3	-15.1	-15.7	-16.1	-16.5	-16.9	-16.3	-12.8
20-Feb	-18.3	-21.7	-24.1	-25.5	-26.6	-27.6	-28.3	-28.8	-27.7	-21.6	-16.4	-14.0	-12.4	-11.2	-10.2	-9.8	-10.9	-10.9	-11.0	-11.1	-11.2	-11.3	-11.2	-11.1	-17.2	-9.8
21-Feb	-10.8	-10.6	-10.5	-10.7	-10.8	-11.1	-13.4	-15.1	-14.4	-10.2	-8.1	-6.1	-3.9	-3.2	-2.3	-0.9	-0.4	-2.2	-2.8	-3.2	-4.0	-3.4	-5.0	-6.8	-7.1	-0.4
22-Feb	-10.2	-11.3	-11.1	-12.3	-12.8	-13.4	-14.0	-15.5	-12.6	-7.2	-4.0	-1.2	1.3	2.6	4.2	5.0	4.3	1.3	-1.4	-2.8	-2.3	-3.4	-5.6	-6.5	-5.4	5.0
23-Feb	-4.6	-4.1	-4.5	-4.5	-4.6	-4.2	-4.6	-4.9	-4.6	-2.4	-0.9	0.6	0.7	1.8	2.6	2.5	1.8	0.3	-0.6	-2.1	-3.7	-4.0	-4.4	-4.8	-2.2	2.6
24-Feb	-5.2	-6.6	-7.9	-9.6	-11.1	-11.3	-10.8	-10.8	-8.1	-3.8	-0.8	1.2	2.9	4.0	4.6	4.6	3.6	1.5	-2.6	-1.5	-1.3	-1.6	-1.9	-2.3	-3.1	4.6
25-Feb	-2.6	-2.7	-2.4	-2.0	-1.8	-1.8	-2.2	-2.6	-2.4	-0.3	1.9	3.9	6.0	7.3	8.3	9.0	8.4	5.7	3.8	1.5	1.8	1.5	2.4	2.6	1.8	9.0
26-Feb	2.0	1.5	0.6	0.5	0.6	-0.2	-0.9	-0.6	0.3	2.2	3.7	5.6	7.0	7.4	7.7	7.6	6.1	2.3	0.1	-1.7	-2.9	-3.9	-5.1	-6.8	1.4	7.7
27-Feb	-7.9	-9.3	-10.8	-12.2	-13.5	-14.3	-15.0	-15.4	-15.3	-15.0	-14.5	-13.7	-13.2	-12.5	-11.9	-11.4	-11.3	-11.0	-10.7	-10.3	-9.9	-9.3	-9.0	-11.9	-12.1	-7.9
28-Feb	-14.4	-15.4	-16.5	-17.9	-19.8	-20.0	-19.5	-20.6	-20.6	-20.5	-20.2	-19.6	-18.7	-18.6	-18.8	-19.1	-20.0	-21.8	-24.5	-27.1	-27.1	-27.4	-30.0	-30.7	-21.2	-14.4
29-Feb	-31.5	-31.5	-32.0	-30.9	-28.5	-27.4	-27.9	-28.3	-24.6	-20.7	-18.2	-15.6	-13.1	-11.1	-10.7	-10.3	-10.5	-10.7	-10.9	-10.9	-10.7	-10.6	-10.9	-10.8	-18.7	-10.3
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Brion MacKay River - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	48	6.90	6.90
-20 - 0	574	82.47	89.37
0 - 10	74	10.63	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

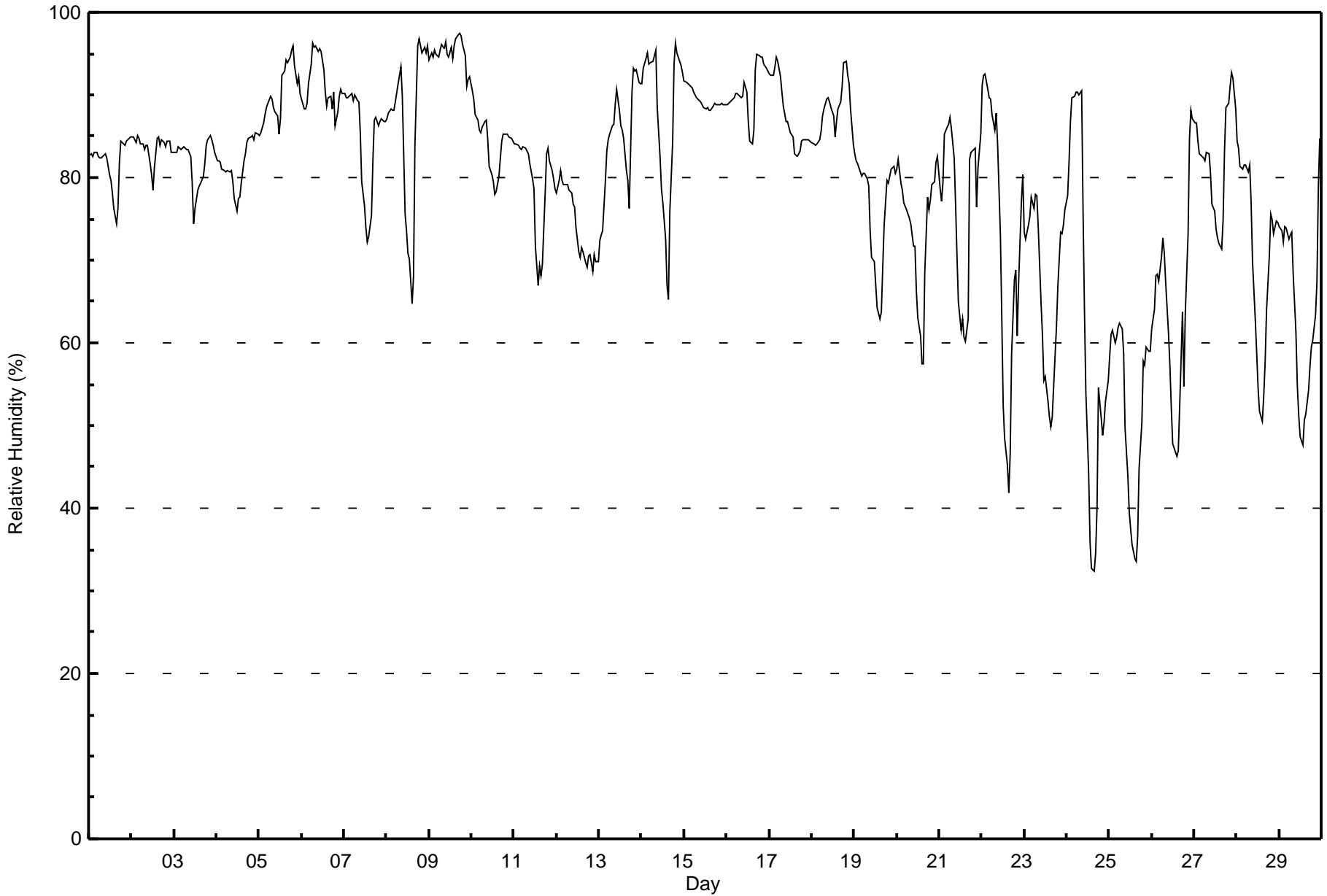
Brion MacKay River - February 2016

Maximum Value: 98 % on Feb 9 18:00 Maximum Daily Average: 95.1 % on Feb 9																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 32 % on Feb 24 16:00 Minimum Daily Average: 51.8 % on Feb 25 Maximum Diurnal Average: 84.5 % at hour 7 Minimum Diurnal Average: 69.3 % at hour 15 Monthly Average: 79.5 % Percentiles: P ₁ = 36 P ₁₀ = 60 Q ₁ = 74 Median = 83 O ₃ = 89 P ₉₀ = 93 P ₉₉ = 96																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	83	83	83	83	83	83	82	82	83	83	82	80	80	78	76	74	76	82	84	84	84	84	85	85	81.8	85
2-Feb	85	85	84	85	85	84	84	83	84	84	82	80	78	81	85	85	84	85	84	84	84	84	83	83	83.6	85
3-Feb	83	83	84	83	83	84	84	83	83	82	79	74	76	79	79	79	80	82	84	85	85	85	84	83	82.0	85
4-Feb	82	82	82	81	81	81	81	81	81	79	78	76	77	78	79	82	83	84	85	85	85	85	86	85	81.6	86
5-Feb	85	85	87	88	88	89	90	90	88	88	87	85	87	92	93	94	94	95	95	96	94	91	92	90	90.2	96
6-Feb	90	88	88	89	91	94	96	96	96	95	96	95	93	90	89	90	90	88	90	86	88	90	91	90	91.2	96
7-Feb	90	90	90	90	90	89	90	89	89	85	80	77	74	72	73	75	82	87	87	86	87	87	87	87	84.7	90
8-Feb	87	88	88	88	88	89	91	92	93	90	76	73	71	70	65	68	84	96	97	96	95	96	95	96	86.4	97
9-Feb	94	95	95	95	95	95	95	96	96	96	95	95	96	94	96	97	97	98	97	96	95	91	92	92	95.1	98
10-Feb	90	89	88	87	86	85	86	87	87	85	81	80	79	78	78	80	82	84	85	85	85	85	85	84	84.3	90
11-Feb	84	84	84	84	83	84	84	83	83	82	80	79	72	67	69	68	69	78	83	84	82	81	80	79	79.3	84
12-Feb	78	80	81	80	79	79	79	78	78	77	76	74	71	70	71	71	70	69	70	71	69	71	70	70	74.3	81
13-Feb	72	73	74	80	83	85	85	86	86	89	91	88	86	86	85	81	80	76	91	93	93	93	92	91	84.9	93
14-Feb	91	93	94	95	94	94	94	95	95	88	83	79	77	73	67	65	76	84	94	96	95	94	93	93	87.6	96
15-Feb	92	91	91	91	91	90	90	90	89	89	89	89	88	89	88	88	89	89	89	89	89	89	89	89	89.4	92
16-Feb	89	89	89	90	90	90	90	90	90	90	92	90	87	84	84	86	93	95	95	95	95	94	93	93	90.4	95
17-Feb	93	92	92	93	95	94	92	90	89	87	87	86	86	85	83	83	83	83	84	84	85	85	85	84	87.5	95
18-Feb	84	84	84	84	85	86	88	88	90	90	89	88	87	85	87	88	89	91	94	94	92	91	88	84	88.0	94
19-Feb	83	82	82	81	80	80	81	80	79	74	70	70	67	64	63	64	69	74	80	79	80	81	81	80	76.0	83
20-Feb	81	82	79	78	77	76	76	75	74	72	72	66	63	61	57	57	69	78	76	77	79	80	82	82	73.8	82
21-Feb	79	77	79	85	86	86	87	86	82	77	71	65	61	63	61	60	63	82	83	83	83	76	81	85	76.8	87
22-Feb	91	92	93	91	90	89	88	86	88	84	73	63	52	48	45	42	47	59	68	69	61	67	77	80	72.6	93
23-Feb	73	72	74	75	78	76	78	78	74	65	61	55	56	53	51	50	51	58	62	67	73	73	74	76	66.9	78
24-Feb	78	82	87	90	90	90	90	90	90	76	64	54	44	36	33	32	35	40	55	51	49	50	53	55	63.1	90
25-Feb	58	61	62	60	61	62	62	62	59	50	44	39	37	36	34	33	37	45	50	58	57	59	59	59	51.8	62
26-Feb	62	64	68	68	68	70	73	71	67	61	57	52	48	47	46	47	52	64	55	64	73	85	88	87	64.0	88
27-Feb	87	87	84	83	83	82	82	83	83	80	77	76	74	73	72	71	75	83	88	89	91	93	92	88	82.3	93
28-Feb	84	84	81	81	82	82	81	81	77	70	63	59	54	52	50	54	58	64	70	76	75	73	75	75	70.8	84
29-Feb	74	74	72	74	74	72	73	73	68	61	55	51	49	48	51	51	54	57	60	60	63	67	79	85	64.4	85
82.9 83.2 83.4 83.9 84.0 84.2 84.5 84.3 83.6 80.3 76.8 73.8 71.5 70.0 69.3 69.6 72.7 77.6 80.5 81.4 81.6 82.1 83.1 83.2																		Diurnal Average								
94 95 95 95 95 95 96 96 96 96 96 96 95 96 96 97 97 98 97 96 95 96 95 96																		Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Brion MacKay River - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Brion MacKay River - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	10	1.44	1.44
40 - 60	59	8.48	9.91
60 - 80	198	28.45	38.36
80 - 100	429	61.64	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Speed: 15 km/h on Feb 6 13:00	Maximum Daily Speed Average: 8.9 km/h on Feb 10	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 2 06:00	Minimum Daily Speed Average: 0.6 km/h on Feb 9	Hours of Data: 672
Maximum Diurnal Speed Average: 1.3 km/h at hour 12	Minimum Diurnal Speed Average: 0.4 km/h at hour 9	Hours of Missing Data: 24
Monthly Average Velocity: 0.1 km/h 81.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 Q ₃ = 8 P ₉₀ = 10 P ₉₉ = 13	Percent Operational Time: 96.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	N1	SE1	SSE3	S2	S2	SE2	SE4	SE5	SSE5	S5	S5	S5	S6	S5	SSW5	SW6	SSW4	SSE2	SSE2	SE1	SE2	SSE3	ESE1	SSE2	S2.9	S6	
2-Feb	SE2	SE1	SE1	SSE2	SE2	SE0	SSE1	S3	SSE2	S3	SW3	SSW5	SSW6	WSW4	WNW7	WNW6	NNW6	NE8	NE9	ENE5	NNE6	NE5	NE5	NNE4	NNE0.8	NE9	
3-Feb	NNE2	N3	NNW2	WNW1	ENE1	SSE1	SSE3	SE2	SSE4	SSE5	SSE5	WSW2	NNW1	WNW4	WNW5	NNW5	NNW4	NNE2	N1	N4	NNE6	NE7	NE6	NE6	NNE1.3	NE7	
4-Feb	NE6	NE6	NE4	ENE5	NE4	NE5	ENE5	NE3	NE4	ENE4	ESE5	SE6	SE7	SE6	SE6	SE5	ESE4	NE3	NNW3	N3	NNW3	WNW1	ESE1	SSW2	E2.7	SE7	
5-Feb	S2	S2	S4	SSE4	SE4	SE5	SE7	SE8	SSE6	SSE7	SSE7	S9	S9	SSE8	S9	SSE10	S7	S5	S5	S6	S10	SSW8	S4	S6	S6.1	S10	
6-Feb	S6	S5	S5	SSE5	S6	S6	S7	SSW9	SW7	W10	W11	W12	WNW15	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	WNW15	
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WNW8	N6	N7	NNE7	NE3	E3	ESE3	SE4	SE6	SSE7	SSE5	----	WNW8	
8-Feb	SSE7	SSE3	SW1	SSW3	WSW4	SW5	SW5	SW4	SW3	WSW2	WSW2	W5	WNW5	NW5	WSW3	SW4	SSW3	SSE2	SSE3	S3	SSE2	SE1	E3	SSE2	SW2.2	SSE7	
9-Feb	SSE4	S4	SSE3	SE2	SE4	ESE2	ESE3	ESE4	SE6	SE7	SE7	S5	SSW4	WSW3	W5	W5	W5	W5	W7	NW9	N11	NNE12	NNE13	NNE12	NE0.6	NNE13	
10-Feb	NNE13	NNE13	NNE13	NNE11	NE11	NNE10	NE10	NNE9	NNE10	NE7	NNE9	NNE10	NE10	NE9	NE8	NE8	NE6	NE8	NE7	NE6	NE7	NE7	NE7	NE6	NE8.9	NNE13	
11-Feb	NE6	NNE4	NE6	NE5	NE5	NE5	NE6	NE6	NE6	NE5	NNE6	NNE8	NE8	NNE10	NNE8	NNE8	NNE7	NE3	NE2	NE3	NE3	NE2	E1	ENE1	NE5.1	NNE10	
12-Feb	SE2	SE4	SE6	SE6	SE8	SE8	SE8	SE8	SE8	SE9	SE11	SE10	SE11	SE10	SE9	SE10	SE9	SE11	SE8	SSE8	SSE9	SSE12	S11	S10	SE8.3	SSE12	
13-Feb	S9	SSE8	SSE9	SSE8	S9	S8	S7	S8	SSW8	SSW8	SSW9	SW7	SW7	SSW7	SSW7	SSW5	SW5	W6	WSW3	SSW5	SW6	SW6	WSW6	WSW7	SSW6.0	SSE9	
14-Feb	WSW6	WSW5	W4	WSW6	WSW6	W6	W6	W4	W4	WNW5	W5	WNW5	NW8	N6	N5	NNW5	N4	NNE5	NNE5	NE5	ENE6	ENE4	NE5	ENE5	NW2.5	NW8	
15-Feb	ENE6	ENE5	NW5	NNE6	NNE6	NNE7	NE8	NNE7	NNE8	NNE7	NNE5	NNE5	NNE5	NNE4	NE2	NNW3	NE2	ESE3	ESE4	SE5	SE5	SE5	SE5	SE5	NW4.0	NNE8	
16-Feb	SE4	SSE6	SSE4	SSE6	SSE5	ESE1	NNW1	NE1	NNE2	SE1	S3	S6	SSE6	S5	S4	SSE4	SE4	ESE3	SE3	ESE3	N3	N3	NNE4	NNE4	SE2.1	SSE6	
17-Feb	N5	NNE6	NNE5	NNE9	NNE8	NNE8	NNE9	NNE9	NNE7	NE8	NE7	NE7	NE8	NE8	NE6	NE9	NNE8	NE7	NE7	NE8	NE8	NE8	NE7	NE8	NE7.3	NNE9	
18-Feb	NE7	NE6	ENE6	ENE7	NE7	ENE8	ENE7	E8	E8	E7	ESE7	ESE9	ESE7	NNE2	N5	N4	NNW4	WNW3	WNW7	WNW5	WNW8	WNW10	NW13	NW15	NNE2.8	NW15	
19-Feb	NW12	WNW11	WNW10	NW10	NW12	NW11	WNW9	WNW8	WNW8	WNW8	NW9	NNW10	NNW8	NW6	NNW5	NW4	NW2	SSW1	NE2	ENE4	NE4	NE4	NE4	NE4	NW5.8	NW12	
20-Feb	NNE4	NE1	SSE2	SSE2	SSE2	SE2	SE3	SSE3	SE2	S5	S6	S5	S5	S7	S6	SSW6	SSE3	ESE2	SE3	SE3	SE3	SE3	SE3	S3	SSE2.9	S7	
21-Feb	SSW4	SSW4	SSW2	SSW2	S1	SSW2	SSE2	SE2	SSE3	S4	S6	SSW6	SSW7	SSW6	S7	SSW5	SSW4	SSE1	SSE5	SSE5	SSW6	W8	WNW7	WNW5	SSW3.3	W8	
22-Feb	WNW3	W4	W4	W3	W3	W4	WSW3	WSW1	W3	WSW3	WSW4	WSW5	WSW6	WSW8	WSW9	WSW9	WSW6	WSW5	W4	W5	W5	W4	W1	WSW5	WSW4.4	WSW9	
23-Feb	W7	W6	W7	WSW6	WSW6	W7	WSW8	WSW7	W7	W8	WNW9	NNW10	NNW13	NW12	NW11	NW11	NW12	NW8	WNW5	WNW5	W4	W5	W6	WNW7	WNW7.2	WNW13	
24-Feb	W5	W3	W4	SSW3	S3	SW4	WSW5	WSW4	WSW5	WSW4	SW5	SW6	SSW7	SW7	SW7	SSW7	SSW8	SSW5	S4	S6	S8	S8	S10	S10	SSW5.1	S10	
25-Feb	S11	S10	SSW10	SSW10	SSW9	SSW9	SSW9	SW8	SW8	WSW9	W9	WSW9	WSW11	W11	W11	W12	W9	W6	WSW5	SW5	WSW5	WSW5	WSW7	WSW7	SW7.5	W12	
26-Feb	WSW6	SW6	SW6	SW7	WSW6	SW6	SW6	WSW7	W8	W10	WNW10	WNW8	W8	W7	NW7	NNW4	NNE5	NE12	NE15	NE14	NE12	NE11	NE11	NNE14	NNW2.8	NE15	
27-Feb	NE12	NE11	NE13	NNE13	NNE13	NE12	NNE12	NNE10	NNE10	NNE10	NNE10	NNE10	N7	N8	N7	N6	NNW2	NW1	SSW3	SSW2	SSE1	SSW5	W3	NW7	NNE8	NNE6.4	NE13
28-Feb	NNE9	NNE9	NE9	NE9	NNE6	NNE5	NNE8	NNE7	NNE8	NNE11	NNE12	NNE11	NE12	NNE13	NNE12	NE9	NE9	NE7	NE4	NE3	NE4	NE3	NE2	ESE2	NNE7.5	NNE13	
29-Feb	SE3	SSE1	SE4	SE5	SE6	SE7	SSE5	SSE5	S6	S11	S10	S10	S10	S9	S8	SSW6	SSW7	SSW6	S5	S7	S8	S7	S6	S6	S6.3	S11	

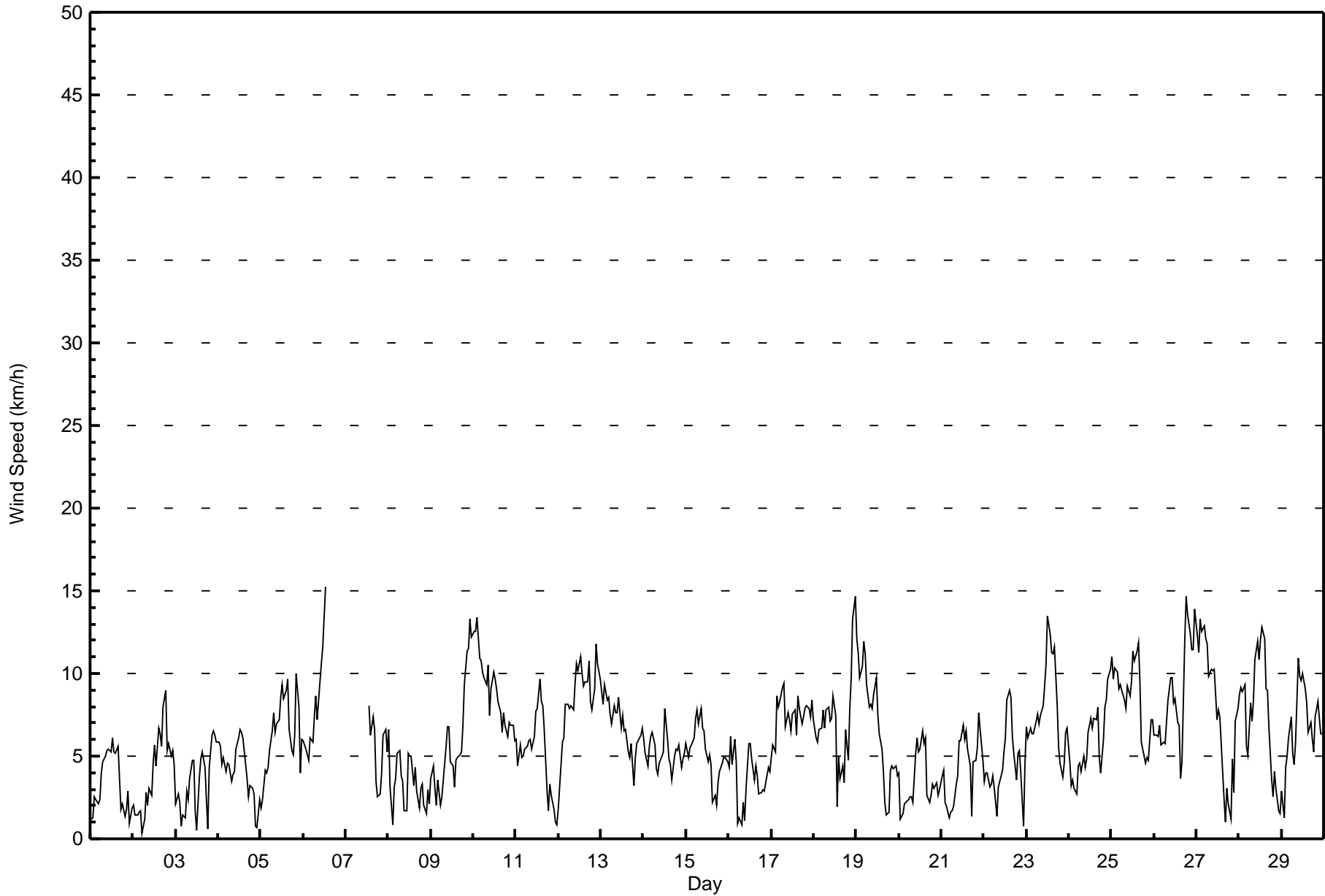
NE0.6	ENE0.5	E0.6	E0.6	ESE0.6	E0.5	ESE0.7	SE0.8	SE0.4	SSW0.7	SW0.8	WSW1.3	WSW1.3	W1.1	NNW1.2	W1.1	NW0.8	NE0.8	ENE0.8	E0.8	E0.8	E0.5	NNE0.9	NNE0.7	Diurnal Average
NNE13	NNE13	NNE13	NNE13	NNE13	NE12	NNE12	NNE10	NNE10	S11	NNE12	W12	WNW15	NNE13	NNE12	W12	NW12	NE12	NE15	NE14	NE12	SSE12	NNE13	NW15	Diurnal 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
Brion MacKay River - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Brion MacKay River - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	318	47.32	47.32
6 - 11	322	47.92	95.24
12 - 19	32	4.76	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: 696



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Brion MacKay River - February 2016

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	18	34	11	3	15	40	43	30	22	11	23	26	13	4	13	318
6 - 11	8	43	54	6	3	3	29	15	44	24	16	22	23	18	11	3	322
12 - 19	0	13	8	0	0	0	0	1	0	0	0	0	2	2	6	0	32
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	20	74	96	17	6	18	69	59	74	46	27	45	51	33	21	16	672

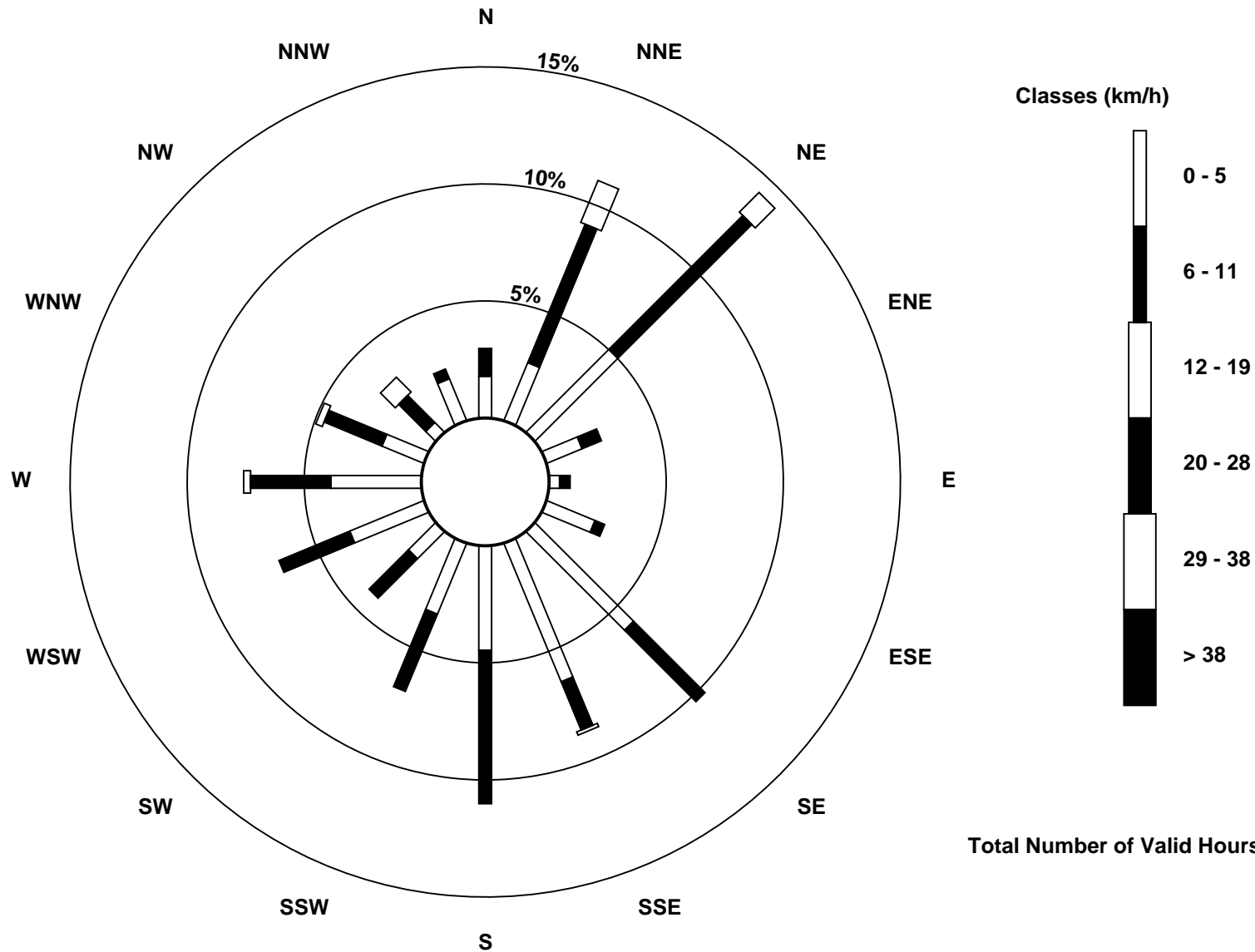
Total Number of Valid Hours: 672

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 672



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Brion MacKay River - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 696													
Maximum Value: 6 km/h on Feb 6 13:00														Hours of Data: 672													
Minimum Value: 0 km/h on Feb 20 06:00														Hours of Missing Data: 24													
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 5														Hours of Calibration: 0													
														Percent Operational Time: 96.6													
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2		
2-Feb	1	1	1	1	2	1	1	1	2	1	1	1	2	2	2	2	3	3	3	2	2	2	2	1	3		
3-Feb	1	1	1	2	1	1	1	1	1	2	1	1	1	1	2	2	1	1	1	1	2	2	2	2	2		
4-Feb	2	2	1	1	1	1	2	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2		
5-Feb	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	2	1	1	2	3	3	2	2	3		
6-Feb	2	2	2	1	2	2	2	2	2	4	4	4	6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6		
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	2	2	2	1	1	1	2	1	2	3		
8-Feb	1	1	1	1	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2		
9-Feb	2	1	1	1	1	1	1	1	2	2	2	1	1	1	2	2	2	2	2	3	4	4	5	4	5		
10-Feb	4	4	4	4	4	3	3	3	4	3	3	3	4	3	3	2	2	3	3	2	2	2	2	2	4		
11-Feb	2	1	2	2	2	2	2	2	2	2	2	2	3	3	2	3	2	2	1	1	1	1	1	1	3		
12-Feb	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	3	4	4	3	4		
13-Feb	3	3	3	3	3	2	2	3	3	3	3	3	2	2	1	2	2	2	1	1	2	2	2	2	3		
14-Feb	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2		
15-Feb	2	2	2	2	2	2	3	3	3	2	2	2	2	2	1	1	1	1	1	1	2	2	2	1	3		
16-Feb	1	2	2	2	1	2	2	2	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2		
17-Feb	2	2	2	3	3	2	3	3	2	3	2	2	2	2	2	3	3	2	2	3	3	3	3	3	3		
18-Feb	2	2	2	2	2	2	2	3	3	3	3	2	2	1	1	1	1	1	2	2	2	4	4	4	4		
19-Feb	4	3	3	3	4	3	3	2	3	3	2	3	3	2	3	2	1	1	2	1	1	1	1	1	4		
20-Feb	1	1	1	1	1	0	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	0	1	2		
21-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	3	2	1	3		
22-Feb	1	1	1	1	1	1	1	1	2	1	2	2	3	4	4	4	3	2	1	2	2	1	1	1	4		
23-Feb	2	2	2	2	3	3	3	3	3	4	4	5	4	4	3	4	3	2	2	1	1	2	2	2	5		
24-Feb	2	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	2	1	2	2	2	3	3	3		
25-Feb	3	3	3	3	3	3	3	2	3	3	4	4	5	5	5	5	4	2	2	1	2	2	3	3	5		
26-Feb	2	2	2	3	2	2	2	3	3	4	3	3	3	3	2	1	4	4	5	5	5	4	4	5	5		
27-Feb	4	5	5	4	4	4	4	3	3	3	3	3	2	2	2	1	1	1	1	1	2	1	2	3	5		
28-Feb	3	3	3	4	3	3	3	2	3	3	4	3	4	4	4	3	3	3	1	1	1	1	1	1	4		
29-Feb	1	1	1	1	1	2	2	1	2	4	3	3	3	3	3	3	2	2	2	2	2	2	2	2	4		
														Diurnal Maximum													
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Brion MacKay River - February 2016

Direction of Maximum Speed: 302 deg on Feb 6 13:00 Direction of Maximum Daily Speed Average: 34.8 deg on Feb 10	Hours in Service: 696 Hours of Data: 672 Hours of Missing Data: 24
Direction of Minimum Speed: 130 deg on Feb 2 06:00 Direction of Minimum Daily Speed Average: 0.6 deg on Feb 9	Percent Operational Time: 96.6
Monthly Average Direction: 230.4 deg	

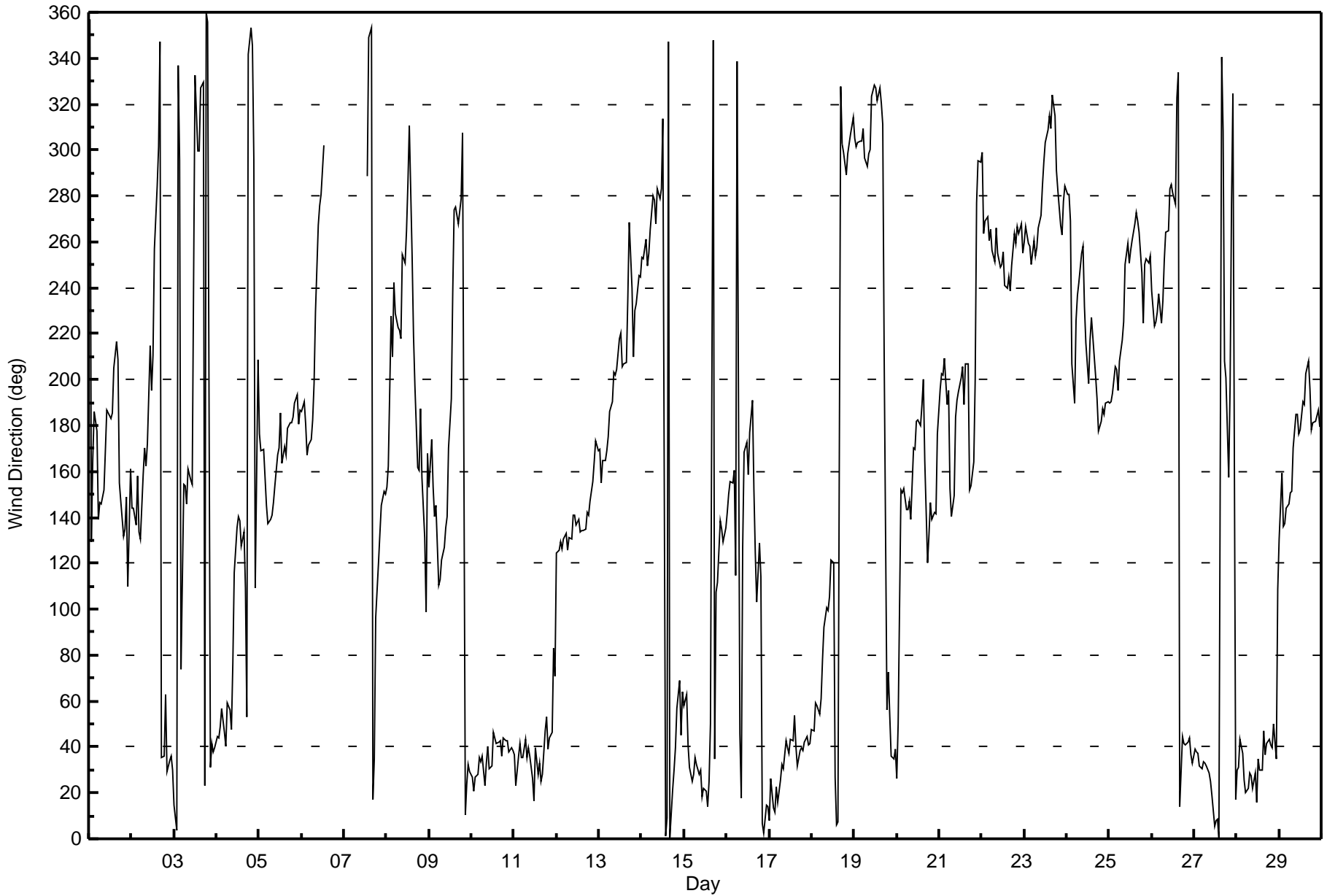
Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	357	129	166	186	178	139	146	146	152	169	187	184	183	185	205	216	208	155	147	132	135	149	110	161	172.4	
2-Feb	144	144	136	158	134	130	158	170	162	172	215	195	211	257	284	301	347	35	36	63	29	34	36	30	31.3	
3-Feb	15	4	337	296	74	155	154	146	161	156	155	244	333	300	300	327	329	53	360	356	31	42	38	40	19.8	
4-Feb	45	44	49	57	46	40	59	56	48	76	116	136	140	138	127	134	109	23	342	354	345	296	109	208	79.5	
5-Feb	176	169	170	157	145	137	139	141	147	154	167	170	186	164	171	167	179	181	181	184	190	194	181	187	169.0	
6-Feb	186	191	180	167	171	174	183	199	229	268	276	280	302	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	289	349	353	17	35	97	120	133	145	151	150	--
8-Feb	153	163	227	210	242	229	223	222	218	255	251	265	286	310	254	219	197	161	160	187	158	131	99	168	215.0	
9-Feb	153	174	153	140	145	110	113	121	127	136	140	170	192	238	274	275	268	273	279	308	10	24	32	29	50.4	
10-Feb	27	21	27	28	35	33	36	23	33	40	30	32	47	44	42	42	43	36	44	43	43	38	40	39	34.8	
11-Feb	37	23	36	41	35	36	43	36	40	36	26	16	40	28	33	25	28	47	53	39	44	47	83	71	34.2	
12-Feb	125	125	130	126	131	133	126	131	130	141	141	137	139	134	134	134	135	142	141	147	155	164	173	169	141.1	
13-Feb	169	155	165	165	169	175	186	190	203	202	204	218	220	206	207	207	236	269	240	210	230	233	245	245	201.3	
14-Feb	253	253	261	250	255	265	280	278	268	283	279	283	314	1	9	347	1	21	30	40	57	69	45	64	316.8	
15-Feb	58	63	41	31	25	28	35	33	28	30	18	22	21	14	25	50	348	35	108	112	138	135	129	135	46.4	
16-Feb	142	150	156	155	160	115	339	46	18	127	169	172	159	177	191	152	124	103	129	114	7	3	15	14	139.0	
17-Feb	8	26	14	12	23	16	25	32	31	43	40	37	44	43	54	40	32	38	39	38	42	44	41	42	33.8	
18-Feb	47	47	59	58	55	61	78	92	101	99	105	121	120	27	6	7	327	303	299	289	298	303	307	314	29.1	
19-Feb	305	301	303	304	304	309	296	293	298	300	324	328	327	322	327	321	311	212	56	73	54	36	35	39	317.2	
20-Feb	26	50	152	151	153	143	143	147	139	170	170	182	183	180	189	200	165	120	132	146	139	142	141	176	161.7	
21-Feb	196	202	202	209	189	195	152	140	149	184	191	195	201	205	189	207	207	152	154	164	200	277	295	295	202.9	
22-Feb	299	263	269	271	261	266	256	252	266	255	249	250	256	241	240	245	239	250	264	260	267	264	268	255	255.2	
23-Feb	260	267	259	258	250	261	254	258	266	271	284	295	303	309	315	309	324	315	291	283	267	263	278	285	285.2	
24-Feb	281	281	269	207	190	226	237	242	255	258	232	216	198	217	227	210	201	192	178	182	187	185	190	190	212.0	
25-Feb	190	191	194	206	204	195	208	217	225	250	259	251	256	261	268	273	269	264	246	225	250	253	250	254	235.4	
26-Feb	239	223	225	229	237	224	234	252	264	265	283	285	281	276	323	334	14	45	42	41	42	44	36	33	326.7	
27-Feb	39	38	37	32	31	34	33	32	29	25	19	5	8	9	0	341	308	208	201	157	198	276	325	17	23.1	
28-Feb	30	31	43	37	26	20	22	29	27	22	29	16	35	30	30	47	37	41	43	41	40	50	35	109	32.1	
29-Feb	131	159	136	138	144	146	150	152	171	185	185	176	178	190	189	203	208	196	178	181	182	184	187	179	176.3	
	48.3	70.6	88.1	101.2	110.8	98.3	109.7	127.2	131.8	196.3	217.9	237.8	244.9	274.6	289.9	279.7	316.5	39.8	70.8	96.0	89.5	83.1	24.4	24.9		
	Diurnal Average																									

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Brion MacKay River - February 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Brion MacKay River - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Feb 22 23:00 Minimum Value: 10 deg on Feb 8 19:00 Percentiles: P ₁ = 13 P ₁₀ = 20 Q ₁ = 23 Median = 26 O ₃ = 35 P ₉₀ = 44 P ₉₉ = 82																								Hours in Service: 696 Hours of Data: 672 Hours of Missing Data: 24 Hours of Calibration: 0 Percent Operational Time: 96.6	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	30	76	25	21	38	37	15	16	21	22	25	27	28	31	34	33	37	55	14	26	17	23	47	33	76
2-Feb	47	48	19	70	57	84	58	36	47	25	43	34	34	51	36	25	36	27	27	36	23	27	25	26	84
3-Feb	33	27	37	89	59	64	31	31	33	24	25	82	92	41	32	25	27	34	78	22	23	23	22	26	92
4-Feb	24	26	36	24	28	24	30	24	22	38	28	29	26	22	28	24	26	47	25	23	25	70	54	30	70
5-Feb	37	28	22	20	21	23	21	22	24	21	22	24	23	27	25	24	26	23	18	19	22	24	25	23	37
6-Feb	24	27	29	26	24	23	19	23	36	41	42	36	27	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	42
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	38	26	23	20	21	36	27	35	17	17	21	38
8-Feb	16	30	79	31	35	27	21	24	20	61	68	46	43	39	58	35	35	28	10	25	45	52	37	24	79
9-Feb	19	13	26	18	20	21	28	15	20	20	23	27	29	53	38	40	37	47	33	26	32	24	25	24	53
10-Feb	25	25	23	25	24	25	26	26	25	28	27	26	29	28	27	26	25	24	25	25	25	20	21	21	29
11-Feb	22	21	24	23	23	23	23	23	25	23	25	24	31	27	23	25	21	33	50	18	55	36	58	36	58
12-Feb	38	15	17	18	19	20	20	20	18	22	21	22	21	22	23	22	22	20	21	22	25	25	26	25	38
13-Feb	27	26	25	26	24	25	26	25	28	28	27	33	31	28	30	26	35	31	28	20	29	35	38	38	38
14-Feb	38	37	30	36	42	35	30	25	33	29	42	52	28	32	38	28	26	21	24	25	26	37	24	37	52
15-Feb	33	35	23	23	21	21	25	26	24	25	26	33	32	35	30	53	43	56	29	26	30	41	34	25	56
16-Feb	22	20	49	21	27	75	64	85	62	72	47	35	31	42	31	26	25	24	23	25	32	35	23	23	85
17-Feb	25	24	22	25	24	23	25	23	30	27	27	28	26	25	31	25	26	24	23	24	25	27	26	24	31
18-Feb	24	24	28	27	25	25	37	38	34	30	27	25	26	79	27	25	21	28	23	33	23	23	21	21	79
19-Feb	24	22	21	21	22	20	24	23	23	29	23	24	35	44	47	60	59	34	63	32	29	25	21	22	63
20-Feb	14	69	25	20	18	14	14	16	21	19	28	52	41	40	36	34	44	27	26	22	21	19	13	17	69
21-Feb	19	21	39	13	23	30	11	13	13	29	31	44	37	34	25	34	26	75	10	14	27	35	19	17	75
22-Feb	23	15	20	22	21	25	20	46	31	42	45	55	52	46	41	43	36	29	26	31	40	25	95	27	95
23-Feb	35	37	40	39	42	44	39	43	44	45	38	36	24	24	26	21	19	20	20	24	36	25	24	45	
24-Feb	22	17	30	24	29	24	24	27	47	59	45	41	43	44	41	41	26	23	17	21	22	22	25	24	59
25-Feb	23	24	25	26	26	23	26	25	30	38	45	41	44	49	42	41	44	44	36	26	33	36	43	46	49
26-Feb	38	22	24	32	40	26	30	44	43	41	35	35	39	41	27	43	57	24	25	27	26	25	25	24	57
27-Feb	25	26	26	24	24	25	25	23	22	23	22	33	29	29	28	72	85	38	38	79	29	48	28	23	85
28-Feb	28	26	27	26	22	24	23	22	23	25	26	30	28	29	29	30	22	23	19	18	21	24	29	24	30
29-Feb	20	37	15	14	17	20	24	22	28	25	30	27	30	37	32	41	32	27	24	23	23	22	23	22	41
47 76 79 89 59 84 64 85 62 72 68 82 92 79 58 72 85 75 78 79 55 70 95 46																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Last Calibration	January 6, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	10:16	End Time (MST)	14:21
Gas Cert Reference	EY0000372	Station temp.	22 Deg C
Cal Gas Concentration	50.7 ppm	Cal Gas Exp Date	10-Jun-16
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-633	-633
Analyzer IP address	192.168.1.43		Lamp voltage	835	833
Calculated slope	0.990759	0.998752	Chamber temp	45	44.9
Calculated intercept	1.463077	1.492947	Pressure	672	667.9
Analyzer Background	12.4	12.6	Flow	0	0.485
Analyzer Coefficient	0.977	0.997	Intensity	89	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	-0.1	----
as found span	5000	79.8	809.2	790.2	1.024
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	79.8	809.2	809.2	1.000
second point	5000	40.0	405.6	404.5	1.003
third point	5000	20.1	203.8	200.8	1.015
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	79.8	809.2	811.3	0.997
Average Correction Factor					1.006

Corrected As found 790.3 Previous response 815.3 % change 3.2%

Notes:

Sample inlet filter replaced after as founds. Adjusted span. As left zero began at 12:40 MST.

Calibration Performed By: Asad Hidayat



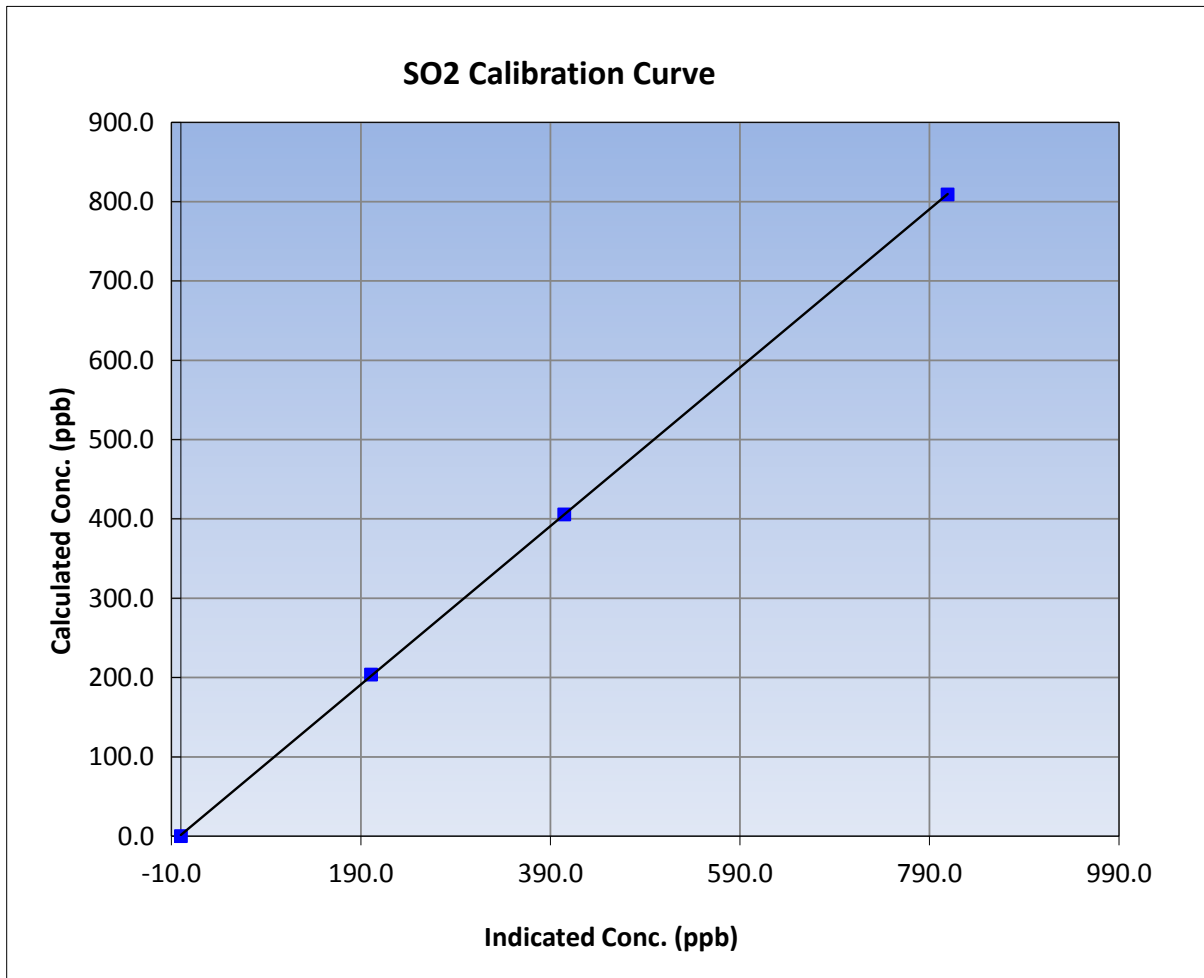
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:16	End Time (MST)	14:21
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

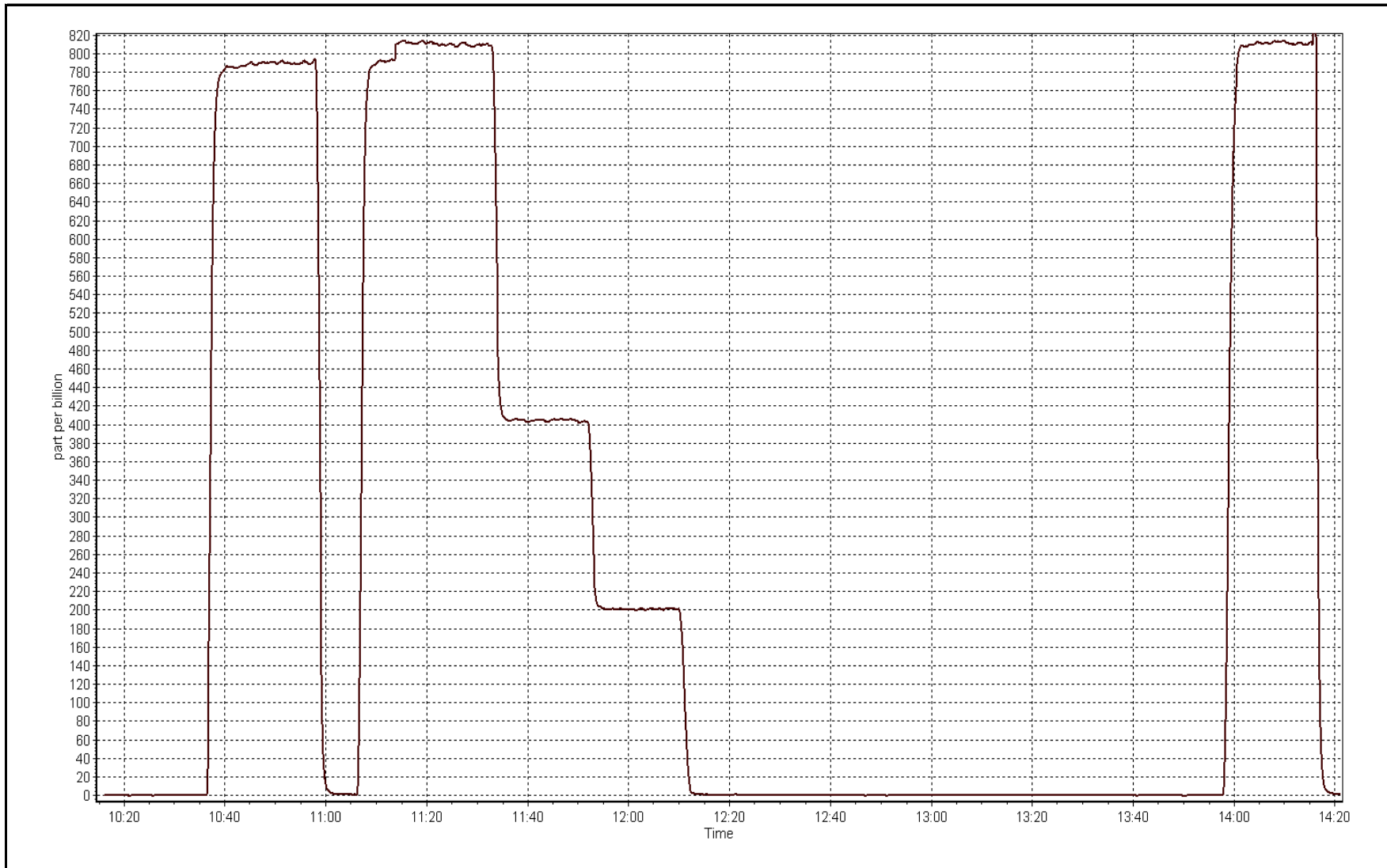
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999985
809.2	809.2	1.0000		
405.6	404.5	1.0028	Slope	0.998752
203.8	200.8	1.0151		
			Intercept	1.492947



SO2 Calibration Plot

Date: February 2, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 1, 2016	Last Calibration	January 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	12:25	End Time (MST)	15:20
Gas Cert Reference	LL119508	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	API 700	Serial Number	1220
ZAG air Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627
SO2 gas concentration	50.7 ppm	SO2 gas cert/exp	EY0000372 10-Jun-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	504	504
Analyzer IP address	192.168.1.75		Lamp voltage	3518	3438
Calculated slope	0.994493	1.012157	Chamber temp	50	50
Calculated intercept	-0.166548	0.046100	Pressure	23.5	23.3
Analyzer Background	25.2	25.2	Flow	0.627	0.618
Analyzer Coefficient	1.022	1.039	Intensity	87	85
			Converter temp.	316	315

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	0.0	----
as found span	5000	75.6	80.9	78.8	1.027
SO2 scrubber check	5000	19.8	200.8	3.9	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	75.6	80.9	79.9	1.013
second point	5000	37.9	40.6	40.1	1.013
third point	5000	19.0	20.3	19.9	1.021
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	75.6	80.9	79.1	1.023
Average Correction Factor					1.015

Corrected As found	78.7	Previous response	81.5	% change	3.5%
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Notes:

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

Calibration Performed By: Asad Hidayat



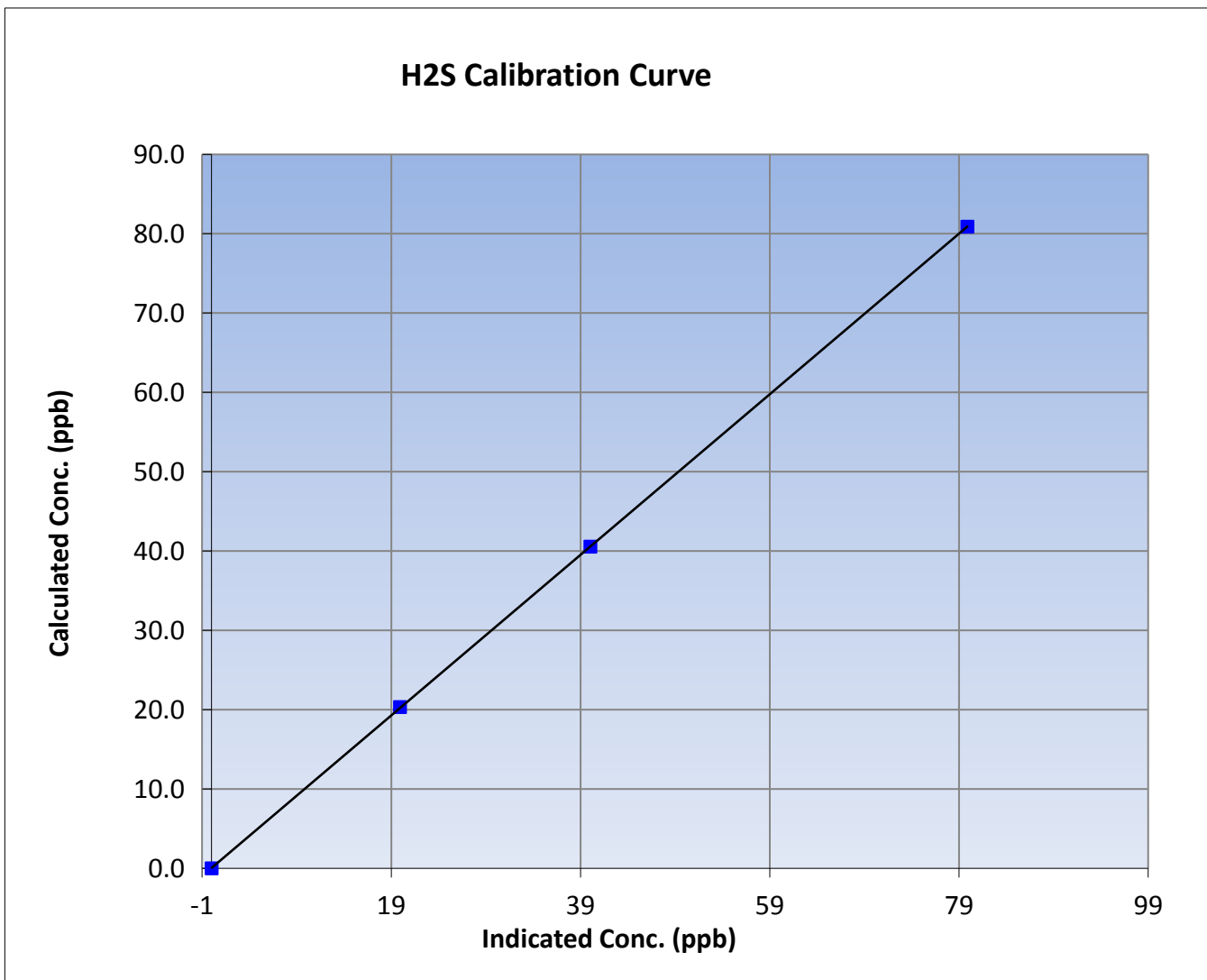
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 1, 2016	Previous Calibration	January 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	12:25	End Time (MST)	15:20
Analyzer make	API T101	Analyzer serial #	196

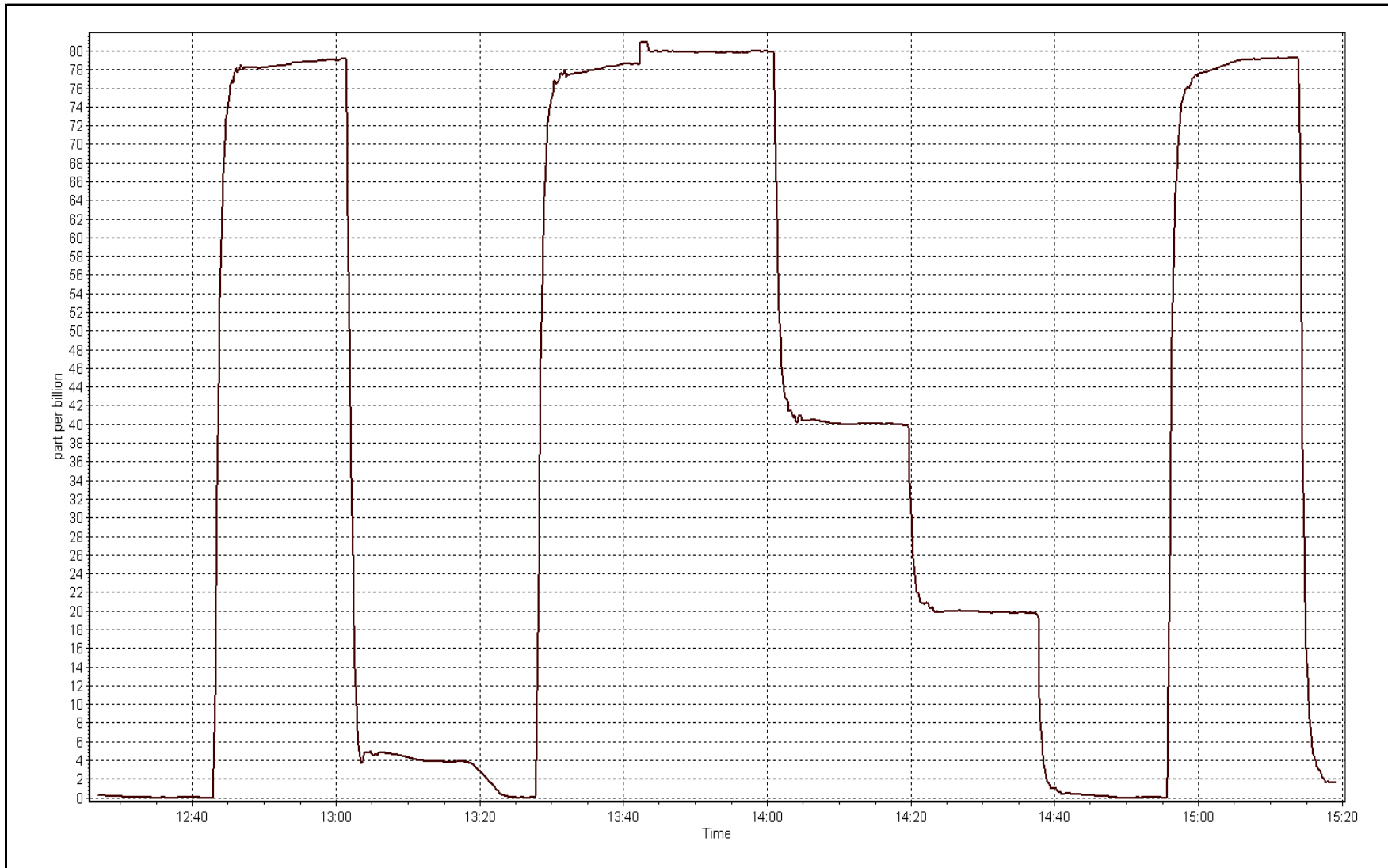
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999994
80.9	79.9	1.0125		
40.6	40.1	1.0126	Slope	1.012157
20.3	19.9	1.0206		
			Intercept	0.046100



H2S Calibration Plot

Date: February 1, 2016





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February-02-16	Last Calibration	January-14-16
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	10:16	End Time (MST)	14:20
Gas Cert Reference	EY0000372	Cal Gas Expiry Date	10/06/2016
CH4 Cal Gas Conc.	517 ppm	CH4 Equiv Conc.	1072.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
ZAG make/model	Teledyne API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.3	34.3
Calculated slope	0.999582	1.003054	Fuel Pressure	23.9	23.9
Calculated intercept	-0.014718	0.009320	Analyzer Coeff	4.3	4.4
			Analyzer BKG	1.960	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	-0.05	----
as found span	5000	79.8	17.12	16.83	1.017
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	79.8	17.12	17.08	1.002
second point	5000	40.0	8.58	8.52	1.007
third point	5000	20.1	4.31	4.24	1.017
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	79.9	17.14	17.21	0.996
Average Correction Factor					1.009

Corrected As found	16.88	Previous response	17.14	% change	1.5%
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Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



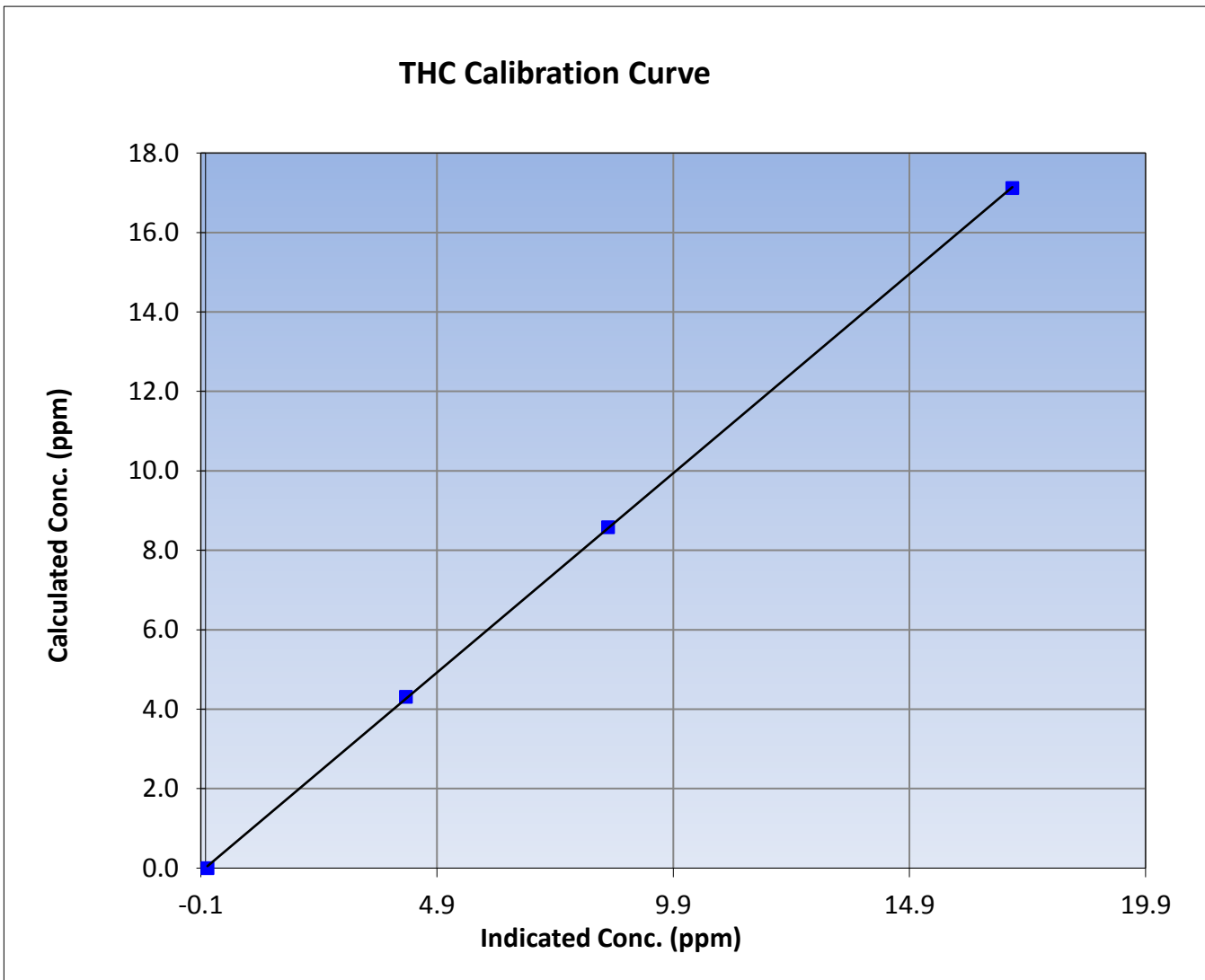
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 14, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:16	End Time (MST)	14:20
Analyzer make	51i-LT	Analyzer serial #	1501663727

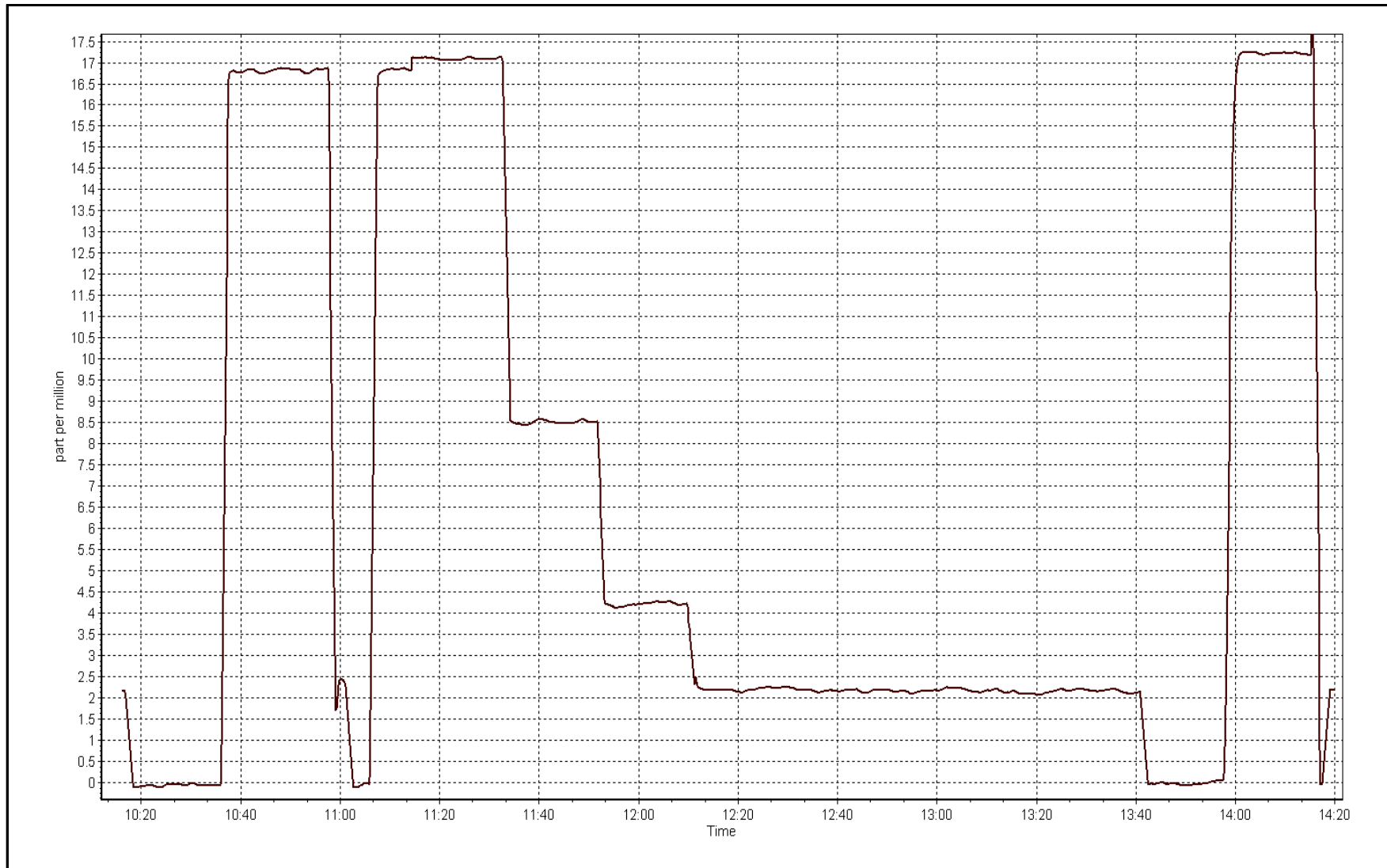
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999962
17.12	17.08	1.0022		
8.58	8.52	1.0070	Slope	1.003054
4.31	4.24	1.0169		
			Intercept	0.009320



THC Calibration Plot

Date: February 2, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	10:16	End Time (MST)	14:20
NO Cal Gas Conc	50.1 ppm	Gas Cert Reference	EY0000372
NOX Cal Gas Conc	50.4 ppm	Cal Gas Expiry Date	June 10, 2016
Calibrator	Sabio 4010	Serial Number	1220
Zero air Generator	Teledyne API T701	Serial Number	4766

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9627
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001929	1.001122	0.970000
	Data Offset	0.938524	0.977850	-3.382551
Current Calibration	Data Slope	1.001929	1.001122	0.970000
	Data Offset	0.938524	0.977850	-3.382551

Analyzer Information

Analyzer make/model	Thermo 42 i	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	1.037		1.085	
NOX coefficient	1.003		1.003	
NO2 coefficient	0.995		0.995	
NO bkgnd	3.1		3.3	
NOX bkgnd	3.3		3.5	
Chamber Temp	50.4	Deg C	50.3	Deg C
Moly Temp	325	Deg C	322.9	Deg C
PMT voltage	-767	V	-767.4	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	171.1	mmHg	171.1	mmHg
R Cell Press Nox	170.8	mmHg	171.4	mmHg
NO sample flow	0.801	lpm	0.809	lpm
Nox sample Flow	0.800	lpm	0.808	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span. Used 2nd GPT point to determine converter efficiency test.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 2, 2016

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	-0.3	-0.2	-0.1	----	----
as found span	5000	79.8	804.4	799.6	4.8	768.0	763.9	4.1	1.0474	1.0468
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
high point	5000	79.8	804.4	799.6	4.8	805.2	800.9	4.3	0.9990	0.9983
second point	5000	40.0	403.2	400.8	2.4	404.7	402.5	2.3	0.9962	0.9959
third point	5000	20.1	202.6	201.4	1.2	201.4	200.0	1.4	1.0059	1.0072
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.1	----	----
as left span	5000	79.9	805.4	443.7	361.7	823.0	450.1	372.9	0.9787	0.9857
Average Correction Factor									1.0004	1.0005

Corrected As found
Previous Response

NO_x= 768.2
NO_x= 801.9

NO= 764.0
NO= 797.7

Percent Change

NO_x= 4.4%

NO= 4.4%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.80 ccm NOx ref calc conc = 804.4 ppb NO ref calc conc = 799.6 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
1st NO ref point		4.8	816.6	810.6	-0.1	0.9851	0.9864	----	----
1st NO2 (300)	443.7	371.7	813.6	443.7	369.9	0.9887	----	1.0050	99.5%
2nd NO2 (200)	561.7	253.7	816.7	561.7	255.0	0.9850	----	0.9949	100.5%
3rd NO2 (100)	684.5	130.9	817.6	684.5	133.1	0.9838	----	0.9834	101.7%
2nd NO ref point		4.8	816.6	810.6	6.0	0.9851	0.9864	----	----
Average Correction Factor						0.9856		0.9944	100.6%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

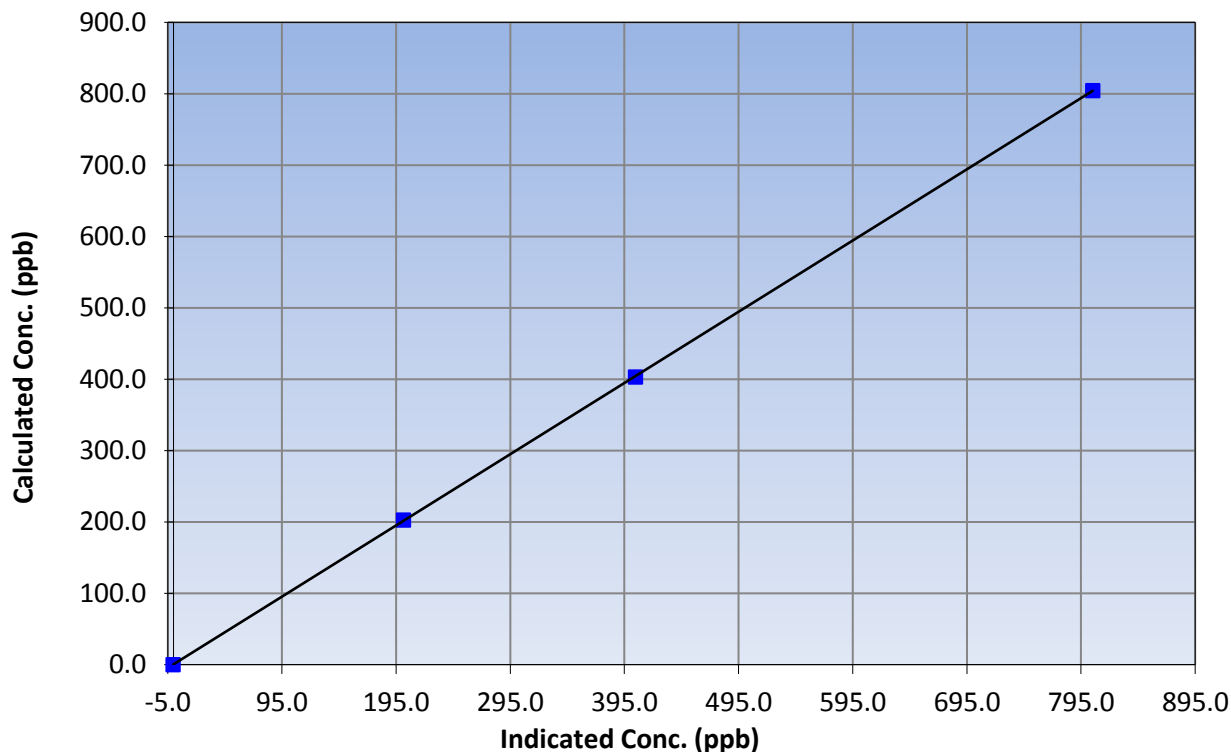
Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:16	End Time (MST)	14:20
Analyzer make	Thermo 42 i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999992
804.4	805.2	0.9990		
403.2	404.7	0.9962	Slope	0.997976
202.6	201.4	1.0059		
			Intercept	0.509383

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

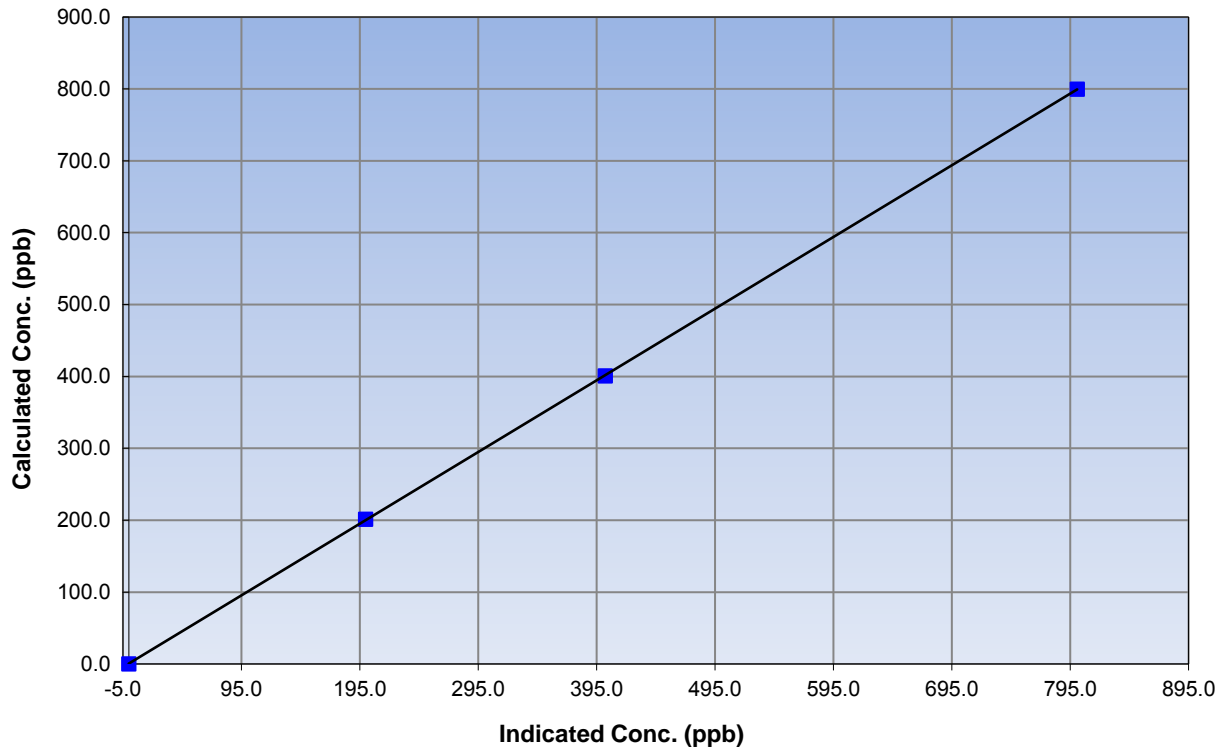
Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:16	End Time (MST)	14:20
Analyzer make	Thermo 42 i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999990
799.6	800.9	0.9983		
400.8	402.5	0.9959	Slope	0.997250
201.4	200.0	1.0072		
			Intercept	0.616696

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

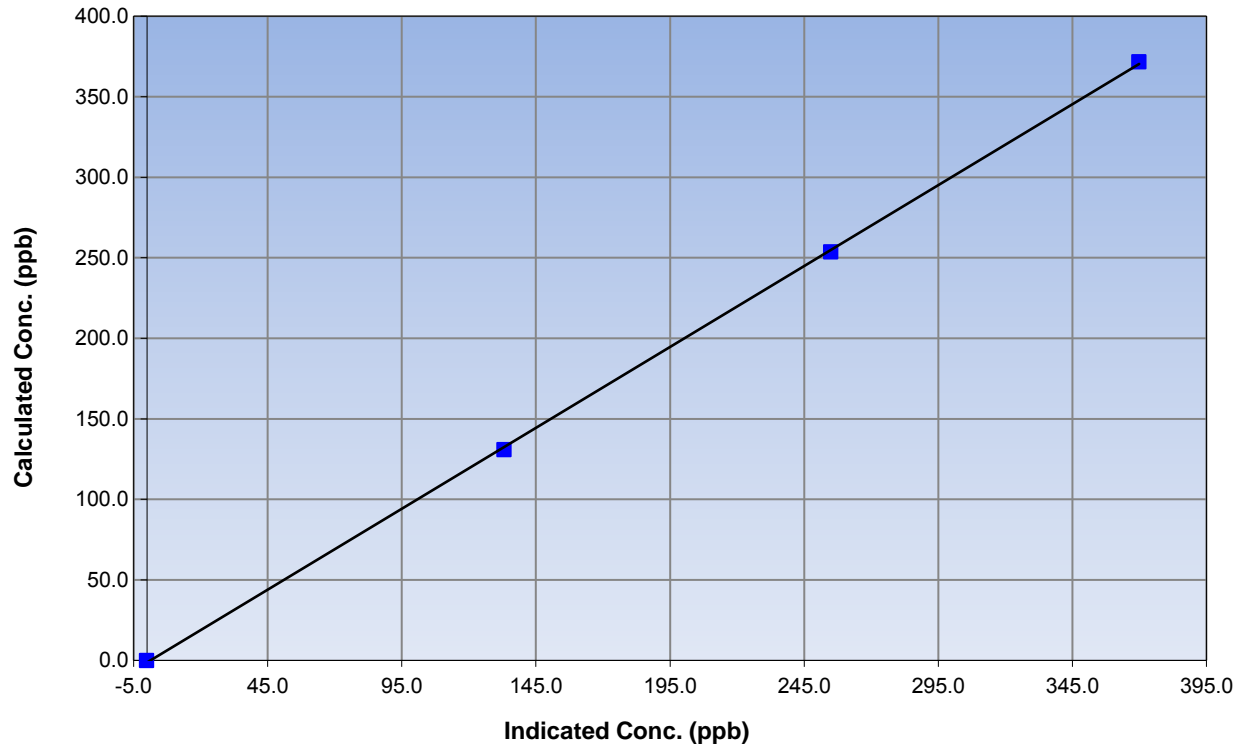
Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 6, 2016
Station Number	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	10:16	End Time (MST)	14:20
Analyzer make	Thermo 42 i	Analyzer serial #	1505164379

Calibration Information

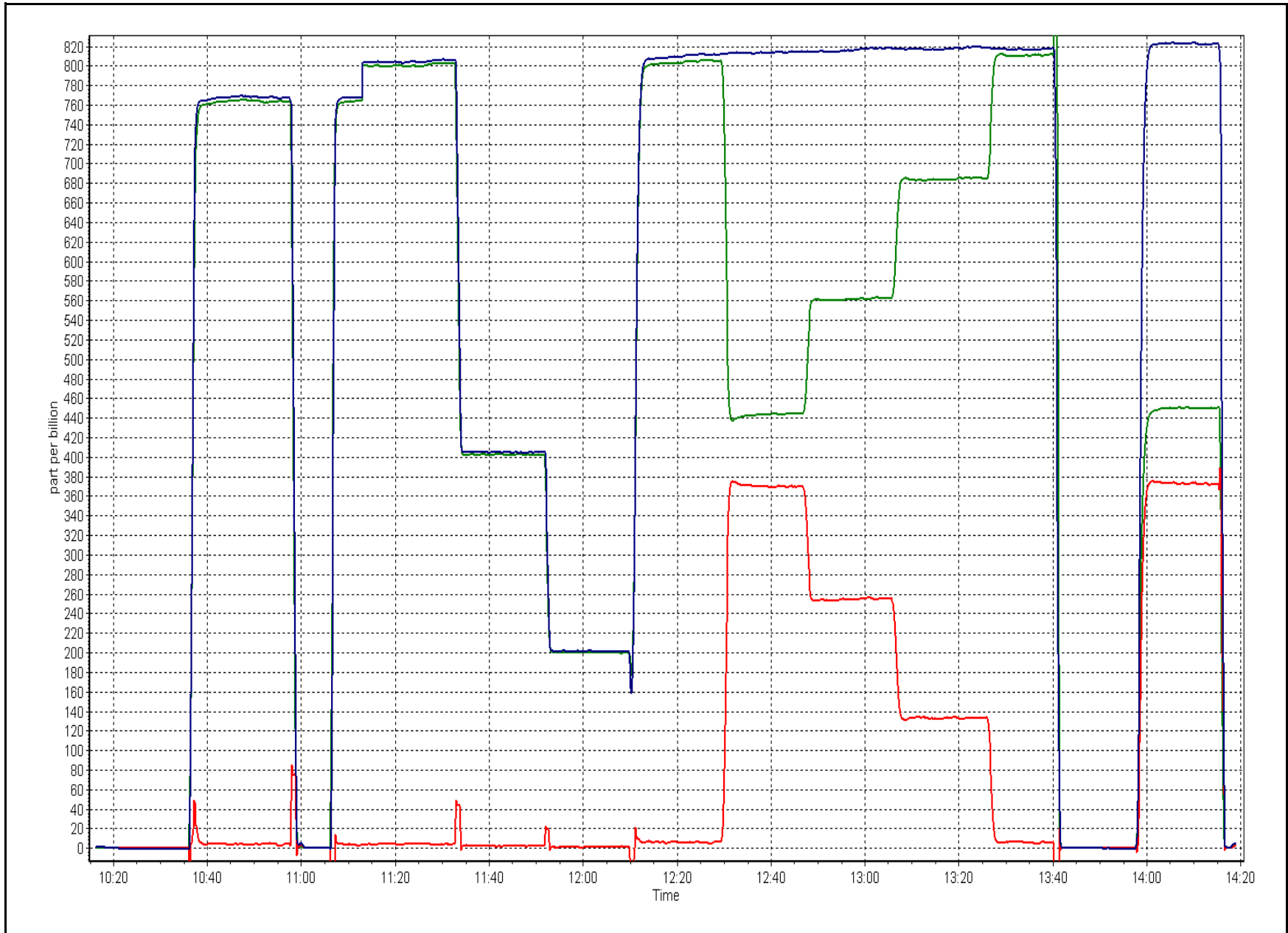
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999899
371.7	369.9	1.0050		
253.7	255.0	0.9949	Slope	1.004594
130.9	133.1	0.9834		
			Intercept	-1.256833

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 2, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 500
CENOVUS
CHRISTINA LAKE
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
 FEBRUARY 2016

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	655	40	41	99.86	11	0	2	0
H2S (ppb) Average	664	32	32	100	2	0	0	0
NO2 (ppb) Average	659	35	37	99.71	38	0	9	-
NO (ppb) Average	659	35	37	99.71	108	-	13	-
NOX (ppb) Average	659	35	37	99.71	145	-	22	-
Temperature 2 m (C) Average	696	0	0	100	9.9	-	4.9	-
Relative Humidity (%) Average	696	0	0	100	97	-	92	-
Wind Speed 10 m (km/h) Average	696	0	0	100	37	-	18	-
Wind Direction 10 m (deg) Average	696	0	0	100	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	655	0.7	1	-	0	0	0	0	1	2	11
H2S (ppb) Average	664	0.2	0	-	0	0	0	0	0	0	2
NO2 (ppb) Average	659	4.4	4	-	0	1	2	3	6	9	38
NO (ppb) Average	659	2.1	6	-	0	0	0	1	2	3	108
NOX (ppb) Average	659	6.4	10	-	0	1	2	4	8	12	145
Temperature 2 m (C) Average	696	-6.5	7.2	-	-31.9	-15.6	-11.3	-6.4	-1	2.4	9.9
Relative Humidity (%) Average	696	73.6	14	-	35	54	64	76	84	91	97
Wind Speed 10 m (km/h) Average	696	9.7	5	-	0	3	6	9	13	17	37
Wind Direction 10 m (deg) Average	696	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	18 Feb 2016 12:00	18 Feb 2016 12:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	18 Feb 2016 12:00	18 Feb 2016 12:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	29 Feb 2016 10:00	29 Feb 2016 10:00	1	Maintenance - reinitiated daily QA check



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

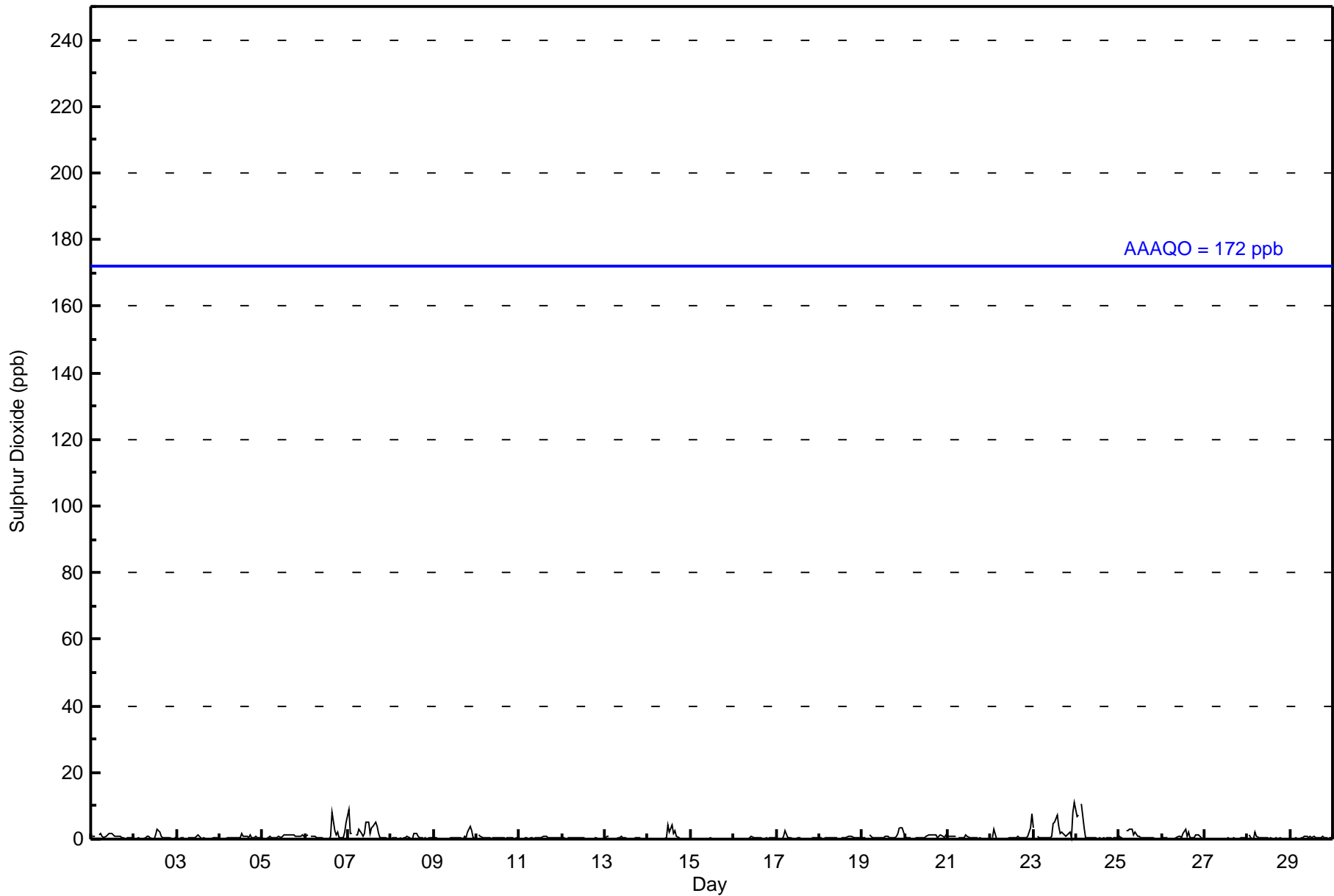
Cenovus - Christina Lake - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 ppb on Feb 24 00:00 Maximum Daily Average: 2.4 ppb on Feb 23														Hours in Service: 696 Hours of Data: 655												
Minimum Value: 0 ppb on Feb 15 14:00 Minimum Daily Average: 0.1 ppb on Feb 15 Maximum Diurnal Average: 1.2 ppb at hour 14 Minimum Diurnal Average: 0.4 ppb at hour 9 Monthly Average: 0.7 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7														Hours of Missing Data: 41 Hours of Calibration: 40 Percent Operational Time: 99.9												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	1	1	Z	1	2	1	0	1	1	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0.8	2
2-Feb	0	0	0	0	Z	0	0	1	1	0	0	0	1	3	2	1	1	0	0	0	0	0	0	0	0.6	3
3-Feb	0	0	0	1	0	Z	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	0	1	0	1	1	1	0	1	0.5	2
5-Feb	0	Z	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
6-Feb	1	1	Z	1	1	1	1	0	0	0	0	0	0	1	8	2	1	2	1	0	0	2	5	1.3	8	
7-Feb	9	2	2	Z	1	1	3	2	1	2	5	5	2	3	4	5	4	2	1	0	1	0	0	2.3	9	
8-Feb	0	0	0	0	Z	0	0	0	0	1	1	0	0	2	2	1	0	0	0	0	0	0	0	0.5	2	
9-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	1	1	2	4	3	0	0.6	4	
10-Feb	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1	
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0.3	0	
13-Feb	1	1	1	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1	
14-Feb	0	0	0	0	Z	0	0	0	0	0	1	4	2	4	2	3	1	0	0	0	0	0	0	0.8	4	
15-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
16-Feb	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
17-Feb	0	Z	0	0	1	3	0	1	0	0	0	0	1	C	C	C	C	C	C	C	0	1	1	0	--	3
18-Feb	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	1	1	1	1	1	1	1	0	0.4	1	
19-Feb	1	0	1	Z	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	2	3	4	2	0.9	4
20-Feb	1	1	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0.8	1	
21-Feb	1	1	1	1	1	Z	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
22-Feb	Z	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	4	8	0.9	8
23-Feb	3	Z	1	0	0	0	0	0	0	0	1	5	5	7	4	2	2	1	1	1	2	0	8	11	2.4	11
24-Feb	7	7	Z	10	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1.5	10	
25-Feb	1	0	0	Z	3	3	3	3	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.9	3	
26-Feb	0	0	0	0	Z	0	0	0	0	1	1	0	2	3	1	2	0	0	0	1	1	1	0	0.7	3	
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	0.1	0	
28-Feb	Z	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
29-Feb	0	Z	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	1	0	0	0	1	0	0.4	1
1.1 0.8 0.5 0.7 0.8 0.6 0.5 0.4 0.4 0.5 0.6 0.9 0.8 1.2 0.9 1.1 0.7 0.5 0.4 0.5 0.6 0.5 0.9 1.1																								Diurnal Average		
9 7 3 10 3 3 3 3 1 2 5 5 5 7 4 8 4 2 2 2 4 3 8 11																								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
Cenovus - Christina Lake - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	654	99.85	99.85
11 - 20	1	0.15	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: 655

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	48	49	21	17	26	33	38	83	54	58	74	39	25	50	17	654
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	22	48	49	21	17	26	33	38	83	54	58	74	39	25	51	17	655

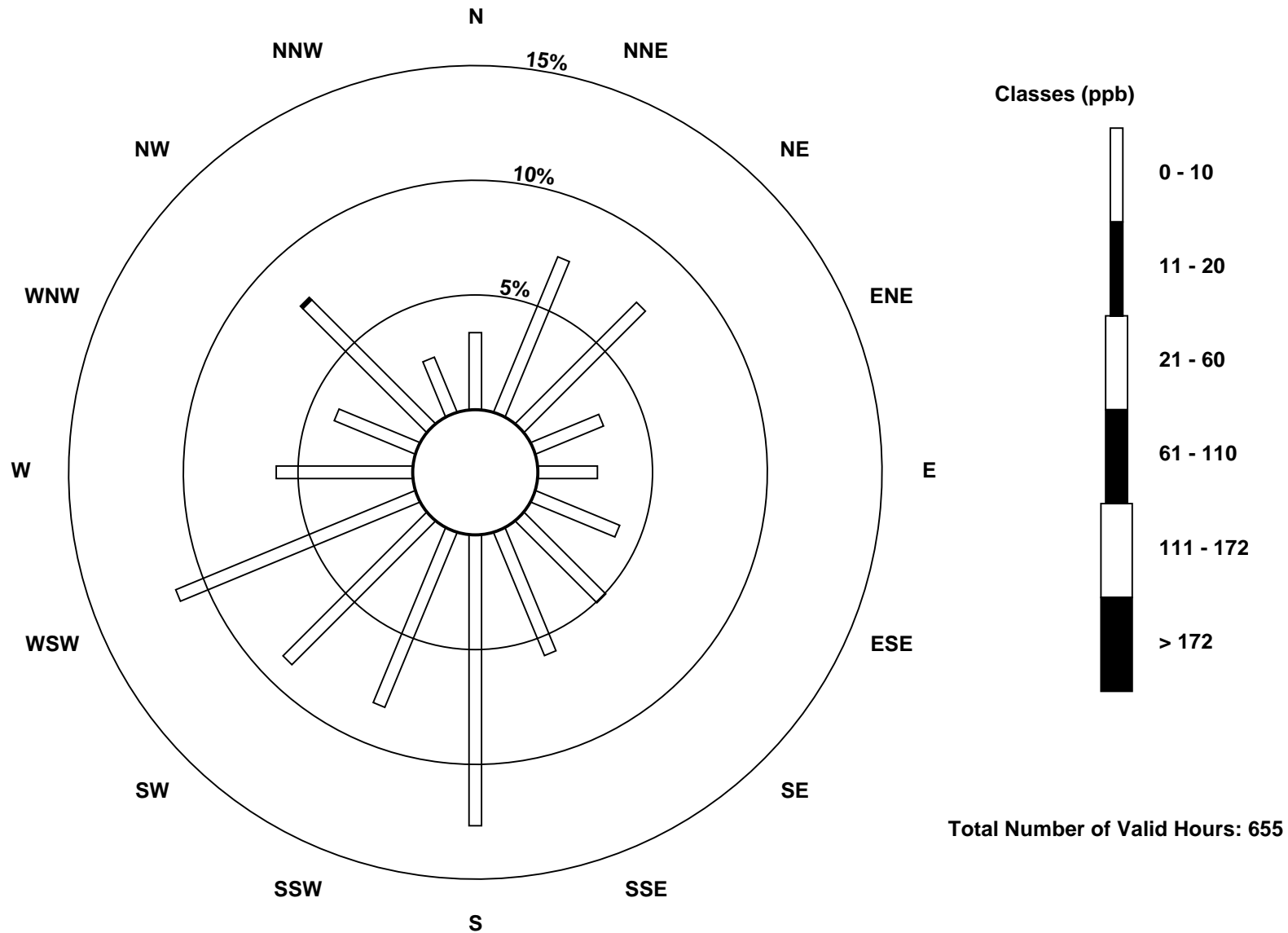
Total Number of Valid Hours: 655

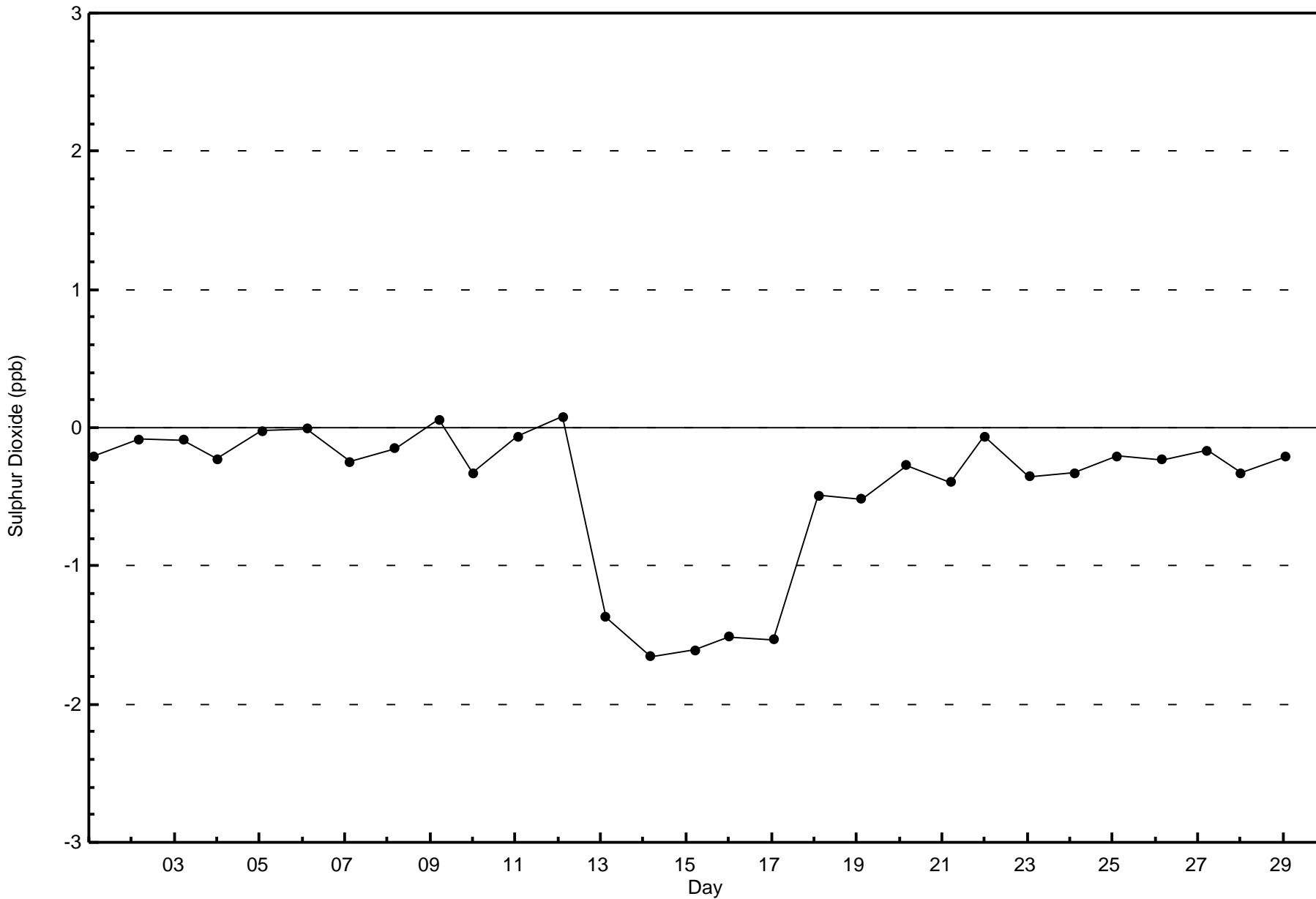
Total Number of Hours: 696

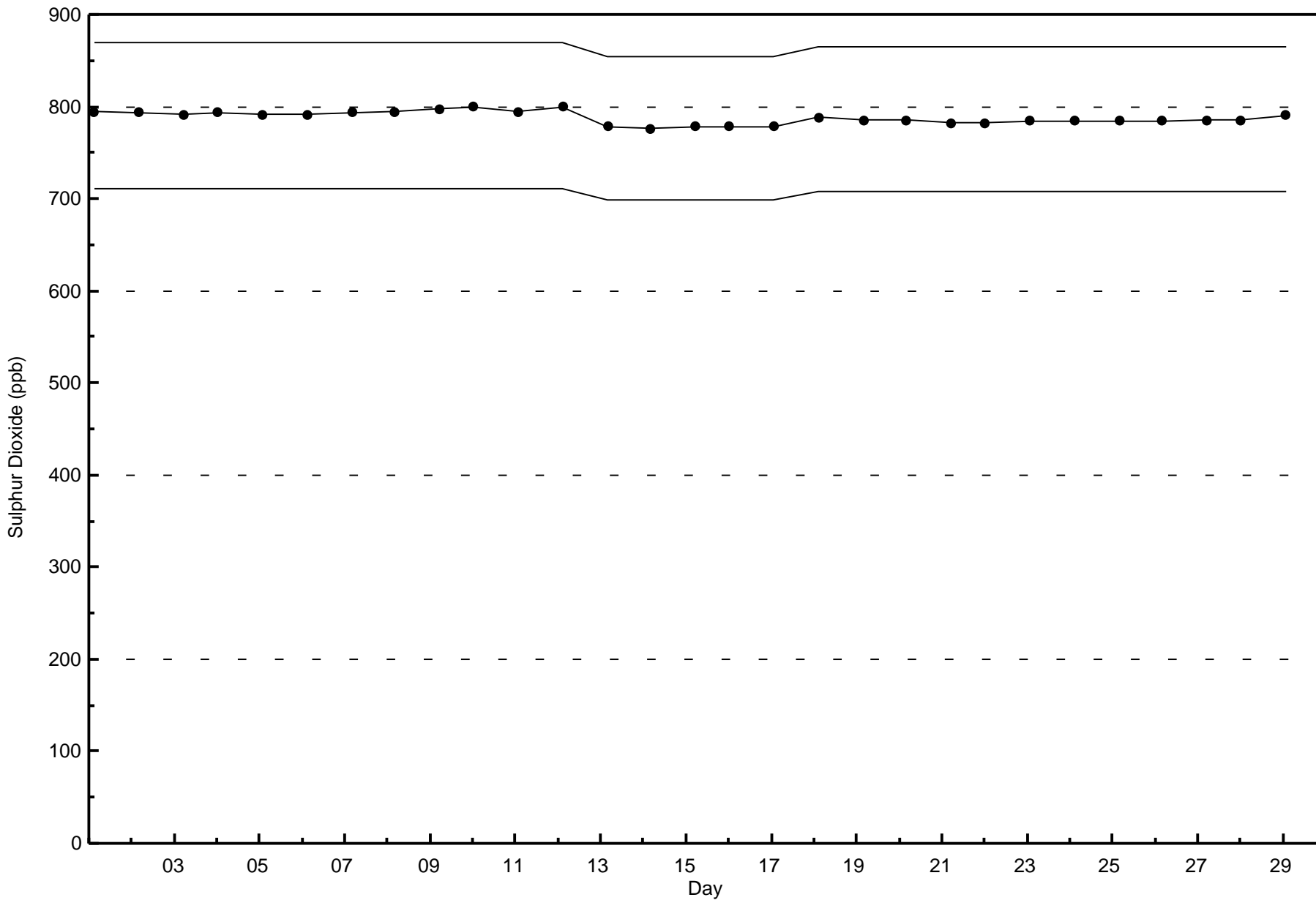


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake (AMS500)







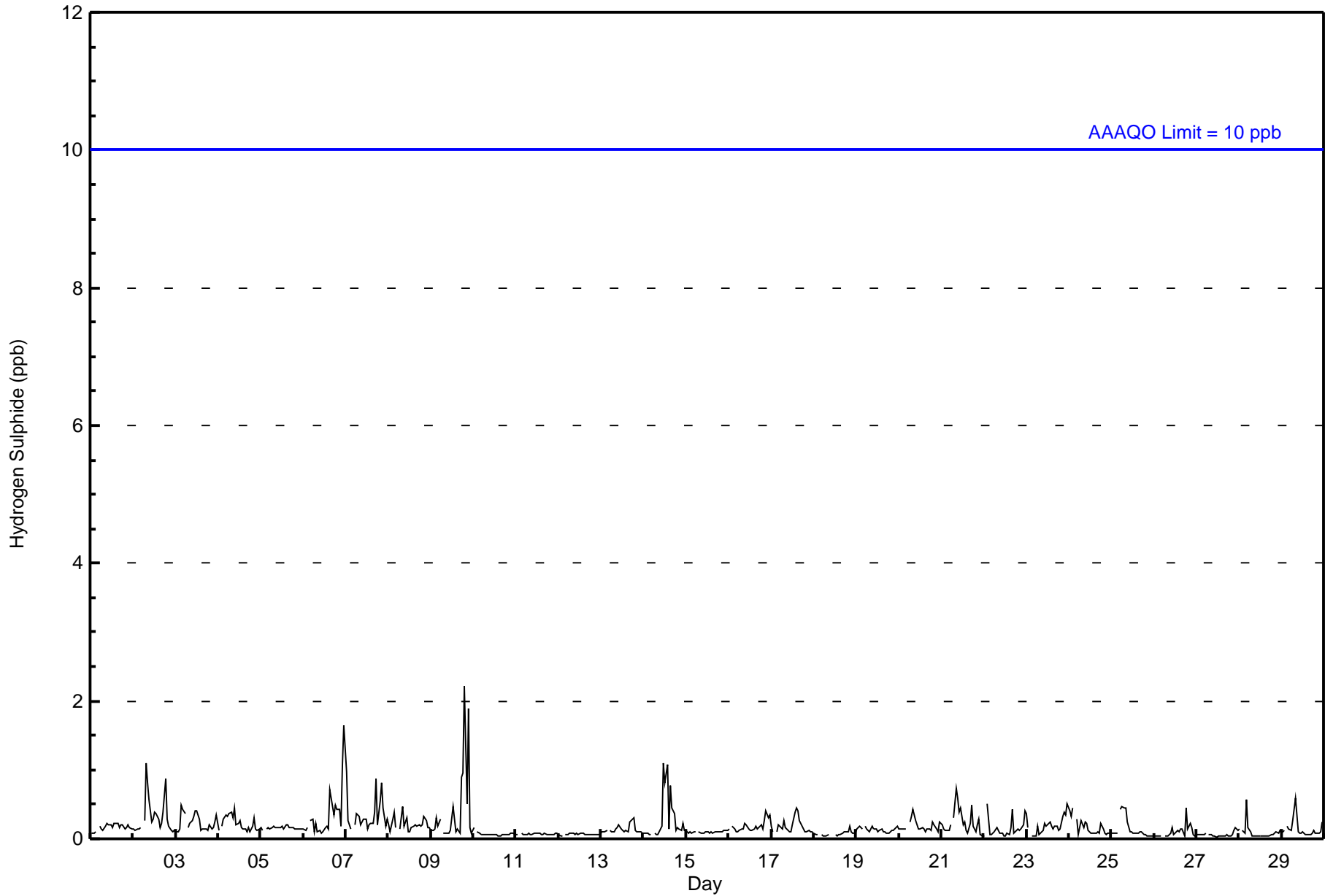


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696										Daily	Daily						
Maximum Value: 2 ppb on Feb 9 20:00										Maximum Daily Average: 0.4 ppb on Feb 9										Hours of Data: 664	Average	Maximum					
Minimum Value: 0 ppb on Feb 27 12:00										Minimum Daily Average: 0.1 ppb on Feb 27										Hours of Missing Data: 32							
Maximum Diurnal Average: 0.2 ppb at hour 20										Minimum Diurnal Average: 0.1 ppb at hour 2										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 = 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	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	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	0	0	0	0	0.2	0	
6-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2	0.3	2	
7-Feb	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0.3	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	0.2	0	
9-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	1	2	0	0	0.4	2	
10-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	
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	0.1	0	
14-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.3	1	
15-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	
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	0.2	0	
17-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	
18-Feb	0	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
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	0.2	0	
21-Feb	0	0	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
22-Feb	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
23-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	
24-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	
25-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	
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	0.1	0	
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	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
29-Feb	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
	1	0	1	0	1	0	0	1	1	1	0	1	1	1	0	1	0	1	1	2	1	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

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	664	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: 664

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	23	51	50	21	18	26	32	44	84	52	59	73	39	25	51	16	664
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	23	51	50	21	18	26	32	44	84	52	59	73	39	25	51	16	664

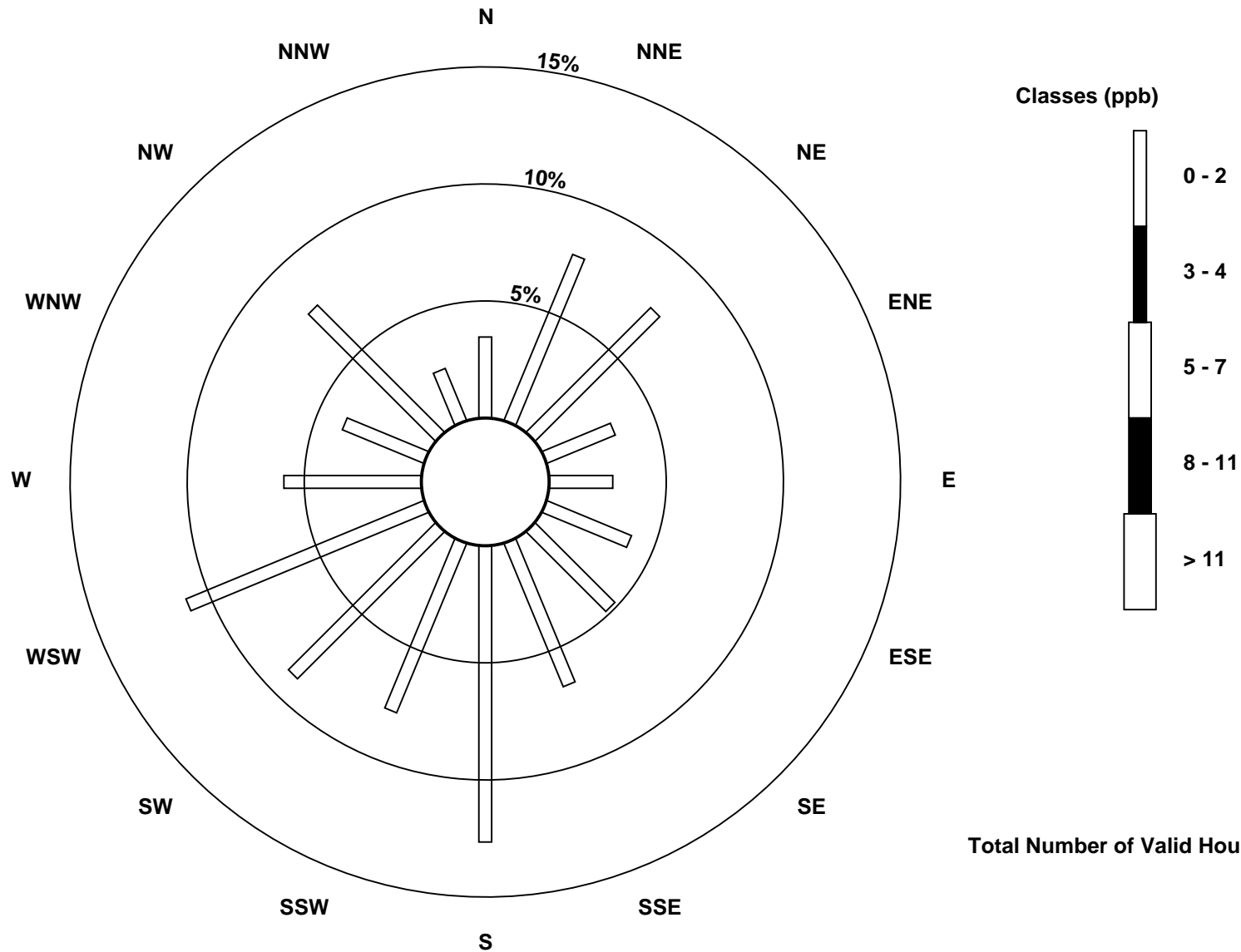
Total Number of Valid Hours: 664

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake (AMS500)

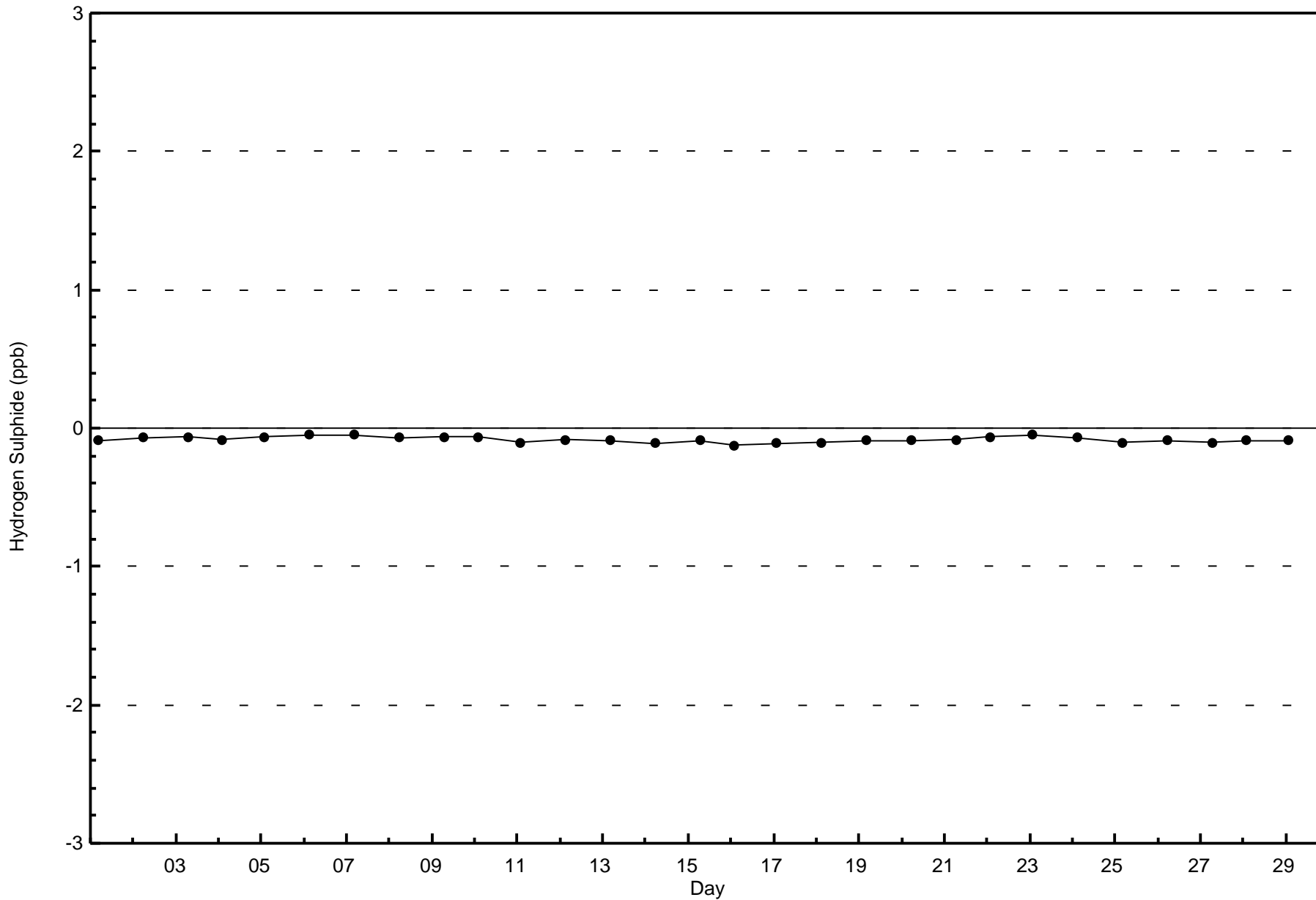


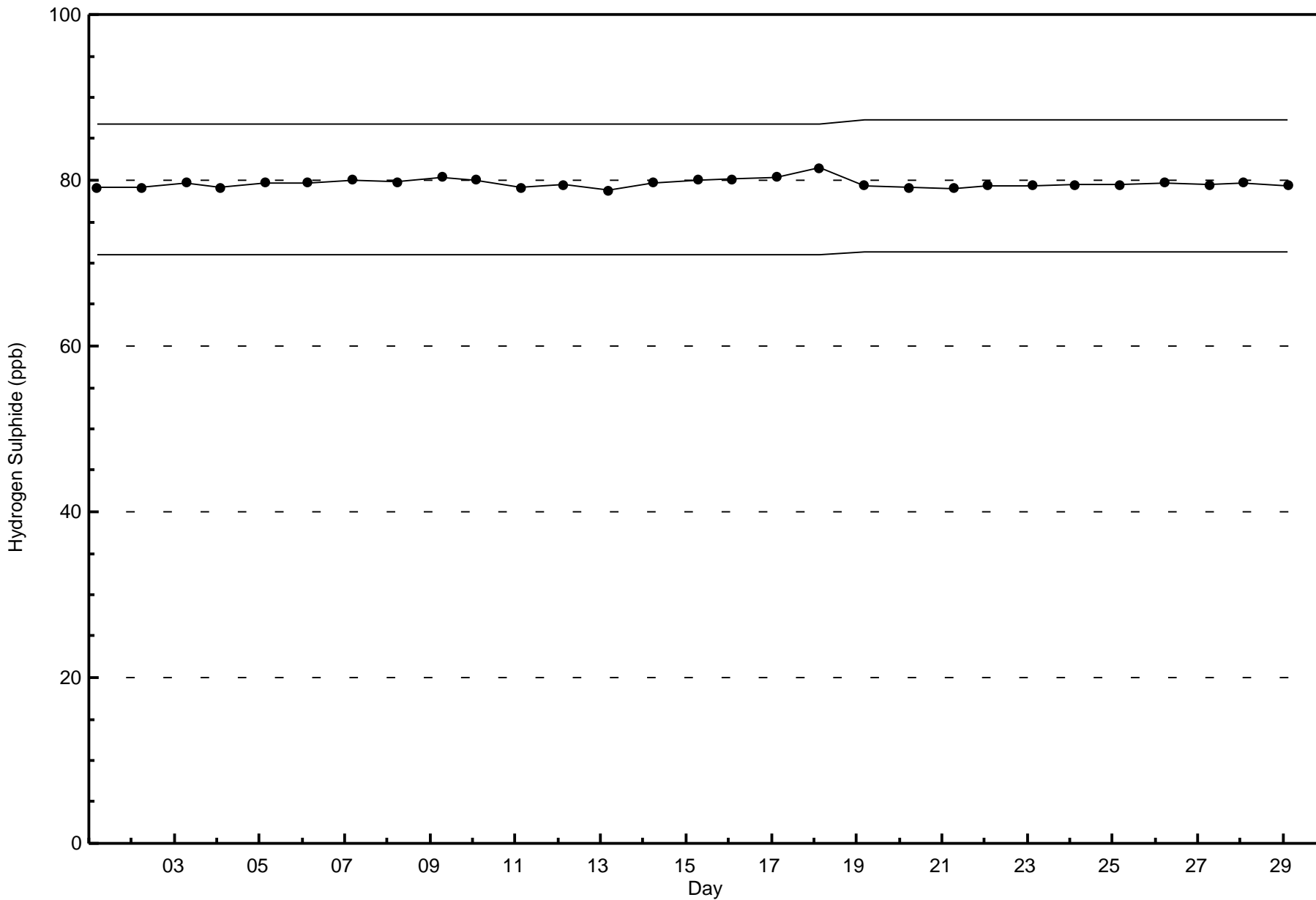
Total Number of Valid Hours: 664



Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - February 2016







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

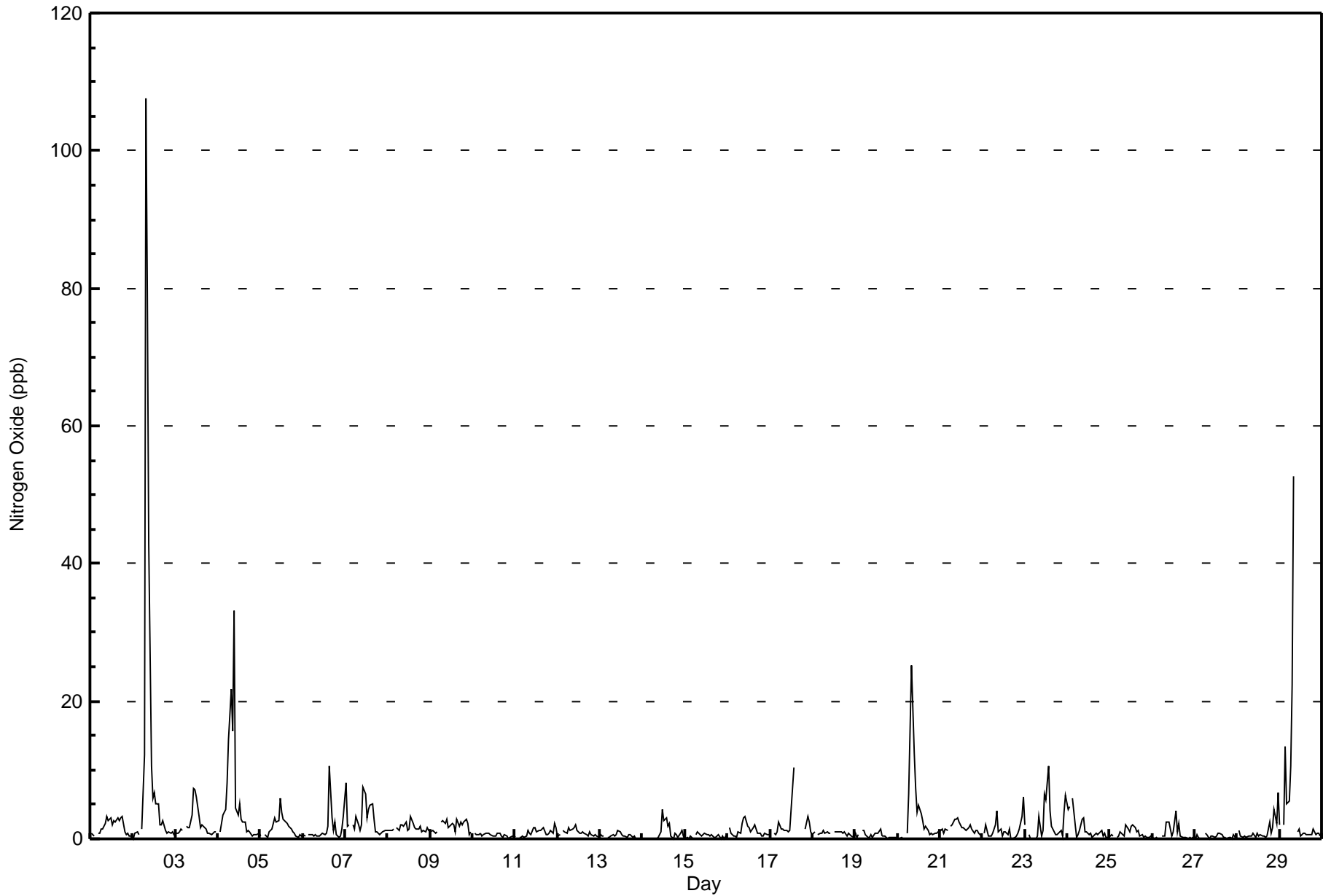
Cenovus - Christina Lake - February 2016

Maximum Value: 108 ppb on Feb 2 08:00		Maximum Daily Average: 12.7 ppb on Feb 2		Hours in Service: 696																											
Minimum Value: 0 ppb on Feb 2 01:00		Minimum Daily Average: 0.3 ppb on Feb 27		Hours of Data: 659																											
Maximum Diurnal Average: 7.3 ppb at hour 9		Minimum Diurnal Average: 0.7 ppb at hour 21		Hours of Missing Data: 37																											
Monthly Average: 2.1 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 22		Hours of Calibration: 35																											
				Percent Operational Time: 99.7																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Feb	1	1	0	Z	1	1	1	1	2	3	3	3	2	3	3	3	3	3	3	1	1	1	0	0	1.7	3					
2-Feb	0	1	1	1	Z	1	12	108	79	43	11	6	7	5	5	2	2	3	1	1	1	1	1	1	12.7	108					
3-Feb	1	1	1	1	1	Z	2	2	2	3	7	7	6	3	2	2	2	1	1	1	1	1	1	1	2.1	7					
4-Feb	Z	1	2	3	4	8	15	22	16	33	4	3	5	3	2	2	1	1	1	0	1	1	1	1	5.7	33					
5-Feb	1	Z	1	0	0	1	1	2	3	2	3	6	4	3	2	2	2	1	1	1	0	0	1	0	1.7	6					
6-Feb	1	0	Z	1	1	1	0	1	0	0	1	1	1	1	2	11	3	1	2	1	0	1	1	3	1.4	11					
7-Feb	8	2	2	Z	2	2	3	2	1	2	7	7	3	4	5	5	3	1	1	1	1	1	1	1	2.8	8					
8-Feb	1	1	1	1	Z	2	1	2	2	2	2	1	1	3	2	2	1	1	2	1	1	1	2	1	1.6	3					
9-Feb	1	1	1	1	1	Z	2	3	2	3	2	2	2	2	1	3	2	2	2	2	3	2	1	1	1.8	3					
10-Feb	Z	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	1	0	0	0	0	0.5	1					
11-Feb	0	Z	0	0	0	0	0	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	2	2	1.0	2					
12-Feb	0	1	Z	1	1	1	2	1	1	2	2	1	1	1	1	1	1	0	1	1	0	1	0	0	0.9	2					
13-Feb	1	0	0	Z	0	0	0	1	0	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0.4	1					
14-Feb	0	0	0	0	Z	0	0	0	0	0	1	4	3	2	2	0	0	1	1	0	1	1	0	0	0.8	4					
15-Feb	0	0	0	0	0	Z	1	1	1	0	1	1	1	1	0	1	0	0	0	1	0	0	0	1	0.4	1					
16-Feb	Z	2	1	0	1	0	1	1	2	3	3	2	2	1	2	2	2	1	1	1	0	1	1	1	1.2	3					
17-Feb	1	Z	1	1	1	2	1	1	1	1	1	1	4	10	C	C	C	C	C	C	1	3	3	1	--	10					
18-Feb	1	1	Z	1	1	1	1	1	1	1	1	M	1	1	1	1	1	1	0	1	1	0	0	0	0.8	1					
19-Feb	1	0	1	Z	1	1	1	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1					
20-Feb	0	0	0	0	Z	1	7	16	25	13	7	4	5	4	3	1	2	1	1	1	1	1	1	1	4.1	25					
21-Feb	1	1	1	1	1	Z	2	2	3	3	3	2	2	2	1	1	2	2	1	1	1	1	1	1	1.6	3					
22-Feb	Z	1	2	0	0	0	1	2	4	1	1	0	1	1	1	0	0	0	0	0	1	1	3	6	1.3	6					
23-Feb	2	Z	1	0	0	0	0	0	3	0	1	7	6	11	4	2	1	1	1	1	1	0	4	6	2.3	11					
24-Feb	4	5	Z	6	2	0	1	1	3	3	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1.5	6					
25-Feb	0	1	0	Z	0	0	1	1	1	2	1	1	2	2	2	1	1	0	1	0	0	0	0	0	0.8	2					
26-Feb	0	0	0	0	Z	0	0	0	2	2	1	0	1	4	1	2	0	0	0	0	0	0	0	0	0.8	4					
27-Feb	0	1	0	0	0	Z	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0.3	1					
28-Feb	Z	1	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	2	1	2	4	2	7	1.1	7				
29-Feb	2	Z	2	13	5	5	11	22	53	M	1	1	0	1	1	1	1	1	1	1	1	1	1	0	5.7	53					
		1.1	0.9	0.8	1.4	1.1	1.2	2.4	6.8	7.3	4.6	2.4	2.4	2.2	2.5	1.7	1.9	1.2	1.0	1.0	0.7	0.7	0.9	1.0	1.3	Diurnal Average					
		8	5	2	13	5	8	15	108	79	43	11	7	7	11	5	11	3	3	3	2	3	4	4	7	Diurnal Maximum					
Z - zerspan		C - Calibration			M - Maintenance																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	651	98.79	98.79
21 - 40	4	0.61	99.39
41 - 80	3	0.46	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	48	49	19	17	25	32	42	80	54	57	74	39	25	51	17	651
21 - 40	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	4
41 - 80	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	1	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	22	48	49	21	17	26	33	43	82	54	58	74	39	25	51	17	659

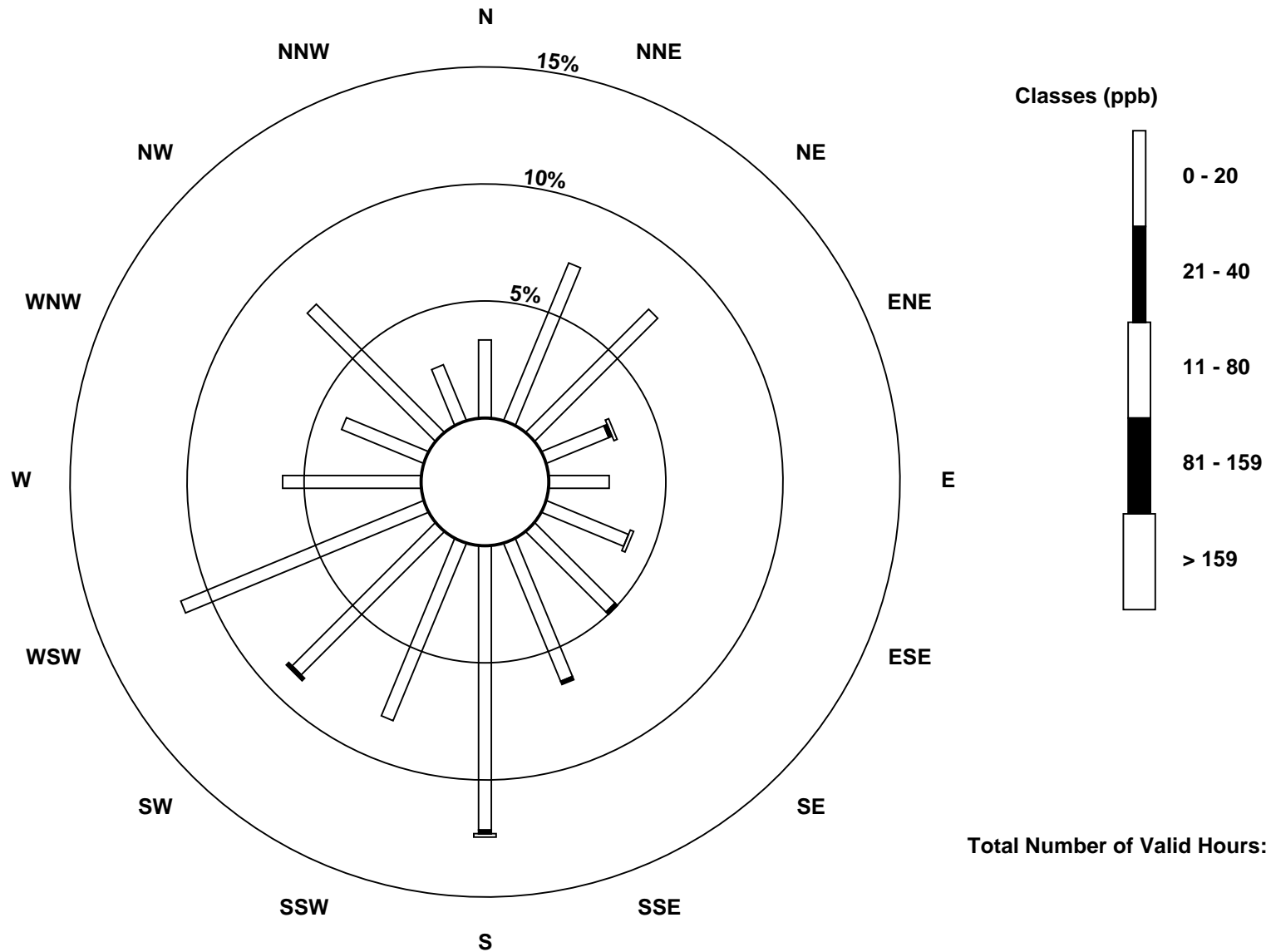
Total Number of Valid Hours: 659

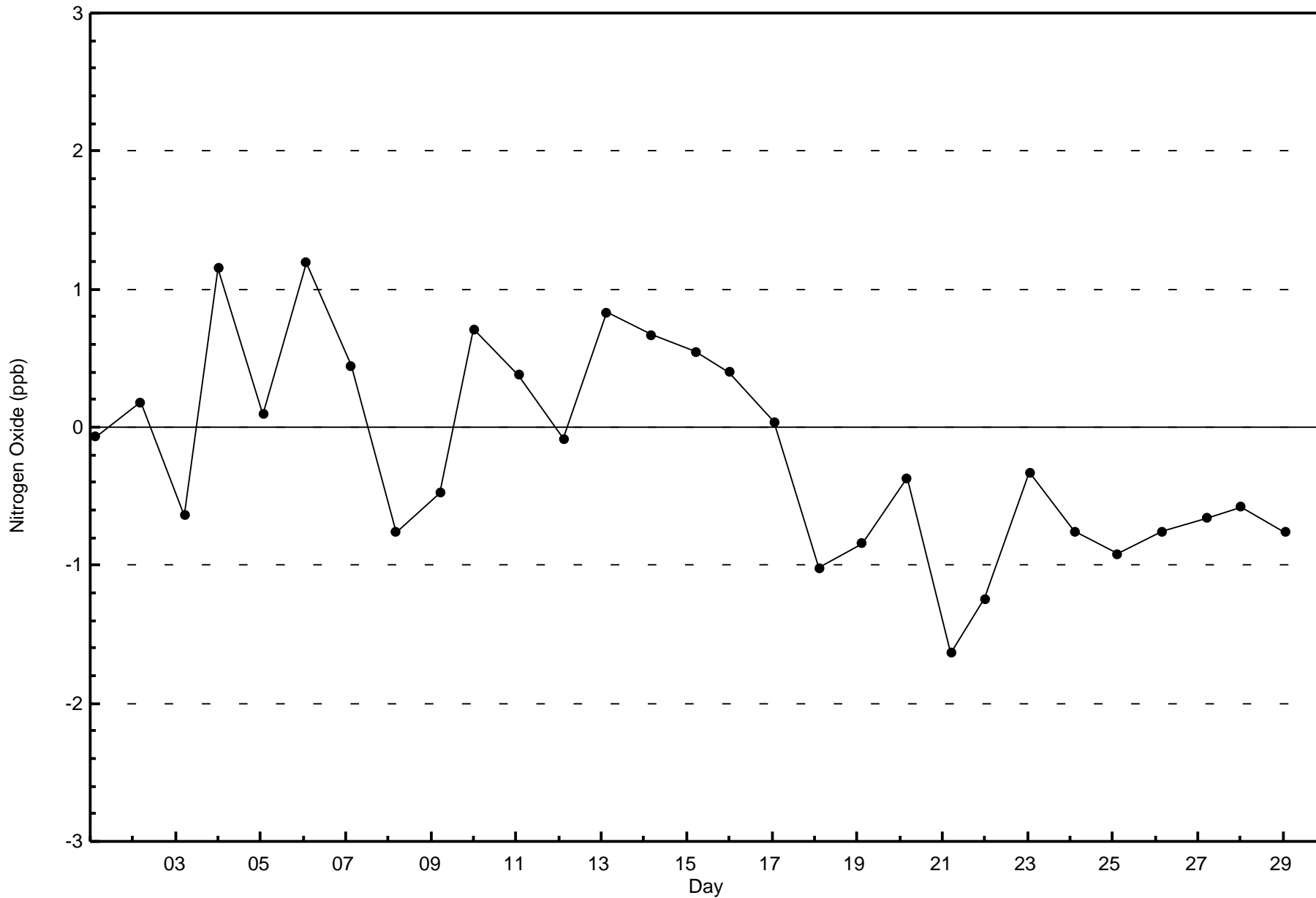
Total Number of Hours: 696

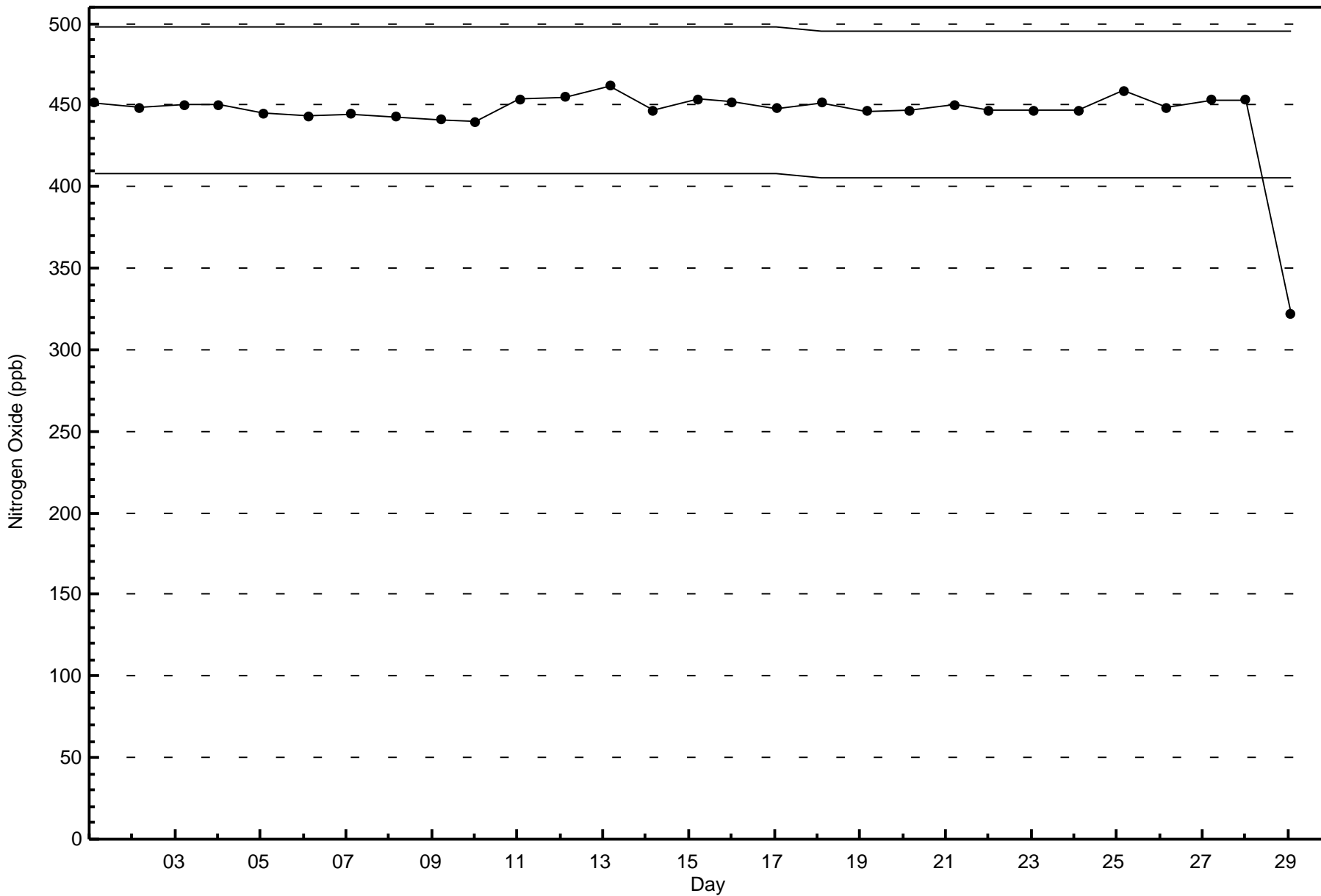


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake (AMS500)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

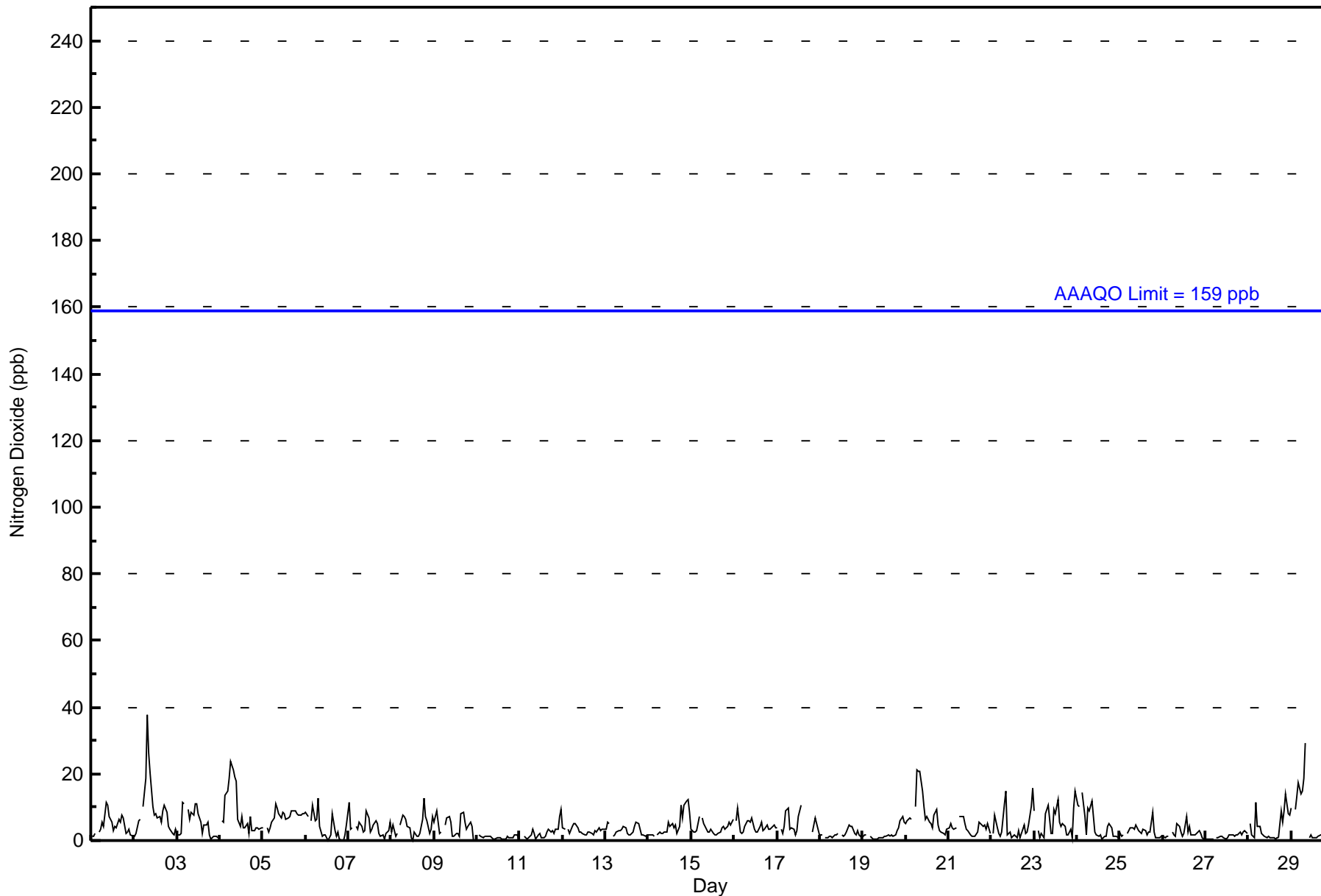
Cenovus - Christina Lake - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																	
Maximum Value: 38 ppb on Feb 2 08:00										Maximum Daily Average: 9.4 ppb on Feb 2										Hours of Data: 659							
Minimum Value: 0 ppb on Feb 6 13:00										Minimum Daily Average: 1.0 ppb on Feb 10										Hours of Missing Data: 37							
Maximum Diurnal Average: 7.9 ppb at hour 9										Minimum Diurnal Average: 2.7 ppb at hour 15										Hours of Calibration: 35							
Monthly Average: 4.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 21										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	2	Z	3	3	6	4	11	10	7	5	3	4	4	6	6	8	7	2	3	3	2	1	4.5	11	
2-Feb	1	2	6	7	Z	10	19	38	26	20	10	8	8	7	7	6	9	11	9	4	3	2	2	3	9.4	38	
3-Feb	2	2	2	12	11	Z	9	7	8	8	11	11	8	6	2	5	5	6	2	1	1	1	1	1	5.2	12	
4-Feb	Z	6	5	14	15	19	24	21	19	18	6	4	7	4	4	5	2	7	3	3	4	4	3	4	8.7	24	
5-Feb	4	Z	4	3	4	6	7	11	10	8	7	8	8	6	7	7	9	9	9	8	8	8	8	8	7.2	11	
6-Feb	8	7	Z	6	11	6	7	13	4	1	2	2	0	1	2	8	3	1	3	1	0	0	2	5	3.9	13	
7-Feb	12	3	4	Z	4	3	6	4	3	3	9	7	3	4	5	6	5	2	1	2	1	2	3	6	4.1	12	
8-Feb	3	5	1	2	Z	5	8	7	6	4	4	1	0	3	1	1	2	6	13	7	6	2	4	7	4.2	13	
9-Feb	6	9	5	2	2	Z	5	7	7	5	1	1	2	2	1	8	8	5	3	4	6	4	0	0	4.2	9	
10-Feb	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	2	2	1	1.0	2	
11-Feb	0	Z	1	1	0	1	2	3	2	1	2	2	1	1	1	3	3	2	3	2	4	4	7	9	2.4	9	
12-Feb	4	3	Z	4	2	4	5	5	4	3	3	2	2	2	2	2	2	2	3	3	4	3	3	3	3.0	5	
13-Feb	4	5	5	Z	1	2	2	3	3	4	4	4	2	2	2	4	6	5	4	2	2	1	2	2	3.1	6	
14-Feb	2	2	2	1	Z	2	3	2	2	3	3	6	4	5	4	5	2	4	11	7	11	12	12	9	4.8	12	
15-Feb	4	3	3	3	7	Z	7	5	3	3	3	3	2	2	2	3	4	4	4	4	4	6	5	6	3.7	7	
16-Feb	Z	6	10	2	2	3	4	6	6	6	7	4	3	3	4	6	3	3	5	3	4	4	5	4	4.4	10	
17-Feb	4	Z	3	2	4	9	10	3	4	4	2	3	7	11	C	C	C	C	C	C	3	7	5	3	--	11	
18-Feb	2	2	Z	1	1	1	1	1	1	2	2	2	M	2	1	2	3	5	4	4	2	2	3	2	1	2.0	5
19-Feb	1	2	2	Z	1	1	1	0	1	1	1	1	1	1	2	1	2	1	2	3	4	6	7	6	2.0	7	
20-Feb	5	6	7	7	Z	10	21	21	21	15	10	7	7	6	5	4	8	9	5	3	3	2	2	3	8.0	21	
21-Feb	4	5	4	4	4	Z	7	7	7	5	3	3	2	1	1	1	3	6	5	4	5	3	5	2	4.0	7	
22-Feb	Z	2	8	4	2	1	3	11	15	2	2	1	1	2	1	3	1	2	5	2	2	5	10	16	4.3	16	
23-Feb	9	Z	3	1	2	1	8	9	11	2	2	9	8	12	6	4	5	4	2	2	4	1	10	15	5.6	15	
24-Feb	11	10	Z	15	7	2	10	9	12	7	2	2	1	2	1	1	1	4	5	4	1	1	1	1	4.8	15	
25-Feb	2	1	2	Z	2	3	4	4	4	5	3	3	2	3	3	2	3	3	9	3	1	1	1	1	2.7	9	
26-Feb	1	1	1	1	Z	3	2	1	5	4	3	1	2	7	2	4	2	2	2	2	3	2	1	1	2.3	7	
27-Feb	0	1	1	0	0	Z	1	1	1	1	1	1	1	2	2	2	1	2	2	3	2	3	3	2	1.3	3	
28-Feb	Z	5	2	1	12	4	4	2	2	1	1	1	1	1	1	1	1	1	9	5	9	14	8	8	4.0	14	
29-Feb	10	Z	9	13	17	14	15	19	29	M	1	2	1	1	1	1	2	2	3	4	4	3	2	2	7.0	29	
4.1 3.7 3.7 4.4 4.9 4.7 6.9 7.8 7.9 5.2 3.8 3.6 3.1 3.5 2.7 3.5 3.5 4.2 4.7 3.2 3.5 3.7 4.0 4.5																								Diurnal Average			
12 10 10 15 17 19 24 38 29 20 11 11 8 12 7 8 9 11 13 8 11 14 12 16																								Diurnal Maximum			
Z - zerspan C - Calibration M - Maintenance																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	651	98.79	98.79
21 - 40	8	1.21	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: 659

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	48	48	20	17	25	32	42	80	54	57	74	39	25	51	17	651
21 - 40	0	0	1	1	0	1	1	1	2	0	1	0	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	22	48	49	21	17	26	33	43	82	54	58	74	39	25	51	17	659

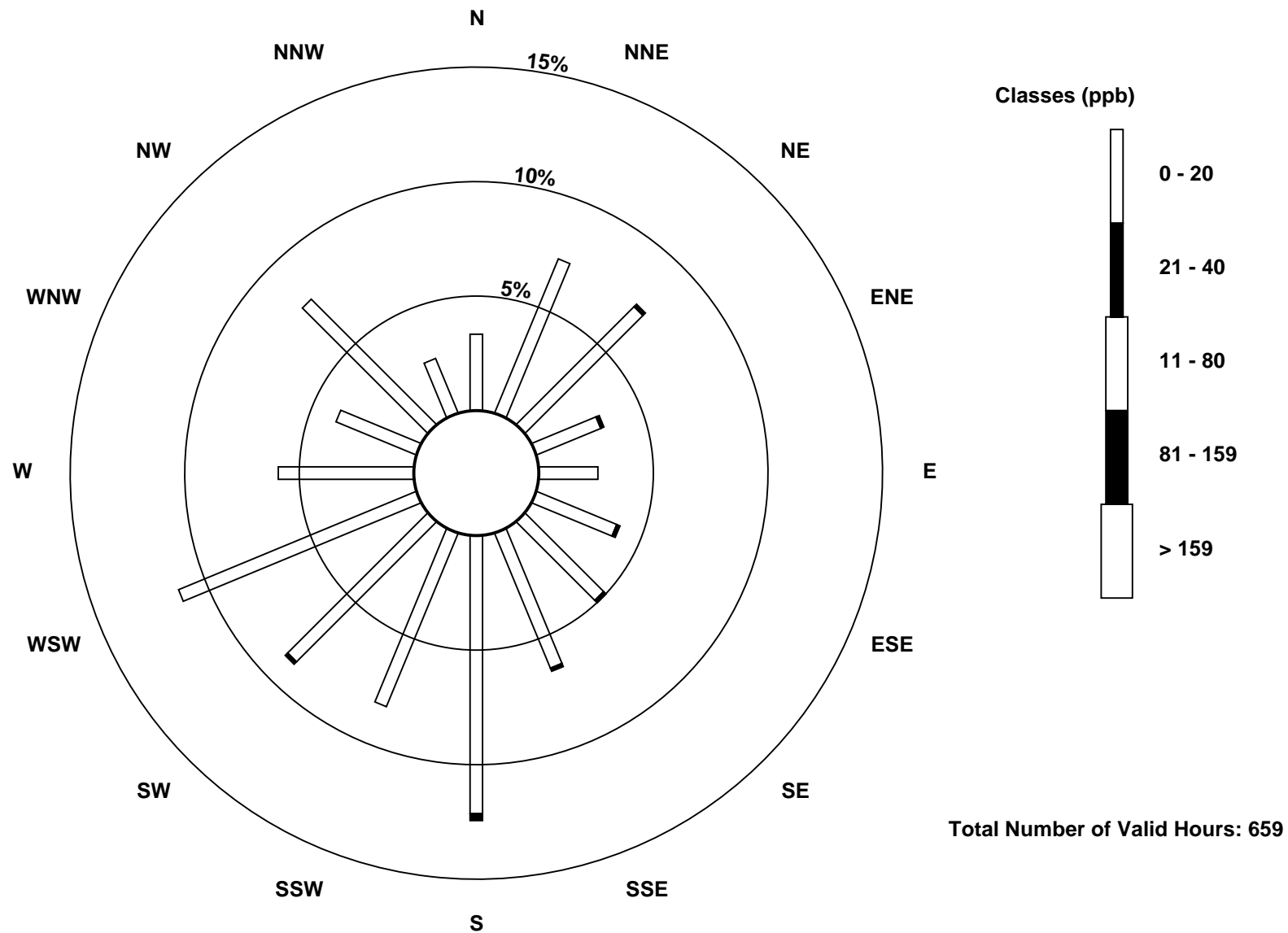
Total Number of Valid Hours: 659

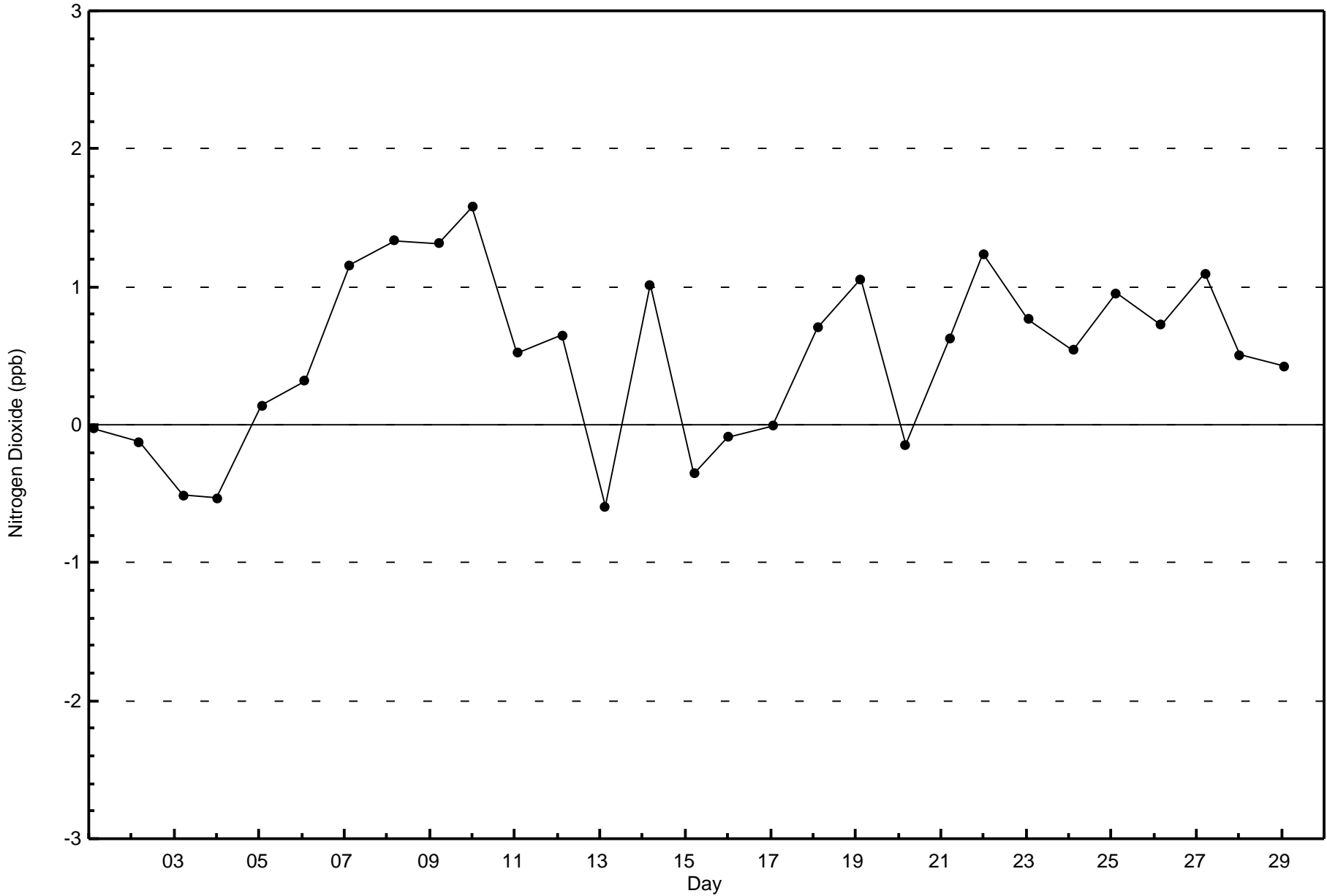
Total Number of Hours: 696

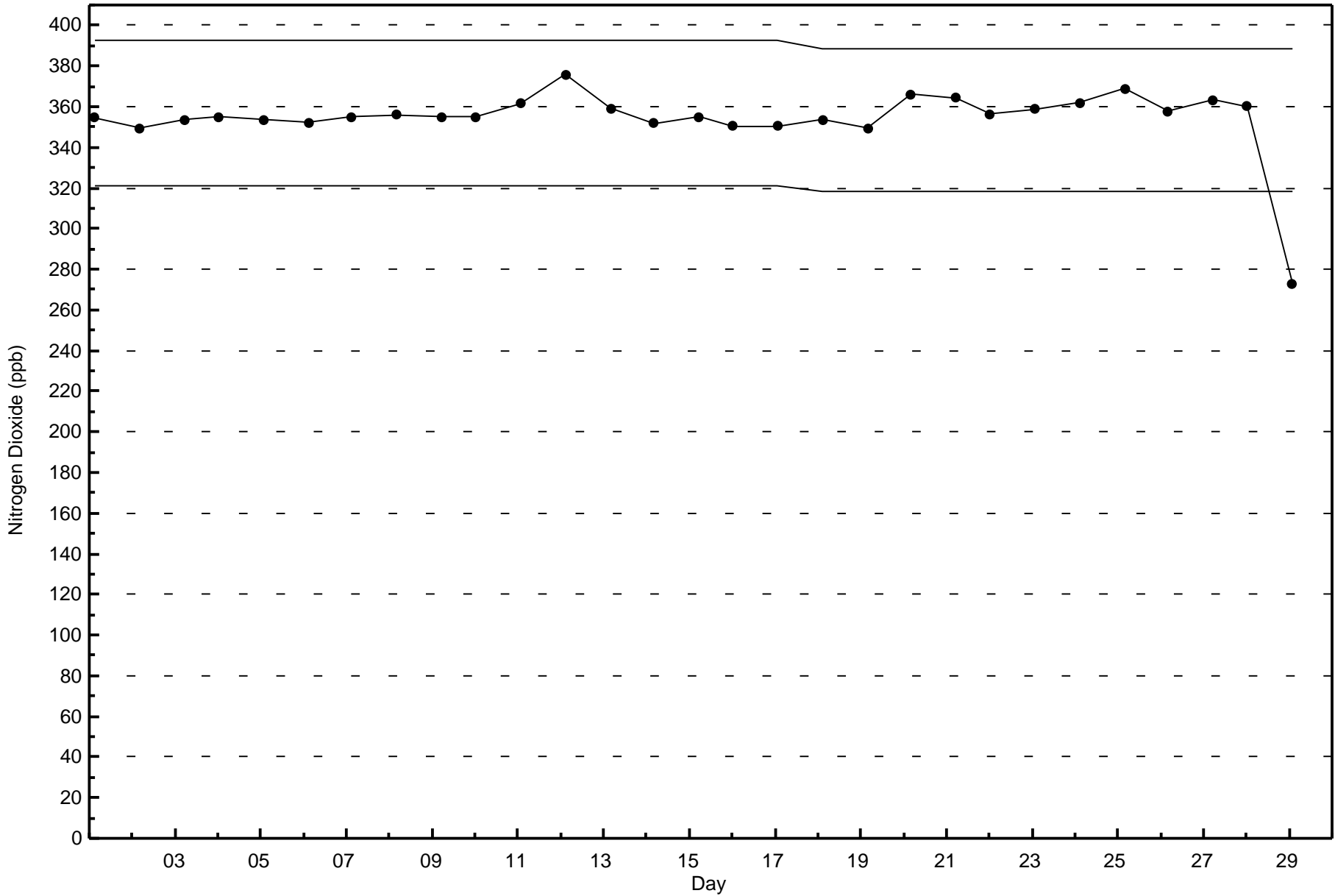


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake (AMS500)









Wood Buffalo Environmental Association
Summary of Hour Averages

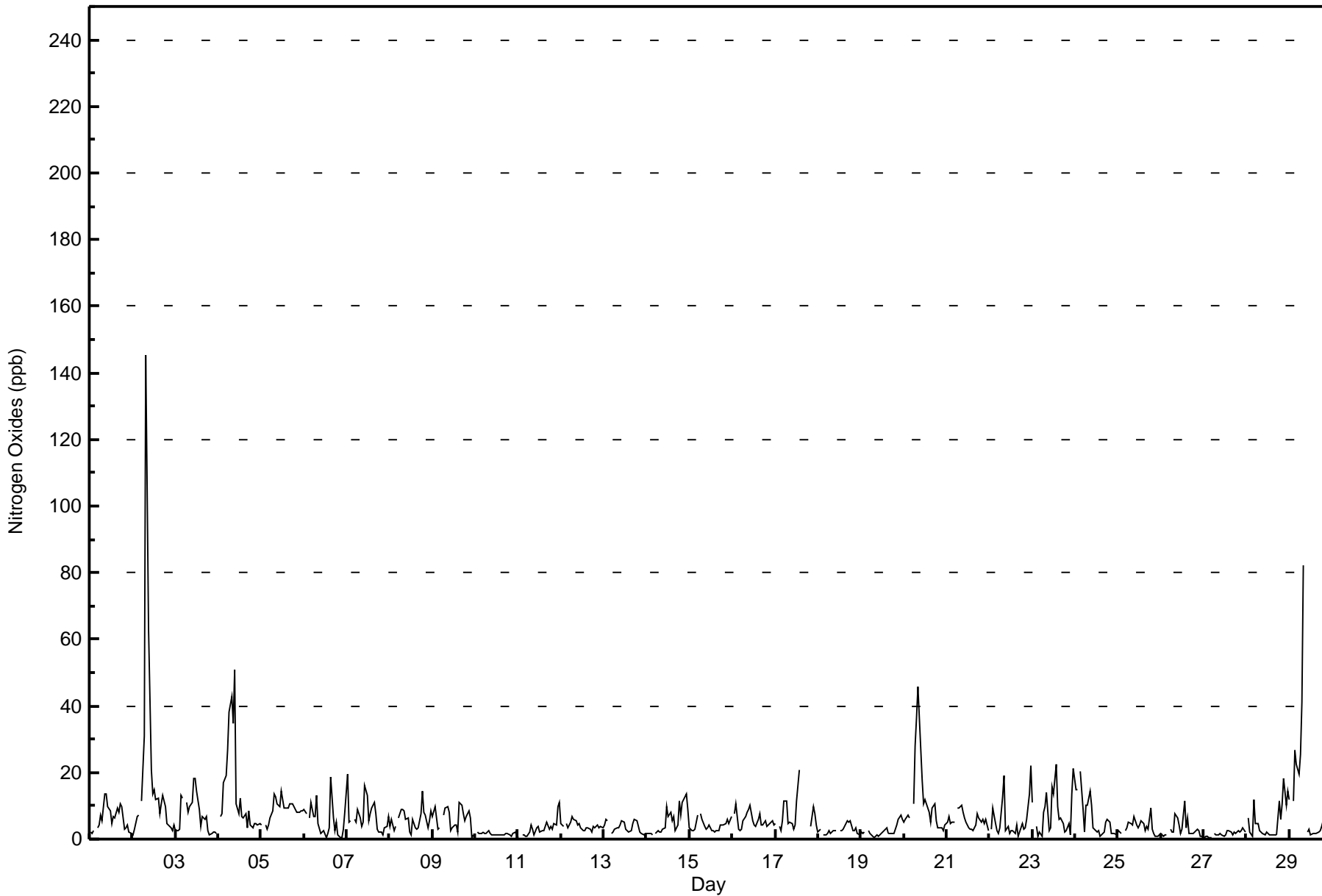
Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - February 2016

Maximum Value: 145 ppb on Feb 2 08:00																		Maximum Daily Average: 22.1 ppb on Feb 2						Hours in Service: 696			
Minimum Value: 0 ppb on Feb 6 21:00																		Minimum Daily Average: 1.5 ppb on Feb 10						Hours of Data: 659			
Maximum Diurnal Average: 15.2 ppb at hour 9																		Minimum Diurnal Average: 4.0 ppb at hour 20						Hours of Missing Data: 37			
Monthly Average: 6.4 ppb																		Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 8 P ₉₀ = 12 P ₉₉ = 42						Hours of Calibration: 35			
																		Percent Operational Time: 99.7									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2	2	3	Z	3	4	7	6	14	14	10	8	5	7	6	9	8	11	10	3	3	4	2	2	6.2	14	
2-Feb	1	3	7	7	Z	12	31	145	106	63	21	14	15	12	12	8	11	13	10	5	4	3	3	4	22.1	145	
3-Feb	3	2	3	13	12	Z	11	8	10	11	18	18	14	9	4	7	6	7	3	1	2	2	2	2	7.3	18	
4-Feb	Z	7	8	17	19	27	38	43	35	51	11	8	12	7	6	8	3	8	4	4	5	5	4	5	14.5	51	
5-Feb	4	Z	4	3	4	7	8	13	13	10	10	14	12	9	9	10	11	11	10	9	8	8	9	9	8.9	14	
6-Feb	9	7	Z	6	11	7	7	13	5	2	2	3	1	2	3	19	6	3	5	1	0	1	3	8	5.3	19	
7-Feb	20	5	6	Z	6	5	9	6	4	5	16	13	5	8	9	11	8	3	2	2	1	3	4	7	6.9	20	
8-Feb	4	6	3	4	Z	6	9	9	8	6	6	2	1	6	4	3	3	8	14	8	7	3	5	9	5.8	14	
9-Feb	7	10	6	3	3	Z	7	9	10	8	3	3	4	4	2	11	10	8	5	7	9	6	1	1	6.0	11	
10-Feb	Z	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2	1	1.5	2
11-Feb	0	Z	1	1	1	1	2	4	3	1	4	4	2	2	2	4	5	3	4	3	5	4	10	11	3.4	11	
12-Feb	5	4	Z	5	3	5	7	6	5	4	5	3	3	3	3	3	3	2	4	3	4	3	4	4	3.9	7	
13-Feb	4	6	6	Z	2	2	3	3	3	4	6	5	3	2	2	3	5	6	5	4	2	2	1	2	3.5	6	
14-Feb	2	2	2	1	Z	2	3	2	2	3	4	10	7	8	6	7	3	4	12	7	11	13	13	9	5.7	13	
15-Feb	3	3	3	3	7	Z	7	6	4	3	3	4	3	2	2	3	3	4	4	4	4	6	5	7	4.1	7	
16-Feb	Z	8	11	3	2	3	5	7	8	9	10	5	4	4	6	8	4	4	6	4	4	5	5	4	5.6	11	
17-Feb	5	Z	4	3	5	11	11	5	5	5	3	4	11	21	C	C	C	C	C	C	4	10	7	4	--	21	
18-Feb	2	3	Z	1	1	2	3	2	3	3	3	M	3	2	3	4	6	5	5	3	3	4	2	1	2.8	6	
19-Feb	2	2	2	Z	2	2	1	1	1	1	1	2	2	2	3	2	2	2	2	3	4	6	7	6	2.5	7	
20-Feb	5	6	7	6	Z	11	28	37	46	27	18	10	12	9	8	5	9	11	5	4	3	3	3	4	12.1	46	
21-Feb	5	7	5	5	5	Z	9	9	10	8	6	5	3	3	3	2	4	7	6	5	6	5	6	3	5.6	10	
22-Feb	Z	3	10	4	3	2	3	13	19	3	4	2	3	3	2	4	1	2	5	3	3	6	14	22	5.7	22	
23-Feb	11	Z	4	1	2	1	8	10	14	2	3	16	14	23	10	6	6	5	2	2	5	1	14	21	7.8	23	
24-Feb	15	15	Z	21	9	2	10	10	15	10	3	3	2	3	1	2	2	5	6	5	2	2	2	1	6.3	21	
25-Feb	2	2	2	Z	3	3	5	5	4	7	4	3	4	5	4	3	4	3	9	3	2	1	1	1	3.5	9	
26-Feb	1	1	1	1	Z	3	2	2	8	7	4	2	3	12	3	6	2	2	2	2	3	2	1	1	3.1	12	
27-Feb	1	1	1	0	0	Z	2	1	1	2	1	1	1	3	3	2	1	2	2	3	2	2	3	2	1.6	3	
28-Feb	Z	6	2	1	12	5	4	2	2	2	1	2	2	1	1	1	1	1	12	6	11	18	10	14	5.1	18	
29-Feb	12	Z	12	27	22	20	25	41	82	M	2	3	1	2	2	2	2	3	4	6	4	4	3	2	12.7	82	
																		Diurnal Average									
																		Diurnal Maximum									
Z - zerspan																		C - Calibration						M - Maintenance			



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	635	96.36	96.36
21 - 40	16	2.43	98.79
41 - 80	5	0.76	99.54
81 - 159	3	0.46	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 659

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	47	45	19	16	22	30	42	79	54	57	74	39	22	50	17	635
21 - 40	0	1	4	0	1	3	2	0	1	0	0	0	0	3	1	0	16
11 - 80	0	0	0	1	0	0	1	1	2	0	0	0	0	0	0	0	5
81 - 159	0	0	0	1	0	1	0	0	0	0	1	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	22	48	49	21	17	26	33	43	82	54	58	74	39	25	51	17	659

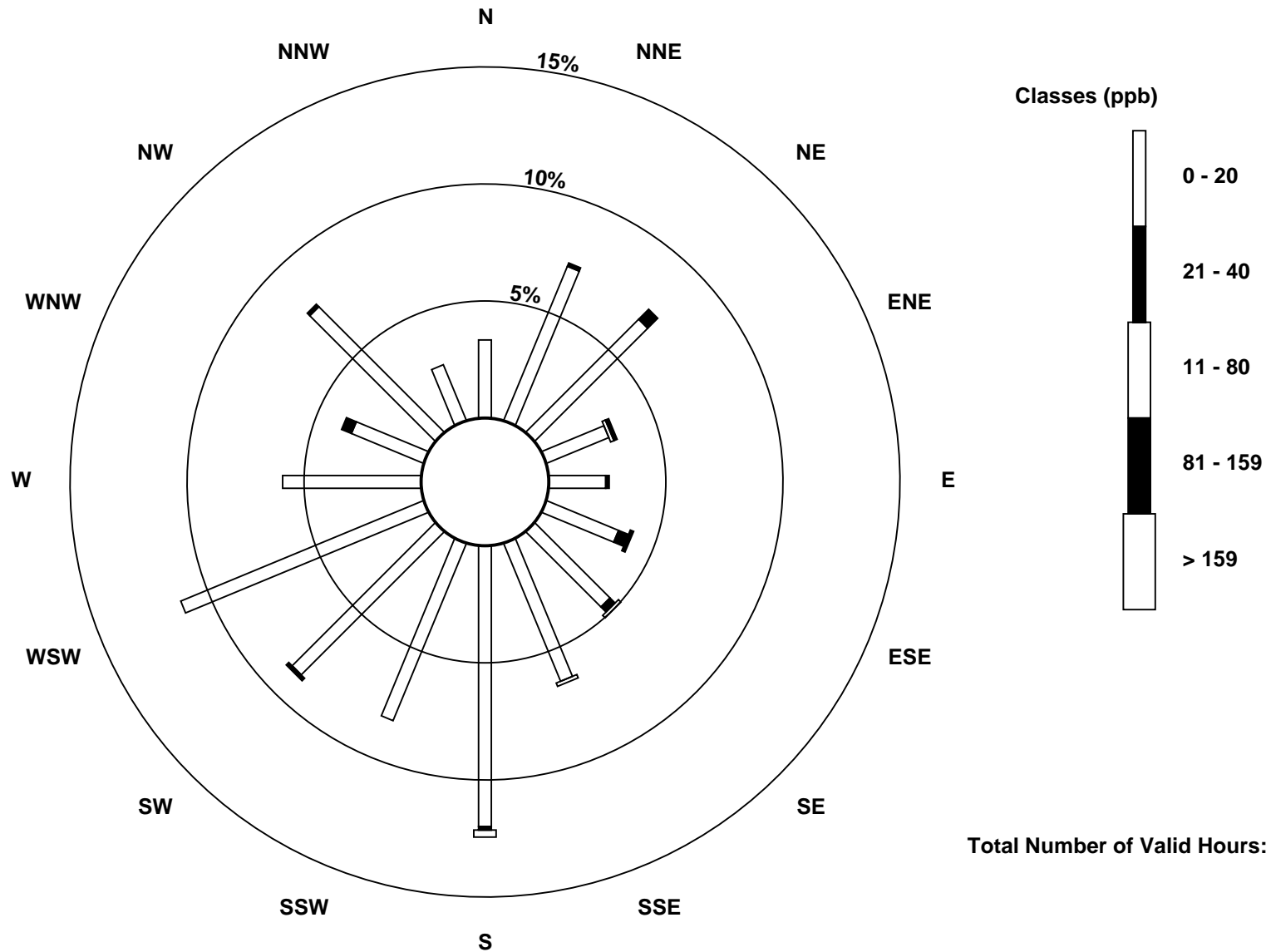
Total Number of Valid Hours: 659

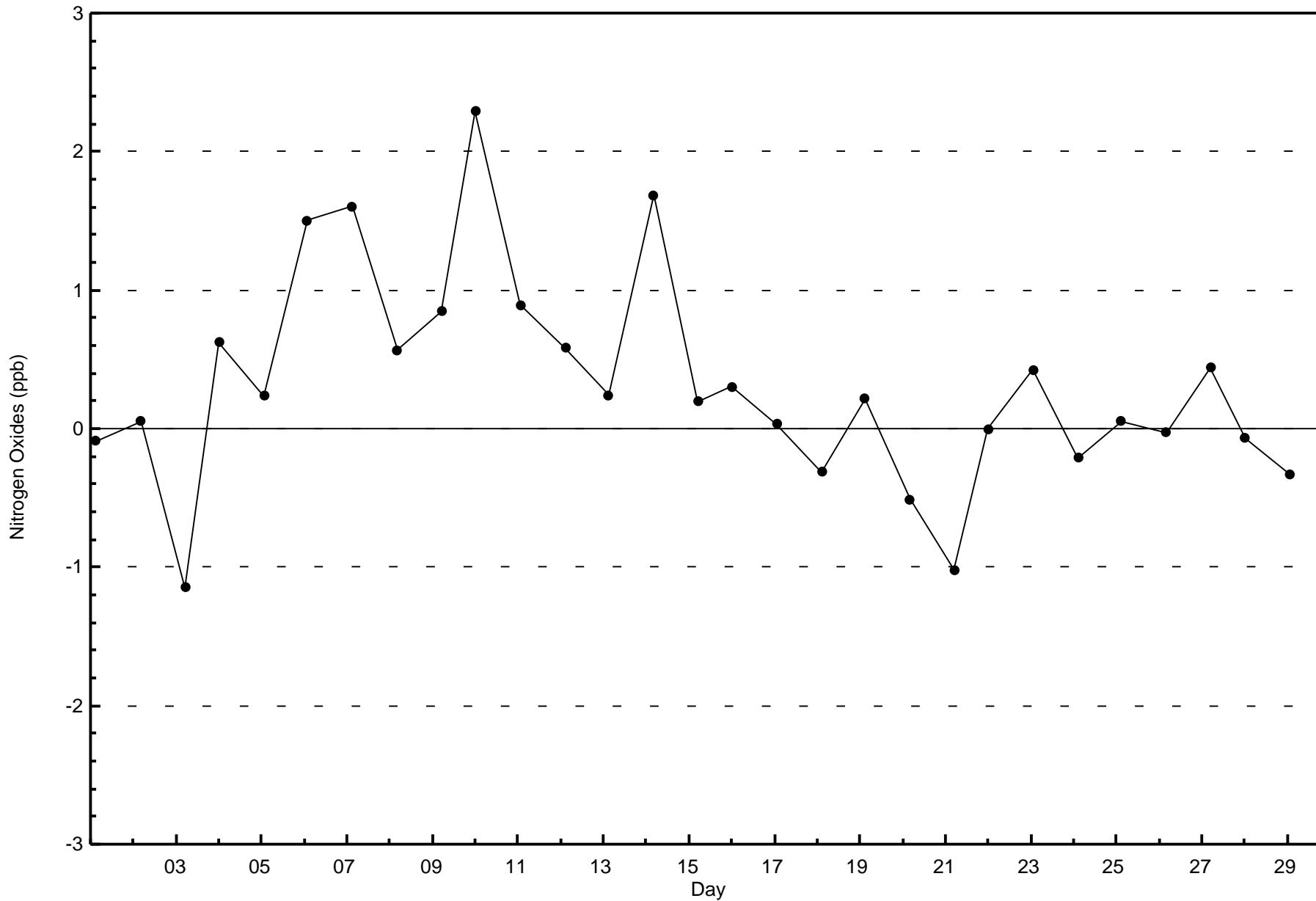
Total Number of Hours: 696

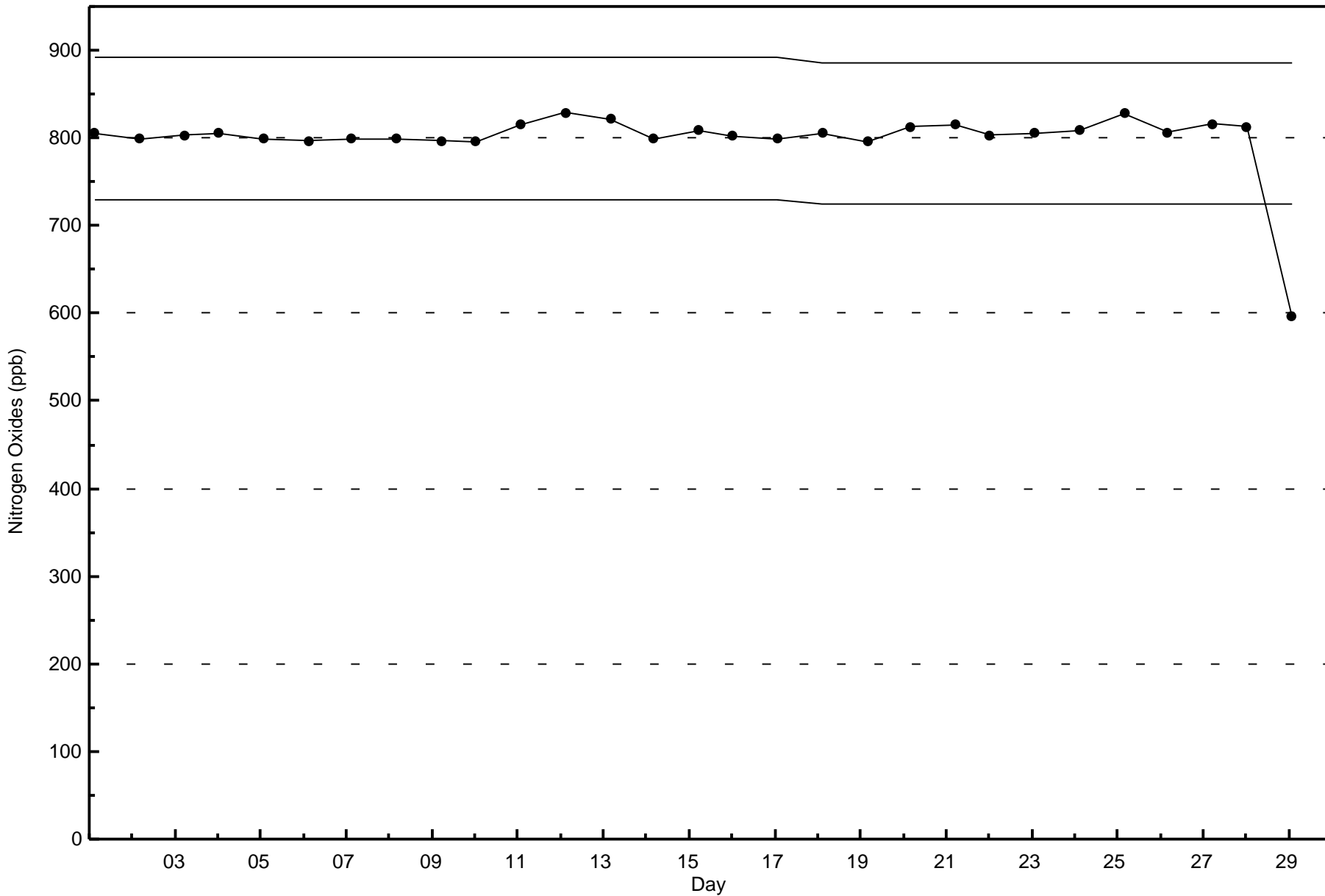


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake (AMS500)







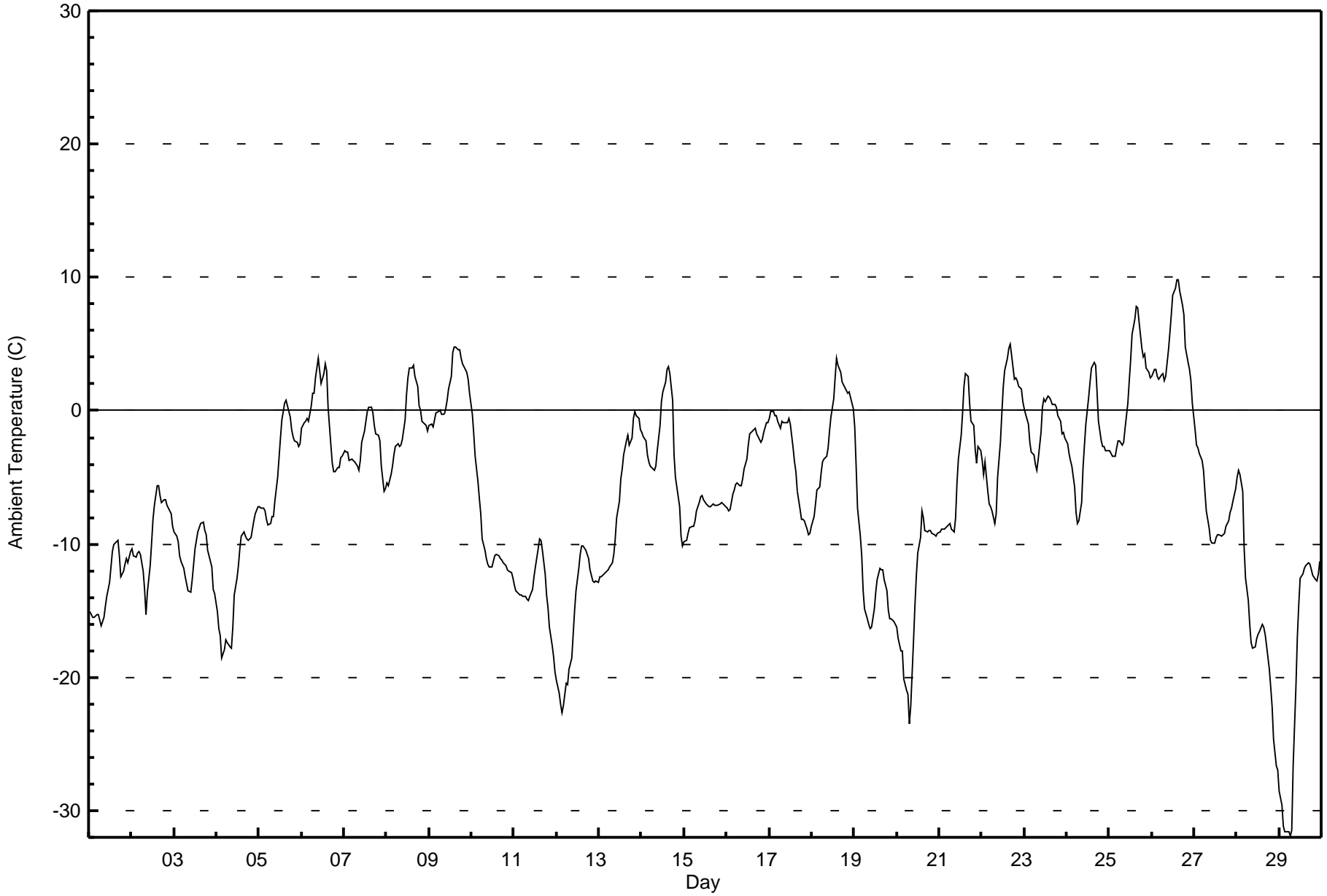


Maximum Value: 9.9 C on Feb 26 16:00 Maximum Daily Average: 4.9 C on Feb 26																				Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: -31.9 C on Feb 29 07:00 Minimum Daily Average: -19.6 C on Feb 29 Maximum Diurnal Average: -3.1 C at hour 16 Minimum Diurnal Average: -9.5 C at hour 8 Monthly Average: -6.50 C Percentiles: P ₁ = -29.3 P ₁₀ = -15.6 Q ₁ = -11.3 Median = -6.4 Q ₃ = -1.0 P ₉₀ = 2.4 P ₉₉ = 7.8																											
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	-15.1	-15.3	-15.6	-15.5	-15.3	-15.3	-15.7	-16.1	-15.5	-14.7	-14.0	-12.9	-11.7	-10.6	-10.1	-9.8	-9.7	-10.9	-12.5	-12.0	-11.5	-11.1	-11.4	-10.5	-13.0	-9.7	
2-Feb	-10.4	-10.8	-11.0	-10.7	-10.6	-10.8	-12.0	-13.5	-15.2	-13.6	-11.7	-9.9	-8.2	-7.1	-5.6	-5.7	-6.4	-6.9	-6.6	-6.7	-7.0	-7.5	-7.7	-8.7	-9.3	-5.6	
3-Feb	-9.1	-9.4	-9.8	-10.9	-11.3	-11.9	-12.5	-13.0	-13.5	-13.6	-12.7	-11.6	-10.3	-9.1	-8.8	-8.4	-8.4	-9.0	-9.3	-10.5	-11.2	-11.7	-13.4	-13.7	-11.0	-8.4	
4-Feb	-15.1	-16.4	-16.9	-18.6	-17.9	-17.2	-17.4	-17.7	-17.9	-16.2	-13.8	-12.5	-11.6	-10.4	-9.4	-9.1	-9.4	-9.6	-9.8	-9.5	-9.5	-8.8	-8.3	-7.7	-7.3	-12.9	-7.3
5-Feb	-7.2	-7.3	-7.4	-7.5	-8.2	-8.6	-8.4	-8.0	-7.9	-6.8	-5.0	-3.5	-2.0	-0.7	0.6	0.8	0.4	-0.5	-1.5	-2.0	-2.3	-2.4	-2.7	-2.5	-4.2	0.8	
6-Feb	-1.4	-0.9	-0.8	-0.6	-0.8	0.4	1.3	1.3	2.5	3.9	3.0	2.1	2.7	3.5	3.0	0.3	-2.6	-3.9	-4.6	-4.6	-4.3	-4.2	-3.5	-3.4	-0.5	3.9	
7-Feb	-3.0	-3.1	-3.1	-3.8	-3.7	-3.7	-3.9	-4.2	-4.4	-3.8	-2.4	-1.5	-0.8	-0.1	0.3	0.3	-0.1	-1.1	-1.7	-1.9	-2.3	-4.1	-6.1	-5.9	-2.7	0.3	
8-Feb	-5.4	-5.6	-4.8	-4.2	-3.3	-2.6	-2.5	-2.7	-2.6	-2.2	-0.6	1.2	2.4	3.2	3.2	3.4	2.5	1.8	0.3	0.0	-0.8	-1.0	-1.1	-1.5	-0.9	3.4	
9-Feb	-1.2	-1.1	-1.2	-0.7	-0.2	0.0	0.0	-0.3	-0.2	0.1	0.8	1.7	2.6	4.4	4.7	4.8	4.5	4.6	4.0	3.5	3.1	2.9	2.4	1.3	1.7	4.8	
10-Feb	-0.3	-1.7	-3.4	-5.3	-6.6	-7.7	-9.6	-10.5	-11.1	-11.5	-11.7	-11.7	-11.3	-10.9	-10.8	-10.9	-11.1	-11.2	-11.4	-11.6	-11.9	-12.0	-12.2	-12.5	-9.5	-0.3	
11-Feb	-13.1	-13.5	-13.7	-13.9	-13.8	-13.9	-13.9	-14.1	-14.2	-14.0	-13.4	-12.5	-11.8	-10.4	-9.6	-9.7	-10.4	-12.3	-13.8	-14.8	-16.2	-17.6	-18.5	-19.6	-13.7	-9.6	
12-Feb	-20.2	-21.1	-22.0	-22.6	-22.1	-20.5	-20.6	-19.4	-18.6	-16.7	-15.0	-13.5	-11.8	-10.8	-10.2	-10.2	-10.4	-10.7	-11.1	-11.9	-12.7	-12.8	-12.8	-12.9	-15.4	-10.2	
13-Feb	-12.5	-12.4	-12.3	-12.2	-12.0	-12.0	-11.7	-11.4	-10.8	-9.6	-8.1	-6.8	-5.1	-4.4	-3.3	-2.3	-1.8	-2.6	-2.1	-0.6	0.0	-0.4	-0.6	-1.4	-6.5	0.0	
14-Feb	-1.6	-1.9	-2.2	-3.3	-3.9	-4.2	-4.3	-4.5	-4.1	-3.0	-1.1	0.7	1.4	2.1	3.0	3.3	2.7	0.8	-3.4	-5.0	-5.7	-7.2	-9.4	-10.1	-2.5	3.3	
15-Feb	-9.8	-9.7	-9.2	-8.8	-8.7	-8.7	-8.3	-7.6	-6.9	-6.5	-6.4	-6.7	-7.0	-7.1	-7.2	-7.2	-7.0	-7.1	-7.1	-7.1	-7.0	-6.9	-7.0	-7.2	-7.6	-6.4	
16-Feb	-7.3	-7.5	-7.4	-6.3	-5.9	-5.5	-5.4	-5.6	-5.6	-5.1	-4.4	-3.6	-2.5	-1.7	-1.6	-1.4	-1.3	-1.8	-2.1	-2.4	-2.2	-1.6	-0.9	-0.9	-3.7	-0.9	
17-Feb	-0.6	-0.1	0.0	-0.4	-0.4	-0.8	-1.3	-0.8	-0.9	-0.9	-0.6	-1.0	-2.7	-3.8	-4.6	-6.1	-7.5	-8.1	-8.1	-8.3	-8.3	-8.9	-9.3	-9.2	-3.5	0.0	
18-Feb	-8.6	-7.9	-7.0	-6.0	-5.7	-4.7	-3.8	-3.6	-3.5	-2.8	-1.5	-0.5	0.9	2.4	4.0	3.4	2.9	2.2	2.0	1.6	1.3	1.4	1.0	0.2	-1.3	4.0	
19-Feb	-1.2	-4.2	-7.3	-9.4	-10.8	-13.5	-14.8	-15.6	-16.0	-16.4	-16.2	-14.9	-13.6	-12.6	-11.8	-11.9	-11.9	-12.7	-13.5	-15.0	-15.6	-15.7	-15.8	-16.0	-12.8	-1.2	
20-Feb	-16.3	-17.1	-18.0	-18.1	-20.1	-21.0	-21.3	-23.5	-22.1	-17.2	-14.6	-12.4	-10.7	-9.5	-7.5	-8.0	-9.0	-9.1	-9.0	-9.0	-9.1	-9.3	-9.4	-9.2	-13.8	-7.5	
21-Feb	-9.1	-8.9	-8.9	-8.9	-8.7	-8.6	-8.4	-8.9	-9.1	-8.0	-5.4	-3.7	-1.8	-0.2	1.9	2.8	2.5	0.5	-0.8	-1.1	-2.9	-3.9	-2.7	-3.0	-4.4	2.8	
22-Feb	-3.8	-4.8	-3.8	-6.0	-7.0	-7.2	-7.5	-8.4	-7.7	-5.0	-2.4	-0.2	1.7	3.0	4.0	4.6	5.0	4.1	2.4	2.5	2.3	1.8	1.6	0.7	-1.3	5.0	
23-Feb	0.2	-0.2	-1.0	-2.4	-3.1	-3.3	-4.1	-4.5	-3.6	-1.6	0.3	0.9	0.7	1.1	1.0	0.8	0.4	0.5	0.2	-0.4	-0.7	-1.7	-1.6	-2.0	-1.0	1.1	
24-Feb	-2.5	-3.2	-3.7	-4.1	-5.7	-7.6	-8.5	-8.3	-6.8	-4.3	-2.6	-1.0	1.0	2.2	3.2	3.6	3.4	1.4	-0.8	-2.2	-2.7	-2.7	-3.0	-3.0	-2.4	3.6	
25-Feb	-2.9	-3.2	-3.4	-3.4	-2.8	-2.3	-2.3	-2.5	-2.4	-1.3	0.5	2.3	3.9	5.7	6.8	7.9	7.7	6.6	4.7	4.1	4.3	3.2	2.9	2.5	1.5	7.9	
26-Feb	2.5	3.1	3.1	2.5	2.3	2.7	2.8	2.2	2.6	4.5	5.9	7.2	8.7	9.1	9.8	9.9	9.0	8.0	7.2	4.7	3.7	3.1	2.3	0.6	4.9	9.9	
27-Feb	-1.5	-2.5	-2.8	-3.2	-3.7	-4.5	-6.0	-7.5	-8.8	-9.8	-9.9	-9.9	-9.6	-9.3	-9.3	-9.4	-9.3	-9.2	-8.7	-8.3	-7.6	-7.3	-6.8	-5.8	-7.1	-1.5	
28-Feb	-5.0	-4.4	-4.8	-6.0	-10.3	-12.6	-14.2	-16.0	-17.3	-17.8	-17.7	-17.0	-16.7	-16.5	-16.0	-16.2	-16.7	-17.6	-19.4	-20.8	-22.3	-24.6	-26.7	-27.0	-16.0	-4.4	
29-Feb	-28.5	-29.6	-31.1	-31.6	-31.6	-31.6	-31.9	-31.5	-26.6	-20.7	-17.0	-14.6	-12.6	-12.2	-11.8	-11.7	-11.4	-11.6	-11.9	-12.3	-12.7	-12.8	-12.2	-11.3	-19.6	-11.3	
																								Diurnal Average			
																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Cenovus - Christina Lake - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Cenovus - Christina Lake - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	27	3.88	3.88
-20 - 0	539	77.44	81.32
0 - 10	130	18.68	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

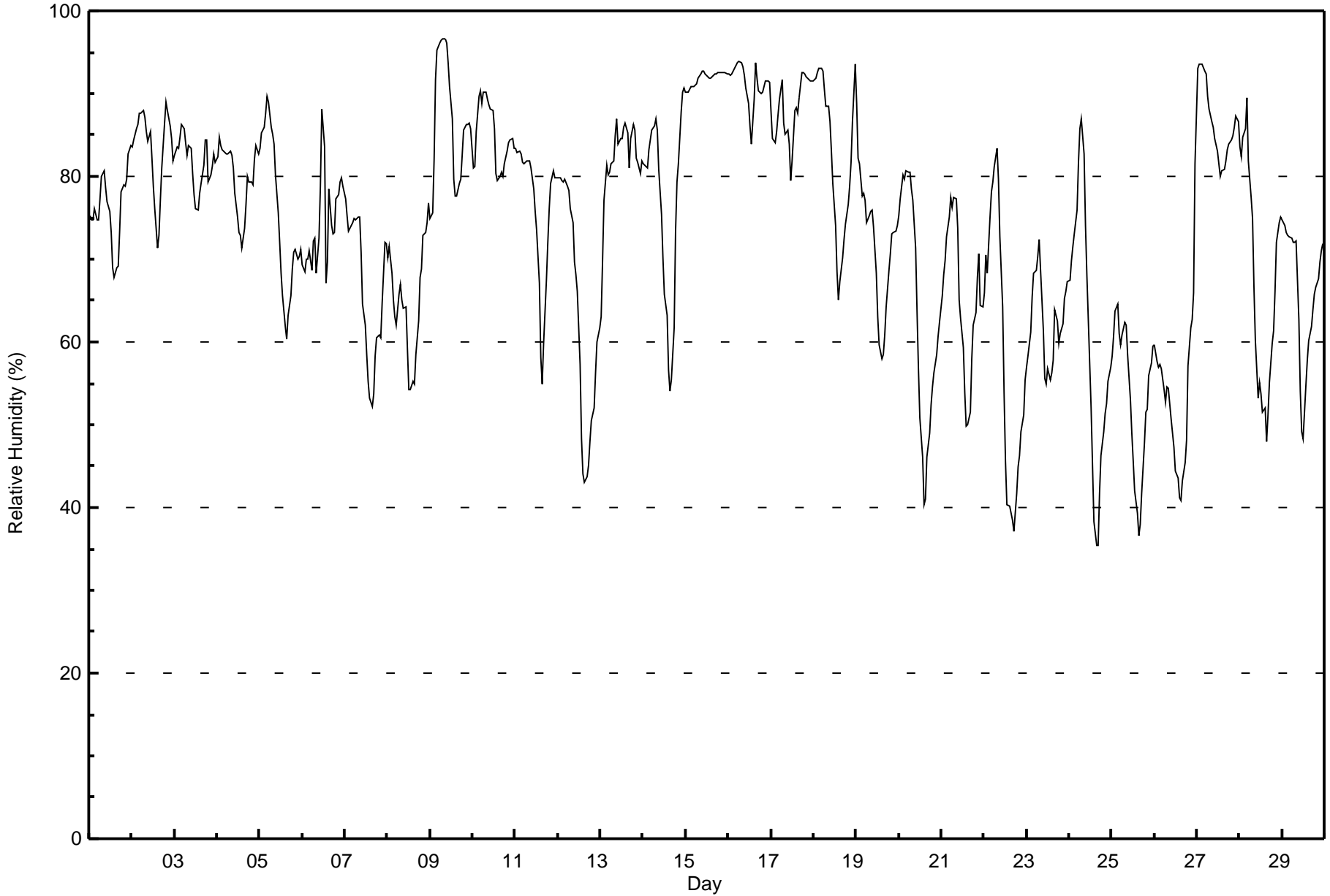
Cenovus - Christina Lake - February 2016

Maximum Value: 97 % on Feb 9 09:00 Maximum Daily Average: 91.8 % on Feb 15																		Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 35 % on Feb 24 16:00 Minimum Daily Average: 53.4 % on Feb 25 Maximum Diurnal Average: 80.5 % at hour 5 Minimum Diurnal Average: 62.7 % at hour 15 Monthly Average: 73.6 % Percentiles: P ₁ = 39 P ₁₀ = 54 Q ₁ = 64 Median = 76 Q ₃ = 84 P ₉₀ = 91 P ₉₉ = 93																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	75	75	75	76	75	75	77	80	81	79	77	76	73	69	68	69	69	73	78	79	79	80	83	84	76.0	84
2-Feb	84	84	86	86	88	88	88	87	85	84	85	82	79	76	71	73	77	81	86	89	88	86	85	82	83.4	89
3-Feb	83	84	83	85	86	86	84	83	84	83	80	78	76	76	78	79	81	84	84	79	80	81	83	82	81.8	86
4-Feb	82	85	84	83	83	83	83	83	83	81	78	75	73	73	71	74	77	80	79	79	79	82	84	83	79.8	85
5-Feb	83	85	86	88	90	89	86	85	84	80	76	72	68	66	62	60	63	66	69	71	71	70	70	71	75.5	90
6-Feb	69	68	70	70	71	69	72	73	68	73	79	88	84	67	70	78	74	73	73	77	78	79	80	79	74.3	88
7-Feb	77	75	73	74	74	75	75	75	75	71	65	62	59	55	53	52	54	58	61	61	61	65	72	72	66.4	77
8-Feb	70	72	68	65	63	62	66	67	65	64	64	59	54	54	55	55	58	62	68	69	73	73	74	77	64.9	77
9-Feb	75	76	82	92	95	96	96	97	97	96	94	91	87	80	78	78	79	80	82	86	86	86	86	86	86.6	97
10-Feb	81	81	85	90	90	89	90	90	89	89	88	88	86	80	80	80	81	80	82	83	84	84	85	83	84.9	90
11-Feb	83	83	83	83	82	81	82	82	82	81	79	76	73	67	58	55	60	68	72	76	79	81	80	80	76.0	83
12-Feb	80	80	79	79	80	79	78	76	74	70	68	66	57	48	44	43	44	45	48	50	52	56	60	62	63.3	80
13-Feb	63	70	77	81	80	81	81	82	85	87	84	85	85	86	86	85	81	85	86	86	82	82	80	82	81.7	87
14-Feb	81	81	81	83	84	86	86	87	86	81	75	70	66	63	57	54	55	62	73	79	81	88	90	91	76.7	91
15-Feb	90	90	91	91	91	91	91	92	92	93	93	92	92	92	92	92	92	92	92	92	93	93	93	92	91.8	93
16-Feb	92	92	92	93	93	94	94	94	93	92	91	89	86	84	89	94	92	90	90	90	91	91	92	91	91.3	94
17-Feb	88	85	84	85	87	89	92	87	85	86	84	80	82	88	88	88	89	93	93	92	92	92	92	91	87.9	93
18-Feb	92	92	93	93	93	93	90	88	89	87	83	79	74	69	65	67	70	72	74	77	79	82	87	94	82.5	94
19-Feb	89	82	82	78	78	77	74	75	76	76	74	68	63	60	58	59	61	64	69	71	73	73	73	74	71.9	89
20-Feb	75	77	80	80	81	80	81	78	77	71	64	57	51	46	40	41	46	49	52	55	56	59	61	62	63.3	81
21-Feb	66	68	70	73	75	77	76	77	77	74	65	63	59	54	50	50	52	58	62	64	68	71	64	64	65.7	77
22-Feb	66	71	68	75	78	79	81	83	80	73	64	54	46	40	40	39	38	37	42	45	46	49	51	55	58.4	83
23-Feb	57	58	61	66	68	69	70	72	69	61	56	55	57	55	56	58	64	63	60	61	62	65	66	67	62.4	72
24-Feb	67	70	72	73	76	82	86	87	83	74	68	63	52	45	38	35	35	42	46	49	51	53	55	57	60.8	87
25-Feb	58	61	64	65	61	60	61	62	62	59	53	49	46	42	39	37	38	42	48	52	52	56	57	59	53.4	65
26-Feb	60	58	57	57	57	54	53	55	54	51	49	47	44	44	41	41	43	45	48	57	62	63	66	82	53.6	82
27-Feb	93	94	94	93	93	92	90	88	87	86	85	83	81	80	81	81	82	83	84	84	85	86	87	87	86.6	94
28-Feb	84	82	85	86	90	82	78	75	67	60	53	55	54	52	52	48	51	55	60	61	66	72	74	75	67.3	90
29-Feb	75	74	73	73	73	73	72	72	72	63	54	49	48	55	58	60	62	64	66	67	68	70	71	72	65.9	75
	77.2	77.6	78.6	79.8	80.5	80.3	80.5	80.4	79.3	76.6	73.3	70.7	67.4	64.3	62.7	62.9	64.5	67.1	69.9	71.8	73.0	74.7	75.9	77.1	Diurnal Average	
	93	94	94	93	95	96	96	97	97	96	94	92	92	92	92	94	92	93	93	92	93	93	93	94	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Cenovus - Christina Lake - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Cenovus - Christina Lake - February 2016

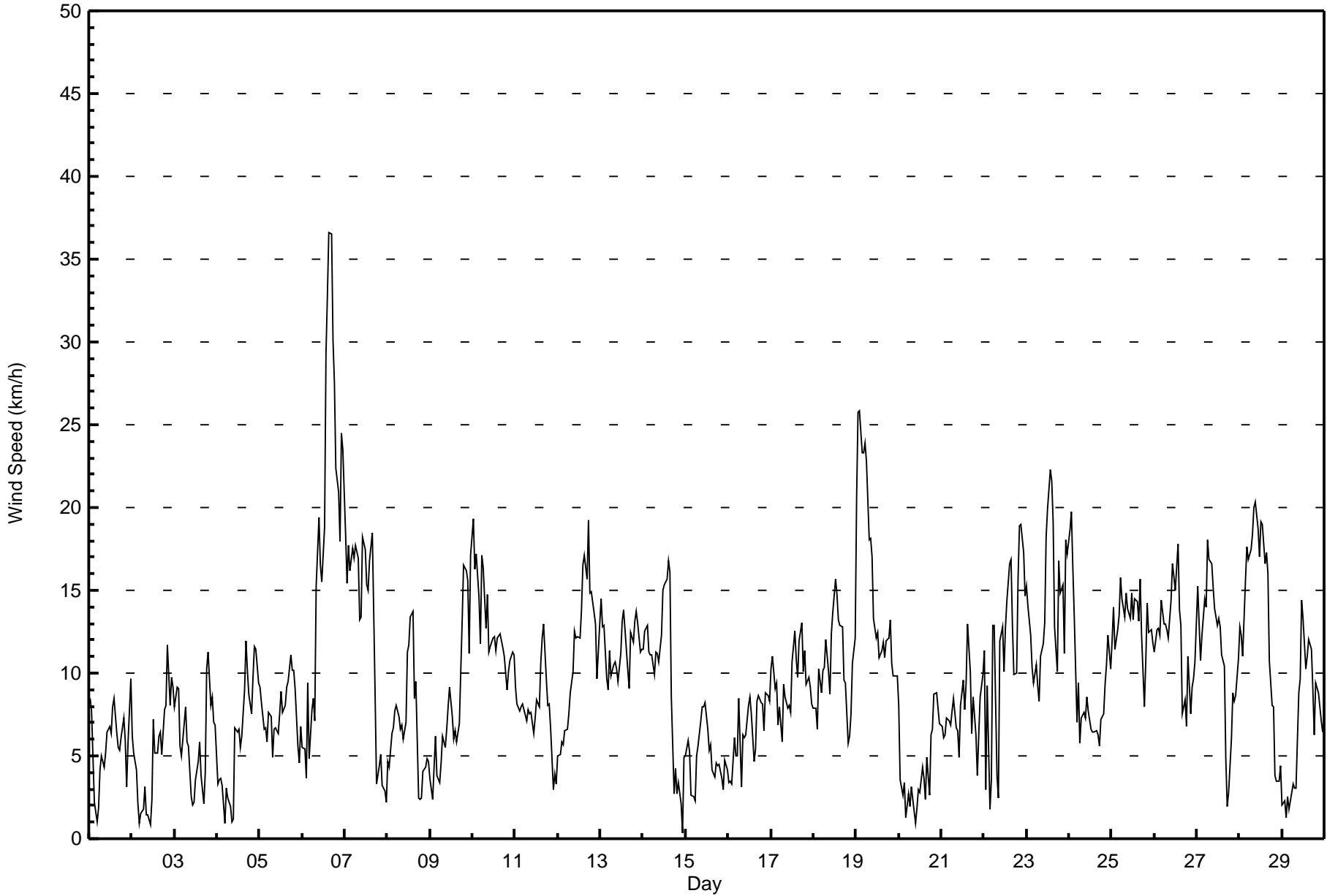
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	9	1.29	1.29
40 - 60	125	17.96	19.25
60 - 80	284	40.80	60.06
80 - 100	278	39.94	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Maximum Speed: 37 km/h on Feb 6 16:00														Maximum Daily Speed Average: 14.6 km/h on Feb 6														Hours in Service: 696	
Minimum Speed Value: 0 km/h on Feb 14 23:00														Minimum Daily Speed Average: 0.5 km/h on Feb 20														Hours of Data: 696	
Maximum Diurnal Speed Average: 5.0 km/h at hour 15														Minimum Diurnal Speed Average: 0.9 km/h at hour 8														Hours of Missing Data: 0	
Monthly Average Velocity: 2.6 km/h 261.1 deg														Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 17 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	NNE8	NNE8	NNE5	ESE2	NNW1	ESE2	ENE4	ESE5	SE4	SE5	ESE6	SSE7	S6	SSW8	SW8	SSW6	S6	S5	S6	S7	S6	S3	SSE6	S10	SSE3.1	S10			
2-Feb	S6	SSE5	E4	E2	S1	E2	ESE2	SW3	E1	S1	NE1	SSW2	SSW7	S5	S5	SW6	SSW6	SSW5	WSW8	WSW8	NW12	NW8	NNW10	N9	SW1.7	NW12			
3-Feb	NNW8	NW9	NNW9	E6	ENE5	NNE7	NE8	NNE6	N6	NE3	SE2	ESE2	SSE4	SW5	SW6	SSW4	NNE2	N4	NW10	NW11	NNW8	NNW9	NNW7	NW7	NNW3.6	NW11			
4-Feb	NE3	SSW4	SSW4	SE3	S1	NE3	SE2	SSE2	SE1	SE1	SSE7	SSE6	SSE7	SSE6	SSE6	SSE9	S12	S10	S9	SSW8	SW10	SW12	SW11	WSW9	S4.8	S12			
5-Feb	WSW9	SW8	SW7	SW7	S6	SSE8	SE7	ESE5	SE7	SSE7	S6	SSE8	SSE9	SSE8	SSW8	S9	S9	S11	S10	S10	S9	S6	SE5	SE7	S6.7	S11			
6-Feb	SSE6	SE5	ESE4	S9	S5	WSW8	WSW8	SW7	WSW15	W19	WSW17	WSW15	WSW19	W29	W33	WNW37	NW37	NW30	NW28	NW22	NW21	NW18	NW24	NW24	WNW14.6	WNW37			
7-Feb	WNW18	W15	W18	W16	W18	W17	W18	W17	W13	W13	WNW18	WNW17	W15	W15	W17	W19	WNW14	WNW9	WNW3	WNW4	W5	S3	SE3	SSW2	W12.2	W19			
8-Feb	S5	S4	S6	SSW7	SW8	SW8	SW7	SSW7	SSW7	S6	SSW7	WSW11	WSW12	W13	NW14	WNW8	WSW9	WSW2	S2	SE2	S4	S4	SSE5	ESE5	SW4.6	NW14			
9-Feb	ESE4	S2	SSE4	S6	SSE4	SE3	ESE5	E6	ESE5	SSE7	S8	SSW9	SSW7	SW6	WSW6	SW6	SW7	W10	NW13	NW16	NW16	NW16	NW11	NNW17	W3.1	NNW17			
10-Feb	NNW19	NNW16	N17	N15	N12	NNE17	NNE16	NNE13	NNE15	N11	NNE12	NNE12	NNE12	NE11	NE12	NE12	NE12	NE12	NE11	NE9	NE10	ENE11	ENE11	ENE11	NNE11.5	NNW19			
11-Feb	E9	E8	ENE8	ENE8	ENE8	ENE8	ENE7	NE8	NE8	NE8	NE6	NE7	NE8	NNE8	NNE11	NNE12	NE13	NNE10	NNE8	NE8	ENE7	ESE3	E4	ESE3	NE7.2	NE13			
12-Feb	ESE5	E5	E6	E6	E7	ESE7	SE8	SE9	SE10	SSE13	SE12	SE12	SE12	SSE14	SSE17	SSE17	SSE16	SSE19	SE15	SE15	SE14	SE13	SE10	SSE13	SE10.8	SSE19			
13-Feb	SSE14	S13	S13	S10	S9	S11	S10	S11	SSW11	SSW10	SW9	SW11	WSW13	WSW14	WSW13	SW10	SW9	SW12	SW12	SW13	SW14	WSW13	WSW11	WSW11	SSW10.3	SSE14			
14-Feb	WSW11	WSW13	WSW13	WSW11	WSW11	WSW11	WSW10	WSW11	WSW11	WSW11	W12	WNW15	WNW15	WNW16	W17	WNW16	NW9	WNW3	S4	S3	N3	SW2	S0	NNE5	W8.4	W17			
15-Feb	NE5	NE6	ENE5	SSE3	S3	E2	NNE5	NE6	ENE7	ENE8	NNE8	NNE8	NNE7	NNE5	NNE6	N4	NNE4	ESE5	ENE4	E4	SSE4	ESE3	ESE5	SE4	ENE3.9	NNE8			
16-Feb	SSE3	SSE3	SSE3	S6	S5	S5	S8	S3	SSE6	SSE6	SSE6	S8	S9	SSE8	SSE5	SSE5	S8	SSW9	SSW8	S8	SSW7	SSW9	SW9	SSW8	S6.2	SSW9			
17-Feb	SW10	SW11	WSW9	WSW9	W7	WNW8	WSW6	NW9	NW9	NW8	NNW8	N8	NNE11	NNE13	NNE11	N10	N12	NNE13	NNE10	NE11	NNE9	NNE10	NNE9	NNE8	NNW5.5	NNE13			
18-Feb	NE8	NE8	ENE7	ENE10	E9	E10	ESE10	ESE12	E10	ESE9	SE12	SE14	SE16	SE15	SE13	SE13	SSE13	S10	S9	S6	SSW6	SW8	NW11	NW12	ESE6.4	SE16			
19-Feb	NW21	NW26	NW26	NW23	NW23	NW24	NW23	NW18	NW18	NW17	NW13	NW12	NNW12	NW11	NW11	NW12	NNW11	NNW12	N12	NNE13	NNE11	NNE10	NNE10	NNE10	NW14.5	NW26			
20-Feb	NNE8	NNE4	NNE3	N3	ENE1	N3	NE2	S3	S2	ESE1	NE2	NE3	NE3	NE4	NNE4	NW2	N5	SE3	SSW6	SSW7	SSW9	SSW9	S8	SSW7	SSE0.5	SSW9			
21-Feb	SW7	SW6	WSW6	WSW7	SW7	SW7	SW8	SW8	SW7	SW7	SSW5	SSW8	SW10	SW8	SW9	WSW13	SW10	SSW6	S9	SSE6	S4	SSW6	SW9	WSW10	SW7.2	WSW13			
22-Feb	WSW11	WSW3	WNW9	WSW2	WSW4	WSW13	WSW13	WSW4	SSW2	WSW12	W13	WSW10	W13	W14	W17	W17	WSW13	WSW10	WSW10	W16	W19	W19	W17	WNW15	W11.1	W19			
23-Feb	W15	W14	WSW12	WSW10	SW9	WSW11	SW9	SW8	WSW11	WSW12	W13	WNW18	WNW20	WNW22	NW22	NW19	WNW13	WNW10	NW17	NW15	NW15	NW11	NW18	NW17	WNW12.6	WNW22			
24-Feb	NW19	WNW20	WNW16	WNW14	W7	WSW9	SW6	SW7	SSW8	SSW7	SSW9	SSW8	SW7	SSW6	SW6	SSW7	SSW6	SW6	SSW7	S8	S9	S10	S12	S10	SW6.3	WNW20			
25-Feb	S12	S14	S11	S13	SSW13	SSW16	SSW15	SSW13	SW15	SW14	SW13	WSW15	WSW13	WSW14	WSW14	WSW13	W16	WSW12	SW8	SW11	WSW14	WSW12	WSW13	WSW12	SW12.0	SSW16			
26-Feb	WSW11	SW13	SW13	SW12	SW14	SW13	WSW13	WSW13	WSW12	W14	W17	WSW16	WSW15	W18	W14	W13	WNW8	NNW8	NNW7	NE11	ENE8	NE9	NE10	NE11	W7.6	W18			
27-Feb	NE15	NE13	NE11	NE12	ENE15	NE14	NE18	NE17	NE17	NE15	NE14	NE13	NNE13	N13	N11	N10	NE5	SSE2	WSW3	SW6	WSW9	SW8	SW9	WSW11	NE7.1	NE18			
28-Feb	WSW13	W12	NW11	NNW16	NNE18	NNE17	N17	N18	N20	N20	N19	N17	NNE19	NNE19	NNE17	NNE17	NNE16	NNE11	NE8	ENE8	E4	ESE3	ESE3	ESE4	N10.9	N20			
29-Feb	E2	SSE2	SE1	ESE3	E2	NE3	NE3	ENE3	ENE3	S9	SSW10	S14	SSW13	S10	S11	S12	S11	S9	SSW6	S9	S9	SSE8	S7	SSW6	S5.9	S14			
W3.1 W2.9 W2.6WSW1.9WSW1.6 W1.8WSW1.4WSW0.9WSW1.3WSW2.5WSW2.7WSW3.3WSW3.4 W4.2 W5.0 W4.5 W3.0WSW2.3WSW2.3WSW1.9WSW2.7WSW2.9 W2.6 W2.6																								Diurnal Average					
NW21 NW26 NW26 NW23 NW23 NW24 NW23 N18 N20 N20 N19WNW18WNW20 W29 W33WNW37 NW37 NW30 NW28 NW22 NW21 W19 NW24 NW24																								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 2016**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	146	20.98	20.98
6 - 11	322	46.26	67.24
12 - 19	205	29.45	96.70
20 - 28	18	2.59	99.28
29 - 38	5	0.72	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Cenovus - Christina Lake - February 2016**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	9	13	7	10	23	15	15	25	8	3	6	1	3	1	1	146
6 - 11	7	24	24	15	10	4	7	21	52	40	48	36	3	6	15	10	322
12 - 19	9	19	15	1	0	1	13	9	9	6	12	35	35	13	21	7	205
20 - 28	2	0	0	0	0	0	0	0	0	0	0	0	0	3	13	0	18
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	24	52	52	23	20	28	35	45	86	54	63	77	41	26	52	18	696

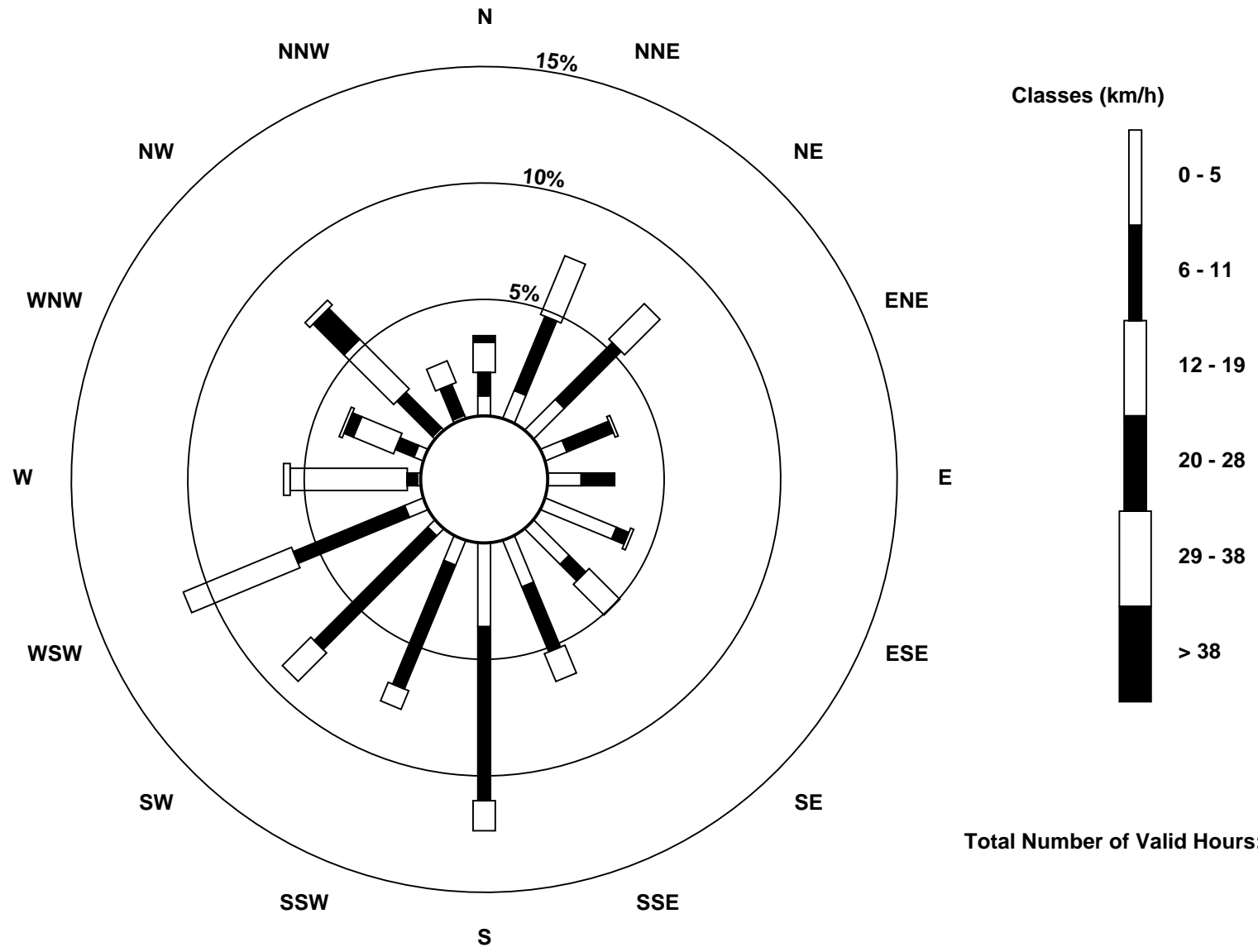
Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

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 2016

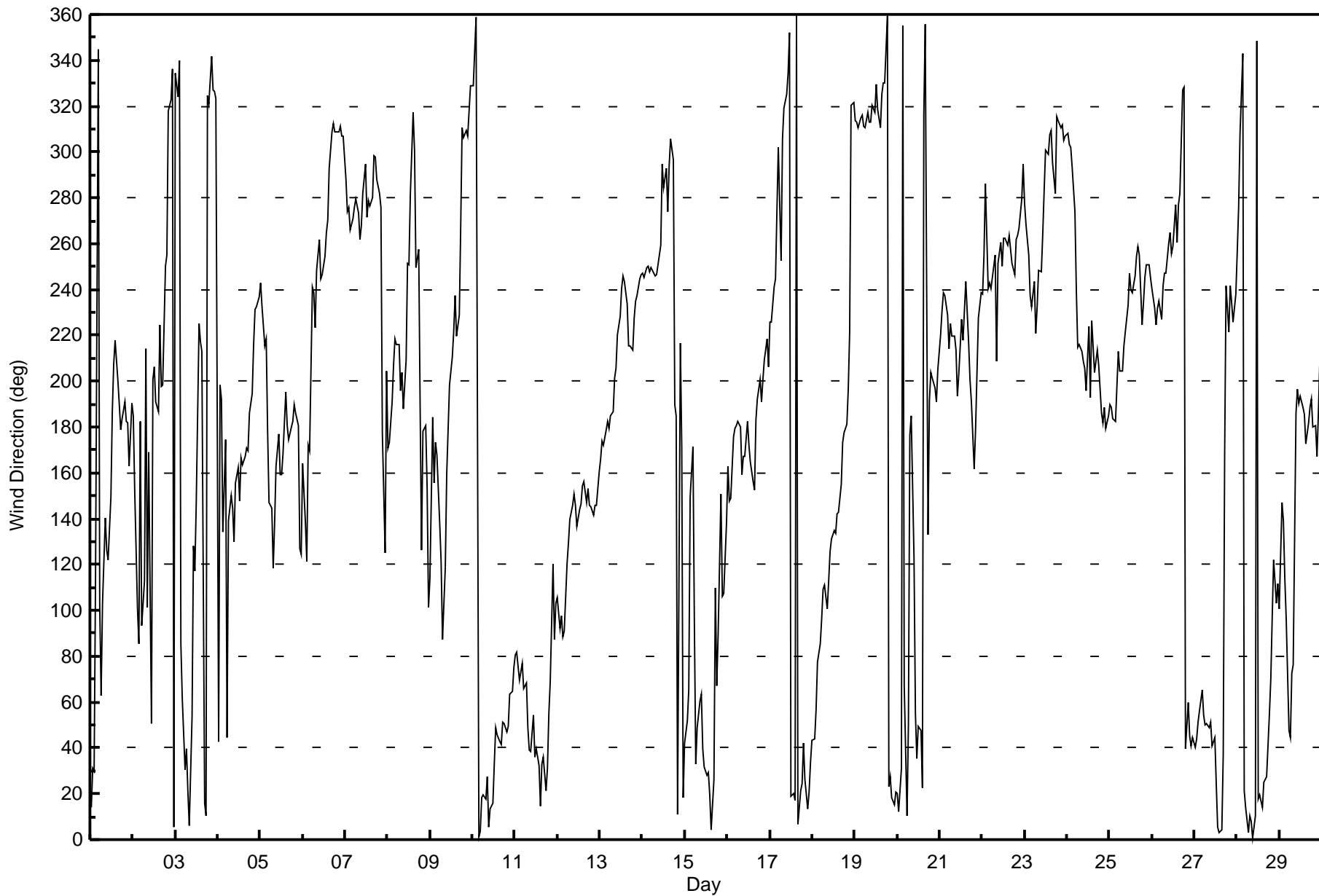
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 6 16:00 Minimum Value: 0 km/h on Feb 15 22:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																	Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 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	1	3	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	2	2	3
2-Feb	2	1	1	1	1	2	2	2	1	1	1	3	2	2	2	2	1	1	3	2	3	1	2	2	3
3-Feb	1	2	2	1	1	1	2	1	1	1	1	1	2	1	1	1	2	5	2	2	1	1	1	5	
4-Feb	1	1	1	1	2	1	1	1	1	1	2	1	1	2	2	3	3	3	3	2	3	3	3	3	3
5-Feb	3	3	1	2	1	1	1	1	1	1	2	2	2	2	3	2	2	2	3	3	2	2	2	1	3
6-Feb	2	1	2	2	1	3	2	3	5	5	4	5	5	8	8	9	9	8	7	5	4	4	5	5	9
7-Feb	5	4	4	4	4	5	4	4	4	4	5	5	4	4	5	5	4	2	2	2	2	2	1	2	5
8-Feb	2	2	1	2	1	2	1	1	2	1	2	3	3	4	4	3	2	2	1	1	2	1	2	2	4
9-Feb	1	2	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	4	4	3	4	3	3	5	5
10-Feb	5	4	4	3	2	3	4	3	3	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	5
11-Feb	2	2	1	1	1	2	2	2	1	1	1	2	2	2	2	2	3	2	2	3	2	1	1	1	3
12-Feb	2	2	1	2	1	1	2	2	2	3	3	3	4	4	4	4	3	4	4	3	3	3	2	3	4
13-Feb	3	3	3	3	3	3	3	2	3	3	3	4	4	4	3	3	2	3	3	3	4	3	3	3	4
14-Feb	3	3	3	2	2	2	2	2	3	3	3	4	4	4	4	4	3	2	2	2	2	2	1	3	4
15-Feb	1	1	1	1	1	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	0	1	1	2
16-Feb	1	1	1	1	1	1	2	1	2	2	2	3	2	2	2	1	2	2	2	2	2	2	2	2	3
17-Feb	3	3	2	2	3	5	2	3	3	2	2	2	4	2	2	2	2	2	3	2	3	2	2	1	5
18-Feb	1	1	1	2	2	2	3	3	2	2	3	3	5	4	3	4	3	2	3	2	1	2	3	5	5
19-Feb	5	5	5	4	5	5	4	3	4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	5
20-Feb	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3
21-Feb	2	2	2	2	2	2	2	2	2	2	1	2	3	2	3	4	3	1	1	2	1	2	1	2	4
22-Feb	2	3	4	3	4	2	3	2	3	3	4	3	4	5	4	5	3	3	4	4	5	5	5	3	5
23-Feb	4	4	3	2	2	2	1	2	2	3	4	5	6	5	4	4	4	3	4	3	3	2	3	3	6
24-Feb	3	5	5	5	5	2	2	2	2	2	2	2	3	3	2	2	2	1	1	1	2	2	2	3	5
25-Feb	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	5	4	4	2	3	4	3	3	3	5
26-Feb	3	3	3	3	4	4	4	3	3	5	5	4	4	5	4	4	3	2	4	3	2	2	2	2	5
27-Feb	3	3	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	2	2	2	2	3	3	3
28-Feb	4	4	3	3	5	4	4	4	5	4	3	4	5	4	4	3	3	3	1	2	1	1	1	1	5
29-Feb	1	1	1	1	1	1	1	1	1	3	4	4	3	3	3	3	2	2	1	2	2	1	2	2	4
Diurnal Maximum																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Cenovus - Christina Lake - February 2016

Direction of Maximum Speed: 293 deg on Feb 6 16:00																						Hours in Service: 696			
Direction of Maximum Daily Speed Average: 282.2 deg on Feb 6																						Hours of Data: 696			
Direction of Minimum Speed: 171 deg on Feb 14 23:00											Direction of Minimum Daily Speed Average: 0.5 deg on Feb 20											Hours of Missing Data: 0			
Monthly Average Direction: 239.5 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	14	31	30	113	345	103	63	103	140	126	122	150	187	207	218	200	190	179	184	191	182	182	163	190	162.9
2-Feb	185	152	101	85	183	93	113	214	101	169	50	201	206	191	187	224	198	199	250	255	318	323	336	5	235.3
3-Feb	335	324	340	85	62	30	40	22	6	54	128	117	147	225	218	213	16	10	324	321	341	327	327	323	347.2
4-Feb	43	199	192	134	174	45	139	150	145	130	156	162	148	167	164	167	171	170	186	195	216	231	232	237	184.4
5-Feb	243	232	216	218	178	147	145	118	138	163	177	159	159	168	195	180	174	180	182	190	186	180	127	124	176.7
6-Feb	164	139	122	172	170	241	239	223	248	262	245	247	254	265	270	293	309	312	309	308	309	311	307	307	282.2
7-Feb	288	274	276	266	271	276	279	274	262	268	282	295	271	279	276	280	298	298	288	282	276	178	125	205	276.9
8-Feb	171	174	191	207	218	216	216	196	204	188	209	252	251	281	317	301	249	258	189	126	178	181	153	102	226.4
9-Feb	114	184	156	173	168	138	122	87	119	159	179	198	210	222	237	220	229	268	310	306	310	307	318	329	261.9
10-Feb	329	344	359	1	4	18	19	18	27	5	14	16	33	49	46	43	42	51	51	47	49	63	65	75	25.1
11-Feb	81	82	70	73	77	66	68	49	39	38	54	36	40	33	15	33	36	21	31	55	69	120	87	103	51.7
12-Feb	105	92	98	88	91	120	129	139	146	151	146	137	144	147	155	156	147	153	146	145	142	146	146	161	141.8
13-Feb	166	174	172	179	182	179	185	187	201	206	220	228	240	246	244	234	216	215	214	228	235	237	244	246	212.6
14-Feb	247	245	250	250	248	249	247	246	247	251	259	295	284	293	274	294	306	297	190	185	11	217	171	18	265.6
15-Feb	42	52	65	149	171	95	33	49	61	63	40	31	28	29	20	5	26	110	67	90	151	106	107	139	59.4
16-Feb	163	147	149	176	179	181	183	180	159	167	167	182	172	165	156	153	183	192	201	191	201	209	218	206	182.2
17-Feb	226	226	241	245	274	302	252	306	319	325	334	352	19	20	17	360	7	22	24	42	26	13	21	33	346.9
18-Feb	43	44	57	78	86	97	109	111	101	113	126	131	135	134	142	143	155	173	177	181	196	222	321	321	123.5
19-Feb	314	313	310	315	316	311	311	317	313	313	320	318	329	319	311	325	330	330	360	23	27	18	15	21	325.5
20-Feb	20	12	31	355	67	10	51	176	185	123	55	35	49	48	22	316	356	133	192	204	201	197	191	205	160.1
21-Feb	220	231	239	238	229	214	225	219	220	214	193	203	227	218	231	243	218	201	191	162	179	204	228	239	218.9
22-Feb	238	255	286	240	243	241	245	255	209	251	260	250	262	262	259	264	258	251	247	262	263	267	279	295	260.0
23-Feb	278	269	255	238	233	244	221	232	248	248	264	283	301	299	308	309	296	282	315	314	311	312	305	307	285.2
24-Feb	308	303	302	294	274	240	215	216	213	209	206	196	224	193	226	204	209	214	207	186	182	188	179	185	231.9
25-Feb	190	188	184	182	198	213	205	205	215	222	233	247	240	239	246	255	259	255	224	234	245	251	251	245	226.6
26-Feb	241	232	224	232	235	227	242	247	247	260	265	256	258	277	260	277	282	327	328	40	60	45	41	44	262.3
27-Feb	40	44	52	56	65	54	50	51	49	51	41	45	24	5	3	4	37	167	242	221	242	234	226	238	38.8
28-Feb	256	276	308	343	21	14	3	10	8	0	10	349	18	20	14	25	26	28	55	70	97	122	103	112	9.6
29-Feb	101	147	139	114	96	47	45	73	76	186	196	190	193	188	185	173	182	188	192	180	180	167	186	208	178.7
278.9	271.7	277.0	247.2	247.3	258.9	248.4	245.9	246.0	243.8	244.9	252.6	254.4	267.3	268.8	274.7	269.1	250.6	255.1	247.7	255.7	249.2	272.5	278.7		
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 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on Feb 22 04:00 Minimum Value: 5 deg on Feb 21 19:00 Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 14 Median = 17 Q ₃ = 22 P ₉₀ = 37 P ₉₉ = 83																	Hours in Service: 696 Hours of Data: 696 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	11	12	33	46	95	72	22	15	34	15	19	15	21	20	22	20	19	12	8	10	13	30	18	11	95		
2-Feb	14	20	39	47	51	79	64	31	57	28	68	76	18	36	49	20	12	11	18	31	12	11	19	21	79		
3-Feb	13	11	22	39	24	12	14	24	14	33	39	56	27	38	19	25	76	59	42	12	15	11	17	16	76		
4-Feb	45	26	33	58	93	26	37	24	62	63	17	15	14	19	18	17	13	15	16	20	19	17	17	17	93		
5-Feb	23	19	16	16	22	14	13	15	11	18	20	14	16	12	21	23	12	12	14	15	15	20	35	10	35		
6-Feb	21	23	53	13	29	29	16	19	19	16	17	18	18	16	16	15	13	14	13	12	12	12	10	11	53		
7-Feb	17	17	15	16	16	15	15	15	18	21	17	19	21	21	20	20	20	19	48	30	34	64	36	94	94		
8-Feb	35	11	15	19	15	14	14	21	15	14	21	19	18	28	17	29	19	86	81	54	45	35	33	26	86		
9-Feb	45	82	21	9	11	25	30	11	12	20	17	18	19	28	16	14	13	29	15	11	11	13	14	12	82		
10-Feb	14	17	18	20	20	14	16	20	12	17	19	15	16	18	16	13	12	11	10	14	13	11	10	10	20		
11-Feb	11	13	13	13	12	19	17	11	13	13	18	17	19	24	19	13	13	8	13	13	24	32	39	51	51		
12-Feb	20	19	10	10	14	15	16	13	15	13	15	16	19	17	13	14	14	12	16	14	13	14	15	13	20		
13-Feb	14	15	14	15	16	15	16	13	18	18	23	21	18	17	16	18	16	15	15	16	16	16	16	15	23		
14-Feb	15	15	17	14	13	14	13	12	14	18	20	20	21	20	18	23	25	66	27	81	47	60	84	38	84		
15-Feb	19	17	17	40	20	34	14	14	13	13	20	20	26	30	26	37	50	25	20	24	22	12	13	39	50		
16-Feb	21	23	25	15	20	17	15	34	12	15	16	19	14	14	20	16	23	18	18	14	18	18	18	16	34		
17-Feb	20	18	18	13	37	61	50	27	22	14	17	21	25	15	12	14	12	12	14	11	21	14	11	14	61		
18-Feb	9	10	16	10	15	13	15	13	13	14	16	13	14	17	16	18	12	13	13	12	16	12	27	12	27		
19-Feb	12	11	11	12	13	10	11	11	12	12	14	16	21	28	27	18	17	10	20	13	11	16	16	12	28		
20-Feb	13	25	60	48	53	42	43	28	26	55	64	42	47	30	28	67	31	59	21	17	16	17	17	19	67		
21-Feb	19	24	19	18	19	19	16	14	17	19	33	21	23	28	24	18	15	11	5	19	29	15	11	12	33		
22-Feb	13	108	31	112	93	12	13	40	80	16	18	25	22	18	17	17	16	15	25	14	16	16	16	15	112		
23-Feb	18	17	18	13	12	14	11	13	15	18	22	18	19	17	13	16	24	25	11	10	9	10	10	8	25		
24-Feb	8	14	14	21	42	13	40	27	18	22	22	20	33	39	39	30	25	21	14	10	10	13	11	14	42		
25-Feb	14	13	14	13	17	16	15	16	17	18	19	18	17	18	19	20	16	16	12	17	16	15	16	14	20		
26-Feb	17	16	16	17	16	16	18	17	18	21	18	17	26	17	17	23	27	20	33	18	12	9	10	14	33		
27-Feb	9	11	11	11	12	11	10	10	9	11	10	13	16	17	17	17	26	60	81	15	16	15	18	19	81		
28-Feb	17	22	25	23	12	16	18	15	18	19	19	20	20	19	21	17	14	10	11	15	14	18	20	19	25		
29-Feb	36	34	35	29	35	24	18	17	34	36	22	20	21	20	21	13	14	14	14	14	11	10	18	20	36		
																	45 108 60 112 95 79 64 40 80 63 68 76 47 39 49 67 76 86 81 81 47 64 84 94										
Diurnal Maximum																											



Wood Buffalo Environmental Association

As Found SO2 Calibration Report

Station Information

Calibration Date	February 12, 2016	Last Calibration	January 19, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Reason:	As Found Linearity test to verify analyzer response		
Start Time (MST)	13:05	End Time (MST)	14:30
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	Sep-8-2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-698	-697
Analyzer IP address	192.168.1.43		Lamp voltage	842	840
Calculated slope	0.990147	0.989893	Chamber temp	44.9	45.0
Calculated intercept	2.126881	1.769710	Pressure	677.9	681.4
Analyzer Background	14.0	13.3	Flow	0.339	0.000
Analyzer Coefficient	1.048	1.027	Intensity	91	90

Analyzer make Thermo 43i Analyzer serial # 118148497

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	800.5	0.991
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	79.3	793.0	800.5	0.991
second point	5000	39.7	397.0	397.3	0.999
third point	5000	19.8	198.0	197.4	1.003
as left zero					
as left span					
Average Correction Factor					0.998

Corrected As found 800.7 Previous response 798.8 % change -0.2%

Notes:

Three point as found Calibration done to verify analyzer precision and accuracy because of the low sample flow.

Calibration Performed By: Evan Magill



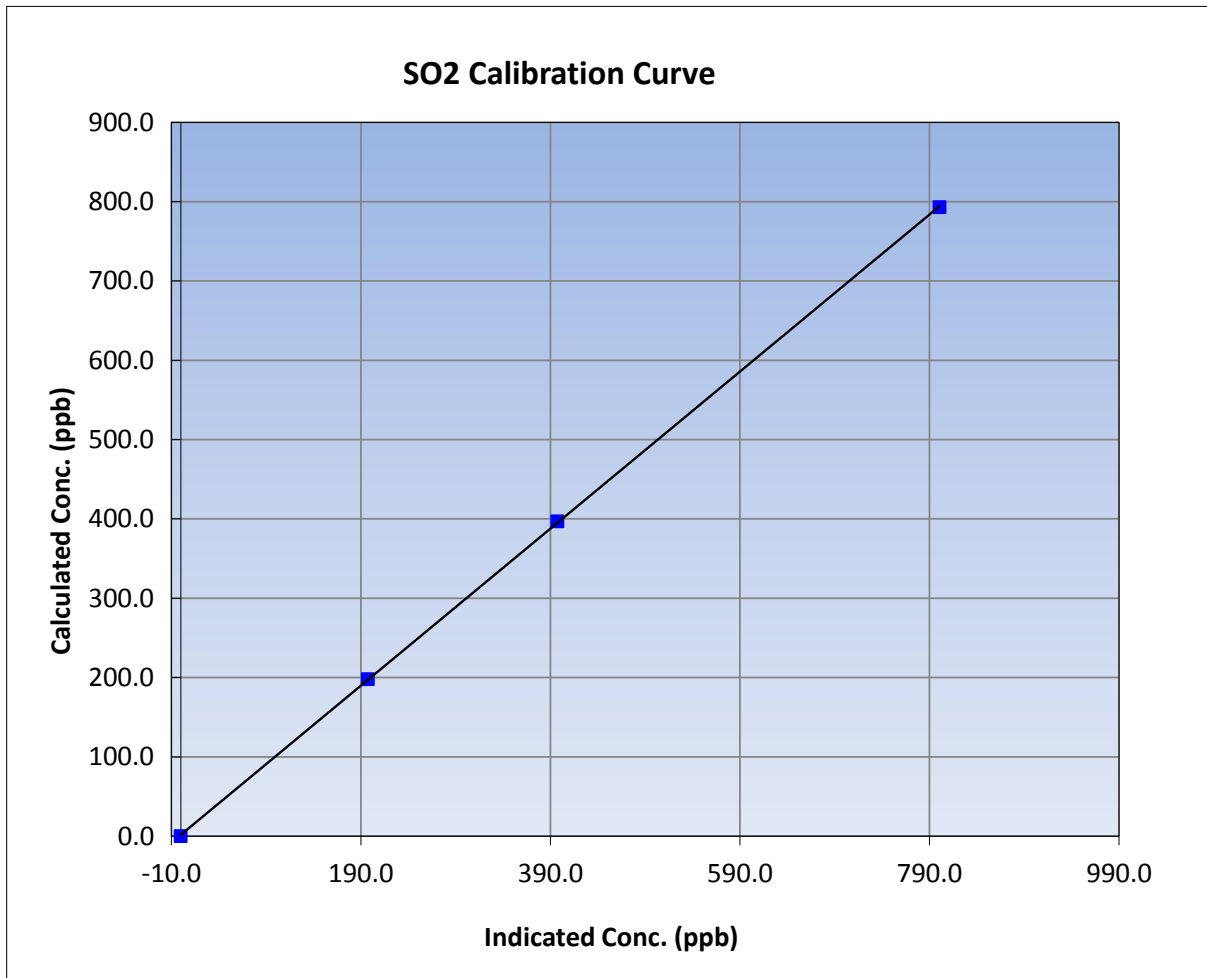
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 12, 2016	Previous Calibration	January 19, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Start Time (MST)	13:05	End Time (MST)	14:30
Analyzer make	Thermo 43i	Analyzer serial #	118148497

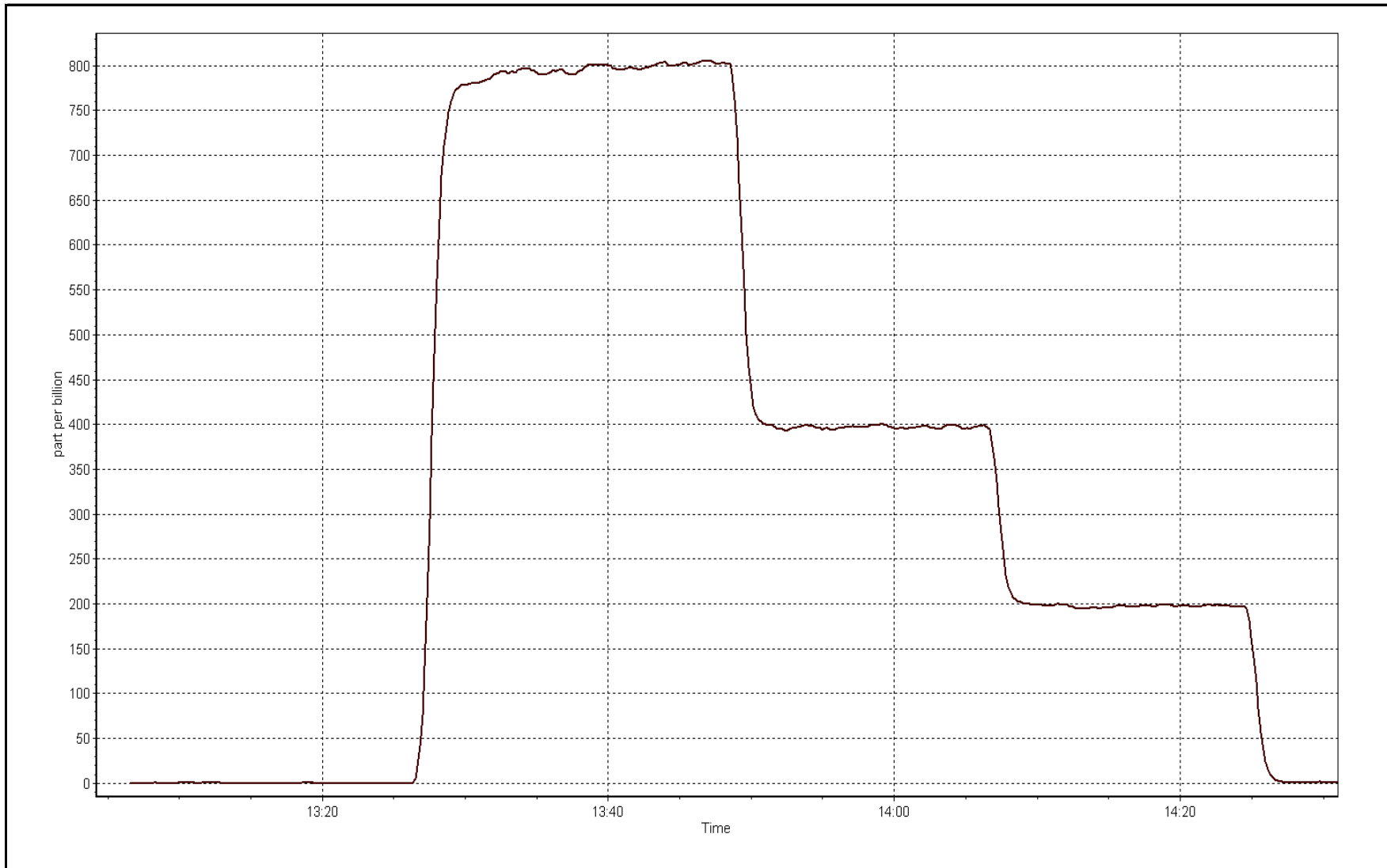
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999976
793.0	800.5	0.9906		
397.0	397.3	0.9992	Slope	0.989893
198.0	197.4	1.0030		
			Intercept	1.769710



SO2 Calibration Plot

Date: February 12, 2016





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 12, 2016	Last Calibration	February 12, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 504
Reason:	Routine		
Start Time (MST)	16:45	End Time (MST)	18:00
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	Sep-8-2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-697	-698
Analyzer IP address	192.168.1.43		Lamp voltage	840	843
Calculated slope	0.990147	0.998172	Chamber temp	45.0	44.8
Calculated intercept	2.126881	3.414356	Pressure	681.4	681.7
Analyzer Background	14.0	14.5	Flow	0.000	0.603
Analyzer Coefficient	1.048	1.032	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 118148497

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)
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	79.3	793.0	793.2	1.000
second point	5000	39.7	397.0	390.6	1.016
third point	5000	19.8	198.0	193.4	1.024
Average Correction Factor					1.013

Corrected As found NA Previous response NA % change NA

Notes:

Calibration conducted after maintenance (replaced faulty analyzer flow sensor).

Calibration Performed By: Evan Magill



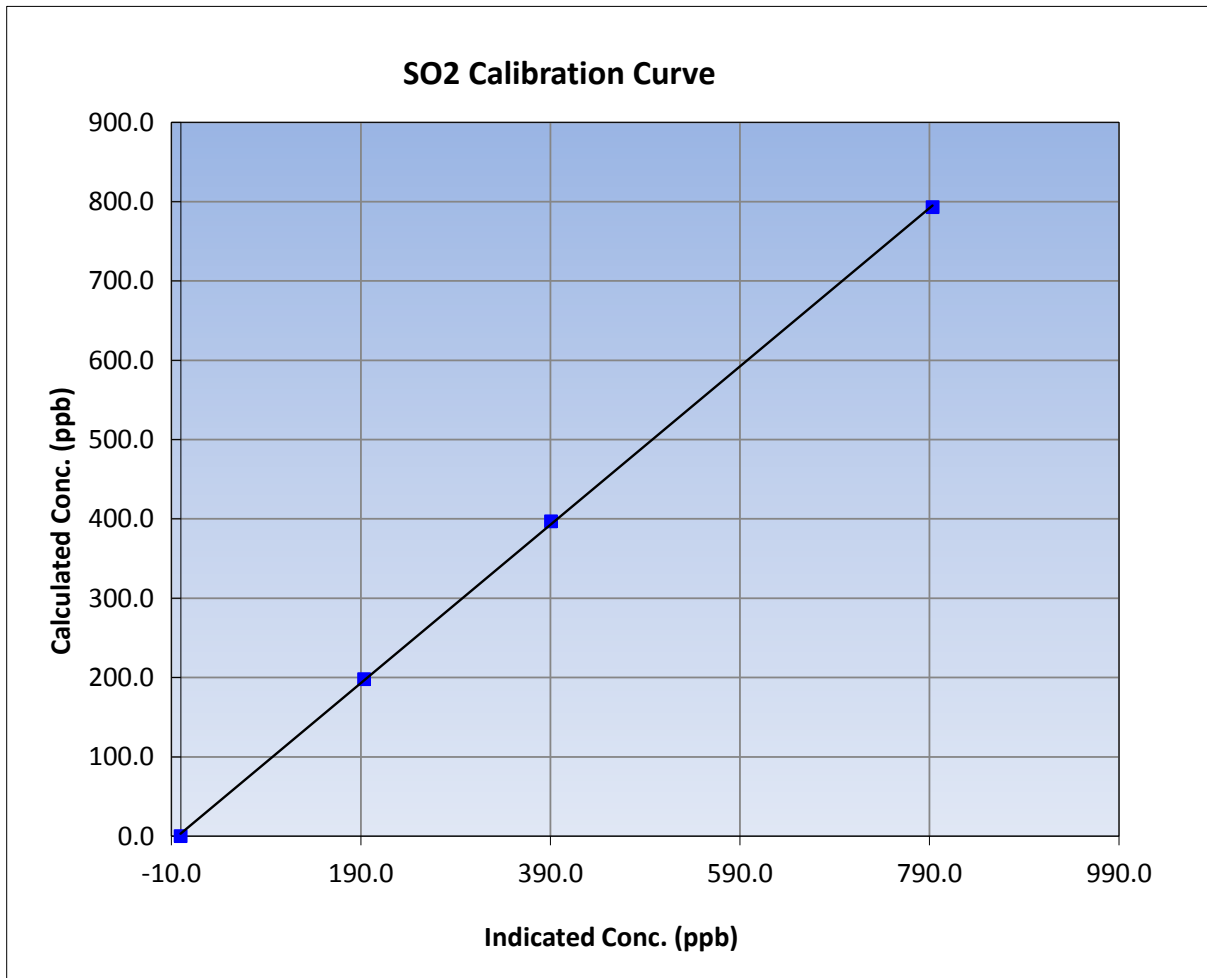
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 12, 2016	Previous Calibration	February 12, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 504
Start Time (MST)	16:45	End Time (MST)	18:00
Analyzer make	Thermo 43i	Analyzer serial #	118148497

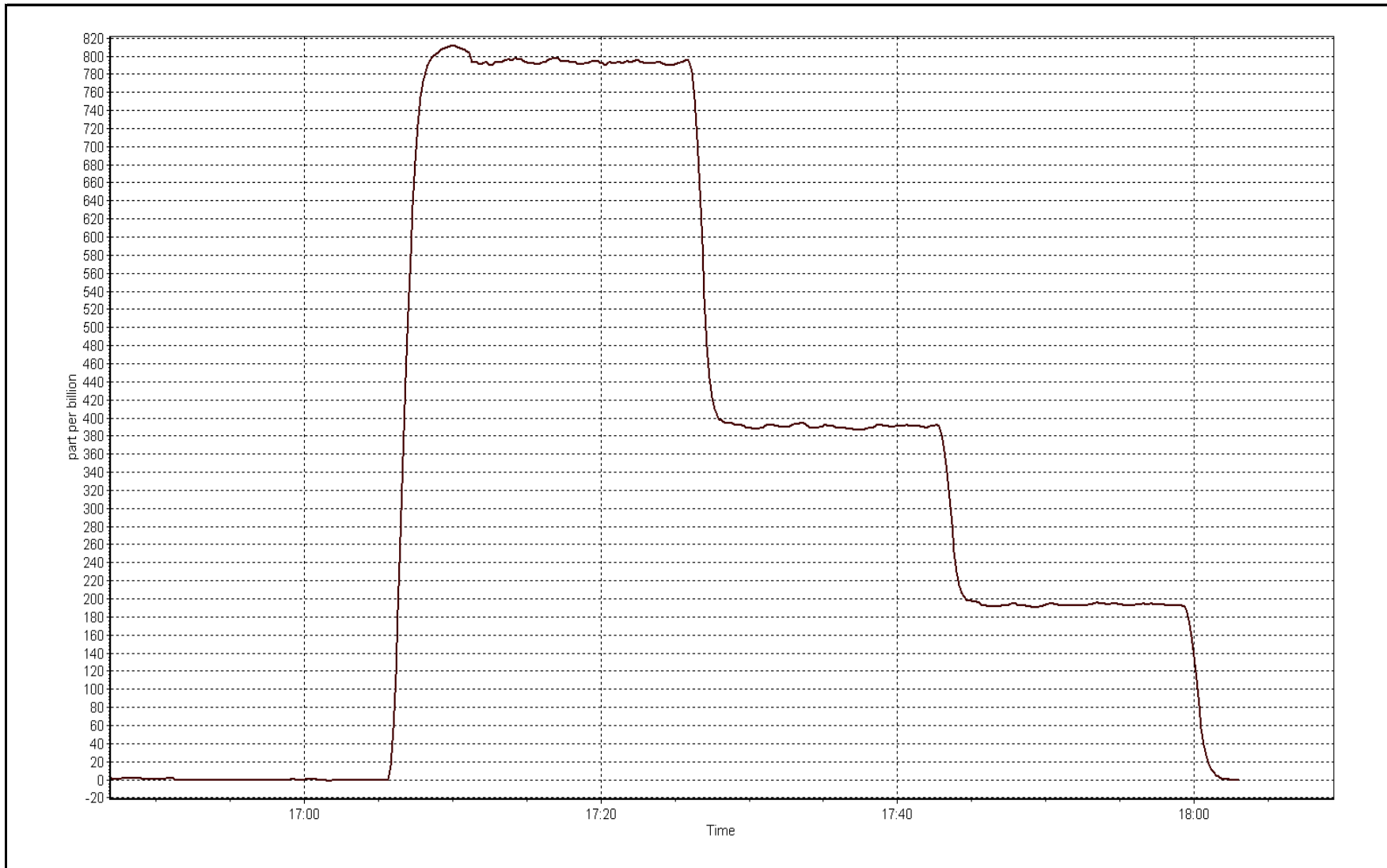
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999913
793.0	793.2	0.9997		
397.0	390.6	1.0163	Slope	0.998172
198.0	193.4	1.0238		
			Intercept	3.414356



SO2 Calibration Plot

Date: February 12, 2016





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 17, 2016	Last Calibration	February 12, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	14:50	End Time (MST)	19:10
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	Sep-8-2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-698	-698
Analyzer IP address	192.168.1.43		Lamp voltage	843	841
Calculated slope	0.998172	0.997571	Chamber temp	44.8	45.1
Calculated intercept	3.414356	0.621039	Pressure	681.7	669.9
Analyzer Background	14.5	13.3	Flow	0.603	0.583
Analyzer Coefficient	1.032	1.027	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 118148497

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	-1.6	----
as found span	5000	79.3	793.0	798.6	0.993
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	79.3	793.0	794.7	0.998
second point	5000	39.7	397.0	396.6	1.001
third point	5000	19.8	198.0	197.8	1.001
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	79.3	793.0	792.8	1.000
Average Correction Factor					1.000

Corrected As found 800.2 Previous response 791.0 % change -1.1%

Notes:

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

Calibration Performed By: Evan Magill



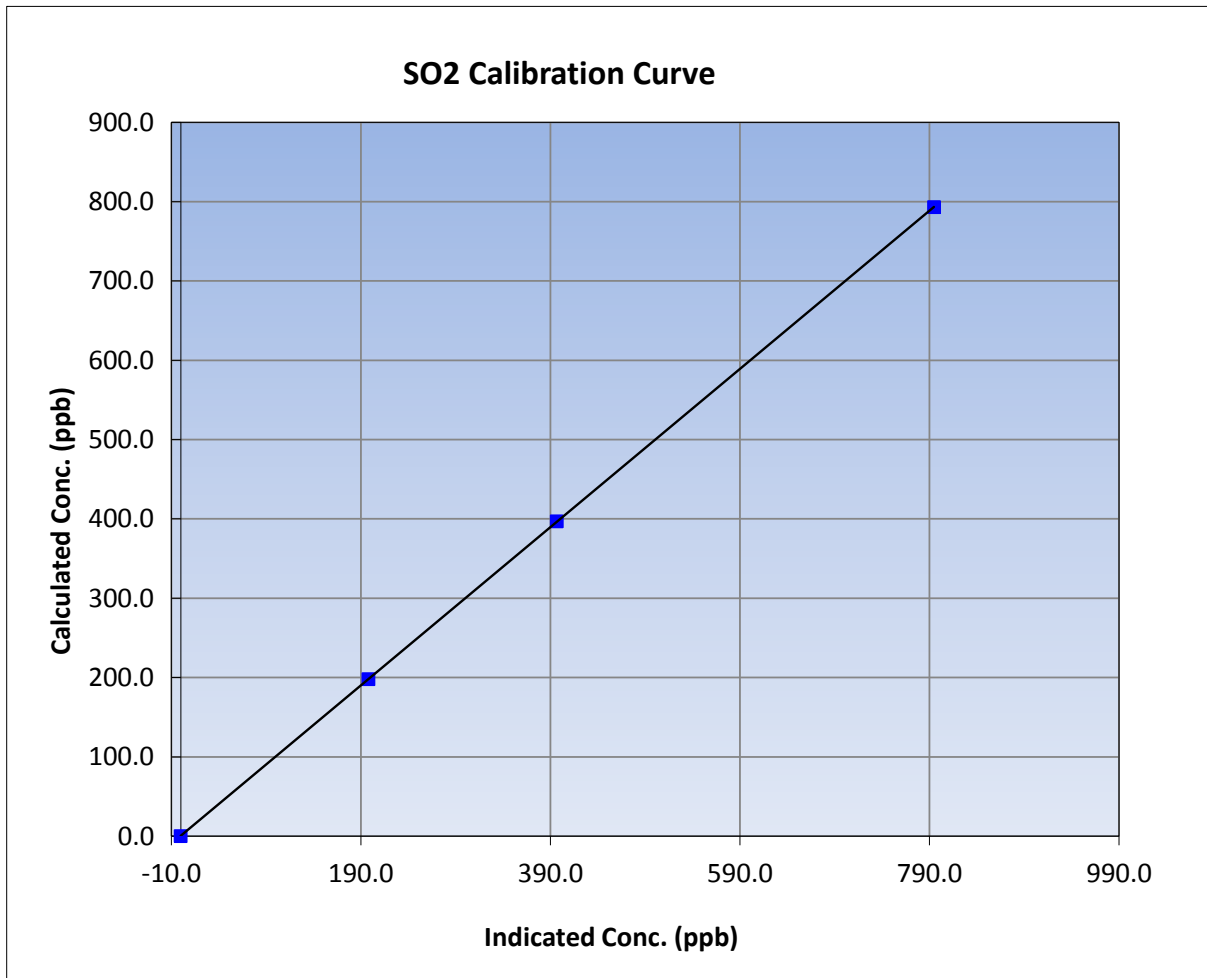
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 17, 2016	Previous Calibration	February 12, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Start Time (MST)	14:50	End Time (MST)	19:10
Analyzer make	Thermo 43i	Analyzer serial #	118148497

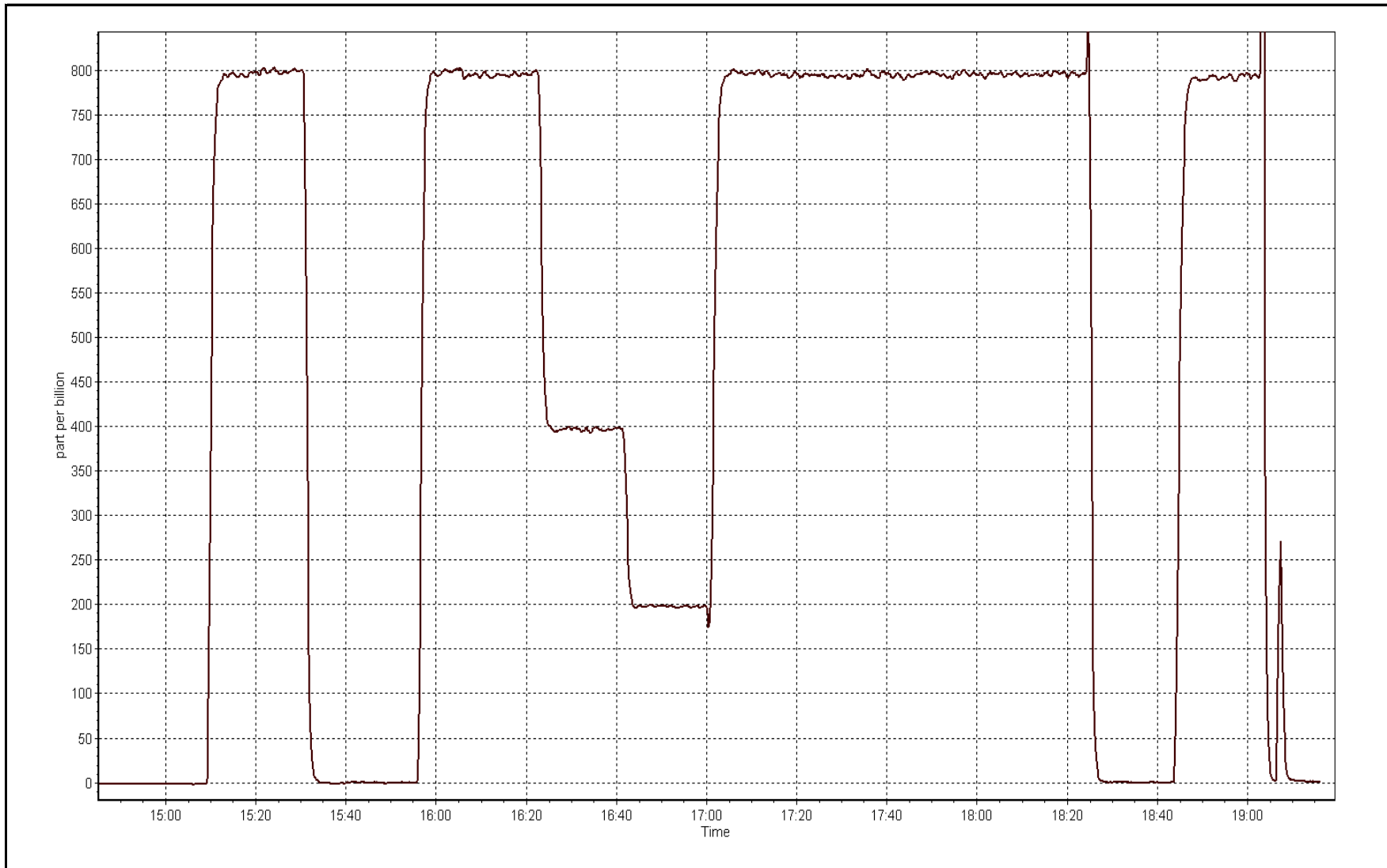
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999997
793.0	794.7	0.9979		
397.0	396.6	1.0010	Slope	0.997571
198.0	197.8	1.0011		
			Intercept	0.621039



SO2 Calibration Plot

Date: February 17, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 18, 2016	Last Calibration	January 20, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	11:45
Gas Cert Reference	LL23598	Station temp.	22 Deg C
Cal Gas Concentration	10.2 ppm	Cal Gas Exp Date	5/30/2016
Calibrator Make/Model	API 700	Serial Number	451
ZAG air Make/Model	API 701	Serial Number	404
DACS make/model	Campbell Scientific CR3000	Serial Number	2575
SO2 gas concentration	50 ppm	SO2 gas cert/exp	LL107928 09-Aug-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-680	-680
Analyzer IP address	192.168.1.42		Lamp voltage	985	982
Calculated slope	1.005565	0.995289	Chamber temp	45	45
Calculated intercept	0.023109	0.262628	Pressure	659.3	639.1
Analyzer Background	1.76	1.76	Flow	0.438	0.424
Analyzer Coefficient	0.907	0.882	Intensity	91	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	39.3	80.2	82.4	0.973
SO2 scrubber check	5000	20.0	200.0	1.6	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	39.3	80.2	80.4	0.998
second point	5000	19.7	40.2	40.1	1.003
third point	6000	11.9	20.2	19.9	1.017
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	39.3	80.2	80.4	0.997
Average Correction Factor					1.006

Corrected As found	82.5	Previous response	79.7	% change	-3.4%
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Notes:

Changed inlet filter and scrubber check done after as founds. Adjusted span.

Calibration Performed By: Evan Magill



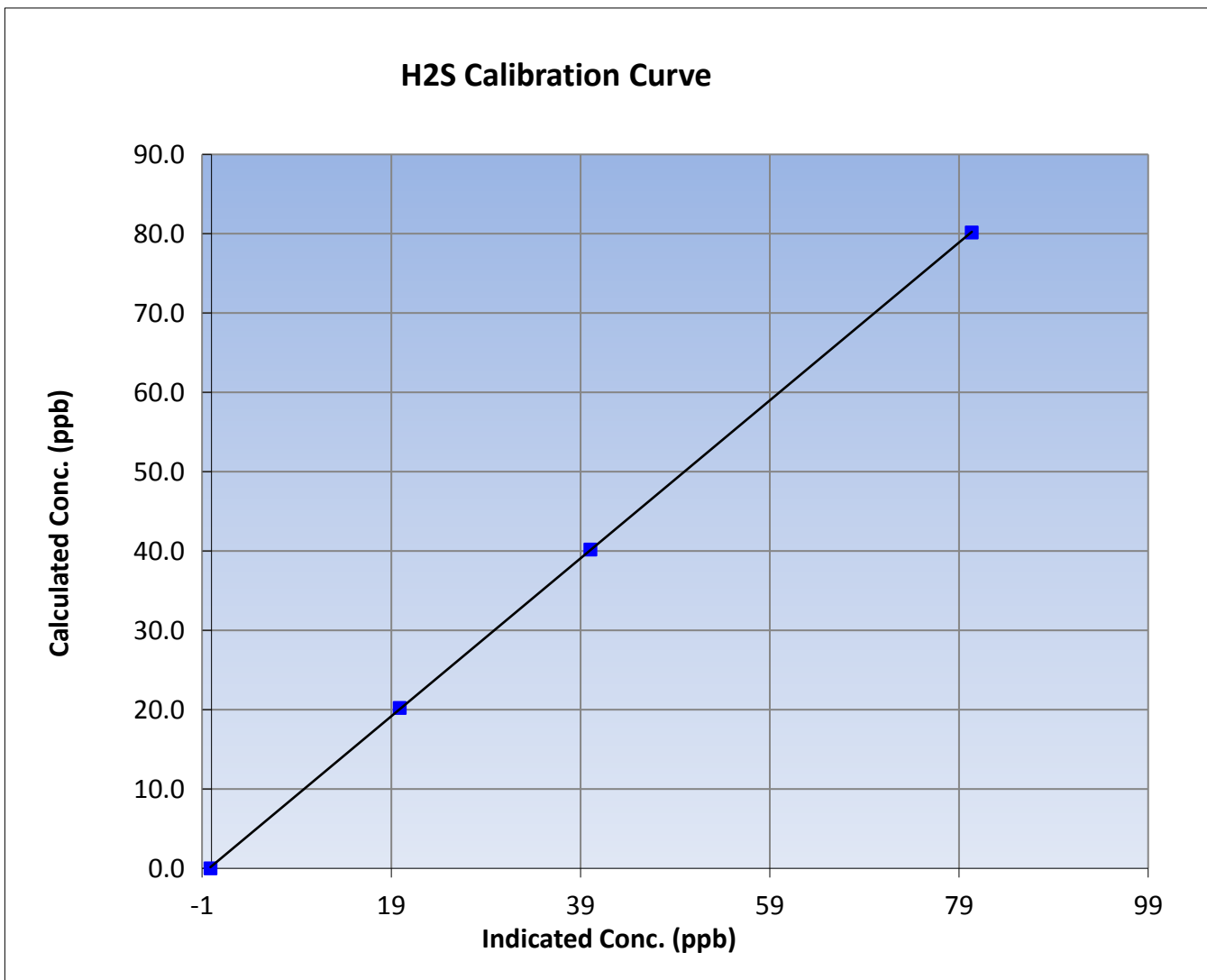
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 18, 2016	Previous Calibration	January 20, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	9:00	End Time (MST)	11:45
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

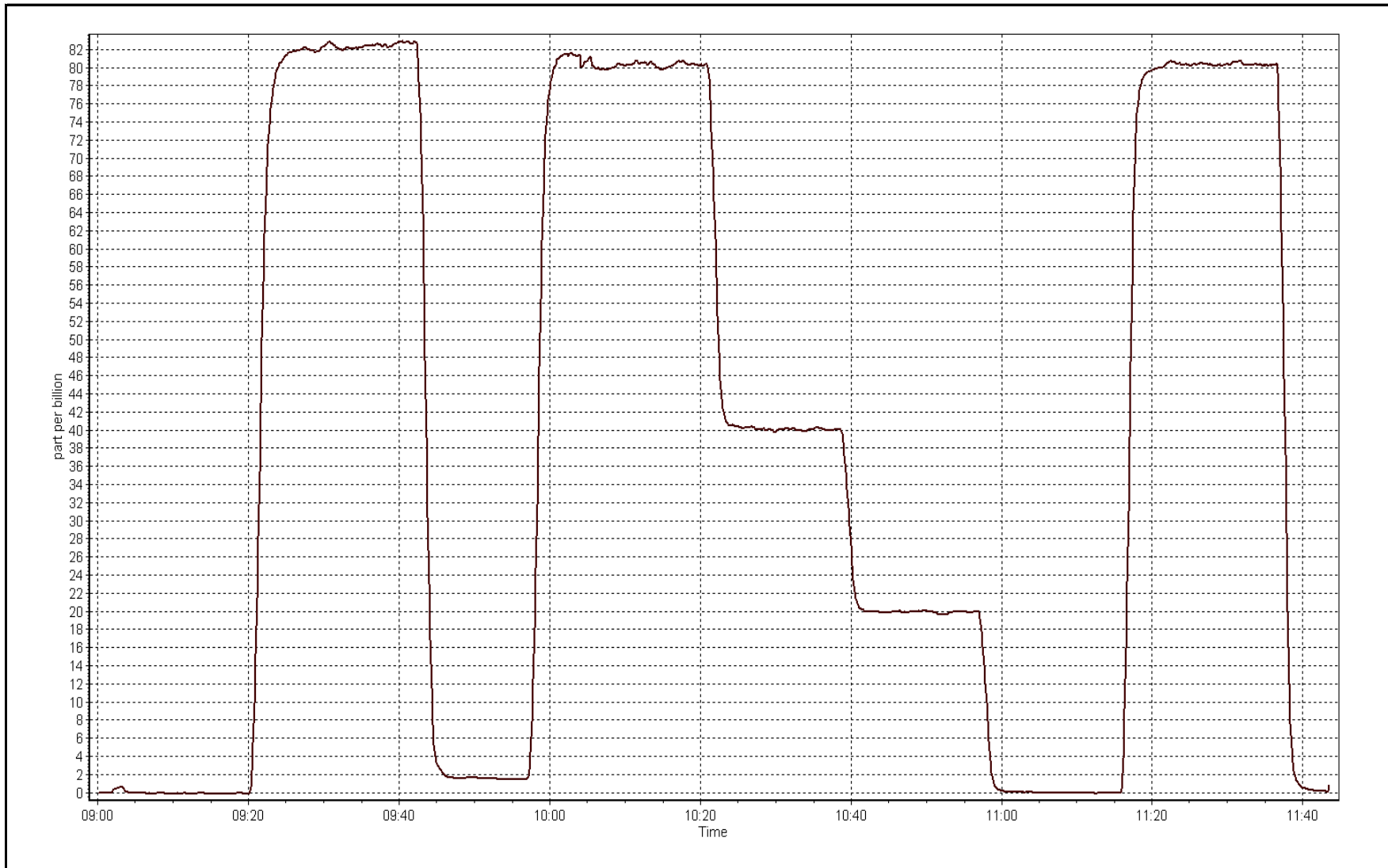
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999983
80.2	80.4	0.9977		
40.2	40.1	1.0034	Slope	0.995289
20.2	19.9	1.0166		
			Intercept	0.262628



H2S Calibration Plot

Date: February 18, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 19, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	14:50	End Time (MST)	19:10
NO Cal Gas Conc	50.5 ppm	Gas Cert Reference	LL107928
NOx Cal Gas Conc	50.8 ppm	Cal Gas Expiry Date	Sep-8-2018
Calibrator	API T700	Serial Number	451
Zero air Generator	Teledyne API T701	Serial Number	4604

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2575
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998652	0.997538	0.996096
	Data Offset	1.064492	1.246343	-0.820353
Current Calibration	Data Slope	1.000094	0.998815	1.013491
	Data Offset	-0.335236	0.480002	-0.871027

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.080		1.065	
NOx coefficient	1.082		1.066	
NO2 coefficient	1.000		1.000	
NO bkgrnd	-0.6		1.3	
NOx bkgrnd	-0.5		0.8	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	315.2	Deg C	315.3	Deg C
PMT voltage	831	V	826	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	85	ccm	85	ccm
R Cell press NO	220.97	mmHg	241.3	mmHg
R Cell Press Nox	223.51	mmHg	243.84	mmHg
NO sample flow	0.491	lpm	0.482	lpm
Nox sample Flow	0.486	lpm	0.478	lpm

Notes:

Changed inlet filter after as founds. Adjusted zero and span. Used 2nd GPT points.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 17, 2016 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	0.9	0.6	0.3	----	----
as found span	5000	79.3	805.7	800.9	4.8	817.2	811.3	6.0	0.9859	0.9873
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.2	0.3	----	----
high point	5000	79.3	805.7	800.9	4.8	805.4	801.4	4.1	1.0003	0.9995
second point	5000	39.6	402.3	400.0	2.4	404.0	400.4	3.6	0.9960	0.9989
third point	5000	19.8	201.2	200.0	1.2	200.8	199.0	1.8	1.0017	1.0049
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.0	0.4	----	----
as left span	5000	79.3	805.7	455.6	350.1	811.7	458.4	353.3	0.9926	0.9938
Average Correction Factor									0.9993	1.0011

Corrected As found NO_x= 816.3 NO= 810.7 Percent Change NO_x= -1.3% NO= -1.1%
 Previous Response NO_x= 805.7 NO= 801.7

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	818.0	811.9	0.3	0.9850	0.9865	----	----
1st NO2 (300)	455.6	361.1	811.8	455.6	356.2	0.9925	----	1.0136	98.7%
2nd NO2 (200)	593.3	223.3	816.0	593.3	222.7	0.9874	----	1.0030	99.7%
3rd NO2 (100)	699.3	117.4	816.0	699.3	116.7	0.9874	----	1.0060	99.4%
2nd NO ref point		4.8	818.0	811.9	6.1	0.9850	0.9865	----	----
Average Correction Factor						0.9880		1.0075	99.3%

Calibration Performed By: Evan Magill



Wood Buffalo Environmental Association

NO_x Calibration Summary

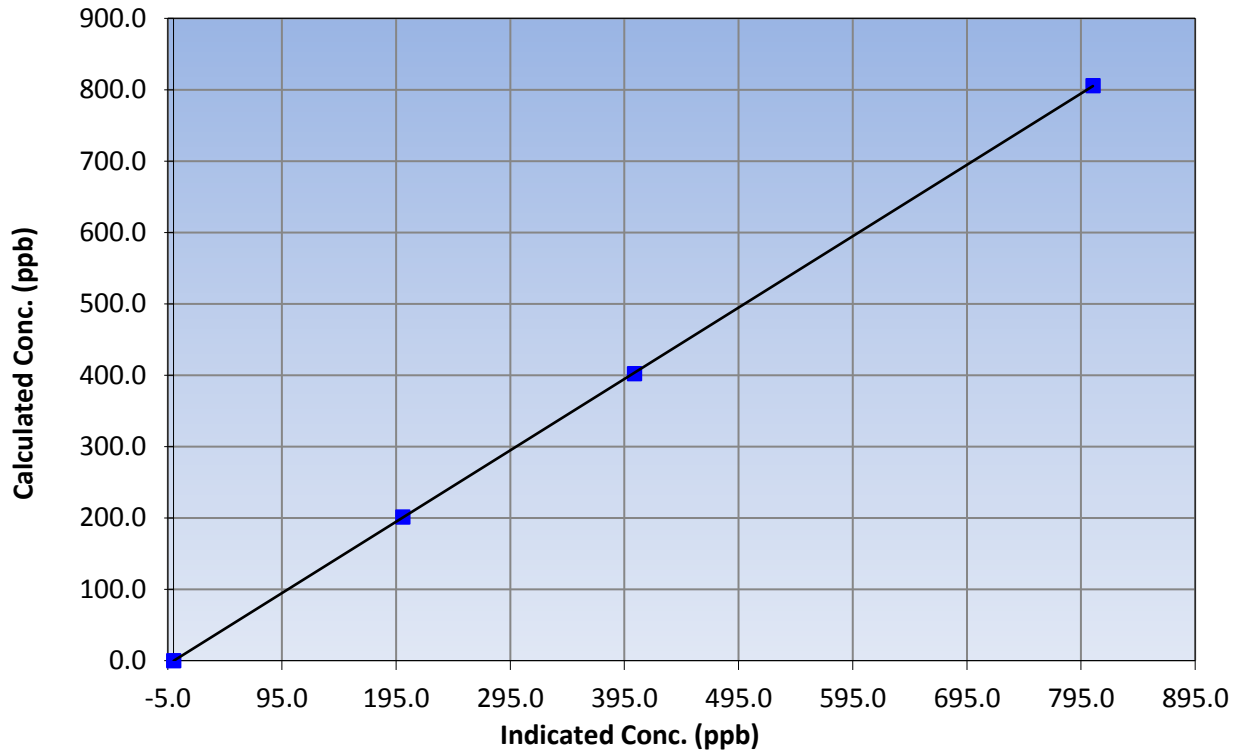
Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 19, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	14:50	End Time (MST)	19:10
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999993
805.7	805.4	1.0003		
402.3	404.0	0.9960	Slope	1.000094
201.2	200.8	1.0017		
			Intercept	-0.335236

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

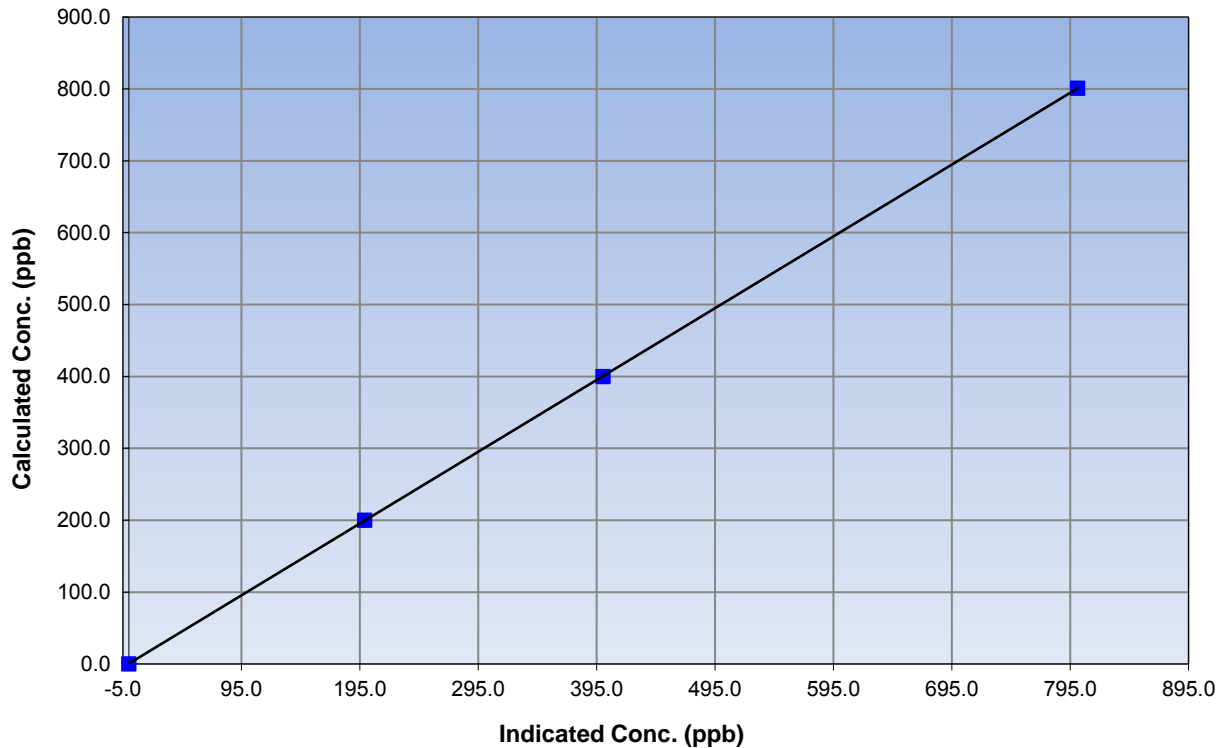
Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 19, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	14:50	End Time (MST)	19:10
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999998
800.9	801.4	0.9995		
400.0	400.4	0.9989	Slope	0.998815
200.0	199.0	1.0049		
			Intercept	0.480002

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

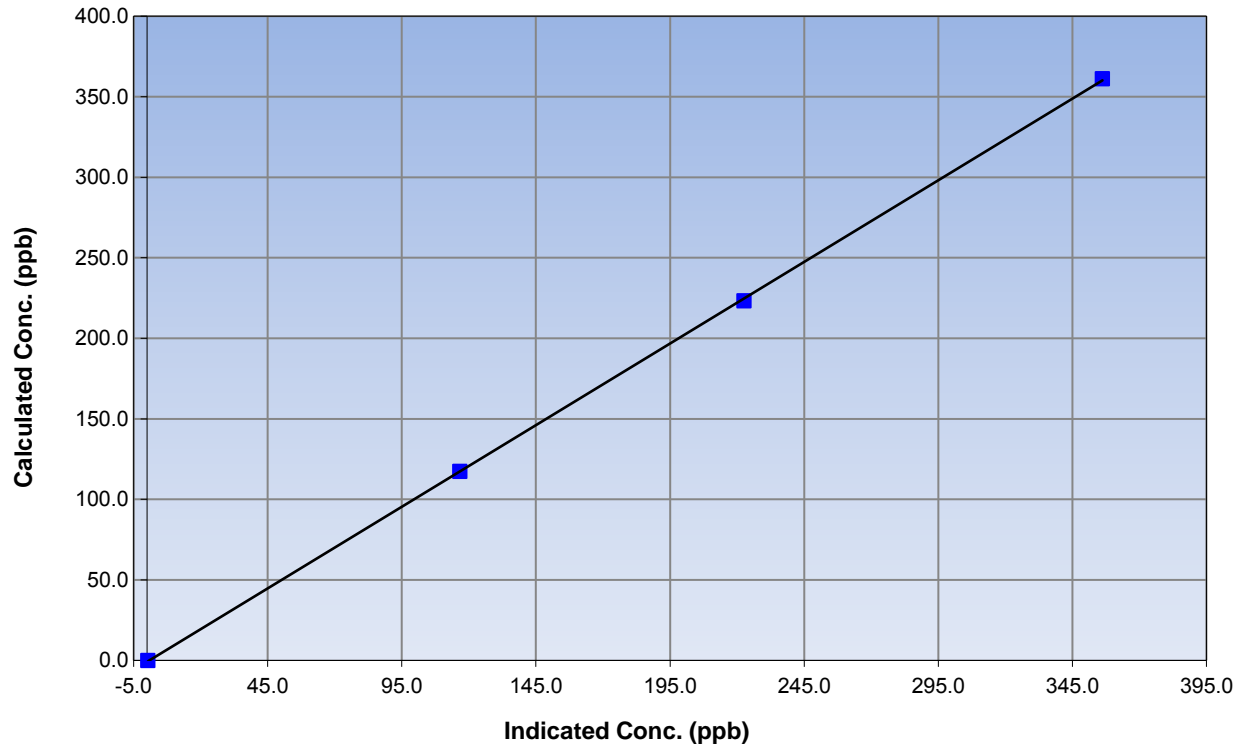
Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 19, 2016
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	14:50	End Time (MST)	19:10
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

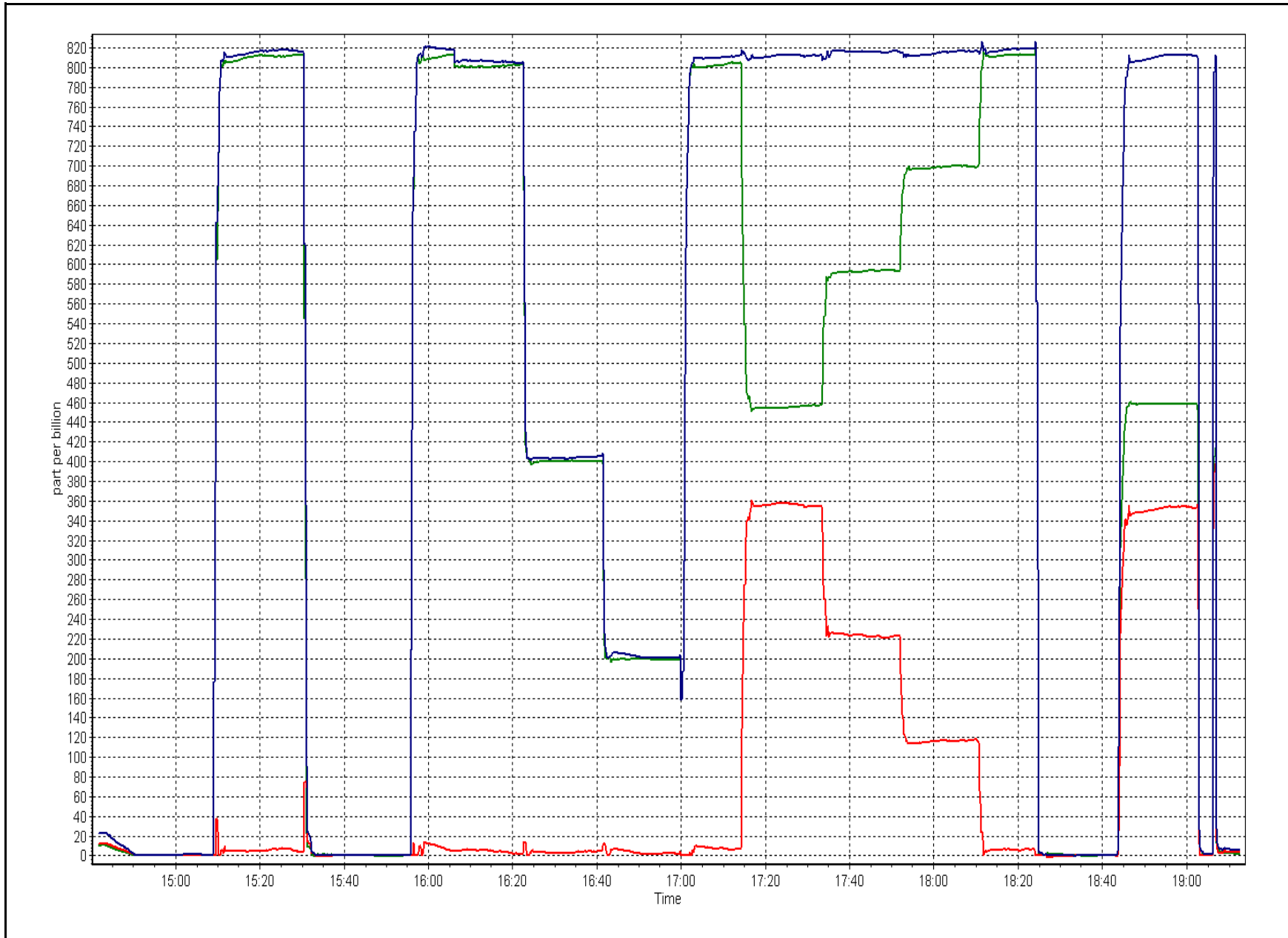
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999953
361.1	356.2	1.0136		
223.3	222.7	1.0030	Slope	1.013491
117.4	116.7	1.0060		
			Intercept	-0.871027

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 17, 2016





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 501
STATOIL LEISMER
FEBRUARY 2016**

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

March 24, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 FEBRUARY 2016

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	634	36	62	96.26	9	0	2	0
H2S (ppb) Average	653	37	43	99.14	1	0	0	0
NO2 (ppb) Average	658	36	38	99.71	11	0	5	-
NO (ppb) Average	658	36	38	99.71	25	-	3	-
NOX (ppb) Average	658	36	38	99.71	29	-	8	-
Temperature 2 m (C) Average	696	0	0	100	7.7	-	3.2	-
Relative Humidity (%) Average	696	0	0	100	98	-	95	-
Wind Speed 10 m (km/h) Average	691	0	5	99.28	38	-	21	-
Wind Direction 10 m (deg) Average	691	0	5	99.28	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	634	0.7	1	-	0	0	0	0	0	1	9
H2S (ppb) Average	653	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	658	2.1	2	-	0	1	1	1	2	4	11
NO (ppb) Average	658	0.7	2	-	0	0	0	0	0	2	25
NOX (ppb) Average	658	2.8	3	-	0	1	1	2	3	7	29
Temperature 2 m (C) Average	696	-7.46	6.8	-	-27.1	-16.2	-12.1	-6.8	-2.3	0.7	7.7
Relative Humidity (%) Average	696	77.5	14	-	37	59	69	80	88	93	98
Wind Speed 10 m (km/h) Average	691	9.3	6	-	0	3	5	8	12	18	38
Wind Direction 10 m (deg) Average	691	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	03 Feb 2016 18:00	03 Feb 2016 19:00	2	Station power failure
SO2	07 Feb 2016 15:00	07 Feb 2016 15:00	1	Intermittent unstable operation - excessive baseline drift
SO2	08 Feb 2016 12:00	08 Feb 2016 13:00	2	Intermittent unstable operation - excessive baseline drift
SO2	08 Feb 2016 17:00	08 Feb 2016 17:00	1	Intermittent unstable operation - excessive baseline drift
SO2	11 Feb 2016 15:00	11 Feb 2016 17:00	3	Intermittent unstable operation - excessive baseline drift
SO2	19 Feb 2016 14:00	19 Feb 2016 14:00	1	Intermittent unstable operation - excessive baseline drift
SO2	19 Feb 2016 16:00	19 Feb 2016 16:00	1	Intermittent unstable operation - excessive baseline drift
SO2	20 Feb 2016 14:00	20 Feb 2016 16:00	3	Intermittent unstable operation - excessive baseline drift
SO2	24 Feb 2016 12:00	24 Feb 2016 20:00	9	Intermittent unstable operation - excessive baseline drift
SO2	28 Feb 2016 13:00	28 Feb 2016 15:00	3	Intermittent unstable operation - excessive baseline drift
H2S	02 Feb 2016 06:00	02 Feb 2016 06:00	1	Intermittent unstable operation - excessive baseline drift
H2S	04 Feb 2016 09:00	04 Feb 2016 11:00	3	Maintenance - baseline adjusted
Wind Speed, Wind Direction	07 Feb 2016 06:00	07 Feb 2016 10:00	5	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

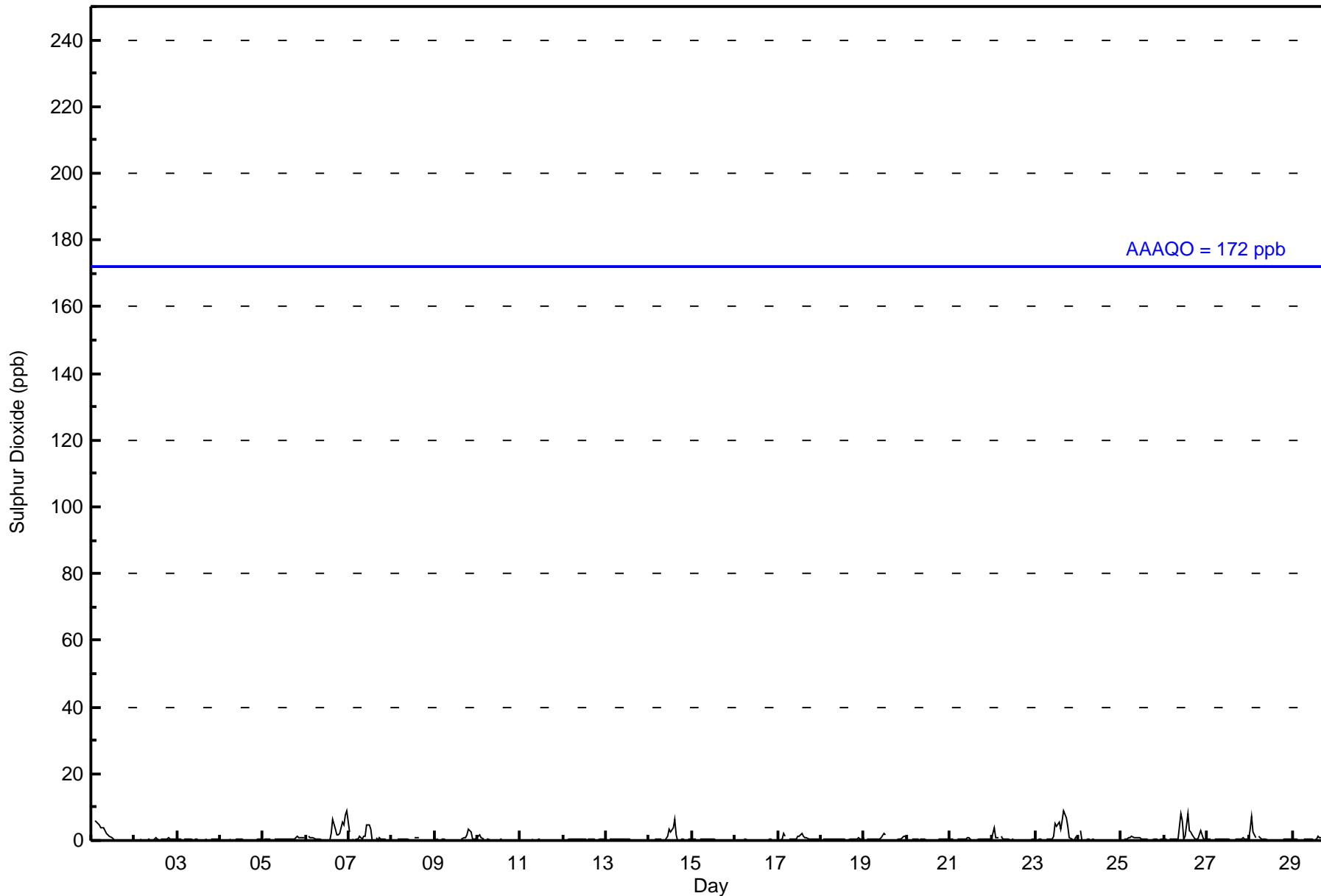
Statoil - Leismer - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 ppb on Feb 1 01:00 Maximum Daily Average: 2.2 ppb on Feb 23																	Hours in Service: 696 Hours of Data: 634 Hours of Missing Data: 62 Hours of Calibration: 36 Percent Operational Time: 96.3																																	
Minimum Value: 0 ppb on Feb 3 16:00 Minimum Daily Average: 0.1 ppb on Feb 11 Maximum Diurnal Average: 1.0 ppb at hour 14 Minimum Diurnal Average: 0.4 ppb at hour 9 Monthly Average: 0.7 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 7																																																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Feb	9	Z	6	6	5	4	4	4	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.9	9																								
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0.3	1																								
3-Feb	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	1	PF	PF	1	0	0	0	0	0.3	1																								
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	0.2	0																								
5-Feb	0	0	0	0	0	Z	1	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	0.5	1																								
6-Feb	Z	1	1	1	1	0	0	0	0	0	0	0	0	2	6	3	2	2	2	5	5	7	9	2.2	9																									
7-Feb	3	Z	0	0	0	1	1	0	1	1	5	5	4	0	UO	1	0	1	0	0	0	0	0	0	1.1	5																								
8-Feb	0	0	Z	0	0	0	0	0	0	0	0	UO	UO	1	1	1	UO	0	0	0	0	0	0	0	0.3	1																								
9-Feb	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	C	1	1	1	2	3	3	0	0	0	--	3																								
10-Feb	1	2	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																								
11-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	UO	UO	UO	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	0.3	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	1	3	3	4	6	2	0	0	0	0	0	0	0	0	1.0	6																								
15-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	0.2	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	0.2	0																								
17-Feb	0	0	0	2	1	Z	1	1	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0.7	2																								
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1																								
19-Feb	1	Z	1	0	0	0	1	0	1	0	1	2	2	UO	1	UO	0	0	0	0	0	1	1	1	0.7	2																								
20-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	UO	UO	UO	0	0	0	0	0	0	0	0	0.3	0																								
21-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1																								
22-Feb	2	4	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4																								
23-Feb	0	0	0	0	0	Z	0	0	0	1	1	5	4	6	3	6	9	7	4	1	0	0	1	1	2.2	9																								
24-Feb	Z	3	0	0	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	--	3																								
25-Feb	0	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																								
26-Feb	0	0	Z	0	0	0	0	0	0	8	6	0	1	8	3	3	1	0	0	1	3	2	0	0	1.8	8																								
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0.3	1																								
28-Feb	3	7	3	1	Z	1	0	0	0	0	0	0	UO	UO	UO	0	0	0	0	0	0	0	0	0	0.9	7																								
29-Feb	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	1	1	1	1	1	0	0	0	1	1	0.5	1																								
																								0.9	0.9	0.7	0.6	0.6	0.6	0.5	0.4	0.4	0.7	0.8	0.9	0.8	1.0	0.9	0.9	0.8	0.6	0.5	0.5	0.6	0.5	0.6	0.7	Diurnal Average		
																								9	7	6	6	5	4	4	4	4	2	8	6	5	4	8	6	6	9	7	4	3	5	5	7	9	Diurnal Maximum	
Z - zerspan C - Calibration UO - Unstable Operation PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																		



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	634	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: 634

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - February 2016**

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	26	12	11	33	69	19	49	41	60	38	8	73	67	48	48	629
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	27	26	12	11	33	69	19	49	41	60	38	8	73	67	48	48	629

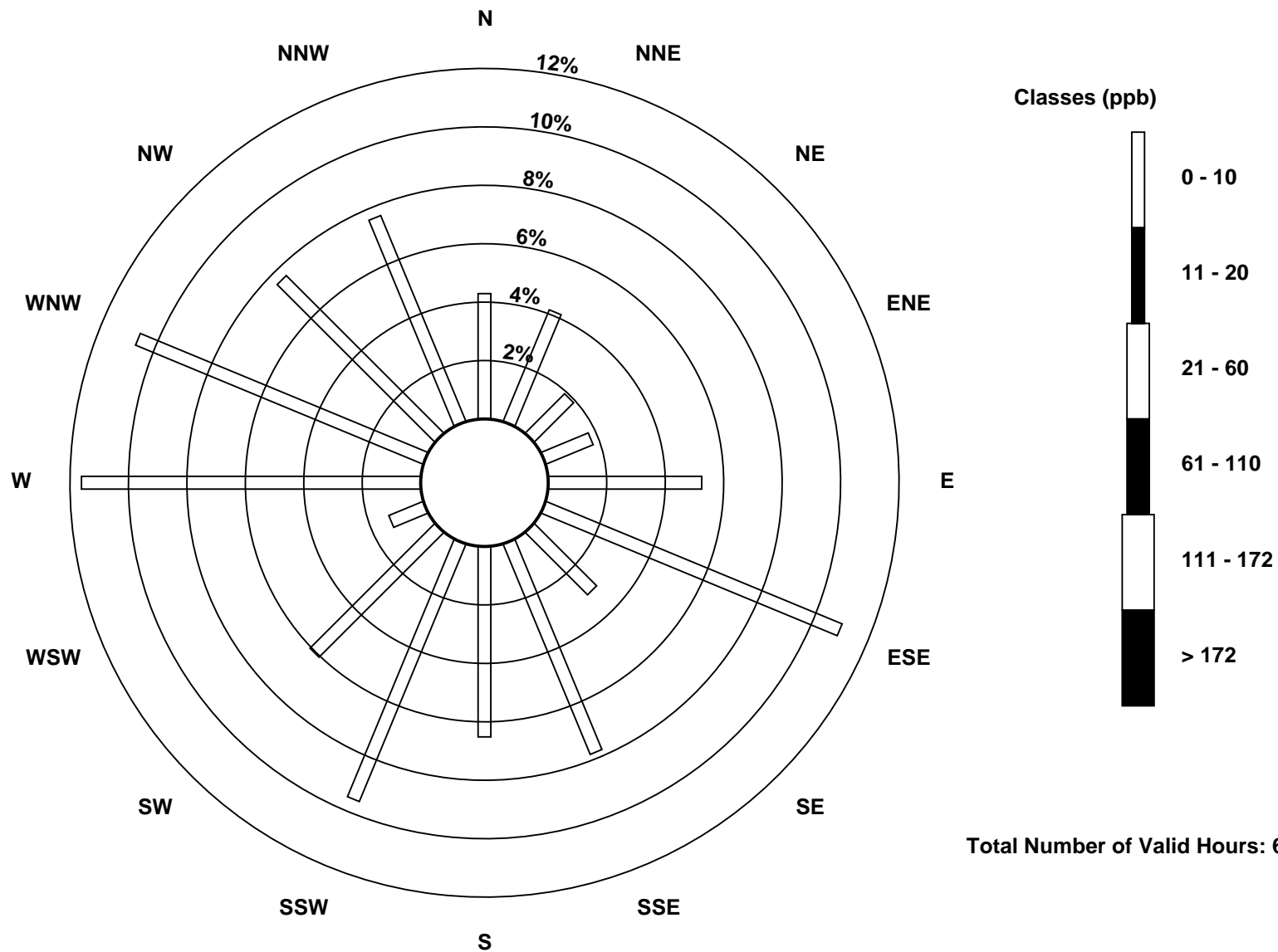
Total Number of Valid Hours: 629

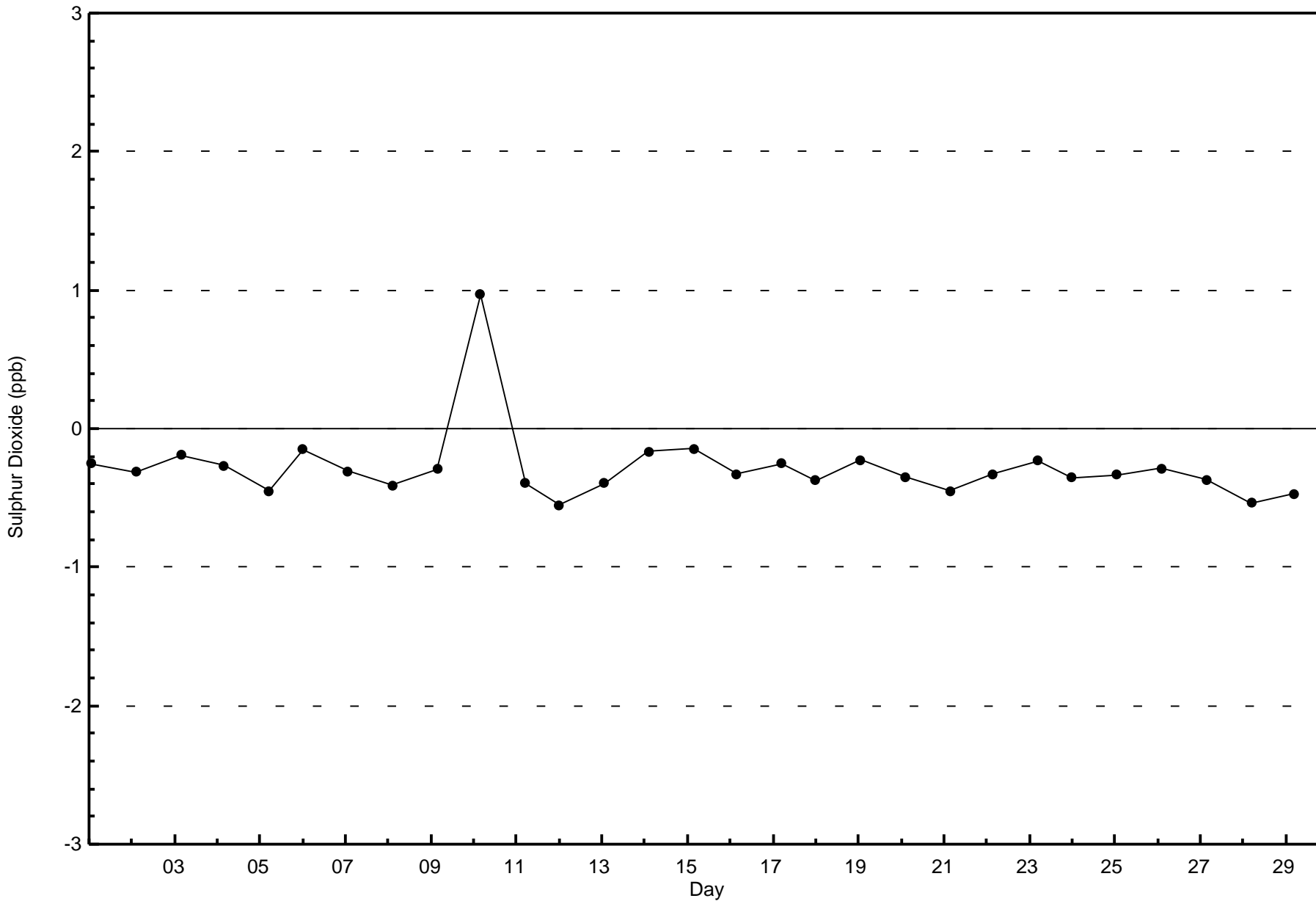
Total Number of Hours: 696

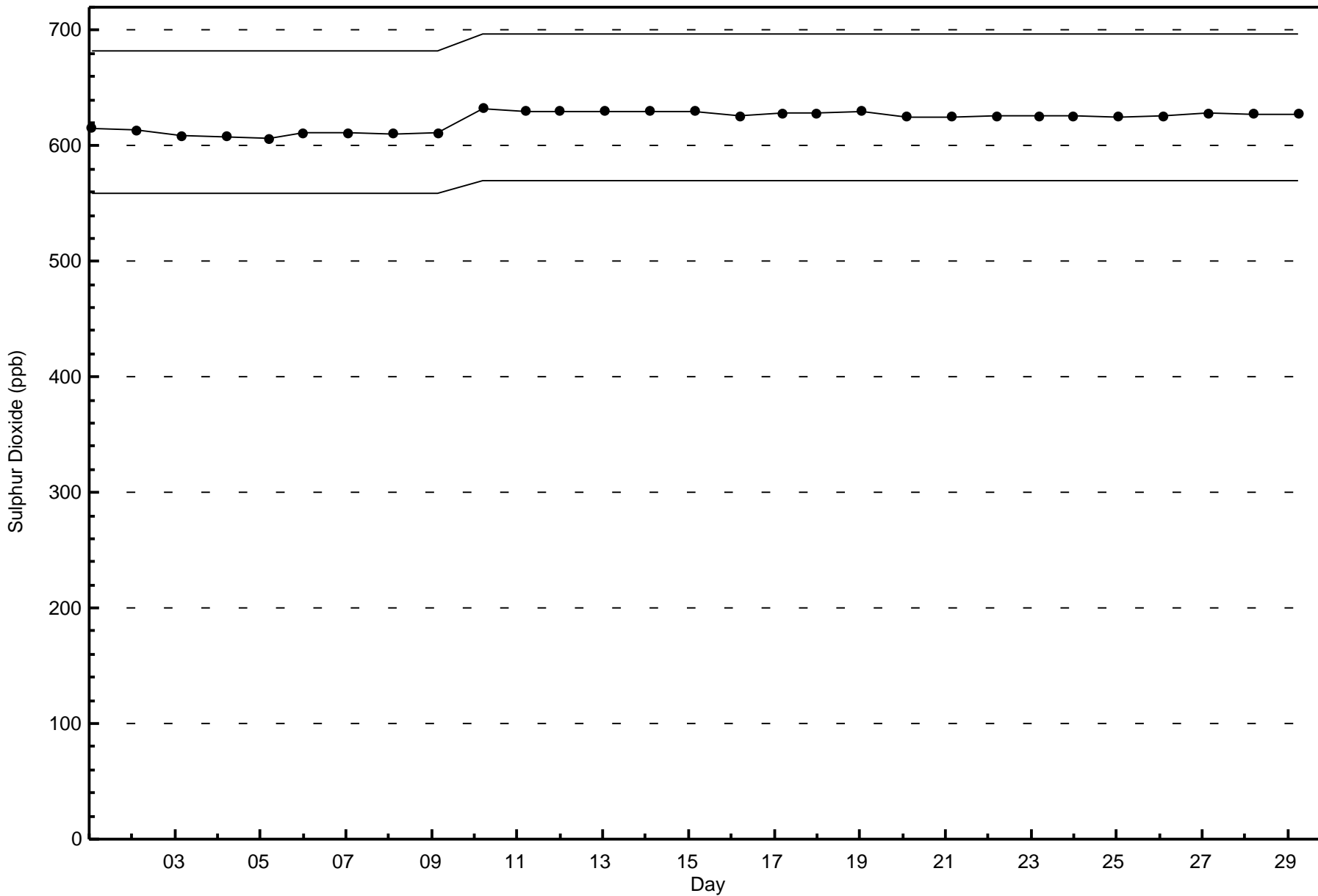


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer (AMS501)







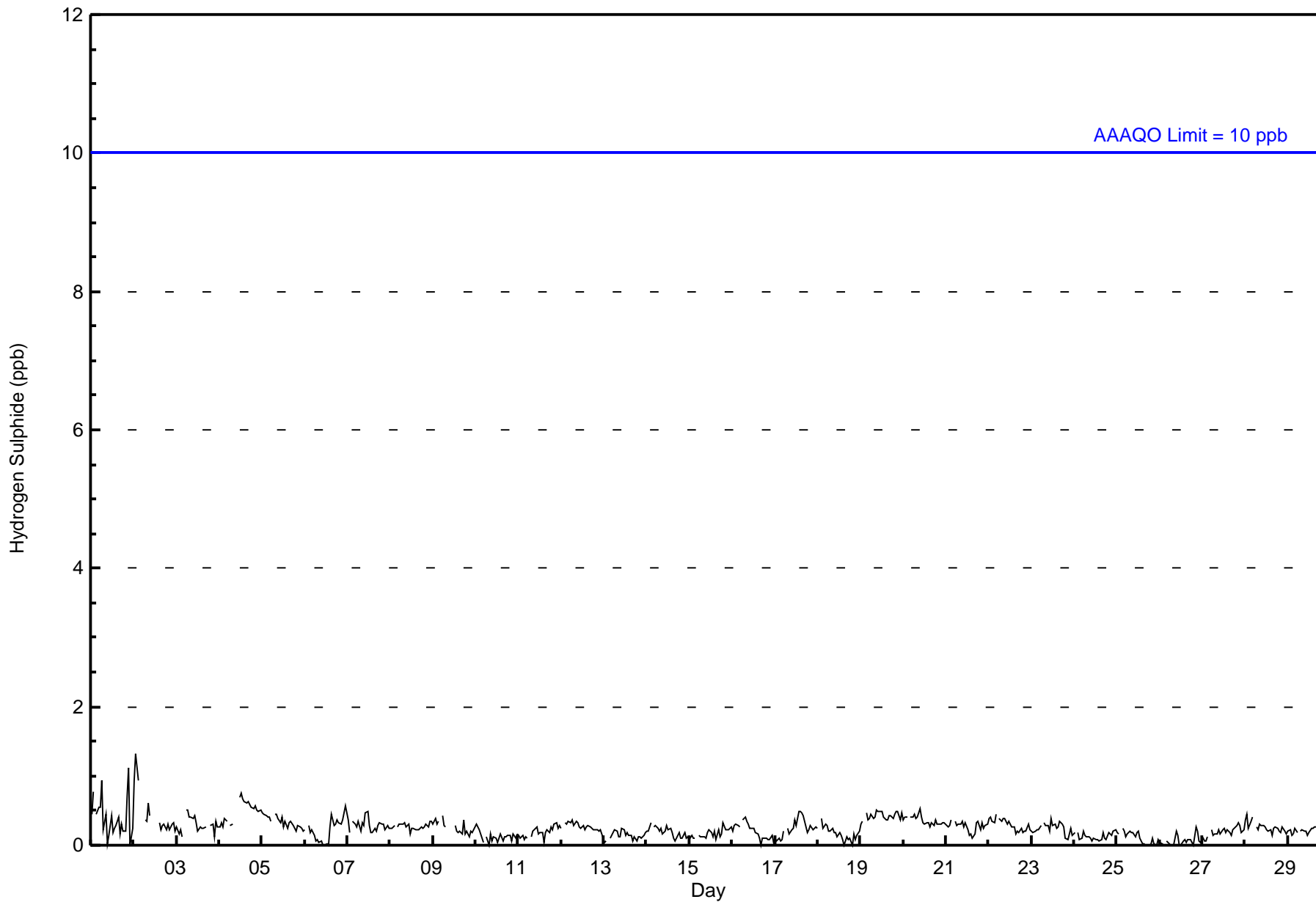


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Feb 2 02:00 Maximum Daily Average: 0.5 ppb on Feb 4																	Hours in Service: 696 Hours of Data: 653 Hours of Missing Data: 43 Hours of Calibration: 37 Percent Operational Time: 99.1									
Minimum Value: 0 ppb on Feb 1 23:00 Minimum Daily Average: 0.1 ppb on Feb 26 Maximum Diurnal Average: 0.3 ppb at hour 2 Minimum Diurnal Average: 0.2 ppb at hour 16 Monthly Average: 0.2 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	1	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1
2-Feb	1	1	1	Z	0	UO	0	0	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0.4	1	
3-Feb	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	PF	PF	0	0	0	0.3	1	
4-Feb	0	0	0	0	0	Z	0	0	M	M	M	1	1	1	1	1	1	1	1	1	1	1	0	0.5	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	0.3	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	1	0.2	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	0.3	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	0.3	0	
9-Feb	0	0	0	0	Z	0	0	0	C	C	C	C	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	0.1	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	0.2	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	0.3	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	0.1	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	0.2	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	0.2	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	0.2	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	0.2	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	0.2	0	
19-Feb	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
20-Feb	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.3	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	0.3	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	0.2	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	0.1	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	0.1	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	0.1	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	0.2	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	0.3	0	
29-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
																								0.3	0.3	
																								1	1	
																								Diurnal Average	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	653	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: 653

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	27	28	11	13	34	69	16	49	45	67	37	8	77	68	48	51	648
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	27	28	11	13	34	69	16	49	45	67	37	8	77	68	48	51	648

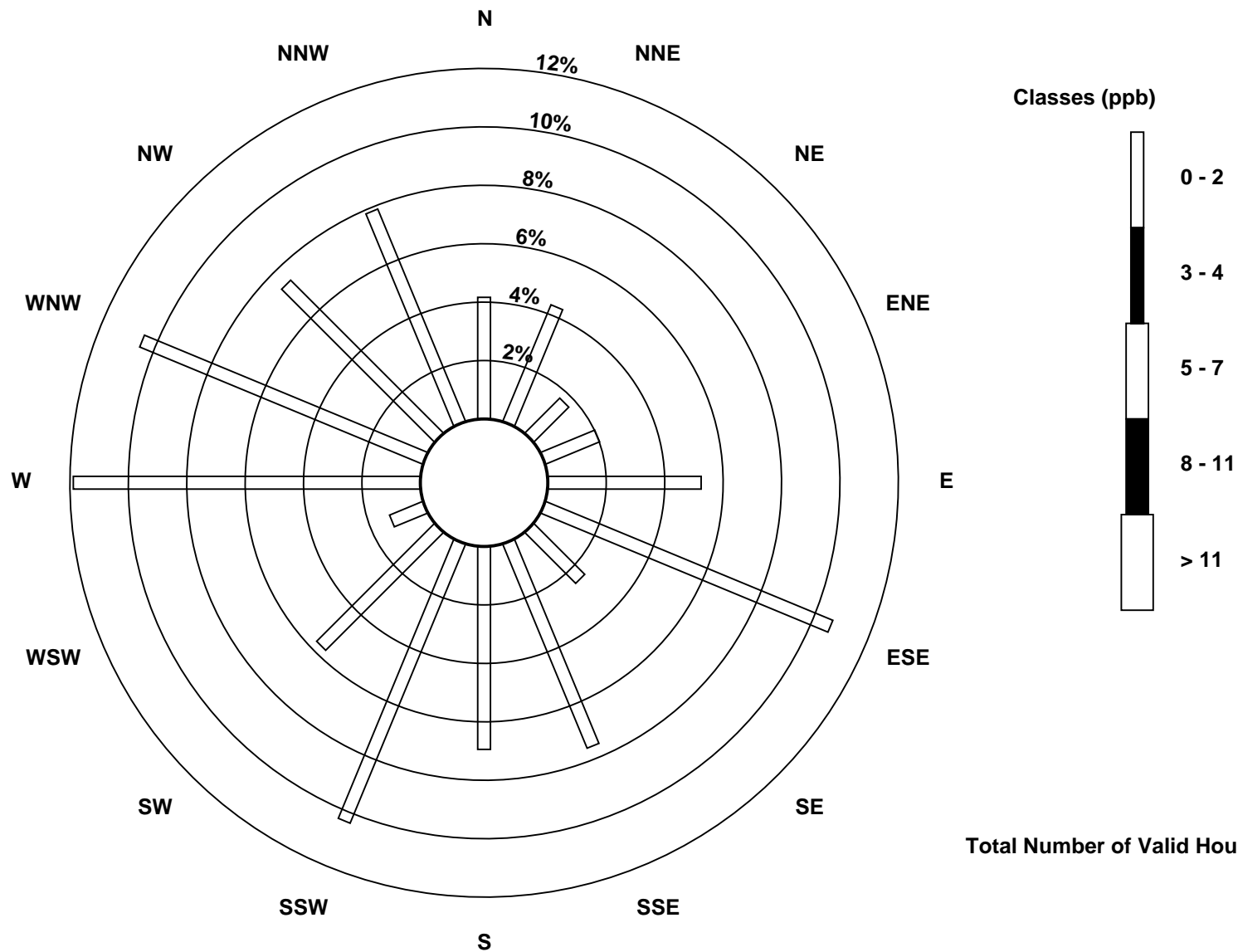
Total Number of Valid Hours: 648

Total Number of Hours: 696

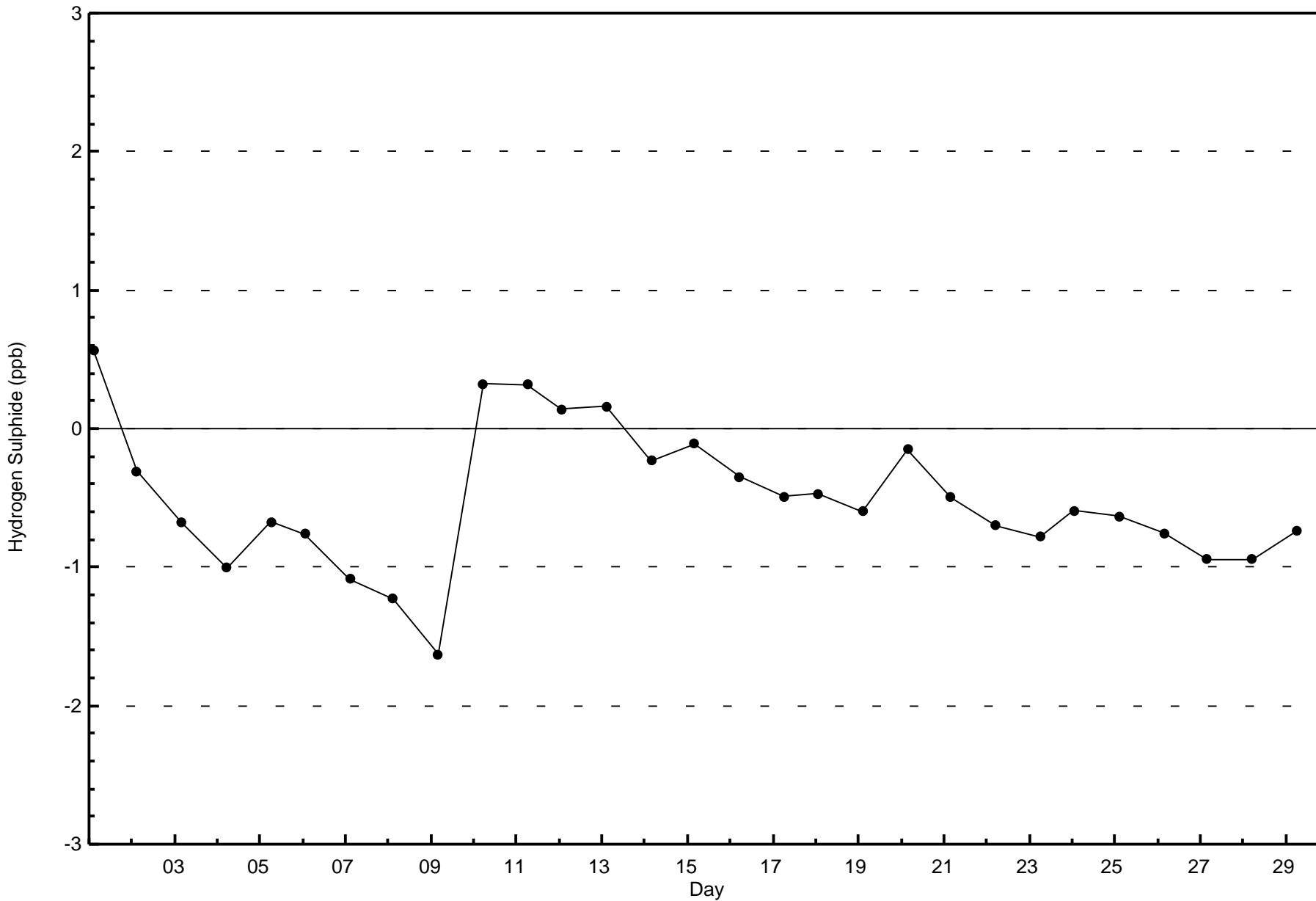


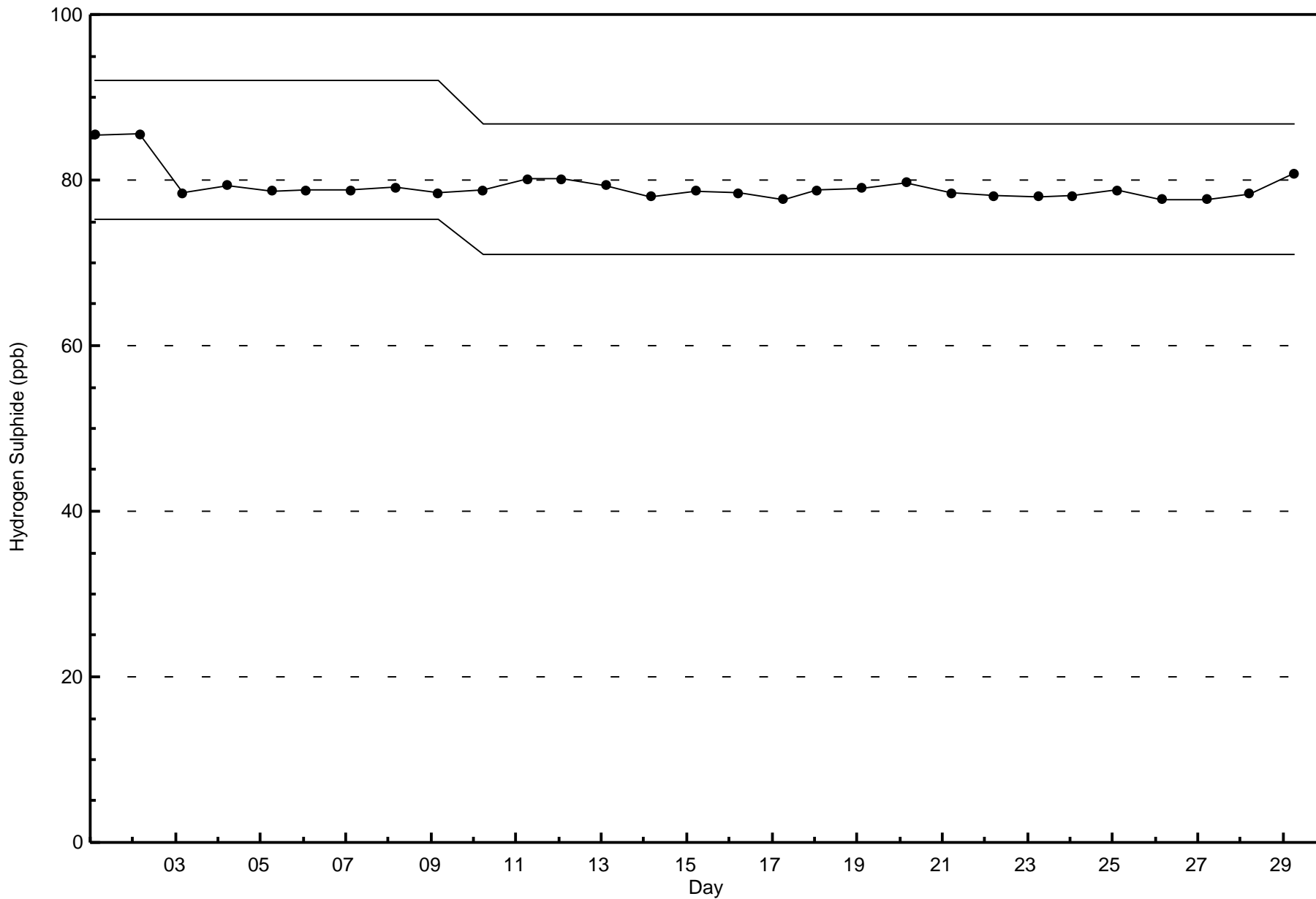
Wood Buffalo Environmental Association
Wind Rose Feb 2016

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer (AMS501)



Total Number of Valid Hours: 648







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

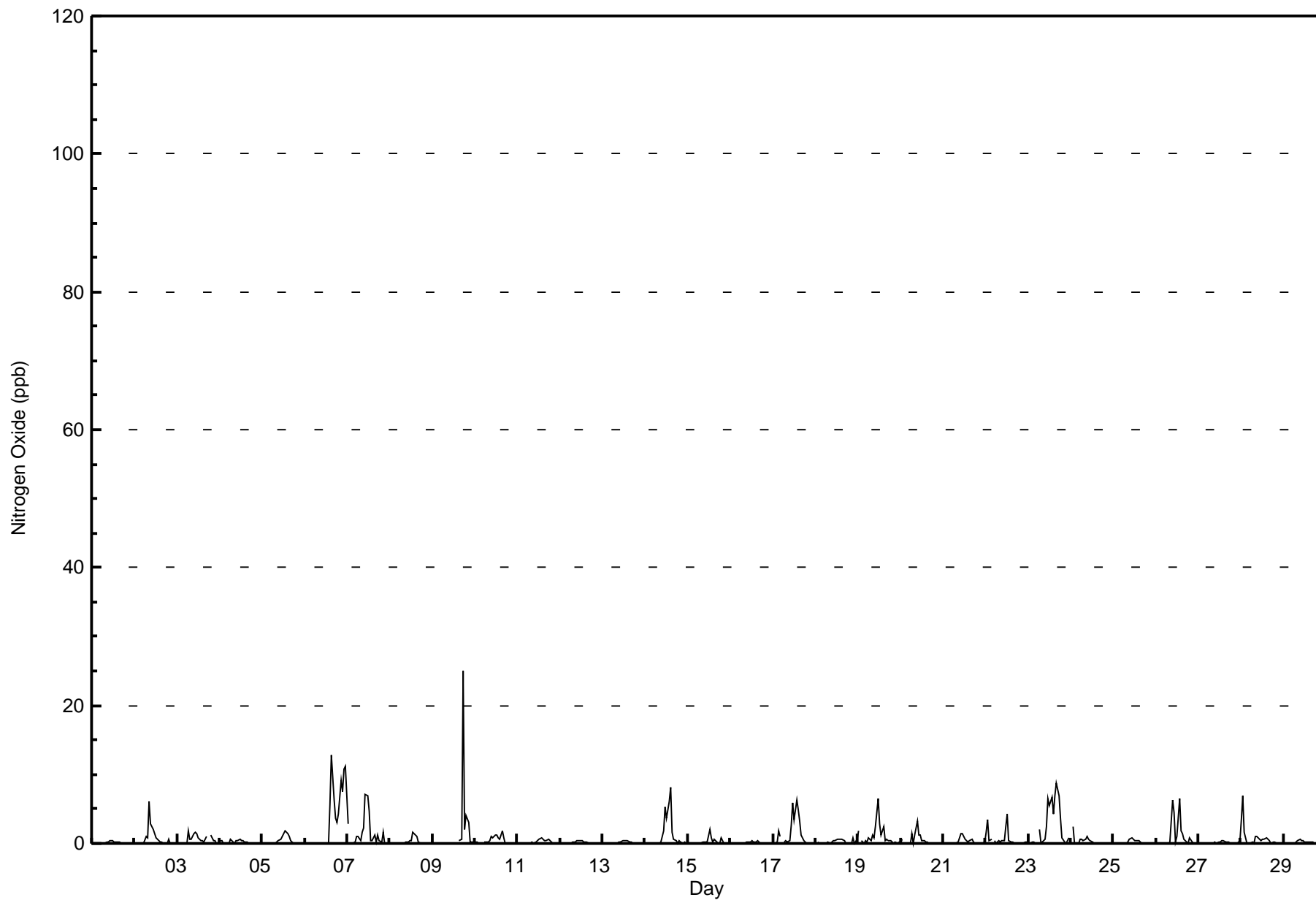
Statoil - Leismer - February 2016

Maximum Value: 25 ppb on Feb 9 18:00																	Maximum Daily Average: 3.3 ppb on Feb 6																	Hours in Service: 696								
Minimum Value: 0 ppb on Feb 8 20:00																	Minimum Daily Average: 0.1 ppb on Feb 16																	Hours of Data: 658								
Maximum Diurnal Average: 1.7 ppb at hour 12																	Minimum Diurnal Average: 0.1 ppb at hour 5																	Hours of Missing Data: 38								
Monthly Average: 0.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 8																	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	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	Z	0	0	0	1	1	6	3	2	1	1	1	0	0	0	0	0	1	0	0	0	0	0.8	6																
3-Feb	0	0	0	Z	0	0	2	1	1	1	2	1	1	0	0	0	1	PF	PF	1	0	0	0	0	0.6	2																
4-Feb	0	0	0	0	Z	0	1	0	0	0	0	1	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	0	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0.4	2																
6-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	6	13	6	4	3	4	9	8	11	11	3.3	13																	
7-Feb	3	Z	0	0	0	1	1	0	2	2	7	7	5	0	0	1	0	1	0	0	2	0	0	0	1.5	7																
8-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0.2	2																
9-Feb	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	C	0	1	25	2	4	3	0	0	0	--	25																
10-Feb	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0.4	2																
11-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	1	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	2	5	4	6	8	2	1	0	0	1	0	0	0	0	1.3	8																
15-Feb	0	0	0	Z	0	0	0	0	0	0	0	2	1	0	1	0	1	0	0	0	1	0	0	0	0.3	2																
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	2	1	Z	0	0	0	0	3	6	4	6	5	3	1	0	0	0	0	0	0	0	1.4	6																
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0	1	0.3	1																
19-Feb	2	Z	0	0	0	0	1	0	1	1	2	6	3	1	2	1	1	0	0	0	0	0	0	0	1.0	6																
20-Feb	0	1	Z	0	0	0	1	0	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3																
21-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0.3	1																
22-Feb	2	4	1	1	Z	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4																
23-Feb	0	0	0	0	0	Z	2	0	0	1	2	6	5	7	4	7	9	7	4	1	0	0	1	2.5	9																	
24-Feb	Z	2	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																
25-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	0.2	1																
26-Feb	0	0	Z	0	0	0	0	0	0	6	5	0	1	6	2	1	1	0	0	1	0	0	0	0	1.0	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	0.1	0																
28-Feb	3	7	2	0	Z	0	0	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.8	7																
29-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	0.1	1																
																	0.4	0.6	0.1	0.1	0.1	0.1	0.4	0.2	0.6	0.9	1.2	1.7	1.3	1.4	1.3	1.3	0.8	1.4	0.4	0.5	0.5	0.3	0.4	0.5	Diurnal Average	
																	3	7	2	2	1	1	2	1	6	6	7	7	5	7	8	13	9	25	4	4	9	8	11	11	Diurnal Maximum	
Z - zerspan			C - Calibration			PF - Power Failure																																				



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	657	99.85	99.85
21 - 40	1	0.15	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	28	12	12	36	69	19	49	44	66	39	9	74	71	48	49	652
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	27	28	12	12	36	69	19	49	44	66	39	9	74	71	48	50	653

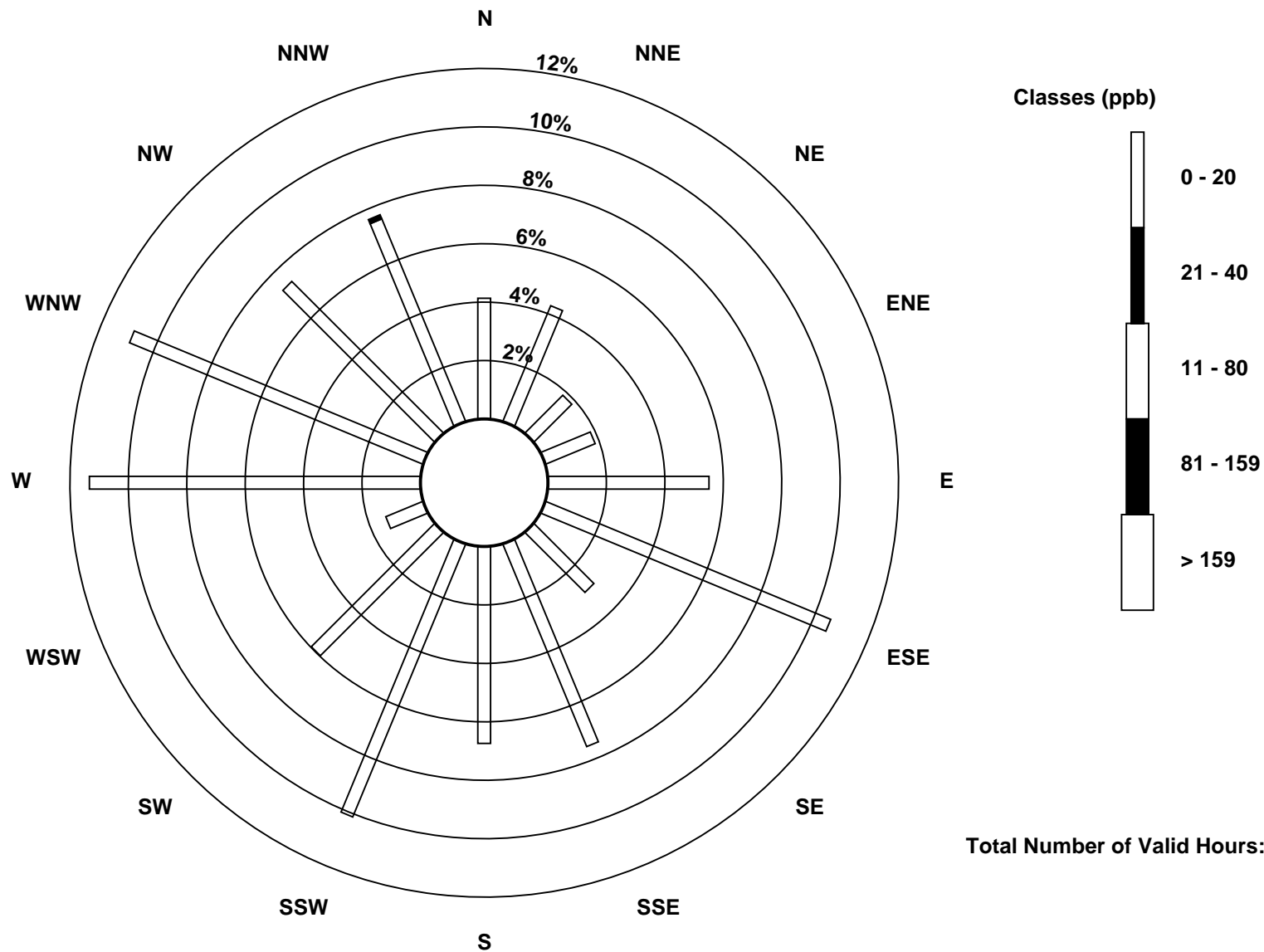
Total Number of Valid Hours: 653

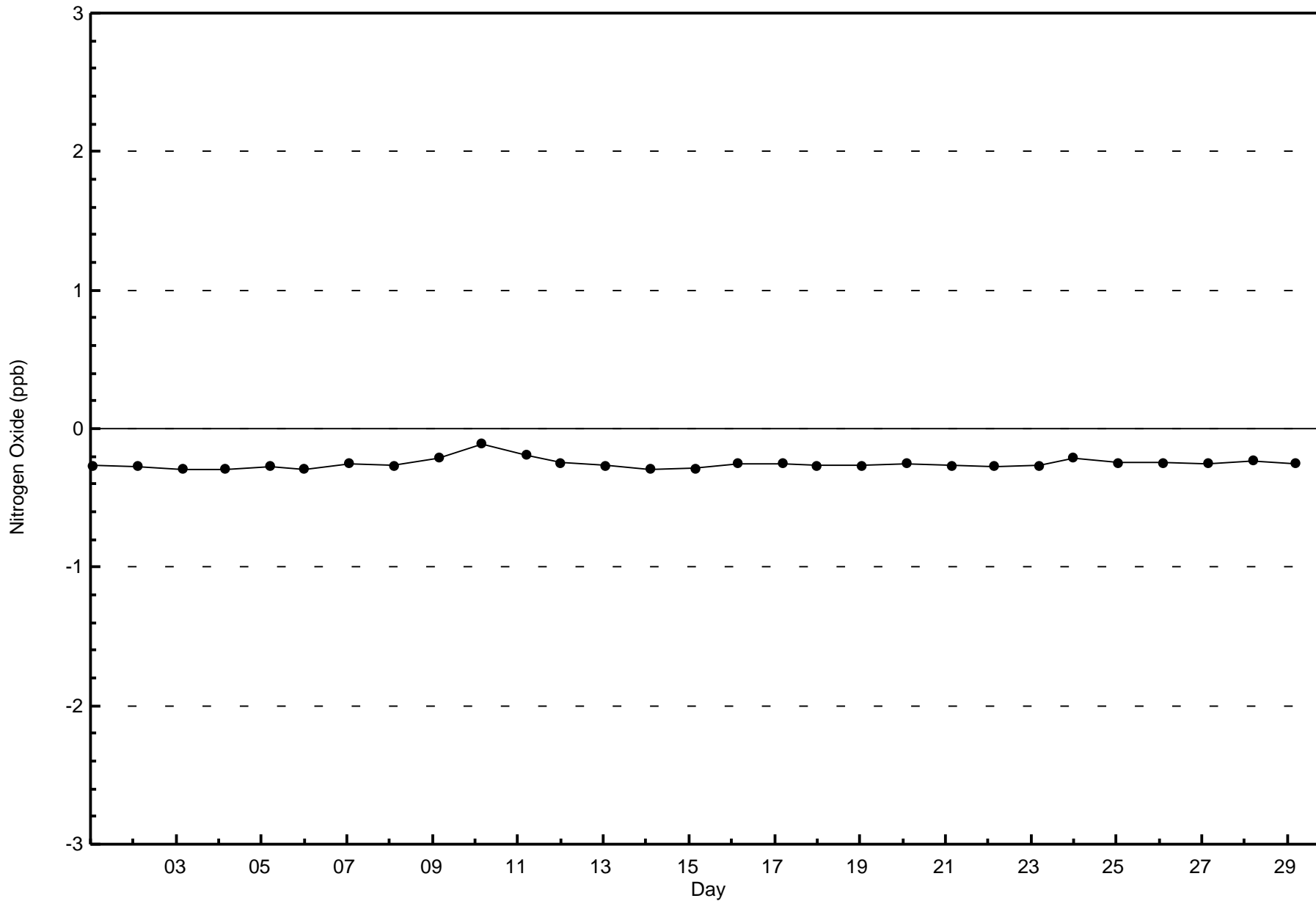
Total Number of Hours: 696

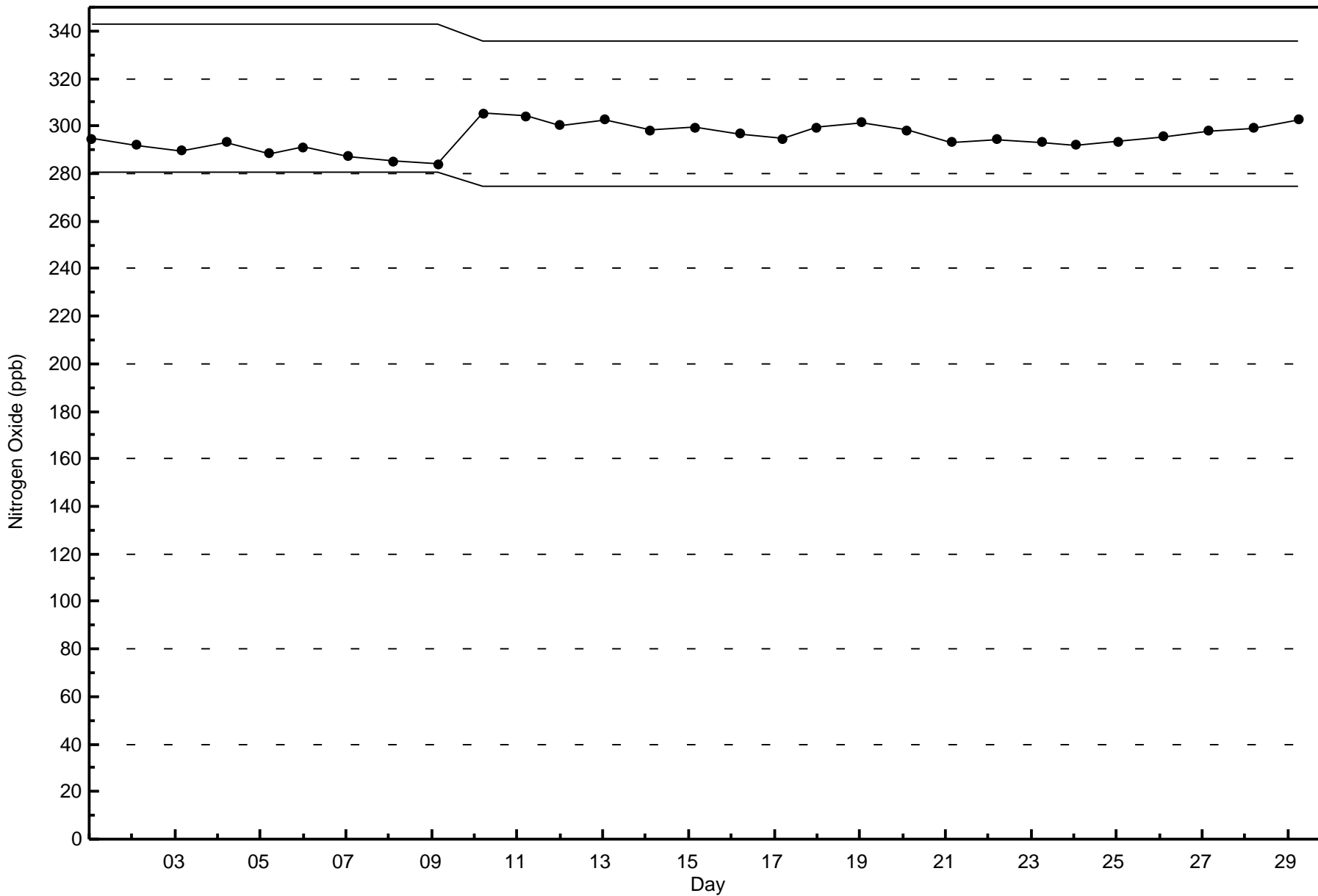


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxide (NO) - ppb
Statoil - Leismer (AMS501)









Wood Buffalo Environmental Association
Summary of Hour Averages

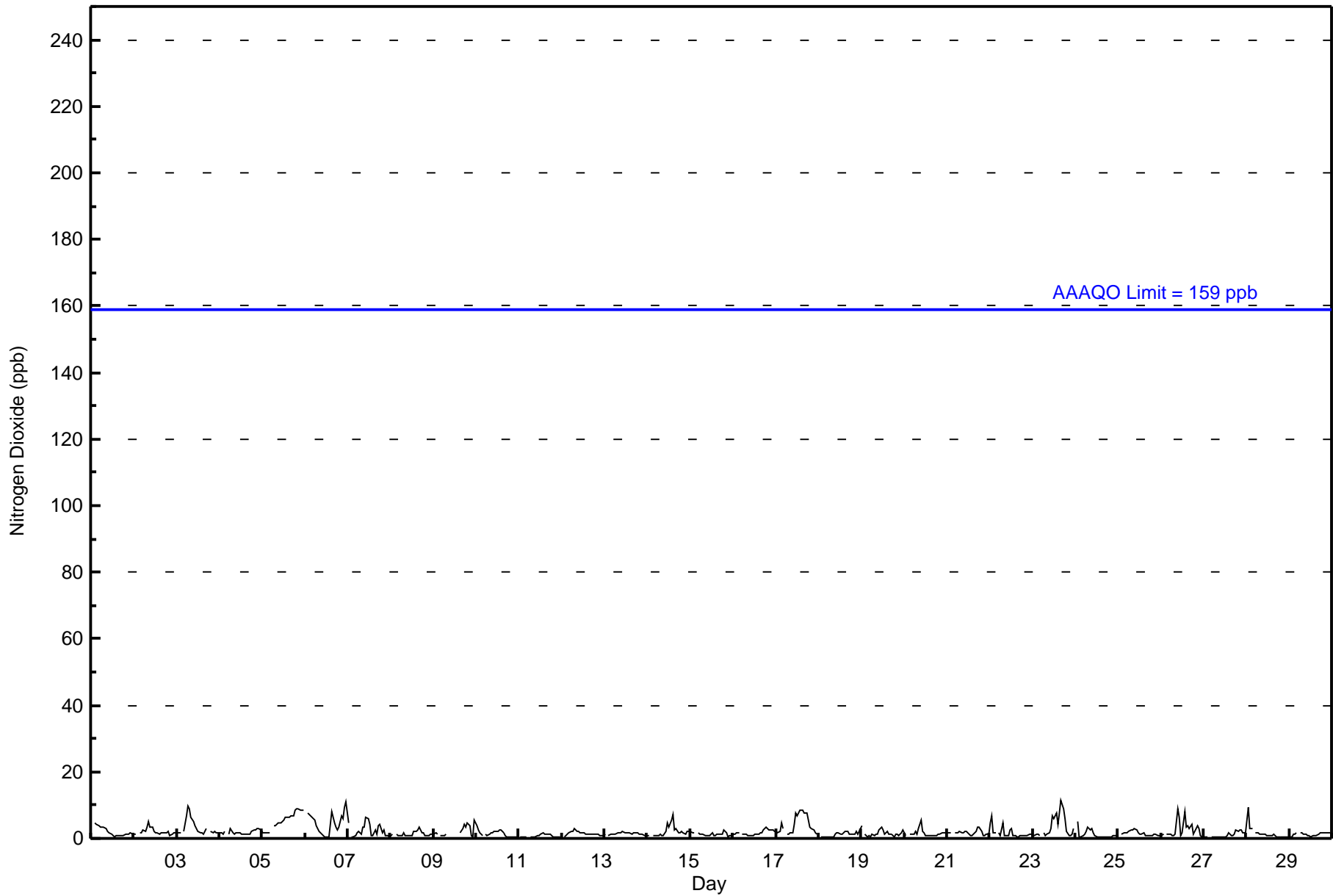
Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 ppb on Feb 23 17:00 Maximum Daily Average: 5.4 ppb on Feb 5																	Hours in Service: 696 Hours of Data: 658 Hours of Missing Data: 38 Hours of Calibration: 36 Percent Operational Time: 99.7									
Minimum Value: 0 ppb on Feb 11 00:00 Minimum Daily Average: 0.7 ppb on Feb 11 Maximum Diurnal Average: 2.4 ppb at hour 17 Minimum Diurnal Average: 1.6 ppb at hour 5 Monthly Average: 2.1 ppb Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 P 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	Z	5	4	4	4	4	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	2.2	6
2-Feb	1	1	Z	2	2	3	2	3	5	3	3	2	2	2	1	2	2	2	2	2	1	1	2	2	2.1	5
3-Feb	2	2	2	Z	2	7	10	9	6	5	4	3	2	2	2	1	3	PF	PF	2	2	2	2	2	3.3	10
4-Feb	2	2	1	2	Z	1	3	2	1	2	2	1	1	1	1	1	1	1	2	3	3	3	3	3	1.8	3
5-Feb	2	2	2	2	2	Z	4	4	4	5	5	5	6	7	6	6	7	7	8	9	9	9	9	8	5.4	9
6-Feb	Z	8	7	7	6	5	4	3	2	1	1	1	1	1	4	8	5	3	3	3	7	6	9	11	4.6	11
7-Feb	5	Z	1	0	1	2	2	1	4	3	7	6	4	1	1	2	1	4	4	2	3	1	1	1	2.4	7
8-Feb	1	1	Z	1	1	1	1	2	1	1	1	1	1	2	2	2	3	2	2	1	1	1	1	1	1.4	3
9-Feb	1	2	1	Z	1	1	1	1	C	C	C	C	C	C	C	2	3	4	4	5	4	1	1	5	--	5
10-Feb	4	3	2	1	Z	1	1	1	2	2	2	2	2	2	2	2	1	1	1	0	0	0	0	0	1.4	4
11-Feb	0	0	0	1	0	Z	0	0	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0.7	2
12-Feb	Z	1	1	1	2	2	2	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.5	3
13-Feb	1	Z	1	1	1	1	1	2	2	2	2	2	2	2	2	1	2	2	2	1	1	1	1	1	1.4	2
14-Feb	1	1	Z	1	1	1	1	1	1	1	2	5	4	6	7	3	3	2	2	2	2	1	2	2	2.2	7
15-Feb	2	2	2	Z	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	3	2	1	1	1	1.2	3
16-Feb	1	1	2	2	Z	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	2	2	1.7	3
17-Feb	2	2	2	5	3	Z	1	1	2	2	4	8	7	8	9	9	8	8	5	3	3	3	2	1	4.2	9
18-Feb	Z	1	1	1	1	1	1	1	1	2	2	1	1	2	2	2	2	1	1	1	1	2	1	3	1.2	3
19-Feb	4	Z	1	1	1	0	1	1	1	1	2	3	3	1	2	1	1	1	1	1	1	1	2	3	1.5	4
20-Feb	2	1	Z	1	1	1	2	1	3	5	2	2	1	1	1	1	1	1	1	1	1	2	2	2	1.5	5
21-Feb	2	2	2	Z	2	2	2	2	2	2	2	2	1	1	1	1	2	4	3	2	1	1	1	1	1.8	4
22-Feb	5	7	2	2	Z	2	1	5	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1.7	7
23-Feb	1	1	1	1	1	Z	2	1	1	2	3	7	6	8	4	8	11	9	6	2	1	1	1	3	3.5	11
24-Feb	Z	5	1	0	1	1	2	4	2	3	2	1	1	1	0	0	0	0	1	1	1	1	1	1	1.2	5
25-Feb	1	Z	1	2	2	2	2	2	3	3	3	2	1	1	2	1	1	1	1	1	1	1	1	1	1.5	3
26-Feb	1	1	Z	1	1	1	1	1	1	9	6	1	2	8	4	4	3	4	1	2	4	3	1	0	2.6	9
27-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	2	1	1	1	3	2	3	2	2	2	1.0	3
28-Feb	6	9	3	3	Z	2	2	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1.6	9
29-Feb	1	1	1	1	2	Z	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1.2	2
2.1 2.2 1.7 1.7 1.6 1.8 2.0 2.1 2.0 2.2 2.3 2.3 2.1 2.3 2.2 2.3 2.4 2.4 2.2 2.0 2.0 1.7 1.8 2.1																								Diurnal Average		
6 9 7 7 6 7 10 9 6 9 7 8 7 8 9 9 11 9 8 9 9 9 9 11																								Diurnal Maximum		
Z - zerspan C - Calibration PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	658	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: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	28	12	12	36	69	19	49	44	66	39	9	74	71	48	50	653
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	27	28	12	12	36	69	19	49	44	66	39	9	74	71	48	50	653

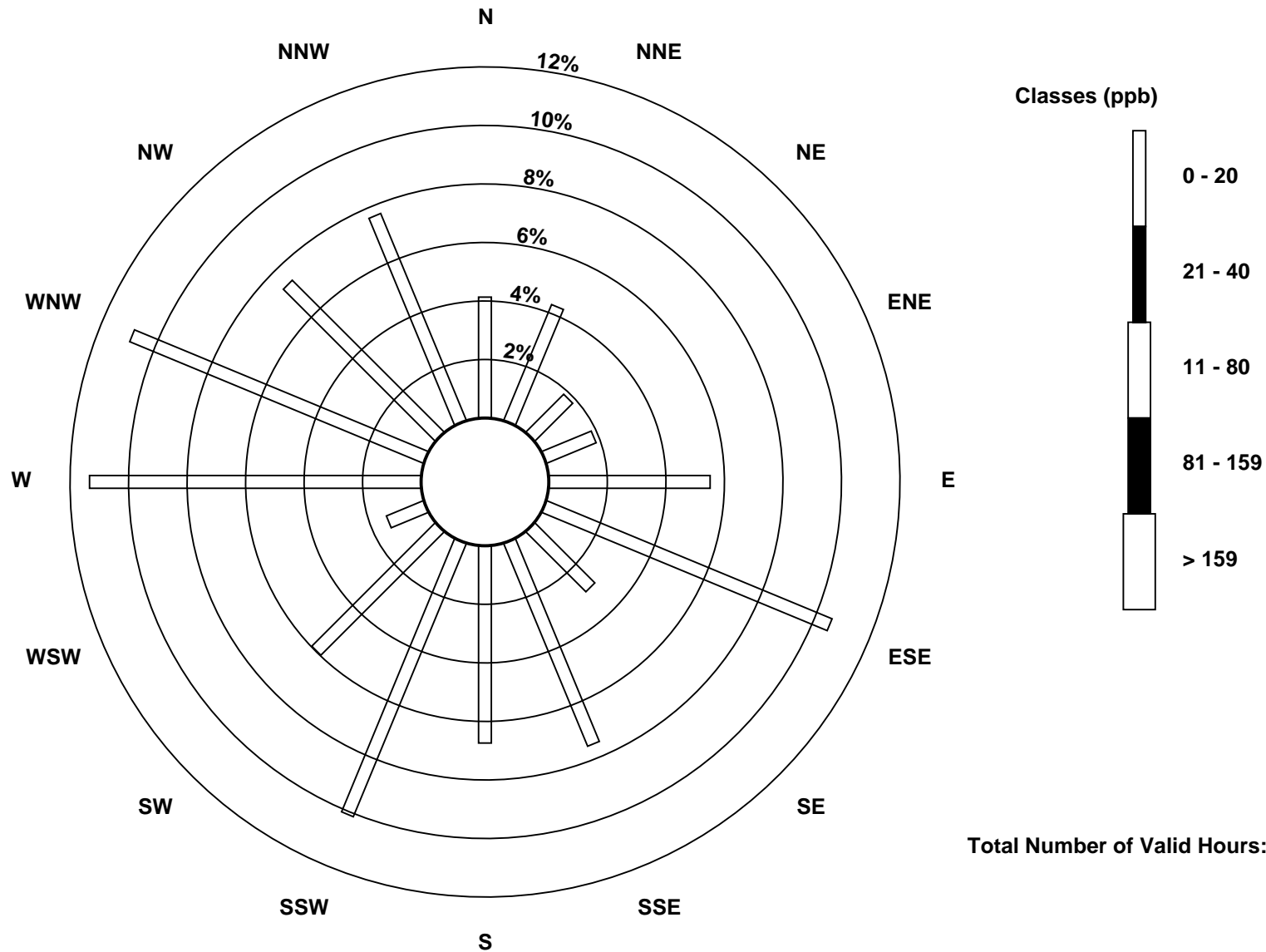
Total Number of Valid Hours: 653

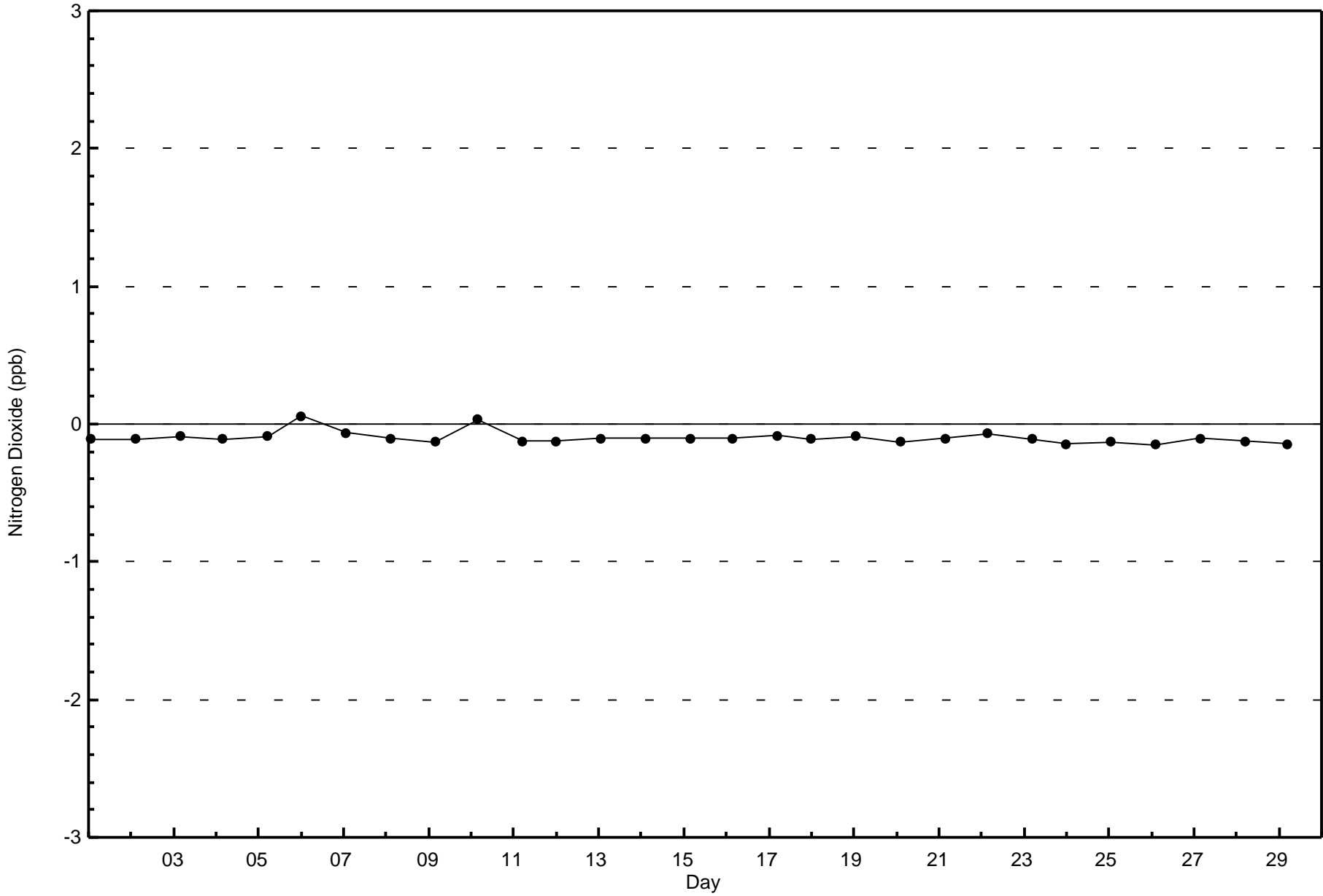
Total Number of Hours: 696

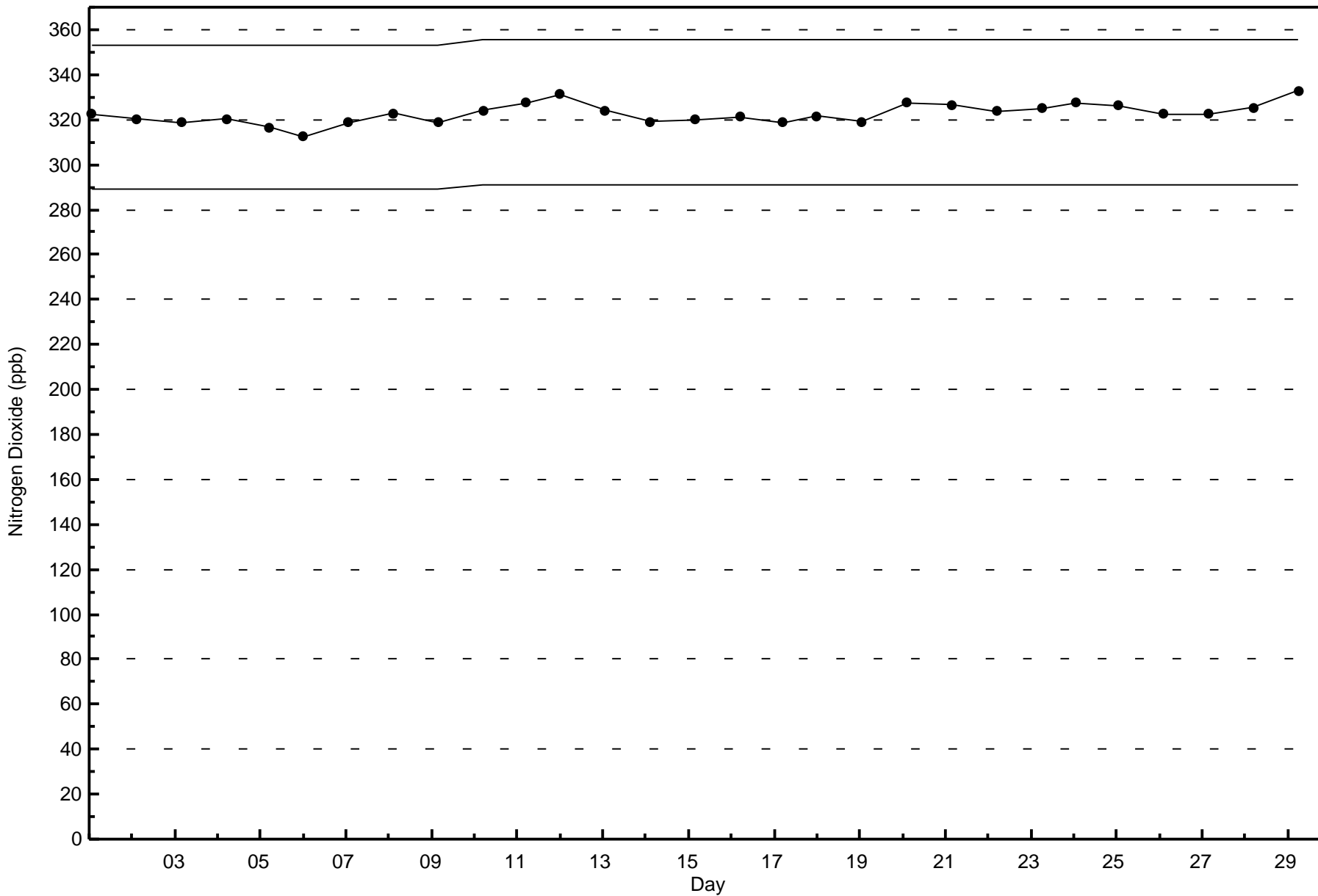


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer (AMS501)









Wood Buffalo Environmental Association
Summary of Hour Averages

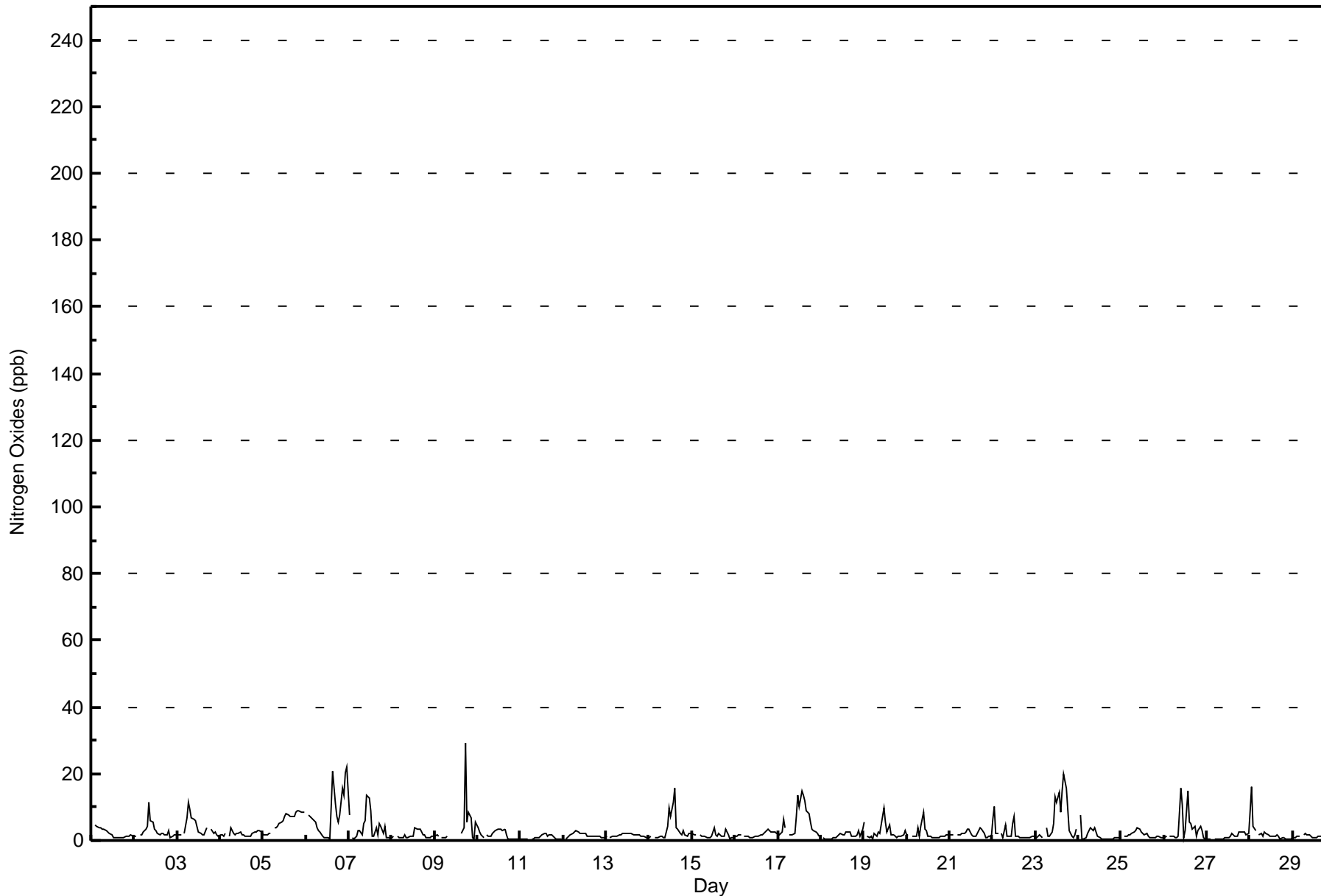
Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - February 2016

Maximum Value: 29 ppb on Feb 9 18:00		Maximum Daily Average: 7.8 ppb on Feb 6		Hours in Service: 696																																												
Minimum Value: 0 ppb on Feb 11 01:00		Minimum Daily Average: 0.9 ppb on Feb 11		Hours of Data: 658																																												
Maximum Diurnal Average: 4.0 ppb at hour 12		Minimum Diurnal Average: 1.7 ppb at hour 5		Hours of Missing Data: 38																																												
Monthly Average: 2.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 16		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	6	Z	5	4	4	4	4	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2.3	6																						
2-Feb	1	1	Z	2	2	3	3	4	11	6	5	4	3	2	2	2	2	2	2	3	1	1	1	2	2.8	11																						
3-Feb	2	2	2	Z	2	7	11	9	7	6	6	4	3	2	2	2	4	PF	PF	3	2	2	2	1	3.9	11																						
4-Feb	2	2	1	2	Z	1	4	2	2	2	2	2	2	1	1	1	1	1	2	2	3	3	3	3	2.0	4																						
5-Feb	2	2	2	2	2	Z	4	4	4	4	5	5	6	7	8	8	7	7	7	8	9	9	8	9	5.8	9																						
6-Feb	Z	8	7	7	6	5	4	3	2	1	1	1	1	1	10	21	11	7	6	7	16	13	20	22	7.8	22																						
7-Feb	7	Z	1	1	1	3	3	2	5	6	14	13	9	1	1	4	2	5	4	2	4	1	1	1	3.9	14																						
8-Feb	1	1	Z	1	1	1	1	2	1	1	1	1	1	4	4	3	3	2	2	1	1	1	1	1	1.6	4																						
9-Feb	1	2	1	Z	1	1	1	1	C	C	C	C	C	C	C	2	4	29	6	9	7	1	1	6	--	29																						
10-Feb	4	3	2	1	Z	1	1	1	2	3	3	3	3	3	3	3	3	2	1	1	1	0	0	0	1.8	4																						
11-Feb	0	0	0	0	0	Z	0	0	1	1	1	1	2	2	2	1	2	2	1	1	0	0	0	0	0.9	2																						
12-Feb	Z	1	1	1	2	2	2	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.6	3																						
13-Feb	1	Z	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1.5	2																						
14-Feb	1	1	Z	1	1	1	1	1	1	1	4	10	7	11	16	4	4	2	2	3	2	1	2	2	3.4	16																						
15-Feb	2	2	2	Z	2	1	1	1	1	1	1	1	4	2	1	2	1	1	1	4	2	1	1	1	1.5	4																						
16-Feb	1	1	2	2	Z	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	2	2	1.8	3																						
17-Feb	2	2	2	6	4	Z	2	2	2	2	7	14	10	15	14	12	9	8	5	4	3	3	2	1	5.6	15																						
18-Feb	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	2	1	1	1	1	3	1	3	1.5	3																						
19-Feb	6	Z	1	1	1	1	2	1	2	2	5	10	5	2	5	2	2	2	1	1	1	1	2	3	2.5	10																						
20-Feb	2	2	Z	1	1	1	4	1	4	9	3	3	1	1	1	1	1	1	1	1	1	1	2	2	1.9	9																						
21-Feb	2	2	2	Z	2	2	2	2	2	3	4	3	2	1	1	1	3	4	3	2	1	1	1	1	2.0	4																						
22-Feb	6	10	2	2	Z	2	1	5	1	1	1	5	7	1	1	1	1	1	1	1	1	1	1	1	2.4	10																						
23-Feb	1	1	2	1	1	Z	4	1	1	2	5	13	11	14	9	15	20	16	10	3	1	1	2	4	6.0	20																						
24-Feb	Z	8	0	0	1	2	3	4	3	4	2	1	1	1	0	0	0	0	1	1	1	1	1	1	1.5	8																						
25-Feb	1	Z	1	1	2	2	2	2	3	4	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1.7	4																						
26-Feb	1	1	Z	1	1	1	1	1	1	16	11	1	3	15	5	5	3	4	1	3	4	3	1	0	3.7	16																						
27-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	2	1	1	1	3	2	2	2	2	2	1.2	3																						
28-Feb	9	16	4	3	Z	2	2	1	2	2	2	1	1	1	1	2	1	0	1	1	0	0	1	0	2.4	16																						
29-Feb	1	1	1	1	1	Z	2	2	2	2	1	1	1	1	1	1	1	2	2	1	2	2	2	2	1.4	2																						
																								2.5	2.8	1.8	1.8	1.7	1.9	2.3	2.2	2.5	3.2	3.5	4.0	3.4	3.6	3.6	3.6	3.3	3.8	2.5	2.5	2.5	2.1	2.2	2.6	Diurnal Average
																								9	16	7	7	6	7	11	9	11	16	14	14	11	15	16	21	20	29	10	9	16	13	20	22	Diurnal Maximum
Z - zerospan																								C - Calibration				PF - Power Failure																				



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	655	99.54	99.54
21 - 40	3	0.46	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	28	12	12	36	69	19	49	44	66	39	9	74	71	46	49	650
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	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	27	28	12	12	36	69	19	49	44	66	39	9	74	71	48	50	653

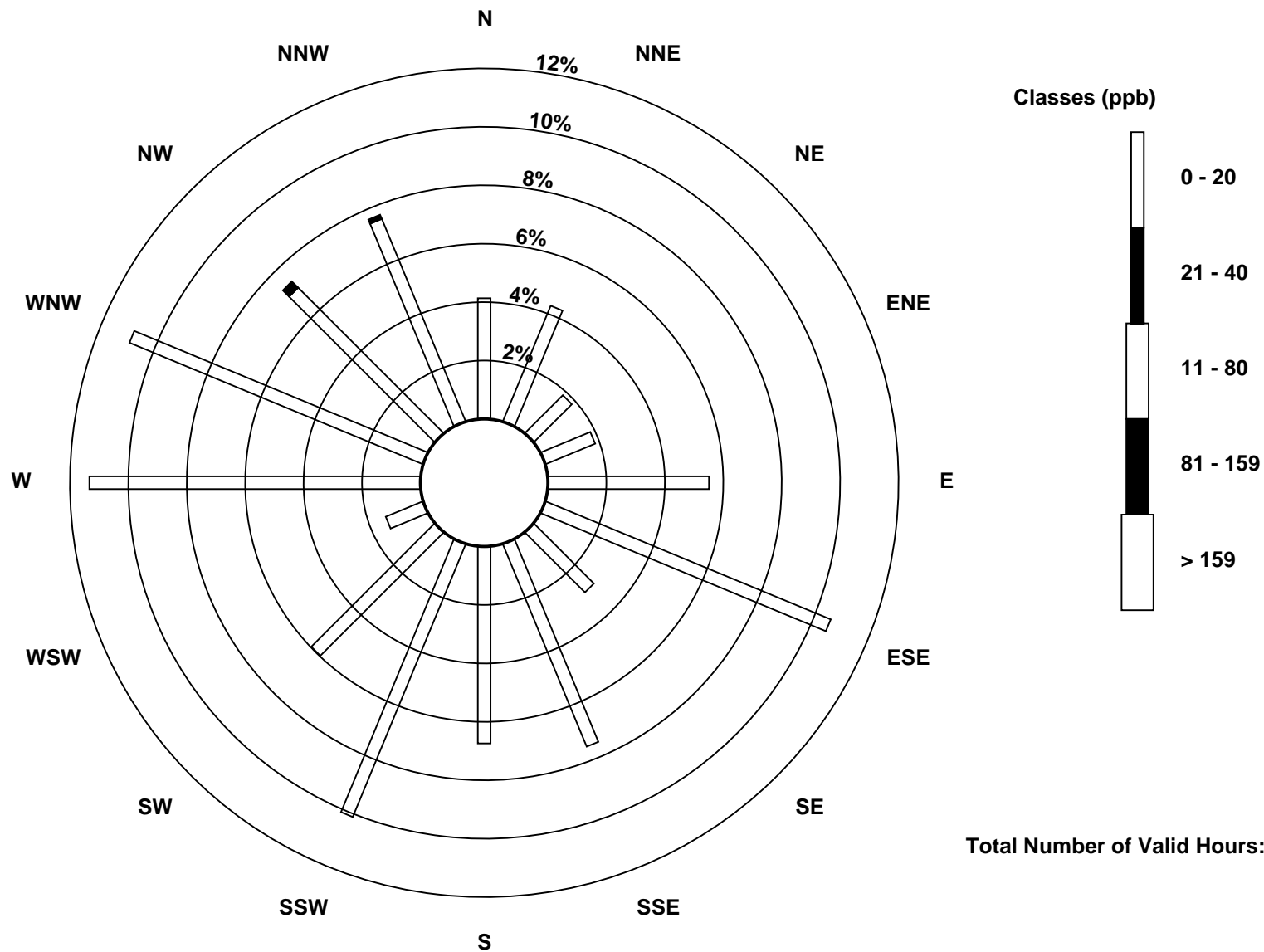
Total Number of Valid Hours: 653

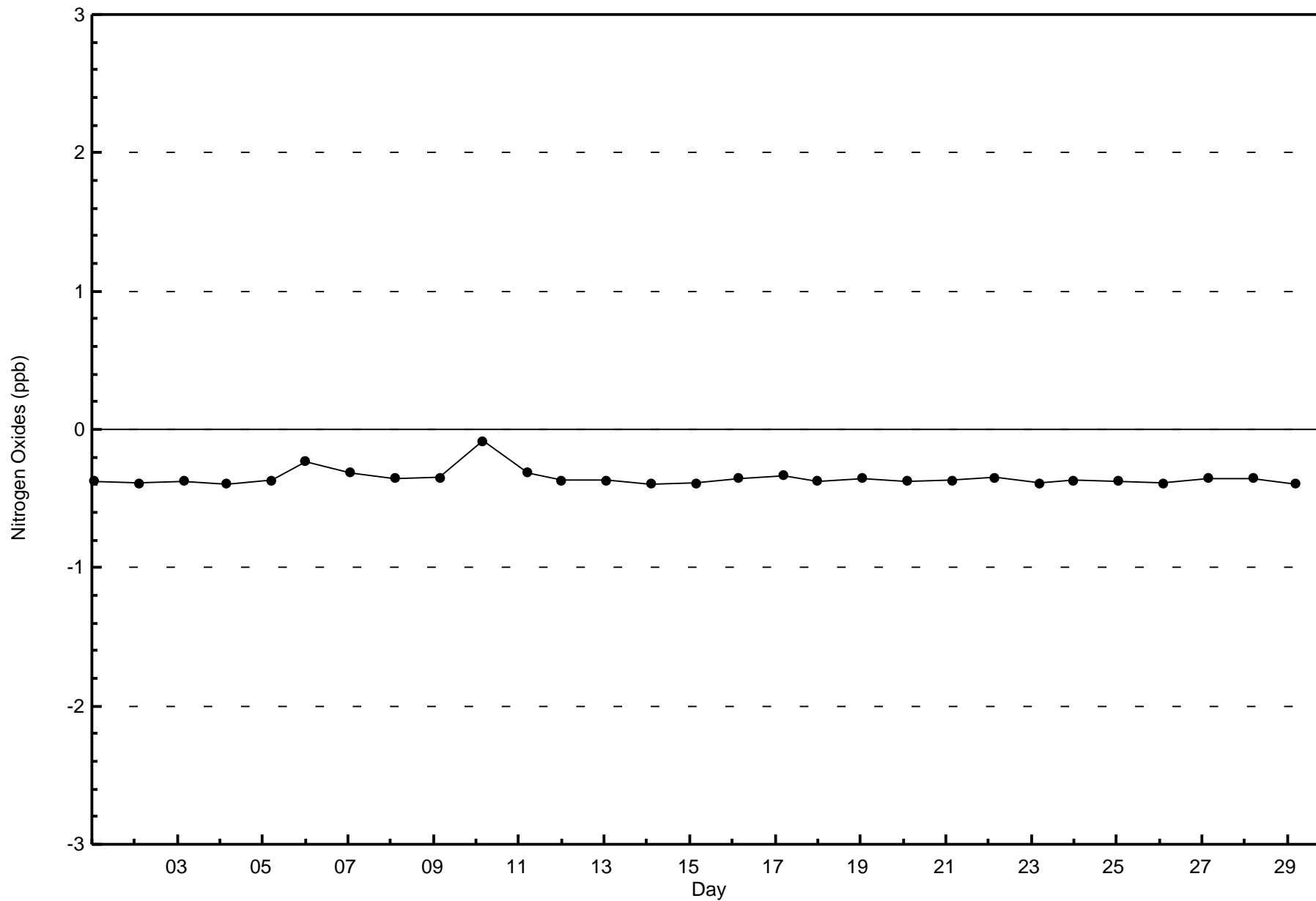
Total Number of Hours: 696

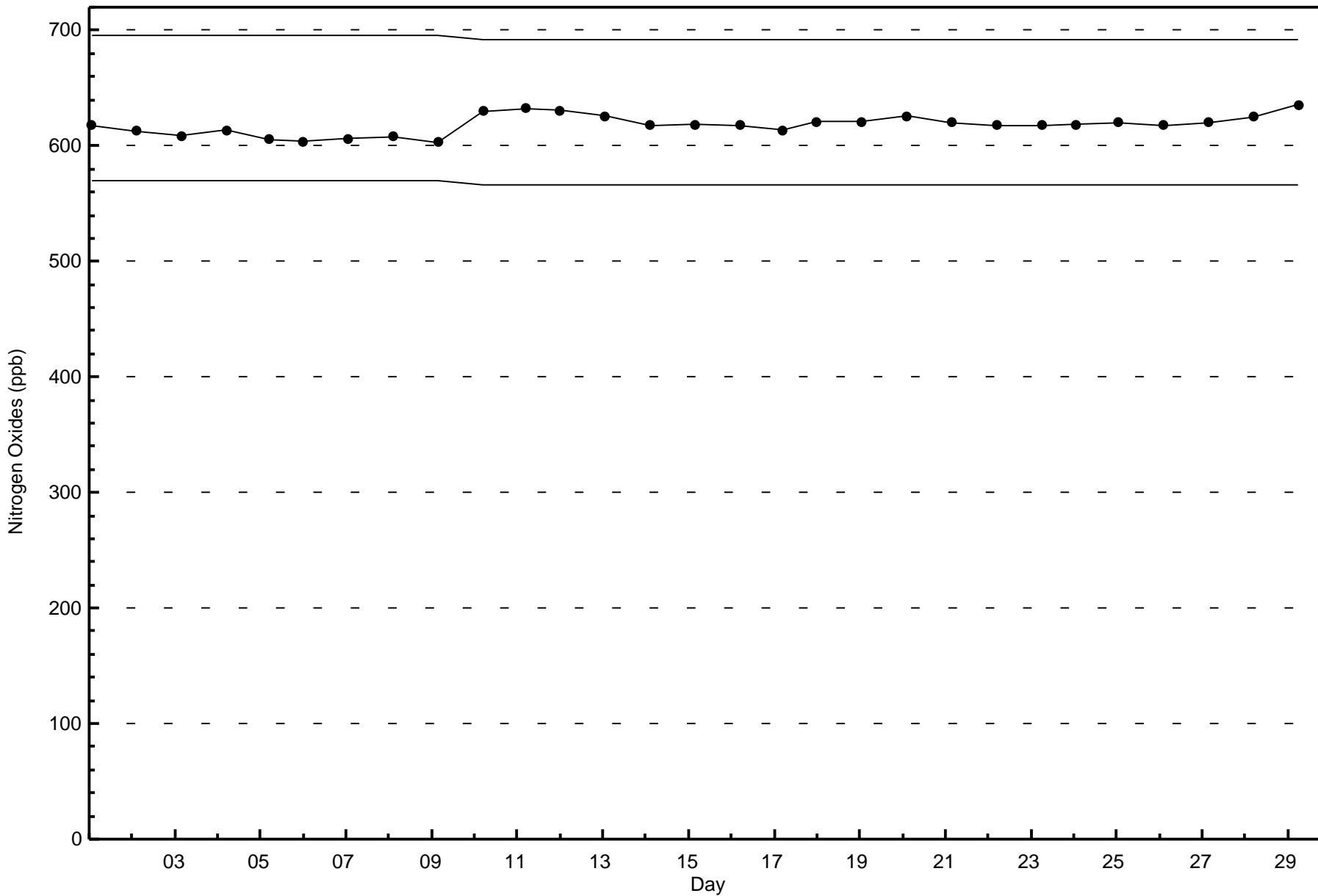


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer (AMS501)





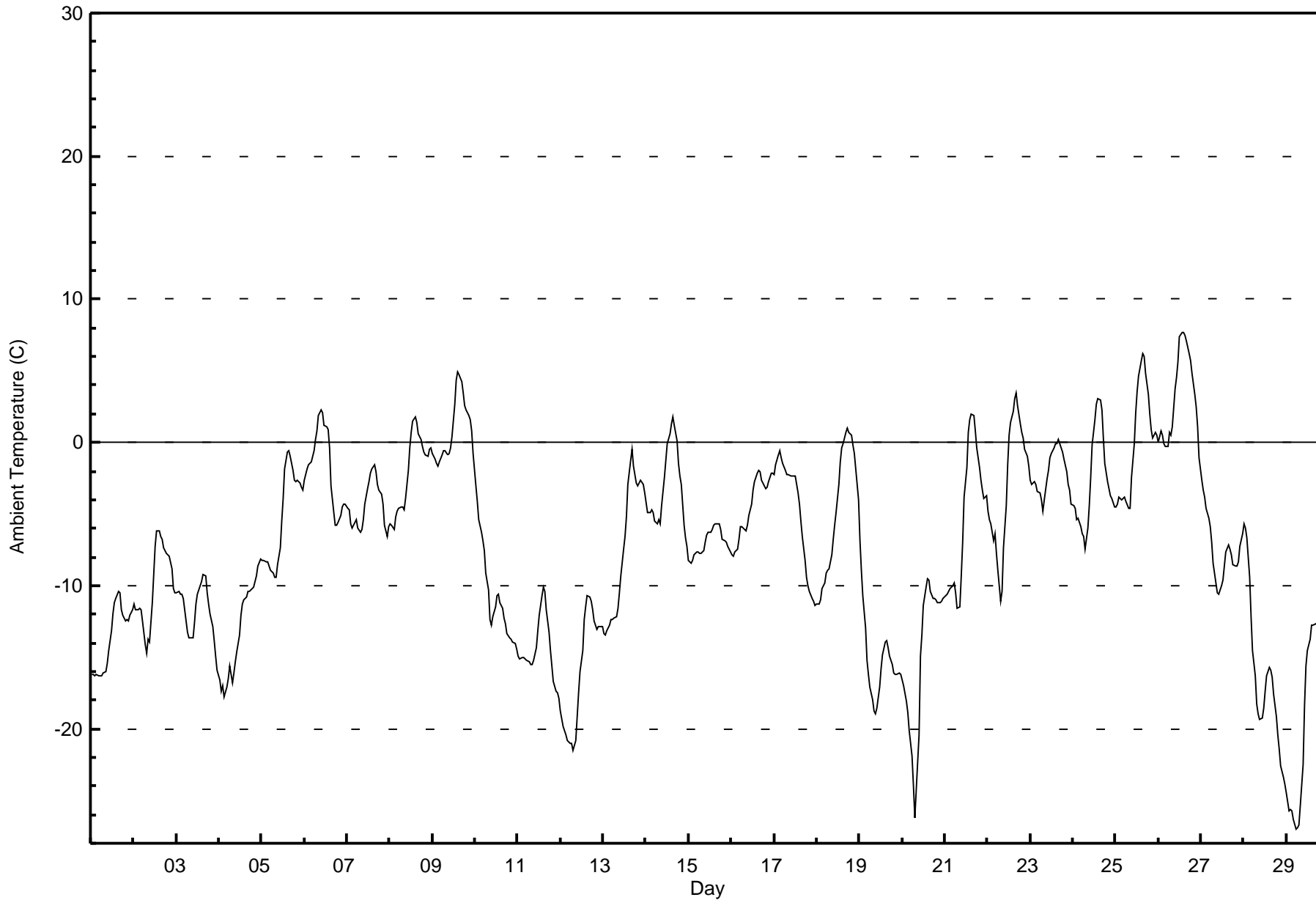




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Statoil - Leismer - February 2016

Maximum Value: 7.7 C on Feb 26 14:00		Maximum Daily Average: 3.2 C on Feb 26		Hours in Service: 696																							
Minimum Value: -27.1 C on Feb 29 06:00		Minimum Daily Average: -18.5 C on Feb 29		Hours of Data: 696																							
Maximum Diurnal Average: -4.1 C at hour 16		Minimum Diurnal Average: -10.6 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -7.46 C		Percentiles: P ₁ = -25.8 P ₁₀ = -16.2 Q ₁ = -12.1 Median = -6.8 Q ₃ = -2.3 P ₉₀ = 0.7 P ₉₉ = 6.2		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	-16.2	-16.2	-16.3	-16.2	-16.3	-16.3	-16.3	-16.1	-16.0	-15.4	-14.5	-13.2	-12.0	-11.2	-10.9	-10.4	-10.5	-11.7	-12.1	-12.5	-12.4	-12.4	-12.1	-11.7	-13.7	-10.4	
2-Feb	-11.3	-11.7	-11.7	-11.6	-11.7	-12.4	-14.2	-14.7	-13.7	-13.9	-11.2	-9.3	-7.2	-6.1	-6.2	-6.6	-6.8	-7.4	-7.7	-7.8	-8.0	-8.9	-10.2	-10.5	-10.0	-6.1	
3-Feb	-10.5	-10.4	-10.6	-10.6	-10.8	-12.4	-13.2	-13.6	-13.7	-13.7	-12.5	-11.3	-10.6	-10.0	-9.7	-9.2	-9.4	-10.5	-11.3	-11.9	-12.9	-13.8	-15.0	-15.9	-11.8	-9.2	
4-Feb	-16.6	-17.4	-17.0	-17.8	-17.1	-16.5	-15.6	-16.8	-16.1	-15.4	-14.6	-13.5	-12.1	-11.3	-11.0	-10.7	-10.4	-10.4	-10.3	-10.1	-9.8	-9.3	-8.6	-8.1	-13.2	-8.1	
5-Feb	-8.2	-8.3	-8.3	-8.4	-8.6	-9.0	-9.2	-9.5	-9.4	-8.6	-7.3	-5.5	-3.9	-1.8	-0.7	-0.6	-1.0	-1.9	-2.6	-2.8	-2.6	-2.9	-3.1	-3.4	-5.3	-0.6	
6-Feb	-2.6	-1.9	-1.5	-1.5	-1.3	-0.6	0.2	0.8	1.9	2.3	2.0	1.2	1.1	0.9	-0.4	-3.1	-4.9	-5.8	-5.8	-5.6	-5.1	-4.5	-4.3	-4.4	-1.8	2.3	
7-Feb	-4.6	-4.7	-5.7	-5.9	-5.5	-5.4	-6.0	-6.3	-6.1	-5.4	-4.3	-3.3	-2.7	-2.2	-1.8	-1.6	-2.1	-3.0	-3.3	-3.6	-4.3	-5.8	-6.5	-5.9	-4.4	-1.6	
8-Feb	-5.7	-5.7	-6.0	-5.2	-4.8	-4.6	-4.5	-4.5	-4.7	-3.9	-1.9	-0.4	0.7	1.5	1.8	1.4	0.6	0.2	-0.3	-0.6	-0.9	-0.9	-0.4	-0.4	-2.1	1.8	
9-Feb	-0.8	-1.2	-1.5	-1.6	-1.4	-0.9	-0.6	-0.6	-0.8	-0.7	-0.3	0.4	2.7	4.3	5.0	4.7	4.3	3.5	2.6	2.3	1.9	1.6	0.8	-0.8	0.9	5.0	
10-Feb	-3.0	-4.1	-5.3	-6.3	-6.9	-7.5	-9.1	-10.3	-12.4	-12.8	-12.2	-11.5	-10.7	-10.6	-11.2	-11.6	-12.3	-12.7	-13.4	-13.6	-13.7	-13.9	-14.1	-14.5	-10.6	-3.0	
11-Feb	-14.9	-15.1	-15.0	-15.0	-15.1	-15.3	-15.3	-15.5	-15.5	-15.2	-14.4	-13.1	-12.1	-10.7	-10.1	-10.4	-11.7	-13.3	-14.5	-15.6	-16.7	-17.4	-17.5	-17.9	-14.5	-10.1	
12-Feb	-18.8	-19.8	-20.1	-20.4	-20.8	-21.0	-21.0	-21.5	-20.9	-19.1	-17.5	-16.0	-14.5	-12.4	-11.5	-10.7	-10.8	-11.1	-11.7	-12.5	-13.0	-12.9	-12.9	-12.9	-16.0	-10.7	
13-Feb	-13.3	-13.5	-13.1	-12.8	-12.4	-12.4	-12.2	-12.2	-11.6	-10.5	-9.4	-7.5	-6.6	-5.2	-2.9	-1.3	-0.5	-1.6	-2.9	-3.0	-2.8	-2.6	-2.9	-3.6	-7.4	-0.5	
14-Feb	-4.2	-4.9	-4.9	-4.7	-4.9	-5.5	-5.7	-5.4	-5.7	-4.5	-2.5	-1.3	-0.1	0.7	1.3	1.8	1.2	0.1	-1.4	-2.4	-3.0	-5.8	-6.6	-7.2	-3.1	1.8	
15-Feb	-8.2	-8.4	-8.2	-7.8	-7.6	-7.6	-7.7	-7.7	-7.6	-7.0	-6.5	-6.3	-6.1	-5.8	-5.7	-5.7	-5.7	-5.7	-6.1	-6.8	-6.8	-7.0	-7.3	-7.7	-7.0	-5.7	
16-Feb	-7.9	-7.9	-7.7	-7.4	-6.7	-5.9	-5.9	-6.1	-6.2	-5.7	-5.1	-4.3	-3.3	-2.7	-2.2	-2.0	-2.1	-2.7	-3.1	-3.2	-3.1	-2.7	-2.1	-2.1	-4.5	-2.0	
17-Feb	-2.2	-1.6	-0.9	-0.6	-1.0	-1.4	-2.0	-2.3	-2.3	-2.3	-2.4	-2.4	-2.4	-3.6	-4.4	-5.5	-6.6	-8.2	-9.4	-10.0	-10.4	-10.9	-11.1	-11.4	-4.8	-0.6	
18-Feb	-11.3	-11.3	-11.0	-10.2	-9.8	-9.1	-8.9	-8.8	-7.8	-6.8	-5.8	-4.9	-2.9	-1.4	-0.3	0.0	0.7	1.0	0.7	0.5	-0.2	-0.7	-1.9	-4.0	-4.8	1.0	
19-Feb	-6.8	-9.0	-10.7	-12.9	-15.2	-16.2	-17.1	-18.0	-18.7	-19.0	-18.5	-17.1	-15.8	-14.8	-13.9	-13.9	-14.3	-14.9	-15.5	-16.1	-16.2	-16.2	-16.1	-16.2	-15.1	-6.8	
20-Feb	-16.6	-17.0	-18.1	-18.9	-20.2	-21.9	-23.9	-26.2	-24.3	-20.5	-14.9	-13.5	-11.4	-10.2	-9.5	-9.6	-10.4	-10.9	-10.9	-11.0	-11.2	-11.2	-11.1	-10.9	-15.2	-9.5	
21-Feb	-10.7	-10.6	-10.4	-10.2	-10.0	-9.8	-10.5	-11.6	-11.5	-9.3	-7.0	-3.9	-1.8	0.7	1.5	2.0	1.9	0.8	-0.3	-1.7	-2.6	-3.3	-3.9	-3.8	-5.3	2.0	
22-Feb	-4.8	-5.4	-5.6	-6.9	-6.4	-7.8	-9.0	-11.1	-10.4	-7.3	-4.4	-1.5	0.5	1.4	2.2	3.1	3.5	2.6	1.3	0.7	0.4	-0.5	-1.0	-1.6	-2.8	3.5	
23-Feb	-2.7	-2.9	-2.7	-2.9	-3.4	-3.6	-4.0	-4.8	-4.0	-2.6	-1.9	-1.1	-0.8	-0.4	-0.1	-0.1	0.2	-0.4	-0.7	-1.2	-2.0	-2.9	-3.4	-4.3	-2.2	0.2	
24-Feb	-4.4	-4.6	-5.4	-5.3	-5.9	-6.4	-6.6	-7.4	-6.0	-4.4	-2.4	-0.2	1.6	2.7	3.1	2.9	2.3	0.4	-1.4	-2.7	-3.2	-3.7	-3.9	-4.5	-2.7	3.1	
25-Feb	-4.5	-4.3	-3.8	-4.1	-3.9	-3.8	-4.1	-4.6	-4.6	-2.4	-0.1	2.1	3.6	4.7	5.8	6.2	6.0	4.9	3.4	2.0	0.9	0.3	0.7	0.5	0.0	6.2	
26-Feb	0.0	0.8	0.5	-0.1	-0.3	-0.2	0.7	0.5	1.1	3.7	4.5	5.6	7.4	7.7	7.7	7.5	7.1	6.2	5.7	4.9	3.4	2.5	1.1	-1.1	3.2	7.7	
27-Feb	-2.6	-3.3	-3.8	-4.6	-5.3	-5.9	-7.0	-8.4	-9.8	-10.5	-10.6	-10.1	-9.6	-8.7	-7.6	-7.2	-7.4	-7.9	-8.6	-8.7	-8.6	-8.3	-7.3	-6.4	-7.4	-2.6	
28-Feb	-5.7	-6.0	-6.6	-9.4	-12.1	-14.6	-16.3	-18.3	-18.9	-19.4	-19.2	-18.5	-17.4	-16.3	-15.7	-15.9	-16.4	-17.6	-19.2	-20.4	-21.5	-22.5	-23.4	-23.9	-16.5	-5.7	
29-Feb	-24.4	-25.7	-25.7	-25.8	-26.3	-27.1	-27.0	-26.7	-25.4	-22.5	-18.3	-15.6	-14.5	-13.7	-12.7	-12.8	-12.7	-12.8	-13.0	-13.0	-12.6	-12.2	-12.2	-12.1	-18.5	-12.1	
		-8.4	-8.7	-8.9	-9.1	-9.4	-9.7	-10.1	-10.6	-10.4	-9.4	-8.1	-6.7	-5.6	-4.6	-4.2	-4.1	-4.4	-5.2	-5.9	-6.4	-6.8	-7.2	-7.5	-7.8	Diurnal Average	
		0.0	0.8	0.5	-0.1	-0.3	-0.2	0.7	0.8	1.9	3.7	4.5	5.6	7.4	7.7	7.7	7.5	7.1	6.2	5.7	4.9	3.4	2.5	1.1	0.5	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Statoil - Leismer - February 2016

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	28	4.02	4.02
-20 - 0	580	83.33	87.36
0 - 10	88	12.64	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

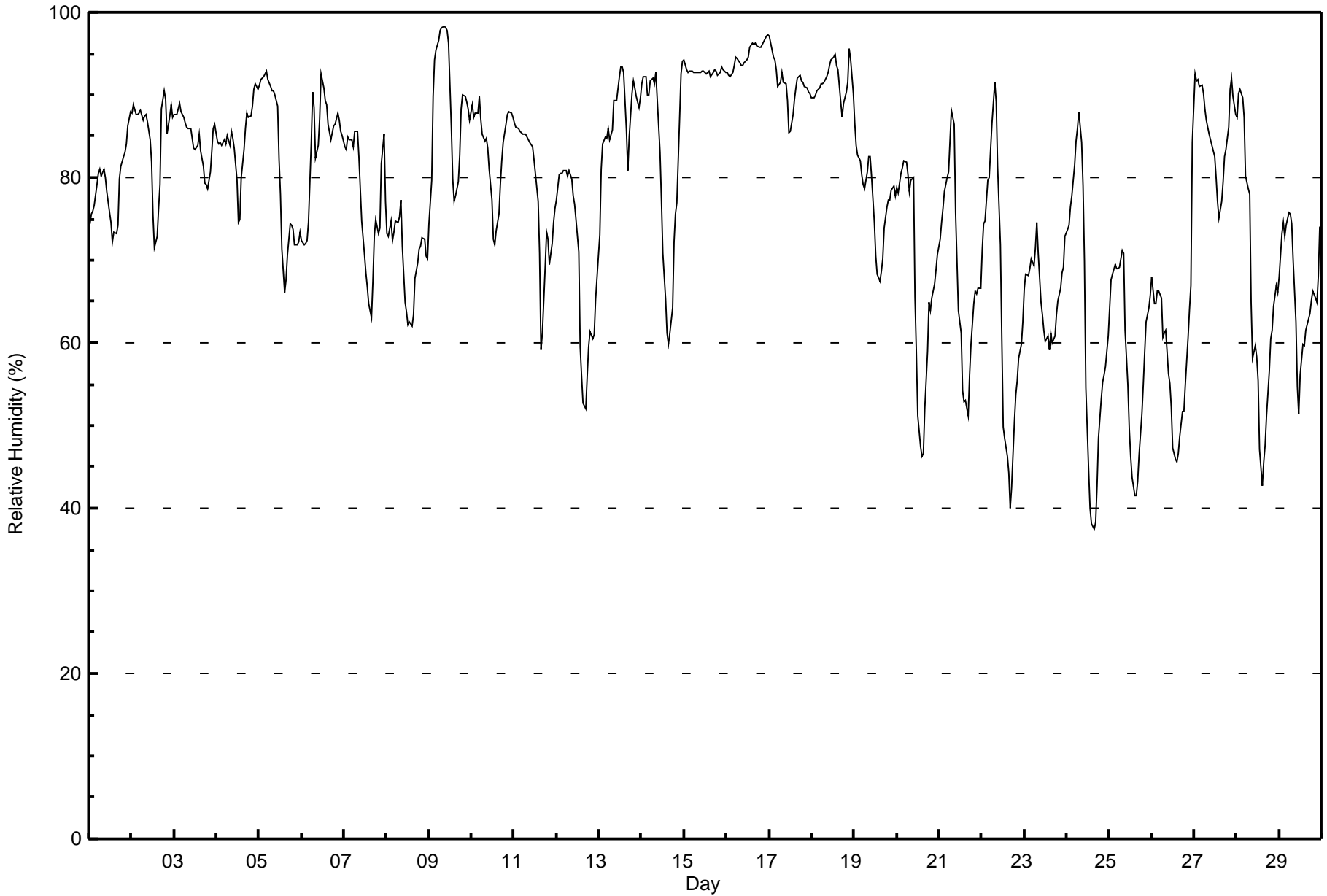
Statoil - Leismer - February 2016

Maximum Value: 98 % on Feb 9 09:00 Maximum Daily Average: 94.8 % on Feb 16																			Hours in Service: 696 Hours of Data: 696 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 37 % on Feb 24 16:00 Minimum Daily Average: 58.5 % on Feb 25 Maximum Diurnal Average: 84.4 % at hour 8 Minimum Diurnal Average: 67.7 % at hour 16 Monthly Average: 77.5 % Percentiles: P ₁ = 43 P ₁₀ = 59 Q ₁ = 69 Median = 80 Q ₃ = 88 P ₉₀ = 93 P ₉₉ = 97																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	74	76	76	77	79	81	81	80	81	80	78	76	75	72	73	73	74	80	81	83	83	84	86	88	78.8	88
2-Feb	88	89	88	88	88	88	87	87	88	87	84	82	75	72	73	76	79	88	91	89	85	87	89	87	84.8	91
3-Feb	88	88	88	89	88	87	87	86	86	86	85	84	83	84	85	83	81	79	79	79	81	83	86	86	84.6	89
4-Feb	84	84	84	84	85	84	85	84	86	85	84	80	75	75	80	83	86	88	87	87	89	91	91	91	84.6	91
5-Feb	91	92	92	93	93	92	91	90	90	90	89	82	78	71	66	68	71	74	74	74	72	72	72	73	81.3	93
6-Feb	72	72	72	72	75	84	90	88	82	84	87	93	91	89	89	87	85	85	86	86	88	87	86	85	84.0	93
7-Feb	84	83	85	85	85	84	86	86	83	79	75	71	68	67	65	63	67	73	75	73	74	82	85	77	77.2	86
8-Feb	73	73	75	72	73	75	75	75	77	72	65	64	62	63	62	63	68	70	71	72	73	73	70	70	70.2	77
9-Feb	74	80	90	94	95	97	98	98	98	98	98	96	86	80	77	78	80	83	88	90	90	89	88	87	88.8	98
10-Feb	89	87	88	88	90	87	85	84	85	84	81	77	73	72	74	76	79	82	84	86	88	88	88	87	83.4	90
11-Feb	87	86	86	86	85	85	85	85	85	84	84	82	81	77	71	59	61	69	73	72	70	72	75	76	78.2	87
12-Feb	77	80	81	80	81	81	80	81	80	78	77	75	71	59	56	53	52	56	60	61	61	61	65	71	69.8	81
13-Feb	73	81	84	85	85	86	85	86	89	89	89	92	93	93	93	86	81	85	90	92	91	90	89	90	87.3	93
14-Feb	91	92	92	90	90	92	92	91	93	90	83	77	71	65	61	60	61	64	72	76	77	87	92	94	81.4	94
15-Feb	94	93	93	93	93	93	93	93	93	93	93	93	92	93	93	92	93	93	93	92	93	93	93	93	92.8	94
16-Feb	93	92	92	93	94	95	94	94	94	94	94	94	94	96	96	96	96	96	96	96	96	97	97	97	94.8	97
17-Feb	97	96	95	94	93	91	92	93	91	91	89	86	86	88	90	91	92	92	92	92	91	91	90	90	91.3	97
18-Feb	90	90	90	91	91	91	91	91	92	93	94	94	95	95	94	93	89	87	89	90	92	96	94	90	91.7	96
19-Feb	87	84	83	82	80	79	79	81	83	83	80	75	71	68	68	69	70	74	76	77	77	78	79	78	77.5	87
20-Feb	79	78	80	81	82	82	80	78	80	80	66	59	51	47	46	47	52	59	65	64	65	67	69	71	67.9	82
21-Feb	73	75	76	78	80	81	84	88	86	76	70	64	61	54	53	53	51	56	60	65	66	66	67	67	68.7	88
22-Feb	71	74	75	80	80	83	87	91	89	81	72	61	50	48	46	44	40	43	50	54	55	58	60	63	64.8	91
23-Feb	66	68	68	69	70	69	72	75	71	65	63	62	60	61	59	61	60	61	63	65	67	69	69	73	66.1	75
24-Feb	74	74	76	78	82	84	86	88	84	79	70	54	45	40	38	37	38	43	48	53	55	56	57	61	62.6	88
25-Feb	64	68	68	70	69	69	69	71	71	61	55	50	46	44	42	42	43	47	51	55	59	63	64	66	58.5	71
26-Feb	68	65	65	66	66	65	61	61	62	56	55	52	47	46	46	47	49	52	52	55	61	64	67	84	58.8	84
27-Feb	92	92	92	91	91	90	88	87	85	85	84	83	80	77	75	77	80	83	83	86	91	92	90	88	85.9	92
28-Feb	87	90	91	90	87	80	79	78	65	58	60	58	55	47	43	46	48	51	57	60	61	64	67	66	66.2	91
29-Feb	68	73	75	73	74	76	76	74	70	63	55	51	56	60	60	61	63	63	65	66	65	65	68	74	66.4	76
																			81.0 81.9 82.7 83.1 83.6 83.8 84.0 84.4 83.4 80.7 77.8 74.7 71.4 69.1 68.0 67.7 68.6 71.6 74.3 75.6 76.3 78.1 79.1 80.1				Diurnal Average			
																			97 96 95 94 95 97 98 98 98 98 98 96 95 96 96 96 96 96 96 96 96 96 97 97 97				Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Statoil - Leismer - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Statoil - Leismer - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	4	0.57	0.57
40 - 60	78	11.21	11.78
60 - 80	256	36.78	48.56
80 - 100	358	51.44	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

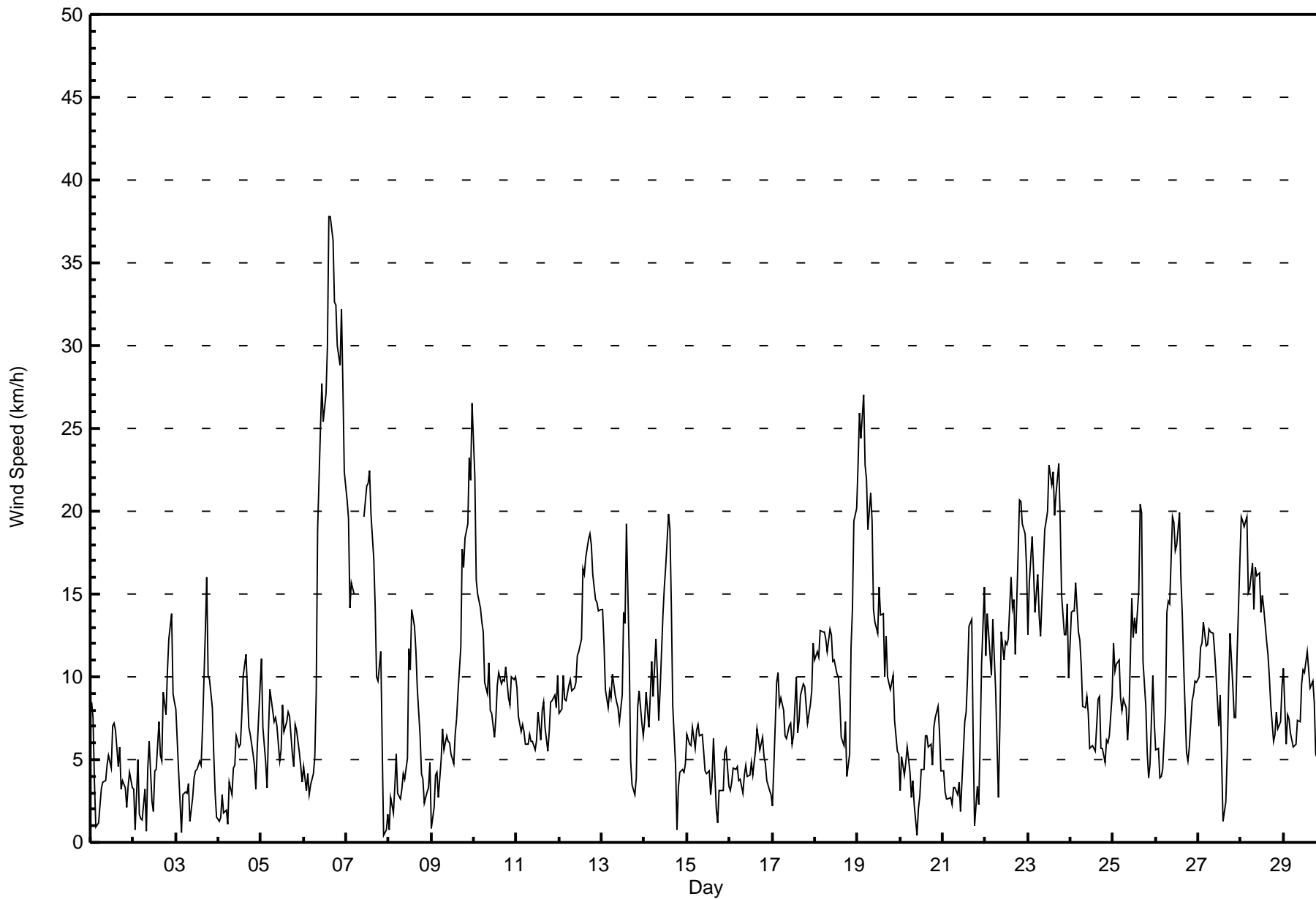


Maximum Speed: 38 km/h on Feb 6 15:00	Maximum Daily Speed Average: 19.1 km/h on Feb 6	Hours in Service: 696
Minimum Speed Value: 0 km/h on Feb 20 10:00	Minimum Daily Speed Average: 1.6 km/h on Feb 20	Hours of Data: 691
Maximum Diurnal Speed Average: 5.1 km/h at hour 15	Minimum Diurnal Speed Average: 0.7 km/h at hour 8	Hours of Missing Data: 5
Monthly Average Velocity: 2.6 km/h 299.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 18 P ₉₉ = 29	Percent Operational Time: 99.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	N8	NNW8	NW4	SSE1	SW1	SSE2	SSE3	SSE4	SSE4	SSE5	SSE5	S5	SSW7	SW7	SW7	SSW5	SSW6	S3	SSW4	SSW3	SW2	SSW3	SSW4	SSW3	SSW2.5	N8
2-Feb	SW3	E1	NE5	E2	SSE1	ESE1	NE3	NNW1	N4	NNE6	NE2	W2	SW4	SW4	W7	W5	W5	WNN9	W8	NNW10	NNW12	N14	NNE9	N9	NNW3.0	N14
3-Feb	NNW8	NNE4	SE2	S1	N3	N3	N3	NNE4	ESE1	S3	SSW4	S4	SSW4	SSW5	SW5	W7	NW13	NW16	NNW10	NNW10	N8	N5	NW3	NE2	NW2.8	NW16
4-Feb	NE1	W2	ESE3	NNW2	ENE2	E1	SE4	SSE3	SE4	SE5	SSE6	SSE6	S6	S8	SSE10	SSE11	S9	S7	SSW6	SW5	SW5	SW3	W6	W9	S3.6	SSE11
5-Feb	WNNW11	W7	WSW5	SW3	S7	SSE9	SSE8	SSE7	SSE8	SSE7	S5	SSE6	SSE8	SSW7	SSW7	S8	S8	S7	SSW5	SSW7	SSW7	SSW5	S5	S4	S5.3	WNNW11
6-Feb	S5	S3	S4	S3	W4	W4	W5	W9	W19	NNW25	WNN28	W25	W27	WNN30	NW38	NW38	NW36	NW33	NW32	NW30	NW29	NW32	NW28	NW22	NW19.1	NW38
7-Feb	WNNW21	WNNW20	WNNW14	WNNW16	WNNW15	AF	AF	AF	AF	AF	NW20	NW22	WNNW22	WNNW22	WNNW20	WNNW17	WNNW14	WNNW10	WNNW10	WNNW12	NW6	SW0	SSW1	SSW2	WNNW13.5	WNNW22
8-Feb	SW1	SSW3	S2	WNNW3	WNNW5	SW3	SSW3	SSE3	SE4	S4	WSW5	W12	WNNW10	NW14	NW13	NW12	WNNW9	WNNW6	W4	W4	SW2	W3	W3	W5	W4.2	NW14
9-Feb	SSW1	ESE2	SE4	SSE4	SE3	SSE5	SSE7	SE6	SE6	SE6	SSE6	SSW5	SW5	W7	W7	WNNW9	WNNW12	NNW18	NNW17	NW18	NNW19	NNW23	NNW22	N27	NW4.7	N27
10-Feb	N22	N16	N15	NNE14	NNE13	NNE13	NNE10	NNE9	NNE11	NNE8	NE8	ENE6	ESE8	ESE10	ESE10	ESE10	ESE10	E10	ESE11	ESE9	ESE8	E10	E10	ESE10	NE7.6	N22
11-Feb	ESE9	ESE8	ESE7	ESE7	ESE7	ESE6	ESE6	ESE7	ESE6	ESE6	ESE6	ESE6	ESE8	E6	E8	E8	E7	E6	ENE7	ENE9	E9	ESE9	ESE8	ESE10	E7.1	ESE10
12-Feb	ESE8	ESE8	ESE10	ESE9	ESE9	ESE9	ESE10	ESE9	ESE9	SE10	SSE11	SE12	SE12	SSE17	SSE16	SSE17	SSE18	SSE19	SSE18	SSE16	SSE15	SSE14	SSE14	SSE14	SE11.9	SSE19
13-Feb	S14	SSE12	S9	S8	S9	SSW9	SSW10	SSW9	SSW8	SW8	SW7	W9	W14	W13	WNNW19	W11	SW5	SSW4	SW3	W4	W8	W9	W7	W6	SW6.6	WNNW19
14-Feb	W7	W9	W7	WNNW9	WNNW11	W9	WNNW12	W10	W7	W9	WNNW14	NW15	NW17	NW20	NW19	NW14	NW8	NNW5	W1	NW3	NNE4	SSE4	SE4	ESE5	WNNW7.7	NW20
15-Feb	ESE7	ESE6	ESE6	ESE7	SE6	ESE7	E7	E6	E7	E6	E4	NE4	ENE4	NNE3	N4	NNW6	N2	SSE1	NNE3	NE3	SSE5	SE6	S3	E3.5	E7	
16-Feb	S3	SSE4	SSE4	S4	S5	SW4	SSW4	SSW3	SSE4	SSE5	S4	SSW4	S5	S4	SSE6	S7	S6	SSW6	SSW6	SSW5	SSW5	SSW4	SSW3	SSW3	S4.2	S7
17-Feb	SW2	W5	WNNW10	NW10	WNNW8	NW9	NW8	WNNW6	NNW6	NNW7	N7	N6	N6	N10	E7	ESE7	ESE9	ESE10	ESE9	E8	E7	E8	ESE9	ESE12	NE2.4	ESE12
18-Feb	ESE11	ESE11	ESE11	ESE13	ESE13	ESE13	ESE12	ESE12	ESE13	ESE13	ESE11	ESE11	SE10	SE10	SE9	ESE6	SE6	SSE7	WSW4	W5	NNW12	NNW14	NNW19	NNW20	ESE5.4	NNW20
19-Feb	NNW23	NNW26	NNW24	NNW27	NNW23	NNW22	NNW19	NNW21	NNW19	NNW14	NW13	NW13	NNW15	NNW14	NW14	NNW10	NNW12	N10	NNE9	NNE10	NNE10	NNE7	NNE6	NE5	NNW14.6	NNW27
20-Feb	NNE3	NNE5	N4	NE5	NE6	NNE4	NNE3	NE4	NE2	WNNW0	S2	SSE3	S4	S4	SSW6	SW6	SW6	SSW6	S5	SSW7	SW8	SW8	SW7	SW4	SSW1.6	SW8
21-Feb	SSW4	SW3	SSW3	SSW3	S3	SSW2	SW3	SSW3	S3	S4	W2	SW4	WSW7	W8	W10	WNNW13	NW13	NNW6	WNN1	SSW3	WSW2	WNNW6	WNNW11	WNNW15	W4.1	WNNW15
22-Feb	NW11	NW14	NNW13	WNNW10	NW13	WNNW11	W9	W3	W7	WNNW13	W11	WNNW12	WNNW12	W12	W16	W14	W15	W11	W17	WNNW21	WNNW21	WNNW19	WNNW19	WNNW17	WNNW12.9	WNNW21
23-Feb	WNNW13	WNNW16	WNNW18	WNNW16	WNNW14	WNNW16	WNNW14	WNNW12	WNNW15	WNNW19	WNNW19	NW20	NW23	NW22	NNW22	NW20	NW21	NW23	NNW19	NNW15	NNW13	NNW13	NNW14	NNW10	NW16.3	NW23
24-Feb	NNW14	NNW14	NNW14	N16	NNW13	NNW12	NNW11	NW8	NW8	WNNW9	WNNW8	WNNW6	WSW6	SSW6	SW6	SSW9	SSW9	SSW6	S6	S5	SSW6	SSW6	SSW6	SSW9	WNNW4.2	N16
25-Feb	SSW12	SSW10	SSW11	SSW11	SW9	SSW8	SW9	SW8	SW6	WSW8	W15	W12	W14	W13	WNNW15	WNNW20	W20	W11	W8	W5	W4	W5	WNNW10	W7	WSW8.9	WNNW20
26-Feb	W6	W6	W4	WSW4	WSW4	W8	W14	W15	WNNW14	NW20	WNNW19	WNNW18	NW20	NW16	NNW14	NW11	NNW5	NNE5	ENE6	E9	E9	E10	E10	NW7.1	NW20	
27-Feb	E10	E12	E12	E13	E12	E12	ENE13	E13	E13	ESE12	E10	ENE7	NNE9	ENE5	ENE1	ESE2	SSE5	W9	WNNW13	W9	W8	W8	W11	WNNW17	ENE3.4	WNNW17
28-Feb	NW20	NW19	NNW19	N20	N15	N15	N17	N14	NNE17	NNE16	N16	N14	NNE15	NNE14	ENE12	ENE11	E10	ENE8	E6	E7	ESE8	ESE7	ESE7	ESE9	NNE9.6	NW20
29-Feb	ESE10	SE6	ESE8	ESE7	SE7	SE6	SSE6	SSE6	SSE7	S7	SSW10	S10	SSW10	SSW12	SSW10	SSW9	SSW10	SSW8	S5	S5	SW7	SW7	SW6	SW4	S6.3	SSW12

NW2.7	NW2.8	NNW2.0	NNW1.8	NNW1.8	NNW1.2	NW1.0	NNW0.7	NNW0.8	NNW1.7	NNW3.5	NNW3.9	NNW4.5	NNW4.8	NNW5.1	NNW4.5	NNW4.0	NNW3.1	NNW2.9	NW2.9	NW2.7	NW2.4	NW2.7	NW2.6	Diurnal Average
NNW23	NNW26	NNW24	NNW27	NNW23	NNW22	NNW19	NNW21	NNW19	NNW25	NNW28	W25	W27	WNNW30	NW38	NW38	NW36	NW33	NW32	NW30	NW29	NW32	NW28	N27	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Statoil - Leismer - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	200	28.94	28.94
6 - 11	294	42.55	71.49
12 - 19	147	21.27	92.76
20 - 28	41	5.93	98.70
29 - 38	9	1.30	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 691

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Statoil - Leismer - February 2016**

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	10	11	4	4	6	8	22	32	32	24	6	22	4	2	5	200
6 - 11	8	12	2	7	26	58	12	19	15	35	16	3	39	21	9	12	294
12 - 19	10	7	0	2	7	9	2	12	1	2	0	0	14	37	18	26	147
20 - 28	3	0	0	0	0	0	0	0	0	0	0	0	3	10	14	11	41
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	0	9
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	29	29	13	13	37	73	22	53	48	69	40	9	78	73	51	54	691

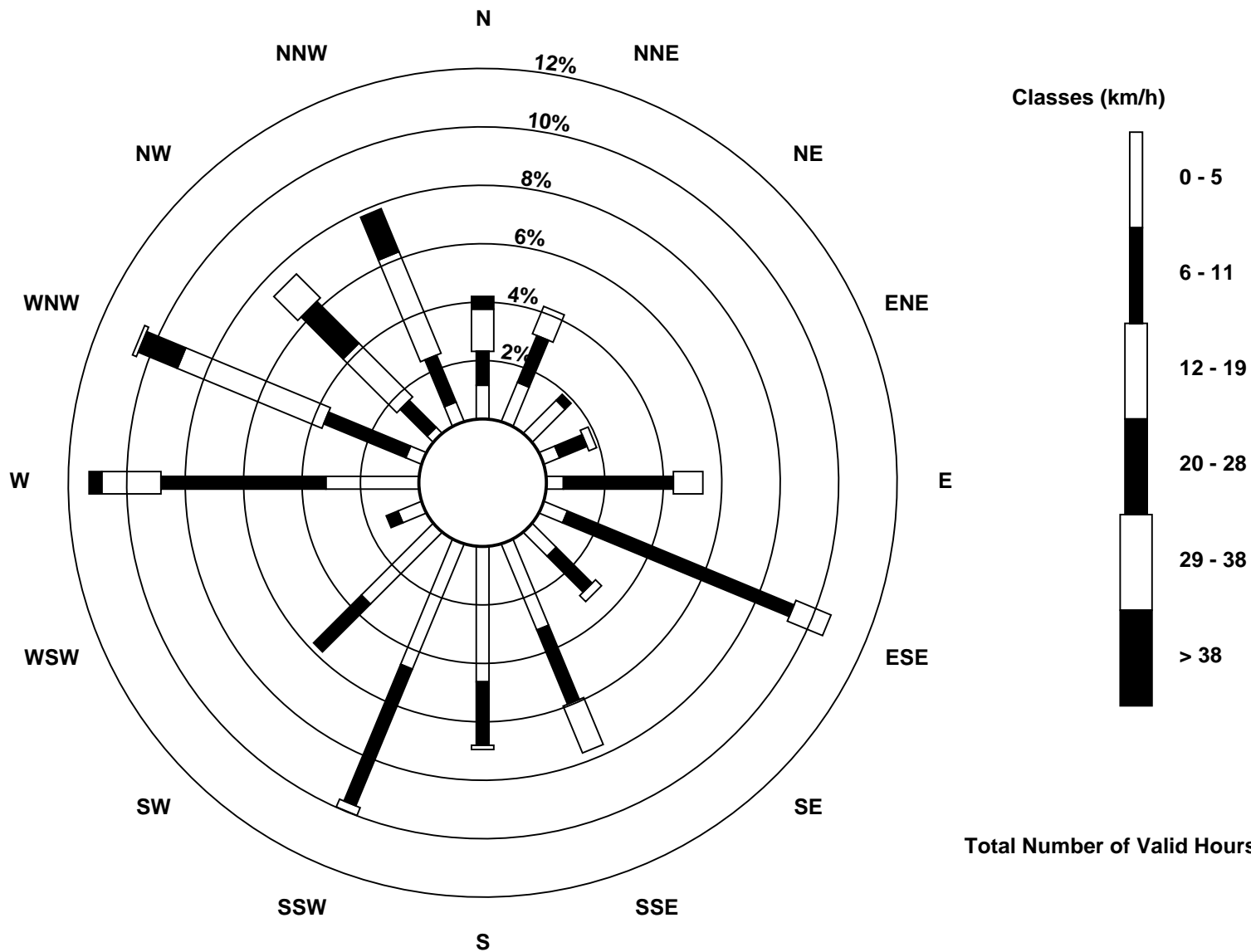
Total Number of Valid Hours: 691

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
Statoil - Leismer (AMS501)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Statoil - Leismer - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 6 15:00 Minimum Value: 0 km/h on Feb 8 02:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6														Hours in Service: 696 Hours of Data: 691 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3													
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2	1	2	1	1	1	1	1	1	1	1	1	2	2	2	1	1	0	1	1	1	1	1	1	1	2	
2-Feb	1	2	1	1	2	1	3	2	2	2	2	1	1	2	2	2	3	1	1	2	3	3	3	3	3	3	
3-Feb	2	1	2	1	2	2	1	2	1	1	1	1	1	1	2	5	4	2	2	2	2	2	2	1	1	5	
4-Feb	1	1	2	2	2	1	1	2	1	1	1	1	2	2	2	2	2	2	2	1	1	1	3	2	2	3	
5-Feb	3	3	2	1	2	2	1	1	1	2	1	1	2	2	2	2	1	1	1	1	2	2	1	1	1	3	
6-Feb	1	1	1	1	1	1	3	6	6	5	6	6	7	6	9	8	8	6	6	5	5	6	6	5	9		
7-Feb	4	4	4	5	6	AF	AF	AF	AF	AF	6	4	4	5	4	4	3	2	2	2	3	1	1	1	6		
8-Feb	1	0	1	1	1	1	1	1	1	1	3	2	3	3	3	3	2	2	2	1	1	1	2	2	3		
9-Feb	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	5	5	6	6		
10-Feb	7	4	4	4	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3	2	2	3	3	3	7		
11-Feb	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	3		
12-Feb	2	2	2	2	2	2	2	2	2	2	2	2	3	4	3	3	4	4	4	3	3	3	3	3	4		
13-Feb	3	2	2	2	2	3	3	2	2	2	2	4	4	3	4	4	2	1	1	2	2	2	3	2	4		
14-Feb	2	2	1	2	2	2	4	4	2	2	3	4	4	4	4	3	3	1	1	2	1	1	1	2	4		
15-Feb	2	2	2	2	2	2	3	2	2	2	1	1	1	2	2	1	1	1	2	2	1	1	1	1	3		
16-Feb	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	2		
17-Feb	1	2	2	2	2	2	3	3	3	2	1	2	2	2	2	3	2	3	3	3	3	3	3	3	3		
18-Feb	3	3	3	3	3	3	3	2	3	3	2	2	2	2	2	2	1	2	1	2	3	3	4	4	4		
19-Feb	5	5	5	5	4	4	5	4	3	3	2	3	3	3	3	3	2	2	2	2	3	2	2	1	5		
20-Feb	2	3	2	1	2	1	2	1	1	1	1	2	2	2	2	2	2	2	1	2	2	2	2	1	3		
21-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	4	4	3	1	1	1	1	1	3	4		
22-Feb	2	4	3	3	4	2	3	2	2	3	3	4	3	4	5	4	4	4	4	5	5	4	4	4	5		
23-Feb	3	3	4	4	3	4	3	2	4	4	4	5	5	5	5	5	4	3	3	2	2	2	2	2	5		
24-Feb	3	3	2	3	2	2	2	2	2	3	3	3	2	2	2	2	2	1	1	1	1	1	1	3	3		
25-Feb	3	2	3	3	2	2	2	2	2	3	5	3	4	4	4	5	5	3	3	2	2	3	2	2	5		
26-Feb	3	2	2	2	2	5	3	3	4	5	5	4	4	4	4	3	3	2	1	3	2	3	3	3	5		
27-Feb	4	4	4	4	4	4	4	4	4	3	3	3	3	2	2	1	2	7	3	2	2	2	4	3	7		
28-Feb	4	4	4	4	5	4	4	3	4	5	5	4	4	5	4	4	4	3	2	2	2	1	3	2	5		
29-Feb	3	1	2	2	1	1	1	1	2	2	3	3	3	3	3	2	2	3	1	1	2	2	2	1	3		
														Diurnal Maximum													
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Statoil - Leismer - February 2016

Direction of Maximum Speed: 306 deg on Feb 6 15:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 305.0 deg on Feb 6	Hours of Data: 691
Direction of Minimum Speed: 300 deg on Feb 20 10:00	Hours of Missing Data: 5
Direction of Minimum Daily Speed Average: 1.6 deg on Feb 20	Percent Operational Time: 99.3
Monthly Average Direction: 269.7 deg	

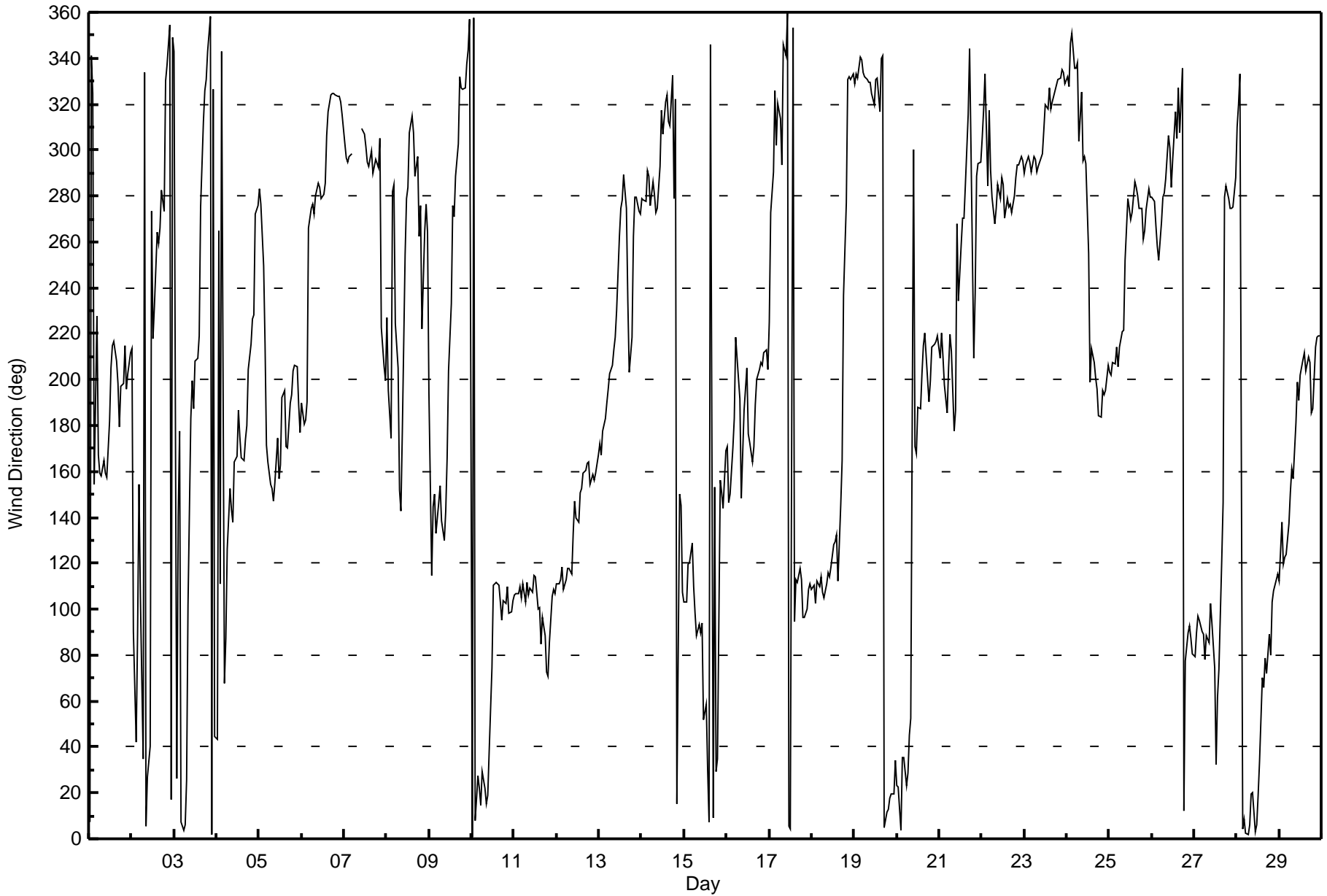
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	8	341	325	155	227	167	159	158	164	159	157	182	205	215	216	208	198	180	197	198	215	196	203	212	198.1
2-Feb	214	91	42	89	154	106	35	334	6	27	40	273	218	232	264	260	266	282	274	330	337	355	17	349	326.4
3-Feb	343	26	140	178	7	4	6	25	102	183	200	187	208	209	219	275	312	326	331	343	358	2	326	45	325.6
4-Feb	43	265	111	343	68	87	126	153	143	138	164	167	187	175	166	165	174	180	205	215	226	228	272	276	181.8
5-Feb	283	276	250	215	172	164	154	152	147	155	174	157	163	192	195	171	171	190	193	204	206	205	189	177	186.0
6-Feb	190	180	182	190	266	274	276	272	280	286	284	279	281	286	306	317	324	325	325	324	323	323	321	315	305.0
7-Feb	302	297	295	297	298	AF	AF	AF	AF	AF	309	307	301	295	293	299	290	293	296	292	305	223	206	199	297.8
8-Feb	227	195	174	282	285	224	205	152	143	177	254	279	284	307	315	308	289	297	262	276	222	265	276	264	278.1
9-Feb	194	115	145	150	133	147	154	139	130	143	166	204	233	276	271	288	303	332	327	326	327	338	344	357	324.8
10-Feb	0	357	8	28	22	15	29	22	15	19	38	74	110	111	111	111	103	95	104	103	110	98	99	103	55.4
11-Feb	106	107	107	110	105	111	103	112	106	109	108	115	114	100	101	85	96	89	73	71	85	106	108	107	101.2
12-Feb	111	111	113	118	109	113	118	118	116	133	147	140	138	151	153	159	160	163	164	155	159	156	159	167	144.4
13-Feb	172	167	177	183	190	196	203	206	213	219	230	263	274	278	289	275	234	203	219	263	280	279	274	272	234.5
14-Feb	279	278	278	291	289	276	286	281	273	274	293	317	307	321	324	313	311	333	279	322	15	150	145	107	299.8
15-Feb	103	103	120	120	129	110	98	89	93	90	94	52	59	30	7	346	9	153	29	35	156	151	144	169	95.9
16-Feb	171	147	150	170	183	219	209	192	148	168	187	205	177	173	164	171	189	200	204	208	206	212	213	204	185.8
17-Feb	225	273	291	326	302	320	313	293	346	341	360	5	4	353	95	113	112	118	113	96	96	100	108	111	35.2
18-Feb	109	111	103	112	110	114	107	105	111	116	114	118	128	129	133	112	146	165	237	277	331	332	331	333	102.1
19-Feb	329	333	331	341	339	334	332	331	330	330	325	320	330	331	317	340	341	5	12	13	18	19	20	34	338.3
20-Feb	23	23	4	36	35	23	29	45	53	300	171	168	188	187	202	215	220	200	190	200	214	215	216	219	201.3
21-Feb	209	220	210	198	185	205	220	212	178	187	268	235	258	270	270	285	315	344	301	210	238	289	294	295	268.3
22-Feb	305	317	333	284	317	291	280	268	274	285	279	288	285	270	279	275	276	273	280	288	293	294	297	295	289.7
23-Feb	290	293	297	294	290	297	296	291	293	296	298	309	320	318	327	318	321	326	328	331	331	335	334	329	311.6
24-Feb	332	328	346	351	336	335	338	304	325	295	297	294	255	199	214	207	201	196	185	184	196	194	195	206	291.6
25-Feb	203	202	208	207	214	206	214	221	222	252	279	274	270	273	286	284	280	275	275	261	265	274	283	280	255.3
26-Feb	279	278	267	258	252	268	280	281	287	306	301	284	296	317	305	327	307	335	12	78	90	93	87	80	304.6
27-Feb	79	90	97	95	90	89	78	89	85	102	94	74	33	61	74	121	147	280	285	279	274	275	275	288	75.7
28-Feb	310	320	333	5	8	3	2	6	20	20	3	6	19	33	70	66	79	72	89	80	103	108	113	115	19.9
29-Feb	112	138	120	123	124	137	151	161	157	181	199	191	202	209	212	204	210	208	185	187	214	218	219	219	181.7
318.8 319.5 333.6 345.6 335.2 332.5 324.2 301.0 340.1 289.0 287.4 284.6 282.5 285.6 284.5 286.0 282.8 296.1 293.3 303.9 309.3 312.6 307.9 309.8																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Statoil - Leismer - February 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Statoil - Leismer - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Feb 4 01:00 Minimum Value: 7 deg on Feb 21 23:00 Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 14 Median = 18 Q ₃ = 24 P ₉₀ = 42 P ₉₉ = 88																	Hours in Service: 696 Hours of Data: 691 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	19	13	42	72	44	21	19	15	10	10	17	33	24	22	22	26	17	13	13	21	49	17	14	24	72
2-Feb	26	93	17	52	51	70	66	84	13	24	70	54	29	36	24	23	30	8	13	13	11	19	22	14	93
3-Feb	16	27	50	85	44	44	34	22	56	18	21	22	24	23	25	26	20	14	21	17	15	17	52	63	85
4-Feb	99	71	47	63	67	77	23	38	13	15	16	19	23	22	13	11	12	15	15	18	24	28	22	13	99
5-Feb	12	24	31	23	13	12	12	10	8	18	15	16	12	20	22	13	9	13	14	12	15	17	16	14	31
6-Feb	17	36	24	37	42	39	49	33	15	11	12	12	12	11	15	13	11	10	10	10	10	11	11	14	49
7-Feb	12	10	10	10	9	AF	AF	AF	AF	AF	13	14	13	12	13	12	9	17	15	10	33	92	72	62	92
8-Feb	84	14	52	48	14	26	34	19	13	20	35	12	16	19	18	20	11	20	24	20	42	35	63	31	84
9-Feb	83	46	24	15	22	9	10	16	15	36	20	22	30	17	16	19	19	10	9	9	9	12	12	16	83
10-Feb	18	16	16	18	15	18	17	15	17	17	26	33	30	23	23	23	22	22	18	21	20	19	20	19	33
11-Feb	18	18	19	18	19	20	21	18	19	22	23	24	19	29	29	31	21	21	22	20	24	20	22	14	31
12-Feb	19	16	12	17	15	13	15	17	15	17	13	17	15	12	11	11	11	11	11	11	9	11	11	11	19
13-Feb	11	10	12	15	15	16	16	16	17	20	25	26	16	12	11	22	30	29	52	47	14	14	19	18	52
14-Feb	14	13	15	10	8	13	11	20	15	12	14	15	16	14	13	26	21	66	93	39	31	31	16	20	93
15-Feb	21	21	24	24	23	22	22	28	25	29	30	35	29	39	29	25	42	90	58	35	26	13	15	32	90
16-Feb	22	22	14	19	15	58	26	32	17	17	19	22	17	26	13	13	23	17	17	16	18	26	32	18	58
17-Feb	48	34	12	12	22	18	34	32	49	28	18	26	21	12	42	28	24	19	22	22	26	26	22	16	49
18-Feb	17	17	19	16	18	15	17	16	14	14	15	15	17	18	18	22	33	9	44	17	18	10	10	13	44
19-Feb	12	11	12	12	12	11	11	12	11	13	19	20	15	20	18	21	13	14	15	14	14	17	23	21	23
20-Feb	58	23	35	16	17	17	36	25	64	97	65	80	49	54	43	27	19	15	15	15	16	16	17	19	97
21-Feb	16	18	18	20	19	22	18	21	19	29	84	83	30	28	24	17	28	20	70	11	51	11	7	9	84
22-Feb	15	16	11	17	16	14	17	49	23	9	11	18	15	21	17	18	16	16	12	11	11	11	11	10	49
23-Feb	11	10	11	12	11	12	12	10	13	12	15	17	17	15	13	15	13	8	9	9	9	8	9	17	17
24-Feb	10	10	9	9	10	8	12	18	29	18	24	30	40	50	52	22	18	11	10	9	14	12	13	16	52
25-Feb	14	14	14	15	18	14	16	18	20	30	16	19	21	22	16	14	12	15	20	36	48	57	13	18	57
26-Feb	40	26	43	49	40	35	12	11	14	17	16	12	14	18	19	14	18	29	16	26	20	22	26	24	49
27-Feb	26	22	21	22	23	24	23	24	24	23	26	43	22	40	89	50	43	52	11	12	15	16	15	14	89
28-Feb	17	14	14	17	15	15	15	14	16	19	21	21	26	24	29	34	32	24	22	24	18	16	18	15	34
29-Feb	16	14	14	14	11	14	7	13	10	22	18	22	23	21	21	19	16	17	15	15	17	18	17	18	23
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 9, 2016	Last Calibration	January 22, 2016
Station Name	Statoil - Leismer	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	14:30
Gas Cert Reference	S990374A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2579

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	549	549
Analyzer IP address	192.168.1.72		Lamp voltage	2684	2659
Calculated slope	1.001264	0.992262	Chamber temp	50.0	50.0
Calculated intercept	0.559419	0.996458	Pressure	25.3	25.6
Analyzer Background	17.6	17.6	Flow	446	454
Analyzer Coefficient	1.051	1.074	Intensity	66	66

Analyzer make API T100 Analyzer serial # 721

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	63.1	631.0	625.2	1.009
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	63.1	631.0	635.6	0.993
second point	5000	31.6	316.0	316.3	0.999
third point	5000	15.8	158.0	157.8	1.001
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	63.1	631.0	633.7	0.996
Average Correction Factor					0.998

Corrected As found 625.5 Previous response 629.6 % change 0.7%

Notes:

no maintenance done, filter changed out, Span adjusted

Calibration Performed By: Melissa Lemay



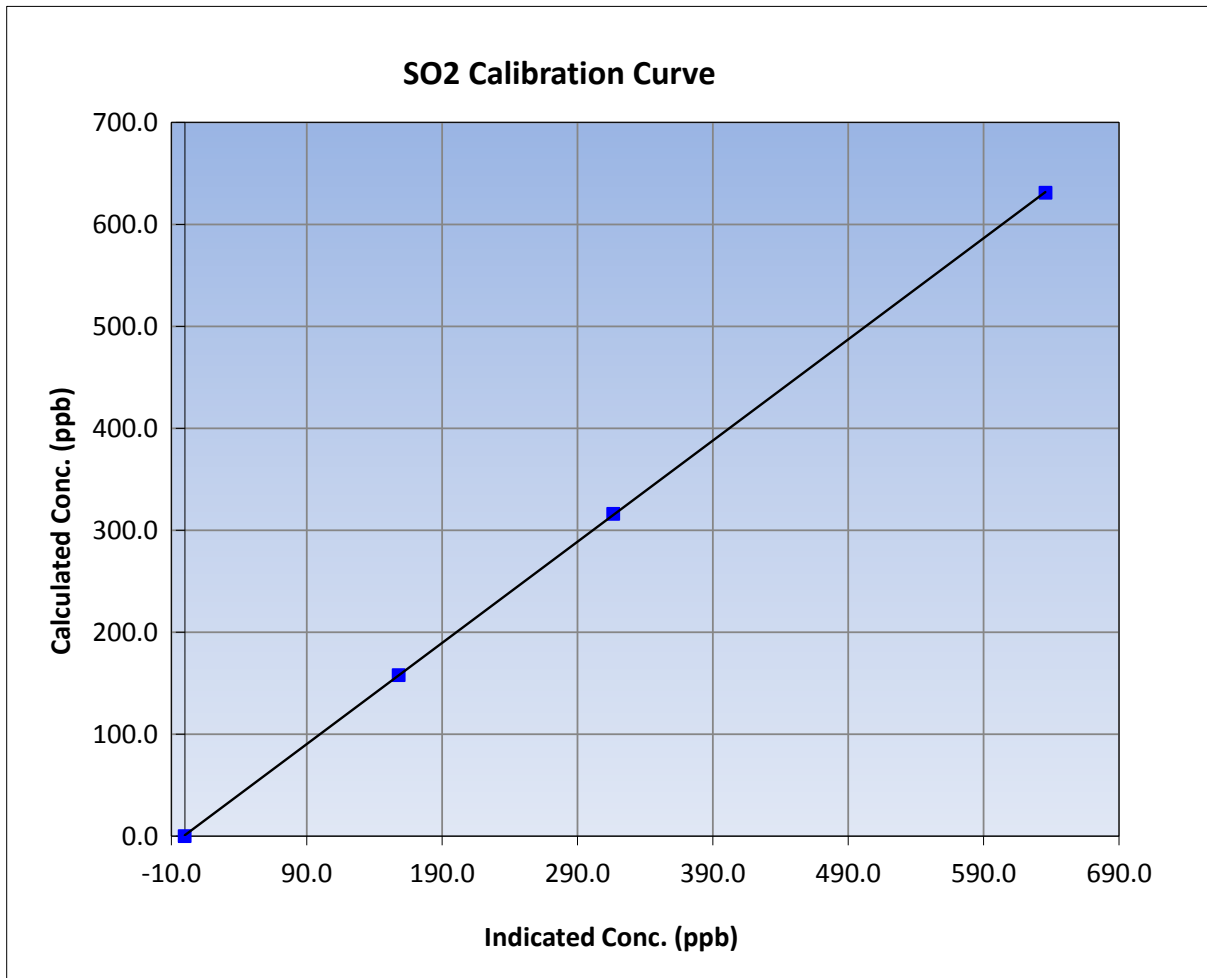
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 9, 2016	Previous Calibration	January 22, 2016
Station Name	Statoil - Leismer	Station Number	AMS 501
Start Time (MST)	8:05	End Time (MST)	14:30
Analyzer make	API T100	Analyzer serial #	721

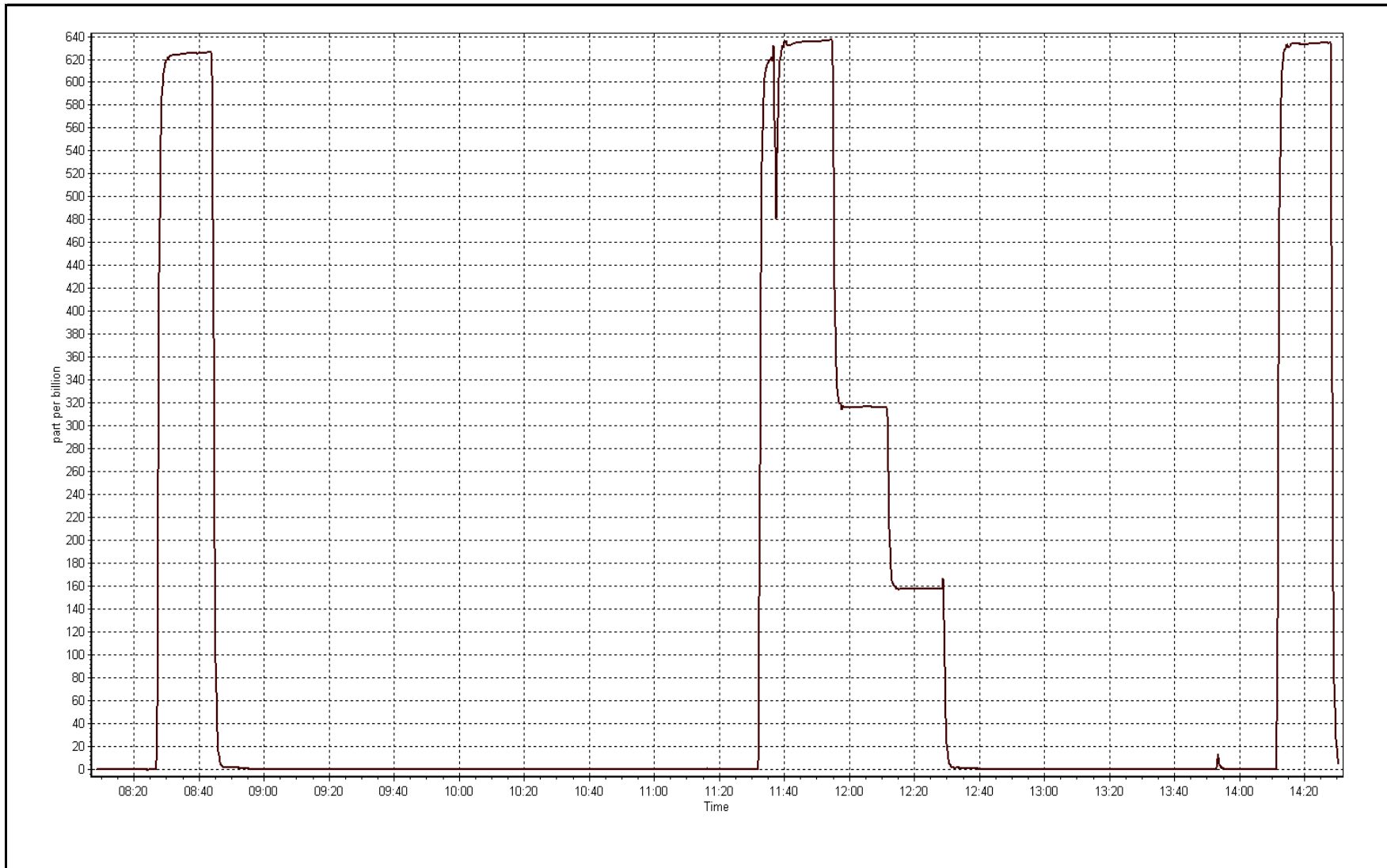
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999987
631.0	635.6	0.9928		
316.0	316.3	0.9991	Slope	0.992262
158.0	157.8	1.0013		
			Intercept	0.996458



SO2 Calibration Plot

Date: February 9, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 2, 2016	Last Calibration	January 27, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Removal		
Start Time (MST)	10:30	End Time (MST)	11:50
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	504	504
Analyzer IP address	192.168.1.75		Lamp voltage	1874	1861
Calculated slope	1.004056	0.926713	Chamber temp	50	50
Calculated intercept	-0.532406	0.126777	Pressure	22.2	22.3
Analyzer Background	21.2	21.2	Flow	530	533
Analyzer Coefficient	1.054	1.054	Intensity	46	46
			Converter temp.	314	314

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	na	Converter serial #	na

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	78.6	80.0	86.2	0.928
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.6	80.0	86.2	0.928
second point	5000	39.3	40.0	43.1	0.928
third point	5000	24.6	25.0	26.8	0.934
as left zero					
as left span					
Average Correction Factor					0.930

Corrected As found	86.3	Previous response	80.2	% change	-7.1%
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Notes:

Instrument was removed from service.

Calibration Performed By: Melissa Lemay



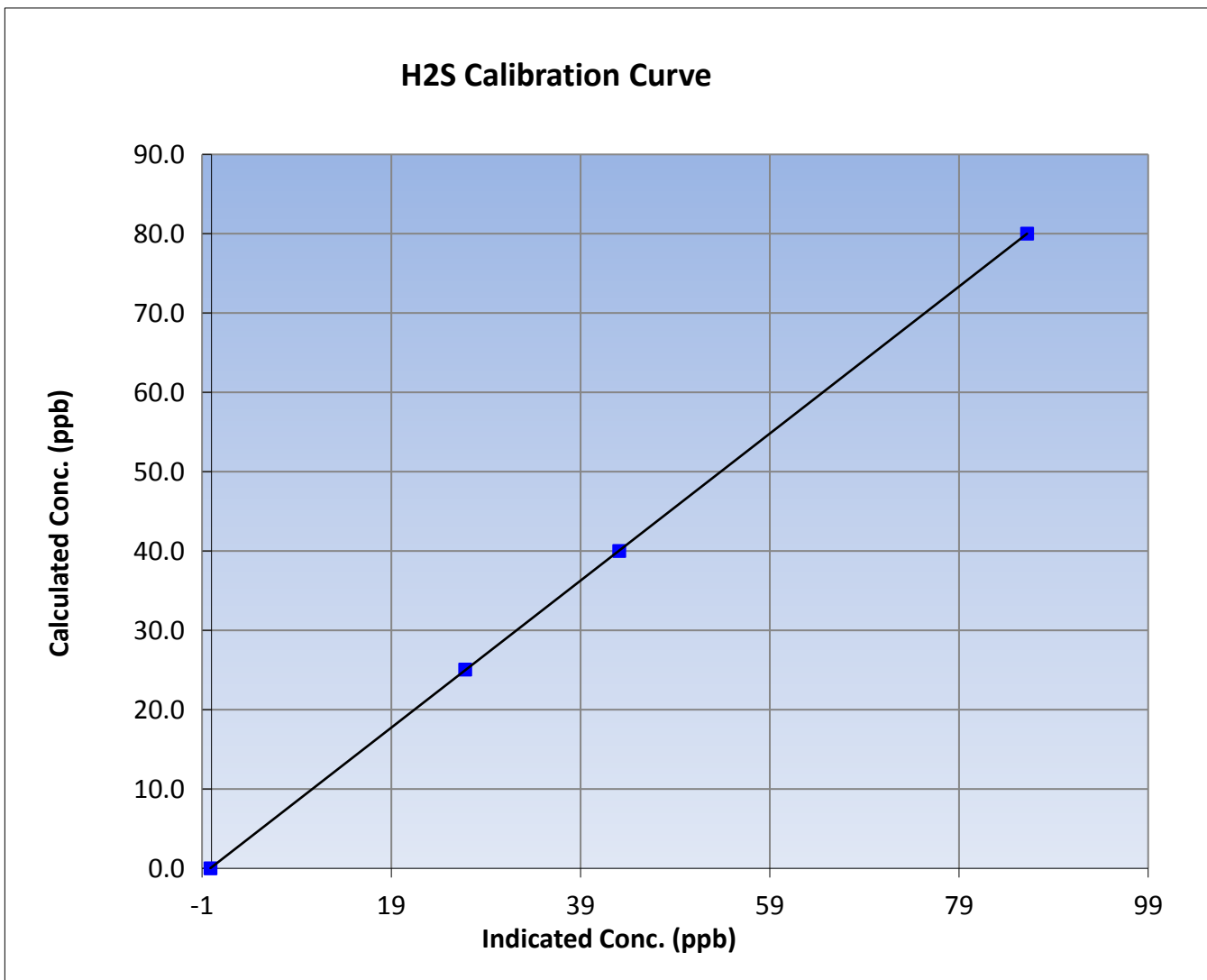
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	January 27, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:30	End Time (MST)	11:50
Analyzer make	API T101	Analyzer serial #	157

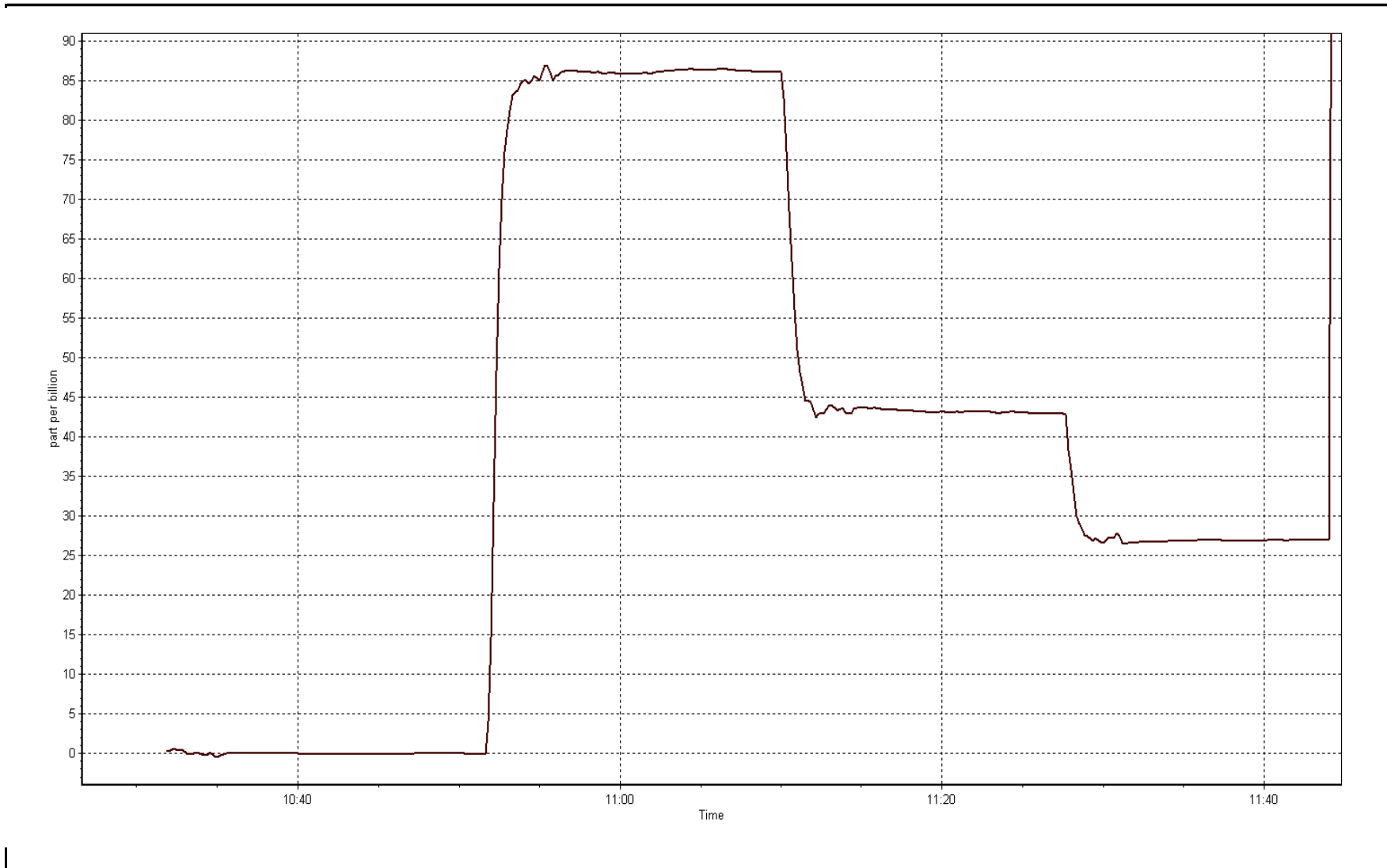
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999997
80.0	86.2	0.9282		
40.0	43.1	0.9282	Slope	0.926713
25.0	26.8	0.9344		
			Intercept	0.126777



H2S Calibration Plot

Date: February 2, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 2, 2016	Last Calibration	NA
Station Name	Statoil	Station Number	AMS 501
Reason:	Install		
Start Time (MST)	11:50	End Time (MST)	14:10
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	NA	-650
Analyzer IP address	192.168.1.75		Lamp voltage	NA	885
Calculated slope	NA	0.995060	Chamber temp	NA	45
Calculated intercept	NA	0.175427	Pressure	NA	542.9
Analyzer Background	NA	23.6	Flow	NA	1.091
Analyzer Coefficient	NA	1.24	Intensity	NA	46
			Converter temp.	NA	339

Analyzer make/model	Thermo 450i	Analyzer serial #	1118148498
Converter make/model	na	Converter serial #	na

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	15.8	158.0	0.3	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.6	80.0	80.3	0.996
second point	5000	39.3	40.0	40.2	0.995
third point	5000	24.6	25.0	24.5	1.022
as left zero	5000	0.0	0.0	-0.5	----
as left span	5000	78.6	80.0	81.1	0.987
Average Correction Factor					1.005

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

Installation calibration.

Calibration Performed By: Melissa Lemay



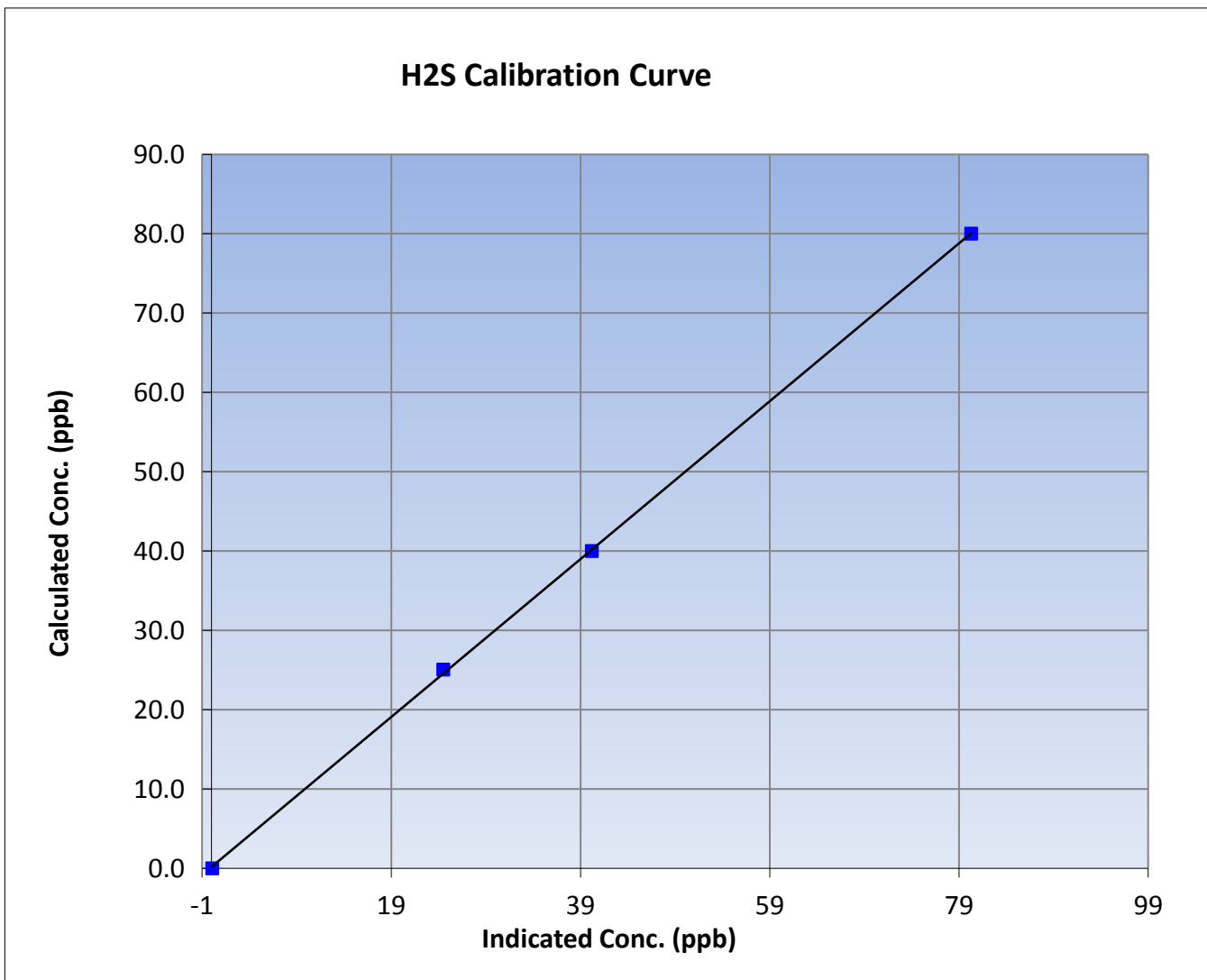
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 2, 2016	Previous Calibration	NA
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	11:50	End Time (MST)	14:10
Analyzer make	Thermo 450i	Analyzer serial #	1118148498

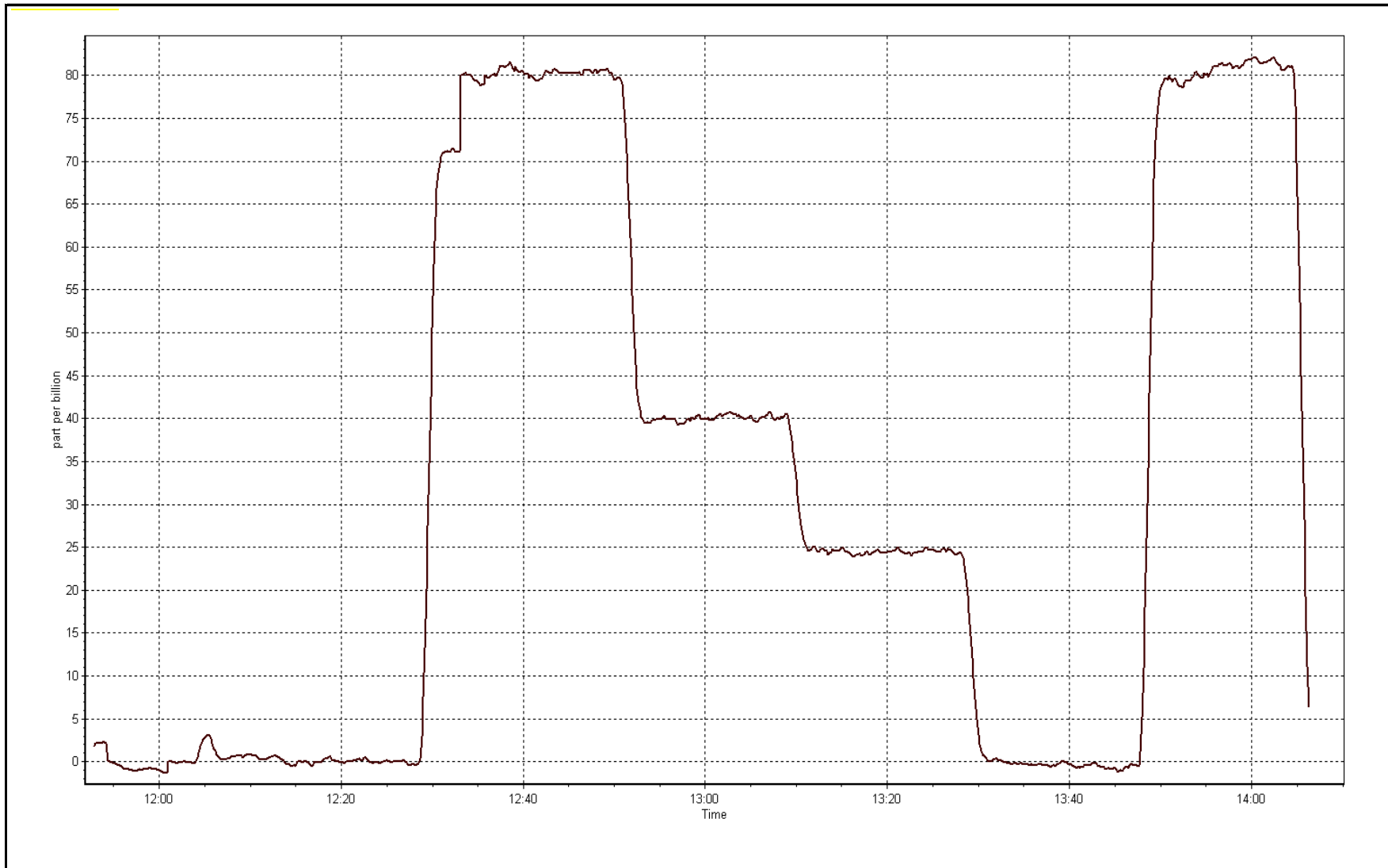
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999900
80.0	80.3	0.9964		
40.0	40.2	0.9952	Slope	0.995060
25.0	24.5	1.0222		
			Intercept	0.175427



H2S Calibration Plot

Date: February 2, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 4, 2016	Last Calibration	February 2, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	10:00
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-650	-649
Analyzer IP address	192.168.1.75		Lamp voltage	885	901
Calculated slope	0.995060	0.996200	Chamber temp	45	45
Calculated intercept	0.175427	-0.079696	Pressure	542.9	542.6
Analyzer Background	23.6	22.5	Flow	1.091	1.086
Analyzer Coefficient	1.240	1.24	Intensity	92	92
			Converter temp.	339	338

Analyzer make/model	Thermo 450i	Analyzer serial #	1118148498
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	-0.8	----
as found span	5000	78.6	80.0	79.4	1.008
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.6	80.0	80.4	0.995
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.995

Corrected As found	80.2	Previous response	80.2	% change	0.0%
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Notes:

shifting zero back up

Calibration Performed By: Melissa Lemay



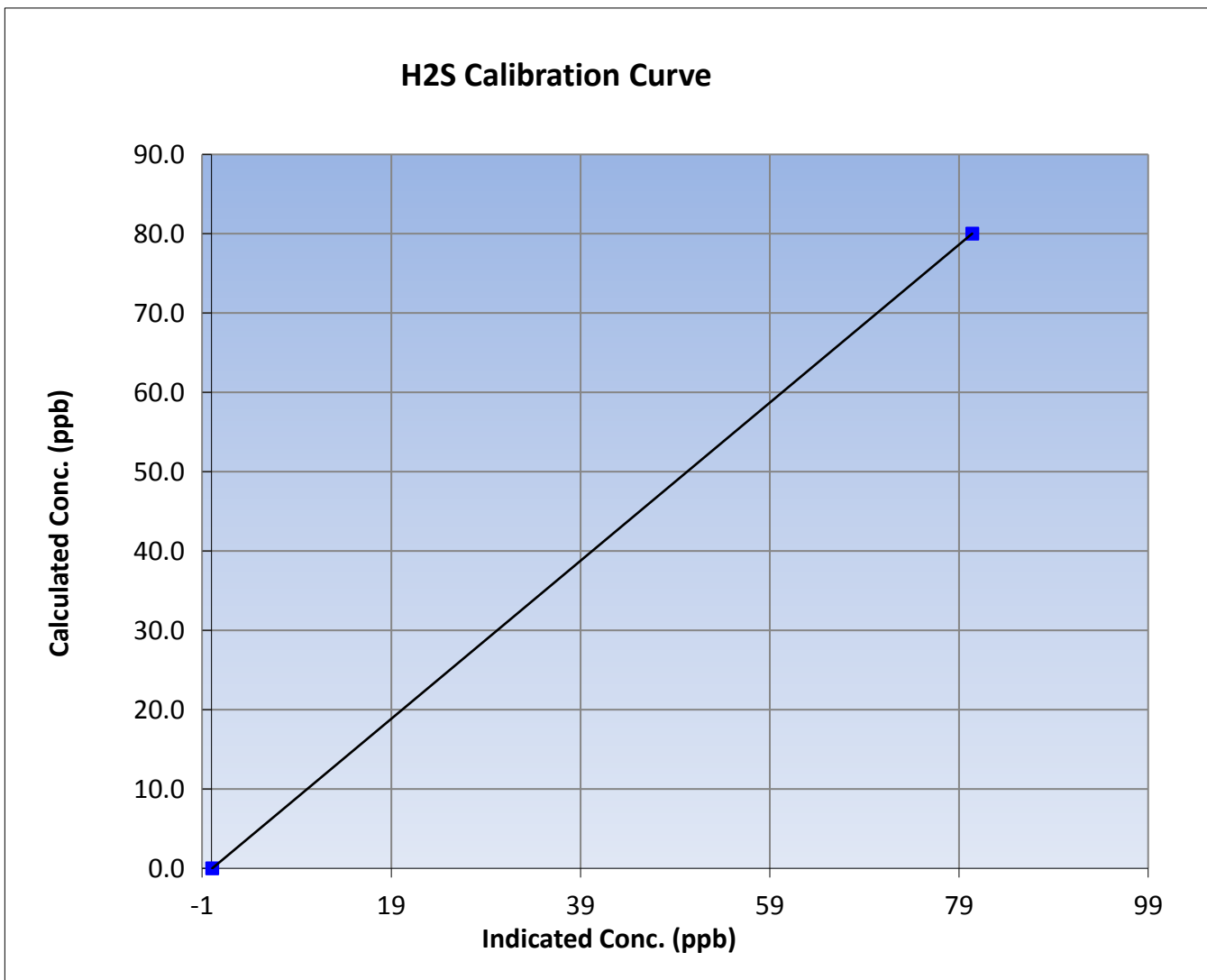
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 4, 2016	Previous Calibration	February 2, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:30	End Time (MST)	10:00
Analyzer make	Thermo 450i	Analyzer serial #	1118148498

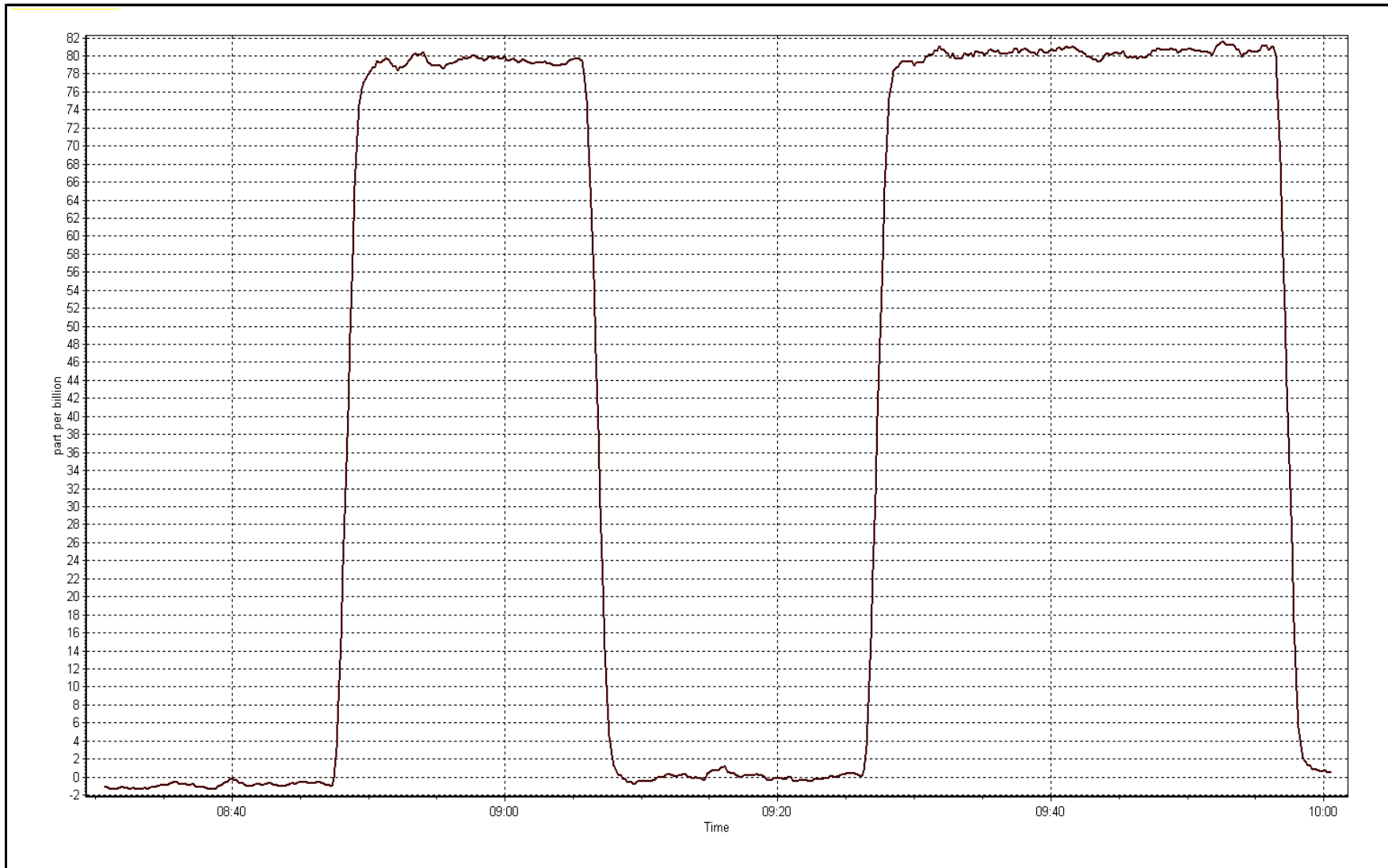
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	1.000000
80.0	80.4	0.9952		
			Slope	0.996200
			Intercept	-0.079696



H2S Calibration Plot

Date: February 4, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 9, 2016	Last Calibration	February 4, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:43	End Time (MST)	11:18
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-649	-649
Analyzer IP address	192.168.1.75		Lamp voltage	901	894
Calculated slope	0.996200	1.004120	Chamber temp	45	45
Calculated intercept	-0.079696	-0.283705	Pressure	542.6	543.2
Analyzer Background	22.5	20.3	Flow	1.086	1.090
Analyzer Coefficient	1.240	1.21	Intensity	92	89
			Converter temp.	338	340

Analyzer make/model	Thermo 450i	Analyzer serial #	1118148498
Converter make/model	na	Converter serial #	na

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.5	----
as found span	5000	78.6	80.0	78.2	1.023
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.5	----
high point	5000	78.6	80.0	80.1	0.999
second point	5000	39.3	40.0	40.0	1.000
third point	5000	24.6	25.0	25.0	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	78.6	80.0	80.3	0.996
Average Correction Factor					1.000

Corrected As found	79.7	Previous response	80.4	% change	0.9%
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Notes:

Drifting zero, adjusted zero and span

Calibration Performed By: Melissa Lemay



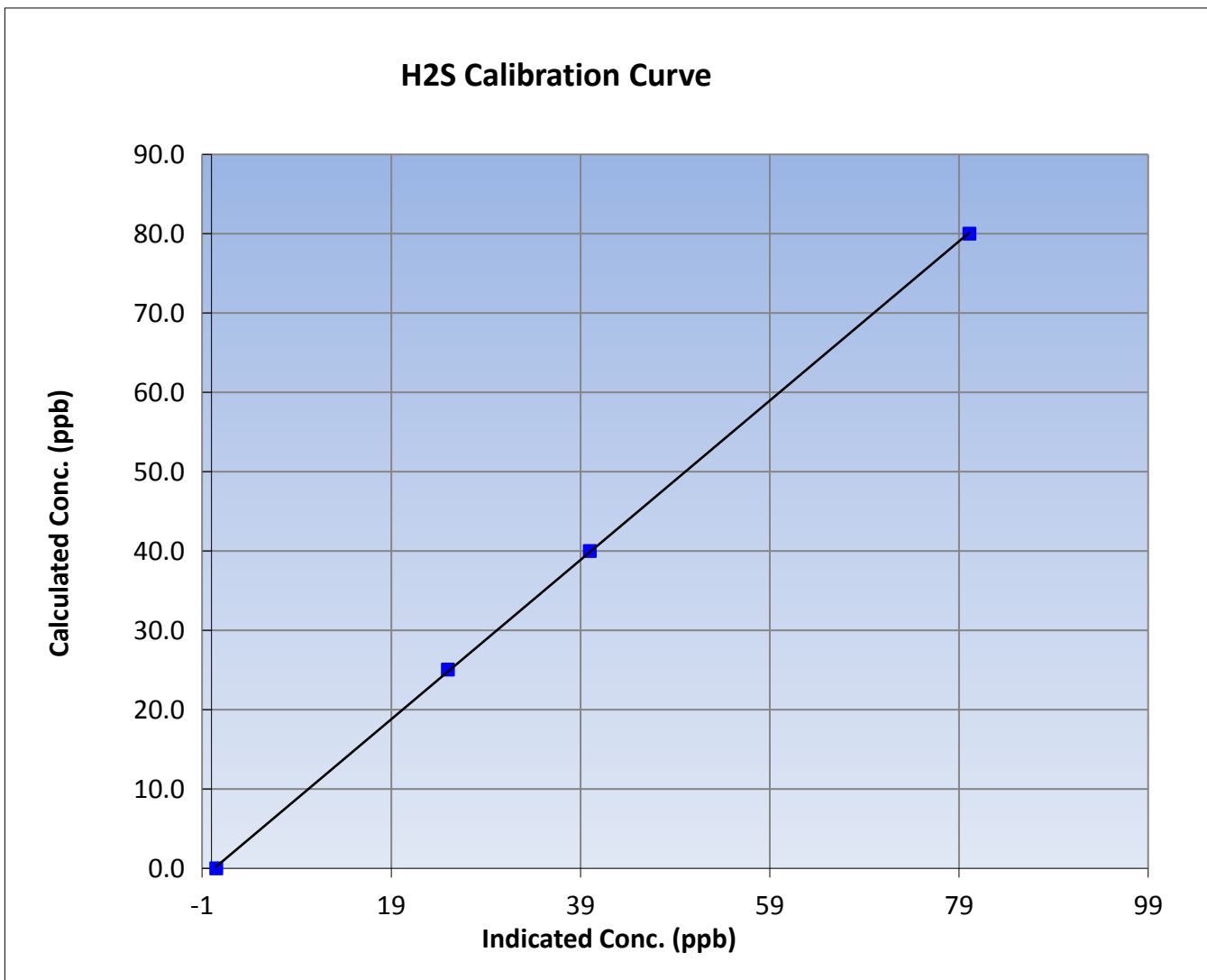
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 9, 2016	Previous Calibration	February 4, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:43	End Time (MST)	11:18
Analyzer make	Thermo 450i	Analyzer serial #	1118148498

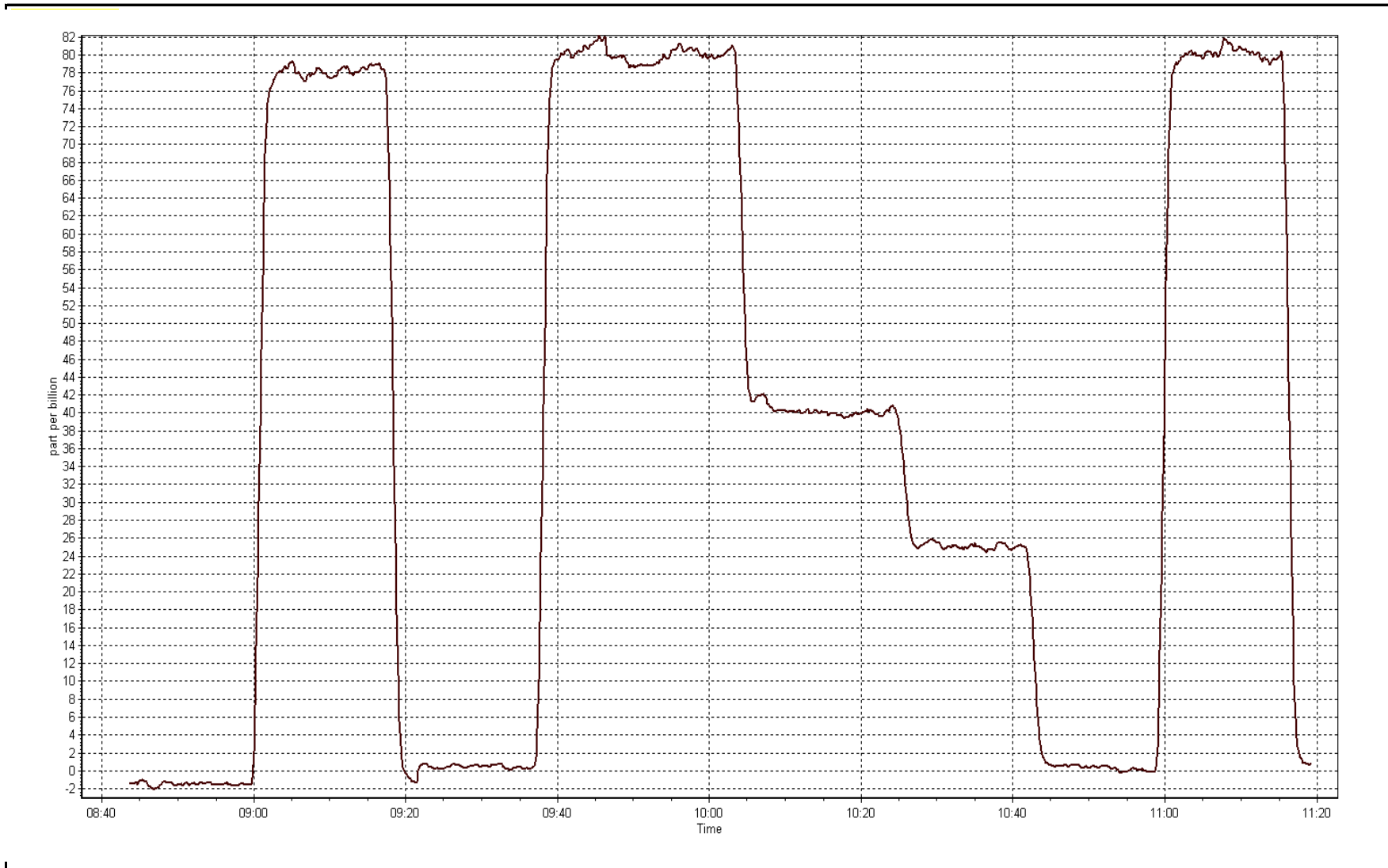
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999961
80.0	80.1	0.9989		
40.0	40.0	1.0002	Slope	1.004120
25.0	25.0	1.0017		
			Intercept	-0.283705



H2S Calibration Plot

Date: February 9, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 9, 2016	Previous Calibration	January 22, 2016
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	14:30
NO Cal Gas Conc	47.5 ppm	Gas Cert Reference	S990374A
NOX Cal Gas Conc	47.5 ppm	Cal Gas Expiry Date	26-Sep-17
Calibrator	Sabio 4010	Serial Number	11581008
Zero air Generator	Teledyne API T701	Serial Number	4522

DACs Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2579
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001602	1.001655	1.032641
	Data Offset	0.894122	1.255844	-0.629582
Current Calibration	Data Slope	0.996268	0.996021	1.024490
	Data Offset	0.070399	0.210032	-1.611241

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1118148498
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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	0.820		0.830	
NOX coefficient	0.999		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.3		4.4	
NOX bkgrnd	4.5		4.5	
Chamber Temp	50	Deg C	49.8	Deg C
Moly Temp	324.7	Deg C	326.6	Deg C
PMT voltage	-756.3	V	-755.9	V
PMT Temp	-2.8	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	181.9	mmHg	181	mmHg
R Cell Press Nox	181.9	mmHg	181.9	mmHg
NO sample flow	0.755	lpm	0.753	lpm
Nox sample Flow	0.756	lpm	0.755	lpm

Notes:

Span adjusted, Due to drift during the GPT, the second high GPT point used, filter changed out, Capillaries are good, orings changed out; Calibration continued at 11:14MST



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: February 9, 2016 Station Number: AMS 501

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
as found span	5000	63.1	599.5	599.5	0.0	604.1	602.4	1.7	0.9923	0.9951
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
high point	5000	63.1	599.5	599.5	0.0	601.7	601.8	-0.2	0.9963	0.9961
second point	5000	31.6	300.2	300.2	0.0	301.1	301.0	0.1	0.9970	0.9973
third point	5000	15.8	150.1	150.1	0.0	150.6	150.2	0.4	0.9967	0.9993
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as left span	5000	63.1	599.5	294.5	305.0	612.3	302.6	309.7	0.9790	0.9732
Average Correction Factor									0.9967	0.9976

Corrected As found NO_x= 604.4 NO= 602.6 Percent Change NO_x= -1.1% NO= -0.9%
 Previous Response NO_x= 597.6 NO= 597.2

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 63.10 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	294.5	320.2	607.1	294.5	312.6	0.9751	1.0000	1.0243	97.6%
2nd NO2 (200)	----	417.2	197.5	612.8	417.2	195.7	0.9660	1.0000	1.0092	99.1%
3rd NO2 (100)	----	501.1	113.6	615.4	501.1	114.3	0.9619	1.0000	0.9939	100.6%
4th NO2 (0)	614.7	----	0.4	615.1	614.7	0.5	0.9624	1.0000	N/A	----
Average Correction Factor							0.9664	1.0000	1.0091	99.1%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

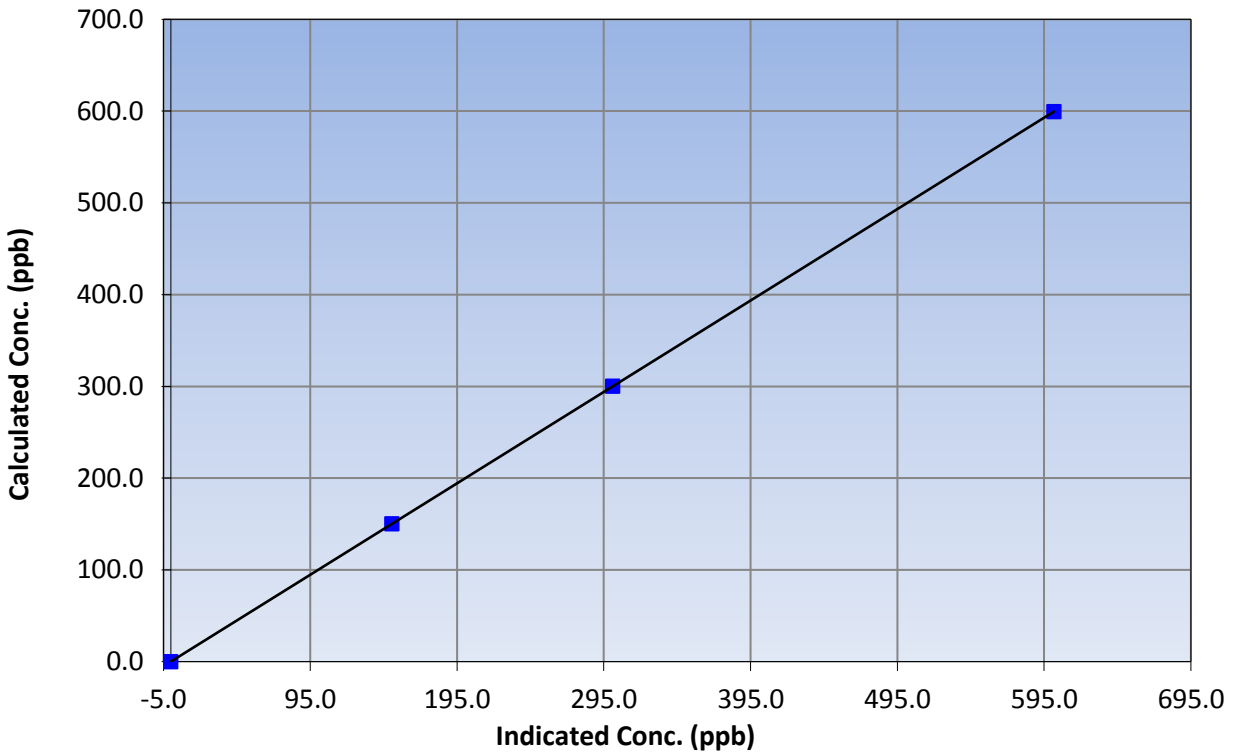
Station Information

Calibration Date	February 9, 2016	Previous Calibration	January 22, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:05	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
599.5	601.7	0.9963		
300.2	301.1	0.9970	Slope	0.996268
150.1	150.6	0.9967		
			Intercept	0.070399

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

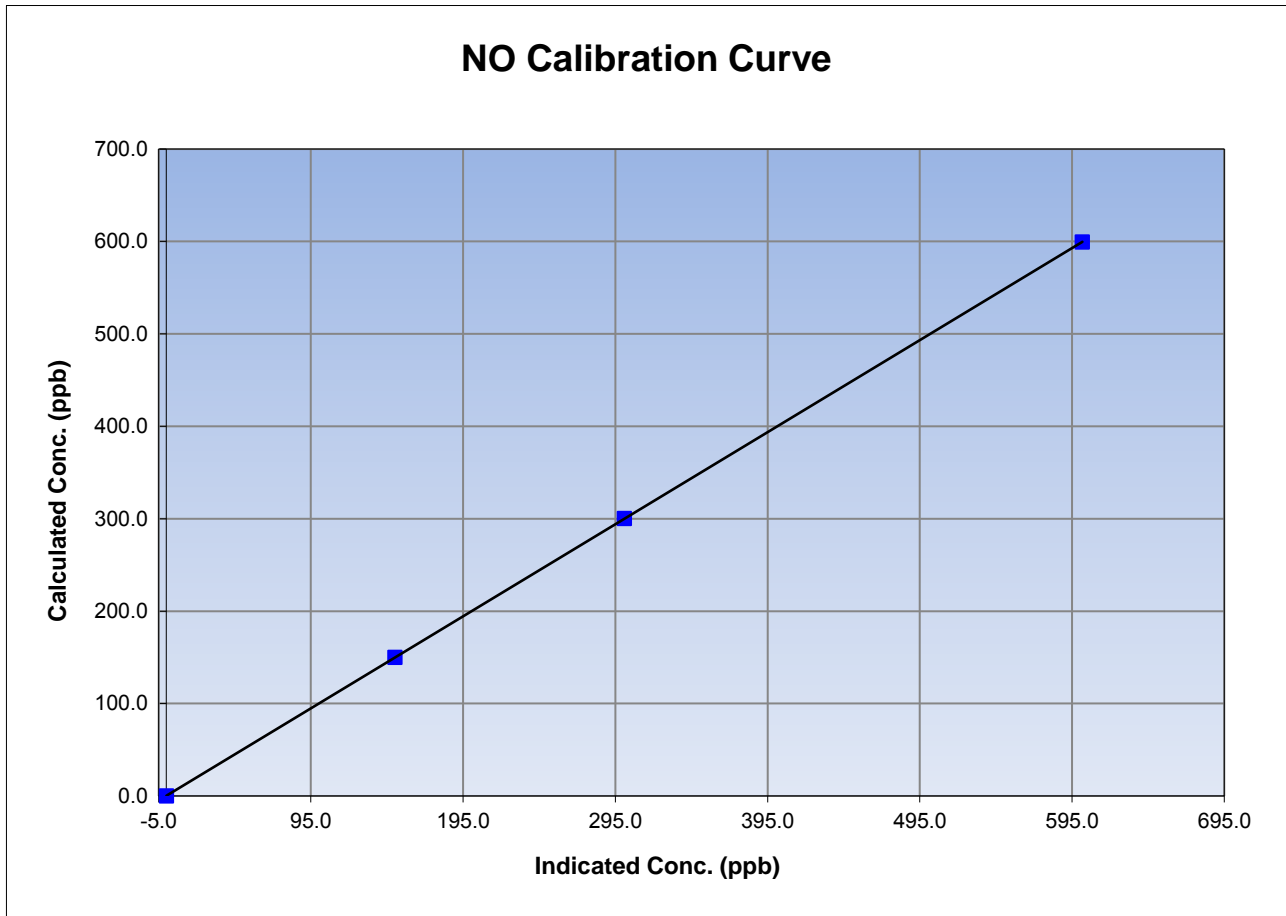
Station Information

Calibration Date	February 9, 2016	Previous Calibration	January 22, 2016
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:05	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999999
599.5	601.8	0.9961		
300.2	301.0	0.9973	Slope	0.996021
150.1	150.2	0.9993		
			Intercept	0.210032

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

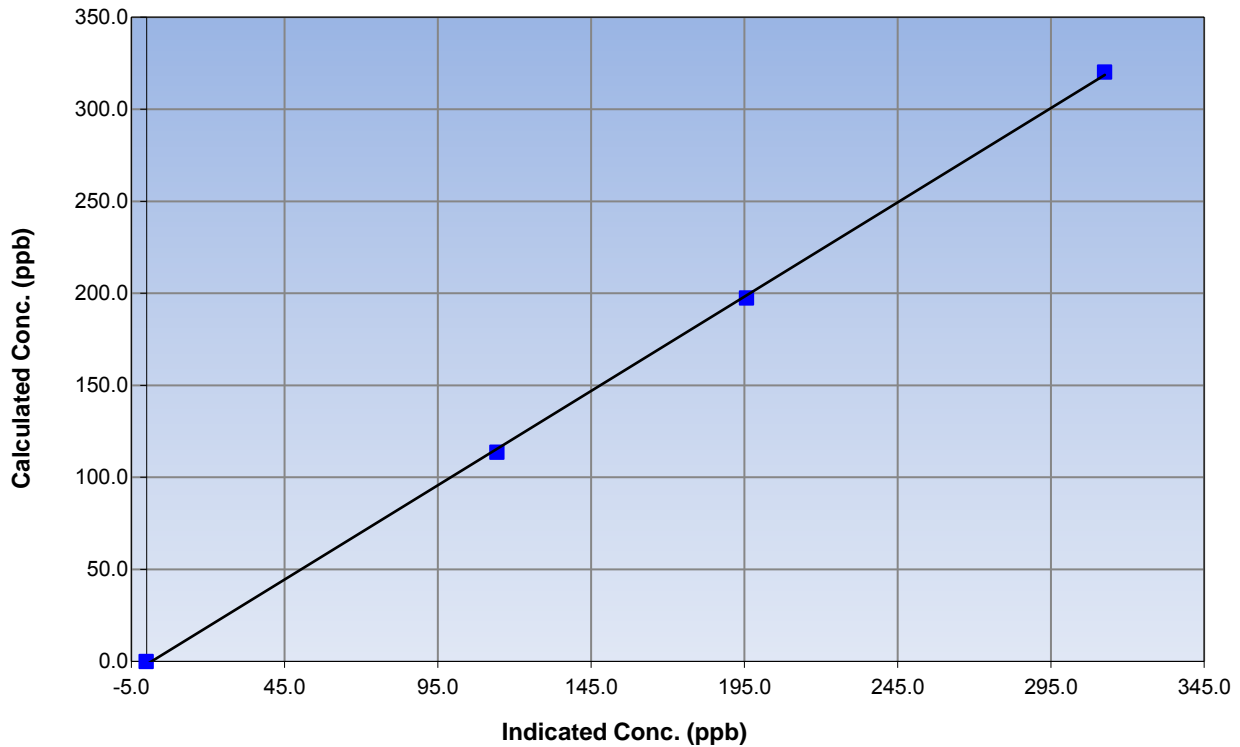
Station Information

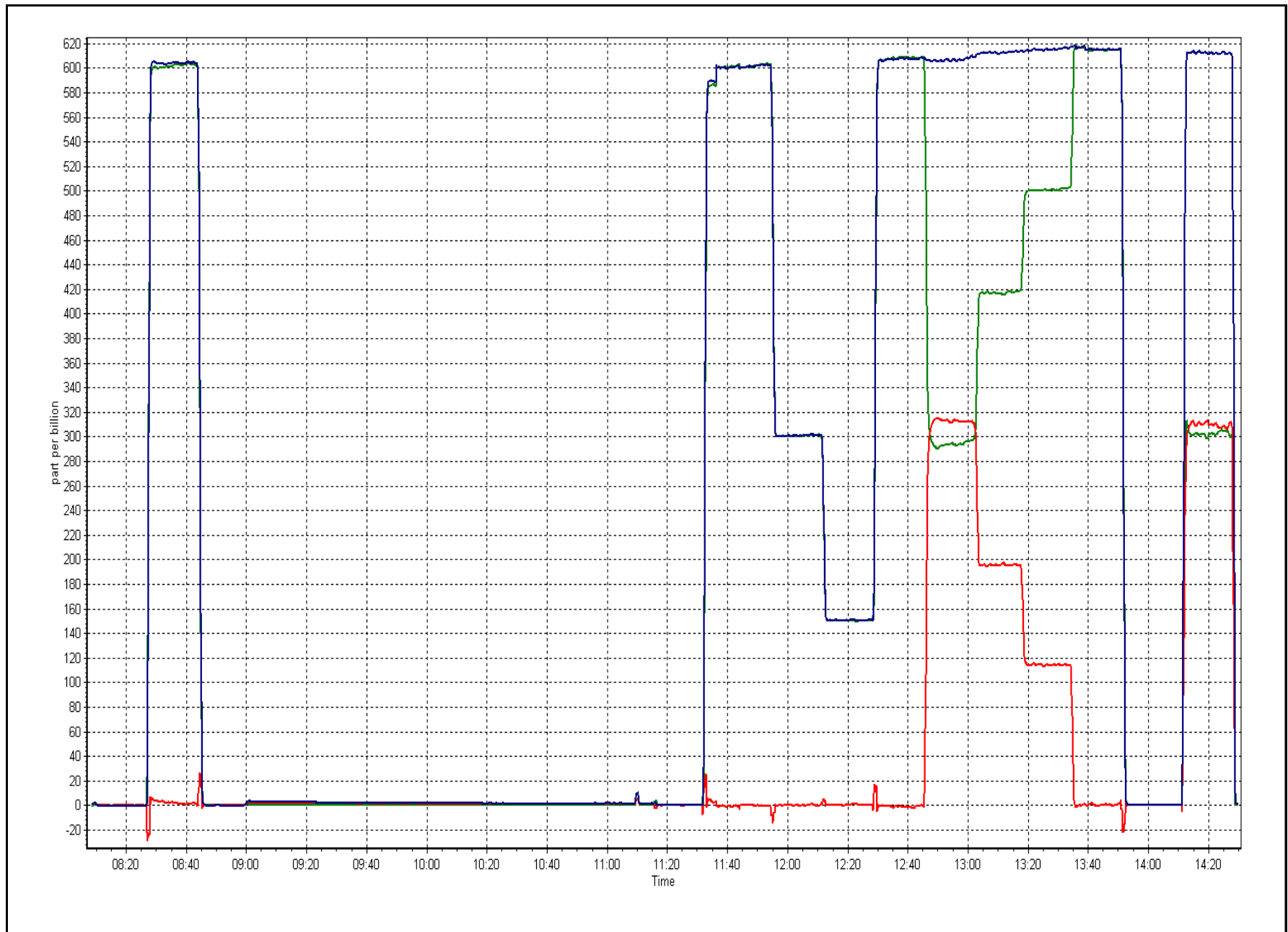
Calibration Date	February 9, 2016	Previous Calibration	January 22, 2016
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	8:05	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999802
320.2	312.6	1.0243		
197.5	195.7	1.0092	Slope	1.024490
113.6	114.3	0.9939		
			Intercept	-1.611241

NO₂ Calibration Curve







WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
FEBRUARY 2016**

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

March 24, 2016
Revised April 25, 2016



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 FEBRUARY 2016

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	649	33	47	97.99	25	0	7	0
H2S (ppb) Average	664	32	32	100.00	2	0	1	0
NO2 (ppb) Average	663	33	33	100.00	27	0	12	-
NO (ppb) Average	663	33	33	100.00	28	-	8	-
NOX (ppb) Average	663	33	33	100.00	46	-	16	-
Temperature 2 m (C) Average	696	0	0	100.00	8	-	3.1	-
Relative Humidity (%) Average	696	0	0	100.00	98	-	95	-
Wind Speed 10 m (km/h) Average	671	0	25	96.41	32	-	23	-
Wind Direction 10 m (deg) Average	671	0	25	96.41	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 FEBRUARY 2016

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	649	1.1	2	-	0	0	0	0	1	2	25
H2S (ppb) Average	664	0.3	0	-	0	0	0	0	0	1	2
NO2 (ppb) Average	663	4.1	4	-	0	1	2	3	6	9	27
NO (ppb) Average	663	2	3	-	0	0	0	1	2	5	28
NOX (ppb) Average	663	6.1	6	-	0	2	2	4	8	12	46
Temperature 2 m (C) Average	696	-7.77	6.9	-	-25.2	-16.8	-12.9	-8.2	-2	1.2	8
Relative Humidity (%) Average	696	78.5	14	-	37	57	69	84	89	93	98
Wind Speed 10 m (km/h) Average	671	11.4	7	-	1	4	6	10	16	21	32
Wind Direction 10 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
FEBRUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	11 Feb 2016 10:00	11 Feb 2016 11:00	2	Unstable operation - excessive baseline drift
SO2	28 Feb 2016 08:00	28 Feb 2016 11:00	4	Unstable operation - excessive baseline drift
SO2	28 Feb 2016 22:00	29 Feb 2016 05:00	8	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	06 Feb 2016 15:00	07 Feb 2016 13:00	23	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	15 Feb 2016 20:00	15 Feb 2016 21:00	2	Flat line in sensor output signal - sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	696
Maximum Value: 25 ppb on Feb 6 18:00	Maximum Daily Average: 6.7 ppb on Feb 6		Hours of Data:	649
Minimum Value: 0 ppb on Feb 11 09:00	Minimum Daily Average: 0.2 ppb on Feb 11		Hours of Missing Data:	47
Maximum Diurnal Average: 1.8 ppb at hour 22	Minimum Diurnal Average: 0.6 ppb at hour 2		Hours of Calibration:	33
Monthly Average: 1.1 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:	98.0

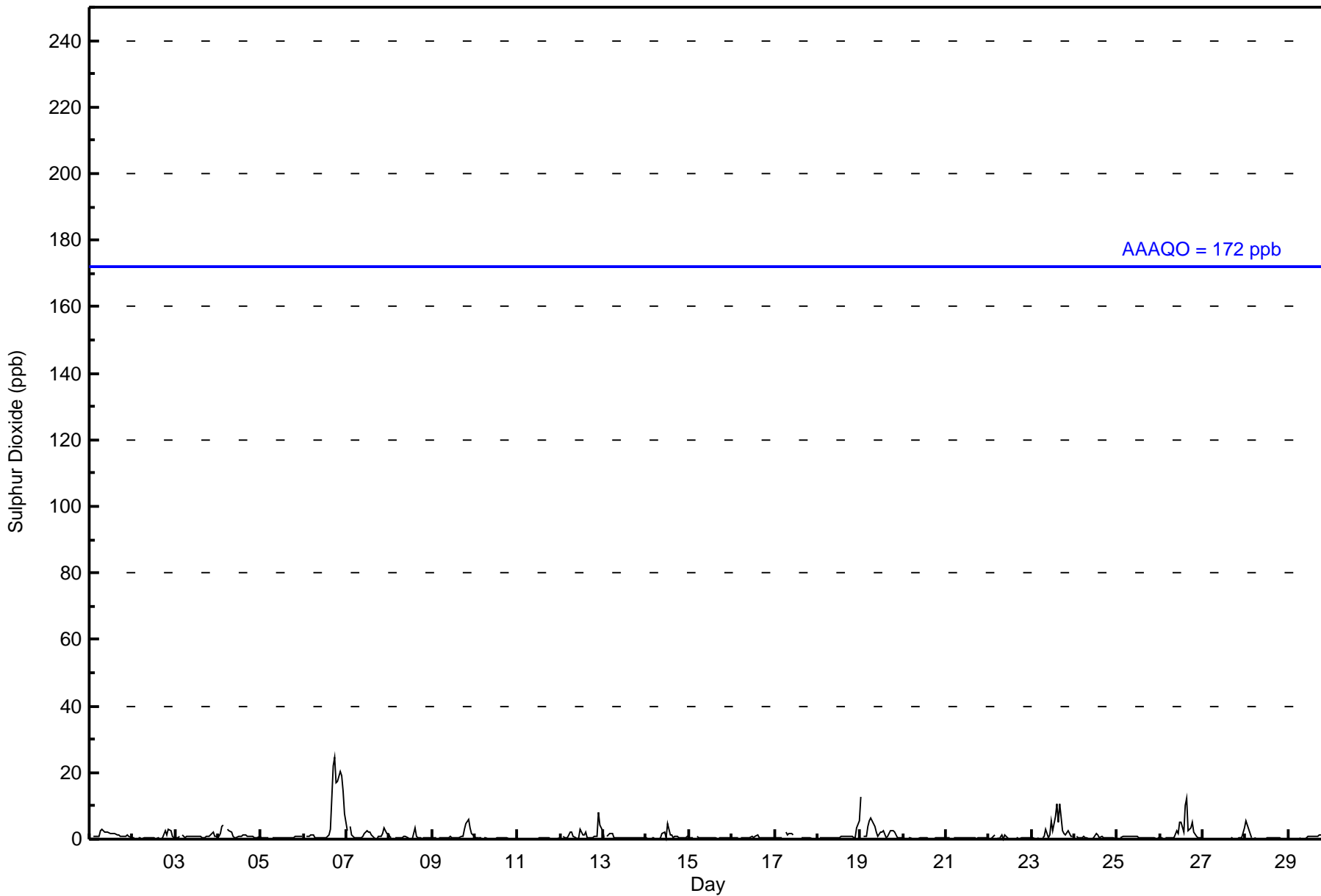
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	0	Z	1	1	1	1	2	3	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	0	1.3	3																						
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	3	1	1	0.6	3																						
3-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	0.8	2																						
4-Feb	1	1	4	4	Z	3	3	2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4																						
5-Feb	1	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	0.5	1																						
6-Feb	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	1	3	22	25	17	17	20	19	14	8	6.7	25																						
7-Feb	2	Z	4	1	0	0	0	0	0	1	2	3	2	2	1	0	0	0	1	1	2	3	2	2	1.3	4																						
8-Feb	1	0	Z	1	0	0	0	0	1	1	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0.5	3																						
9-Feb	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	1	3	5	6	4	2	1	1.2	6																						
10-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	0.2	1																						
11-Feb	0	0	0	0	0	Z	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
12-Feb	Z	1	1	0	0	2	2	1	0	0	0	3	1	1	2	1	0	0	0	1	1	8	4	2	1.5	8																						
13-Feb	0	Z	1	2	2	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.6	2																						
14-Feb	0	0	Z	0	0	0	0	0	0	2	2	1	4	1	1	1	1	1	1	1	1	0	1	1	0.8	4																						
15-Feb	1	0	0	Z	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1																						
16-Feb	0	0	0	0	Z	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0.5	1																						
17-Feb	0	0	0	0	0	Z	2	1	1	2	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0.7	2																						
18-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	3	6	0.8	6																						
19-Feb	13	Z	1	1	4	5	6	5	4	2	1	2	2	3	1	1	2	3	3	2	1	0	0	0	2.6	13																						
20-Feb	0	0	Z	0	0	0	0	0	0	1	1	0	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	1	1	1	0	0	0	0	0	0	0	0	0.4	1																						
22-Feb	0	0	0	1	Z	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1																						
23-Feb	0	0	0	0	1	Z	0	1	3	0	1	6	2	7	10	5	11	2	2	1	2	2	1	1	2.6	11																						
24-Feb	Z	1	1	0	0	1	0	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0.5	2																						
25-Feb	0	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
26-Feb	0	0	Z	0	0	0	0	0	0	3	2	5	5	2	10	12	2	4	5	2	1	1	1	0	2.5	12																						
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.3	3																							
28-Feb	6	4	3	0	Z	0	0	UO	UO	UO	UO	0	0	0	0	0	0	1	0	0	0	UO	UO	UO	--	6																						
29-Feb	UO	UO	UO	UO	UO	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																						
																								1.2	0.6	0.8	0.7	0.7	0.9	0.8	0.7	0.7	0.7	0.7	1.0	1.1	1.0	1.5	1.2	1.7	1.6	1.5	1.4	1.6	1.8	1.3	1.1	Diurnal Average
																								13	4	4	4	4	5	6	5	4	3	2	6	5	7	10	12	22	25	17	17	20	19	14	8	Diurnal Maximum

Z - zerspan 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 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	639	98.46	98.46
11 - 20	8	1.23	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: 649

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - February 2016

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	42	26	22	21	11	24	29	27	61	43	35	54	76	88	22	41	622
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	26	22	21	11	24	29	27	61	43	35	54	76	88	24	42	625

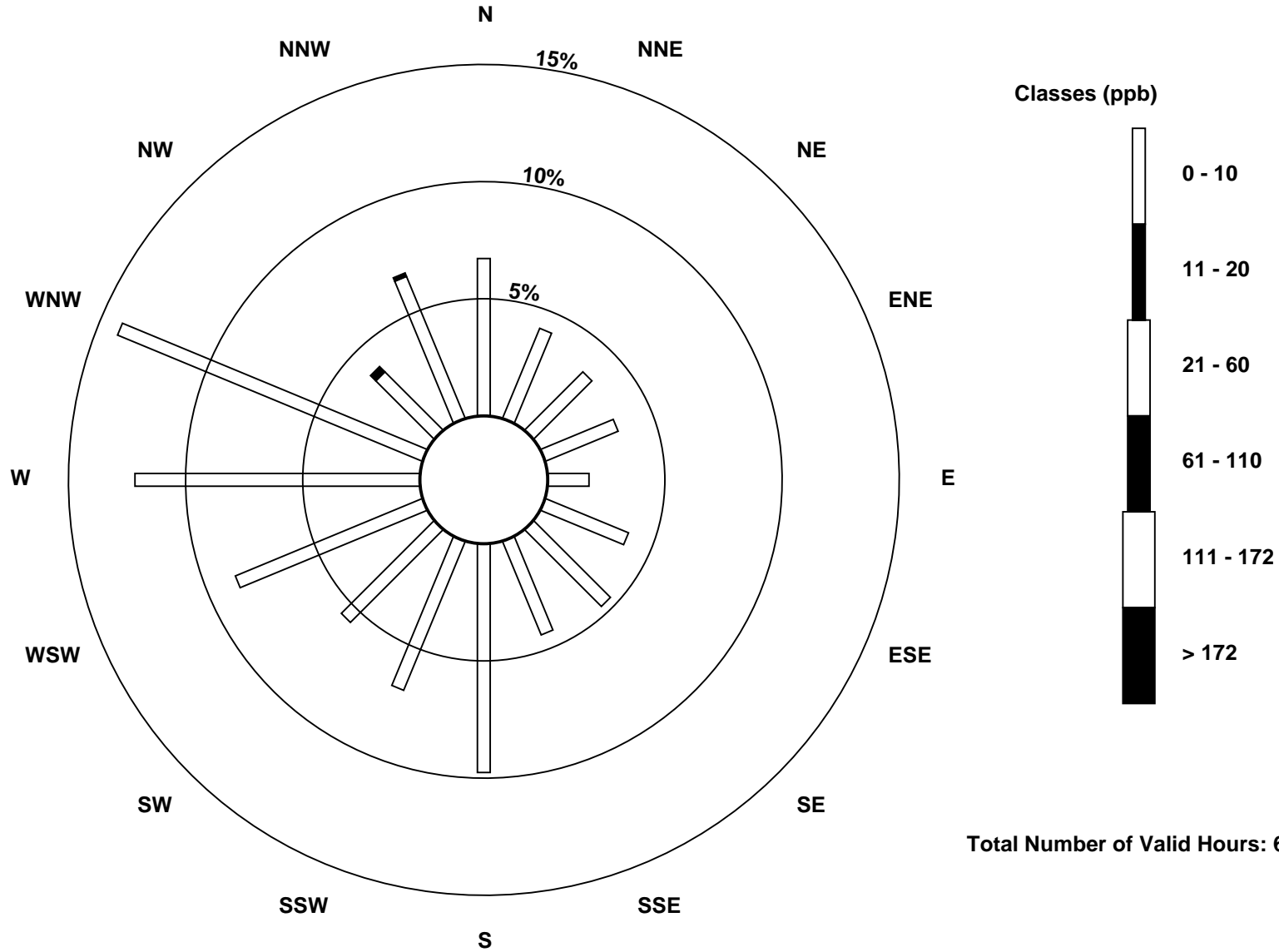
Total Number of Valid Hours: 625

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)



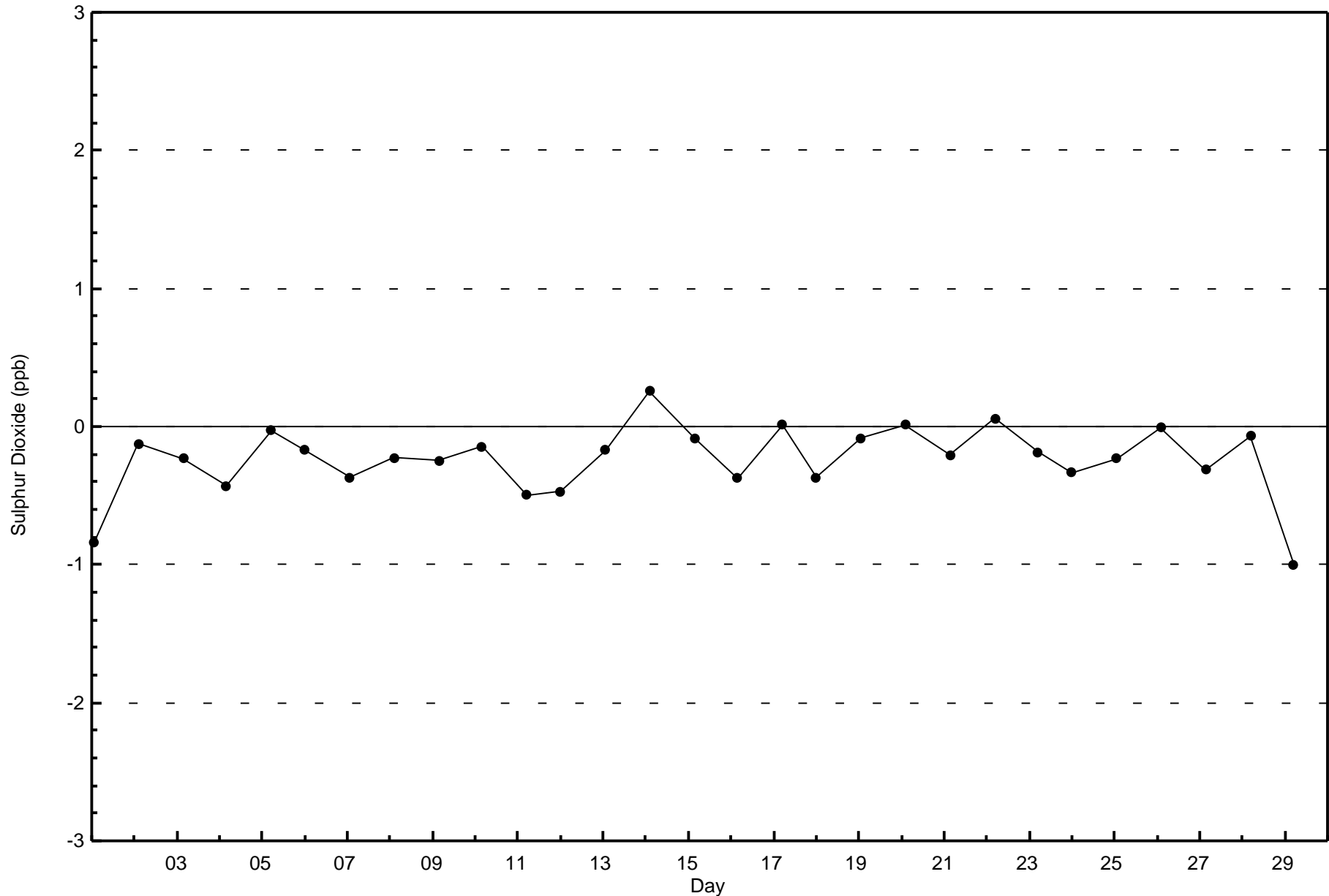


Wood Buffalo Environmental Association

Zero Responses

Sulphur Dioxide (SO₂) - ppb

ConocoPhillips - Surrmont - February 2016



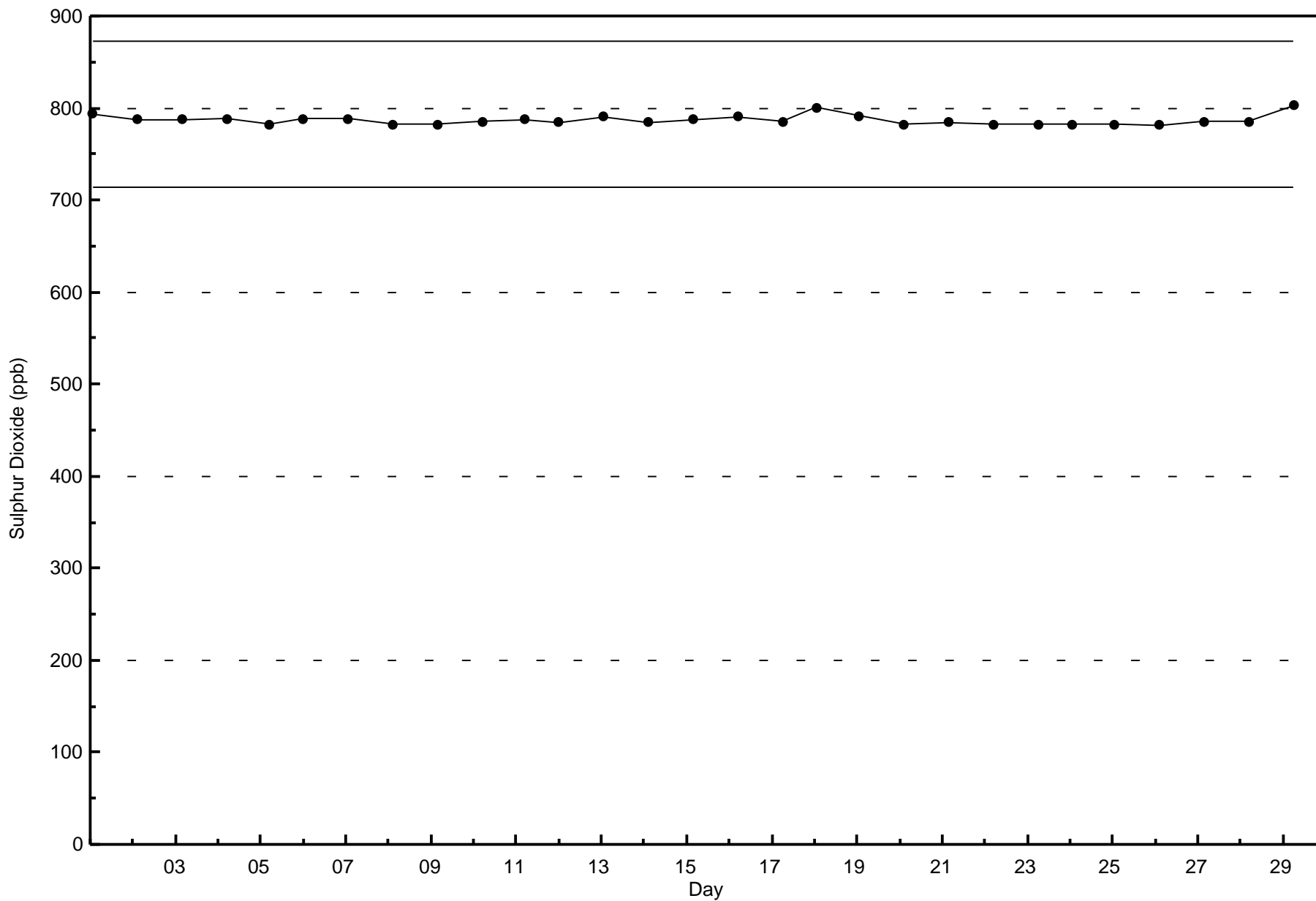


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO₂) - ppb

ConocoPhillips - Surmont - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

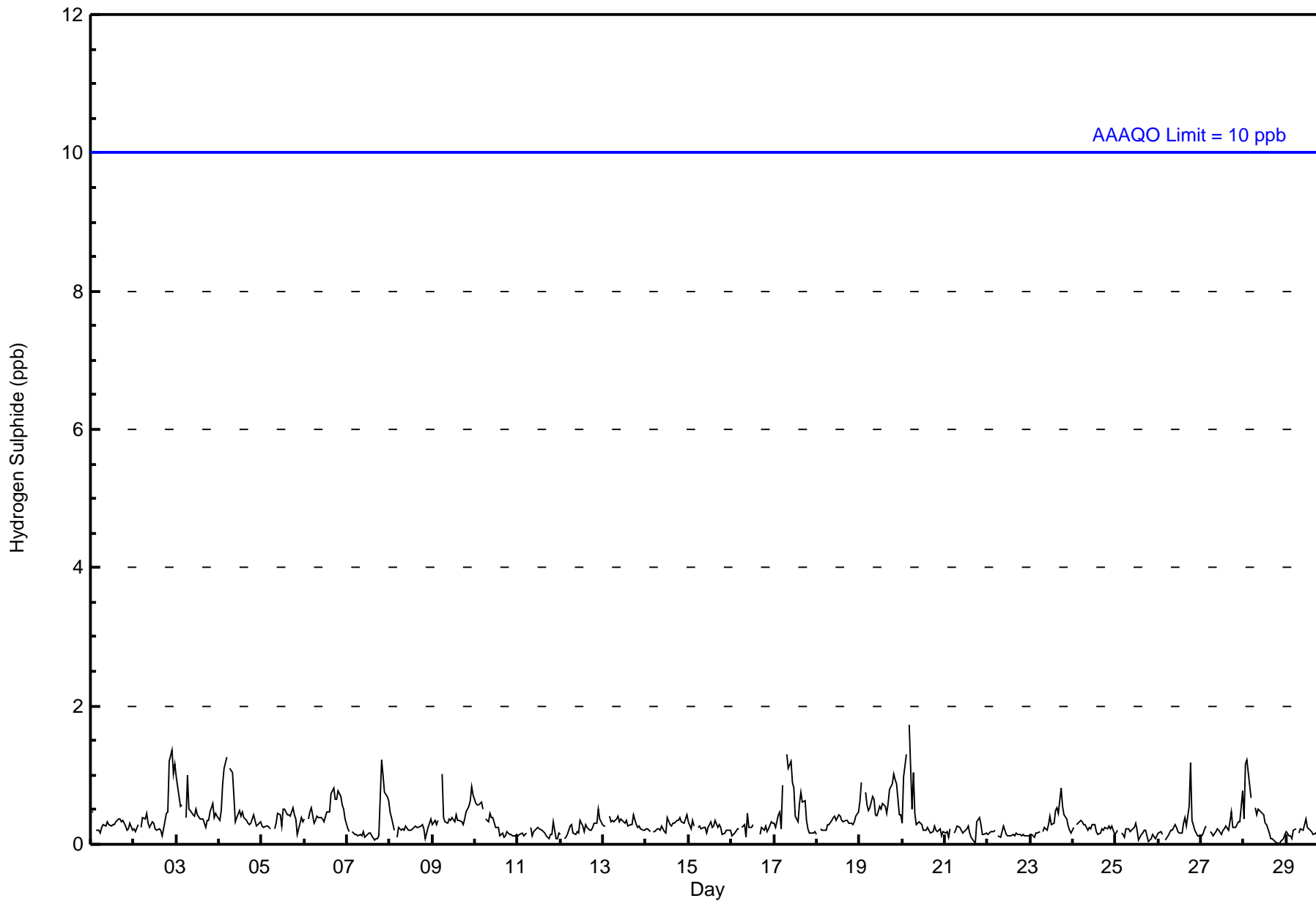
ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Feb 20 05:00 Maximum Daily Average: 0.6 ppb on Feb 19																	Hours in Service: 696 Hours of Data: 664 Hours of Missing Data: 32 Hours of Calibration: 32 Percent Operational Time: 100.0									
Minimum Value: 0 ppb on Feb 28 21:00 Minimum Daily Average: 0.1 ppb on Feb 22 Maximum Diurnal Average: 0.4 ppb at hour 7 Minimum Diurnal Average: 0.3 ppb at hour 17 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 = 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	0.3	0
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
3-Feb	1	1	1	1	Z	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0.5	1
4-Feb	0	0	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
5-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0.3	1
6-Feb	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0.5	1
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	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	0.2	0
9-Feb	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
10-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	0.3	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	0.2	0
12-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	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	0.3	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	0.3	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	0.2	0
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0.2	0
17-Feb	0	0	0	0	0	1	Z	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0.5	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	0.3	0
19-Feb	1	1	Z	1	1	0	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	0	0.6	1
20-Feb	0	1	1	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.1	0
23-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0.3	1
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	0.2	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	0.2	0
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	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	1	0.3	1
28-Feb	0	1	1	1	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
29-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
0.3 0.4 0.4 0.4 0.4 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3																								Diurnal Average		
1 1 1 1 2 1																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	664	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: 664

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	49	27	22	21	13	24	34	26	61	44	37	54	74	87	23	44	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	49	27	22	21	13	24	34	26	61	44	37	54	74	87	23	44	640

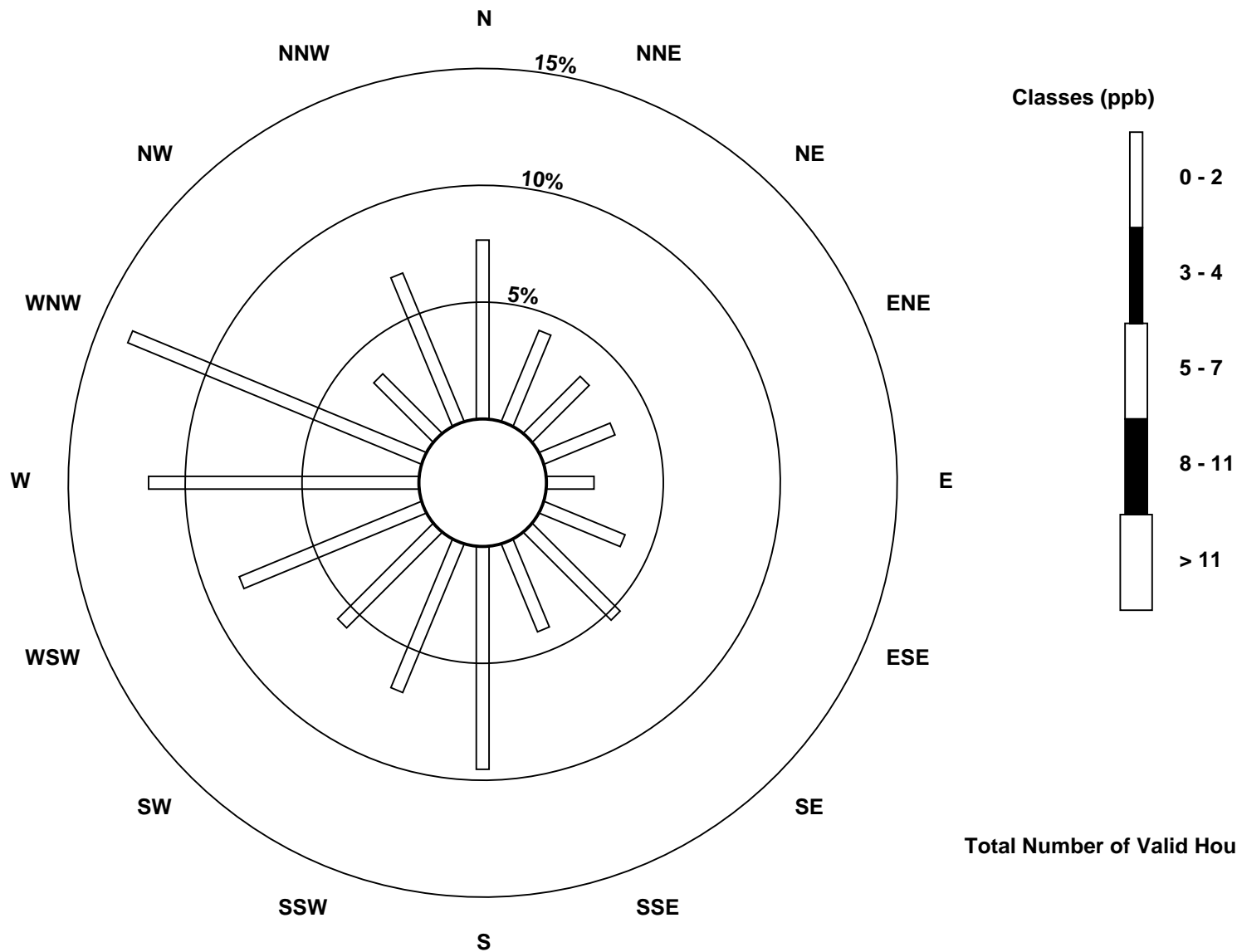
Total Number of Valid Hours: 640

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)

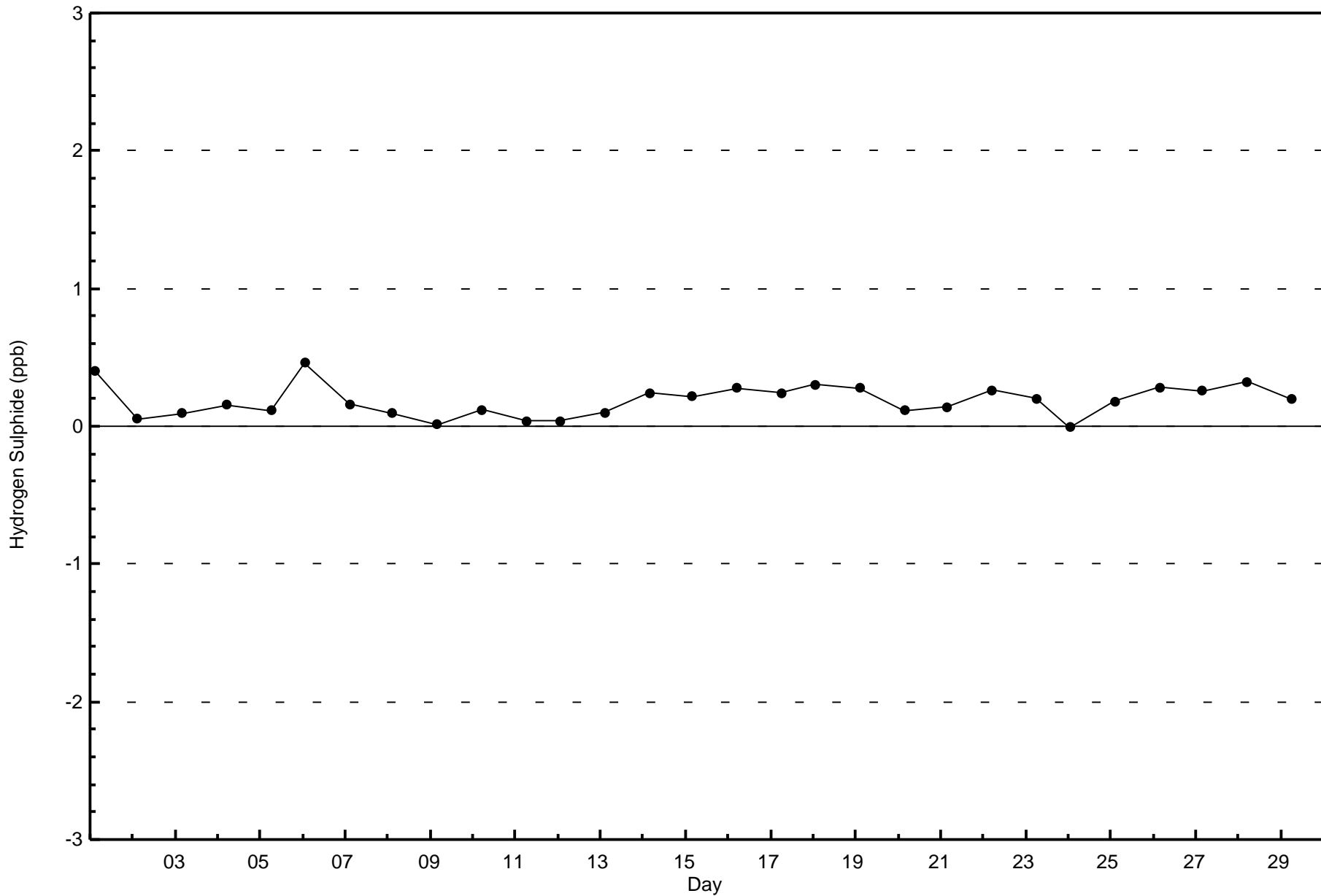


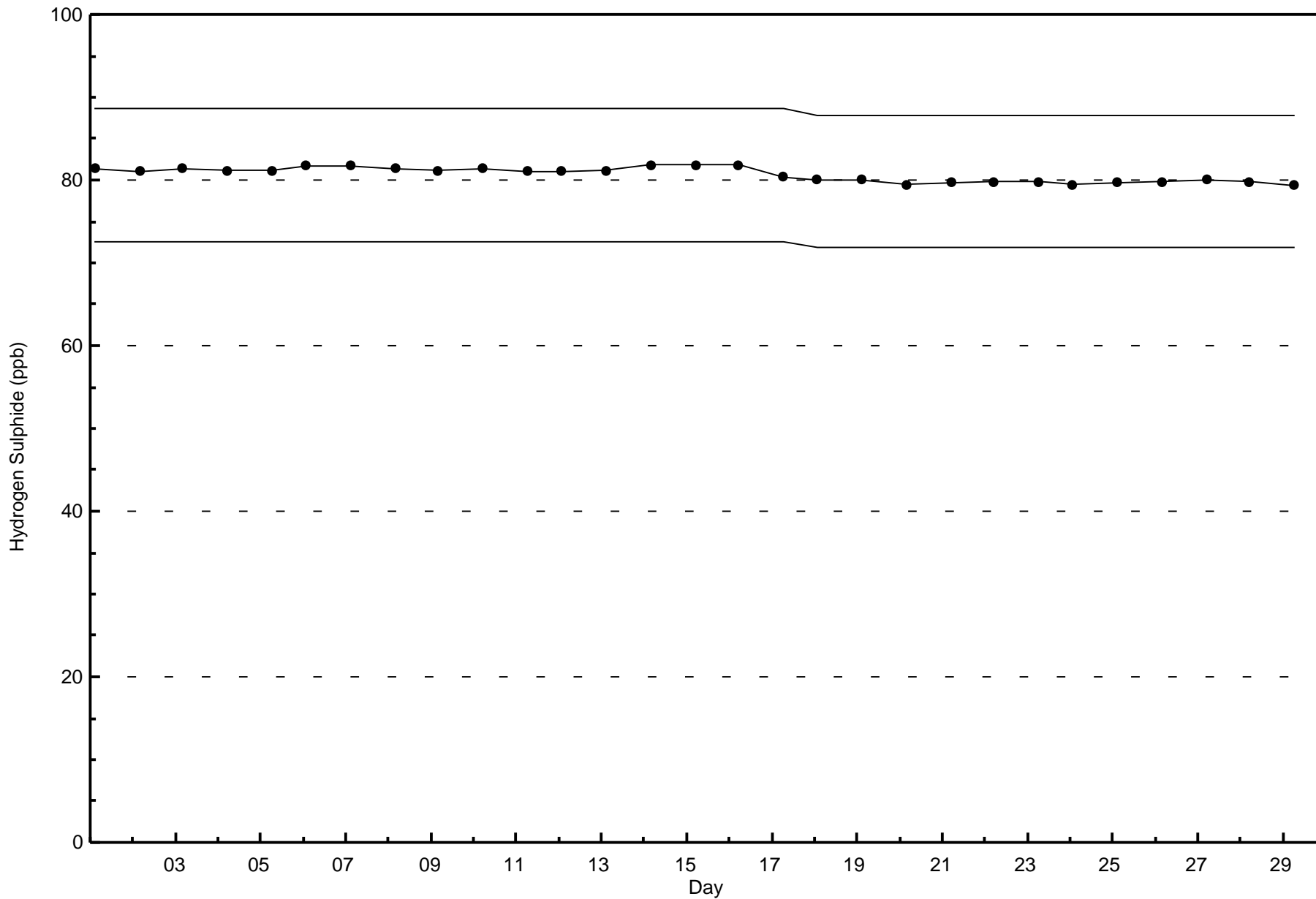
Total Number of Valid Hours: 640



Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - February 2016







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

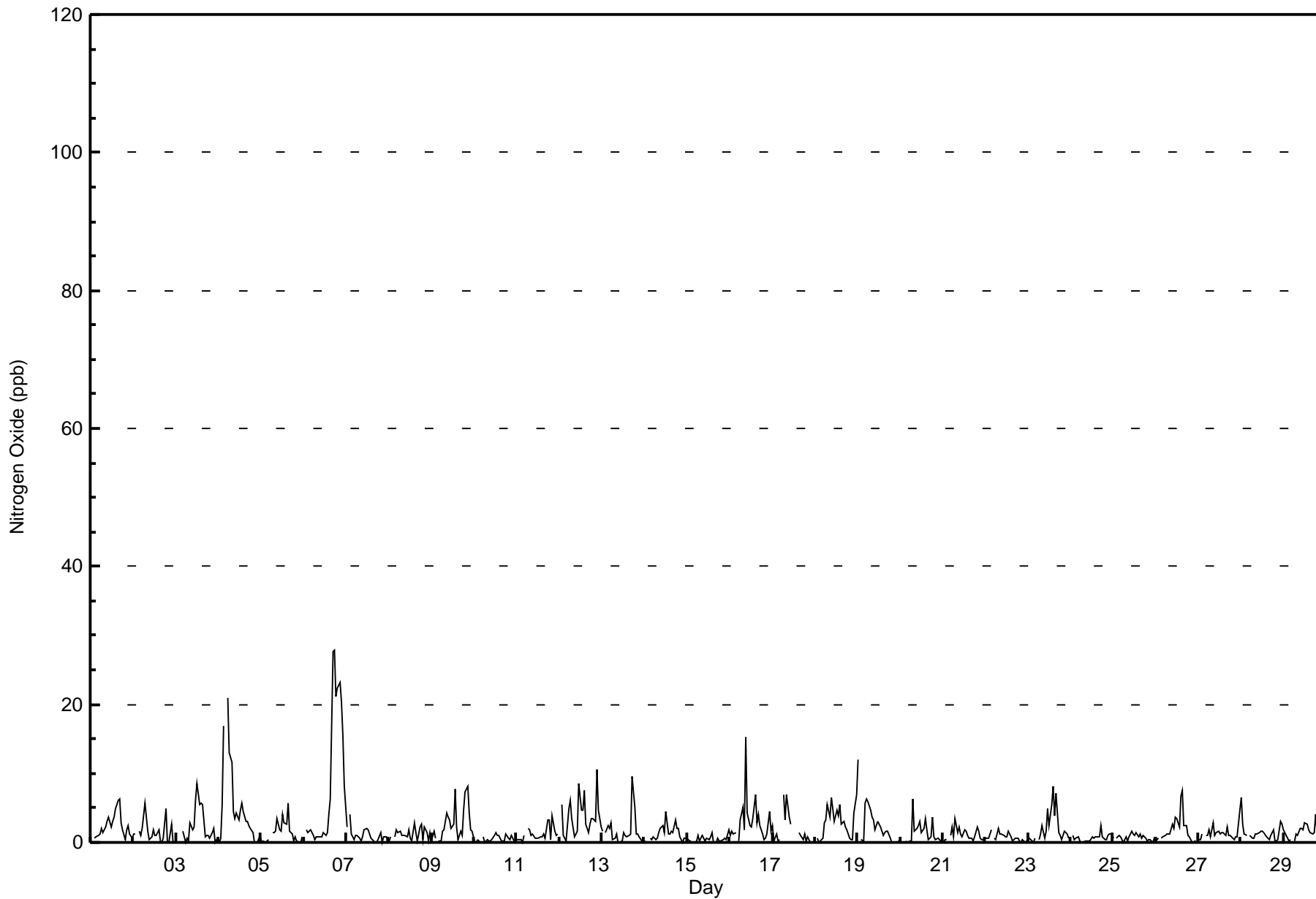
ConocoPhillips - Surmont - February 2016

Maximum Value: 28 ppb on Feb 6 18:00																		Maximum Daily Average: 8.3 ppb on Feb 6																		Hours in Service: 696																																																																									
Minimum Value: 0 ppb on Feb 2 17:00																		Minimum Daily Average: 0.5 ppb on Feb 10																		Hours of Data: 663																																																																									
Maximum Diurnal Average: 2.9 ppb at hour 15																		Minimum Diurnal Average: 0.9 ppb at hour 2																		Hours of Missing Data: 33																																																																									
Monthly Average: 2.0 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 20																		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	1	1	2	2	2	3	4	2	3	4	5	6	6	3	2	0	2	2	1	1	2.4	6																																																																																			
2-Feb	1	1	Z	2	1	2	6	4	2	0	1	2	1	1	2	0	0	1	5	0	0	3	0	0	1.5	6																																																																																			
3-Feb	0	0	0	Z	2	0	1	0	3	2	2	6	8	6	6	5	1	1	1	1	1	2	0	0	2.1	8																																																																																			
4-Feb	0	1	5	17	Z	21	13	12	5	3	4	3	5	6	4	3	3	3	2	1	0	0	0	1	4.8	21																																																																																			
5-Feb	0	0	0	0	0	Z	1	2	2	3	2	2	4	3	3	6	2	1	0	1	0	0	0	1	1.4	6																																																																																			
6-Feb	Z	2	1	2	2	1	0	1	1	1	1	1	1	1	4	6	28	28	21	22	23	20	15	8	8.3	28																																																																																			
7-Feb	2	Z	4	1	0	1	1	1	0	1	2	2	2	1	1	0	0	0	0	1	0	1	1	0	1.0	4																																																																																			
8-Feb	0	1	Z	1	2	2	2	1	1	1	1	2	1	0	3	1	0	2	3	0	2	1	0	1	1.2	3																																																																																			
9-Feb	0	2	1	Z	0	0	2	2	4	4	3	2	3	8	2	0	2	1	5	7	8	4	2	2	2.7	8																																																																																			
10-Feb	0	0	0	0	Z	1	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	1	0	0	0.5	1																																																																																			
11-Feb	0	0	0	0	1	Z	2	2	1	1	1	1	1	1	1	1	1	3	3	0	4	2	1	1	1.2	4																																																																																			
12-Feb	Z	6	1	1	0	5	6	4	1	1	2	9	5	5	8	3	1	3	3	3	3	11	5	2	3.7	11																																																																																			
13-Feb	2	Z	1	3	2	3	0	1	1	0	0	0	1	1	1	1	1	10	5	1	1	1	0	0	1.6	10																																																																																			
14-Feb	0	0	Z	1	0	1	1	1	1	2	2	1	4	1	1	2	1	3	2	2	1	0	1	1	1.3	4																																																																																			
15-Feb	1	0	0	Z	0	0	1	0	1	1	0	1	0	1	1	0	0	1	0	0	1	1	0	2	0.5	2																																																																																			
16-Feb	1	2	1	1	Z	0	3	5	2	15	4	2	2	3	7	3	4	2	1	0	1	1	5	2	3.0	15																																																																																			
17-Feb	2	0	1	0	0	Z	7	3	7	4	3	C	C	C	C	1	1	0	1	0	1	0	0	0	1.7	7																																																																																			
18-Feb	Z	1	0	0	1	3	3	5	4	7	5	3	5	4	6	3	3	2	2	1	0	0	4	7	3.0	7																																																																																			
19-Feb	12	Z	0	0	6	6	6	5	4	3	2	3	3	2	1	2	2	2	1	0	0	0	0	0	2.5	12																																																																																			
20-Feb	0	0	Z	0	0	0	0	6	2	2	3	3	1	2	3	2	0	1	4	1	0	1	0	0	1.4	6																																																																																			
21-Feb	0	0	0	Z	1	2	1	3	1	2	1	1	2	2	1	1	1	0	1	2	2	1	0	0	1.1	3																																																																																			
22-Feb	1	1	1	2	Z	1	0	2	1	1	1	1	1	2	1	0	0	1	1	0	0	0	0	0	0.7	2																																																																																			
23-Feb	0	1	0	0	1	Z	0	1	3	1	2	5	2	5	8	4	7	1	1	0	2	1	1	1	2.1	8																																																																																			
24-Feb	Z	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	3	1	1	0	1	1	1	0.7	3																																																																																			
25-Feb	1	Z	1	1	1	0	0	1	0	1	2	1	1	1	1	1	1	1	1	0	0	0	0	1	0.7	2																																																																																			
26-Feb	0	1	Z	1	1	1	1	1	1	3	2	4	4	2	7	8	2	3	1	1	0	0	0	0	1.8	8																																																																																			
27-Feb	0	0	1	Z	1	1	2	1	3	1	2	2	1	1	1	1	2	1	1	1	0	1	1	5	1.3	5																																																																																			
28-Feb	7	3	1	1	Z	1	1	1	1	1	1	2	2	1	1	1	0	1	2	0	0	0	3	3	1.5	7																																																																																			
29-Feb	2	1	1	0	0	Z	0	1	1	2	2	2	3	3	2	1	1	1	4	1	1	1	1	1	1.4	4																																																																																			
																		Diurnal Average				Diurnal Maximum																																																																																							
1.3																		0.9				1.0				1.4				1.0				2.2				2.2				2.3				1.9				2.3				1.9				2.2				2.4				2.5				2.9				2.2				2.5				2.7				2.5				1.8				1.9				2.0				1.5				1.4			
12																		6				5				17				6				21				13				12				7				15				5				9				8				8				8				8				28				28				21				22				23				20				15				8			
Z - zerospan																								C - Calibration																																																																																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	657	99.10	99.10
21 - 40	6	0.90	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: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	26	22	22	11	25	32	28	63	44	35	54	76	88	24	46	638
21 - 40	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	26	22	23	11	25	32	28	63	44	35	54	76	88	24	46	639

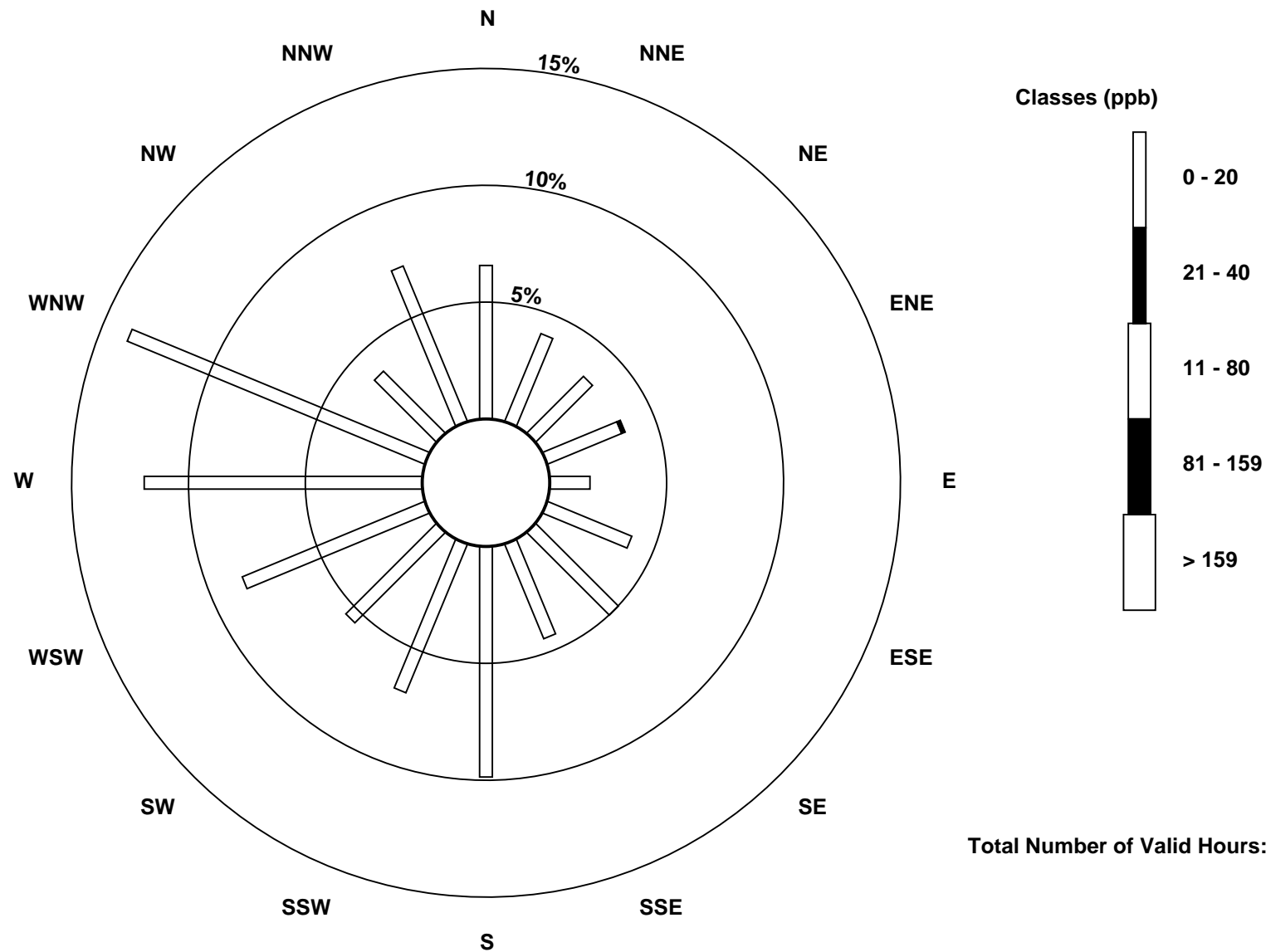
Total Number of Valid Hours: 639

Total Number of Hours: 696

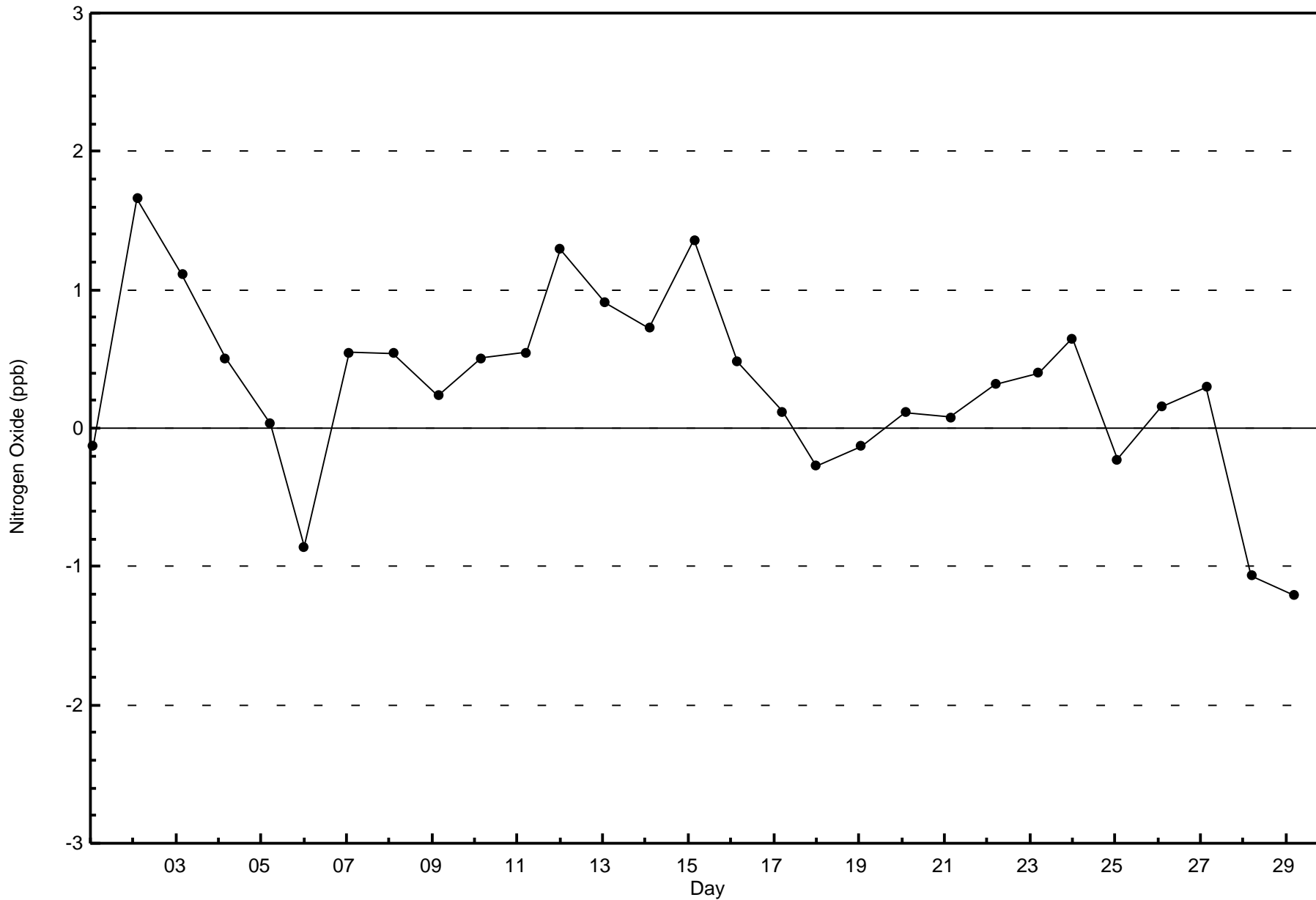


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)



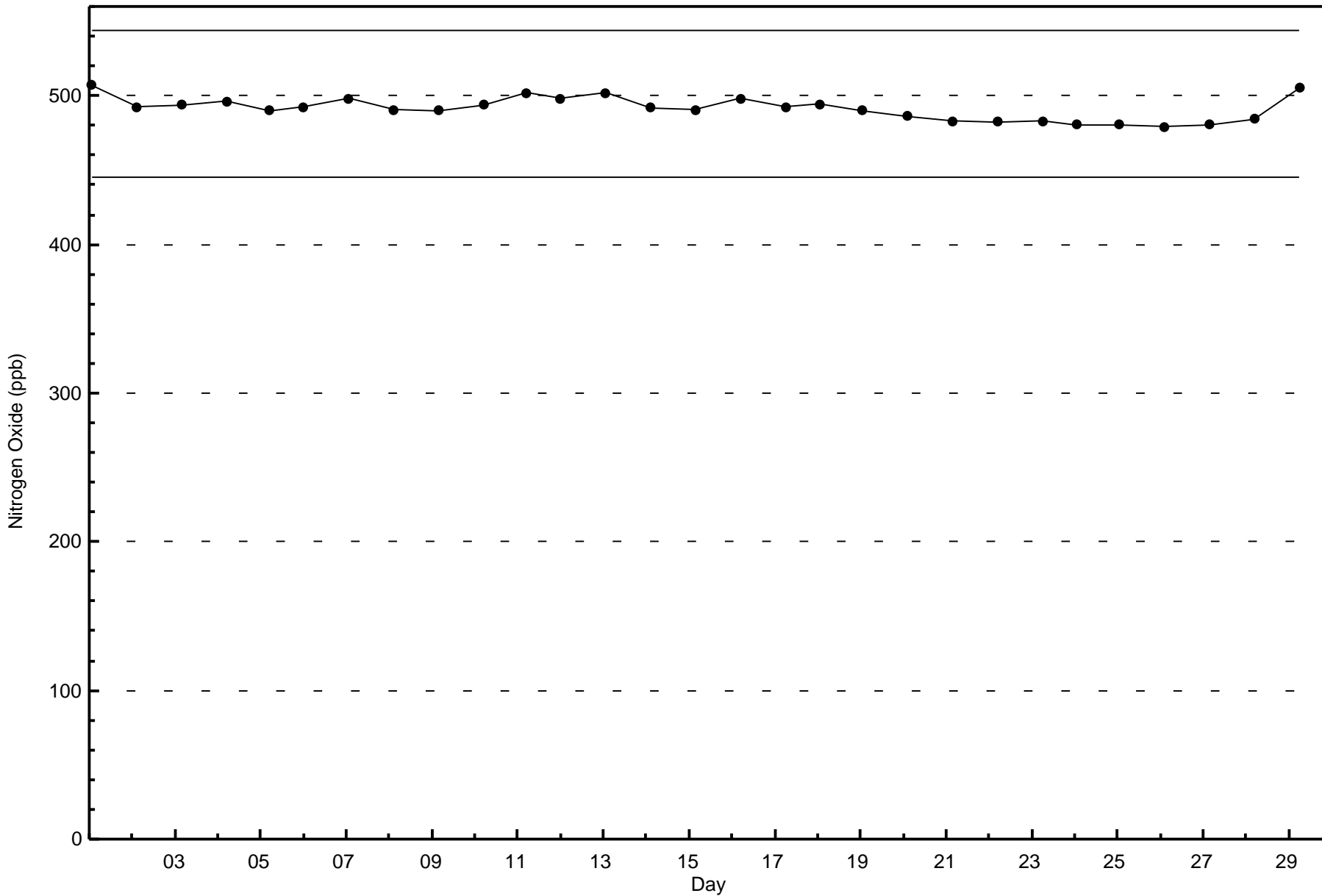
Total Number of Valid Hours: 639





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - February 2016





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 696																
Maximum Value: 27 ppb on Feb 4 04:00										Maximum Daily Average: 11.5 ppb on Feb 4										Hours of Data: 663						
Minimum Value: 0 ppb on Feb 27 01:00										Minimum Daily Average: 1.3 ppb on Feb 24										Hours of Missing Data: 33						
Maximum Diurnal Average: 5.3 ppb at hour 19										Minimum Diurnal Average: 2.9 ppb at hour 13										Hours of Calibration: 33						
Monthly Average: 4.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 6 P ₉₀ = 9 P ₉₉ = 23										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	Z	3	2	3	3	6	5	4	5	4	3	3	5	6	7	7	9	6	1	0	2	6	0	3.9	9
2-Feb	3	2	Z	2	3	9	10	11	5	2	1	1	1	1	1	1	1	2	6	6	17	12	15	13	5.3	17
3-Feb	10	9	10	Z	7	6	8	9	13	9	8	8	7	8	9	9	10	9	8	6	4	4	5	7.9	13	
4-Feb	8	15	25	27	Z	25	25	24	17	7	7	6	7	9	8	8	7	6	6	9	5	4	4	6	11.5	27
5-Feb	4	4	3	2	2	Z	3	4	5	7	5	4	8	7	6	9	9	7	6	6	7	7	7	6	5.4	9
6-Feb	Z	5	5	6	9	6	3	2	2	2	1	1	1	1	4	7	10	12	9	10	9	9	9	6	5.7	12
7-Feb	3	Z	4	1	1	2	1	1	1	2	2	2	2	2	1	1	1	1	3	23	20	23	21	18	5.9	23
8-Feb	11	5	Z	6	6	8	1	1	5	6	3	4	1	1	4	2	2	9	13	2	3	3	5	6	4.7	13
9-Feb	3	3	2	Z	4	3	9	6	6	7	5	2	3	5	4	2	2	1	3	6	6	6	13	4	4.5	13
10-Feb	3	3	3	3	Z	5	4	4	3	4	3	4	4	3	2	1	1	3	3	2	1	1	1	1	2.7	5
11-Feb	1	1	2	1	1	Z	4	3	2	2	2	3	2	1	2	3	2	4	6	5	6	2	4	4	2.8	6
12-Feb	Z	5	6	3	2	9	8	5	4	3	4	9	6	5	8	5	3	4	4	5	5	16	10	7	5.9	16
13-Feb	4	Z	5	7	8	7	4	3	5	3	2	2	3	3	3	3	3	8	4	3	3	3	2	1	3.9	8
14-Feb	2	1	Z	3	2	2	1	1	2	2	2	1	4	2	2	2	5	10	8	9	12	7	5	9	4.1	12
15-Feb	9	5	4	Z	4	3	4	3	3	2	2	2	2	4	5	3	2	3	4	4	3	3	3	4	3.4	9
16-Feb	4	3	4	4	Z	3	4	6	4	4	5	3	3	5	5	1	5	5	5	3	4	5	10	8	4.4	10
17-Feb	7	5	4	3	2	Z	20	19	18	10	7	C	C	C	C	7	8	9	8	8	7	6	5	1	8.1	20
18-Feb	Z	1	1	1	1	2	3	2	4	2	4	2	2	2	2	2	3	4	5	5	3	2	4	6	2.7	6
19-Feb	9	Z	5	5	4	4	5	6	5	3	2	3	3	3	2	3	5	8	9	9	7	4	6	6	5.0	9
20-Feb	4	4	Z	7	6	8	7	9	7	5	6	4	3	3	3	2	2	4	4	3	2	1	2	2	4.2	9
21-Feb	2	2	2	Z	2	3	2	3	3	3	2	1	2	2	1	1	2	2	5	6	5	1	1	1	2.3	6
22-Feb	1	1	1	3	Z	1	2	3	3	2	1	1	1	2	1	1	1	1	2	1	1	1	1	2	1.5	3
23-Feb	2	2	2	1	1	Z	1	2	3	1	2	3	2	4	6	5	6	3	6	7	6	2	1	1	3.0	7
24-Feb	Z	1	1	1	1	2	2	1	1	1	1	1	1	2	2	1	1	2	1	2	2	1	2	1	1.3	2
25-Feb	1	Z	2	2	2	2	2	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	0	0	1.5	3
26-Feb	0	0	Z	0	1	1	1	1	0	2	1	2	2	1	4	7	4	6	7	3	1	0	0	0	1.9	7
27-Feb	0	0	0	Z	0	0	0	0	1	1	1	1	0	1	1	1	6	6	4	3	3	2	2	5	1.6	6
28-Feb	5	16	14	6	Z	4	4	5	2	2	2	2	2	2	1	1	1	3	4	3	1	1	1	2	3.7	16
29-Feb	5	2	3	1	4	Z	2	1	1	0	1	1	2	2	2	2	2	1	2	1	2	1	1	2	1.8	5
4.1 3.9 4.5 4.0 3.2 4.8 5.0 4.9 4.5 3.5 3.0 2.9 2.9 3.0 3.4 3.3 3.8 4.9 5.3 5.3 5.0 4.6 5.0 4.3																								Diurnal Average		
11 16 25 27 9 25 25 24 18 10 8 9 8 9 8 9 10 12 13 23 20 23 21 18																								Diurnal Maximum		
Z - zerspan 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 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	655	98.79	98.79
21 - 40	8	1.21	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: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	24	22	21	11	23	32	27	63	44	35	54	76	88	24	46	631
21 - 40	1	2	0	2	0	2	0	1	0	0	0	0	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	42	26	22	23	11	25	32	28	63	44	35	54	76	88	24	46	639

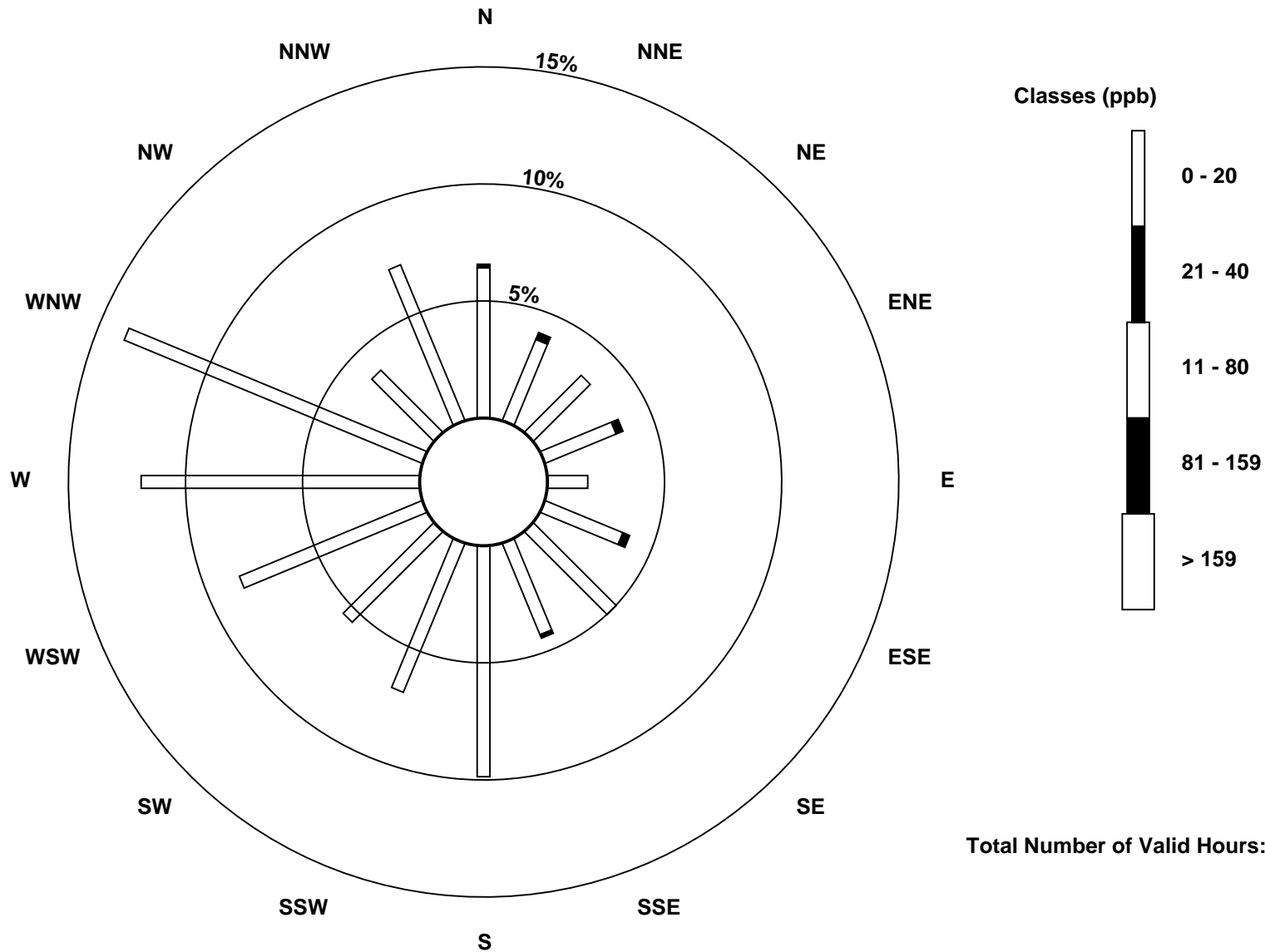
Total Number of Valid Hours: 639

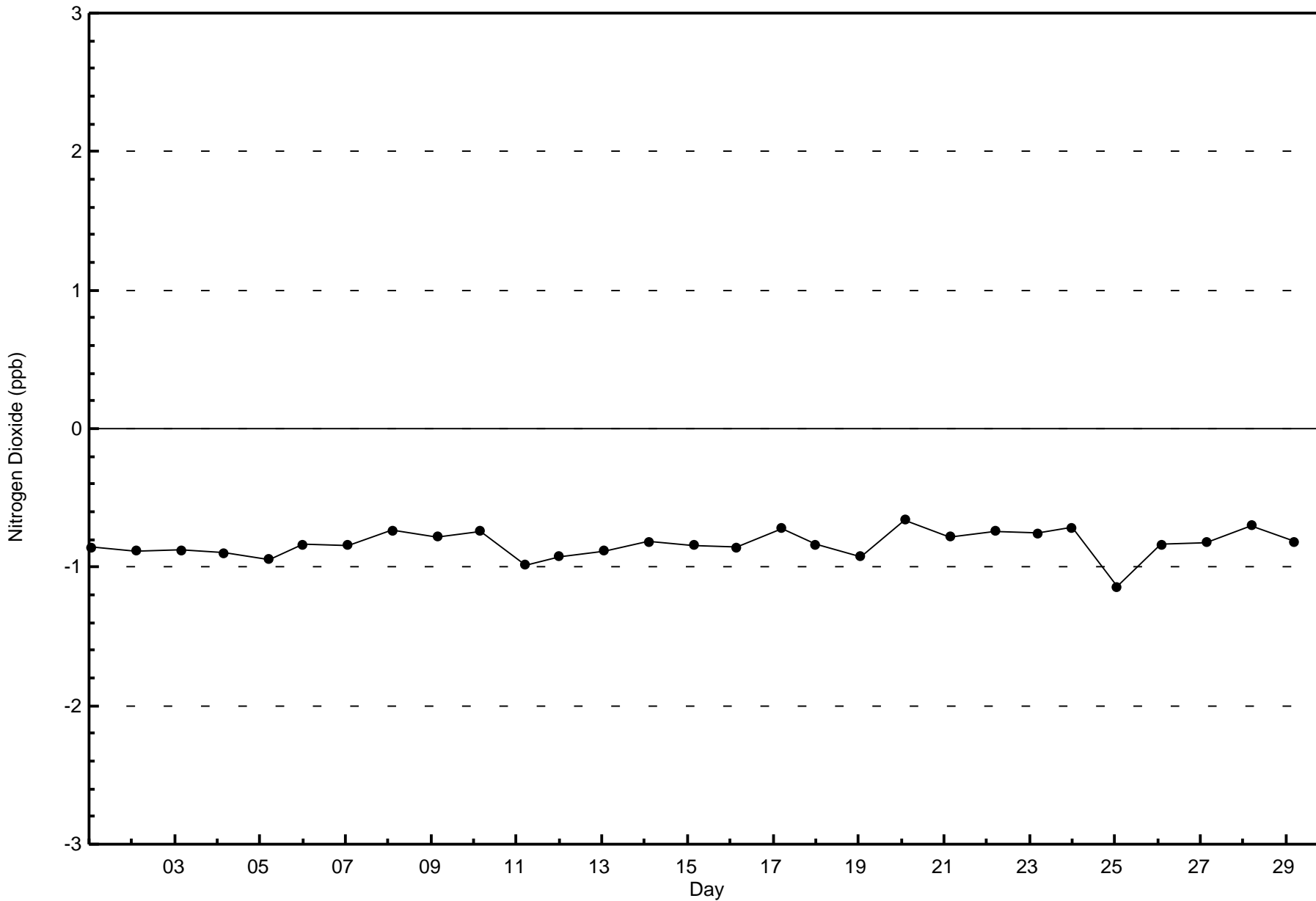
Total Number of Hours: 696

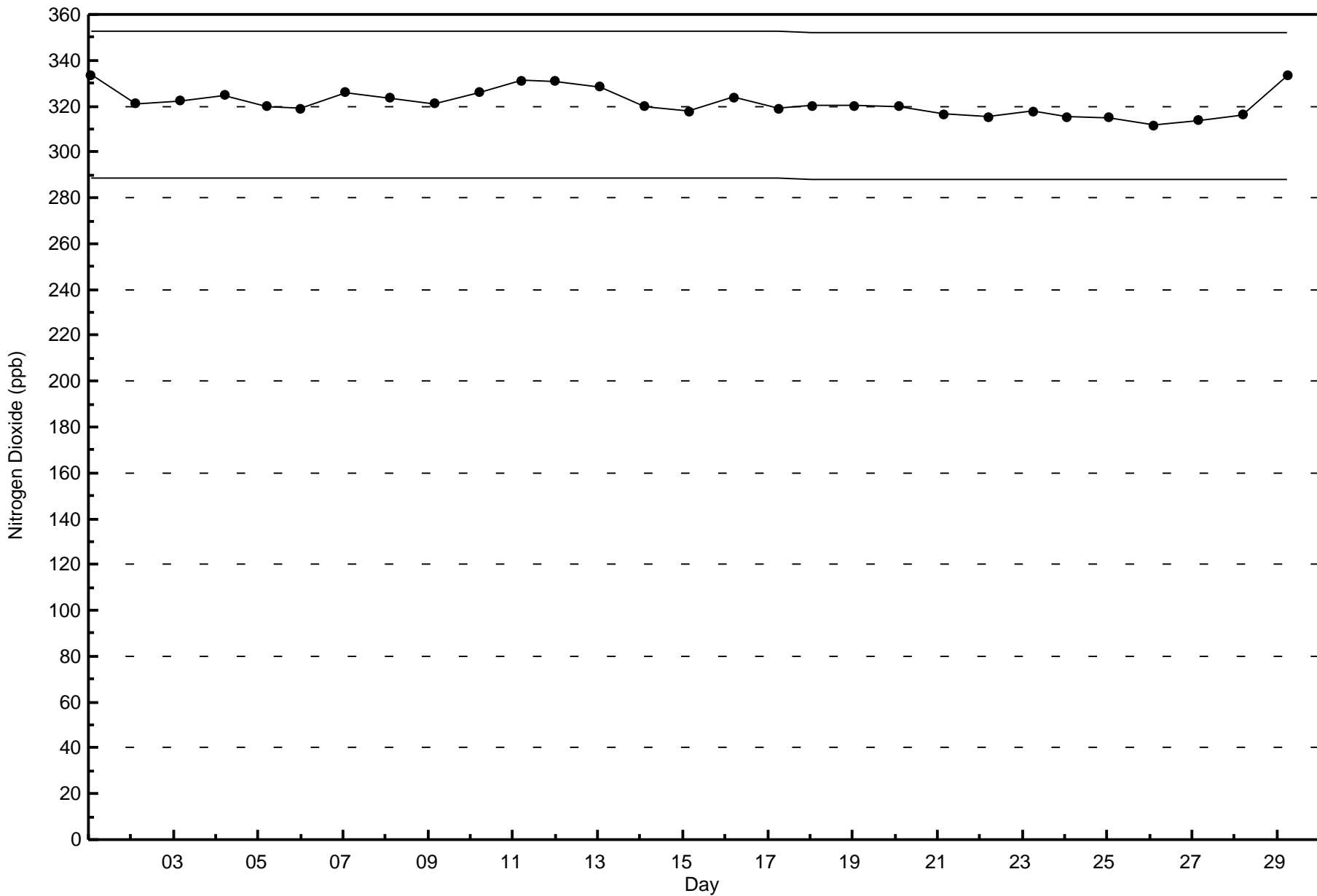


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

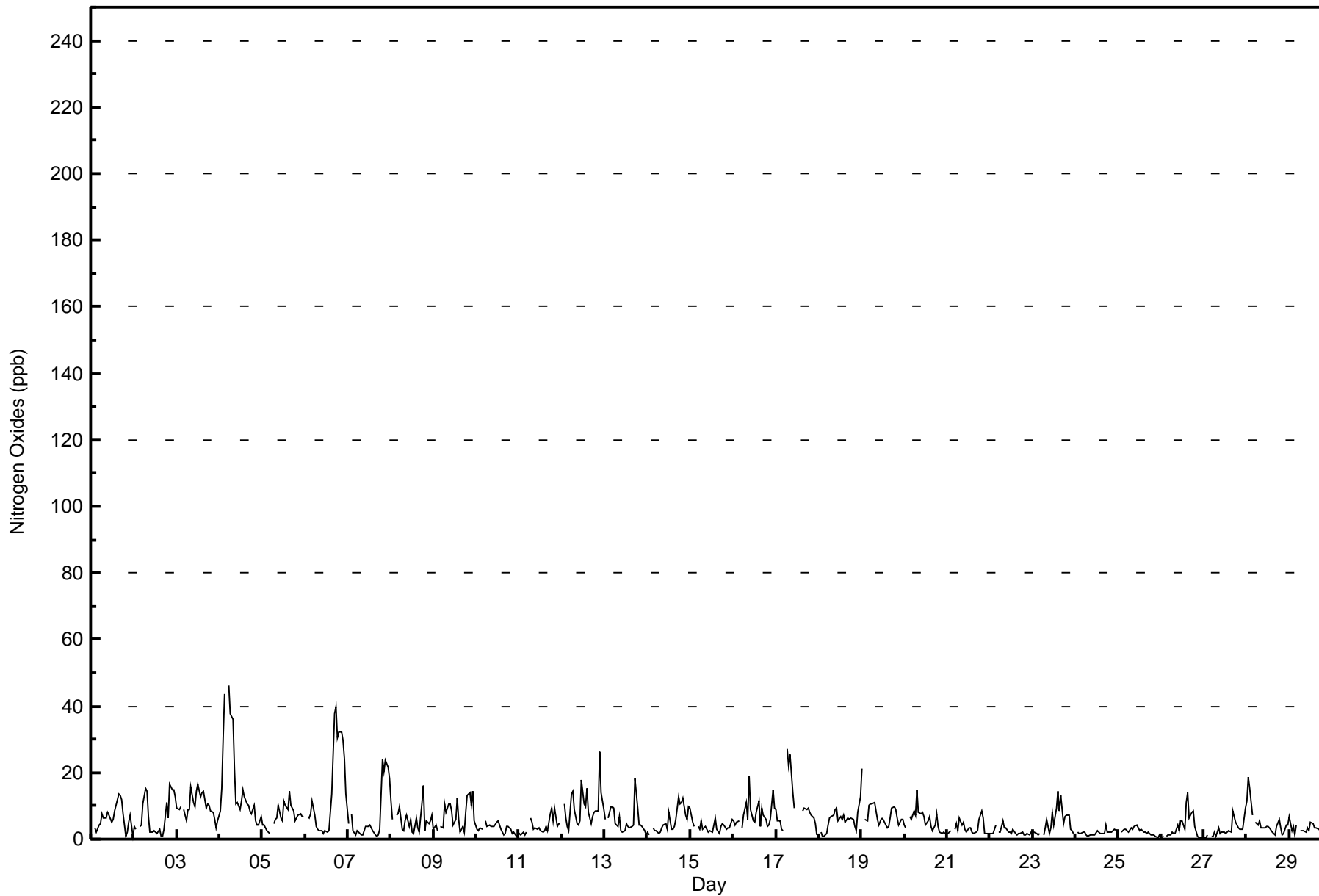
ConocoPhillips - Surmont - February 2016

Maximum Value: 46 ppb on Feb 4 06:00																		Maximum Daily Average: 16.4 ppb on Feb 4																		Hours in Service: 696			
Minimum Value: 0 ppb on Feb 25 23:00																		Minimum Daily Average: 1.9 ppb on Feb 24																		Hours of Data: 663			
Maximum Diurnal Average: 7.8 ppb at hour 19																		Minimum Diurnal Average: 4.2 ppb at hour 5																		Hours of Missing Data: 33			
Monthly Average: 6.1 ppb																		Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 4 Q ₃ = 8 P ₉₀ = 12 P ₉₉ = 32																		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	Z	3	2	4	5	8	6	6	8	7	5	6	9	10	14	13	12	7	1	2	5	7	1	6.2	14													
2-Feb	4	3	Z	4	4	11	15	14	7	2	2	2	2	2	3	1	1	3	11	6	17	15	15	13	6.8	17													
3-Feb	10	9	10	Z	9	6	9	9	16	11	10	14	16	13	14	14	9	10	10	9	8	6	4	5	10.0	16													
4-Feb	8	15	31	44	Z	46	38	36	21	11	11	9	12	15	13	11	10	9	8	10	5	4	4	7	16.4	46													
5-Feb	4	4	3	2	2	Z	5	6	6	10	6	5	12	10	9	14	10	9	6	6	7	8	7	7	6.8	14													
6-Feb	Z	7	6	8	11	7	4	3	3	2	2	3	2	3	8	14	38	40	30	32	32	30	24	14	14.0	40													
7-Feb	5	Z	8	3	1	3	2	1	1	3	4	4	4	3	3	1	1	1	3	24	20	24	22	18	6.9	24													
8-Feb	11	6	Z	7	8	10	3	2	6	7	4	6	2	2	6	4	2	11	16	3	6	5	6	7	6.0	16													
9-Feb	3	4	3	Z	4	3	11	8	11	11	8	4	6	12	6	2	4	2	8	13	14	10	14	6	7.3	14													
10-Feb	3	3	3	3	Z	6	4	4	4	4	4	5	5	4	3	1	2	4	4	3	1	2	1	1	3.2	6													
11-Feb	2	1	2	1	2	Z	6	5	3	3	3	3	3	2	3	4	3	8	9	5	9	4	5	5	4.0	9													
12-Feb	Z	10	7	4	3	14	14	9	5	4	5	18	11	10	15	8	5	7	8	9	8	26	14	9	9.6	26													
13-Feb	6	Z	6	10	10	10	5	4	7	3	2	2	5	4	3	4	4	18	9	4	4	4	2	1	5.5	18													
14-Feb	2	1	Z	3	3	2	2	2	3	4	5	3	8	3	3	4	6	13	10	11	12	7	6	10	5.4	13													
15-Feb	9	5	4	Z	4	3	5	3	4	3	2	3	2	4	6	3	2	4	5	4	3	3	3	6	3.9	9													
16-Feb	5	4	5	5	Z	3	7	11	6	19	9	6	5	8	11	4	9	7	6	4	4	6	15	9	7.4	19													
17-Feb	9	5	5	3	3	Z	27	22	25	14	9	C	C	C	C	8	9	9	9	8	7	6	5	1	9.8	27													
18-Feb	Z	2	1	1	2	4	6	7	7	9	9	5	7	6	7	5	6	6	6	6	4	3	8	13	5.7	13													
19-Feb	21	Z	6	5	10	11	11	11	8	6	4	6	6	5	3	4	6	9	10	9	6	4	6	6	7.6	21													
20-Feb	4	4	Z	7	6	8	7	15	8	8	8	7	4	5	7	4	3	4	8	4	2	2	2	2	5.6	15													
21-Feb	2	2	2	Z	3	5	3	6	4	5	3	2	4	3	2	2	2	2	6	8	6	2	2	2	3.4	8													
22-Feb	2	2	2	4	Z	2	2	5	4	3	2	2	2	3	2	1	2	2	2	1	1	2	1	2	2.2	5													
23-Feb	2	2	2	1	2	Z	1	3	6	2	3	8	4	9	15	8	13	5	7	7	7	3	2	2	5.1	15													
24-Feb	Z	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	4	2	2	2	2	3	3	1.9	4													
25-Feb	2	Z	2	3	3	3	2	3	3	4	4	3	3	3	2	2	2	2	1	1	1	1	0	1	2.2	4													
26-Feb	1	1	Z	1	1	1	2	2	2	4	3	6	6	3	11	14	6	8	8	4	1	0	0	0	3.7	14													
27-Feb	0	0	1	Z	1	1	2	1	4	2	2	2	2	2	2	2	8	7	5	3	3	3	3	9	2.9	9													
28-Feb	12	19	15	7	Z	5	4	6	3	3	4	4	4	3	2	2	1	4	6	3	1	2	4	4	5.2	19													
29-Feb	7	3	4	1	4	Z	2	2	2	2	3	3	5	5	3	3	3	3	6	3	3	2	2	3	3.2	7													
5.4																		4.8																		Diurnal Average			
21																		19																		Diurnal Maximum			
5.5																		5.5																					
4.2																		7.1																					
7.1																		7.2																					
7.2																		7.2																					
6.4																		5.8																					
4.8																		5.1																					
5.3																		5.4																					
6.3																		6.3																					
5.5																		5.5																					
6.3																		7.6																					
7.8																		7.0																					
6.9																		6.6																					
6.5																		6.5																					
5.7																		5.7																					
Z - zerspan																		C - Calibration																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	642	96.83	96.83
21 - 40	19	2.87	99.70
41 - 80	2	0.30	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 696



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - February 2016**

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	24	22	21	11	22	32	26	63	44	35	54	76	88	24	44	625
21 - 40	3	1	0	1	0	3	0	2	0	0	0	0	0	0	0	2	12
11 - 80	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	26	22	23	11	25	32	28	63	44	35	54	76	88	24	46	639

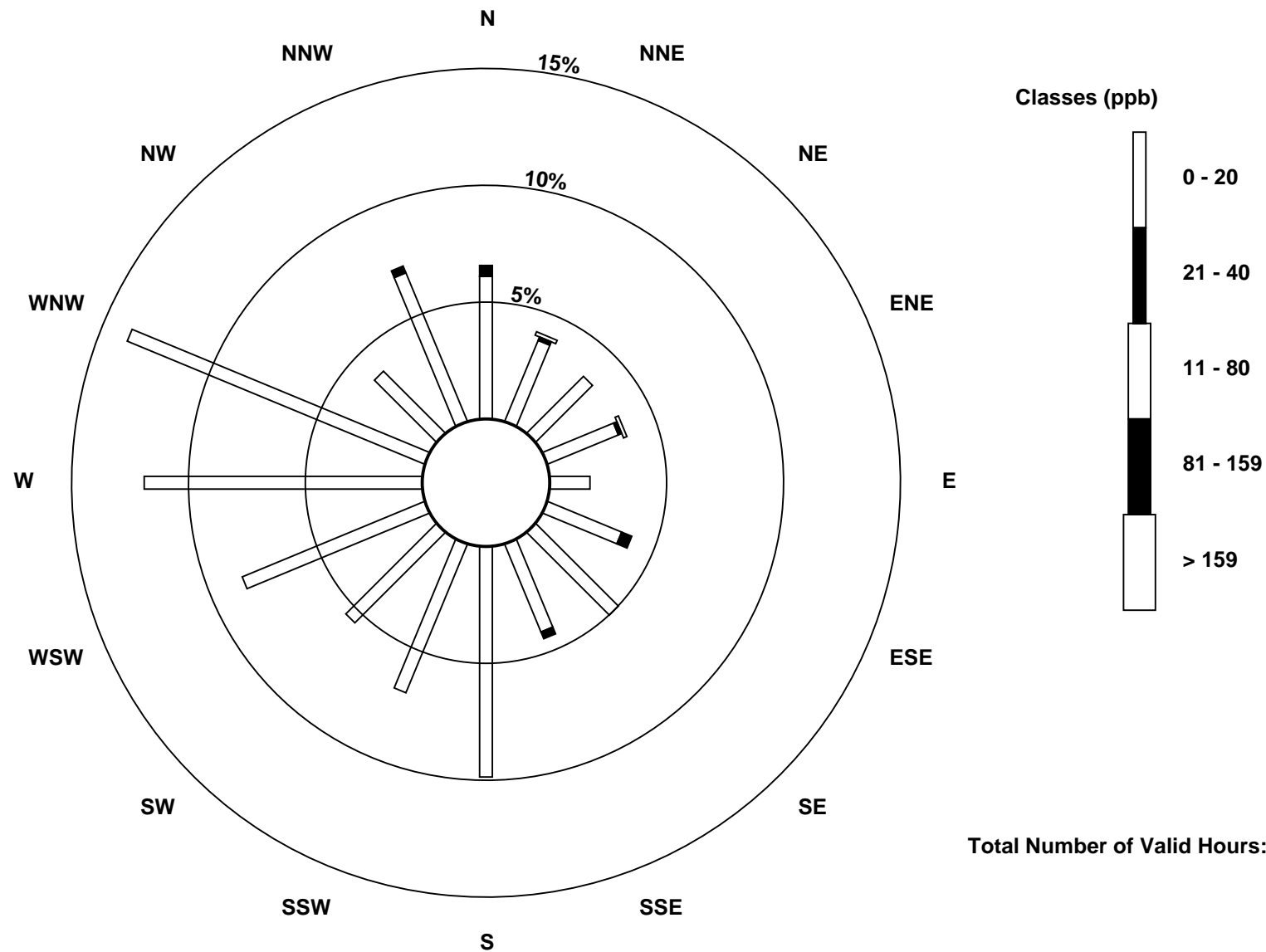
Total Number of Valid Hours: 639

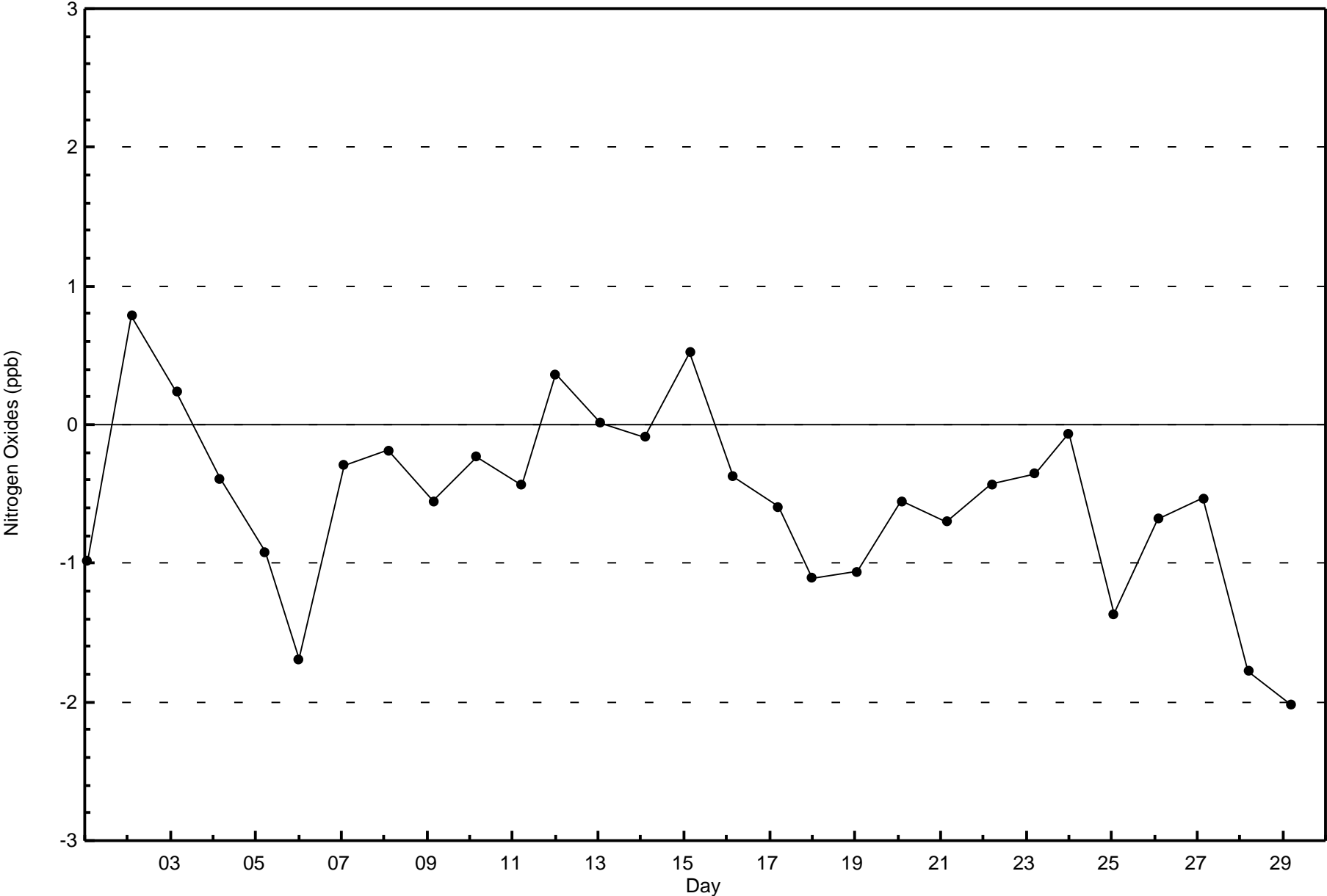
Total Number of Hours: 696

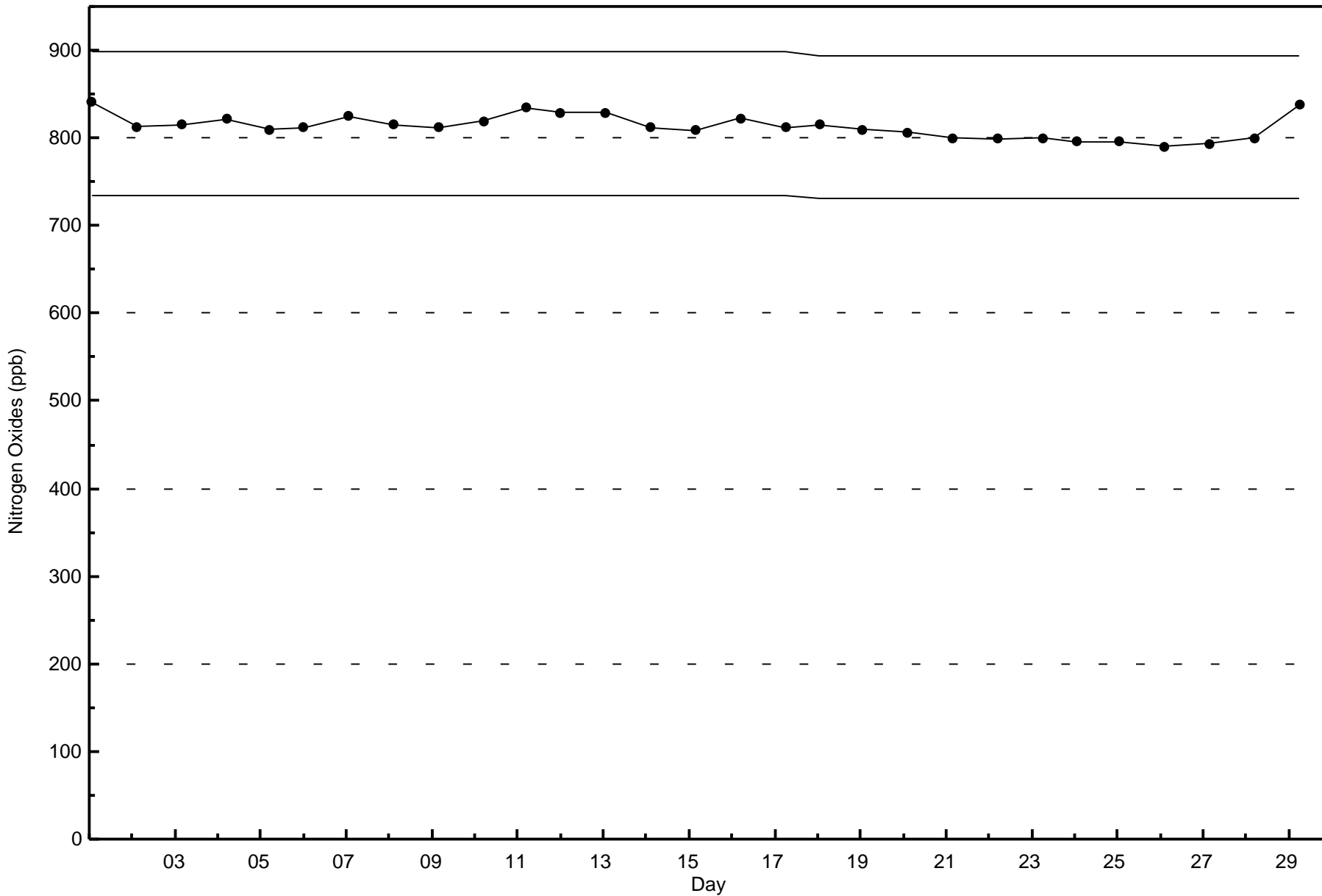


Wood Buffalo Environmental Association
Wind Rose Feb 2016

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

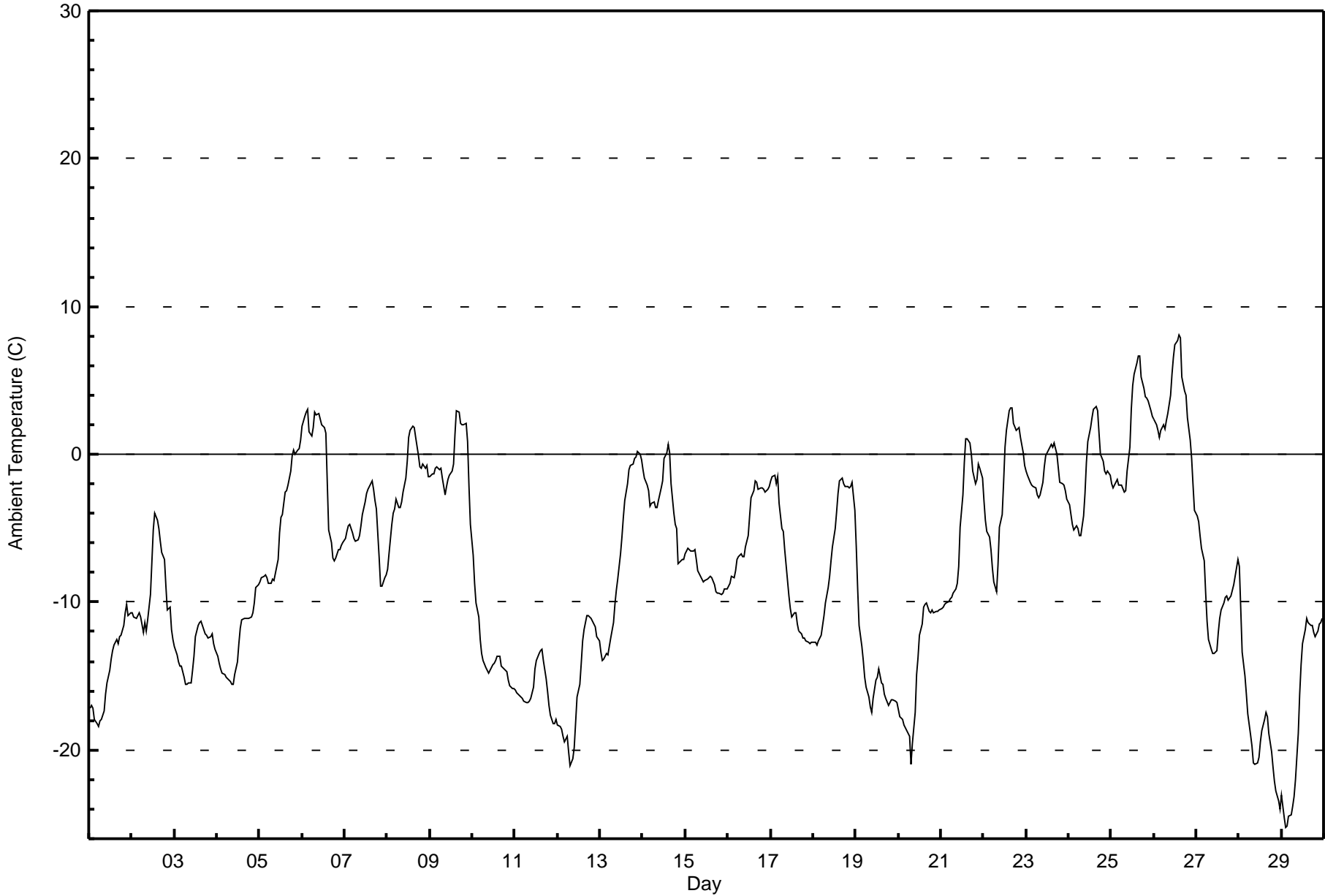
ConocoPhillips - Surmont - February 2016

Maximum Value: 8.0 C on Feb 26 15:00		Maximum Daily Average: 3.1 C on Feb 26		Hours in Service: 696																							
Minimum Value: -25.2 C on Feb 29 03:00		Minimum Daily Average: -18.6 C on Feb 28		Hours of Data: 696																							
Maximum Diurnal Average: -5.2 C at hour 16		Minimum Diurnal Average: -10.1 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -7.77 C		Percentiles: P ₁ = -23.7 P ₁₀ = -16.8 Q ₁ = -12.9 Median = -8.2 Q ₃ = -2.0 P ₉₀ = 1.2 P ₉₉ = 6.5		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	-17.2	-17.0	-17.2	-17.9	-18.2	-18.4	-18.0	-18.0	-17.4	-16.2	-15.5	-14.6	-13.9	-13.3	-12.9	-12.5	-12.8	-12.4	-12.2	-11.6	-10.7	-10.2	-10.9	-10.7	-14.6	-10.2	
2-Feb	-10.7	-11.0	-11.1	-10.9	-10.7	-11.0	-12.0	-11.4	-12.0	-11.2	-9.5	-7.3	-5.1	-4.0	-4.4	-5.0	-5.9	-6.7	-7.1	-8.9	-10.5	-10.3	-11.9	-12.6	-9.2	-4.0	
3-Feb	-13.0	-13.6	-14.1	-14.3	-14.4	-15.1	-15.6	-15.6	-15.4	-15.5	-14.6	-13.6	-12.3	-11.6	-11.4	-11.3	-11.8	-12.2	-12.3	-12.4	-12.4	-12.2	-12.8	-13.2	-13.4	-11.3	
4-Feb	-13.6	-14.1	-14.6	-14.8	-14.9	-15.1	-15.2	-15.4	-15.6	-15.6	-14.9	-14.1	-12.8	-11.8	-11.2	-11.1	-11.1	-11.1	-11.1	-11.0	-10.8	-10.1	-9.0	-8.8	-12.8	-8.8	
5-Feb	-8.7	-8.3	-8.3	-8.2	-8.3	-8.7	-8.7	-8.5	-8.5	-8.1	-7.1	-5.3	-4.2	-4.1	-2.6	-2.5	-2.1	-1.1	-0.1	0.3	0.0	0.3	0.4	1.0	-4.6	1.0	
6-Feb	1.9	2.5	2.9	3.0	1.5	1.2	1.8	2.9	2.6	2.7	2.3	2.0	1.8	1.4	-1.9	-5.1	-6.0	-7.0	-7.2	-7.0	-6.5	-6.4	-6.2	-6.0	-1.2	3.0	
7-Feb	-5.7	-5.2	-4.8	-4.7	-5.3	-5.7	-5.9	-5.7	-5.5	-4.8	-4.1	-3.3	-2.7	-2.4	-2.2	-1.8	-2.3	-3.1	-3.7	-7.0	-8.9	-8.9	-8.4	-8.1	-5.0	-1.8	
8-Feb	-7.8	-6.7	-4.8	-4.0	-3.7	-3.1	-3.6	-3.6	-3.3	-2.5	-1.6	-0.5	1.1	1.6	1.9	1.8	1.1	-0.1	-0.8	-1.0	-0.7	-1.0	-0.7	-1.5	-1.8	1.9	
9-Feb	-1.5	-1.3	-1.4	-0.9	-0.8	-1.0	-1.0	-1.6	-2.7	-2.1	-1.7	-1.4	-1.1	-0.7	1.3	3.0	2.8	2.1	2.0	2.0	2.1	0.8	-2.1	-4.7	-0.4	3.0	
10-Feb	-6.8	-8.7	-10.1	-11.0	-12.5	-13.5	-14.0	-14.4	-14.6	-14.8	-14.6	-14.3	-14.1	-13.9	-13.6	-13.7	-14.3	-14.4	-14.5	-14.7	-15.2	-15.7	-15.9	-15.9	-13.6	-6.8	
11-Feb	-16.0	-16.1	-16.3	-16.4	-16.5	-16.7	-16.8	-16.8	-16.7	-16.5	-15.8	-14.6	-14.0	-13.5	-13.3	-13.2	-14.0	-15.2	-16.1	-16.9	-17.6	-18.2	-18.2	-18.0	-16.0	-13.2	
12-Feb	-18.3	-18.4	-18.6	-19.1	-19.4	-19.0	-20.2	-21.1	-20.6	-19.8	-18.1	-16.4	-15.5	-14.2	-12.6	-11.9	-10.9	-10.9	-11.0	-11.1	-11.4	-11.7	-12.4	-12.6	-15.6	-10.9	
13-Feb	-13.4	-13.9	-13.8	-13.5	-13.6	-13.0	-12.4	-11.4	-10.1	-9.2	-8.4	-6.7	-5.6	-4.3	-3.1	-2.0	-1.1	-0.8	-0.7	-0.3	-0.2	0.2	0.0	-0.4	-6.6	0.2	
14-Feb	-1.0	-1.6	-2.1	-2.4	-3.5	-3.3	-3.2	-3.6	-3.6	-3.1	-2.3	-1.8	-0.2	0.1	0.7	0.1	-2.0	-3.9	-4.7	-5.0	-7.4	-7.2	-7.1	-7.1	-3.1	0.7	
15-Feb	-6.7	-6.4	-6.4	-6.5	-6.6	-6.5	-7.1	-7.8	-8.3	-8.5	-8.6	-8.5	-8.4	-8.4	-8.3	-8.4	-8.8	-9.3	-9.4	-9.4	-9.4	-9.4	-9.1	-9.1	-8.1	-6.4	
16-Feb	-8.9	-8.7	-8.2	-8.3	-7.9	-7.1	-7.0	-6.7	-6.9	-6.9	-6.2	-5.5	-4.2	-2.9	-2.5	-1.8	-1.9	-2.3	-2.3	-2.3	-2.4	-2.6	-2.3	-2.2	-4.9	-1.8	
17-Feb	-1.8	-1.5	-1.4	-1.9	-1.5	-3.3	-5.0	-5.2	-6.5	-8.6	-9.6	-10.4	-11.0	-10.7	-10.8	-11.4	-12.0	-12.1	-12.4	-12.5	-12.6	-12.7	-12.8	-12.7	-8.4	-1.4	
18-Feb	-12.7	-12.7	-12.9	-12.6	-12.2	-11.6	-10.9	-10.1	-9.1	-8.3	-7.2	-6.2	-5.1	-3.8	-2.6	-1.8	-1.6	-2.0	-2.2	-2.2	-2.3	-2.2	-1.9	-3.8	-6.6	-1.6	
19-Feb	-6.3	-9.1	-11.5	-13.0	-13.9	-15.1	-15.8	-16.4	-17.1	-17.5	-16.5	-15.2	-15.1	-14.6	-15.5	-15.6	-16.3	-16.5	-17.0	-16.8	-16.6	-16.6	-16.7	-16.8	-15.1	-6.3	
20-Feb	-17.3	-17.8	-18.0	-18.3	-18.5	-18.8	-19.1	-20.9	-19.6	-17.5	-14.9	-13.8	-12.2	-11.5	-10.3	-10.1	-10.0	-10.6	-10.7	-10.6	-10.7	-10.6	-10.6	-10.5	-14.3	-10.0	
21-Feb	-10.4	-10.3	-10.2	-10.1	-9.9	-9.8	-9.7	-9.4	-9.1	-8.7	-7.6	-5.0	-2.7	-0.6	1.0	1.0	0.7	0.0	-1.1	-2.0	-1.7	-0.7	-0.9	-1.6	-4.9	1.0	
22-Feb	-3.2	-4.5	-5.2	-5.6	-6.5	-7.7	-8.7	-9.3	-7.5	-5.0	-4.0	-1.9	0.5	1.6	2.9	3.1	3.1	2.1	1.6	1.7	1.8	1.2	0.1	-0.7	-2.1	3.1	
23-Feb	-1.2	-1.4	-1.9	-2.1	-2.1	-2.3	-2.8	-3.0	-2.8	-1.9	-0.8	-0.1	0.1	0.5	0.7	0.5	0.7	0.0	-1.0	-1.9	-2.0	-2.1	-2.5	-3.0	-1.3	0.7	
24-Feb	-3.4	-4.0	-4.7	-5.1	-4.8	-5.0	-5.5	-5.5	-4.2	-2.6	-0.6	0.9	1.9	2.4	3.0	3.3	2.9	1.4	0.0	-0.5	-1.2	-1.3	-1.1	-1.4	-1.5	3.3	
25-Feb	-2.0	-2.3	-2.1	-1.7	-2.1	-2.1	-2.1	-2.5	-2.5	-1.1	0.5	3.1	4.6	5.4	6.2	6.6	6.6	5.2	4.5	3.9	3.8	3.6	3.0	2.6	1.6	6.6	
26-Feb	2.4	2.0	1.7	1.2	1.6	2.0	1.8	2.3	2.8	4.0	5.4	6.5	7.4	7.7	8.0	7.8	5.2	4.3	4.0	2.5	1.0	-0.3	-2.1	-3.8	3.1	8.0	
27-Feb	-4.2	-4.6	-5.5	-6.4	-7.2	-9.4	-11.3	-12.5	-13.2	-13.5	-13.5	-13.3	-12.0	-11.1	-10.5	-10.0	-9.7	-9.6	-9.9	-9.5	-9.2	-8.8	-8.2	-7.1	-9.6	-4.2	
28-Feb	-7.6	-10.4	-13.4	-15.0	-16.3	-17.5	-19.0	-19.8	-20.8	-21.0	-20.9	-20.5	-19.5	-18.7	-18.0	-17.5	-17.7	-18.9	-20.1	-21.1	-22.1	-22.8	-23.5	-24.0	-18.6	-7.6	
29-Feb	-23.1	-24.5	-25.2	-25.2	-24.4	-24.4	-23.8	-23.1	-22.0	-18.9	-16.3	-14.3	-12.8	-11.8	-11.1	-11.4	-11.6	-11.6	-12.1	-12.3	-11.9	-11.4	-11.4	-11.1	-16.9	-11.1	
		-8.2	-8.6	-8.9	-9.2	-9.4	-9.7	-10.0	-10.1	-10.0	-9.4	-8.5	-7.4	-6.5	-5.8	-5.3	-5.2	-5.5	-6.1	-6.5	-6.8	-7.1	-7.1	-7.4	-7.7	Diurnal Average	
		2.4	2.5	2.9	3.0	1.6	2.0	1.8	2.9	2.8	4.0	5.4	6.5	7.4	7.7	8.0	7.8	6.6	5.2	4.5	3.9	3.8	3.6	3.0	2.6	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - February 2016





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
ConocoPhillips - Surmont - February 2016**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	23	3.30	3.30
-20 - 0	573	82.33	85.63
0 - 10	100	14.37	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

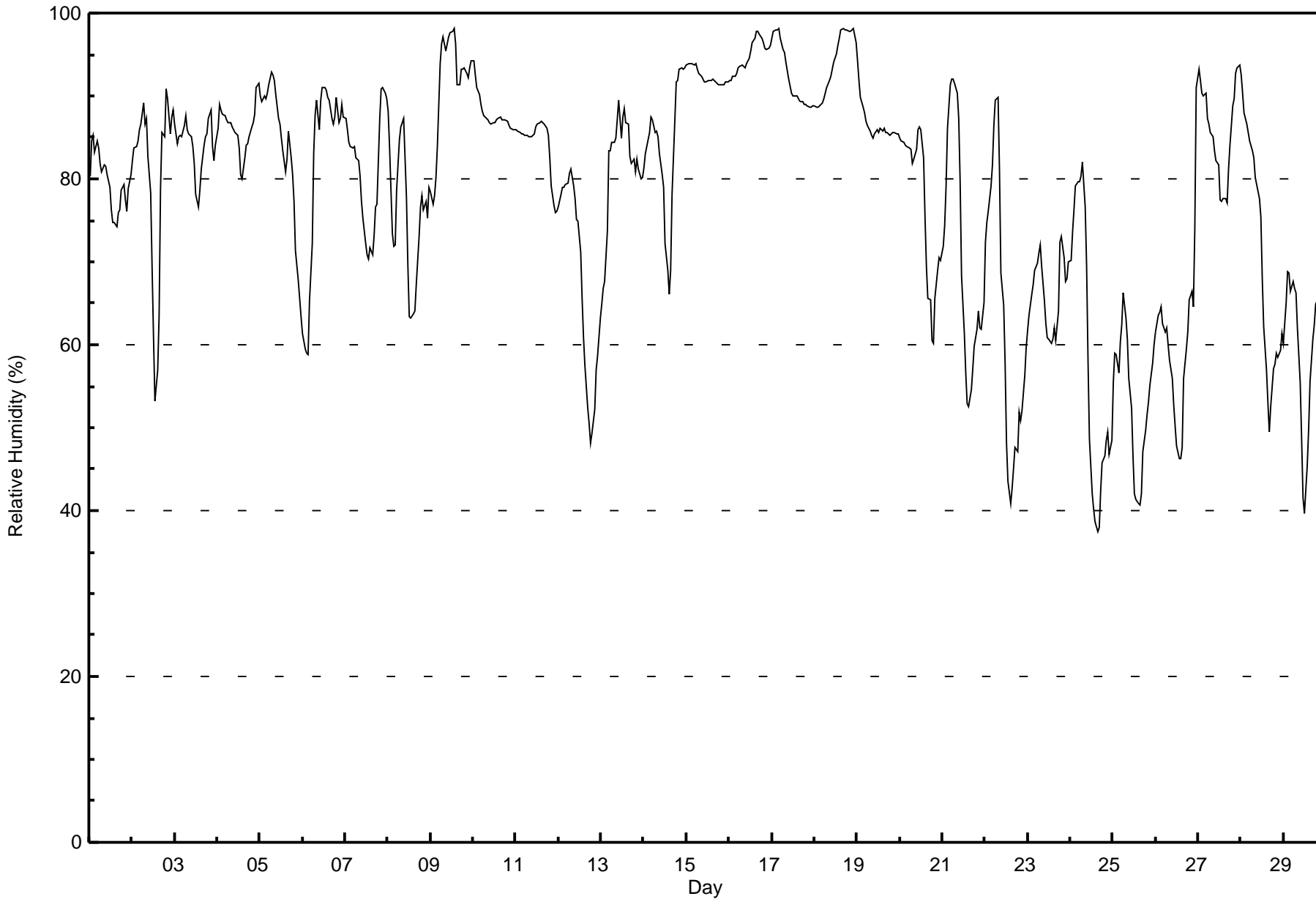
ConocoPhillips - Surmont - February 2016

Maximum Value: 98 % on Feb 18 23:00																			Maximum Daily Average: 94.8 % on Feb 16						Hours in Service: 696	
Minimum Value: 37 % on Feb 24 16:00																			Minimum Daily Average: 53.3 % on Feb 25						Hours of Data: 696	
Maximum Diurnal Average: 84.4 % at hour 7																			Minimum Diurnal Average: 71.8 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 78.5 %																			Percentiles: P ₁ = 41 P ₁₀ = 57 Q ₁ = 69 Median = 84 Q ₃ = 89 P ₉₀ = 93 P ₉₉ = 98						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	80	85	85	83	85	84	82	81	82	82	80	79	76	75	75	74	76	76	79	79	78	76	79	81	79.6	85
2-Feb	82	84	84	85	86	87	89	87	87	83	78	69	61	53	57	64	79	86	85	91	90	85	87	88	80.3	91
3-Feb	87	84	85	85	85	86	88	86	85	85	84	82	78	77	79	81	84	85	85	87	88	84	82	84	84.1	88
4-Feb	86	89	88	88	88	87	87	87	86	86	86	85	84	80	80	83	84	84	85	86	87	88	91	91	86.1	91
5-Feb	90	89	90	90	90	91	93	93	92	90	87	87	85	83	81	82	86	83	80	77	71	68	66	63	83.7	93
6-Feb	61	59	59	59	65	72	83	88	90	86	89	91	91	91	90	90	87	87	87	90	87	87	89	88	81.9	91
7-Feb	87	86	84	84	84	84	83	82	80	77	75	72	71	70	72	71	73	77	77	87	91	91	90	90	80.8	91
8-Feb	88	84	73	72	72	79	85	86	87	87	78	70	63	63	64	64	67	73	77	78	76	77	75	79	75.7	88
9-Feb	79	77	78	80	84	94	96	97	95	96	97	98	98	98	96	91	91	93	93	93	93	92	93	94	91.6	98
10-Feb	94	92	91	90	89	88	88	87	87	87	87	87	87	87	87	87	87	87	87	87	86	86	86	86	87.9	94
11-Feb	86	86	86	85	85	85	85	85	85	85	85	86	87	87	87	87	87	86	85	82	79	77	76	76	84.2	87
12-Feb	77	78	79	79	79	80	81	81	79	78	75	75	71	66	61	57	52	51	48	49	52	57	59	63	67.8	81
13-Feb	65	67	68	74	83	83	84	84	85	87	89	85	87	88	87	87	83	82	82	81	82	81	80	80	81.5	89
14-Feb	81	83	85	86	88	87	86	86	85	83	80	79	72	69	66	69	78	87	92	92	93	93	93	93	83.6	93
15-Feb	94	94	94	94	94	94	93	93	92	92	92	92	92	92	92	92	92	92	91	91	91	91	92	92	92.4	94
16-Feb	92	92	92	92	93	93	93	94	94	93	94	95	95	96	97	98	98	97	97	96	96	96	96	96	94.8	98
17-Feb	97	98	98	98	98	97	96	95	94	92	91	90	90	90	90	89	89	89	89	89	89	89	89	89	92.3	98
18-Feb	89	89	89	89	89	90	90	91	92	92	93	94	95	96	97	98	98	98	98	98	98	98	98	97	94.0	98
19-Feb	94	92	90	89	88	87	86	86	85	85	85	86	86	86	86	86	86	86	85	85	86	86	85	85	86.7	94
20-Feb	85	85	84	84	84	84	83	82	82	84	86	86	86	83	76	69	66	65	61	60	66	69	71	70	77.1	86
21-Feb	72	74	79	86	91	92	92	92	90	87	80	68	61	57	53	53	55	57	60	62	64	62	62	65	71.4	92
22-Feb	72	75	76	79	82	86	89	90	81	69	65	58	48	43	41	43	45	48	47	52	51	52	56	60	62.8	90
23-Feb	62	64	66	67	69	70	71	72	70	65	62	61	61	60	61	62	61	64	72	73	71	68	68	70	66.2	73
24-Feb	70	74	76	79	80	80	80	82	77	70	58	49	42	40	39	37	38	42	46	47	48	50	47	49	58.3	82
25-Feb	55	59	59	57	60	62	66	63	61	56	52	47	42	41	41	41	42	47	50	52	53	55	58	60	53.3	66
26-Feb	62	64	64	65	63	62	62	60	58	56	53	50	48	46	46	48	56	60	61	65	66	65	74	91	60.1	91
27-Feb	93	92	90	90	90	87	87	86	85	83	82	82	78	77	78	78	77	81	84	89	90	93	93	94	85.8	94
28-Feb	93	90	88	87	86	85	83	83	80	79	78	75	68	62	57	53	49	52	57	58	59	58	59	61	70.9	93
29-Feb	60	65	69	69	66	68	67	66	62	55	49	42	40	45	50	56	61	62	65	65	65	65	76	82	61.2	82
	80.4	81.0	81.0	81.5	82.6	83.6	84.4	84.2	83.1	81.1	79.0	76.5	73.9	72.6	71.8	72.0	73.3	75.1	76.1	77.3	77.4	77.2	78.3	79.9	Diurnal Average	
	97	98	98	98	98	97	96	97	95	96	97	98	98	98	97	98	98	98	98	98	98	98	98	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - February 2016





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - February 2016

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	4	0.57	0.57
40 - 60	87	12.50	13.07
60 - 80	192	27.59	40.66
80 - 100	413	59.34	100.00

Total Number of Valid Hours: 696

Total Number of Hours: 696

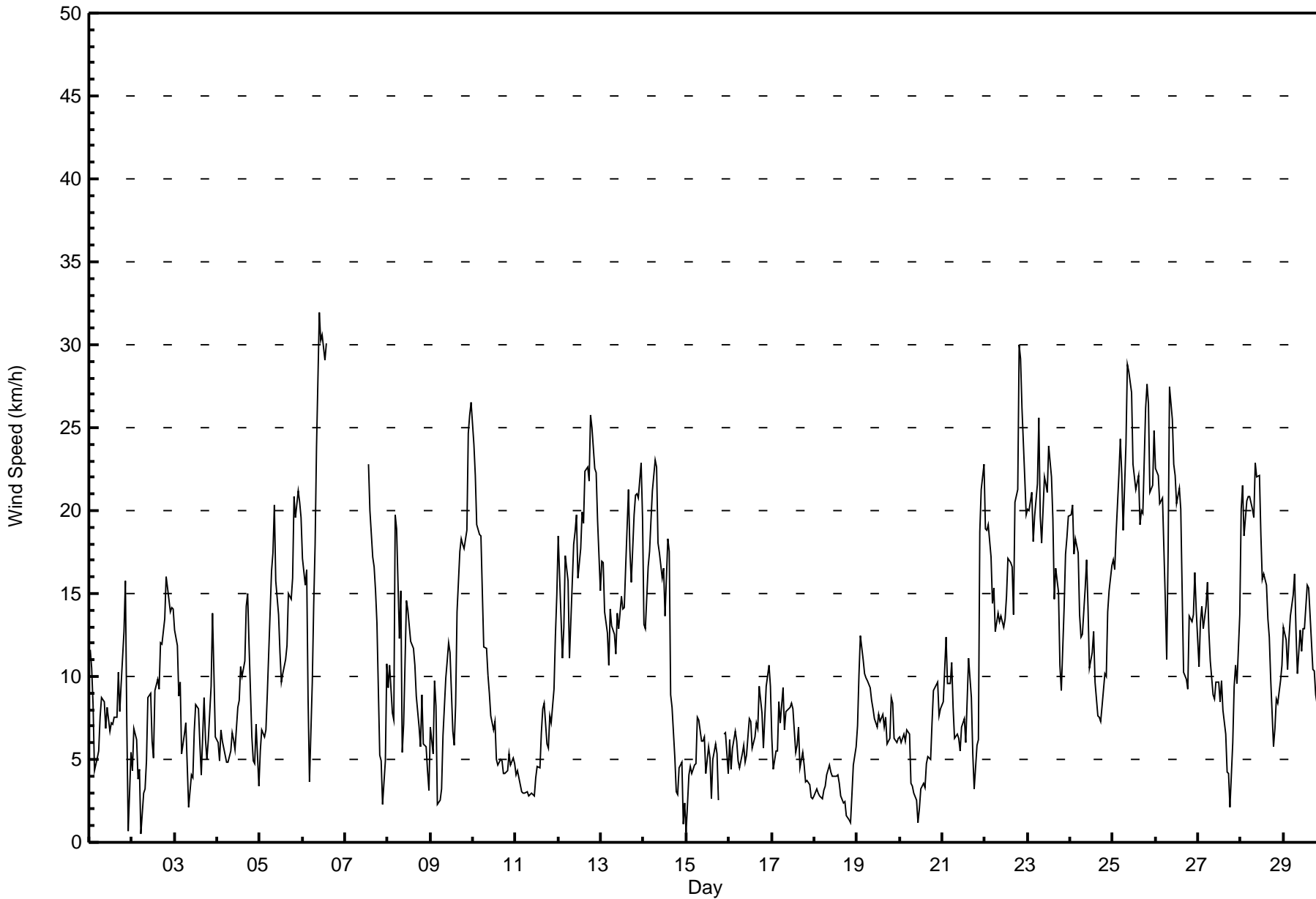


Maximum Speed: 32 km/h on Feb 6 10:00	Maximum Daily Speed Average: 21.6 km/h on Feb 25	Hours in Service: 696
Minimum Speed Value: 1 km/h on Feb 2 06:00	Minimum Daily Speed Average: 1.9 km/h on Feb 18	Hours of Data: 671
Maximum Diurnal Speed Average: 6.2 km/h at hour 11	Minimum Diurnal Speed Average: 3.1 km/h at hour 17	Hours of Missing Data: 25
Monthly Average Velocity: 4.9 km/h 268.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 10 Q ₃ = 16 P ₉₀ = 21 P ₉₉ = 29	Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	N12	NW10	NW8	NNW4	NW5	W5	SW8	SW9	WSW8	SSW7	SSW8	SSW7	S7	S7	SSE8	SSE8	SSE10	S8	SSW10	SW13	WSW16	W7	NNW1	WSW5	SW4.5	WSW16
2-Feb	NW4	WNW7	SW6	W4	WSW4	ESE1	W3	S3	SW5	SW9	SSW9	SSW6	SSW5	WSW9	WSW10	WSW9	WNW12	WNW12	NW14	N16	N15	NNW14	N14	NNW14	WNW5.1	N16
3-Feb	N13	N12	N9	N10	NW5	N7	NNW7	W5	ESE2	ENE4	SE4	SSE7	SE8	SE8	SE6	ENE4	N9	WNW6	NNW5	N6	NNW9	NW14	N10	NNW6	N3.9	NW14
4-Feb	NNE6	NE5	NNE7	NNE6	NNE5	ENE5	ENE5	E6	ESE7	SE6	S6	S8	S9	S11	S10	SSE11	S14	S15	S12	S6	S5	WSW5	WNW7	WNW3	SSE3.7	S15
5-Feb	WSW6	WSW7	SW6	SW7	SSW9	S11	S16	S17	S20	S16	SSW14	SSW11	S10	S10	S11	SSE12	S15	SSW15	SW16	WSW21	WSW20	WSW21	WSW21	WSW20	SSW12.2	WSW21
6-Feb	WSW17	WSW15	WSW16	SW9	WNW4	W10	W14	W18	W24	W32	W30	W31	W29	WNW30	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	W32
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WNW23	WNW20	WNW17	WNW17	WNW15	WNW13	N5	NW5	ESE2	SSE5	SSW11	----	WNW23
8-Feb	SSW9	SW11	SSW8	W7	W20	W19	WSW12	WSW15	W5	W7	WSW15	W14	WNW13	WNW12	WNW12	WNW11	W9	WSW7	WSW6	WSW9	SW6	SW6	SW4	SSW3	WSW9.1	W20
9-Feb	SW7	WSW5	SW10	SW8	WNW2	N3	NE3	SE6	SE10	SSE11	S12	S11	SSE7	S6	WSW8	WNW14	WNW18	WNW18	WNW18	NW18	NW19	NNW25	NNW26	NNW27	WNW5.6	NNW27
10-Feb	NNW24	NNW22	NNW19	NNW19	NNW18	NNW15	N12	N12	NNW10	N9	N8	N7	NNE7	NNE5	NE5	NE5	ENE5	E4	E4	E4	ESE5	ESE5	ESE5	ESE5	N7.6	NNW24
11-Feb	ESE4	ESE4	ESE3	ESE3	ESE3	E3	E3	E3	ENE3	ENE3	ENE3	NE4	NNE5	NE5	NE7	NE8	ENE8	ENE6	E6	ESE8	ESE7	SE9	SE12	SE15	E4.5	SE15
12-Feb	SE18	SSE14	SSE11	S13	S17	S16	SSE11	S13	S18	S19	S20	SSE16	SSE18	SE20	SSE19	SE22	SE23	SE22	SE26	SE25	SE23	SSE22	SSE19	SSE15	SSE17.7	SE26
13-Feb	SE17	SE17	SSE14	S13	SSE11	S14	S13	S13	SSW11	SW14	SW13	WSW15	W14	W14	W17	W21	W18	WSW16	WSW20	W21	W21	W21	W23	W20	WSW11.3	W23
14-Feb	W13	WNW13	W17	W18	W19	W21	W23	WNW23	WNW18	WNW17	WNW16	WNW17	NW14	WNW18	WNW18	NNW9	NNE8	NNE5	W3	S3	NE5	NNE5	W1	SW2	WNW11.0	W23
15-Feb	S1	E4	E5	E4	ENE5	ENE5	NE8	NE7	ENE6	NE6	NNE6	NNE4	N6	N5	N3	N5	NNE6	N5	N3	AF	AF	S7	S7	SSE4	NE3.1	NE8
16-Feb	S6	SE4	S6	S7	SSW6	SSW5	S5	SSE5	S6	SE5	S5	S7	S7	S6	S6	SSW7	S7	S9	S8	SSW6	SW8	WSW9	WSW11	WSW9	S5.9	WSW11
17-Feb	WSW6	W4	WNW6	NW6	WNW8	N7	NNW9	N7	N8	N8	N8	N8	N8	N5	N6	NNW7	N4	N5	N5	NNE4	NNE4	NNE3	ENE3	E3	NNW4.9	NNW9
18-Feb	E3	ESE3	ESE3	ESE3	ESE3	ESE3	SE3	SE4	SE5	SE4	SSE4	SSE4	SE4	SE4	SE4	SE3	ESE2	E2	E2	NE1	NNW1	WNW3	WNW5	WNW6	SE1.9	WNW6
19-Feb	NNW7	NNW10	NNW12	NNW11	NW10	NW10	NW10	NNW9	NW9	WNW8	NW7	NW7	NW8	NNW7	N8	NNW7	NNW8	N6	N6	NNW9	NNW8	N6	N6	N6	NNW7.8	NNW12
20-Feb	N6	N6	N7	NNW6	NNW7	NNW7	NNW4	WSW3	WSW3	SW3	SE1	ESE2	S3	SE4	SSE3	S5	SSW5	SSW5	SSW7	SSW9	SSW9	SW10	SW8	SW8	SW2.1	SW10
21-Feb	WSW8	WSW10	WSW12	WSW10	WSW10	WSW11	WSW8	SSW6	SSW7	SSW6	SSW6	SSW7	SSW7	SW6	W9	W11	W9	W5	S3	S6	SSW6	WSW19	W21	W23	WSW8.3	W23
22-Feb	WNW19	WNW19	WNW19	WNW17	WNW14	WNW15	WNW13	WNW14	WNW13	WNW14	WNW13	WNW14	W15	W17	WNW17	W17	W14	WSW21	W21	W30	WNW29	WNW26	WNW22	WNW20	WNW17.6	W30
23-Feb	WNW20	WNW20	WNW21	WNW18	WNW20	W22	W26	WNW20	WNW18	WNW22	WNW22	WNW21	WNW24	WNW22	NW20	NW15	NW17	NNW15	NW11	WNW9	WNW14	WNW17	WNW18	WNW20	WNW18.3	W26
24-Feb	WNW20	WNW20	WNW17	WNW18	WNW17	WNW14	WNW12	W13	W15	W17	W14	W11	WNW11	W13	W10	W8	WSW8	SW7	SW8	SSW10	SSW10	SSW14	SSW15	SSW17	W11.2	WNW20
25-Feb	SW17	SW16	SW19	SW22	WSW24	WSW22	SW19	WSW24	WSW29	WSW28	W27	W23	W22	W21	W22	W19	W20	W20	W26	W28	W26	W21	W22	WSW25	WSW21.6	WSW29
26-Feb	WSW23	WSW22	WSW20	WSW21	W21	W15	WNW11	WNW18	WNW27	WNW26	W23	WNW22	WNW20	WNW21	WNW20	NW15	NNE10	N10	N9	NNE14	NE13	NE14	NE16	NE14	WNW12.1	WNW27
27-Feb	NE11	ENE13	E14	ENE13	ENE14	ENE16	ENE13	ENE11	ENE9	NE9	NE10	NNE10	NNE8	NNE10	NNE8	NNE6	NNE4	NW4	W2	WSW6	W9	W11	WNW10	NW14	NE5.7	ENE16
28-Feb	NW20	NNW22	NNW19	NNW21	NNW21	NNW21	NNW20	NNW20	NNW23	NNW22	NNW22	N19	N16	N16	NNE16	NNE13	NE12	NE10	ENE6	ENE7	ESE9	ESE8	SE10	SE11	N12.0	NNW23
29-Feb	SSE13	SE12	S10	SSW12	S14	SSW15	SSW16	SSW13	SSW10	SSW13	SSW11	SSW13	S13	S15	S15	S14	S10	SSW10	SW9	SSW8	SW10	SW10	SW9	SW9	SSW11.2	SSW16

W4.8	WNW4.3	W4.8	W5.0	W5.8	W5.1	W4.8	W4.9	W5.4	W6.2	W6.2	W5.8	W4.9	W5.6	W4.8	W3.7	W3.1	WSW3.8	WSW4.3	WSW4.5	W4.9	W5.8	W5.1	W5.5	Diurnal Average
NNW24	NNW22	WNW21	SW22	WSW24	WSW22	W26	WSW24	WSW29	W32	W30	W31	W29	WNW30	W22	SE22	SE23	SE22	W26	W30	WNW29	WNW26	NNW26	NNW27	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - February 2016

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	140	20.86	20.86
6 - 11	248	36.96	57.82
12 - 19	178	26.53	84.35
20 - 28	97	14.46	98.81
29 - 38	8	1.19	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 696



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - February 2016

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	11	8	12	12	19	12	8	8	5	4	6	10	6	3	6	140
6 - 11	29	13	9	7	1	6	9	10	31	31	25	22	13	12	11	19	248
12 - 19	10	3	5	5	1	0	6	9	23	11	8	12	21	45	9	10	178
20 - 28	0	0	0	0	0	0	7	1	2	0	1	16	29	25	2	14	97
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	5	2	0	0	8
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	49	27	22	24	14	25	34	28	64	47	38	57	78	90	25	49	671

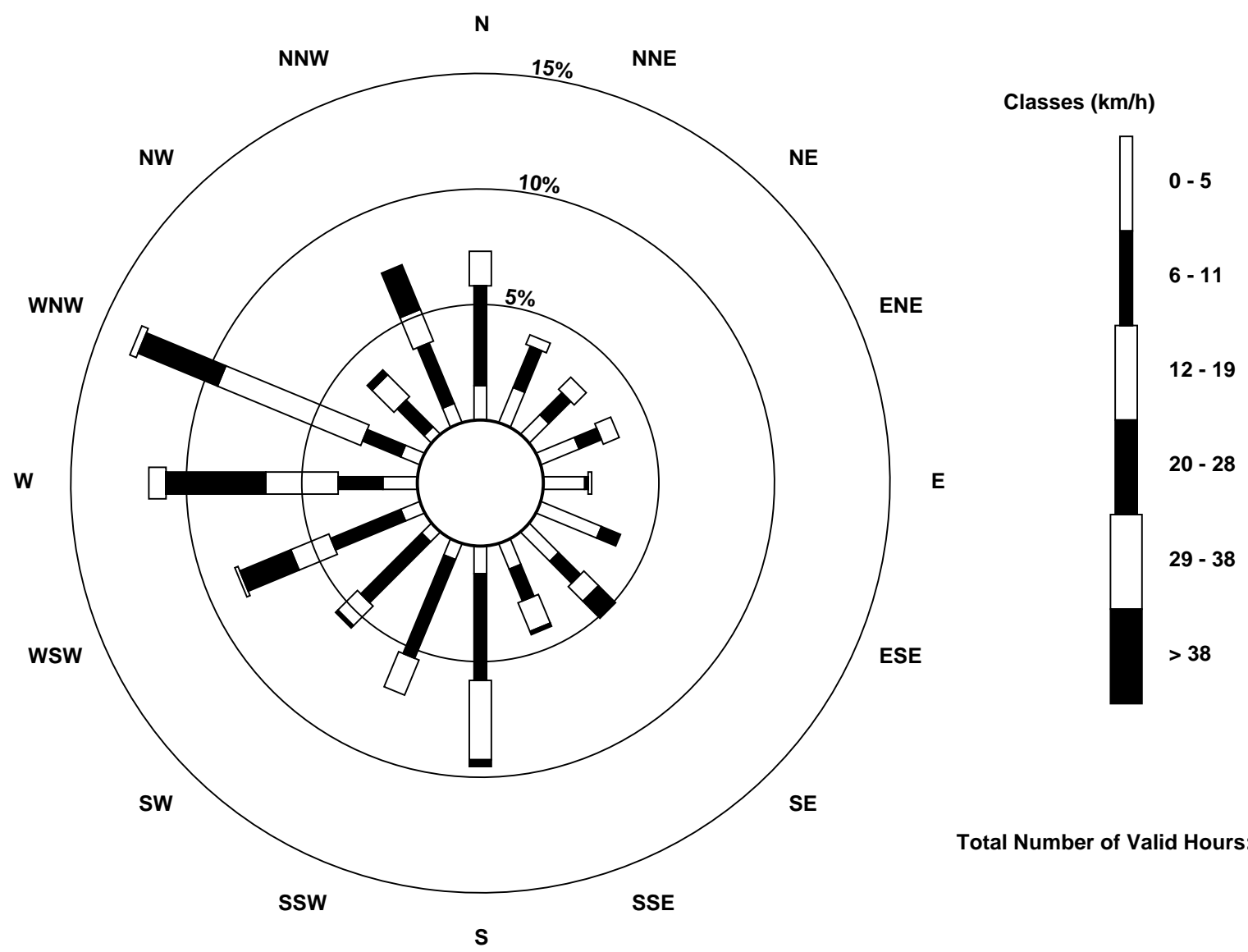
Total Number of Valid Hours: 671

Total Number of Hours: 696



Wood Buffalo Environmental Association
Wind Rose Feb 2016

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 25 05:00														Hours in Service: 696 Hours of Data: 671 Hours of Missing Data: 25 Hours of Calibration: 0 Percent Operational Time: 96.4										
Minimum Value: 0 km/h on Feb 18 22:00																								
Percentiles: P ₁ = 0 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	
1-Feb	2	2	3	1	1	1	1	2	1	2	2	2	2	2	2	3	3	2	2	3	4	2	2	4
2-Feb	1	1	1	2	1	1	1	1	2	1	2	2	1	2	3	3	2	3	3	3	2	3	3	2
3-Feb	2	2	2	2	2	2	2	2	1	1	2	2	2	2	1	1	2	1	2	1	3	3	2	2
4-Feb	2	1	1	1	2	1	1	1	1	1	2	2	2	2	3	3	4	3	2	2	1	1	2	1
5-Feb	1	1	1	2	3	3	3	4	4	3	4	3	3	4	3	3	3	3	3	4	4	3	3	3
6-Feb	3	3	3	3	4	5	4	3	5	6	6	6	5	6	AF	AF	AF	AF	AF	AF	AF	AF	AF	6
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	4	4	4	2	4	1	2	1	2	4
8-Feb	2	1	2	3	5	4	2	3	2	2	3	3	2	2	2	2	1	1	1	2	1	1	1	2
9-Feb	2	2	2	2	2	1	1	2	2	3	4	3	2	2	2	3	3	3	3	3	4	6	6	5
10-Feb	4	5	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
11-Feb	1	1	1	1	0	0	0	0	1	1	1	1	1	1	2	2	2	1	1	1	1	1	3	3
12-Feb	3	3	3	4	4	4	2	3	4	4	5	4	4	4	4	4	4	4	5	5	4	5	4	4
13-Feb	3	4	4	4	2	3	4	3	3	3	3	4	3	3	3	4	3	3	4	3	3	4	4	3
14-Feb	3	2	2	2	2	3	3	3	3	3	3	4	3	3	4	1	2	2	1	1	2	1	1	4
15-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	AF	AF	2	2
16-Feb	2	2	2	2	2	1	1	2	2	2	1	1	1	1	1	2	2	2	2	2	1	2	3	2
17-Feb	2	1	1	1	2	1	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	0	0
18-Feb	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	1	1
19-Feb	1	2	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	2	1	2	1	1	1
20-Feb	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	2	1	1	2	2	2	2	3	2
21-Feb	2	2	2	2	3	2	2	1	1	2	2	2	2	2	3	2	1	2	1	2	3	3	3	3
22-Feb	3	2	3	4	2	2	1	2	2	2	3	3	3	4	4	4	3	4	4	5	5	5	4	3
23-Feb	3	3	3	4	4	4	4	5	4	4	4	4	4	5	4	4	4	3	2	2	3	2	3	3
24-Feb	3	3	2	2	3	2	2	2	3	3	3	3	3	3	4	3	2	1	1	2	2	3	4	4
25-Feb	4	4	5	5	7	5	4	6	5	6	5	4	4	5	6	4	4	3	4	4	4	4	3	3
26-Feb	3	3	3	3	4	4	3	6	5	6	5	4	4	4	4	4	2	2	2	3	2	3	3	2
27-Feb	2	3	4	3	4	3	3	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	4
28-Feb	4	5	3	4	3	4	4	4	5	4	4	4	3	4	4	3	3	3	1	1	1	1	1	3
29-Feb	3	2	4	3	3	3	3	2	2	3	4	3	3	4	3	4	3	3	3	3	3	3	2	2
														Diurnal Maximum										
AF - Analyzer Failure																								



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - February 2016

Direction of Maximum Speed: 274 deg on Feb 6 10:00	Hours in Service: 696
Direction of Maximum Daily Speed Average: 253.2 deg on Feb 25	Hours of Data: 671
Direction of Minimum Speed: 109 deg on Feb 2 06:00	Hours of Missing Data: 25
Direction of Minimum Daily Speed Average: 1.9 deg on Feb 18	Percent Operational Time: 96.4
Monthly Average Direction: 274.0 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	354	319	325	336	304	270	227	226	237	211	193	194	189	171	157	155	154	182	203	221	242	278	330	257	227.0
2-Feb	323	284	220	277	253	109	273	181	224	228	207	201	199	242	258	256	282	292	324	353	350	341	353	347	293.8
3-Feb	349	356	3	358	322	350	343	268	103	71	138	155	141	130	125	78	11	287	344	355	331	309	358	348	356.3
4-Feb	29	50	14	33	24	59	70	101	119	140	172	182	186	185	181	159	185	188	183	169	169	245	283	284	164.5
5-Feb	255	252	234	218	213	189	187	185	182	186	195	206	177	185	178	151	190	200	220	238	238	241	243	242	209.0
6-Feb	242	240	246	233	290	271	274	275	268	274	275	272	275	286	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	298	293	284	285	287	303	5	310	113	163	209	--
8-Feb	207	214	209	261	262	266	247	249	263	278	252	264	284	286	296	285	279	251	256	246	232	232	224	201	256.7
9-Feb	226	237	233	219	296	351	36	126	138	147	173	189	162	179	239	285	295	296	301	304	325	338	341	341	292.9
10-Feb	344	345	345	345	345	343	351	355	348	349	353	11	22	26	43	52	77	81	79	97	102	103	112	109	3.2
11-Feb	104	120	116	117	110	89	91	98	71	67	76	38	32	51	40	48	58	60	88	104	122	125	141	146	95.4
12-Feb	144	149	155	180	188	170	163	176	185	181	179	161	151	145	149	146	143	143	145	145	146	166	154	160	157.8
13-Feb	145	143	158	173	158	175	177	183	204	222	232	248	265	275	276	268	259	249	253	263	262	272	274	281	236.5
14-Feb	280	282	274	273	263	276	281	286	298	296	298	295	305	291	288	342	26	28	263	190	38	31	274	222	290.1
15-Feb	180	79	98	98	73	72	39	37	59	38	29	20	3	2	5	7	13	10	3	AF	AF	184	178	154	47.0
16-Feb	182	145	172	170	198	192	186	166	177	146	172	178	176	170	173	197	176	181	184	203	221	239	244	249	191.2
17-Feb	255	271	302	305	292	357	348	353	350	349	349	349	354	6	358	348	360	354	11	25	21	24	62	95	345.8
18-Feb	93	116	110	119	115	121	128	134	138	141	148	147	146	146	143	133	115	101	84	52	332	289	300	303	129.7
19-Feb	328	344	343	345	307	312	321	330	316	302	309	318	315	337	351	338	343	351	355	347	347	356	5	1	333.9
20-Feb	358	359	356	342	347	343	331	240	243	232	130	121	170	144	157	174	206	199	196	193	205	224	229	224	230.6
21-Feb	247	248	253	250	248	248	241	206	195	204	204	196	207	216	264	275	280	266	189	187	205	253	262	279	245.0
22-Feb	284	286	293	299	301	296	290	300	293	292	287	286	277	279	283	273	268	252	265	273	286	292	293	292	284.4
23-Feb	290	290	289	285	293	281	279	293	292	289	291	298	294	301	314	323	317	339	319	300	299	296	296	296	296.7
24-Feb	293	299	296	294	293	293	282	281	275	278	277	284	281	266	268	238	223	215	211	205	210	209	213	213	267.5
25-Feb	217	214	225	230	237	241	233	237	244	253	261	265	264	272	278	277	273	261	264	262	264	264	259	256	253.2
26-Feb	256	254	250	252	267	281	286	285	284	290	280	298	294	289	301	325	25	9	352	29	40	39	37	36	298.2
27-Feb	53	70	82	74	72	75	73	68	65	50	42	31	33	28	13	14	16	326	270	258	266	260	282	316	40.9
28-Feb	305	341	345	343	343	342	344	348	344	344	346	349	4	2	12	20	42	54	73	78	114	121	127	136	358.2
29-Feb	161	133	176	199	188	196	205	206	203	209	193	192	178	177	181	184	189	205	222	208	216	214	224	229	193.9

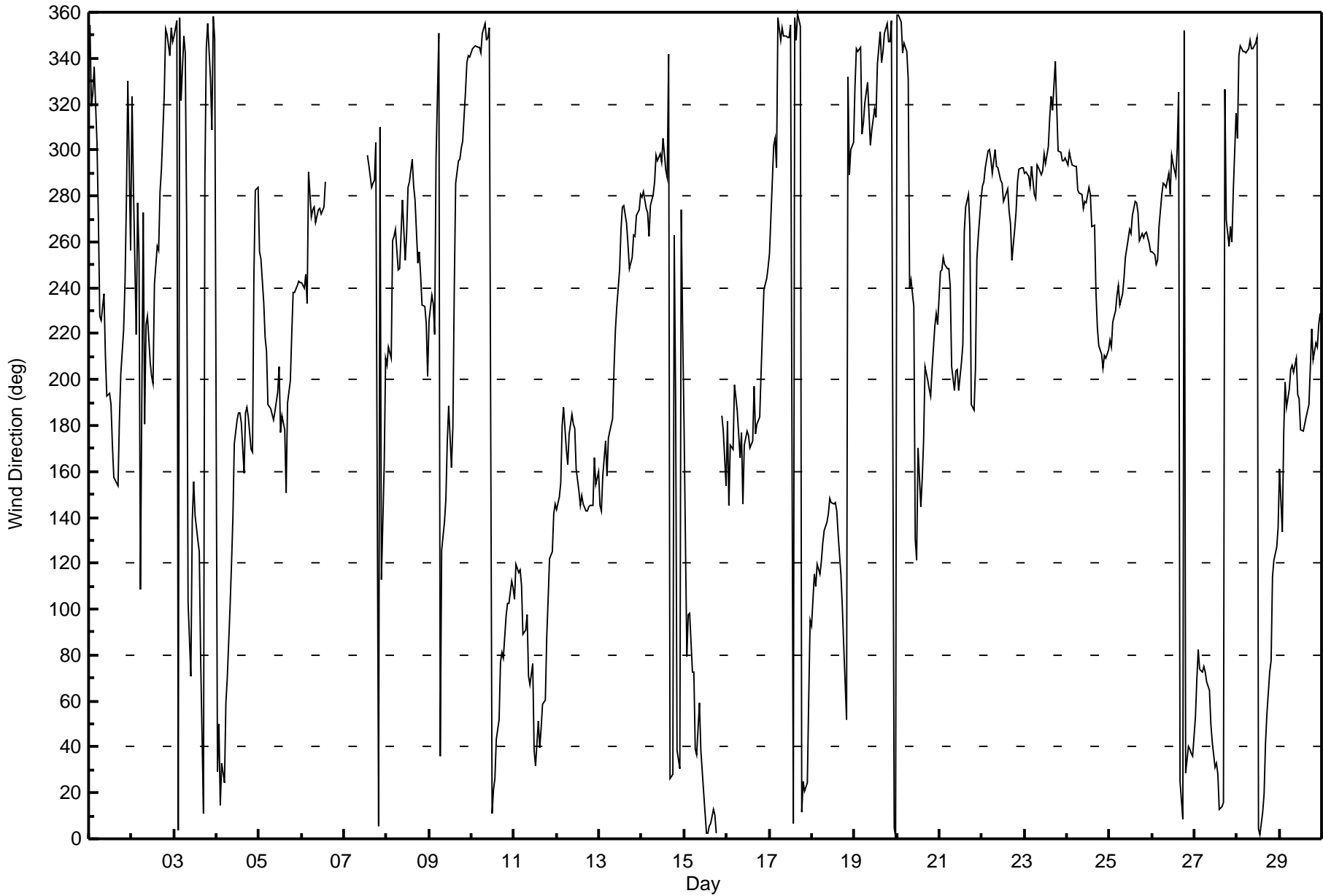
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 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
ConocoPhillips - Surmont - February 2016





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
ConocoPhillips - Surmont - February 2016

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 86 deg on Feb 2 06:00																	Hours in Service: 696 Hours of Data: 671 Hours of Missing Data: 25 Hours of Calibration: 0 Percent Operational Time: 96.4								
Minimum Value: 6 deg on Feb 14 03:00																									
Percentiles: P ₁ = 7 P ₁₀ = 9 Q ₁ = 11 Median = 15 Q ₃ = 20 P ₉₀ = 30 P ₉₉ = 70																									
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	27	32	48	38	19	9	19	9	18	17	19	18	26	27	28	25	17	16	13	11	40	83	24	83
2-Feb	50	19	14	52	33	86	43	49	37	10	14	17	29	18	19	18	11	10	25	15	13	17	15	12	86
3-Feb	14	15	16	15	52	37	22	36	55	17	37	29	15	14	17	43	16	28	44	25	30	18	17	35	55
4-Feb	22	18	14	21	33	22	16	13	15	16	26	20	19	17	21	20	17	14	14	29	34	30	13	70	70
5-Feb	15	14	12	16	18	14	14	14	12	14	14	12	22	18	16	20	14	12	16	11	10	9	8	9	22
6-Feb	9	10	12	38	84	33	10	10	10	10	9	9	10	10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	84
7-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	11	12	10	8	8	24	23	70	53	35	11	70
8-Feb	12	7	17	42	9	9	8	11	25	16	11	12	13	12	21	11	7	9	12	6	19	20	19	61	61
9-Feb	16	21	10	17	67	71	40	14	11	18	25	15	23	26	32	11	9	8	9	11	16	15	13	11	71
10-Feb	11	13	11	11	11	11	14	17	15	16	16	21	20	31	23	19	16	16	14	20	13	12	13	12	31
11-Feb	14	13	18	16	20	16	19	20	21	21	20	22	20	28	16	18	14	9	24	14	8	9	11	10	28
12-Feb	9	16	16	20	14	15	16	21	14	13	13	17	16	12	15	10	10	10	10	10	11	15	15	19	21
13-Feb	12	12	22	20	18	18	14	17	18	16	15	15	14	14	12	9	10	12	9	8	8	10	9	9	22
14-Feb	9	8	6	9	8	8	8	8	9	9	10	12	22	13	14	45	17	24	58	58	24	16	77	54	77
15-Feb	75	14	17	13	16	17	12	14	17	19	15	34	20	30	78	21	13	19	53	AF	AF	16	19	46	78
16-Feb	18	28	21	19	21	19	21	23	34	20	30	14	13	23	19	15	24	15	14	18	14	14	9	8	34
17-Feb	10	7	33	28	14	15	11	14	14	12	14	15	17	17	18	11	19	16	17	17	14	16	13	16	33
18-Feb	18	12	12	12	13	10	12	12	11	12	10	11	10	10	11	14	14	16	38	22	55	8	14	11	55
19-Feb	19	13	11	13	17	17	18	18	21	13	24	24	25	27	15	29	23	20	15	12	13	16	13	16	29
20-Feb	14	15	13	24	10	17	42	22	18	15	41	50	31	35	34	28	24	19	16	17	16	14	16	16	50
21-Feb	17	12	9	11	12	8	9	16	16	31	30	22	24	37	26	18	13	22	44	36	33	9	9	8	44
22-Feb	9	7	9	11	8	7	9	6	8	12	12	13	13	14	14	13	12	9	9	9	10	9	8	9	14
23-Feb	8	8	9	10	10	11	10	12	13	10	12	12	11	13	18	22	17	17	19	13	8	8	8	8	22
24-Feb	9	7	8	8	8	8	7	8	10	8	11	16	21	19	30	28	28	9	9	12	13	15	16	15	30
25-Feb	15	14	14	14	13	11	13	12	9	11	10	10	14	13	13	12	12	8	8	8	8	9	8	7	15
26-Feb	7	8	8	8	12	11	10	13	11	13	19	16	12	11	12	33	13	15	14	14	12	13	12	10	33
27-Feb	14	13	13	14	14	14	13	13	14	25	20	15	16	18	23	26	23	45	70	19	11	11	16	20	70
28-Feb	12	16	11	10	11	12	12	15	13	12	13	16	21	21	22	21	25	13	14	11	12	9	10	10	25
29-Feb	18	10	30	16	15	14	13	12	14	15	19	21	22	19	16	16	18	20	19	18	16	18	18	18	30
																	Diurnal Maximum								
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	February 17, 2016	Last Calibration	January 22, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	15:00
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	518	518
Analyzer IP address	192.168.1.43		Lamp voltage	2040	1993
Calculated slope	1.006898	0.998556	Chamber temp	50.0	50.0
Calculated intercept	-0.848253	0.177287	Pressure	21.6	21.7
Analyzer Background	21.1	21.1	Flow	0.531	0.541
Analyzer Coefficient	1.011	1.011	Intensity	50	49

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	0.1	----
as found span	5000	83.2	803.7	804.6	0.999
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	83.2	803.7	804.6	0.999
second point	5000	41.6	401.9	402.9	0.997
third point	5000	20.8	200.9	200.1	1.004
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	83.2	803.7	799.1	1.006
Average Correction Factor					1.000

Corrected As found 804.5 Previous response 799.1 % change -0.7%

Notes:

Inlet filter replaced after as founds. No adjustments. As left zero began at 14:19 MST.

Calibration Performed By: Asad Hidayat



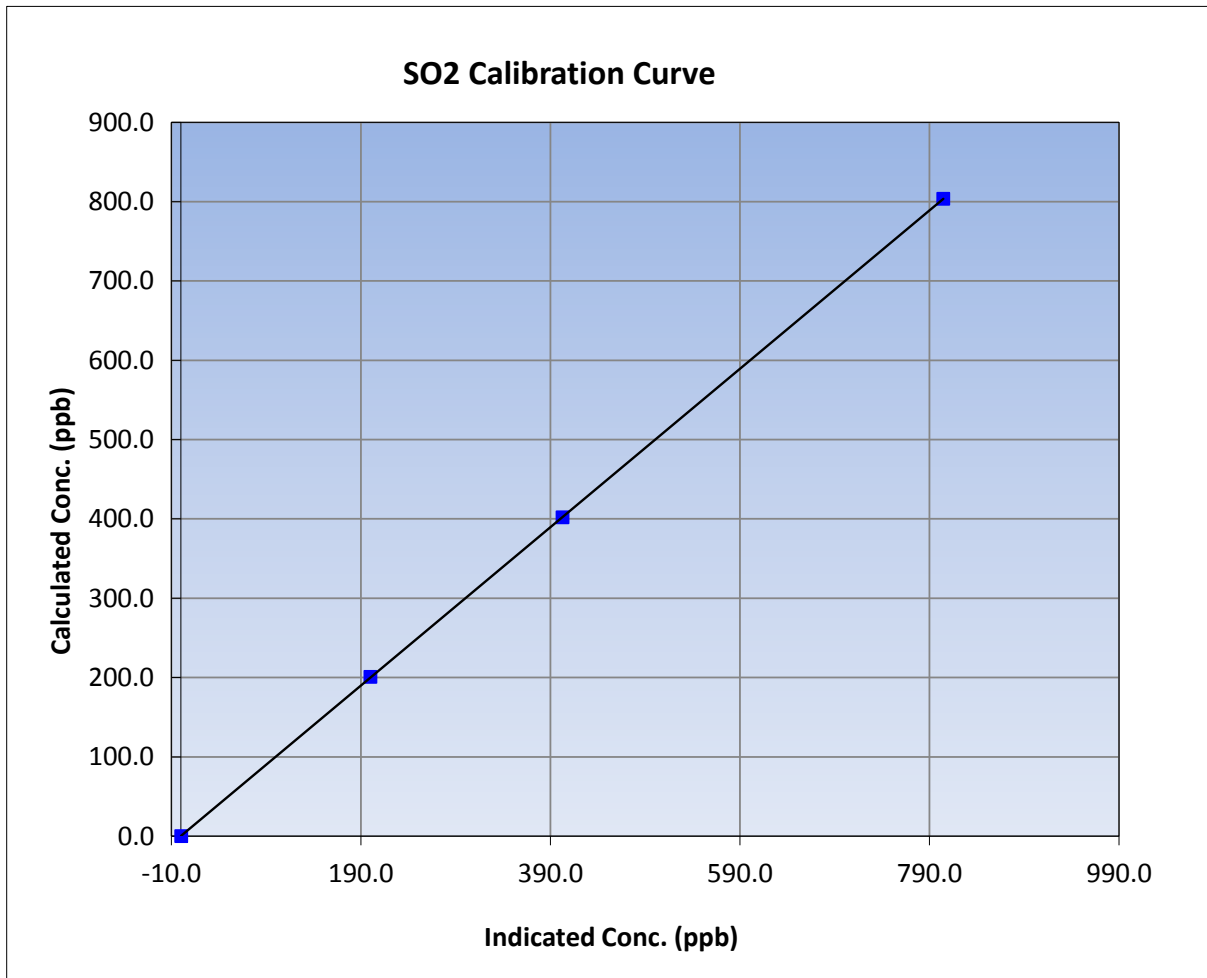
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
Analyzer make	API T100	Analyzer serial #	598

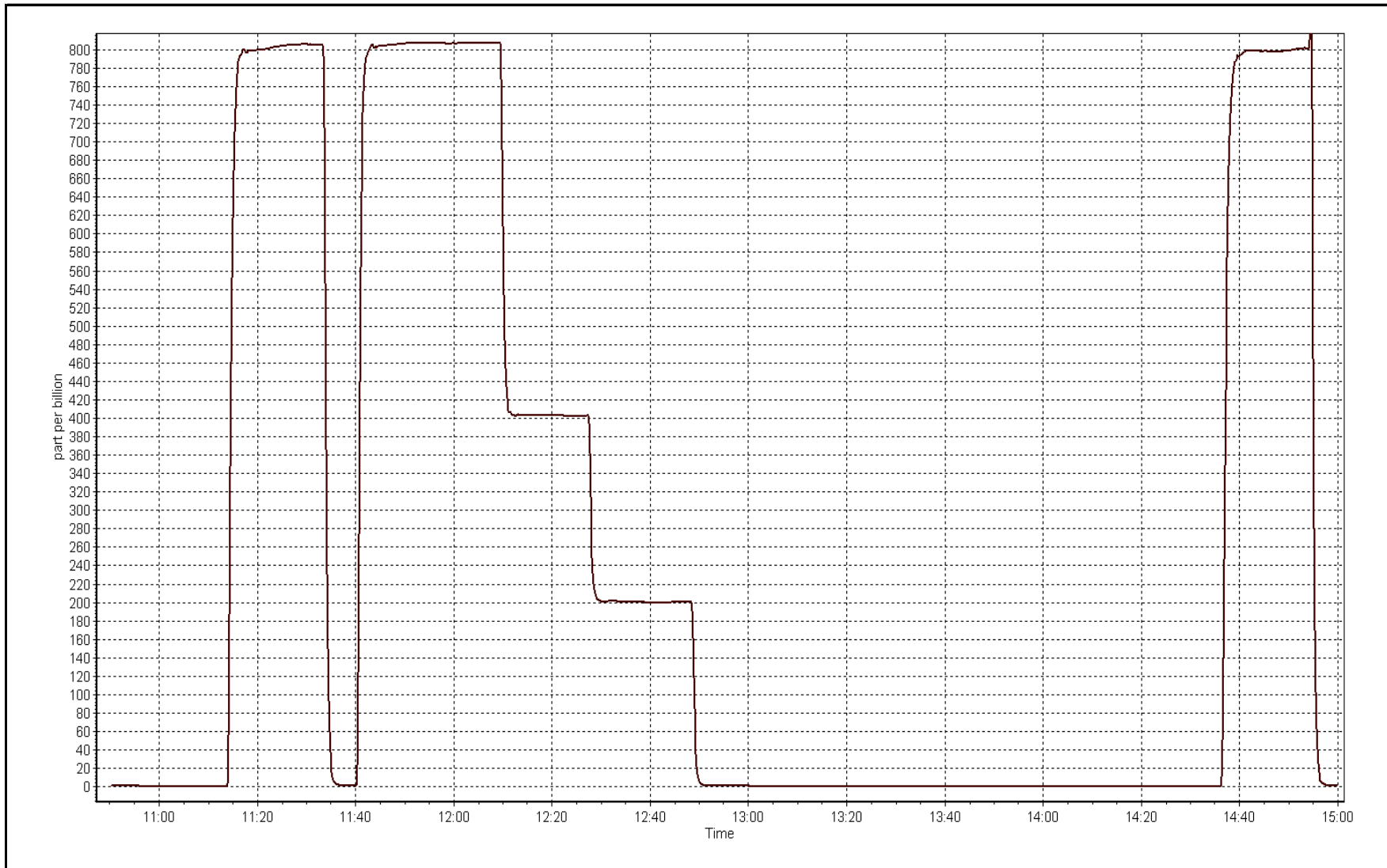
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
803.7	804.6	0.9989		
401.9	402.9	0.9974	Slope	0.998556
200.9	200.1	1.0043		
			Intercept	0.177287



SO2 Calibration Plot

Date: February 17, 2016





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 16, 2016	Last Calibration	January 21, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	13:18	End Time (MST)	15:55
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 12-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	497	496
Analyzer IP address	192.168.1.75		Lamp voltage	2598	2568
Calculated slope	0.989837	0.995422	Chamber temp	50	50
Calculated intercept	-0.169574	0.114634	Pressure	23.3	23.1
Analyzer Background	17.4	17.4	Flow	0.613	0.611
Analyzer Coefficient	1.016	0.999	Intensity	58	57
			Converter temp.	316	316

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	38.5	80.1	81.7	0.981
SO2 scrubber check	5000	20.7	200.0	3.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	80.4	0.996
second point	5000	19.3	40.1	40.1	1.000
third point	5000	12.1	25.2	25.1	1.002
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	38.5	80.1	80.2	0.999
Average Correction Factor					0.999

Corrected As found	81.6	Previous response	81.1	% change	-0.6%
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Notes:

Sample inlet filter replaced after as founds. Scrubber check done after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



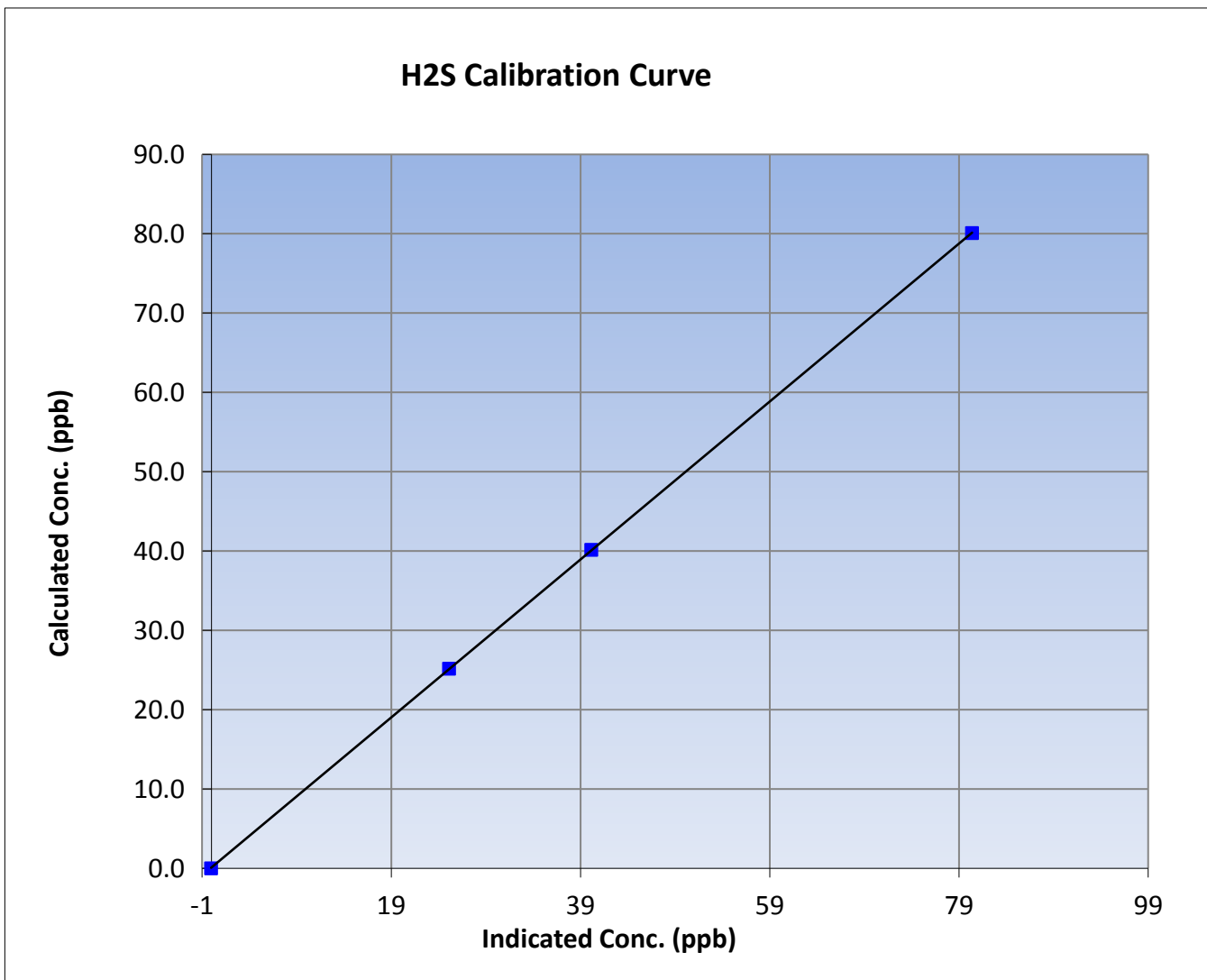
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	February 16, 2016	Previous Calibration	January 21, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:18	End Time (MST)	15:55
Analyzer make	API T101	Analyzer serial #	197

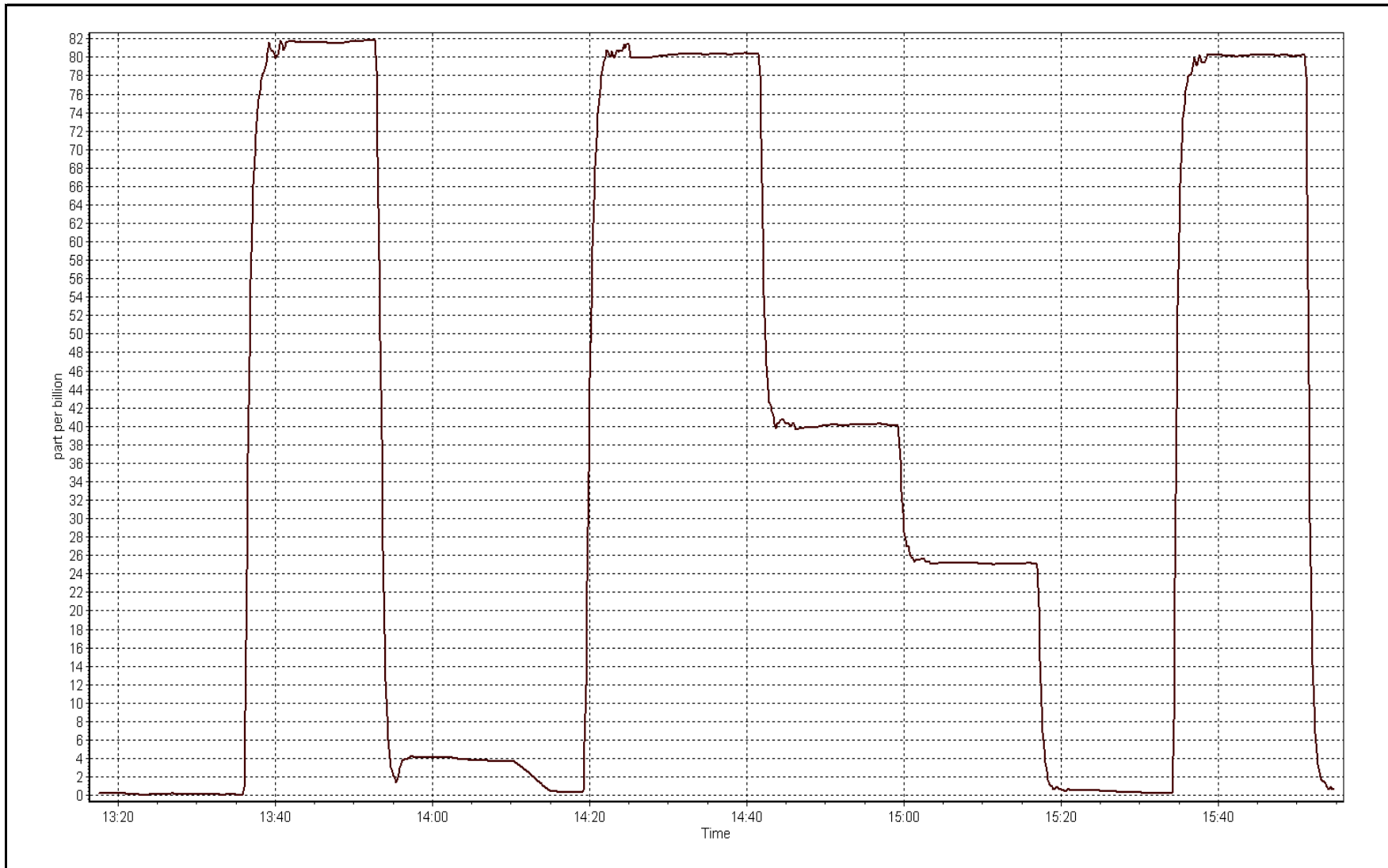
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999995
80.1	80.4	0.9961		
40.1	40.1	1.0003	Slope	0.995422
25.2	25.1	1.0019		
			Intercept	0.114634



H2S Calibration Plot

Date: February 16, 2016





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	15:00
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOX Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	12-Feb-18
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999582	0.999492	1.002663
	Data Offset	0.231709	0.046028	-0.082380
Current Calibration	Data Slope	0.998717	0.999442	0.988063
	Data Offset	1.797897	1.487522	-0.251878

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		0.955	
NOX coefficient	0.999		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.3		8.2	
NOX bkgrnd	9.3		9.1	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	322.1	Deg C	322.1	Deg C
PMT voltage	-866.5	V	-866.5	V
PMT Temp	-2.7	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.6	mmHg	160.9	mmHg
R Cell Press Nox	160.9	mmHg	160.6	mmHg
NO sample flow	0.654	lpm	0.662	lpm
Nox sample Flow	0.653	lpm	0.661	lpm

Notes:

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



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

February 17, 2016

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	-0.4	-0.1	----	----
as found span	5000	83.2	800.4	800.4	0.0	810.0	810.2	-0.2	0.9881	0.9879
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	5000	83.2	800.4	800.4	0.0	800.4	799.9	0.5	1.0000	1.0006
second point	5000	41.6	400.2	400.2	0.0	398.2	398.4	-0.2	1.0049	1.0044
third point	5000	20.8	200.1	200.1	0.0	196.9	197.3	-0.4	1.0162	1.0142
as left zero	5000	0.0	0.0	0.0	0.0	-0.6	0.2	-0.8	----	----
as left span	5000	83.2	800.4	489.3	311.1	804.8	489.4	315.5	0.9945	0.9998
Average Correction Factor									1.0071	1.0064

Corrected As found
Previous Response

NO_x= 810.5
NO_x= 800.5

NO= 810.6
NO= 800.7

Percent Change

NO_x= -1.2%

NO= -1.2%

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	799.9	798.0	0.0	1.0006	1.0031	----	----
1st NO2 (300)	489.3	308.7	800.2	489.3	312.9	1.0002	----	0.9865	101.4%
2nd NO2 (200)	583.9	214.0	800.0	583.9	216.1	1.0005	----	0.9907	100.9%
3rd NO2 (100)	685.0	113.0	800.5	685.0	115.5	0.9999	----	0.9784	102.2%
2nd NO ref point		0.0	799.8	797.5	2.2	1.0007	1.0036	----	----
Average Correction Factor						1.0003		0.9852	101.5%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

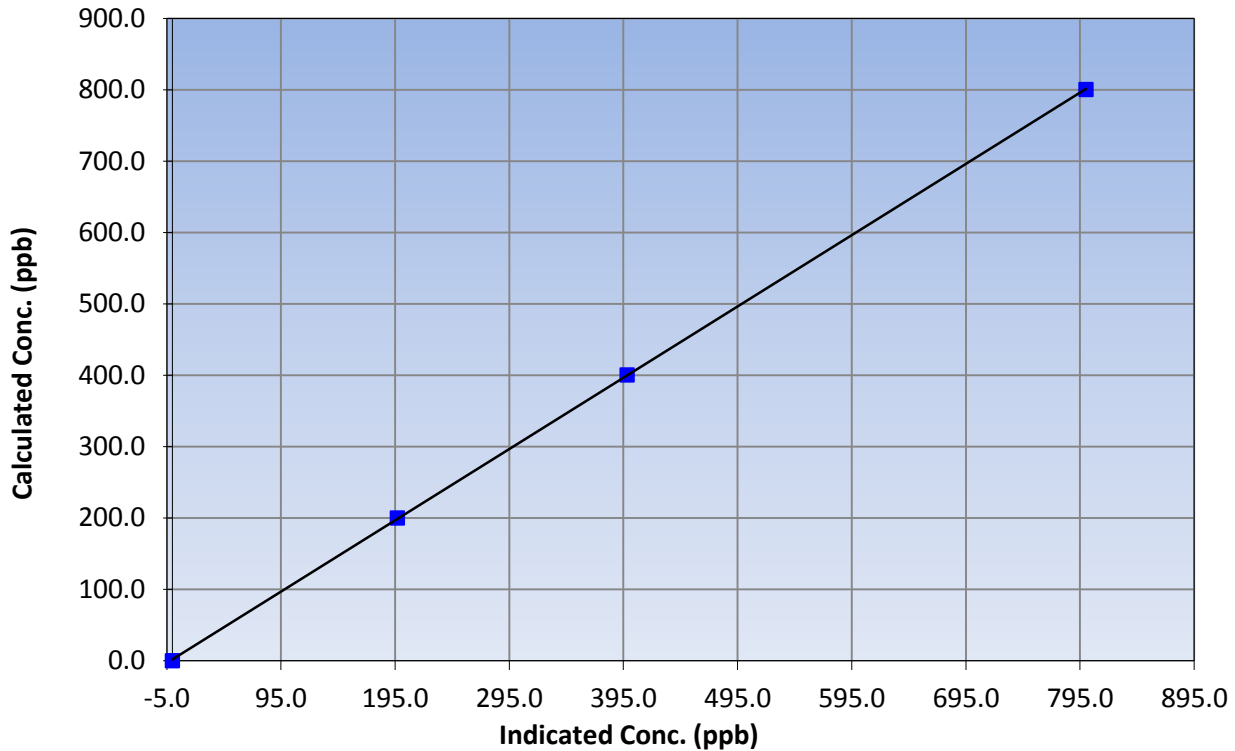
Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999982
800.4	800.4	1.0000		
400.2	398.2	1.0049	Slope	0.998717
200.1	196.9	1.0162		
			Intercept	1.797897

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

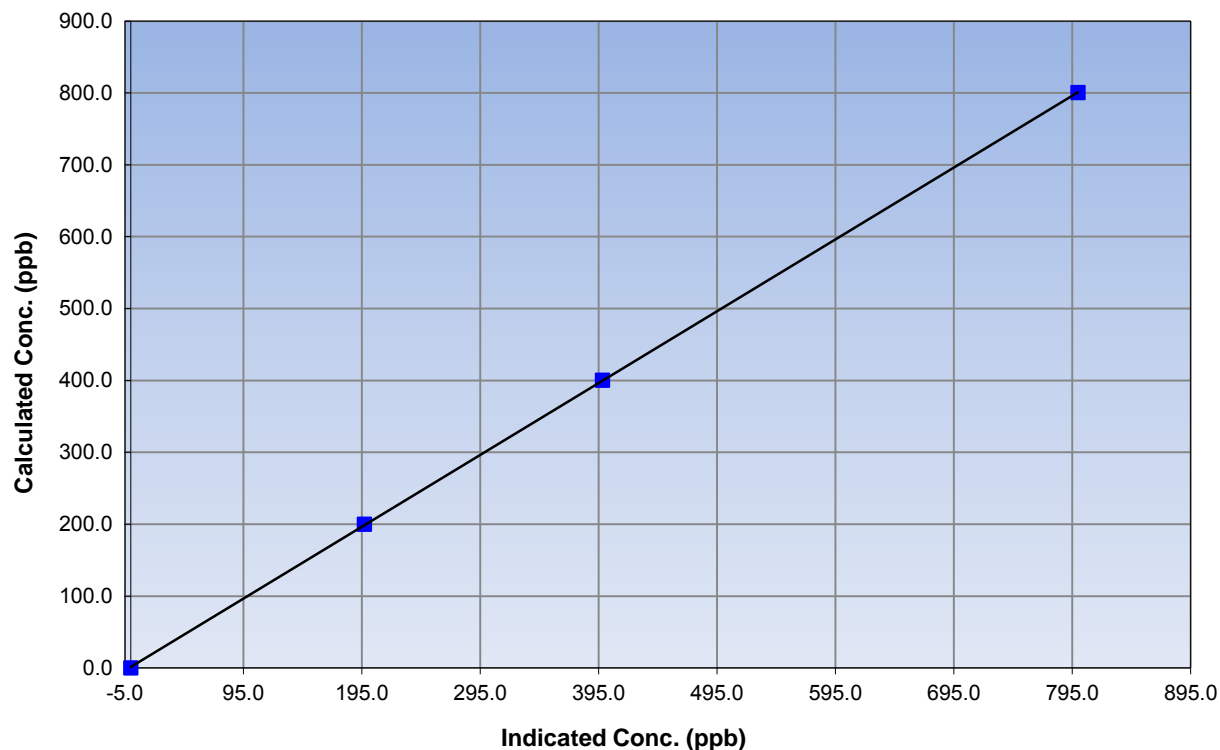
Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
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	0.999988
800.4	799.9	1.0006		
400.2	398.4	1.0044	Slope	0.999442
200.1	197.3	1.0142		
			Intercept	1.487522

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

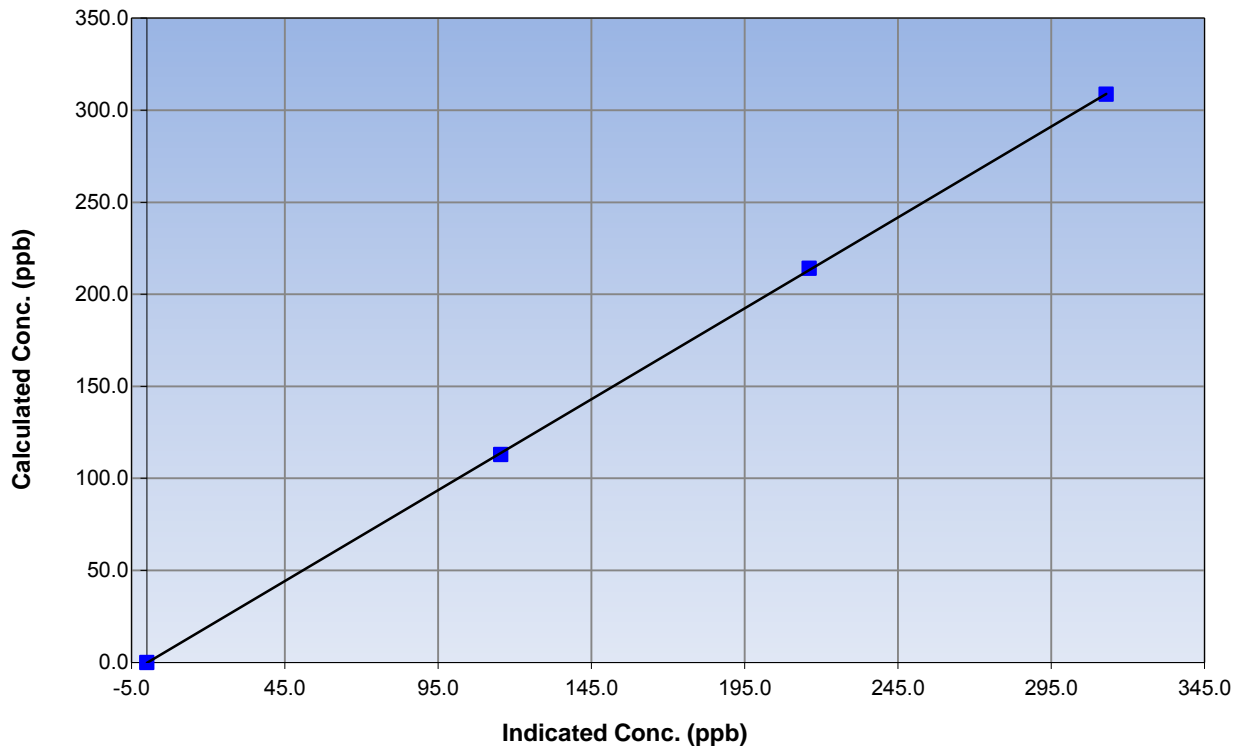
Station Information

Calibration Date	February 17, 2016	Previous Calibration	January 22, 2016
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:50	End Time (MST)	15:00
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

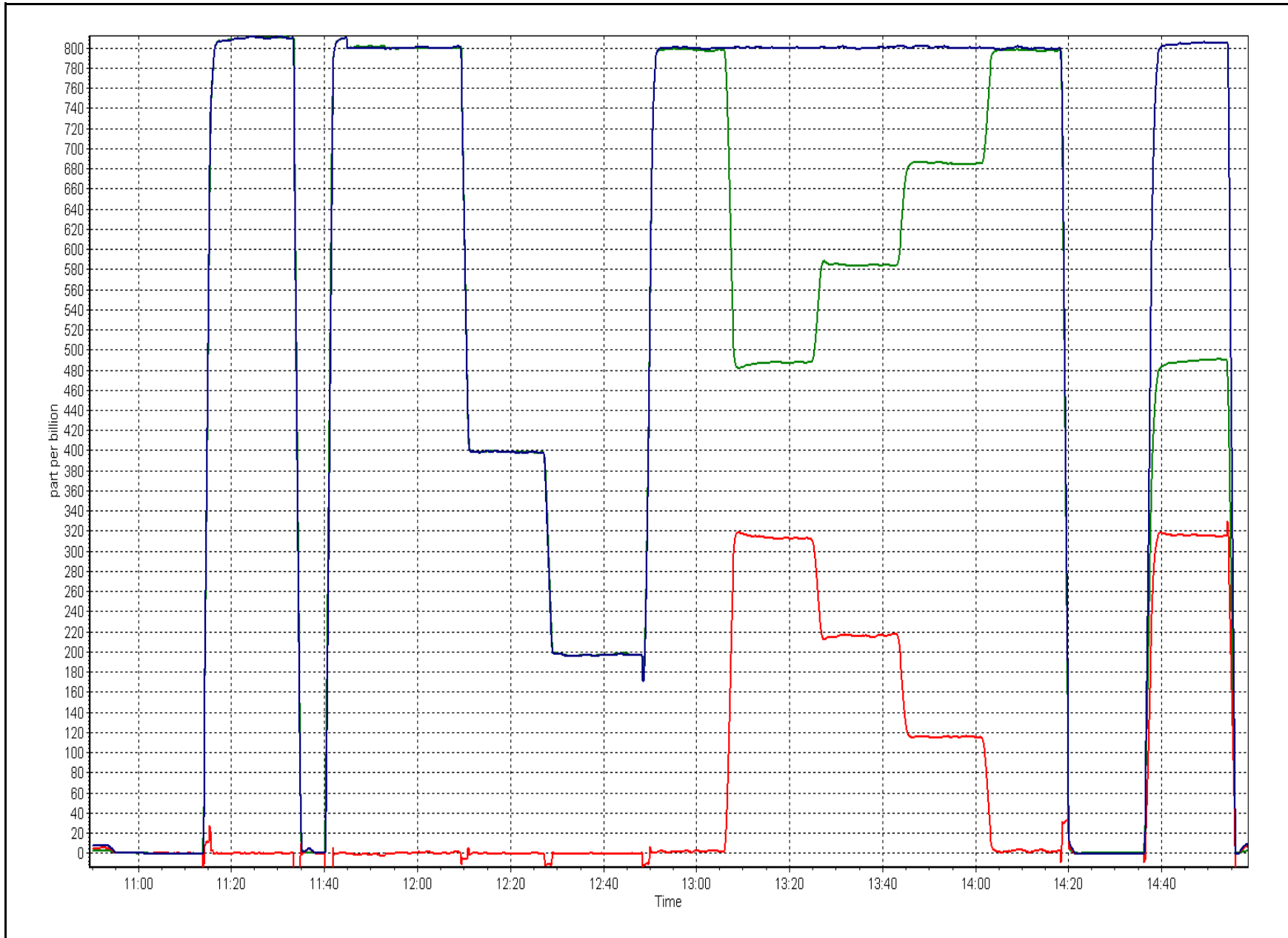
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999971
308.7	312.9	0.9865		
214.0	216.1	0.9907	Slope	0.988063
113.0	115.5	0.9784		
			Intercept	-0.251878

NO₂ Calibration Curve



NOX Calibration Plot

Date: February 17, 2016





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