



Wood Buffalo Environmental Association

NOVEMBER 2015 MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
December 22, 2015

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



This page intentionally left blank

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

NOVEMBER 2015

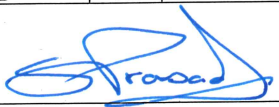
page 1 of 2

Prepared: Dec 21 2015 10:26

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	11	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00							
224816-00-03				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
189942-00-02	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
206355-00-00							
46586-00-00							
216466-00-04	SO2(ppm)	1	100.00	0.008	0	0.002	0
137467-00-00	SO2(ppm)	2	100.00	0.045	0	0.007	0
20809-01-00	SO2(ppm)	4	100.00	0.003	0	0.001	0
241311-00-00	SO2(ppm)	5	100.00	0.040	0	0.010	0
094-02-00	SO2(ppm)	6	99.86	0.008	0	0.002	0
305529-00-00	SO2(ppm)	7	100.00	0.009	0	0.002	0
026-02-00	SO2(ppm)	8	100.00	0.004	0	0.001	0
228044-00-00	SO2(ppm)	11	100.00	0.043	0	0.007	0
73203-01-00	SO2(ppm)	13	98.89	0.008	0	0.001	0
	SO2(ppm)	14	100.00	0.012	0	0.003	0
	SO2(ppm)	15	99.86	0.010	0	0.002	0
	SO2(ppm)	16	100.00	0.012	0	0.005	0
	SO2(ppm)	17	99.86	0.016	0	0.007	0
	SO2(ppm)	18	100.00	0.003	0	0.001	0
	SO2(ppm)	19	100.00	0.020	0	0.008	0
	SO2(ppm)	501	99.44	0.008	0	0.002	0
	SO2(ppm)	502	100.00	0.014	0	0.006	0
	H2S(ppm)	2	100.00	0.003	0	0.001	0
	H2S(ppm)	4	100.00	0.003	0	0.001	0
	H2S(ppm)	5	99.86	0.004	0	0.001	0
	H2S(ppm)	11	100.00	0.006	0	0.001	0
	H2S(ppm)	17	99.86	0.006	0	0.001	0
	H2S(ppm)	19	100.00	0.003	0	0.000	0
	H2S(ppm)	501	98.61	0.001	0	0.001	0
	H2S(ppm)	502	100.00	0.003	0	0.001	0
	TRS(ppm)	1	100.00	0.004	0	0.001	0
	TRS(ppm)	6	99.86	0.001	0	0.000	0
	TRS(ppm)	7	99.86	0.002	0	0.001	0
	TRS(ppm)	9	100.00	0.003	0	0.001	0
	TRS(ppm)	13	98.89	0.001	0	0.000	0
	TRS(ppm)	14	99.86	0.002	0	0.000	0
	TRS(ppm)	15	99.86	0.001	0	0.000	0
	TRS(ppm)	18	100.00	0.001	0	0.000	0
	THC(ppm)	1	83.06	3.1	-	2.5	-
	THC(ppm)	2	99.72	4.7	-	3.2	-
	THC(ppm)	4	100.00	3.6	-	2.6	-
	THC(ppm)	5	100.00	3.9	-	2.5	-
	THC(ppm)	6	99.86	2.4	-	2.1	-
	THC(ppm)	7	100.00	2.6	-	2.1	-
	THC(ppm)	9	100.00	3.2	-	2.8	-
	THC(ppm)	11	100.00	3.1	-	2.6	-
	THC(ppm)	13	98.75	4.1	-	2.9	-
	THC(ppm)	14	100.00	2.1	-	1.9	-
	THC(ppm)	15	95.83	9.0	-	2.5	-
	THC(ppm)	16	100.00	6.0	-	2.8	-
	THC(ppm)	17	99.86	3.4	-	2.4	-
	THC(ppm)	18	100.00	2.2	-	2.0	-
	THC(ppm)	19	100.00	2.7	-	2.3	-
	O3(ppm)	1	99.86	0.039	0	0.032	-
	O3(ppm)	6	99.86	0.043	0	0.036	-
	O3(ppm)	7	99.86	0.034	0	0.025	-
	O3(ppm)	8	100.00	0.043	0	0.035	-

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

NOVEMBER 2015
page 2 of 2
Prepared: Dec 21 2015 10:26

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	11	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	O3(ppm)	13	98.89	0.035	0	0.024	-
206355-00-00	O3(ppm)	14	99.86	0.046	0	0.039	-
46586-00-00	O3(ppm)	17	97.36	0.037	0	0.031	-
216466-00-04	O3(ppm)	18	100.00	0.046	0	0.043	-
137467-00-00	NO2(ppm)	1	100.00	0.034	0	0.020	-
20809-01-00	NO2(ppm)	6	99.58	0.039	0	0.015	-
241311-00-02	NO2(ppm)	7	100.00	0.041	0	0.022	-
094-02-00	NO2(ppm)	8	100.00	0.022	0	0.011	-
305529-00-00	NO2(ppm)	13	98.61	0.021	0	0.013	-
026-02-00	NO2(ppm)	14	96.39	0.021	0	0.007	-
228044-00-00	NO2(ppm)	15	99.44	0.031	0	0.011	-
73203-01-00	NO2(ppm)	16	100.00	0.038	0	0.020	-
	NO2(ppm)	17	99.86	0.023	0	0.012	-
	NO2(ppm)	18	64.03	0.008	0	0.004	-
	NO2(ppm)	19	100.00	0.023	0	0.009	-
	NO2(ppm)	501	100.00	0.012	0	0.003	-
	NO2(ppm)	502	100.00	0.018	0	0.005	-
	CO(ppm)	7	99.86	1.0	0	0.4	-
	NH3(ppm)	1	92.22	0.000	-	0.000	0
	NH3(ppm)	6	93.06	0.010	-	0.000	0
	PM2.5(ug/m3)	1	100.00	58.0	-	21.9	0
	PM2.5(ug/m3)	6	98.06	118.2	-	29.8	0
	PM2.5(ug/m3)	7	100.00	76.8	-	23.3	0
	PM2.5(ug/m3)	8	98.06	39.0	-	25.6	0
	PM2.5(ug/m3)	13	98.89	29.6	-	17.0	0
	PM2.5(ug/m3)	14	99.86	87.7	-	20.9	0
	PM2.5(ug/m3)	15	99.86	55.4	-	18.5	0
	PM2.5(ug/m3)	16	100.00	61.8	-	24.3	0
	PM2.5(ug/m3)	17	99.86	60.5	-	13.8	0
	PM2.5(ug/m3)	18	97.22	36.5	-	12.6	0
	WIND	1	100.00	-	-	-	-
	WIND	2	96.53	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	99.03	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	98.75	-	-	-	-
	WIND	8	100.00	-	-	-	-
	WIND	9	99.72	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	13	98.61	-	-	-	-
	WIND	14	97.78	-	-	-	-
	WIND	15	95.69	-	-	-	-
	WIND	16	92.36	-	-	-	-
	WIND	17	99.72	-	-	-	-
	WIND	18	100.00	-	-	-	-
	WIND	19	100.00	-	-	-	-
	WIND	501	99.86	-	-	-	-
	WIND	502	97.22	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			



December 22, 2015

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

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

#100 – 330 Thickwood Blvd.
Fort McMurray, AB, T9K 1Y1

Tel: (780) 799-4420
Fax: (780) 715-2016
Email: info@wbea.org

www.wbea.org

Enclosed is the November 2015 Ambient Air Quality Monitoring Report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

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

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

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



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

Aboriginal Communities

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

Government and Non-Industrial Organizations

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

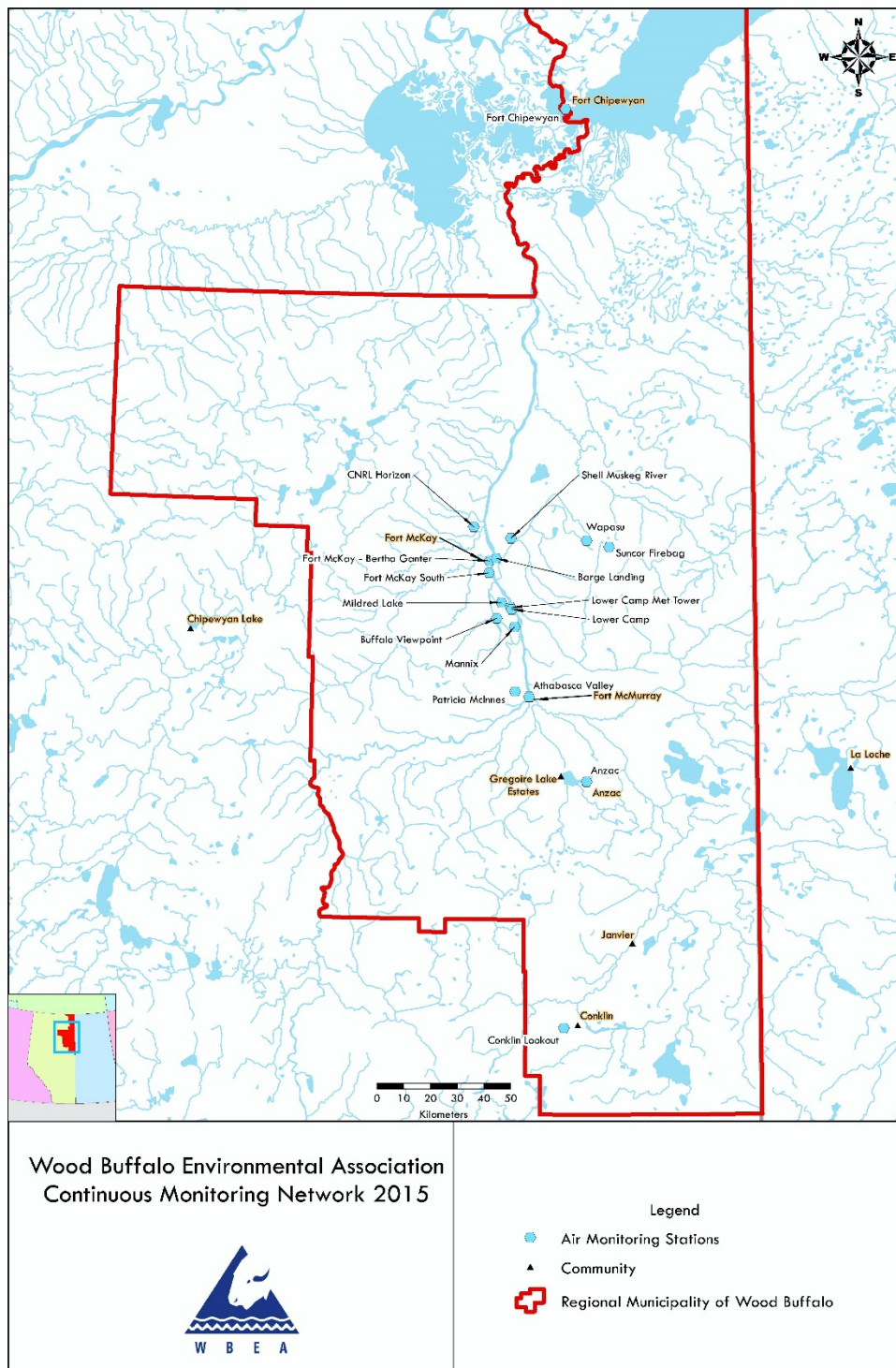


Figure 1: Map of WBEA Air Monitoring Network.

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, H₂S, CO, NO₂, NH₃ and O₃.

There was 1 ambient ground level concentration of Particulate Matter (PM_{2.5}) in excess of the PM_{2.5} 24-hour air quality objective reported to the Energy and Environmental Response Centre in real time. After data processing to account for valid analyzer response and reporting precision, the final 24-hour value was below the PM_{2.5} air quality objective.

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

<u>Site</u>	<u>Parameter</u>	<u>Date / Time</u>	<u>Reference</u>	<u>Period</u>	<u>Concentration ppb or ug/m³</u>		<u>Status</u>
					<u>Reported</u>	<u>Final</u>	
AMS 6 Patricia McInnes	PM2.5	04Nov15 24:00	305395	24hr	30.0	29.8	nae

*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 CASA Data Warehouse

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

2.0 Operational Status

2.1 Continuous Monitoring

There were 2 incidents of a monitoring instrument required for air quality compliance operating less than 90% of the time:

1. The total hydrocarbon (THC) analyzer at AMS 1, Bertha Ganter Fort McKay, operated less than 90% of the time in November 2015. There were multiple issues associated with normal operations of the THC analyzer, resulting in 122 hours of invalid data this reporting period.
 - The THC analyzer exhibited periods of increased instrument noise in the output signal. The noise exhibited was within the manufacturer's specification of 50 ppb. However, based on operations of this analyzer, the noise suggests issues with the actuator, electrical noise, or the instrument software to properly capture elution peaks of the methane and non-methane compounds. These intermittent periods were flagged as unstable operations, resulting in 57 hours of invalid data.
 - One maintenance period to replace the actuator and two maintenance periods to optimize carrier pressure, including stabilization and re-calibration time resulted in an additional 30 hours of downtime.
 - Carrier gas depletion and maintenance to replace support gases resulted in 6 hours of invalid data.
 - Analyzer failure and the installation of a replacement analyzer on November 24 resulted in an additional 29 hours of downtime. The carrier gas infrastructure was also modified at this time to a shorter run length with larger diameter tubing and included an inline carrier gas purifier.

During daily network operations checks, the performance of the THC analyzer was evaluated and multiple mitigative measures were taken to resolve the intermittent periods of analyzer malfunction. Repairs initially yielded successful results, however analyzer performance degraded below WBEA internal QA criteria for data acceptance. Since the replacement of the analyzer, operational issues have not occurred and the performance of this analyzer continues to be monitored.

After flagging and processing for monthly reports, data for THC at AMS 1 was available for 83% of the month. This incident was reported to Alberta Environment and Parks on December 18, 2015 (reference 306755).

2. The nitrogen dioxide (NO₂) analyzer at AMS 18, Conklin Lookout, operated less than 90% of the time in November 2015. During a station visit on November 20, 2015, the station operator discovered a disconnected sample line from the NO₂ analyzer and the sample inlet manifold.

A review of the station maintenance and calibration activities indicates monthly calibration of the NO₂ analyzer was performed on November 10, 2015 and there were no other physical inspections or activities performed at the station until November 20, 2015. The network operations are remotely reviewed daily for indications of analyzer malfunction. In this specific incident, the daily checks did not indicate any symptoms of analyzer malfunction. The reviews of site activities indicate that sample line from the NO₂ analyzer was sampling station indoor air from November 10 to 20, 2015 and data during this period is not representative of ambient air quality.

Data from this period was invalidated during quality assurance validation and processing for monthly reporting. This incident was reported to AESRD on November 23, 2015 (reference 305954).

In November 2015, there were no incidents of a monitoring instrument not required for air quality compliance operating less than 90% of the time.

2.2 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 55 hours this month.

A power spike on November 11 interrupted the normal operations of the O₃ and NH₃ analyzers for 1 hour.

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

Station 2, Mildred Lake

Maintenance to confirm the daily zero response of the THC analyzer on November 12 interrupted the normal operations of the analyzer for 2 hours.

Flat lines in the output signals of the wind sensor on November 22 resulted in 25 hours of invalid data.

Station 3, Lower Camp B - Meteorology

Flat lines in output signals of the sonic wind sensors at 20, 45, and 100 m elevations resulted in 5, 3, and 38 hours of downtime for each respective sensor.

Station 4, Buffalo Viewpoint

No operational issues to report this month.

Station 5, Mannix

Maintenance and cleaning of the sample manifold on November 10 interrupted the normal operations of the H₂S analyzer for 1 hour.

A flat-line in the output signal of the sonic wind sensor at the 20 m tower elevation resulted in 7 hours of invalid data this reporting period.

Station 6, Patricia McInnes

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span and routine monthly multipoint calibration periods. Additional time for stabilization after exposure to high concentrations of the NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 to 2 hours following each daily span has been reported as invalid for a total of 29 hours this month.

Preventative maintenance on November 9 affected the routine operations of the NH₃ analyzer for 21 hours.

A flat-line in the output signal of the PM_{2.5} analyzer on November 8 resulted in 14 hours of invalid data.

Maintenance and cleaning of the sample manifold on November 9 interrupted the normal operations of the SO₂, TRS, THC, and O₃ analyzers for 1 hour.

Maintenance to confirm calibration points for the ozone calibration on November 12 interrupted the normal operations of the NO₂ analyzer for 3 hours.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on November 12 interrupted the normal operations of the TRS, O₃, and CO analyzers for 1 hour.

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

Station 8, Fort Chipewyan

The PM_{2.5} analyzer experienced a single episode of unstable operation on November 25. This incident was related to an automated filter tape change and analyzer zero reference point, resulting in 14 hours of invalid data.

Station 9, Barge Landing

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

Station 11, Lower Camp

No operational issues to report this month.

Station 13, Fort McKay South

Maintenance to verify analyzer stability on November 19 interrupted the normal operations of the THC analyzer for 1 hour.

Maintenance to confirm calibration points for the ozone calibration on November 19 interrupted the normal operations of the NO₂ analyzer for 2 hours.

Maintenance to update the data logger program on November 27 affected the normal operations of all parameters for 8 hours.

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

Station 14, Anzac

A leak check in the calibration system on November 5 interrupted the normal operations of the NO₂ analyzer for 24 hours. Maintenance and a follow up calibration was performed the following day. Confirmation of calibration points for the ozone calibration on November 16 interrupted the routine operations of the NO₂ analyzer for 2 hours.

Routine maintenance on November 16 interrupted the normal operations of the precipitation collector for 1 hour.

Station operator activities on November 19 affected the normal operations of the TRS analyzer for 1 hour.

The PM_{2.5} analyzer experienced an episode of unstable operation after a routine calibration. This resulted in 1 hour of invalid data during this reporting period.

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

A power spike at the station on November 26 affected the normal operations of the O₃ analyzer for 1 hour.

Station 15, CNRL Horizon

A new data collection program and revision uploads to the data logger on November 15 interrupted the normal data collection of all parameters for 1 hour.

The normal baseline of the total hydrocarbon analyzer drifted below the accepted global background value of 1.8 ppm. The normal baseline for THC in this region is 1.9 ppm and is consistently observed at 15 other stations in the WBEA network. Values below the global background are flagged as unstable operations. This resulted in 27 hours of invalid data.

The NO₂ analyzer experienced two episodes of unstable operations caused by baseline drift, resulting in 3 hours of invalid data this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 30 hours of invalid data this reporting period.

Station 16, Shell Muskeg River

Flat-lines in the output signal of the wind sensor resulted in 55 hours of invalid data this reporting period.

Station 17, Wapasu

There were 2 issues associated with the operations of the O₃ analyzer resulting in 19 hours of invalid data. On November 20, the lamp voltage dropped below the normal set point affecting the operations of the analyzer for 15 hours, including maintenance and calibration time. Additional maintenance to optimize the lamp and re-calibrate the analyzer on November 24 resulted in 4 hours of downtime.

Maintenance and program upload to the data-logger on November 24 interrupted the data collection of all parameters for 1 hour.

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

Station 18, Conklin Lookout

On November 10, after a routine calibration, the NO₂ analyzer was inadvertently left disconnected from the sample manifold until it was discovered on November 20 by the station operator. The analyzer was sampling from the interior of the station rather than ambient air; as a result, 259 hours of data were invalidated.

The PM_{2.5} analyzer experienced 2 instances of debris entering the nephelometer (optic) chamber on November 25 and 28, resulting in 1 hour of unstable operations and 19 hours of analyzer failure, respectively. The debris was removed in response to the analyzer failure by the station operator and normal operations were restored.

Station 19, Firebag

No operational issues to report this month.

Station 501, Statoil Leismer

The SO₂ analyzer experienced multiple instances of unstable operations due to a negative baseline resulting in 4 hours of invalid data this reporting period.

The H₂S analyzer experienced 2 episodes of unstable operations on November 2 and 20 resulting in 10 hours of invalid data.

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

Station 502, ConocoPhillips Surrmont

Flat-lines in the output signal of the wind sensor resulted in 18 hours of invalid data this reporting period. The wind speed sensor was replaced by the station operator on November 5 interrupting the normal operations of the sensor for 2 hours.

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

Yours sincerely,

Wood Buffalo Environmental Association

Michael Martineau
Data Technician

Sanjay Prasad
Air Quality Scientist



This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
NOVEMBER 2015

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY - BERTHA GANTER (AMS 1)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	685	35	35	100.00	8	0	2	0
TRS(ppb) Average	686	34	34	100.00	4	0	1	0
THC(ppm) Average	564	34	156	83.06	3.1	-	2.5	-
NMHC(ppm) Average	564	34	156	83.06	0.382	-	0.223	-
CH4(ppm) Average	564	34	156	83.06	2.7	-	2.3	-
O3 (ppb) Average	685	34	35	99.86	39	0	32	-
NO2 (ppb) Average	685	35	35	100.00	34	0	20	-
NO (ppb) Average	685	35	35	100.00	32	-	8	-
NOX (ppb) Average	685	35	35	100.00	60	-	23	-
NH3 (ppb) Average	622	42	98	92.22	0	0	0	-
PM2.5 (ug/m3) Average	719	1	1	100.00	58	-	21.9	0
Wind Speed 10 m (km/h) Average	720	0	0	100.00	18	-	12	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	8.8	-	3.2	-
Temperature 10 m (C) Average	720	0	0	100.00	8.7	-	3.8	-
Relative Humidity (%) Average	720	0	0	100.00	97	-	95	-
Precipitation (mm) Total	720	0	0	100.00	1.6	-	7.2	-
Leaf Wetness (% of range) Average	720	0	0	100.00	24	-	6	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	289	-	49	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	0.8	1	-	0	0	0	0	1	2	8
TRS (ppb) Average	686	0.6	0	-	0	0	0	0	1	1	4
THC (ppm) Average	564	2.1	0.2	-	1.8	1.9	2	2	2.2	2.4	3.1
NMHC(ppm) Average	564	0.048	0.078	-	0	0	0	0	0.1	0.2	0.382
CH4(ppm) Average	564	2.06	0.1	-	1.8	1.9	2	2	2.1	2.3	2.7
O3 (ppb) Average	685	20.1	9	-	4	8	13	20	26	33	39
NO2 (ppb) Average	685	8.1	7	-	0	1	2	6	13	18	34
NO (ppb) Average	685	1.7	4	-	0	0	0	0	1	5	32
NOX (ppb) Average	685	9.8	10	-	0	1	2	6	14	22	60
NH3 (ppb) Average	622	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	719	5.7	5.8	-	0.5	1.5	2.3	3.8	7.3	10.5	58
Wind Speed 10 m (km/h) Average	720	6.3	3	-	0	3	4	6	8	10	18
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	-4.73	5.8	-	-22.1	-12.9	-8.1	-3.7	-0.6	1.7	8.8
Temperature 10 m (C) Average	720	-4.16	5.5	-	-20.1	-12.4	-7.4	-3.3	-0.3	2	8.7
Relative Humidity (%) Average	720	77.6	13	-	39	57	70	81	87	93	97
Precipitation (mm) Total	720	-	-	18.13	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	720	0.9	2	-	0	0	0	1	1	2	24
Global Solar Radiation (W/m2) Average	720	26	53	-	0	0	0	0	24	109	289

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	13 Nov 2015 11:00	13 Nov 2015 15:00	5	Intermittent unstable operation - excessive baseline drift
THC	13 Nov 2015 16:00	14 Nov 2015 10:00	19	Maintenance - replaced actuator
THC	17 Nov 2015 11:00	18 Nov 2015 09:00	23	Intermittent unstable operation - excessive baseline drift
THC	18 Nov 2015 10:00	18 Nov 2015 14:00	5	Maintenance - carrier pressure adjustment and calibration
THC	19 Nov 2015 13:00	19 Nov 2015 16:00	4	Analyzer Failure - carrier gas depleted
THC	19 Nov 2015 17:00	19 Nov 2015 18:00	2	Maintenance - replaced fuel and carrier gas cylinders
THC	20 Nov 2015 09:00	21 Nov 2015 13:00	29	Intermittent unstable operation - excessive baseline drift
THC	21 Nov 2015 14:00	21 Nov 2015 19:00	6	Maintenance - carrier pressure adjustment and calibration
THC	24 Nov 2015 06:00	25 Nov 2015 10:00	29	Analyzer Failure - baseline collapse
O3, NH3	11 Nov 2015 13:00	11 Nov 2015 13:00	1	Power spike
NH3	01 Nov 2015 09:00	30 Nov 2015 09:00	55	Stabilization after daily span



Summary of Hour Averages

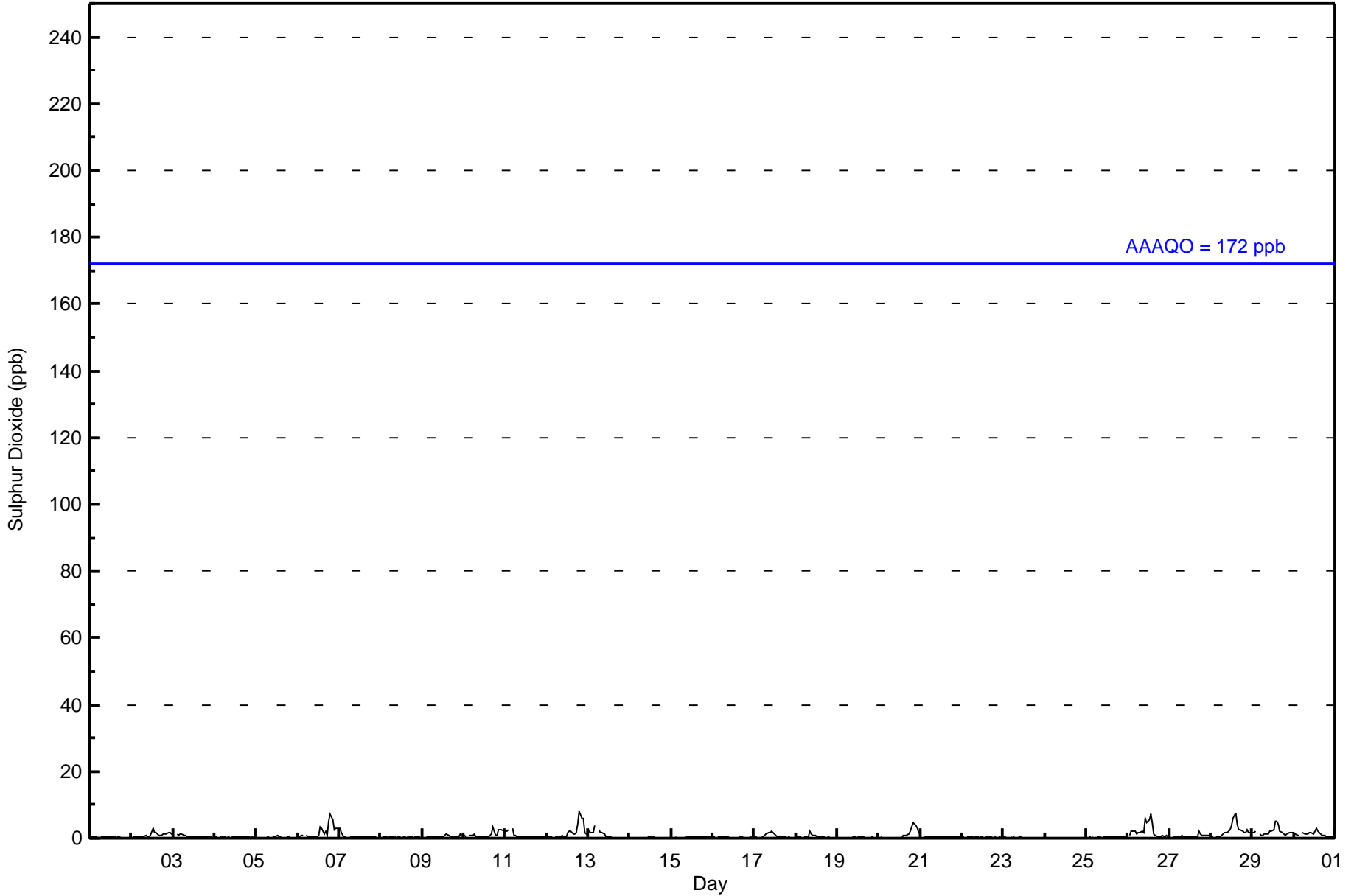
Fort McKay - Bertha Ganter - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Nov 12 20:00	Maximum Daily Average: 2.2 ppb on Nov 28		Hours of Data:	685
Minimum Value: 0 ppb on Nov 14 06:00	Minimum Daily Average: 0.2 ppb on Nov 14		Hours of Missing Data:	35
Maximum Diurnal Average: 1.2 ppb at hour 14	Minimum Diurnal Average: 0.5 ppb at hour 6		Hours of Calibration:	35
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	Z	0	0	0	0	0	0	1	1	1	0	1	3	2	2	1	1	1	1	1	1	2	2	1	1.0	3
3-Nov	1	Z	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
4-Nov	0	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
5-Nov	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Nov	0	0	1	1	Z	1	1	0	0	0	0	1	3	3	1	2	1	5	7	6	2	3	3	1.9	7	
7-Nov	3	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3	
8-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0.5	1	
10-Nov	1	0	Z	1	1	1	1	1	1	1	1	0	0	0	1	1	3	1	1	2	3	2	2	1.1	3	
11-Nov	2	2	2	Z	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
12-Nov	0	0	0	0	Z	0	0	0	0	1	1	1	2	2	2	1	1	2	4	8	6	6	2	1.8	8	
13-Nov	2	2	2	2	4	Z	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	4	
14-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
15-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
16-Nov	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.2	0	
17-Nov	0	0	0	Z	0	0	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0.6	2	
18-Nov	0	0	0	0	Z	0	0	0	2	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0.4	2	
19-Nov	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	
20-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	3	5	4	3	2	1.1	5
21-Nov	1	Z	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
23-Nov	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	
24-Nov	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	
25-Nov	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	
26-Nov	Z	1	2	2	2	1	2	2	2	2	6	4	5	7	4	1	1	1	1	1	1	1	1	2.1	7	
27-Nov	1	Z	1	1	1	0	0	1	1	0	0	0	0	0	1	0	0	2	1	1	1	1	1	0.7	2	
28-Nov	1	1	Z	1	1	0	1	1	2	2	2	2	4	6	8	4	3	2	2	2	2	3	2	2.2	8	
29-Nov	2	2	2	Z	1	1	1	1	1	1	2	2	2	5	5	4	2	2	1	1	1	2	2	2.0	5	
30-Nov	2	1	1	1	Z	2	1	1	1	2	2	1	2	3	2	1	1	1	1	1	1	1	0	1.2	3	

0.7	0.6	0.6	0.5	0.7	0.5	0.6	0.5	0.6	0.6	0.8	0.7	1.0	1.2	1.2	0.7	0.6	0.7	0.8	1.0	1.0	0.9	0.7	0.6	Diurnal Average	
3	2	2	2	4	2	3	2	2	2	6	4	5	7	8	4	3	3	5	8	6	6	3	3	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	685	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: 685

Total Number of Hours: 720



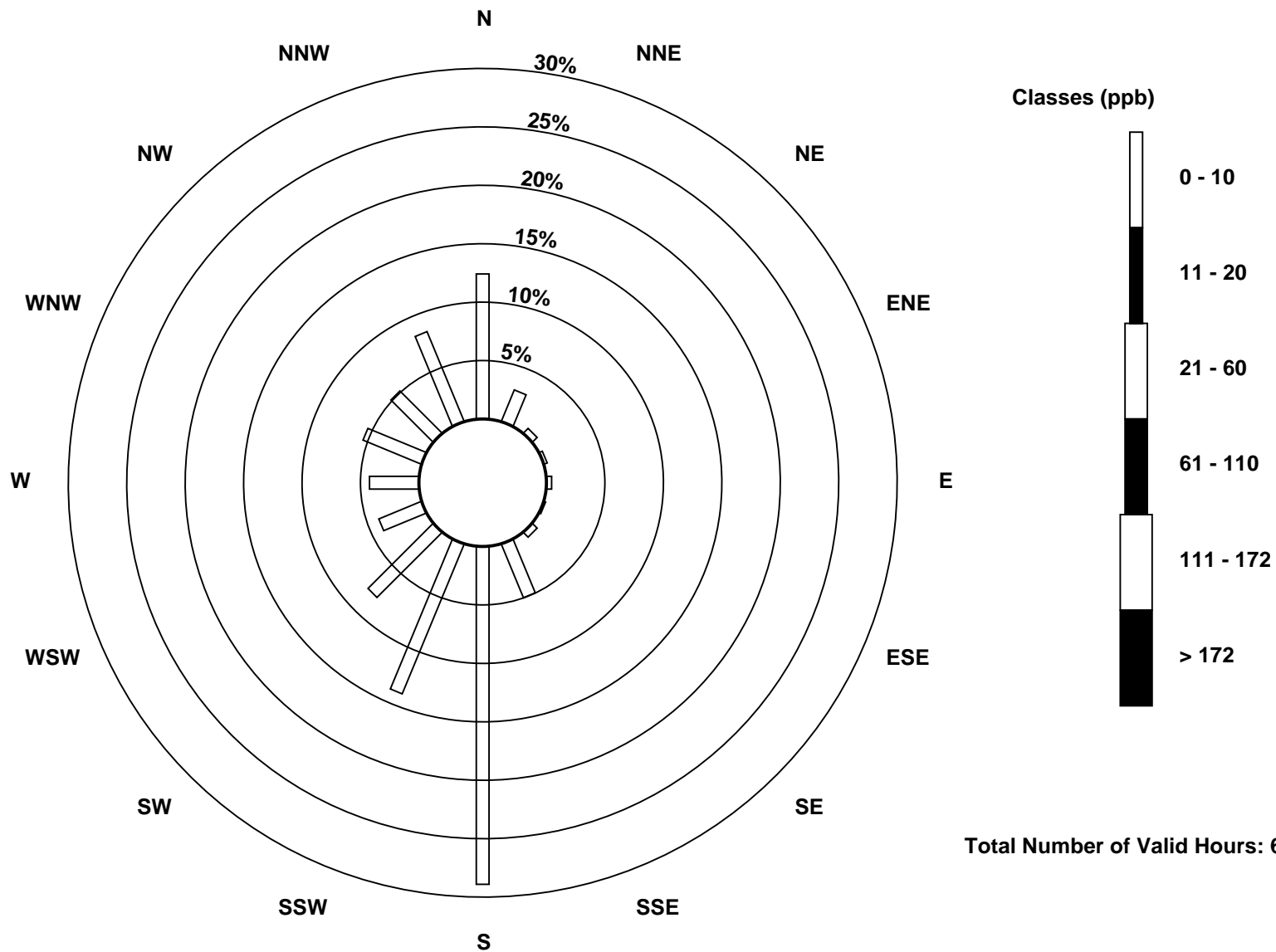
Wood Buffalo Environmental Association
Frequency Distribution

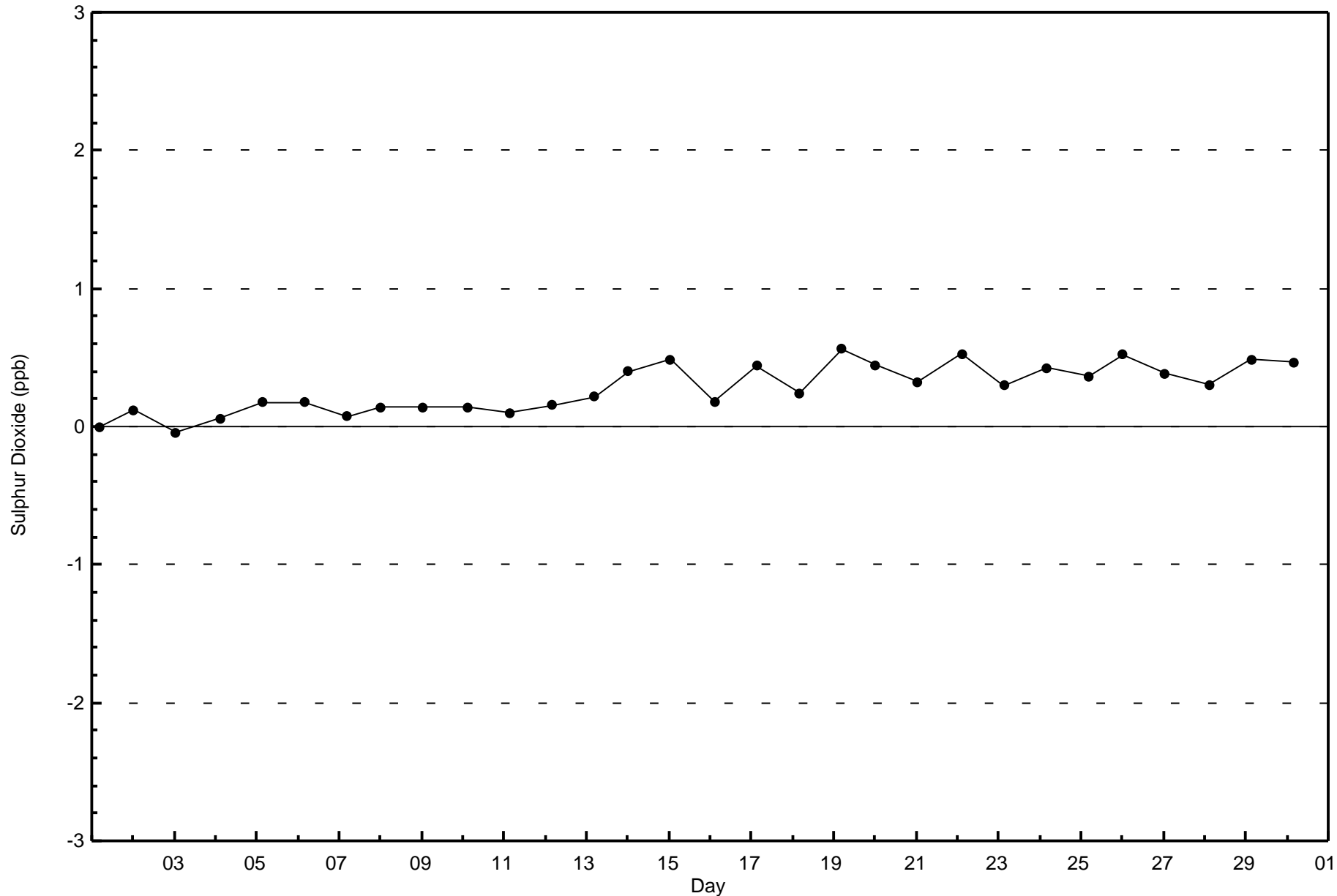
Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	85	20	4	2	3	1	4	34	198	95	54	27	29	37	35	57	685
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	85	20	4	2	3	1	4	34	198	95	54	27	29	37	35	57	685

Total Number of Valid Hours: 685

Total Number of Hours: 720





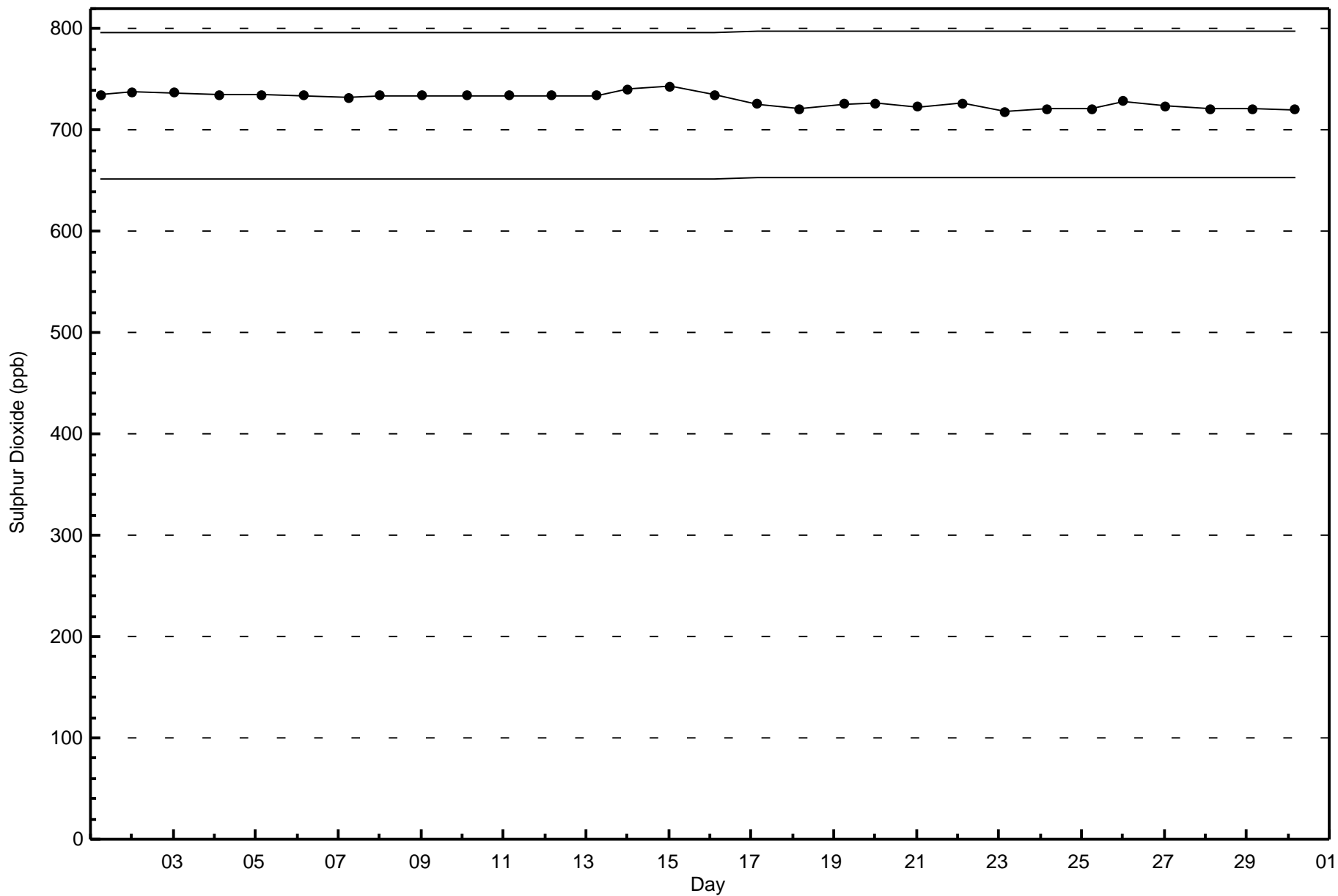


Wood Buffalo Environmental Association

Span Responses

Sulphur Dioxide (SO₂) - ppb

Fort McKay - Bertha Ganter - November 2015



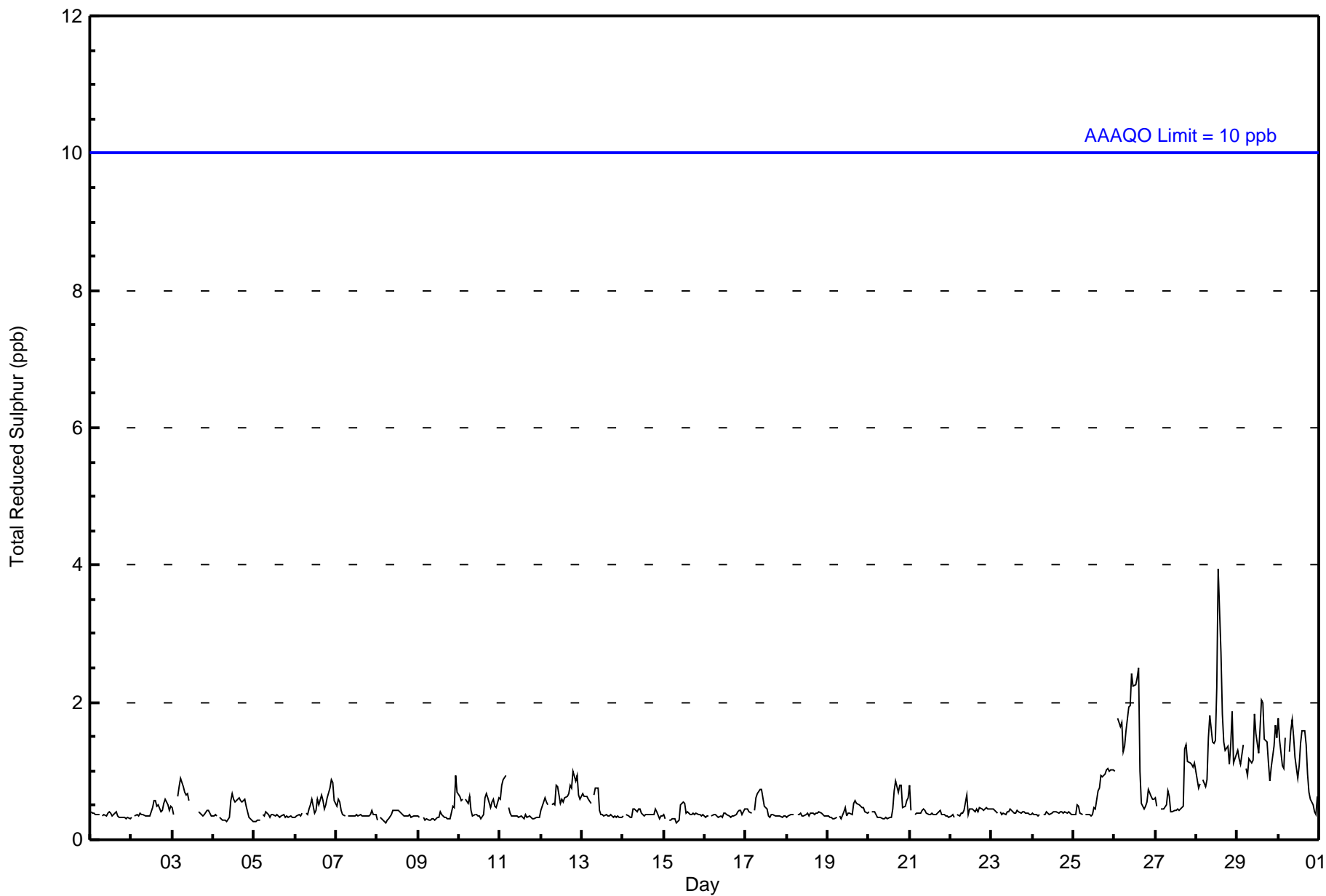


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Nov 28 14:00	Maximum Daily Average: 1.5 ppb on Nov 28		Hours of Data:	686
Minimum Value: 0 ppb on Nov 15 08:00	Minimum Daily Average: 0.3 ppb on Nov 5		Hours of Missing Data:	34
Maximum Diurnal Average: 0.7 ppb at hour 14	Minimum Diurnal Average: 0.5 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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-Nov	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
2-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	1	0	0	0	0.4	1
3-Nov	0	0	Z	1	1	1	1	1	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.5	1
4-Nov	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.4	1
5-Nov	0	0	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
6-Nov	0	0	0	0	0	Z	0	0	0	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	0.5	1
7-Nov	0	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Nov	0	Z	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
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
10-Nov	1	1	1	Z	1	1	1	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0.5	1
11-Nov	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	0.4	1
12-Nov	0	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
13-Nov	1	1	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
14-Nov	0	Z	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
15-Nov	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
16-Nov	0	0	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
17-Nov	0	0	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Nov	0	0	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
19-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.4	1
20-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1	0.5	1
21-Nov	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Nov	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
24-Nov	0	0	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
25-Nov	0	0	1	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1
26-Nov	1	Z	2	2	2	1	1	2	2	2	2	2	2	2	3	1	1	0	0	1	1	1	1	1	1	1.4	3
27-Nov	1	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.7	1
28-Nov	1	1	1	Z	1	1	1	1	2	1	1	1	2	4	3	2	1	1	1	1	1	1	2	1	1	1.5	4
29-Nov	1	1	1	1	Z	1	1	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1	1	2	1	1.4	2
30-Nov	2	1	1	1	1	Z	1	2	2	2	1	1	1	1	2	2	1	1	1	1	1	1	0	0	1	1.1	2

0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.5		Diurnal Average
2	1	2	2	2	1	1	2	2	2	2	2	2	2	4	3	2	1	1	1	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
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	683	99.56	99.56
3 - 4	3	0.44	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	83	20	4	2	3	1	4	35	192	99	52	30	30	38	36	54	683
3 - 4	0	0	0	0	0	0	0	0	3	0	0	0	0	0	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	83	20	4	2	3	1	4	35	195	99	52	30	30	38	36	54	686

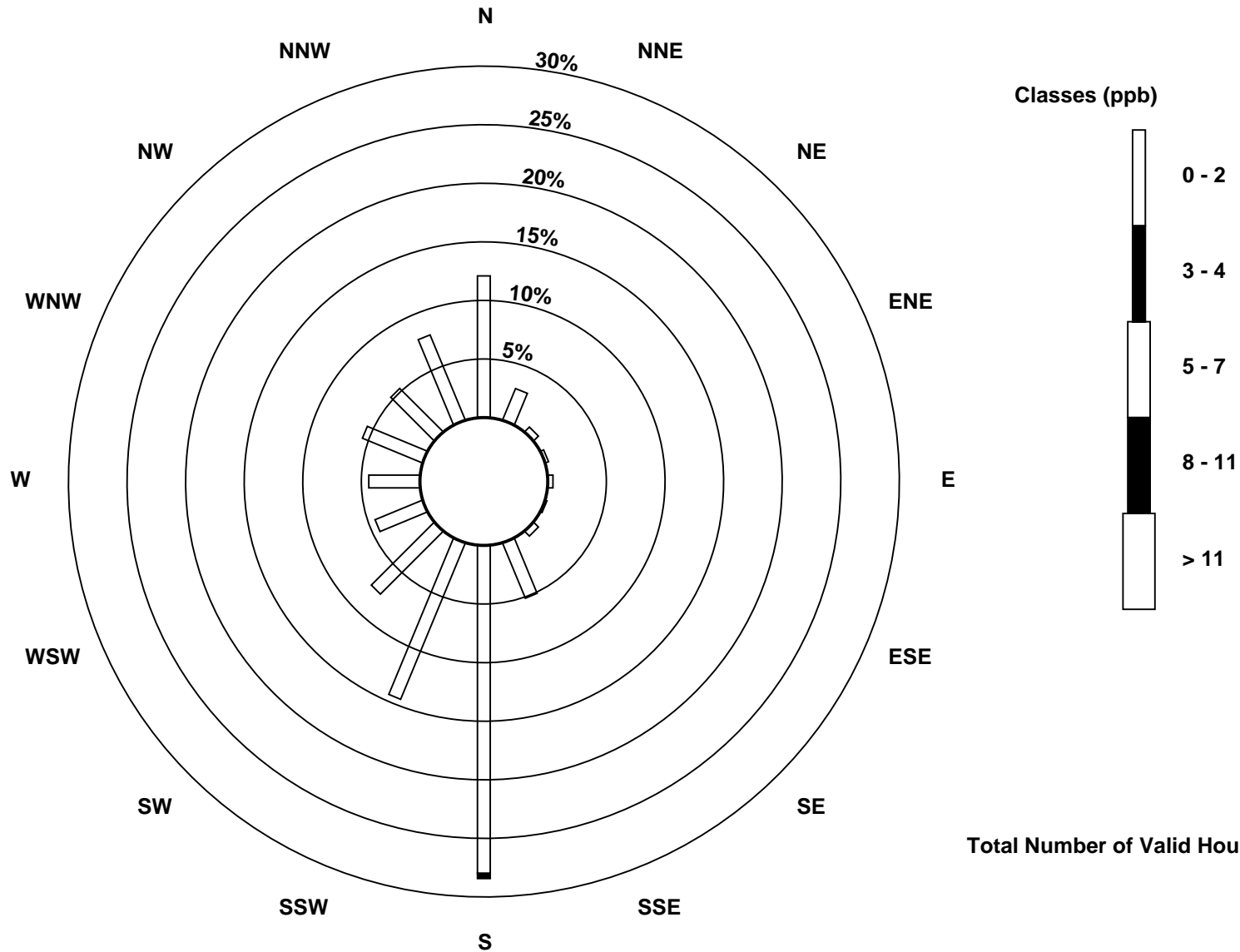
Total Number of Valid Hours: 686

Total Number of Hours: 720

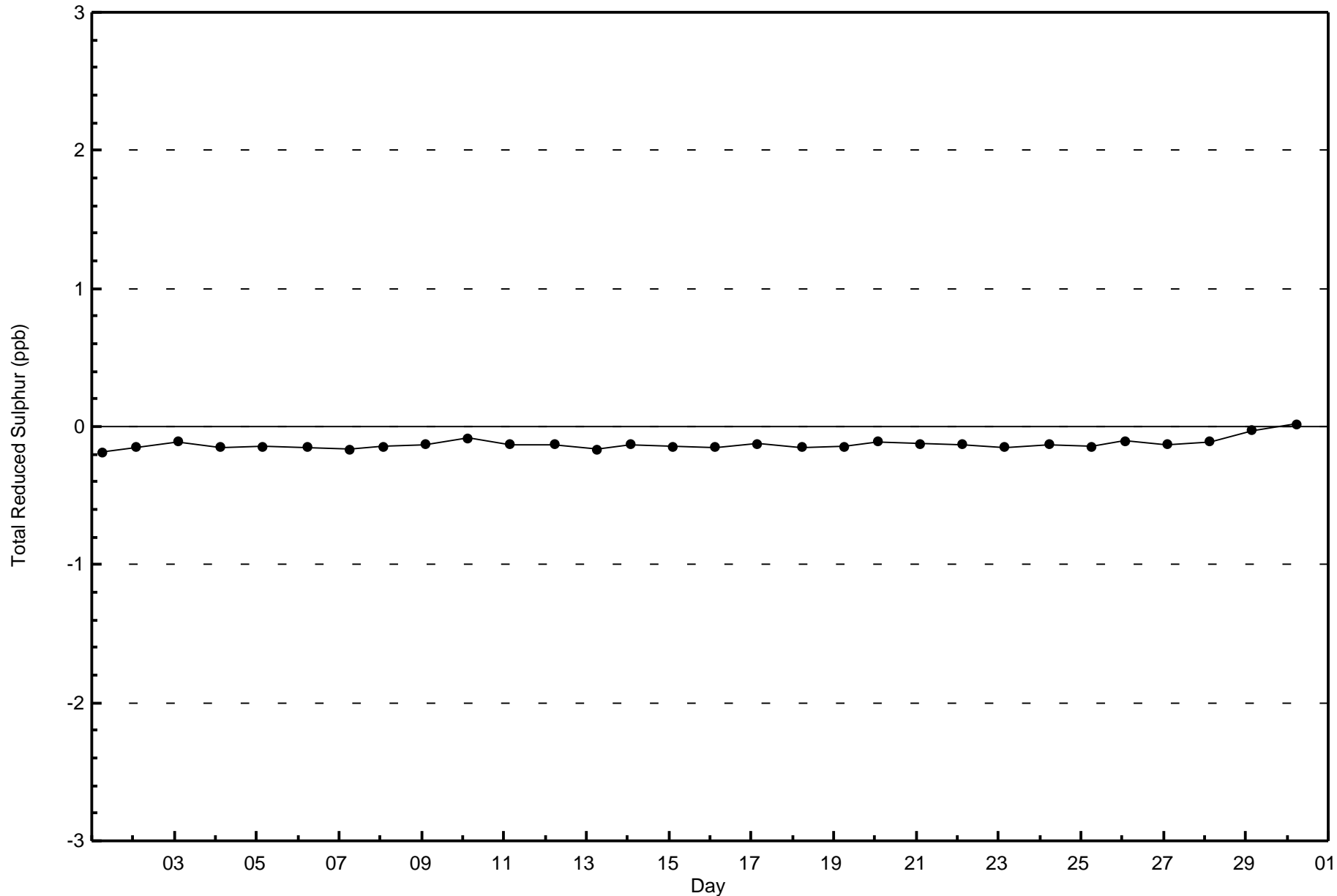


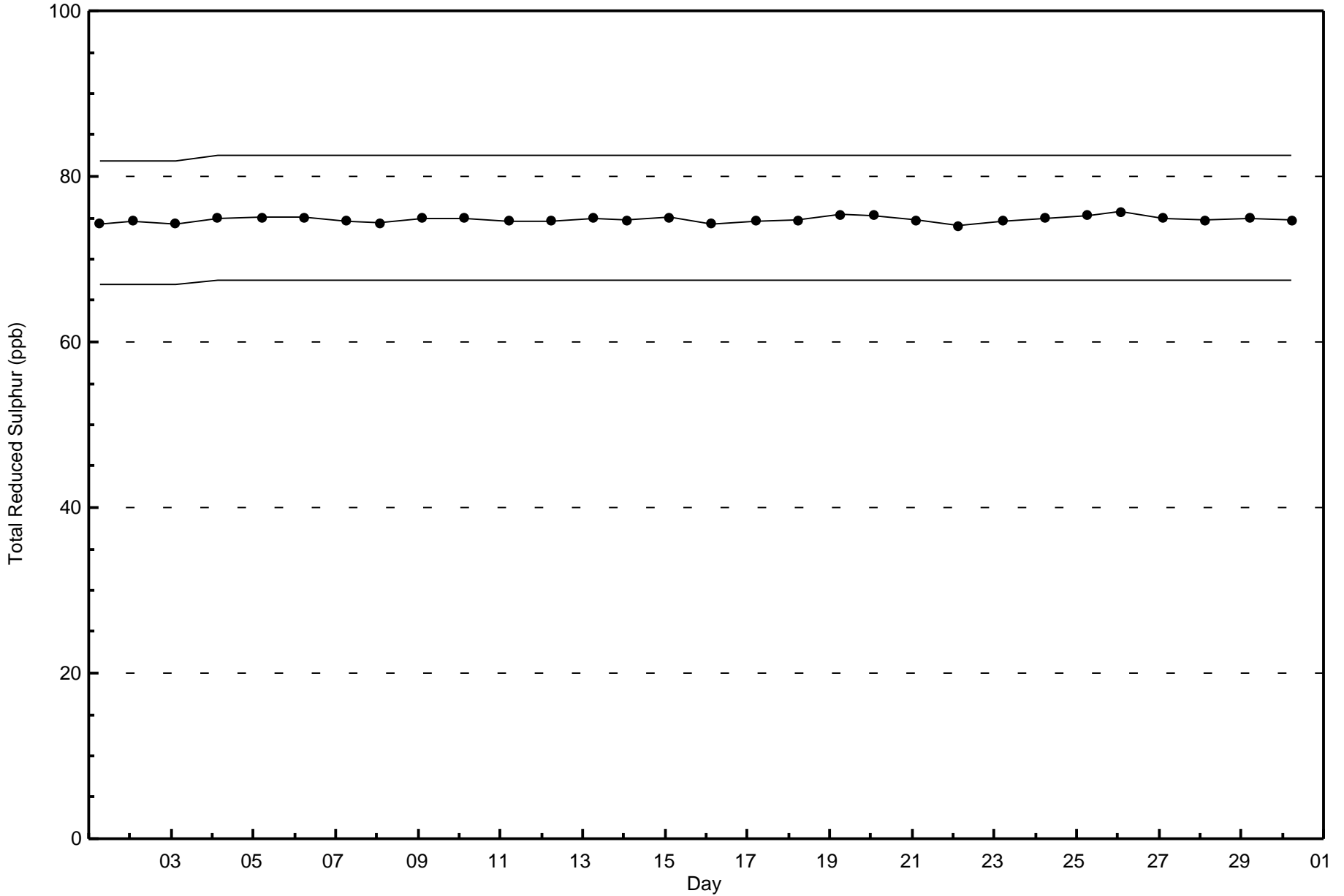
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 686





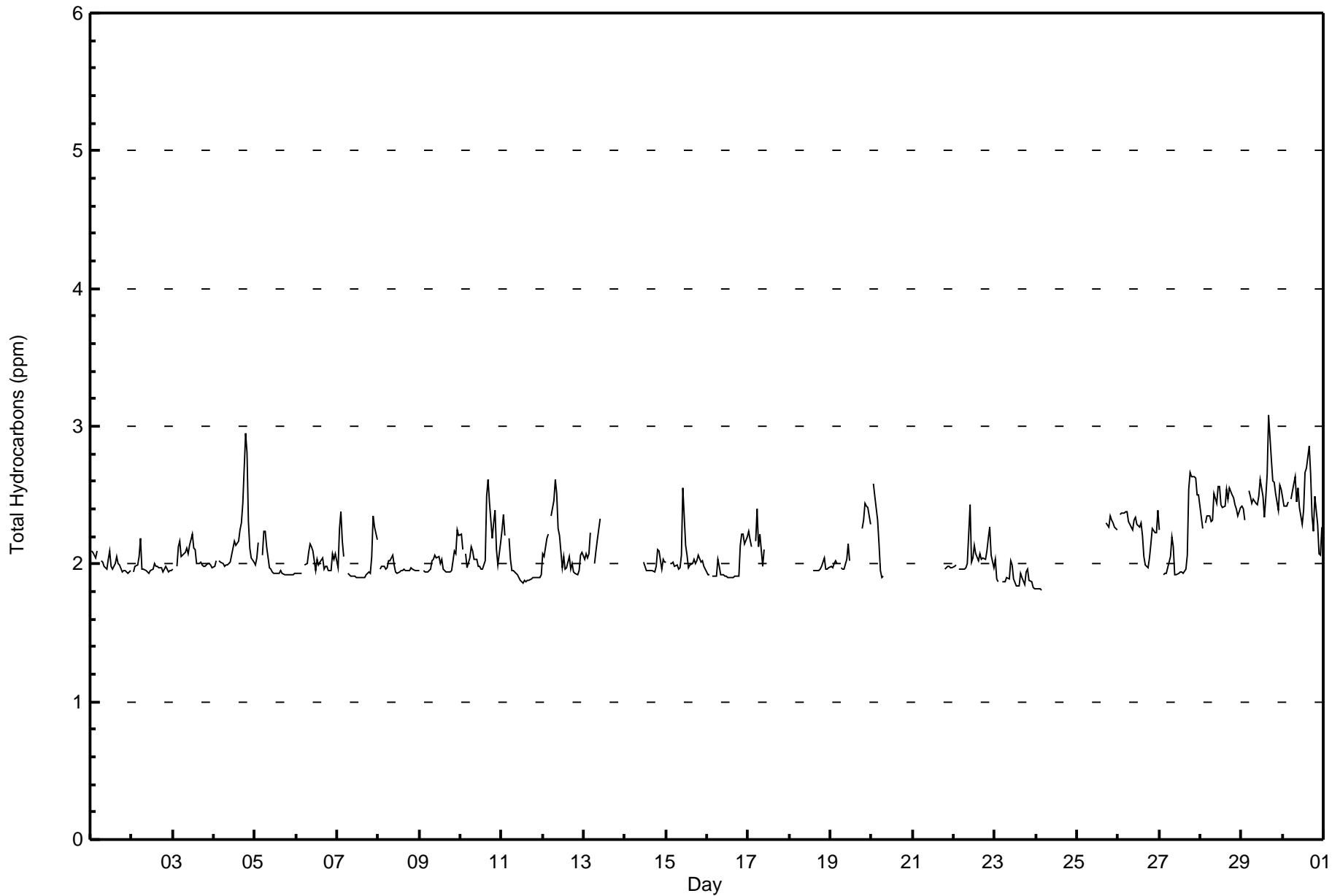


Maximum Value: 3.1 ppm on Nov 29 17:00	Maximum Daily Average: 2.5 ppm on Nov 29	Hours in Service: 720
Minimum Value: 1.8 ppm on Nov 24 04:00	Minimum Daily Average: 1.9 ppm on Nov 23	Hours of Data: 564
Maximum Diurnal Average: 2.2 ppm at hour 20	Minimum Diurnal Average: 2.1 ppm at hour 15	Hours of Missing Data: 156
Monthly Average: 2.10 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 2.7	Hours of Calibration: 34
		Percent Operational Time: 83.1

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-Nov	2.1	2.1	2.1	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.0	
2-Nov	Z	1.9	2.0	2.0	2.1	2.2	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	2.0	2.0	2.0	
3-Nov	2.0	Z	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	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	
4-Nov	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.2	2.3	2.3	2.4	2.9	2.8	2.3	2.1	2.0	2.0	2.0	
5-Nov	2.0	2.0	2.2	Z	2.1	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
6-Nov	1.9	1.9	1.9	1.9	Z	2.0	2.0	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	1.9	2.1	2.0	2.1	2.0	
7-Nov	2.0	2.3	2.4	2.2	2.1	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	2.1	2.3	2.3	2.2	2.0	
8-Nov	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	
9-Nov	2.0	Z	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.3	2.2	2.0	
10-Nov	2.2	2.1	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	2.5	2.6	2.5	2.2	2.3	2.4	2.1	2.0	2.2	2.1	
11-Nov	2.2	2.4	2.2	Z	2.2	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
12-Nov	2.1	2.1	2.2	2.2	Z	2.4	2.5	2.6	2.5	2.3	2.2	2.0	2.1	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.1	
13-Nov	2.0	2.1	2.0	2.1	2.2	Z	2.0	2.1	2.2	2.3	UO	UO	UO	UO	UO	M	M	M	M	M	M	M	M	M	--	
14-Nov	M	M	M	M	M	M	M	M	M	M	M	C	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.0	2.0	2.0	--	
15-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	
16-Nov	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.2	2.1	2.2	2.0	
17-Nov	2.2	2.2	2.1	Z	2.2	2.4	2.1	2.2	2.0	2.1	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	
18-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	--	
19-Nov	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	AF	AF	AF	AF	AF	M	M	2.3	2.3	2.4	2.4	2.4	--	
20-Nov	Z	2.6	2.5	2.3	2.1	2.0	1.9	1.9	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	
21-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	2.0	2.0	2.0	2.0	2.0	--	
22-Nov	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.1	2.0	2.1	
23-Nov	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.8	1.8	1.8	1.9	1.9	1.8	1.9	2.0	1.9	1.9	1.8	1.8	1.9	
24-Nov	1.8	1.8	1.8	1.8	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	C	C	2.3	2.3	2.3	2.3	2.3	2.2	--	
26-Nov	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.1	2.3	2.2	2.2	2.4	2.2	2.4	
27-Nov	2.3	Z	1.9	1.9	1.9	2.0	2.1	2.2	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.5	2.7	2.6	2.6	2.6	2.5	2.5	2.2	
28-Nov	2.3	2.3	Z	2.3	2.3	2.4	2.3	2.3	2.5	2.4	2.6	2.6	2.4	2.4	2.4	2.5	2.5	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.4	
29-Nov	2.4	2.4	2.3	Z	2.5	2.5	2.4	2.5	2.4	2.4	2.5	2.6	2.5	2.3	2.5	2.7	3.1	2.8	2.6	2.6	2.5	2.4	2.6	2.5	2.5	
30-Nov	2.5	2.4	2.4	2.5	Z	2.5	2.6	2.6	2.5	2.6	2.4	2.3	2.4	2.7	2.7	2.9	2.7	2.3	2.2	2.5	2.3	2.1	2.1	2.3	2.4	

2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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	Diurnal Average	
2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.5	2.6	2.6	2.6	2.6	2.5	2.7	2.7	2.9	3.1	2.8	2.9	2.8	2.6	2.6	2.6	2.5	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure UO - Unstable Operation





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	323	57.27	57.27
2.1 - 3.0	240	42.55	99.82
3.1 - 10.0	1	0.18	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 564

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	57	13	3	1	3	0	2	20	43	34	30	12	23	26	18	38	323
2.1 - 3.0	26	6	1	1	0	1	2	7	123	39	6	6	3	5	9	5	240
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	83	19	4	2	3	1	4	27	167	73	36	18	26	31	27	43	564

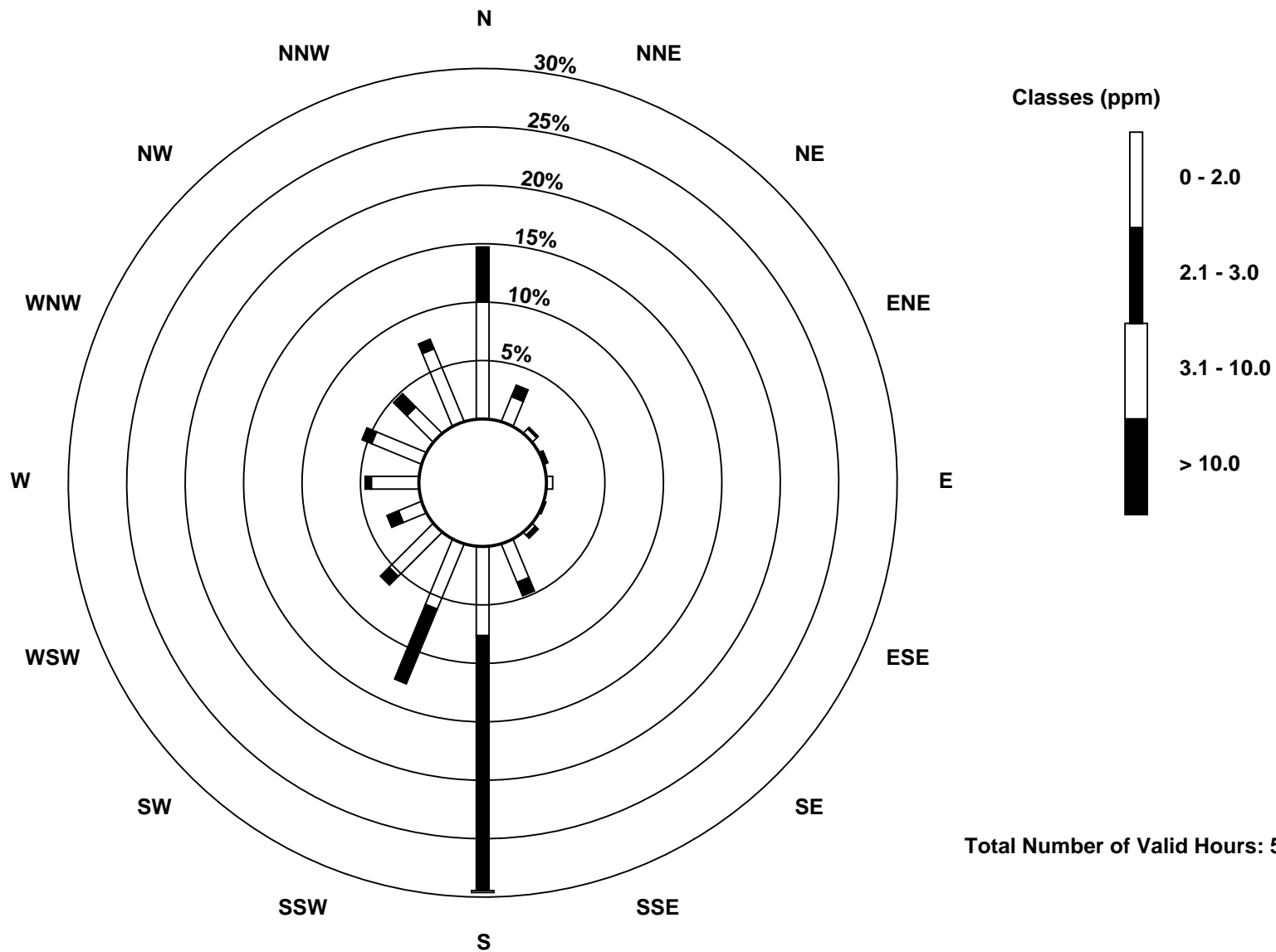
Total Number of Valid Hours: 564

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

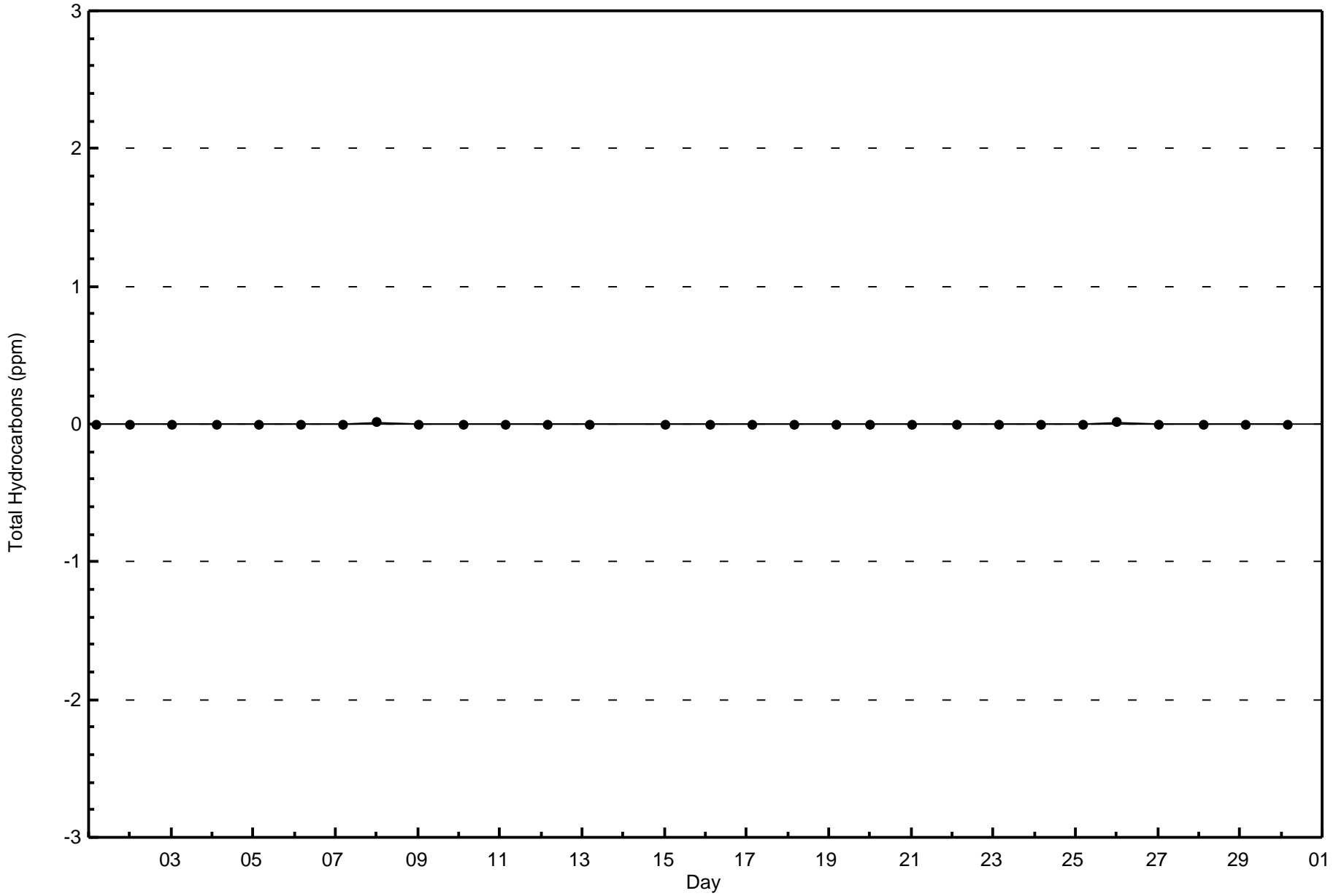
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter (AMS 1)

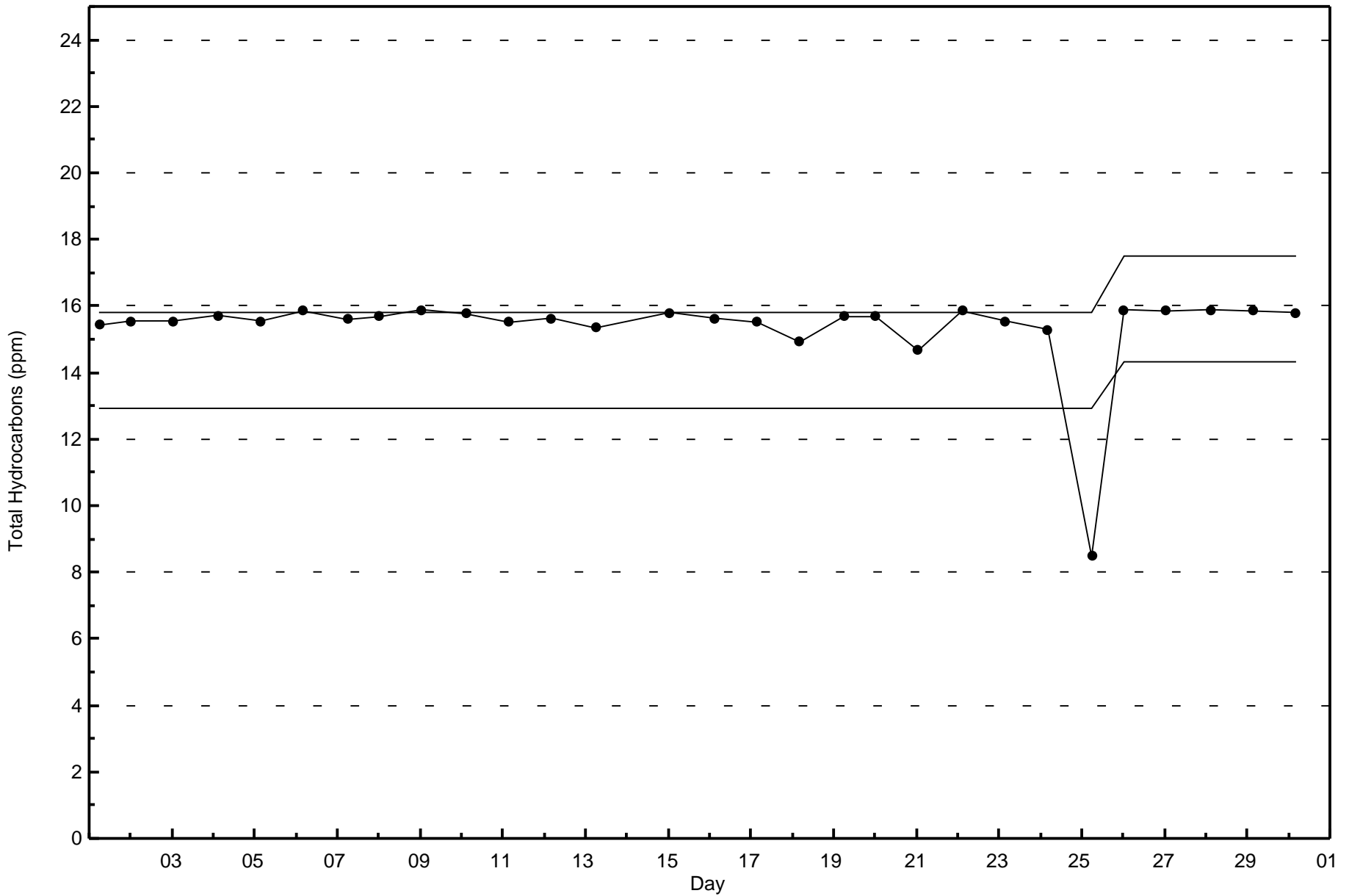


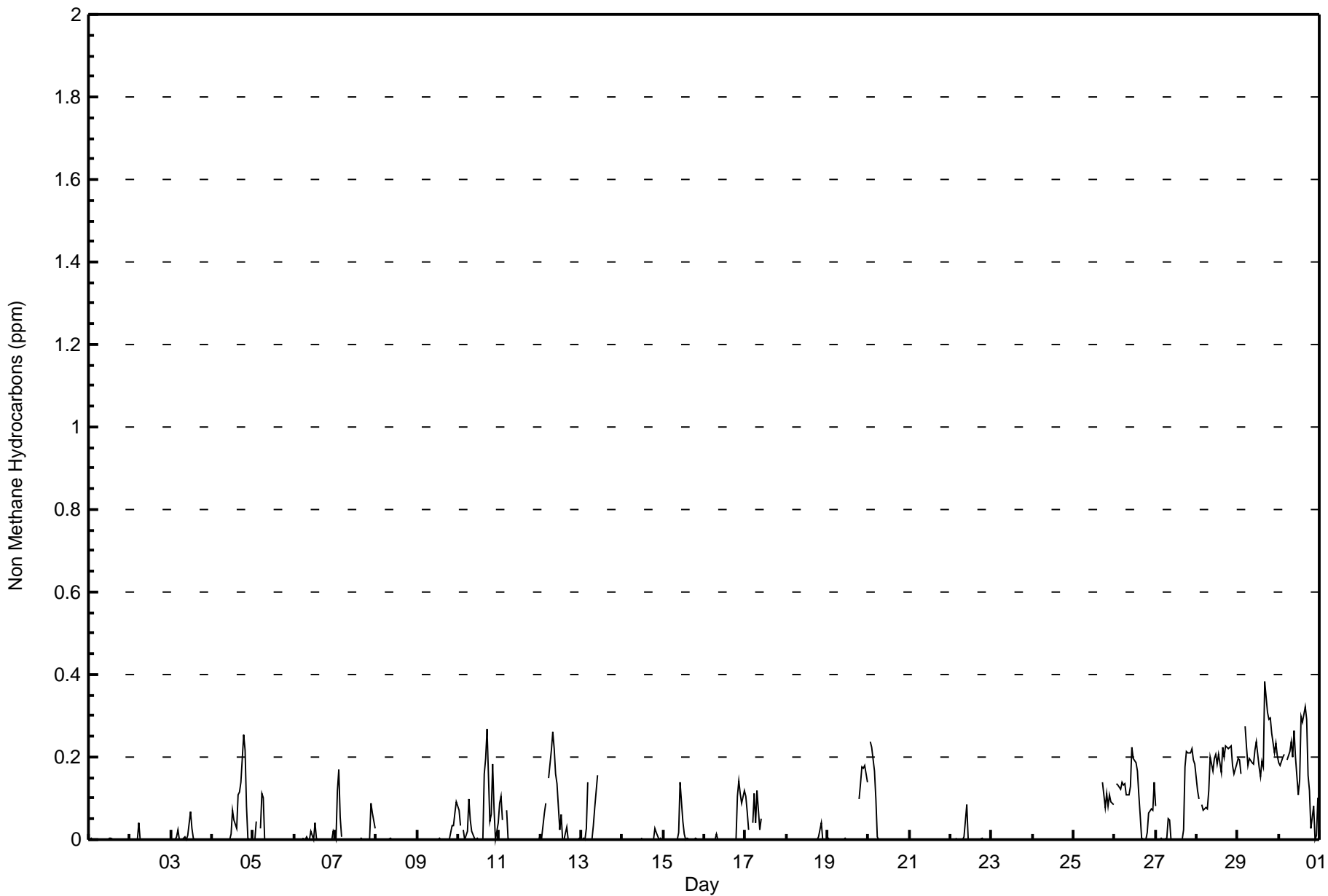


Wood Buffalo Environmental Association
Zero Responses

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









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	352	62.41	62.41
0.006 - 0.05	51	9.04	71.45
0.06 - 0.1	78	13.83	85.28
> 0.1	83	14.72	100.00

Total Number of Valid Hours: 564

Total Number of Hours: 720



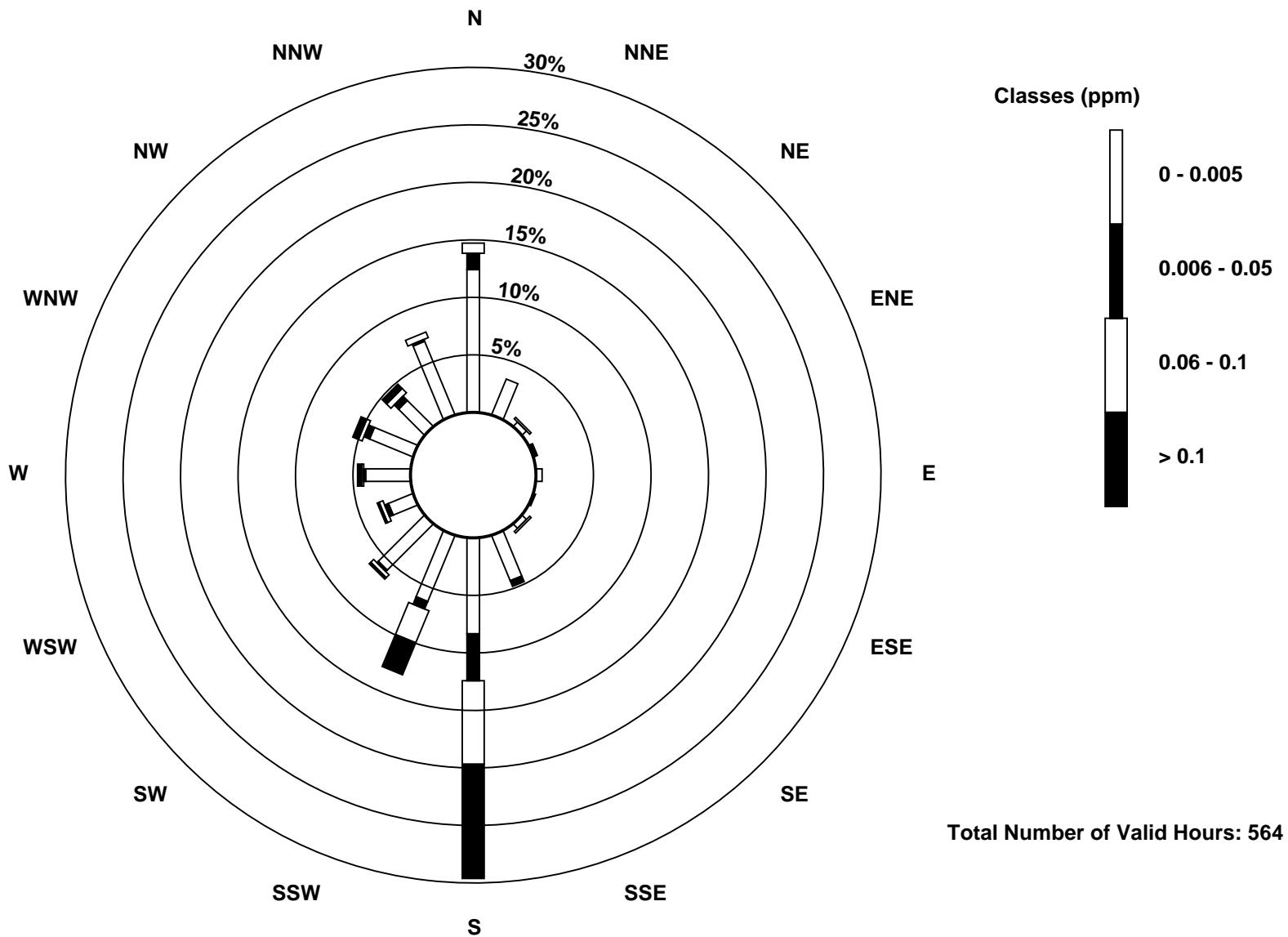
**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	70	19	3	1	3	0	3	24	47	35	32	13	22	23	18	39	352
0.006 - 0.05	8	0	0	1	0	1	0	3	23	4	1	2	1	3	3	1	51
0.06 - 0.1	5	0	1	0	0	0	1	0	41	17	2	2	1	2	3	3	78
> 0.1	0	0	0	0	0	0	0	0	56	17	1	1	2	3	3	0	83
Totals	83	19	4	2	3	1	4	27	167	73	36	18	26	31	27	43	564

Total Number of Valid Hours: 564

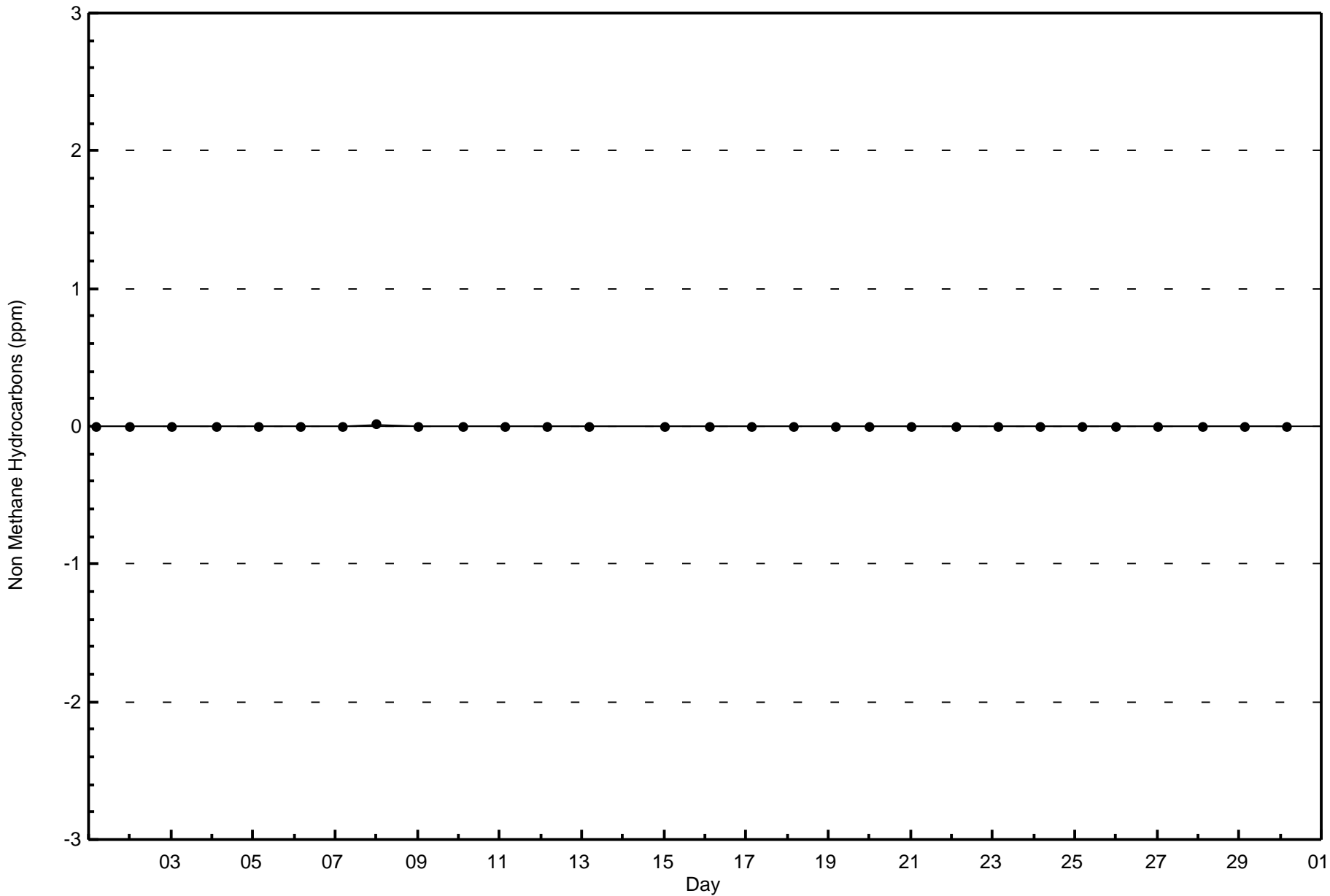
Total Number of Hours: 720

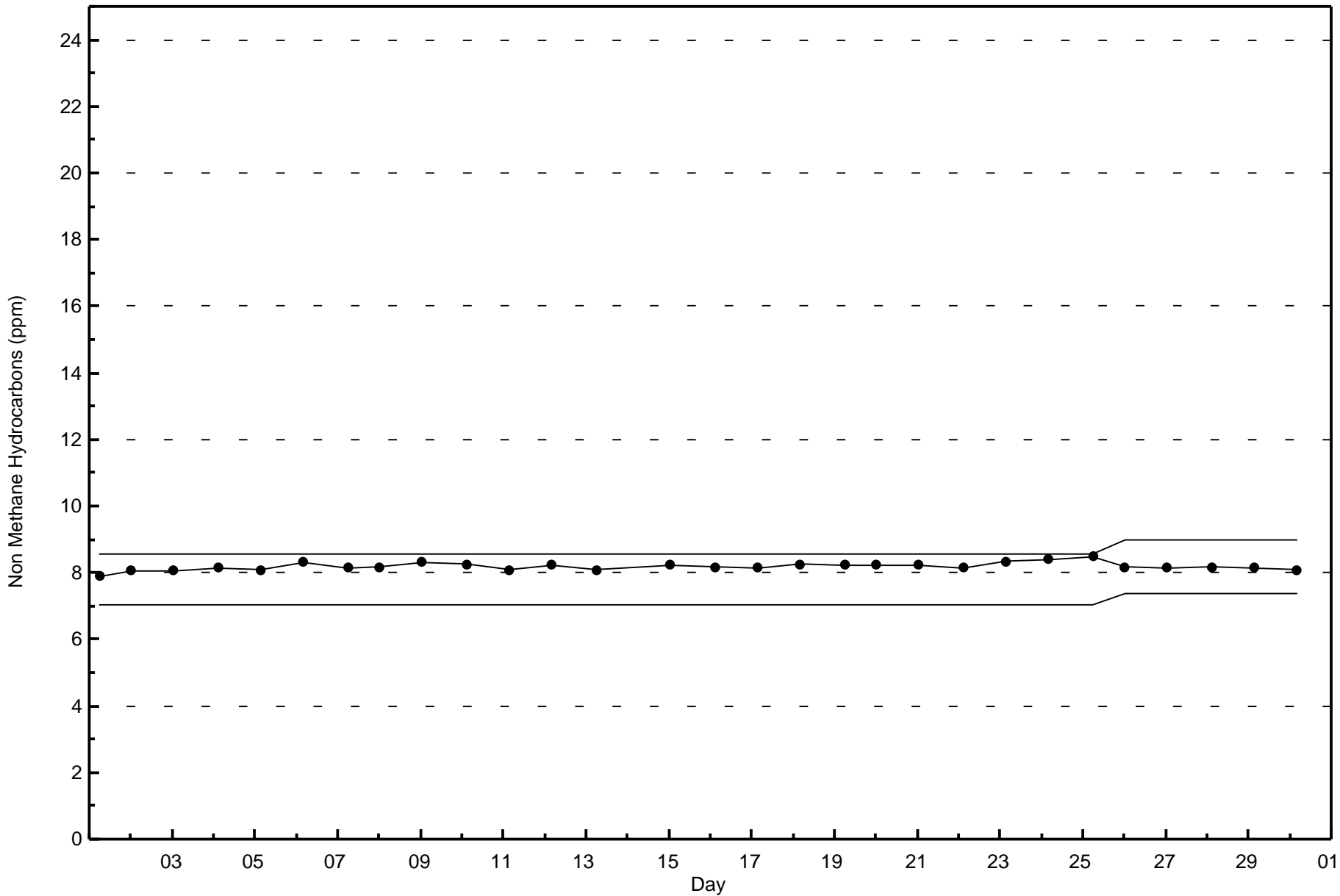




Wood Buffalo Environmental Association
Zero Responses

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



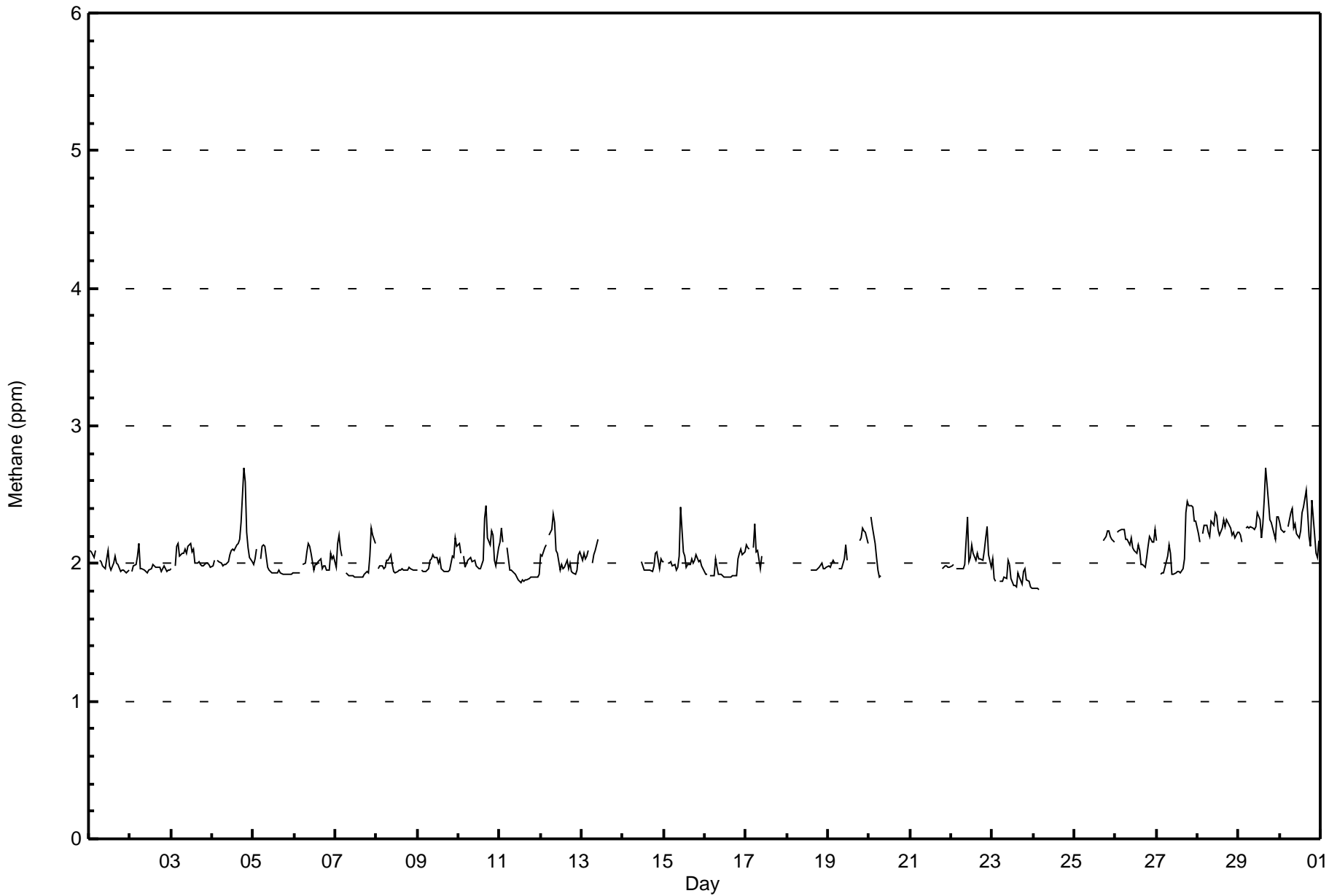




Summary of Hour Averages

Fort McKay - Bertha Ganter - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2.7 ppm on Nov 29 17:00 Maximum Daily Average: 2.3 ppm on Nov 29		Hours in Service: 720 Hours of Data: 564 Hours of Missing Data: 156 Hours of Calibration: 34 Percent Operational Time: 83.1																									
Minimum Value: 1.8 ppm on Nov 24 04:00 Minimum Daily Average: 1.9 ppm on Nov 23 Maximum Diurnal Average: 2.1 ppm at hour 20 Minimum Diurnal Average: 2.0 ppm at hour 14 Monthly Average: 2.06 ppm Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.3 P ₉₉ = 2.5																											
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-Nov	2.1	2.1	2.1	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.1	
2-Nov	Z	1.9	2.0	2.0	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.1	
3-Nov	2.0	Z	2.0	2.1	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	2.0	2.0	2.0	2.0	2.1	
4-Nov	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	2.7	2.6	2.2	2.1	2.7	
5-Nov	2.0	2.0	2.1	Z	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1		
6-Nov	1.9	1.9	1.9	1.9	Z	2.0	2.0	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	1.9	2.1	2.0	2.0	2.1	
7-Nov	2.0	2.1	2.2	2.1	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.3	2.2	2.1	2.0	2.3	
8-Nov	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	
9-Nov	2.0	Z	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.2	2.1	2.0	2.2	
10-Nov	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	2.3	2.4	2.2	2.1	2.2	2.2	2.0	2.0	2.1	2.1	2.4	
11-Nov	2.2	2.3	2.2	Z	2.1	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3	
12-Nov	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.4	2.3	2.1	2.1	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.4	
13-Nov	2.0	2.1	2.0	2.0	2.1	Z	2.0	2.1	2.1	2.2	UO	UO	UO	UO	UO	M	M	M	M	M	M	M	M	M	--	2.2	
14-Nov	M	M	M	M	M	M	M	M	M	M	M	C	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.0	2.0	2.0	--	2.1	
15-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.4	
16-Nov	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.0	2.1	
17-Nov	2.1	2.1	2.1	Z	2.1	2.3	2.1	2.1	2.0	2.1	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	2.3	
18-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	1.9	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	--	2.0	
19-Nov	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	AF	AF	AF	AF	M	M	2.2	2.2	2.3	2.2	2.2	2.1	--	2.3	
20-Nov	Z	2.3	2.3	2.1	2.0	1.9	1.9	1.9	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	2.3	
21-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	M	M	M	M	M	M	M	2.0	2.0	2.0	2.0	2.0	--	2.0
22-Nov	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.1	2.0	2.1	2.3	
23-Nov	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.8	1.8	1.8	1.9	1.9	1.8	1.9	2.0	1.9	1.9	1.8	1.8	1.9	2.0	
24-Nov	1.8	1.8	1.8	1.8	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1.8	
25-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	--	2.2	
26-Nov	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	
27-Nov	2.2	Z	1.9	1.9	1.9	2.0	2.0	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.4	2.5	2.4	2.4	2.4	2.3	2.3	2.1	2.5	
28-Nov	2.2	2.2	Z	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	
29-Nov	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.3	2.5	2.7	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.7	
30-Nov	2.3	2.2	2.2	2.2	Z	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.4	2.4	2.5	2.4	2.2	2.1	2.5	2.2	2.1	2.0	2.2	2.3	2.5	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure UO - Unstable Operation																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	340	60.28	60.28
2.1 - 3.0	224	39.72	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 564

Total Number of Hours: 720



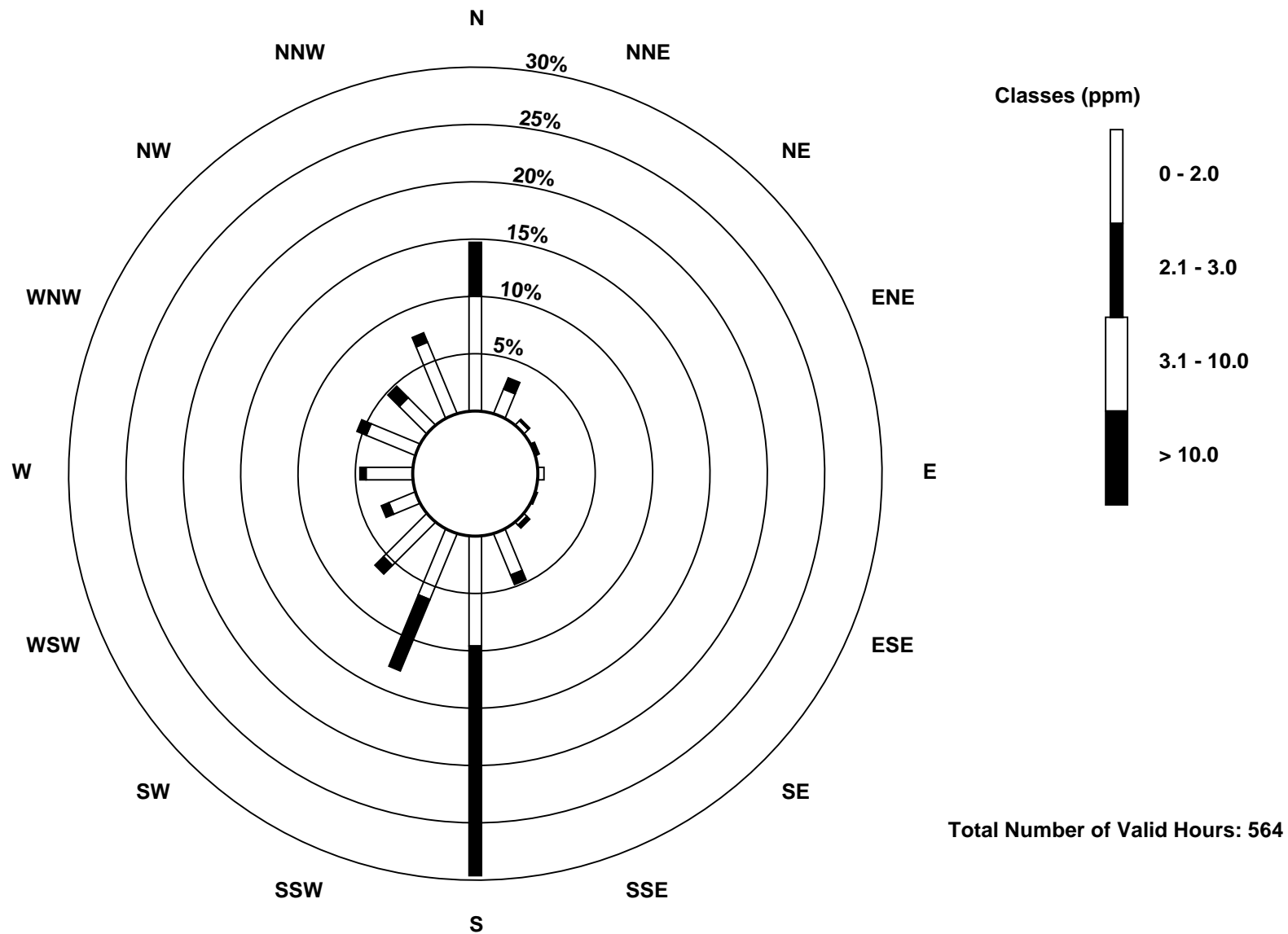
Wood Buffalo Environmental Association
Frequency Distribution

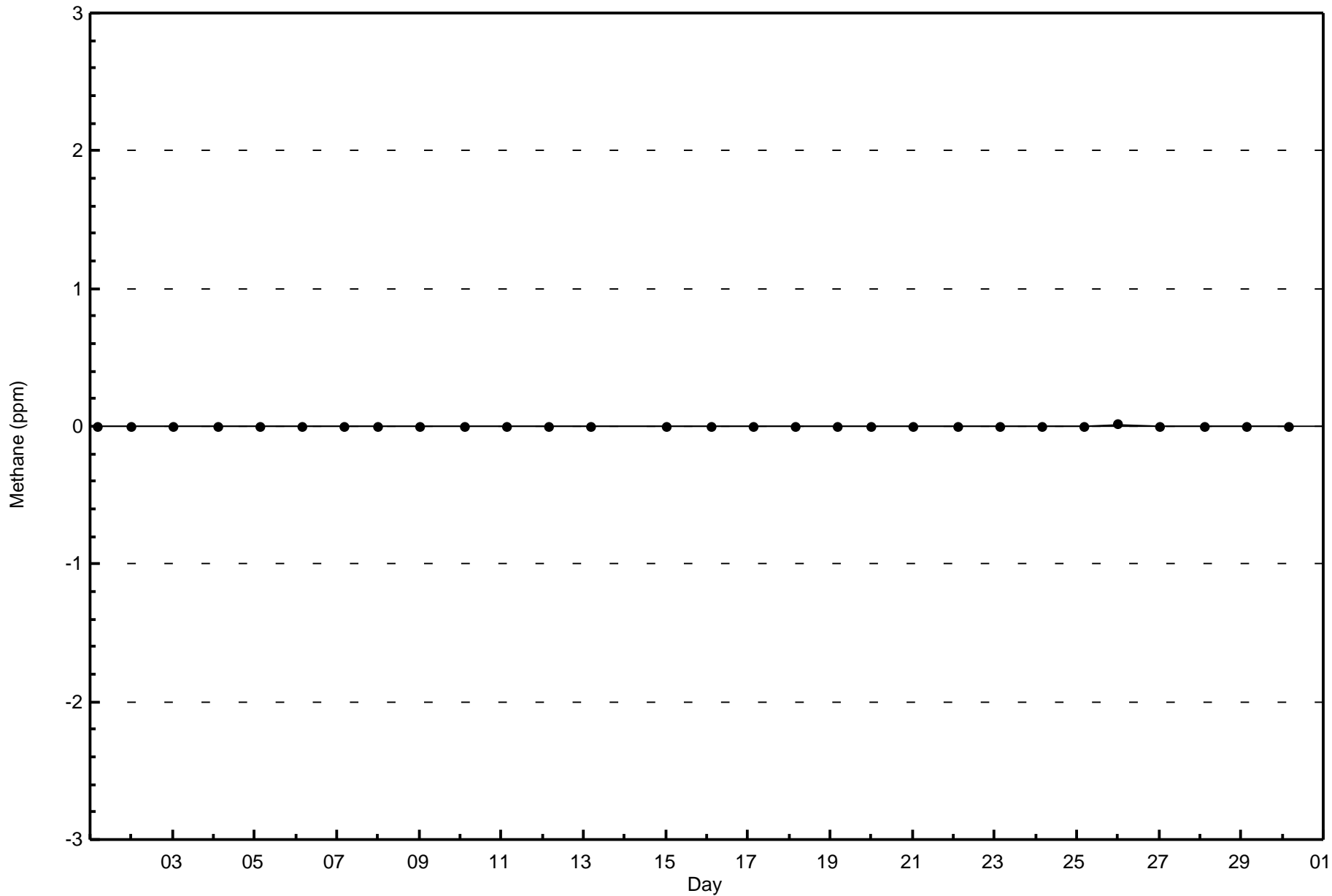
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - November 2015

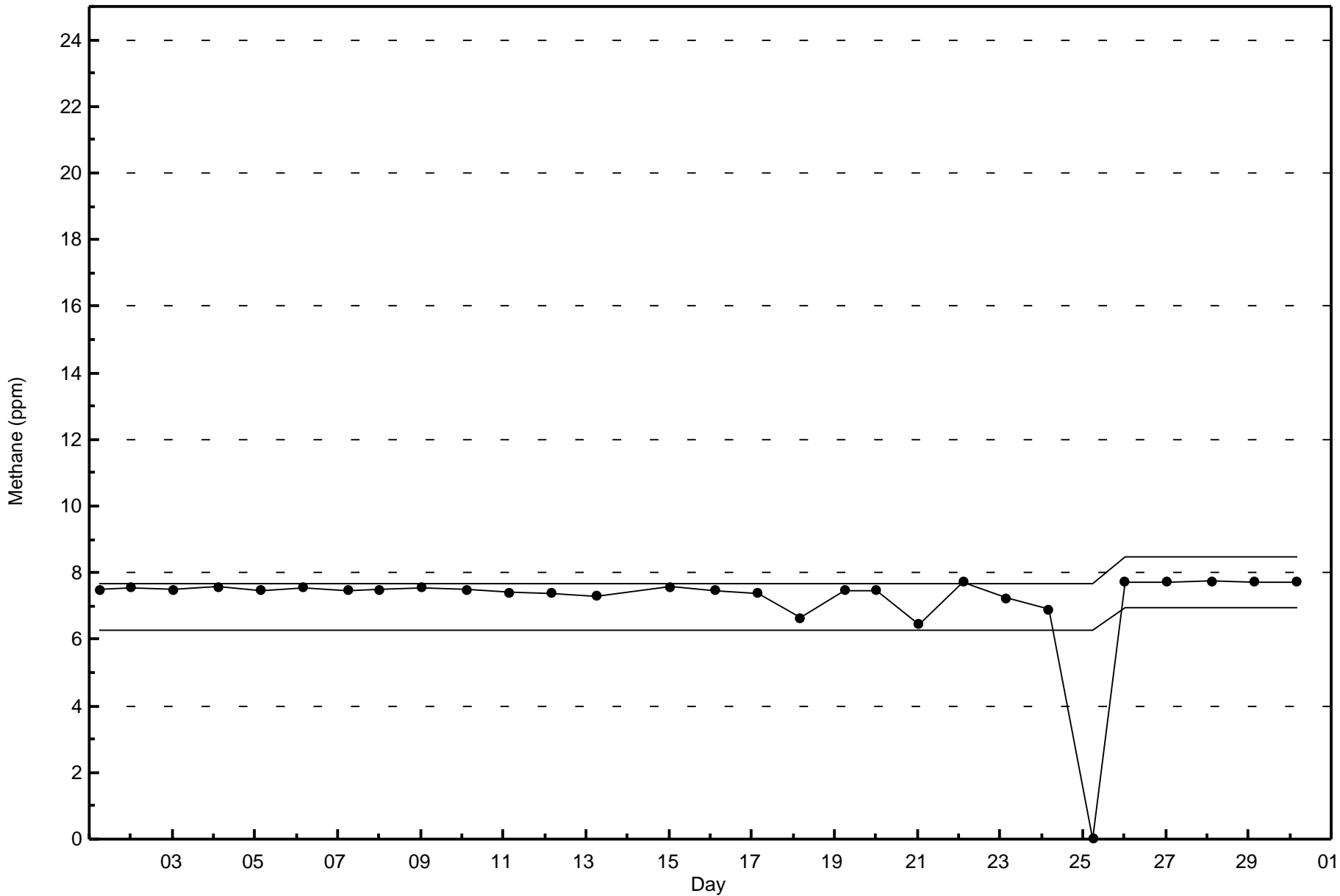
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	57	13	3	1	3	0	2	22	54	35	30	14	23	26	19	38	340
2.1 - 3.0	26	6	1	1	0	1	2	5	113	38	6	4	3	5	8	5	224
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	83	19	4	2	3	1	4	27	167	73	36	18	26	31	27	43	564

Total Number of Valid Hours: 564

Total Number of Hours: 720









Summary of Hour Averages

Fort McKay - Bertha Ganter - November 2015

Maximum Value: 32 ppb on Nov 4 19:00																	Maximum Daily Average: 8.3 ppb on Nov 25																	Hours in Service: 720	
Minimum Value: 0 ppb on Nov 11 17:00																	Minimum Daily Average: 0.0 ppb on Nov 18																	Hours of Data: 685	
Maximum Diurnal Average: 4.0 ppb at hour 11																	Minimum Diurnal Average: 0.1 ppb at hour 4																	Hours of Missing Data: 35	
Monthly Average: 1.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 1 P ₉₀ = 5 P ₉₉ = 25																	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-Nov	1	0	0	0	0	Z	0	0	0	1	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0.6	3									
2-Nov	Z	0	0	0	0	1	0	0	0	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0.5	3									
3-Nov	0	Z	0	0	0	0	0	0	1	1	6	11	7	7	3	2	1	0	0	0	0	0	0	1.8	11										
4-Nov	0	0	Z	0	0	0	0	0	0	2	6	8	12	11	10	8	9	11	32	25	6	2	0	6.3	32										
5-Nov	0	0	0	Z	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1										
6-Nov	0	0	0	0	Z	0	0	1	5	5	3	1	1	1	1	0	0	0	0	0	0	0	0	0.9	5										
7-Nov	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	1	0.5	3										
8-Nov	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										
9-Nov	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	1	0	0	0	0	0	1	0	0	0.4	2										
10-Nov	0	0	Z	0	0	0	0	1	2	3	3	2	2	1	1	1	0	0	0	0	0	0	0	0.7	3										
11-Nov	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1										
12-Nov	0	0	0	0	Z	0	0	1	8	4	4	4	2	1	1	1	0	0	0	0	0	0	0	1.2	8										
13-Nov	0	0	0	0	0	Z	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3										
14-Nov	Z	0	0	0	0	0	0	1	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0.4	3										
15-Nov	0	Z	0	0	0	0	0	0	0	5	28	8	6	1	1	1	0	0	0	0	0	0	0	2.3	28										
16-Nov	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	1	0	0	0.2	1										
17-Nov	1	2	5	Z	1	3	1	3	1	1	3	3	3	0	0	1	1	0	0	0	0	0	0	1.2	5										
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0										
19-Nov	0	0	0	0	0	Z	0	0	2	12	13	9	13	7	5	13	7	6	13	9	16	15	9	6.6	16										
20-Nov	Z	7	3	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.7	7										
21-Nov	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1										
22-Nov	0	0	Z	0	0	0	0	0	0	6	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	6										
23-Nov	0	0	0	Z	0	0	0	0	0	3	5	3	1	1	0	0	0	0	0	0	0	0	0	0.6	5										
24-Nov	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0.3	2										
25-Nov	0	0	0	0	0	Z	0	0	1	3	2	4	6	6	10	3	2	9	21	26	32	28	21	8.3	32										
26-Nov	Z	4	1	0	0	0	1	2	3	9	13	12	10	8	4	1	0	0	0	0	0	0	0	3.0	13										
27-Nov	0	Z	0	0	0	0	0	1	1	0	1	1	2	1	2	2	2	15	25	24	25	24	14	6.6	25										
28-Nov	3	1	Z	0	2	1	0	1	2	4	5	5	6	6	4	1	0	0	0	1	0	0	0	1.9	6										
29-Nov	0	0	0	Z	0	0	0	1	1	3	7	9	6	4	5	2	0	0	0	0	0	0	0	1.7	9										
30-Nov	0	0	0	0	Z	0	0	1	1	3	6	5	4	3	3	4	3	5	6	6	1	0	0	2.4	6										
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan C - Calibration																																			

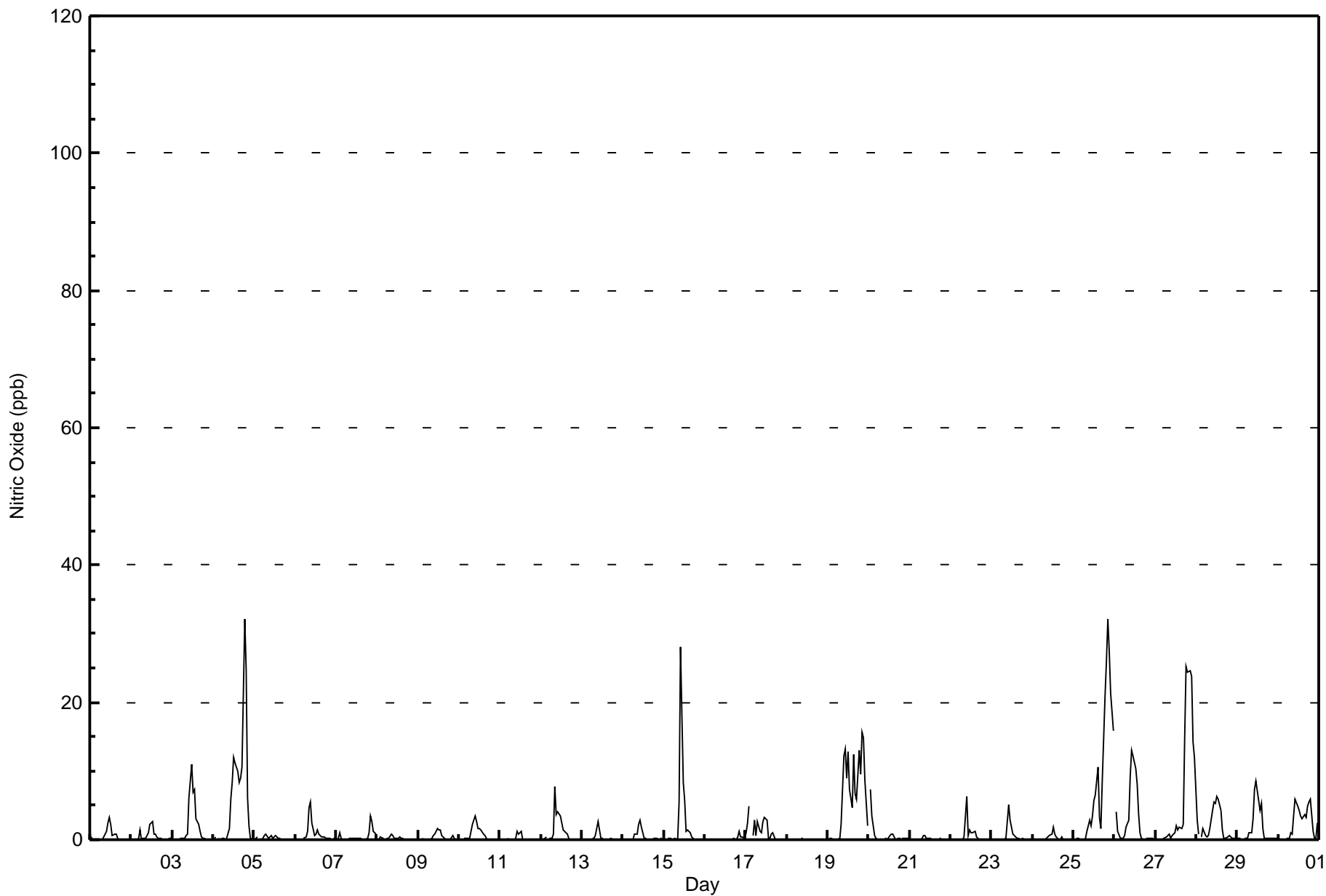


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort McKay - Bertha Ganter - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	673	98.25	98.25
21 - 40	12	1.75	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	84	20	4	2	3	1	4	34	194	90	54	26	29	36	35	57	673
21 - 40	1	0	0	0	0	0	0	0	4	5	0	1	0	1	0	0	12
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	20	4	2	3	1	4	34	198	95	54	27	29	37	35	57	685

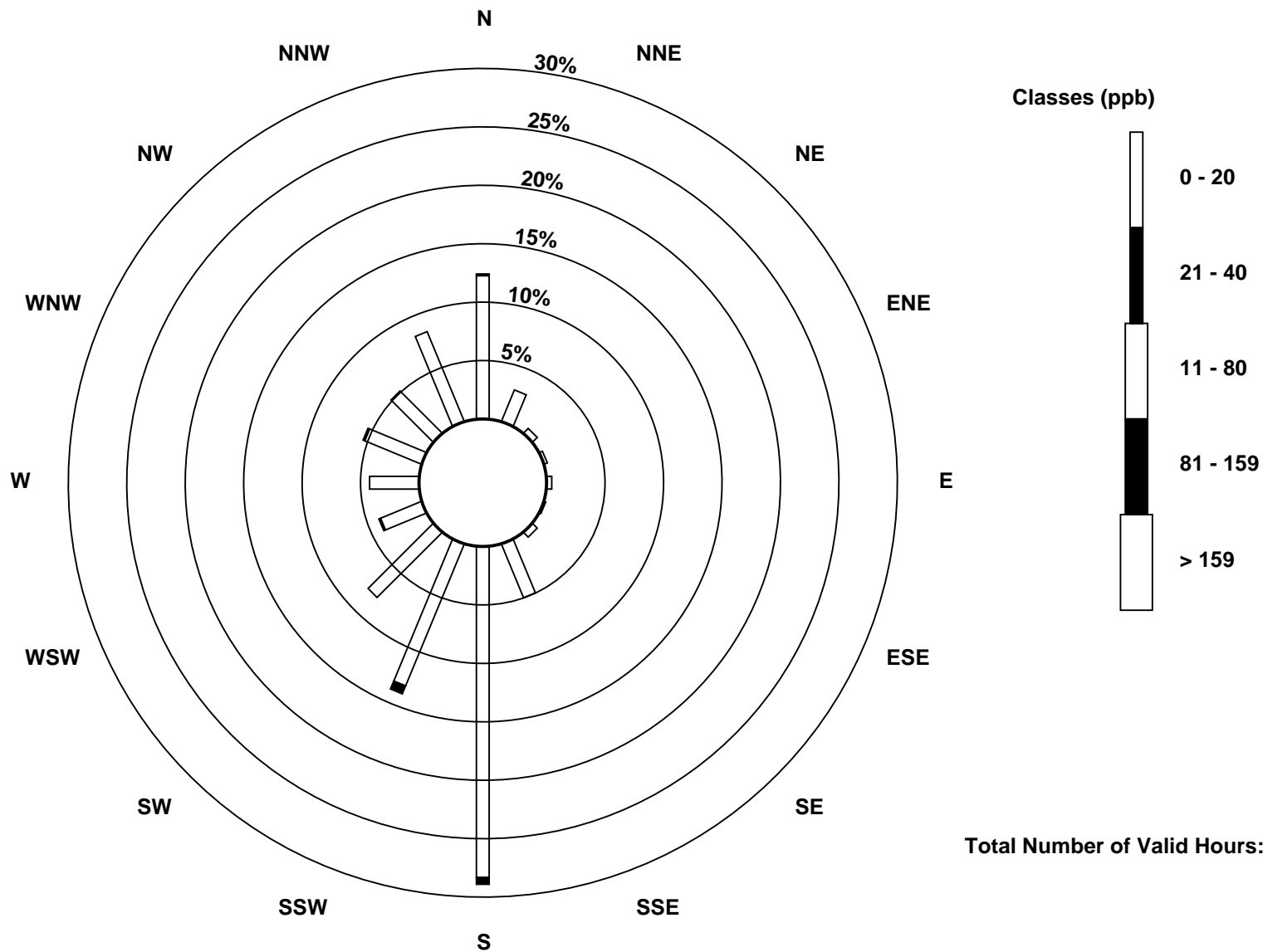
Total Number of Valid Hours: 685

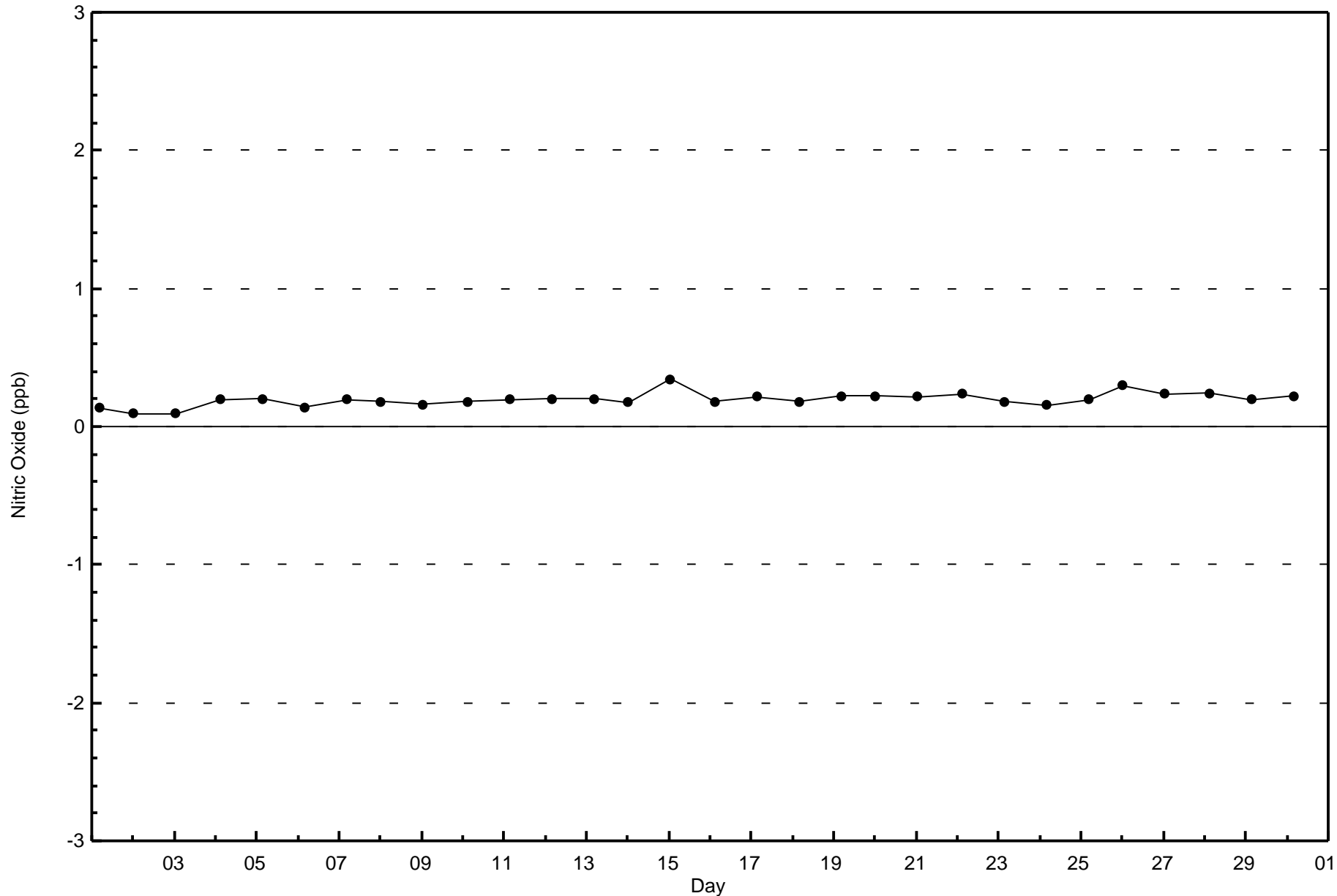
Total Number of Hours: 720

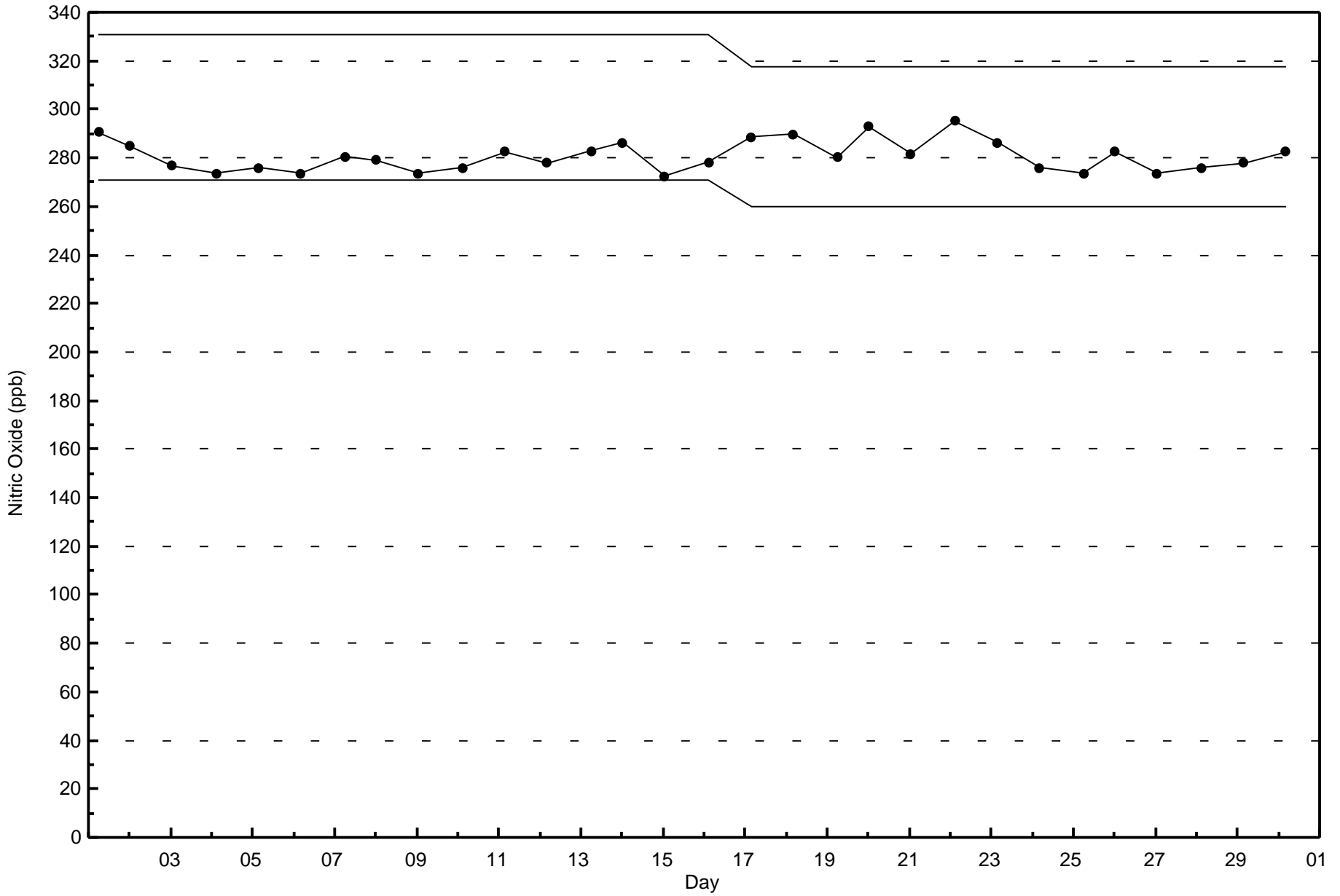


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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







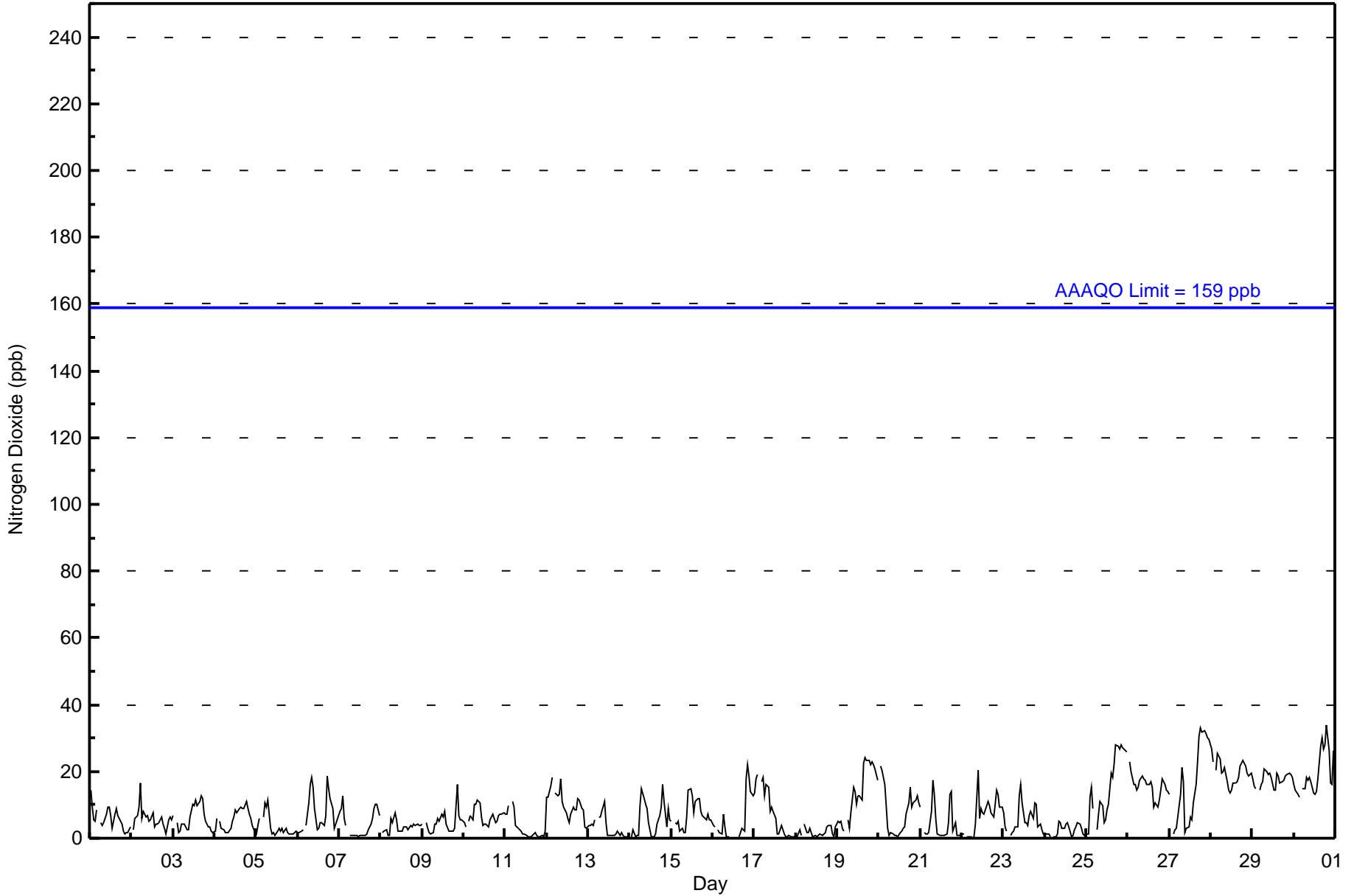


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 34 ppb on Nov 30 20:00	Maximum Daily Average: 19.7 ppb on Nov 28
Minimum Value: 0 ppb on Nov 22 07:00	Hours of Data: 685
Maximum Diurnal Average: 10.6 ppb at hour 21	Hours of Missing Data: 35
Monthly Average: 8.1 ppb	Hours of Calibration: 35
Minimum Daily Average: 1.8 ppb on Nov 18	Percent Operational Time: 100.0
Minimum Diurnal Average: 6.0 ppb at hour 14	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 13 P ₉₀ = 18 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-Nov	14	9	6	5	8	Z	5	4	5	7	9	9	7	3	7	9	7	6	4	2	1	2	2	4	5.9	14
2-Nov	Z	3	6	7	9	17	6	8	7	7	5	6	8	4	4	4	5	6	4	3	1	6	7	5	5.9	17
3-Nov	7	Z	5	2	2	4	4	3	3	3	6	10	10	12	10	11	13	12	7	5	3	3	2	2	6.0	13
4-Nov	2	6	Z	5	3	3	2	2	2	3	5	6	9	8	9	9	9	11	9	7	6	4	2	2	5.6	11
5-Nov	1	4	6	Z	6	11	9	11	3	1	2	1	2	3	2	3	2	3	2	1	1	1	2	2	3.5	11
6-Nov	2	2	2	2	Z	4	10	16	18	15	9	3	3	5	5	4	7	19	15	12	9	3	4	6	7.6	19
7-Nov	8	9	13	6	4	Z	1	1	1	1	1	1	1	1	1	1	1	3	4	6	9	10	10	7	4.2	13
8-Nov	Z	2	2	3	1	1	6	5	8	5	2	2	2	4	3	3	3	4	3	4	4	4	4	4	3.4	8
9-Nov	4	Z	5	3	2	1	2	4	4	6	5	7	7	8	4	2	2	2	2	3	16	7	6	6	4.6	16
10-Nov	5	3	Z	5	7	6	10	10	11	11	6	4	4	4	3	6	7	7	5	5	7	7	7	8	6.4	11
11-Nov	7	7	10	Z	11	9	4	3	3	2	1	1	1	0	0	1	1	2	1	1	1	1	1	2	3.0	11
12-Nov	12	12	16	18	Z	14	13	13	18	11	10	8	6	5	7	9	8	9	12	11	9	8	3	3	10.2	18
13-Nov	4	4	4	4	5	Z	6	7	8	11	5	1	1	1	1	1	1	2	1	2	1	1	1	1	3.1	11
14-Nov	Z	1	3	1	1	1	10	15	12	10	9	5	1	1	1	1	4	7	9	16	11	3	9	6	5.8	16
15-Nov	5	Z	5	4	5	2	3	2	2	6	14	15	13	8	11	12	12	8	7	6	5	7	5	5	7.1	15
16-Nov	4	3	Z	3	2	1	7	3	1	1	C	C	C	C	C	0	2	3	2	18	22	19	14	13	6.5	22
17-Nov	13	18	19	Z	17	18	13	16	15	8	9	8	6	1	1	3	4	1	1	1	1	1	0	0	7.6	19
18-Nov	0	0	3	1	Z	4	2	2	3	2	1	1	1	1	1	1	1	2	3	4	4	1	1	4	1.8	4
19-Nov	5	5	5	3	2	Z	6	3	8	15	14	10	13	13	11	23	24	23	23	22	23	22	21	17	13.5	24
20-Nov	Z	22	21	16	10	3	1	2	1	1	1	0	2	2	3	4	7	11	15	10	11	12	13	10	7.6	22
21-Nov	10	Z	2	1	1	2	8	17	13	6	1	1	1	1	1	1	5	13	14	2	5	1	1	1	4.7	17
22-Nov	1	1	Z	1	0	0	0	0	4	20	6	9	8	7	10	11	10	8	6	10	14	13	10	9	6.9	20
23-Nov	8	3	2	Z	1	2	2	4	3	13	16	11	5	5	4	7	8	6	10	10	4	4	3	1	5.6	16
24-Nov	1	1	1	0	Z	1	1	1	5	5	3	3	4	5	4	1	1	3	4	5	4	3	1	1	2.4	5
25-Nov	1	1	12	15	9	Z	2	7	11	10	5	6	8	10	19	18	22	28	28	27	28	27	27	26	15.1	28
26-Nov	Z	23	20	16	16	15	15	17	19	18	17	16	16	17	15	10	10	9	12	15	18	16	15	14	15.5	23
27-Nov	13	Z	1	3	3	7	13	21	17	2	3	3	6	5	10	16	23	31	33	32	32	32	30	30	15.9	33
28-Nov	27	23	Z	21	25	24	20	20	21	17	14	14	15	16	17	17	18	22	24	23	22	19	19	20	19.7	27
29-Nov	18	16	15	Z	14	16	17	21	20	19	20	18	15	14	19	19	16	17	17	19	19	20	19	18	17.6	21
30-Nov	16	14	13	12	Z	15	15	18	18	18	17	14	13	14	18	28	30	27	28	34	26	16	16	26	19.4	34

7.5	7.7	7.8	6.2	6.6	7.1	7.1	8.5	8.7	8.5	7.4	6.6	6.3	6.0	6.9	7.8	8.8	10.0	10.2	10.5	10.6	9.1	8.4	8.4	Diurnal Average
27	23	21	21	25	24	20	21	21	20	20	18	16	17	19	28	30	31	33	34	32	32	30	30	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	93.14	93.14
21 - 40	47	6.86	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



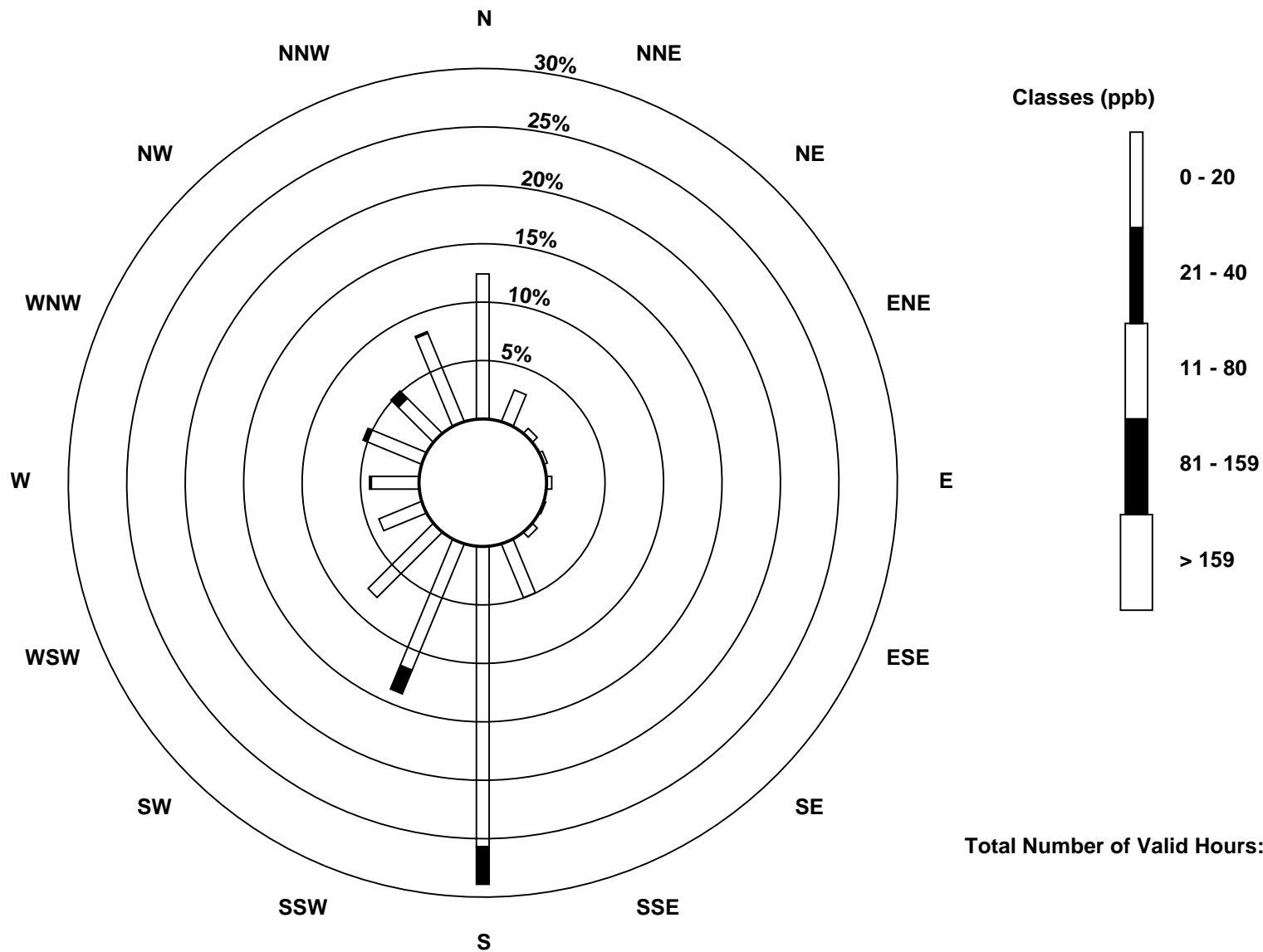
Wood Buffalo Environmental Association
Frequency Distribution

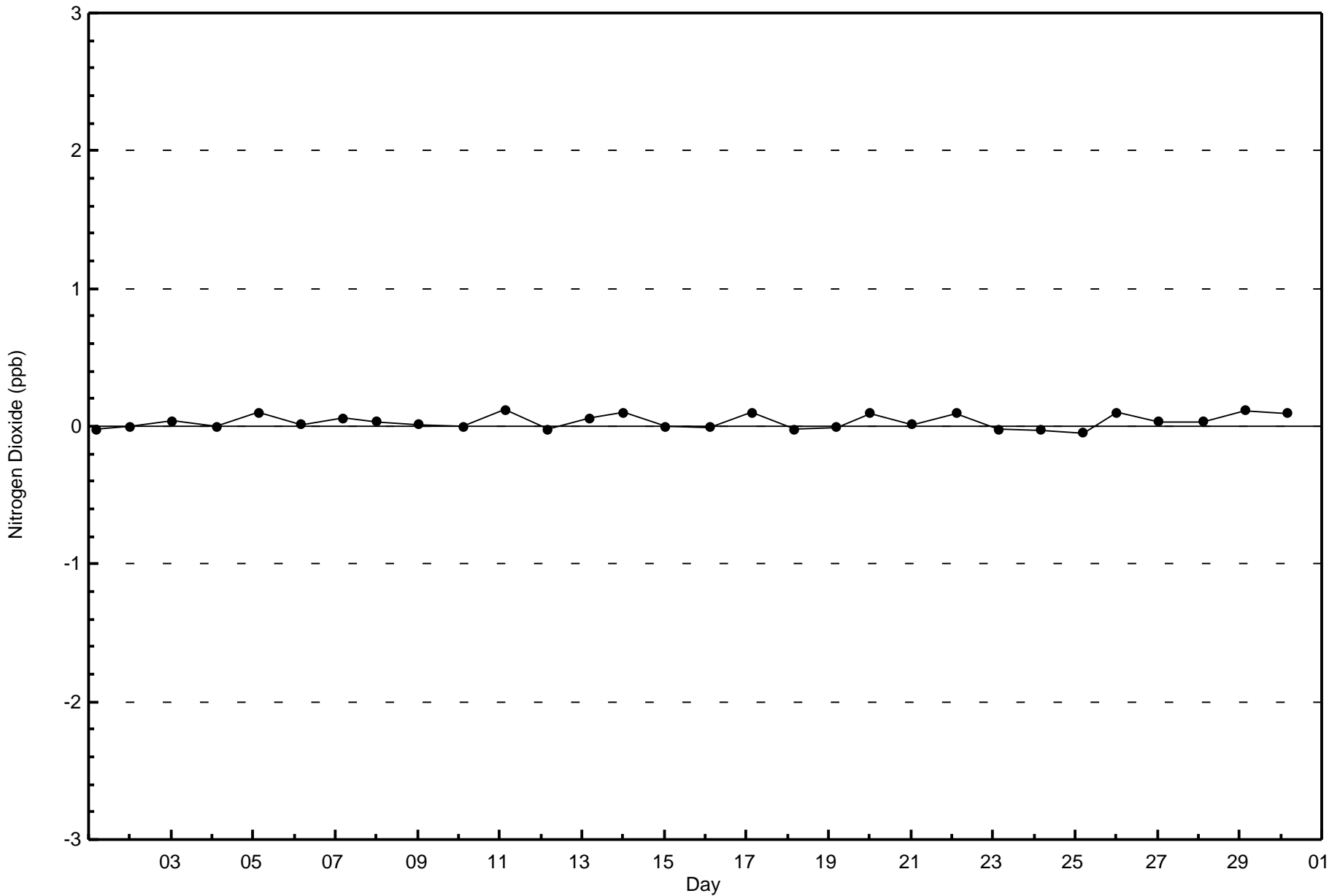
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - November 2015

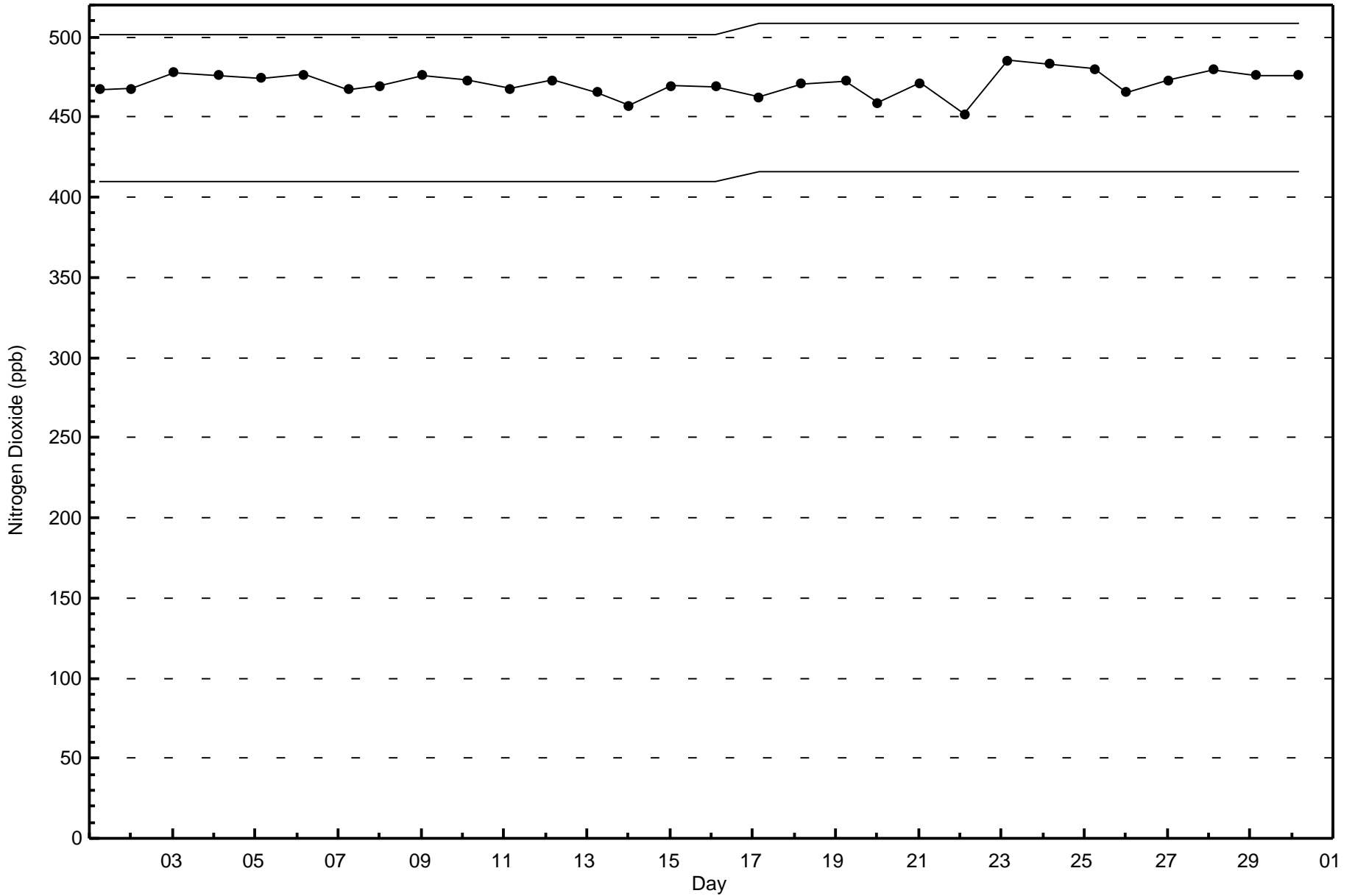
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	85	20	4	2	3	1	4	34	176	80	54	27	28	35	29	56	638
21 - 40	0	0	0	0	0	0	0	0	22	15	0	0	1	2	6	1	47
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	20	4	2	3	1	4	34	198	95	54	27	29	37	35	57	685

Total Number of Valid Hours: 685

Total Number of Hours: 720







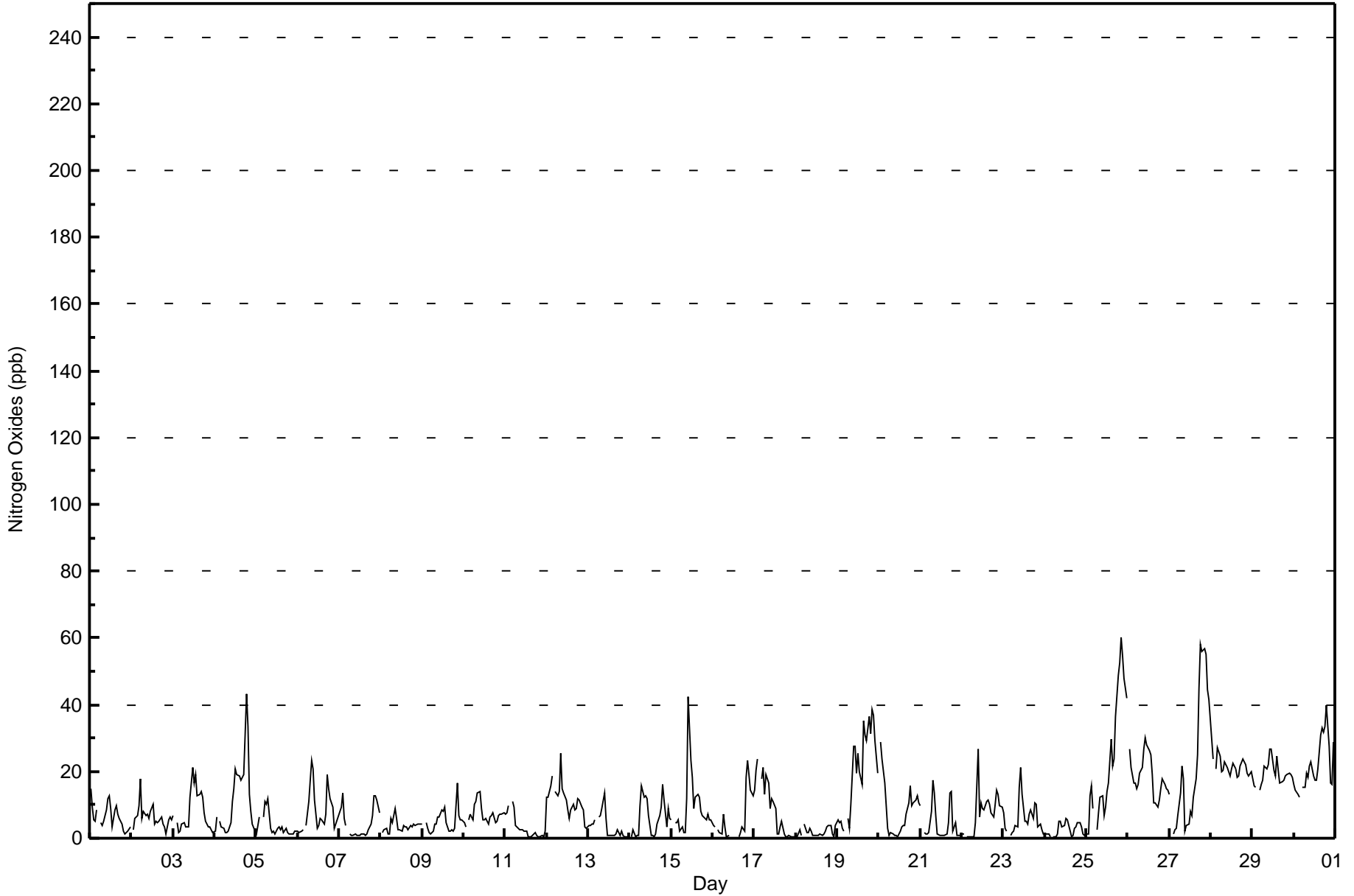


Maximum Value: 60 ppb on Nov 25 21:00	Maximum Daily Average: 23.4 ppb on Nov 25	Hours in Service: 720
Minimum Value: 0 ppb on Nov 22 07:00	Minimum Daily Average: 1.8 ppb on Nov 18	Hours of Data: 685
Maximum Diurnal Average: 13.6 ppb at hour 20	Minimum Diurnal Average: 6.4 ppb at hour 4	Hours of Missing Data: 35
Monthly Average: 9.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 14 P ₉₀ = 22 P ₉₉ = 52	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-Nov	15	9	6	5	8	Z	5	4	5	9	12	13	9	4	8	10	7	6	4	2	1	2	2	3	6.5	15
2-Nov	Z	3	6	7	10	18	6	8	7	7	6	8	10	4	5	5	5	7	4	3	1	6	7	5	6.4	18
3-Nov	7	Z	5	2	2	4	4	3	3	3	12	21	17	19	13	13	14	12	7	5	3	3	2	2	7.8	21
4-Nov	2	6	Z	5	3	3	2	2	2	5	11	15	21	19	19	17	18	19	43	34	13	8	4	2	11.9	43
5-Nov	1	4	6	Z	6	11	10	12	3	2	2	1	3	4	2	3	2	3	2	1	1	1	2	2	3.7	12
6-Nov	2	2	2	3	Z	4	11	17	23	21	11	3	4	6	5	4	7	19	15	12	9	3	4	6	8.4	23
7-Nov	8	9	13	6	4	Z	1	1	1	1	1	1	1	1	1	1	1	3	4	7	13	13	12	8	4.8	13
8-Nov	Z	2	2	3	1	1	6	5	9	6	2	2	2	4	3	3	3	4	3	4	4	4	4	4	3.6	9
9-Nov	4	Z	5	3	2	1	2	4	4	6	6	9	8	9	5	2	2	2	2	3	17	7	6	6	5.0	17
10-Nov	5	3	Z	5	7	6	10	11	13	14	9	5	6	6	4	6	7	8	5	5	7	7	7	8	7.1	14
11-Nov	7	7	10	Z	11	9	4	3	3	2	3	2	2	0	0	1	1	2	1	1	1	1	1	2	3.2	11
12-Nov	12	12	16	19	Z	14	13	14	26	15	14	11	8	6	8	10	9	9	12	11	9	8	3	3	11.4	26
13-Nov	4	4	4	4	5	Z	6	7	9	14	6	1	1	1	1	1	1	2	1	2	1	1	0	1	3.3	14
14-Nov	Z	1	3	1	1	1	10	15	12	13	12	7	1	1	1	1	4	7	9	16	11	3	9	6	6.3	16
15-Nov	5	Z	5	4	5	2	3	2	2	12	42	23	18	9	12	13	12	8	7	6	5	7	5	5	9.4	42
16-Nov	4	4	Z	3	2	1	7	3	1	1	C	C	C	C	C	0	2	3	2	18	23	19	14	13	6.7	23
17-Nov	14	21	24	Z	18	21	13	19	16	9	12	11	9	1	1	3	5	1	1	1	1	1	0	0	8.8	24
18-Nov	0	0	3	1	Z	4	2	2	3	2	1	1	1	1	1	1	1	2	3	4	4	1	0	4	1.8	4
19-Nov	5	5	5	3	2	Z	6	3	10	27	27	19	25	20	16	35	31	29	36	31	39	37	29	19	20.0	39
20-Nov	Z	29	24	17	10	3	1	2	1	1	1	1	2	3	4	4	7	11	16	10	11	12	13	10	8.3	29
21-Nov	10	Z	2	1	1	2	8	17	14	7	1	1	1	1	1	1	5	13	14	2	5	1	1	1	4.8	17
22-Nov	1	1	Z	1	0	0	0	0	4	27	6	11	9	8	11	12	10	8	6	10	15	13	10	9	7.5	27
23-Nov	8	3	2	Z	1	2	2	4	3	15	21	13	5	5	4	7	8	6	10	10	4	4	3	1	6.2	21
24-Nov	1	1	1	0	Z	1	1	1	5	5	3	4	6	5	4	1	1	3	3	5	4	3	1	1	2.7	6
25-Nov	1	1	13	16	9	Z	2	7	12	13	7	9	14	17	30	22	24	36	49	53	60	54	48	42	23.4	60
26-Nov	Z	27	21	17	16	15	16	19	21	27	30	28	26	25	19	10	11	9	12	15	18	16	15	14	18.6	30
27-Nov	13	Z	1	3	3	7	13	22	18	2	4	4	8	7	12	18	25	45	58	56	57	55	44	42	22.5	58
28-Nov	30	24	Z	21	27	24	20	20	23	21	20	19	21	22	21	18	19	22	24	23	22	20	19	20	21.7	30
29-Nov	18	16	15	Z	14	16	17	22	21	22	27	27	20	19	24	20	17	17	18	19	19	20	19	18	19.3	27
30-Nov	16	15	13	12	Z	15	15	19	18	22	23	18	17	17	21	31	33	32	33	40	27	17	16	29	21.8	40

7.8	8.3	8.3	6.4	6.8	7.4	7.3	9.0	9.8	11.0	11.5	9.9	9.5	8.4	8.9	9.2	9.7	11.6	13.5	13.6	13.5	11.6	10.0	9.5		Diurnal Average
30	29	24	21	27	24	20	22	26	27	42	28	26	25	30	35	33	45	58	56	60	55	48	42		Diurnal Maximum

Z - zerspan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	600	87.59	87.59
21 - 40	70	10.22	97.81
41 - 80	15	2.19	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



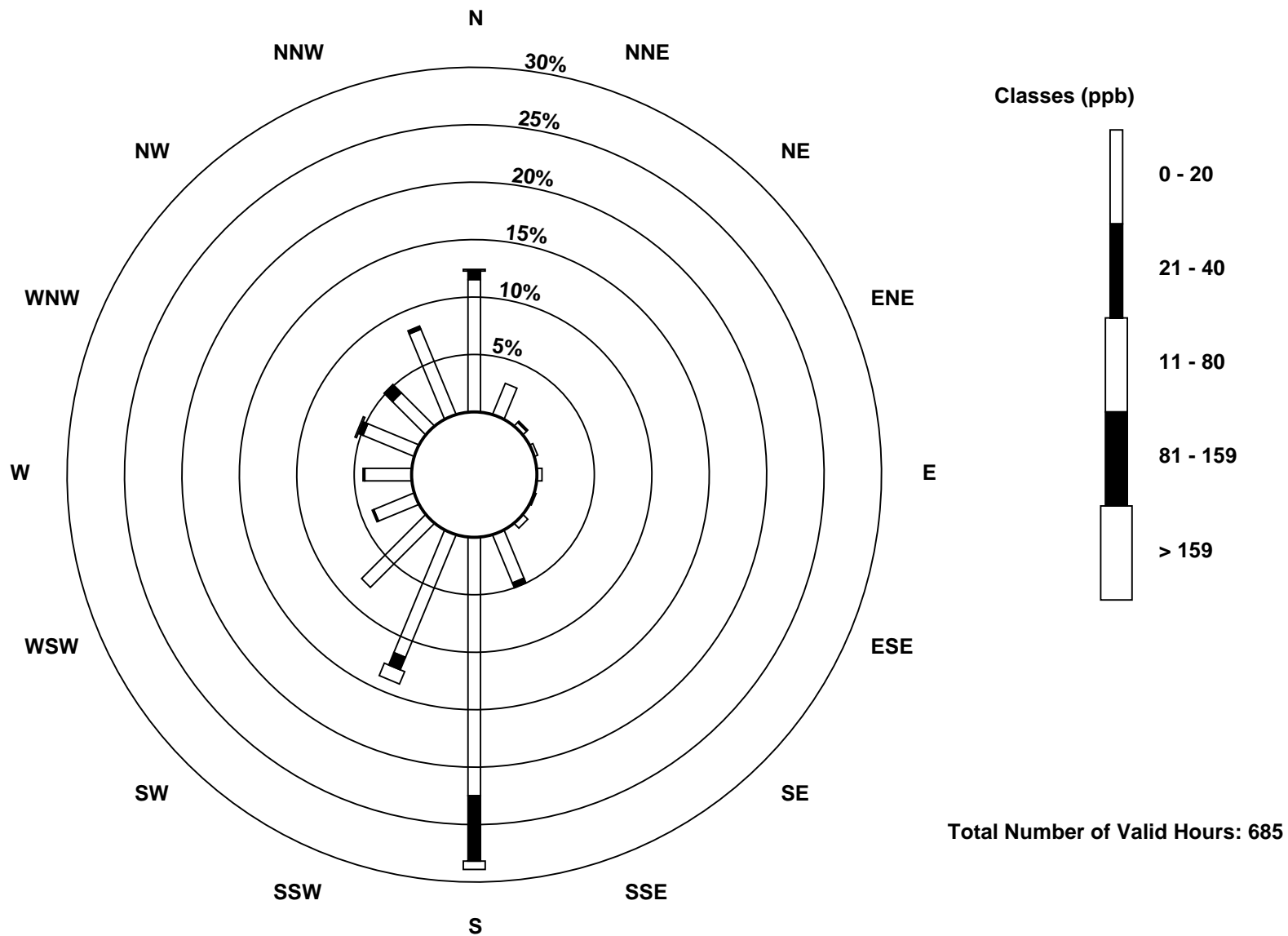
Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	79	20	3	2	3	1	4	31	154	79	54	26	28	33	28	55	600
21 - 40	5	0	1	0	0	0	0	3	39	8	0	1	1	3	7	2	70
11 - 80	1	0	0	0	0	0	0	0	5	8	0	0	0	1	0	0	15
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	20	4	2	3	1	4	34	198	95	54	27	29	37	35	57	685

Total Number of Valid Hours: 685

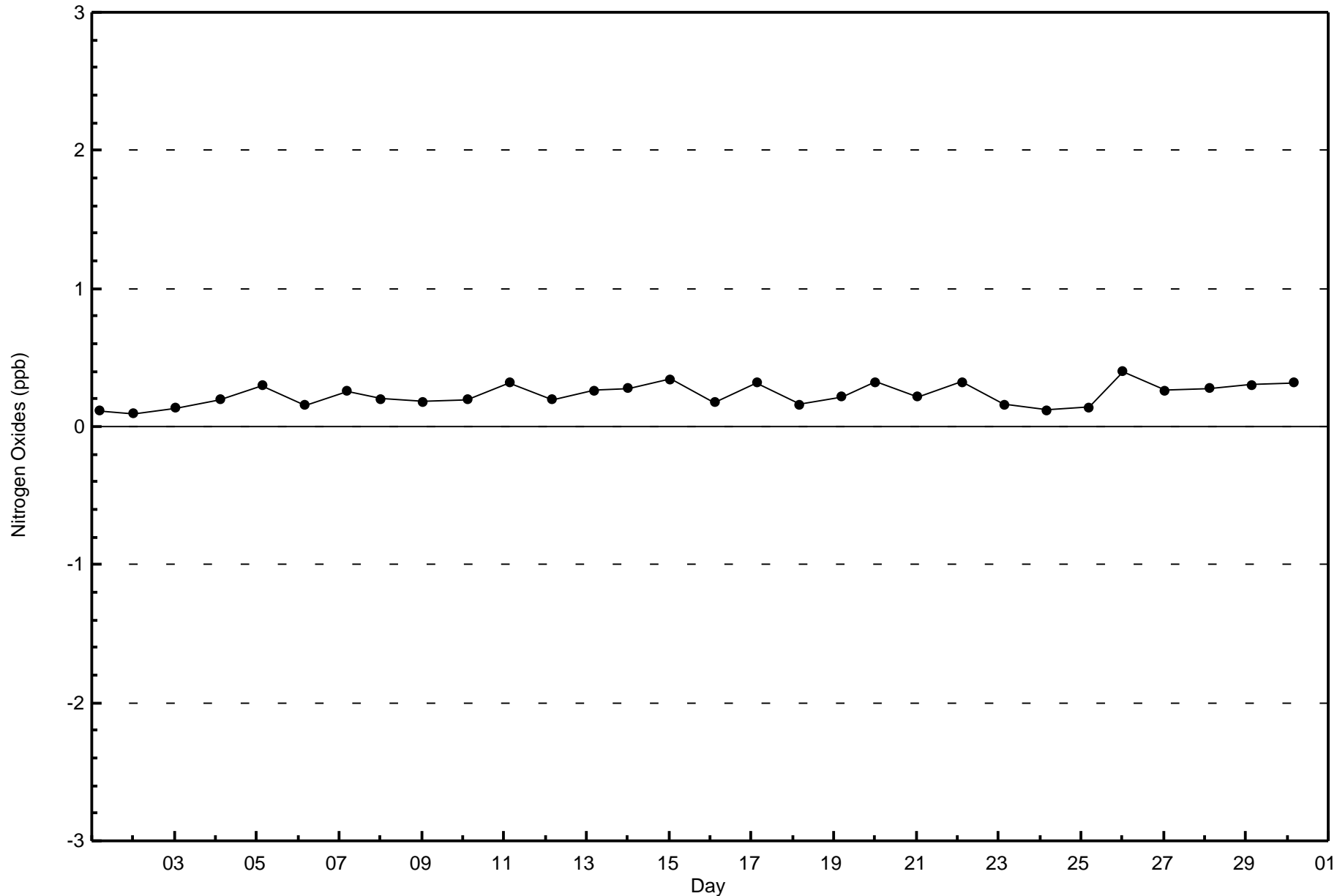
Total Number of Hours: 720

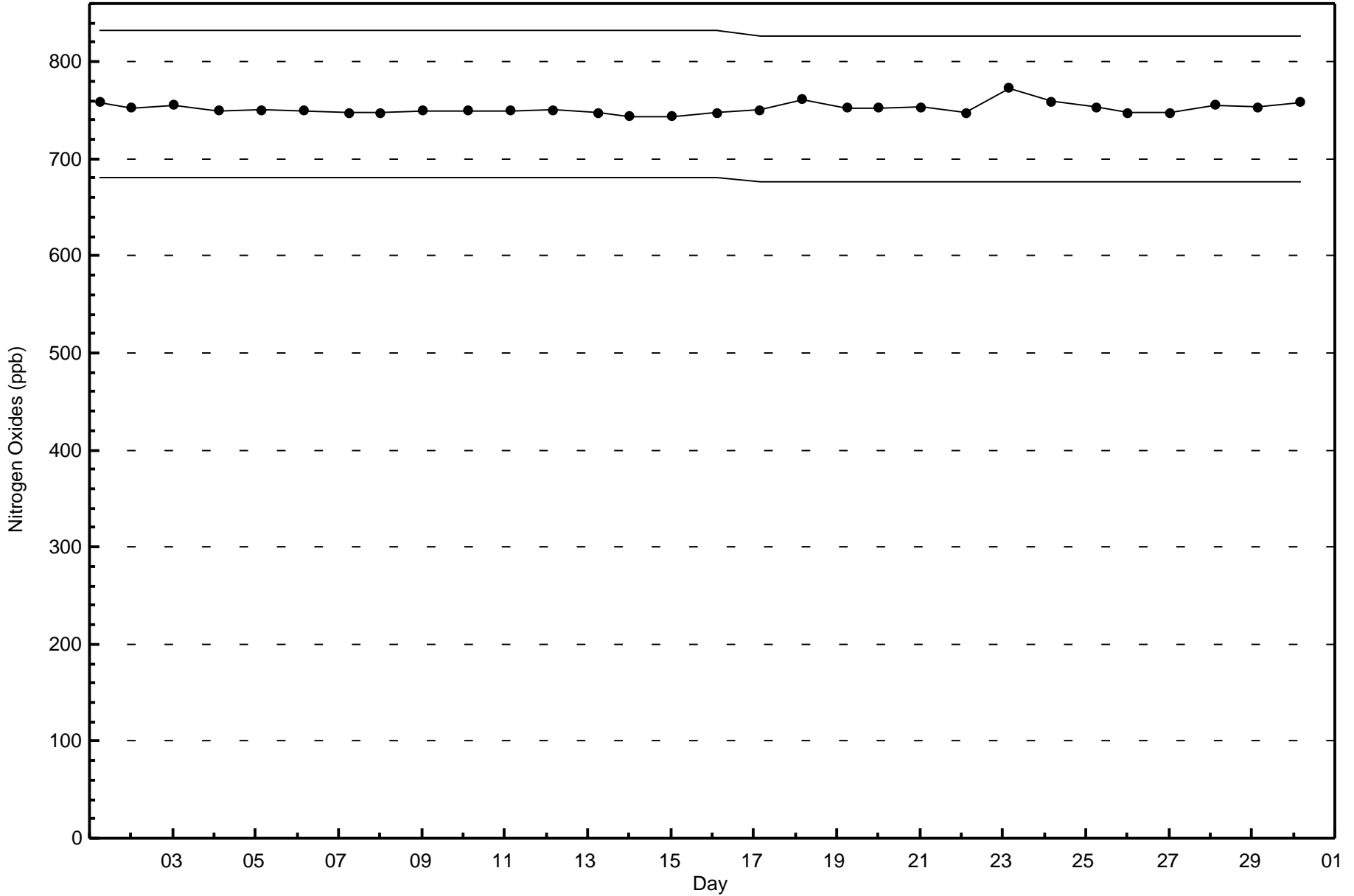




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - November 2011







Summary of Hour Averages

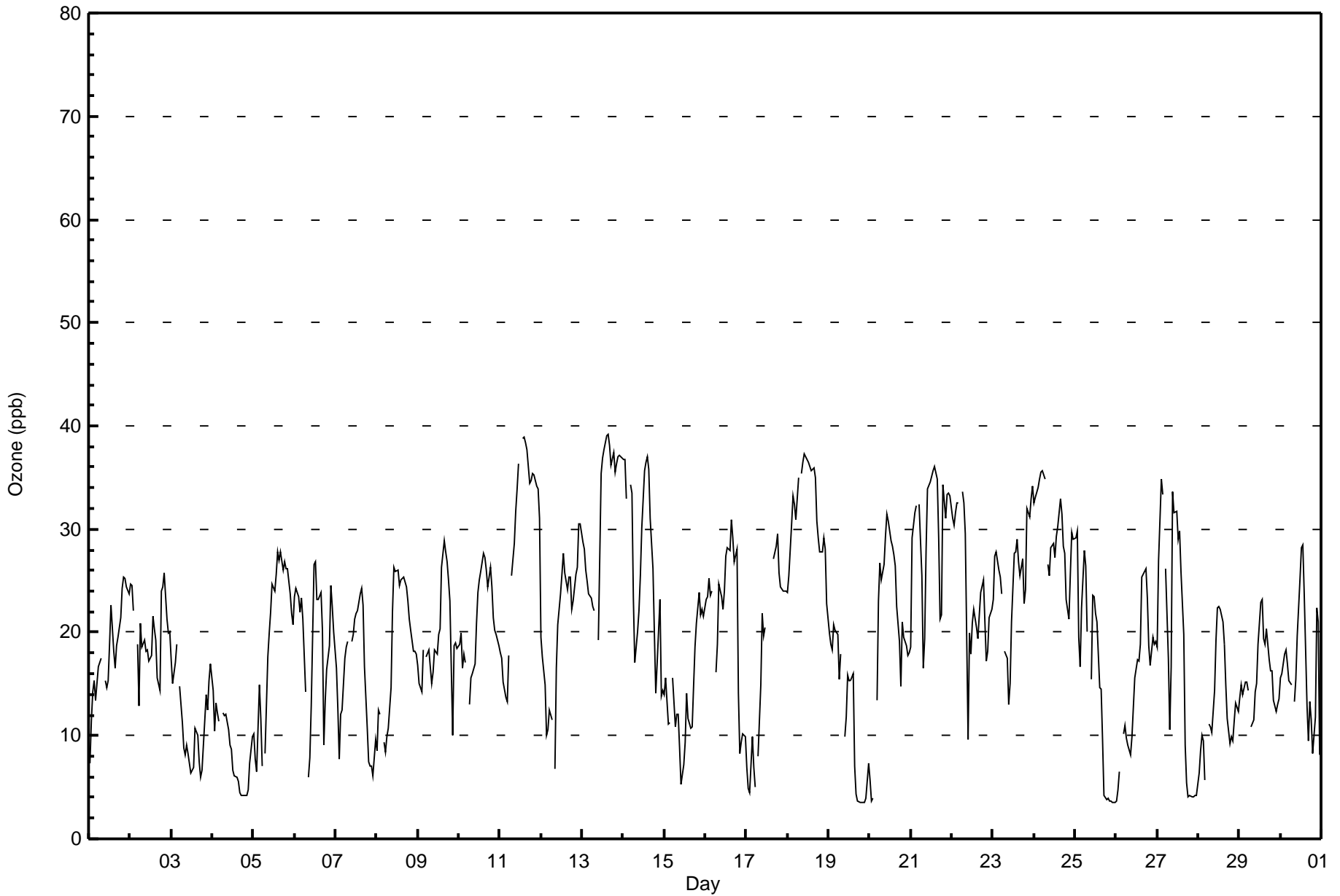
Fort McKay - Bertha Ganter - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 39 ppb on Nov 13 16:00	Maximum Daily Average: 31.8 ppb on Nov 18		Hours of Data:	685
Minimum Value: 4 ppb on Nov 19 20:00	Minimum Daily Average: 8.4 ppb on Nov 4		Hours of Missing Data:	35
Maximum Diurnal Average: 24.8 ppb at hour 14	Minimum Diurnal Average: 16.1 ppb at hour 8		Hours of Calibration:	34
Monthly Average: 20.1 ppb	Percentiles: P ₁ = 4 P ₁₀ = 8 Q ₁ = 13 Median = 20 Q ₃ = 26 P ₉₀ = 33 P ₉₉ = 38		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	7	11	14	15	13	17	17	17	Z	15	15	15	19	23	18	17	19	19	21	24	25	25	24	24	18.1	25
2-Nov	25	25	22	Z	19	13	21	19	19	18	18	17	18	22	20	19	16	14	24	24	26	21	20	20	20.0	26
3-Nov	17	15	17	19	Z	15	11	9	8	9	8	6	7	7	11	10	8	6	7	9	14	12	15	17	11.2	19
4-Nov	14	11	13	12	11	Z	12	12	12	11	9	7	6	6	6	4	4	4	4	4	4	5	7	10	8.4	14
5-Nov	10	8	7	15	12	7	Z	8	18	20	22	25	24	26	28	27	28	26	27	26	26	24	22	21	19.8	28
6-Nov	23	24	24	22	23	21	14	Z	6	8	13	27	27	23	23	24	20	9	13	16	19	25	22	20	19.5	27
7-Nov	17	13	8	12	12	17	19	19	Z	19	20	21	22	22	24	24	23	17	11	7	7	7	6	10	15.5	24
8-Nov	8	12	12	Z	9	8	10	11	15	22	26	26	26	25	25	25	25	24	23	21	20	18	18	18	18.7	26
9-Nov	17	15	14	18	Z	18	18	17	15	16	18	18	20	20	26	29	28	27	25	23	10	19	19	18	19.5	29
10-Nov	19	20	16	18	17	Z	13	16	16	17	21	24	25	26	28	27	26	24	26	24	21	20	20	19	21.0	28
11-Nov	18	17	15	14	13	18	Z	26	29	32	34	36	PF	39	39	38	38	34	35	35	35	34	34	31	29.3	39
12-Nov	20	18	15	10	11	13	11	Z	7	17	21	24	26	28	26	24	25	25	22	23	26	26	31	31	20.7	31
13-Nov	29	28	26	25	24	23	22	22	Z	19	27	35	37	38	39	39	38	36	37	35	36	37	37	37	31.7	39
14-Nov	37	37	33	Z	34	33	23	17	20	22	25	30	36	36	37	36	31	26	20	14	17	23	14	14	26.8	37
15-Nov	14	16	11	11	Z	16	11	12	12	9	5	7	9	14	12	11	11	15	19	21	24	22	22	22	14.1	24
16-Nov	23	23	25	24	24	Z	16	19	25	23	22	24	27	28	28	31	29	27	28	14	8	9	10	10	21.7	31
17-Nov	7	5	4	10	7	5	Z	8	15	22	20	20	C	C	C	C	27	28	30	26	24	24	24	24	17.4	30
18-Nov	24	25	31	33	32	31	35	Z	35	36	37	37	36	36	36	36	35	31	29	28	28	29	28	23	31.8	37
19-Nov	20	19	18	21	20	20	16	18	Z	10	12	16	15	15	16	7	4	4	4	4	4	4	4	7	12.0	21
20-Nov	6	4	4	Z	13	23	27	25	27	29	31	31	29	28	27	26	22	19	15	21	20	19	18	18	21.0	31
21-Nov	19	29	32	32	Z	32	26	17	19	28	34	35	35	36	36	35	29	21	22	34	31	33	33	33	29.6	36
22-Nov	31	30	32	33	33	Z	34	32	30	10	20	18	21	22	21	19	22	24	25	21	17	18	21	22	24.1	34
23-Nov	23	27	28	26	25	24	Z	18	17	13	15	21	28	28	29	27	26	27	23	24	32	31	33	34	25.2	34
24-Nov	33	33	34	35	36	36	35	Z	27	26	28	29	27	29	30	33	31	28	28	23	21	26	30	29	29.8	36
25-Nov	29	30	20	17	22	28	26	20	Z	16	24	23	22	21	15	15	10	4	4	4	4	4	4	4	15.8	30
26-Nov	4	5	7	Z	10	11	10	9	8	10	13	16	17	17	19	25	26	26	23	19	17	20	19	19	15.1	26
27-Nov	19	27	35	33	Z	26	17	11	17	34	32	32	29	30	26	20	9	5	4	4	4	4	4	4	18.5	35
28-Nov	6	9	10	9	6	Z	11	11	10	14	19	22	23	22	21	19	15	12	9	10	9	11	13	12	13.3	23
29-Nov	14	15	14	15	15	14	Z	11	12	14	15	19	23	23	19	19	20	17	16	16	13	12	13	14	15.9	23
30-Nov	16	16	18	18	17	15	15	Z	13	15	20	25	28	28	24	13	10	13	12	8	12	22	21	8	16.9	28

18.2	18.9	18.6	19.9	18.4	19.4	18.8	16.1	17.2	18.5	20.8	22.9	23.6	24.8	24.4	23.5	21.8	19.9	19.5	18.9	18.5	19.5	19.6	19.1	Diurnal Average		
37	37	35	35	36	36	35	32	35	36	37	37	37	39	39	39	38	36	37	35	36	37	37	37	37	Diurnal Maximum	

Z - zerspan C - Calibration PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	359	52.41	52.41
21 - 50	326	47.59	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	9	2	2	2	1	3	20	124	47	17	13	14	18	21	24	359
21 - 50	44	10	2	0	1	0	1	14	72	47	34	16	16	20	16	33	326
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	86	19	4	2	3	1	4	34	196	94	51	29	30	38	37	57	685

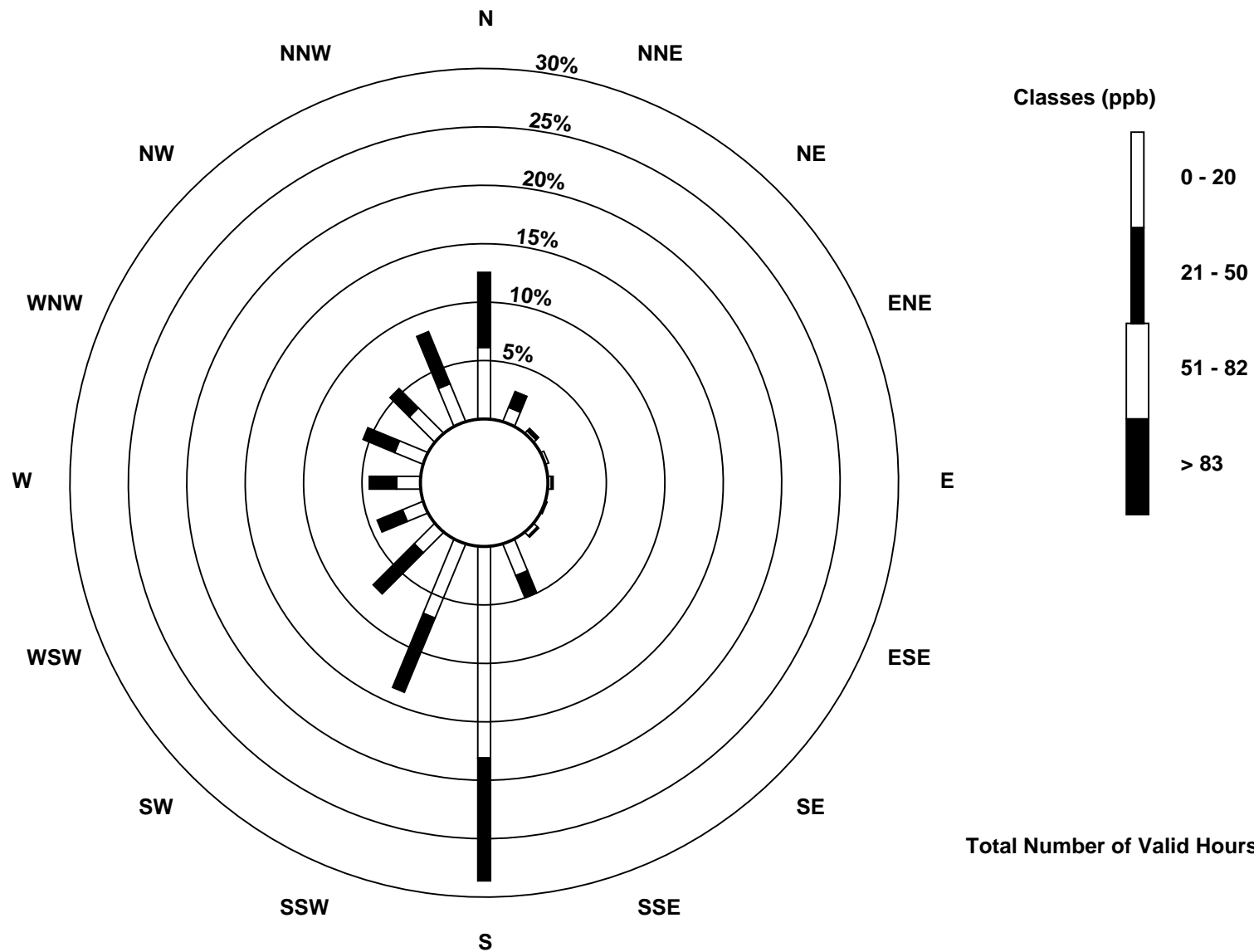
Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



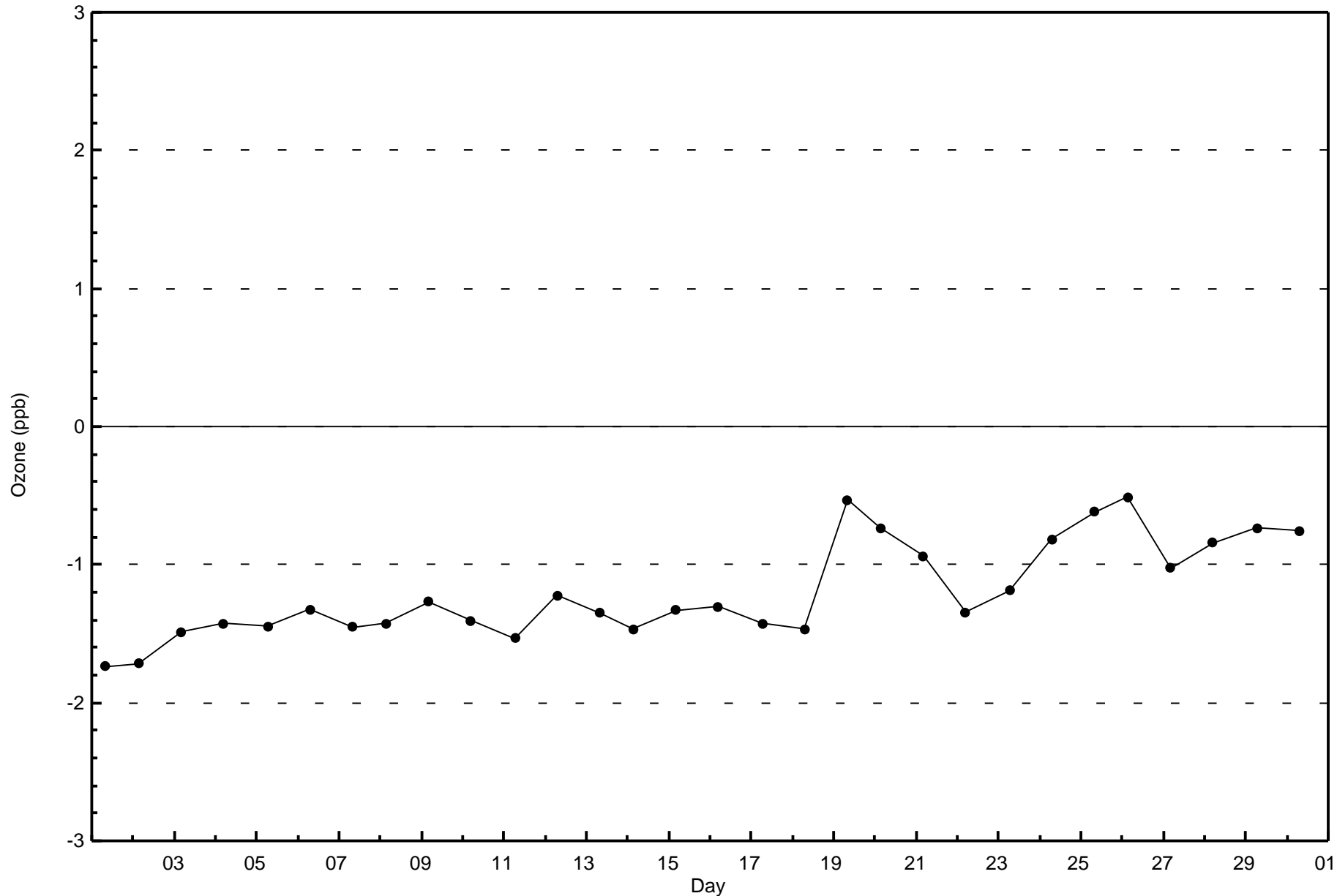


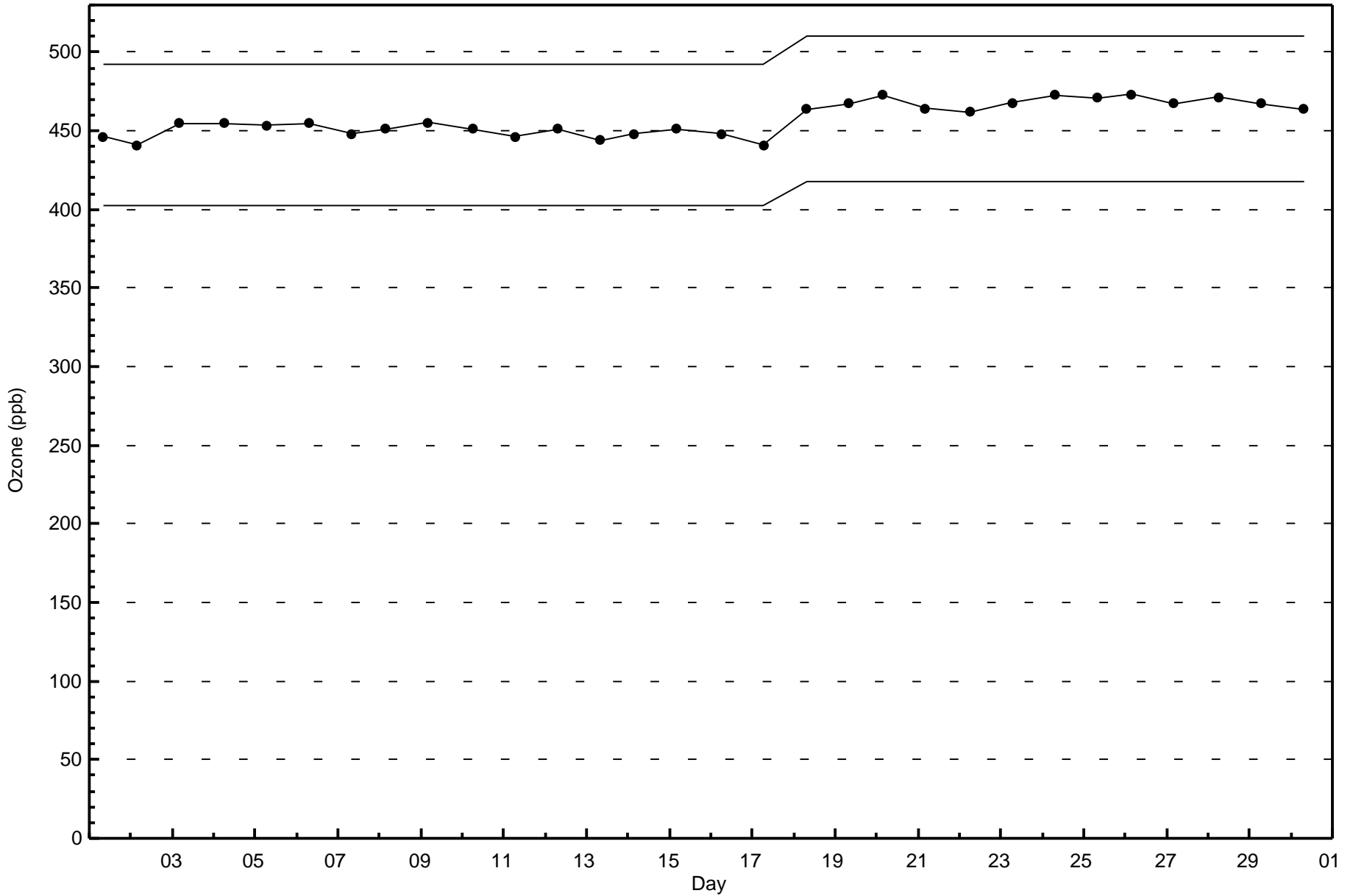
Wood Buffalo Environmental Association

Zero Responses

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - November 2015







Summary of Hour Averages

Fort McKay - Bertha Ganter - November 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 58.0 µg/m ³ on Nov 3 21:00	Maximum Daily Average: 21.9 µg/m ³ on Nov 4	Hours of Data:	719
Minimum Value: 0.5 µg/m ³ on Nov 13 16:00	Minimum Daily Average: 1.3 µg/m ³ on Nov 1	Hours of Missing Data:	1
Maximum Diurnal Average: 7.2 µg/m ³ at hour 21	Minimum Diurnal Average: 4.9 µg/m ³ at hour 14	Hours of Calibration:	1
Monthly Average: 5.70 µg/m ³	Percentiles: P ₁ = 0.9 P ₁₀ = 1.5 Q ₁ = 2.3 Median = 3.8 Q ₃ = 7.3 P ₉₀ = 10.5 P ₉₉ = 31.4	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-Nov	3.3	2.3	1.7	1.3	1.1	1.0	1.0	1.0	1.1	1.4	1.4	1.2	1.1	1.0	1.2	1.2	1.1	1.1	1.0	0.9	1.2	1.2	1.3	1.4	1.3	3.3
2-Nov	1.3	1.4	1.9	2.2	2.5	2.9	2.7	3.4	3.6	3.2	2.4	2.3	2.2	2.2	2.3	2.5	2.5	2.5	1.9	1.9	1.7	2.0	2.3	2.2	2.3	3.6
3-Nov	2.2	2.4	2.5	2.3	2.7	3.8	3.4	3.0	3.3	4.2	4.6	4.4	5.1	9.2	15.1	22.5	24.2	16.0	17.0	29.8	58.0	55.3	34.6	18.8	14.4	58.0
4-Nov	22.1	24.3	21.6	22.4	21.4	19.0	11.7	9.1	8.8	13.8	33.7	34.8	33.3	29.5	31.8	32.2	30.1	25.5	22.7	20.5	17.3	16.1	14.5	10.1	21.9	34.8
5-Nov	8.6	7.8	6.6	5.0	7.3	8.7	9.2	15.1	10.2	6.5	9.6	11.9	11.7	7.8	2.1	2.1	2.5	3.2	2.9	2.6	2.3	2.0	1.9	2.0	6.2	15.1
6-Nov	2.7	3.2	3.0	3.0	2.6	3.5	3.9	4.4	6.3	8.3	10.2	6.0	7.1	8.0	8.6	8.6	8.5	8.0	8.1	9.7	10.2	10.3	8.8	9.4	6.8	10.3
7-Nov	9.9	9.3	8.7	7.5	7.7	4.1	3.6	3.4	3.4	3.4	2.5	2.4	2.3	2.8	2.6	2.4	4.7	8.5	9.0	8.1	5.1	5.2	6.4	5.7	5.4	9.9
8-Nov	5.5	4.8	5.2	6.0	4.6	4.1	4.2	3.8	3.3	2.2	1.6	1.6	1.7	1.8	1.8	2.5	2.7	2.9	3.0	3.1	3.0	2.8	3.0	2.9	3.3	6.0
9-Nov	4.1	5.0	4.8	4.1	3.6	3.5	3.7	4.0	4.7	4.1	4.6	3.3	3.9	7.0	6.4	4.2	3.4	2.8	3.4	3.8	5.4	4.7	5.5	5.3	4.4	7.0
10-Nov	4.5	3.4	4.3	6.4	8.7	9.0	11.9	8.8	7.1	5.6	3.9	3.3	3.3	3.5	3.9	4.4	5.7	6.0	4.3	5.1	6.2	7.5	7.9	7.8	5.9	11.9
11-Nov	8.0	6.7	6.6	6.4	6.3	5.4	3.8	3.3	2.4	1.7	1.4	1.3	1.1	0.9	0.9	0.9	0.8	1.2	1.1	0.9	0.9	1.0	1.4	1.7	2.8	8.0
12-Nov	2.6	2.8	2.9	3.6	4.5	5.6	8.2	9.0	8.5	3.9	3.0	2.6	5.1	3.6	4.1	6.7	8.3	6.6	4.3	5.0	5.0	4.4	4.9	4.6	5.0	9.0
13-Nov	3.6	4.0	4.3	5.1	8.3	8.6	6.2	4.6	5.1	6.1	2.6	1.6	1.2	1.0	0.8	0.5	0.8	1.8	1.2	5.3	2.1	1.4	1.4	1.5	3.3	8.6
14-Nov	1.1	1.0	1.3	1.1	1.2	1.3	2.9	3.6	3.7	3.7	2.7	1.6	1.0	0.8	0.9	1.8	4.2	6.1	12.2	8.6	4.0	2.1	6.7	3.8	3.2	12.2
15-Nov	4.8	2.3	3.3	7.0	10.1	2.7	2.2	1.8	1.9	4.1	10.5	7.6	5.5	4.2	5.3	6.6	3.5	2.9	2.4	2.0	1.7	1.7	1.7	1.8	4.1	10.5
16-Nov	1.7	1.7	1.5	1.6	1.5	1.4	1.6	1.9	1.2	1.1	1.0	C	1.3	1.7	2.2	2.6	2.6	2.4	2.1	4.8	4.4	7.0	7.2	9.9	2.8	9.9
17-Nov	6.5	3.9	2.9	2.5	3.1	3.4	3.0	3.0	3.2	4.3	6.3	4.6	1.9	0.9	0.8	1.0	1.4	1.9	3.0	4.4	4.3	3.3	2.5	2.1	3.1	6.5
18-Nov	2.6	2.8	2.1	2.2	2.2	2.0	1.9	1.9	1.9	1.8	1.5	1.5	1.6	1.7	1.4	1.4	1.6	1.6	1.8	1.9	1.9	1.6	1.6	4.5	2.0	4.5
19-Nov	8.1	2.4	2.5	1.9	2.0	2.1	3.5	1.8	2.2	3.7	3.5	2.0	1.8	2.1	2.3	4.7	5.7	6.4	6.8	5.2	5.4	5.3	5.0	4.5	3.8	8.1
20-Nov	6.3	6.6	6.6	5.8	5.6	8.2	7.3	6.4	4.7	3.6	2.8	3.8	3.4	2.2	2.9	3.1	4.5	4.3	4.2	7.4	11.7	8.8	5.5	6.4	5.5	11.7
21-Nov	5.3	3.5	3.0	3.4	4.1	5.0	7.0	6.4	6.2	4.7	3.2	2.7	2.7	2.8	2.7	2.6	3.4	3.8	3.0	2.6	2.7	2.1	2.5	2.9	3.7	7.0
22-Nov	3.7	7.0	4.0	3.5	3.2	2.7	2.3	1.9	2.3	3.9	2.6	3.1	3.3	2.9	3.0	3.8	3.7	3.9	3.6	3.4	3.4	3.0	3.0	2.3	3.3	7.0
23-Nov	2.5	2.8	2.9	3.0	3.7	3.7	3.7	3.5	3.3	3.3	3.3	2.5	1.5	1.4	1.3	1.3	1.7	1.7	1.9	1.9	1.7	1.8	1.8	2.0	2.4	3.7
24-Nov	2.7	2.9	2.6	2.5	2.6	2.1	1.9	1.9	2.2	2.4	2.3	6.0	3.1	1.6	1.6	1.8	1.8	2.3	2.8	2.5	2.6	2.1	1.7	1.9	2.4	6.0
25-Nov	2.2	2.5	3.0	3.2	3.0	2.7	2.8	4.8	6.8	7.4	2.7	2.4	2.7	3.5	5.8	10.6	11.1	21.8	16.3	21.3	11.0	9.6	6.8	6.7	7.1	21.8
26-Nov	7.1	7.8	8.3	7.3	7.3	7.2	7.0	7.1	6.6	7.1	8.1	9.4	9.7	9.5	8.5	7.5	7.0	6.1	7.0	9.6	8.2	6.8	7.9	8.2	7.8	9.7
27-Nov	8.1	7.6	3.8	3.5	3.4	5.6	4.1	5.8	7.2	3.4	3.0	2.8	4.0	2.9	3.9	6.7	15.0	12.0	14.8	14.8	10.0	12.0	10.2	11.7	7.3	15.0
28-Nov	19.7	7.1	7.9	8.0	6.8	6.3	7.0	7.1	8.8	8.8	9.2	10.5	11.1	12.0	12.3	11.0	10.3	11.5	11.5	10.4	9.3	9.0	8.2	8.5	9.7	19.7
29-Nov	8.4	8.8	9.1	9.6	10.4	10.5	9.6	9.7	10.7	9.8	10.2	10.9	10.6	10.2	12.4	12.5	12.6	12.1	11.5	10.3	10.2	9.5	11.5	11.1	10.5	12.6
30-Nov	12.8	12.0	11.5	9.0	9.7	9.9	9.4	9.7	8.9	9.1	6.9	5.7	6.2	7.3	6.9	9.7	10.9	8.9	15.0	5.7	6.1	5.8	14.9	11.6	9.3	15.0

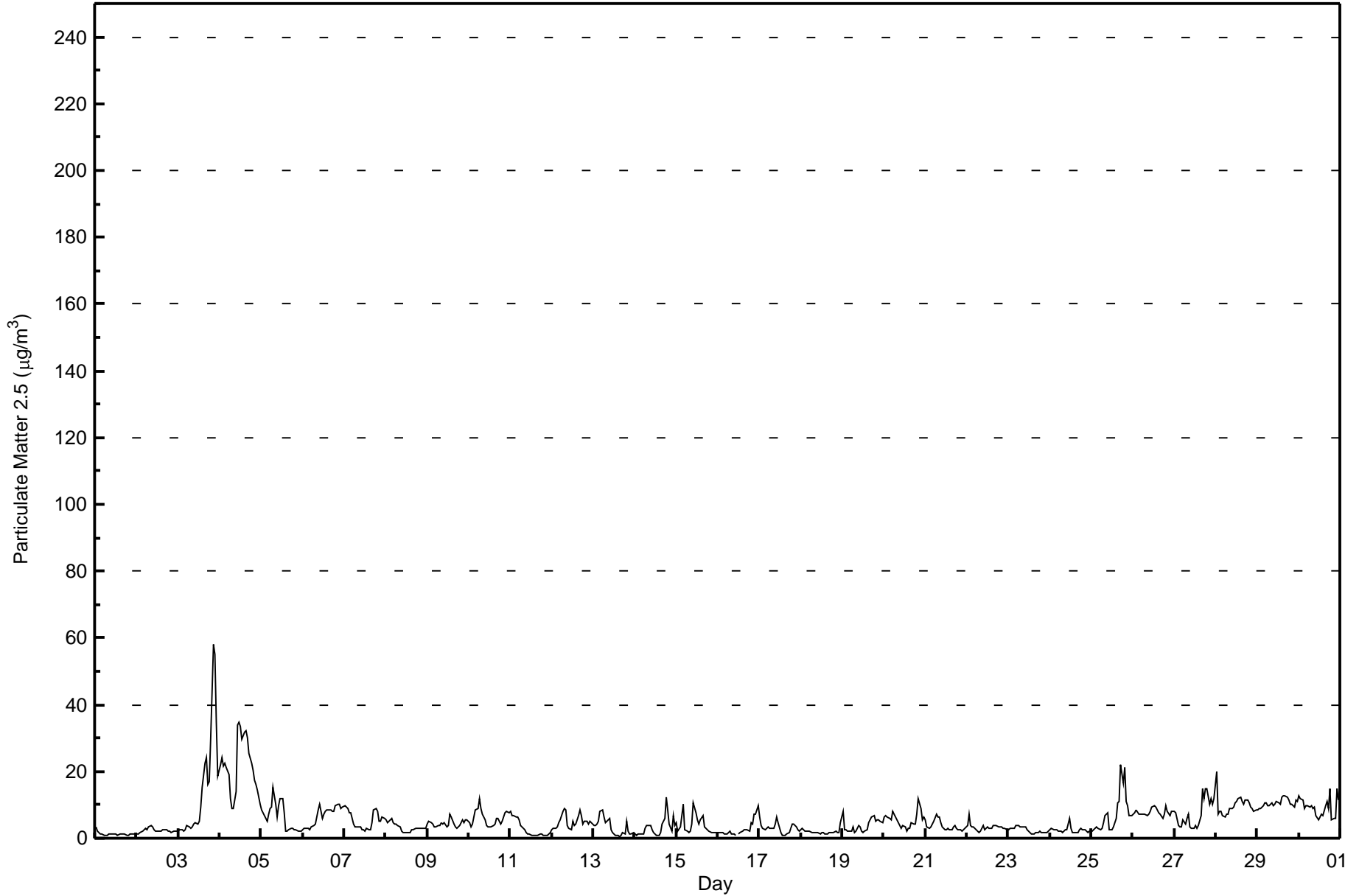
6.1	5.3	5.0	5.0	5.4	5.2	5.0	5.0	5.0	4.9	5.4	5.3	5.0	4.9	5.2	6.0	6.5	6.5	6.7	7.1	7.2	6.9	6.4	5.8	Diurnal Average	
22.1	24.3	21.6	22.4	21.4	19.0	11.9	15.1	10.7	13.8	33.7	34.8	33.3	29.5	31.8	32.2	30.1	25.5	22.7	29.8	58.0	55.3	34.6	18.8	Diurnal Maximum	

C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	436	60.64	60.64
6 - 15	233	32.41	93.05
16 - 25	20	2.78	95.83
26 - 80	11	1.53	97.36
> 81.0	0	0.00	97.36

Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay - Bertha Ganter - November 2015

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	75	17	4	2	3	0	2	29	75	46	31	23	21	28	33	47	436
6 - 15	6	2	0	0	0	0	1	7	126	50	6	6	6	9	7	7	233
16 - 25	0	0	0	0	0	0	0	0	2	3	5	3	1	2	0	4	20
26 - 80	4	0	0	0	0	1	1	0	0	0	1	0	2	1	0	1	11
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	85	19	4	2	3	1	4	36	203	99	43	32	30	40	40	59	700

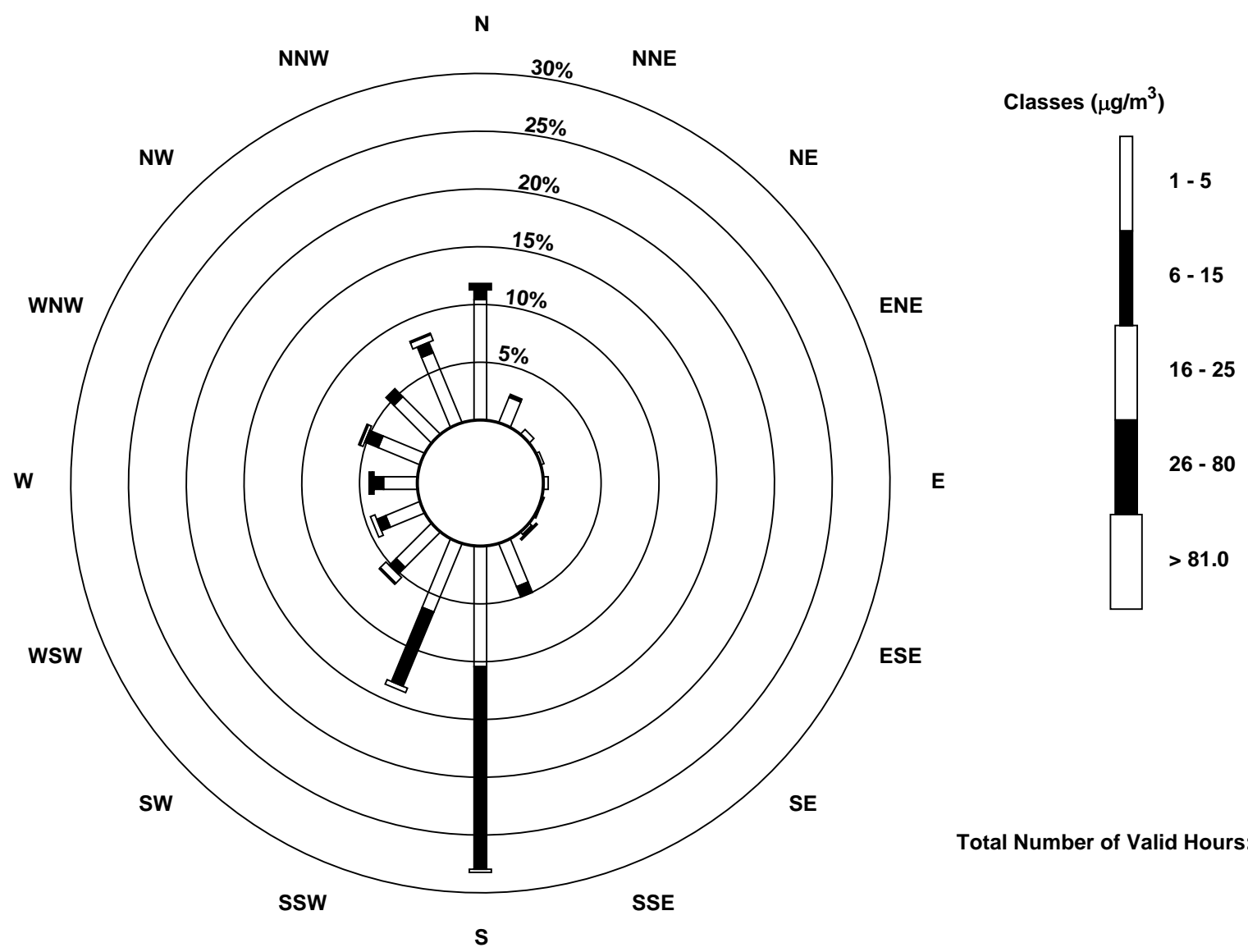
Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 719



Summary of Hour Averages

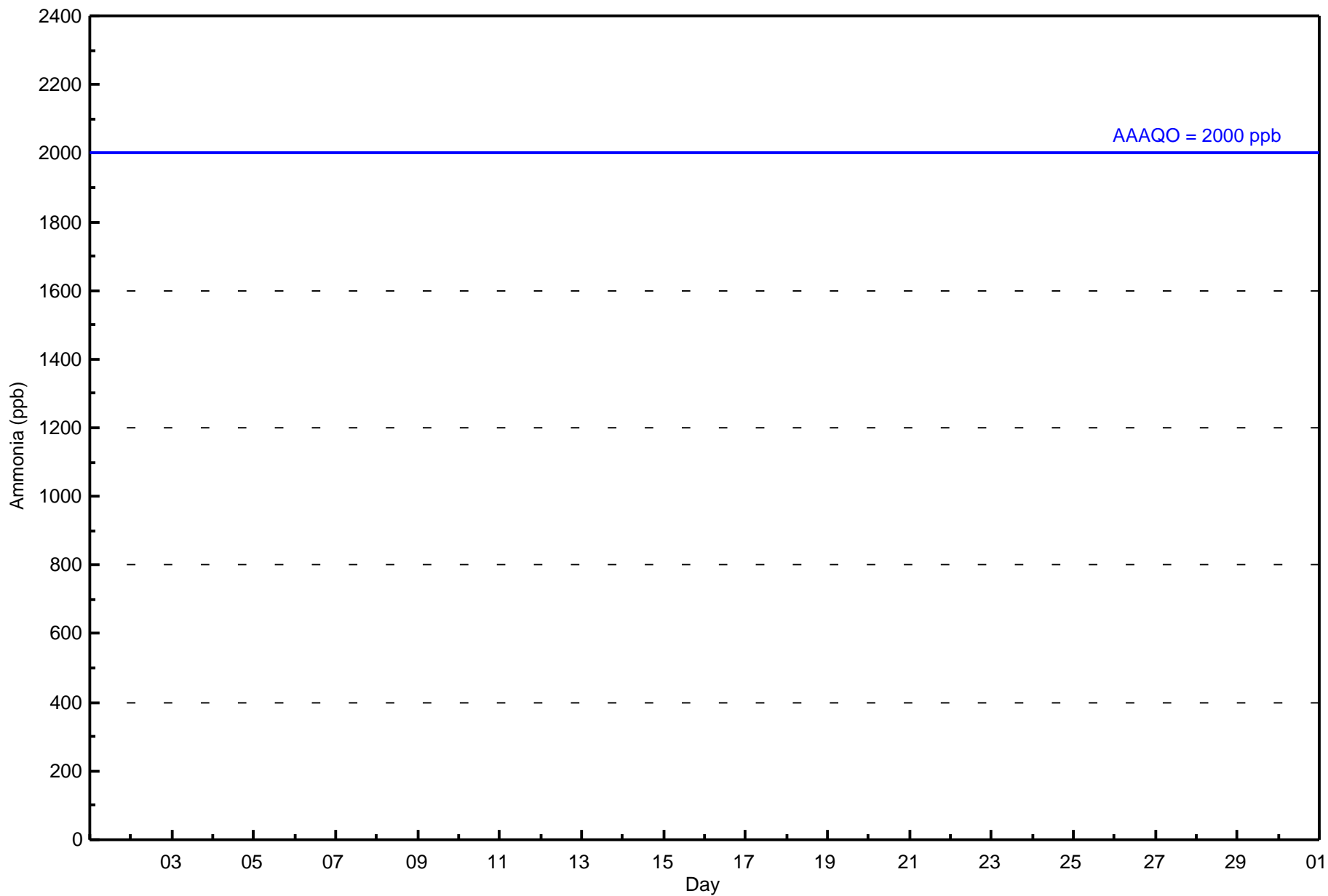
Fort McKay - Bertha Ganter - November 2015

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Nov 1 01:00	Maximum Daily Average: 0.0 ppb on Nov 1	Hours in Service: 720
Minimum Value: 0 ppb on Nov 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Daily Average: 0.0 ppb on Nov 1	Hours of Data: 622
Monthly Average: 0.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 0	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Missing Data: 98
			Hours of Calibration: 42
			Percent Operational Time: 92.2

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-Nov	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
2-Nov	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
3-Nov	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Nov	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
5-Nov	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
6-Nov	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
7-Nov	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
8-Nov	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
9-Nov	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Nov	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
11-Nov	0	0	0	0	0	Z	RE	RE	0	0	0	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Nov	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
13-Nov	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
14-Nov	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
15-Nov	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Nov	0	0	0	0	Z	RE	RE	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
17-Nov	0	0	0	0	0	Z	RE	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0
18-Nov	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
19-Nov	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
20-Nov	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
21-Nov	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
22-Nov	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
23-Nov	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
24-Nov	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
25-Nov	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
26-Nov	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
27-Nov	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Nov	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
29-Nov	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
30-Nov	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	622	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: 622

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	82	17	4	2	3	1	4	31	180	84	50	25	27	28	33	51	622
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	17	4	2	3	1	4	31	180	84	50	25	27	28	33	51	622

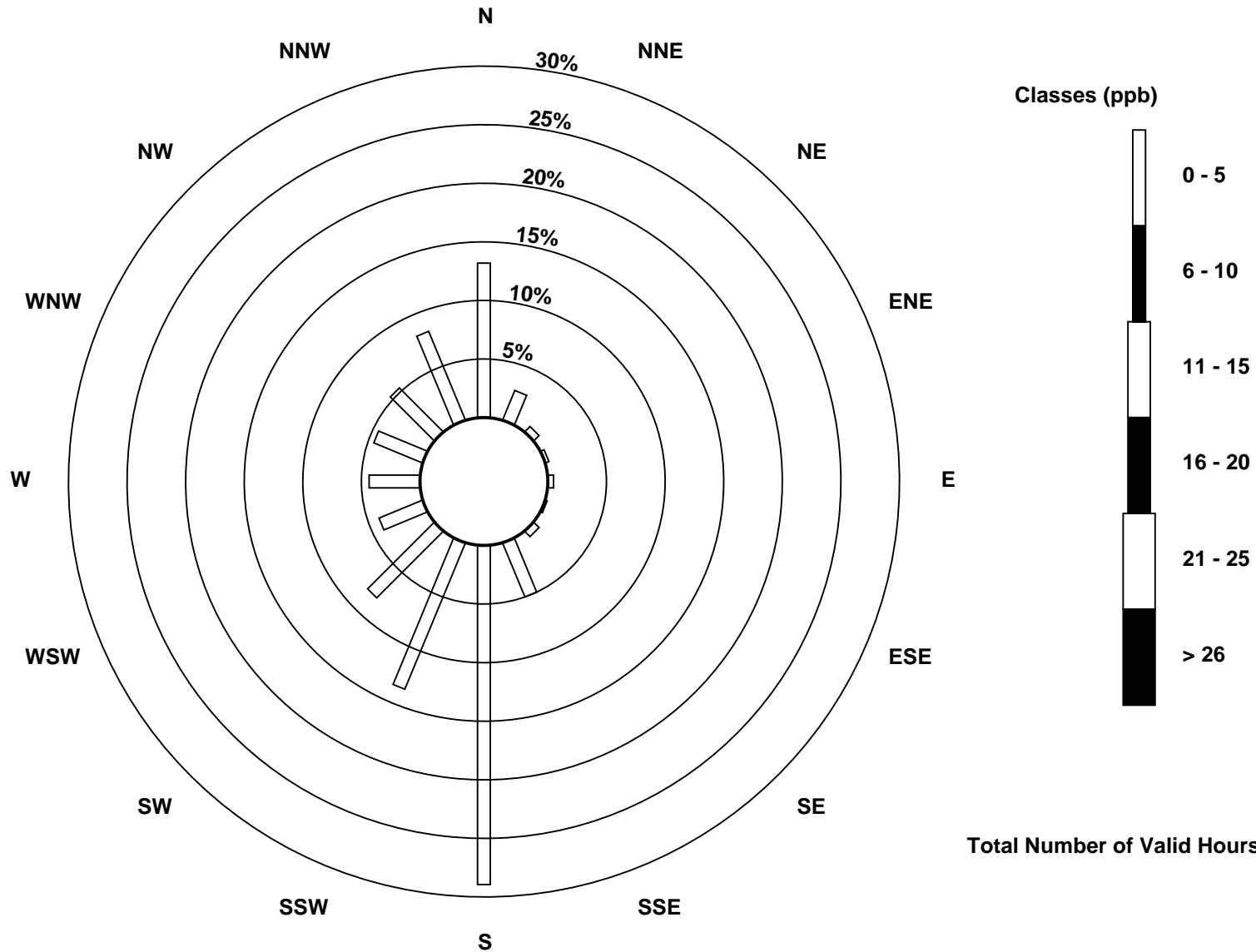
Total Number of Valid Hours: 622

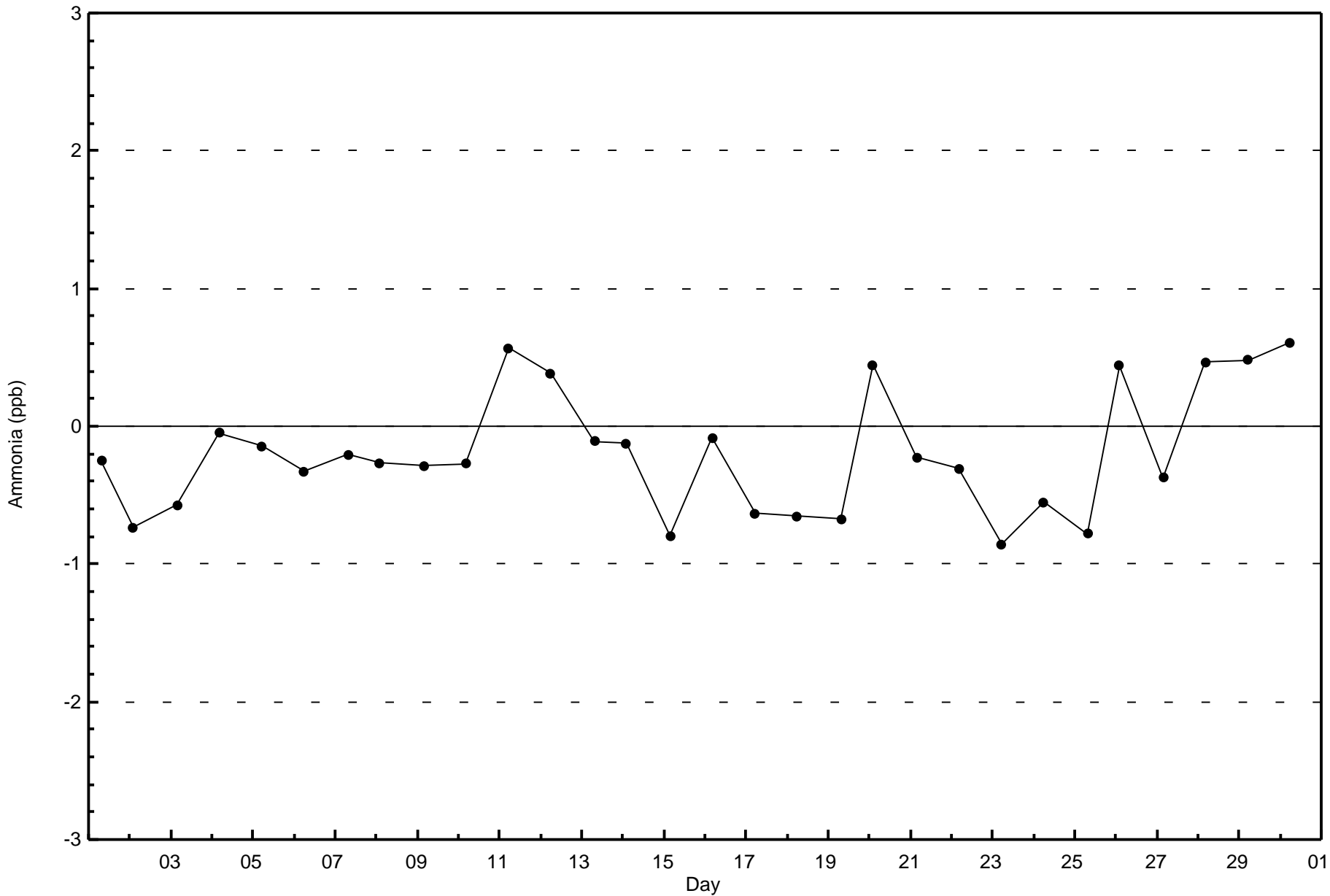
Total Number of Hours: 720

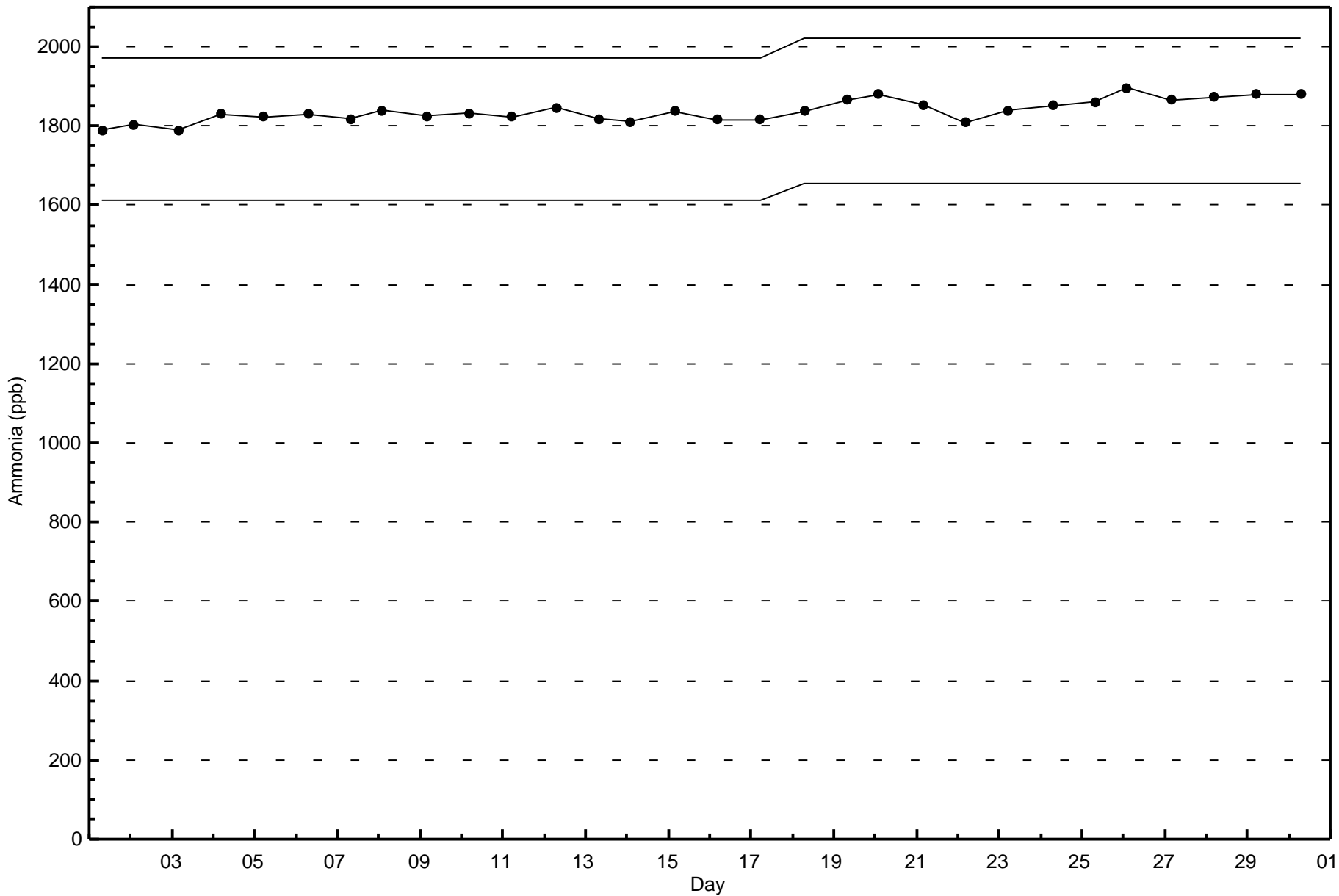


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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









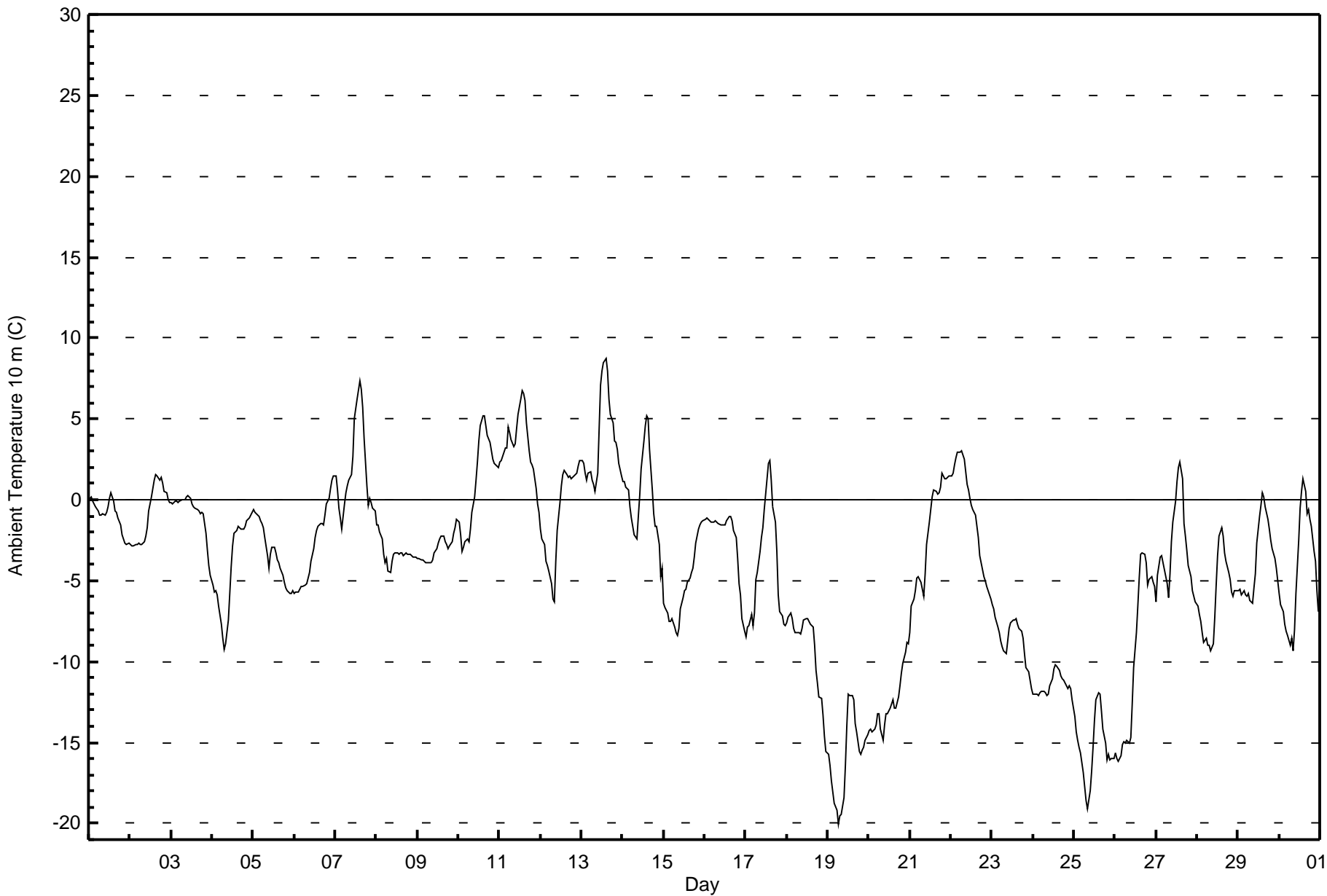
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 10 m (AT 10m) - C

Fort McKay - Bertha Ganter - November 2015

Maximum Value: 8.7 C on Nov 13 15:00															Maximum Daily Average: 3.8 C on Nov 13										Hours in Service: 720	
Minimum Value: -20.1 C on Nov 19 07:00															Minimum Daily Average: -15.9 C on Nov 19										Hours of Data: 720	
Maximum Diurnal Average: -1.5 C at hour 15															Minimum Diurnal Average: -5.9 C at hour 9										Hours of Missing Data: 0	
Monthly Average: -4.16 C															Percentiles: P ₁ = -18.5 P ₁₀ = -12.4 Q ₁ = -7.4 Median = -3.3 Q ₃ = -0.3 P ₉₀ = 2.0 P ₉₉ = 6.7										Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0.1	0.1	-0.1	-0.3	-0.4	-0.7	-0.9	-0.9	-0.9	-1.0	-0.8	-0.4	0.1	0.4	-0.1	-0.7	-0.8	-1.1	-1.6	-2.1	-2.4	-2.6	-2.8	-2.7	-0.9	0.4
2-Nov	-2.8	-2.8	-2.8	-2.8	-2.7	-2.7	-2.8	-2.8	-2.6	-2.3	-1.8	-0.7	0.2	0.7	1.2	1.6	1.5	1.3	1.4	1.0	0.5	0.4	0.0	-0.1	-0.8	1.6
3-Nov	-0.1	-0.3	-0.1	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.2	0.3	0.1	-0.2	-0.4	-0.5	-0.6	-0.7	-0.9	-0.8	-0.8	-2.1	-3.1	-4.0	-4.7	-0.8	0.3
4-Nov	-5.3	-5.7	-5.6	-5.9	-6.6	-7.6	-8.5	-9.3	-8.9	-7.4	-5.8	-4.1	-2.8	-2.1	-1.9	-1.7	-1.7	-1.8	-1.8	-1.6	-1.3	-1.2	-1.1	-0.7	-4.2	-0.7
5-Nov	-0.6	-0.8	-0.9	-1.0	-1.3	-1.5	-1.7	-2.4	-3.5	-4.2	-3.4	-3.0	-2.9	-3.3	-3.7	-3.9	-4.2	-4.7	-5.1	-5.4	-5.6	-5.8	-5.7	-5.6	-3.3	-0.6
6-Nov	-5.8	-5.7	-5.7	-5.5	-5.4	-5.3	-5.3	-5.2	-4.9	-4.5	-3.8	-3.0	-2.3	-1.9	-1.6	-1.5	-1.5	-1.6	-0.9	-0.2	0.1	0.7	1.2	1.5	-2.8	1.5
7-Nov	1.5	0.6	-0.6	-1.1	-1.8	-0.2	0.4	0.9	1.2	1.5	2.7	5.0	5.7	6.2	7.3	6.9	5.8	3.8	0.8	-0.3	0.1	-0.1	-0.5	-0.7	1.9	7.3
8-Nov	-1.6	-1.5	-2.0	-2.4	-3.4	-3.9	-3.7	-4.4	-4.5	-3.8	-3.4	-3.3	-3.3	-3.4	-3.3	-3.3	-3.4	-3.3	-3.4	-3.3	-3.4	-3.5	-3.5	-3.6	-3.3	-1.5
9-Nov	-3.6	-3.7	-3.7	-3.7	-3.8	-3.9	-3.8	-3.8	-3.9	-3.7	-3.3	-3.0	-2.7	-2.4	-2.2	-2.3	-2.6	-2.8	-3.0	-2.8	-2.6	-2.1	-1.8	-1.2	-3.0	-1.2
10-Nov	-1.4	-2.2	-3.2	-3.0	-2.6	-2.4	-2.6	-1.8	-0.8	0.2	1.2	2.3	3.6	4.6	5.2	5.2	4.6	4.0	3.5	3.0	2.5	2.2	2.2	2.0	1.1	5.2
11-Nov	2.3	2.4	2.7	3.2	3.2	4.5	4.1	3.7	3.3	3.5	4.5	5.3	6.3	6.7	6.6	6.1	4.7	3.0	2.3	2.2	1.9	0.7	-0.2	-0.8	3.4	6.7
12-Nov	-1.8	-2.4	-2.7	-3.8	-4.1	-4.4	-5.1	-6.1	-6.3	-3.8	-1.9	-0.2	0.9	1.6	1.8	1.6	1.4	1.4	1.3	1.4	1.6	1.7	2.0	2.4	-1.0	2.4
13-Nov	2.4	2.3	1.6	1.2	1.7	1.7	1.2	0.9	0.6	1.6	4.4	7.1	7.9	8.4	8.7	7.9	6.2	5.3	4.8	3.7	3.5	3.1	2.3	1.5	3.8	8.7
14-Nov	1.2	1.1	0.8	0.6	-0.4	-1.1	-1.6	-2.2	-2.4	-1.0	0.3	1.9	3.6	4.6	5.2	5.1	3.1	0.6	-0.8	-1.7	-1.7	-2.7	-4.7	-4.3	0.1	5.2
15-Nov	-6.4	-6.7	-7.0	-7.5	-7.5	-7.3	-7.9	-8.2	-8.4	-7.9	-6.7	-6.0	-5.6	-5.5	-5.1	-4.8	-4.5	-4.2	-3.5	-2.7	-1.8	-1.5	-1.4	-1.3	-5.4	-1.3
16-Nov	-1.2	-1.1	-1.2	-1.3	-1.4	-1.4	-1.3	-1.3	-1.5	-1.6	-1.6	-1.5	-1.3	-1.0	-1.0	-1.3	-1.9	-2.3	-3.6	-5.2	-5.9	-7.3	-8.1	-2.4	-1.0	
17-Nov	-8.4	-7.9	-7.7	-7.1	-7.8	-7.0	-4.9	-4.5	-3.2	-2.3	-1.7	-0.6	1.3	2.3	2.4	1.2	-0.4	-1.3	-3.2	-5.9	-6.9	-7.2	-7.7	-7.8	-4.0	2.4
18-Nov	-7.6	-7.3	-7.0	-7.3	-7.9	-8.2	-8.2	-8.2	-8.3	-8.0	-7.5	-7.4	-7.3	-7.5	-7.7	-7.9	-9.0	-10.5	-11.4	-12.2	-12.3	-13.3	-14.6	-15.6	-9.3	-7.0
19-Nov	-15.7	-16.4	-17.3	-18.1	-18.8	-19.2	-20.1	-19.5	-19.4	-18.4	-16.4	-14.0	-12.0	-12.1	-12.1	-12.4	-13.8	-14.4	-15.6	-15.7	-15.5	-15.3	-14.8	-14.5	-15.9	-12.0
20-Nov	-14.3	-14.1	-14.4	-14.2	-13.9	-13.2	-13.3	-14.2	-14.8	-13.9	-13.2	-13.2	-12.9	-12.6	-12.3	-12.8	-12.8	-12.2	-11.5	-10.7	-10.1	-9.4	-8.9	-8.9	-12.6	-8.9
21-Nov	-8.2	-6.5	-6.1	-5.6	-4.9	-4.7	-5.1	-5.5	-6.0	-4.6	-2.8	-1.4	-0.6	0.2	0.6	0.5	0.3	0.4	0.8	1.6	1.3	1.3	1.4	1.5	-2.2	1.6
22-Nov	1.5	1.7	2.2	2.6	2.9	2.9	3.0	2.8	2.5	1.0	0.6	0.1	-0.3	-0.6	-1.0	-1.6	-2.4	-3.4	-4.4	-4.7	-5.0	-5.3	-5.6	-6.1	-0.7	3.0
23-Nov	-6.5	-6.7	-7.2	-7.8	-8.2	-8.7	-9.1	-9.3	-9.5	-8.7	-7.9	-7.6	-7.5	-7.4	-7.3	-7.6	-8.0	-8.1	-8.5	-9.5	-10.4	-10.6	-11.1	-11.7	-8.5	-6.5
24-Nov	-12.0	-12.0	-12.0	-12.1	-11.9	-11.9	-11.8	-11.9	-12.1	-12.0	-11.5	-11.0	-10.5	-10.2	-10.3	-10.6	-10.9	-11.0	-11.1	-11.3	-11.7	-11.5	-11.6	-12.4	-11.5	-10.2
25-Nov	-13.4	-14.4	-14.9	-15.3	-15.6	-16.8	-17.7	-18.6	-19.1	-18.0	-16.8	-15.3	-13.6	-12.4	-11.9	-12.0	-13.0	-14.2	-15.1	-16.1	-15.7	-16.1	-16.0	-16.0	-15.3	-11.9
26-Nov	-15.6	-16.0	-16.2	-15.8	-15.1	-14.9	-15.1	-14.9	-15.0	-14.7	-12.6	-10.3	-8.2	-6.5	-4.8	-3.4	-3.3	-3.3	-3.9	-5.3	-4.9	-4.8	-5.1	-5.4	-9.8	-3.3
27-Nov	-6.3	-4.7	-3.5	-3.4	-3.9	-4.3	-5.2	-6.0	-4.6	-2.6	-1.4	-0.1	1.1	2.0	2.3	1.3	-1.4	-2.3	-3.1	-4.1	-4.7	-5.6	-5.9	-6.3	-3.0	2.3
28-Nov	-6.6	-7.1	-7.5	-8.2	-8.8	-8.5	-9.0	-9.0	-9.3	-8.9	-7.2	-5.3	-3.4	-2.3	-1.8	-2.3	-3.3	-3.8	-4.5	-4.9	-5.7	-6.0	-5.7	-5.6	-6.0	-1.8
29-Nov	-5.6	-5.6	-5.8	-5.6	-5.9	-5.9	-5.8	-6.2	-6.4	-5.5	-4.6	-2.7	-1.0	-0.3	0.4	0.2	-0.4	-1.2	-1.8	-2.5	-3.1	-3.6	-4.2	-5.0	-3.7	0.4
30-Nov	-5.8	-6.5	-6.9	-7.7	-8.1	-8.4	-8.9	-8.6	-9.3	-8.0	-5.8	-2.5	-0.5	0.5	1.3	0.6	-0.9	-0.6	-1.2	-1.7	-3.2	-3.8	-5.6	-6.9	-4.5	1.3
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

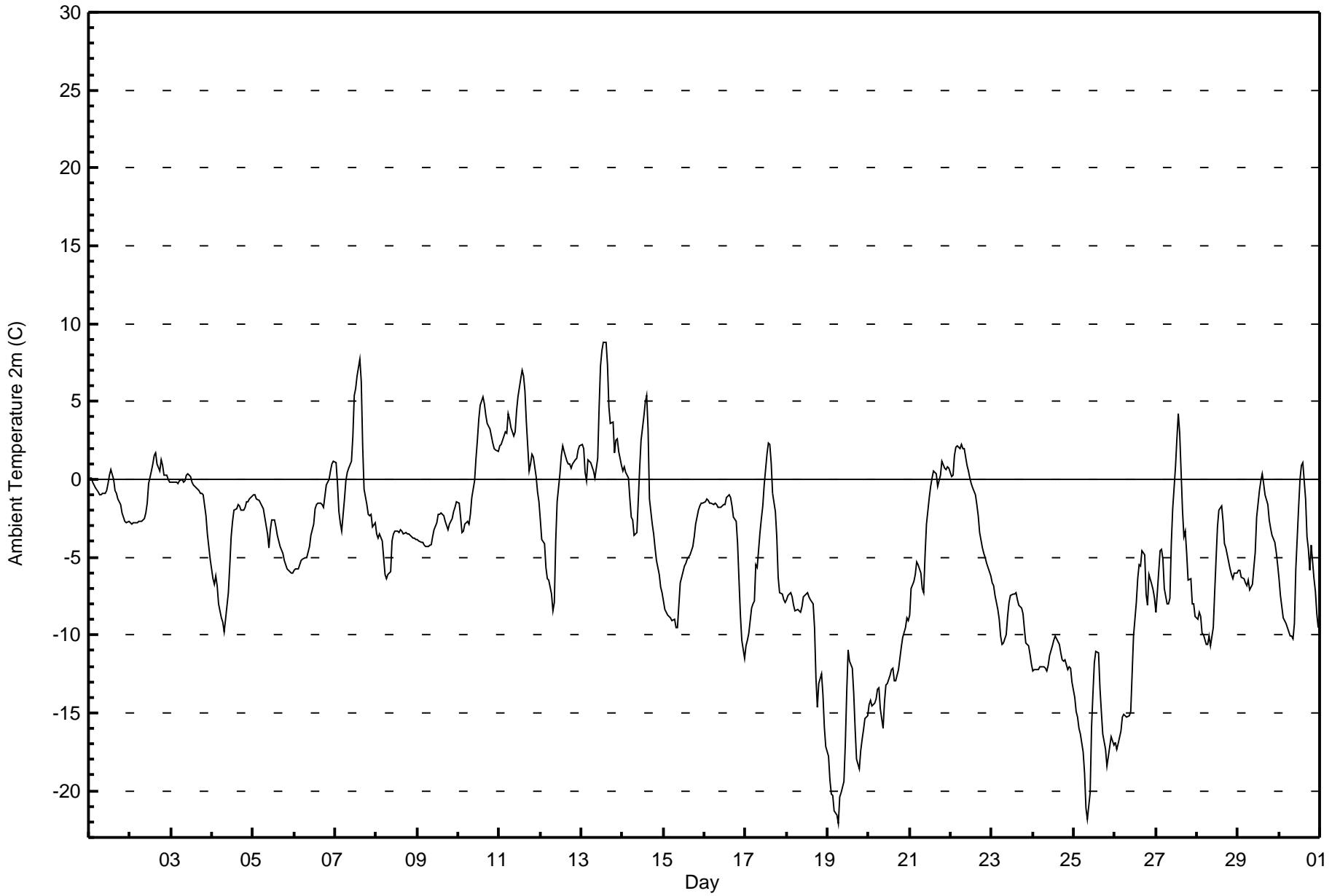
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	1	0.14	0.14
-20 - 0	557	77.36	77.50
0 - 10	162	22.50	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 8.8 C on Nov 13 15:00		Maximum Daily Average: 3.2 C on Nov 13		Hours in Service: 720																							
Minimum Value: -22.1 C on Nov 19 07:00		Minimum Daily Average: -17.3 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.4 C at hour 15		Minimum Diurnal Average: -6.7 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -4.73 C		Percentiles: P ₁ = -20.3 P ₁₀ = -12.9 Q ₁ = -8.1 Median = -3.7 Q ₃ = -0.6 P ₉₀ = 1.7 P ₉₉ = 6.7		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0.1	0.1	-0.2	-0.4	-0.5	-0.8	-1.0	-1.0	-0.9	-0.9	-0.8	-0.3	0.3	0.6	0.0	-0.7	-0.9	-1.2	-1.6	-2.2	-2.4	-2.7	-2.8	-2.7	-1.0	0.6	
2-Nov	-2.8	-2.8	-2.8	-2.8	-2.8	-2.7	-2.7	-2.7	-2.5	-2.1	-1.5	-0.3	0.5	1.0	1.5	1.7	1.0	0.6	1.3	0.9	0.3	0.3	0.0	-0.2	-0.8	1.7	
3-Nov	-0.1	-0.2	-0.2	-0.2	-0.2	-0.1	0.0	-0.2	-0.1	0.3	0.4	0.2	-0.1	-0.3	-0.5	-0.6	-0.7	-0.9	-0.9	-1.0	-2.4	-3.5	-4.3	-5.1	-0.9	0.4	
4-Nov	-6.4	-6.7	-6.2	-6.9	-8.0	-8.9	-9.2	-9.8	-8.9	-7.3	-5.6	-3.7	-2.7	-2.0	-1.9	-1.7	-1.7	-2.0	-2.0	-1.8	-1.5	-1.5	-1.3	-1.1	-4.5	-1.1	
5-Nov	-1.0	-1.0	-1.3	-1.3	-1.6	-1.7	-1.9	-2.4	-3.5	-4.4	-3.2	-2.6	-2.6	-3.1	-3.6	-3.9	-4.3	-4.8	-5.2	-5.5	-5.7	-5.9	-6.0	-6.0	-3.4	-1.0	
6-Nov	-5.8	-5.8	-5.7	-5.5	-5.2	-5.1	-5.1	-5.0	-4.7	-4.3	-3.6	-2.9	-1.9	-1.6	-1.5	-1.5	-1.7	-1.8	-1.0	-0.4	0.0	0.6	1.0	1.2	-2.8	1.2	
7-Nov	1.1	-0.2	-2.1	-2.8	-3.3	-1.3	-0.1	0.5	0.7	1.2	2.8	5.4	5.8	6.6	7.7	6.3	2.1	-0.7	-1.6	-2.3	-2.4	-2.3	-3.0	-2.8	0.6	7.7	
8-Nov	-3.5	-3.8	-3.5	-4.0	-5.0	-6.1	-6.4	-6.1	-5.9	-4.0	-3.5	-3.4	-3.4	-3.4	-3.3	-3.3	-3.5	-3.4	-3.5	-3.5	-3.6	-3.8	-3.8	-3.8	-4.1	-3.3	
9-Nov	-3.9	-4.0	-4.1	-4.1	-4.2	-4.3	-4.3	-4.2	-4.3	-3.7	-3.3	-2.8	-2.3	-2.3	-2.2	-2.3	-2.7	-3.0	-3.2	-2.9	-2.5	-2.1	-1.8	-1.4	-3.2	-1.4	
10-Nov	-1.5	-2.4	-3.5	-3.3	-2.9	-2.7	-2.9	-2.2	-1.2	-0.1	1.3	2.5	3.9	4.8	5.3	4.8	4.2	3.6	3.3	2.8	2.3	2.0	1.9	1.8	0.9	5.3	
11-Nov	2.1	2.2	2.5	3.0	2.9	4.2	3.9	3.4	2.8	3.1	4.4	5.3	6.5	7.0	6.7	5.7	3.7	0.6	1.0	1.6	1.4	0.2	-0.8	-1.4	3.0	7.0	
12-Nov	-2.6	-3.9	-4.2	-5.7	-6.4	-6.5	-7.4	-8.4	-7.9	-4.0	-1.5	0.3	1.6	2.2	1.8	1.2	1.0	1.0	0.7	1.0	1.3	1.3	1.9	2.2	-1.7	2.2	
13-Nov	2.2	1.9	0.5	-0.1	1.3	1.0	0.8	0.5	0.1	1.3	4.6	7.3	8.2	8.8	8.8	7.3	4.7	3.6	3.6	1.7	2.5	2.6	1.8	0.9	3.2	8.8	
14-Nov	0.6	0.8	0.5	0.1	-1.3	-2.4	-2.6	-3.6	-3.4	-1.4	0.7	2.5	4.0	5.0	5.4	3.2	-1.3	-2.9	-3.5	-4.4	-5.2	-6.1	-6.9	-7.3	-1.2	5.4	
15-Nov	-7.8	-8.3	-8.7	-8.8	-8.9	-9.1	-9.0	-9.5	-9.5	-8.1	-6.7	-6.0	-5.5	-5.4	-5.1	-4.9	-4.6	-4.3	-3.7	-2.9	-2.0	-1.7	-1.6	-1.5	-6.0	-1.5	
16-Nov	-1.4	-1.3	-1.4	-1.5	-1.5	-1.6	-1.5	-1.6	-1.8	-1.8	-1.7	-1.6	-1.6	-1.2	-1.0	-1.2	-1.7	-2.4	-2.7	-4.2	-6.5	-8.7	-10.3	-11.5	-3.0	-1.0	
17-Nov	-10.7	-10.3	-9.9	-8.3	-8.0	-7.8	-5.5	-5.7	-3.4	-2.5	-1.7	-0.4	1.6	2.3	2.2	1.1	-0.9	-2.1	-3.7	-6.3	-7.2	-7.4	-7.8	-7.9	-4.6	2.3	
18-Nov	-7.8	-7.5	-7.3	-7.5	-8.1	-8.5	-8.4	-8.5	-8.5	-8.1	-7.5	-7.4	-7.3	-7.5	-7.7	-8.0	-9.5	-12.8	-14.6	-13.1	-12.5	-13.8	-15.9	-17.2	-9.8	-7.3	
19-Nov	-17.8	-19.3	-20.2	-20.3	-21.3	-21.6	-22.1	-20.4	-20.1	-19.4	-16.9	-13.7	-11.0	-11.7	-12.2	-13.7	-16.0	-18.0	-18.6	-17.4	-16.7	-16.1	-15.3	-15.2	-17.3	-11.0	
20-Nov	-14.5	-14.2	-14.5	-14.4	-14.1	-13.5	-13.4	-14.7	-15.9	-14.2	-13.2	-13.1	-12.6	-12.2	-12.1	-13.0	-13.0	-12.2	-11.5	-10.7	-10.1	-9.5	-8.9	-9.1	-12.7	-8.9	
21-Nov	-8.7	-7.0	-6.6	-6.1	-5.3	-5.5	-6.0	-7.0	-7.3	-4.9	-2.8	-1.2	-0.5	0.1	0.5	0.4	-0.4	-0.1	0.3	1.2	0.7	0.6	0.8	0.7	-2.7	1.2	
22-Nov	0.1	0.2	1.5	2.1	2.1	2.0	2.2	2.0	2.0	0.9	0.6	0.1	-0.3	-0.6	-0.9	-1.6	-2.4	-3.4	-4.4	-4.7	-5.1	-5.4	-5.7	-6.2	-1.0	2.2	
23-Nov	-6.6	-6.8	-7.4	-8.4	-9.0	-10.1	-10.6	-10.5	-9.9	-8.8	-7.9	-7.5	-7.3	-7.3	-7.7	-8.1	-8.3	-8.7	-9.6	-10.5	-10.7	-11.2	-11.9	-11.9	-8.8	-6.6	
24-Nov	-12.3	-12.3	-12.2	-12.3	-12.1	-12.0	-12.0	-12.1	-12.3	-12.0	-11.3	-10.7	-10.3	-10.1	-10.2	-10.6	-11.2	-11.6	-11.7	-11.6	-12.2	-12.1	-12.1	-13.0	-11.7	-10.1	
25-Nov	-14.0	-14.9	-15.3	-16.0	-16.4	-17.5	-18.9	-21.1	-21.9	-20.1	-15.9	-13.7	-11.8	-11.0	-11.1	-13.4	-14.9	-16.3	-17.4	-18.4	-17.7	-17.2	-16.5	-17.0	-16.2	-11.0	
26-Nov	-16.9	-17.4	-16.9	-16.2	-15.3	-15.1	-15.2	-15.3	-15.2	-14.9	-12.5	-10.0	-7.9	-6.4	-5.5	-5.5	-4.6	-4.8	-7.3	-8.1	-6.1	-6.8	-7.1	-7.7	-10.8	-4.6	
27-Nov	-8.5	-7.3	-4.6	-4.5	-5.1	-7.0	-8.0	-8.0	-7.6	-4.2	-1.9	0.8	2.6	4.2	3.0	-2.0	-3.7	-3.4	-4.8	-6.5	-6.4	-8.0	-8.0	-8.8	-4.5	4.2	
28-Nov	-9.0	-8.6	-8.8	-9.9	-10.0	-10.6	-10.6	-10.1	-10.7	-9.6	-7.3	-5.2	-3.1	-2.0	-1.7	-2.7	-4.1	-4.4	-5.3	-5.8	-6.1	-6.4	-6.0	-6.0	-6.8	-1.7	
29-Nov	-5.9	-5.8	-6.3	-6.4	-6.7	-6.9	-6.5	-7.1	-6.8	-5.7	-4.6	-2.5	-0.7	-0.1	0.3	-0.3	-1.0	-1.7	-2.6	-3.2	-3.6	-4.0	-4.7	-5.5	-4.1	0.3	
30-Nov	-6.4	-7.4	-8.9	-9.1	-9.2	-9.5	-10.1	-10.1	-10.2	-9.3	-5.8	-1.8	0.0	0.9	1.1	-1.2	-3.7	-4.5	-5.8	-4.2	-6.4	-7.1	-8.6	-9.6	-6.1	1.1	
		-5.7	-5.8	-5.9	-6.0	-6.2	-6.4	-6.5	-6.7	-6.6	-5.6	-4.2	-2.9	-1.9	-1.5	-1.4	-2.3	-3.3	-4.1	-4.5	-4.7	-4.9	-5.2	-5.4	-5.8	Diurnal Average	
		2.2	2.2	2.5	3.0	2.9	4.2	3.9	3.4	2.8	3.1	4.6	7.3	8.2	8.8	8.8	7.3	4.7	3.6	3.6	2.8	2.5	2.6	1.9	2.2	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

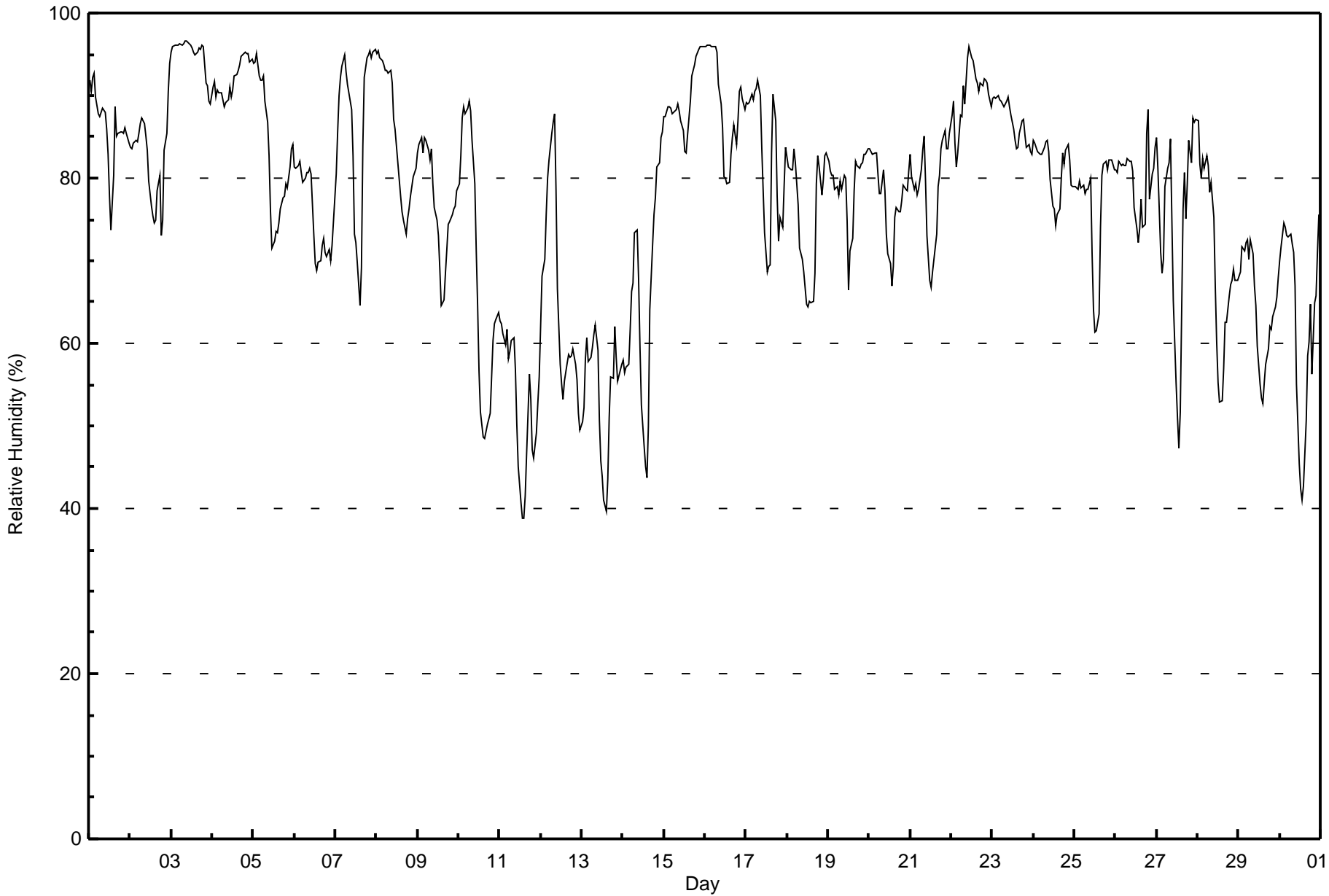
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	10	1.39	1.39
-20 - 0	561	77.92	79.31
0 - 10	149	20.69	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

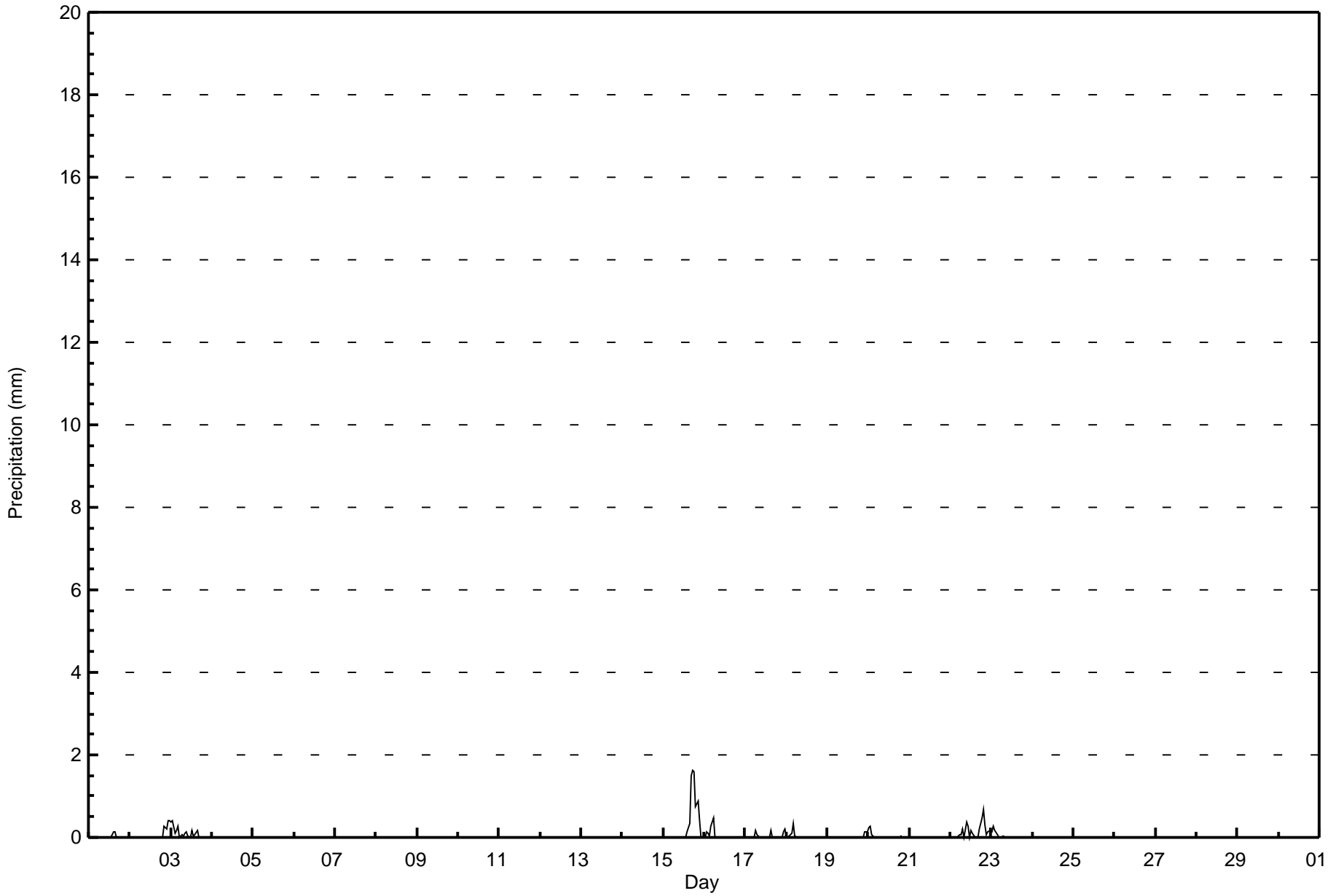


Maximum Value: 97 % on Nov 3 10:00		Maximum Daily Average: 95.0 % on Nov 3		Hours in Service: 720																																														
Minimum Value: 39 % on Nov 11 14:00		Minimum Daily Average: 52.7 % on Nov 11		Hours of Data: 720																																														
Maximum Diurnal Average: 82.8 % at hour 8		Minimum Diurnal Average: 67.1 % at hour 14		Hours of Missing Data: 0																																														
Monthly Average: 77.6 %		Percentiles: P ₁ = 42 P ₁₀ = 57 Q ₁ = 70 Median = 81 Q ₃ = 87 P ₉₀ = 93 P ₉₉ = 96		Hours of Calibration: 0																																														
				Percent Operational Time: 100.0																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Nov	92	90	92	93	90	88	87	88	88	88	86	83	78	74	80	89	85	85	86	86	85	86	85	84	86.2	93																								
2-Nov	84	84	84	85	84	85	87	87	87	85	83	80	77	75	75	75	79	80	73	75	83	85	91	94	82.3	94																								
3-Nov	95	96	96	96	96	96	96	96	96	97	96	96	96	95	95	95	96	96	96	96	91	91	89	89	95.0	97																								
4-Nov	91	92	90	91	90	90	90	89	89	90	91	90	91	92	93	93	94	95	95	95	95	95	94	94	92.0	95																								
5-Nov	94	94	95	92	92	92	92	89	87	83	76	72	72	74	73	75	76	78	78	79	79	81	84	84	82.9	95																								
6-Nov	81	81	81	82	81	79	80	81	81	81	81	73	70	69	70	70	72	73	71	71	71	70	72	75	75.6	82																								
7-Nov	81	86	90	92	93	95	93	91	90	88	83	73	72	70	65	69	84	92	95	95	95	95	95	96	86.6	96																								
8-Nov	95	95	95	94	94	93	93	93	93	92	87	86	82	80	78	76	75	73	75	76	78	80	81	81	85.2	95																								
9-Nov	83	84	85	83	85	85	83	82	83	79	76	75	73	69	65	65	68	71	74	75	76	76	77	79	77.2	85																								
10-Nov	79	83	87	89	88	88	89	88	84	79	71	65	57	52	49	48	49	50	51	56	60	62	63	64	68.9	89																								
11-Nov	63	62	61	60	62	58	59	60	61	57	50	45	41	39	39	42	47	56	53	47	46	49	53	56	52.7	63																								
12-Nov	62	68	70	76	80	82	85	87	88	79	67	57	55	53	55	58	59	58	58	59	57	56	51	49	65.5	88																								
13-Nov	50	52	58	61	58	58	59	61	62	59	51	46	44	41	40	44	51	56	56	62	58	55	56	58	54.0	62																								
14-Nov	58	56	57	57	62	66	67	73	74	68	59	53	47	45	44	50	64	72	76	78	81	82	85	86	65.0	86																								
15-Nov	87	87	89	89	89	88	88	88	89	88	87	86	83	83	85	89	92	93	94	95	96	96	96	96	89.7	96																								
16-Nov	96	96	96	96	96	96	96	95	91	89	86	80	80	79	80	83	85	86	84	87	90	91	90	88	89.1	96																								
17-Nov	89	89	89	90	89	90	91	92	90	84	79	73	69	69	70	83	90	87	78	72	75	74	79	84	82.3	92																								
18-Nov	83	81	81	81	84	82	77	72	71	70	69	65	64	65	65	65	68	79	83	81	78	80	83	83	75.4	84																								
19-Nov	82	81	80	80	79	79	78	80	79	80	80	75	66	71	73	78	82	82	81	82	82	83	83	84	79.1	84																								
20-Nov	84	83	83	83	83	81	78	78	81	78	73	71	70	67	69	75	76	76	76	77	79	79	79	81	77.5	84																								
21-Nov	83	80	79	79	78	79	81	83	85	80	73	68	67	69	70	73	79	80	84	85	86	84	84	85	78.9	86																								
22-Nov	88	89	84	81	83	88	87	91	89	95	96	95	95	94	92	91	91	91	91	92	92	92	90	89	90.3	96																								
23-Nov	90	90	90	90	90	89	89	89	89	90	89	88	86	85	84	84	85	87	87	85	84	84	83	83	87.0	90																								
24-Nov	85	84	83	83	83	84	84	84	85	83	80	77	76	74	76	76	80	83	82	83	84	82	79	79	81.2	85																								
25-Nov	79	79	79	80	79	79	78	79	79	80	71	64	61	62	64	74	80	82	82	81	82	82	81	81	76.6	82																								
26-Nov	81	81	82	81	82	82	82	82	82	82	81	76	74	72	74	77	74	74	86	88	78	81	81	84	79.9	88																								
27-Nov	85	81	71	69	70	79	81	82	85	75	65	55	51	47	52	76	81	75	79	85	82	87	87	87	74.5	87																								
28-Nov	87	82	80	82	81	83	81	78	80	75	67	60	55	53	53	57	63	63	66	67	68	69	68	68	70.2	87																								
29-Nov	68	69	72	71	72	72	70	73	71	67	65	60	55	53	53	55	57	59	62	62	63	64	66	68	64.5	73																								
30-Nov	70	72	75	74	73	73	73	72	71	67	55	45	42	41	43	51	59	60	65	56	65	66	71	76	63.0	76																								
																								81.5	81.6	81.8	82.0	82.1	82.6	82.6	82.8	82.7	80.3	75.7	71.0	68.3	67.1	67.3	71.2	74.7	76.5	77.2	77.6	78.0	78.6	79.2	80.1	Diurnal Average		
																								96	96	96	96	96	96	96	96	97	97	96	96	96	95	95	95	96	96	96	96	96	96	96	96	96	Diurnal Maximum	





Maximum Value: 1.6 mm on Nov 15 18:00 Maximum Daily Total: 7.2 mm on Nov 15		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Minimum Value: 0.0 mm on Nov 1 01:00 Maximum Diurnal Total: 2.1 mm at hour 19 Monthly Total: 18.13 mm		Minimum Daily Total: 0.0 mm on Nov 4 Minimum Diurnal Total: 0.0 mm at hour 12 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.3																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1
2-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.4	0.4	1.3	0.4
3-Nov	0.4	0.4	0.1	0.2	0.3	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.4
4-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.5	1.6	1.6	0.7	0.9	0.4	0.0	0.0	7.2	1.6	
16-Nov	0.0	0.1	0.1	0.1	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	
17-Nov	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	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.7	0.2	
18-Nov	0.0	0.0	0.1	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	
19-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.1	
20-Nov	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	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6	0.3	
21-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.4	0.3	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.5	0.7	0.3	0.1	0.1	0.2	3.3	0.7	
23-Nov	0.1	0.3	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.3	
24-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - November 2015

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	706	98.06	98.06
0.4 - 0.5	8	1.11	99.17
0.6 - 0.7	2	0.28	99.44
0.8 - 1.4	1	0.14	99.58
1.5 - 10	2	0.28	99.86
> 10	0	0.00	99.86

Total Number of Valid Hours: 720

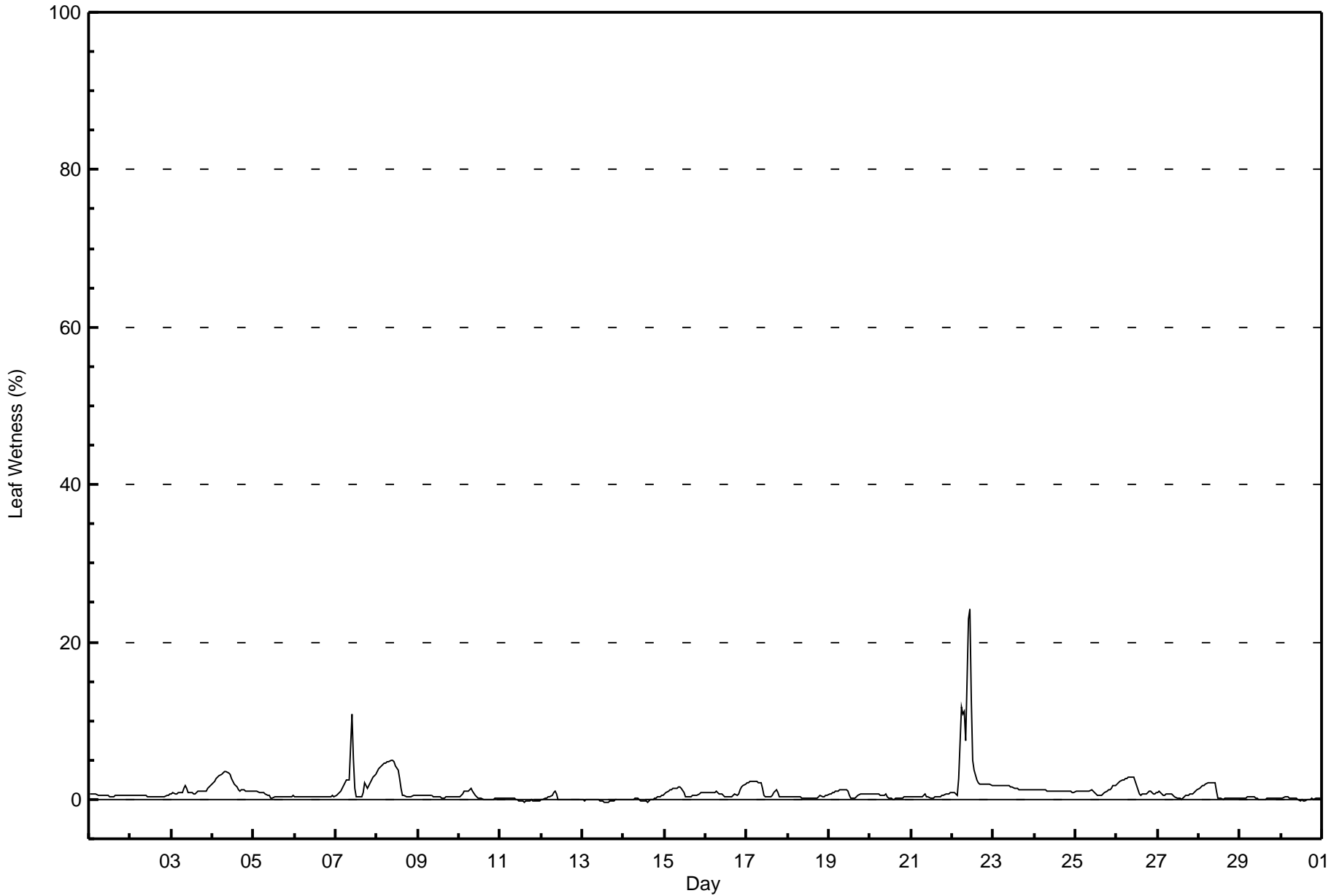
Total Number of Hours: 720



Summary of Hour Averages

Fort McKay - Bertha Ganter - November 2015

Maximum Value: 24 % on Nov 22 11:00														Maximum Daily Average: 5.6 % on Nov 22														Hours in Service: 720			
Minimum Value: 0 % on Nov 13 15:00														Minimum Daily Average: -0.1 % on Nov 13														Hours of Data: 720			
Maximum Diurnal Average: 2.1 % at hour 10														Minimum Diurnal Average: 0.4 % at hour 15														Hours of Missing Data: 0			
Monthly Average: 0.9 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 11														Hours of Calibration: 0			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Nov	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.5	1				
2-Nov	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1				
3-Nov	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.1	2				
4-Nov	2	2	3	3	3	3	3	4	4	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	2.1	4				
5-Nov	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1				
6-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1				
7-Nov	0	1	1	1	1	2	2	3	3	11	5	1	0	0	0	0	1	2	1	2	2	2	3	3	3	2.1	11				
8-Nov	4	4	4	4	5	5	5	5	5	5	5	4	4	3	1	1	0	0	0	0	0	0	0	0	0	2.7	5				
9-Nov	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1				
10-Nov	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1				
11-Nov	0	0	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-Nov	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1				
13-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.1	0				
14-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0	1				
15-Nov	1	1	1	1	1	1	1	1	2	2	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0.9	2				
16-Nov	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	2	2	2	2	0.8	2				
17-Nov	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1.2	2				
18-Nov	0	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	1				
19-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0.8	1				
20-Nov	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1				
21-Nov	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1				
22-Nov	1	1	1	1	3	12	11	11	7	23	24	13	5	4	2	2	2	2	2	2	2	2	2	2	2	5.6	24				
23-Nov	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	1.5	2				
24-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1				
25-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	2	2	2	1.0	2				
26-Nov	2	2	2	2	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	3				
27-Nov	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0.6	1				
28-Nov	1	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	2				
29-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0				
30-Nov	0	0	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 0.9 0.9 1.0 1.1 1.4 1.5 1.5 1.4 2.1 1.7 1.1 0.7 0.5 0.4 0.4 0.5 0.6 0.6 0.6 0.6 0.7 0.7 0.8														Diurnal Average																	
4 4 4 4 5 12 11 11 7 23 24 13 5 4 2 2 2 2 2 2 2 2 2 3 3														Diurnal Maximum																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

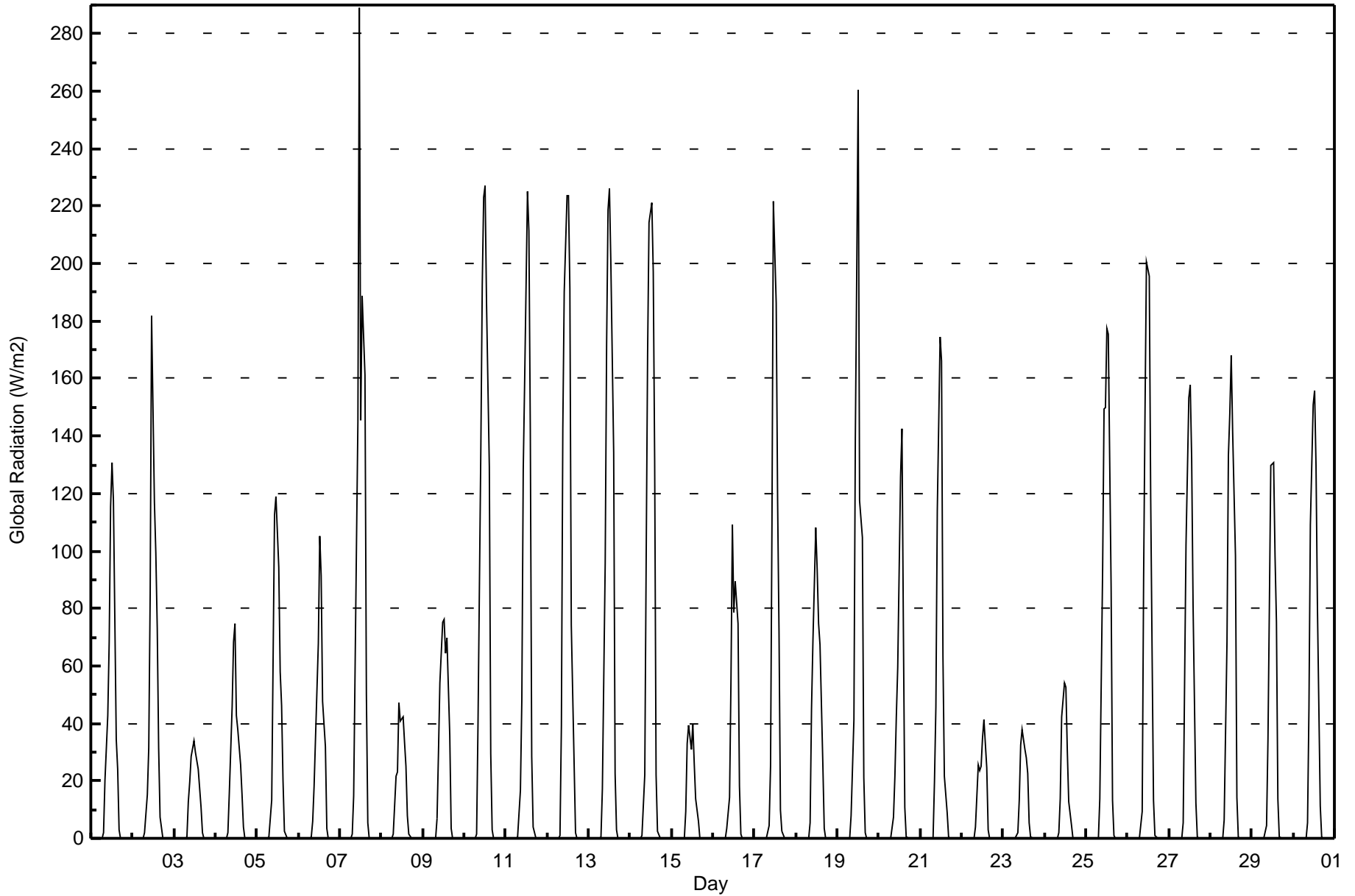
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	192	29.31	29.31
0.4 - 0.5	118	18.02	47.33
0.6 - 0.7	70	10.69	58.02
0.8 - 1.4	156	23.82	81.83
1.5 - 10	106	16.18	98.02
> 10	7	1.07	99.08

Total Number of Valid Hours: 655

Total Number of Hours: 720



Maximum Value: 289 W/m2 on Nov 7 12:00																			Maximum Daily Average: 48.7 W/m2 on Nov 10						Hours in Service: 720	
Minimum Value: 0 W/m2 on Nov 1 01:00																			Minimum Daily Average: 7.2 W/m2 on Nov 23						Hours of Data: 720	
Maximum Diurnal Average: 132.9 W/m2 at hour 12																			Minimum Diurnal Average: 0.0 W/m2 at hour 19						Hours of Missing Data: 0	
Monthly Average: 26.0 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 24 P ₉₀ = 109 P ₉₉ = 224						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	0	0	2	20	43	68	115	131	117	34	24	3	0	0	0	0	0	0	0	23.2	131
2-Nov	0	0	0	0	0	0	0	2	15	31	85	182	117	99	73	31	7	0	0	0	0	0	0	0	26.8	182
3-Nov	0	0	0	0	0	0	0	1	13	20	29	34	30	27	24	11	2	0	0	0	0	0	0	0	7.9	34
4-Nov	0	0	0	0	0	0	0	2	16	46	68	75	43	38	25	15	4	0	0	0	0	0	0	0	13.9	75
5-Nov	0	0	0	0	0	0	0	0	13	63	113	119	94	58	46	20	2	0	0	119	0	0	0	0	22.1	119
6-Nov	0	0	0	0	0	0	0	1	6	18	35	68	105	91	48	32	4	0	0	0	0	0	0	0	16.9	105
7-Nov	0	0	0	0	0	0	0	1	15	103	145	289	145	189	161	50	5	0	0	0	0	0	0	0	46.0	289
8-Nov	0	0	0	0	0	0	0	1	22	23	47	41	42	34	25	8	1	0	0	0	0	0	0	0	10.2	47
9-Nov	0	0	0	0	0	0	0	0	7	30	54	75	76	65	70	36	4	0	0	0	0	0	0	0	17.3	76
10-Nov	0	0	0	0	0	0	0	2	40	136	193	223	227	187	129	30	3	0	0	0	0	0	0	0	48.7	227
11-Nov	0	0	0	0	0	0	0	1	17	48	128	159	225	211	142	29	4	0	0	0	0	0	0	0	40.2	225
12-Nov	0	0	0	0	0	0	0	1	39	143	190	224	224	191	74	26	2	0	0	0	0	0	0	0	46.4	224
13-Nov	0	0	0	0	0	0	0	1	17	96	172	219	226	200	134	23	3	0	0	0	0	0	0	0	45.4	226
14-Nov	0	0	0	0	0	0	0	1	22	98	169	214	221	197	131	22	2	0	0	0	0	0	0	0	44.9	221
15-Nov	0	0	0	0	0	0	0	0	10	33	40	31	40	26	14	6	0	0	0	0	0	0	0	0	8.3	40
16-Nov	0	0	0	0	0	0	0	0	3	14	55	109	78	90	75	18	2	0	0	0	0	0	0	0	18.5	109
17-Nov	0	0	0	0	0	0	0	0	4	25	109	222	186	117	72	10	2	0	0	0	0	0	0	0	31.2	222
18-Nov	0	0	0	0	0	0	0	0	6	45	69	108	94	75	67	26	3	0	0	0	0	0	0	0	20.5	108
19-Nov	0	0	0	0	0	0	0	0	8	41	139	197	261	118	105	21	2	0	0	0	0	0	0	0	37.1	261
20-Nov	0	0	0	0	0	0	0	0	7	22	42	59	126	143	73	11	0	0	0	0	0	0	0	0	20.1	143
21-Nov	0	0	0	0	0	0	0	0	20	46	114	175	166	63	22	9	0	0	0	0	0	0	0	0	25.6	175
22-Nov	0	0	0	0	0	0	0	0	4	26	24	25	35	41	24	3	0	0	0	0	0	0	0	0	7.6	41
23-Nov	0	0	0	0	0	0	0	0	2	13	33	38	31	28	23	6	0	0	0	0	0	0	0	0	7.2	38
24-Nov	0	0	0	0	0	0	0	0	2	14	42	54	53	30	13	5	0	0	0	0	0	0	0	0	8.9	54
25-Nov	0	0	0	0	0	0	0	0	14	94	149	150	178	175	88	13	1	0	0	0	0	0	0	0	35.9	178
26-Nov	0	0	0	0	0	0	0	0	10	91	149	201	195	119	65	13	1	0	0	0	0	0	0	0	35.1	201
27-Nov	0	0	0	0	0	0	0	0	5	54	102	153	158	132	81	13	1	0	0	0	0	0	0	0	29.1	158
28-Nov	0	0	0	0	0	0	0	0	7	68	133	148	168	141	98	14	1	0	0	0	0	0	0	0	32.4	168
29-Nov	0	0	0	0	0	0	0	0	4	34	81	130	131	98	75	14	1	0	0	0	0	0	0	0	23.7	131
30-Nov	0	0	0	0	0	0	0	0	5	45	109	151	156	130	81	11	1	0	0	0	0	0	0	0	28.7	156
																			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 12.4 52.0 96.2 132.9 132.1 107.7 69.8 18.3 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 0 2 40 143 193 289 261 211 161 50 7 0 0 0 0 0 0 0						Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	531	73.75	73.75
21 - 100	111	15.42	89.17
101 - 300	78	10.83	100.00
301 - 600	0	0.00	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

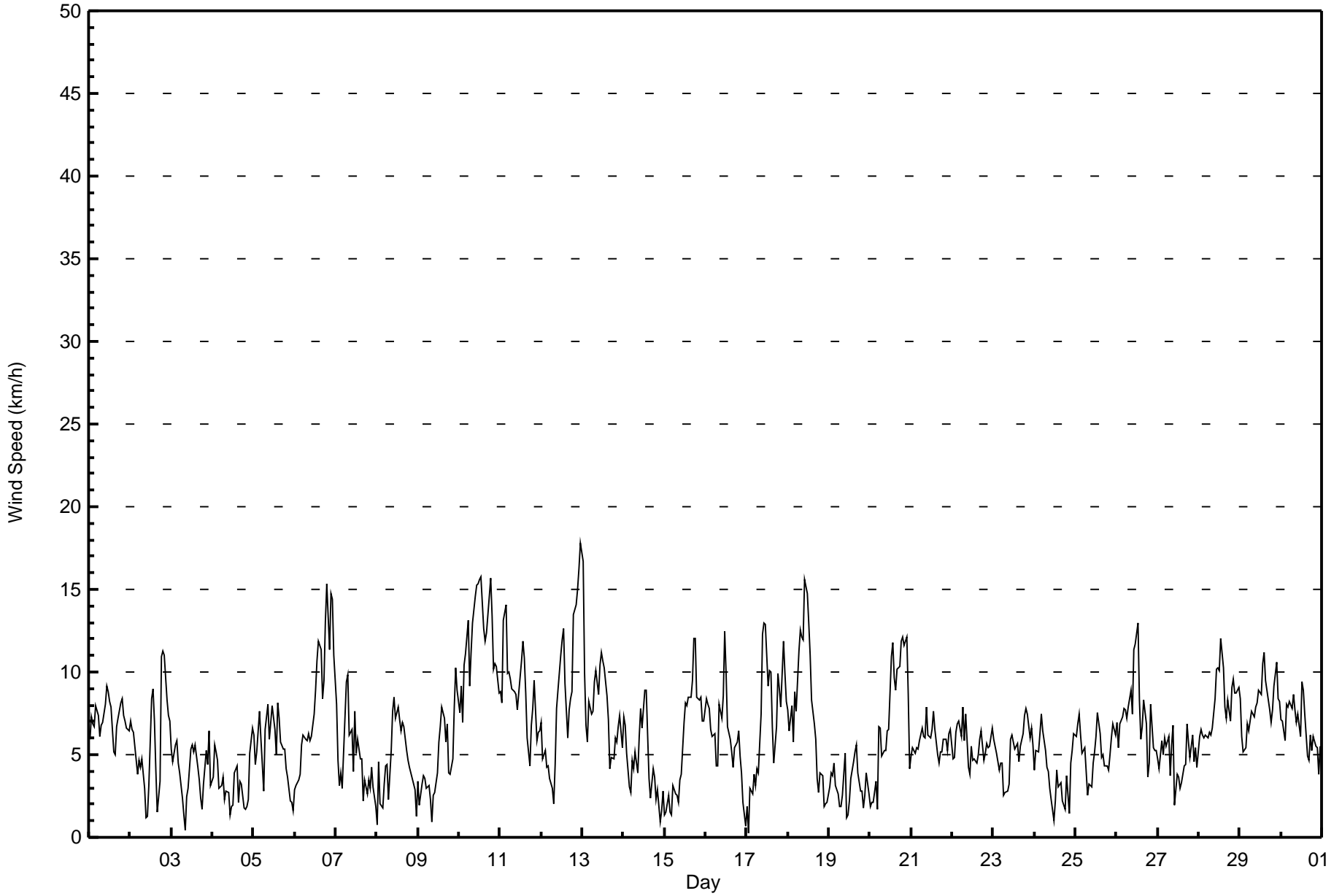


Maximum Speed: 18 km/h on Nov 13 00:00	Maximum Daily Speed Average: 11.9 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 17 02:00	Minimum Daily Speed Average: 1.0 km/h on Nov 3	Hours of Data: 720
Maximum Diurnal Speed Average: 3.5 km/h at hour 22	Minimum Diurnal Speed Average: 1.7 km/h at hour 17	Hours of Missing Data: 0
Monthly Average Velocity: 2.6 km/h 214.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 8 P ₉₀ = 10 P ₉₉ = 16	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	N6	N7	N7	N7	N8	N7	N6	N7	N7	N8	N9	N9	NNE8	NNE8	NNE5	NNE5	N7	N7	N8	N8	N7	N7	NNW7	NNW6	N7.0	N9
2-Nov	NNW7	NNW7	N6	NNE5	NNE4	ENE5	E4	E5	ENE3	E1	SE1	SSE3	S8	S9	SSE7	SSE4	NE2	SSE3	S11	S11	S11	SSE8	SSE7	SSE7	SSE2.8	S11
3-Nov	SSE5	SSE5	S6	S6	S4	S4	S2	SSE1	N0	N2	N3	N5	N6	NNW5	NNW6	NNW4	NNW3	NNW2	WNW2	W3	WNW5	SW4	W6	SW3	W1.0	W6
4-Nov	SW4	SW6	SSW5	SW5	WSW3	WSW3	W4	W2	NW3	NNW3	SE1	ESE2	NNW2	N4	N4	N2	N3	NNW3	WNW2	WSW2	W2	SW2	W5	WNW7	W1.9	WNW7
5-Nov	NW6	NNW4	NW5	NNW8	NW6	NW4	N3	NNE6	N8	NNW6	NNW7	NNW8	N7	NNE5	NNW8	NW7	NNW6	NNW5	NW5	NW4	N4	NW2	W2	WSW2	NNW4.9	NNW8
6-Nov	SW3	SSW3	SSW3	S4	SSE6	SSE6	SSE6	SSE6	SSE6	S6	S6	S7	SSE9	S11	SSE12	S11	SSE8	SSE9	SSE13	S15	S11	S15	S14	S11	S8.2	S15
7-Nov	S8	SW5	W3	WSW4	WSW3	W7	WNW9	WNW10	W6	W7	SW4	WSW8	SW5	SW6	WSW5	SW5	SSW2	SW3	WSW3	SSW4	SW3	S4	SSW3	SSW2	WSW4.2	WNW10
8-Nov	WSW1	WNW5	SW2	SSW2	N3	NNW4	NNW4	NNE2	N5	NNE8	NNE8	N7	NNE8	NNE7	N6	N7	N7	N5	N5	N4	NNW4	NNW3	NNW3	NNW1	N4.0	NNE8
9-Nov	NNW3	NW2	NW3	NW4	WNW4	WNW3	WNW3	NNW2	W1	WSW3	SW3	S4	SSE6	S7	SSW8	SSW7	SSW6	SSW7	SW4	SSW4	S5	SSE8	S10	S9	SSW3.1	S10
10-Nov	S8	S9	S7	S10	S11	S13	S9	S11	S13	S15	SSW15	S15	SSW16	SSW16	S13	S12	S12	S13	S16	S13	S10	S10	S10	S9	S11.9	SSW16
11-Nov	S9	S8	S13	S14	S10	SSW10	SSW10	SSW9	SSW9	SSW9	SW8	WSW9	W11	W12	SW11	SW9	SW6	SSW4	W7	W8	W10	SW6	SW6	S6	SW7.3	S14
12-Nov	S7	SSE5	S5	S4	SSW4	SSW4	SSW3	SW2	S4	S8	S9	S11	S12	S13	S9	S6	S8	S8	SSE9	S13	S14	S15	S16	S18	S8.6	S18
13-Nov	S17	S10	SSE7	S6	S8	S7	S8	S9	S10	S9	SSW10	SW11	WSW11	SW10	SW9	SW7	SW4	SW5	SW5	SSW6	WSW6	WSW7	WSW7	SW5	SSW7.2	S17
14-Nov	W7	WSW7	SW5	WSW3	SSW3	SSW5	SSW4	S5	S4	SSE6	S8	SSW7	SW9	SW9	SW6	SW4	WSW2	SSW4	S4	SSW2	SW3	N1	NNW2	W3	SW4.0	SW9
15-Nov	WSW1	NW1	WSW3	SSW2	W1	N3	NW3	NNW3	NW2	NNW3	N4	N7	N8	N8	N9	N8	N9	N12	N12	N8	N8	N8	N7	N7	N5.3	N12
16-Nov	N8	NNW8	N8	NNW7	NNW6	NW6	WNW4	W4	WNW8	W7	WNW9	WNW12	WNW10	W7	WSW6	W5	SSW4	SSW5	SSW6	S6	S5	SW4	SSW2	SE1	WNW3.9	WNW12
17-Nov	SSW2	NE0	N3	WNW3	N4	WNW3	SSE4	S4	S7	S12	S13	S13	S9	SSW10	SSW10	SW7	SW4	WNW7	NW10	WNW9	W8	WNW12	WNW10	WNW8	SW4.1	S13
18-Nov	WNW8	WNW6	NW8	NNW6	NW9	NW8	NNW11	NNW13	NNW12	NNW12	NNW16	NNW15	NNW13	NNW11	NNW8	NNW7	NNW6	NNW4	NW3	WNW4	WNW4	NW2	NNW2	SW2	NNW7.4	NNW16
19-Nov	SSW3	SW4	SW4	WSW4	W3	WSW3	WNW2	WNW2	SW3	S5	NW1	NNW1	SSE2	NNE4	NNW5	NNW5	NW6	NW4	WNW3	NW3	NW2	NW3	NW4	NW3	WNW1.9	NW6
20-Nov	WSW2	W2	WNW2	WNW3	WSW2	WNW7	WNW7	WNW5	WNW5	W5	WSW6	SW7	SSW11	S12	S10	S9	S10	S10	S12	S12	S12	S12	S9	SW4	SSW5.5	S12
21-Nov	SSW5	WSW5	W5	WSW5	WSW5	SSW6	SSW7	SSW6	S6	S8	SSW6	SW6	SSW7	SSW8	SSW7	S5	S4	S5	S5	SSW6	S6	SSW5	SSW6	S7	SSW5.4	S8
22-Nov	S5	SW5	W6	W7	WNW7	WNW6	NW8	WNW6	NW7	N4	N4	NNE5	NNE5	NNE5	NNE5	NNE5	NNE6	NE6	NE5	N5	N6	N5	N6	N7	NNW3.6	NW8
23-Nov	N6	N6	N5	NW4	NW4	NNW4	NW3	NW3	N3	NNW3	N6	N6	N5	N6	N6	N5	N6	N6	N7	N8	N7	N6	N7	N6	N5.1	N8
24-Nov	NNW4	N5	NNW5	NNW6	NNW7	NNW6	NNW5	NW4	WNW4	W3	SW2	S1	N2	N4	NNW3	NW3	NW2	SW2	SW2	S4	SW1	SSW5	SSW5	SSW6	NW2.1	NNW7
25-Nov	SSW6	SSW7	S7	SSW6	SW5	SSW5	S4	S3	S3	S3	SSE5	SSE5	SSE6	SSE8	SSE6	S5	S5	S4	SSW4	S4	SSW5	S6	SSW7	S6	S5.1	SSE8
26-Nov	S7	S5	S7	S7	S8	S8	S7	S8	S9	S7	S11	S12	S13	S8	S6	S7	S8	S7	S4	S5	S8	SSW5	SSW5	SSW5	S7.4	S13
27-Nov	SSW5	SSW4	SW6	SSW5	SSW6	SSW6	S6	S4	WSW6	W7	SSW2	S4	S4	SE3	SSE3	SSW4	S4	SSW7	SSW6	SSW5	S6	S5	S5	SSW4	SSW4.4	SSW7
28-Nov	SSW6	S7	S6	S6	S6	SSW6	SSW6	SSW6	S7	S8	S10	S10	S10	S12	S10	S8	SSW7	SSW8	SSW7	S9	S10	S9	S9	S9	S8.0	S12
29-Nov	S8	S6	S5	SSW5	S7	S6	S7	S8	S7	S8	S8	S9	S9	S11	S11	S10	S9	S8	S7	S8	S9	S11	S8	S8	S8.0	S11
30-Nov	SSW7	SSW7	SSW6	S8	SSW8	SSW8	SSW8	SSW9	SSW8	SSW7	S7	S6	S9	S9	S7	S5	S5	S6	SSW5	SSW6	S6	SSW5	SSW4	SSW5	S6.6	S9

SSW2.9	SW2.4	SW2.2	SW2.6	SW2.1	SW2.5	SW2.2	SW2.2	SW2.3	SW2.7	SSW2.6	SW2.6	SSW2.8	SSW3.1	SSW2.7	SSW2.2	SSW1.7	SSW2.1	SSW2.4	SSW3.2	SSW3.1	SSW3.5	SSW3.5	SSW3.3	Diurnal Average
S17	S10	S13	S14	S11	S13	NNW11	NNW13	S13	S15	NNW16	S15	SSW16	SSW16	S13	S12	S12	S13	S16	S15	S14	S15	S16	S18	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 - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	310	43.06	43.06
6 - 11	360	50.00	93.06
12 - 19	50	6.94	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: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay - Bertha Ganter - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	29	12	3	2	3	1	4	13	41	47	35	22	17	22	28	31	310
6 - 11	56	8	1	0	0	0	0	21	128	51	19	10	15	17	12	22	360
12 - 19	2	0	0	0	0	0	0	2	34	3	0	0	1	2	0	6	50
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	87	20	4	2	3	1	4	36	203	101	54	32	33	41	40	59	720

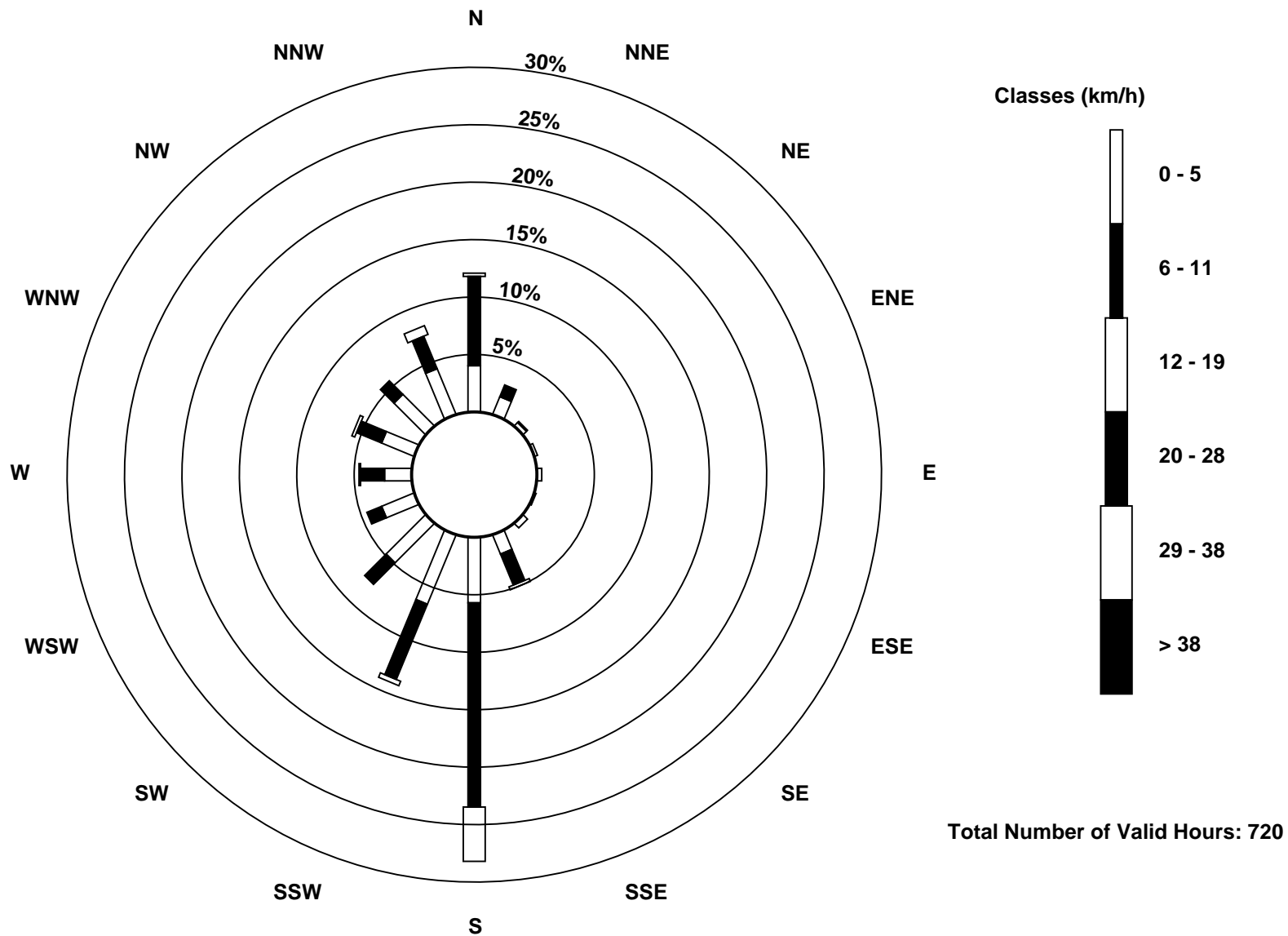
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Nov 11 14:00 Minimum Value: 0 km/h on Nov 5 23:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 4																	Hours in Service: 720 Hours of Data: 720 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-Nov	2	2	2	2	3	3	2	2	2	3	3	3	3	3	2	2	2	2	3	3	2	2	2	2	3
2-Nov	2	2	2	2	1	2	1	2	1	1	1	2	2	2	2	2	1	3	3	3	3	2	1	2	3
3-Nov	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	2	2	1	2	1	2
4-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
5-Nov	2	1	2	1	1	1	1	3	3	2	3	3	2	2	3	2	2	1	1	1	1	1	0	1	3
6-Nov	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	3	3	3	4	4	3	4
7-Nov	2	2	1	1	1	2	3	3	3	3	2	3	2	2	2	2	1	1	1	1	1	2	2	1	3
8-Nov	1	2	1	1	1	1	2	2	2	3	4	3	3	3	3	3	3	2	1	1	1	1	1	1	4
9-Nov	1	1	1	1	1	1	1	2	1	1	1	1	1	2	3	2	2	3	1	1	1	2	2	2	3
10-Nov	2	2	1	3	2	3	2	3	3	3	4	4	4	4	3	3	3	4	3	3	2	3	3	2	4
11-Nov	2	1	3	3	2	3	3	3	2	2	3	4	4	6	5	3	2	1	3	3	4	2	2	2	6
12-Nov	2	2	1	1	1	1	1	1	2	2	2	3	3	3	2	1	2	2	2	3	4	3	4	4	4
13-Nov	3	4	1	2	2	1	2	2	2	2	3	5	5	4	4	3	1	1	2	1	2	3	3	2	5
14-Nov	3	3	2	2	1	2	2	1	2	2	2	3	4	3	3	1	1	1	1	1	1	1	1	1	4
15-Nov	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	3	3	4	4	3	3	2	2	2	4
16-Nov	2	2	3	2	1	1	2	2	3	3	3	4	4	3	2	3	1	2	1	1	1	1	1	1	4
17-Nov	1	1	1	3	2	1	2	2	2	3	3	3	3	3	3	3	2	3	3	3	3	4	4	3	4
18-Nov	2	2	2	2	3	2	4	4	4	5	5	5	4	4	3	2	2	1	1	2	2	1	1	1	5
19-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	2
20-Nov	1	1	1	2	1	2	2	2	2	2	2	2	3	3	2	2	2	3	3	3	3	3	3	2	3
21-Nov	1	2	2	3	2	2	2	1	1	2	2	2	2	2	2	1	1	1	1	2	3	2	2	2	3
22-Nov	2	1	2	2	2	2	3	3	3	1	1	2	2	2	2	2	2	3	2	2	2	2	2	2	3
23-Nov	2	2	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	3	3	2	2	2	3
24-Nov	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	2
25-Nov	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2
26-Nov	2	1	2	2	2	2	2	2	2	2	2	3	2	3	2	2	2	2	1	2	1	2	1	1	3
27-Nov	1	1	2	2	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	2	2
28-Nov	1	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
29-Nov	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2
30-Nov	2	2	2	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	1	1	2	2
																	Diurnal Maximum								



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - November 2015

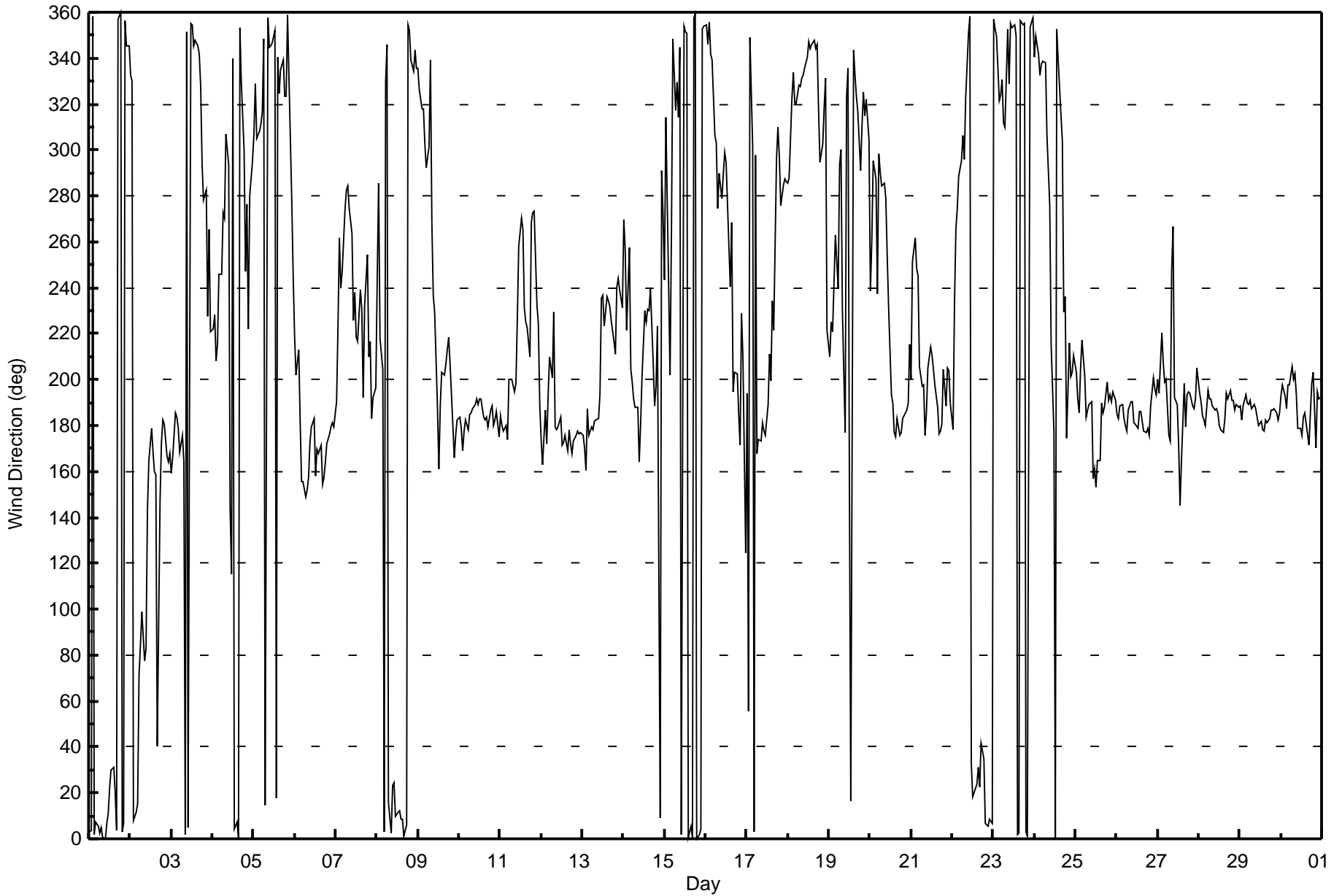
Direction of Maximum Speed: 177 deg on Nov 13 00:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 184.6 deg on Nov 10		Hours of Data:	720
Direction of Minimum Speed: 56 deg on Nov 17 02:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.0 deg on Nov 3		Percent Operational Time:	100.0
Monthly Average Direction: 245.9 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	3	3	358	2	7	6	2	5	0	0	7	11	22	30	31	20	4	357	360	3	7	356	345	345	5.1
2-Nov	333	330	8	12	15	71	84	99	78	83	143	165	179	169	160	159	41	147	172	182	181	167	164	168	153.2
3-Nov	159	166	186	184	178	169	176	164	2	352	5	355	354	345	348	345	342	328	294	278	283	228	266	221	270.9
4-Nov	222	228	208	215	246	246	273	270	307	294	145	115	340	4	8	0	354	329	299	247	276	222	280	295	275.5
5-Nov	307	329	305	308	311	317	349	15	358	345	345	347	352	18	341	325	335	340	324	323	359	305	278	246	334.5
6-Nov	220	202	213	182	156	156	149	152	158	173	179	183	158	169	168	172	155	157	164	172	176	180	181	180	170.9
7-Nov	190	223	262	240	247	274	282	284	275	264	226	238	219	216	239	231	192	232	254	210	217	183	193	197	239.8
8-Nov	244	285	218	205	3	329	346	16	2	23	24	10	12	12	9	8	1	6	354	352	339	334	344	336	359.4
9-Nov	336	326	318	318	303	292	302	339	268	237	229	188	161	189	203	202	207	213	218	207	180	166	176	182	208.4
10-Nov	184	179	169	178	182	178	185	185	187	189	192	189	192	192	183	182	184	179	187	189	180	182	186	175	184.6
11-Nov	185	180	178	180	174	200	200	200	195	198	226	258	271	265	231	225	223	210	268	273	274	232	225	189	217.0
12-Nov	174	163	187	172	193	210	201	229	179	178	179	184	171	173	176	169	178	172	168	173	176	177	176	177	177.1
13-Nov	176	170	160	187	176	179	178	182	183	183	194	236	237	223	236	234	232	226	217	211	240	244	239	232	204.3
14-Nov	270	256	221	258	205	199	192	188	188	164	181	201	230	225	230	230	240	207	189	197	223	9	291	272	217.4
15-Nov	243	314	241	202	264	349	317	329	314	345	2	354	351	351	1	6	0	358	359	0	2	5	352	354	352.8
16-Nov	355	346	356	342	339	306	303	275	290	279	289	299	295	277	240	268	195	203	202	185	171	229	210	125	286.6
17-Nov	194	56	349	301	3	298	168	174	173	182	177	176	189	211	199	235	221	297	310	297	276	285	288	286	233.9
18-Nov	285	288	323	334	321	320	328	328	331	333	336	340	347	344	346	348	344	346	317	295	303	319	331	222	329.2
19-Nov	210	225	221	241	263	240	293	300	231	177	323	336	155	16	344	332	323	317	291	310	325	315	322	305	287.8
20-Nov	239	260	295	287	237	298	290	284	286	279	254	231	194	190	177	175	183	176	177	183	184	187	190	216	206.2
21-Nov	200	251	262	248	245	205	197	197	176	186	205	214	210	204	198	188	177	177	180	204	188	205	204	190	203.5
22-Nov	178	233	265	275	289	295	306	296	323	351	358	33	18	20	24	31	23	41	35	7	6	5	8	7	344.4
23-Nov	357	353	350	321	324	331	312	310	353	329	355	353	354	350	2	3	356	354	355	3	1	353	356	358	350.6
24-Nov	340	350	342	333	337	339	338	306	291	276	215	177	1	353	339	315	304	229	236	174	216	202	203	210	305.8
25-Nov	203	192	185	205	217	201	183	187	189	190	157	161	153	165	165	190	185	188	199	191	193	190	195	191	186.2
26-Nov	185	183	188	189	183	180	178	187	190	190	181	181	179	186	186	182	178	177	179	176	189	201	196	193	184.4
27-Nov	200	194	220	207	199	200	176	174	247	267	192	189	172	145	165	198	179	193	195	194	189	187	191	205	197.3
28-Nov	194	190	184	182	180	195	192	192	188	187	188	186	180	178	177	183	194	192	196	191	191	186	189	188	187.1
29-Nov	188	183	189	193	190	189	191	187	189	188	183	180	182	178	178	182	181	183	186	187	187	186	182	185	184.8
30-Nov	193	198	193	187	198	198	206	200	203	193	179	179	175	184	185	177	172	185	198	203	170	195	192	192	190.1

212.1 226.3 227.6 227.8 230.8 232.4 230.6 224.5 228.0 217.3 208.9 219.7 206.0 204.5 203.2 212.5 206.2 203.1 210.5 207.3 207.1 204.6 210.6 205.4

Diurnal Average

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Nov 8 01:00																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 10 deg on Nov 30 04:00																									
Percentiles: P ₁ = 11 P ₁₀ = 14 Q ₁ = 16 Median = 23 O ₃ = 34 P ₉₀ = 45 P ₉₉ = 83																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Nov	30	29	25	31	32	29	30	26	25	27	29	32	37	38	38	40	28	26	28	28	29	27	29	26	40
2-Nov	23	25	29	45	41	46	33	22	32	91	86	53	18	15	18	46	47	76	16	15	18	16	14	14	91
3-Nov	14	17	16	15	16	17	37	58	83	23	37	28	28	26	25	23	23	24	30	40	29	25	36	49	83
4-Nov	24	18	17	17	21	41	29	39	30	46	77	67	50	26	29	49	21	25	34	54	41	36	38	17	77
5-Nov	18	20	17	13	13	18	34	33	26	23	30	29	32	43	24	22	22	21	31	19	24	25	14	27	43
6-Nov	22	16	20	18	15	14	15	16	13	18	23	20	16	16	14	14	13	13	14	15	14	15	15	15	23
7-Nov	15	34	28	26	35	33	33	31	54	42	64	38	43	38	41	38	33	25	37	30	44	32	34	76	76
8-Nov	94	44	70	53	35	21	35	72	23	40	43	38	34	37	37	40	32	34	22	25	17	16	27	50	94
9-Nov	21	71	17	15	11	12	16	79	76	34	46	30	20	22	25	20	19	22	28	34	17	14	12	16	79
10-Nov	14	13	11	14	15	13	14	13	13	15	17	16	18	16	15	14	13	15	14	14	15	15	16	14	18
11-Nov	14	13	13	14	15	23	17	18	13	19	39	45	42	45	35	31	22	21	41	42	36	37	32	28	45
12-Nov	15	31	20	23	34	35	23	46	24	15	17	18	13	13	14	13	14	14	16	14	14	13	14	14	46
13-Nov	14	16	21	17	15	16	13	13	13	20	41	45	36	40	38	31	28	36	18	39	41	44	47	47	
14-Nov	37	45	43	66	60	33	20	20	43	20	23	38	33	32	36	34	40	15	24	21	19	76	63	32	76
15-Nov	61	50	27	59	65	19	26	17	49	24	34	23	25	23	25	30	30	26	30	29	33	28	24	24	65
16-Nov	23	23	28	22	21	19	24	35	24	36	29	21	27	39	40	44	18	21	19	14	14	21	24	80	80
17-Nov	56	93	44	89	43	38	74	57	15	16	15	13	25	23	19	39	31	31	22	23	34	30	31	31	93
18-Nov	24	24	23	22	20	20	21	20	21	22	23	24	26	25	27	26	21	20	47	43	48	63	41	48	63
19-Nov	16	13	23	19	24	40	50	76	23	18	83	78	65	64	22	15	11	38	33	26	62	34	18	21	83
20-Nov	36	39	42	47	60	25	24	29	20	36	40	39	22	17	17	15	15	15	14	14	16	15	18	37	60
21-Nov	23	41	42	41	42	23	19	20	15	17	27	39	29	20	18	11	19	16	11	20	50	45	27	21	50
22-Nov	34	36	36	35	22	20	19	29	32	27	34	41	37	47	41	44	41	49	46	30	30	27	31	31	49
23-Nov	26	25	23	17	13	16	31	21	34	34	27	30	30	25	31	31	27	24	23	29	28	26	26	24	34
24-Nov	24	22	23	19	22	21	20	17	15	30	44	81	69	34	42	24	45	39	44	29	68	14	16	18	81
25-Nov	16	12	12	16	38	19	19	33	23	26	20	18	15	14	13	11	16	31	13	19	12	13	14	15	38
26-Nov	13	17	15	14	14	13	14	13	15	15	14	14	13	17	14	16	12	17	33	24	16	21	26	22	33
27-Nov	24	36	29	36	19	21	19	50	27	32	71	29	33	24	14	23	16	13	16	17	11	16	13	13	71
28-Nov	11	15	16	15	17	15	22	20	16	15	14	14	14	13	13	14	13	13	13	13	13	14	15	13	22
29-Nov	16	19	21	14	17	19	13	13	23	15	16	15	15	14	13	14	12	14	13	11	14	14	12	13	23
30-Nov	17	16	14	10	13	15	18	16	16	23	16	20	14	13	11	18	27	15	11	21	18	13	17	17	27
	94	93	70	89	65	46	74	79	83	91	86	81	69	64	42	49	47	76	47	54	68	76	63	80	
Diurnal Maximum																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 16, 2015	Last Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	14:20
Gas Cert Reference	LL107945	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	09-Aug-18
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	811	815
Calculated slope	1.003661	0.999055	Chamber temp	44.9	45.0
Calculated intercept	0.140513	2.041252	Pressure	683.9	678.5
Analyzer Background	11.5	11.4	Flow	0.499	0.497
Analyzer Coefficient	0.949	0.932	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	0.3	----
as found span	5500	81.3	734.7	744.8	0.986
calibrator zero	5500	0.0	0.0	0.3	----
high point	5500	81.3	734.7	735.0	1.000
second point	5500	45.6	412.1	408.3	1.009
third point	5500	22.8	206.0	202.2	1.019
as left zero	5500	0.0	0.0	1.2	----
as left span	5500	81.3	734.7	734.3	1.000
Average Correction Factor					1.009

Corrected As found 744.5 Previous response 731.8 % change -1.7%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



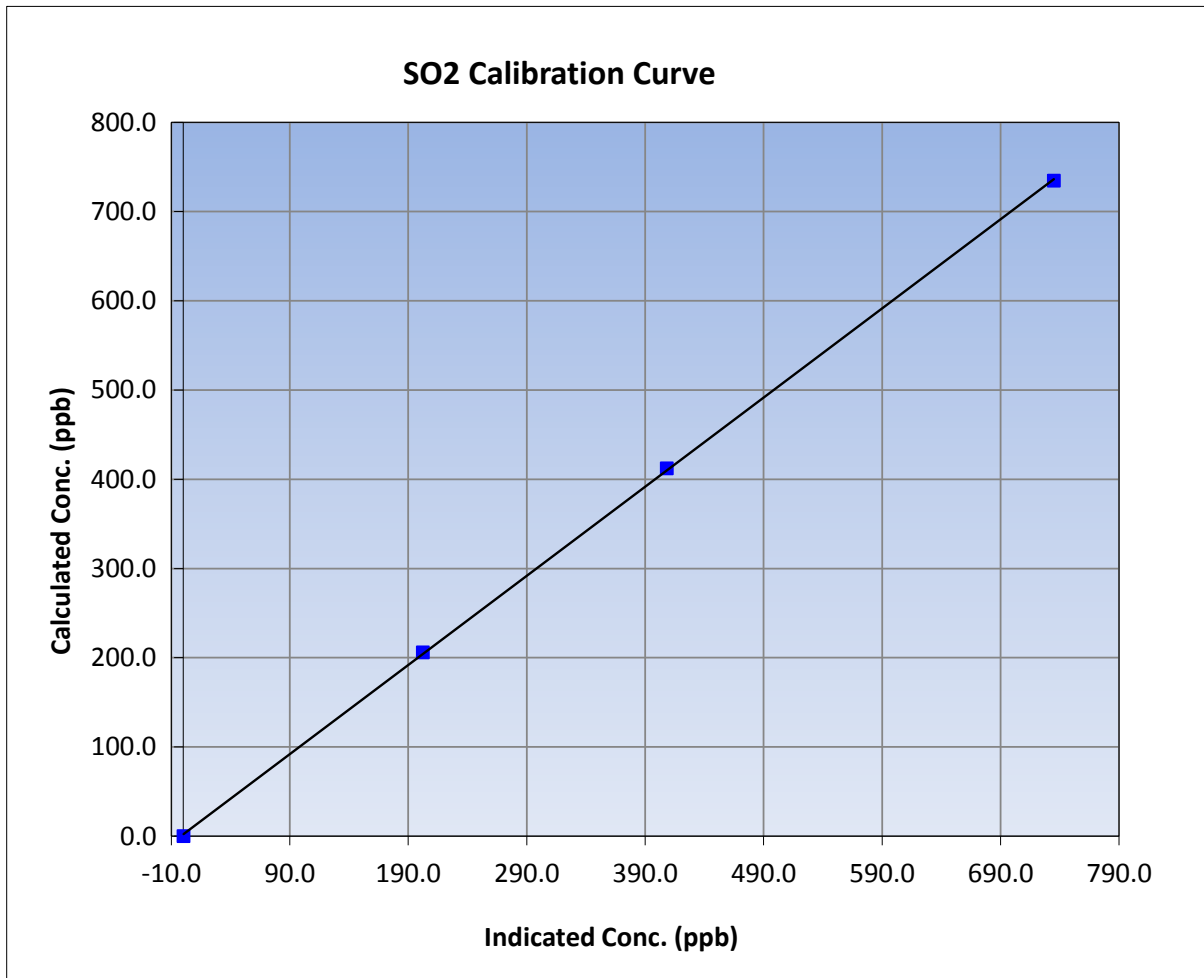
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:20
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

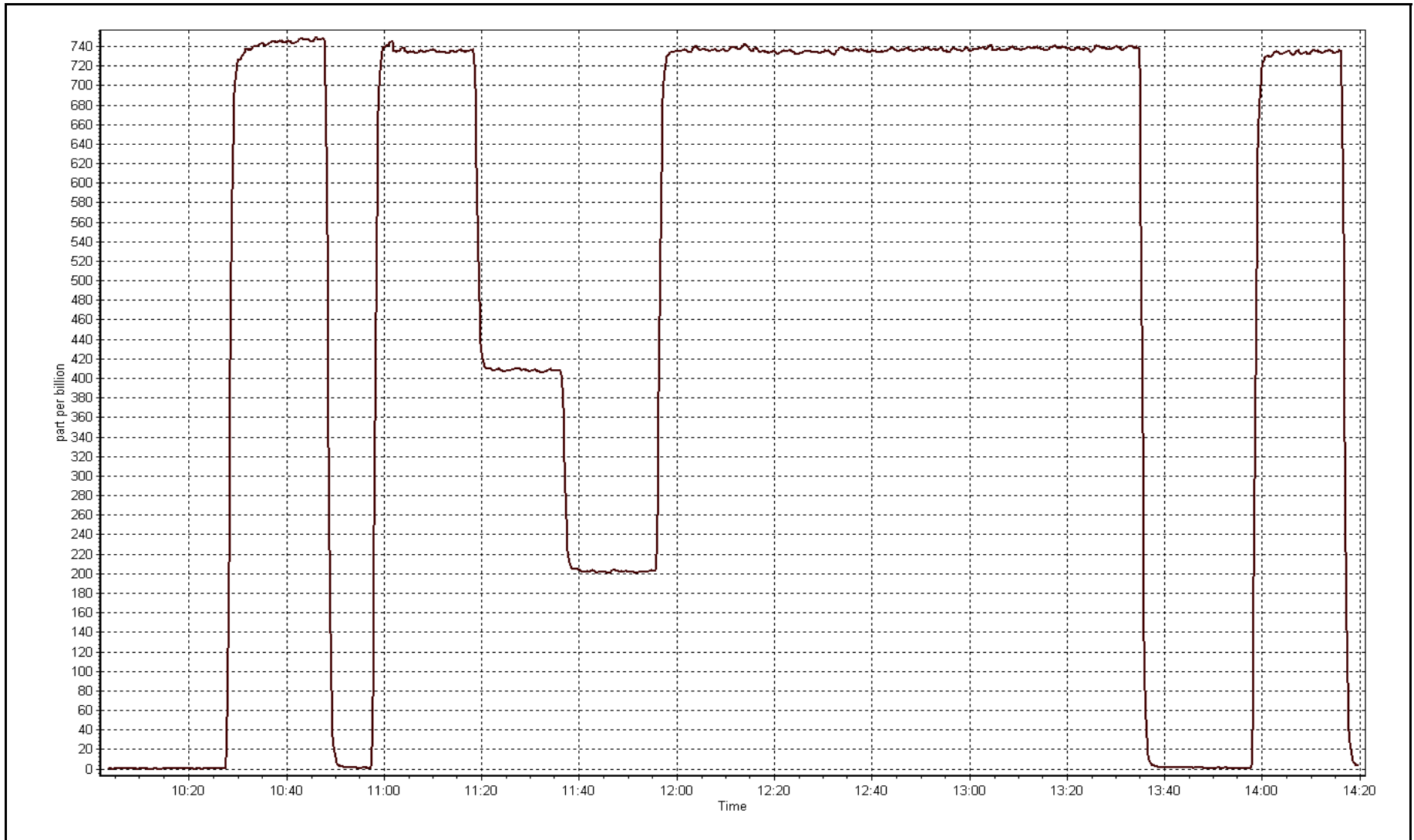
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999944
734.7	735.0	0.9995		
412.1	408.3	1.0092	Slope	0.999055
206.0	202.2	1.0187		
			Intercept	2.041252



SO2 Calibration Plot

Date: November 16, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	November 3, 2015	Last Calibration	October 26, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	14:15
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	192.168.1.44		Lamp voltage	1142	1144
Calculated slope	1.003740	0.994130	Chamber temp	45	45
Calculated intercept	0.122218	0.305450	Pressure	678.1	678.7
Analyzer Background	1.84	1.86	Flow	0.413	0.415
Analyzer Coefficient	1.006	1.015	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	-0.1	----
as found span	6500	46.0	75.0	74.0	1.013
SO2 scrubber check	5500	22.8	206.0	0.5	----
calibrator zero	6500	0.0	0.0	-0.1	----
high point	6500	46.0	75.0	75.3	0.996
second point	6500	24.6	40.1	39.8	1.008
third point	6500	12.3	20.1	19.8	1.013
as left zero	6000	0.0	0.0	0.0	----
as left span	6500	46.0	75.0	75.7	0.991
Average Correction Factor					1.006

Corrected As found	74.2	Previous response	74.6	% change	0.6%
--------------------	------	-------------------	------	----------	------

Notes:

Filter changed after as founds. Scrubber check completed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



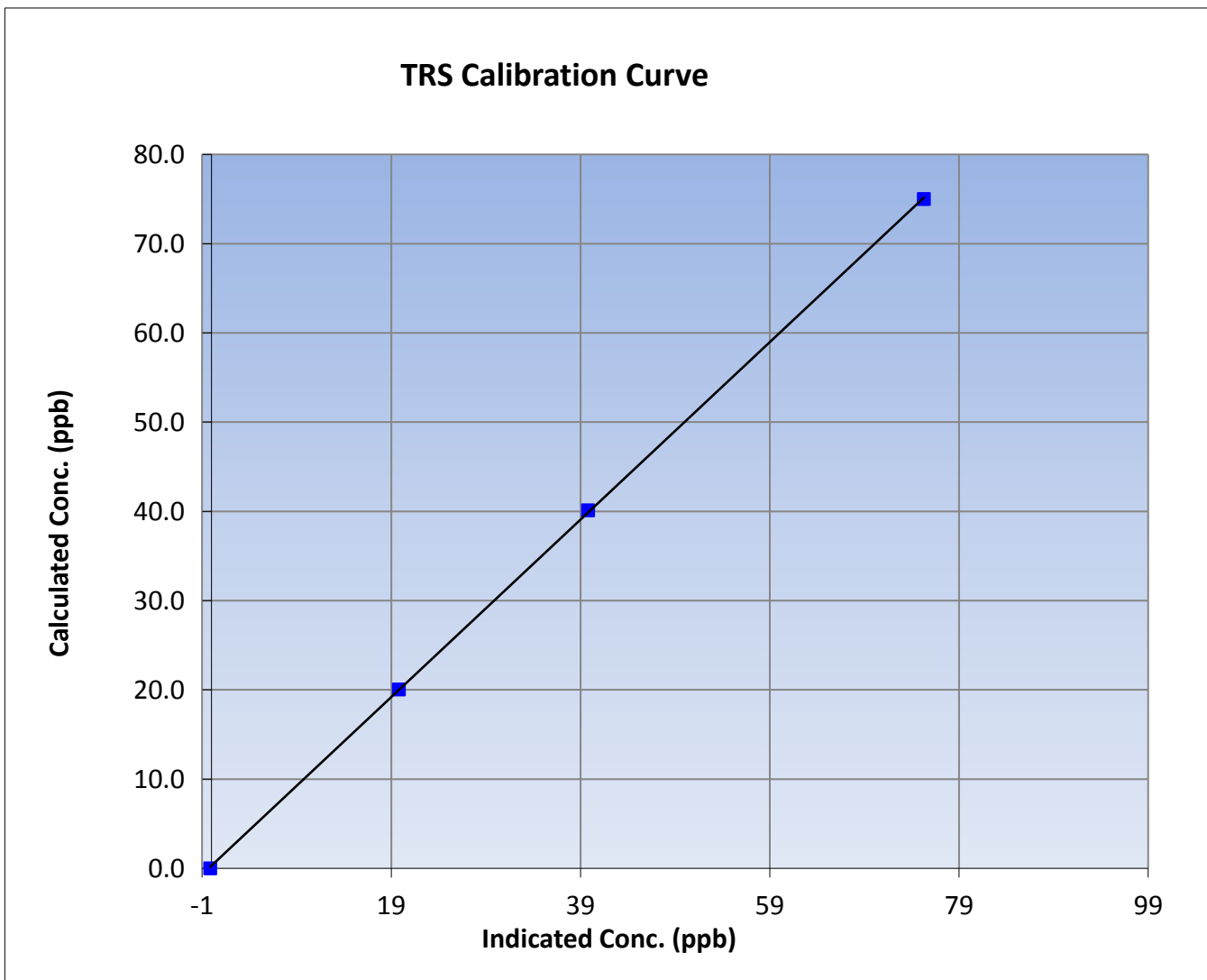
Wood Buffalo Environmental Association TRS Calibration Report

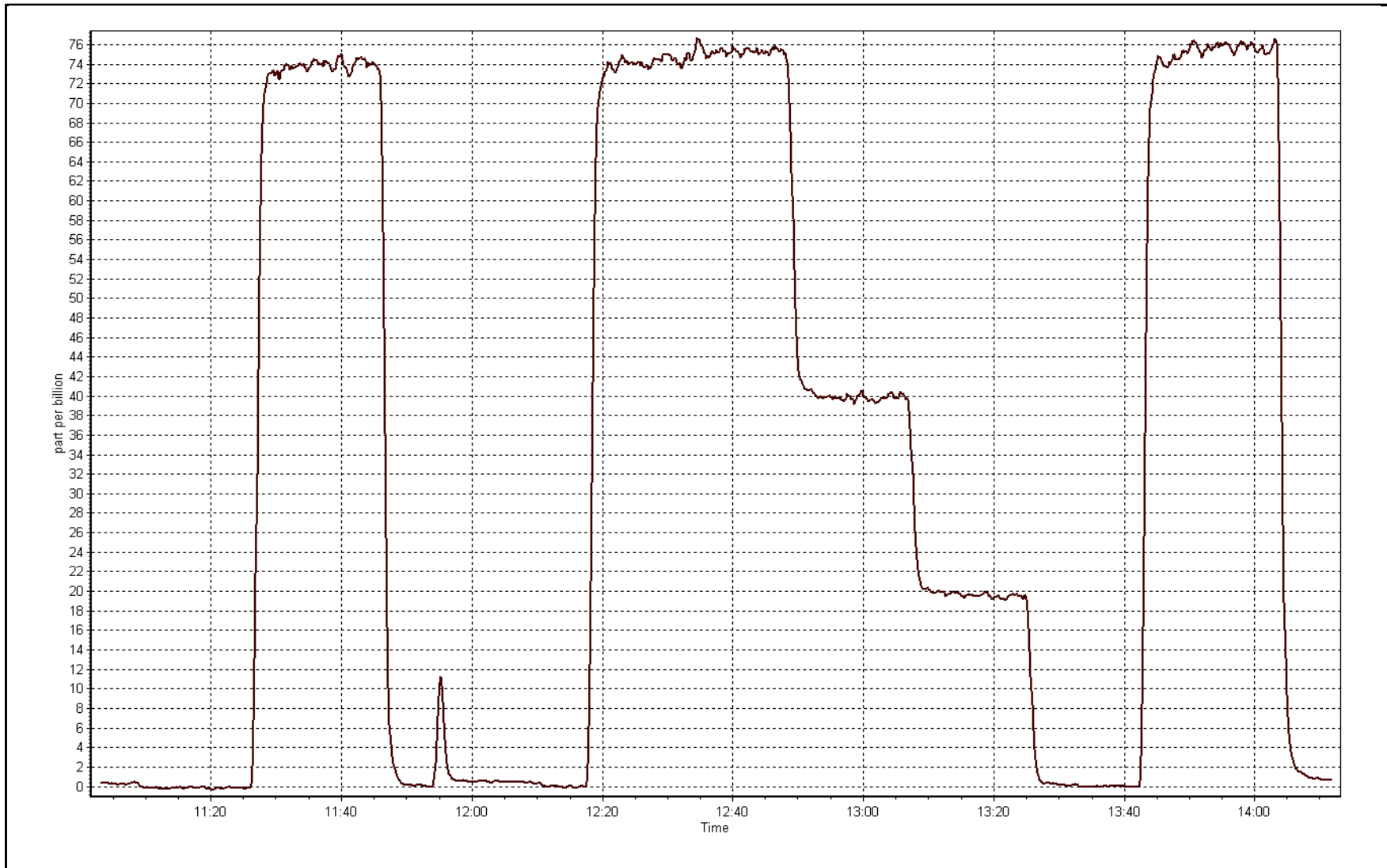
Station Information

Calibration Date	November 3, 2015	Previous Calibration	October 26, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:00	End Time (MST)	14:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999963
75.0	75.3	0.9962		
40.1	39.8	1.0080	Slope	0.994130
20.1	19.8	1.0131		
			Intercept	0.305450







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November 14, 2015	Last Calibration	November 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other: repair		
Start Time (MST)	9:20	End Time (MST)	10:55
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	74.9	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.1
Analyzer IP address	192.168.1.55		Flame Temp	354.4	356.8
THC Calc slope	1.000749	0.999472	Carrier Pressure	39.7	39.8
THC Calc intercept	0.021434	0.018162	Fuel Pressure	39.5	39.5
NMHC Calc slope	1.000445	0.998601	Air Pressure	21.7	21.7
NMHC Calc intercept	0.003335	0.007733			

Analyzer make Thermo 55i Analyzer serial # 1118148494

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	81.3	15.74	15.25	1.032
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	8.79	1.005
third point	5500	22.8	4.41	4.39	1.006
as left zero					
as left span					
Average Correction Factor					1.003

Corrected As found 15.25 Previous response 15.71 % change 3.0%

Notes:

Actuator changed. Calibration completed to ensure linearity and sensitivity. As found data captured on November 13 prior to maintenance; final calibration conducted November 14.

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	8.00	1.016
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	4.55	1.002
third point	5500	22.8	2.28	2.27	1.004
as left zero					
as left span					
Average Correction Factor					1.002

Corrected As found 8.00 Previous response 8.12 % change 1.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	7.61	7.25	1.050
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	4.24	1.007
third point	5500	22.8	2.13	2.11	1.012
as left zero					
as left span					
Average Correction Factor					1.006

Corrected As found 7.25 Previous response 7.59 % change 4.6%



Wood Buffalo Environmental Association

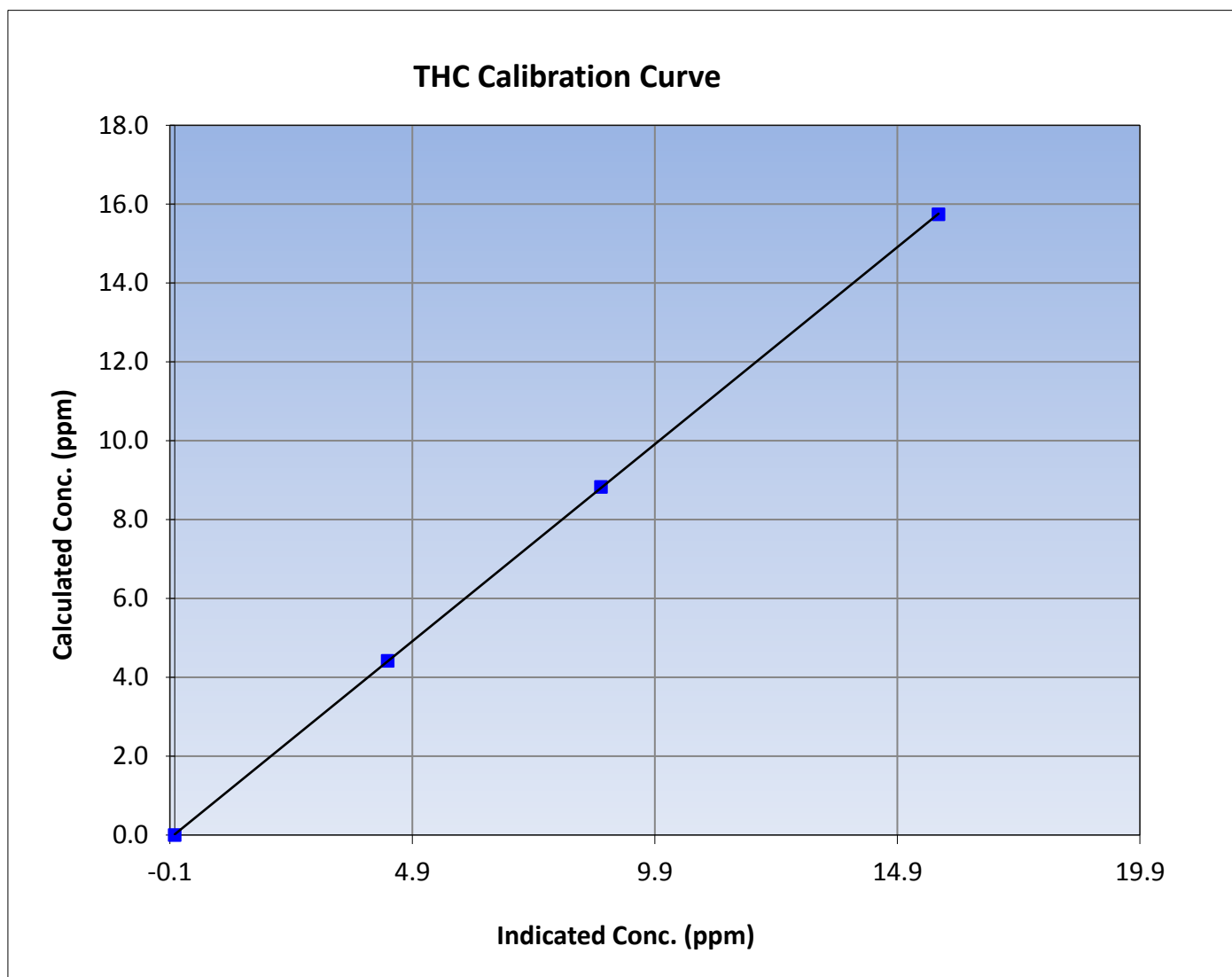
THC Calibration Summary

Station Information

Calibration Date	November 14, 2015	Previous Calibration	November 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	10:55
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999990
15.74	15.75	0.9995		
8.83	8.79	1.0045	Slope	0.999472
4.41	4.39	1.0057		
			Intercept	0.018162





Wood Buffalo Environmental Association

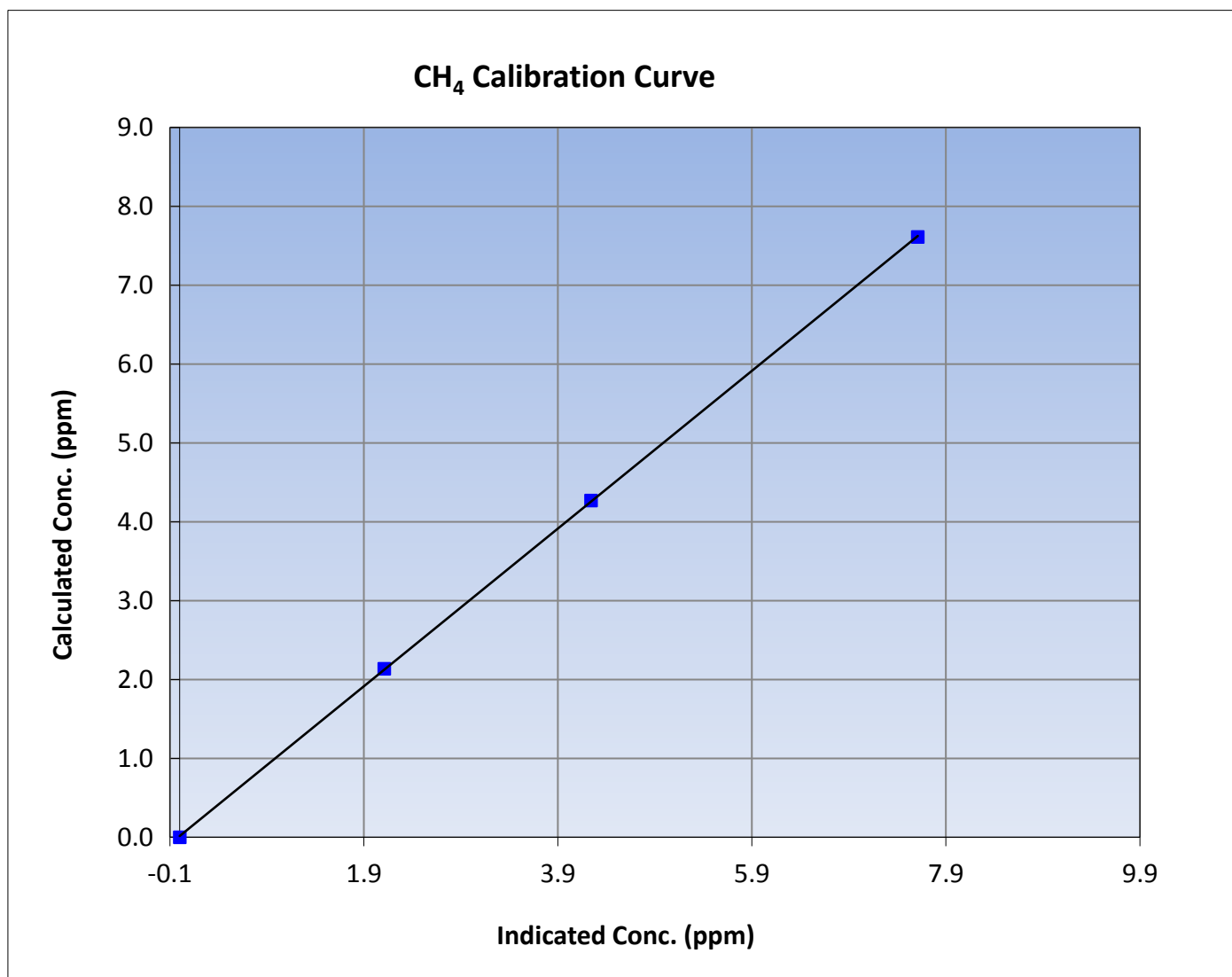
CH₄ Calibration Summary

Station Information

Calibration Date	November 14, 2015	Previous Calibration	November 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	10:55
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999978
7.61	7.61	1.0003		
4.27	4.24	1.0070	Slope	0.999964
2.13	2.11	1.0118		
			Intercept	0.014468





Wood Buffalo Environmental Association

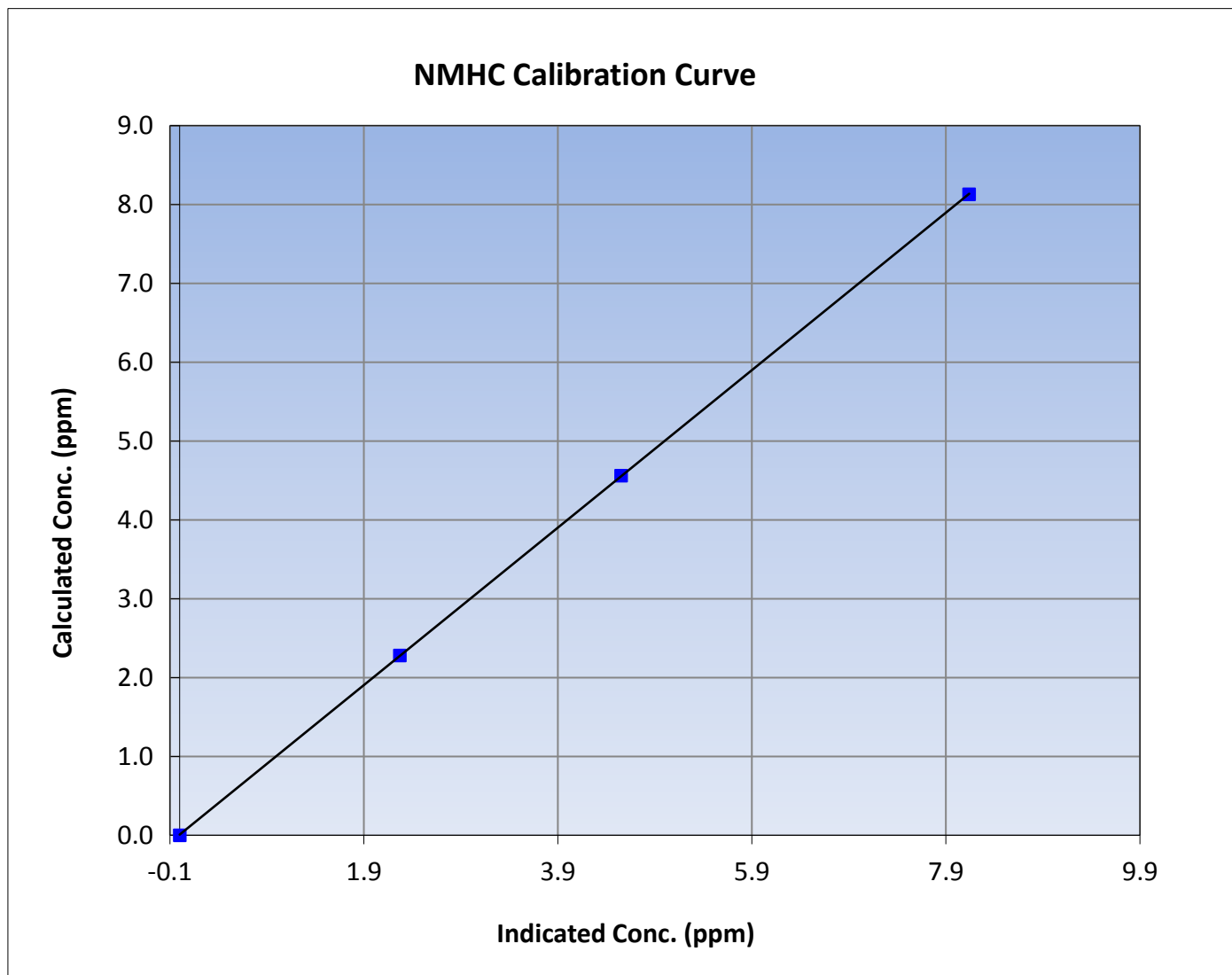
NMHC Calibration Summary

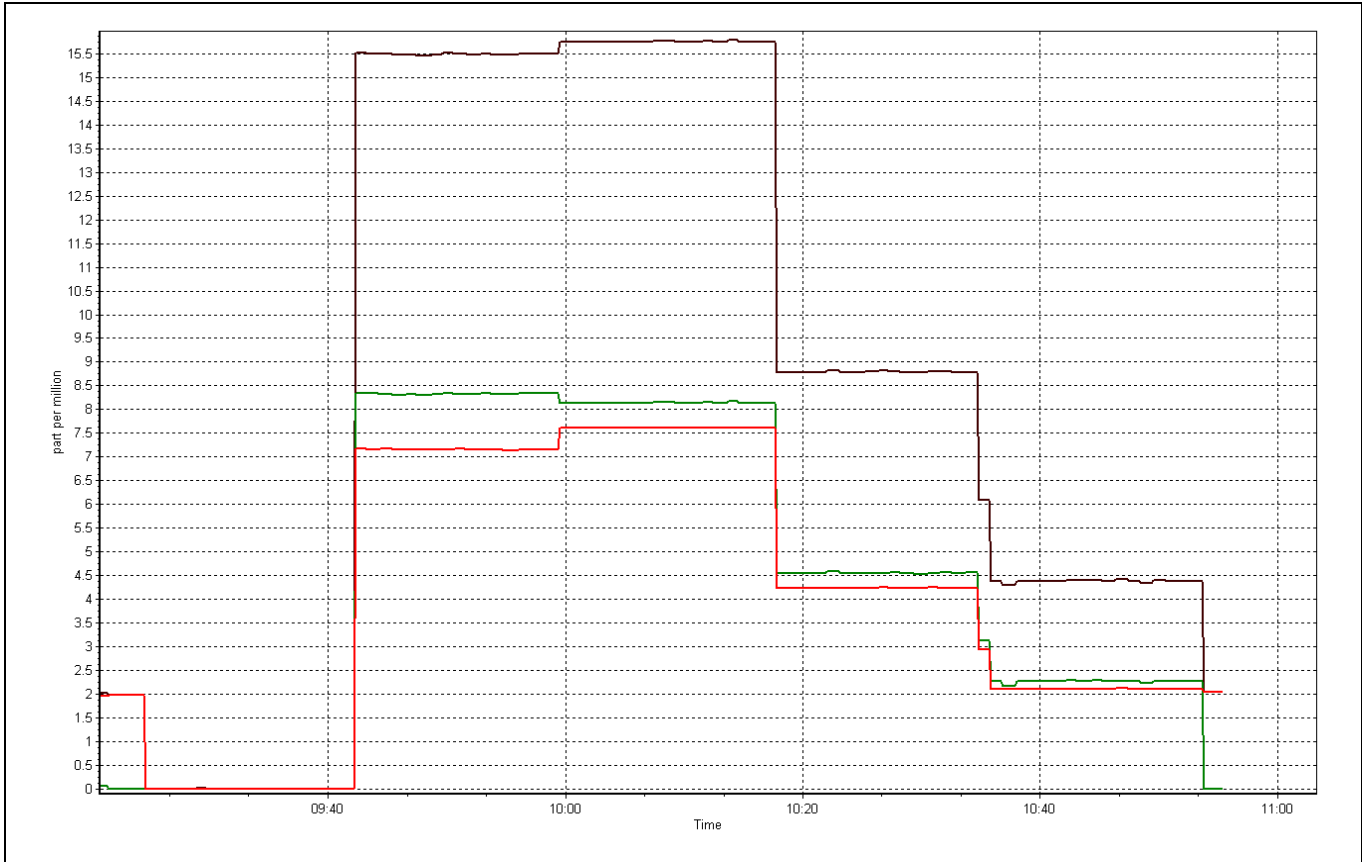
Station Information

Calibration Date	November 14, 2015	Previous Calibration	November 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:20	End Time (MST)	10:55
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

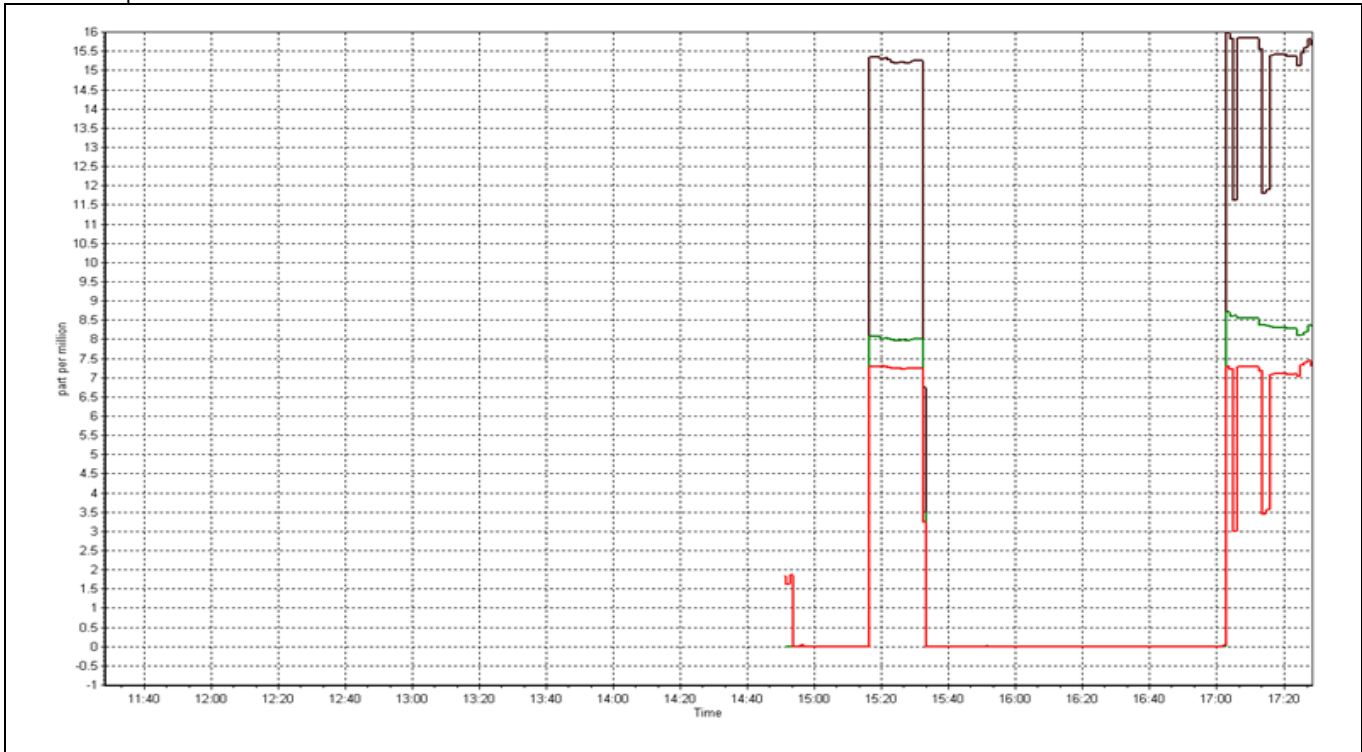
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999994
8.13	8.14	0.9988		
4.56	4.55	1.0022	Slope	0.998601
2.28	2.27	1.0044		
			Intercept	0.007733





As found captured Nov 13th





Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November 18, 2015	Last Calibration	November 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other: repair		
Start Time (MST)	10:15	End Time (MST)	14:10
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	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.1
Analyzer IP address	192.168.1.55		Flame Temp	356.8	356.8
THC Calc slope	0.999472	1.001394	Carrier Pressure	39.8	39.8
THC Calc intercept	0.018162	0.026788	Fuel Pressure	39.5	39.5
NMHC Calc slope	0.998601	1.001699	Air Pressure	21.7	21.7
NMHC Calc intercept	0.007733	0.008668			

Analyzer make Thermo 55i Analyzer serial # 1118148494

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	81.3	15.74	14.96	1.052
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.72	1.001
second point	5500	45.6	8.83	8.75	1.009
third point	5500	22.8	4.41	4.37	1.010
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	15.74	15.73	1.001
Average Correction Factor					1.007

Corrected As found 14.96 Previous response 15.73 % change 5.2%

Notes:

Carrier pressure adjusted from 40 to 45 psi after as founds. Span adjusted.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	8.13	8.34	0.975
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.12	1.001
second point	5500	45.6	4.56	4.52	1.009
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	8.12	1.001
Average Correction Factor					1.005

Corrected As found 8.34 Previous response 8.13 % change -2.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	7.61	6.61	1.152
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.60	1.002
second point	5500	45.6	4.27	4.23	1.009
third point	5500	22.8	2.13	2.10	1.017
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	7.61	7.61	1.000
Average Correction Factor					1.009

Corrected As found 6.61 Previous response 7.60 % change 15.0%



Wood Buffalo Environmental Association

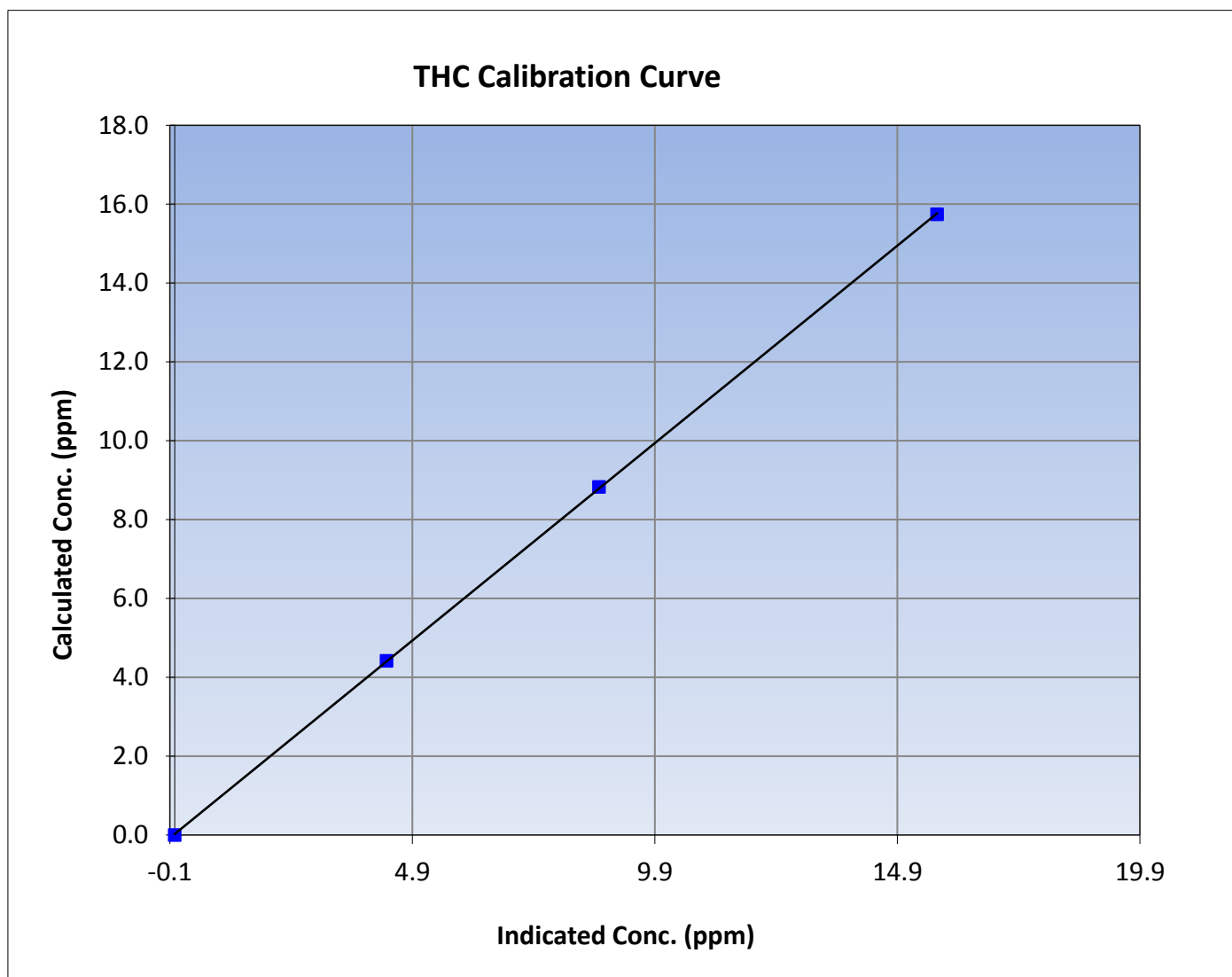
THC Calibration Summary

Station Information

Calibration Date	November 18, 2015	Previous Calibration	November 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:15	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999976
15.74	15.72	1.0014		
8.83	8.75	1.0091	Slope	1.001394
4.41	4.37	1.0103		
			Intercept	0.026788





Wood Buffalo Environmental Association

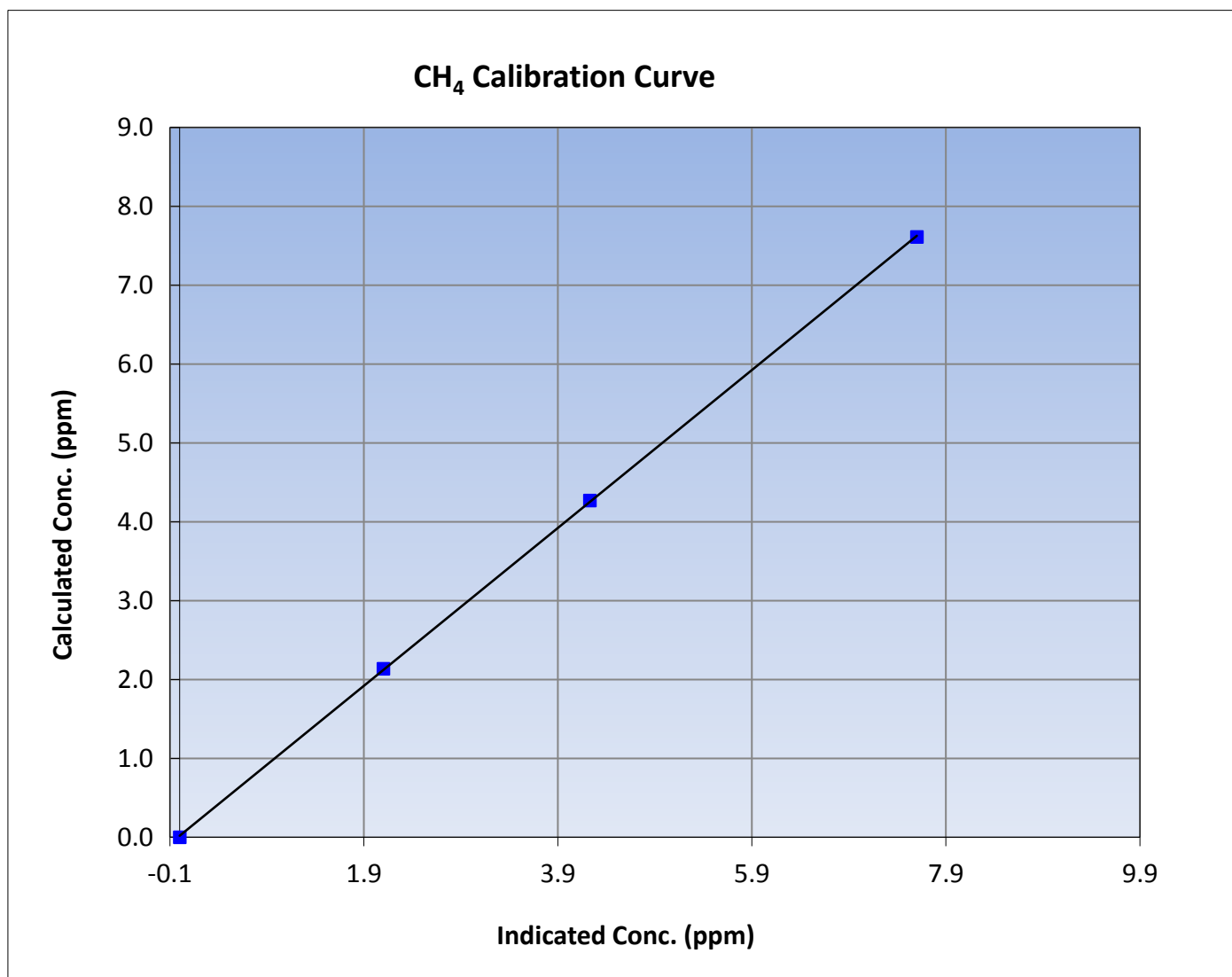
CH₄ Calibration Summary

Station Information

Calibration Date	November 18, 2015	Previous Calibration	November 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:15	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

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





Wood Buffalo Environmental Association

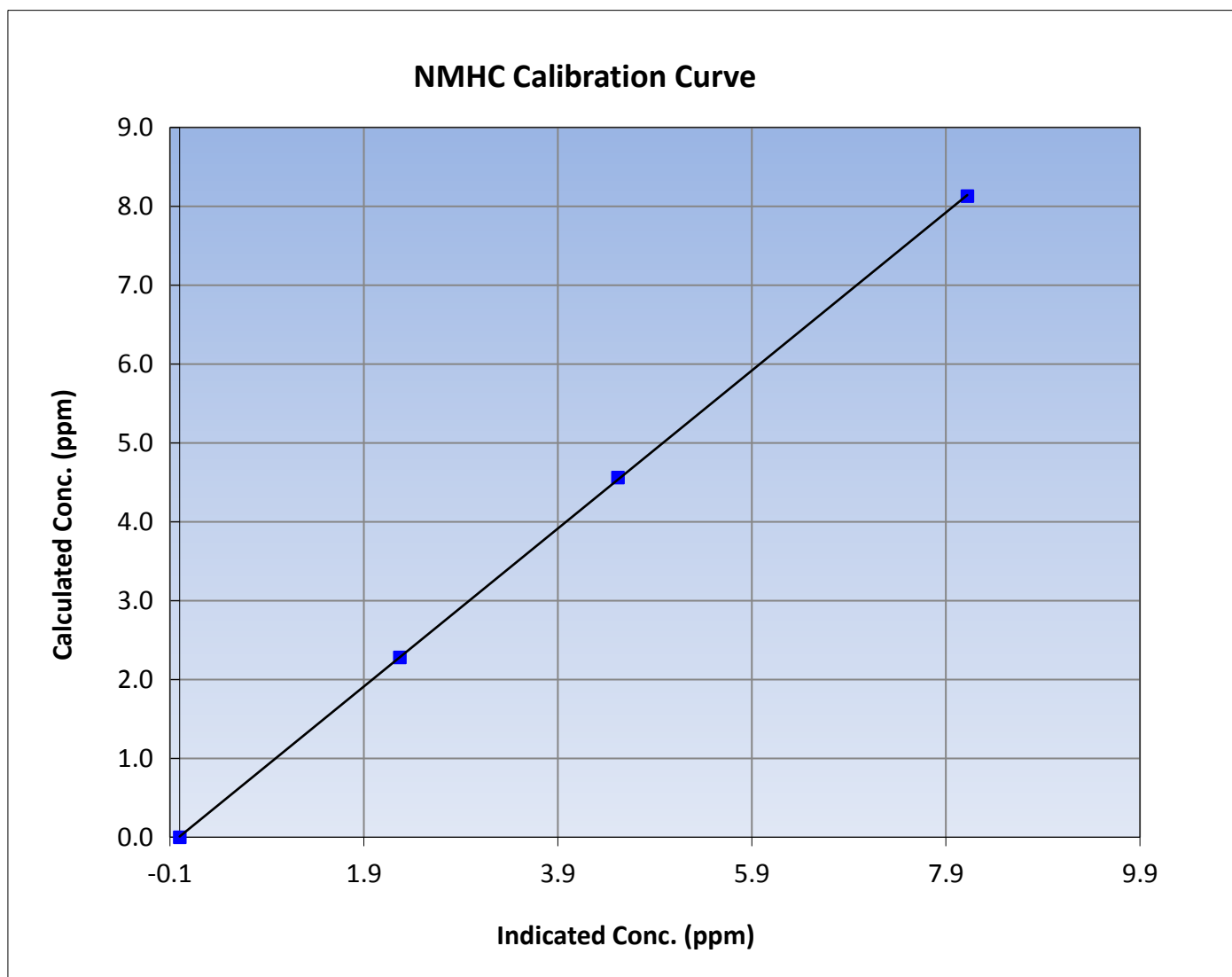
NMHC Calibration Summary

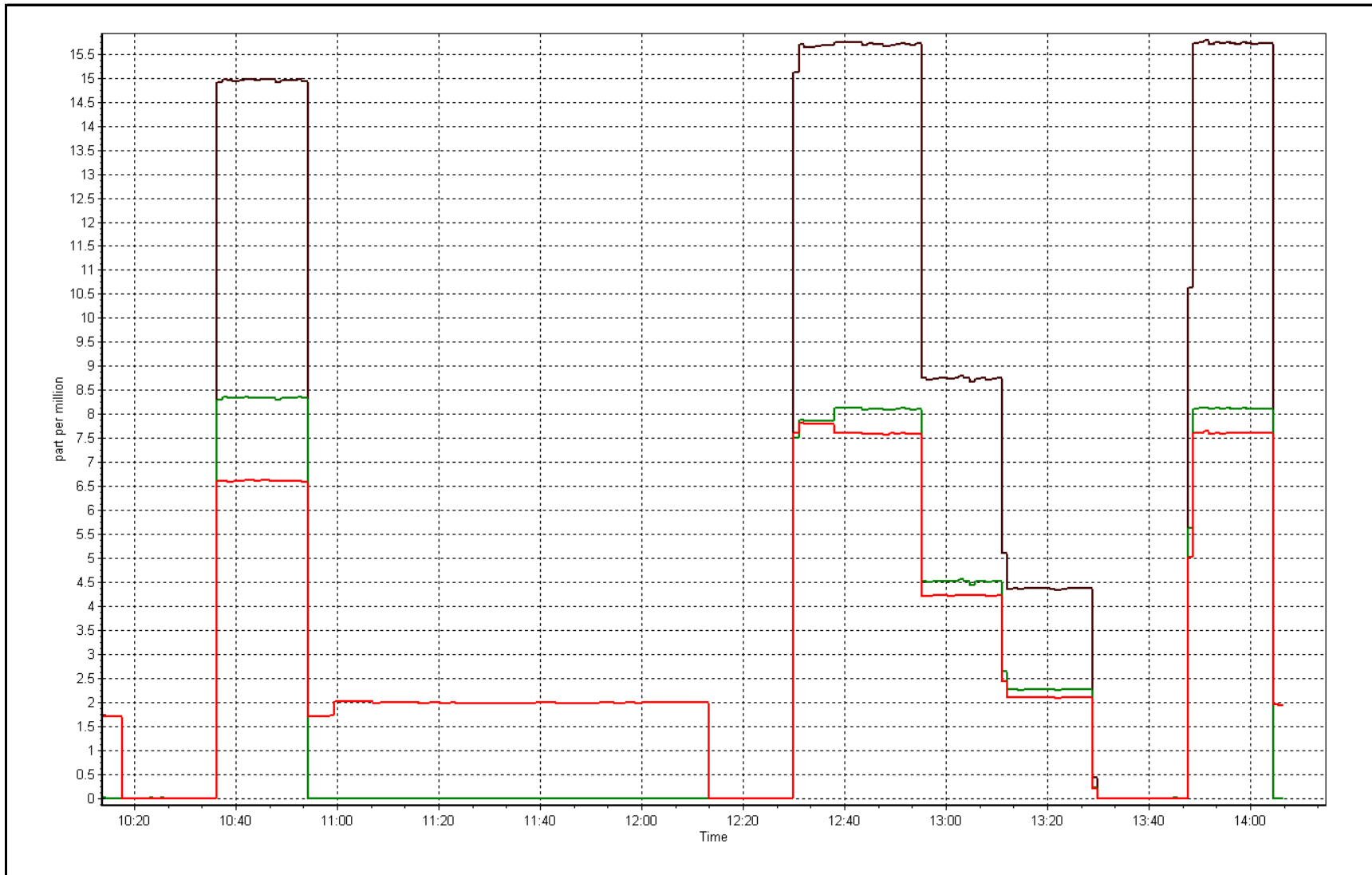
Station Information

Calibration Date	November 18, 2015	Previous Calibration	November 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:15	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999978
8.13	8.12	1.0012		
4.56	4.52	1.0088	Slope	1.001699
2.28	2.27	1.0044		
			Intercept	0.008668







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November 21, 2015	Last Calibration	November 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other: <input type="text" value="repair"/>		
Start Time (MST)	12:00	End Time (MST)	19:00
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	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.1
Analyzer IP address	192.168.1.55		Flame Temp	356.8	356.8
THC Calc slope	0.999472	0.999916	Carrier Pressure	45.0	43.5
THC Calc intercept	0.018162	0.034950	Fuel Pressure	39.5	39.5
NMHC Calc slope	0.998601	1.000225	Air Pressure	21.7	21.7
NMHC Calc intercept	0.007733	0.001660			

Analyzer make Thermo 55i Analyzer serial # 1118148494

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	81.3	15.74	14.92	1.055
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.74	1.000
second point	5500	45.6	8.83	8.75	1.009
third point	5500	22.8	4.41	4.36	1.013
as left zero	5500	0.0	0.00	0.01	----
as left span	5500	81.3	15.74	15.76	0.999
Average Correction Factor					1.007

Corrected As found 14.92 Previous response 15.73 % change 5.4%

Notes:

Carrier pressure adjusted down until stable response to a calibration point was achieved. Spiking issue resolved at this time. No other repairs or changes made. Calibration passed.

Calibration Performed By: Zach Eastman



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	8.13	8.13	1.000
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.13	1.000
second point	5500	45.6	4.56	4.55	1.002
third point	5500	22.8	2.28	2.28	1.000
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	8.13	8.13	1.000
Average Correction Factor					1.001

Corrected As found 8.13 Previous response 8.13 % change 0.0%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	7.61	6.79	1.121
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.60	1.002
second point	5500	45.6	4.27	4.21	1.014
third point	5500	22.8	2.13	2.08	1.026
as left zero	5500	0.0	0.00	0.01	----
as left span	5500	81.3	7.61	7.63	0.998
Average Correction Factor					1.014

Corrected As found 6.79 Previous response 7.60 % change 11.9%



Wood Buffalo Environmental Association

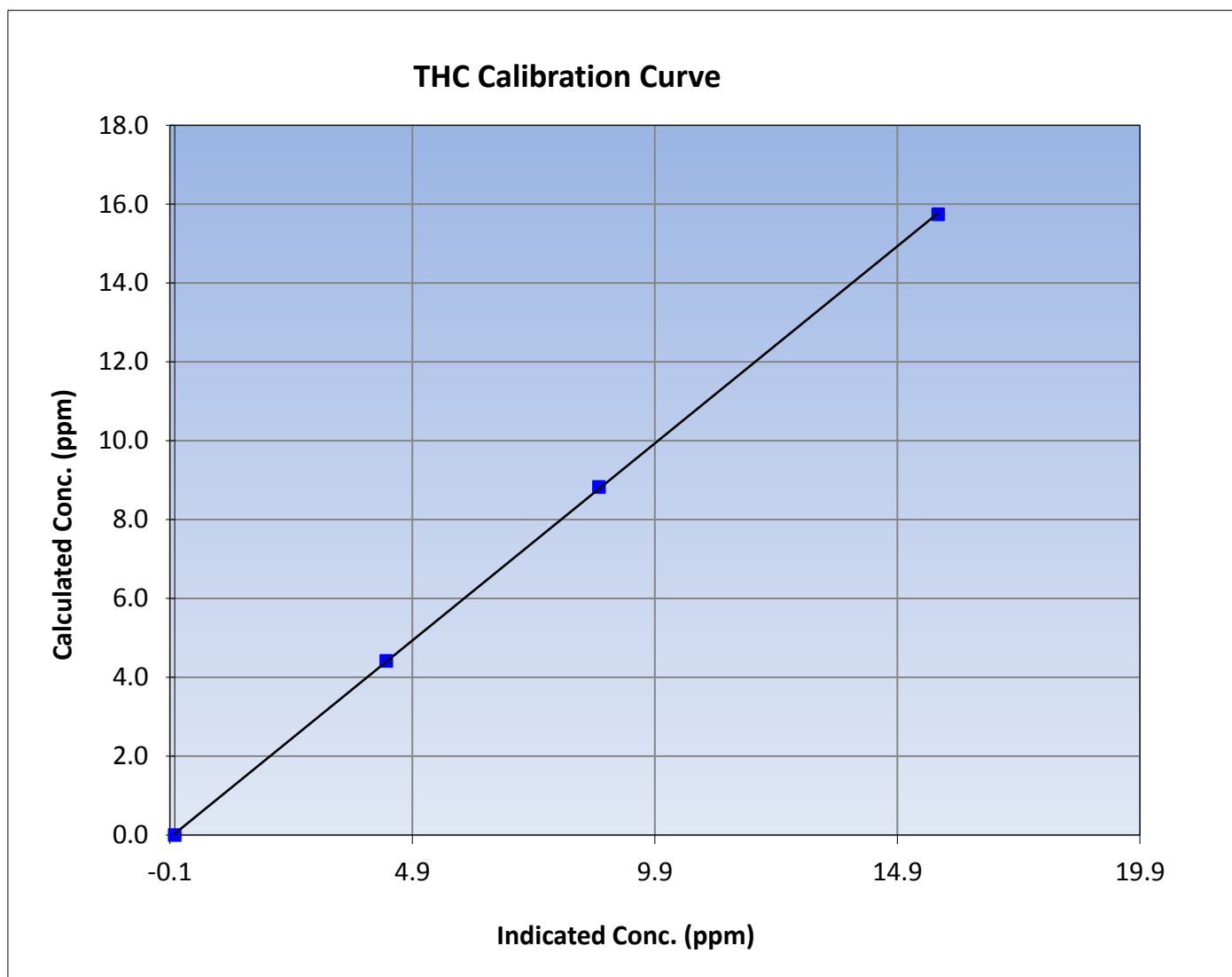
THC Calibration Summary

Station Information

Calibration Date	November 21, 2015	Previous Calibration	November 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	19:00
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999965
15.74	15.74	1.0002		
8.83	8.75	1.0091	Slope	0.999916
4.41	4.36	1.0126		
			Intercept	0.034950





Wood Buffalo Environmental Association

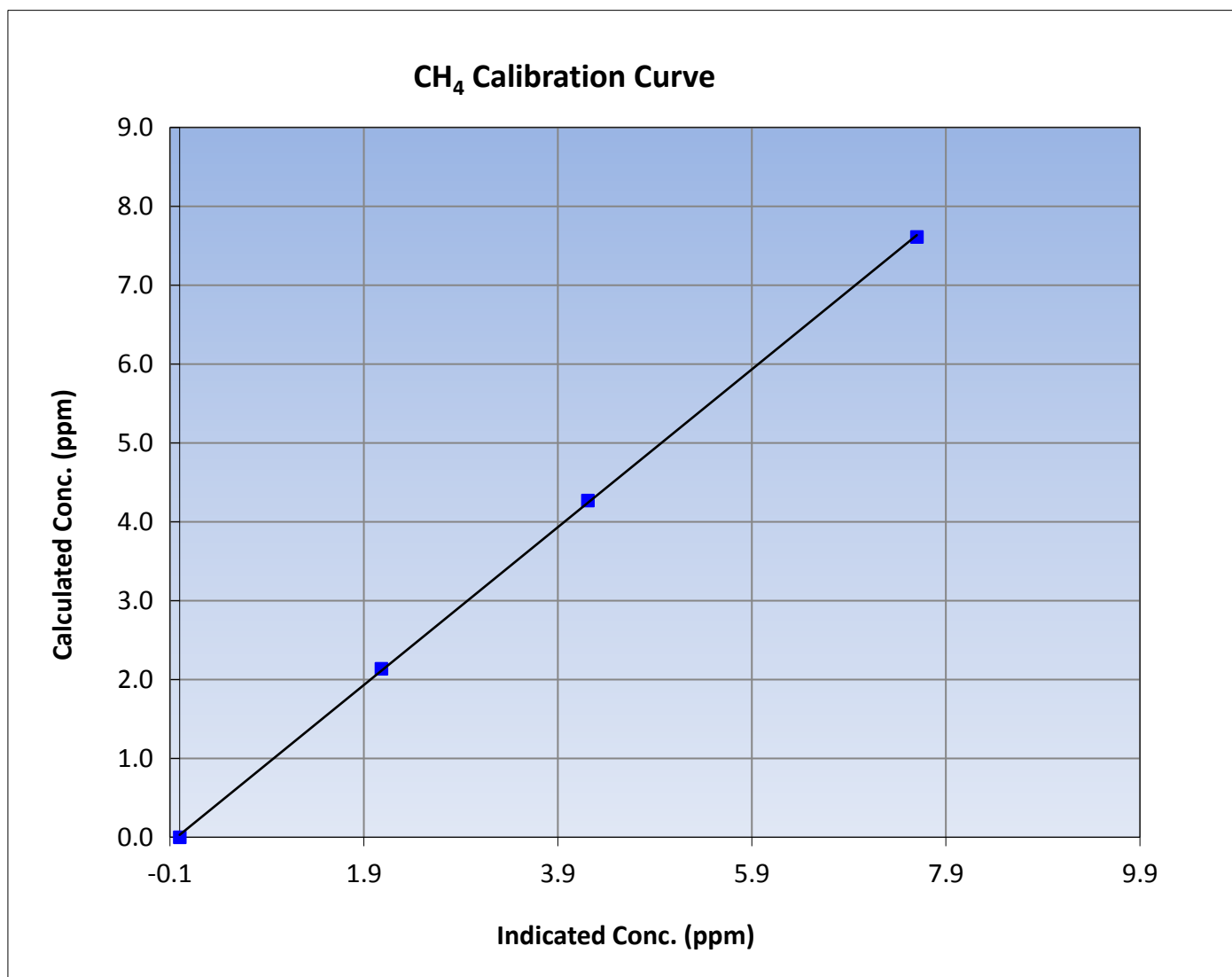
CH₄ Calibration Summary

Station Information

Calibration Date	November 21, 2015	Previous Calibration	November 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	19:00
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999915
7.61	7.60	1.0017		
4.27	4.21	1.0142	Slope	1.000627
2.13	2.08	1.0264		
			Intercept	0.029662





Wood Buffalo Environmental Association

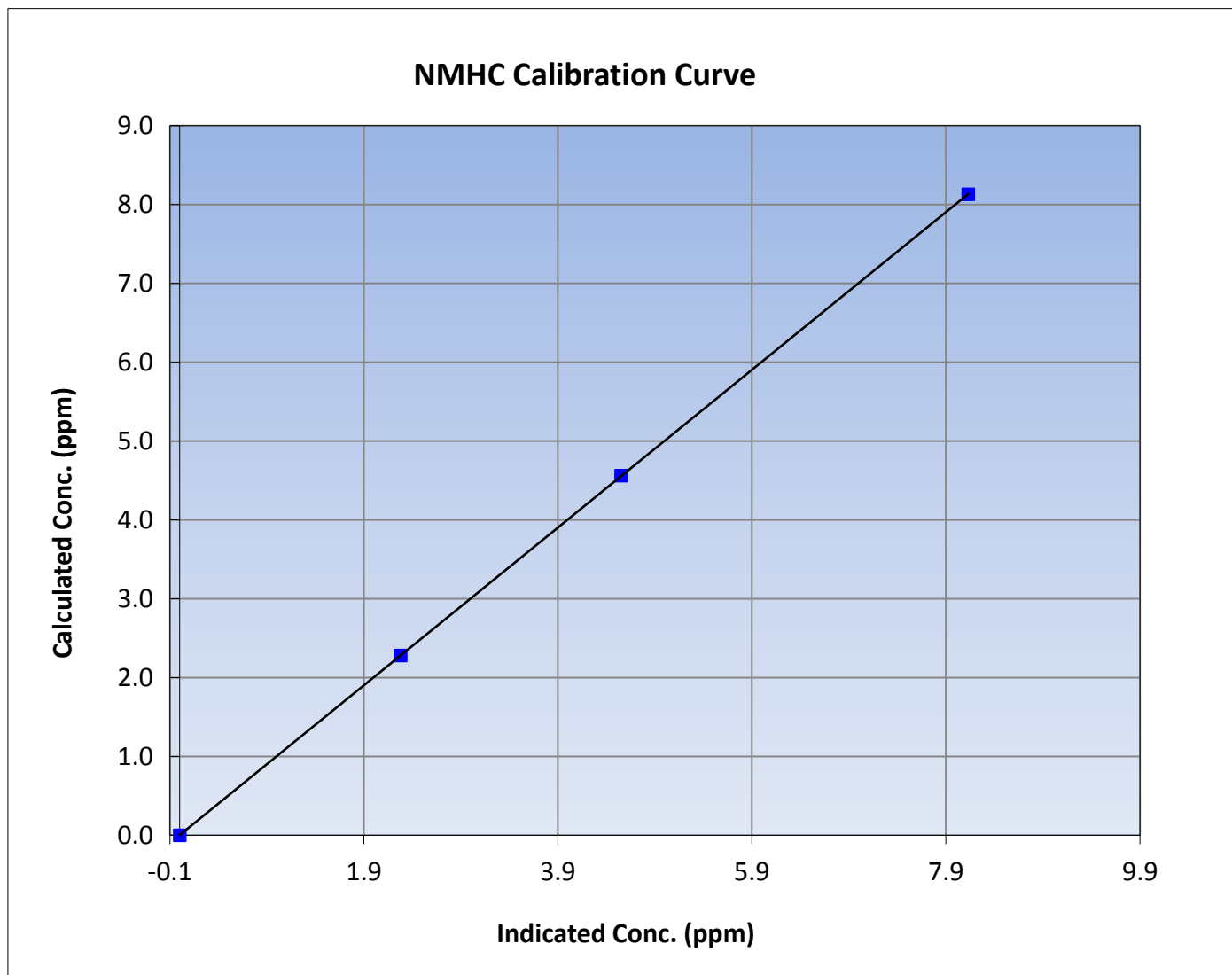
NMHC Calibration Summary

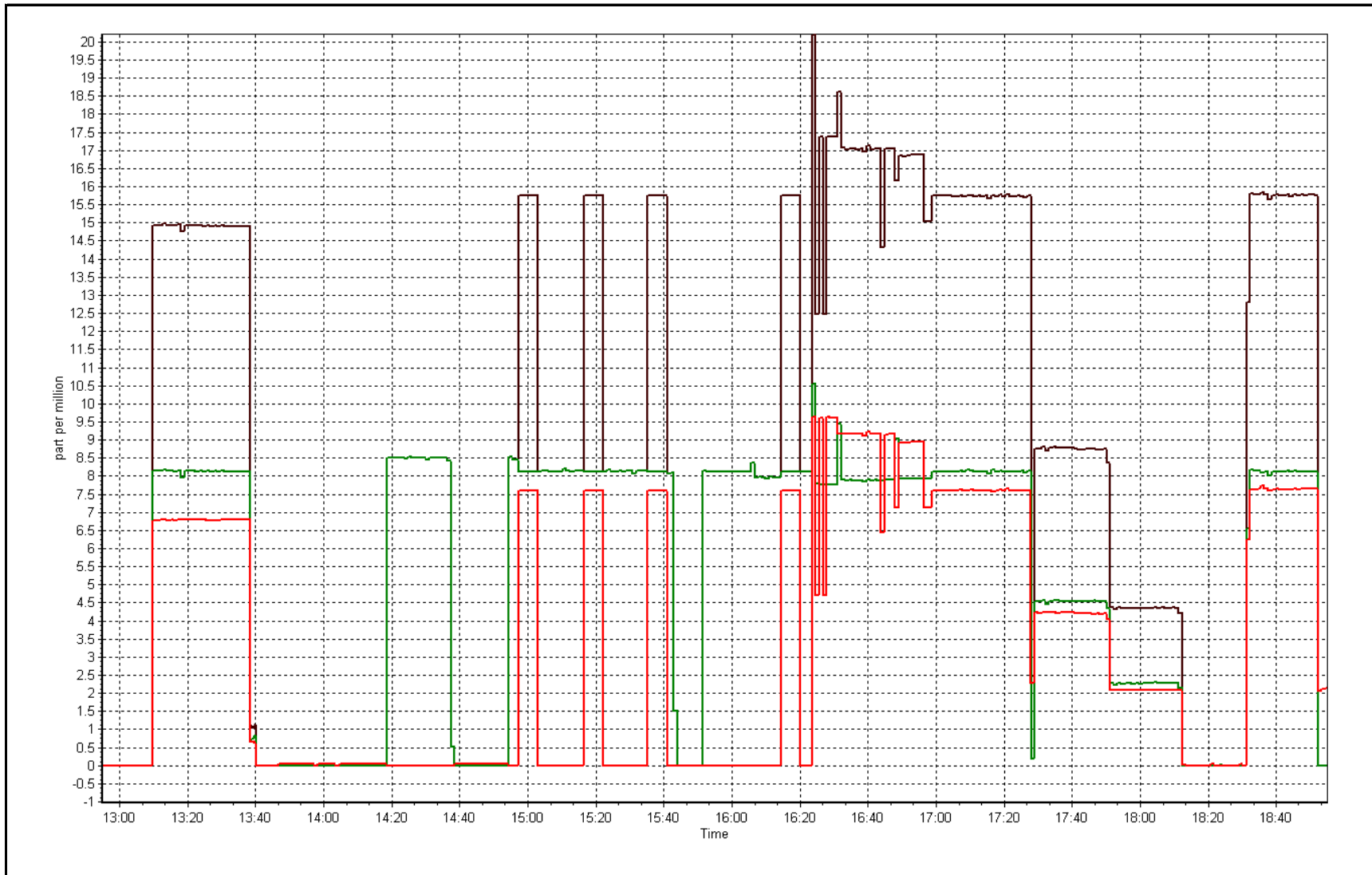
Station Information

Calibration Date	November 21, 2015	Previous Calibration	November 18, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:00	End Time (MST)	19:00
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999998
8.13	8.13	1.0000		
4.56	4.55	1.0022	Slope	1.000225
2.28	2.28	1.0000		
			Intercept	0.001660







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November 25, 2015	Last Calibration	November 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Removal		
Start Time (MST)	10:10	End Time (MST)	11:30
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	75.0	
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	
Analyzer IP address	192.168.1.55		Flame Temp	356.8	
THC Calc slope	0.999916	1.019476	Carrier Pressure	40.0	
THC Calc intercept	0.034950	0.036089	Fuel Pressure	39.5	
NMHC Calc slope	1.000225	0.976572	Air Pressure	21.7	
NMHC Calc intercept	0.001660	0.002474			

Analyzer make Thermo 55i Analyzer serial # 1118148494

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	81.3	15.74	15.43	1.020
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.43	1.020
second point	5500	45.6	8.83	8.60	1.027
third point	5500	22.8	4.41	4.26	1.036
as left zero					
as left span					
Average Correction Factor					1.028

Corrected As found 15.43 Previous response 15.71 % change 1.8%

Notes:

Removal calibration.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	8.13	8.33	0.976
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.33	0.976
second point	5500	45.6	4.56	4.65	0.981
third point	5500	22.8	2.28	2.34	0.975
as left zero					
as left span					
Average Correction Factor					0.977

Corrected As found 8.33 Previous response 8.13 % change -2.4%

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	7.10	1.072
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.10	1.072
second point	5500	45.6	4.27	3.95	1.081
third point	5500	22.8	2.13	1.92	1.110
as left zero					
as left span					
Average Correction Factor					1.088

Corrected As found 7.10 Previous response 7.58 % change 6.8%



Wood Buffalo Environmental Association

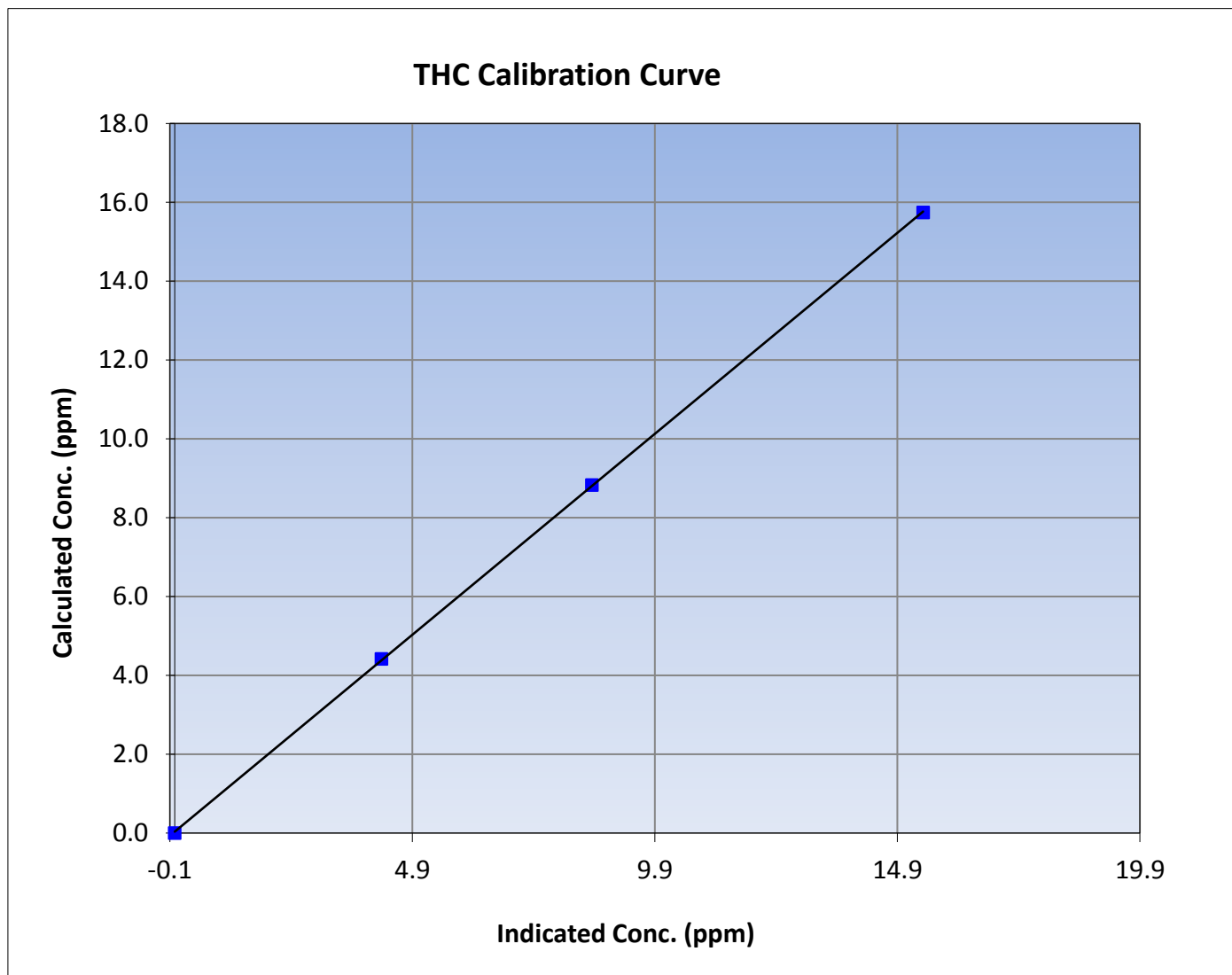
THC Calibration Summary

Station Information

Calibration Date	November 25, 2015	Previous Calibration	November 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:10	End Time (MST)	11:30
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999973
15.74	15.43	1.0203		
8.83	8.60	1.0267	Slope	1.019476
4.41	4.26	1.0359		
			Intercept	0.036089





Wood Buffalo Environmental Association

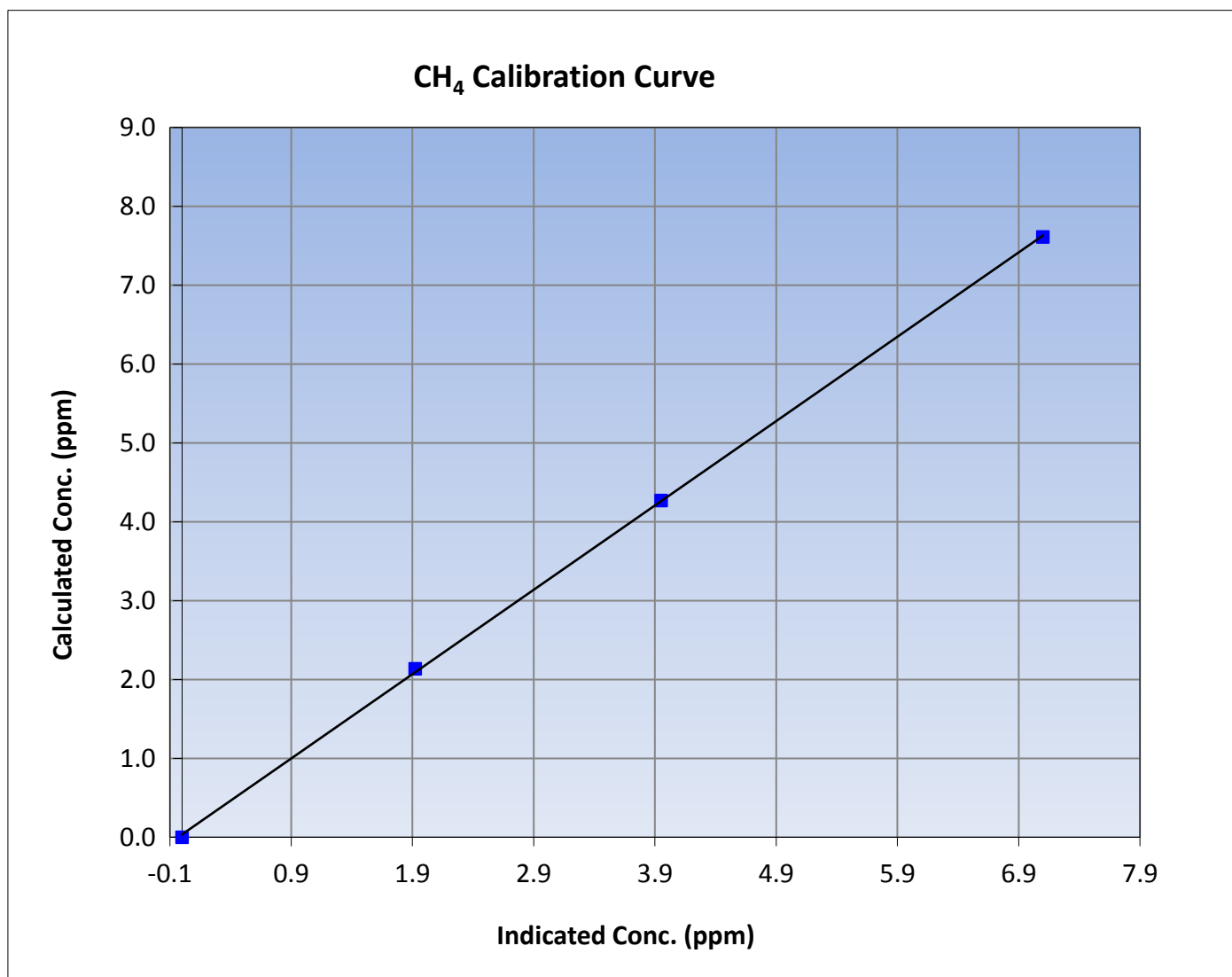
CH₄ Calibration Summary

Station Information

Calibration Date	November 25, 2015	Previous Calibration	November 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:10	End Time (MST)	11:30
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999891
7.61	7.10	1.0722		
4.27	3.95	1.0810	Slope	1.069597
2.13	1.92	1.1102		
			Intercept	0.035370





Wood Buffalo Environmental Association

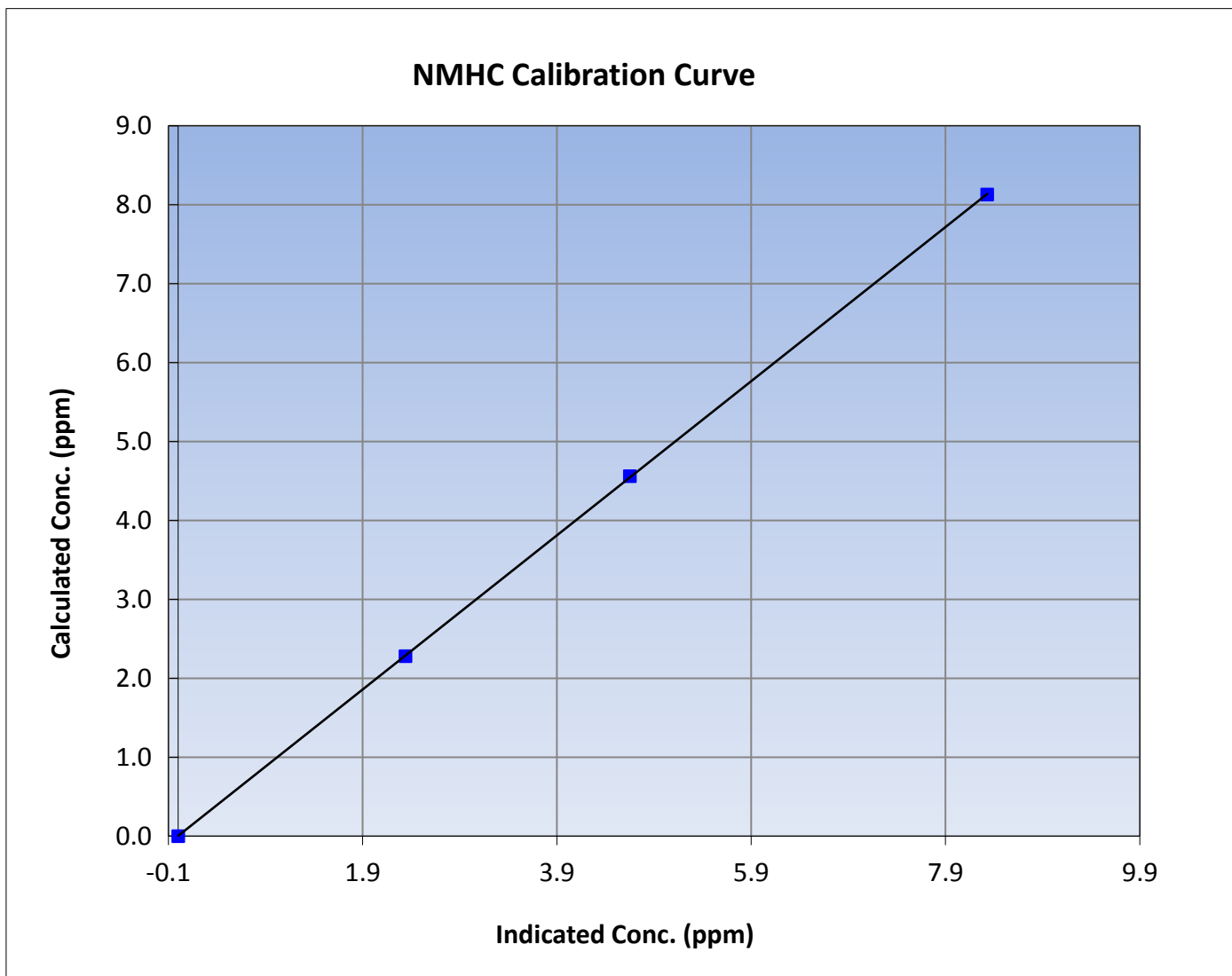
NMHC Calibration Summary

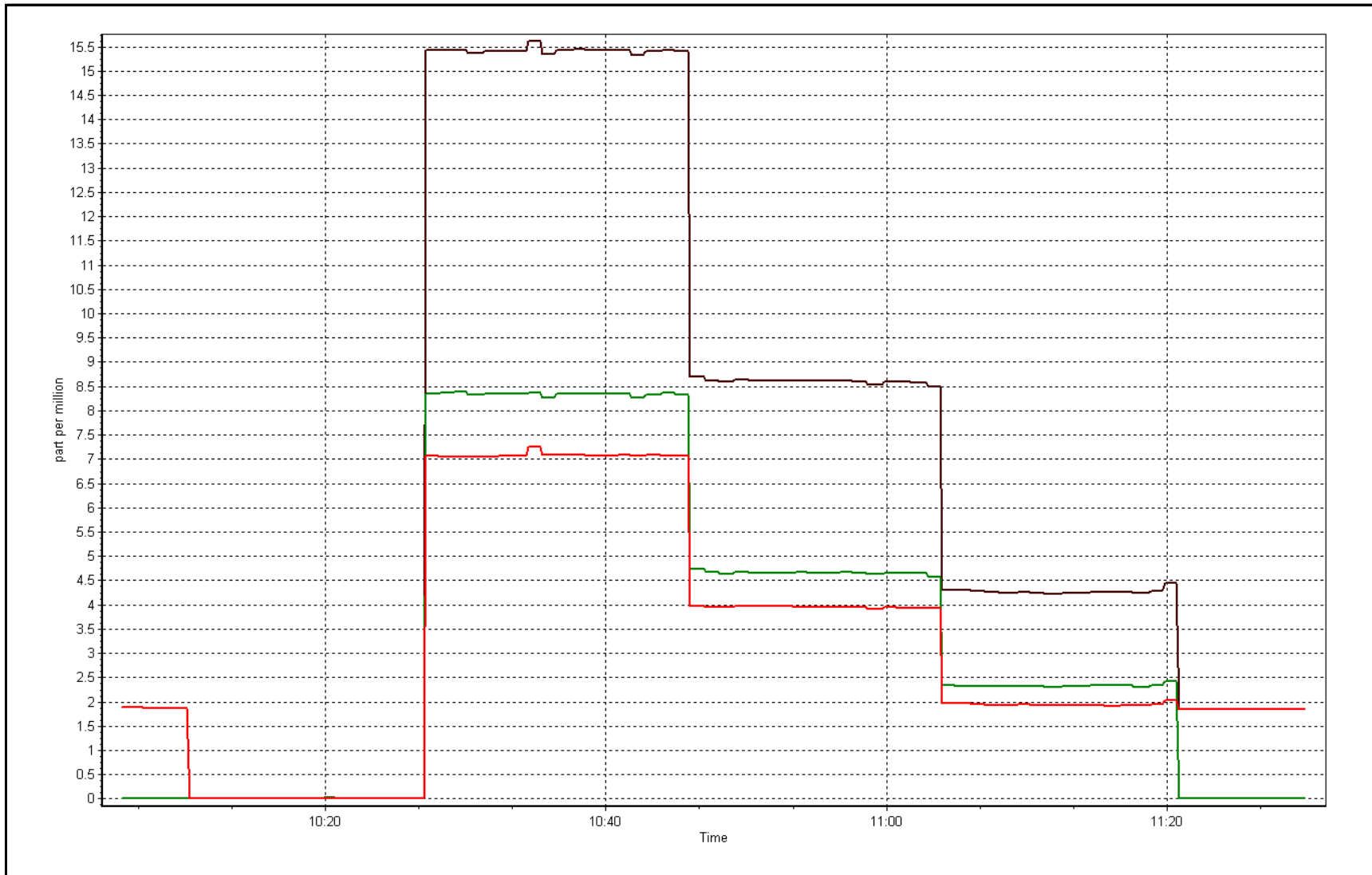
Station Information

Calibration Date	November 25, 2015	Previous Calibration	November 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:10	End Time (MST)	11:30
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999990
8.13	8.33	0.9760		
4.56	4.65	0.9806	Slope	0.976572
2.28	2.34	0.9748		
			Intercept	0.002474







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November 25, 2015	Last Calibration	
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Install		
Start Time (MST)	14:10	End Time (MST)	16:20
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	75.1	
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	
Analyzer IP address	192.168.1.55		Flame Temp	405.0	
THC Calc slope	1.003184		Carrier Pressure	37.3	
THC Calc intercept	0.084108		Fuel Pressure	42.3	
NMHC Calc slope	1.006882		Air Pressure	35.0	
NMHC Calc intercept	0.027105				

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		----
as found span	5500	81.3	15.74		
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.67	1.005
second point	5500	45.6	8.83	8.64	1.022
third point	5500	22.8	4.41	4.25	1.039
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	15.74	15.71	1.002
Average Correction Factor					1.022

Corrected As found NA Previous response NA % change NA

Notes:

Installation Calibration

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00		----
as found span	5500	81.3	8.13		
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.07	1.007
second point	5500	45.6	4.56	4.47	1.020
third point	5500	22.8	2.28	2.22	1.027
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	8.13	8.10	1.004
Average Correction Factor					1.018

Corrected As found NA Previous response NA % change NA

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00		----
as found span	5500	81.3	7.61		
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.60	1.002
second point	5500	45.6	4.27	4.16	1.026
third point	5500	22.8	2.13	2.04	1.049
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	7.61	7.61	1.000
Average Correction Factor					1.026

Corrected As found NA Previous response NA % change NA



Wood Buffalo Environmental Association

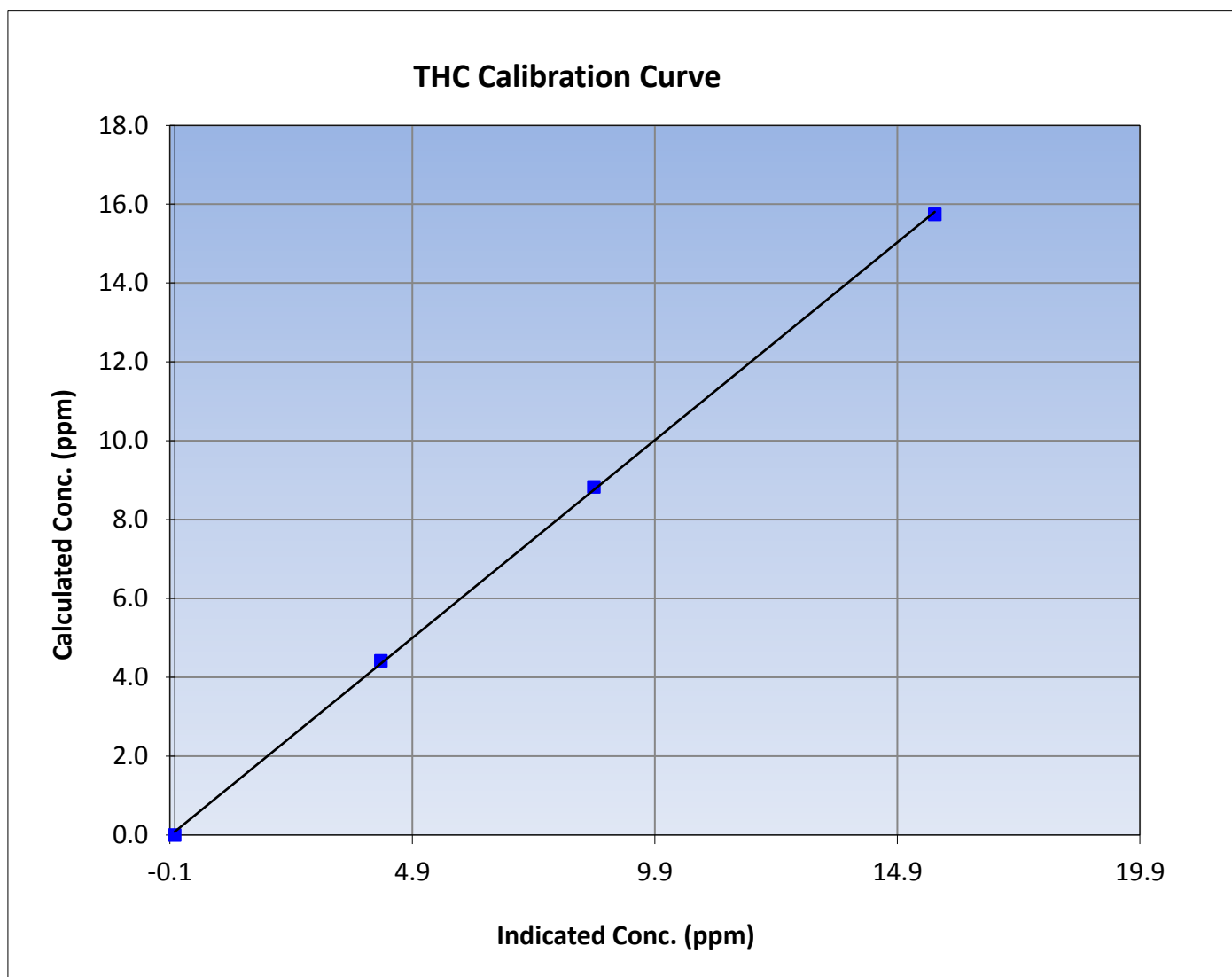
THC Calibration Summary

Station Information

Calibration Date	November 25, 2015	Previous Calibration	
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	14:10	End Time (MST)	16:20
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	0.999841
15.74	15.67	1.0046		
8.83	8.64	1.0220	Slope	1.003184
4.41	4.25	1.0388		
			Intercept	0.084108





Wood Buffalo Environmental Association

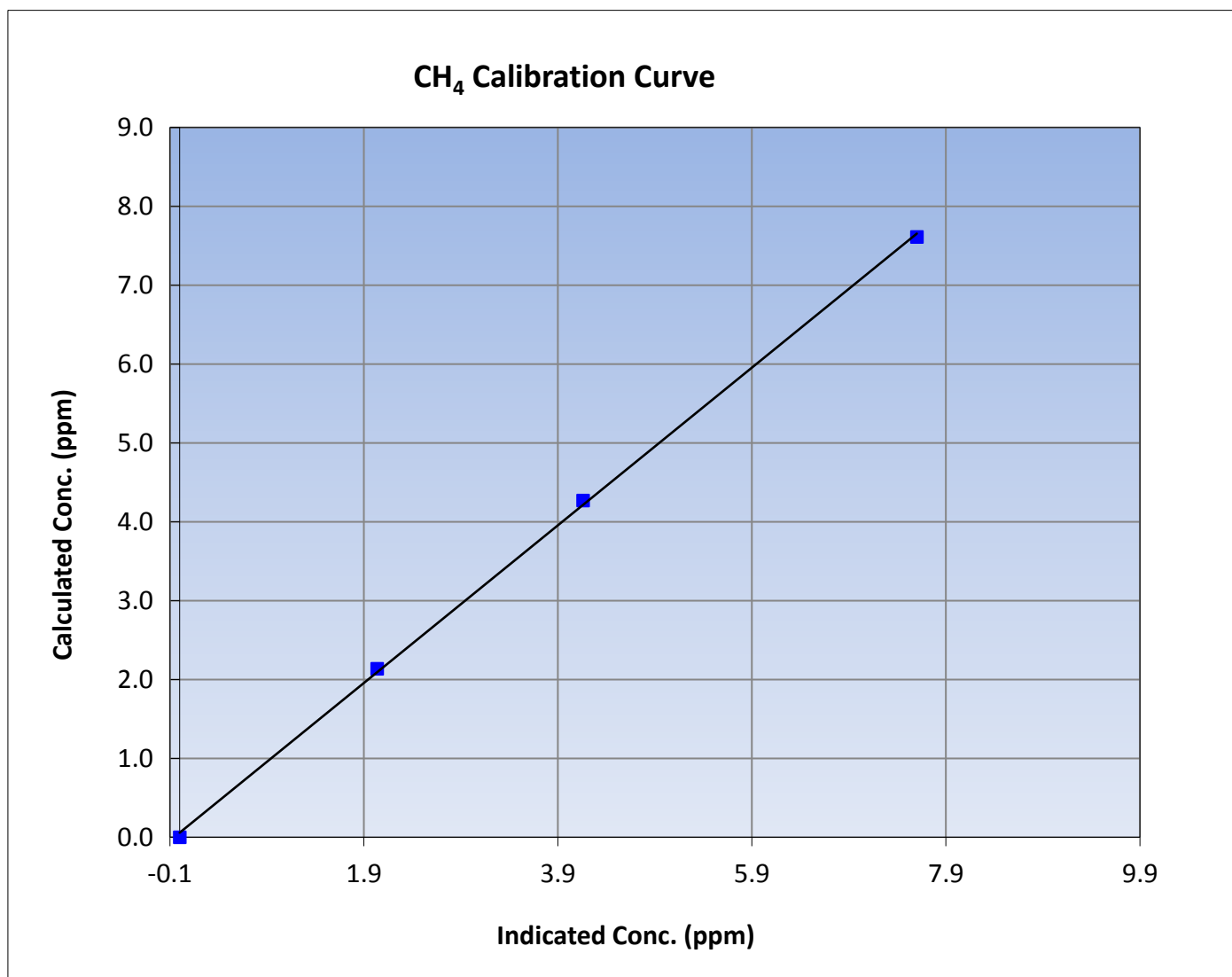
CH₄ Calibration Summary

Station Information

Calibration Date	November 25, 2015	Previous Calibration	
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	14:10	End Time (MST)	16:20
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	0.999689
7.61	7.60	1.0017		
4.27	4.16	1.0264	Slope	0.999662
2.13	2.04	1.0491		
			Intercept	0.056756





Wood Buffalo Environmental Association

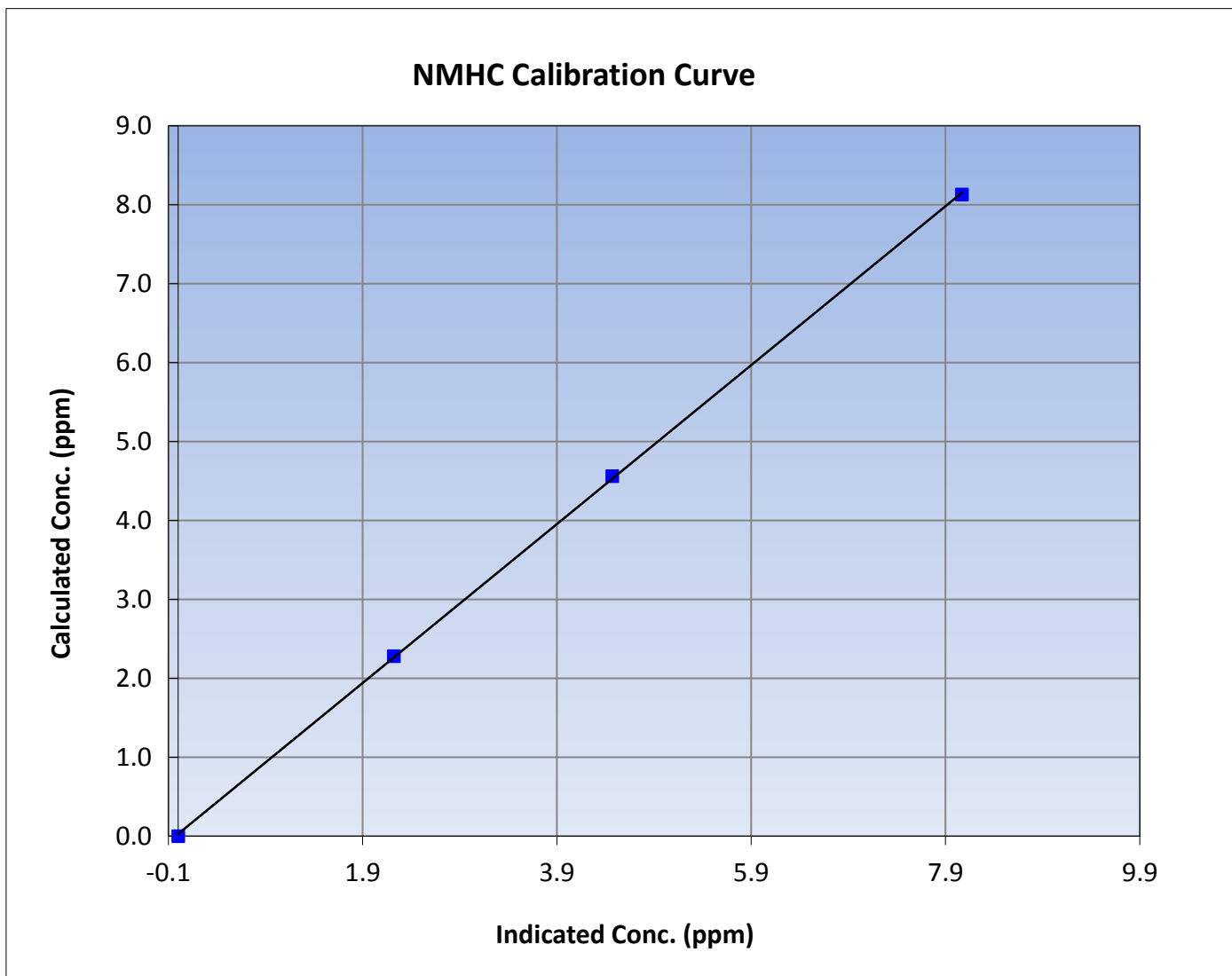
NMHC Calibration Summary

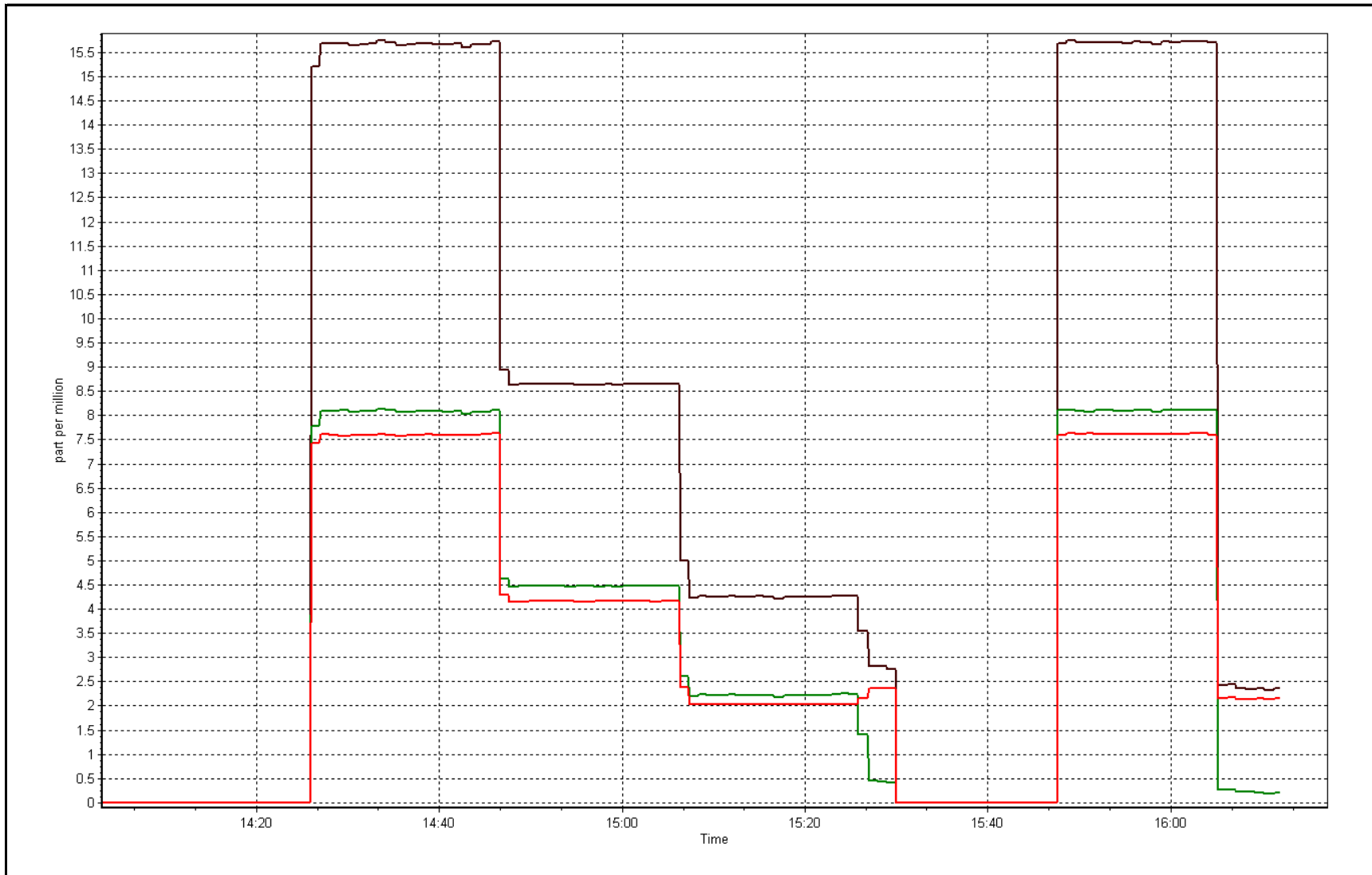
Station Information

Calibration Date	November 25, 2015	Previous Calibration	
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	14:10	End Time (MST)	16:20
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	0.999928
8.13	8.07	1.0074		
4.56	4.47	1.0201	Slope	1.006882
2.28	2.22	1.0270		
			Intercept	0.027105







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 17, 2015	Previous Calibration	October 22, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	12:15	End Time (MST)	15:05
NO2 GPT Ref date	November-16-15	Transfer Standard	N/A
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.8	27.1
Analyzer IP address	192.168.1.49		Lamp temp.	53.5	53.5
Calculated slope	0.994886	1.004782	Pressure	719.3	703.5
Calculated intercept	0.328016	-2.721993	Flow cell A	0.763	0.751
Analyzer Background	-2.4	-2.6	Flow cell B	0.759	0.755
Analyzer Coefficient	1.015	1.056	Cell A Intensity	73000	72000
			Cell B Intensity	69000	68000

Analyzer make	Thermo 49i	Analyzer serial #	1300156233
---------------	------------	-------------------	------------

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.6	----
as found span	5500	0.98	442.8	424.5	1.043
calibrator zero	5500	0.00	0.0	0.6	----
high point	5000	0.98	442.8	442.0	1.002
second point	5000	0.56	227.7	231.0	0.986
third point	5000	0.34	116.7	120.7	0.967
as left zero	5500	0.00	0.0	-0.2	----
as left span	5000	0.98	442.8	455.7	0.972
Average Correction Factor					0.985

Corrected As found	423.9	Previous response	444.7	% change	4.9%
--------------------	-------	-------------------	-------	----------	------

Notes:

Long as found span stabilization time. Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



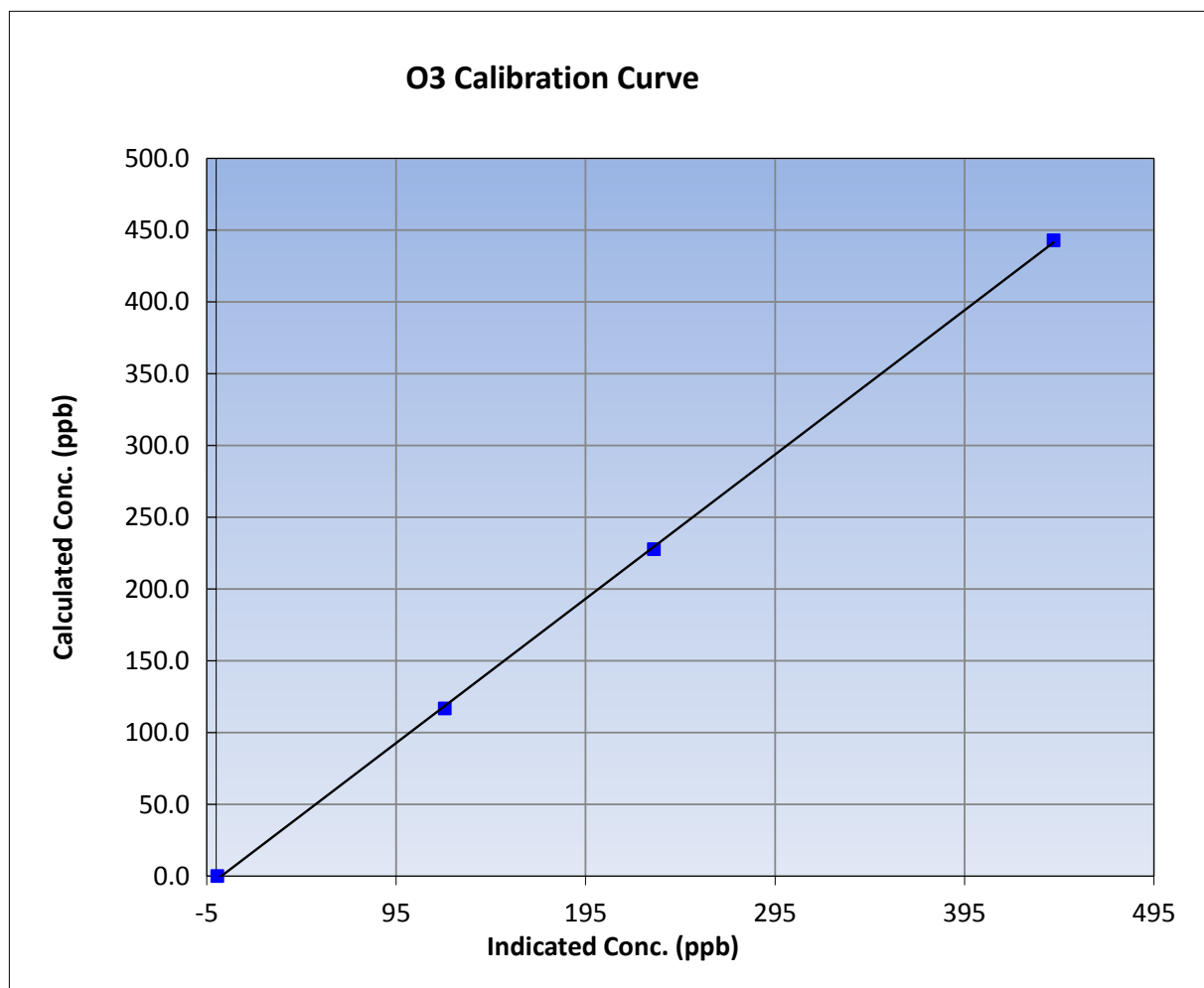
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-17-15	Previous Calibration	October 22, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	12:15	End Time (MST)	15:05
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

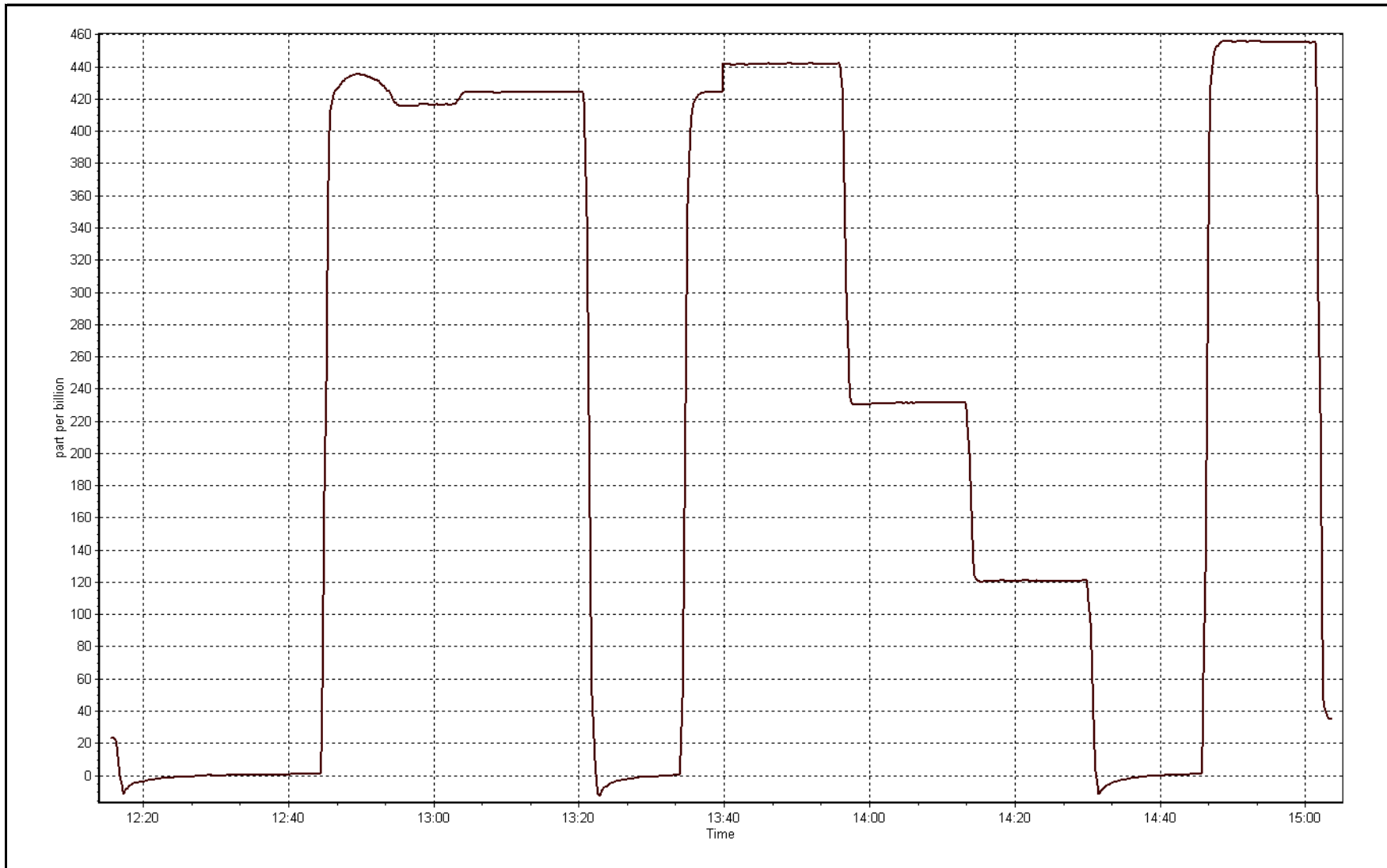
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999879
442.8	442.0	1.0018		
227.7	231.0	0.9857	Slope	1.004782
116.7	120.7	0.9669		
			Intercept	-2.721993



O3 Calibration Plot

Date: November 17, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	14:20
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL107945
NOx Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	09/08/2018
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

DACS Information

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

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998044	1.000003	0.996442
	Data Offset	2.172456	2.242034	-0.471053
Current Calibration	Data Slope	1.000518	1.000445	1.000777
	Data Offset	2.097907	2.180531	-0.175531

Analyzer Information

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

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.755		0.763	
NOx coefficient	1.000		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.6		5.7	
NOx bkgrnd	5.7		5.8	
Chamber Temp	50.5	Deg C	50.6	Deg C
Moly Temp	327.6	Deg C	327.6	Deg C
PMT voltage	-849.9	V	-849.5	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	185.3	mmHg	183.6	mmHg
R Cell Press Nox	185.3	mmHg	183.6	mmHg
NO sample flow	0.546	lpm	0.539	lpm
Nox sample Flow	0.546	lpm	0.539	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: November 16, 2015 Station Number: AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
as found span	5500	81.3	749.4	749.4	0.0	744.3	742.3	2.0	1.0068	1.0096
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
high point	5500	81.3	749.4	749.4	0.0	748.5	748.6	0.0	1.0012	1.0012
second point	5500	45.6	420.3	420.3	0.0	416.2	416.1	0.1	1.0099	1.0102
third point	5500	22.8	210.2	210.2	0.0	205.9	205.8	0.2	1.0206	1.0214
as left zero	5500	0.0	0.0	0.0	0.0	0.4	0.3	0.2	----	----
as left span	5500	81.3	749.4	306.4	443.0	748.9	299.5	449.4	1.0008	1.0231
Average Correction Factor									1.0106	1.0109

Corrected As found NO_x= 744.2 NO= 742.1 Percent Change NO_x= 0.6% NO= 0.7%
 Previous Response NO_x= 748.7 NO= 747.2

GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 81.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	306.4	442.8	748.9	306.4	442.5	0.9861	1.0000	1.0006	99.9%
2nd NO2 (200)	----	521.5	227.7	749.3	521.5	227.8	0.9856	1.0000	0.9996	100.0%
3rd NO2 (100)	----	632.5	116.7	749.5	632.5	117.0	0.9854	1.0000	0.9975	100.2%
4th NO2 (0)	749.2	----	-0.5	748.7	749.2	-0.5	0.9864	1.0000	N/A	----
Average Correction Factor							0.9859	1.0000	0.9992	100.1%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

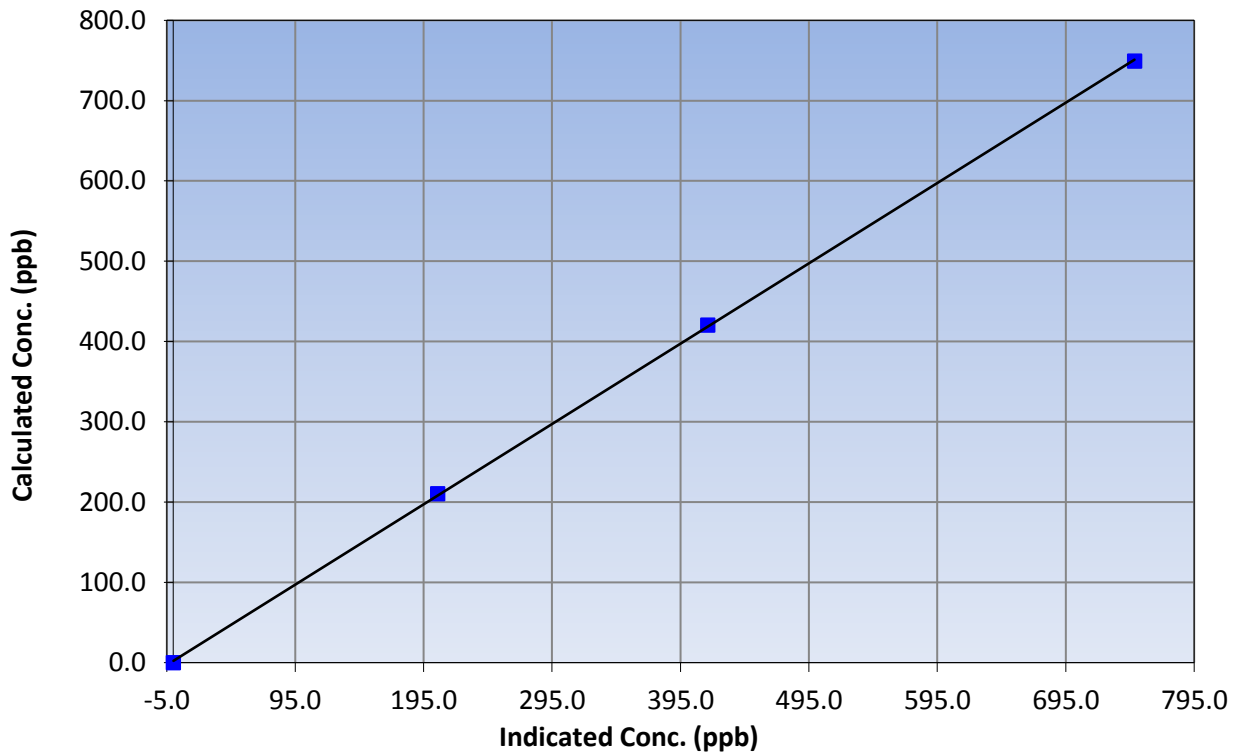
Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:20
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	0.999951
749.4	748.5	1.0012		
420.3	416.2	1.0099	Slope	1.000518
210.2	205.9	1.0206		
			Intercept	2.097907

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

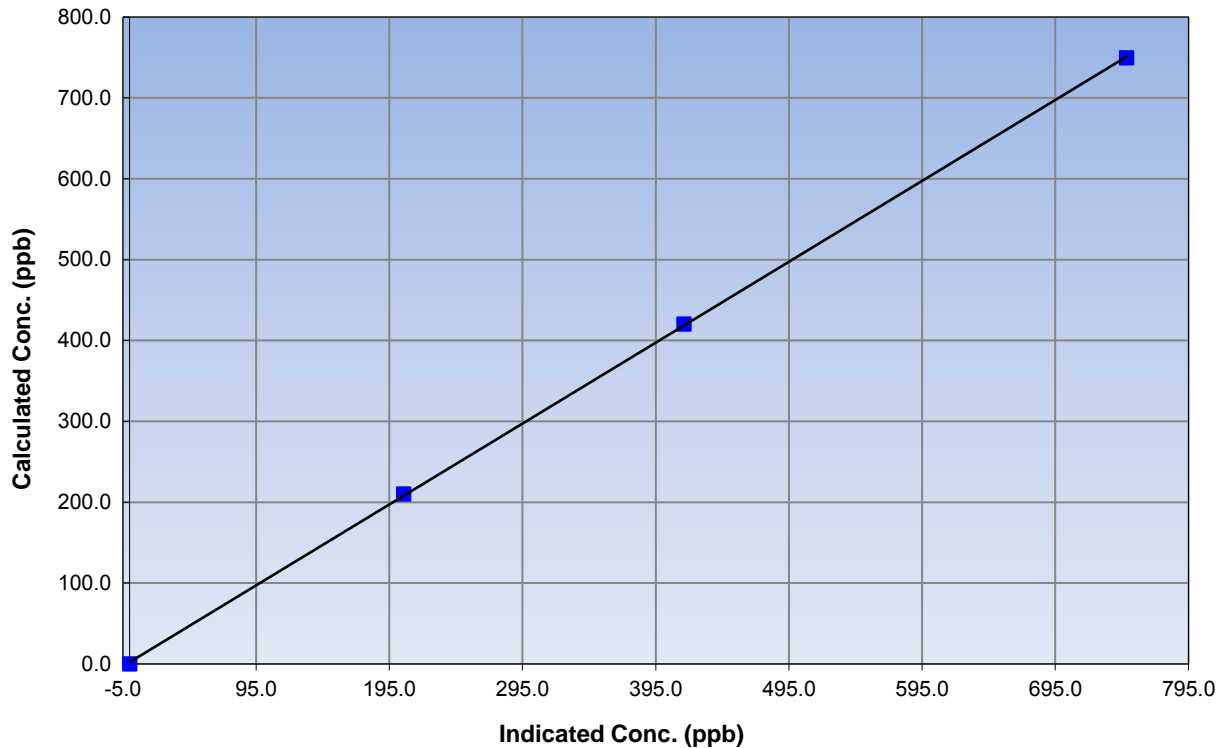
Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:20
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	0.999946
749.4	748.6	1.0012		
420.3	416.1	1.0102	Slope	1.000445
210.2	205.8	1.0214		
			Intercept	2.180531

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

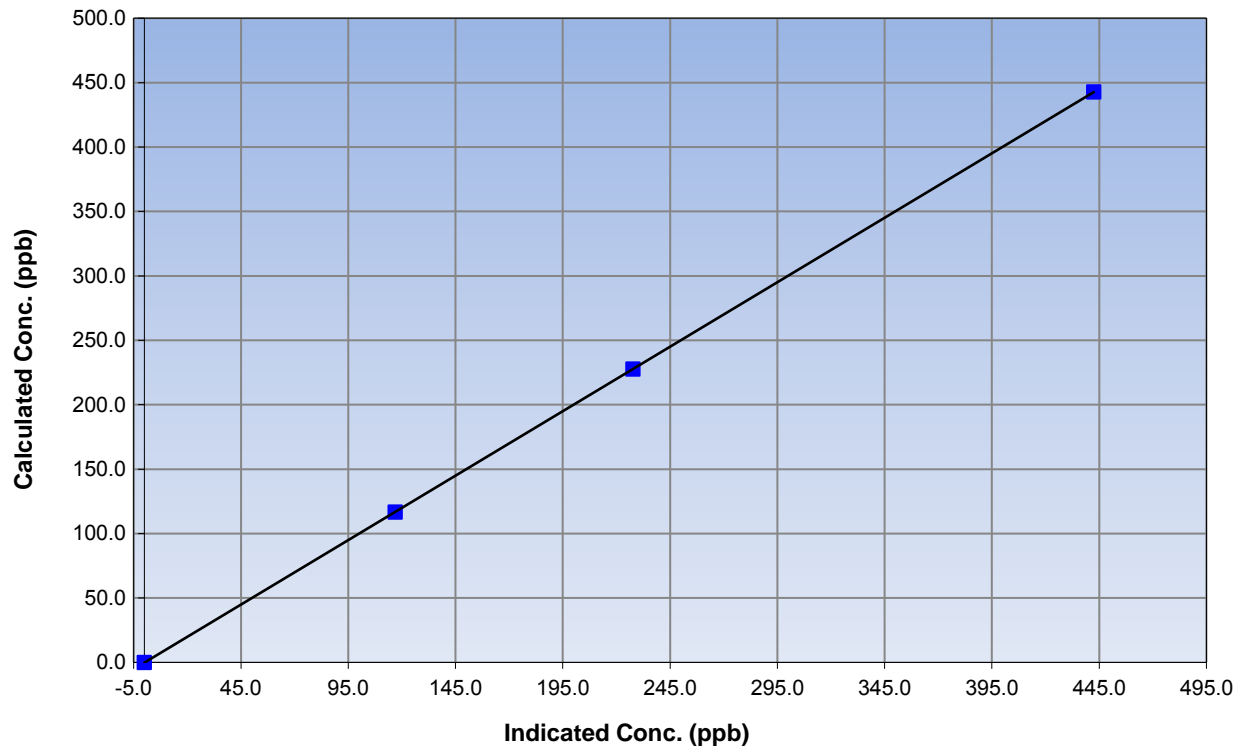
Station Information

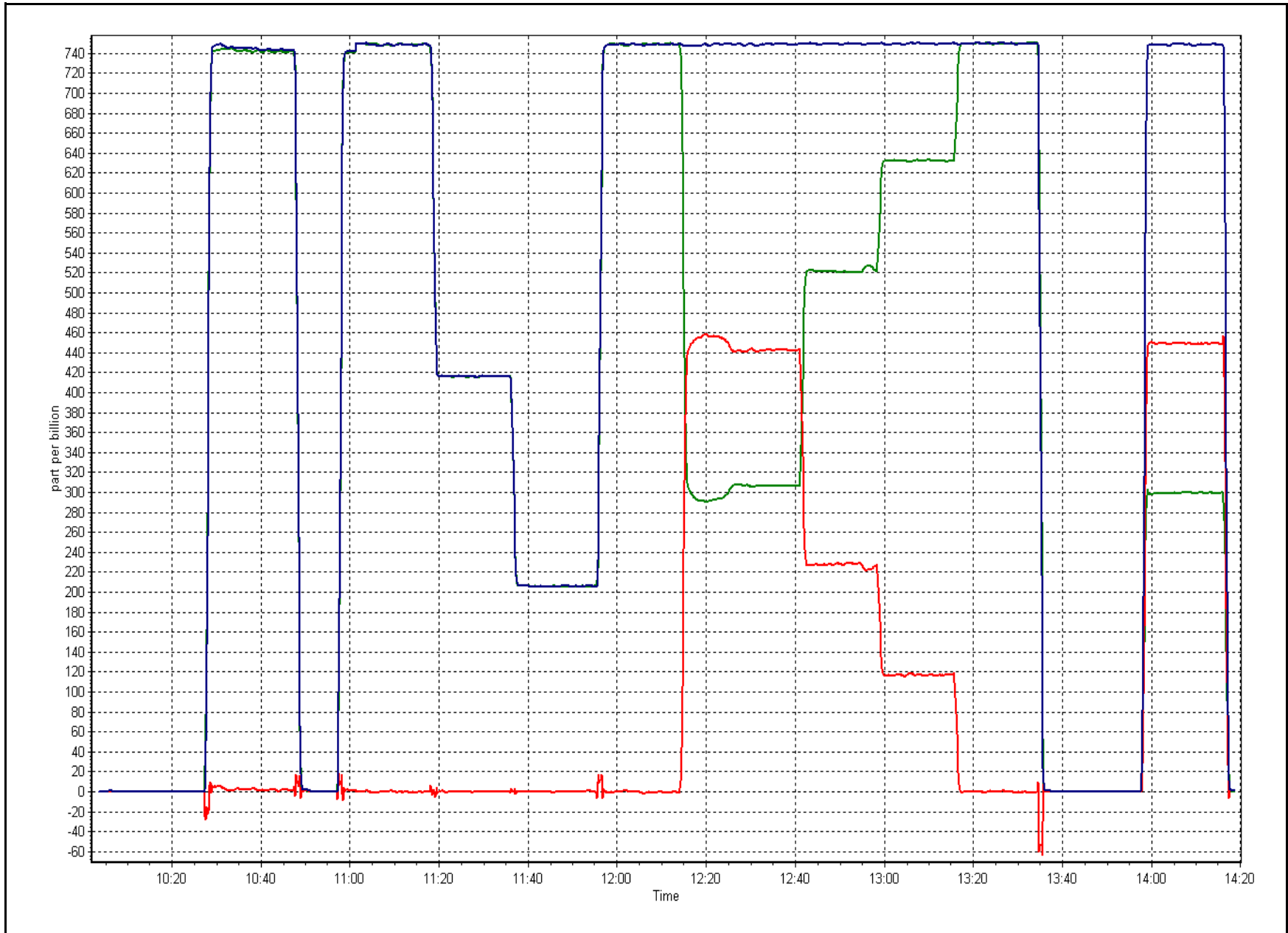
Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
442.8	442.5	1.0006		
227.7	227.8	0.9996	Slope	1.000777
116.7	117.0	0.9975		
			Intercept	-0.175531

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	November 16, 2015	NOX Previous Cal Date	October 21, 2015
NH3 Calibration Date	November 17, 2015	NH3 Previous Cal Date	October 22, 2015
Reason:	Routine		
Start Time (MST)	10:05	End Time (MST)	14:25
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	0.997960	0.985793	1.002261	1.001779	0.998354
	Data Offset	-3.422032	-3.514401	3.184247	3.539162	-0.003050
Cal Stats After	Data Slope	1.003270	0.991251	1.006746	0.998143	1.012732
	Data Offset	-0.698909	-2.113604	0.727747	1.032948	2.301444
IP address		192.168.1.77				

Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152	
Converter	API 501 NH3	Converter serial #	147	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	-0.3	ppb	-0.3	ppb
NOx BKG	-0.1	ppb	-0.1	ppb
Nt BKG	0.1		0.1	
NO coefficient	1.202		1.212	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.319		1.322	
NH3 coefficient	0.951		0.951	
Nt coefficient	1.360		1.350	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.2	Deg C	316.1	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	84.0	ccm	84.0	ccm
R Cell Press	4.8	mmHg	5.0	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	529.0	ccm	519.0	ccm
Sample Flow 2 Nox	529.0	ccm	519.0	ccm
Sample Flow 3 Nt	539.0	ccm	525.0	ccm

Notes:

Inlet filter changed after as founds. NO/NOx Span adjusted. Second High NO point used for GPT reference. No adjustments made to NH3.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date: November 17, 2015 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	0.9	0.6	0.3	----	----
as found NO	5500	81.3	752.4	752.4	----	754.4	743.3	11.1	0.997	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.1	0.8	-0.7	----	----
high NO point	5500	81.3	752.4	752.4	----	748.7	747.7	1.0	1.005	----
NO/O ₃ point	5500	81.3	752.4	752.4	----	746.6	747.5	-1.0	1.008	----
as found NH ₃	6500	67.7	1999.8	NA	1999.8	2018.1	24.5	1993.3	0.991	1.003
first NH ₃	6500	67.7	1999.8	NA	1999.8	2018.1	24.5	1993.3	0.991	1.003
second NH ₃	6500	33.9	1001.4	NA	1001.4	1014.7	15.3	999.3	0.987	1.002
third NH ₃	6500	17.0	502.2	NA	502.2	509.9	7.2	502.7	0.985	0.999
Average Correction Factor									1.0063	1.0014

NH ₃ Corrected As Found	NH ₃ = 1993.0 ppb	Previous Response	NH ₃ = 2007.3 ppb	NH ₃ percent change	0.7%
Nt Corrected As Found	Nt = 753.5 ppb	Previous Response	Nt = 766.8 ppb	Nt percent change	1.8%
NO _x Corrected As Found	NO _x = 742.7 ppb	Previous Response	NO _x = 747.5 ppb	NO _x percent change	0.7%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date:

November 16, 2015

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	0.8	1.7	0.1	----	----
as found span	5500	81.3	752.4	749.4	752.4	745.1	746.3	756.6	1.0098	1.0042
calibrator zero	5500	0.0	0.0	0.0	0.0	0.8	1.7	0.1	----	----
high point	5500	81.3	752.4	749.4	752.4	747.7	751.8	748.7	1.0063	0.9968
second point	5500	45.6	422.0	420.3	422.0	417.3	417.5	416.7	1.0112	1.0068
third point	5500	22.8	211.0	210.2	211.0	207.5	207.3	207.5	1.0170	1.0138
as left zero	5500	0.0	0.0	0.0	0.0	3.3	3.3	3.1	----	----
as left span	5500	81.3	752.4	306.1	752.4	742.6	299.6	742.1	1.0132	1.0219
Average Correction Factor									1.0115	1.0058

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	756.5	744.3	744.6	436.1
Previous Response	766.8	747.5	744.6	443.0
Percent Change	1.4%	0.4%	0.0%	1.6%

GPT Calibration Data

Total Flow 5500 ccm Source Gas Flow 81.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO 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
Cal zero			0.0			-1.0			----	
1st NO ₂ (300)	----	306.1	442.3	741.2	306.1	435.1	1.0150	1.0000	1.0165	98.4%
2nd NO ₂ (200)	----	521.4	227.0	742.7	521.4	221.3	1.0131	1.0000	1.0258	97.5%
3rd NO ₂ (100)	----	631.1	117.3	743.3	631.1	112.2	1.0122	1.0000	1.0453	95.7%
4th NO ₂ (0)	748.4	----	-0.9	747.5	748.4	-1.0	1.0065	1.0000	----	----
Average Correction Factor							1.0117	1.0000	1.0292	97.2%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

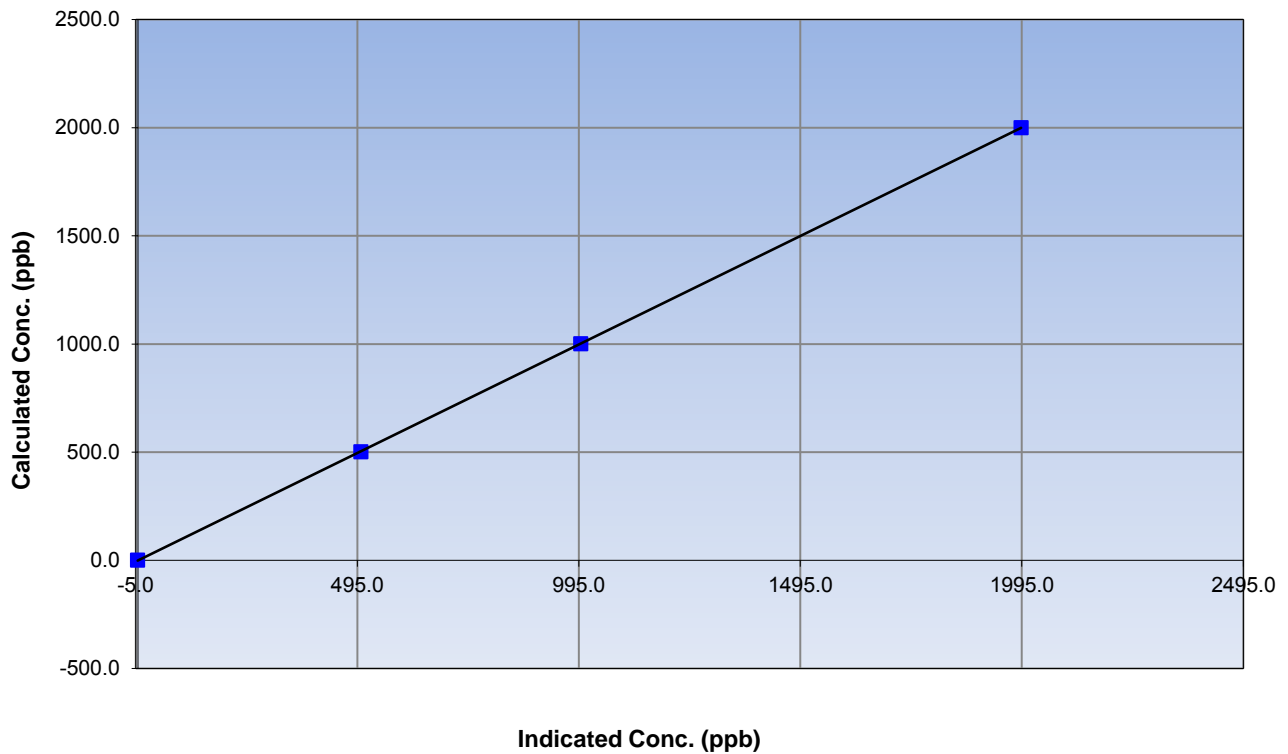
Station Information

Calibration Date	November 17, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:25
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	-0.7	----	Correlation Coefficient	0.999998
1999.8	1993.3	1.0032		
1001.4	999.3	1.0020	Slope	1.003270
502.2	502.7	0.9988		
			Intercept	-0.698909

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

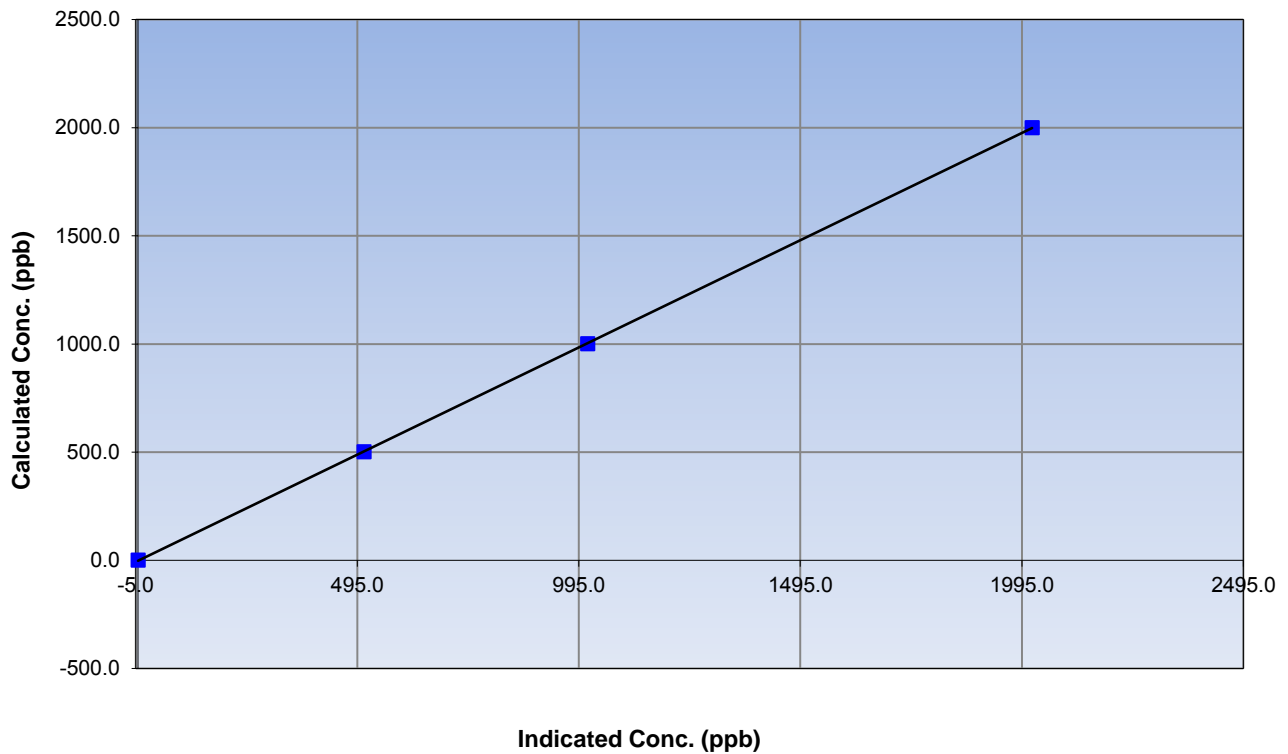
Station Information

Calibration Date	November 17, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:25
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	0.1	----	Correlation Coefficient	0.999994
1999.8	2018.1	0.9909		
1001.4	1014.7	0.9869		
502.2	509.9	0.9848	Slope	0.991251
			Intercept	-2.113604

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

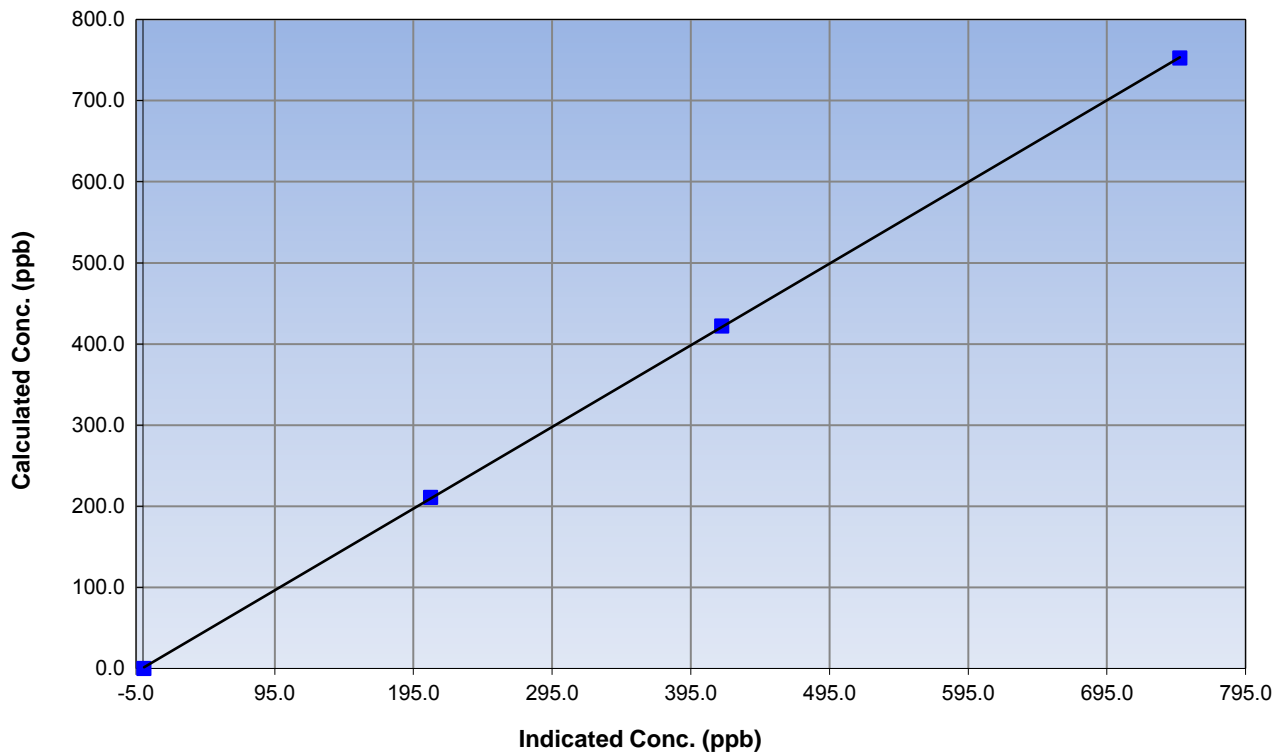
Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:25
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	0.8	----	Correlation Coefficient	0.999978
752.4	747.7	1.0063		
422.0	417.3	1.0112	Slope	1.006746
211.0	207.5	1.0170		
			Intercept	0.727747

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

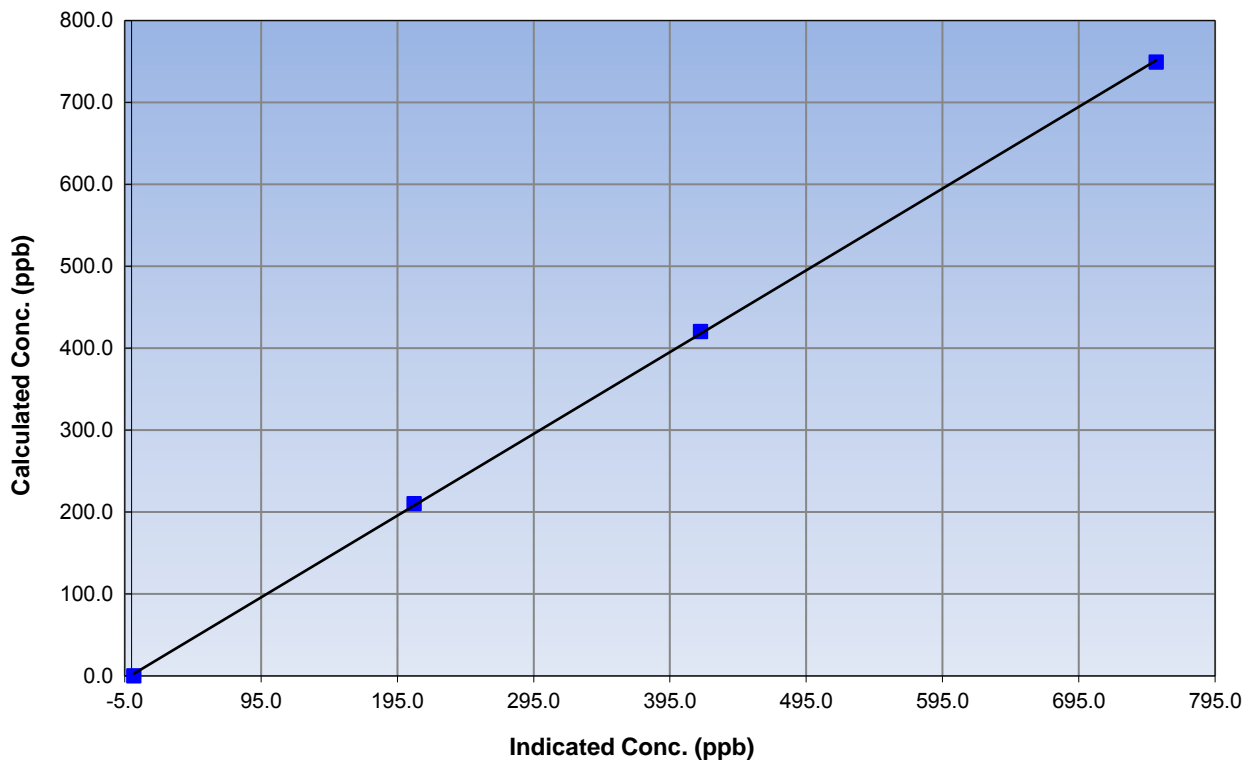
Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:25
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.7	----	Correlation Coefficient	0.999924
749.4	751.8	0.9968		
420.3	417.5	1.0068	Slope	0.998143
210.2	207.3	1.0138		
			Intercept	1.032948

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

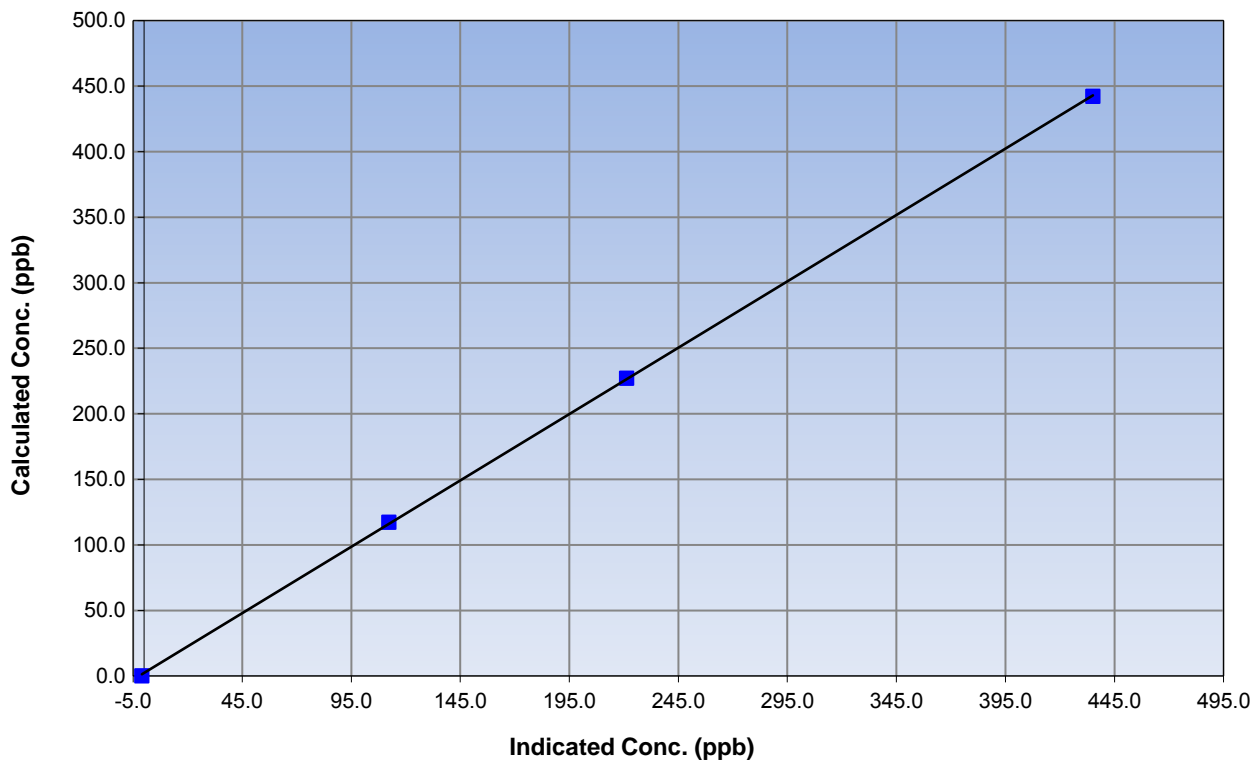
Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:05	End Time (MST)	14:25
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

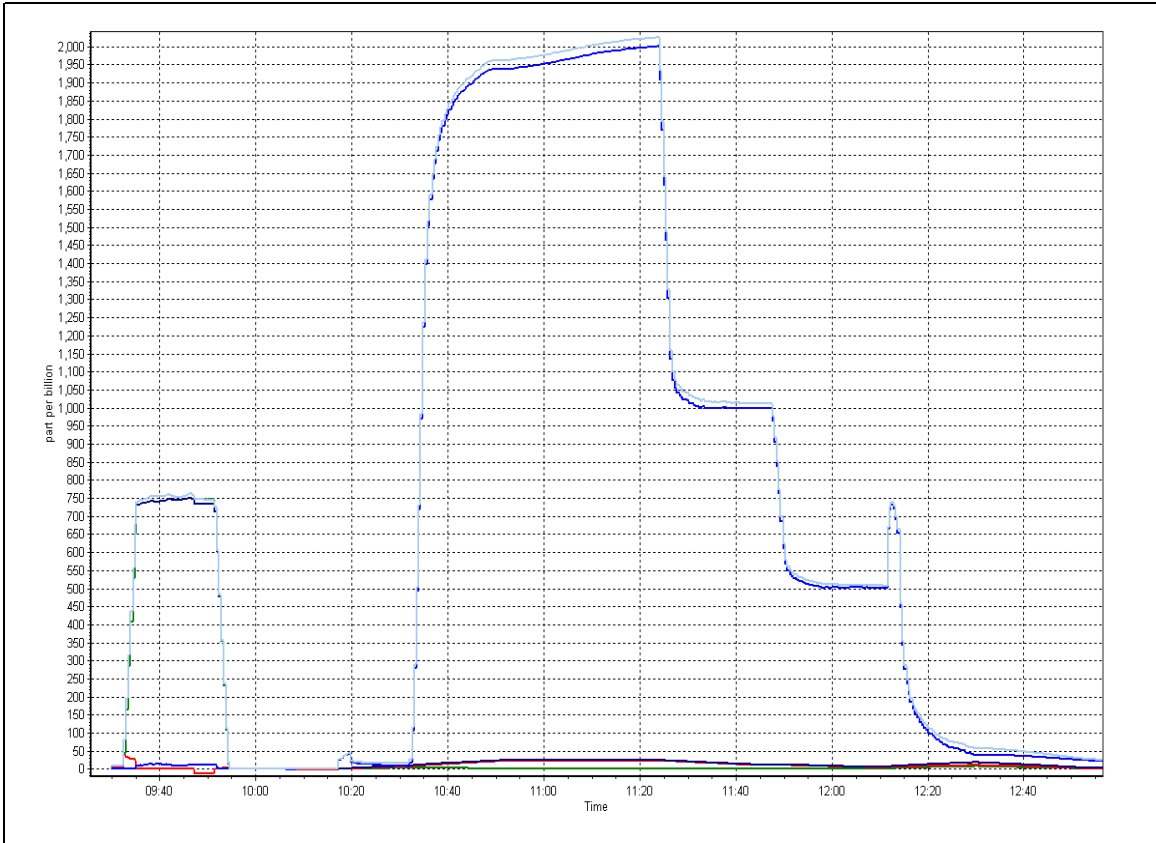
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	----	Correlation Coefficient	0.999960
442.3	435.1	1.0165		
227.0	221.3	1.0258	Slope	1.012732
117.3	112.2	1.0453		
			Intercept	2.301444

NO₂ Calibration Curve



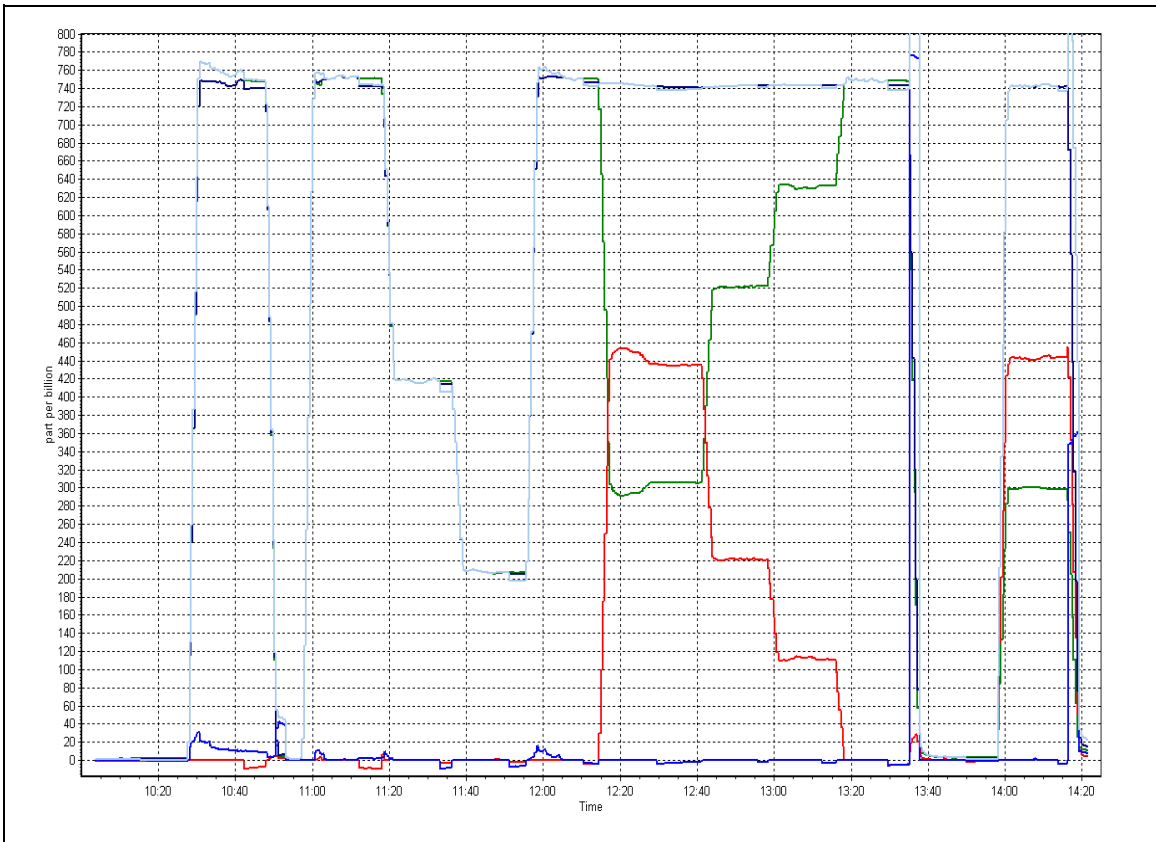
NH₃ Calibration Plot

Date: November 17, 2015



NO_x Calibration Plot

Date: November 16, 2015





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	November 16, 2015	Previous Calibration:	October 22, 2015
Station Name:	Bertha Ganter - Fort McKay	Station Number:	AMS 1
Start Time (MST):	11:20	End Time (MST):	12:00
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 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	-2.0	-1.4	0.6	-2.0
T2	21.0	na	na	
T3	23.0	na	na	
T4	19.0	na	na	
RH (%)	15.0	na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	969	966.7	-2.3	966.72

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1001	1	1000	1001.4

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	220		220
Neph	0.2		0.2
C14	5.1		5.1
Indicated Concentration (ug/m3)	0.1	no	0.1
Offset 1	220.2		220.2
Offset 2	34.5		34.5

Leak Check (Quarterly)

Leak Check Date:	Previous Leak Check Date:	April 20, 2015
	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):		0.00
*Flow with adaptor (LPM):		
<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	22/10/2015
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head cleaned. No adjustments made.

Calibration Performed By: Devin Russell



This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 2
MILDRED LAKE
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	687	33	33	100.00	45	0	7	0
H2S (ppb) Average	687	33	33	100.00	3	0	1	0
THC (ppm) Average	685	33	35	99.72	4.7	-	3.2	-
Temperature (C) Average	720	0	0	100.00	8.1	-	3.4	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	92	-
Wind Speed 10 m (km/h) Average	695	0	25	96.53	23	-	15	-
Wind Direction 10 m (deg) Average	695	0	25	96.53	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	687	1.6	4	-	0	0	0	1	1	3	45
H2S (ppb) Average	687	0.4	0	-	0	0	0	0	0	1	3
THC (ppm) Average	685	2.47	0.4	-	2.1	2.2	2.2	2.3	2.6	3	4.7
Temperature 2 m (C) Average	720	-3.81	5.4	-	-18.1	-12.9	-6.7	-3	0.1	2.2	8.1
Relative Humidity (%) Average	720	76.4	14	-	39	56	66	79	87	93	99
Wind Speed 10 m (km/h) Average	695	9.8	4	-	1	5	7	10	12	15	23
Wind Direction 10 m (deg) Average	695	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	12 Nov 2015 11:00	12 Nov 2015 12:00	2	Maintenance - investigate daily zero and span system
Wind Speed, Wind Direction	22 Nov 2015 13:00	23 Nov 2015 13:00	25	Flat line in sensor output signal - Sensor frozen

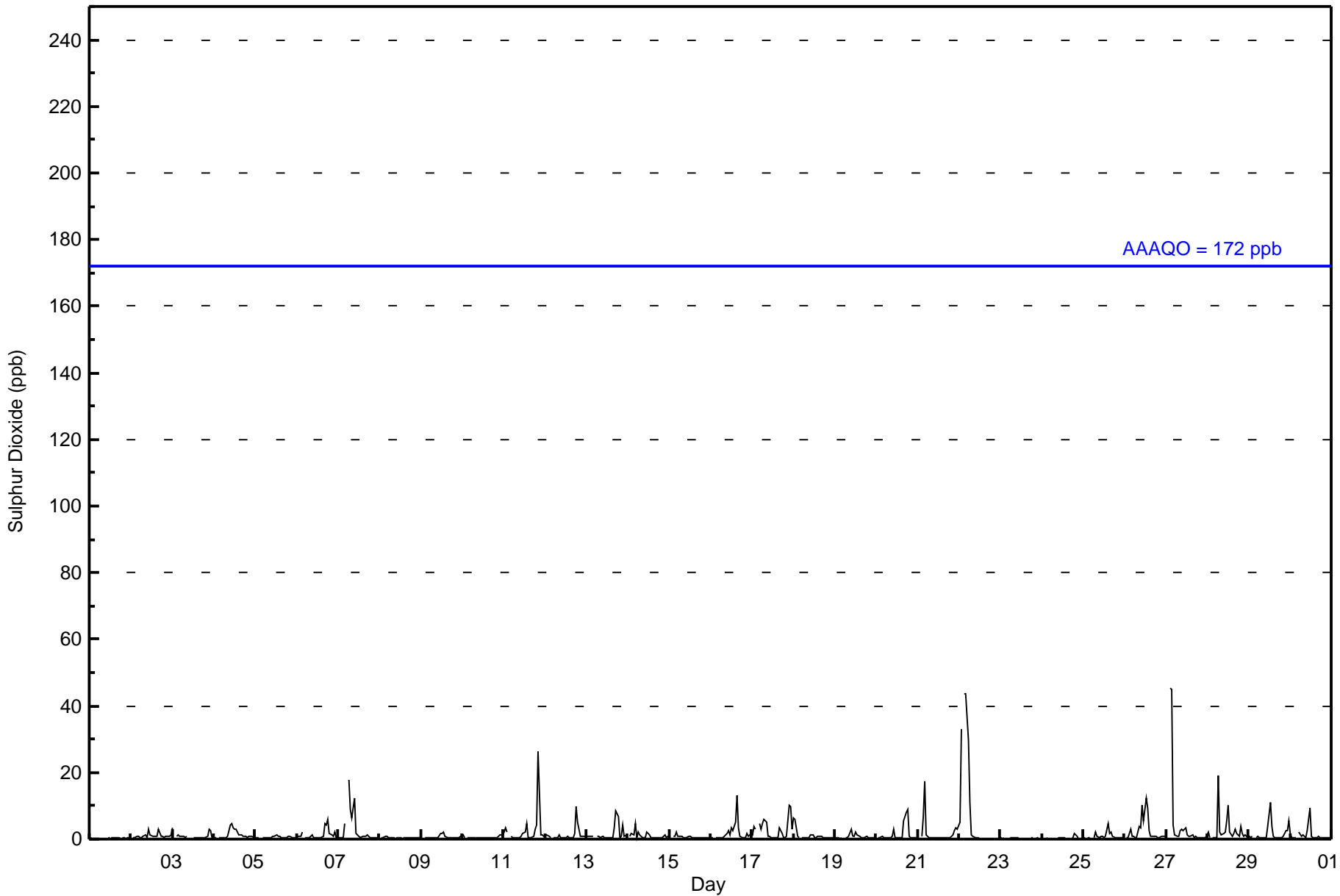


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 45 ppb on Nov 27 03:00	Maximum Daily Average: 7.4 ppb on Nov 22
Minimum Value: 0 ppb on Nov 24 06:00	Hours of Data: 687
Maximum Diurnal Average: 4.4 ppb at hour 4	Hours of Missing Data: 33
Monthly Average: 1.6 ppb	Hours of Calibration: 33
Minimum Daily Average: 0.2 ppb on Nov 23	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.9 ppb at hour 15	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 25	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-Nov	Z	0	0	1	1	1	1	1	1	1	3	1	1	1	1	1	3	1	1	1	1	1	1	1	1.0	3	
3-Nov	3	Z	1	1	1	1	1	1	1	C	C	C	0	0	0	0	0	0	0	0	1	3	2	1	0.9	3	
4-Nov	0	0	Z	0	0	0	0	1	1	4	5	4	3	3	1	1	1	1	1	1	1	1	1	1	1.3	5	
5-Nov	0	0	0	Z	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0.6	1	
6-Nov	0	1	1	2	Z	1	0	0	1	1	1	0	1	1	0	1	5	4	6	2	1	1	2	1	1.4	6	
7-Nov	0	0	0	0	5	Z	18	9	6	12	2	1	1	1	1	1	1	1	0	0	0	0	0	0	2.7	18	
8-Nov	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	2	2	2	1	0	0	0	0	0	0	0	0	1	0.6	2	
10-Nov	1	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1	
11-Nov	2	3	2	Z	1	1	0	0	0	0	1	2	2	5	0	0	0	1	3	4	26	1	1	1	2.5	26	
12-Nov	1	1	1	0	Z	0	0	0	1	0	0	0	0	1	0	0	0	2	10	5	1	1	1	1	1.3	10	
13-Nov	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	4	8	7	0	1	4	1	1	1.5	8	
14-Nov	Z	1	1	1	5	1	2	1	1	0	0	2	1	1	0	0	0	0	0	0	1	1	1	1	1.0	5	
15-Nov	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.6	2	
16-Nov	0	0	Z	0	0	0	0	0	1	2	3	1	3	3	5	13	3	1	1	0	0	2	1	2	1.8	13	
17-Nov	1	4	3	Z	5	3	5	6	5	1	1	1	1	0	0	0	3	2	0	0	1	10	10	3	2.8	10	
18-Nov	6	6	1	0	Z	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	1.0	6	
19-Nov	0	0	0	0	0	Z	0	0	1	3	1	1	2	1	1	1	1	1	1	1	0	1	1	1	0.7	3	
20-Nov	Z	0	1	1	1	1	0	0	0	1	3	1	0	0	0	0	6	8	9	1	0	0	0	0	1.5	9	
21-Nov	0	Z	1	7	18	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	3	1.9	18
22-Nov	5	33	Z	44	44	30	11	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.4	44	
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0.3	2	
25-Nov	0	0	0	0	0	Z	0	2	1	0	1	1	1	1	4	2	2	1	0	0	0	0	0	0	0.8	4	
26-Nov	Z	1	0	3	1	1	1	1	4	3	10	6	12	9	2	1	1	1	1	1	1	1	1	1	2.6	12	
27-Nov	1	Z	45	45	4	1	1	1	2	3	2	3	1	1	1	1	1	1	0	0	0	0	0	0	5.1	45	
28-Nov	2	1	Z	1	0	0	19	2	1	1	2	5	10	2	1	1	3	2	1	4	2	1	1	1	2.7	19	
29-Nov	1	1	1	Z	0	1	1	0	1	1	1	4	11	4	1	1	0	1	0	0	1	3	2	6	1.7	11	
30-Nov	2	1	1	1	Z	2	1	1	1	1	2	9	1	1	0	1	1	0	0	0	0	0	0	0	1.2	9	

1.2	2.2	2.5	4.4	3.6	1.9	2.2	1.1	1.1	1.4	1.5	1.7	2.0	1.3	0.9	1.0	1.3	1.3	1.5	0.9	1.5	1.2	1.1	0.9	Diurnal Average
6	33	45	45	44	30	19	9	6	12	10	9	12	9	5	13	6	8	10	5	26	10	10	6	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	672	97.82	97.82
11 - 20	8	1.16	98.98
21 - 60	7	1.02	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: 687

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	69	55	14	4	3	10	10	92	98	78	61	62	18	25	19	30	648
11 - 20	0	0	0	0	0	0	0	3	0	0	0	0	3	2	0	0	8
21 - 60	0	0	0	0	0	0	0	0	0	0	1	0	3	3	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	69	55	14	4	3	10	10	95	98	78	62	62	24	30	19	30	663

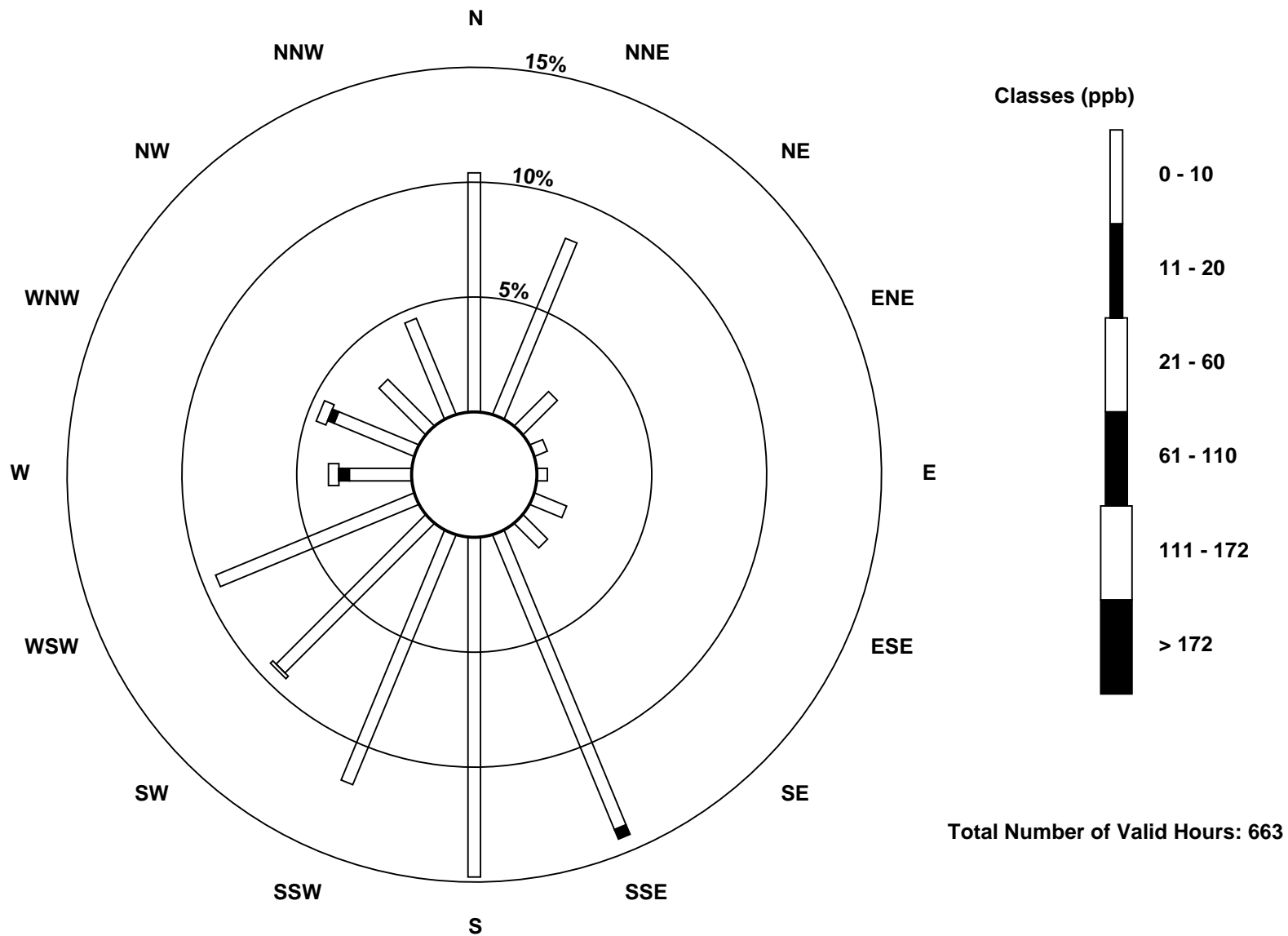
Total Number of Valid Hours: 663

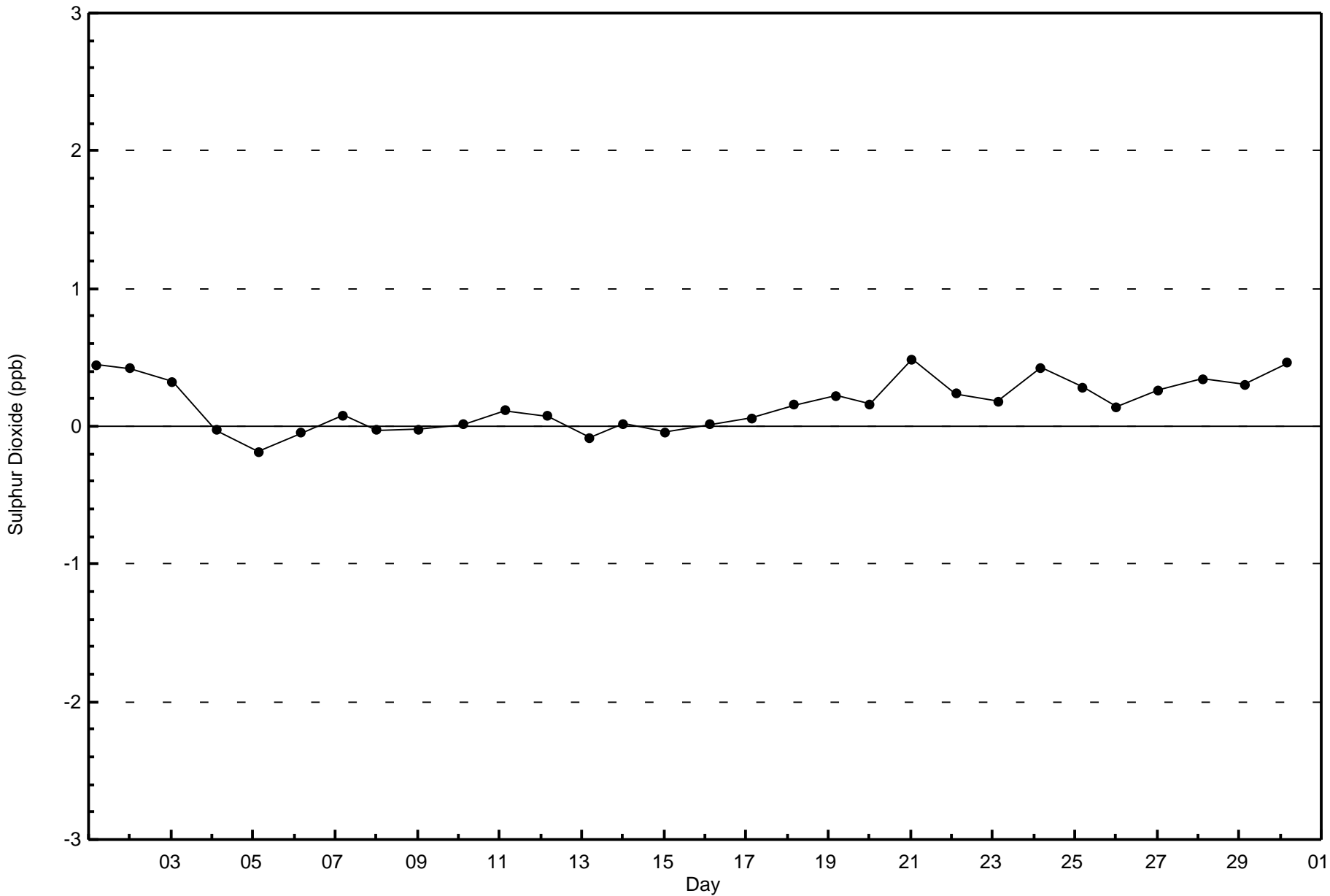
Total Number of Hours: 720

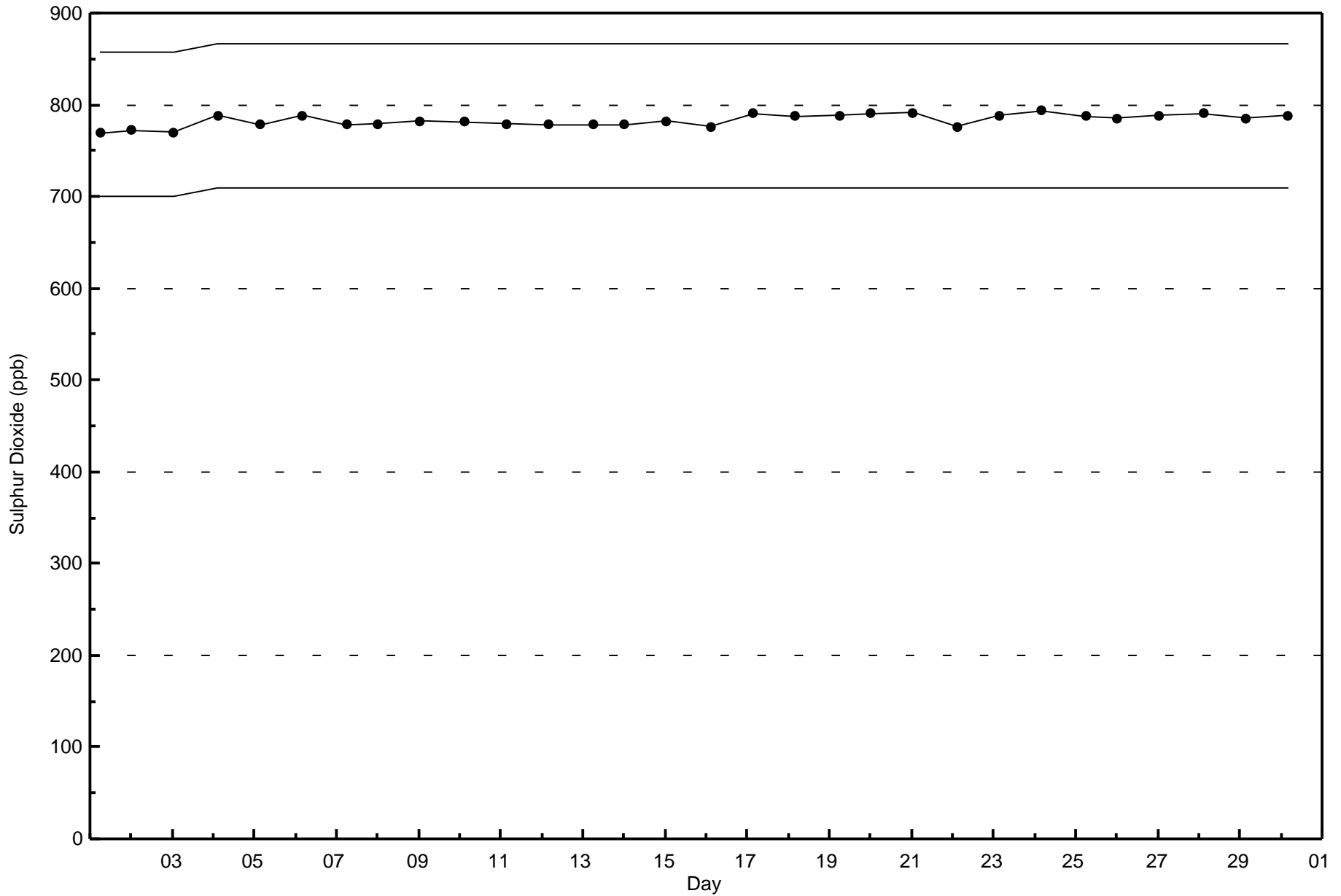


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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







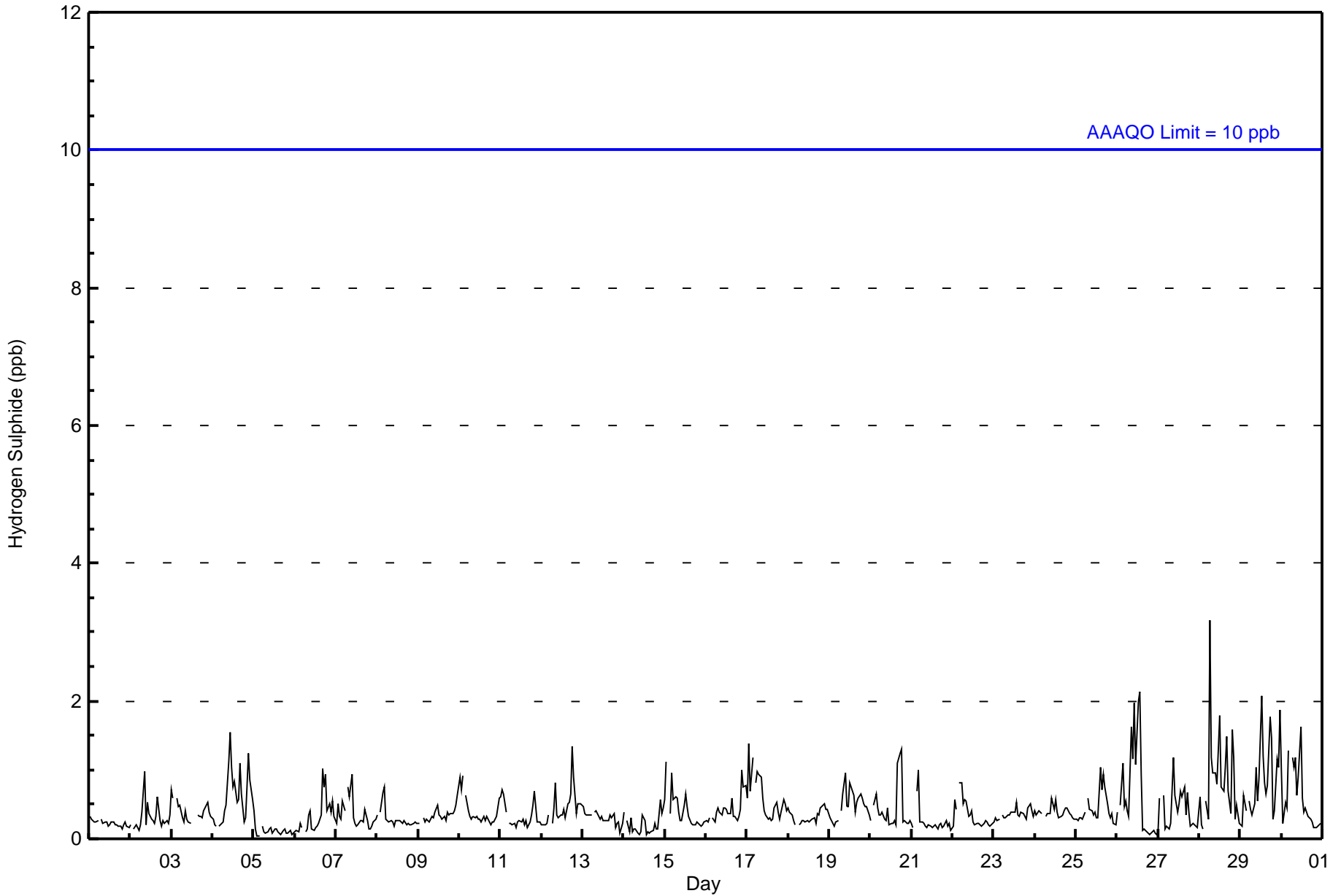


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Nov 28 07:00	Maximum Daily Average: 0.9 ppb on Nov 28		Hours of Data:	687
Minimum Value: 0 ppb on Nov 5 04:00	Minimum Daily Average: 0.1 ppb on Nov 5		Hours of Missing Data:	33
Maximum Diurnal Average: 0.5 ppb at hour 13	Minimum Diurnal Average: 0.3 ppb at hour 20		Hours of Calibration:	33
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-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
3-Nov	1	1	Z	1	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	1	0	0	0.4	1	
4-Nov	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	0	1	1	1	1	0.6	2	
5-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
6-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0.3	1	
7-Nov	0	1	0	0	1	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Nov	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	
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
10-Nov	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
11-Nov	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1	
12-Nov	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0.5	1	
13-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
14-Nov	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	
15-Nov	1	1	Z	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
16-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0.4	1	
17-Nov	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0.6	1	
18-Nov	0	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	
19-Nov	0	0	0	0	0	0	Z	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0.5	1	
20-Nov	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.4	1	
21-Nov	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Nov	0	1	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0.4	1	
24-Nov	0	0	0	0	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
25-Nov	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.4	1	
26-Nov	0	Z	0	1	0	1	0	0	2	1	2	1	2	2	1	0	0	0	0	0	0	0	0	0	0.7	2	
27-Nov	0	1	Z	1	0	0	0	0	1	1	1	0	1	1	1	1	0	1	0	0	0	0	0	0	0.4	1	
28-Nov	1	0	0	Z	1	0	3	1	1	1	1	1	2	1	1	1	1	1	0	2	1	0	0	0	0.9	3	
29-Nov	0	0	1	0	Z	1	0	0	1	1	1	1	2	1	1	1	1	2	1	0	0	1	1	2	0.8	2	
30-Nov	1	0	1	0	1	Z	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2	

0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.4	0.4	0.4	Diurnal Average
1	1	1	1	1	1	1	3	1	2	1	2	2	2	2	1	1	1	2	1	2	1	1	1	2	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	686	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: 687

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	66	55	14	4	3	10	12	93	99	82	62	61	22	30	19	30	662
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	66	55	14	4	3	10	12	94	99	82	62	61	22	30	19	30	663

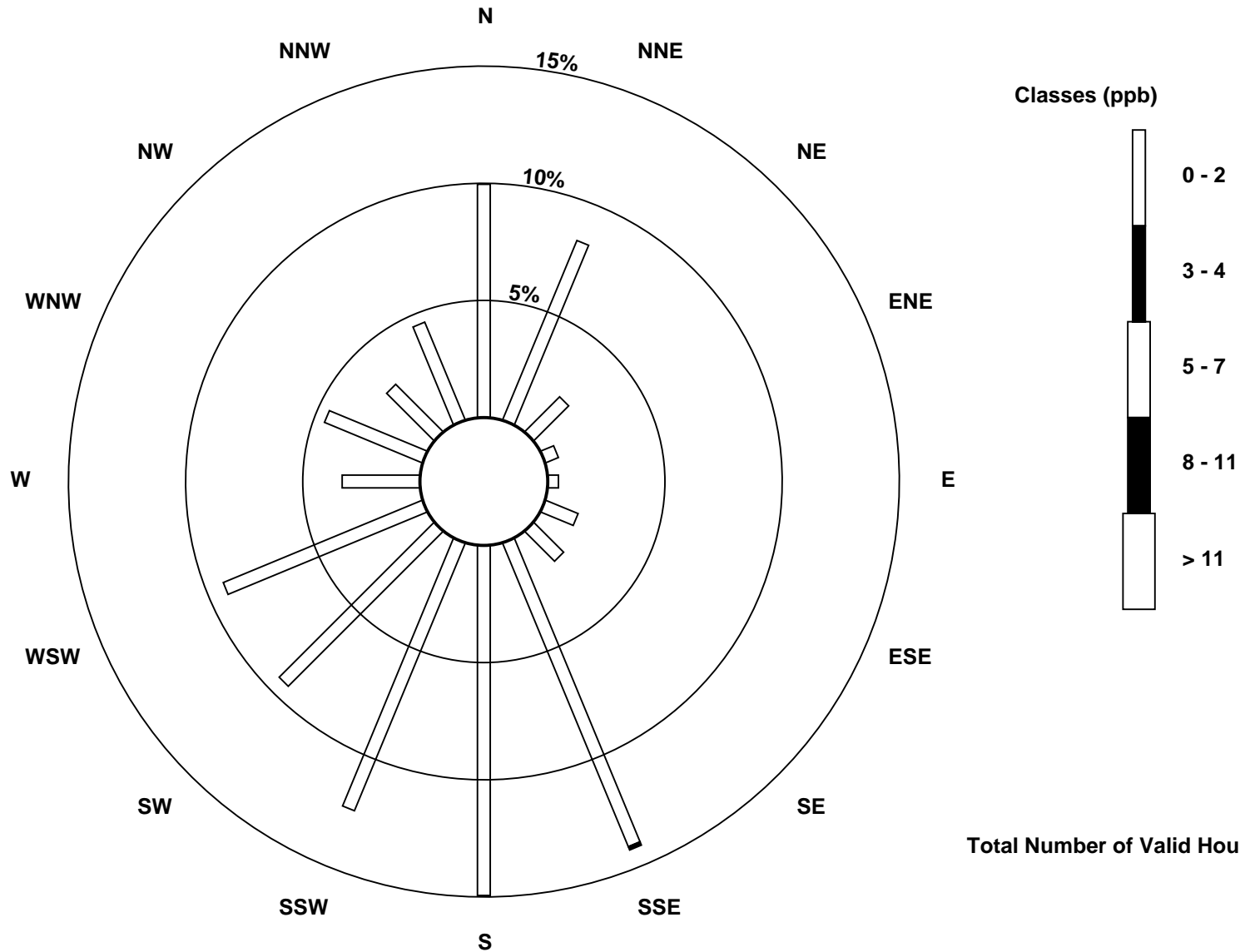
Total Number of Valid Hours: 663

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

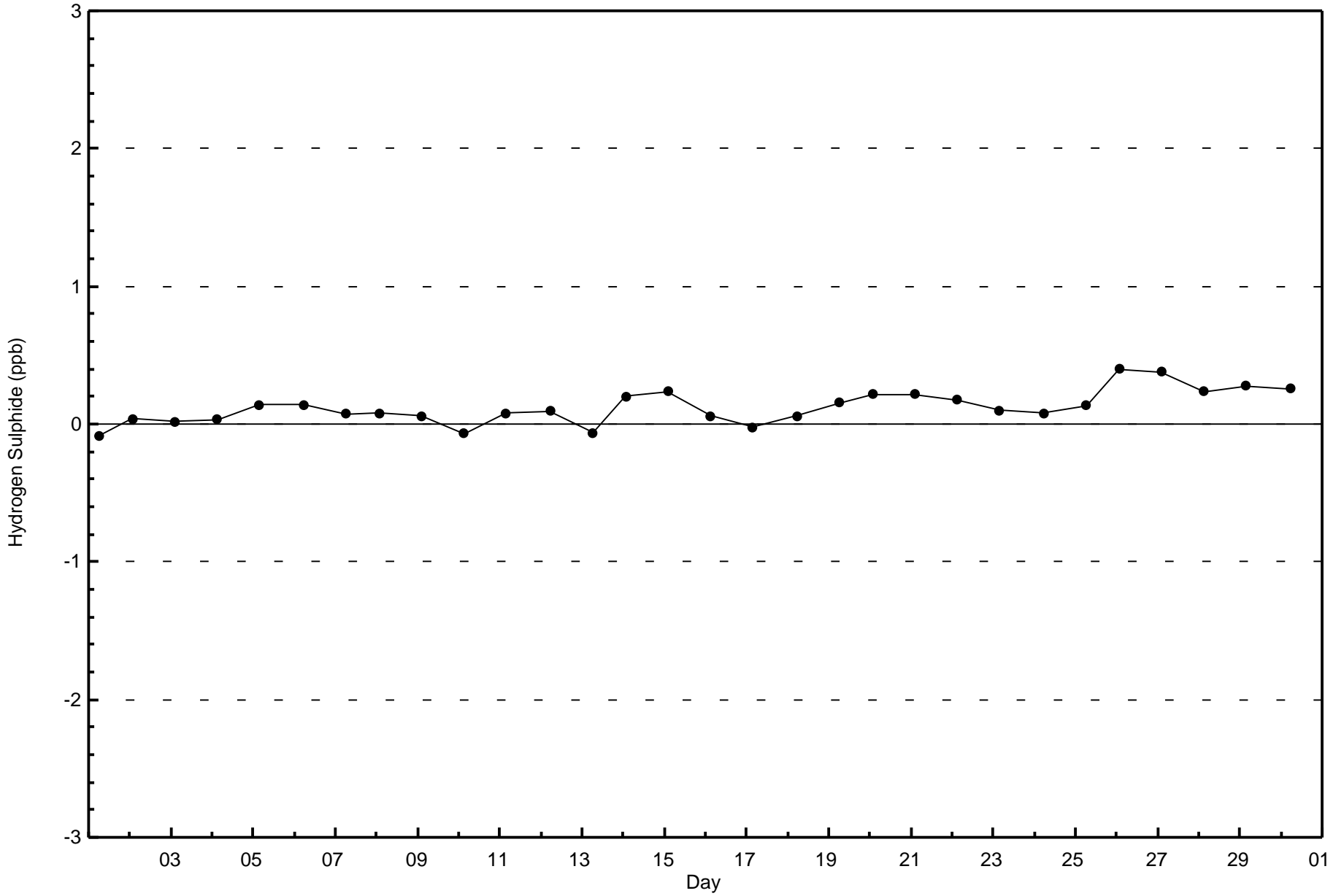
Hydrogen Sulphide (H₂S) - ppb
Mildred Lake (AMS 2)

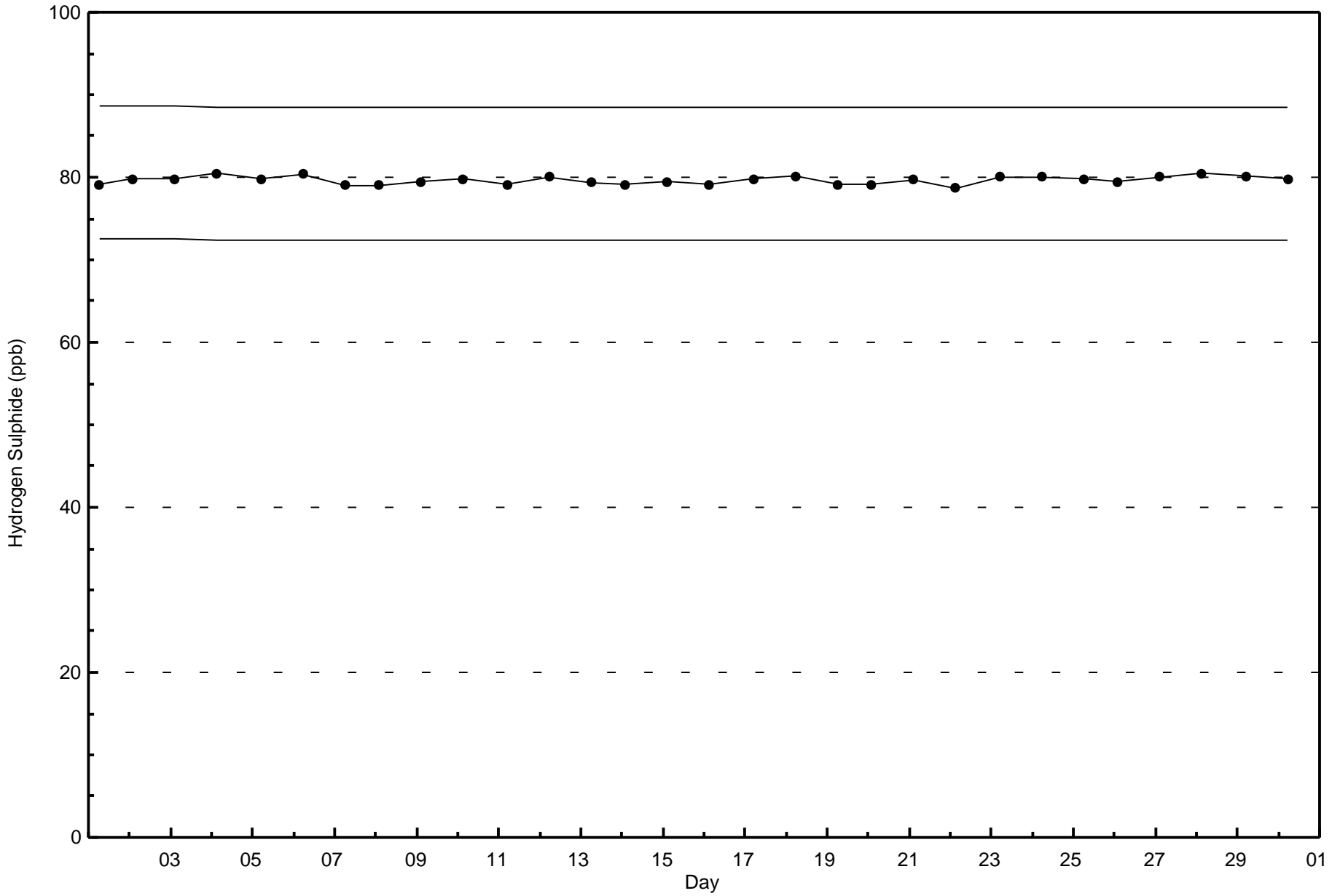


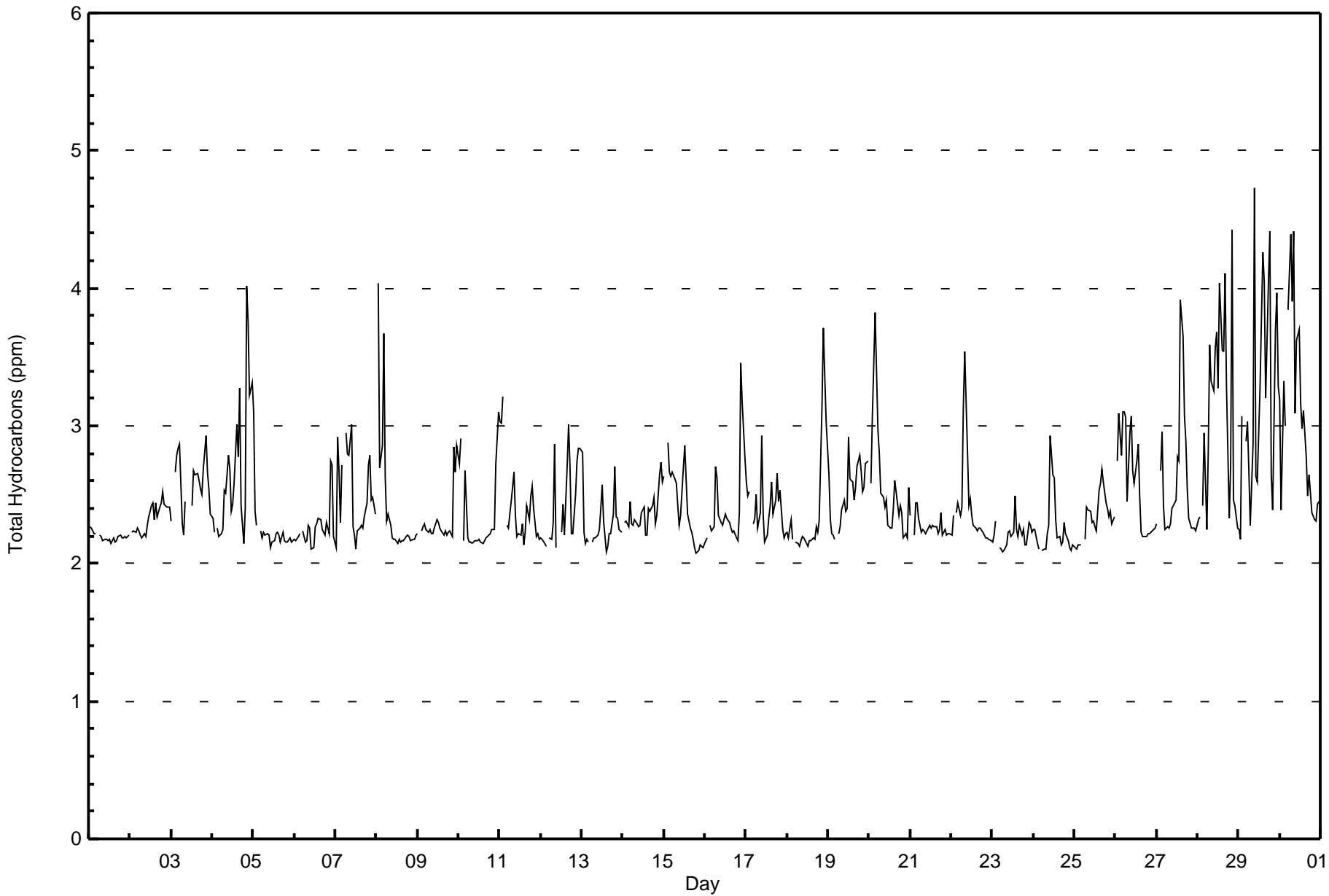


Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - November 2015









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	622	90.80	90.80
3.1 - 10.0	63	9.20	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	68	54	14	4	3	10	9	77	72	74	62	62	23	28	11	27	598
3.1 - 10.0	1	1	0	0	0	0	1	17	25	4	0	0	1	2	8	3	63
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	55	14	4	3	10	10	94	97	78	62	62	24	30	19	30	661

Total Number of Valid Hours: 661

Total Number of Hours: 720

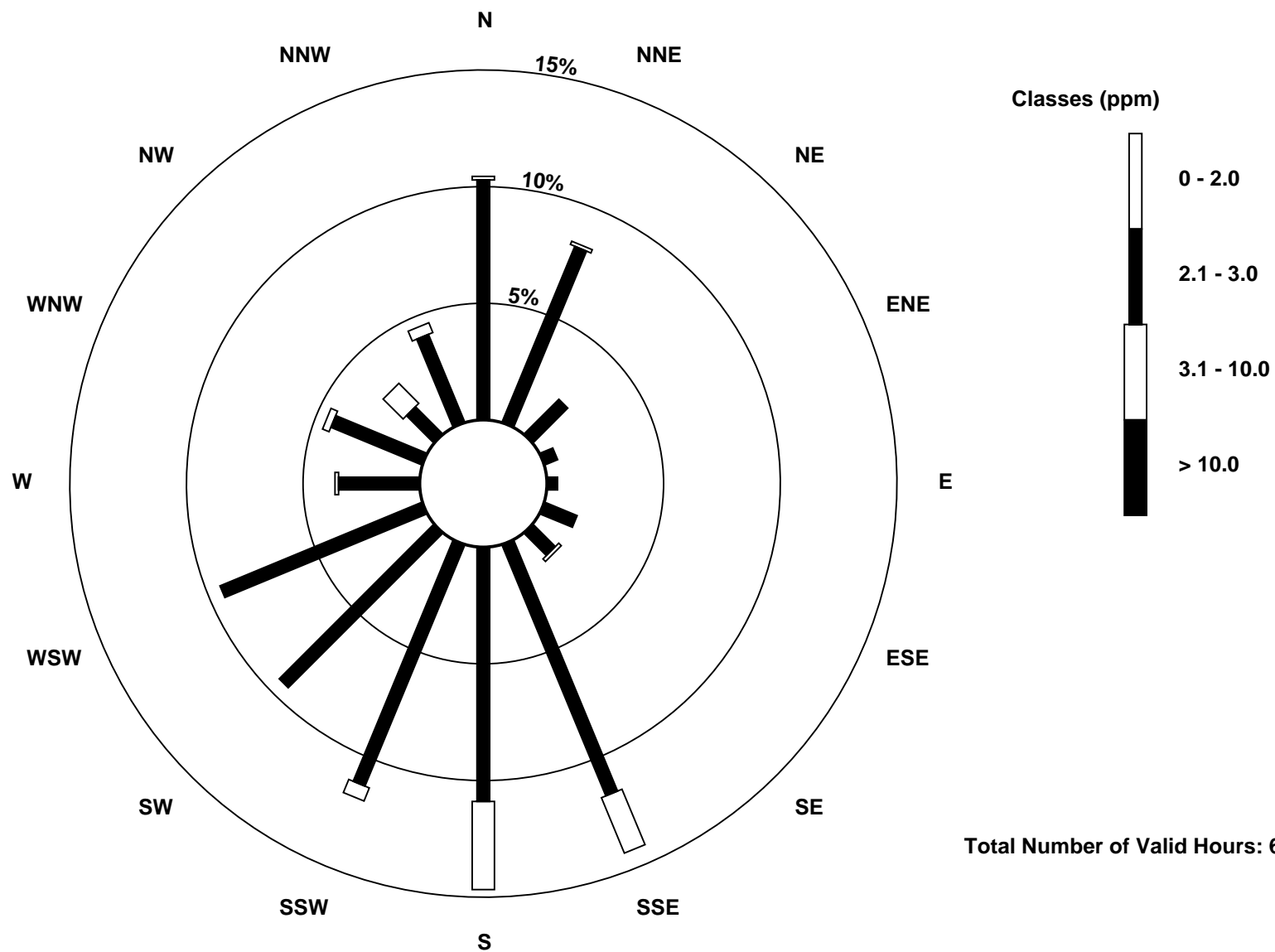


Wood Buffalo Environmental Association

Wind Rose Nov 2015

Total Hydrocarbons (THC) - ppm

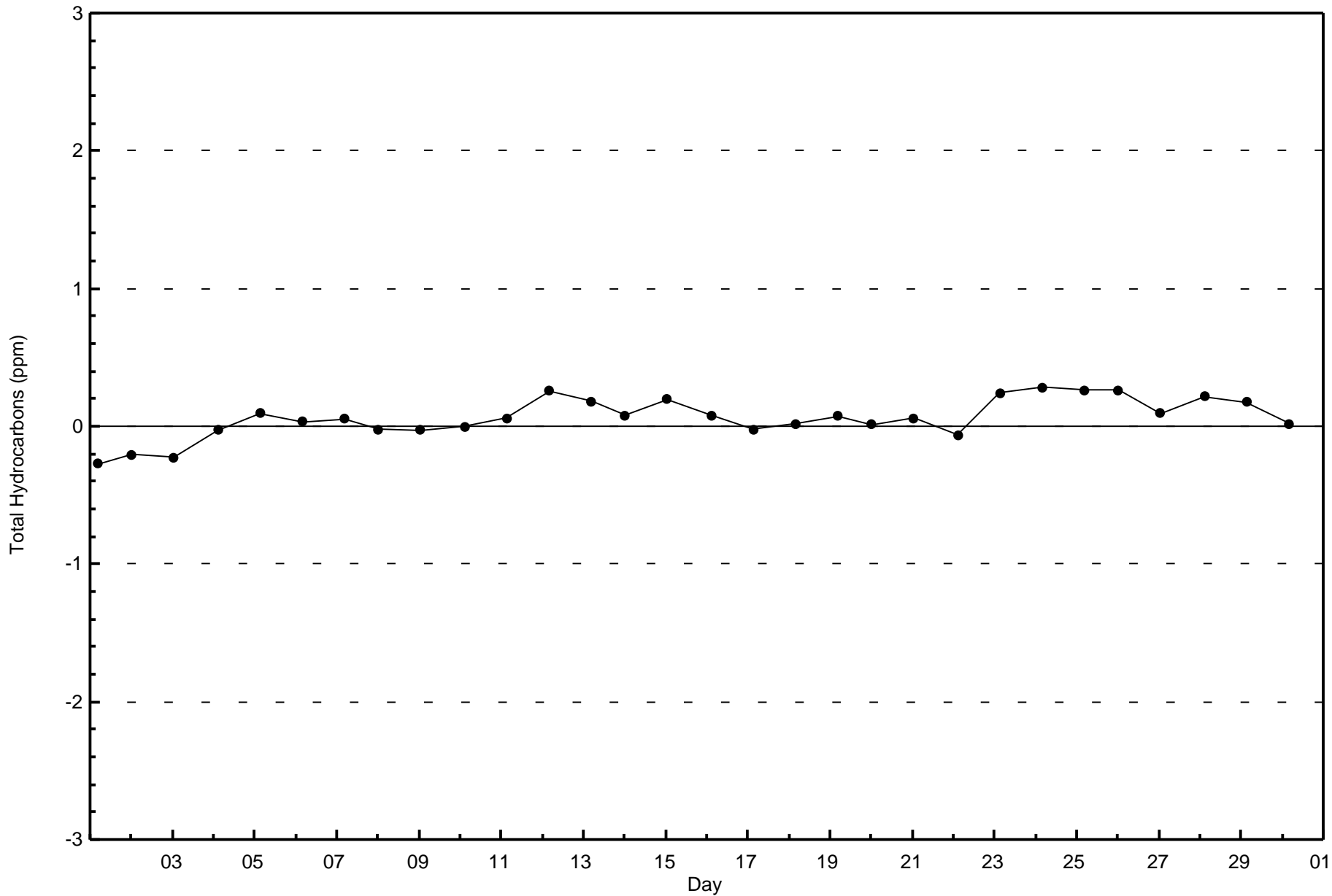
Mildred Lake (AMS 2)

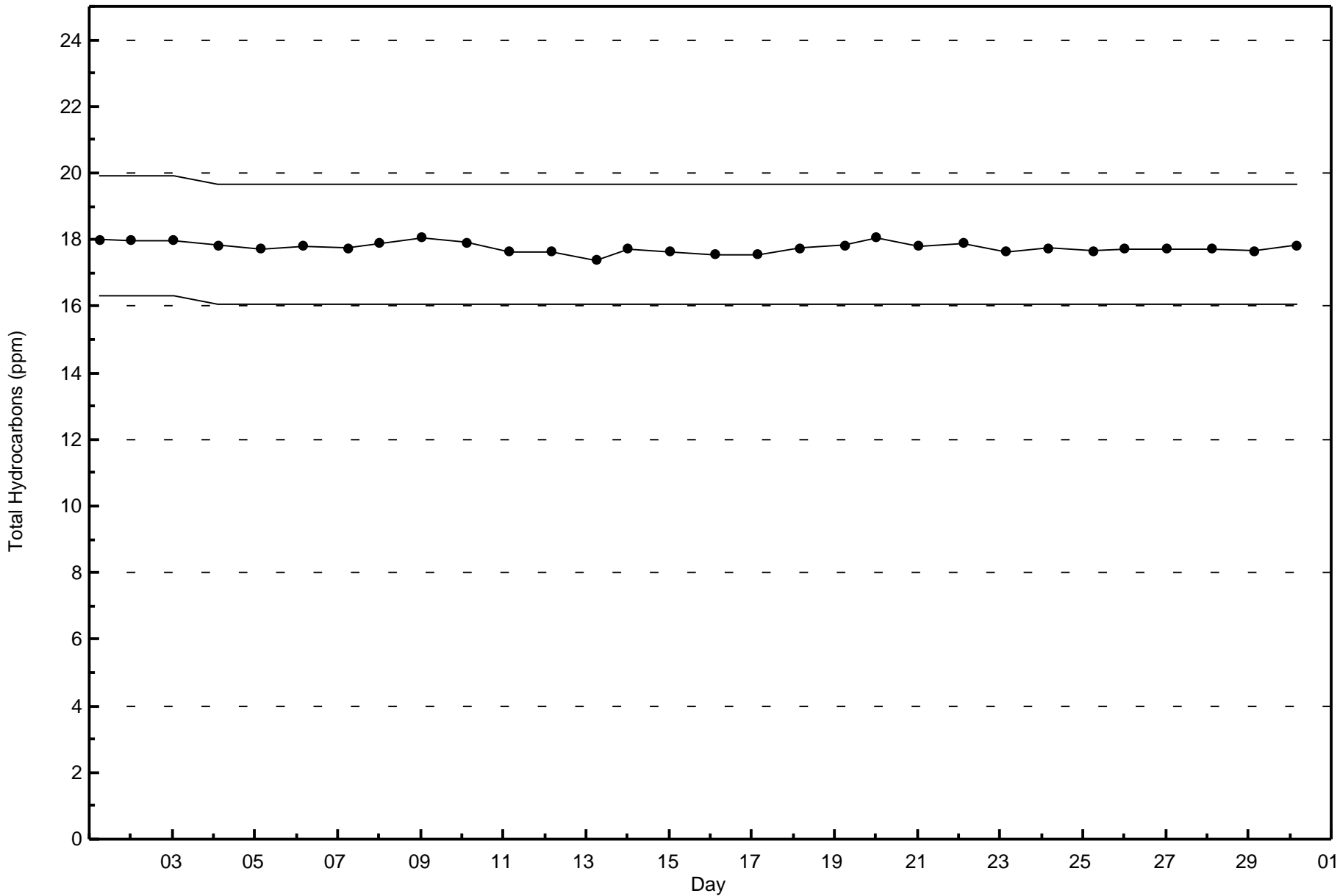




Wood Buffalo Environmental Association
Zero Responses

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







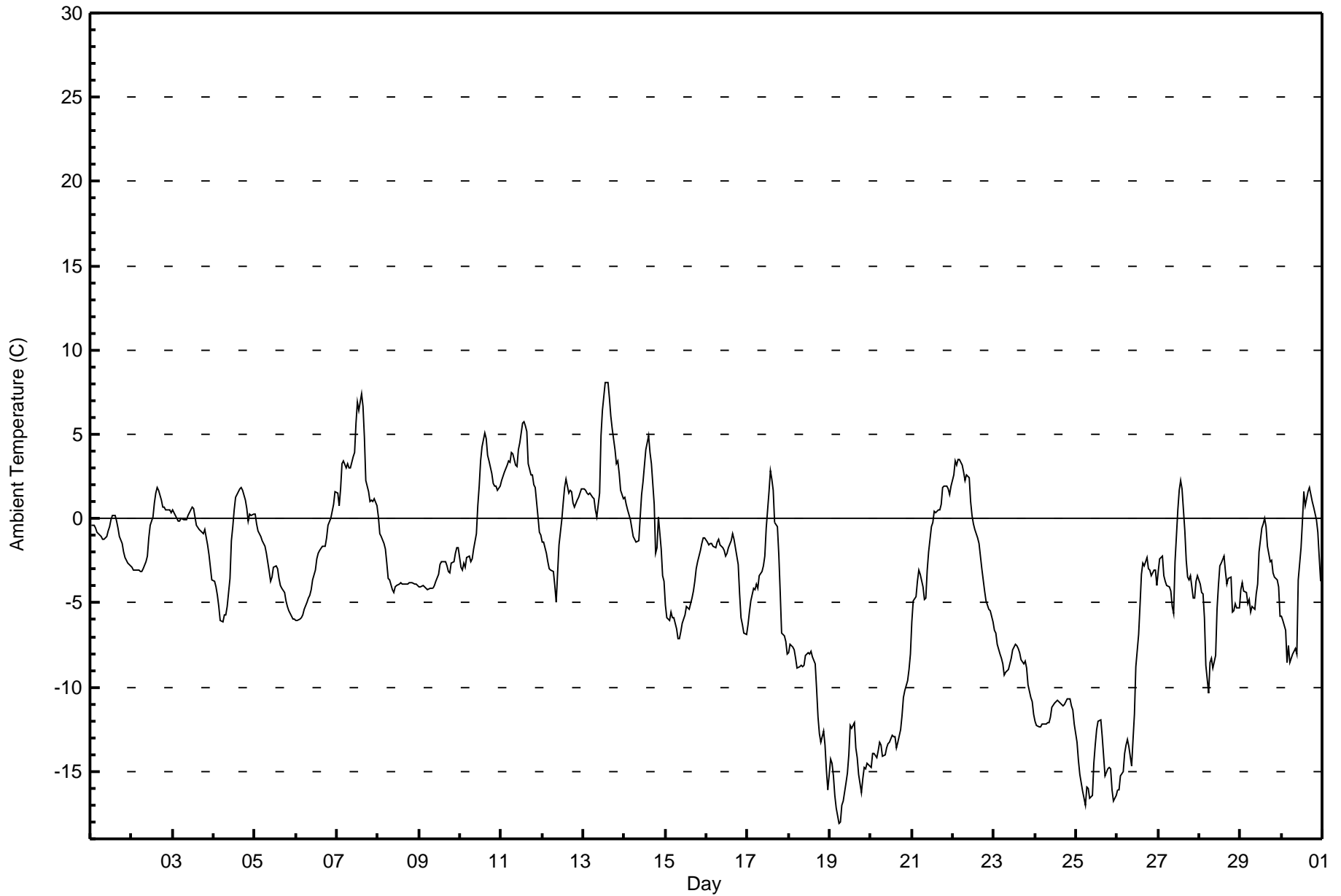
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Mildred Lake - November 2015

Maximum Value: 8.1 C on Nov 13 15:00 Maximum Daily Average: 3.4 C on Nov 13		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -18.1 C on Nov 19 06:00 Maximum Diurnal Average: -1.6 C at hour 15 Monthly Average: -3.81 C		Minimum Daily Average: -15.1 C on Nov 19 Minimum Diurnal Average: -5.3 C at hour 9 Percentiles: P ₁ = -16.6 P ₁₀ = -12.9 Q ₁ = -6.7 Median = -3.0 Q ₃ = 0.1 P ₉₀ = 2.2 P ₉₉ = 6.6																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	-0.4	-0.4	-0.4	-0.5	-0.8	-1.0	-1.1	-1.2	-1.3	-1.1	-0.8	-0.5	-0.1	0.2	0.2	-0.2	-0.6	-1.1	-1.5	-1.9	-2.3	-2.5	-2.7	-2.8	-1.0	0.2
2-Nov	-2.9	-3.0	-3.1	-3.1	-3.1	-3.1	-3.1	-3.0	-2.6	-2.2	-1.2	-0.4	0.1	0.9	1.5	1.9	1.7	1.1	0.7	0.7	0.5	0.5	0.5	0.4	-0.8	1.9
3-Nov	0.5	0.3	0.0	-0.2	-0.1	0.0	0.0	-0.1	0.0	0.2	0.3	0.7	0.6	0.1	-0.4	-0.6	-0.7	-0.8	-0.9	-0.7	-1.6	-2.1	-2.9	-3.7	-0.5	0.7
4-Nov	-3.7	-4.0	-4.6	-5.2	-6.1	-6.2	-5.7	-5.7	-5.2	-3.5	-1.3	-0.5	0.5	1.3	1.6	1.8	1.9	1.7	1.1	0.6	-0.2	0.3	0.2	0.3	-1.7	1.9
5-Nov	0.3	-0.3	-0.7	-1.1	-1.3	-1.5	-1.6	-2.0	-3.1	-3.7	-3.5	-2.9	-2.8	-3.0	-3.6	-3.9	-4.1	-4.3	-4.9	-5.2	-5.5	-5.8	-6.0	-6.0	-3.2	0.3
6-Nov	-6.0	-6.1	-6.0	-5.9	-5.7	-5.3	-5.0	-4.7	-4.6	-4.3	-3.7	-3.0	-2.4	-2.1	-1.9	-1.6	-1.7	-1.7	-1.1	-0.4	0.0	0.4	0.8	1.6	-2.9	1.6
7-Nov	1.5	0.8	1.8	3.2	3.4	3.0	3.3	3.0	3.0	3.7	3.9	5.6	6.9	6.5	7.4	6.7	4.8	2.3	1.6	1.0	1.1	1.0	1.2	0.8	3.2	7.4
8-Nov	0.1	-0.9	-1.1	-1.5	-1.8	-2.7	-3.5	-3.6	-4.2	-4.4	-4.1	-4.0	-3.9	-3.8	-3.9	-3.9	-3.9	-3.9	-3.8	-3.8	-3.8	-3.9	-3.9	-4.0	-3.2	0.1
9-Nov	-4.0	-4.0	-4.0	-4.1	-4.2	-4.2	-4.1	-4.1	-4.1	-4.0	-3.8	-3.3	-2.7	-2.6	-2.6	-2.5	-2.8	-3.1	-3.2	-2.6	-2.5	-2.1	-1.8	-1.7	-3.3	-1.7
10-Nov	-2.9	-3.1	-2.6	-2.9	-2.3	-2.2	-2.5	-2.3	-1.8	-0.9	0.7	1.9	3.5	4.3	5.1	4.7	3.8	3.4	2.6	2.1	1.9	1.9	1.7	1.9	0.7	5.1
11-Nov	2.3	2.5	2.7	3.2	3.5	3.3	3.9	3.8	3.2	3.1	4.1	4.5	5.7	5.8	5.5	5.1	3.2	2.6	2.6	2.1	1.9	0.1	-0.8	-1.0	3.0	5.8
12-Nov	-1.4	-1.4	-2.1	-2.5	-3.0	-3.0	-3.2	-4.0	-4.9	-3.2	-1.6	-0.1	0.9	1.9	2.3	1.5	1.7	1.6	0.9	0.7	1.1	1.3	1.5	1.7	-0.5	2.3
13-Nov	1.8	1.7	1.6	1.4	1.5	1.3	1.1	0.5	0.1	1.5	4.9	6.4	7.3	8.1	8.1	7.2	6.1	5.3	4.1	3.2	3.4	2.6	1.6	1.2	3.4	8.1
14-Nov	1.3	0.8	0.5	0.0	-0.6	-1.1	-1.2	-1.4	-1.3	0.1	1.4	2.2	4.1	4.5	4.9	4.0	3.3	0.9	-2.1	-1.7	0.1	-1.8	-3.4	-3.7	0.4	4.9
15-Nov	-5.1	-5.9	-6.1	-5.6	-5.9	-5.9	-6.6	-7.1	-7.1	-6.7	-6.2	-5.7	-5.2	-5.3	-5.4	-4.7	-4.3	-3.7	-3.0	-2.5	-1.9	-1.5	-1.1	-1.1	-4.7	-1.1
16-Nov	-1.4	-1.6	-1.5	-1.5	-1.6	-1.7	-1.4	-1.2	-1.6	-1.7	-1.9	-2.2	-2.0	-1.7	-1.3	-0.9	-1.2	-1.7	-2.7	-4.5	-5.9	-6.3	-6.8	-6.8	-2.5	-0.9
17-Nov	-6.3	-5.5	-4.9	-4.2	-4.2	-3.9	-4.2	-3.4	-3.1	-2.8	-2.3	-0.6	1.6	2.8	2.4	1.7	-0.2	-0.5	-2.1	-4.4	-6.8	-7.0	-7.3	-8.0	-3.0	2.8
18-Nov	-7.9	-7.5	-7.6	-7.8	-8.3	-8.9	-8.8	-8.7	-8.8	-8.7	-8.1	-8.0	-8.0	-7.9	-8.2	-8.6	-10.1	-11.8	-12.7	-13.3	-12.6	-13.4	-14.9	-16.1	-9.9	-7.5
19-Nov	-14.3	-14.5	-15.2	-16.4	-17.2	-18.1	-18.0	-17.0	-16.7	-15.7	-15.1	-14.0	-12.3	-12.4	-12.1	-13.6	-14.2	-15.2	-16.3	-15.4	-14.8	-14.8	-14.5	-14.7	-15.1	-12.1
20-Nov	-14.8	-13.9	-13.9	-14.2	-13.7	-13.2	-13.4	-14.1	-14.0	-13.6	-13.3	-13.3	-12.9	-12.9	-12.9	-13.6	-13.2	-12.5	-11.7	-10.6	-10.2	-9.6	-9.0	-8.1	-12.6	-8.1
21-Nov	-6.1	-4.8	-4.7	-3.7	-3.1	-3.3	-4.0	-4.8	-4.7	-3.0	-2.0	-0.5	-0.2	0.4	0.3	0.5	0.5	0.8	1.8	1.9	2.0	1.7	1.4	2.0	-1.3	2.0
22-Nov	2.6	3.4	3.2	3.5	3.5	3.1	2.7	2.2	2.6	2.4	1.0	0.2	-0.3	-0.7	-1.1	-1.5	-2.3	-3.0	-4.3	-4.9	-5.1	-5.3	-5.5	-6.1	-0.4	3.5
23-Nov	-6.7	-6.8	-7.5	-8.0	-8.3	-8.6	-9.3	-9.1	-8.9	-8.6	-8.3	-7.8	-7.5	-7.7	-8.0	-8.4	-8.6	-8.5	-8.9	-9.8	-10.6	-10.9	-11.6	-11.6	-8.6	-6.7
24-Nov	-12.0	-12.3	-12.4	-12.4	-12.2	-12.2	-12.2	-12.1	-12.1	-11.8	-11.2	-10.9	-10.8	-10.7	-10.9	-11.0	-11.1	-11.1	-10.9	-10.7	-10.7	-11.1	-11.4	-12.2	-11.5	-10.7
25-Nov	-13.2	-14.4	-15.1	-15.7	-16.2	-17.0	-16.0	-16.0	-16.6	-16.4	-14.5	-13.5	-12.5	-12.0	-12.0	-12.9	-14.1	-15.2	-14.8	-14.8	-14.8	-16.1	-16.8	-16.4	-14.9	-12.0
26-Nov	-16.1	-16.1	-15.3	-15.0	-14.0	-13.5	-13.1	-13.5	-14.7	-13.1	-11.6	-8.7	-6.9	-5.1	-3.3	-2.6	-2.8	-2.3	-2.9	-3.0	-3.4	-3.0	-3.1	-3.9	-8.6	-2.3
27-Nov	-3.2	-2.4	-2.2	-3.4	-3.7	-4.0	-4.1	-4.3	-5.2	-5.6	-2.6	0.6	1.7	2.3	1.8	-0.8	-2.4	-3.5	-3.6	-3.4	-4.7	-4.7	-3.7	-3.4	-2.7	2.3
28-Nov	-3.9	-4.3	-4.5	-5.9	-8.7	-10.3	-8.5	-8.3	-8.9	-8.1	-5.4	-4.0	-2.8	-2.6	-2.3	-3.2	-3.9	-3.5	-3.5	-5.6	-5.4	-5.1	-5.3	-5.3	-5.4	-2.3
29-Nov	-4.2	-3.8	-4.3	-4.4	-5.1	-4.8	-5.5	-5.2	-5.4	-4.5	-3.9	-2.0	-0.6	-0.4	0.0	-0.5	-1.6	-2.5	-2.4	-3.2	-3.5	-3.6	-4.1	-5.8	-3.4	0.0
30-Nov	-5.8	-6.0	-6.6	-8.5	-7.6	-8.6	-8.1	-7.9	-7.7	-8.0	-3.6	-1.7	-0.2	1.6	0.8	1.6	1.8	1.4	1.0	0.7	-0.1	-0.8	-2.3	-3.7	-3.3	1.8
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	533	74.03	74.03
0 - 10	187	25.97	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

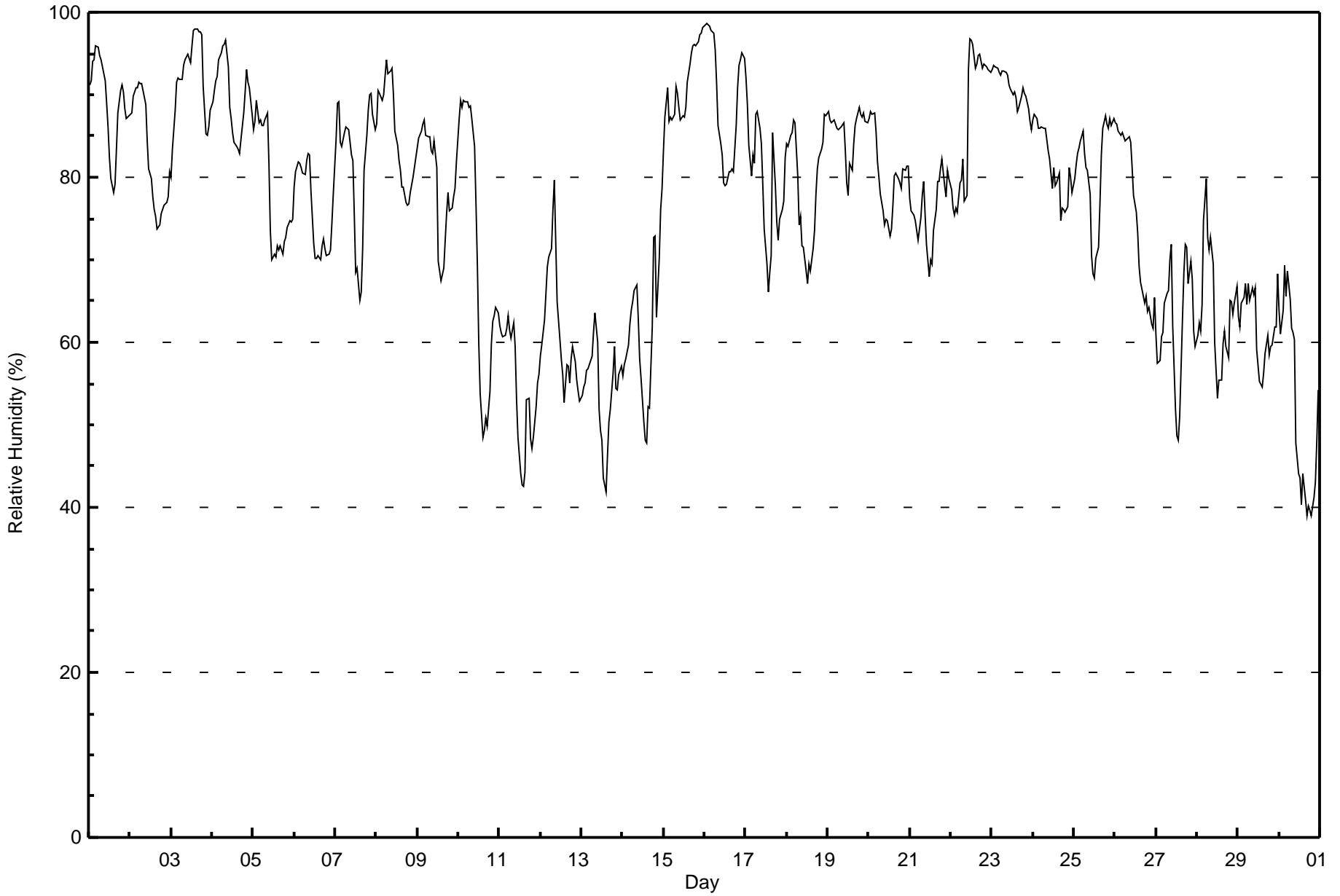


Maximum Value: 99 % on Nov 16 02:00																		Maximum Daily Average: 92.0 % on Nov 3																		Hours in Service: 720													
Minimum Value: 39 % on Nov 30 20:00																		Minimum Daily Average: 51.9 % on Nov 30																		Hours of Data: 720													
Maximum Diurnal Average: 81.6 % at hour 6																		Minimum Diurnal Average: 69.1 % at hour 15																		Hours of Missing Data: 0													
Monthly Average: 76.4 %																		Percentiles: P ₁ = 42 P ₁₀ = 56 Q ₁ = 66 Median = 79 Q ₃ = 87 P ₉₀ = 93 P ₉₉ = 98																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	91	92	94	94	96	96	95	94	93	92	89	86	82	80	78	79	83	88	90	91	90	88	87	87	89.1	96																							
2-Nov	88	88	90	91	91	91	91	91	90	89	84	81	80	78	76	75	74	74	76	76	77	77	78	81	82.7	91																							
3-Nov	80	83	88	91	92	92	92	94	94	95	95	94	96	98	98	98	98	98	97	91	85	85	86	88	92.0	98																							
4-Nov	89	90	92	92	94	95	96	96	97	93	88	87	85	84	84	83	83	85	88	90	93	92	91	88	89.8	97																							
5-Nov	86	87	89	87	87	86	86	87	88	82	74	70	71	70	72	71	72	71	72	73	74	75	75	75	78.2	89																							
6-Nov	79	81	82	82	81	81	80	82	83	83	79	72	70	70	70	70	72	73	71	70	71	71	74	78	76.0	83																							
7-Nov	85	89	89	84	84	85	86	86	86	83	82	76	69	69	65	66	71	81	85	88	90	90	88	86	81.7	90																							
8-Nov	86	91	90	89	90	92	94	93	93	93	90	86	84	82	81	79	79	77	77	77	78	80	81	82	85.2	94																							
9-Nov	84	85	86	86	87	85	85	85	83	83	84	81	70	69	68	69	72	76	78	76	76	78	79	82	79.4	87																							
10-Nov	87	89	88	89	89	89	89	89	87	84	77	69	60	54	49	49	51	50	54	60	62	63	64	64	71.1	89																							
11-Nov	62	61	61	61	62	63	62	61	62	60	53	49	44	43	43	44	53	53	48	47	48	52	55	56	54.3	63																							
12-Nov	58	60	63	66	69	70	71	76	80	72	65	60	58	56	53	57	57	55	58	59	58	55	54	53	61.8	80																							
13-Nov	54	55	55	57	57	58	58	61	64	60	52	49	48	44	42	46	50	52	56	60	54	54	56	57	54.1	64																							
14-Nov	56	57	58	60	62	64	65	66	67	63	58	56	50	48	48	52	52	62	73	73	63	70	76	79	61.6	79																							
15-Nov	83	87	91	87	87	87	88	91	90	88	87	87	87	88	91	94	95	96	96	96	97	97	98	98	91.1	98																							
16-Nov	98	99	98	98	98	97	95	91	86	84	83	79	79	79	81	81	81	81	86	91	94	94	95	94	89.3	99																							
17-Nov	92	89	84	80	83	82	88	88	86	84	79	74	69	66	68	71	85	79	75	72	75	76	77	82	79.3	92																							
18-Nov	84	84	85	85	87	87	80	74	75	72	72	69	67	69	69	71	74	78	81	82	83	84	88	87	78.7	88																							
19-Nov	88	87	87	87	87	86	86	86	86	87	83	79	78	82	81	84	86	87	88	88	87	88	87	87	85.4	88																							
20-Nov	87	88	88	88	85	82	80	78	76	74	75	75	73	74	77	80	80	80	79	79	81	81	81	81	80.1	88																							
21-Nov	77	76	75	75	74	72	75	78	80	76	72	68	70	70	74	76	79	80	81	82	79	78	81	80	76.1	82																							
22-Nov	78	76	75	76	76	79	80	82	77	78	93	97	97	96	93	94	95	95	93	94	93	93	93	93	87.4	97																							
23-Nov	93	94	93	93	93	92	93	93	93	92	91	91	90	90	88	88	90	91	90	90	90	88	87	86	90.8	94																							
24-Nov	87	88	87	86	86	86	86	86	85	83	82	79	81	79	79	81	75	76	76	76	81	80	78	81.6	88																								
25-Nov	80	81	83	84	84	86	83	81	81	78	70	68	68	70	72	77	83	86	87	86	86	87	86	87	80.6	87																							
26-Nov	87	86	86	85	85	85	84	85	85	84	81	78	76	73	69	67	66	65	66	64	64	62	62	65	75.4	87																							
27-Nov	61	58	58	61	61	65	66	66	70	72	62	52	49	48	51	63	68	72	72	67	70	68	61	60	62.5	72																							
28-Nov	61	62	61	65	75	80	73	71	73	69	60	57	53	55	55	60	61	60	58	65	65	63	65	67	63.9	80																							
29-Nov	63	62	65	65	67	65	67	65	67	66	67	59	55	55	55	56	59	61	58	59	60	62	62	68	62.0	68																							
30-Nov	64	61	64	69	66	69	65	62	61	60	48	44	44	40	44	41	39	40	40	39	41	43	48	54	51.9	69																							
																								78.9	79.5	80.2	80.5	81.2	81.6	81.3	81.2	81.2	79.3	75.8	72.4	70.1	69.3	69.1	70.8	72.7	73.9	75.0	75.4	75.4	75.9	76.5	77.5	Diurnal Average	
																								98	99	98	98	98	97	96	96	97	95	95	97	97	98	98	98	98	98	97	96	97	97	98	98	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mildred Lake - November 2015





Maximum Speed: 23 km/h on Nov 12 22:00	Maximum Daily Speed Average: 14.9 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 14 22:00	Minimum Daily Speed Average: 0.9 km/h on Nov 19	Hours of Data: 695
Maximum Diurnal Speed Average: 4.1 km/h at hour 22	Minimum Diurnal Speed Average: 2.1 km/h at hour 9	Hours of Missing Data: 25
Monthly Average Velocity: 3.1 km/h 222.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 12 P ₉₀ = 15 P ₉₉ = 21	Percent Operational Time: 96.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	NNE10	NNE8	NNE7	NNE9	NE9	NNE8	NNE8	NNE9	NNE10	NNE12	NNE12	NNE12	NNE11	NE11	NNE12	NNE13	NNE12	NNE13	NNE13	NNE13	NNE12	NNE11	NNE14	NNE11	NNE10.7	NNE14
2-Nov	N10	N10	NE9	ENE8	NE7	ENE8	NE7	NE5	ENE5	E4	SE6	SSE10	SSE9	S10	S10	SSE9	SSE12	SSE16	SSE15	SSE18	SSE15	SSE15	SSE14	SSE13	SE6.2	SSE18
3-Nov	SSE12	SSE13	SSE13	SSE10	SSE10	SSE8	S8	S5	S7	S6	S4	S1	N7	N9	N10	N9	N9	N6	NNE3	NW9WNW10	NW9WNW10	WSW8	SW1.3	SSE13		
4-Nov	SW8	SSW10	SSW9	S7	S4	S5	S6	SSE5	S6	SSE2	SSE7	SSE11	SSE11	SSE9	SSE9	S9	S10	SSW10	SW4	WSW3	NW7	WNW6	WNW7	NW10	SSW4.9	SSE11
5-Nov	NNW12	NNW14	NNW12	NNW14	NNW13	NNW11	NNW9	NNE9	NNE13	N15	N15	N14	N12	N10	NNE11	N12	NNW11	NNW12	N11	N11	N8	NNE7	NNE5	NNE6	N10.7	N15
6-Nov	ESE3	ESE3	ESE3	SE5	SE5	SSE7	S7	S8	SSE6	S8	SSW10	S7	SSE11	S14	SSE14	SSE13	SSE13	SSE16	SSE16	SSE18	SSE18	SSE19	SSE17	S13	SSE10.1	SSE19
7-Nov	S11	SSE7	SW8	WSW12	WSW12	WSW12	W12	WSW13	W11	W11	WSW10	WSW11	WSW13	WSW9	WSW7	W6	W4	SW4	SSW6	SW6	SW6	SW7	WSW7	WSW9	WSW8.0	WSW13
8-Nov	W6	W1	W8	WNW6	NNW4	N5	N6	NNE8	NNE11	NNE14	NE16	NE12	NE12	NE12	NNE11	NE11	NNE8	NNE8	NNE5	NE5	NNE5	N6	N6	NNE6	NNE6.6	NE16
9-Nov	NNE6	NNE6	NNE7	N6	N6	N4	N2	N1	NNE3	NE2	ESE3	S5	SSW10	SSW9	SSW9	SSW10	SSW10	SSW6	S5	SSW9	S8	SSE11	S12	S9	S2.9	S12
10-Nov	S7	S11	S11	SSW10	S11	S14	SSW15	SSW16	S17	SSW16	SSW18	SSW20	SSW18	SSW18	SSW17	S13	S15	S19	SSW19	S16	S14	S14	SSE14	SSE16	S14.9	SSW20
11-Nov	SSE17	SSE15	SSE17	S12	SSW15	SSW12	SW13	SW13	SW10	SW10	SW11	WSW12	W15	W17	WSW17	WSW13	SW9	WSW11	WSW15	W13	W14	WSW12	WSW13	WSW12	SW11.0	SSE17
12-Nov	WSW11	WSW12	WSW10	WSW10	SW7	SW7	SW7	SSW6	SSE8	S10	S10	SSE13	SSE14	SSE11	S12	SSE9	SSE14	SSE17	SSE16	SSE17	SSE22	SSE23	SSE22	SSE21	S11.2	SSE23
13-Nov	SSE16	S13	SSW14	SSW16	SSW12	SSW13	S17	S10	S10	SSW12	SW12	SW12	SSW11	WSW13	WSW17	WSW16	WSW12	W11	WSW8	WSW9	WSW11	WSW12	WSW12	WSW13	SW11.0	WSW17
14-Nov	WSW14	WSW14	WSW13	WSW10	WSW9	WSW12	WSW9	SW9	SW10	SW9	SW11	SSW10	SW9	WSW13	SW7	SW7	WSW9	SW6	S3	SW7	W6	ESE1	ESE5	ESE3	SW7.7	WSW14
15-Nov	ENE1	SE3	S4	SSE6	SE6	ESE3	NE2	N5	NNE7	N7	N9	N11	N10	N13	N16	NNE17	NNE16	N19	NNE17	NNE15	NNE14	NNE13	N12	N12	NNE8.4	N19
16-Nov	N11	N11	N12	N10	N10	NW9	NNW11	NNW11	NNW17	NNW20	NNW18	NNW18	NNW15	NNW14	NNW16	NNW13	W8	WSW8	SW9	SSW7	SSE7	SSE7	SE6	SE7	NNW7.3	NNW20
17-Nov	SSE8	SE13	SE10	SSE18	SSE11	SSE14	SSE15	SSE15	SSE14	SSE14	S12	SSW14	SSW13	WSW12	SW12	SW10	W12	WNW13	NW17	NW18	NNW18	NNW20	NNW20	NNW18	SW6.2	NNW20
18-Nov	WNW18	NNW17	NW16	NNW14	NNW14	NNW18	NNW17	NNW21	NNW17	NNW17	NNW22	NNW22	N19	N15	N15	NNW11	NNW7	N6	N5	NNW6	NW7	NNW5	N2	ESE2	NNW12.3	NNW22
19-Nov	SW4	SSW4	SSW6	SSW7	SSW7	SSW8	S4	SSE3	E3	SSW5	SSW9	S8	SSW1	NE4	N6	NNW7	N7	NNW6	N5	N1	N2	NNW4	N5	N6	WSW0.9	SSW9
20-Nov	SSW1	WSW1	NW3	NW2	NNE3	NW7	NNW12	NNW12	NNW12	NNW13	W10	SW10	SSW10	S11	SSE12	SSE13	SSE13	SSE14	SSE13	S15	S14	S15	S11	S10	SSW5.4	S15
21-Nov	S10	SW10	WSW12	W12	W20	WSW13	SW10	SW10	SSW10	SSW10	SSW11	SW10	SW11	SW10	SSW10	SSW9	S7	SSE5	WSW11	WSW11	WSW10	WSW12	WSW12	WSW13	SW9.7	W20
22-Nov	WSW13	W13	NNW15	NNW16	NNW13	NNW14	NNW13	NW11	NW14	NW16	NNE8	NNE8	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NW16
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N9	N10	N10	N9	N7	N9	N11	N12	N13	N14	N14	----	N14
24-Nov	NNE9	N9	N7	NNW9	N11	N12	N10	NNW9	NNW7	NW8	NNW6	SW4	N6	N9	NNE6	N4	N8	N4	NW6	W3	SW5	SSW11	SW9	SW9	NNW4.8	N12
25-Nov	SW9	SSW9	S8	S7	SSW8	SSW8	WSW9	W7	W7	SW5	SSW4	SW5	SSW5	SSW5	SSE5	SE5	SSE3	SSE4	SSW7	SSW7	S6	S6	SSW10	S7	SSW5.7	SSW10
26-Nov	S6	S7	S7	S9	S10	S10	S10	S11	SSE8	SSE11	SSE11	SSE13	SSE12	SE8	SSW8	SW10	SW10	SW11	SW8	SW9	SW10	SW10	SW9	SSW10	S8.5	SSE13
27-Nov	SW11	WSW13	W12	SW5	SW7	SSW6	SSW5	ESE5	E5	SE1	WSW6	W8	NNW8	NNW7	NNW2	SSE3	S4	S5	SW7	SW6	SSW7	SW8	SSW9	SW9	SW4.7	WSW13
28-Nov	SSW8	SW10	SW9	SW8	SSW7	SSW6	SSE9	S9	S8	SSE7	SSE9	SSE8	S8	SSE11	S8	SSE6	SSE7	SSW7	S7	S8	S9	SSW10	SSW8	SSW10	S7.8	SSE11
29-Nov	S10	S10	S5	SSW8	SW5	S7	SSW6	SSW9	S10	S7	SSW8	S10	SSE10	SSE10	S12	S8	S7	SSE7	S7	SSW8	S6	SSE9	SSE8	SSE7	S7.7	S12
30-Nov	S8	S8	S7	S7	S8	S8	S9	S8	S8	SSW8	S8	S9	SSW8	SSW9	SSW8	SW6	WSW9	WSW10	WSW10	WSW11	WSW11	WSW12	SW6	SSW8	SSW7.4	WSW12

SW3.7	SW3.5	SW3.3	SW3.4	SW2.9	SW3.3	SW3.5	SW2.8	SW2.1	WSW2.7	SW3.2	SSW3.6	SW3.5	SW2.7	SW2.7	SW2.2	SW2.3	SSW2.6	SW2.8	SW3.6	SW3.7	SW4.1	SW3.7	SSW3.8	Diurnal Average
NNW18	NNW17	SSE17	SSE18	W20	NNW18	NNW17	NNW21	S17	NNW20	NNW22	NNW22	N19	SSW18	WSW17	NNE17	NNE16	S19	SSW19	SSE18	SSE22	SSE23	SSE22	SSE21	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

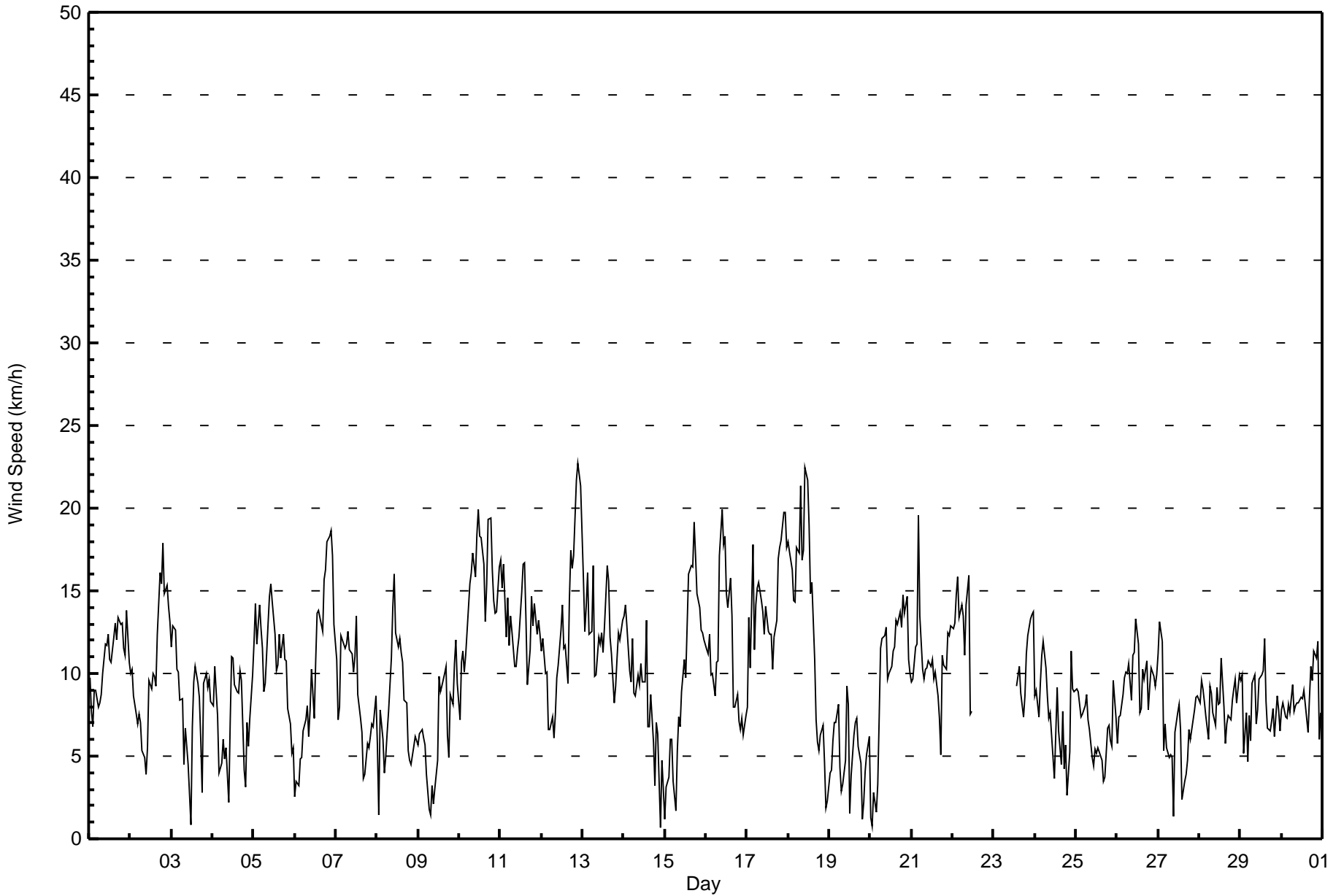
Mildred Lake - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Nov 27 03:00	Hours of Data: 695
Minimum Value: 1 km/h on Nov 9 06:00	Hours of Missing Data: 25
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 96.5

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

5	6	7	5	7	7	4	4	6	5	5	5	5	6	5	5	6	5	5	5	6	6	6	6	5	
Diurnal Maximum																									

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	93	13.38	13.38
6 - 11	379	54.53	67.91
12 - 19	211	30.36	98.27
20 - 28	12	1.73	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	6	5	2	3	10	5	8	13	9	8	2	3	0	2	4	93
6 - 11	40	32	5	2	0	0	6	40	72	57	52	29	12	7	11	14	379
12 - 19	19	19	4	0	0	0	1	45	20	17	5	34	9	21	6	11	211
20 - 28	0	0	0	0	0	0	0	4	0	1	0	0	1	3	0	3	12
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	57	14	4	3	10	12	97	105	84	65	65	25	31	19	32	695

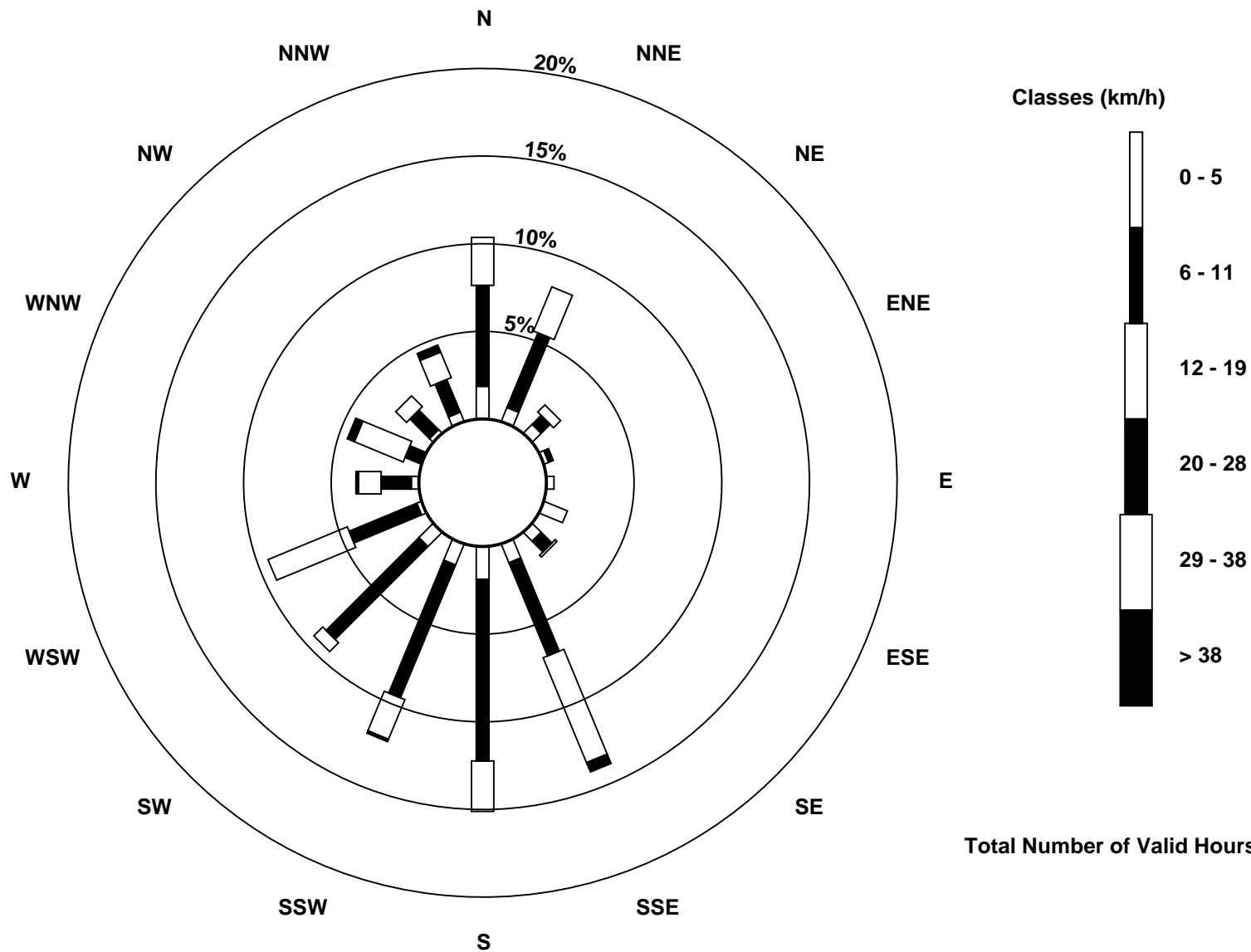
Total Number of Valid Hours: 695

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Mildred Lake - November 2015

Direction of Maximum Speed: 165 deg on Nov 12 22:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 187.4 deg on Nov 10	Hours of Data: 695
Direction of Minimum Speed: 121 deg on Nov 14 22:00	Hours of Missing Data: 25
Direction of Minimum Daily Speed Average: 0.9 deg on Nov 19	Percent Operational Time: 96.5
Monthly Average Direction: 231.7 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-Nov	26	33	16	16	34	24	20	22	17	14	16	21	31	36	23	32	26	18	17	18	24	23	12	23	22.3
2-Nov	8	9	38	62	41	57	50	54	63	80	128	158	150	170	178	167	158	163	159	164	162	161	161	160	138.3
3-Nov	159	160	166	163	161	163	175	175	170	184	183	174	360	0	358	360	353	360	15	314	303	296	286	245	217.8
4-Nov	231	206	194	180	172	175	169	160	187	150	153	159	163	166	164	175	175	200	228	245	322	303	301	310	191.8
5-Nov	315	337	338	332	334	336	341	14	18	2	355	350	355	355	20	350	337	343	355	349	2	12	12	15	350.5
6-Nov	106	115	110	126	130	156	178	171	156	179	203	188	162	169	166	162	153	151	152	158	160	162	162	179	161.5
7-Nov	177	161	223	251	255	255	267	253	264	263	243	251	251	249	249	264	281	214	213	228	225	225	247	248	243.8
8-Nov	268	271	262	285	343	3	11	24	16	27	38	42	37	35	31	35	32	27	24	42	25	11	11	12	20.2
9-Nov	14	19	22	7	6	7	6	355	12	39	113	170	199	205	197	200	202	204	186	195	184	167	179	172	184.5
10-Nov	181	170	176	193	174	184	197	197	190	192	200	193	197	194	193	187	184	190	193	190	185	185	163	163	187.4
11-Nov	164	159	163	174	194	204	224	228	229	225	233	257	262	260	250	243	225	242	258	262	266	249	249	242	228.6
12-Nov	240	252	239	239	226	228	231	198	161	176	184	164	166	166	190	156	165	161	155	159	164	165	166	164	179.2
13-Nov	168	175	193	199	205	195	187	178	184	204	219	229	210	240	250	248	256	260	237	240	247	254	244	248	219.1
14-Nov	257	245	246	238	238	242	237	228	229	219	221	195	221	243	234	226	240	217	185	218	263	121	104	103	231.4
15-Nov	61	146	181	159	125	121	41	11	15	10	5	11	9	6	11	17	12	5	12	15	19	13	10	5	15.7
16-Nov	2	358	5	1	355	321	327	295	292	291	293	294	295	296	295	283	269	243	220	212	160	154	139	146	299.2
17-Nov	158	133	129	156	156	161	158	157	160	165	186	195	207	239	228	236	276	297	317	321	298	288	292	297	220.7
18-Nov	293	291	315	343	332	331	334	338	337	338	346	348	357	355	351	347	341	357	352	327	315	335	5	121	335.8
19-Nov	218	198	201	196	193	200	183	152	100	208	202	173	197	42	353	341	349	342	356	349	2	348	351	3	236.3
20-Nov	202	239	325	311	14	316	302	294	298	295	264	230	203	174	164	163	160	158	160	181	179	176	183	173	202.2
21-Nov	182	234	254	265	277	255	232	226	208	212	209	218	224	227	212	197	184	162	244	238	238	253	251	245	232.6
22-Nov	256	278	294	284	284	288	294	308	310	325	18	27	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	10	11	10	6	4	6	5	6	7	10	--
24-Nov	12	4	356	348	351	357	355	343	328	324	343	224	357	11	13	358	351	351	307	262	219	202	224	231	336.5
25-Nov	226	202	181	176	199	199	240	260	263	233	212	224	208	192	156	135	164	160	202	192	189	191	207	191	202.9
26-Nov	178	186	169	169	171	170	181	179	160	166	157	163	161	137	211	220	215	215	218	220	217	223	227	204	187.9
27-Nov	222	250	265	221	220	207	202	119	93	139	250	280	305	319	328	164	187	191	217	216	195	222	197	216	227.4
28-Nov	198	216	219	214	211	201	160	184	173	166	165	163	169	165	178	167	159	200	184	173	190	205	194	203	186.0
29-Nov	191	189	184	198	217	190	205	200	178	186	201	170	157	167	169	178	176	162	178	193	174	162	163	148	179.5
30-Nov	189	186	187	182	181	177	182	175	183	193	183	187	197	208	199	234	252	248	256	247	249	255	236	208	210.0

218.3 217.2 227.3 222.2 232.5 228.9 231.4 230.9 234.8 244.0 226.5 213.3 214.7 226.6 229.2 225.0 219.1 213.2 219.9 221.0 221.4 217.0 216.3 211.2

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association

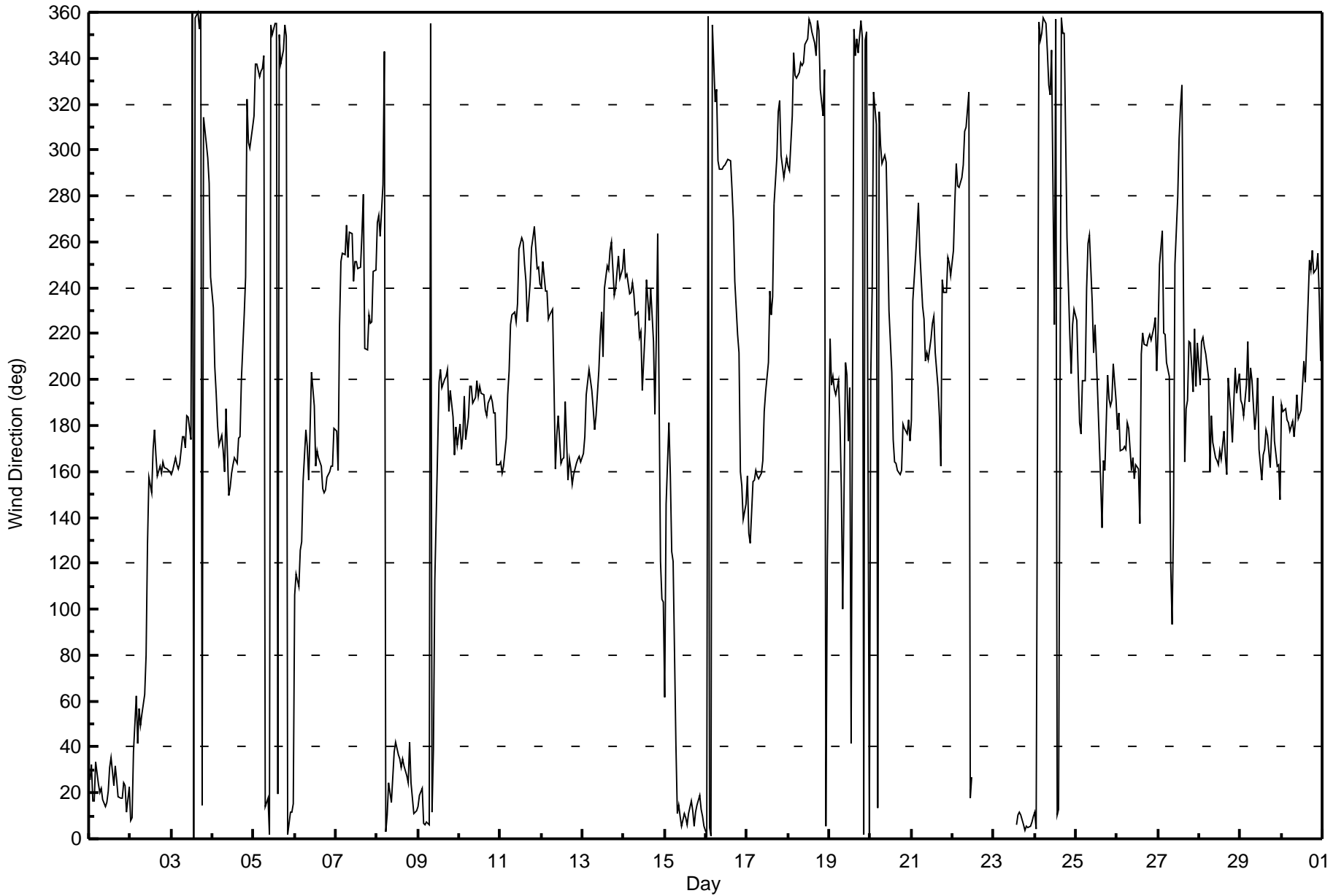
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Mildred Lake - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value:	91 deg on Nov 27 15:00		Hours of Data:	695
Minimum Value:	8 deg on Nov 19 19:00		Hours of Missing Data:	25
Percentiles:	P ₁ = 9 P ₁₀ = 12 Q ₁ = 13 Median = 17 Q ₃ = 22 P ₉₀ = 28 P ₉₉ = 78		Hours of Calibration:	0
			Percent Operational Time:	96.5

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	15	16	15	14	17	15	14	14	13	13	15	17	20	17	17	16	15	15	15	15	15	14	17	17	20
2-Nov	15	13	19	18	17	18	17	17	20	25	37	18	20	17	18	16	14	13	15	12	12	12	13	13	37
3-Nov	14	13	10	12	13	16	18	29	18	20	24	86	10	12	10	11	12	15	30	25	20	19	25	27	86
4-Nov	19	14	15	16	58	20	13	27	39	62	24	15	14	17	16	20	17	16	33	57	17	26	25	16	62
5-Nov	15	13	11	10	9	9	10	17	18	15	16	15	14	27	18	14	16	11	16	12	16	13	11	10	27
6-Nov	42	26	14	17	28	22	18	14	19	33	20	23	16	15	11	11	15	15	16	15	15	15	13	16	42
7-Nov	17	14	29	21	24	23	25	23	21	23	27	26	23	26	28	23	36	33	16	19	19	22	26	26	36
8-Nov	37	80	18	16	49	18	18	15	14	19	17	22	21	19	22	21	21	18	17	18	16	13	11	11	80
9-Nov	12	13	14	12	13	13	43	48	17	25	17	42	17	19	16	18	17	19	18	14	16	15	15	13	48
10-Nov	16	17	16	14	14	15	13	13	12	13	14	12	12	12	14	15	14	12	13	16	16	12	11	17	17
11-Nov	10	12	11	20	13	21	20	21	21	21	27	22	21	23	20	20	18	24	21	22	25	19	19	22	27
12-Nov	23	23	25	25	26	24	24	34	21	16	17	13	12	18	15	15	11	13	14	14	11	11	11	11	34
13-Nov	15	14	14	16	17	14	12	16	19	16	28	25	18	25	21	21	22	23	29	22	23	22	22	22	29
14-Nov	21	21	23	26	23	22	31	25	25	20	22	28	29	22	27	21	22	24	54	15	30	88	23	38	88
15-Nov	51	30	21	20	11	33	62	14	13	11	12	13	13	11	15	16	14	14	14	16	15	13	14	12	62
16-Nov	12	10	12	12	11	17	15	16	17	16	16	16	18	17	18	20	28	27	16	17	17	10	17	25	28
17-Nov	25	16	20	18	16	16	13	13	12	17	16	14	21	25	20	26	25	21	18	18	18	18	17	17	26
18-Nov	16	16	22	10	11	10	10	9	9	10	12	12	14	12	15	12	13	12	15	12	14	22	76	51	76
19-Nov	27	14	14	11	13	14	45	47	42	23	12	12	78	31	17	10	11	9	8	82	35	15	20	16	82
20-Nov	82	61	13	51	38	22	18	17	16	18	29	25	19	17	12	10	12	13	13	17	18	17	17	14	82
21-Nov	19	29	26	27	22	29	23	24	17	20	15	17	19	22	15	13	13	32	21	23	25	23	25	23	32
22-Nov	21	22	16	18	20	17	16	15	15	21	18	19	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	22
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	13	13	13	12	12	13	13	13	13	13	15	15
24-Nov	14	12	15	12	12	13	12	14	11	11	26	27	27	16	14	42	13	77	36	68	56	12	22	20	77
25-Nov	19	13	20	14	18	11	25	22	21	25	21	22	20	19	22	15	35	45	12	11	13	24	10	10	45
26-Nov	16	12	14	13	11	12	15	14	13	12	13	12	9	21	44	17	17	19	21	20	15	25	23	13	44
27-Nov	22	34	35	35	21	14	28	30	25	69	46	25	19	23	91	25	27	33	18	13	13	16	17	24	91
28-Nov	20	13	19	21	10	25	15	13	13	16	15	16	14	12	12	19	20	11	11	10	13	15	16	11	25
29-Nov	10	12	35	13	33	19	20	14	19	15	17	17	15	13	10	12	9	15	14	13	16	11	13	13	35
30-Nov	17	12	11	19	18	9	12	18	20	16	18	15	20	18	13	32	24	20	19	20	19	16	57	17	57
Diurnal Maximum																									
82 80 35 51 58 33 62 48 42 69 46 86 78 31 91 42 36 77 54 82 56 88 76 51																									

AF - Analyzer Failure





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 3, 2015	Last Calibration	October 13, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:04	End Time (MST)	11:48
Gas Cert Reference	SA1301009	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	787	789
Calculated slope	0.998929	0.996477	Chamber temp	44.9	44.9
Calculated intercept	2.148310	1.157659	Pressure	686.4	691.7
Analyzer Background	20.5	21.3	Flow	0.484	0.488
Analyzer Coefficient	0.965	0.980	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	0.5	----
as found span	5000	82.7	780.7	770.0	1.014
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.7	780.7	783.0	0.997
second point	5000	41.6	392.7	392.0	1.002
third point	5000	20.8	196.4	194.9	1.007
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	82.6	779.7	782.3	0.997
Average Correction Factor					1.002

Corrected As found 769.4 Previous response 779.4 % change 1.3%

Notes:

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

Calibration Performed By: Evan Magill



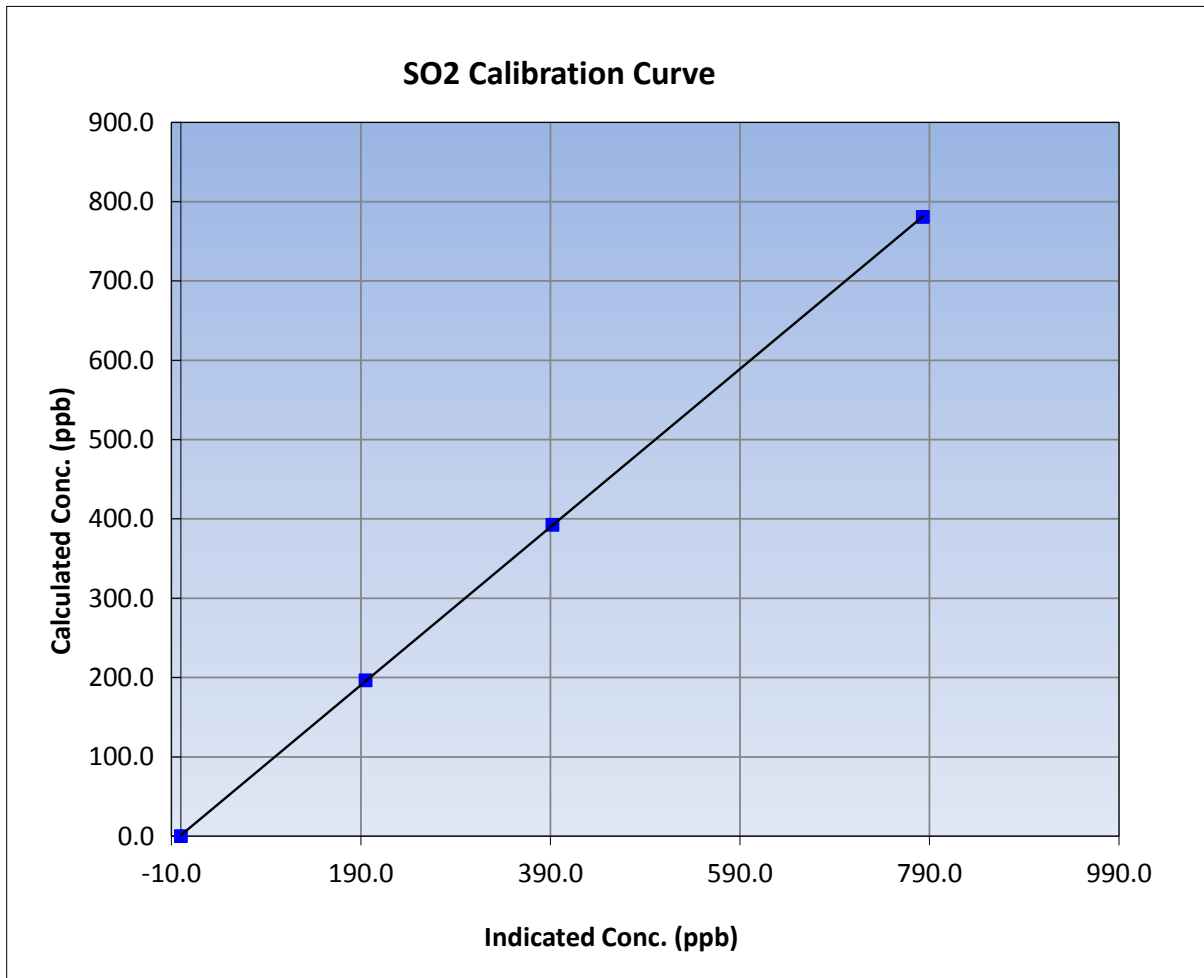
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 3, 2015	Previous Calibration	October 13, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:04	End Time (MST)	11:48
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

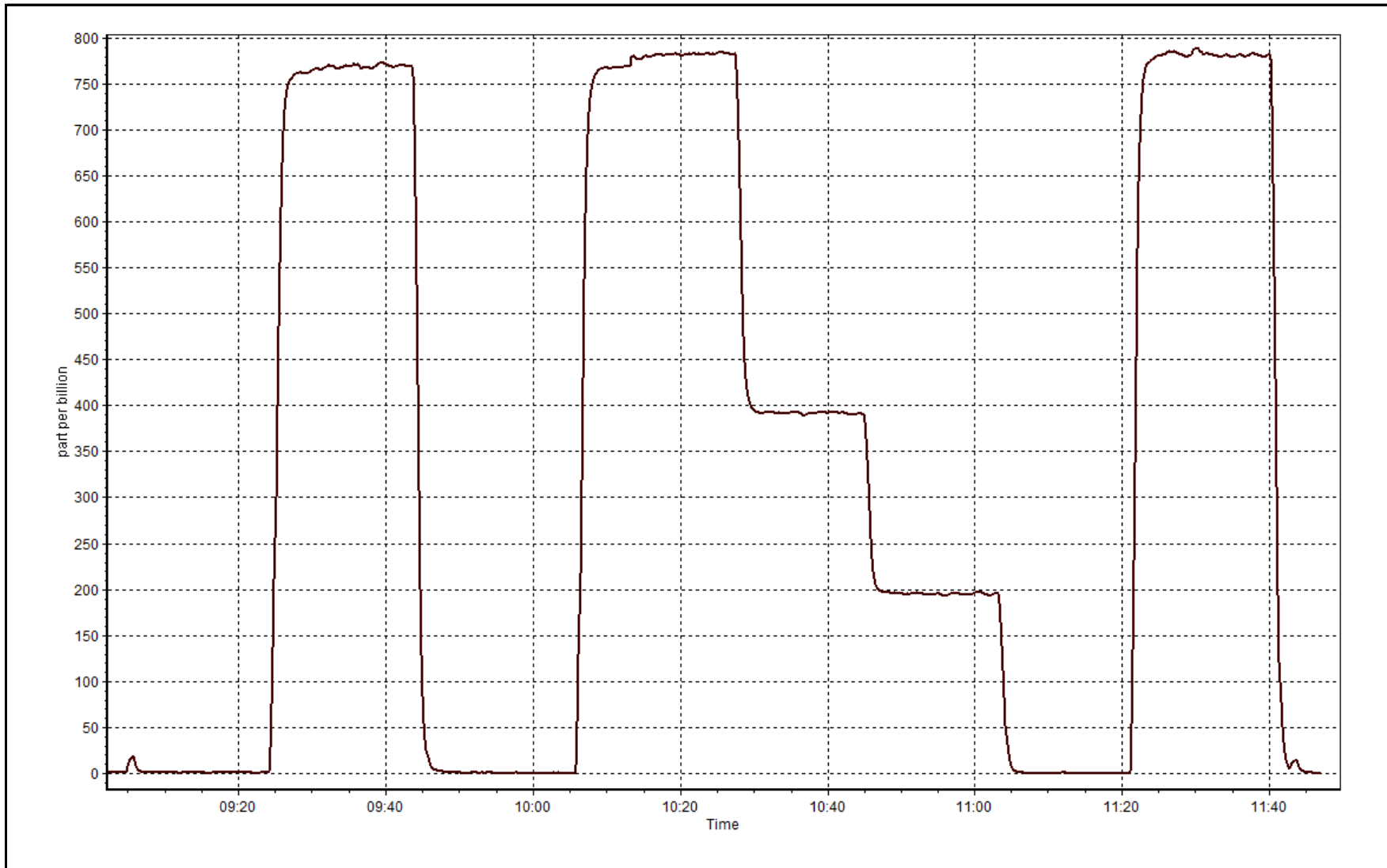
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999989
780.7	783.0	0.9970		
392.7	392.0	1.0018	Slope	0.996477
196.4	194.9	1.0074		
			Intercept	1.157659



SO2 Calibration Plot

Date: November 3, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 3, 2015	Last Calibration	October 14, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	11:50	End Time (MST)	14:22
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	778	784
Calculated slope	0.991643	1.011366	Chamber temp	45	45
Calculated intercept	0.362778	-0.028384	Pressure	594.1	607.2
Analyzer Background	14.2	14	Flow	0.775	0.725
Analyzer Coefficient	0.955	0.955	Intensity	88	87
			Converter temp.	323	328

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	4000	0.0	0.0	0.0	----
as found span	4000	64.1	80.8	79.9	1.011
SO2 scrubber check	5000	21.2	200.1	1.2	----
calibrator zero	4000	0.0	0.0	0.0	----
high point	4000	64.1	80.8	79.9	1.011
second point	4000	32.1	40.4	40.1	1.009
third point	4000	16.1	20.3	20.0	1.013
as left zero	5000	0.0	0.0	0.0	----
as left span	4000	64.1	80.8	80.4	1.005
Average Correction Factor					1.011

Corrected As found	79.8	Previous response	81.1	% change	1.6%
--------------------	------	-------------------	------	----------	------

Notes:

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By: Evan Magill



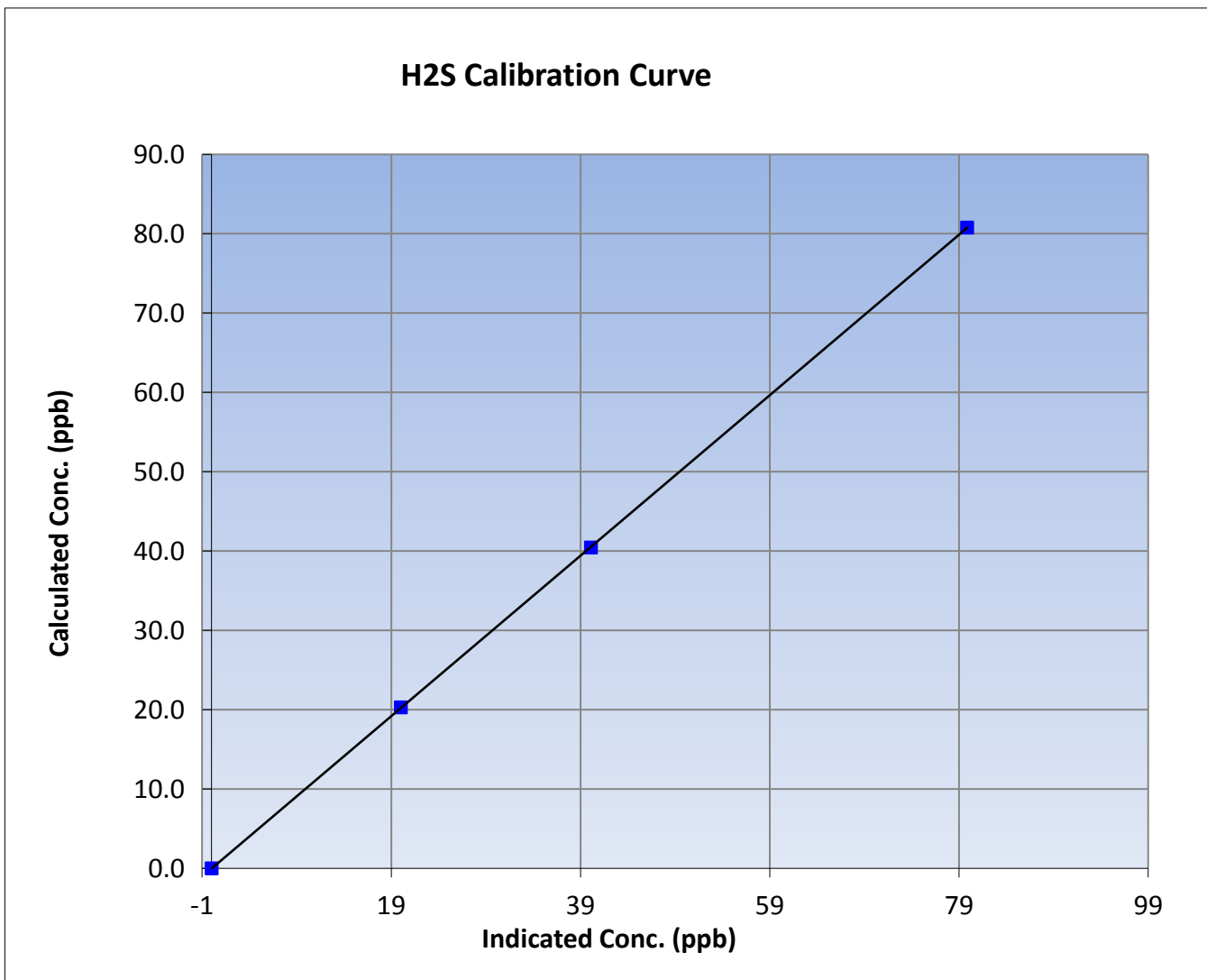
Wood Buffalo Environmental Association H2S Calibration Report

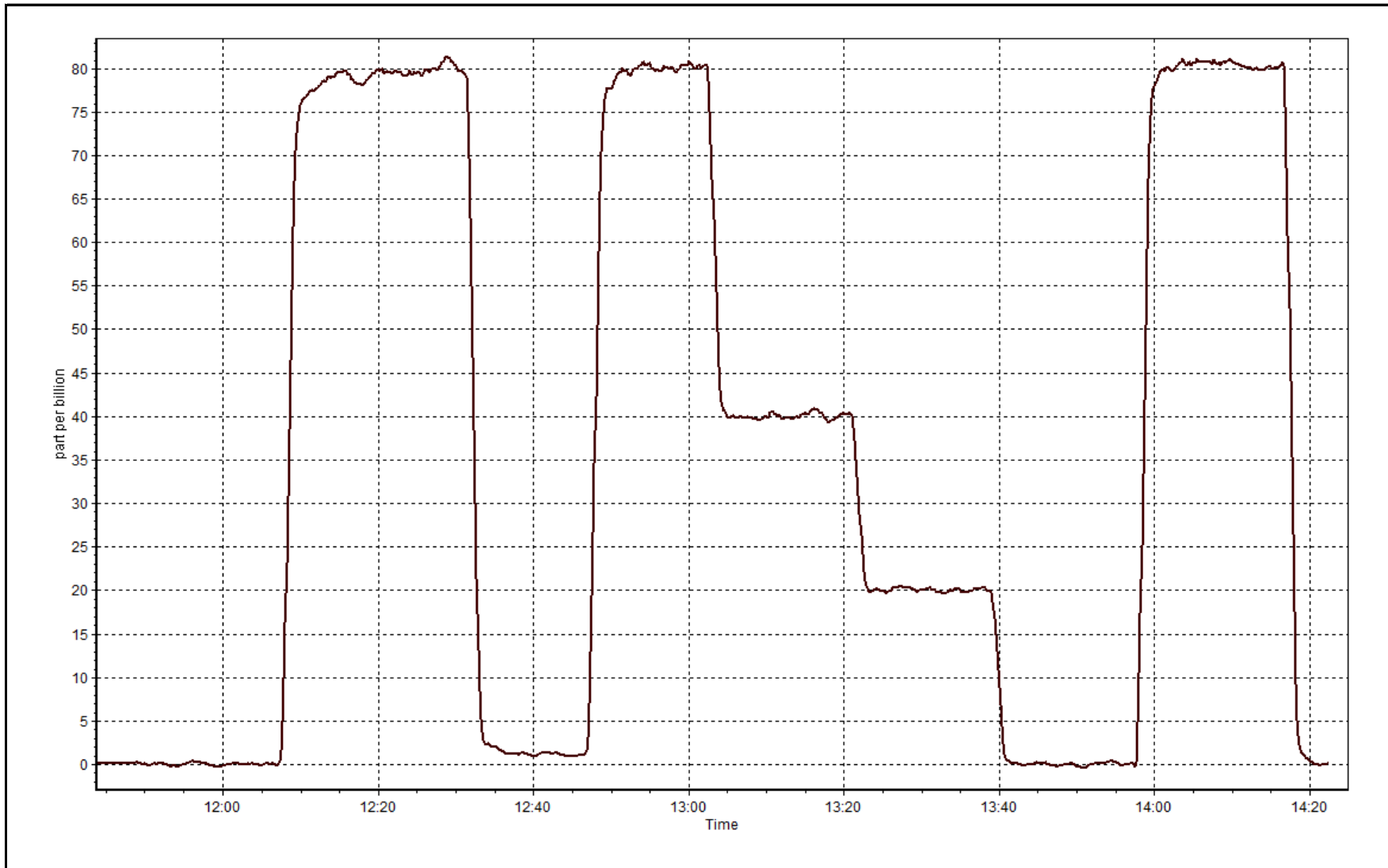
Station Information

Calibration Date	November 3, 2015	Previous Calibration	October 14, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	11:50	End Time (MST)	14:22
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	0.999997
80.8	79.9	1.0113		
40.4	40.1	1.0086	Slope	1.011366
20.3	20.0	1.0128		
			Intercept	-0.028384







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-03-15	Last Calibration	October-13-15
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:04	End Time (MST)	11:48
Gas Cert Reference	SA1301009	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1087.5 ppm
C3H8 Cal Gas Conc.	210 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.8	39.8
Calculated slope	0.997381	1.000708	Fuel Pressure	25.7	25.6
Calculated intercept	0.007107	0.001730	Analyzer Coeff	4.7	4.6
			Analyzer BKG	2.440	2.100

Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231
---------------	---------------	-------------------	------------

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.29	----
as found span	5000	82.7	17.99	18.18	0.989
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	82.7	17.99	17.99	1.000
second point	5000	41.6	9.05	9.01	1.004
third point	5000	20.8	4.52	4.51	1.003
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	82.6	17.97	17.81	1.009
Average Correction Factor					1.002

Corrected As found	18.47	Previous response	18.03	% change	-2.4%
--------------------	-------	-------------------	-------	----------	-------

Notes:

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

Calibration Performed By:

_____ Evan Magill



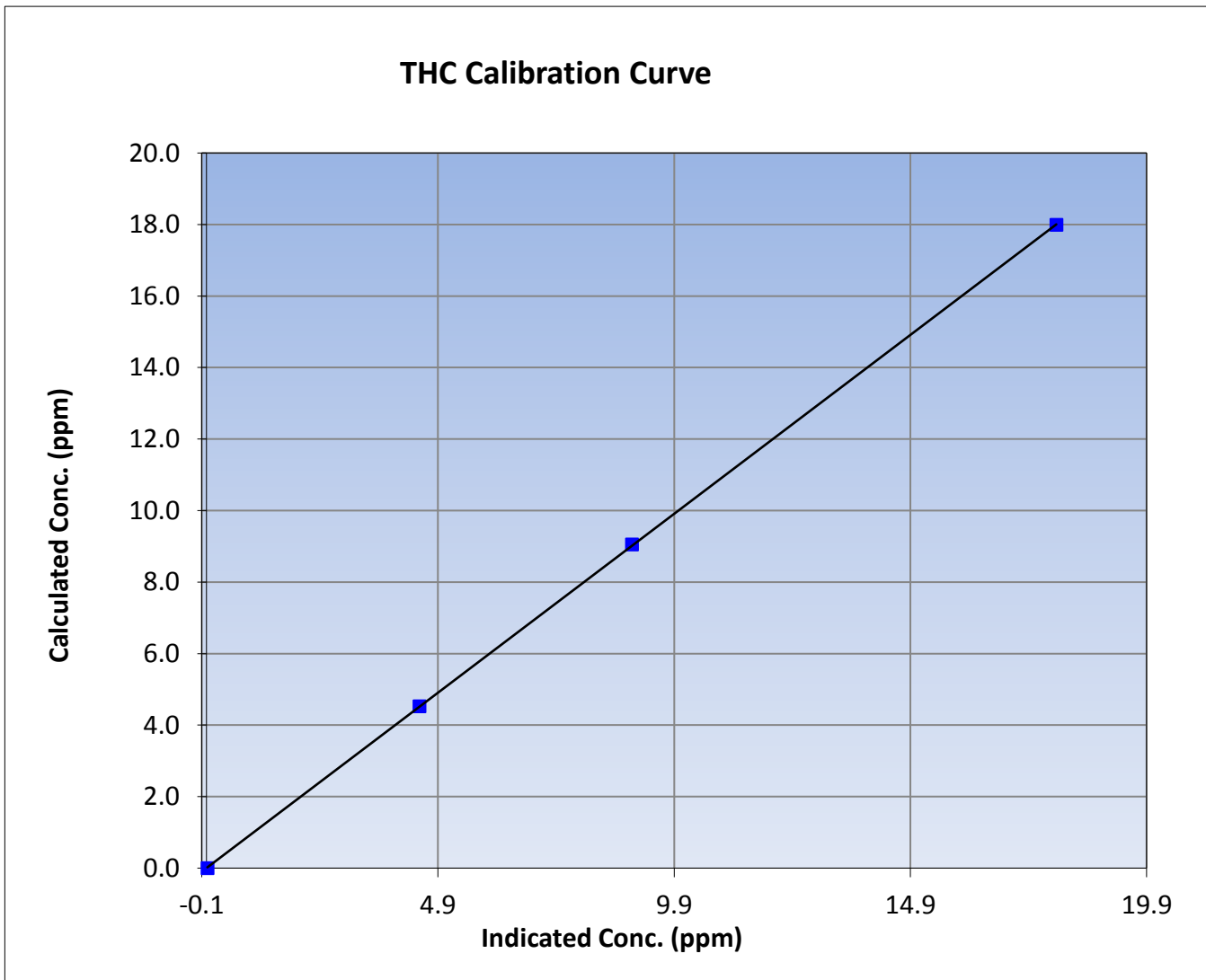
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November 3, 2015	Previous Calibration	October 13, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:04	End Time (MST)	11:48
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

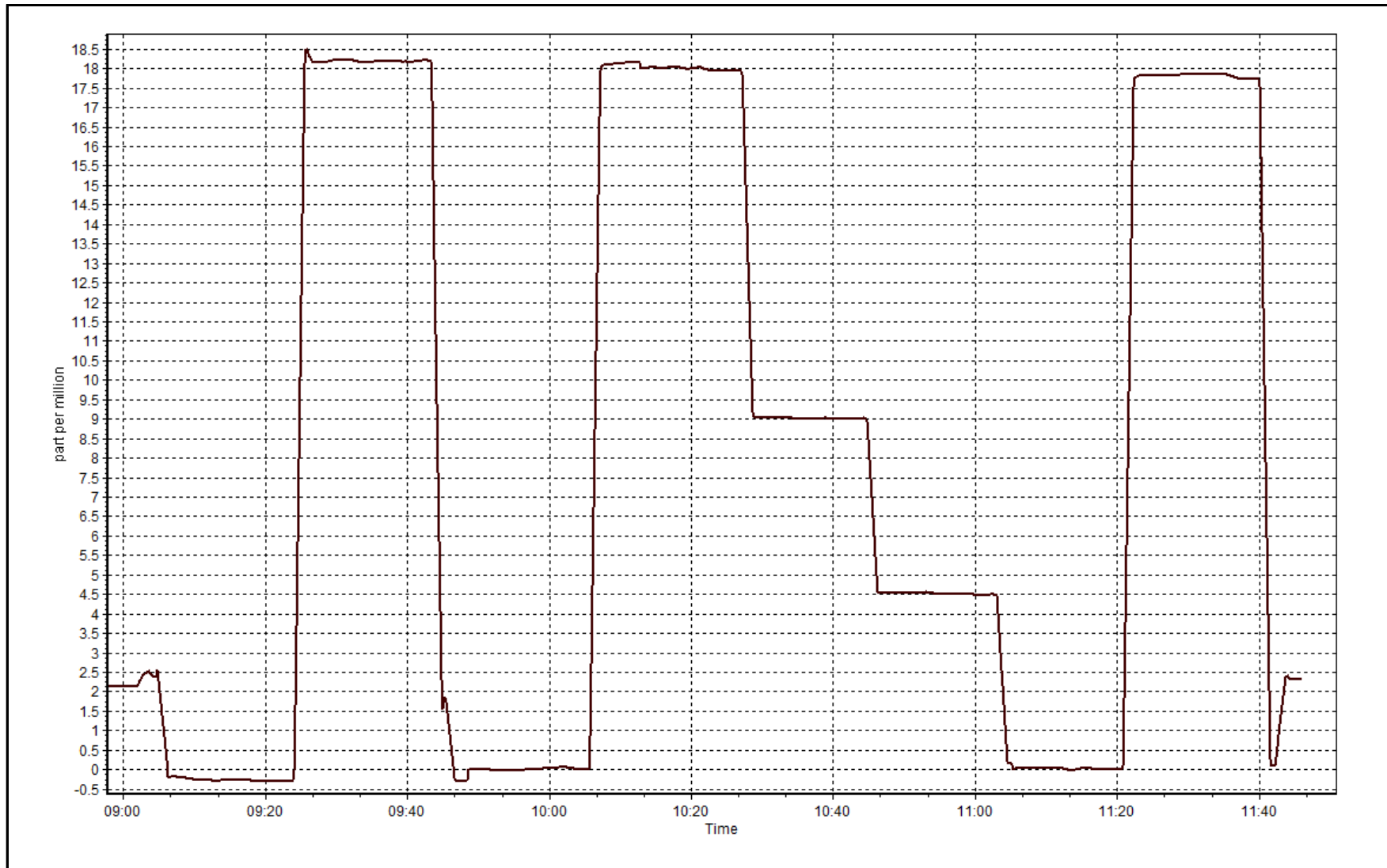
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999990
17.99	17.99	0.9998		
9.05	9.01	1.0042	Slope	1.000708
4.52	4.51	1.0031		
			Intercept	0.001730



THC Calibration Plot

Date: November 3, 2015





This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3 LOWER CAMP METEOROLOGY NOVEMBER 2015

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

December 22, 2015



This page intentionally left blank

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	720	0	0	100.00	8.5	-	4.1	-
Temperature 45 m (C) Average	720	0	0	100.00	8.4	-	4.2	-
Temperature 100 m (C) Average	720	0	0	100.00	8.1	-	4.3	-
Temperature 167 m (C) Average	720	0	0	100.00	7.5	-	4.4	-
Relative Humidity 20 m (%) Average	720	0	0	100.00	97	-	91.0	-
Relative Humidity 45 m (%) Average	720	0	0	100.00	96	-	89.0	-
Relative Humidity 100 m (%) Average	720	0	0	100.00	98	-	90.0	-
Relative Humidity 167 m (%) Average	720	0	0	100.00	98	-	92.0	-
Wind Speed 20 m (km/h) Average	715	0	5	99.31	28	-	16.0	-
Wind Speed 45 m (km/h) Average	717	0	3	99.58	35	-	20.0	-
Wind Speed 100 m (km/h) Average	682	0	38	94.72	44	-	29.0	-
Wind Speed 167 m (km/h) Average	720	0	0	100.00	45	-	33.0	-
Wind Direction 20 m (deg) Average	715	0	5	99.31	-	-	-	-
Wind Direction 45 m (deg) Average	717	0	3	99.58	-	-	-	-
Wind Direction 100 m (deg) Average	682	0	38	94.72	-	-	-	-
Wind Direction 167 m (deg) Average	720	0	0	100.00	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	715	0	5	99.31	0.6	-	0.2	-
Vertical Wind Speed 45 m (km/h) Average	717	0	3	99.58	2.1	-	1.4	-
Vertical Wind Speed 100 m (km/h) Average	682	0	38	94.72	6.4	-	1.3	-
Vertical Wind Speed 167 m (km/h) Average	720	0	0	100.00	4.3	-	1.8	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	720	-3.78	5.6	-	-16.8	-12.6	-7.4	-3.2	0.4	2.9	8.5
Temperature 45 m (C) Average	720	-3.62	5.6	-	-16.8	-12.2	-7.1	-2.9	0.4	3	8.4
Temperature 100 m (C) Average	720	-3.03	5.4	-	-16.5	-12.3	-5.6	-2	0.6	3.1	8.1
Temperature 167 m (C) Average	720	-2.94	5.4	-	-16.6	-12	-5.5	-1.8	0.9	3.2	7.5
Relative Humidity 20 m (%) Average	720	75.8	12	-	41	57	70	77	85	90	97
Relative Humidity 45 m (%) Average	720	73.9	13	-	40	54	67	75	84	89	96
Relative Humidity 100 m (%) Average	720	71.3	16	-	28	47	57	74	84	90	98
Relative Humidity 167 m (%) Average	720	70.2	18	-	25	43	55	74	84	91	98
Wind Speed 20 m (km/h) Average	715	9.6	6	-	0	3	5	9	14	17	28
Wind Speed 45 m (km/h) Average	717	12.3	7	-	0	3	7	12	17	21	35
Wind Speed 100 m (km/h) Average	682	15.8	9	-	1	6	9	14	22	28	44
Wind Speed 167 m (km/h) Average	720	19.2	9	-	1	8	13	17	25	34	45
Wind Direction 20 m (deg) Average	715	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	682	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	715	-0.03	0.2	-	-0.8	-0.3	-0.1	0	0.1	0.2	0.6
Vertical Wind Speed 45 m (km/h) Average	717	0.24	0.6	-	-1.5	-0.4	-0.2	0.1	0.7	1.2	2.1
Vertical Wind Speed 100 m (km/h) Average	682	0.4	0.9	-	-2.7	-0.3	-0.1	0.2	0.6	1.2	6.4
Vertical Wind Speed 167 m (km/h) Average	720	0.75	0.9	-	-1.8	-0.1	0.1	0.6	1.2	1.9	4.3

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	03 Nov 2015 16:00	03 Nov 2015 17:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	19 Nov 2015 20:00	19 Nov 2015 22:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	21 Nov 2015 03:00	21 Nov 2015 04:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	22 Nov 2015 14:00	22 Nov 2015 14:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	22 Nov 2015 12:00	23 Nov 2015 07:00	20	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	23 Nov 2015 11:00	23 Nov 2015 15:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	23 Nov 2015 20:00	23 Nov 2015 20:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	23 Nov 2015 23:00	24 Nov 2015 10:00	12	Flat line in sensor output signal - Sensor frozen

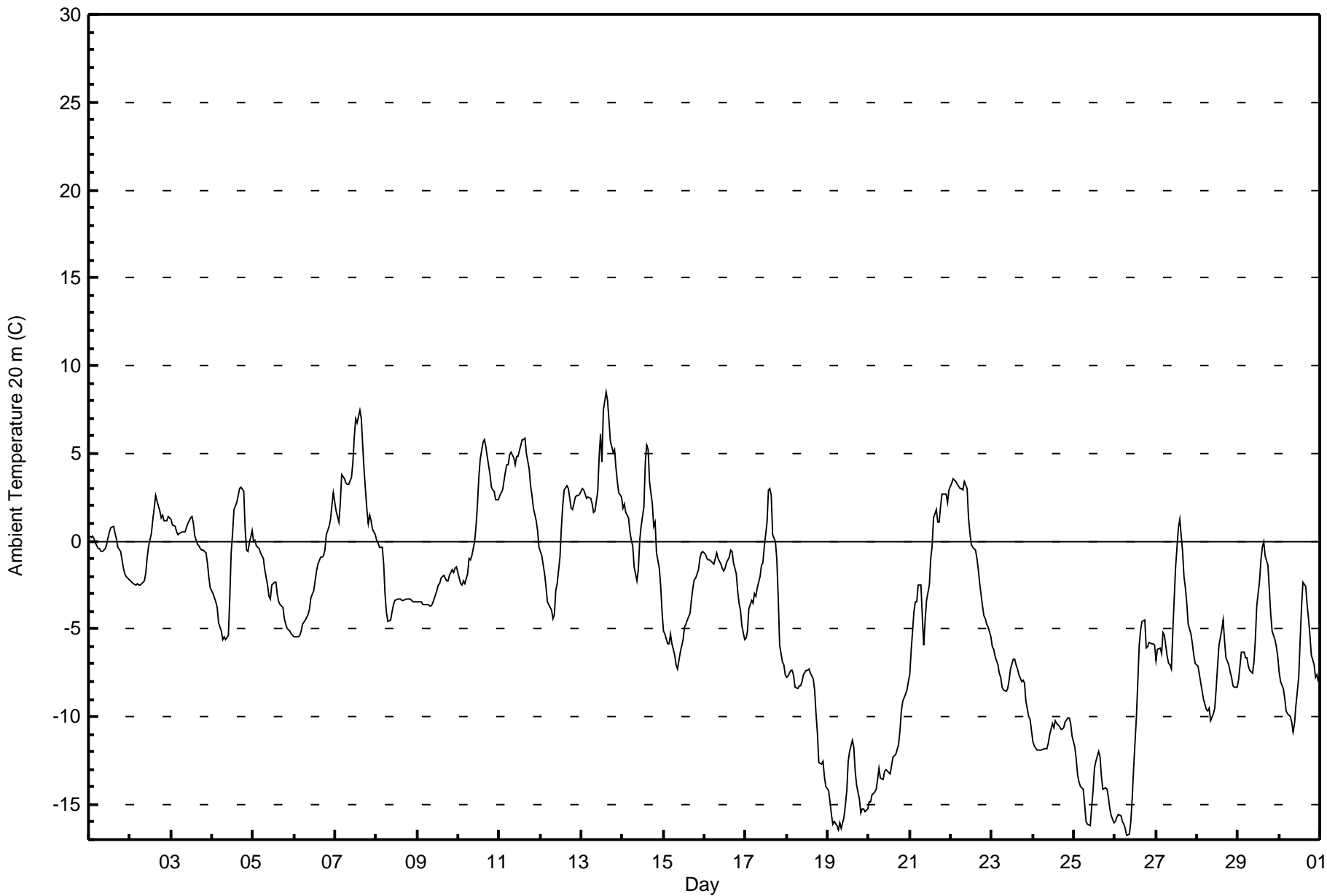


Maximum Value: 8.5 C on Nov 13 15:00 Maximum Daily Average: 4.1 C on Nov 13																				Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: -16.8 C on Nov 26 08:00 Minimum Daily Average: -14.7 C on Nov 19 Maximum Diurnal Average: -1.4 C at hour 15 Minimum Diurnal Average: -5.3 C at hour 9 Monthly Average: -3.78 C Percentiles: P ₁ = -16.1 P ₁₀ = -12.6 O ₁ = -7.4 Median = -3.2 O ₃ = 0.4 P ₉₀ = 2.9 P ₉₉ = 6.8																											
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-Nov	0.3	0.2	0.3	0.2	-0.1	-0.4	-0.5	-0.6	-0.6	-0.4	-0.2	0.2	0.6	0.8	0.8	0.5	0.1	-0.3	-0.6	-1.0	-1.6	-1.9	-2.0	-2.1	-0.3	0.8	
2-Nov	-2.3	-2.4	-2.5	-2.5	-2.5	-2.5	-2.5	-2.4	-2.2	-1.8	-0.9	-0.2	0.4	1.3	1.9	2.6	2.3	1.7	1.4	1.4	1.2	1.2	1.4	1.4	-0.3	2.6	
3-Nov	1.2	0.9	0.9	0.5	0.3	0.5	0.5	0.6	0.5	0.7	1.0	1.4	1.4	1.0	0.3	-0.2	-0.3	-0.4	-0.5	-0.5	-0.7	-1.2	-2.0	-2.7	0.1	1.4	
4-Nov	-2.9	-3.2	-3.5	-3.8	-4.6	-5.1	-5.6	-5.5	-5.6	-5.4	-3.2	-0.7	0.4	1.8	2.2	2.6	3.0	3.1	2.8	0.7	-0.5	-0.6	-0.1	0.6	-1.4	3.1	
5-Nov	0.0	0.0	-0.3	-0.4	-0.7	-0.9	-1.0	-1.6	-2.5	-3.2	-3.3	-2.5	-2.3	-2.3	-3.0	-3.4	-3.6	-3.8	-4.4	-4.7	-4.9	-5.1	-5.3	-5.3	-2.7	0.0	
6-Nov	-5.5	-5.4	-5.4	-5.4	-5.1	-4.7	-4.5	-4.3	-4.2	-3.8	-3.2	-2.8	-2.2	-1.7	-1.3	-0.9	-0.9	-0.8	-0.5	0.3	0.8	1.3	2.1	2.8	-2.3	2.8	
7-Nov	1.7	1.4	1.1	2.2	3.8	3.6	3.3	3.2	3.3	3.6	4.5	6.0	7.0	6.7	7.5	7.0	5.4	4.0	1.8	1.0	1.5	1.2	0.7	0.4	3.4	7.5	
8-Nov	0.0	-0.1	-0.3	-0.3	-1.3	-3.1	-4.1	-4.5	-4.5	-4.0	-3.6	-3.4	-3.3	-3.3	-3.3	-3.3	-3.3	-3.3	-3.3	-3.3	-3.3	-3.4	-3.4	-3.5	-2.9	0.0	
9-Nov	-3.5	-3.4	-3.5	-3.6	-3.6	-3.6	-3.6	-3.7	-3.7	-3.6	-3.3	-2.8	-2.5	-2.4	-2.1	-1.9	-2.1	-2.3	-2.3	-2.0	-1.6	-1.8	-1.6	-1.5	-2.7	-1.5	
10-Nov	-2.1	-2.4	-2.5	-2.3	-2.4	-1.8	-1.0	-1.1	-0.9	0.0	0.8	2.0	3.6	4.7	5.6	5.8	5.4	4.8	3.8	3.1	2.9	2.8	2.3	2.3	1.4	5.8	
11-Nov	2.6	2.8	2.9	4.0	4.3	4.3	4.9	5.1	4.7	4.3	4.8	4.8	5.5	5.8	5.8	5.9	5.0	4.1	3.2	2.6	1.9	1.2	0.6	-0.3	3.8	5.9	
12-Nov	-0.6	-0.8	-1.8	-2.6	-3.4	-3.6	-3.9	-4.4	-4.2	-2.8	-2.4	-0.9	0.7	2.0	2.9	3.2	3.0	2.4	1.9	1.8	2.5	2.6	2.6	2.7	-0.1	3.2	
13-Nov	3.0	2.9	2.7	2.5	2.5	2.4	2.1	1.7	1.7	2.8	4.8	6.1	4.5	7.4	8.5	8.0	6.9	5.7	5.1	5.2	4.2	3.4	2.8	2.5	4.1	8.5	
14-Nov	1.9	2.1	1.7	1.3	0.6	0.1	-0.3	-1.4	-2.3	-1.6	0.1	0.9	1.9	4.5	5.5	5.2	3.4	2.1	0.8	1.1	-0.7	-1.5	-2.5	-4.1	0.8	5.5	
15-Nov	-5.1	-5.3	-5.9	-5.9	-5.3	-5.8	-6.5	-7.0	-7.3	-6.8	-6.3	-5.6	-4.9	-4.7	-4.5	-4.1	-3.3	-2.6	-2.2	-2.1	-1.6	-1.0	-0.6	-0.6	-4.4	-0.6	
16-Nov	-0.8	-1.0	-1.1	-1.0	-1.2	-1.3	-1.0	-0.7	-1.0	-1.3	-1.5	-1.7	-1.6	-1.3	-0.9	-0.5	-0.6	-1.2	-1.9	-2.9	-3.6	-3.9	-4.8	-5.6	-1.8	-0.5	
17-Nov	-5.5	-5.1	-3.8	-3.4	-3.5	-3.0	-3.2	-2.7	-2.1	-1.4	-1.2	-0.3	1.0	2.9	3.0	2.6	0.4	-0.1	-1.1	-3.2	-5.9	-6.9	-7.0	-7.6	-2.4	3.0	
18-Nov	-7.7	-7.6	-7.4	-7.3	-7.7	-8.3	-8.4	-8.2	-8.2	-8.0	-7.6	-7.4	-7.4	-7.3	-7.5	-7.8	-8.5	-9.8	-11.0	-12.6	-12.7	-12.6	-13.4	-14.0	-9.1	-7.3	
19-Nov	-14.2	-14.9	-15.5	-16.1	-16.0	-16.2	-16.4	-16.1	-16.3	-15.7	-15.0	-14.2	-12.5	-12.0	-11.3	-11.7	-13.1	-13.9	-14.7	-15.5	-15.2	-15.3	-15.4	-15.2	-14.7	-11.3	
20-Nov	-14.8	-14.9	-14.5	-14.3	-14.1	-13.6	-13.0	-13.5	-13.5	-13.1	-13.0	-13.1	-13.3	-12.8	-12.3	-12.2	-12.2	-11.5	-10.8	-9.7	-9.1	-8.7	-8.5	-8.0	-12.3	-8.0	
21-Nov	-7.6	-6.2	-4.0	-3.4	-3.4	-2.5	-2.5	-4.4	-5.9	-4.5	-3.4	-2.5	-1.0	-0.2	1.3	1.8	1.1	1.1	2.0	2.7	2.7	2.7	2.2	2.9	-1.3	2.9	
22-Nov	3.3	3.6	3.4	3.4	3.2	3.0	3.0	2.9	3.4	3.0	1.3	0.5	-0.2	-0.4	-0.5	-1.0	-1.6	-2.4	-3.7	-4.3	-4.5	-4.7	-4.9	-5.4	0.0	3.6	
23-Nov	-6.0	-6.1	-6.5	-7.1	-7.5	-7.8	-8.3	-8.4	-8.5	-8.4	-7.9	-7.3	-6.8	-6.7	-7.0	-7.3	-7.6	-8.0	-7.9	-8.1	-9.1	-10.0	-10.2	-10.8	-7.9	-6.0	
24-Nov	-11.4	-11.7	-11.9	-11.9	-11.9	-11.8	-11.8	-11.8	-11.5	-11.0	-10.4	-10.6	-10.3	-10.4	-10.6	-10.7	-10.7	-10.6	-10.7	-10.6	-10.3	-10.0	-10.1	-10.4	-11.1	-11.0	-10.0
25-Nov	-11.7	-12.5	-13.3	-13.7	-13.9	-14.1	-15.0	-15.9	-16.1	-16.2	-15.2	-14.2	-13.0	-12.5	-12.0	-12.3	-13.4	-14.1	-14.1	-14.2	-14.6	-15.3	-15.6	-16.0	-14.1	-11.7	
26-Nov	-15.9	-15.8	-15.6	-15.7	-16.0	-16.1	-16.4	-16.8	-16.7	-16.0	-14.6	-12.9	-10.0	-8.0	-5.9	-5.0	-4.6	-4.5	-6.1	-6.0	-5.8	-5.8	-5.9	-5.9	-10.9	-4.5	
27-Nov	-6.8	-6.2	-6.1	-6.4	-5.2	-5.4	-6.6	-7.0	-7.1	-7.2	-5.1	-1.5	-0.4	0.7	1.2	-0.6	-2.0	-2.6	-3.5	-4.7	-5.3	-5.9	-6.5	-6.9	-4.5	1.2	
28-Nov	-7.1	-7.6	-8.1	-8.5	-9.0	-9.6	-9.6	-9.5	-10.2	-9.8	-9.5	-8.4	-7.1	-5.9	-5.0	-4.5	-5.7	-6.6	-7.1	-7.4	-7.7	-8.2	-8.4	-8.3	-7.9	-4.5	
29-Nov	-7.9	-7.1	-6.3	-6.3	-6.6	-6.7	-7.1	-7.4	-7.5	-6.9	-5.6	-3.7	-2.3	-1.1	-0.4	-0.1	-0.8	-1.4	-2.8	-4.2	-5.2	-5.6	-6.0	-6.6	-4.8	-0.1	
30-Nov	-7.4	-8.0	-8.4	-8.9	-9.7	-9.8	-10.0	-10.3	-10.9	-10.4	-9.4	-7.8	-5.7	-3.7	-2.3	-2.6	-3.6	-4.4	-5.4	-6.5	-7.0	-7.7	-7.6	-8.0	-7.3	-2.3	
																								Diurnal Average			
																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

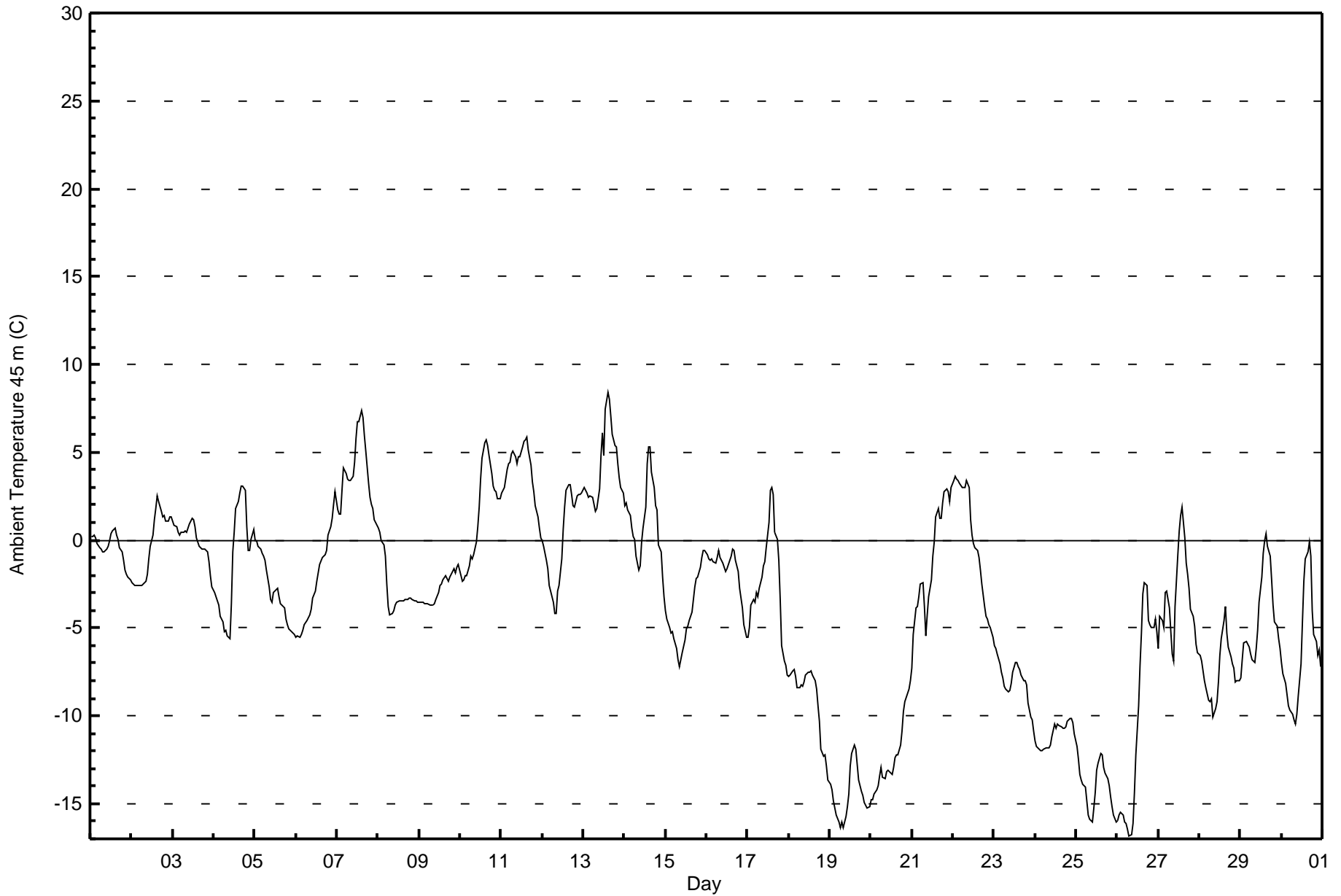
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	525	72.92	72.92
0 - 10	195	27.08	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 8.4 C on Nov 13 15:00 Maximum Daily Average: 4.2 C on Nov 13																				Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: -16.8 C on Nov 26 08:00 Minimum Daily Average: -14.5 C on Nov 19 Maximum Diurnal Average: -1.3 C at hour 16 Minimum Diurnal Average: -5.2 C at hour 9 Monthly Average: -3.62 C Percentiles: P ₁ = -16.1 P ₁₀ = -12.2 Q ₁ = -7.1 Median = -2.9 Q ₃ = 0.4 P ₉₀ = 3.0 P ₉₉ = 6.5																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0.2	0.2	0.3	0.1	-0.2	-0.5	-0.5	-0.6	-0.7	-0.5	-0.3	0.0	0.3	0.6	0.7	0.3	0.0	-0.4	-0.6	-1.2	-1.7	-2.0	-2.1	-2.3	-0.5	0.7	
2-Nov	-2.4	-2.5	-2.6	-2.6	-2.6	-2.6	-2.6	-2.5	-2.3	-1.9	-1.0	-0.4	0.3	1.1	1.8	2.5	2.2	1.7	1.3	1.4	1.1	1.1	1.3	1.3	-0.4	2.5	
3-Nov	1.1	0.8	0.8	0.4	0.3	0.4	0.4	0.5	0.5	0.7	0.9	1.2	1.2	0.8	0.1	-0.3	-0.4	-0.5	-0.5	-0.5	-0.6	-1.2	-2.0	-2.7	0.1	1.2	
4-Nov	-3.0	-3.2	-3.4	-3.7	-4.3	-4.7	-5.2	-5.1	-5.4	-5.6	-3.6	-0.7	0.4	1.8	2.2	2.7	3.1	3.1	2.8	0.8	-0.6	-0.6	0.1	0.6	-1.3	3.1	
5-Nov	0.0	0.0	-0.3	-0.5	-0.8	-0.9	-1.1	-1.7	-2.7	-3.4	-3.6	-3.0	-2.8	-2.8	-3.2	-3.6	-3.7	-3.8	-4.5	-4.8	-5.0	-5.2	-5.3	-5.4	-2.8	0.0	
6-Nov	-5.5	-5.5	-5.5	-5.4	-5.2	-4.8	-4.6	-4.4	-4.2	-3.9	-3.3	-2.9	-2.4	-1.9	-1.4	-1.0	-0.9	-0.9	-0.6	0.3	0.8	1.2	2.1	2.7	-2.4	2.7	
7-Nov	1.8	1.5	1.4	2.9	4.1	3.8	3.5	3.4	3.4	3.6	4.4	5.7	6.7	6.7	7.3	7.0	5.9	5.1	3.2	2.4	2.0	1.8	1.2	0.8	3.7	7.3	
8-Nov	0.7	0.4	-0.1	-0.2	-0.9	-2.5	-3.8	-4.2	-4.2	-4.0	-3.7	-3.5	-3.5	-3.4	-3.5	-3.4	-3.4	-3.4	-3.3	-3.3	-3.4	-3.5	-3.5	-3.5	-2.8	0.7	
9-Nov	-3.5	-3.5	-3.6	-3.6	-3.6	-3.6	-3.7	-3.7	-3.7	-3.7	-3.6	-3.4	-2.9	-2.6	-2.5	-2.2	-2.0	-2.2	-2.3	-2.1	-2.0	-1.7	-1.8	-1.5	-1.4	-2.8	-1.4
10-Nov	-2.0	-2.3	-2.3	-2.0	-2.0	-1.5	-0.9	-1.1	-0.8	-0.1	0.7	1.9	3.5	4.6	5.6	5.7	5.4	4.8	3.8	3.1	2.8	2.8	2.4	2.3	1.4	5.7	
11-Nov	2.7	2.8	3.0	4.0	4.3	4.4	4.9	5.1	4.7	4.4	4.7	4.8	5.3	5.6	5.7	5.9	5.1	4.3	3.3	2.8	2.0	1.3	0.7	0.1	3.8	5.9	
12-Nov	0.0	-0.4	-1.2	-1.6	-2.5	-2.9	-3.5	-4.2	-4.2	-2.9	-2.6	-1.1	0.6	1.9	2.9	3.2	3.1	2.6	1.9	1.9	2.5	2.6	2.6	2.7	0.1	3.2	
13-Nov	3.0	2.9	2.7	2.5	2.5	2.4	2.1	1.7	1.8	2.9	4.8	6.1	4.8	7.5	8.4	8.0	7.0	6.1	5.4	5.3	4.3	3.6	3.0	2.7	4.2	8.4	
14-Nov	2.0	2.1	1.7	1.4	0.7	0.2	0.1	-0.9	-1.7	-1.4	-0.1	0.7	1.9	4.3	5.3	5.3	3.9	3.0	2.0	1.8	-0.3	-0.7	-2.1	-3.3	1.1	5.3	
15-Nov	-4.0	-4.5	-5.0	-5.3	-5.2	-5.6	-6.1	-6.8	-7.2	-6.8	-6.4	-5.7	-5.1	-4.9	-4.6	-4.1	-3.3	-2.7	-2.2	-2.1	-1.6	-1.0	-0.6	-0.6	-4.2	-0.6	
16-Nov	-0.8	-1.0	-1.2	-1.1	-1.2	-1.3	-1.0	-0.6	-1.0	-1.3	-1.6	-1.8	-1.7	-1.3	-0.9	-0.5	-0.6	-1.2	-1.8	-2.8	-3.3	-3.8	-4.8	-5.5	-1.8	-0.5	
17-Nov	-5.5	-4.9	-3.7	-3.4	-3.5	-3.0	-3.2	-2.7	-2.1	-1.4	-1.2	-0.4	1.0	2.9	3.0	2.6	0.4	0.0	-1.2	-3.4	-6.0	-6.9	-7.1	-7.7	-2.4	3.0	
18-Nov	-7.8	-7.7	-7.4	-7.4	-7.8	-8.4	-8.4	-8.3	-8.3	-8.0	-7.7	-7.5	-7.5	-7.5	-7.7	-8.0	-8.4	-9.4	-10.3	-11.9	-12.3	-12.2	-12.9	-13.6	-9.0	-7.4	
19-Nov	-13.9	-14.2	-14.9	-15.3	-15.7	-16.0	-16.4	-16.1	-16.4	-15.7	-15.2	-14.4	-12.8	-12.1	-11.7	-11.9	-12.8	-13.6	-14.3	-14.5	-14.9	-15.1	-15.3	-15.2	-14.5	-11.7	
20-Nov	-14.8	-14.8	-14.4	-14.2	-14.0	-13.4	-12.9	-13.5	-13.6	-13.2	-13.1	-13.2	-13.4	-12.9	-12.4	-12.2	-12.2	-11.6	-10.9	-9.7	-9.2	-8.7	-8.5	-8.0	-12.3	-8.0	
21-Nov	-7.3	-5.4	-3.9	-3.8	-3.2	-2.5	-2.4	-3.8	-5.5	-4.2	-3.2	-2.3	-0.9	-0.1	1.3	1.8	1.2	1.2	2.1	2.7	2.9	2.7	2.2	3.0	-1.1	3.0	
22-Nov	3.4	3.7	3.5	3.4	3.3	3.0	3.0	3.0	3.4	3.0	1.2	0.3	-0.2	-0.4	-0.6	-1.0	-1.7	-2.5	-3.8	-4.4	-4.5	-4.8	-5.0	-5.5	0.0	3.7	
23-Nov	-6.0	-6.2	-6.5	-7.1	-7.6	-7.8	-8.3	-8.5	-8.6	-8.5	-8.2	-7.5	-7.0	-7.0	-7.2	-7.4	-7.7	-8.0	-8.0	-8.2	-9.2	-10.1	-10.2	-10.9	-8.0	-6.0	
24-Nov	-11.5	-11.7	-11.9	-12.0	-12.0	-11.9	-11.9	-11.8	-11.8	-11.6	-11.2	-10.5	-10.7	-10.4	-10.5	-10.7	-10.7	-10.7	-10.7	-10.6	-10.3	-10.1	-10.1	-10.4	-11.0	-11.1	-10.1
25-Nov	-11.7	-12.4	-13.3	-13.7	-13.9	-14.1	-14.8	-15.7	-15.9	-16.1	-15.3	-14.3	-13.1	-12.7	-12.1	-12.3	-12.9	-13.2	-13.6	-14.0	-14.6	-15.2	-15.6	-16.0	-14.0	-11.7	
26-Nov	-15.9	-15.6	-15.5	-15.7	-16.0	-16.1	-16.4	-16.8	-16.8	-16.1	-14.4	-12.2	-9.4	-7.1	-5.3	-3.1	-2.4	-2.6	-4.6	-4.8	-4.9	-5.0	-4.5	-5.2	-10.3	-2.4	
27-Nov	-6.2	-4.4	-4.6	-5.0	-3.0	-2.9	-3.8	-5.2	-6.5	-6.9	-3.8	-0.8	0.5	1.4	1.9	0.1	-1.3	-1.9	-2.8	-3.9	-4.3	-4.9	-5.9	-6.4	-3.4	1.9	
28-Nov	-6.5	-6.9	-7.4	-8.0	-8.4	-9.1	-9.2	-9.0	-10.0	-9.6	-9.2	-8.1	-6.6	-5.6	-4.6	-3.8	-5.3	-6.1	-6.7	-7.1	-7.3	-8.1	-8.0	-8.0	-7.4	-3.8	
29-Nov	-7.8	-6.8	-5.9	-5.8	-5.9	-6.1	-6.5	-6.8	-6.9	-6.2	-5.1	-3.5	-2.1	-0.8	0.0	0.3	-0.4	-0.9	-2.3	-3.7	-4.6	-4.9	-5.6	-6.1	-4.3	0.3	
30-Nov	-7.0	-7.6	-8.2	-8.8	-9.4	-9.7	-9.9	-10.2	-10.5	-9.9	-8.8	-7.0	-4.6	-2.3	-1.1	-0.6	-0.1	-0.9	-4.0	-5.4	-5.7	-6.5	-6.3	-7.2	-6.3	-0.1	
																								Diurnal Average			
																								Diurnal Maximum			





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	518	71.94	71.94
0 - 10	202	28.06	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

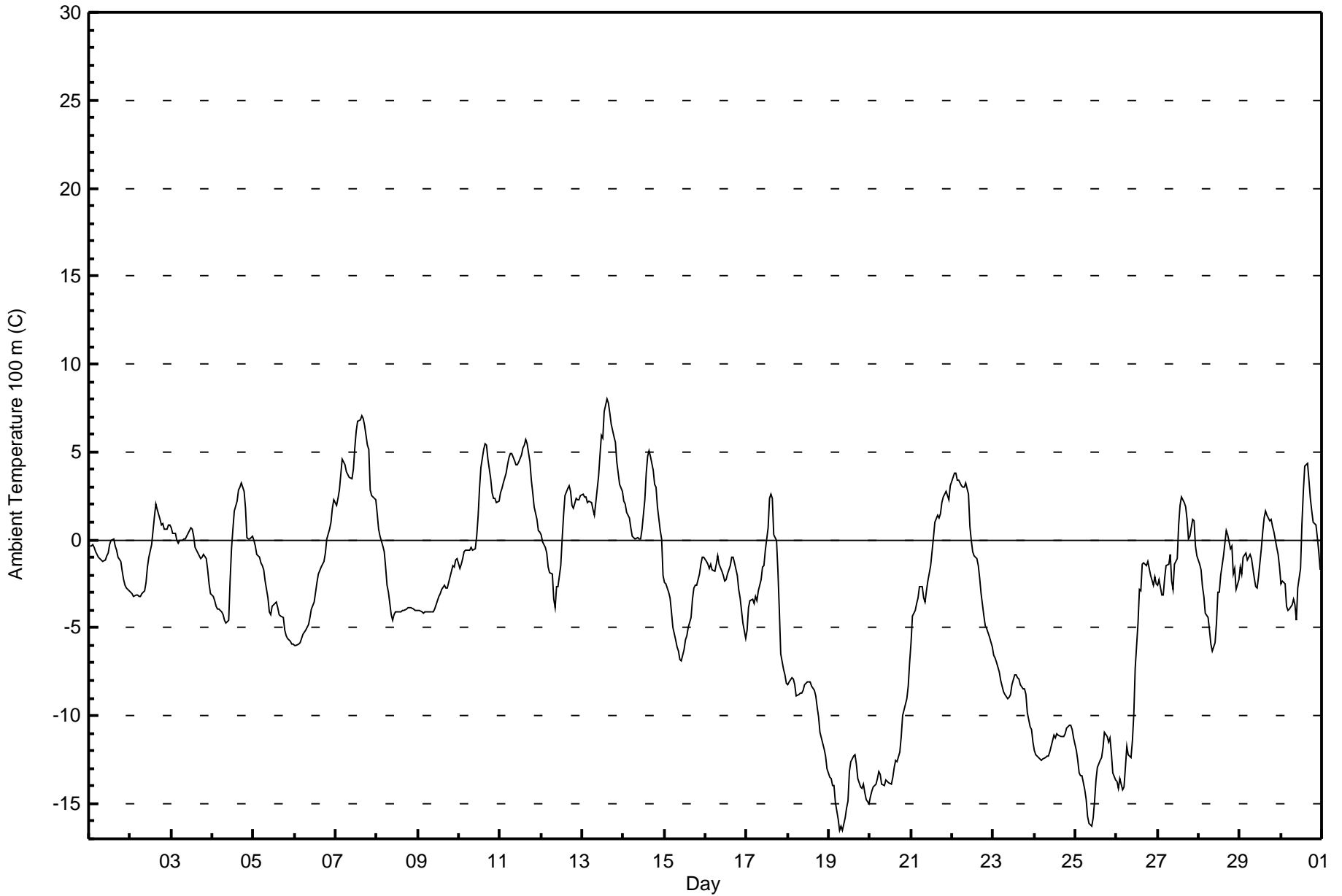


Maximum Value: 8.1 C on Nov 13 15:00 Maximum Daily Average: 4.3 C on Nov 7																				Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: -16.5 C on Nov 19 09:00 Minimum Daily Average: -14.3 C on Nov 19 Maximum Diurnal Average: -1.2 C at hour 16 Minimum Diurnal Average: -4.4 C at hour 9 Monthly Average: -3.03 C Percentiles: P ₁ = -15.9 P ₁₀ = -12.3 Q ₁ = -5.6 Median = -2.0 Q ₃ = 0.6 P ₉₀ = 3.1 P ₉₉ = 6.8																											
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-Nov	-0.3	-0.3	-0.3	-0.4	-0.7	-1.0	-1.0	-1.2	-1.3	-1.1	-0.9	-0.7	-0.3	-0.1	0.0	-0.3	-0.6	-1.0	-1.2	-1.8	-2.3	-2.6	-2.7	-2.9	-1.0	0.0	
2-Nov	-3.0	-3.1	-3.2	-3.2	-3.1	-3.2	-3.2	-3.1	-2.9	-2.5	-1.6	-1.0	-0.3	0.5	1.3	2.0	1.7	1.2	0.9	0.9	0.6	0.6	0.8	0.9	-0.9	2.0	
3-Nov	0.6	0.3	0.4	0.0	-0.2	0.0	0.0	0.0	0.1	0.2	0.3	0.6	0.6	0.2	-0.4	-0.8	-0.9	-1.0	-1.0	-0.8	-1.1	-1.7	-2.5	-3.0	-0.4	0.6	
4-Nov	-3.2	-3.5	-3.7	-3.9	-4.0	-4.1	-4.3	-4.6	-4.7	-4.6	-2.4	-0.5	0.6	1.6	2.2	2.8	3.0	3.2	2.8	1.8	0.2	0.0	0.0	0.2	-1.0	3.2	
5-Nov	0.0	-0.4	-0.8	-1.0	-1.3	-1.5	-1.7	-2.3	-3.3	-4.1	-4.3	-3.8	-3.6	-3.5	-3.9	-4.2	-4.3	-4.4	-5.1	-5.4	-5.6	-5.8	-5.9	-5.9	-3.4	0.0	
6-Nov	-6.0	-6.0	-6.0	-5.8	-5.6	-5.3	-5.2	-5.0	-4.8	-4.4	-3.9	-3.5	-3.0	-2.4	-1.9	-1.5	-1.4	-1.2	-0.8	0.0	0.6	1.0	1.8	2.3	-2.8	2.3	
7-Nov	2.0	2.3	2.9	3.7	4.6	4.3	3.9	3.7	3.5	3.5	4.0	5.2	6.2	6.7	6.8	7.1	6.9	6.5	5.4	5.2	2.8	2.6	2.5	2.2	4.3	7.1	
8-Nov	1.4	0.6	0.2	-0.4	-0.7	-1.5	-2.6	-3.0	-4.2	-4.6	-4.3	-4.1	-4.1	-4.1	-4.1	-4.1	-4.0	-3.9	-3.8	-3.8	-3.9	-3.9	-4.0	-4.0	-2.9	1.4	
9-Nov	-4.0	-4.1	-4.1	-4.2	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-3.9	-3.5	-3.2	-3.1	-2.8	-2.6	-2.7	-2.7	-2.4	-2.1	-1.5	-1.5	-1.1	-1.0	-3.1	-1.0	
10-Nov	-1.6	-1.4	-1.1	-0.7	-0.6	-0.6	-0.6	-0.5	-0.6	-0.5	0.2	1.3	2.9	4.1	5.1	5.4	5.4	4.6	3.5	2.6	2.4	2.4	2.1	2.2	1.5	5.4	
11-Nov	2.6	3.0	3.2	3.8	4.3	4.7	4.9	4.9	4.5	4.3	4.3	4.5	4.8	5.2	5.4	5.7	5.5	4.5	3.4	2.7	1.9	1.2	0.6	0.4	3.8	5.7	
12-Nov	0.3	-0.1	-0.4	-0.8	-1.6	-1.8	-2.0	-3.4	-3.9	-2.7	-2.6	-1.4	0.1	1.4	2.5	2.9	3.1	2.8	2.0	1.8	2.4	2.3	2.3	2.5	0.2	3.1	
13-Nov	2.6	2.5	2.4	2.1	2.2	2.1	1.7	1.4	2.2	3.6	4.8	5.9	5.8	7.3	8.1	7.8	7.2	6.6	5.8	5.5	4.4	3.8	3.2	2.8	4.2	8.1	
14-Nov	2.2	2.0	1.6	1.2	0.7	0.2	0.1	0.0	0.1	0.0	0.1	0.6	2.2	3.8	4.7	5.1	4.8	3.9	3.1	3.0	1.9	0.5	0.1	-2.0	1.7	5.1	
15-Nov	-2.4	-2.5	-3.0	-3.3	-4.1	-5.0	-5.7	-6.1	-6.3	-6.8	-6.9	-6.2	-5.7	-5.5	-5.0	-4.4	-3.3	-2.9	-2.6	-2.5	-2.0	-1.4	-1.0	-1.0	-4.0	-1.0	
16-Nov	-1.2	-1.4	-1.6	-1.4	-1.7	-1.8	-1.4	-0.9	-1.4	-1.7	-2.0	-2.4	-2.2	-1.9	-1.5	-1.0	-1.0	-1.3	-2.0	-2.8	-3.3	-4.0	-4.7	-5.6	-2.1	-0.9	
17-Nov	-5.2	-3.9	-3.5	-3.4	-3.7	-3.3	-3.5	-2.9	-2.3	-1.6	-1.5	-0.6	0.7	2.4	2.6	2.4	0.3	0.0	-1.7	-4.0	-6.4	-7.3	-7.7	-8.2	-2.6	2.6	
18-Nov	-8.2	-8.1	-7.9	-7.9	-8.3	-8.8	-8.8	-8.7	-8.7	-8.6	-8.2	-8.1	-8.1	-8.1	-8.3	-8.6	-8.9	-9.5	-10.1	-11.0	-11.6	-11.9	-12.3	-13.0	-9.2	-7.9	
19-Nov	-13.5	-13.6	-14.0	-14.0	-14.9	-15.9	-16.5	-16.3	-16.5	-15.8	-15.2	-14.8	-13.2	-12.7	-12.3	-12.2	-12.7	-13.6	-14.0	-14.2	-13.9	-14.4	-14.8	-15.0	-14.3	-12.2	
20-Nov	-14.6	-14.3	-14.0	-13.9	-13.6	-13.2	-13.3	-13.9	-14.0	-13.7	-13.7	-13.8	-13.9	-13.5	-12.9	-12.6	-12.6	-12.1	-11.2	-10.0	-9.7	-9.0	-8.3	-7.0	-12.4	-7.0	
21-Nov	-5.9	-4.3	-4.0	-3.6	-3.3	-2.7	-2.6	-3.3	-3.5	-2.9	-2.4	-1.5	-0.7	0.1	1.0	1.4	1.3	1.5	2.1	2.4	2.8	2.5	2.3	3.1	-0.8	3.1	
22-Nov	3.6	3.8	3.8	3.4	3.4	3.1	3.0	3.0	3.2	2.6	0.7	0.0	-0.7	-0.9	-1.0	-1.5	-2.2	-3.1	-4.4	-4.9	-5.1	-5.3	-5.6	-6.1	-0.3	3.8	
23-Nov	-6.5	-6.7	-7.0	-7.5	-8.0	-8.3	-8.7	-8.8	-9.0	-9.0	-8.8	-8.2	-7.7	-7.7	-7.8	-7.9	-8.2	-8.5	-8.5	-8.8	-9.8	-10.6	-10.8	-11.5	-8.5	-6.5	
24-Nov	-12.0	-12.2	-12.4	-12.5	-12.5	-12.4	-12.3	-12.3	-12.1	-11.7	-11.1	-11.2	-11.1	-11.1	-11.1	-11.2	-11.2	-11.2	-11.1	-10.7	-10.5	-10.5	-10.8	-11.2	-11.6	-10.5	-11.0
25-Nov	-11.9	-12.5	-13.3	-13.4	-13.4	-14.2	-14.8	-15.7	-16.1	-16.3	-15.8	-14.9	-13.6	-12.9	-12.6	-12.3	-11.8	-11.0	-11.2	-11.5	-11.3	-12.2	-13.3	-13.6	-13.3	-11.0	
26-Nov	-13.7	-14.1	-13.6	-14.2	-14.0	-13.0	-11.7	-12.3	-12.4	-11.5	-9.9	-7.2	-4.7	-2.8	-2.9	-1.4	-1.3	-1.5	-1.3	-1.6	-2.1	-2.6	-2.1	-2.5	-7.3	-1.3	
27-Nov	-2.6	-2.3	-3.1	-3.1	-2.2	-1.5	-1.3	-0.8	-2.3	-2.8	-1.4	-1.1	0.8	2.0	2.4	2.2	1.9	1.2	0.0	0.2	1.2	1.1	-0.3	-0.9	-0.5	2.4	
28-Nov	-1.4	-1.7	-2.7	-3.2	-4.2	-4.4	-5.1	-5.9	-6.3	-5.9	-4.7	-3.0	-3.0	-2.0	-0.9	-0.2	0.5	0.3	-0.5	-0.4	-1.9	-1.6	-2.8	-2.3	-2.6	0.5	
29-Nov	-1.6	-2.0	-1.0	-0.8	-1.1	-1.0	-0.8	-1.0	-2.2	-2.7	-2.8	-2.1	-0.5	0.5	1.2	1.7	1.4	1.1	1.2	0.8	0.5	-0.4	-0.8	-1.5	-0.6	1.7	
30-Nov	-2.5	-2.3	-2.5	-3.7	-4.0	-3.9	-3.7	-3.4	-3.7	-4.6	-2.8	-1.6	0.9	2.7	4.2	4.4	3.4	2.4	1.7	1.0	0.8	0.1	-0.7	-1.7	-0.8	4.4	
																								Diurnal Average			
																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	497	69.03	69.03
0 - 10	223	30.97	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

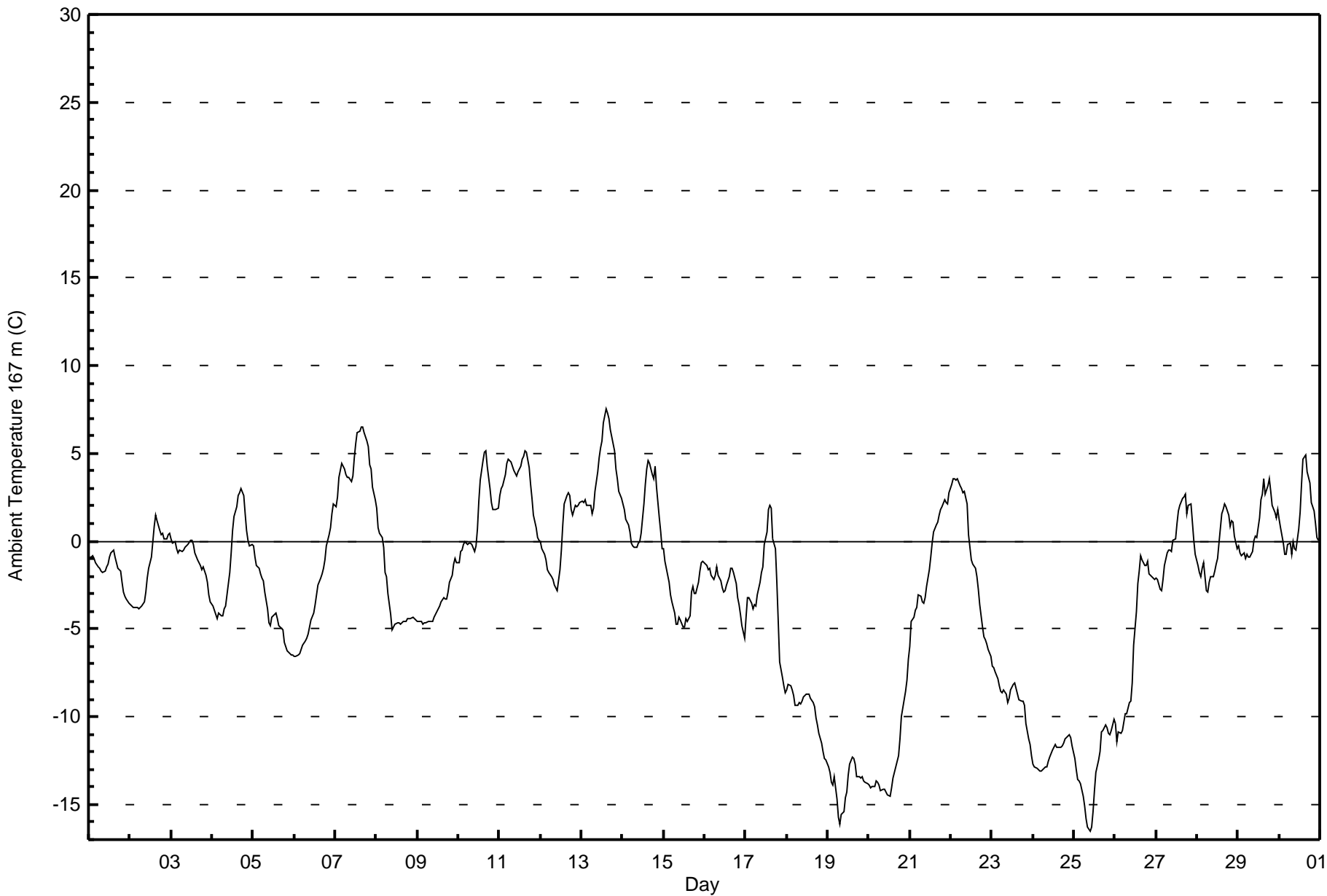


Maximum Value: 7.5 C on Nov 13 15:00		Maximum Daily Average: 4.4 C on Nov 7		Hours in Service: 720																							
Minimum Value: -16.6 C on Nov 25 10:00		Minimum Daily Average: -13.8 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.4 C at hour 16		Minimum Diurnal Average: -4.0 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -2.94 C		Percentiles: P ₁ = -15.4 P ₁₀ = -12.0 Q ₁ = -5.5 Median = -1.8 Q ₃ = 0.9 P ₉₀ = 3.2 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-Nov	-0.9	-0.9	-0.8	-1.0	-1.2	-1.5	-1.6	-1.7	-1.8	-1.7	-1.4	-1.3	-0.9	-0.6	-0.5	-0.9	-1.2	-1.6	-1.7	-2.4	-2.9	-3.1	-3.3	-3.5	-1.6	-0.5	
2-Nov	-3.6	-3.7	-3.8	-3.8	-3.8	-3.8	-3.8	-3.7	-3.4	-2.9	-2.1	-1.6	-0.9	-0.1	0.8	1.5	1.2	0.6	0.4	0.5	0.1	0.1	0.4	0.5	-1.5	1.5	
3-Nov	0.2	-0.1	0.0	-0.4	-0.7	-0.5	-0.6	-0.5	-0.4	-0.3	-0.2	0.0	0.1	-0.2	-0.7	-1.1	-1.2	-1.4	-1.6	-1.5	-2.0	-2.4	-3.0	-3.5	-0.9	0.2	
4-Nov	-3.7	-3.9	-4.2	-4.4	-4.1	-4.3	-4.2	-3.9	-3.7	-2.4	-1.8	-0.6	0.6	1.4	2.0	2.6	2.7	3.0	2.6	1.6	0.6	0.1	-0.3	-0.2	-1.0	3.0	
5-Nov	-0.3	-0.9	-1.4	-1.6	-1.9	-2.1	-2.3	-2.9	-3.9	-4.6	-4.8	-4.3	-4.2	-4.1	-4.4	-4.8	-4.9	-5.1	-5.7	-6.0	-6.2	-6.4	-6.5	-6.5	-4.0	-0.3	
6-Nov	-6.6	-6.5	-6.5	-6.4	-6.1	-5.9	-5.7	-5.6	-5.3	-4.9	-4.5	-4.1	-3.6	-3.0	-2.5	-2.1	-1.8	-1.6	-1.1	-0.3	0.4	0.8	1.6	2.2	-3.3	2.2	
7-Nov	2.0	2.5	3.6	4.1	4.4	4.1	3.8	3.7	3.6	3.4	3.7	4.7	5.6	6.2	6.3	6.5	6.5	6.2	5.7	5.3	4.3	4.1	3.1	2.4	4.4	6.5	
8-Nov	1.8	0.7	0.5	0.2	-0.3	-1.8	-2.0	-3.0	-4.2	-5.0	-4.9	-4.7	-4.7	-4.7	-4.7	-4.7	-4.6	-4.6	-4.4	-4.4	-4.4	-4.4	-4.5	-4.5	-3.2	1.8	
9-Nov	-4.6	-4.6	-4.6	-4.7	-4.7	-4.7	-4.6	-4.6	-4.6	-4.5	-4.3	-4.0	-3.8	-3.7	-3.4	-3.2	-3.3	-3.3	-2.9	-2.4	-1.9	-1.3	-1.0	-1.2	-3.6	-1.0	
10-Nov	-1.3	-0.6	-0.5	-0.2	0.0	-0.2	-0.1	-0.1	-0.2	-0.6	-0.3	0.7	2.3	3.5	4.6	5.1	5.2	4.3	3.0	2.2	1.8	1.8	1.8	1.9	1.4	5.2	
11-Nov	2.6	3.0	3.1	3.8	4.4	4.7	4.6	4.5	4.1	3.9	3.7	3.9	4.3	4.7	4.8	5.1	5.1	4.2	3.2	2.5	1.5	0.8	0.2	0.1	3.5	5.1	
12-Nov	-0.1	-0.5	-0.7	-1.0	-1.7	-1.8	-2.1	-2.2	-2.5	-2.6	-2.8	-1.7	-0.5	0.9	2.1	2.6	2.8	2.6	1.8	1.5	2.0	1.9	2.1	2.2	0.1	2.8	
13-Nov	2.3	2.2	2.3	2.0	2.1	2.0	1.6	1.9	2.8	3.9	4.7	5.3	5.7	6.7	7.5	7.3	7.0	6.3	5.5	5.2	4.1	3.5	2.9	2.4	4.1	7.5	
14-Nov	2.1	1.8	1.2	0.9	0.5	-0.1	-0.3	-0.4	-0.4	-0.1	0.0	0.4	2.1	3.2	4.1	4.6	4.4	3.8	3.6	4.2	3.1	1.4	0.6	-0.4	1.7	4.6	
15-Nov	-0.4	-1.1	-2.0	-2.4	-3.0	-3.5	-4.1	-4.8	-4.7	-4.3	-4.5	-4.9	-4.9	-4.5	-4.6	-4.3	-2.9	-2.6	-2.9	-3.0	-2.3	-1.7	-1.2	-1.2	-3.2	-0.4	
16-Nov	-1.3	-1.4	-1.6	-1.5	-2.0	-2.2	-1.9	-1.5	-1.9	-2.2	-2.6	-2.9	-2.9	-2.5	-2.0	-1.5	-1.5	-1.8	-2.4	-3.2	-3.6	-4.2	-4.8	-5.5	-2.5	-1.3	
17-Nov	-4.3	-3.2	-3.2	-3.6	-3.9	-3.6	-3.7	-3.1	-2.3	-1.8	-1.4	-0.2	0.5	1.8	2.0	1.9	0.1	-0.4	-2.4	-4.6	-6.9	-7.8	-8.3	-8.6	-2.8	2.0	
18-Nov	-8.5	-8.2	-8.2	-8.5	-8.8	-9.4	-9.3	-9.2	-9.3	-9.1	-8.8	-8.7	-8.7	-8.7	-8.9	-9.2	-9.5	-10.1	-10.4	-10.9	-11.5	-12.0	-12.4	-12.5	-9.6	-8.2	
19-Nov	-12.9	-13.2	-13.7	-13.9	-13.4	-14.7	-15.7	-16.1	-15.6	-15.4	-14.6	-14.3	-13.4	-12.7	-12.3	-12.4	-12.7	-13.4	-13.4	-13.5	-13.4	-13.7	-13.8	-13.8	-13.8	-12.3	-12.3
20-Nov	-13.9	-14.0	-13.9	-14.0	-13.7	-13.7	-13.9	-14.2	-14.1	-14.2	-14.3	-14.4	-14.5	-14.1	-13.5	-13.1	-12.8	-12.2	-11.3	-10.0	-9.5	-8.5	-7.9	-6.7	-12.6	-6.7	
21-Nov	-6.0	-4.6	-4.3	-4.0	-3.8	-3.1	-3.1	-3.5	-3.5	-3.2	-2.6	-1.6	-0.9	-0.1	0.5	0.9	1.1	1.5	1.8	2.0	2.4	2.2	2.1	2.8	-1.1	2.8	
22-Nov	3.3	3.5	3.6	3.4	3.6	3.2	3.0	2.8	2.8	2.1	0.4	-0.4	-1.1	-1.3	-1.5	-2.0	-2.8	-3.6	-4.9	-5.4	-5.6	-5.8	-6.1	-6.6	-0.7	3.6	
23-Nov	-7.1	-7.2	-7.5	-7.8	-8.2	-8.5	-8.6	-8.5	-8.7	-9.2	-8.9	-8.5	-8.1	-8.1	-8.4	-8.7	-9.0	-9.1	-9.1	-9.3	-10.4	-11.3	-11.6	-12.2	-8.9	-7.1	
24-Nov	-12.7	-12.8	-13.0	-13.0	-13.1	-13.1	-12.9	-12.8	-12.8	-12.6	-12.3	-11.9	-11.8	-11.6	-11.7	-11.8	-11.7	-11.7	-11.5	-11.3	-11.1	-11.0	-11.2	-11.6	-12.1	-11.0	-11.0
25-Nov	-12.4	-13.0	-13.6	-13.7	-13.8	-14.5	-15.1	-15.8	-16.3	-16.3	-15.4	-14.2	-13.2	-12.4	-12.0	-12.0	-10.8	-10.8	-10.5	-10.7	-11.0	-11.0	-10.8	-10.2	-13.1	-10.2	
26-Nov	-10.4	-11.4	-10.8	-11.0	-10.8	-10.3	-9.8	-9.8	-9.2	-9.1	-8.1	-5.9	-4.0	-2.4	-1.7	-0.9	-1.1	-1.4	-1.4	-1.2	-1.8	-2.0	-2.1	-2.2	-5.8	-0.9	
27-Nov	-2.1	-2.2	-2.8	-2.8	-2.2	-1.4	-0.7	-0.5	-0.5	-0.6	0.1	0.1	1.0	1.7	2.1	2.4	2.5	2.7	1.6	2.0	2.1	1.1	0.1	-0.8	0.1	2.7	
28-Nov	-1.4	-1.8	-2.0	-1.6	-1.2	-2.8	-2.9	-2.3	-2.0	-2.0	-1.7	-1.3	-1.0	-0.1	1.6	1.8	2.1	1.9	1.5	0.9	1.1	1.1	0.3	-0.4	-0.5	2.1	
29-Nov	-0.3	-0.6	-0.9	-0.7	-1.0	-0.8	-0.9	-0.9	-0.6	0.1	0.3	0.2	1.3	2.4	2.7	3.6	2.7	3.2	3.5	2.8	2.0	1.6	1.3	1.8	1.0	3.6	
30-Nov	1.2	0.7	-0.1	-0.8	-0.8	-0.2	-0.1	-0.7	0.0	-0.4	-0.5	0.7	1.7	3.3	4.7	4.9	4.0	3.6	3.3	2.2	1.7	1.0	0.2	0.0	1.2	4.9	
																								Diurnal Average			
																								Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	498	69.17	69.17
0 - 10	222	30.83	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

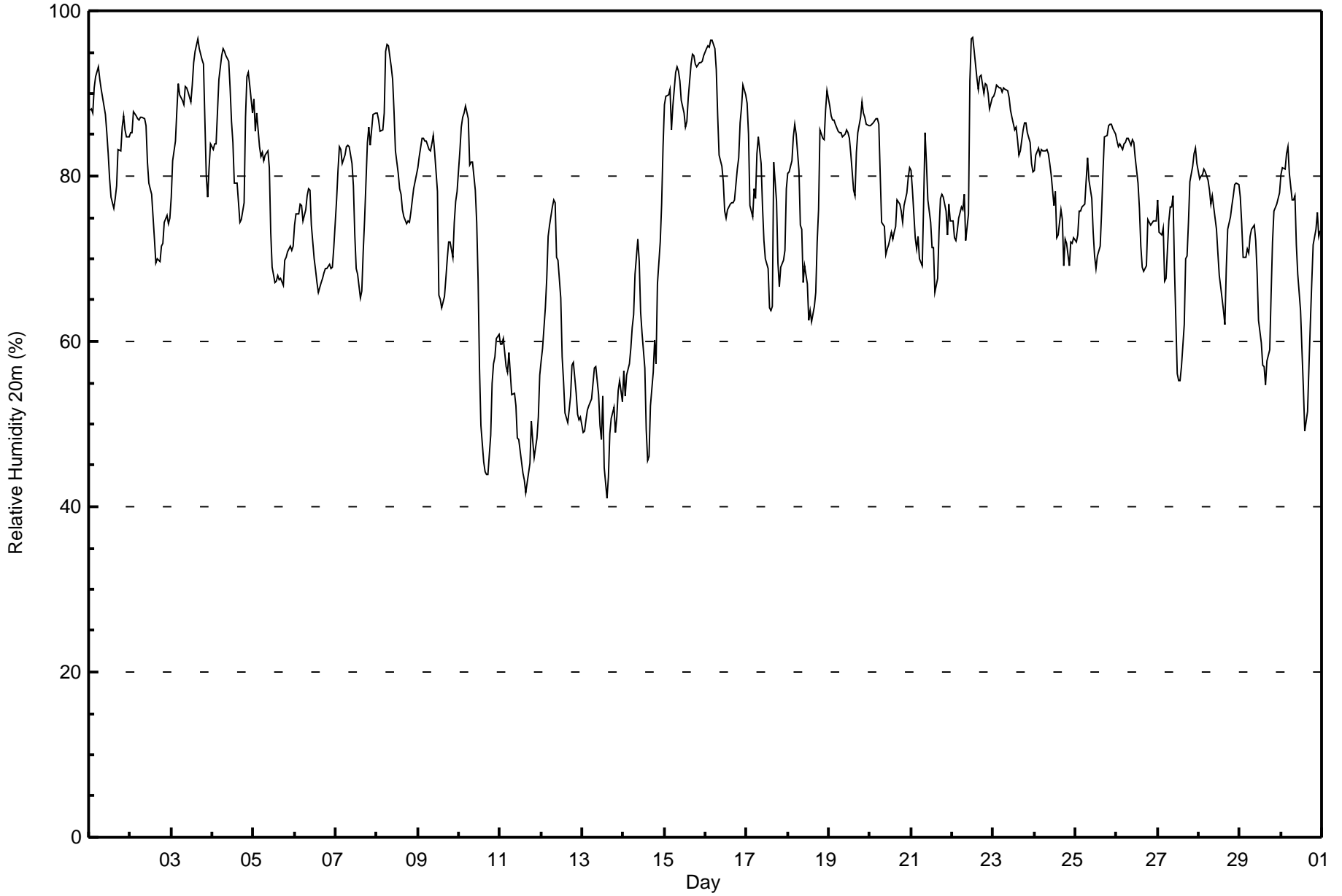


Maximum Value: 97 % on Nov 22 13:00																		Maximum Daily Average: 91.1 % on Nov 15																		Hours in Service: 720													
Minimum Value: 41 % on Nov 13 15:00																		Minimum Daily Average: 50.9 % on Nov 13																		Hours of Data: 720													
Maximum Diurnal Average: 80.6 % at hour 8																		Minimum Diurnal Average: 67.3 % at hour 15																		Hours of Missing Data: 0													
Monthly Average: 75.8 %																		Percentiles: P ₁ = 44 P ₁₀ = 57 Q ₁ = 70 Median = 77 O ₃ = 85 P ₉₀ = 90 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-Nov	88	88	88	91	92	93	92	91	90	88	85	83	80	77	76	77	79	83	83	86	87	86	85	85	85.4	93																							
2-Nov	85	85	88	87	87	87	87	87	87	86	82	79	78	75	72	70	70	70	71	72	74	75	74	75	79.3	88																							
3-Nov	77	82	84	88	91	90	89	89	91	91	90	89	91	94	95	97	95	95	94	93	80	78	81	84	88.6	97																							
4-Nov	83	84	84	88	92	95	95	95	95	94	91	87	84	79	79	77	74	75	77	87	92	92	91	88	86.5	95																							
5-Nov	89	85	88	84	82	83	82	83	83	81	73	69	67	67	68	67	68	67	70	70	71	72	71	71	75.5	89																							
6-Nov	74	75	75	77	76	75	76	78	79	78	74	70	69	67	66	67	68	68	69	69	69	69	69	71	72.0	79																							
7-Nov	77	81	84	83	81	83	84	84	84	82	79	73	69	68	65	66	71	75	84	86	84	86	87	88	79.2	88																							
8-Nov	88	87	85	86	88	95	96	96	93	92	88	83	80	79	78	76	75	74	75	74	76	79	79	80	83.3	96																							
9-Nov	81	82	85	85	84	84	83	83	84	85	83	78	66	65	64	66	68	70	72	72	70	74	77	78	76.6	85																							
10-Nov	83	86	87	88	88	87	81	82	82	78	74	67	57	50	45	44	44	44	49	55	57	58	60	61	67.0	88																							
11-Nov	60	60	60	57	56	59	56	54	54	52	48	48	45	44	43	42	43	45	50	48	46	48	51	56	51.1	60																							
12-Nov	58	59	64	68	73	74	76	77	77	70	70	65	58	55	51	50	52	53	57	57	54	51	51	51	61.3	77																							
13-Nov	49	49	50	52	52	53	55	57	57	54	50	48	53	45	41	44	49	51	52	49	51	54	55	53	50.9	57																							
14-Nov	56	53	56	57	59	62	63	68	72	70	64	61	57	49	46	46	52	56	60	57	67	72	77	84	61.0	84																							
15-Nov	89	90	90	90	86	88	93	93	93	92	89	88	86	87	89	94	95	95	93	93	94	94	94	95	91.1	95																							
16-Nov	95	96	96	96	96	95	93	87	83	81	79	76	75	76	77	77	77	77	81	82	86	88	91	90	85.5	96																							
17-Nov	89	85	76	75	79	77	83	85	82	76	72	70	69	64	64	64	82	77	70	67	69	70	71	78	74.7	89																							
18-Nov	80	80	82	85	86	85	81	74	74	67	69	67	63	64	62	64	66	72	76	86	85	84	88	90	76.3	90																							
19-Nov	89	87	87	87	86	85	85	85	85	85	86	85	85	83	78	78	83	85	87	89	88	87	86	86	85.3	89																							
20-Nov	86	86	86	87	87	86	80	74	74	70	71	72	73	72	73	74	77	77	76	74	76	78	80	81	78.0	87																							
21-Nov	81	78	73	71	73	70	69	77	85	81	77	74	71	71	66	68	73	77	78	77	76	73	77	75	74.6	85																							
22-Nov	75	73	72	73	75	76	76	78	72	75	92	97	97	95	92	91	92	92	90	91	91	90	88	89	84.7	97																							
23-Nov	90	90	91	91	91	90	91	91	90	90	88	87	86	86	84	83	86	87	86	86	85	84	81	81	87.1	91																							
24-Nov	81	83	83	82	83	83	83	83	83	81	80	76	78	73	73	76	75	69	72	72	69	72	72	73	77.3	83																							
25-Nov	72	73	76	76	76	77	80	82	80	77	73	70	69	70	72	76	81	85	85	86	86	86	86	85	78.2	86																							
26-Nov	84	84	84	83	84	84	85	85	84	84	84	82	79	76	72	69	68	69	75	74	74	75	75	75	78.6	85																							
27-Nov	77	73	73	74	67	68	75	76	76	78	69	56	55	55	57	62	70	70	74	79	81	83	83	81	71.4	83																							
28-Nov	80	80	80	81	80	79	78	77	78	75	74	71	68	67	64	62	69	74	75	76	78	79	79	79	75.1	81																							
29-Nov	77	74	70	70	71	71	73	74	74	72	68	63	60	57	57	55	58	59	66	72	76	77	77	78	68.7	78																							
30-Nov	80	81	81	83	84	80	77	77	78	72	68	64	59	54	49	52	57	62	67	72	74	76	73	73	70.5	84																							
																								79.1	79.0	79.3	79.8	80.2	80.5	80.5	80.6	80.4	78.6	76.3	73.3	70.9	68.8	67.3	67.7	70.4	71.7	73.8	75.1	75.5	76.3	77.0	77.8	Diurnal Average	
																								95	96	96	96	96	95	96	96	96	94	92	97	97	95	95	97	95	95	94	93	94	94	94	95	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	98	13.61	13.61
60 - 80	318	44.17	57.78
80 - 100	304	42.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

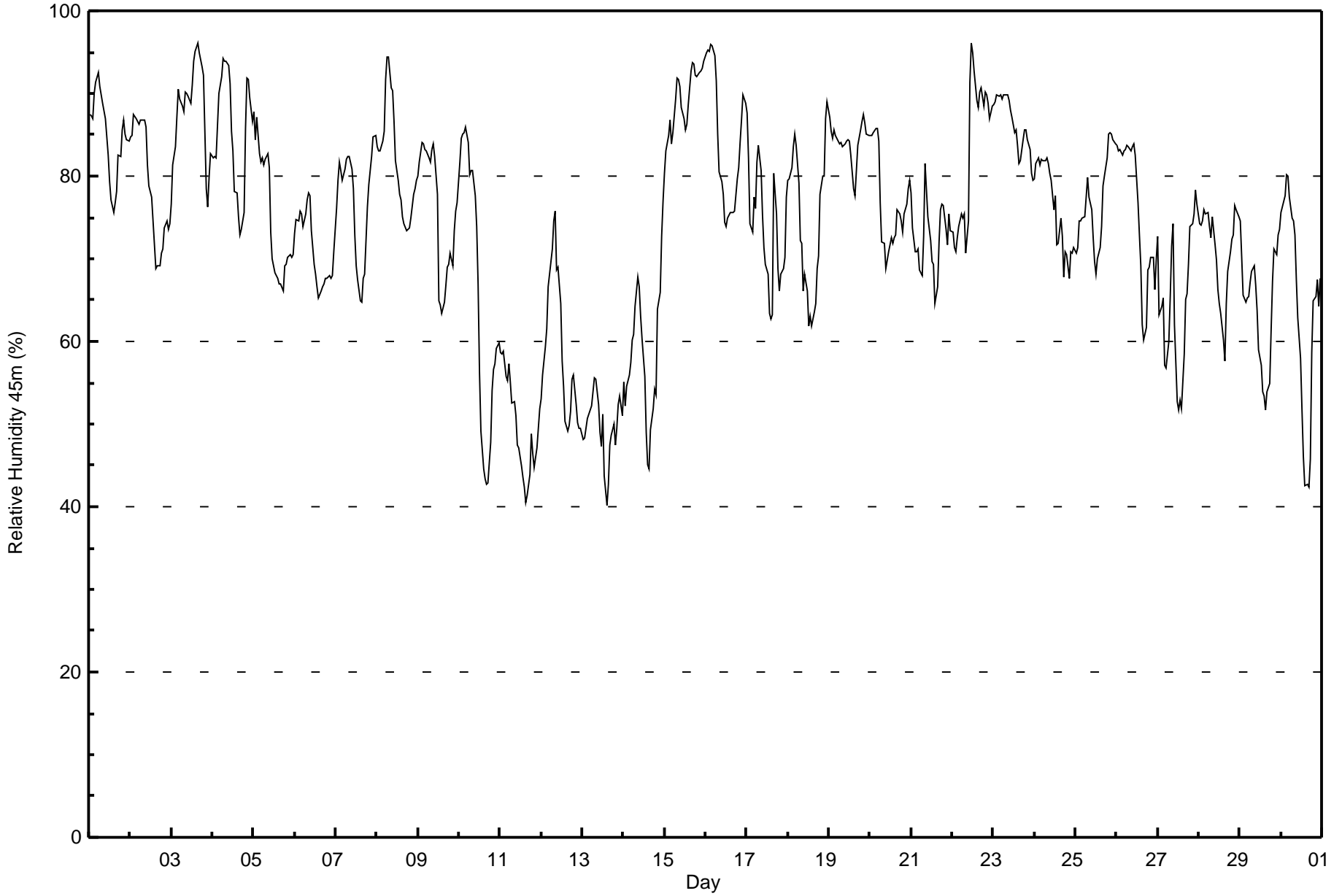


Maximum Value: 96 % on Nov 3 16:00																		Maximum Daily Average: 89.2 % on Nov 15																		Hours in Service: 720													
Minimum Value: 40 % on Nov 13 15:00																		Minimum Daily Average: 49.6 % on Nov 13																		Hours of Data: 720													
Maximum Diurnal Average: 78.7 % at hour 9																		Minimum Diurnal Average: 65.9 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 73.9 %																		Percentiles: P ₁ = 43 P ₁₀ = 54 Q ₁ = 67 Median = 75 Q ₃ = 84 P ₉₀ = 89 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-Nov	87	87	87	90	91	92	91	90	89	87	85	83	79	77	76	77	78	83	82	86	87	85	84	84	84.9	92																							
2-Nov	85	85	88	87	87	86	87	87	87	86	81	79	77	75	72	69	69	69	71	71	74	75	74	74	78.8	88																							
3-Nov	77	81	83	87	91	89	88	88	90	90	90	89	91	94	95	96	95	94	93	92	78	76	80	83	88.0	96																							
4-Nov	82	82	82	86	90	92	94	94	94	93	91	85	83	78	78	75	73	74	76	86	92	92	89	87	85.4	94																							
5-Nov	88	84	87	83	82	82	81	82	83	81	73	70	68	68	68	67	67	66	69	69	70	71	70	71	75.0	88																							
6-Nov	73	75	75	76	75	74	75	77	78	78	73	69	68	67	65	66	67	67	68	68	68	68	68	71	71.2	78																							
7-Nov	76	79	82	81	79	81	82	82	82	81	78	73	69	67	65	65	68	68	76	79	81	82	85	85	77.0	85																							
8-Nov	84	83	83	84	85	92	94	94	91	90	87	82	80	78	77	75	74	73	74	74	75	78	78	79	81.9	94																							
9-Nov	80	82	84	84	83	83	82	82	83	84	82	78	65	64	63	65	67	69	69	71	69	73	76	77	75.7	84																							
10-Nov	82	85	85	85	86	84	80	81	81	78	74	67	56	49	45	43	43	43	48	54	57	57	59	60	65.8	86																							
11-Nov	59	58	59	56	55	57	55	53	53	51	47	47	45	43	42	40	41	44	49	46	45	47	50	52	49.8	59																							
12-Nov	53	56	59	62	67	68	71	75	76	69	69	65	58	55	50	49	50	51	55	56	52	50	49	49	58.9	76																							
13-Nov	48	48	50	51	51	52	54	56	56	52	49	47	51	44	40	43	47	49	50	48	50	52	53	51	49.6	56																							
14-Nov	55	52	55	56	58	60	61	64	68	67	63	60	56	49	45	45	49	52	54	54	64	66	73	77	58.4	77																							
15-Nov	80	83	85	87	84	85	89	92	92	91	88	87	86	86	89	93	94	93	92	92	93	93	93	94	89.2	94																							
16-Nov	95	95	95	96	96	95	92	85	80	79	78	74	74	75	76	76	76	76	80	81	84	87	90	89	84.3	96																							
17-Nov	88	82	74	73	77	76	82	84	81	75	71	69	68	63	63	63	80	75	69	66	68	69	70	78	73.6	88																							
18-Nov	79	80	81	84	85	84	79	72	72	66	68	66	62	63	62	64	65	69	70	78	80	80	87	89	74.3	89																							
19-Nov	87	85	85	86	85	84	84	84	84	84	84	84	84	83	79	78	81	84	86	87	87	86	85	85	84.2	87																							
20-Nov	85	85	85	86	86	84	77	72	72	69	70	71	73	72	72	73	76	75	75	73	75	77	79	79	76.7	86																							
21-Nov	78	74	71	71	71	69	68	73	81	78	75	72	70	69	65	67	72	76	77	76	74	72	75	73	72.8	81																							
22-Nov	73	71	71	73	74	75	75	75	71	75	91	96	95	93	89	88	90	91	88	90	90	89	87	89	83.3	96																							
23-Nov	89	89	90	90	90	89	90	90	90	89	88	87	85	86	84	81	82	84	86	86	84	83	80	79	86.3	90																							
24-Nov	80	81	82	81	82	82	82	82	81	80	80	76	78	72	72	75	73	68	71	70	68	71	71	71	76.2	82																							
25-Nov	71	71	75	75	75	75	77	80	77	76	73	70	68	70	71	74	79	80	82	85	85	85	84	84	76.8	85																							
26-Nov	84	83	83	83	83	83	84	84	83	84	84	82	77	73	69	62	60	62	69	69	70	70	66	70	75.7	84																							
27-Nov	73	63	64	65	57	57	60	65	72	74	62	53	52	53	52	58	65	66	69	74	74	75	78	77	65.0	78																							
28-Nov	74	74	75	76	75	76	74	73	75	72	70	66	65	63	60	58	65	68	71	72	73	76	76	75	70.9	76																							
29-Nov	75	70	66	65	65	65	67	68	69	67	64	59	57	54	53	52	54	55	61	67	71	70	73	74	64.2	75																							
30-Nov	76	76	78	80	80	77	75	75	73	67	63	58	52	46	42	43	42	46	59	65	65	67	64	68	64.1	80																							
																								77.1	76.8	77.2	77.8	78.2	78.4	78.4	78.6	78.7	77.1	75.1	72.2	69.7	67.6	66.0	65.9	68.0	69.0	71.3	72.8	73.4	74.1	74.9	75.8	Diurnal Average	
																								95	95	95	96	96	95	94	94	94	93	91	96	95	94	95	96	95	94	93	92	93	93	93	94	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	112	15.56	15.56
60 - 80	342	47.50	63.06
80 - 100	266	36.94	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

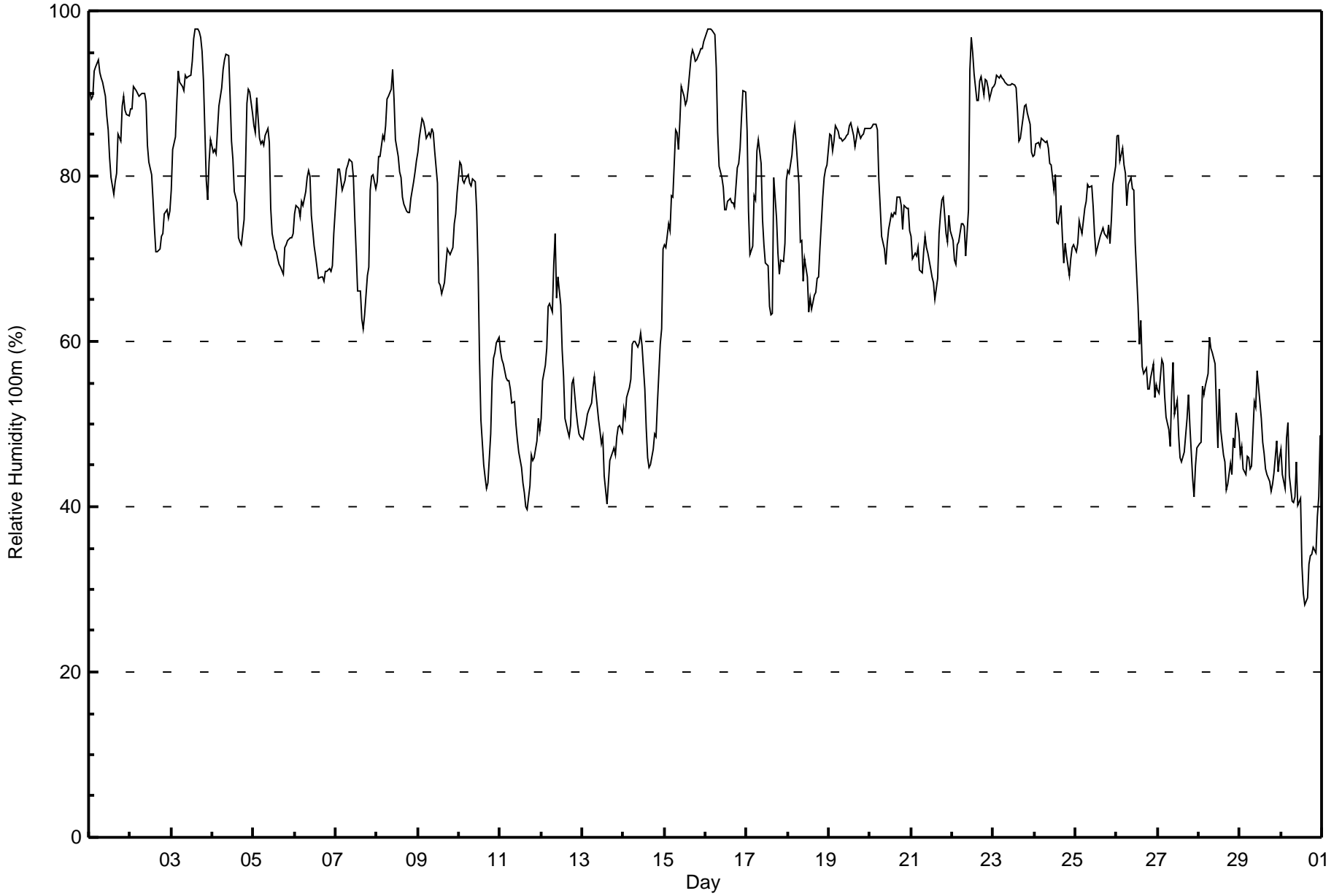


Maximum Value: 98 % on Nov 16 02:00																		Maximum Daily Average: 89.9 % on Nov 3																		Hours in Service: 720													
Minimum Value: 28 % on Nov 30 15:00																		Minimum Daily Average: 39.3 % on Nov 30																		Hours of Data: 720													
Maximum Diurnal Average: 75.6 % at hour 5																		Minimum Diurnal Average: 65.2 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 71.3 %																		Percentiles: P ₁ = 34 P ₁₀ = 47 Q ₁ = 57 Median = 74 O ₃ = 84 P ₉₀ = 90 P ₉₉ = 97																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	90	89	90	93	93	94	92	92	91	90	87	86	82	80	78	79	80	85	84	88	90	88	87	87	87.4	94																							
2-Nov	88	88	91	90	90	90	90	90	90	89	84	82	80	77	74	71	71	71	73	73	75	76	75	76	81.4	91																							
3-Nov	78	83	85	89	93	91	91	90	92	92	92	94	97	98	98	97	97	95	92	79	77	82	84	89.9	98																								
4-Nov	83	83	83	86	88	91	93	94	95	95	90	84	82	78	77	73	72	72	75	81	89	90	90	88	84.6	95																							
5-Nov	86	85	89	85	84	84	84	85	86	84	76	73	71	71	70	69	69	68	71	72	72	72	73	73	77.2	89																							
6-Nov	75	76	76	75	77	76	78	80	81	80	75	71	70	69	68	68	68	67	68	68	69	68	69	73	72.8	81																							
7-Nov	79	81	81	80	78	79	81	81	82	82	80	75	71	66	66	63	62	63	68	69	78	80	80	79	75.1	82																							
8-Nov	79	82	82	85	84	86	89	90	91	93	89	84	82	81	80	78	77	76	76	76	77	79	81	82	82.4	93																							
9-Nov	83	85	87	87	86	84	85	85	86	85	83	79	67	67	66	67	69	71	71	70	71	74	75	78	77.6	87																							
10-Nov	82	81	80	79	80	80	79	79	80	79	76	69	58	51	45	44	42	43	49	55	58	59	60	60	65.3	82																							
11-Nov	59	58	57	56	55	55	54	52	53	50	48	47	45	43	42	40	40	43	46	46	46	48	51	49	49.2	59																							
12-Nov	51	55	57	59	64	65	64	69	73	65	68	64	59	56	51	49	48	50	55	55	52	50	49	48	57.3	73																							
13-Nov	48	49	50	51	52	53	54	56	54	50	49	48	48	44	40	43	46	46	47	46	48	50	50	49	48.8	56																							
14-Nov	52	51	53	54	55	60	60	60	59	60	61	59	54	49	46	45	45	47	49	48	52	60	62	71	54.7	71																							
15-Nov	72	71	74	73	78	78	86	85	83	87	91	90	89	89	91	94	95	95	94	94	95	95	95	96	87.1	96																							
16-Nov	97	98	98	98	98	97	93	85	81	80	79	76	76	77	77	77	77	76	81	81	83	87	90	90	85.5	98																							
17-Nov	85	76	71	72	78	77	83	84	82	75	72	69	69	64	63	63	80	75	71	68	70	70	72	80	73.6	85																							
18-Nov	81	80	83	85	86	84	79	72	72	67	70	68	64	65	64	66	66	68	68	71	78	80	81	81	74.1	86																							
19-Nov	85	85	83	84	86	85	85	85	84	85	85	85	86	86	85	84	85	86	85	85	85	86	86	86	85.0	86																							
20-Nov	86	86	86	86	86	80	76	73	71	69	72	73	75	75	76	75	77	77	76	74	76	76	76	73	77.2	86																							
21-Nov	73	70	71	70	71	69	68	71	73	71	71	69	68	67	65	68	73	75	77	77	73	72	75	73	71.3	77																							
22-Nov	72	70	69	72	72	74	74	74	70	76	93	97	95	92	89	89	92	92	90	92	92	91	89	91	83.6	97																							
23-Nov	91	91	92	92	92	92	92	91	91	91	91	91	91	91	88	84	85	87	88	89	88	86	83	82	89.1	92																							
24-Nov	83	84	84	84	85	84	84	84	83	82	81	78	80	74	74	76	73	69	72	70	68	70	71	72	77.8	85																							
25-Nov	71	72	75	74	73	76	77	79	79	79	76	73	71	71	73	73	74	73	73	74	72	75	79	81	74.6	81																							
26-Nov	85	85	82	83	81	80	76	79	80	78	78	72	64	60	62	57	56	57	54	54	56	57	53	55	68.6	85																							
27-Nov	54	54	58	57	53	51	49	47	54	57	51	53	49	46	45	47	49	51	54	50	43	41	45	47	50.2	58																							
28-Nov	48	48	55	54	55	56	61	59	59	57	52	47	54	49	46	45	42	43	45	44	48	47	51	49	50.6	61																							
29-Nov	46	47	45	44	46	46	45	45	53	52	57	55	51	48	46	45	44	43	42	43	44	48	44	46	46.8	57																							
30-Nov	47	44	42	48	50	44	41	41	41	45	40	41	33	30	28	29	33	34	34	35	34	39	41	49	39.3	50																							
																								73.6	73.6	74.2	74.8	75.6	75.4	75.4	75.2	75.6	74.8	73.9	71.7	69.3	67.1	65.8	65.2	66.2	66.7	67.7	68.1	68.7	69.7	70.5	71.6	Diurnal Average	
																								97	98	98	98	98	97	93	94	95	95	93	97	95	97	98	98	97	97	95	94	95	95	95	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	11	1.53	1.53
40 - 60	189	26.25	27.78
60 - 80	268	37.22	65.00
80 - 100	252	35.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

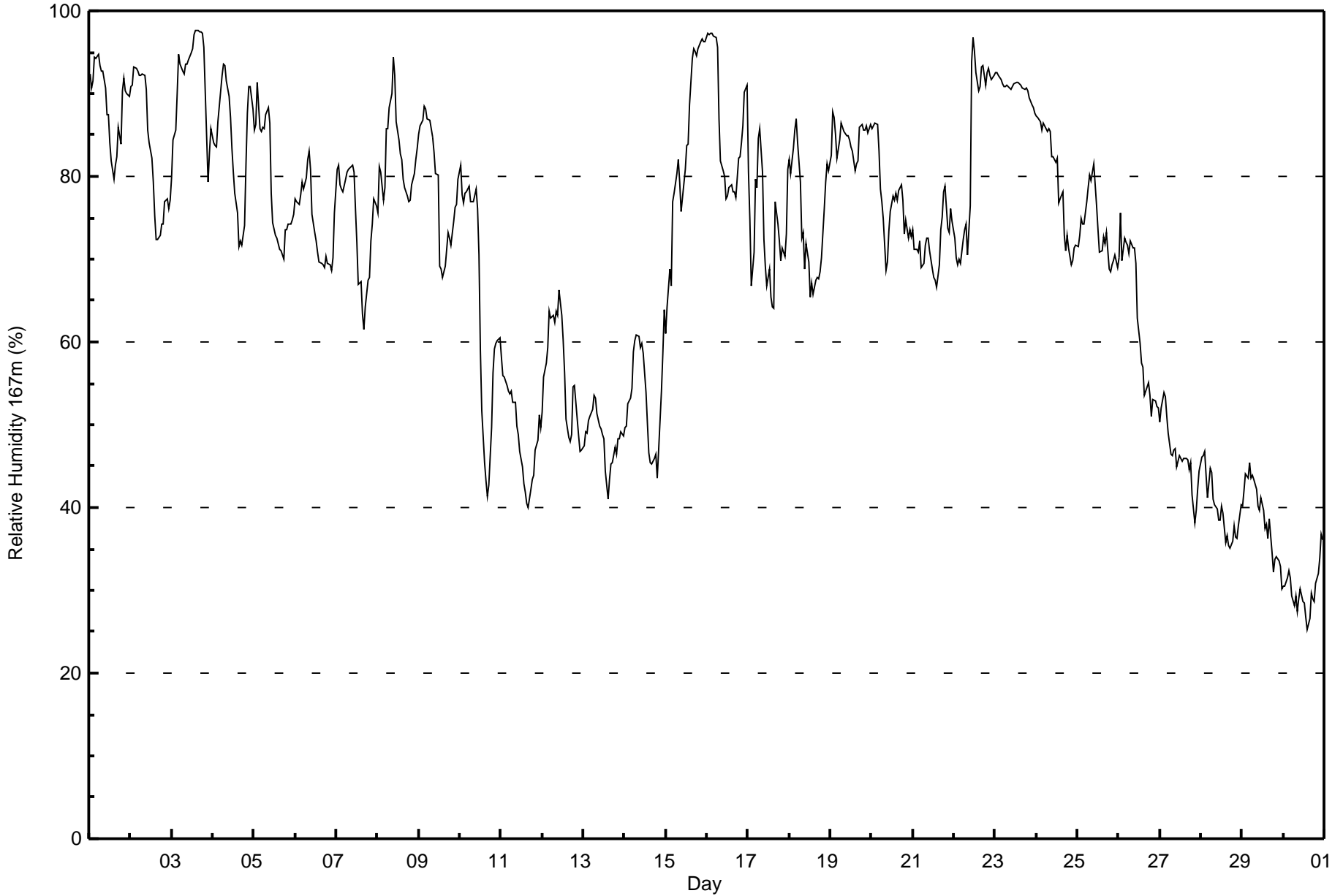


Maximum Value: 98 % on Nov 3 16:00																	Maximum Daily Average: 91.6 % on Nov 3																	Hours in Service: 720															
Minimum Value: 25 % on Nov 30 15:00																	Minimum Daily Average: 30.1 % on Nov 30																	Hours of Data: 720															
Maximum Diurnal Average: 74.4 % at hour 7																	Minimum Diurnal Average: 65.3 % at hour 16																	Hours of Missing Data: 0															
Monthly Average: 70.2 %																	Percentiles: P ₁ = 28 P ₁₀ = 43 Q ₁ = 55 Median = 74 Q ₃ = 84 P ₉₀ = 91 P ₉₉ = 97																	Hours of Calibration: 0															
																																		Percent Operational Time: 100.0															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	92	91	91	94	94	95	93	93	93	91	87	87	84	82	80	81	82	86	84	90	92	90	90	90	88.9	95																							
2-Nov	91	91	93	93	93	92	92	92	92	91	86	84	82	79	75	72	72	73	74	74	77	77	76	77	83.4	93																							
3-Nov	80	84	86	90	95	94	93	92	94	94	94	95	96	97	98	98	98	97	97	96	85	79	83	86	91.6	98																							
4-Nov	84	84	84	87	88	92	93	93	91	90	87	83	81	78	76	72	72	72	74	81	88	91	91	88	84.2	93																							
5-Nov	86	86	91	86	86	86	86	87	88	87	78	74	73	72	72	71	71	70	74	74	74	74	75	75	79.0	91																							
6-Nov	77	77	77	78	79	78	80	82	83	81	76	73	72	71	70	70	69	69	70	70	69	69	70	76	74.4	83																							
7-Nov	81	81	79	79	78	80	81	81	81	81	80	76	72	67	67	63	62	64	67	68	72	74	77	76	74.5	81																							
8-Nov	76	81	81	77	79	86	86	88	90	94	92	87	84	83	82	80	79	78	77	77	79	80	82	83	82.5	94																							
9-Nov	85	86	87	88	88	87	87	86	85	83	80	80	69	69	68	69	71	73	73	72	75	76	77	80	78.9	88																							
10-Nov	81	78	77	78	78	79	77	77	77	79	76	70	59	52	45	43	41	43	50	56	59	60	61	61	64.8	81																							
11-Nov	58	56	56	55	54	54	54	53	53	50	49	47	45	43	42	41	40	42	43	44	47	48	51	50	48.9	58																							
12-Nov	51	56	57	59	64	63	63	62	64	63	66	63	60	56	51	49	48	49	55	55	51	49	47	47	56.1	66																							
13-Nov	48	49	49	50	51	52	54	53	51	50	49	49	48	44	41	43	45	45	47	46	48	48	49	49	48.4	54																							
14-Nov	50	50	53	53	54	59	60	61	61	59	60	59	54	50	47	45	45	46	46	44	47	54	59	64	53.3	64																							
15-Nov	61	64	69	67	77	78	80	82	79	76	77	81	84	84	89	94	95	95	95	95	96	97	96	96	83.7	97																							
16-Nov	97	97	97	97	97	97	96	87	82	81	80	77	78	79	79	78	78	78	82	82	84	86	90	91	86.2	97																							
17-Nov	80	75	67	71	80	79	85	86	80	72	69	67	69	65	64	64	77	74	72	70	71	70	73	81	73.4	86																							
18-Nov	82	80	83	86	87	84	79	73	73	69	72	70	65	67	66	67	68	68	68	70	76	79	82	81	74.8	87																							
19-Nov	82	88	87	85	82	84	87	86	85	85	85	84	84	83	81	81	82	86	86	86	86	86	85	86	84.7	88																							
20-Nov	86	86	86	86	83	79	77	75	69	70	73	76	78	77	78	77	78	79	77	73	75	73	74	73	77.4	86																							
21-Nov	74	71	71	71	72	69	69	72	72	72	71	69	68	67	67	69	74	75	78	79	74	73	76	75	72.0	79																							
22-Nov	72	70	69	70	70	72	74	74	70	76	94	97	95	93	90	91	93	93	91	93	93	92	92	92	84.1	97																							
23-Nov	93	93	92	92	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	90	89	89	88	88	90.7	93																							
24-Nov	87	87	87	86	87	86	85	86	85	82	82	82	77	77	78	73	71	73	71	69	70	71	72	72	79.5	87																							
25-Nov	71	73	75	74	74	77	79	80	80	81	79	76	74	71	71	73	72	73	69	68	69	70	71	69	73.7	81																							
26-Nov	70	76	70	73	72	72	71	72	71	71	69	63	60	57	57	54	54	55	54	51	53	53	52	52	62.6	76																							
27-Nov	50	52	54	53	51	49	46	46	47	47	45	46	46	46	46	46	46	45	45	41	38	40	42	44	46.4	54																							
28-Nov	46	46	47	44	41	45	44	41	40	40	39	38	40	39	36	37	35	35	36	38	36	36	38	40	39.9	47																							
29-Nov	40	42	44	44	45	44	44	43	42	40	40	41	40	37	38	36	39	35	32	34	34	34	33	30	38.8	45																							
30-Nov	30	31	31	32	32	29	28	29	27	29	30	29	28	27	25	27	30	29	29	31	32	34	37	36	30.1	37																							
																								72.1	72.7	73.0	73.3	74.1	74.3	74.4	74.1	73.3	72.5	71.9	70.5	68.7	66.8	65.6	65.3	66.0	66.3	67.0	67.3	68.0	68.4	69.5	70.2	Diurnal Average	
																								97	97	97	97	97	97	96	93	94	94	94	97	96	97	98	98	98	97	97	96	96	97	96	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	53	7.36	7.36
40 - 60	148	20.56	27.92
60 - 80	269	37.36	65.28
80 - 100	250	34.72	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 28 km/h on Nov 13 01:00	Maximum Daily Speed Average: 15.7 km/h on Nov 30	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 9 10:00	Minimum Daily Speed Average: 1.2 km/h on Nov 19	Hours of Data: 715
Maximum Diurnal Speed Average: 5.6 km/h at hour 21	Minimum Diurnal Speed Average: 2.2 km/h at hour 9	Hours of Missing Data: 5
Monthly Average Velocity: 4.0 km/h 174.9 deg	Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 14 P ₉₀ = 17 P ₉₉ = 25	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-Nov	N6	N5	N6	N6	N7	N7	NNE6	NNE7	NNE6	NNE7	NE9	NNE8	NE8	NNE9	NNE9	NNE10	NNE10	NNE9	NE9	N6	NNW5	NNW8	N7	N7	NNE7.2	NNE10
2-Nov	N7	N7	NNE5	NE5	NE5	NNE5	NNE4	NNE2	NNW1	NW2	SSE4	SSE7	SSE8	S10	S9	S10	SSE15	S20	S21	S20	SSE13	SSE11	SSE16	SSE17	SSE5.9	S21
3-Nov	SSE12	SSE13	SSE8	SE4	SE3	SSE2	ESE2	SSE6	SSE6	SSE5	SSE2	SE1	N3	NNW5	NNW7	AF	AF	NW6	NNW4	NW3	NNW10	NNW10	W9	W5	SW1.2	SSE13
4-Nov	SSW5	SSW6	S6	SSE5	E1	NNE1	ENE1	ESE2	N3	NW3	N3	SSE5	SSE10	SSE13	SSE14	SSE19	SSE19	SSE16	S6	N5	NNW3	NW1	N1	NNW3	SSE4.2	SSE19
5-Nov	N4	N7	NNW5	NNW5	NNW7	NNW6	NNW6	N8	N11	N11	NNW11	NNW9	N8	N10	N9	NNW7	NNW8	N9	N7	N7	N5	NNW4	NNW3	NNW7.2	N11	
6-Nov	NNW3	E1	ESE2	ESE3	SE4	SSE7	SSE7	SSE8	SSE6	SSE6	SSW7	S7	SSE11	S13	S11	SSE13	SE15	SSE20	SSE22	SSE26	SSE27	SSE22	SSE25	SSE23	SSE11.5	SSE27
7-Nov	SSE14	SE11	SE15	SSE7	W6	W8	W11	W11	W10	NNW10	WSW7	W8	W12	W9	W7	WSW9	WSW4	SSW2	SSE1	NE0	SSE3	SSE4	S4	S4	SW4.2	SE15
8-Nov	ESE1	NW1	SSW3	NNW3	NW4	NNW3	NNW3	NNW4	NNW5	N8	NNE10	NNE9	NE9	NNE10	NNE9	NNE8	NNE8	NNE5	N3	NE2	NNE2	N2	N3	NNW2	NNE4.1	NNE10
9-Nov	N4	N5	NNW1	NNW2	NW3	NW2	NW3	NNW3	N1	NE0	WNW0	S0	SW8	SSW7	SW9	SW7	SSW8	SSW5	S5	SSE8	S12	SSE15	SSE14	SSE10	S3.3	SSE15
10-Nov	SSE9	SSE13	SSE16	SSE16	SSE14	SSE18	S17	S17	S18	S18	S19	S15	S14	S15	S16	SSE22	S19	S21	S20	S14	S14	SSE11	SSE13	SE10	S15.3	SSE22
11-Nov	SE13	SE14	SSE13	SSE18	S16	S14	SSW12	SW15	SW13	SW13	SW14	WSW14	WSW18	W20	W17	WSW13	SW8	SW11	W10	WSW8	SW10	WSW10	SW9	SSE8	SW9.9	W20
12-Nov	SSE9	SSE4	SSE8	SSE6	SE8	SSE8	SE9	SE6	SE7	SSE12	SSE14	SSE14	SSE15	SSE13	S15	SSE18	SSE20	SSE21	SSE21	SSE24	SSE27	SSE25	SSE27	SSE23	SSE14.6	SSE27
13-Nov	SSE28	SSE21	S20	S17	S15	SSE13	SSE14	SSE13	SSE13	SSW14	SSW12	SSW11	SSE15	SSW8	WSW16	WSW17	WSW11	WSW10	SW6	SW13	WSW4	W9	W9	W15	SSW10.5	SSE28
14-Nov	W15	W15	W14	W16	W10	W4	WSW4	SE6	SE6	SE6	SE7	SSE11	SSE11	WSW9	WSW6	SSW4	SW4	SSW2	WSW4	WSW8	W2	SSE9	SSE3	N3	SW4.4	W16
15-Nov	NNW1	SE1	ENE0	SE3	SE6	NNE2	N3	NNW3	NNW3	NNW3	NNW4	NNW4	NNW5	NNW7	N7	N10	N12	NNE9	NNW5	N7	N6	N5	NNW3	N3.9	N12	
16-Nov	N5	NNW4	N6	NNW4	NNW5	NW6	NW8	NNW9	NNW14	W19	W18	NNW17	NNW14	NNW12	W15	W15	WSW11	SW7	SW6	S4	SSE7	SSE8	SSE8	SE5	W6.4	W19
17-Nov	SSE11	SE13	SE17	SSE22	SSE16	SSE18	SSE17	SE13	SSE14	SSE19	SSE18	SSE20	S11	SW17	SW15	SW11	W9	NNW10	NW14	NNW15	NNW16	W20	W21	W16	SSW7.7	SSE22
18-Nov	W18	W21	NNW14	NNW9	NW10	NW14	NW13	NNW12	NNW14	NNW14	NNW15	NNW13	NNW16	NNW12	NNW11	NNW8	NNW7	NNW4	NW2	NW2	NNW2	NNW3	NNW3	NNW1	NNW9.0	W21
19-Nov	S2	S1	SSE2	SE3	SSE4	SSE4	SSE6	SSE4	SE4	S2	SE6	SE5	SE3	NNW2	NW4	NW5	NW5	NNW4	NW1	AF	AF	AF	W2	W2	S1.2	SSE6
20-Nov	SSE0	ESE2	NE0	ESE0	ESE1	NW2	NNW8	W13	W13	W15	W13	SW10	SSW8	S12	S15	S17	SSE14	SSE15	SSE13	SSE21	SSE21	SSE22	SSE18	SSE16	S7.5	SSE22
21-Nov	SE13	SSE9	WSW11	WSW10	WSW7	W13	WSW8	SSE6	SE11	SE11	SSE12	SSE15	SSE11	SSE8	SW8	SSW6	SE6	SE6	SW4	WSW6	S6	W11	W13	W16	SSW5.7	W16
22-Nov	W16	W15	W15	W17	W17	W17	NNW15	NW11	NW12	NW12	N7	N4	NNE5	N5	N6	N6	NNE6	NNE6	NNE8	N7	N6	N8	N8	N7	NW7.5	W17
23-Nov	N6	NNW5	N5	NNW5	NNW5	NNW5	NW4	N3	NNW3	NNW4	NNW4	NNW4	NNW4	NNW5	N8	N7	N7	N5	N7	N8	N9	N10	N10	N7	N5.7	N10
24-Nov	N7	NNW7	NNW6	NNW7	NNW7	NNW8	NNW7	NNW6	NW5	NNW4	NNW2	SW2	NW3	N7	N6	N3	NW2	NW1	SSE2	SW4	SSW5	SSW6	SSW6	SSW7	NW2.9	NNW8
25-Nov	SW10	SSW8	S9	S11	S11	S8	S3	SW1	SW1	SW3	S3	S3	S3	SE5	SSE6	SSE5	SE3	SSE6	SSE9	SE10	SE11	SSE10	SSE13	SSE13	SSE6.3	SSE13
26-Nov	SSE11	SSE9	SE10	SE9	SE11	SE11	SE11	SE10	SE11	SE11	SSE15	SSE21	SSE18	SSE17	SE15	SSE17	SSE18	SSE16	SE14	SE14	SE13	SE13	SE12	SE13	SE13.2	SSE21
27-Nov	SE16	SE13	SE12	SE12	SSE14	SSE14	SE12	SE12	SSE4	SE1	SE5	ESE4	SSE4	SSE3	SSW2	SSE9	SSE14	SE12	SSE11	SSE14	SE16	SSE14	SSE15	SSE13	SSE10.1	SE16
28-Nov	SSE12	SSE14	SSE12	SSE13	SSE15	SSE15	SSE14	SSE14	SSE9	SSE11	SSE15	SSE16	SSE16	SSE15	SSE13	SSE11	SSE16	SSE15	SSE17	SSE15	SSE17	SE16	SSE13	SSE17	SSE14.1	SSE17
29-Nov	SSE16	SSE14	SSE13	SSE15	SSE14	SSE14	SSE14	SSE15	SSE15	SSE13	SSE13	SSE12	SSE12	SSE10	SSE11	SSE10	SSE9	SSE9	SSE11	SSE16	SSE16	SSE15	SSE14	SSE14	SSE13.0	SSE16
30-Nov	SSE15	SSE18	SE16	SSE14	SSE16	SE16	SE18	SE17	SSE14	SSE15	SSE15	SSE16	SSE16	SE16	SE17	SE17	SSE17	SE17	SSE16	SSE14	SSE16	SSE13	SSE13	SSE14	SSE15.7	SE18

S4.4	S4.0	SSE4.1	S3.9	S3.5	S3.1	S2.8	S2.8	S2.2	SSW2.7	S3.4	S4.2	S4.0	SSW3.4	SSW3.4	S4.5	SSE4.6	SSE4.8	SSE4.3	S5.1	SSE5.6	S5.4	S5.2	S5.2	Diurnal Average
SSE28	W21	S20	SSE22	W17	SSE18	SE18	SE17	S18	W19	S19	SSE21	WSW18	W20	W17	SSE22	SSE20	SSE21	SSE22	SSE26	SSE27	SSE25	SSE27	SSE23	Diurnal Maximum

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

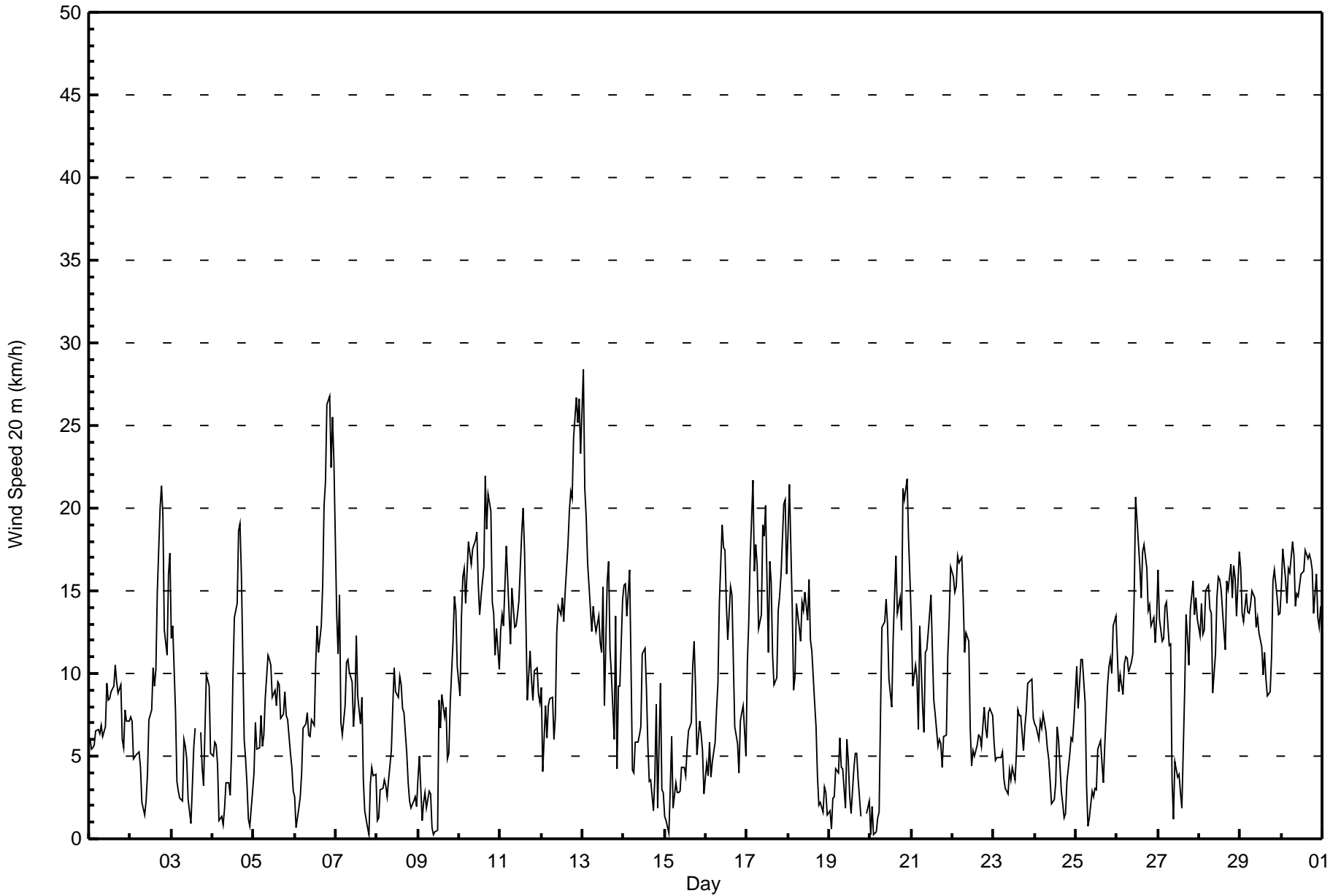


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Nov 13 02:00	Hours of Data: 715
Minimum Value: 0 km/h on Nov 9 10:00	Hours of Missing Data: 5
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational 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-Nov	2	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	3	2	3	3	3	4
2-Nov	3	3	2	2	2	3	2	2	1	1	4	2	3	3	2	3	4	5	5	5	5	3	4	5	5
3-Nov	4	5	4	2	2	2	2	2	2	2	1	1	2	2	2	AF	AF	2	2	2	3	3	3	3	5
4-Nov	2	2	2	2	1	1	1	2	2	1	1	4	3	5	4	4	4	4	4	3	1	1	1	2	5
5-Nov	1	3	2	2	3	2	2	3	4	4	4	4	4	3	4	3	3	4	3	3	2	2	2	1	4
6-Nov	1	1	1	1	1	2	2	2	2	2	3	2	3	4	3	4	5	7	7	6	6	6	6	6	7
7-Nov	5	3	3	5	3	3	3	4	4	4	4	5	4	4	3	2	3	1	1	1	2	2	2	2	5
8-Nov	2	2	2	2	1	1	2	1	2	4	5	4	4	4	4	4	3	3	1	1	1	1	1	1	5
9-Nov	2	2	2	1	1	1	1	1	1	0	1	2	3	3	3	3	3	2	2	2	3	4	3	2	4
10-Nov	3	4	3	4	3	4	4	4	4	4	5	4	4	4	5	4	5	5	5	4	4	4	3	3	5
11-Nov	3	3	5	5	5	4	4	5	4	4	5	5	5	7	5	4	3	4	4	3	4	3	2	4	7
12-Nov	3	2	3	2	3	3	2	1	3	5	4	4	4	3	3	4	4	4	4	5	5	6	7	5	7
13-Nov	7	7	5	5	5	4	5	4	4	4	6	4	4	5	5	4	3	2	3	4	3	2	5	7	
14-Nov	5	5	5	4	4	5	3	4	3	2	2	4	3	5	3	2	2	1	3	2	1	3	2	1	5
15-Nov	1	1	1	2	2	1	1	1	1	1	2	2	2	2	3	3	3	4	4	2	3	2	2	2	4
16-Nov	2	2	3	1	2	2	3	5	5	6	6	7	5	5	6	5	3	3	3	2	2	3	2	3	7
17-Nov	4	4	5	6	6	6	6	5	7	6	6	5	4	4	4	5	6	6	5	5	6	7	7	6	7
18-Nov	6	6	6	3	4	4	4	4	5	5	5	5	6	5	4	3	2	1	1	1	2	1	1	2	6
19-Nov	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	AF	AF	AF	1	1	2
20-Nov	1	1	1	1	1	1	4	4	4	5	4	4	3	3	3	4	5	6	5	7	6	5	5	4	7
21-Nov	3	3	5	4	4	7	5	4	2	3	3	3	4	3	3	2	2	2	4	3	3	5	4	5	7
22-Nov	5	4	5	5	5	5	5	4	5	5	2	2	3	2	3	2	3	2	3	2	2	2	3	3	5
23-Nov	2	2	2	2	2	2	1	1	1	2	1	2	2	2	3	3	3	2	3	3	3	4	3	3	4
24-Nov	2	2	2	2	2	3	3	2	2	1	2	1	2	3	3	2	1	1	1	3	2	2	2	3	3
25-Nov	3	3	3	3	2	3	3	1	2	1	1	1	1	2	2	1	1	2	2	3	3	3	4	4	4
26-Nov	3	3	3	2	3	3	4	4	4	5	6	5	5	5	4	4	3	4	3	3	3	2	2	2	6
27-Nov	3	4	3	3	3	3	3	5	2	2	2	2	2	2	1	2	2	2	3	3	2	3	3	3	5
28-Nov	2	2	3	2	2	3	4	4	5	4	3	4	5	4	3	2	3	4	3	3	3	4	3	3	5
29-Nov	4	3	3	2	2	2	2	3	3	3	3	3	4	2	3	4	3	2	3	3	3	3	3	4	4
30-Nov	3	3	3	3	4	4	4	4	5	3	3	3	3	4	2	3	3	3	3	3	2	3	2	2	5

7	7	6	6	6	7	6	5	7	6	6	7	6	7	6	5	6	7	7	7	6	7	7	6	
Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	198	27.69	27.69
6 - 11	251	35.10	62.80
12 - 19	232	32.45	95.24
20 - 28	34	4.76	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

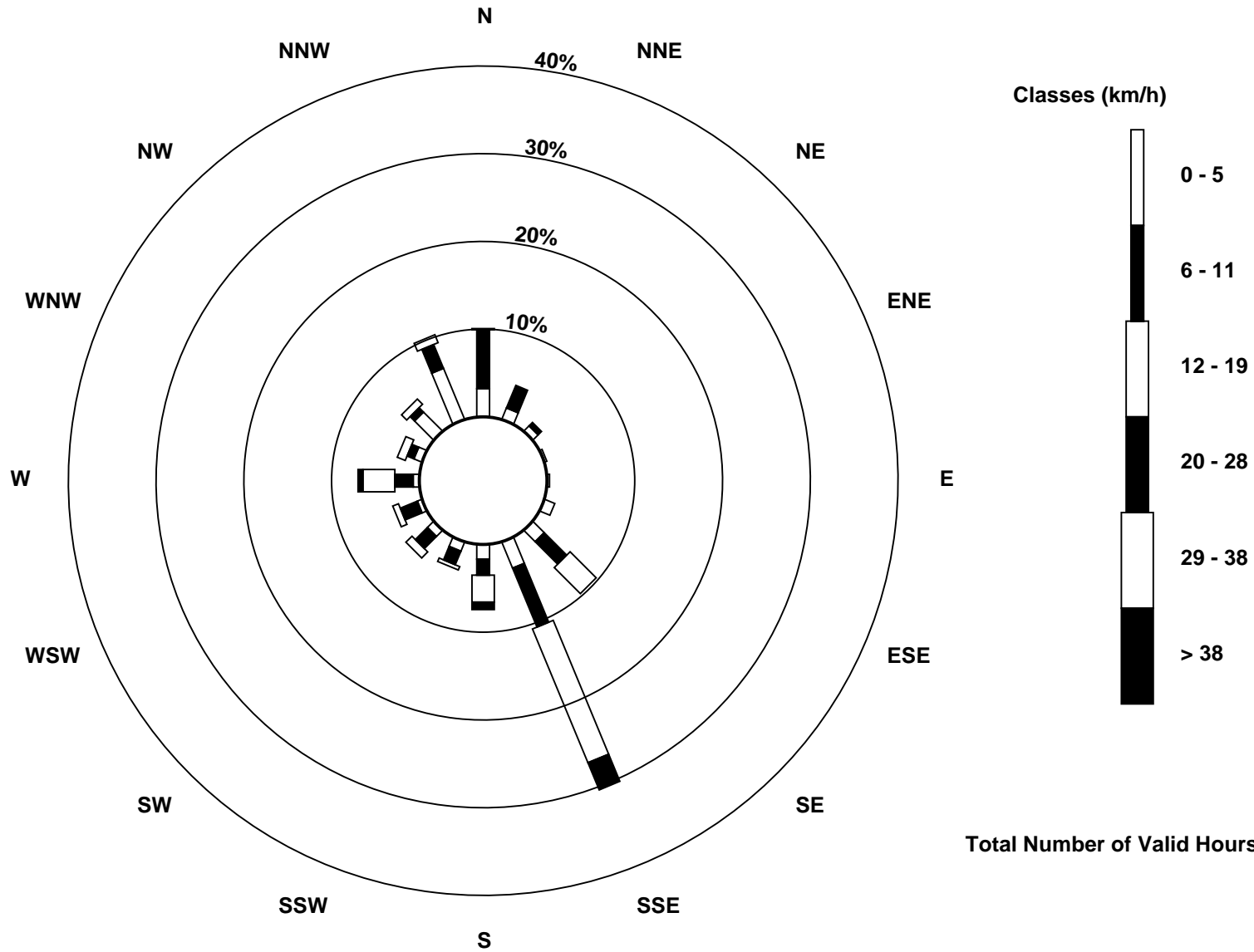
Total Number of Valid Hours: 715

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Maximum Speed: 35 km/h on Nov 6 21:00	Maximum Daily Speed Average: 18.9 km/h on Nov 30	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 4 06:00	Minimum Daily Speed Average: 1.5 km/h on Nov 3	Hours of Data: 717
Maximum Diurnal Speed Average: 6.4 km/h at hour 21	Minimum Diurnal Speed Average: 2.6 km/h at hour 9	Hours of Missing Data: 3
Monthly Average Velocity: 4.4 km/h 177.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 7 Median = 12 Q ₃ = 17 P ₉₀ = 21 P ₉₉ = 29	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-Nov	N8	N8	N8	N8	N10	N10	NNE10	NNE11	NNE10	NNE10	NE14	NNE13	NE13	NNE14	NNE15	NNE17	NNE15	NNE14	NE15	N9	NNW8	NNW11	N10	N10	NNE10.9	NNE17
2-Nov	N10	N10	NNE7	NE7	NE8	NNE8	NNE6	NNE3	NNW2	NW3	SSE5	SSE8	SSE10	S12	S11	S12	SSE17	S22	S23	S22	SSE15	SSE14	SSE18	SSE20	SSE6.4	S23
3-Nov	SSE16	SSE17	SSE10	SE5	SE5	SSE4	ESE4	SSE7	SSE7	SSE6	SSE3	SE1	N4	NNW8	NNW9	AF9	AF7	NW8	NNW6	NW5	WNW13	WNW13	W13	W8	SW1.5	SSE17
4-Nov	SSW7	SSW8	S7	SSE6	E2	NNE0	ENE1	ESE5	N3	NW4	N2	SE7	SSE13	SSE16	SSE18	SSE21	SSE22	SSE17	S8	N6	NNW5	NW1	N2	WNW4	SSE5.2	SSE22
5-Nov	N6	N10	NNW8	NNW7	NNW10	NNW8	NNW9	N12	N15	N15	NNW13	NNW11	N12	N11	N13	N13	NNW10	NNW10	N13	N11	N10	N7	NNW6	NW4	NNW10.0	N15
6-Nov	NNW3	E1	ESE2	ESE3	SE5	SSE7	SSE8	SSE9	SSE7	SSE7	SSW9	S8	SSE12	S14	S12	SSE16	SE20	SSE29	SSE30	SSE33	SSE35	SSE29	SSE29	SSE26	SSE14.2	SSE35
7-Nov	SSE19	SE15	SE18	SSE7	W10	W12	W16	W16	W15	WNW13	WSW10	W11	W16	W12	W9	WSW12	WSW5	SSW4	SSE2	NE4	SSE3	SSE4	S4	S4	WSW5.8	SSE19
8-Nov	ESE1	NW3	SSW5	WNW5	NW5	NNW4	NNW5	NNW6	NNW9	N11	NNE15	NNE14	NE12	NNE14	NNE14	NNE12	NNE12	NNE8	N5	NE3	NNE3	N4	N4	NNW3	NNE6.2	NNE15
9-Nov	N5	N8	WNW2	NNW3	NW4	NW3	NW3	NNW4	N1	NE1	WNW0	S1	SW11	SSW8	SW10	SW9	SSW10	SSW6	S7	SSE9	S12	SSE18	SSE16	SSE13	S3.7	SSE18
10-Nov	SSE12	SSE18	SSE21	SSE22	SSE20	SSE21	S20	S19	S19	S20	S21	S17	S16	S16	S18	SSE23	S20	S22	S22	S16	S15	SSE14	SSE16	SE13	SSE17.9	SSE23
11-Nov	SE15	SE17	SSE16	SSE21	S17	S16	SSW15	SW19	SW16	SW17	SW17	WSW20	WSW26	W26	W23	WSW17	SW12	SW16	W14	WSW12	SW14	WSW14	SW12	SSE8	SW12.9	W26
12-Nov	SSE7	SSE4	SSE7	SSE5	SE9	SSE10	SE11	SE9	SE10	SSE14	SSE17	SSE17	SSE16	SSE15	S16	SSE20	SSE22	SSE24	SSE26	SSE29	SSE30	SSE27	SSE29	SSE26	SSE16.6	SSE30
13-Nov	SSE31	SSE23	S21	S19	S18	SSE15	SSE16	SSE16	SSE16	SSW17	SSW14	SSW14	SSE17	SSW10	WSW22	WSW23	WSW16	WSW14	SW9	SW17	WSW7	W13	W13	W21	SSW12.9	SSE31
14-Nov	W21	W22	W19	W22	W16	W8	WSW7	SE6	SE7	SE8	SE8	SSE13	SSE12	WSW12	WSW8	SSW5	SW6	SSW3	WSW6	WSW13	W5	SSE10	SSE5	N2	SW6.4	W22
15-Nov	NNW2	SSE1	ENE3	SE6	SE8	NNE1	N5	NNW5	NNW4	NNW4	NNW6	NNW6	NNW5	NNW8	NNW10	N11	N16	N18	NNE15	NNW7	N11	N9	N8	NNW5	N5.8	N18
16-Nov	N7	NNW5	N8	NNW5	NNW7	NW8	NW11	WNW13	WNW19	W25	W24	WNW23	WNW19	WNW16	W20	W20	WSW15	SW10	SW8	S5	SSE9	SSE9	SSE10	SE8	W8.6	W25
17-Nov	SSE14	SE21	SE23	SSE31	SSE22	SSE23	SSE22	SE18	SSE17	SSE23	SSE21	SSE21	S13	SW20	SW19	SW14	W13	WNW13	NNW17	NW18	WNW21	W28	W28	W21	SSW9.8	SSE31
18-Nov	W24	W28	WNW18	NNW12	NW12	NW17	NW16	NNW16	NNW19	NNW18	NNW20	NNW19	NNW22	NNW17	NNW16	NNW11	NNW10	NNW7	NW4	NW3	WNW3	NNW3	NNW4	NNW3	NW12.0	W28
19-Nov	S2	S2	SSE3	SE6	SSE7	SSE6	SSE8	SSE6	SE6	S2	SE8	SE6	SE3	WNW2	NW5	NW7	NW7	WNW4	NW2	AF2	AF3	AF2	W1	W2	SSE1.9	SE8
20-Nov	SSE0	ESE2	NE1	ESE1	ESE1	NW3	WNW10	W17	W18	W19	W17	SW12	SSW10	S13	S16	S19	SSE17	SSE19	SSE17	SSE25	SSE24	SSE26	SSE22	SSE20	S8.9	SSE26
21-Nov	SE15	SSW15	WSW15	WSW15	WSW10	W18	WSW11	SSE6	SE13	SE14	SSE14	SSE15	SSE13	SSE9	SW10	SSW8	SE7	SE7	SW7	WSW9	S7	W16	W18	W22	SSW6.9	W22
22-Nov	W21	W20	W21	W22	W22	W23	WNW20	NW15	NW16	NW15	N10	N6	NNE9	NAF	N8	N10	NNE10	NNE9	NNE12	N10	N9	N11	N11	N10	NW10.5	W23
23-Nov	N8	NNW7	N7	NNW7	NNW7	NNW7	NW5	N5	NNW4	NNW6	NNW5	NNW6	NNW5	NNW8	N11	N11	N11	N8	N10	N11	N13	N13	N14	N11	N8.2	N14
24-Nov	N10	NNW10	NNW8	NNW10	NNW10	NNW11	NNW9	NNW8	NW6	NNW5	NNW3	SW3	NW4	N10	N9	N4	NW3	NW2	SSE1	SW5	SSW7	SSW8	SSW8	SSW10	NW4.1	NNW11
25-Nov	SW14	SSW11	S10	S12	S12	S9	S5	SW1	SW3	SW5	S3	S3	S3	SE6	SSE7	SSE6	SE6	SSE10	SSE13	SE14	SE14	SSE13	SSE16	SSE17	SSE8.0	SSE17
26-Nov	SSE14	SSE12	SE13	SE11	SE13	SE14	SE16	SE16	SE16	SE17	SSE21	SSE27	SSE27	SSE25	SE17	SSE18	SSE18	SSE18	SE16	SE17	SE14	SE15	SE13	SE16	SE16.7	SSE27
27-Nov	SE20	SE13	SE11	SE12	SSE9	SSE9	SE11	SE13	SSE6	SE3	SE4	ESE1	SSE2	SSE2	SSW1	SSE11	SSE15	SE15	SSE13	SSE17	SE18	SSE17	SSE18	SSE15	SSE10.6	SE20
28-Nov	SSE16	SSE17	SSE16	SSE16	SSE19	SSE20	SSE19	SSE16	SSE12	SSE16	SSE19	SSE22	SSE18	SSE18	SSE15	SSE12	SSE20	SSE23	SSE22	SSE19	SSE20	SE21	SSE18	SSE22	SSE18.1	SSE23
29-Nov	SSE23	SSE18	SSE16	SSE17	SSE15	SSE16	SSE16	SSE19	SSE19	SSE14	SSE16	SSE15	SSE15	SSE13	SSE16	SSE13	SSE13	SSE10	SSE16	SSE21	SSE20	SSE18	SSE20	SSE19	SSE16.6	SSE23
30-Nov	SSE19	SSE21	SE21	SSE20	SSE22	SE22	SE23	SE22	SSE18	SSE17	SSE17	SSE18	SSE18	SE20	SE18	SE18	SSE16	SE16	SSE20	SSE18	SSE20	SSE17	SSE16	SSE17	SSE18.9	SE23
S5.2 S4.7 SSE4.7 SSE4.7 S3.9 S3.5 S3.2 S3.1 S2.6 SSW3.1 S3.8 S4.5 S4.3 SSW3.9 SSW3.5 SSW4.6 S4.8 SSE5.4 SSE5.1 S5.9 SSE6.4 S6.1 S5.9 S5.9																								Diurnal Average		
SSE31 W28 SE23 SSE31 W22 SSE23 SE23 SE22 SSE19 W25 W24 SSE27 SSE27 W26 W23 SSE23 SSE22 SSE29 SSE30 SSE33 SSE35 SSE29 SSE29 SSE26																								Diurnal Maximum		

AF - Analyzer Failure

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

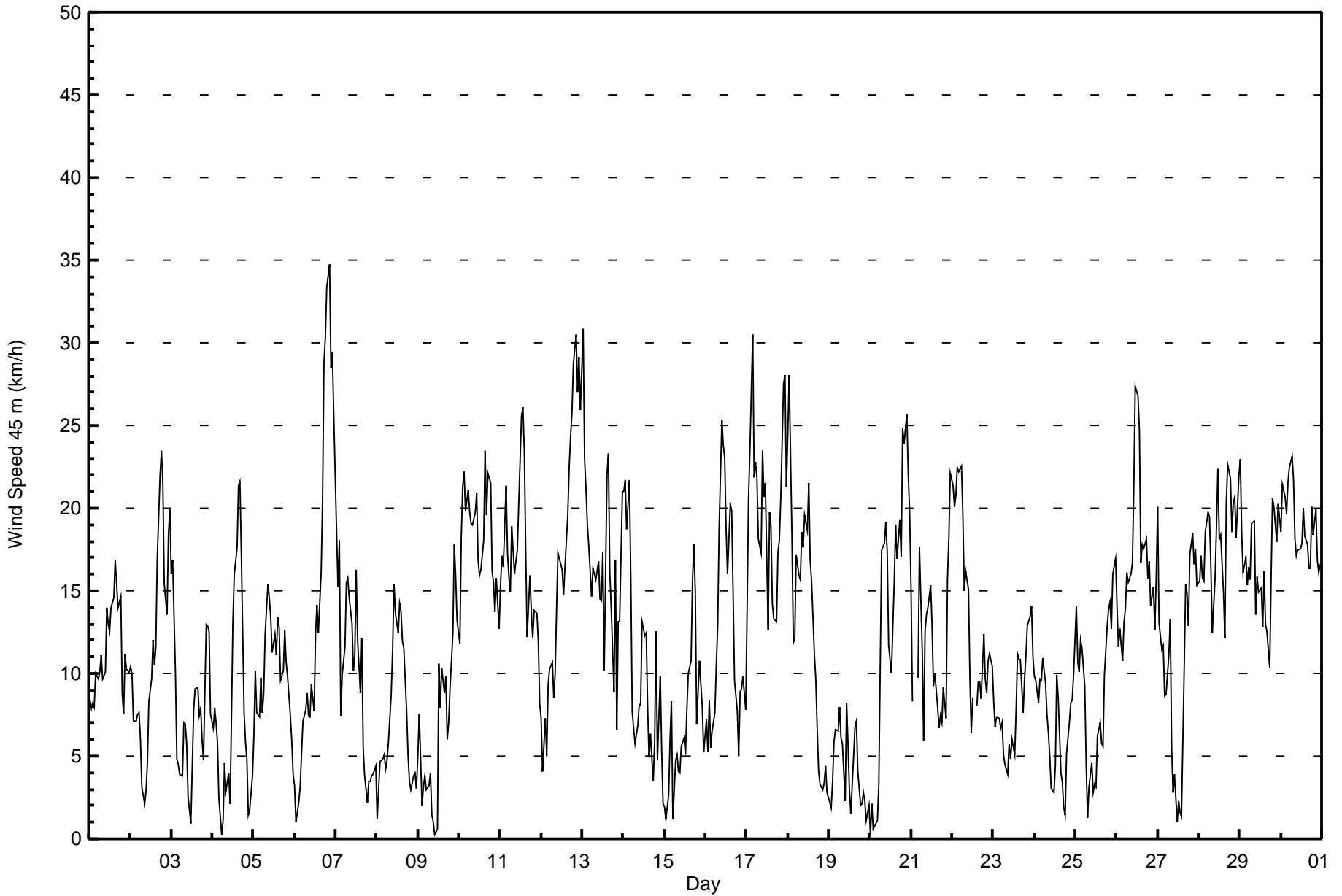


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Nov 17 18:00	Hours in Service: 720 Hours of Data: 717 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6
Minimum Value: 1 km/h on Nov 9 11:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 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-Nov	2	2	3	3	3	2	3	3	3	4	4	5	4	4	4	5	4	4	4	3	2	3	3	3	5
2-Nov	3	3	3	2	3	3	2	2	1	1	4	3	3	3	2	3	4	5	5	5	5	4	4	5	5
3-Nov	4	5	5	3	3	3	3	2	2	2	2	1	3	2	3	2	2	2	2	3	4	3	3	4	5
4-Nov	3	2	2	2	2	1	1	2	2	1	1	5	4	4	3	4	4	4	4	3	2	1	1	2	5
5-Nov	1	3	3	3	3	2	3	3	4	4	3	4	4	3	4	4	3	3	3	3	3	2	2	2	4
6-Nov	1	1	1	1	1	2	2	2	2	2	2	2	4	3	3	4	6	7	7	6	6	5	6	6	7
7-Nov	4	2	2	4	3	3	3	3	5	5	5	6	3	5	3	2	4	1	1	2	2	2	2	2	6
8-Nov	3	3	3	2	2	2	3	1	2	5	6	4	4	4	5	4	4	3	1	1	1	1	1	2	6
9-Nov	2	2	2	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	1	2	3	3	2	2	3
10-Nov	3	4	3	3	3	4	4	3	4	4	4	4	4	4	5	5	5	5	5	4	5	5	3	3	5
11-Nov	3	3	5	6	4	4	4	5	5	4	5	4	4	7	5	4	4	4	4	3	4	3	2	3	7
12-Nov	3	2	4	2	2	3	1	1	3	5	4	3	4	3	3	5	5	5	5	5	5	6	7	5	7
13-Nov	7	8	5	5	5	4	5	4	5	4	3	6	4	4	4	5	4	3	3	3	5	3	2	5	8
14-Nov	4	6	4	4	4	7	5	5	3	2	2	4	3	5	3	2	2	2	4	2	2	4	2	1	7
15-Nov	1	1	2	2	2	1	2	2	1	1	2	2	2	3	3	3	3	3	4	5	3	3	2	3	5
16-Nov	3	2	3	2	2	3	3	5	5	5	5	6	5	4	5	4	3	3	3	2	2	3	2	3	6
17-Nov	4	3	5	6	6	6	6	5	7	6	7	5	4	4	4	5	7	8	5	5	6	6	6	5	8
18-Nov	5	5	6	3	5	4	4	4	5	5	6	5	6	5	4	3	3	1	2	1	2	1	1	2	6
19-Nov	1	1	2	1	1	2	2	2	2	2	2	2	3	1	2	2	1	1	1	1	2	1	1	1	3
20-Nov	1	1	1	1	1	2	4	4	4	4	4	3	3	3	3	4	5	6	5	7	5	5	4	4	7
21-Nov	2	4	AF	AF	5	7	6	3	2	2	3	3	3	3	4	3	2	3	5	4	3	5	4	5	7
22-Nov	4	4	5	5	5	5	4	4	6	5	2	2	3	AF	3	3	3	3	3	2	2	2	3	3	6
23-Nov	3	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	3	2	3	3	3	4	4	3	4
24-Nov	3	3	2	2	2	3	3	2	1	1	2	2	2	3	3	2	1	1	1	4	2	2	3	4	4
25-Nov	3	4	3	4	2	3	3	1	2	2	1	1	1	2	2	1	2	2	2	2	2	3	3	3	4
26-Nov	3	3	3	2	3	3	5	5	4	5	4	3	3	5	3	4	3	3	3	2	3	2	3	2	5
27-Nov	3	4	3	3	3	3	2	4	3	2	2	2	2	1	1	4	1	2	2	1	2	2	2	3	4
28-Nov	2	1	2	2	1	2	4	4	6	4	2	3	3	3	4	3	3	2	1	2	2	4	2	1	6
29-Nov	4	2	2	1	2	1	2	1	2	2	2	4	3	2	3	4	2	2	2	1	1	2	3	2	4
30-Nov	2	3	2	2	2	3	3	3	5	3	3	3	2	2	1	2	3	3	2	2	2	3	1	2	5
	7	8	6	6	6	7	6	5	7	6	7	6	6	7	5	5	7	8	7	7	6	6	7	6	

Diurnal Maximum

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	134	18.69	18.69
6 - 11	212	29.57	48.26
12 - 19	260	36.26	84.52
20 - 28	100	13.95	98.47
29 - 38	11	1.53	100.00
> 38	0	0.00	100.00

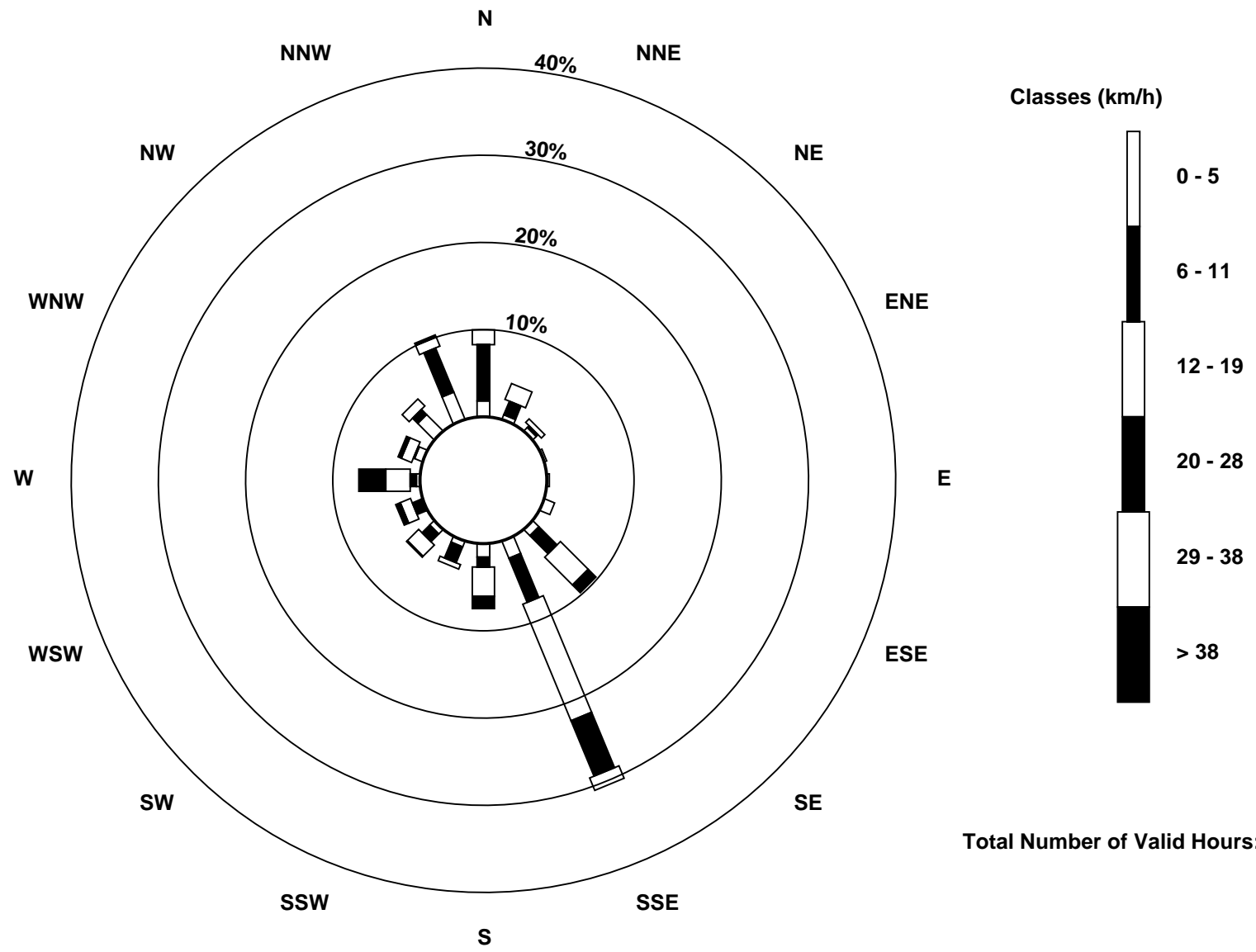
Total Number of Valid Hours: 717

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Maximum Speed: 44 km/h on Nov 6 19:00	Maximum Daily Speed Average: 23.9 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 3 12:00	Minimum Daily Speed Average: 0.2 km/h on Nov 19	Hours of Data: 682
Maximum Diurnal Speed Average: 8.5 km/h at hour 23	Minimum Diurnal Speed Average: 5.0 km/h at hour 14	Hours of Missing Data: 38
Monthly Average Velocity: 6.4 km/h 203.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 9 Median = 14 Q ₃ = 22 P ₉₀ = 28 P ₉₉ = 39	Percent Operational Time: 94.7

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-Nov	N12	NNE12	NNE12	N12	NNE14	NNE13	NNE15	NNE17	NNE16	NNE17	NE19	NNE18	NE17	NNE18	NNE19	NNE22	NNE20	NNE20	NE21	NNE14	N12	N15	N15	N14	NNE15.6	NNE22	
2-Nov	N14	N13	NNE10	NE9	NE10	NE10	NNE8	NNE4	NNE3	N2	SSE8	SE10	SE14	SSE14	S13	SSE15	SSE21	SSE27	SSE32	SSE29	SE23	SSE21	SSE24	SSE27	SE9.4	SSE32	
3-Nov	SE24	SE24	SSE18	SE11	SE12	SE10	SE8	SSE7	SSE9	SSE8	SSE3	ESE1	NNW5	NNW8	NNW13	NNW14	NNW11	NNW12	NNW9	NNW9	W18	W19	W18	WSW14	SSW2.1	SE24	
4-Nov	SW12	SSW10	SSW9	SSE7	SSE4	SSE4	SSE7	SSE9	SSE6	SSE8	SSE12	SE17	SE22	SSE24	SSE23	SSE22	S23	S14	SW5	NW5	W6	W8	NNW6	S9.9	SSE24		
5-Nov	NNW10	NNW15	NNW13	NW13	NNW16	NNW13	NNW13	N15	N20	NNW20	NNW18	NNW15	NNW17	N14	N17	NNW17	NNW14	NNW14	N16	N15	NNW13	N11	N8	NNW4	NNW13.9	N20	
6-Nov	N3	NE2	ESE2	SE4	SE8	SSE8	SSE9	SE11	SE9	SSE9	SSW11	SSE8	SSE14	SSE15	SSE15	SE22	SE30	SE42	SE44	SSE40	SSE41	SSE34	SSE37	SSE30	SSE18.0	SE44	
7-Nov	SSE22	SSE17	S10	SW13	WSW20	WSW22	WSW27	WSW27	WSW27	W24	WSW18	WSW18	WSW21	WSW18	WSW14	WSW20	WSW12	WSW7	SW10	SW17	SW14	WSW14	WSW15	WSW18	WSW15.7	WSW27	
8-Nov	W15	NW5	WSW11	W14	W8	N7	NNW11	N12	N16	N17	NNE20	NNE19	NNE17	NNE19	NNE18	NNE17	NNE16	NNE11	NNE8	NE6	NNE5	NNE7	NNE7	NNE5	N9.1	NNE20	
9-Nov	N7	NNE11	N7	N6	NNW6	N4	NNW2	NNW4	N3	NE2	ESE1	S2	SSW11	SSW8	SW12	SSW10	SSW11	SSW8	S10	S11	S14	SSE18	SSE19	SSE17	S3.8	SSE19	
10-Nov	SSE20	SSE28	SSE32	SSE28	SSE28	S25	S27	SSW24	S31	S29	S26	S20	S18	S19	S21	SSE25	S26	S28	S29	S23	SSE19	SSE17	SSE21	SSE19	S23.9	SSE32	
11-Nov	SSE21	SSE22	SSE25	SSE26	S25	SSW22	SW24	SW29	SW25	SW26	SW24	WSW26	WSW31	WSW34	WSW30	WSW23	SW24	SW26	WSW24	WSW21	SW18	WSW19	WSW17	SW12	SW20.2	WSW34	
12-Nov	SW10	WSW12	SW10	WSW11	SW6	SW7	SSW6	SSE11	SSE13	SSE13	SSE15	SSE17	SSE19	SSE18	SSE17	SSE22	SSE29	SSE30	SSE35	SSE36	SSE37	SSE35	SSE36	SSE34	SSE18.2	SSE37	
13-Nov	SSE39	SSE27	S30	S28	S24	S19	SSE18	SSE18	S20	SSW29	SSW24	SW21	SSW13	SW14	WSW27	WSW29	WSW25	WSW22	WSW18	SW24	WSW16	WSW23	WSW22	WSW30	SSW19.4	SSE39	
14-Nov	WSW32	WSW30	WSW27	WSW29	WSW25	WSW15	WSW13	SW6	SSW6	SW8	S7	SSE10	S6	WSW17	SW13	SW11	SW17	SW13	SW15	WSW20	WSW16	SW5	SE10	SE10	SW13.1	WSW32	
15-Nov	SE5	SE8	S4	SSE8	SE13	ESE5	ESE3	N7	N7	NNW9	N10	NNW7	NNW12	N17	N18	NNE21	NNE24	NNE24	N12	N17	N15	N14	N13	NNE8.3	NNE24		
16-Nov	N13	NNW11	NNW14	NNW10	NNW12	NW13	NW19	NNW20	W26	W36	W34	W32	W25	W22	W28	WSW26	WSW19	SW14	SW15	SSW14	SSE10	SSE13	SE16	SE19	W12.7	W36	
17-Nov	SSE23	SE31	SE36	SE42	SE35	SSE35	SE32	SE31	SE28	SSE35	SSE26	S28	SSW17	SW26	SW25	SW23	W22	W21	NW24	NW25	W31	W39	W37	W31	SSW15.5	SE42	
18-Nov	W33	W36	NNW26	NNW19	NW19	NW26	NW25	NW26	NNW28	NNW27	NNW28	NNW27	NNW31	NNW23	NNW21	NNW16	NNW15	N12	N10	NW7	NW5	W4	NNW6	NNW5	NW17.5	W36	
19-Nov	SSW3	S2	SSW4	S5	SSE7	SSE7	SSE10	SSE9	SE10	S5	SSE9	SSE8	SE3	NNE1	NW5	NNW12	NNW12	NNW10	NNW8	NW4	NNW7	NNW7	NNW8	NNW8	NW0.2	NNW12	
20-Nov	NNW4	WSW3	WSW4	NNW2	W5	W8	W15	W23	W26	W27	WSW20	SW13	SSW12	SSE14	SSE16	SSE24	SSE24	SE29	SSE25	SSE34	SSE28	SSE31	SSE24	S16	S11.6	SSE34	
21-Nov	S8	SW13	WSW24	WSW22	WSW18	WSW26	WSW18	SW11	SSW9	SSW7	SSW8	SSW9	S9	SSW8	SW16	SW15	S9	SSW10	SW16	WSW15	SW13	WSW26	WSW32	WSW33	SW14.5	WSW33	
22-Nov	WSW32	W32	W33	W36	W36	W35	W30	NNW24	NNW26	NW23	N14	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	W36	
23-Nov	AF	AF	AF	AF	AF	AF	AF	NNW7	NNW7	NNW9	AF	AF	AF	AF	AF	N14	N12	N1	N3	AF	N5	N6	AF	AF	----	N14	
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW5	SW3	NW7	N19	N14	N6	NNW7	NNW4	WSW2	WSW8	SW10	SSW13	SW16	SW18	----	N19
25-Nov	SW24	SW20	S12	S13	S13	SSW11	SW8	WSW7	WSW11	WSW11	WSW6	SW5	SW5	SSE6	SE8	SE9	S6	S8	S8	S6	S7	SSE9	SSE9	SSE12	SSW8.2	SW24	
26-Nov	SSE19	SSE16	SSE17	SSE16	SSE19	SSE17	SSE25	SSE20	SSE21	SSE27	SSE30	SSE21	SSE18	SSW11	SW14	SSW15	SSW12	S10	SSW9	SSW8	SSW9	SW9	S9	S15.3	SSE30		
27-Nov	SSW8	SW14	WSW12	WSW11	SW13	SW14	SW16	SW15	S4	SW5	WSW17	WSW11	W10	NNW8	W2	SSE3	S6	S8	SSW7	SSW8	SSW11	SSW9	SSW10	S6	SW8.7	WSW17	
28-Nov	S7	SSW7	S8	SSE10	S9	SSE10	SSE18	SSE21	SSE17	SSE16	SSE18	SSE18	SSE20	SSE19	SSE12	S8	SSE12	S14	S12	SSE11	S13	S15	SSE12	S14	SSE13.2	SSE21	
29-Nov	S14	SSE13	S9	S10	SSW8	S9	SSW7	S11	SSE16	SSE11	SSE11	SSE14	SSE18	SSE16	SSE21	SSE17	SSE12	SSE14	SSE13	SSE13	SSE13	SSE20	SSE21	SSE18	SSE13.5	SSE21	
30-Nov	S14	S16	S16	SSE18	SSE23	SSE23	SSE20	SSE22	SSE19	SSE13	SSE15	SSE16	S11	SSW10	SW11	SW11	SW12	SW10	SSW7	SSW6	SW6	SW9	SW7	SSE10	S12.2	SSE23	

SSW7.7SSW7.3SSW7.2SSW7.1SSW7.0SSW6.5SSW6.5SSW5.4SSW5.1 SW5.8SSW5.6SSW5.7SSW5.2SSW5.0 SW5.6 SW5.4SSW5.5 S6.2 S6.1SSW7.7SSW7.0SSW7.9SSW8.5SSW8.5	Diurnal Average
SSE39 W36 SE36 SE42 W36 W35 SE32 SE31 S31 W36 W34 W32WSW31WSW34WSW30WSW29 SE30 SE42 SE44 SSE40 SSE41 W39 W37 SSE34	Diurnal Maximum

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

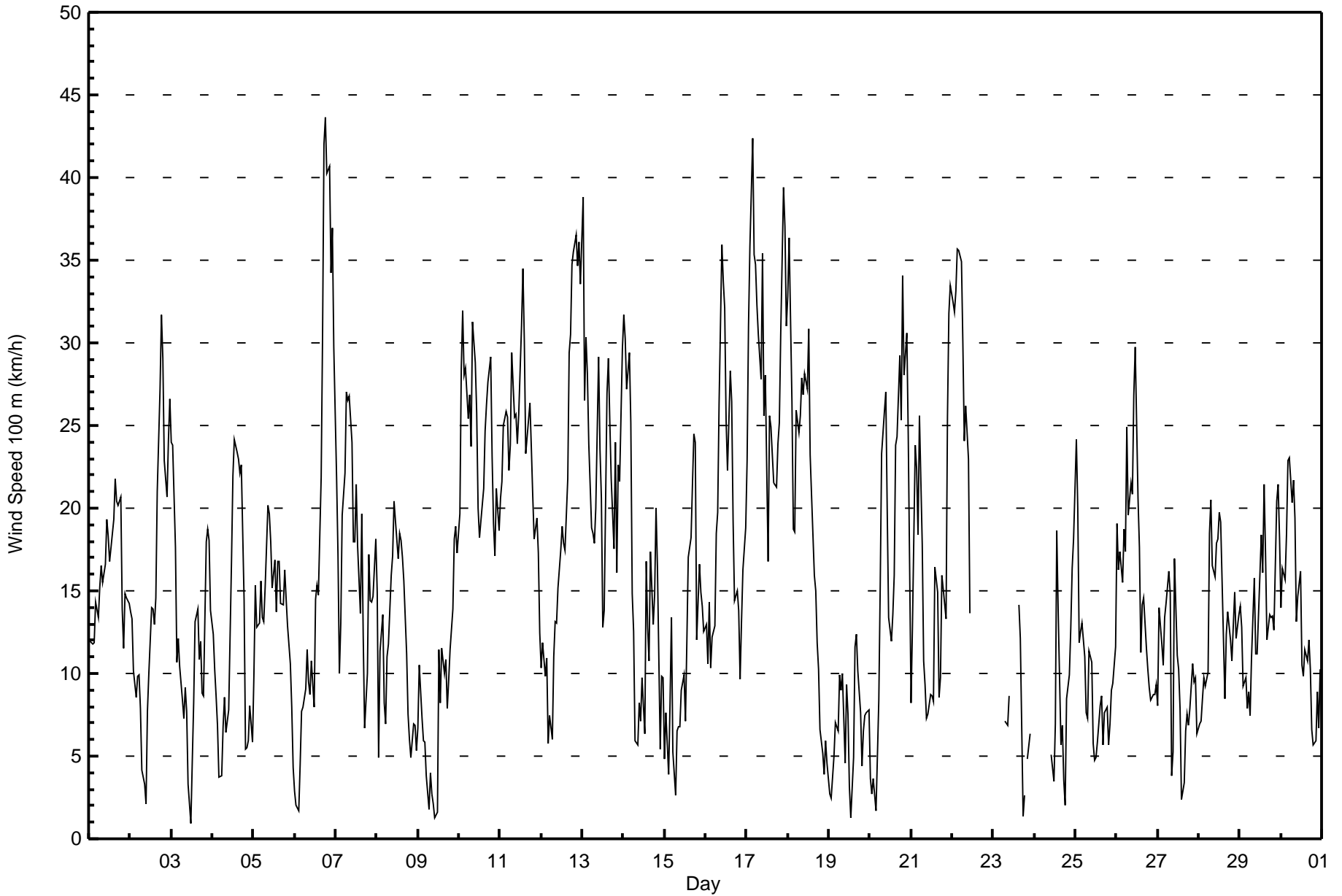


Summary of Hour Standard Deviations

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 9 km/h on Nov 17 18:00	Hours of Data: 682
Minimum Value: 0 km/h on Nov 9 10:00	Hours of Missing Data: 38
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 94.7

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-Nov	2	2	3	2	2	1	2	2	3	4	4	4	3	3	3	3	3	3	4	3	3	3	3	2	4
2-Nov	3	2	3	2	2	2	2	2	1	1	4	3	3	4	3	4	4	6	5	6	4	4	4	5	6
3-Nov	3	3	4	3	3	2	2	2	2	2	2	1	2	2	3	2	1	2	2	4	4	3	3	4	4
4-Nov	2	2	2	3	2	2	2	2	3	3	3	3	3	5	4	4	5	3	6	3	2	2	2	3	6
5-Nov	2	2	3	3	3	2	3	2	3	3	3	4	3	3	3	3	3	3	2	2	2	2	1	2	4
6-Nov	1	1	1	2	1	2	2	2	2	2	3	3	4	3	3	3	5	3	3	5	4	4	6	7	7
7-Nov	4	5	3	6	3	3	2	2	5	5	7	5	3	5	3	2	4	1	3	2	5	3	2	2	7
8-Nov	5	4	4	3	3	2	2	2	3	4	6	4	3	4	4	3	3	3	1	1	2	2	1	2	6
9-Nov	2	1	3	2	2	2	1	0	1	0	1	3	3	3	3	3	3	3	2	2	2	4	4	4	4
10-Nov	3	6	5	5	5	5	6	5	4	5	6	5	5	5	5	4	4	6	6	6	5	5	4	5	6
11-Nov	3	4	6	6	5	6	6	3	3	3	4	3	3	6	4	3	2	3	4	5	4	3	3	4	6
12-Nov	3	3	4	3	3	3	2	4	3	3	3	3	3	4	4	5	6	6	4	5	6	7	8	7	8
13-Nov	7	7	6	6	7	5	5	5	5	5	6	7	5	4	4	4	3	3	3	2	6	3	2	3	7
14-Nov	3	5	3	3	4	8	5	3	3	4	3	3	3	3	3	3	4	3	2	1	3	4	3	3	8
15-Nov	2	2	1	3	2	3	2	2	1	1	2	3	2	3	2	2	2	3	5	4	2	2	1	2	5
16-Nov	2	2	3	2	2	3	3	5	6	4	3	6	5	5	5	4	3	3	3	5	2	4	2	3	6
17-Nov	5	3	5	4	4	5	5	4	6	4	8	6	5	3	3	3	8	9	6	5	7	4	4	5	9
18-Nov	4	3	6	4	5	4	4	5	6	6	6	6	6	5	5	3	3	1	2	2	2	2	1	3	6
19-Nov	1	1	1	2	2	2	1	2	2	2	3	2	3	1	2	2	1	1	1	1	1	1	1	2	3
20-Nov	1	1	1	1	3	2	4	4	3	4	3	3	4	3	4	4	6	6	4	6	6	5	5	5	6
21-Nov	2	4	5	4	4	8	6	4	3	3	3	4	3	4	4	3	3	3	4	3	5	5	4	3	8
22-Nov	3	3	3	5	4	4	4	4	7	6	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	7
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	2	3	3	AF	AF	AF	AF	2	6	2	1	AF	2	2	AF	AF	6
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	4	5	2	2	1	3	4	2	4	3	6	6
25-Nov	2	5	3	3	3	3	2	3	4	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	5
26-Nov	3	5	3	4	3	4	4	3	3	4	2	4	4	3	5	5	5	3	2	3	4	3	3	3	5
27-Nov	2	4	5	3	4	2	3	3	2	4	4	4	3	2	1	2	2	3	3	2	3	3	3	2	5
28-Nov	2	2	3	2	3	2	2	4	3	4	2	3	1	4	4	2	3	2	2	2	2	3	3	2	4
29-Nov	2	2	2	2	2	2	2	2	5	3	3	3	3	2	3	3	3	3	2	3	4	2	3	3	5
30-Nov	3	3	3	3	2	3	3	3	4	3	2	3	3	3	3	3	4	4	2	1	2	2	3	3	4
	7	7	6	6	7	8	6	5	7	6	8	7	6	6	5	5	8	9	6	6	7	7	8	7	
	Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	60	8.80	8.80
6 - 11	188	27.57	36.36
12 - 19	228	33.43	69.79
20 - 28	141	20.67	90.47
29 - 38	58	8.50	98.97
> 38	7	1.03	100.00

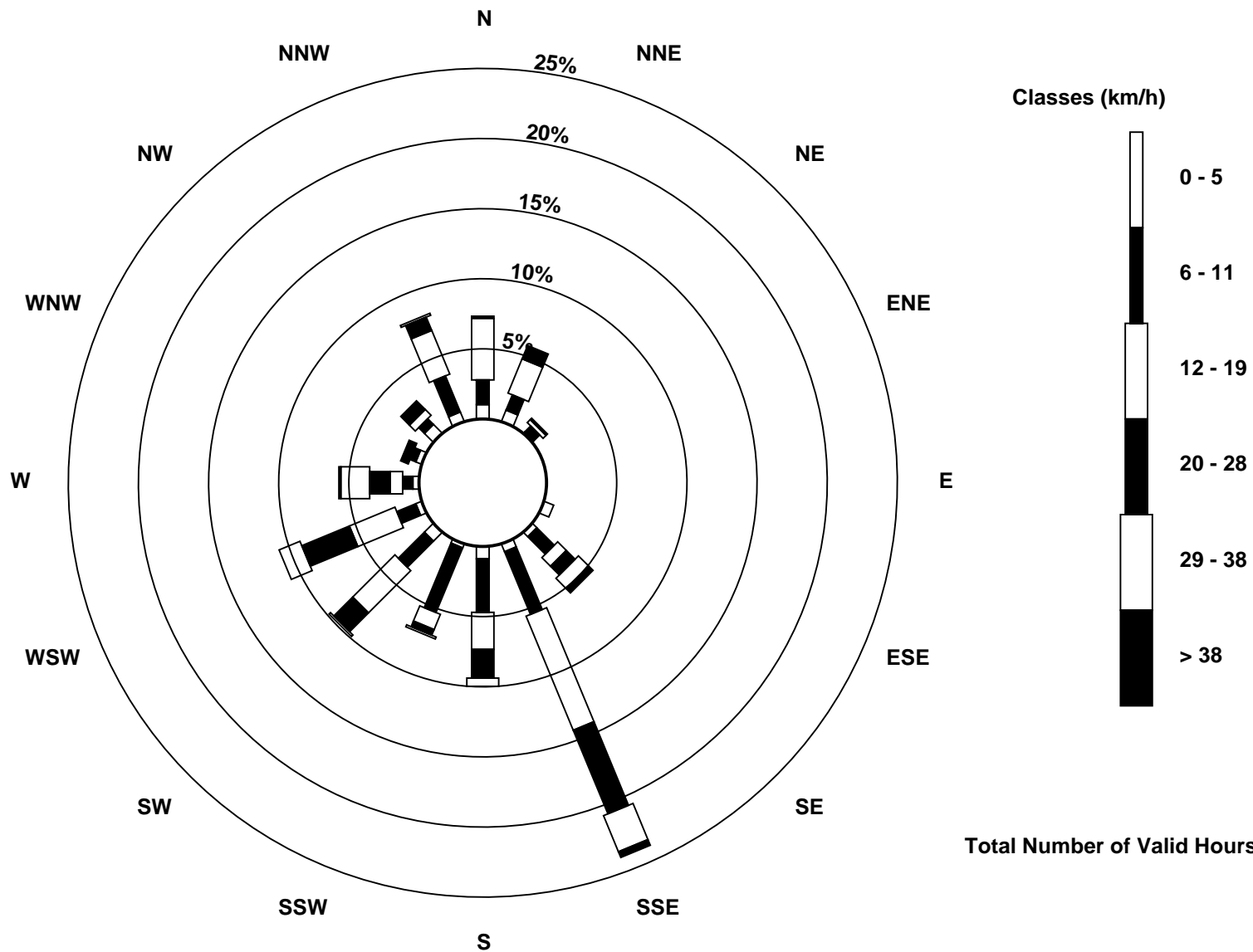
Total Number of Valid Hours: 682

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Maximum Speed: 45 km/h on Nov 17 22:00	Maximum Daily Speed Average: 29.7 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 3 12:00	Minimum Daily Speed Average: 1.2 km/h on Nov 19	Hours of Data: 720
Maximum Diurnal Speed Average: 11.0 km/h at hour 22	Minimum Diurnal Speed Average: 6.3 km/h at hour 13	Hours of Missing Data: 0
Monthly Average Velocity: 8.5 km/h 232.6 deg	Percentiles: P ₁ = 3 P ₁₀ = 8 Q ₁ = 13 Median = 17 Q ₃ = 25 P ₉₀ = 34 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-Nov	NNE14	NNE15	NNE14	NNE13	NNE18	NNE16	NNE18	NNE20	NE21	NE22	NE24	NE20	NE18	NE18	NNE21	NNE23	NNE23	NNE25	NE26	NNE17	NNE13	N15	N16	NNE16	NNE18.4	NE26
2-Nov	N14	N14	NNE11	NE10	NE11	NE11	NE9	NE5	ENE4	ESE3	SSE10	SSE11	SE15	SSE15	S17	SSE18	SSE21	SSE28	SSE33	SSE31	SSE23	SSE22	SSE26	SSE27	SE10.6	SSE33
3-Nov	SSE25	SSE23	SSE21	SSE13	SE13	SE10	SSE8	S7	SSE10	S9	SSW4	SW1	NNW4	N8	N13	N14	NNW10	NNW10	NNW9	WNW13	W21	W24	W22	WSW17	SW3.4	SSE25
4-Nov	SW13	SSW13	SW10	SSW7	SSW7	S9	S13	SSE17	SSE16	SSE16	SSE17	SE22	SSE23	SSE20	SSE25	S26	S25	S23	SSW20	SSW13	WSW6	W9	W11	WNW10	S13.0	S26
5-Nov	NW15	NNW20	NNW16	NW18	NNW20	NNW16	NNW16	N15	N21	N20	NNW21	NNW17	NNW18	NNW14	N17	NNW18	NNW16	NNW16	N17	N15	N13	N11	N8	N5	NNW15.6	NNW21
6-Nov	N3	NNE3	E1	SSE5	SSE7	SSE7	SSE8	SSE10	SSE9	S10	SSW15	S8	SSE14	SSE16	SSE17	SSE23	SE33	SSE42	SSE39	SSE38	SSE37	SSE35	SSE40	S36	SSE18.0	SSE42
7-Nov	S23	SSW18	SW24	WSW26	WSW29	WSW32	WSW38	WSW37	W38	W35	WSW27	WSW25	WSW26	WSW22	WSW18	W24	W16	W12	WSW14	WSW20	W26	WSW27	WSW25	WSW28	WSW24.3	W38
8-Nov	W25	WNW11	W16	W21	WNW11	NNW11	NNE16	NNE20	NNE24	NNE19	NNE23	NNE21	NNE18	NNE19	NNE19	NNE18	NNE17	NNE13	NNE9	NE9	NNE7	NNE11	NNE10	NE9	N11.5	W25
9-Nov	NNE9	NNE13	NNE10	N8	N7	N4	NNW1	NNW3	NNE4	ENE3	SE3	SSW3	SSW13	SSW9	SW12	SSW11	SSW12	SSW10	S11	S15	S13	S18	S22	S18	S4.4	S22
10-Nov	SSE24	S34	S35	S34	S33	S33	SSW41	SSW39	SSW36	SSW34	S31	S24	S22	S22	S25	S31	S35	S37	S35	S29	S26	S20	SSE24	SSE25	S29.7	SSW41
11-Nov	SSE26	SSE27	SSE30	S29	SSW32	SW36	SW31	SW34	SW30	SW29	SW28	WSW31	WSW37	WSW40	WSW36	WSW28	SW29	WSW34	WSW36	WSW31	WSW24	WSW28	WSW24	SW18	SW26.8	WSW40
12-Nov	WSW16	WSW20	WSW16	WSW19	WSW14	WSW15	SW11	SSW10	S14	SSW13	S13	S15	SSE18	S17	S19	S27	S34	SSE35	SSE34	SSE36	SSE39	SSE40	SSE42	SSE40	S20.1	SSE42
13-Nov	S44	S35	S37	S36	SSW32	SSW27	S24	SSW25	SSW30	SW37	SW29	SW25	SW19	SW18	WSW33	WSW37	WSW34	WSW30	WSW23	WSW31	WSW24	WSW33	WSW31	WSW40	SW26.9	S44
14-Nov	WSW43	WSW41	WSW36	WSW39	W33	WSW23	WSW21	WSW11	SW11	SW14	SW10	SSW6	SW8	WSW21	SW16	SW14	SW22	WSW20	WSW23	WSW35	WSW30	WSW17	SSW3	S5	WSW20.3	WSW43
15-Nov	WSW3	WNW1	SSW4	S9	SSE12	SE13	SSE6	WNW1	NE5	NNE10	NNE19	NNE17	NNE12	NNE16	NNE19	NNE22	NE31	NNE33	NE32	NNE18	NNE19	NNE18	NNE17	NNE17	NNE11.3	NNE33
16-Nov	N17	N14	N18	N12	NNW15	NW17	NNE24	WNW24	W32	W40	W37	W37	W29	W26	W32	W31	WSW24	WSW19	SW20	SW19	SSW11	S14	SSE16	SSE18	W15.2	W40
17-Nov	SSE27	SE33	SE42	SSE44	SSE33	SSE32	SSE32	SSE31	SSE31	SSE38	S31	SSW34	SSW26	SW29	SW28	SW27	W30	W28	NW27	NW28	WNW35	W45	W41	W35	SSW18.9	W45
18-Nov	W35	W37	WNW30	NNW23	NW22	NW31	NW30	NNW32	NNW34	NNW32	NNW33	NNW31	NNW35	NNW26	NNW24	NNW18	NNW17	N16	N15	NNW12	NW10	WNW8	W8	WNW5	NW21.4	W37
19-Nov	W6	WSW5	SW5	SSW9	S9	S7	S8	S5	SE7	S7	S8	S5	SSW4	NE2	NNW5	N11	N14	N14	N11	NNE8	NNE6	NNW7	NNW11	N13	NNW1.2	N14
20-Nov	NNE5	W5	W8	W7	WNW10	WNW11	W18	W23	W30	W31	WSW22	SW14	SSW14	S16	SSE17	SSE22	SSE23	SSE25	SSE23	S33	S30	S29	SSW23	SSW18	SSW12.6	S33
21-Nov	SW12	WSW19	WSW33	WSW32	WSW26	WSW36	WSW24	WSW18	SW18	SW13	SW15	SW17	SW15	SW14	SW21	SW19	SW15	SW18	WSW23	WSW22	SW20	WSW34	W41	W41	WSW22.1	W41
22-Nov	W40	W38	W38	W44	W40	W38	WNW34	WNW30	WNW34	NW31	N16	NNE14	NNE15	NNE15	NNE14	NNE15	NNE14	NNE14	NNE18	NNE15	N14	NNE14	NNE15	N15	NW16.3	W44
23-Nov	N13	N13	N14	N12	N13	N13	N11	NNE9	NNE9	N7	NNE7	NNE9	N8	N10	N13	N14	N16	N16	N16	N16	N16	N20	N20	N17	N12.9	N20
24-Nov	N14	N17	N15	NNW17	NNW18	NNW20	NNW19	NNW15	NNW12	NW11	NW7	WSW5	NW9	N14	N12	N7	NW10	NW5	W6	WSW10	SW12	SW17	SW21	SW24	NW8.6	SW24
25-Nov	SW27	SW24	SSW19	SSW17	SSW19	SW17	WSW11	WSW17	WSW19	WSW16	WSW10	WSW7	SW9	SSW7	S5	SSW6	WSW13	SW11	SW14	SW13	SW13	SW13	SW17	SSW15	SW13.6	SW27
26-Nov	S13	S17	SSW13	S16	S18	S18	S16	SSW17	SSW18	SSW17	S18	S18	SSW17	SSW19	SW23	SW27	SW25	SW19	SSW13	SW17	SW16	WSW21	WSW16	SW14	SSW16.7	SW27
27-Nov	SW18	WSW27	WSW26	WSW25	WSW25	WSW23	WSW20	WSW14	W6	W5	W19	W22	W17	WNW9	WNW6	W7	SW13	SW18	WSW20	WSW20	SW19	SW15	WSW19	WSW15	WSW16.4	WSW27
28-Nov	SW12	WSW17	WSW16	SW11	SW17	SW18	SSW12	S16	S15	S16	SSW13	SSW14	S16	S20	SSW19	SW15	SW20	SW24	SW21	SW13	SW18	SW22	SSW19	SW19	SSW16.0	SW24
29-Nov	SW20	SW17	SW13	SW13	SW15	SW13	SW16	SW16	SSW15	SW12	SSW12	SSW12	S10	S13	S21	S16	SSW14	S14	SSW16	SSW20	SSW17	S16	SSW19	SSW16	SSW14.6	S21
30-Nov	S15	SSW17	SSW19	SSW16	SSW19	SSW21	SSW19	SSW19	SSW17	SSW16	SSW13	SW13	SW16	SW19	WSW20	WSW23	WSW24	WSW26	WSW18	WSW14	WSW19	WSW27	WSW20	SW12	SW17.2	WSW27

SW9.2 SW9.1 SW9.4 SW9.6WSW9.6WSW9.7WSW8.7WSW8.0WSW7.9WSW8.7WSW7.4WSW6.5 SW6.3 SW6.3 SW7.2 SW7.6 SW7.7 SW7.6 SW7.1 SW9.4 SW9.7SW11.0SW10.7 SW9.9	Diurnal Average
S44 WSW41 SE42 SSE44 W40 W38 SSW41 SSW39 W38 W40 W37 W37WSW37WSW40WSW36WSW37 S35 SSE42 SSE39 SSE38 SSE39 W45 SSE42 W41	Diurnal Maximum

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

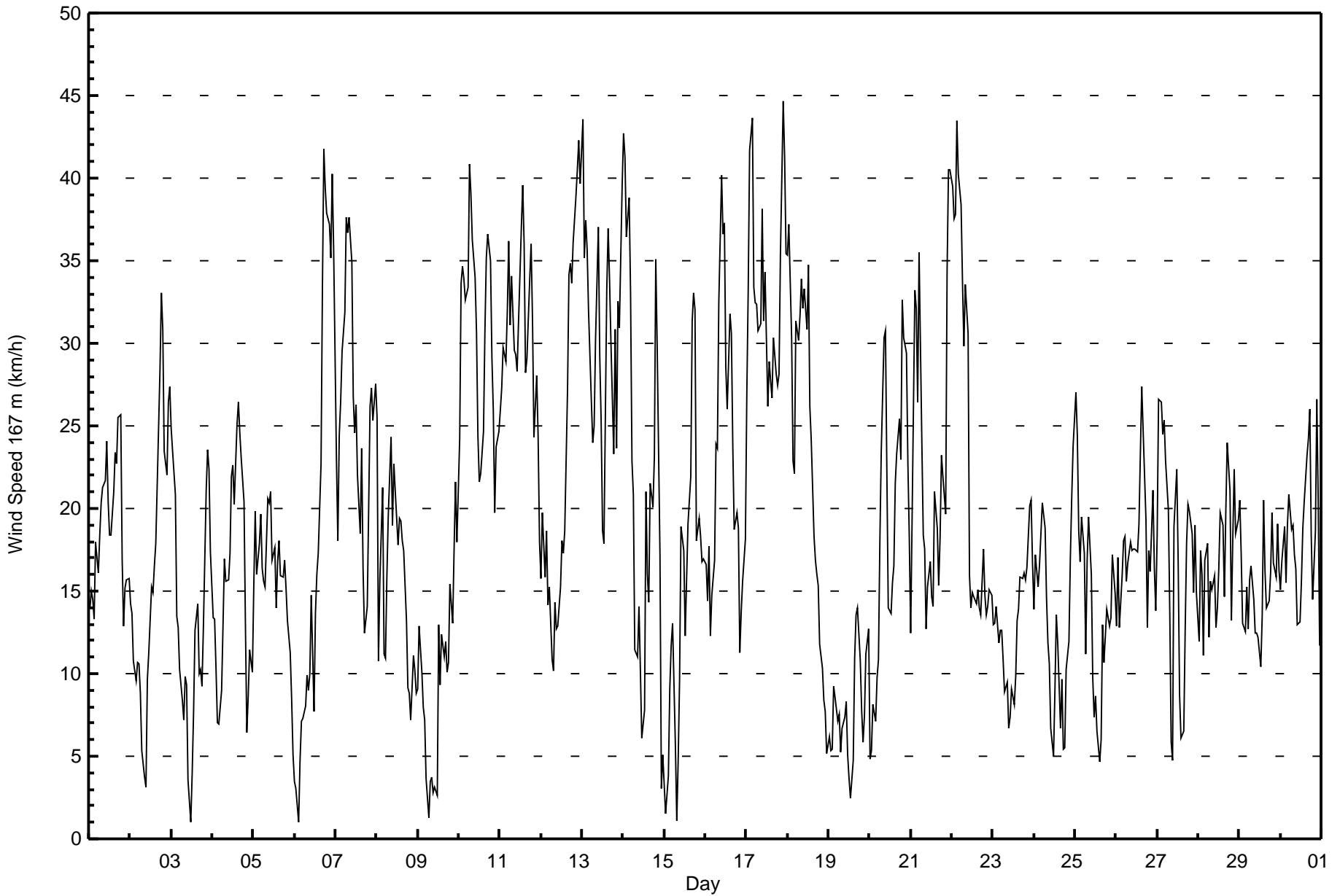


Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Nov 17 18:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 0 km/h on Nov 9 09:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 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-Nov	2	2	4	2	2	2	2	2	3	3	4	4	4	3	3	2	3	3	3	4	3	3	3	2	4
2-Nov	3	2	3	2	2	2	2	2	1	2	3	2	3	3	2	3	4	4	4	6	5	4	4	4	6
3-Nov	3	4	3	4	2	2	3	2	2	2	1	1	2	2	1	2	1	1	1	4	3	2	3	3	4
4-Nov	2	2	2	3	3	2	3	3	2	2	4	2	6	8	4	3	2	1	4	3	3	4	3	2	8
5-Nov	2	2	3	3	2	2	2	2	2	3	3	4	3	3	2	3	2	3	2	2	2	1	1	2	4
6-Nov	1	1	1	1	1	2	2	2	2	3	3	2	3	3	4	3	4	3	5	5	5	5	6	6	6
7-Nov	4	4	4	5	3	5	2	2	3	3	6	3	2	5	3	2	4	2	2	3	2	1	2	2	6
8-Nov	4	5	3	1	4	3	1	2	4	4	5	4	3	4	3	4	3	4	1	1	2	1	1	1	5
9-Nov	2	1	2	2	1	2	1	1	0	1	2	3	3	2	3	3	3	3	2	2	2	3	3	3	3
10-Nov	6	3	2	2	2	3	4	4	2	2	3	4	4	3	4	3	3	4	4	4	5	5	4	5	6
11-Nov	4	4	4	4	4	5	4	3	3	3	4	2	2	5	4	3	4	3	3	6	3	3	5	4	6
12-Nov	3	4	4	4	4	3	2	2	3	2	2	2	2	3	3	4	3	4	5	6	6	5	5	5	6
13-Nov	4	5	3	3	6	5	4	4	6	2	5	7	4	5	4	5	3	4	4	3	6	3	3	4	7
14-Nov	3	5	3	3	5	8	5	5	5	4	2	3	2	3	3	4	3	4	2	3	6	3	2	8	8
15-Nov	1	1	1	2	2	2	3	1	1	5	1	3	2	3	1	3	3	3	5	6	2	2	1	1	6
16-Nov	2	1	2	1	1	3	3	4	5	2	2	4	5	4	4	3	3	3	2	3	2	3	3	4	5
17-Nov	3	3	4	4	5	5	5	4	6	4	5	4	4	4	3	3	8	8	6	6	7	2	2	4	8
18-Nov	3	2	4	4	6	4	4	4	5	5	6	5	5	5	4	3	3	2	2	1	3	2	2	2	6
19-Nov	2	1	1	2	1	2	2	2	4	1	2	1	2	1	2	1	1	1	1	1	1	3	1	1	4
20-Nov	2	2	1	2	3	3	5	3	1	3	3	3	3	2	3	3	5	5	4	3	4	3	3	3	5
21-Nov	4	4	5	3	4	6	6	4	4	4	3	4	4	4	3	3	3	1	4	4	6	4	3	3	6
22-Nov	3	3	2	2	2	2	4	5	7	8	2	2	5	3	3	2	3	3	2	2	2	1	2	2	8
23-Nov	2	2	1	2	2	1	1	1	2	1	1	2	1	3	1	2	3	2	2	2	2	3	2	2	3
24-Nov	2	2	2	2	2	2	2	2	1	1	3	2	2	2	3	2	2	1	3	4	2	3	2	3	4
25-Nov	1	3	3	2	3	3	2	4	2	2	2	2	1	1	1	2	1	1	1	1	1	1	2	3	4
26-Nov	1	3	2	4	4	3	2	1	1	1	1	2	3	3	4	3	6	3	3	3	4	3	3	3	6
27-Nov	3	4	3	3	4	3	1	2	2	2	6	2	3	4	1	2	2	2	2	2	2	2	3	4	6
28-Nov	4	2	3	2	2	5	3	3	2	2	2	2	2	3	2	2	3	2	2	2	4	3	2	2	5
29-Nov	2	3	2	1	4	2	2	1	3	2	2	2	2	4	3	4	2	3	2	2	3	2	3	3	4
30-Nov	2	2	3	3	4	3	3	4	3	3	4	3	3	3	2	3	3	2	3	2	4	2	4	2	4
																	Diurnal Maximum								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	39	5.42	5.42
6 - 11	110	15.28	20.69
12 - 19	283	39.31	60.00
20 - 28	151	20.97	80.97
29 - 38	112	15.56	96.53
> 38	25	3.47	100.00

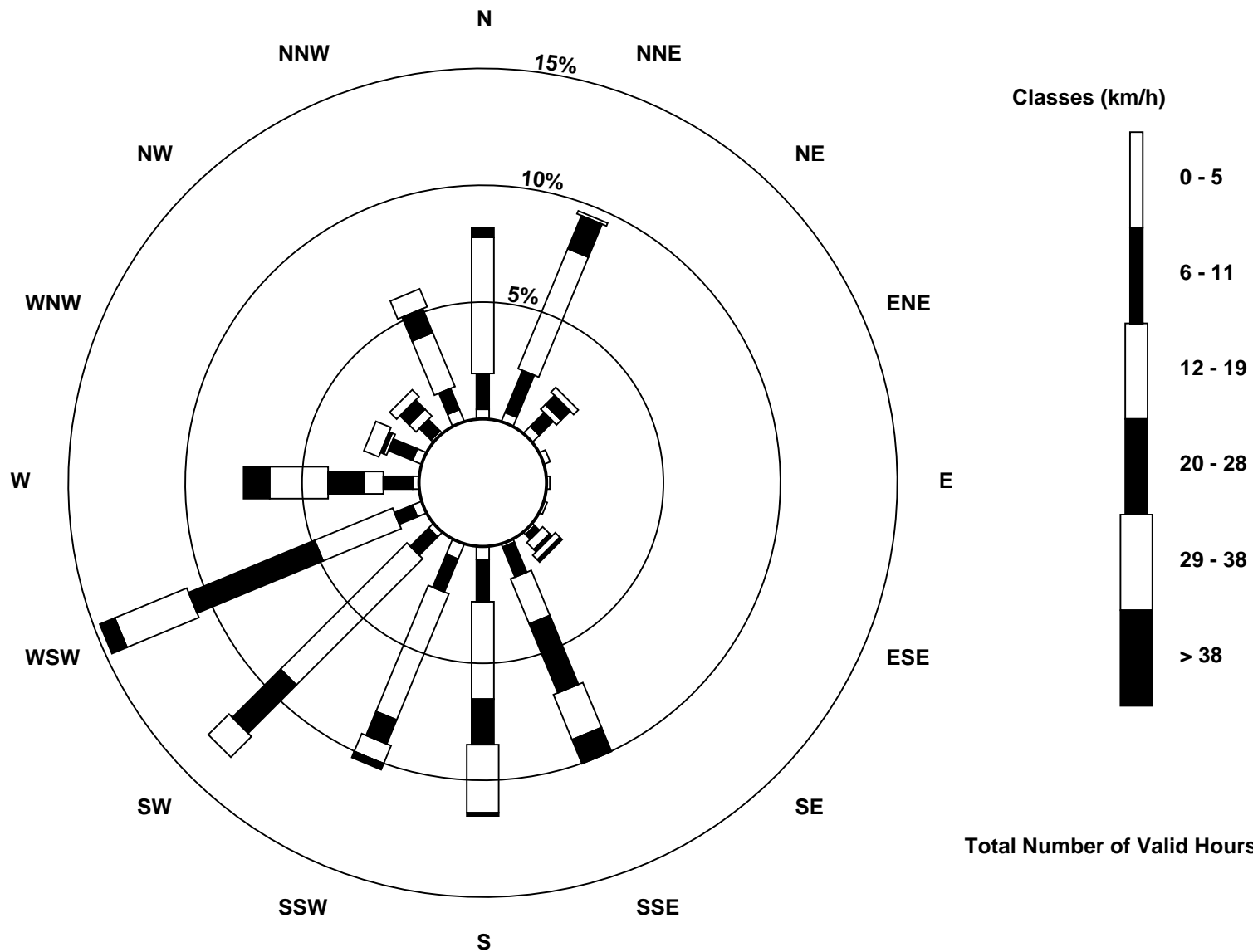
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Direction of Maximum Speed: 166 deg on Nov 13 01:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 148.1 deg on Nov 30		Hours of Data: 715
Direction of Minimum Speed: 43 deg on Nov 9 10:00	Direction of Minimum Daily Speed Average: 1.2 deg on Nov 19	Hours of Missing Data: 5
Monthly Average Direction: 250.1 deg		Percent Operational Time: 99.3

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-Nov	4	3	6	357	9	6	14	20	19	18	34	27	43	29	31	23	24	18	37	7	345	347	358	3	16.5
2-Nov	354	357	19	37	35	28	20	17	340	314	167	163	150	170	191	182	164	169	170	169	159	159	163	163	159.9
3-Nov	151	152	160	143	144	159	102	150	158	167	149	135	2	345	333	AF	AF	325	328	325	294	283	277	273	215.3
4-Nov	201	197	180	151	92	13	59	108	1	326	0	167	152	160	158	162	165	168	176	349	343	308	2	282	165.4
5-Nov	3	352	344	334	335	330	338	11	356	351	331	346	352	359	1	349	337	339	0	353	350	352	346	318	348.4
6-Nov	335	87	121	111	125	162	161	157	150	159	210	169	161	170	181	156	146	149	150	157	155	154	162	165	158.2
7-Nov	151	142	145	149	270	272	266	269	281	285	254	260	261	270	259	257	251	206	166	43	168	156	171	171	232.4
8-Nov	113	306	204	287	311	336	347	344	339	6	32	26	34	31	29	20	22	19	2	35	22	10	358	345	13.0
9-Nov	355	11	302	330	315	310	310	328	11	43	287	173	215	206	227	215	201	202	186	168	171	157	155	152	188.8
10-Nov	155	150	152	153	151	158	181	184	177	179	185	181	189	184	171	168	172	171	177	178	170	157	148	141	169.3
11-Nov	142	145	149	163	175	182	208	225	223	222	234	257	258	266	261	246	219	235	267	256	227	238	234	157	219.4
12-Nov	153	162	153	147	140	150	146	140	140	165	153	155	165	164	169	168	164	160	156	160	162	167	166	165	159.9
13-Nov	166	168	176	184	180	166	161	154	163	192	197	202	153	203	253	250	256	246	235	233	251	267	263	261	198.9
14-Nov	270	266	270	265	261	261	255	144	140	140	132	154	156	255	245	209	220	206	256	248	268	157	150	1	228.7
15-Nov	348	163	64	146	139	20	354	344	331	334	332	332	334	342	348	349	1	3	17	329	350	357	358	344	354.6
16-Nov	349	338	352	335	329	313	326	294	284	276	275	287	291	285	276	269	255	230	214	181	153	154	151	146	276.3
17-Nov	157	142	138	148	148	159	152	145	152	161	167	168	182	231	227	224	272	291	319	323	293	276	275	278	197.1
18-Nov	269	268	297	333	325	320	321	328	331	330	335	343	346	346	345	336	337	337	323	320	289	327	337	342	321.5
19-Nov	176	186	148	145	149	151	154	148	126	182	146	144	135	302	304	320	312	295	306	AF	AF	AF	276	274	172.0
20-Nov	161	115	52	120	114	314	291	273	273	272	265	233	212	175	170	170	160	154	150	162	162	160	154	152	183.3
21-Nov	146	149	243	253	245	264	258	151	140	143	150	156	155	162	217	211	131	137	226	239	188	265	274	269	199.2
22-Nov	269	277	278	279	275	278	283	304	310	325	357	355	17	3	359	6	17	18	13	1	354	356	359	0	313.8
23-Nov	352	344	349	333	331	338	319	354	342	346	342	344	344	347	358	2	357	350	349	353	355	354	3	353	349.7
24-Nov	355	337	330	330	336	337	335	327	321	331	339	219	315	354	2	352	321	310	162	235	212	199	203	213	316.9
25-Nov	222	213	169	169	172	171	175	220	234	216	187	187	172	138	151	148	145	149	148	145	146	147	152	152	164.5
26-Nov	151	147	135	139	141	141	140	144	142	142	148	151	150	151	144	149	151	152	145	142	141	142	140	144	145.4
27-Nov	146	145	145	146	148	147	140	139	149	135	141	119	154	161	205	158	147	143	149	149	146	148	149	151	146.8
28-Nov	151	147	150	152	151	153	152	149	149	154	151	151	154	156	150	149	151	148	149	151	150	146	155	147	150.7
29-Nov	148	150	150	149	147	149	148	148	150	150	153	152	152	152	151	153	147	149	154	151	151	154	152	153	150.5
30-Nov	151	148	146	148	148	146	145	144	149	153	152	151	147	146	143	146	149	144	149	153	149	152	151	149	148.1

170.7 170.0 168.0 170.9 170.2 179.2 183.7 172.8 185.8 198.6 182.3 175.9 173.6 191.5 202.6 185.9 168.2 165.4 161.3 170.8 166.6 172.3 172.8 172.4

Diurnal Average

AF - Analyzer Failure

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

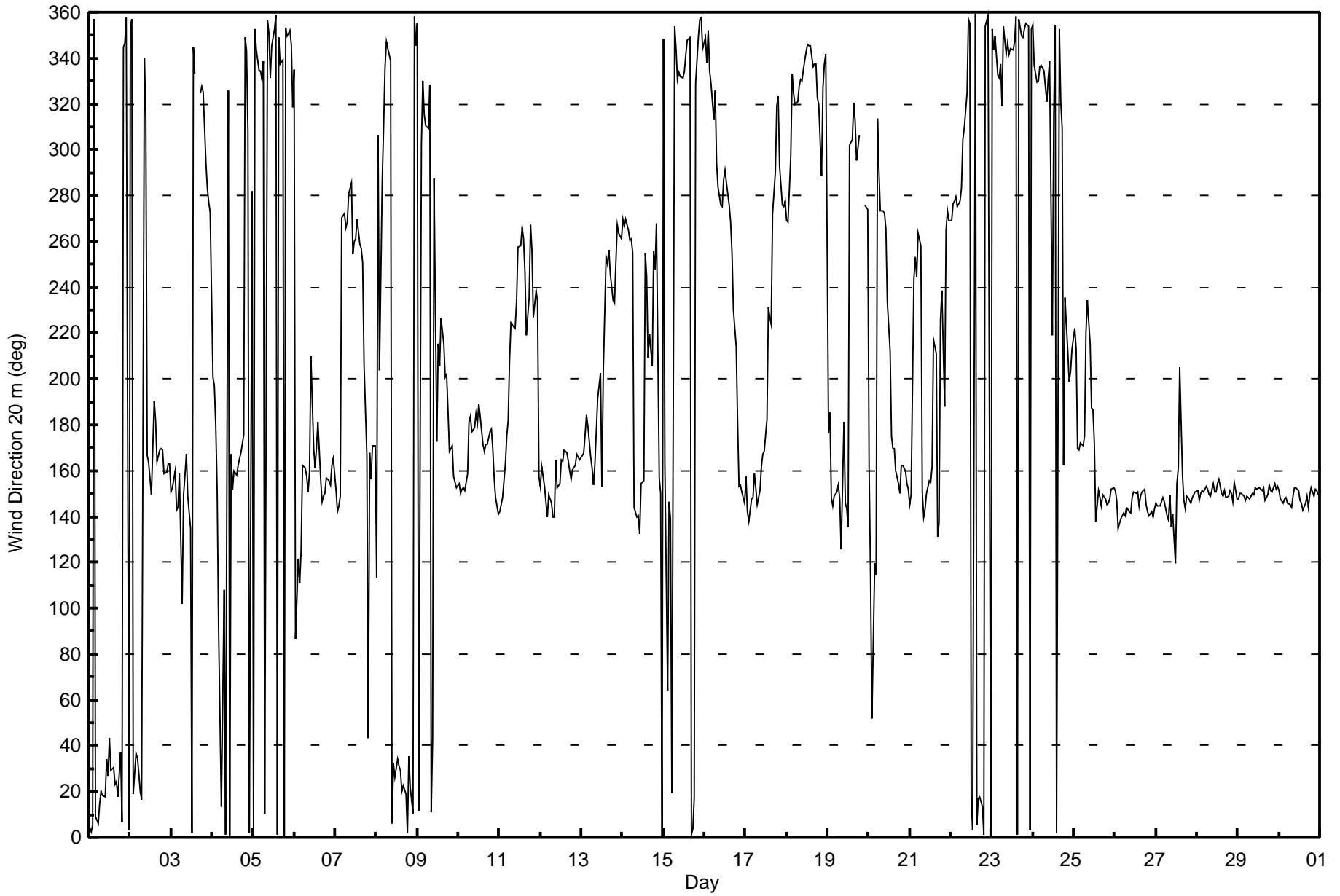


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 101 deg on Nov 7 20:00			Hours of Data:	715
Minimum Value: 4 deg on Nov 27 17:00			Hours of Missing Data:	5
			Hours of Calibration:	0
			Percent Operational Time:	99.3
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 17 Q ₃ = 24 P ₉₀ = 42 P ₉₉ = 91				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	19	19	24	18	18	18	19	20	25	28	23	30	30	24	23	20	21	24	21	32	22	16	21	21	32
2-Nov	20	21	34	25	25	30	24	47	56	42	92	18	23	19	12	15	11	11	10	10	15	13	11	12	92
3-Nov	16	17	26	50	66	68	79	20	16	20	35	61	81	18	16	AF	AF	12	20	33	19	17	19	40	81
4-Nov	20	12	21	25	90	66	80	82	44	25	54	70	16	15	16	8	7	7	54	40	33	59	88	45	90
5-Nov	20	18	19	20	16	16	17	23	20	22	17	27	23	27	20	18	18	19	20	20	16	18	19	42	42
6-Nov	35	77	25	22	21	16	13	15	19	29	16	24	17	14	15	13	15	16	15	10	10	11	11	9	77
7-Nov	14	12	10	56	24	13	15	15	21	26	59	32	17	18	16	10	52	40	91	101	36	40	36	31	101
8-Nov	89	89	53	59	37	24	51	22	16	24	23	23	26	23	24	26	24	28	20	26	32	31	35	42	89
9-Nov	22	20	76	39	27	28	10	16	66	92	90	89	12	22	15	20	18	23	19	14	9	10	8	10	92
10-Nov	13	11	10	9	10	11	11	11	10	11	12	13	14	13	12	7	9	10	11	14	14	21	13	17	21
11-Nov	12	12	16	12	12	13	18	11	12	11	20	14	13	15	15	14	14	19	17	24	12	13	14	27	27
12-Nov	14	29	12	16	30	15	9	11	18	17	12	11	13	11	7	7	8	9	9	9	9	8	8	8	30
13-Nov	8	9	11	13	15	14	15	16	21	14	14	32	12	38	15	12	13	9	24	9	46	16	12	14	46
14-Nov	14	16	15	12	19	87	65	35	33	18	23	16	9	28	23	23	19	51	51	11	65	11	68	29	87
15-Nov	59	70	87	33	15	51	15	25	23	24	19	25	25	19	24	21	18	17	29	35	21	18	21	74	87
16-Nov	24	23	17	19	22	22	18	20	19	15	16	21	20	22	18	15	16	30	21	25	13	19	15	33	33
17-Nov	17	15	14	14	16	17	17	19	21	14	11	9	17	10	9	12	29	16	18	18	24	17	16	17	29
18-Nov	15	14	26	18	16	15	13	16	17	15	17	19	18	18	18	17	17	16	46	39	82	26	28	83	83
19-Nov	40	65	45	37	14	23	18	29	22	51	16	20	55	97	20	16	13	15	36	AF	AF	AF	37	35	97
20-Nov	95	21	94	96	36	66	17	19	15	16	17	20	16	13	9	9	15	17	19	11	10	10	12	10	96
21-Nov	11	22	26	26	41	25	45	23	9	12	10	10	12	30	23	17	31	23	54	21	30	22	17	14	54
22-Nov	14	15	15	15	15	15	17	18	18	23	18	20	25	23	26	24	24	25	22	20	18	16	17	18	26
23-Nov	17	19	18	18	18	21	30	35	30	29	22	29	27	19	17	18	19	17	17	17	17	18	18	22	35
24-Nov	18	18	15	12	16	17	18	15	13	17	79	36	35	20	19	36	39	71	64	61	18	17	17	20	79
25-Nov	12	21	11	11	11	18	72	91	72	25	25	21	24	18	14	13	20	17	9	10	11	11	10	10	91
26-Nov	12	15	15	12	14	14	21	23	20	21	16	10	12	15	14	9	8	9	9	9	6	6	9	6	23
27-Nov	8	11	11	9	7	8	9	15	36	90	37	41	36	27	40	8	4	7	11	8	6	7	8	7	90
28-Nov	7	6	8	7	7	9	12	17	28	16	10	13	12	9	11	6	8	12	8	9	7	10	11	9	28
29-Nov	12	10	8	6	6	6	6	9	11	7	8	10	12	11	12	12	16	8	10	8	8	8	12	12	16
30-Nov	8	9	9	10	9	11	9	9	14	9	9	9	8	10	5	6	6	8	7	8	6	8	7	6	14
	95	89	94	96	90	87	80	91	72	92	92	89	81	97	40	36	52	71	91	101	82	59	88	83	

Diurnal Maximum

AF - Analyzer Failure





Direction of Maximum Speed: 144 deg on Nov 6 21:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 136.9 deg on Nov 30		Hours of Data:	717
Direction of Minimum Speed: 136 deg on Nov 4 06:00		Hours of Missing Data:	3
Direction of Minimum Daily Speed Average: 1.1 deg on Nov 3		Percent Operational Time:	99.6
Monthly Average Direction: 261.3 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-Nov	360	360	2	353	5	1	11	16	18	17	29	24	37	25	24	18	19	16	30	4	341	340	355	1	12.8
2-Nov	349	352	13	33	29	27	17	10	339	319	158	151	141	158	178	170	154	160	161	159	145	146	151	153	144.3
3-Nov	139	141	150	130	123	137	114	139	148	160	141	118	355	338	331	329	320	319	324	320	283	272	268	261	238.2
4-Nov	199	185	173	145	121	136	135	116	12	331	358	153	139	150	148	153	158	161	170	338	340	327	290	273	156.9
5-Nov	358	345	337	329	328	324	334	8	350	347	327	341	349	354	356	344	332	333	356	348	342	350	344	320	343.7
6-Nov	328	56	111	106	120	153	150	145	141	150	197	158	148	160	170	145	136	139	140	144	144	143	153	157	147.1
7-Nov	142	135	136	154	258	261	256	258	269	272	243	252	252	260	255	250	235	224	245	228	186	174	197	213	230.6
8-Nov	275	296	221	269	295	343	345	343	338	1	25	21	28	25	23	15	17	15	356	30	17	8	0	350	6.0
9-Nov	348	8	354	332	320	319	310	324	3	44	314	156	204	195	218	205	190	193	171	160	165	147	146	144	177.2
10-Nov	142	142	145	147	146	153	174	176	171	170	175	171	178	175	164	161	165	164	169	169	162	148	140	132	160.7
11-Nov	135	136	141	155	167	175	199	216	214	215	226	248	250	257	252	238	210	228	255	248	222	233	228	164	214.0
12-Nov	160	193	158	160	138	143	138	135	135	157	142	145	155	155	161	160	157	151	145	149	153	159	157	156	152.2
13-Nov	158	161	168	175	172	158	153	148	156	183	187	199	147	200	244	242	246	238	229	226	243	255	252	251	195.3
14-Nov	259	255	259	255	251	254	254	144	135	128	126	144	147	249	236	197	209	189	232	252	146	140	9		223.2
15-Nov	349	179	134	140	135	47	354	349	344	333	332	332	335	336	345	344	357	359	16	335	346	350	352	346	353.7
16-Nov	344	334	345	333	324	307	317	284	273	266	265	278	280	274	266	258	246	224	205	184	143	143	140	140	267.7
17-Nov	145	134	133	139	137	147	141	135	142	152	159	162	176	224	219	216	262	278	311	315	282	266	266	268	187.9
18-Nov	259	259	288	331	317	311	313	322	325	325	329	338	341	338	340	332	334	335	326	301	256	336	346	353	315.9
19-Nov	176	171	148	144	138	138	141	136	121	171	138	134	122	311	301	322	325	317	294	321	350	314	304	292	144.1
20-Nov	243	108	84	65	118	298	280	263	263	263	256	226	199	165	161	160	148	142	141	153	154	152	145	144	176.7
21-Nov	139	156	AF	AF	242	254	250	153	129	137	143	149	146	159	212	206	134	144	224	232	195	254	262	259	195.5
22-Nov	258	266	268	268	264	267	272	293	301	318	354	348	15	AF	1	4	12	15	10	359	351	353	356	356	306.8
23-Nov	348	341	344	330	328	331	319	343	335	342	339	341	337	340	354	359	353	346	344	350	351	350	1	350	345.8
24-Nov	352	333	328	327	332	333	331	325	315	325	335	217	308	350	2	354	322	323	151	228	204	187	195	206	315.7
25-Nov	213	203	163	162	167	165	163	219	246	226	197	179	165	131	139	137	143	144	140	139	139	141	142	141	157.5
26-Nov	141	139	132	133	133	135	136	139	137	137	141	144	140	140	136	144	148	148	138	134	134	135	130	134	138.4
27-Nov	136	145	147	141	157	155	146	136	133	130	169	73	207	194	219	147	134	133	134	136	135	136	136	135	140.2
28-Nov	137	133	137	138	138	139	141	138	138	140	138	139	143	142	137	132	139	139	136	138	137	137	141	137	138.1
29-Nov	139	137	136	136	133	134	133	134	137	134	139	138	141	138	139	141	138	134	141	138	137	139	139	139	137.3
30-Nov	137	136	136	138	138	137	137	136	137	138	137	136	134	139	131	134	143	136	139	143	137	136	135	136	136.9

162.7 163.7 156.2 157.8 165.2 174.9 177.8 164.5 175.4 189.4 172.8 166.9 162.9 183.1 198.3 181.9 161.0 155.3 147.9 161.1 157.7 163.5 162.9 164.2

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association

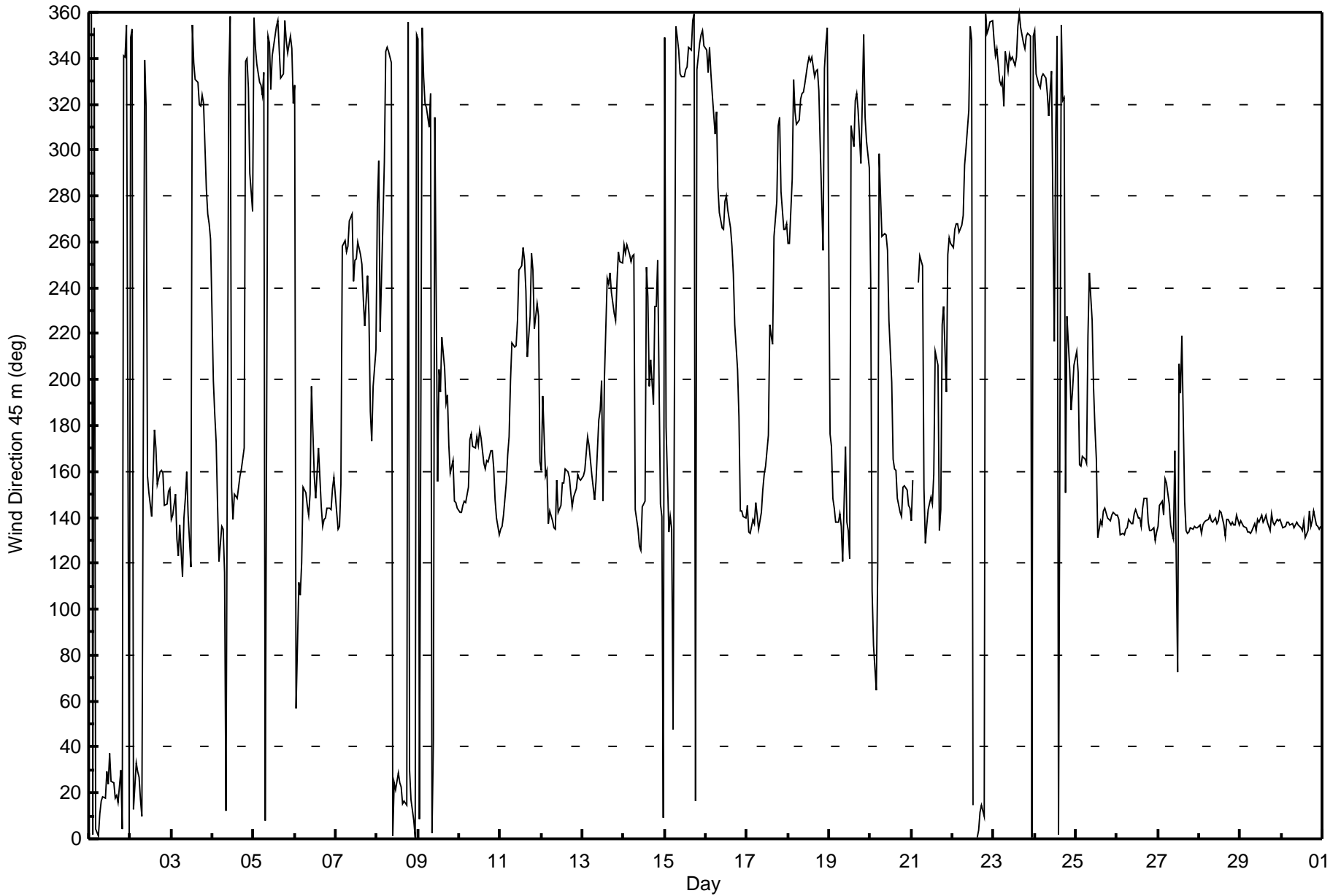
Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 101 deg on Nov 20 01:00	Hours of Data: 717
Minimum Value: 2 deg on Nov 27 17:00	Hours of Missing Data: 3
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 13 Q ₃ = 19 P ₉₀ = 35 P ₉₉ = 86	Hours of Calibration: 0
	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	15	14	19	15	13	14	13	14	17	19	15	21	20	14	15	13	13	16	15	24	17	13	16	16	24
2-Nov	16	18	28	20	19	20	21	45	28	35	73	15	18	16	9	12	10	9	8	8	13	12	11	11	73
3-Nov	12	12	21	37	45	66	70	17	13	15	38	68	58	12	13	11	11	11	13	26	17	12	13	32	70
4-Nov	19	8	18	19	68	100	83	17	52	20	72	38	12	14	9	8	6	6	26	42	20	66	52	45	100
5-Nov	13	14	15	17	12	13	14	18	16	19	15	23	20	22	15	15	15	17	15	16	12	17	15	37	37
6-Nov	29	89	21	17	14	14	12	12	16	25	15	22	15	12	11	10	11	9	10	8	7	9	10	8	89
7-Nov	10	6	6	48	12	8	10	10	15	19	41	25	11	12	13	6	26	18	43	52	40	42	31	32	52
8-Nov	86	53	39	44	33	24	19	15	12	22	17	18	19	18	18	18	17	20	18	16	22	21	24	24	86
9-Nov	17	15	84	34	19	17	10	11	44	48	92	88	12	20	14	18	16	21	10	12	7	9	7	8	92
10-Nov	9	7	7	7	8	10	7	7	7	8	8	9	10	9	10	6	7	8	8	11	12	19	10	14	19
11-Nov	10	9	13	10	9	10	17	10	11	11	19	8	7	9	10	11	13	16	11	18	9	9	11	30	30
12-Nov	20	30	22	30	12	11	7	7	13	17	8	8	12	9	6	6	8	9	7	8	8	8	7	8	30
13-Nov	7	8	8	9	12	12	14	12	19	9	11	28	10	34	10	7	9	7	20	7	33	12	9	9	34
14-Nov	10	11	10	7	12	59	55	47	31	12	19	12	9	24	18	14	13	33	29	7	33	18	15	59	59
15-Nov	25	48	20	10	10	53	17	12	14	17	16	19	19	14	16	15	12	12	16	30	15	13	13	31	53
16-Nov	17	18	13	14	18	18	15	16	14	10	10	15	15	16	12	10	13	28	18	21	13	15	11	23	28
17-Nov	12	8	9	8	11	14	14	13	17	11	9	8	13	9	8	10	21	13	17	16	22	10	10	12	22
18-Nov	9	8	24	15	16	13	12	13	15	13	14	14	14	14	15	14	14	10	19	21	36	29	13	50	50
19-Nov	30	49	40	7	10	11	12	20	17	39	11	17	60	87	17	12	9	19	23	34	73	40	59	48	87
20-Nov	101	29	80	60	60	60	14	13	10	11	11	18	15	10	7	9	13	13	14	10	8	8	9	6	101
21-Nov	7	31	AF	AF	25	19	35	32	7	10	9	13	8	29	19	14	32	15	43	16	26	15	11	9	43
22-Nov	9	10	10	11	10	11	12	16	15	23	13	19	18	AF	24	17	17	19	15	14	14	11	14	14	24
23-Nov	14	16	13	14	16	17	24	20	25	24	18	23	20	15	11	13	16	14	13	13	13	13	13	16	25
24-Nov	15	14	13	10	13	14	13	11	10	12	61	38	33	17	16	31	30	57	71	54	16	12	14	18	71
25-Nov	10	17	9	9	8	13	23	80	50	23	31	18	25	13	10	8	9	9	4	5	6	8	6	6	80
26-Nov	9	9	10	10	10	9	12	13	13	13	9	3	4	6	12	9	9	7	9	6	7	6	9	4	13
27-Nov	5	13	14	11	16	14	14	14	26	48	38	94	74	62	32	8	2	5	6	4	3	4	3	4	94
28-Nov	3	3	4	4	3	5	6	11	12	9	5	5	7	5	6	5	4	4	3	4	3	5	5	3	12
29-Nov	6	4	3	3	4	3	3	3	5	4	4	7	9	6	5	7	7	5	4	3	3	3	5	6	9
30-Nov	4	4	4	5	4	4	5	6	7	5	4	6	6	5	3	5	7	8	4	5	3	4	4	3	8
	101	89	84	60	68	100	83	80	52	48	92	94	74	87	32	31	32	57	71	54	73	66	59	59	
	Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - November 2015

Direction of Maximum Speed: 145 deg on Nov 6 19:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 170.2 deg on Nov 10	Hours of Data: 682
Direction of Minimum Speed: 123 deg on Nov 3 12:00	Hours of Missing Data: 38
Direction of Minimum Daily Speed Average: 0.2 deg on Nov 19	Percent Operational Time: 94.7
Monthly Average Direction: 231.5 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-Nov	10	15	13	3	16	14	19	26	27	26	35	28	40	28	27	21	24	23	36	20	358	352	3	10	20.5
2-Nov	356	356	18	41	34	35	26	31	13	10	151	146	140	156	175	166	153	158	157	156	146	148	152	152	139.7
3-Nov	143	144	151	139	135	136	135	147	152	163	157	123	340	341	339	342	328	328	332	311	277	269	267	251	211.1
4-Nov	220	196	195	158	154	163	161	147	152	153	147	139	146	152	155	163	166	177	182	220	306	262	261	285	169.7
5-Nov	330	333	336	326	327	329	340	7	355	347	331	341	348	349	357	345	331	335	358	350	346	354	355	342	343.3
6-Nov	3	37	107	129	140	152	148	146	146	161	204	164	150	160	166	145	140	142	145	149	149	150	155	162	150.0
7-Nov	156	160	188	228	250	252	254	254	258	260	246	251	251	251	253	256	256	255	225	235	236	238	242	247	241.8
8-Nov	263	309	248	259	276	351	346	11	2	7	27	24	29	25	23	15	19	17	12	39	28	21	14	13	4.2
9-Nov	10	14	11	351	346	355	342	344	2	34	109	183	208	197	216	207	194	195	175	170	174	161	162	152	177.6
10-Nov	152	158	160	163	162	171	188	193	181	177	181	175	182	179	170	166	173	171	175	175	168	156	150	148	170.2
11-Nov	148	151	153	164	179	197	215	222	222	226	229	247	248	255	249	237	224	235	251	248	236	242	239	223	221.6
12-Nov	226	240	232	240	235	228	207	161	153	167	154	151	156	157	163	164	160	156	149	152	155	158	158	158	164.4
13-Nov	159	167	176	180	181	172	165	164	182	210	212	217	192	219	241	241	248	248	240	234	242	250	246	246	209.2
14-Nov	252	250	252	253	252	249	245	227	213	214	169	153	175	245	229	214	228	227	231	239	249	218	135	141	234.4
15-Nov	138	142	187	153	140	120	104	354	11	5	346	350	343	348	357	2	21	17	26	7	360	2	3	355	13.6
16-Nov	352	346	347	345	328	310	314	283	271	265	265	276	277	273	265	258	249	236	218	213	168	152	141	143	268.1
17-Nov	147	136	141	142	143	148	145	142	146	151	168	179	196	227	223	222	259	273	307	310	280	264	264	268	191.8
18-Nov	261	261	290	335	317	313	317	324	328	329	329	338	341	341	342	335	342	349	353	315	306	269	292	288	318.3
19-Nov	213	175	194	187	155	155	148	148	140	190	156	147	137	22	323	338	346	337	328	324	337	332	336	336	305.9
20-Nov	284	243	253	284	261	281	276	265	264	262	255	227	200	166	163	159	149	145	147	157	160	159	160	171	189.0
21-Nov	189	226	244	250	247	251	246	230	213	197	201	208	186	204	223	219	191	202	234	237	224	253	258	258	235.0
22-Nov	256	264	268	265	260	264	272	294	298	313	0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	331	344	345	AF	AF	AF	AF	1	358	6	356	AF	350	358	AF	AF	--
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	323	230	311	354	0	355	322	335	246	237	222	207	219	222	--
25-Nov	221	216	190	188	191	201	216	252	254	246	247	217	216	159	133	139	175	179	182	191	179	167	165	161	197.7
26-Nov	153	153	156	157	158	162	160	160	157	157	153	157	161	164	192	215	210	192	182	204	206	211	222	180	169.0
27-Nov	194	235	238	237	236	233	221	214	176	220	238	246	262	282	266	165	186	191	203	209	205	208	210	183	223.2
28-Nov	177	195	171	167	179	165	154	158	161	158	159	158	151	159	166	169	168	178	177	165	171	176	167	177	165.6
29-Nov	171	168	175	179	199	174	197	182	157	164	160	148	147	154	154	156	168	166	168	168	166	158	160	159	163.8
30-Nov	173	173	171	158	157	160	166	161	161	163	158	157	172	195	215	232	229	218	209	202	219	236	216	160	176.9

198.0 199.3 202.3 200.5 202.3 211.9 213.6 211.3 212.8 222.9 208.0 196.3 197.0 213.7 220.8 215.3 203.3 190.9 185.2 197.5 201.5 203.3 198.9 196.4

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

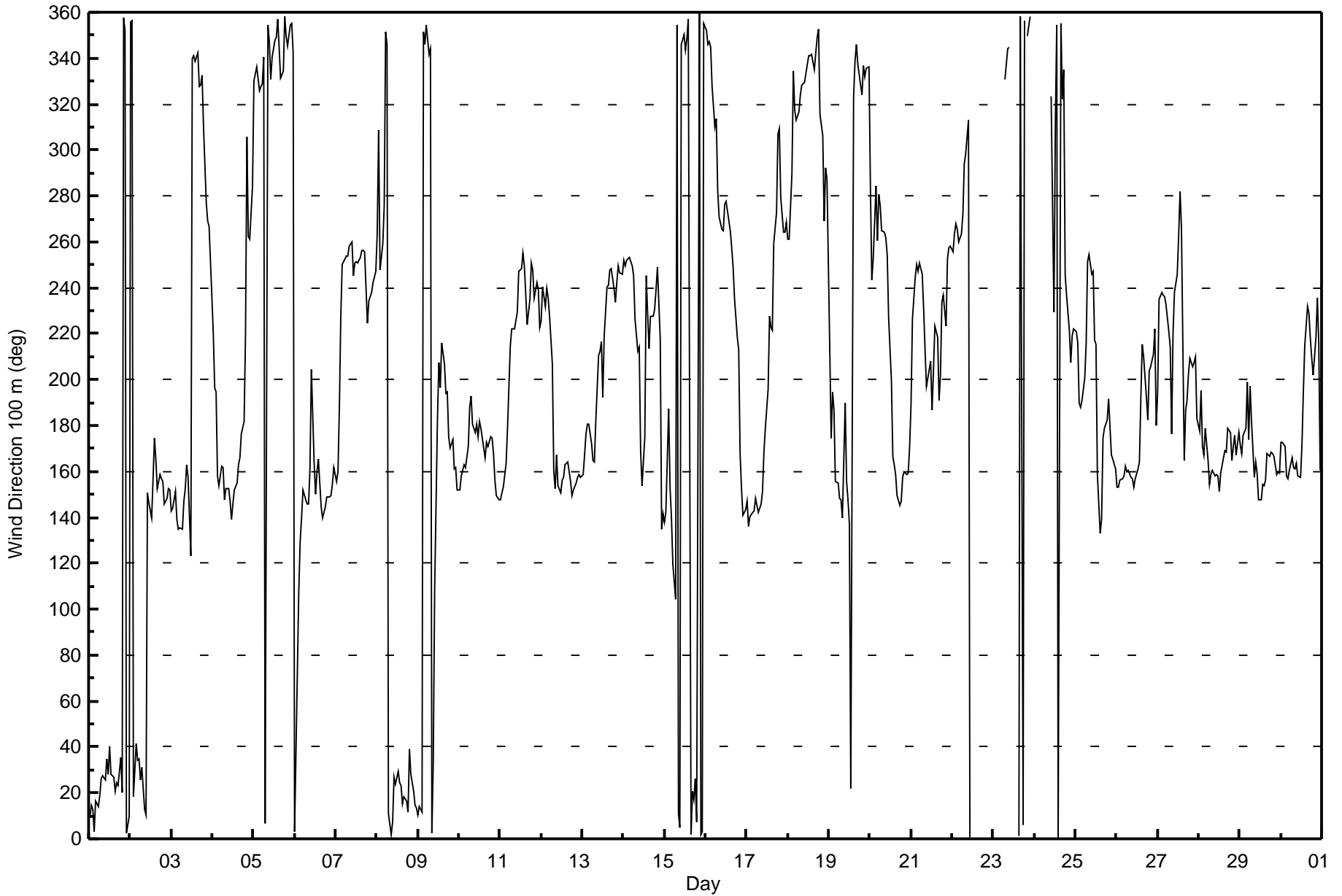
Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value:	96 deg on Nov 23 18:00		Hours of Data:	682
Minimum Value:	2 deg on Nov 14 20:00		Hours of Missing Data:	38
Percentiles:	P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 14 P ₉₀ = 22 P ₉₉ = 59		Hours of Calibration:	0
			Percent Operational Time:	94.7

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-Nov	10	9	16	8	7	8	6	7	10	11	10	11	12	9	7	6	7	8	8	13	14	11	12	10	16
2-Nov	10	12	20	15	13	13	12	28	23	62	45	16	11	15	9	11	8	6	6	7	7	8	8	7	62
3-Nov	7	6	9	15	8	9	14	15	9	10	25	57	32	8	7	5	7	5	5	20	12	8	7	14	57
4-Nov	9	12	20	16	28	20	13	15	17	11	9	7	7	11	6	7	7	4	13	28	41	16	14	41	41
5-Nov	9	10	12	11	8	8	9	11	9	13	10	17	16	18	9	12	10	14	9	10	6	11	11	37	37
6-Nov	24	58	34	14	8	10	10	8	10	25	13	18	11	10	10	5	4	3	3	5	4	6	7	6	58
7-Nov	8	10	20	25	6	3	3	6	10	14	13	6	4	6	2	5	15	9	7	15	6	7	7	25	25
8-Nov	22	56	16	11	49	29	5	10	11	13	12	11	12	12	11	10	13	11	9	15	10	11	14	56	56
9-Nov	17	7	25	18	13	13	21	11	26	10	57	70	11	19	10	16	15	21	6	8	7	11	7	15	70
10-Nov	8	5	5	5	4	9	9	8	5	6	8	10	11	11	9	6	5	7	7	9	12	16	10	13	16
11-Nov	10	9	9	9	8	12	10	6	6	7	14	5	5	4	7	8	5	11	6	9	5	6	8	14	14
12-Nov	12	12	15	13	34	21	19	17	10	11	9	8	8	9	6	5	6	7	5	6	6	7	6	6	34
13-Nov	5	8	6	7	11	12	11	11	21	4	10	10	22	19	7	5	7	8	11	3	13	6	6	6	22
14-Nov	4	5	5	4	8	13	19	39	32	22	34	17	23	7	10	11	6	12	8	2	9	47	12	8	47
15-Nov	9	7	18	14	11	37	47	8	13	14	9	10	12	8	6	7	8	7	10	19	8	6	6	7	47
16-Nov	6	8	8	7	9	10	9	11	9	5	4	12	13	10	7	6	9	18	9	11	16	11	4	6	18
17-Nov	8	4	4	4	4	7	7	5	8	5	9	7	15	6	5	5	16	12	14	13	18	4	4	6	18
18-Nov	5	4	21	9	13	8	7	8	10	9	9	10	10	10	11	9	8	6	10	19	27	18	12	60	60
19-Nov	31	44	24	15	16	14	6	10	5	34	10	11	58	63	17	12	3	7	4	20	7	7	8	8	63
20-Nov	40	13	18	77	53	15	11	8	5	6	7	15	16	9	7	5	8	6	7	5	7	5	7	13	77
21-Nov	21	12	8	7	7	10	9	14	17	22	26	26	23	28	8	7	22	15	10	8	14	9	4	4	28
22-Nov	4	5	3	5	4	5	10	10	10	21	9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	21
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	23	14	14	AF	AF	AF	AF	5	29	96	60	AF	39	21	AF	AF	96
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	25	38	32	11	9	23	17	31	70	27	13	11	7	8	70
25-Nov	4	9	11	10	10	12	13	19	16	10	15	21	20	17	7	10	15	11	11	15	12	7	7	6	21
26-Nov	5	11	8	10	9	6	3	7	5	9	6	3	6	10	26	17	14	16	14	17	16	20	15	23	26
27-Nov	18	13	24	16	10	5	6	5	33	37	7	18	16	8	26	50	20	15	17	14	11	10	10	17	50
28-Nov	17	17	16	8	11	11	6	7	6	6	3	6	6	6	8	7	8	6	7	8	9	6	9	6	17
29-Nov	7	8	10	9	16	15	13	8	14	7	12	13	8	5	4	5	9	8	8	8	10	3	5	5	16
30-Nov	7	6	7	5	4	3	5	9	5	8	5	6	13	19	9	15	12	20	10	15	18	10	30	9	30
Diurnal Maximum																									
40 58 34 77 53 37 47 39 33 62 57 70 58 63 26 50 29 96 70 28 41 47 30 60																									

AF - Analyzer Failure





Maximum Value: 0.6 km/h on Nov 26 18:00		Maximum Daily Average: 0.2 km/h on Nov 27		Hours in Service: 720																							
Minimum Value: -0.8 km/h on Nov 11 14:00		Minimum Daily Average: -0.2 km/h on Nov 22		Hours of Data: 715																							
Maximum Diurnal Average: 0.1 km/h at hour 18		Minimum Diurnal Average: -0.1 km/h at hour 13		Hours of Missing Data: 5																							
Monthly Average: -0.03 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.5		Hours of Calibration: 0																							
				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-Nov	0.0	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.1	0.1	0.0	-0.2	0.2	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	0.0	0.1	0.1	0.0	0.2	
2-Nov	-0.1	-0.1	0.0	-0.1	0.0	0.1	-0.1	0.1	0.1	0.1	0.0	0.0	-0.2	0.0	0.1	0.1	0.1	0.2	0.5	0.4	0.1	0.3	0.0	0.2	0.1	0.5	
3-Nov	0.1	0.0	0.3	0.0	0.0	0.0	-0.1	-0.2	0.1	0.2	0.0	0.1	-0.1	0.1	0.2	AF	AF	-0.2	0.0	0.1	-0.3	-0.4	-0.3	-0.1	0.0	0.3	
4-Nov	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.0	-0.1	0.0	-0.1	-0.2	0.1	-0.1	0.0	-0.2	0.1	0.3	0.4	0.4	-0.2	0.1	0.0	0.0	-0.2	0.0	0.4
5-Nov	0.0	-0.2	0.1	0.1	-0.1	0.1	0.1	0.1	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	-0.2	-0.1	0.1	0.0	-0.2	0.0	0.0	0.1	0.1	-0.1	-0.1	0.1
6-Nov	0.1	0.0	0.0	-0.1	-0.1	0.1	0.0	0.0	-0.1	0.0	-0.1	0.1	0.0	0.2	0.1	-0.1	-0.2	-0.1	0.0	-0.5	-0.6	-0.4	0.0	0.3	-0.1	0.3	
7-Nov	-0.1	-0.1	0.1	0.3	-0.2	-0.3	-0.4	-0.4	-0.3	-0.3	-0.3	-0.1	-0.5	-0.3	-0.3	-0.2	0.0	0.1	0.1	0.0	0.1	0.2	0.2	0.1	-0.1	0.3	
8-Nov	0.0	0.0	0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.3	-0.3	-0.2	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.2	
9-Nov	0.0	0.0	0.2	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	-0.4	0.0	-0.3	-0.2	-0.1	-0.1	0.1	0.2	0.4	0.0	-0.1	0.0	0.0	0.4	
10-Nov	0.0	0.0	-0.1	-0.1	0.0	0.1	0.4	0.4	0.6	0.5	0.3	0.4	0.2	0.2	0.4	0.4	0.5	0.4	0.4	0.2	0.3	-0.2	-0.2	-0.3	0.2	0.6	
11-Nov	-0.3	-0.2	-0.2	0.2	0.5	0.3	-0.2	-0.3	-0.2	-0.3	-0.2	-0.2	-0.4	-0.8	-0.6	-0.3	-0.2	-0.2	-0.3	-0.2	-0.1	-0.1	-0.1	0.4	-0.2	0.5	
12-Nov	0.3	0.2	0.3	0.2	0.1	0.0	0.1	0.1	-0.3	0.2	-0.1	-0.2	0.3	0.1	0.3	0.2	0.3	-0.1	-0.2	-0.5	-0.3	0.2	0.1	0.1	0.1	0.3	
13-Nov	0.2	0.3	0.4	0.2	0.4	0.2	-0.2	-0.3	0.0	0.1	0.0	0.2	0.2	-0.1	-0.3	-0.3	-0.3	-0.1	-0.1	-0.3	-0.1	-0.3	-0.3	-0.2	0.0	0.4	
14-Nov	-0.6	-0.5	-0.3	-0.5	-0.2	-0.1	0.0	0.2	0.2	0.2	0.0	-0.2	0.1	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	-0.1	0.2	
15-Nov	0.0	0.1	0.1	0.1	-0.1	0.1	-0.1	0.0	-0.1	0.0	0.2	0.1	0.1	0.2	0.0	0.1	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.1	0.0	0.2	
16-Nov	0.1	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.2	-0.4	-0.8	-0.6	-0.5	-0.4	-0.2	-0.5	-0.4	-0.1	0.0	0.0	0.1	0.2	-0.1	0.0	0.1	-0.2	0.2	
17-Nov	0.1	-0.2	-0.4	-0.2	-0.1	0.1	0.0	-0.1	-0.1	0.2	0.3	0.5	0.2	-0.3	-0.4	-0.2	-0.1	-0.1	-0.3	-0.3	-0.6	-0.6	-0.7	-0.5	-0.2	0.5	
18-Nov	-0.7	-0.7	-0.4	0.0	-0.3	-0.4	-0.4	0.0	-0.1	-0.3	-0.3	0.0	-0.4	0.1	-0.2	0.2	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.2	0.2	
19-Nov	0.0	0.0	0.1	0.0	0.1	0.2	0.2	0.2	0.0	0.1	0.0	0.0	0.1	0.1	0.0	-0.1	-0.2	0.0	0.0	AF	AF	AF	0.0	0.0	0.0	0.2	
20-Nov	0.0	0.0	0.0	0.0	0.0	0.0	-0.2	-0.4	-0.4	-0.5	-0.4	-0.2	-0.2	0.0	0.2	0.2	0.2	0.0	-0.2	0.2	0.1	0.1	-0.1	0.0	-0.1	0.2	
21-Nov	0.1	0.3	-0.1	-0.2	-0.1	-0.4	-0.4	0.1	0.2	0.1	0.2	0.2	0.0	0.1	0.0	0.0	-0.1	0.1	0.1	0.0	0.2	-0.2	-0.5	-0.6	0.0	0.3	
22-Nov	-0.8	-0.6	-0.4	-0.5	-0.7	-0.6	-0.4	-0.3	-0.3	-0.3	0.0	0.1	0.0	-0.1	-0.1	0.0	0.1	0.0	0.0	-0.2	-0.1	-0.2	-0.1	-0.2	-0.2	0.1	
23-Nov	-0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	-0.1	0.0	0.0	0.1	0.1	-0.3	-0.2	0.0	0.0	0.0	-0.1	-0.3	-0.2	-0.2	-0.1	0.0	0.1	
24-Nov	-0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	-0.1	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.0	-0.1	0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.1	
25-Nov	-0.1	0.0	0.4	0.5	0.5	0.6	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.0	-0.1	-0.2	0.1	0.6	
26-Nov	-0.1	0.0	-0.3	-0.3	0.0	-0.1	0.1	0.2	-0.1	0.0	-0.3	-0.1	-0.2	-0.4	-0.2	0.4	0.4	0.6	0.4	0.2	0.2	0.3	0.2	0.3	0.1	0.6	
27-Nov	0.1	0.2	0.3	0.2	0.5	0.3	0.2	0.3	0.1	0.0	0.1	0.3	0.3	0.2	0.1	0.2	0.4	0.4	0.4	0.3	0.2	0.3	0.2	0.3	0.2	0.5	
28-Nov	0.1	0.3	0.1	0.0	0.0	0.1	-0.4	-0.1	0.0	-0.1	-0.1	-0.3	-0.7	-0.6	0.1	0.1	-0.1	0.0	0.0	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	0.3	
29-Nov	0.0	-0.1	0.1	-0.1	0.3	0.0	0.1	0.0	-0.2	-0.2	-0.1	0.0	-0.3	-0.1	-0.5	0.0	-0.3	0.1	0.1	-0.1	-0.2	-0.2	-0.3	-0.1	-0.1	0.3	
30-Nov	-0.3	-0.4	-0.2	-0.3	0.1	0.0	-0.1	-0.2	-0.3	-0.2	0.0	-0.3	0.0	0.3	0.5	0.4	0.3	0.5	0.4	0.1	0.4	0.2	0.3	0.2	0.1	0.5	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 20 m (VW20m) - km/h
Lower Camp Met Tower - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4.1 km/h on Nov 6 19:00	Hours of Data: 715
Minimum Value: 0.1 km/h on Nov 15 01:00	Hours of Missing Data: 5
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.4 Q ₃ = 2.0 P ₉₀ = 2.5 P ₉₉ = 3.5	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-Nov	1.3	1.1	1.3	1.2	1.5	1.3	1.5	1.7	1.7	2.0	2.3	2.5	2.3	2.3	2.4	2.6	2.4	2.4	2.3	1.8	1.2	1.6	1.7	1.7	2.6
2-Nov	1.6	1.7	1.4	1.2	1.4	1.4	1.1	0.8	0.5	0.7	1.1	1.3	1.6	1.6	1.1	1.4	2.0	2.4	2.4	2.3	2.3	2.0	2.3	2.4	2.4
3-Nov	2.3	2.6	1.8	1.3	1.3	1.1	1.1	1.0	0.9	0.9	0.6	0.6	1.0	1.2	1.3	AF	AF	0.9	0.8	0.8	1.8	1.8	1.6	1.4	2.6
4-Nov	0.9	0.8	0.8	0.7	0.3	0.3	0.2	0.4	0.5	0.6	0.8	1.0	1.8	2.0	1.8	1.7	1.9	1.4	1.1	1.1	0.7	0.2	0.5	0.7	2.0
5-Nov	0.7	1.4	1.2	1.3	1.5	1.1	1.4	1.9	2.3	2.3	2.2	2.1	2.1	2.0	2.1	1.9	1.5	1.6	1.9	1.6	1.4	1.1	0.9	0.7	2.3
6-Nov	0.5	0.4	0.4	0.5	0.7	0.8	0.9	1.2	1.2	1.1	1.3	1.2	1.8	1.6	1.5	2.1	2.9	4.0	4.1	3.8	3.7	3.6	3.1	2.9	4.1
7-Nov	2.2	1.5	1.4	1.4	1.0	1.1	1.7	1.8	2.0	2.3	1.8	1.8	2.1	1.5	1.1	0.9	0.3	0.3	0.2	0.7	0.9	0.8	0.8	0.7	2.3
8-Nov	1.0	0.5	1.0	0.8	0.7	0.3	0.4	0.4	0.9	1.9	2.5	2.3	2.1	2.3	2.2	2.1	2.0	1.4	0.7	0.5	0.5	0.6	0.7	0.5	2.5
9-Nov	0.7	1.2	0.9	0.7	0.5	0.3	0.2	0.3	0.3	0.3	0.4	0.6	1.2	1.1	1.1	1.1	1.2	0.8	0.7	0.9	1.2	1.7	1.3	1.2	1.7
10-Nov	1.2	1.8	2.1	2.2	1.9	1.9	2.1	1.9	2.0	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.2	2.5	2.2	2.2	2.2	1.9	1.8	2.5
11-Nov	1.7	1.8	2.0	2.4	2.0	1.9	1.8	1.9	1.7	1.6	2.0	2.2	2.7	3.1	2.6	1.6	1.3	1.6	1.7	1.4	1.3	1.2	1.0	1.3	3.1
12-Nov	1.3	0.8	1.1	0.9	1.0	1.1	0.6	0.5	1.2	1.4	2.0	1.9	1.8	1.6	1.3	1.7	2.0	2.4	2.7	3.0	2.8	2.8	2.8	2.6	3.0
13-Nov	3.0	2.4	2.3	2.1	2.2	2.1	2.0	2.3	2.2	2.0	1.8	2.1	1.9	1.6	2.4	2.5	1.6	1.0	0.8	1.3	1.1	1.6	1.2	2.2	3.0
14-Nov	2.3	2.5	2.2	2.2	1.9	1.3	1.0	0.8	0.8	0.9	1.3	1.5	1.3	1.7	1.2	0.6	0.5	0.4	0.4	0.9	0.6	0.8	0.4	0.3	2.5
15-Nov	0.1	0.2	0.1	0.2	0.8	0.4	0.4	0.4	0.4	0.6	0.9	1.0	0.9	1.3	1.5	1.6	2.1	2.4	2.6	1.4	1.6	1.3	1.1	1.0	2.6
16-Nov	1.1	0.8	1.3	0.7	1.0	1.1	1.6	1.9	2.7	3.3	3.1	3.4	2.7	2.5	2.8	2.4	1.5	1.0	0.9	0.8	0.6	0.9	1.0	1.4	3.4
17-Nov	1.8	2.3	2.6	3.8	3.2	3.2	2.9	2.8	2.6	3.0	2.4	2.3	1.7	1.8	1.7	1.4	2.0	2.0	2.7	2.8	3.0	3.5	3.6	2.9	3.8
18-Nov	2.9	3.1	2.7	1.8	1.8	2.5	2.2	2.4	2.8	2.5	3.0	2.8	3.1	2.6	2.5	1.6	1.4	0.4	0.4	0.2	0.3	0.2	0.3	0.3	3.1
19-Nov	0.2	0.1	0.3	0.2	0.5	0.7	0.9	0.9	0.9	0.4	1.2	1.1	1.1	0.8	0.8	0.9	0.5	0.4	0.2	AF	AF	AF	0.1	0.2	1.2
20-Nov	0.2	0.3	0.2	0.1	0.2	0.4	1.4	2.1	2.1	2.4	2.0	1.3	1.3	1.4	1.4	1.6	2.3	3.1	2.8	2.8	2.6	2.8	2.4	2.1	3.1
21-Nov	1.7	1.3	1.9	1.8	1.4	2.2	1.7	1.0	1.0	1.4	1.6	1.9	1.4	1.4	1.3	1.1	0.8	0.8	1.1	1.0	1.0	2.1	2.4	2.5	2.5
22-Nov	2.4	2.4	2.6	2.9	2.7	2.9	2.6	1.8	2.5	2.3	1.3	0.9	1.4	1.2	1.3	1.4	1.7	1.4	2.0	1.3	1.2	1.4	1.6	1.5	2.9
23-Nov	1.2	1.0	1.0	1.0	1.1	1.1	0.7	0.6	0.7	0.9	1.0	1.1	0.9	1.2	1.5	1.6	1.6	1.1	1.4	1.6	1.9	2.0	2.0	1.7	2.0
24-Nov	1.4	1.4	1.1	1.2	1.5	1.6	1.4	1.0	0.7	0.7	0.7	0.7	0.8	1.5	1.3	0.7	0.5	0.4	0.4	0.9	0.9	1.2	1.2	1.2	1.6
25-Nov	1.5	1.3	1.1	1.2	1.3	1.2	0.6	0.5	0.7	0.7	0.6	0.7	0.8	1.1	1.0	0.6	0.2	0.6	0.9	1.3	1.5	1.5	1.7	1.8	1.8
26-Nov	1.8	1.3	1.6	1.2	1.9	1.8	2.5	2.6	2.5	2.8	2.9	2.9	2.8	2.6	1.6	2.2	1.9	1.7	1.5	1.2	1.0	1.0	1.1	0.8	2.9
27-Nov	1.6	1.7	1.6	1.5	1.3	1.6	1.4	1.4	0.5	0.3	0.9	1.1	1.1	0.4	0.2	0.4	0.7	0.9	1.1	1.3	1.5	1.3	1.4	1.3	1.7
28-Nov	1.1	1.0	1.2	1.1	1.4	1.7	2.0	1.4	1.4	1.9	2.1	2.5	2.1	2.0	1.7	0.9	1.9	2.2	1.8	1.7	1.7	2.0	1.8	1.9	2.5
29-Nov	2.5	1.7	1.4	1.2	1.0	1.2	1.3	1.7	1.9	1.3	1.5	1.7	1.6	1.1	1.5	0.9	1.2	0.8	1.4	1.6	1.6	1.6	2.1	2.0	2.5
30-Nov	1.7	1.9	1.9	2.0	2.0	2.3	2.3	2.1	2.1	1.7	1.7	1.7	1.7	1.9	1.2	1.3	1.5	1.6	1.5	1.6	1.2	1.3	1.1	1.0	2.3

3.0	3.1	2.7	3.8	3.2	3.2	2.9	2.8	2.8	3.3	3.1	3.4	3.1	3.1	2.8	2.6	2.9	4.0	4.1	3.8	3.7	3.6	3.6	2.9	
Diurnal Maximum																								

AF - Analyzer Failure



Maximum Value: 2.1 km/h on Nov 30 21:00		Maximum Daily Average: 1.4 km/h on Nov 30		Hours in Service: 720																						
Minimum Value: -1.5 km/h on Nov 17 21:00		Minimum Daily Average: -0.5 km/h on Nov 18		Hours of Data: 717																						
Maximum Diurnal Average: 0.4 km/h at hour 18		Minimum Diurnal Average: 0.1 km/h at hour 15		Hours of Missing Data: 3																						
Monthly Average: 0.24 km/h		Percentiles: P ₁ = -1.2 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.7 P ₉₀ = 1.2 P ₉₉ = 1.8		Hours of Calibration: 0																						
				Percent Operational Time: 99.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0.0	-0.1	-0.2	0.0	-0.1	-0.2	0.0	0.2	0.2	0.2	0.3	0.3	0.4	0.1	0.3	0.1	0.2	0.1	0.3	0.0	0.1	-0.4	0.0	0.1	0.1	0.4
2-Nov	-0.2	-0.3	0.2	-0.1	0.1	0.1	-0.1	0.1	0.2	0.1	0.3	0.3	0.3	0.4	0.1	0.3	0.8	0.8	1.2	1.2	1.0	1.0	1.0	1.3	0.4	1.3
3-Nov	0.9	0.8	0.9	0.3	0.4	0.2	-0.1	0.0	0.4	0.3	0.2	0.4	-0.1	-0.3	-0.1	-0.2	-0.3	-0.3	-0.2	0.0	-0.6	-0.7	-0.6	-0.1	0.1	0.9
4-Nov	-0.2	-0.1	0.2	0.3	0.2	0.1	0.1	0.2	0.0	-0.3	0.0	0.3	0.5	0.6	0.9	1.0	0.8	0.6	0.7	-0.4	0.1	0.0	0.0	-0.3	0.2	1.0
5-Nov	-0.1	-0.5	-0.1	0.1	-0.4	-0.2	-0.1	-0.1	-0.4	-0.3	-0.6	-0.1	-0.3	-0.2	-0.3	-0.4	-0.1	0.3	-0.4	-0.2	-0.2	0.1	0.1	-0.2	-0.2	0.1
6-Nov	0.1	-0.1	0.1	0.1	0.1	0.3	0.3	0.7	0.3	0.3	0.1	0.3	0.6	0.5	0.1	0.7	1.0	1.4	1.6	1.4	1.3	1.1	1.3	1.2	0.6	1.6
7-Nov	0.7	0.7	1.2	0.6	-0.4	-0.6	-0.5	-0.6	-0.8	-0.4	-0.4	-0.3	-0.6	-0.6	-0.3	-0.4	0.0	0.0	0.0	-0.1	0.0	0.2	0.0	0.0	-0.1	1.2
8-Nov	0.0	-0.1	0.1	-0.3	-0.3	-0.2	-0.1	-0.3	-0.3	-0.1	-0.1	0.0	0.0	-0.1	0.0	-0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	-0.1	0.1
9-Nov	-0.1	0.0	0.2	-0.2	-0.1	0.0	-0.1	-0.1	0.0	-0.1	0.0	-0.1	-0.2	-0.1	-0.3	-0.2	-0.1	0.0	0.1	0.5	0.7	0.8	0.7	0.7	0.1	0.8
10-Nov	0.6	1.0	1.2	1.1	1.1	1.0	-0.1	-0.1	0.2	0.1	0.0	0.4	-0.1	-0.1	0.5	0.5	0.5	0.6	0.2	0.3	0.6	0.3	0.5	0.4	0.4	1.2
11-Nov	0.4	0.6	0.6	1.1	0.7	0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.3	-0.7	-1.1	-0.8	-0.2	-0.1	-0.4	-0.4	-0.3	0.0	0.0	-0.1	0.8	-0.1	1.1
12-Nov	0.5	0.0	0.6	0.3	0.9	0.7	0.9	0.7	0.1	0.8	0.6	0.7	0.8	0.7	0.5	0.6	1.0	1.1	1.0	0.8	1.0	1.1	1.2	1.1	0.7	1.2
13-Nov	1.1	1.0	0.5	0.1	0.5	0.8	0.6	0.5	0.7	-0.1	0.0	0.3	1.2	0.2	-0.4	-0.3	-0.3	-0.1	-0.2	-0.2	-0.3	-0.5	-0.4	-0.5	0.2	1.2
14-Nov	-0.9	-0.8	-0.8	-0.8	-0.2	0.0	-0.1	0.5	0.6	0.9	0.4	0.5	0.9	-0.4	0.0	0.0	0.0	0.1	0.0	0.0	-0.1	0.6	0.4	0.1	0.0	0.9
15-Nov	0.1	0.1	0.2	0.4	0.4	0.1	-0.2	-0.2	-0.1	0.0	0.2	0.0	0.1	0.0	-0.2	-0.1	-0.4	-0.3	0.1	-0.2	-0.2	-0.3	0.1	0.0	0.0	0.4
16-Nov	-0.1	-0.1	-0.2	-0.1	-0.1	-0.5	-0.5	-0.6	-1.0	-1.3	-1.1	-1.0	-1.0	-0.6	-1.0	-0.8	-0.2	0.1	0.0	0.0	0.6	0.3	0.4	0.3	-0.4	0.6
17-Nov	0.8	0.8	0.9	1.3	1.0	0.9	0.9	0.8	0.9	1.4	1.0	1.0	0.3	-0.1	-0.3	-0.2	-0.4	-0.5	-1.0	-0.8	-1.5	-1.3	-1.4	-1.0	0.2	1.4
18-Nov	-1.1	-1.2	-1.2	-0.4	-0.8	-1.0	-0.9	-0.6	-0.6	-0.9	-0.9	-0.5	-0.7	-0.3	-0.6	-0.1	-0.3	-0.3	-0.1	-0.1	0.0	-0.1	-0.2	-0.1	-0.5	0.0
19-Nov	0.1	0.1	0.2	0.4	0.5	0.5	0.6	0.5	0.2	0.2	0.3	0.3	0.4	0.1	-0.1	-0.2	-0.3	-0.1	0.0	0.0	-0.1	-0.1	0.0	-0.1	0.1	0.6
20-Nov	0.0	0.1	0.0	0.1	0.1	-0.1	-0.5	-0.5	-0.6	-0.8	-0.6	-0.2	-0.1	0.2	0.3	0.5	0.8	1.0	0.6	1.3	1.1	1.3	1.1	1.2	0.3	1.3
21-Nov	1.0	0.6	AF	AF	-0.1	-0.6	-0.2	0.5	1.0	0.8	1.1	1.0	0.6	0.5	0.0	0.0	0.2	0.7	0.0	-0.1	0.1	-0.5	-0.8	-1.1	0.2	1.1
22-Nov	-0.8	-1.0	-1.0	-1.2	-1.2	-1.2	-0.9	-0.9	-0.7	-0.8	-0.2	-0.1	-0.1	AF	-0.3	-0.1	0.0	0.1	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.5	0.1
23-Nov	-0.2	0.0	0.0	0.0	-0.1	-0.3	-0.1	-0.1	0.1	-0.3	0.1	-0.1	0.0	-0.1	-0.4	-0.4	-0.2	-0.1	-0.1	-0.2	-0.5	-0.4	-0.3	-0.3	-0.2	0.1
24-Nov	-0.2	-0.2	-0.2	-0.5	-0.3	-0.2	-0.2	-0.2	-0.4	-0.2	-0.1	0.0	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	0.3	0.0	0.0	0.1	0.0	0.2	-0.1	0.3
25-Nov	0.0	0.0	0.6	0.8	0.7	1.0	0.3	0.0	0.0	-0.1	0.0	0.1	0.1	0.3	0.4	0.4	0.4	0.8	1.1	1.1	0.9	0.6	0.6	0.5	0.5	1.1
26-Nov	0.6	0.5	0.1	0.1	0.4	0.5	0.7	0.9	0.7	0.9	1.1	1.7	1.8	1.5	0.6	1.5	1.6	1.9	1.5	1.3	1.2	1.3	1.1	1.2	1.0	1.9
27-Nov	1.5	1.1	1.0	1.0	0.5	0.6	1.0	1.3	0.5	0.2	0.0	0.2	0.0	0.2	0.1	0.9	1.4	1.4	1.5	1.7	1.6	1.5	1.6	1.4	0.9	1.7
28-Nov	1.2	1.4	1.1	1.0	1.2	1.4	0.8	0.8	0.8	0.8	1.1	1.2	0.0	0.2	1.1	0.7	1.3	2.0	1.5	1.2	1.2	1.4	1.0	1.1	1.1	2.0
29-Nov	1.6	1.2	1.2	1.0	1.2	1.1	1.1	1.4	1.1	0.5	0.9	0.8	0.5	0.6	0.6	0.7	0.5	0.8	1.3	1.5	1.1	0.9	0.9	1.1	1.0	1.6
30-Nov	0.9	0.9	1.1	0.8	1.5	1.6	1.4	1.1	0.8	0.9	1.2	0.6	1.1	1.9	1.4	1.7	1.4	1.8	2.0	1.5	2.1	1.6	1.7	1.4	1.4	2.1
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Lower Camp Met Tower - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 3.8 km/h on Nov 16 12:00	Hours of Data: 717
Minimum Value: 0.1 km/h on Nov 19 20:00	Hours of Missing Data: 3
Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 1.4 Q ₃ = 2.0 P ₉₀ = 2.6 P ₉₉ = 3.6	Hours of Calibration: 0
	Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	1.4	1.2	1.2	1.3	1.5	1.3	1.5	1.8	1.8	2.2	2.4	2.6	2.3	2.1	2.3	2.5	2.4	2.4	2.2	2.0	1.6	1.8	1.9	1.7	2.6
2-Nov	1.6	1.7	1.5	1.2	1.3	1.4	1.1	0.8	0.6	0.8	1.1	1.2	1.6	1.6	1.2	1.5	2.1	2.7	2.5	2.5	2.3	2.1	2.3	2.4	2.7
3-Nov	2.3	2.4	2.0	1.4	1.5	1.2	1.2	1.1	0.9	1.0	0.7	0.7	0.9	1.2	1.5	1.5	1.1	1.2	0.8	1.1	2.0	2.0	1.8	1.6	2.4
4-Nov	1.0	0.7	0.9	0.8	0.4	0.4	0.3	0.5	0.5	0.6	0.8	1.0	1.8	2.1	1.7	1.6	1.7	1.4	1.3	1.1	0.8	0.3	0.6	0.8	2.1
5-Nov	0.7	1.5	1.3	1.6	1.8	1.4	1.6	1.8	2.3	2.5	2.4	2.3	2.3	2.1	1.9	2.0	1.7	1.8	2.0	1.7	1.4	1.3	1.1	0.8	2.5
6-Nov	0.6	0.5	0.4	0.5	0.7	0.8	1.0	1.3	1.2	1.1	1.4	1.3	1.7	1.7	1.5	2.0	2.7	3.6	3.8	3.5	3.3	3.1	3.1	2.9	3.8
7-Nov	2.1	1.2	1.2	1.8	1.2	1.2	1.9	2.0	2.4	2.6	2.0	2.0	2.1	1.5	1.1	0.8	0.3	0.3	0.3	0.8	1.1	1.0	0.9	0.9	2.6
8-Nov	1.3	0.6	1.2	1.3	0.7	0.3	0.4	0.5	1.2	2.1	2.5	2.4	2.2	2.3	2.1	2.1	1.9	1.5	0.8	0.6	0.5	0.7	0.8	0.7	2.5
9-Nov	0.7	1.2	1.0	0.8	0.5	0.4	0.2	0.4	0.3	0.2	0.4	0.6	1.3	1.2	1.3	1.3	1.3	0.9	0.5	0.9	1.2	1.3	1.3	1.0	1.3
10-Nov	1.2	1.5	1.9	1.9	1.9	1.8	2.4	2.2	2.2	2.6	2.7	2.6	2.3	2.3	2.0	1.9	2.1	2.5	2.9	2.7	2.6	2.5	1.9	2.0	2.9
11-Nov	1.7	1.6	2.0	2.4	2.3	2.2	1.9	2.3	2.0	2.0	2.3	2.0	2.5	3.0	2.6	1.5	1.3	1.8	1.9	1.7	1.4	1.4	1.1	1.6	3.0
12-Nov	1.4	1.1	1.2	1.0	1.1	1.3	0.6	0.6	1.2	1.2	1.7	1.6	1.8	1.7	1.3	1.8	2.2	2.4	2.4	3.0	3.0	3.1	3.1	2.9	3.1
13-Nov	3.2	2.6	2.8	2.6	2.7	2.3	2.2	2.3	2.3	2.3	2.0	2.6	2.0	1.8	2.3	2.3	1.6	0.9	0.9	1.5	1.3	1.7	1.2	2.1	3.2
14-Nov	2.5	2.4	2.2	2.1	1.9	1.5	1.2	1.0	1.0	1.1	1.3	1.2	1.1	1.7	1.2	0.7	0.7	0.8	0.5	0.8	0.8	1.1	0.5	0.5	2.5
15-Nov	0.1	0.2	0.2	0.3	0.8	0.4	0.5	0.5	0.4	0.7	1.1	1.2	1.1	1.4	1.7	1.9	2.2	2.5	2.7	1.7	1.7	1.4	1.2	1.2	2.7
16-Nov	1.3	1.0	1.4	0.9	1.2	1.3	1.8	2.0	3.1	3.6	3.3	3.8	3.0	2.9	3.1	2.4	1.6	1.0	1.1	1.0	0.7	1.2	1.1	1.7	3.8
17-Nov	1.7	1.7	2.2	3.1	3.2	3.3	2.8	2.7	2.7	2.8	2.5	2.6	1.8	2.2	2.0	1.6	2.3	2.4	3.0	3.2	3.2	3.7	3.7	3.4	3.7
18-Nov	2.9	3.0	2.9	2.3	2.1	2.8	2.6	2.7	3.4	3.1	3.5	3.2	3.6	2.9	2.6	2.0	1.6	0.5	0.6	0.3	0.4	0.2	0.3	0.3	3.6
19-Nov	0.2	0.2	0.3	0.4	0.7	0.9	1.0	1.1	0.9	0.5	1.2	1.1	1.1	0.8	0.9	1.0	0.6	0.5	0.3	0.1	0.3	0.2	0.2	0.2	1.2
20-Nov	0.2	0.3	0.1	0.2	0.2	0.5	1.6	2.1	2.3	2.5	1.8	1.4	1.5	1.6	1.3	1.7	2.2	3.0	2.9	2.7	2.6	2.6	2.1	1.7	3.0
21-Nov	1.3	1.4	AF	AF	1.5	2.4	1.9	1.1	1.0	1.3	1.5	1.7	1.4	1.4	1.6	1.2	0.8	1.0	1.4	1.2	1.1	2.4	2.6	2.6	2.6
22-Nov	2.6	2.6	2.8	3.3	2.9	3.2	2.9	2.1	2.9	2.6	1.4	1.0	1.6	AF	1.5	1.5	1.7	1.5	1.9	1.4	1.4	1.3	1.6	1.5	3.3
23-Nov	1.2	1.2	1.2	1.2	1.2	1.2	0.8	0.6	0.8	0.9	1.1	1.2	1.0	1.3	1.4	1.6	1.7	1.3	1.5	1.7	1.8	2.0	2.0	1.9	2.0
24-Nov	1.5	1.7	1.4	1.3	1.7	1.9	1.6	1.1	0.7	0.7	0.8	0.9	1.6	1.4	0.7	0.7	0.5	0.6	1.0	0.9	1.2	1.4	1.3	1.3	1.9
25-Nov	1.7	1.4	1.2	1.3	1.3	1.4	0.8	0.8	1.1	0.9	0.7	0.8	0.8	1.0	0.9	0.5	0.3	0.7	0.7	1.0	1.2	1.3	1.4	1.5	1.7
26-Nov	1.7	1.2	1.5	1.4	1.9	1.6	2.4	2.6	2.5	2.6	2.3	1.6	1.7	1.8	1.6	2.1	1.9	1.6	1.3	1.0	1.0	1.0	1.1	0.7	2.6
27-Nov	1.1	1.7	1.7	1.6	1.2	1.4	1.5	1.4	0.5	0.3	1.1	1.4	1.0	0.4	0.2	0.6	0.5	0.7	0.8	0.7	0.8	0.7	0.8	0.8	1.7
28-Nov	0.6	0.6	0.8	0.6	0.8	1.0	1.6	1.2	1.4	1.5	1.4	1.6	1.5	1.4	1.3	0.6	1.2	1.4	0.9	0.9	0.9	1.3	1.3	1.1	1.6
29-Nov	1.8	1.1	0.8	0.6	0.6	0.6	0.5	0.8	1.2	0.7	0.8	1.1	1.2	0.8	1.0	0.8	1.0	0.6	1.0	1.0	0.9	0.9	1.4	1.3	1.8
30-Nov	1.0	1.2	1.2	1.4	1.4	1.5	1.8	1.7	1.6	1.2	1.1	1.1	1.0	1.3	0.6	0.8	1.4	1.6	0.8	1.4	0.7	0.8	0.7	0.6	1.8

3.2	3.0	2.9	3.3	3.2	3.3	2.9	2.7	3.4	3.6	3.5	3.8	3.6	3.0	3.1	2.5	2.7	3.6	3.8	3.5	3.3	3.7	3.7	3.4	
Diurnal Maximum																								

AF - Analyzer Failure



Maximum Value: 6.4 km/h on Nov 23 22:00		Maximum Daily Average: 1.3 km/h on Nov 6		Hours in Service: 720																							
Minimum Value: -2.7 km/h on Nov 24 14:00		Minimum Daily Average: -0.4 km/h on Nov 18		Hours of Data: 682																							
Maximum Diurnal Average: 0.7 km/h at hour 22		Minimum Diurnal Average: 0.1 km/h at hour 14		Hours of Missing Data: 38																							
Monthly Average: 0.40 km/h		Percentiles: P ₁ = -0.9 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.2 Q ₃ = 0.6 P ₉₀ = 1.2 P ₉₉ = 3.5		Hours of Calibration: 0																							
				Percent Operational Time: 94.7																							
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-Nov	0.2	0.0	0.0	0.0	0.2	0.1	0.3	0.3	0.8	1.0	0.9	0.4	1.1	0.2	0.7	0.3	0.3	0.9	0.8	1.2	0.4	-0.1	0.2	0.5	0.5	1.2	
2-Nov	-0.2	-0.1	0.5	0.2	0.1	0.1	0.1	0.3	0.5	0.2	0.2	0.6	1.1	0.9	0.2	0.8	2.1	1.2	1.8	2.5	3.5	3.0	3.5	3.2	1.1	3.5	
3-Nov	2.8	2.6	3.5	1.8	2.2	1.5	0.3	-0.5	0.3	0.2	0.1	0.7	0.2	-0.2	-0.1	-0.1	-0.2	-0.3	-0.1	0.0	-0.4	-0.5	-0.1	0.6	0.6	3.5	
4-Nov	-0.5	0.1	0.0	0.2	0.2	0.0	0.1	0.4	0.3	0.3	0.6	0.6	1.4	1.6	1.7	0.6	0.1	-0.2	0.5	0.1	-0.2	-0.1	0.2	0.0	0.3	1.7	
5-Nov	-0.4	-0.6	-0.1	-0.2	-0.5	-0.4	0.0	0.1	-0.2	-0.1	-0.4	0.7	0.1	-0.1	-0.1	-0.2	-0.2	0.0	0.3	-0.1	-0.3	0.8	1.2	0.3	0.0	1.2	
6-Nov	0.0	-0.1	-0.1	0.1	0.4	0.5	0.7	1.4	0.8	0.3	0.1	0.4	1.6	0.6	0.1	1.7	2.4	2.7	3.5	3.8	3.7	3.0	2.0	1.2	1.3	3.8	
7-Nov	1.2	0.4	-0.1	0.3	0.3	0.0	0.4	0.6	0.2	-0.1	0.8	0.1	0.4	0.1	-0.1	-0.2	0.1	0.0	0.2	0.7	0.9	1.2	1.0	0.9	0.4	1.2	
8-Nov	1.6	0.1	0.0	-0.7	-0.1	-0.2	-0.1	-0.2	-0.1	0.3	0.0	0.1	0.2	-0.1	-0.1	0.5	0.1	0.1	0.1	0.0	0.2	0.4	0.2	0.2	0.1	1.6	
9-Nov	0.0	0.4	1.4	-0.1	-0.1	0.1	-0.1	0.0	0.1	0.0	0.2	0.2	-0.1	-0.2	-0.2	0.0	-0.1	0.0	0.0	0.3	0.2	0.5	0.5	0.4	0.1	1.4	
10-Nov	1.5	1.2	0.8	0.5	0.3	0.2	0.4	1.1	-0.6	-0.7	-0.3	0.3	-0.1	-0.1	0.1	-0.1	0.1	0.0	-0.1	0.4	0.8	0.8	0.6	0.6	0.3	1.5	
11-Nov	0.3	0.7	1.0	1.0	0.2	0.2	0.4	1.0	0.9	0.5	1.0	0.4	0.6	0.0	0.2	0.3	0.8	0.7	0.7	0.4	0.7	0.5	0.6	0.5	0.6	1.0	
12-Nov	0.2	0.3	0.4	0.2	0.2	0.2	0.0	0.4	0.3	0.4	0.1	0.5	1.0	0.9	0.0	-0.2	0.5	1.7	2.6	2.8	2.2	1.9	1.1	1.3	0.8	2.8	
13-Nov	0.4	0.6	0.0	-0.2	0.7	1.0	1.2	1.2	1.0	0.3	0.6	0.9	0.6	0.6	0.6	0.4	0.0	0.2	0.7	0.1	0.1	0.1	0.4	0.4	0.5	1.2	
14-Nov	0.2	0.4	0.1	-0.2	1.3	0.9	0.1	0.0	0.2	0.4	0.3	0.0	0.3	0.7	0.1	0.6	0.2	0.2	0.3	0.7	0.2	0.6	0.7	0.7	0.3	1.3	
15-Nov	0.3	0.5	0.0	0.4	0.3	0.3	0.2	-0.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	0.4	0.6	0.5	0.5	0.6	0.3	0.3	0.2	0.9	0.3	0.9	
16-Nov	0.3	-0.1	0.0	0.0	-0.3	-0.5	-0.3	-0.3	-0.4	-0.2	-0.4	-0.6	-0.3	-0.3	-0.7	-0.1	0.2	0.4	0.4	0.2	0.0	0.0	0.0	1.5	-0.1	1.5	
17-Nov	1.8	1.6	1.5	1.9	3.1	3.2	2.6	2.8	2.6	3.5	1.2	-0.3	0.3	0.8	0.7	-0.2	-0.5	-0.4	-0.4	-0.6	-0.1	-0.4	-0.1	1.0	1.0	3.5	
18-Nov	0.2	0.0	-0.5	-0.6	-0.4	-0.9	-0.6	-0.5	-0.8	-0.7	-0.5	-0.7	-0.8	-0.6	-0.2	-0.2	-0.3	-0.1	0.0	0.0	-0.1	-0.1	-0.3	-0.2	-0.4	0.2	
19-Nov	0.1	0.1	0.1	0.0	0.3	0.3	0.7	0.7	0.5	0.1	0.3	0.4	0.4	0.3	0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.3	0.2	0.7	
20-Nov	-0.1	0.0	0.1	0.0	0.0	-0.3	-0.3	0.0	-0.3	0.0	-0.2	0.4	-0.1	-0.1	-0.2	0.2	2.1	3.2	2.6	2.2	1.2	1.0	0.8	0.3	0.5	3.2	
21-Nov	0.0	0.1	1.3	0.7	0.6	0.2	0.6	0.4	0.2	0.0	0.1	0.6	0.1	0.1	0.9	0.2	0.1	0.5	0.4	0.4	0.3	0.2	-0.2	-0.3	0.3	1.3	
22-Nov	0.2	-0.4	-1.0	-0.9	0.0	-0.3	-0.6	-0.9	-1.0	-0.7	-0.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.2	
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	0.2	0.0	-1.3	AF	AF	AF	AF	AF	-0.3	1.3	5.8	5.9	AF	5.7	6.4	AF	AF	6.4	
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.4	0.0	-0.1	-2.7	-0.7	0.2	-0.1	0.1	0.4	0.9	0.0	0.4	1.4	--	1.4	
25-Nov	1.1	0.7	0.2	0.3	0.6	0.6	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.4	0.6	0.1	0.0	0.0	-0.1	-0.1	0.1	0.2	0.3	0.2	1.1	
26-Nov	1.2	0.4	0.3	-0.5	0.0	0.2	2.0	2.1	2.4	2.3	2.6	1.5	0.8	0.5	-0.3	0.1	0.2	0.1	0.0	-0.3	0.1	0.1	-0.2	0.2	0.7	2.6	
27-Nov	0.0	0.5	0.8	0.4	-0.1	0.0	0.0	0.2	0.2	0.1	-0.5	-1.5	-0.7	-0.3	0.0	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	0.0	-0.1	0.8	
28-Nov	0.0	-0.3	0.2	0.1	-0.2	0.3	0.8	0.1	0.6	0.9	0.9	1.5	0.8	0.9	0.7	0.1	0.2	0.0	-0.6	0.3	0.0	-0.2	0.4	-0.2	0.3	1.5	
29-Nov	0.3	0.1	-0.2	-0.2	-0.2	0.0	-0.1	-0.4	0.6	-0.1	0.5	0.8	1.0	0.6	1.4	0.5	0.4	0.7	0.5	0.4	0.0	0.5	0.7	0.6	0.3	1.4	
30-Nov	0.1	0.4	0.5	0.6	1.7	1.0	0.8	0.5	0.9	0.1	0.6	0.5	0.2	0.0	0.1	0.3	0.1	-0.2	-0.1	-0.1	-0.2	0.1	0.0	0.5	0.3	1.7	
		0.5	0.3	0.4	0.2	0.4	0.3	0.4	0.4	0.3	0.2	0.3	0.3	0.3	0.1	0.2	0.2	0.4	0.6	0.7	0.6	0.7	0.7	0.5	0.5	Diurnal Average	
		2.8	2.6	3.5	1.9	3.1	3.2	2.6	2.8	2.6	3.5	2.6	1.5	1.6	1.6	1.7	1.7	2.4	5.8	5.9	3.8	5.7	6.4	3.5	3.2	Diurnal Maximum	
AF - Analyzer Failure																											



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4.0 km/h on Nov 12 21:00	Hours of Data: 682
Minimum Value: 0.2 km/h on Nov 19 21:00	Hours of Missing Data: 38
Percentiles: P ₁ = 0.2 P ₁₀ = 0.7 Q ₁ = 1.0 Median = 1.4 Q ₃ = 2.0 P ₉₀ = 2.5 P ₉₉ = 3.4	Hours of Calibration: 0
	Percent Operational Time: 94.7

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

3.1	2.5	2.7	2.5	2.5	2.8	2.5	3.1	3.7	3.2	3.5	3.4	3.2	3.0	2.7	2.4	2.4	2.9	3.0	3.4	4.0	3.7	3.5	3.5	
Diurnal Maximum																								

AF - Analyzer Failure



Maximum Value: 4.3 km/h on Nov 13 09:00		Maximum Daily Average: 1.8 km/h on Nov 13		Hours in Service: 720																						
Minimum Value: -1.8 km/h on Nov 27 12:00		Minimum Daily Average: -0.3 km/h on Nov 18		Hours of Data: 720																						
Maximum Diurnal Average: 1.0 km/h at hour 19		Minimum Diurnal Average: 0.5 km/h at hour 2		Hours of Missing Data: 0																						
Monthly Average: 0.75 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.1 Q ₁ = 0.1 Median = 0.6 Q ₃ = 1.2 P ₉₀ = 1.9 P ₉₉ = 3.5		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-Nov	0.2	0.1	-0.1	0.0	0.2	0.0	0.4	0.7	1.3	1.7	1.2	0.6	1.4	0.3	0.5	0.3	0.4	1.7	1.2	1.8	0.5	-0.3	0.3	0.4	0.6	1.8
2-Nov	0.2	0.1	0.3	0.3	0.2	0.3	0.1	0.4	0.3	0.3	0.5	0.6	1.3	1.1	0.6	1.0	2.4	1.2	2.0	2.1	4.2	3.6	3.6	3.4	1.3	4.2
3-Nov	3.5	2.9	4.2	3.0	2.8	1.7	0.6	-0.5	0.3	0.1	0.2	0.8	0.2	0.0	0.2	0.1	0.1	-0.1	0.0	0.0	0.2	-0.1	0.6	1.7	0.9	4.2
4-Nov	0.3	1.1	0.7	0.3	0.6	0.1	0.2	0.4	0.4	0.7	1.1	1.4	1.5	1.3	1.2	0.2	0.2	1.4	2.6	1.1	0.3	0.2	0.5	0.1	0.7	2.6
5-Nov	-0.6	-0.4	0.1	0.2	-0.4	-0.3	0.0	0.3	-0.2	0.0	-0.4	1.2	0.5	-0.2	0.0	-0.1	-0.1	-0.1	0.5	0.1	-0.3	0.8	1.8	0.9	0.1	1.8
6-Nov	-0.2	-0.3	0.0	0.1	0.3	0.4	0.8	1.2	0.6	0.7	1.3	0.5	1.3	0.5	0.3	2.1	2.9	3.0	3.3	3.0	2.6	2.1	1.6	0.4	1.2	3.3
7-Nov	0.5	0.9	1.6	1.8	1.1	0.7	1.4	1.6	1.7	1.0	2.2	1.0	1.1	0.5	0.0	0.4	0.3	0.0	0.8	1.1	1.8	2.7	2.1	1.7	1.2	2.7
8-Nov	3.1	-0.1	0.0	-0.6	0.2	-0.1	-0.1	0.0	-0.1	0.3	-0.3	-0.1	0.2	-0.1	-0.1	0.5	0.0	0.0	0.2	0.0	0.2	0.8	0.8	0.6	0.2	3.1
9-Nov	0.0	0.8	2.5	-0.1	-0.1	0.2	0.0	-0.1	0.0	0.0	0.3	0.5	0.6	0.6	0.2	0.4	0.9	0.6	0.3	0.5	0.7	0.6	0.2	0.8	0.4	2.5
10-Nov	1.4	0.5	-0.3	0.0	-0.2	1.5	3.6	3.7	2.8	1.9	1.6	0.6	1.1	0.7	0.4	-0.5	-0.8	-0.3	0.8	1.0	0.7	0.6	0.3	0.2	0.9	3.7
11-Nov	-0.1	0.1	0.6	1.0	2.8	3.2	2.3	2.3	1.9	1.4	1.7	1.1	1.3	0.9	1.1	1.2	1.9	1.5	1.8	1.3	1.5	1.2	1.1	1.4	1.4	3.2
12-Nov	0.7	1.1	1.0	0.9	0.7	1.0	0.7	0.7	0.1	1.3	0.1	0.1	0.8	0.7	-0.1	-0.4	0.2	1.4	2.1	1.9	1.5	1.1	0.6	1.0	0.8	2.1
13-Nov	0.5	0.3	1.9	2.2	2.8	2.2	1.7	2.5	4.3	3.3	2.4	2.6	2.5	1.9	1.7	1.6	1.1	0.7	0.8	1.5	0.9	1.0	0.7	1.4	1.8	4.3
14-Nov	1.2	1.1	0.7	0.6	2.3	1.7	0.1	0.2	0.3	0.6	0.8	0.4	0.0	1.1	1.5	1.4	1.6	1.1	0.8	1.2	2.0	0.8	0.2	0.3	0.9	2.3
15-Nov	0.2	0.1	0.4	0.4	0.5	0.9	0.4	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.5	0.7	1.2	0.8	1.3	1.4	0.7	0.6	0.5	1.7	0.6	1.7
16-Nov	0.2	0.1	0.3	0.2	0.1	-0.5	-0.3	0.2	0.2	0.2	0.0	0.4	0.7	0.9	-0.2	0.3	0.6	1.2	1.5	1.3	0.5	-0.1	-0.4	1.3	0.4	1.5
17-Nov	1.6	1.4	1.8	2.0	3.1	3.2	2.6	3.4	3.0	3.3	1.8	3.0	2.7	1.9	1.8	1.8	0.6	0.1	-0.2	-0.4	-0.3	0.3	0.0	0.5	1.6	3.4
18-Nov	0.3	0.1	-0.3	-0.4	-0.3	-0.6	-0.7	-0.6	-0.7	-0.4	-0.5	-0.6	-0.7	-0.3	-0.2	-0.3	-0.4	-0.1	0.0	0.1	-0.1	-0.1	0.1	0.0	-0.3	0.3
19-Nov	0.3	0.3	0.5	0.9	0.3	0.3	0.2	0.2	0.6	0.1	0.2	0.2	0.2	0.4	0.0	0.2	0.3	0.2	0.3	0.2	0.1	0.0	0.0	-0.1	0.2	0.9
20-Nov	0.2	0.1	0.1	0.2	-0.1	-0.1	0.1	0.3	0.0	0.2	0.0	0.9	0.7	-0.1	-0.3	0.1	1.8	2.3	2.0	1.1	0.6	0.0	0.9	1.6	0.5	2.3
21-Nov	0.7	0.4	2.7	1.7	1.3	1.2	1.6	1.3	1.0	0.8	0.8	1.7	1.4	1.2	2.0	1.1	1.4	2.2	1.3	0.9	1.1	1.1	0.7	0.3	1.3	2.7
22-Nov	0.9	-0.1	-0.5	-0.5	0.1	-0.1	-0.1	-0.8	-0.8	-0.8	-0.2	0.0	0.1	0.1	0.3	0.1	0.2	0.2	-0.1	0.0	-0.1	-0.1	0.1	-0.1	-0.1	0.9
23-Nov	0.1	0.2	0.3	0.1	0.1	0.0	0.1	0.1	0.2	0.0	0.1	0.2	0.4	0.1	-0.3	0.0	-0.3	0.1	0.2	0.3	-0.2	0.0	0.4	0.6	0.1	0.6
24-Nov	0.3	-0.6	-0.1	-0.2	-0.3	-0.5	-0.4	-0.2	-0.4	-0.3	0.2	-0.1	-0.1	0.8	0.0	0.0	0.1	0.9	1.1	0.4	1.7	1.4	2.7	0.2	2.7	
25-Nov	2.1	1.9	1.8	1.5	1.9	2.2	1.2	0.7	0.5	0.4	0.5	0.3	0.4	0.4	0.3	0.4	0.7	0.7	1.0	0.6	0.5	0.7	1.1	1.1	1.0	2.2
26-Nov	0.7	0.2	0.5	-0.1	0.3	0.3	0.8	1.5	1.7	1.6	0.8	0.5	1.4	1.6	1.5	2.1	2.0	1.8	0.8	0.8	1.2	1.3	0.5	0.9	1.0	2.1
27-Nov	1.3	1.4	2.2	1.2	0.8	0.6	0.8	0.5	0.2	0.2	-0.1	-1.8	-0.5	-0.2	0.0	0.1	0.6	0.9	0.5	0.3	0.8	0.7	0.8	0.5	0.5	2.2
28-Nov	0.6	0.4	0.5	0.6	0.7	0.9	0.7	0.4	0.8	0.8	1.1	1.3	0.4	0.9	1.6	1.1	1.3	2.2	1.0	0.7	1.1	1.3	1.7	0.9	1.0	2.2
29-Nov	1.4	1.0	0.4	0.6	0.6	0.8	0.7	0.8	0.9	0.8	1.0	1.0	0.4	0.3	0.7	0.6	1.6	0.8	1.3	1.8	0.9	0.8	1.4	1.3	0.9	1.8
30-Nov	0.8	1.5	1.6	0.9	1.4	2.3	2.0	1.4	1.4	0.9	1.0	0.6	0.9	1.0	1.0	0.8	1.1	1.0	0.5	0.5	0.3	0.6	0.6	0.7	1.0	2.3
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.9 km/h on Nov 6 20:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 0.1 km/h on Nov 19 21:00																									
Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 1.3 Q ₃ = 1.8 P ₉₀ = 2.3 P ₉₉ = 3.4																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	1.6	1.4	1.1	0.9	1.3	1.0	1.0	0.9	1.7	2.0	2.1	2.4	2.5	1.9	1.9	1.8	1.5	1.9	1.5	2.4	2.2	1.9	1.9	1.8	2.5
2-Nov	1.5	1.4	1.4	1.6	1.5	1.7	1.3	1.0	0.8	1.1	1.1	1.6	1.6	1.9	1.0	1.8	2.3	2.7	2.6	3.1	2.5	2.6	3.0	2.9	3.1
3-Nov	2.1	2.0	2.0	1.9	1.5	1.6	2.0	1.0	0.9	0.7	0.5	0.6	0.7	0.7	0.7	0.4	0.4	0.3	0.5	1.6	1.5	1.4	1.4	1.0	2.1
4-Nov	0.8	0.7	0.8	0.9	0.9	0.7	0.9	1.3	0.9	0.9	1.3	1.7	2.4	2.1	1.6	1.4	1.2	1.1	1.2	1.3	0.8	0.9	1.0	1.4	2.4
5-Nov	1.3	1.6	1.1	1.8	1.4	1.2	1.4	1.7	2.1	2.3	2.1	2.9	2.4	2.3	1.7	2.0	1.6	1.7	1.9	1.9	1.4	1.6	1.3	1.2	2.9
6-Nov	0.6	0.9	0.4	0.5	0.8	0.8	1.0	1.4	1.2	1.4	1.6	1.1	1.9	1.9	1.7	1.9	2.1	2.7	3.7	3.9	3.6	3.4	2.9	1.5	3.9
7-Nov	1.7	1.4	1.6	2.1	1.5	1.3	1.0	1.1	1.3	1.9	1.4	1.6	1.0	0.8	0.9	0.5	0.7	0.6	0.7	0.8	1.2	0.7	0.8	1.0	2.1
8-Nov	2.4	1.6	1.3	0.9	0.6	0.4	0.5	0.9	1.3	2.5	3.0	2.2	2.4	2.3	2.6	2.4	2.0	1.6	0.7	0.3	0.7	0.5	0.5	0.6	3.0
9-Nov	1.2	0.9	0.9	0.9	0.8	0.4	0.2	0.2	0.2	0.2	0.3	0.9	1.8	1.3	1.9	1.8	1.3	0.9	0.5	0.7	0.8	1.0	1.0	1.3	1.9
10-Nov	1.4	1.2	1.2	1.2	1.1	1.5	1.3	1.1	1.1	1.2	1.5	1.6	1.5	1.5	1.5	1.1	1.0	1.6	1.8	1.6	1.9	2.3	2.2	2.8	2.8
11-Nov	2.5	1.9	2.1	1.6	1.5	2.5	2.3	2.2	2.0	1.9	2.5	1.5	1.2	1.4	1.5	1.3	1.0	1.5	1.6	1.5	1.7	1.6	1.8	2.0	2.5
12-Nov	2.3	1.8	1.8	1.6	1.9	1.4	1.0	0.9	1.0	1.2	1.2	1.1	1.6	1.6	1.0	0.8	1.5	2.6	3.4	3.7	3.5	3.1	2.4	2.5	3.7
13-Nov	1.9	1.5	1.4	1.4	1.4	1.6	1.6	1.5	2.1	1.4	2.3	2.9	2.2	2.4	2.4	2.1	1.4	1.3	1.1	1.5	1.8	1.5	1.5	1.6	2.9
14-Nov	1.6	1.7	1.7	1.7	1.5	2.0	2.3	2.1	2.3	2.5	2.1	1.0	1.7	1.2	1.4	1.0	0.7	0.5	0.4	0.3	1.1	1.4	1.2	0.5	2.5
15-Nov	0.3	0.2	0.4	0.6	0.7	0.8	0.5	0.2	0.2	0.4	0.8	0.6	0.9	0.9	0.9	1.6	1.8	2.2	2.8	2.9	1.5	1.3	1.0	0.8	2.9
16-Nov	0.9	0.8	0.7	0.5	0.7	1.0	1.2	1.4	1.9	1.7	1.8	2.9	3.0	2.6	2.3	1.8	1.5	1.3	1.4	1.1	0.9	1.2	1.9	2.4	3.0
17-Nov	1.3	1.5	1.7	2.3	2.9	2.9	2.8	2.6	3.0	2.4	1.7	1.8	2.0	2.2	2.1	1.7	1.5	2.0	2.9	3.2	1.9	1.4	1.6	1.8	3.2
18-Nov	1.4	1.4	2.3	1.9	1.9	2.2	1.9	2.5	3.5	3.1	2.9	3.0	2.9	2.9	2.5	1.8	1.2	0.8	1.4	0.5	0.8	0.6	0.7	0.5	3.5
19-Nov	0.5	0.4	0.5	0.8	0.5	0.6	0.6	0.5	0.6	0.4	0.5	0.5	0.8	0.8	0.5	0.6	0.4	0.3	0.2	0.4	0.1	0.2	0.3	0.3	0.8
20-Nov	0.3	0.3	0.2	0.7	0.9	1.2	1.5	1.5	0.8	0.8	1.6	1.6	1.2	1.1	1.2	1.4	1.8	2.1	1.9	1.6	1.4	1.3	1.5	1.9	2.1
21-Nov	1.5	2.5	1.7	2.1	1.7	2.3	2.0	1.9	2.5	2.1	2.2	2.2	2.1	2.0	2.0	1.8	1.3	1.3	1.7	1.7	2.1	1.8	1.5	1.9	2.5
22-Nov	1.7	1.5	1.1	1.1	1.4	1.8	1.9	1.9	2.8	3.0	1.4	0.9	1.7	1.6	1.5	1.1	1.6	1.6	1.5	1.3	1.0	1.0	1.3	1.0	3.0
23-Nov	1.0	0.9	0.9	0.5	0.3	0.3	0.4	0.3	0.4	0.5	0.6	0.7	0.9	0.9	0.9	1.1	1.2	0.9	1.4	1.4	1.6	1.6	1.8	1.9	1.9
24-Nov	1.7	1.8	1.3	1.0	1.4	1.4	1.1	0.9	0.5	0.6	0.7	0.7	0.9	1.5	1.5	0.7	1.2	0.8	1.4	1.5	1.4	1.3	1.2	1.3	1.8
25-Nov	0.9	1.3	1.4	1.3	1.3	1.7	1.2	1.1	0.9	0.7	0.7	0.5	0.6	0.6	0.4	0.5	0.4	0.6	0.8	0.7	0.7	1.0	0.9	1.7	1.7
26-Nov	0.8	0.9	1.1	1.1	1.1	1.1	1.0	0.8	0.9	1.0	0.9	1.1	1.3	1.4	1.9	1.8	2.0	2.0	1.6	2.1	2.0	2.0	2.0	1.9	2.1
27-Nov	1.8	2.2	1.8	1.5	1.0	0.6	0.6	1.0	0.6	0.6	1.4	1.3	1.0	0.5	0.4	0.3	0.6	0.9	0.7	0.6	0.8	1.2	1.3	1.5	2.2
28-Nov	1.5	1.4	1.6	0.9	0.6	0.9	1.0	1.2	1.0	0.9	0.8	0.8	0.9	1.1	1.3	0.9	1.3	1.3	1.0	1.2	1.2	1.5	1.1	1.3	1.6
29-Nov	1.2	1.1	1.4	0.8	1.3	1.0	1.0	0.8	1.2	1.1	0.9	1.0	0.9	0.7	0.7	0.9	1.0	0.9	1.1	1.2	1.3	1.0	1.3	1.2	1.4
30-Nov	0.9	1.2	1.2	1.1	1.3	1.1	1.0	1.3	1.2	1.7	1.3	2.0	1.7	1.6	1.2	1.1	0.7	1.1	0.9	0.8	1.2	1.1	1.2	0.9	2.0
	2.5	2.5	2.3	2.3	2.9	2.9	2.8	2.6	3.5	3.1	3.0	3.0	3.0	2.9	2.6	2.4	2.3	2.7	3.7	3.9	3.6	3.4	3.0	2.9	
	Diurnal Maximum																								



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 4 BUFFALO VIEWPOINT NOVEMBER 2015

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

December 22, 2015



This page intentionally left blank

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	686	34	34	100.00	3	0	1	0
H2S (ppb) Average	686	34	34	100.00	3	0	1	0
THC (ppm) Average	686	34	34	100.00	3.6	-	2.6	-
Temperature (C) Average	720	0	0	100.00	8.3	-	3.4	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	92	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	25	-	16	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	686	0.4	0	-	0	0	0	0	0	1	3
H2S (ppb) Average	686	0.2	0	-	0	0	0	0	0	0	3
THC (ppm) Average	686	2.28	0.2	-	2.1	2.2	2.2	2.2	2.3	2.4	3.6
Temperature 2 m (C) Average	720	-4.04	5.8	-	-21.8	-12.5	-7.3	-3.1	-0.1	2.5	8.3
Relative Humidity (%) Average	720	75.5	15	-	31	52	64	79	87	93	98
Wind Speed 10 m (km/h) Average	720	11.2	5	-	1	6	8	10	14	18	25
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

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

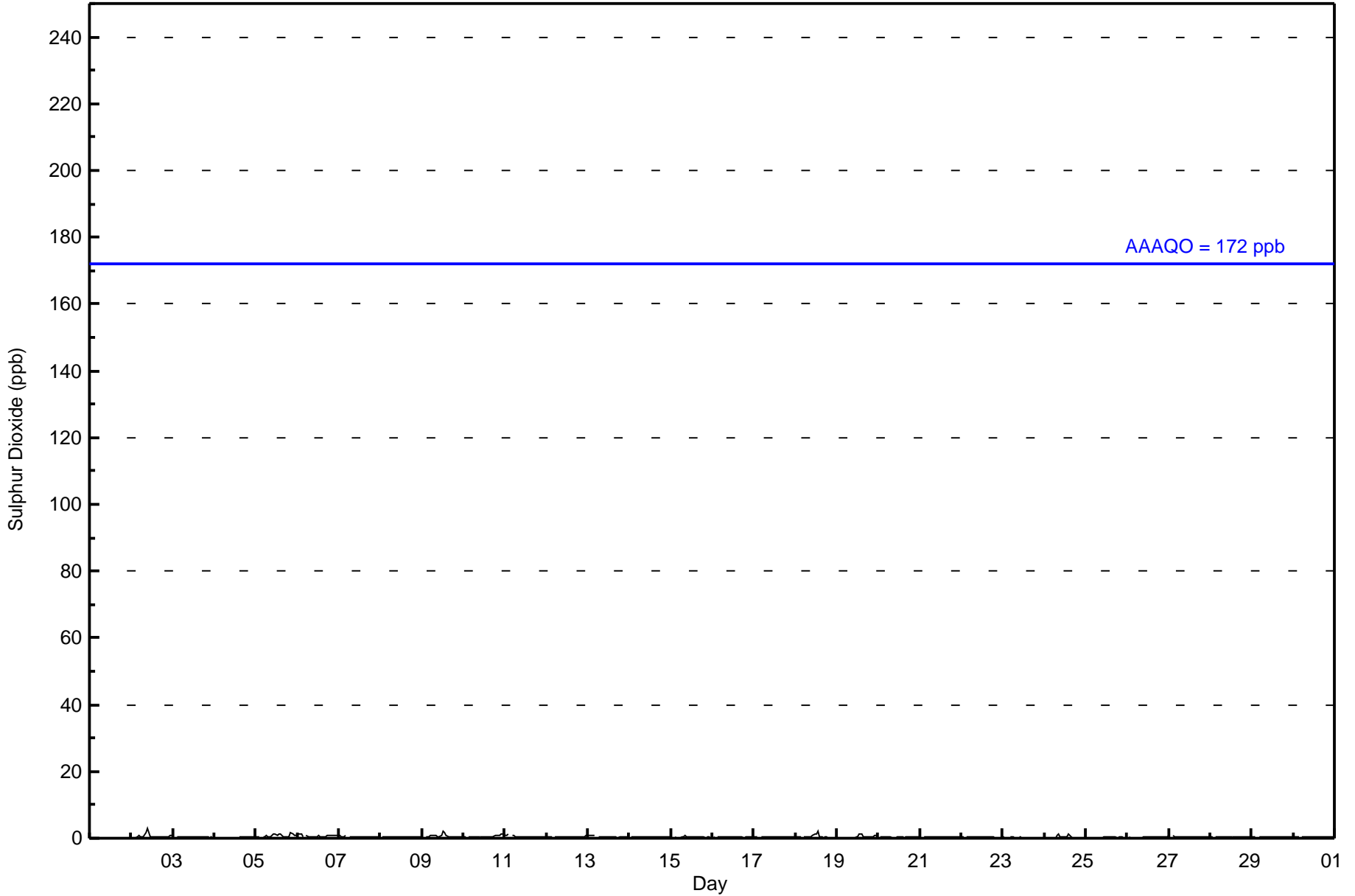


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Nov 2 10:00	Maximum Daily Average: 0.8 ppb on Nov 5		Hours of Data:	686
Minimum Value: 0 ppb on Nov 19 03:00	Minimum Daily Average: 0.2 ppb on Nov 1		Hours of Missing Data:	34
Maximum Diurnal Average: 0.5 ppb at hour 14	Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O 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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	Z	0	0	0	1	0	0	0	2	3	2	0	0	0	0	0	0	1	1	0	0	0	1	1	0.6	3
3-Nov	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
4-Nov	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	1	1	1	1	1	0	1	0	0	0	0.3	1
5-Nov	0	0	0	Z	0	0	1	1	0	1	1	C	C	1	1	1	1	1	1	1	0	2	1	1	0.8	2
6-Nov	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
7-Nov	1	1	1	1	1	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
8-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
9-Nov	1	Z	1	1	1	1	1	1	1	1	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0.7	2
10-Nov	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1	1	1	0.6	1
11-Nov	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
12-Nov	0	1	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.4	1
13-Nov	1	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Nov	Z	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
15-Nov	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Nov	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Nov	0	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
18-Nov	0	0	0	0	Z	0	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0.5	2
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0.4	1
20-Nov	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Nov	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
27-Nov	1	Z	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Nov	0	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

0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average
1	1	1	1	1	1	1	1	1	2	3	2	1	2	2	1	1	1	1	1	1	1	2	1	1	1	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	68	55	5	0	1	3	86	180	44	44	41	61	32	16	36	14	686
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	68	55	5	0	1	3	86	180	44	44	41	61	32	16	36	14	686

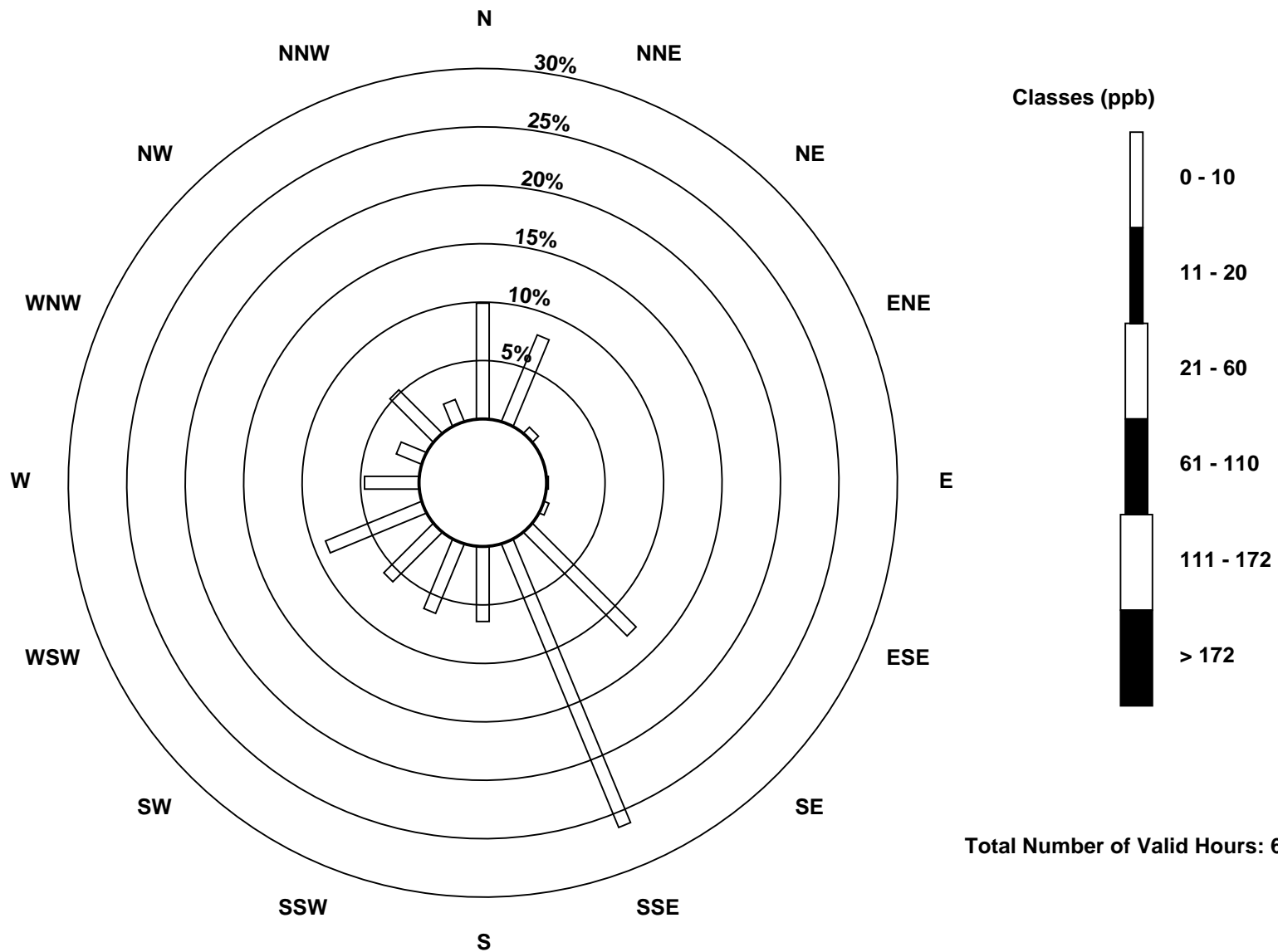
Total Number of Valid Hours: 686

Total Number of Hours: 720

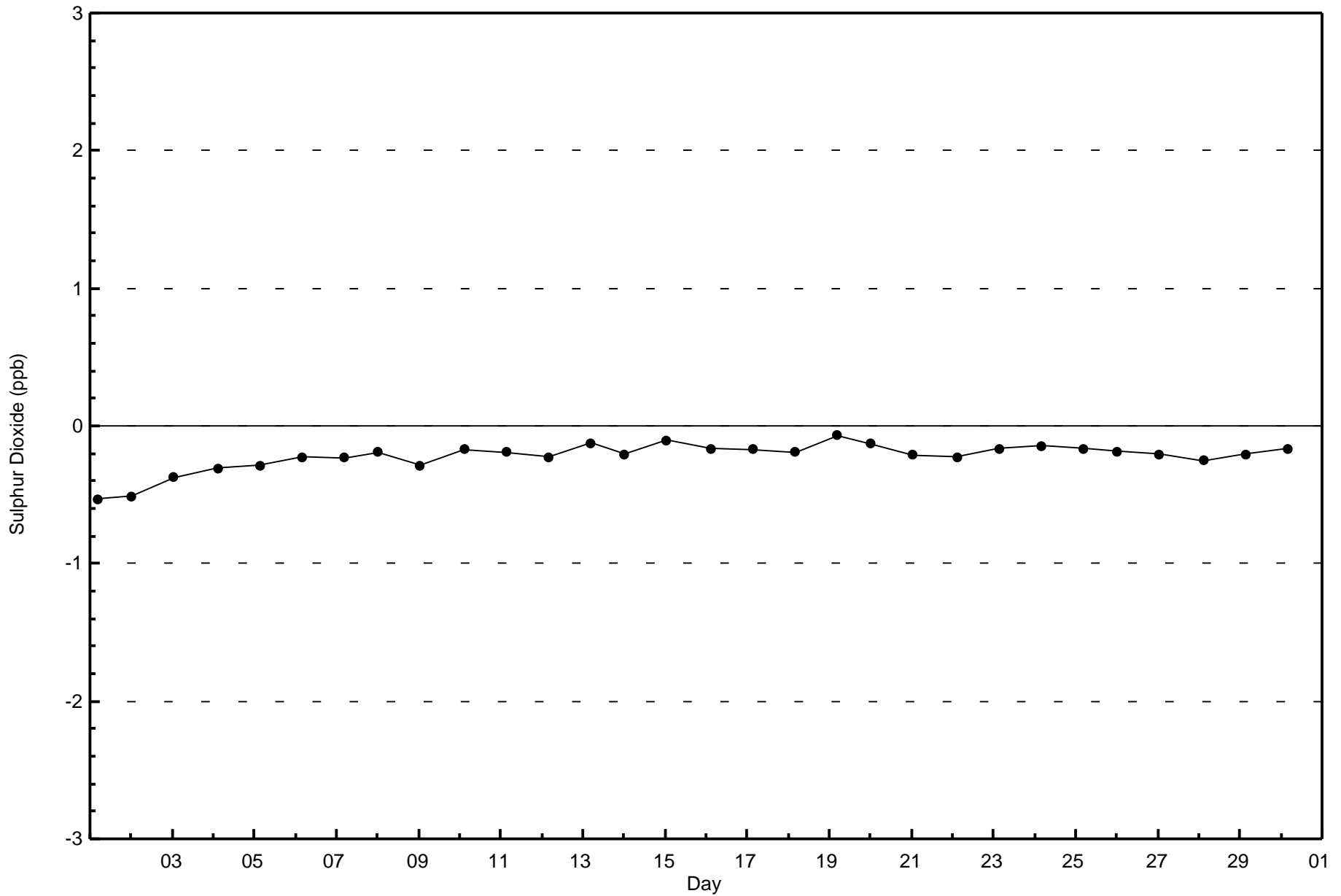


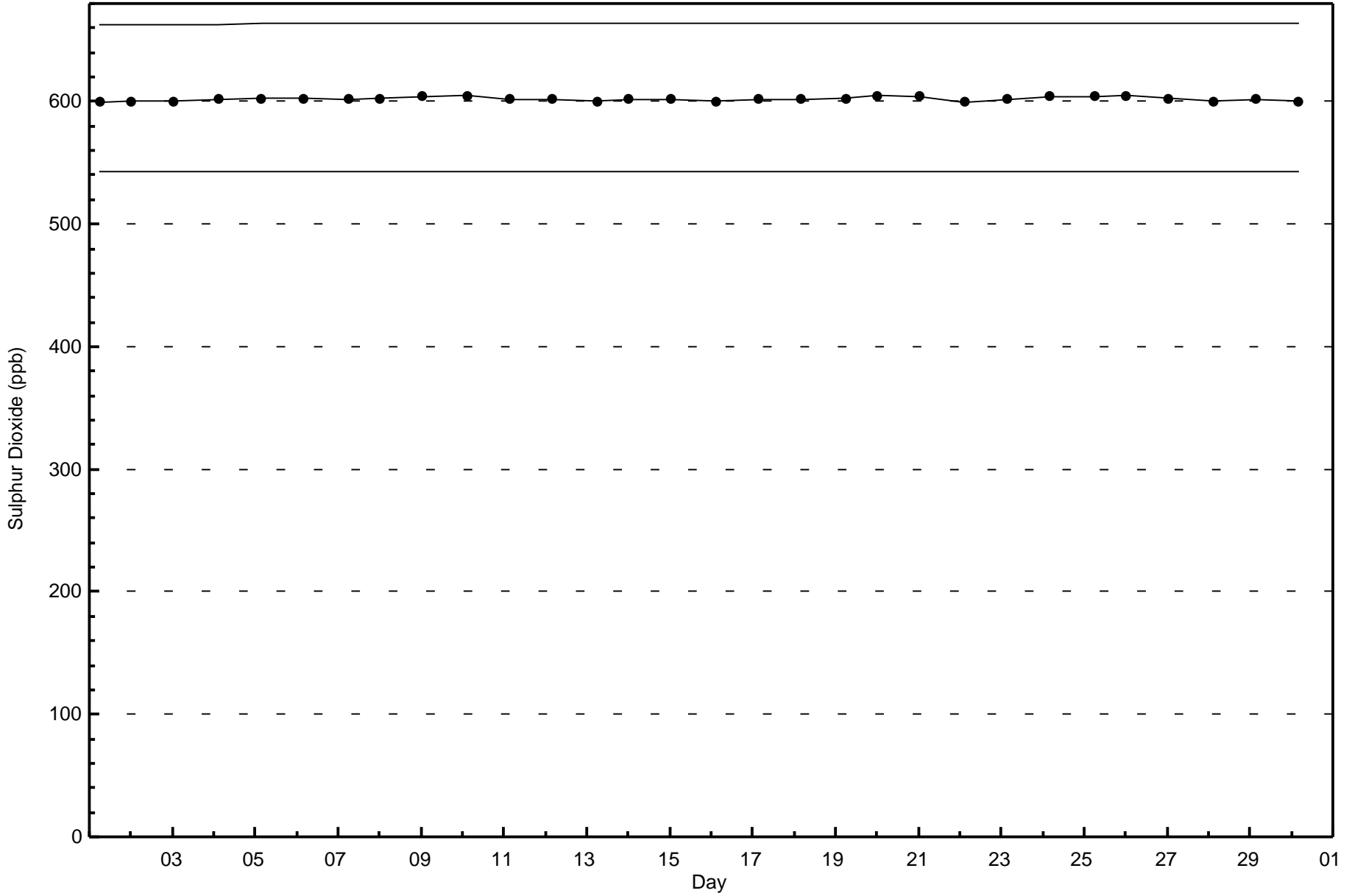
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 686





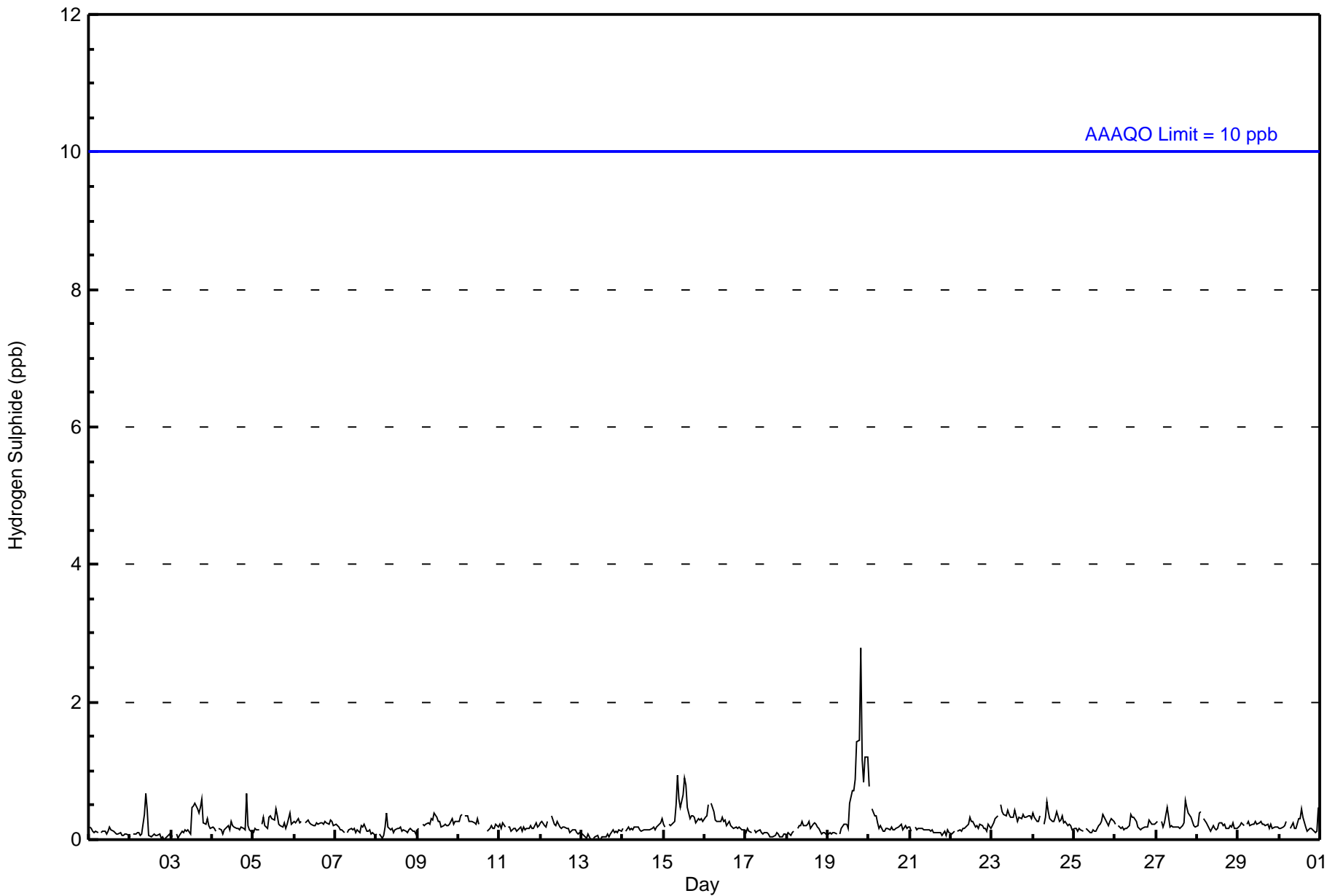


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Nov 19 20:00	Maximum Daily Average: 0.6 ppb on Nov 19		Hours of Data:	686
Minimum Value: 0 ppb on Nov 2 21:00	Minimum Daily Average: 0.1 ppb on Nov 13		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 20	Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	100.0

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

0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
1	0	1	0	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	3	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
Buffalo Viewpoint - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	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: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	70	53	5	0	1	3	87	181	42	42	43	60	32	17	36	13	685
3 - 4	0	1	0	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	70	54	5	0	1	3	87	181	42	42	43	60	32	17	36	13	686

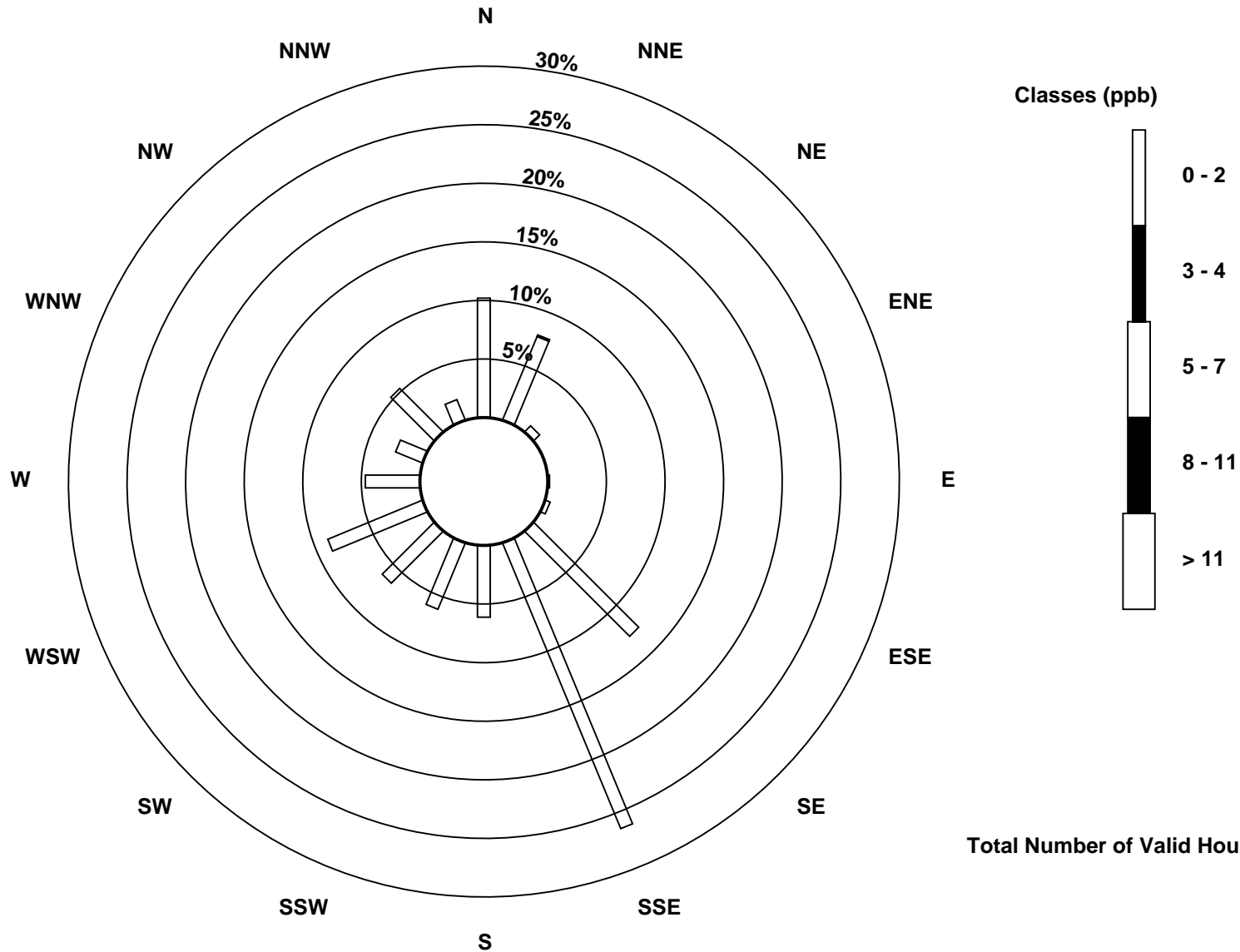
Total Number of Valid Hours: 686

Total Number of Hours: 720

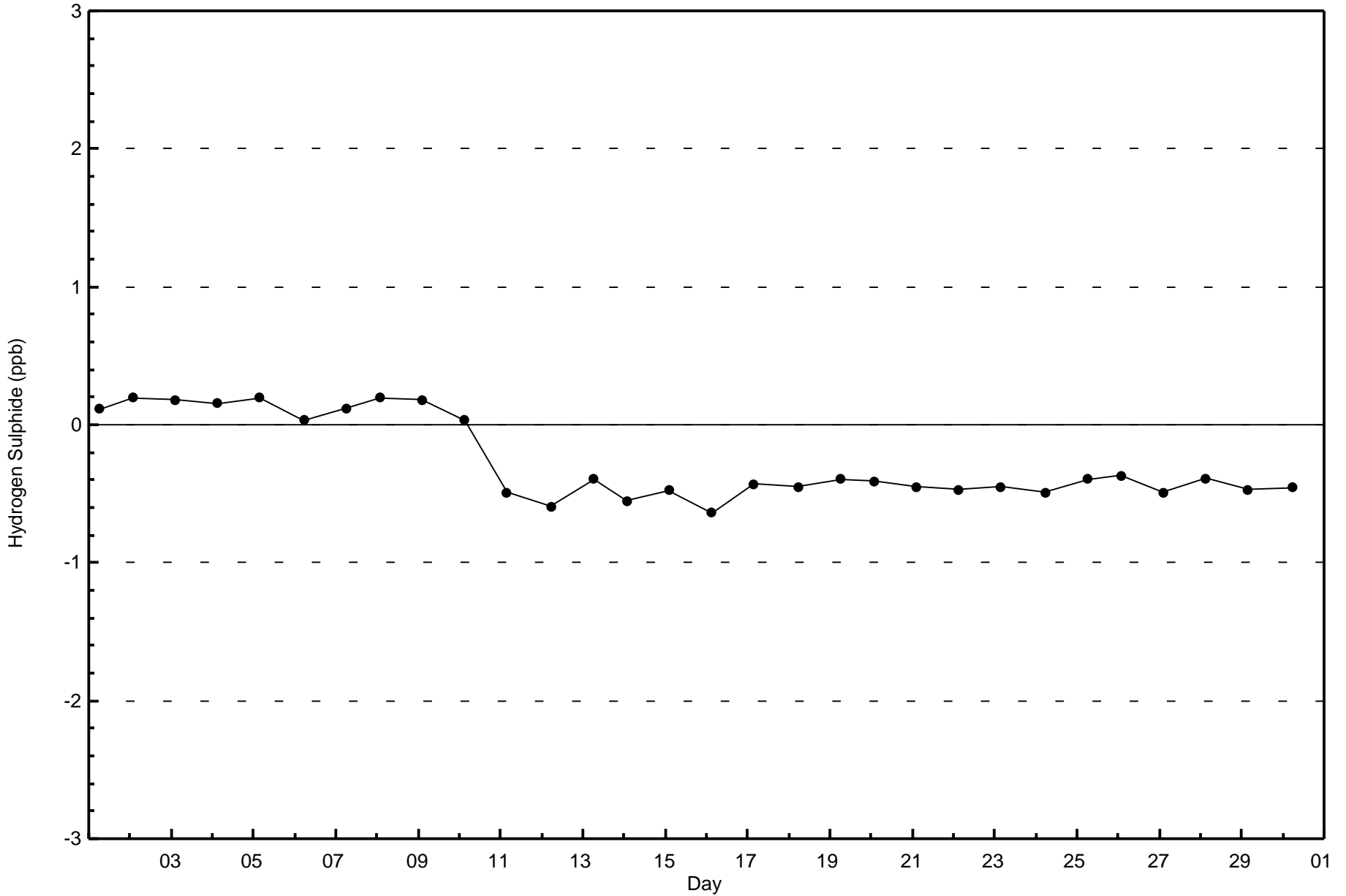


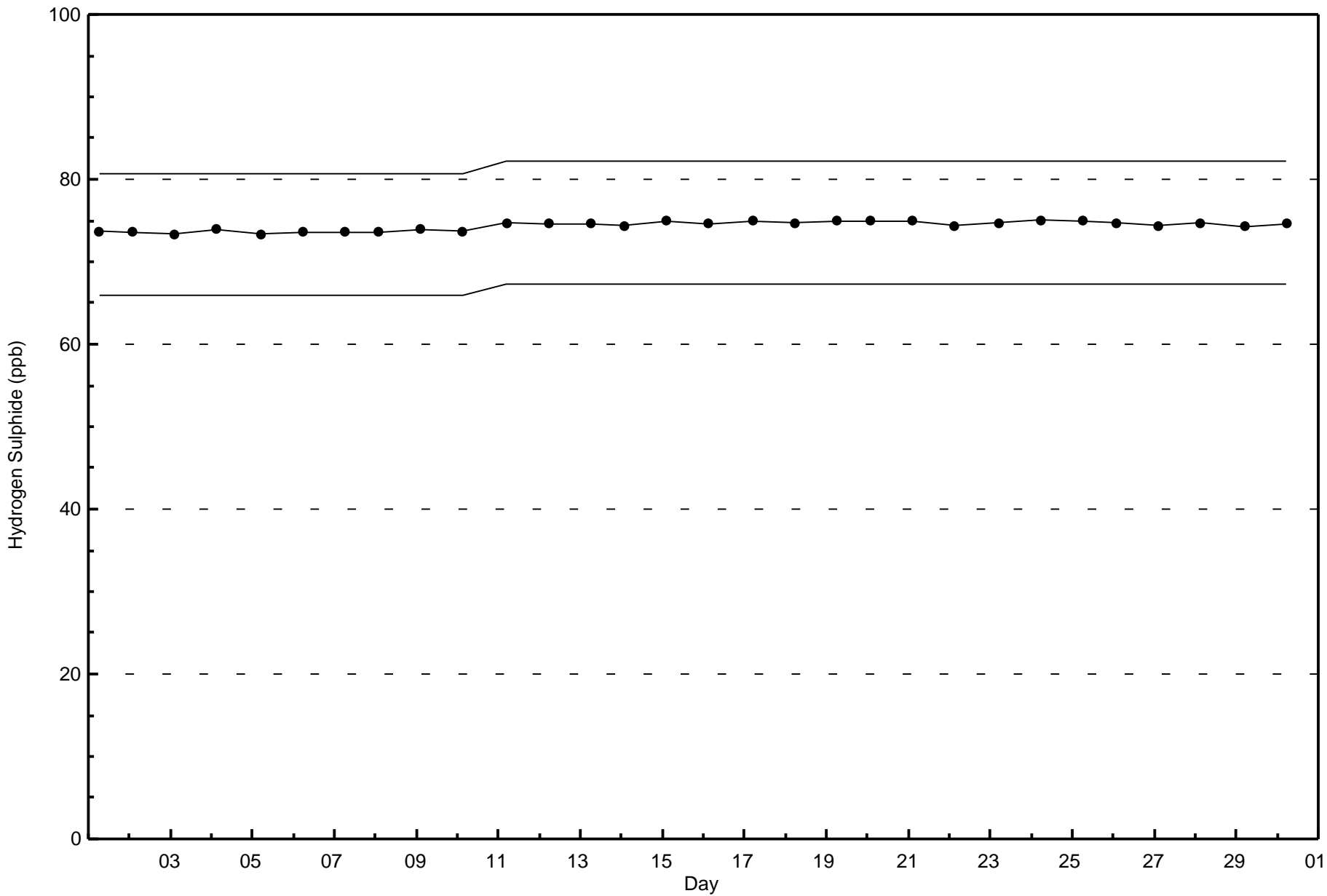
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 686







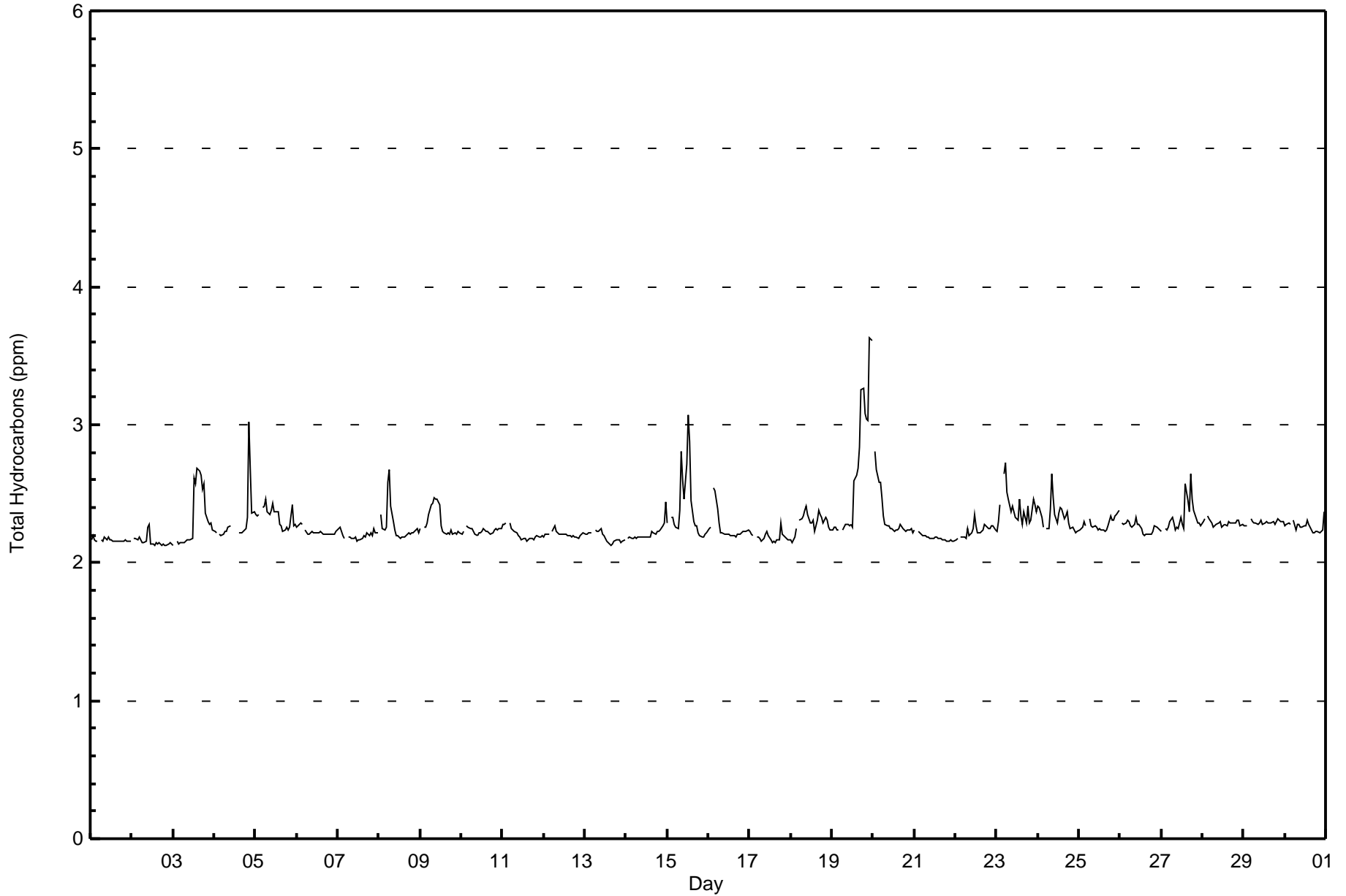
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - November 2015

Maximum Value: 3.6 ppm on Nov 19 23:00																			Maximum Daily Average: 2.6 ppm on Nov 19						Hours in Service: 720				
Minimum Value: 2.1 ppm on Nov 2 18:00																			Minimum Daily Average: 2.2 ppm on Nov 2						Hours of Data: 686				
Maximum Diurnal Average: 2.3 ppm at hour 6																			Minimum Diurnal Average: 2.2 ppm at hour 1						Hours of Missing Data: 34				
Monthly Average: 2.28 ppm																			Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 3.0						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-Nov	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	2.2		
2-Nov	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3
3-Nov	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.6	2.6	2.7	2.7	2.6	2.5	2.6	2.4	2.3	2.3	2.3	2.2	2.3	2.2	2.3	2.7	
4-Nov	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.3	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.0	2.7	2.4	2.4	2.4	2.3	3.0	
5-Nov	2.3	2.3	2.3	Z	2.4	2.4	2.5	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.5	
6-Nov	2.3	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
7-Nov	2.3	2.3	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	2.3	
8-Nov	Z	2.3	2.2	2.2	2.3	2.6	2.7	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.7	
9-Nov	2.2	Z	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	
10-Nov	2.2	2.2	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.3	
11-Nov	2.3	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
12-Nov	2.2	2.2	2.2	2.2	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
13-Nov	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	
14-Nov	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	2.3	2.4	2.4	2.2	2.4	2.4	
15-Nov	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.4	2.8	2.6	2.5	2.7	3.1	2.9	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.1	
16-Nov	2.2	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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	
17-Nov	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	2.1	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
18-Nov	2.2	2.1	2.2	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	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.3	2.4	
19-Nov	2.2	2.3	2.3	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.6	2.7	2.8	3.3	3.3	3.1	3.0	3.0	3.6	3.6	2.6	3.6	3.6		
20-Nov	Z	2.8	2.7	2.6	2.6	2.5	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.8	
21-Nov	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	2.2	
22-Nov	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	
23-Nov	2.2	2.3	2.4	Z	2.6	2.7	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.5	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.5	2.4	2.4	2.4	2.4	2.7	
24-Nov	2.4	2.4	2.3	2.3	Z	2.3	2.2	2.4	2.6	2.5	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.6	2.6	
25-Nov	2.2	2.2	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	
26-Nov	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	
27-Nov	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.6	2.4	2.4	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.6	
28-Nov	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
29-Nov	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
30-Nov	2.3	2.3	2.3	2.3	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	
2.2 2.3																								Diurnal Average					
2.4 2.8 2.7 2.6 2.6 2.7 2.7 2.5 2.8 2.6 2.5 2.7 3.1 2.9 2.7 2.7 2.8 3.3 3.3 3.1 3.0 3.0 3.6 3.6 2.3 2.3 2.3 2.3 2.4																								Diurnal Maximum					
Z - zerospan C - Calibration																													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	680	99.13	99.13
3.1 - 10.0	6	0.87	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	65	54	5	0	1	3	86	180	44	44	41	61	32	14	36	14	680
3.1 - 10.0	3	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	6
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	55	5	0	1	3	86	180	44	44	41	61	32	16	36	14	686

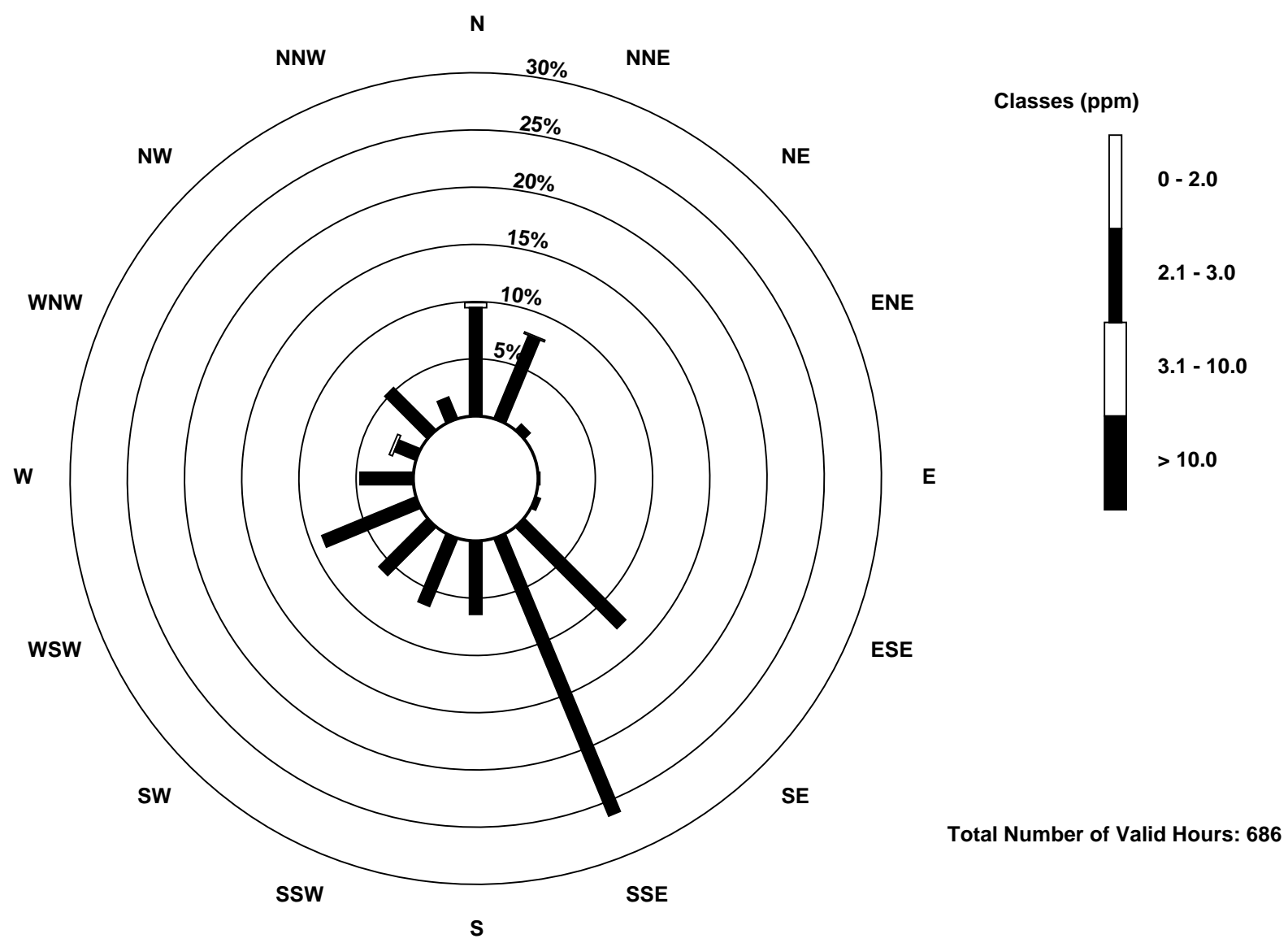
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

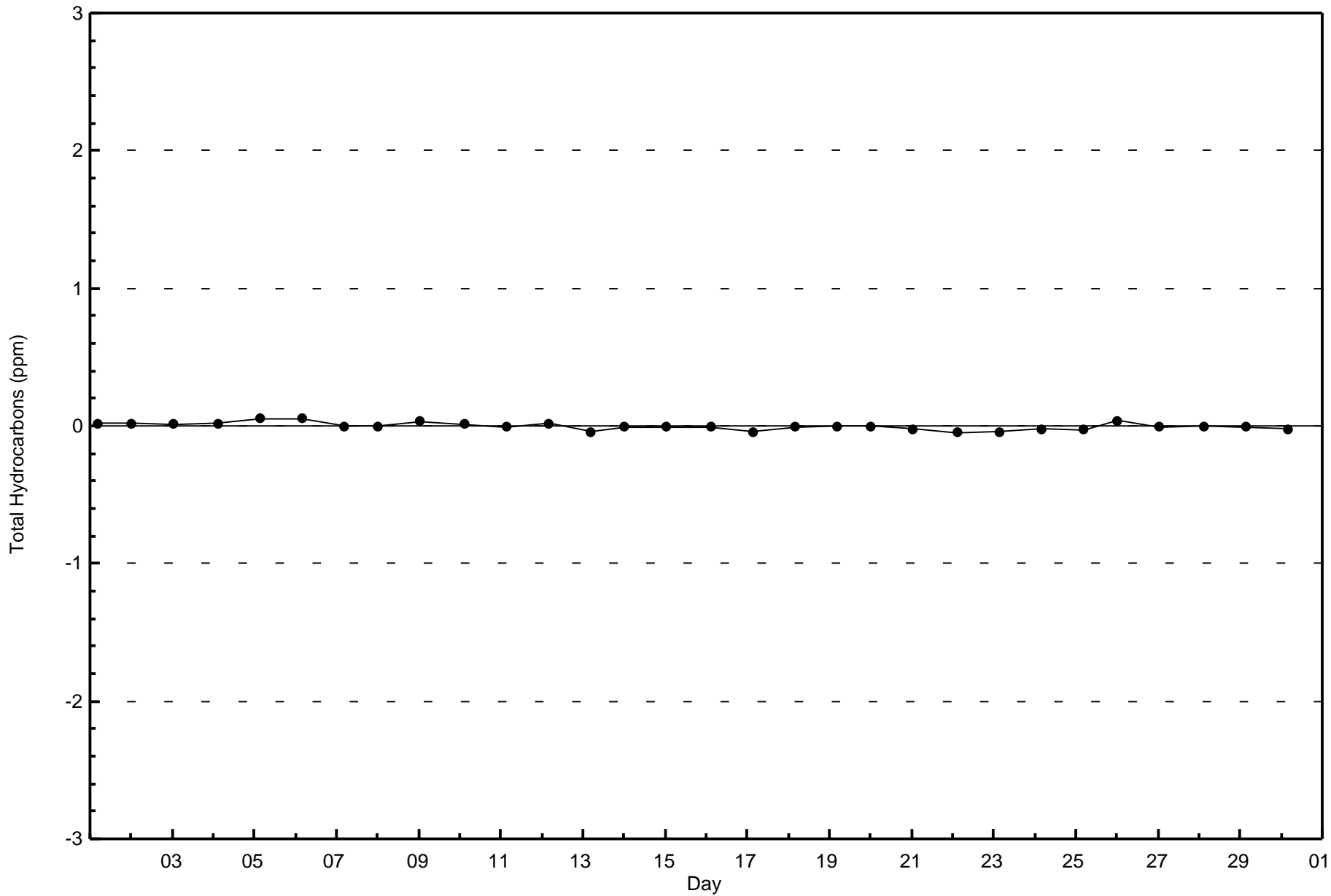
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint (AMS 4)

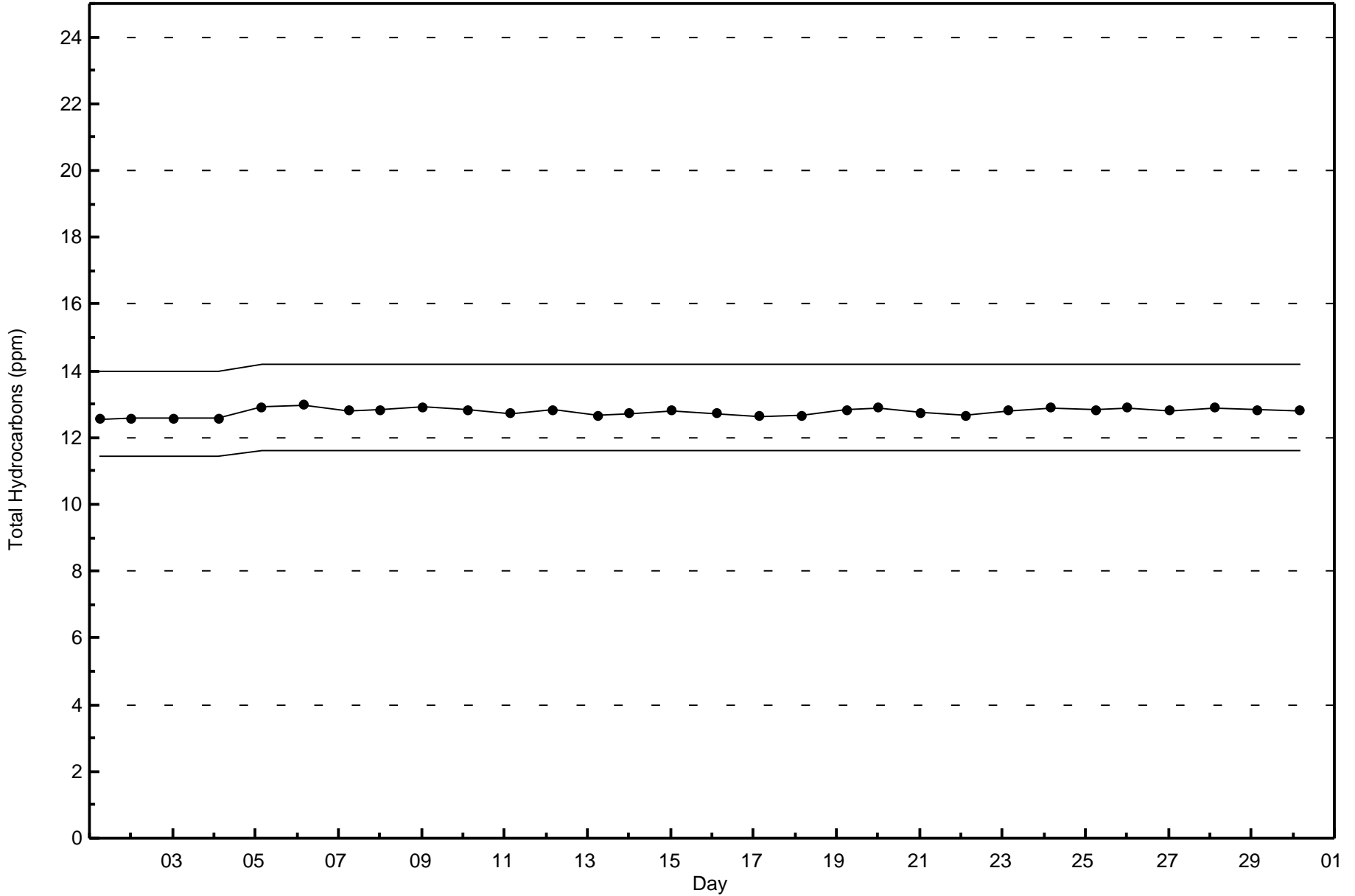




Wood Buffalo Environmental Association
Zero Responses

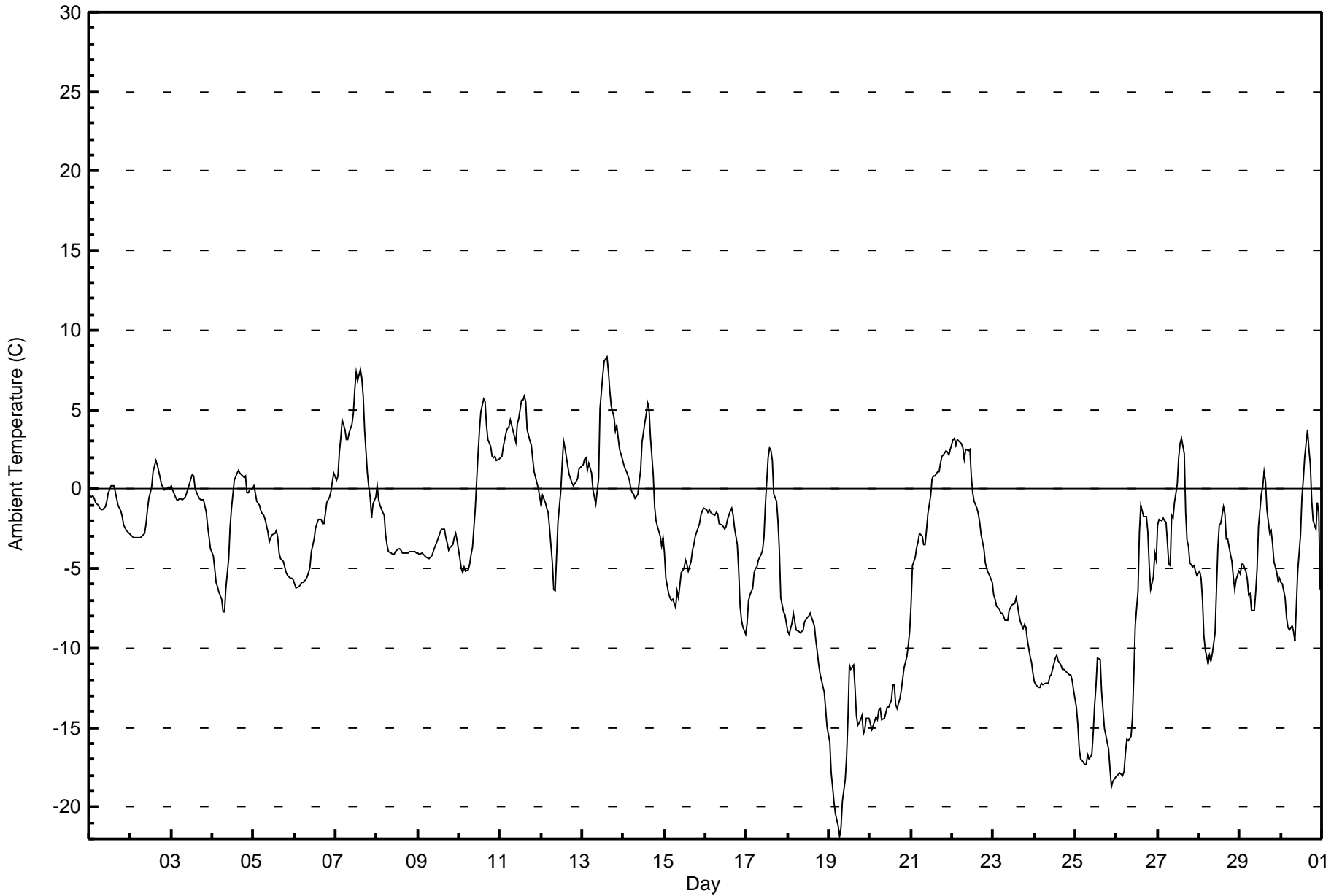
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - November 2015







Maximum Value: 8.3 C on Nov 13 15:00																				Maximum Daily Average: 3.4 C on Nov 13					Hours in Service: 720	
Minimum Value: -21.8 C on Nov 19 07:00																				Minimum Daily Average: -16.2 C on Nov 19					Hours of Data: 720	
Maximum Diurnal Average: -1.1 C at hour 15																				Minimum Diurnal Average: -5.9 C at hour 8					Hours of Missing Data: 0	
Monthly Average: -4.04 C																				Percentiles: P ₁ = -18.8 P ₁₀ = -12.5 Q ₁ = -7.3 Median = -3.1 Q ₃ = -0.1 P ₉₀ = 2.5 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-Nov	-0.4	-0.5	-0.4	-0.5	-0.9	-1.0	-1.2	-1.3	-1.3	-1.1	-0.8	-0.2	-0.1	0.2	0.2	-0.1	-0.6	-1.0	-1.4	-1.7	-2.2	-2.4	-2.6	-2.8	-1.0	0.2
2-Nov	-2.9	-3.0	-3.1	-3.0	-3.0	-3.1	-3.1	-3.0	-2.8	-2.2	-1.3	-0.6	0.2	1.1	1.5	1.8	1.5	0.8	0.3	0.2	-0.1	0.0	0.1	0.0	-1.0	1.8
3-Nov	0.2	-0.1	-0.5	-0.7	-0.6	-0.6	-0.6	-0.6	-0.5	-0.3	0.1	0.7	0.9	0.8	0.0	-0.4	-0.5	-0.7	-0.7	-0.6	-1.5	-2.3	-3.1	-3.8	-0.6	0.9
4-Nov	-4.2	-5.0	-5.9	-6.2	-6.5	-7.0	-7.8	-7.7	-6.2	-4.4	-2.3	-1.2	-0.3	0.6	1.0	1.2	1.0	0.9	0.8	0.8	-0.2	-0.3	0.0	0.1	-2.4	1.2
5-Nov	0.2	-0.3	-0.7	-1.1	-1.3	-1.6	-1.7	-1.9	-2.7	-3.3	-3.1	-2.9	-2.8	-2.6	-3.1	-4.0	-4.4	-4.5	-4.9	-5.2	-5.4	-5.6	-5.6	-5.7	-3.1	0.2
6-Nov	-5.9	-6.2	-6.1	-6.0	-5.9	-5.8	-5.7	-5.5	-5.3	-4.9	-3.9	-3.1	-2.4	-2.2	-1.9	-1.9	-2.1	-2.2	-1.6	-0.9	-0.5	-0.1	0.5	1.0	-3.3	1.0
7-Nov	0.5	0.8	2.3	3.2	4.3	3.7	3.2	3.2	3.6	4.1	4.8	6.3	7.3	6.8	7.5	7.0	5.9	3.7	1.0	0.1	-0.5	-1.8	-0.9	-0.5	3.2	7.5
8-Nov	0.2	-0.7	-1.0	-1.5	-1.6	-2.9	-3.5	-3.9	-4.0	-4.1	-4.1	-4.0	-3.7	-3.7	-3.9	-4.0	-4.1	-4.0	-4.0	-3.9	-3.9	-3.9	-4.0	-4.0	-3.3	0.2
9-Nov	-4.0	-4.1	-4.0	-4.1	-4.2	-4.3	-4.4	-4.3	-4.2	-3.9	-3.6	-3.2	-3.0	-2.7	-2.5	-2.6	-3.0	-3.4	-3.8	-3.7	-3.5	-3.1	-2.8	-3.2	-3.6	-2.5
10-Nov	-4.4	-5.0	-5.3	-4.9	-5.1	-5.1	-4.7	-4.1	-3.7	-1.2	0.6	2.2	3.8	4.9	5.6	5.5	4.0	3.1	2.7	2.1	2.0	2.1	1.8	1.8	-0.1	5.6
11-Nov	1.9	2.1	2.7	3.5	3.8	3.9	4.4	4.0	3.3	2.9	4.1	4.4	5.5	5.6	5.8	5.5	3.7	3.1	2.8	1.9	1.1	0.4	0.0	-0.5	3.2	5.8
12-Nov	-1.0	-0.4	-0.8	-1.2	-1.5	-2.4	-4.6	-6.3	-6.4	-4.3	-2.1	-0.1	1.5	3.0	2.6	1.5	0.9	0.6	0.4	0.2	0.5	0.6	1.3	1.4	-0.7	3.0
13-Nov	1.5	1.9	1.9	1.2	1.6	1.0	0.0	-0.5	-0.9	0.6	5.1	6.1	7.1	8.0	8.3	7.5	6.2	5.2	4.5	3.6	4.0	3.2	2.5	1.9	3.4	8.3
14-Nov	1.5	1.3	1.1	0.6	0.0	-0.2	-0.4	-0.6	-0.3	0.5	1.2	2.9	4.2	4.7	5.4	5.1	3.3	0.9	-1.1	-2.0	-2.4	-2.9	-3.6	-3.0	0.7	5.4
15-Nov	-4.0	-5.6	-6.6	-6.8	-7.0	-7.0	-7.4	-6.4	-6.8	-6.0	-5.2	-4.9	-4.5	-4.7	-5.1	-4.6	-3.8	-3.5	-3.0	-2.7	-2.2	-1.7	-1.4	-1.2	-4.7	-1.2
16-Nov	-1.3	-1.5	-1.3	-1.5	-1.5	-1.6	-1.4	-1.5	-2.2	-2.3	-2.4	-2.5	-2.4	-1.9	-1.4	-1.2	-1.6	-2.4	-3.5	-5.2	-7.3	-8.2	-8.7	-9.2	-3.1	-1.2
17-Nov	-8.4	-7.0	-6.6	-6.2	-5.2	-5.0	-4.9	-4.5	-4.1	-3.8	-3.1	-1.0	2.0	2.6	2.4	1.8	-0.3	-0.7	-2.0	-3.8	-6.9	-7.7	-7.9	-8.5	-3.7	2.6
18-Nov	-9.0	-9.1	-8.4	-7.8	-8.3	-8.9	-9.0	-9.0	-9.0	-8.9	-8.3	-8.1	-8.0	-7.8	-8.1	-8.6	-9.5	-10.2	-11.0	-11.6	-12.4	-12.8	-13.8	-14.9	-9.7	-7.8
19-Nov	-15.9	-17.8	-18.7	-19.7	-20.4	-21.2	-21.8	-21.3	-19.6	-18.3	-16.8	-14.3	-11.1	-11.3	-11.1	-12.5	-14.2	-14.8	-14.5	-14.2	-15.4	-15.1	-14.4	-14.4	-16.2	-11.1
20-Nov	-14.7	-15.2	-14.8	-14.3	-14.5	-13.9	-13.8	-14.5	-14.5	-14.0	-13.7	-13.7	-13.3	-12.3	-12.3	-13.5	-13.8	-13.2	-12.6	-12.0	-11.3	-10.5	-9.8	-8.9	-13.1	-8.9
21-Nov	-7.3	-4.8	-4.3	-3.6	-3.3	-2.8	-3.0	-3.5	-3.5	-2.6	-1.5	-0.4	0.7	0.8	0.8	1.1	1.1	1.6	2.1	2.1	2.4	2.4	2.2	2.5	-0.9	2.5
22-Nov	3.2	3.2	2.8	3.1	3.1	2.8	2.6	1.9	2.5	2.5	2.5	0.8	-0.2	-0.7	-1.2	-1.5	-2.1	-2.8	-3.8	-4.7	-5.0	-5.3	-5.5	-5.9	-0.3	3.2
23-Nov	-6.7	-7.0	-7.4	-7.6	-7.8	-7.8	-8.0	-8.3	-8.2	-7.7	-7.5	-7.3	-7.2	-6.8	-7.3	-7.9	-8.4	-8.8	-8.5	-8.7	-9.5	-10.6	-10.9	-11.6	-8.2	-6.7
24-Nov	-12.2	-12.3	-12.5	-12.5	-12.2	-12.3	-12.2	-12.2	-12.2	-11.8	-11.7	-11.0	-10.6	-10.5	-10.8	-11.0	-11.4	-11.3	-11.4	-11.5	-11.7	-11.7	-12.0	-12.6	-11.7	-10.5
25-Nov	-13.7	-14.8	-16.3	-17.0	-17.1	-17.3	-17.3	-16.7	-17.0	-16.7	-15.4	-13.6	-12.4	-10.6	-10.7	-12.7	-13.9	-15.0	-15.9	-16.3	-17.6	-18.8	-18.4	-18.1	-15.6	-10.6
26-Nov	-18.0	-17.9	-17.9	-18.0	-17.8	-16.6	-15.8	-15.8	-15.6	-14.4	-11.6	-8.6	-6.4	-2.7	-1.0	-1.4	-1.7	-1.8	-2.7	-4.8	-6.3	-5.5	-4.0	-4.4	-9.6	-1.0
27-Nov	-2.3	-1.9	-2.0	-1.8	-2.0	-2.1	-4.7	-4.8	-1.6	-1.8	-0.9	0.3	1.9	2.9	3.2	2.3	-1.5	-3.2	-3.6	-4.6	-4.9	-4.8	-5.2	-5.4	-2.0	3.2
28-Nov	-5.2	-5.6	-7.0	-9.3	-10.1	-11.0	-10.5	-10.8	-10.4	-9.1	-6.3	-3.7	-2.3	-2.2	-1.1	-1.6	-3.2	-3.1	-4.1	-4.6	-5.5	-6.4	-5.7	-5.2	-6.0	-1.1
29-Nov	-5.4	-4.7	-4.7	-5.1	-5.7	-6.7	-6.6	-7.6	-7.7	-6.4	-5.0	-2.3	-0.4	0.2	1.1	0.4	-1.3	-2.8	-2.6	-3.4	-4.5	-5.2	-5.8	-5.6	-4.1	1.1
30-Nov	-5.9	-5.9	-6.8	-8.1	-8.7	-8.9	-8.6	-9.0	-9.5	-7.3	-5.1	-2.9	-0.5	0.7	2.1	3.7	2.5	1.5	-0.8	-2.0	-2.5	-0.8	-1.5	-6.3	-3.8	3.7
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Buffalo Viewpoint - November 2015

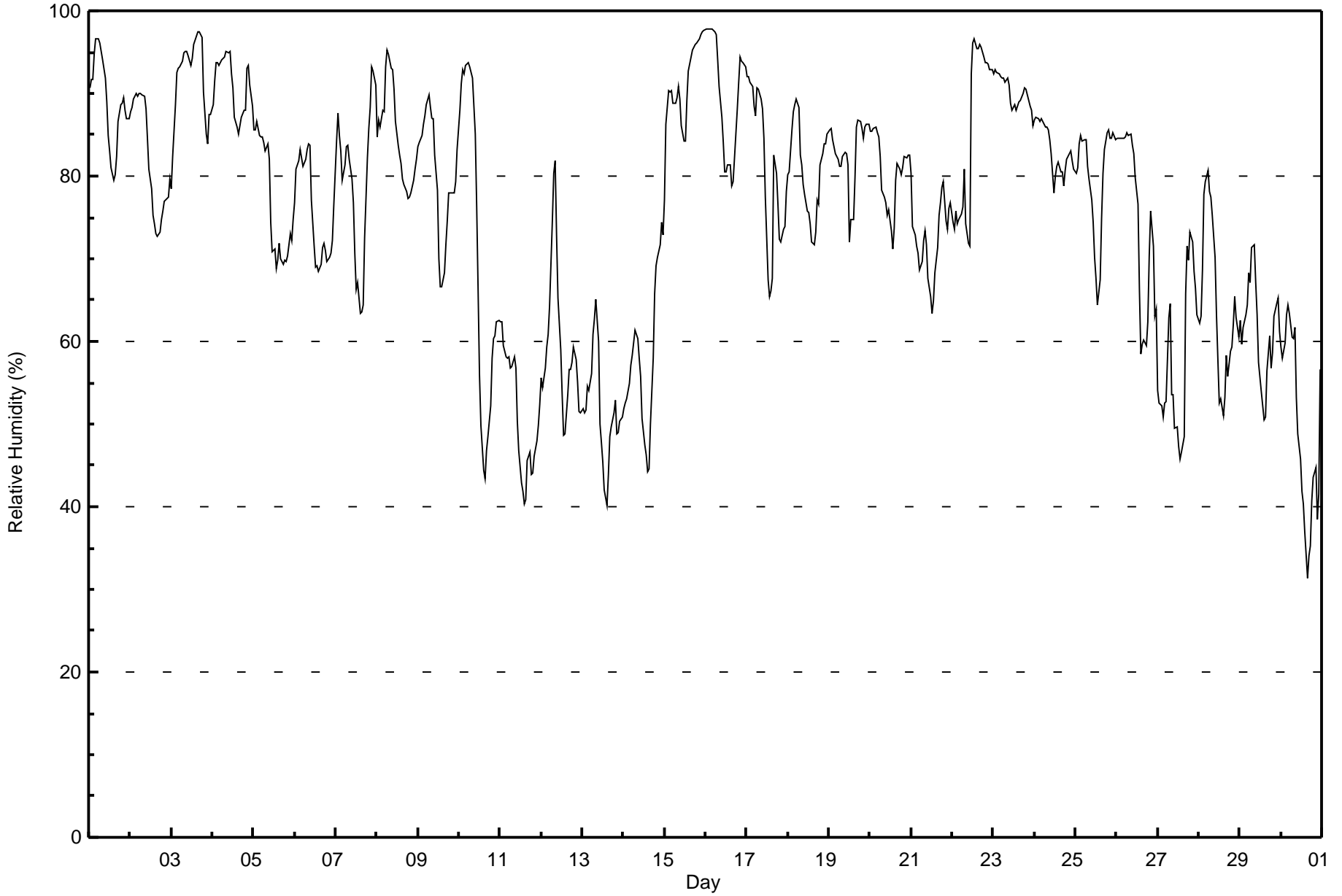
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	4	0.56	0.56
-20 - 0	540	75.00	75.56
0 - 10	176	24.44	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 98 % on Nov 16 03:00 Maximum Daily Average: 91.9 % on Nov 3																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 31 % on Nov 30 16:00 Minimum Daily Average: 49.3 % on Nov 30 Maximum Diurnal Average: 81.6 % at hour 8 Minimum Diurnal Average: 67.0 % at hour 15 Monthly Average: 75.5 % Percentiles: P ₁ = 40 P ₁₀ = 52 Q ₁ = 64 Median = 79 O ₃ = 87 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-Nov	91	92	92	95	97	97	96	95	94	92	89	85	83	81	79	80	82	87	89	89	89	88	87	87	88.9	97
2-Nov	88	88	89	90	90	90	90	90	90	88	85	81	78	75	74	73	73	73	75	76	77	77	77	80	82.0	90
3-Nov	78	82	89	93	93	93	94	95	95	95	95	93	94	96	97	97	97	97	97	90	85	84	87	87	91.9	97
4-Nov	89	92	94	94	93	94	94	94	95	95	92	91	87	86	85	86	87	88	88	93	93	91	88	91.1	95	
5-Nov	86	86	87	85	85	85	84	83	84	82	74	71	71	69	70	72	70	69	70	70	70	73	72	75	76.7	87
6-Nov	77	81	82	83	82	81	82	83	84	84	77	72	69	69	69	69	71	72	71	70	70	71	72	76	75.7	84
7-Nov	84	88	85	83	79	81	84	84	82	80	77	71	66	67	63	64	64	73	82	86	88	93	93	91	79.5	93
8-Nov	85	87	86	88	88	93	95	95	93	93	91	87	84	82	81	80	79	78	77	77	78	79	81	82	85.0	95
9-Nov	84	84	85	86	87	89	90	88	87	87	83	78	70	67	67	68	72	75	78	78	78	78	79	83	80.0	90
10-Nov	88	91	93	92	93	94	93	93	92	85	76	66	56	50	44	43	47	48	52	58	60	61	62	63	70.9	94
11-Nov	62	62	59	58	58	58	57	57	58	57	50	47	43	42	40	41	46	47	44	44	46	48	50	52	51.1	62
12-Nov	56	54	57	59	61	64	75	80	82	73	65	59	54	49	49	54	57	57	58	59	58	55	52	51	59.8	82
13-Nov	52	51	52	55	54	56	61	63	65	60	50	48	45	42	40	44	48	50	51	53	49	49	50	51	51.6	65
14-Nov	52	53	53	55	57	58	60	61	60	58	56	51	47	46	44	45	50	58	66	69	70	72	74	73	57.8	74
15-Nov	77	86	90	90	90	89	89	89	91	89	86	84	84	89	93	94	95	96	96	96	97	97	97	98	91.0	98
16-Nov	98	98	98	98	98	98	97	94	91	87	84	81	81	81	81	79	79	82	88	91	94	94	94	93	89.9	98
17-Nov	92	92	91	91	89	87	91	91	89	88	85	77	68	65	66	68	82	80	77	72	72	73	74	78	80.8	92
18-Nov	80	81	86	88	89	89	88	83	81	79	78	76	76	74	72	72	73	77	77	81	83	84	84	85	80.6	89
19-Nov	86	86	84	84	83	82	81	81	82	83	83	81	72	75	75	80	86	87	87	86	85	86	86	86	82.7	87
20-Nov	85	86	86	86	85	85	82	78	77	77	75	76	73	71	74	80	82	81	80	81	82	82	83	83	80.4	86
21-Nov	80	74	73	72	71	69	70	72	73	72	68	66	63	65	68	71	75	77	79	79	75	74	76	77	72.4	80
22-Nov	74	74	76	74	75	75	76	81	74	72	72	92	96	97	95	95	96	96	94	94	94	94	93	93	85.5	97
23-Nov	92	93	93	92	92	92	92	91	92	91	89	88	89	88	89	89	89	90	91	91	90	89	88	86	90.2	93
24-Nov	87	87	87	87	87	87	86	86	86	84	83	78	80	81	82	80	80	79	81	82	83	83	82	81	83.2	87
25-Nov	80	81	84	85	84	84	84	81	80	77	74	70	68	64	67	75	80	83	85	86	85	85	85	84	79.7	86
26-Nov	85	85	85	85	85	85	85	85	85	84	83	80	77	66	58	60	60	60	62	70	76	72	63	64	74.9	85
27-Nov	54	53	52	51	53	53	63	64	54	54	50	50	47	46	47	48	66	71	70	73	72	68	67	63	57.8	73
28-Nov	62	63	69	78	79	81	78	77	75	70	63	58	53	53	51	53	58	56	59	59	62	65	63	61	64.4	81
29-Nov	62	60	62	63	64	68	67	71	72	67	63	57	54	52	50	51	56	61	57	59	63	65	65	61	61.3	72
30-Nov	59	58	60	63	64	63	61	60	62	53	49	46	42	40	37	31	34	35	41	43	45	38	42	57	49.3	64
	77.5	78.2	79.2	80.0	80.1	80.7	81.5	81.6	80.8	78.5	74.8	72.0	69.1	67.7	67.0	68.0	71.2	72.7	74.0	75.0	75.6	75.7	75.7	76.3	Diurnal Average	
	98	98	98	98	98	98	97	95	95	95	95	93	96	97	97	97	97	97	97	96	97	97	97	98	Diurnal Maximum	





Maximum Speed: 25 km/h on Nov 15 18:00	Maximum Daily Speed Average: 15.4 km/h on Nov 1	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 9 08:00	Minimum Daily Speed Average: 1.8 km/h on Nov 19	Hours of Data: 720
Maximum Diurnal Speed Average: 3.5 km/h at hour 23	Minimum Diurnal Speed Average: 1.7 km/h at hour 17	Hours of Missing Data: 0
Monthly Average Velocity: 2.5 km/h 202.7 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 8 Median = 10 Q ₃ = 14 P ₉₀ = 18 P ₉₉ = 22	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	NNE14	NNE11	N12	N13	N13	N14	NNE14	NNE12	NNE14	NNE15	NNE16	NNE18	NNE16	NNE14	NNE16	NNE19	NNE17	NNE17	NNE16	NNE17	NNE19	NNE19	N16	NNE15.4	NNE19		
2-Nov	N13	N13	NNE11	NE10	NNE11	NNE11	NNE9	NE6	NE4	NNE2	SSE4	SSE9	SE10	SSE10	SSE9	SSE10	SE12	SSE15	SSE15	SSE15	SSE12	SE12	SSE13	SSE13	ESE5.5	SSE15	
3-Nov	SE13	SSE13	SSE10	SSE9	SSE8	SSE7	SSE7	SSE7	SSE8	SSE7	SSE5	S3	WNW4	N7	N11	N8	NNW6	NW7	NW7	WNW11	W12	W10	W8	SW6	SSW1.8	SE13	
4-Nov	SSW8	S7	SSE8	SSE9	SSE8	SSE7	SSE6	SSE8	SSE8	SSE7	SE9	SE11	SSE11	SSE9	SSE10	SSE10	SSE9	SSE7	S5	SSW4	NW7	WNW5	W8	W10	SSE5.8	SSE11	
5-Nov	WNW15	WNW17	NW16	NW18	NW16	NW15	NW13	NW16	NNW16	NNW18	NNW15	NW15	NW13	NW13	N12	NW15	NW17	NW17	NNW19	NW15	NNW11	NNW9	NW6	N3	NW13.8	NW19	
6-Nov	E4	SE4	SSE4	SSE5	SE6	SSE7	SSE7	SSE7	SE7	SSE6	S6	SSE7	SE10	SSE13	SSE12	SE10	SE12	SE16	SE19	SSE19	SE19	SSE16	SSE20	SSE18	SSE10.5	SSE20	
7-Nov	SSE12	SSE9	SSE8	SSW10	SW15	WSW13	WSW12	WSW12	WSW17	WSW19	WSW17	WSW14	WSW15	WSW10	WSW13	WSW12	WSW9	SSW4	SSE8	S7	S8	SSE10	S6	SSW4	SW8.8	WSW19	
8-Nov	WNW10	W10	WSW8	W10	W7	N7	N7	N12	N17	N18	NNE17	NNE16	NNE15	NNE16	N17	NNE16	NNE14	N13	NNE10	NNE6	NNE8	NNE9	NNE10	NNE10	N9.6	N18	
9-Nov	NNE7	NNE7	NNE6	N6	N7	N4	N1	WNW1	ESE1	S2	S4	S5	S7	S7	SSW8	S8	SSW8	SSE4	SSE5	SSE5	SSE7	SSE9	SSE9	SSE8	SSE2.5	SSE9	
10-Nov	SSE9	SSE12	SSE14	SSE14	SSE13	SE15	SSE14	SSE13	SSE13	S15	S17	S15	S15	S14	S15	SSE14	SSE16	SSE18	SSE18	SSE16	SSE17	SSE15	SSE12	SSE14	SSE14.3	SSE18	
11-Nov	SE12	SE12	SSE14	SSE13	S14	S12	SSW15	SSW13	SSW10	S10	SW13	WSW15	WSW18	WSW22	WSW18	SW13	SSW10	SW14	WSW19	WSW14	SW16	SW16	SW15	SSW8	SSW11.5	WSW22	
12-Nov	SSW9	SW15	SW11	SW13	WSW12	SSW4	SE7	SSE8	SE9	SSE10	SE10	SE12	SSE11	S11	S11	SSE11	SSE14	SE14	SE16	SSE18	SSE19	SSE20	SSE20	SSE19	SSE10.9	SSE20	
13-Nov	SSE18	SSE17	S18	SSE13	SSE15	SSE12	SE12	SE13	SE14	SE10	SSW13	SSW17	SSW14	SW15	SW19	SW18	SW11	WSW11	SSW7	SSW10	WSW15	WSW15	SW12	WSW11	SSW11.0	SW19	
14-Nov	SW15	SW16	SW18	WSW18	WSW12	SW14	W10	SSW5	SW8	SSW9	SSW6	SSW6	WSW13	WSW13	SSW9	SSW9	SSW9	S8	SSE8	SSE9	SSW5	SSE5	ESE8	ESE4	SW8.3	WSW18	
15-Nov	SE4	SSE5	SE7	SE7	SE9	SE10	SSE6	S3	NE6	NE6	N7	N11	N14	N11	N13	N18	NNE18	NNE19	N25	NNE21	NNE18	NNE15	NNE13	NNE12	N12	NNE8.7	N25
16-Nov	NNE12	N9	N11	NNW8	NW11	NNW13	NW13	W13	W18	WSW18	W20	W22	W17	W17	W14	WSW17	SW11	S6	S7	SSE8	SE10	SE11	SE10	SE9	W6.7	W22	
17-Nov	SSE9	SE10	SSE11	SSE11	SSE13	SSE17	SE15	SSE15	SSE15	SSE14	SSE14	SSE13	SSW12	SW15	SSW13	SSW11	WSW13	W12	WNW20	WNW22	W19	WSW21	WSW23	W20	SSW8.5	WSW23	
18-Nov	WSW20	WSW20	WNW20	NW21	NW22	NW21	NW21	NW23	NW23	NW22	NW25	NW23	NNW22	NNW20	NW19	NW17	NW13	NNW9	W3	W7	WSW5	WSW5	SW5	SSE4	NW14.2	NW25	
19-Nov	SSE5	SE8	SSE8	SE9	SSE9	SE9	SSE7	SSE7	SE4	S6	SSE7	SSE6	SSE1	NNE6	N7	N11	N10	N9	N5	NNE4	SE1	W3	WNW4	WNW4	SE1.8	N11	
20-Nov	SW2	SSW2	SW4	WSW4	S3	WSW5	W8	WSW11	WSW14	WSW12	WSW12	SW10	S9	SSE11	SSE10	SE10	SE11	SSE12	SSE13	SSE15	SSE16	SSE16	SSE13	SE10	S7.0	SSE16	
21-Nov	SE6	SW12	WSW20	WSW18	WSW21	WSW20	WSW13	SW10	SSW11	SW10	SW11	SW10	SW8	SW10	SSW10	SSW10	S7	SSW9	SW13	SW9	SW11	WSW21	WSW20	W14	SW11.8	WSW21	
22-Nov	WSW17	W16	W14	WSW22	WSW20	W18	W16	NW13	WNW17	WNW15	NW18	NNE11	NNE11	NNE10	N13	N10	N11	NNE11	NNE13	N13	N13	N13	N12	N13	NW8.9	WSW22	
23-Nov	N11	N10	N10	N10	NNW7	NNW8	N4	NNE4	N4	N7	N7	N6	N5	N8	N9	N12	N15	N13	N16	N17	N16	N16	N16	N18	N10.4	N18	
24-Nov	N13	N15	N15	N16	N18	N22	N23	NNW14	NW9	WNW7	WSW7	SW6	WNW11	N10	NNW9	NNW11	NW8	S1	SSW5	SSE4	SSE5	S6	S7	S7	NNW6.5	N23	
25-Nov	SSW8	S9	SSE9	SSE9	SSE9	SSE8	SSE5	W6	WSW7	SW7	WSW8	WSW5	SW6	S4	SE5	SE8	SE8	SE10	SSE10	SE10	SE8	SSE8	SSE11	SSE10	S6.3	SSE11	
26-Nov	SSE9	SSE8	SSE9	SSE8	SSE8	SSE8	SSE8	SSE9	SSE9	SSE8	SE8	SE10	SE11	S9	SSW11	SSW10	SSW13	SSW10	SSE7	SSE8	SSE8	SSE7	S6	SSE7	SSE8.1	SSW13	
27-Nov	SW17	WSW13	WSW22	WSW16	WSW11	SW7	S9	S7	W10	SW9	WSW10	WSW12	W11	W8	W6	SW5	SE9	SE11	SE10	SE10	SE11	SE9	S11	S9	SW7.0	WSW22	
28-Nov	SSE8	SSE7	SSE8	SE10	SSE11	SE12	SE10	SSE11	SSE12	SSE10	SSE9	SSE8	SE8	SSE9	SSE7	SE9	SSE10	SSE12	SE11	SE10	SSE10	SE12	SSE10	SSE10	SSE9.6	SE12	
29-Nov	SE11	SE10	SE9	SE9	SE9	SE10	SE9	SSE10	SE10	SE8	SSE7	SSE9	SE9	SE7	SE8	SSE7	SE9	SE10	SSE9	SSE11	SSE11	SE11	SSE12	SSE10	SE9.4	SSE12	
30-Nov	SSE10	SSE12	SSE10	SSE11	SSE12	SSE13	SE12	SE13	SE10	SE9	SE10	SE10	SE7	SE9	SE7	SSW6	SSW6	S7	SSE9	SSE9	SSE7	SW7	SW3	SE10	SSE8.4	SE13	
SSW3.0SSW3.4SSW3.3 SW3.3 SW3.4SSW2.7SSW2.0SSW2.0 SW2.4 SW2.7 SW3.3 SW2.8 SW2.6 SW2.5WSW2.0 SW1.8SSW1.7 SSE2.0 SSE2.6 SSE3.1 S3.2 S3.4 S3.5 S3.2																								Diurnal Average			
WSW20WSW20WSW22WSW22 NW22 N22 N23 NW23 NW23 NW22 NW25 NW23NNW22 WSW22 SW19 NNE19 NNE19 N25 NNE21 WNW22 NNE19 WSW21WSW23 W20																								Diurnal Maximum			

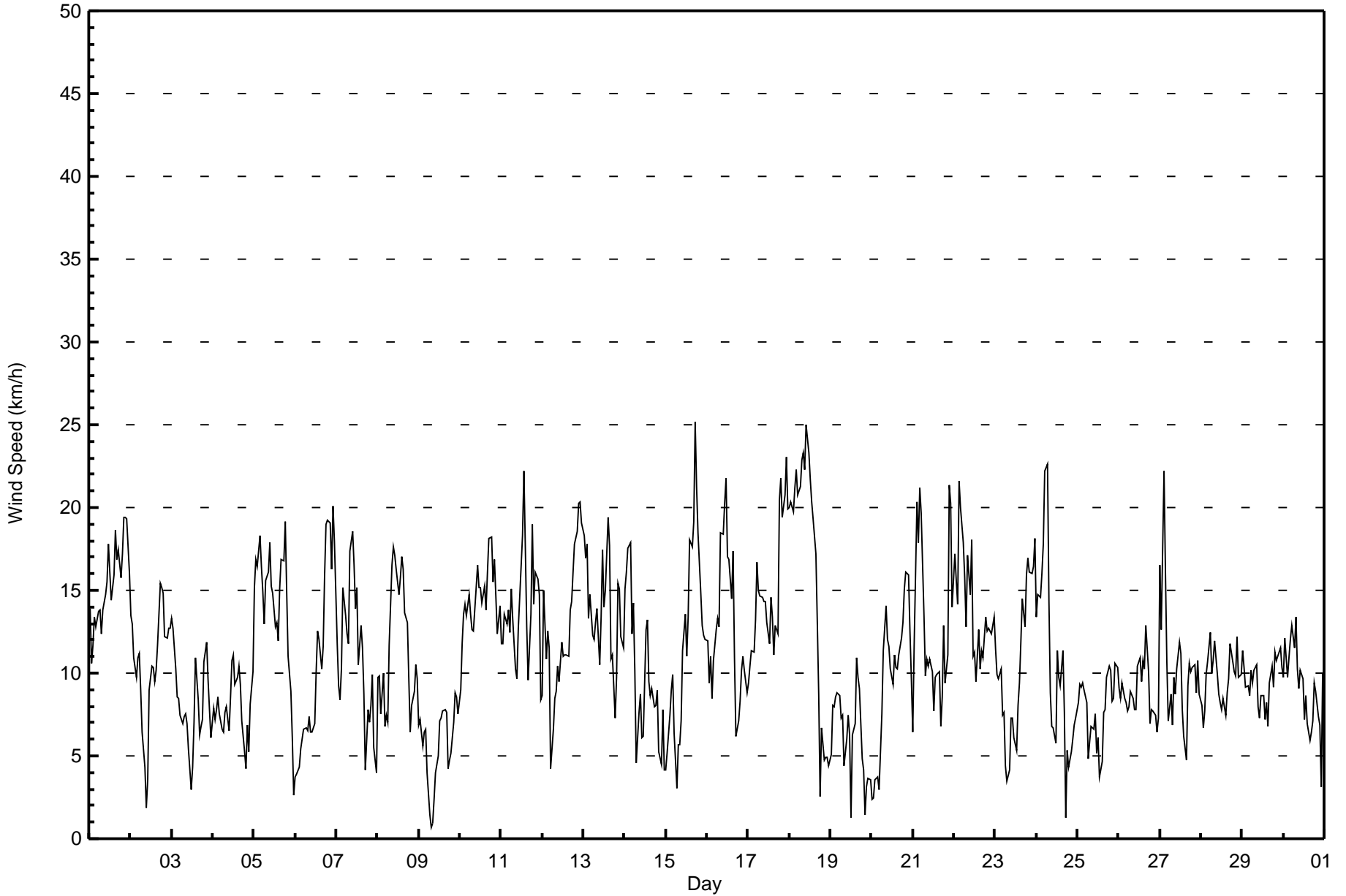
All monthly, daily, and diurnal averages have been calculated using vector methods



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 km/h on Nov 27 04:00			Hours of Data:	720
Minimum Value: 0 km/h on Nov 20 02:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6				

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

	5	4	6	8	7	5	7	4	7	5	5	5	5	6	6	6	4	5	5	6	5	5	5	5	5
	Diurnal Maximum																								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	68	9.44	9.44
6 - 11	352	48.89	58.33
12 - 19	263	36.53	94.86
20 - 28	37	5.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	3	1	0	1	2	5	15	9	8	4	6	2	5	0	0	68
6 - 11	26	19	4	0	0	1	67	112	28	28	19	11	15	4	9	9	352
12 - 19	36	33	0	0	0	0	19	63	7	8	21	34	13	5	20	4	263
20 - 28	3	1	0	0	0	0	0	3	0	0	0	13	3	3	9	2	37
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	72	56	5	0	1	3	91	193	44	44	44	64	33	17	38	15	720

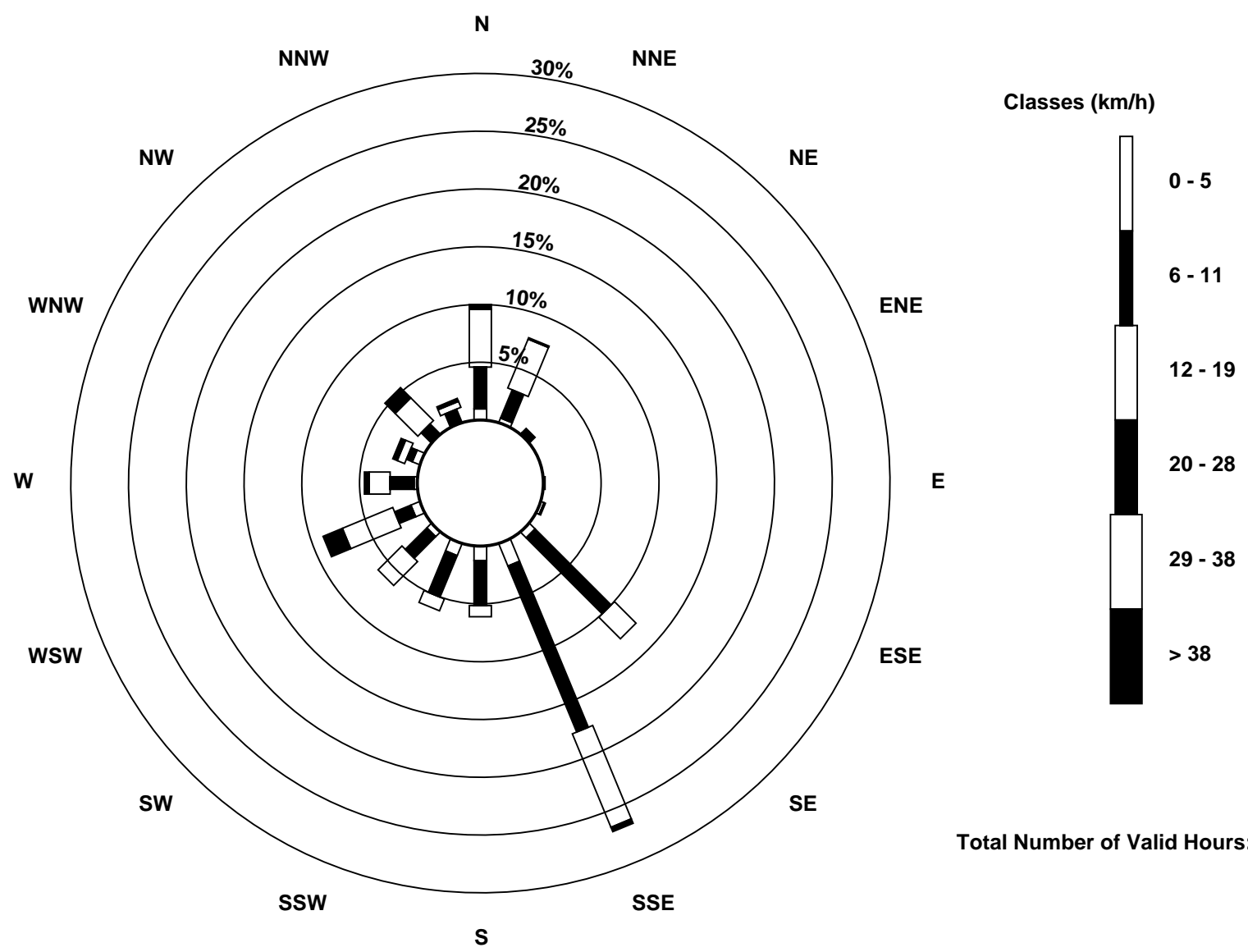
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 720



Direction of Maximum Speed: 10 deg on Nov 15 18:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 13.2 deg on Nov 1	Hours of Data: 720
Direction of Minimum Speed: 299 deg on Nov 9 08:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.8 deg on Nov 19	Percent Operational Time: 100.0
Monthly Average Direction: 218.2 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-Nov	13	13	7	4	11	10	12	15	17	15	16	14	14	13	13	14	17	13	14	16	16	12	12	10	13.2
2-Nov	358	5	20	36	30	33	33	40	50	24	165	148	144	150	155	148	145	147	147	149	148	146	148	147	114.9
3-Nov	146	150	154	153	151	151	153	149	147	153	156	176	293	353	353	352	336	326	315	288	278	271	269	235	202.7
4-Nov	204	169	148	147	153	165	165	151	151	160	144	145	151	157	148	153	150	167	169	195	309	286	273	271	167.1
5-Nov	294	303	308	310	312	313	320	311	327	340	333	313	323	326	350	315	304	307	307	308	319	334	313	360	316.3
6-Nov	98	126	161	147	142	150	149	147	146	150	179	152	143	149	152	142	141	142	144	147	146	152	154	157	148.0
7-Nov	154	147	162	213	233	238	238	251	248	252	240	251	249	237	248	251	246	192	162	187	173	147	172	206	223.8
8-Nov	291	271	238	269	273	349	349	2	6	10	16	17	20	13	11	13	18	8	14	23	16	17	12	15	1.4
9-Nov	17	22	19	10	7	9	352	299	112	175	182	173	172	172	198	173	192	161	153	168	152	147	150	154	151.1
10-Nov	163	154	152	150	152	145	149	150	148	169	173	170	176	176	169	162	158	160	166	162	161	161	151	148	159.9
11-Nov	141	136	148	162	169	181	203	205	200	187	220	240	247	251	246	224	201	228	242	237	231	231	232	196	213.1
12-Nov	202	231	224	228	238	201	132	153	138	149	146	144	154	172	170	147	147	146	144	151	151	151	150	148	163.0
13-Nov	151	163	169	161	165	159	141	140	142	143	208	213	208	220	233	236	236	240	204	202	237	241	235	239	196.0
14-Nov	234	229	236	243	245	234	267	210	226	208	202	213	241	239	211	211	207	180	155	167	199	158	117	111	219.2
15-Nov	130	160	139	135	141	147	172	48	41	3	2	357	360	356	11	15	17	10	21	18	14	24	13	11	21.9
16-Nov	14	7	360	337	318	293	307	276	263	258	263	273	264	274	261	248	236	184	171	152	129	136	138	144	266.3
17-Nov	147	137	149	155	150	150	145	148	152	153	153	158	198	216	211	207	246	270	300	287	273	256	255	259	205.9
18-Nov	250	249	288	311	310	314	313	320	320	318	320	320	342	327	326	317	306	332	278	260	247	246	223	167	307.4
19-Nov	166	142	149	145	157	145	151	151	143	174	158	149	159	31	6	351	355	358	357	33	142	263	302	284	125.2
20-Nov	228	201	236	245	180	256	260	252	256	247	243	214	181	163	158	145	144	152	154	156	151	151	151	141	182.8
21-Nov	136	236	251	248	244	244	238	222	210	234	231	230	214	221	209	209	177	206	228	228	226	251	249	260	233.0
22-Nov	251	259	269	257	253	260	265	305	292	295	306	15	30	23	5	3	7	18	16	10	3	4	7	356	316.8
23-Nov	8	4	1	349	345	330	6	23	359	357	354	360	355	354	358	4	2	355	354	360	0	355	357	353	357.3
24-Nov	356	355	354	349	351	352	351	348	318	301	250	236	296	353	341	322	321	171	194	160	166	175	180	175	335.3
25-Nov	192	171	156	155	168	156	157	264	239	229	239	252	233	184	132	133	145	145	156	136	143	152	158	158	169.1
26-Nov	164	156	152	163	165	160	166	162	160	156	136	136	131	188	202	197	207	197	149	148	149	151	178	161	165.3
27-Nov	226	253	251	250	257	226	185	172	267	226	244	256	266	274	276	230	143	142	140	145	139	142	181	175	217.8
28-Nov	152	161	151	142	152	145	136	154	157	157	149	150	140	147	148	141	147	151	137	140	157	143	156	147	148.2
29-Nov	146	146	131	139	137	141	139	151	140	140	167	148	135	138	140	151	140	138	157	155	152	146	154	157	145.5
30-Nov	157	164	162	151	151	147	145	142	144	146	130	135	142	137	142	200	209	191	162	166	167	223	228	129	155.4

191.6 199.7 206.9 217.9 216.0 210.9 209.1 200.0 220.5 223.9 230.4 220.5 225.1 236.0 240.6 234.1 193.2 165.5 164.2 167.5 174.7 180.8 187.1 171.1

Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

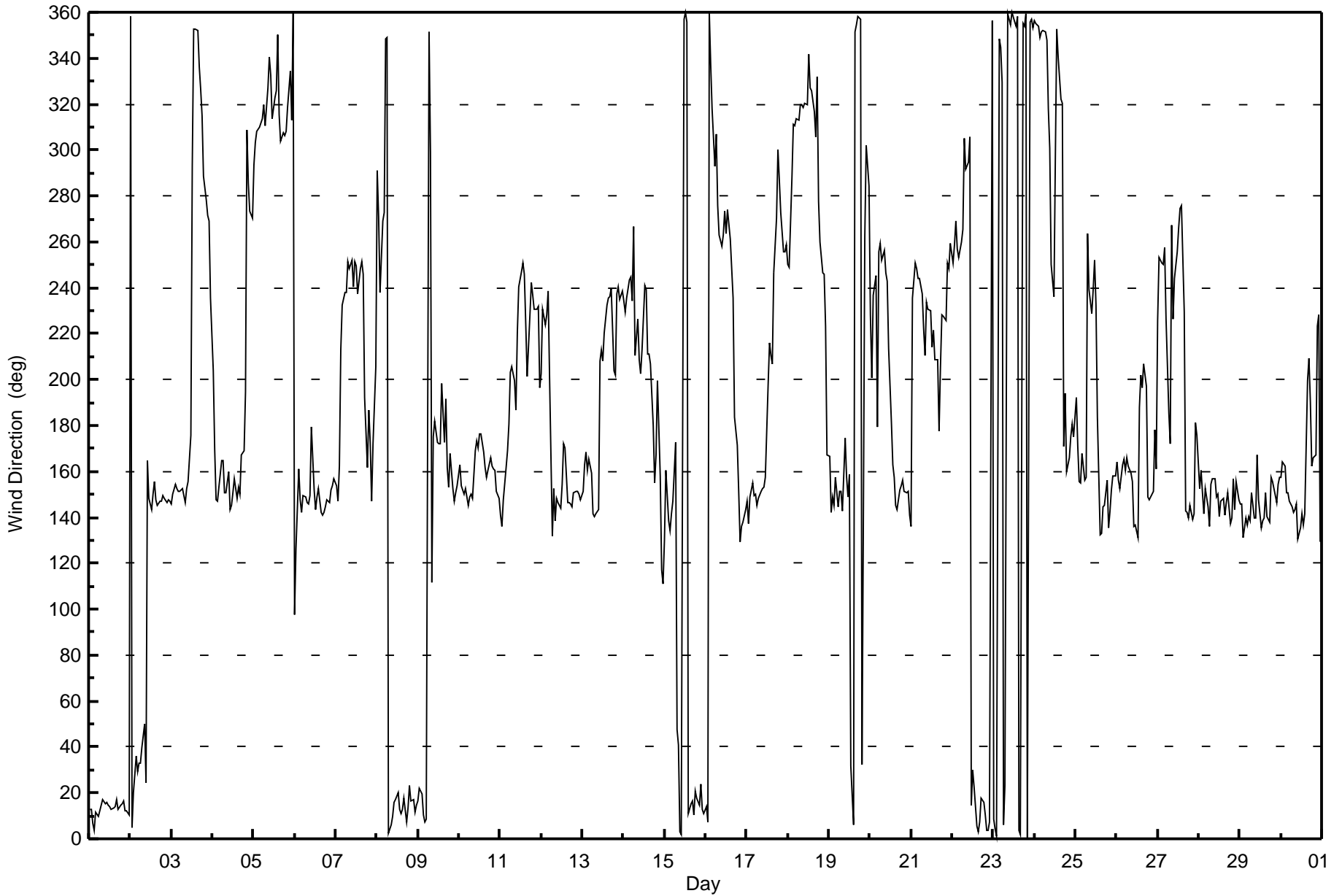
Wind Direction (WD) - deg

Buffalo Viewpoint - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 91 deg on Nov 19 13:00			Hours of Data:	720
Minimum Value: 5 deg on Nov 29 20:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 6 P ₁₀ = 11 Q ₁ = 13 Median = 15 Q ₃ = 19 P ₉₀ = 26 P ₉₉ = 67				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	13	14	15	14	13	13	13	13	13	13	14	14	15	15	13	14	14	13	14	15	14	15	15	15	15
2-Nov	15	14	17	16	15	14	15	17	19	56	42	20	20	20	18	19	17	17	17	17	17	18	16	18	56
3-Nov	17	16	16	15	16	15	15	11	13	13	17	39	54	15	12	14	13	14	11	17	18	16	15	26	54
4-Nov	16	16	10	11	13	14	16	12	16	23	19	17	18	22	19	18	17	17	22	41	16	36	15	14	41
5-Nov	15	13	14	12	14	13	13	14	19	16	21	16	17	17	22	26	13	14	13	14	16	18	22	62	62
6-Nov	23	17	16	13	15	14	13	14	11	14	27	23	20	19	18	17	16	16	17	17	17	19	17	16	27
7-Nov	18	15	18	22	14	14	14	17	13	13	15	19	17	14	19	12	12	46	11	24	23	13	60	54	60
8-Nov	30	31	13	14	35	17	13	12	14	16	15	17	16	17	16	17	15	15	12	15	13	13	13	13	35
9-Nov	15	14	19	14	13	18	69	77	72	29	21	23	23	24	25	21	19	19	19	22	17	17	17	16	77
10-Nov	14	15	14	15	15	14	12	12	13	20	19	19	19	20	19	18	17	18	18	17	17	18	17	16	20
11-Nov	16	14	16	18	17	21	17	16	15	16	26	15	15	14	15	16	15	21	13	15	14	15	16	47	47
12-Nov	42	17	22	16	14	55	32	14	13	13	16	21	22	22	18	14	14	15	16	17	17	16	17	17	55
13-Nov	16	17	18	19	18	19	13	14	11	15	34	15	17	19	17	15	14	12	17	14	18	14	15	15	34
14-Nov	14	13	15	12	16	14	38	48	24	24	50	45	17	19	19	16	10	20	13	15	45	47	18	36	50
15-Nov	24	15	9	5	6	21	40	17	15	12	12	14	14	15	12	11	13	15	14	14	14	17	13	12	40
16-Nov	14	18	17	23	11	14	14	18	14	14	15	17	17	18	18	13	15	27	14	16	9	11	9	20	27
17-Nov	20	17	19	25	17	17	17	17	16	19	16	17	27	15	15	15	26	25	17	17	19	13	14	16	27
18-Nov	11	12	23	12	13	14	12	11	12	12	14	13	19	15	13	11	14	24	60	12	24	22	32	30	60
19-Nov	28	9	6	12	11	7	10	7	31	17	14	18	91	15	19	12	11	11	16	35	83	50	26	18	91
20-Nov	32	25	22	24	26	22	23	15	12	13	16	23	23	20	19	15	15	18	17	16	16	16	17	21	32
21-Nov	39	26	11	13	14	13	17	19	29	34	16	23	25	16	16	16	17	19	15	18	22	13	13	17	39
22-Nov	14	14	16	13	12	14	17	19	19	15	25	14	14	16	14	13	13	13	15	14	14	13	14	15	25
23-Nov	13	13	14	12	20	21	41	28	20	16	14	19	21	19	16	13	14	14	15	16	15	16	15	14	41
24-Nov	15	15	14	15	15	15	14	21	11	24	18	28	19	27	24	12	12	81	13	27	17	17	12	13	81
25-Nov	11	13	14	11	12	10	28	49	15	19	13	36	30	40	61	7	9	15	12	9	17	11	7	7	61
26-Nov	9	16	9	23	13	13	14	12	10	13	14	15	12	30	16	17	17	25	34	18	18	30	42	35	42
27-Nov	15	21	15	20	24	22	28	39	17	15	16	13	15	15	15	30	12	6	6	7	5	10	25	30	39
28-Nov	24	24	25	13	11	10	11	14	13	11	13	15	16	14	11	6	9	8	9	13	9	7	11	9	25
29-Nov	8	13	13	10	13	7	10	7	9	15	19	14	13	14	13	18	9	7	10	5	7	12	10	11	19
30-Nov	10	14	16	14	9	7	10	12	11	11	11	12	33	14	20	23	24	18	6	18	25	26	75	8	75

Diurnal Maximum





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Last Calibration	October 2, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:13	End Time (MST)	10:55
Gas Cert Reference	LL107926	Station temp.	21 Deg C
Cal Gas Concentration	51 ppm	Cal Gas Exp Date	29-May-14
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-593	-593
Analyzer IP address	192.168.1.43		Lamp voltage	832	832
Calculated slope	0.991404	0.990635	Chamber temp	44.9	44.9
Calculated intercept	0.126586	0.376441	Pressure	698.5	698.5
Analyzer Background	10.9	10.9	Flow	0.496	0.496
Analyzer Coefficient	0.856	0.856	Intensity	85	85
Analyzer make	TEI 43i		Analyzer serial #	JC1327300932	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	58.8	599.8	605.1	0.991
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	58.8	599.8	605.1	0.991
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.991

Corrected As found 605.4 Previous response 604.8 % change -0.1%

Notes:

No adjustments. Changing mix cal cylinder; calibration sheet reflects as found change.

Calibration Performed By:

Asad Hidayat



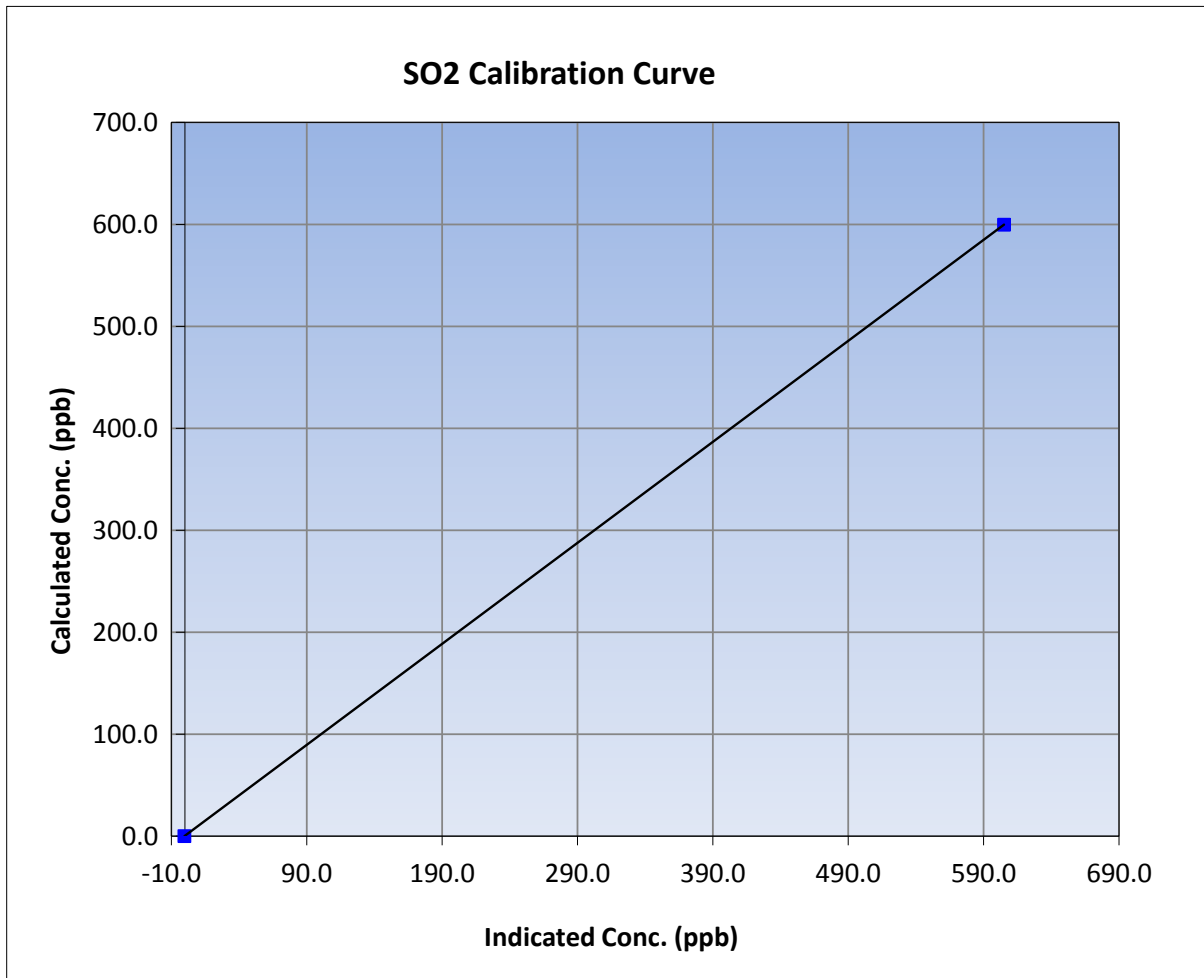
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 2, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:13	End Time (MST)	10:55
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

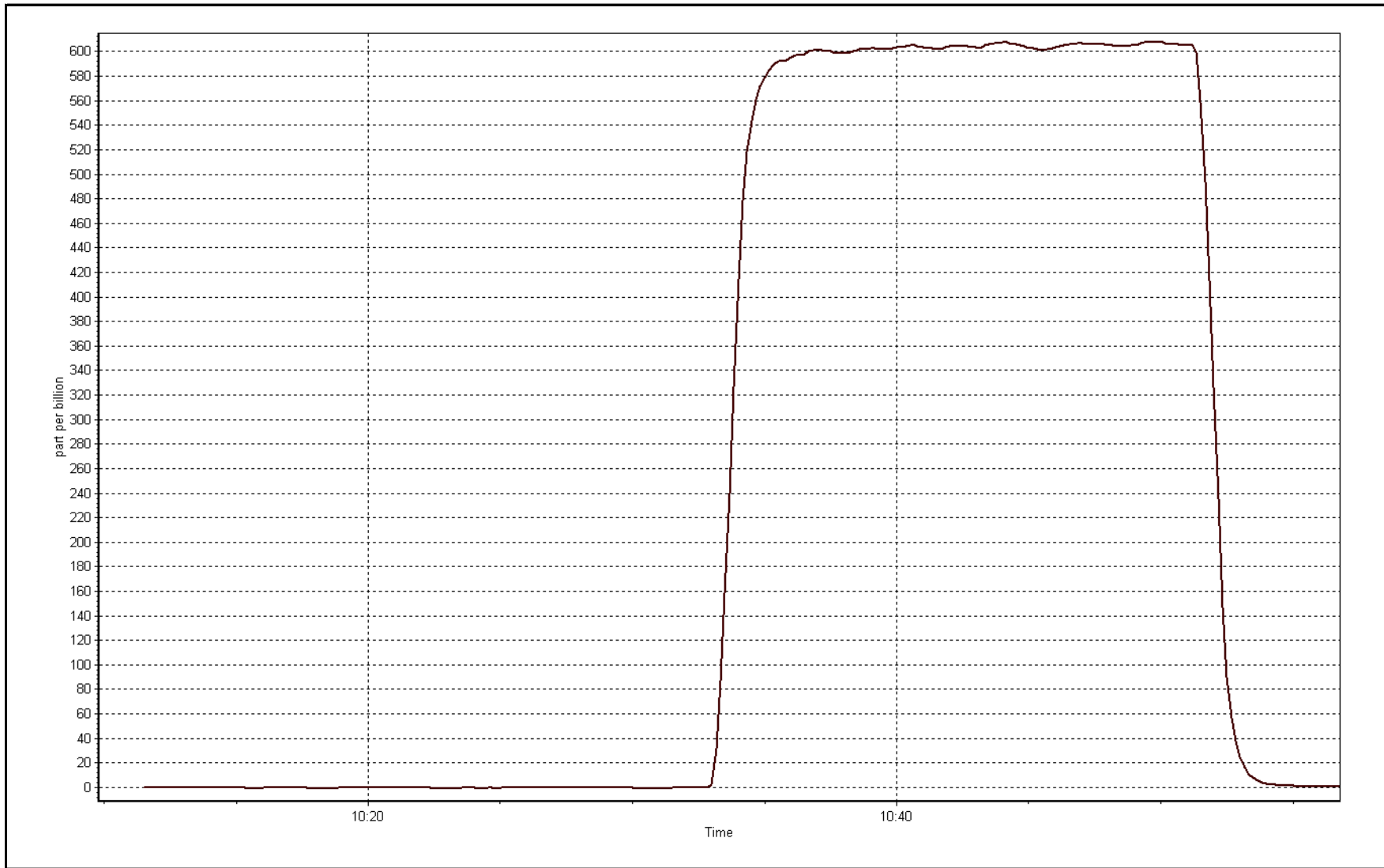
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	1.000000
599.8	605.1	0.9913		
			Slope	0.990635
			Intercept	0.376441



SO2 Calibration Plot

Date: November 4, 2015





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Last Calibration	October 2, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	13:47
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	832	836
Calculated slope	0.990635	0.988402	Chamber temp	44.9	45.0
Calculated intercept	0.376441	0.625824	Pressure	698.5	699.1
Analyzer Background	10.9	10.8	Flow	0.496	0.497
Analyzer Coefficient	0.856	0.856	Intensity	85	85
Analyzer make	TEI 43i		Analyzer serial #	JC1327300932	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	60.2	599.6	605.8	0.990
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.2	599.6	605.8	0.990
second point	5000	30.1	299.8	303.8	0.987
third point	5000	15.1	150.4	150.1	1.002
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.2	599.6	606.0	0.989
Average Correction Factor					0.993

Corrected As found 605.9 Previous response 604.9 % change -0.2%

Notes:

Inlet filter replaced after as founds. Mix cal gas cylinder changed after as founds. Adjusted zero.

Calibration Performed By:

Asad Hidayat



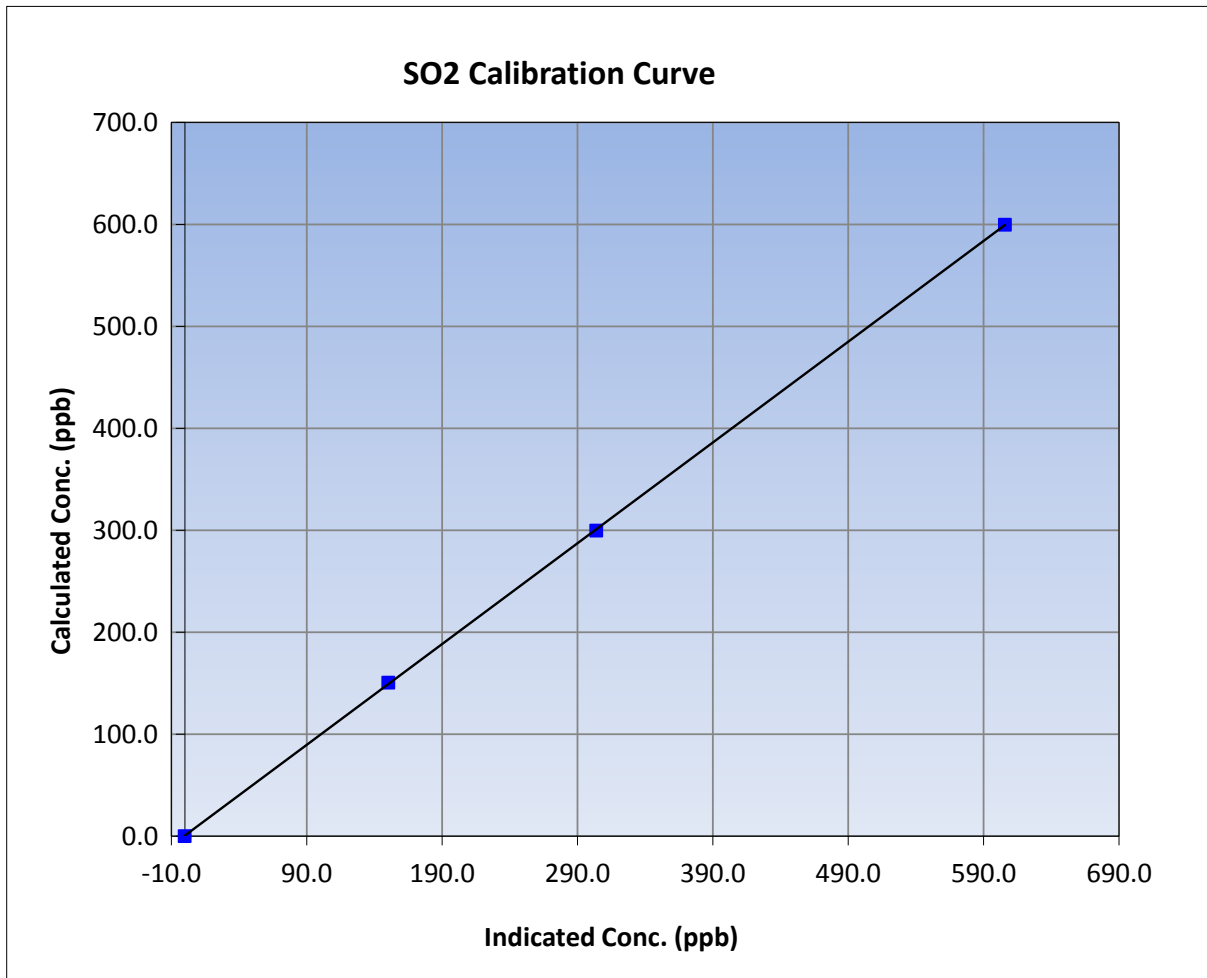
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 2, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:45	End Time (MST)	13:47
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

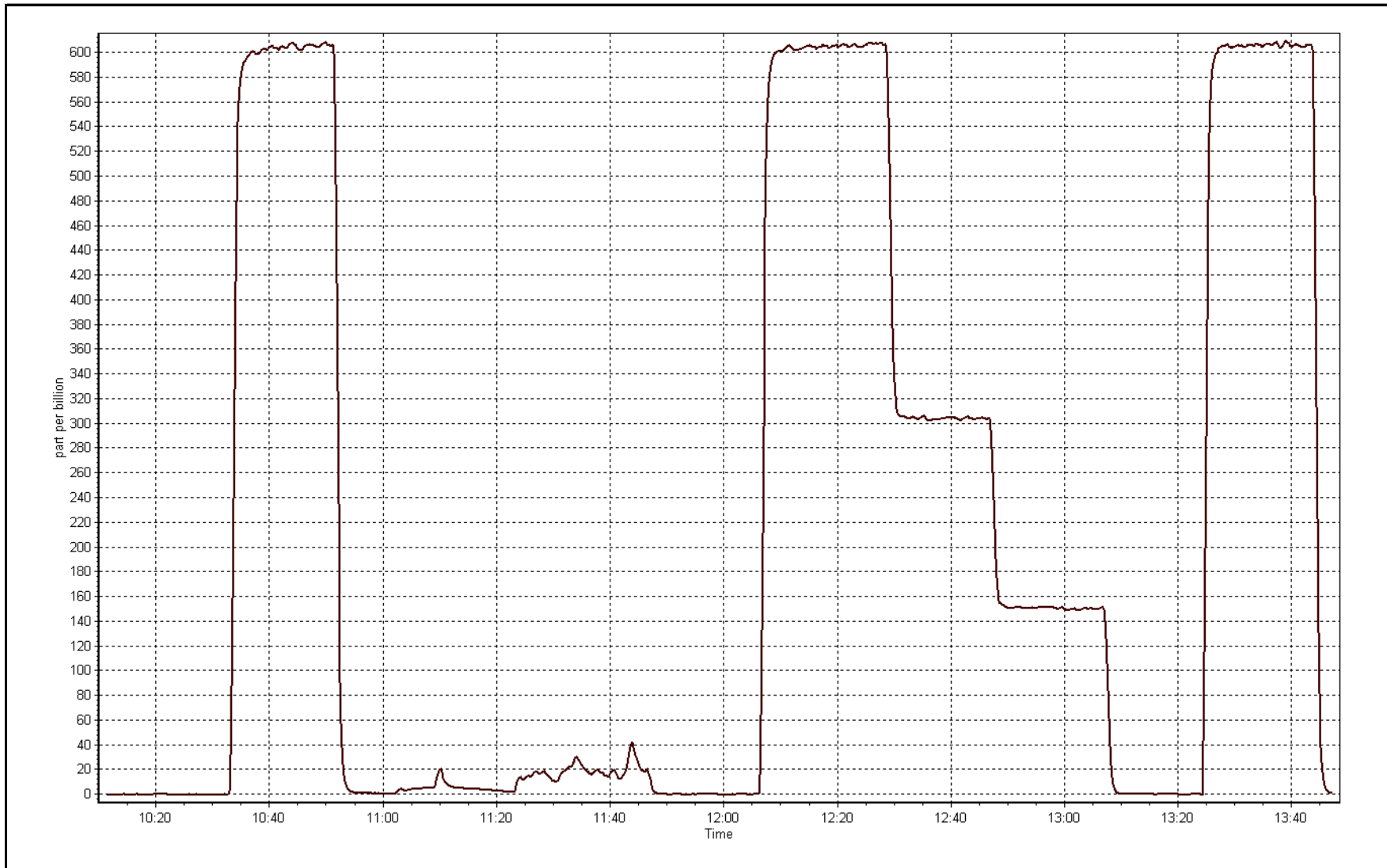
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999983
599.6	605.8	0.9898		
299.8	303.8	0.9869	Slope	0.988402
150.4	150.1	1.0018		
			Intercept	0.625824



SO2 Calibration Plot

Date: November 4, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 10, 2015	Last Calibration	October 1, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:45	End Time (MST)	16:00
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	51 ppm	SO2 gas cert/exp	LL107926 29-May-14

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-616
Analyzer IP address	192.168.1.42		Lamp voltage	868	875
Calculated slope	0.997641	0.992587	Chamber temp	45	45
Calculated intercept	-0.190068	0.179159	Pressure	554.7	546.0
Analyzer Background	13.7	14.6	Flow	1.054	1.039
Analyzer Coefficient	0.821	0.87	Intensity	94	94
			Converter temp.	328	331

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	0.2	----
as found span	6000	46.1	74.9	73.7	1.017
SO2 scrubber check	5000	14.7	149.9	5.0	----
calibrator zero	6000	0.0	0.0	-0.1	----
high point	6000	46.1	74.9	75.3	0.995
second point	6000	25.8	41.9	42.2	0.995
third point	6000	15.4	25.0	24.9	1.005
as left zero	5000	0.0	0.0	-0.2	----
as left span	6000	46.1	74.9	75.2	0.997
Average Correction Factor					0.998

Corrected As found	73.5	Previous response	75.3	% change	2.5%
--------------------	------	-------------------	------	----------	------

Notes:

Scrubber check and inlet filter changed after as founds. Upgrade iOS version to 02.02.00.289 after scrubber check. Zero and span response had dropped after upgrading to new iOS version. Only adjusted span.

Calibration Performed By: Asad Hidayat



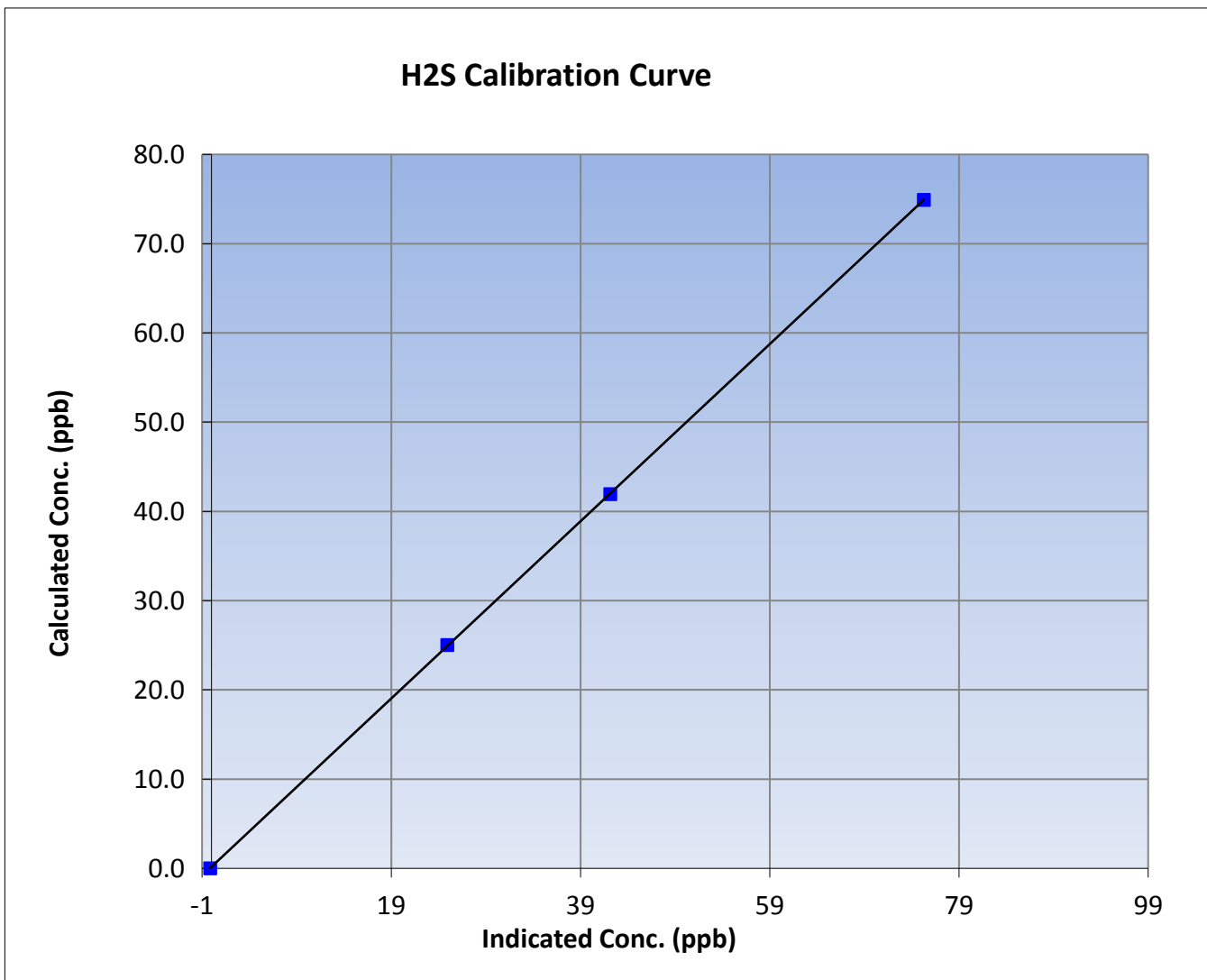
Wood Buffalo Environmental Association H2S Calibration Report

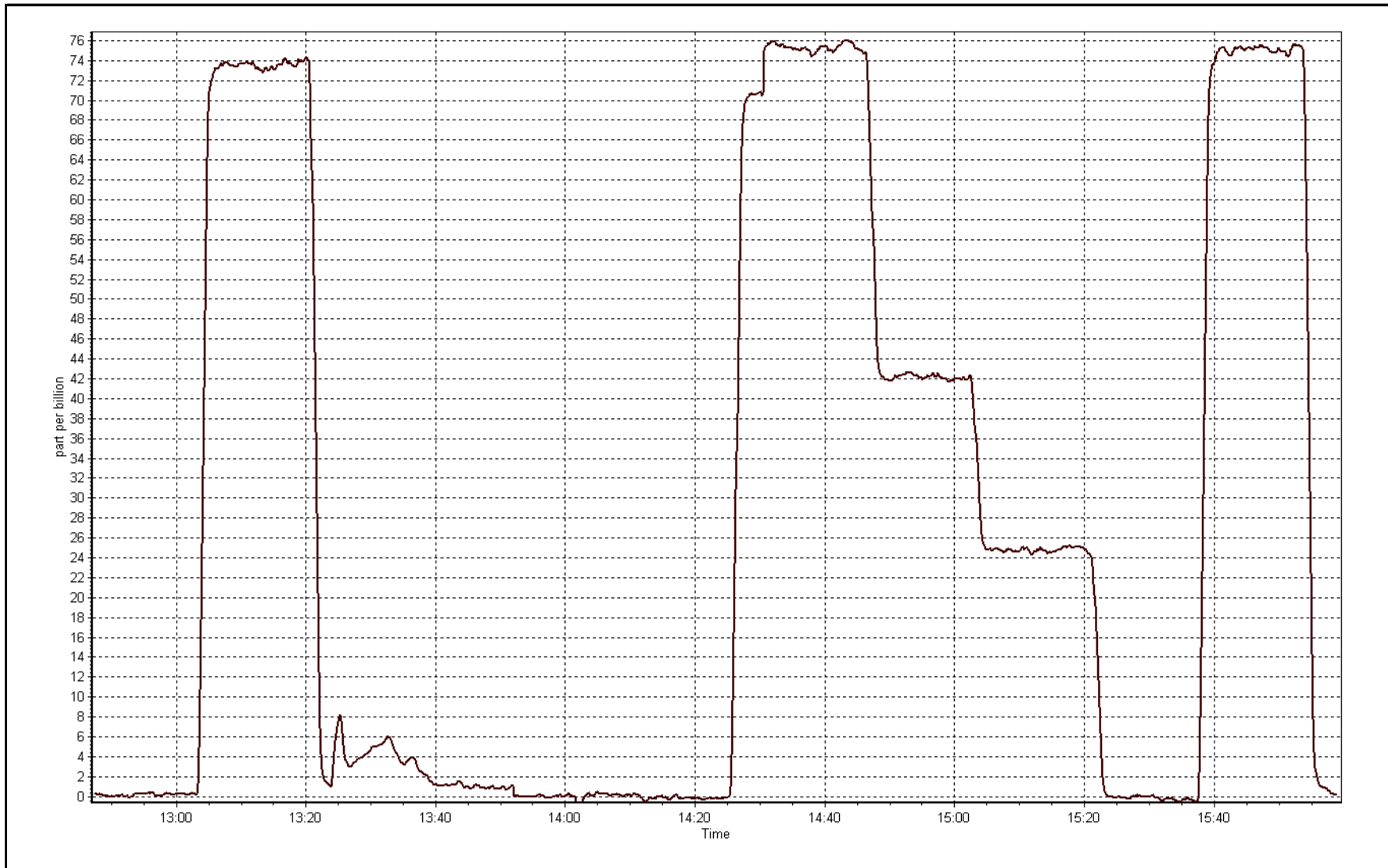
Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	12:45	End Time (MST)	16:00
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	0.999992
74.9	75.3	0.9951		
41.9	42.2	0.9947	Slope	0.992587
25.0	24.9	1.0046		
			Intercept	0.179159







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-04-15	Last Calibration	October-02-15
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:13	End Time (MST)	10:55
Gas Cert Reference	LL107926	Cal Gas Expiry Date	29-May-14
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	
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	
Calculated slope	1.003623	0.997197	Fuel Pressure	19.9	
Calculated intercept	-0.053955	-0.009972	Analyzer Coeff	4.1	
			Analyzer BKG	0.860	

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	58.8	12.45	12.49	0.996
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	58.8	12.45	12.49	0.996
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.996

Corrected As found	12.48	Previous response	12.45	% change	-0.2%
--------------------	-------	-------------------	-------	----------	-------

Notes:

No adjustments. Changing mix cal cylinder.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

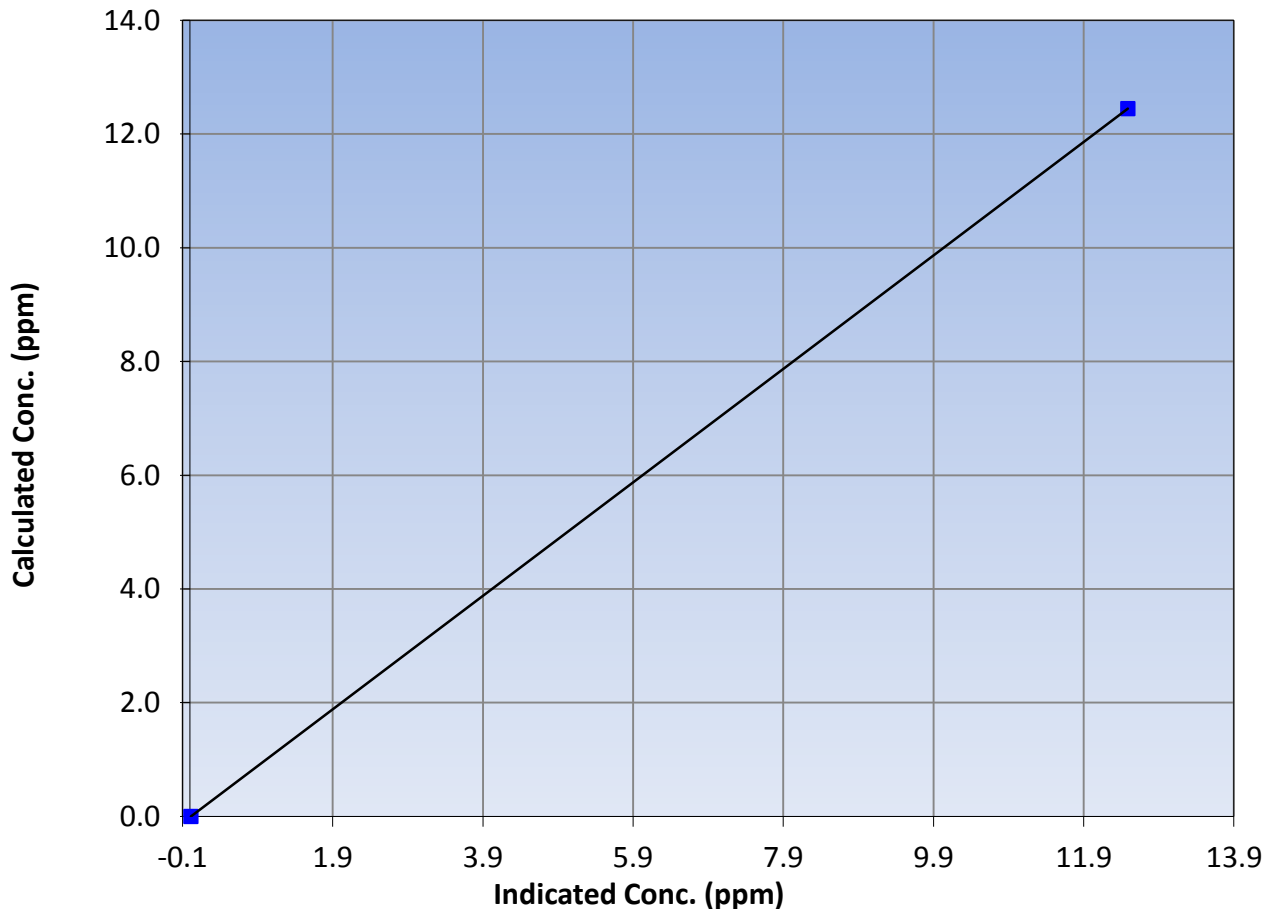
Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 2, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:13	End Time (MST)	10:55
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

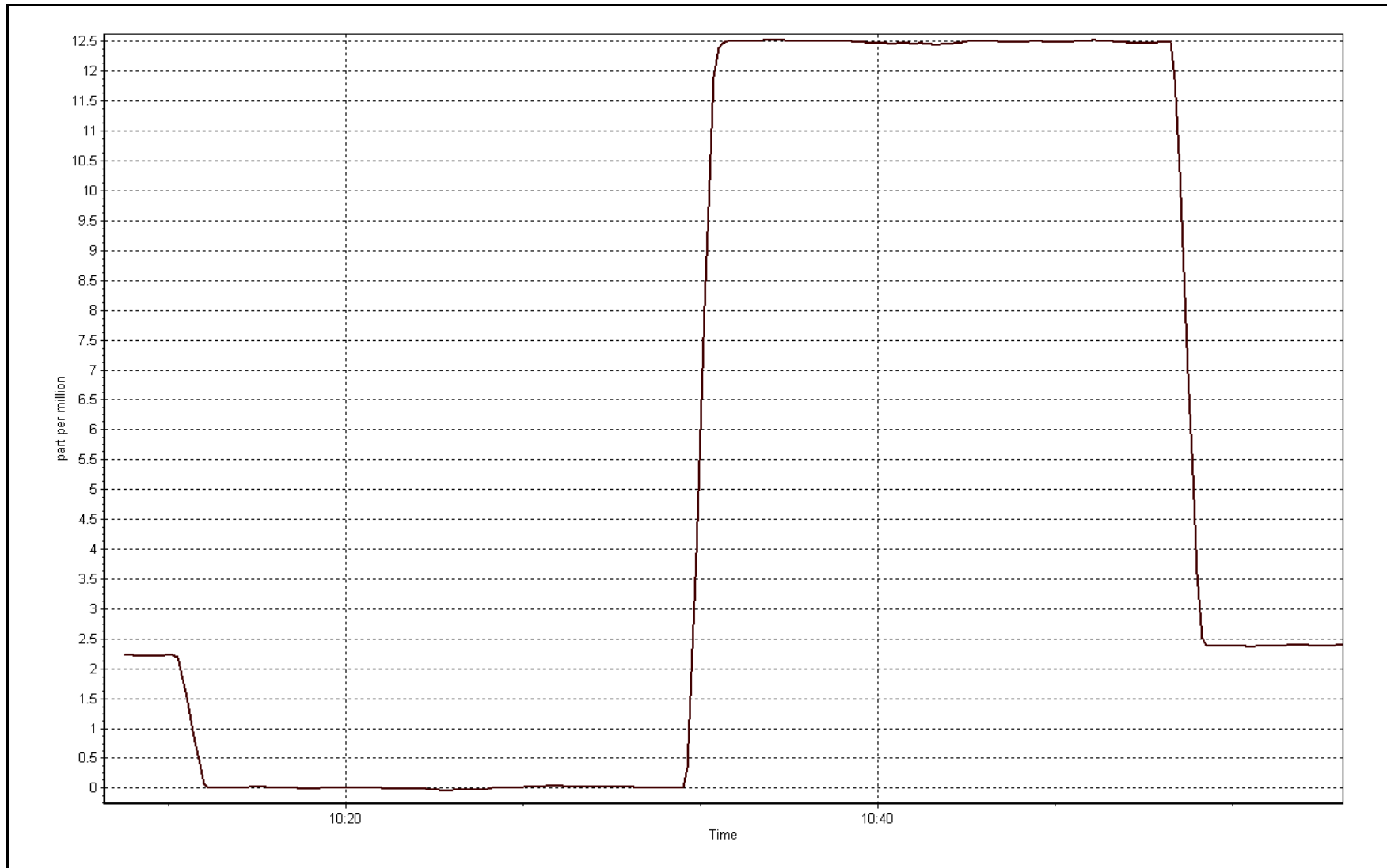
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	1.000000
12.45	12.49	0.9964		
			Slope	0.997197
			Intercept	-0.009972

THC Calibration Curve



THC Calibration Plot

Date: November 4, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-04-15	Last Calibration	October-02-15
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	13:46
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	0.997197	0.998294	Fuel Pressure	19.9	19.9
Calculated intercept	-0.009972	-0.033436	Analyzer Coeff	4.1	4.2
			Analyzer BKG	0.860	0.880

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	60.2	12.74	12.77	0.998
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.2	12.74	12.77	0.998
second point	5000	30.1	6.37	6.47	0.985
third point	5000	15.1	3.20	3.23	0.989
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	60.2	12.74	12.91	0.987
Average Correction Factor					0.991

Corrected As found	12.76	Previous response	12.79	% change	0.2%
--------------------	-------	-------------------	-------	----------	------

Notes:

Inlet filter replaced after as founds. Mix cal gas cylinder changed after as founds. Adjusted Span.

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

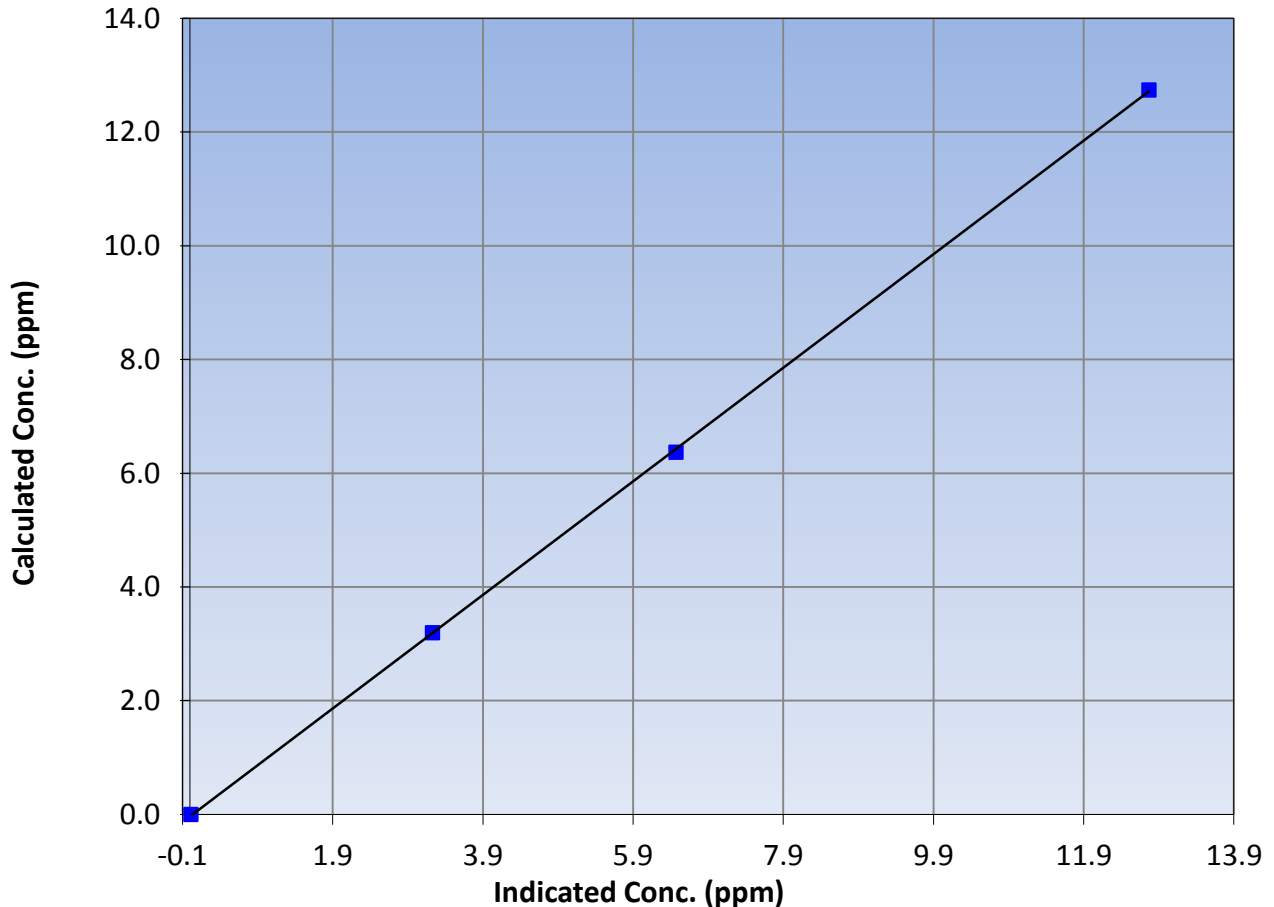
Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 2, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:45	End Time (MST)	13:46
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

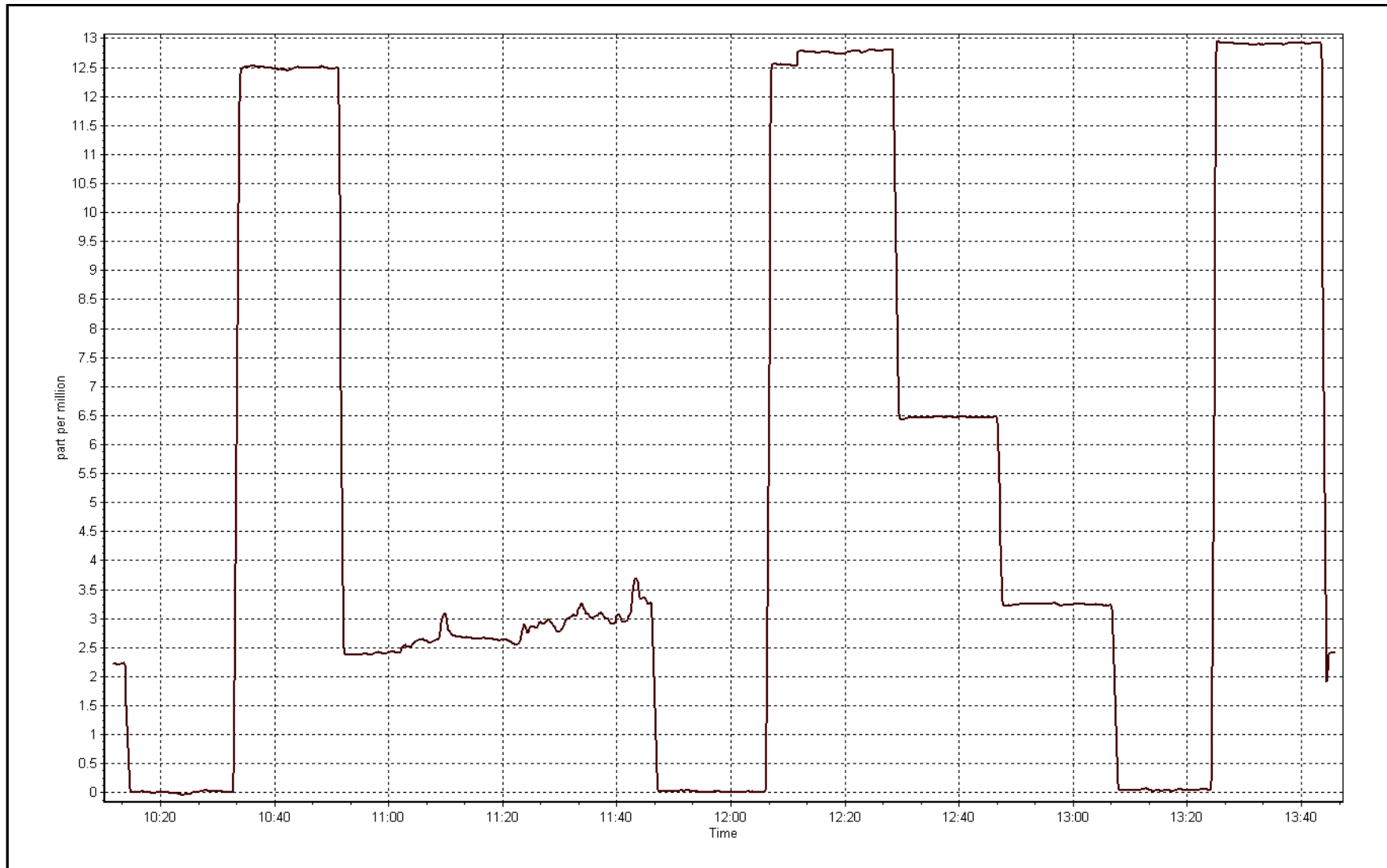
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999952
12.74	12.77	0.9978		
6.37	6.47	0.9846	Slope	0.998294
3.20	3.23	0.9894		
			Intercept	-0.033436

THC Calibration Curve



THC Calibration Plot

Date: November 4, 2015





This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

AMS 5 MANNIX NOVEMBER 2015

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

December 22, 2015



This page intentionally left blank

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	35	35	100.00	40	0	10	0
H2S (ppb) Average	685	34	35	99.86	4	0	1	0
THC (ppm) Average	685	35	35	100.00	3.9	-	2.5	-
Temperature 2 m (C) Average	720	0	0	100.00	7.6	-	3	-
Temperature 20 m (C) Average	720	0	0	100.00	7.9	-	4.2	-
Temperature 45 m (C) Average	720	0	0	100.00	7.6	-	4.6	-
Temperature 75 m (C) Average	720	0	0	100.00	7.3	-	4.8	-
Temperature 90 m (C) Average	720	0	0	100.00	7.2	-	4.9	-
Relative Humidity 2 m (%) Average	720	0	0	100.00	97	-	90	-
Relative Humidity 20 m (%) Average	720	0	0	100.00	97	-	89	-
Relative Humidity 45 m (%) Average	720	0	0	100.00	98	-	91	-
Relative Humidity 75 m (%) Average	720	0	0	100.00	98	-	91	-
Relative Humidity 90 m (%) Average	720	0	0	100.00	98	-	92	-
Wind Speed 20 m (km/h) Average	713	0	7	99.03	30	-	17	-
Wind Speed 45 m (km/h) Average	720	0	0	100.00	33	-	24	-
Wind Speed 75 m (km/h) Average	720	0	0	100.00	36	-	30	-
Wind Speed 90 m (km/h) Average	720	0	0	100.00	40	-	33	-
Wind Direction 20 m (deg) Average	713	0	7	99.03	-	-	-	-
Wind Direction 45 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 75 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 90 m (deg) Average	720	0	0	100.00	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	713	0	7	99.03	1.7	-	0.5	-
Vertical Wind Speed 45 m (km/h) Average	720	0	0	100.00	2	-	1.3	-
Vertical Wind Speed 75 m (km/h) Average	720	0	0	100.00	1.8	-	0.8	-
Vertical Wind Speed 90 m (km/h) Average	720	0	0	100.00	3.3	-	2.1	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	1	3	-	0	0	0	0	0	2	40
H2S (ppb) Average	685	0.4	0	-	0	0	0	0	1	1	4
THC (ppm) Average	685	2.27	0.2	-	2	2.1	2.2	2.2	2.3	2.5	3.9
Temperature 2 m (C) Average	720	-4.19	5.4	-	-19.1	-13.1	-7.3	-3.4	-0.2	1.9	7.6
Temperature 20 m (C) Average	720	-3.53	5.4	-	-17.5	-12.5	-5.9	-2.8	0.2	2.6	7.9
Temperature 45 m (C) Average	720	-3.3	5.4	-	-17.5	-12.6	-5.7	-2.3	0.4	2.7	7.6
Temperature 75 m (C) Average	720	-3.12	5.4	-	-16.4	-12.3	-5.5	-1.9	0.7	2.7	7.3
Temperature 90 m (C) Average	720	-3.08	5.4	-	-16.1	-12.1	-5.6	-1.8	0.7	2.9	7.2
Relative Humidity 2 m (%) Average	720	76.2	13	-	40	56	68	79	85	91	97
Relative Humidity 20 m (%) Average	720	72.3	15	-	28	49	60	77	84	90	97
Relative Humidity 45 m (%) Average	720	71.3	17	-	24	45	57	77	84	91	98
Relative Humidity 75 m (%) Average	720	70.6	18	-	23	41	56	76	85	91	98
Relative Humidity 90 m (%) Average	720	70.4	19	-	22	41	56	75	85	91	98
Wind Speed 20 m (km/h) Average	713	11.1	5	-	1	5	8	11	14	17	30
Wind Speed 45 m (km/h) Average	720	15.9	6	-	1	7	11	16	20	24	33
Wind Speed 75 m (km/h) Average	720	18.3	8	-	1	8	13	18	24	29	36
Wind Speed 90 m (km/h) Average	720	19.3	8	-	1	8	13	19	25	31	40
Wind Direction 20 m (deg) Average	713	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	713	0.09	0.4	-	-0.8	-0.4	-0.2	0.1	0.4	0.6	1.7
Vertical Wind Speed 45 m (km/h) Average	720	0.24	0.7	-	-1.4	-0.6	-0.3	0	0.9	1.3	2
Vertical Wind Speed 75 m (km/h) Average	720	0.19	0.3	-	-0.9	-0.2	0	0.1	0.4	0.7	1.8
Vertical Wind Speed 90 m (km/h) Average	720	0.67	0.7	-	-1.3	0	0.2	0.6	1	1.6	3.3

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	10 Nov 2015 17:00	10 Nov 2015 17:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	22 Nov 2015 13:00	22 Nov 2015 19:00	7	Flat line in sensor output signal - Sensor frozen



Summary of Hour Averages

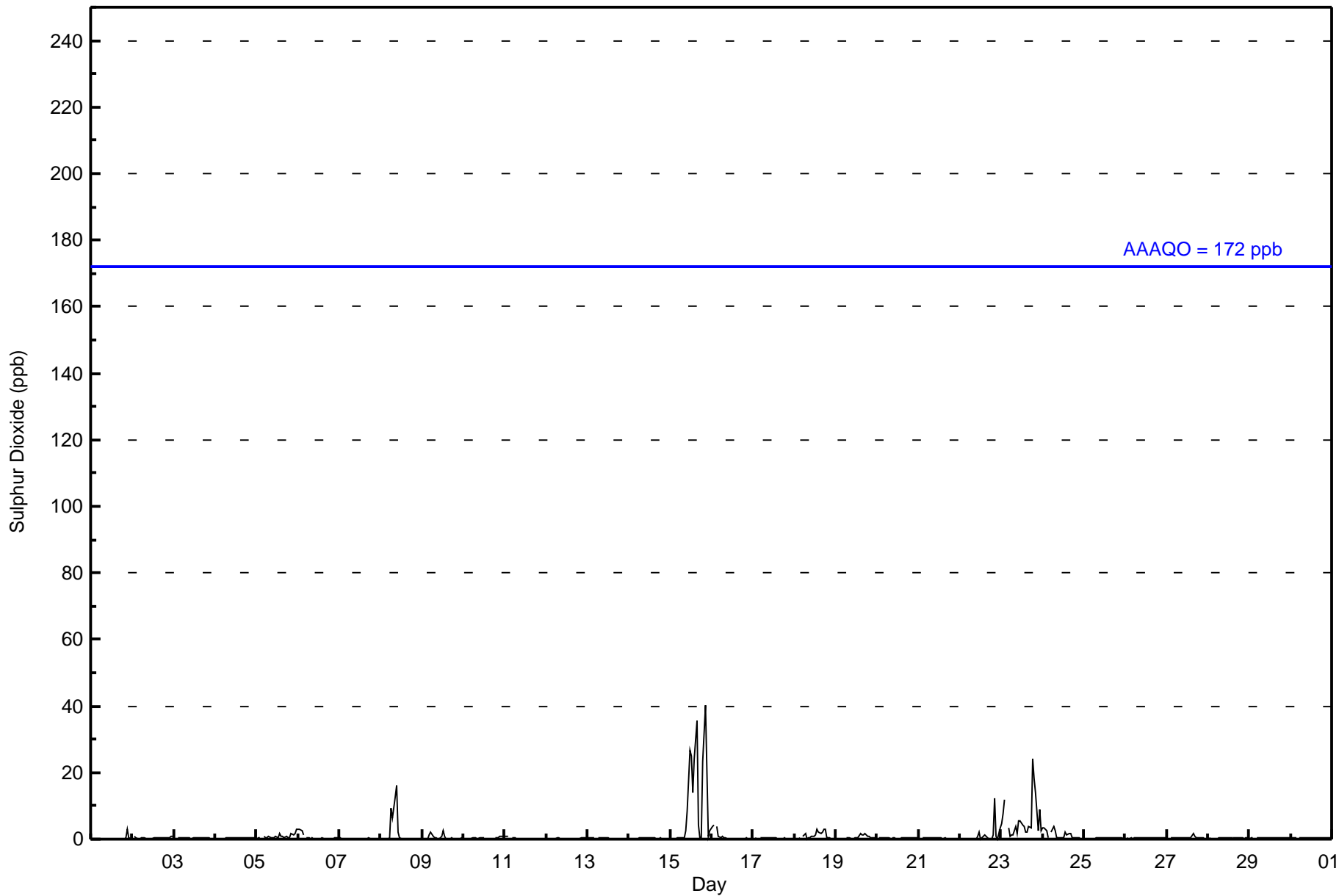
Mannix - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 40 ppb on Nov 15 21:00	Maximum Daily Average: 10.0 ppb on Nov 15
Minimum Value: 0 ppb on Nov 1 11:00	Hours of Data: 685
Maximum Diurnal Average: 2.5 ppb at hour 21	Hours of Missing Data: 35
Monthly Average: 1.0 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.1 ppb on Nov 7	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.4 ppb at hour 4	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 23	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0.2	3
2-Nov	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0.4	1
3-Nov	1	Z	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0.3	1
4-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0.3	1
5-Nov	0	1	0	Z	1	0	0	1	1	1	0	1	1	2	1	1	0	1	1	0	2	1	2	3	0.9	3
6-Nov	3	3	3	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Nov	Z	0	0	0	0	1	9	7	13	16	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2.1	16
9-Nov	0	Z	0	0	1	2	1	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0.5	3
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	1	1	1	0.4	1
11-Nov	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Nov	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Nov	0	Z	0	0	0	1	0	0	1	2	8	27	25	14	24	36	4	1	0	23	40	21	1	3	10.0	40
16-Nov	4	4	Z	4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4
17-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Nov	0	0	0	0	Z	1	2	0	0	0	1	1	1	3	2	2	2	3	3	0	0	0	0	0	1.0	3
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	1	1	2	1	1	0	0	0	0	0.5	2
20-Nov	Z	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
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Nov	0	0	Z	0	0	0	0	0	0	0	1	2	0	0	1	1	0	0	0	1	12	1	0	3	1.1	12
23-Nov	5	8	12	Z	4	1	1	1	4	2	5	5	4	4	2	2	4	4	24	18	14	3	9	3	6.0	24
24-Nov	4	3	3	0	Z	2	4	2	1	0	0	1	1	2	1	2	2	1	0	0	0	0	0	0	1.3	4
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
26-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0.4	1
27-Nov	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0.5	2
28-Nov	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
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.3	1

0.8	1.0	0.9	0.4	0.5	0.5	0.8	0.6	0.8	0.9	0.8	1.5	1.3	1.1	1.4	1.8	0.7	0.5	1.2	1.7	2.5	1.2	0.6	0.6	Diurnal Average	
5	8	12	4	4	2	9	7	13	16	8	27	25	14	24	36	4	4	24	23	40	21	9	3	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	670	97.81	97.81
11 - 20	7	1.02	98.83
21 - 60	8	1.17	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	25	46	3	2	2	4	67	201	57	41	37	50	38	17	33	40	663
11 - 20	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7
21 - 60	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	50	3	2	2	4	67	201	57	41	37	50	38	17	33	43	678

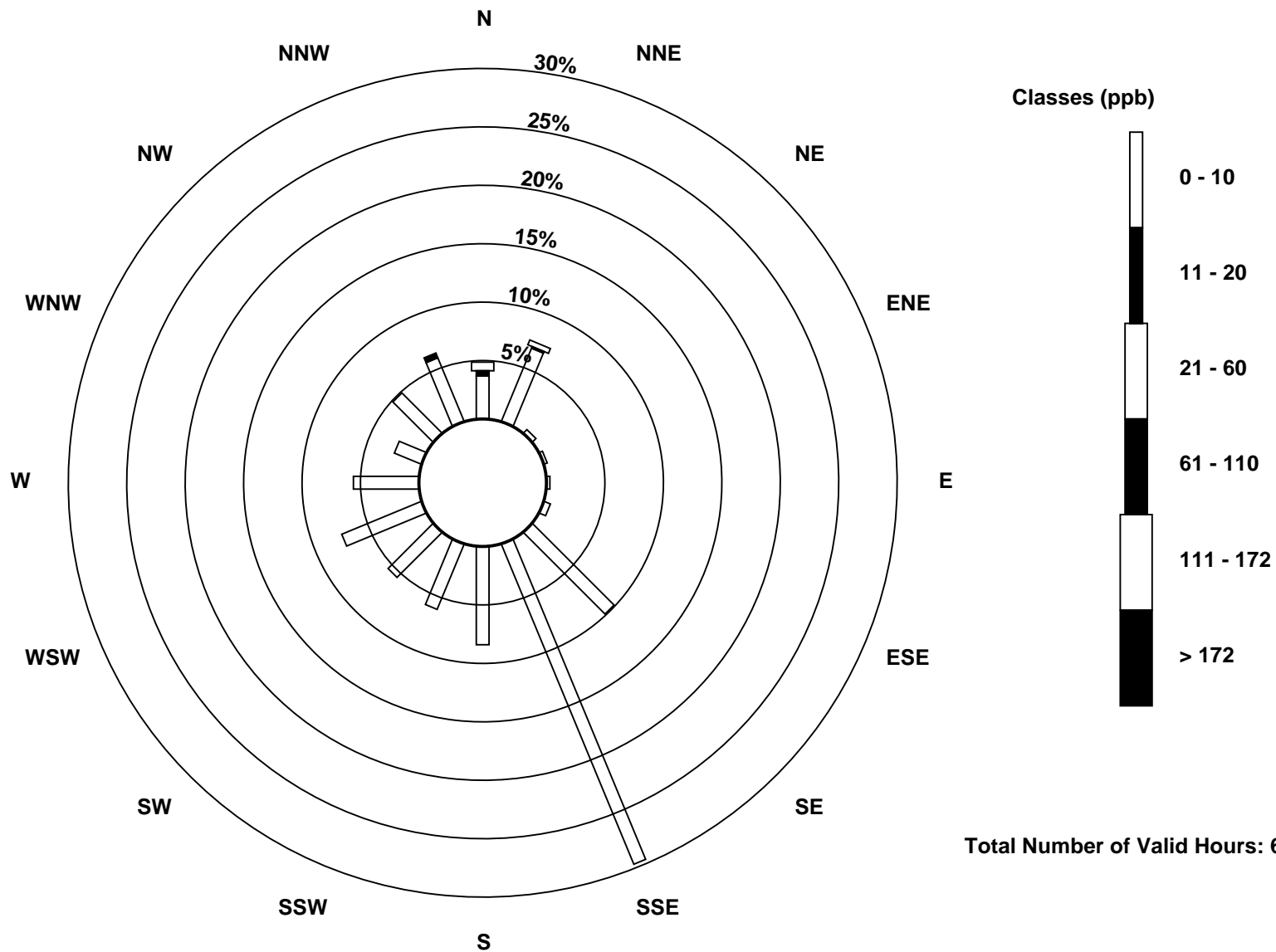
Total Number of Valid Hours: 678

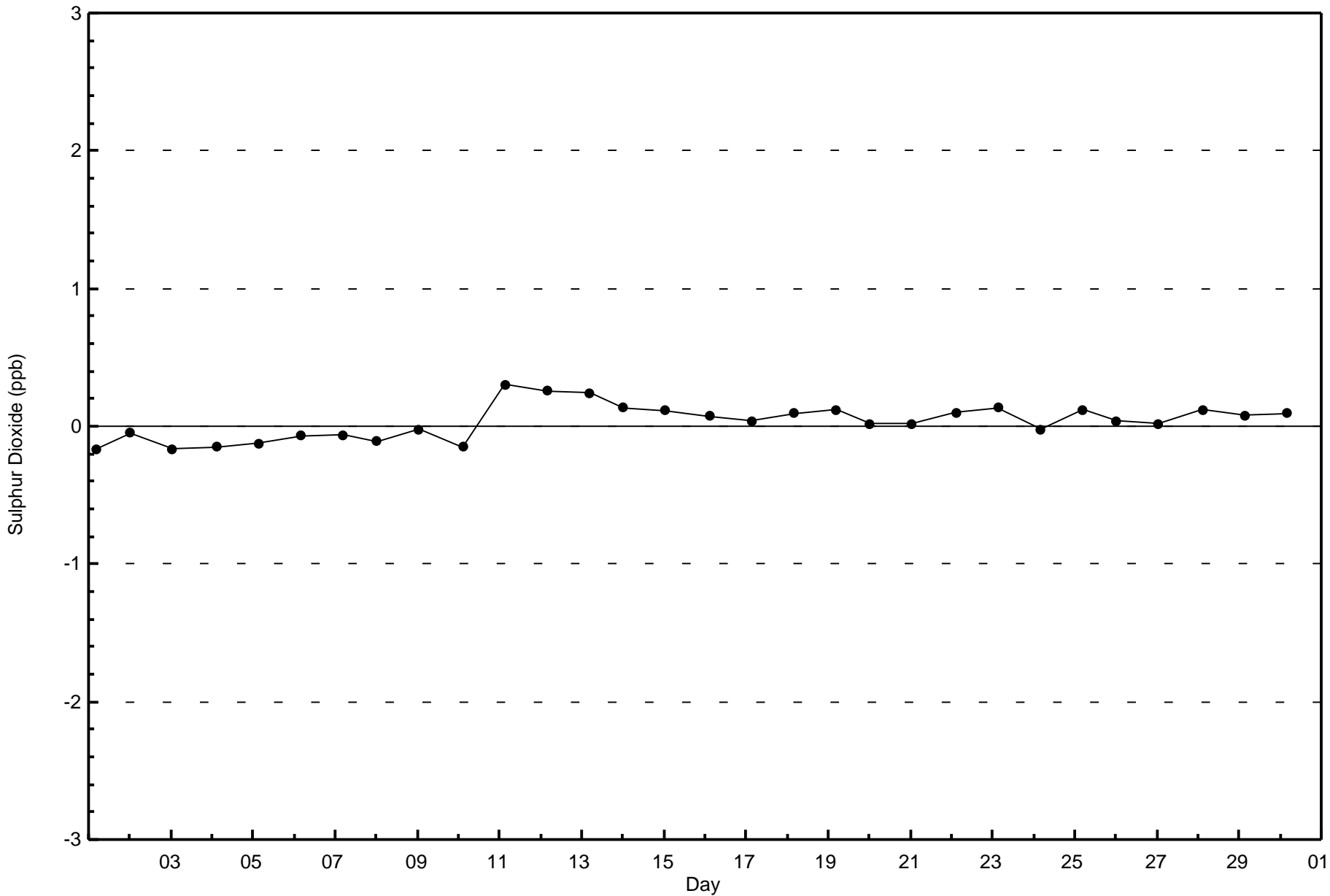
Total Number of Hours: 720

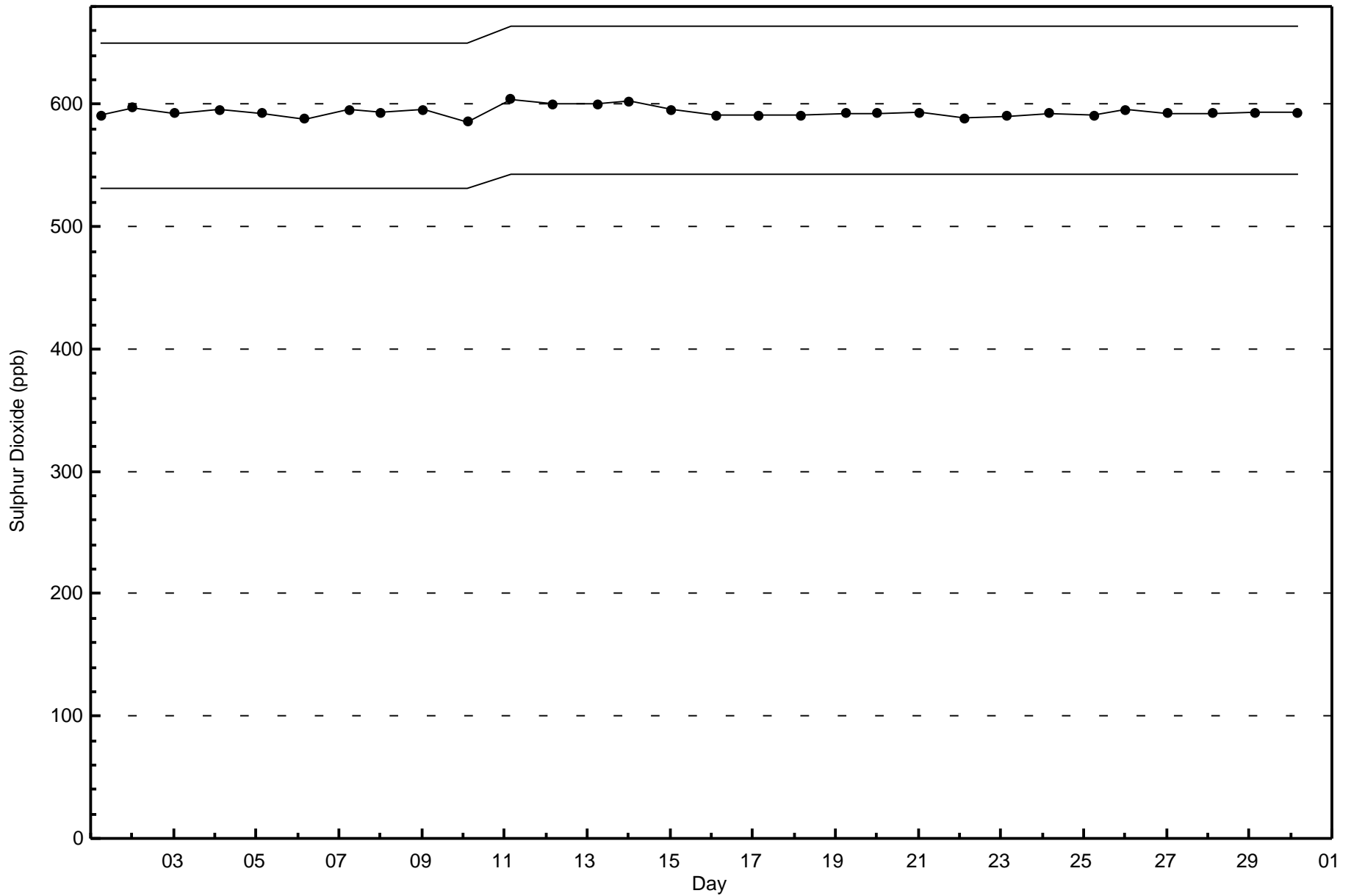


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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









Summary of Hour Averages

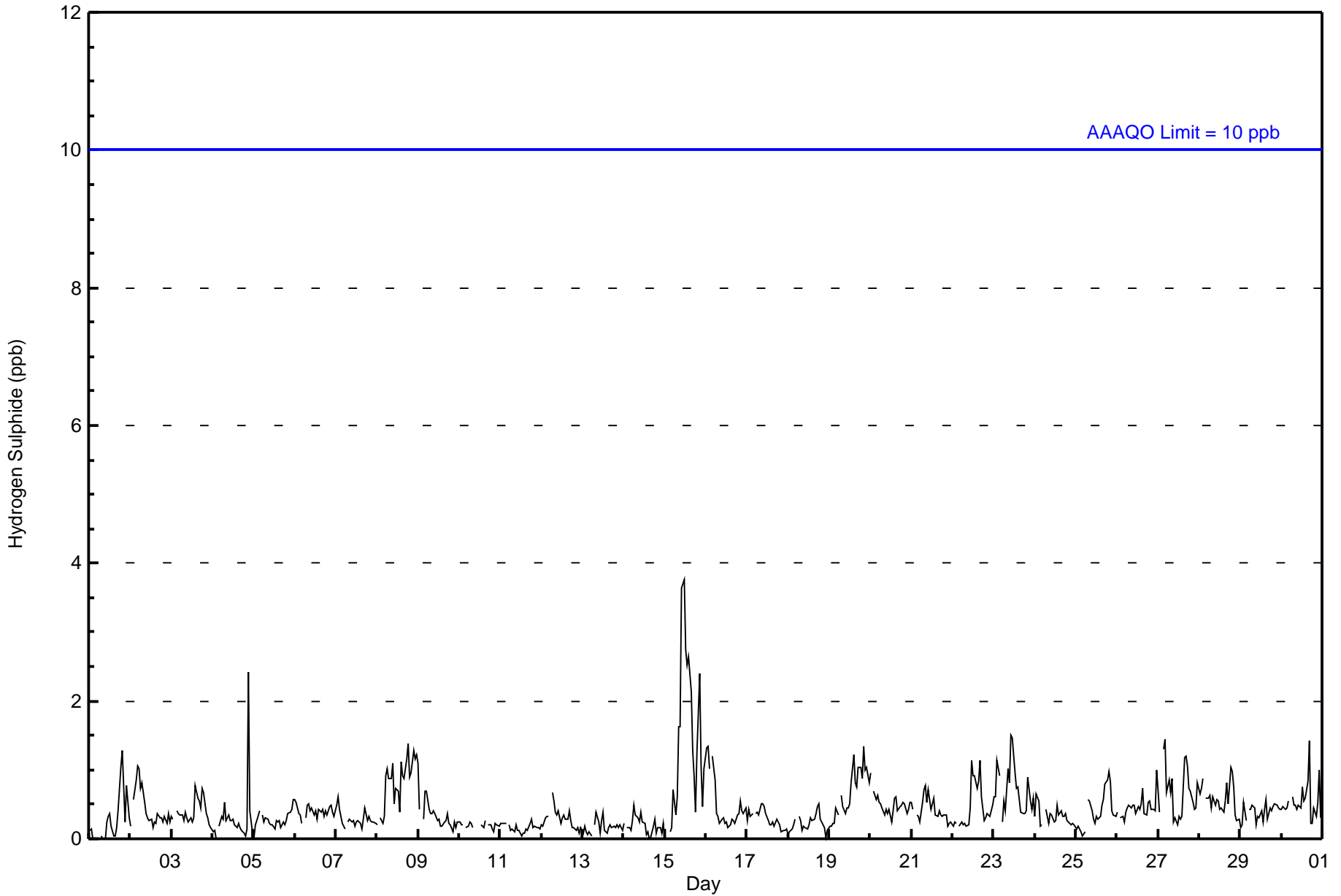
Mannix - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 4 ppb on Nov 15 12:00	Maximum Daily Average: 1.4 ppb on Nov 15
Minimum Value: 0 ppb on Nov 1 03:00	Hours of Data: 685
Maximum Diurnal Average: 0.5 ppb at hour 11	Hours of Missing Data: 35
Monthly Average: 0.4 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.2 ppb on Nov 11	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.4 ppb at hour 4	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2	

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

0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.4	Diurnal Average
1	1	1	1	1	1	1	1	1	2	2	4	4	3	3	3	2	1	1	1	1	1	2	2	1	1	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	680	99.27	99.27
3 - 4	5	0.73	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	31	49	3	2	2	4	68	203	55	41	37	50	37	17	33	41	673
3 - 4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	50	3	2	2	4	68	203	55	41	37	50	37	17	33	42	678

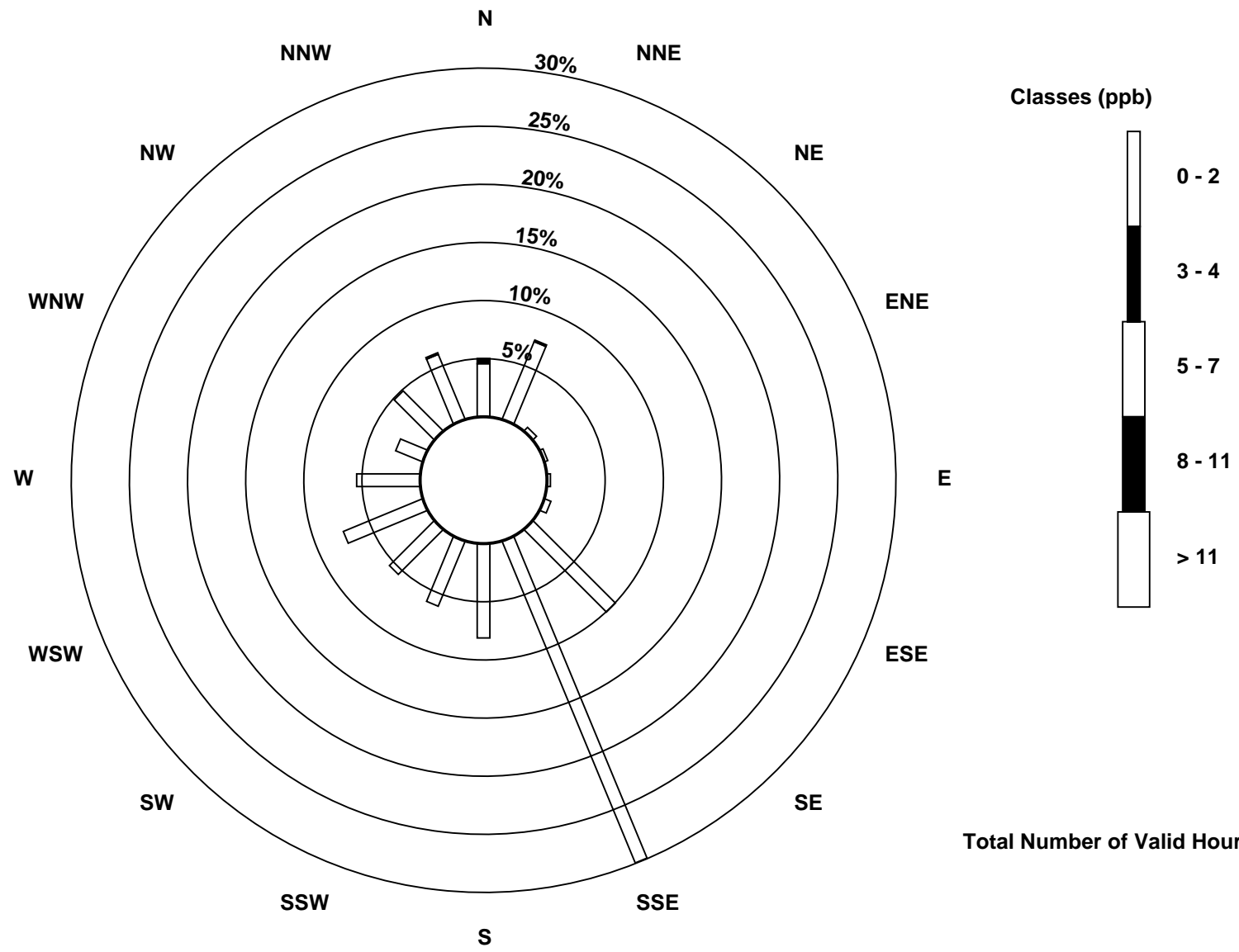
Total Number of Valid Hours: 678

Total Number of Hours: 720

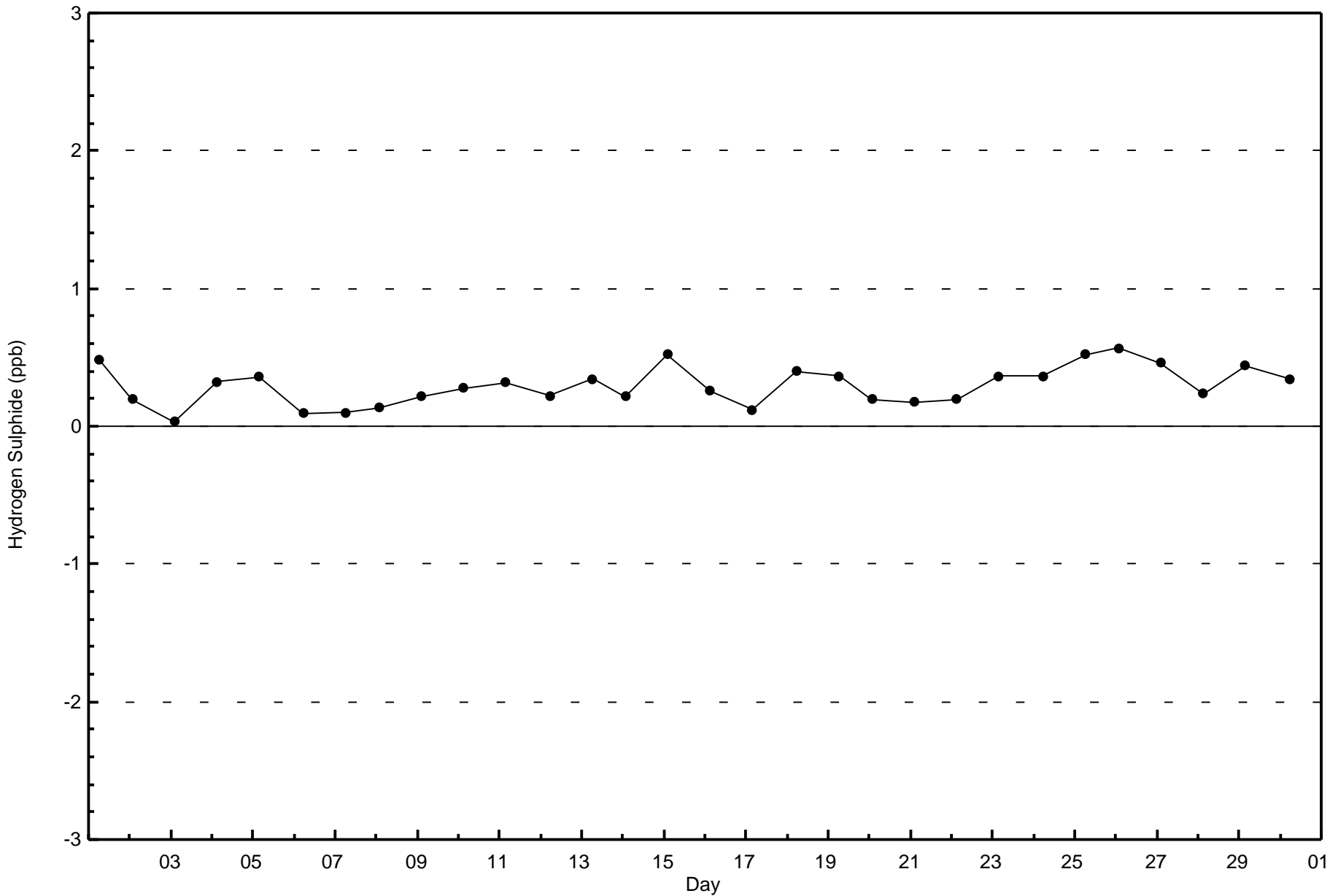


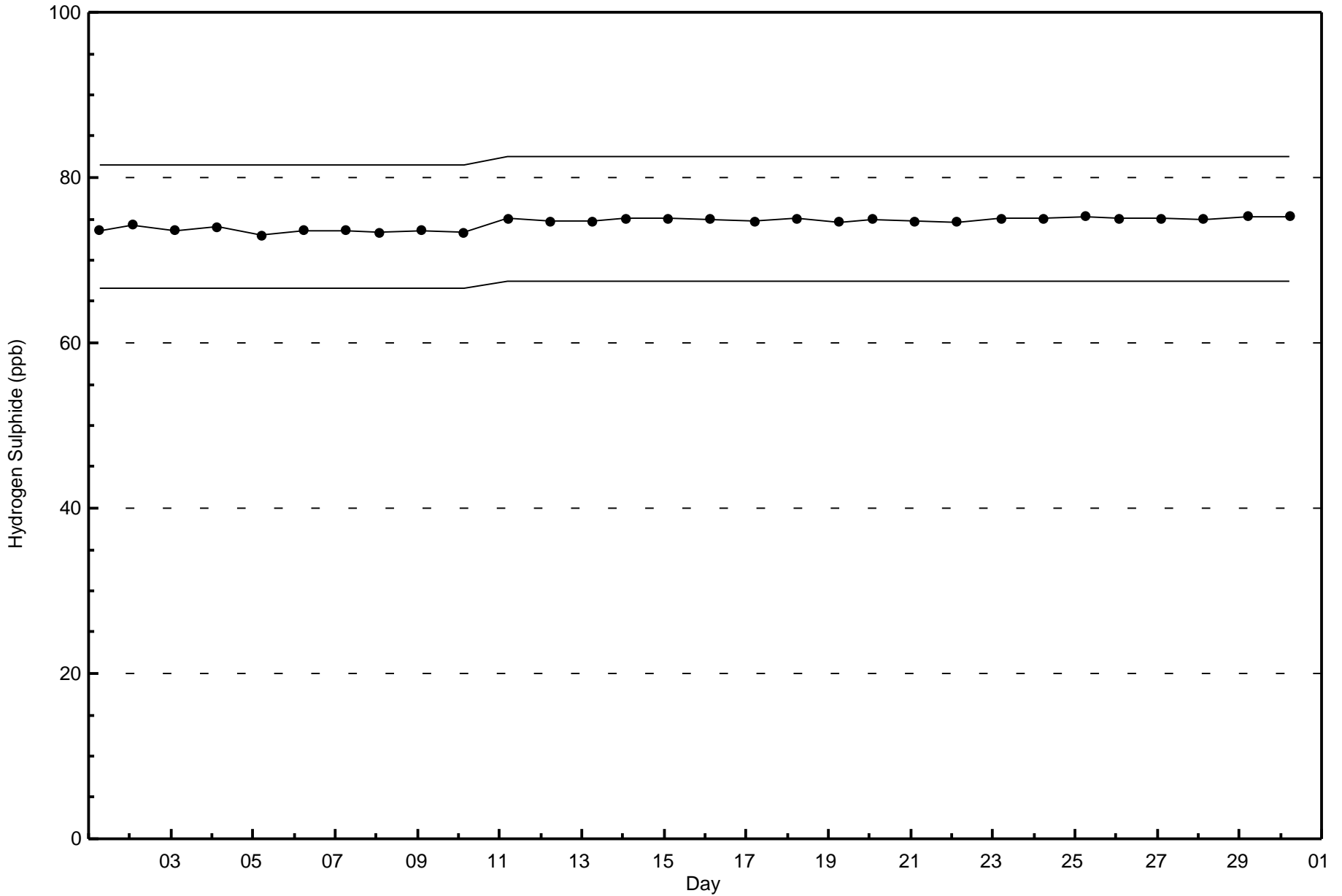
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



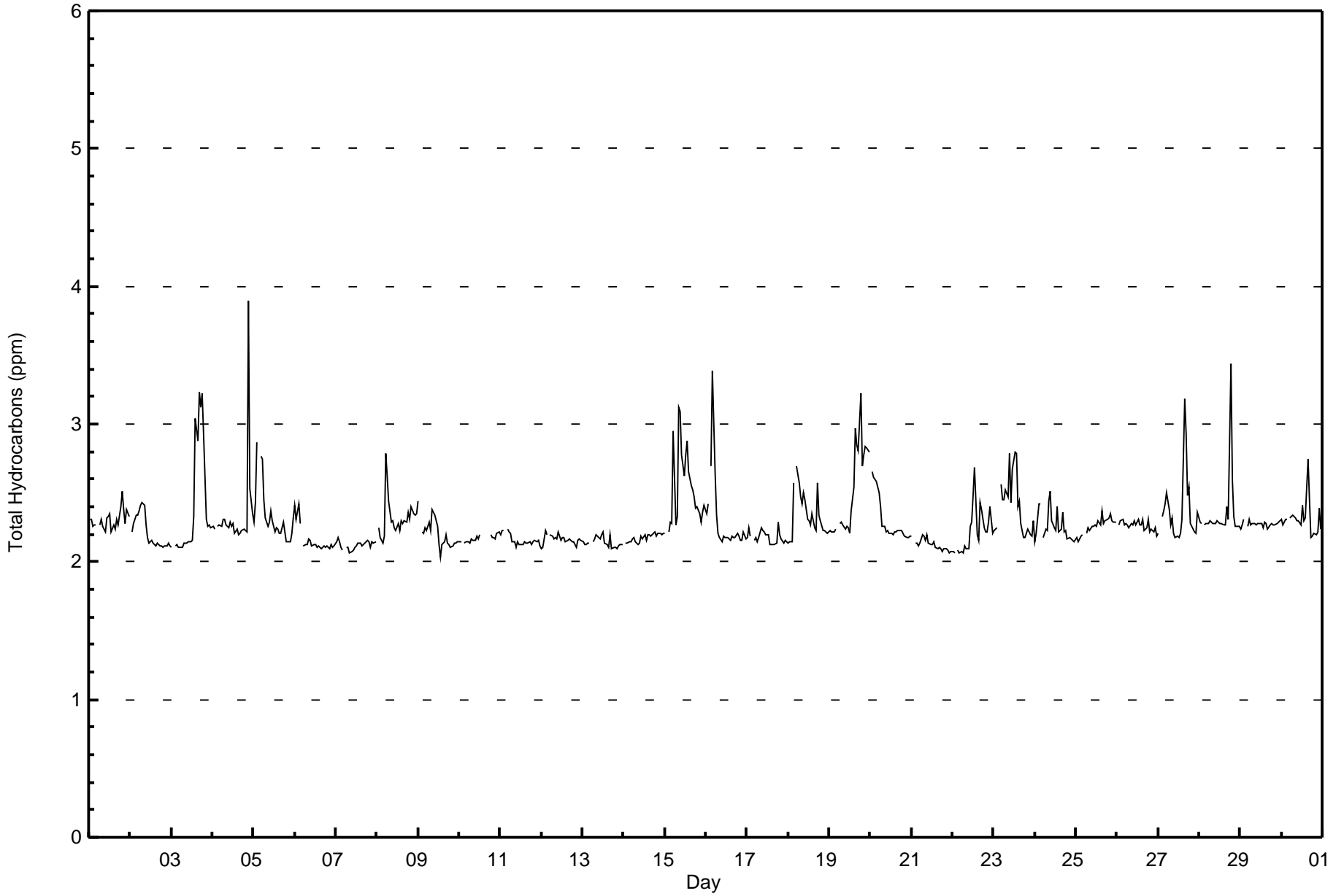
Total Number of Valid Hours: 678







Maximum Value: 3.9 ppm on Nov 4 22:00														Maximum Daily Average: 2.5 ppm on Nov 15														Hours in Service: 720	
Minimum Value: 2.0 ppm on Nov 9 14:00														Minimum Daily Average: 2.1 ppm on Nov 7														Hours of Data: 685	
Maximum Diurnal Average: 2.4 ppm at hour 6														Minimum Diurnal Average: 2.2 ppm at hour 1														Hours of Missing Data: 35	
Monthly Average: 2.27 ppm														Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.5 P ₉₉ = 3.2														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-Nov	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.3	2.3	2.4	2.5	2.4	2.3	2.4	2.3	2.3	2.5			
2-Nov	Z	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	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	2.2	2.4		
3-Nov	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	3.0	2.9	3.2	3.1	3.2	2.9	2.3	2.3	2.3	2.2	2.4	3.2			
4-Nov	2.3	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.9	2.5	2.3	2.3	3.9			
5-Nov	2.3	2.4	2.9	Z	2.8	2.7	2.5	2.3	2.3	2.3	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.9			
6-Nov	2.4	2.3	2.4	2.3	Z	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	2.2	2.4		
7-Nov	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	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2		
8-Nov	Z	2.2	2.2	2.1	2.2	2.8	2.6	2.4	2.3	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.8		
9-Nov	2.4	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.4	2.4	2.3	2.3	2.1	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4		
10-Nov	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	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
11-Nov	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.2	2.2		
12-Nov	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	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2		
13-Nov	2.2	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2		
14-Nov	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
15-Nov	2.2	Z	2.2	2.3	2.3	3.0	2.3	2.3	3.1	3.1	2.8	2.6	2.8	2.9	2.7	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.4	2.4	2.5	3.1		
16-Nov	2.3	2.4	Z	2.7	3.4	2.6	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	3.4		
17-Nov	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.3		
18-Nov	2.1	2.1	2.1	2.6	Z	2.7	2.6	2.5	2.4	2.5	2.5	2.3	2.3	2.3	2.4	2.3	2.2	2.6	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.7		
19-Nov	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.4	2.5	3.0	2.9	2.8	3.2	2.7	2.8	2.8	2.8	2.8	2.8	2.5	3.2		
20-Nov	Z	2.7	2.6	2.6	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	2.2	2.2	2.2	2.2	2.2	2.3	2.7		
21-Nov	2.2	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2		
22-Nov	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.5	2.7	2.2	2.2	2.4	2.4	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.7		
23-Nov	2.2	2.2	2.3	Z	2.6	2.5	2.5	2.5	2.5	2.8	2.4	2.7	2.8	2.8	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.8		
24-Nov	2.1	2.2	2.4	2.4	Z	2.2	2.2	2.2	2.4	2.5	2.3	2.3	2.2	2.4	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.5			
25-Nov	2.2	2.1	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.4		
26-Nov	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3		
27-Nov	2.2	Z	2.3	2.4	2.4	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	3.2	2.9	2.5	2.5	2.3	2.2	2.2	2.2	2.4	2.4	3.2			
28-Nov	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	3.4	2.6	2.3	2.3	2.3	2.3	2.3	2.4	3.4		
29-Nov	2.2	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3		
30-Nov	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.7	2.5	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.3	2.7		
																								Diurnal Average					
																								Diurnal Maximum					
																								Z - zerospan C - Calibration					





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	1	0.15	0.15
2.1 - 3.0	674	98.39	98.54
3.1 - 10.0	10	1.46	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2.1 - 3.0	32	49	3	2	2	4	67	199	56	41	37	50	38	15	29	43	667
3.1 - 10.0	1	1	0	0	0	0	0	2	0	0	0	0	0	2	4	0	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	50	3	2	2	4	67	201	57	41	37	50	38	17	33	43	678

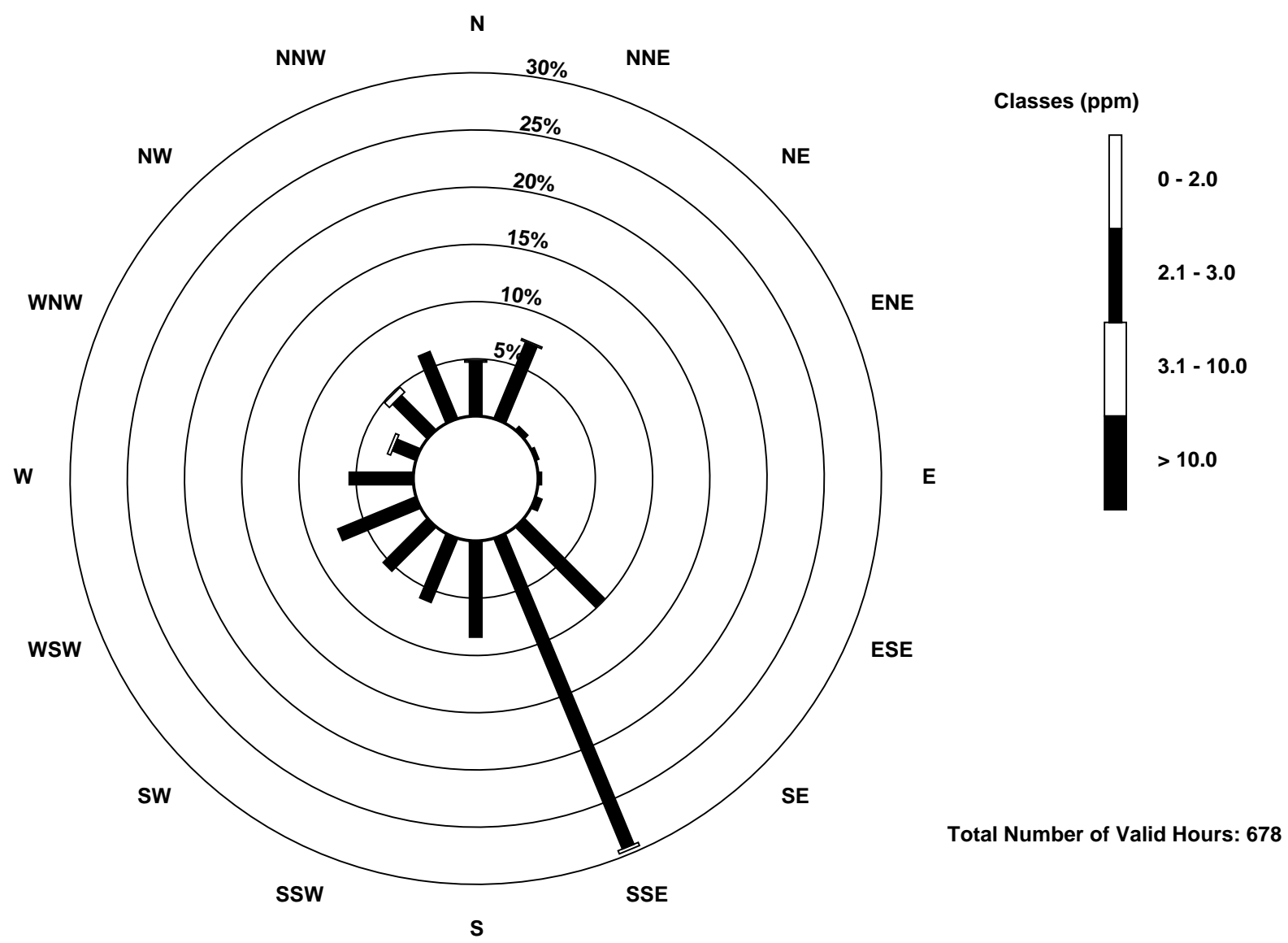
Total Number of Valid Hours: 678

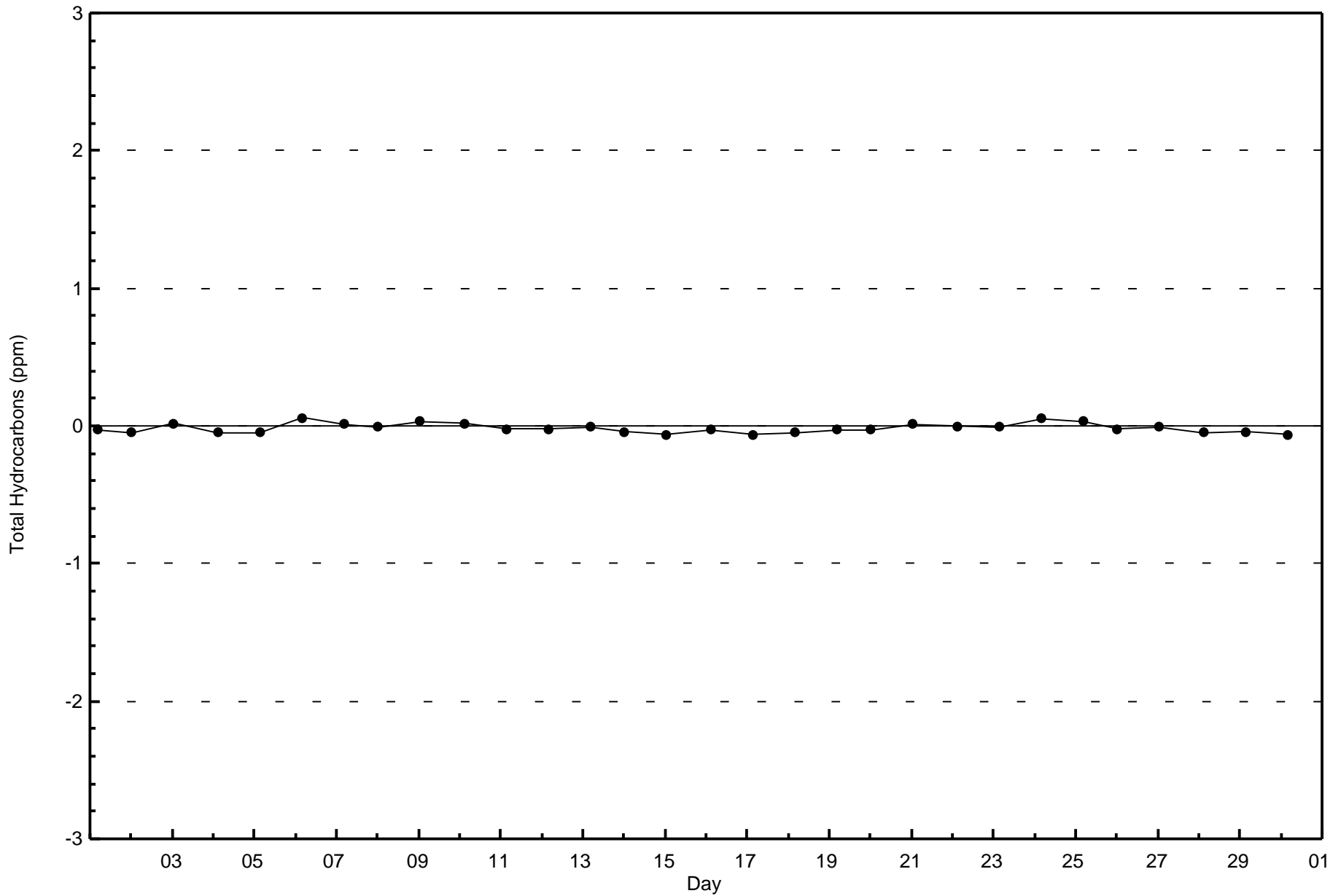
Total Number of Hours: 720

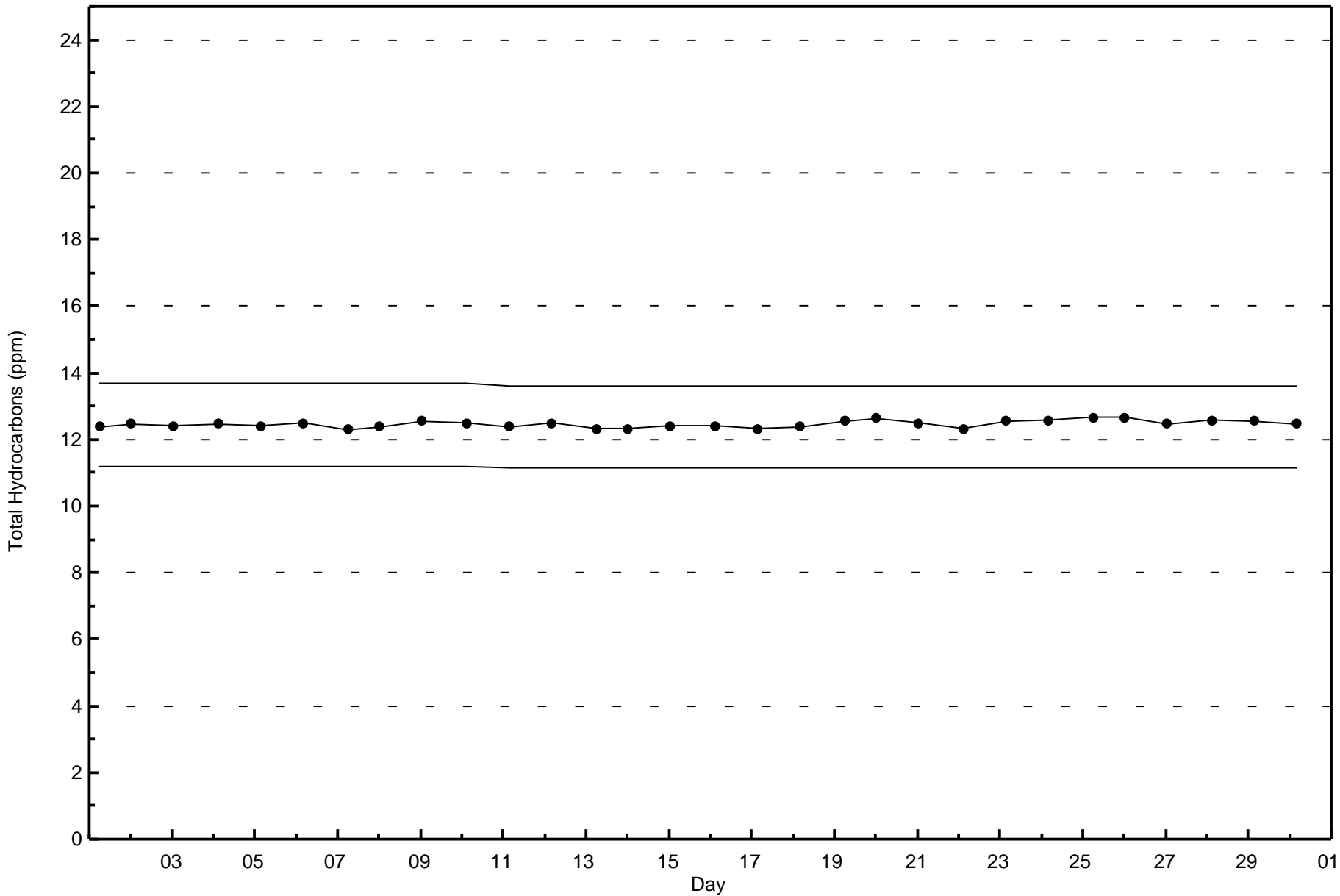


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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

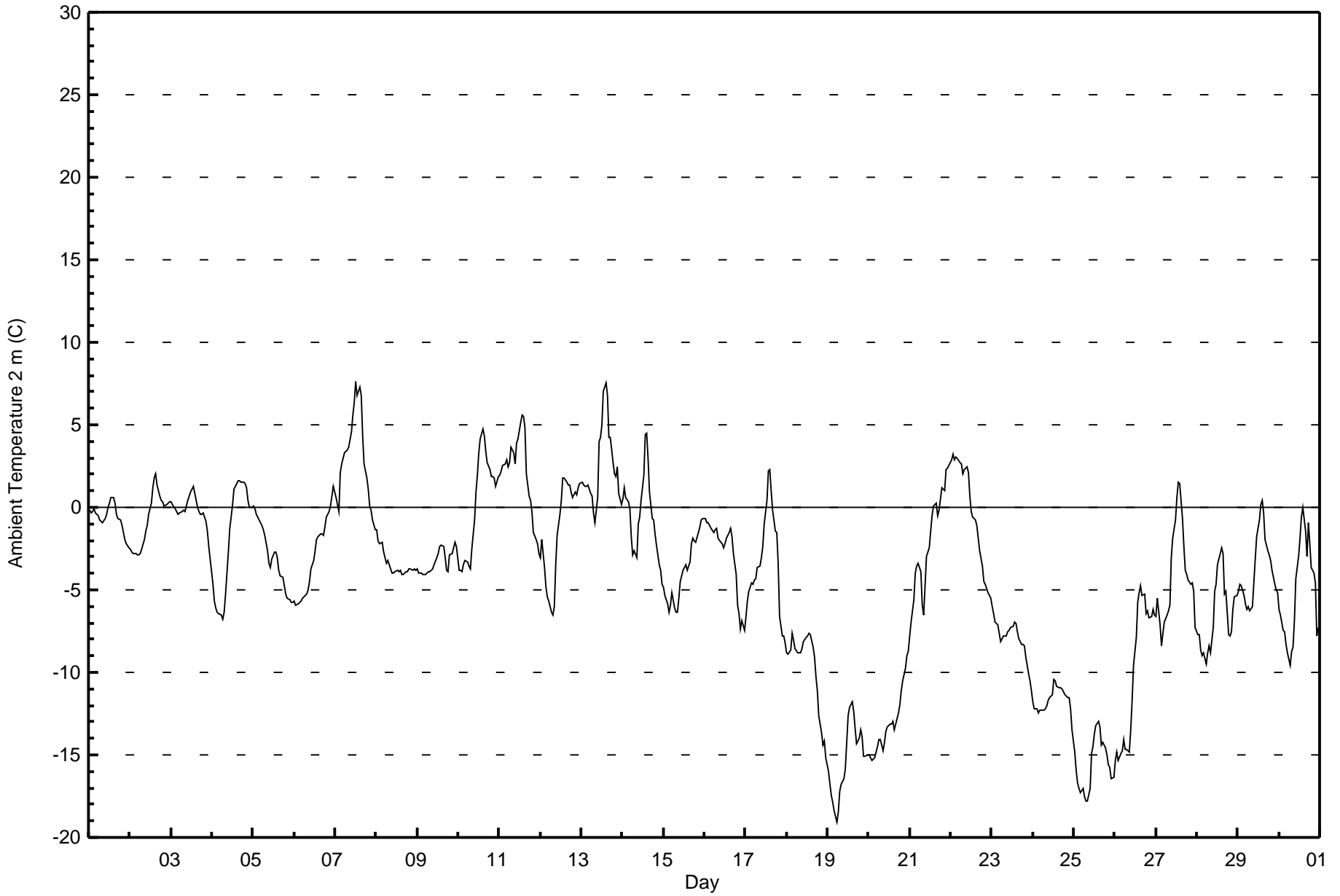








Maximum Value: 7.6 C on Nov 7 13:00		Maximum Daily Average: 3.0 C on Nov 7		Hours in Service: 720																							
Minimum Value: -19.1 C on Nov 19 06:00		Minimum Daily Average: -15.6 C on Nov 25		Hours of Data: 720																							
Maximum Diurnal Average: -1.6 C at hour 15		Minimum Diurnal Average: -5.6 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: -4.19 C		Percentiles: P ₁ = -17.5 P ₁₀ = -13.1 Q ₁ = -7.3 Median = -3.4 Q ₃ = -0.2 P ₉₀ = 1.9 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-Nov	-0.2	-0.3	-0.2	-0.1	-0.3	-0.5	-0.8	-0.8	-0.9	-0.7	-0.5	0.0	0.3	0.6	0.6	0.2	-0.4	-0.7	-0.8	-1.1	-1.5	-1.9	-2.2	-2.4	-0.6	0.6	
2-Nov	-2.5	-2.7	-2.8	-2.8	-2.8	-2.9	-2.8	-2.6	-2.0	-1.5	-1.1	-0.4	0.2	1.1	1.8	2.0	1.4	0.7	0.4	0.3	0.1	0.2	0.2	0.3	-0.8	2.0	
3-Nov	0.3	0.2	-0.1	-0.3	-0.4	-0.3	-0.3	-0.2	-0.2	0.1	0.4	0.9	1.1	1.3	0.8	0.0	-0.3	-0.4	-0.5	-0.4	-0.8	-1.4	-2.4	-3.1	-0.3	1.3	
4-Nov	-4.7	-5.7	-6.1	-6.4	-6.4	-6.6	-6.8	-6.3	-5.3	-2.7	-1.3	-0.6	0.2	1.1	1.4	1.6	1.6	1.5	1.5	1.4	1.2	0.4	0.0	0.0	-2.0	1.6	
5-Nov	0.1	-0.1	-0.4	-0.8	-0.9	-1.1	-1.4	-1.7	-2.6	-3.4	-3.6	-3.1	-2.7	-2.7	-3.0	-3.8	-4.1	-4.2	-4.7	-5.2	-5.5	-5.6	-5.8	-5.7	-3.0	0.1	
6-Nov	-5.7	-5.9	-5.8	-5.7	-5.7	-5.5	-5.4	-5.3	-5.0	-4.5	-3.7	-3.2	-2.6	-1.9	-1.8	-1.6	-1.6	-1.7	-1.2	-0.6	-0.2	0.1	0.7	1.3	-3.0	1.3	
7-Nov	0.6	0.2	-0.2	2.1	2.6	3.3	3.3	3.5	3.7	4.5	5.6	6.4	7.6	6.8	7.3	6.8	4.3	2.6	1.8	1.1	0.1	-0.2	-0.8	-1.4	3.0	7.6	
8-Nov	-1.3	-2.1	-2.2	-2.1	-2.7	-3.0	-3.4	-3.2	-3.7	-4.0	-4.0	-3.9	-3.8	-3.9	-3.8	-4.1	-4.0	-3.9	-3.9	-3.8	-3.7	-3.8	-3.8	-3.8	-3.4	-1.3	
9-Nov	-3.8	-4.0	-4.0	-4.0	-4.1	-4.1	-3.9	-3.9	-3.8	-3.7	-3.5	-3.1	-2.8	-2.4	-2.3	-2.4	-3.0	-3.8	-3.9	-2.9	-2.8	-2.5	-2.1	-2.4	-3.3	-2.1	
10-Nov	-3.8	-3.8	-3.9	-3.5	-3.2	-3.3	-3.5	-3.7	-2.6	-0.7	1.0	1.9	3.3	4.1	4.7	4.3	3.4	2.7	2.3	1.9	1.9	1.8	1.3	1.8	0.2	4.7	
11-Nov	2.0	2.2	2.5	2.6	2.9	2.4	2.8	3.7	3.3	2.6	3.9	4.2	5.2	5.6	5.6	4.8	2.0	0.7	0.5	-0.3	-1.5	-2.0	-2.2	-2.8	2.1	5.6	
12-Nov	-3.1	-1.9	-3.7	-4.8	-5.4	-5.7	-6.4	-6.5	-6.0	-3.5	-1.7	-0.4	0.5	1.8	1.7	1.5	1.4	1.4	0.9	0.6	0.9	0.8	1.2	1.5	-1.5	1.8	
13-Nov	1.5	1.4	1.3	1.3	1.4	0.8	0.7	-0.3	-0.9	0.6	4.0	4.3	5.0	7.0	7.5	6.8	4.2	4.3	2.7	2.0	1.8	2.4	0.9	0.2	2.5	7.5	
14-Nov	0.5	1.2	0.6	0.3	-0.1	-1.8	-2.9	-2.6	-3.1	-1.0	-0.6	0.5	1.9	4.4	4.5	3.0	0.9	-0.6	-0.7	-1.6	-2.3	-3.5	-3.8	-4.7	-0.5	4.5	
15-Nov	-4.9	-5.4	-5.8	-6.4	-5.9	-5.1	-6.1	-6.4	-6.3	-5.5	-4.5	-3.8	-3.6	-3.5	-3.8	-3.3	-2.2	-1.9	-2.0	-2.1	-1.5	-1.2	-0.7	-0.7	-3.9	-0.7	
16-Nov	-0.7	-0.9	-1.0	-1.1	-1.3	-1.5	-1.4	-1.2	-1.9	-2.2	-2.2	-2.4	-2.2	-1.9	-1.5	-1.3	-1.8	-2.8	-4.1	-6.0	-6.5	-7.4	-6.8	-7.4	-2.8	-0.7	
17-Nov	-6.6	-5.6	-5.1	-4.6	-4.7	-4.4	-4.4	-3.7	-3.5	-3.1	-2.4	-1.0	0.4	2.2	2.3	1.0	-0.2	-1.4	-1.5	-3.4	-6.6	-7.8	-7.8	-8.3	-3.3	2.3	
18-Nov	-8.8	-8.9	-8.6	-7.6	-8.0	-8.6	-8.8	-8.8	-8.8	-8.6	-8.1	-7.9	-7.8	-7.6	-7.7	-8.4	-9.1	-10.3	-11.1	-12.6	-13.6	-14.4	-14.2	-15.1	-9.7	-7.6	
19-Nov	-16.0	-16.8	-17.4	-17.9	-18.4	-19.1	-18.4	-17.2	-16.8	-16.4	-15.9	-14.3	-12.6	-12.1	-11.7	-12.3	-13.4	-14.3	-14.0	-13.5	-13.9	-15.1	-15.0	-15.0	-15.3	-11.7	
20-Nov	-15.0	-15.2	-15.3	-15.2	-14.8	-14.5	-14.1	-14.1	-14.7	-14.3	-13.5	-13.3	-13.1	-13.1	-13.0	-13.5	-13.2	-12.5	-12.0	-11.1	-10.5	-9.7	-8.9	-8.8	-13.1	-8.8	
21-Nov	-7.8	-6.9	-5.6	-4.0	-3.5	-3.4	-3.9	-5.9	-6.6	-4.7	-3.0	-2.4	-1.5	-0.5	0.1	0.2	-0.5	-0.2	0.5	1.2	1.0	2.3	2.4	2.5	-2.1	2.5	
22-Nov	2.9	3.2	2.8	3.1	3.0	2.7	2.6	2.0	2.3	2.4	2.1	0.7	-0.2	-0.6	-0.7	-1.1	-1.9	-2.7	-3.6	-4.5	-4.7	-4.9	-5.2	-5.5	-0.2	3.2	
23-Nov	-6.1	-6.4	-6.9	-7.1	-7.6	-8.1	-7.9	-7.8	-7.8	-7.6	-7.5	-7.3	-7.2	-7.0	-7.1	-7.5	-8.0	-8.3	-8.3	-8.4	-9.0	-10.1	-10.5	-11.1	-7.9	-6.1	
24-Nov	-11.8	-12.2	-12.2	-12.4	-12.3	-12.3	-12.2	-12.0	-11.7	-11.5	-11.3	-10.4	-10.5	-10.8	-10.9	-10.9	-11.0	-11.2	-11.3	-11.3	-11.5	-11.5	-12.2	-13.5	-11.7	-10.4	
25-Nov	-14.8	-15.9	-16.7	-17.0	-17.3	-17.0	-17.5	-17.8	-17.8	-17.0	-14.9	-14.5	-13.7	-13.3	-13.0	-13.3	-14.4	-14.2	-14.6	-15.0	-15.6	-15.7	-16.5	-16.3	-15.6	-13.0	
26-Nov	-15.4	-14.9	-15.3	-15.0	-14.8	-14.0	-14.6	-14.7	-14.8	-13.4	-11.7	-9.6	-7.9	-5.8	-5.1	-4.8	-5.4	-5.2	-6.4	-6.3	-6.7	-6.6	-6.2	-6.6	-10.0	-4.8	
27-Nov	-6.6	-5.5	-7.1	-8.4	-7.7	-6.9	-6.5	-6.3	-5.9	-3.1	-1.9	-0.8	0.6	1.5	1.4	-0.6	-2.3	-3.8	-4.0	-4.4	-4.6	-4.6	-5.1	-7.3	-4.2	1.5	
28-Nov	-7.8	-7.8	-8.7	-9.0	-8.8	-9.5	-8.9	-8.4	-8.8	-7.3	-5.1	-4.7	-3.5	-3.1	-2.5	-2.8	-5.2	-5.1	-7.7	-7.8	-7.6	-6.2	-5.4	-5.3	-6.5	-2.5	
29-Nov	-5.1	-4.6	-4.8	-5.3	-5.8	-6.2	-6.0	-6.3	-6.0	-4.5	-3.1	-1.8	-0.7	0.2	0.4	-0.4	-2.0	-2.6	-2.8	-3.2	-3.8	-4.7	-5.0	-5.2	-3.7	0.4	
30-Nov	-6.2	-6.5	-7.5	-7.5	-8.3	-8.8	-9.6	-8.7	-8.5	-6.9	-4.4	-3.0	-1.9	-0.6	0.0	-1.5	-3.0	-0.9	-2.2	-3.6	-4.0	-4.6	-7.8	-7.3	-5.1	0.0	
		-5.0	-5.1	-5.4	-5.3	-5.4	-5.5	-5.6	-5.6	-5.6	-4.7	-3.8	-3.1	-2.4	-1.8	-1.6	-2.0	-2.9	-3.3	-3.7	-4.0	-4.4	-4.6	-4.8	-5.1	Diurnal Average	
		2.9	3.2	2.8	3.1	3.0	3.3	3.3	3.7	3.7	4.5	5.6	6.4	7.6	7.0	7.5	6.8	4.3	4.3	2.7	2.0	1.9	2.4	2.4	2.5	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 2 m (AT2m) - C
Mannix - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	553	76.81	76.81
0 - 10	167	23.19	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

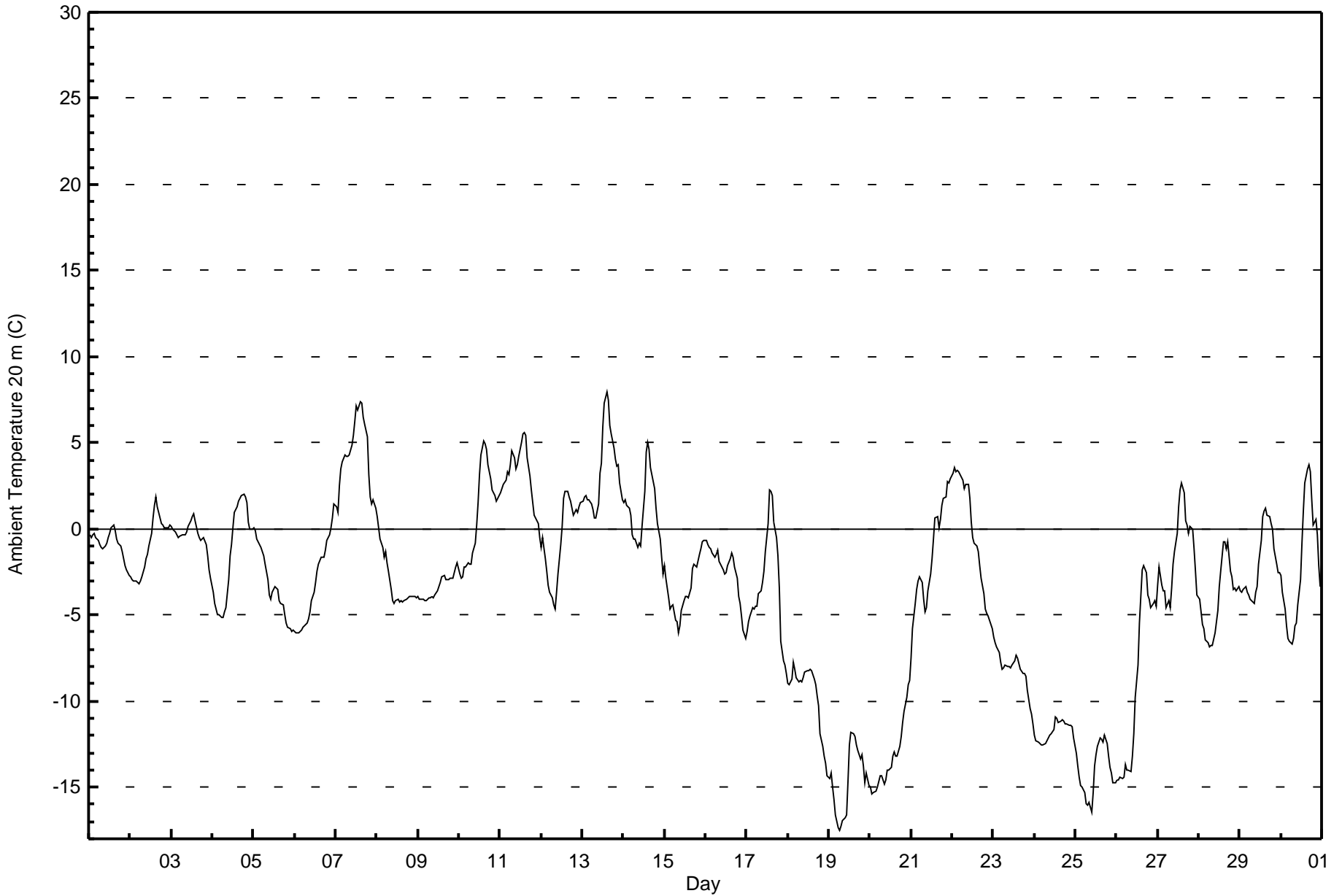
Mannix - November 2015

Maximum Value: 7.9 C on Nov 13 15:00		Maximum Daily Average: 4.2 C on Nov 7		Hours in Service: 720																							
Minimum Value: -17.5 C on Nov 19 07:00		Minimum Daily Average: -14.6 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.4 C at hour 15		Minimum Diurnal Average: -4.9 C at hour 9		Hours of Missing Data: 0																							
Monthly Average: -3.53 C		Percentiles: P ₁ = -16.6 P ₁₀ = -12.5 Q ₁ = -5.9 Median = -2.8 Q ₃ = 0.2 P ₉₀ = 2.6 P ₉₉ = 6.7		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	-0.3	-0.5	-0.3	-0.3	-0.5	-0.7	-0.9	-1.0	-1.2	-1.0	-0.9	-0.5	-0.2	0.1	0.2	-0.1	-0.6	-0.9	-1.0	-1.3	-1.7	-2.1	-2.4	-2.7	-0.9	0.2	
2-Nov	-2.8	-3.0	-3.1	-3.0	-3.1	-3.2	-3.0	-2.8	-2.2	-1.7	-1.5	-1.0	-0.2	0.6	1.3	1.8	1.3	0.6	0.3	0.2	0.1	0.1	0.1	0.2	-1.0	1.8	
3-Nov	0.2	0.0	-0.2	-0.3	-0.5	-0.4	-0.3	-0.3	-0.4	-0.2	0.1	0.5	0.7	0.9	0.4	-0.3	-0.5	-0.7	-0.6	-0.5	-0.9	-1.6	-2.3	-2.9	-0.4	0.9	
4-Nov	-3.7	-4.3	-4.7	-5.0	-5.0	-5.2	-5.1	-4.8	-4.6	-2.9	-1.6	-0.9	0.1	1.0	1.3	1.6	1.8	1.9	2.0	1.9	1.6	0.4	0.0	0.0	-1.4	2.0	
5-Nov	0.0	-0.1	-0.6	-0.9	-1.1	-1.3	-1.6	-2.0	-3.0	-3.9	-4.1	-3.7	-3.4	-3.4	-3.6	-4.2	-4.4	-4.4	-5.0	-5.4	-5.7	-5.8	-6.0	-5.9	-3.3	0.0	
6-Nov	-5.9	-6.1	-6.0	-5.9	-5.8	-5.7	-5.5	-5.4	-5.2	-4.8	-4.2	-3.7	-3.1	-2.5	-2.1	-1.7	-1.6	-1.7	-1.3	-0.7	-0.3	0.0	0.6	1.5	-3.2	1.5	
7-Nov	1.2	0.9	2.5	3.5	3.9	4.3	4.2	4.2	4.3	4.8	5.5	6.3	7.2	6.9	7.4	7.3	6.5	6.1	5.3	3.2	1.8	1.4	1.7	1.2	4.2	7.4	
8-Nov	0.7	0.0	-0.6	-1.1	-1.6	-1.3	-1.9	-2.5	-3.6	-4.2	-4.3	-4.2	-4.1	-4.2	-4.1	-4.3	-4.2	-4.1	-4.0	-3.9	-3.9	-3.9	-3.9	-4.0	-3.0	0.7	
9-Nov	-3.9	-4.1	-4.1	-4.1	-4.2	-4.2	-4.0	-4.0	-3.9	-4.0	-3.9	-3.6	-3.4	-3.1	-2.8	-2.7	-3.0	-3.0	-3.0	-2.9	-2.9	-2.6	-2.2	-2.0	-3.4	-2.0	
10-Nov	-2.6	-2.9	-2.8	-2.2	-2.3	-2.0	-2.0	-2.1	-1.4	-0.8	0.2	1.5	3.2	4.3	5.1	5.0	4.6	3.7	2.9	2.3	2.1	1.9	1.6	1.9	0.8	5.1	
11-Nov	2.1	2.3	2.6	2.9	3.3	3.2	3.7	4.5	4.2	3.5	3.7	4.2	5.0	5.5	5.6	5.4	4.2	3.1	2.3	1.6	0.8	0.5	0.3	-0.5	3.1	5.6	
12-Nov	-1.1	-0.5	-1.7	-2.5	-3.2	-3.7	-4.0	-4.4	-4.6	-3.7	-2.7	-0.9	0.1	1.8	2.1	2.1	1.9	1.6	1.2	0.8	1.1	1.0	1.3	1.5	-0.7	2.1	
13-Nov	1.6	1.9	1.9	1.7	1.7	1.4	1.1	0.7	0.6	1.5	3.3	3.8	5.9	7.3	7.9	7.5	6.0	5.5	4.7	4.1	3.6	3.7	2.7	1.7	3.4	7.9	
14-Nov	1.6	1.7	1.3	1.2	0.8	-0.3	-0.6	-0.6	-1.0	-0.8	-1.0	0.1	2.2	4.5	5.0	4.6	3.6	2.8	2.3	1.2	0.3	-0.6	-1.6	-2.6	1.0	5.0	
15-Nov	-2.1	-2.8	-4.0	-4.6	-4.5	-4.4	-5.3	-5.4	-6.1	-5.6	-4.7	-4.2	-3.9	-3.9	-4.0	-3.4	-2.3	-2.0	-2.2	-2.2	-1.5	-1.2	-0.7	-0.7	-3.4	-0.7	
16-Nov	-0.7	-0.9	-1.0	-1.2	-1.4	-1.7	-1.5	-1.3	-1.9	-2.2	-2.4	-2.7	-2.6	-2.2	-1.7	-1.4	-1.7	-2.2	-2.9	-3.9	-4.3	-5.1	-5.9	-6.3	-2.5	-0.7	
17-Nov	-6.0	-5.4	-5.0	-4.6	-4.7	-4.5	-4.5	-3.7	-3.6	-3.1	-2.5	-1.3	0.3	2.3	2.2	1.9	0.4	-0.5	-1.6	-3.5	-6.5	-7.7	-8.0	-8.4	-3.2	2.3	
18-Nov	-8.9	-9.0	-8.7	-7.7	-8.1	-8.7	-8.9	-8.8	-8.9	-8.6	-8.3	-8.2	-8.2	-8.1	-8.3	-8.7	-9.0	-9.7	-10.3	-11.9	-12.6	-13.2	-13.6	-14.3	-9.6	-7.7	
19-Nov	-14.5	-14.1	-15.0	-15.7	-16.6	-17.4	-17.5	-17.3	-17.0	-16.8	-16.6	-14.7	-12.6	-11.8	-11.9	-12.1	-12.5	-12.9	-13.4	-13.1	-13.7	-14.8	-14.2	-14.9	-14.6	-11.8	
20-Nov	-15.0	-15.4	-15.3	-15.2	-15.0	-14.7	-14.3	-14.3	-14.8	-14.6	-14.0	-14.0	-13.9	-13.2	-13.0	-13.2	-13.2	-12.7	-12.1	-11.3	-10.6	-9.8	-9.0	-8.8	-13.2	-8.8	
21-Nov	-7.5	-5.8	-4.3	-3.5	-3.0	-2.8	-3.1	-4.1	-4.8	-4.6	-3.6	-2.7	-1.7	-0.6	0.6	0.7	0.1	0.5	1.4	1.8	1.9	2.8	2.7	2.9	-1.5	2.9	
22-Nov	3.3	3.6	3.3	3.4	3.3	3.0	2.9	2.3	2.6	2.6	1.8	0.4	-0.5	-0.8	-1.0	-1.3	-2.1	-2.8	-3.8	-4.7	-4.9	-5.1	-5.3	-5.8	-0.2	3.6	
23-Nov	-6.3	-6.6	-6.9	-7.2	-7.7	-8.1	-8.1	-7.9	-8.0	-8.0	-8.1	-7.9	-7.7	-7.4	-7.5	-7.8	-8.1	-8.4	-8.4	-8.6	-9.3	-10.4	-10.7	-11.3	-8.2	-6.3	
24-Nov	-12.0	-12.3	-12.4	-12.5	-12.5	-12.6	-12.5	-12.3	-12.2	-12.0	-11.9	-11.7	-10.9	-11.0	-11.3	-11.2	-11.0	-11.1	-11.3	-11.3	-11.4	-11.4	-11.5	-12.2	-11.8	-10.9	
25-Nov	-13.0	-13.8	-14.5	-14.9	-15.0	-15.3	-16.0	-16.1	-15.9	-16.5	-15.4	-13.8	-13.1	-12.6	-12.1	-12.3	-12.4	-12.0	-12.5	-13.2	-13.9	-14.2	-14.8	-14.8	-14.1	-12.0	
26-Nov	-14.6	-14.6	-14.4	-14.5	-14.4	-13.7	-14.0	-14.0	-14.1	-13.2	-11.9	-9.8	-7.9	-5.5	-3.9	-2.4	-2.2	-2.6	-3.8	-4.1	-4.5	-4.3	-4.2	-4.5	-8.9	-2.2	
27-Nov	-3.3	-2.2	-3.3	-3.6	-3.6	-4.6	-4.1	-4.6	-3.4	-2.1	-1.3	-0.2	1.2	2.2	2.6	2.1	0.5	0.2	-0.3	0.1	0.0	-1.2	-2.5	-3.9	-1.5	2.6	
28-Nov	-4.1	-4.8	-5.6	-5.8	-6.4	-6.6	-6.8	-6.7	-6.7	-6.0	-5.4	-4.8	-3.4	-2.5	-0.8	-0.7	-1.2	-0.7	-2.5	-2.8	-3.5	-3.4	-3.6	-3.4	-4.1	-0.7	
29-Nov	-3.6	-3.7	-3.5	-3.4	-3.7	-3.9	-4.1	-4.2	-4.3	-3.6	-3.4	-2.0	-0.6	0.7	1.0	1.2	0.8	0.7	0.3	0.0	-1.2	-2.0	-2.5	-2.6	-2.0	1.2	
30-Nov	-2.7	-3.7	-4.7	-5.6	-6.4	-6.5	-6.7	-6.4	-5.7	-5.4	-4.4	-3.0	-0.9	1.0	2.7	3.5	3.7	3.3	1.7	0.2	0.5	-0.4	-2.1	-3.4	-2.1	3.7	
		-4.1	-4.2	-4.4	-4.4	-4.6	-4.7	-4.8	-4.8	-4.9	-4.6	-4.1	-3.4	-2.5	-1.8	-1.4	-1.4	-1.8	-2.1	-2.5	-2.9	-3.3	-3.6	-3.9	-4.2	Diurnal Average	
		3.3	3.6	3.3	3.5	3.9	4.3	4.2	4.5	4.3	4.8	5.5	6.3	7.2	7.3	7.9	7.5	6.5	6.1	5.3	4.1	3.6	3.7	2.7	2.9	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Mannix - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 20 m (AT20m) - C
Mannix - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	524	72.78	72.78
0 - 10	196	27.22	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

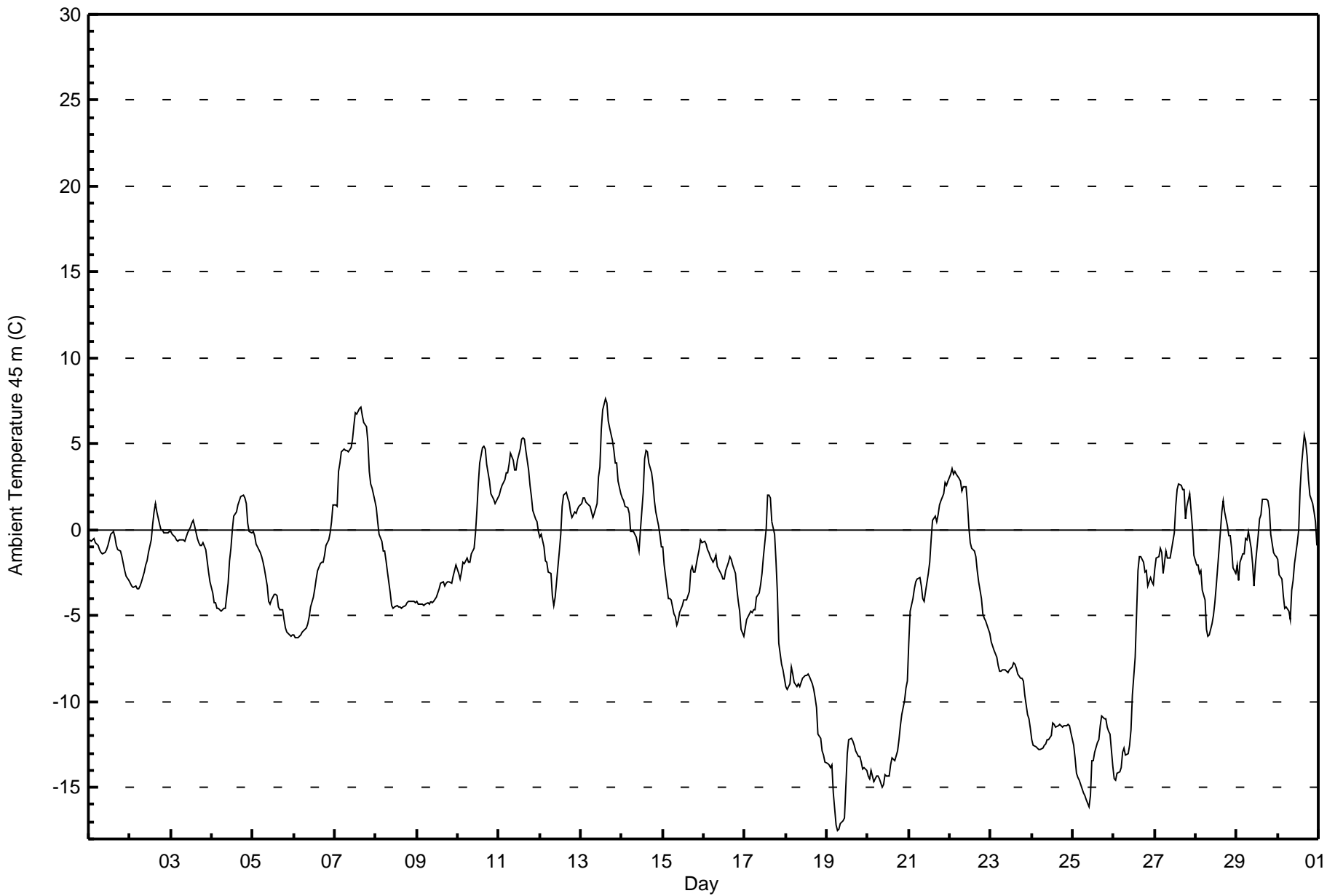
Total Number of Hours: 720



Summary of Hour Averages

Mannix - November 2015

Maximum Value: 7.6 C on Nov 13 15:00		Maximum Daily Average: 4.6 C on Nov 7		Hours in Service: 720																						
Minimum Value: -17.5 C on Nov 19 07:00		Minimum Daily Average: -14.4 C on Nov 19		Hours of Data: 720																						
Maximum Diurnal Average: -1.4 C at hour 16		Minimum Diurnal Average: -4.6 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -3.30 C		Percentiles: P ₁ = -15.8 P ₁₀ = -12.6 Q ₁ = -5.7 Median = -2.3 Q ₃ = 0.4 P ₉₀ = 2.7 P ₉₉ = 6.7		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	-0.6	-0.7	-0.6	-0.5	-0.8	-1.0	-1.2	-1.3	-1.4	-1.3	-1.2	-0.9	-0.6	-0.2	-0.1	-0.4	-0.9	-1.2	-1.3	-1.6	-2.0	-2.4	-2.7	-3.0	-1.2	-0.1
2-Nov	-3.1	-3.3	-3.3	-3.3	-3.4	-3.5	-3.3	-3.1	-2.5	-2.0	-1.8	-1.3	-0.6	0.3	1.0	1.6	1.1	0.3	0.0	0.0	-0.2	-0.2	-0.2	-0.1	-1.3	1.6
3-Nov	-0.1	-0.2	-0.4	-0.6	-0.7	-0.6	-0.6	-0.6	-0.6	-0.5	-0.2	0.2	0.4	0.6	0.2	-0.5	-0.8	-0.9	-0.9	-0.8	-1.2	-1.8	-2.5	-3.0	-0.7	0.6
4-Nov	-3.7	-4.2	-4.3	-4.6	-4.6	-4.8	-4.7	-4.5	-4.6	-3.1	-1.8	-1.1	0.0	0.8	1.1	1.4	1.7	1.9	2.0	1.8	1.5	0.4	-0.1	-0.2	-1.4	2.0
5-Nov	-0.1	-0.4	-0.8	-1.2	-1.3	-1.5	-1.9	-2.3	-3.3	-4.2	-4.4	-4.1	-3.8	-3.8	-3.9	-4.5	-4.7	-4.7	-5.2	-5.7	-6.0	-6.1	-6.2	-6.2	-3.6	-0.1
6-Nov	-6.2	-6.3	-6.3	-6.2	-6.1	-5.9	-5.8	-5.7	-5.5	-5.1	-4.5	-4.0	-3.5	-2.8	-2.4	-1.9	-1.9	-1.9	-1.5	-0.9	-0.6	-0.2	0.5	1.4	-3.5	1.4
7-Nov	1.5	1.3	3.4	3.9	4.5	4.7	4.6	4.6	4.5	4.8	5.3	6.1	6.8	6.7	7.1	7.2	6.6	6.2	6.0	5.1	3.4	2.6	2.4	1.7	4.6	7.2
8-Nov	1.3	0.5	-0.3	-0.7	-1.2	-1.2	-1.8	-2.5	-3.7	-4.4	-4.6	-4.5	-4.4	-4.5	-4.5	-4.6	-4.5	-4.4	-4.3	-4.2	-4.1	-4.2	-4.2	-4.3	-3.1	1.3
9-Nov	-4.2	-4.3	-4.4	-4.4	-4.4	-4.3	-4.3	-4.3	-4.2	-4.2	-4.2	-3.9	-3.7	-3.4	-3.1	-3.0	-3.2	-3.1	-3.0	-3.1	-3.1	-2.7	-2.3	-2.1	-3.6	-2.1
10-Nov	-2.5	-2.8	-2.5	-1.9	-2.0	-1.6	-1.9	-1.9	-1.4	-1.1	-0.1	1.1	2.7	3.9	4.8	4.9	4.7	3.8	2.8	2.1	1.9	1.8	1.6	1.8	0.8	4.9
11-Nov	2.0	2.3	2.6	2.9	3.3	3.3	3.8	4.5	4.1	3.5	3.5	4.0	4.7	5.2	5.3	5.3	4.6	3.5	2.6	1.9	1.2	0.6	0.5	-0.1	3.1	5.3
12-Nov	-0.4	-0.2	-1.0	-1.8	-1.9	-2.4	-2.6	-3.8	-4.4	-3.9	-3.0	-1.3	-0.3	1.4	2.0	2.1	1.9	1.6	1.0	0.7	1.1	0.9	1.2	1.4	-0.5	2.1
13-Nov	1.5	1.9	1.8	1.6	1.5	1.4	1.0	0.7	1.0	1.5	3.1	3.7	5.8	7.0	7.6	7.4	6.3	5.9	5.2	4.6	3.9	3.9	2.9	2.1	3.5	7.6
14-Nov	1.8	1.7	1.4	1.3	1.0	-0.1	-0.1	-0.1	-0.4	-0.8	-1.2	-0.1	2.2	4.1	4.7	4.5	3.9	3.3	2.7	1.7	1.0	0.3	-0.3	-1.0	1.3	4.7
15-Nov	-1.0	-2.1	-3.4	-4.0	-4.0	-4.1	-4.9	-5.0	-5.6	-5.3	-4.8	-4.4	-4.1	-4.1	-4.1	-3.6	-2.4	-2.1	-2.4	-2.4	-1.6	-1.2	-0.6	-0.8	-3.2	-0.6
16-Nov	-0.7	-0.8	-1.2	-1.3	-1.6	-1.9	-1.7	-1.5	-2.1	-2.5	-2.6	-2.9	-2.8	-2.4	-1.9	-1.6	-1.8	-2.1	-2.6	-3.4	-4.2	-4.8	-5.8	-6.2	-2.5	-0.7
17-Nov	-5.7	-5.2	-5.1	-4.8	-4.9	-4.7	-4.7	-3.9	-3.7	-3.2	-2.6	-1.5	0.1	2.0	2.0	1.8	0.4	-0.3	-1.8	-3.7	-6.6	-7.8	-8.2	-8.6	-3.4	2.0
18-Nov	-9.2	-9.3	-9.0	-8.0	-8.4	-8.9	-9.1	-9.0	-9.1	-8.9	-8.6	-8.5	-8.5	-8.4	-8.6	-9.0	-9.3	-9.8	-10.4	-11.9	-12.1	-12.9	-13.1	-13.5	-9.7	-8.0
19-Nov	-13.6	-13.7	-13.8	-13.7	-15.3	-17.2	-17.5	-17.4	-17.1	-17.0	-16.7	-14.9	-13.0	-12.2	-12.2	-12.3	-12.6	-12.9	-13.2	-13.2	-13.5	-14.0	-13.8	-14.0	-14.4	-12.2
20-Nov	-14.3	-14.5	-14.0	-14.7	-14.5	-14.4	-14.4	-14.5	-15.0	-14.8	-14.3	-14.3	-14.3	-13.7	-13.3	-13.4	-13.4	-12.9	-12.2	-11.4	-10.7	-10.0	-9.2	-8.8	-13.2	-8.8
21-Nov	-6.6	-4.7	-4.0	-3.5	-3.1	-2.8	-2.8	-3.3	-4.0	-4.2	-3.6	-2.6	-1.9	-0.6	0.6	0.8	0.5	0.9	1.5	1.7	2.1	2.7	2.6	2.8	-1.3	2.8
22-Nov	3.2	3.5	3.3	3.4	3.3	3.0	2.8	2.3	2.5	2.5	1.6	0.1	-0.7	-1.1	-1.2	-1.5	-2.4	-3.1	-4.0	-4.9	-5.1	-5.3	-5.6	-6.0	-0.4	3.5
23-Nov	-6.5	-6.8	-7.1	-7.4	-7.9	-8.2	-8.2	-8.1	-8.2	-8.2	-8.3	-8.2	-8.0	-7.8	-7.8	-8.1	-8.4	-8.7	-8.7	-8.8	-9.6	-10.7	-11.0	-11.6	-8.4	-6.5
24-Nov	-12.2	-12.5	-12.6	-12.7	-12.8	-12.8	-12.7	-12.6	-12.4	-12.3	-12.2	-12.0	-11.2	-11.3	-11.5	-11.4	-11.3	-11.4	-11.5	-11.4	-11.4	-11.3	-11.4	-11.8	-12.0	-11.2
25-Nov	-12.6	-13.3	-14.2	-14.5	-14.5	-15.1	-15.3	-15.5	-15.7	-16.1	-15.5	-13.4	-13.4	-13.0	-12.4	-12.2	-11.4	-10.8	-11.0	-11.0	-11.5	-11.7	-11.9	-13.8	-13.3	-10.8
26-Nov	-14.5	-14.6	-14.2	-14.1	-13.9	-13.0	-12.7	-13.1	-13.0	-12.5	-11.7	-9.7	-7.4	-4.9	-2.3	-1.5	-1.5	-1.9	-2.4	-2.4	-3.3	-2.8	-3.0	-3.2	-8.1	-1.5
27-Nov	-2.3	-1.7	-1.5	-1.1	-1.3	-2.5	-1.3	-1.7	-1.6	-1.7	-1.1	-0.2	1.3	2.3	2.7	2.6	2.3	2.3	0.7	1.3	2.1	1.1	0.1	-1.4	0.0	2.7
28-Nov	-2.1	-2.0	-2.5	-2.4	-3.5	-4.1	-5.8	-6.2	-6.1	-5.5	-4.9	-4.3	-3.2	-2.2	-0.1	1.1	1.7	1.1	0.2	-0.4	-0.3	-1.1	-2.2	-2.6	-2.4	1.7
29-Nov	-2.0	-3.0	-1.9	-1.4	-1.4	-0.5	-0.6	-0.1	-1.1	-2.0	-3.3	-2.0	-0.4	0.7	0.9	1.7	1.7	1.8	1.7	1.2	-0.3	-1.3	-1.5	-1.6	-0.6	1.8
30-Nov	-1.7	-2.7	-2.9	-3.8	-4.6	-4.5	-4.7	-5.2	-3.5	-2.9	-2.0	-0.8	0.0	2.3	3.7	5.5	5.1	4.3	2.9	2.0	1.5	1.0	0.5	-0.9	-0.5	5.5
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 45 m (AT45m) - C
Mannix - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	526	73.06	73.06
0 - 10	194	26.94	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

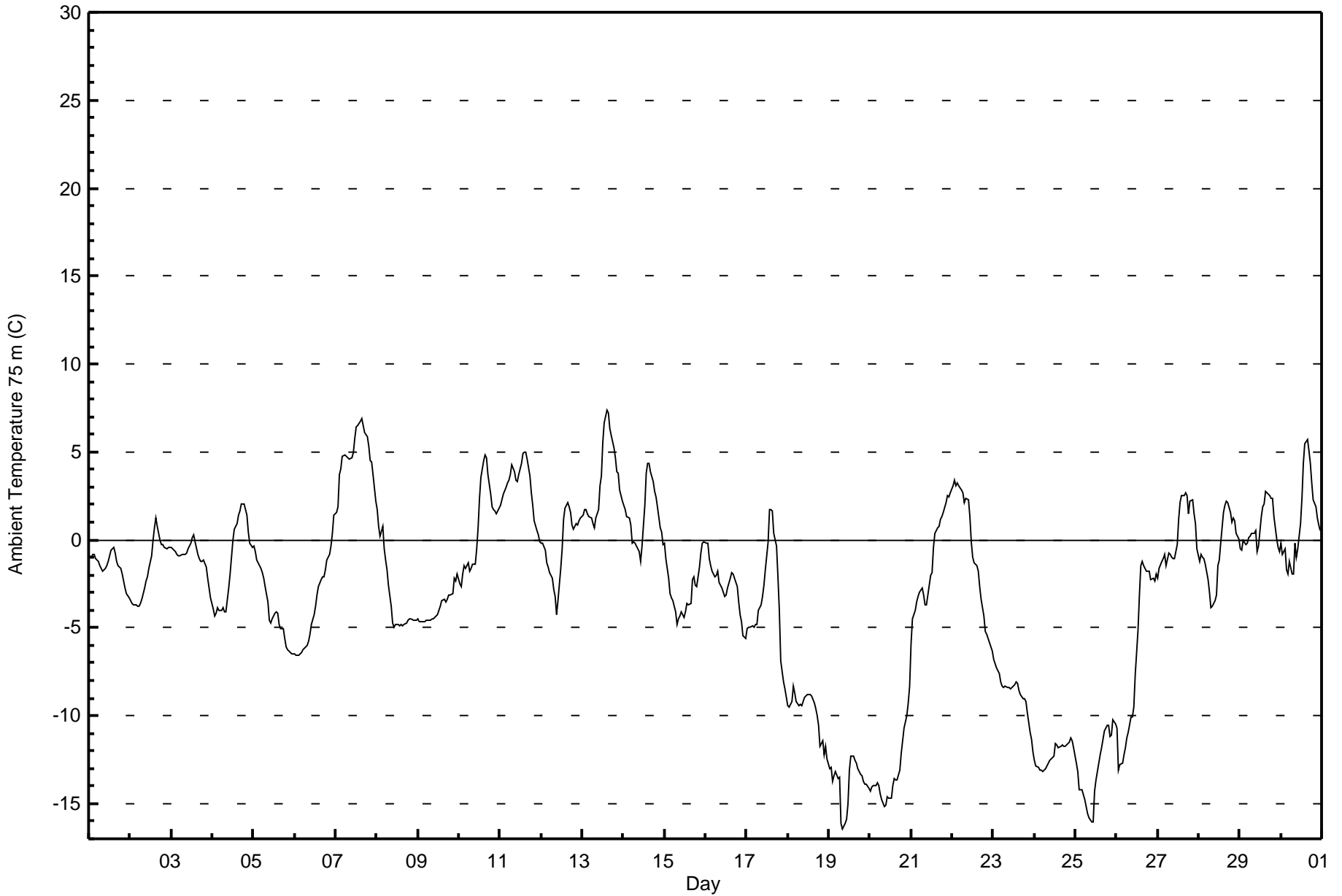
Total Number of Hours: 720



Summary of Hour Averages

Mannix - November 2015

Maximum Value: 7.3 C on Nov 13 15:00		Maximum Daily Average: 4.8 C on Nov 7		Hours in Service: 720																							
Minimum Value: -16.4 C on Nov 19 09:00		Minimum Daily Average: -13.8 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.5 C at hour 16		Minimum Diurnal Average: -4.3 C at hour 10		Hours of Missing Data: 0																							
Monthly Average: -3.12 C		Percentiles: P ₁ = -15.7 P ₁₀ = -12.3 Q ₁ = -5.5 Median = -1.9 Q ₃ = 0.7 P ₉₀ = 2.7 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-Nov	-0.9	-1.0	-0.9	-0.8	-1.1	-1.3	-1.5	-1.6	-1.8	-1.6	-1.5	-1.2	-0.9	-0.6	-0.4	-0.8	-1.3	-1.5	-1.6	-2.0	-2.3	-2.7	-3.1	-3.3	-1.5	-0.4	
2-Nov	-3.4	-3.6	-3.7	-3.7	-3.7	-3.8	-3.6	-3.4	-2.8	-2.4	-2.1	-1.6	-0.9	0.0	0.7	1.2	0.7	0.0	-0.3	-0.3	-0.5	-0.5	-0.5	-0.4	-1.6	1.2	
3-Nov	-0.4	-0.5	-0.7	-0.8	-0.9	-0.9	-0.8	-0.8	-0.9	-0.7	-0.5	-0.2	0.1	0.3	-0.1	-0.8	-1.1	-1.2	-1.2	-1.1	-1.5	-2.2	-2.8	-3.3	-1.0	0.3	
4-Nov	-3.9	-4.3	-4.2	-3.9	-4.1	-4.0	-3.9	-4.1	-4.1	-2.7	-2.0	-1.0	0.0	0.6	0.9	1.4	1.7	2.0	2.1	1.7	1.4	0.5	-0.2	-0.4	-1.3	2.1	
5-Nov	-0.3	-0.6	-1.1	-1.4	-1.6	-1.9	-2.2	-2.6	-3.6	-4.5	-4.7	-4.5	-4.1	-4.1	-4.2	-4.8	-5.0	-5.0	-5.6	-6.0	-6.3	-6.4	-6.5	-6.5	-3.9	-0.3	
6-Nov	-6.5	-6.6	-6.6	-6.5	-6.4	-6.3	-6.1	-6.0	-5.7	-5.4	-4.8	-4.3	-3.8	-3.1	-2.7	-2.3	-2.1	-2.1	-1.7	-1.2	-0.8	-0.4	0.4	1.4	-3.7	1.4	
7-Nov	1.6	1.9	3.7	4.0	4.7	4.9	4.8	4.7	4.6	4.7	5.0	5.7	6.4	6.5	6.7	6.9	6.5	6.1	5.8	5.3	4.5	4.5	3.7	2.2	4.8	6.9	
8-Nov	1.7	0.8	0.2	0.8	-0.5	-1.2	-1.7	-2.6	-3.8	-4.8	-4.9	-4.9	-4.8	-4.9	-4.8	-4.9	-4.9	-4.8	-4.6	-4.5	-4.5	-4.5	-4.6	-4.5	-3.2	1.7	
9-Nov	-4.5	-4.6	-4.7	-4.6	-4.7	-4.6	-4.6	-4.6	-4.5	-4.5	-4.4	-4.2	-4.0	-3.8	-3.5	-3.4	-3.6	-3.4	-3.1	-3.1	-3.0	-2.2	-2.4	-1.9	-3.8	-1.9	
10-Nov	-2.5	-2.7	-1.9	-1.5	-1.6	-1.3	-1.8	-1.6	-1.4	-1.4	-0.5	0.7	2.3	3.5	4.5	4.8	4.7	3.7	2.6	1.9	1.7	1.6	1.5	1.8	0.7	4.8	
11-Nov	2.0	2.3	2.6	3.0	3.3	3.4	3.7	4.3	3.9	3.4	3.3	3.8	4.4	4.9	5.0	5.0	4.6	3.6	2.7	2.0	1.1	0.5	0.3	-0.1	3.0	5.0	
12-Nov	-0.2	-0.2	-0.6	-1.3	-1.6	-1.9	-2.2	-2.8	-3.3	-4.3	-3.4	-1.6	-0.5	1.2	1.8	2.1	1.9	1.5	0.9	0.6	0.9	0.8	1.0	1.3	-0.4	2.1	
13-Nov	1.4	1.8	1.7	1.4	1.3	1.2	0.9	0.7	1.2	1.7	3.1	3.6	5.6	6.6	7.3	7.2	6.3	5.9	5.2	4.7	3.9	3.8	2.9	2.2	3.4	7.3	
14-Nov	1.9	1.7	1.3	1.2	0.8	-0.2	-0.1	-0.2	-0.5	-0.7	-1.2	-0.3	2.0	3.8	4.3	4.3	3.8	3.3	2.7	2.4	1.8	0.7	0.4	-0.2	1.4	4.3	
15-Nov	-0.2	-1.1	-2.2	-3.0	-3.3	-3.5	-4.1	-4.8	-4.5	-4.4	-4.1	-4.4	-4.1	-3.6	-3.7	-3.7	-2.3	-2.1	-2.6	-2.6	-1.5	-0.8	-0.2	-0.1	-2.8	-0.1	
16-Nov	-0.2	-0.2	-1.1	-1.4	-1.8	-2.1	-2.0	-1.8	-2.4	-2.7	-2.9	-3.2	-3.2	-2.7	-2.2	-1.9	-2.0	-2.2	-2.7	-3.5	-4.2	-4.6	-5.4	-5.6	-2.6	-0.2	
17-Nov	-5.1	-5.0	-4.9	-4.9	-5.0	-4.8	-4.8	-4.0	-3.7	-3.3	-2.6	-1.7	-0.1	1.7	1.7	1.6	0.4	-0.3	-2.1	-4.0	-6.9	-8.1	-8.5	-8.9	-3.5	1.7	
18-Nov	-9.4	-9.5	-9.2	-8.3	-8.7	-9.2	-9.4	-9.3	-9.5	-9.2	-9.0	-8.8	-8.8	-8.8	-8.9	-9.3	-9.6	-10.0	-10.6	-11.7	-11.4	-12.2	-11.8	-12.5	-9.8	-8.3	
19-Nov	-13.0	-13.0	-13.7	-13.4	-13.2	-13.6	-13.5	-16.2	-16.4	-16.2	-15.9	-15.0	-13.1	-12.3	-12.3	-12.5	-12.7	-13.0	-13.3	-13.4	-13.7	-13.9	-13.9	-14.1	-13.8	-12.3	
20-Nov	-14.3	-14.1	-14.0	-14.0	-13.8	-14.0	-14.5	-14.8	-15.2	-15.1	-14.6	-14.7	-14.7	-14.0	-13.6	-13.6	-13.7	-13.1	-12.1	-11.4	-10.7	-10.0	-9.2	-8.3	-13.2	-8.3	
21-Nov	-5.9	-4.5	-4.0	-3.5	-3.2	-3.0	-2.7	-3.1	-3.7	-3.7	-3.1	-2.1	-1.9	-0.4	0.4	0.7	0.8	1.2	1.4	1.5	2.1	2.5	2.4	2.7	-1.2	2.7	
22-Nov	3.1	3.4	3.1	3.2	3.1	2.8	2.7	2.1	2.4	2.3	1.3	-0.1	-1.0	-1.3	-1.5	-1.8	-2.7	-3.4	-4.3	-5.2	-5.4	-5.6	-5.9	-6.3	-0.6	3.4	
23-Nov	-6.8	-7.1	-7.3	-7.6	-8.1	-8.3	-8.4	-8.3	-8.4	-8.4	-8.5	-8.4	-8.2	-8.1	-8.2	-8.5	-8.8	-9.1	-9.0	-9.2	-9.9	-11.0	-11.4	-12.0	-8.7	-6.8	
24-Nov	-12.5	-12.9	-12.9	-13.1	-13.1	-13.2	-13.0	-12.9	-12.7	-12.5	-12.5	-12.3	-11.5	-11.6	-11.8	-11.7	-11.6	-11.7	-11.7	-11.6	-11.5	-11.3	-11.4	-11.8	-12.2	-11.3	-11.3
25-Nov	-12.7	-13.2	-14.2	-14.2	-14.3	-14.8	-15.1	-15.6	-15.8	-16.1	-16.0	-14.3	-13.7	-13.1	-12.2	-11.8	-11.3	-10.8	-10.5	-10.6	-11.2	-11.1	-10.2	-10.5	-13.1	-10.2	
26-Nov	-10.7	-13.1	-12.8	-12.7	-12.2	-11.8	-11.3	-10.9	-10.1	-10.0	-9.5	-7.6	-5.1	-3.1	-1.5	-1.2	-1.4	-1.8	-1.8	-1.8	-2.3	-2.2	-2.3	-1.9	-6.6	-1.2	
27-Nov	-2.2	-1.6	-1.2	-1.0	-0.8	-1.5	-0.8	-0.8	-1.0	-1.1	-1.1	-0.3	1.2	2.1	2.5	2.5	2.7	2.5	1.4	2.2	2.3	1.5	0.9	-0.5	0.3	2.7	
28-Nov	-1.2	-0.8	-1.0	-1.1	-1.4	-2.3	-3.0	-3.9	-3.8	-3.5	-3.2	-1.5	-1.1	-0.2	1.5	2.0	2.2	2.1	1.6	1.0	1.3	1.1	0.4	0.0	-0.6	2.2	
29-Nov	-0.5	-0.6	0.0	-0.2	-0.2	0.1	0.2	0.4	0.4	0.5	-0.6	-0.4	1.3	1.9	2.0	2.7	2.6	2.5	2.4	2.3	1.3	0.0	-0.4	-0.7	0.7	2.7	
30-Nov	-0.2	-0.8	-0.5	-1.7	-1.9	-1.3	-2.0	-2.0	-0.2	-1.0	-0.5	0.9	2.4	4.4	5.5	5.7	5.1	4.3	3.2	2.3	1.9	1.3	0.8	0.6	1.1	5.7	
		-3.5	-3.7	-3.7	-3.7	-3.8	-3.9	-4.0	-4.2	-4.2	-4.3	-4.1	-3.5	-2.7	-1.9	-1.6	-1.5	-1.7	-1.9	-2.2	-2.5	-2.8	-3.0	-3.2	-3.4	Diurnal Average	
		3.1	3.4	3.7	4.0	4.7	4.9	4.8	4.7	4.6	4.7	5.0	5.7	6.4	6.6	7.3	7.2	6.5	6.1	5.8	5.3	4.5	4.5	3.7	2.7	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 75 m (AT75m) - C
Mannix - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	515	71.53	71.53
0 - 10	205	28.47	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

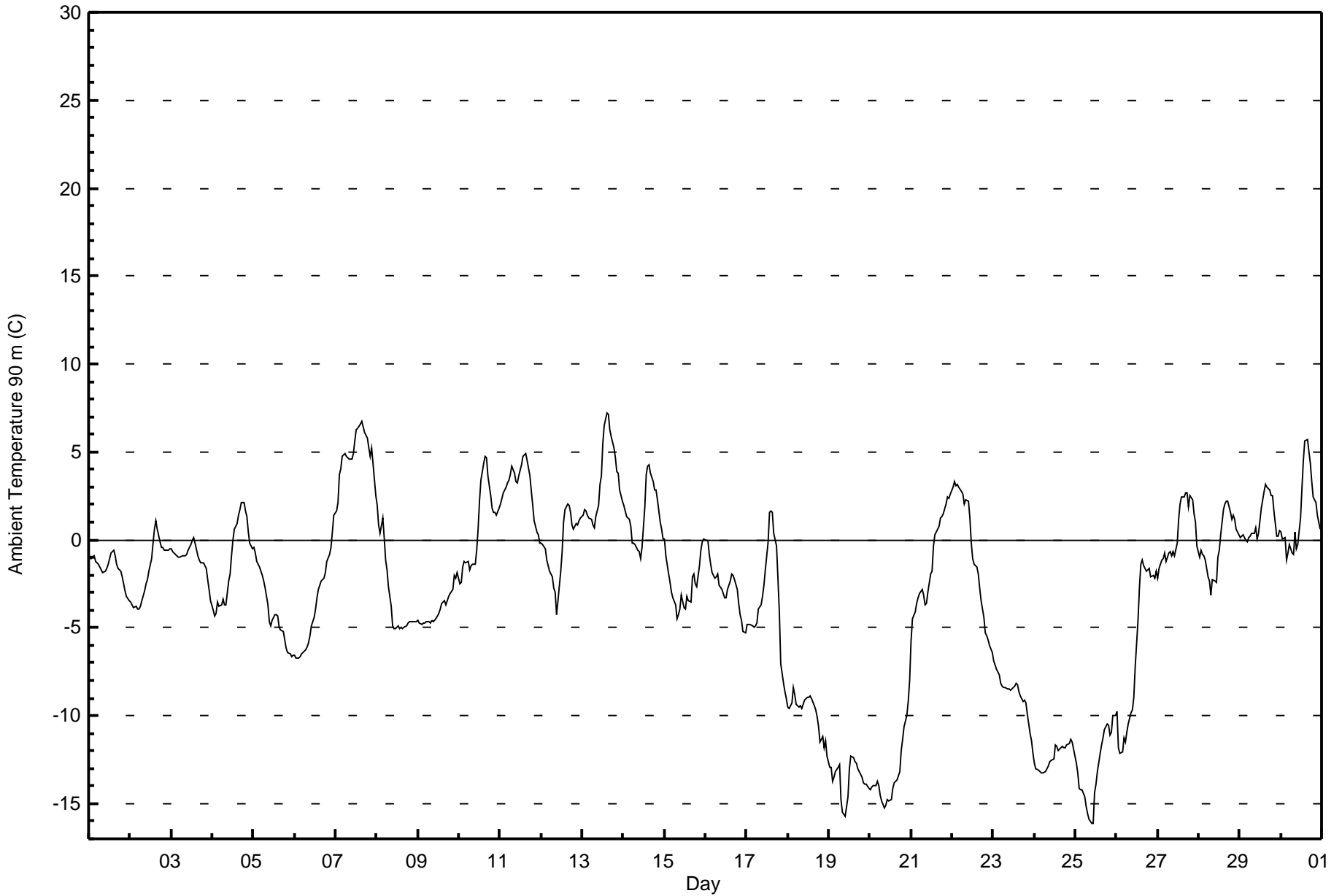
Total Number of Hours: 720



Summary of Hour Averages

Mannix - November 2015

Maximum Value: 7.2 C on Nov 13 15:00		Maximum Daily Average: 4.9 C on Nov 7		Hours in Service: 720																						
Minimum Value: -16.1 C on Nov 25 10:00		Minimum Daily Average: -13.6 C on Nov 19		Hours of Data: 720																						
Maximum Diurnal Average: -1.5 C at hour 16		Minimum Diurnal Average: -4.2 C at hour 10		Hours of Missing Data: 0																						
Monthly Average: -3.08 C		Percentiles: P ₁ = -15.2 P ₁₀ = -12.1 Q ₁ = -5.6 Median = -1.8 Q ₃ = 0.7 P ₉₀ = 2.9 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-Nov	-1.0	-1.1	-1.0	-0.9	-1.2	-1.4	-1.6	-1.7	-1.9	-1.8	-1.6	-1.4	-1.1	-0.7	-0.6	-0.9	-1.4	-1.7	-1.8	-2.1	-2.5	-2.9	-3.2	-3.4	-1.6	-0.6
2-Nov	-3.6	-3.7	-3.8	-3.8	-3.9	-4.0	-3.7	-3.5	-2.9	-2.5	-2.2	-1.8	-1.0	-0.2	0.6	1.1	0.6	-0.1	-0.4	-0.4	-0.6	-0.6	-0.6	-0.5	-1.7	1.1
3-Nov	-0.5	-0.7	-0.8	-0.9	-1.0	-1.0	-0.9	-0.9	-0.9	-0.8	-0.6	-0.3	0.0	0.2	-0.2	-0.9	-1.2	-1.3	-1.3	-1.3	-1.7	-2.3	-2.8	-3.4	-1.1	0.2
4-Nov	-4.0	-4.3	-4.2	-3.5	-3.7	-3.7	-3.4	-3.7	-3.7	-2.4	-1.9	-0.9	0.0	0.6	0.9	1.4	1.7	2.1	1.7	1.3	0.5	-0.2	-0.5	-1.2	2.1	
5-Nov	-0.4	-0.7	-1.3	-1.6	-1.8	-2.0	-2.3	-2.7	-3.7	-4.7	-4.9	-4.6	-4.3	-4.3	-4.3	-5.0	-5.2	-5.2	-5.7	-6.2	-6.4	-6.5	-6.6	-6.6	-4.0	-0.4
6-Nov	-6.6	-6.7	-6.7	-6.6	-6.5	-6.4	-6.2	-6.1	-5.8	-5.5	-4.9	-4.4	-3.9	-3.3	-2.8	-2.4	-2.2	-2.2	-1.8	-1.2	-0.9	-0.5	0.4	1.4	-3.8	1.4
7-Nov	1.6	2.1	3.7	4.1	4.8	4.9	4.8	4.7	4.6	4.6	4.9	5.6	6.3	6.4	6.6	6.8	6.4	6.1	5.8	5.2	4.7	5.2	4.4	2.5	4.9	6.8
8-Nov	1.9	0.9	0.3	1.2	0.1	-1.1	-1.7	-2.6	-3.8	-4.9	-5.1	-5.0	-4.9	-5.0	-5.0	-5.1	-5.0	-4.9	-4.7	-4.6	-4.6	-4.7	-4.7	-4.6	-3.2	1.9
9-Nov	-4.6	-4.7	-4.8	-4.7	-4.8	-4.7	-4.7	-4.7	-4.6	-4.6	-4.5	-4.4	-4.2	-3.9	-3.6	-3.5	-3.7	-3.4	-3.2	-3.1	-2.8	-2.0	-2.2	-1.9	-3.9	-1.9
10-Nov	-2.5	-2.4	-1.5	-1.2	-1.3	-1.2	-1.7	-1.4	-1.4	-1.4	-0.6	0.6	2.2	3.4	4.4	4.7	4.6	3.7	2.5	1.8	1.6	1.5	1.4	1.8	0.7	4.7
11-Nov	2.0	2.4	2.6	3.0	3.3	3.4	3.7	4.2	3.8	3.3	3.2	3.6	4.3	4.8	4.9	4.9	4.5	3.6	2.7	1.9	1.0	0.5	0.3	-0.2	3.0	4.9
12-Nov	-0.2	-0.2	-0.5	-1.2	-1.5	-1.8	-2.1	-2.7	-3.0	-4.3	-3.5	-1.8	-0.7	1.0	1.7	2.1	1.9	1.6	0.9	0.6	1.0	0.9	1.1	1.3	-0.4	2.1
13-Nov	1.4	1.7	1.6	1.4	1.2	1.2	0.8	0.7	1.4	2.0	3.2	3.7	5.5	6.5	7.2	7.1	6.3	5.9	5.2	4.7	3.9	3.8	2.8	2.2	3.4	7.2
14-Nov	1.9	1.7	1.3	1.2	0.7	-0.2	-0.2	-0.3	-0.6	-0.6	-1.1	-0.4	1.9	3.7	4.2	4.2	3.8	3.3	2.8	2.9	2.3	1.0	0.6	0.0	1.4	4.2
15-Nov	0.0	-0.9	-1.9	-2.4	-2.9	-3.3	-3.7	-4.5	-4.2	-4.0	-3.1	-3.8	-3.9	-3.2	-3.4	-3.6	-2.1	-1.9	-2.5	-2.6	-1.5	-0.6	-0.1	0.0	-2.5	0.0
16-Nov	0.0	-0.1	-0.8	-1.4	-1.9	-2.2	-2.1	-1.9	-2.6	-2.8	-3.1	-3.3	-3.3	-2.8	-2.3	-2.0	-2.1	-2.3	-2.8	-3.6	-4.3	-4.6	-5.2	-5.3	-2.6	0.0
17-Nov	-4.8	-4.8	-4.8	-4.9	-5.0	-4.9	-4.8	-3.9	-3.7	-3.2	-2.6	-1.7	-0.1	1.6	1.6	1.6	0.3	-0.4	-2.2	-4.1	-7.0	-8.2	-8.6	-9.1	-3.5	1.6
18-Nov	-9.5	-9.6	-9.3	-8.4	-8.8	-9.3	-9.5	-9.5	-9.6	-9.3	-9.1	-8.9	-8.9	-8.9	-9.0	-9.4	-9.7	-10.1	-10.6	-11.5	-11.2	-11.8	-11.4	-12.3	-9.8	-8.4
19-Nov	-12.9	-12.9	-13.7	-13.5	-13.2	-12.9	-12.8	-14.8	-15.5	-15.7	-15.2	-14.6	-13.0	-12.3	-12.4	-12.6	-12.7	-13.0	-13.3	-13.5	-13.8	-13.9	-13.9	-14.1	-13.6	-12.3
20-Nov	-14.2	-14.0	-14.0	-14.0	-13.7	-14.0	-14.5	-14.8	-15.2	-15.1	-14.7	-14.8	-14.8	-14.2	-13.8	-13.7	-13.7	-13.1	-12.0	-11.3	-10.6	-10.0	-9.2	-8.0	-13.2	-8.0
21-Nov	-5.7	-4.5	-4.1	-3.6	-3.3	-3.0	-2.8	-3.1	-3.7	-3.6	-2.9	-1.9	-1.8	-0.3	0.3	0.6	0.8	1.2	1.3	1.4	2.1	2.4	2.4	2.6	-1.2	2.6
22-Nov	3.0	3.3	3.0	3.1	3.0	2.7	2.6	2.1	2.3	2.2	1.2	-0.2	-1.1	-1.4	-1.6	-1.9	-2.8	-3.5	-4.4	-5.3	-5.5	-5.7	-6.0	-6.4	-0.7	3.3
23-Nov	-6.9	-7.1	-7.4	-7.7	-8.1	-8.3	-8.4	-8.4	-8.4	-8.5	-8.6	-8.5	-8.3	-8.2	-8.3	-8.6	-8.9	-9.2	-9.1	-9.2	-9.9	-11.0	-11.5	-12.2	-8.8	-6.9
24-Nov	-12.7	-13.0	-13.1	-13.2	-13.3	-13.3	-13.2	-13.0	-12.9	-12.6	-12.5	-12.4	-11.7	-11.7	-11.9	-11.8	-11.8	-11.8	-11.8	-11.7	-11.6	-11.3	-11.5	-11.9	-12.3	-11.3
25-Nov	-12.7	-13.2	-14.2	-14.2	-14.2	-14.6	-15.1	-15.5	-15.9	-16.1	-16.1	-14.4	-13.9	-13.2	-12.2	-11.7	-11.3	-10.8	-10.4	-10.6	-11.1	-10.9	-10.0	-10.0	-13.0	-10.0
26-Nov	-9.7	-11.9	-12.2	-12.1	-11.2	-11.5	-10.9	-10.4	-9.8	-9.6	-8.9	-7.2	-4.6	-2.7	-1.4	-1.2	-1.5	-1.8	-1.7	-1.7	-2.1	-2.0	-2.2	-1.8	-6.3	-1.2
27-Nov	-2.2	-1.6	-1.2	-1.1	-0.8	-1.2	-0.7	-0.7	-0.9	-0.7	-0.9	-0.2	1.1	2.0	2.4	2.5	2.7	2.7	1.9	2.5	2.3	1.5	1.0	-0.3	0.4	2.7
28-Nov	-1.0	-0.6	-0.8	-0.9	-1.2	-2.1	-2.4	-3.1	-2.2	-2.3	-2.4	-1.0	-0.6	0.3	1.7	2.1	2.2	2.2	1.6	1.2	1.4	1.1	0.6	0.3	-0.3	2.2
29-Nov	0.1	0.2	0.3	0.0	-0.1	0.1	0.2	0.4	0.4	0.7	0.1	0.3	1.8	2.3	2.8	3.2	3.0	2.8	2.5	2.5	1.6	0.2	0.2	0.6	1.1	3.2
30-Nov	0.4	0.1	0.1	-1.1	-0.8	-0.3	-0.8	-0.9	0.4	-0.5	-0.3	1.2	2.9	4.5	5.6	5.7	5.0	4.3	3.3	2.4	2.1	1.4	1.0	0.6	1.5	5.7
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 90 m (AT90m) - C
Mannix - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	499	69.31	69.31
0 - 10	221	30.69	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

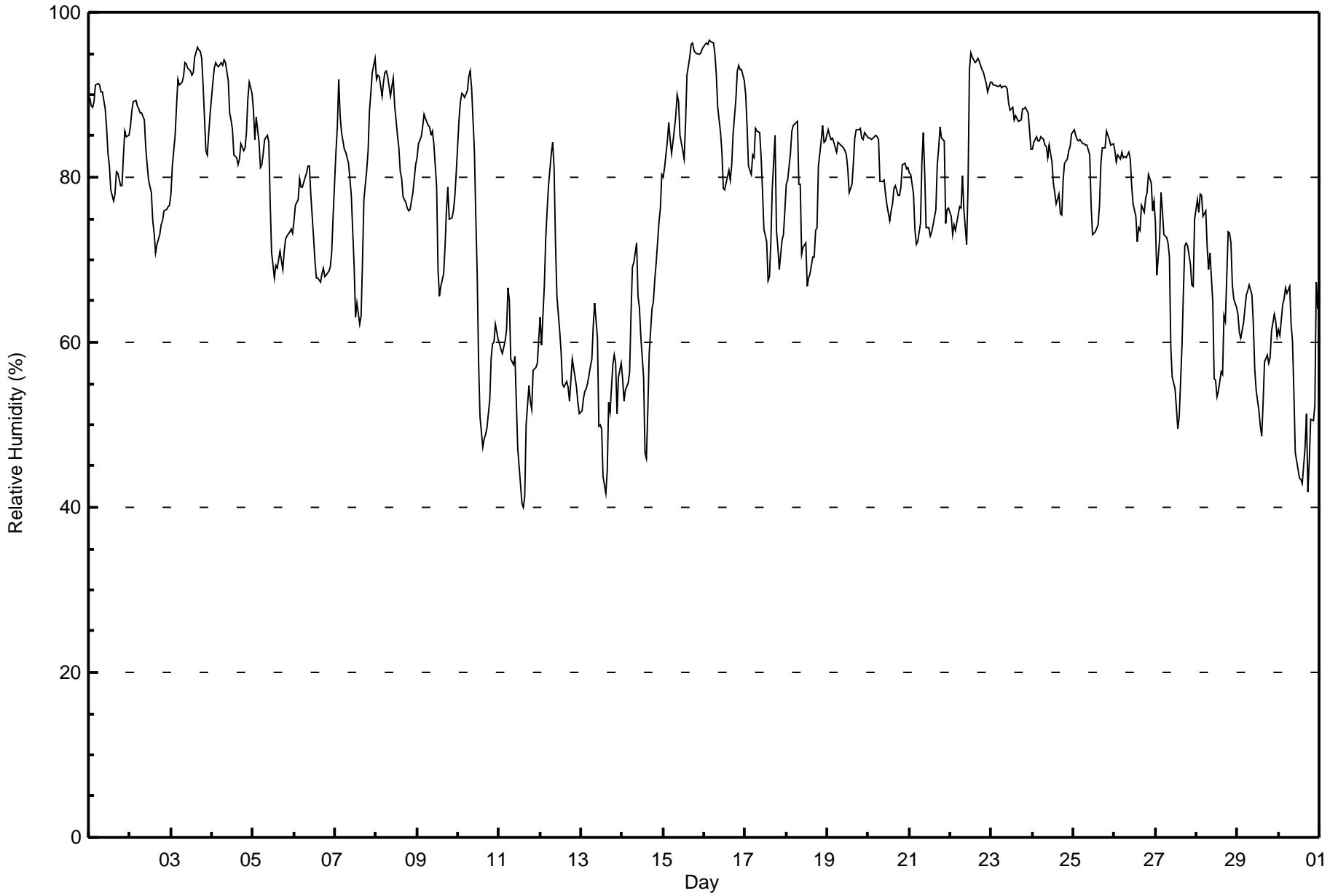
Mannix - November 2015

Maximum Value: 97 % on Nov 16 04:00														Maximum Daily Average: 90.2 % on Nov 3														Hours in Service: 720	
Minimum Value: 40 % on Nov 11 15:00														Minimum Daily Average: 53.9 % on Nov 13														Hours of Data: 720	
Maximum Diurnal Average: 81.6 % at hour 7														Minimum Diurnal Average: 68.2 % at hour 14														Hours of Missing Data: 0	
Monthly Average: 76.2 %														Percentiles: P ₁ = 43 P ₁₀ = 56 Q ₁ = 68 Median = 79 Q ₃ = 85 P ₉₀ = 91 P ₉₉ = 96														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Nov	90	89	88	89	91	91	91	90	90	88	86	83	81	78	77	78	81	81	79	79	82	86	85	85	85.0	91			
2-Nov	86	88	89	89	89	88	88	88	87	84	82	80	78	75	73	71	72	73	74	75	76	76	76	77	80.5	89			
3-Nov	78	81	85	89	92	91	91	92	94	94	93	93	92	93	95	96	95	95	94	91	83	83	85	88	90.2	96			
4-Nov	92	93	94	93	93	94	94	94	94	92	88	87	86	83	82	82	84	83	84	85	90	91	90	90	88.7	94			
5-Nov	88	85	87	84	81	82	83	85	85	84	77	71	68	69	69	80	71	69	71	73	73	73	74	73	76.8	88			
6-Nov	75	77	77	80	79	79	80	81	81	81	78	73	70	68	68	67	68	69	68	68	69	69	71	75	73.7	81			
7-Nov	83	86	92	87	85	83	83	82	82	78	73	69	63	65	62	63	70	77	81	83	88	90	93	94	79.8	94			
8-Nov	92	92	92	90	91	93	93	92	90	91	92	89	85	83	81	80	78	77	76	76	76	78	80	82	85.4	93			
9-Nov	82	84	85	86	88	87	86	86	85	86	84	79	69	66	67	68	72	76	79	75	75	76	78	81	79.1	88			
10-Nov	87	89	90	90	90	91	92	93	91	83	75	68	58	51	47	48	49	50	53	58	60	60	62	60	70.7	93			
11-Nov	60	59	59	60	62	67	65	58	57	58	53	47	43	40	40	41	50	55	53	52	57	57	57	60	54.6	67			
12-Nov	63	60	67	73	76	79	83	84	81	72	66	61	59	55	55	55	55	53	55	58	56	55	53	51	63.4	84			
13-Nov	52	53	54	54	55	57	58	62	65	61	50	50	49	44	42	44	53	52	57	59	58	51	56	57	53.9	65			
14-Nov	56	53	54	55	57	63	69	70	72	66	64	61	56	47	46	52	59	64	65	68	70	75	76	80	62.3	80			
15-Nov	80	81	84	87	85	83	86	88	90	89	85	83	82	87	92	95	96	96	95	95	95	95	95	96	89.1	96			
16-Nov	96	96	96	97	97	96	95	92	89	85	83	79	79	79	81	80	82	85	90	93	93	93	93	92	89.2	97			
17-Nov	90	86	81	80	83	82	86	86	85	83	79	74	72	68	68	72	79	85	74	71	69	72	73	76	78.1	90			
18-Nov	79	80	83	86	86	86	87	79	79	71	71	72	67	68	68	70	70	73	74	81	84	86	84	84	77.9	87			
19-Nov	86	85	85	85	84	83	84	84	84	84	83	83	81	78	79	82	85	86	86	86	85	85	85	85	83.8	86			
20-Nov	85	85	85	85	85	85	85	79	79	80	78	77	75	76	77	79	79	78	78	79	82	82	81	81	80.5	85			
21-Nov	80	80	78	74	72	72	74	82	85	81	74	74	73	73	74	76	82	84	86	85	84	74	76	76	77.9	86			
22-Nov	75	73	74	74	75	76	76	80	76	72	79	93	95	95	94	94	94	94	93	93	92	91	90	91	85.0	95			
23-Nov	91	91	91	91	91	91	91	91	91	91	89	88	88	87	87	87	87	88	88	88	88	88	86	83	88.9	91			
24-Nov	83	84	85	84	84	85	85	84	84	82	84	82	79	78	77	78	76	75	80	82	82	83	84	85	81.9	85			
25-Nov	86	85	85	84	85	84	84	84	84	83	77	73	73	73	74	77	82	84	84	86	85	85	84	84	81.8	86			
26-Nov	83	82	83	82	83	82	83	82	83	82	79	77	75	72	74	74	77	76	77	78	80	79	76	77	79.0	83			
27-Nov	74	68	73	78	76	73	73	72	70	59	56	54	52	49	51	60	66	72	72	72	70	67	67	75	66.6	78			
28-Nov	77	76	78	78	75	76	72	69	71	65	56	55	53	54	56	56	63	63	73	73	72	67	65	64	67.0	78			
29-Nov	63	61	61	62	64	66	66	67	66	62	57	54	52	50	49	53	58	58	57	58	61	63	63	61	59.7	67			
30-Nov	61	61	64	65	67	66	67	62	60	54	47	45	44	43	43	47	51	42	46	51	50	52	67	64	55.0	67			
	79.2	78.8	80.0	80.4	80.6	81.1	81.6	81.3	81.0	78.0	74.5	72.4	69.9	68.2	68.3	69.8	72.6	73.7	74.7	75.6	76.0	76.1	76.9	77.6	Diurnal Average				
	96	96	96	97	97	96	95	94	94	94	93	93	95	95	95	96	96	96	95	95	95	95	95	96	Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mannix - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	1	0.14	0.14
40 - 60	107	14.86	15.00
60 - 80	273	37.92	52.92
80 - 100	339	47.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 97 % on Nov 16 04:00																		Maximum Daily Average: 89.3 % on Nov 3																		Hours in Service: 720													
Minimum Value: 28 % on Nov 30 17:00																		Minimum Daily Average: 41.8 % on Nov 30																		Hours of Data: 720													
Maximum Diurnal Average: 77.6 % at hour 7																		Minimum Diurnal Average: 66.0 % at hour 15																		Hours of Missing Data: 0													
Monthly Average: 72.3 %																		Percentiles: P ₁ = 36 P ₁₀ = 49 Q ₁ = 60 Median = 77 O ₃ = 84 P ₉₀ = 90 P ₉₉ = 95																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	90	89	88	89	91	92	91	90	91	89	87	84	82	80	78	79	81	81	79	79	83	86	85	86	85.3	92																							
2-Nov	87	89	90	90	89	89	88	88	87	84	83	81	79	76	74	71	72	73	74	74	75	76	76	77	80.9	90																							
3-Nov	78	81	84	87	91	90	90	91	93	93	92	92	93	95	96	95	95	94	90	81	81	83	85	89.3	96																								
4-Nov	87	89	89	90	92	94	94	94	93	89	86	86	84	81	81	80	80	80	79	79	82	89	91	89	86.6	94																							
5-Nov	87	83	87	83	80	81	83	85	86	85	76	71	69	70	69	80	71	68	71	72	72	72	72	72	76.4	87																							
6-Nov	73	76	76	79	78	78	79	80	81	81	78	73	71	68	68	67	68	68	68	68	68	69	71	74	73.3	81																							
7-Nov	81	84	83	81	80	78	79	79	78	76	73	69	64	64	61	61	60	62	66	74	81	83	82	83	74.2	84																							
8-Nov	82	83	84	85	86	86	87	89	88	91	92	88	84	82	80	79	77	77	76	75	76	78	80	82	82.7	92																							
9-Nov	82	84	84	86	87	86	85	86	84	85	84	79	69	66	68	68	70	72	72	73	74	75	77	79	78.2	87																							
10-Nov	83	85	86	85	86	85	86	86	84	81	76	67	56	49	45	45	44	45	50	56	58	58	60	59	67.3	86																							
11-Nov	59	58	58	58	59	63	60	54	53	54	51	46	42	40	39	39	42	45	45	45	47	47	47	51	50.1	63																							
12-Nov	54	53	58	62	66	69	71	72	73	70	68	61	59	54	52	52	52	51	54	56	54	53	51	50	59.1	73																							
13-Nov	51	51	51	52	53	54	55	57	58	56	51	51	46	42	40	42	47	47	49	50	50	47	49	51	50.0	58																							
14-Nov	51	50	51	51	53	58	59	60	62	63	64	61	54	45	44	45	49	50	52	55	57	61	66	69	55.4	69																							
15-Nov	66	69	74	77	78	79	82	83	89	87	83	82	82	87	92	94	96	96	95	94	93	93	93	94	85.8	96																							
16-Nov	95	95	95	97	96	96	94	90	86	83	82	77	78	79	80	79	80	82	85	88	89	91	92	90	87.4	97																							
17-Nov	87	83	79	79	81	81	85	85	85	82	78	73	71	65	66	66	76	80	72	70	67	71	72	75	76.2	87																							
18-Nov	78	79	82	84	85	84	84	75	76	68	70	71	65	67	67	69	68	70	69	78	81	82	81	83	75.7	85																							
19-Nov	83	82	85	86	86	85	85	84	84	83	83	84	81	76	79	80	82	83	85	84	85	85	85	84	83.2	86																							
20-Nov	85	84	84	85	85	85	85	79	77	77	76	76	75	74	75	77	78	77	77	77	80	80	79	80	79.5	85																							
21-Nov	78	74	71	70	68	68	70	74	78	78	76	73	73	72	68	72	77	79	81	81	78	71	74	74	74.0	81																							
22-Nov	73	70	71	71	72	73	73	76	72	69	80	94	95	94	92	92	94	93	92	92	91	90	89	91	83.3	95																							
23-Nov	91	91	91	90	91	91	91	91	91	90	89	89	87	88	86	86	86	88	88	88	88	88	84	82	88.6	91																							
24-Nov	82	83	84	83	84	84	84	83	82	81	84	82	78	77	74	75	72	73	77	78	78	79	77	79	79.8	84																							
25-Nov	78	79	80	80	80	81	81	80	79	78	74	67	68	69	69	72	74	75	76	80	82	82	81	81	76.9	82																							
26-Nov	81	81	81	81	81	80	81	80	81	80	79	76	73	69	66	62	60	61	66	67	68	67	64	65	73.0	81																							
27-Nov	57	51	55	56	56	61	59	62	57	53	50	49	46	44	45	47	53	53	53	49	47	49	53	59	52.6	62																							
28-Nov	59	60	62	62	63	62	61	59	59	55	52	52	48	48	45	45	46	44	50	50	52	52	52	51	53.8	63																							
29-Nov	52	53	52	51	53	54	54	55	56	54	54	52	48	44	44	43	43	42	43	44	49	51	50	47	49.5	56																							
30-Nov	45	47	50	55	56	53	52	50	46	45	43	41	38	35	32	30	28	28	32	36	33	36	43	47	41.8	56																							
																								74.4	74.5	75.5	76.1	76.8	77.4	77.6	77.2	77.0	75.4	73.8	71.6	68.7	66.5	66.0	66.2	67.3	67.9	68.9	70.1	70.6	71.4	72.1	72.9	Diurnal Average	
																								95	95	95	97	96	96	94	94	93	93	92	94	95	94	95	96	96	96	95	94	93	93	93	94	Diurnal Maximum	

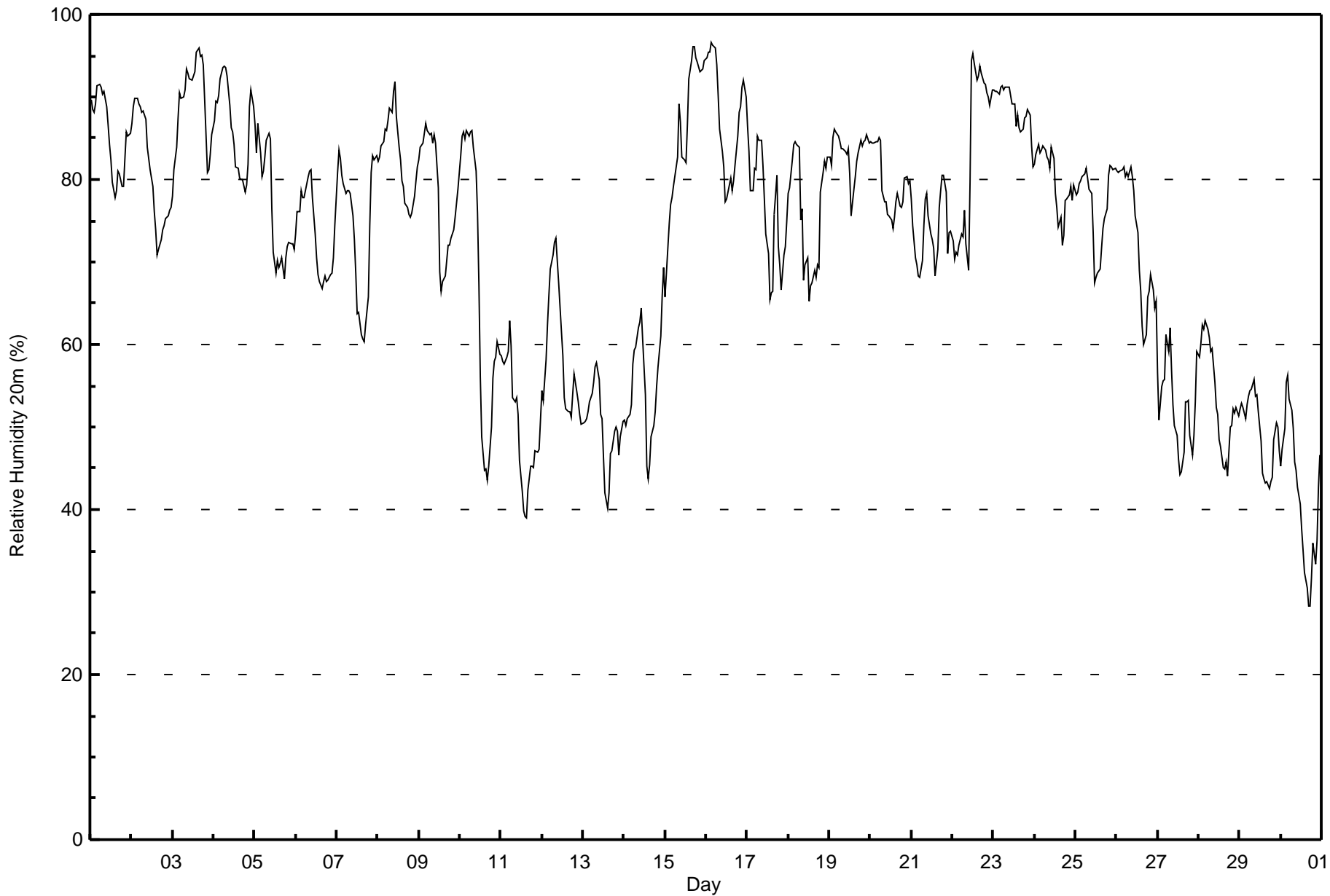


Wood Buffalo Environmental Association

Hourly Averages

Relative Humidity 20m (RH20m) - %

Mannix - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 20m (RH20m) - %
Mannix - November 2015

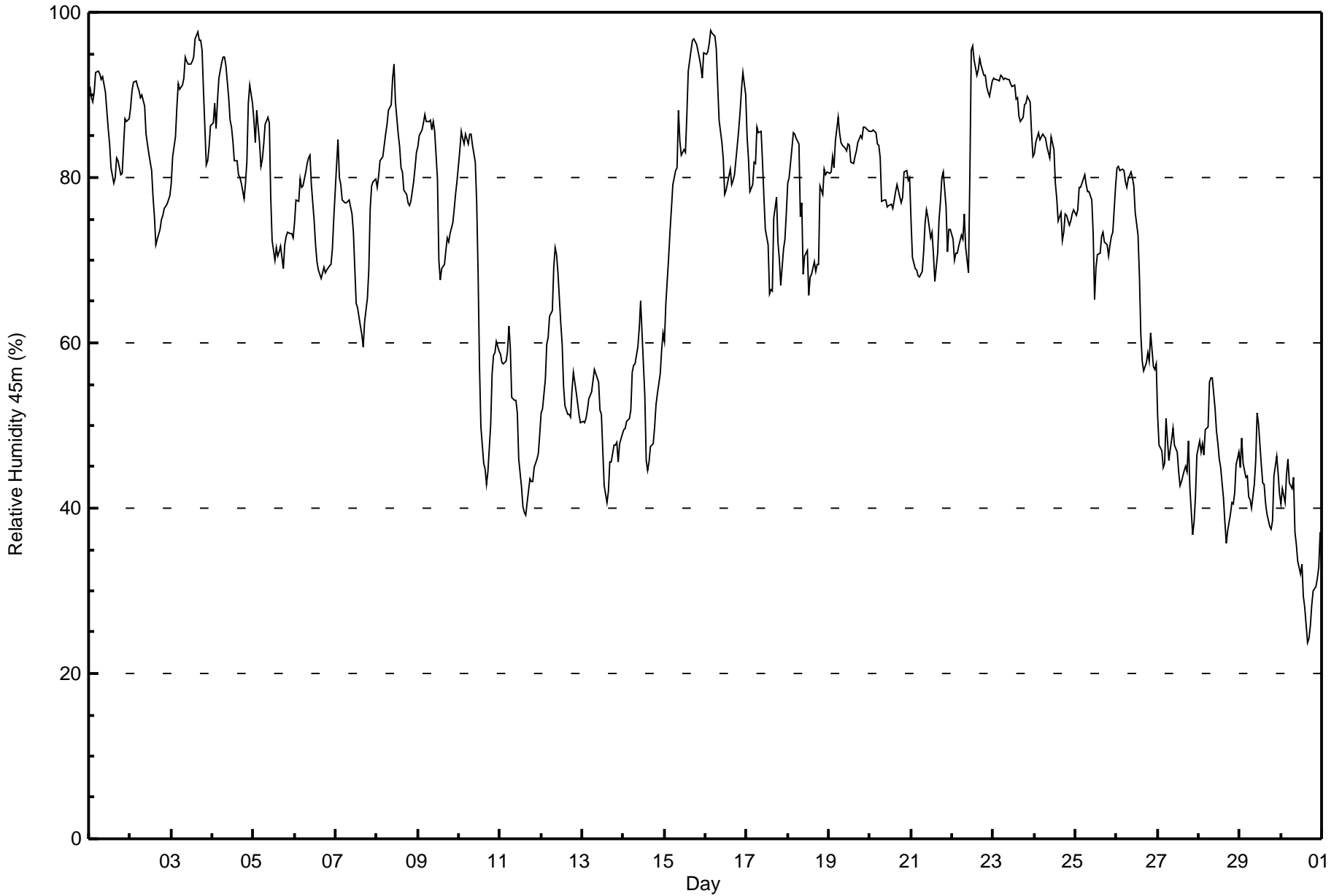
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	13	1.81	1.81
40 - 60	165	22.92	24.72
60 - 80	255	35.42	60.14
80 - 100	287	39.86	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 98 % on Nov 16 04:00																		Maximum Daily Average: 90.5 % on Nov 3																		Hours in Service: 720	
Minimum Value: 24 % on Nov 30 16:00																		Minimum Daily Average: 34.8 % on Nov 30																		Hours of Data: 720	
Maximum Diurnal Average: 76.0 % at hour 7																		Minimum Diurnal Average: 66.0 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 71.3 %																		Percentiles: P ₁ = 30 P ₁₀ = 45 Q ₁ = 57 Median = 77 O ₃ = 84 P ₉₀ = 91 P ₉₉ = 97																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Nov	91	90	89	90	93	93	92	92	92	90	88	86	84	81	79	80	82	82	80	81	84	87	87	87	86.7	93											
2-Nov	88	91	92	92	91	91	90	90	89	85	84	83	81	78	75	72	73	74	75	75	76	77	77	78	82.3	92											
3-Nov	79	83	85	88	91	91	91	92	95	94	94	94	94	95	97	98	97	97	95	91	82	82	84	86	90.5	98											
4-Nov	87	89	86	89	92	94	95	95	94	90	87	86	84	82	82	80	79	78	79	82	89	91	89	86.6	95												
5-Nov	87	84	88	84	81	82	84	86	87	87	78	72	70	72	70	71	72	69	72	73	73	73	73	73	77.6	88											
6-Nov	75	77	77	80	79	79	81	82	82	83	79	75	72	70	69	68	68	69	68	69	69	69	71	75	74.4	83											
7-Nov	81	85	80	79	77	77	77	77	77	76	73	69	65	64	62	61	59	63	65	69	76	79	79	80	73.0	85											
8-Nov	79	80	82	83	84	85	86	88	89	92	94	89	85	84	81	81	78	78	77	77	77	79	81	83	83.0	94											
9-Nov	84	85	86	87	88	87	87	87	86	87	86	80	70	68	69	70	71	73	72	73	75	76	78	80	79.2	88											
10-Nov	83	86	85	84	85	84	85	85	84	82	77	68	57	50	45	45	43	44	50	56	58	59	60	59	67.3	86											
11-Nov	59	58	57	58	59	62	59	53	53	53	51	46	43	40	40	39	41	43	43	43	45	46	47	49	49.5	62											
12-Nov	51	52	56	60	61	63	64	69	72	71	68	62	60	55	52	51	51	51	54	56	54	53	51	50	57.9	72											
13-Nov	51	50	51	52	53	54	55	57	56	55	52	51	47	43	41	42	46	46	48	48	48	46	48	49	49.5	57											
14-Nov	49	50	50	51	52	56	57	57	59	62	65	61	54	46	45	46	47	48	50	52	54	56	59	61	53.7	65											
15-Nov	60	65	70	74	76	79	81	81	88	84	83	83	83	88	93	95	97	97	96	96	94	93	92	95	85.2	97											
16-Nov	95	95	96	98	97	97	96	91	87	84	82	78	78	79	81	79	80	80	84	86	88	91	93	90	87.7	98											
17-Nov	85	82	78	79	82	82	86	85	86	82	78	74	72	66	66	66	75	78	72	70	67	71	73	76	76.3	86											
18-Nov	79	80	84	85	85	85	84	75	77	68	70	71	66	68	68	70	69	70	70	79	78	81	80	81	76.0	85											
19-Nov	81	81	83	81	84	87	85	84	84	84	83	84	84	82	82	82	83	84	85	85	86	86	86	86	83.8	87											
20-Nov	86	86	86	85	84	84	82	77	77	77	76	77	77	76	77	78	79	78	77	78	81	81	80	80	79.9	86											
21-Nov	75	70	69	69	68	68	69	71	74	76	75	73	73	71	67	71	75	77	80	81	76	71	74	74	72.8	81											
22-Nov	72	70	71	71	72	73	73	76	72	68	81	95	96	94	92	93	94	94	92	92	91	90	90	92	83.5	96											
23-Nov	92	92	92	92	92	92	92	92	92	92	91	91	91	89	90	87	87	87	89	89	90	89	85	83	89.9	92											
24-Nov	83	84	85	85	85	85	85	84	83	82	85	83	79	77	75	76	72	73	76	75	74	75	76	76	79.8	85											
25-Nov	75	76	79	79	79	80	79	78	78	77	73	65	69	71	71	73	73	72	72	71	72	73	73	79	74.5	80											
26-Nov	81	81	81	81	81	80	79	80	81	80	79	76	73	68	61	58	57	58	59	58	61	57	57	57	70.1	81											
27-Nov	51	48	47	45	45	51	46	47	48	50	48	47	44	43	43	45	45	44	48	43	37	38	41	47	45.4	51											
28-Nov	48	47	48	46	50	50	55	56	56	52	49	48	46	45	41	38	36	37	39	41	40	42	45	47	45.9	56											
29-Nov	45	48	45	44	44	41	41	40	43	46	51	50	45	43	43	41	39	38	37	38	44	46	44	42	43.3	51											
30-Nov	41	42	41	44	46	43	42	44	37	36	34	32	33	29	28	24	24	26	28	30	31	32	33	37	34.8	46											
	73.1	73.5	73.9	74.5	75.2	75.8	76.0	75.8	75.9	74.8	73.8	71.7	69.2	67.2	66.2	66.0	66.5	66.9	67.8	68.4	68.8	69.6	70.3	71.3	Diurnal Average												
	95	95	96	98	97	97	96	95	95	94	94	95	96	95	97	98	97	97	96	96	94	93	93	95	Diurnal Maximum												





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 45m (RH45m) - %
Mannix - November 2015

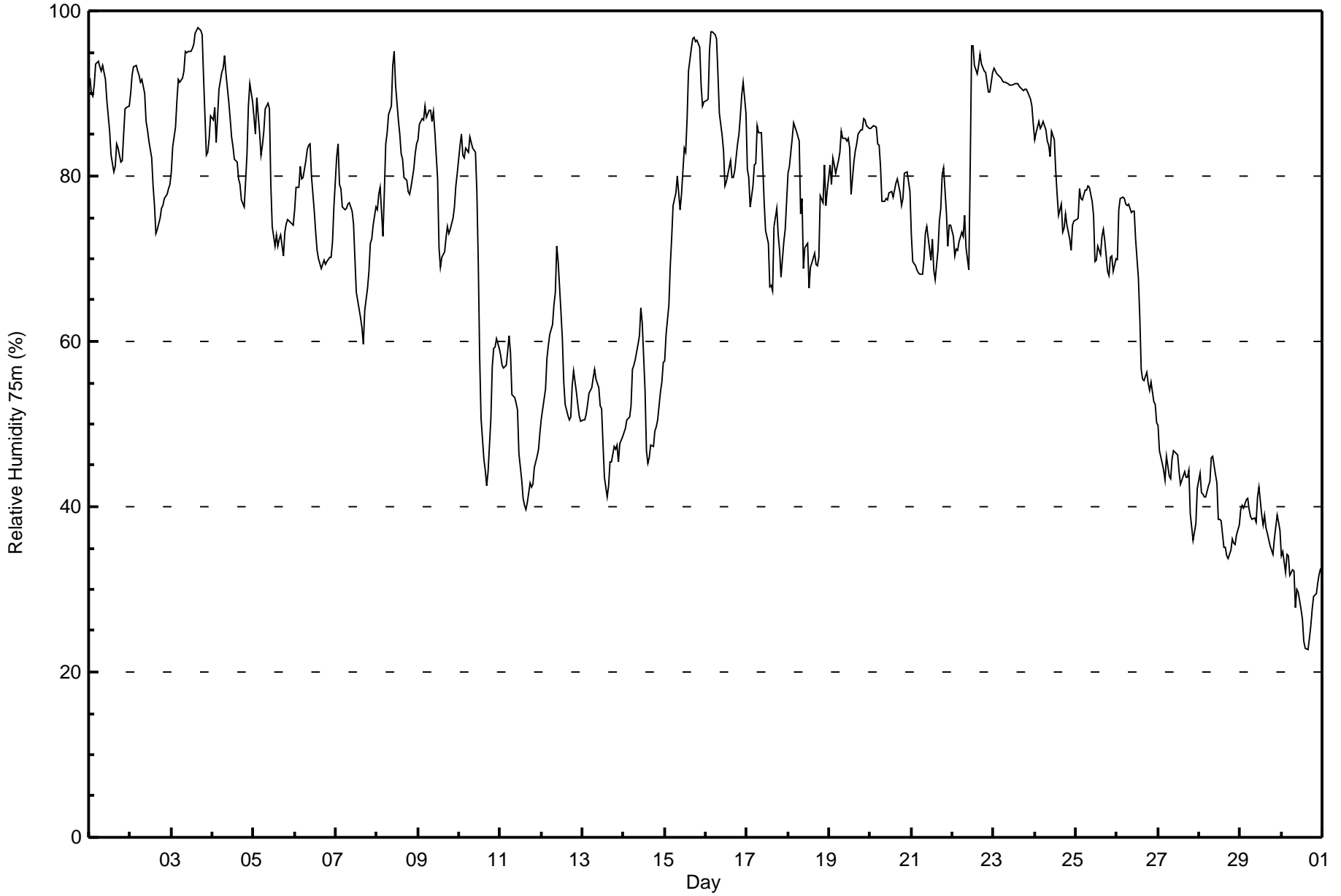
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	28	3.89	3.89
40 - 60	171	23.75	27.64
60 - 80	243	33.75	61.39
80 - 100	278	38.61	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 98 % on Nov 3 16:00 Maximum Daily Average: 91.5 % on Nov 3																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 23 % on Nov 30 16:00 Minimum Daily Average: 29.5 % on Nov 30 Maximum Diurnal Average: 74.8 % at hour 7 Minimum Diurnal Average: 66.1 % at hour 15 Monthly Average: 70.6 % Percentiles: P ₁ = 28 P ₁₀ = 41 Q ₁ = 56 Median = 76 Q ₃ = 85 P ₉₀ = 91 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-Nov	92	90	90	91	94	94	93	93	93	92	89	87	85	83	81	81	84	83	82	82	85	88	88	88	87.8	94
2-Nov	90	92	93	93	93	92	91	92	90	87	86	84	82	79	76	73	74	75	76	76	77	78	78	79	83.6	93
3-Nov	80	84	86	89	92	91	92	93	95	95	95	95	96	97	98	98	98	97	92	83	83	85	87	91.5	98	
4-Nov	87	88	84	87	90	93	93	95	92	89	87	85	84	82	82	80	79	77	76	79	83	88	91	89	85.8	95
5-Nov	87	85	89	85	82	84	85	88	89	88	79	74	71	73	72	72	73	70	73	74	75	74	74	74	78.9	89
6-Nov	76	79	79	81	80	80	82	83	84	84	80	76	73	71	70	69	69	70	69	70	70	70	72	76	75.5	84
7-Nov	82	84	79	78	76	76	76	77	77	76	74	70	66	65	63	62	60	64	66	68	72	72	74	76	72.2	84
8-Nov	76	78	79	73	78	84	85	87	88	93	95	91	87	85	83	82	80	79	78	78	79	81	83	84	82.7	95
9-Nov	84	86	87	87	88	87	88	88	87	88	85	80	71	69	70	71	72	74	73	73	75	76	79	80	80.0	88
10-Nov	84	85	83	82	83	83	85	84	83	83	78	70	58	51	46	44	42	44	51	57	59	59	60	59	67.3	85
11-Nov	58	57	57	57	59	61	59	54	53	53	52	47	43	41	40	40	41	43	42	43	45	46	47	49	49.4	61
12-Nov	51	52	54	58	59	61	62	64	66	72	70	64	60	55	52	51	50	51	55	56	54	52	51	50	57.1	72
13-Nov	51	50	51	52	54	54	56	57	55	54	52	52	48	44	41	43	45	45	47	47	47	45	48	48	49.5	57
14-Nov	49	49	51	51	52	57	57	58	60	61	64	62	54	47	45	46	47	47	49	50	51	54	55	57	53.0	64
15-Nov	58	61	64	69	73	76	78	80	78	76	78	83	83	87	93	95	97	97	96	96	96	91	89	89	82.6	97
16-Nov	89	89	95	97	97	97	97	92	88	85	83	79	79	80	82	80	80	81	84	85	87	90	91	88	87.3	97
17-Nov	81	80	76	79	81	82	86	85	85	81	77	73	72	67	67	66	74	76	73	71	68	72	74	77	75.9	86
18-Nov	80	81	85	86	86	85	84	75	77	69	71	72	66	69	69	71	69	69	70	78	77	81	76	78	76.2	86
19-Nov	81	79	82	81	80	82	83	85	85	85	84	85	83	78	82	83	84	85	86	86	87	87	86	86	83.5	87
20-Nov	86	86	86	86	84	84	81	77	77	77	77	78	78	77	78	79	80	78	76	77	80	81	79	78	80.1	86
21-Nov	73	70	69	69	68	68	68	70	73	74	73	70	72	69	68	71	75	76	80	81	76	71	74	74	72.1	81
22-Nov	73	70	71	71	72	73	73	75	71	69	81	96	96	93	92	93	95	94	93	93	91	90	90	93	83.7	96
23-Nov	93	93	92	92	92	92	91	91	91	91	91	91	91	91	91	91	91	90	91	90	90	89	88	86	90.9	93
24-Nov	84	85	87	86	86	87	86	84	84	82	85	84	81	78	75	77	73	74	75	74	72	71	74	75	80.0	87
25-Nov	75	75	79	77	77	78	78	79	79	77	75	70	70	72	71	73	74	72	69	68	70	70	69	70	73.5	79
26-Nov	70	76	77	77	77	77	76	77	76	76	76	72	68	63	57	55	55	56	55	54	55	53	52	50	65.8	77
27-Nov	50	47	45	44	43	46	44	43	46	47	47	46	44	43	44	44	44	44	44	39	36	37	38	42	43.6	50
28-Nov	44	42	42	41	41	43	43	46	46	44	43	38	39	38	35	35	34	34	35	36	36	35	37	38	39.3	46
29-Nov	40	40	40	41	41	40	39	39	39	38	41	42	39	38	39	37	37	35	35	34	36	39	38	37	38.5	42
30-Nov	34	35	32	34	34	32	32	32	28	30	30	28	26	24	23	23	24	26	28	29	30	31	32	32	29.5	35
																		71.9 72.3 72.8 73.2 73.8 74.6 74.8 74.8 74.5 73.8 73.3 71.4 68.9 66.8 66.1 66.2 66.6 66.9 67.5 67.9 68.0 68.6 69.1 69.7						Diurnal Average		
																		93 93 95 97 97 97 97 95 95 95 95 96 96 96 97 98 98 98 97 96 96 91 91 93						Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 75m (RH75m) - %
Mannix - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	61	8.47	8.47
40 - 60	142	19.72	28.19
60 - 80	250	34.72	62.92
80 - 100	267	37.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

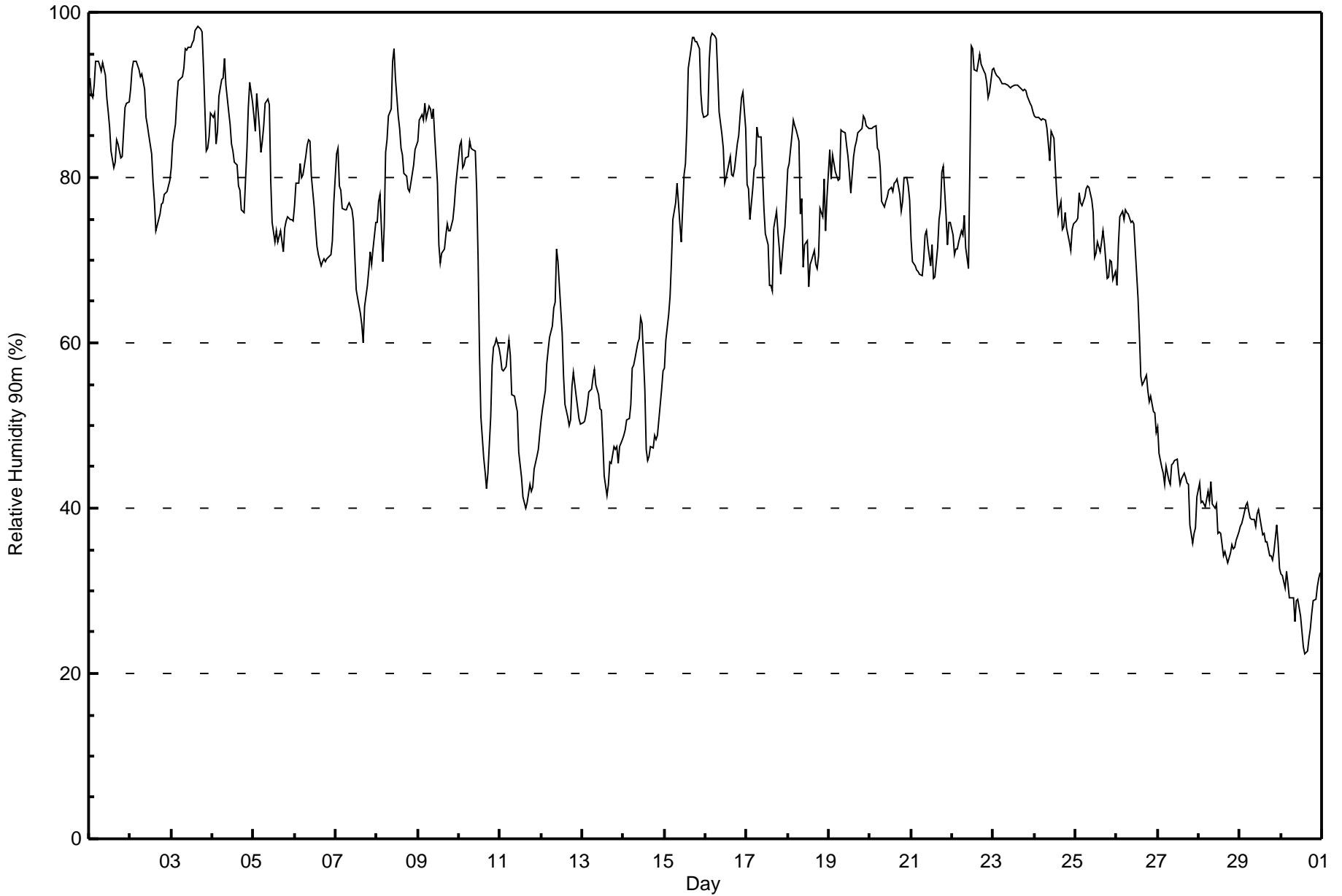


Maximum Value: 98 % on Nov 3 16:00																		Maximum Daily Average: 92.0 % on Nov 3																		Hours in Service: 720	
Minimum Value: 22 % on Nov 30 15:00																		Minimum Daily Average: 28.2 % on Nov 30																		Hours of Data: 720	
Maximum Diurnal Average: 74.7 % at hour 8																		Minimum Diurnal Average: 66.4 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 70.4 %																		Percentiles: P ₁ = 27 P ₁₀ = 41 Q ₁ = 56 Median = 75 Q ₃ = 85 P ₉₀ = 91 P ₉₉ = 97																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Nov	92	90	90	91	94	94	93	93	94	92	90	88	86	83	81	82	85	84	82	83	86	89	89	89	88.3	94											
2-Nov	91	93	94	94	94	93	92	92	91	87	86	85	83	80	77	74	74	76	77	77	78	78	79	80	84.3	94											
3-Nov	81	84	86	90	92	92	92	93	96	95	96	96	96	97	98	98	98	98	98	93	83	83	85	88	92.0	98											
4-Nov	87	88	84	86	90	92	92	94	91	88	86	84	83	82	81	79	78	76	76	80	83	88	92	89	85.4	94											
5-Nov	87	86	90	86	83	84	86	89	90	89	80	75	72	74	72	73	74	71	74	75	75	75	75	75	79.5	90											
6-Nov	77	79	79	82	80	80	83	84	85	84	80	76	74	72	71	69	70	70	70	70	71	71	72	77	76.1	85											
7-Nov	83	84	79	78	76	76	76	77	77	76	75	70	67	65	64	62	60	64	67	69	71	70	71	75	72.1	84											
8-Nov	75	77	78	70	74	83	85	87	88	94	96	92	87	86	84	83	81	80	79	78	79	81	83	84	82.7	96											
9-Nov	84	87	88	87	89	87	89	88	87	88	85	79	72	70	71	71	73	74	74	74	75	77	79	81	80.4	89											
10-Nov	84	84	81	81	82	83	84	84	83	83	79	70	59	51	46	44	42	44	51	57	60	60	61	59	67.2	84											
11-Nov	58	57	57	57	59	60	58	54	54	53	52	47	44	41	41	40	41	43	42	43	45	46	47	49	49.4	60											
12-Nov	51	52	54	57	59	61	62	64	65	71	70	64	61	56	53	51	50	51	55	56	54	52	51	50	57.1	71											
13-Nov	50	51	51	53	54	54	56	57	55	54	52	52	48	44	42	43	46	45	47	47	47	46	47	48	49.5	57											
14-Nov	49	49	51	51	53	57	57	58	60	60	63	62	54	47	46	46	47	47	49	48	49	53	54	57	52.8	63											
15-Nov	57	60	63	66	70	75	77	79	77	74	72	80	82	86	93	96	97	97	96	96	96	90	88	87	81.5	97											
16-Nov	88	88	94	97	98	97	97	93	88	85	84	79	80	81	82	80	80	81	84	85	88	90	90	86	87.2	98											
17-Nov	79	79	75	79	81	81	86	85	85	81	76	73	72	67	67	66	74	76	73	71	68	72	74	77	75.8	86											
18-Nov	81	82	85	87	86	86	84	76	77	69	72	72	67	69	70	71	70	69	71	76	75	80	74	78	76.1	87											
19-Nov	83	80	83	82	81	80	80	86	86	85	84	83	81	78	83	84	84	85	86	86	87	87	86	86	83.5	87											
20-Nov	86	86	86	86	84	83	81	77	77	77	78	79	79	78	79	80	80	78	76	77	80	80	79	77	80.1	86											
21-Nov	73	70	69	69	69	68	68	70	73	74	72	69	72	68	68	71	75	76	81	81	75	72	75	75	72.2	81											
22-Nov	73	71	71	71	72	74	73	75	72	69	82	96	96	93	93	94	95	94	93	93	91	90	90	93	83.9	96											
23-Nov	93	93	92	92	92	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	90	89	89	88	90.9	93											
24-Nov	87	87	87	87	87	87	87	86	84	82	86	85	81	78	76	77	74	74	76	74	72	71	74	74	80.5	87											
25-Nov	75	75	78	77	77	78	79	79	79	77	76	70	71	72	71	72	74	72	68	68	70	70	68	69	73.5	79											
26-Nov	67	72	75	76	75	76	76	76	75	75	74	71	65	61	56	55	55	56	54	53	54	52	52	49	64.6	76											
27-Nov	50	47	45	44	43	45	43	43	45	45	46	46	44	43	43	44	44	43	43	38	36	37	38	41	43.2	50											
28-Nov	43	41	41	41	40	42	41	43	41	40	40	37	37	37	34	35	34	33	35	36	35	35	36	37	38.1	43											
29-Nov	38	38	39	40	41	40	39	39	39	38	39	40	38	37	37	36	36	34	34	34	35	38	36	33	37.3	41											
30-Nov	32	32	30	32	31	29	29	29	26	29	29	27	25	23	22	23	24	25	27	29	29	30	31	32	28.2	32											
	71.8	72.0	72.6	72.9	73.4	74.3	74.6	74.7	74.3	73.6	72.9	71.3	68.9	67.0	66.4	66.4	66.8	67.0	67.6	67.9	67.9	68.4	68.8	69.4	Diurnal Average												
	93	93	94	97	98	97	97	94	96	95	96	96	96	97	98	98	98	98	98	98	96	96	90	92	93	Diurnal Maximum											



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 90m (RH90m) - %
Mannix - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 90m (RH90m) - %
Mannix - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	65	9.03	9.03
40 - 60	137	19.03	28.06
60 - 80	252	35.00	63.06
80 - 100	266	36.94	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 30 km/h on Nov 16 12:00	Maximum Daily Speed Average: 16.0 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 15 08:00	Minimum Daily Speed Average: 1.7 km/h on Nov 19	Hours of Data: 713
Maximum Diurnal Speed Average: 5.0 km/h at hour 24	Minimum Diurnal Speed Average: 2.8 km/h at hour 16	Hours of Missing Data: 7
Monthly Average Velocity: 3.8 km/h 191.8 deg	Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 8 Median = 11 Q ₃ = 14 P ₉₀ = 17 P ₉₉ = 25	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-Nov	NNE14	NNE11	NNE12	NNE13	NNE11	NNE13	NNE15	NNE12	NNE11	N11	NNE16	NNE16	NNE16	N14	NNE16	NNE17	NNE15	NNE12	NNE13	NE14	NNE14	NNE15	NNE14	NNE14	NNE13.6	NNE17	
2-Nov	N9	N9	NNE10	NNE9	NNE10	NNE9	NNE7	NNE6	E6	ESE7	SE9	SSE9	SE9	SE11	SSE7	SE12	SE13	SE14	SE14	SE16	SE13	SE13	SE13	SE12	ESE6.2	SE16	
3-Nov	SE12	SE13	SE10	SE10	SSE11	SSE10	SSE8	SSE7	SSE7	SSE7	S5	S4	WSW4	W4	NW7	NW8	NW8	NW7	NW7	W10	W13	W11	WNW8	WSW7	SSW3.0	W13	
4-Nov	SSW7	S8	S6	SSE5	SSE7	S6	SSE9	SSE10	SSE7	SSE9	SE8	SE11	SE12	SE13	SE10	SSE10	SSE10	SSE10	SSE10	S8	SSW6	WNW6	W9	W10	SSE7.0	SE13	
5-Nov	W13WNW15	NW13WNW15	NW16	NW15	NW15	NNW13	NNW12	NNW14	NNW15	NW16	NW15	NNW12	NNW10	NNW10	NNW12	NNW14	NNW12	NNW12	NNW10	N9	NNW7	NNW5	NW4	NW11.4	NW16		
6-Nov	N3	ENE1	SSE3	SSE4	SSE6	SSE6	SSE7	SSE8	SSE8	SSE8	S7	SE7	SE12	SSE12	SSE12	SE13	SE15	SE17	SE20	SE18	SE20	SE17	SSE20	SSE20	SSE10.6	SSE20	
7-Nov	SSE12	SE9	SSW11	SW17	SW15WSW15	WSW17	WSW18	WSW18	WSW17	WSW15	WSW12	WSW17	WSW11	WSW10	WSW8	WSW5	WSW3	SSW10	SW10	SW12	SW10	SW9	SW10	SW11.2	WSW18		
8-Nov	WSW7	W6	WSW7	W11	W5	N5	NNW9	N14	N20	NNE16	N12	NNE13	NNE14	N16	NNE16	NNE16	NNE15	NNE10	NNE8	NE7	NE6	NNE8	NNE8	NNE8	N8.4	N20	
9-Nov	NNE6	N5	N5	N5	NNW4	NNW3	WSW3	WSW4	WNW2	SW3	SSW3	S4	S7	S8	S7	SSW8	S8	SSE5	SSE8	SSE8	SSE9	SSE11	SSE11	SE11	S3.2	SE11	
10-Nov	SSE10	SSE14	SSE15	SSE15	SSE15	SSE17	S13	S12	SSE17	S16	S15	S16	S15	S16	SSE15	SSE18	SSE19	SSE20	S19	S18	SSE19	SSE18	SSE15	SSE20	SSE16.0	SSE20	
11-Nov	SSE15	SSE16	SSE16	SSE14	SSE16	S14	S12	SSW14	SSW13	SSW11	SSW13	SW15	WSW18	WSW23	WSW21	SW15	SSW11	SSW13	SW13	SSW11	S11	SW8	SSW9	S9	SSW11.8	WSW23	
12-Nov	SSW8	SW12	SSE6	S5	SSE8	SSE7	SSE10	SSE12	SSE13	SSE12	SSE11	SSE14	SSE14	SSE12	SSE12	SSE14	SSE14	SE16	SE18	SE19	SSE21	SSE20	SSE21	SSE19	SSE12.7	SSE21	
13-Nov	SSE19	SSE20	SSE19	S18	S15	SSE15	SSE13	SSE11	SSE12	S12	S12	SSE11	S9	SW14	SW15	SW12	SW11	SW13	SSW9	SSW13	SSW11	SW12	SW10	SW15	S11.8	SSE20	
14-Nov	WSW17	WSW20	SW15	WSW13	WSW14	SSW6	S5	SSE10	S9	SSE10	SSE9	SE9	S2	SW16	SSW10	SSW11	SSW9	SSW7	S6	SSW9	SSW6	SSE6	SE9	SSE8	SSW8.0	WSW20	
15-Nov	SSE5	SSE5	SSW4	SSE4	SE7	SSE5	SSE3	N1	NNE5	N5	NNW4	N3	N3	N8	N15	NNE16	NNE14	NNW19	NNE18	NNE14	N13	N15	N11	N8	NNE6.1	NNE19	
16-Nov	N7	N7	N8	NNW5	WNW7	W12	WNW13	W15	W21	W27	W27	W30	W22	W20	W17	WSW15	SW11	SSW7	S9	SSE8	SE10	SSE9	SE9	SE11	WSW9.2	W30	
17-Nov	SE12	SE12	SE15	SE19	SE16	SE16	SE16	SE15	SE15	SE16	SSE17	S15	S11	SW15	SSW13	SSW13	WSW11	W9	WNW19	WNW23	W25	WSW24	W24	W25	SSW8.8	W25	
18-Nov	W23	W23	W22	NW16	NW18	NW23	NW24	NW24	NW21	NW22	NW23	NNW19	NNW20	NNW15	NNW15	NNW13	NNW11	NW8	NNW4	SSW4	W8	WSW5	WSW11	WSW6	NW13.8	NW24	
19-Nov	SW5	SW6	S6	S10	SSE9	SSE8	SSE8	SSE5	SE6	SSW5	S6	SSE5	SSE5	ENE3	N4	NW6	NNW7	NNW8	NW6	N5	NNW2	W6	NNW3	W4	SSW1.7	S10	
20-Nov	SW4	WSW4	WSW6	WSW6	WSW7	WSW8	WSW10	W17	WSW12	WSW11	WSW10	SW11	S10	SSE13	SSE13	SSE13	SE11	SE11	SE13	SSE16	SSE18	SSE17	SSE15	SSE11	S7.6	SSE18	
21-Nov	SSE8	S8	SW13	WSW14	WSW12	SW12	SW7	SSE9	SSE9	SE7	SSE9	SSE9	SSE8	SSE6	SSW10	S10	SSE12	S8	SSW9	SW8	SSW8	WSW20	WSW25	W23	SSW8.4	WSW25	
22-Nov	WSW24	W28	W22	W25	W22	W20	W21	WNW14	W18	WNW19	NW10	NNE10	AF	AF	AF	AF	AF	AF	AF	AF	NNE9	N12	N12	NNE12	N8	----	W28
23-Nov	NNW8	NNW7	NNW7	NNW8	WNW6	NW6	W5	N4	NNW4	NW5	NNW5	NW4	NW4	N5	NNW7	N10	N10	N10	N10	NNW12	NNW12	NNW11	N10	NNW12	NNW7.1	NNW12	
24-Nov	NNW10	NNW10	NW9	NW12	NW13	NNW13	NW13	NW11	NW9	WNW8	W7	SW3	WNW8	NW9	NNW9	NNW5	WNW8	W4	SW5	SSW4	S6	S8	SSW9	S9	WNW5.3	NNW13	
25-Nov	SSW9	S9	SSE12	SSE12	SSE12	SSE12	S8	S5	SSW4	SW5	SW2	ESE1	SSE3	SSE4	SE3	SE4	SSE8	SSE7	SSE10	SSE7	SSE10	SSE11	SSE11	SSE11	SSE7.2	SSE12	
26-Nov	SSE12	SSE12	SSE11	SE12	SSE16	SSE13	SSE14	SSE15	SSE14	SSE15	SSE15	SSE16	SE12	SE11	SSE11	S7	SSW9	S7	SE7	SSE11	SSE12	SSE10	SE8	SSE9	SSE11.5	SSE16	
27-Nov	S9	SW8	SSE5	SE3	E4	ESE5	SSE9	SE5	WSW4	WSW13	WSW14	WSW13	W9	WNW7	W4	SSE3	SSE7	S7	S6	S8	S10	SSE13	SSE12	SE6	SSW5.1	WSW14	
28-Nov	SE8	SSE9	SE7	SSE10	SSE12	SSE10	SSE12	SSE16	SSE13	SSE15	SSE13	SSE11	SSE12	SSE14	SSE14	SSE11	SSE10	S11	SSE9	SSE9	SSE13	SSE15	SSE17	SSE13	SSE11.8	SSE17	
29-Nov	SSE14	SSE12	SSE9	SSE12	SSE9	SSE10	SSE11	SSE10	SSE11	SSE11	SSE12	SSE9	SSE10	SSE12	SSE13	SSE12	SSE13	SSE13	SSE10	SSE11	SSE12	SSE12	SSE14	SSE13	SSE11.4	SSE14	
30-Nov	SSE13	SSE13	SSE15	SE11	SSE13	SSE13	SSE14	SSE14	SSE16	SSE17	SSE14	SSE12	SE4	SSE8	SSE7	S5	SW10	SSW12	S9	SSE9	S9	SSE10	SE7	SSE9	SSE10.3	SSE17	

SSW4.2SSW4.5SSW3.9SSW3.9SSW4.1SSW3.6SSW3.7SSW3.4SSW3.5SSW4.2SSW4.1SSW3.6SSW3.3SSW3.7SSW3.0	S2.8	S3.4	S3.4	S3.9	S4.3	S4.9	S4.5	S4.8	S5.0	Diurnal Average														
WSW24	W28	W22	W25	W22	NW23	NW24	NW24	NW21	W27	W27	W30	W22	WSW23	WSW21	SSE18	SSE19	SSE20	SE20	WNW23	W25	WSW24	WSW25	W25	Diurnal Maximum

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



Summary of Hour Standard Deviations

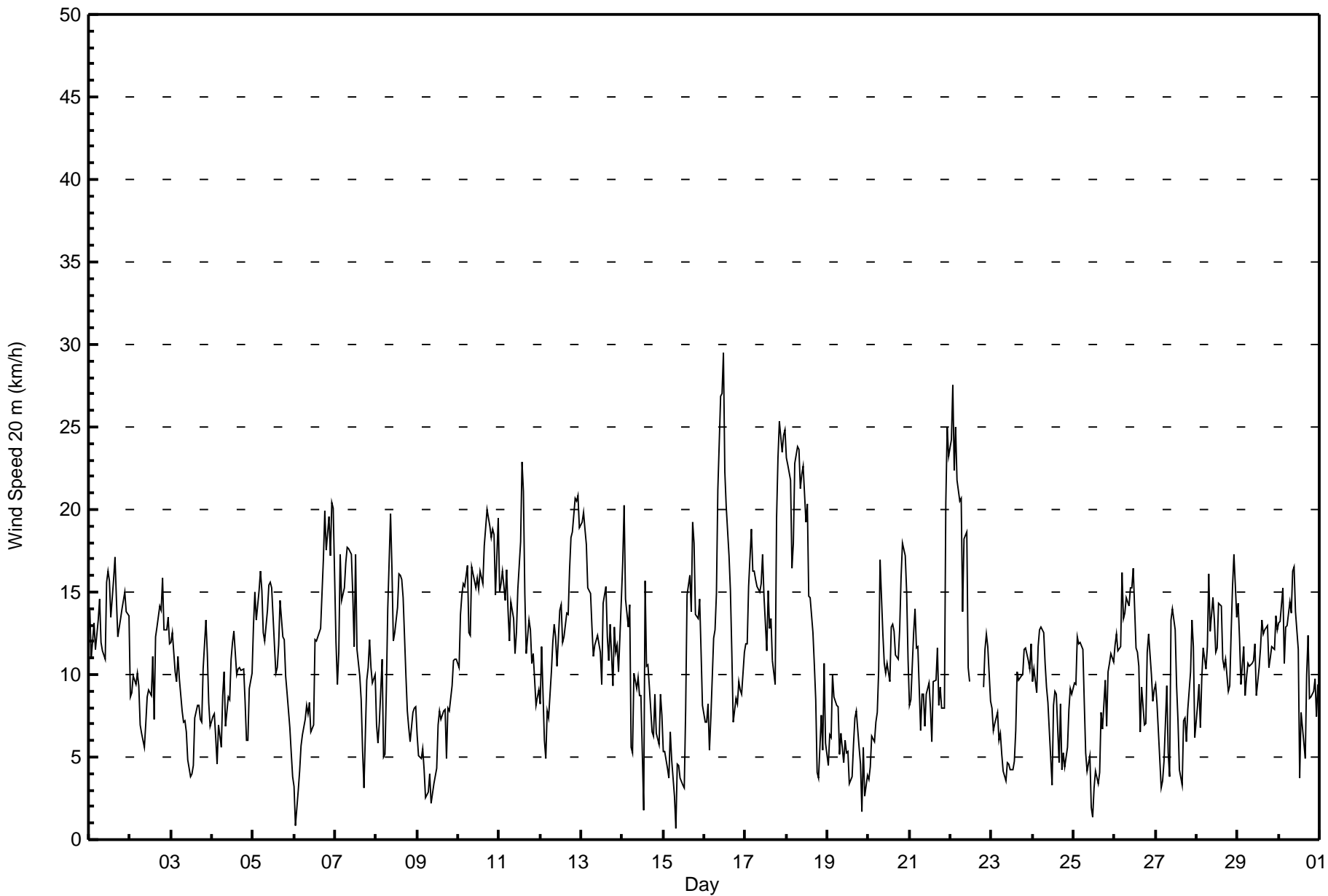
Mannix - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 6 km/h on Nov 21 22:00	Hours of Data: 713
Minimum Value: 1 km/h on Nov 20 02:00	Hours of Missing Data: 7
Percentiles: P ₁ = 1 P ₁₀ = 2 O ₁ = 2 Median = 3 O ₃ = 4 P ₉₀ = 4 P ₉₉ = 6	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-Nov	3	3	3	3	3	3	3	3	3	3	4	4	4	3	4	4	4	4	4	4	4	3	3	4	4
2-Nov	3	3	3	2	2	2	2	2	2	3	2	3	3	3	2	4	4	4	4	4	4	3	3	3	4
3-Nov	3	3	3	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	4	3	3	2	2	4
4-Nov	2	2	1	1	2	1	2	2	2	2	3	3	4	4	3	2	2	2	2	3	2	1	2	2	4
5-Nov	2	4	4	3	4	4	4	3	4	4	4	4	4	3	3	3	3	3	4	3	2	2	2	1	4
6-Nov	2	1	1	1	1	2	2	2	2	2	3	2	3	3	3	3	5	5	6	5	5	4	5	4	6
7-Nov	4	2	4	4	3	3	3	3	4	4	4	3	5	6	3	2	2	2	2	2	2	1	1	1	6
8-Nov	3	3	3	2	3	2	2	4	4	5	3	3	4	4	4	4	4	3	2	2	1	2	2	2	5
9-Nov	2	1	1	2	1	1	1	1	1	1	2	2	2	3	3	3	3	2	1	2	2	3	3	2	3
10-Nov	2	3	3	3	3	3	3	3	4	5	5	5	5	6	4	4	4	5	6	5	5	4	3	4	6
11-Nov	4	4	4	4	4	4	4	4	4	3	4	4	4	6	5	5	2	3	3	3	3	2	2	2	6
12-Nov	4	3	2	2	3	3	3	2	3	3	3	4	3	3	3	3	3	4	4	5	5	5	5	5	5
13-Nov	5	5	5	5	5	4	4	3	4	4	4	4	5	5	5	4	2	3	2	3	3	3	2	2	5
14-Nov	4	4	4	3	3	3	2	3	2	3	2	3	4	3	4	3	1	2	2	2	1	2	2	3	4
15-Nov	1	2	1	1	3	2	2	2	2	1	2	2	2	5	3	4	3	4	4	4	4	3	3	2	5
16-Nov	2	3	3	2	2	4	3	3	4	4	5	5	6	4	4	4	3	2	2	1	2	2	2	3	6
17-Nov	3	5	5	6	4	4	4	4	4	4	4	4	4	4	4	4	4	6	5	6	5	5	5	4	6
18-Nov	4	4	4	6	5	6	5	6	6	5	5	6	5	4	5	3	3	2	2	2	3	2	2	4	6
19-Nov	2	1	1	2	2	1	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2
20-Nov	1	1	1	1	1	2	3	3	2	3	3	3	4	3	3	3	3	4	4	4	4	4	4	3	4
21-Nov	2	3	3	3	3	3	4	2	1	2	2	2	2	2	3	2	2	2	3	3	4	6	6	4	6
22-Nov	4	4	4	4	3	3	3	4	5	4	4	2	AF	AF	AF	AF	AF	AF	AF	AF	2	3	3	2	5
23-Nov	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	3	3	3	4	4	3	4	4	4	4
24-Nov	3	3	3	3	3	4	3	3	3	2	2	1	2	2	3	2	3	2	1	2	1	2	2	2	4
25-Nov	2	2	2	2	2	2	2	1	2	1	2	1	1	2	1	1	1	2	1	1	1	1	2	1	2
26-Nov	3	4	3	3	4	3	3	3	3	3	4	4	3	3	2	3	3	2	3	2	3	2	2	2	4
27-Nov	3	3	2	2	2	2	3	3	4	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	4
28-Nov	2	1	3	1	2	2	4	4	3	3	3	3	3	3	4	2	2	3	2	1	2	2	3	2	4
29-Nov	2	2	2	2	3	2	3	1	2	2	5	3	3	3	3	3	1	2	2	2	3	2	3	2	5
30-Nov	3	2	3	2	2	3	4	3	3	4	3	2	2	3	1	2	3	2	3	2	2	2	1	4	4

5	5	5	6	5	6	5	6	6	6	5	5	6	6	6	5	5	5	6	6	6	5	6	6	5	
Diurnal Maximum																									

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	91	12.76	12.76
6 - 11	303	42.50	55.26
12 - 19	274	38.43	93.69
20 - 28	44	6.17	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 713

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	1	0	2	1	3	5	15	8	6	7	8	5	2	4	11	91
6 - 11	15	18	2	0	1	1	29	93	37	28	13	17	10	8	14	17	303
12 - 19	7	32	1	0	0	0	34	100	15	8	18	20	6	7	11	15	274
20 - 28	1	0	0	0	0	0	2	8	0	0	0	8	17	1	6	1	44
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	51	3	2	2	4	70	216	60	42	38	53	39	18	35	44	713

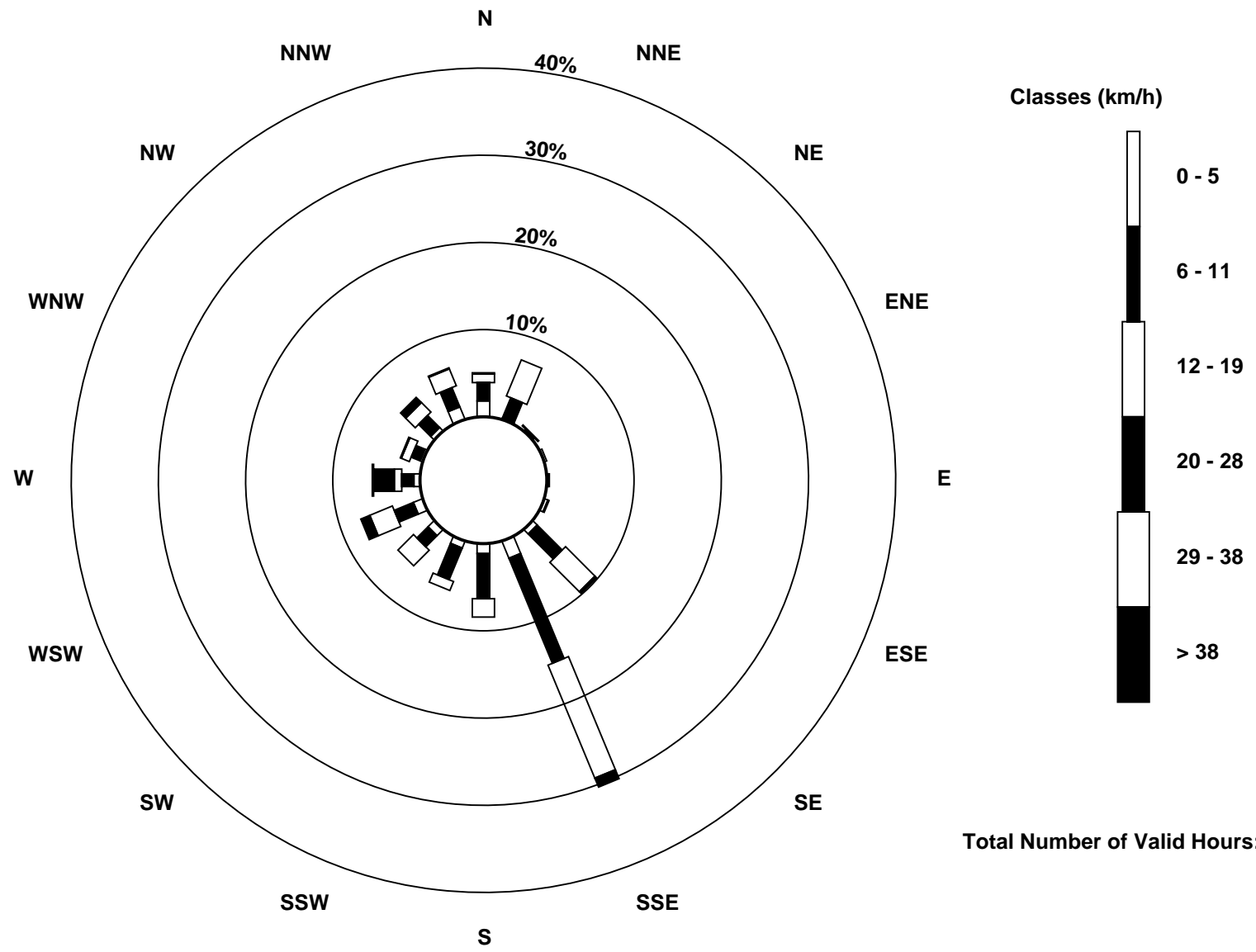
Total Number of Valid Hours: 713

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Maximum Speed: 33 km/h on Nov 16 12:00	Maximum Daily Speed Average: 23.7 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 6 02:00	Minimum Daily Speed Average: 2.0 km/h on Nov 19	Hours of Data: 720
Maximum Diurnal Speed Average: 7.7 km/h at hour 24	Minimum Diurnal Speed Average: 4.2 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 6.0 km/h 191.0 deg	Percentiles: P ₁ = 3 P ₁₀ = 7 Q ₁ = 11 Median = 16 Q ₃ = 20 P ₉₀ = 24 P ₉₉ = 30	Percent Operational Time: 100.0

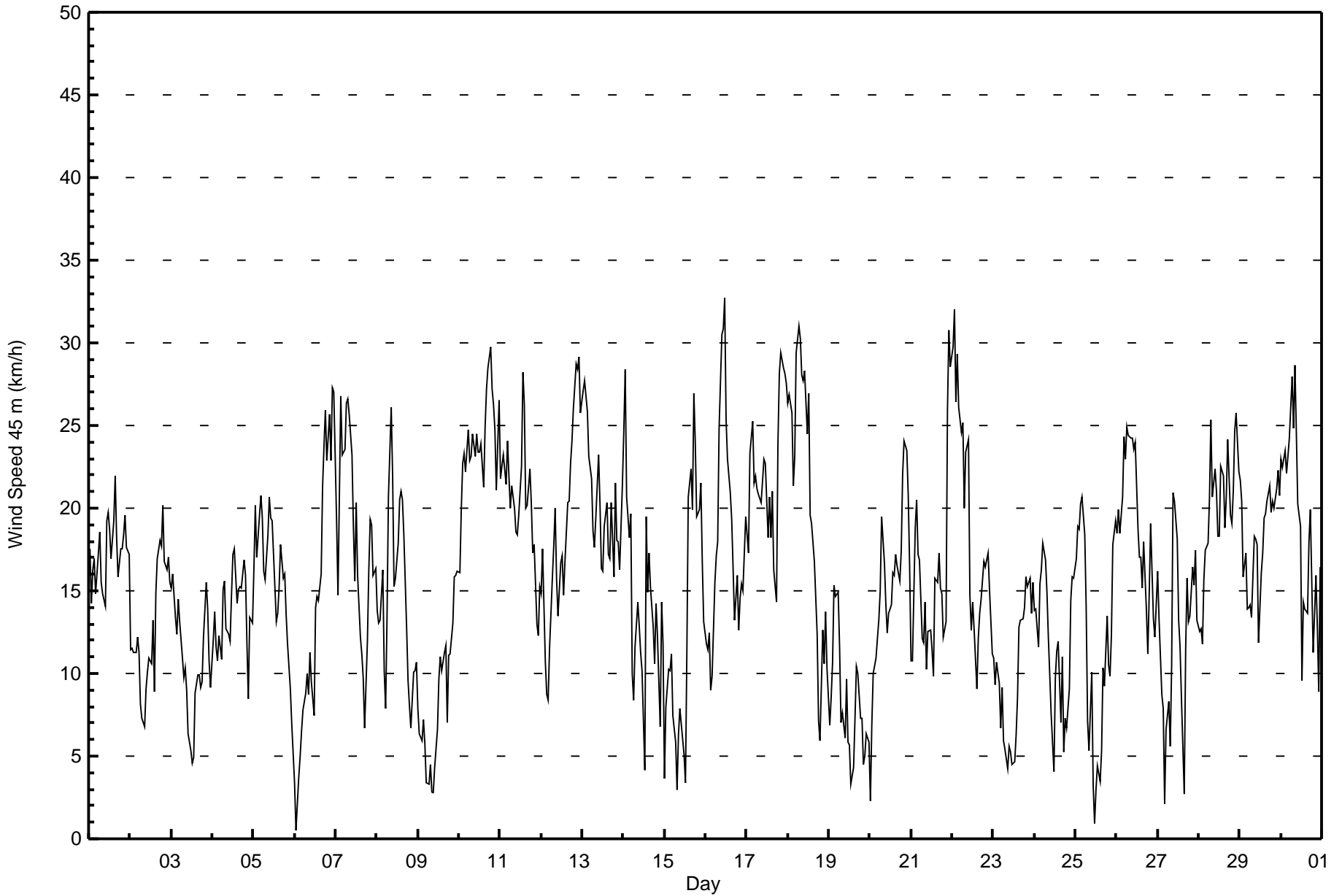
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	NNE18	N14	N16	N17	N15	N17	N19	N15	N15	N14	NNE19	NNE20	NNE19	N17	N19	N22	N18	N16	NNE18	NNE18	NNE18	N20	NNE18	N17	N17.4	N22	
2-Nov	N11	N12	NNE11	NNE11	NNE12	NNE11	NNE8	NNE7	ENE7	ESE9	SE10	SE11	SE11	SE13	SE9	SE15	SE17	SE18	SE18	SE20	SE17	SE16	SE17	SE16	ESE7.9	SE20	
3-Nov	SE15	SE16	SE13	SE12	SE15	SSE13	SSE11	SSE10	SSE10	SSE9	S6	S5	WSW5	W5	NW9	NW10	NW10	NW9	NW10	W12	W15	W14	W11	SW9	SSW3.8	SE16	
4-Nov	SSW12	S14	S12	S11	SSE12	SSE11	SSE15	SE16	SSE13	SE12	SE12	SE15	SE17	SE18	SE14	SE15	SE15	SSE15	SSE17	S16	S12	WNW9	WSW13	W13	SSE11.1	SE18	
5-Nov	W16	WNW20	NW17	WNW20	NW21	NW19	NW16	NNW16	NNW18	NNW21	NW19	NW19	NW15	NNW13	NNW14	NNW15	WNW18	NW16	NNW16	NNW14	NNW12	NNW9	NNW7	NW5	NW14.8	NW21	
6-Nov	N3	ENE1	SSE4	SSE5	SSE7	SSE8	SSE9	SSE10	SSE9	SSE11	S9	SE7	SE14	SSE15	SE14	SE16	SE21	SE24	SE26	SE23	SE26	SE23	SE27	SSE27	SE13.6	SE27	
7-Nov	SSE19	SSE15	SSW21	SW27	SW23	WSW24	WSW26	WSW27	WSW26	WSW23	SW19	WSW16	WSW20	WSW16	WSW12	WSW11	WSW10	WSW7	SSW12	SW16	SW19	SW19	SW16	SW16	SW17.0	SW27	
8-Nov	W14	W13	WSW13	W16	W10	NNW8	NNW13	N21	N26	N22	N15	NNE16	N18	N21	NNE21	NNE20	NNE18	NNE13	NNE10	NNE8	NNE7	NNE10	NNE10	NNE11	N11.2	N26	
9-Nov	NNE8	N6	N6	N7	NNW6	NNW3	W3	W4	W3	WSW3	SSW4	S7	S10	S11	S10	S11	S12	SSE7	SE11	SSE11	SSE13	SE16	SE16	SE16	SSE4.6	SE16	
10-Nov	SE16	SE20	SSE23	SSE23	SSE22	SSE25	S23	S23	SSE24	SSE23	S24	SSE23	S23	SSE24	SSE21	SSE25	SSE27	SSE28	SSE30	SSE27	SSE26	SSE25	SSE21	SSE27	SSE23.7	SSE30	
11-Nov	SE22	SSE23	SSE23	SSE21	SSE24	S22	S20	SSW21	SSW20	SSW19	SSW18	SW20	SW23	WSW28	WSW26	SW20	SSW20	SSW22	SW20	SSW17	SSW18	SW13	SSW12	SSW15	SSW17.4	WSW28	
12-Nov	SSW15	SW18	SSW11	SSW9	SSE8	SSE12	SSE16	SSE18	SSE20	SSE16	SSE13	SSE17	SE17	SSE15	SSE17	SSE20	SE20	SE23	SE24	SE26	SE29	SE28	SE29	SE26	SSE17.3	SSE29	
13-Nov	SSE27	SSE28	SSE27	SSE26	SSE23	SSE22	SSE19	SSE18	SSE19	S23	S20	SSE16	SSW16	SSW19	SW20	SW17	SW17	SW20	SW16	SW22	SW18	SW18	SW16	SW21	S17.8	SSE28	
14-Nov	WSW25	WSW28	SW21	WSW18	WSW20	SW10	SSW8	S12	SSW14	S13	SE11	SE10	S4	SW19	SSW15	SSW17	SSW15	SSW13	SSW11	SW14	SW12	S7	SE14	SSE12	SSW12.3	WSW28	
15-Nov	S4	SSE8	S10	SSE10	SE11	ESE7	SE6	N3	NNE6	N8	NNW7	NNW5	NNW3	N11	N21	N22	NNE20	N27	N24	N19	N20	N21	N17	N13	NNE8.6	N27	
16-Nov	N12	N11	N12	NNW9	WNW10	W15	WNW17	W18	WSW25	WSW31	WSW31	W33	W25	W23	WSW21	WSW19	SW16	SSW13	S16	S13	SE15	SSE15	SE15	SE20	WSW11.0	W33	
17-Nov	SE18	ESE17	SE23	SE25	SE22	SE22	SE21	SE21	SE20	SE22	SSE23	SSE23	S18	SSW21	SSW18	SSW21	SW16	W14	W24	W28	W29	WSW28	WSW28	WSW28	S12.1	W29	
18-Nov	WSW26	WSW27	W26	NW21	NW23	NW29	NW31	NW30	NW28	NW28	NW28	NW24	NNW27	NNW20	NNW19	NNW17	NNW15	NW12	NNW7	WSW6	W13	W11	W14	W10	WNW18.4	NW31	
19-Nov	W7	SW9	S11	S15	SSE15	SSE15	SSE12	SSE7	SE8	S6	SSE10	SSE6	SSE6	NE3	N4	NW7	NNW10	NNW10	NNW7	NNE7	N4	WNW5	NNW6	NW6	S2.0	S15	
20-Nov	W2	W7	W10	W11	WSW12	WSW13	WSW15	W19	WSW17	WSW14	SW12	SW14	S14	SSE16	SSE16	SE17	SE17	SE16	SE17	SSE22	SSE24	SSE23	SSE21	SSE16	S9.7	SSE24	
21-Nov	SSE11	SSW11	SW19	SW21	SW17	SW17	SW12	S12	S14	SSE10	SSE13	SSE13	SSE11	S10	SSW16	S15	SSE17	S15	SSW15	SW12	SSW13	WSW26	WSW31	WSW29	SSW13.0	WSW31	
22-Nov	WSW30	W32	W26	W29	WSW26	W25	W25	WNW20	W23	W24	NW15	N13	NNE14	NNE13	N9	NNW12	NNE14	N15	N17	N16	N17	N17	N15	NNW11	WNW12.7	WSW32	
23-Nov	NNW11	NNW9	N11	NNW9	NW7	NW9	WNW6	N5	NW4	NW6	NNW5	NW5	NW5	N6	NNW9	N13	N13	N13	NNW14	NNW16	NNW15	NNW16	NNW14	NNW15	NNW9.5	NNW16	
24-Nov	NNW14	NW14	NW12	NW15	NW16	NW18	NW17	NW15	NW12	WNW10	W8	SW4	WNW10	NW11	NNW12	NNW7	WNW11	W5	SW7	SW7	S9	S14	SSW16	S16	WNW7.2	NW18	
25-Nov	SSW17	S19	SSE19	SSE20	S21	SSE18	S14	SW7	SW5	WSW10	WSW3	SE1	SSE3	SSE4	SE4	SSE5	S10	S9	SSE14	S11	S10	SSE12	SSE18	SSE19	S10.6	S21	
26-Nov	SE18	SE20	SSE19	SE21	SSE24	SE23	SSE25	SSE24	SSE24	SE24	SE24	SE24	SE19	SSE17	S17	SSW15	SSW18	SSW14	SSE11	S15	SSE19	S13	SSE12	SSE14	SSE18.2	SSE25	
27-Nov	SSW16	SW13	SSW9	S8	WNW2	ESE7	SSW8	S6	W10	WSW21	WSW20	WSW18	W13	W12	W8	SW3	S11	SSW16	SSW13	SSW13	S16	S15	S17	SSE13	SW9.7	WSW21	
28-Nov	SSE13	S13	SSE12	SSE16	SSE17	S18	SSE21	SSE25	SSE21	SSE22	SSE21	SSE18	SSE18	SSE23	SSE22	S19	S21	S24	S20	SSE19	S21	SSE25	SSE26	SSE22	SSE19.6	SSE26	
29-Nov	SSE22	SSE20	SSE16	SSE17	SSE14	S14	S14	S13	SSE18	SSE18	SSE18	SSE12	SE16	SE17	SE19	SSE20	SSE20	SSE21	SSE20	SSE20	SSE20	SSE20	SSE21	SSE22	SSE21	SSE18.0	SSE22
30-Nov	SSE23	SSE22	SSE23	SSE22	SSE23	SSE24	SSE28	SSE25	SSE29	SSE25	SSE20	SSE19	SSE10	SSE14	S14	SW14	SW18	SW20	SSW16	SSW11	SSW16	SSW13	S9	SSE16	S17.3	SSE29	

SSW6.5	SSW7.0	SSW6.7	SSW6.8	SSW6.6	SSW6.1	SSW6.3	SSW5.4	SSW5.9	SSW6.4	SSW6.1	S5.3	S4.5	SSW4.8	SSW4.2	SSW4.3	S5.3	S5.3	S5.5	S6.6	S7.2	S6.6	S7.2	S7.7	Diurnal Average
WSW30	WSW32	SSE27	W29	WSW26	NW29	NW31	NW30	SSE29	WSW31	WSW31	W33	NNW27	WSW28	WSW26	SSE25	SSE27	SSE28	SSE30	W28	W29	WSW28	WSW31	WSW29	Diurnal Maximum

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Nov 27 09:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Nov 6 04:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Nov	3	2	2	2	2	2	2	2	3	3	4	4	3	3	3	3	4	4	4	4	3	2	3	3	4
2-Nov	3	2	3	2	2	3	2	1	2	3	2	2	3	3	2	4	4	5	4	4	4	3	3	3	5
3-Nov	3	4	3	2	2	2	2	1	2	1	2	1	1	1	2	1	1	1	2	4	3	3	2	2	4
4-Nov	2	1	1	2	2	2	2	2	2	2	3	3	4	4	3	2	3	2	2	2	3	2	2	2	4
5-Nov	2	3	4	3	3	3	4	3	3	4	4	3	3	3	3	3	3	2	3	2	2	2	2	1	4
6-Nov	1	1	2	1	1	1	2	2	1	2	3	2	3	3	3	4	5	5	5	5	5	4	5	4	5
7-Nov	3	2	4	3	3	3	3	3	4	4	4	3	5	6	4	2	2	1	1	2	2	2	2	1	6
8-Nov	2	4	4	1	5	3	2	4	3	5	3	3	4	3	4	3	4	3	2	2	2	3	2	3	5
9-Nov	2	2	1	1	1	2	1	1	2	1	2	1	2	3	3	4	3	1	1	2	2	3	3	2	4
10-Nov	2	3	4	4	3	3	3	3	3	4	4	4	4	5	4	3	3	4	5	4	4	4	3	4	5
11-Nov	3	4	3	4	4	3	4	4	4	3	4	4	4	6	6	5	2	3	3	2	2	3	3	2	6
12-Nov	3	3	2	6	4	2	1	2	3	4	3	5	3	3	3	2	3	4	4	5	5	5	5	5	6
13-Nov	5	4	4	4	4	3	4	2	4	3	3	5	5	4	5	4	2	3	3	2	3	3	3	2	5
14-Nov	4	4	4	3	3	4	3	2	2	2	2	4	3	4	2	2	2	2	4	1	3	2	3	4	4
15-Nov	2	3	2	2	4	3	3	1	1	1	2	2	2	6	2	3	4	3	4	3	3	2	3	2	6
16-Nov	2	3	2	3	1	4	3	3	4	4	4	5	6	4	3	4	2	1	2	1	1	2	2	3	6
17-Nov	3	5	5	6	4	4	4	3	3	4	3	4	4	4	4	3	4	6	5	5	5	4	4	4	6
18-Nov	3	3	4	6	5	5	5	5	5	4	5	5	5	4	4	3	3	3	3	2	1	1	3	6	
19-Nov	2	1	2	1	2	1	2	2	2	2	2	2	2	1	1	3	2	2	1	2	2	3	1	2	3
20-Nov	1	1	2	1	1	1	2	3	2	3	3	3	3	3	3	3	4	4	4	4	3	3	3	3	4
21-Nov	2	3	3	4	4	4	5	3	2	2	2	2	2	2	3	2	1	2	2	2	5	6	6	4	6
22-Nov	4	4	4	4	3	3	3	3	5	4	4	2	3	3	2	2	3	3	3	2	2	2	3	3	5
23-Nov	2	2	2	2	1	2	1	2	1	1	1	2	2	2	2	3	3	3	4	3	3	4	4	4	4
24-Nov	3	3	2	3	3	3	3	3	2	2	3	1	2	2	2	2	3	2	2	3	2	2	1	1	3
25-Nov	2	2	1	1	1	1	2	3	1	2	2	1	1	1	1	2	2	1	2	3	2	2	2	2	3
26-Nov	2	3	3	2	2	2	2	2	2	3	3	3	2	2	2	3	3	3	2	3	3	3	3	3	3
27-Nov	4	4	3	3	2	3	4	3	9	3	2	1	2	2	2	1	2	1	2	3	2	2	2	2	9
28-Nov	1	1	2	2	2	1	4	4	3	2	3	3	3	4	2	1	2	2	1	1	1	2	1	2	4
29-Nov	1	2	1	1	2	1	1	1	1	2	4	3	3	2	2	3	1	1	1	1	2	3	2	2	4
30-Nov	2	2	1	2	2	2	3	3	3	2	2	2	4	2	1	2	2	1	4	2	2	1	1	3	4
																	Diurnal Maximum								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	40	5.56	5.56
6 - 11	150	20.83	26.39
12 - 19	317	44.03	70.42
20 - 28	197	27.36	97.78
29 - 38	16	2.22	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	0	1	1	0	0	2	5	3	1	3	3	6	2	4	4	40
6 - 11	9	14	0	1	0	3	11	25	22	8	6	5	11	6	11	18	150
12 - 19	30	16	0	0	0	1	42	64	32	34	29	13	16	3	16	21	317
20 - 28	11	5	0	0	0	0	28	75	13	7	12	23	10	3	7	3	197
29 - 38	0	0	0	0	0	0	1	3	0	0	0	6	3	0	3	0	16
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	35	1	2	0	4	84	172	70	50	50	50	46	14	41	46	720

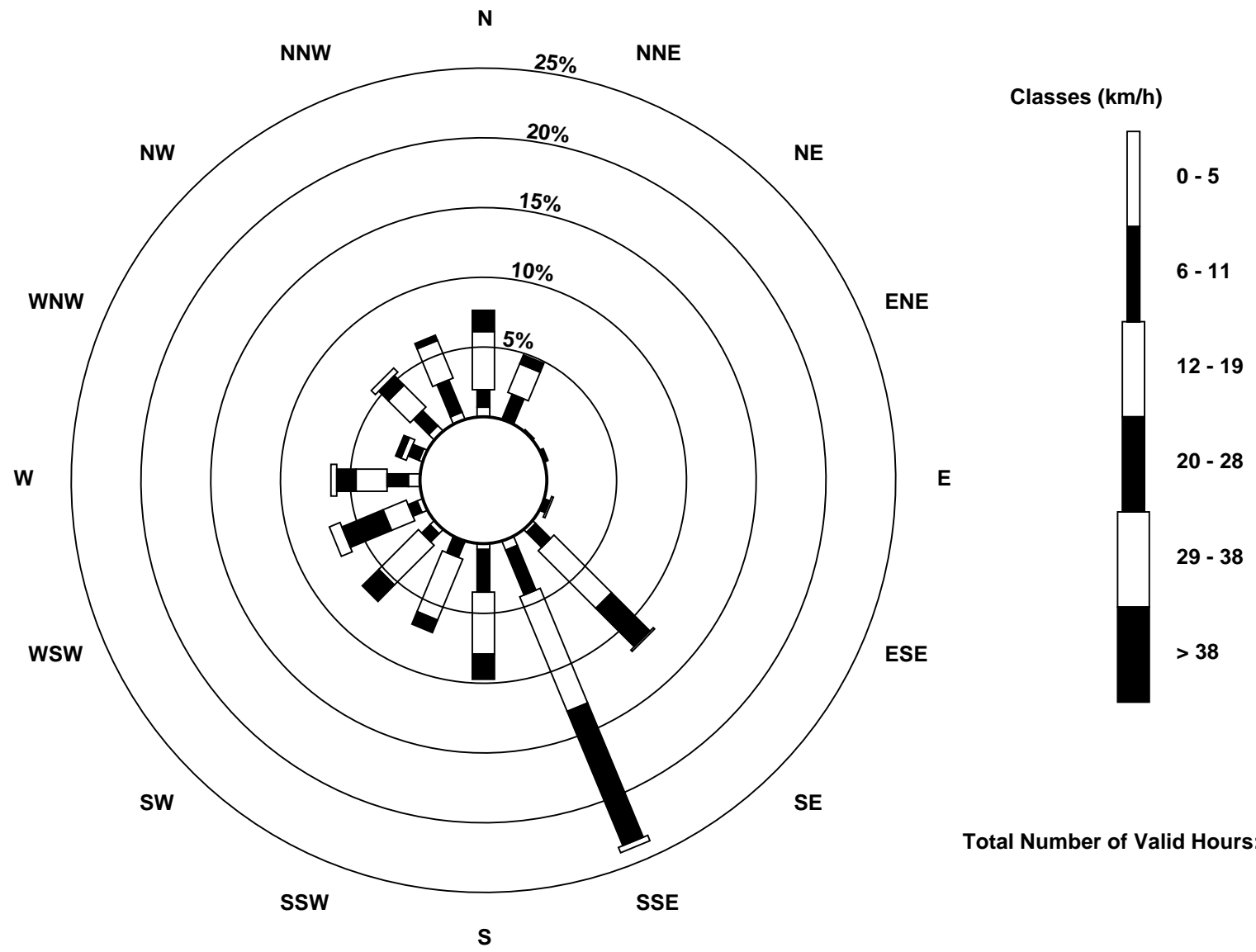
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Maximum Speed: 36 km/h on Nov 22 02:00	Maximum Daily Speed Average: 29.5 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 6 02:00	Minimum Daily Speed Average: 0.9 km/h on Nov 19	Hours of Data: 720
Maximum Diurnal Speed Average: 8.9 km/h at hour 24	Minimum Diurnal Speed Average: 5.0 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 7.1 km/h 201.4 deg	Percentiles: P ₁ = 3 P ₁₀ = 8 Q ₁ = 13 Median = 18 Q ₃ = 24 P ₉₀ = 29 P ₉₉ = 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-Nov	NNE21	NNE17	N19	NNE20	NNE17	N20	NNE21	NNE18	NNE17	N16	NNE22	NNE22	NNE21	N19	NNE21	N24	NNE20	NNE18	NNE21	NNE21	NNE21	NNE22	NNE20	NNE19	NNE19.8	N24
2-Nov	N13	N13	NNE13	NNE13	NNE14	NNE13	NNE9	NE8	E7	ESE8	SE10	SE12	SE11	SE14	SE10	SE16	SE19	SE20	SE20	SE24	SE20	SE20	SE20	SE18	ESE9.2	SE24
3-Nov	SE17	SE18	SE16	SE16	SE18	SSE16	SSE14	SSE12	SSE13	SSE11	S7	S5	WSW5	W5	NW9	NW11	NW10	NW10	NW11	W13	W17	W15	W11	WSW10	SSW4.4	SE18
4-Nov	SSW13	S16	SSW14	S18	SSE17	SSE18	SSE23	SE23	SSE20	SE19	SE17	SE19	SE23	SE22	SE19	SE20	SSE21	SSE22	S23	S20	SSW14	W7	W16	W15	SSE15.0	SE23
5-Nov	W19	WNW23	NW18	WNW21	NW22	NW21	NW18	NNW17	NNW21	NNW23	NW21	NW21	NW16	NNW14	NNW15	NNW17	WNW19	NW17	NNW18	NNW15	NNW13	NNW10	NNW8	NW6	NW16.2	NNW23
6-Nov	N4	ESE1	SSE4	SSE5	SSE7	SSE9	SSE9	SSE11	SSE10	S13	S11	SE7	SE14	SE15	SE16	SE19	SE24	SE28	SE30	SE27	SE30	SE28	SE34	SSE33	SE15.6	SE34
7-Nov	SSE26	S21	SW27	SW33	WSW29	WSW30	WSW33	WSW32	WSW31	WSW28	WSW22	WSW18	WSW22	WSW18	WSW14	WSW12	WSW13	WSW10	SW12	SW15	WSW24	WSW28	SW25	WSW24	SW21.4	WSW33
8-Nov	W20	W18	W19	W23	W16	NNW10	N17	N25	N30	N25	N17	NNE18	NNE20	N23	NNE24	NNE24	NNE21	NNE15	NNE12	NE9	NE8	NNE13	NNE13	NNE14	N13.1	N30
9-Nov	NNE10	NNE7	NNE7	N8	NNW6	N3	W3	W4	WNW3	WSW2	SSW4	S7	S10	S12	S11	S12	S13	SSE9	SSE13	SSE14	SSE18	SSE21	SSE21	SE22	SSE5.8	SE22
10-Nov	SE22	SSE28	SSE33	SSE33	SSE30	SSE31	S31	S32	SSE32	SSE28	S29	SSE26	S26	SSE27	SSE25	SSE30	SSE34	SSE35	S35	SSE32	SSE31	SSE29	SSE26	SSE32	SSE29.5	S35
11-Nov	SSE28	SSE29	SSE29	SSE27	SSE29	S28	SSW25	SSW26	SSW24	SSW23	SSW21	SW22	WSW25	WSW31	WSW29	SW23	SSW24	SW28	SW25	SW21	SSW20	SW17	SW14	SSW16	SSW21.0	WSW31
12-Nov	SW19	SW22	SW15	SW14	SSW6	S12	S13	SSE16	SSE20	SSE18	SSE16	SSE18	SE18	SSE17	SSE20	SSE26	SE27	SE29	SE30	SE33	SE36	SE36	SSE36	SE33	SSE19.6	SSE36
13-Nov	SSE34	SSE34	SSE32	SSE31	S28	SSE27	SSE23	SSE24	S26	S31	S26	S20	SSW19	SSW21	SW24	SW20	SW21	WSW25	SW20	SW26	SW22	WSW23	SW21	SW27	SSW21.9	SSE34
14-Nov	WSW31	WSW35	SW26	WSW22	WSW23	SW14	SW11	S11	SSW16	S14	SSE13	SE11	SSW6	SW21	SSW16	SSW20	SSW19	SW17	SW15	SW21	WSW21	SW9	SSE8	S10	SW15.4	WSW35
15-Nov	WNW4	S3	SE14	SE17	SE15	SE10	ESE8	NE4	NE8	NNE11	N12	NNW9	N6	N12	N24	NNE21	NNE17	NNE33	NNE29	N24	N22	NNE23	NNE17	NNE15	NNE10.8	NNE33
16-Nov	NNE13	N11	N16	N11	NW11	WNW17	WNW20	W20	WSW27	WSW33	WSW33	W34	W27	W25	WSW23	WSW23	WSW19	SSW15	SSW18	S14	SSE15	SSE20	SE21	SSE28	WSW12.0	W34
17-Nov	SE25	ESE16	SE25	SE30	SE27	SE28	SE26	SE26	SE27	SE28	SSE27	S28	S23	SSW24	SSW22	SSW25	SW20	WSW16	WNW26	W30	W31	WSW32	WSW31	W29	S14.6	WSW32
18-Nov	WSW29	WSW30	W29	NW24	NW25	NW32	NW35	NW34	NW32	NW31	NW32	NW28	NNW31	NNW22	NNW21	NNW19	NNW17	NNW16	NNW10	W9	WNW14	WNW12	WNW15	WNW13	NW21.2	NW35
19-Nov	WNW7	WSW5	SSW8	SSE11	SSE12	S15	S13	SSE10	SE9	SSE6	S9	SSE7	SSE6	NE3	NNW5	NW8	N12	N12	N9	NNE10	NNE6	NW4	NNW8	NNW7	S0.9	S15
20-Nov	NNW2	WSW1	W8	W13	W15	W14	WSW18	W22	WSW21	WSW18	WSW14	SW15	S15	SSE17	SSE18	SE21	SE21	SE20	SE22	SSE29	SSE30	SSE29	SSE26	SSE20	S11.1	SSE30
21-Nov	SSW11	SW12	WSW23	WSW25	WSW21	SW21	SW17	SSW14	SSW17	S10	S13	S13	SSE14	SSW12	SSW18	SSW18	S19	SSW19	SW19	SW15	SW17	WSW30	WSW35	WSW33	SW16.7	WSW35
22-Nov	WSW34	W36	W30	W33	WSW30	W27	W28	WNW23	W27	WNW27	NW17	N15	NNE17	NNE16	N11	N14	NNE16	NNE17	N19	N19	N18	N20	N17	N13	NW14.1	W36
23-Nov	N12	N12	N13	NNW10	NW8	NNW10	NW6	N6	NNW4	NNW5	NNW5	NNW4	NW4	N7	NNW9	N14	N15	N15	N17	N18	NNW17	NNW19	N16	NNW18	NNW10.9	NNW19
24-Nov	NNW16	NNW16	NW13	NW18	NW19	NNW21	NNW20	NNW18	NW14	WNW11	W8	WSW4	WNW10	NNW12	NNW14	NNW8	WNW12	W6	SW7	SW7	SSW8	SSW16	SSW19	SSW19	WNW8.6	NNW21
25-Nov	SSW20	S22	S22	S23	S25	S19	SSW15	WSW9	WSW7	WSW12	WSW6	SSE1	S3	S4	SSE3	S5	SSW8	SSW8	S12	SSW9	SSW8	SSW9	S14	S18	SSW10.7	S25
26-Nov	SSE20	SSE26	SSE19	SSE26	SSE28	SSE27	SSE29	SSE27	S27	S28	SSE27	SSE30	SSE24	S23	SSW20	SSW22	SSW23	SSW18	SSW13	SSW14	S18	SSW14	S10	SSW14	S20.8	SSE30
27-Nov	SW20	SW18	SW12	SW8	W8	S3	WSW13	WSW9	W18	WSW26	WSW24	WSW22	W16	W14	WNW11	WSW5	SSW11	SSW17	SW19	SW17	SSW18	SSW13	SSW13	SSW14	SW13.1	WSW26
28-Nov	SSW12	SW13	SW10	SSW11	SSW13	SSW17	SSE18	SSE26	S27	SSE27	S22	S18	SSE19	SSE26	S22	SSW20	S21	S24	SSW19	S18	SSW20	S21	S23	S21	S18.7	SSE27
29-Nov	S23	S22	SSW13	SSW13	SSW11	SSW12	SSW12	SSW12	S15	S13	SSE17	S11	SSE16	SSE20	SSE24	SSE24	S21	SSE25	SSE26	S20	SSE21	SSE26	S28	SSE27	S18.2	SSE28
30-Nov	SSE26	SSE27	S18	SSE20	S26	S27	SSE30	SSE24	S26	S22	S19	S17	S13	S14	SSW15	SW18	SW21	SW23	SW21	SW16	SW21	SW15	SW9	S12	S18.2	SSE30

SSW7.7SSW8.5SSW7.8SSW8.0SSW7.8SSW7.6SSW7.6SSW6.5SSW7.3SSW7.7SSW7.1SSW6.2SSW5.5SSW5.7SSW5.0SSW5.4SSW6.1SSW6.2SSW6.3SSW7.2SSW8.1SSW7.6SSW8.1SSW8.9	Diurnal Average
SSE34 W36 SSE33 W33 SSE30 NW32 NW35 NW34 NW32 WSW33 WSW33 W34 NNW31 WSW31 WSW29 SSE30 SSE34 SSE35 S35 SE33 SE36 SE36 SSE36 SSE33	Diurnal Maximum

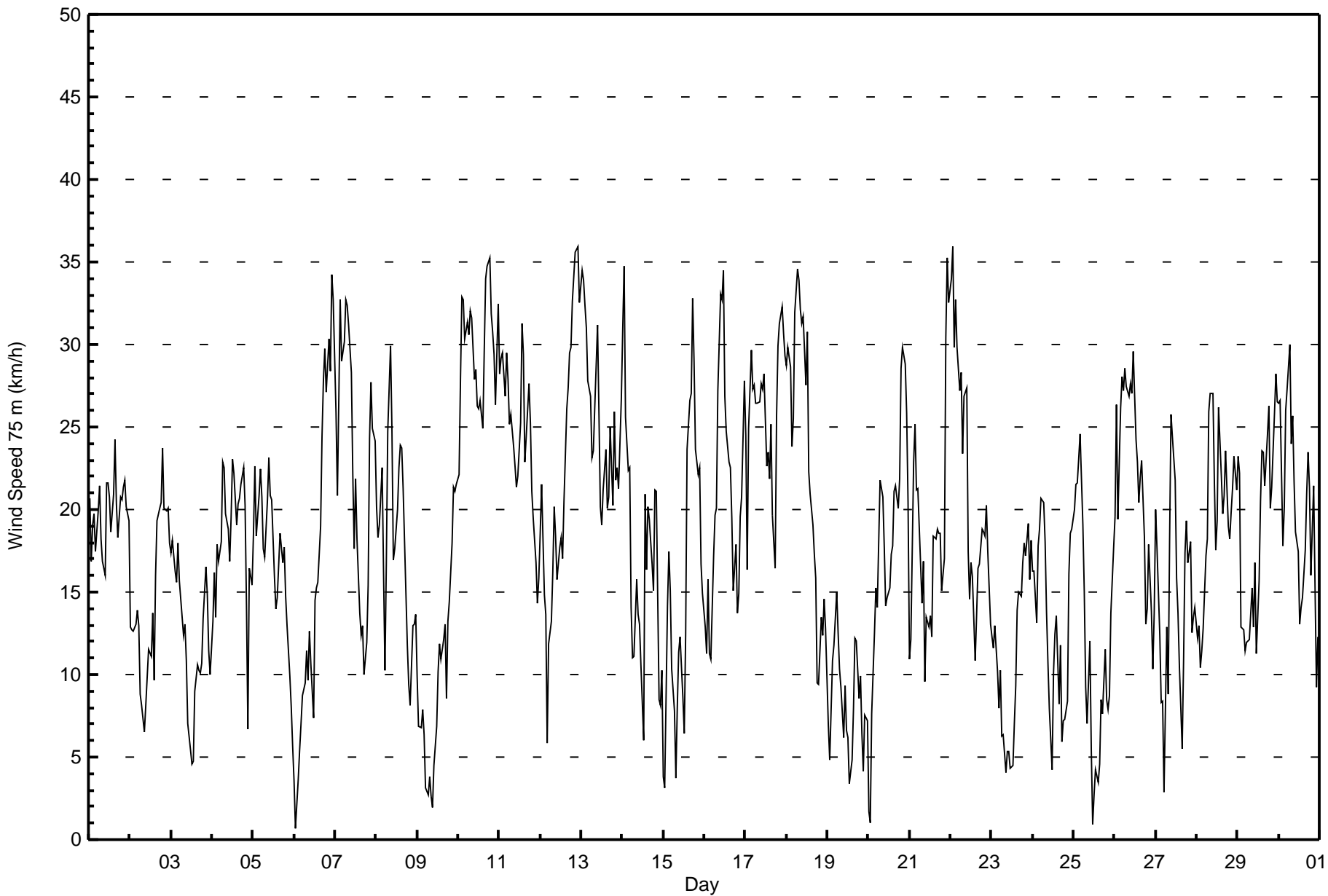
All monthly, daily, and diurnal averages have been calculated using vector methods



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 km/h on Nov 27 09:00			Hours of Data:	720
Minimum Value: 1 km/h on Nov 6 04:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6				

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

4	6	7	7	5	5	5	5	9	6	5	5	6	6	5	5	5	5	7	6	5	6	6	6	5	
Diurnal Maximum																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	35	4.86	4.86
6 - 11	113	15.69	20.56
12 - 19	254	35.28	55.83
20 - 28	237	32.92	88.75
29 - 38	81	11.25	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	0	2	0	0	1	0	4	6	1	0	6	3	2	2	6	35
6 - 11	8	7	4	0	1	2	8	13	11	13	7	6	7	4	10	12	113
12 - 19	28	23	0	0	0	1	19	27	31	40	24	12	15	7	9	18	254
20 - 28	8	21	0	0	0	0	30	51	32	19	26	22	9	6	7	6	237
29 - 38	1	2	0	0	0	0	10	27	5	0	1	20	8	0	6	1	81
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	47	53	6	0	1	4	67	122	85	73	58	66	42	19	34	43	720

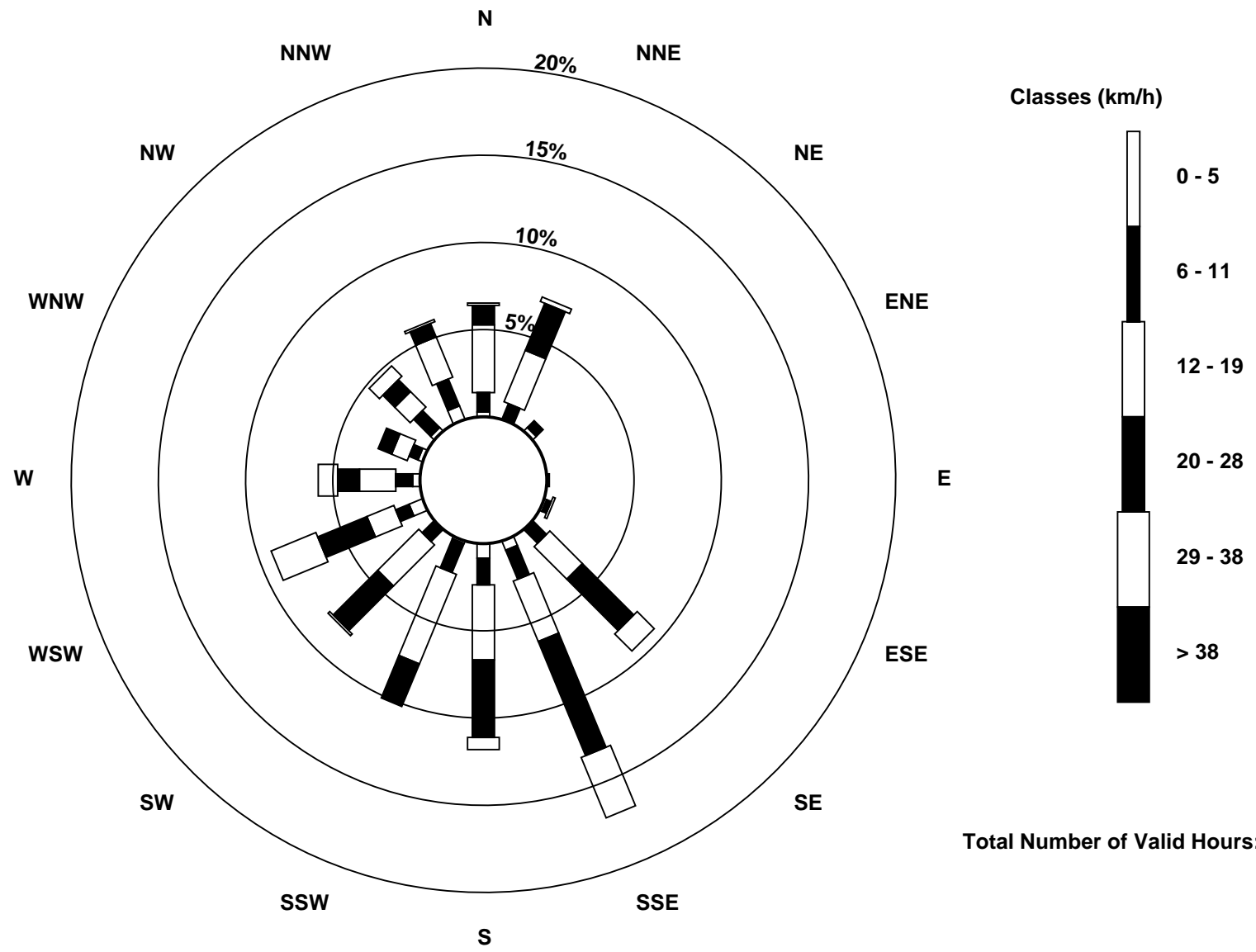
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 720



Maximum Speed: 40 km/h on Nov 12 23:00	Maximum Daily Speed Average: 32.5 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 20 02:00	Minimum Daily Speed Average: 0.4 km/h on Nov 19	Hours of Data: 720
Maximum Diurnal Speed Average: 9.6 km/h at hour 24	Minimum Diurnal Speed Average: 5.6 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 7.6 km/h 208.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 8 Q ₁ = 13 Median = 19 Q ₃ = 25 P ₉₀ = 31 P ₉₉ = 37	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	NNE22	NNE18	NNE20	NNE20	NNE18	NNE21	NNE22	NNE19	NNE18	NNE17	NNE23	NNE22	NNE21	NNE19	NNE21	N25	NNE21	NNE19	NNE22	NNE22	NNE22	NNE22	NNE21	NNE20	NNE20.6	NNE25
2-Nov	N13	N13	NNE13	NNE14	NNE14	NNE14	NE9	NE8	E8	ESE10	SE11	SSE12	SE13	SE15	SE10	SE18	SE22	SE23	SE23	SE27	SE23	SE23	SE23	SE21	ESE10.5	SE27
3-Nov	SE20	SE21	SE19	SE18	SE20	SSE18	SSE15	SSE14	SSE15	SSE12	S8	S6	WSW5	W5	NW9	NW10	NW10	NW10	NW11	W14	W17	W15	W12	WSW10	S5.3	SE21
4-Nov	SSW13	S17	SSW14	SSW21	S19	SSE21	SSE26	SSE27	SSE25	SE23	SE20	SE23	SE27	SE26	SE22	SSE24	SSE24	SSE25	S25	S22	SSW15	W6	W17	W16	SSE17.3	SSE27
5-Nov	WNW19	WNW23	NW19	NW21	NW23	NW21	NW18	NNW17	NNW21	NNW24	NW21	NW21	NNW16	NNW14	NNW15	NNW17	WNW18	NW17	NNW18	NNW15	NNW13	NNW10	NNW8	NW5	NW16.4	NNW24
6-Nov	N3	SE1	SSE4	S6	SSE8	SSE10	SSE10	SSE13	SSE11	S14	S12	SE8	SE16	SSE16	SSE17	SE22	SE29	SE32	SE34	SE31	SE34	SE32	SSE39	SSE36	SSE17.4	SSE39
7-Nov	S29	S24	SW29	SW35	WSW31	WSW32	WSW35	WSW34	WSW33	WSW30	WSW23	WSW18	WSW22	WSW19	WSW14	WSW13	WSW14	W11	WSW12	WSW16	WSW24	WSW29	WSW28	WSW28	WSW22.9	SW35
8-Nov	W23	W20	W19	W21	WNW18	NNW12	N18	N26	N31	NNE25	N17	NNE18	NNE21	N23	NNE25	NNE24	NNE22	NNE16	NNE13	NE10	NE9	NNE14	NNE14	NNE15	N14.0	N31
9-Nov	NE11	NNE7	NNE7	N8	N6	N3	WNW2	W3	WNW2	WSW2	SSW5	S7	S11	S12	S11	S13	S14	S10	SSE14	SSE17	SSE21	SSE22	SSE24	SE24	SSE6.6	SE24
10-Nov	SE26	SSE33	SSE38	SSE37	SSE35	SSE34	S34	S36	S35	S31	S30	S28	S27	S28	SSE27	SSE32	SSE37	SSE38	S38	S34	S33	SSE32	SSE29	SSE36	SSE32.5	SSE38
11-Nov	SSE32	SSE33	SSE33	SSE30	S32	S30	SSW27	SW27	SSW25	SSW24	SSW23	WSW23	WSW26	WSW31	WSW30	SW24	SSW26	SW29	WSW27	SW23	SW21	SW19	SW15	SW16	SSW22.5	SSE33
12-Nov	SW20	WSW23	SW16	SW16	SW7	SSW11	S12	S15	SSE18	S19	S18	SSE18	SSE19	SSE19	SSE23	SSE29	SSE31	SE34	SE34	SSE37	SSE40	SSE40	SSE40	SSE37	SSE21.1	SSE40
13-Nov	SSE39	SSE37	S35	SSE34	S30	S30	S26	S26	S30	S34	SSW28	S21	SSW21	SW22	SW25	SW21	SW22	WSW27	SW22	SW28	SW23	WSW24	SW24	SW29	SSW23.8	SSE39
14-Nov	WSW34	WSW37	WSW28	WSW24	WSW24	SW16	SW12	SSW11	SW17	SSW14	S13	SSE11	SSW8	SW21	SSW17	SSW21	SW21	SW19	SW18	WSW26	WSW25	WSW11	S6	SSW9	SW17.1	WSW37
15-Nov	NW5	SW2	NNE12	SE17	SE14	SE11	E5	NE8	NNE12	NNE14	N11	N9	NNE13	NNE24	NNE28	NNE30	NNE35	NNE31	NNE25	NNE22	NNE22	NE16	NNE14	NNE11.7	NNE35	
16-Nov	NNE12	NNE10	N16	N12	NW11	WNW17	WNW20	W21	W28	W34	W33	W35	W27	W25	WSW23	WSW24	WSW21	SSW16	SSW19	SSW15	SSE15	SSE21	SSE23	SSE31	WSW12.5	W35
17-Nov	SE29	ESE23	SE30	SE35	SE32	SE31	SE30	SE31	SE30	SSE32	SSE30	S31	S25	SW25	SW23	SSW27	SW21	WSW17	WNW26	WNW30	W32	WSW33	W31	W30	S16.2	SE35
18-Nov	W30	WSW31	W29	NW24	NW26	NW33	NW36	NW35	NW33	NW32	NW33	NNW29	NNW32	NNW24	NNW21	NNW20	NNW18	NNW17	NNW10	W10	WNW13	WNW12	WNW13	NNW12	NW22.0	NW36
19-Nov	WNW6	WSW3	SW8	S10	SSE11	S16	S13	SSW8	SE6	SE5	SSE7	SSE9	S7	NE3	NNW5	NNW8	N13	N13	N9	NNE11	NNE7	NNW4	NNW8	NNW7	SSW0.4	S16
20-Nov	N2	NNE1	W6	W11	W14	WNW14	W18	W23	W22	WSW19	WSW15	SW15	S16	SSE18	SSE19	SSE23	SE25	SE24	SE26	SSE32	SSE33	SSE32	SSE28	S21	S12.0	SSE33
21-Nov	SW12	SW13	WSW25	WSW27	WSW23	WSW23	SW18	SSW16	SSW18	SSW10	S13	SSW13	S14	SSW14	SSW20	SSW19	S19	SSW20	SW20	SW17	SW19	WSW31	WSW36	WSW34	SW18.2	WSW36
22-Nov	WSW35	W37	W31	W34	W31	W28	W30	WNW24	W28	WNW28	NW19	N15	NNE18	NNE17	N11	N14	NNE17	NNE17	N19	N19	N19	NNE21	NNE18	N14	NW14.8	W37
23-Nov	N13	N12	N14	NNW10	NNW9	NNW11	NNW6	N7	NNW4	NNW5	NNW5	NNW4	NNW4	N7	N9	N14	N15	N15	N18	N18	NNW17	NNW20	N17	NNW19	N11.3	NNW20
24-Nov	NNW17	NNW17	NW14	NNW18	NNW20	NNW22	NNW22	NNW19	NW14	NW11	WNW8	WSW5	NNW10	NNW13	NNW14	NNW8	WNW12	W6	SW7	WSW8	SSW8	SSW16	SSW20	SSW20	NW9.2	NNW22
25-Nov	SSW22	SSW22	S22	S22	S24	SSW19	SW16	WSW11	WSW9	WSW13	WSW7	SW2	SSW3	SSW4	SSW4	SW5	SW9	SW8	SSW11	SW9	SW9	SW10	SSW14	S17	SSW11.3	S24
26-Nov	S16	SSE25	S18	SSE24	S25	SSE26	S27	S25	S26	S27	SSE30	S25	S24	SSW22	SW24	SSW25	SW20	SSW15	SSW16	SSW18	SW15	SSW11	SSW14	S20.6	SSE30	
27-Nov	SW22	SW20	SW14	SW9	W11	SW4	WSW15	WSW12	W20	W24	W25	W23	W17	W14	WNW11	WSW7	SW11	SW19	SW23	WSW18	SSW18	SW12	SW14	SW16	WSW14.6	W25
28-Nov	SW14	SW15	SW12	SW12	SW14	SSW18	S16	SSE22	S22	S24	S19	SSW17	S17	S23	SSW22	SSW20	SSW21	SSW23	SSW20	SSW17	SSW19	SSW22	SSW22	SSW21	SSW17.9	S24
29-Nov	SSW24	SSW22	SW13	SW12	SW11	SSW12	SW12	SSW13	SSW15	SSW12	S14	SSW12	S14	SSE18	SSE22	S22	S18	S22	S27	SSW19	S19	S26	S29	S25	S17.3	S29
30-Nov	SSE22	S22	S15	S18	S23	S23	S24	S20	S21	SSW22	S19	SSW19	SSW14	SSW13	SW15	WSW19	WSW23	SW25	SW24	SW19	SW24	SW18	SW11	SSW12	SSW17.6	SW25

SSW8.3SSW9.1SSW8.4SSW8.5SSW8.4SSW8.2 SW8.2SSW7.1 SW7.7 SW8.3SSW7.7SSW6.7SSW6.0SSW6.0 SW5.6SSW6.1SSW6.6SSW6.8SSW7.0SSW7.8SSW8.6SSW8.2SSW8.9SSW9.6	Diurnal Average
SSE39WSW37 SSE38 SSE37 SSE35 SSE34 NW36 S36 S35 S34 W33 W35NNW32WSW31WSW30 SSE32 SSE37 SSE38 S38 SSE37 SSE40 SSE40 SSE40 SSE37	Diurnal Maximum

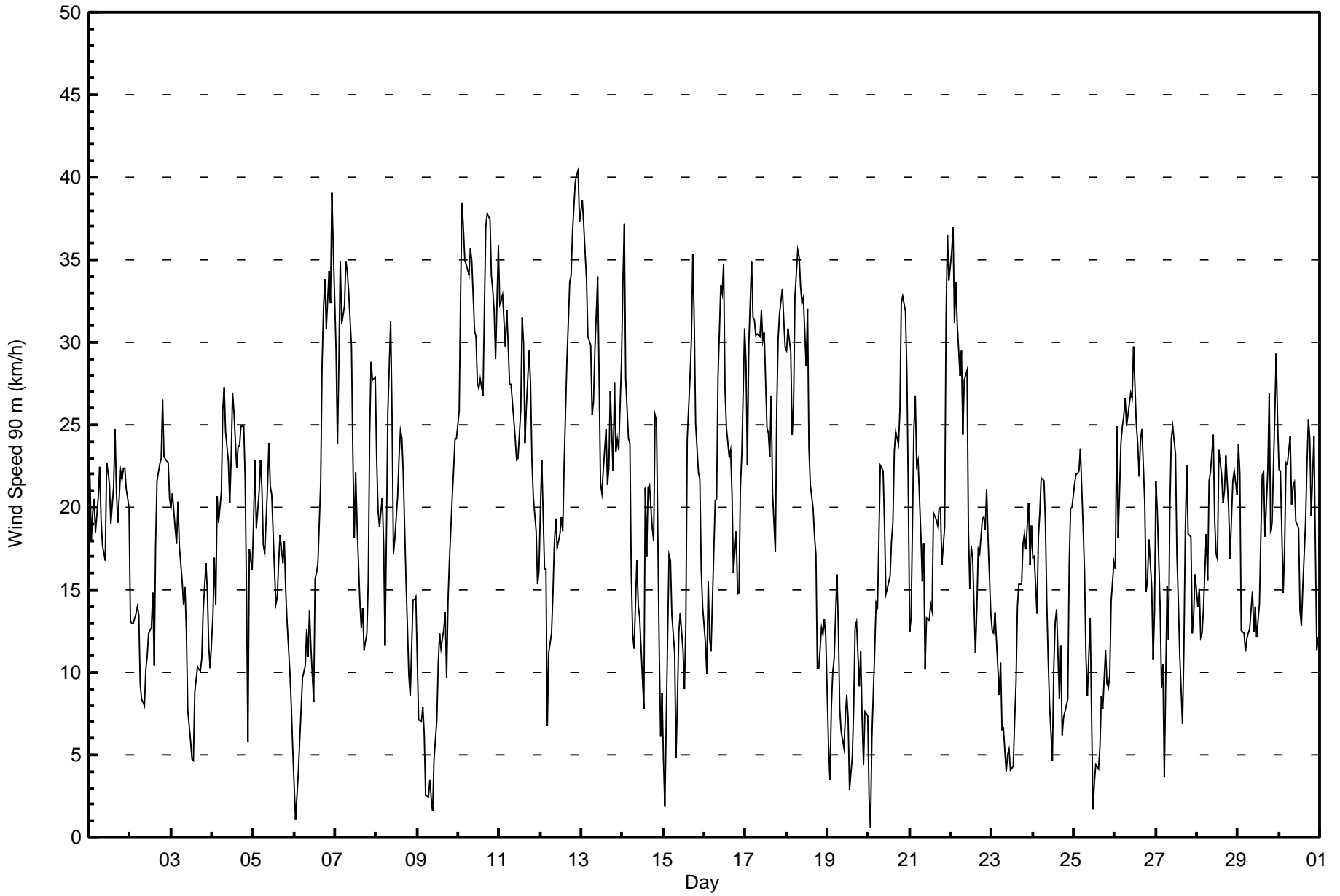
All monthly, daily, and diurnal averages have been calculated using vector methods



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Nov 27 09:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 0 km/h on Nov 7 22:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

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

4	5	7	6	5	5	5	4	8	6	5	5	6	5	5	5	5	6	7	6	5	6	6	6	5	
Diurnal Maximum																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	34	4.72	4.72
6 - 11	102	14.17	18.89
12 - 19	241	33.47	52.36
20 - 28	228	31.67	84.03
29 - 38	110	15.28	99.31
> 38	5	0.69	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	1	1	0	1	0	2	1	0	4	4	4	2	2	2	7	34
6 - 11	9	5	6	0	1	1	5	8	10	9	12	7	7	4	7	11	102
12 - 19	23	27	1	0	0	0	8	22	30	35	34	15	11	10	6	19	241
20 - 28	2	28	0	0	0	1	23	24	34	29	26	25	15	5	7	9	228
29 - 38	1	3	0	0	0	0	16	30	17	0	4	17	13	1	6	2	110
> 38	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	5
Totals	38	64	8	0	2	2	54	90	91	77	80	68	48	22	28	48	720

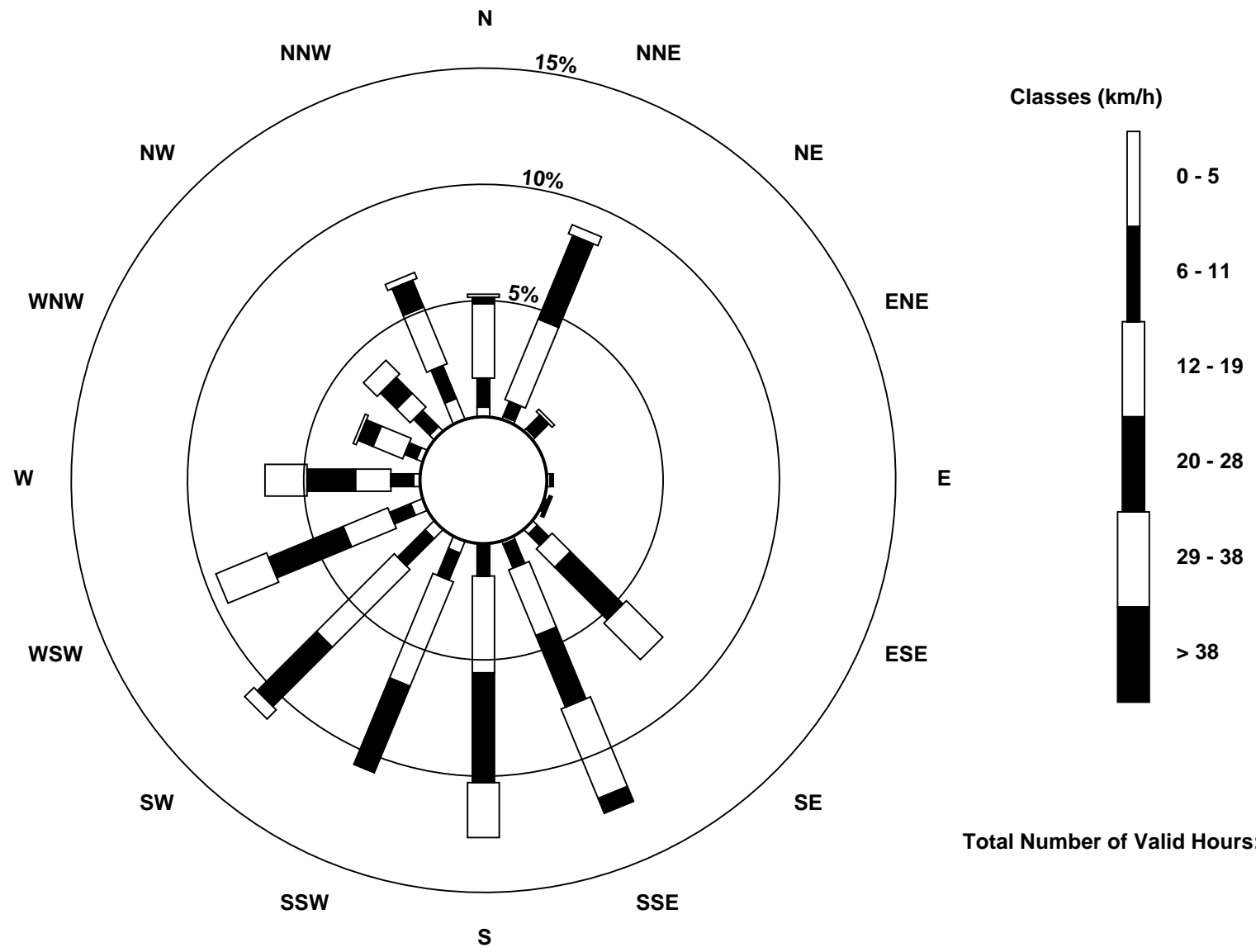
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Direction of Maximum Speed: 267 deg on Nov 16 12:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 164.6 deg on Nov 10	Hours of Data: 713
Direction of Minimum Speed: 354 deg on Nov 15 08:00	Hours of Missing Data: 7
Direction of Minimum Daily Speed Average: 1.7 deg on Nov 19	Percent Operational Time: 99.0
Monthly Average Direction: 218.7 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-Nov	17	17	12	13	16	13	13	17	15	11	19	17	18	11	13	12	17	19	25	35	21	13	21	17	16.9
2-Nov	1	353	23	23	27	25	23	28	79	120	139	152	139	144	151	144	138	143	145	144	141	142	142	139	117.5
3-Nov	136	141	146	146	149	151	156	166	155	166	176	186	245	268	312	316	309	322	310	273	275	280	287	239	211.1
4-Nov	204	180	174	163	161	172	162	154	164	150	138	145	141	143	139	147	151	156	165	184	193	296	259	262	166.2
5-Nov	274	294	314	300	311	314	324	337	339	344	322	319	330	335	343	339	290	310	335	347	352	341	344	326	322.0
6-Nov	6	67	166	161	157	155	150	150	151	167	179	146	140	154	153	142	134	135	138	140	140	146	150	156	146.7
7-Nov	158	146	206	225	234	241	241	243	246	249	237	243	251	241	248	253	258	240	201	228	230	227	218	226	231.9
8-Nov	256	260	256	261	271	359	348	7	8	14	10	19	16	11	25	25	21	33	27	38	43	30	31	31	9.3
9-Nov	30	5	7	357	341	334	250	256	284	234	210	190	181	189	188	192	191	166	152	160	162	148	150	141	171.4
10-Nov	152	151	156	156	157	160	172	173	167	169	176	173	177	173	162	159	165	165	173	170	167	163	154	156	164.6
11-Nov	151	151	150	157	165	170	187	211	208	201	205	235	240	251	245	227	202	206	224	205	191	214	202	189	201.6
12-Nov	201	225	165	171	150	150	157	158	159	160	162	160	148	150	154	154	147	143	139	146	147	150	153	148	154.9
13-Nov	153	163	167	169	171	167	162	164	162	180	180	162	190	215	223	225	221	235	211	212	212	232	225	228	189.9
14-Nov	241	243	236	243	240	205	181	164	186	168	150	138	171	234	209	199	211	192	191	211	213	147	146	159	205.4
15-Nov	163	157	205	147	137	124	164	354	23	357	341	353	9	358	11	14	24	15	18	12	1	8	11	359	17.2
16-Nov	355	352	356	336	300	280	289	265	261	261	261	267	267	268	259	248	234	196	189	161	146	152	137	145	256.9
17-Nov	145	125	133	138	143	146	140	139	142	145	158	170	178	215	212	204	240	275	285	283	269	257	261	263	199.5
18-Nov	260	260	277	316	312	308	309	314	316	314	316	327	331	337	333	336	341	325	343	211	259	257	249	258	305.6
19-Nov	235	222	185	170	157	166	151	155	137	201	173	163	158	73	6	320	343	334	313	9	336	272	327	271	192.7
20-Nov	236	248	258	256	238	250	248	265	252	241	238	222	182	166	153	148	136	139	144	152	157	159	156	152	188.0
21-Nov	149	174	230	238	237	234	217	161	163	143	154	156	154	161	197	190	163	175	205	215	198	251	256	259	207.8
22-Nov	258	264	270	265	263	268	270	289	279	284	321	12	AF	AF	AF	AF	AF	AF	AF	14	10	10	13	350	--
23-Nov	343	342	347	327	298	314	275	3	327	320	343	318	305	354	335	1	1	354	349	345	342	339	349	334	339.0
24-Nov	345	331	320	322	326	330	326	326	313	290	262	226	291	326	338	344	297	262	216	202	178	185	193	186	302.3
25-Nov	194	179	160	168	168	167	176	181	200	222	234	103	150	149	145	143	163	155	161	157	158	151	154	151	165.5
26-Nov	147	148	151	145	156	151	152	155	154	152	148	147	145	144	166	187	193	186	146	160	163	157	145	152	154.6
27-Nov	189	214	150	128	81	121	159	139	248	256	254	251	261	283	281	151	158	171	185	182	170	163	164	139	195.0
28-Nov	143	147	143	152	157	160	149	155	157	155	155	152	153	154	166	165	164	173	159	151	162	165	162	162	157.5
29-Nov	159	155	152	157	151	151	156	153	151	155	155	154	149	152	151	156	161	158	158	164	155	152	154	156	155.0
30-Nov	161	158	157	146	151	154	154	152	161	158	153	154	129	157	165	188	222	213	191	163	190	165	140	153	162.8

192.8 199.8 195.7 200.8 195.3 198.6 199.9 195.1 201.4 208.2 202.4 193.1 197.9 204.5 203.8 186.3 184.7 176.1 173.5 175.0 178.8 183.9 179.2 184.6

Diurnal Average

AF - Analyzer Failure

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

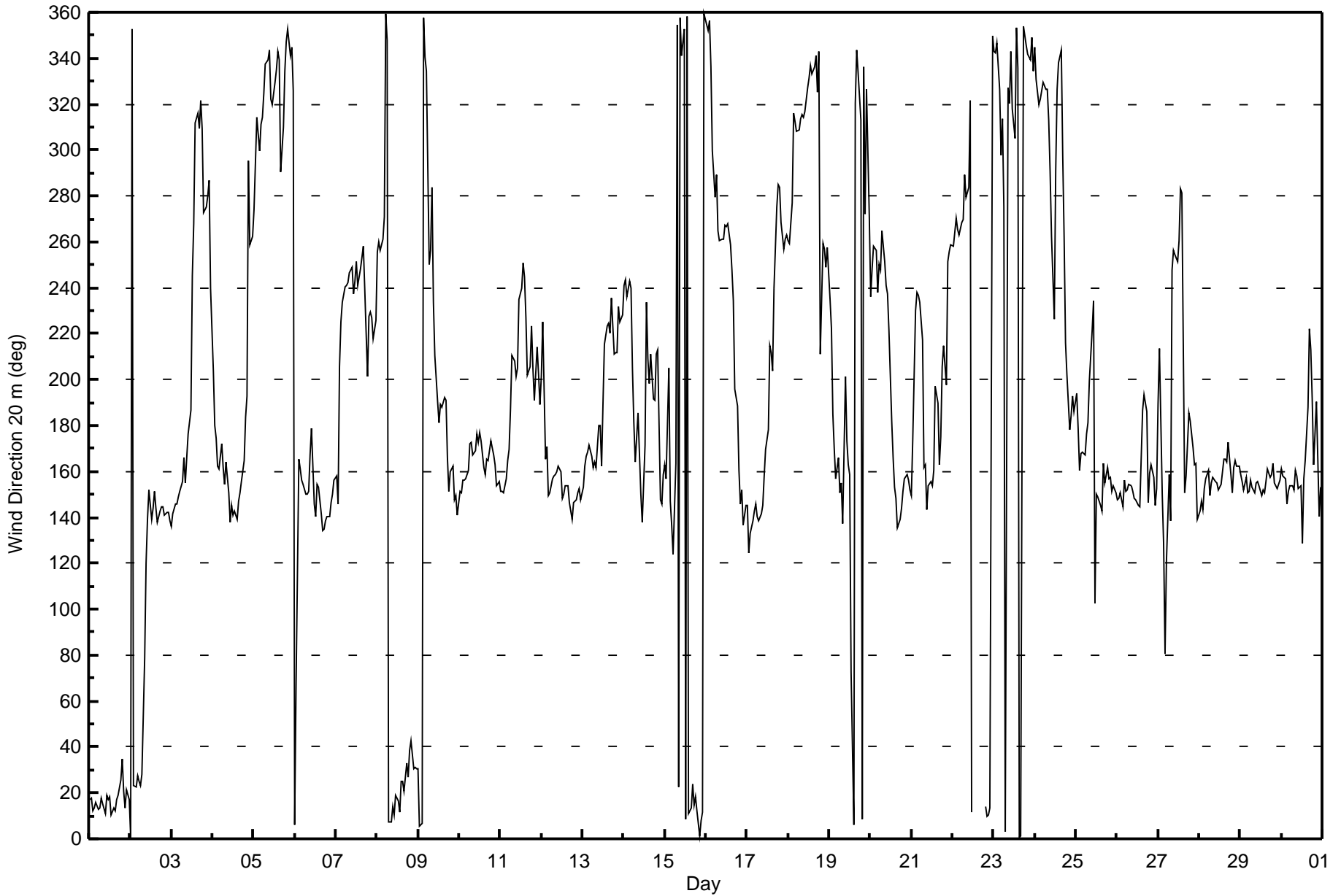


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 85 deg on Nov 15 08:00	Hours of Data: 713
Minimum Value: 4 deg on Nov 27 22:00	Hours of Missing Data: 7
Percentiles: P ₁ = 5 P ₁₀ = 8 Q ₁ = 10 Median = 12 Q ₃ = 15 P ₉₀ = 23 P ₉₉ = 63	Hours of Calibration: 0
	Percent 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-Nov	10	10	11	10	10	10	9	10	12	14	10	10	11	12	10	10	10	12	13	13	11	11	11	11	14
2-Nov	15	16	13	11	12	12	11	13	29	23	14	17	15	11	14	12	10	12	11	10	11	10	10	11	29
3-Nov	10	11	11	10	8	10	14	10	11	12	19	21	27	21	22	12	9	12	15	17	10	10	11	28	
4-Nov	15	13	12	18	16	22	8	12	14	12	15	12	11	12	11	10	10	8	11	14	27	13	12	7	27
5-Nov	9	11	11	11	11	11	13	14	14	13	14	15	20	16	17	15	10	18	18	13	11	16	16	18	20
6-Nov	23	66	28	11	11	11	9	9	9	12	21	14	12	14	13	10	11	11	10	10	10	11	11	8	66
7-Nov	12	10	22	12	9	10	8	8	9	12	12	20	14	12	14	11	24	43	8	11	6	5	10	5	43
8-Nov	22	48	12	9	71	24	12	9	9	14	15	17	13	12	14	13	13	12	13	14	13	13	16	13	71
9-Nov	13	16	13	12	14	26	27	19	43	16	26	21	19	20	25	21	19	21	6	14	9	11	10	9	43
10-Nov	10	10	8	8	9	7	12	11	10	13	15	14	15	14	14	9	9	9	13	12	11	9	9	9	15
11-Nov	10	10	10	11	11	12	17	13	12	16	16	11	12	13	12	14	9	10	10	19	11	14	12	9	19
12-Nov	28	13	22	38	12	20	8	11	9	12	15	13	10	12	9	9	9	10	9	10	9	10	10	10	38
13-Nov	10	9	10	10	13	11	11	11	9	14	15	16	36	17	16	20	14	9	14	9	15	13	15	9	36
14-Nov	8	9	9	13	10	40	31	15	15	19	10	12	80	12	21	12	8	18	34	7	18	15	10	10	80
15-Nov	14	20	17	26	13	19	54	85	17	16	23	30	30	23	11	10	11	10	10	12	13	9	9	11	85
16-Nov	12	17	14	32	11	10	11	9	8	7	7	8	11	8	10	11	10	22	12	12	8	11	11	10	32
17-Nov	15	12	11	11	10	11	11	10	9	11	10	13	18	13	13	12	27	38	14	12	11	9	9	7	38
18-Nov	7	8	11	13	13	10	11	10	11	10	11	13	14	14	16	14	14	19	59	45	14	20	6	33	59
19-Nov	18	8	24	6	8	8	9	15	13	23	23	18	13	30	14	24	11	15	19	26	75	19	37	23	75
20-Nov	15	12	6	7	9	10	12	7	12	10	13	18	18	16	12	11	10	13	24	11	10	9	10	10	24
21-Nov	14	23	12	10	13	12	41	12	11	15	10	8	13	21	14	15	6	12	16	16	29	12	9	9	41
22-Nov	9	7	7	7	7	8	9	10	11	10	28	13	AF	AF	AF	AF	AF	AF	AF	11	10	10	11	16	28
23-Nov	12	16	15	14	24	28	24	30	21	27	23	24	22	40	19	19	14	14	15	12	14	15	17	15	40
24-Nov	16	13	15	13	12	13	12	13	13	18	13	26	27	14	13	22	17	18	18	14	14	13	13	10	27
25-Nov	10	11	6	8	8	8	9	17	31	29	74	56	20	20	21	16	6	14	5	12	5	5	7	7	74
26-Nov	9	13	9	10	8	10	7	8	8	8	9	9	10	9	18	20	13	24	20	6	9	7	11	10	24
27-Nov	19	23	30	37	42	12	13	17	71	8	9	8	11	13	24	51	14	12	20	8	10	4	6	13	71
28-Nov	8	5	13	6	8	10	11	9	7	8	9	10	10	9	8	8	6	10	9	6	8	7	5	7	13
29-Nov	7	8	10	5	14	8	8	6	8	7	13	15	11	8	9	9	5	5	9	8	8	8	8	7	15
30-Nov	7	6	6	8	8	8	8	8	7	7	9	9	25	14	9	22	7	9	22	11	14	12	9	11	25

28	66	30	38	71	40	54	85	71	29	74	56	80	40	25	51	27	43	59	45	75	20	37	33	
Diurnal Maximum																								

AF - Analyzer Failure





Direction of Maximum Speed: 261 deg on Nov 16 12:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 160.0 deg on Nov 10		Hours of Data:	720
Direction of Minimum Speed: 75 deg on Nov 6 02:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.0 deg on Nov 19		Percent Operational Time:	100.0
Monthly Average Direction: 224.4 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-Nov	12	11	6	7	9	6	7	11	10	5	13	12	13	4	8	6	11	11	19	25	15	6	15	9	10.7
2-Nov	357	349	19	18	20	19	22	29	76	114	131	145	133	138	145	139	132	135	138	138	134	136	136	133	112.0
3-Nov	130	133	139	139	141	147	151	161	151	161	172	182	240	264	308	312	307	314	304	269	270	275	277	236	200.2
4-Nov	204	178	183	174	154	162	154	145	153	142	133	137	134	137	134	142	145	152	165	179	186	291	258	261	162.0
5-Nov	272	291	311	297	307	310	320	333	336	338	318	316	324	328	337	334	286	304	331	341	344	336	337	320	317.8
6-Nov	355	75	159	160	152	151	148	147	148	166	174	139	134	147	146	133	128	129	132	134	134	140	144	152	141.1
7-Nov	160	159	209	222	233	238	239	240	244	246	236	237	246	237	242	247	254	250	213	224	236	230	227	232	230.3
8-Nov	260	264	254	260	270	348	346	3	2	7	5	12	9	6	17	16	12	21	22	31	33	22	21	23	357.2
9-Nov	27	8	4	353	339	339	262	265	280	241	203	183	179	182	181	188	186	165	146	153	155	142	144	134	163.1
10-Nov	143	145	148	148	149	157	169	169	163	165	172	167	171	168	157	154	161	161	168	167	164	159	151	150	160.0
11-Nov	146	147	147	155	162	170	186	207	205	200	201	233	236	246	240	222	201	207	227	211	197	219	210	194	199.0
12-Nov	211	228	194	198	159	160	157	153	157	157	160	156	143	147	150	150	142	138	134	142	142	144	146	143	153.7
13-Nov	147	158	163	163	167	164	159	163	162	176	179	168	193	209	218	222	221	233	221	214	216	232	225	227	188.7
14-Nov	237	239	232	240	239	221	210	173	194	171	146	137	184	229	202	195	210	205	206	219	231	173	146	164	208.5
15-Nov	191	152	169	149	128	118	131	11	22	358	335	336	336	351	2	6	15	8	11	5	358	4	11	355	13.0
16-Nov	353	350	349	340	303	278	285	262	256	255	256	261	261	263	253	244	233	196	189	171	146	149	136	142	248.7
17-Nov	138	119	125	131	136	139	134	132	135	141	154	167	176	212	207	200	233	261	280	278	264	252	256	258	189.1
18-Nov	255	254	273	313	308	304	305	309	312	311	312	322	327	330	327	331	335	324	341	241	266	264	262	269	302.5
19-Nov	262	220	177	169	156	160	147	152	130	184	166	156	157	55	356	320	341	342	335	12	5	288	331	320	176.8
20-Nov	259	265	268	267	251	258	250	261	249	240	236	216	177	161	147	142	130	132	136	147	152	153	154	149	185.1
21-Nov	162	192	233	236	236	232	223	179	181	151	152	158	150	171	198	190	164	182	209	216	207	248	251	254	208.3
22-Nov	253	259	264	260	257	262	265	283	275	279	317	4	13	12	351	342	16	10	4	4	1	6	7	347	303.2
23-Nov	342	342	349	328	311	320	296	358	326	320	336	317	305	353	335	356	356	350	348	344	338	335	344	330	338.4
24-Nov	341	326	316	318	322	325	323	323	310	290	265	228	286	324	334	332	293	265	219	214	187	183	196	191	294.9
25-Nov	195	181	161	168	169	168	191	222	223	237	245	127	157	155	138	148	173	171	168	180	170	156	157	149	173.3
26-Nov	145	146	149	143	154	146	150	153	154	151	145	144	146	150	179	203	197	198	166	170	164	175	156	166	157.9
27-Nov	206	220	203	189	284	121	206	175	268	253	251	251	260	275	280	215	178	193	208	206	189	177	172	167	214.9
28-Nov	161	169	162	163	164	173	151	149	156	153	154	151	147	149	165	173	173	172	171	162	172	168	163	163	161.6
29-Nov	166	158	162	167	165	171	172	174	160	152	151	151	146	146	146	154	164	158	161	163	150	149	156	158	157.8
30-Nov	161	159	158	151	155	157	154	149	159	160	155	156	151	162	174	217	229	219	212	194	207	193	170	159	169.3

192.8 196.8 192.8 195.5 193.3 194.3 196.9 192.9 196.6 200.6 194.7 187.9 189.0 198.8 202.4 195.0 188.6 184.1 181.8 183.8 184.5 187.7 179.9 181.9

Diurnal Average

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



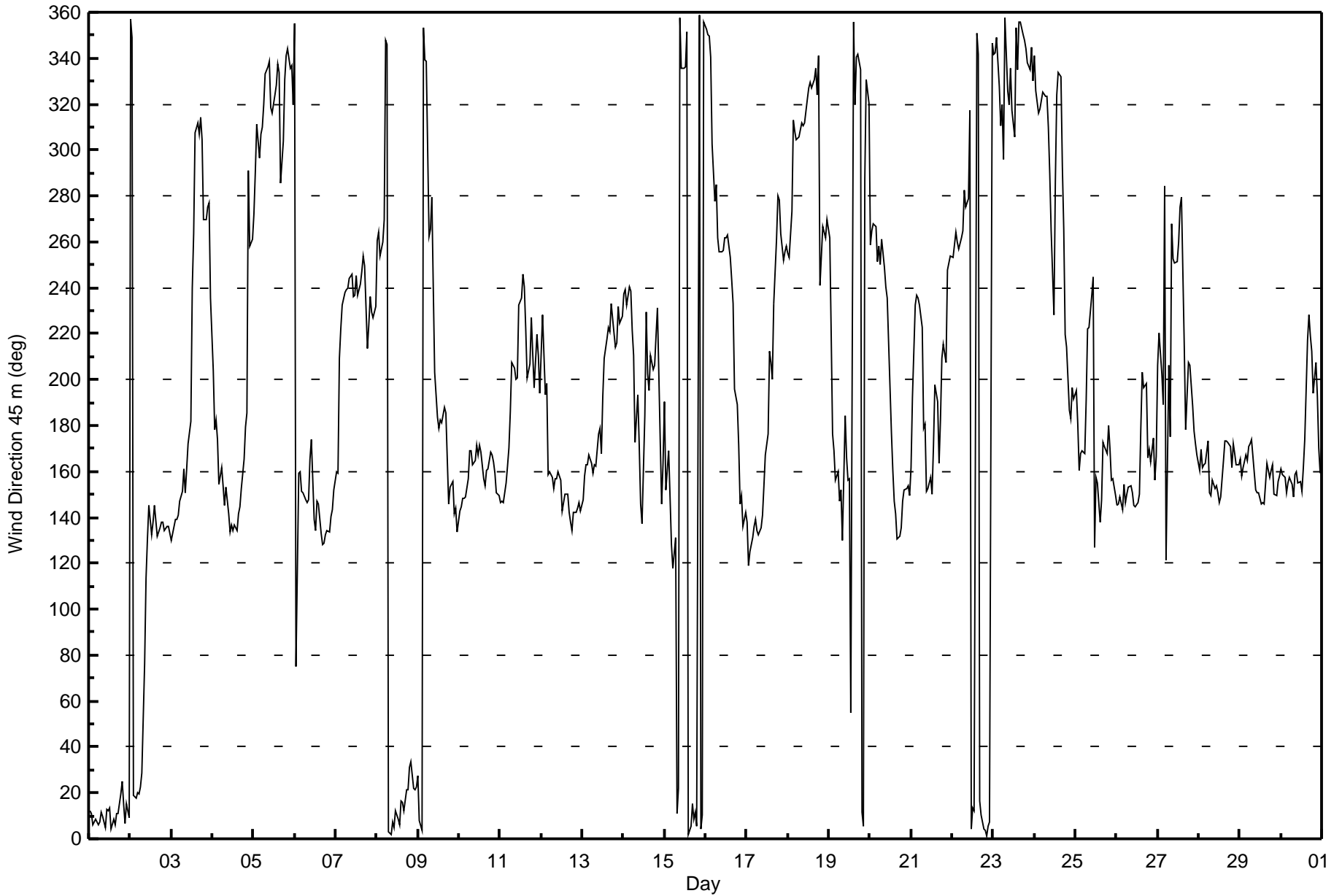
Summary of Hour Standard Deviations

Mannix - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 88 deg on Nov 27 05:00			Hours of Data:	720
Minimum Value: 2 deg on Nov 28 23:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 9 Q ₃ = 12 P ₉₀ = 19 P ₉₉ = 47				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	7	7	6	6	7	6	6	7	8	9	8	7	8	8	7	6	7	9	10	9	8	8	8	7	10
2-Nov	11	11	11	8	9	9	9	11	24	20	9	14	12	9	12	11	8	10	8	8	8	8	8	8	24
3-Nov	8	8	8	7	6	6	9	6	8	8	12	13	23	17	19	9	7	8	11	15	9	7	7	24	
4-Nov	13	9	11	9	6	16	6	7	7	9	11	8	8	10	8	7	7	6	7	7	20	9	7	5	
5-Nov	7	9	8	8	9	8	10	10	10	9	11	13	15	13	12	13	8	15	15	8	8	11	12	15	
6-Nov	24	78	30	9	10	9	8	7	8	8	13	12	10	11	11	7	7	7	7	8	7	8	9	78	
7-Nov	8	9	10	8	5	6	4	5	5	9	9	17	12	8	11	8	13	19	7	9	3	2	7	19	
8-Nov	15	26	6	6	30	19	11	4	4	11	10	12	9	8	10	10	10	10	12	12	11	11	12	30	
9-Nov	9	12	11	8	10	30	15	14	27	22	22	15	13	14	19	15	14	18	5	8	6	7	7	30	
10-Nov	6	7	6	6	6	6	6	5	6	7	8	9	8	8	11	6	6	6	7	7	8	6	7	11	
11-Nov	7	6	6	9	7	8	13	9	8	13	15	8	9	10	9	11	5	7	6	15	10	11	10	15	
12-Nov	19	9	16	33	11	14	5	6	6	10	14	10	9	10	6	5	6	8	7	8	7	7	7	33	
13-Nov	7	6	6	6	7	7	8	7	7	7	9	12	20	14	14	17	13	6	7	6	12	10	11	20	
14-Nov	5	6	6	10	9	25	18	18	14	23	7	10	56	10	19	9	5	6	22	5	7	32	6	56	
15-Nov	41	17	8	12	11	11	16	24	13	10	12	19	28	18	6	6	8	6	7	8	7	5	6	41	
16-Nov	7	12	9	25	8	9	10	7	6	5	6	6	9	7	8	8	8	21	11	12	4	9	7	25	
17-Nov	12	8	6	9	8	10	8	7	7	8	8	7	13	10	10	8	23	32	13	9	9	6	7	32	
18-Nov	6	6	10	11	11	8	8	8	9	8	9	11	11	11	13	10	10	14	51	32	5	10	7	51	
19-Nov	22	11	16	3	5	4	7	12	10	24	19	17	15	34	16	20	11	10	14	18	28	50	12	50	
20-Nov	70	5	4	3	5	6	7	6	8	8	10	14	12	11	10	8	7	9	17	9	8	7	6	70	
21-Nov	18	27	8	7	9	9	20	17	11	17	8	7	8	20	9	9	4	13	12	11	21	9	7	27	
22-Nov	7	6	6	6	6	6	8	7	10	8	26	10	9	10	14	11	11	7	6	6	5	6	7	26	
23-Nov	8	12	9	13	18	22	17	18	20	20	20	25	18	35	16	15	9	10	11	9	10	10	12	35	
24-Nov	12	10	11	9	9	9	9	10	9	16	11	21	24	11	9	17	13	14	16	14	13	9	10	24	
25-Nov	7	8	4	4	3	4	16	11	17	17	42	74	22	13	13	16	7	11	7	6	7	4	5	74	
26-Nov	5	8	5	5	4	6	4	4	4	5	5	5	5	6	16	9	9	12	23	12	6	12	18	23	
27-Nov	11	15	18	25	88	29	26	39	86	4	4	4	7	9	9	44	9	7	5	9	8	8	5	88	
28-Nov	6	7	9	6	11	12	5	5	3	4	5	7	5	5	6	10	7	4	3	4	11	7	2	12	
29-Nov	8	3	5	6	11	8	5	8	4	6	8	10	6	5	5	7	3	3	4	5	4	4	4	11	
30-Nov	4	4	3	4	4	3	3	4	3	7	8	6	11	8	12	9	4	5	10	12	9	12	20	20	

70	78	30	33	88	30	26	39	86	24	42	74	56	35	19	44	23	32	51	32	28	50	20	28	
Diurnal Maximum																								





Direction of Maximum Speed: 260 deg on Nov 22 02:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 161.7 deg on Nov 10		Hours of Data:	720
Direction of Minimum Speed: 112 deg on Nov 6 02:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 0.9 deg on Nov 19		Percent Operational Time:	100.0
Monthly Average Direction: 230.9 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	17	17	11	12	13	10	12	17	14	9	18	17	19	10	13	9	14	14	23	28	19	12	18	13	15.1
2-Nov	3	356	23	23	24	25	31	43	82	116	130	145	133	137	143	139	133	136	139	138	135	137	136	134	112.6
3-Nov	132	134	140	140	140	147	152	160	151	159	172	181	243	265	311	316	313	316	306	274	272	275	273	237	192.0
4-Nov	206	183	197	186	161	158	151	146	147	139	134	134	133	138	135	143	147	157	172	184	193	280	262	266	162.3
5-Nov	280	294	315	301	311	314	323	336	340	341	322	320	326	331	340	336	288	306	334	342	344	339	338	320	321.0
6-Nov	357	112	155	166	154	153	154	152	153	170	177	139	135	145	146	134	130	130	134	135	135	141	145	156	142.8
7-Nov	166	179	215	226	238	242	242	243	247	249	238	237	246	237	242	247	255	257	228	235	248	240	236	237	234.6
8-Nov	260	264	260	272	274	340	355	8	7	11	9	16	12	10	18	18	14	22	25	36	36	24	23	27	357.1
9-Nov	32	23	12	0	348	355	279	277	292	250	195	182	179	181	180	188	184	167	148	149	157	149	147	134	157.2
10-Nov	143	147	152	152	151	162	172	171	165	166	172	168	172	168	159	156	162	163	170	168	166	162	155	153	161.7
11-Nov	149	150	152	161	167	178	192	210	208	206	206	236	237	246	241	223	206	215	234	222	210	228	220	207	203.0
12-Nov	224	236	217	227	202	187	177	163	163	162	164	157	145	150	153	154	145	140	137	143	143	145	147	144	158.9
13-Nov	149	161	165	165	169	167	163	167	169	182	187	180	198	212	219	225	226	237	229	221	226	237	229	232	192.8
14-Nov	239	240	234	243	242	230	227	190	207	188	158	144	195	230	203	197	212	214	219	232	239	224	155	183	219.0
15-Nov	303	172	157	157	136	127	122	52	44	18	356	347	349	6	11	12	23	16	16	10	10	20	30	18	25.2
16-Nov	13	11	357	353	312	283	289	265	258	258	258	263	263	265	255	246	238	204	199	187	155	157	146	147	248.7
17-Nov	141	123	127	132	136	139	135	133	137	143	157	172	183	213	210	202	232	255	282	280	266	254	257	261	187.5
18-Nov	257	255	276	317	312	307	309	312	314	314	315	325	330	332	329	333	339	333	345	264	283	286	285	287	307.5
19-Nov	284	248	199	168	156	174	177	164	138	163	170	150	165	47	348	324	352	358	352	20	15	325	332	330	174.6
20-Nov	345	251	270	274	268	275	258	264	254	246	238	215	176	161	148	143	133	133	137	149	156	155	160	163	184.0
21-Nov	201	215	238	240	238	236	232	199	201	183	174	183	163	194	203	199	178	200	217	223	219	249	252	255	219.6
22-Nov	255	260	265	261	258	262	267	286	277	282	320	7	16	14	358	351	17	13	7	8	6	10	11	354	306.5
23-Nov	351	352	358	340	324	336	320	5	337	328	340	332	321	1	347	360	360	357	356	351	344	340	351	336	346.9
24-Nov	346	331	323	323	326	330	329	330	317	299	279	240	288	331	339	330	296	277	226	230	201	196	209	202	301.7
25-Nov	202	191	170	176	178	185	213	249	248	251	250	168	186	182	158	191	199	199	190	209	202	193	189	173	194.2
26-Nov	161	152	160	149	166	160	162	167	174	169	159	159	167	169	197	212	203	208	198	196	190	207	189	194	174.2
27-Nov	217	229	225	215	268	173	241	244	274	258	255	258	265	276	283	247	203	209	227	228	203	202	202	205	236.2
28-Nov	203	216	217	204	201	200	167	153	170	167	169	176	158	158	186	195	190	191	200	180	194	191	181	188	182.5
29-Nov	188	186	199	198	201	199	206	200	189	178	164	178	159	152	153	168	179	167	168	180	164	161	169	168	174.9
30-Nov	166	167	177	167	173	174	168	166	171	183	176	180	180	187	208	233	234	227	225	221	224	220	217	189	189.8

201.3 204.1 205.3 205.8 205.4 205.5 209.6 203.4 207.2 210.5 203.6 198.4 195.7 202.4 208.2 202.0 195.5 193.2 194.6 196.5 196.7 199.7 193.3 193.6

Diurnal Average

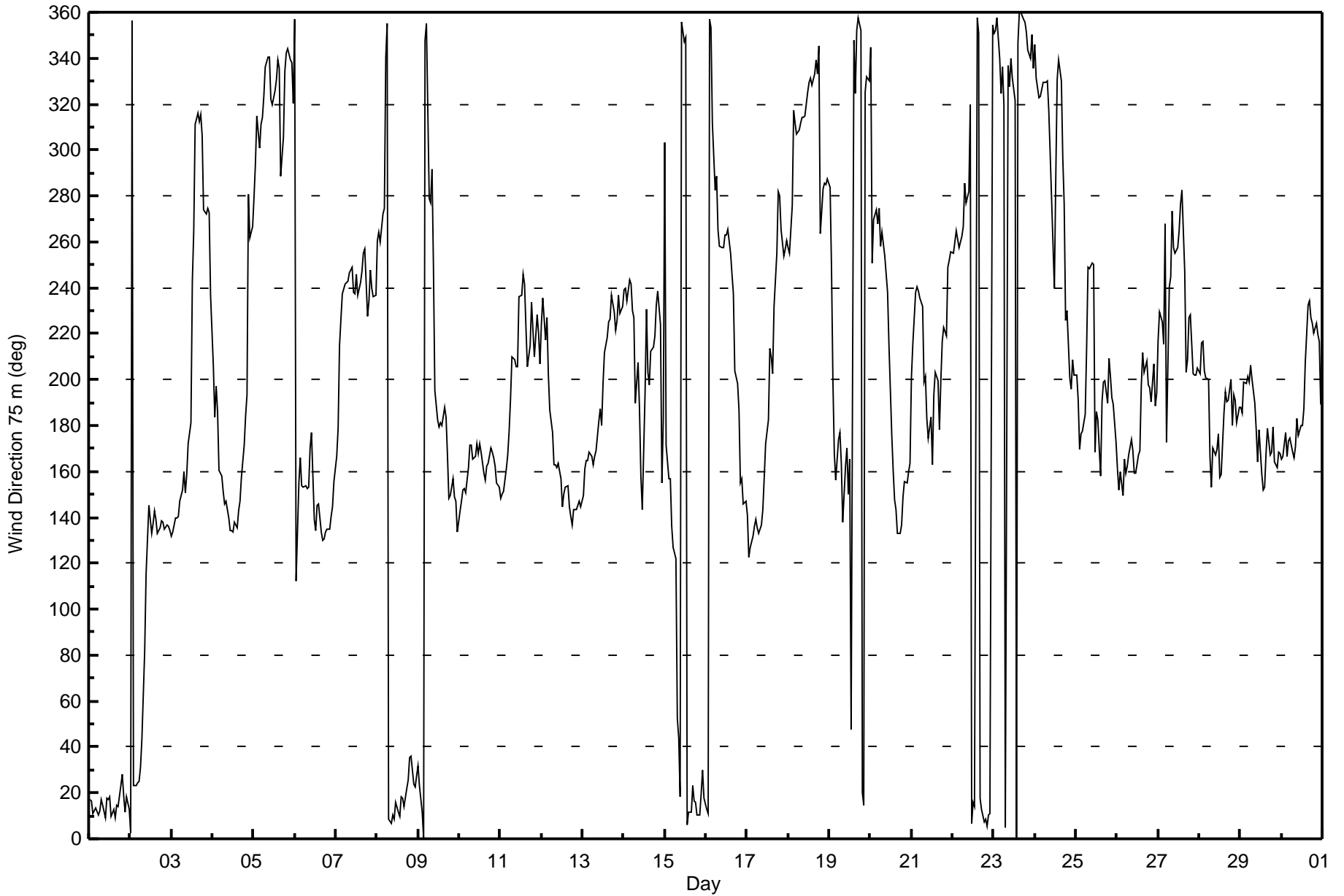
All monthly, daily, and diurnal averages have been calculated using vector methods



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 91 deg on Nov 25 12:00			Hours of Data:	720
Minimum Value: 2 deg on Nov 7 21:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 6 Median = 8 Q ₃ = 11 P ₉₀ = 16 P ₉₉ = 32				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	6	5	4	4	5	4	4	6	6	8	6	6	6	7	6	4	6	8	8	7	6	7	6	6	8
2-Nov	11	9	8	6	6	7	8	10	16	19	9	12	10	8	11	10	7	9	7	7	7	7	7	8	19
3-Nov	7	8	6	6	4	5	7	5	6	8	12	14	23	16	16	8	6	6	8	16	7	6	6	21	23
4-Nov	12	13	12	6	10	6	4	4	4	7	7	6	5	8	6	5	5	6	6	6	16	22	6	5	22
5-Nov	6	8	7	7	8	7	9	9	8	8	10	11	15	13	12	12	6	14	13	7	7	9	10	11	15
6-Nov	26	86	38	7	10	8	8	7	8	7	11	13	9	10	9	7	6	6	6	7	6	6	7	5	86
7-Nov	6	11	7	7	5	5	3	5	5	7	8	15	11	7	10	7	10	11	6	10	2	3	6	2	15
8-Nov	14	16	5	6	15	16	14	3	4	9	9	10	7	6	8	7	7	8	10	9	7	9	9	8	16
9-Nov	7	12	10	9	8	39	17	13	38	37	19	15	12	12	18	16	12	14	6	6	6	9	7	5	39
10-Nov	5	5	5	4	5	5	4	3	5	6	7	7	7	7	9	4	5	5	6	6	6	6	6	4	9
11-Nov	5	4	5	8	7	7	13	8	7	11	14	8	8	9	8	10	4	8	5	12	9	9	11	8	14
12-Nov	13	8	11	13	28	9	6	8	6	9	12	9	8	9	5	3	5	6	5	5	5	5	5	6	28
13-Nov	6	6	5	6	6	6	7	6	6	6	7	10	15	13	13	14	11	5	6	6	11	9	9	5	15
14-Nov	4	4	6	9	8	14	12	21	13	23	11	11	50	9	18	9	5	5	12	3	4	30	14	38	50
15-Nov	36	73	4	6	10	8	18	14	9	10	9	15	18	17	8	5	6	5	6	6	10	7	6	7	73
16-Nov	11	12	6	20	10	9	8	7	5	5	5	6	8	7	7	7	7	19	11	12	4	8	4	3	20
17-Nov	10	10	7	7	6	8	7	5	5	6	8	7	12	9	8	7	23	30	13	9	8	5	7	6	30
18-Nov	6	5	12	10	10	7	7	7	7	7	8	9	10	9	12	8	8	13	40	25	8	11	6	14	40
19-Nov	20	15	20	5	9	4	9	11	14	24	17	16	18	38	22	14	11	7	9	12	18	33	7	16	38
20-Nov	33	72	10	2	7	9	5	7	5	7	8	14	12	10	8	6	5	7	11	7	7	6	5	10	72
21-Nov	19	23	7	6	8	7	11	13	10	19	12	12	8	17	9	7	6	12	9	8	15	9	6	7	23
22-Nov	6	6	6	6	6	5	8	8	10	7	25	11	6	7	11	9	7	5	5	5	4	4	6	8	25
23-Nov	6	9	8	11	14	16	16	15	24	17	17	25	20	25	14	13	7	8	9	7	8	8	10	10	25
24-Nov	10	9	10	8	8	7	7	8	9	17	9	24	22	10	7	18	11	11	21	17	16	10	9	7	24
25-Nov	6	9	5	4	3	7	14	14	9	8	29	91	28	18	19	16	10	14	7	8	9	10	8	8	91
26-Nov	6	4	6	4	4	4	3	3	3	6	3	3	5	8	12	7	8	8	15	15	8	13	29	26	29
27-Nov	8	13	14	25	24	56	16	22	16	3	3	4	6	8	7	23	11	6	9	12	6	10	9	9	56
28-Nov	10	8	10	9	13	8	13	5	4	6	7	12	3	6	8	7	8	7	5	7	11	6	4	9	13
29-Nov	8	4	12	8	9	8	5	7	7	15	12	16	9	4	3	6	3	4	2	3	5	4	4	3	16
30-Nov	2	3	5	2	5	4	3	5	6	8	11	9	10	11	10	6	5	4	4	7	6	11	21	8	21
	36	86	38	25	28	56	18	22	38	37	29	91	50	38	22	23	23	30	40	25	18	33	29	38	

Diurnal Maximum





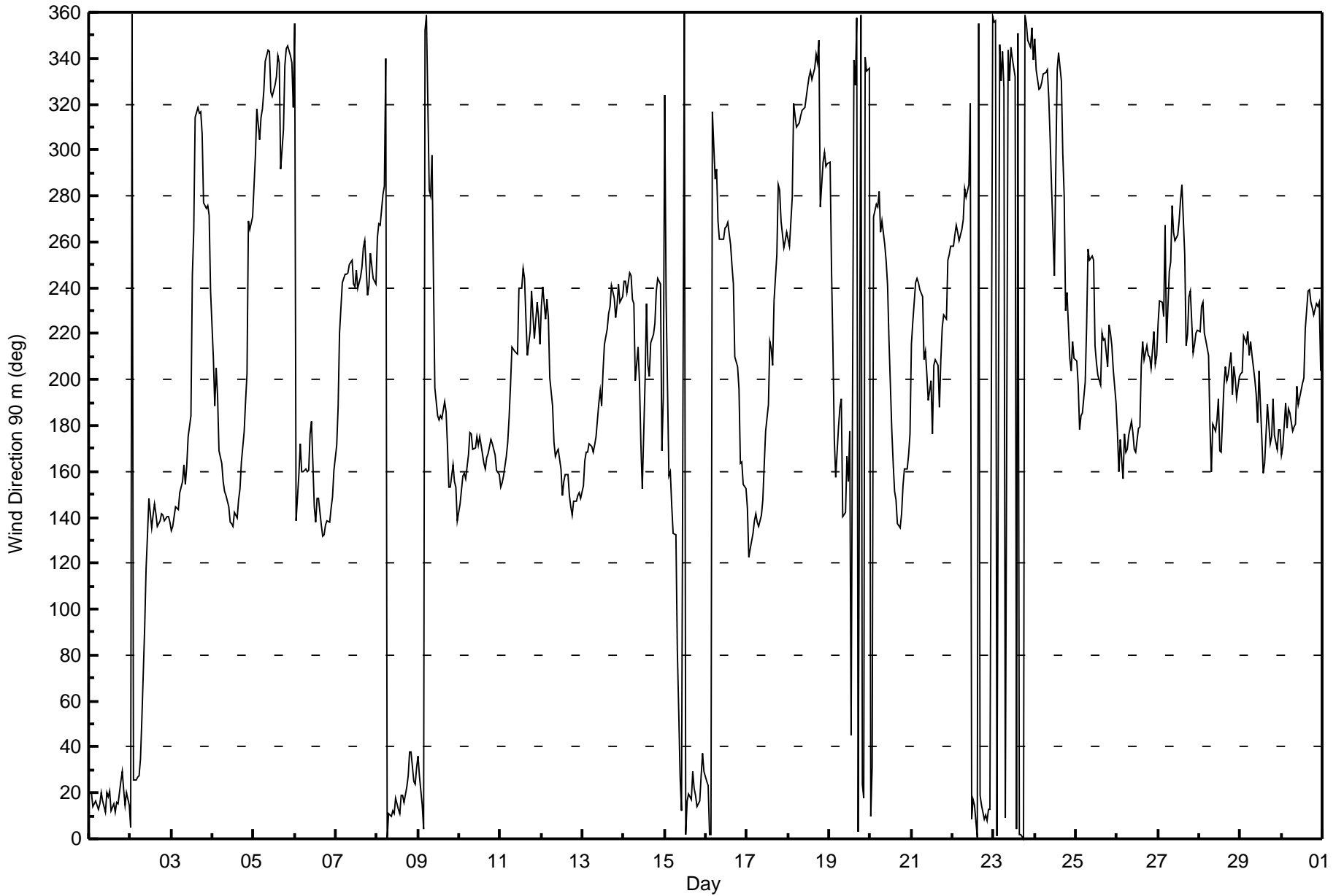
Summary of Hour Standard Deviations

Mannix - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 97 deg on Nov 6 02:00			Hours of Data:	720
Minimum Value: 2 deg on Nov 8 00:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 7 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 50				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	5	5	4	3	4	3	4	5	6	7	6	5	6	7	5	4	5	7	7	6	6	7	5	5	7
2-Nov	10	8	8	5	6	6	7	13	13	15	8	12	9	7	11	9	6	8	7	6	6	6	6	7	15
3-Nov	7	7	6	5	3	5	6	4	5	8	11	14	21	15	15	7	5	6	8	15	7	5	6	19	21
4-Nov	12	15	13	6	11	5	3	4	3	6	6	4	5	8	5	5	4	5	6	6	13	33	6	5	33
5-Nov	5	8	7	7	8	6	8	9	7	7	9	11	14	12	12	6	14	12	6	6	8	10	11	14	14
6-Nov	32	97	37	7	10	7	7	6	7	7	11	14	9	10	9	5	5	5	6	6	6	6	7	4	97
7-Nov	6	12	6	6	5	4	3	4	5	7	7	15	10	7	9	6	9	8	5	10	3	2	6	2	15
8-Nov	12	12	5	5	11	12	14	4	4	8	8	10	7	6	7	6	6	8	11	9	7	8	7	7	14
9-Nov	7	11	9	10	9	65	17	14	34	46	14	14	11	11	17	16	12	13	7	5	7	10	8	5	65
10-Nov	4	5	5	4	4	4	4	3	4	6	6	7	7	7	9	4	4	5	6	6	6	5	5	4	9
11-Nov	4	4	5	7	6	7	12	8	7	10	13	7	8	9	7	10	3	8	5	10	9	9	11	9	13
12-Nov	12	7	9	8	21	10	7	8	6	9	10	8	7	9	5	3	4	6	4	5	5	4	4	5	21
13-Nov	5	5	5	5	6	6	6	5	6	7	7	11	13	12	12	13	10	5	5	6	11	8	8	5	13
14-Nov	4	4	5	8	8	11	11	21	12	21	13	11	43	8	18	9	5	4	11	2	4	20	24	38	43
15-Nov	20	70	5	4	5	7	12	15	12	9	8	12	12	15	9	5	6	6	5	6	10	7	7	6	70
16-Nov	11	13	5	19	10	8	8	7	5	5	5	6	8	7	7	7	7	18	10	11	5	7	4	3	19
17-Nov	9	4	4	7	6	7	6	4	5	5	8	6	11	8	8	7	23	28	12	9	8	5	6	6	28
18-Nov	6	5	12	10	9	6	7	6	6	6	7	9	10	9	11	7	7	12	34	18	7	9	5	12	34
19-Nov	24	15	18	6	7	4	6	13	29	24	21	10	16	52	22	12	9	6	8	9	15	30	8	14	52
20-Nov	20	73	16	3	7	8	5	6	4	7	8	14	11	9	8	5	4	6	11	6	7	6	4	12	73
21-Nov	16	19	7	6	7	7	10	11	9	18	13	12	9	14	9	7	6	11	9	8	13	8	6	7	19
22-Nov	6	5	6	6	6	6	8	5	10	7	24	11	6	6	10	8	6	4	4	4	4	3	5	7	24
23-Nov	5	7	6	9	13	15	17	14	25	17	16	28	24	24	13	12	6	7	8	6	7	7	9	8	28
24-Nov	10	8	9	7	7	6	6	7	8	16	9	25	22	10	7	18	10	9	21	18	17	10	8	6	25
25-Nov	5	8	5	5	5	7	13	13	7	6	23	73	25	15	21	12	10	14	8	8	7	9	8	7	73
26-Nov	9	5	10	6	6	4	2	5	4	6	4	2	6	9	10	6	7	7	12	12	7	11	28	25	28
27-Nov	8	12	12	21	16	55	13	16	12	3	3	4	6	7	7	18	11	6	8	11	7	12	11	8	55
28-Nov	9	6	8	7	10	6	16	6	6	5	10	9	5	8	8	4	8	7	5	9	10	6	5	8	16
29-Nov	7	5	12	10	8	8	6	7	7	14	15	18	11	5	4	5	4	5	3	5	6	4	4	5	18
30-Nov	2	4	6	4	5	6	5	7	9	8	11	9	8	11	8	5	5	3	4	6	4	10	13	8	13

32	97	37	21	21	65	17	21	34	46	24	73	43	52	22	18	23	28	34	18	17	33	28	38	
Diurnal Maximum																								





Summary of Hour Averages

Mannix - November 2015

Maximum Value: 1.7 km/h on Nov 22 20:00		Maximum Daily Average: 0.5 km/h on Nov 29		Hours in Service: 720																						
Minimum Value: -0.8 km/h on Nov 7 09:00		Minimum Daily Average: -0.4 km/h on Nov 18		Hours of Data: 713																						
Maximum Diurnal Average: 0.1 km/h at hour 13		Minimum Diurnal Average: 0.0 km/h at hour 15		Hours of Missing Data: 7																						
Monthly Average: 0.09 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.6 P ₉₉ = 0.8		Hours of Calibration: 0																						
				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-Nov	0.1	0.1	0.0	0.0	0.0	-0.1	-0.1	0.1	0.1	0.0	0.1	0.0	0.3	-0.1	-0.1	-0.1	0.2	0.1	0.4	0.6	0.4	0.1	0.3	0.0	0.1	0.6
2-Nov	0.0	0.0	0.2	0.2	0.3	0.1	0.3	0.2	0.4	0.5	0.2	0.4	0.4	0.2	0.3	0.3	0.6	0.5	0.5	0.5	0.6	0.4	0.3	0.4	0.3	0.6
3-Nov	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.2	0.3	0.2	0.1	0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.2	0.0	-0.1	0.0	0.0	0.1	0.5
4-Nov	-0.2	0.0	0.0	0.1	0.2	0.1	0.4	0.4	0.3	0.3	0.4	0.3	0.5	0.5	0.4	0.4	0.4	0.5	0.4	0.0	0.0	0.0	-0.2	-0.2	0.2	0.5
5-Nov	-0.1	-0.3	-0.3	-0.3	-0.4	-0.4	-0.2	-0.3	-0.3	-0.2	-0.4	-0.3	0.2	0.0	-0.2	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.2	0.2
6-Nov	0.1	0.0	0.1	0.2	0.2	0.4	0.4	0.3	0.3	0.3	0.1	0.2	0.4	0.4	0.4	0.4	0.8	0.7	0.5	0.6	0.7	0.6	0.8	0.7	0.4	0.8
7-Nov	0.6	0.5	-0.3	-0.6	-0.6	-0.6	-0.8	-0.7	-0.8	-0.5	-0.5	-0.2	-0.4	-0.3	-0.2	-0.2	0.0	0.0	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.3	0.6
8-Nov	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	-0.2	-0.1	-0.4	0.3	-0.1	0.3	0.1	-0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.4	0.5	0.1	0.5
9-Nov	0.3	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	0.1	0.0	0.0	0.3	0.0	-0.2	0.1	0.0	0.0	0.2	0.4	0.2	0.4	0.5	0.5	0.4	0.1	0.5
10-Nov	0.5	0.5	0.7	0.6	0.6	0.7	0.2	0.2	0.3	0.2	0.2	0.3	0.1	0.2	0.5	0.7	0.4	0.5	0.1	0.1	0.4	0.4	0.6	0.7	0.4	0.7
11-Nov	0.6	0.6	0.6	0.6	0.5	0.3	-0.2	-0.4	-0.3	-0.2	-0.4	-0.4	-0.6	-0.6	-0.8	-0.4	-0.2	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	-0.1	0.6
12-Nov	-0.1	-0.4	0.1	0.1	0.2	0.2	0.5	0.5	0.5	0.3	0.3	0.2	0.5	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.7	0.4	0.8
13-Nov	0.9	0.6	0.5	0.2	0.2	0.5	0.5	0.5	0.5	0.1	0.0	0.5	0.6	-0.5	-0.3	-0.4	-0.4	-0.4	-0.3	-0.5	-0.3	-0.4	-0.4	-0.6	0.0	0.9
14-Nov	-0.7	-0.8	-0.5	-0.4	-0.5	-0.1	0.0	0.2	-0.2	0.4	0.5	0.3	0.3	-0.6	-0.2	-0.2	-0.3	-0.1	-0.1	-0.3	-0.2	0.2	0.5	0.2	-0.1	0.5
15-Nov	0.1	0.2	-0.1	0.2	0.4	0.3	0.1	0.0	0.1	-0.1	0.0	0.3	0.0	0.0	-0.1	0.0	0.4	-0.1	0.0	0.0	-0.2	0.0	0.0	-0.1	0.1	0.4
16-Nov	0.0	0.0	-0.1	0.1	0.0	-0.1	-0.3	-0.3	-0.4	-0.7	-0.6	-0.5	-0.3	-0.2	-0.4	-0.6	-0.3	0.0	-0.1	0.2	0.6	0.5	0.4	0.6	-0.1	0.6
17-Nov	0.5	0.2	0.8	0.8	0.5	0.7	0.6	0.5	0.5	0.6	0.5	0.1	0.2	-0.5	-0.4	-0.3	-0.3	-0.2	-0.4	-0.5	-0.6	-0.7	-0.5	-0.6	0.1	0.8
18-Nov	-0.7	-0.6	-0.4	-0.4	-0.6	-0.7	-0.6	-0.8	-0.4	-0.7	-0.7	-0.5	-0.5	-0.1	-0.2	-0.2	-0.3	-0.2	-0.1	-0.2	0.1	0.0	-0.3	-0.1	-0.4	0.1
19-Nov	-0.1	-0.2	0.0	0.1	0.4	0.2	0.2	0.2	0.3	-0.1	0.2	0.2	0.2	0.5	-0.1	0.0	-0.2	-0.1	-0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.5
20-Nov	-0.1	-0.2	0.0	-0.1	-0.4	-0.3	-0.7	-0.4	-0.4	-0.4	-0.2	-0.3	0.1	0.2	0.4	0.5	0.7	0.5	0.3	0.6	0.7	0.7	0.6	0.5	0.1	0.7
21-Nov	0.2	-0.2	-0.4	-0.5	-0.2	-0.3	-0.1	0.2	0.0	0.6	0.6	0.4	0.4	0.3	-0.1	-0.2	0.6	0.1	-0.3	-0.3	-0.2	-0.6	-0.7	-0.7	-0.1	0.6
22-Nov	-0.4	-0.5	-0.1	-0.4	-0.3	-0.2	-0.3	-0.3	-0.3	-0.4	-0.2	0.0	AF	AF	AF	AF	AF	AF	AF	1.7	0.1	0.1	-0.1	-0.1	--	1.7
23-Nov	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	-0.1	-0.3	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.2	-0.3	-0.1	0.1
24-Nov	0.1	0.0	0.0	-0.2	-0.2	-0.3	-0.3	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	-0.1	-0.1	-0.2	-0.1	0.1
25-Nov	-0.2	-0.1	0.6	0.2	0.3	0.3	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.2	0.2	0.3	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.3	0.1	0.6
26-Nov	0.6	0.7	0.6	0.5	0.8	0.7	0.7	0.8	0.6	0.6	0.7	0.7	0.6	0.7	0.1	-0.1	-0.1	-0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.8
27-Nov	-0.2	-0.1	0.2	0.2	0.3	0.3	-0.1	0.2	-0.1	-0.4	-0.6	-0.5	-0.3	-0.2	0.0	0.1	0.1	0.0	0.0	-0.1	0.0	0.2	0.2	0.3	0.0	0.3
28-Nov	0.3	0.3	0.3	0.4	0.2	0.2	0.5	0.8	0.6	0.8	0.6	0.5	0.6	0.8	0.3	0.2	0.2	0.0	0.3	0.4	0.3	0.3	0.7	0.4	0.4	0.8
29-Nov	0.5	0.5	0.3	0.3	0.3	0.2	0.1	0.2	0.3	0.4	0.5	0.4	0.5	0.5	0.6	0.6	0.5	0.8	0.6	0.3	0.7	0.7	0.8	0.6	0.5	0.8
30-Nov	0.6	0.7	0.7	0.6	0.5	0.5	0.7	0.8	0.7	0.7	0.7	0.7	0.5	0.3	0.3	0.2	0.0	-0.2	-0.5	-0.1	0.0	-0.2	0.0	0.3	0.3	0.8
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Summary of Hour Standard Deviations

Mannix - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2.9 km/h on Nov 18 13:00			Hours of Data:	713
Minimum Value: 0.2 km/h on Nov 27 16:00			Hours of Missing Data:	7
			Hours of Calibration:	0
			Percent Operational Time:	99.0
Percentiles: P ₁ = 0.3 P ₁₀ = 0.5 Q ₁ = 0.8 Median = 1.2 Q ₃ = 1.7 P ₉₀ = 2.1 P ₉₉ = 2.7				

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

AF - Analyzer Failure



Summary of Hour Averages

Mannix - November 2015

Maximum Value: 2.0 km/h on Nov 30 07:00		Maximum Daily Average: 1.3 km/h on Nov 10		Hours in Service: 720																						
Minimum Value: -1.4 km/h on Nov 8 09:00		Minimum Daily Average: -0.7 km/h on Nov 18		Hours of Data: 720																						
Maximum Diurnal Average: 0.4 km/h at hour 23		Minimum Diurnal Average: 0.1 km/h at hour 16		Hours of Missing Data: 0																						
Monthly Average: 0.24 km/h		Percentiles: P ₁ = -1.2 P ₁₀ = -0.6 Q ₁ = -0.3 Median = 0.0 Q ₃ = 0.9 P ₉₀ = 1.3 P ₉₉ = 1.8		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	-0.5	-0.5	-0.6	-0.6	-0.6	-0.7	-0.8	-0.6	-0.5	-0.5	-0.5	-0.7	-0.3	-0.7	-0.7	-0.9	-0.4	-0.6	0.0	0.0	-0.3	-0.8	-0.3	-0.6	-0.5	0.0
2-Nov	-0.4	-0.4	-0.1	-0.2	0.0	-0.3	0.2	0.0	0.4	0.7	0.2	0.7	0.6	0.5	0.7	0.6	1.0	1.1	1.2	1.2	0.9	1.0	0.7	0.9	0.5	1.2
3-Nov	0.8	0.9	0.7	0.8	0.8	0.9	0.9	0.6	0.6	0.5	0.4	0.3	0.2	-0.1	-0.3	-0.2	-0.5	-0.3	-0.2	-0.2	-0.1	-0.2	-0.1	0.1	0.3	0.9
4-Nov	0.0	0.4	0.3	0.4	0.8	0.6	1.0	1.0	0.8	0.8	0.8	0.6	0.9	1.0	0.9	0.8	0.9	0.9	0.4	0.3	-0.2	-0.3	-0.3	-0.3	0.6	1.0
5-Nov	-0.3	-0.6	-0.7	-0.6	-0.9	-0.8	-0.6	-0.9	-0.9	-1.2	-0.8	-1.0	-0.1	-0.5	-0.7	-0.9	-0.5	-0.4	-0.8	-0.7	-0.6	-0.4	-0.4	-0.2	-0.7	-0.1
6-Nov	-0.2	0.0	0.1	0.3	0.4	0.7	0.5	0.6	0.5	0.7	0.8	0.5	0.6	1.2	0.8	1.0	1.2	1.3	1.3	1.2	1.2	1.2	1.6	1.6	0.8	1.6
7-Nov	1.4	0.8	-0.1	-0.3	-0.3	-0.4	-0.6	-0.6	-0.8	-0.4	-0.2	0.0	-0.2	-0.3	0.0	-0.1	-0.2	-0.2	-0.1	-0.2	-0.5	-0.4	-0.4	-0.4	-0.2	1.4
8-Nov	-0.3	-0.3	-0.3	-0.4	-0.4	-0.3	-0.8	-1.0	-1.4	-0.4	-0.7	-0.4	-0.6	-1.0	-0.6	-0.6	-0.6	-0.3	0.0	0.1	0.1	0.0	0.2	0.0	-0.4	0.2
9-Nov	0.2	0.0	-0.2	-0.3	-0.2	0.0	0.0	-0.1	0.1	0.0	0.3	0.4	0.2	0.0	0.5	0.2	0.2	0.3	0.7	0.5	0.8	1.1	1.0	0.9	0.3	1.1
10-Nov	0.9	1.3	1.4	1.5	1.4	1.5	0.9	0.9	1.2	1.2	1.0	1.2	1.0	1.2	1.4	1.5	1.5	1.6	1.3	1.2	1.3	1.5	1.3	1.6	1.3	1.6
11-Nov	1.4	1.4	1.6	1.2	1.5	1.0	0.5	-0.1	-0.1	0.0	0.0	0.0	-0.1	-0.5	-0.4	0.0	-0.1	-0.3	-0.3	-0.1	0.0	-0.3	-0.2	0.0	0.2	1.6
12-Nov	-0.2	-0.2	0.1	0.1	0.4	0.5	1.0	1.2	1.2	0.8	0.9	1.0	0.9	1.2	1.2	1.3	1.3	1.4	1.3	1.5	1.7	1.9	1.8	1.8	1.0	1.9
13-Nov	1.8	1.9	1.5	1.3	1.1	1.2	1.2	1.0	1.2	0.8	0.8	1.2	1.5	0.0	0.2	-0.3	-0.2	-0.4	-0.3	-0.3	-0.2	-0.2	-0.1	-0.4	0.6	1.9
14-Nov	-0.5	-0.8	-0.3	-0.4	-0.4	0.0	-0.1	0.3	0.1	0.6	0.9	0.7	0.4	-0.4	0.1	0.2	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	0.3	1.2	0.6	1.2
15-Nov	0.1	0.5	0.4	0.6	0.7	0.5	0.4	0.0	0.1	-0.4	-0.2	0.0	-0.2	-0.3	-1.0	-0.8	-0.2	-0.9	-0.7	-0.6	-0.8	-0.5	-0.2	-0.6	-0.2	0.7
16-Nov	-0.4	-0.3	-0.4	-0.3	-0.3	-0.4	-0.5	-0.4	-0.4	-0.4	-0.7	-0.7	-0.3	-0.2	-0.3	-0.5	-0.3	0.3	0.2	0.5	1.2	1.1	1.1	1.5	0.0	1.5
17-Nov	1.1	0.6	1.3	1.7	1.2	1.4	1.1	0.9	1.1	1.3	1.4	1.0	0.9	0.0	-0.1	0.0	-0.3	-0.2	-0.6	-0.8	-0.5	-0.5	-0.5	-0.5	0.5	1.7
18-Nov	-0.4	-0.5	-0.6	-0.9	-1.2	-1.3	-1.2	-1.3	-1.2	-1.2	-1.3	-1.0	-1.4	-0.5	-0.6	-0.9	-0.9	-0.5	-0.3	-0.1	0.2	0.1	-0.2	-0.1	-0.7	0.2
19-Nov	-0.2	-0.1	0.3	0.3	1.2	0.7	0.5	0.4	0.4	0.2	0.4	0.3	0.3	0.5	-0.3	-0.3	-0.6	-0.4	-0.3	0.0	-0.1	0.0	-0.1	-0.1	0.1	1.2
20-Nov	0.0	-0.2	0.0	-0.2	-0.2	-0.2	-0.4	-0.4	-0.4	-0.4	0.0	-0.1	0.5	0.7	1.0	0.9	0.9	1.0	1.0	1.3	1.6	1.5	1.2	1.0	0.4	1.6
21-Nov	0.4	0.0	-0.2	-0.2	0.0	-0.1	0.2	0.4	0.2	1.0	1.0	0.7	0.8	0.5	0.1	0.2	1.1	0.3	-0.1	-0.1	-0.1	-0.6	-0.8	-0.6	0.2	1.1
22-Nov	-0.6	-0.5	-0.3	-0.3	-0.3	-0.1	-0.5	-0.9	-0.5	-0.7	-0.7	-0.5	-0.4	-0.2	-0.4	-0.5	-0.3	-0.6	-0.8	-0.6	-0.8	-0.6	-0.6	-0.4	-0.5	-0.1
23-Nov	-0.6	-0.5	-0.4	-0.4	-0.3	-0.3	0.1	-0.1	0.0	0.0	-0.2	-0.1	-0.1	-0.2	-0.3	-0.7	-0.4	-0.7	-0.3	-0.7	-0.8	-0.7	-0.6	-0.8	-0.4	0.1
24-Nov	-0.3	-0.2	-0.1	-0.7	-0.7	-1.1	-0.7	-0.6	-0.3	-0.2	-0.1	0.0	-0.4	-0.7	-0.7	-0.2	-0.2	-0.1	-0.1	-0.1	0.2	0.2	0.0	0.1	-0.3	0.2
25-Nov	0.1	0.4	1.2	0.8	0.9	0.6	0.0	-0.1	0.0	-0.1	0.0	0.2	0.1	0.3	0.4	0.4	0.2	0.3	0.4	0.3	0.2	0.6	0.8	0.9	0.4	1.2
26-Nov	0.9	1.4	1.1	1.3	1.8	1.5	1.7	1.8	1.8	1.7	1.7	1.7	1.4	1.3	0.3	0.2	0.0	0.0	0.5	0.5	0.8	0.3	0.8	0.7	1.0	1.8
27-Nov	-0.2	0.0	0.2	0.2	0.1	0.3	-0.1	0.2	-0.3	-0.5	-0.5	-0.6	-0.3	-0.3	-0.1	0.0	0.3	0.2	-0.1	-0.1	0.2	0.3	0.5	0.6	0.0	0.6
28-Nov	0.6	0.4	0.5	0.7	0.6	0.6	1.3	1.7	1.2	1.6	1.4	1.1	1.2	1.8	1.0	0.5	0.8	0.8	0.7	1.0	0.7	0.9	1.4	1.0	1.0	1.8
29-Nov	1.1	1.2	0.6	0.5	0.6	0.5	0.2	0.4	0.8	0.9	1.0	0.7	1.1	1.2	1.3	1.3	1.1	1.5	1.3	0.9	1.5	1.6	1.6	1.2	1.0	1.6
30-Nov	1.3	1.4	1.4	1.4	1.3	1.5	2.0	1.7	1.8	1.4	1.3	1.0	0.5	0.7	0.5	0.0	-0.1	-0.3	-0.1	0.0	-0.2	0.0	0.4	0.9	0.8	2.0
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.4 km/h on Nov 18 08:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 0.2 km/h on Nov 7 19:00																									
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.8 Median = 1.2 Q ₃ = 1.8 P ₉₀ = 2.2 P ₉₉ = 3.1																									
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-Nov	1.6	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.7	2.1	2.1	2.2	1.6	1.8	1.8	1.7	1.9	2.3	2.3	2.0	1.6	1.9	1.6	2.3
2-Nov	1.5	1.4	1.5	1.4	1.6	1.2	1.3	1.0	1.0	1.4	1.4	1.5	1.8	1.7	1.5	1.7	2.1	2.2	2.2	2.4	2.0	2.1	2.0	2.0	2.4
3-Nov	1.9	1.9	1.7	1.4	1.3	1.2	1.1	0.8	1.0	0.9	0.9	1.0	0.9	0.9	1.1	1.2	0.9	1.0	1.0	1.3	1.4	1.2	0.7	0.8	1.9
4-Nov	0.5	0.6	0.4	0.6	0.5	0.5	0.5	1.0	0.9	1.2	1.5	1.4	1.9	2.1	1.5	1.4	1.4	1.0	1.1	1.0	0.6	0.4	0.6	0.6	2.1
5-Nov	1.0	1.7	1.8	1.5	2.1	2.2	2.0	1.6	2.0	2.4	2.5	2.4	2.4	2.0	1.6	1.9	1.6	1.8	1.8	1.5	1.2	1.2	0.8	0.7	2.5
6-Nov	0.7	0.5	0.6	0.6	0.8	0.9	0.9	0.9	1.0	1.0	1.2	1.5	1.8	1.9	1.8	1.9	2.3	2.5	3.0	2.7	2.8	2.6	2.9	2.1	3.0
7-Nov	1.6	1.1	1.2	1.5	1.3	1.7	1.6	1.6	1.8	2.7	2.2	1.6	2.3	1.4	1.4	0.9	0.8	0.4	0.2	0.2	0.4	0.2	0.5	0.4	2.7
8-Nov	0.5	0.9	0.6	0.4	0.6	0.7	0.9	1.2	1.6	2.6	1.7	1.8	1.8	1.9	2.4	2.1	2.0	1.7	1.3	1.2	1.2	1.5	1.5	1.4	2.6
9-Nov	1.2	0.9	0.8	0.6	0.4	0.4	0.5	0.4	0.6	0.4	0.8	1.0	1.3	1.5	1.6	1.4	1.3	0.6	0.4	0.7	0.9	1.4	1.4	1.3	1.6
10-Nov	1.4	1.8	1.8	1.9	1.7	1.4	1.5	1.5	1.8	2.1	2.4	2.4	2.3	2.4	2.1	1.7	1.9	2.3	2.7	2.5	2.4	2.1	1.7	2.3	2.7
11-Nov	2.0	1.9	2.0	1.9	1.8	1.5	1.9	2.2	1.9	1.6	1.9	2.0	2.5	2.7	2.8	1.8	0.7	1.3	1.4	1.2	1.4	1.4	1.5	0.9	2.8
12-Nov	1.5	1.6	0.8	0.8	0.5	0.6	0.6	0.6	0.7	1.3	1.6	1.7	2.2	1.9	1.3	1.5	1.7	2.3	2.5	2.9	2.8	2.8	2.8	2.8	2.9
13-Nov	2.6	2.3	2.2	2.2	2.2	1.9	1.7	1.4	1.2	1.8	1.9	1.8	2.8	2.5	2.6	1.8	1.2	1.2	0.8	0.9	1.5	1.7	1.3	1.0	2.8
14-Nov	1.6	2.2	1.7	1.7	1.4	1.1	1.0	1.4	1.2	1.2	1.1	1.3	1.4	1.8	1.6	1.1	0.6	0.3	1.1	0.4	0.6	0.5	0.6	0.6	2.2
15-Nov	0.3	0.4	0.3	0.5	0.8	0.9	0.5	0.2	0.3	0.5	0.7	1.0	0.6	1.1	1.8	1.7	2.0	2.1	2.2	1.9	1.8	1.3	1.0	0.9	2.2
16-Nov	0.7	0.6	1.0	0.8	1.0	1.0	1.6	1.3	1.9	2.3	2.3	2.5	2.3	2.1	1.8	2.0	1.3	0.7	0.7	0.6	0.7	0.8	1.2	1.4	2.5
17-Nov	1.1	1.7	2.2	2.6	2.5	2.4	2.3	2.1	2.0	2.2	1.8	2.1	2.0	2.2	1.9	1.6	1.3	1.3	1.9	2.1	2.0	2.6	2.6	2.1	2.6
18-Nov	2.1	2.2	2.1	2.4	2.3	2.9	3.1	3.4	3.3	3.1	3.2	3.1	3.3	2.8	2.5	2.1	1.5	1.3	1.0	0.9	0.5	0.4	0.3	0.3	3.4
19-Nov	0.4	0.2	0.3	0.2	0.6	0.4	0.6	0.8	1.1	0.7	0.8	1.0	1.0	0.9	0.6	0.9	0.9	0.7	0.4	0.9	0.6	0.2	0.3	0.6	1.1
20-Nov	0.2	0.2	0.2	0.2	0.2	0.4	1.0	1.3	1.2	1.3	1.5	1.6	1.5	1.7	1.8	1.4	1.7	1.8	2.2	2.2	2.1	1.7	1.4	1.2	2.2
21-Nov	1.2	1.6	1.6	1.8	2.1	1.8	1.4	0.9	0.9	1.0	1.2	1.0	1.2	1.1	1.4	1.2	0.8	0.8	1.4	1.2	1.6	2.7	3.0	2.4	3.0
22-Nov	2.5	2.3	1.9	2.2	1.8	1.7	1.8	1.6	2.0	2.0	1.7	1.1	1.8	1.6	1.0	1.1	1.5	1.3	1.3	1.4	1.1	1.5	1.4	1.3	2.5
23-Nov	1.0	1.2	1.1	1.1	0.9	0.7	0.7	0.6	0.6	0.7	0.8	0.8	0.7	1.0	1.1	1.3	1.4	1.4	1.9	1.9	1.6	2.1	1.8	1.9	2.1
24-Nov	1.8	1.8	1.4	1.8	2.2	2.2	2.0	1.9	1.4	0.9	0.6	0.9	1.2	1.6	1.3	1.0	1.1	0.5	0.3	0.5	0.4	0.6	0.7	0.7	2.2
25-Nov	0.7	0.7	0.6	0.6	0.6	0.7	0.5	0.4	0.4	0.4	0.9	0.7	0.7	0.7	0.6	0.4	0.3	0.5	0.4	0.3	0.2	0.4	0.4	0.7	0.9
26-Nov	1.1	1.7	1.0	1.2	1.0	1.1	1.0	1.0	0.9	1.3	1.6	1.7	1.3	1.3	1.2	1.5	1.3	1.0	1.0	0.9	0.8	0.9	1.1	1.1	1.7
27-Nov	1.2	1.8	1.1	1.0	1.2	0.9	1.2	1.1	0.9	0.9	1.0	1.0	0.7	0.6	0.5	0.2	0.4	0.4	0.5	0.4	0.5	0.6	0.6	0.8	1.8
28-Nov	0.6	0.6	0.6	0.6	0.5	0.7	0.9	1.2	0.7	1.0	1.2	1.0	1.3	1.5	0.9	0.5	0.7	0.7	0.5	0.4	0.5	0.5	0.6	0.7	1.5
29-Nov	0.7	0.8	0.6	0.4	0.6	0.4	0.4	0.3	0.5	0.8	1.2	1.0	1.0	1.1	1.4	1.0	0.4	0.4	0.6	0.5	0.9	1.1	0.9	0.8	1.4
30-Nov	0.7	0.7	0.5	0.9	0.8	0.7	0.9	1.3	1.0	1.5	1.6	1.1	0.9	0.6	0.6	0.9	0.8	0.6	0.5	0.8	0.7	0.8	0.6	0.5	1.6
	2.6	2.3	2.2	2.6	2.5	2.9	3.1	3.4	3.3	3.1	3.2	3.1	3.3	2.8	2.8	2.1	2.3	2.5	3.0	2.9	2.8	2.8	3.0	2.8	
	Diurnal Maximum																								



Summary of Hour Averages

Mannix - November 2015

Maximum Value: 1.8 km/h on Nov 13 13:00		Maximum Daily Average: 0.8 km/h on Nov 10		Hours in Service: 720																						
Minimum Value: -0.9 km/h on Nov 8 09:00		Minimum Daily Average: -0.1 km/h on Nov 1		Hours of Data: 720																						
Maximum Diurnal Average: 0.3 km/h at hour 13		Minimum Diurnal Average: 0.1 km/h at hour 18		Hours of Missing Data: 0																						
Monthly Average: 0.19 km/h		Percentiles: $P_1 = -0.5$ $P_{10} = -0.2$ $Q_1 = 0.0$ Median = 0.1 $Q_3 = 0.4$ $P_{90} = 0.7$ $P_{99} = 1.1$		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	-0.3	-0.1	-0.2	-0.3	-0.2	-0.4	-0.4	-0.1	-0.1	0.0	-0.1	-0.1	0.3	-0.2	-0.1	-0.4	-0.1	-0.2	0.2	0.3	0.1	-0.4	0.0	-0.1	-0.1	0.3
2-Nov	0.2	0.1	0.1	0.0	0.1	-0.1	0.3	0.1	0.2	0.5	-0.4	0.3	0.1	-0.2	0.3	0.0	-0.1	0.2	0.3	0.2	0.1	0.2	-0.1	0.0	0.1	0.5
3-Nov	-0.2	-0.1	0.1	0.1	0.2	0.6	0.8	0.5	0.5	0.4	0.3	0.2	0.2	0.0	0.1	0.1	-0.1	0.2	0.2	0.3	0.4	0.4	0.2	0.3	0.2	0.8
4-Nov	0.0	0.2	0.1	0.3	0.5	0.7	1.0	0.5	0.6	0.3	0.1	-0.2	-0.1	0.3	0.0	0.3	0.5	0.7	0.5	0.2	0.1	0.1	0.2	0.0	0.3	1.0
5-Nov	0.4	0.3	0.0	0.3	0.0	0.1	-0.1	-0.3	-0.4	-0.5	-0.1	-0.4	0.6	-0.1	-0.3	-0.4	0.3	0.3	-0.2	-0.3	-0.4	-0.1	-0.2	-0.2	-0.1	0.6
6-Nov	-0.1	0.0	0.0	0.2	0.3	0.5	0.4	0.4	0.5	0.4	0.6	0.2	-0.1	1.0	0.4	-0.1	-0.2	-0.4	-0.1	0.0	-0.1	0.3	0.6	1.0	0.2	1.0
7-Nov	1.1	0.3	0.0	0.0	0.0	0.1	-0.1	0.0	-0.1	0.3	0.4	0.3	0.4	0.2	0.2	0.2	0.1	0.0	0.0	-0.1	-0.2	-0.3	-0.3	-0.3	0.1	1.1
8-Nov	0.1	0.5	0.1	0.1	0.0	-0.1	-0.5	-0.4	-0.9	0.3	-0.3	0.0	-0.2	-0.6	-0.4	-0.4	-0.3	-0.2	0.1	0.1	0.0	0.1	0.2	0.2	-0.1	0.5
9-Nov	0.2	0.2	-0.2	-0.1	0.0	0.1	0.1	0.0	0.4	0.0	0.3	0.3	0.0	-0.4	0.4	0.2	-0.1	0.3	0.4	0.3	0.6	0.6	0.5	-0.1	0.2	0.6
10-Nov	0.3	0.6	0.9	1.0	0.9	0.9	0.4	0.4	0.7	0.7	0.6	0.8	0.5	0.7	0.8	1.0	1.0	1.0	0.8	0.8	0.7	0.8	0.9	1.1	0.8	1.1
11-Nov	0.8	0.9	1.0	0.7	0.9	0.5	0.1	0.1	-0.1	-0.1	0.1	0.2	0.4	0.2	0.2	0.1	-0.2	-0.3	0.0	0.0	-0.4	0.0	-0.3	-0.2	0.2	1.0
12-Nov	0.2	0.1	0.0	0.1	0.0	0.2	0.3	0.5	0.6	0.4	0.6	0.6	0.3	0.8	0.9	1.0	0.6	0.3	0.0	0.6	0.5	0.8	0.9	0.9	0.5	1.0
13-Nov	1.1	1.2	1.1	0.8	0.6	0.8	0.8	0.6	0.6	0.3	0.2	0.9	1.8	0.1	0.3	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.0	-0.2	0.5	1.8
14-Nov	-0.2	-0.3	-0.1	-0.1	0.0	0.1	-0.1	0.0	-0.2	0.2	0.7	0.3	0.5	-0.3	0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	0.5	0.3	0.0	0.7
15-Nov	0.1	0.3	0.6	0.7	0.1	0.0	0.0	0.1	0.2	-0.1	0.0	0.0	-0.1	0.0	-0.5	-0.1	0.2	-0.2	-0.2	0.1	0.0	0.3	0.3	0.1	0.1	0.7
16-Nov	0.0	0.2	0.0	0.1	0.0	0.2	0.3	0.2	0.4	0.4	0.3	0.1	0.5	0.6	0.3	0.1	-0.2	0.1	0.0	0.1	0.7	0.7	0.6	1.1	0.3	1.1
17-Nov	0.3	-0.6	-0.2	0.1	0.1	0.4	-0.2	-0.3	-0.1	0.5	0.8	0.5	0.5	0.2	0.0	-0.1	-0.1	0.3	0.4	0.3	0.5	0.3	0.2	0.3	0.2	0.8
18-Nov	0.2	0.5	0.3	0.0	-0.1	0.1	0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.5	0.3	0.2	-0.4	-0.4	0.0	0.2	0.2	0.7	0.5	0.3	0.4	0.1	0.7
19-Nov	0.1	0.1	0.1	0.1	0.6	0.2	0.2	0.1	0.0	0.1	0.2	0.1	0.3	0.2	-0.2	-0.1	-0.2	-0.1	-0.1	0.2	-0.1	0.0	0.0	0.0	0.1	0.6
20-Nov	0.0	0.0	0.3	0.2	0.1	0.2	0.0	0.1	0.0	-0.1	0.2	-0.2	0.3	0.4	0.5	0.4	-0.2	-0.1	0.1	0.6	0.9	0.9	0.6	0.6	0.2	0.9
21-Nov	0.0	0.0	0.1	0.3	0.6	0.2	0.4	0.0	-0.1	0.4	0.5	0.1	0.6	0.3	-0.1	-0.1	0.4	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.2	0.6
22-Nov	0.2	0.3	0.2	0.8	0.4	0.8	0.4	-0.1	0.2	0.3	0.1	-0.2	-0.1	-0.1	-0.2	0.0	-0.1	-0.3	-0.3	-0.3	-0.5	-0.2	-0.2	0.0	0.0	0.8
23-Nov	-0.3	-0.1	0.0	-0.2	-0.2	0.0	0.4	0.1	0.1	0.2	0.0	0.0	0.0	-0.1	0.0	-0.4	0.0	-0.2	0.6	-0.1	-0.2	-0.2	-0.2	-0.2	-0.1	0.6
24-Nov	0.3	0.5	0.4	-0.1	-0.3	-0.3	-0.2	0.0	0.2	0.2	0.2	0.1	0.2	-0.4	-0.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	0.5
25-Nov	0.0	0.0	0.5	0.4	0.5	0.2	-0.1	0.0	0.1	0.2	0.2	0.2	0.3	0.0	0.1	0.3	0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	0.5
26-Nov	0.4	1.1	0.5	1.1	0.8	1.0	1.0	0.9	0.7	0.7	1.1	1.1	0.7	0.7	0.0	0.4	-0.1	-0.2	0.1	0.0	0.1	0.0	0.3	0.3	0.5	1.1
27-Nov	-0.2	0.2	0.1	0.0	0.3	0.2	0.0	0.1	0.3	0.3	0.1	-0.1	0.2	0.3	0.2	0.0	0.1	0.0	0.0	0.0	-0.1	-0.1	0.1	0.0	0.1	0.3
28-Nov	0.1	0.0	0.0	0.0	0.0	0.0	0.5	1.1	0.4	0.8	0.6	0.4	0.8	1.2	0.2	0.1	0.3	0.2	0.0	0.4	0.1	0.1	0.3	0.2	0.3	1.2
29-Nov	0.2	0.0	0.0	0.0	0.1	0.0	-0.1	-0.1	0.0	0.1	0.5	0.1	0.5	0.9	1.0	0.5	0.6	0.7	0.7	0.4	0.7	1.1	0.7	0.3	0.4	1.1
30-Nov	0.7	0.7	0.3	0.3	0.3	0.6	0.8	0.7	0.6	0.3	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.0	0.1	-0.1	0.0	-0.2	0.1	0.2	0.3	0.8
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.2 km/h on Nov 18 13:00 Minimum Value: 0.2 km/h on Nov 27 16:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.7 Median = 1.2 Q ₃ = 1.7 P ₉₀ = 2.2 P ₉₉ = 2.9																								Hours in Service: 720 Hours of Data: 720 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-Nov	1.4	1.1	1.0	1.0	1.0	1.0	1.1	1.3	1.6	1.6	1.9	2.0	2.0	1.4	1.6	1.6	1.6	1.9	2.2	2.0	1.8	1.3	1.6	1.3	2.2
2-Nov	1.3	1.4	1.4	1.3	1.3	1.1	1.2	0.9	1.5	1.8	1.4	1.6	1.8	1.7	1.5	1.7	1.9	2.3	2.1	2.2	1.9	1.9	1.8	1.9	2.3
3-Nov	1.8	1.7	1.5	1.2	1.0	1.0	0.9	0.6	0.8	0.8	0.8	0.9	0.7	0.9	1.1	1.1	0.7	0.8	0.8	1.2	1.3	1.1	0.8	1.0	1.8
4-Nov	0.4	0.6	0.4	0.6	0.5	0.4	0.4	0.7	0.8	1.0	1.4	1.2	1.7	2.2	1.3	1.1	1.2	0.8	1.1	0.8	0.5	0.5	0.5	0.6	2.2
5-Nov	1.0	1.6	1.5	1.4	1.9	1.9	2.0	1.3	1.6	2.0	2.4	2.3	2.6	2.2	1.5	1.6	1.6	1.8	1.7	1.3	1.0	1.0	0.6	0.7	2.6
6-Nov	0.8	0.7	0.6	0.5	0.7	0.8	0.9	0.7	0.9	0.9	1.3	1.5	1.9	2.1	1.7	1.7	2.2	2.4	2.8	2.6	2.6	2.4	2.6	1.8	2.8
7-Nov	1.7	1.2	1.3	1.5	1.6	1.7	1.4	1.5	1.9	2.4	2.1	1.4	2.2	1.3	1.5	1.0	0.9	0.5	0.2	0.3	0.3	0.2	0.5	0.5	2.4
8-Nov	0.6	0.8	0.4	0.4	0.7	0.9	1.0	0.8	1.4	2.6	1.7	1.9	1.8	1.6	2.0	1.7	1.6	1.5	1.1	1.2	1.1	1.3	1.4	1.1	2.6
9-Nov	1.0	1.0	0.8	0.5	0.4	0.3	0.5	0.4	0.7	0.3	0.7	1.1	1.5	1.6	1.9	1.7	1.5	0.7	0.2	0.7	0.7	0.8	1.2	0.8	1.9
10-Nov	1.3	1.6	1.6	1.5	1.6	1.3	1.4	1.2	1.5	2.1	2.4	2.5	2.4	2.5	2.1	1.3	1.7	2.1	2.7	2.5	2.6	2.2	1.5	1.7	2.7
11-Nov	1.7	1.5	1.7	1.9	1.8	1.4	1.9	2.2	1.9	1.6	2.0	2.0	2.4	2.6	2.8	1.7	0.6	1.3	1.7	1.4	1.7	1.7	1.7	1.2	2.8
12-Nov	1.7	1.8	0.9	0.9	0.9	0.6	0.5	0.6	0.6	1.0	1.4	1.7	1.9	1.8	1.2	1.1	1.4	1.8	2.1	2.5	2.4	2.4	2.5	2.5	2.5
13-Nov	2.2	2.2	2.2	2.2	2.1	2.0	1.8	1.5	1.4	1.4	1.7	2.0	3.0	2.5	2.7	2.1	1.4	1.2	0.9	1.0	1.6	2.0	1.4	1.1	3.0
14-Nov	1.5	1.9	1.8	2.0	1.6	1.3	1.3	1.6	1.4	1.2	1.0	1.1	1.4	1.5	1.5	1.1	0.7	0.3	1.3	0.4	0.9	0.5	0.6	0.4	2.0
15-Nov	0.2	0.5	0.3	0.4	0.9	1.0	0.9	0.2	0.3	0.3	0.8	1.1	0.8	0.8	2.2	1.5	1.8	1.8	1.8	1.5	1.7	1.3	1.1	0.8	2.2
16-Nov	0.7	0.6	0.7	0.7	1.0	0.9	1.4	1.3	2.1	2.3	2.4	2.8	2.4	2.2	1.7	2.0	1.3	0.7	0.8	0.8	0.5	0.8	0.8	0.8	2.8
17-Nov	1.0	2.1	2.3	2.5	2.1	2.1	2.0	1.6	1.6	2.0	1.8	1.9	1.9	2.3	1.8	1.5	1.3	1.5	1.9	2.1	2.1	2.4	2.5	2.3	2.5
18-Nov	2.0	2.1	2.1	2.3	2.2	2.6	3.0	2.9	3.0	2.8	2.9	3.0	3.2	2.7	2.4	1.8	1.3	1.3	1.2	1.0	0.7	0.5	0.4	0.3	3.2
19-Nov	0.5	0.3	0.3	0.2	0.3	0.2	0.3	0.6	0.9	0.5	0.3	0.7	0.9	0.9	0.5	0.7	0.9	0.8	0.5	1.0	0.6	0.3	0.5	0.7	1.0
20-Nov	0.3	0.3	0.3	0.2	0.2	0.3	0.7	1.3	1.1	1.0	1.6	1.5	1.6	1.6	1.6	1.1	1.3	1.6	2.4	1.9	2.1	1.5	1.2	1.0	2.4
21-Nov	1.5	1.8	2.0	1.9	2.1	2.0	1.5	1.3	1.1	1.0	1.3	1.2	1.0	1.1	1.4	1.1	0.9	0.9	1.6	1.4	1.8	2.9	3.2	2.6	3.2
22-Nov	2.6	2.5	2.1	2.5	2.0	1.9	1.9	1.6	2.1	2.0	1.7	0.9	1.3	1.4	0.9	0.8	1.4	1.0	0.9	1.0	0.9	1.1	1.0	1.2	2.6
23-Nov	0.9	1.1	1.0	1.0	1.0	0.7	0.8	0.7	0.6	0.7	0.7	0.7	0.8	0.9	1.1	1.2	1.4	1.3	2.0	1.6	1.2	1.8	1.7	1.7	2.0
24-Nov	1.7	1.8	1.4	1.5	2.0	1.8	1.7	1.6	1.3	0.8	0.6	0.8	1.3	1.6	0.9	1.2	1.0	0.4	0.2	0.6	0.4	0.6	0.7	0.8	2.0
25-Nov	0.7	0.8	0.6	0.4	0.4	0.9	0.6	0.6	0.6	0.5	0.9	0.8	0.6	0.6	0.5	0.3	0.3	0.6	0.5	0.4	0.4	0.7	0.5	0.5	0.9
26-Nov	0.6	1.1	0.7	0.6	0.7	0.5	0.5	0.4	0.3	0.6	0.7	0.8	1.0	1.3	1.4	1.7	1.5	1.2	1.4	1.1	1.0	1.1	1.2	1.2	1.7
27-Nov	1.5	2.3	1.4	1.4	1.5	1.2	1.4	1.4	1.0	0.7	0.8	0.9	0.8	0.6	0.6	0.2	0.4	0.4	0.5	0.4	0.6	0.7	0.9	1.0	2.3
28-Nov	0.7	0.6	0.5	0.7	0.7	0.5	0.7	0.8	0.5	0.6	0.6	0.5	0.6	1.0	0.7	0.5	0.9	0.9	0.7	0.6	0.5	0.4	0.8	0.7	1.0
29-Nov	0.6	0.7	0.7	0.5	0.6	0.5	0.5	0.5	0.4	0.6	0.9	0.9	0.7	0.6	0.7	0.5	0.3	0.4	0.5	0.5	0.8	0.7	0.7	0.7	0.9
30-Nov	0.5	0.5	0.3	0.5	0.6	0.6	0.6	0.7	1.2	1.5	1.8	1.1	0.9	0.6	0.7	1.2	1.1	0.7	0.5	1.0	0.7	0.7	0.6	0.5	1.8
2.6 2.5 2.3 2.5 2.2 2.6 3.0 2.9 3.0 2.8 2.9 3.0 3.2 2.7 2.8 2.1 2.2 2.4 2.8 2.6 2.6 2.9 3.2 2.6																									
Diurnal Maximum																									



Summary of Hour Averages

Mannix - November 2015

Maximum Value: 3.3 km/h on Nov 18 07:00		Maximum Daily Average: 2.1 km/h on Nov 18		Hours in Service: 720																							
Minimum Value: -1.3 km/h on Nov 17 02:00		Minimum Daily Average: 0.2 km/h on Nov 25		Hours of Data: 720																							
Maximum Diurnal Average: 0.8 km/h at hour 5		Minimum Diurnal Average: 0.5 km/h at hour 17		Hours of Missing Data: 0																							
Monthly Average: 0.67 km/h		Percentiles: $P_1 = -0.3$ $P_{10} = 0.0$ $Q_1 = 0.2$ Median = 0.6 $Q_3 = 1.0$ $P_{90} = 1.6$ $P_{99} = 2.7$		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0.6	0.7	0.9	0.9	0.8	0.8	0.8	0.8	0.9	1.1	1.0	1.1	1.2	0.9	1.1	1.1	1.0	0.8	1.3	1.1	1.1	0.8	0.9	1.1	0.9	1.3	
2-Nov	1.2	1.1	0.6	0.4	0.6	0.4	0.5	0.3	0.0	0.3	-0.5	0.2	0.0	-0.1	0.2	0.1	0.1	0.3	0.5	0.4	0.2	0.3	0.1	0.1	0.3	1.2	
3-Nov	-0.2	0.0	0.3	0.3	0.3	0.7	0.7	0.4	0.5	0.4	0.2	0.1	0.4	0.2	0.9	1.0	0.8	1.2	1.2	1.4	1.6	1.7	1.1	0.5	0.7	1.7	
4-Nov	0.0	0.1	0.0	0.2	0.4	0.7	0.9	0.6	0.8	0.7	0.4	0.1	0.2	0.5	0.3	0.5	0.7	0.6	0.5	0.1	0.0	0.5	1.2	1.1	0.5	1.2	
5-Nov	2.1	2.5	1.7	2.2	2.1	1.9	1.4	1.2	1.4	1.4	1.4	1.7	1.3	2.1	1.2	1.0	1.1	1.9	1.9	1.3	0.9	0.7	0.6	0.4	0.3	2.5	
6-Nov	0.2	-0.1	0.0	0.1	0.3	0.5	0.4	0.4	0.7	0.4	0.6	0.2	-0.2	1.1	0.3	0.1	-0.2	-0.4	0.1	0.2	0.3	0.6	0.8	1.0	0.3	1.1	
7-Nov	1.2	0.3	0.1	0.4	0.8	1.2	0.8	1.0	1.1	1.4	1.1	0.8	1.2	0.5	0.6	0.7	0.8	0.6	0.2	0.3	0.9	0.7	0.4	0.3	0.7	1.4	
8-Nov	1.4	1.8	1.3	1.9	1.6	0.9	0.8	1.1	0.8	1.8	0.8	0.9	1.0	0.8	0.7	0.7	0.9	0.4	0.5	0.4	0.2	0.7	0.9	0.7	1.0	1.9	
9-Nov	0.5	0.6	0.1	0.4	0.5	0.3	0.3	0.3	0.7	0.1	0.3	0.3	-0.1	-0.4	0.4	0.2	-0.1	0.2	0.4	0.3	0.5	0.7	0.7	0.4	0.3	0.7	
10-Nov	0.5	0.9	1.0	1.1	1.0	0.7	0.7	0.8	0.7	0.7	0.8	0.7	0.6	0.8	0.8	0.9	0.9	0.9	1.0	0.9	0.8	0.6	0.9	1.0	0.8	1.1	
11-Nov	1.0	1.0	1.1	0.6	0.9	0.6	0.1	-0.1	-0.2	-0.1	0.1	0.7	1.0	1.3	0.9	0.3	-0.3	-0.2	0.5	0.3	-0.3	0.3	-0.2	-0.2	0.4	1.3	
12-Nov	0.6	0.7	0.2	0.4	0.2	0.1	0.1	0.4	0.4	0.4	0.6	0.6	0.4	0.8	0.9	0.9	0.9	0.7	0.4	1.0	0.9	1.2	1.2	1.1	0.6	1.2	
13-Nov	1.4	1.2	1.1	0.9	0.8	0.8	0.8	0.6	0.7	0.3	0.1	0.8	1.9	0.2	0.4	0.4	0.3	0.5	0.3	0.2	0.3	0.7	0.4	0.1	0.6	1.9	
14-Nov	0.6	0.6	0.4	0.6	0.6	0.4	0.1	-0.1	-0.2	0.2	0.6	0.3	0.6	0.0	0.1	0.0	-0.1	0.0	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.6	
15-Nov	0.5	0.4	0.5	0.6	0.5	0.1	0.1	0.1	0.3	0.4	1.0	0.9	0.5	0.8	0.7	1.3	1.3	1.6	1.4	1.7	1.3	1.0	0.6	0.6	0.8	1.7	
16-Nov	0.5	0.7	1.2	1.1	1.0	1.6	2.2	1.7	1.9	2.2	2.0	2.2	2.2	2.2	1.4	0.9	0.4	0.1	-0.2	0.0	0.5	0.6	0.8	1.4	1.2	2.2	
17-Nov	0.4	-1.3	-0.9	0.0	0.4	0.7	0.2	0.1	0.4	0.8	0.8	0.5	0.5	0.1	-0.1	-0.3	0.4	1.1	2.5	2.7	2.5	1.9	1.7	1.9	0.7	2.7	
18-Nov	1.6	1.9	2.5	2.2	2.3	3.3	3.3	2.9	2.8	2.9	2.7	2.4	2.3	2.3	2.4	1.4	1.1	1.5	1.3	1.0	1.8	1.7	1.4	1.5	2.1	3.3	
19-Nov	0.6	0.3	0.1	0.1	0.5	0.2	0.2	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.2	0.5	0.7	0.7	0.6	0.7	0.2	0.4	0.6	0.6	0.3	0.7	
20-Nov	0.1	0.1	1.1	1.8	1.9	1.9	1.7	1.6	1.2	0.7	0.6	-0.2	0.4	0.3	0.6	0.6	0.2	0.2	0.3	0.8	0.8	0.8	0.4	0.4	0.8	1.9	
21-Nov	-0.1	0.1	0.7	1.1	1.4	0.7	0.9	-0.1	-0.1	0.3	0.4	-0.1	0.5	0.3	-0.2	-0.3	0.2	0.0	0.0	0.2	0.2	1.3	1.8	1.7	0.5	1.8	
22-Nov	1.8	2.4	1.9	2.7	2.0	2.5	2.2	2.2	2.5	2.7	1.8	0.8	0.7	0.7	0.6	1.1	0.8	0.6	0.9	0.8	0.7	1.2	0.9	1.2	1.5	2.7	
23-Nov	0.6	0.7	1.0	0.7	0.5	0.8	1.0	0.5	0.4	0.7	0.6	0.3	0.3	0.4	0.8	0.5	0.9	1.0	2.2	1.4	1.3	1.5	1.2	1.5	0.9	2.2	
24-Nov	1.9	2.2	1.7	1.6	1.4	1.7	1.7	1.8	1.5	1.2	0.8	0.3	1.0	0.8	0.4	0.7	1.4	0.5	0.1	0.2	0.0	-0.2	-0.1	-0.3	0.9	2.2	
25-Nov	-0.2	-0.1	0.5	0.4	0.4	0.0	0.0	0.6	0.5	0.9	0.5	0.3	0.0	0.1	0.3	0.1	0.0	0.1	-0.1	0.0	0.0	-0.1	-0.2	-0.1	0.2	0.9	
26-Nov	0.1	0.9	0.2	0.9	0.6	0.6	0.5	0.7	0.7	0.5	0.6	0.5	0.7	0.5	-0.2	0.5	-0.2	-0.1	0.1	-0.1	-0.1	0.0	0.3	0.3	0.3	0.9	
27-Nov	0.1	0.6	0.4	0.3	1.0	0.4	0.6	0.7	1.8	1.7	1.4	1.1	1.4	1.5	1.3	0.3	0.1	0.1	0.5	0.4	-0.1	-0.1	0.2	0.1	0.6	1.8	
28-Nov	0.2	0.3	0.3	0.0	0.0	0.0	0.2	0.7	0.3	0.7	0.3	0.1	0.4	0.8	-0.1	-0.2	0.1	0.0	-0.1	0.2	0.0	-0.2	0.0	-0.1	0.2	0.8	
29-Nov	-0.1	-0.3	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.0	0.2	0.0	0.3	0.6	0.7	0.5	0.2	0.6	0.9	0.1	0.4	0.7	0.7	0.5	0.2	0.9	
30-Nov	0.6	0.6	0.1	0.3	0.0	0.4	0.7	0.4	0.4	0.0	0.0	-0.2	0.0	0.0	0.2	0.6	0.6	0.3	0.4	0.1	0.3	0.1	0.3	-0.1	0.3	0.7	
		0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.6	Diurnal Average	
		2.1	2.5	2.5	2.7	2.3	3.3	3.3	2.9	2.8	2.9	2.7	2.4	2.3	2.3	2.4	1.4	1.9	1.9	2.5	2.7	2.5	1.9	1.8	1.9	Diurnal Maximum	



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.3 km/h on Nov 21 23:00 Minimum Value: 0.1 km/h on Nov 20 02:00 Percentiles: P ₁ = 0.3 P ₁₀ = 0.5 Q ₁ = 0.7 Median = 1.2 Q ₃ = 1.7 P ₉₀ = 2.2 P ₉₉ = 2.8																							Hours in Service: 720 Hours of Data: 720 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-Nov	1.3	1.0	0.9	0.9	0.9	0.8	1.0	1.2	1.5	1.6	1.9	2.0	1.9	1.4	1.6	1.6	1.6	2.0	2.1	1.8	1.7	1.4	1.5	1.3	2.1
2-Nov	1.4	1.5	1.3	1.2	1.2	1.1	1.2	0.8	1.2	1.5	1.4	1.6	1.8	1.7	1.5	1.6	1.7	2.2	2.1	2.2	1.9	1.8	1.6	1.9	2.2
3-Nov	1.7	1.5	1.4	1.1	0.8	1.0	0.9	0.6	0.8	0.8	0.7	0.8	0.7	0.8	1.1	1.1	0.7	0.8	0.8	1.2	1.3	1.1	0.8	1.2	1.7
4-Nov	0.3	0.6	0.4	0.5	0.4	0.4	0.3	0.5	0.7	0.8	1.1	1.0	1.3	2.2	1.1	1.0	1.2	0.8	1.1	0.8	0.6	0.8	0.7	0.7	2.2
5-Nov	1.1	1.6	1.5	1.3	1.9	1.8	1.8	1.3	1.6	1.8	2.4	2.3	2.6	2.1	1.6	1.6	1.5	1.9	1.7	1.3	1.1	1.0	0.7	0.7	2.6
6-Nov	0.9	0.7	0.6	0.5	0.6	0.7	0.9	0.7	0.9	0.9	1.3	1.4	1.8	2.2	1.8	1.4	1.8	2.0	2.6	2.4	2.3	2.3	2.5	1.8	2.6
7-Nov	1.8	1.4	1.3	1.6	1.8	1.8	1.5	1.7	2.0	2.4	2.1	1.5	2.3	1.3	1.6	1.1	0.9	0.5	0.3	0.5	0.3	0.2	0.5	0.4	2.4
8-Nov	0.8	1.0	0.4	0.4	0.7	1.0	1.0	0.7	1.6	2.8	1.8	1.8	1.8	1.8	2.0	1.6	1.7	1.4	1.1	1.2	1.0	1.2	1.3	1.1	2.8
9-Nov	0.9	1.0	0.8	0.6	0.5	0.3	0.5	0.5	0.7	0.4	0.7	1.1	1.6	1.7	1.9	1.7	1.5	0.7	0.2	0.7	0.7	0.7	1.1	0.6	1.9
10-Nov	1.2	1.6	1.4	1.3	1.6	1.4	1.4	1.1	1.4	2.1	2.4	2.5	2.4	2.5	2.0	1.2	1.7	2.1	2.6	2.5	2.6	2.2	1.5	1.6	2.6
11-Nov	1.7	1.4	1.6	1.9	1.9	1.5	2.0	2.3	1.9	1.6	2.0	2.1	2.5	2.7	2.8	1.8	0.7	1.5	1.9	1.6	1.8	1.9	1.8	1.3	2.8
12-Nov	1.9	1.9	1.1	1.0	1.0	0.7	0.6	0.7	0.6	0.9	1.2	1.7	1.8	1.8	1.2	1.0	1.2	1.6	1.9	2.4	2.2	2.2	2.3	2.2	2.4
13-Nov	2.1	2.2	2.3	2.1	2.1	2.1	1.8	1.5	1.5	1.4	1.6	2.1	3.2	2.7	2.8	2.2	1.6	1.3	1.0	1.1	1.8	2.0	1.5	1.1	3.2
14-Nov	1.5	1.9	2.0	2.0	1.8	1.4	1.4	1.7	1.6	1.2	1.1	1.0	1.5	1.7	1.5	1.1	0.7	0.4	1.3	0.4	0.8	0.6	0.5	0.4	2.0
15-Nov	0.4	0.5	0.4	0.3	0.6	0.7	0.5	0.3	0.3	0.5	0.9	1.2	0.9	0.9	2.6	1.8	1.7	1.9	1.8	1.6	2.0	1.5	1.1	0.8	2.6
16-Nov	0.8	0.7	0.8	0.7	1.0	0.8	1.4	1.3	2.1	2.2	2.5	2.7	2.5	2.2	1.8	2.2	1.4	0.8	0.8	0.9	0.6	0.8	0.9	0.7	2.7
17-Nov	0.8	1.6	1.8	2.0	2.0	1.9	1.8	1.3	1.3	2.0	1.8	1.9	2.0	2.4	1.9	1.6	1.4	1.7	1.8	2.1	2.2	2.5	2.6	2.3	2.6
18-Nov	2.0	2.2	2.0	2.3	2.2	2.4	2.6	2.8	2.9	2.8	2.8	2.9	2.9	2.6	2.4	1.7	1.2	1.4	1.3	1.2	0.6	0.6	0.5	0.3	2.9
19-Nov	0.6	0.3	0.4	0.2	0.3	0.3	0.2	0.4	0.6	0.4	0.3	0.6	0.8	0.8	0.6	0.7	0.9	0.9	0.6	0.9	0.6	0.5	0.6	0.8	0.9
20-Nov	0.4	0.1	0.7	0.3	0.3	0.3	0.8	1.3	1.1	1.0	1.7	1.6	1.7	1.6	1.5	0.9	0.9	1.3	2.6	1.9	2.1	1.5	1.1	1.0	2.6
21-Nov	1.5	2.0	2.1	2.1	2.1	2.0	1.6	1.3	1.4	1.1	1.4	1.4	1.1	1.1	1.5	1.3	1.1	0.9	1.6	1.5	1.9	3.1	3.3	2.8	3.3
22-Nov	2.6	2.6	2.2	2.5	2.1	1.9	2.1	1.6	2.2	2.0	1.7	1.0	1.2	1.3	1.0	1.0	1.2	0.9	1.0	1.0	1.0	1.1	1.0	1.2	2.6
23-Nov	0.9	1.0	1.1	1.0	1.1	0.7	0.9	0.7	0.6	0.7	0.7	0.7	0.8	0.9	1.1	1.2	1.4	1.3	1.9	1.7	1.4	1.8	1.7	1.8	1.9
24-Nov	1.7	1.7	1.4	1.4	1.9	1.7	1.6	1.5	1.3	0.8	0.7	0.8	1.4	1.7	0.9	1.2	1.0	0.5	0.3	0.7	0.4	0.6	0.7	0.8	1.9
25-Nov	0.8	0.8	0.6	0.5	0.5	0.9	0.6	0.8	0.7	0.7	1.0	0.9	0.6	0.5	0.4	0.3	0.4	0.7	0.6	0.4	0.4	0.8	0.7	0.5	1.0
26-Nov	0.5	1.0	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.6	1.2	1.5	1.6	1.7	1.6	1.4	1.6	1.3	1.0	1.2	1.3	1.3	1.7
27-Nov	1.6	2.5	1.6	1.5	1.7	1.5	1.5	1.6	1.1	0.7	0.8	0.9	0.9	0.7	0.6	0.3	0.4	0.5	0.4	0.5	0.6	0.8	0.9	1.1	2.5
28-Nov	0.7	0.6	0.6	0.7	0.7	0.4	0.7	0.9	0.4	0.5	0.6	0.4	0.5	0.9	0.7	0.4	0.9	0.9	0.7	0.7	0.5	0.5	0.8	0.6	0.9
29-Nov	0.6	0.6	0.8	0.5	0.6	0.5	0.5	0.5	0.4	0.6	0.8	0.9	0.6	0.6	0.5	0.4	0.3	0.4	0.5	0.5	0.8	0.7	0.7	0.8	0.9
30-Nov	0.6	0.5	0.3	0.5	0.6	0.8	0.6	0.7	1.4	1.5	1.7	1.1	0.8	0.7	0.8	1.3	1.3	0.7	0.5	1.1	0.7	0.7	0.5	0.5	1.7
Diurnal Maximum																								2.6	



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 10, 2015	Last Calibration	October 23, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	12:50	End Time (MST)	17:25
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

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-635	-635
Analyzer IP address	192.168.1.43		Lamp voltage	867	823
Calculated slope	1.007763	0.994045	Chamber temp	45.1	45.2
Calculated intercept	0.907331	0.628816	Pressure	692.2	691.3
Analyzer Background	7.7	7.5	Flow	0.486	0.485
Analyzer Coefficient	1.033	0.995	Intensity	89	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	599.7	1.001
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	60.0	600.0	602.9	0.995
second point	5000	30.0	300.0	302.2	0.993
third point	5000	15.0	150.0	148.5	1.010
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	60.0	600.0	605.7	0.991
Average Correction Factor					0.999

Corrected As found 599.8 Previous response 594.5 % change -0.9%

Notes:

Changed inlet filter after as founds. Installed new flash lamp because of intermittent stalls in the old lamps signal. However, lamp voltage is still a little noisy, resulting in a slightly noisy SO2 signal. Adjusted span.

Calibration Performed By: Evan Magill



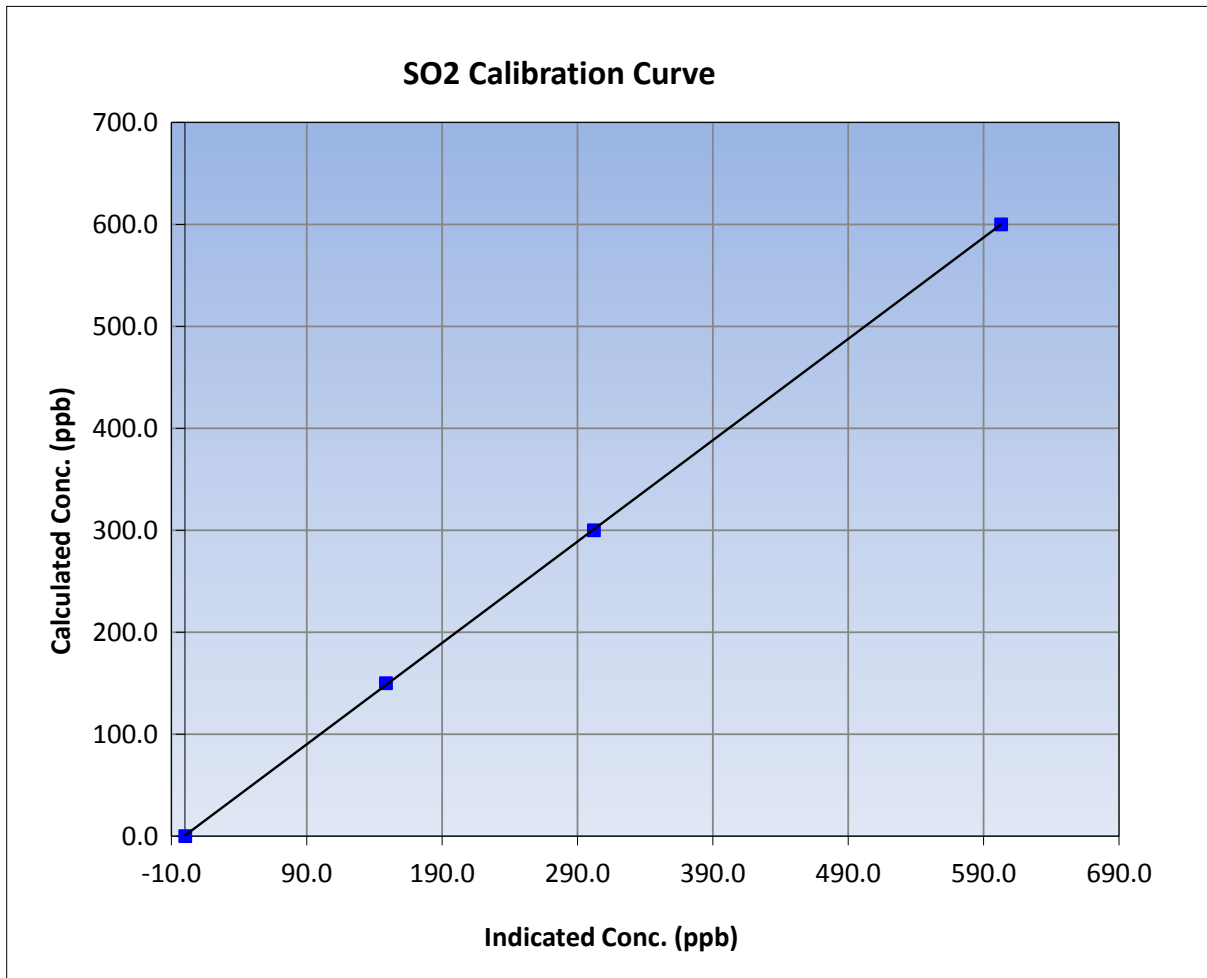
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 23, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	12:50	End Time (MST)	17:25
Analyzer make	TEI 43i	Analyzer serial #	1008841399

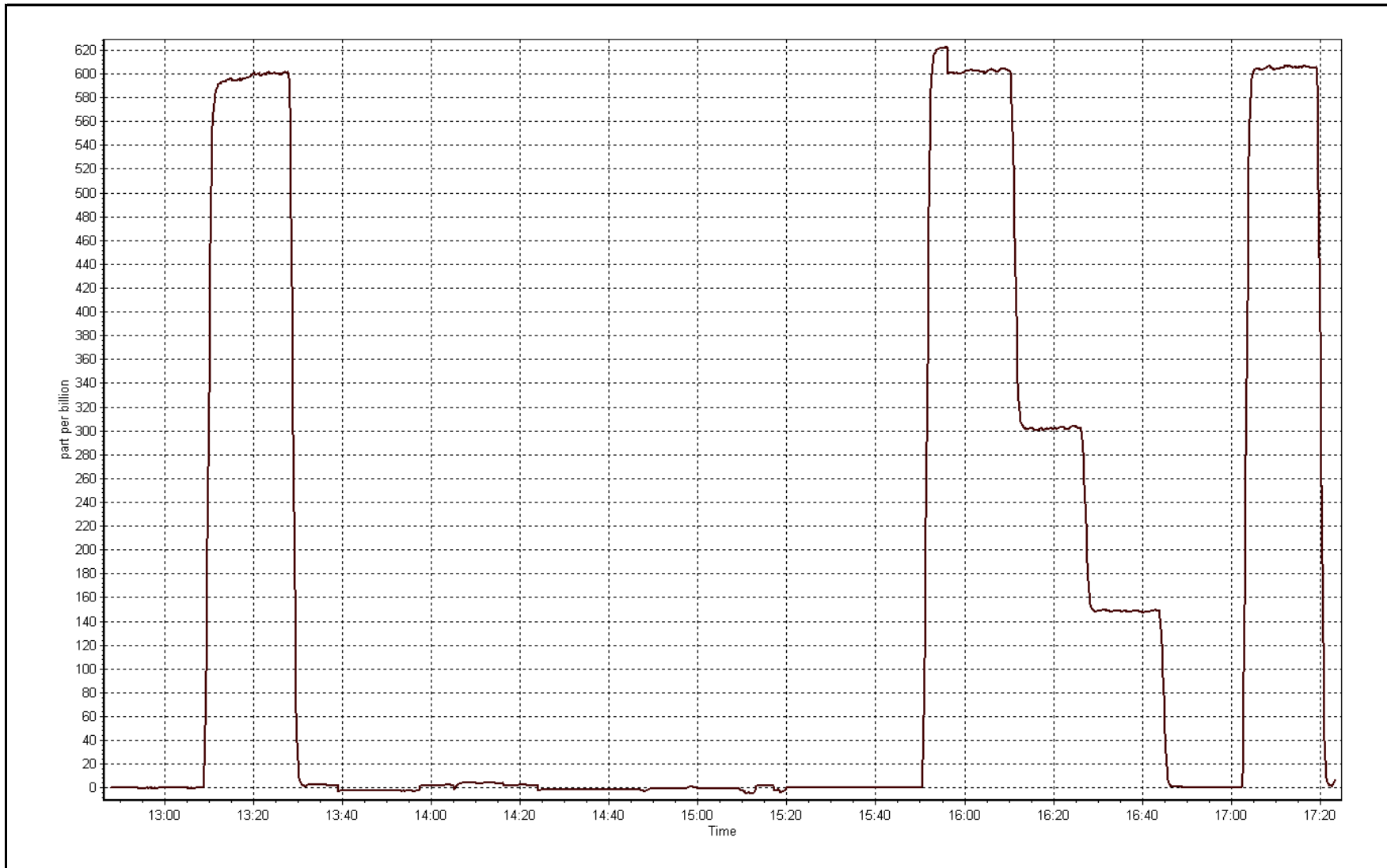
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999975
600.0	602.9	0.9952		
300.0	302.2	0.9928	Slope	0.994045
150.0	148.5	1.0103		
			Intercept	0.628816



SO2 Calibration Plot

Date: November 10, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 10, 2015	Last Calibration	October 27, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:18	End Time (MST)	12:15
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	-658
Analyzer IP address	192.168.1.42		Lamp voltage	805	806
Calculated slope	1.005679	0.993138	Chamber temp	45	45
Calculated intercept	-0.081671	-0.186598	Pressure	518.0	514.4
Analyzer Background	18.8	19.1	Flow	1.067	1.061
Analyzer Coefficient	1.235	1.254	Intensity	90	91
			Converter temp.	324	326

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	74.4	75.0	73.9	1.015
SO2 scrubber check	5000	15.0	150.0	1.5	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	74.4	75.0	75.6	0.992
second point	5000	41.7	42.0	42.6	0.986
third point	5000	24.8	25.0	25.4	0.985
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	74.4	75.0	75.9	0.988
Average Correction Factor					0.987

Corrected As found	73.8	Previous response	74.7	% change	1.2%
--------------------	------	-------------------	------	----------	------

Notes:

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

Calibration Performed By: Evan Magill



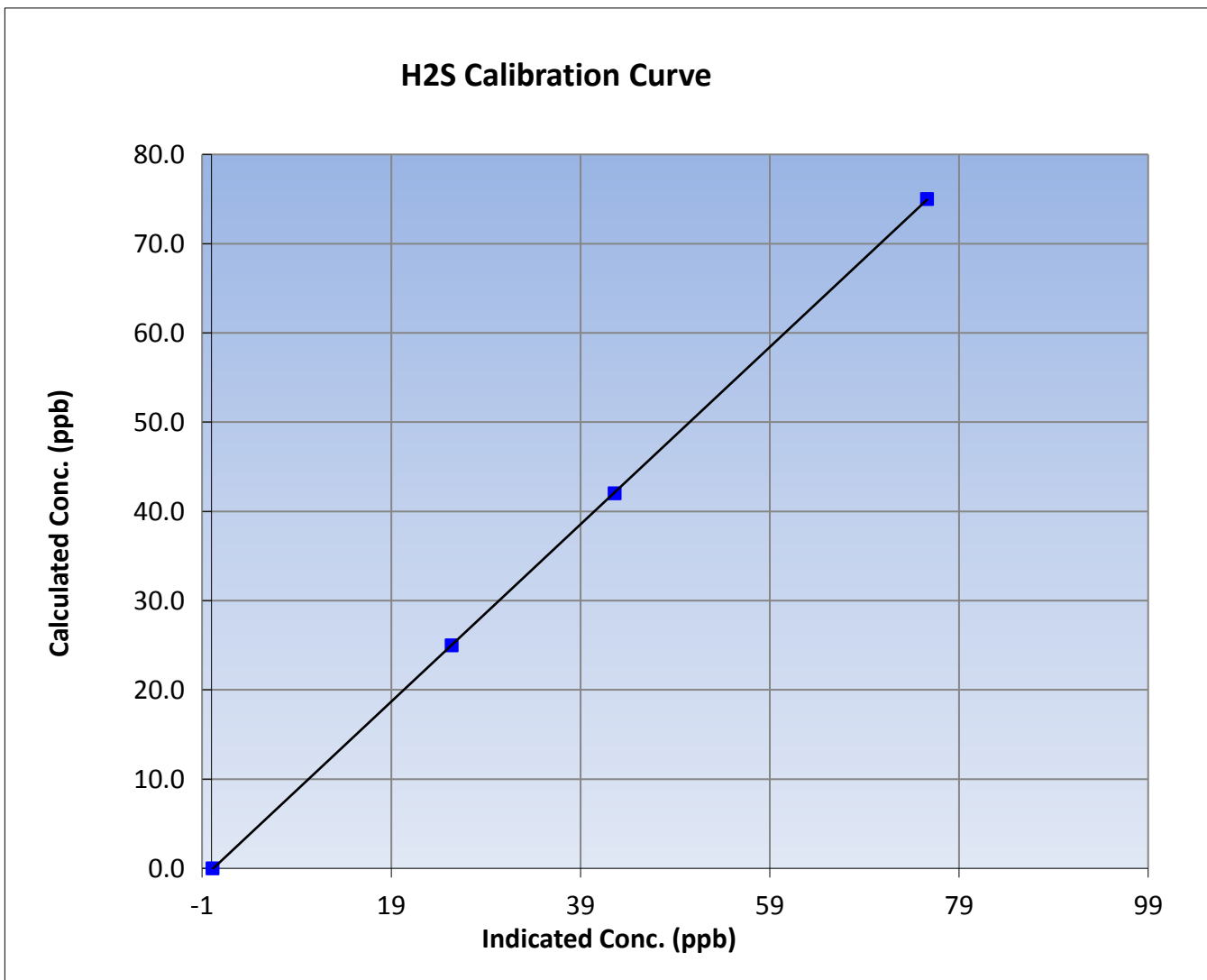
Wood Buffalo Environmental Association H2S Calibration Report

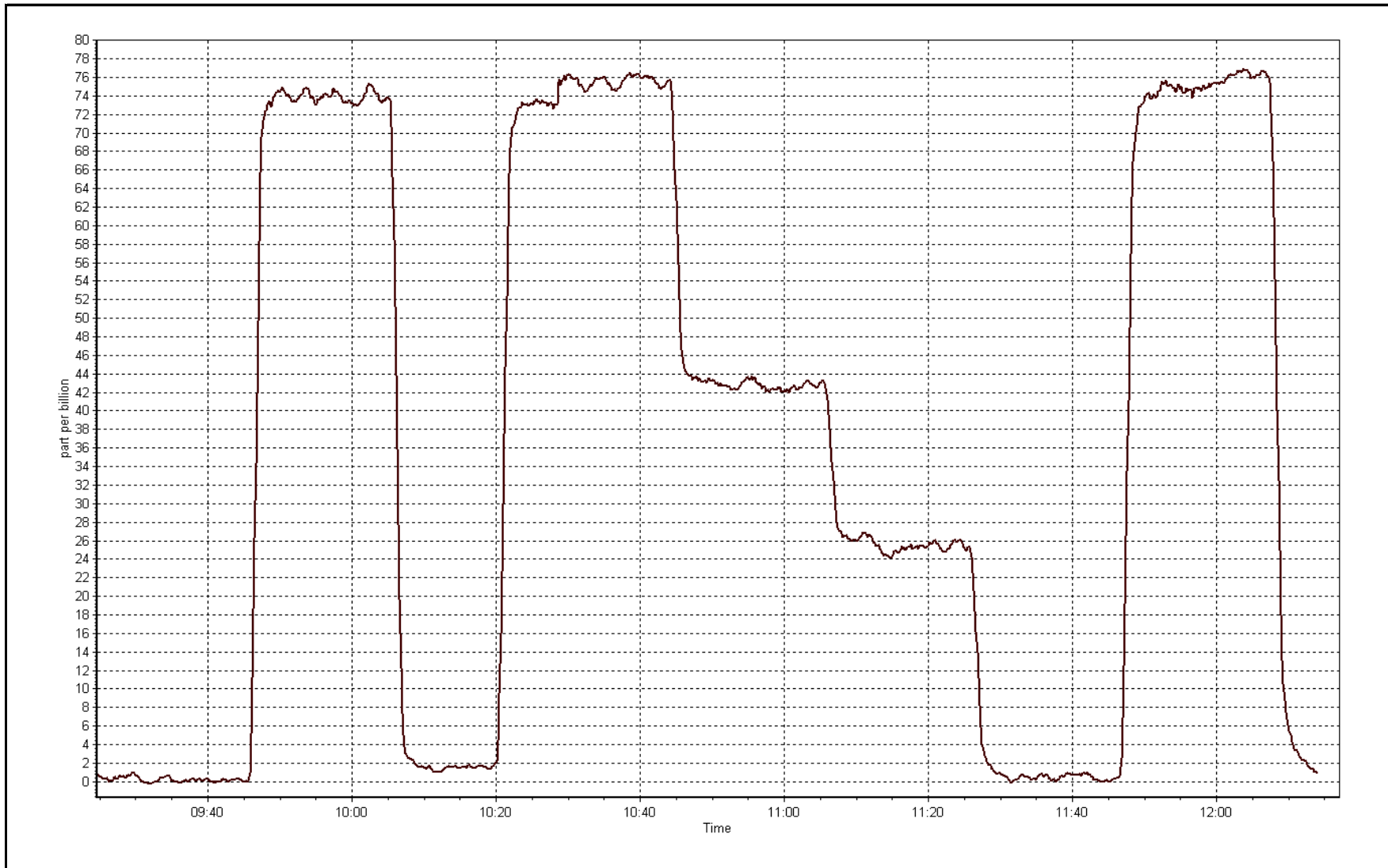
Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 27, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:18	End Time (MST)	12:15
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	0.999993
75.0	75.6	0.9916		
42.0	42.6	0.9862	Slope	0.993138
25.0	25.4	0.9846		
			Intercept	-0.186598







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-10-15	Last Calibration	October-23-15
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	12:50	End Time (MST)	17:25
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	1.005879	1.009697	Fuel Pressure	20.2	20.2
Calculated intercept	-0.030026	0.002187	Analyzer Coeff	3.8	3.8
			Analyzer BKG	3.150	3.200

Analyzer make Thermo 51i-LT Analyzer serial # 1317958295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.04	----
as found span	5000	60.0	12.46	12.35	1.009
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	60.0	12.46	12.35	1.009
second point	5000	30.0	6.23	6.15	1.013
third point	5000	15.0	3.11	3.05	1.021
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	60.0	12.46	12.37	1.007
Average Correction Factor					1.014

Corrected As found 12.31 Previous response 12.41 % change 0.8%

Notes:

Changed inlet filter after as founds. Adjusted zero

Calibration Performed By:

Evan Magill



Wood Buffalo Environmental Association THC Calibration Report

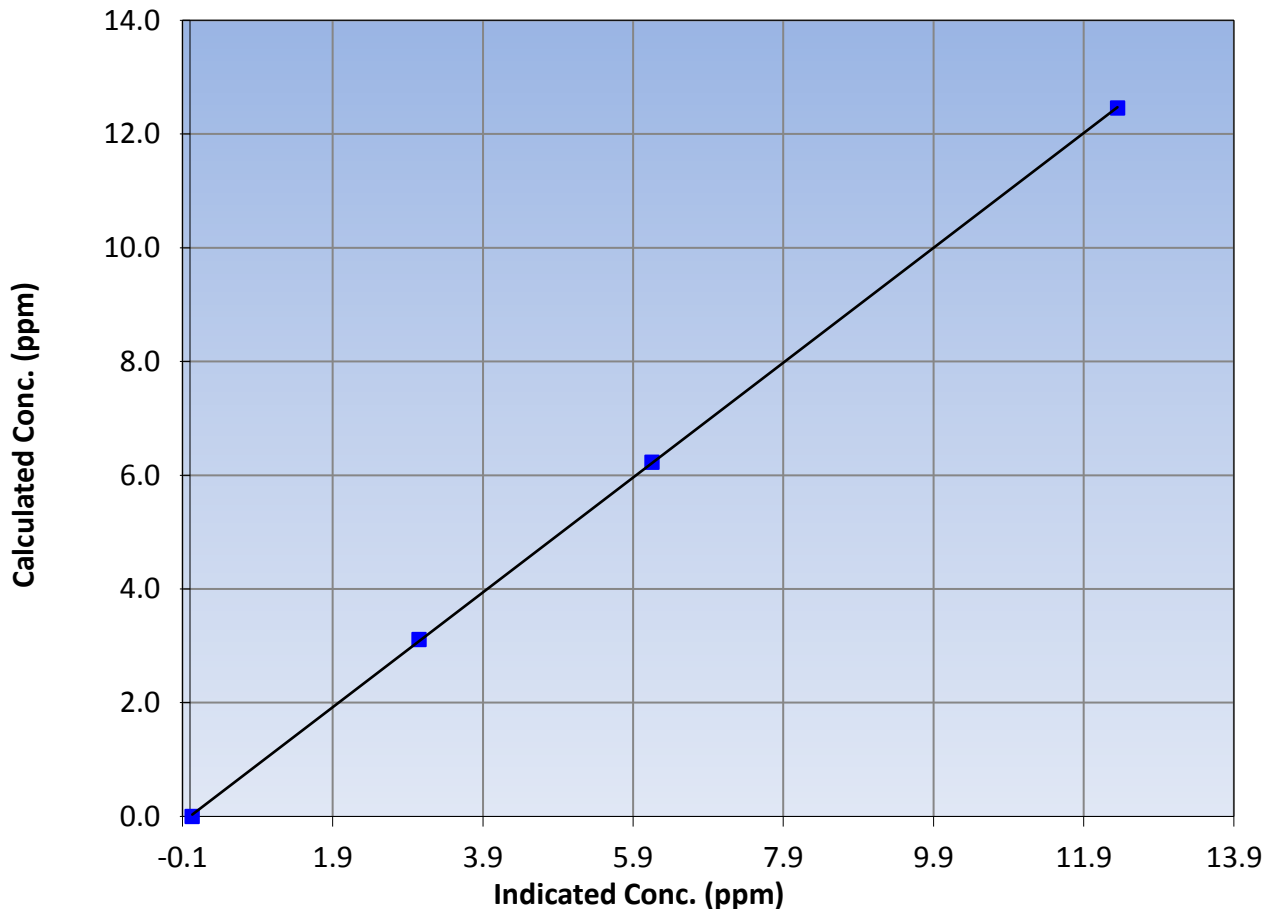
Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 23, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	12:50	End Time (MST)	17:25
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

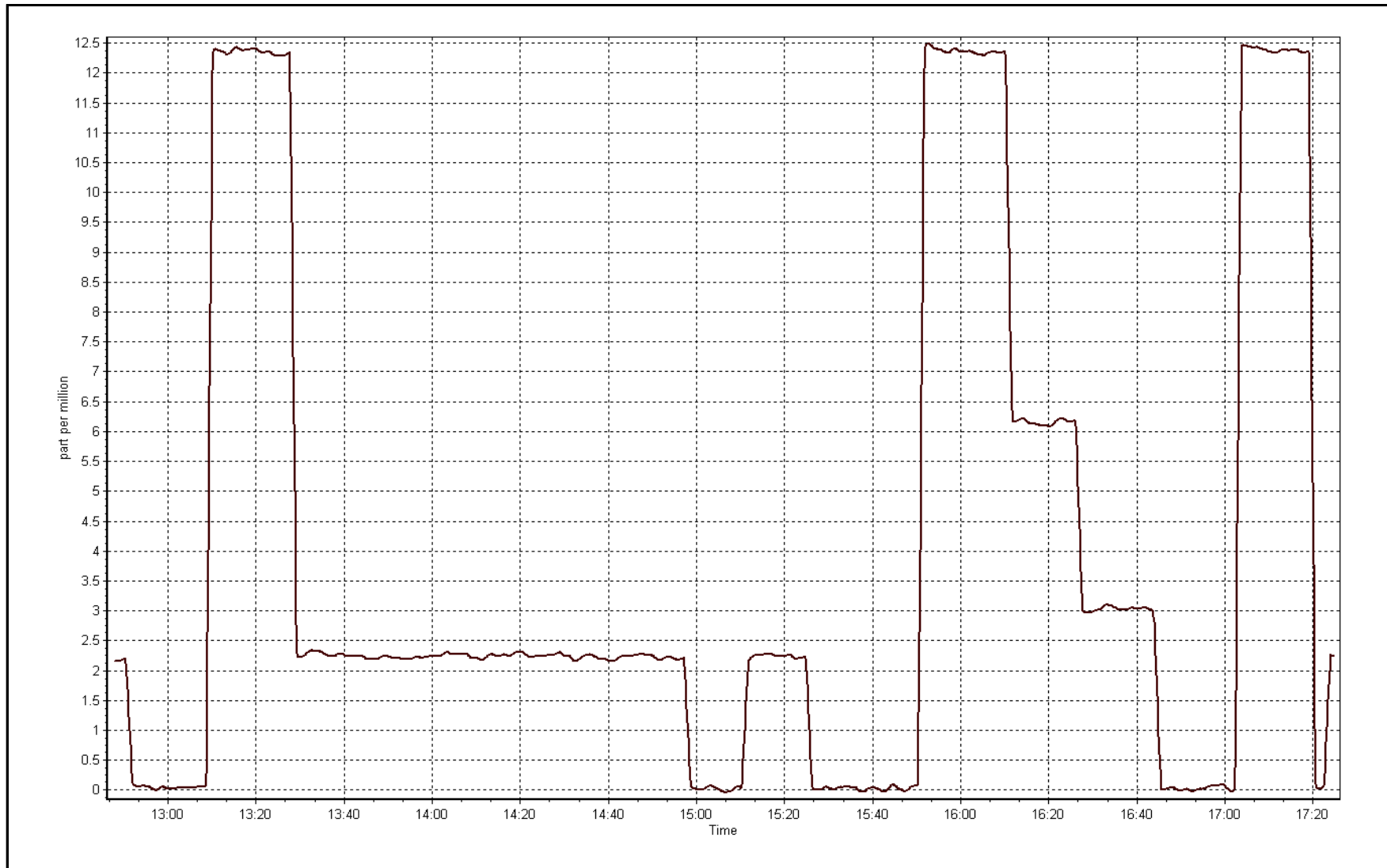
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999969
12.46	12.35	1.0086		
6.23	6.15	1.0127	Slope	1.009697
3.11	3.05	1.0210		
			Intercept	0.002187

THC Calibration Curve



THC Calibration Plot

Date: November 10, 2015





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
NOVEMBER 2015

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

December 22, 2015



This page intentionally left blank

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	34	35	99.86	8	0	2	0
TRS (ppb) Average	684	35	36	99.86	1	0	0	0
THC (ppm) Average	685	34	35	99.86	2.4	-	2.1	-
NMHC(ppm) Average	685	34	35	99.86	0.067	-	0.003	-
CH4(ppm) Average	685	34	35	99.86	2.4	-	2.1	-
O3 (ppb) Average	685	34	35	99.86	43	0	36	-
NO2 (ppb) Average	681	36	39	99.58	39	0	15	-
NO (ppb) Average	681	36	39	99.58	48	-	7	-
NOX (ppb) Average	681	36	39	99.58	87	-	21	-
NH3 (ppb) Average	627	43	93	93.06	10	0	0	-
PM2.5 (ug/m3) Average	705	1	15	98.06	118.2	-	29.8	0
Temperature 2 m (C) Average	720	0	0	100.00	8.7	-	3	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	89	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	25	-	15	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	0.3	1	-	0	0	0	0	0	1	8
TRS (ppb) Average	684	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	685	2.02	0.1	-	1.9	2	2	2	2	2.1	2.4
NMHC(ppm) Average	685	0	0.003	-	0	0	0	0	0	0	0.067
CH4(ppm) Average	685	2.02	0.1	-	1.9	2	2	2	2	2.1	2.4
O3 (ppb) Average	685	23.9	10	-	3	10	16	24	32	37	43
NO2 (ppb) Average	681	6.9	7	-	0	1	2	5	10	17	39
NO (ppb) Average	681	2.7	6	-	0	0	0	1	2	7	48
NOX (ppb) Average	681	9.6	12	-	0	1	2	6	12	23	87
NH3 (ppb) Average	627	0	0	-	0	0	0	0	0	0	10
PM2.5 (ug/m3) Average	705	5.81	10.3	-	0.5	1.3	1.8	3.5	5.6	9.9	118.2
Temperature 2 m (C) Average	720	-3.89	5.7	-	-19.8	-12.7	-7	-3	0.2	2.5	8.7
Relative Humidity (%) Average	720	74	14	-	26	52	64	78	85	90	98
Wind Speed 10 m (km/h) Average	720	9.6	4	-	0	4	6	9	13	16	25
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, TRS, THC, O3	09 Nov 2015 11:00	09 Nov 2015 11:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	12 Nov 2015 09:00	12 Nov 2015 11:00	3	Maintenance - confirmed calibration points for Ozone
NH3	01 Nov 2015 09:00	30 Nov 2015 08:00	29	Stabilization after daily span
NH3	09 Nov 2015 16:00	10 Nov 2015 12:00	21	Maintenance - repairs and stabilization
PM2.5	08 Nov 2015 22:00	09 Nov 2015 11:00	14	Analyzer Failure - flatline in sensor output

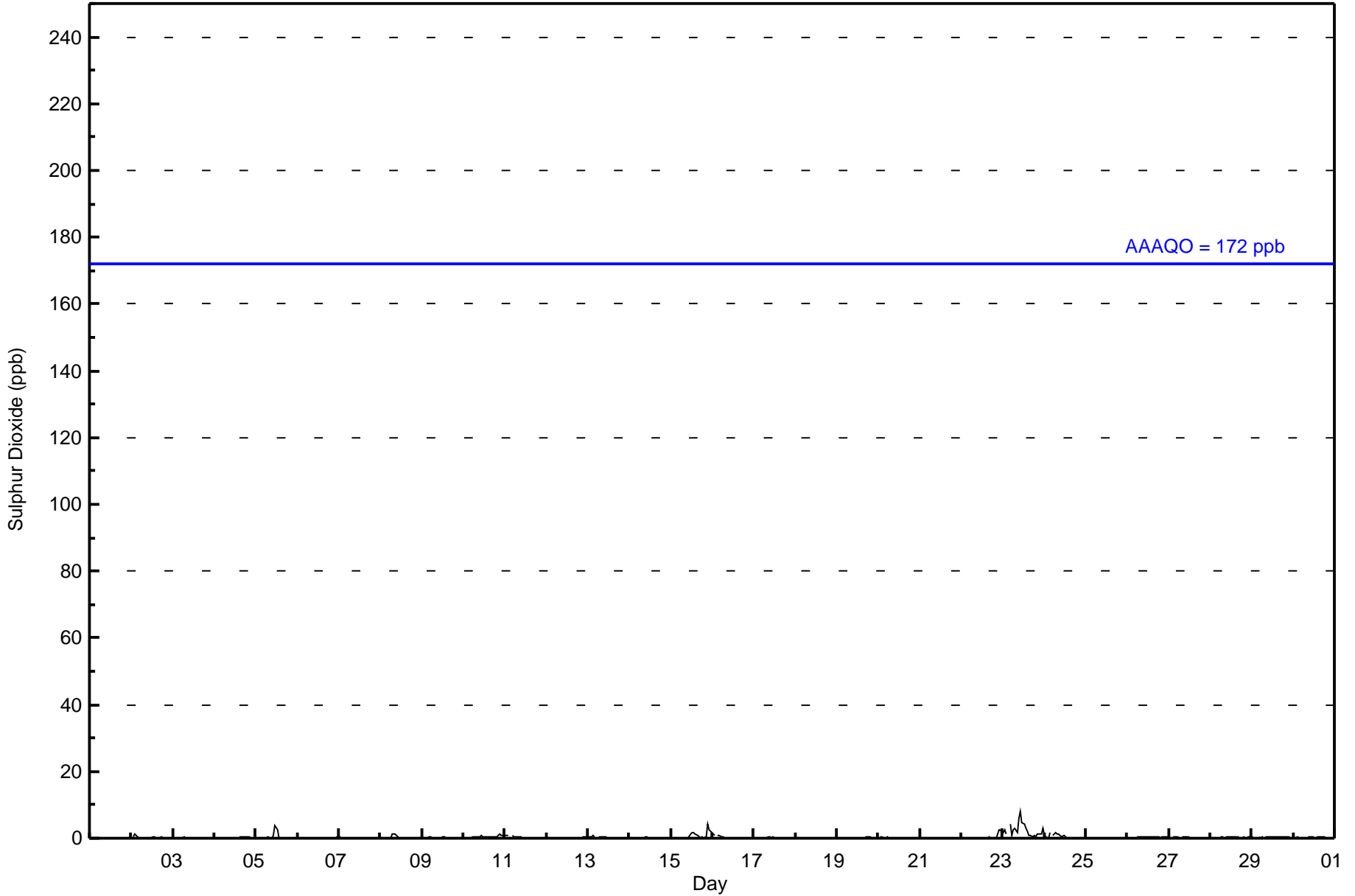


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 ppb on Nov 23 11:00	Maximum Daily Average: 2.4 ppb on Nov 23
Minimum Value: 0 ppb on Nov 1 08:00	Hours of Data: 685
Maximum Diurnal Average: 0.5 ppb at hour 12	Hours of Missing Data: 35
Monthly Average: 0.3 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.0 ppb on Nov 18	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.1 ppb at hour 20	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 4	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Nov	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Nov	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	1	0	0	0	0.2	1
5-Nov	0	0	0	Z	0	0	0	0	0	0	1	4	3	0	0	0	0	0	0	0	0	0	0	0	0.4	4
6-Nov	0	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
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Nov	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
9-Nov	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Nov	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
11-Nov	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Nov	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Nov	Z	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
15-Nov	0	Z	0	0	0	0	0	0	0	0	0	1	2	2	1	1	0	0	0	0	0	4	3	2	0.8	4
16-Nov	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Nov	Z	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
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Nov	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
23-Nov	2	3	1	Z	4	1	3	3	2	6	8	5	4	3	2	1	1	0	1	1	1	1	1	3	2.4	8
24-Nov	1	0	0	2	Z	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Nov	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Nov	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

0.3	0.3	0.2	0.2	0.4	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.4	Diurnal Average	
2	3	1	2	4	1	3	3	2	6	8	5	4	3	2	1	1	0	1	1	1	4	3	3	Diurnal Maximum			

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	685	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	67	7	5	2	2	26	49	38	71	84	133	48	44	31	45	33	685
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	67	7	5	2	2	26	49	38	71	84	133	48	44	31	45	33	685

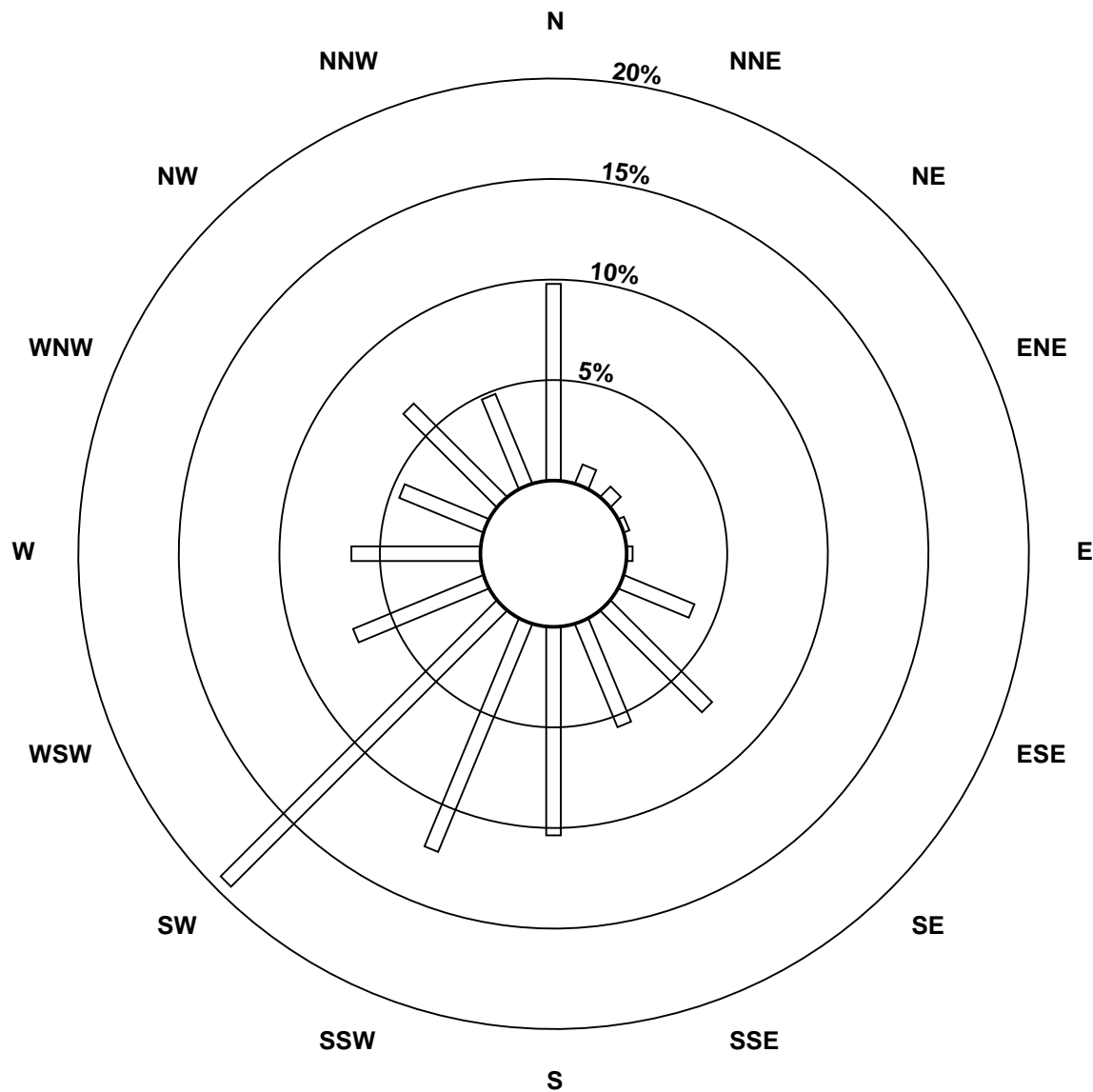
Total Number of Valid Hours: 685

Total Number of Hours: 720

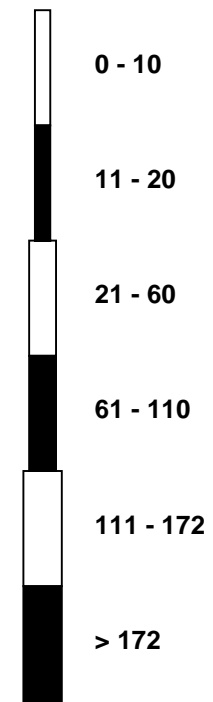


Wood Buffalo Environmental Association
Wind Rose Nov 2015

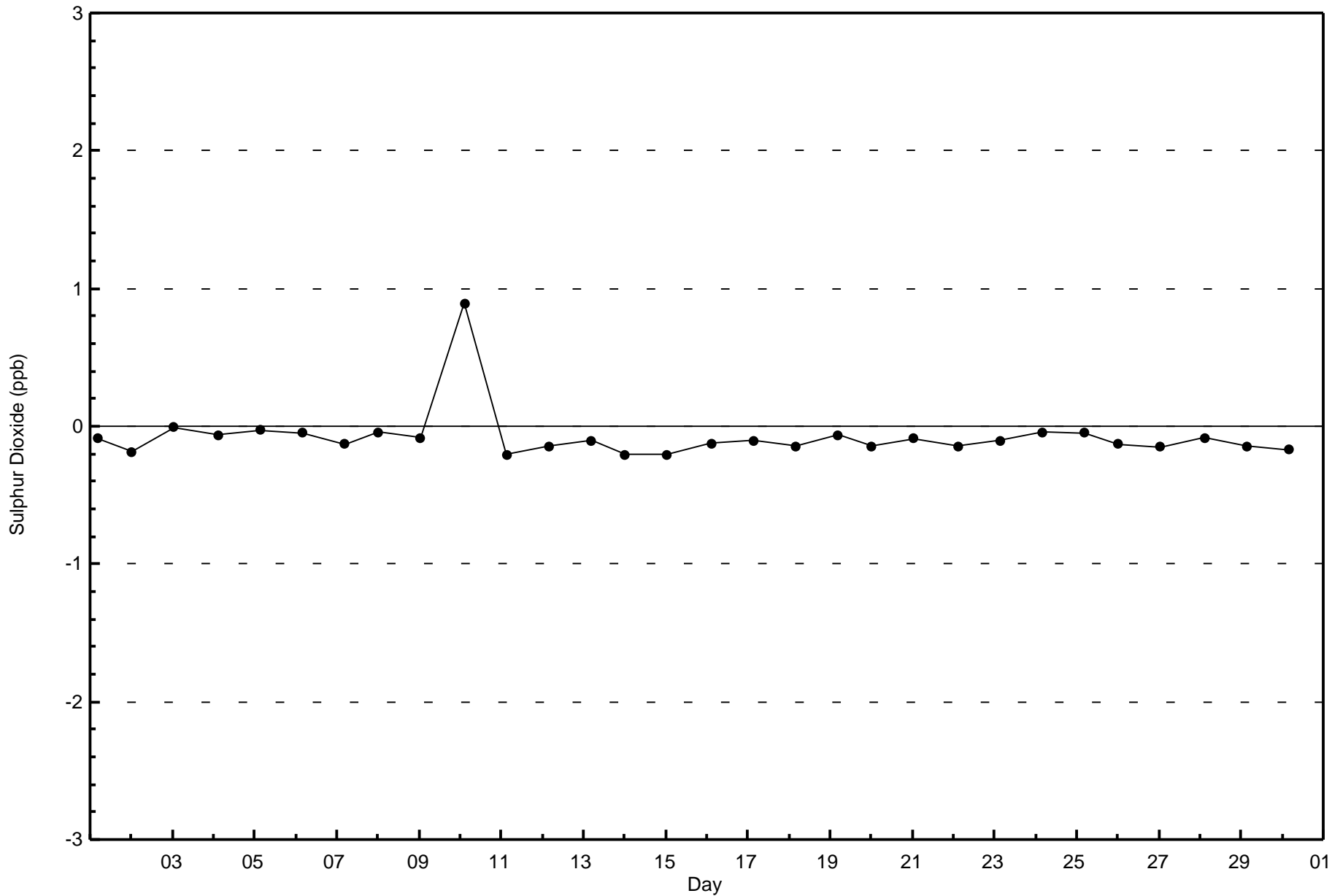
Sulphur Dioxide (SO₂) - ppb
Patricia McInnes (AMS 6)

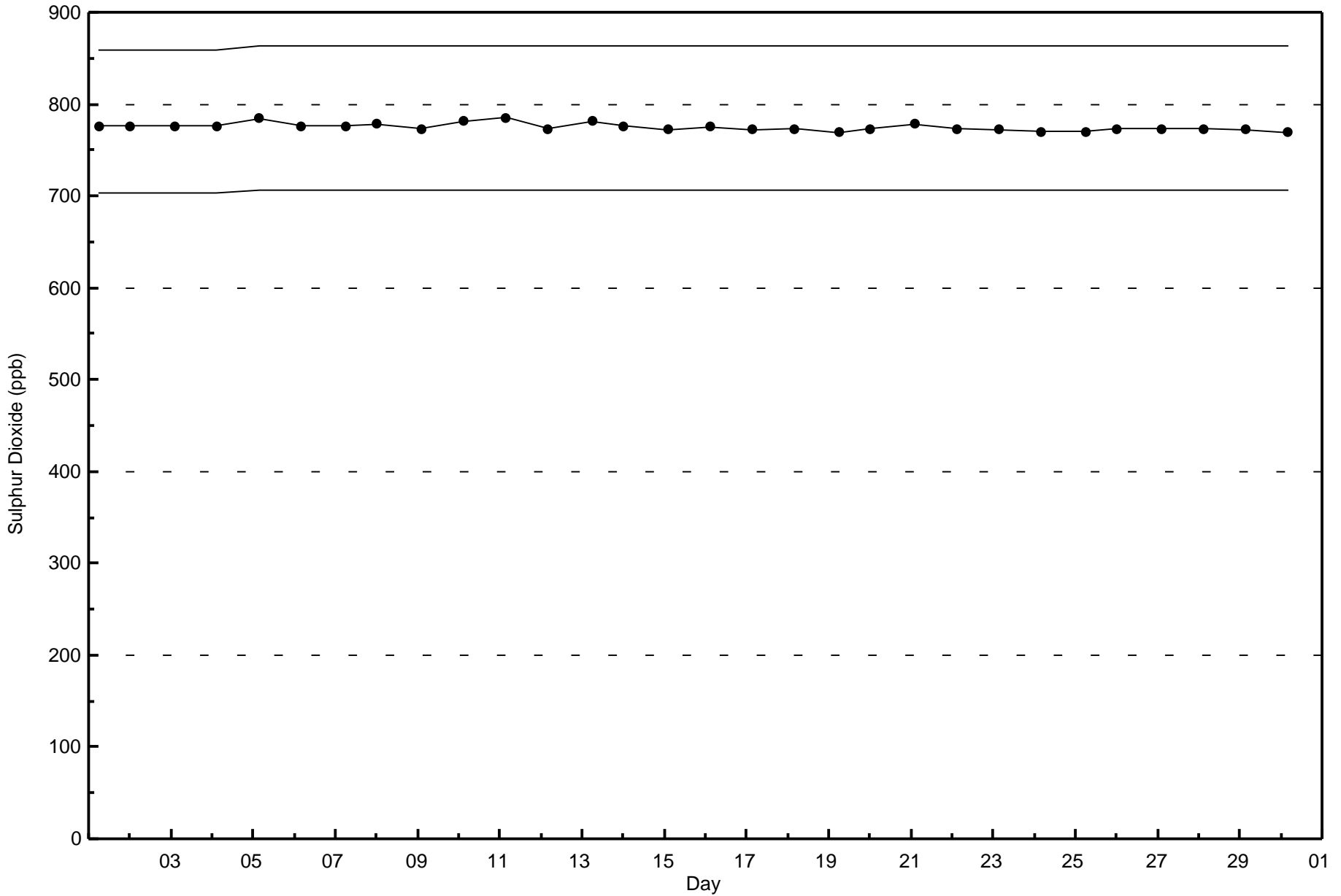


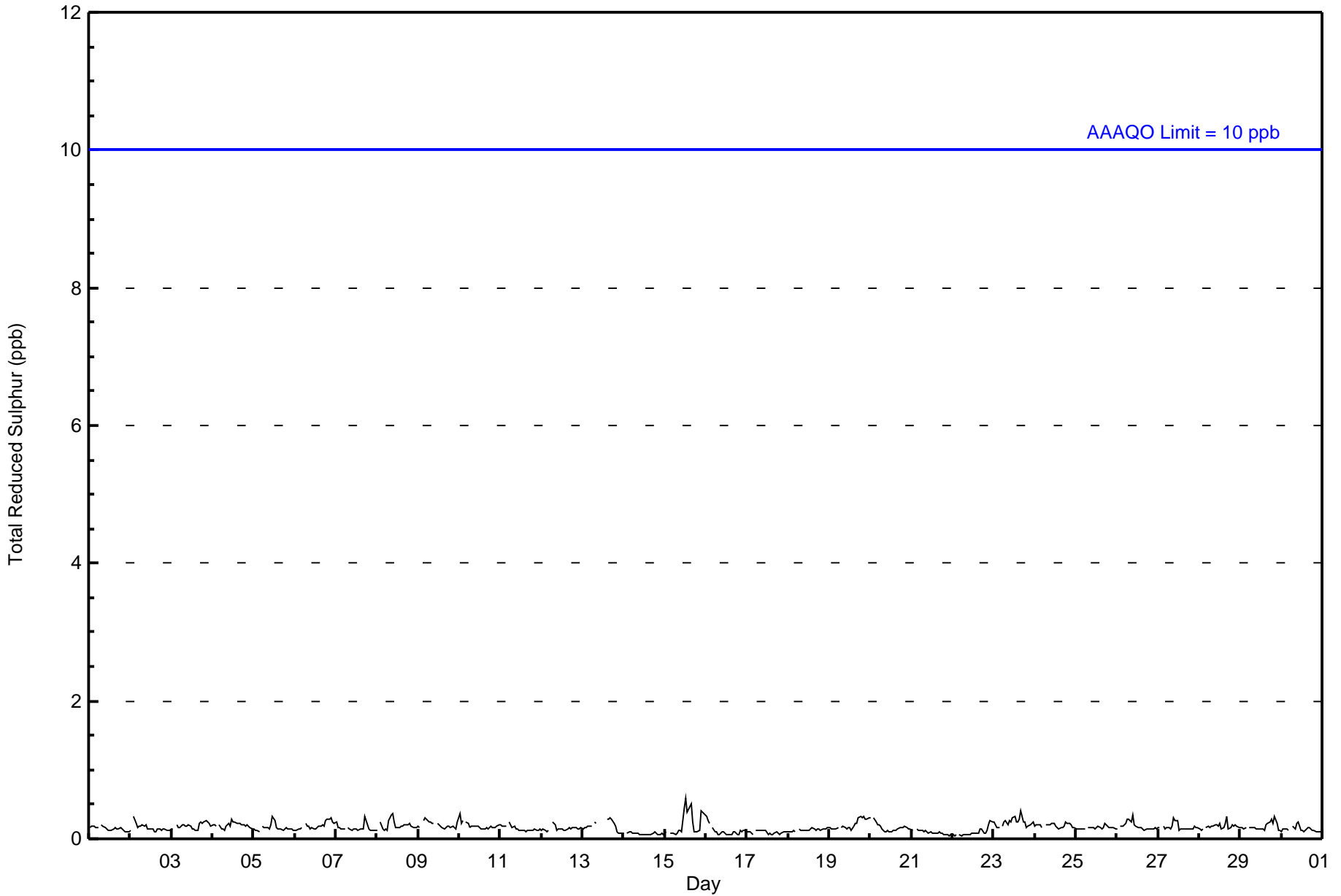
Classes (ppb)



Total Number of Valid Hours: 685









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	684	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: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	67	7	5	2	2	27	51	39	69	82	128	52	44	31	45	33	684
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	7	5	2	2	27	51	39	69	82	128	52	44	31	45	33	684

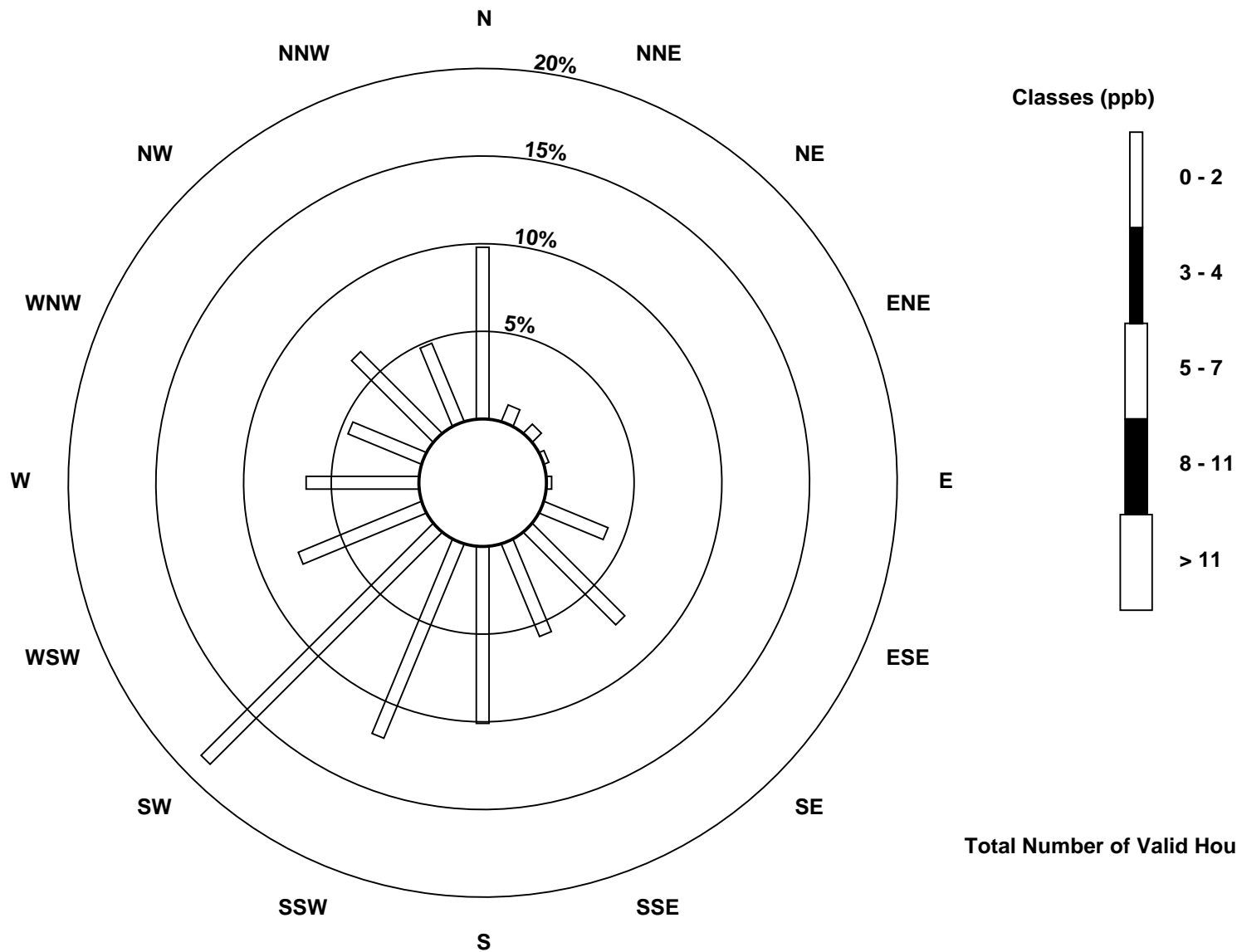
Total Number of Valid Hours: 684

Total Number of Hours: 720

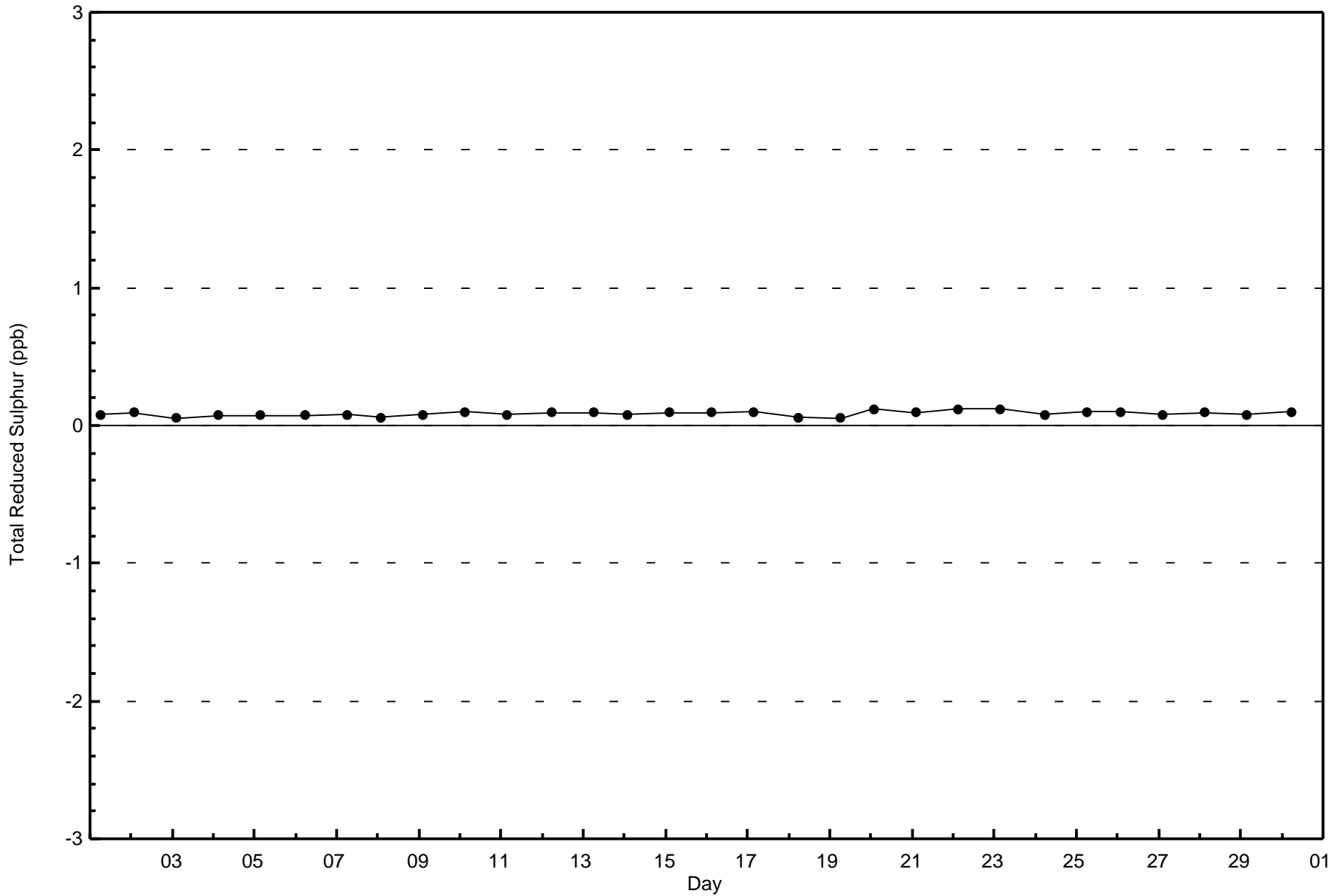


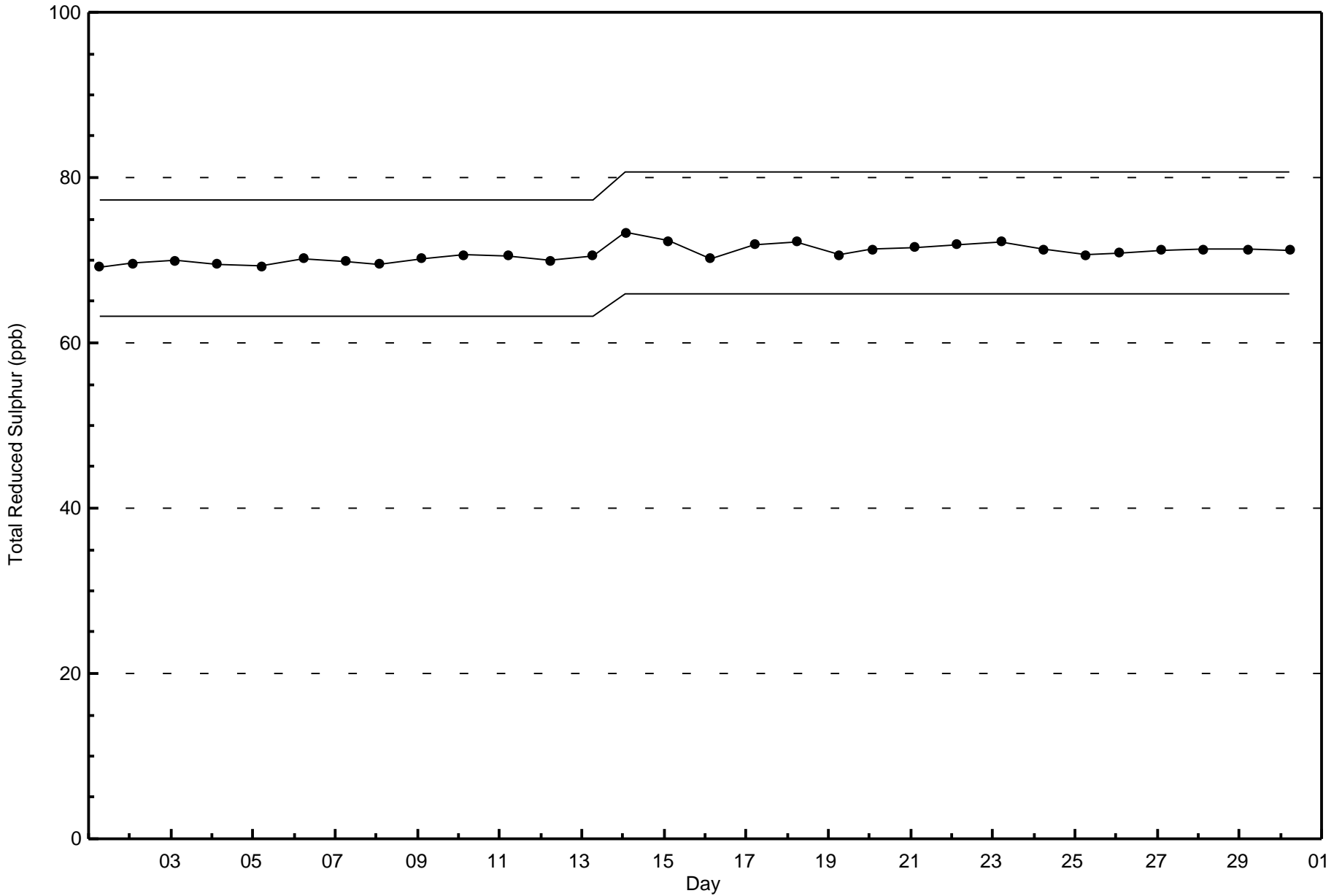
Wood Buffalo Environmental Association
Wind Rose Nov 2015

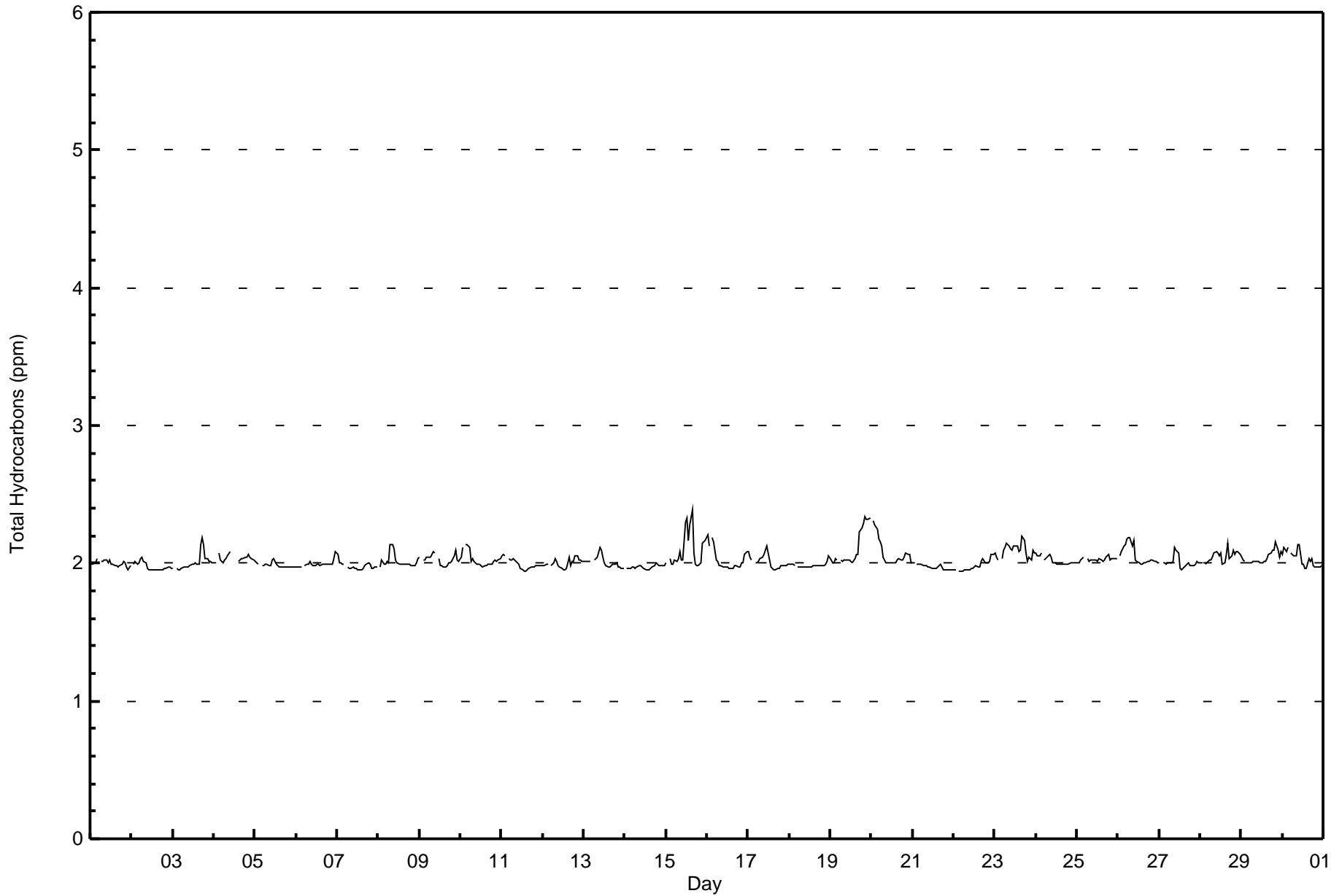
Total Reduced Sulphur (TRS) - ppb
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 684









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	555	81.02	81.02
2.1 - 3.0	130	18.98	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	49	5	5	1	2	23	38	21	48	73	131	43	38	27	38	13	555
2.1 - 3.0	18	2	0	1	0	3	11	17	23	11	2	5	6	4	7	20	130
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	67	7	5	2	2	26	49	38	71	84	133	48	44	31	45	33	685

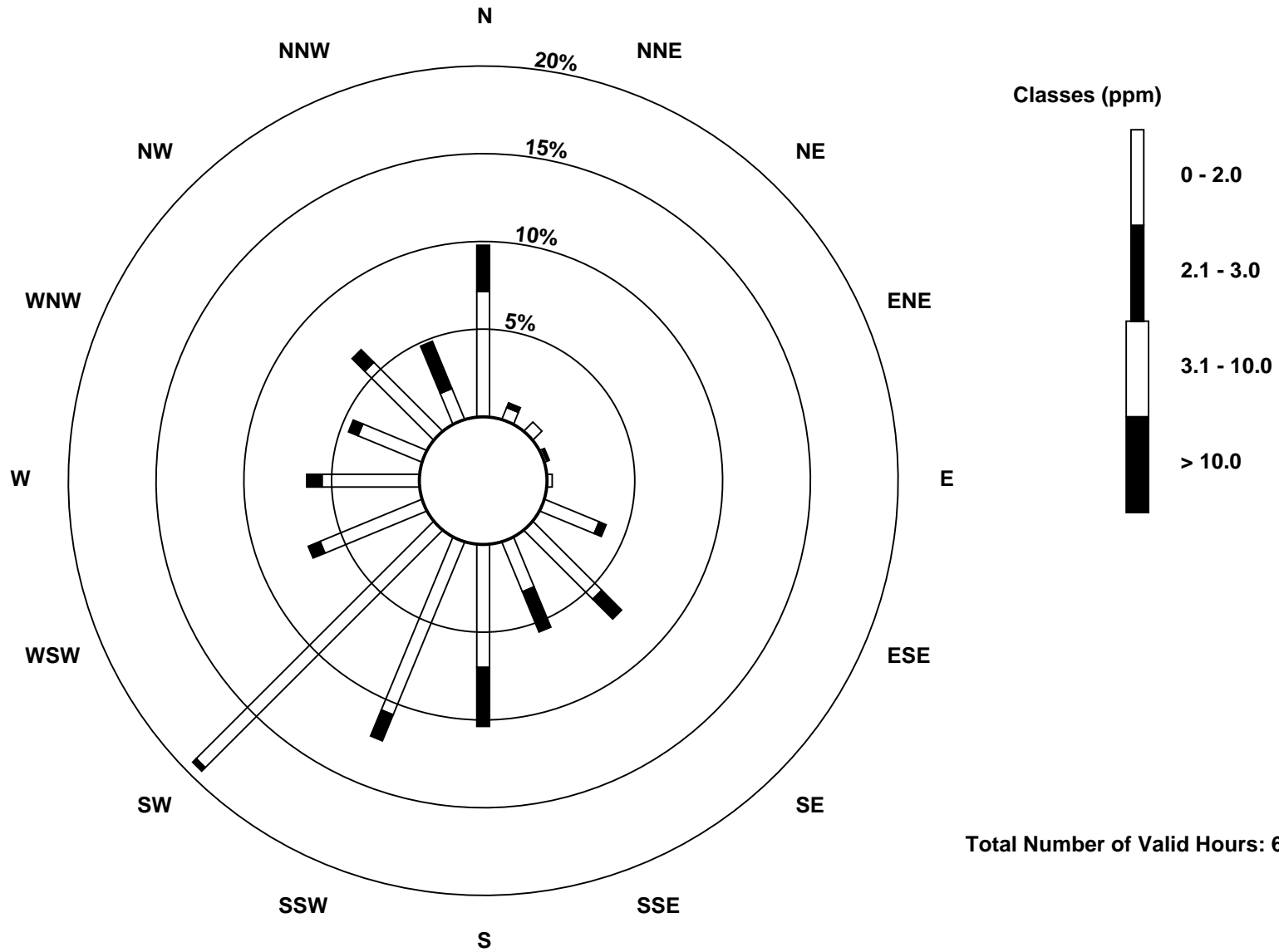
Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

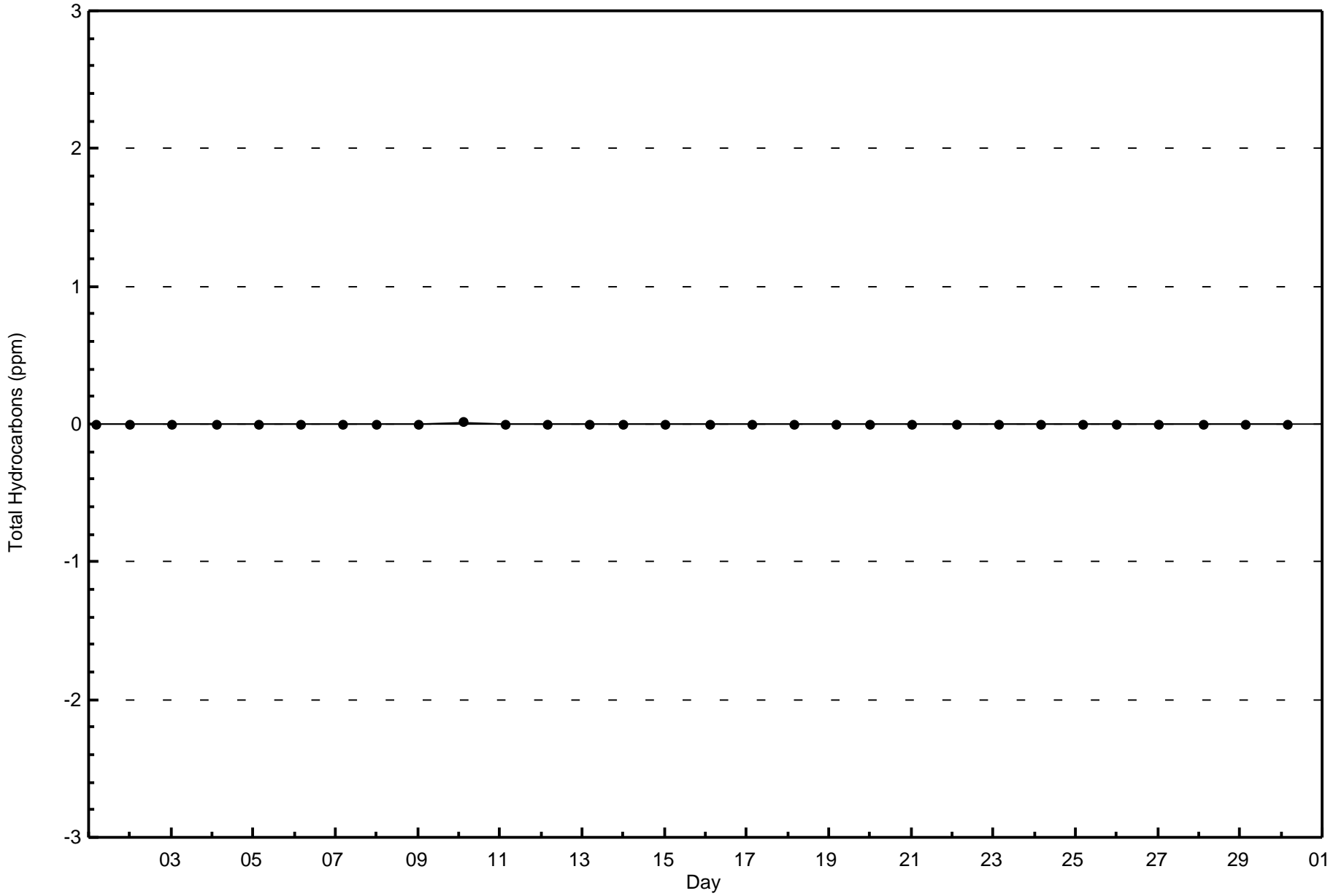
Total Hydrocarbons (THC) - ppm
Patricia McInnes (AMS 6)

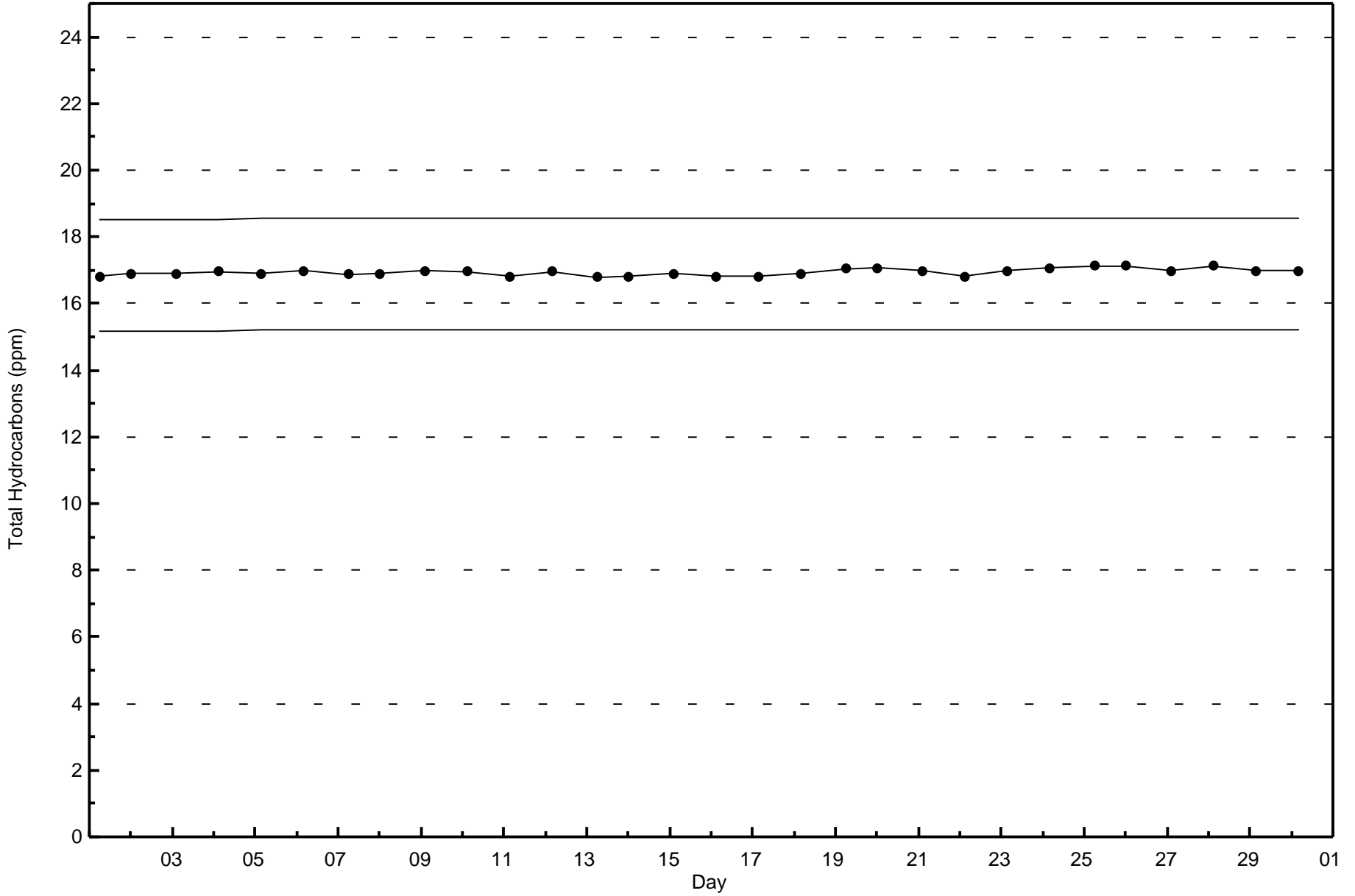




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Patricia McInnes - November 2015







Summary of Hour Averages

Patricia McInnes - November 2015

Maximum Value: 0.067 ppm on Nov 12 16:00		Maximum Daily Average: 0.003 ppm on Nov 12		Hours in Service: 720																														
Minimum Value: 0.000 ppm on Nov 1 01:00		Minimum Daily Average: 0.000 ppm on Nov 1		Hours of Data: 685																														
Maximum Diurnal Average: 0.002 ppm at hour 16		Minimum Diurnal Average: 0.000 ppm at hour 1		Hours of Missing Data: 35																														
Monthly Average: 0.000 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0		Hours of Calibration: 34																														
				Percent Operational Time: 99.9																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
1-Nov	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
2-Nov	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
3-Nov	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
4-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
5-Nov	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
6-Nov	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001		
7-Nov	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	0.010	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010	0.010		
8-Nov	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
9-Nov	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
10-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	
11-Nov	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
12-Nov	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.001	0.005	0.067	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.067	0.067		
13-Nov	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	
14-Nov	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15-Nov	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	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	
16-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
17-Nov	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
18-Nov	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
19-Nov	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.002
20-Nov	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
21-Nov	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	0.002	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	0.009	0.009
22-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23-Nov	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-Nov	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25-Nov	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26-Nov	Z	0.000	0.001	0.003	0.000	0.000	0.000	0.003	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.011	0.011	
27-Nov	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.029	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.029	0.029	
28-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.000	0.012	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.037	0.037	0.037	
29-Nov	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	0.012	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.012	0.012	0.012	0.012	
30-Nov	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.015	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.015	0.015	0.015	0.015	
																								Diurnal Average										
																								Diurnal Maximum										
Z - zerospan		C - Calibration				M - Maintenance																												

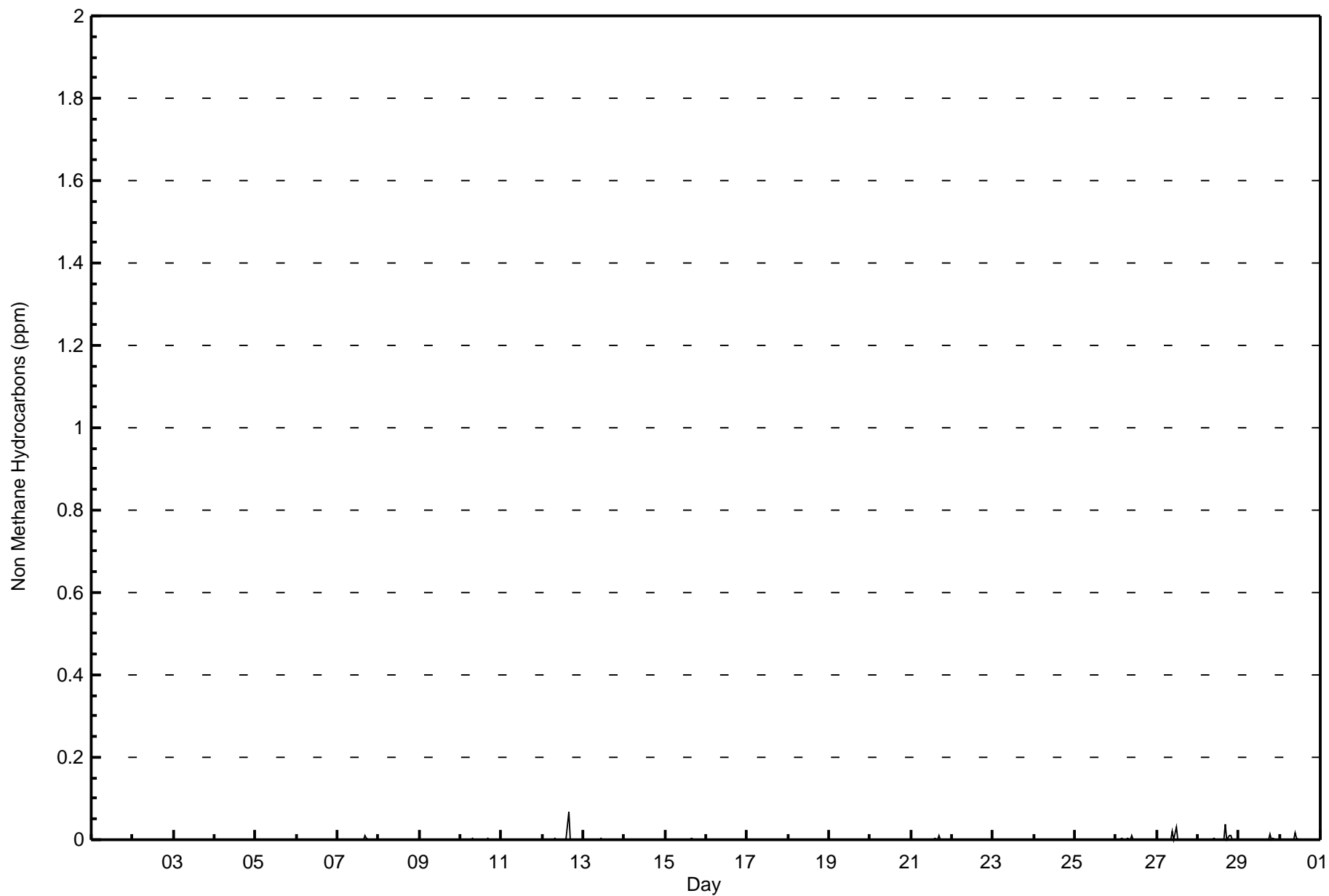


Wood Buffalo Environmental Association

Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	674	98.39	98.39
0.006 - 0.05	10	1.46	99.85
0.06 - 0.1	1	0.15	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



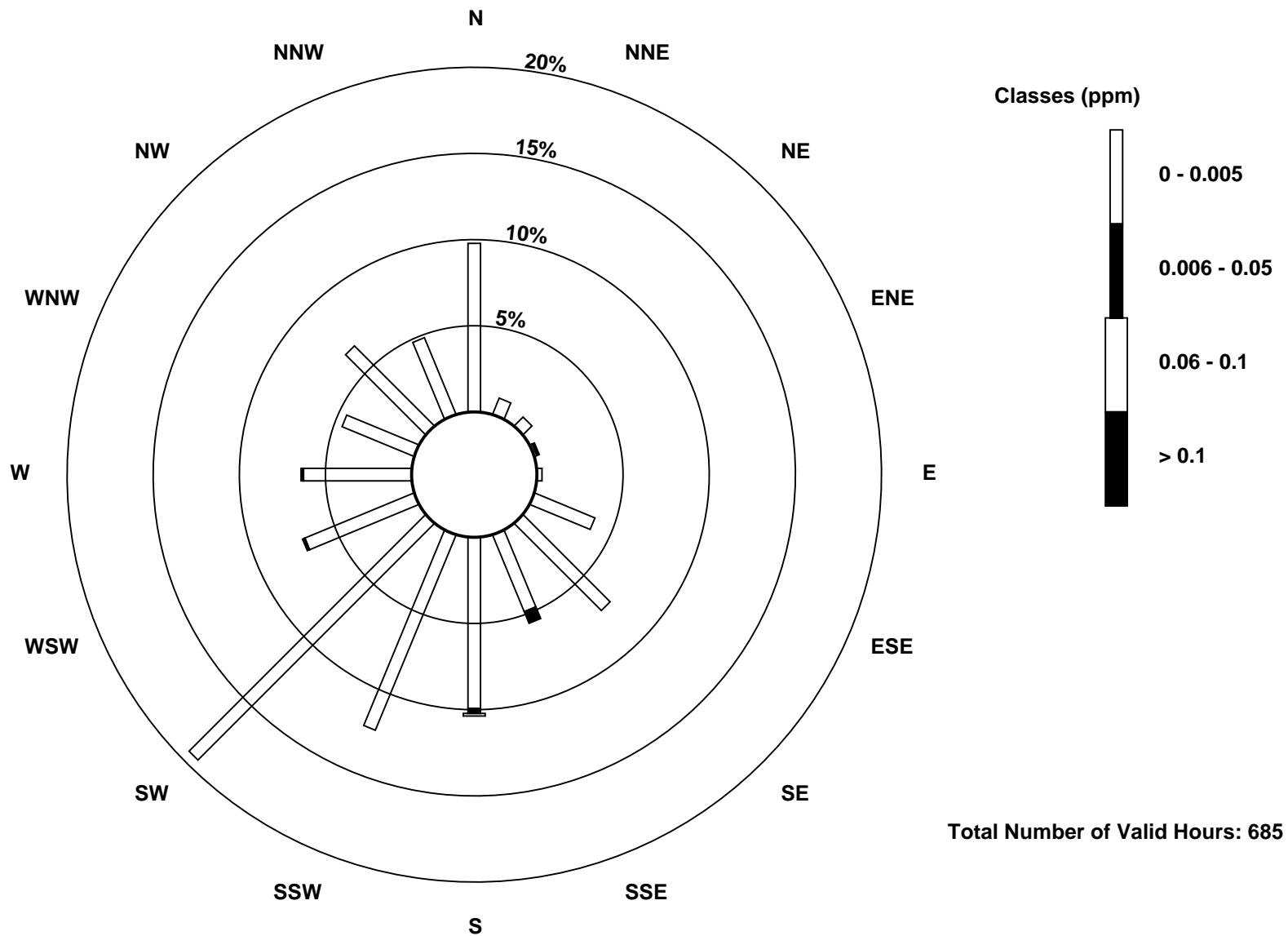
Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	67	7	5	1	2	26	49	33	68	84	133	47	43	31	45	33	674
0.006 - 0.05	0	0	0	1	0	0	0	5	2	0	0	1	1	0	0	0	10
0.06 - 0.1	0	0	0	0	0	0	0	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	0	0	0	0
Totals	67	7	5	2	2	26	49	38	71	84	133	48	44	31	45	33	685

Total Number of Valid Hours: 685

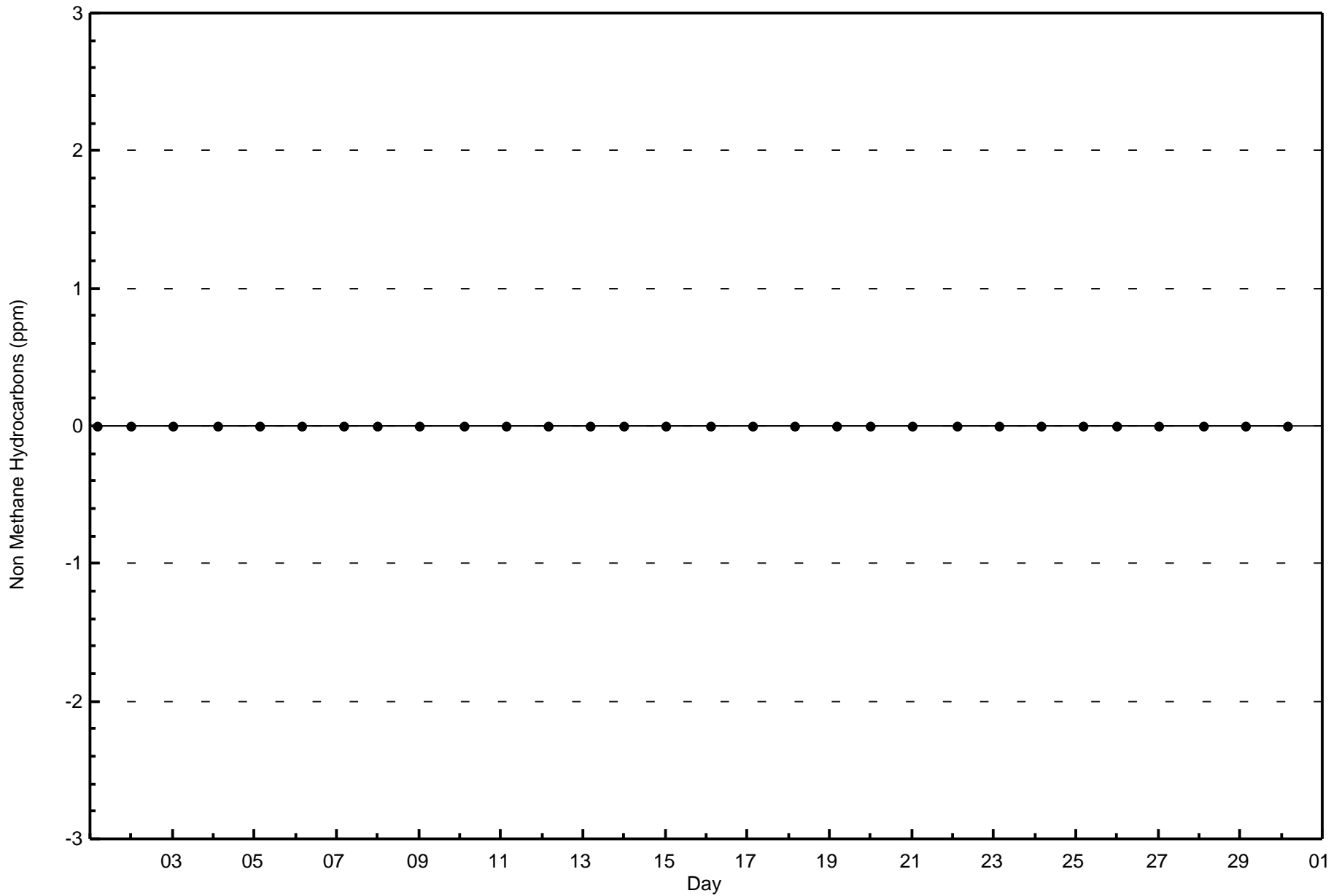
Total Number of Hours: 720

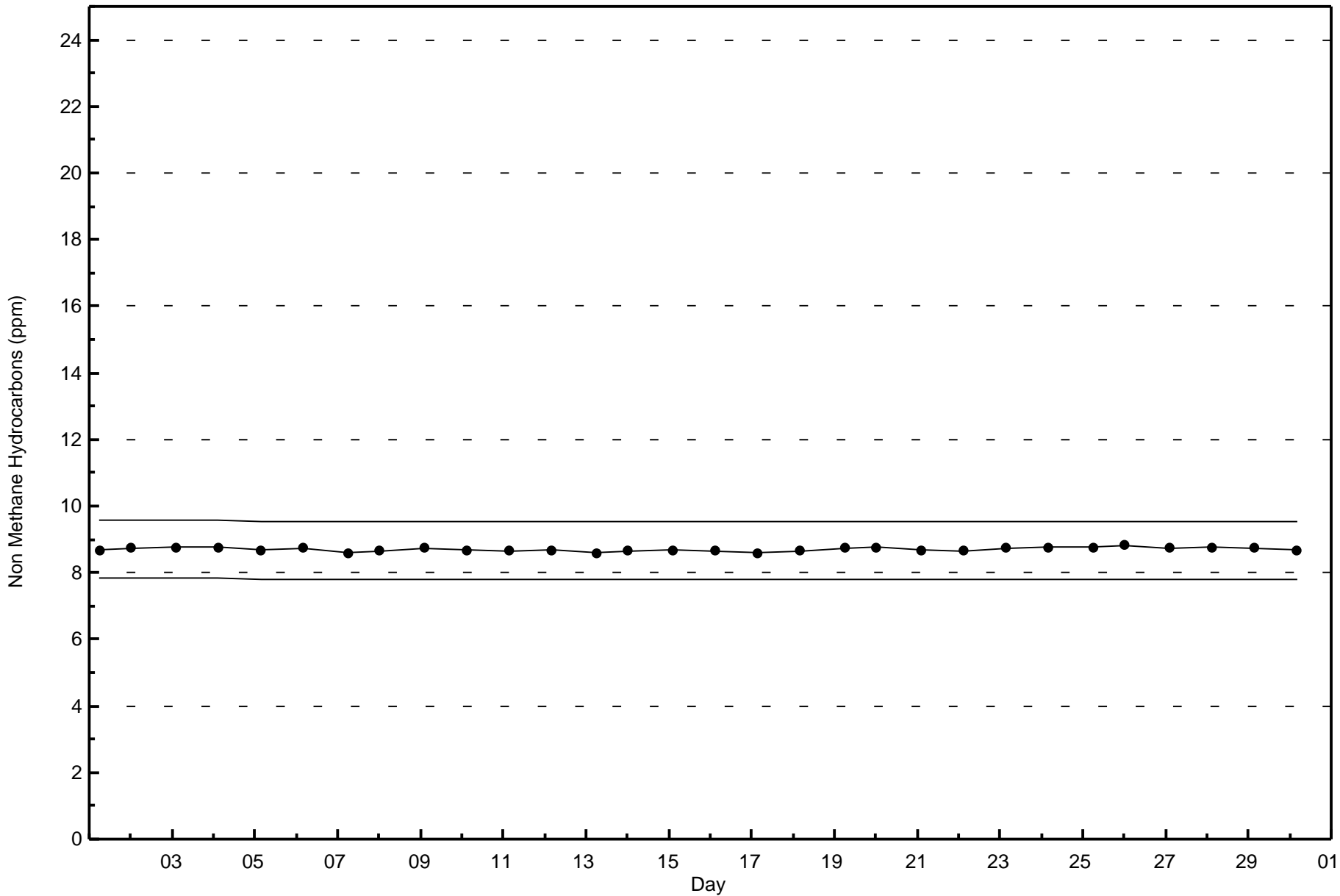




Wood Buffalo Environmental Association
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - November 2015





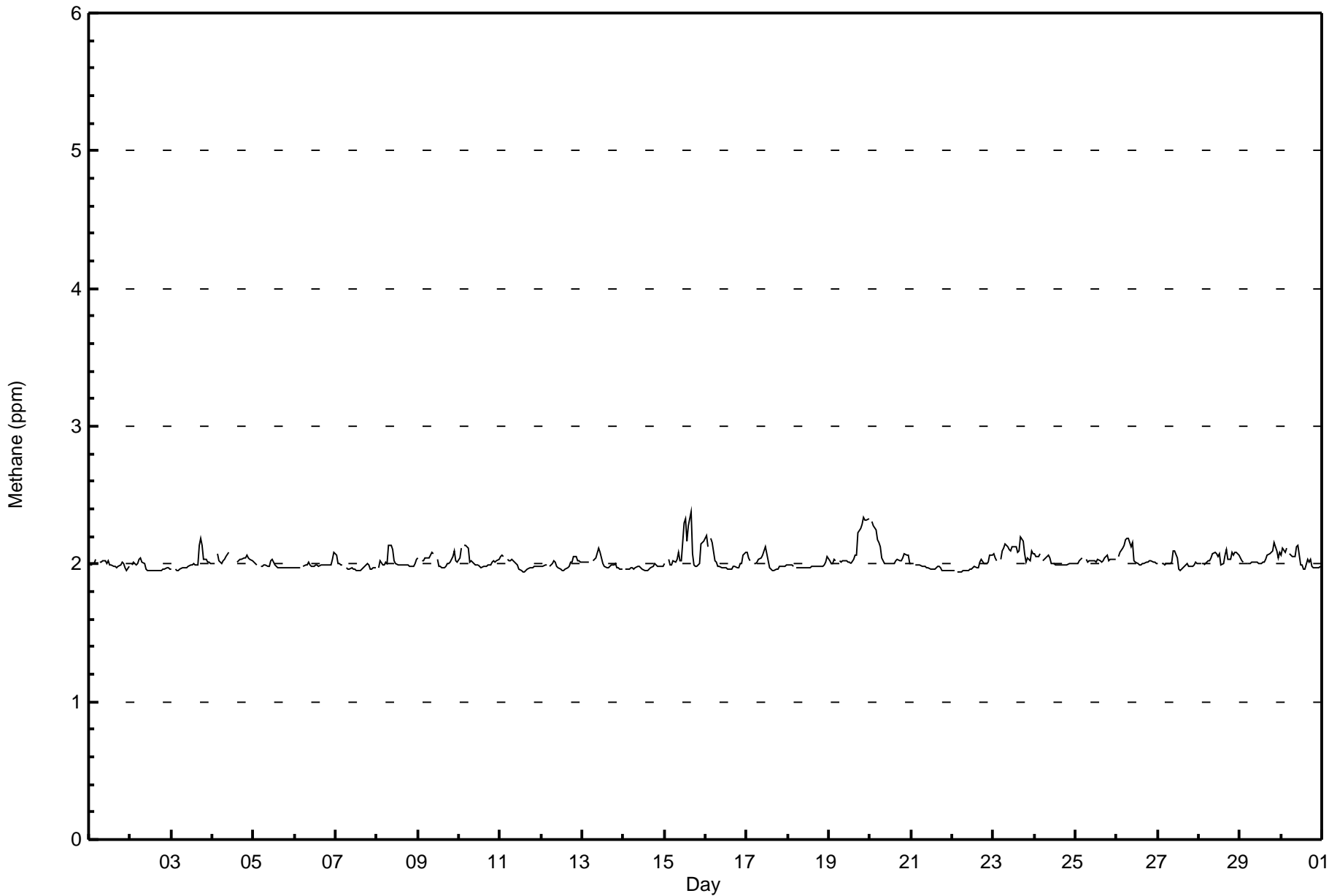


Wood Buffalo Environmental Association
Summary of Hour Averages

Methane (CH₄) - ppm

Patricia McInnes - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 720																													
Maximum Value: 2.4 ppm on Nov 15 16:00														Maximum Daily Average: 2.1 ppm on Nov 19																													
Minimum Value: 1.9 ppm on Nov 22 04:00														Minimum Daily Average: 2.0 ppm on Nov 14																													
Maximum Diurnal Average: 2.0 ppm at hour 4														Minimum Diurnal Average: 2.0 ppm at hour 14																													
Monthly Average: 2.02 ppm														Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 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-Nov	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-Nov	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	2.0						
3-Nov	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	2.2	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					
4-Nov	2.0	2.0	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	C	C	C	C	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	2.0					
5-Nov	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	2.0				
6-Nov	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	2.1	2.0	2.0	2.1	2.0					
7-Nov	2.1	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.0	2.0				
8-Nov	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
9-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	M	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	2.1	2.0	2.0	2.0	2.0	2.0	2.0				
10-Nov	2.0	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
11-Nov	2.1	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
12-Nov	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	2.1	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			
13-Nov	2.0	2.0	2.0	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
14-Nov	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
15-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.3	2.3	2.2	2.3	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1			
16-Nov	2.2	2.1	Z	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	2.0	2.0	2.0			
17-Nov	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
18-Nov	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	2.0	2.0	2.0	2.0	2.0	2.0		
19-Nov	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3		
20-Nov	Z	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	2.0	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
21-Nov	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	2.0	2.0	2.0	2.0		
22-Nov	2.0	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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			
23-Nov	2.1	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1		
24-Nov	2.1	2.0	2.0	2.1	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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-Nov	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	2.0	2.0	2.0	2.0	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-Nov	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
28-Nov	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
29-Nov	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
30-Nov	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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 - zerspan C - Calibration M - Maintenance																																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	556	81.17	81.17
2.1 - 3.0	129	18.83	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



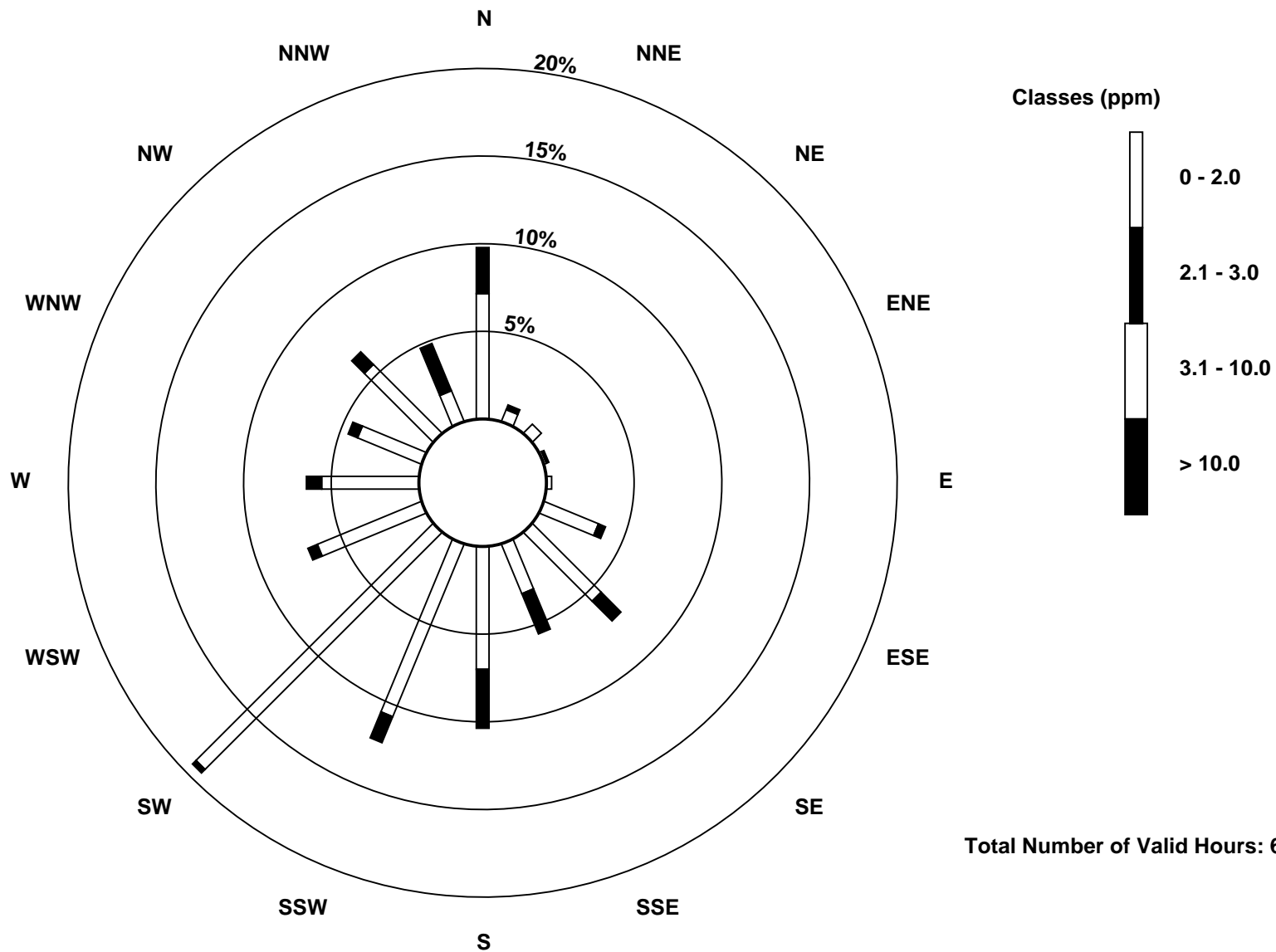
Wood Buffalo Environmental Association
Frequency Distribution

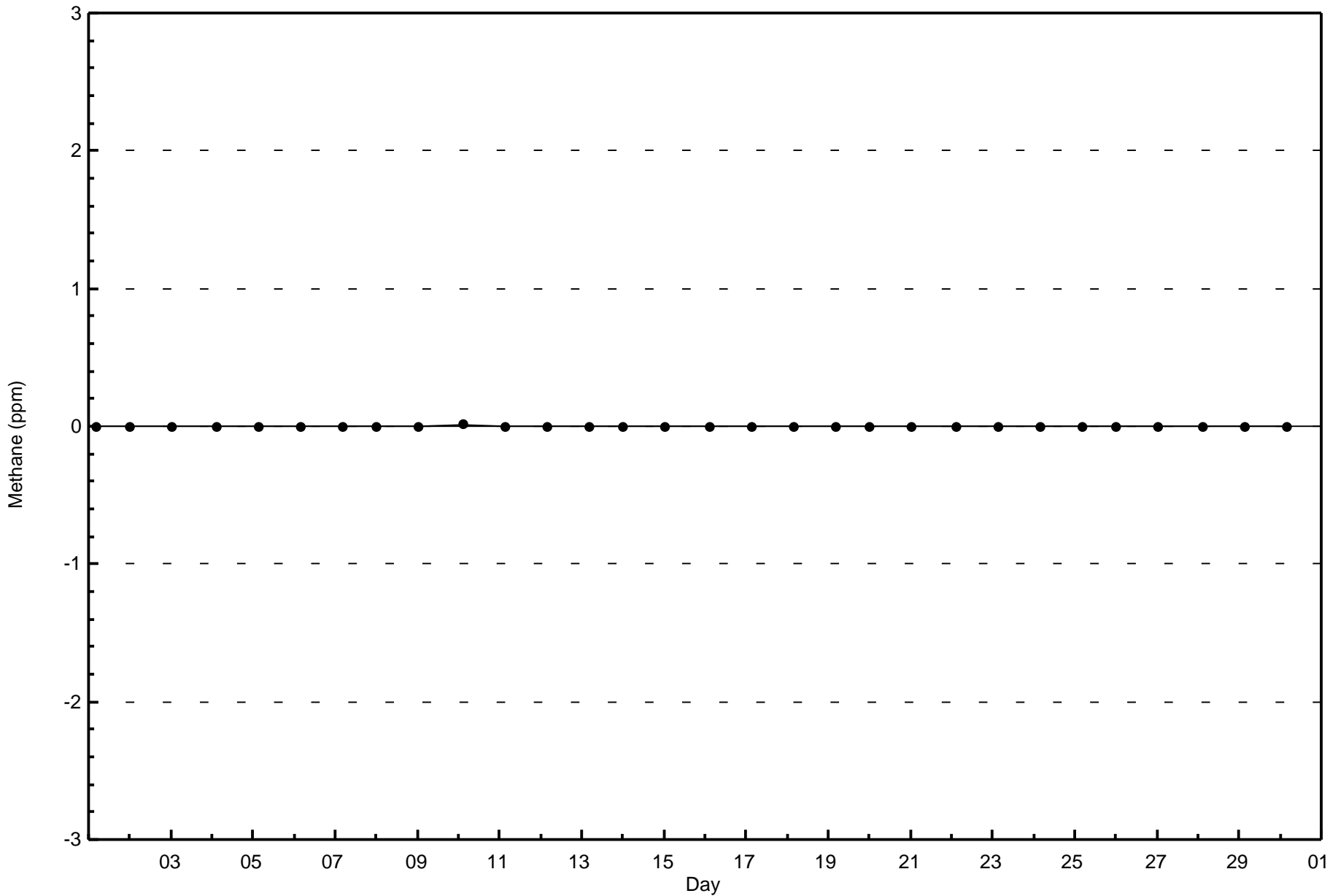
Methane (CH₄) - ppm
Patricia McInnes - November 2015

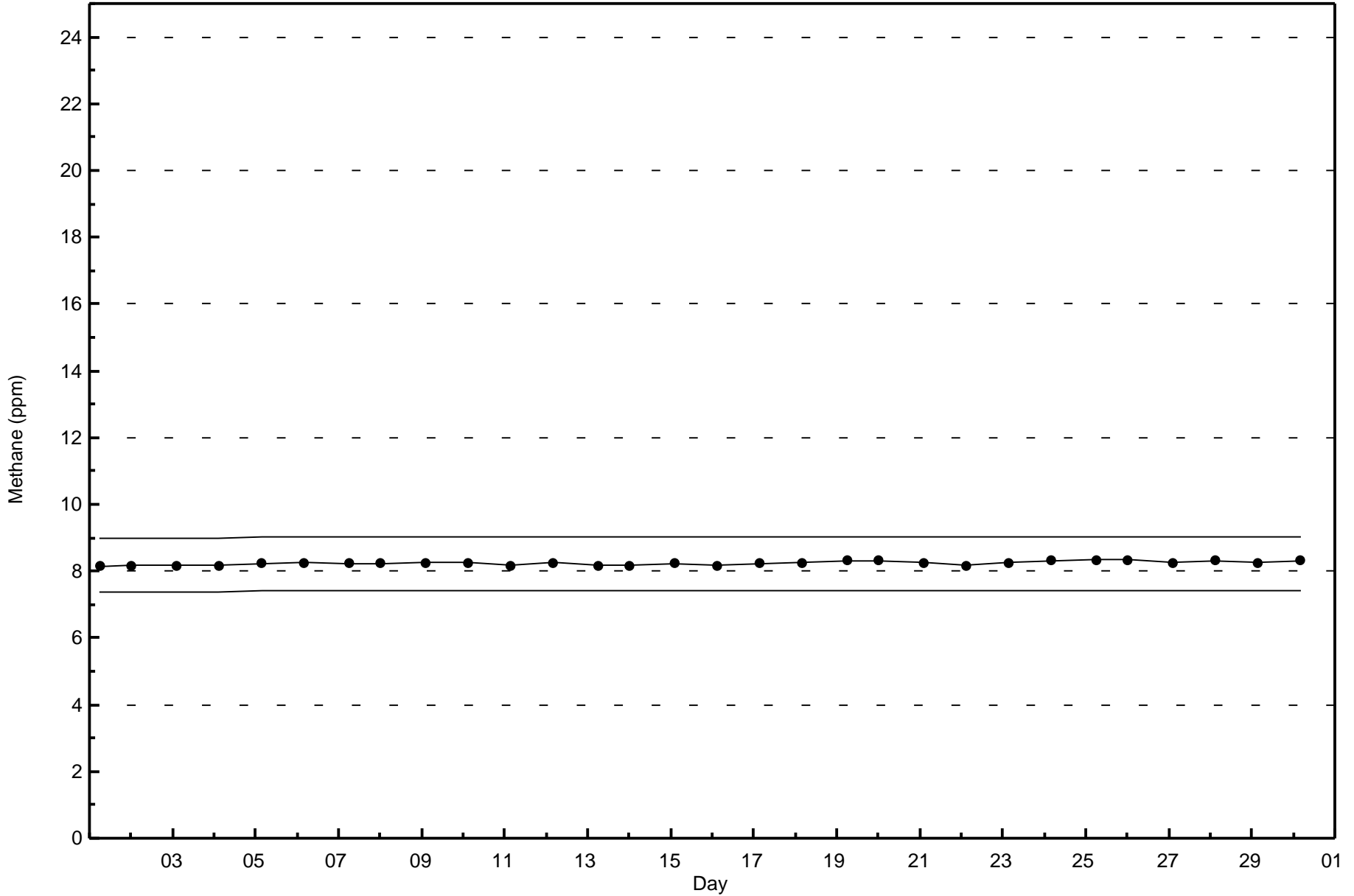
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	49	5	5	1	2	23	38	21	48	73	131	44	38	27	38	13	556
2.1 - 3.0	18	2	0	1	0	3	11	17	23	11	2	4	6	4	7	20	129
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	7	5	2	2	26	49	38	71	84	133	48	44	31	45	33	685

Total Number of Valid Hours: 685

Total Number of Hours: 720









Summary of Hour Averages

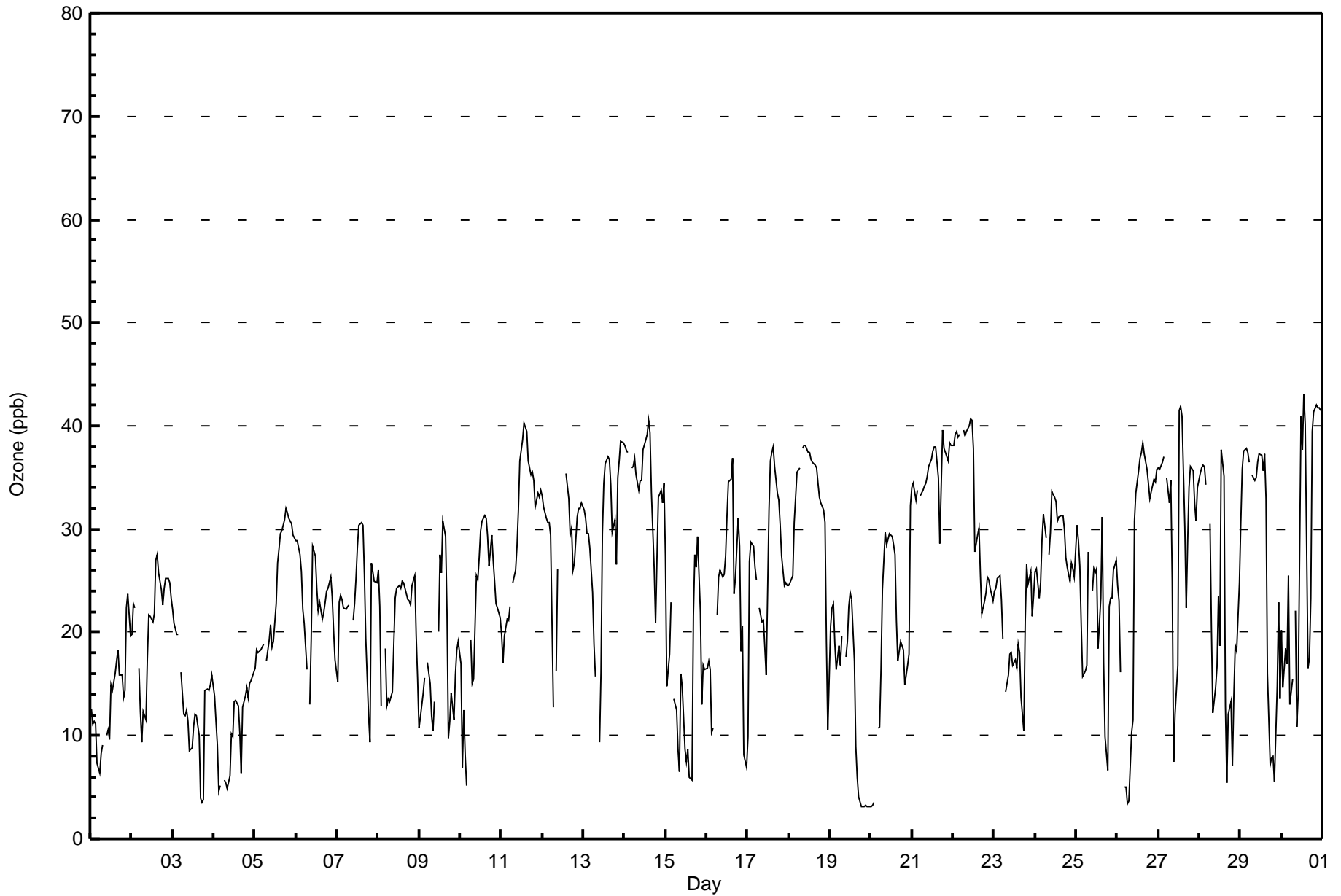
Patricia McInnes - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 43 ppb on Nov 30 14:00	Maximum Daily Average: 35.5 ppb on Nov 21		Hours of Data:	685
Minimum Value: 3 ppb on Nov 19 23:00	Minimum Daily Average: 10.6 ppb on Nov 4		Hours of Missing Data:	35
Maximum Diurnal Average: 29.3 ppb at hour 15	Minimum Diurnal Average: 19.8 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 23.9 ppb	Percentiles: P ₁ = 3 P ₁₀ = 10 Q ₁ = 16 Median = 24 Q ₃ = 32 P ₉₀ = 37 P ₉₉ = 41		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	13	11	11	11	7	6	8	9	Z	10	11	10	15	14	16	17	18	16	16	14	14	22	24	20	13.7	24
2-Nov	20	23	22	Z	17	12	9	12	11	17	22	22	21	22	27	27	26	24	23	24	25	25	25	23	20.9	27
3-Nov	22	21	20	20	Z	16	12	12	12	11	9	9	11	12	12	10	4	4	4	14	14	14	15	16	12.8	22
4-Nov	14	11	9	5	5	Z	6	5	5	6	10	10	13	13	13	10	6	13	14	15	14	15	15	16	10.6	16
5-Nov	17	18	18	18	19	19	Z	17	19	21	19	19	23	27	28	30	30	31	32	32	31	30	29	29	24.1	32
6-Nov	29	29	28	26	22	21	16	Z	13	19	28	27	24	22	23	21	22	23	24	24	25	23	20	17	23.0	29
7-Nov	15	23	24	23	22	22	23	23	Z	21	23	25	28	30	31	30	26	19	12	9	27	26	25	25	23.2	31
8-Nov	26	23	13	Z	18	13	14	13	14	19	23	24	24	24	25	25	24	23	23	23	25	25	20	16	20.8	26
9-Nov	11	12	14	16	Z	17	15	12	10	13	M	20	28	26	31	29	22	10	11	14	11	16	18	19	17.1	31
10-Nov	17	7	12	8	5	Z	19	15	16	25	25	27	30	31	31	31	29	26	29	27	25	23	22	21	21.9	31
11-Nov	20	17	20	21	21	23	Z	25	26	28	32	37	39	40	40	39	37	35	36	35	32	33	33	34	30.5	40
12-Nov	33	32	31	31	31	29	13	Z	16	26	C	C	C	C	35	33	29	30	26	27	31	32	32	33	29.0	35
13-Nov	32	31	30	30	28	24	19	16	Z	9	16	30	34	36	37	37	34	30	31	27	35	37	38	38	29.5	38
14-Nov	38	38	37	Z	36	36	37	35	34	35	35	38	39	39	41	39	34	26	21	27	33	34	33	35	34.7	41
15-Nov	27	15	18	23	Z	14	13	9	7	16	15	9	8	9	6	6	22	28	26	29	22	13	17	16	15.8	29
16-Nov	17	17	16	10	11	Z	22	25	26	25	26	27	31	35	35	37	24	25	31	28	18	21	8	7	22.7	37
17-Nov	10	27	29	28	26	25	Z	22	21	21	19	16	32	37	37	38	36	33	33	30	27	25	25	25	27.1	38
18-Nov	24	25	25	31	33	35	36	Z	38	38	38	37	37	37	36	36	36	34	33	33	32	31	19	11	32.0	38
19-Nov	21	22	23	19	16	19	17	20	Z	18	19	23	24	23	17	9	6	4	3	3	3	3	3	3	13.8	24
20-Nov	3	3	4	Z	11	11	16	24	30	28	29	30	29	29	27	21	17	19	19	18	15	17	18	32	19.6	32
21-Nov	34	34	33	34	Z	33	34	34	34	35	36	37	37	38	38	35	29	34	40	38	37	37	38	38	35.5	40
22-Nov	38	39	39	39	39	Z	40	39	39	40	41	41	38	28	29	30	25	22	23	24	25	25	24	23	32.7	41
23-Nov	24	24	25	25	23	19	Z	14	16	18	18	17	17	19	18	14	10	21	27	25	26	22	24	20.1	27	
24-Nov	26	26	23	25	29	31	29	Z	28	30	34	33	33	31	31	31	31	30	27	26	25	27	26	25	28.6	34
25-Nov	30	29	26	21	16	16	17	28	Z	24	26	26	26	18	23	31	17	10	7	23	23	23	26	27	22.3	31
26-Nov	25	23	16	Z	5	5	3	4	10	12	31	34	36	37	37	38	37	36	34	33	34	35	35	36	25.9	38
27-Nov	36	36	36	37	Z	35	33	35	25	7	12	17	41	42	41	30	22	29	34	36	36	33	31	34	31.2	42
28-Nov	35	36	36	36	34	Z	30	20	12	15	17	24	19	38	35	13	5	12	13	7	14	19	18	25	22.3	38
29-Nov	31	36	38	38	37	36	Z	35	35	35	36	37	37	36	37	33	16	7	8	8	6	15	23	14	27.5	38
30-Nov	20	15	18	17	26	13	15	Z	22	11	14	41	38	43	40	17	18	23	39	41	42	42	42	42	27.8	43

23.6	23.4	23.2	23.6	21.5	21.3	19.8	20.2	20.8	21.2	23.6	25.6	28.0	28.7	29.3	26.8	23.2	22.2	23.1	23.9	24.2	24.9	24.1	24.1	Diurnal Average	
38	39	39	39	39	36	40	39	39	40	41	41	41	43	41	39	37	36	40	41	42	42	42	42	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	252	36.79	36.79
21 - 50	433	63.21	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	2	0	2	2	11	27	26	37	26	12	8	9	10	16	17	252
21 - 50	19	5	5	0	0	15	24	13	32	57	122	40	33	21	29	18	433
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	7	5	2	2	26	51	39	69	83	134	48	42	31	45	35	685

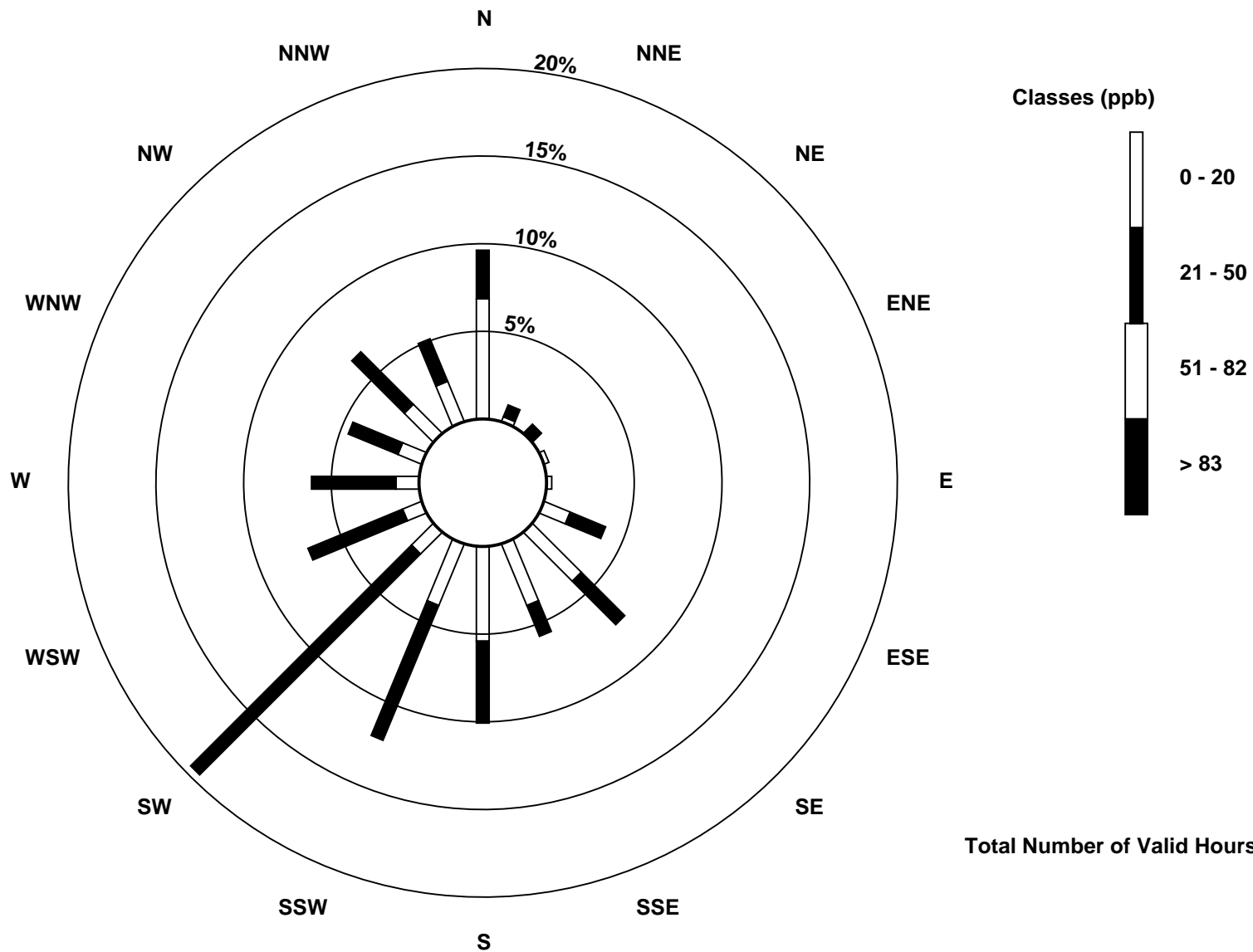
Total Number of Valid Hours: 685

Total Number of Hours: 720

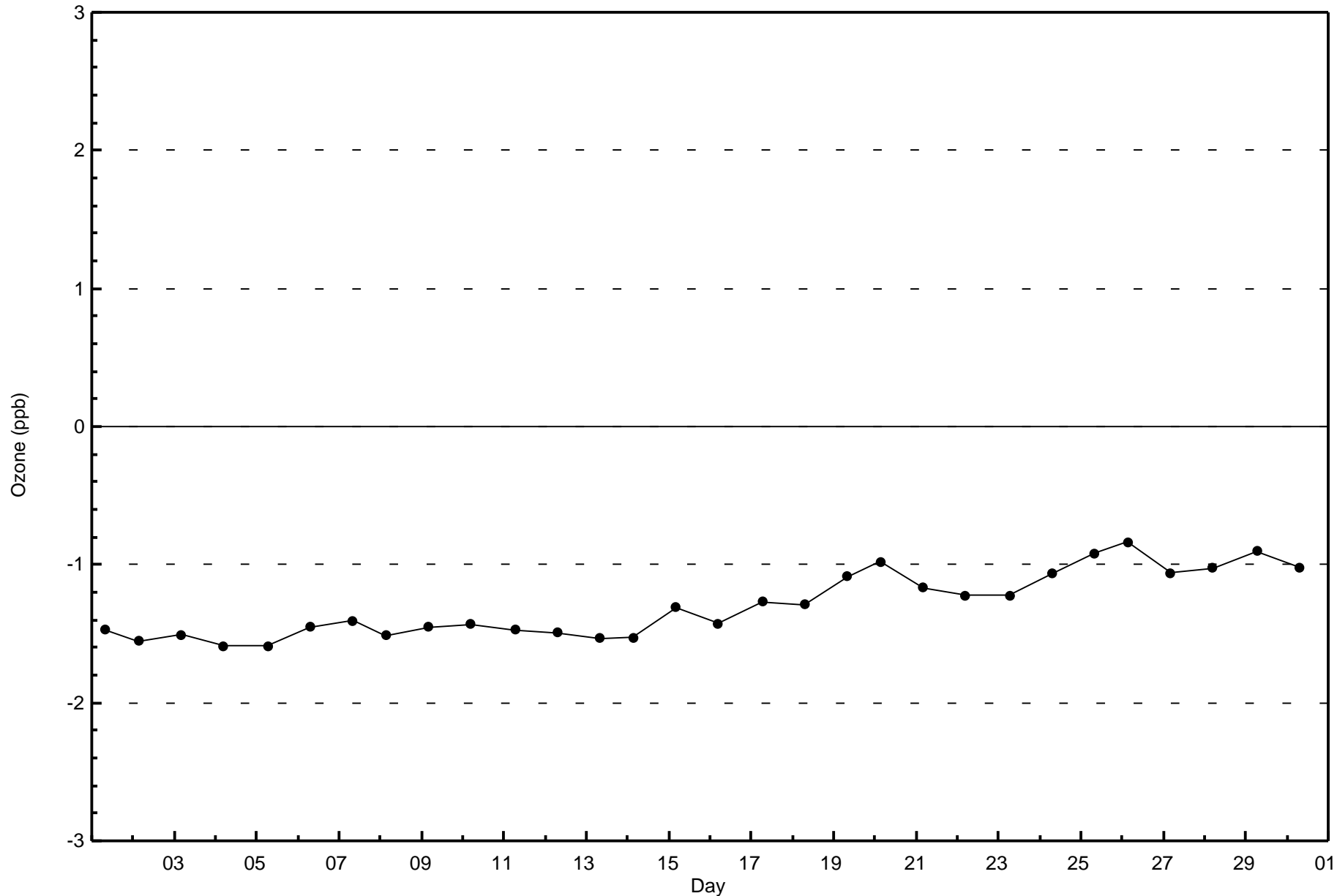


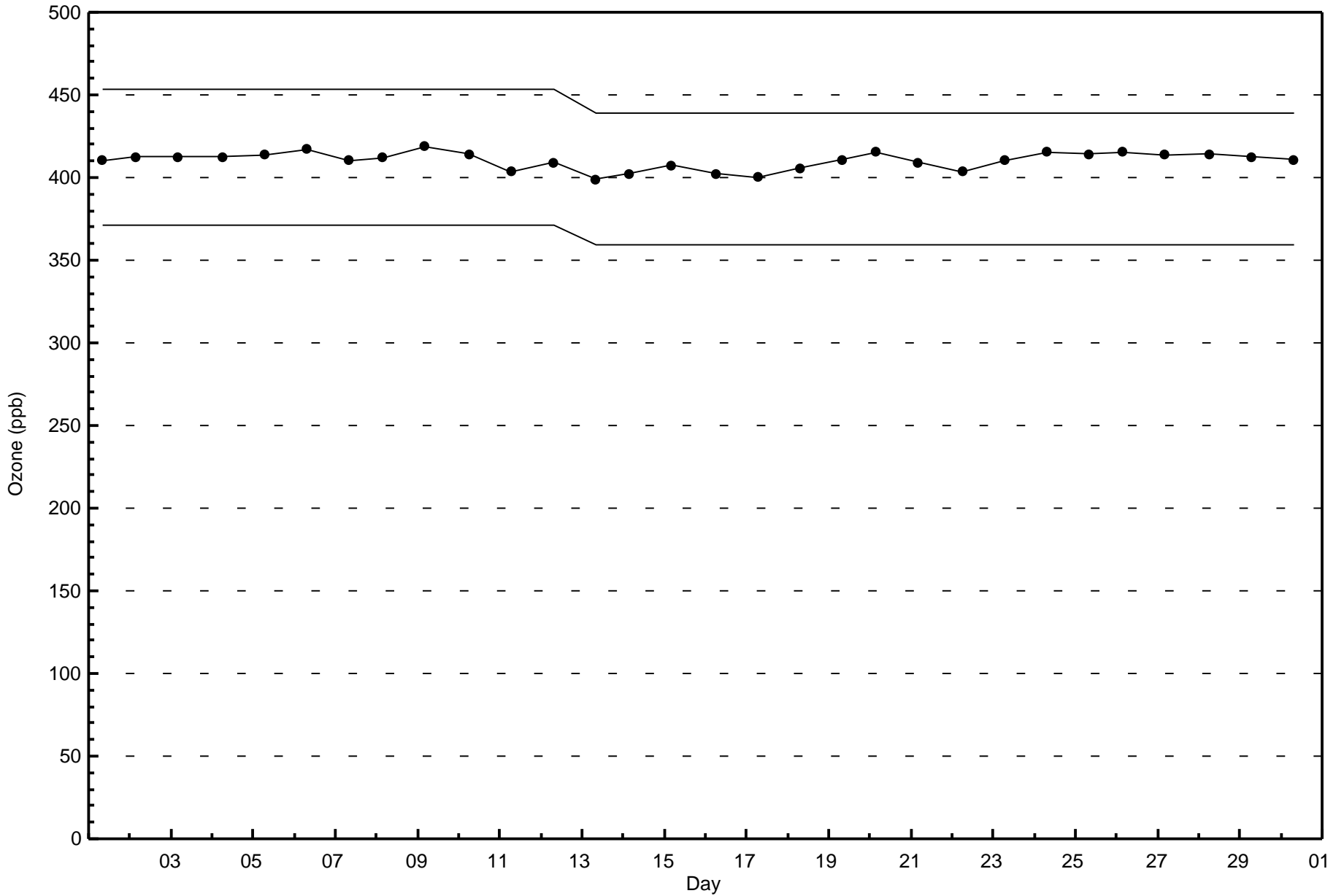
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 685





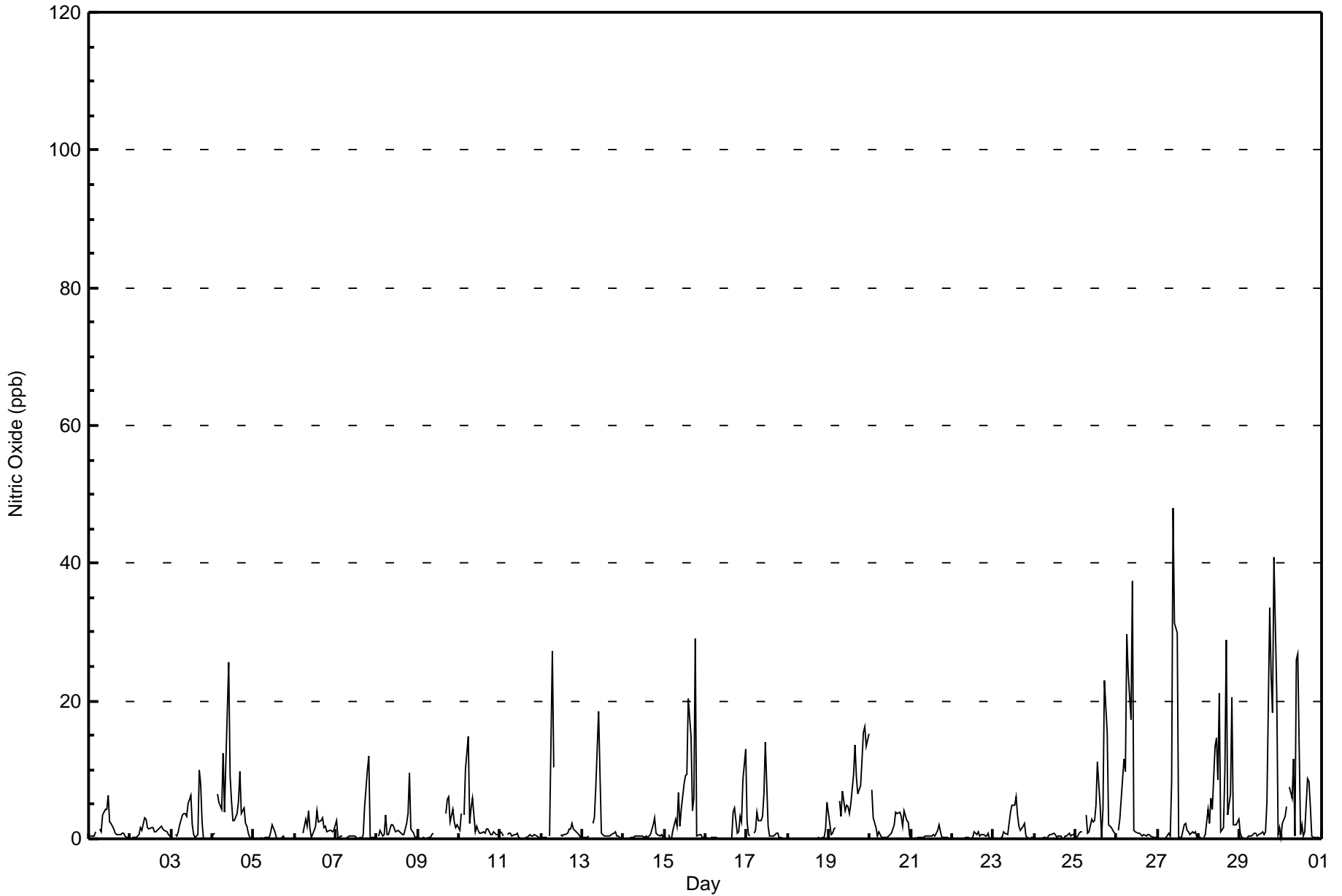


Maximum Value: 48 ppb on Nov 27 10:00	Maximum Daily Average: 7.1 ppb on Nov 19	Hours in Service: 720
Minimum Value: 0 ppb on Nov 4 00:00	Minimum Daily Average: 0.2 ppb on Nov 5	Hours of Data: 681
Maximum Diurnal Average: 7.0 ppb at hour 10	Minimum Diurnal Average: 0.6 ppb at hour 1	Hours of Missing Data: 39
Monthly Average: 2.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 7 P ₉₉ = 30	Hours of Calibration: 36
		Percent Operational Time: 99.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	1	Z	2	1	3	4	4	6	2	2	1	1	1	1	1	1	1	0	0	0	1.5	6
2-Nov	Z	0	0	0	0	1	2	1	3	3	2	1	2	2	1	1	1	2	2	1	1	1	1	0	1.2	3
3-Nov	1	Z	1	0	1	2	3	4	4	3	5	6	2	1	0	1	10	8	3	0	0	0	0	2.3	10	
4-Nov	1	1	Z	6	5	4	12	4	11	26	9	5	3	3	4	6	10	4	5	2	2	1	0	5.3	26	
5-Nov	0	0	0	Z	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0.2	2	
6-Nov	0	0	0	0	Z	1	3	2	4	1	0	1	2	4	2	3	3	2	2	1	1	1	1	1.5	4	
7-Nov	3	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	1	5	10	12	0	0	0	1.5	12	
8-Nov	Z	0	1	0	1	3	1	1	2	2	2	1	1	1	1	1	1	2	4	9	1	1	0	1.6	9	
9-Nov	0	Z	0	0	0	0	0	0	1	1	C	C	C	C	C	C	4	6	6	3	4	2	2	2	--	6
10-Nov	1	4	Z	3	10	15	2	4	6	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2.6	15	
11-Nov	1	1	0	Z	1	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0.5	1	
12-Nov	0	0	0	0	Z	0	27	10	M	M	M	1	1	1	1	1	2	1	2	2	1	1	1	2.6	27	
13-Nov	0	0	0	0	0	Z	2	3	8	18	9	1	1	0	0	0	0	1	1	1	0	0	0	2.1	18	
14-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	1	1	0	1	0.5	3	
15-Nov	1	Z	1	0	0	1	3	2	7	2	4	8	9	9	20	15	4	6	29	0	1	1	0	5.3	29	
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	1	1	3	2	8	1.7	13	
17-Nov	2	1	0	Z	1	1	4	3	3	3	7	14	2	0	0	0	0	1	1	0	0	0	0	1.9	14	
18-Nov	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	5	
19-Nov	2	1	1	1	2	Z	5	3	7	4	5	5	4	5	9	14	9	6	8	11	15	16	13	7.1	16	
20-Nov	Z	7	3	2	0	1	1	0	0	0	0	0	1	1	2	4	4	4	3	2	4	3	2	2.0	7	
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1	0	0	0	0	0	0.4	2	
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0.3	1	
23-Nov	0	0	0	Z	0	0	1	1	1	2	4	5	5	6	3	2	1	2	2	0	0	0	0	1.6	6	
24-Nov	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	0	1	0.3	1	
25-Nov	0	1	1	1	1	Z	3	1	1	3	2	3	5	11	5	0	4	23	15	2	2	2	1	3.8	23	
26-Nov	Z	1	3	9	12	10	30	24	17	37	1	1	1	1	0	1	0	1	1	0	0	0	0	6.6	37	
27-Nov	0	Z	0	0	0	0	1	0	8	48	31	30	0	0	0	2	2	1	1	1	1	1	0	5.7	48	
28-Nov	0	0	Z	0	1	4	2	6	4	13	15	9	21	1	2	10	29	4	7	21	2	2	2	6.8	29	
29-Nov	1	0	0	Z	0	0	0	0	1	1	0	1	1	1	1	1	5	34	24	18	41	21	1	6.7	41	
30-Nov	0	2	3	5	Z	8	6	12	0	26	27	1	2	1	1	9	8	5	0	0	0	0	0	5.1	27	

0.6	0.8	0.6	1.2	1.5	2.2	3.8	2.8	3.2	7.0	4.8	3.6	2.3	1.8	2.0	2.5	3.6	4.2	4.4	3.1	2.9	2.0	1.3	1.5	Diurnal Average	
3	7	3	9	12	15	30	24	17	48	31	30	21	11	20	15	29	34	29	21	41	21	13	15	Diurnal Maximum	

Z - zerspan C - Calibration M - Maintenance





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	662	97.21	97.21
21 - 40	17	2.50	99.71
41 - 80	2	0.29	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	7	4	1	2	28	50	35	59	76	133	47	44	31	45	33	662
21 - 40	0	0	1	0	0	0	0	4	9	2	0	1	0	0	0	0	17
11 - 80	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	7	5	2	2	28	50	39	68	79	133	48	44	31	45	33	681

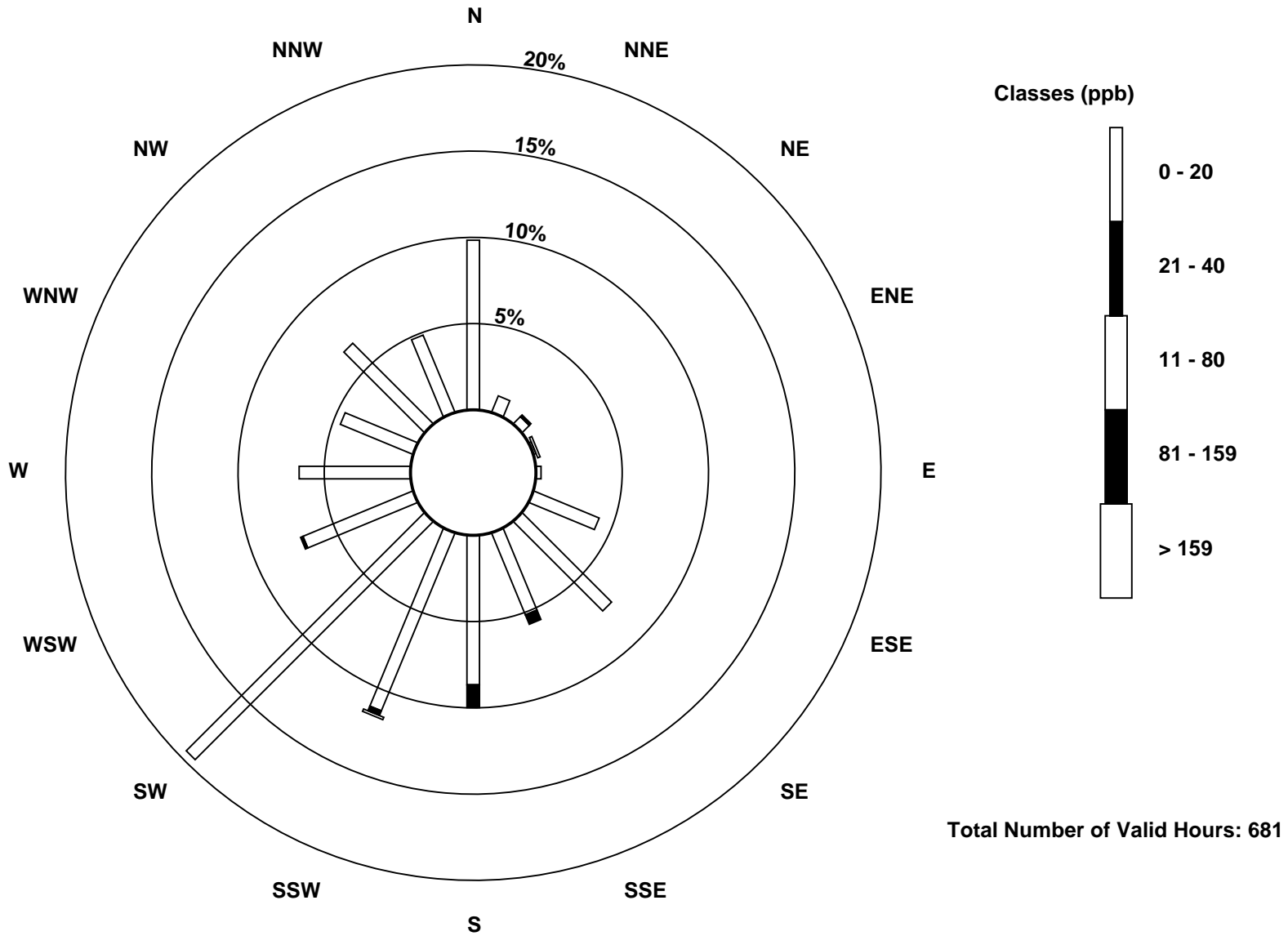
Total Number of Valid Hours: 681

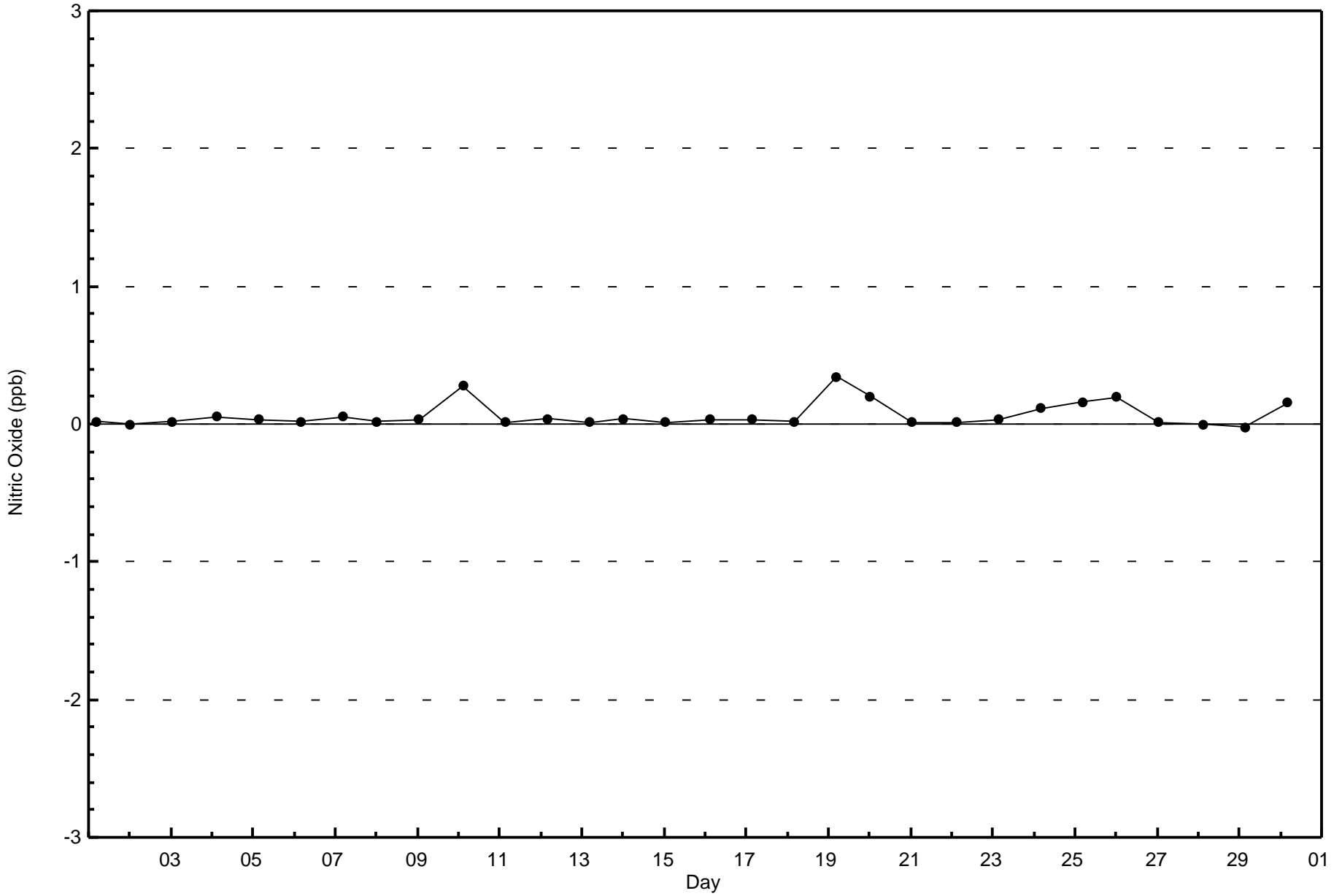
Total Number of Hours: 720

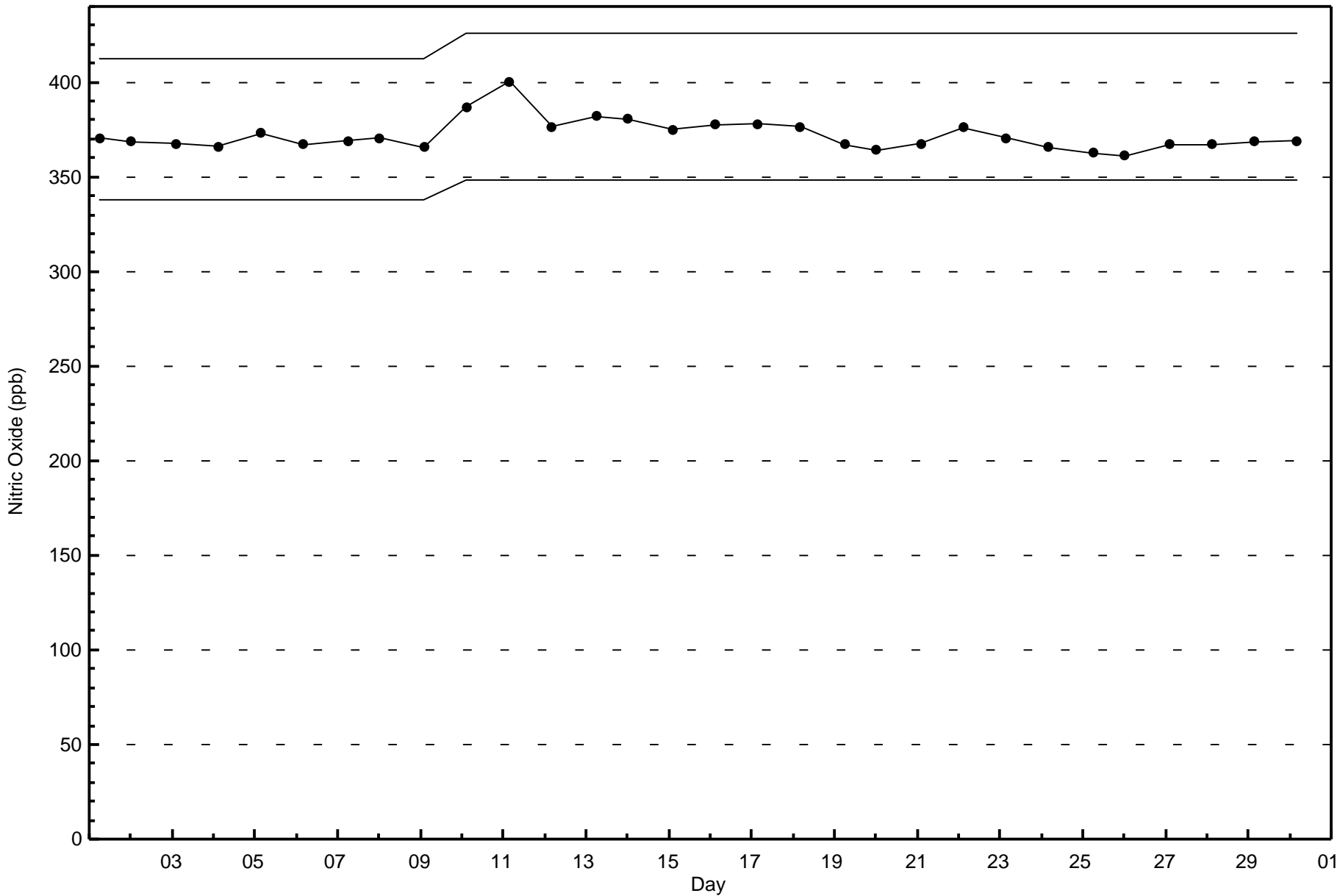


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

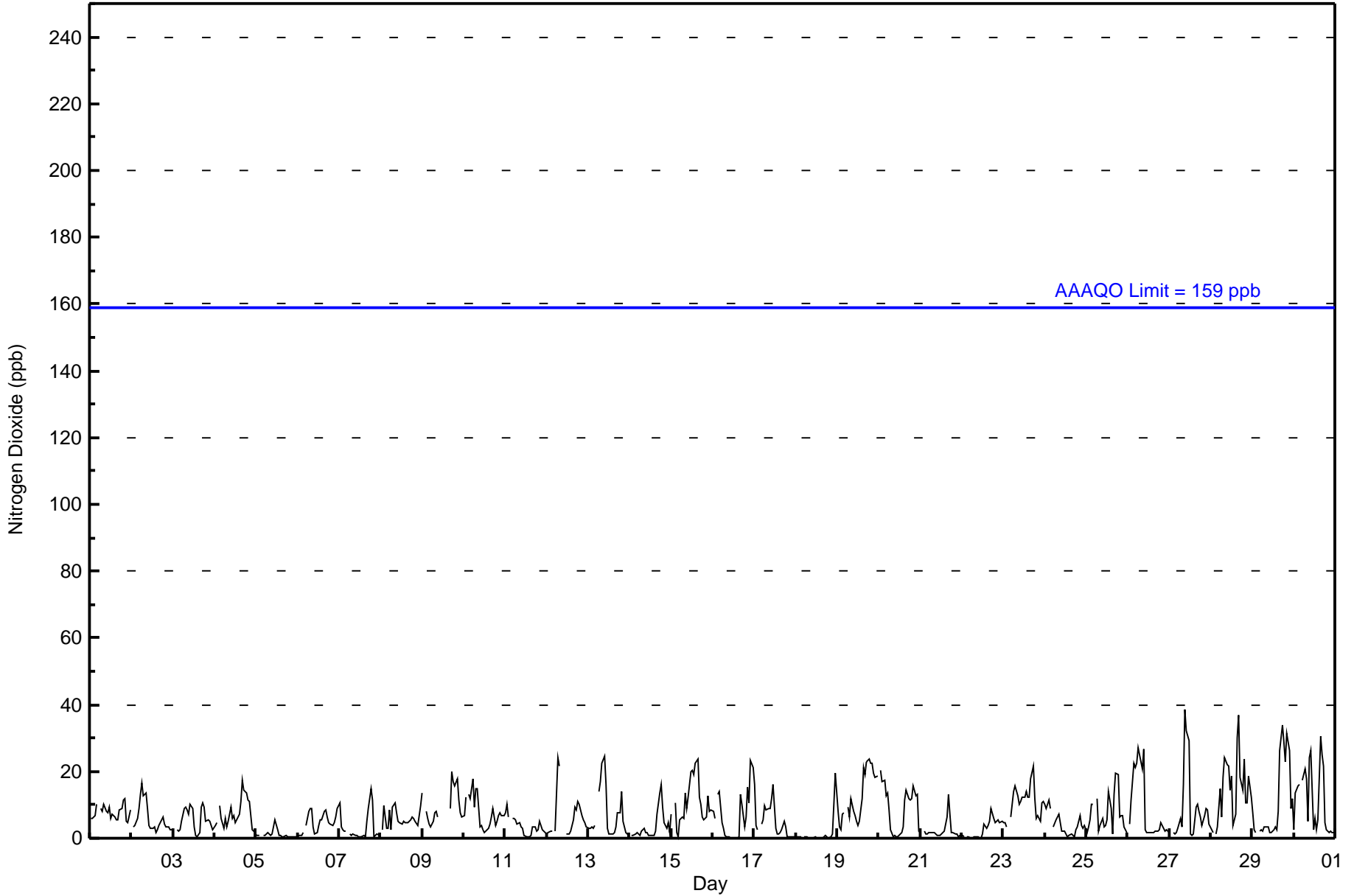
Patricia McInnes - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 39 ppb on Nov 27 10:00	Maximum Daily Average: 14.6 ppb on Nov 28		Hours of Data:	681
Minimum Value: 0 ppb on Nov 16 11:00	Minimum Daily Average: 1.2 ppb on Nov 5		Hours of Missing Data:	39
Maximum Diurnal Average: 10.8 ppb at hour 18	Minimum Diurnal Average: 3.7 ppb at hour 14		Hours of Calibration:	36
Monthly Average: 6.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 10 P ₉₀ = 17 P ₉₉ = 30		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-Nov	6	6	7	7	10	Z	9	8	10	8	8	10	6	7	6	6	5	9	9	11	12	5	5	9	7.6	12
2-Nov	Z	4	4	6	9	13	17	13	14	9	4	3	3	3	2	3	4	6	6	4	3	3	2	3	5.9	17
3-Nov	3	Z	3	2	3	5	9	9	9	7	10	9	4	1	1	2	9	11	9	5	6	5	4	3	5.5	11
4-Nov	4	5	Z	10	6	3	6	4	5	9	6	7	5	6	7	11	17	14	14	12	11	7	3	2	7.4	17
5-Nov	1	1	1	Z	1	1	1	2	1	1	4	5	2	1	1	1	0	1	1	0	1	0	0	0	1.2	5
6-Nov	0	1	1	2	Z	4	8	9	9	4	1	2	4	5	6	8	8	6	5	4	4	5	7	9	4.8	9
7-Nov	11	4	3	2	2	Z	1	1	1	1	1	1	1	0	1	1	5	9	15	12	1	1	1	1	3.2	15
8-Nov	Z	3	10	3	3	9	3	10	11	8	5	5	4	5	5	5	5	5	7	6	5	4	7	10	5.8	11
9-Nov	14	Z	8	6	4	3	5	8	8	7	C	C	C	C	C	C	9	20	17	16	18	11	8	6	--	20
10-Nov	7	12	Z	13	12	18	10	15	15	3	4	3	2	2	3	4	7	9	4	5	7	8	7	7	7.5	18
11-Nov	8	10	7	Z	6	6	5	4	5	3	3	1	0	0	0	1	3	4	2	3	5	2	2	2	3.6	10
12-Nov	1	2	2	2	Z	2	24	22	M	M	M	1	1	1	2	6	9	8	11	10	7	6	5	3	6.3	24
13-Nov	3	3	3	3	4	Z	14	17	22	25	16	3	1	1	1	2	4	8	8	14	5	4	2	1	7.0	25
14-Nov	Z	1	1	1	2	1	1	2	3	2	2	1	1	1	1	2	7	13	16	9	5	3	5	2	3.5	16
15-Nov	7	Z	11	2	1	5	6	6	14	9	12	20	21	19	23	24	12	10	6	6	6	13	8	9	10.8	24
16-Nov	8	6	Z	13	14	5	3	1	0	0	0	0	0	0	0	0	13	10	3	6	15	10	23	21	6.7	23
17-Nov	16	4	3	Z	4	6	10	9	9	9	12	16	3	1	1	2	3	5	3	1	1	0	0	0	5.0	16
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	10	19	1.6	19
19-Nov	8	3	3	7	8	Z	10	6	12	8	7	5	4	5	12	21	19	23	24	23	22	20	18	19	12.4	24
20-Nov	Z	20	17	18	13	13	8	3	0	1	0	1	1	2	4	12	15	12	12	12	16	13	13	2	9.0	20
21-Nov	2	Z	2	1	1	2	2	2	2	1	1	1	1	2	2	7	13	7	2	2	1	1	1	1	2.4	13
22-Nov	1	0	Z	0	0	0	0	0	0	0	0	0	1	4	3	4	5	9	6	5	5	6	5	5	2.6	9
23-Nov	5	5	4	Z	6	10	14	16	13	10	11	12	12	14	12	12	18	22	12	6	7	5	11	11	10.7	22
24-Nov	10	9	11	9	Z	4	6	6	7	5	2	2	1	1	1	1	1	0	2	3	7	4	3	4	4.3	11
25-Nov	2	4	6	10	10	Z	12	2	4	6	4	4	6	14	9	1	13	20	19	7	7	7	3	2	7.3	20
26-Nov	Z	4	11	23	21	22	27	25	21	27	3	2	2	2	2	2	2	2	3	5	4	2	3	2	9.3	27
27-Nov	2	Z	2	1	2	3	6	4	16	39	32	29	1	1	1	9	10	8	6	4	7	9	9	4	8.9	39
28-Nov	3	2	Z	1	3	15	7	18	24	22	22	14	19	4	7	30	37	18	15	24	11	11	19	12	14.6	37
29-Nov	8	2	2	Z	2	3	2	3	4	4	2	2	2	4	3	8	26	34	29	23	31	26	9	12	10.4	34
30-Nov	3	14	16	16	Z	17	21	18	5	24	26	2	6	2	6	31	25	21	5	2	2	2	2	2	11.6	31

5.2	4.9	5.3	6.3	5.9	6.8	8.2	8.0	8.4	8.7	7.0	5.5	3.9	3.7	4.2	7.3	10.2	10.8	9.0	7.9	7.6	6.4	6.4	6.0	Diurnal Average	
16	20	17	23	21	22	27	25	24	39	32	29	21	19	23	31	37	34	29	24	31	26	23	21	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	638	93.69	93.69
21 - 40	43	6.31	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	62	7	5	1	2	26	47	32	56	75	130	47	44	31	42	31	638
21 - 40	5	0	0	1	0	2	3	7	12	4	3	1	0	0	3	2	43
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	7	5	2	2	28	50	39	68	79	133	48	44	31	45	33	681

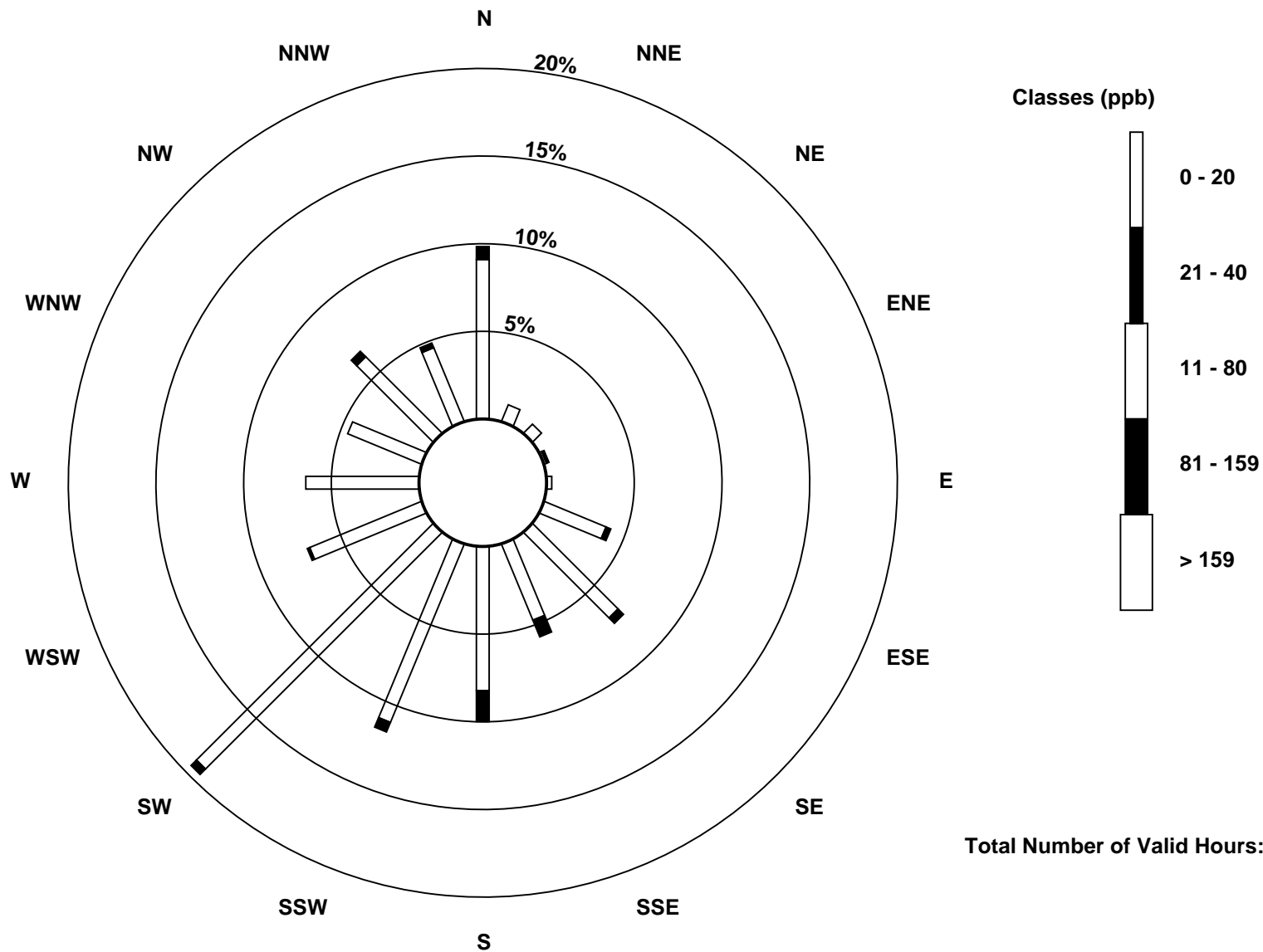
Total Number of Valid Hours: 681

Total Number of Hours: 720

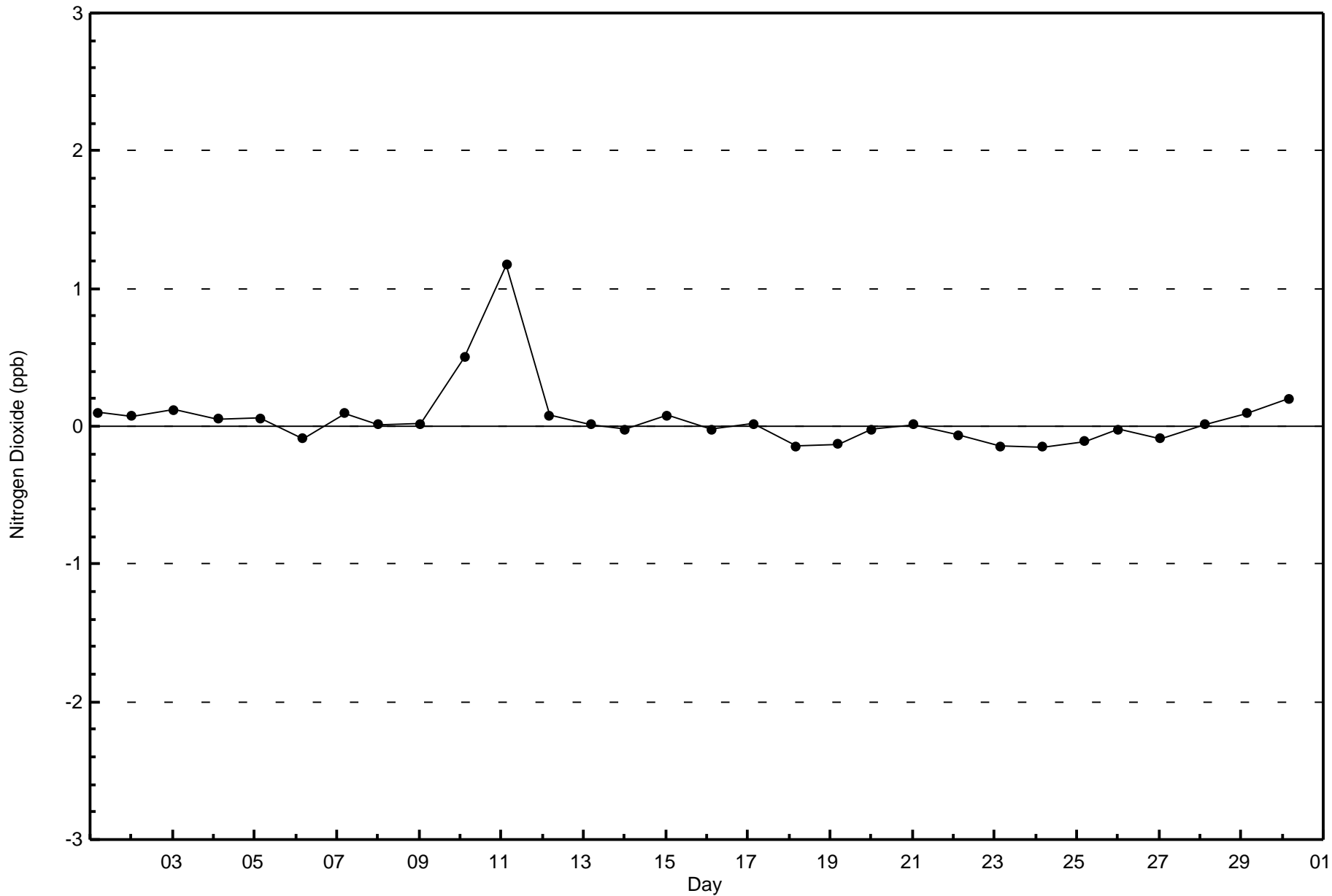


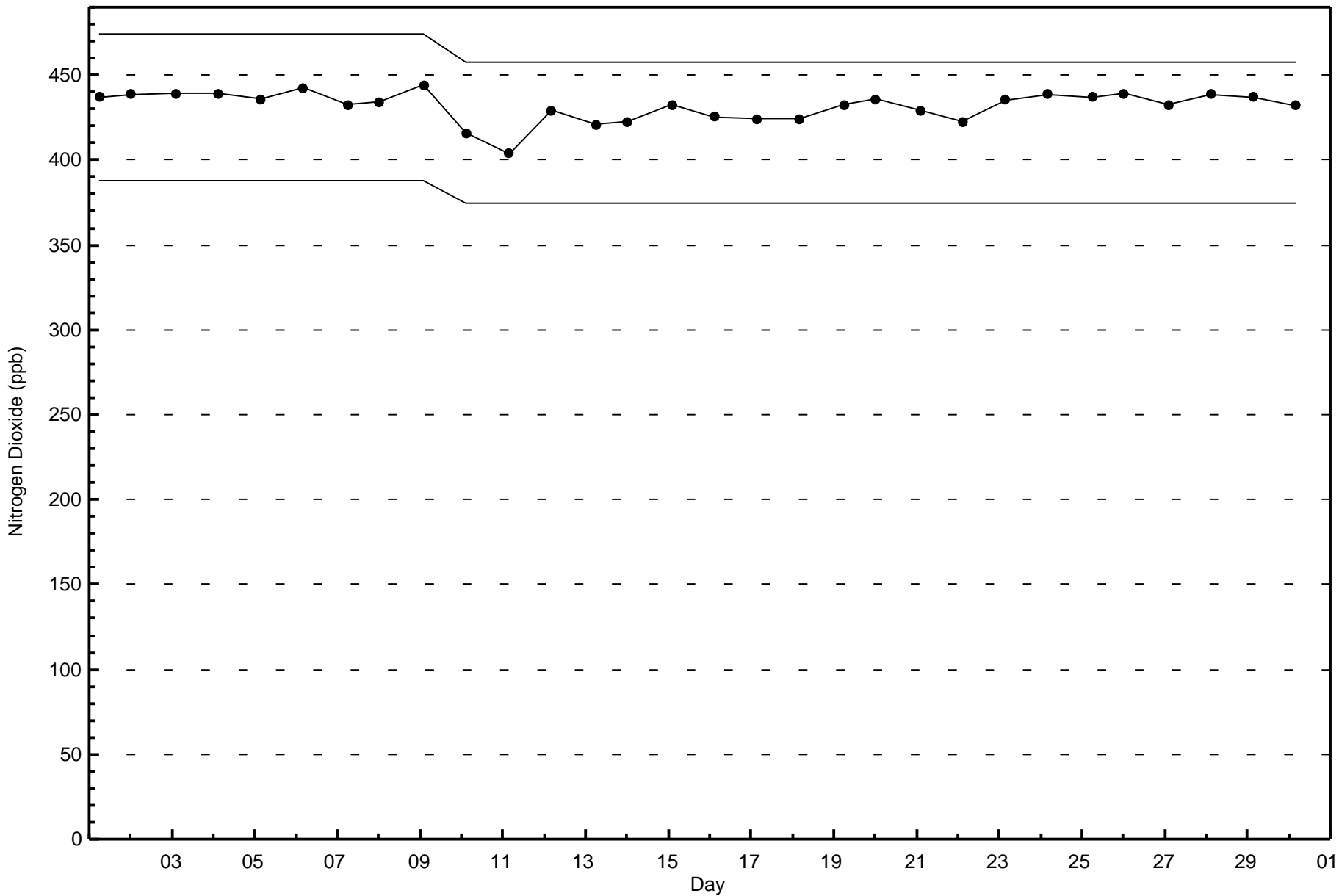
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



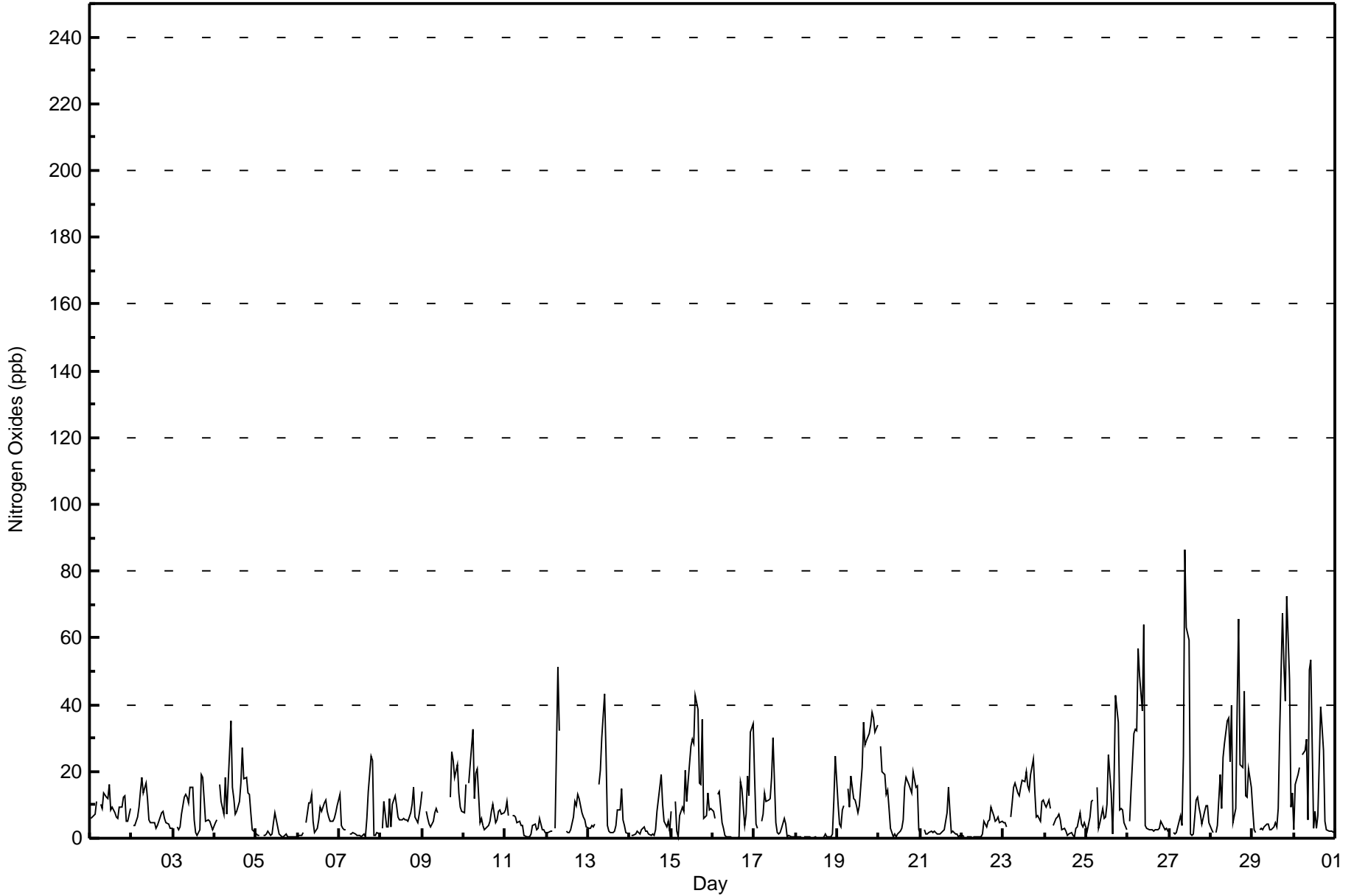
Total Number of Valid Hours: 681







Maximum Value: 87 ppb on Nov 27 10:00		Maximum Daily Average: 21.4 ppb on Nov 28		Hours in Service: 720																																													
Minimum Value: 0 ppb on Nov 18 16:00		Minimum Daily Average: 1.4 ppb on Nov 5		Hours of Data: 681																																													
Maximum Diurnal Average: 15.7 ppb at hour 10		Minimum Diurnal Average: 5.5 ppb at hour 14		Hours of Missing Data: 39																																													
Monthly Average: 9.6 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 12 P ₉₀ = 23 P ₉₉ = 58		Hours of Calibration: 36																																													
				Percent Operational Time: 99.6																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	6	6	7	7	11	Z	10	9	14	12	12	16	8	9	8	6	6	9	9	12	13	5	5	9	9.2	16																							
2-Nov	Z	4	4	6	9	14	18	14	17	12	5	4	5	5	3	4	5	7	8	6	5	4	3	3	7.1	18																							
3-Nov	3	Z	3	3	3	7	12	13	12	11	15	15	6	2	1	2	19	18	12	5	6	5	4	3	7.8	19																							
4-Nov	4	6	Z	16	11	7	18	7	17	35	15	12	7	8	11	16	27	18	18	14	13	8	3	2	12.8	35																							
5-Nov	1	1	1	Z	1	1	1	2	1	1	5	7	3	1	1	0	0	1	1	0	0	0	0	0	1.4	7																							
6-Nov	0	1	1	2	Z	5	11	11	13	5	1	3	6	9	8	11	11	8	6	5	5	6	7	10	6.3	13																							
7-Nov	13	4	3	3	3	Z	1	1	2	1	1	1	1	1	1	1	6	14	25	23	1	1	2	1	4.7	25																							
8-Nov	Z	3	11	3	4	12	3	10	13	10	6	5	6	6	5	5	5	8	10	15	6	5	7	10	7.4	15																							
9-Nov	14	Z	8	6	4	3	5	8	9	7	C	C	C	C	C	C	12	26	23	18	22	14	9	8	--	26																							
10-Nov	8	16	Z	16	22	33	12	19	21	5	6	4	3	3	4	5	8	10	5	6	8	8	7	7	10.2	33																							
11-Nov	9	11	7	Z	7	7	6	5	5	4	4	1	0	0	0	1	4	4	3	3	6	3	2	2	4.0	11																							
12-Nov	2	2	2	2	Z	3	51	32	M	M	M	2	2	2	3	6	11	10	13	12	8	6	5	3	8.8	51																							
13-Nov	3	3	4	3	4	Z	16	20	30	43	25	4	2	2	2	2	4	8	9	15	5	4	2	1	9.2	43																							
14-Nov	Z	1	1	1	2	2	1	2	3	2	2	1	1	1	2	8	15	19	10	5	3	5	2	4.1	19																								
15-Nov	8	Z	11	2	1	7	9	8	20	11	17	28	30	28	43	39	16	16	36	6	7	13	8	9	16.2	43																							
16-Nov	8	6	Z	13	14	5	3	1	0	0	0	0	0	0	0	0	17	15	4	7	18	13	32	34	8.3	34																							
17-Nov	18	4	3	Z	5	7	14	11	12	12	18	30	5	2	1	2	3	6	4	1	1	0	0	0	7.0	30																							
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	12	25	1.9	25																							
19-Nov	10	4	3	9	10	Z	15	9	19	12	12	10	8	10	21	35	28	29	31	34	38	36	32	34	19.5	38																							
20-Nov	Z	28	20	19	13	14	9	3	1	1	0	1	2	3	6	15	18	16	15	14	20	15	16	3	10.9	28																							
21-Nov	2	Z	2	1	1	2	2	2	2	2	1	1	2	2	3	8	15	8	2	2	1	1	1	1	2.8	15																							
22-Nov	1	0	Z	0	0	0	0	0	1	0	0	0	1	5	3	5	5	9	7	5	5	6	5	5	2.9	9																							
23-Nov	5	5	3	Z	6	10	15	17	13	13	15	17	17	20	16	14	19	24	14	6	7	5	11	11	12.4	24																							
24-Nov	10	9	11	9	Z	4	6	6	7	5	3	3	2	1	1	2	1	0	3	4	7	4	4	5	4.7	11																							
25-Nov	2	4	6	11	11	Z	15	3	5	9	6	7	10	25	14	1	17	43	35	9	9	8	5	2	11.2	43																							
26-Nov	Z	5	14	31	33	32	57	49	38	64	4	3	3	3	2	2	3	3	3	5	4	2	3	2	15.9	64																							
27-Nov	2	Z	2	1	2	3	7	4	25	87	63	59	1	1	1	11	12	9	7	4	8	10	10	5	14.5	87																							
28-Nov	3	2	Z	2	4	19	9	24	29	35	36	23	40	5	9	40	66	22	21	44	13	12	21	15	21.4	66																							
29-Nov	8	3	2	Z	2	3	3	4	4	4	2	2	3	5	3	9	32	67	52	41	72	47	10	13	17.1	72																							
30-Nov	3	16	19	21	Z	25	26	30	6	50	53	3	8	3	7	39	33	26	5	3	2	2	2	1	16.7	53																							
																								5.8	5.7	6.0	7.6	7.3	9.0	11.9	10.8	11.6	15.7	11.8	9.1	6.3	5.5	6.1	9.8	13.8	15.0	13.3	11.0	10.5	8.4	7.7	7.6	Diurnal Average	
																								18	28	20	31	33	33	57	49	38	87	63	59	40	28	43	40	66	67	52	44	72	47	32	34	Diurnal Maximum	
Z - zerspan		C - Calibration				M - Maintenance																																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	603	88.55	88.55
21 - 40	59	8.66	97.21
41 - 80	18	2.64	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	7	4	0	1	26	42	26	48	72	128	47	41	30	41	31	603
21 - 40	7	0	1	1	1	2	8	9	11	4	5	0	3	1	4	2	59
11 - 80	1	0	0	0	0	0	0	4	9	3	0	1	0	0	0	0	18
81 - 159	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	7	5	2	2	28	50	39	68	79	133	48	44	31	45	33	681

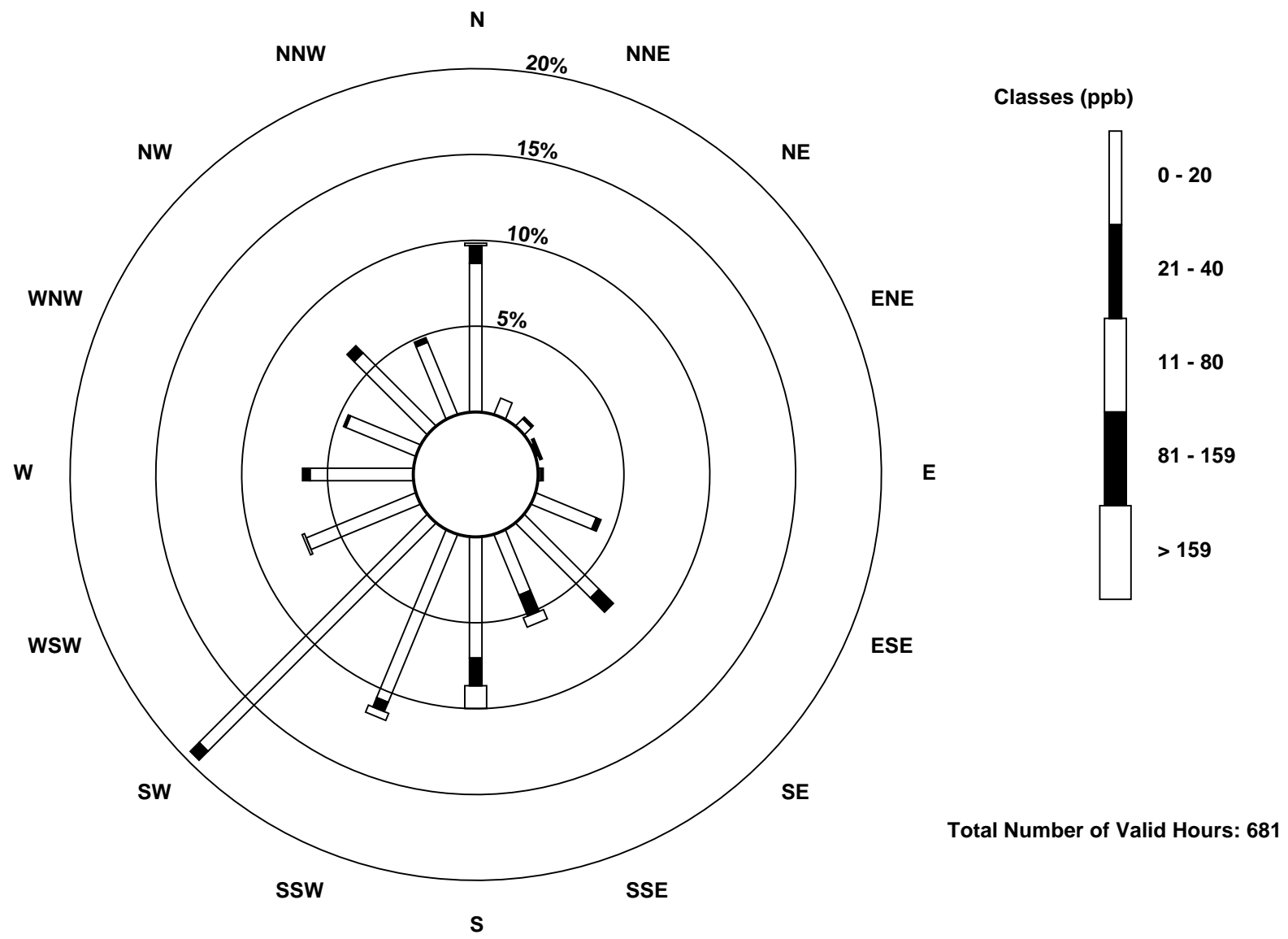
Total Number of Valid Hours: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

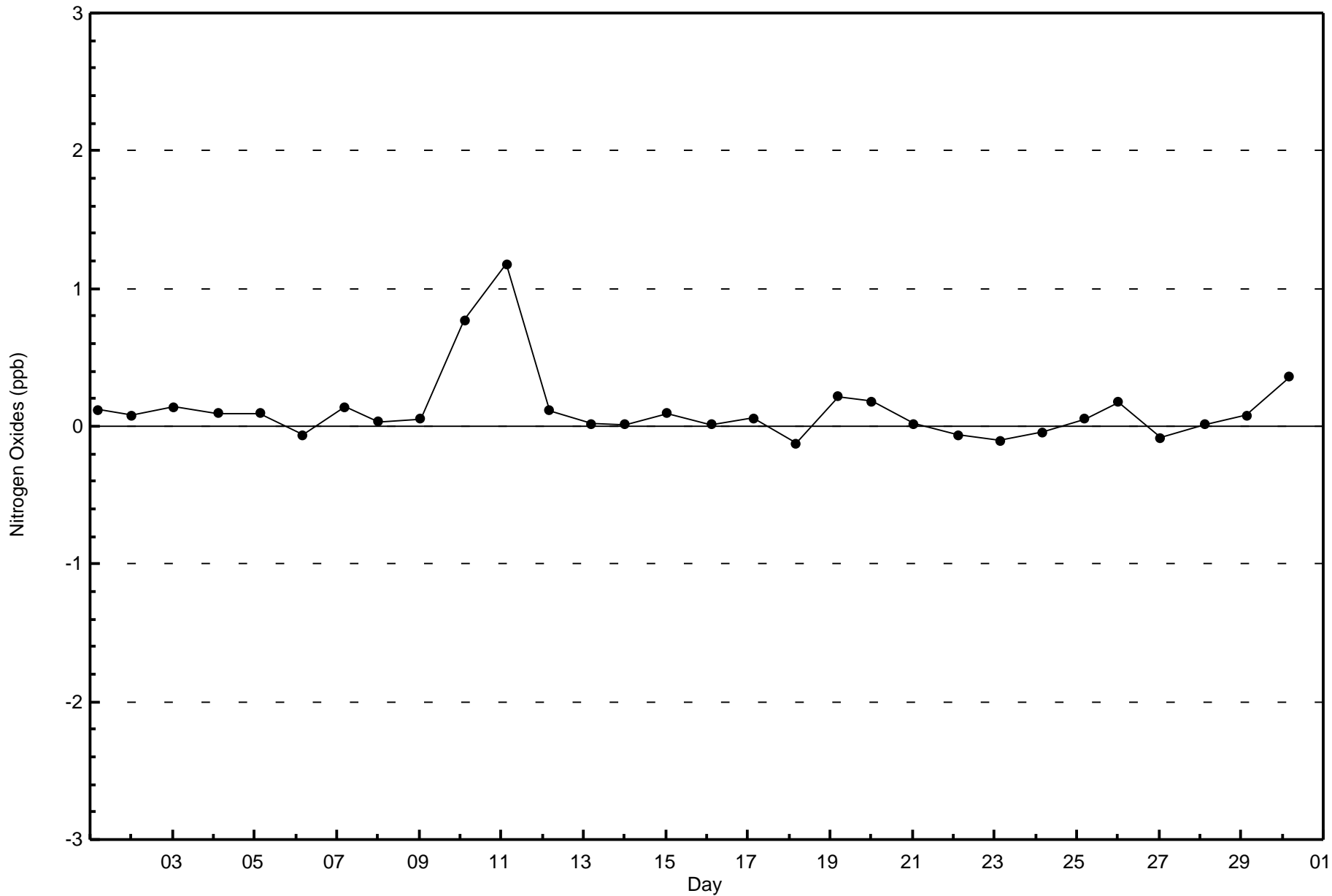
Nitrogen Oxides (NO_x) - ppb
Patricia McInnes (AMS 6)

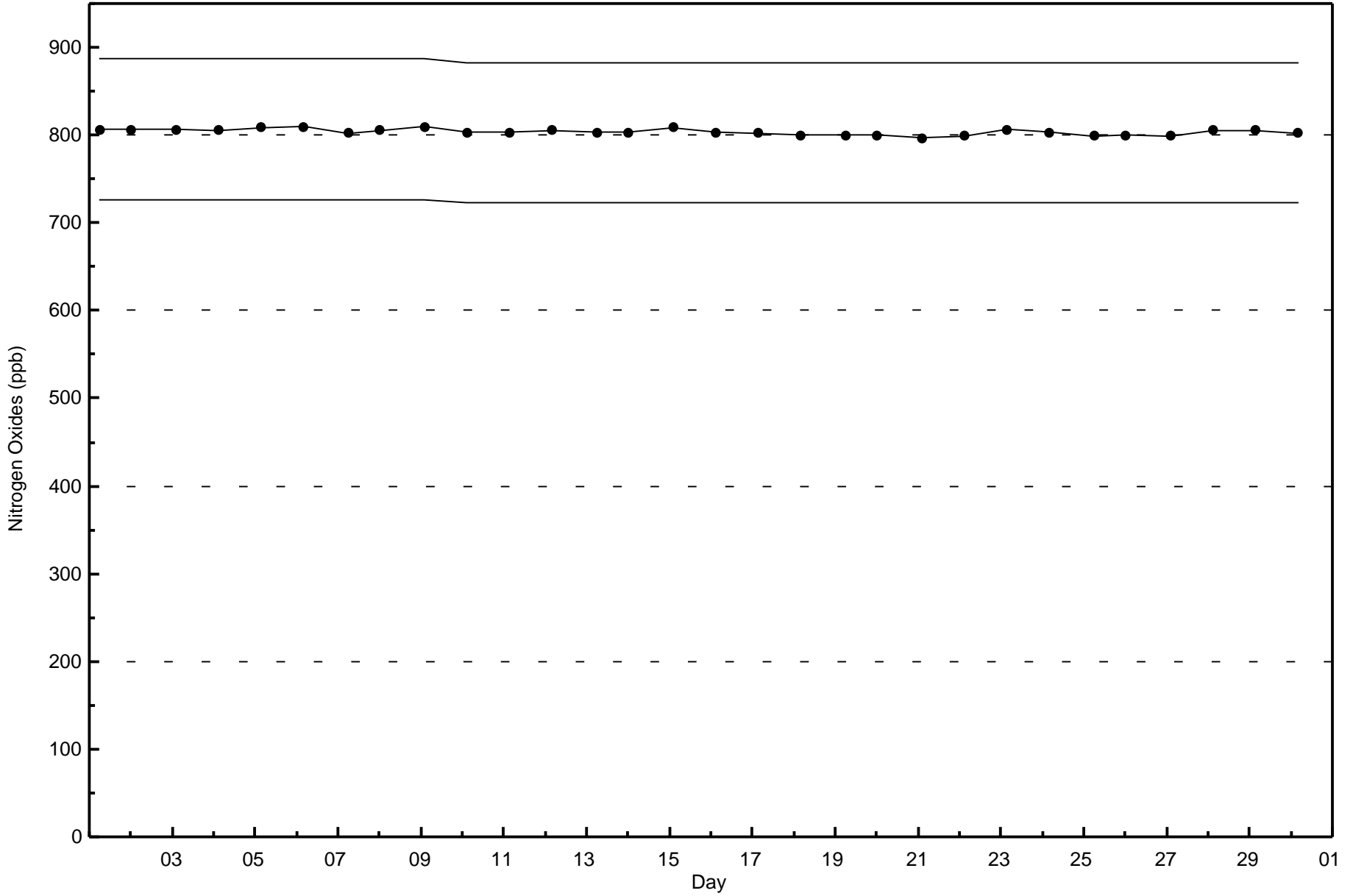




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - November 2015







Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 10 ppb on Nov 15 19:00	Maximum Daily Average: 0.5 ppb on Nov 15	Hours in Service: 720	Hours of Data: 627	Hours of Missing Data: 93	Hours of Calibration: 43	Percent Operational Time: 93.1
Minimum Value: 0 ppb on Nov 1 01:00	Maximum Diurnal Average: 0.4 ppb at hour 19	Monthly Average: 0.0 ppb	Minimum Daily Average: 0.0 ppb on Nov 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-Nov	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
2-Nov	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
3-Nov	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
4-Nov	0	0	0	0	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-Nov	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
6-Nov	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
7-Nov	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
8-Nov	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
9-Nov	0	0	0	Z	RE	0	0	0	0	0	C	C	C	C	C	M	M	M	M	M	M	M	M	M	M	--	0
10-Nov	M	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C	C	C	C	0	--	0
11-Nov	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
12-Nov	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
13-Nov	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
14-Nov	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
15-Nov	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0.5	10
16-Nov	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
17-Nov	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
18-Nov	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
19-Nov	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
20-Nov	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
21-Nov	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
22-Nov	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
23-Nov	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
24-Nov	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
25-Nov	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
26-Nov	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
27-Nov	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
28-Nov	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
29-Nov	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
30-Nov	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

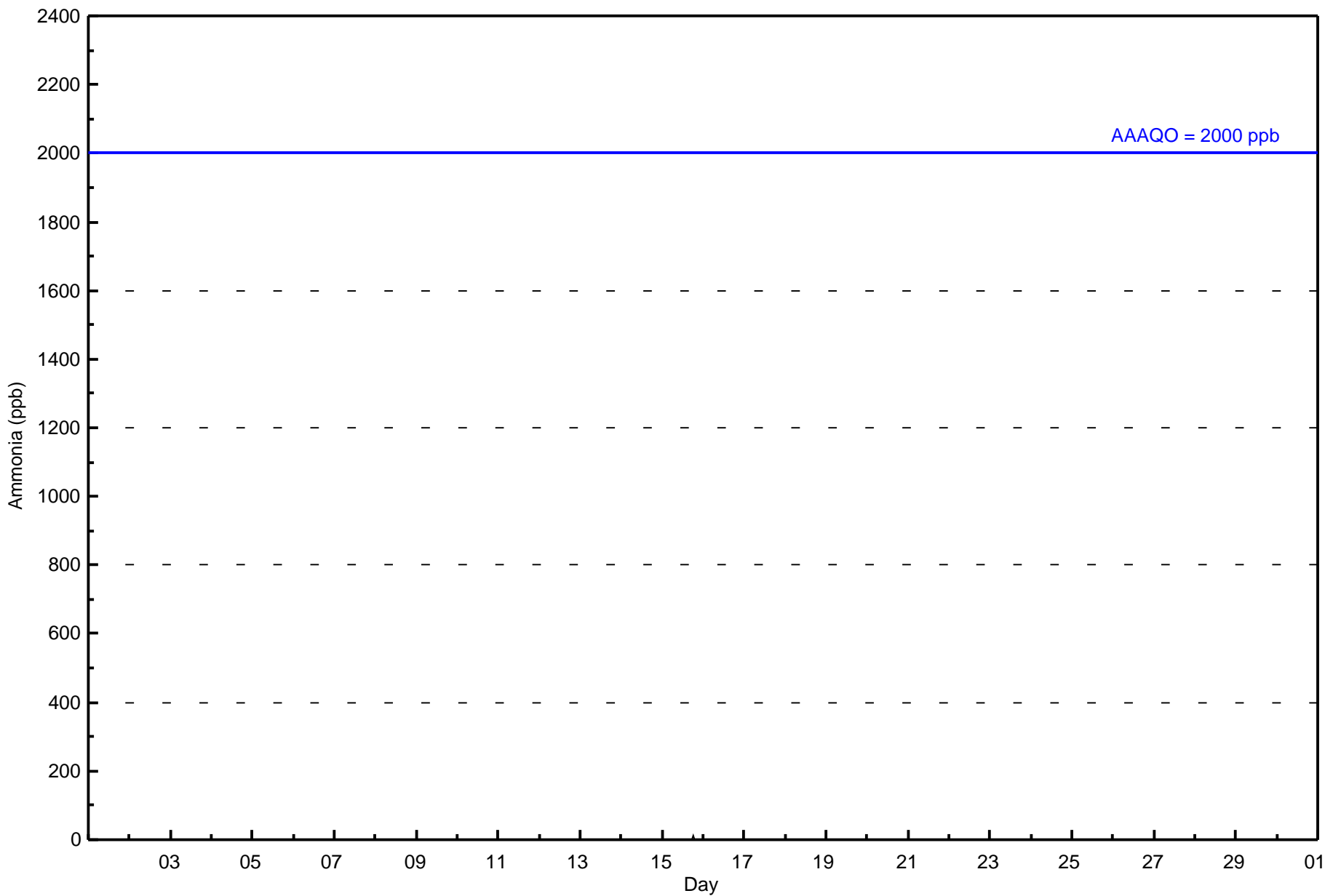
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	Diurnal Maximum

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
Patricia McInnes - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	626	99.84	99.84
6 - 10	1	0.16	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: 627

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	64	7	4	2	2	23	41	33	56	75	130	42	42	30	41	34	626
6 - 10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	64	7	5	2	2	23	41	33	56	75	130	42	42	30	41	34	627

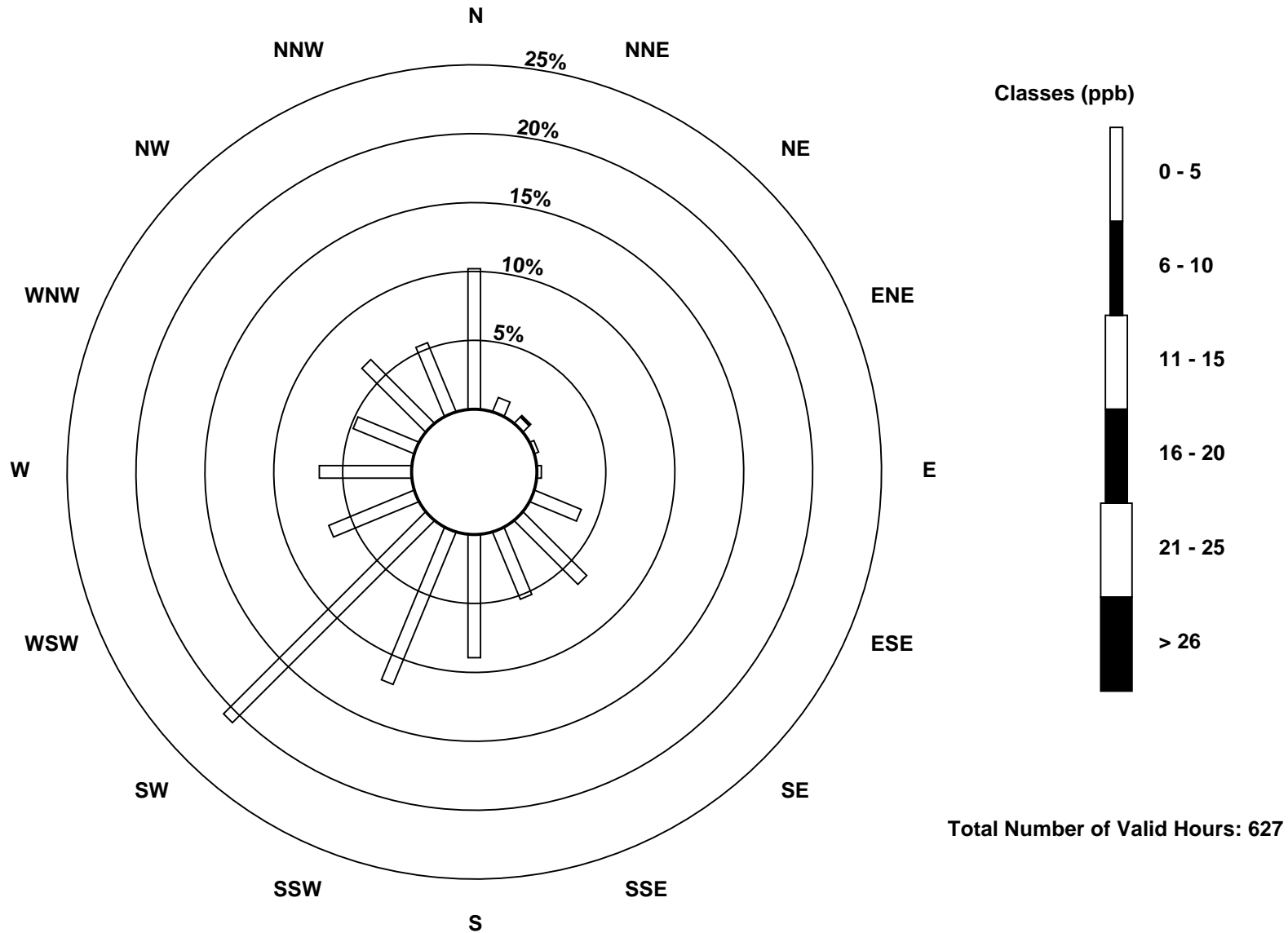
Total Number of Valid Hours: 627

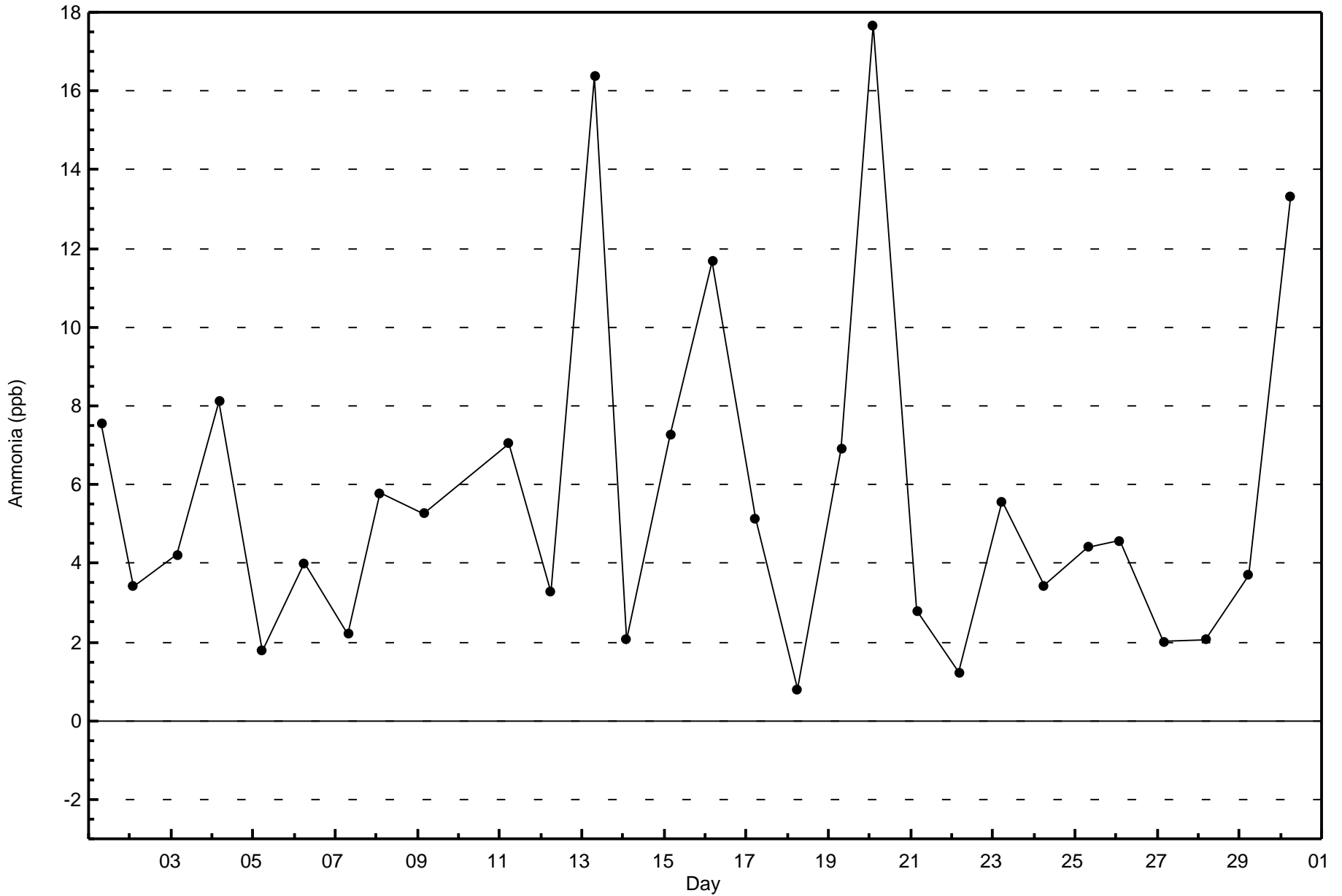
Total Number of Hours: 720

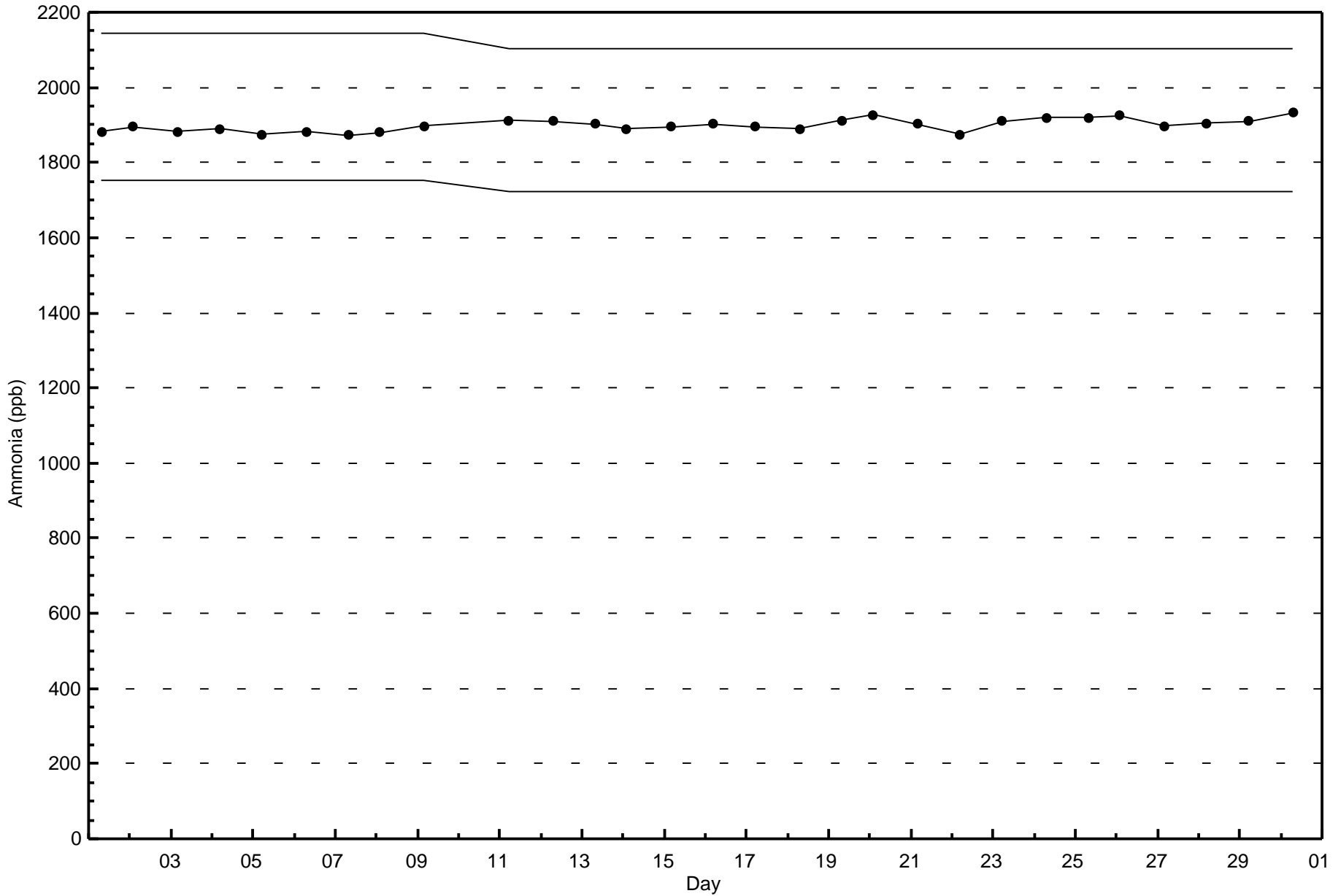


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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







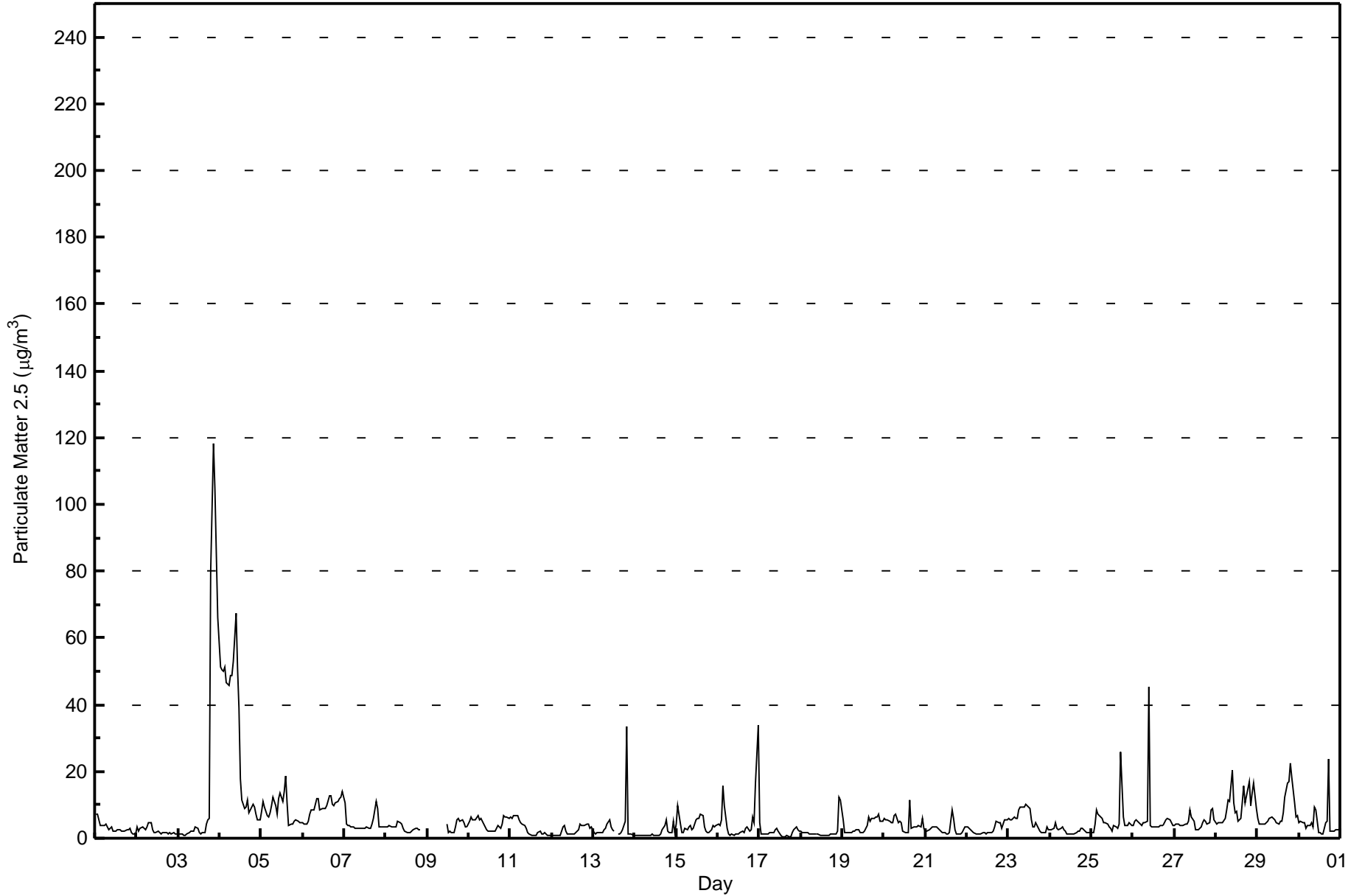


Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 118.2 µg/m ³ on Nov 3 21:00	Maximum Daily Average: 29.8 µg/m ³ on Nov 4	Hours of Data:	705
Minimum Value: 0.5 µg/m ³ on Nov 17 15:00	Minimum Daily Average: 1.6 µg/m ³ on Nov 14	Hours of Missing Data:	15
Maximum Diurnal Average: 8.4 µg/m ³ at hour 20	Minimum Diurnal Average: 3.3 µg/m ³ at hour 14	Hours of Calibration:	1
Monthly Average: 5.81 µg/m ³	Percentiles: P ₁ = 0.8 P ₁₀ = 1.3 Q ₁ = 1.8 Median = 3.5 Q ₃ = 5.6 P ₉₀ = 9.9 P ₉₉ = 45.8	Percent Operational Time:	98.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	7.4	7.4	5.5	3.7	3.9	3.9	4.1	3.4	2.5	3.4	2.2	2.2	2.2	2.5	2.6	2.1	2.1	2.2	2.4	2.7	3.0	1.6	1.1	1.5	3.1	7.4
2-Nov	3.2	2.1	3.0	3.4	3.1	2.7	3.4	4.7	4.6	2.6	1.9	1.8	1.9	1.7	1.2	1.8	1.8	1.7	1.4	1.5	1.5	1.5	1.4	1.2	2.3	4.7
3-Nov	1.1	1.1	1.1	0.9	1.0	1.2	1.8	2.0	2.2	2.0	3.4	3.0	1.6	1.3	1.6	1.7	4.0	5.5	6.1	79.6	118.2	104.8	85.3	66.1	20.7	118.2
4-Nov	51.4	50.3	49.9	51.2	46.7	45.8	48.6	48.5	53.0	67.3	50.9	39.0	17.8	11.2	9.0	9.2	11.6	7.8	9.2	10.0	9.5	7.2	5.4	5.4	29.8	67.3
5-Nov	8.2	11.1	9.2	6.7	6.2	7.5	9.5	12.2	9.6	7.2	12.0	13.5	10.8	13.9	18.9	10.7	3.9	4.0	4.2	5.0	5.4	5.2	4.9	4.5	8.5	18.9
6-Nov	4.5	4.4	4.4	5.1	7.1	8.4	8.6	10.1	11.9	11.8	8.4	8.8	8.8	8.8	9.6	12.9	12.8	10.1	9.6	10.6	10.8	11.7	12.3	13.9	9.4	13.9
7-Nov	10.5	4.1	3.7	3.7	3.6	3.4	3.1	3.0	2.9	2.8	2.8	2.8	2.8	3.3	3.1	2.8	4.4	6.1	11.1	9.0	3.3	3.5	3.6	3.5	4.3	11.1
8-Nov	3.4	3.5	3.7	3.4	3.2	3.4	3.2	5.1	4.5	4.3	2.9	2.3	1.9	1.8	1.8	1.9	2.3	3.0	3.0	2.6	2.4	AF	AF	AF	3.0	5.1
9-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4.1	1.8	2.0	1.5	1.6	3.2	5.4	6.0	5.1	5.6	4.5	3.2	3.6	--	6.0
10-Nov	4.9	6.4	5.4	5.5	5.6	6.9	5.7	5.9	5.0	3.4	2.7	2.1	2.0	2.1	2.2	2.2	3.0	4.0	3.1	4.2	6.8	6.2	6.3	6.0	4.5	6.9
11-Nov	6.3	6.1	6.9	6.8	6.9	5.6	4.6	4.3	3.7	2.9	1.9	1.1	0.9	0.9	0.9	0.9	1.8	1.9	1.2	1.3	1.5	1.0	0.9	0.9	3.0	6.9
12-Nov	1.0	1.0	1.0	0.9	0.9	0.9	3.3	3.6	1.9	1.2	1.3	1.3	1.4	1.3	1.9	2.7	4.1	4.0	3.9	4.0	4.1	4.4	2.9	3.4	2.3	4.4
13-Nov	1.5	1.4	1.5	1.6	1.7	1.8	2.6	2.9	4.2	5.3	3.5	2.6	2.0	C	1.3	1.3	1.9	2.6	5.3	33.3	1.4	1.3	1.1	0.9	3.6	33.3
14-Nov	0.8	0.9	0.8	0.9	0.9	0.9	0.9	1.0	0.9	1.2	0.8	0.9	0.9	0.9	1.0	1.1	2.4	3.7	5.5	2.0	1.6	1.8	4.9	1.6	1.6	5.5
15-Nov	4.3	9.6	4.2	1.7	1.8	2.9	2.4	3.2	3.7	2.5	3.1	5.6	5.7	6.0	7.1	7.0	3.4	2.1	1.7	1.7	2.5	3.9	3.5	3.8	3.9	9.6
16-Nov	4.0	3.7	5.3	15.8	9.6	2.8	1.4	1.0	1.4	1.0	1.1	1.3	1.4	1.6	2.0	1.9	2.9	3.3	2.3	2.5	6.3	4.8	16.7	34.1	5.3	34.1
17-Nov	4.7	1.4	1.2	1.1	1.4	1.5	1.7	1.7	1.8	2.5	2.8	1.9	0.8	0.5	0.5	0.5	0.7	0.5	0.6	1.6	2.5	3.3	2.7	2.3	1.7	4.7
18-Nov	2.1	1.8	1.8	1.7	1.6	1.3	1.2	1.2	1.2	1.2	1.1	1.0	0.8	0.8	0.9	0.9	1.1	1.3	1.3	1.4	1.3	2.0	12.5	11.3	2.2	12.5
19-Nov	5.5	1.8	1.6	1.6	1.8	1.8	2.1	2.0	2.7	2.6	1.9	1.7	1.6	2.2	3.8	6.4	5.2	6.1	6.0	6.2	6.2	7.3	5.1	5.2	3.7	7.3
20-Nov	6.1	5.5	5.5	4.9	4.6	4.7	6.6	7.2	4.6	5.3	4.5	2.3	1.8	1.7	1.5	11.3	2.8	3.4	3.5	3.3	3.8	3.6	5.8	3.0	4.5	11.3
21-Nov	2.3	2.2	2.5	2.9	3.4	3.4	3.2	3.0	2.7	2.2	1.8	1.5	1.3	1.4	1.6	8.3	6.1	2.4	1.3	1.3	1.2	1.5	2.5	3.6	2.7	8.3
22-Nov	3.5	2.8	2.4	2.0	1.7	1.5	1.4	1.4	1.4	1.5	1.5	1.3	1.6	1.9	1.6	2.0	3.6	4.9	4.7	4.7	3.0	4.0	5.6	5.6	2.7	5.6
23-Nov	6.0	5.4	5.7	6.3	5.8	5.9	8.4	9.4	9.1	9.4	10.1	9.6	8.7	5.5	3.3	3.6	4.6	3.2	2.0	1.5	1.8	1.8	3.6	2.5	5.5	10.1
24-Nov	2.6	2.6	2.8	4.6	2.8	2.7	2.9	3.4	2.5	2.0	1.4	1.4	1.2	1.2	1.3	1.8	2.3	2.1	3.1	2.8	2.0	1.7	1.5	1.5	2.3	4.6
25-Nov	1.5	1.8	4.2	8.5	7.4	6.6	5.8	4.5	4.5	4.3	3.5	2.8	2.2	3.8	3.3	2.9	4.3	25.9	6.2	3.7	3.8	3.8	4.7	3.8	5.2	25.9
26-Nov	3.8	4.9	5.3	4.5	4.2	4.0	4.8	4.7	5.0	45.3	4.0	3.6	3.6	3.4	3.5	3.5	3.7	4.0	4.8	5.5	6.1	5.3	4.6	3.8	6.1	45.3
27-Nov	3.9	4.3	4.0	3.8	3.7	3.9	4.1	4.3	5.1	8.6	6.4	5.0	2.3	2.4	2.6	3.3	4.5	5.7	5.2	4.1	4.5	8.6	8.7	5.7	4.8	8.7
28-Nov	4.3	4.7	4.8	4.7	4.7	5.9	8.5	11.4	11.2	20.5	10.6	7.5	8.2	4.9	5.7	10.8	15.5	10.7	15.0	16.9	9.9	13.5	16.6	8.8	9.8	20.5
29-Nov	5.8	4.2	4.2	4.2	4.3	4.6	5.0	5.9	6.2	5.9	5.6	4.8	4.3	5.3	4.9	7.7	12.2	16.5	16.9	22.7	18.2	10.8	6.3	6.7	8.0	22.7
30-Nov	4.6	4.9	4.5	4.6	3.2	3.6	3.9	4.5	3.3	9.1	8.5	1.5	1.6	1.2	1.3	4.7	5.0	23.7	2.2	2.2	2.2	2.4	2.4	2.7	4.5	23.7

5.8	5.6	5.4	5.8	5.3	5.2	5.6	6.1	6.0	8.2	5.6	4.6	3.5	3.3	3.4	4.3	4.6	5.9	5.0	8.4	8.3	8.0	8.1	7.5	Diurnal Average	
51.4	50.3	49.9	51.2	46.7	45.8	48.6	48.5	53.0	67.3	50.9	39.0	17.8	13.9	18.9	12.9	15.5	25.9	16.9	79.6	118.2	104.8	85.3	66.1	Diurnal Maximum	

C - Calibration AF - Analyzer Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	482	68.37	68.37
6 - 15	148	20.99	89.36
16 - 25	13	1.84	91.21
26 - 80	18	2.55	93.76
> 81.0	3	0.43	94.18

Total Number of Valid Hours: 705

Total Number of Hours: 720



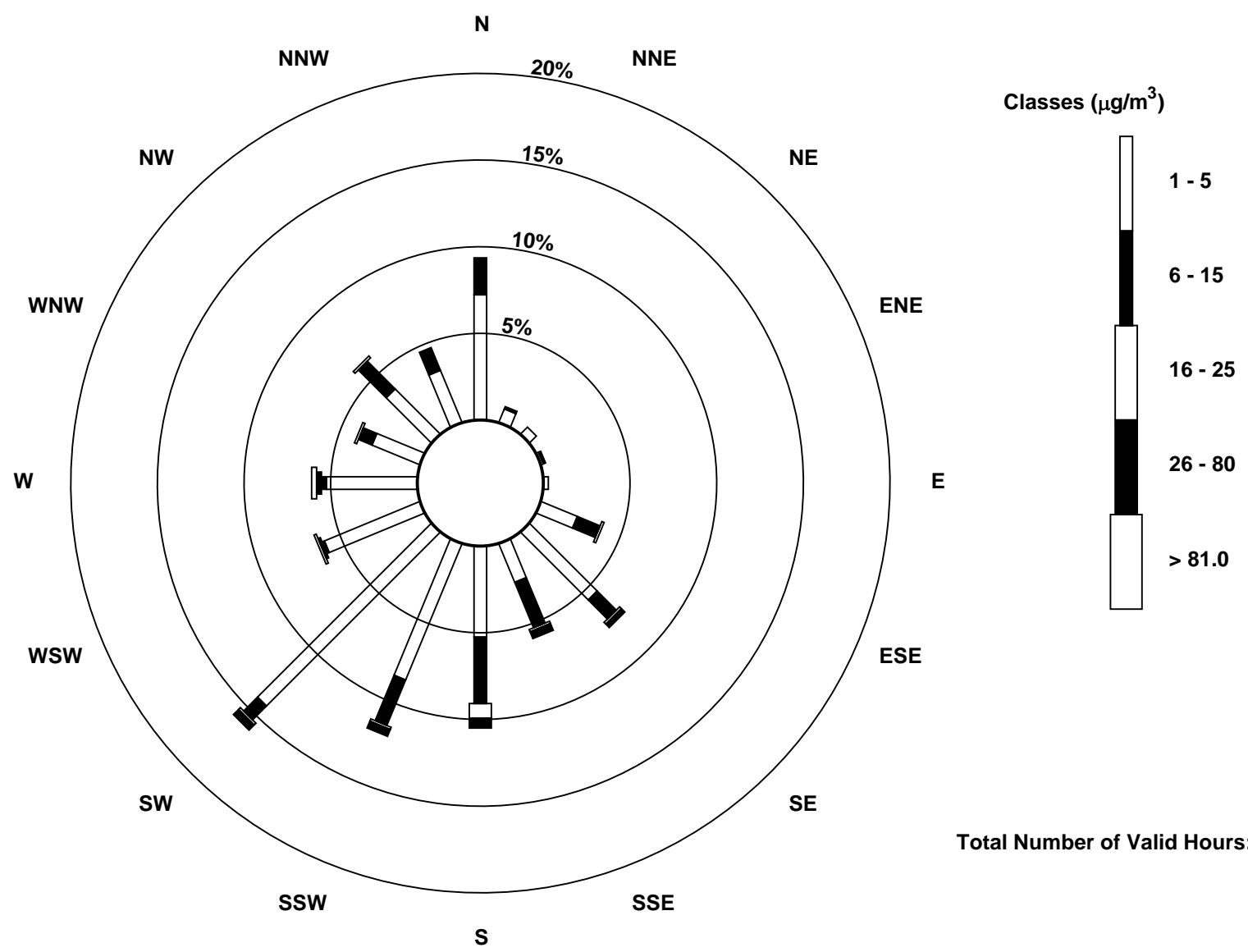
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	51	6	4	1	2	16	39	17	37	60	100	42	37	21	26	23	482
6 - 15	15	1	0	1	0	10	11	20	27	20	8	1	2	6	16	10	148
16 - 25	0	0	0	0	0	1	1	1	6	1	1	0	0	1	1	0	13
26 - 80	0	0	0	0	0	0	2	3	4	3	3	1	2	0	0	0	18
> 81.0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	3
Totals	66	7	4	2	2	27	53	41	74	84	112	45	43	28	43	33	664

Total Number of Valid Hours: 705

Total Number of Hours: 720





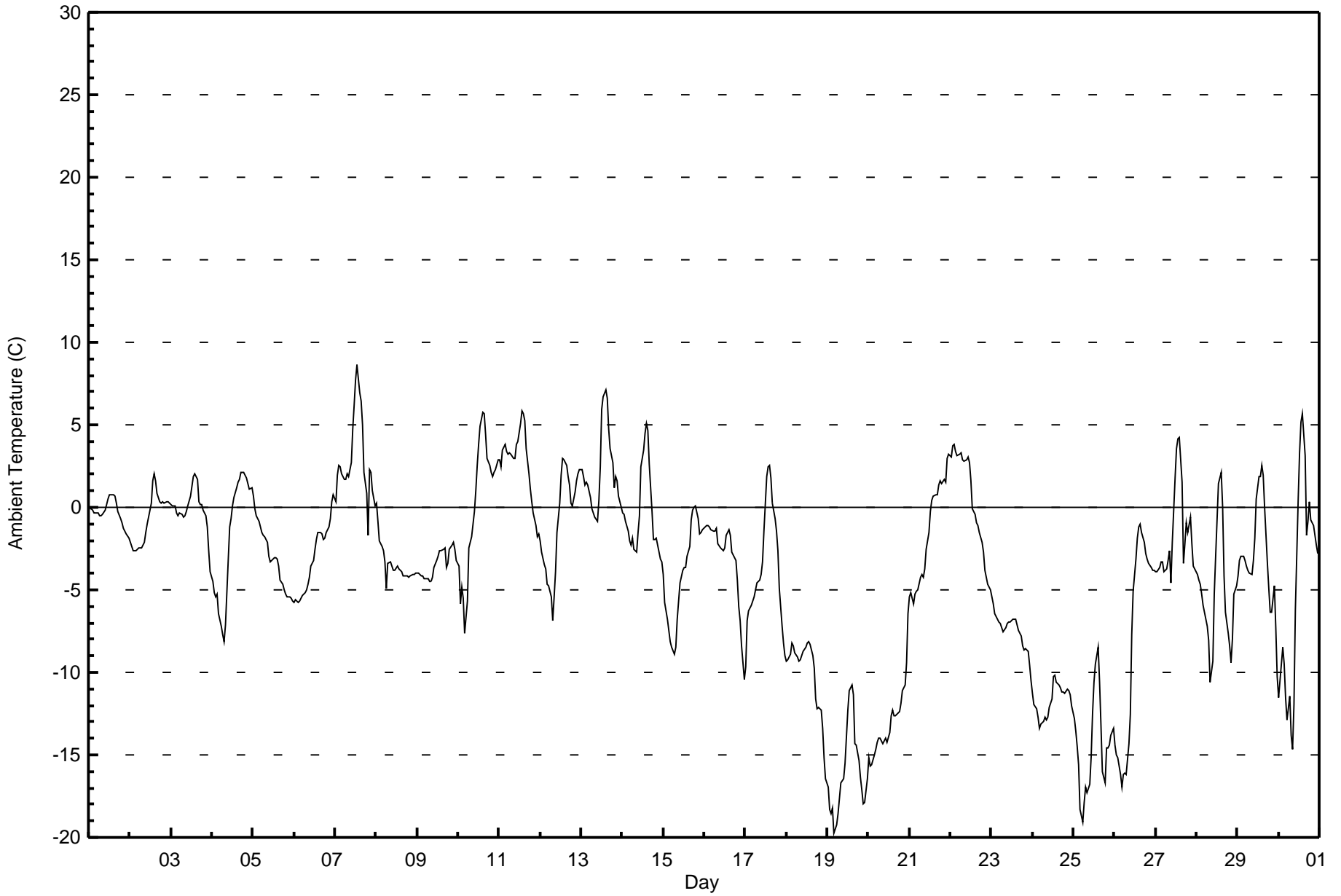
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Patricia McInnes - November 2015

Maximum Value: 8.7 C on Nov 7 14:00		Maximum Daily Average: 3.0 C on Nov 7		Hours in Service: 720																						
Minimum Value: -19.8 C on Nov 19 05:00		Minimum Daily Average: -16.0 C on Nov 19		Hours of Data: 720																						
Maximum Diurnal Average: -0.6 C at hour 15		Minimum Diurnal Average: -5.8 C at hour 6		Hours of Missing Data: 0																						
Monthly Average: -3.89 C		Percentiles: P ₁ = -18.3 P ₁₀ = -12.7 Q ₁ = -7.0 Median = -3.0 Q ₃ = 0.2 P ₉₀ = 2.5 P ₉₉ = 6.3		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-Nov	-0.1	-0.1	-0.2	-0.3	-0.4	-0.4	-0.5	-0.5	-0.4	-0.2	0.1	0.5	0.8	0.7	0.8	0.7	0.2	-0.3	-0.7	-1.0	-1.3	-1.4	-1.6	-1.8	-0.3	0.8
2-Nov	-2.1	-2.4	-2.6	-2.6	-2.5	-2.5	-2.5	-2.5	-2.1	-1.5	-1.0	-0.6	0.2	1.6	2.1	1.6	0.9	0.4	0.2	0.4	0.3	0.3	0.4	0.2	-0.7	2.1
3-Nov	0.2	0.0	0.0	-0.3	-0.5	-0.4	-0.4	-0.6	-0.5	-0.2	0.1	0.7	1.2	1.8	2.0	1.7	0.4	0.2	0.2	-0.1	-0.5	-1.2	-2.7	-3.9	-0.1	2.0
4-Nov	-4.5	-5.1	-5.4	-5.3	-6.5	-7.2	-7.7	-8.2	-7.1	-3.1	-1.2	-0.7	0.1	0.6	1.1	1.6	1.7	2.2	2.1	2.0	1.8	1.4	1.1	1.2	-1.9	2.2
5-Nov	0.7	-0.1	-0.5	-0.8	-1.2	-1.5	-1.7	-1.8	-2.1	-2.9	-3.3	-3.3	-3.1	-3.0	-3.2	-3.5	-4.4	-4.6	-5.0	-5.2	-5.4	-5.4	-5.5	-5.7	-3.0	0.7
6-Nov	-5.7	-5.6	-5.7	-5.7	-5.5	-5.3	-5.1	-5.0	-4.7	-4.2	-3.6	-3.2	-2.5	-1.9	-1.5	-1.5	-1.6	-2.0	-1.8	-1.5	-1.2	-0.6	0.4	0.8	-3.1	0.8
7-Nov	0.3	2.0	2.5	2.5	2.0	1.7	1.7	2.0	1.8	2.7	4.7	6.2	7.7	8.7	7.0	6.4	5.0	2.1	0.9	-1.7	2.3	2.1	1.0	0.1	3.0	8.7
8-Nov	0.3	-0.8	-2.0	-2.4	-2.6	-3.3	-4.9	-3.4	-3.3	-3.5	-3.8	-3.8	-3.6	-3.7	-3.8	-3.9	-4.1	-4.1	-4.1	-4.2	-4.1	-4.1	-4.1	-4.0	-3.4	0.3
9-Nov	-4.0	-4.0	-4.1	-4.2	-4.3	-4.4	-4.4	-4.5	-4.5	-4.3	-3.7	-3.2	-3.0	-2.7	-2.6	-2.5	-2.5	-3.7	-3.4	-2.5	-2.2	-2.1	-2.6	-3.2	-3.4	-2.1
10-Nov	-3.6	-5.8	-4.8	-5.5	-7.7	-5.7	-2.4	-2.2	-1.7	-0.2	1.0	2.5	3.8	4.9	5.8	5.7	4.4	2.9	2.5	2.1	1.9	2.1	2.3	2.8	0.2	5.8
11-Nov	2.9	2.5	3.4	3.8	3.4	3.2	3.3	3.2	2.9	2.9	3.8	4.0	5.1	5.9	5.7	5.2	3.6	2.1	1.1	0.3	-0.3	-1.1	-1.8	-1.6	2.6	5.9
12-Nov	-2.0	-2.7	-3.5	-3.7	-4.7	-4.7	-5.5	-6.9	-5.4	-3.9	-1.5	0.3	1.9	3.0	2.9	2.5	1.8	1.3	0.2	0.1	0.9	1.6	2.1	2.3	-1.0	3.0
13-Nov	2.3	1.9	1.4	1.6	1.4	0.6	-0.1	-0.3	-0.6	-0.8	0.4	2.5	5.9	6.7	7.1	6.6	4.8	3.6	2.7	1.2	1.9	1.6	0.7	0.0	2.2	7.1
14-Nov	-0.3	-0.4	-0.9	-1.4	-2.0	-2.3	-1.9	-2.6	-2.7	-1.5	-0.5	2.5	3.5	4.5	5.1	4.7	2.6	-0.3	-1.9	-2.0	-1.9	-2.7	-3.1	-3.3	-0.4	5.1
15-Nov	-4.1	-5.8	-6.8	-7.4	-8.2	-8.4	-8.9	-8.5	-6.8	-5.7	-4.6	-3.8	-3.6	-3.6	-3.0	-2.3	-0.8	-0.2	0.0	0.1	-0.7	-1.6	-1.5	-1.3	-4.1	0.1
16-Nov	-1.2	-1.1	-1.1	-1.2	-1.3	-1.4	-1.4	-1.3	-2.2	-2.4	-2.5	-2.6	-2.4	-1.7	-1.4	-1.7	-2.7	-2.8	-3.2	-4.4	-6.0	-6.9	-8.4	-10.4	-3.0	-1.1
17-Nov	-9.7	-6.9	-6.2	-5.9	-5.7	-5.4	-5.0	-4.6	-4.4	-4.1	-3.3	-1.4	1.9	2.4	2.6	1.8	0.3	-0.7	-1.4	-2.6	-4.9	-7.2	-8.2	-9.0	-3.7	2.6
18-Nov	-9.3	-9.2	-8.9	-8.2	-8.4	-8.8	-9.1	-9.3	-9.3	-9.0	-8.8	-8.5	-8.2	-8.1	-8.3	-9.0	-9.8	-11.6	-12.2	-12.1	-12.3	-13.4	-15.1	-16.4	-10.1	-8.1
19-Nov	-16.9	-18.3	-18.6	-18.2	-19.8	-19.2	-18.6	-17.6	-16.7	-16.4	-15.5	-13.9	-12.3	-11.1	-10.8	-11.3	-14.3	-14.4	-15.4	-16.4	-17.1	-18.0	-17.9	-16.5	-16.0	-10.8
20-Nov	-15.1	-15.7	-15.6	-15.0	-14.7	-14.2	-14.0	-14.0	-14.3	-14.2	-14.0	-14.3	-13.7	-12.6	-12.3	-12.6	-12.6	-12.4	-12.4	-11.9	-11.1	-10.8	-9.4	-6.5	-13.1	-6.5
21-Nov	-5.4	-5.1	-5.8	-5.2	-5.1	-5.0	-4.2	-4.1	-4.3	-3.8	-2.5	-1.5	-0.2	0.5	0.7	0.8	0.8	1.3	1.6	1.4	1.7	1.5	2.9	3.2	-1.5	3.2
22-Nov	3.1	3.7	3.8	3.4	3.1	3.2	3.3	2.9	2.8	2.9	3.1	2.7	1.6	-0.1	-0.5	-0.9	-1.1	-1.6	-2.1	-2.7	-3.8	-4.2	-4.7	-5.0	0.5	3.8
23-Nov	-5.4	-5.9	-6.5	-6.7	-7.0	-7.0	-7.3	-7.5	-7.3	-7.0	-6.9	-7.0	-6.8	-6.8	-6.8	-7.2	-7.5	-7.8	-8.4	-8.7	-8.6	-8.7	-9.6	-10.5	-7.5	-5.4
24-Nov	-11.3	-12.0	-12.2	-12.7	-13.4	-13.1	-13.0	-12.7	-12.9	-12.7	-12.1	-11.6	-10.3	-10.2	-10.6	-10.8	-10.9	-11.1	-11.2	-11.2	-11.0	-11.1	-11.3	-12.1	-11.7	-10.2
25-Nov	-12.8	-13.6	-14.5	-15.6	-18.3	-19.1	-17.9	-17.0	-17.3	-16.8	-15.1	-12.4	-10.6	-9.5	-8.4	-10.6	-13.2	-16.0	-16.7	-14.6	-14.6	-14.4	-13.8	-13.4	-14.4	-8.4
26-Nov	-14.4	-15.0	-15.2	-16.2	-16.9	-16.2	-16.1	-16.2	-14.3	-12.6	-7.7	-5.1	-3.2	-1.9	-1.1	-1.1	-1.5	-2.1	-2.8	-3.2	-3.4	-3.6	-3.9	-3.8	-8.2	-1.1
27-Nov	-3.9	-3.9	-3.6	-3.3	-3.3	-3.9	-3.7	-3.2	-2.6	-4.6	-2.1	1.8	3.5	4.2	4.2	1.5	-3.3	-2.2	-1.0	-1.5	-0.6	-2.2	-3.6	-3.7	-1.7	4.2
28-Nov	-4.0	-4.4	-4.7	-5.2	-6.0	-6.8	-7.2	-8.0	-10.6	-9.3	-5.2	-3.0	-0.8	1.4	2.1	0.0	-4.1	-6.3	-7.7	-8.4	-9.4	-7.9	-5.3	-4.7	-5.2	2.1
29-Nov	-4.1	-3.3	-2.9	-2.9	-3.2	-3.5	-3.8	-4.0	-4.0	-3.3	-1.8	0.5	1.8	1.9	2.5	1.9	0.0	-3.4	-4.9	-6.3	-6.4	-4.7	-7.3	-10.2	-3.0	2.5
30-Nov	-11.5	-10.5	-8.5	-9.5	-11.5	-12.9	-11.4	-13.8	-14.7	-12.0	-6.2	0.4	3.3	5.2	5.7	3.1	-1.7	-0.9	0.3	-0.7	-1.1	-1.7	-2.3	-2.8	-4.8	5.7
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Patricia McInnes - November 2015

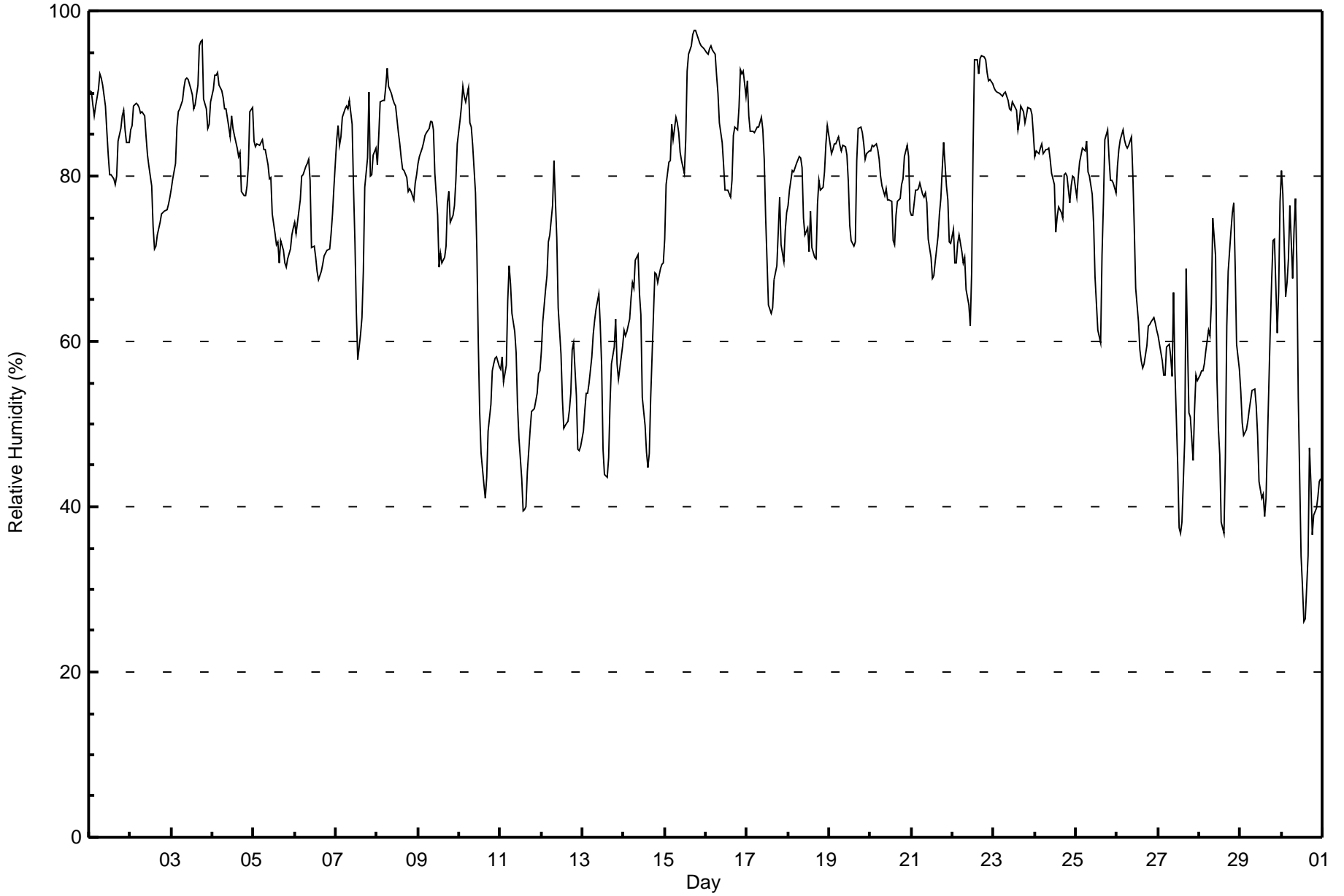
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	529	73.47	73.47
0 - 10	191	26.53	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 98 % on Nov 15 18:00 Maximum Daily Average: 88.8 % on Nov 3																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 26 % on Nov 30 14:00 Minimum Daily Average: 52.6 % on Nov 30 Maximum Diurnal Average: 79.8 % at hour 6 Minimum Diurnal Average: 64.3 % at hour 15 Monthly Average: 74.0 % Percentiles: P ₁ = 37 P ₁₀ = 52 Q ₁ = 64 Median = 78 O ₃ = 85 P ₉₀ = 90 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-Nov	90	90	89	87	88	91	92	92	91	89	85	83	80	80	80	79	80	84	86	87	88	86	84	84	86.0	92	
2-Nov	86	86	88	89	89	88	88	88	87	85	83	81	79	74	71	72	73	74	75	76	76	76	77	77	80.7	89	
3-Nov	78	80	81	86	88	88	89	91	92	92	92	91	90	88	89	91	96	96	97	89	88	86	86	89	88.8	97	
4-Nov	90	92	92	92	91	90	89	88	88	86	85	87	86	85	83	82	83	78	78	78	79	81	88	88	85.9	92	
5-Nov	84	83	84	84	84	84	83	83	81	80	80	75	73	72	72	69	72	71	69	69	70	71	73	74	76.8	84	
6-Nov	74	73	76	77	80	80	81	82	82	80	71	72	70	68	67	68	69	70	71	71	71	73	75	79	74.3	82	
7-Nov	84	86	84	85	87	88	89	88	89	86	78	72	64	58	61	63	68	79	82	90	80	80	83	83	79.5	90	
8-Nov	81	85	89	89	89	91	93	91	90	89	89	88	85	84	82	81	81	80	78	79	78	77	79	80	84.5	93	
9-Nov	82	82	83	84	85	85	86	87	87	86	80	75	69	71	70	70	72	77	78	74	75	77	80	84	79.1	87	
10-Nov	87	89	91	90	89	91	86	86	84	78	71	60	51	46	43	41	44	49	52	56	57	58	58	57	67.2	91	
11-Nov	57	58	55	57	65	69	67	63	61	59	52	48	43	40	40	40	44	49	52	52	52	54	56	56	53.7	69	
12-Nov	59	62	66	68	72	73	76	82	77	72	64	58	53	50	50	50	52	54	59	60	53	47	47	47	60.5	82	
13-Nov	49	52	54	54	55	58	61	63	64	66	62	57	47	44	44	46	53	57	59	63	57	55	57	60	55.6	66	
14-Nov	61	61	61	63	65	67	67	70	70	66	63	53	50	47	45	46	53	63	68	68	67	69	69	69	61.8	70	
15-Nov	72	79	82	82	86	84	87	86	85	83	82	80	84	93	95	96	97	98	98	97	96	96	96	95	88.7	98	
16-Nov	95	95	95	96	95	95	92	90	86	84	81	78	78	78	78	79	85	86	86	88	93	92	93	90	87.9	96	
17-Nov	91	87	85	85	85	86	86	86	86	87	86	82	75	64	64	63	64	67	69	73	77	72	70	73	76	77.3	91
18-Nov	76	78	81	81	81	81	82	82	81	75	73	74	71	76	71	70	70	77	79	78	79	80	84	86	77.8	86	
19-Nov	84	83	83	84	84	85	84	83	84	83	83	79	74	72	72	72	82	86	86	85	84	82	83	83	81.6	86	
20-Nov	83	84	84	84	83	82	80	79	78	79	77	77	77	72	72	75	77	77	79	80	82	84	82	76	79.2	84	
21-Nov	75	75	78	78	79	79	78	77	78	77	72	70	68	68	70	73	75	77	81	84	79	77	72	72	75.5	84	
22-Nov	74	70	69	72	73	71	70	70	66	64	62	68	83	94	94	92	94	94	94	94	93	91	92	91	80.7	94	
23-Nov	91	90	90	90	90	90	90	90	89	88	88	89	88	88	86	87	88	88	86	87	88	88	87	85	88.4	91	
24-Nov	82	83	83	83	84	83	83	83	83	82	80	79	73	75	76	76	75	80	80	80	77	79	80	80	80.0	84	
25-Nov	77	80	82	83	83	83	84	80	80	78	74	68	65	61	60	71	77	84	86	82	79	79	78	78	77.3	86	
26-Nov	81	83	84	86	84	84	83	84	85	80	74	66	62	59	58	57	57	60	62	62	62	63	62	61	70.8	86	
27-Nov	61	60	58	56	56	59	60	58	56	66	56	45	37	37	38	48	69	60	51	51	46	52	56	55	53.7	69	
28-Nov	56	57	56	57	59	61	61	64	75	70	55	50	46	38	37	46	62	68	73	76	77	69	60	57	59.6	77	
29-Nov	54	50	49	49	50	52	53	54	54	52	49	43	41	41	39	41	48	61	67	72	72	61	66	77	54.0	77	
30-Nov	81	78	65	67	70	76	68	74	77	69	53	34	30	26	26	34	47	43	37	39	40	41	43	43	52.6	81	
76.6 77.0 77.3 77.9 79.0 79.8 79.6 79.8 79.6 77.6 73.3 69.3 66.1 65.0 64.3 66.0 70.3 73.0 74.1 74.8 73.7 73.1 74.0 74.4																								Diurnal Average			
95 95 95 96 95 95 93 92 92 92 92 91 90 94 95 96 97 98 98 97 96 96 96 95																								Diurnal Maximum			





Maximum Speed: 25 km/h on Nov 22 12:00	Maximum Daily Speed Average: 13.7 km/h on Nov 18	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 28 09:00	Minimum Daily Speed Average: 1.4 km/h on Nov 9	Hours of Data: 720
Maximum Diurnal Speed Average: 5.7 km/h at hour 13	Minimum Diurnal Speed Average: 1.9 km/h at hour 17	Hours of Missing Data: 0
Monthly Average Velocity: 4.2 km/h 239.3 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 16 P ₉₉ = 21	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	N10	N9	N9	N11	N9	N8	N8	N10	N9	N11	N12	N12	N12	N14	N13	N12	N14	N13	NNW13	N13	N12	N13	N13	N11	N11.1	N14
2-Nov	N11	N11	N10	N10	N10	N10	N8	N8	NNE5	E5	ESE8	SE8	ESE9	ESE6	SSE13	SE14	SE14	SE12	SE8	SE9	SE10	SE9	SE10	ESE8	E4.2	SE14
3-Nov	ESE9	SE8	SE8	ESE8	SE9	SE6	ESE5	ESE6	ESE6	SE5	SSE4	SE4	SSW4	SW4	WSW4	WNW4	NNW7	NNW6	WNW3	W9	W9	WSW10	W10	W8	S1.8	W10
4-Nov	SW5	SW5	SW3	S3	SSW2	WSW3	SSW2	S3	S2	SSE3	SSE7	SE9	ESE12	ESE10	ESE9	SE6	SE6	S6	SSE6	S6	S6	SW6	WSW9	NNW10	S3.8	ESE12
5-Nov	WNW13	WNW15	NW16	NW14	NW14	NW12	NW11	NW11	NW14	NW17	NW13	NW14	NW13	NNW12	WNW12	WNW15	NW15	NW15	WNW16	NW13	NW9	NW6	NW6	WNW6	NW12.4	NW17
6-Nov	W5	WNW3	WSW4	SW4	S4	S5	SSE5	SE5	SSE5	SSW6	S4	SSE8	SE9	ESE9	ESE11	ESE10	ESE12	ESE13	SE13	ESE13	ESE13	SE11	SE11	SSE8	SE6.4	ESE13
7-Nov	S6	SW11	SW15	SW14	SW12	WSW14	WSW14	WSW15	WSW15	SW15	WSW15	SW18	WSW15	W14	WSW12	W10	W5	WNW4	NW4	SW4	WSW13	WSW13	WSW12	WSW12	WSW11.2	SW18
8-Nov	WSW12	SW6	SSW3	SW5	SW6	SSW4	NW6	NNW11	NNW12	NNW12	N15	N14	N17	NNE17	N16	N14	N14	NNE12	NNE11	NE10	NE9	NE6	N8	N8	N7.2	N17
9-Nov	N6	NNW6	NNW6	NW5	NW5	WNW3	WNW3	W4	WSW3	WSW3	S2	S4	SSW7	SSW9	SSW8	SSW5	SE3	SE3	SE5	SE5	SE4	ESE6	SE7	ESE8	S1.4	SSW9
10-Nov	SE8	SSE5	SE7	SE6	SSE5	S7	S9	S8	S8	SSW11	S12	S13	SSW17	S14	S15	S14	S12	S10	SSW16	S13	S11	S12	S13	S11	S10.3	SSW17
11-Nov	SSE10	SSE8	S12	S10	S9	S10	SSW9	SSW9	SSW8	SSW9	SSW11	SW14	WSW17	WSW19	WSW16	SW14	SSW9	SW11	SW12	SW10	SSW8	SW9	SW10	SW12	SW10.1	WSW19
12-Nov	SW10	SW11	SW8	SW11	WSW12	SW9	S3	SSW5	S5	SSW8	S11	S12	S13	SSW14	S13	S9	SSE10	SE10	SE11	SE11	SE12	SSE11	SSE11	SSE11	S8.3	SSW14
13-Nov	S12	S12	S11	S13	S10	SSE9	SSE8	SSE8	SSE7	SSE7	S7	SSW11	SW19	SW18	SW18	SW13	SW10	SW6	SW8	SSW7	SW8	SW8	SW12	WSW13	SSW9.6	SW19
14-Nov	WSW15	SW14	SW13	SW11	SW9	SW13	SW17	SW11	SSW7	SSW7	SW9	SW16	SW16	SW14	SW16	SW13	SSW7	SW7	SW7	SW8	SW9	SW10	SW10	WSW11	SW11.1	SW17
15-Nov	SSW4	SSE3	SSW5	WSW4	WSW1	SSW2	S3	SSW2	N4	N7	N8	N8	N8	N11	N14	N13	NNE14	NE11	NE12	NNE9	N11	N11	NNW10	NNW9	N5.5	NNE14
16-Nov	NNW8	NW7	NNW8	NW9	WNW9	W9	W9	W11	W16	W18	W22	W23	W19	W14	W17	W16	SSW5	SW9	SW11	SW9	SSW6	SSW6	SE6	SE4	W9.0	W23
17-Nov	SE4	SE10	ESE17	SE14	ESE12	SE11	ESE11	SE11	SE10	SE9	SSE8	SSE6	SSW13	SW15	SW15	SW14	SW12	SW10	W11	WNW16	WNW21	W18	W19	W18	SSW5.3	WNW21
18-Nov	W18	W19	WNW19	NW20	NW18	NW21	NW19	NW20	NW19	NW20	NW18	NW18	NW17	NW16	NW17	WNW17	WNW13	W8	W8	WNW9	WNW7	W6	S2	SE3	WNW13.7	NW21
19-Nov	SSW5	SW4	SW7	SSW4	SSW4	SSW7	SSW6	S8	SSE6	ESE2	SSW3	S5	SSE6	SSE5	ENE4	N4	N5	NW7	NW6	NNW7	NW6	W4	WNW5	W2	SW1.9	S8
20-Nov	S1	SW3	WSW4	W4	W5	WSW5	W7	WSW7	W8	WSW8	WSW11	SW12	SSW11	S11	S11	SSE7	SE9	SE8	SE9	SE8	SE7	SE6	SSE6	SSW11	SSW4.6	SW12
21-Nov	SW15	WSW12	SSW8	WSW21	WSW23	SW19	SW13	SW13	SW14	SW19	SW18	SW14	SW14	SW13	SSW9	S7	SSE7	SSW7	SW13	SW12	SW14	SW15	WSW19	WSW13	SW13.3	WSW23
22-Nov	SW12	WSW15	W16	W16	WSW21	W21	W21	W18	W18	W20	WNW23	WNW25	NW15	N9	N7	N9	N7	N7	N8	N9	N10	NNW10	NNW10	NNW10	WNW10.9	WNW25
23-Nov	NNW10	NNW9	NNW8	NW8	NNW10	NNW8	N8	N6	NNW4	NNW5	N6	NNE6	N6	N8	N7	N10	N10	NNW9	NNW10	NNW11	NNW10	NNW11	NNW14	NNW15	NNW8.4	NNW15
24-Nov	NNW15	NNW13	NNW10	NW8	NW8	NW8	NW10	NW8	WNW7	WNW6	WNW6	WSW5	WSW6	NW10	NNW12	NW9	WNW7	W4	WSW5	SW6	SSW4	SSW6	SSW7	SSW7	WNW5.6	NNW15
25-Nov	SSW9	SSW7	S7	SE5	S4	SSW5	SW7	WSW12	SW9	SW6	SSW6	S4	SW1	E5	WNW3	W8	SW5	S4	SSW6	SW8	SW8	SSW7	SSW10	SW15	SSW5.7	SW15
26-Nov	SSW8	S8	SSE6	ESE3	ESE4	SE5	S6	S6	S8	S7	SSW14	SW17	SW21	SSW19	SW17	SW21	SW21	SW20	SW17	SSW7	SW12	SW14	SW9	SW12	SSW10.8	SW21
27-Nov	SW14	SW10	SW14	WSW16	WSW12	WSW11	SW10	SW11	W3	ENE1	SSW3	WSW2	NW11	WNW9	NW7	WSW5	SW5	SW9	SW10	WSW12	SW11	SSW9	SSW8	SW9	WSW7.8	WSW16
28-Nov	SW11	SW11	SW14	SW15	SW9	SSW8	SSW9	SSE5	N0	S6	S4	SSE7	S5	SW9	SSW7	SSE5	SSE5	S3	SSE3	S5	SSW4	SSW7	S6	SSW7	SSW6.5	SW15
29-Nov	SSW7	SW10	SW16	SW14	SW13	SW11	SW14	SSW9	SSW10	SSW10	SW14	SW11	SSW10	SSW10	SSW11	SSW7	SSE7	S3	S4	S3	SSW6	SSW7	SE3	S6	SSW8.5	SW16
30-Nov	SSW3	SSW6	S7	SSW7	SW4	SSW6	SW8	S3	WNW3	SSE5	S8	SW14	SSW8	SW10	SW8	S7	SW6	SW10	WSW14	WSW15	SW17	SW14	SW14	SW15	SW8.1	WSW17

WSW4.4	WSW4.6	WSW4.7	WSW4.9	WSW4.8	WSW4.7	WSW3.9	WSW3.6	WSW3.9	WSW4.8	WSW5.5	WSW5.7	WSW4.6	WSW4.4	WSW3.9	SW1.9	SW2.3	SW3.2	WSW3.0	WSW3.6	SW4.3	SW4.3	SW5.0	Diurnal Average				
W18	W19	WNW19	WSW21	WSW23	NW21	W21	NW20	NW19	NW20	WNW23	WNW25	SW21	WSW19	SW18	SW21	SW21	SW20	SW17	WNW16	WNW21	W18	WSW19	W18	Diurnal Maximum			

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

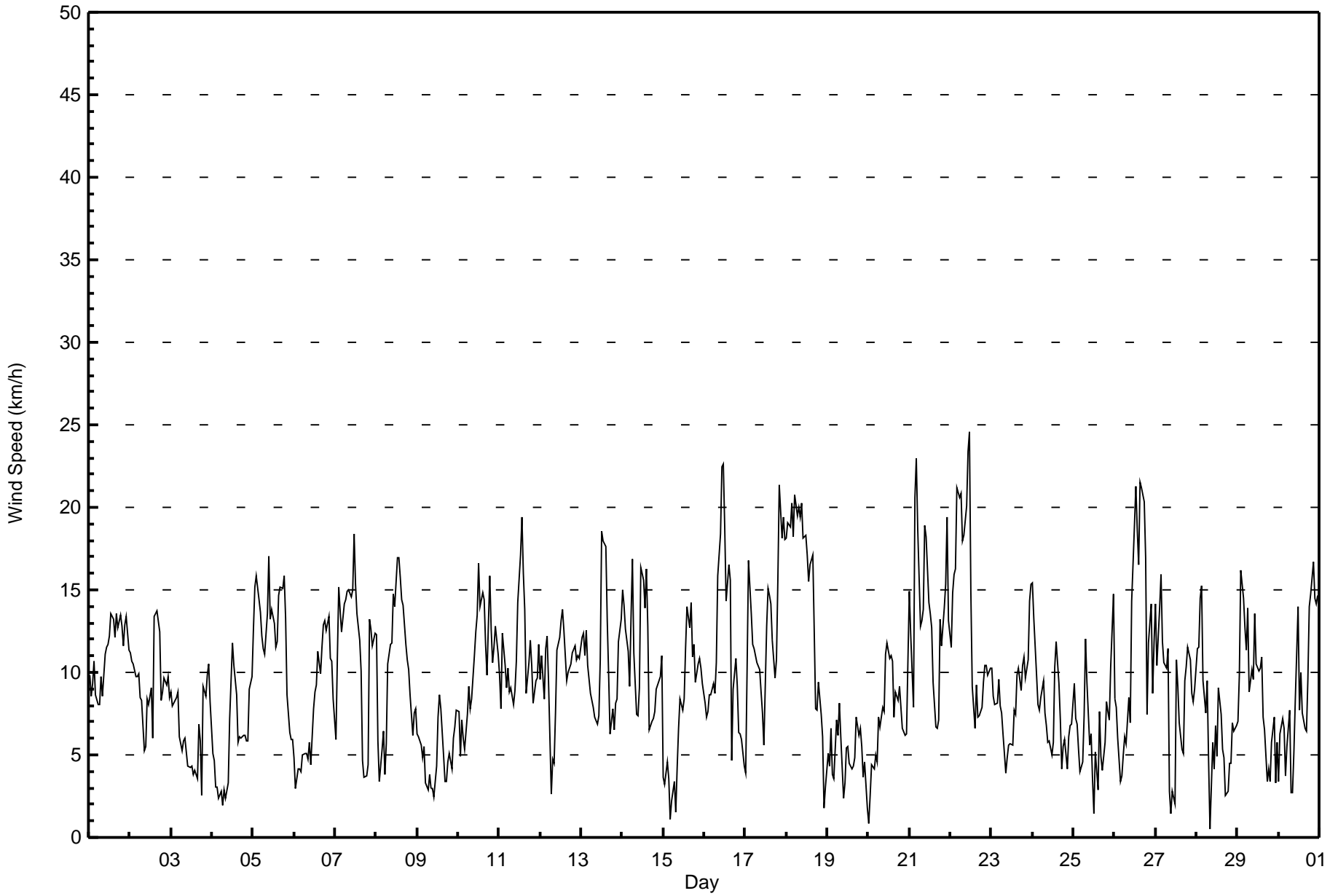
Wind Speed (WS) - km/h

Patricia McInnes - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 6 km/h on Nov 17 21:00			Hours of Data:	720
Minimum Value: 1 km/h on Nov 15 06:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 5				

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

4	5	4	5	5	4	6	4	4	4	5	5	6	5	4	4	5	4	4	4	4	3	6	4	4	4		
Diurnal Maximum																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	135	18.75	18.75
6 - 11	359	49.86	68.61
12 - 19	207	28.75	97.36
20 - 28	19	2.64	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	1	0	2	2	4	13	14	25	21	13	13	9	9	3	2	135
6 - 11	45	3	4	0	0	16	35	26	34	59	59	8	15	10	21	24	359
12 - 19	20	3	1	0	0	8	5	1	16	7	62	29	16	9	21	9	207
20 - 28	0	0	0	0	0	0	0	0	0	0	4	3	5	3	4	0	19
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	69	7	5	2	2	28	53	41	75	87	138	53	45	31	49	35	720

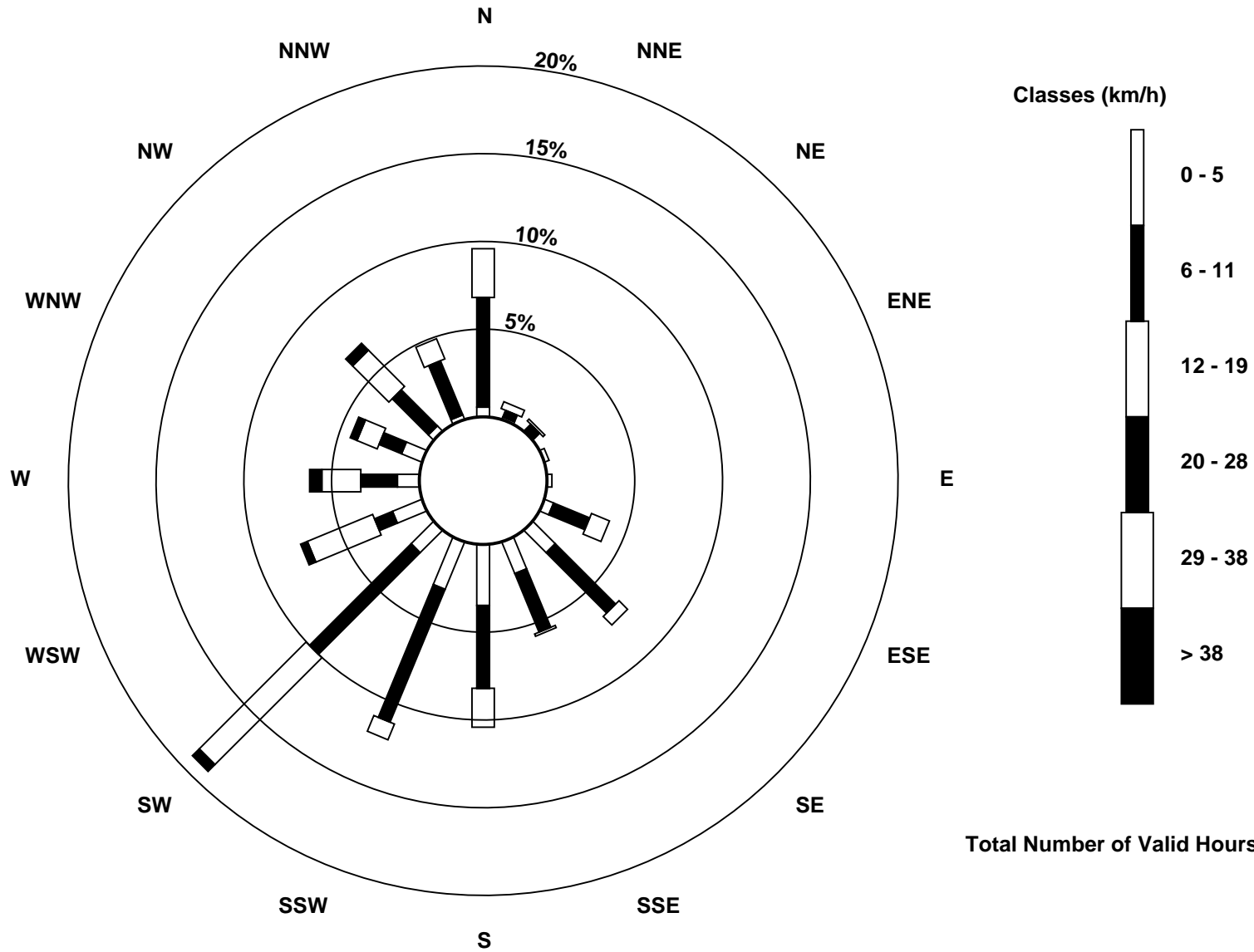
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Patricia McInnes - November 2015

Direction of Maximum Speed: 297 deg on Nov 22 12:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 300.6 deg on Nov 18	Hours of Data: 720
Direction of Minimum Speed: 5 deg on Nov 28 09:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.4 deg on Nov 9	Percent Operational Time: 100.0
Monthly Average Direction: 247.9 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	355	350	356	6	359	360	360	6	9	3	7	5	354	352	357	355	358	355	347	351	358	9	11	3	359.2	
2-Nov	351	349	356	356	354	350	354	357	24	90	121	124	115	123	149	143	136	127	128	134	135	137	138	123	95.4	
3-Nov	122	124	124	120	126	127	118	118	123	129	147	145	213	227	252	303	334	327	299	270	260	258	268	263	183.1	
4-Nov	220	225	228	172	195	242	212	173	188	168	150	126	120	122	120	127	129	185	167	175	179	225	251	287	170.4	
5-Nov	298	300	309	317	319	316	320	317	321	323	326	323	311	327	298	301	308	321	300	319	315	322	308	298	313.4	
6-Nov	275	286	250	223	188	174	149	141	147	207	187	159	124	119	116	122	122	123	124	121	123	136	139	149	139.7	
7-Nov	174	222	225	231	233	237	245	244	241	235	238	234	254	260	244	261	281	297	321	223	255	246	237	244	241.7	
8-Nov	247	234	192	226	231	204	315	344	342	341	354	3	358	14	9	9	2	13	32	42	43	48	352	351	356.7	
9-Nov	353	348	331	311	316	297	295	262	247	252	177	183	193	194	193	198	141	128	130	127	130	119	124	123	182.4	
10-Nov	131	158	131	144	151	180	189	170	183	192	183	191	196	186	177	178	176	177	194	189	176	174	174	178	178.2	
11-Nov	163	157	186	187	180	183	199	205	201	207	207	236	243	250	245	232	207	221	231	226	210	226	229	220	215.3	
12-Nov	227	219	227	232	239	231	184	204	178	195	182	184	188	193	177	172	147	137	131	134	138	147	152	161	181.2	
13-Nov	172	181	177	177	175	164	160	161	161	168	184	206	215	220	221	219	226	224	224	211	219	224	234	237	201.4	
14-Nov	238	235	236	234	225	233	233	225	213	207	215	227	233	222	231	214	210	227	219	225	227	226	217	238	227.0	
15-Nov	201	154	211	240	237	197	178	206	353	360	350	356	357	360	4	3	21	36	34	25	27	356	352	338	337	1.7
16-Nov	332	321	332	308	300	281	275	274	264	266	267	271	276	268	262	261	203	218	214	219	202	205	136	140	264.4	
17-Nov	125	127	123	126	119	127	123	130	129	134	148	148	213	228	228	233	221	221	271	303	296	278	266	262	207.3	
18-Nov	260	268	285	307	306	308	313	316	317	317	313	309	318	317	310	295	292	267	280	289	287	279	186	130	300.6	
19-Nov	204	226	228	193	209	212	206	185	147	114	197	177	163	149	78	351	349	324	313	333	314	273	303	264	227.9	
20-Nov	184	220	256	277	276	249	268	258	260	248	251	228	206	178	173	150	131	128	129	141	129	128	160	213	198.3	
21-Nov	226	238	212	240	241	236	233	226	225	227	235	233	226	224	209	176	163	207	226	226	236	235	257	243	230.1	
22-Nov	234	253	262	263	257	262	265	270	274	278	291	297	306	357	350	357	359	11	358	1	1	347	338	335	293.3	
23-Nov	342	341	337	326	330	344	1	7	334	332	9	21	11	2	356	359	358	344	330	333	331	329	337	343	344.6	
24-Nov	342	340	333	322	304	316	319	317	294	284	287	244	248	319	332	321	286	260	239	232	201	193	205	204	299.2	
25-Nov	211	195	175	144	185	197	224	239	232	222	209	177	234	80	283	266	231	186	199	224	219	206	207	218	212.4	
26-Nov	193	190	161	121	123	137	173	185	189	169	204	214	219	212	219	227	226	226	226	207	221	228	217	222	210.9	
27-Nov	220	224	236	245	241	237	230	232	279	70	200	253	304	296	315	244	226	230	228	239	230	207	195	216	237.6	
28-Nov	218	218	223	222	219	197	197	165	5	187	184	168	180	214	196	157	163	178	156	183	196	203	189	201	200.0	
29-Nov	200	223	233	227	231	214	222	213	210	210	220	230	210	199	207	200	164	179	170	179	199	198	146	175	210.7	
30-Nov	205	192	188	207	229	208	217	183	296	156	181	224	200	229	219	187	215	217	237	240	236	232	227	231	219.2	

237.0 239.5 237.4 244.1 248.0 241.1 244.0 245.3 250.8 246.0 239.7 237.9 239.8 241.2 238.8 243.4 225.7 224.3 231.0 238.3 236.8 229.8 231.9 234.8

Diurnal Average

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



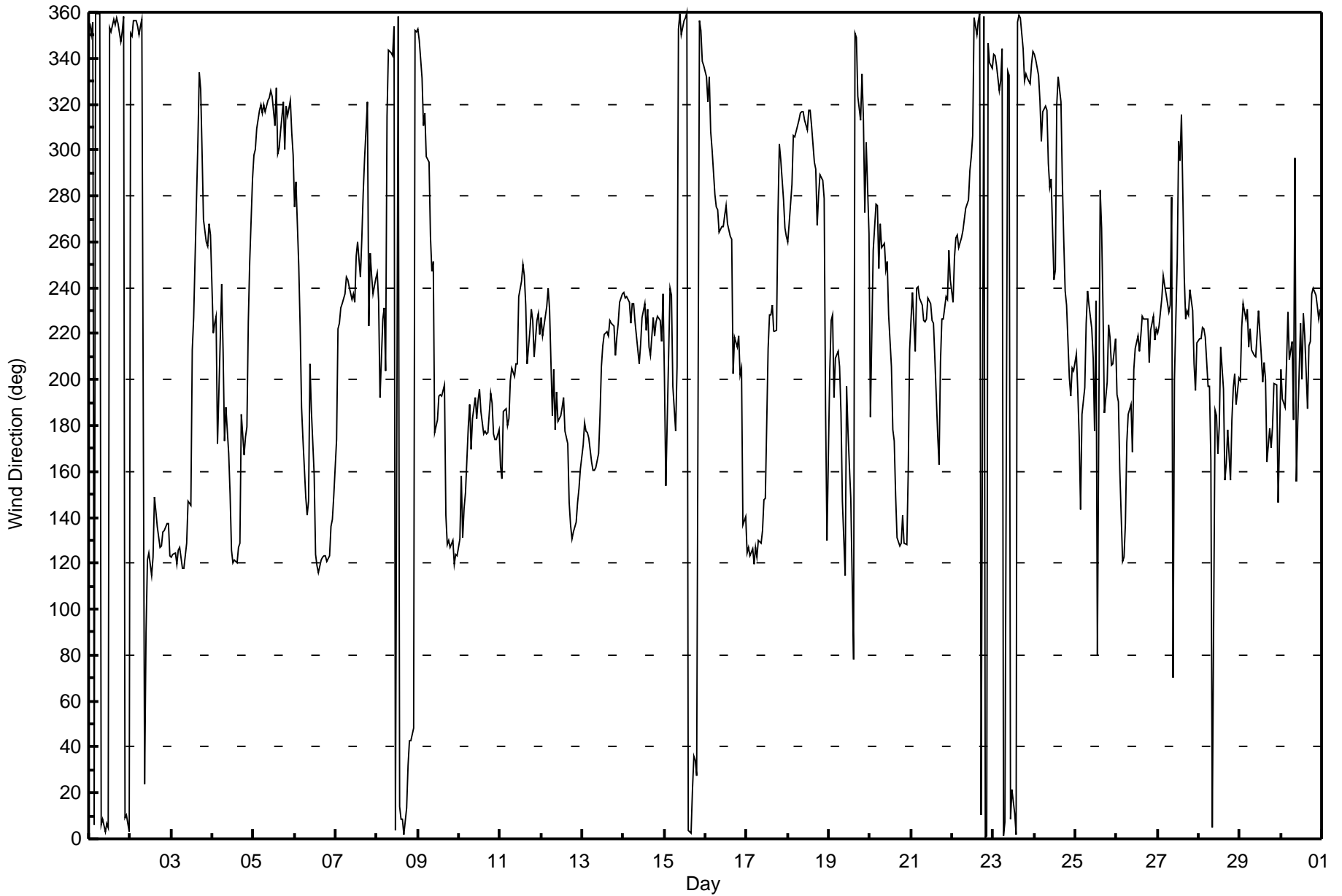
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Patricia McInnes - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 92 deg on Nov 27 10:00 Minimum Value: 5 deg on Nov 30 19:00 Percentiles: P ₁ = 7 P ₁₀ = 9 Q ₁ = 11 Median = 13 Q ₃ = 17 P ₉₀ = 27 P ₉₉ = 76																	Hours in Service: 720 Hours of Data: 720 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-Nov	13	12	13	12	13	12	12	11	13	13	13	15	15	13	13	14	13	14	11	11	14	12	11	13	15		
2-Nov	12	12	13	12	12	12	12	11	30	19	19	18	14	44	13	14	14	14	17	18	15	14	13	13	44		
3-Nov	13	15	13	13	14	13	13	13	13	16	18	29	21	28	21	51	11	10	27	11	12	12	15	12	51		
4-Nov	21	16	35	17	33	22	24	16	19	35	22	12	13	12	13	11	19	12	12	10	17	10	13	35			
5-Nov	9	10	9	10	10	11	12	11	11	11	15	18	17	15	12	12	11	13	10	13	15	13	16	24	24		
6-Nov	15	23	10	17	17	23	15	19	20	38	36	22	19	15	12	12	11	12	12	11	13	13	11	11	38		
7-Nov	33	13	9	9	8	9	9	9	10	11	13	13	16	16	12	12	49	60	63	26	8	10	8	9	63		
8-Nov	12	85	35	20	13	35	31	10	10	10	14	13	13	15	15	15	13	17	15	15	13	18	16	12	85		
9-Nov	13	13	16	15	19	26	41	19	17	20	76	32	26	20	33	26	35	13	27	20	16	14	11	9	76		
10-Nov	15	22	8	11	10	13	14	10	14	14	13	14	15	14	13	12	11	16	13	12	12	10	10	12	22		
11-Nov	22	29	18	14	12	17	17	16	17	20	21	13	13	14	14	12	13	10	10	12	14	12	10	11	29		
12-Nov	10	9	10	11	7	10	63	13	31	15	14	15	14	17	13	13	12	13	11	11	12	14	17	15	63		
13-Nov	14	11	11	11	12	9	9	8	9	9	16	12	13	11	11	11	10	12	10	9	11	12	8	8	16		
14-Nov	8	9	10	9	15	10	11	17	20	17	15	13	14	15	13	11	13	8	9	7	9	12	12	7	20		
15-Nov	45	71	17	22	74	40	29	57	17	13	12	15	13	14	13	13	13	13	11	13	14	12	8	7	74		
16-Nov	9	10	7	8	12	11	16	13	14	12	11	13	16	14	14	12	35	19	11	9	15	20	11	19	35		
17-Nov	50	15	14	22	13	15	13	13	13	14	11	15	24	12	13	13	12	10	28	13	13	16	11	10	50		
18-Nov	11	13	13	11	11	10	10	11	11	11	11	11	12	12	12	10	10	14	23	9	9	35	66	36	66		
19-Nov	18	13	9	24	15	11	21	13	29	75	28	18	21	38	34	14	11	12	8	6	18	35	37	56	75		
20-Nov	89	20	8	17	12	19	17	15	13	11	14	21	19	14	14	16	12	15	14	14	18	13	32	19	89		
21-Nov	13	21	26	11	9	10	23	13	13	10	11	14	12	11	16	18	15	26	13	11	14	12	12	14	26		
22-Nov	18	16	13	11	10	11	11	12	11	12	12	12	21	15	12	13	14	15	13	14	15	11	12	9	21		
23-Nov	9	10	11	11	9	14	17	21	17	18	21	15	19	17	15	14	14	15	9	9	9	10	10	11	21		
24-Nov	10	9	9	9	11	10	9	10	9	11	15	13	20	20	12	19	11	12	19	14	21	14	15	16	21		
25-Nov	12	14	19	14	28	20	18	9	10	21	11	35	90	13	77	8	15	23	15	12	13	12	13	11	90		
26-Nov	17	12	19	14	18	14	16	13	10	17	12	14	10	12	11	10	9	9	9	35	13	12	16	14	35		
27-Nov	13	17	14	11	14	9	9	10	64	92	54	78	15	16	21	13	15	7	7	8	16	10	17	15	92		
28-Nov	11	11	11	11	18	20	11	55	80	31	14	13	45	15	14	11	21	18	20	16	12	19	13	15	80		
29-Nov	16	21	10	10	13	13	10	14	15	16	11	14	13	15	12	11	15	29	34	21	11	11	29	12	34		
30-Nov	41	10	16	27	42	17	9	63	47	23	19	11	29	16	20	8	12	15	5	7	8	9	10	10	63		
																	89 85 35 27 74 40 63 63 80 92 76 78 90 44 77 51 49 60 63 35 21 35 66 56										
Diurnal Maximum																											





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Last Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	13:35
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	-678
Analyzer IP address	192.168.1.43		Lamp voltage	762	760
Calculated slope	0.998173	0.994414	Chamber temp	45.2	45.2
Calculated intercept	0.645560	1.095133	Pressure	692.8	693.1
Analyzer Background	5.8	5.8	Flow	0.441	0.442
Analyzer Coefficient	1.101	1.101	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	6000	0.0	0.0	-0.2	----
as found span	6000	94.7	786.0	786.6	0.999
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	94.7	786.0	789.6	0.995
second point	6000	47.3	392.6	394.1	0.996
third point	6000	23.7	196.7	194.7	1.010
as left zero	6000	0.0	0.0	0.4	----
as left span	6000	94.7	786.0	784.2	1.002
Average Correction Factor					1.001

Corrected As found 786.8 Previous response 786.8 % change 0.0%

Notes:

Inlet filter changed after as founds.

Calibration Performed By: Devin Russell



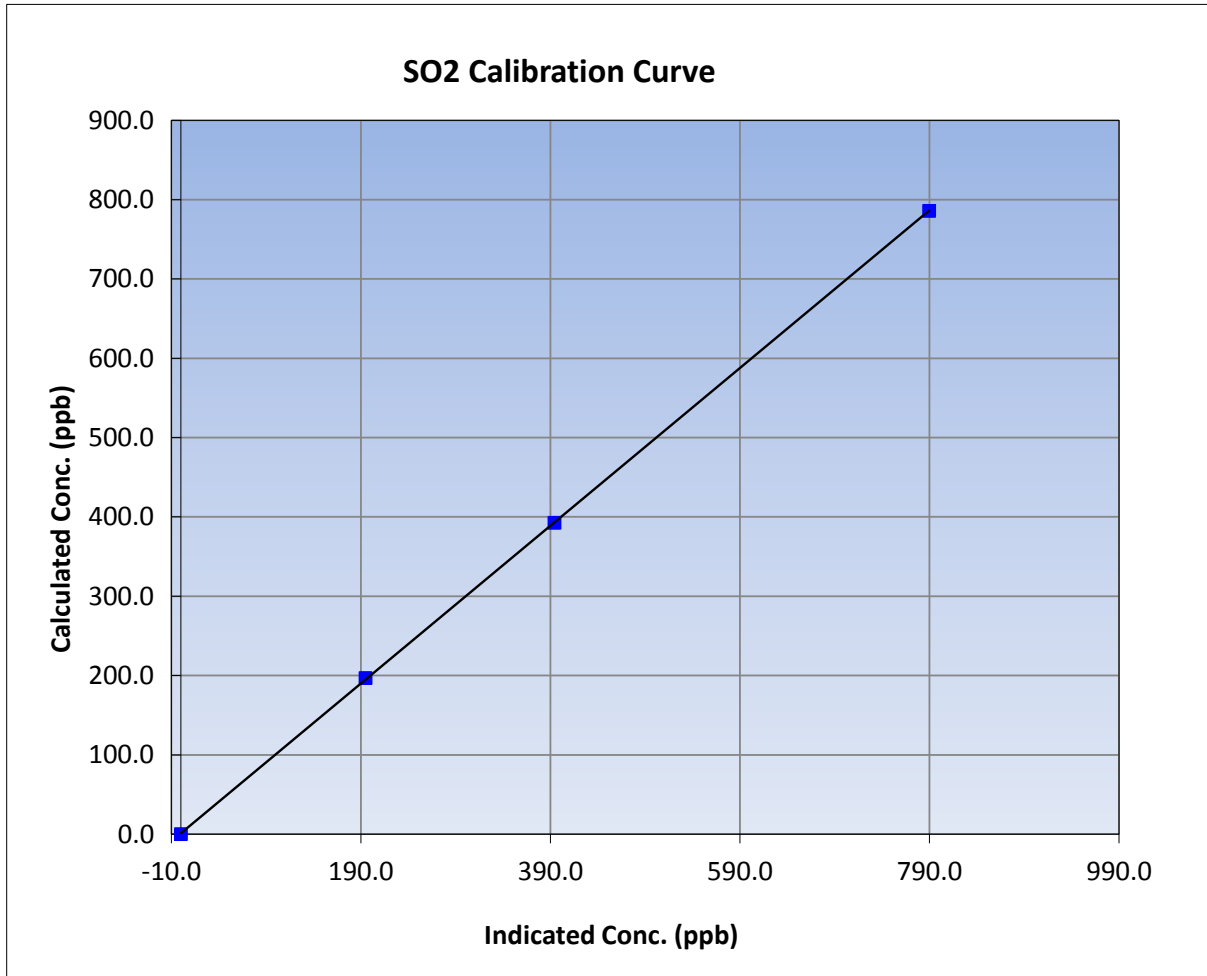
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	13:35
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

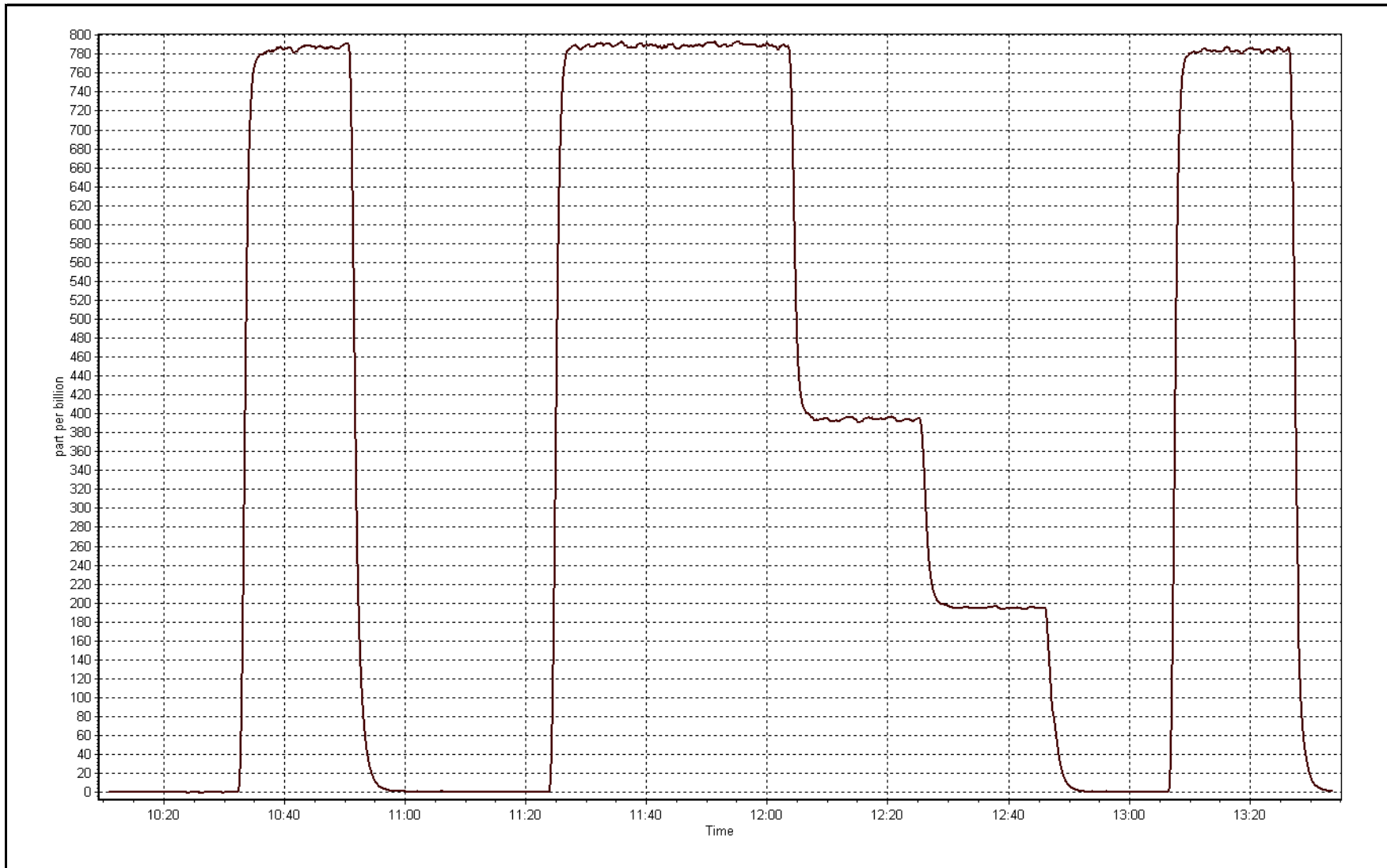
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999983
786.0	789.6	0.9955		
392.6	394.1	0.9961	Slope	0.994414
196.7	194.7	1.0102		
			Intercept	1.095133



SO2 Calibration Plot

Date: November 4, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	November 13, 2015	Last Calibration	October 2, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:30
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API T701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	SA130110A December-12-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.44		Lamp voltage	993	997
Calculated slope	0.997073	0.996740	Chamber temp	45	45
Calculated intercept	-0.208104	-0.427013	Pressure	694.6	662.1
Analyzer Background	2.19	2.15	Flow	0.439	0.421
Analyzer Coefficient	1.216	1.155	Intensity	90	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	71.1	0.984
SO2 scrubber check	6000	21.7	180.1	0.5	----
calibrator zero	6000	0.0	0.0	0.3	----
high point	6000	79.5	70.0	70.4	0.993
second point	6000	39.8	35.0	36.0	0.974
third point	6000	20.5	18.0	18.4	0.978
as left zero	6000	0.0	0.0	0.3	----
as left span	6000	79.5	70.0	72.4	0.966
Average Correction Factor					0.982

Corrected As found	71.0	Previous response	70.4	% change	-0.9%
--------------------	------	-------------------	------	----------	-------

Notes:

Filter changed after as founds. Scrubber check completed after as founds. TRS reading above 5 ppb during scrubber check. Replaced scrubber. New scrubber passed check. Span adjusted.

Calibration Performed By: Devin Russell



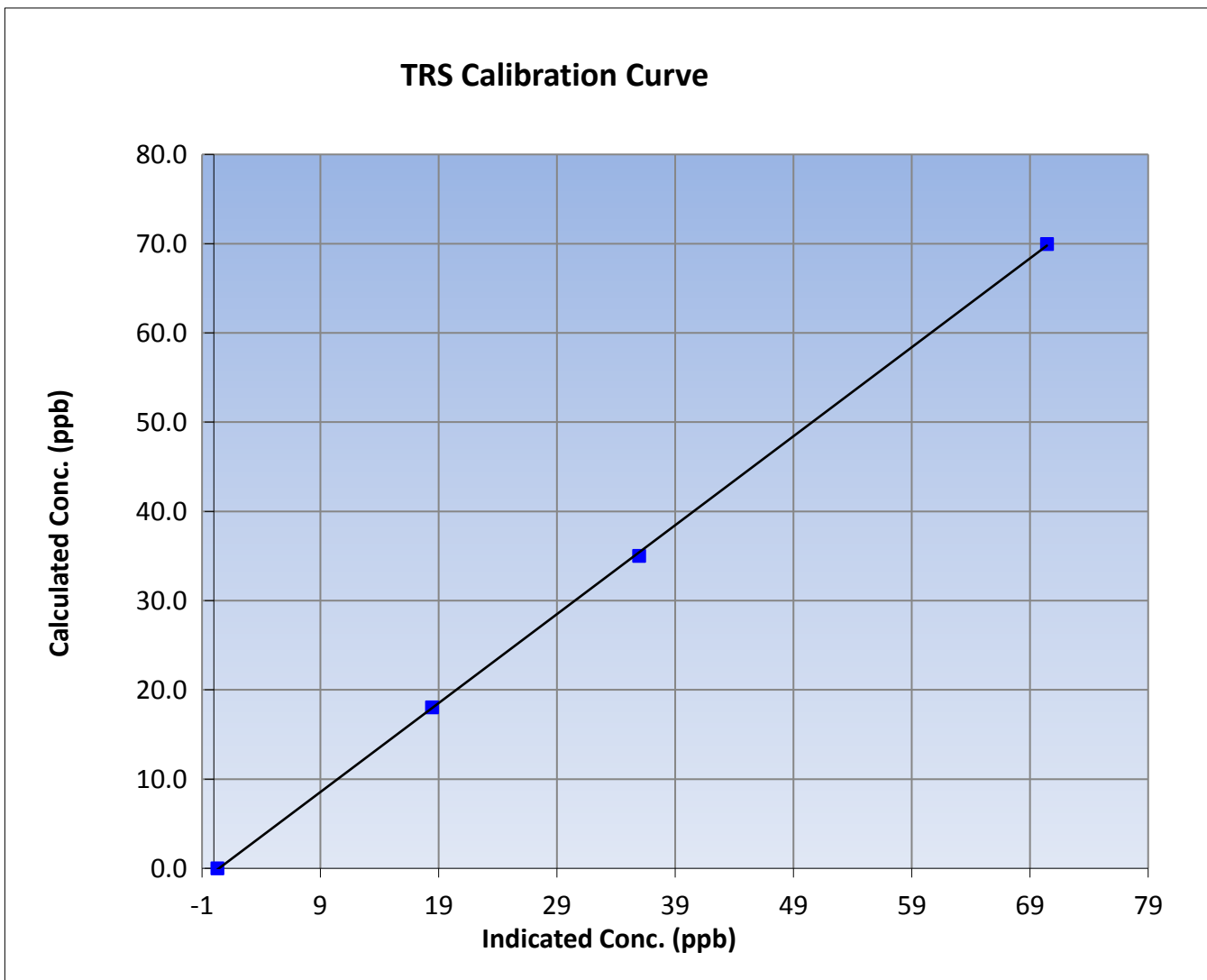
Wood Buffalo Environmental Association TRS Calibration Report

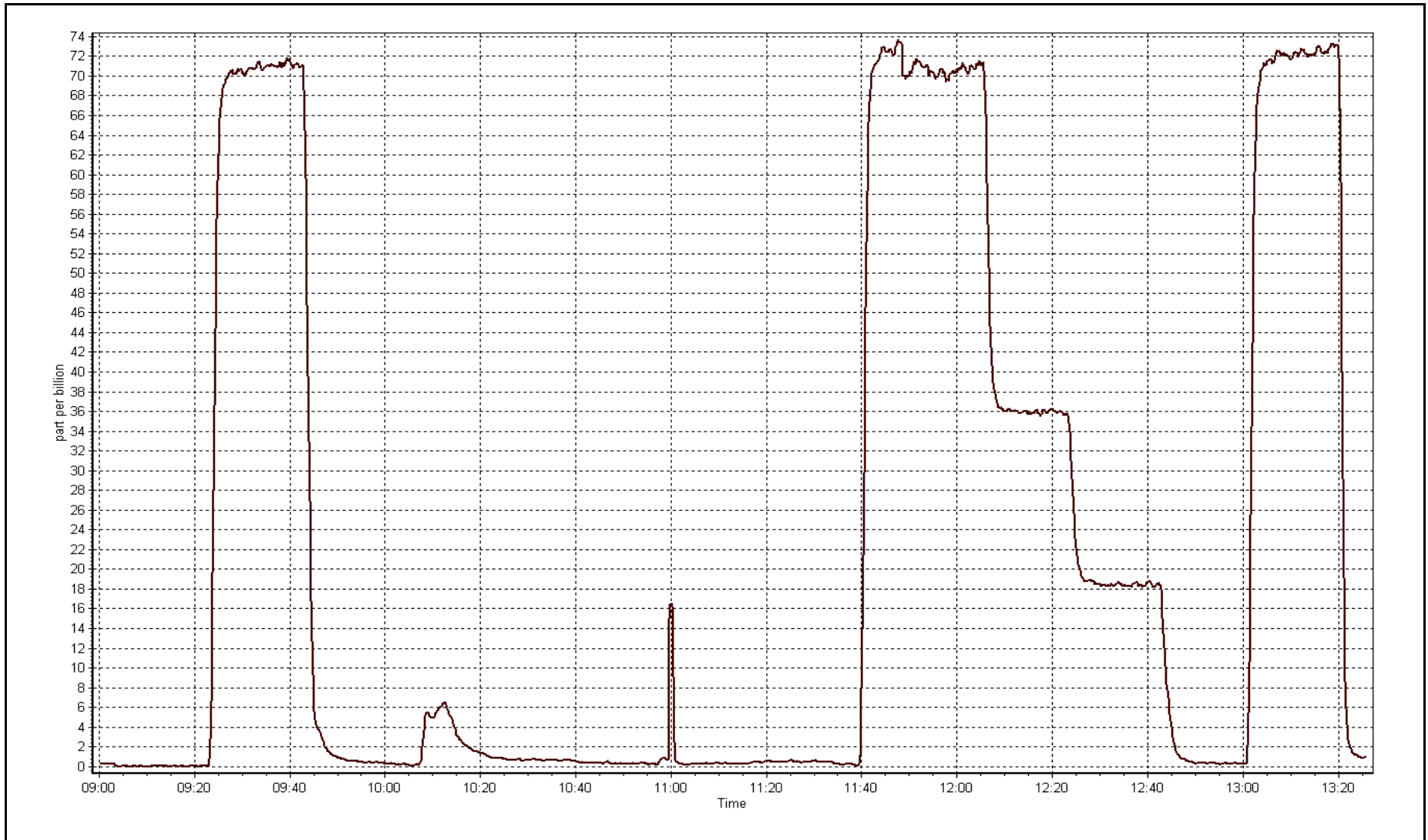
Station Information

Calibration Date	November 13, 2015	Previous Calibration	October 2, 2015
Station Name	AMS 6	Station Number	AMS 6
Start Time (MST)	9:00	End Time (MST)	13:30
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999922
70.0	70.4	0.9932		
35.0	36.0	0.9740	Slope	0.996740
18.0	18.4	0.9783		
			Intercept	-0.427013







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November-04-15	Last Calibration	October-19-15
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	13:40
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	75.3
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	0.997619	0.997836	Carrier Pressure	34.5	34.5
THC Calc intercept	0.046142	0.032071	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.999641	0.997291	Air Pressure	32.4	32.4
NMHC Calc intercept	0.026146	0.020053			

Analyzer make Thermo 55i Analyzer serial # 1331259521

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	0.00	----
as found span	6000	94.7	16.86	16.88	0.999
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	16.86	16.87	0.999
second point	6000	47.3	8.42	8.41	1.001
third point	6000	23.7	4.22	4.15	1.017
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	16.86	16.83	1.002
Average Correction Factor					1.006

Corrected As found 16.88 Previous response 16.85 % change -0.2%

Notes:

H2 and N2 cylinder changed after as founds. Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	94.7	8.68	8.77	0.990
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	8.68	8.69	0.999
second point	6000	47.3	4.34	4.33	1.001
third point	6000	23.7	2.17	2.13	1.020
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	8.68	8.64	1.005
Average Correction Factor					1.007

Corrected As found 8.77 Previous response 8.66 % change -1.3%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	94.7	8.18	8.11	1.008
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	8.18	8.18	0.999
second point	6000	47.3	4.08	4.08	1.001
third point	6000	23.7	2.05	2.01	1.018
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	8.18	8.19	0.998
Average Correction Factor					1.006

Corrected As found 8.11 Previous response 8.19 % change 1.0%



Wood Buffalo Environmental Association

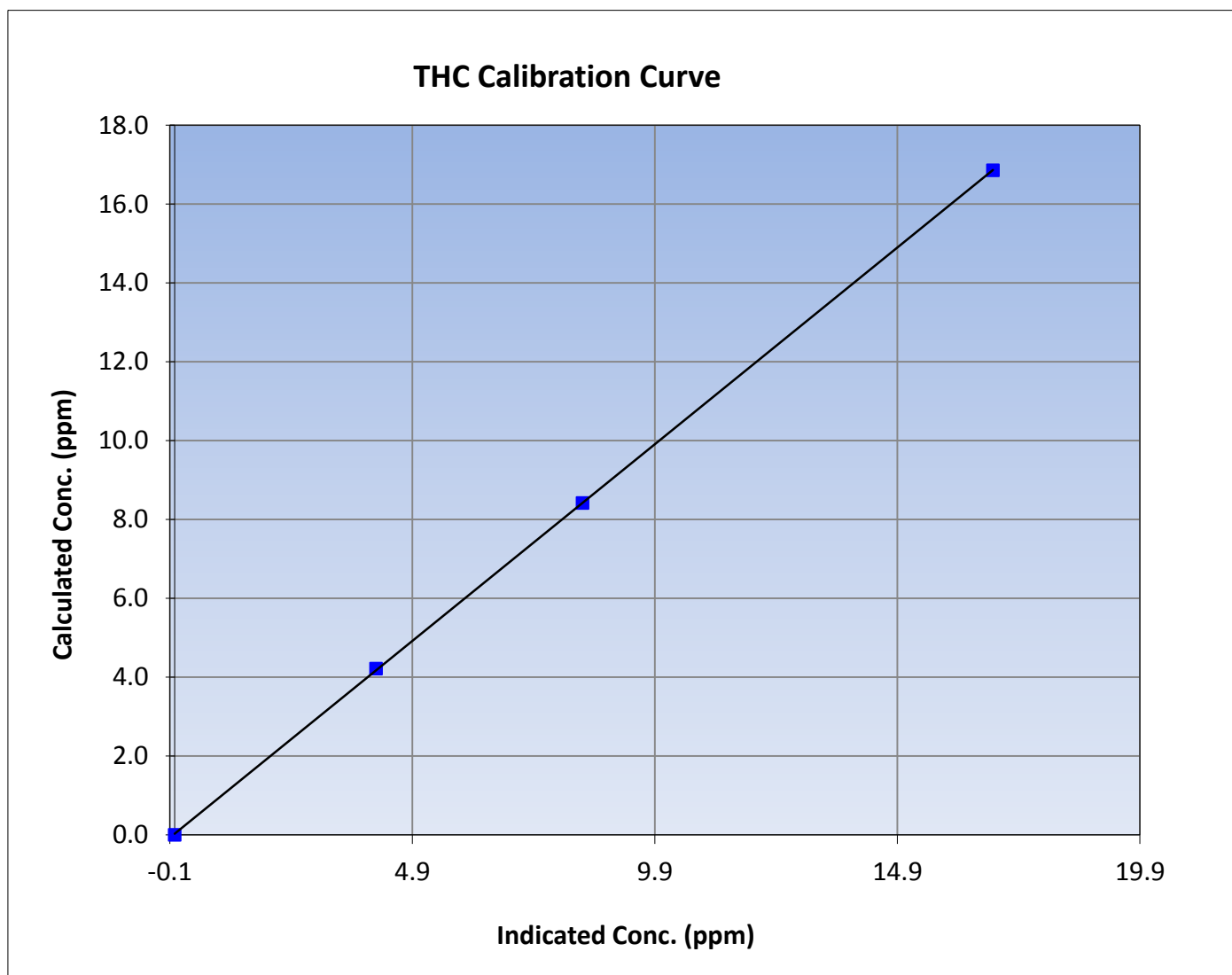
THC Calibration Summary

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	13:40
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	0.999979
16.86	16.87	0.9992		
8.42	8.41	1.0011	Slope	0.997836
4.22	4.15	1.0165		
			Intercept	0.032071





Wood Buffalo Environmental Association

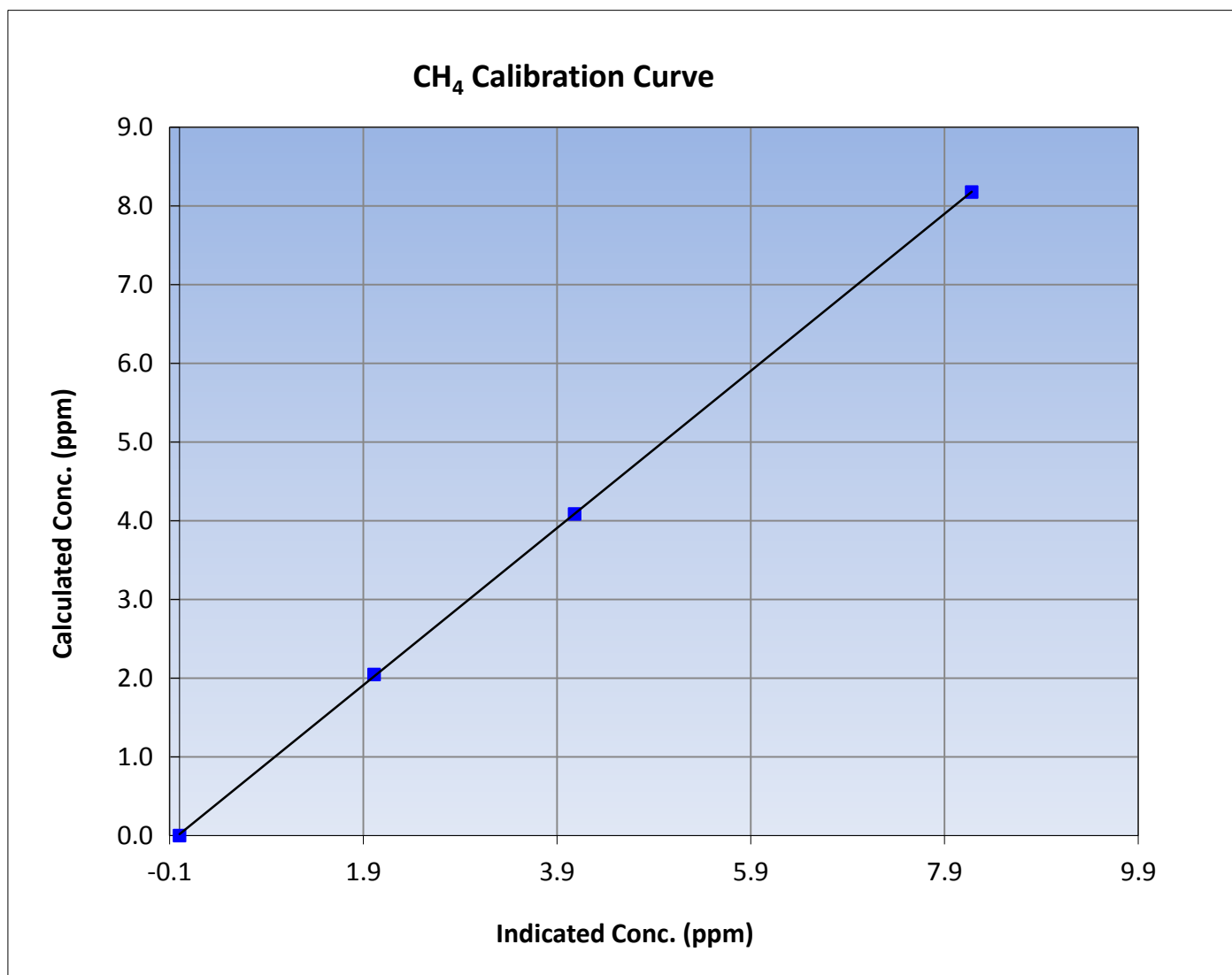
CH₄ Calibration Summary

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	13:40
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	0.999976
8.18	8.18	0.9995		
4.08	4.08	1.0009	Slope	0.997985
2.05	2.01	1.0180		
			Intercept	0.016046





Wood Buffalo Environmental Association

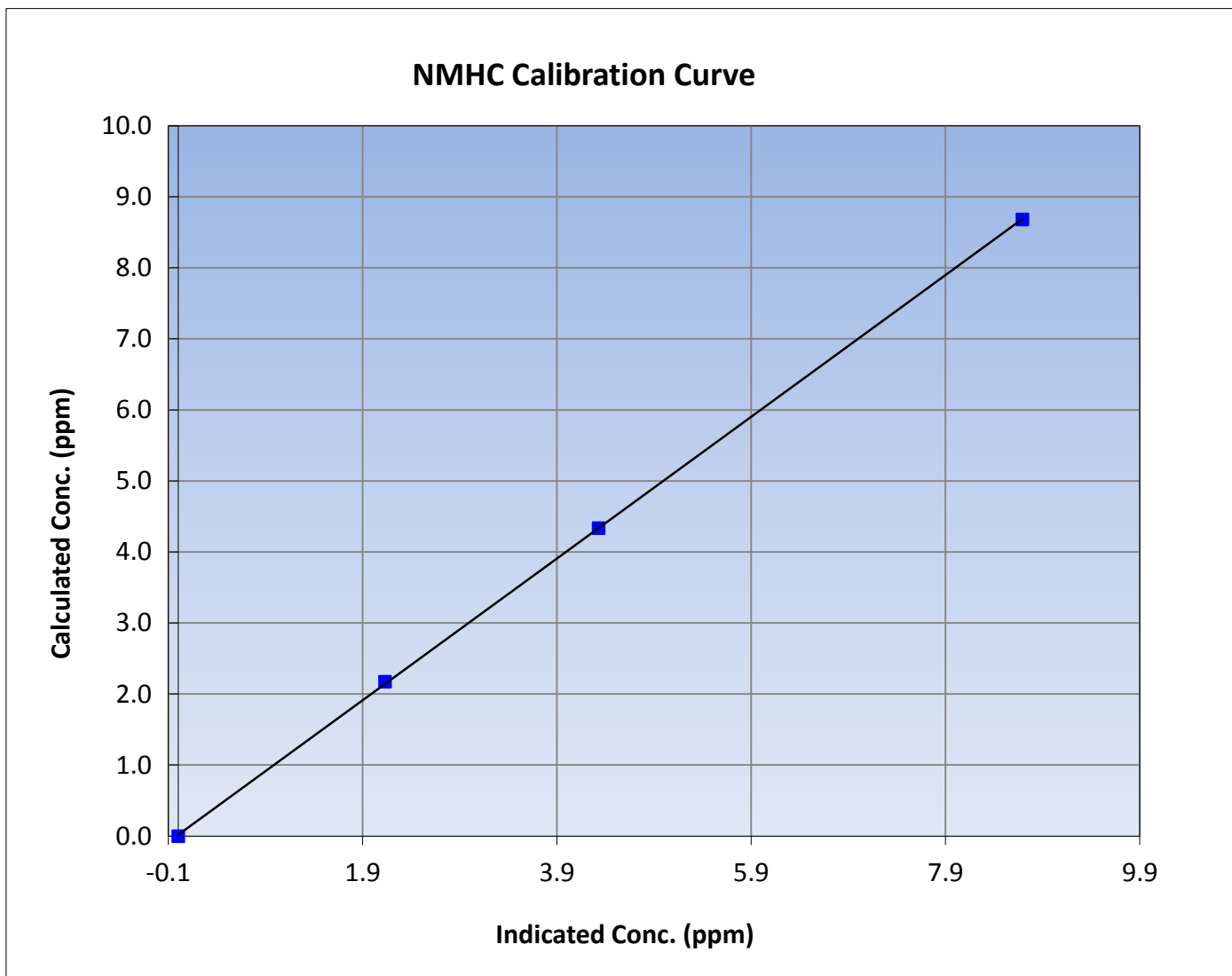
NMHC Calibration Summary

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	13:40
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

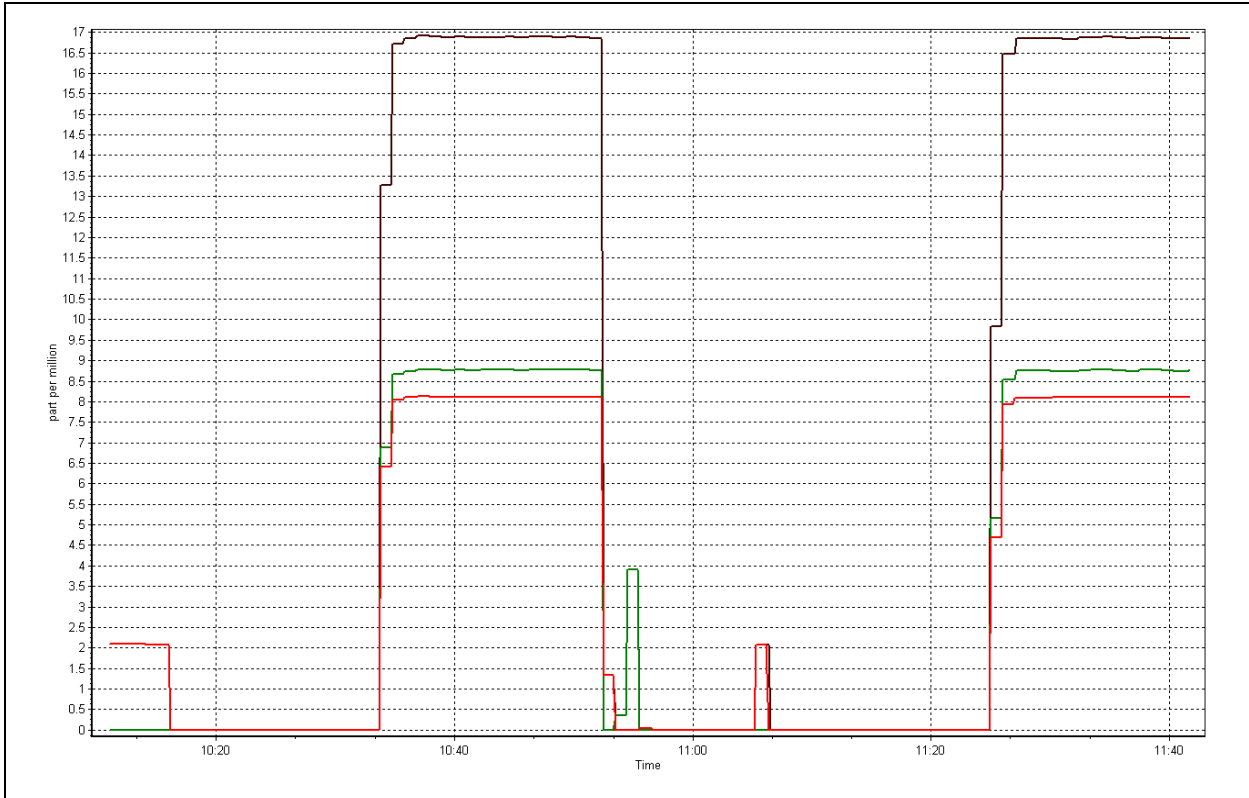
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999970
8.68	8.69	0.9989		
4.34	4.33	1.0013	Slope	0.997291
2.17	2.13	1.0200		
			Intercept	0.020053

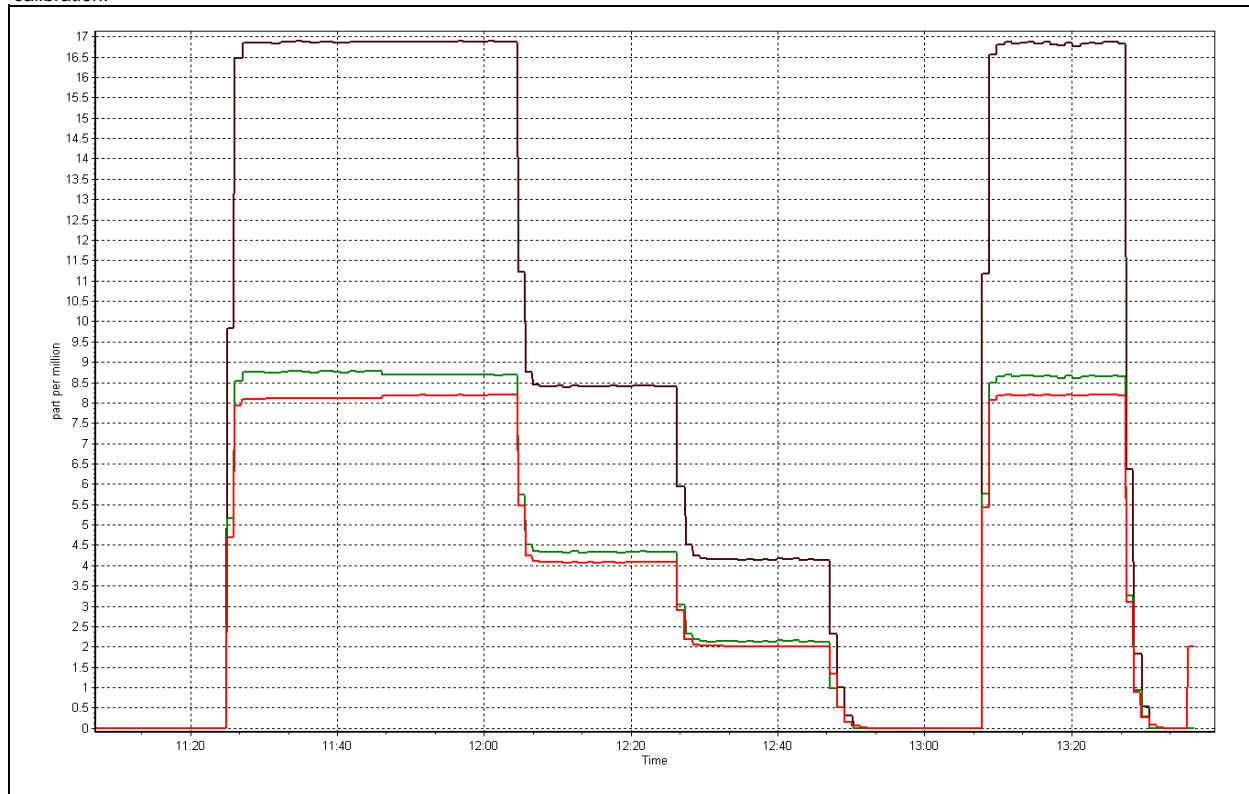


THC Calibration Plot
as found:

Date: November 4, 2015



calibration:





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 20, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:50
NO2 GPT Ref date	November-12-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.1	26.1
Analyzer IP address	192.168.1.49		Lamp temp.	53.5	53.4
Calculated slope	0.998304	1.000828	Pressure	670.0	665.6
Calculated intercept	-1.330325	-1.457132	Flow cell A	0.709	0.706
Analyzer Background	-1.7	-1.7	Flow cell B	0.731	0.728
Analyzer Coefficient	1.050	1.045	Cell A Intensity	78540	77603
			Cell B Intensity	73335	73063

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
---------------	------------	-------------------	------------

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	0.3	----
as found span	5500	0.78	406.8	410.4	0.991
calibrator zero	5500	0.00	0.0	0.1	----
high point	5500	0.78	406.8	407.0	0.999
second point	5500	0.52	255.4	257.5	0.992
third point	5500	0.26	103.7	106.6	0.973
as left zero	5500	0.00	0.0	0.8	----
as left span	5500	0.78	406.8	402.3	1.011
Average Correction Factor					0.988

Corrected As found	410.0	Previous response	408.8	% change	-0.3%
--------------------	-------	-------------------	-------	----------	-------

Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



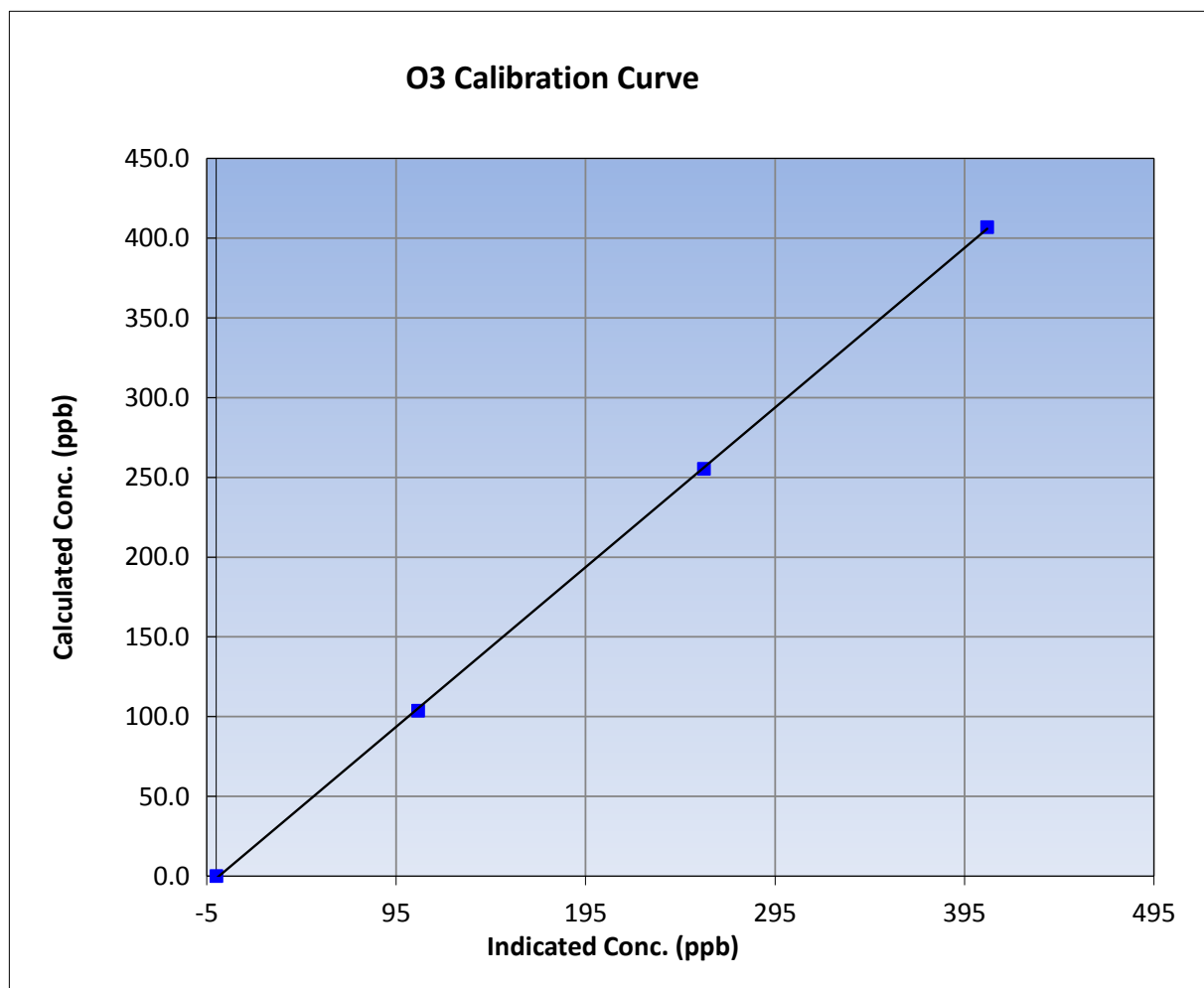
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-12-15	Previous Calibration	October 20, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:30	End Time (MST)	13:50
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

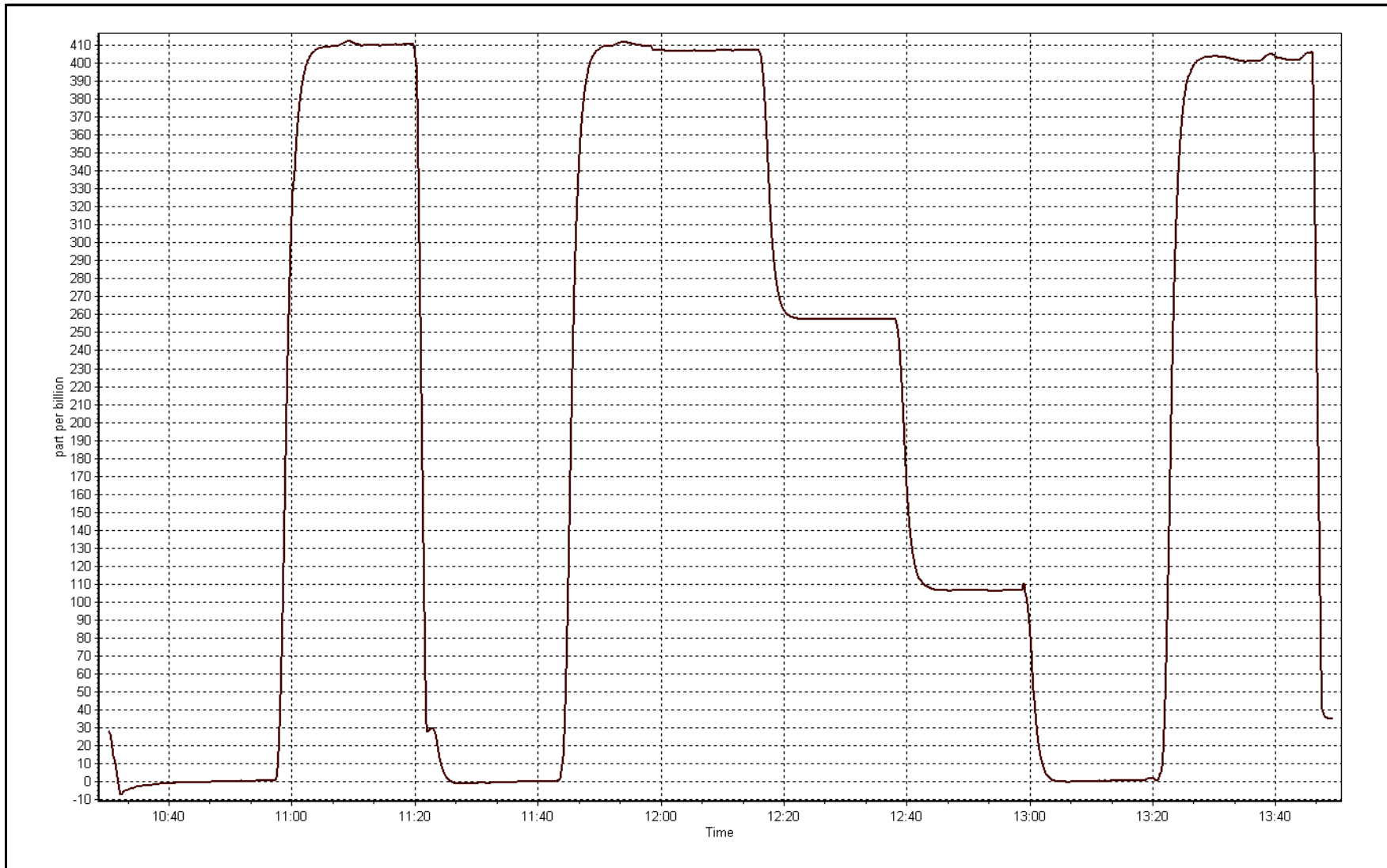
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999940
406.8	407.0	0.9995		
255.4	257.5	0.9920	Slope	1.000828
103.7	106.6	0.9733		
			Intercept	-1.457132



O3 Calibration Plot

Date: November 12, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 9, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	15:20
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOx Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996091	1.000149	1.000146
	Data Offset	0.323623	0.784267	-0.841005
Current Calibration	Data Slope	0.998184	0.999473	0.998614
	Data Offset	0.287446	0.562896	-0.397298

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.044		1.036	
NOx coefficient	1.002		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.6		2.600	
NOx bkgrnd	2.9		2.900	
Chamber Temp	50.5	Deg C	50.500	Deg C
Moly Temp	326.8	Deg C	322.600	Deg C
PMT voltage	-761.1	V	-761.100	V
PMT Temp	-3	Deg C	-3.000	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	165.8	mmHg	164.700	mmHg
R Cell Press Nox	165.8	mmHg	164.700	mmHg
NO sample flow	0.871	lpm	0.871	lpm
Nox sample Flow	0.871	lpm	0.871	lpm

Notes:

Inlter filter changed after as founds. No adjustments made.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 9, 2015

Station Number:

AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.2	0.2	0.1	----	----
as found span	6000	94.7	800.2	800.2	0.0	807.0	803.6	3.5	0.9916	0.9958
calibrator zero	6000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
high point	6000	94.7	800.2	800.2	0.0	800.9	799.8	1.1	0.9991	1.0005
second point	6000	47.3	399.7	399.7	0.0	402.0	400.8	1.2	0.9943	0.9972
third point	6000	23.7	200.3	200.3	0.0	198.5	197.9	0.6	1.0087	1.0117
as left zero	6000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	6000	94.7	800.2	390.0	410.2	806.0	396.6	409.3	0.9929	0.9833
Average Correction Factor									1.0007	1.0031

Corrected As found

NO_x= 806.8

NO= 803.4

Percent Change

NO_x= -0.5%

NO= -0.5%

Previous Response

NO_x= 803.0

NO= 799.3

GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

94.70

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	390.0	412.7	803.6	390.0	413.5	0.9803	1.0000	0.9980	100.2%
2nd NO2 (200)	----	540.3	262.4	803.5	540.3	263.2	0.9804	1.0000	0.9969	100.3%
3rd NO2 (100)	----	693.4	109.3	803.7	693.4	110.3	0.9802	1.0000	0.9909	100.9%
4th NO2 (0)	802.7	----	1.0	803.7	802.7	1.0	0.9802	1.0000	N/A	----
Average Correction Factor							0.9803	1.0000	0.9953	100.5%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

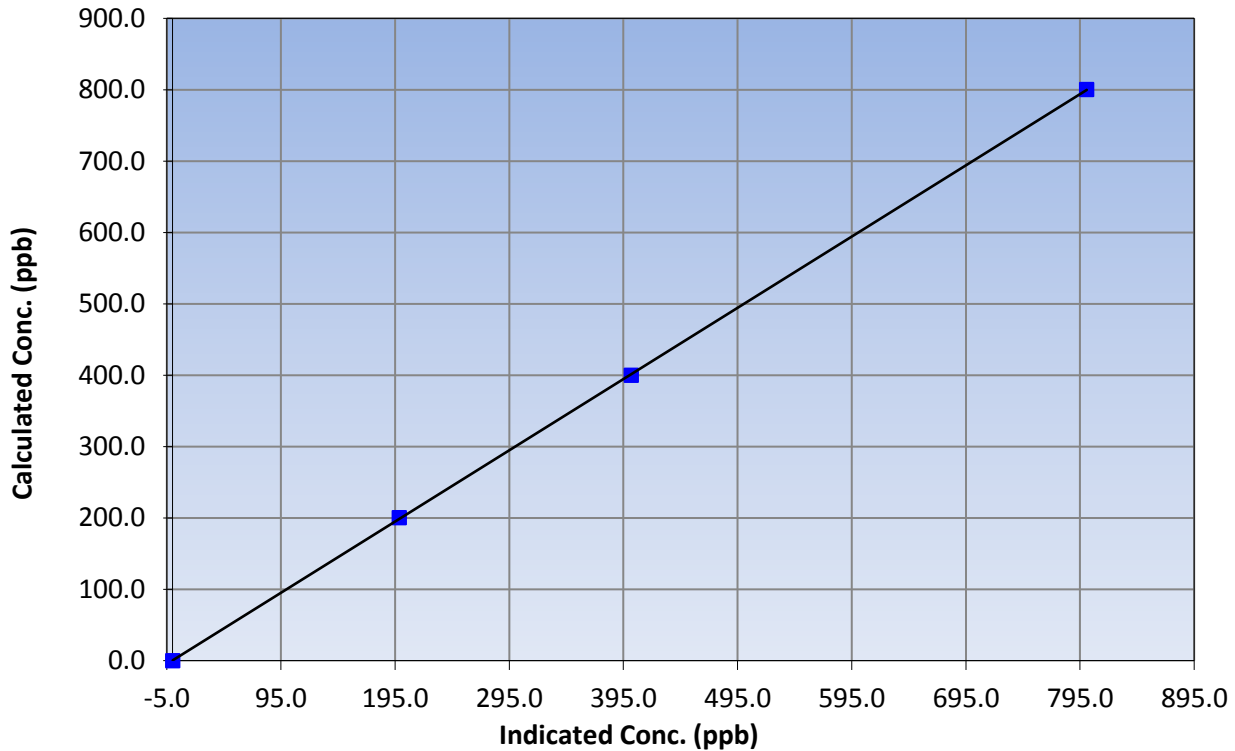
Station Information

Calibration Date	November 9, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:55	End Time (MST)	15:20
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	0.999980
800.2	800.9	0.9991		
399.7	402.0	0.9943	Slope	0.998184
200.3	198.5	1.0087		
			Intercept	0.287446

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

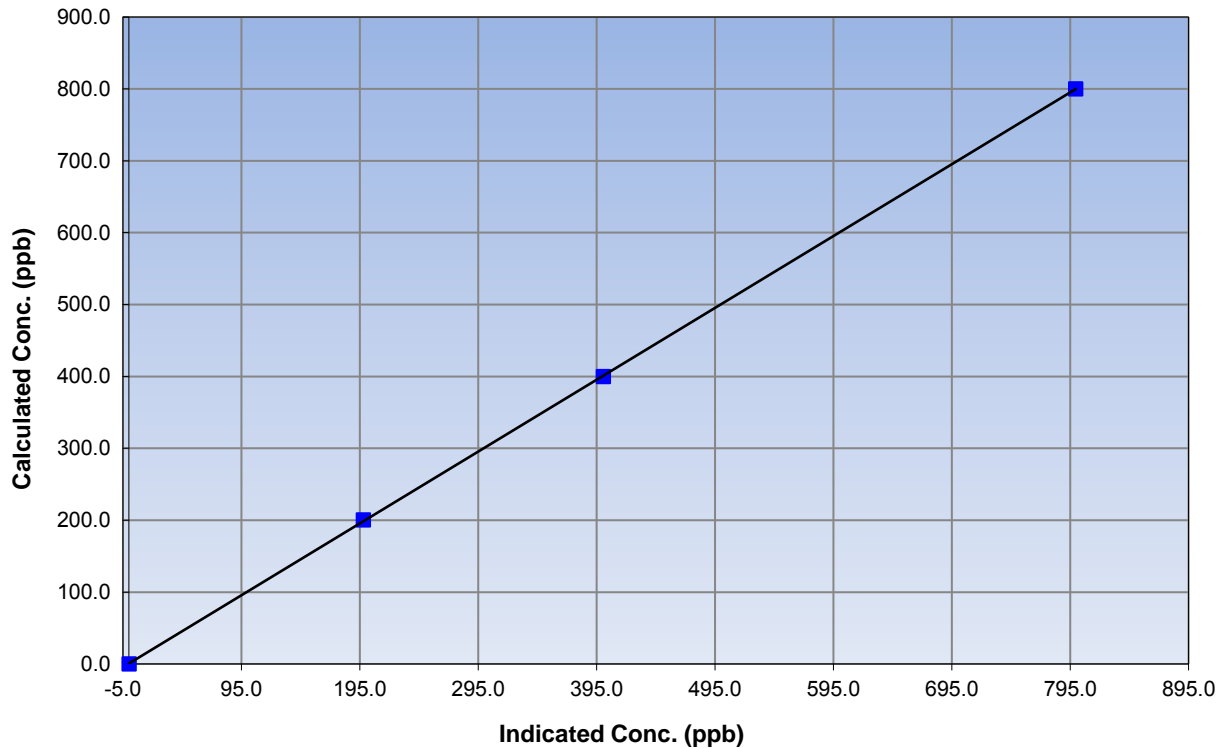
Station Information

Calibration Date	November 9, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:55	End Time (MST)	15:20
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	0.999982
800.2	799.8	1.0005		
399.7	400.8	0.9972	Slope	0.999473
200.3	197.9	1.0117		
			Intercept	0.562896

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

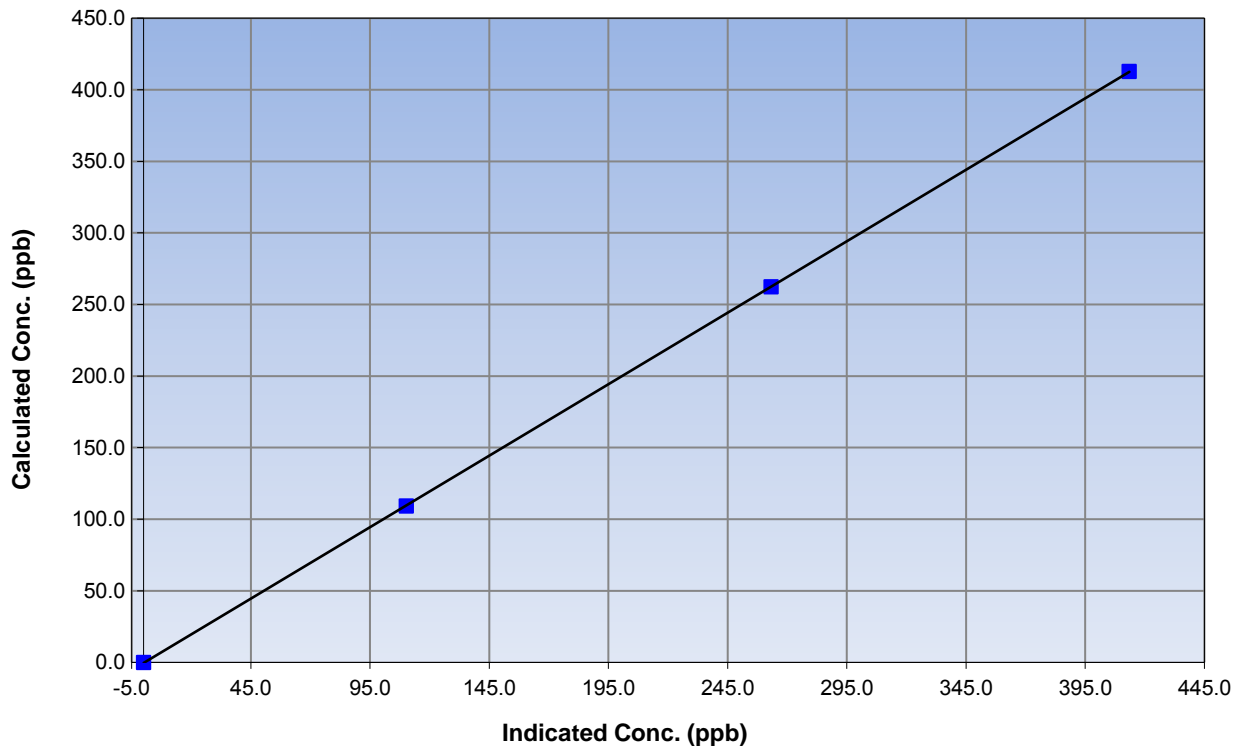
Station Information

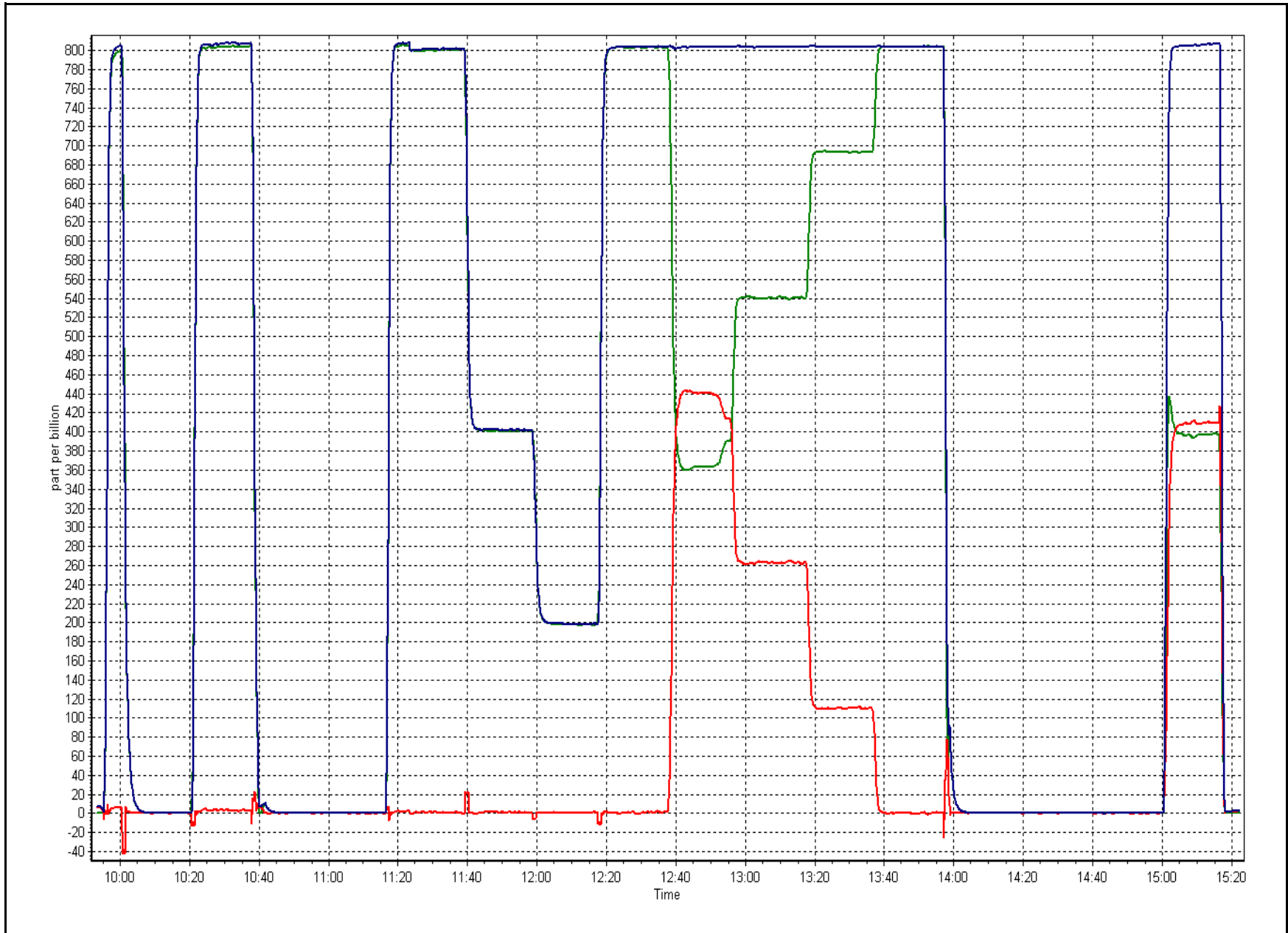
Calibration Date	November 9, 2015	Previous Calibration	October 19, 2015
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:55	End Time (MST)	15:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999996
412.7	413.5	0.9980		
262.4	263.2	0.9969	Slope	0.998614
109.3	110.3	0.9909		
			Intercept	-0.397298

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	October 19, 2015	NOX Previous Cal Date	October 19, 2015
NH3 Calibration Date	NA	NH3 Previous Cal Date	October 19, 2015
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	15:20
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	75.1 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.7 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355

DACs Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 9036

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.998912	0.986107	1.010122	1.003429	1.005609
	Data Offset	-4.365037	-5.032690	0.362104	1.939237	0.186767
Cal Stats After	Data Slope			0.997750	0.997668	1.021990
	Data Offset			2.662227	2.745419	2.064149
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model API T201 Analyzer serial # 215
 Converter API 501 NH# Converter serial # 217

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOX Conc range	1000	ppb	1000	ppb
NO BKG	-1.2	ppb	-0.2	ppb
NOx BKG	-0.6	ppb	-0.2	ppb
Nt BKG	-0.4		-0.4	
NO coefficient	1.069		1.069	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.072		1.072	
NH3 coefficient	0.964			
Nt coefficient	1.066		1.066	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	49.9	Deg C
Moly Temp	314.8	Deg C	316.0	Deg C
PMT Temp	7.0	Deg C	7.1	Deg C
O3 flow	85.0	ccm	85.0	ccm
R Cell Press	4.4	mmHg	4.9	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	553.0	ccm	563.0	ccm
Sample Flow 2 Nox	553.0	ccm	563.0	ccm
Sample Flow 3 Nt	553.0	ccm	563.0	ccm

Notes:

As founds captured; NOX calibration showed linearity and response stability issues starting. Preventative maintenance done; full NOX/NH3 calibration completed Nov 10th.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

NA

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										
as found NO										
calibrator zero	6000	0.0	0.0	0.0	0.0	0.9	0.3	0.5	----	----
high NO point	6000	94.7	800.2	800.2	----	805.0	800.7	4.3	0.994	----
NO/O ₃ point	6000	94.7	800.2	800.2	----	800.1	795.3	4.8	1.000	----
as found NH ₃										
first NH ₃										
second NH ₃										
third NH ₃										
Average Correction Factor									0.9971	

NH₃ Corrected As Found
 Nt Corrected As Found
 NO_x Corrected As Found

NH₃ = NA ppb
 Nt = NA ppb
 NO_x = NA ppb

Previous Response
 Previous Response
 Previous Response

NH₃ = NA ppb
 Nt = NA ppb
 NO_x = NA ppb

NH₃ percent change NA
 Nt percent change NA
 NO_x percent change NA



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date:

October 19, 2015

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	6000	0.0	0.0	0.0	0.0	-1.7	-1.7	-1.5	----	----
as found span	6000	94.7	800.2	800.2	800.2	796.9	796.9	799.3	1.0042	1.0042
calibrator zero	6000	0.0	0.0	0.0	0.0	0.3	0.4	0.9	----	----
high point	6000	94.7	800.2	800.2	800.2	800.7	800.7	805.0	0.9994	0.9994
second point	6000	47.3	399.7	399.7	399.7	396.8	396.8	397.3	1.0073	1.0074
third point	6000	23.7	200.3	200.3	200.3	194.8	194.6	195.7	1.0278	1.0291
as left zero	6000	0.0	0.0	0.0	0.0	0.3	0.1	2.2	----	----
as left span	6000	94.7	800.2	360.6	800.2					
Average Correction Factor									1.0115	1.0119

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	800.8	798.6	798.6	423.8
Previous Response	816.5	791.8	795.5	432.1
Percent Change	2.0%	-0.8%	-0.4%	1.9%

GPT Calibration Data

Total Flow 6000 ccm Source Gas Flow 94.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO 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
Cal zero			0.0			0.0			----	
1st NO ₂ (300)	----	360.6	434.7	784.6	360.6	423.8	1.0199	1.0000	1.0256	97.5%
2nd NO ₂ (200)	----	534.4	260.9	787.9	534.4	253.5	1.0156	1.0000	1.0292	97.2%
3rd NO ₂ (100)	----	688.2	107.1	788.2	688.2	100.0	1.0152	1.0000	1.0709	93.4%
4th NO ₂ (0)	795.3	----	0.0	795.3	795.3	0.0	1.0062	1.0000	----	----
Average Correction Factor							1.0142	1.0000	1.0419	96.0%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NOx Calibration Summary

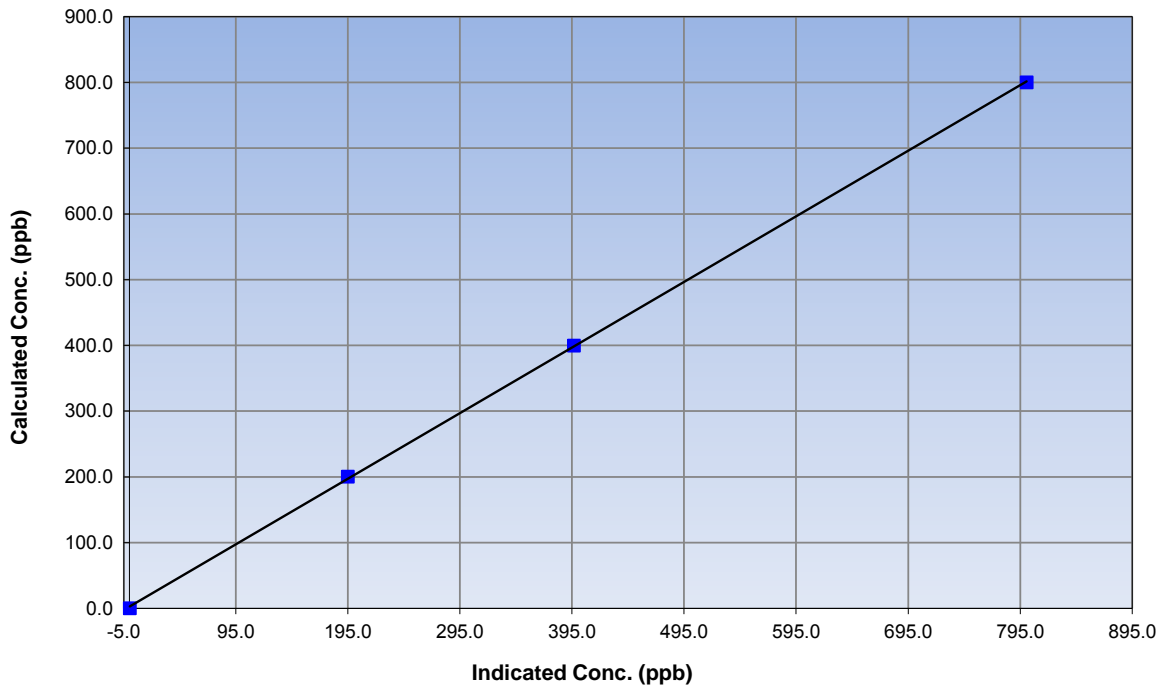
Station Information

Calibration Date	October 19, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:55	End Time (MST)	15:20
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	0.3	----	Correlation Coefficient	0.999936
800.2	800.7	0.9994		
399.7	396.8	1.0073	Slope	0.997750
200.3	194.8	1.0278		
			Intercept	2.662227

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

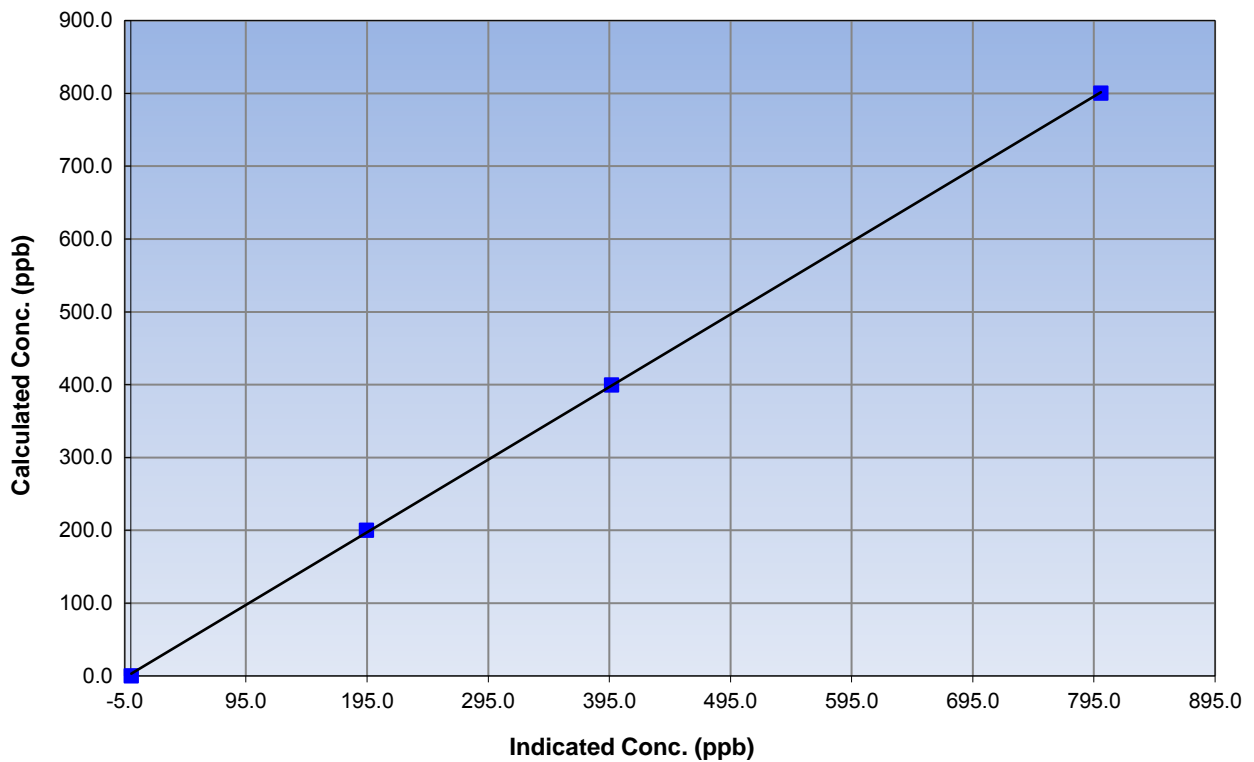
Station Information

Calibration Date	October 19, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:55	End Time (MST)	15:20
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	0.4	----	Correlation Coefficient	0.999931
800.2	800.7	0.9994		
399.7	396.8	1.0074	Slope	0.997668
200.3	194.6	1.0291		
			Intercept	2.745419

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

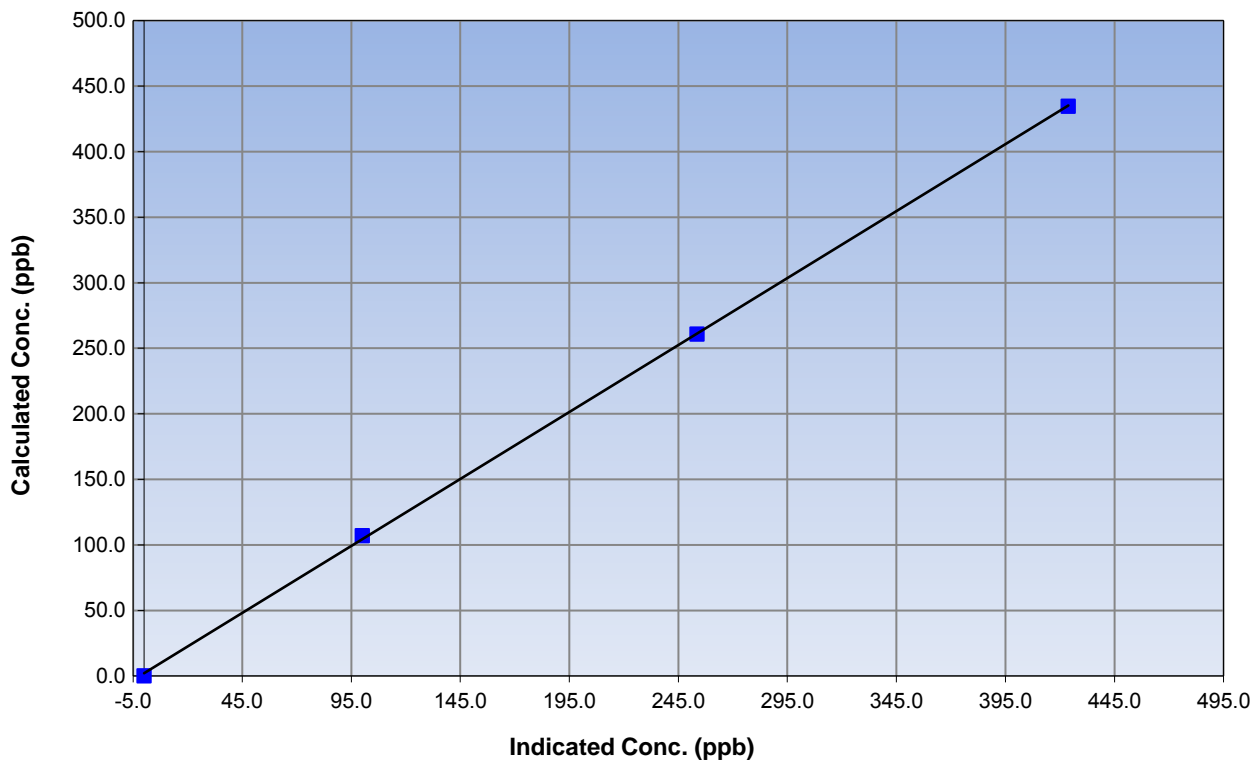
Station Information

Calibration Date	October 19, 2015	Previous Calibration	October 19, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:55	End Time (MST)	15:20
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

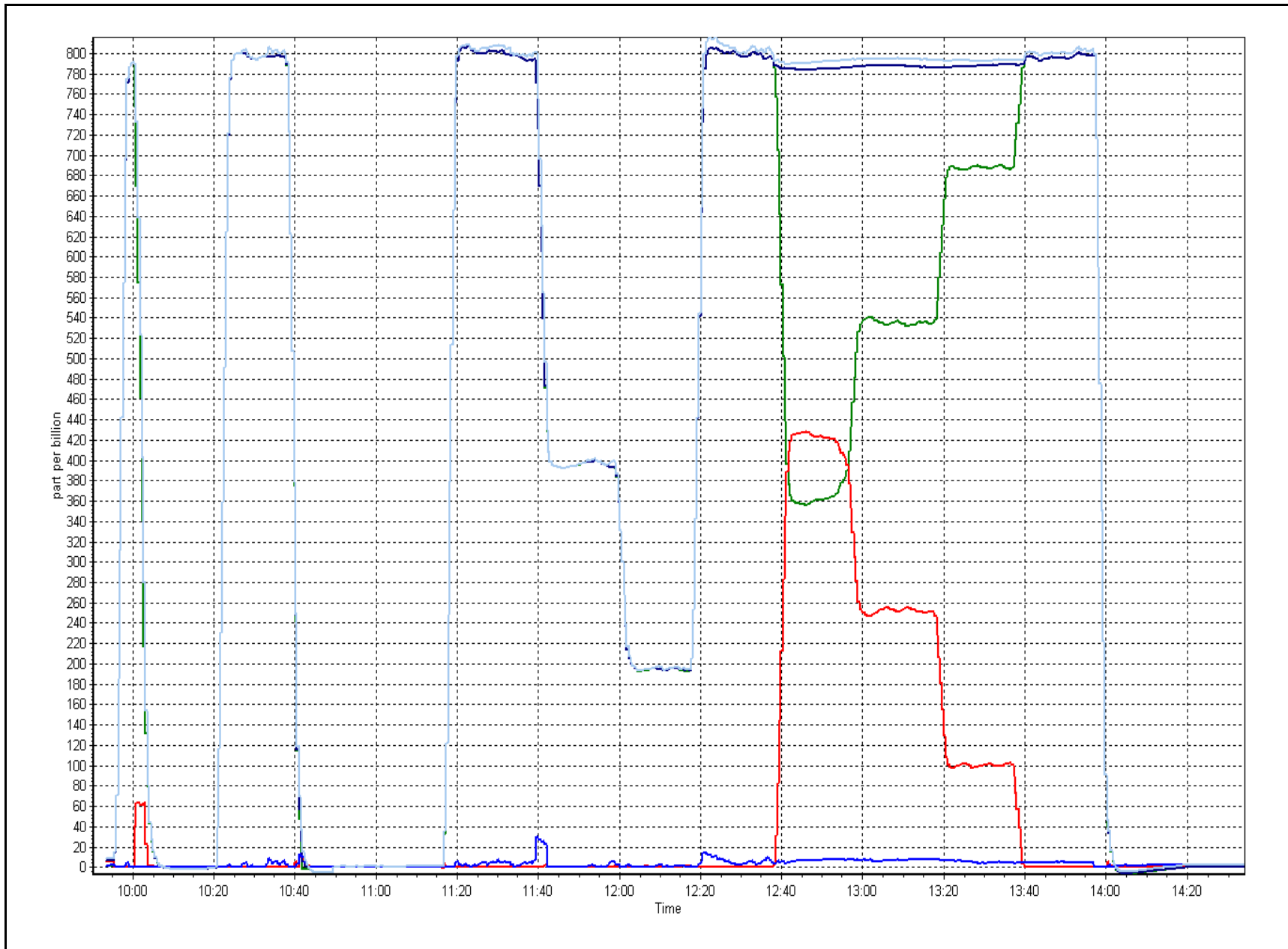
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999883
434.7	423.8	1.0256		
260.9	253.5	1.0292	Slope	1.021990
107.1	100.0	1.0709		
			Intercept	2.064149

NO₂ Calibration Curve



NOX Calibration Plot

Date:





Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	November 10, 2015	NOX Previous Cal Date	November 9, 2015
NH3 Calibration Date	November 10, 2015	NH3 Previous Cal Date	October 19, 2015
Reason:	Routine		
Start Time (MST)	12:15	End Time (MST)	18:00
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	75.1 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.7 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355

DACs Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 9036

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.998912	0.986107	0.997750	0.997668	1.021990
	Data Offset	-4.365037	-5.032690	2.662227	2.745419	2.064149
Cal Stats After	Data Slope	1.002926	0.986725	0.997724	0.998232	1.005796
	Data Offset	-2.970816	-3.936473	4.196831	5.263725	-0.401030
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model	<u>API T201</u>	Analyzer serial #	215
Converter	<u>API 501 NH#</u>	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	1.069		1.069	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.072		1.072	
NH3 coefficient			0.964	
Nt coefficient	1.066		1.066	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	316.0	Deg C	316.0	Deg C
PMT Temp	7.1	Deg C	7.1	Deg C
O3 flow	85.0	ccm	85.0	ccm
R Cell Press	4.9	mmHg	4.9	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	563.0	ccm	563.0	ccm
Sample Flow 2 Nox	563.0	ccm	563.0	ccm
Sample Flow 3 Nt	563.0	ccm	563.0	ccm

Notes:

Critical flow orifice o-rings and filters replaced. Removed metal shaving from exhaust manifold. NO/Nox span adjusted.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

November 10, 2015

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										
as found NO										
calibrator zero	5500	0.0	0.0	0.0	0.0	-1.6	-2.4	0.9	----	----
high NO point	5500	86.8	800.1	800.1	----	798.9	799.1	0.1	1.002	----
NO/O ₃ point	5500	86.8	800.1	800.1	----	798.9	799.1	-0.1	1.002	----
as found NH ₃										
first NH ₃	3500	93.2	1999.8	NA	1999.8	2026.3	30.9	1995.4	0.987	1.002
second NH ₃	3500	46.6	999.9	NA	999.9	1024.9	22.4	1002.5	0.976	0.997
third NH ₃	3500	23.3	500.0	NA	500.0	513.1	10.6	502.5	0.974	0.995
Average Correction Factor									1.0015	0.9982

NH₃ Corrected As Found
 Nt Corrected As Found
 NO_x Corrected As Found

NH₃ = NA ppb
 Nt = NA ppb
 NO_x = NA ppb

Previous Response
 Previous Response
 Previous Response

NH₃ = NA ppb
 Nt = NA ppb
 NO_x = NA ppb

NH₃ percent change NA
 Nt percent change NA
 NO_x percent change NA



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: November 10, 2015 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										
as found span										
calibrator zero	5500	0.0	0.0	0.0	0.0	-2.4	-2.8	-1.6	----	----
high point	5500	86.8	800.1	800.1	800.1	799.1	797.6	798.9	1.0013	1.0032
second point	5500	43.4	400.1	400.1	400.1	394.6	394.0	394.5	1.0139	1.0153
third point	5500	21.7	200.0	200.0	200.0	195.4	192.8	194.1	1.0238	1.0373
as left zero	5500	0.0	0.0	0.0	0.0	-0.8	-1.0	2.0	----	----
as left span	5500	94.7	873.0	396.6	873.0	794.5	406.3	795.2	1.0987	0.9761
Average Correction Factor									1.0130	1.0186

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	NA	NA	NA	397.8
Previous Response	NA	NA	NA	390.3
Percent Change	NA	NA	NA	-1.9%

GPT Calibration Data

Total Flow 6000 ccm Source Gas Flow 86.80 ccm

O3 Setpoint (ppb)	Indicated NO high point (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
Cal zero			0.0			1.5			----	
1st NO ₂ (300)	----	396.6	401.0	795.8	396.6	399.3	0.9216	1.0000	1.0042	99.6%
2nd NO ₂ (200)	----	544.0	253.5	796.8	544.0	252.8	0.9205	1.0000	1.0030	99.7%
3rd NO ₂ (100)	----	691.1	106.5	795.7	691.1	104.6	0.9218	1.0000	1.0178	98.3%
4th NO ₂ (0)	797.6	----	1.5	799.1	797.6	1.5	0.9179	1.0000	----	----
Average Correction Factor							0.9205	1.0000	1.0083	99.2%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

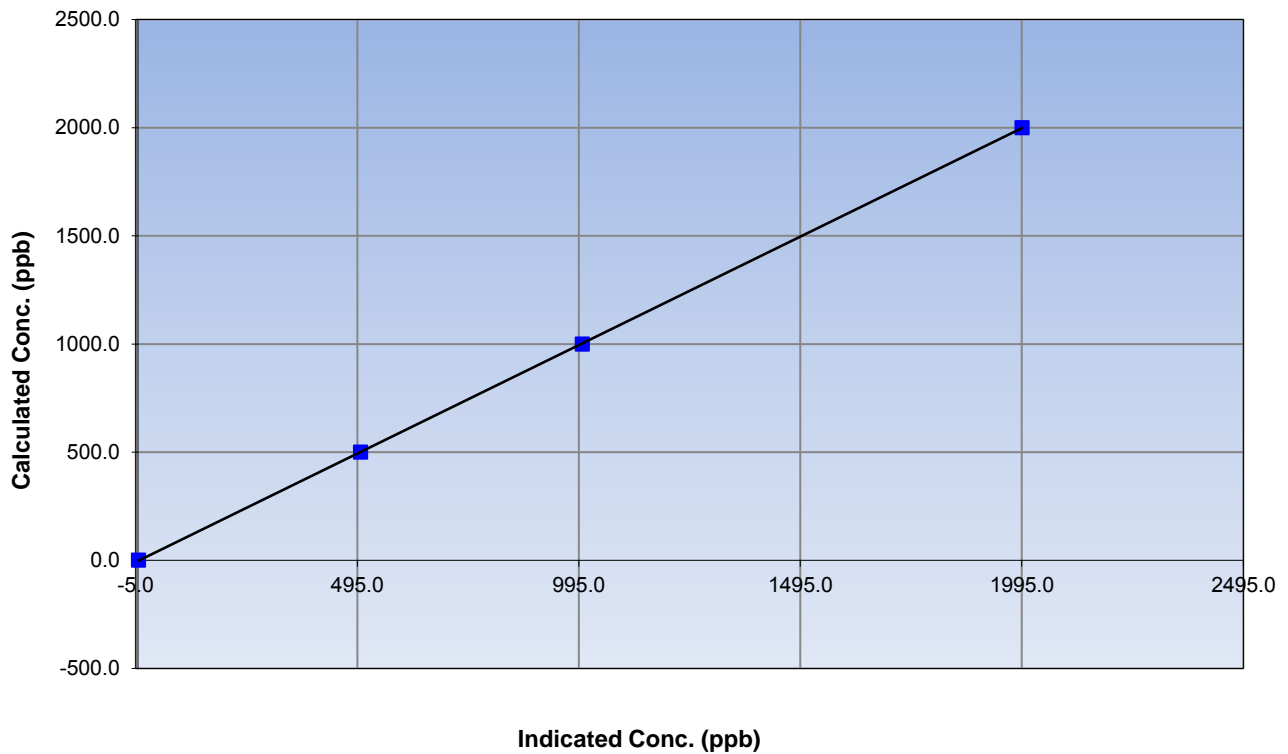
Station Information

Calibration Date	November 10, 2015	Previous Calibration	November 9, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:15	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	----	Correlation Coefficient	0.999993
1999.8	1995.4	1.0022		
999.9	1002.5	0.9974	Slope	1.002926
500.0	502.5	0.9949		
			Intercept	-2.970816

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

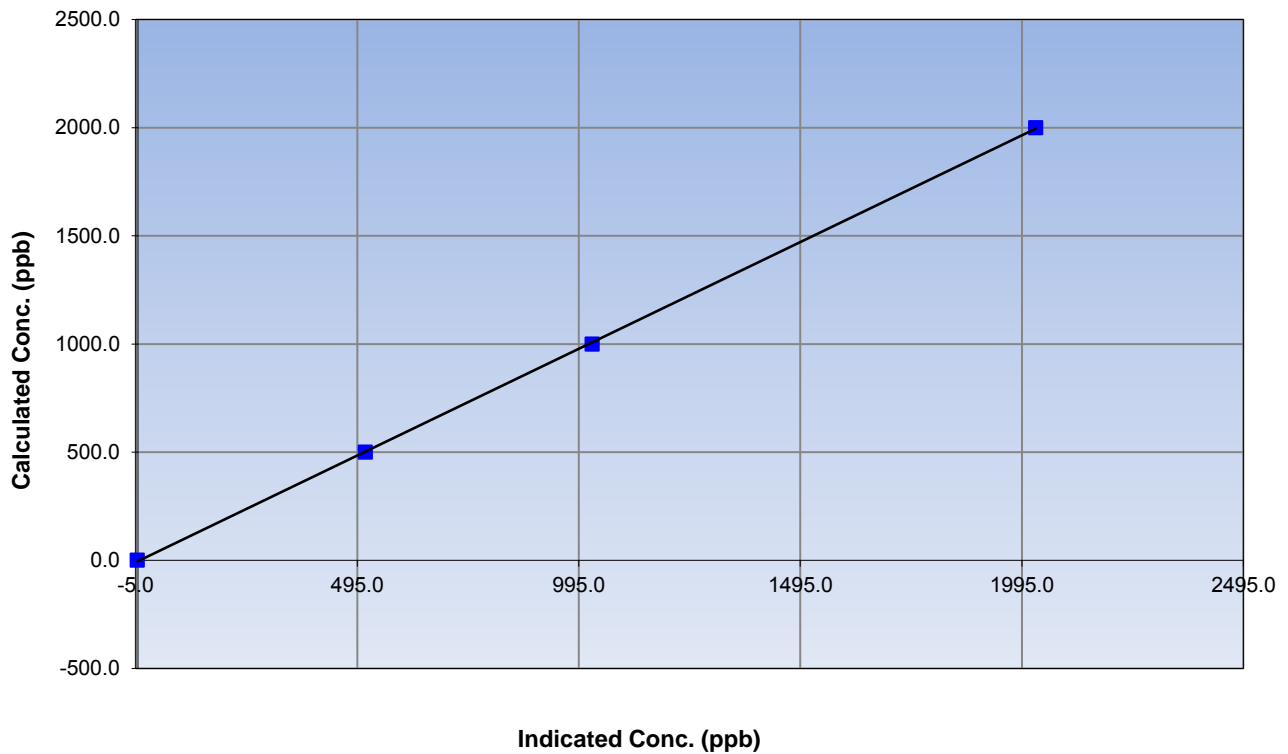
Station Information

Calibration Date	November 10, 2015	Previous Calibration	November 9, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:15	End Time (MST)	18:00
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	-1.6	----	Correlation Coefficient	0.999950
1999.8	2026.3	0.9869		
999.9	1024.9	0.9756	Slope	0.986725
500.0	513.1	0.9744		
			Intercept	-3.936473

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

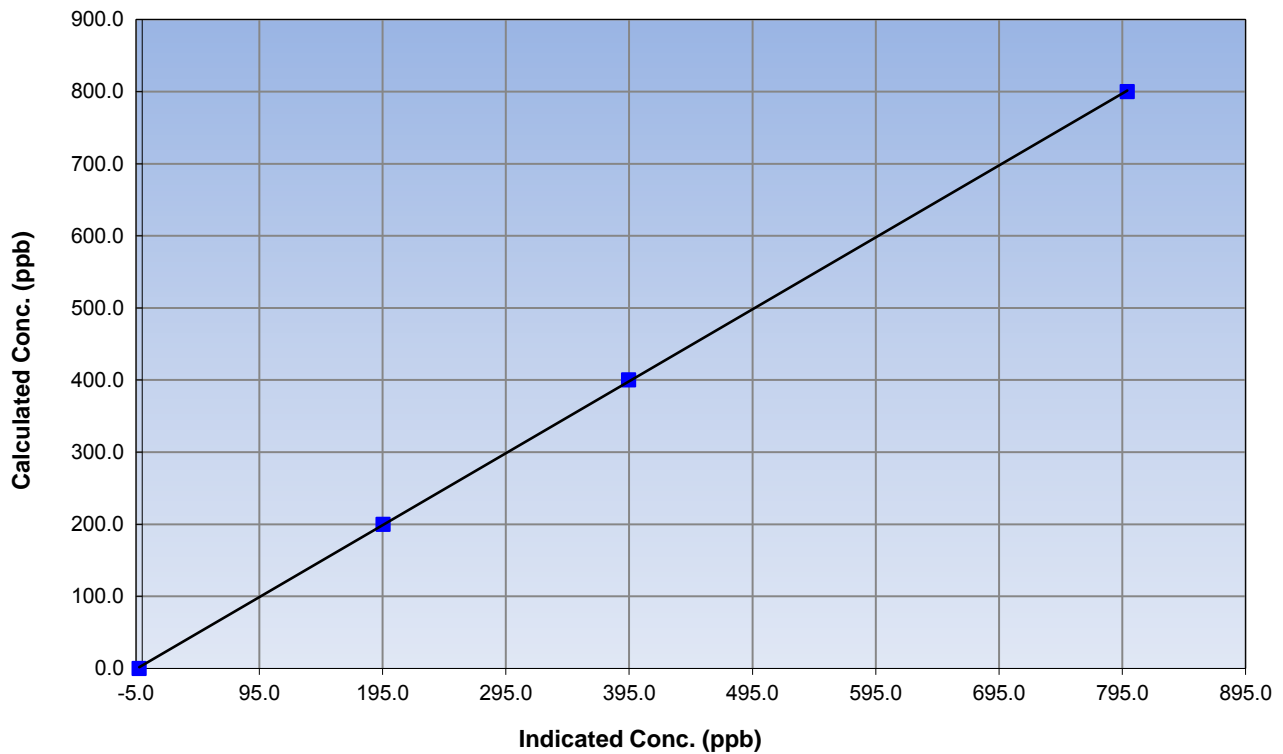
Station Information

Calibration Date	November 10, 2015	Previous Calibration	November 9, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:15	End Time (MST)	18:00
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	-2.4	----	Correlation Coefficient	0.999970
800.1	799.1	1.0013		
400.1	394.6	1.0139	Slope	0.997724
200.0	195.4	1.0238		
			Intercept	4.196831

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

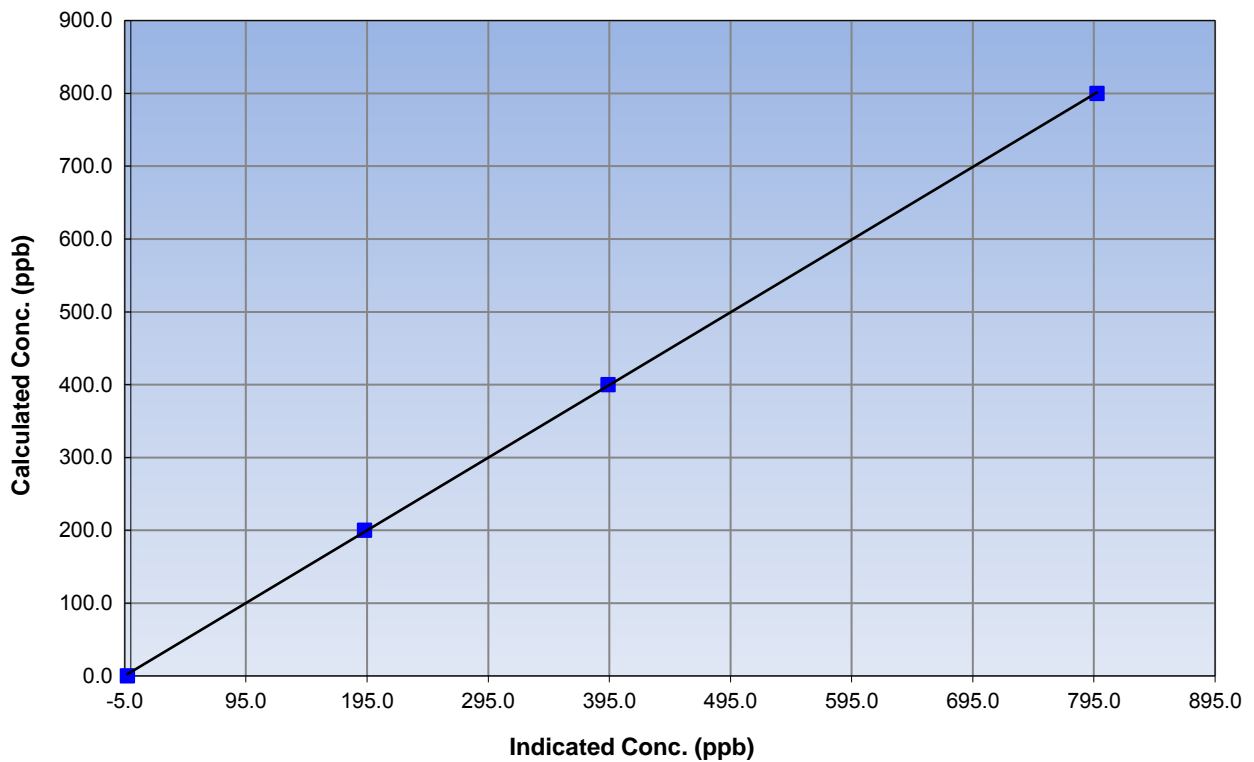
Station Information

Calibration Date	November 10, 2015	Previous Calibration	November 9, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:15	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-2.8	----	Correlation Coefficient	0.999957
800.1	797.6	1.0032		
400.1	394.0	1.0153	Slope	0.998232
200.0	192.8	1.0373		
			Intercept	5.263725

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

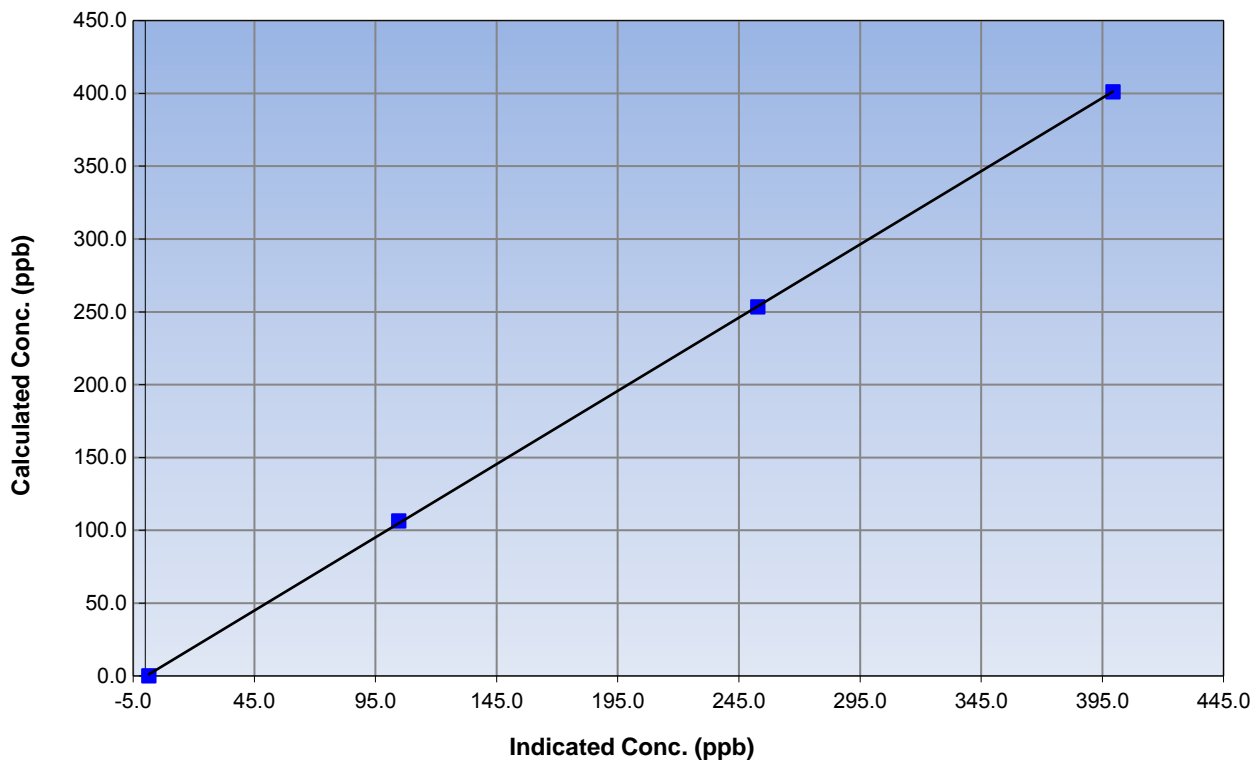
Station Information

Calibration Date	November 10, 2015	Previous Calibration	November 9, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	12:15	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

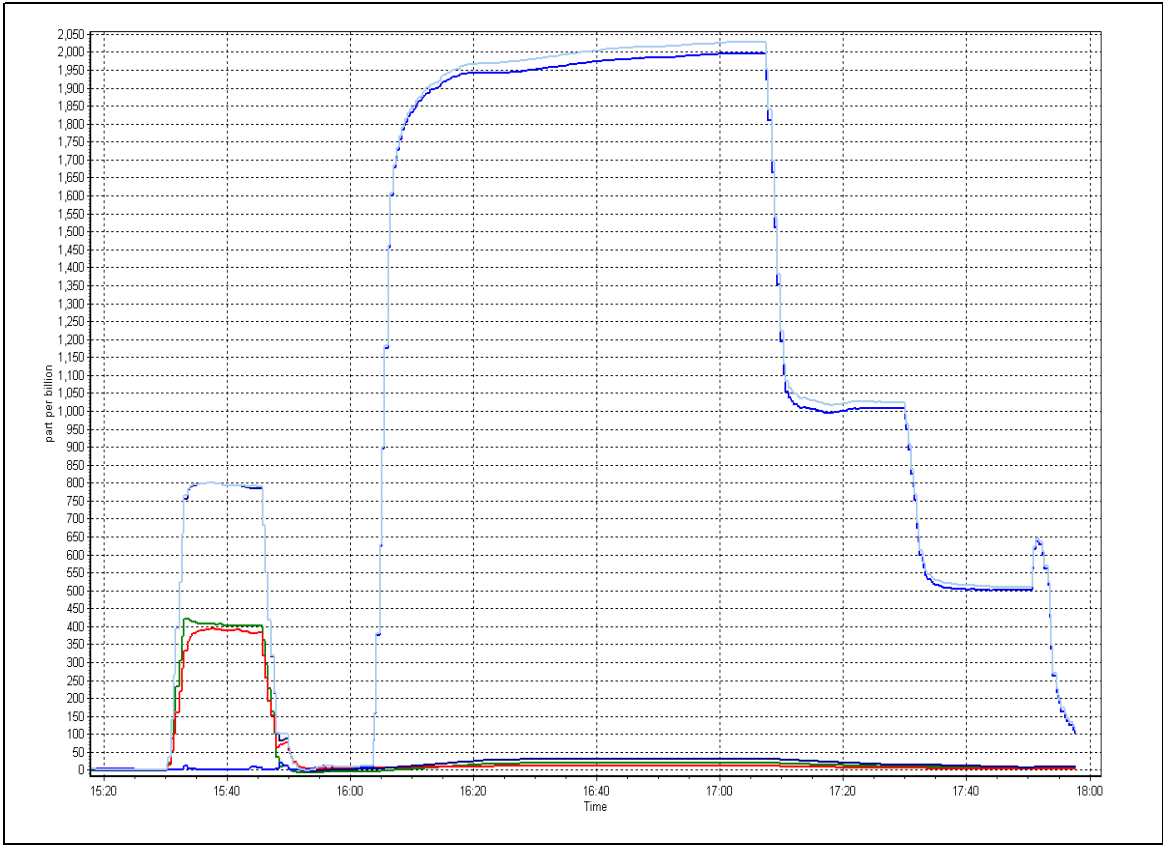
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.5	----	Correlation Coefficient	0.999955
401.0	399.3	1.0042		
253.5	252.8	1.0030	Slope	1.005796
106.5	104.6	1.0178		
			Intercept	-0.401030

NO₂ Calibration Curve



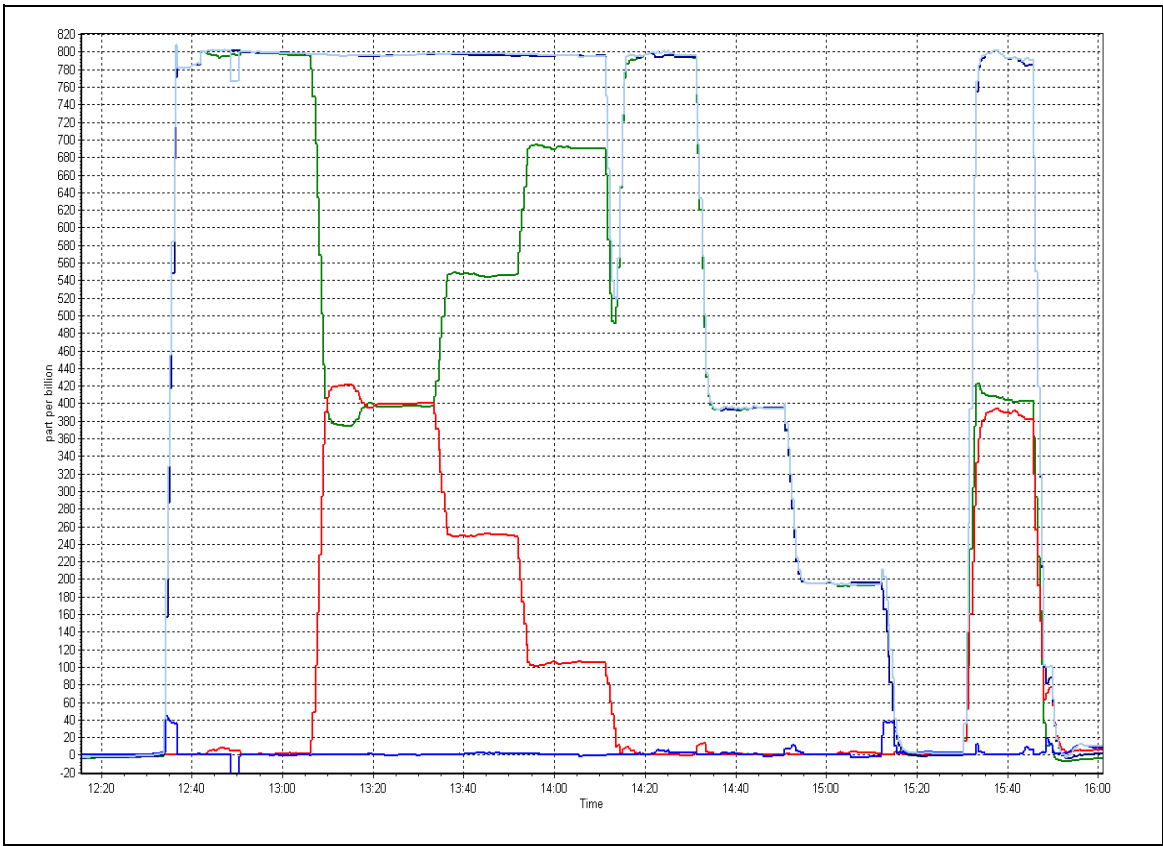
NH₃ Calibration Plot

Date: November 10, 2015



NO_x Calibration Plot

Date: November 10, 2015





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date: November 13, 2015 Previous Calibration: October 27, 2015
 Station Name: Patricia McInnis Station Number: AMS 6
 Start Time (MST): 12:43 End Time (MST): 13:11
 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	7.0	5.5	-1.5	7.0
T2	19.0	na	na	19.0
T3	21.0	na	na	21.0
T4	13.0	na	na	13.0
RH (%)	22.0	na	na	22.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	948	943.3	-4.8	948

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	994	-6	994	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	204		204
Neph	0.4		0.4
C14	-1.8		-1.8
Indicated Concentration (ug/m3)	0.1	no	0.1
Offset 1	202.2		202.2
Offset 2	32		32

Leak Check (Quarterly)

Leak Check Date: 28/9/15 Previous Leak Check Date:

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	17.10	
*Flow with adaptor (LPM):	16.73	0.37

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

Mass Foil Calibration (Annually)

Foil Calibration Date: Previous Foil Calibration: May 20, 2015
 Zeroed?:
 Foil Mass: Mass foil set S/N:
 Previous Correction Factor:
 New Correction Factor:

INSPECTION DATA

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

NOTES:

Cyclone head cleaned. No adjustments made.

Calibration Performed By: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 7
ATHABASCA VALLEY
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	35	35	100.00	9	0	2	0
TRS (ppb) Average	686	33	34	99.86	2	0	1	0
THC (ppm) Average	685	35	35	100.00	2.6	-	2.1	-
NMHC (ppm) Average	685	35	35	100.00	0.395	-	0.054	-
CH4(ppm) Average	685	35	35	100.00	2.4	-	2.1	-
O3 (ppb) Average	686	33	34	99.86	34	0	25	-
NO2 (ppb) Average	685	35	35	100.00	41	0	22	-
NO (ppb) Average	685	35	35	100.00	140	-	37	-
NOX (ppb) Average	685	35	35	100.00	181	-	58	-
PM2.5 (ug/m3) Average	719	1	1	100.00	76.8	-	23.3	0
CO(ppm) Average	685	34	35	99.86	1	0	0.4	-
Temperature 2 m (C) Average	720	0	0	100.00	9.2	-	3	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.4	-	29.3	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	88	-
Wind Speed 10 m (km/h) Average	711	0	9	98.75	25	-	18	-
Wind Direction 10 m (deg) Average	711	0	9	98.75	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	0.4	1	-	0	0	0	0	0	1	9
TRS (ppb) Average	686	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	685	1.97	0.1	-	1.8	1.9	1.9	1.9	2	2.1	2.6
NMHC (ppm) Average	685	0.01	0.043	-	0	0	0	0	0	0	0.395
CH4(ppm) Average	685	1.96	0.1	-	1.8	1.9	1.9	1.9	2	2.1	2.4
O3 (ppb) Average	686	12.3	8	-	0	2	5	11	19	24	34
NO2 (ppb) Average	685	11	7	-	1	3	6	10	15	21	41
NO (ppb) Average	685	7.2	13	-	0	0	1	2	9	19	140
NOX (ppb) Average	685	18.2	18	-	1	3	7	13	24	41	181
PM2.5 (ug/m3) Average	719	6.48	6.7	-	2	2.7	3.4	5	7	10.2	76.8
CO(ppm) Average	685	0.12	0.1	-	0	0	0	0.1	0.2	0.3	1
Temperature 2 m (C) Average	720	-4.28	6	-	-18.5	-12.5	-9.4	-3.1	0.6	2.4	9.2
Barometric Pressure (inHg) Average	720	28.87	0.3	-	28.2	28.5	28.7	28.9	29.1	29.2	29.4
Relative Humidity (%) Average	720	77.2	11	-	39	61	71	80	85	89	98
Wind Speed 10 m (km/h) Average	711	9	5	-	0	3	5	8	12	16	25
Wind Direction 10 m (deg) Average	711	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS, O3, CO	12 Nov 2015 10:00	12 Nov 2015 10:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	04 Nov 2015 03:00	04 Nov 2015 11:00	9	Flat line in sensor output signal - Sensor frozen

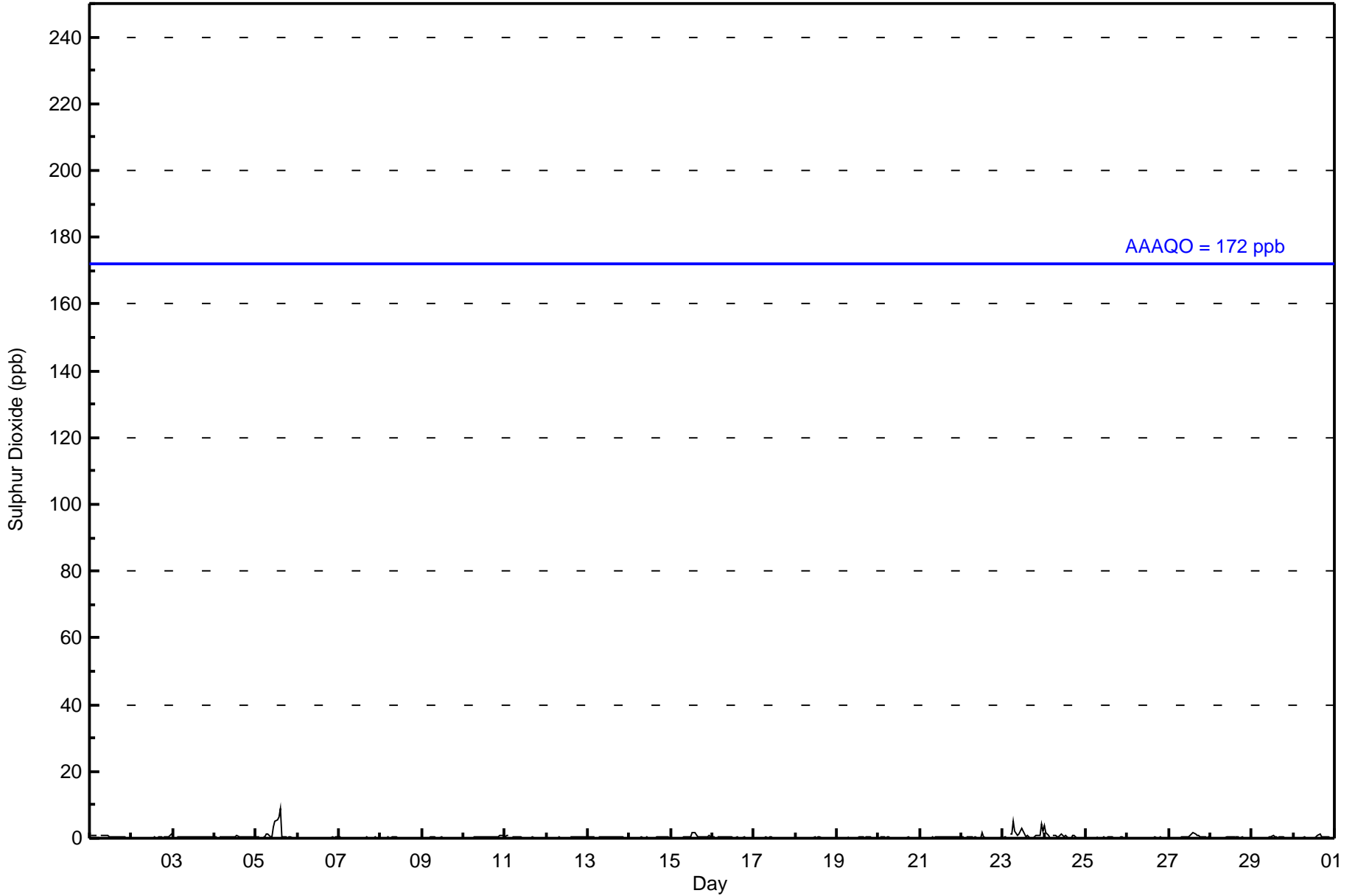


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 9 ppb on Nov 5 15:00	Maximum Daily Average: 1.6 ppb on Nov 5
Minimum Value: 0 ppb on Nov 17 23:00	Hours of Data: 685
Maximum Diurnal Average: 0.7 ppb at hour 15	Hours of Missing Data: 35
Monthly Average: 0.4 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.1 ppb on Nov 26	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.2 ppb at hour 4	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 4	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	1	1	1	1	1	Z	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.5	1
2-Nov	Z	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
3-Nov	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0.5	1
5-Nov	0	0	0	Z	0	1	1	1	0	1	3	5	5	7	9	0	0	0	0	0	0	0	0	0	1.6	9
6-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Nov	Z	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
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
11-Nov	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Nov	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	1	0	0	0	0	1	1	1	1	0.3	1
13-Nov	1	1	1	1	1	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	1	0.5	2
16-Nov	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
20-Nov	Z	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
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2
23-Nov	0	0	1	Z	1	1	5	2	1	1	2	3	1	1	1	0	0	0	1	1	1	1	4	2	1.4	5
24-Nov	4	2	1	0	Z	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0.7	4
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Nov	Z	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
27-Nov	0	Z	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0.5	2
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.3	1

0.4	0.3	0.3	0.2	0.3	0.3	0.5	0.4	0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	Diurnal Average		
4	2	1	1	1	1	5	2	1	1	3	5	5	7	9	1	1	1	1	1	1	1	1	4	2	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	685	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677
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	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677

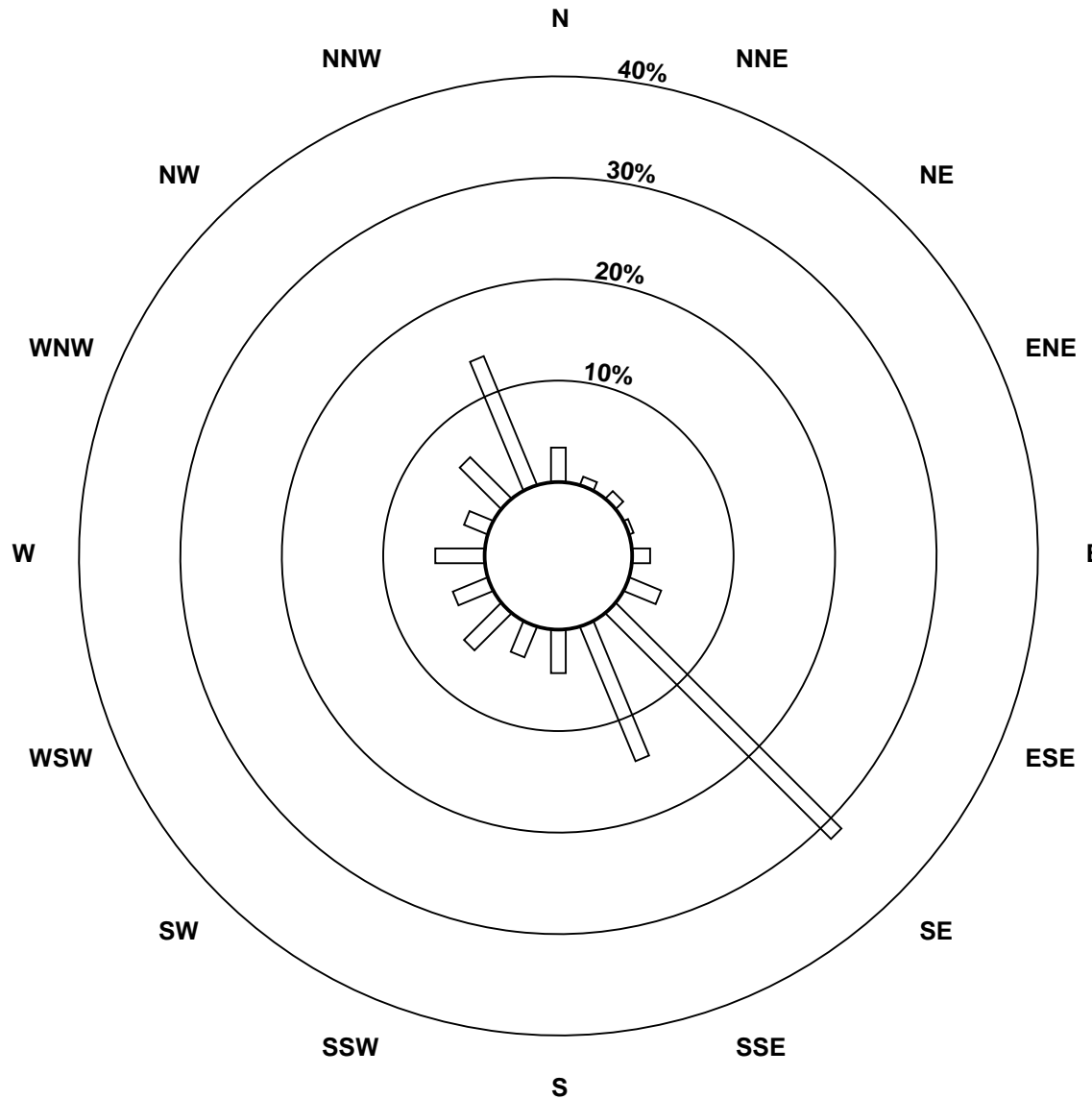
Total Number of Valid Hours: 677

Total Number of Hours: 720

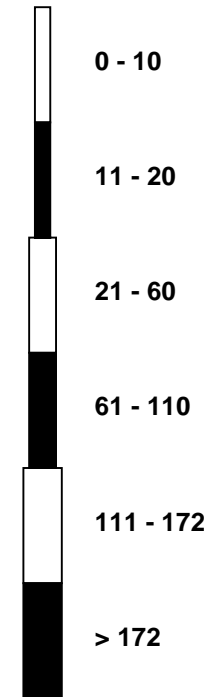


Wood Buffalo Environmental Association
Wind Rose Nov 2015

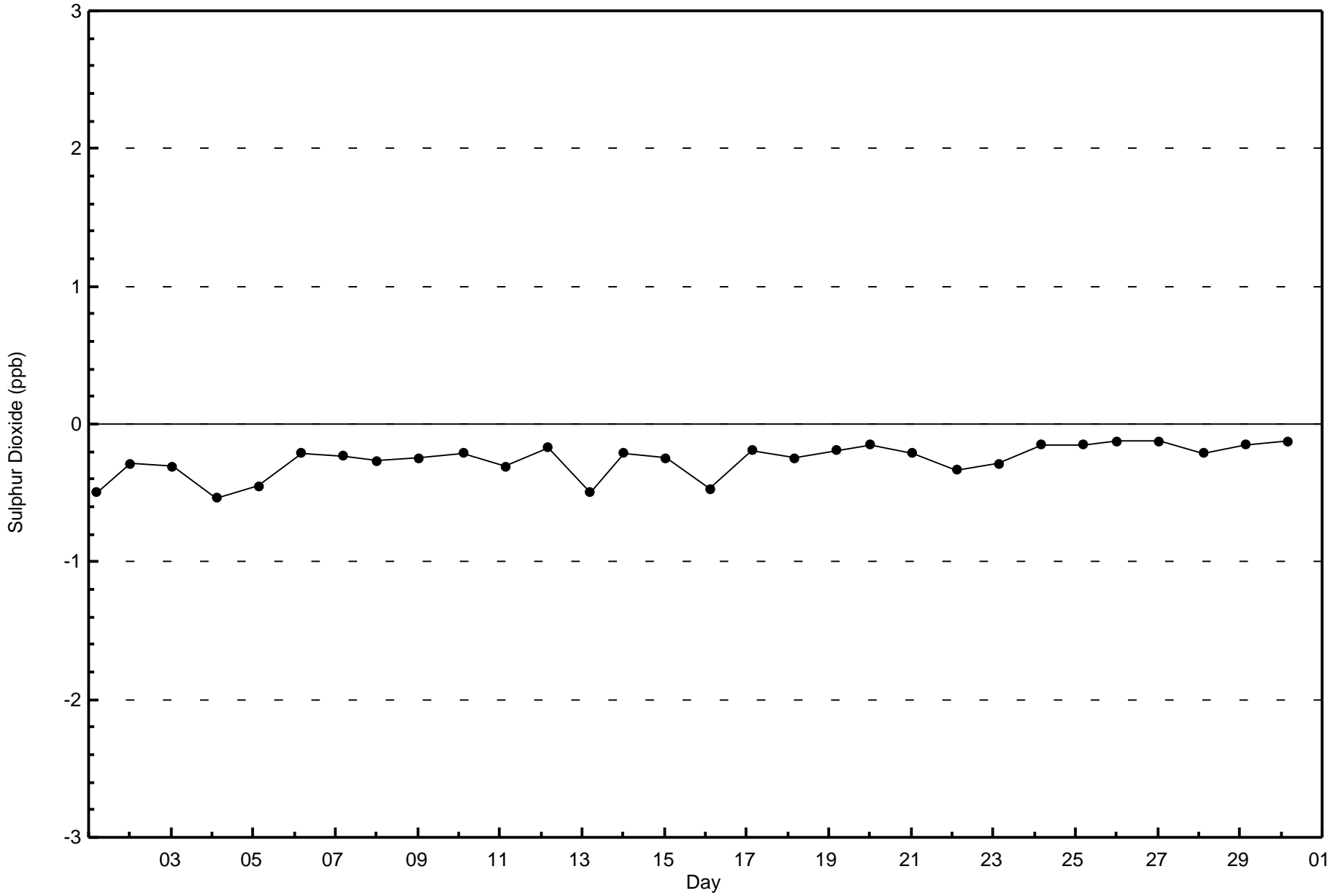
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)

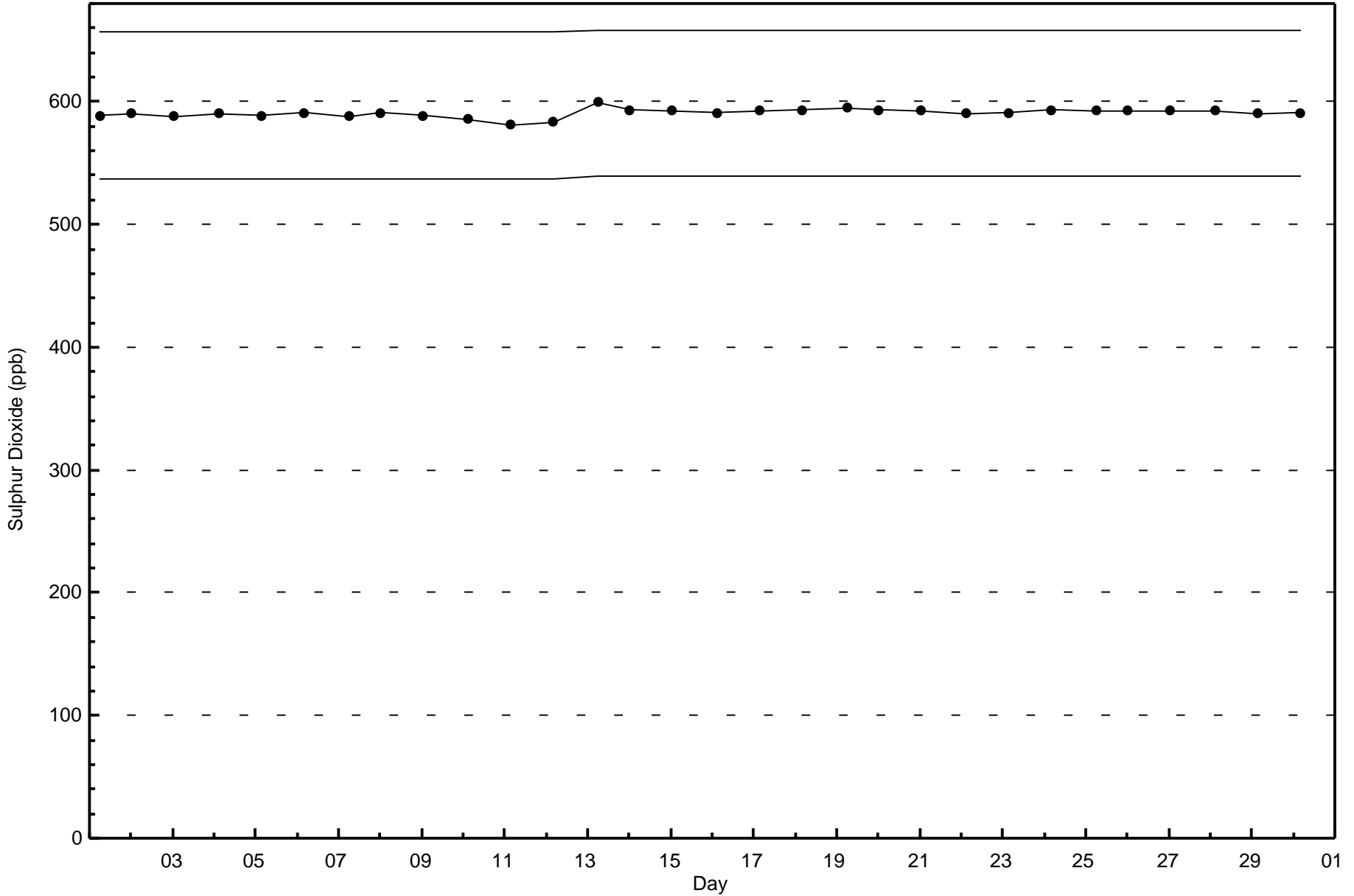


Classes (ppb)



Total Number of Valid Hours: 677







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Nov 15 14:00	Maximum Daily Average: 0.7 ppb on Nov 15		Hours of Data:	686
Minimum Value: 0 ppb on Nov 16 09:00	Minimum Daily Average: 0.2 ppb on Nov 18		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 15	Minimum Diurnal Average: 0.3 ppb at hour 4		Hours of Calibration:	33
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	99.9

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

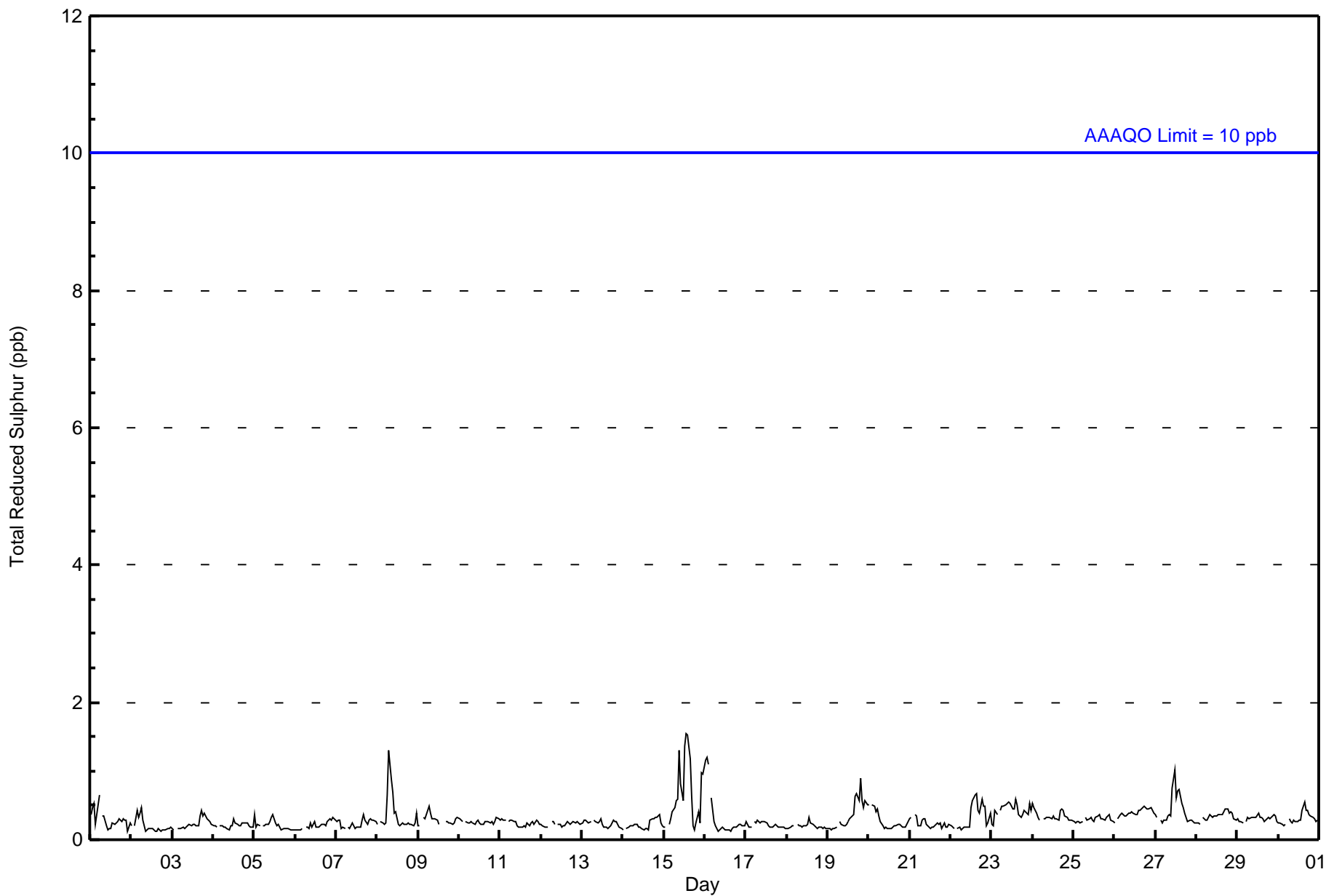
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average
1	1	1	0	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	0	1	1	1	1	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	686	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: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	22	7	7	3	12	24	212	100	27	23	33	26	33	19	36	94	678
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	7	7	3	12	24	212	100	27	23	33	26	33	19	36	94	678

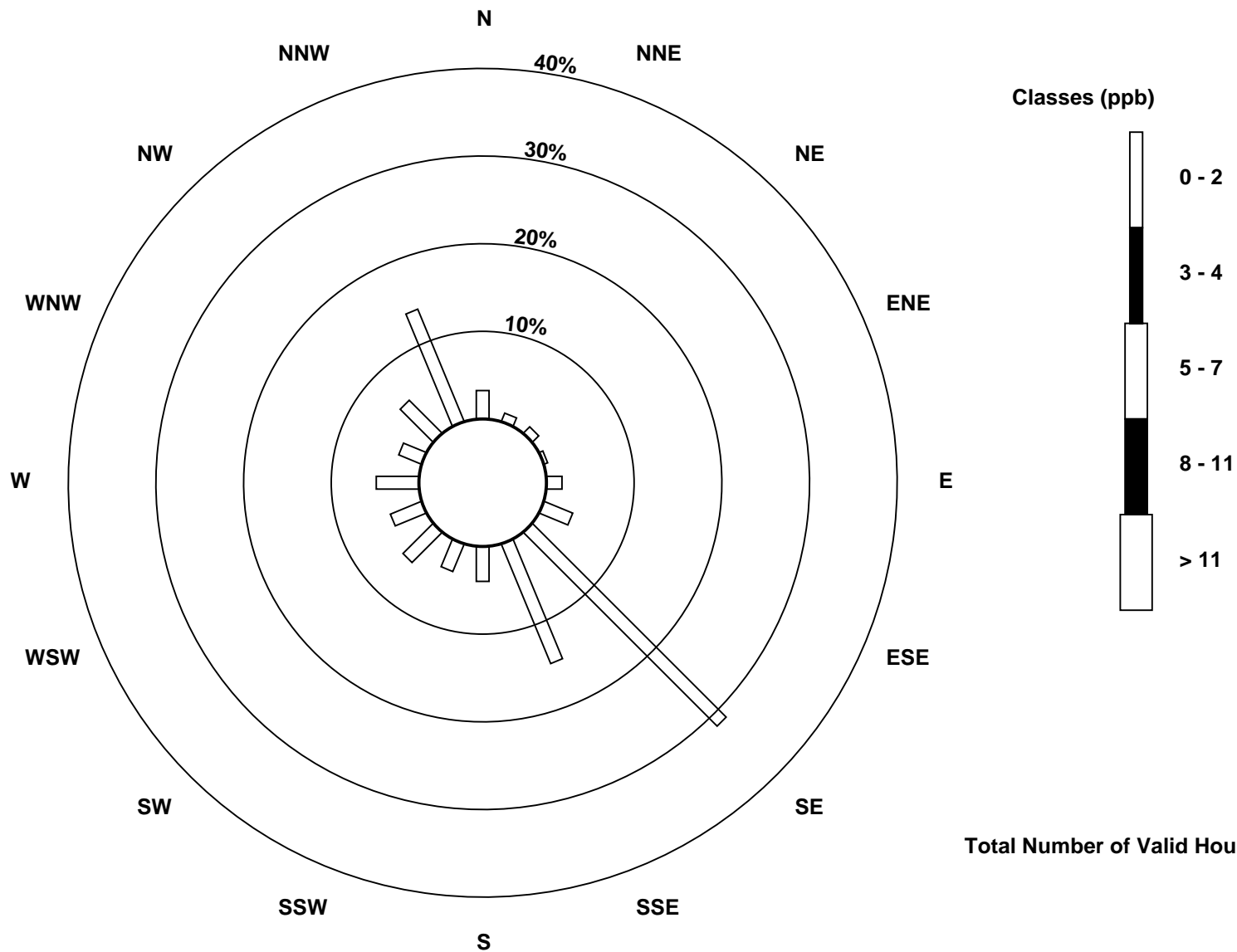
Total Number of Valid Hours: 678

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

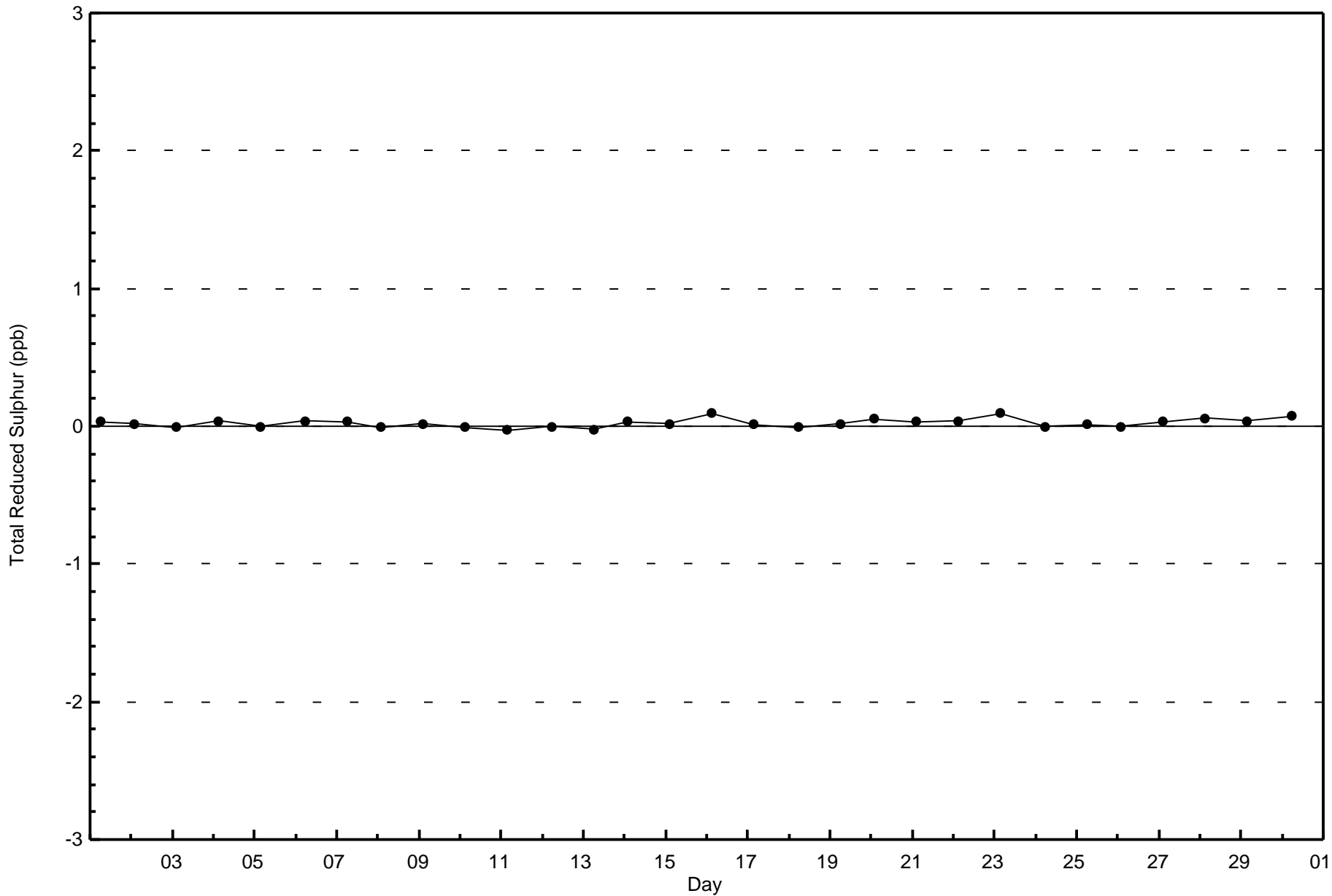
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)

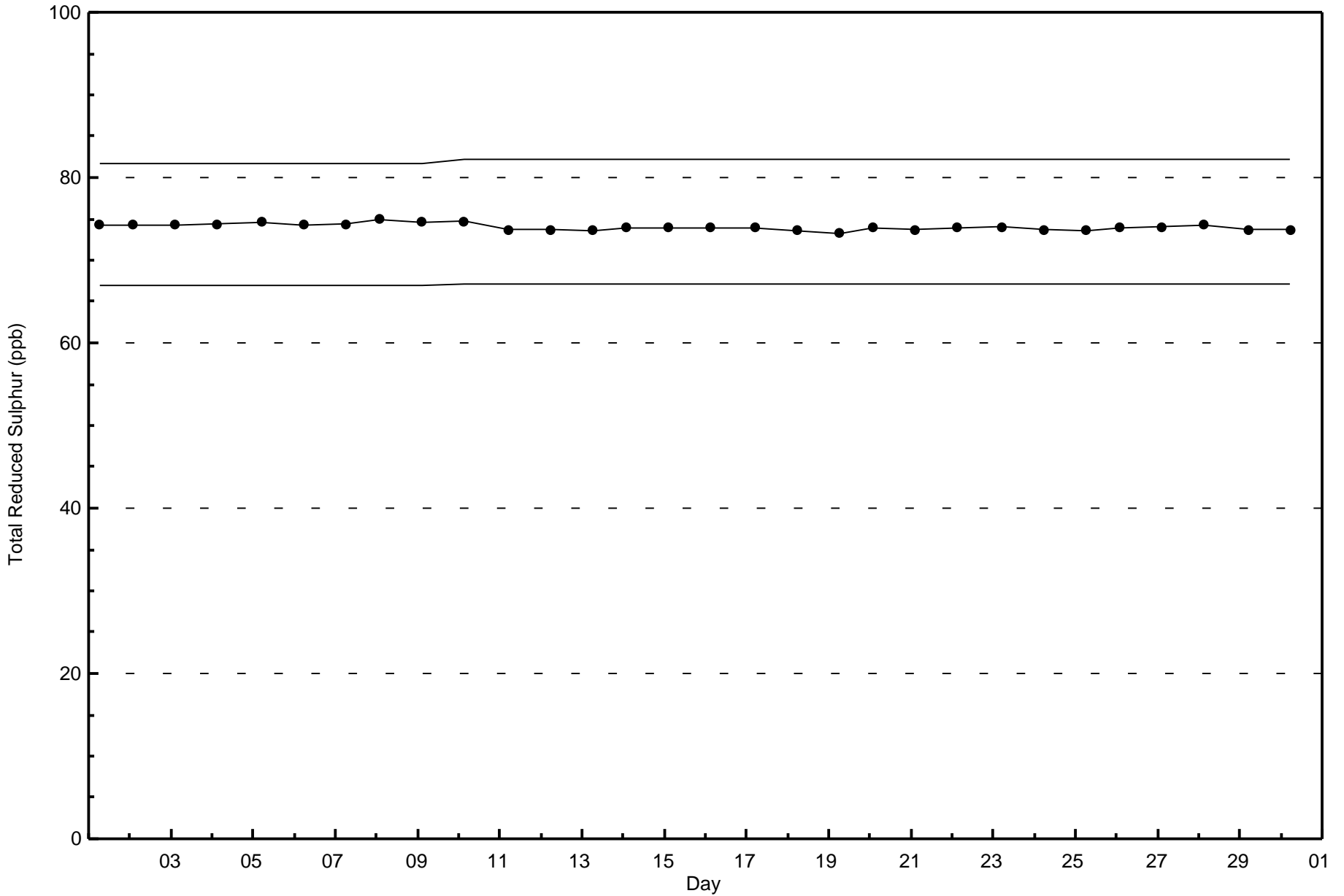




Wood Buffalo Environmental Association
Zero Responses

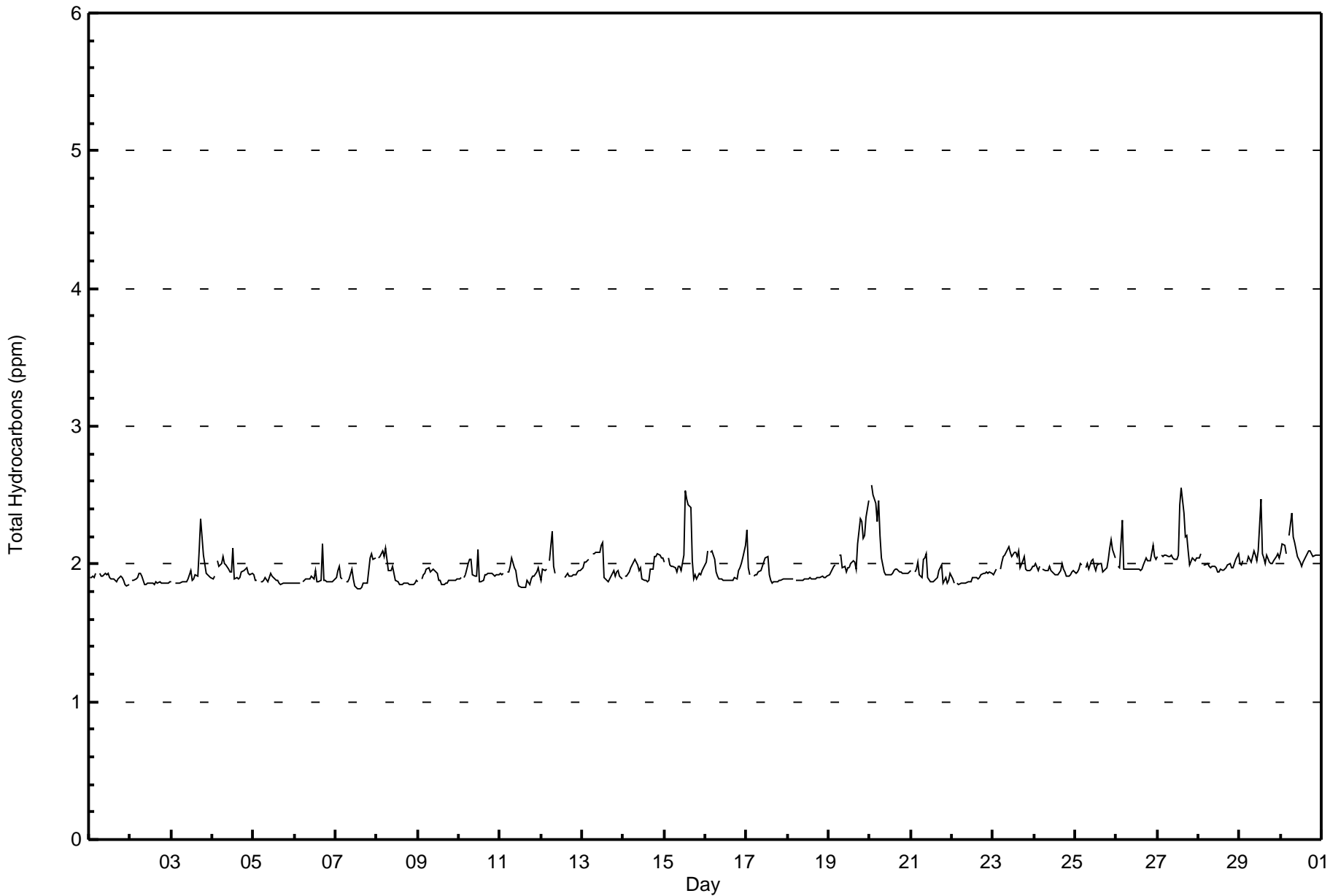
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - November 2015







Maximum Value: 2.6 ppm on Nov 20 02:00																	Maximum Daily Average: 2.1 ppm on Nov 27										Hours in Service: 720	
Minimum Value: 1.8 ppm on Nov 7 15:00																	Minimum Daily Average: 1.9 ppm on Nov 2										Hours of Data: 685	
Maximum Diurnal Average: 2.0 ppm at hour 7																	Minimum Diurnal Average: 2.0 ppm at hour 16										Hours of Missing Data: 35	
Monthly Average: 1.97 ppm																	Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.5										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-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9			
2-Nov	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9			
3-Nov	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.3	2.2	2.1	1.9	1.9	1.9	1.9	1.9	1.9			
4-Nov	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9			
5-Nov	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			
6-Nov	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	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9			
7-Nov	1.9	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	2.0	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	1.9	2.1			
8-Nov	Z	2.0	2.1	2.1	2.0	2.1	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1			
9-Nov	1.9	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0			
10-Nov	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	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	2.1			
11-Nov	1.9	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	2.0	1.9	1.9	2.0			
12-Nov	1.9	2.0	2.0	2.0	Z	2.0	2.2	2.0	1.9	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2			
13-Nov	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.2	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	1.9	2.2			
14-Nov	Z	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1			
15-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.5	2.5	2.4	2.4	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.5			
16-Nov	2.0	2.1	Z	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.1			
17-Nov	2.2	2.0	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2			
18-Nov	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			
19-Nov	1.9	1.9	2.0	2.0	2.0	Z	2.1	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.2	2.2	2.3	2.5	2.5			
20-Nov	Z	2.6	2.5	2.4	2.3	2.5	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.6			
21-Nov	1.9	Z	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.1			
22-Nov	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			
23-Nov	1.9	1.9	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	1.9	2.0	2.0	2.0	2.0	2.1			
24-Nov	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0			
25-Nov	1.9	1.9	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	2.1	2.2	2.1	2.0	2.2			
26-Nov	Z	2.0	2.0	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	2.0	2.1	2.0	2.0	2.0	2.3			
27-Nov	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.4	2.6	2.4	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.6			
28-Nov	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1			
29-Nov	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.1	2.1	2.0	2.1	2.5	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.5			
30-Nov	2.1	2.1	2.1	2.1	Z	2.2	2.4	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4			
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerspan C - Calibration																												





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	574	83.80	83.80
2.1 - 3.0	111	16.20	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	16	6	7	3	10	11	183	70	20	19	35	24	31	16	37	78	566
2.1 - 3.0	7	0	0	0	2	12	30	27	9	3	0	1	2	1	2	15	111
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	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677

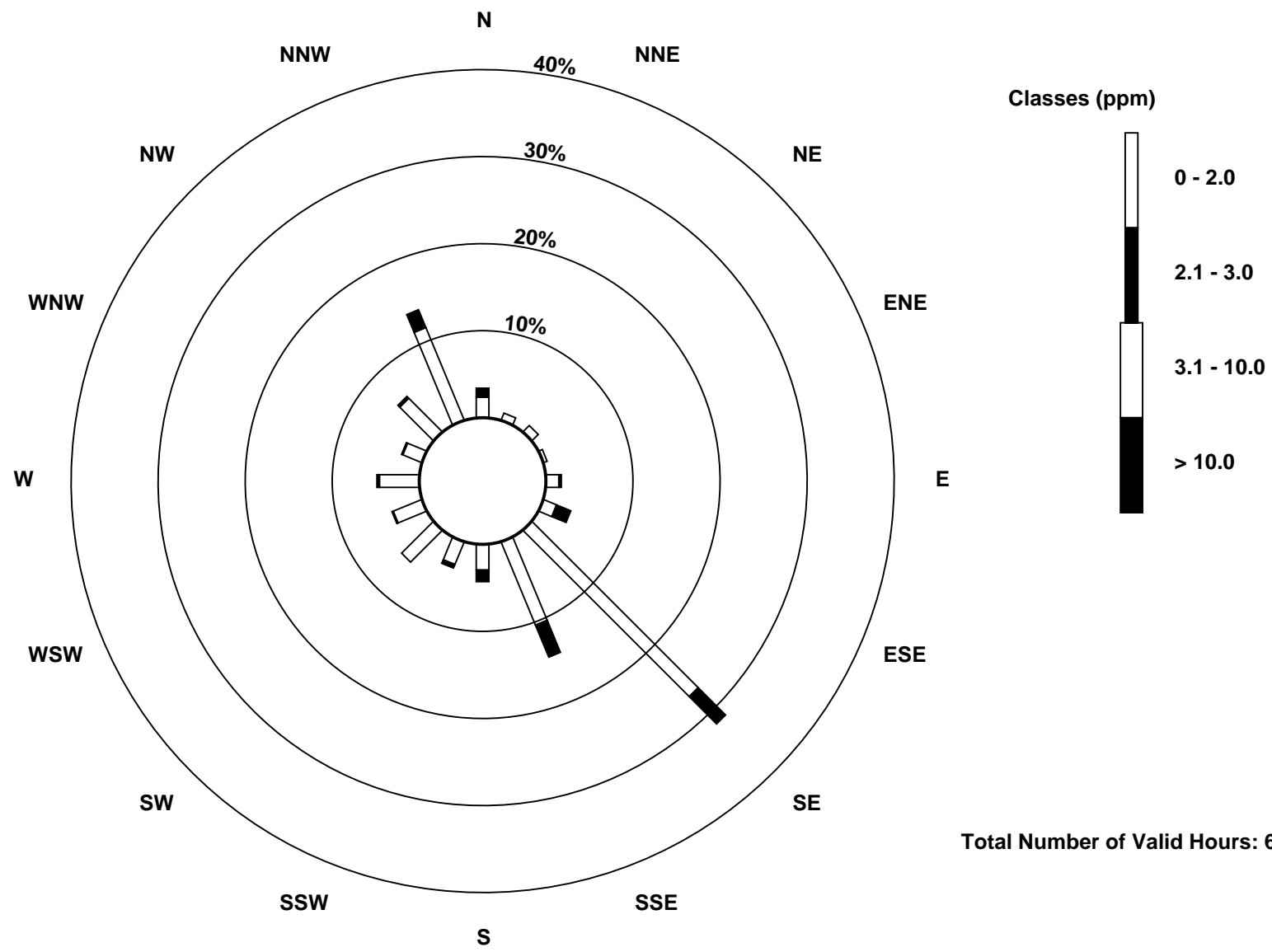
Total Number of Valid Hours: 677

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

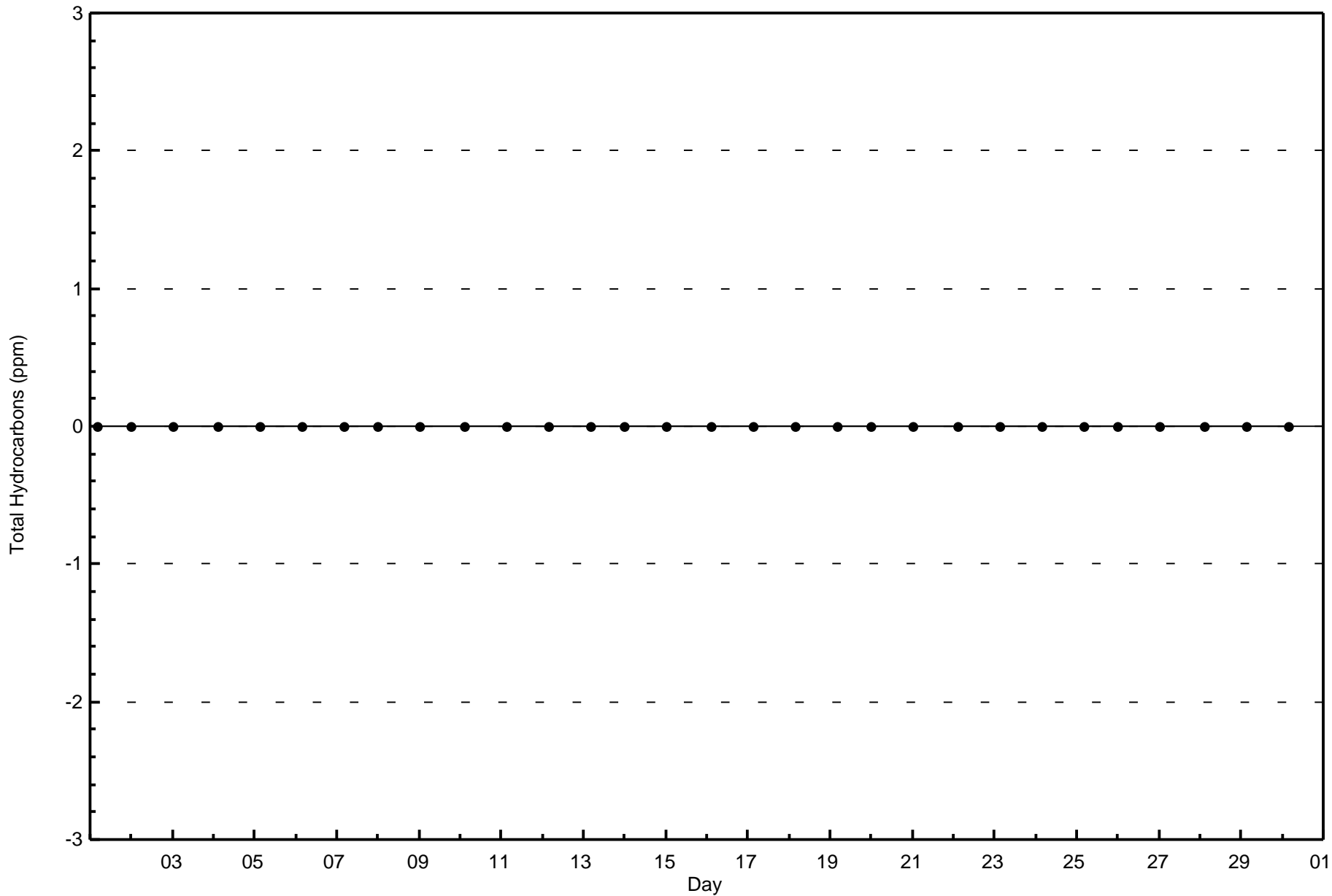
Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)

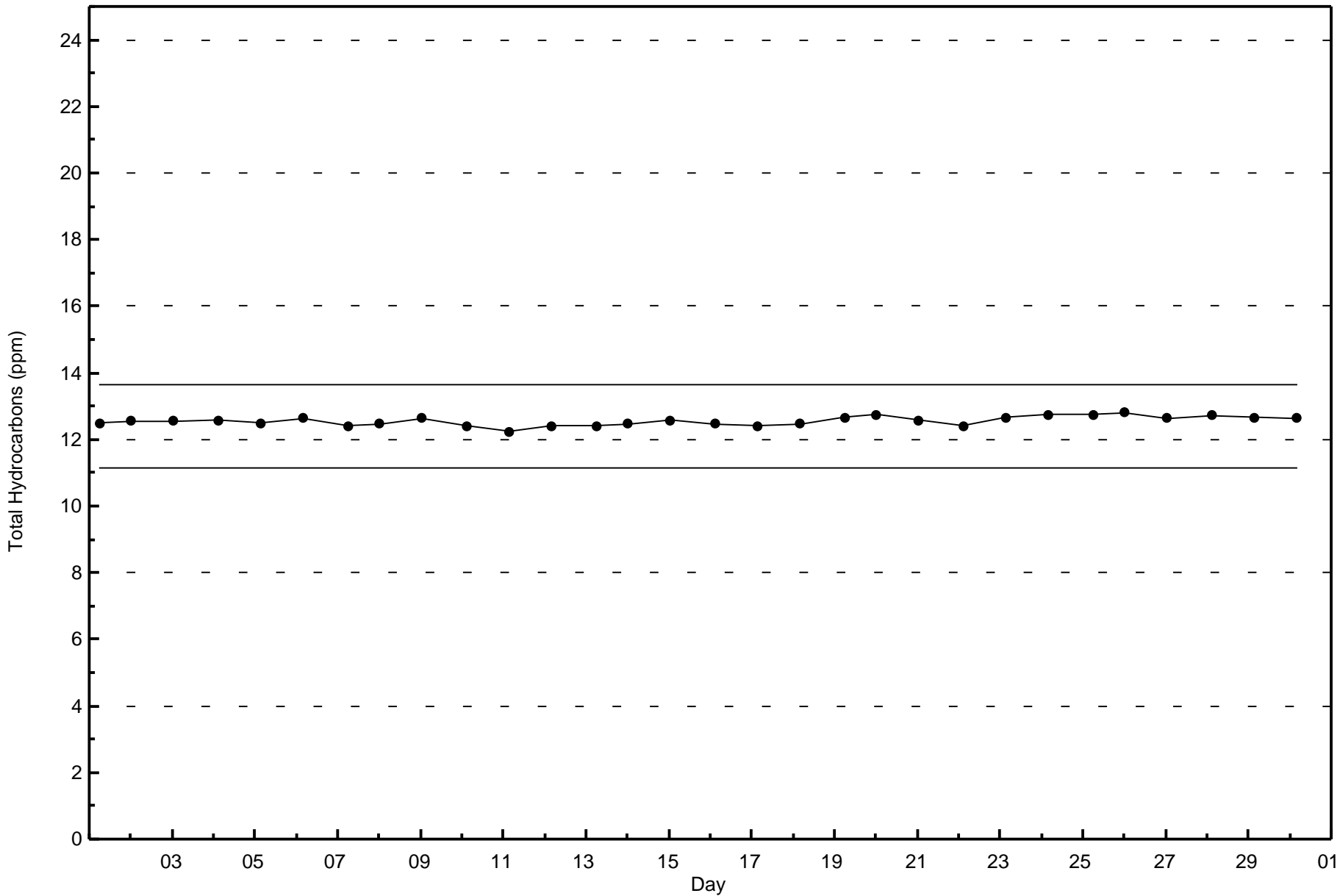


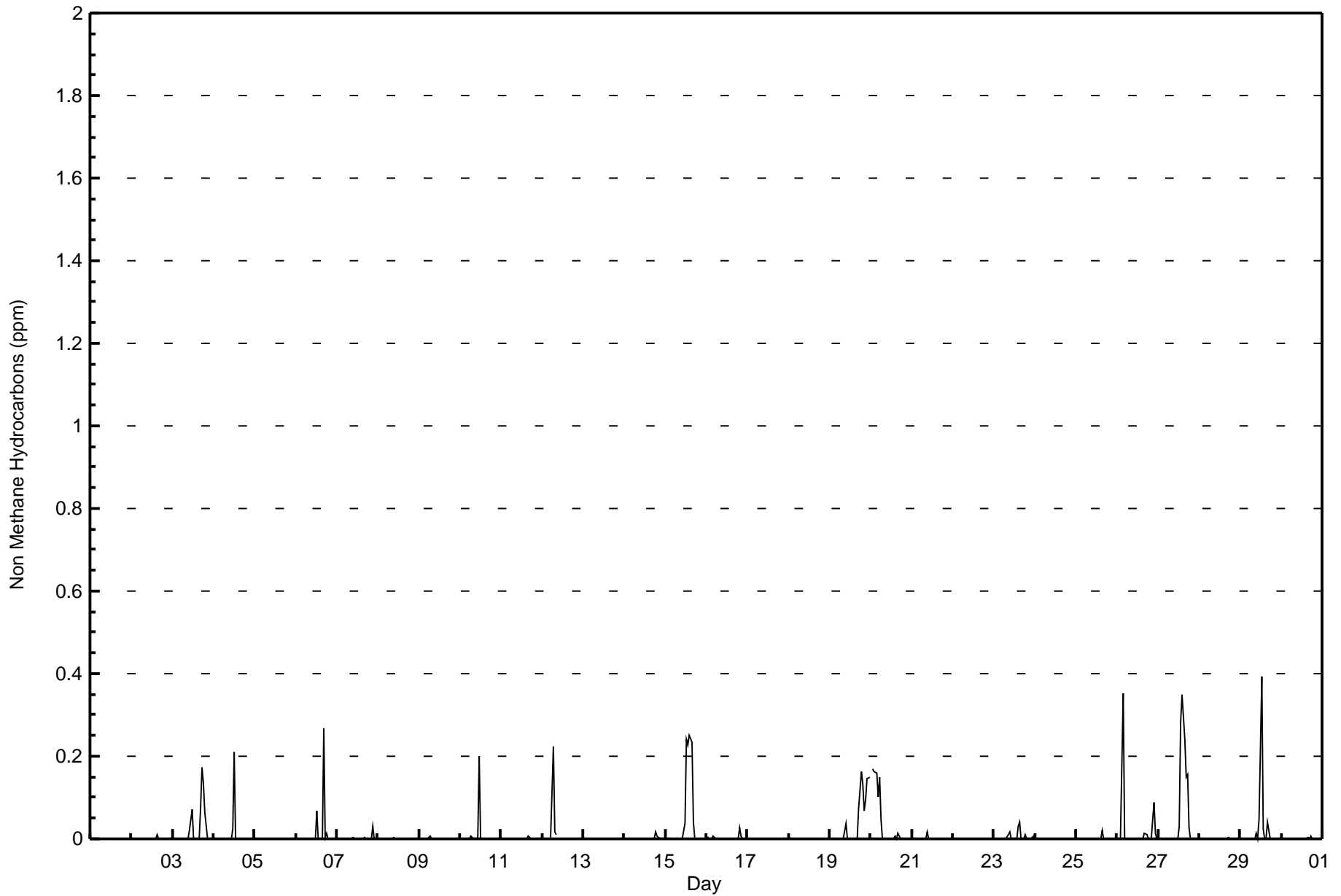


Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - November 2015









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	614	89.64	89.64
0.006 - 0.05	37	5.40	95.04
0.06 - 0.1	14	2.04	97.08
> 0.1	20	2.92	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - November 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	18	6	7	3	9	15	193	85	26	20	35	24	32	16	37	80	606
0.006 - 0.05	4	0	0	0	1	4	12	6	1	2	0	1	0	0	2	4	37
0.06 - 0.1	0	0	0	0	1	2	2	1	2	0	0	0	1	1	0	4	14
> 0.1	1	0	0	0	1	2	6	5	0	0	0	0	0	0	0	5	20
Totals	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677

Total Number of Valid Hours: 677

Total Number of Hours: 720

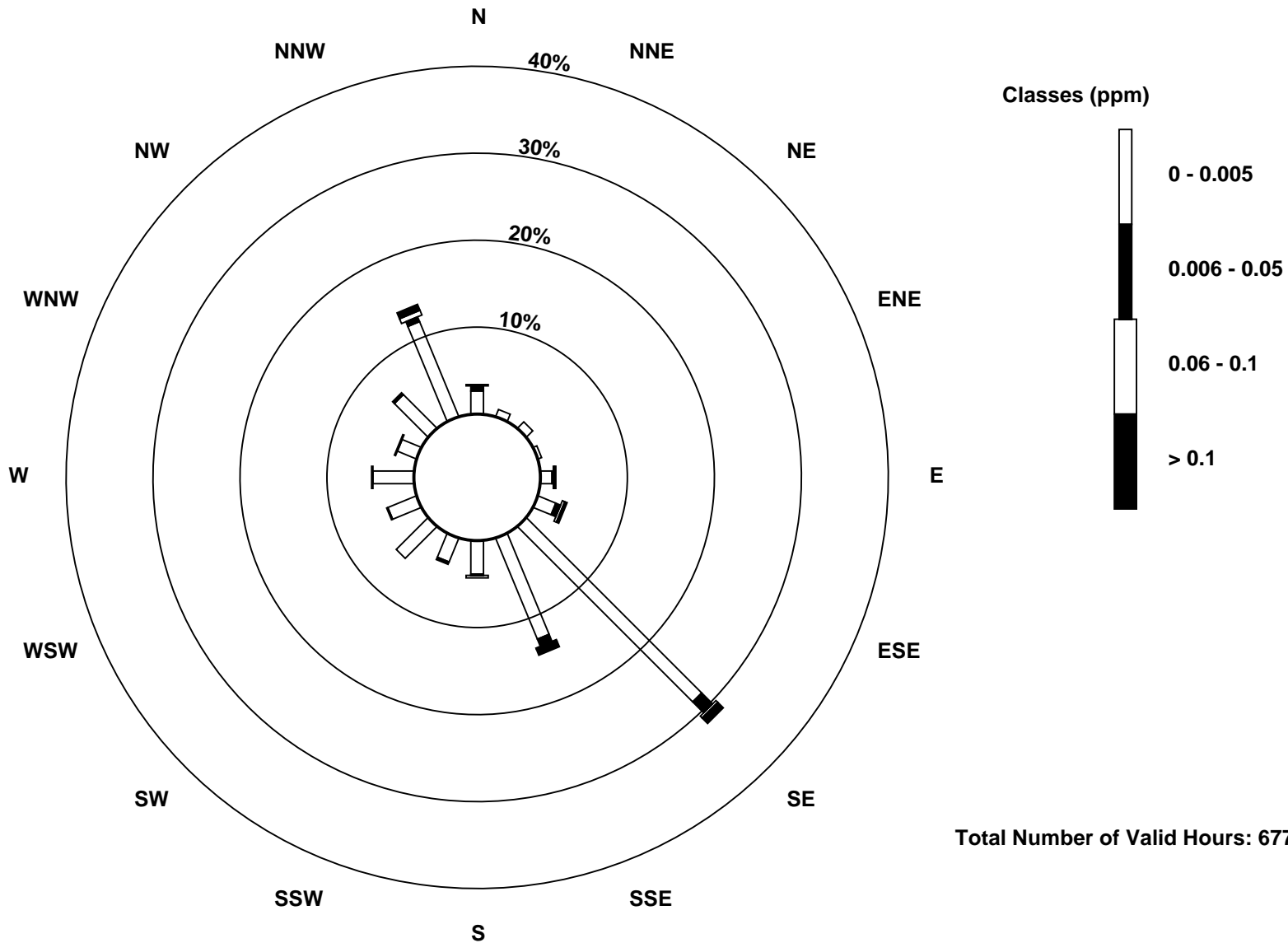


Wood Buffalo Environmental Association

Wind Rose Nov 2015

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley (AMS 7)

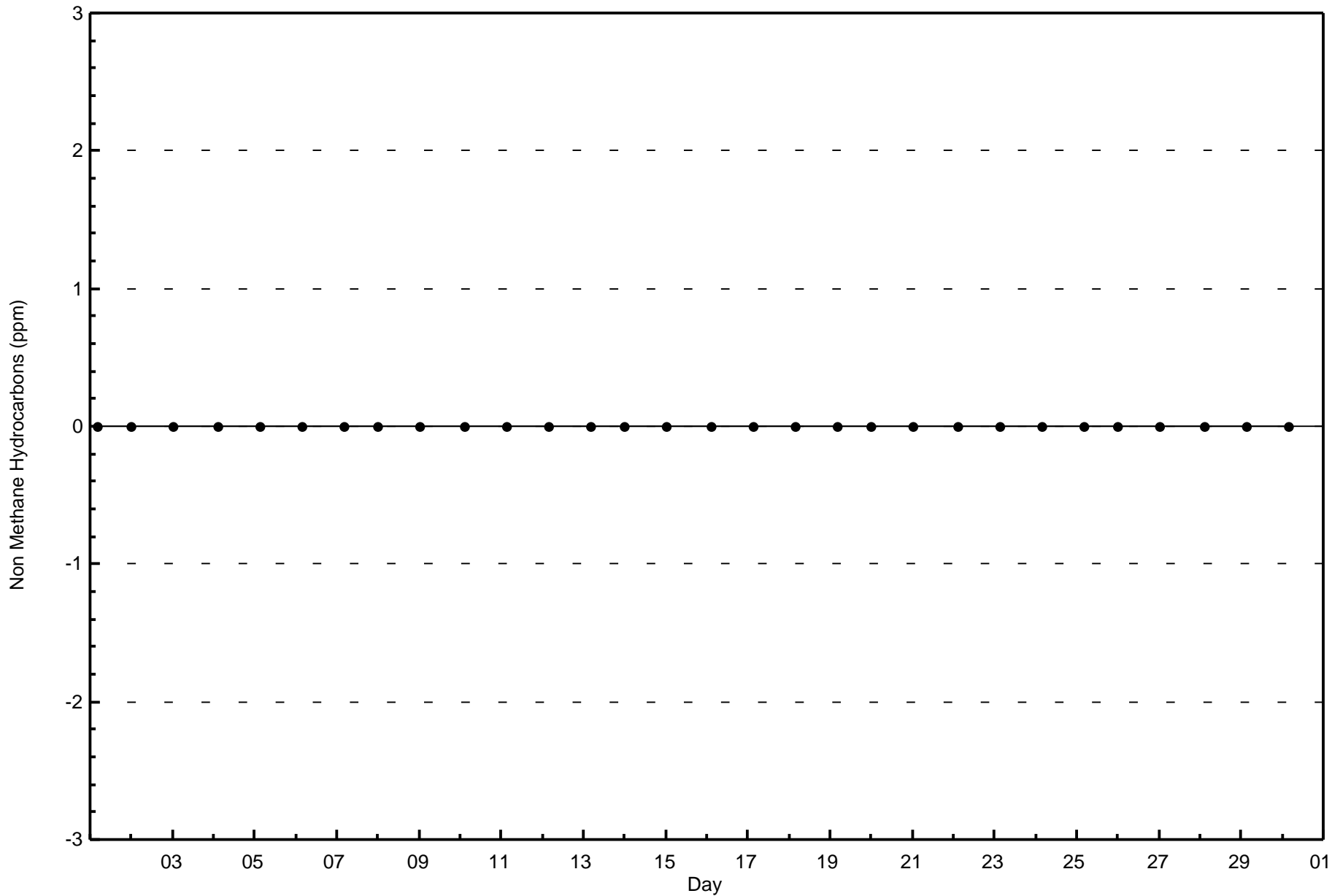


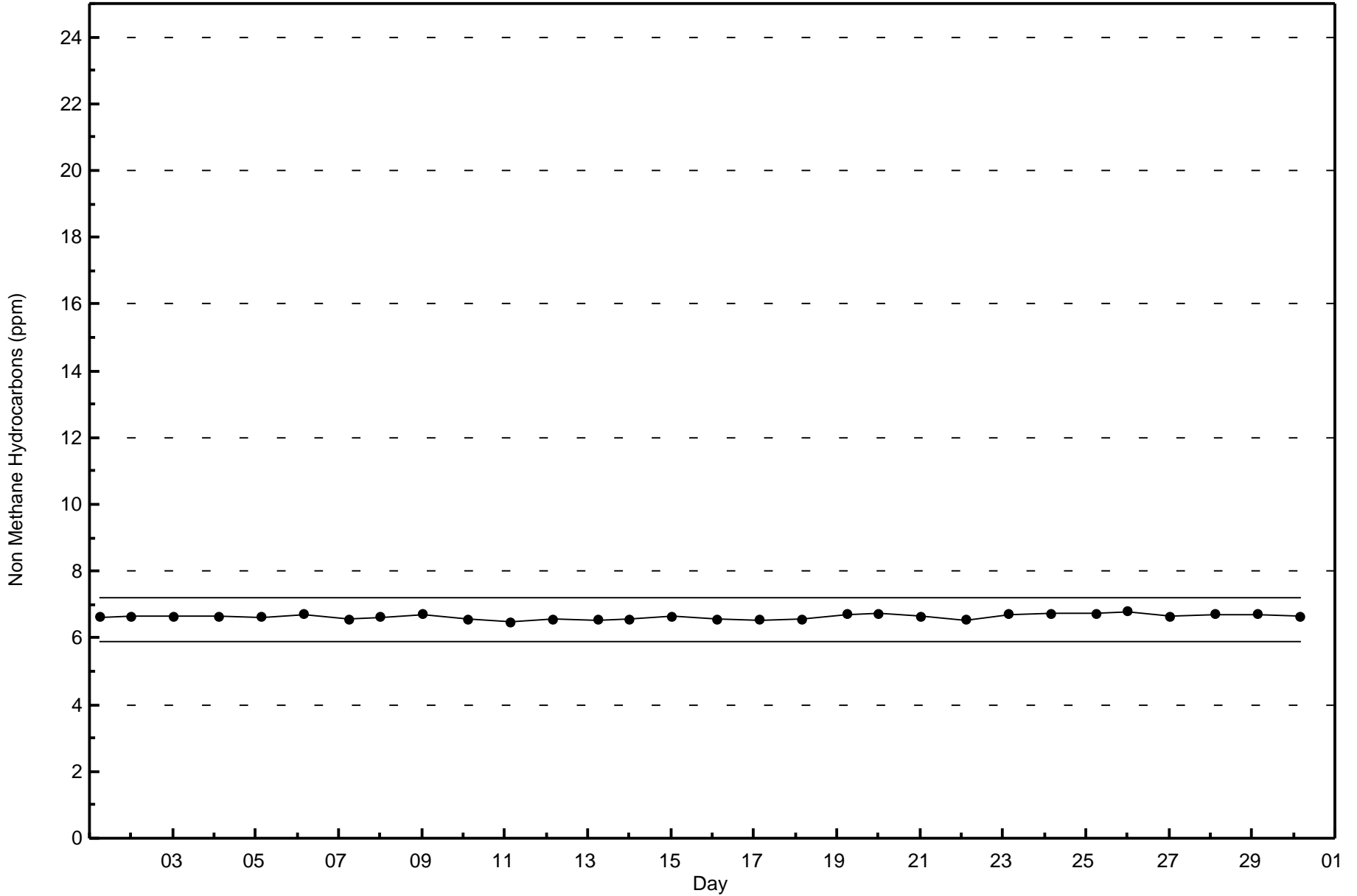
Total Number of Valid Hours: 677



Wood Buffalo Environmental Association
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - November 2015







Summary of Hour Averages

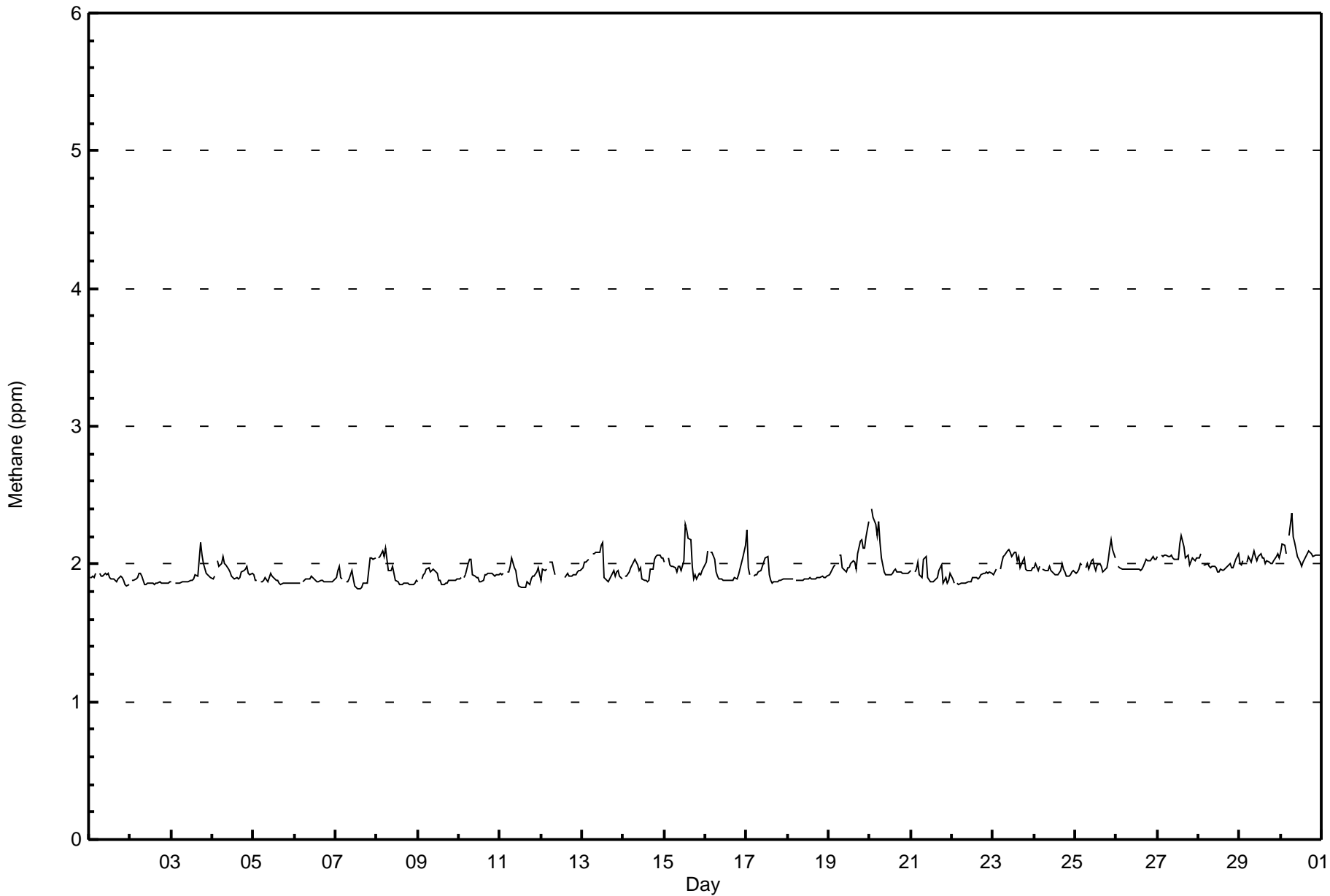
Athabasca Valley - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2.4 ppm on Nov 20 02:00	Maximum Daily Average: 2.1 ppm on Nov 30		Hours of Data:	685
Minimum Value: 1.8 ppm on Nov 7 15:00	Minimum Daily Average: 1.9 ppm on Nov 2		Hours of Missing Data:	35
Maximum Diurnal Average: 2.0 ppm at hour 6	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	35
Monthly Average: 1.96 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3		Percent Operational Time:	100.0

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

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	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Diurnal Average	
2.2	2.4	2.3	2.3	2.2	2.3	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.1	2.2	2.2	2.3	Diurnal Maximum

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	592	86.42	86.42
2.1 - 3.0	93	13.58	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



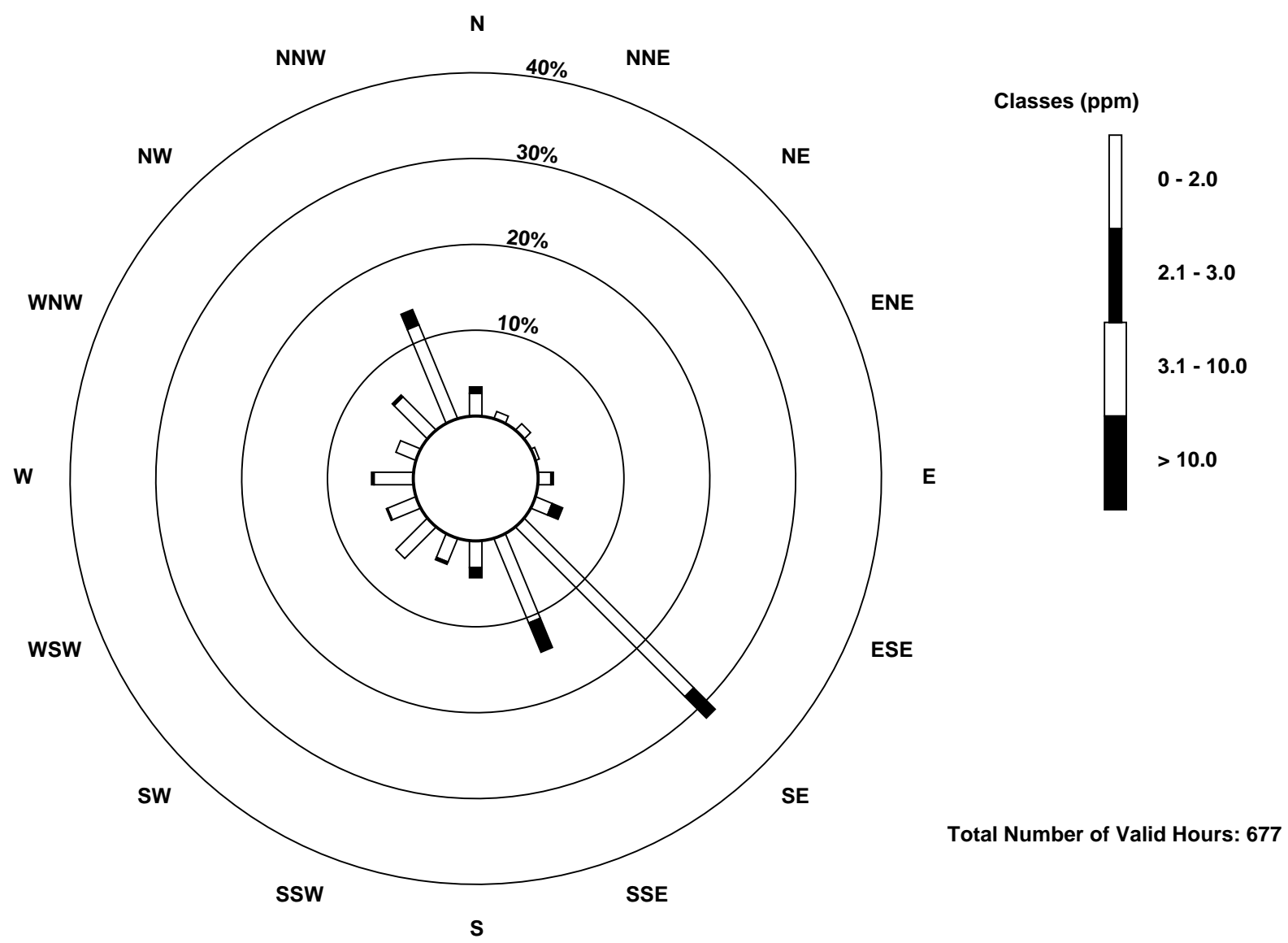
Wood Buffalo Environmental Association
Frequency Distribution

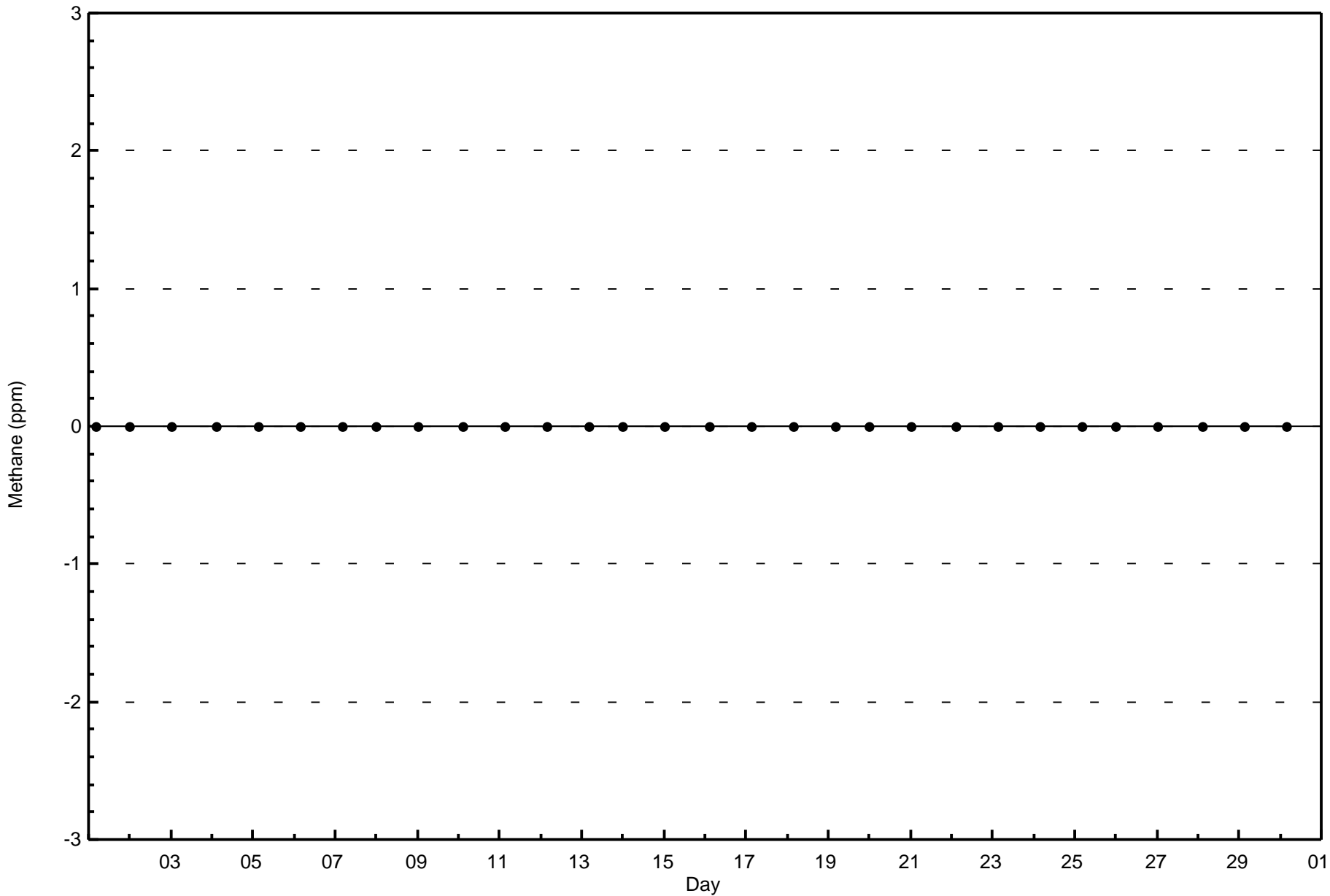
Methane (CH₄) - ppm
Athabasca Valley - November 2015

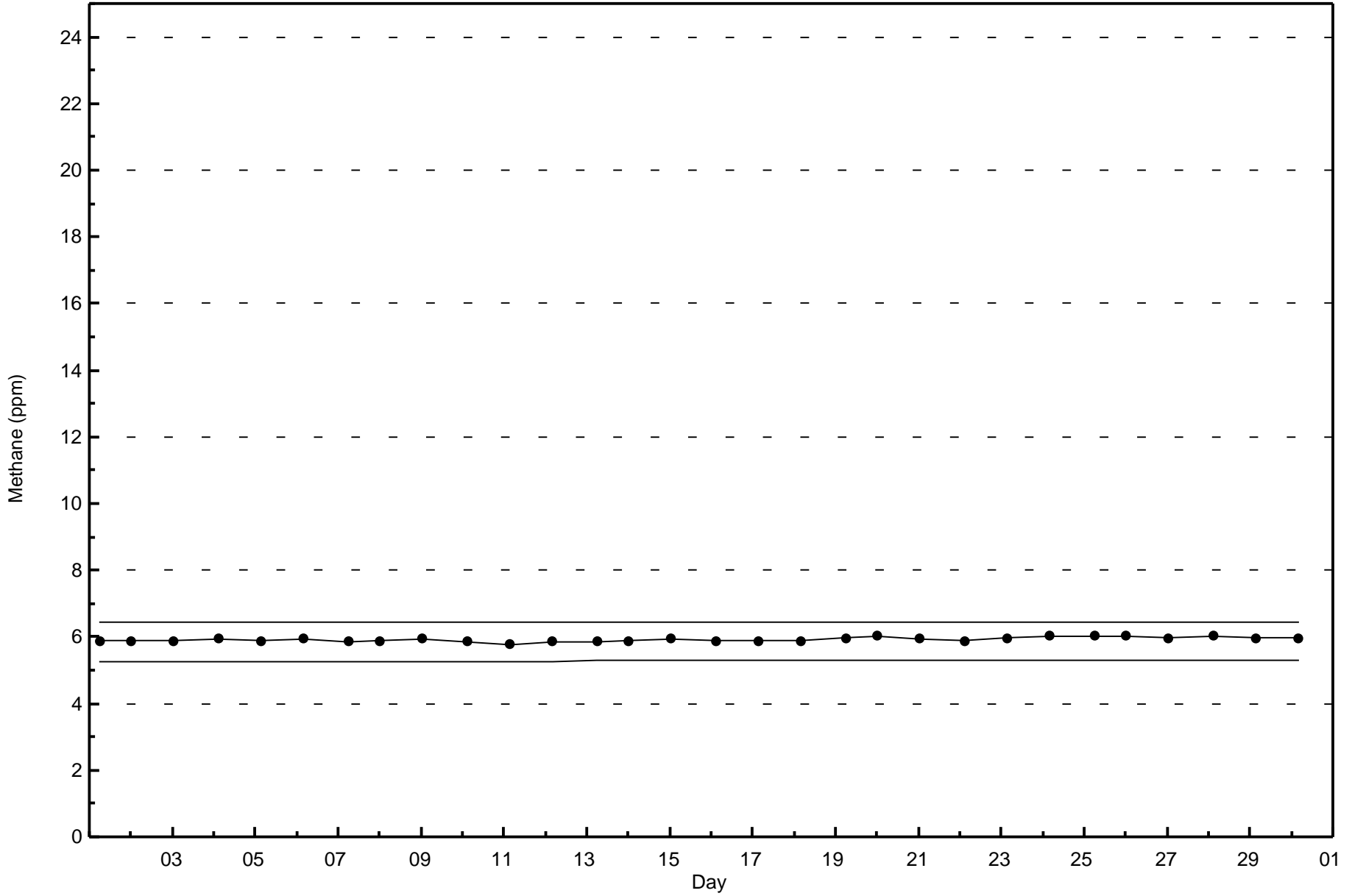
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	18	6	7	3	10	14	189	72	21	20	35	24	31	17	37	80	584
2.1 - 3.0	5	0	0	0	2	9	24	25	8	2	0	1	2	0	2	13	93
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677

Total Number of Valid Hours: 677

Total Number of Hours: 720









Summary of Hour Averages

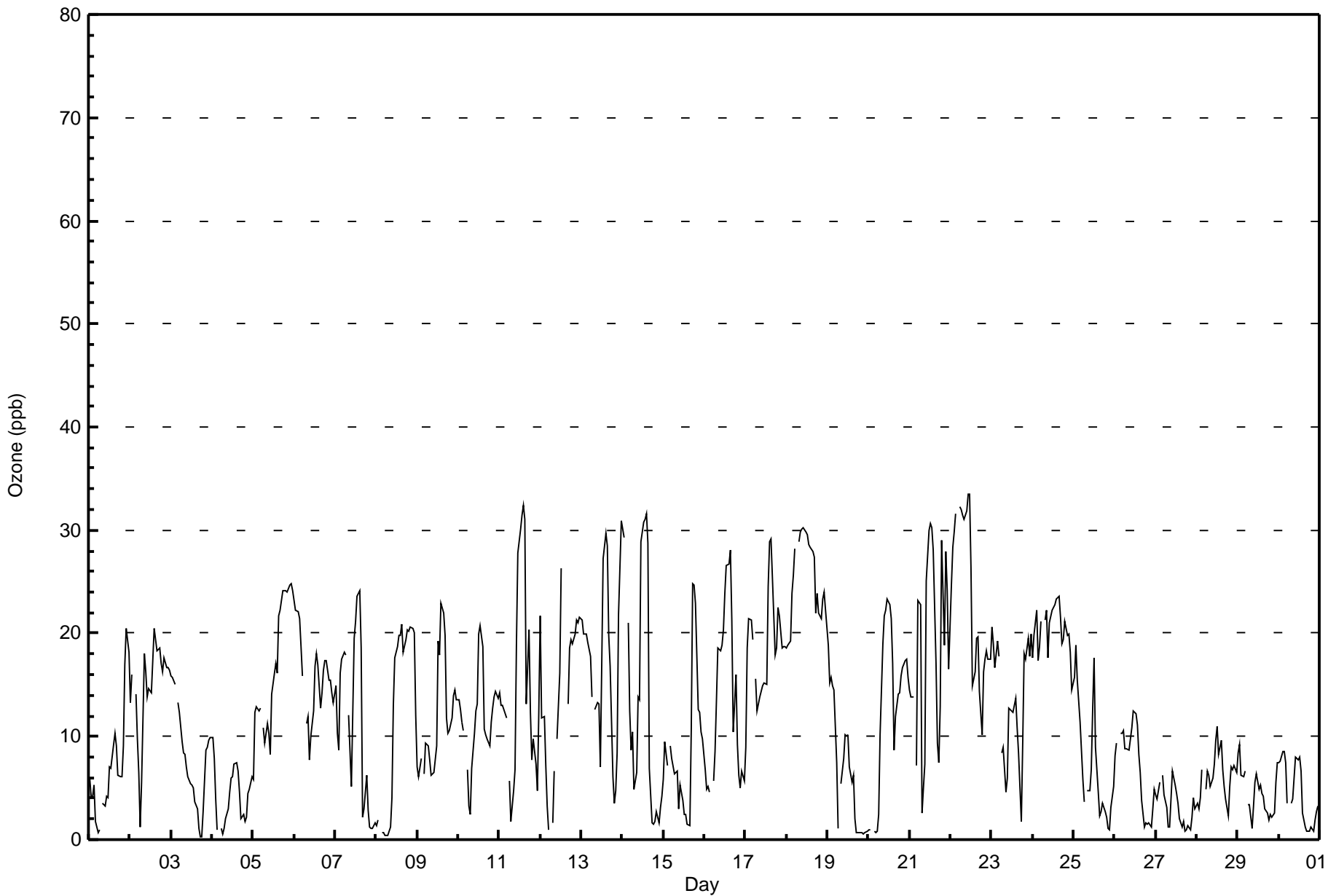
Athabasca Valley - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 34 ppb on Nov 22 11:00	Maximum Daily Average: 25.4 ppb on Nov 18
Minimum Value: 0 ppb on Nov 3 18:00	Hours of Data: 686
Maximum Diurnal Average: 16.8 ppb at hour 13	Hours of Missing Data: 34
Monthly Average: 12.3 ppb	Hours of Calibration: 33
Minimum Daily Average: 3.1 ppb on Nov 27	Percent Operational Time: 99.9
Minimum Diurnal Average: 8.3 ppb at hour 7	
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 11 Q ₃ = 19 P ₉₀ = 24 P ₉₉ = 32	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	6	4	4	5	2	1	1	Z	3	3	4	4	7	7	9	10	9	6	6	6	9	17	20	18	7.1	20
2-Nov	13	16	Z	14	10	6	1	6	18	16	14	15	14	17	20	19	18	19	17	16	18	17	17	16	14.7	20
3-Nov	16	16	15	Z	13	12	9	8	8	7	6	5	5	5	4	3	1	0	0	3	9	9	10	10	7.6	16
4-Nov	10	8	4	1	Z	1	1	1	2	3	5	6	6	7	7	5	2	2	2	2	5	5	6	6	4.2	10
5-Nov	6	12	13	12	13	Z	11	9	11	10	8	14	16	17	16	22	22	24	24	24	24	25	25	24	16.7	25
6-Nov	23	22	22	21	19	16	Z	11	12	8	10	12	17	18	17	13	14	16	17	17	15	15	14	13	15.9	23
7-Nov	15	10	9	16	18	18	18	Z	12	5	12	20	21	24	24	19	2	3	6	3	1	1	1	2	11.3	24
8-Nov	1	2	Z	1	1	0	0	0	1	4	13	18	19	20	20	21	18	19	20	20	21	20	20	12	11.8	21
9-Nov	7	6	8	Z	6	9	9	8	6	6	7	9	19	18	23	22	20	12	10	11	12	14	14	14	11.7	23
10-Nov	14	13	11	11	Z	7	3	2	7	10	12	13	20	21	19	11	10	10	9	11	13	14	14	14	11.7	21
11-Nov	14	13	13	12	12	Z	6	2	5	7	19	28	30	31	32	31	13	20	12	8	10	7	5	12	14.9	32
12-Nov	22	12	12	7	3	1	Z	2	7	M	10	16	26	C	C	C	13	19	19	19	20	21	21	22	14.3	26
13-Nov	21	20	20	20	19	18	14	Z	13	13	13	7	17	27	30	28	20	17	6	4	5	8	22	31	17.1	31
14-Nov	30	29	Z	21	13	9	10	5	7	14	14	29	31	31	32	29	7	2	1	2	3	2	3	4	14.2	32
15-Nov	6	10	7	Z	9	8	6	7	7	3	5	4	2	2	1	1	11	25	25	23	13	12	10	10	9.0	25
16-Nov	7	5	5	5	Z	6	9	13	19	18	19	20	24	27	27	28	21	10	16	9	6	5	7	6	13.5	28
17-Nov	9	19	21	21	19	Z	16	12	14	14	15	15	15	25	29	29	25	18	19	22	22	19	19	19	18.9	29
18-Nov	19	19	19	24	26	28	Z	29	30	30	30	30	30	29	28	28	27	22	24	22	21	23	24	22	25.4	30
19-Nov	19	15	16	15	15	8	1	Z	5	8	10	10	10	7	6	6	2	1	1	1	1	1	1	1	6.8	19
20-Nov	1	1	Z	1	1	1	2	10	19	22	22	23	23	21	17	9	12	14	14	16	17	17	17	16	12.9	23
21-Nov	15	14	14	Z	7	23	23	3	5	7	25	30	31	30	28	17	9	8	13	29	19	28	24	17	18.1	31
22-Nov	25	28	30	32	Z	32	32	31	31	32	34	33	26	15	16	20	20	14	10	16	17	18	17	17	23.8	34
23-Nov	21	19	17	19	18	Z	8	9	5	6	13	13	12	13	14	11	8	2	10	18	18	20	18	20	13.4	21
24-Nov	18	20	22	17	19	21	Z	21	22	18	21	22	23	23	23	24	22	19	19	21	20	20	18	14	20.3	24
25-Nov	16	19	15	13	11	6	4	Z	5	5	7	13	18	9	5	2	3	3	3	2	1	1	3	5	7.3	19
26-Nov	8	9	Z	10	10	11	9	9	9	10	11	12	12	11	8	6	4	1	2	2	2	1	3	5	7.2	12
27-Nov	4	4	6	Z	6	4	3	1	1	4	7	5	4	4	2	1	2	1	1	1	1	2	4	3	3.1	7
28-Nov	4	3	4	7	Z	5	7	6	5	6	7	10	11	8	10	7	5	4	2	5	7	7	7	6	6.2	11
29-Nov	8	9	6	6	7	Z	3	3	1	3	6	6	5	5	4	4	3	3	2	2	2	3	6	7	4.6	9
30-Nov	7	8	9	9	7	4	Z	3	4	6	8	8	8	7	3	1	1	1	1	1	1	2	3	3	4.5	9

12.8	12.8	12.9	12.8	11.3	10.2	8.3	8.5	9.8	10.3	12.9	15.0	16.8	16.5	16.4	14.8	11.6	10.5	10.4	11.2	10.9	11.8	12.4	12.3	Diurnal Average	
30	29	30	32	26	32	32	31	31	32	34	33	31	31	32	31	27	25	25	29	24	28	25	31	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	565	82.36	82.36
21 - 50	121	17.64	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	6	4	3	12	25	203	96	27	15	8	8	20	6	16	88	557
21 - 50	1	1	3	0	0	0	7	2	3	8	24	19	12	13	20	8	121
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	21	7	7	3	12	25	210	98	30	23	32	27	32	19	36	96	678

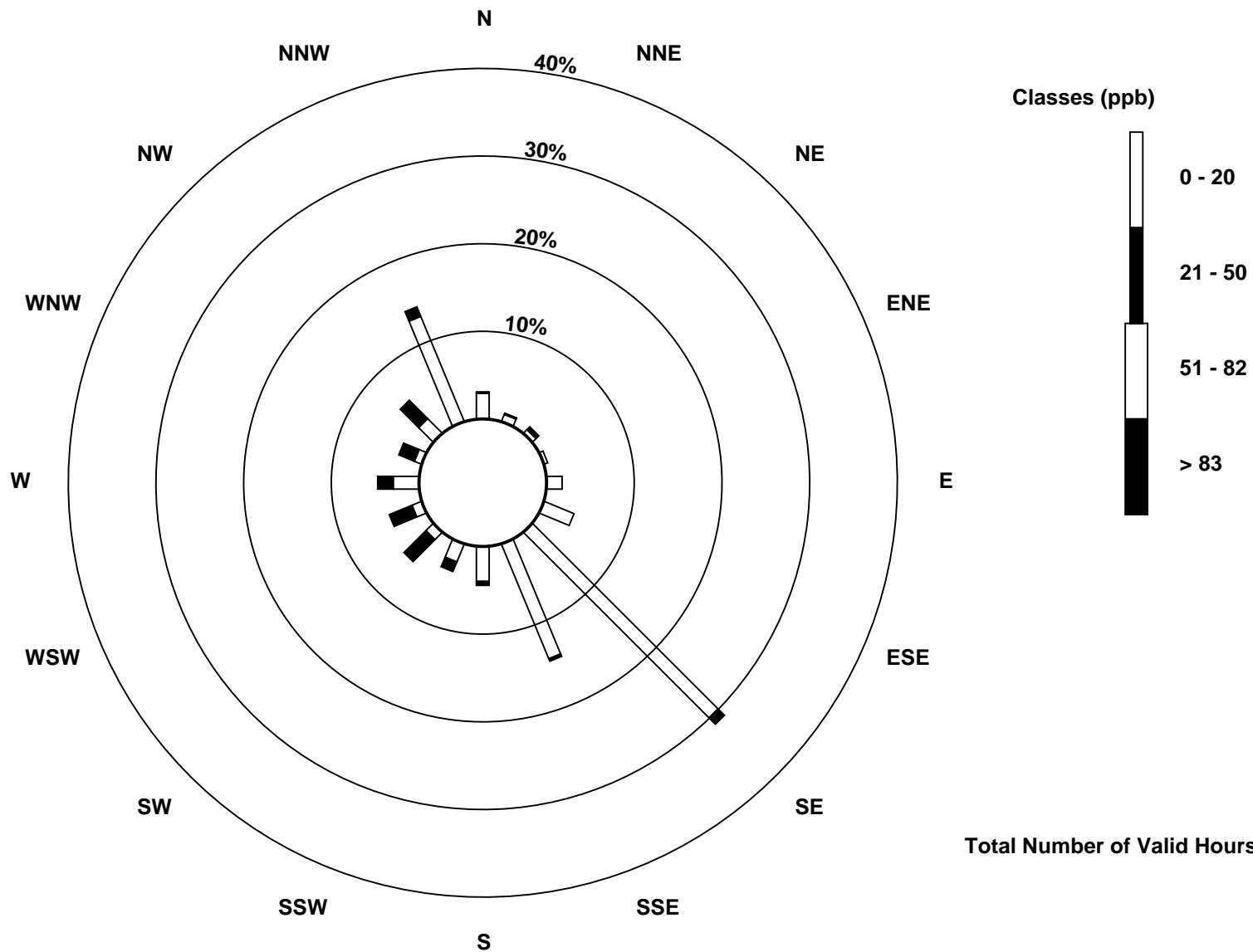
Total Number of Valid Hours: 678

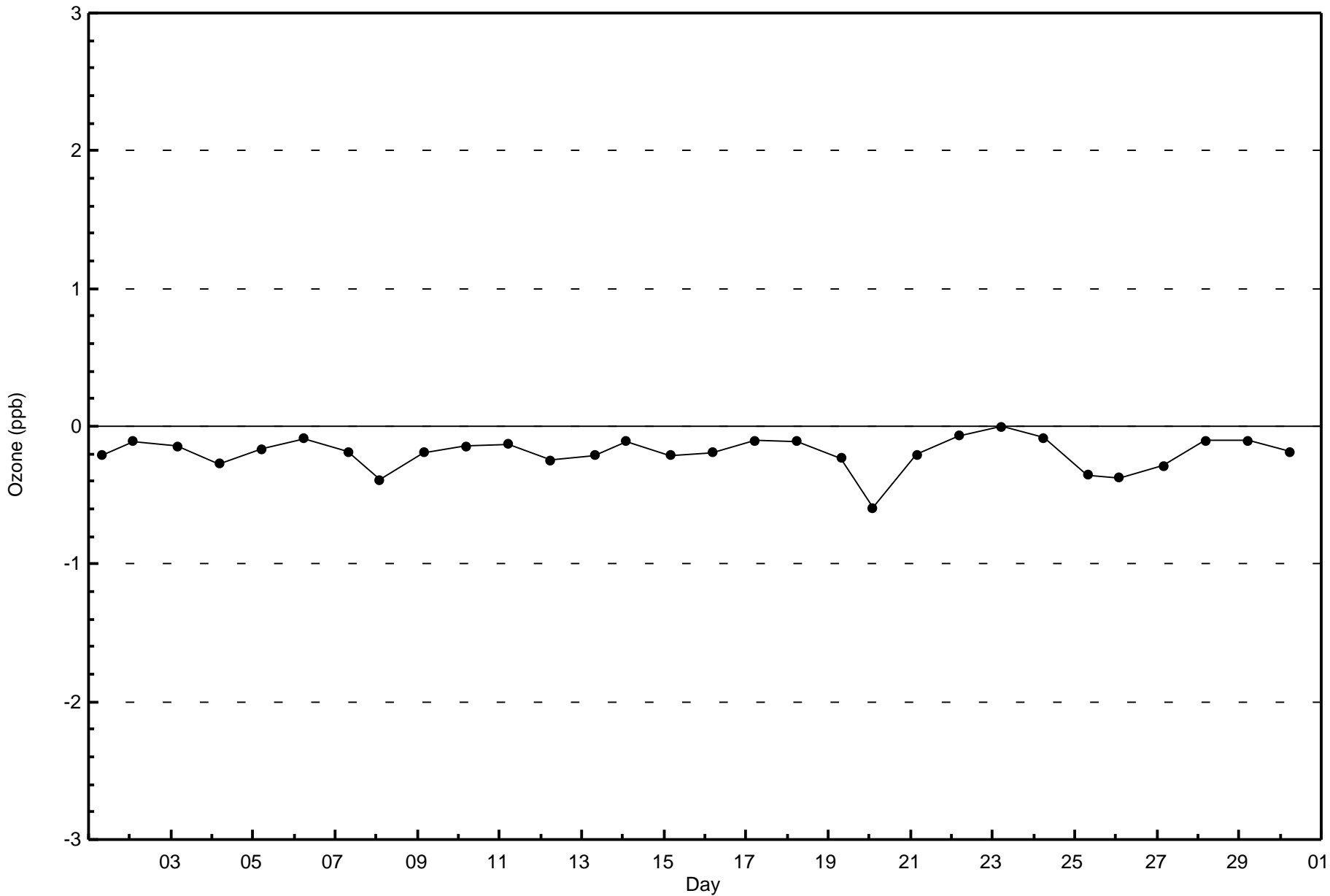
Total Number of Hours: 720

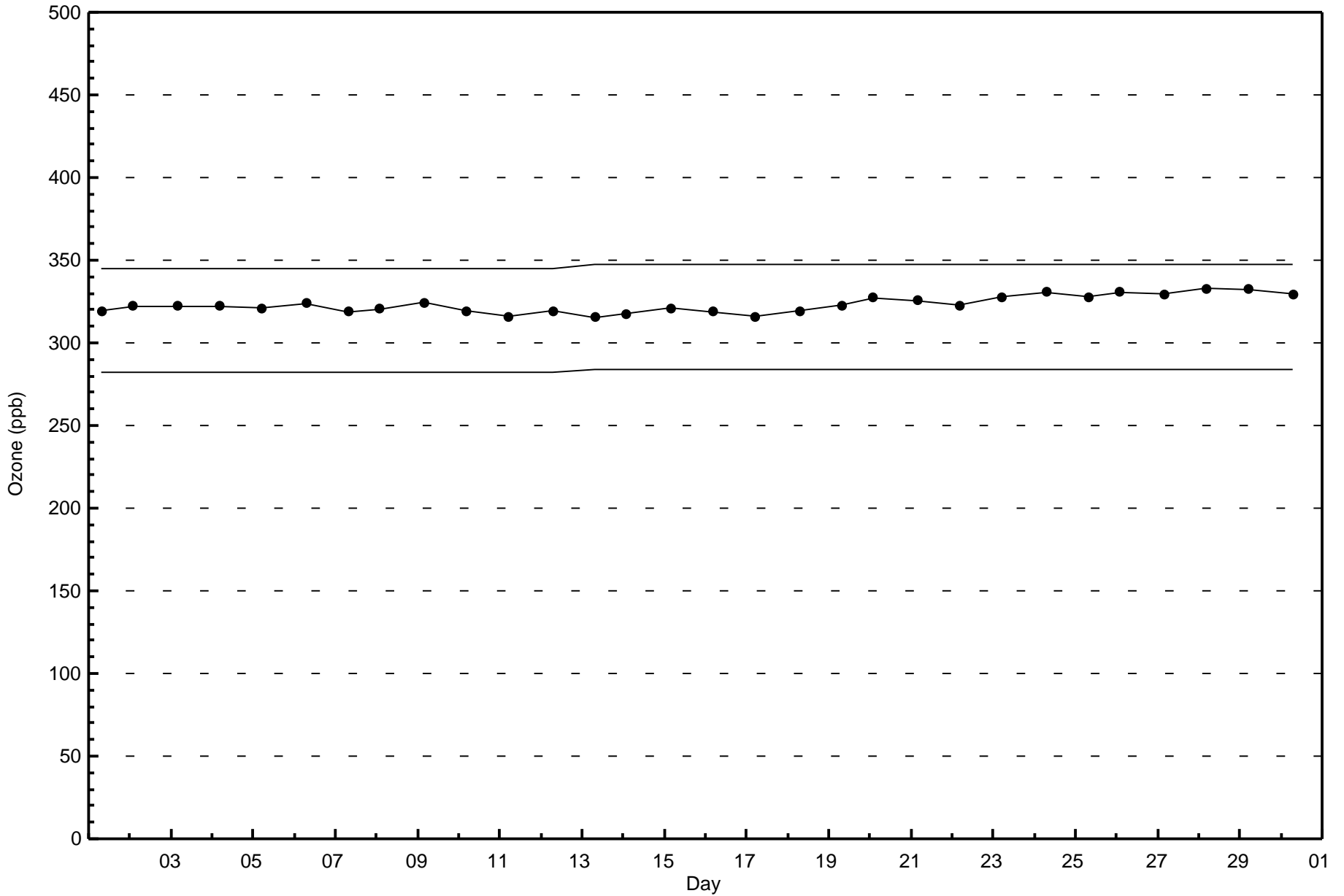


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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







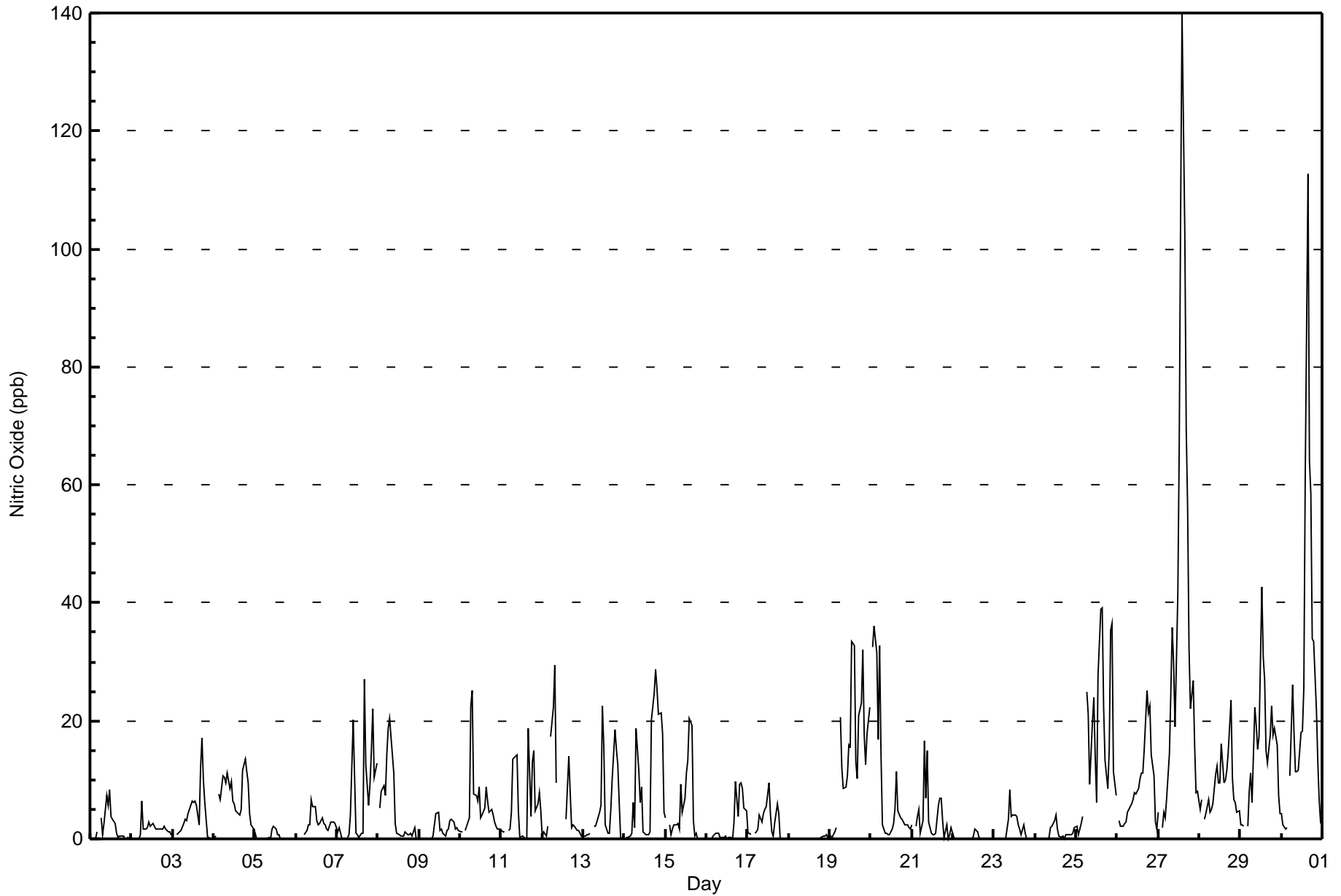


Maximum Value: 140 ppb on Nov 27 15:00	Maximum Daily Average: 36.5 ppb on Nov 27	Hours in Service: 720
Minimum Value: 0 ppb on Nov 1 21:00	Minimum Daily Average: 0.1 ppb on Nov 18	Hours of Data: 685
Maximum Diurnal Average: 12.8 ppb at hour 15	Minimum Diurnal Average: 1.3 ppb at hour 1	Hours of Missing Data: 35
Monthly Average: 7.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 9 P ₉₀ = 19 P ₉₉ = 63	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-Nov	0	0	0	0	1	Z	4	1	3	7	6	8	4	3	3	1	0	0	0	0	0	0	0	0	1.8	8
2-Nov	Z	0	0	0	0	1	6	2	2	2	3	2	3	2	2	2	2	2	2	2	2	1	1	1	1.6	6
3-Nov	1	Z	1	1	1	2	3	3	3	4	5	6	6	6	6	2	12	17	10	6	0	0	0	0	4.2	17
4-Nov	0	0	Z	8	7	11	10	9	11	8	10	6	6	5	4	4	5	12	14	11	9	4	2	2	6.9	14
5-Nov	1	0	0	Z	0	0	0	0	0	0	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0.3	2
6-Nov	0	0	0	0	Z	1	1	2	2	7	5	6	3	2	3	4	3	2	2	1	3	3	3	3	2.4	7
7-Nov	1	2	1	0	0	Z	0	1	4	20	11	1	1	0	1	1	27	12	6	9	15	22	11	13	6.9	27
8-Nov	Z	5	8	9	7	14	19	20	14	11	3	1	1	0	1	1	1	1	1	1	0	2	0	0	5.2	20
9-Nov	0	Z	0	0	0	0	0	0	1	2	4	5	1	2	1	0	1	2	3	3	3	2	2	1	1.4	5
10-Nov	1	1	Z	1	2	4	23	25	8	7	7	9	4	4	5	9	6	5	5	4	3	2	2	2	6.0	25
11-Nov	1	1	1	Z	1	2	4	14	14	14	4	0	0	0	0	0	19	4	13	15	5	6	8	5	5.8	19
12-Nov	1	1	1	2	Z	17	22	29	10	C	C	C	C	C	3	14	8	2	2	2	1	2	1	1	6.6	29
13-Nov	0	0	1	1	1	Z	2	2	3	5	6	23	16	2	1	1	5	10	18	15	13	6	0	0	5.7	23
14-Nov	Z	0	0	1	1	6	2	19	12	6	9	1	1	1	1	1	20	25	29	25	21	21	18	5	9.7	29
15-Nov	3	Z	2	1	2	2	2	3	2	9	5	7	11	13	20	19	3	1	1	0	0	0	0	0	4.6	20
16-Nov	0	0	Z	0	0	1	1	1	0	0	0	1	0	0	0	0	3	10	4	9	9	9	5	5	2.6	10
17-Nov	1	1	1	Z	1	1	2	4	3	4	5	5	9	4	1	0	3	6	4	0	0	0	0	0	2.4	9
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.1	1
19-Nov	1	0	1	1	2	Z	21	12	8	9	11	16	16	33	33	13	10	21	23	32	18	13	18	22	14.5	33
20-Nov	Z	33	36	32	17	33	14	2	1	1	1	1	2	3	5	11	5	4	3	3	2	2	2	2	9.3	36
21-Nov	2	Z	2	4	5	1	3	17	7	15	3	1	1	1	1	6	7	7	3	0	2	0	1	2	3.9	17
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0.2	2
23-Nov	0	0	0	Z	0	0	0	0	0	3	8	4	4	4	2	2	1	2	1	0	0	0	0	0	1.5	8
24-Nov	0	0	0	0	Z	0	0	0	0	2	2	3	4	2	1	0	1	0	1	1	1	1	1	2	0.9	4
25-Nov	2	1	2	3	4	Z	25	21	9	20	24	14	6	28	39	39	22	13	9	15	35	36	11	7	16.7	39
26-Nov	Z	3	2	2	3	3	5	5	6	7	8	8	9	10	11	11	15	25	21	23	14	11	3	2	8.9	25
27-Nov	4	Z	2	4	4	7	14	25	36	30	19	42	67	106	140	103	69	56	32	22	27	16	8	8	36.5	140
28-Nov	5	7	Z	3	4	7	5	5	6	11	12	9	9	16	9	10	12	15	23	10	7	6	4	5	8.7	23
29-Nov	2	2	2	Z	2	8	11	6	22	19	15	17	43	31	27	15	13	17	23	18	19	16	7	4	14.8	43
30-Nov	4	2	2	2	Z	11	26	18	11	11	12	18	18	26	61	113	64	59	34	33	22	13	6	3	24.7	113

1.3	2.4	2.6	3.0	2.6	5.2	7.5	8.2	6.7	8.3	6.7	7.4	8.5	10.6	12.8	12.7	11.2	10.9	9.6	8.8	7.7	6.5	3.8	3.1		Diurnal Average
5	33	36	32	17	33	26	29	36	30	24	42	67	106	140	113	69	59	34	33	35	36	18	22		Diurnal Maximum

Z - zerspan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	622	90.80	90.80
21 - 40	51	7.45	98.25
41 - 80	8	1.17	99.42
81 - 159	4	0.58	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	5	7	3	10	18	195	76	22	20	34	24	33	16	38	90	614
21 - 40	0	1	0	0	2	5	16	15	5	1	1	1	0	0	1	3	51
11 - 80	0	0	0	0	0	0	1	4	1	1	0	0	0	1	0	0	8
81 - 159	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677

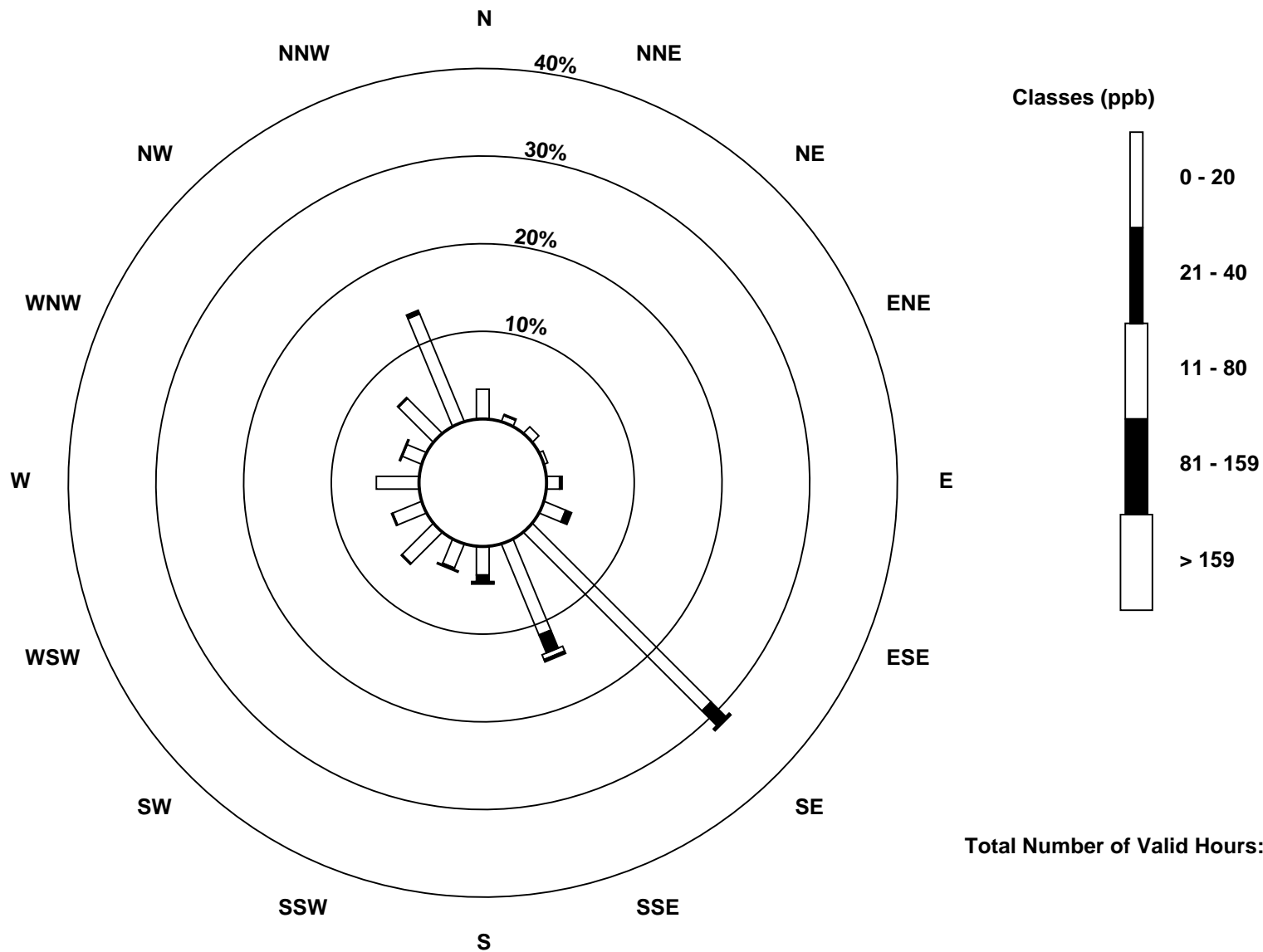
Total Number of Valid Hours: 677

Total Number of Hours: 720

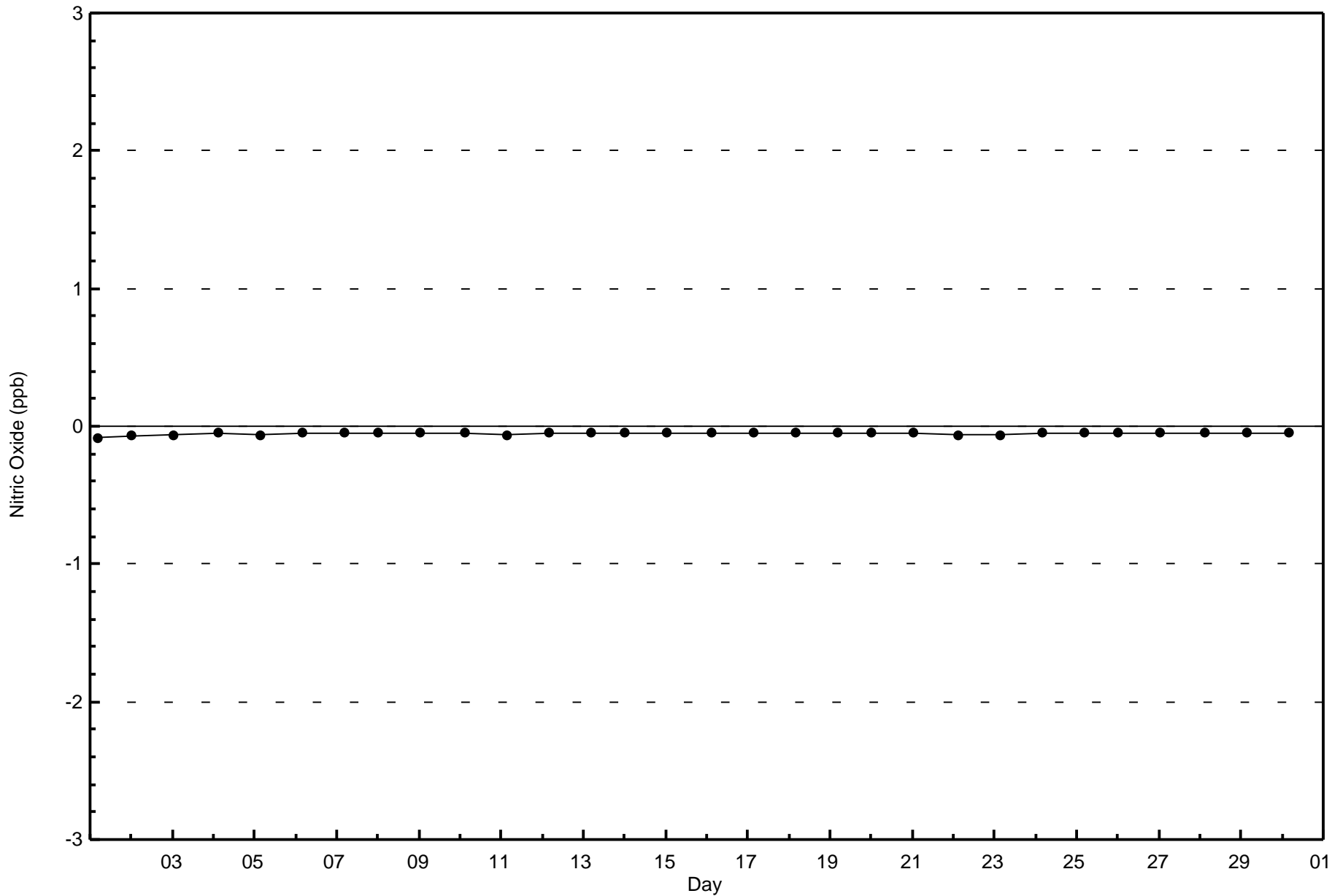


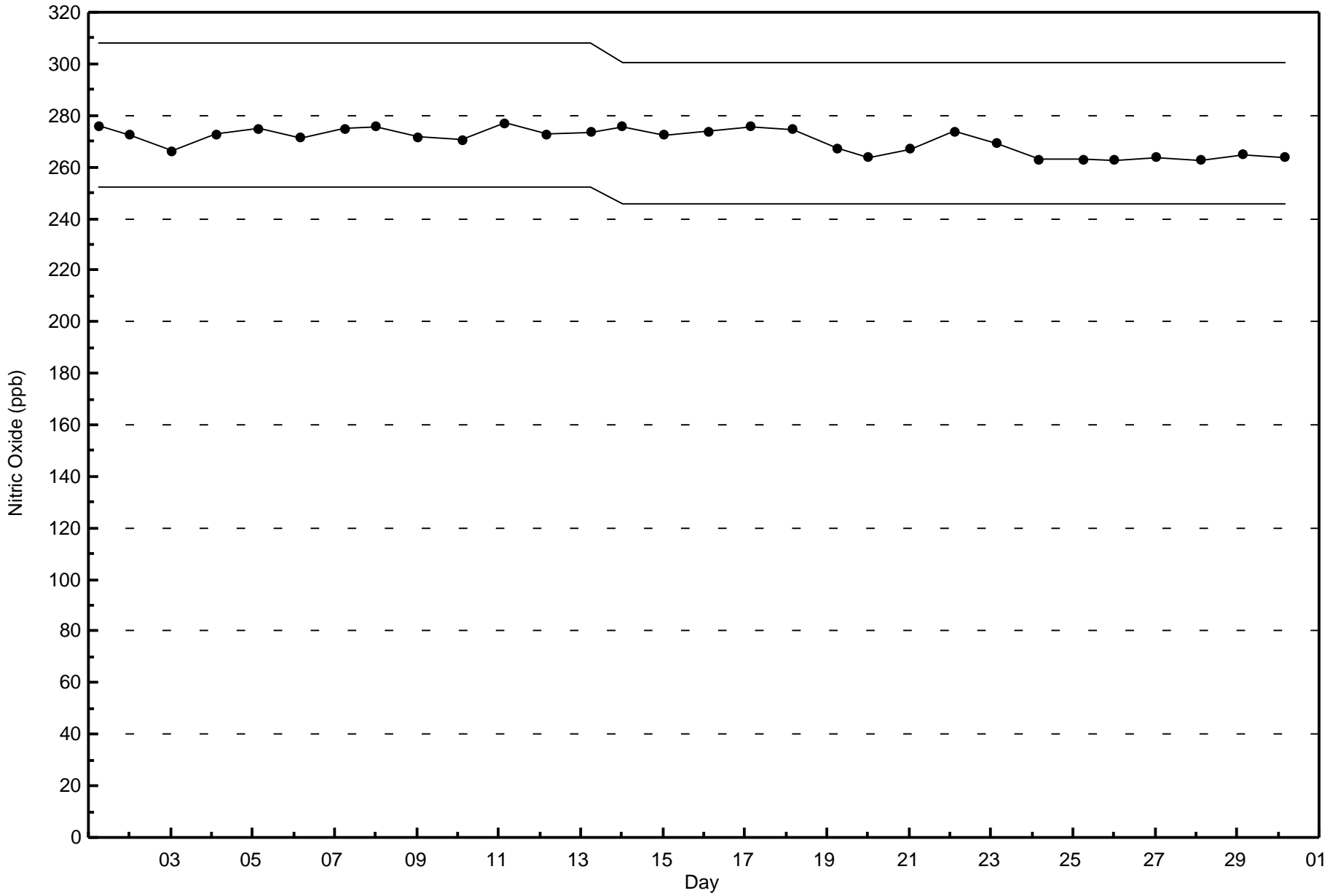
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 677





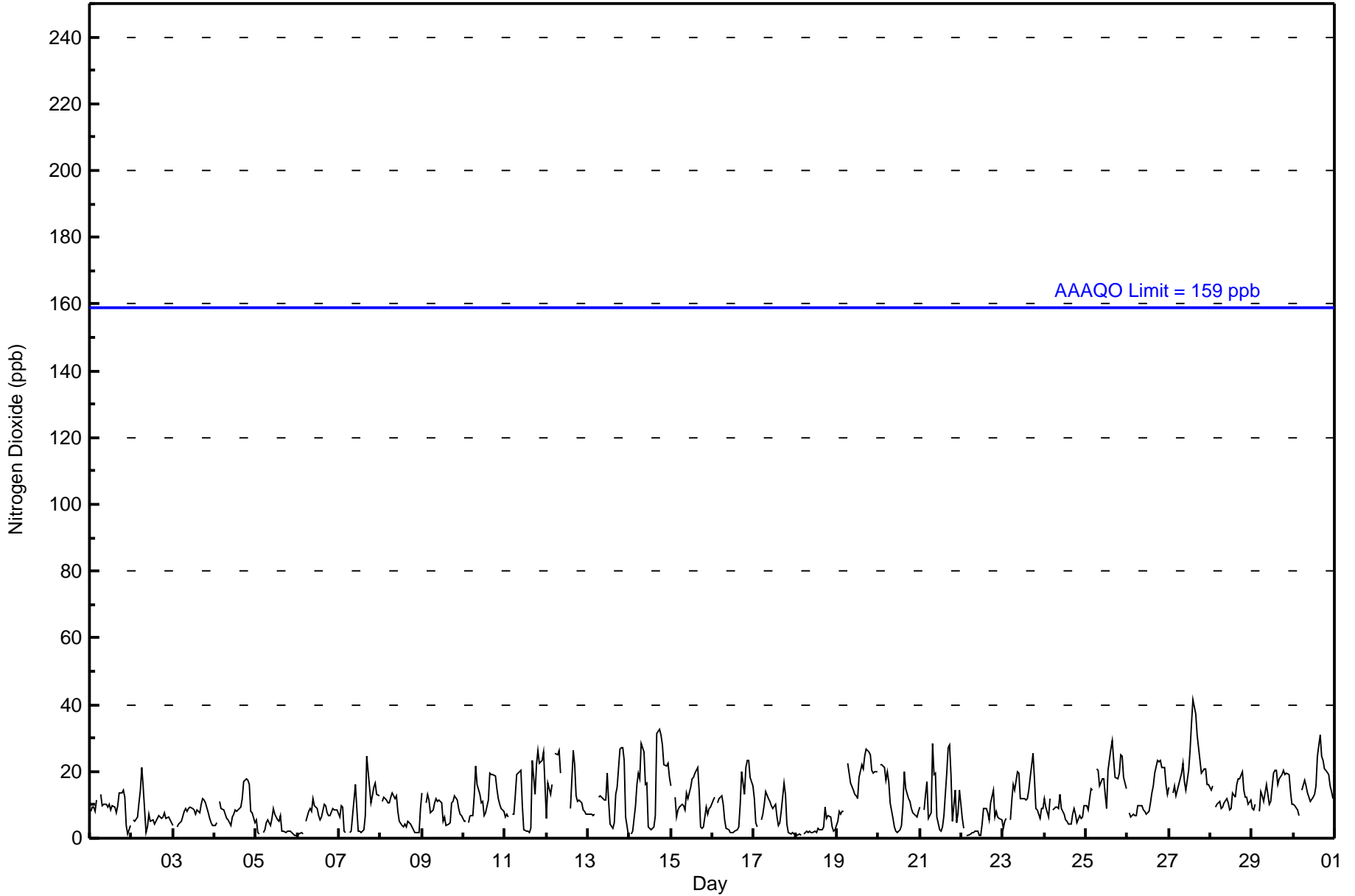


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 41 ppb on Nov 27 15:00	Maximum Daily Average: 21.7 ppb on Nov 27
Minimum Value: 1 ppb on Nov 14 00:00	Hours of Data: 685
Maximum Diurnal Average: 15.8 ppb at hour 18	Hours of Missing Data: 35
Monthly Average: 11.0 ppb	Hours of Calibration: 35
Minimum Daily Average: 2.9 ppb on Nov 18	Percent Operational Time: 100.0
Minimum Diurnal Average: 7.8 ppb at hour 2	
Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 10 Q ₃ = 15 P ₉₀ = 21 P ₉₉ = 31	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	8	9	9	8	12	Z	13	10	10	10	10	10	8	10	9	8	10	14	13	14	12	4	1	4	9.4	14
2-Nov	Z	5	5	6	11	14	21	15	2	4	7	5	5	4	5	6	7	6	6	8	6	6	6	5	7.2	21
3-Nov	4	Z	4	4	5	5	8	9	8	9	9	9	8	7	8	8	10	12	12	11	8	6	5	4	7.4	12
4-Nov	4	5	Z	11	9	9	7	6	6	4	6	7	8	8	9	9	12	17	18	17	16	8	8	5	9.1	18
5-Nov	6	2	1	Z	2	3	5	6	4	6	9	7	5	5	7	2	2	2	2	2	1	1	1	3.6	9	
6-Nov	1	1	2	1	Z	5	8	9	8	12	10	9	7	6	6	10	10	8	7	7	9	9	8	9	6.9	12
7-Nov	6	10	9	2	2	Z	2	2	7	16	9	2	2	2	3	7	25	20	11	13	15	17	13	13	9.0	25
8-Nov	Z	11	12	12	11	11	12	14	12	13	8	5	4	4	4	3	5	4	4	3	2	2	2	9	7.1	14
9-Nov	14	Z	11	13	11	8	9	11	12	11	12	11	5	6	4	4	5	11	11	13	11	9	7	7	9.3	14
10-Nov	5	5	Z	5	7	7	13	22	16	13	11	11	7	8	11	19	19	19	19	15	12	10	9	8	11.7	22
11-Nov	6	7	6	Z	7	7	13	19	20	20	10	3	2	2	2	3	23	13	22	26	22	23	26	16	13.0	26
12-Nov	6	17	13	16	Z	26	25	26	20	C	C	C	C	C	9	26	22	13	11	11	11	8	8	7	15.3	26
13-Nov	7	7	7	7	7	Z	12	13	12	12	11	20	11	4	3	5	13	15	27	27	27	23	6	1	12.1	27
14-Nov	Z	1	2	10	16	19	18	28	26	16	17	3	3	3	3	7	31	33	31	28	22	22	23	18	16.5	33
15-Nov	16	Z	12	7	9	9	10	10	9	14	12	15	18	18	20	21	14	3	3	4	9	7	9	9	11.1	21
16-Nov	12	12	Z	11	12	13	10	6	3	3	2	2	2	2	3	3	10	20	13	21	23	23	18	16	10.3	23
17-Nov	12	5	3	Z	6	7	10	14	12	11	10	9	10	6	4	5	8	17	13	4	2	1	2	1	7.4	17
18-Nov	1	1	1	1	Z	1	2	2	2	2	2	2	2	3	3	3	3	9	6	7	6	3	2	3	2.9	9
19-Nov	5	8	7	8	8	Z	23	19	17	14	13	13	12	18	22	21	25	27	26	25	20	19	20	20	16.9	27
20-Nov	Z	22	22	21	17	20	17	11	6	4	2	2	3	4	10	20	15	12	11	9	8	7	6	8	11.1	22
21-Nov	9	Z	8	13	17	6	8	29	19	20	7	2	2	3	7	19	27	28	19	5	14	5	8	15	12.6	29
22-Nov	6	3	Z	1	1	1	2	2	2	2	1	1	4	9	9	8	5	11	14	7	8	7	6	5	4.9	14
23-Nov	3	5	6	Z	6	11	16	15	20	20	12	12	12	12	15	18	26	18	9	9	6	9	9	9	12.1	26
24-Nov	12	9	6	12	Z	8	9	9	9	13	9	7	6	5	4	4	7	9	7	5	7	6	6	10	7.9	13
25-Nov	10	9	12	15	15	Z	21	20	16	18	18	13	9	20	27	29	23	18	18	20	25	24	18	15	17.9	29
26-Nov	Z	8	6	7	7	7	10	10	10	8	8	7	8	11	14	16	20	23	23	23	21	21	16	13	12.9	23
27-Nov	15	Z	14	16	13	15	18	19	23	17	14	21	26	35	41	37	31	27	24	20	21	21	16	16	21.7	41
28-Nov	14	16	Z	10	10	11	9	9	11	12	11	8	9	14	12	16	18	18	20	14	12	12	10	12	12.5	20
29-Nov	9	8	10	Z	8	14	13	11	16	13	10	11	20	20	20	16	18	19	21	19	20	19	14	10	14.7	21
30-Nov	10	10	8	7	Z	14	17	16	14	12	11	12	13	16	24	31	25	24	21	21	19	16	14	12	15.9	31

8.0	7.8	8.0	8.9	9.0	10.0	11.9	13.0	11.6	11.3	9.3	8.3	8.0	9.1	10.5	12.7	15.4	15.8	15.0	13.5	13.3	11.5	9.9	9.3	Diurnal Average	
16	22	22	21	17	26	25	29	26	20	18	21	26	35	41	37	31	33	31	28	27	24	26	20	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	611	89.20	89.20
21 - 40	73	10.66	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	6	7	3	12	17	192	73	21	18	35	24	33	16	38	86	603
21 - 40	1	0	0	0	0	6	20	24	8	4	0	1	0	1	1	7	73
11 - 80	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677

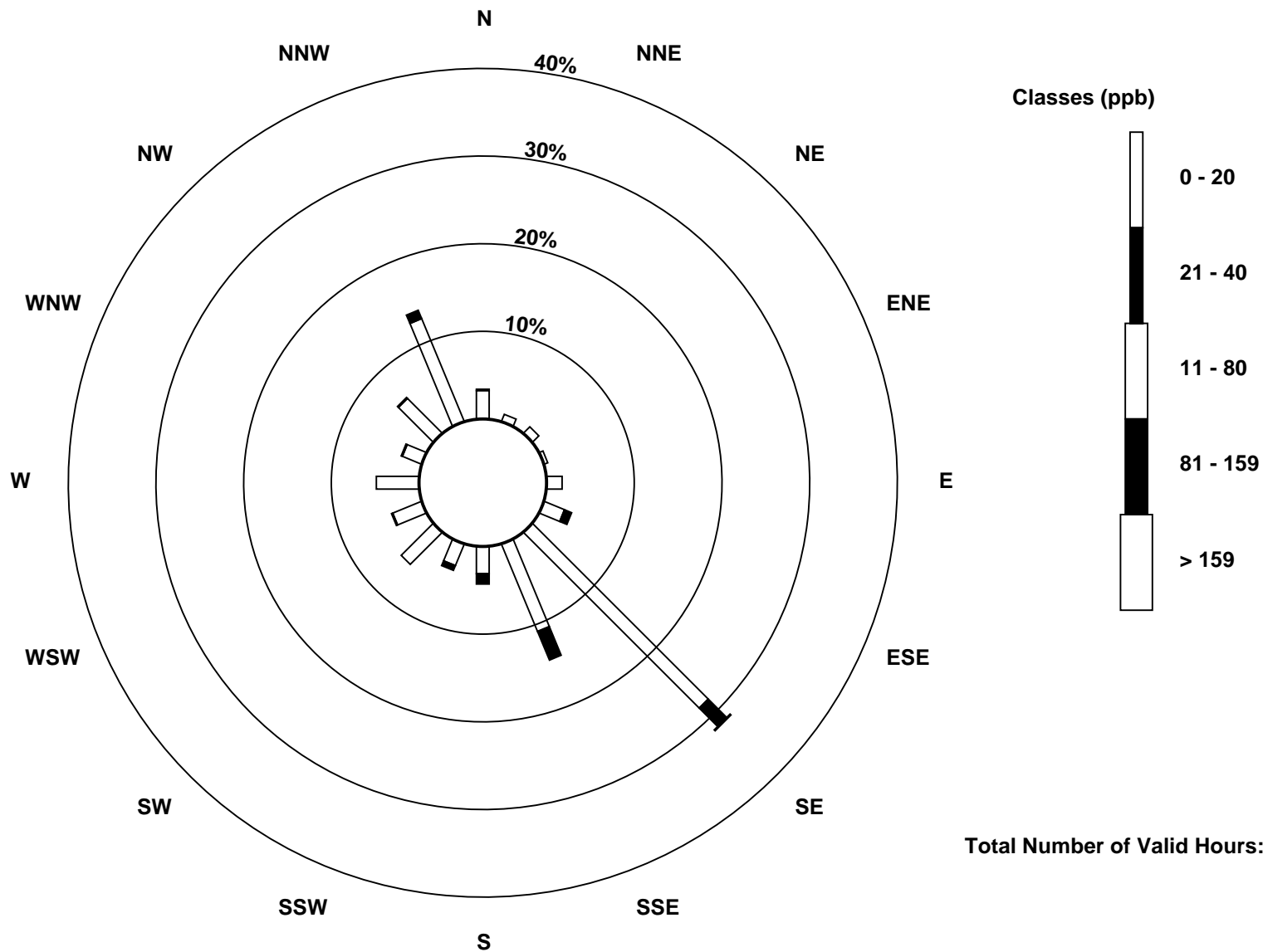
Total Number of Valid Hours: 677

Total Number of Hours: 720

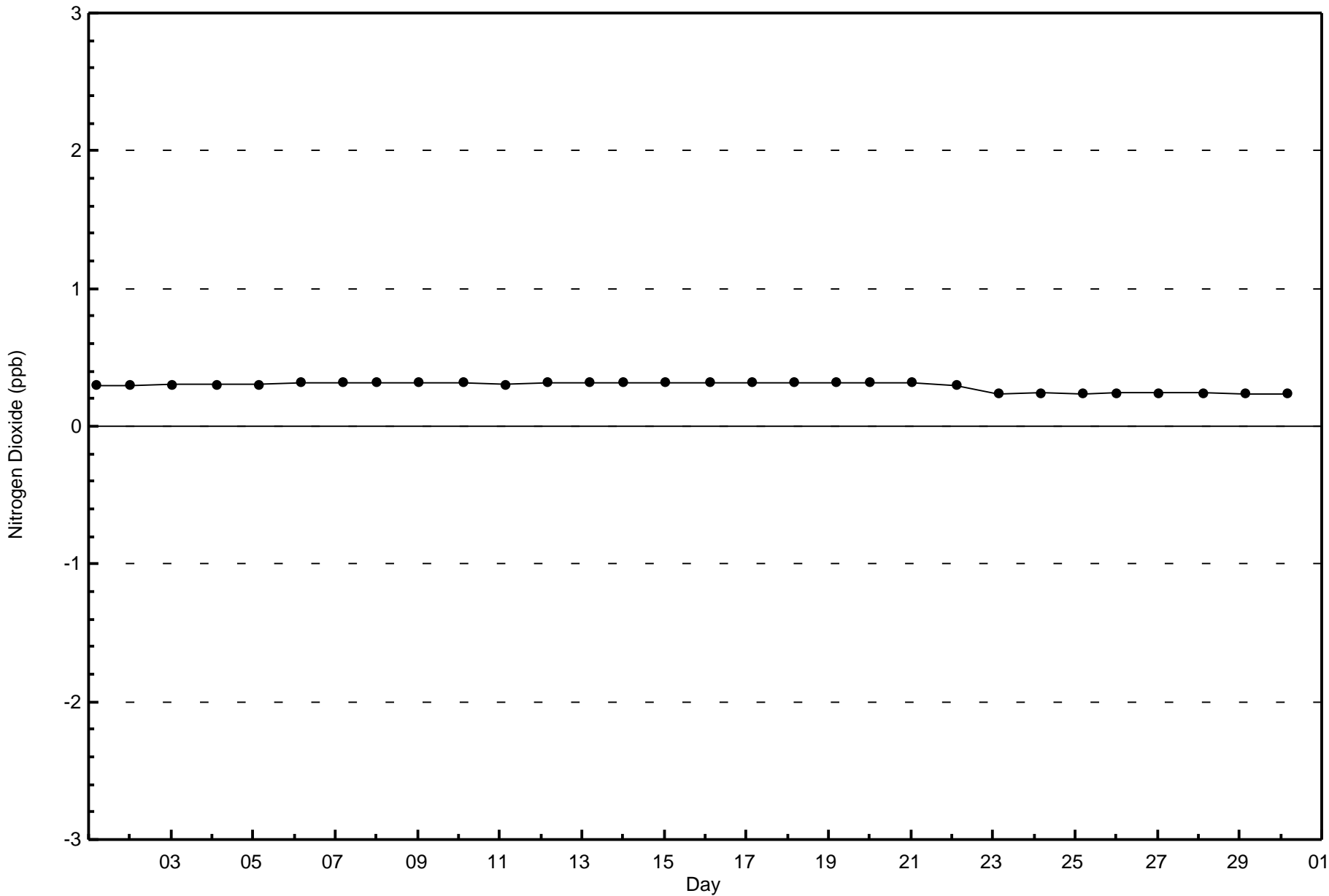


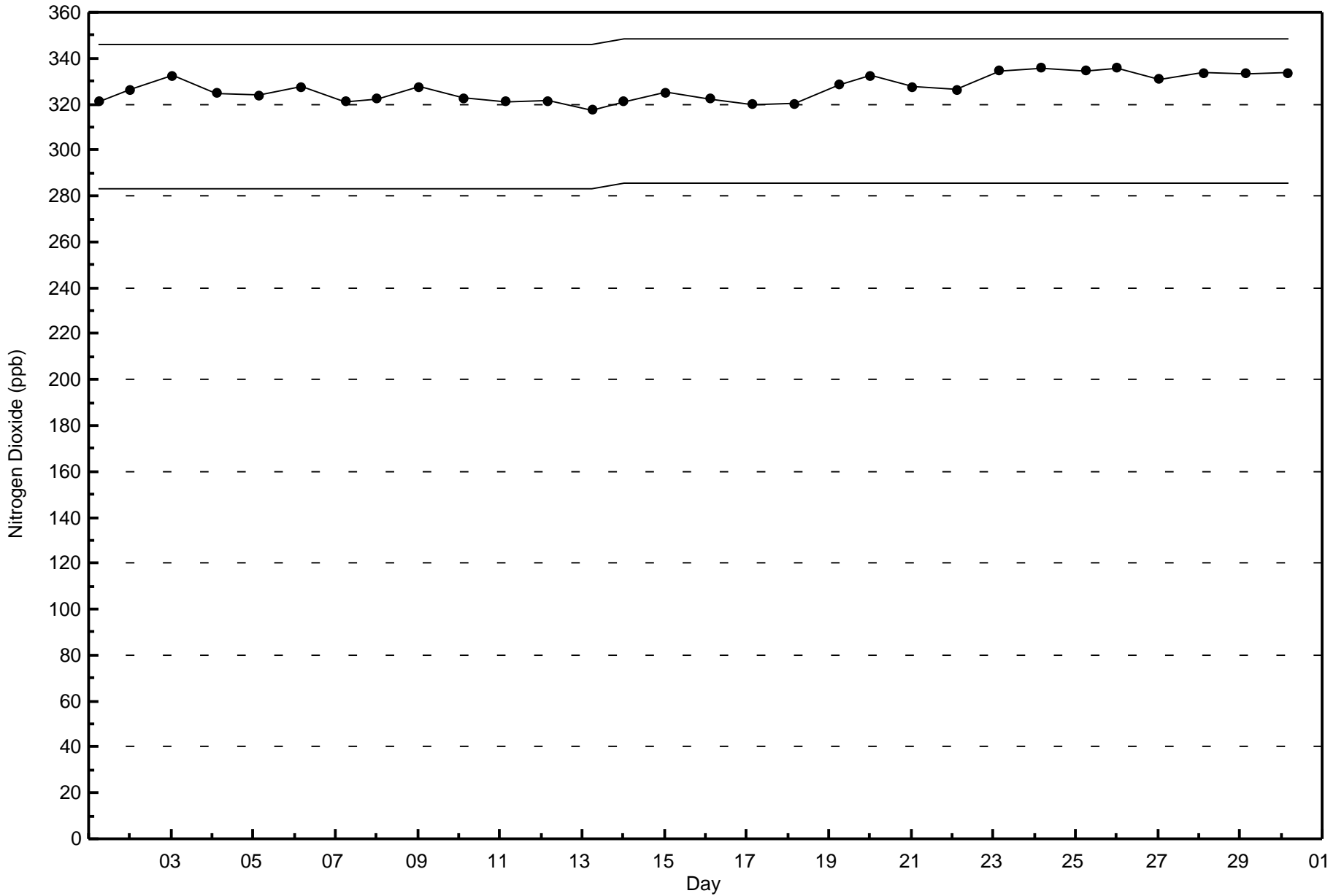
Wood Buffalo Environmental Association
Wind Rose Nov 2015

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



Total Number of Valid Hours: 677





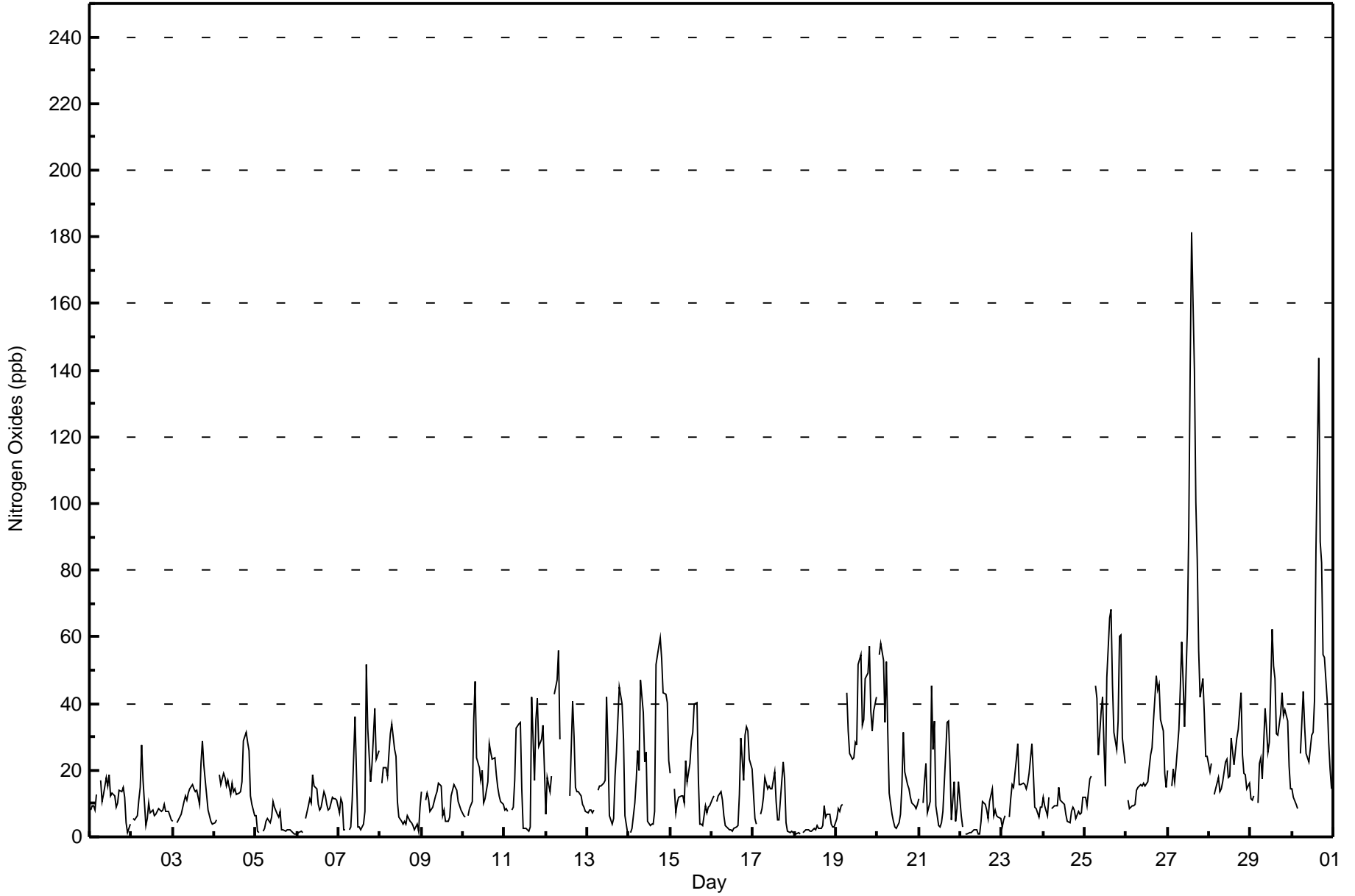


Maximum Value: 181 ppb on Nov 27 15:00	Maximum Daily Average: 58.2 ppb on Nov 27	Hours in Service: 720
Minimum Value: 1 ppb on Nov 14 00:00	Minimum Daily Average: 3.0 ppb on Nov 18	Hours of Data: 685
Maximum Diurnal Average: 26.7 ppb at hour 18	Minimum Diurnal Average: 9.3 ppb at hour 1	Hours of Missing Data: 35
Monthly Average: 18.2 ppb	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 7 Median = 13 Q ₃ = 24 P ₉₀ = 41 P ₉₉ = 87	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-Nov	8	9	9	8	13	Z	17	10	13	18	15	19	12	13	12	9	10	14	14	15	12	4	1	4	11.3	19
2-Nov	Z	5	5	6	11	15	27	17	3	5	10	7	8	6	7	8	8	8	8	10	8	8	7	5	8.8	27
3-Nov	5	Z	4	5	6	7	11	12	11	13	14	15	14	14	14	10	22	29	22	17	8	6	5	4	11.6	29
4-Nov	4	5	Z	19	16	19	18	15	17	13	16	13	14	13	13	13	17	29	31	29	26	12	10	6	16.0	31
5-Nov	6	2	1	Z	2	2	5	6	4	6	11	9	7	6	8	2	2	2	2	2	2	1	1	1	3.9	11
6-Nov	1	1	2	1	Z	6	9	11	10	18	15	15	10	8	9	14	12	10	8	8	12	11	11	11	9.4	18
7-Nov	7	11	10	2	2	Z	2	3	11	36	19	3	3	2	4	8	52	32	17	22	30	39	23	26	15.8	52
8-Nov	Z	16	21	21	18	25	31	34	26	24	11	6	5	4	5	4	6	5	4	3	2	4	2	9	12.4	34
9-Nov	14	Z	11	13	11	8	9	11	12	13	16	15	6	8	5	5	6	12	14	16	14	11	9	8	10.7	16
10-Nov	6	6	Z	6	9	10	35	47	24	21	17	20	10	12	17	28	25	23	24	19	15	12	10	10	17.7	47
11-Nov	8	9	8	Z	8	9	17	33	34	34	14	3	3	2	2	3	42	17	35	41	27	29	33	21	18.8	42
12-Nov	7	18	14	18	Z	43	47	56	29	C	C	C	C	C	12	41	30	15	13	14	12	10	9	8	21.9	56
13-Nov	7	8	8	7	8	Z	14	15	15	16	17	42	27	7	4	6	18	25	45	42	40	29	6	1	17.8	45
14-Nov	Z	1	3	10	17	26	20	47	37	22	25	5	3	4	4	8	52	57	60	53	43	43	40	23	26.3	60
15-Nov	19	Z	15	7	10	12	12	12	10	23	17	22	29	31	40	40	17	4	4	4	9	7	9	9	15.7	40
16-Nov	12	12	Z	11	12	14	11	6	3	3	2	2	2	2	3	3	13	30	17	31	33	32	24	20	12.9	33
17-Nov	13	6	4	Z	7	8	12	18	14	15	15	14	20	10	5	5	11	22	18	4	2	1	2	1	9.9	22
18-Nov	1	1	1	1	Z	1	2	2	2	2	2	2	2	3	3	3	3	9	6	7	7	4	3	3	3.0	9
19-Nov	6	8	8	9	10	Z	43	32	25	23	24	29	27	52	55	34	35	47	49	57	38	32	38	42	31.4	57
20-Nov	Z	54	58	53	34	53	31	13	7	5	3	3	4	7	15	31	20	16	15	12	10	9	8	10	20.4	58
21-Nov	12	Z	10	17	22	7	11	45	26	35	9	3	3	4	8	25	34	35	22	5	17	5	8	16	16.5	45
22-Nov	6	3	Z	1	1	1	1	2	2	2	1	1	5	11	10	8	5	11	14	7	8	7	6	5	5.1	14
23-Nov	3	5	6	Z	6	11	16	15	23	28	16	16	16	16	14	16	19	28	19	9	9	6	9	9	13.6	28
24-Nov	12	9	6	12	Z	8	9	9	9	15	11	10	10	7	5	4	8	9	8	5	8	7	7	12	8.8	15
25-Nov	12	9	13	17	18	Z	46	41	25	38	42	27	15	48	66	68	46	31	26	35	60	61	30	22	34.6	68
26-Nov	Z	11	9	9	9	10	14	15	16	15	16	15	17	21	25	27	35	48	44	46	35	32	19	15	21.8	48
27-Nov	20	Z	15	20	16	21	32	44	58	47	33	62	93	141	181	140	100	83	56	42	48	37	24	24	58.2	181
28-Nov	19	22	Z	13	14	18	14	14	17	23	23	18	18	30	22	26	30	32	43	24	19	18	15	16	21.2	43
29-Nov	11	11	12	Z	10	22	24	17	39	32	25	29	62	51	47	31	30	37	43	36	38	35	21	14	29.6	62
30-Nov	14	12	10	9	Z	25	43	33	25	24	22	31	31	41	86	144	89	82	55	54	41	28	20	15	40.6	144

9.3	10.2	10.5	11.8	11.6	15.2	19.5	21.2	18.3	19.6	15.9	15.7	16.4	19.7	23.2	25.4	26.6	26.7	24.5	22.3	21.0	18.0	13.7	12.3	Diurnal Average	
20	54	58	53	34	53	47	56	58	47	42	62	93	141	181	144	100	83	60	57	60	61	40	42	Diurnal Maximum	

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	481	70.22	70.22
21 - 40	135	19.71	89.93
41 - 80	59	8.61	98.54
81 - 159	9	1.31	99.85
> 159	1	0.15	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	5	7	3	6	5	137	45	15	14	34	23	32	16	38	73	473
21 - 40	3	0	0	0	4	13	57	28	7	4	0	1	1	0	0	17	135
11 - 80	0	1	0	0	2	5	18	18	5	3	1	1	0	1	1	3	59
81 - 159	0	0	0	0	0	0	0	6	2	1	0	0	0	0	0	0	9
> 159	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Totals	23	6	7	3	12	23	213	97	29	22	35	25	33	17	39	93	677

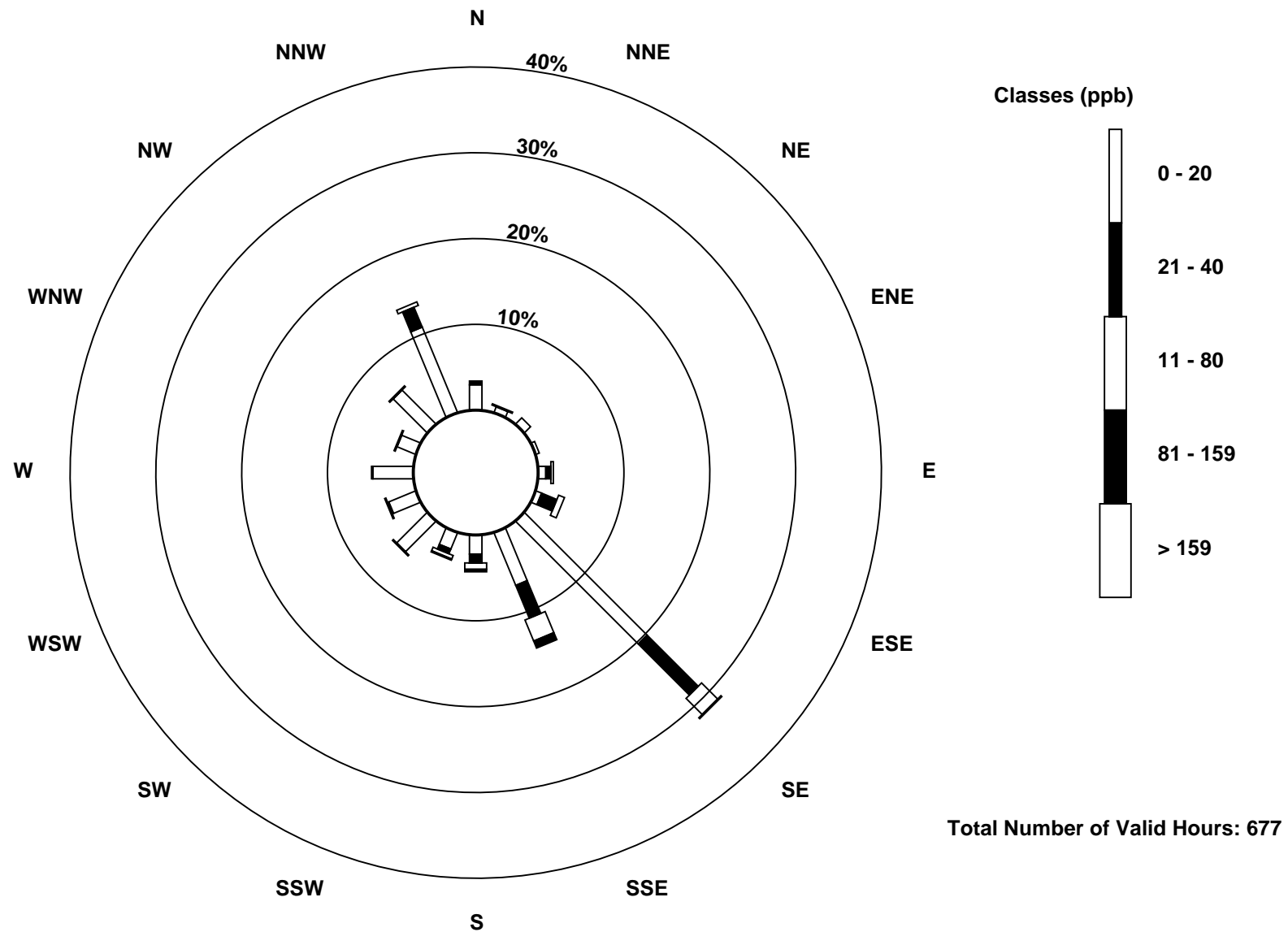
Total Number of Valid Hours: 677

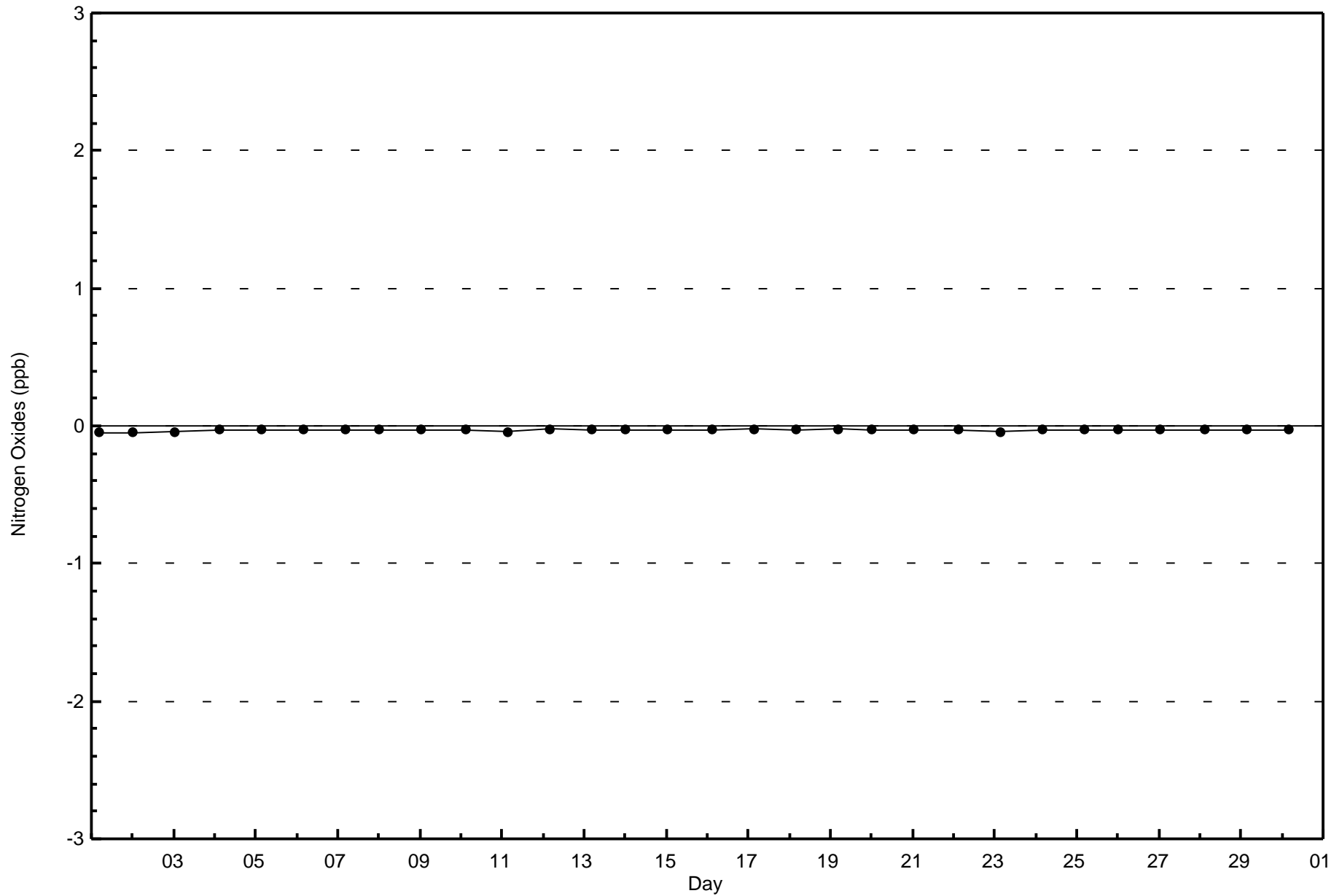
Total Number of Hours: 720

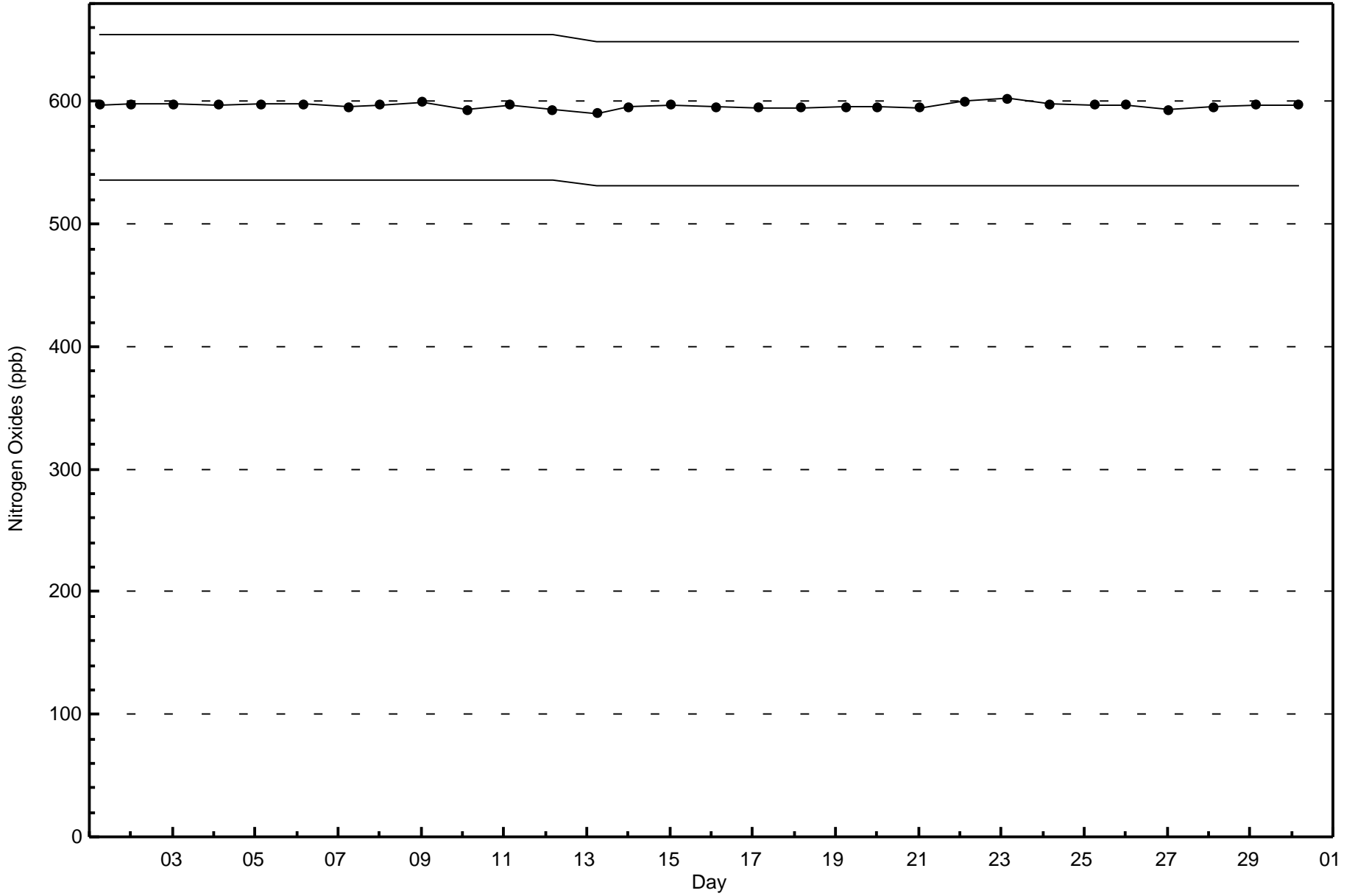


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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









Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 76.8 µg/m ³ on Nov 3 22:00	Maximum Daily Average: 23.3 µg/m ³ on Nov 4	Hours of Data:	719
Minimum Value: 2.0 µg/m ³ on Nov 1 23:00	Minimum Daily Average: 2.4 µg/m ³ on Nov 18	Hours of Missing Data:	1
Maximum Diurnal Average: 9.0 µg/m ³ at hour 21	Minimum Diurnal Average: 5.4 µg/m ³ at hour 14	Hours of Calibration:	1
Monthly Average: 6.48 µg/m ³	Percentiles: P ₁ = 2.1 P ₁₀ = 2.7 Q ₁ = 3.4 Median = 5.0 Q ₃ = 7.0 P ₉₀ = 10.2 P ₉₉ = 41.0	Percent Operational Time:	100.0

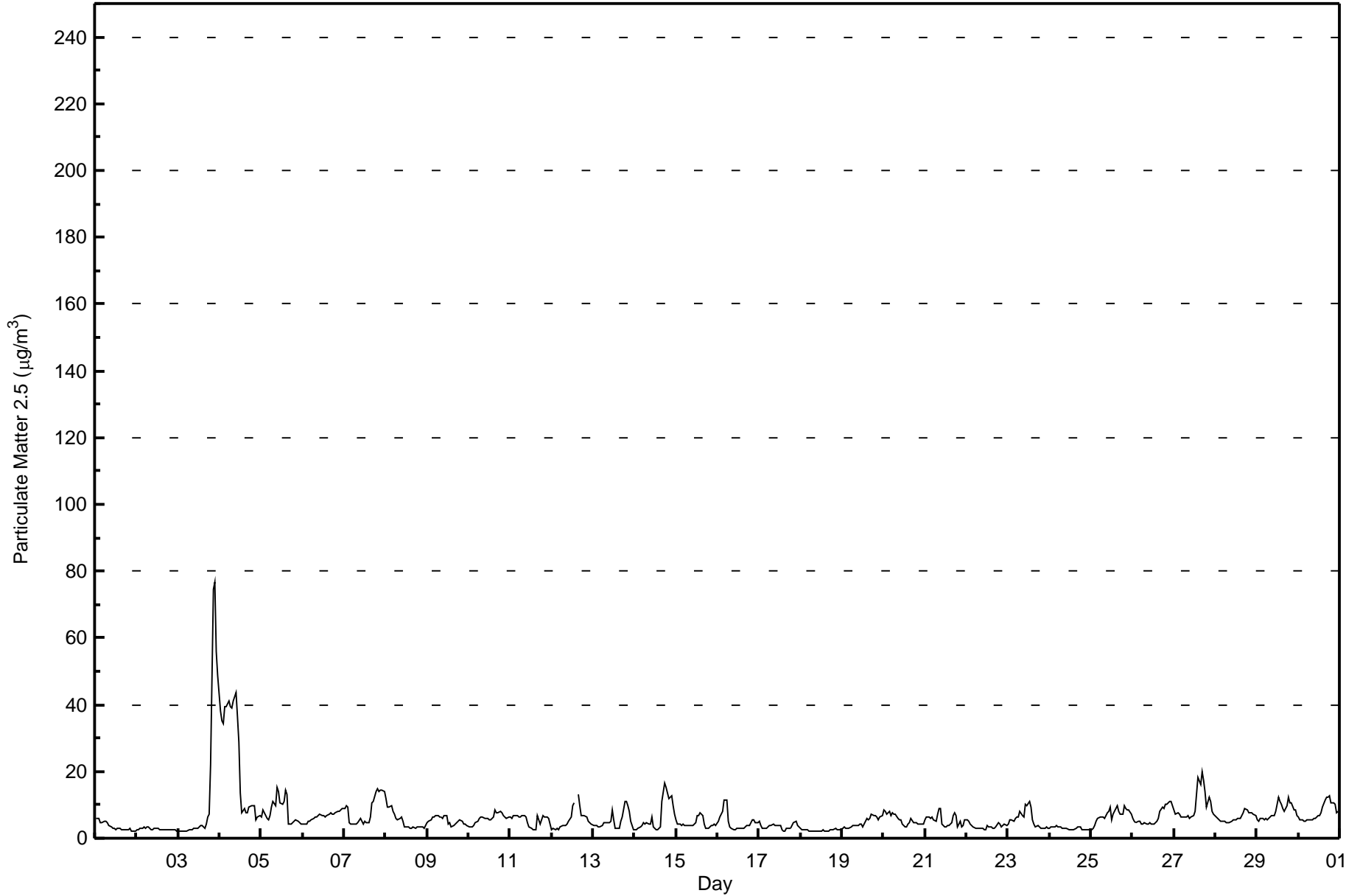
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	5.9	6.0	5.8	4.9	4.9	4.9	5.0	4.5	3.7	3.2	3.0	2.9	2.6	2.8	2.9	2.7	2.6	2.7	2.7	2.7	2.8	2.1	2.0	2.1	3.6	6.0																							
2-Nov	2.5	2.7	2.9	3.2	3.3	3.1	3.3	3.6	2.5	2.7	3.0	2.9	2.9	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.7	2.5	2.5	2.1	2.8	3.6																							
3-Nov	2.0	2.1	2.2	2.2	2.2	2.3	2.6	2.7	2.7	2.8	2.8	2.9	3.5	3.9	4.0	3.0	4.3	6.2	7.0	21.9	74.7	76.8	55.9	48.7	14.2	76.8																							
4-Nov	38.2	35.3	34.3	39.5	39.5	41.1	39.4	38.9	41.2	43.5	36.4	28.7	13.6	7.8	8.7	7.5	7.6	9.3	9.9	9.6	9.7	5.7	6.2	6.6	23.3	43.5																							
5-Nov	6.5	8.3	7.8	5.8	5.6	6.8	9.2	11.0	9.8	15.3	14.1	10.7	10.3	10.9	14.2	13.0	4.0	4.4	4.6	5.2	5.4	5.0	4.5	4.4	8.2	15.3																							
6-Nov	4.2	4.2	4.2	4.9	4.9	5.5	6.0	6.3	6.3	7.0	7.0	6.7	6.7	6.5	6.7	7.3	7.5	7.0	7.3	7.5	8.2	8.2	8.6	8.8	6.6	8.8																							
7-Nov	8.9	9.7	9.3	4.5	4.1	4.1	4.1	4.1	4.5	6.0	5.0	4.2	5.0	4.5	4.7	6.2	10.5	10.8	13.8	14.7	14.1	14.4	14.5	13.9	8.2	14.7																							
8-Nov	11.8	9.4	9.2	9.8	7.9	7.4	6.1	5.7	5.9	6.3	5.0	3.6	3.4	3.2	3.1	2.9	3.3	3.1	3.4	3.2	3.2	3.2	2.8	3.7	5.3	11.8																							
9-Nov	4.8	5.2	5.5	6.3	6.4	6.8	6.6	6.4	6.2	5.9	6.7	6.6	4.2	4.6	3.5	3.7	4.2	4.7	5.1	5.4	5.0	4.2	4.1	3.7	5.3	6.8																							
10-Nov	3.2	3.4	3.5	3.7	4.5	5.1	5.8	6.3	6.2	6.1	5.7	6.0	5.4	5.7	6.4	8.6	7.5	7.7	8.2	7.7	7.0	6.3	5.9	6.3	5.9	8.6																							
11-Nov	6.2	6.1	6.9	6.7	6.9	6.5	6.5	6.8	7.0	6.4	4.8	3.2	3.0	2.6	2.5	2.8	6.9	4.3	5.5	6.6	6.2	6.3	5.8	4.2	5.4	7.0																							
12-Nov	2.5	2.9	2.6	2.8	2.7	3.2	3.6	3.9	3.8	4.1	5.0	6.3	9.6	10.4	C	13.3	9.7	7.0	6.9	6.8	6.2	5.3	4.5	4.1	5.5	13.3																							
13-Nov	3.6	3.7	3.6	3.4	3.6	3.8	4.6	4.6	4.8	4.8	5.0	8.6	5.4	3.1	2.8	3.1	5.2	6.2	10.8	10.8	9.7	7.9	5.2	2.4	5.3	10.8																							
14-Nov	2.4	2.7	2.9	3.5	3.8	4.5	4.1	4.7	4.4	4.4	6.4	3.2	2.7	2.6	2.8	3.4	11.2	16.7	15.3	13.7	11.8	12.7	9.7	7.1	6.5	16.7																							
15-Nov	5.4	4.3	4.4	3.7	4.1	3.9	4.0	4.0	4.0	4.0	3.6	4.6	6.7	6.6	7.5	6.8	4.2	2.8	2.8	2.8	3.9	3.9	4.1	3.9	4.4	7.5																							
16-Nov	5.2	6.6	7.3	7.9	11.3	11.5	5.2	3.5	3.2	2.6	2.6	2.8	2.9	2.9	2.9	3.0	3.3	4.0	3.6	4.5	5.7	5.5	4.8	4.7	4.9	11.5																							
17-Nov	5.0	3.8	3.1	3.1	3.1	3.4	3.7	3.9	4.0	3.8	3.6	3.6	3.9	2.4	2.2	2.2	2.8	2.9	2.9	3.8	4.7	5.0	3.9	3.6	3.5	5.0																							
18-Nov	2.8	2.5	2.5	2.4	2.4	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.1	2.3	2.2	2.1	2.2	2.6	2.4	2.5	3.0	2.4	2.5	2.6	2.4	3.0																							
19-Nov	2.8	3.2	2.8	2.9	2.8	3.2	4.0	3.7	3.6	3.8	4.1	4.1	3.5	4.4	5.8	5.7	5.9	7.3	6.9	6.6	6.2	5.6	6.4	6.8	4.7	7.3																							
20-Nov	8.3	8.0	7.2	7.9	6.8	7.5	7.2	7.3	6.0	5.7	5.6	4.2	3.5	3.6	4.0	4.9	5.7	4.6	4.8	4.5	4.1	4.1	4.2	4.0	5.6	8.3																							
21-Nov	5.6	6.2	6.2	5.8	6.4	5.7	5.3	7.0	8.9	8.9	4.4	3.4	3.5	3.7	3.8	4.6	6.8	7.6	7.0	3.2	5.0	3.3	4.0	5.6	5.5	8.9																							
22-Nov	5.5	4.9	4.3	3.6	3.3	3.0	2.9	2.8	2.9	2.9	2.5	2.5	3.9	3.6	3.4	3.2	3.1	3.3	4.6	4.2	3.5	3.8	4.0	3.8	3.6	5.5																							
23-Nov	4.4	5.4	5.5	5.3	5.9	6.3	6.3	7.9	6.6	6.4	10.3	9.9	11.0	9.5	5.6	4.3	3.3	3.6	3.5	2.9	2.9	3.1	3.2	2.8	5.7	11.0																							
24-Nov	3.0	3.2	3.4	3.3	3.8	3.5	3.3	3.0	2.9	3.1	2.9	2.6	2.4	2.5	2.6	2.8	3.3	3.5	3.3	2.6	2.6	2.4	2.5	2.6	3.0	3.8																							
25-Nov	2.6	3.1	3.8	5.1	6.1	6.3	6.5	6.1	5.8	7.7	8.1	9.5	5.5	7.4	8.9	9.7	8.0	7.2	7.1	9.8	9.0	8.7	8.5	7.3	7.0	9.8																							
26-Nov	6.1	5.0	4.8	4.9	4.9	4.4	4.2	4.5	4.3	4.3	4.5	4.2	4.4	4.6	5.2	5.8	8.2	9.3	8.9	10.2	10.4	10.9	10.8	9.6	6.4	10.9																							
27-Nov	8.6	7.3	7.5	7.3	6.4	6.4	6.5	6.3	6.6	6.1	6.2	6.8	7.9	13.0	18.1	15.9	19.8	17.4	13.9	9.5	12.5	11.2	7.9	7.0	9.8	19.8																							
28-Nov	6.4	6.0	5.5	5.2	5.0	5.0	4.6	4.7	4.8	4.9	5.3	5.3	5.4	5.8	6.0	6.6	7.7	8.9	8.7	7.6	7.8	7.5	7.0	7.0	6.2	8.9																							
29-Nov	5.6	5.3	6.1	5.9	5.4	6.1	5.7	5.8	6.9	6.6	6.7	8.1	12.4	10.8	10.0	8.8	8.2	9.9	12.5	10.5	10.4	8.6	8.6	6.8	8.0	12.5																							
30-Nov	6.3	5.7	5.4	5.1	5.2	5.3	5.7	5.5	5.3	6.1	5.9	6.7	6.9	7.5	9.4	11.3	12.4	12.4	12.7	10.8	10.8	10.1	7.8	8.2	7.9	12.7																							
																								6.2	6.1	6.0	6.0	6.1	6.3	6.1	6.3	6.2	6.6	6.3	5.9	5.5	5.4	5.6	5.9	6.4	6.7	7.0	7.1	9.0	8.6	7.4	6.8	Diurnal Average	
																								38.2	35.3	34.3	39.5	39.5	41.1	39.4	38.9	41.2	43.5	36.4	28.7	13.6	13.0	18.1	15.9	19.8	17.4	15.3	21.9	74.7	76.8	55.9	48.7	Diurnal Maximum	

C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	395	54.94	54.94
6 - 15	302	42.00	96.94
16 - 25	6	0.83	97.77
26 - 80	16	2.23	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



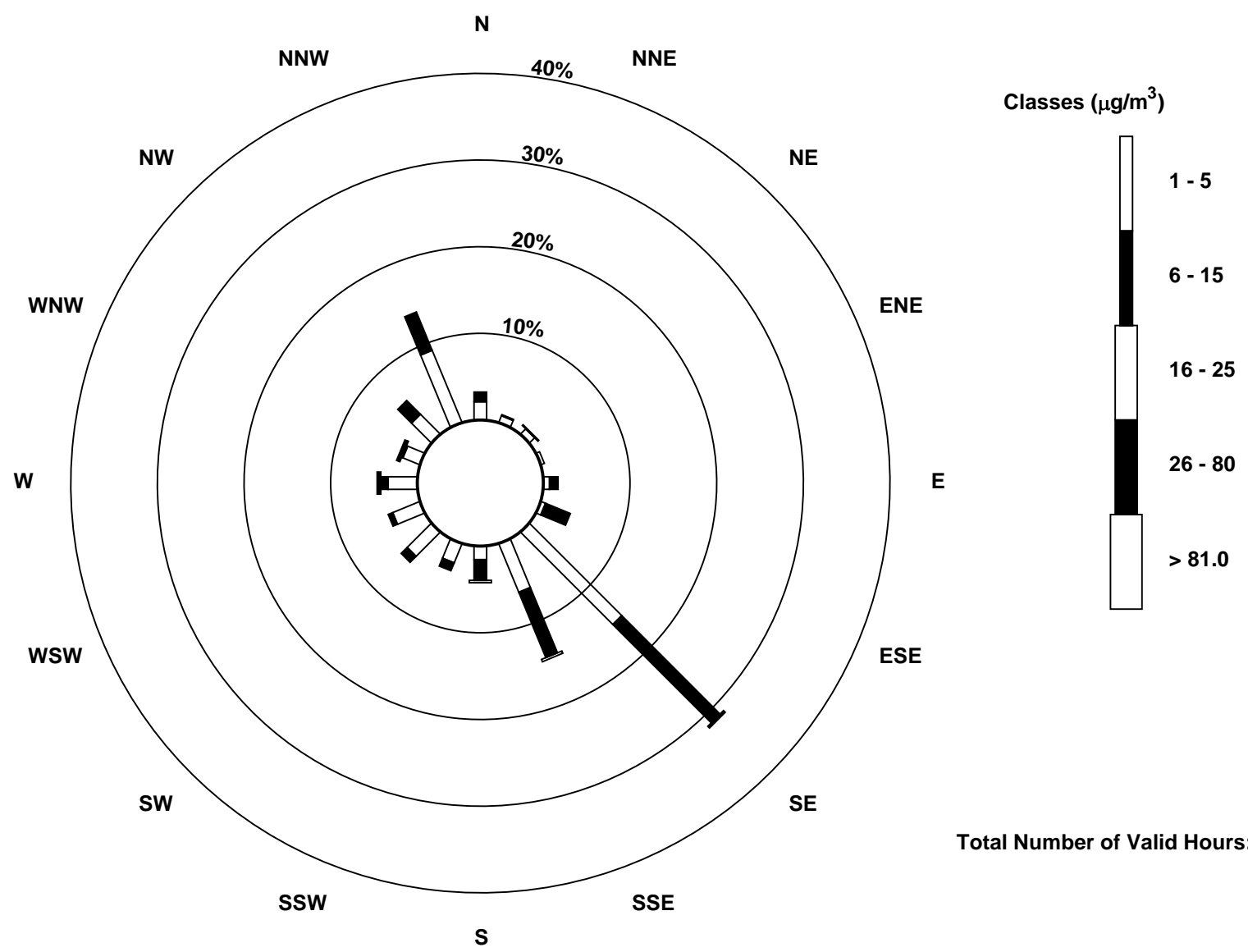
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	15	6	6	3	5	4	107	43	11	17	28	24	24	15	23	64	395
6 - 15	8	1	0	0	7	22	114	58	17	7	7	4	6	1	16	34	302
16 - 25	0	0	0	0	0	0	1	2	2	0	0	0	0	1	0	0	6
26 - 80	0	0	1	0	0	0	1	0	0	0	0	0	3	2	0	0	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	23	7	7	3	12	26	223	103	30	24	35	28	33	19	39	98	710

Total Number of Valid Hours: 710

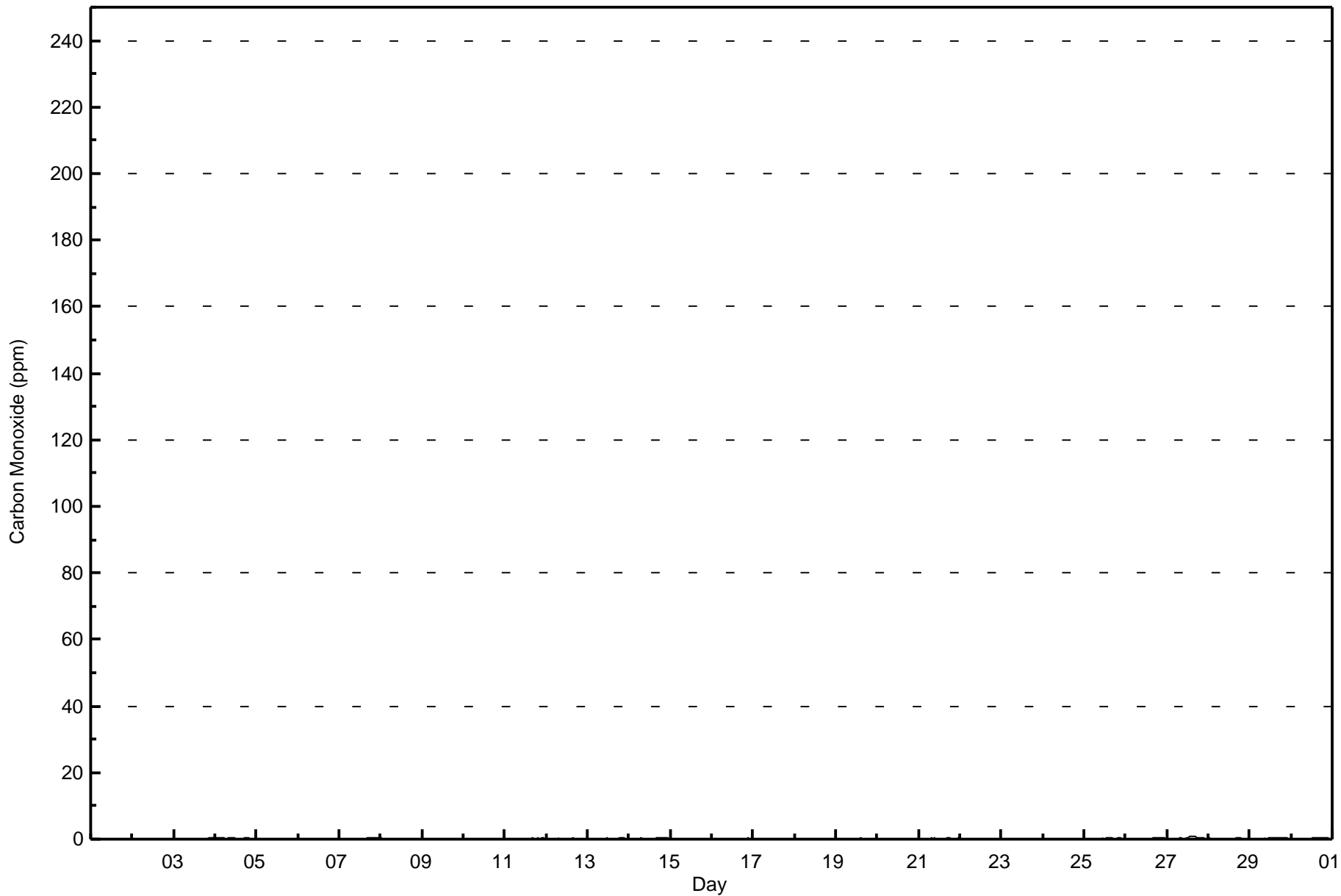
Total Number of Hours: 720





Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	659	96.20	96.20
0.4 - 0.5	20	2.92	99.12
0.6 - 0.7	5	0.73	99.85
0.8 - 1.4	1	0.15	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Carbon Monoxide (CO) - ppm
Athabasca Valley - November 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	22	7	7	3	11	22	208	89	23	22	32	28	29	18	34	96	651
0.4 - 0.5	0	0	0	0	0	2	6	4	2	2	0	0	2	1	1	0	20
0.6 - 0.7	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	5
0.8 - 1.4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
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	22	7	7	3	11	24	215	96	27	24	32	28	31	19	35	96	677

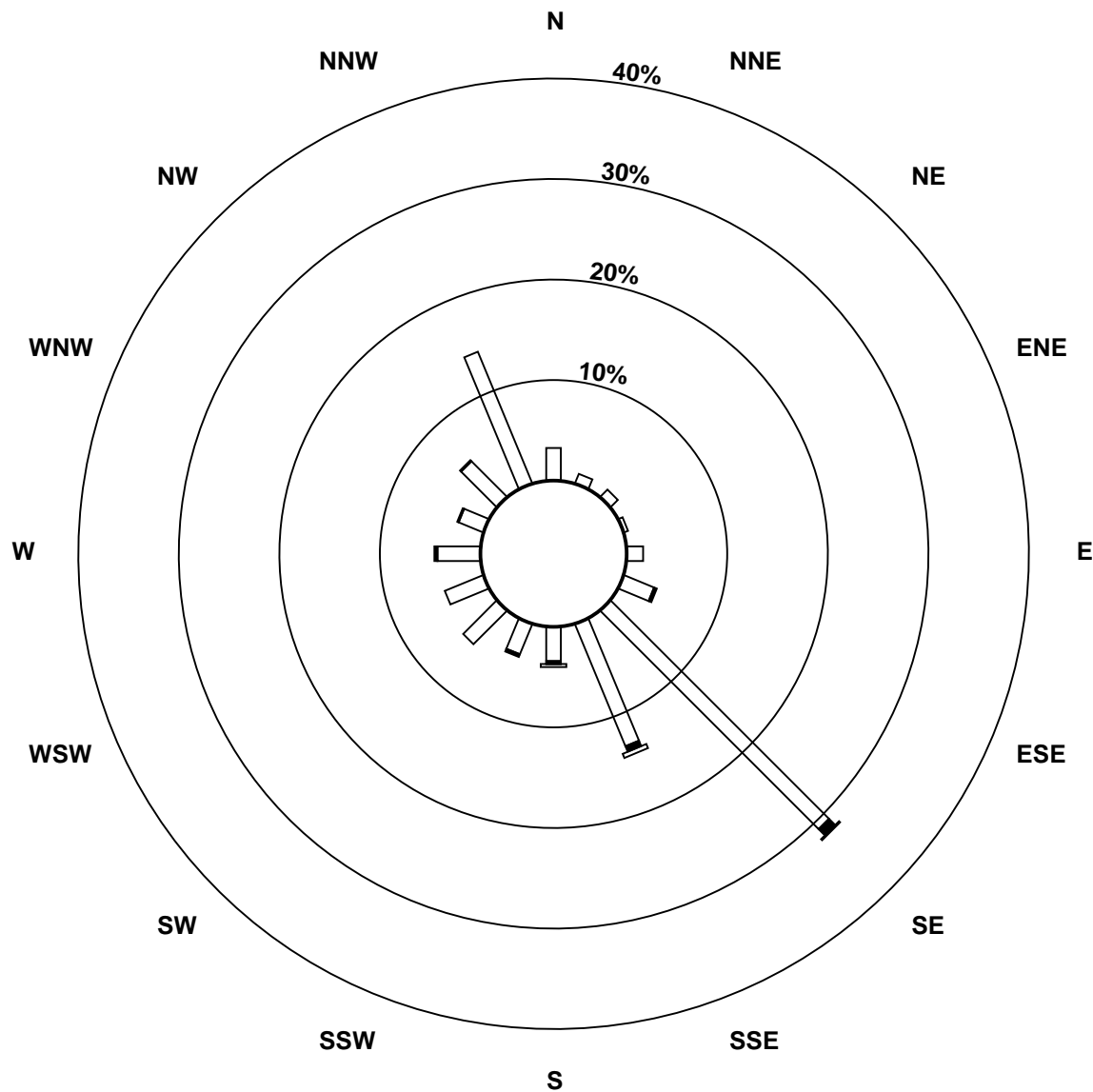
Total Number of Valid Hours: 677

Total Number of Hours: 720

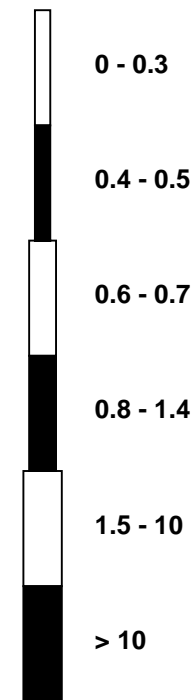


Wood Buffalo Environmental Association
Wind Rose Nov 2015

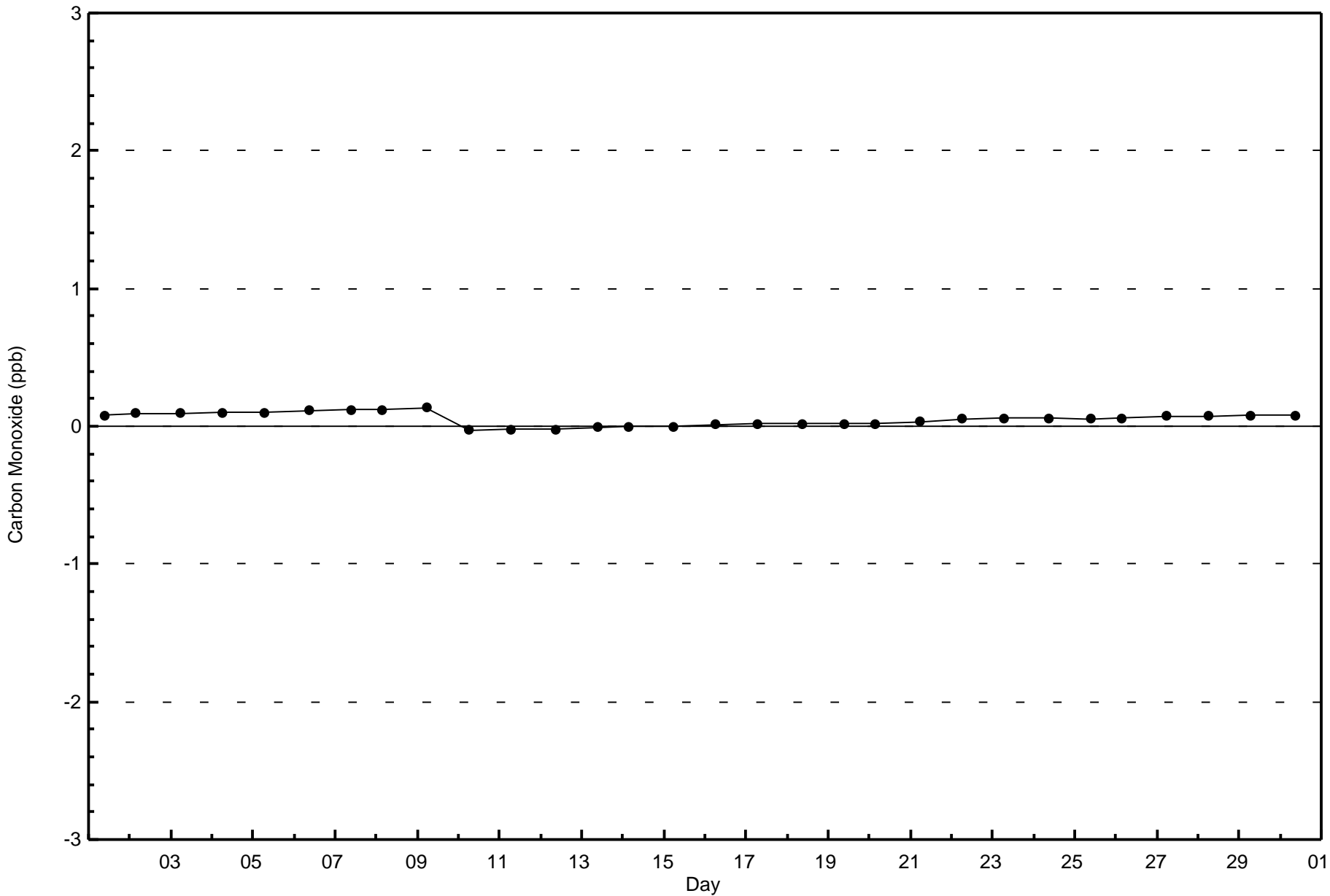
Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)

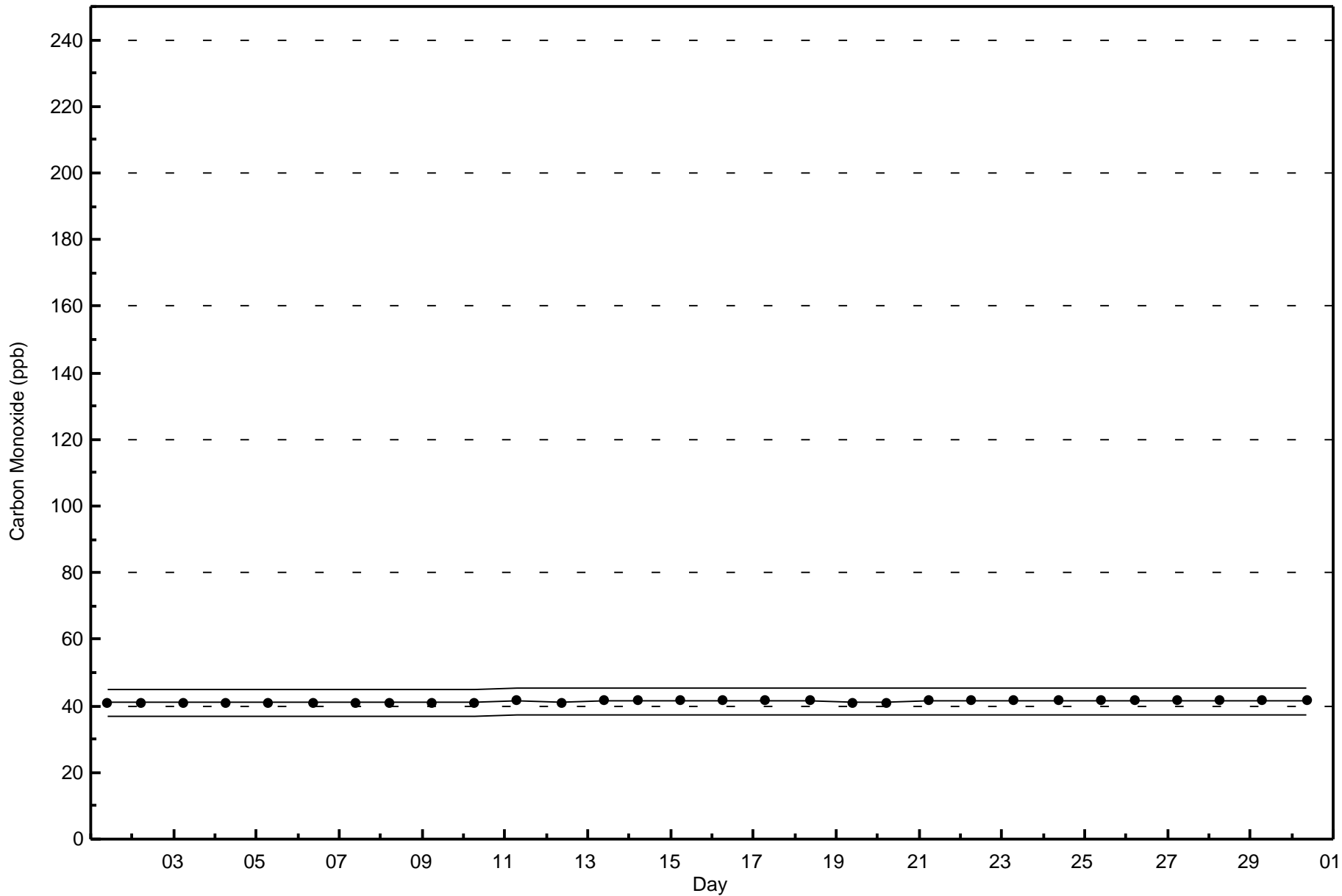


Classes (ppm)



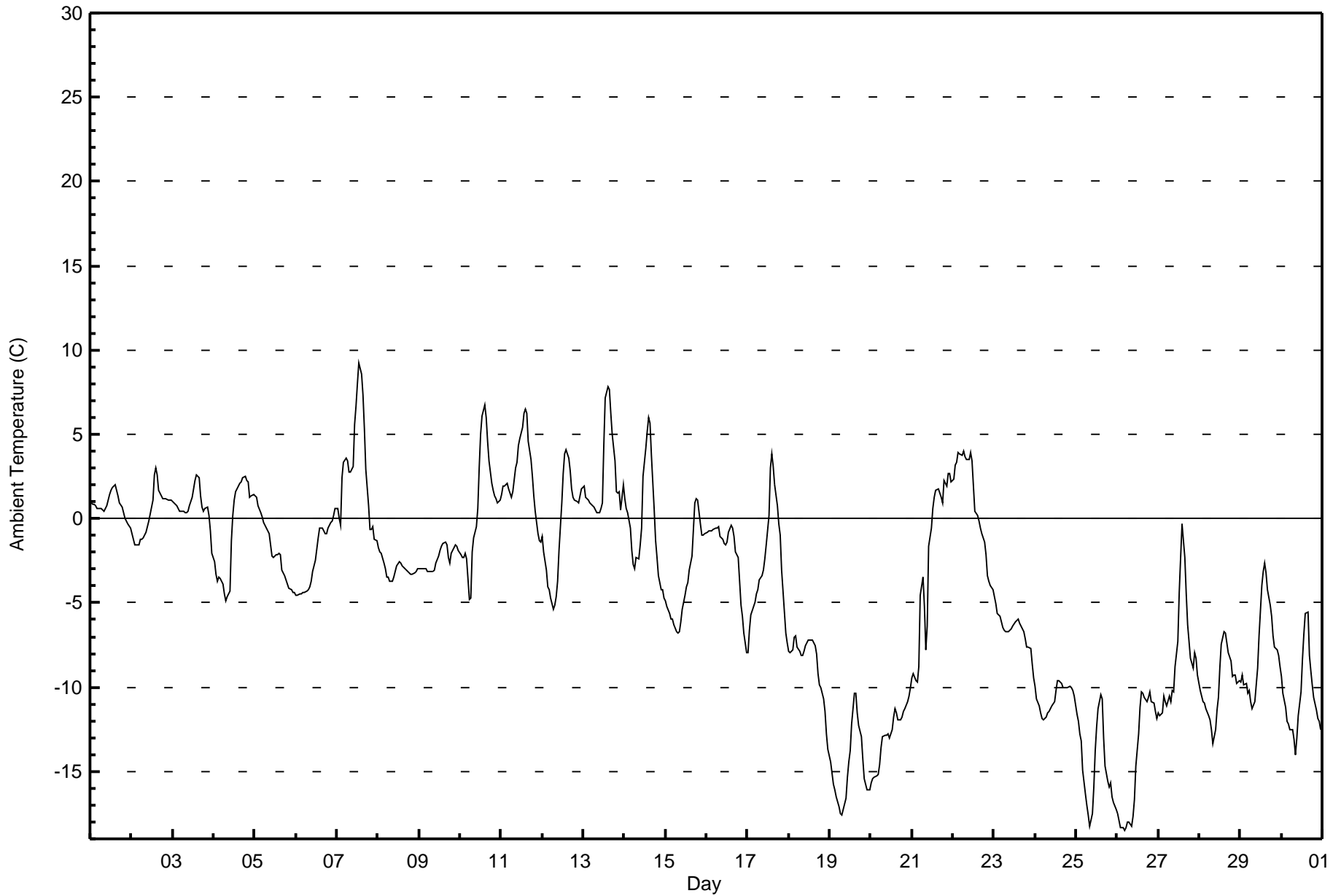
Total Number of Valid Hours: 677







Maximum Value: 9.2 C on Nov 7 14:00		Maximum Daily Average: 3.0 C on Nov 7		Hours in Service: 720																							
Minimum Value: -18.5 C on Nov 26 05:00		Minimum Daily Average: -14.8 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.2 C at hour 15		Minimum Diurnal Average: -5.8 C at hour 9		Hours of Missing Data: 0																							
Monthly Average: -4.28 C		Percentiles: P ₁ = -18.0 P ₁₀ = -12.5 Q ₁ = -9.4 Median = -3.1 Q ₃ = 0.6 P ₉₀ = 2.4 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-Nov	0.9	0.9	0.8	0.7	0.6	0.6	0.6	0.5	0.5	0.7	1.1	1.5	1.7	1.8	2.0	1.7	1.3	0.9	0.7	0.3	0.0	-0.1	-0.3	-0.6	0.8	2.0	
2-Nov	-0.9	-1.3	-1.5	-1.6	-1.5	-1.3	-1.2	-1.1	-0.8	-0.5	-0.1	0.3	1.1	2.6	3.0	2.6	1.7	1.3	1.2	1.2	1.2	1.1	1.1	1.1	0.3	3.0	
3-Nov	1.0	1.0	0.8	0.6	0.4	0.4	0.4	0.3	0.3	0.4	0.8	1.3	1.8	2.2	2.6	2.4	1.3	0.7	0.5	0.6	0.7	0.2	-0.7	-2.1	0.7	2.6	
4-Nov	-2.6	-3.3	-3.7	-3.5	-3.6	-3.9	-4.5	-4.9	-4.7	-4.3	-1.3	0.2	1.1	1.6	1.9	2.1	2.2	2.4	2.5	2.3	2.2	1.2	1.3	1.4	-0.7	2.5	
5-Nov	1.4	1.3	0.7	0.4	0.1	-0.3	-0.4	-0.6	-0.9	-1.6	-2.2	-2.3	-2.2	-2.1	-2.1	-2.1	-3.0	-3.3	-3.7	-3.9	-4.1	-4.2	-4.4	-4.4	-1.8	1.4	
6-Nov	-4.5	-4.6	-4.5	-4.4	-4.4	-4.4	-4.3	-4.2	-4.0	-3.7	-3.1	-2.5	-1.8	-1.2	-0.5	-0.6	-0.7	-0.9	-0.9	-0.6	-0.2	-0.1	0.2	0.6	-2.3	0.6	
7-Nov	0.6	0.1	-0.4	2.4	3.3	3.6	3.4	2.7	2.8	3.1	5.6	6.7	8.0	9.2	8.5	7.3	5.4	2.9	0.8	-0.6	-0.7	-0.5	-1.2	-1.3	3.0	9.2	
8-Nov	-1.7	-2.0	-2.1	-2.6	-3.0	-3.5	-3.5	-3.7	-3.7	-3.5	-3.2	-2.8	-2.6	-2.6	-2.8	-2.9	-2.9	-3.1	-3.3	-3.3	-3.3	-3.3	-3.2	-3.0	-3.0	-1.7	
9-Nov	-3.0	-3.0	-3.0	-3.0	-3.0	-3.1	-3.1	-3.1	-3.1	-3.0	-2.7	-2.2	-1.9	-1.6	-1.5	-1.4	-1.6	-2.3	-2.7	-2.1	-1.7	-1.6	-1.7	-1.9	-2.4	-1.4	
10-Nov	-2.1	-2.3	-2.3	-2.0	-2.4	-4.8	-4.7	-2.0	-1.2	-0.5	0.6	3.0	5.0	6.0	6.8	6.0	4.6	3.4	2.1	1.7	1.4	1.2	0.9	1.1	0.8	6.8	
11-Nov	1.5	1.9	2.0	2.1	1.8	1.5	1.3	1.6	3.0	3.4	4.3	4.7	5.4	6.3	6.5	6.3	4.6	3.5	2.5	1.3	0.4	-0.9	-1.3	-1.4	2.6	6.5	
12-Nov	-1.0	-2.0	-3.1	-4.1	-4.2	-4.7	-5.3	-5.1	-4.6	-3.7	-1.9	1.0	2.7	3.9	4.1	3.6	2.8	1.8	1.3	1.1	1.0	1.0	1.3	1.7	-0.5	4.1	
13-Nov	1.9	1.2	1.2	1.1	0.9	0.8	0.7	0.5	0.4	0.3	0.6	0.9	4.3	7.1	7.8	7.7	6.3	5.0	3.4	1.6	1.5	1.6	0.5	2.0	2.5	7.8	
14-Nov	1.2	0.6	0.4	-0.6	-1.9	-2.8	-3.0	-2.3	-2.4	-1.5	-0.5	2.5	4.2	5.2	6.0	5.7	3.8	0.5	-1.3	-2.3	-3.4	-4.2	-4.2	-4.7	-0.2	6.0	
15-Nov	-4.9	-5.2	-5.6	-6.0	-6.0	-6.3	-6.7	-6.8	-6.7	-6.1	-5.4	-4.5	-4.0	-3.8	-3.1	-2.2	-0.7	1.0	1.2	1.1	-0.3	-1.0	-0.9	-0.9	-3.5	1.2	
16-Nov	-0.8	-0.8	-0.7	-0.7	-0.6	-0.6	-0.5	-0.5	-1.0	-1.2	-1.5	-1.6	-1.4	-0.8	-0.4	-0.6	-1.1	-2.0	-2.3	-3.8	-5.1	-5.8	-6.8	-8.0	-2.0	-0.4	
17-Nov	-8.0	-6.6	-5.7	-5.2	-4.9	-4.5	-4.2	-3.7	-3.4	-3.1	-2.4	-1.5	0.2	3.0	3.8	3.1	2.0	0.8	-0.3	-1.0	-3.0	-5.6	-6.8	-7.4	-2.7	3.8	
18-Nov	-7.9	-8.0	-7.8	-7.0	-7.0	-7.6	-7.9	-8.1	-8.2	-7.9	-7.5	-7.2	-7.2	-7.2	-7.2	-7.6	-8.0	-9.2	-9.9	-10.1	-10.7	-11.5	-12.8	-13.7	-8.6	-7.0	
19-Nov	-14.5	-15.1	-15.8	-16.1	-16.5	-17.1	-17.5	-17.6	-17.2	-16.6	-15.3	-14.5	-13.8	-12.2	-10.4	-10.4	-11.5	-12.2	-12.9	-14.2	-15.4	-15.8	-16.1	-16.1	-14.8	-10.4	
20-Nov	-15.7	-15.4	-15.3	-15.2	-15.2	-14.6	-13.6	-12.9	-12.8	-12.8	-12.7	-13.0	-12.5	-11.8	-11.3	-11.5	-12.0	-11.9	-11.8	-11.5	-11.2	-10.9	-10.5	-10.0	-12.8	-10.0	
21-Nov	-9.5	-9.2	-9.6	-9.7	-8.8	-4.5	-3.5	-5.2	-7.8	-6.4	-1.6	-0.6	0.6	1.3	1.7	1.8	1.5	1.2	0.9	2.3	1.9	2.7	2.7	2.2	-2.3	2.7	
22-Nov	2.4	3.1	3.3	4.0	3.8	3.8	4.0	3.7	3.5	3.5	3.9	3.4	2.0	0.4	0.2	-0.2	-0.5	-0.9	-1.4	-2.2	-3.4	-3.7	-4.0	-4.2	1.0	4.0	
23-Nov	-4.7	-5.1	-5.6	-5.8	-6.1	-6.4	-6.6	-6.7	-6.7	-6.6	-6.5	-6.4	-6.2	-6.0	-6.0	-6.2	-6.4	-6.7	-7.1	-7.6	-7.6	-7.7	-8.6	-9.5	-6.6	-4.7	
24-Nov	-10.0	-10.7	-11.1	-11.5	-11.9	-11.9	-11.8	-11.6	-11.4	-11.3	-11.1	-10.9	-10.2	-9.6	-9.6	-9.8	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.2	-10.6	-10.6	-10.6	-9.6
25-Nov	-11.6	-12.1	-12.7	-13.2	-14.9	-16.3	-17.0	-17.6	-18.2	-17.5	-15.9	-13.8	-12.3	-11.3	-10.5	-10.7	-13.0	-14.7	-15.6	-16.0	-15.7	-16.5	-16.9	-17.2	-14.6	-10.5	
26-Nov	-17.5	-18.0	-18.3	-18.4	-18.5	-18.4	-18.0	-18.0	-18.2	-17.7	-16.7	-14.7	-12.8	-11.2	-10.3	-10.3	-10.6	-10.9	-10.6	-10.3	-10.9	-11.0	-11.4	-11.8	-14.3	-10.3	
27-Nov	-11.5	-11.7	-11.6	-10.6	-10.9	-11.1	-10.6	-10.9	-10.2	-10.3	-8.8	-7.3	-4.4	-2.3	-0.3	-2.3	-4.5	-6.3	-7.3	-8.3	-8.9	-7.9	-8.3	-9.3	-8.1	-0.3	
28-Nov	-10.2	-10.5	-10.9	-11.0	-11.3	-11.7	-11.9	-12.6	-13.3	-12.6	-11.3	-10.6	-8.8	-7.4	-6.7	-6.8	-7.4	-7.9	-8.4	-9.4	-9.3	-9.3	-9.7	-9.6	-9.9	-6.7	
29-Nov	-9.7	-9.3	-9.9	-9.8	-10.4	-10.2	-10.9	-11.3	-10.9	-9.9	-8.9	-6.9	-4.0	-3.1	-2.6	-3.2	-4.2	-5.1	-5.8	-7.0	-7.6	-7.8	-8.1	-8.8	-7.7	-2.6	
30-Nov	-9.4	-10.3	-11.2	-12.0	-12.2	-12.5	-12.5	-13.1	-14.0	-13.0	-11.7	-10.2	-8.4	-6.9	-5.6	-5.5	-8.1	-9.0	-9.9	-10.6	-11.4	-11.9	-12.0	-12.5	-10.6	-5.5	
																								Diurnal Average			
																								Diurnal Maximum			





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Athabasca Valley - November 2015**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	509	70.69	70.69
0 - 10	211	29.31	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

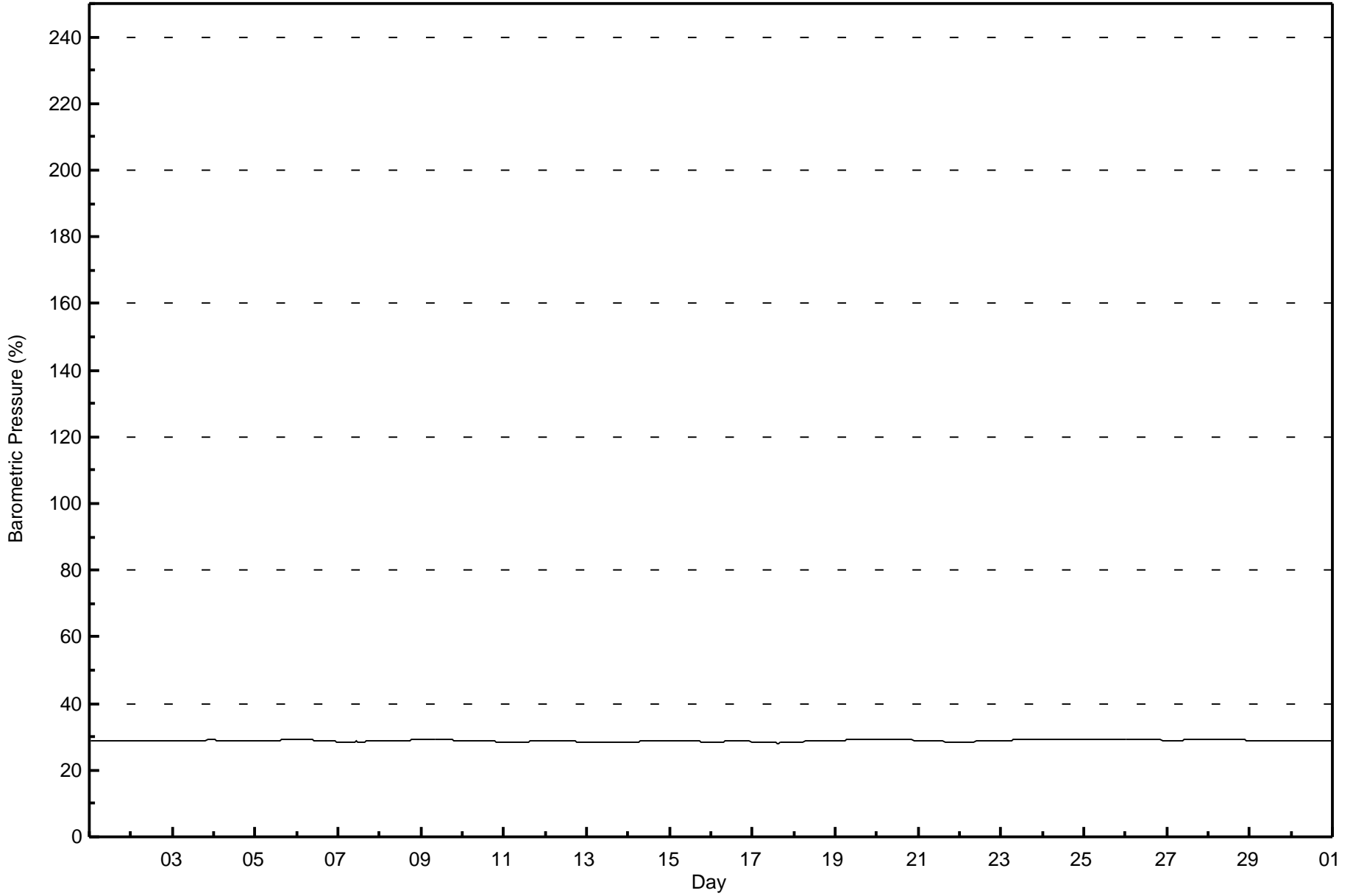


Maximum Value: 29.4 % on Nov 26 00:00 Maximum Daily Average: 29.3 % on Nov 24																						Hours in Service: 720 Hours of Data: 720																									
Minimum Value: 28.2 % on Nov 17 16:00 Minimum Daily Average: 28.3 % on Nov 17 Maximum Diurnal Average: 28.9 % at hour 11 Minimum Diurnal Average: 28.9 % at hour 1 Monthly Average: 28.87 % Percentiles: P ₁ = 28.2 P ₁₀ = 28.5 Q ₁ = 28.7 Median = 28.9 O ₃ = 29.1 P ₉₀ = 29.2 P ₉₉ = 29.4																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Nov	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9																					
2-Nov	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																				
3-Nov	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0																				
4-Nov	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.9																				
5-Nov	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	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1																				
6-Nov	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	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.6	28.6	28.9	29.1	28.9																				
7-Nov	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.6	28.7	28.6																				
8-Nov	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	28.9	29.1	28.9																				
9-Nov	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1																				
10-Nov	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.7	29.0	28.7																				
11-Nov	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.6	28.7	28.7	28.6																				
12-Nov	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.5	28.5	28.4	28.4	28.7	28.9	28.7																				
13-Nov	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.5	28.3	28.5	28.3																				
14-Nov	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.7	28.8	28.7																				
15-Nov	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.7	28.8	28.7																				
16-Nov	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.7	28.6																				
17-Nov	28.6	28.5	28.5	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.6																				
18-Nov	28.4	28.4	28.4	28.5	28.5	28.6	28.6	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.8	29.0	28.8																				
19-Nov	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.1	29.2	29.1																				
20-Nov	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.0	29.0	29.0	29.2	29.3	29.2	29.3																				
21-Nov	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.7	28.9	28.7																				
22-Nov	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.7	28.9	28.7																				
23-Nov	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.1	29.2	29.1																				
24-Nov	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3																				
25-Nov	29.3	29.3	29.3	29.3	29.3	29.3	29.3	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	29.4	29.4	29.4	29.4	29.3	29.3	29.3																				
26-Nov	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.2	29.2	29.2	29.4																				
27-Nov	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.1	29.2	29.2	29.1																				
28-Nov	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.1	29.2	29.1	29.2																				
29-Nov	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	29.0	29.0	29.0																				
30-Nov	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	28.8	28.8	28.8	28.8	28.8	28.9																				
																						28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
																						29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4
																						Diurnal Average		Diurnal Maximum																							



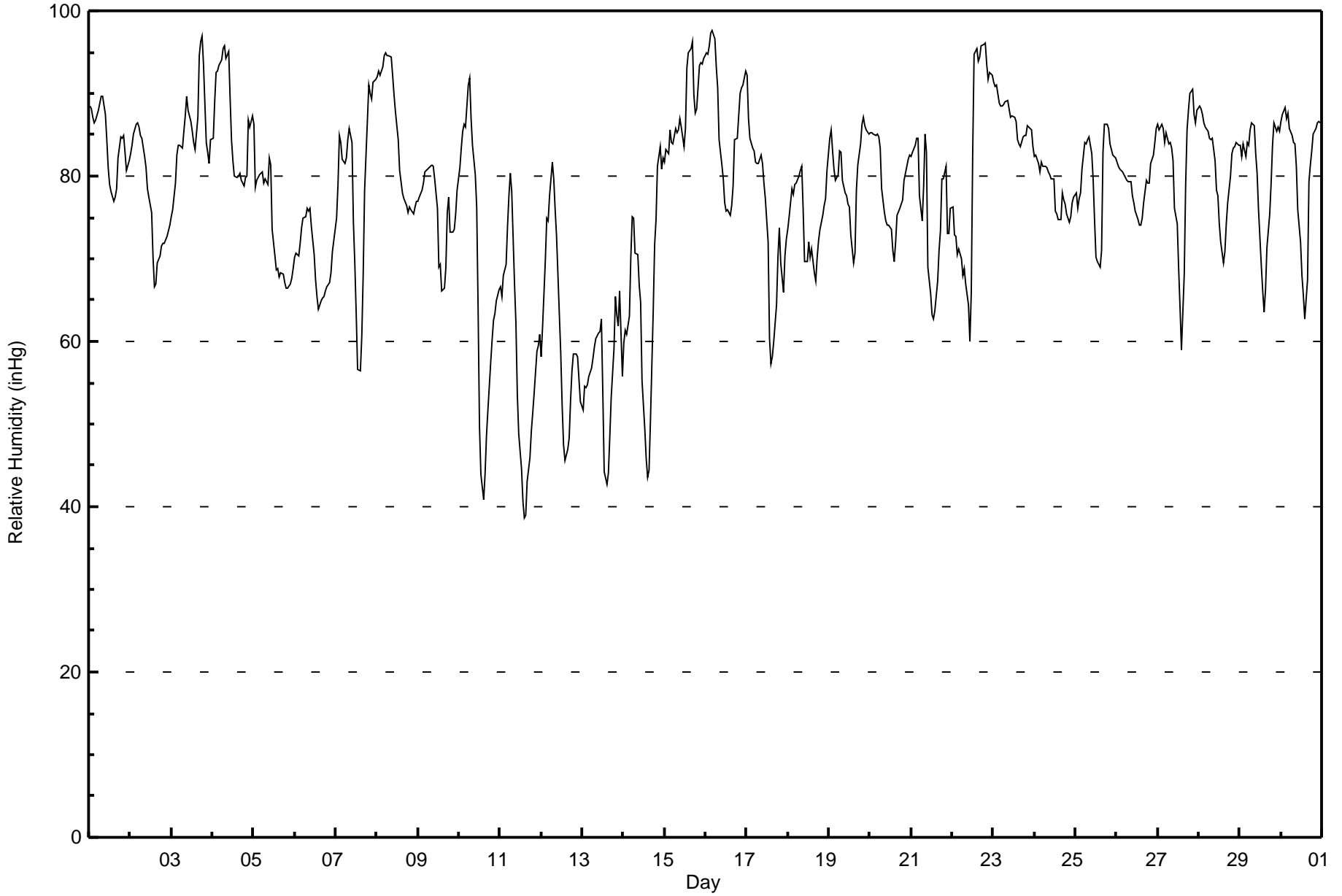
Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - November 2015





Maximum Value: 98 inHg on Nov 16 05:00																			Maximum Daily Average: 88.3 inHg on Nov 15						Hours in Service: 720	
Minimum Value: 39 inHg on Nov 11 15:00																			Minimum Daily Average: 56.2 inHg on Nov 13						Hours of Data: 720	
Maximum Diurnal Average: 82.4 inHg at hour 7																			Minimum Diurnal Average: 66.9 inHg at hour 15						Hours of Missing Data: 0	
Monthly Average: 77.2 inHg																			Percentiles: P ₁ = 44 P ₁₀ = 61 Q ₁ = 71 Median = 80 Q ₃ = 85 P ₉₀ = 89 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-Nov	89	88	87	86	87	88	89	90	90	87	84	81	79	78	77	78	78	82	85	85	85	83	81	82	84.1	90
2-Nov	83	84	85	86	86	86	85	85	82	81	79	78	76	70	67	67	69	70	71	72	72	73	73	74	77.2	86
3-Nov	75	76	79	82	84	84	83	85	87	90	88	87	85	84	83	87	95	96	97	94	84	83	82	84	85.6	97
4-Nov	85	89	93	93	93	94	95	96	94	95	90	84	82	80	80	80	80	79	79	80	80	87	86	87	86.7	96
5-Nov	86	79	79	80	80	80	79	80	79	82	81	74	70	69	69	68	68	68	67	66	66	67	68	69	74.0	86
6-Nov	70	71	70	72	74	75	75	76	76	76	74	71	67	65	64	65	65	65	66	67	67	68	71	72	70.1	76
7-Nov	75	79	85	84	82	82	82	84	86	84	74	69	63	57	56	61	68	78	87	91	90	89	91	92	78.8	92
8-Nov	92	93	92	93	95	95	95	95	94	92	90	88	84	81	79	78	77	77	76	76	76	75	76	77	85.2	95
9-Nov	77	77	78	79	80	81	81	81	81	81	80	76	69	69	66	66	69	76	78	73	73	74	75	78	75.8	81
10-Nov	81	83	85	86	86	91	92	87	84	80	76	64	50	44	41	44	49	52	57	60	63	63	65	66	68.8	92
11-Nov	67	65	68	69	74	78	80	78	67	62	54	49	45	41	39	39	43	46	49	51	54	59	59	61	58.2	80
12-Nov	58	62	70	75	75	78	82	80	76	73	68	59	52	47	46	47	48	53	56	59	59	58	55	53	61.9	82
13-Nov	52	55	54	55	56	57	58	59	60	61	61	63	54	44	43	44	49	53	59	65	63	62	66	56	56.2	66
14-Nov	60	61	61	63	70	75	75	71	71	67	65	55	49	46	44	44	50	64	72	75	81	84	81	82	65.2	84
15-Nov	82	83	83	86	84	84	86	85	86	87	86	84	86	93	95	96	96	90	88	88	93	94	94	94	88.3	96
16-Nov	95	95	96	97	98	97	93	91	84	81	80	77	76	76	75	76	79	84	85	87	90	91	91	93	86.9	98
17-Nov	92	87	85	83	83	82	82	82	83	81	79	77	72	60	57	58	60	64	70	74	69	66	70	72	74.6	92
18-Nov	74	75	78	78	79	79	80	81	81	76	70	70	72	70	71	68	67	70	72	74	75	76	77	81	74.8	81
19-Nov	85	86	83	81	80	80	83	83	80	78	78	77	76	73	69	71	78	81	84	86	87	86	86	85	80.6	87
20-Nov	85	85	85	85	85	85	83	79	76	74	74	74	74	71	70	72	75	76	77	77	80	81	82	83	78.6	85
21-Nov	82	83	84	85	85	78	75	79	85	83	69	66	63	63	64	67	71	73	80	80	81	73	73	76	75.7	85
22-Nov	76	73	73	70	71	70	68	69	67	64	60	66	83	95	96	94	94	96	96	96	94	92	93	92	81.1	96
23-Nov	91	91	91	89	88	89	89	89	89	88	87	87	87	87	84	84	85	85	85	85	86	86	86	84	87.1	91
24-Nov	82	83	82	81	82	81	81	81	81	80	80	76	75	75	75	78	77	77	75	74	75	77	77	77	78.5	83
25-Nov	78	76	77	78	81	84	84	84	85	83	80	75	70	70	69	71	83	86	86	86	84	83	83	82	79.9	86
26-Nov	82	81	81	81	80	80	79	79	79	78	77	76	75	74	74	75	77	79	79	79	82	82	84	86	79.1	86
27-Nov	86	86	86	86	84	85	84	84	83	82	76	74	69	64	59	68	79	86	88	90	91	87	86	88	81.3	91
28-Nov	88	88	87	86	86	85	85	84	85	82	78	78	74	72	70	71	74	77	80	83	83	84	84	84	81.2	88
29-Nov	84	82	84	82	84	84	86	86	86	83	80	76	69	66	64	66	71	75	79	84	86	86	86	85	79.8	86
30-Nov	87	87	88	87	88	86	85	84	84	81	76	72	68	66	63	67	79	81	83	85	86	86	87	86	80.9	88
																			79.9 80.1 81.0 81.3 82.0 82.3 82.4 82.2 81.3 79.8 76.4 73.5 70.5 68.3 66.9 68.3 71.9 74.7 76.9 78.1 78.5 78.4 78.9 79.4						Diurnal Average	
																			95 95 96 97 98 97 95 96 94 95 90 88 87 95 96 96 96 97 96 94 94 94 94						Diurnal Maximum	





Maximum Speed: 25 km/h on Nov 18 00:00	Maximum Daily Speed Average: 15.9 km/h on Nov 18	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 25 08:00	Minimum Daily Speed Average: 1.1 km/h on Nov 9	Hours of Data: 711
Maximum Diurnal Speed Average: 2.7 km/h at hour 12	Minimum Diurnal Speed Average: 0.8 km/h at hour 17	Hours of Missing Data: 9
Monthly Average Velocity: 1.7 km/h 181.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 24	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	NNW8	NNW10	NNW10	N10	N8	NNW8	NNW8	N7	N7	NNW10	NNW11	NNW12	NNW13	NNW11	N8	NNW12	NNW15	NNW15	NNW15	NNW15	NNW13	N11	NNE8	NNW10	NNW10.5	NNW15	
2-Nov	NNW12	NNW13	NNW11	NNW12	NNW12	NNW10	NNW7	N6	ENE5	E4	SE8	SSE8	SE8	SE13	SE16	SE15	SE14	SE13	SE12	SE11	SE11	SE9	SE10	SE10	ESE3.9	SE16	
3-Nov	SE11	SE11	SE11	SE10	SE10	SE10	SE10	SE9	SE9	SE8	SE8	SSE7	SE5	SE6	E4	NE3	NNW10	NNW10	NNW6	NW7	W8	W12	WNW13	WNW8	SSE2.8	WNW13	
4-Nov	W5	NE2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE12	SE11	SE14	SE12	SE11	SE11	SE8	SE9	SE5	SE7	SW5	SW4	SW4	---	SE14
5-Nov	NW6	NNW11	NNW11	NNW14	NW15	NW14	NW13	NW13	NW16	NNW17	NNW17	NNW18	NW15	NNW13	NNW10	NW16	WNW21	NW19	WNW17	WNW17	NW14	NW11	NW11	NW10	NW13.8	WNW21	
6-Nov	WNW8	WNW5	WNW6	W4	SSE4	SSE6	SE8	SE9	SE10	SE7	SE7	SE8	SE11	SE13	SE12	SE11	SE13	SE16	SE16	SE14	SE16	SE19	SE19	SSE17	SE9.0	SE19	
7-Nov	SE15	SE8	S3	WSW18	WSW20	WSW20	WSW18	SW14	SW10	SE4	SSW6	SW13	WSW10	WSW12	WSW10	NW6	SSE1	S1	SW1	SSE2	ESE4	SE5	ESE5	SE7	SW6.2	WSW20	
8-Nov	SE6	SE5	ESE2	ESE3	SSE2	SE2	NNW5	NNW6	NNW6	NNW7	NNW15	NNW15	NNW15	N13	N12	NNE11	NNE9	NE9	ENE10	NE7	NE6	NNE5	N5	NNW3	NNE5.5	NNW15	
9-Nov	NNE4	NNE4	N3	NNW5	NNW6	NW6	NW3	NW4	NW4	W2	SW1	S1	SW3	S5	SSW5	SW3	E4	ENE1	ESE5	SE8	SE9	SE9	SE11	SE11	SE1.1	SE11	
10-Nov	SSE12	SSE12	SSE13	SSE10	SSE9	SSW6	S5	SSE9	SE12	SE10	SE10	SSE6	SSW8	S9	SSE9	SE10	SE11	SE11	SE12	SE14	SE14	SE16	SE17	SE16	SSE10.5	SE17	
11-Nov	SE18	SE17	SE18	SE15	SE16	SE15	SE11	SE7	SE8	SE6	S7	WSW13	SW13	WSW14	WSW15	SW11	SSW5	SSW7	S6	SSE7	SE8	SE5	SE5	S5	S7.7	SE18	
12-Nov	SE4	SE4	S2	SSE3	SE4	SSE4	SE3	SSE5	SE10	SE10	ESE6	S6	SSW7	SSW9	SSE9	SSE7	SE13	SE14	SE16	SSE14	SE15	SE15	SSE12	SE11	SSE8.1	SE16	
13-Nov	SE12	SE12	SE12	SE12	SE13	SSE13	SE14	SE12	SSE13	SSE12	SSE12	S5	SSW5	SW12	SW15	SW10	SSW7	SSW6	S3	SSW2	SSE2	S2	WSW5	WSW13	S7.3	SW15	
14-Nov	WSW14	SW14	SW14	SE5	SE2	SE3	ESE4	SE6	SE9	SE9	SE6	SW13	SW11	SSW9	SW10	SW9	SSE5	S1	ESE1	SSW1	SE2	S2	SSE4	SSE3	SSW4.9	WSW14	
15-Nov	SSE4	SE4	SE5	SE2	SE6	SSE6	SE5	SE6	E3	NNW5	NNW8	N7	NNW9	NNW15	NNW15	N11	N10	NE8	NE7	N7	N12	N14	NNW13	NNW10	N4.8	NNW15	
16-Nov	NNW7	NW5	NNW5	NW4	W2	W6	W7	WSW8	W15	W17	W19	W23	WNW20	W16	W17	W16	W2	SSW4	S4	SSE4	SE7	SSE7	SE8	SSE4	W6.9	W23	
17-Nov	SE5	SE14	SE19	SE14	SE11	SSE11	SE12	SE11	SE14	SE16	SE15	SE13	SE9	SSW8	SW10	WSW9	SW9	SSW5	W7	NW14	NW23	WNW22	W19	W25	SSW5.4	W25	
18-Nov	W18	W24	W22	WNW21	WNW18	NW25	NW25	NW25	NW24	NW22	NW23	NW23	NW19	NNW19	NW19	WNW19	WNW17	WNW12	NW8	W7	SW9	SW12	SW11	SW5	WNW15.9	NW25	
19-Nov	SSW5	SSE4	SSE6	SSE7	SSE6	SSE6	SE6	SE10	SE12	SSE7	ESE4	SE6	SE6	SSE5	SE2	NNW4	NNW5	NNW7	NNW6	NNW4	W1	S1	E2	E3	SE2.7	SE12	
20-Nov	ESE3	ESE3	SSE4	ESE3	SE1	ESE3	WSW4	WSW10	W11	WSW10	W12	WSW11	SW8	SSE9	SSE8	SE10	SE11	SE13	SE16	SE16	SE18	SE18	SE16	SE12	SSE6.4	SE18	
21-Nov	SE13	SE11	SE13	SE10	ESE7	SW5	SSW3	SE7	ESE6	ESE6	S7	SW12	SSW11	SW8	SSW5	SSE4	SE8	SE8	SSE2	SW6	SE2	WSW8	SSW6	SE4	SSE5.4	SE13	
22-Nov	S4	WSW4	WSW8	WSW15	WSW18	W18	W20	W15	W16	W21	WNW23	NW24	NNW14	NNW10	NNW8	NNW7	NNW8	NNW5	NNW7	NNW10	NNW15	NNW12	NNW12	NNW11	WNW10.3	NW24	
23-Nov	NNW11	NNW11	NNW7	NNW9	NNW9	N7	N7	N5	NNW5	N5	N7	NNW7	NNW5	NNW8	N8	NNW10	N9	NNW9	NNW12	NNW12	NNW12	NNW13	NNW19	NNW17	NNW9.2	NNW19	
24-Nov	NNW15	NNW12	NW10	NW11	WNW9	NNW8	NW11	NW10	NW11	W7	WSW7	SW6	SW7	SW3	NNW8	NNW10	NNW7	NW6	W3	WSW7	SSW3	S5	SSE6	SSE7	WNW5.3	NNW15	
25-Nov	S4	SSE6	SSE8	SSE8	SSE3	SSE3	S2	SW0	SE1	E4	E4	E3	E6	SE6	SSE5	NW1	WSW2	SE1	E1	SE2	SSE4	SSE4	SSE8	SSE8	SSE3.3	SSE8	
26-Nov	SE13	SE14	SE15	SE14	SE15	SE15	SE13	SE12	SE14	SE14	SE15	SE15	SE16	SSE17	SE13	SE13	SE10	ESE8	SE9	SE8	ESE7	ESE7	E7	ESE6	SE11.9	SSE17	
27-Nov	SE7	ESE7	ESE8	SE9	ESE10	ESE10	SE11	SE7	SE6	NNE2	NNW1	WNW2	SSW2	SSE2	SE0	SSE3	S2	SSE2	SE2	SSE2	SE4	SSE8	SSE6	SSE4	SE4.3	SE11	
28-Nov	S3	SSE3	SSE4	SE9	SE8	SE11	SSE15	SE12	SE8	SE9	SE7	SE11	SE12	SE10	SE13	SE9	SSE8	SSE6	SSE6	SE5	SSE8	SSE8	SSE9	SSE7	SE8.3	SSE15	
29-Nov	SE8	SE8	SE5	SE7	SE6	SE5	SE3	SSE2	SSE4	SE3	SE4	ESE5	SE5	SE6	SE7	SE10	SE6	SSE5	SSE5	SSE3	S4	SSE6	SSE7	SSE7	SE5.4	SE10	
30-Nov	SSE7	S5	S5	S4	SSE6	S5	SSE7	SSE8	SSE6	SE9	SSE9	SE8	SE8	SE4	SSE5	S3	SSE2	SSE2	SE3	SSE2	SSE2	SE3	SE5	SE2	SSE4.8	SSE9	

SSE2.5	SSE2.4	SSE2.7	S2.0	S2.1	SSW2.2	SSW1.8	S2.0	S2.1	SSE1.4	SW1.2	WSW2.7	SW2.2	SSW2.3	SW2.0	SW1.0	SE0.8	SE1.2	SE1.6	S1.1	SSE1.7	S2.3	SSE2.4	S2.4	Diurnal Average	
W18	W24	W22	WNW21	WSW20	NW25	NW25	NW25	NW24	NW22	NW23	NW24	WNW20	NNW19	NW19	WNW19	WNW21	NW19	WNW17	WNW17	NW23	WNW22	SE19	W25	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

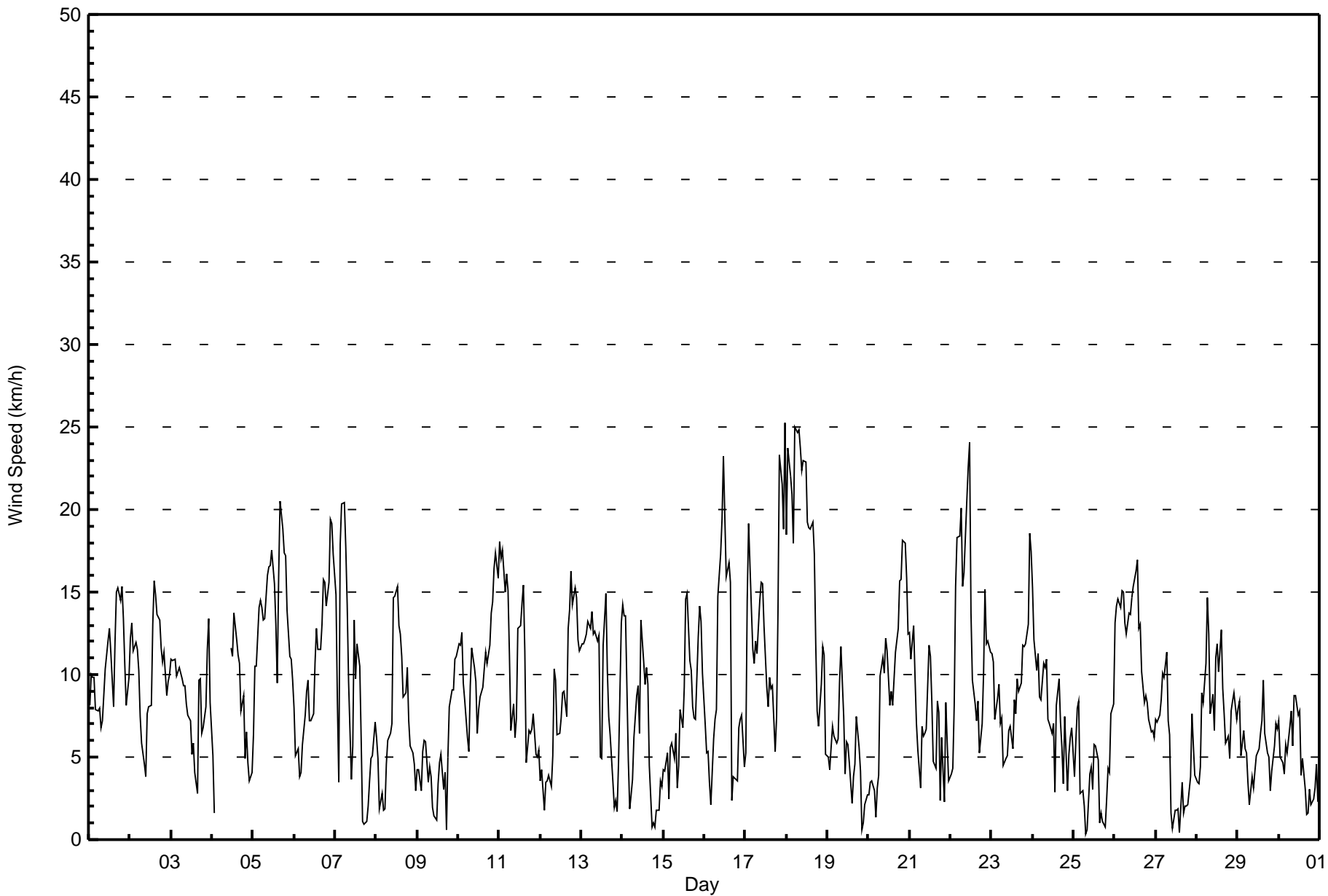
Wind Speed (WS) - km/h
Athabasca Valley - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 6 km/h on Nov 17 21:00	Hours of Data: 711
Minimum Value: 1 km/h on Nov 3 16:00	Hours of Missing Data: 9
	Hours of Calibration: 0
	Percent Operational Time: 98.8
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 5	

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

4	4	4	5	4	4	4	4	4	4	5	4	5	4	5	5	5	3	5	5	5	6	5	4	4
Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	199	27.99	27.99
6 - 11	306	43.04	71.03
12 - 19	184	25.88	96.91
20 - 28	22	3.09	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - November 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	4	2	2	10	14	41	43	25	12	11	4	7	2	6	12	199
6 - 11	15	3	5	1	2	12	102	49	5	12	14	12	7	5	12	50	306
12 - 19	4	0	0	0	0	0	80	12	0	0	10	10	13	7	12	36	184
20 - 28	0	0	0	0	0	0	0	0	0	0	0	2	6	5	9	0	22
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	23	7	7	3	12	26	223	104	30	24	35	28	33	19	39	98	711

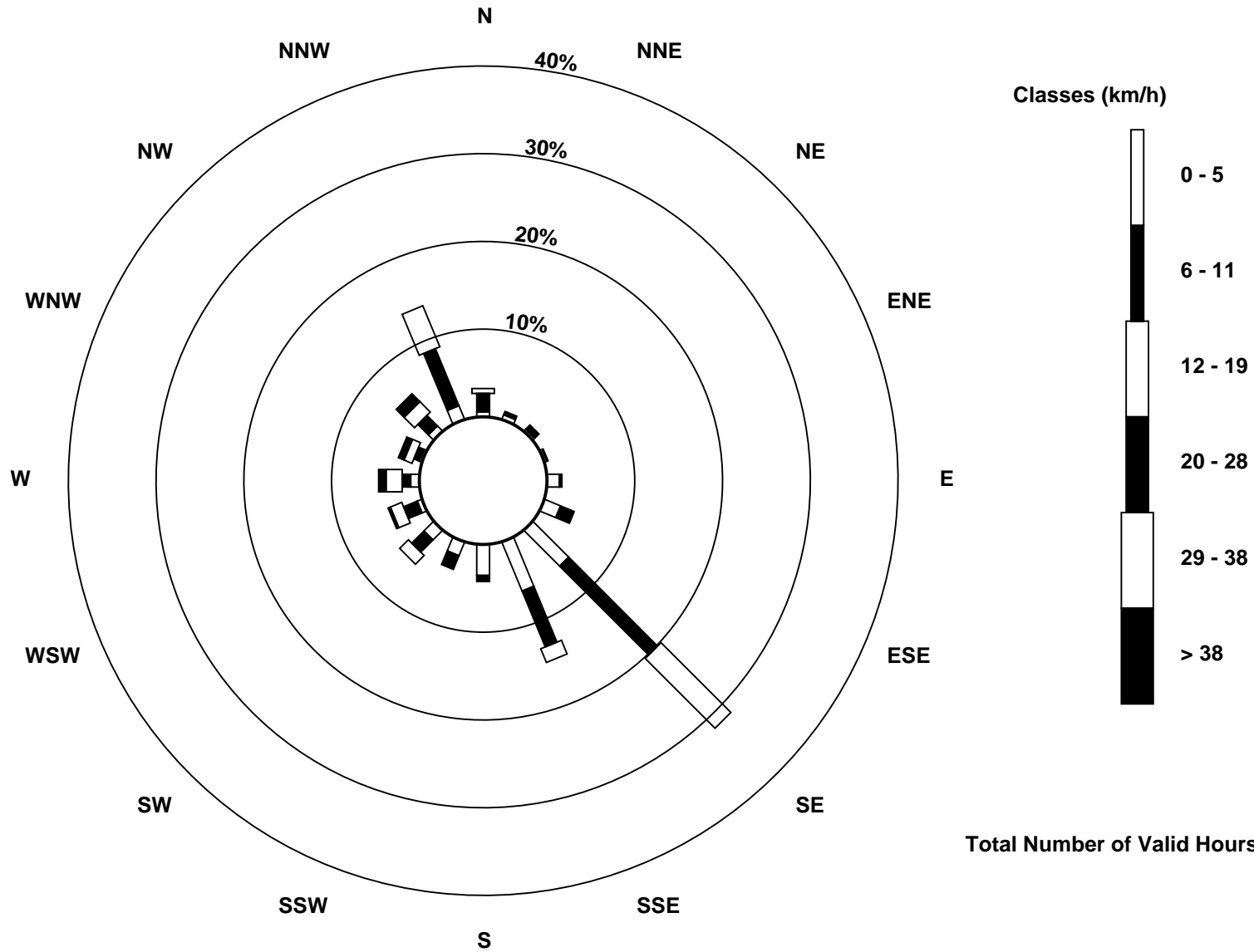
Total Number of Valid Hours: 711

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Athabasca Valley - November 2015

Direction of Maximum Speed: 266 deg on Nov 18 00:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 296.4 deg on Nov 18	Hours of Data: 711
Direction of Minimum Speed: 224 deg on Nov 25 08:00	Hours of Missing Data: 9
Direction of Minimum Daily Speed Average: 1.1 deg on Nov 9	Percent Operational Time: 98.8
Monthly Average Direction: 244.7 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-Nov	336	337	341	350	349	347	346	352	349	343	339	342	341	342	359	347	342	340	336	330	334	349	17	348	343.5
2-Nov	343	344	344	338	344	338	348	0	72	95	144	153	137	135	145	142	135	132	142	143	142	143	138	134	114.5
3-Nov	133	136	146	142	143	145	145	138	141	142	137	151	141	132	97	49	347	340	348	304	281	261	301	295	149.3
4-Nov	266	55	AF	AF	AF	AF	AF	AF	AF	AF	AF	146	134	138	132	130	130	141	140	140	139	223	214	234	--
5-Nov	316	327	335	331	323	315	321	317	325	341	336	328	314	329	335	317	303	316	300	302	307	315	318	317	319.7
6-Nov	287	290	296	269	168	162	137	134	137	136	134	135	135	137	136	136	137	140	139	144	140	141	143	147	143.3
7-Nov	141	146	183	239	246	247	246	235	219	124	193	220	239	251	251	321	165	169	228	158	118	138	112	136	220.6
8-Nov	138	126	121	120	160	128	345	342	334	347	341	340	347	359	6	16	24	51	63	49	34	28	351	340	11.8
9-Nov	19	32	2	337	328	323	324	316	304	279	222	185	217	182	207	219	88	73	117	143	146	133	142	143	143.8
10-Nov	153	155	149	154	162	204	189	147	143	140	133	149	193	180	164	145	141	136	141	143	143	144	144	144	150.4
11-Nov	143	145	142	146	144	139	140	136	139	144	189	239	235	244	256	236	193	210	187	158	140	125	130	189	170.7
12-Nov	138	145	183	167	140	155	144	149	144	130	121	180	211	201	165	152	142	142	144	148	144	143	147	145	150.3
13-Nov	138	138	141	146	145	147	143	146	148	149	176	206	234	235	230	202	204	189	193	152	184	247	241	171.1	
14-Nov	238	229	221	141	142	127	109	138	140	136	131	225	210	228	219	167	186	112	210	140	178	161	156	195.0	
15-Nov	163	142	157	141	138	147	132	130	87	348	344	357	346	343	346	358	2	42	37	357	354	349	344	342	5.5
16-Nov	331	325	327	306	272	261	268	250	263	267	267	276	285	278	275	274	267	194	186	161	142	150	141	156	266.3
17-Nov	136	140	138	143	135	149	142	146	140	139	143	139	140	213	231	252	230	208	277	309	308	288	270	266	191.9
18-Nov	261	267	275	300	301	306	307	312	313	314	309	315	315	337	314	302	287	282	325	274	234	231	225	214	296.4
19-Nov	201	167	161	162	158	152	135	134	142	147	109	141	127	149	131	346	327	327	329	342	275	173	79	87	142.2
20-Nov	114	119	164	122	135	122	239	244	268	251	266	252	216	162	149	144	136	143	140	142	141	141	140	146	164.9
21-Nov	143	132	137	134	119	224	213	130	112	108	183	215	213	216	193	147	135	140	147	217	124	242	195	137	163.7
22-Nov	186	246	255	257	257	262	264	268	271	276	296	309	332	335	333	336	338	338	339	342	339	346	342	342	298.5
23-Nov	346	347	345	329	333	350	355	357	333	356	1	343	343	343	352	348	352	333	329	331	334	333	337	343	341.4
24-Nov	341	331	326	324	302	334	320	320	305	275	256	235	222	234	329	341	334	314	280	243	207	185	168	160	303.2
25-Nov	187	160	148	148	160	168	179	224	146	96	99	99	89	146	153	315	256	141	100	133	150	165	163	156	146.7
26-Nov	146	135	134	135	137	139	141	136	143	144	143	139	138	149	136	135	128	123	125	125	117	117	98	105	135.1
27-Nov	124	119	116	125	120	120	132	131	142	12	335	288	212	162	133	167	184	158	141	150	143	148	147	165	134.4
28-Nov	170	154	149	141	133	142	147	140	127	143	134	136	140	139	140	143	149	153	157	145	147	150	153	156	143.8
29-Nov	138	144	134	136	128	146	137	154	148	132	126	115	132	142	142	143	146	147	165	159	169	167	154	158	144.0
30-Nov	156	171	174	175	154	170	154	149	153	145	156	141	132	127	168	184	162	160	140	162	159	146	146	145	153.6

165.2 157.8 163.5 175.6 177.3 198.5 195.7 177.5 177.0 167.1 217.7 236.7 223.6 211.2 216.8 233.4 140.4 138.1 133.5 171.3 146.9 169.7 160.1 175.1

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

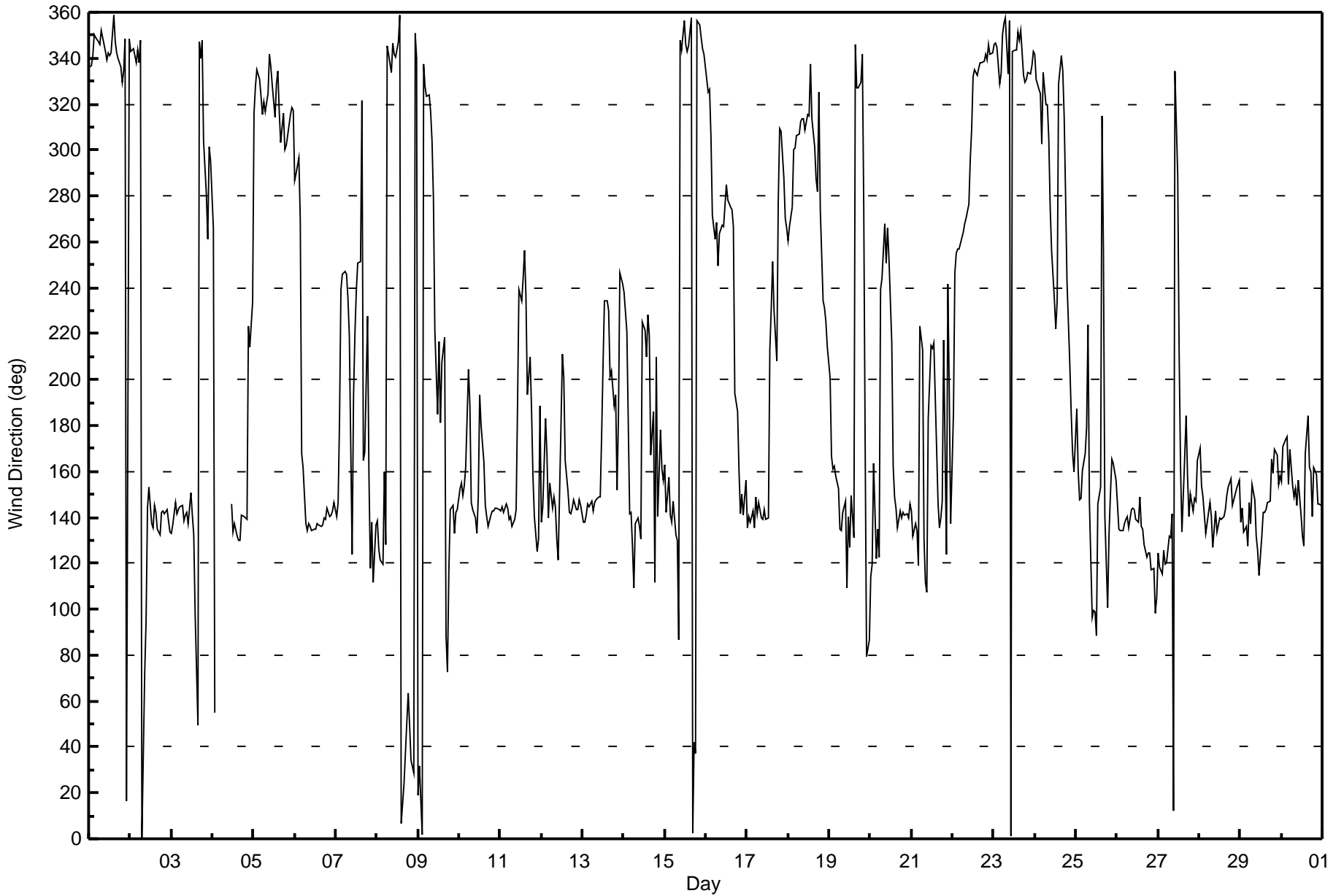
Athabasca Valley - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 101 deg on Nov 25 08:00	Hours of Data: 711
Minimum Value: 7 deg on Nov 2 04:00	Hours of Missing Data: 9
Percentiles: P ₁ = 8 P ₁₀ = 10 Q ₁ = 13 Median = 17 Q ₃ = 27 P ₉₀ = 50 P ₉₉ = 90	Hours of Calibration: 0
	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	20	12	11	14	15	13	13	16	16	9	9	9	12	13	23	22	9	8	9	10	8	15	27	15	27
2-Nov	10	11	12	7	9	9	16	19	24	35	20	21	17	14	14	16	16	16	16	15	18	19	19	15	35
3-Nov	15	16	15	13	12	12	12	14	14	15	14	17	18	21	26	43	13	9	13	28	20	15	14	21	43
4-Nov	30	55	AF	AF	AF	AF	AF	AF	AF	AF	AF	17	16	12	12	12	11	19	11	34	19	14	46	57	57
5-Nov	35	14	15	10	10	10	11	11	13	15	16	14	17	25	24	13	11	11	12	11	13	11	11	15	35
6-Nov	13	26	15	38	28	17	13	12	12	21	24	19	17	14	15	12	14	13	14	14	12	12	10	10	38
7-Nov	11	23	78	10	8	8	9	13	38	47	44	13	21	19	25	26	81	99	101	66	33	22	28	22	101
8-Nov	27	48	90	46	44	67	59	13	11	14	11	10	14	19	20	20	18	20	17	21	20	12	39	48	90
9-Nov	20	14	30	20	11	14	38	18	23	58	71	81	57	51	49	57	18	90	38	21	16	16	14	15	90
10-Nov	17	17	16	18	23	22	29	11	11	13	13	31	28	25	17	14	12	11	10	10	10	10	10	11	31
11-Nov	10	10	12	13	10	11	11	27	12	26	31	12	13	18	17	13	31	15	21	21	40	33	54	65	65
12-Nov	67	25	58	42	35	34	41	29	11	11	25	34	22	29	19	16	12	13	11	13	12	12	13	14	67
13-Nov	13	13	11	10	10	10	11	12	13	18	14	31	39	16	15	18	24	24	59	37	79	84	65	10	84
14-Nov	10	12	25	44	73	69	57	26	16	10	25	45	15	14	17	23	26	89	83	79	78	61	48	49	89
15-Nov	32	56	20	63	20	18	23	15	35	35	14	31	13	10	12	18	16	27	21	21	14	12	8	10	63
16-Nov	10	14	14	26	39	15	16	11	13	13	13	13	13	13	11	14	70	43	59	41	14	32	25	38	70
17-Nov	30	15	13	25	17	22	17	16	11	10	10	11	25	22	19	19	24	22	44	15	20	20	13	10	44
18-Nov	13	11	11	15	13	10	10	9	9	10	10	12	12	12	13	13	12	17	25	41	10	10	10	57	57
19-Nov	50	22	17	12	11	14	18	15	12	25	34	26	24	27	55	50	21	11	20	29	90	75	31	64	90
20-Nov	48	27	25	40	59	37	61	10	17	17	21	24	33	22	20	14	14	14	11	12	10	10	12	13	61
21-Nov	11	19	14	12	32	76	75	29	25	34	58	15	16	18	43	39	9	10	82	33	76	35	43	44	82
22-Nov	59	62	34	11	10	12	11	12	11	10	12	12	16	13	13	9	9	14	9	10	8	12	8	9	62
23-Nov	13	11	17	11	9	21	20	20	11	20	18	13	16	17	19	16	17	13	8	10	9	12	10	12	21
24-Nov	13	10	11	9	15	12	10	11	16	20	27	21	10	47	26	17	18	23	51	17	21	17	17	16	51
25-Nov	32	21	18	12	80	49	53	101	87	41	20	37	32	25	14	91	48	77	96	56	30	40	13	15	101
26-Nov	10	11	11	13	13	12	13	14	12	13	12	11	10	10	18	12	16	18	20	21	19	22	22	22	22
27-Nov	23	21	23	23	18	18	12	17	23	78	82	77	71	51	95	38	38	48	50	58	26	14	24	22	95
28-Nov	24	25	29	19	20	16	11	14	24	19	19	15	13	13	13	14	16	21	23	30	19	17	24	22	30
29-Nov	18	20	33	20	21	30	36	28	24	34	27	22	23	18	22	14	20	28	18	35	26	20	19	24	36
30-Nov	20	21	20	28	30	23	20	26	41	18	17	19	18	39	16	22	39	67	39	63	46	23	23	28	67

67	62	90	63	80	76	75	101	87	78	82	81	71	51	95	91	81	99	101	79	90	84	65	65	
Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 12, 2015	Last Calibration	October 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	13:28
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	804
Calculated slope	0.996596	1.000245	Chamber temp	43.9	43.9
Calculated intercept	0.907044	1.740311	Pressure	689.6	684.9
Analyzer Background	17.9	18.4	Flow	0.479	0.473
Analyzer Coefficient	1.065	1.084	Intensity	43818	43592

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	-0.2	----
as found span	5000	60.7	607.0	591.8	1.026
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.7	607.0	606.1	1.001
second point	5000	30.4	304.0	300.8	1.011
third point	5000	15.2	152.0	149.0	1.020
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	60.7	607.0	605.9	1.002
Average Correction Factor					1.011

Corrected As found 592.0 Previous response 608.2 % change 2.7%

Notes:

filter changed out, no maintenance done, Span adjusted

Calibration Performed By: Melissa Lemay



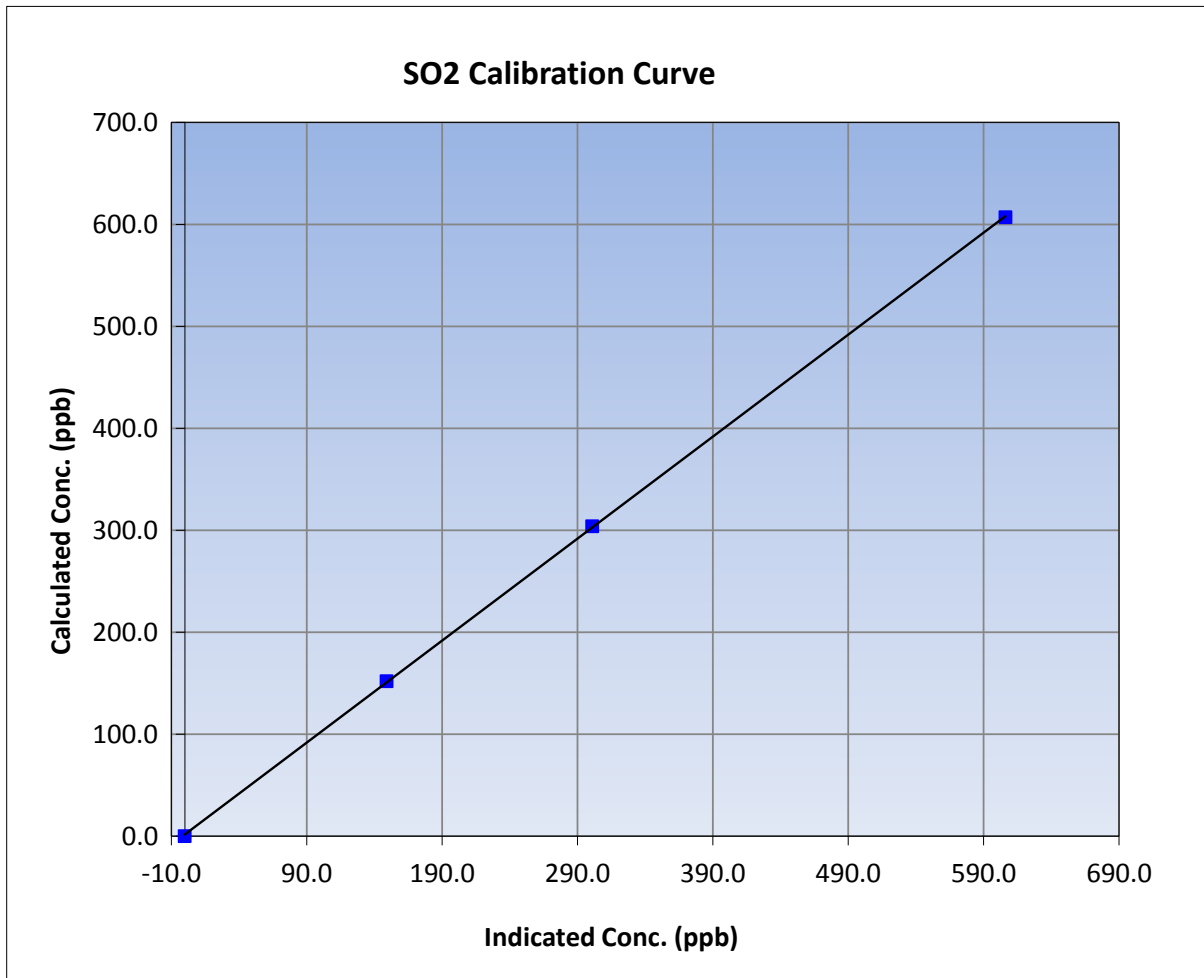
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	13:28
Analyzer make	Thermo 45C	Analyzer serial #	630718530

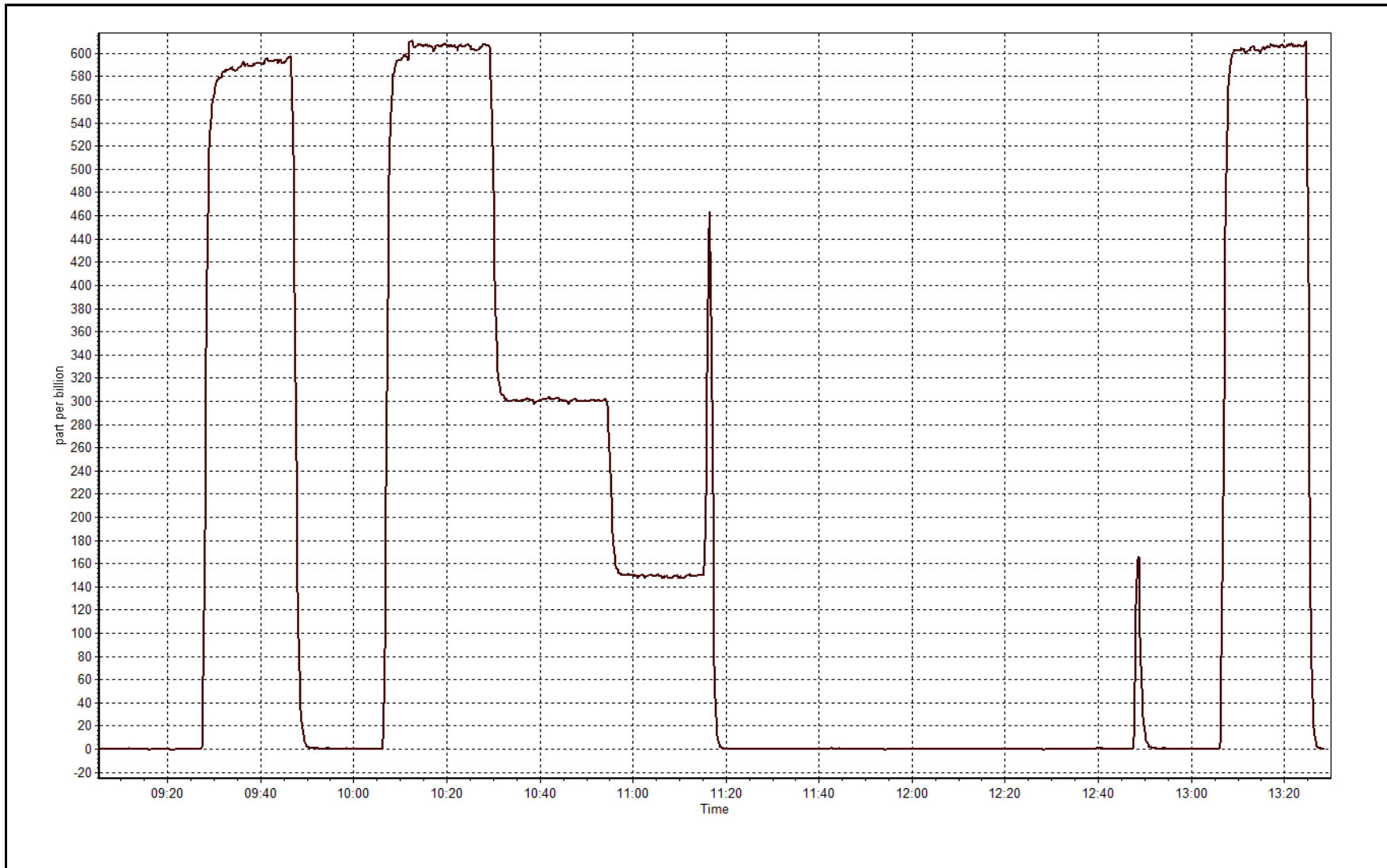
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999965
607.0	606.1	1.0015		
304.0	300.8	1.0106	Slope	1.000245
152.0	149.0	1.0201		
			Intercept	1.740311



SO2 Calibration Plot

Date: November 12, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	November 9, 2015	Last Calibration	October 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	13:05	End Time (MST)	15:15
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	1086	1096
Calculated slope	1.001726	1.003902	Chamber temp	45	45
Calculated intercept	0.001923	-0.067652	Pressure	701.0	702.5
Analyzer Background	2.42	2.42	Flow	0.434	0.435
Analyzer Coefficient	1.118	1.118	Intensity	72	72
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-LTE		Analyzer serial #	1507864683	
Converter make/model	CDN-101		Converter serial #	503	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	89.6	75.0	74.7	1.004
SO2 scrubber check	5000	15.2	154.4	0.5	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	89.6	75.0	74.7	1.004
second point	6000	50.2	42.0	42.0	1.000
third point	6000	29.9	25.0	25.0	1.003
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	89.6	75.0	75.2	0.997
Average Correction Factor					1.002

Corrected As found	74.7	Previous response	74.8	% change	0.2%
--------------------	------	-------------------	------	----------	------

Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



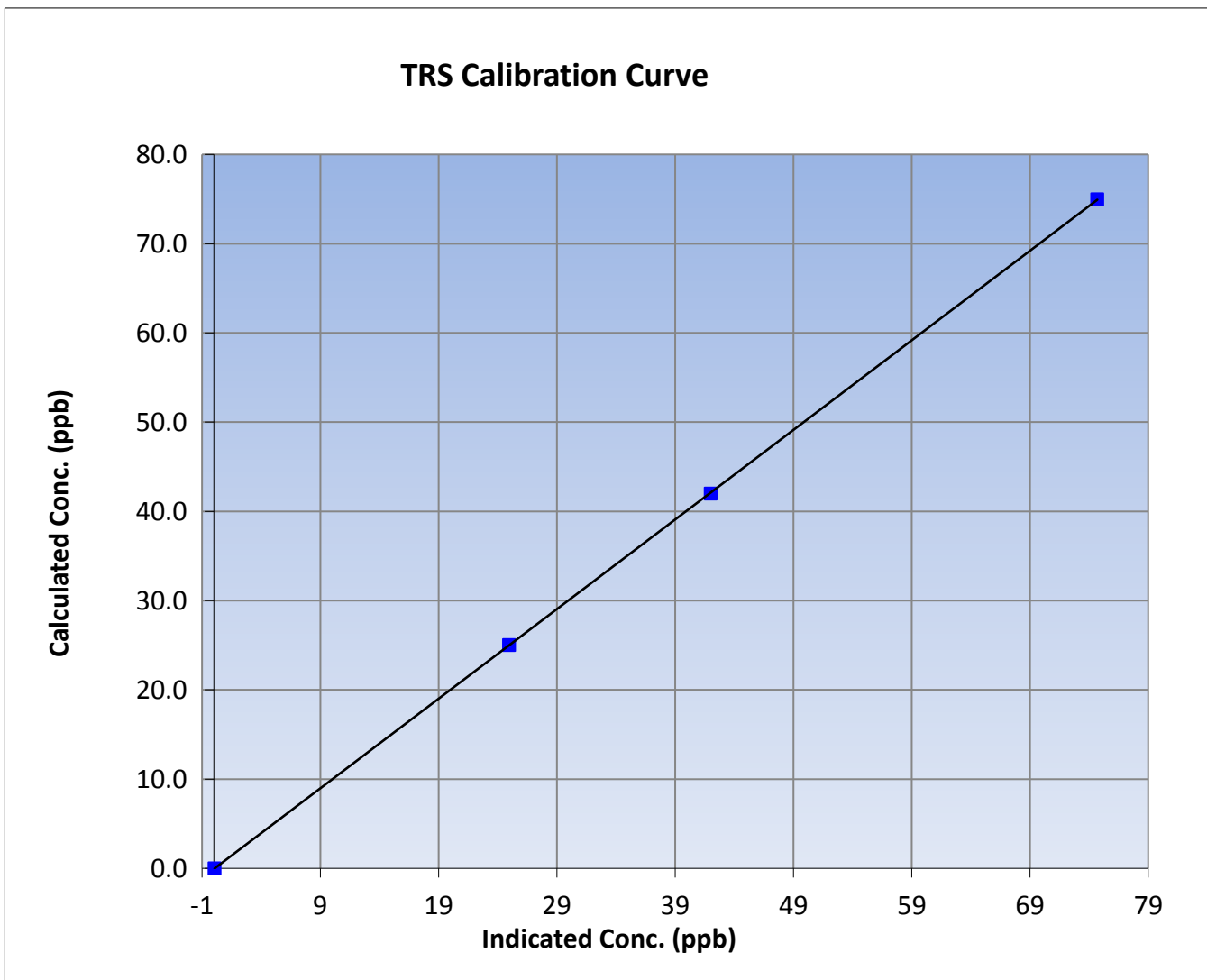
Wood Buffalo Environmental Association TRS Calibration Report

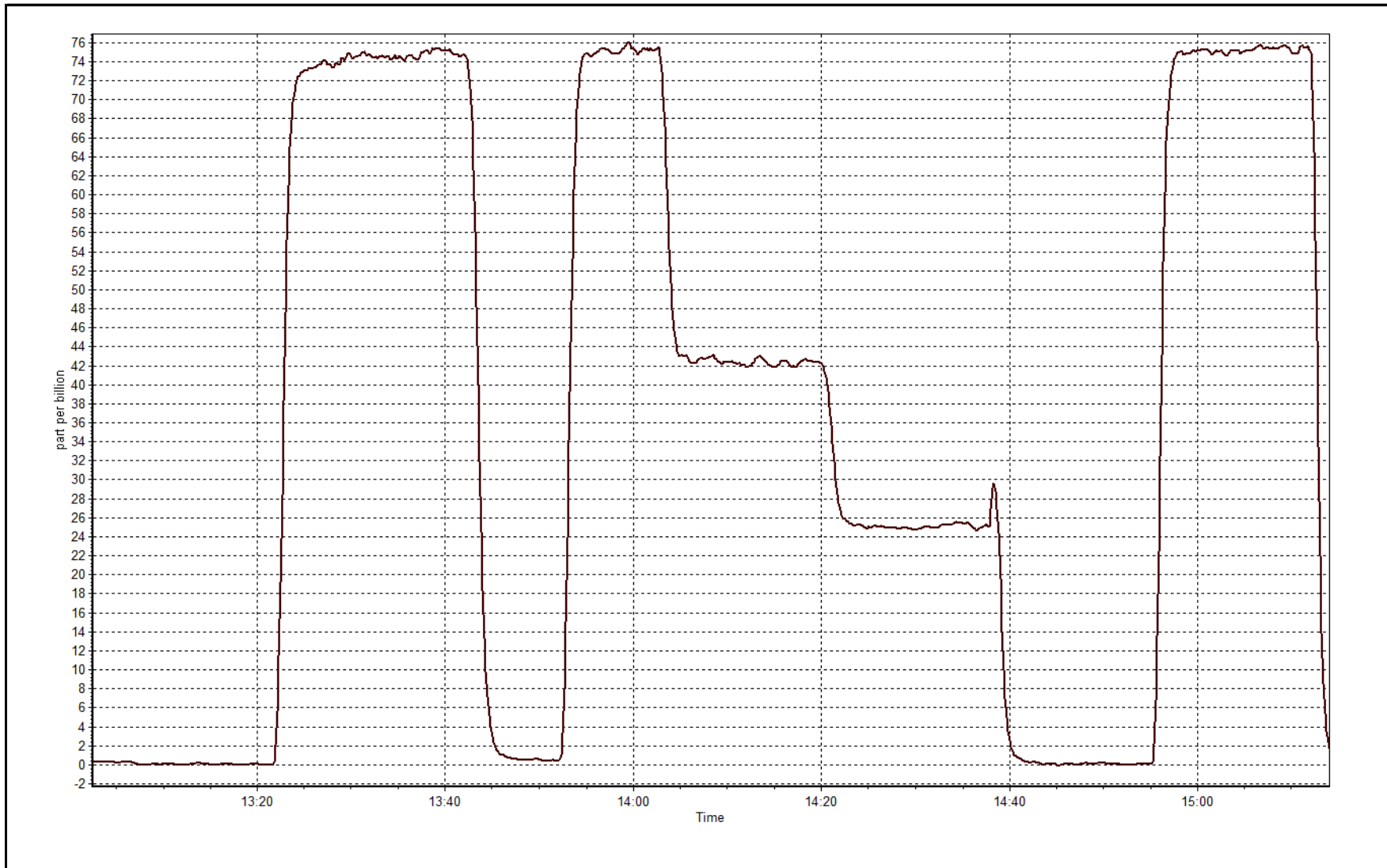
Station Information

Calibration Date	November 9, 2015	Previous Calibration	October 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	13:05	End Time (MST)	15:15
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	0.999996
75.0	74.7	1.0036		
42.0	42.0	1.0000	Slope	1.003902
25.0	25.0	1.0027		
			Intercept	-0.067652







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November-12-15	Last Calibration	October-09-15
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	13:27
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	288.0	286.9
THC Calc slope	1.008096	1.001557	Carrier Pressure	36.8	36.8
THC Calc intercept	0.008275	0.046579	Fuel Pressure	42.1	42.1
NMHC Calc slope	1.008284	1.002353	Air Pressure	32.2	32.2
NMHC Calc intercept	-0.005815	0.026451			

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	12.40	1.018
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.59	1.003
second point	5000	30.4	6.32	6.22	1.017
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	12.55	1.006
Average Correction Factor					1.015

Corrected As found 12.40 Previous response 12.52 % change 0.9%

Notes:

Nitrogen changed out, filter changed out, span adjusted

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	6.68	6.56	1.018
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.65	1.004
second point	5000	30.4	3.34	3.29	1.016
third point	5000	15.2	1.67	1.62	1.032
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					1.018

Corrected As found 6.56 Previous response 6.63 % change 1.0%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	5.95	5.83	1.020
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	5.95	5.94	1.001
second point	5000	30.4	2.98	2.93	1.017
third point	5000	15.2	1.49	1.46	1.020
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	5.95	5.93	1.003
Average Correction Factor					1.013

Corrected As found 5.83 Previous response 5.89 % change 1.0%



Wood Buffalo Environmental Association

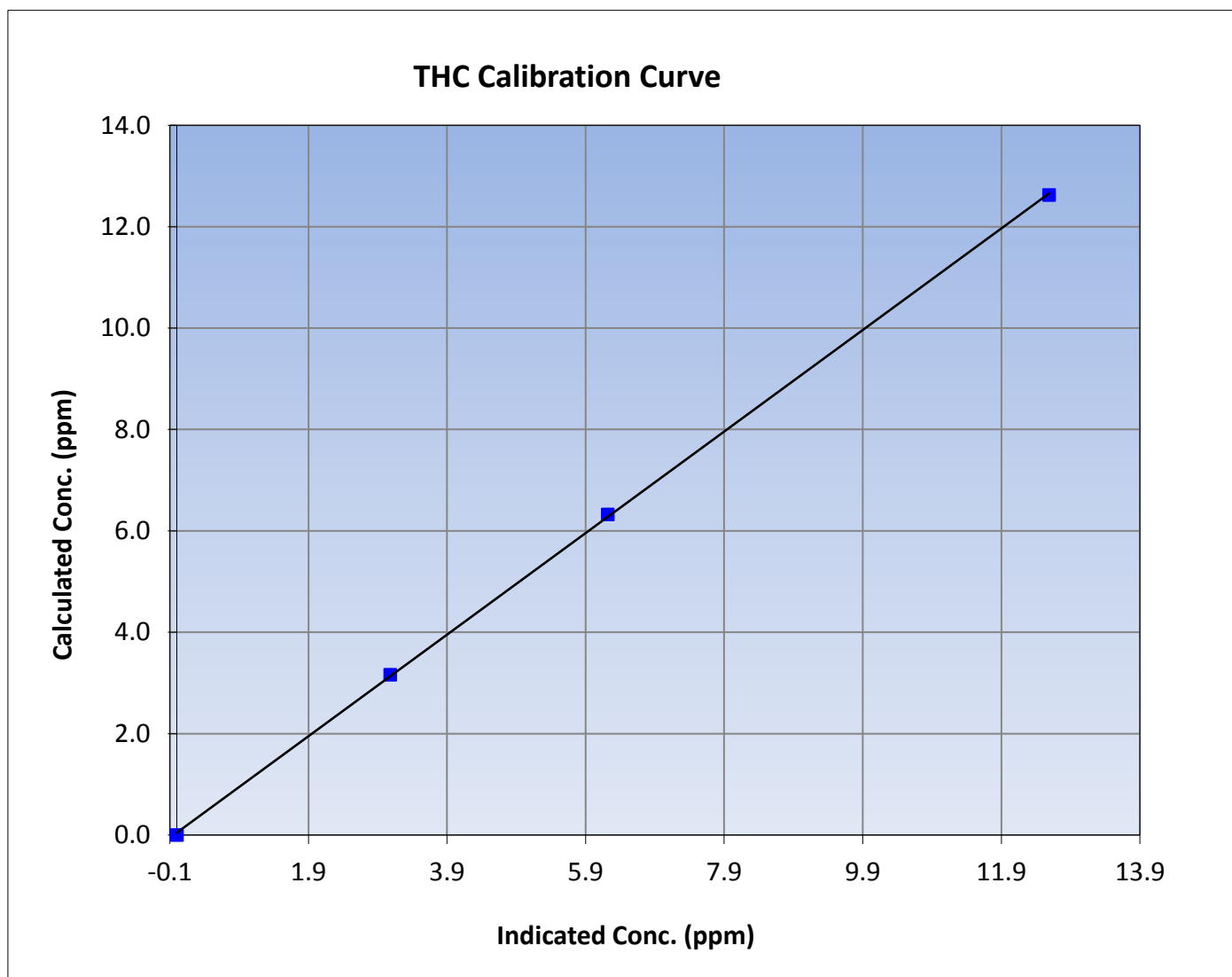
THC Calibration Summary

Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	13:27
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
12.63	12.59	1.0028		
6.32	6.22	1.0166	Slope	1.001557
3.16	3.08	1.0265		
			Intercept	0.046579





Wood Buffalo Environmental Association

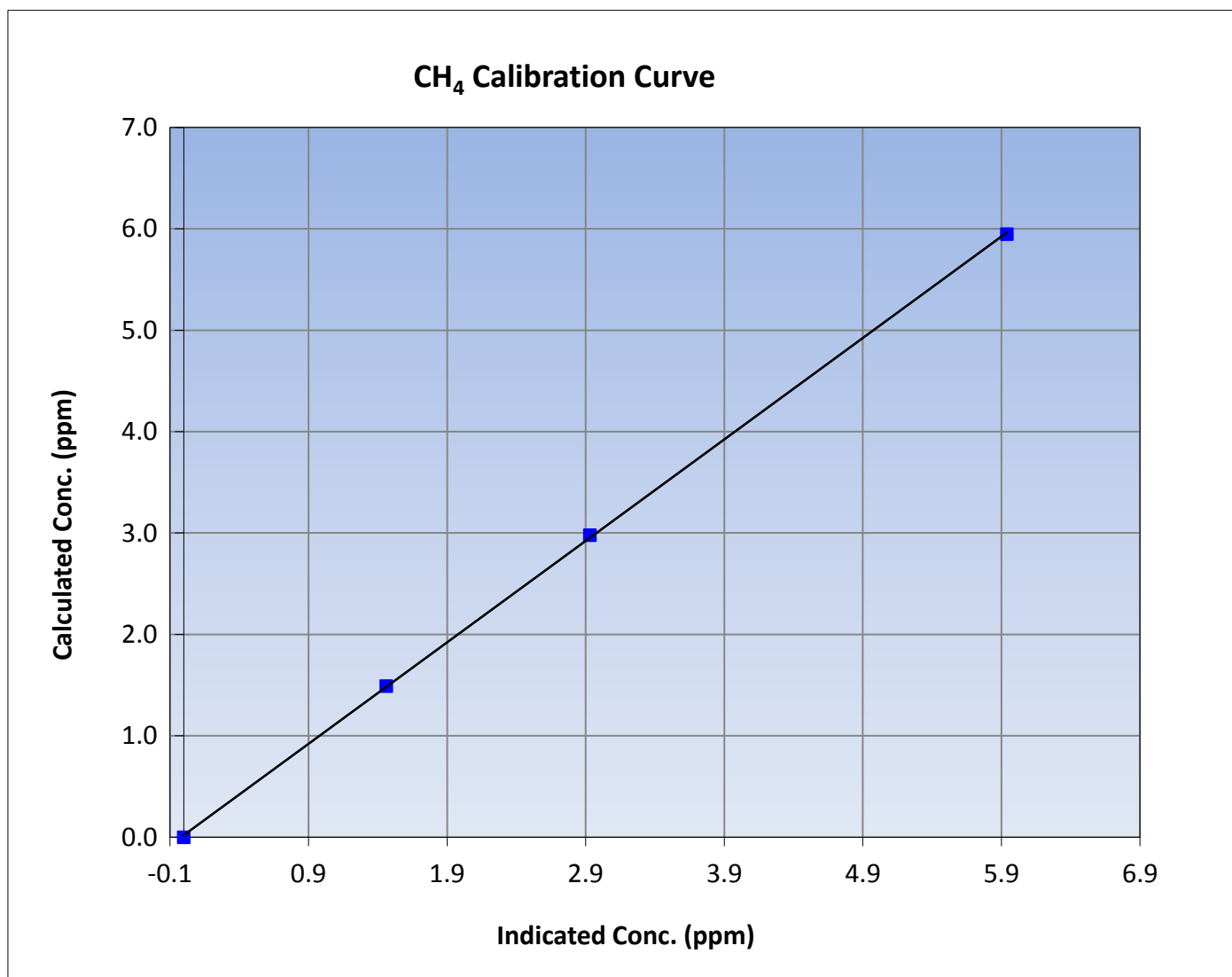
CH₄ Calibration Summary

Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	13:27
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	0.999925
5.95	5.94	1.0014		
2.98	2.93	1.0168	Slope	1.000660
1.49	1.46	1.0203		
			Intercept	0.020147





Wood Buffalo Environmental Association

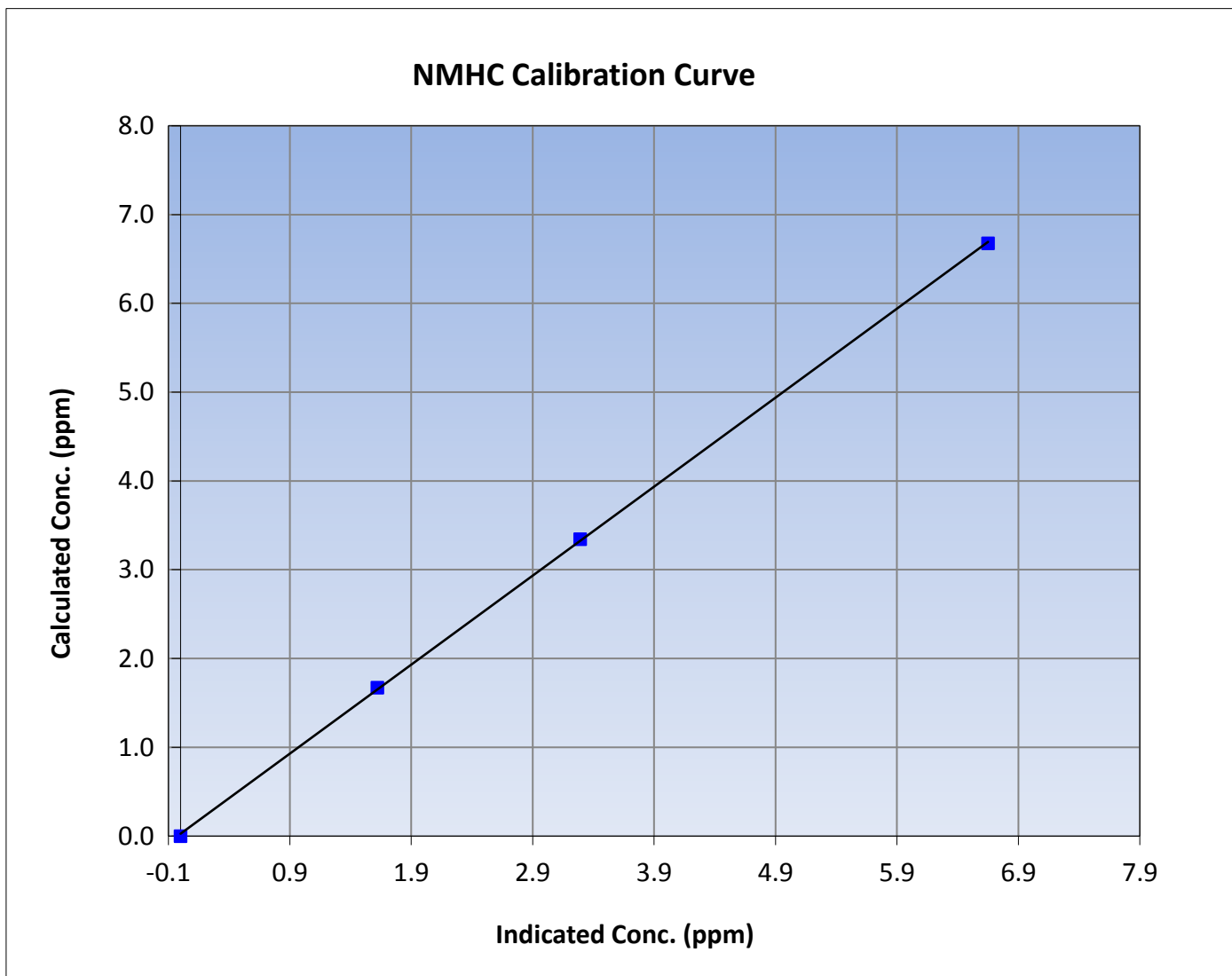
NMHC Calibration Summary

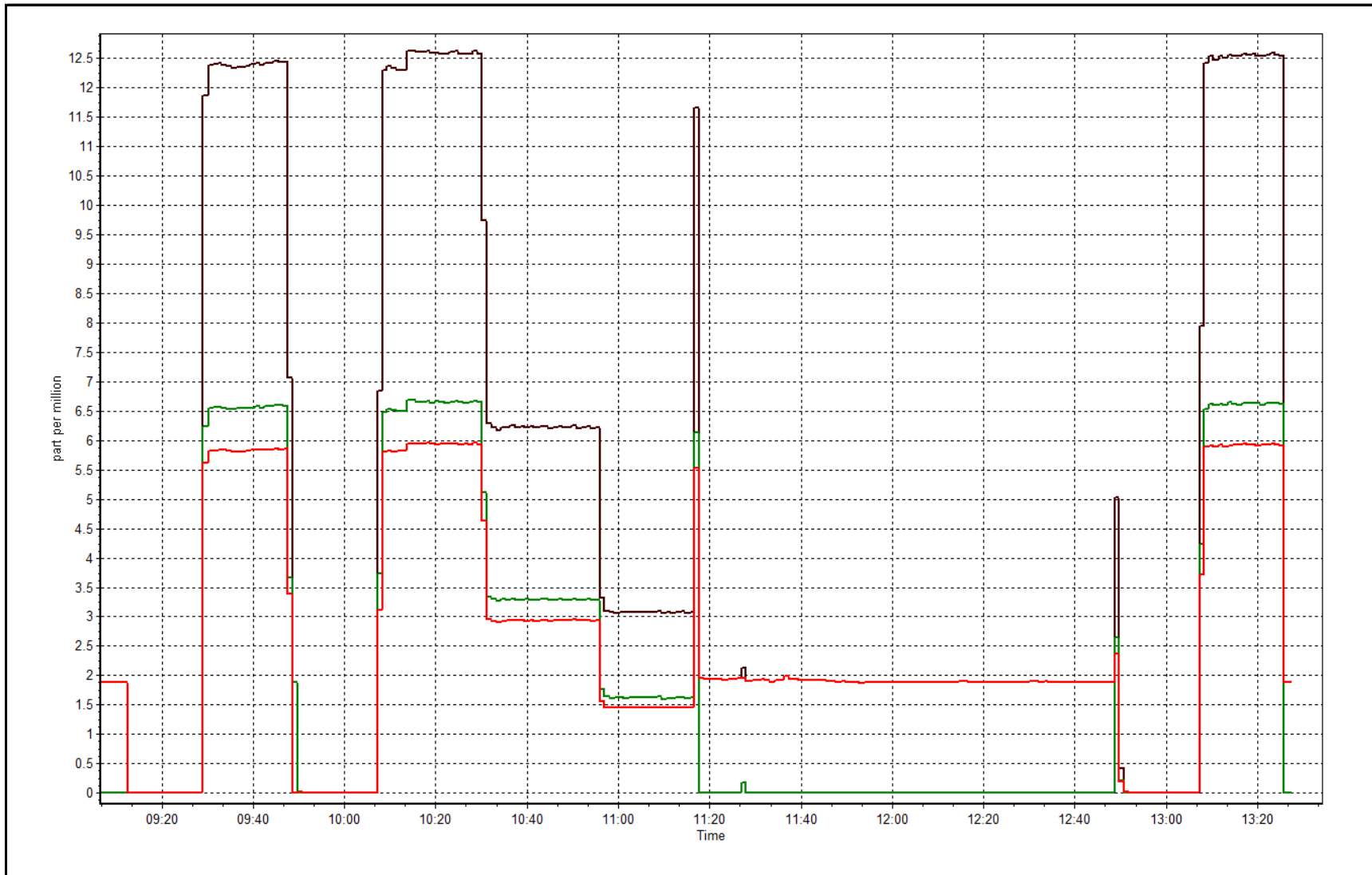
Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	13:27
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	0.999926
6.68	6.65	1.0041		
3.34	3.29	1.0164	Slope	1.002353
1.67	1.62	1.0321		
			Intercept	0.026451







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	13:23	End Time (MST)	15:25
NO2 GPT Ref date	October-09-15	Transfer Standard	GPT
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11021107
DACS make/model	Campbell Scientific CR3000	Serial Number	1864
		Serial Number	5564

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.9	27.1
Analyzer IP address	192.168.1.49		Lamp temp.	67.9	67.9
Calculated slope	1.013937	1.014090	Pressure	706.8	715.6
Calculated intercept	-0.250553	0.581497	Flow cell A	0.732	0.738
Analyzer Background	0.2	0.2	Flow cell B	0.744	0.748
Analyzer Coefficient	0.939	0.939	Cell A Intensity	90642	89831
			Cell B Intensity	89949	84561

Analyzer make	TEI 49i	Analyzer serial #	1507964700
---------------	---------	-------------------	------------

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.3	----
as found span	5000	1.22	325.9	320.9	1.016
calibrator zero	5000	0.00	0.0	-0.3	----
high point	5000	1.22	325.9	320.9	1.016
second point	5000	0.70	162.6	159.7	1.018
third point	5000	0.43	83.4	81.4	1.025
as left zero	5000	0.00	0.0	-0.2	----
as left span	5000	1.22	325.9	319.7	1.019
Average Correction Factor					1.019

Corrected As found	321.2	Previous response	321.7	% change	0.1%
--------------------	-------	-------------------	-------	----------	------

Notes:

Filter changed out,, no maintenance or adjustments done

Calibration Performed By: Melissa Lemay



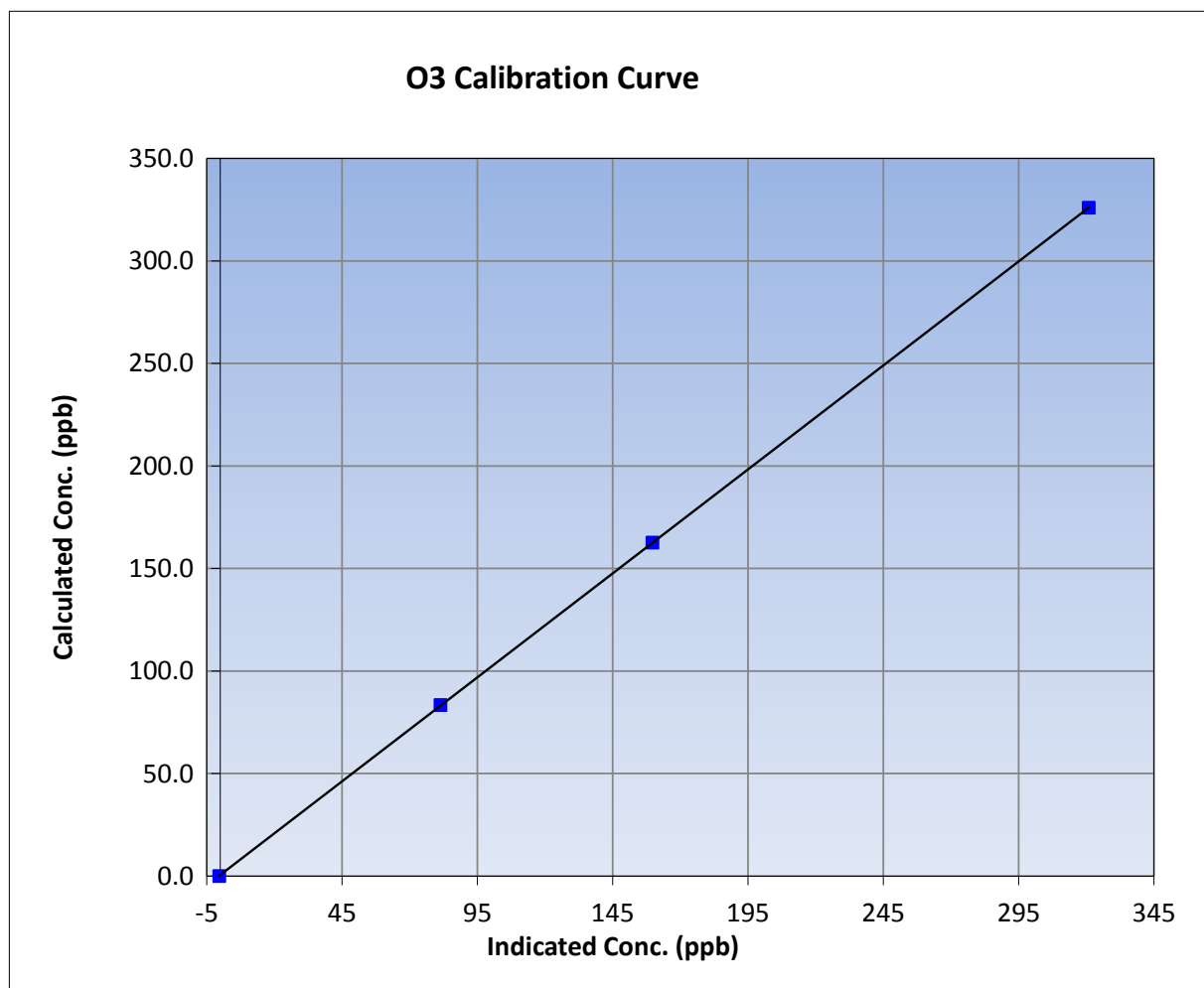
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-12-15	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	13:23	End Time (MST)	15:25
Analyzer make	TEI 49i	Analyzer serial #	1507964700

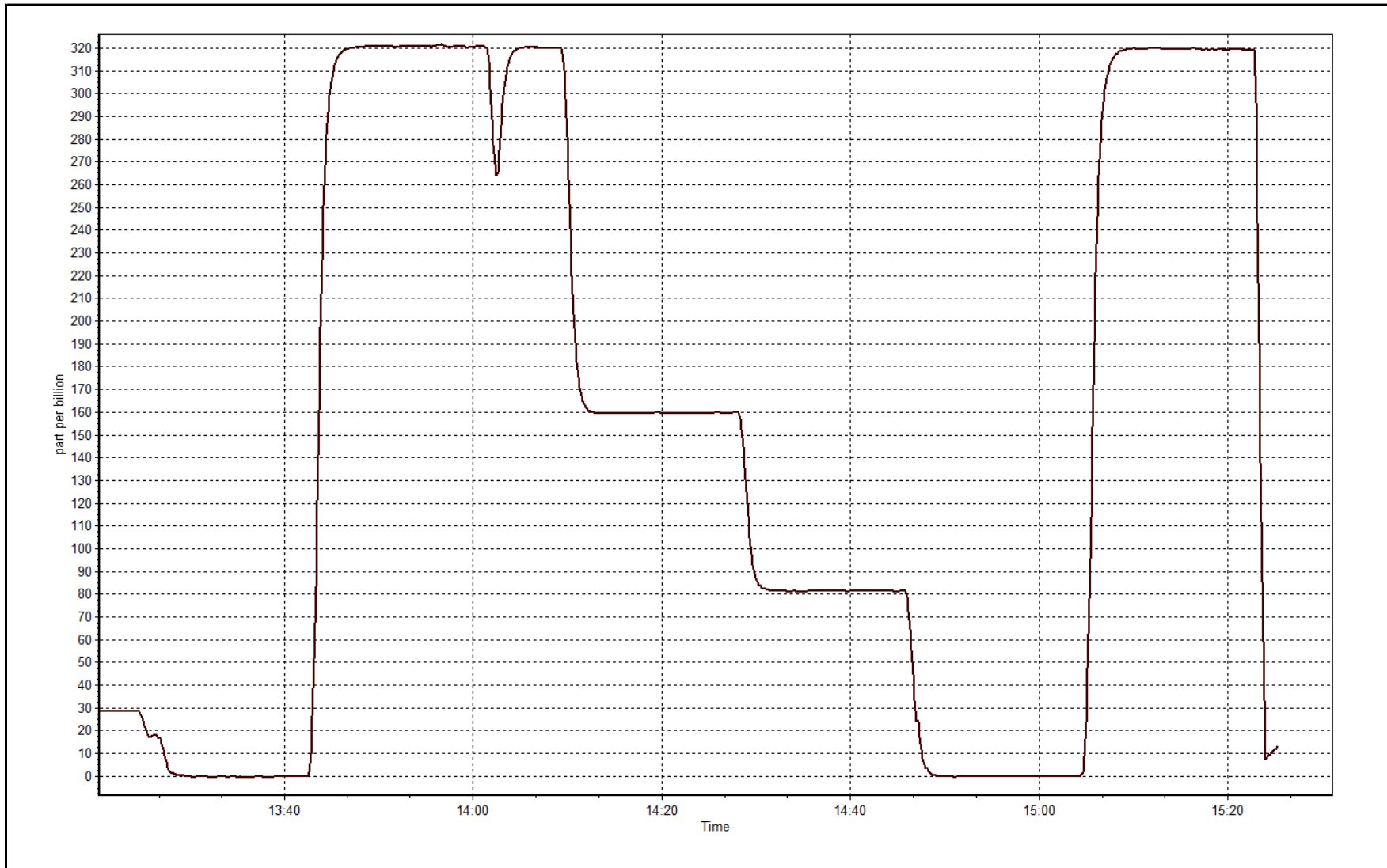
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999997
325.9	320.9	1.0156		
162.6	159.7	1.0182	Slope	1.014090
83.4	81.4	1.0246		
			Intercept	0.581497



O3 Calibration Plot

Date: November 12, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	13:27
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOX Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne API T701	Serial Number	1864

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	5564
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000619	0.997941	1.007316
	Data Offset	1.011740	1.142740	0.451912
Current Calibration	Data Slope	1.003063	0.999178	1.005267
	Data Offset	1.674227	1.868076	0.478337

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
---------------------	------------	-------------------	-----------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	0.786		0.786	
NOX coefficient	0.996		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.7		2.7	
NOX bkgrnd	2.7		2.7	
Chamber Temp	49.5	Deg C	49.5	Deg C
Moly Temp	323	Deg C	323	Deg C
PMT voltage	-805	V	-805	V
PMT Temp	-3.7	Deg C	-3.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	135.7	mmHg	134.9	mmHg
R Cell Press Nox	135.7	mmHg	134.9	mmHg
NO sample flow	0.91	lpm	0.904	lpm
Nox sample Flow	0.910	lpm	0.904	lpm

Notes:

No maintenance or adjustments done, filter changed out,



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: November 12, 2015 Station Number: AMS 7

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	----	----
as found span	5000	60.7	599.7	599.7	0.0	598.8	599.8	-0.6	1.0015	0.9999
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	----	----
high point	5000	60.7	599.7	599.7	0.0	597.2	599.4	-1.8	1.0042	1.0005
second point	5000	30.4	300.4	300.4	0.0	296.4	297.3	-0.6	1.0133	1.0103
third point	5000	15.2	150.2	150.2	0.0	146.8	147.0	-0.1	1.0230	1.0216
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	----	----
as left span	5000	60.7	599.7	272.6	327.1	593.3	271.8	321.7	1.0108	1.0029
Average Correction Factor									1.0135	1.0108

Corrected As found NO_x= 598.8 NO= 599.9 Percent Change NO_x= -0.1% NO= 0.0%
 Previous Response NO_x= 598.3 NO= 599.8

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.3			N/A	
1st NO2 (300)	----	272.6	325.9	596.5	272.6	324.0	0.9933	1.0000	1.0059	99.4%
2nd NO2 (200)	----	435.9	162.6	596.9	435.9	161.2	0.9927	1.0000	1.0087	99.1%
3rd NO2 (100)	----	515.1	83.4	596.3	515.1	81.5	0.9937	1.0000	1.0233	97.7%
4th NO2 (0)	598.5	----	-1.9	596.6	598.5	-1.7	0.9932	1.0000	N/A	----
Average Correction Factor							0.9932	1.0000	1.0126	98.8%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

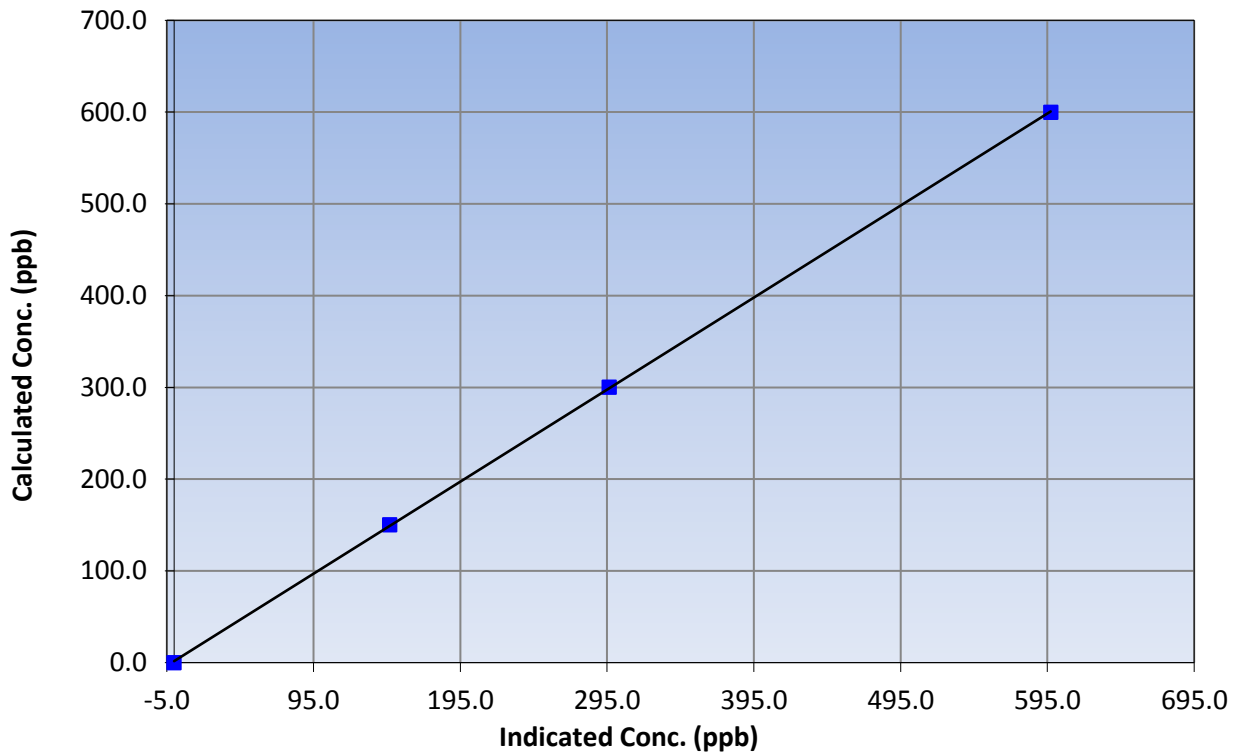
Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	13:27
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999964
599.7	597.2	1.0042		
300.4	296.4	1.0133	Slope	1.003063
150.2	146.8	1.0230		
			Intercept	1.674227

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

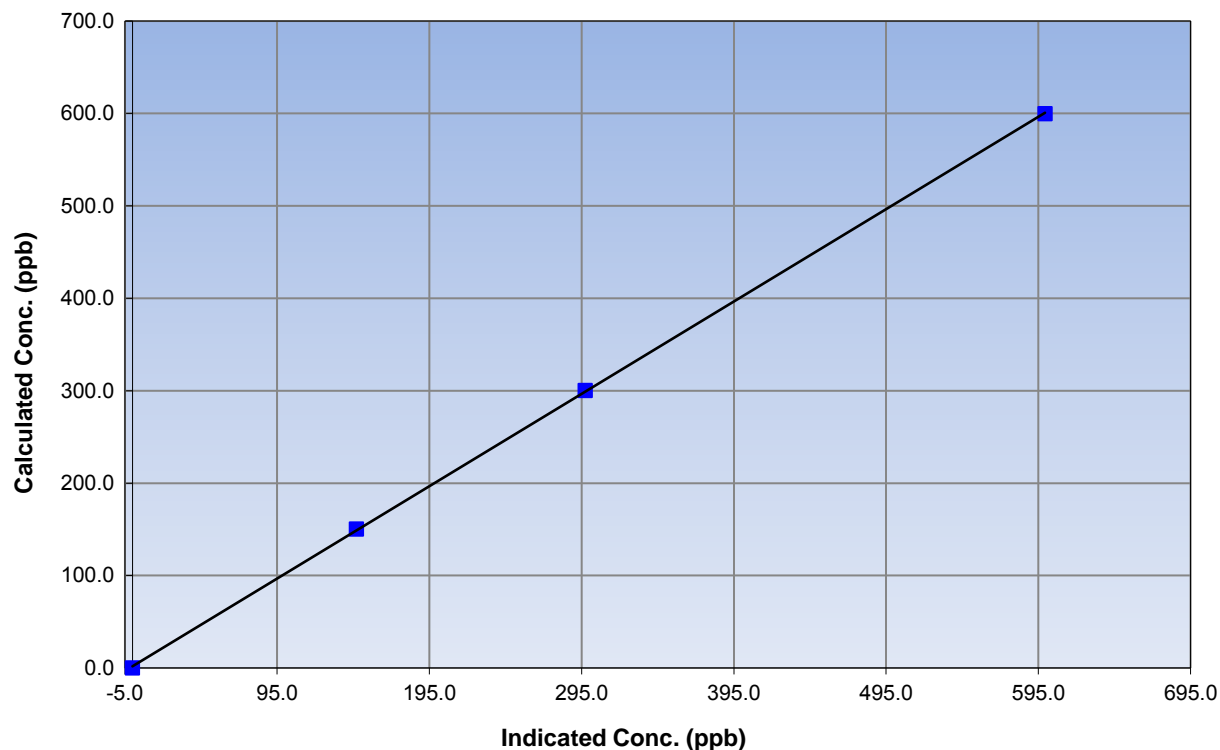
Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	13:27
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	0.999957
599.7	599.4	1.0005		
300.4	297.3	1.0103	Slope	0.999178
150.2	147.0	1.0216		
			Intercept	1.868076

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

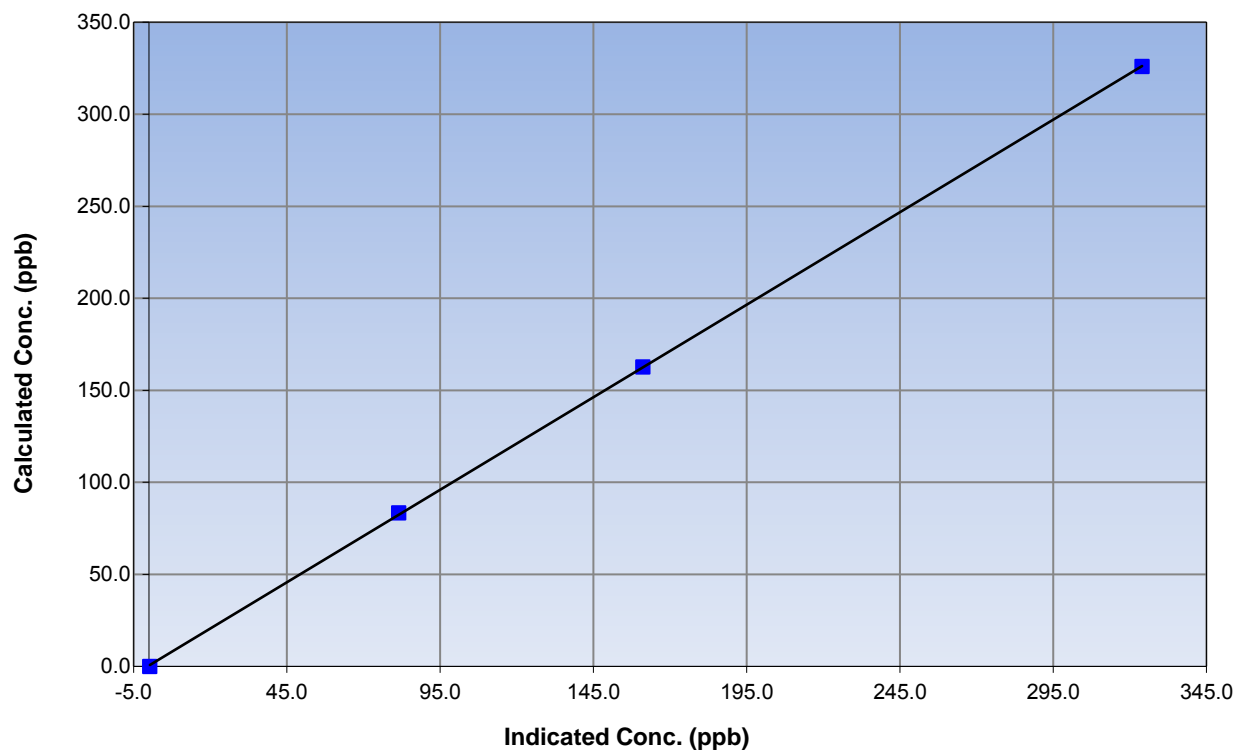
Station Information

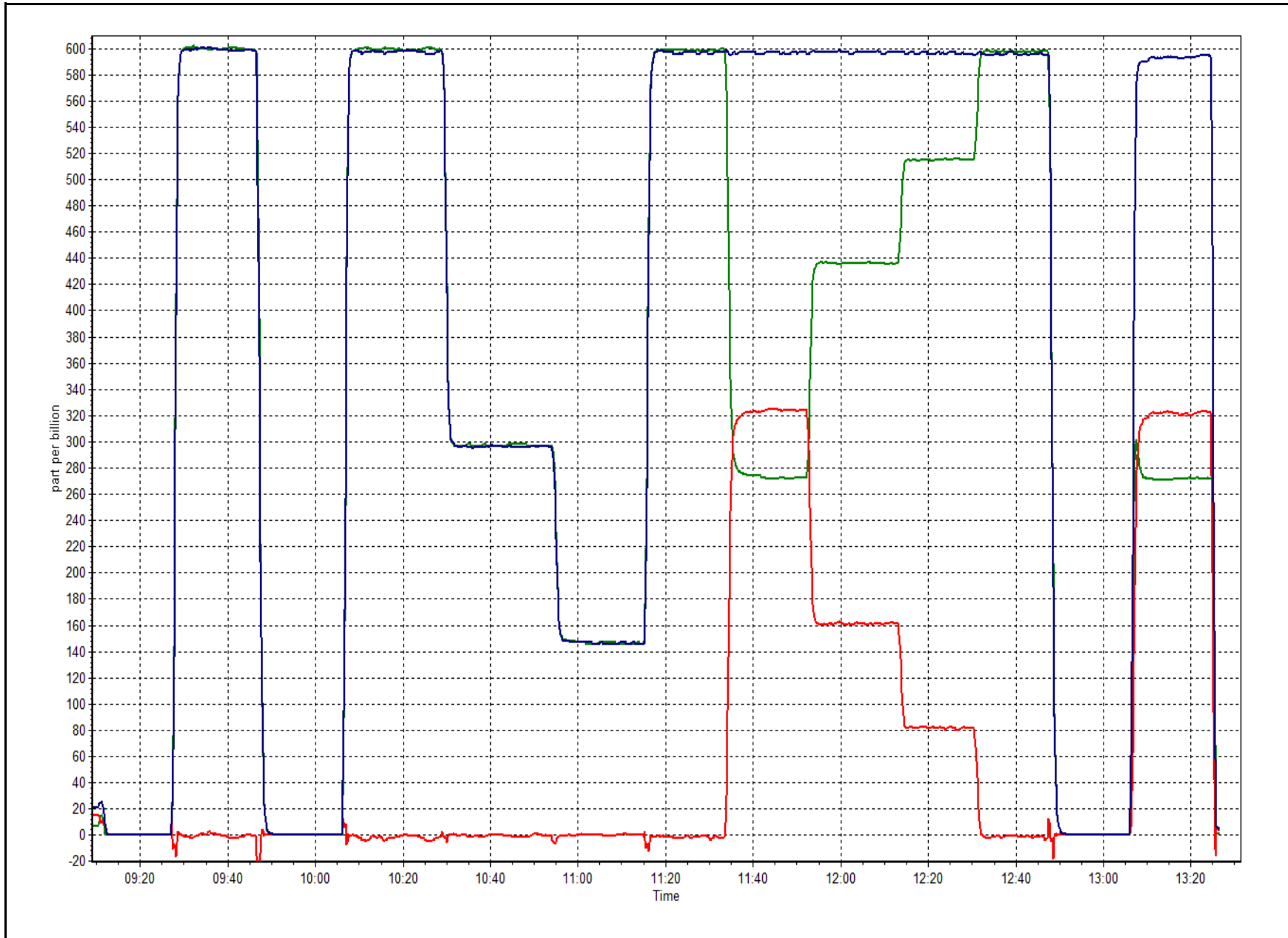
Calibration Date	November 12, 2015	Previous Calibration	October 9, 2015
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:05	End Time (MST)	13:27
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999971
325.9	324.0	1.0059		
162.6	161.2	1.0087	Slope	1.005267
83.4	81.5	1.0233		
			Intercept	0.478337

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	November 12, 2015	Previous Calibration:	10/19/15
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	13:56	End Time (MST):	14:30
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	4.0	4.3	0.3	4.0
T2	15.0	na	na	15.0
T3	18.0	na	na	18.0
T4	21.0	na	na	21.0
RH (%)	15.0	na	na	15.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	977	980.0	3.0	977

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1005	5	1010	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	246		246
Neph	0.9		0.9
C14	193		193
Indicated Concentration (ug/m3)	0.5	No	0.5
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	September 23, 2015	Previous Leak Check Date:	June 22, 2015
------------------	--------------------	---------------------------	---------------

	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.78		
*Flow with adaptor (LPM):	16.66		0.12

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

Mass Foil Calibration (Annually)

Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	
Foil Mass:	<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	
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	November 9, 2015	Last Calibration	October 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	13:08
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	02/02/2023
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		Chamber temp.	47.9	48.5
Analyzer IP address	192.168.1.48		Pressure	728.3	733.7
Calculated slope	1.008937	0.998427	Flow	0.483	0.486
Calculated intercept	0.039718	0.065349	Intensity	199681	199542
Analyzer Background	3.664	4.015	S/R ratio	1.175164	1.175416
Analyzer Coefficient	1.040	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	0.1	----
as found span	5000	69.7	41.4	40.9	1.013
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.4	1.000
second point	5000	35.2	20.9	20.9	1.001
third point	5000	15.2	9.0	8.9	1.011
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	41.2	1.004
Average Correction Factor					1.004

Corrected As found 40.8 Previous response 41.0 % change 0.6%

Notes:

zero and span adjusted, No Maintenance done, Filter changed out

Calibration Performed By:

Melissa Lemay



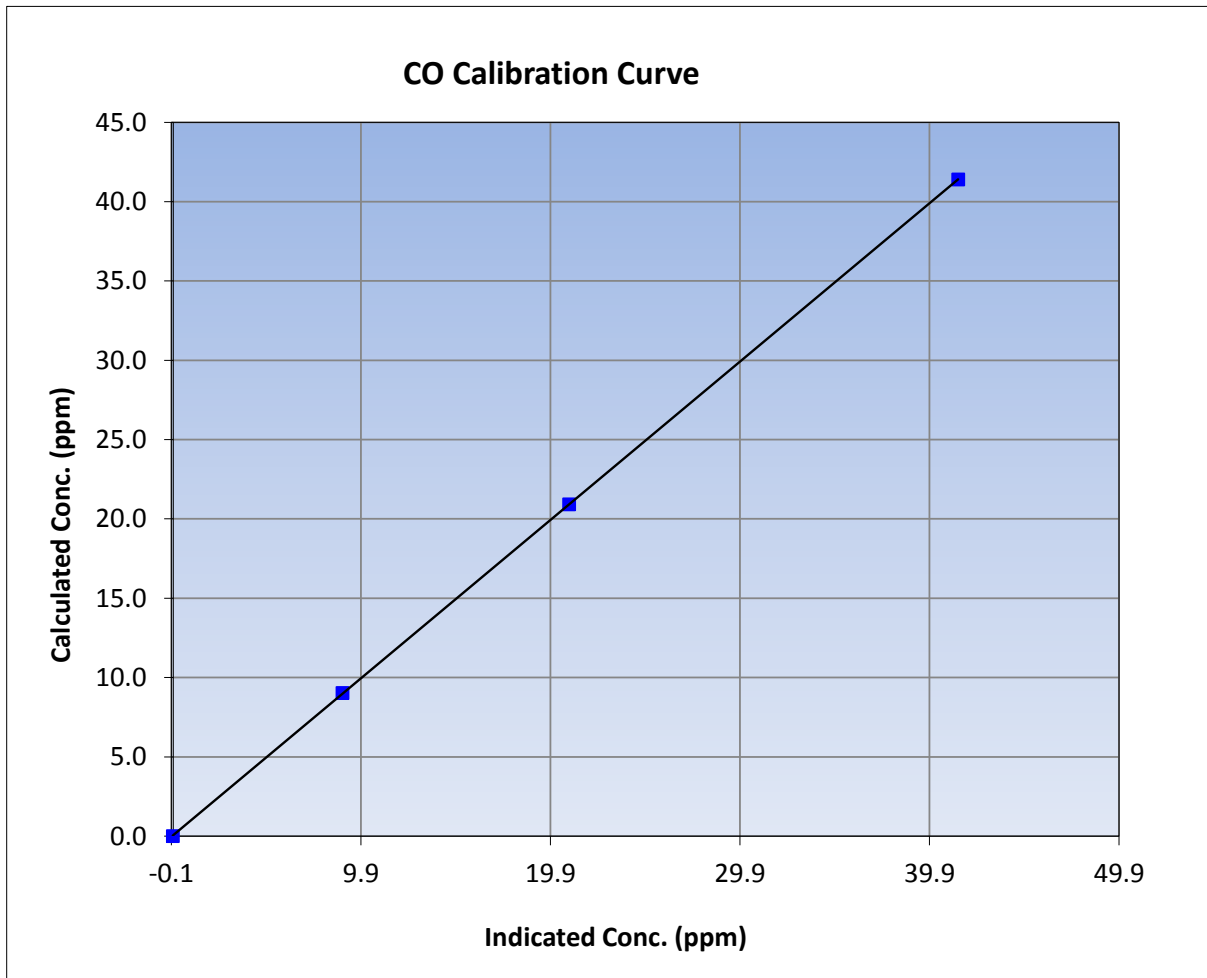
Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	November 9, 2015	Previous Calibration	October 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:40	End Time (MST)	13:08
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

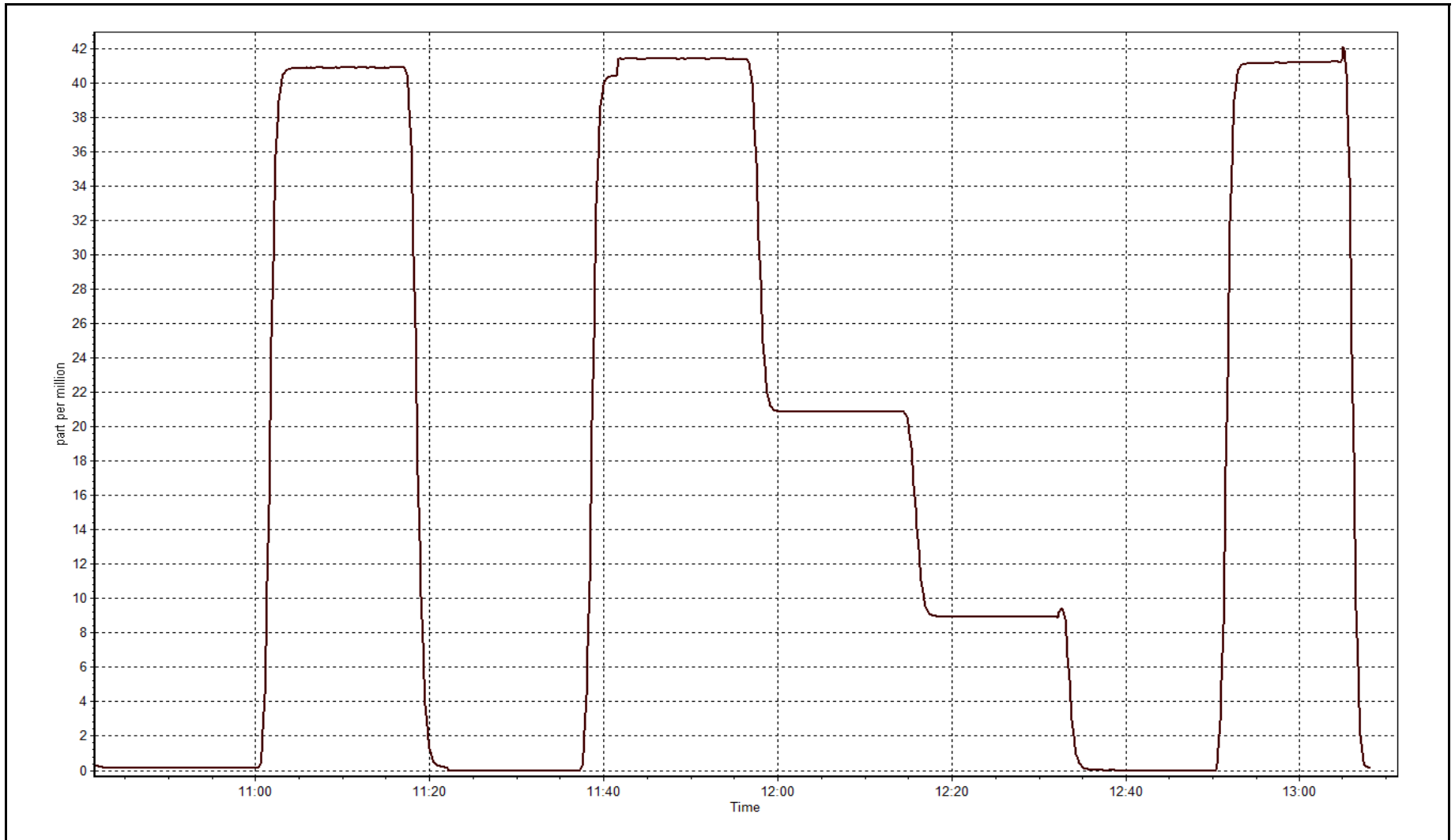
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
41.4	41.4	0.9998		
20.9	20.9	1.0014	Slope	0.998427
9.0	8.9	1.0111		
			Intercept	0.065349



CO Calibration Plot

Date: November 9, 2015





This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	686	34	34	100.00	4	0	1	0
O3(ppb) Average	686	34	34	100.00	43	0	35	-
NO2(ppb) Average	686	34	34	100.00	22	0	11	-
NO(ppb) Average	686	34	34	100.00	5	-	1	-
NOX(ppb) Average	686	34	34	100.00	22	-	12	-
PM2.5(ug/m3) Average	704	2	16	98.06	39	-	25.6	0
Wind Speed 10 m (km/h) Average	720	0	0	100.00	37	-	25	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	5.7	-	2.7	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	94	-
Precipitation (mm) Total	720	0	0	100.00	0.5	-	1.8	-
Leaf Wetness (% of range) Average	720	0	0	100.00	4	-	2	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	314	-	57	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	686	0.3	1	-	0	0	0	0	0	1	4
O3(ppb) Average	686	24.8	7	-	4	16	21	24	29	34	43
NO2(ppb) Average	686	2.3	4	-	0	0	0	1	2	6	22
NO(ppb) Average	686	0.2	1	-	0	0	0	0	0	0	5
NOX(ppb) Average	686	2.5	4	-	0	0	0	1	3	7	22
PM2.5(ug/m3) Average	704	5.83	5.8	-	1.5	2.5	2.9	4	5.9	9.9	39
Wind Speed 10 m (km/h) Average	720	12.4	7	-	1	5	7	10	17	24	37
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	-5.76	5.1	-	-20.1	-13.5	-9.1	-5.1	-2.4	0.6	5.7
Relative Humidity (%) Average	720	82.9	11	-	45	65	80	86	90	94	98
Precipitation (mm) Total	720	-	-	2.29	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	720	1.6	0	-	1	1	1	1	2	2	4
Global Solar Radiation (W/m2) Average	720	29.7	60	-	0	0	0	0	27	116	314

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	25 Nov 2015 01:00	25 Nov 2015 14:00	14	Unstable Operation - baseline shift after tape change



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Nov 9 22:00	Maximum Daily Average: 0.9 ppb on Nov 30		Hours of Data:	686
Minimum Value: 0 ppb on Nov 1 17:00	Minimum Daily Average: 0.0 ppb on Nov 8		Hours of Missing Data:	34
Maximum Diurnal Average: 0.4 ppb at hour 19	Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O 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-Nov	0	0	0	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-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1
3-Nov	0	Z	0	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-Nov	0	0	Z	0	0	0	0	0	0	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0.4	2
5-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0.1	0
6-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0.2	2
7-Nov	1	2	2	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
8-Nov	Z	0	0	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-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	2	0	0.4	4
10-Nov	0	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	2	1	1	1	1	0.8	2
11-Nov	1	1	1	Z	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	2	3	0	0	0	0	0	0.4	3
13-Nov	1	1	1	1	2	Z	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
14-Nov	Z	0	0	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-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Nov	0	0	Z	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-Nov	0	0	0	Z	2	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	2
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	2	1	2	2	2	0.6	4
21-Nov	2	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
22-Nov	0	0	Z	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-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Nov	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
27-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Nov	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0.7	2
29-Nov	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	3	2	0.6	3
30-Nov	2	2	1	1	Z	2	2	2	2	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.9	2

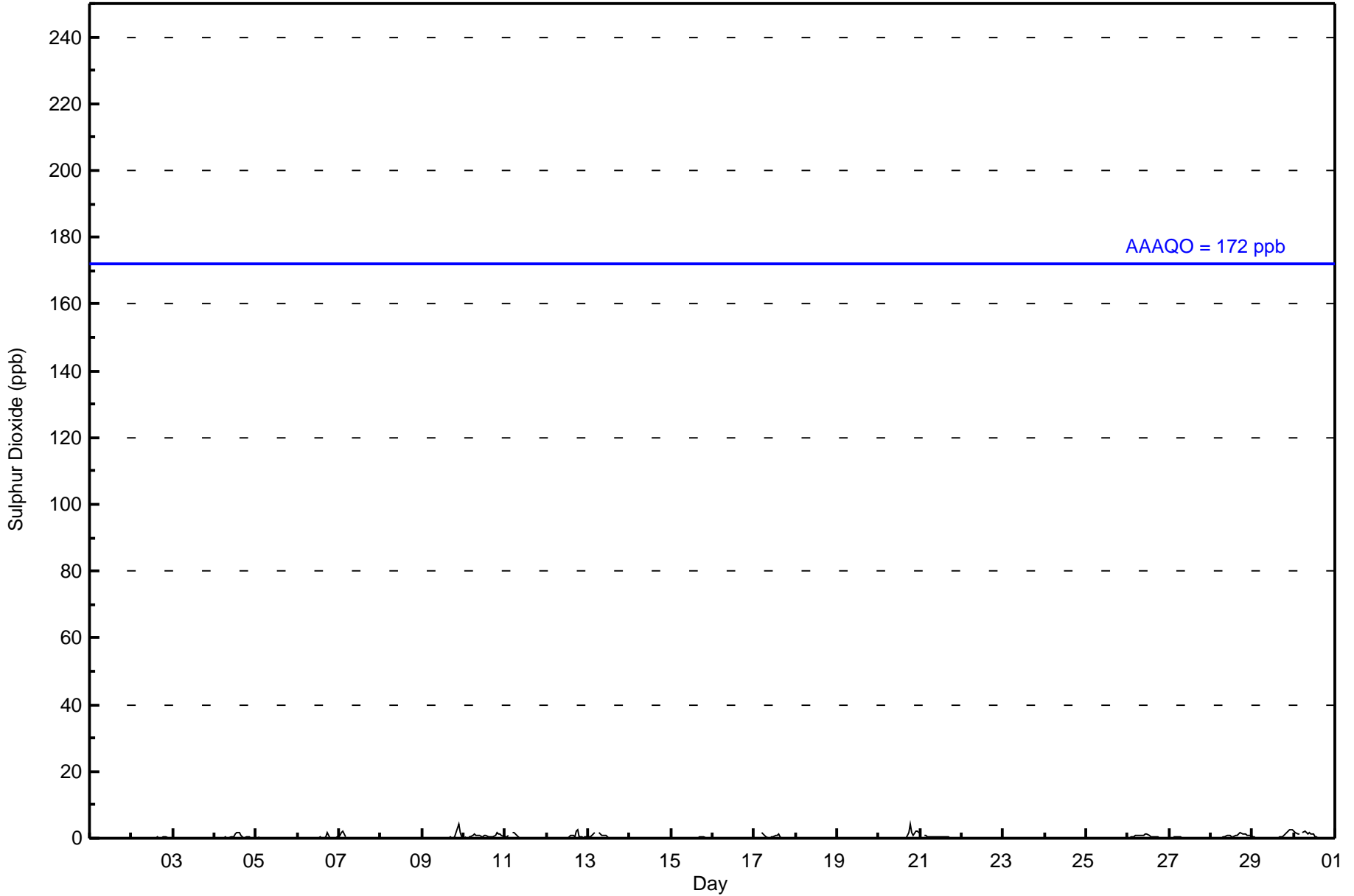
0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.4	0.3	0.3	Diurnal Average
2	2	2	1	2	2	2	2	2	1	2	1	1	1	2	2	1	1	2	4	2	3	4	3	2	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	25	18	14	27	60	36	42	32	65	37	47	61	88	47	49	38	686
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	18	14	27	60	36	42	32	65	37	47	61	88	47	49	38	686

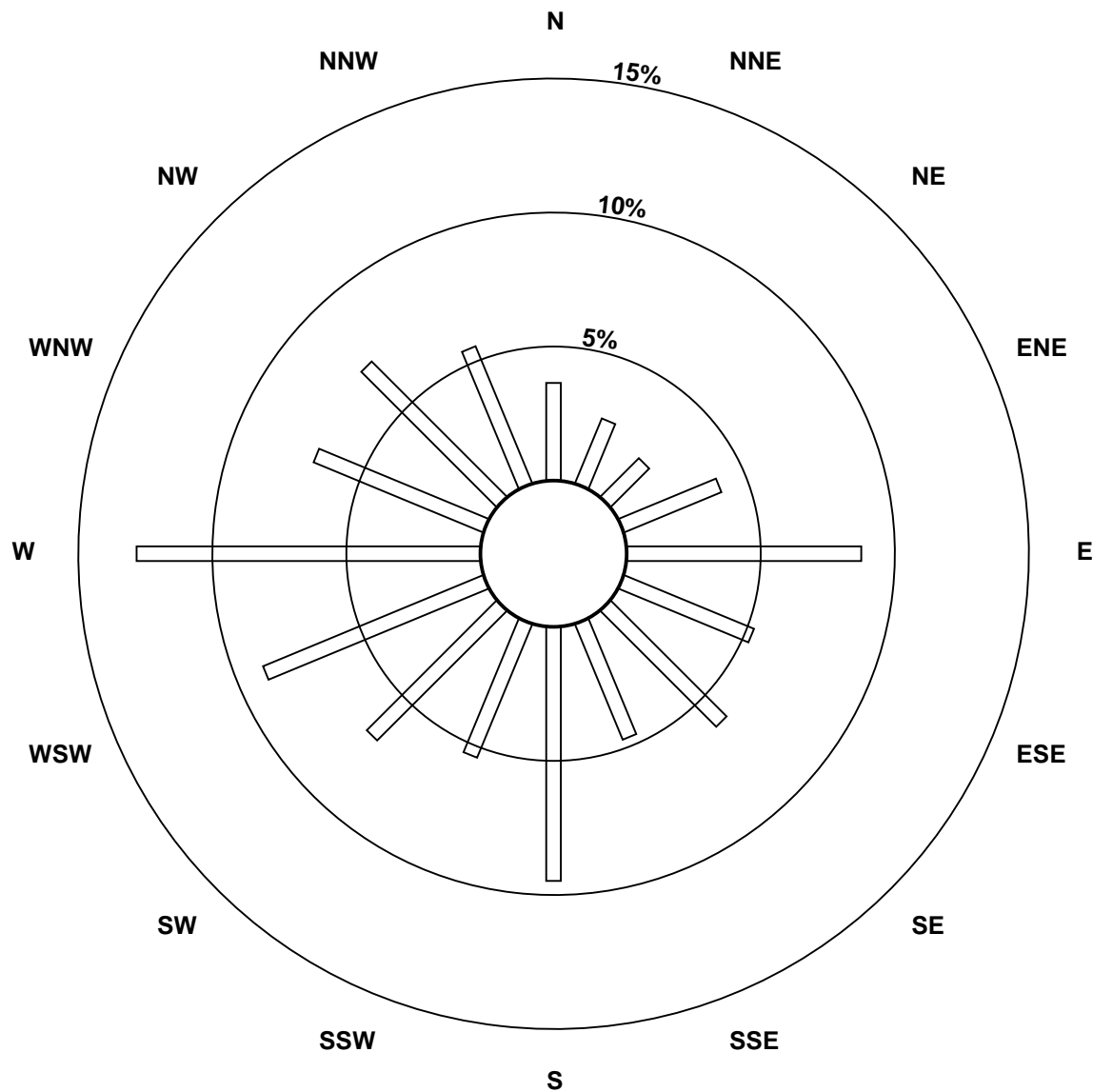
Total Number of Valid Hours: 686

Total Number of Hours: 720

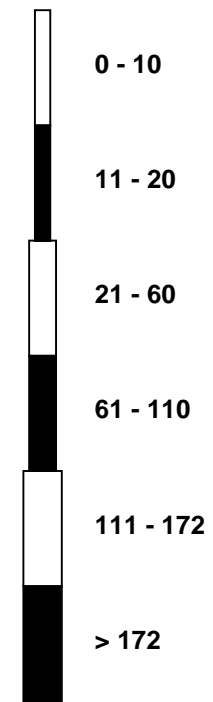


Wood Buffalo Environmental Association
Wind Rose Nov 2015

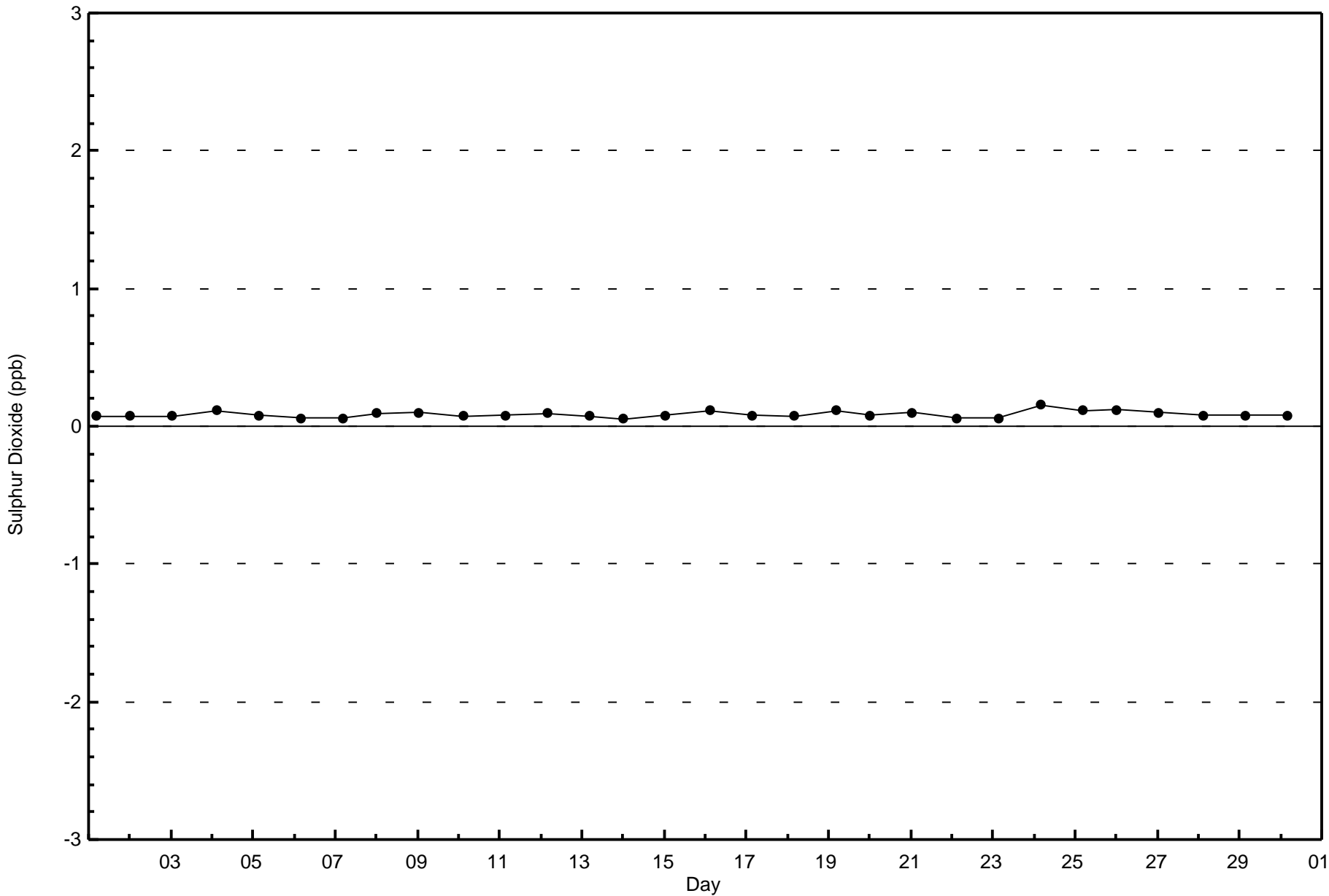
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)

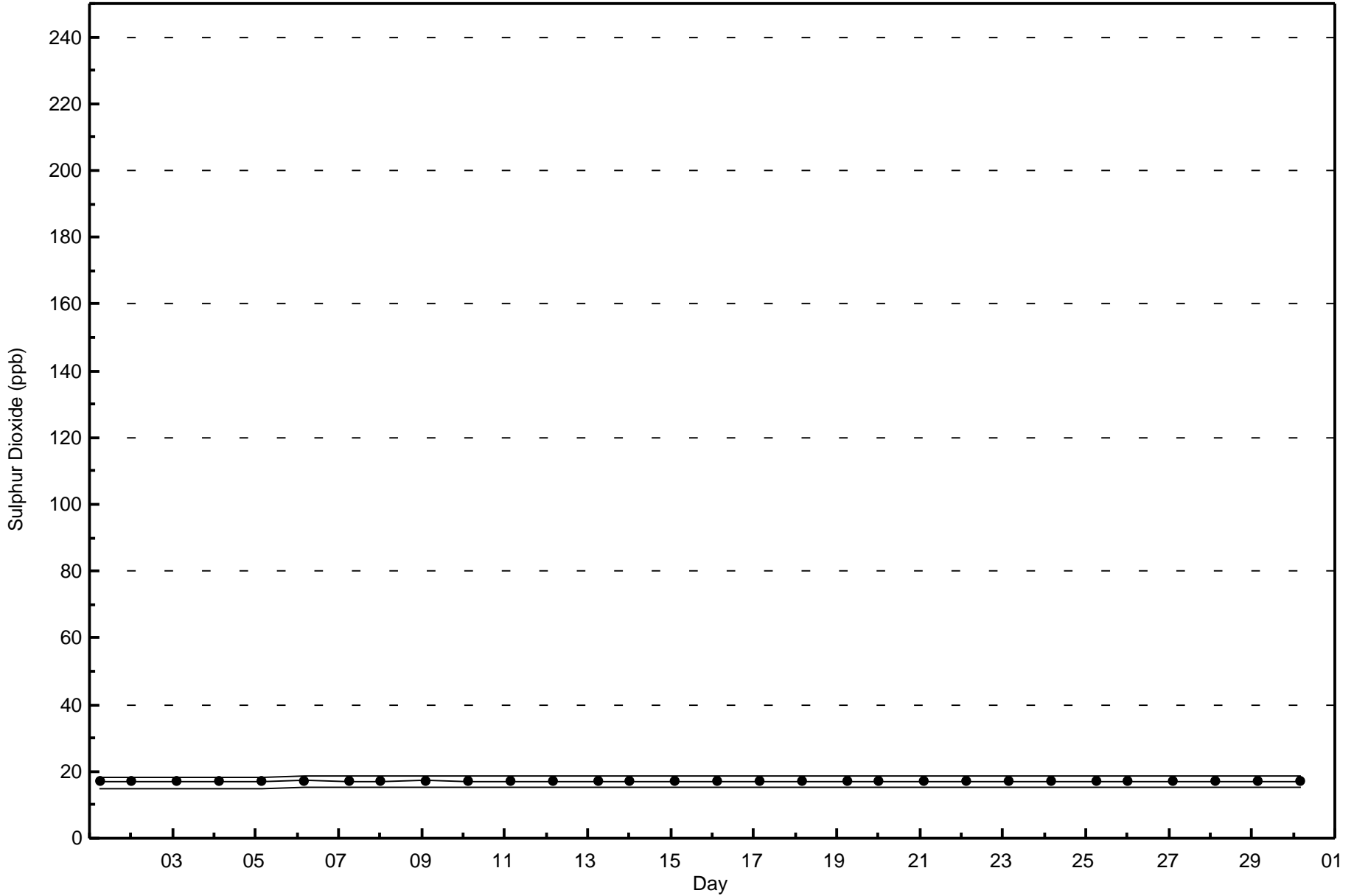


Classes (ppb)



Total Number of Valid Hours: 686







Maximum Value: 5 ppb on Nov 28 13:00														Maximum Daily Average: 1.2 ppb on Nov 28														Hours in Service: 720			
Minimum Value: 0 ppb on Nov 1 01:00														Minimum Daily Average: 0.0 ppb on Nov 11														Hours of Data: 686			
Maximum Diurnal Average: 0.7 ppb at hour 12														Minimum Diurnal Average: 0.0 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 = 3														Hours of Calibration: 34			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
2-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
3-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
4-Nov	0	0	Z	0	0	0	0	0	2	4	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0.8	4					
5-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0.0	0					
6-Nov	0	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					
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0					
8-Nov	Z	0	0	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-Nov	0	Z	0	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-Nov	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.3	2					
11-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0					
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1					
13-Nov	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1					
14-Nov	Z	0	0	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-Nov	0	Z	0	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-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
17-Nov	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1					
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
20-Nov	Z	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					
21-Nov	0	Z	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0.5	2					
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0					
24-Nov	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1					
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
26-Nov	Z	1	0	0	0	0	0	0	1	4	4	4	3	2	1	1	0	0	0	0	0	0	0	0	1.0	4					
27-Nov	0	Z	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2					
28-Nov	0	0	Z	0	0	0	0	0	1	3	4	5	5	4	3	1	0	0	0	0	0	0	0	0	1.2	5					
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0					
30-Nov	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					
																								Diurnal Average							
																								Diurnal Maximum							
																								Z - zerospan C - Calibration							

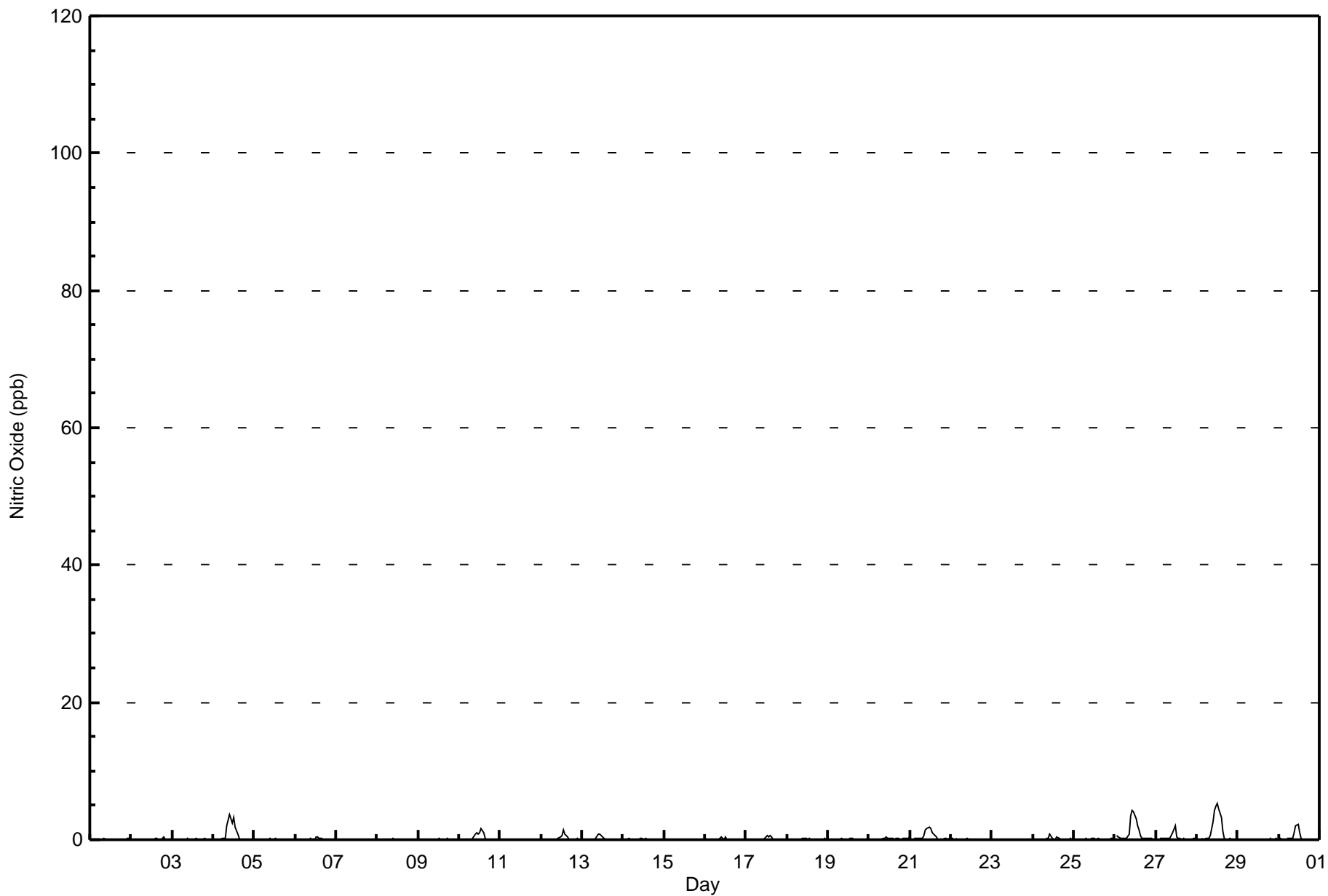


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort Chipewyan - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	686	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: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	18	14	27	60	36	42	32	65	37	47	61	88	47	49	38	686
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	18	14	27	60	36	42	32	65	37	47	61	88	47	49	38	686

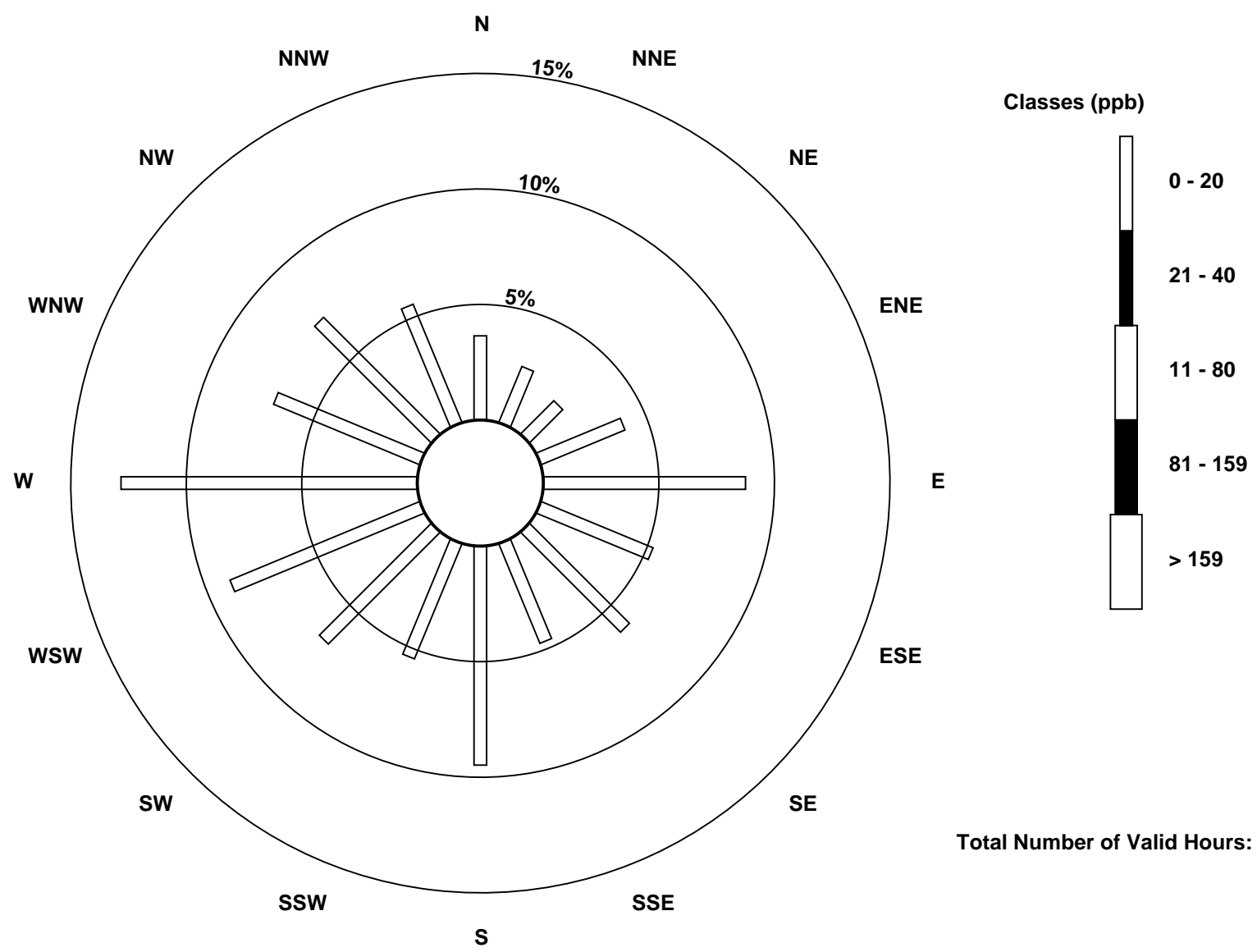
Total Number of Valid Hours: 686

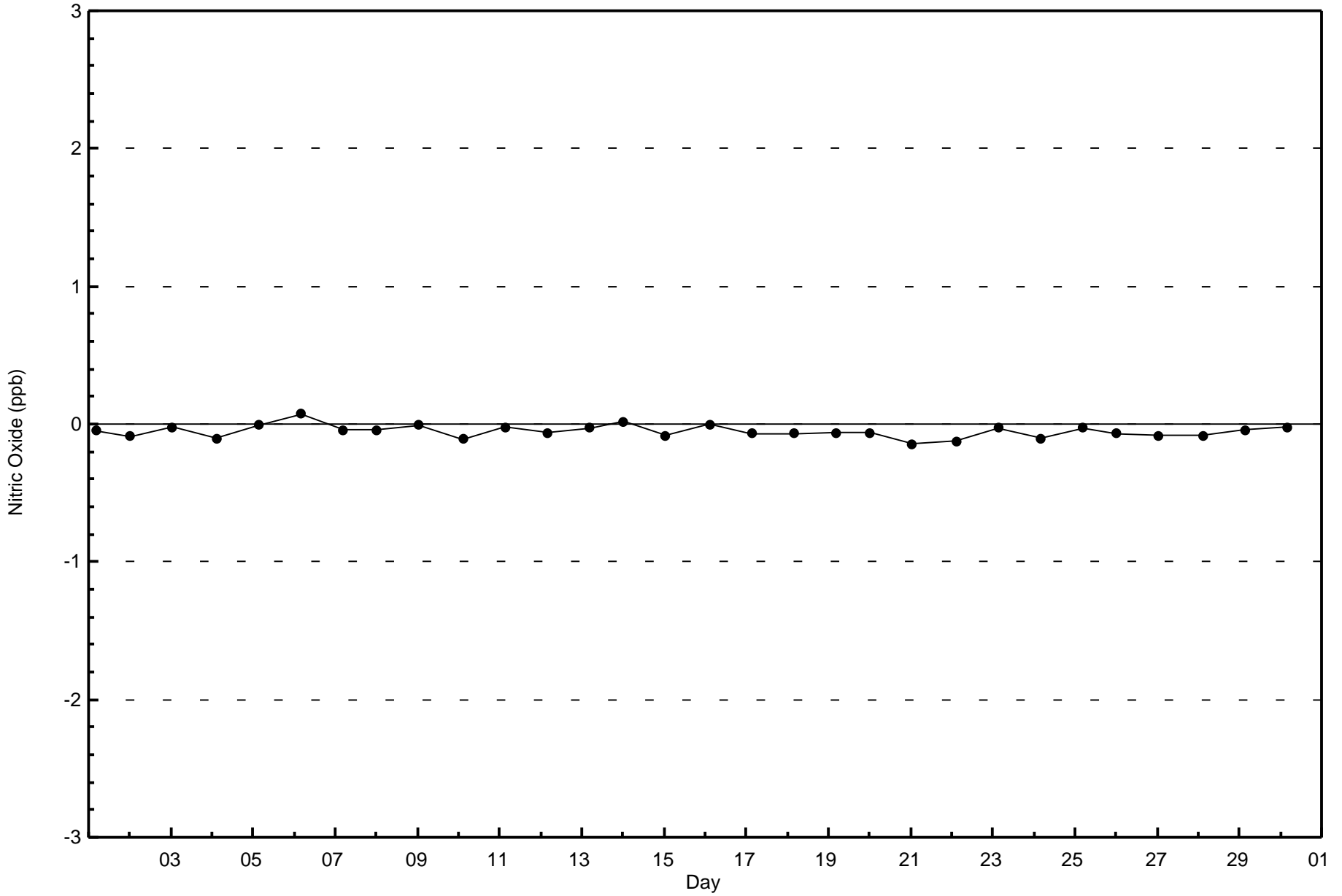
Total Number of Hours: 720

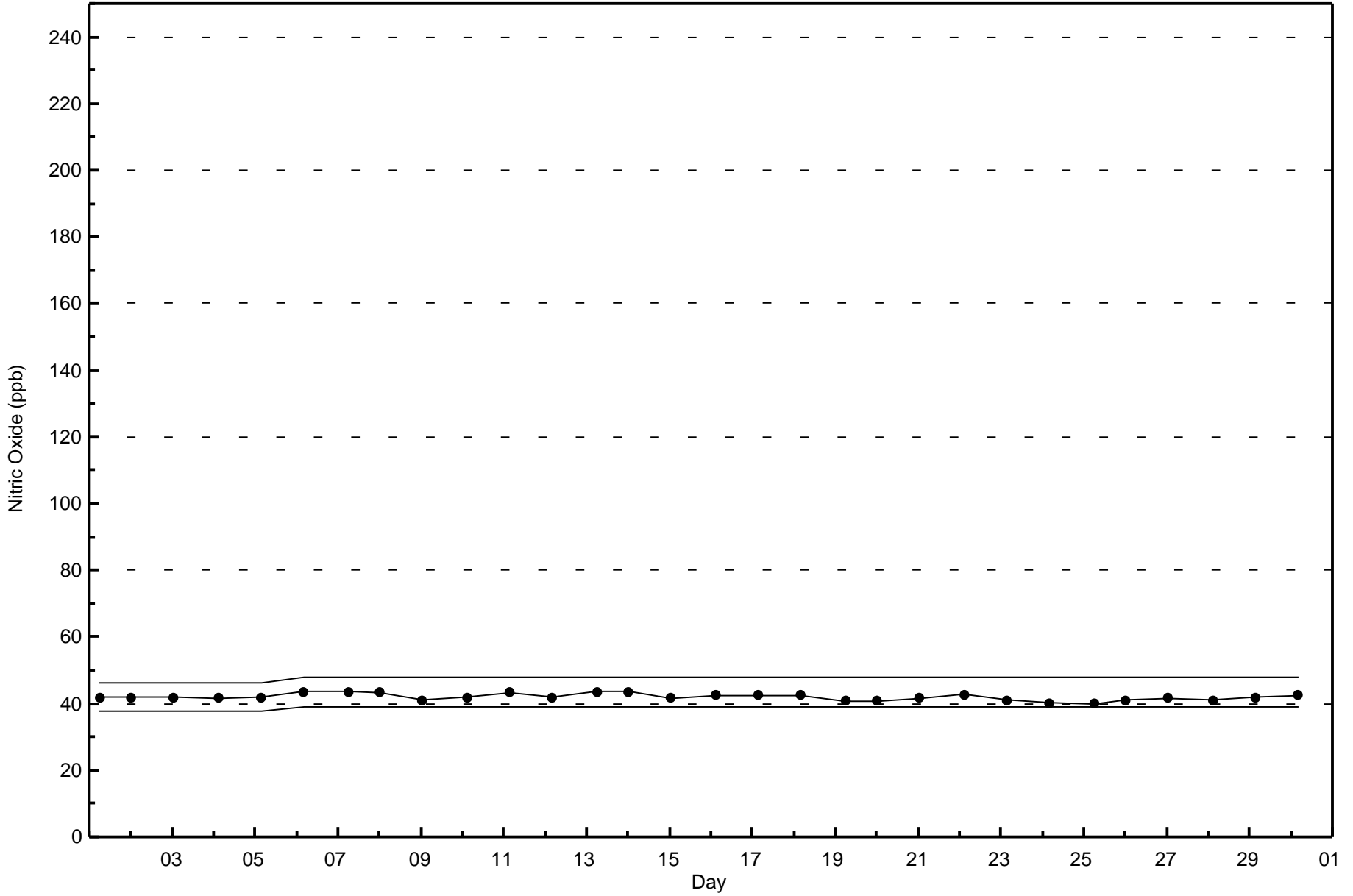


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)









Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 22 ppb on Nov 26 06:00	Maximum Daily Average: 11.2 ppb on Nov 28
Minimum Value: 0 ppb on Nov 1 14:00	Hours of Data: 686
Maximum Diurnal Average: 3.2 ppb at hour 8	Hours of Missing Data: 34
Monthly Average: 2.3 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.4 ppb on Nov 2	Percent Operational Time: 100.0
Minimum Diurnal Average: 1.5 ppb at hour 13	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 18	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	1	6	7	0.9	7
2-Nov	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	2	1	1	1	0.4	2
3-Nov	1	Z	1	1	1	1	2	1	1	1	0	0	0	1	1	1	2	2	2	2	2	2	2	2	1.1	2
4-Nov	1	1	Z	1	2	5	7	8	7	5	4	4	5	4	3	3	2	2	2	2	2	3	1	3.3	8	
5-Nov	2	2	1	Z	1	1	1	1	1	1	0	0	0	0	0	C	C	C	C	1	0	0	0	0.6	2	
6-Nov	0	0	0	0	Z	0	1	2	2	2	1	0	2	2	2	3	4	2	1	1	1	1	1	1.3	4	
7-Nov	3	6	7	5	2	Z	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1.4	7	
8-Nov	Z	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1	1	1	0.5	2	
9-Nov	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	6	8	5	2	1.4	8	
10-Nov	1	2	Z	4	2	4	3	4	3	3	2	2	2	4	3	2	3	4	5	5	4	5	4	3.2	5	
11-Nov	4	4	4	Z	8	9	9	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2	9	
12-Nov	0	0	0	0	Z	1	1	0	0	0	1	1	2	4	4	5	5	6	6	2	1	1	1	1.8	6	
13-Nov	2	2	2	3	4	Z	5	5	5	5	3	2	1	1	1	1	1	1	1	1	1	1	1	2.1	5	
14-Nov	Z	1	0	1	1	1	1	0	0	1	1	1	0	1	0	0	1	1	0	0	1	2	1	0.7	2	
15-Nov	2	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	1	2	1	1	1	0.8	2	
16-Nov	1	1	Z	1	1	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0.5	1	
17-Nov	3	1	2	Z	3	2	1	1	1	1	1	1	2	3	5	5	3	1	1	1	1	0	0	1.6	5	
18-Nov	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	1	2	0.5	2	
19-Nov	0	0	0	0	1	Z	1	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0.4	1	
20-Nov	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	4	6	4	3	4	4	1.5	6	
21-Nov	5	Z	5	4	3	4	6	7	8	5	4	3	3	4	4	4	4	3	2	4	4	3	1	3.9	8	
22-Nov	1	1	Z	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0.7	2	
23-Nov	0	0	0	Z	0	1	0	2	3	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0.6	3	
24-Nov	0	0	1	1	Z	1	1	0	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0.5	1	
25-Nov	0	1	2	2	2	Z	2	8	2	1	1	1	1	0	1	1	1	1	1	2	5	8	12	2.9	14	
26-Nov	Z	18	18	19	22	22	19	16	16	13	9	7	6	5	6	7	7	6	4	3	2	2	2	10.0	22	
27-Nov	5	Z	5	5	6	5	4	2	2	3	3	3	1	1	1	2	1	1	1	1	1	2	1	2.5	6	
28-Nov	1	1	Z	4	6	9	12	16	17	13	10	10	12	13	14	15	15	16	15	15	12	12	10	11.2	17	
29-Nov	9	5	2	Z	1	1	1	1	1	1	1	1	1	1	1	2	7	8	12	18	16	16	13	5.7	18	
30-Nov	10	8	9	9	Z	13	14	11	10	9	8	6	4	2	1	1	1	1	1	1	1	1	1	5.2	14	

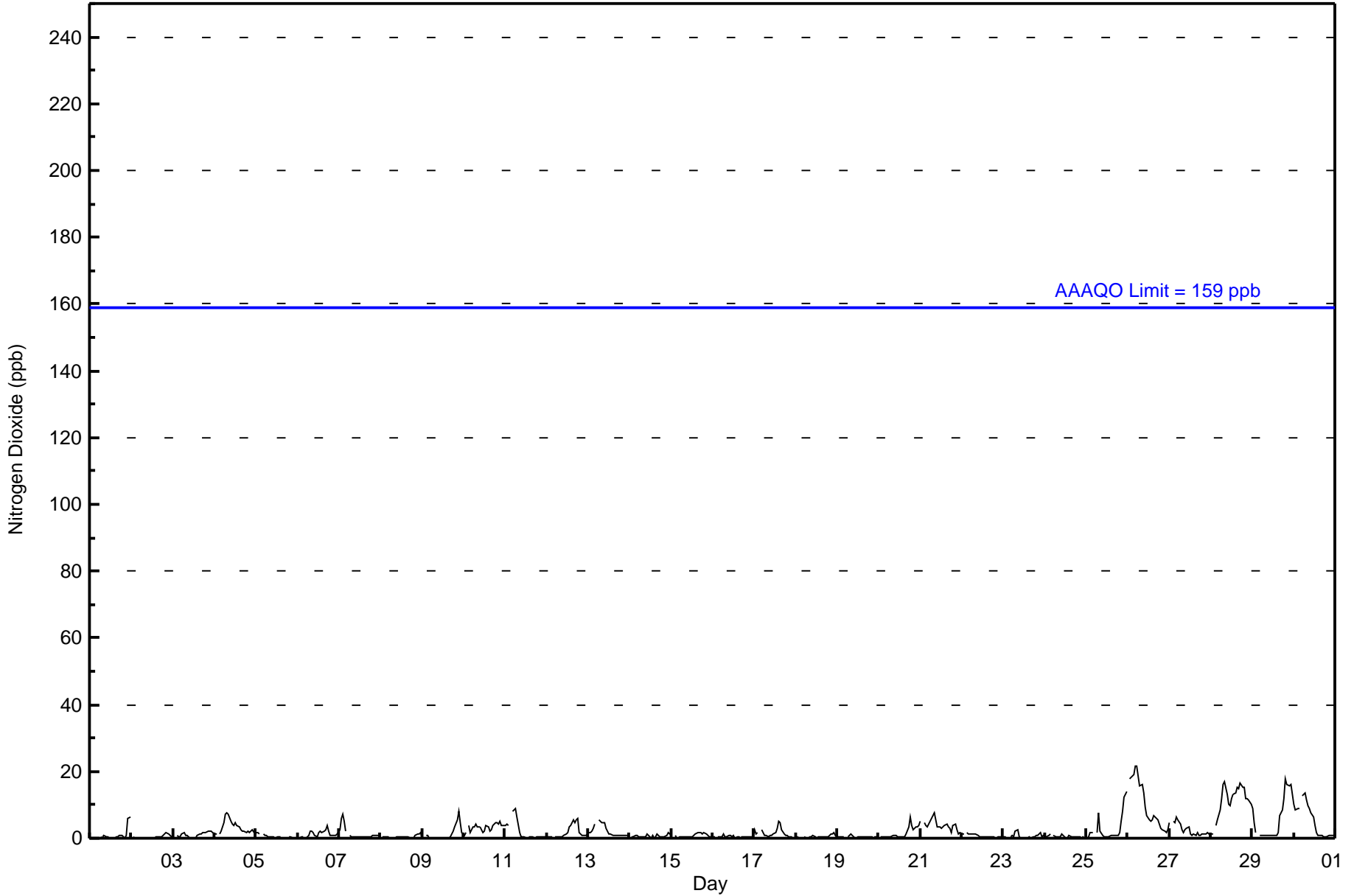
2.0	2.2	2.5	2.5	2.6	3.2	3.1	3.2	2.9	2.3	1.8	1.6	1.5	1.6	1.7	2.0	2.1	2.3	2.4	2.4	2.3	2.5	2.7	2.5	Diurnal Average
10	18	18	19	22	22	19	16	17	13	10	10	12	13	14	15	15	16	15	18	16	16	16	14	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	18	14	27	60	35	41	32	65	37	47	61	88	47	49	38	684
21 - 40	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	18	14	27	60	36	42	32	65	37	47	61	88	47	49	38	686

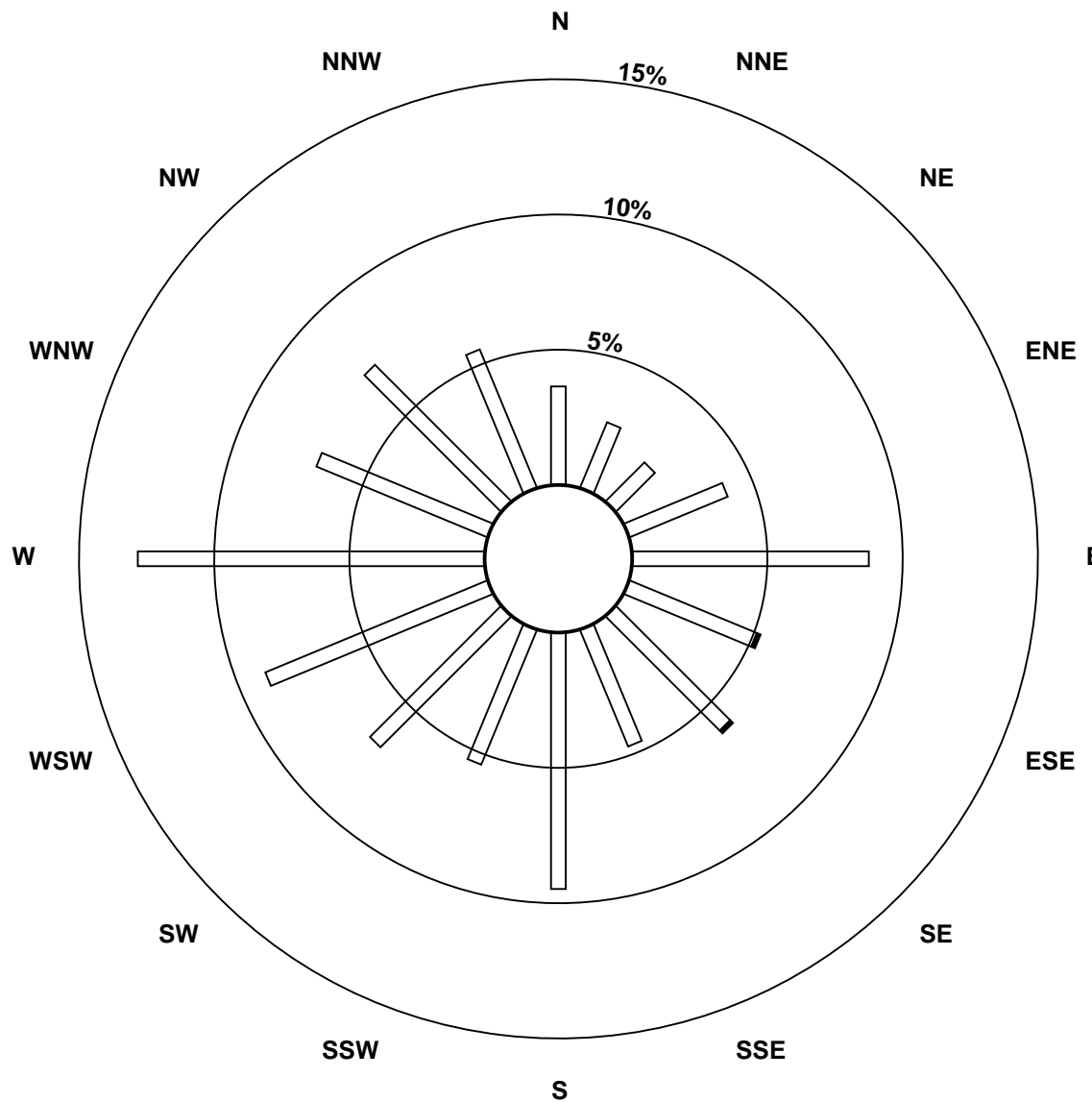
Total Number of Valid Hours: 686

Total Number of Hours: 720

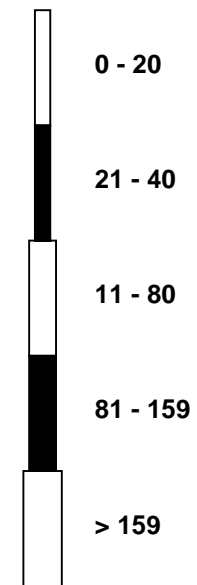


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)



Classes (ppb)

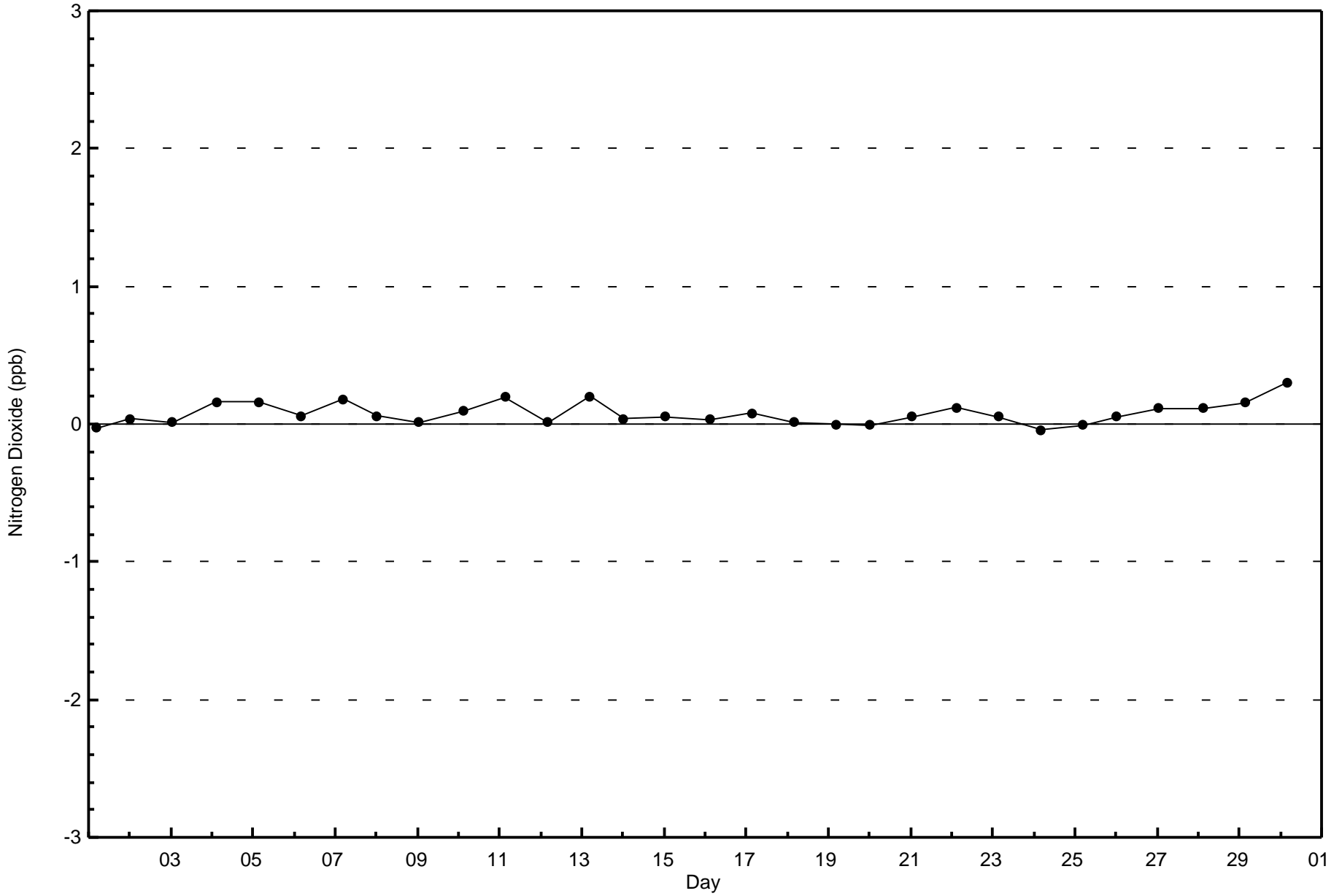


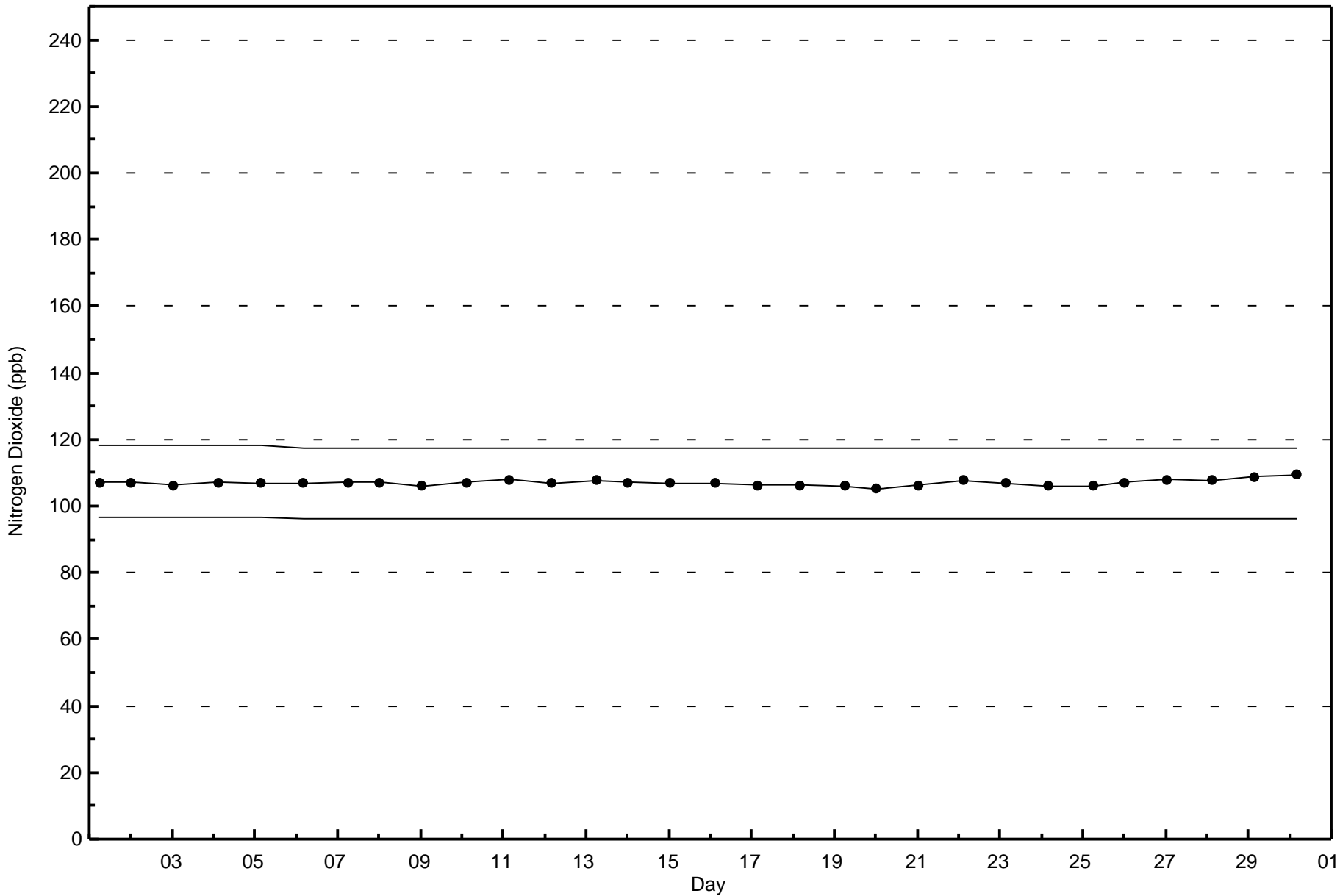
Total Number of Valid Hours: 686



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - November 2015





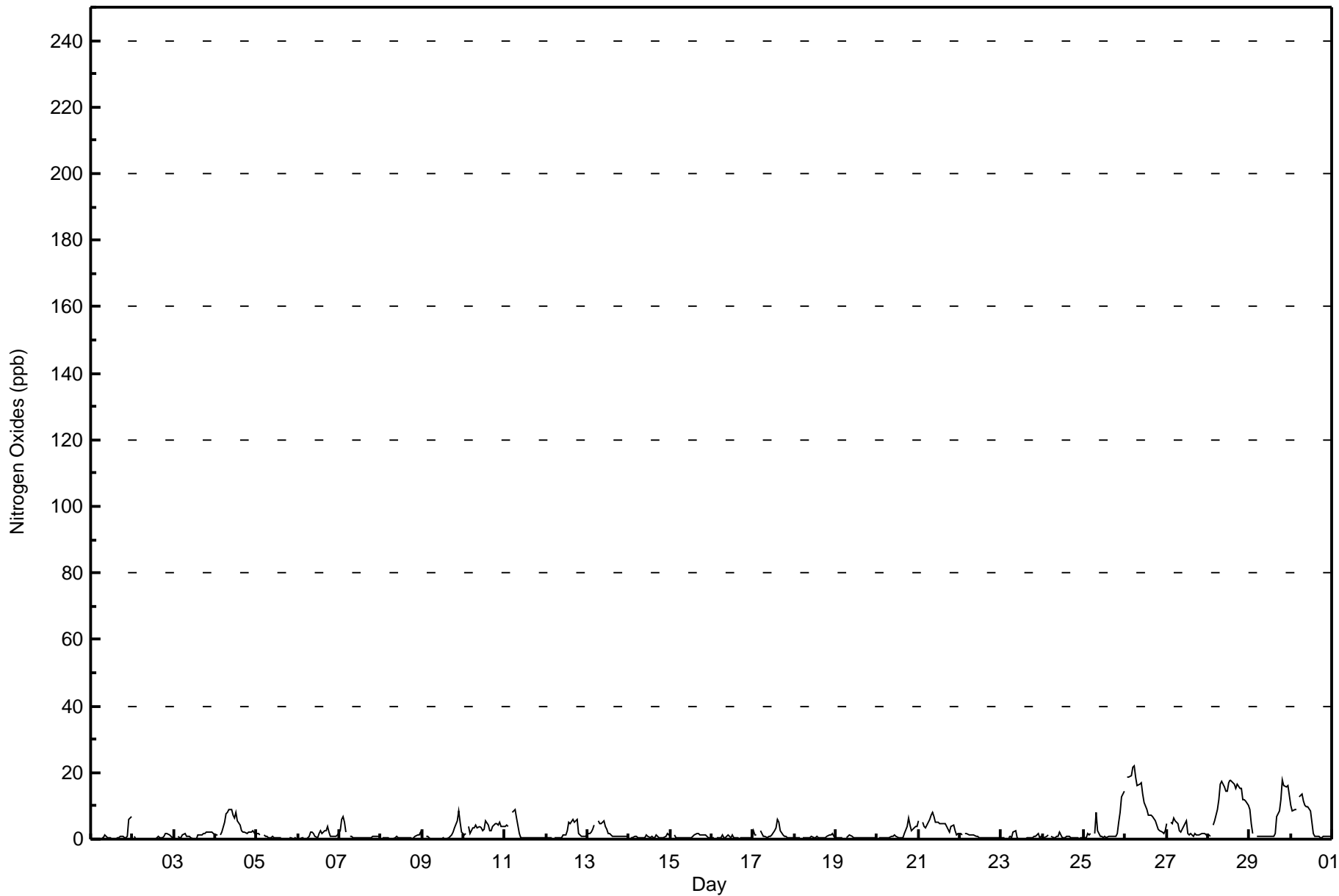


Maximum Value: 22 ppb on Nov 26 06:00		Maximum Daily Average: 12.5 ppb on Nov 28		Hours in Service: 720																																												
Minimum Value: 0 ppb on Nov 2 12:00		Minimum Daily Average: 0.5 ppb on Nov 2		Hours of Data: 686																																												
Maximum Diurnal Average: 3.3 ppb at hour 8		Minimum Diurnal Average: 2.1 ppb at hour 1		Hours of Missing Data: 34																																												
Monthly Average: 2.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 18		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-Nov	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	1	6	7	0.9	7																						
2-Nov	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	1	1	1	1	0	0.5	2																						
3-Nov	1	Z	1	1	1	1	2	1	1	1	0	0	0	1	1	1	2	2	2	2	2	2	2	2	1.1	2																						
4-Nov	1	1	Z	1	2	5	7	8	9	9	7	6	8	6	4	3	2	2	2	2	2	2	2	1	4.1	9																						
5-Nov	2	2	1	Z	1	1	1	1	1	1	0	0	1	0	0	C	C	C	C	1	0	0	0	0	0.7	2																						
6-Nov	0	0	0	0	Z	0	1	2	2	2	1	0	2	2	2	2	4	2	1	1	1	1	1	1	1.4	4																						
7-Nov	3	6	7	5	2	Z	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1.5	7																						
8-Nov	Z	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	1	1	1	2	0.5	2																						
9-Nov	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	6	8	5	2	1.4	8																							
10-Nov	1	2	Z	4	2	4	3	4	4	4	3	3	3	5	4	2	3	4	4	5	4	5	4	4	3.6	5																						
11-Nov	4	4	4	Z	8	9	9	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2	9																						
12-Nov	0	0	0	0	Z	0	0	0	0	0	1	1	2	5	5	6	5	5	6	2	1	1	1	1	2.0	6																						
13-Nov	2	2	2	3	4	Z	5	5	5	5	4	3	2	1	1	1	1	1	1	1	1	1	1	1	2.2	5																						
14-Nov	Z	1	0	1	1	1	0	0	0	1	1	1	0	1	0	0	1	0	0	1	1	2	1	1	0.7	2																						
15-Nov	2	Z	1	0	0	0	0	0	0	0	0	1	1	1	2	2	1	1	1	1	1	1	1	1	0.8	2																						
16-Nov	1	0	Z	1	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0.5	1																						
17-Nov	3	1	1	Z	3	2	1	1	0	1	1	1	2	4	6	5	3	1	1	1	1	1	0	0	1.7	6																						
18-Nov	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1	1	2	1	0.6	2																						
19-Nov	0	0	0	0	0	Z	1	1	1	1	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0.5	1																						
20-Nov	Z	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	4	6	4	3	4	4	4	1.7	6																						
21-Nov	5	Z	5	4	3	4	6	7	8	7	5	5	5	5	5	5	4	3	2	4	4	3	1	2	4.4	8																						
22-Nov	2	1	Z	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0.8	2																						
23-Nov	0	0	0	Z	0	1	0	2	3	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0.6	3																							
24-Nov	0	0	1	1	Z	1	1	0	1	1	2	0	0	0	1	1	0	0	0	0	0	0	0	0	0.6	2																						
25-Nov	0	1	2	1	2	Z	2	8	2	1	1	1	1	1	1	1	1	1	1	2	5	8	13	14	2.9	14																						
26-Nov	Z	19	18	19	22	22	19	16	17	17	14	11	9	7	7	7	7	6	4	3	3	2	2	3	11.0	22																						
27-Nov	5	Z	5	5	6	5	5	2	2	3	4	5	2	1	2	1	2	1	1	1	2	1	2	1	2.8	6																						
28-Nov	1	1	Z	4	6	9	12	16	18	16	14	15	17	18	17	17	15	17	15	15	12	12	12	10	12.5	18																						
29-Nov	9	5	2	Z	1	1	1	1	1	1	1	1	1	1	1	2	7	8	12	18	16	16	16	13	5.7	18																						
30-Nov	10	8	9	9	Z	13	14	11	10	10	10	10	8	5	2	1	1	1	1	1	1	1	1	1	5.5	14																						
																								2.1	2.3	2.5	2.6	2.7	3.2	3.2	3.3	3.0	2.8	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.4	2.4	2.6	2.7	2.5	Diurnal Average
																								10	19	18	19	22	22	19	16	18	17	14	15	17	18	17	17	15	17	15	18	16	16	16	14	Diurnal Maximum
Z - zerospan C - Calibration																																																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	18	14	27	60	35	41	32	65	37	47	61	88	47	49	38	684
21 - 40	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	18	14	27	60	36	42	32	65	37	47	61	88	47	49	38	686

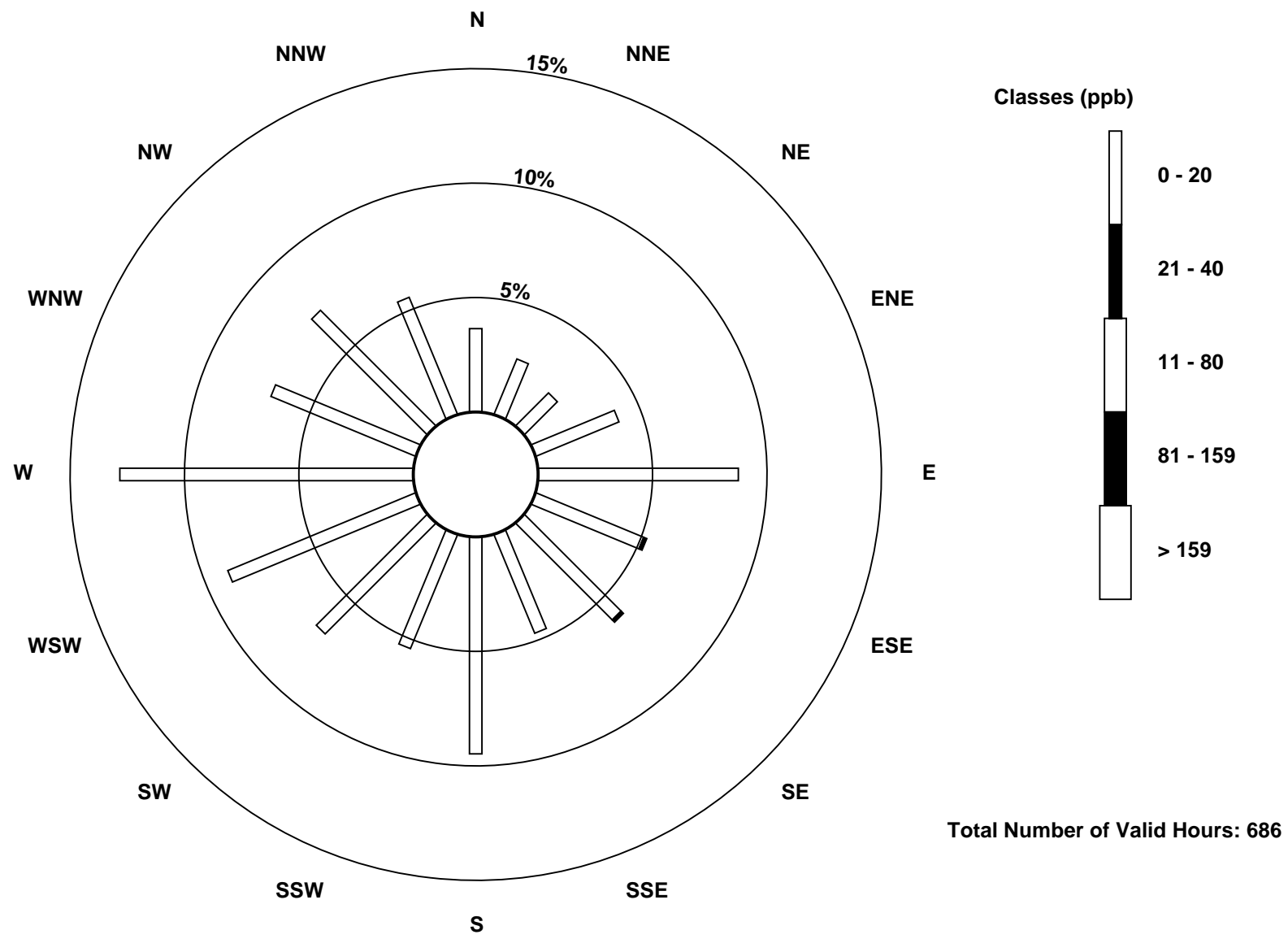
Total Number of Valid Hours: 686

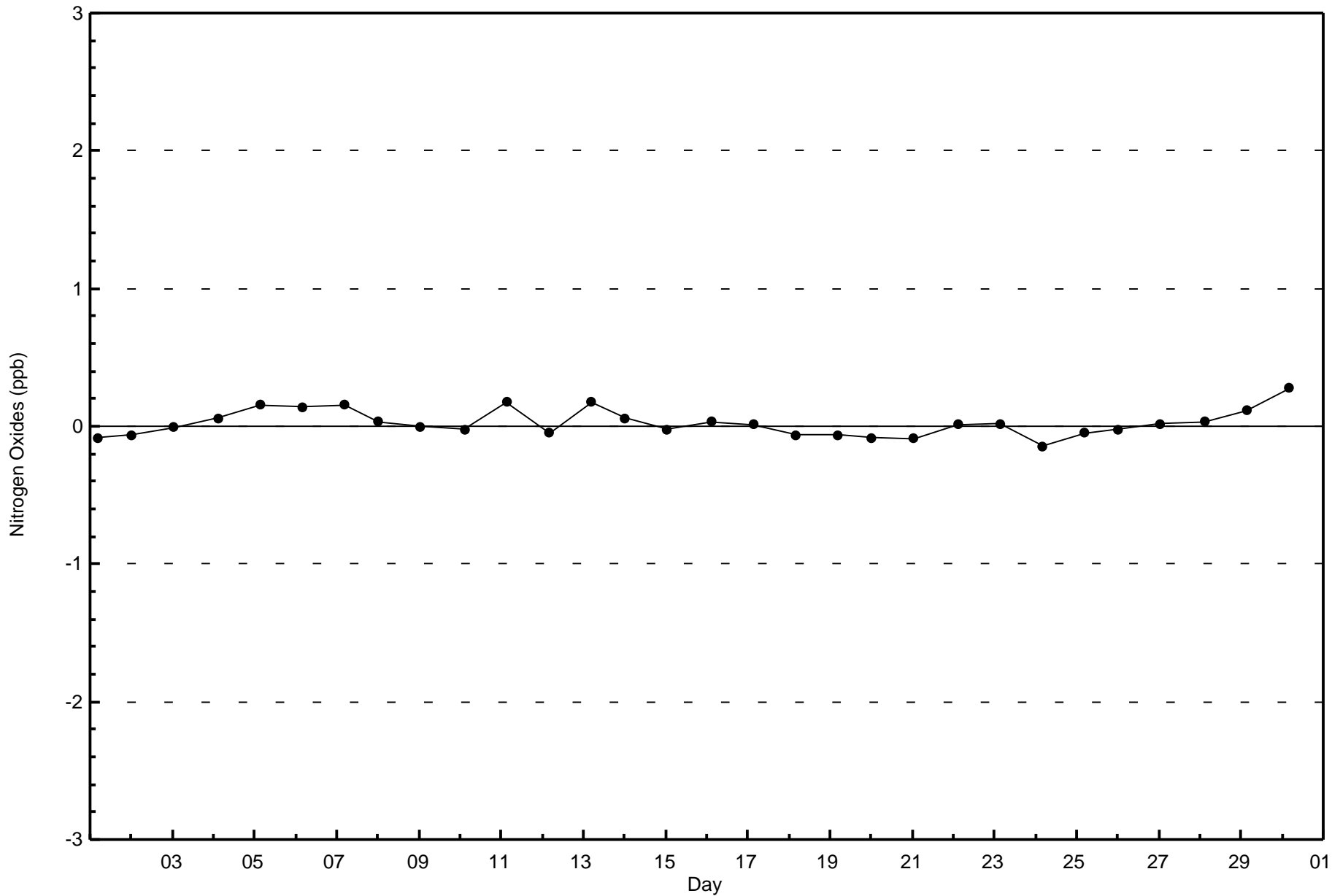
Total Number of Hours: 720

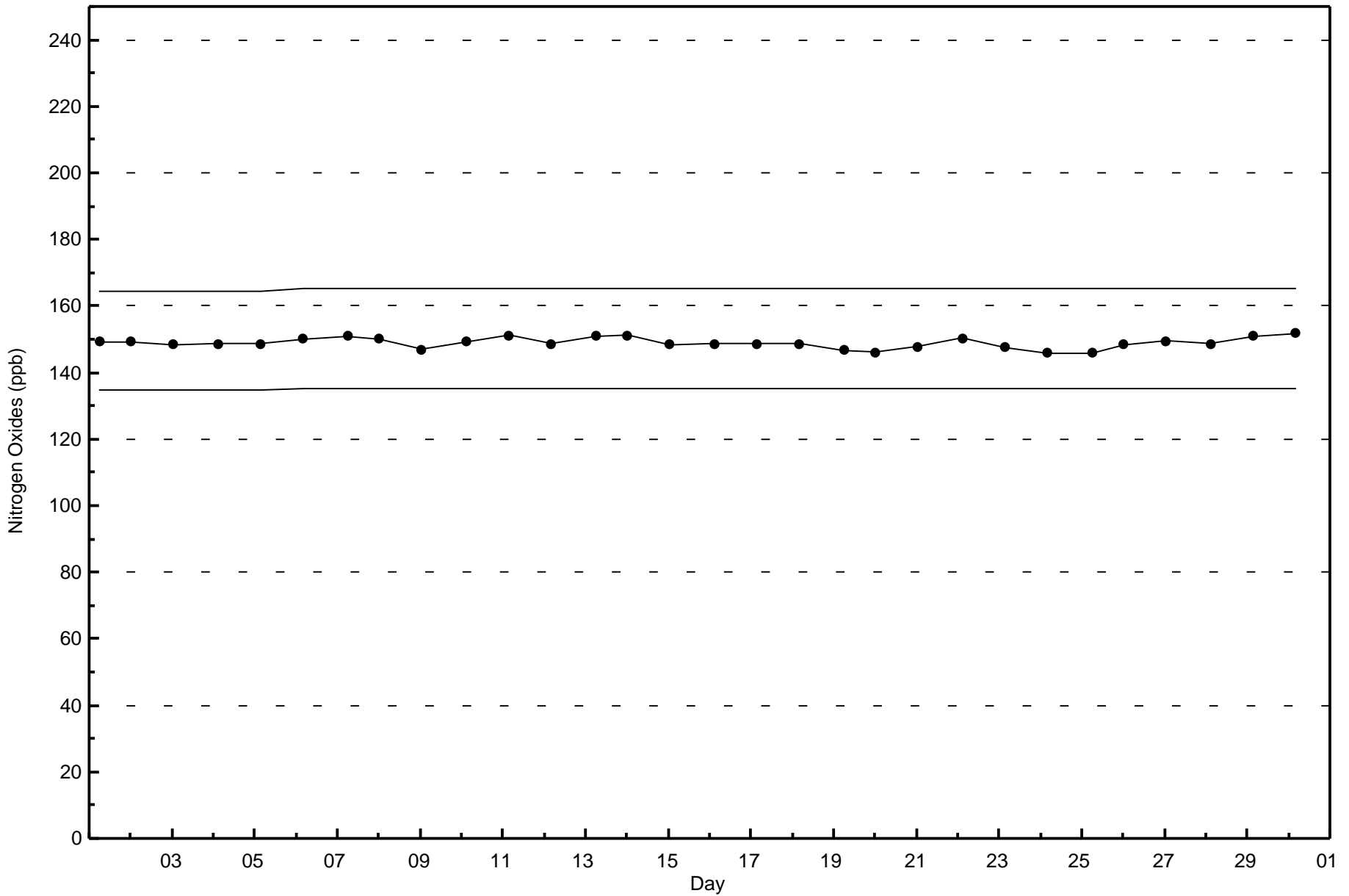


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)







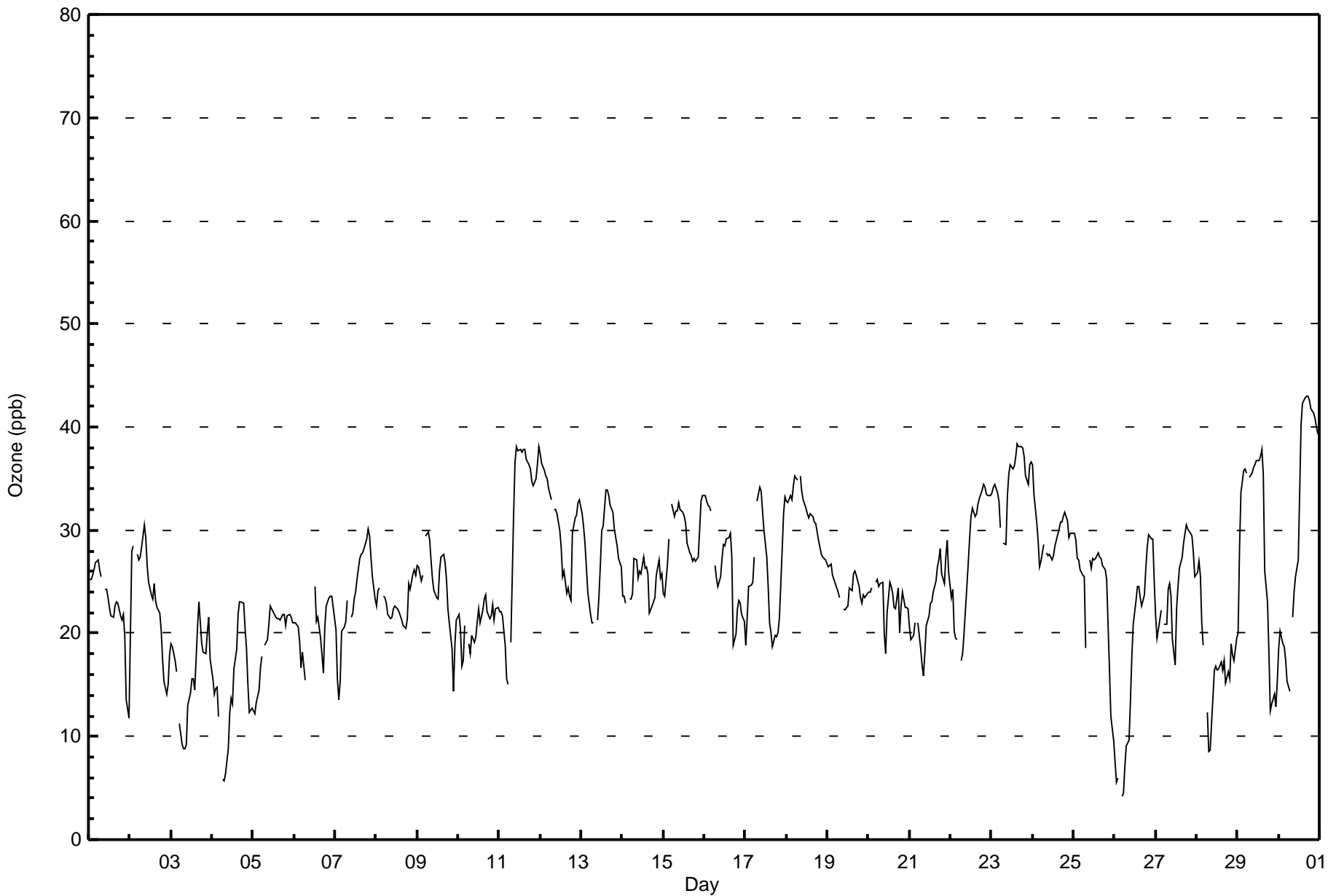


Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 43 ppb on Nov 30 18:00	Maximum Daily Average: 34.9 ppb on Nov 23		Hours of Data:	686
Minimum Value: 4 ppb on Nov 26 05:00	Minimum Daily Average: 14.9 ppb on Nov 4		Hours of Missing Data:	34
Maximum Diurnal Average: 26.9 ppb at hour 16	Minimum Diurnal Average: 21.6 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 24.8 ppb	Percentiles: P ₁ = 7 P ₁₀ = 16 Q ₁ = 21 Median = 24 Q ₃ = 29 P ₉₀ = 34 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-Nov	25	25	26	26	27	27	26	26	Z	24	24	23	23	22	22	23	23	23	22	21	22	20	14	12	22.8	27	
2-Nov	20	28	28	Z	28	27	27	28	30	29	27	25	24	23	25	23	22	22	20	17	15	14	15	18	23.4	30	
3-Nov	19	19	17	16	Z	11	9	9	9	9	13	14	16	16	14	21	23	21	19	18	18	20	22	18	16.1	23	
4-Nov	16	14	15	15	12	Z	6	6	6	9	12	14	13	17	18	22	23	23	23	20	19	15	12	13	14.9	23	
5-Nov	12	12	13	15	17	18	Z	19	19	21	23	22	22	22	21	21	21	22	22	21	22	22	22	21	19.5	23	
6-Nov	21	21	21	19	17	18	15	Z	C	C	C	C	25	21	22	20	18	16	21	23	23	24	24	23	20.5	25	
7-Nov	20	16	14	15	20	21	21	23	Z	22	22	23	23	24	25	27	28	28	28	29	30	29	27	26	23	23.6	30
8-Nov	23	24	24	Z	24	24	23	22	21	22	22	23	22	22	22	21	21	21	21	25	24	26	26	26	22.9	26	
9-Nov	27	26	25	26	Z	29	30	29	27	25	24	23	23	26	27	28	27	25	22	21	18	14	19	21	24.5	30	
10-Nov	22	20	17	17	21	Z	19	18	20	19	20	21	22	21	22	23	24	22	21	22	23	21	22	22	20.9	24	
11-Nov	22	22	22	19	16	15	Z	19	32	37	38	38	38	38	38	38	37	36	36	35	34	35	36	38	31.2	38	
12-Nov	37	36	36	35	35	34	33	Z	32	32	32	30	28	25	26	24	24	24	23	30	31	31	33	33	30.7	37	
13-Nov	32	30	29	26	24	22	21	21	Z	21	24	27	30	30	34	34	33	32	32	30	29	29	27	26	28.0	34	
14-Nov	24	24	23	Z	23	23	24	27	27	25	26	26	27	26	26	26	22	23	23	23	26	27	25	26	24.9	27	
15-Nov	24	24	27	29	Z	33	31	32	32	33	32	32	31	31	29	28	28	27	27	27	30	33	33	33	29.5	33	
16-Nov	33	33	32	32	32	Z	27	25	24	25	27	29	29	29	30	27	19	20	22	23	23	22	21	21	26.7	33	
17-Nov	19	21	24	25	25	27	Z	33	34	34	32	30	27	25	21	20	19	20	20	20	21	28	32	33	25.6	34	
18-Nov	33	33	33	33	34	35	35	Z	35	34	33	32	32	31	32	31	31	31	30	29	28	27	27	27	31.6	35	
19-Nov	26	27	27	26	25	24	24	23	Z	22	22	23	23	24	24	26	26	26	25	23	23	24	23	24	24.3	27	
20-Nov	24	24	24	Z	25	25	25	25	25	20	18	22	25	25	24	23	22	24	20	23	24	23	23	22	23.2	25	
21-Nov	21	19	20	21	Z	21	19	17	16	18	21	22	23	23	24	25	26	27	28	26	25	27	29	26	22.8	29	
22-Nov	23	24	20	19	19	Z	17	18	20	24	27	29	31	32	31	32	33	33	34	34	34	33	33	33	27.7	34	
23-Nov	34	34	34	34	33	30	Z	29	29	33	35	36	36	36	37	38	38	38	38	37	35	34	36	37	34.9	38	
24-Nov	36	33	31	29	26	27	29	Z	28	28	28	27	28	29	29	30	31	31	31	32	31	29	30	30	29.6	36	
25-Nov	30	29	27	27	26	26	25	19	Z	27	26	27	27	27	28	27	27	27	26	25	21	17	12	10	24.5	30	
26-Nov	8	6	6	Z	4	4	7	9	10	13	18	21	23	25	25	23	23	24	26	28	29	29	29	25	18.1	29	
27-Nov	22	20	21	22	Z	21	21	24	25	24	19	17	22	25	26	27	29	30	30	30	30	29	28	25	24.7	30	
28-Nov	26	27	26	21	19	Z	12	9	9	14	16	17	16	17	17	16	17	15	16	16	19	18	17	20	17.4	27	
29-Nov	20	28	34	36	36	36	Z	35	36	36	36	37	37	37	38	35	26	23	18	12	13	14	13	15	28.3	38	
30-Nov	19	20	19	19	17	15	14	Z	22	24	26	27	34	40	42	43	43	43	43	42	41	41	40	39	31.0	43	

23.9	24.0	23.8	24.1	23.4	23.8	21.6	21.8	23.6	24.3	24.9	25.4	26.0	26.3	26.7	26.9	26.4	25.8	25.6	25.4	25.3	25.1	25.0	24.7	Diurnal Average		
37	36	36	36	36	36	35	35	36	37	38	38	38	40	42	43	43	43	43	43	42	41	41	40	39	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	156	22.74	22.74
21 - 50	530	77.26	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	2	1	2	5	15	14	16	6	19	17	15	10	16	2	5	11	156
21 - 50	23	18	14	21	45	22	25	27	43	19	31	51	74	45	45	27	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	25	19	16	26	60	36	41	33	62	36	46	61	90	47	50	38	686

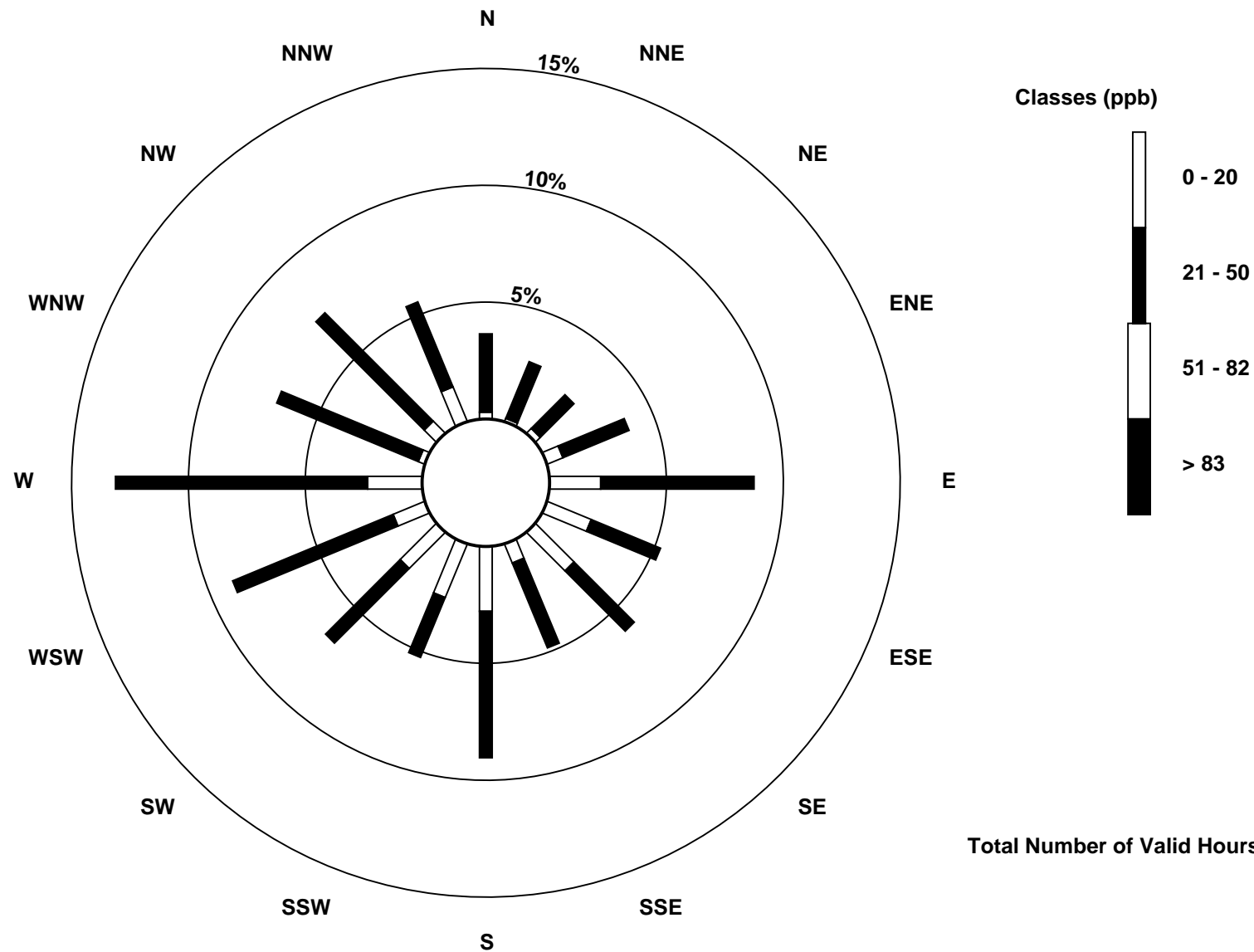
Total Number of Valid Hours: 686

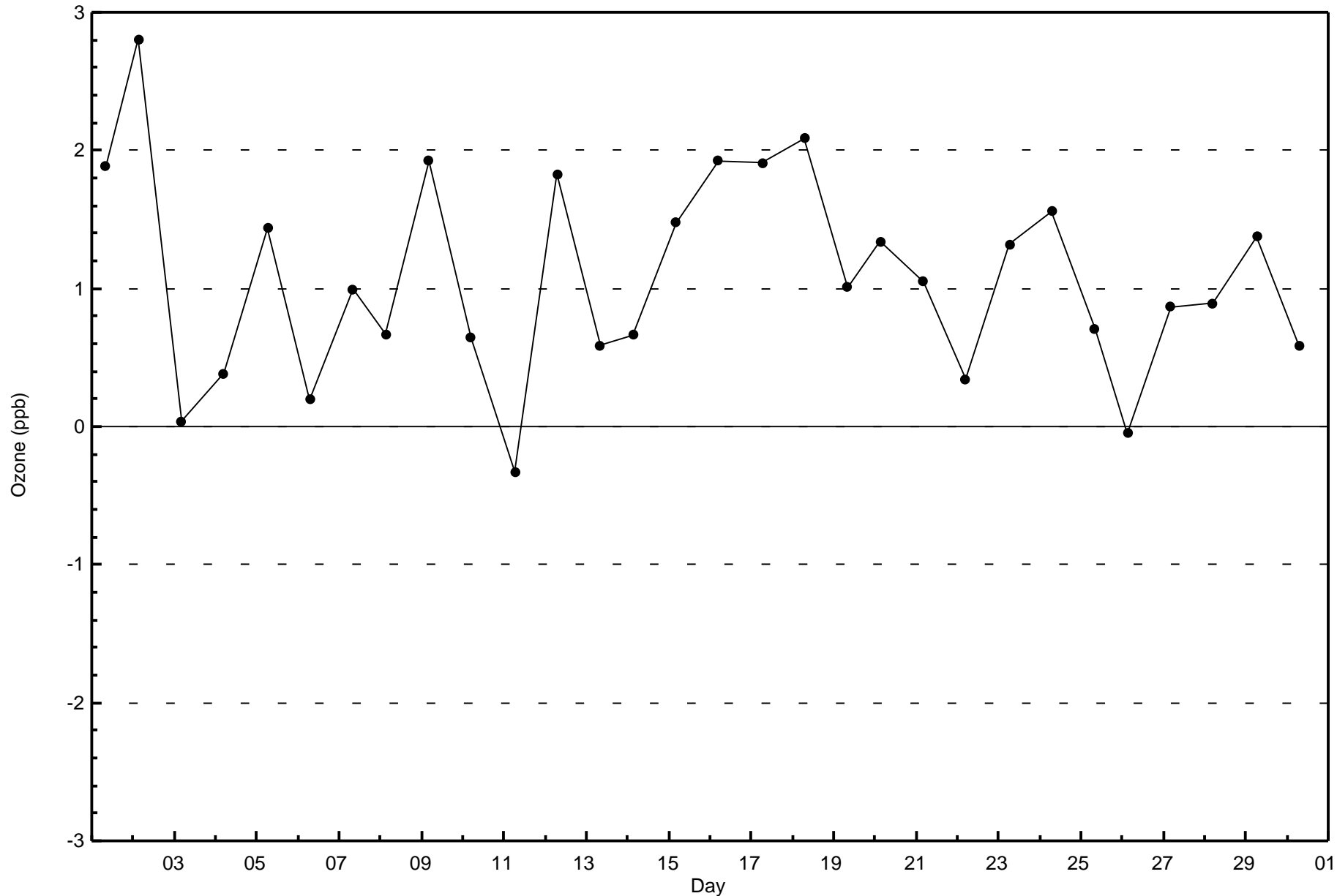
Total Number of Hours: 720

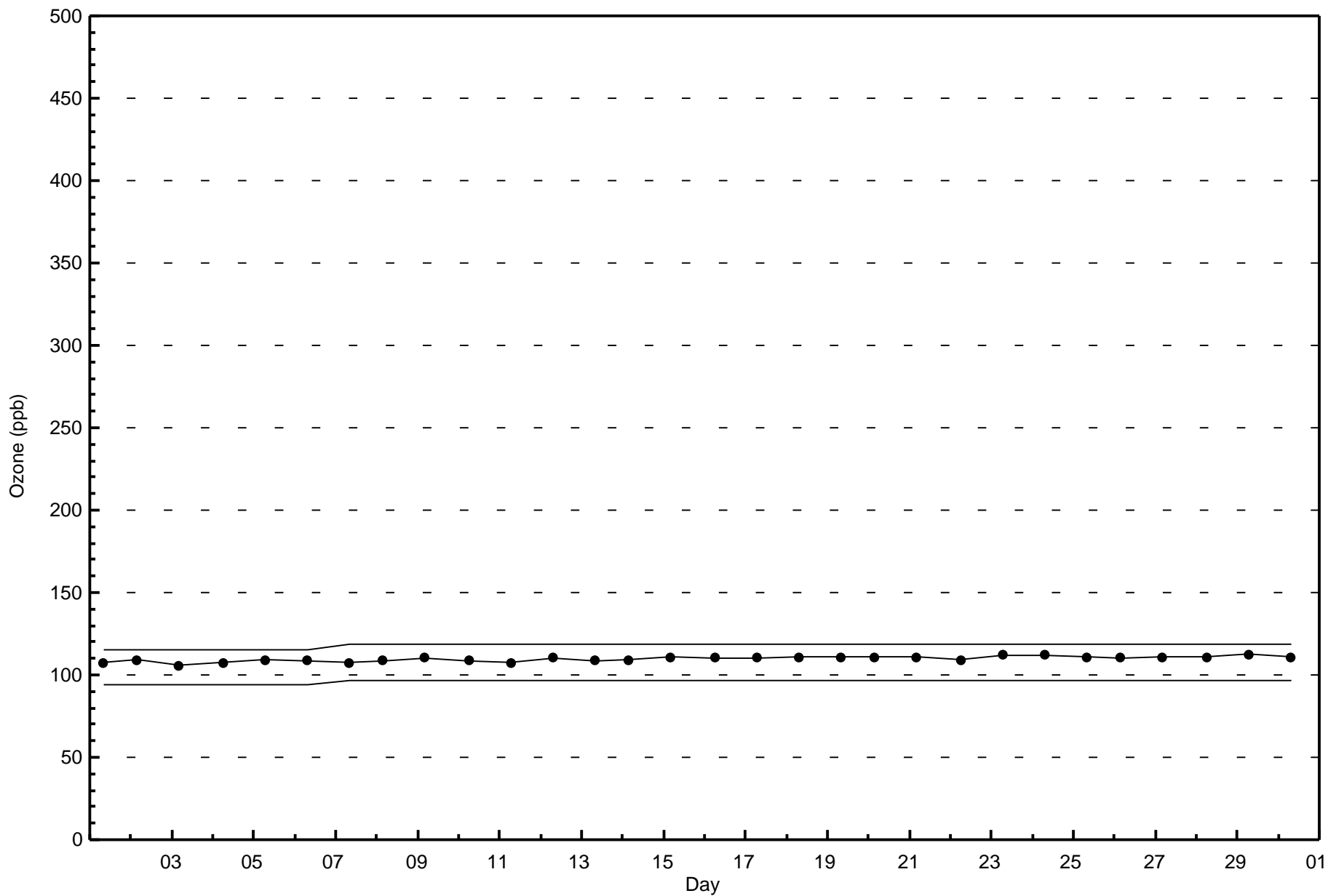


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)







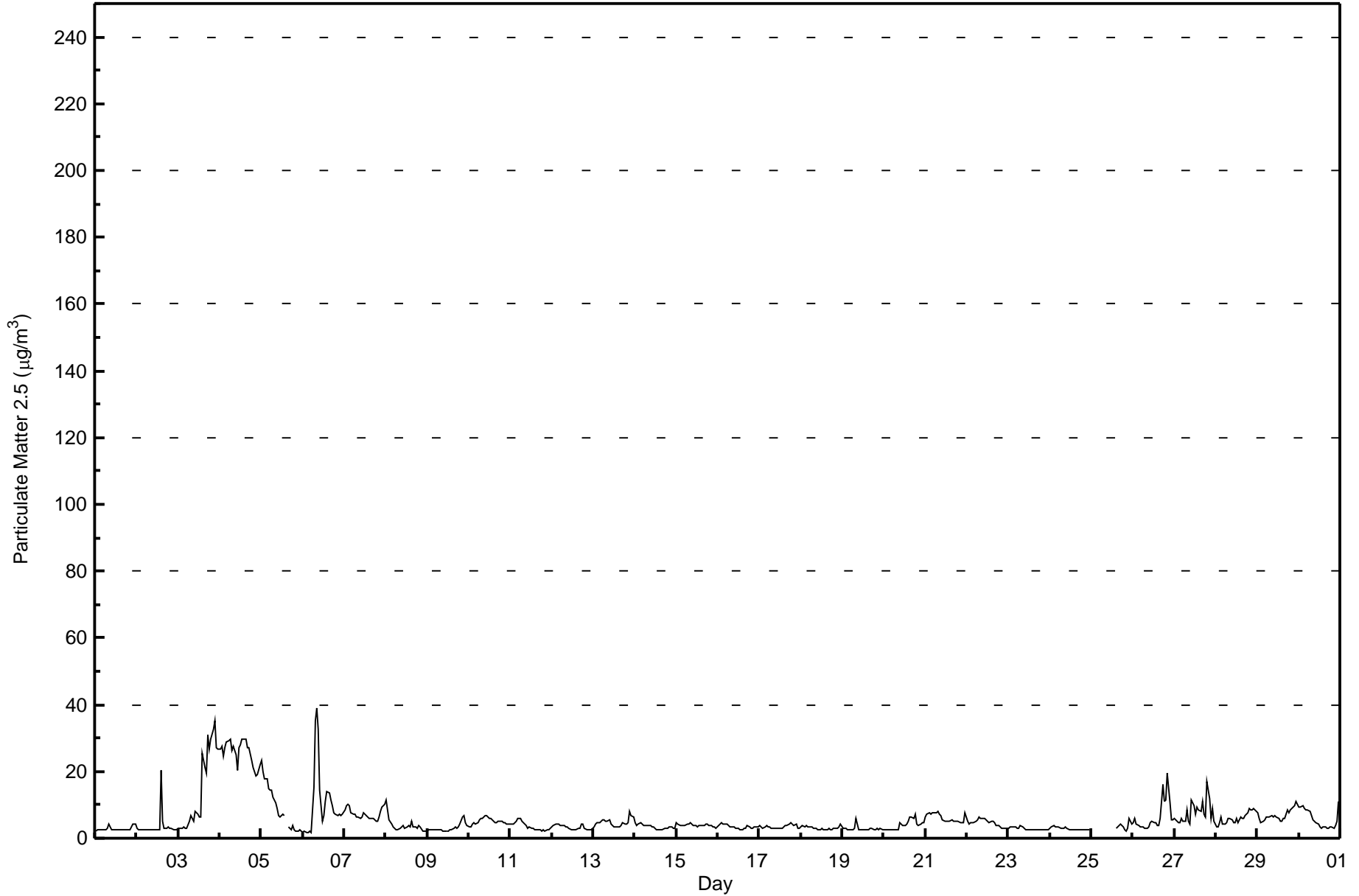


Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 39.0 µg/m ³ on Nov 6 09:00	Maximum Daily Average: 25.6 µg/m ³ on Nov 4
Minimum Value: 1.5 µg/m ³ on Nov 6 06:00	Hours of Data: 704
Maximum Diurnal Average: 6.6 µg/m ³ at hour 9	Hours of Missing Data: 16
Monthly Average: 5.83 µg/m ³	Hours of Calibration: 2
Minimum Daily Average: 2.7 µg/m ³ on Nov 1	Percent Operational Time: 98.1
Minimum Diurnal Average: 5.0 µg/m ³ at hour 13	
Percentiles: P ₁ = 2.1 P ₁₀ = 2.5 Q ₁ = 2.9 Median = 4.0 Q ₃ = 5.9 P ₉₀ = 9.9 P ₉₉ = 29.2	

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-Nov	2.2	2.4	2.4	2.4	2.4	2.4	2.4	2.9	4.2	2.7	2.7	2.5	2.5	2.5	2.5	2.5	2.6	2.5	2.5	2.5	2.5	3.3	4.3	4.0	2.7	4.3	
2-Nov	3.0	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.6	20.2	5.2	2.8	2.9	3.2	2.9	2.8	2.6	2.4	2.4	3.4	20.2	
3-Nov	2.8	3.2	3.1	3.2	3.1	3.1	5.0	6.7	5.9	5.2	8.3	7.1	6.5	6.5	25.5	21.2	19.4	31.0	26.6	29.8	32.8	35.2	27.3	26.8	14.4	35.2	
4-Nov	26.5	27.4	24.5	27.2	28.7	29.0	29.9	26.1	27.7	25.2	20.2	27.0	28.0	29.7	29.7	29.7	27.2	27.0	23.2	21.4	20.0	18.6	19.2	22.0	25.6	29.9	
5-Nov	23.4	20.1	17.6	18.0	14.8	14.4	14.3	12.1	10.5	9.0	6.7	6.4	7.0	7.0	C	C	3.3	2.4	3.8	2.5	2.0	2.1	2.6	2.1	9.2	23.4	
6-Nov	1.9	2.0	1.6	1.9	2.3	1.5	15.3	35.3	39.0	32.5	14.3	4.9	7.0	11.1	13.8	13.3	11.5	9.9	7.7	7.3	7.0	7.1	6.9	7.3	10.9	39.0	
7-Nov	8.4	9.8	10.2	9.8	7.8	7.2	7.2	6.5	6.3	5.8	6.2	7.5	7.3	6.9	6.1	5.9	5.9	5.8	5.2	4.9	6.2	7.9	9.4	10.0	7.2	10.2	
8-Nov	11.4	8.5	5.5	4.3	3.2	2.9	2.7	2.7	2.8	3.4	3.6	3.1	3.3	3.7	3.5	5.3	3.6	3.3	3.1	3.9	3.3	2.3	2.1	2.0	3.9	11.4	
9-Nov	2.3	2.4	2.4	2.5	2.4	2.5	2.4	2.4	2.4	2.3	2.2	2.2	2.3	2.6	2.6	2.9	3.3	3.0	3.3	4.1	6.2	6.8	4.6	3.8	3.1	6.8	
10-Nov	3.3	3.4	4.4	4.7	4.4	4.7	5.5	5.9	5.8	6.9	6.8	6.2	6.0	6.0	5.3	4.7	4.6	4.9	5.2	5.2	4.8	4.5	4.4	4.2	5.1	6.9	
11-Nov	4.1	4.3	4.3	5.2	5.9	6.1	6.1	5.3	4.4	3.7	3.1	3.2	3.1	2.8	2.7	2.5	2.4	2.4	2.2	2.4	2.2	2.4	2.7	2.8	3.6	6.1	
12-Nov	3.5	3.9	4.1	4.2	4.0	4.0	3.8	3.7	3.5	3.3	2.9	2.7	2.4	2.7	2.7	3.0	2.9	4.1	4.1	2.9	2.7	2.5	2.5	2.7	3.3	4.2	
13-Nov	3.6	4.2	4.5	4.5	4.7	5.6	5.6	5.0	5.2	5.6	4.4	3.9	3.6	3.5	3.3	3.4	3.8	4.7	4.3	4.2	4.6	8.2	6.7	6.5	4.7	8.2	
14-Nov	4.8	4.0	4.0	4.8	4.0	3.9	3.7	3.8	3.9	3.7	3.3	3.3	2.7	2.7	2.6	2.7	2.5	2.9	3.1	2.9	3.4	3.4	3.1	3.0	3.4	4.8	
15-Nov	4.5	4.3	4.0	3.9	4.0	4.0	4.3	4.4	4.5	4.0	3.9	3.8	3.4	3.6	3.9	4.0	3.7	4.2	4.2	3.9	3.8	3.5	3.2	3.0	3.9	4.5	
16-Nov	3.7	4.4	4.6	4.3	4.1	4.0	3.9	3.4	3.5	3.3	3.1	3.0	2.8	2.6	2.7	2.8	3.1	3.7	3.4	3.2	3.1	3.3	3.2	3.6	3.4	4.6	
17-Nov	3.8	3.4	3.2	3.4	3.7	3.5	3.3	3.1	2.9	3.0	3.1	3.0	2.9	3.0	3.3	3.9	3.8	4.2	4.6	4.3	3.8	4.1	3.2	2.9	3.5	4.6	
18-Nov	3.3	3.8	3.5	3.7	3.4	3.4	3.2	2.9	2.9	3.0	2.8	2.6	2.9	2.7	2.7	2.6	2.8	2.7	2.7	2.8	2.9	2.8	3.5	4.2	3.1	4.2	
19-Nov	2.8	3.1	2.9	2.7	2.7	2.7	2.6	2.8	6.0	2.7	2.4	2.5	2.6	2.5	2.5	2.6	2.8	2.8	2.6	2.7	3.1	2.7	2.8	2.6	2.8	6.0	
20-Nov	2.6	2.7	2.6	2.7	2.6	2.6	2.6	2.6	2.7	4.6	4.4	3.9	3.8	4.1	5.0	6.3	6.4	5.9	7.2	4.4	4.0	4.3	4.5	4.8	4.1	7.2	
21-Nov	6.2	7.3	7.5	7.3	7.4	7.8	7.8	8.1	7.3	6.6	5.6	5.3	5.3	5.1	5.1	5.5	5.0	5.0	5.0	5.1	4.8	4.6	4.5	7.7	6.1	8.1	
22-Nov	5.0	4.3	4.6	4.5	4.7	4.9	5.5	6.3	6.1	5.7	5.8	5.5	4.9	4.5	5.0	5.1	4.6	4.0	3.7	3.2	3.1	3.0	3.0	2.9	4.6	6.3	
23-Nov	3.1	3.4	3.4	3.3	3.2	3.1	3.2	3.7	3.4	3.1	2.7	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.7	2.6	2.6	2.4	2.7	2.8	3.7	
24-Nov	2.8	3.5	3.8	3.6	3.5	3.2	3.1	3.0	3.1	3.4	2.8	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.7	2.7	2.9	3.8	
25-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	3.1	3.3	3.9	4.1	3.3	2.6	2.2	3.2	5.9	4.4	--	5.9
26-Nov	4.7	5.8	4.1	3.9	3.5	3.4	3.3	3.0	3.1	3.5	4.6	5.0	4.6	4.8	4.0	4.0	5.7	16.1	10.8	11.4	19.7	10.6	5.6	5.6	6.3	19.7	
27-Nov	5.9	5.7	4.6	4.7	5.9	5.0	5.0	8.4	5.1	4.4	11.6	9.8	7.1	9.4	8.4	8.1	10.9	7.3	6.3	16.8	11.8	5.8	8.7	5.0	7.6	16.8	
28-Nov	3.4	3.3	4.7	6.4	4.1	4.0	4.6	5.7	5.7	5.5	4.8	4.8	5.9	4.7	6.6	6.1	6.0	6.7	7.5	9.0	8.3	8.5	8.7	7.9	6.0	9.0	
29-Nov	7.5	6.0	4.8	4.9	5.4	6.2	6.4	6.5	6.6	6.6	6.7	6.5	5.8	5.1	5.2	5.8	6.1	8.6	7.7	8.6	8.9	9.9	11.0	10.3	7.0	11.0	
30-Nov	9.2	9.5	9.8	9.0	8.7	8.5	8.2	6.7	5.4	5.1	4.7	4.0	3.3	3.1	3.4	3.3	2.8	2.8	3.5	3.3	3.1	3.8	5.2	11.2	5.7	11.2	

5.8	5.8	5.5	5.6	5.4	5.4	6.0	6.6	6.6	6.1	5.4	5.1	5.0	5.2	6.4	5.9	5.6	6.3	5.8	6.1	6.3	6.1	5.9	6.0	Diurnal Average	
26.5	27.4	24.5	27.2	28.7	29.0	29.9	35.3	39.0	32.5	20.2	27.0	28.0	29.7	29.7	29.7	27.2	31.0	26.6	29.8	32.8	35.2	27.3	26.8	Diurnal Maximum	

C - Calibration UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	500	71.02	71.02
6 - 15	159	22.59	93.61
16 - 25	20	2.84	96.45
26 - 80	25	3.55	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	24	18	16	21	44	26	28	23	43	20	29	40	58	40	37	33	500
6 - 15	2	0	0	5	11	6	9	9	21	14	15	16	28	7	14	2	159
16 - 25	0	1	1	1	1	0	2	1	0	0	1	0	5	1	1	5	20
26 - 80	0	0	0	0	3	4	2	0	4	4	4	2	1	1	0	0	25
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	19	17	27	59	36	41	33	68	38	49	58	92	49	52	40	704

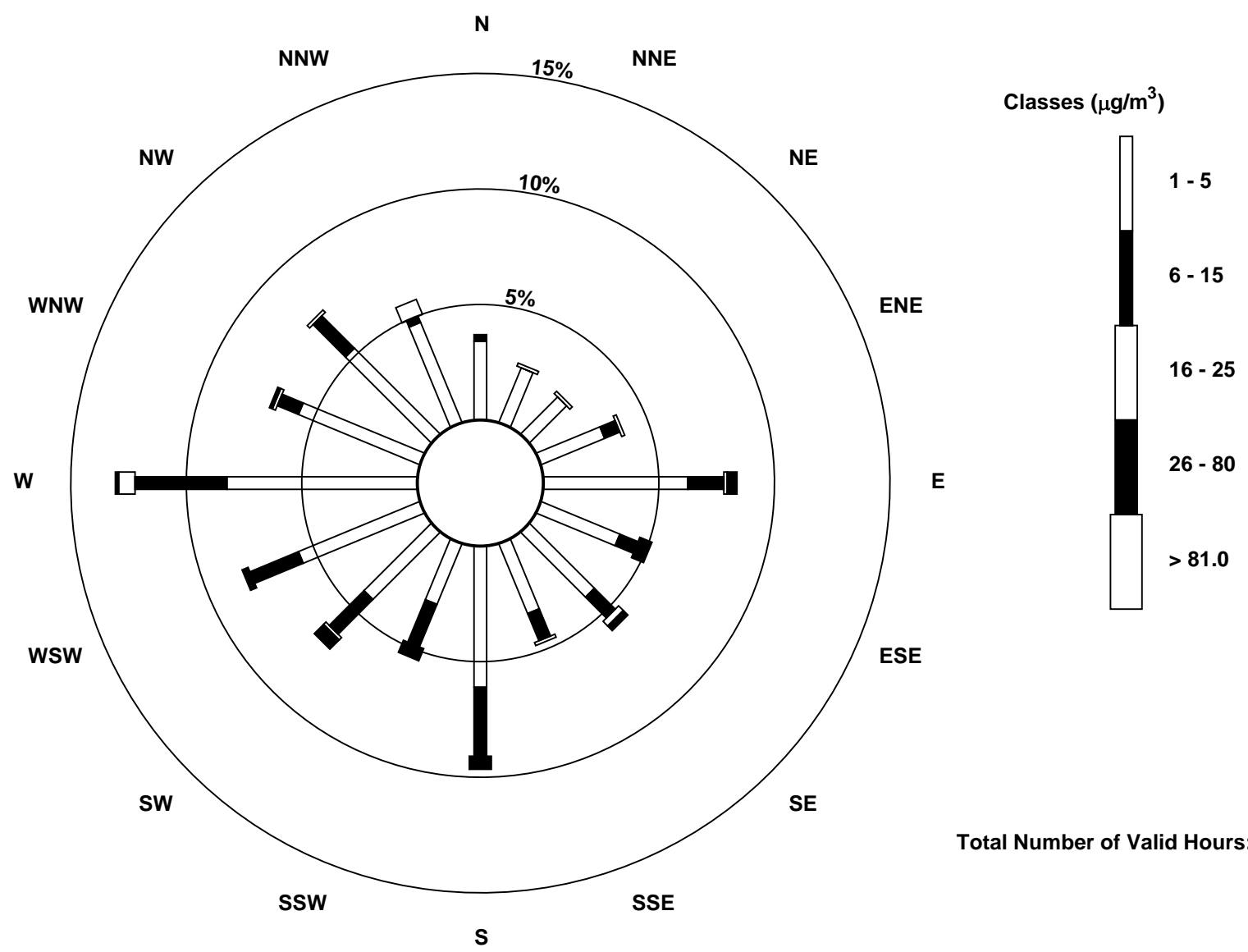
Total Number of Valid Hours: 704

Total Number of Hours: 720



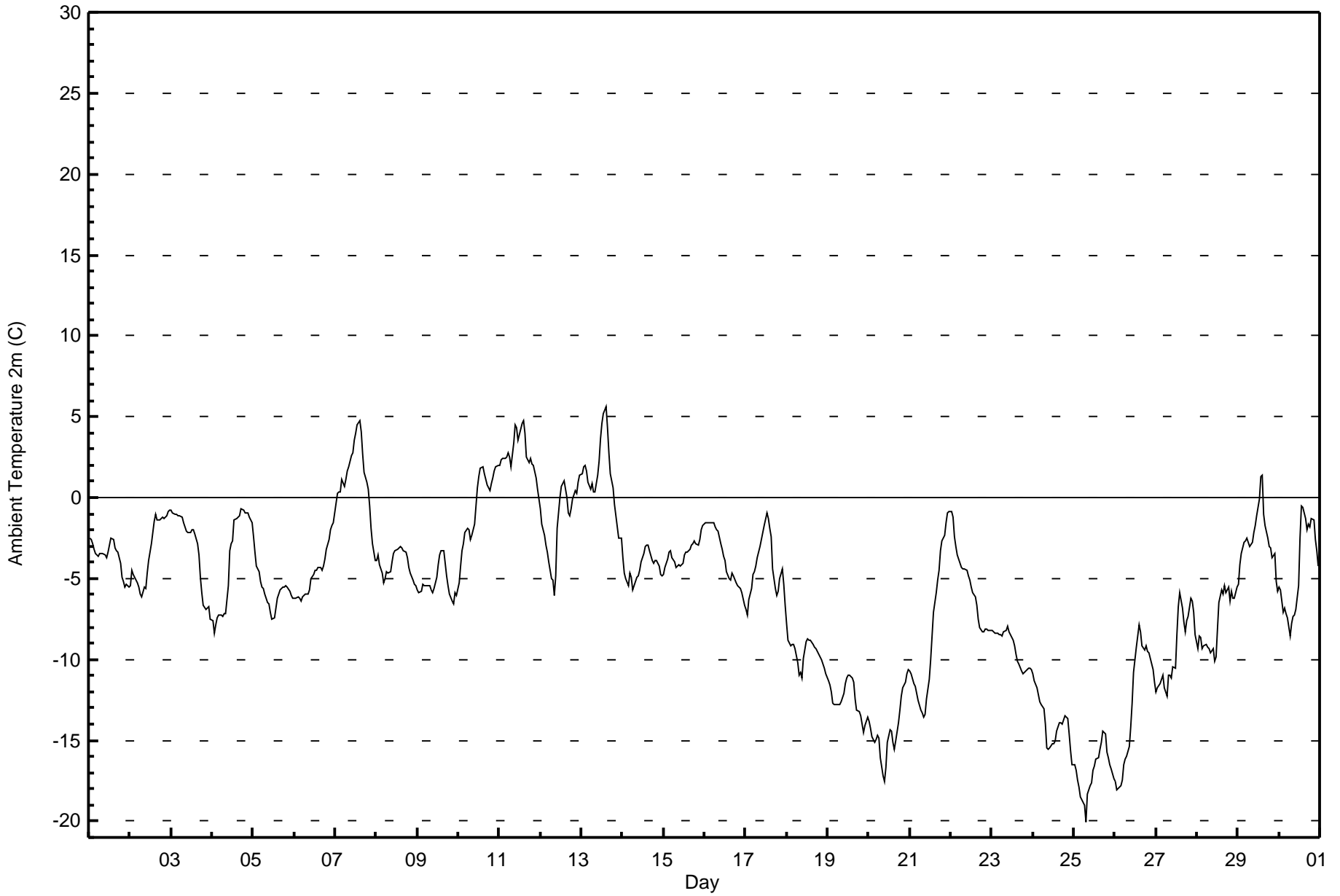
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan (AMS 8)





Maximum Value: 5.7 C on Nov 13 15:00																				Maximum Daily Average: 2.7 C on Nov 11					Hours in Service: 720				
Minimum Value: -20.1 C on Nov 25 08:00																				Minimum Daily Average: -17.0 C on Nov 25					Hours of Data: 720				
Maximum Diurnal Average: -4.2 C at hour 15																				Minimum Diurnal Average: -6.9 C at hour 8					Hours of Missing Data: 0				
Monthly Average: -5.76 C																				Percentiles: P ₁ = -17.9 P ₁₀ = -13.5 Q ₁ = -9.1 Median = -5.1 Q ₃ = -2.4 P ₉₀ = 0.6 P ₉₉ = 4.5					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-Nov	-2.5	-2.6	-2.9	-3.2	-3.5	-3.6	-3.5	-3.4	-3.5	-3.5	-3.7	-3.4	-2.9	-2.5	-2.6	-3.1	-3.3	-3.4	-4.0	-4.9	-5.2	-5.5	-5.4	-5.5	-3.6	-2.5			
2-Nov	-5.4	-4.5	-4.7	-5.1	-5.3	-5.6	-6.0	-6.1	-5.5	-5.6	-4.7	-3.9	-2.8	-2.1	-1.5	-1.1	-1.3	-1.4	-1.3	-1.2	-1.3	-1.2	-0.8	-0.7	-3.3	-0.7			
3-Nov	-0.8	-1.0	-1.0	-1.0	-1.2	-1.1	-1.2	-1.6	-1.8	-2.1	-2.2	-2.1	-2.0	-2.0	-2.3	-2.9	-3.6	-4.9	-5.9	-6.6	-6.9	-6.9	-6.7	-7.6	-3.1	-0.8			
4-Nov	-7.6	-8.4	-7.9	-7.5	-7.3	-7.2	-7.3	-7.2	-7.2	-5.4	-3.3	-2.9	-2.6	-1.4	-1.3	-1.2	-1.1	-0.7	-0.7	-1.0	-1.0	-1.0	-1.2	-1.6	-3.9	-0.7			
5-Nov	-2.4	-3.4	-4.3	-4.6	-5.2	-5.5	-5.6	-6.0	-6.5	-6.6	-7.1	-7.5	-7.4	-6.8	-6.2	-5.9	-5.7	-5.5	-5.5	-5.5	-5.5	-5.8	-6.0	-6.3	-5.7	-2.4			
6-Nov	-6.3	-6.2	-6.2	-6.2	-6.4	-6.1	-6.0	-6.0	-5.9	-5.7	-5.0	-4.8	-4.4	-4.5	-4.4	-4.4	-4.5	-4.3	-3.8	-3.2	-2.6	-2.0	-1.7	-1.5	-4.7	-1.5			
7-Nov	-0.4	0.3	0.4	0.4	1.1	0.7	1.1	1.7	1.9	2.6	2.7	3.6	4.0	4.5	4.7	4.1	2.7	1.6	0.9	0.5	-0.5	-1.9	-2.9	-3.9	1.2	4.7			
8-Nov	-3.9	-3.5	-4.1	-4.6	-5.3	-5.0	-4.6	-4.7	-4.5	-3.9	-3.4	-3.3	-3.2	-3.1	-3.0	-3.1	-3.3	-3.4	-3.7	-4.3	-4.6	-5.1	-5.3	-5.5	-4.1	-3.0			
9-Nov	-5.7	-5.9	-5.8	-5.4	-5.4	-5.4	-5.5	-5.4	-5.7	-5.8	-5.6	-4.9	-4.2	-3.5	-3.3	-3.3	-4.1	-4.8	-5.5	-5.9	-6.4	-6.6	-5.9	-6.0	-5.2	-3.3			
10-Nov	-5.3	-4.2	-3.3	-2.8	-2.1	-1.9	-1.9	-2.6	-2.3	-1.7	-0.5	0.6	1.3	1.8	1.9	1.5	1.1	0.8	0.4	0.8	1.2	1.7	1.9	2.0	-0.5	2.0			
11-Nov	2.0	2.4	2.4	2.4	2.5	2.7	2.5	1.9	3.4	4.5	4.3	3.6	4.3	4.6	4.7	4.0	2.5	2.1	2.4	2.1	2.0	1.2	0.5	-0.1	2.7	4.7			
12-Nov	-0.7	-1.6	-2.4	-2.9	-3.3	-4.0	-5.0	-5.1	-6.0	-4.8	-1.9	0.0	0.7	0.9	1.0	0.0	-1.0	-1.1	-0.7	-0.1	0.4	0.3	1.0	1.4	-1.5	1.4			
13-Nov	1.5	1.9	2.0	1.7	1.0	0.5	0.9	0.3	0.3	1.4	2.3	3.6	4.6	5.2	5.7	4.3	2.8	1.5	0.6	-0.4	-1.1	-1.8	-2.5	-2.5	1.4	5.7			
14-Nov	-3.7	-4.6	-5.0	-5.5	-4.7	-4.9	-5.7	-5.5	-4.9	-4.9	-4.5	-3.9	-3.5	-3.1	-2.9	-2.9	-3.3	-3.9	-4.1	-3.9	-3.9	-4.2	-4.7	-4.9	-4.3	-2.9			
15-Nov	-4.7	-4.3	-3.8	-3.4	-3.3	-3.7	-4.0	-4.3	-4.2	-4.1	-4.2	-4.0	-3.6	-3.3	-3.4	-3.2	-3.0	-2.8	-2.6	-2.9	-2.9	-2.6	-2.0	-1.7	-3.4	-1.7			
16-Nov	-1.5	-1.6	-1.6	-1.6	-1.6	-1.6	-1.8	-1.9	-2.1	-2.8	-3.2	-3.6	-3.9	-4.6	-5.0	-5.1	-4.7	-4.9	-5.3	-5.5	-5.5	-5.6	-5.9	-6.6	-3.6	-1.5			
17-Nov	-6.9	-7.2	-6.3	-5.6	-4.8	-4.6	-4.3	-3.7	-3.0	-2.6	-2.1	-1.7	-1.0	-1.3	-1.9	-2.4	-4.4	-5.6	-6.0	-5.8	-5.0	-4.4	-5.4	-6.7	-4.3	-1.0			
18-Nov	-7.8	-8.9	-9.2	-9.1	-9.1	-9.4	-10.2	-11.0	-10.8	-11.2	-10.0	-8.9	-8.7	-8.8	-8.8	-9.1	-9.2	-9.4	-9.5	-9.7	-10.0	-10.3	-10.6	-10.8	-9.6	-7.8			
19-Nov	-11.3	-11.6	-12.0	-12.7	-12.8	-12.8	-12.8	-12.8	-12.6	-12.1	-11.5	-11.1	-11.0	-11.0	-11.2	-11.4	-12.4	-13.1	-13.2	-13.5	-14.0	-14.5	-14.1	-13.6	-12.5	-11.0			
20-Nov	-13.8	-14.2	-14.7	-15.1	-14.9	-14.7	-14.9	-16.1	-17.2	-17.6	-16.7	-15.2	-14.4	-14.4	-15.1	-15.6	-15.1	-13.9	-13.1	-12.3	-11.7	-11.4	-10.9	-10.6	-14.3	-10.6			
21-Nov	-10.7	-10.9	-11.5	-11.6	-12.1	-12.5	-13.2	-13.3	-13.5	-13.4	-12.4	-11.2	-10.0	-8.6	-7.1	-5.9	-5.1	-4.5	-3.3	-2.7	-2.4	-1.6	-0.9	-0.8	-8.3	-0.8			
22-Nov	-0.9	-1.2	-2.4	-3.0	-3.6	-4.0	-4.3	-4.4	-4.4	-4.5	-4.8	-5.1	-5.5	-5.9	-6.2	-6.6	-7.6	-8.0	-8.3	-8.3	-8.1	-8.1	-8.2	-8.2	-5.5	-0.9			
23-Nov	-8.2	-8.3	-8.4	-8.4	-8.4	-8.5	-8.6	-8.3	-8.2	-7.9	-8.3	-8.5	-8.9	-9.2	-9.7	-10.1	-10.3	-10.7	-10.9	-10.8	-10.7	-10.6	-10.5	-10.6	-9.3	-7.9			
24-Nov	-10.8	-11.3	-11.7	-12.2	-12.6	-12.8	-13.1	-14.0	-15.5	-15.6	-15.4	-15.2	-15.2	-15.0	-14.4	-13.9	-13.9	-14.0	-13.7	-13.5	-13.6	-14.6	-15.7	-16.5	-13.9	-10.8			
25-Nov	-16.5	-16.9	-17.5	-17.9	-18.5	-18.8	-19.0	-20.1	-18.3	-17.8	-17.7	-16.9	-16.6	-16.2	-16.0	-15.5	-15.1	-14.4	-14.6	-15.8	-16.1	-16.5	-16.8	-17.4	-17.0	-14.4			
26-Nov	-17.5	-18.1	-18.0	-17.8	-17.5	-16.5	-16.1	-16.0	-15.4	-14.1	-12.7	-10.8	-9.2	-8.5	-7.9	-8.3	-9.1	-9.4	-9.2	-9.5	-9.6	-10.2	-10.6	-11.4	-12.6	-7.9			
27-Nov	-12.0	-11.8	-11.5	-11.2	-11.0	-11.7	-12.2	-11.0	-10.9	-11.1	-10.4	-10.5	-8.5	-6.7	-5.9	-6.9	-7.7	-8.3	-7.6	-7.4	-6.2	-6.4	-7.1	-8.5	-9.3	-5.9			
28-Nov	-9.3	-8.5	-8.7	-9.4	-9.2	-9.1	-9.2	-9.3	-9.6	-9.3	-10.1	-9.8	-8.1	-6.4	-5.7	-6.0	-5.4	-5.9	-5.5	-6.4	-5.8	-6.3	-6.2	-5.5	-7.7	-5.4			
29-Nov	-5.4	-4.1	-3.4	-2.7	-2.7	-2.5	-2.8	-3.0	-2.8	-2.2	-1.8	-1.1	-0.1	1.3	1.4	-1.0	-1.7	-2.5	-3.0	-3.1	-3.7	-3.5	-5.2	-5.8	-2.6	1.4			
30-Nov	-5.6	-5.7	-7.1	-6.8	-7.2	-7.5	-8.6	-7.8	-7.4	-7.2	-6.9	-5.4	-2.5	-0.5	-0.6	-1.3	-2.0	-1.6	-1.8	-1.3	-1.4	-2.6	-3.3	-4.3	-4.4	-0.5			
																								Diurnal Average					
																								Diurnal Maximum					





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - November 2015**

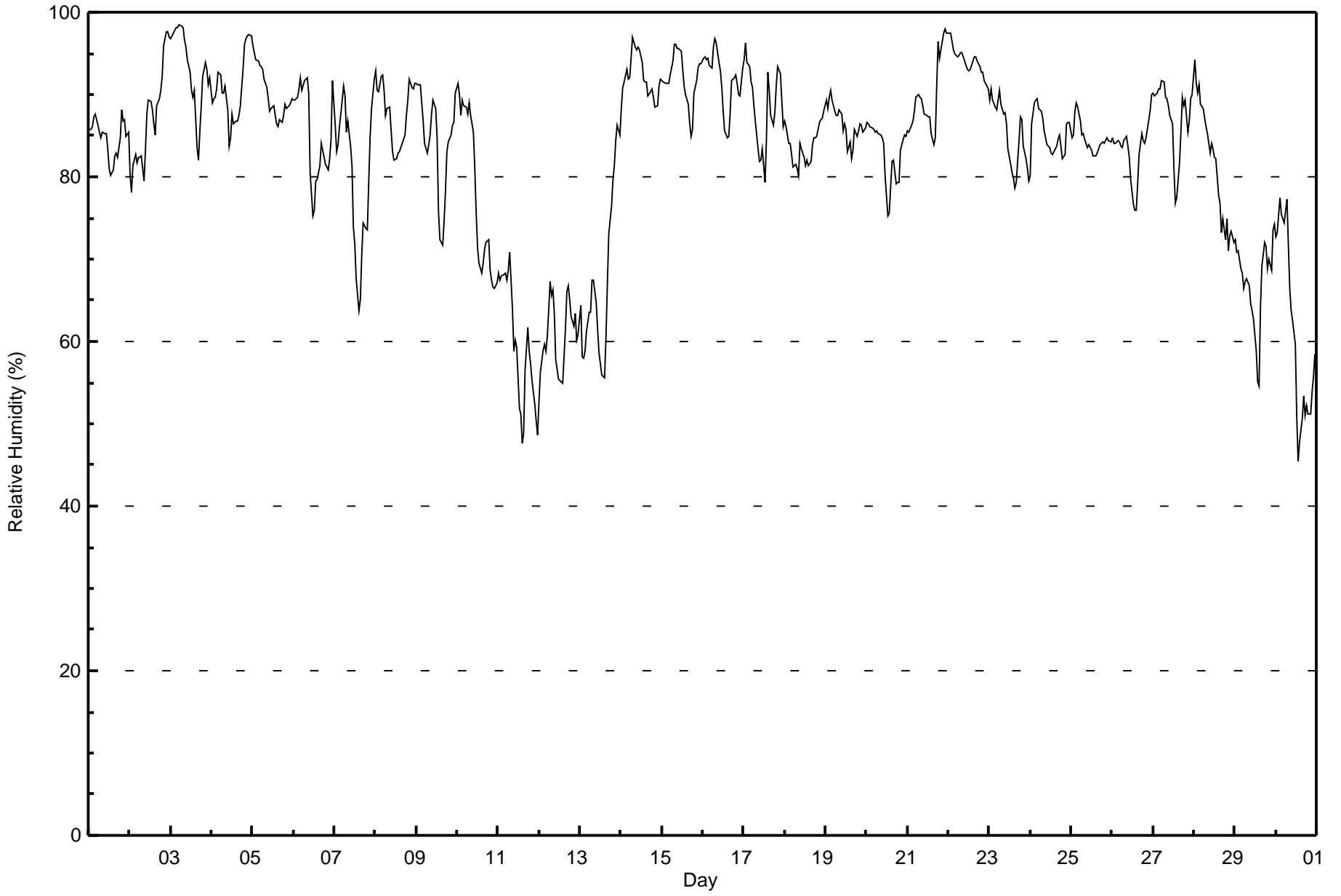
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	1	0.14	0.14
-20 - 0	636	88.33	88.47
0 - 10	83	11.53	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 98 % on Nov 3 06:00 Maximum Daily Average: 94.1 % on Nov 22																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 45 % on Nov 30 14:00 Minimum Daily Average: 59.6 % on Nov 11 Maximum Diurnal Average: 86.0 % at hour 4 Minimum Diurnal Average: 77.3 % at hour 15 Monthly Average: 82.9 % Percentiles: P ₁ = 51 P ₁₀ = 65 Q ₁ = 80 Median = 86 Q ₃ = 90 P ₉₀ = 94 P ₉₉ = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	86	86	86	87	88	86	85	85	85	85	85	83	81	80	81	82	83	82	85	88	87	87	85	85	84.8	88
2-Nov	80	78	81	83	82	82	82	83	79	83	88	89	89	88	86	85	89	90	91	92	96	98	98	97	87.0	98
3-Nov	97	97	98	98	98	98	98	98	97	96	94	93	91	90	90	84	82	86	89	92	94	93	91	92	93.1	98
4-Nov	89	90	90	91	93	92	90	90	91	88	84	85	88	86	87	87	88	89	93	96	97	97	97	97	90.6	97
5-Nov	96	95	94	94	94	93	93	92	91	90	88	88	89	88	86	86	87	87	87	89	88	89	89	90	90.1	96
6-Nov	89	89	90	91	92	91	92	92	92	90	81	75	76	79	80	81	84	83	82	82	81	82	85	92	85.4	92
7-Nov	86	83	84	86	88	91	90	85	87	84	81	74	72	68	64	65	70	74	74	74	79	85	88	92	80.2	92
8-Nov	93	90	90	92	92	91	87	88	88	86	83	82	82	83	83	83	84	85	88	89	92	91	91	91	87.8	93
9-Nov	91	91	91	89	87	84	83	84	85	88	89	88	85	76	72	72	75	78	83	84	85	86	87	90	84.3	91
10-Nov	91	90	88	89	89	88	88	89	87	85	81	76	71	70	68	70	71	72	72	69	68	67	66	67	78.0	91
11-Nov	68	68	68	68	68	67	69	71	64	59	60	59	52	51	48	49	56	62	59	57	55	52	50	49	59.6	71
12-Nov	53	56	59	60	59	61	67	66	66	63	58	55	55	55	55	62	66	67	65	63	62	63	60	61	60.7	67
13-Nov	64	58	58	59	61	63	64	67	68	65	61	59	57	56	56	61	67	73	76	80	81	84	86	85	67.1	86
14-Nov	88	91	92	93	92	92	94	97	96	95	96	95	94	92	92	91	90	90	91	90	89	89	91	92	92.1	97
15-Nov	92	92	91	91	91	92	94	96	96	96	96	95	93	91	90	89	86	85	86	90	92	93	94	94	91.9	96
16-Nov	94	95	94	94	94	93	96	97	96	94	93	91	88	86	85	85	88	92	92	92	91	90	90	93	91.8	97
17-Nov	94	96	94	93	92	91	89	87	83	82	82	83	79	85	93	91	87	86	88	91	93	92	89	86	88.6	96
18-Nov	87	86	84	84	83	81	81	81	80	84	83	82	81	82	81	82	84	85	85	85	87	87	87	88	83.8	88
19-Nov	89	88	90	91	89	88	88	87	88	88	86	86	86	83	84	82	83	86	85	86	87	86	85	86	86.5	91
20-Nov	87	86	86	86	86	85	86	85	85	85	84	80	75	76	79	82	82	79	79	79	83	85	85	85	82.9	87
21-Nov	86	86	86	87	88	90	90	90	90	89	88	87	87	87	85	84	85	91	96	94	96	97	98	97	89.8	98
22-Nov	97	98	96	96	95	95	95	95	95	94	94	93	93	93	94	95	95	94	93	93	93	92	91	91	94.1	98
23-Nov	89	91	89	88	88	89	91	89	88	88	86	83	81	81	80	79	79	84	87	87	84	82	81	80	85.2	91
24-Nov	80	86	89	89	89	88	88	87	86	85	84	84	83	83	83	84	85	85	84	82	83	86	87	87	85.3	89
25-Nov	85	85	88	89	89	87	85	85	85	84	84	84	83	83	83	83	83	84	84	84	84	85	84	84	84.7	89
26-Nov	85	84	84	84	84	84	84	84	85	84	82	80	77	76	76	79	83	85	84	84	85	87	88	90	83.3	90
27-Nov	90	90	90	91	91	92	92	90	89	89	87	86	81	77	77	82	85	90	89	89	85	87	90	90	87.4	92
28-Nov	94	91	90	91	89	88	87	86	85	83	84	83	82	82	78	77	73	75	72	75	71	73	73	72	81.5	94
29-Nov	72	71	71	69	68	66	67	68	67	65	64	63	59	55	55	64	69	72	71	69	70	69	74	74	67.1	74
30-Nov	73	73	77	75	75	74	77	72	66	64	63	60	51	45	48	51	53	51	52	51	51	54	56	58	61.3	77
85.6 85.3 85.6 86.0 85.7 85.5 85.7 85.5 84.7 83.6 82.3 80.8 78.7 77.5 77.3 78.1 79.8 81.4 82.1 82.5 83.0 83.6 83.9 84.5																								Diurnal Average		
97 98 98 98 98 98 98 98 98 97 96 96 95 94 93 94 95 95 94 96 96 97 98 98 97																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipewyan - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	46	6.39	6.39
60 - 80	132	18.33	24.72
80 - 100	542	75.28	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

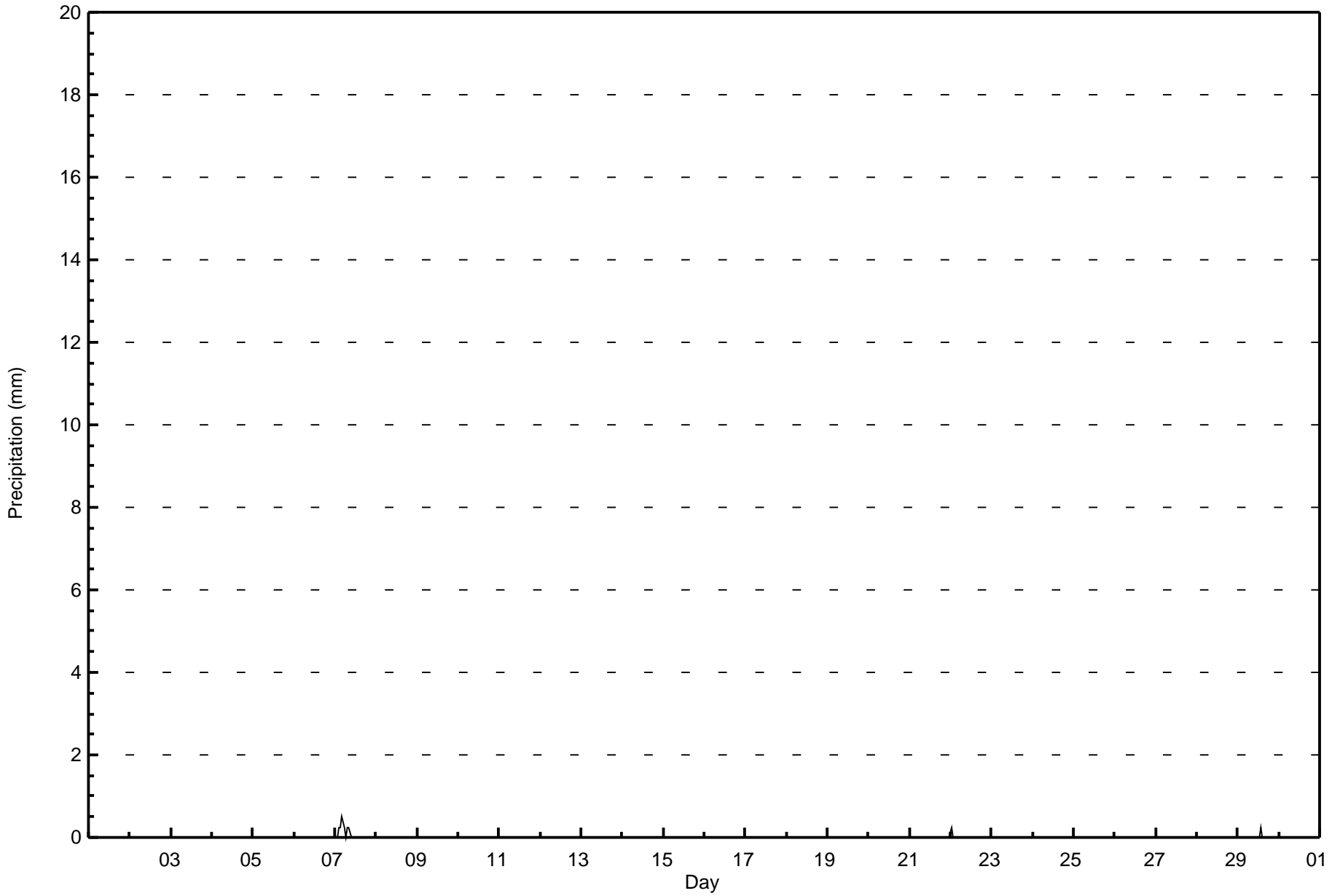


Maximum Value: 0.5 mm on Nov 7 05:00																			Maximum Daily Total: 1.8 mm on Nov 7						Hours in Service: 720																																
Minimum Value: 0.0 mm on Nov 1 01:00																			Minimum Daily Total: 0.0 mm on Nov 1						Hours of Data: 720																																
Maximum Diurnal Total: 0.5 mm at hour 5																			Minimum Diurnal Total: 0.0 mm at hour 2						Hours of Missing Data: 0																																
Monthly Total: 2.29 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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.3	0.3	0.5	0.3	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	1.8	0.5																						
8-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	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	0.0	0.0	0.3	0.3																						
23-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	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	0.3	0.3																							
30-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.5	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
																								0.3	0.0	0.3	0.3	0.5	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - November 2015

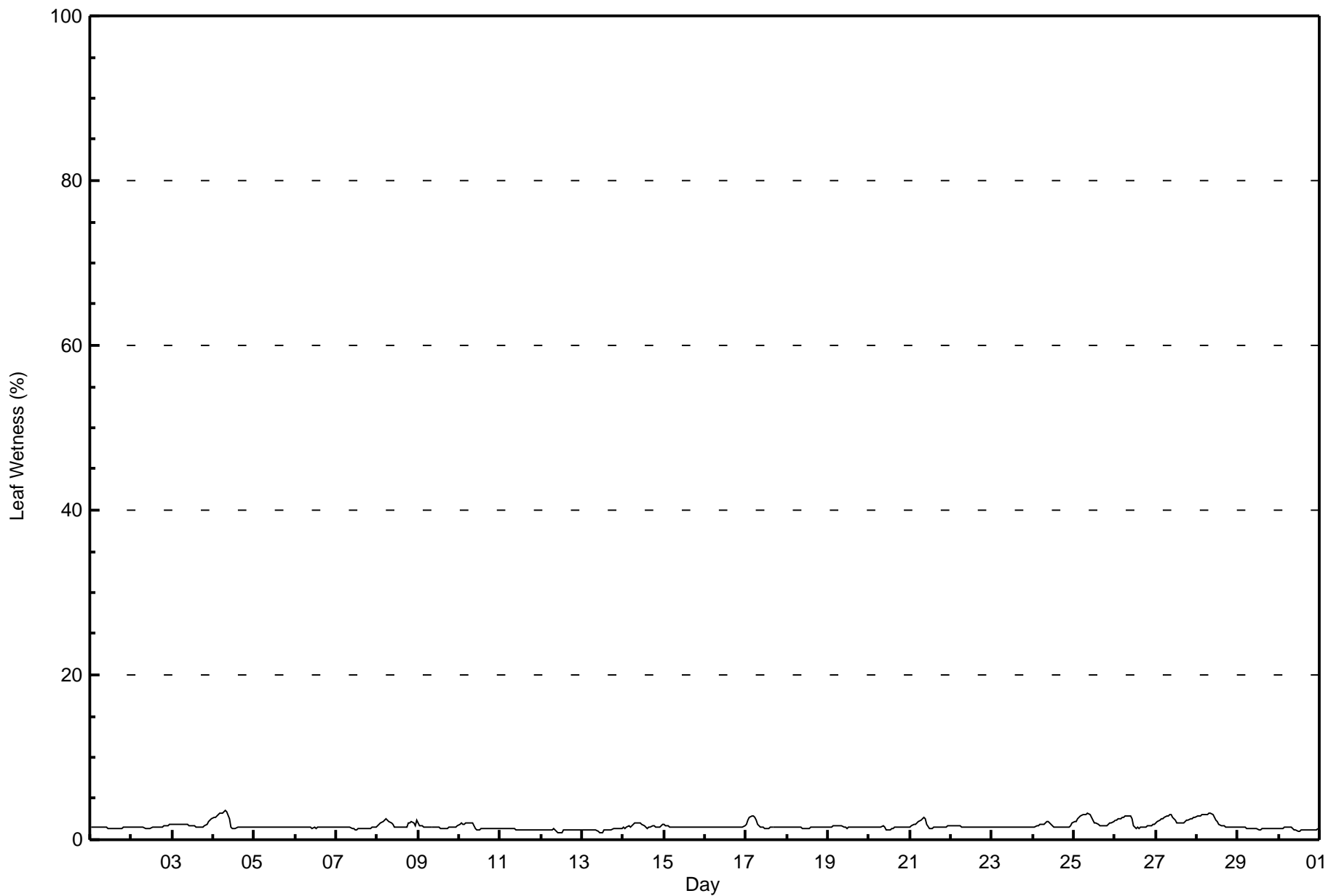
Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	719	99.86	99.86
0.4 - 0.5	1	0.14	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 4 % on Nov 4 08:00														Maximum Daily Average: 2.4 % on Nov 27														Hours in Service: 720			
Minimum Value: 1 % on Nov 13 12:00														Minimum Daily Average: 1.2 % on Nov 12														Hours of Data: 720			
Maximum Diurnal Average: 1.9 % at hour 8														Minimum Diurnal Average: 1.4 % at hour 13														Hours of Missing Data: 0			
Monthly Average: 1.6 %														Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 2 P ₉₉ = 3														Hours of Calibration: 0			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Nov	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					
2-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1.5	2					
3-Nov	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	3	1.8	3					
4-Nov	3	3	3	3	3	3	3	4	3	3	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2.1	4					
5-Nov	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					
6-Nov	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.5	2					
7-Nov	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.4	2					
8-Nov	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.9	2					
9-Nov	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.5	2					
10-Nov	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.6	2					
11-Nov	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					
12-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1					
13-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1					
14-Nov	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	1.7	2					
15-Nov	2	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	2					
16-Nov	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.5	2					
17-Nov	2	2	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.8	3					
18-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	1					
19-Nov	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1.5	2					
20-Nov	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	2					
21-Nov	2	2	2	2	2	2	2	3	3	3	2	1	1	1	1	1	1	1	2	1	2	2	2	2	1.8	3					
22-Nov	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1.6	2					
23-Nov	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	2	1	1.5	2					
24-Nov	1	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1.7	2					
25-Nov	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2.3	3					
26-Nov	2	2	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	2	2	2	2	2	2	2	2.1	3					
27-Nov	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	3	3	3	2.4	3					
28-Nov	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	1	1	1	1	2.3	3					
29-Nov	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					
30-Nov	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					
														1.7 1.7 1.8 1.8 1.8 1.9 1.9 1.9 1.9 1.8 1.6 1.5 1.4 1.5 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.6 1.6 1.6 1.7														Diurnal Average			
														3 3 3 3 3 3 3 3 4 3 3 3 2 2 2 2 2 2 2 2 2 2 3 3 3 3														Diurnal Maximum			





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Fort Chipewyan - November 2015

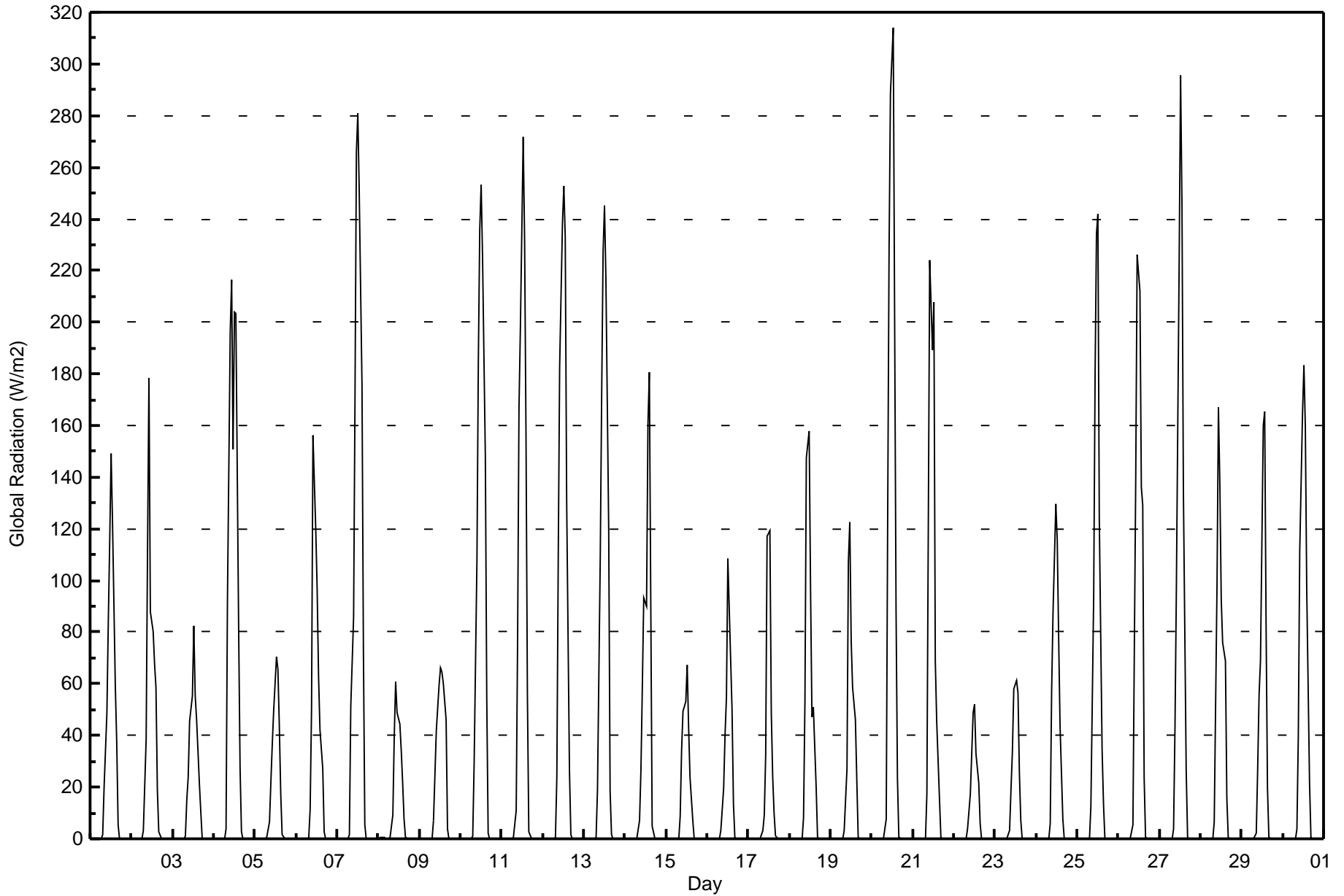
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	0	0.00	0.00
0.6 - 0.7	0	0.00	0.00
0.8 - 1.4	215	29.86	29.86
1.5 - 10	312	43.33	73.19
> 10	0	0.00	73.19

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 314 W/m2 on Nov 20 13:00																			Maximum Daily Average: 56.7 W/m2 on Nov 7						Hours in Service: 720	
Minimum Value: 0 W/m2 on Nov 1 01:00																			Minimum Daily Average: 9.0 W/m2 on Nov 22						Hours of Data: 720	
Maximum Diurnal Average: 153.1 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 21						Hours of Missing Data: 0	
Monthly Average: 29.7 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 27 P ₉₀ = 116 P ₉₉ = 245						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	0	0	2	20	49	84	115	149	123	59	37	6	0	0	0	0	0	0	0	26.8	149
2-Nov	0	0	0	0	0	0	0	3	39	113	179	88	80	68	59	19	3	0	0	0	0	0	0	0	27.1	179
3-Nov	0	0	0	0	0	0	0	1	15	24	45	55	83	56	46	21	10	0	0	0	0	0	0	0	14.9	83
4-Nov	0	0	0	0	0	0	0	4	92	197	217	151	204	203	81	28	3	0	0	0	0	0	0	0	49.2	217
5-Nov	0	0	0	0	0	0	0	1	7	22	37	50	70	66	44	18	2	0	0	0	0	0	0	0	13.2	70
6-Nov	0	0	0	0	0	0	0	1	11	51	156	120	97	63	42	27	3	0	0	0	0	0	0	0	23.7	156
7-Nov	0	0	0	0	0	0	0	1	51	86	171	266	281	251	175	73	5	0	0	0	0	0	0	0	56.7	281
8-Nov	0	0	0	0	0	0	0	0	9	40	61	49	45	34	22	8	1	0	0	0	0	0	0	0	11.2	61
9-Nov	0	0	0	0	0	0	0	0	7	24	42	60	66	64	60	46	4	0	0	0	0	0	0	0	15.6	66
10-Nov	0	0	0	0	0	0	0	1	29	108	185	236	253	225	147	54	2	0	0	0	0	0	0	0	51.7	253
11-Nov	0	0	0	0	0	0	0	0	11	77	167	198	272	232	156	56	3	0	0	0	0	0	0	0	48.8	272
12-Nov	0	0	0	0	0	0	0	1	24	109	183	238	253	233	131	26	2	0	0	0	0	0	0	0	49.9	253
13-Nov	0	0	0	0	0	0	0	0	19	110	173	227	245	217	120	19	2	0	0	0	0	0	0	0	47.2	245
14-Nov	0	0	0	0	0	0	0	0	7	26	59	93	90	161	181	93	5	0	0	0	0	0	0	0	29.8	181
15-Nov	0	0	0	0	0	0	0	0	9	34	49	53	67	43	24	7	0	0	0	0	0	0	0	0	11.9	67
16-Nov	0	0	0	0	0	0	0	0	3	20	40	55	108	89	50	14	1	0	0	0	0	0	0	0	15.8	108
17-Nov	0	0	0	0	0	0	0	0	3	9	32	117	119	49	24	10	1	0	0	0	0	0	0	0	15.2	119
18-Nov	0	0	0	0	0	0	0	0	8	53	148	158	97	47	51	20	1	0	0	0	0	0	0	0	24.3	158
19-Nov	0	0	0	0	0	0	0	0	3	27	108	122	76	58	46	23	1	0	0	0	0	0	0	0	19.4	122
20-Nov	0	0	0	0	0	0	0	0	8	121	226	288	314	200	89	23	0	0	0	0	0	0	0	0	52.9	314
21-Nov	0	0	0	0	0	0	0	0	17	120	224	189	208	69	45	15	0	0	0	0	0	0	0	0	37.0	224
22-Nov	0	0	0	0	0	0	0	0	4	17	33	49	52	33	21	6	0	0	0	0	0	0	0	0	9.0	52
23-Nov	0	0	0	0	0	0	0	0	3	19	34	58	61	56	25	7	0	0	0	0	0	0	0	0	11.0	61
24-Nov	0	0	0	0	0	0	0	0	6	57	88	129	116	78	44	8	0	0	0	0	0	0	0	0	21.9	129
25-Nov	0	0	0	0	0	0	0	0	12	94	179	235	242	124	35	13	0	0	0	0	0	0	0	0	39.0	242
26-Nov	0	0	0	0	0	0	0	0	5	73	140	226	212	136	129	24	1	0	0	0	0	0	0	0	39.4	226
27-Nov	0	0	0	0	0	0	0	0	4	43	97	224	296	245	135	27	0	0	0	0	0	0	0	0	44.6	296
28-Nov	0	0	0	0	0	0	0	0	6	99	167	138	93	76	69	16	0	0	0	0	0	0	0	0	27.7	167
29-Nov	0	0	0	0	0	0	0	0	2	27	56	69	160	165	83	19	0	0	0	0	0	0	0	0	24.2	165
30-Nov	0	0	0	0	0	0	0	0	4	40	111	165	183	160	96	22	0	0	0	0	0	0	0	0	32.5	183
																			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.5 14.7 62.9 116.4 140.7 153.1 120.8 76.4 26.0 1.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 0 4 92 197 226 288 314 251 181 93 10 0 0 0 0 0 0 0						Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - November 2015

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	524	72.78	72.78
21 - 100	115	15.97	88.75
101 - 300	80	11.11	99.86
301 - 600	1	0.14	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 37 km/h on Nov 16 00:00	Maximum Daily Speed Average: 22.3 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 14 09:00	Minimum Daily Speed Average: 2.2 km/h on Nov 27	Hours of Data: 720
Maximum Diurnal Speed Average: 4.6 km/h at hour 13	Minimum Diurnal Speed Average: 1.5 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 2.9 km/h 209.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 17 P ₉₀ = 24 P ₉₉ = 31	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	NNW11	N9	N7	NNE8	NNE7	N6	N3	NNW5	NW7	NW6	WNW6	WNW4	NNW4	N6	NNE8	ENE10	NNE7	NNE7	N7	N8	NNW9	NNW3	N5	N4	N5.8	NNW11
2-Nov	NE7	E10	SE11	SE13	SE17	SSE19	SE20	SE24	SE31	SE22	ESE17	ESE16	SE15	ESE14	SE17	SE15	ESE17	ESE15	SE12	SE10	SE7	SE6	SSE9	S12	SE14.0	SE31
3-Nov	S11	S10	SSW7	SSW5	SW5	SW4	WSW7	WSW9	W8	W11	W12	W12	W12	W11	W13	W12	W11	WNW10	W7	WSW7	SW8	SSW7	SSW5	SW12	WSW7.8	W13
4-Nov	SW12	SW10	SW9	SSW7	S8	S8	S9	SE10	ESE10	SE10	SSE17	SE14	ESE15	ESE16	ESE13	E15	E14	E15	E17	ENE14	NE11	NNE7	NNW10	NNW11	ESE6.4	E17
5-Nov	NNW13	NNW15	NNW14	NW14	NW13	NW15	NW14	NW13	WNW13	NW13	NW15	NW15	NW13	NW13	NW12	NW12	WNW11	NW11	NW9	WNW9	NW10	NW11	NW11	NW9	NW12.2	NW15
6-Nov	WNW9	WNW9	NW6	W5	W5	W8	WSW8	WSW7	SSW10	S12	S16	S17	S20	SSE19	SE22	SE22	SE23	SE23	SSE25	SSE26	SSE24	SSE24	S29	S27	S12.8	S29
7-Nov	SSW26	SSW20	SW20	SW16	WSW14	WSW14	WSW16	WSW24	WSW18	W13	W17	W22	W23	W18	W16	W12	WSW8	WSW9	WSW11	W10	W8	W9	W9	W10	WSW13.7	SSW26
8-Nov	NW10	NW10	NW8	NW9	NNW9	NW6	WNW6	W8	WNW8	WNW7	NW8	NNW9	NNW7	NNW7	NW7	NW7	NNW6	NNW7	N7	NNE9	NNE10	NNE9	NNE6	N6	NNW6.7	NW10
9-Nov	N6	N6	NNE7	ENE8	ENE13	E15	E15	E14	ESE11	ESE10	ESE9	SE10	SSE10	S15	S19	SSE18	SSE17	SE18	SE19	ESE19	ESE17	ESE13	SSE14	S9	ESE10.0	ESE19
10-Nov	SSE11	SSE16	S24	S26	S24	S25	S27	S24	S24	S21	S23	SSW26	S27	S22	S23	S20	S22	S20	S17	S21	S22	S23	S24	S26	S22.3	S27
11-Nov	S28	S27	S27	SSW26	S27	SSW28	SSW25	SSW23	SW24	WSW26	W27	W28	W34	W23	WSW22	WSW23	WSW18	SW22	WSW26	WSW23	WSW22	W25	W26	W22	SW21.6	W34
12-Nov	W25	W24	W21	W19	W17	WSW13	WSW12	SW11	SW11	SW15	SSW14	SSW13	S15	SSE14	SSE18	S20	S22	S24	SSE22	SSE25	SSE27	SSE27	SSE29	S32	SSW14.4	S32
13-Nov	S30	S30	S29	S26	S26	S23	S22	S19	S19	S13	SSW15	SSW15	SSW14	SSW12	WSW13	WSW10	WSW9	WSW7	W8	WNW10	WNW10	WNW8	NW7	NW6	SSW12.7	S30
14-Nov	W7	WNW9	W7	WNW7	NW7	NW6	NNW9	N4	SE1	E4	ESE6	E4	ENE7	E6	E7	E4	NNW5	N6	N6	N4	NE3	NE5	NNE7	N7	N2.7	WNW9
15-Nov	NNE5	NE4	E7	SE14	ESE15	E22	E22	E22	E21	E23	E24	E24	E23	ENE25	ENE24	ENE24	ENE26	ENE27	ENE28	ENE25	NE23	NE26	NE33	NE37	ENE20.6	NE37
16-Nov	ENE36	ENE34	ENE30	ENE26	NE21	NE14	N7	NNW6	NW10	NW13	WNW15	WNW19	W19	W22	W21	W21	W17	W17	W16	WSW13	WSW12	WSW9	SW7	SSW5	NW5.7	ENE36
17-Nov	E7	E11	SE19	ESE19	E25	E30	E31	E30	E28	ESE21	SE19	SE15	S22	SSW17	SSW15	WSW21	WSW19	WSW20	WSW20	WSW15	W10	NW17	NW18	NNW22	SE5.5	E31
18-Nov	NNW22	NNW25	NNW28	NNW24	NNW23	NNW22	NW21	NNW19	NW18	NW17	NW15	NW18	WNW16	WNW15	WNW18	WNW16	WNW12	WNW11	W7	WNW6	WNW5	WNW8	WNW7	WNW4	NW14.9	NNW28
19-Nov	W5	W6	SW5	SW8	WSW5	WSW6	WSW4	W5	WNW5	W1	SW3	W9	WNW9	NW9	WNW9	W11	W11	WNW8	W8	WNW9	WNW10	W10	W9	W9	W6.8	W11
20-Nov	W9	W9	W9	W10	WNW11	WNW10	WNW11	WNW13	WNW11	W9	W9	WSW8	SW10	SSE12	SE15	SE18	SSE20	SSE25	S26	S25	S23	S14	SSE11	SSE10	SSW7.5	S26
21-Nov	S8	SSW8	SW9	SW9	SW7	SE1	E5	E7	E8	E9	E6	E8	E8	E8	E8	E9	E8	E9	S6	S11	S8	SSW6	SW6	WNW4	SE3.7	S11
22-Nov	NW7	NW10	NNW10	NW8	NNW7	NNW9	NNW10	NNW10	NNW9	N8	N8	N9	N9	N7	NNW8	NNW9	NNW9	N8	NNW8	N6	NNE7	NE7	NE7	NE6	NNW7.6	NNW10
23-Nov	ENE4	ENE8	NE6	NE6	NNE5	N5	N6	NNE7	NNE10	E18	ESE22	ESE20	ESE18	ESE18	E19	ESE16	ESE13	E12	E12	ENE6	NE5	E6	ESE6	E8	E9.3	ESE22
24-Nov	NNE1	NNW4	NNW5	NW4	WNW7	WNW5	NW9	NW11	NW11	NW11	WNW11	W9	W11	W10	WSW7	WSW8	WSW9	SW8	SW10	WSW12	SW8	S7	SSE5	SE6	W5.4	WSW12
25-Nov	SE6	ESE5	E6	E7	E5	E3	SSW2	ENE2	WSW5	WSW6	WSW7	WSW8	WSW7	WSW8	WSW6	SW7	SW7	SW9	SW11	SW12	SSW8	SW5	S2	SSW4	SW3.8	SW12
26-Nov	SSE2	ENE7	E6	E7	ESE7	SE6	ESE8	ESE9	ESE9	SE9	SE10	SE8	SSE9	SSE7	SSW11	SSW9	SW9	W7	W8	W8	WNW8	WSW4	SW5	SSW2	SSE3.7	SSW11
27-Nov	ENE7	E7	E9	ENE7	ENE5	E3	W2	NW7	NW7	NW7	WNW3	W4	WSW4	W5	WSW5	SW7	W6	SW4	SW7	W7	W9	WSW7	WNW7	W4	W2.2	E9
28-Nov	SW6	SW6	SW4	ENE7	E8	E9	E10	E8	E10	ESE7	E8	ENE7	ENE6	SE4	S4	SE5	SSW7	SW10	SSW7	S4	SSW9	SW17	SW15	SW14	SSE3.9	SW17
29-Nov	SW11	WSW14	WSW14	WSW14	W12	W13	W11	WSW11	W11	W14	W14	W11	WSW6	WSW7	WSW8	SSE2	ESE4	SE3	SSE5	S5	SSW8	S7	ESE6	ESE8	WSW6.7	WSW14
30-Nov	SE6	SSW5	ESE5	S5	E5	E6	E7	SSW6	SSW9	SW10	SW13	SW12	SW11	WSW17	WSW19	WSW20	WSW19	W20	W20	W20	W19	WNW14	W10	WNW8	WSW8.7	W20

SW2.3	SW1.8	SSW2.2	SSW2.5	SSW1.5	S1.5	SSW1.6	SSW1.9	SSW2.1	SSW2.5	SSW3.4	SW3.7	SW4.6	SSW3.9	SSW4.4	SSW4.1	SSW3.7	SSW3.8	SSW4.3	SSW4.0	SW3.5	SW3.0	SW2.7	SW2.6	Diurnal Average	
ENE36	ENE34	ENE30	SSW26	SSW27	E30	E31	ENE30	SE31	WSW26	W27	W28	W34	ENE25	ENE24	ENE24	ENE26	ENE27	ENE28	SSE26	SSE27	SSE27	NE33	NE37	Diurnal Maximum	

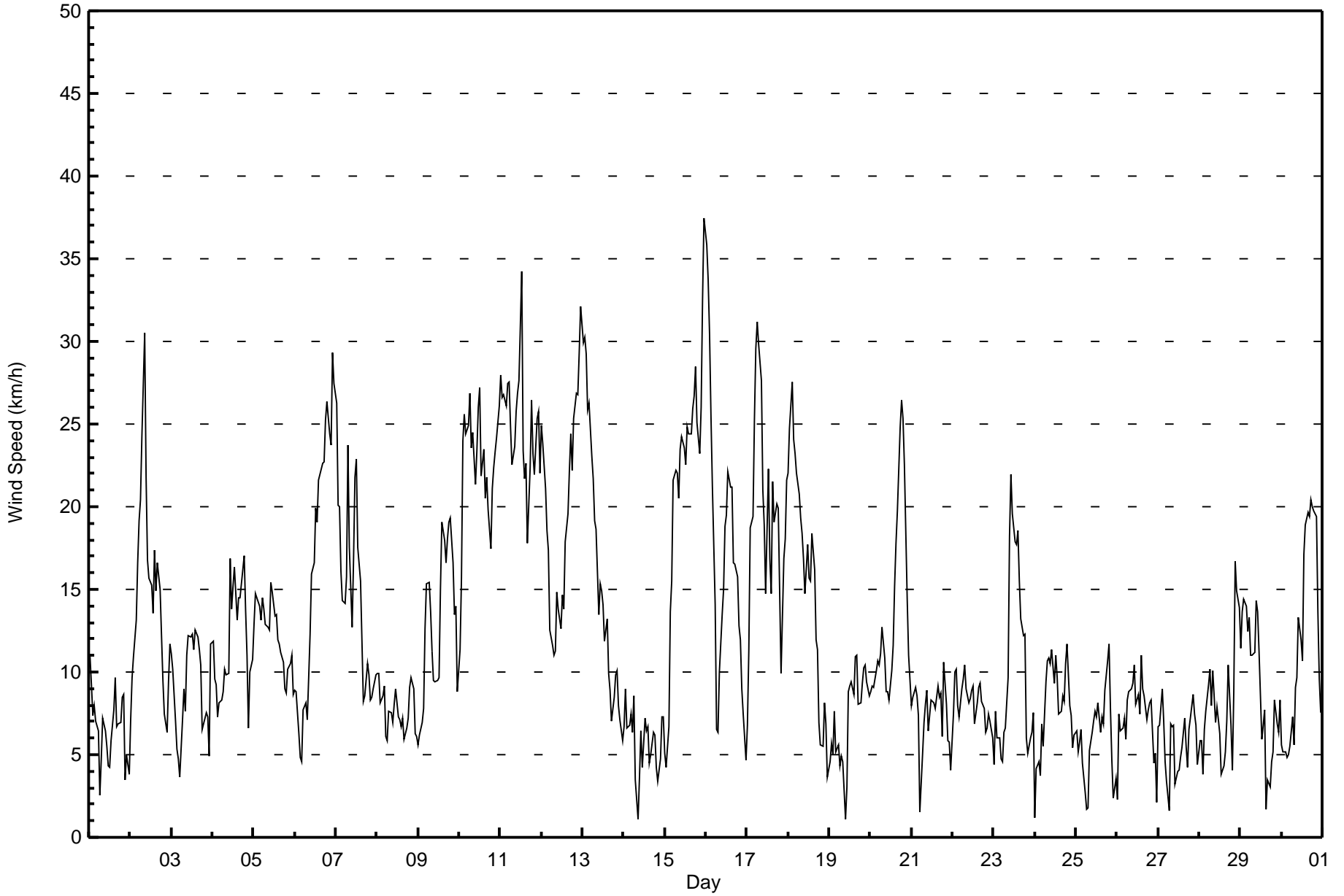
All monthly, daily, and diurnal averages have been calculated using vector methods



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 9 km/h on Nov 18 03:00	Hours of Data: 720
Minimum Value: 0 km/h on Nov 24 03:00	Hours of Missing Data: 0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 8	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-Nov	4	3	4	2	3	3	2	2	2	2	2	2	2	2	3	3	2	2	1	1	2	1	1	1	4
2-Nov	1	4	3	2	3	2	2	3	2	3	1	2	2	1	2	1	2	2	1	2	1	1	2	1	4
3-Nov	2	2	1	1	1	1	2	2	2	3	3	3	2	3	3	3	2	2	1	1	2	2	2	3	4
4-Nov	2	3	2	2	2	2	2	3	1	3	2	3	1	1	2	2	1	2	2	2	2	2	4	2	4
5-Nov	4	4	4	4	4	4	3	3	3	3	4	4	3	3	3	3	2	3	2	2	3	2	2	2	4
6-Nov	2	2	2	1	1	1	1	1	2	1	4	3	3	2	3	2	2	3	3	4	4	4	4	4	4
7-Nov	3	4	3	3	4	3	4	5	4	4	5	5	5	5	4	4	1	1	2	2	1	1	1	1	5
8-Nov	1	2	1	1	2	2	1	2	1	2	2	3	3	2	2	2	1	2	3	3	3	3	2	2	3
9-Nov	2	2	2	5	2	2	1	2	2	1	1	1	2	3	3	2	2	3	2	1	2	2	2	3	5
10-Nov	1	4	4	3	3	3	4	3	3	3	3	4	4	3	4	3	2	2	3	3	2	2	3	3	4
11-Nov	3	3	3	3	3	3	3	4	4	7	7	8	8	7	5	5	4	4	5	5	5	7	6	5	8
12-Nov	5	6	6	4	4	3	2	2	2	2	2	2	2	3	4	3	4	3	3	3	4	4	4	6	6
13-Nov	4	3	4	3	3	3	3	3	2	3	2	2	2	2	3	2	1	1	2	1	1	1	1	1	4
14-Nov	2	2	2	2	2	2	2	2	1	3	2	2	2	2	2	2	1	1	1	1	2	1	1	1	3
15-Nov	2	1	2	2	3	2	3	2	3	3	3	3	3	4	4	4	4	4	4	4	5	5	7	6	7
16-Nov	6	5	5	4	4	4	2	2	3	3	3	4	5	5	5	5	4	4	5	3	2	2	1	2	6
17-Nov	3	1	2	2	2	2	3	3	2	3	2	2	4	3	2	6	5	5	4	3	2	5	6	7	7
18-Nov	7	8	9	8	8	8	7	6	6	5	5	5	4	4	4	4	3	3	2	1	1	2	2	1	9
19-Nov	1	1	1	2	2	1	1	1	1	2	1	2	2	3	2	3	2	2	2	2	2	2	2	2	3
20-Nov	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	3	4	3	2	2	4
21-Nov	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	2	1	1	3
22-Nov	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	3	2	1	1	3
23-Nov	1	2	1	2	1	1	1	2	2	5	2	3	2	2	2	1	2	2	1	2	1	2	1	3	5
24-Nov	1	0	0	2	1	2	2	2	2	2	2	2	2	2	2	1	1	2	3	2	1	1	1	1	3
25-Nov	2	1	1	1	2	1	1	1	2	1	2	2	2	2	2	1	1	1	1	1	3	3	2	2	3
26-Nov	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	2	2	1	1	2	1	2	2	2
27-Nov	2	1	1	1	1	1	2	3	1	2	2	1	1	1	2	1	2	2	2	2	2	2	2	3	3
28-Nov	3	2	3	2	1	2	1	1	1	1	1	1	1	1	2	1	2	1	2	2	3	2	1	1	3
29-Nov	2	2	3	3	3	3	3	3	3	3	4	5	2	2	2	1	1	1	1	2	2	2	2	1	5
30-Nov	1	3	1	2	1	1	1	2	3	4	3	2	3	4	4	4	3	4	4	3	4	3	3	2	4

7	8	9	8	8	8	7	6	6	7	7	8	8	7	5	6	5	5	5	5	5	5	7	7	7	
Diurnal Maximum																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipewyan - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	85	11.81	11.81
6 - 11	336	46.67	58.47
12 - 19	159	22.08	80.56
20 - 28	124	17.22	97.78
29 - 38	16	2.22	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipewyan - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	3	4	3	8	3	5	4	5	7	8	6	9	7	1	6	85
6 - 11	20	16	7	11	33	13	14	7	11	16	28	28	44	32	33	23	336
12 - 19	0	0	1	2	10	18	15	11	11	8	10	19	21	10	19	4	159
20 - 28	0	0	3	8	10	3	7	10	36	8	3	11	17	0	1	7	124
29 - 38	0	0	2	4	2	0	1	1	5	0	0	0	1	0	0	0	16
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	26	19	17	28	63	37	42	33	68	39	49	64	92	49	54	40	720

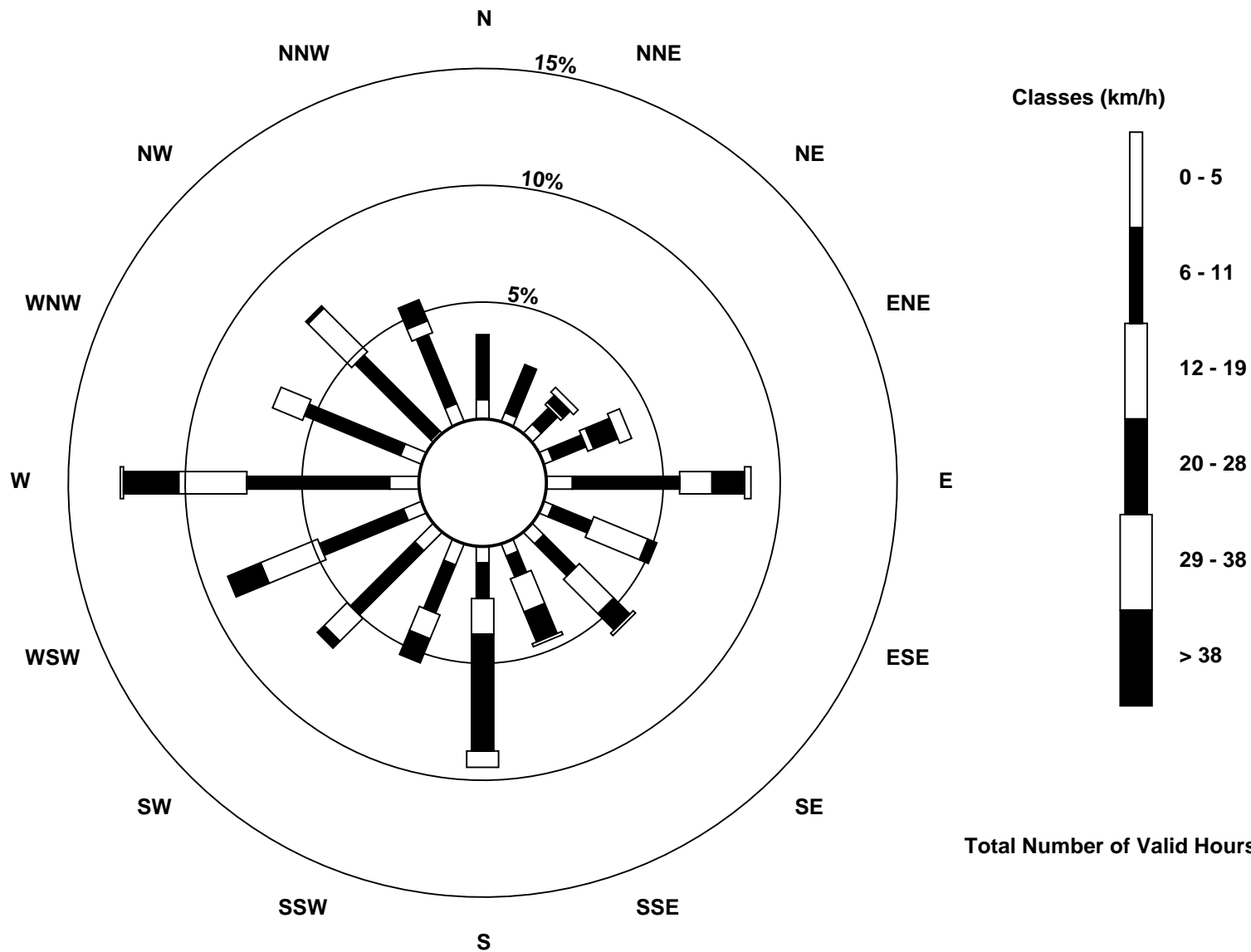
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort Chipewyan - November 2015

Direction of Maximum Speed: 56 deg on Nov 16 00:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 182.3 deg on Nov 10	Hours of Data: 720
Direction of Minimum Speed: 135 deg on Nov 14 09:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 2.2 deg on Nov 27	Percent Operational Time: 100.0
Monthly Average Direction: 263.7 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-Nov	347	353	356	20	14	11	9	328	325	325	291	291	344	356	16	60	31	19	3	349	347	332	4	6	357.2
2-Nov	45	100	142	138	144	147	143	135	126	131	120	114	124	117	131	130	103	111	124	131	126	130	165	175	129.2
3-Nov	179	188	200	199	217	217	255	255	262	263	271	274	275	271	260	261	268	282	269	237	226	213	213	224	246.6
4-Nov	227	224	226	211	188	189	175	139	119	141	156	134	117	118	109	98	87	82	85	73	56	19	348	341	120.7
5-Nov	338	335	327	317	319	315	314	308	300	308	314	314	306	304	310	308	303	311	305	303	319	319	316	310	314.0
6-Nov	293	303	306	264	278	259	248	238	205	184	171	172	170	147	146	139	135	143	148	155	162	167	176	186	169.6
7-Nov	193	204	215	229	249	252	258	247	258	264	261	265	266	264	268	273	242	251	254	266	272	273	271	281	249.8
8-Nov	308	311	312	307	332	320	284	273	284	296	307	334	332	330	322	316	329	340	1	14	24	16	13	5	328.1
9-Nov	353	1	22	74	76	88	94	101	110	114	102	129	157	178	176	160	151	136	125	114	109	108	163	177	123.7
10-Nov	168	160	169	182	188	182	188	184	188	190	191	192	191	181	183	186	180	173	169	172	182	181	186	184	182.3
11-Nov	185	191	191	192	191	194	201	209	228	253	263	260	263	260	255	247	238	228	241	252	252	260	271	272	233.2
12-Nov	263	262	263	262	262	257	254	235	230	216	211	202	184	167	162	170	172	170	162	164	155	153	160	175	196.5
13-Nov	172	173	169	185	191	189	190	183	190	186	197	207	211	213	241	248	246	249	265	294	287	282	308	319	201.4
14-Nov	272	282	268	282	319	321	331	349	135	89	109	92	78	90	93	82	342	355	354	358	41	49	13	6	2.0
15-Nov	19	36	80	125	112	99	99	97	93	91	83	81	80	73	68	68	72	75	73	61	47	47	52	56	74.6
16-Nov	62	65	62	61	56	44	1	329	317	305	293	284	279	279	279	280	276	264	259	249	251	251	234	210	321.7
17-Nov	86	97	133	114	94	86	82	79	92	115	138	143	178	194	199	237	254	251	248	244	264	316	324	328	135.0
18-Nov	329	332	332	331	334	329	324	327	324	320	319	308	290	294	285	290	289	288	278	293	297	287	302	285	314.5
19-Nov	260	278	235	231	239	258	254	269	298	270	220	265	297	313	291	275	277	288	273	291	289	281	281	271	275.6
20-Nov	277	281	280	279	285	286	284	283	283	275	259	258	228	165	132	128	148	166	169	177	178	169	158	161	200.0
21-Nov	183	198	224	218	223	142	85	81	88	87	79	82	82	84	88	82	97	95	180	191	191	196	214	295	134.8
22-Nov	318	323	328	323	329	334	332	333	341	353	352	349	352	353	328	329	343	351	340	356	24	35	39	49	345.0
23-Nov	73	66	41	49	26	359	11	32	33	93	104	106	106	102	101	104	112	88	90	74	44	80	109	95	86.5
24-Nov	28	348	338	309	299	289	319	324	318	312	302	273	269	260	256	239	245	235	234	237	226	191	159	132	271.7
25-Nov	133	117	94	95	87	91	198	76	255	256	243	258	257	245	258	235	233	220	216	218	206	215	180	203	216.9
26-Nov	153	73	93	98	111	125	119	121	123	140	140	145	155	154	192	212	236	263	271	279	283	257	223	192	163.0
27-Nov	70	85	79	78	73	99	271	316	316	317	296	275	247	262	256	232	261	218	230	260	264	254	289	272	275.4
28-Nov	217	217	224	78	85	86	91	96	97	112	90	75	74	124	169	128	197	217	200	183	204	220	222	218	159.4
29-Nov	221	240	248	253	259	267	270	257	264	276	281	273	254	250	247	155	120	146	163	177	198	178	108	114	244.2
30-Nov	133	196	122	184	101	89	91	194	211	218	217	218	236	246	253	254	257	267	270	273	274	284	278	283	247.8

217.6 226.7 208.9 199.5 194.1 181.1 198.8 204.2 207.6 210.2 210.9 224.3 219.2 210.7 208.5 206.0 202.4 198.9 200.2 209.3 215.9 219.8 218.4 216.1

Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

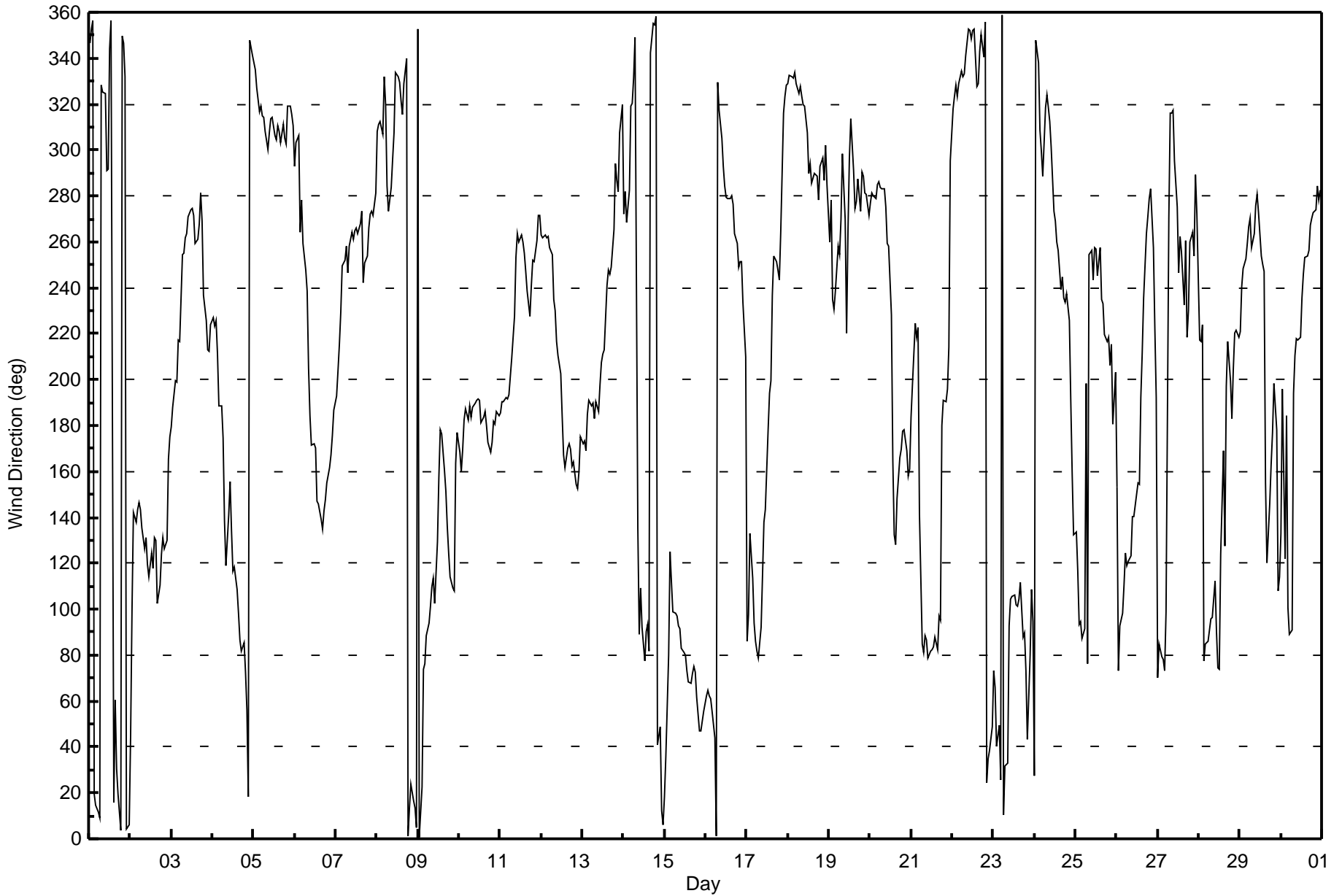
Wind Direction (WD) - deg

Fort Chipewyan - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value:	95 deg on Nov 27 07:00		Hours of Data:	720
Minimum Value:	4 deg on Nov 17 06:00		Hours of Missing Data:	0
Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 9 Median = 14 Q ₃ = 19 P ₉₀ = 25 P ₉₉ = 69			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-Nov	22	26	31	22	23	23	71	36	23	29	27	31	49	34	27	16	21	21	19	13	29	50	25	24	71
2-Nov	11	34	13	7	6	5	6	7	5	5	8	8	8	11	6	9	6	6	6	9	9	16	12	8	34
3-Nov	6	8	10	9	13	12	15	15	16	14	15	14	14	14	15	14	13	16	11	7	21	23	8	23	
4-Nov	8	13	13	16	14	15	20	16	14	30	15	12	11	5	7	7	6	6	7	9	26	20	16	30	
5-Nov	19	21	20	17	18	15	15	18	15	17	15	15	14	14	16	15	13	15	14	16	16	16	15	17	21
6-Nov	14	14	24	14	17	12	12	14	13	9	10	10	9	10	7	8	6	8	8	10	11	10	9	8	24
7-Nov	7	10	7	10	16	13	13	13	15	19	16	14	14	15	14	13	14	17	16	11	10	11	10	11	19
8-Nov	14	11	10	11	21	28	19	13	14	18	22	23	23	20	24	15	17	17	24	19	17	24	21	24	28
9-Nov	33	25	26	56	8	6	7	9	10	10	8	17	15	13	13	12	8	12	7	5	6	8	18	12	56
10-Nov	16	11	9	9	6	7	7	6	7	7	7	7	8	7	7	6	7	6	9	7	6	6	6	6	16
11-Nov	7	6	6	6	6	7	7	10	11	17	15	15	14	15	15	13	12	9	14	13	14	14	14	14	17
12-Nov	14	13	14	15	14	13	12	11	10	9	11	10	12	9	10	8	7	8	10	9	11	11	9	12	15
13-Nov	9	7	8	8	6	7	7	6	7	9	7	10	9	15	13	11	12	12	15	14	8	10	17	19	19
14-Nov	27	10	32	22	18	22	25	67	76	75	15	23	12	21	7	40	21	16	15	17	19	20	13	17	76
15-Nov	23	46	24	9	11	10	9	9	12	8	8	8	8	8	9	9	8	8	8	10	10	10	10	9	46
16-Nov	8	8	8	8	10	14	27	20	18	15	15	14	14	14	15	14	15	14	14	13	13	13	9	39	39
17-Nov	8	14	12	8	5	4	5	6	6	14	7	13	9	10	9	20	14	13	13	12	22	16	20	22	22
18-Nov	22	21	22	23	22	21	22	21	20	19	19	16	16	16	13	15	16	15	21	16	19	23	14	29	29
19-Nov	13	28	14	8	20	19	25	17	18	77	25	22	21	17	15	13	14	12	13	14	14	12	13	14	77
20-Nov	12	13	12	12	11	12	11	11	12	14	15	17	19	24	8	8	12	10	10	8	8	12	15	14	24
21-Nov	16	11	18	11	10	71	18	12	8	6	9	9	7	5	7	7	9	7	42	11	11	13	21	22	71
22-Nov	15	19	20	19	22	17	17	16	17	24	25	24	26	26	26	23	24	25	26	29	25	23	14	20	29
23-Nov	28	17	16	13	17	25	18	14	12	23	5	6	6	7	8	7	7	9	30	24	23	18	16	30	
24-Nov	53	11	10	24	9	11	15	13	13	12	14	14	13	17	16	15	12	11	12	15	18	9	33	21	53
25-Nov	21	25	9	5	13	64	51	43	21	15	15	17	22	20	18	12	15	10	8	7	21	41	68	65	68
26-Nov	66	7	13	8	11	11	14	14	14	16	14	20	14	15	9	10	18	13	11	10	11	22	13	67	67
27-Nov	15	13	6	6	14	20	95	11	17	18	52	34	21	17	23	8	23	23	12	18	11	16	22	48	95
28-Nov	17	12	45	8	7	6	6	10	7	11	9	14	19	41	30	21	25	10	18	56	16	7	7	7	56
29-Nov	8	11	12	13	16	15	16	16	16	15	15	21	19	17	16	70	28	48	22	34	17	29	26	14	70
30-Nov	33	49	30	44	26	23	10	47	17	15	7	7	14	13	11	11	10	13	11	10	11	14	19	16	49

66	49	45	56	26	71	95	67	76	77	52	34	49	41	30	70	28	48	42	56	29	50	68	67	
Diurnal Maximum																								





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 5, 2015	Last Calibration	October 7, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	15:00	End Time (MST)	18:50
Gas Cert Reference	LL103809	Station temp.	22 Deg C
Cal Gas Concentration	2.45 ppm	Cal Gas Exp Date	16/09/2015
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-827	-826
Analyzer IP address	192.168.1.43		Lamp voltage	982	988
Calculated slope	0.996190	1.009428	Chamber temp	44.9	44.9
Calculated intercept	-0.041894	-0.075569	Pressure	714.3	717.3
Analyzer Background	1.13	1.13	Flow	0.435	0.437
Analyzer Coefficient	1.013	1.013	Intensity	93	93

Analyzer make Thermo 43i-TLE Analyzer serial # 1136451241

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	44.6	18.2	18.1	1.005
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.6	18.2	18.1	1.004
second point	6000	23.8	9.7	9.7	1.003
third point	6000	11.9	4.9	4.8	1.005
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	44.6	18.2	17.9	1.019
Average Correction Factor					1.004

Corrected As found 18.0 Previous response 18.3 % change 1.8%

Notes:

Filter change after As Finds. Elevated readings after as finds due to analyzer sampling room air while calibrator was purged. No adjustments made.

Calibration Performed By: Devin Russell



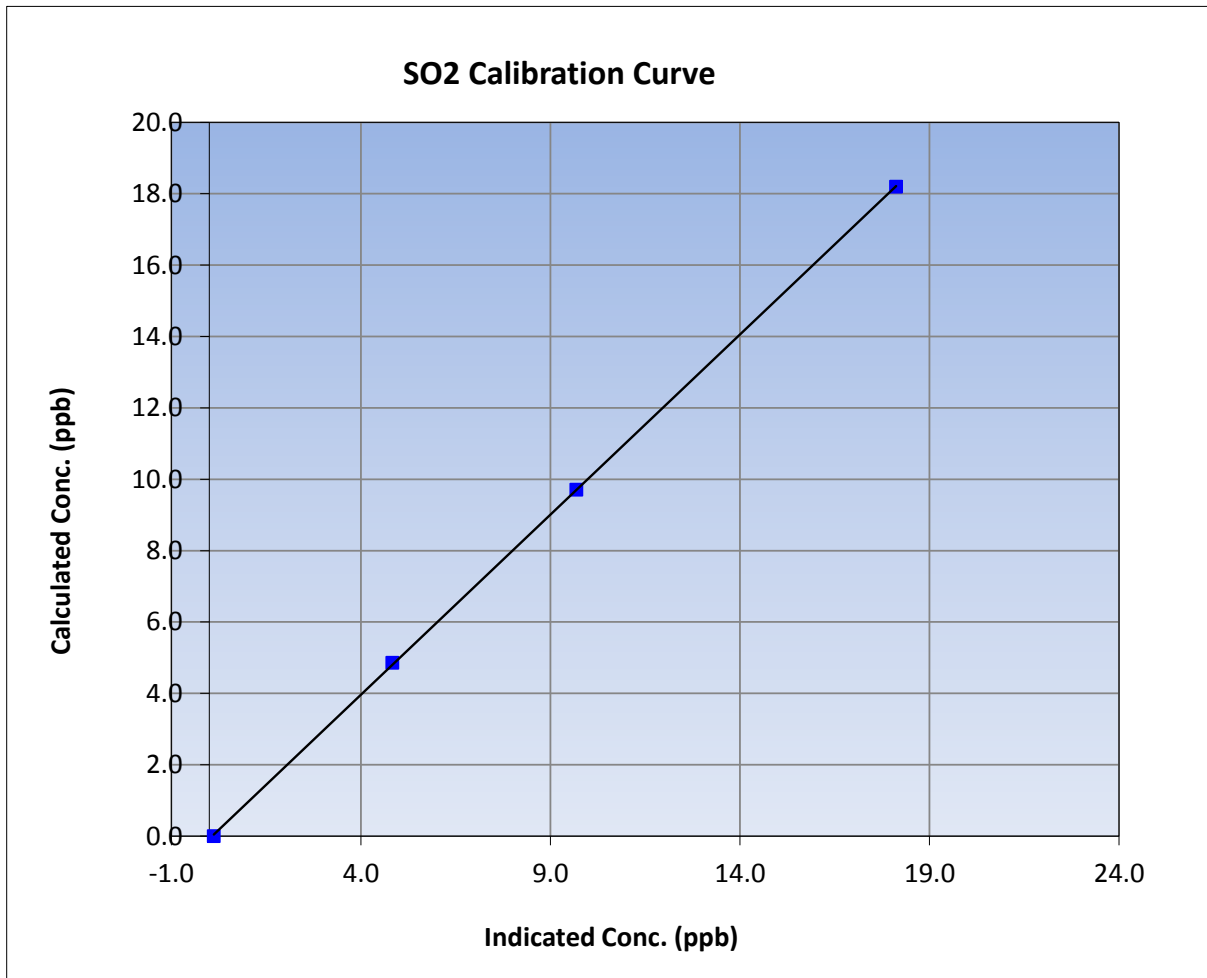
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 7, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	15:00	End Time (MST)	18:50
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

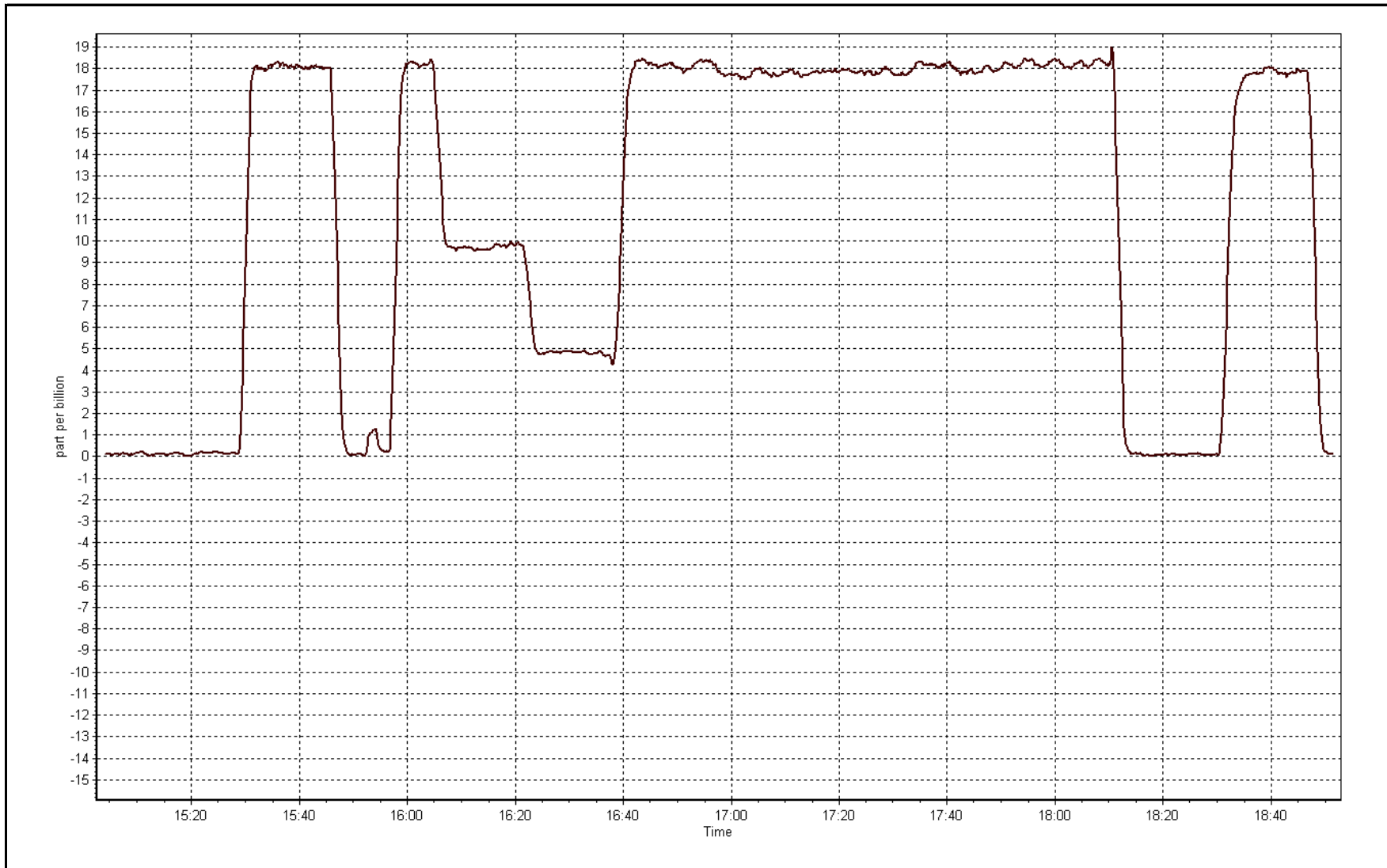
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999969
18.2	18.1	1.0042		
9.7	9.7	1.0027	Slope	1.009428
4.9	4.8	1.0052		
			Intercept	-0.075569



SO2 Calibration Plot

Date: November 5, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 6, 2015	Previous Calibration	October 7, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	11:45
NO2 GPT Ref date	November 5, 2015	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	38.7	36.8
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	1.004873	0.995504	Pressure	27.4	27.1
Calculated intercept	-0.210053	0.157276	Flow cell A	0.822	0.793
Analyzer Background	1.6	0.8	Flow cell B	0.822	0.793
Analyzer Coefficient	1.281	1.167	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 Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	0.2	----
as found span	6000	235.0 - 832.2	105.1	106.1	0.991
calibrator zero	6000	0.00	0.0	-0.1	----
high point	6000	235.0 - 832.2	105.1	105.4	0.997
second point	6000	178.2 - 792.9	85.1	85.4	0.997
third point	6000	114.1 - 736.9	53.8	53.8	1.001
as left zero	6000	0.00	0.0	-0.2	----
as left span	6000	235.0 - 832.2	105.1	107.1	0.981
Average Correction Factor					0.998

Corrected As found	105.9	Previous response	104.8	% change	-1.0%
--------------------	-------	-------------------	-------	----------	-------

Notes:

After as founds, analyzer was checked for leaks/loose fittings. Inlet filter changed. Zero adjusted, span adjusted.

Calibration Performed By:

Devin Russell



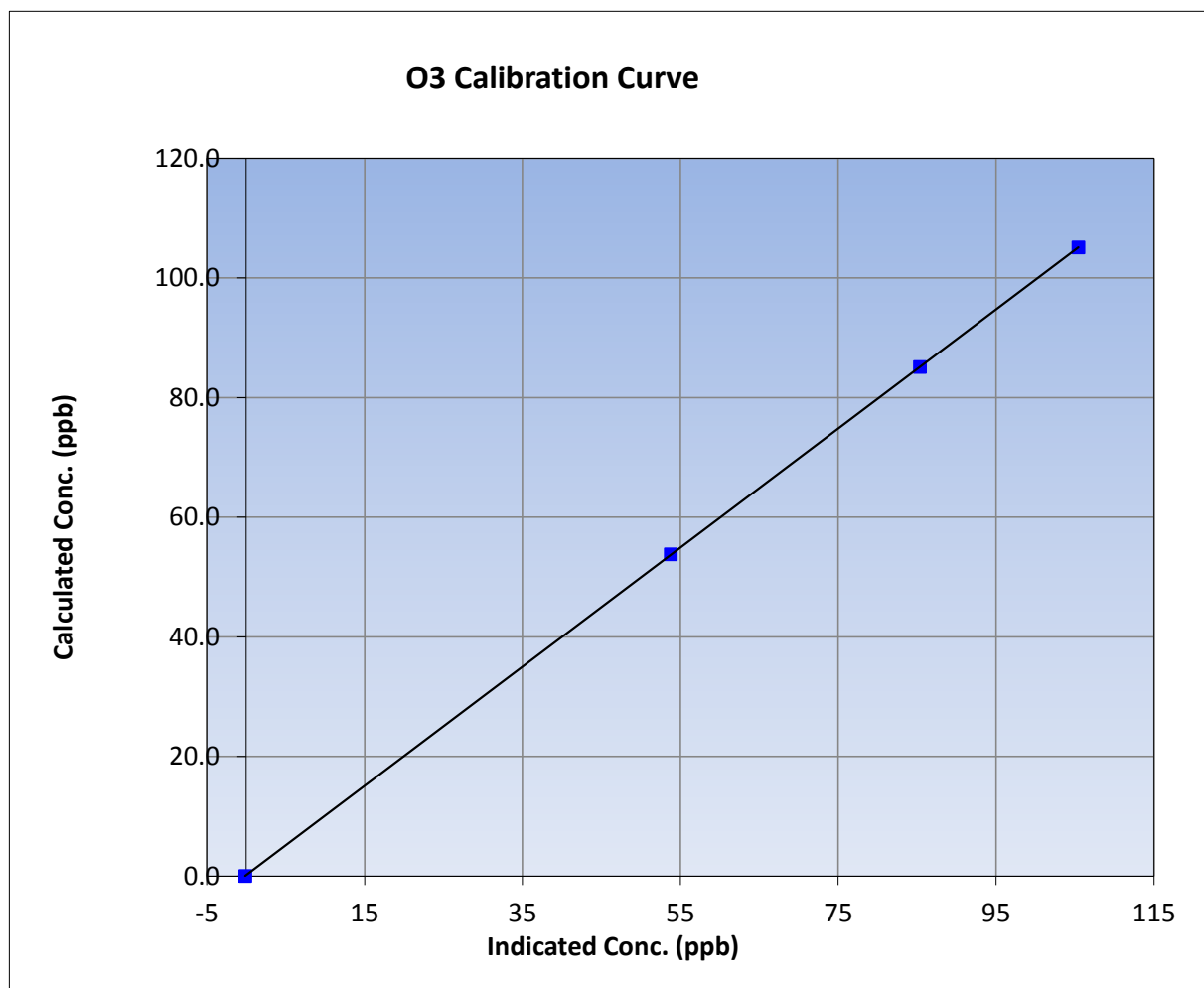
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-06-15	Previous Calibration	October 7, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:05	End Time (MST)	11:45
Analyzer make	Teledyne API T400	Analyzer serial #	1107

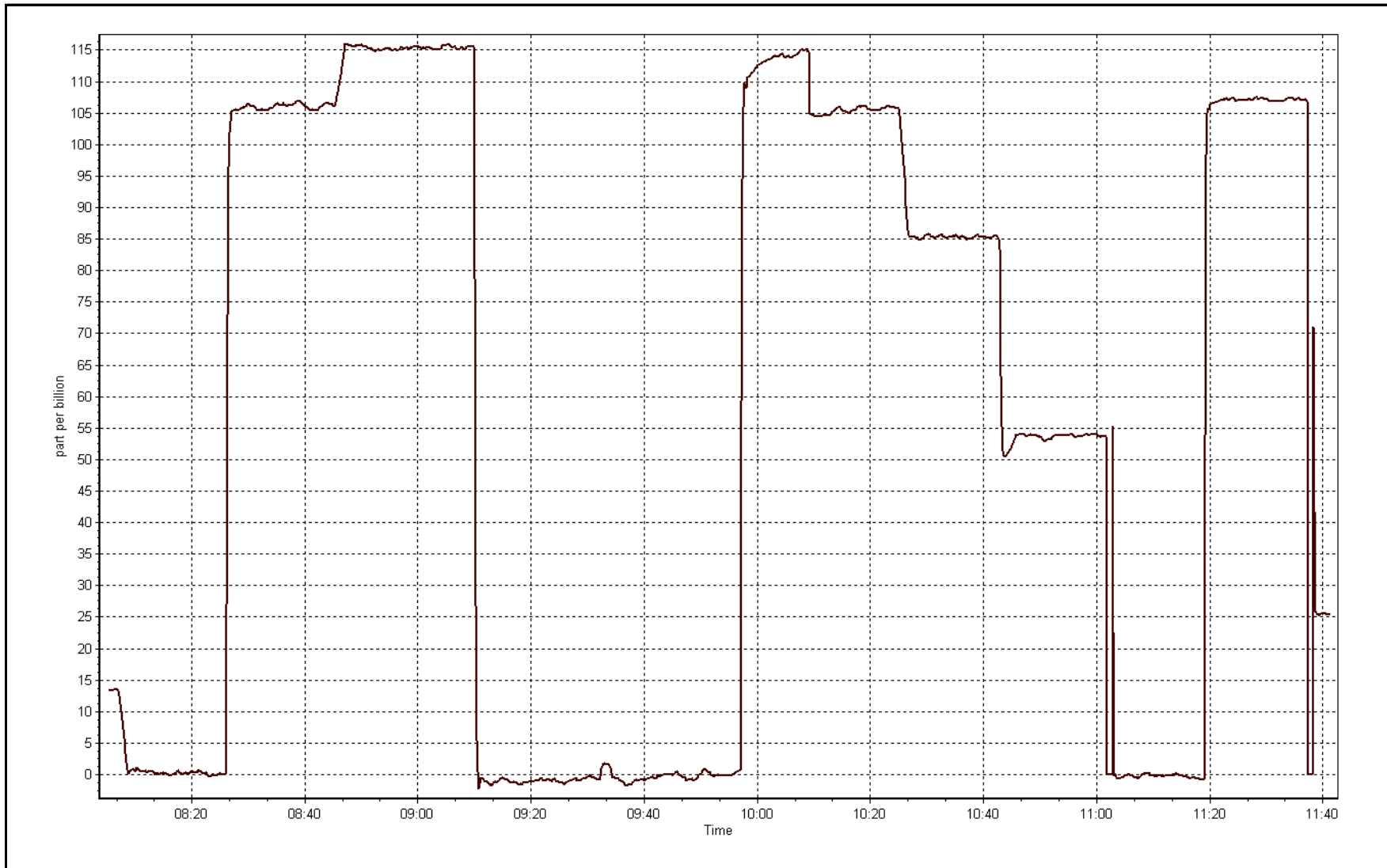
Calibration Data

Calculated concentration (ppb) (Cc)			Statistical Evaluation	
November-05-15				
0.0	-0.1	----	Correlation Coefficient	0.999997
105.1	105.4	0.9968		
85.1	85.4	0.9968		
53.8	53.8	1.0006		
			Slope	0.995504
			Intercept	0.157276



O3 Calibration Plot

Date: November 6, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 7, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	15:00	End Time (MST)	18:50
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
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997392	0.996801	1.007629
	Data Offset	0.733116	0.850012	-0.129017
Current Calibration	Data Slope	1.003222	1.000367	1.002420
	Data Offset	0.269622	0.483696	-0.054925

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	1.173		1.173	
NOx coefficient	1.183		1.183	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.1		0.1	
NOx bkgrnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314.2	Deg C	315.7	Deg C
HVPS	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	88	ccm	89	ccm
R Cell press NO	3.8	"Hg	3.8	"Hg
R Cell Press Nox	3.8	"Hg	3.8	"Hg
NO sample flow	1111	ccm	1116	ccm
Nox sample Flow	1088	ccm	1116	ccm

Notes:

Filter changed after As Finds. Elevated readings after as finds due to analyzer sampling room air while calibrator was purged. No adjustments made.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: November 5, 2015 Station Number: AMS 8

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as found span	6000	44.6	150.2	150.2	0.0	149.7	150.0	-0.3	1.0034	1.0014
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
high point	6000	44.6	150.2	150.2	0.0	149.7	150.0	-0.3	1.0034	1.0014
second point	6000	23.8	80.1	80.1	0.0	79.2	79.1	0.1	1.0112	1.0127
third point	6000	11.9	40.1	40.1	0.0	39.5	39.3	0.2	1.0155	1.0199
as left zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	6000	44.6	150.2	44.0	106.2	149.3	44.2	105.1	1.0059	0.9948
Average Correction Factor									1.0100	1.0113

Corrected As found NO_x= 149.6 NO= 150.0 Percent Change NO_x= 0.1% NO= -0.1%
 Previous Response NO_x= 149.8 NO= 149.8

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			0.1			N/A	
1st NO2 (300)	----	44.0	105.1	148.9	44.0	104.9	1.0007	1.0000	1.0013	99.9%
2nd NO2 (200)	----	64.0	85.1	148.9	64.0	85.0	1.0009	1.0000	1.0020	99.8%
3rd NO2 (100)	----	95.3	53.8	148.9	95.3	53.6	1.0008	1.0000	1.0030	99.7%
4th NO2 (0)	149.1	----	0.5	149.5	149.1	0.5	0.9967	1.0000	N/A	----
Average Correction Factor							0.9998	1.0000	1.0021	99.8%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

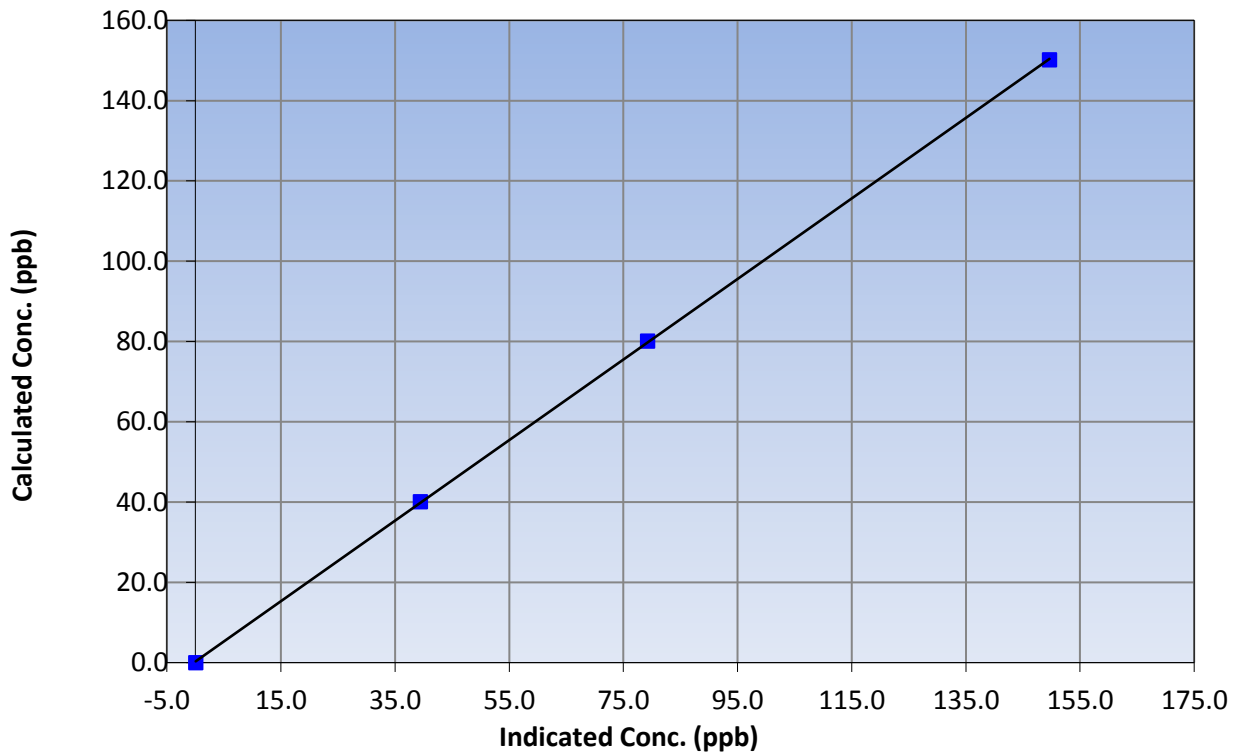
Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 7, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	15:00	End Time (MST)	18:50
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999972
150.2	149.7	1.0034		
80.1	79.2	1.0112	Slope	1.003222
40.1	39.5	1.0155		
			Intercept	0.269622

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

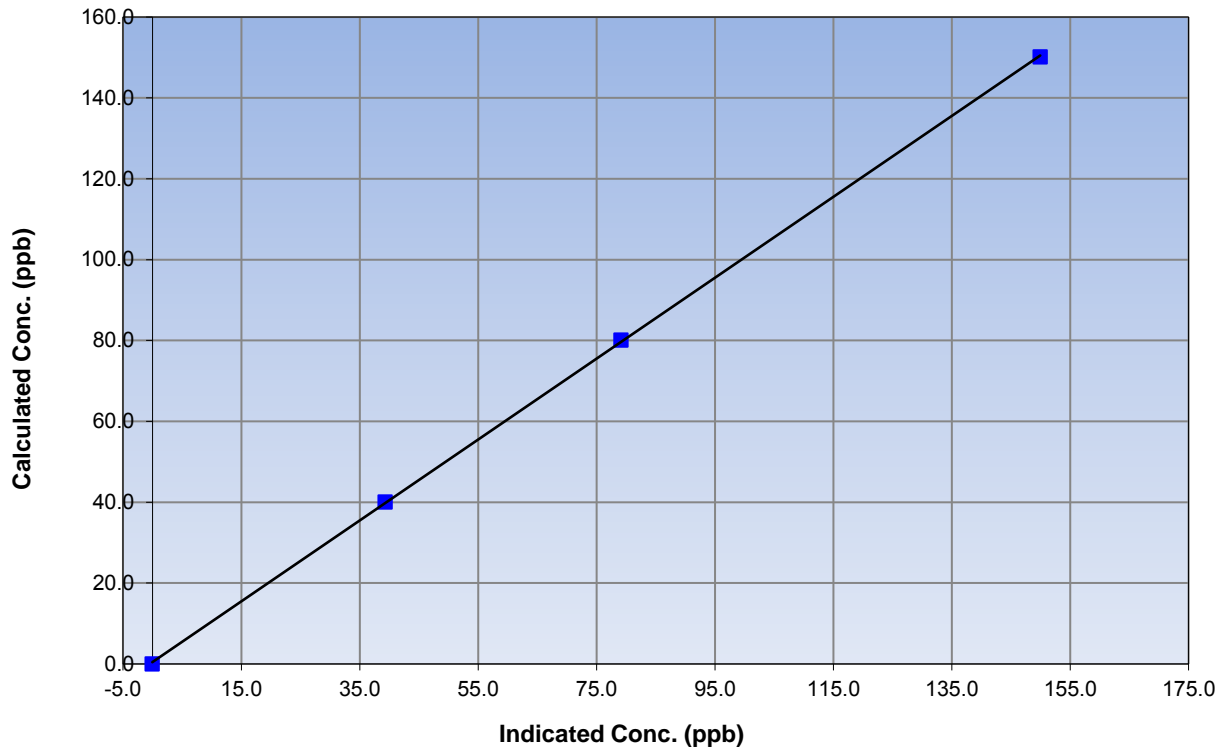
Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 7, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	15:00	End Time (MST)	18:50
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	0.999948
150.2	150.0	1.0014		
80.1	79.1	1.0127	Slope	1.000367
40.1	39.3	1.0199		
			Intercept	0.483696

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

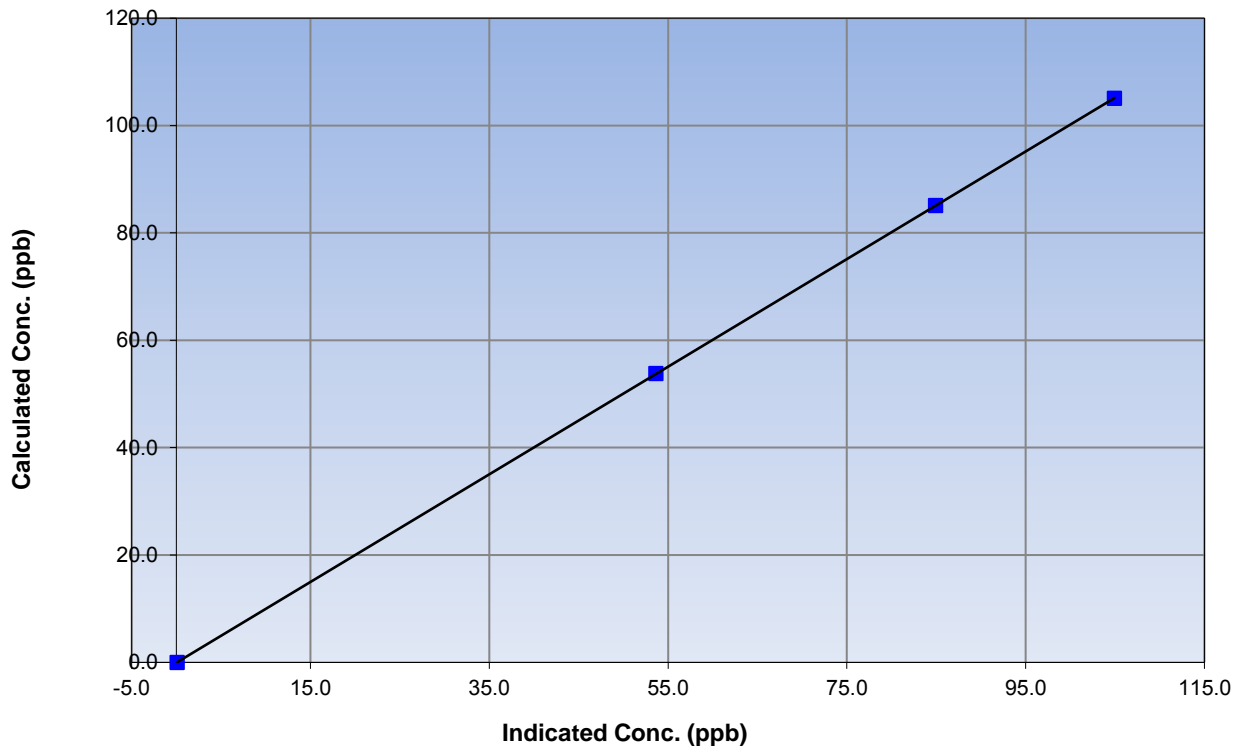
Station Information

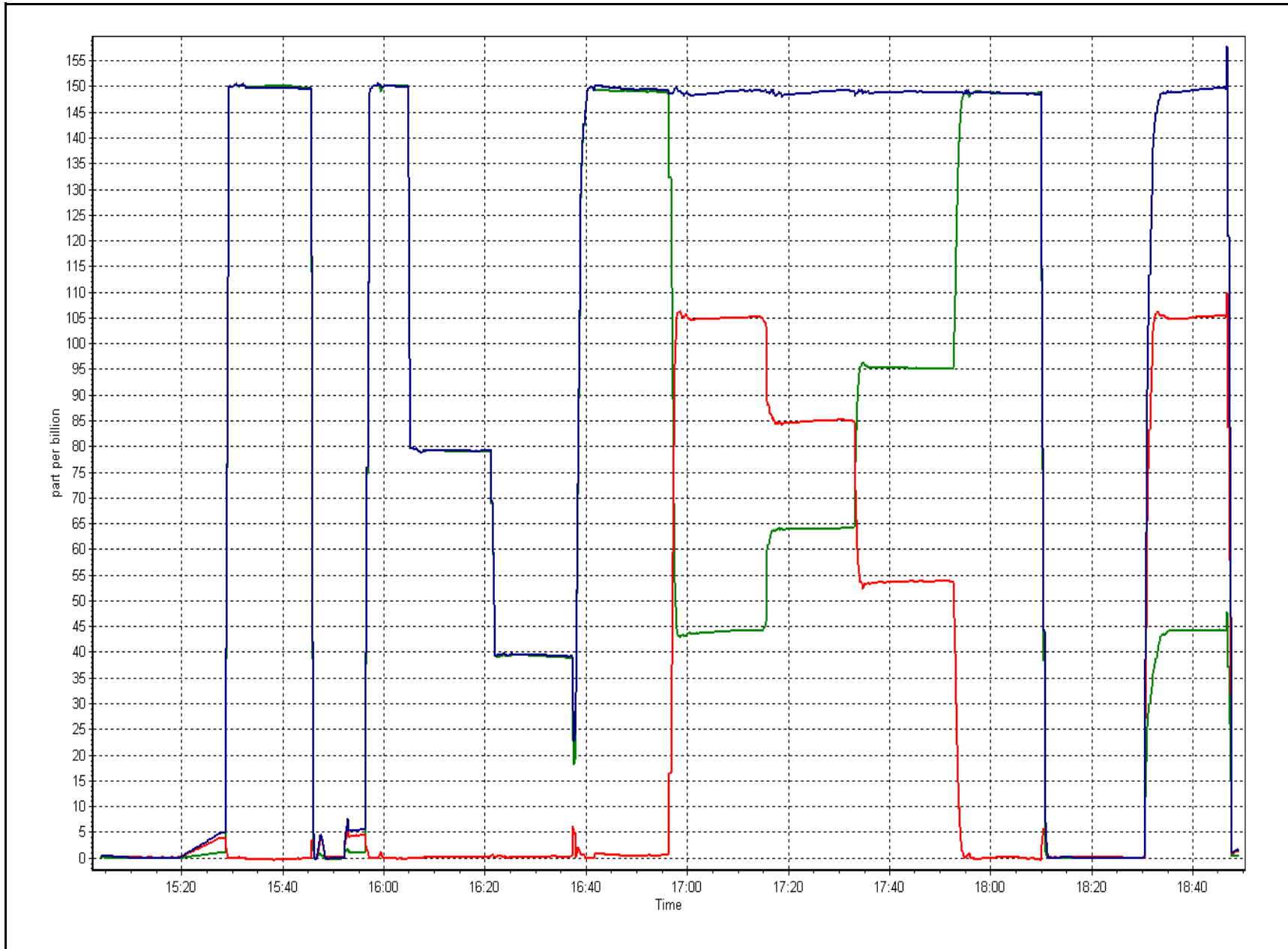
Calibration Date	November 5, 2015	Previous Calibration	October 7, 2015
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	15:00	End Time (MST)	18:50
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999998
105.1	104.9	1.0013		
85.1	85.0	1.0020	Slope	1.002420
53.8	53.6	1.0030		
			Intercept	-0.054925

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	<u>November 5, 2015</u>	Previous Calibration:	<u>October 7, 2015</u>
Station Name:	<u>Fort Chipewyan</u>	Station Number:	<u>AMS 8</u>
Start Time (MST):	<u>14:18</u>	End Time (MST):	<u>15:35</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>954</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-2025</u>
C 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	-5.0	-5.5	-0.5	-5.0
T2	17.0	na	na	21.0
T3	18.0	na	na	20.0
T4	21.0	na	na	25.0
RH (%)	21.0	na	na	27.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	988	984.9	-3.1	988

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1004	4	1004	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	193		193
Neph	12		0.3
C14	32.2		18.2
Indicated Concentration (ug/m3)	3.6	yes	0
Offset 1	180.6		194
Offset 2	30.7		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>		
Previous Correction Factor:	<u>7081</u>		<u>Mass foil set S/N:</u>
New Correction Factor:	<u>7022</u>		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	02/09/2015
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	na	NA
HEPA filter	Good	NA

NOTES:

Cyclone head cleaned. Nephelometer adjusted.

Calibration Performed By:	Devin Russell
----------------------------------	----------------------



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	687	33	33	100.00	3	0	1	0
THC(ppm) Average	686	34	34	100.00	3.2	-	2.8	-
Temperature (C) Average	720	0	0	100.00	8.5	-	3.5	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	96	-
Wind Speed 10 m (km/h) Average	718	0	2	99.72	17	-	11	-
Wind Direction 10 m (deg) Average	718	0	2	99.72	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	687	0.4	0	-	0	0	0	0	0	1	3
THC(ppm) Average	686	2.32	0.2	-	2	2.1	2.2	2.3	2.4	2.6	3.2
Temperature (C) Average	720	-4.24	5.5	-	-20.8	-12.6	-7.4	-3.4	-0.4	1.9	8.5
Relative Humidity (%) Average	720	77.3	14	-	38	56	67	81	88	93	98
Wind Speed 10 m (km/h) Average	718	6.4	3	-	0	3	4	6	8	10	17
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	09 Nov 2015 03:00	09 Nov 2015 03:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	19 Nov 2015 08:00	19 Nov 2015 08:00	1	Flat line in sensor output signal -sensor frozen

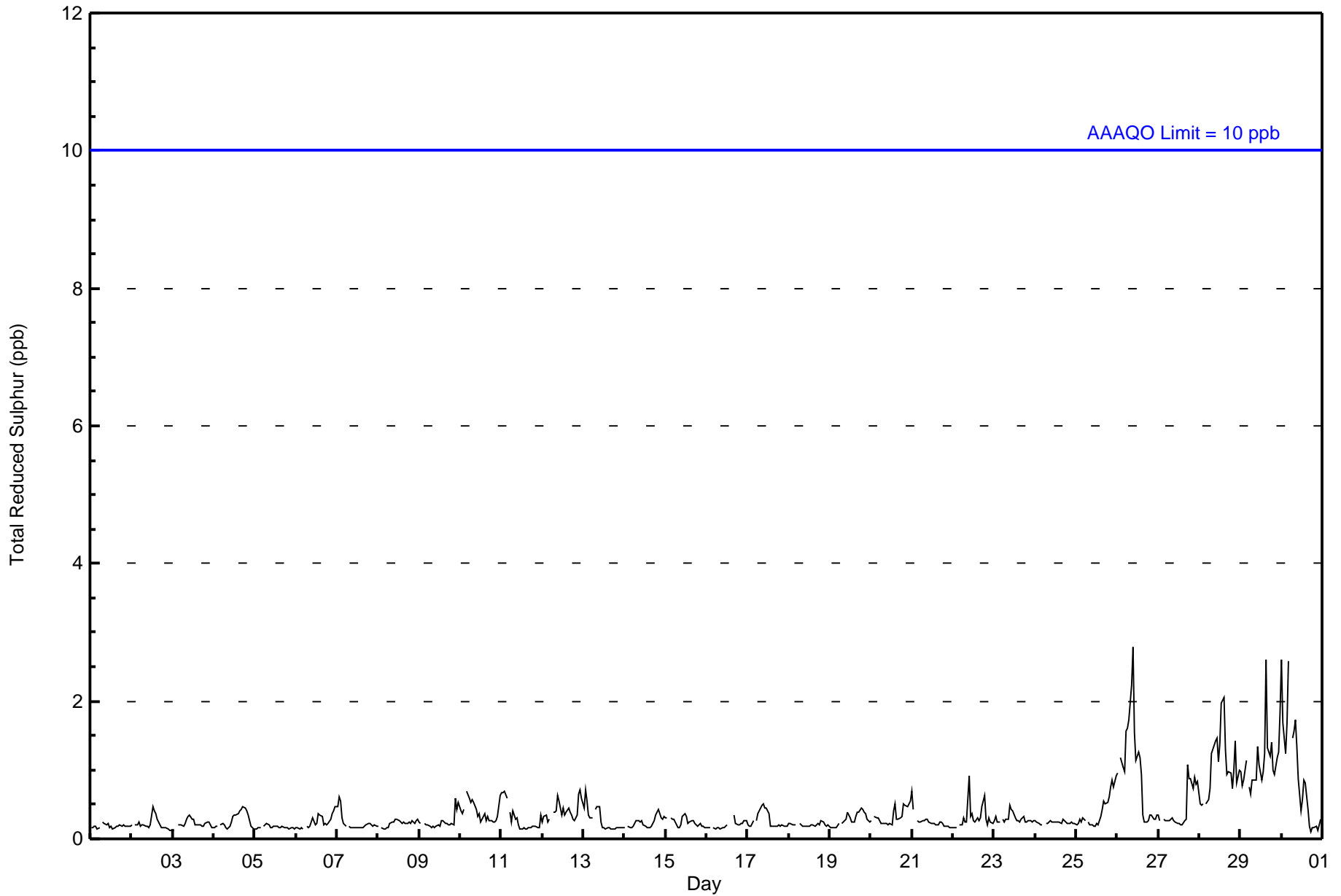


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Nov 26 10:00	Maximum Daily Average: 1.1 ppb on Nov 29		Hours of Data:	687
Minimum Value: 0 ppb on Nov 30 18:00	Minimum Daily Average: 0.2 ppb on Nov 5		Hours of Missing Data:	33
Maximum Diurnal Average: 0.5 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration:	33
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-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	0	Z	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
3-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Nov	0	0	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
5-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Nov	0	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Nov	0	Z	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
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.2	1
10-Nov	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
11-Nov	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	0.3	1
12-Nov	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
13-Nov	0	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0.2	0
17-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Nov	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
20-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.3	1
21-Nov	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Nov	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1
26-Nov	1	Z	1	1	1	2	2	2	2	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.0	3
27-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1
28-Nov	1	0	1	Z	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1.1	2
29-Nov	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	2	1.1	3
30-Nov	3	2	1	2	3	Z	1	2	2	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.9	3

0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	Diurnal Average		
3	2	1	2	3	2	2	2	2	2	3	2	1	1	2	2	3	1	1	1	1	1	1	1	1	2	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	683	99.42	99.42
3 - 4	4	0.58	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: 687

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	59	37	12	2	4	6	16	93	137	68	68	49	30	12	15	74	682
3 - 4	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
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	59	37	12	2	4	6	16	93	141	68	68	49	30	12	15	74	686

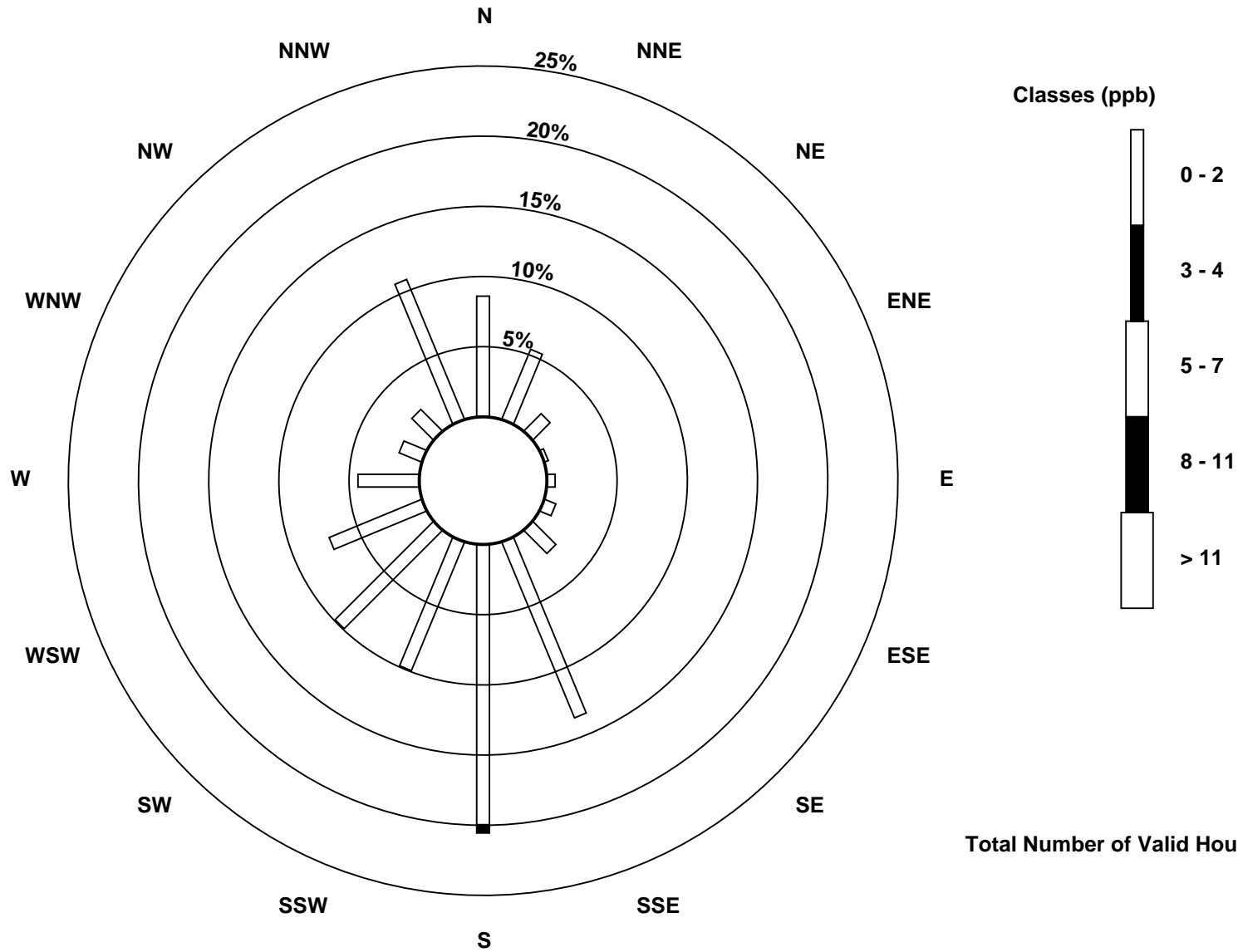
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)

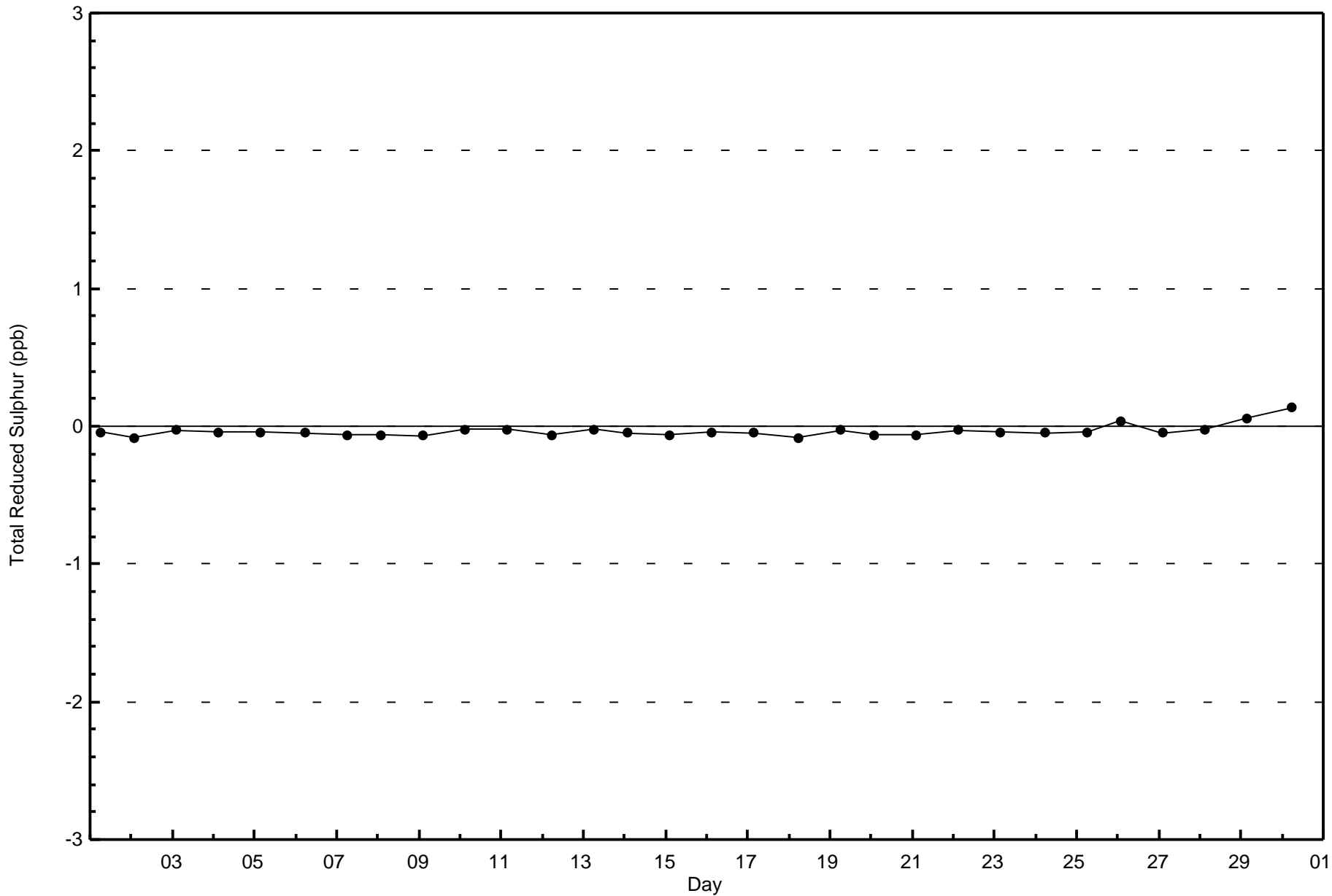


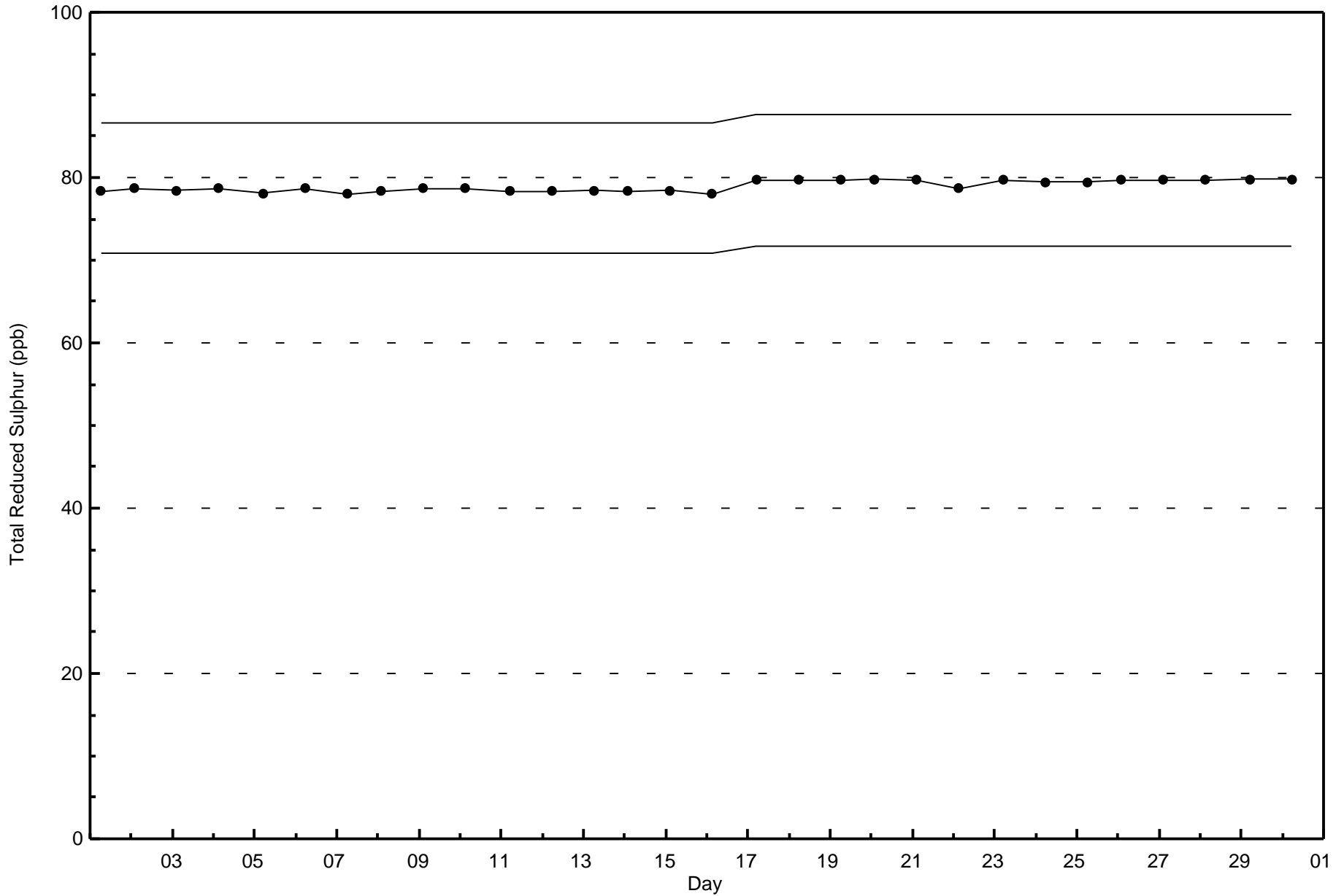
Total Number of Valid Hours: 686



Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Barge Landing - November 2015







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

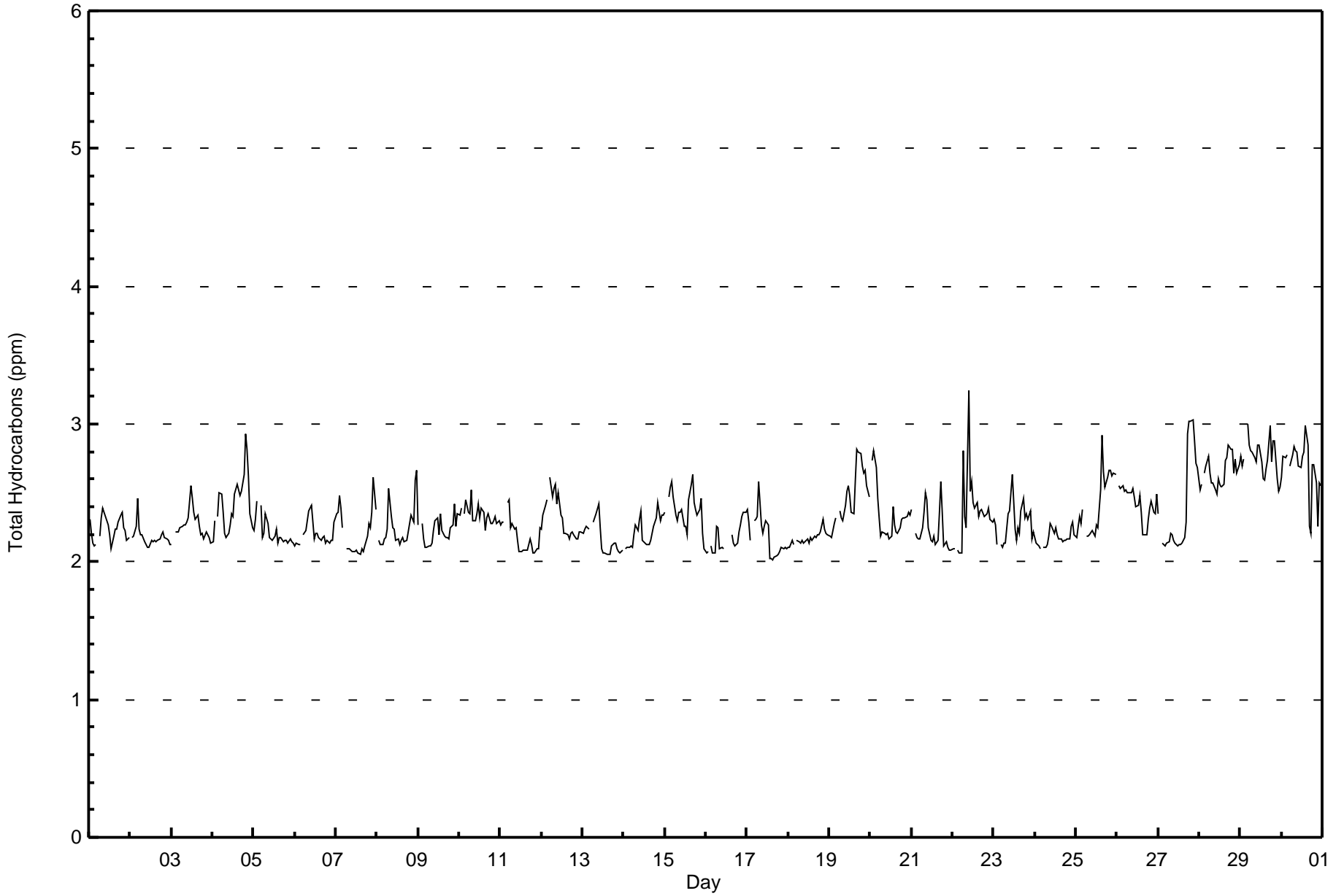
Barge Landing - November 2015

Maximum Value: 3.2 ppm on Nov 22 10:00																		Maximum Daily Average: 2.8 ppm on Nov 29						Hours in Service:	720		
Minimum Value: 2.0 ppm on Nov 17 16:00																		Minimum Daily Average: 2.2 ppm on Nov 13						Hours of Data:	686		
Maximum Diurnal Average: 2.4 ppm at hour 20																		Minimum Diurnal Average: 2.3 ppm at hour 14						Hours of Missing Data:	34		
Monthly Average: 2.32 ppm																		Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.0						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-Nov	2.3	2.2	2.1	2.1	2.1	Z	2.2	2.3	2.4	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.4
2-Nov	Z	2.2	2.2	2.3	2.5	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.5	
3-Nov	2.1	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.6		
4-Nov	2.1	2.3	Z	2.3	2.5	2.5	2.4	2.2	2.2	2.3	2.3	2.3	2.5	2.6	2.5	2.5	2.5	2.6	2.6	2.9	2.8	2.6	2.4	2.2	2.4	2.9	
5-Nov	2.2	2.3	2.4	Z	2.4	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.4	
6-Nov	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.3	2.2	2.4	
7-Nov	2.4	2.4	2.5	2.4	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	2.3	2.2	2.4	2.6	2.4	2.2	2.6	
8-Nov	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.5	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.6	2.7	2.3	2.7	
9-Nov	2.3	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.4	2.2	2.4	
10-Nov	2.3	2.4	Z	2.3	2.4	2.4	2.3	2.5	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	
11-Nov	2.3	2.3	2.3	Z	2.4	2.5	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	
12-Nov	2.2	2.3	2.4	2.5	Z	2.6	2.5	2.5	2.6	2.4	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	2.2	2.3	2.6	
13-Nov	2.2	2.2	2.3	2.2	2.2	Z	2.3	2.3	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	
14-Nov	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.4	
15-Nov	2.4	Z	2.5	2.5	2.6	2.5	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.2	2.4	2.6	2.6	2.4	2.4	2.3	2.4	2.5	2.2	2.1	2.4	2.6	
16-Nov	2.1	2.1	Z	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.1	C	C	C	C	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.2	2.4	
17-Nov	2.4	2.3	2.2	Z	2.3	2.3	2.3	2.6	2.3	2.2	2.3	2.3	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.6	
18-Nov	2.1	2.1	2.2	2.1	Z	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	
19-Nov	2.2	2.2	2.2	2.3	2.3	Z	2.4	2.3	2.3	2.4	2.5	2.6	2.5	2.4	2.3	2.6	2.8	2.8	2.8	2.7	2.6	2.7	2.6	2.5	2.5	2.8	
20-Nov	Z	2.7	2.8	2.7	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.8	
21-Nov	2.4	Z	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.5	2.2	2.2	2.1	2.2	2.1	2.2	2.4	2.6	2.4	2.1	2.1	2.1	2.1	2.1	2.2	2.6	
22-Nov	2.1	2.1	Z	2.1	2.1	2.1	2.8	2.3	2.2	3.2	2.5	2.6	2.4	2.4	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.4	3.2	
23-Nov	2.3	2.3	2.1	Z	2.1	2.1	2.1	2.1	2.3	2.4	2.5	2.6	2.2	2.2	2.2	2.2	2.4	2.5	2.3	2.4	2.3	2.4	2.2	2.2	2.3	2.6	
24-Nov	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	
25-Nov	2.2	2.3	2.3	2.3	2.4	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.5	2.9	2.7	2.5	2.6	2.7	2.7	2.6	2.6	2.6	2.4	2.9	
26-Nov	Z	2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.5	2.4	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.5	2.4	2.6	
27-Nov	2.3	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.9	3.0	3.0	3.0	2.9	2.7	2.7	2.4	3.0	
28-Nov	2.5	2.6	Z	2.6	2.7	2.8	2.6	2.6	2.6	2.5	2.5	2.6	2.6	2.5	2.6	2.7	2.8	2.8	2.8	2.8	2.6	2.7	2.6	2.7	2.7	2.8	
29-Nov	2.8	2.7	2.7	Z	3.0	2.8	2.8	2.8	2.8	2.7	2.8	2.9	2.7	2.6	2.6	2.7	2.7	3.0	2.7	2.9	2.9	2.6	2.5	2.5	2.8	3.0	
30-Nov	2.6	2.8	2.8	2.8	Z	2.7	2.8	2.8	2.8	2.8	2.7	2.7	2.8	2.8	3.0	2.8	2.3	2.2	2.7	2.7	2.6	2.3	2.6	2.6	2.7	3.0	
																								Diurnal Average			
																								Diurnal Maximum			
2.3 2.4 2.4 2.3 2.3 2.3																											
2.8 2.8 2.8 2.8 3.0 2.8 2.8 2.8 2.8 2.8 3.2 2.8 2.9 2.8 2.8 3.0 2.9 2.8 3.0 3.0 3.0 3.0 2.9 2.7 2.7																											
Z - zerospan C - Calibration																											



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	5	0.73	0.73
2.1 - 3.0	680	99.13	99.85
3.1 - 10.0	1	0.15	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0	5
2.1 - 3.0	56	39	12	1	4	6	16	95	141	66	64	50	30	8	15	75	678	
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	56	39	12	1	4	6	16	95	141	67	66	51	30	9	15	76	684	

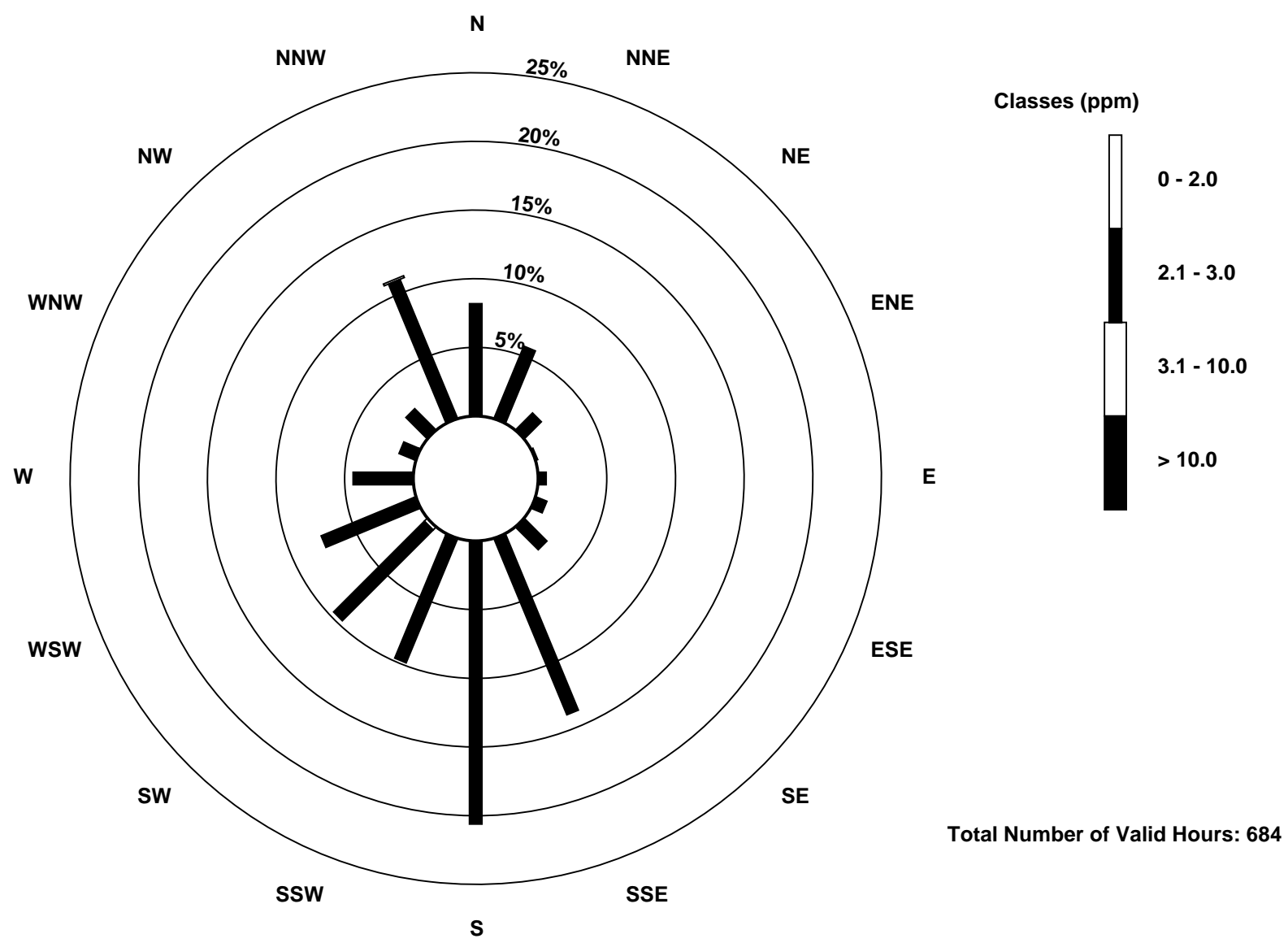
Total Number of Valid Hours: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

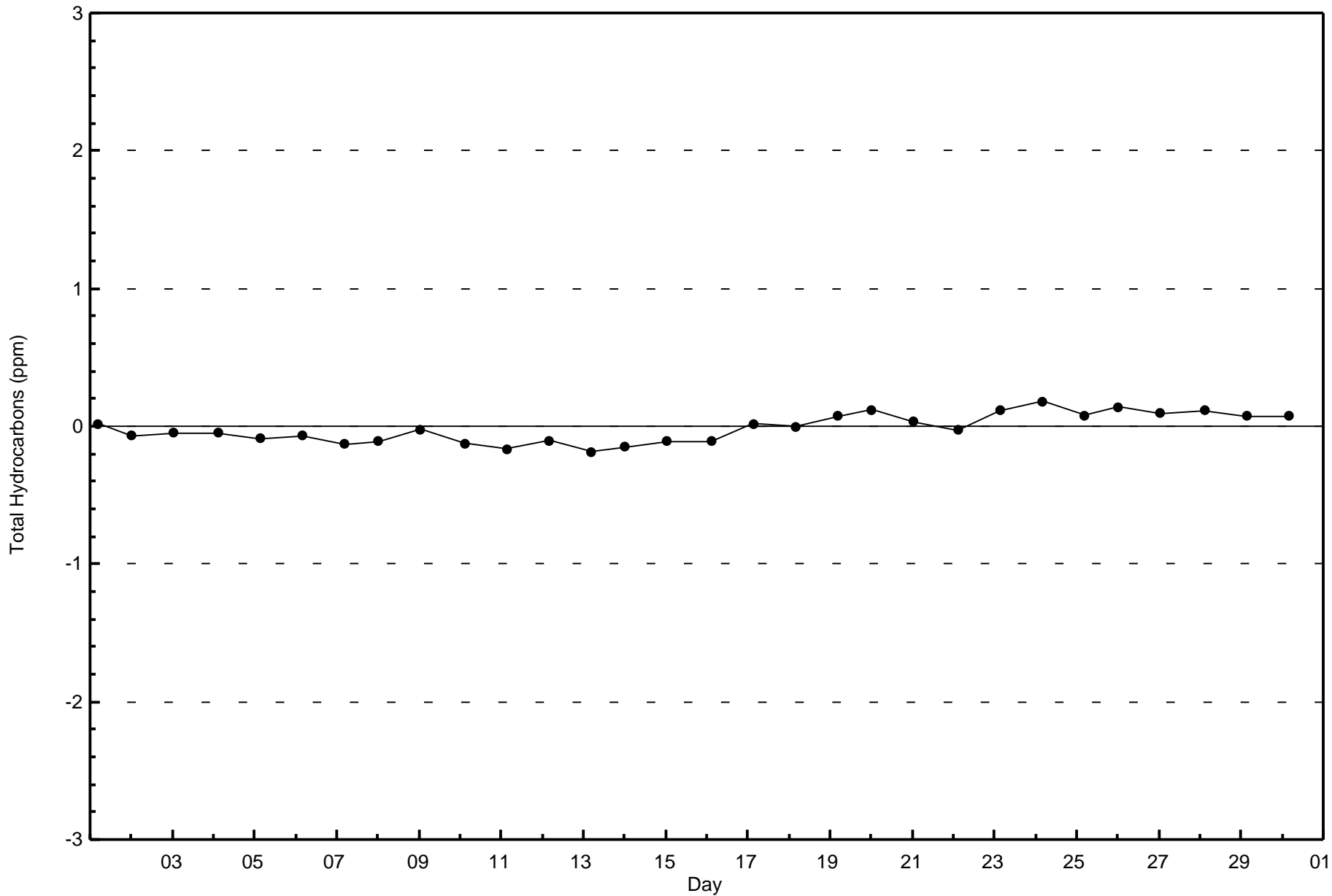
Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)

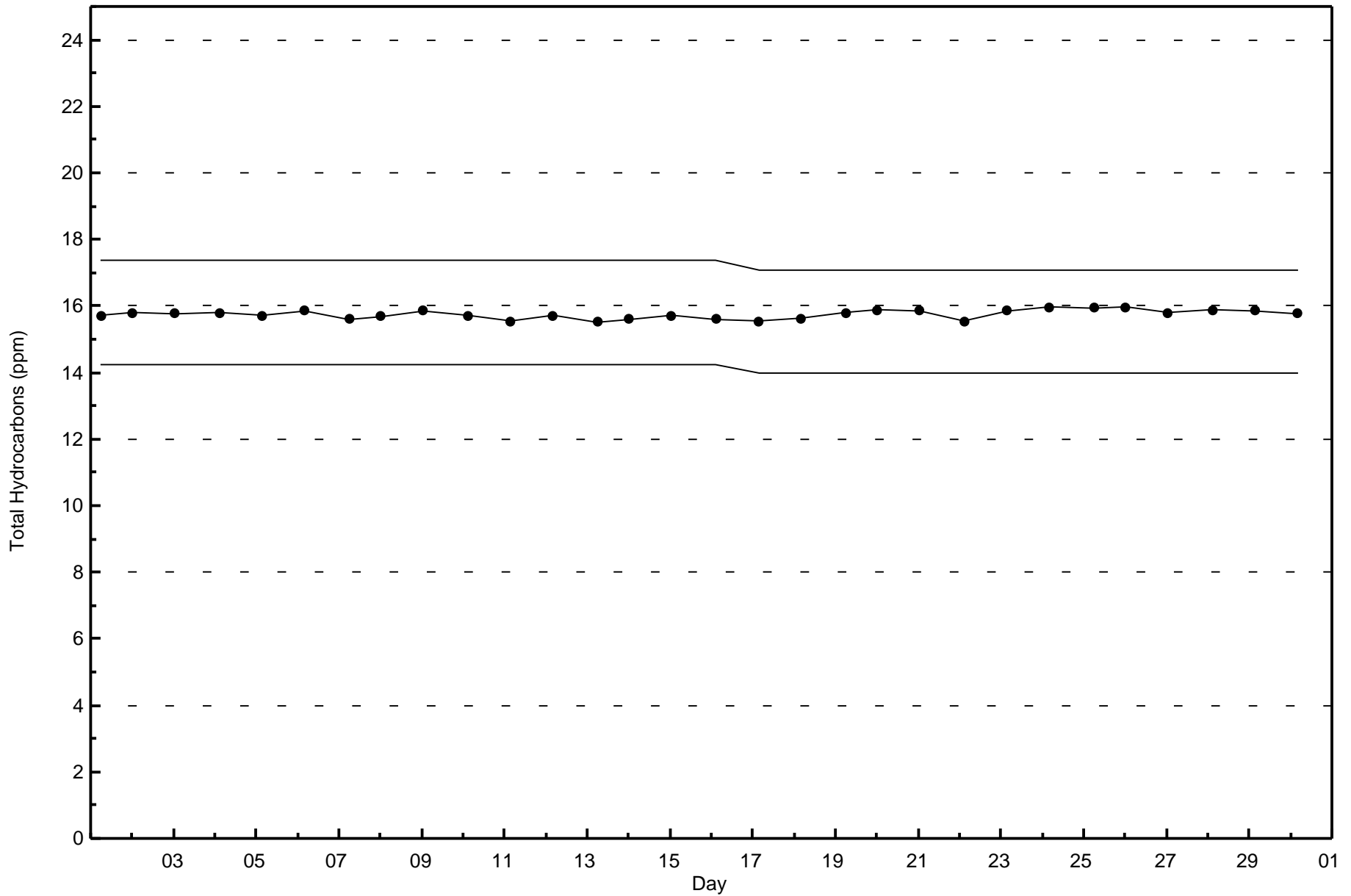




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Barge Landing - November 2015







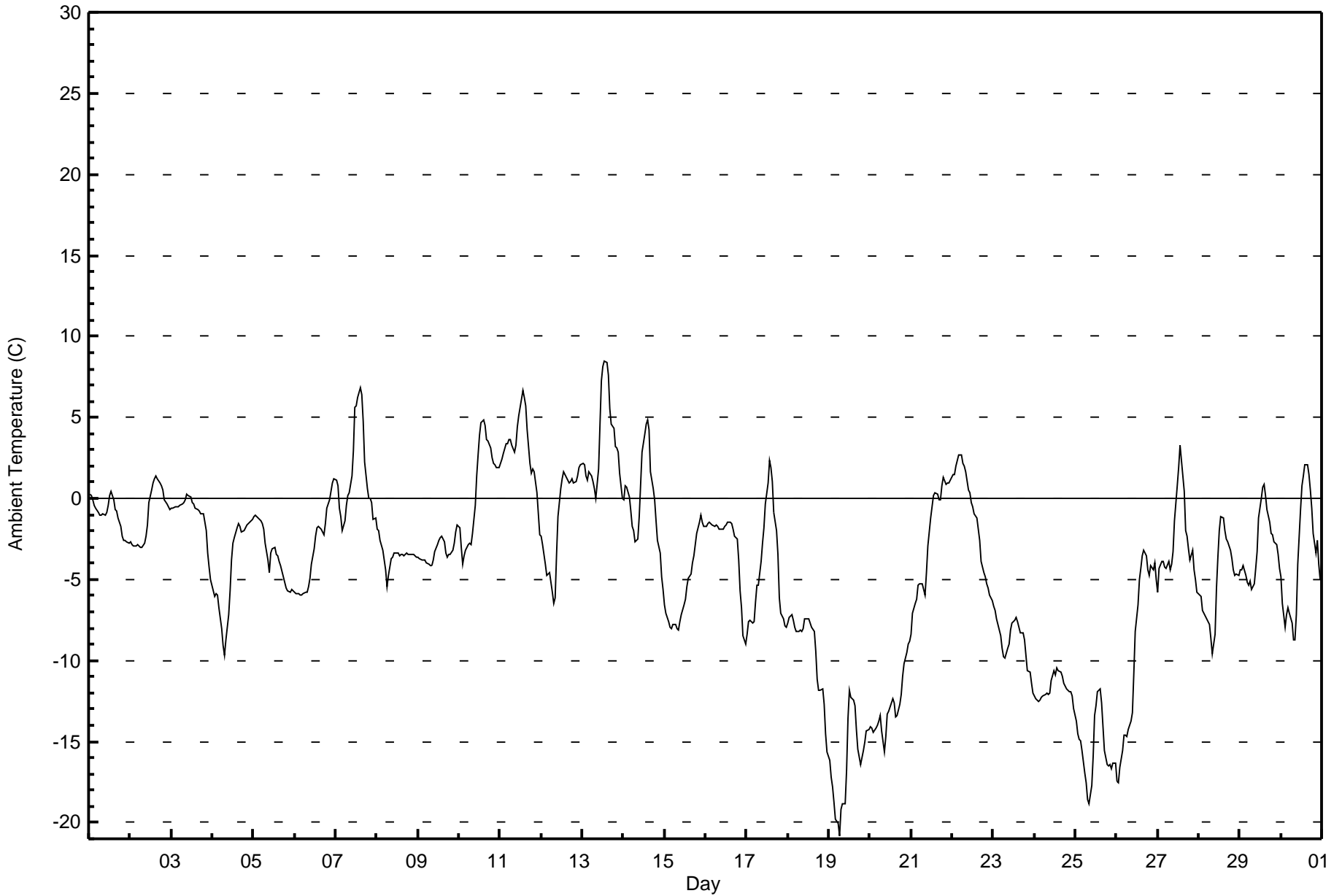
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Barge Landing - November 2015

Maximum Value: 8.5 C on Nov 13 14:00		Maximum Daily Average: 3.5 C on Nov 13		Hours in Service: 720																							
Minimum Value: -20.8 C on Nov 19 07:00		Minimum Daily Average: -16.2 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.6 C at hour 15		Minimum Diurnal Average: -6.1 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -4.24 C		Percentiles: P ₁ = -18.8 P ₁₀ = -12.6 Q ₁ = -7.4 Median = -3.4 Q ₃ = -0.4 P ₉₀ = 1.9 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-Nov	0.2	0.2	-0.1	-0.4	-0.6	-0.9	-1.0	-1.1	-1.0	-1.0	-0.9	-0.4	0.2	0.4	-0.1	-0.7	-0.8	-1.2	-1.7	-2.3	-2.5	-2.6	-2.7	-2.7	-1.0	0.4	
2-Nov	-2.7	-2.9	-2.9	-2.9	-2.9	-2.9	-3.0	-3.0	-2.7	-2.3	-1.6	-0.2	0.5	1.0	1.2	1.4	1.2	1.0	0.8	0.6	0.0	-0.3	-0.5	-0.7	-1.0	1.4	
3-Nov	-0.6	-0.6	-0.5	-0.5	-0.5	-0.4	-0.3	-0.3	-0.1	0.2	0.2	0.1	-0.2	-0.4	-0.6	-0.6	-0.8	-0.9	-1.0	-1.0	-2.0	-3.4	-4.2	-5.0	-1.0	0.2	
4-Nov	-5.7	-6.0	-5.9	-6.0	-6.7	-8.1	-9.1	-9.6	-8.7	-7.1	-5.7	-3.8	-2.8	-2.4	-1.8	-1.6	-1.7	-2.1	-2.0	-1.8	-1.6	-1.6	-1.5	-1.3	-4.4	-1.3	
5-Nov	-1.1	-1.0	-1.1	-1.3	-1.4	-1.6	-1.9	-2.7	-3.8	-4.6	-3.3	-3.1	-3.0	-3.5	-3.5	-3.9	-4.2	-4.8	-5.2	-5.5	-5.7	-5.8	-5.7	-5.7	-3.5	-1.0	
6-Nov	-5.8	-5.9	-5.9	-6.0	-6.0	-5.9	-5.8	-5.8	-5.4	-4.9	-4.1	-3.1	-2.4	-1.8	-1.7	-1.9	-2.1	-2.2	-1.6	-0.6	0.0	0.4	0.9	1.2	-3.2	1.2	
7-Nov	1.1	0.8	-0.6	-1.2	-2.0	-1.3	-0.4	0.2	0.3	1.4	2.9	5.6	5.7	6.2	6.8	6.4	4.8	2.3	0.6	0.0	0.0	-0.2	-1.3	-1.2	1.5	6.8	
8-Nov	-1.9	-2.0	-2.6	-3.2	-3.8	-4.4	-5.4	-4.7	-3.7	-3.6	-3.4	-3.3	-3.3	-3.6	-3.4	-3.4	-3.5	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	-3.6	-3.6	-3.5	-1.9
9-Nov	-3.6	-3.7	-3.8	-3.8	-3.8	-4.0	-4.1	-4.1	-4.1	-3.8	-3.3	-2.9	-2.6	-2.4	-2.3	-2.7	-3.3	-3.6	-3.5	-3.5	-3.2	-2.8	-2.1	-1.7	-3.3	-1.7	
10-Nov	-1.8	-3.0	-4.0	-3.5	-3.2	-2.8	-2.8	-2.8	-2.2	-0.4	1.4	2.7	3.9	4.7	4.9	4.5	3.6	3.5	3.1	2.5	2.2	2.1	1.9	1.9	0.7	4.9	
11-Nov	2.2	2.4	2.8	3.4	3.3	3.7	3.7	3.3	2.9	3.3	4.4	5.1	6.2	6.6	6.3	5.7	4.3	2.2	1.5	1.9	1.7	0.4	-0.9	-2.3	3.1	6.6	
12-Nov	-2.3	-2.9	-4.0	-4.8	-4.7	-4.6	-5.8	-6.5	-6.1	-3.4	-1.1	0.6	1.2	1.6	1.5	1.1	0.9	1.0	1.2	0.9	1.0	1.4	1.9	2.0	-1.2	2.0	
13-Nov	2.2	2.1	1.4	1.1	1.7	1.4	1.0	0.6	0.0	1.9	4.6	7.3	8.1	8.5	8.4	7.6	5.6	4.6	4.3	3.2	3.1	2.9	1.5	0.0	3.5	8.5	
14-Nov	-0.1	0.8	0.7	0.1	-0.8	-1.7	-2.0	-2.7	-2.5	-1.1	0.9	2.8	4.0	4.6	4.9	4.3	1.6	0.6	-0.1	-1.4	-2.6	-3.3	-4.8	-5.6	-0.2	4.9	
15-Nov	-6.6	-7.1	-7.6	-8.0	-8.0	-7.7	-7.7	-8.0	-8.1	-7.6	-7.2	-6.6	-6.2	-5.5	-4.9	-4.7	-4.0	-3.5	-2.9	-2.1	-1.5	-1.0	-1.4	-1.7	-5.4	-1.0	
16-Nov	-1.7	-1.5	-1.5	-1.6	-1.7	-1.7	-1.7	-1.7	-1.9	-1.9	-1.9	-1.7	-1.7	-1.4	-1.5	-1.5	-1.9	-2.3	-2.5	-3.8	-5.7	-6.8	-8.5	-9.0	-2.8	-1.4	
17-Nov	-8.4	-7.6	-7.5	-7.7	-7.6	-6.4	-5.3	-5.3	-3.8	-2.7	-1.8	-0.3	1.0	2.3	1.9	1.1	-0.9	-2.0	-3.5	-6.2	-7.1	-7.4	-7.8	-8.0	-4.2	2.3	
18-Nov	-7.7	-7.4	-7.2	-7.5	-8.0	-8.2	-8.2	-8.1	-8.2	-8.0	-7.4	-7.4	-7.4	-7.7	-7.9	-8.2	-9.4	-11.2	-11.9	-11.8	-11.7	-12.7	-14.5	-15.7	-9.3	-7.2	
19-Nov	-16.2	-17.2	-17.8	-18.8	-19.8	-20.0	-20.8	-19.2	-18.8	-18.8	-16.8	-13.6	-11.8	-12.2	-12.5	-12.8	-14.2	-15.5	-16.4	-16.0	-15.6	-15.0	-14.4	-14.3	-16.2	-11.8	
20-Nov	-14.1	-14.1	-14.4	-14.2	-14.0	-13.7	-13.4	-14.4	-15.6	-14.7	-13.3	-13.2	-12.6	-12.4	-12.6	-13.5	-13.4	-12.7	-12.1	-11.0	-10.2	-9.5	-9.0	-8.8	-12.8	-8.8	
21-Nov	-8.4	-7.1	-6.5	-6.2	-5.4	-5.3	-5.3	-5.7	-6.0	-4.6	-2.9	-1.2	-0.5	0.1	0.4	0.2	-0.1	-0.1	0.8	1.3	0.9	1.0	1.0	1.2	-2.4	1.3	
22-Nov	1.5	1.5	2.0	2.4	2.7	2.7	2.2	2.0	1.7	0.5	0.3	-0.3	-0.5	-0.9	-1.2	-1.9	-2.6	-3.9	-4.6	-4.9	-5.2	-5.5	-5.9	-6.3	-1.0	2.7	
23-Nov	-6.6	-6.9	-7.4	-8.2	-8.5	-9.3	-9.7	-9.9	-9.3	-9.0	-8.1	-7.7	-7.5	-7.4	-7.6	-8.0	-8.3	-8.3	-8.7	-9.7	-10.6	-10.7	-11.4	-12.0	-8.8	-6.6	
24-Nov	-12.2	-12.3	-12.5	-12.4	-12.3	-12.2	-12.1	-12.0	-12.1	-12.0	-11.3	-10.6	-10.9	-10.5	-10.6	-10.7	-11.0	-11.4	-11.6	-11.7	-11.9	-11.9	-12.2	-13.0	-11.7	-10.5	
25-Nov	-13.7	-14.5	-14.9	-15.0	-15.6	-17.0	-17.5	-18.6	-18.9	-17.7	-15.9	-13.4	-12.8	-11.9	-11.7	-12.6	-14.1	-15.6	-16.5	-16.5	-16.4	-16.7	-16.4	-16.3	-15.4	-11.7	
26-Nov	-17.5	-17.6	-16.6	-15.6	-14.6	-14.6	-14.7	-14.2	-13.7	-13.2	-10.8	-8.2	-6.5	-5.0	-4.3	-3.5	-3.2	-3.5	-4.4	-4.8	-4.1	-4.4	-4.0	-5.0	-9.3	-3.2	
27-Nov	-5.8	-4.3	-3.9	-3.9	-4.3	-4.3	-3.9	-4.4	-4.0	-3.3	-1.4	0.8	1.9	3.2	2.4	0.5	-1.9	-2.3	-3.1	-3.8	-3.2	-4.4	-5.1	-5.8	-2.7	3.2	
28-Nov	-5.9	-6.1	-6.9	-7.1	-7.3	-7.6	-7.8	-8.6	-9.6	-8.4	-5.5	-3.6	-2.0	-1.1	-1.2	-2.0	-2.5	-2.7	-3.2	-3.7	-4.4	-4.7	-4.6	-4.7	-5.1	-1.1	
29-Nov	-4.4	-4.4	-4.2	-4.8	-5.2	-5.4	-5.1	-5.7	-5.3	-4.3	-3.3	-1.2	0.0	0.7	0.9	0.1	-0.7	-1.4	-2.2	-2.3	-2.6	-2.8	-3.5	-4.3	-3.0	0.9	
30-Nov	-4.9	-6.5	-7.9	-7.1	-6.8	-7.1	-7.7	-8.7	-8.7	-7.2	-4.1	-0.6	0.8	1.4	2.1	2.1	1.5	0.5	-0.6	-2.1	-3.4	-2.6	-4.1	-5.0	-3.6	2.1	
		-5.1	-5.2	-5.4	-5.5	-5.6	-5.7	-5.9	-6.1	-6.0	-5.3	-4.0	-2.7	-2.0	-1.6	-1.6	-2.0	-2.7	-3.3	-3.7	-4.0	-4.2	-4.4	-4.8	-5.1	Diurnal Average	
		2.2	2.4	2.8	3.4	3.3	3.7	3.7	3.3	2.9	3.3	4.6	7.3	8.1	8.5	8.4	7.6	5.6	4.6	4.3	3.2	3.1	2.9	1.9	2.0	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - November 2015**

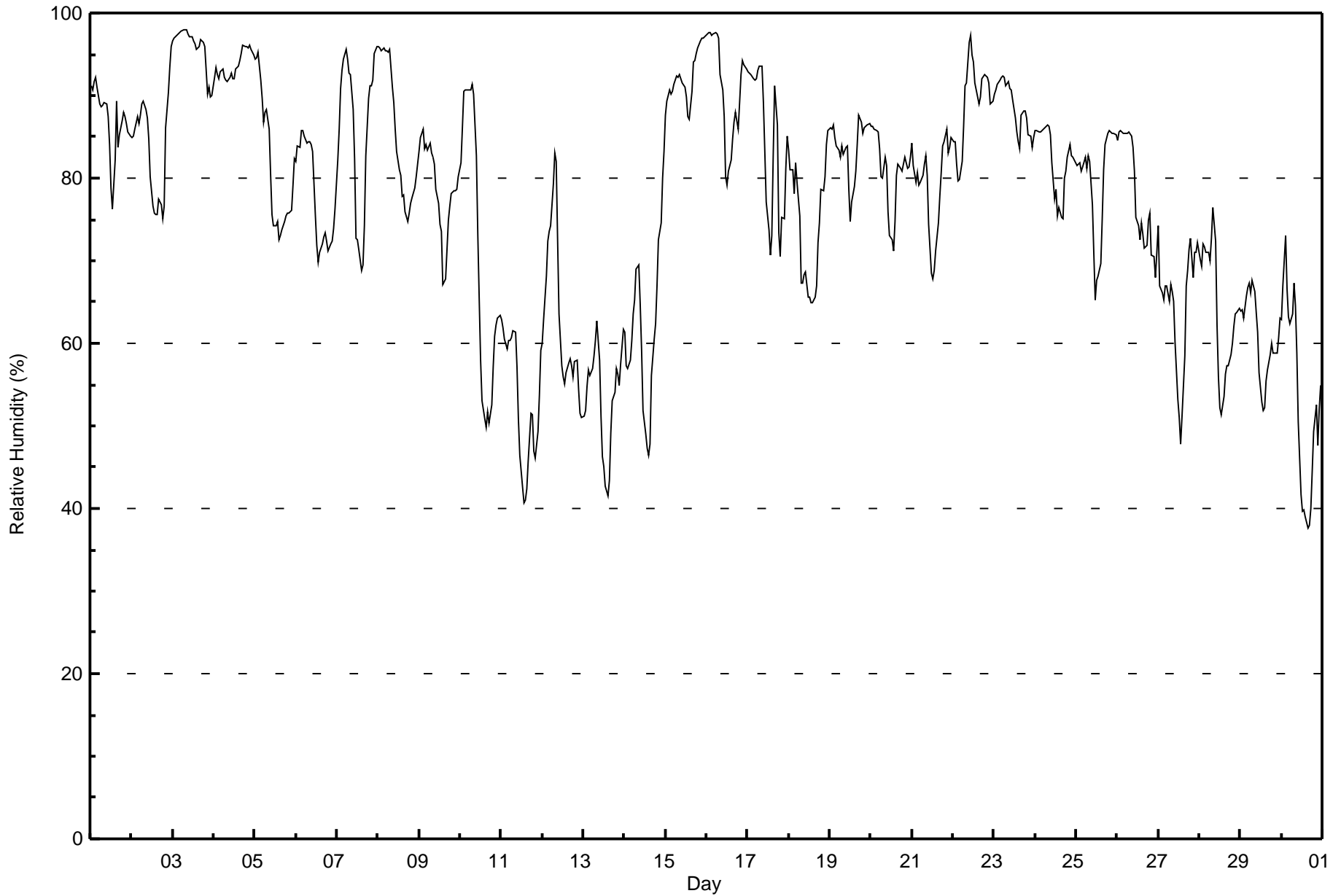
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	2	0.28	0.28
-20 - 0	563	78.19	78.47
0 - 10	155	21.53	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 98 % on Nov 3 08:00																		Maximum Daily Average: 95.9 % on Nov 3																		Hours in Service: 720														
Minimum Value: 38 % on Nov 30 16:00																		Minimum Daily Average: 53.1 % on Nov 11																		Hours of Data: 720														
Maximum Diurnal Average: 82.8 % at hour 8																		Minimum Diurnal Average: 68.5 % at hour 14																		Hours of Missing Data: 0														
Monthly Average: 77.3 %																		Percentiles: P ₁ = 41 P ₁₀ = 56 Q ₁ = 67 Median = 81 Q ₃ = 88 P ₉₀ = 93 P ₉₉ = 98																		Hours of Calibration: 0														
																																				Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Nov	91	91	92	92	91	89	89	89	89	89	88	84	79	76	82	89	84	85	87	88	88	87	86	85	87.0	92																								
2-Nov	85	85	86	87	87	88	89	89	88	87	85	80	77	76	76	76	77	77	75	77	86	90	93	96	83.8	96																								
3-Nov	97	97	97	97	98	98	98	98	98	97	97	97	97	96	96	96	97	97	96	96	90	91	90	90	95.9	98																								
4-Nov	92	93	93	92	93	93	92	92	92	92	93	92	92	93	94	94	95	96	96	96	96	96	96	95	93.7	96																								
5-Nov	94	95	95	92	90	87	88	88	86	81	76	74	74	75	72	73	74	75	76	76	76	76	79	82	81.4	95																								
6-Nov	82	84	84	86	86	85	84	84	84	84	83	75	72	70	71	72	73	73	72	71	72	72	74	76	77.9	86																								
7-Nov	82	86	91	93	94	96	94	93	93	88	82	73	73	71	69	70	74	83	90	91	91	92	95	96	85.8	96																								
8-Nov	96	96	95	96	96	95	95	96	91	89	86	83	81	80	78	78	76	75	76	77	78	79	80	82	85.5	96																								
9-Nov	83	85	86	84	84	83	84	83	83	82	79	77	74	73	67	68	71	75	77	78	79	78	79	80	78.8	86																								
10-Nov	82	86	91	91	91	91	91	91	90	83	73	65	58	53	51	50	52	50	53	57	61	62	63	63	70.7	91																								
11-Nov	63	62	60	59	60	60	61	62	61	57	51	46	43	41	41	42	46	51	51	47	46	49	54	59	53.1	63																								
12-Nov	60	63	68	72	74	74	79	83	82	72	64	57	56	55	56	58	58	57	56	58	58	54	51	51	63.2	83																								
13-Nov	51	52	55	57	56	57	59	60	63	58	51	46	45	43	41	43	49	53	54	57	56	55	57	62	53.4	63																								
14-Nov	61	57	57	58	60	64	65	69	69	65	59	52	49	47	46	48	56	60	62	67	72	75	80	83	61.8	83																								
15-Nov	88	89	91	90	90	91	92	92	93	92	91	91	90	87	87	91	94	94	95	96	97	97	97	97	92.2	97																								
16-Nov	98	98	98	97	97	98	98	97	93	91	87	80	79	81	82	85	87	88	86	89	93	94	94	93	90.9	98																								
17-Nov	93	93	93	92	92	92	93	94	94	89	83	77	74	71	73	83	91	86	73	70	75	75	81	85	84.3	94																								
18-Nov	83	81	81	78	82	80	75	67	67	68	69	66	66	65	65	66	67	72	75	79	78	80	84	86	74.1	86																								
19-Nov	86	86	86	85	84	83	83	84	83	84	84	79	75	77	79	81	84	88	87	85	86	86	86	87	83.6	88																								
20-Nov	86	86	86	86	86	84	80	80	83	82	76	73	72	71	75	80	82	81	81	82	83	81	81	83	80.8	86																								
21-Nov	84	82	79	81	79	79	80	82	83	80	74	69	68	69	71	75	78	81	84	84	86	83	84	85	79.1	86																								
22-Nov	84	84	82	80	80	82	86	91	92	96	97	95	94	92	90	89	90	92	93	92	92	92	89	89	89.3	97																								
23-Nov	90	91	91	92	92	92	92	91	92	91	89	87	86	84	84	88	88	88	87	85	85	84	85	85	88.6	92																								
24-Nov	86	86	86	86	86	86	86	86	86	85	82	77	79	75	76	75	80	81	83	84	83	82	82	82	82.2	86																								
25-Nov	82	82	82	81	81	83	81	83	82	77	71	65	68	68	70	75	81	84	85	86	86	85	85	85	79.5	86																								
26-Nov	85	86	86	85	85	85	85	86	85	84	81	75	74	73	75	73	72	72	75	76	71	71	68	71	78.2	86																								
27-Nov	74	67	66	65	67	67	65	67	66	65	60	53	51	48	51	59	67	69	71	73	68	71	72	72	64.8	74																								
28-Nov	70	69	72	72	71	71	70	73	76	72	62	56	52	51	54	56	57	57	59	60	62	64	64	64	63.9	76																								
29-Nov	64	64	63	66	67	67	66	68	66	64	61	56	53	52	52	55	57	59	60	59	59	59	61	63	60.9	68																								
30-Nov	63	67	73	67	63	62	64	67	65	59	51	42	40	40	39	38	38	40	45	49	53	48	55	55	53.2	73																								
																								81.2	81.4	82.1	81.9	82.0	82.1	82.2	82.8	82.5	80.1	76.2	71.6	69.7	68.5	68.8	70.7	72.9	74.6	75.2	76.2	76.8	77.0	78.0	79.4	Diurnal Average		
																								98	98	98	97	98	98	98	98	98	97	97	97	97	96	96	96	96	97	97	96	96	97	97	97	97	Diurnal Maximum	





Maximum Speed: 17 km/h on Nov 11 14:00	Maximum Daily Speed Average: 10.5 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 15 02:00	Minimum Daily Speed Average: 1.1 km/h on Nov 3	Hours of Data: 718
Maximum Diurnal Speed Average: 3.5 km/h at hour 23	Minimum Diurnal Speed Average: 1.6 km/h at hour 17	Hours of Missing Data: 2
Monthly Average Velocity: 2.5 km/h 206.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 8 P ₉₀ = 10 P ₉₉ = 14	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-Nov	NNE6	NNE6	N6	N7	NNE8	N8	NNE7	N7	N6	N8	NNE9	NNE9	NE8	NE7	NE6	NNE5	NNE6	N7	N8	N8	N7	NNE5	NE4	N5	NNE6.7	NNE9	
2-Nov	N5	NNW7	N6	NNE6	NNE4	E5	ENE5	E4	E3	ESE1	SSE2	SSE4	S7	S6	SSE7	SSE4	E2	SE6	SSE9	S7	SSE6	SSE6	SSE6	SE6	SE2.6	SSE9	
3-Nov	SSE6	SSE6	SSE4	SSE3	SSE3	SSE3	SE2	SSE3	SE1	NNW3	NNW3	NNW5	NNW5	NNW5	NNW5	NNW4	NNW3	NNW3	NW2	WSW4	WSW7	SW5	SW8	SW6	W1.1	SW8	
4-Nov	SSW4	SSW5	SSW6	SSW5	SW2	SW3	W2	W2	NNW2	NW3	W1	ESE2	NW2	NNW5	NNW3	NNW2	NNW4	NNW4	NNW2	W2	SW1	S2	WSW3	NW3	W1.5	SSW6	
5-Nov	NNW4	NNW4	NW4	NNW5	NNW5	N6	N4	NNE7	N8	N7	N7	N8	N7	NNE5	NNW6	NW6	NNW5	N6	N6	N5	N4	N3	W1	WSW1	N4.9	N8	
6-Nov	SW3	SSW3	SSW4	SE4	SE5	SE5	SE4	SE5	SE5	SSE5	SSE5	S6	SSE8	S9	SSE9	SSE9	SSE8	SSE9	SSE11	SSE11	S10	S12	S12	S11	SSE6.9	S12	
7-Nov	S8	SSW5	WSW5	SW4	SW3	SW4	WSW4	SW5	SW5	WSW7	SW7	SW10	SW6	SW7	WSW8	WSW7	SSW3	SSE4	SSW4	SSW5	SSW4	S5	SSE2	SW4	SW4.9	SW10	
8-Nov	SSW3	WSW5	WSW3	WSW4	NNE2	NNW3	N2	NE5	NNE8	NNE10	NE10	NNE8	NNE8	NNE9	NNE8	NNE7	NNE7	NE5	N5	N5	N5	N4	NNW4	NNW3	NNE4.3	NNE10	
9-Nov	NNW3	ENE1	AF	NNW3	NNW2	NNW2	W2	NNW2	NNE1	SW3	SW3	SW4	SSE5	S5	SW8	SW5	SSW4	SSW6	SW4	S4	SSE5	SSE7	SSE8	S8	SSW2.6	SSE8	
10-Nov	S6	SSE6	SSE7	S9	S10	S11	S10	S9	S9	S11	SSW12	SSW13	SSW13	SSW14	S12	S11	S12	S14	S13	S12	S11	S11	S10	S10	S10.5	SSW14	
11-Nov	S9	S9	S11	S12	SSE11	SSW8	SSW10	SSW10	SSW10	SW10	WSW12	WSW13	W15	WSW17	WSW15	SW12	WSW8	SW5	W10	WSW13	W15	WSW10	SW9	S6	SW9.1	WSW17	
12-Nov	S6	S5	SSE5	SSE5	S6	S5	SSE5	S4	SSE7	S7	S8	S9	S10	SSE11	SSE8	SSE8	SSE9	SSE10	SSE13	SSE12	SSE12	SSE13	S13	SSE14	SSE8.4	SSE14	
13-Nov	S14	S11	SSE9	S8	S10	S9	SSE8	SSE9	S10	S9	SSW11	WSW14	WSW13	SW12	WSW12	WSW10	WSW7	WSW6	WSW9	SW8	WSW10	WSW12	SW8	SW6	SSW8.2	S14	
14-Nov	WSW9	WSW8	WSW6	SW6	WSW6	SW5	SW5	SSW5	SSW5	SSE5	S6	WSW8	WSW10	WSW11	WSW8	WSW5	S3	SSW5	SSW5	SSW4	S3	NNW2	SSW1	WSW2	SW4.9	WSW11	
15-Nov	WSW2	SW0	S3	SSE2	ESE2	N2	NNW3	NNW3	NNW3	NNW5	NNW7	NNW7	NNW5	N6	N7	NNE7	NNE11	NNE13	NE11	NNE9	N8	NNW6	NNW7	NNE13	N4.7	NNE13	
16-Nov	N7	NNW7	N7	NNW5	NNW5	NW5	NW3	WSW4	W7	W11	W10	NNW11	NNW9	WSW9	WSW10	WSW9	SW4	SSW6	SSW6	SSW7	SSE6	SSE4	SE4	SE5	W3.7	W11	
17-Nov	SE4	SE5	ESE3	NNW2	NNE2	S3	SSW3	SSW3	S7	S8	S11	S12	S9	SW10	SSW9	WSW8	SW6	NNW6	NW10	NNW9	W9	W11	W12	W12	SW4.7	S12	
18-Nov	W9	W6	NNW5	NNW7	NNW7	NNW8	NNW11	NNW16	NNW14	NNW10	NNW13	NNW13	NNW11	NNW11	N9	N7	N6	N5	N3	NNW4	W3	NNW4	W4	WSW3	NNW6.9	NNW16	
19-Nov	S3	SW3	S4	SSW3	WSW1	WSW2	SSE1	AF	SSW3	S4	SW1	NNW3	W3	NNW4	NNW4	NNW4	NNW4	NNW4	NNW2	SE0	NW2	NNW2	NW4	NNW4	NW2	NNW1.2	NNW4
20-Nov	WSW3	WSW4	W2	W2	W3	W3	W6	W6	SSW2	SW4	WSW10	WSW8	SW10	SSW9	S8	SSE8	SSE7	SSE7	SSE8	S9	S10	S10	S7	SSW3	SSW5.0	SW10	
21-Nov	S5	SW5	WSW6	SW7	WSW7	SSW8	SSW8	SSW8	SSE6	S6	SSW7	SW7	SW8	SW8	SSW7	S6	S5	SSE5	SSW7	SW6	S7	SW7	SW8	SW8	SSW6.2	SSW8	
22-Nov	SSW7	SW8	WSW11	WSW11	W10	W8	NNE1	NW4	NNW4	NNW3	N4	NNE6	NNE4	NNE6	NE6	NE7	NNE7	NE8	NE5	NNE5	NNE6	NNE6	NNE7	N6	NNW2.7	WSW11	
23-Nov	N6	NNW5	N5	NNW4	NNW3	NNW3	NNW3	NNW3	N3	NNW3	NNW4	N5	NNW5	NNW4	N6	NNE6	N6	N6	N7	N6	N6	N5	N7	N5	N4.8	N7	
24-Nov	N5	N6	NNW5	NNW6	NNW7	NNW6	NNW5	NW4	NNW3	W4	WSW3	WSW2	N3	NNE4	N3	NW3	NW3	S2	SSW3	S4	SSW3	SSW4	SSW5	SSW6	NW1.8	NNW7	
25-Nov	SW8	SSW8	SSW9	SSW8	SSW7	WSW6	SW6	SSW3	SW5	SW4	S3	SW4	S5	S5	S4	S4	SSE5	ESE5	SE4	SE6	SSE5	SSE6	SSE5	S5	S4.8	SSW9	
26-Nov	SW4	SSW5	SSE5	S7	S8	S8	S7	S8	S7	S8	S8	S9	S8	S8	S8	SSW9	S9	S8	SE6	SSE8	S8	S9	SSW7	SSE5	S7.3	S9	
27-Nov	S8	SSW6	SW8	SW7	SW10	SW8	SW7	SSE5	SW9	SW5	S4	SSW4	SSW4	SW3	SSW3	SSE4	SSE6	S6	S6	S6	S8	SSE6	SSE7	SSE6	SSW5.1	SW10	
28-Nov	SSE7	SSE7	SSE7	SSE7	S8	S7	S7	S5	SSE6	SSE5	S7	S9	S9	S9	S8	S8	SSE7	S8	S6	SSE8	S9	S9	S9	S9	S7.3	S9	
29-Nov	S8	SSE7	SSE6	SSE4	SSE6	SSE7	SSE7	SSE7	SSE7	SSE7	S7	S8	SSE8	S7	SSE7	S8	S8	SSE7	SSE8	S9	S8	S8	S7	S8	SSE7.2	S9	
30-Nov	S7	S4	SSW5	S8	S10	S8	SSW7	SSW7	SSW7	S6	SSE8	S8	S9	S9	SSW8	SW9	SW9	SW8	SW7	S4	SSE6	SSW6	S6	SSE6	S6.8	S10	

SSW3.0SSW2.7SSW2.4 SW2.3SSW2.2 SW2.2SSW2.0SSW1.7SSW1.8SSW2.4 SW2.6 SW3.1 SW3.0 SW3.1 SW2.8 SW2.2SSW1.6 S1.9 S2.0SSW2.8SSW3.0SSW3.3SSW3.5SSW3.3 S14 S11 WSW11 S12 SSE11 S11 NNW11 NNW16 NNW14 W11 NNW13 WSW14 W15 WSW17 WSW15 WSW12 S12 S14 S13 WSW13 W15 SSE13 S13 SSE14	Diurnal Average	Diurnal Maximum
--	-----------------	-----------------

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 5 km/h on Nov 11 14:00	Hours of Data: 718
Minimum Value: 0 km/h on Nov 23 07:00	Hours of Missing Data: 2
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5	Hours of Calibration: 0
	Percent Operational Time: 99.7

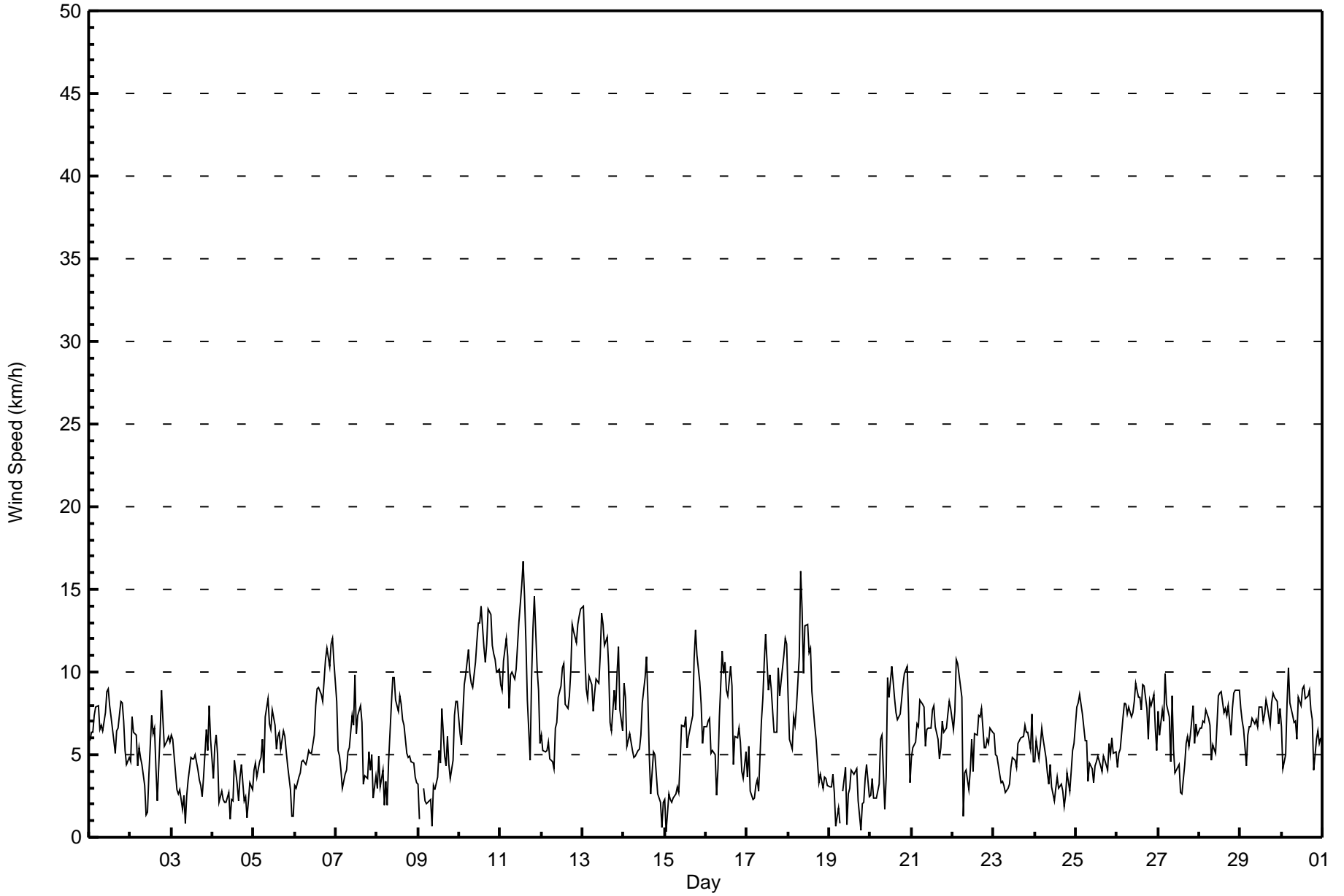
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	3	2	2	2	2	1	3
2-Nov	1	2	2	2	1	2	2	2	1	1	1	2	2	2	2	2	1	2	3	3	2	1	2	1	3
3-Nov	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2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

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	298	41.50	41.50
6 - 11	380	52.92	94.43
12 - 19	40	5.57	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: 718

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	22	11	4	2	4	6	13	31	28	34	31	19	14	8	13	58	298
6 - 11	37	27	8	0	0	0	4	63	106	32	38	29	12	4	2	18	380
12 - 19	0	1	0	0	0	0	0	5	11	4	1	10	4	0	0	4	40
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	59	39	12	2	4	6	17	99	145	70	70	58	30	12	15	80	718

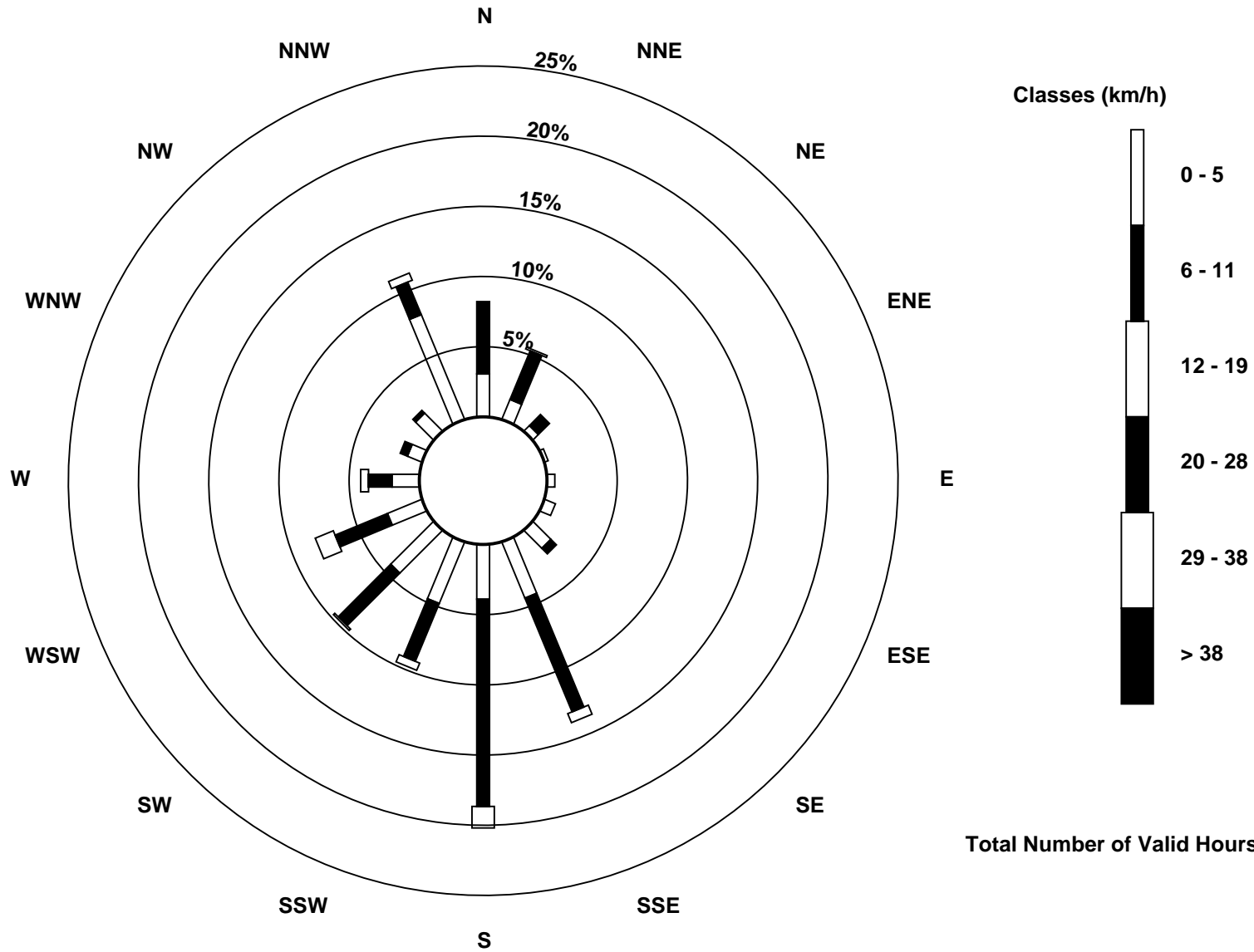
Total Number of Valid Hours: 718

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Barge Landing (AMS 9)



Total Number of Valid Hours: 718



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - November 2015

Direction of Maximum Speed: 257 deg on Nov 11 14:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 182.0 deg on Nov 10		Hours of Data: 718
Direction of Minimum Speed: 217 deg on Nov 15 02:00	Direction of Minimum Daily Speed Average: 1.1 deg on Nov 3	Hours of Missing Data: 2
Monthly Average Direction: 234.7 deg		Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	26	17	2	9	13	9	12	6	1	360	15	24	37	42	46	19	15	4	9	10	7	23	46	7	16.1
2-Nov	354	342	7	14	16	79	76	97	81	116	148	162	184	183	162	149	96	139	154	171	160	149	149	146	129.4
3-Nov	157	161	159	150	154	147	144	155	146	334	340	342	344	341	346	344	334	332	318	254	254	230	236	234	259.2
4-Nov	196	202	207	213	220	226	274	269	300	314	278	105	326	344	346	341	338	328	303	266	219	180	240	309	266.3
5-Nov	336	335	324	333	331	357	359	21	10	355	350	4	1	28	338	322	341	1	359	355	8	352	278	240	352.4
6-Nov	216	205	207	146	141	138	136	141	146	164	168	191	152	172	166	160	148	149	154	159	174	174	178	179	164.2
7-Nov	181	197	239	233	215	226	237	224	219	238	233	232	230	228	237	238	205	157	212	196	201	186	159	220	218.2
8-Nov	209	254	254	258	15	346	5	35	26	28	39	29	24	19	15	30	15	36	357	2	355	1	348	337	11.9
9-Nov	335	74	AF	340	335	292	279	335	15	228	218	220	167	179	227	214	207	206	228	176	158	149	168	174	199.5
10-Nov	176	166	160	170	176	174	181	181	177	180	193	194	200	197	189	172	180	181	184	187	182	182	177	175	182.0
11-Nov	181	179	176	174	168	192	205	210	207	214	237	248	259	257	242	236	238	226	260	258	261	240	231	170	224.6
12-Nov	182	186	158	154	171	184	148	175	153	172	190	182	170	167	162	155	152	153	150	156	157	162	170	167	164.6
13-Nov	171	172	167	173	180	176	160	164	172	184	199	237	242	232	247	244	243	245	243	232	247	244	229	220	210.2
14-Nov	243	238	242	236	240	230	219	192	198	151	181	219	241	238	237	238	180	195	205	210	169	332	198	254	222.6
15-Nov	256	217	178	156	106	357	337	338	344	341	333	332	338	337	2	357	13	12	19	35	26	11	343	339	0.4
16-Nov	351	348	354	342	336	314	318	244	270	262	267	288	290	258	244	257	220	206	211	193	157	154	132	124	266.8
17-Nov	146	131	114	300	19	183	192	201	180	178	175	179	184	224	207	245	236	289	305	288	260	265	263	260	226.8
18-Nov	260	269	341	346	328	329	337	336	334	339	343	339	348	345	350	357	1	7	349	283	274	299	280	240	332.2
19-Nov	187	214	186	211	246	255	160	AF	193	181	218	297	275	345	343	340	334	340	139	309	330	311	330	325	287.7
20-Nov	247	244	276	276	259	273	270	263	193	219	251	239	215	198	177	162	166	160	163	180	181	185	180	205	204.2
21-Nov	169	217	237	235	237	210	193	195	166	180	213	219	222	216	202	189	172	157	194	216	190	230	230	218	206.5
22-Nov	210	231	246	251	264	265	21	304	335	345	0	32	27	26	34	35	32	38	40	31	17	27	23	10	347.4
23-Nov	2	345	352	334	338	342	347	333	358	328	347	352	342	340	9	15	359	2	9	357	352	350	358	4	353.8
24-Nov	358	353	343	333	346	343	334	323	299	262	244	255	9	19	357	323	315	182	209	170	211	200	198	199	309.6
25-Nov	216	199	197	210	209	239	215	204	222	227	184	215	169	180	190	175	147	123	145	145	166	158	165	190	189.8
26-Nov	221	193	167	170	172	171	174	173	182	189	181	190	182	183	184	200	191	176	136	162	177	184	199	162	180.1
27-Nov	169	209	234	235	233	233	219	151	234	228	175	212	210	230	197	158	155	174	174	171	187	152	167	152	196.8
28-Nov	166	165	168	167	190	185	178	174	159	159	173	179	183	184	174	173	168	171	170	165	178	171	181	178	173.9
29-Nov	170	156	155	160	153	156	166	157	164	165	175	174	162	174	167	169	169	156	166	173	173	174	173	179	166.6
30-Nov	185	176	199	186	187	184	194	195	198	180	167	176	181	184	202	224	230	225	221	182	160	193	169	165	191.1

197.7	206.0	207.9	214.6	211.6	214.4	204.6	202.9	202.9	211.8	217.2	227.9	221.9	222.5	218.4	216.6	193.8	172.0	190.9	191.7	196.6	195.3	197.9	193.3
Diurnal Average																							

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

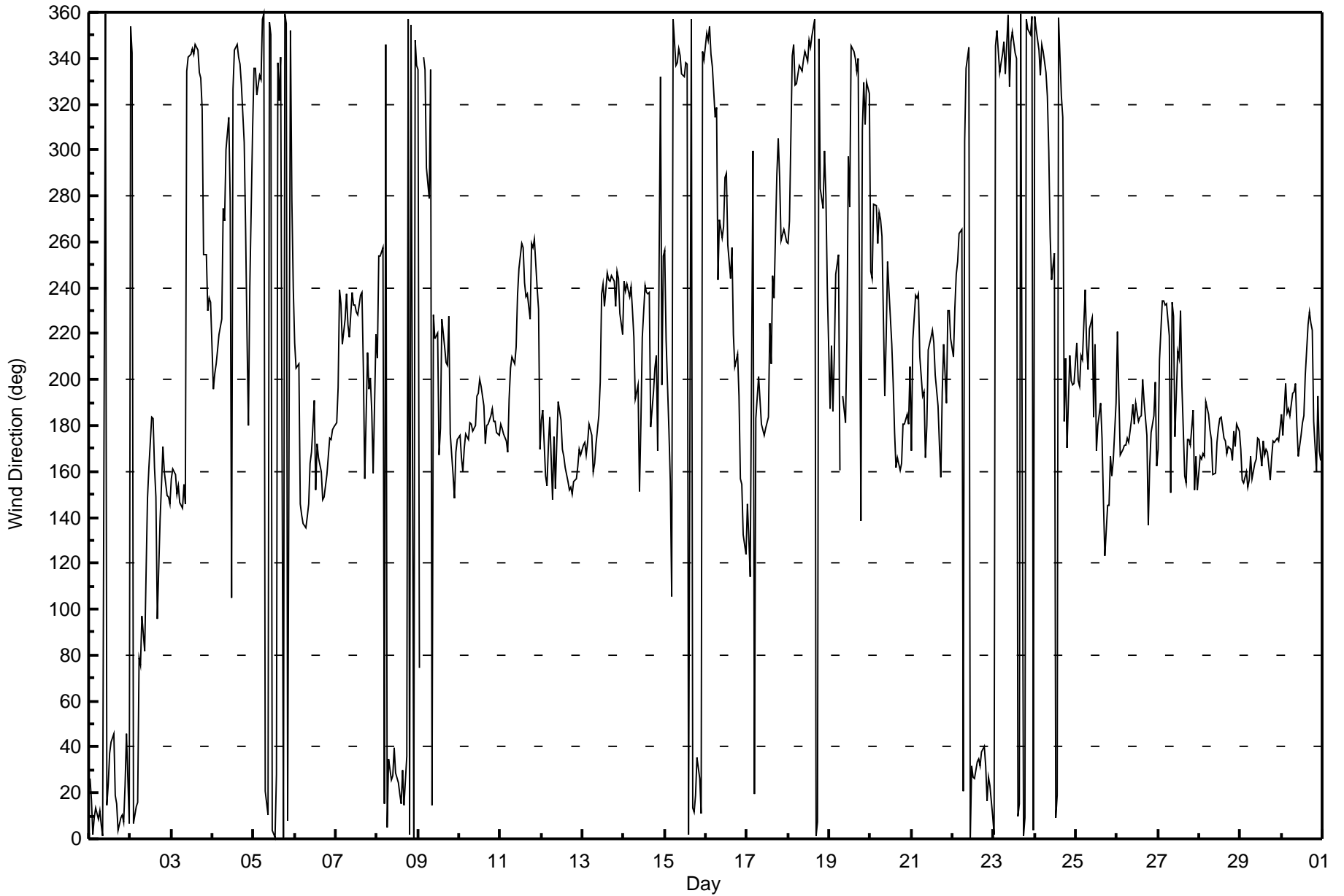
Wind Direction (WD) - deg
Barge Landing - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 94 deg on Nov 14 23:00	Hours of Data: 718
Minimum Value: 10 deg on Nov 9 05:00	Hours of Missing Data: 2
Percentiles: P ₁ = 12 P ₁₀ = 16 Q ₁ = 19 Median = 22 Q ₃ = 26 P ₉₀ = 35 P ₉₉ = 77	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-Nov	18	20	19	19	18	19	18	19	20	21	19	18	21	21	29	25	19	20	20	19	21	23	27	24	29
2-Nov	22	18	19	21	25	23	23	20	21	72	60	56	27	31	25	25	17	17	20	24	20	15	16	12	72
3-Nov	18	22	21	19	17	18	28	21	67	27	24	19	19	20	19	15	17	24	27	20	21	18	21	67	
4-Nov	23	20	23	20	28	24	23	33	46	38	90	44	65	15	21	29	21	20	29	30	80	40	39	27	90
5-Nov	15	16	21	16	16	20	24	20	19	21	21	22	30	25	24	22	21	20	22	20	22	22	26	46	46
6-Nov	17	22	19	16	14	12	13	15	13	22	24	32	22	26	23	21	16	16	20	22	26	23	24	24	32
7-Nov	24	34	20	23	50	45	81	39	31	16	24	18	22	21	19	18	33	32	29	17	27	21	70	39	81
8-Nov	35	33	41	25	51	46	40	21	19	17	20	21	21	20	20	19	23	24	18	19	18	20	19	18	51
9-Nov	16	33	AF	11	10	27	34	36	79	42	35	30	29	39	28	25	23	23	26	31	22	14	22	21	79
10-Nov	23	18	16	19	21	22	23	22	22	23	25	24	26	25	26	23	23	23	23	24	26	24	24	23	26
11-Nov	24	26	24	24	22	31	22	22	21	22	21	17	21	20	19	19	17	21	22	17	19	17	18	30	31
12-Nov	21	20	22	25	22	30	19	24	15	24	25	25	25	24	19	15	14	16	18	20	19	22	24	23	30
13-Nov	24	25	22	22	24	22	18	17	20	22	23	20	20	25	20	18	14	14	18	19	15	14	29	21	29
14-Nov	18	24	30	18	30	31	30	32	26	21	32	26	22	18	18	15	33	18	16	15	43	51	94	27	94
15-Nov	14	81	29	57	35	21	11	13	17	16	16	16	18	20	21	19	22	19	18	21	20	20	22	17	81
16-Nov	17	17	20	19	17	20	60	40	28	18	23	28	31	22	15	20	30	24	28	22	17	22	25	13	60
17-Nov	38	26	67	89	52	56	73	76	23	25	25	23	26	23	25	30	18	33	28	30	21	25	20	18	89
18-Nov	25	35	35	22	28	22	20	20	21	21	21	22	21	23	21	18	17	28	23	36	28	36	31	36	36
19-Nov	24	27	17	25	69	51	87	AF	35	27	90	41	44	28	16	13	11	13	90	27	29	18	13	24	90
20-Nov	28	12	23	41	35	45	30	22	53	30	19	22	25	29	24	19	22	23	21	25	26	25	24	80	80
21-Nov	30	35	22	20	21	22	22	19	24	30	29	32	25	24	25	21	16	19	21	25	37	24	21	25	37
22-Nov	26	21	15	17	20	20	71	44	37	21	21	19	19	16	17	18	17	17	20	17	17	18	18	19	71
23-Nov	20	21	17	13	13	15	14	23	21	28	23	24	22	26	21	18	19	18	19	20	20	21	20	18	28
24-Nov	18	18	18	16	18	18	15	13	17	16	31	50	31	29	39	36	34	49	28	26	36	25	22	20	50
25-Nov	22	20	22	23	22	22	25	23	17	21	40	30	35	40	27	17	19	13	11	14	16	13	18	21	40
26-Nov	23	30	15	19	20	20	21	19	24	22	24	25	26	24	20	20	21	22	19	27	20	22	34	41	41
27-Nov	22	34	20	19	15	15	22	35	16	39	35	33	25	38	35	18	14	18	21	15	20	23	15	14	39
28-Nov	14	16	17	15	22	20	22	23	18	20	24	25	25	25	24	21	15	16	21	16	20	18	20	20	25
29-Nov	20	19	20	24	18	14	17	15	26	21	21	25	21	26	21	19	17	15	19	17	16	20	20	20	26
30-Nov	22	27	26	21	20	21	24	30	28	32	20	27	23	20	20	19	16	16	20	40	27	20	18	13	40

38	81	67	89	69	56	87	76	79	72	90	56	65	40	39	36	34	49	90	40	80	51	94	80	
Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	November 16, 2015	Last Calibration	October 20, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	16:05
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	LL104180 12/Feb/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-690	-690
Analyzer IP address	192.168.1.42		Lamp voltage	1001	1008
Calculated slope	1.015056	0.989555	Chamber temp	45	45
Calculated intercept	-0.222826	-0.113151	Pressure	685.1	680.5
Analyzer Background	1.97	2.01	Flow	0.435	0.431
Analyzer Coefficient	1.033	1.051	Intensity	91	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	519	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	83.7	79.8	78.4	1.019
SO2 scrubber check	5000	15.4	147.2	1.4	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.7	79.8	80.7	0.990
second point	5000	41.9	40.0	40.7	0.982
third point	5000	21.0	20.0	20.4	0.980
as left zero	6000	0.0	0.0	0.2	----
as left span	5000	83.7	79.8	80.2	0.996
Average Correction Factor					0.984

Corrected As found	78.4	Previous response	78.9	% change	0.6%
--------------------	------	-------------------	------	----------	------

Notes:

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

Calibration Performed By:

Evan Magill



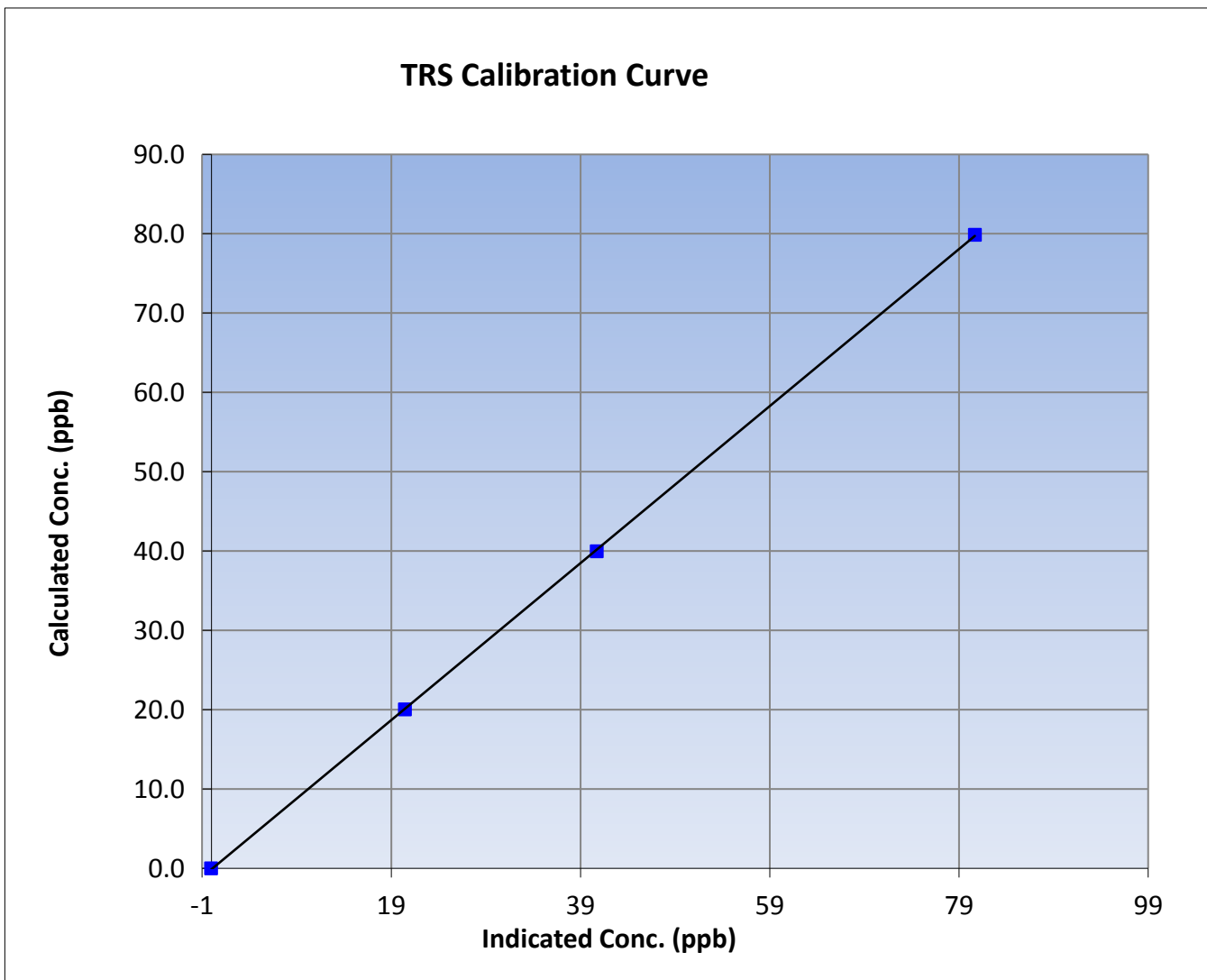
Wood Buffalo Environmental Association TRS Calibration Report

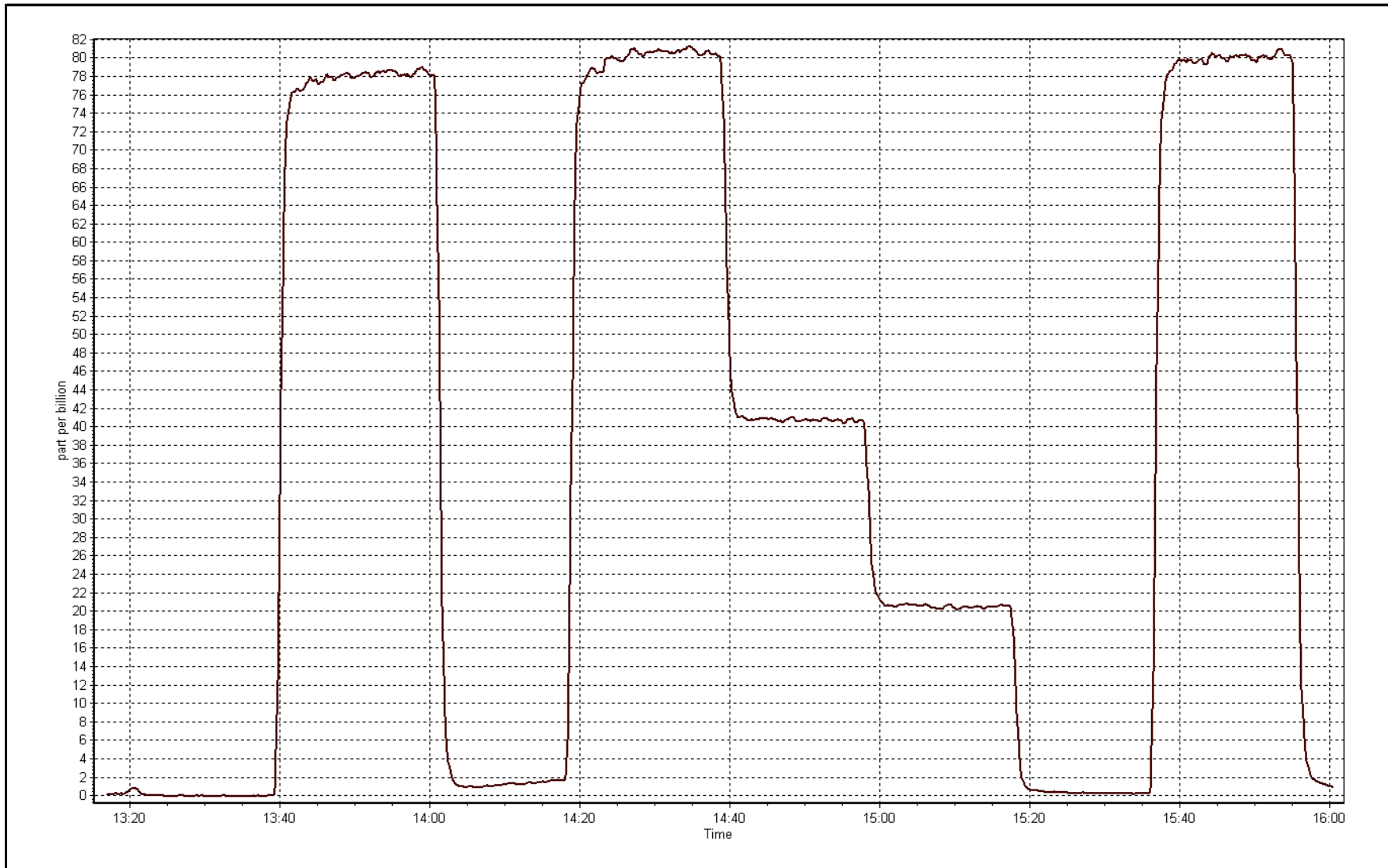
Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 20, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	13:20	End Time (MST)	16:05
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999974
79.8	80.7	0.9897		
40.0	40.7	0.9816	Slope	0.989555
20.0	20.4	0.9801		
			Intercept	-0.113151







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-16-15	Last Calibration	October-20-15
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	13:20
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	9.2	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	1.000003	1.006689	Fuel Pressure	24.1	24.1
Calculated intercept	-0.026243	-0.019077	Analyzer Coeff	4.3	4.2
			Analyzer BKG	5.610	5.420

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	-0.15	----
as found span	5000	76.6	15.68	15.59	1.006
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	76.6	15.68	15.60	1.005
second point	5000	41.0	8.39	8.35	1.005
third point	5000	15.4	3.15	3.14	1.004
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	76.6	15.68	15.51	1.011
Average Correction Factor					1.005

Corrected As found	15.74	Previous response	15.71	% change	-0.2%
--------------------	-------	-------------------	-------	----------	-------

Notes:

Replaced inlet filter after as founds. Adjusted zero.

Calibration Performed By:

Evan Magill



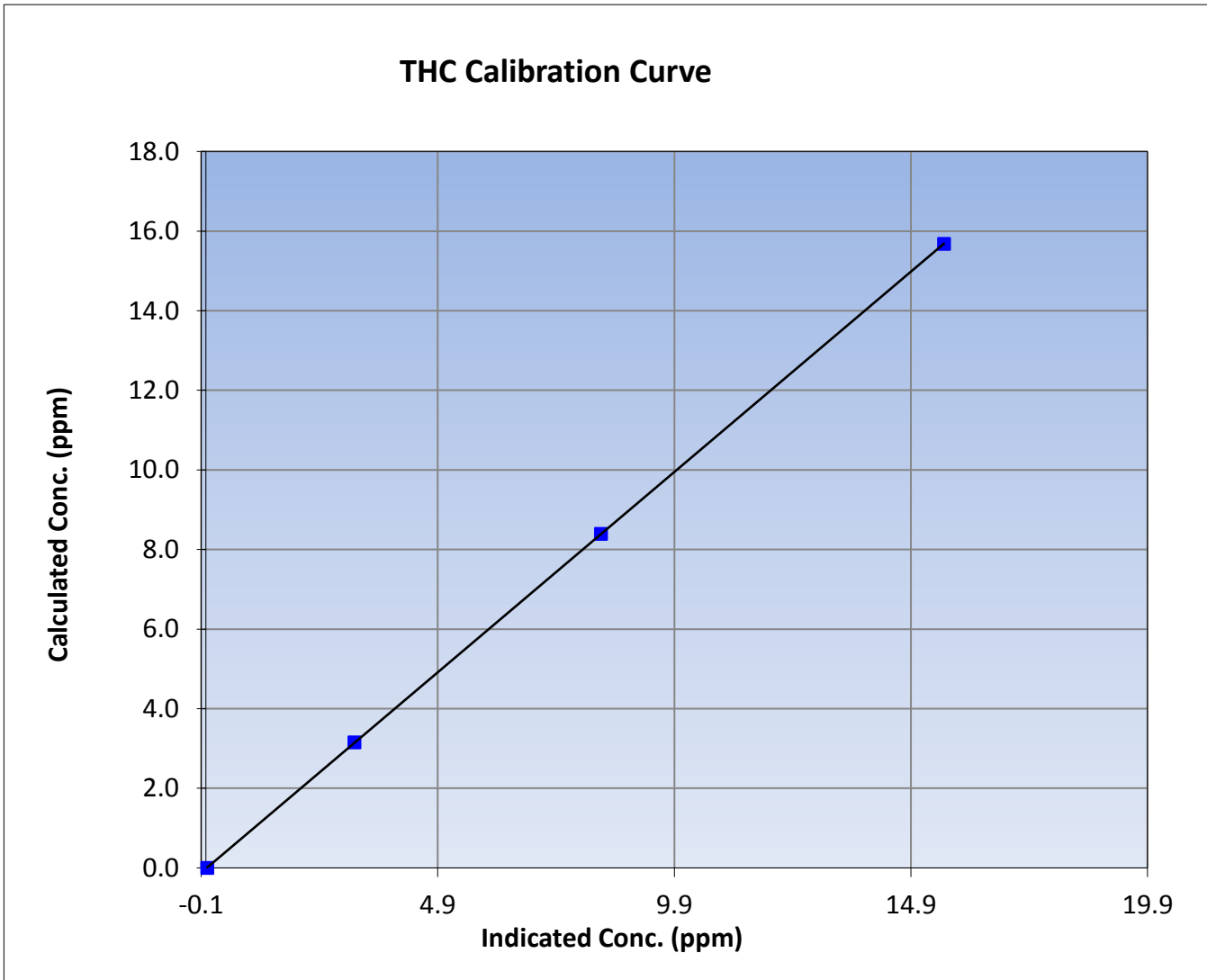
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 20, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	10:45	End Time (MST)	13:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

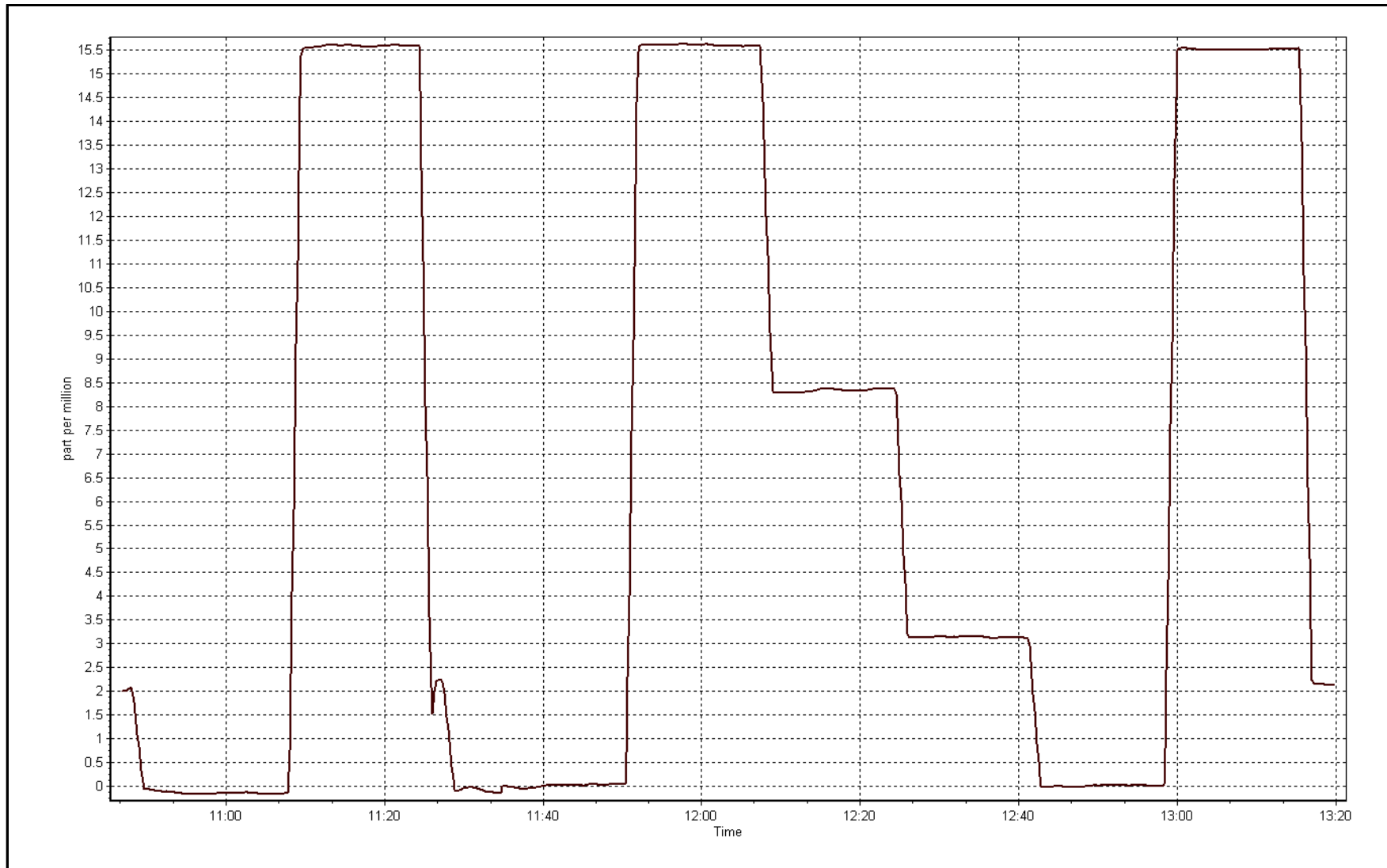
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999998
15.68	15.60	1.0051		
8.39	8.35	1.0051	Slope	1.006689
3.15	3.14	1.0039		
			Intercept	-0.019077



THC Calibration Plot

Date: November 16, 2015





This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 11
LOWER CAMP
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	686	34	34	100.00	43	0	7	0
H2S (ppb) Average	686	34	34	100.00	6	0	1	0
THC (ppm) Average	686	34	34	100.00	3.1	-	2.6	-
Temperature (C) Average	720	0	0	100.00	8.9	-	3.9	-
Relative Humidity (%) Average	720	0	0	100.00	96	-	91	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	26	-	17	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	686	2.1	5	-	0	0	0	0	1	5	43
H2S (ppb) Average	686	0.6	1	-	0	0	0	0	1	1	6
THC (ppm) Average	686	2.32	0.2	-	2	2.1	2.2	2.2	2.4	2.6	3.1
Temperature 2 m (C) Average	720	-4	5.6	-	-17.4	-12.4	-7.5	-3.2	0.2	2.7	8.9
Relative Humidity (%) Average	720	77.5	12	-	40	59	72	80	86	91	96
Wind Speed 10 m (km/h) Average	720	10.3	5	-	0	3	6	10	14	18	26
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
-----------	-----------------	---------------	---------------------	-------

No operational issues to report



This page intentionally left blank

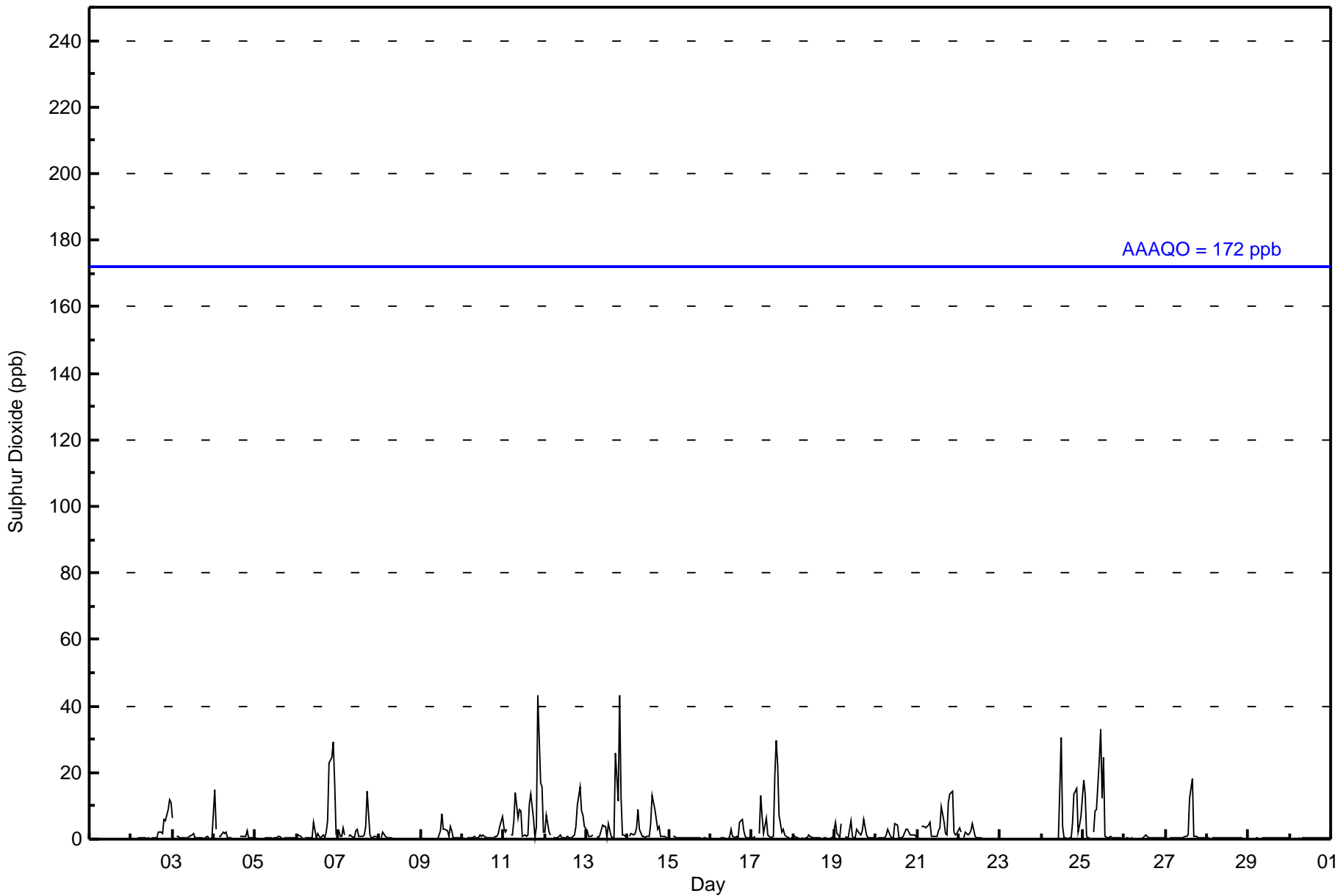


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 43 ppb on Nov 11 21:00	Maximum Daily Average: 7.4 ppb on Nov 11
Minimum Value: 0 ppb on Nov 1 08:00	Hours of Data: 686
Maximum Diurnal Average: 4.7 ppb at hour 21	Hours of Missing Data: 34
Monthly Average: 2.1 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.1 ppb on Nov 1	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.7 ppb at hour 4	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 24	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
2-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	6	5	9	12	11	2.3	12	
3-Nov	6	Z	1	1	0	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	1	0	0	1	0.7	6	
4-Nov	15	3	Z	1	1	2	2	2	1	0	0	C	C	C	C	1	1	1	1	3	0	0	0	1	1.8	15	
5-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
6-Nov	0	1	1	0	Z	0	0	0	0	1	5	1	2	1	1	1	0	2	6	23	24	29	17	2	5.1	29	
7-Nov	2	1	1	3	1	Z	1	1	1	0	3	3	1	1	1	1	4	14	1	1	0	1	1	1	1.9	14	
8-Nov	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	2	8	3	3	2	1	4	3	0	0	0	0	0	1.3	8	
10-Nov	0	0	Z	0	0	0	0	1	0	0	1	1	1	1	1	1	0	1	1	1	1	2	4	7	1.0	7	
11-Nov	4	2	3	Z	1	1	5	14	6	9	8	1	1	1	1	11	13	6	1	4	43	17	16	2	7.4	43	
12-Nov	2	7	2	1	Z	1	0	0	1	1	0	1	1	1	0	0	1	1	4	10	16	8	7	4	3.1	16	
13-Nov	2	1	1	1	1	Z	1	1	1	4	4	4	1	5	1	1	0	26	12	43	13	1	1	1	5.4	43	
14-Nov	Z	1	2	1	2	4	9	3	1	1	1	1	1	5	13	11	9	3	4	1	1	1	1	1	3.2	13	
15-Nov	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
16-Nov	0	0	Z	0	0	0	0	1	0	0	0	1	3	1	1	1	0	5	6	3	1	1	0	0	1.1	6	
17-Nov	0	0	1	Z	2	13	7	2	6	1	1	1	1	19	30	22	7	2	3	1	1	0	0	0	5.3	30	
18-Nov	1	1	1	0	Z	0	0	0	1	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0.4	1	
19-Nov	5	2	1	0	5	Z	1	1	0	5	1	0	0	3	2	1	3	6	1	0	0	0	0	0	1.7	6	
20-Nov	Z	0	1	0	0	0	1	3	1	0	1	5	4	1	0	0	1	3	3	2	1	1	1	1	1.4	5	
21-Nov	1	Z	4	4	4	3	4	5	1	1	1	1	2	4	10	5	2	1	11	14	14	2	1	2	4.2	14	
22-Nov	3	2	Z	0	2	1	2	3	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5	
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	31	4	0	0	0	0	0	5	13	15	2	4	7	3.6	31
25-Nov	18	13	1	0	0	Z	2	9	9	24	33	12	25	1	0	1	1	1	0	0	0	0	0	0	6.6	33	
26-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0.4	1	
27-Nov	0	Z	1	0	0	0	0	0	0	0	1	1	1	1	12	18	1	1	1	1	1	0	0	0	1.8	18	
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1	

2.5	1.5	0.9	0.7	0.9	1.2	1.3	1.6	1.3	1.8	2.1	2.3	2.1	1.7	2.7	2.7	1.6	2.7	2.2	4.3	4.7	2.6	2.3	1.4	Diurnal Average	
18	13	4	4	5	13	9	14	9	24	33	31	25	19	30	22	13	26	12	43	43	29	17	11	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	647	94.31	94.31
11 - 20	27	3.94	98.25
21 - 60	12	1.75	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	38	32	8	7	12	21	213	71	13	9	6	28	45	38	64	42	647
11 - 20	0	0	0	0	0	0	5	5	3	5	8	1	0	0	0	0	27
21 - 60	0	0	0	0	0	0	3	1	1	3	3	1	0	0	0	0	12
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	32	8	7	12	21	221	77	17	17	17	30	45	38	64	42	686

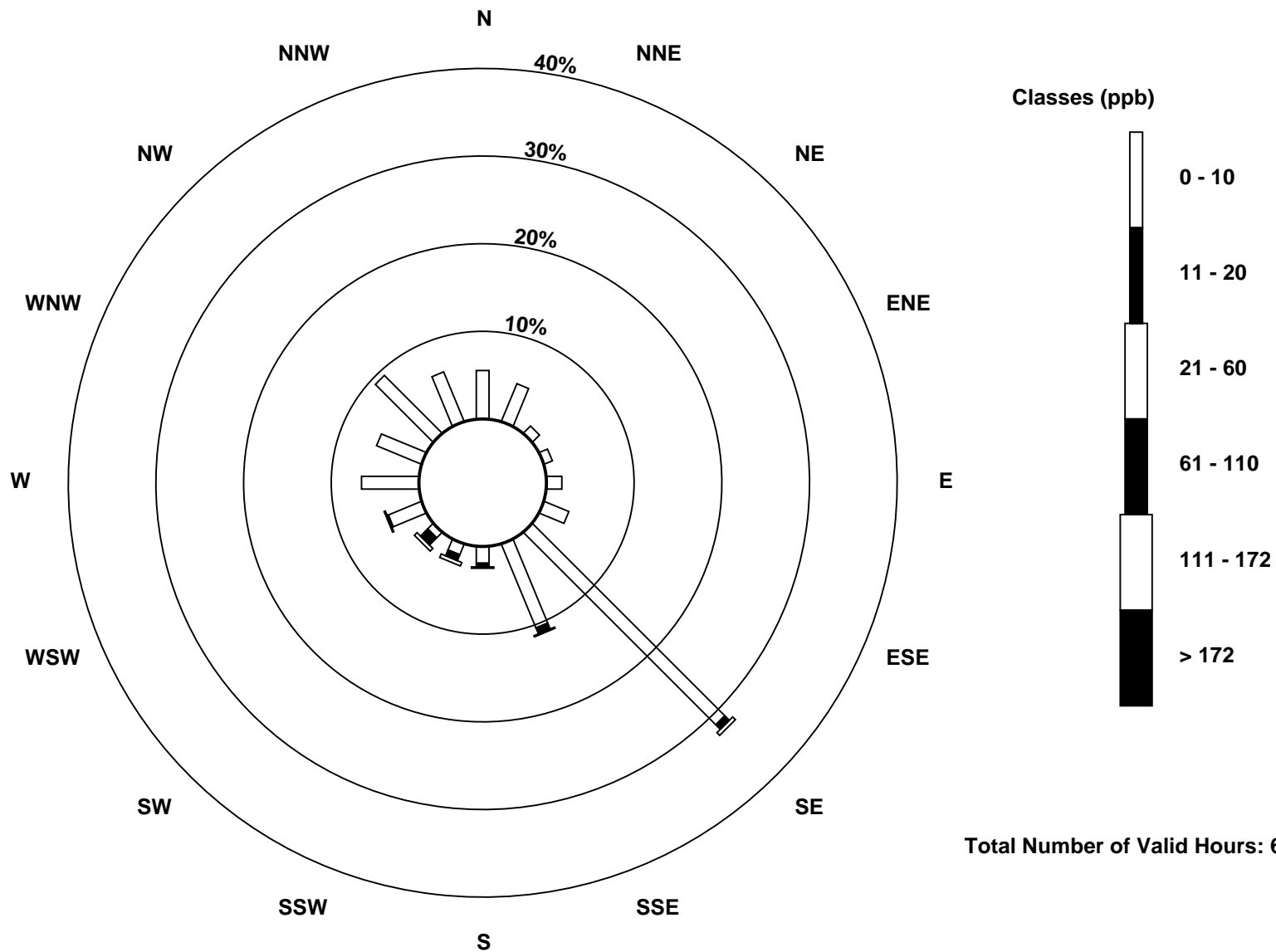
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)

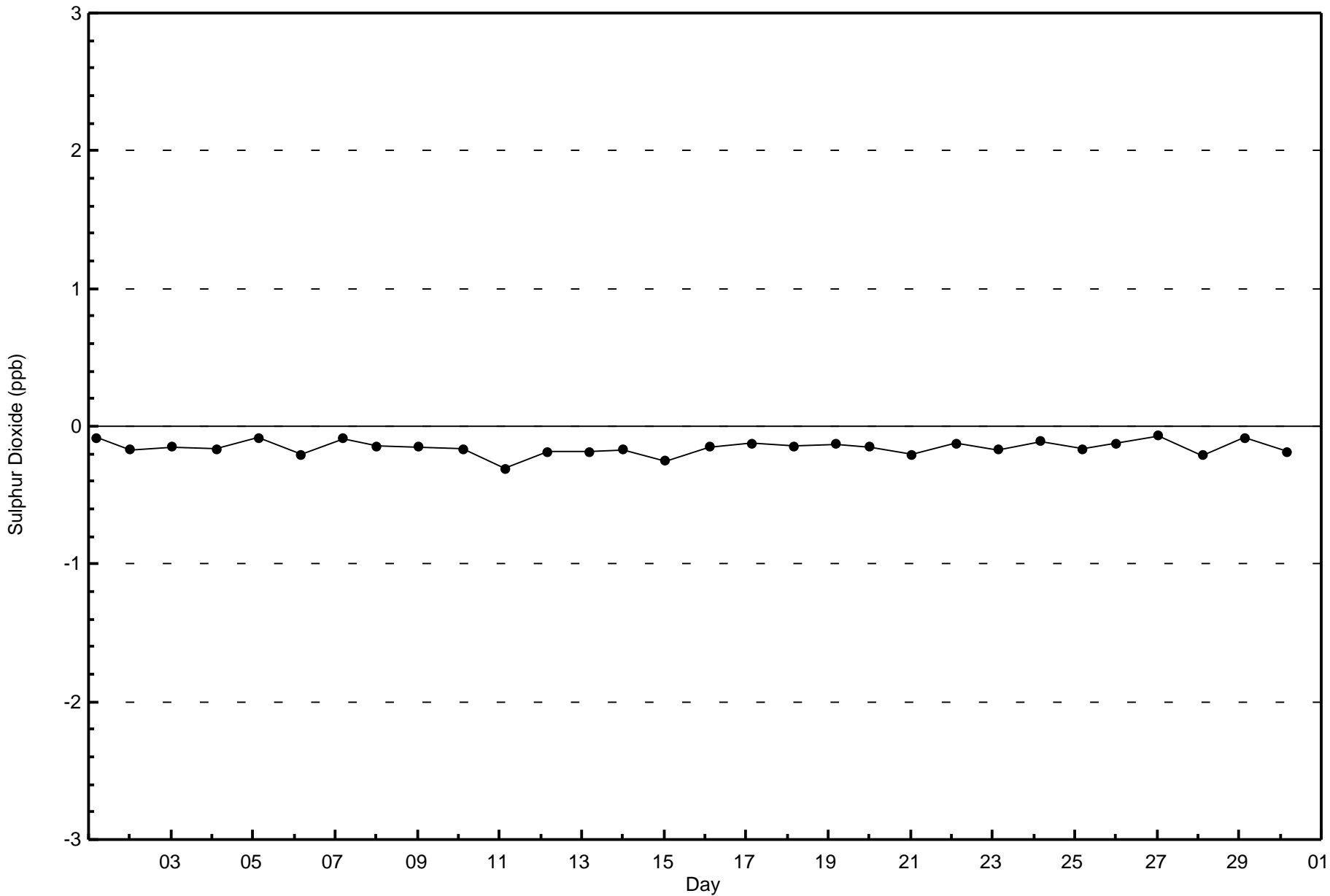


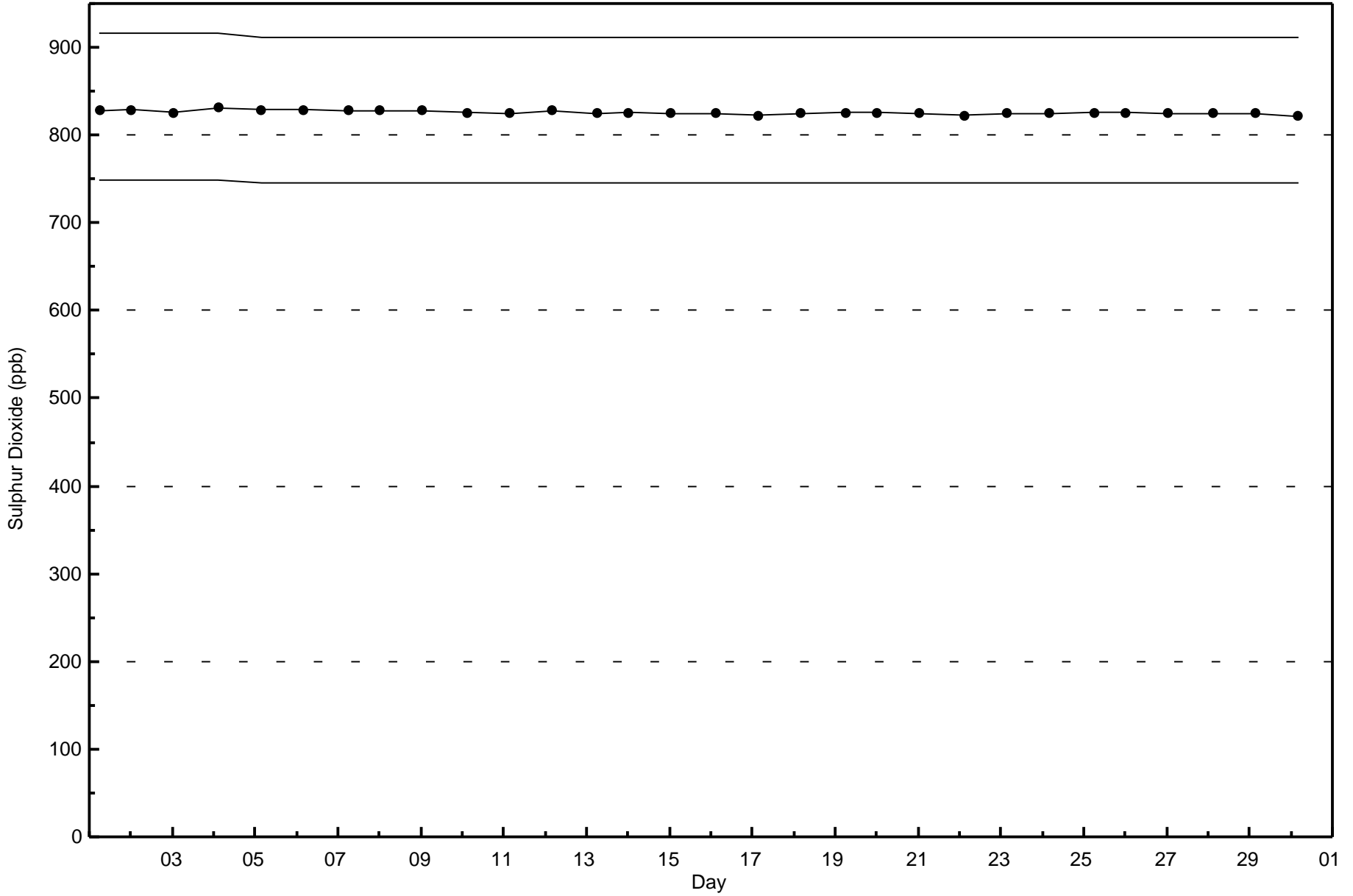
Total Number of Valid Hours: 686



Wood Buffalo Environmental Association
Zero Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - November 2015





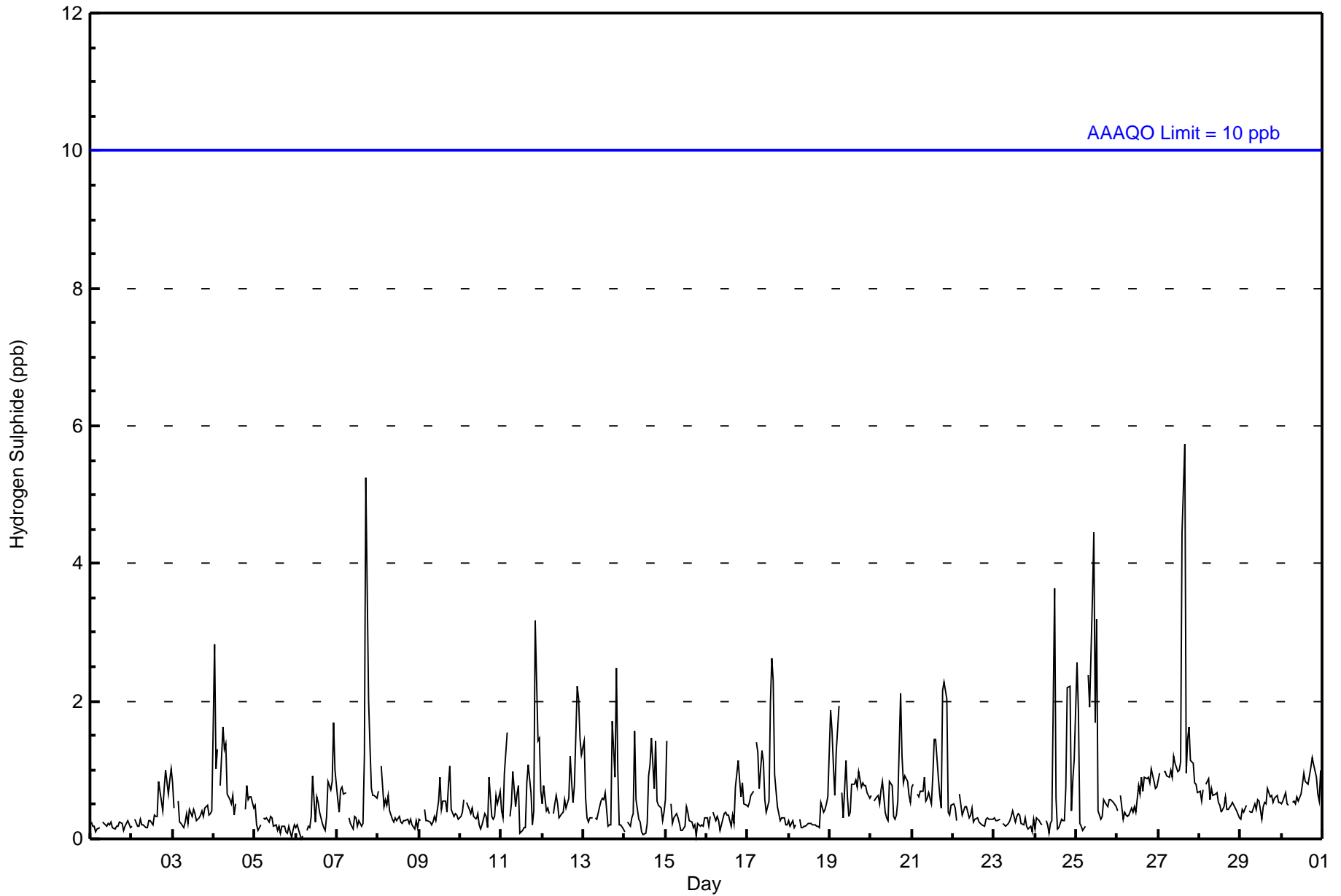


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 6 ppb on Nov 27 16:00	Maximum Daily Average: 1.4 ppb on Nov 27
Minimum Value: 0 ppb on Nov 6 04:00	Hours of Data: 686
Maximum Diurnal Average: 0.8 ppb at hour 18	Hours of Missing Data: 34
Monthly Average: 0.6 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.2 ppb on Nov 1	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.4 ppb at hour 9	
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-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1	0.4	1
3-Nov	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Nov	3	1	1	Z	1	2	1	1	1	1	1	0	1	C	C	C	C	0	1	1	1	1	1	0	0.9	3	
5-Nov	0	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-Nov	0	0	0	0	0	Z	0	0	0	0	1	0	1	1	0	0	0	0	0	0	1	1	1	2	1	0.4	2
7-Nov	1	0	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	1	5	2	1	1	1	1	1	0.8	5	
8-Nov	1	Z	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	0	0	0	0	0	0.4	1	
10-Nov	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0.4	1	
11-Nov	0	0	1	2	Z	0	1	1	0	1	1	0	0	0	1	1	1	1	0	0	3	1	1	1	0.8	3	
12-Nov	1	1	0	0	0	Z	0	1	1	1	0	0	1	0	1	1	1	1	1	1	2	2	1	1	0.8	2	
13-Nov	1	1	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	2	1	2	1	0	0	0	0.6	2	
14-Nov	0	Z	0	0	0	0	2	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0.5	2	
15-Nov	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
16-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0.4	1	
17-Nov	0	1	1	1	Z	1	1	1	1	1	1	0	1	2	3	2	1	0	0	0	0	0	0	0	0.8	3	
18-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0.3	1	
19-Nov	2	2	1	1	1	2	Z	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
20-Nov	1	Z	1	1	1	1	1	1	0	0	0	1	1	0	0	0	1	2	1	1	1	1	1	1	0.7	2	
21-Nov	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	2	2	2	0	0	0	0.9	2	
22-Nov	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
24-Nov	0	0	0	0	0	Z	0	0	0	0	0	4	1	0	0	0	0	0	1	2	2	0	1	1	0.7	4	
25-Nov	3	2	0	0	0	0	Z	2	2	4	4	2	3	0	0	0	1	1	0	1	1	1	1	0	1.2	4	
26-Nov	0	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
27-Nov	1	1	Z	1	1	1	1	1	1	1	1	1	1	4	6	1	1	2	1	1	1	1	1	1	1.4	6	
28-Nov	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0.6	1	
29-Nov	0	0	0	0	Z	0	0	0	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1	
30-Nov	1	1	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	

0.7	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.4	0.5	0.6	0.5	0.5	0.5	0.6	0.7	0.6	0.8	0.7	0.8	0.8	0.6	0.6	0.5	Diurnal Average	
3	2	1	2	1	2	2	2	2	4	4	4	4	3	2	4	6	1	5	2	2	3	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
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	675	98.40	98.40
3 - 4	9	1.31	99.71
5 - 7	2	0.29	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	38	33	7	9	13	22	224	69	16	13	15	30	43	35	65	43	675
3 - 4	0	0	0	0	0	0	0	2	1	4	2	0	0	0	0	0	9
5 - 7	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	33	7	9	13	22	225	72	17	17	17	30	43	35	65	43	686

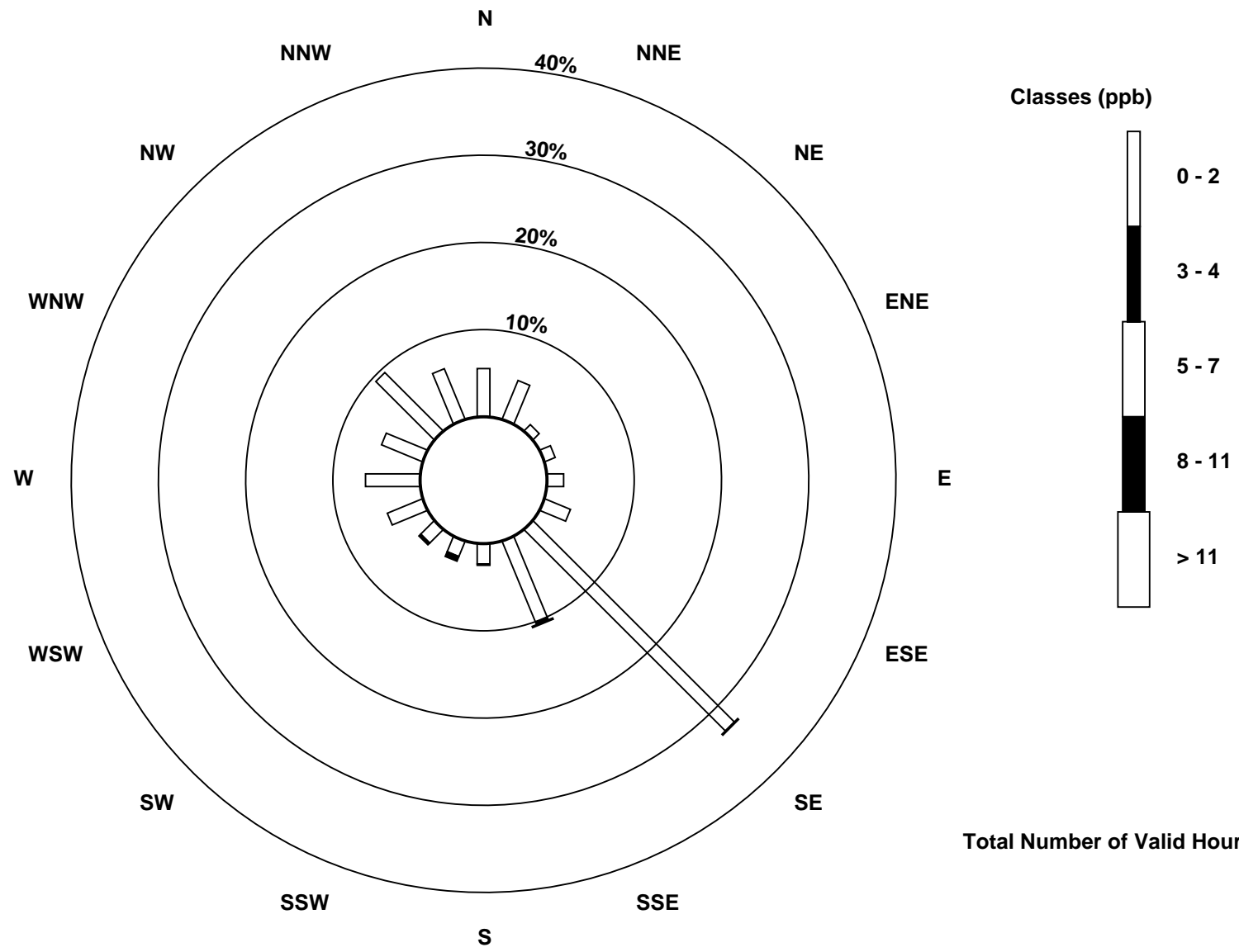
Total Number of Valid Hours: 686

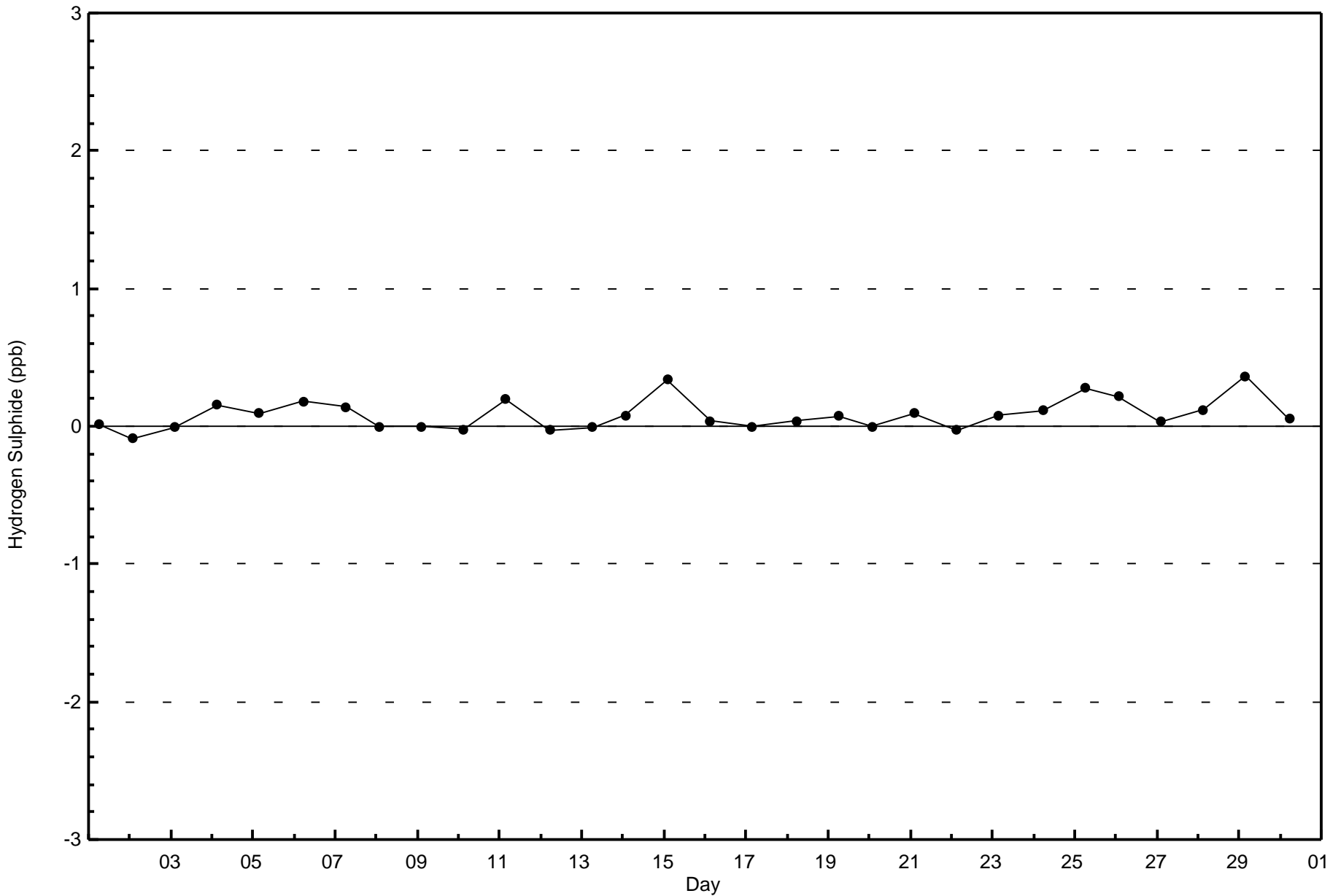
Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)





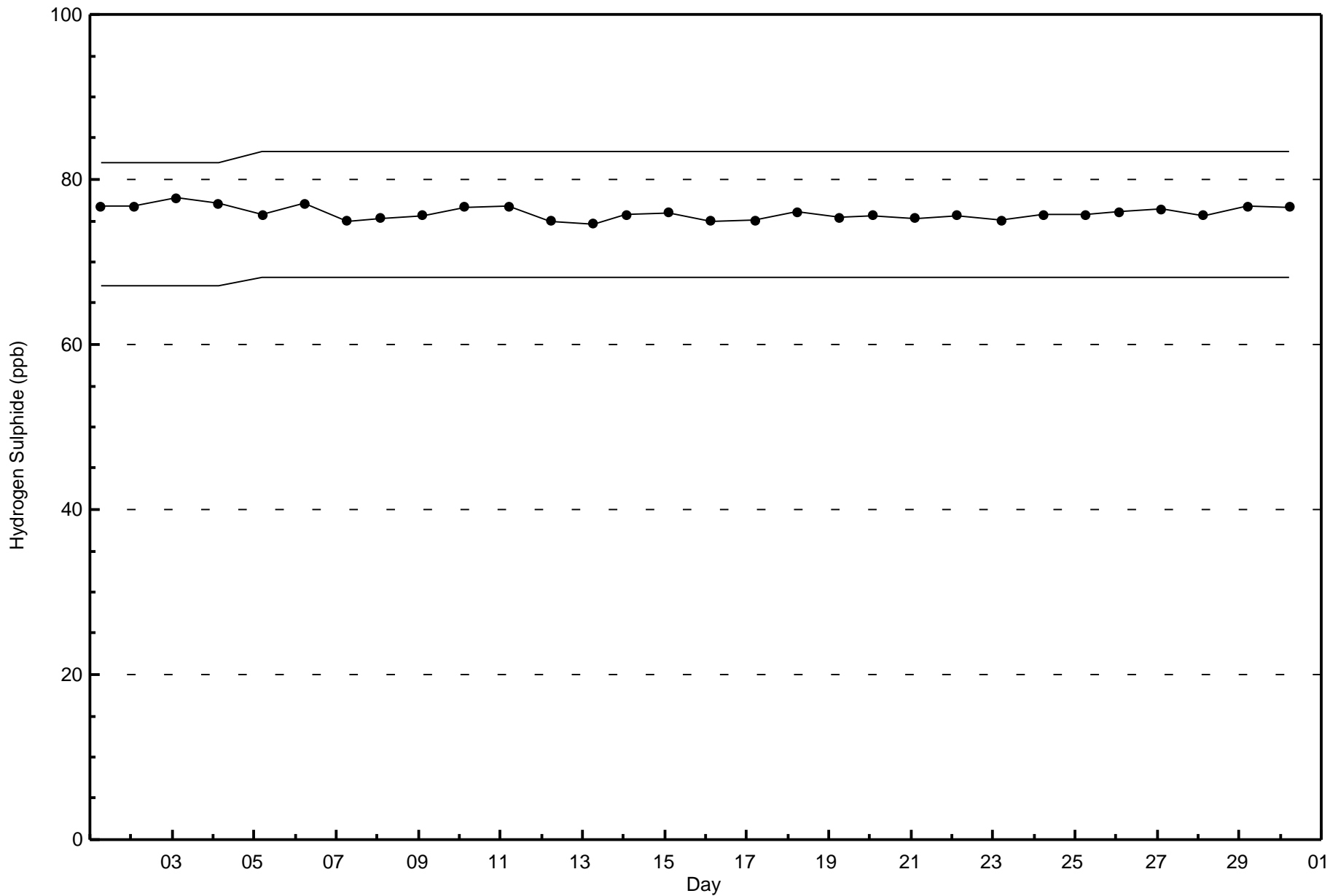


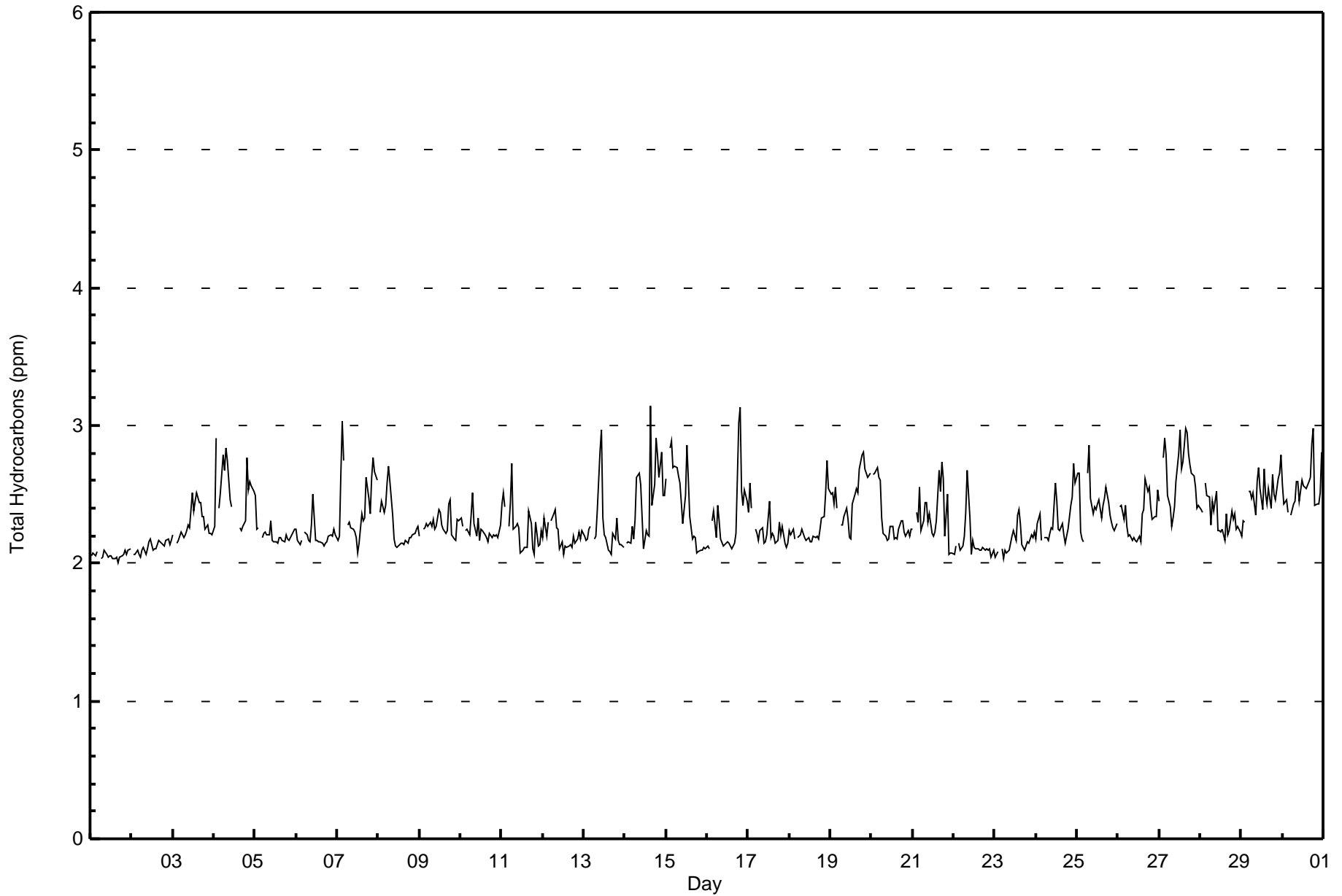
Wood Buffalo Environmental Association

Span Responses

Hydrogen Sulphide (H₂S) - ppb

Lower Camp - November 2015







Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	12	1.75	1.75
2.1 - 3.0	672	97.96	99.71
3.1 - 10.0	2	0.29	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	1	2	12
2.1 - 3.0	37	24	8	7	12	21	221	76	16	17	17	30	45	38	63	40	672
3.1 - 10.0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	32	8	7	12	21	221	77	17	17	17	30	45	38	64	42	686

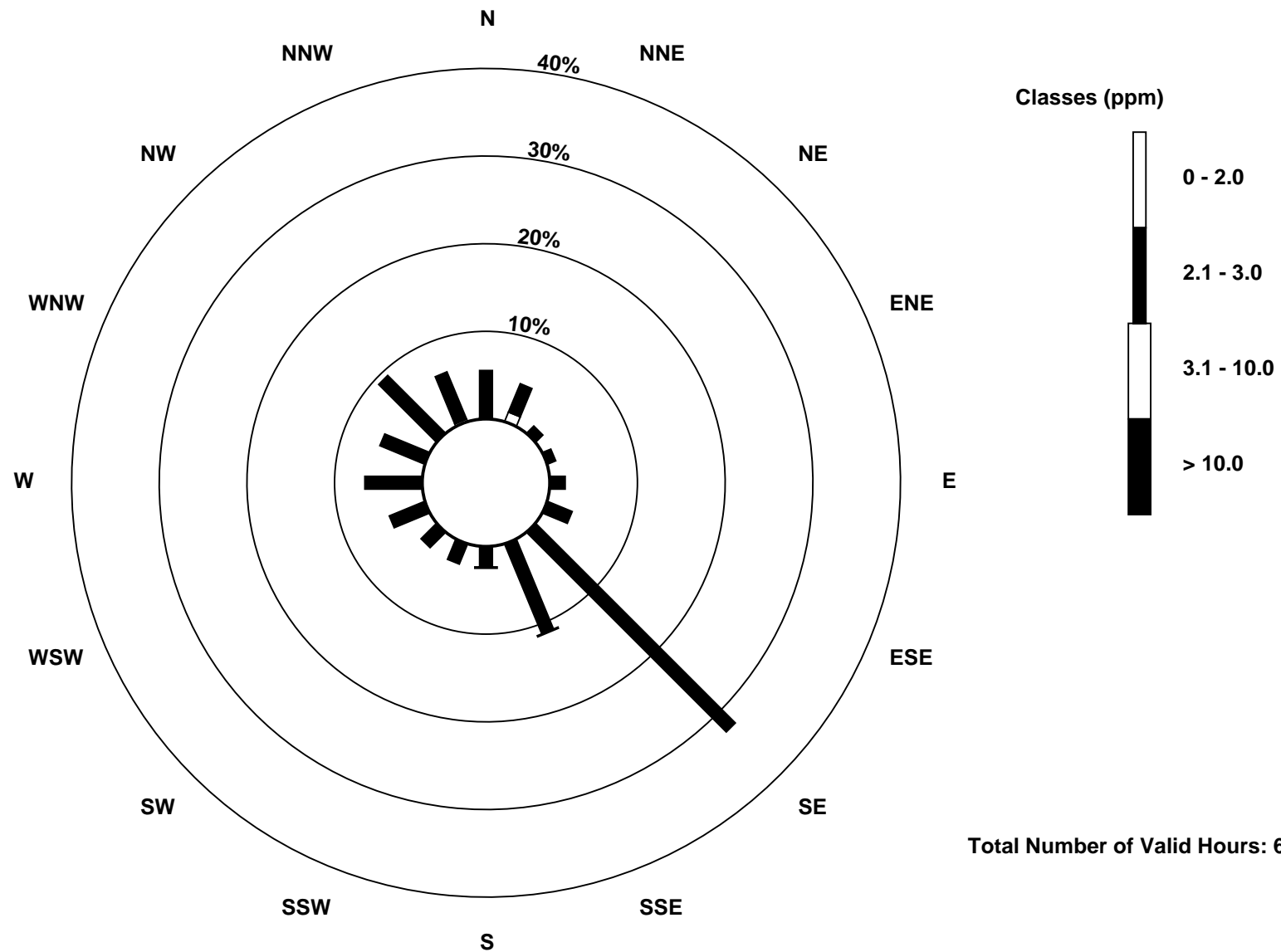
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

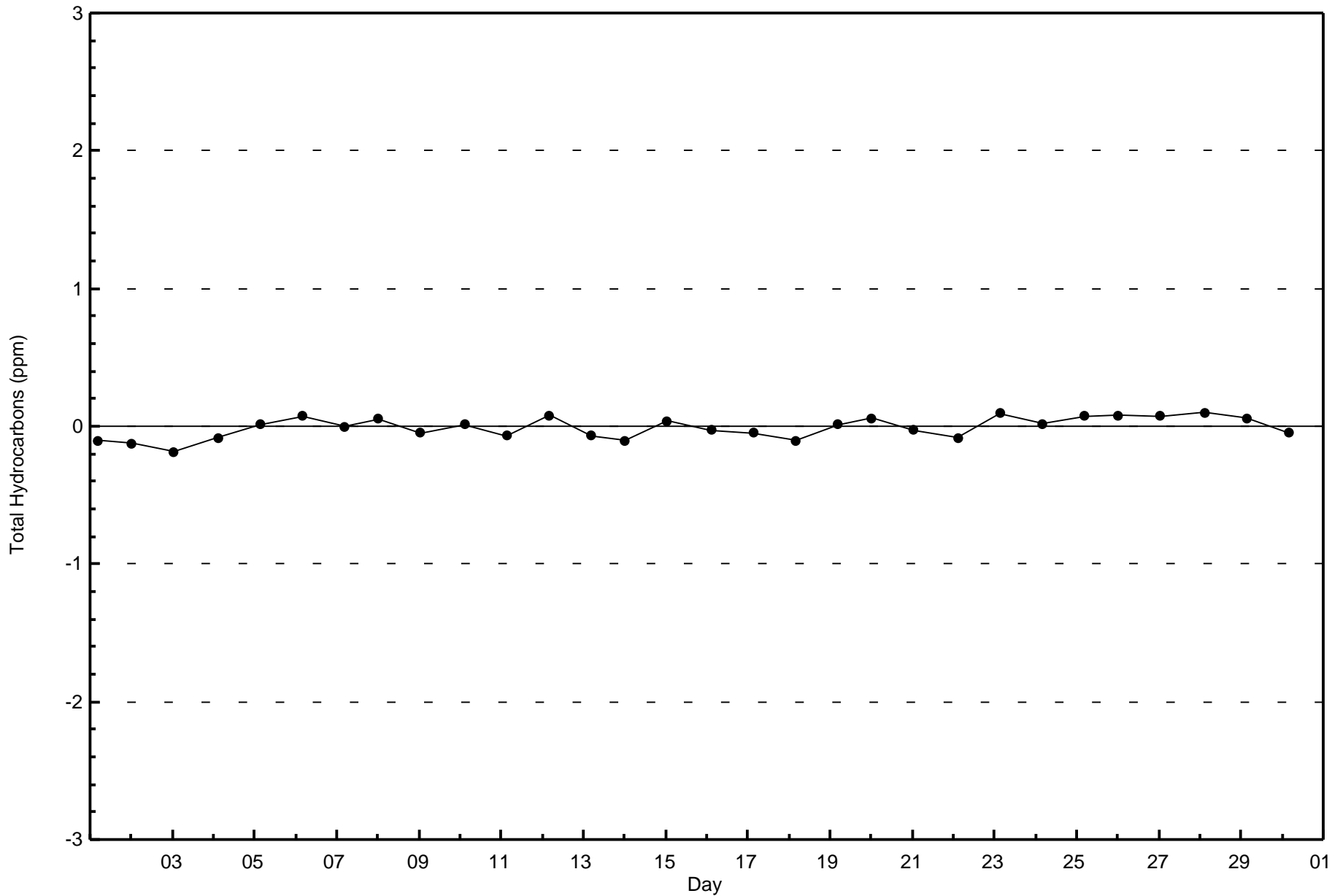
Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)

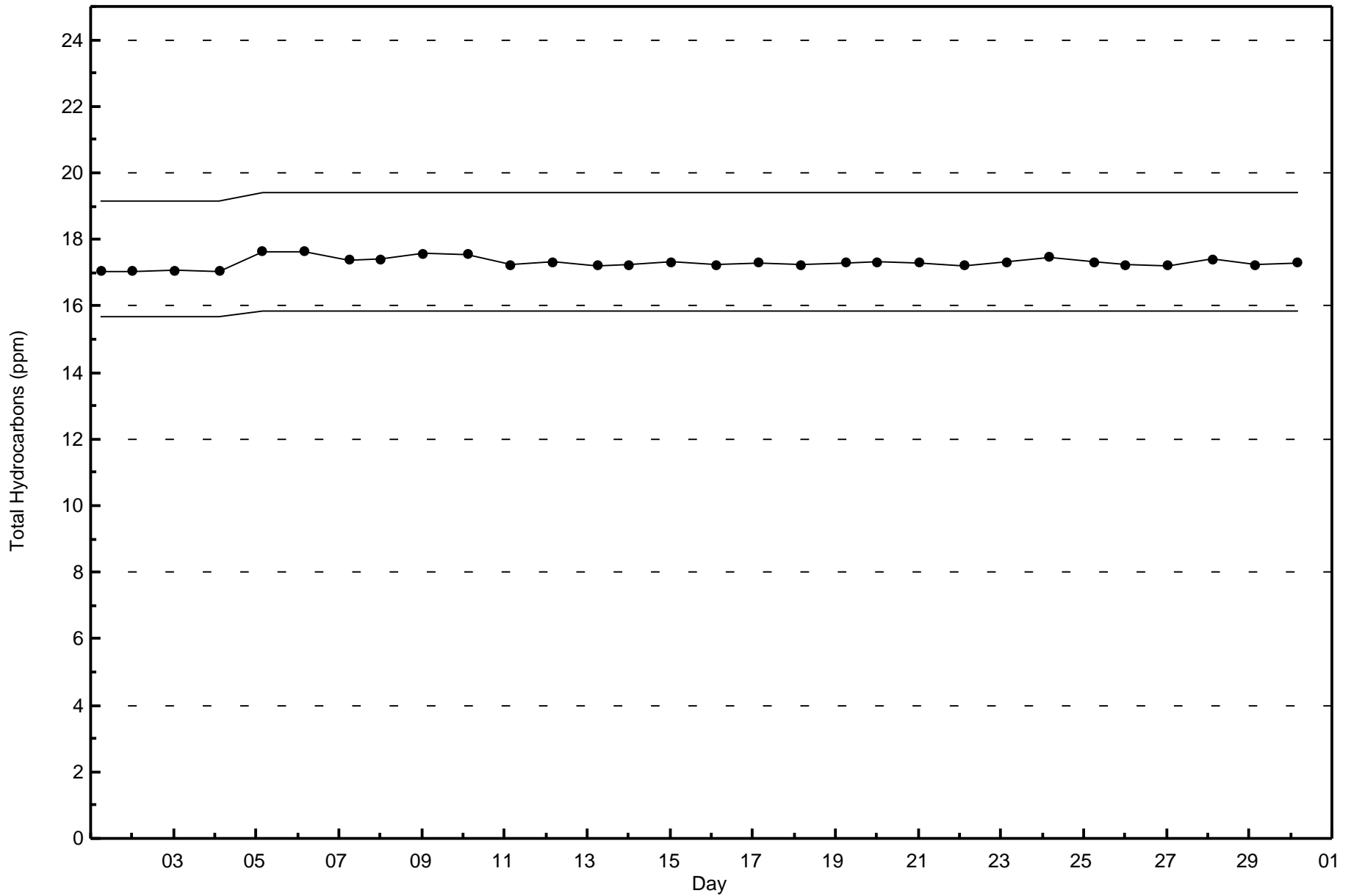




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Lower Camp - November 2015







Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

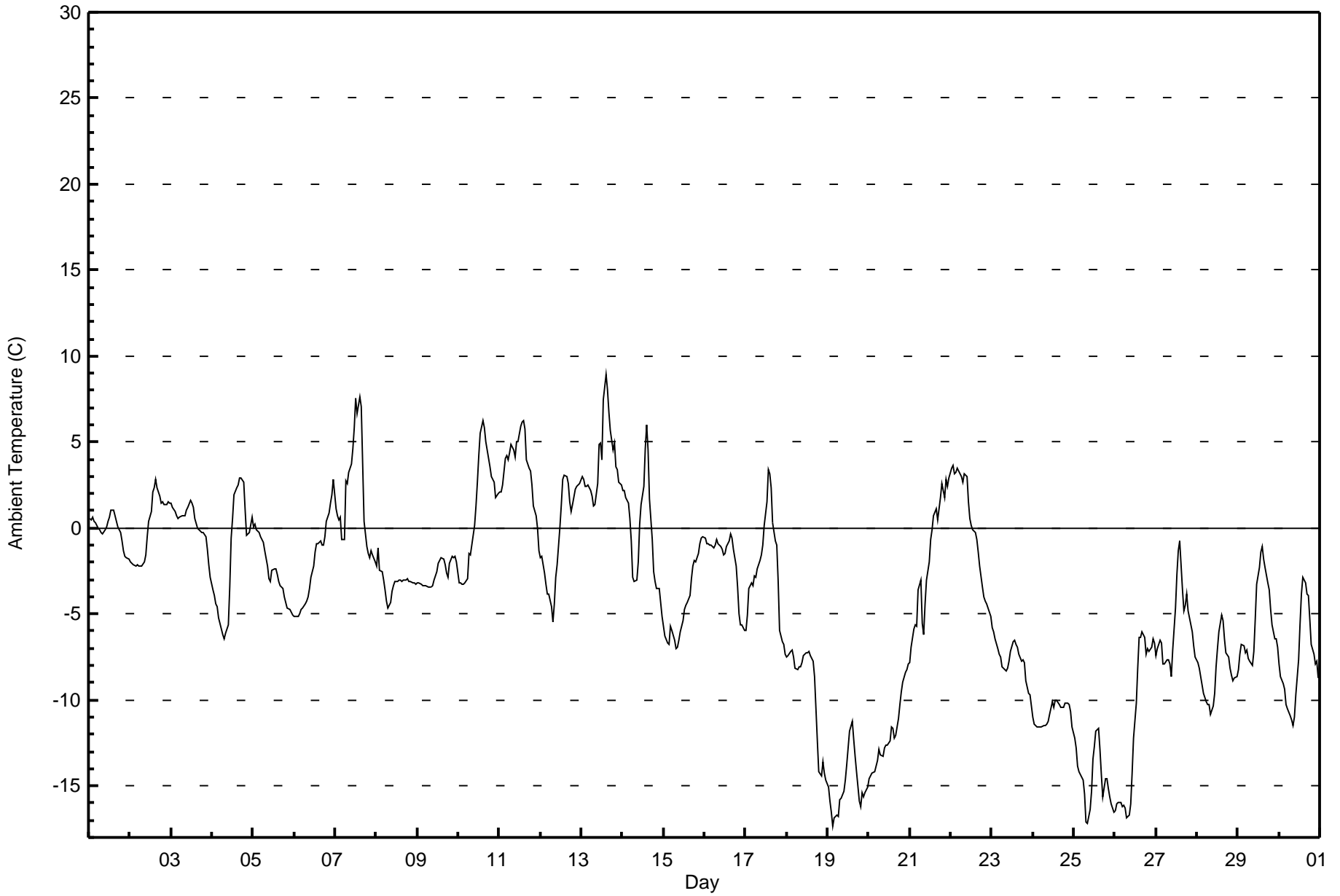
Lower Camp - November 2015

Maximum Value: 8.9 C on Nov 13 15:00		Maximum Daily Average: 3.9 C on Nov 13		Hours in Service: 720																							
Minimum Value: -17.4 C on Nov 19 04:00		Minimum Daily Average: -15.0 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.3 C at hour 15		Minimum Diurnal Average: -5.5 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -4.00 C		Percentiles: P ₁ = -16.7 P ₁₀ = -12.4 O ₁ = -7.5 Median = -3.2 O ₃ = 0.2 P ₉₀ = 2.7 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-Nov	0.6	0.5	0.6	0.4	0.3	0.0	-0.1	-0.2	-0.3	-0.1	0.0	0.4	0.7	1.0	1.0	0.7	0.4	0.0	-0.3	-0.7	-1.3	-1.6	-1.7	-1.8	-0.1	1.0	
2-Nov	-2.0	-2.1	-2.2	-2.2	-2.1	-2.2	-2.2	-2.2	-2.0	-1.6	-0.5	0.4	1.0	2.1	2.4	2.8	2.4	1.8	1.4	1.5	1.3	1.3	1.5	1.5	0.0	2.8	
3-Nov	1.5	1.2	1.0	0.7	0.6	0.7	0.7	0.7	0.7	1.0	1.2	1.6	1.5	1.2	0.5	0.0	-0.1	-0.2	-0.3	-0.3	-0.5	-1.3	-2.1	-2.8	0.3	1.6	
4-Nov	-3.6	-3.9	-4.4	-4.6	-5.3	-5.9	-6.2	-6.5	-6.1	-5.7	-3.5	-0.6	0.5	1.9	2.3	2.5	2.9	2.9	2.7	1.1	-0.5	-0.4	-0.3	0.6	-1.7	2.9	
5-Nov	0.1	0.2	-0.1	-0.2	-0.5	-0.7	-0.8	-1.3	-2.2	-2.9	-3.1	-2.5	-2.4	-2.4	-2.7	-3.1	-3.4	-3.5	2.0	-4.3	-4.6	-4.8	-4.9	-5.0	-2.5	0.2	
6-Nov	-5.1	-5.2	-5.2	-5.0	-4.7	-4.6	-4.4	-4.2	-4.0	-3.5	-2.9	-2.2	-1.4	-0.9	-0.9	-0.7	-1.0	-1.0	-0.5	0.4	0.9	1.4	2.0	2.8	-2.1	2.8	
7-Nov	1.1	0.7	0.5	0.6	-0.7	-0.7	2.7	2.6	3.2	3.7	4.6	5.8	7.5	6.7	7.6	7.1	3.8	0.4	-1.1	-1.5	-1.7	-1.3	-1.6	-2.0	2.0	7.6	
8-Nov	-2.2	-1.2	-2.5	-2.6	-3.0	-3.6	-4.2	-4.6	-4.3	-3.7	-3.3	-3.2	-3.1	-3.0	-3.1	-3.1	-3.0	-3.0	-3.0	-3.1	-3.1	-3.2	-3.2	-3.3	-3.2	-1.2	
9-Nov	-3.2	-3.2	-3.3	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	-3.3	-3.1	-2.5	-2.0	-1.9	-1.7	-1.8	-2.1	-2.6	-2.9	-2.1	-1.6	-1.8	-1.6	-2.0	-2.6	-1.6	
10-Nov	-3.2	-3.2	-3.2	-3.3	-3.2	-2.9	-1.4	-1.5	-1.0	0.1	1.3	2.7	4.2	5.5	6.3	5.8	5.0	4.6	3.6	3.0	2.8	2.7	1.8	2.0	1.2	6.3	
11-Nov	2.1	2.1	2.5	4.0	4.2	4.0	4.4	4.9	4.5	4.1	5.0	5.0	5.9	6.2	6.2	5.8	3.9	3.4	3.3	2.5	1.3	0.7	0.0	-1.3	3.5	6.2	
12-Nov	-1.7	-1.7	-2.6	-3.3	-3.8	-3.9	-4.6	-5.5	-4.4	-2.9	-2.1	0.0	1.4	2.8	3.0	3.0	2.6	1.5	0.9	1.3	2.3	2.4	2.5	2.6	-0.4	3.0	
13-Nov	3.0	2.8	2.5	2.4	2.5	2.2	1.9	1.3	1.4	2.6	4.8	5.0	4.0	7.4	8.9	8.0	6.8	5.7	4.5	4.9	3.6	3.4	2.7	2.5	3.9	8.9	
14-Nov	2.2	2.2	1.8	1.4	0.5	-0.8	-2.9	-3.1	-3.0	-2.0	0.2	1.3	2.4	4.6	6.0	4.5	1.7	-0.7	-2.6	-3.1	-3.6	-3.5	-4.3	-5.2	-0.2	6.0	
15-Nov	-5.7	-6.3	-6.7	-6.8	-5.7	-5.9	-6.6	-7.0	-7.0	-6.5	-6.0	-5.4	-4.7	-4.5	-4.3	-3.9	-3.0	-2.2	-1.9	-2.0	-1.5	-0.9	-0.6	-0.5	-4.4	-0.5	
16-Nov	-0.6	-0.9	-0.9	-1.0	-1.0	-1.2	-1.0	-0.7	-0.9	-1.1	-1.3	-1.6	-1.5	-1.1	-0.7	-0.3	-0.6	-1.2	-2.2	-3.4	-5.0	-5.6	-5.6	-6.0	-1.9	-0.3	
17-Nov	-6.0	-5.1	-3.5	-3.2	-3.3	-2.8	-2.9	-2.4	-1.9	-1.6	-1.0	0.2	1.5	3.4	3.2	2.3	0.3	-0.7	-1.0	-3.1	-6.0	-6.6	-6.7	-7.4	-2.3	3.4	
18-Nov	-7.5	-7.4	-7.2	-7.1	-7.5	-8.2	-8.2	-8.1	-8.1	-7.9	-7.5	-7.2	-7.2	-7.2	-7.4	-7.8	-8.6	-10.5	-12.4	-14.2	-14.4	-13.6	-14.2	-14.7	-9.3	-7.1	
19-Nov	-15.1	-15.8	-16.6	-17.4	-16.8	-16.7	-16.7	-15.8	-15.7	-15.3	-14.7	-13.8	-12.8	-11.8	-11.3	-12.3	-13.3	-14.1	-15.9	-16.2	-15.4	-15.6	-15.4	-15.1	-15.0	-11.3	
20-Nov	-14.6	-14.4	-14.3	-14.2	-13.9	-13.6	-12.8	-13.2	-13.3	-12.8	-12.6	-12.6	-12.4	-11.6	-11.6	-12.3	-12.1	-11.1	-10.3	-9.5	-9.0	-8.4	-8.3	-7.9	-11.9	-7.9	
21-Nov	-7.8	-6.9	-5.9	-5.6	-5.7	-3.6	-3.1	-5.5	-6.2	-4.5	-3.0	-2.0	-0.6	-0.1	0.7	1.1	0.5	1.1	1.8	2.6	1.8	2.8	2.4	2.9	-1.8	2.9	
22-Nov	3.5	3.6	3.2	3.3	3.5	3.2	3.0	2.7	3.2	3.0	1.5	0.5	0.1	-0.1	-0.3	-0.7	-1.4	-2.2	-3.4	-4.0	-4.2	-4.4	-4.7	-5.2	0.2	3.6	
23-Nov	-5.8	-6.0	-6.4	-7.0	-7.4	-7.5	-8.0	-8.1	-8.3	-8.2	-7.8	-7.2	-6.6	-6.5	-6.8	-7.0	-7.3	-7.7	-7.6	-7.8	-8.9	-9.7	-9.7	-10.4	-7.7	-5.8	
24-Nov	-11.0	-11.4	-11.5	-11.6	-11.6	-11.6	-11.5	-11.5	-11.4	-11.2	-10.8	-10.1	-10.4	-10.1	-10.0	-10.3	-10.4	-10.4	-10.5	-10.2	-10.2	-10.3	-10.6	-11.5	-10.8	-10.0	
25-Nov	-12.2	-12.8	-13.8	-14.1	-14.4	-14.7	-15.5	-17.1	-17.2	-16.4	-15.3	-13.5	-12.7	-11.8	-11.7	-12.9	-14.4	-15.6	-14.6	-14.6	-15.2	-15.7	-16.1	-16.6	-14.5	-11.7	
26-Nov	-16.5	-16.1	-16.0	-16.0	-16.2	-16.1	-16.3	-16.8	-16.7	-16.0	-14.3	-12.2	-10.2	-8.2	-6.4	-6.4	-6.1	-6.4	-7.4	-7.1	-7.2	-7.0	-6.5	-6.7	-11.4	-6.1	
27-Nov	-7.4	-7.0	-6.5	-6.7	-7.9	-7.9	-7.7	-7.7	-7.9	-8.7	-7.1	-4.7	-2.7	-1.3	-0.7	-3.6	-4.9	-4.5	-3.9	-4.8	-5.6	-6.1	-6.8	-7.5	-5.8	-0.7	
28-Nov	-7.8	-8.2	-8.6	-9.2	-9.6	-10.1	-10.3	-10.2	-10.8	-10.4	-9.6	-8.1	-7.0	-6.1	-5.1	-5.4	-6.5	-7.2	-7.5	-8.1	-8.5	-8.9	-8.7	-8.6	-8.4	-5.1	
29-Nov	-8.2	-7.4	-6.8	-6.9	-7.3	-7.1	-7.6	-7.7	-8.0	-7.2	-5.3	-3.3	-2.3	-1.4	-1.0	-1.8	-2.3	-3.2	-3.6	-4.8	-5.6	-6.4	-6.4	-7.0	-5.4	-1.0	
30-Nov	-7.9	-8.7	-9.1	-9.4	-10.2	-10.5	-11.0	-11.2	-11.5	-11.0	-9.7	-7.7	-5.7	-3.8	-2.9	-3.2	-3.8	-3.9	-5.3	-6.8	-7.4	-7.9	-7.7	-8.7	-7.7	-2.9	
		-4.7	-4.7	-4.8	-4.9	-5.1	-5.2	-5.2	-5.5	-5.4	-5.0	-4.2	-3.2	-2.5	-1.7	-1.3	-1.8	-2.5	-3.0	-3.5	-3.8	-4.2	-4.3	-4.5	-4.7	Diurnal Average	
		3.5	3.6	3.2	4.0	4.2	4.0	4.4	4.9	4.5	4.1	5.0	5.8	7.5	7.4	8.9	8.0	6.8	5.7	4.5	4.9	3.6	3.4	2.7	2.9	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - November 2015





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - November 2015**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	530	73.61	73.61
0 - 10	190	26.39	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

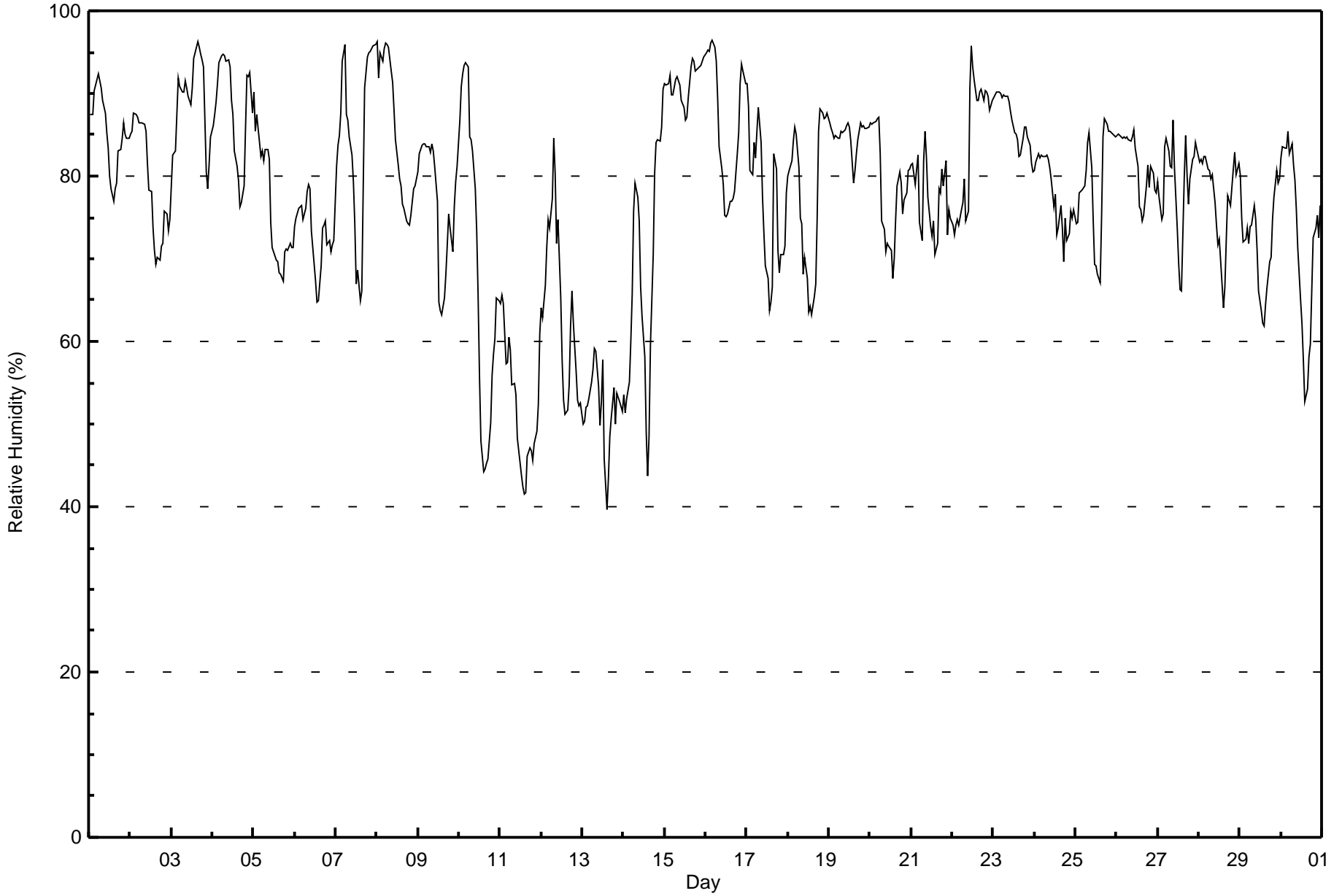
**Relative Humidity (RH) - %
Lower Camp - November 2015**

Maximum Value: 96 % on Nov 16 05:00																			Maximum Daily Average: 91.4 % on Nov 15						Hours in Service: 720			
Minimum Value: 40 % on Nov 13 15:00																			Minimum Daily Average: 51.9 % on Nov 13						Hours of Data: 720			
Maximum Diurnal Average: 82.7 % at hour 5																			Minimum Diurnal Average: 67.8 % at hour 15						Hours of Missing Data: 0			
Monthly Average: 77.5 %																			Percentiles: P ₁ = 44 P ₁₀ = 59 Q ₁ = 72 Median = 80 O ₃ = 86 P ₉₀ = 91 P ₉₉ = 96						Hours of Calibration: 0			
																									Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Nov	87	87	87	90	91	92	92	91	89	88	85	83	80	78	77	78	79	83	83	85	87	85	85	85	85	85.3	92	
2-Nov	85	85	88	87	87	86	86	86	86	85	81	78	78	74	71	69	70	70	71	72	76	75	73	75	75	79.1	88	
3-Nov	79	83	83	87	92	91	90	90	91	91	90	89	91	94	95	96	96	95	94	93	80	78	81	85	88.9	96		
4-Nov	86	87	89	91	94	95	95	95	94	94	93	89	87	83	81	80	76	77	79	86	92	92	93	88	88.1	95		
5-Nov	90	85	87	84	82	83	82	83	83	82	74	71	70	70	70	68	68	67	71	71	71	72	71	71	76.3	90		
6-Nov	74	75	76	76	76	75	76	78	79	78	73	69	67	65	65	69	74	74	75	72	72	71	72	72	73.1	79		
7-Nov	81	84	85	88	94	96	87	87	85	82	79	74	67	69	65	66	78	91	94	95	95	95	96	96	84.6	96		
8-Nov	96	92	95	94	95	96	96	96	93	91	88	84	81	80	79	77	76	75	74	74	75	78	79	80	85.2	96		
9-Nov	81	83	84	84	84	84	84	83	84	83	81	77	65	64	63	65	68	72	76	74	71	76	79	81	76.8	84		
10-Nov	87	91	92	93	94	93	85	84	83	78	73	66	56	48	44	45	45	46	50	56	58	60	65	65	69.1	94		
11-Nov	64	66	65	57	57	61	59	55	55	54	48	47	44	42	41	42	46	47	47	46	48	49	52	61	52.2	66		
12-Nov	64	63	67	71	75	74	77	85	80	72	75	65	58	53	51	52	55	62	66	62	56	53	52	53	64.2	85		
13-Nov	50	50	52	52	53	55	57	59	59	54	50	53	58	46	40	43	48	51	54	50	54	53	53	52	51.9	59		
14-Nov	54	51	53	55	60	66	76	79	77	75	67	63	58	49	44	48	59	71	80	84	84	84	86	90	67.2	90		
15-Nov	91	91	91	92	90	90	92	92	92	91	89	88	87	87	90	93	94	94	93	93	93	93	94	94	91.4	94		
16-Nov	95	95	95	96	96	96	94	89	83	81	79	75	75	75	77	77	77	78	83	85	91	94	93	91	86.3	96		
17-Nov	91	89	81	80	84	82	85	88	84	77	73	69	68	64	65	67	83	81	71	68	70	71	72	78	76.7	91		
18-Nov	80	81	82	84	86	85	81	75	74	68	70	68	64	64	63	65	67	75	85	88	88	87	87	88	77.3	88		
19-Nov	86	86	85	85	85	85	85	85	85	86	86	86	86	84	79	81	83	84	86	86	86	86	86	86	84.9	86		
20-Nov	86	86	86	87	87	87	83	75	74	71	72	71	71	68	70	75	79	81	79	75	77	78	81	81	78.3	87		
21-Nov	81	82	79	81	83	74	72	82	85	82	77	74	73	75	70	72	78	78	81	79	82	73	76	75	77.7	85		
22-Nov	74	73	74	75	74	76	77	80	75	76	91	96	93	92	89	89	90	90	89	90	90	90	88	89	84.1	96		
23-Nov	89	90	90	90	90	90	90	90	90	89	88	87	85	85	84	82	82	85	86	86	85	84	82	81	86.6	90		
24-Nov	81	82	83	82	83	82	82	83	82	81	80	76	78	73	74	76	74	70	75	72	73	76	75	76	77.8	83		
25-Nov	74	74	78	78	78	79	81	84	85	81	75	69	69	68	67	75	85	87	86	85	85	85	85	85	79.2	87		
26-Nov	85	85	85	85	85	85	85	84	84	85	86	83	81	76	76	75	75	79	81	79	81	80	78	78	81.5	86		
27-Nov	79	77	75	75	84	85	83	81	81	87	81	74	69	66	66	80	85	80	77	80	82	82	84	83	79.0	87		
28-Nov	82	82	81	82	82	81	81	80	80	77	74	72	72	70	64	67	72	78	76	79	81	83	80	82	77.4	83		
29-Nov	80	75	72	72	74	72	74	74	76	75	71	66	64	62	62	64	66	70	70	75	77	81	79	80	72.1	81		
30-Nov	82	84	83	83	85	83	84	81	79	76	71	65	62	58	53	54	58	60	66	72	74	75	73	76	72.5	85		
	80.6	80.4	80.8	81.3	82.7	82.5	82.3	82.5	81.6	79.7	77.4	74.3	71.9	69.4	67.8	69.7	73.0	74.9	76.7	77.1	77.9	78.0	78.3	79.1	Diurnal Average			
	96	95	95	96	96	96	96	96	94	94	93	96	93	94	95	96	96	95	94	95	95	95	96	96	Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - November 2015





Maximum Speed: 26 km/h on Nov 17 04:00	Maximum Daily Speed Average: 16.4 km/h on Nov 30	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 20 04:00	Minimum Daily Speed Average: 0.8 km/h on Nov 3	Hours of Data: 720
Maximum Diurnal Speed Average: 4.3 km/h at hour 24	Minimum Diurnal Speed Average: 1.6 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 3.1 km/h 156.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 10 Q ₃ = 14 P ₉₀ = 18 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-Nov	N10	N7	N8	NNW8	N11	N9	N11	NNE11	NNE10	NNE11	NNE15	NNE13	NE17	NNE14	NNE16	NNE19	NNE16	NNE14	NNE14	N8	NNW8	NNW9	N11	N11	N11.3	NNE19
2-Nov	NNW9	NNW9	NNE8	NNE8	NNE8	NNE8	NNE7	NNE4	NNW3	NW3	SE5	SE8	SE11	SSE10	S7	SSE8	SSE12	SSE15	SSE15	SSE14	SE13	SE13	SE14	SSE15	SE4.9	SSE15
3-Nov	SE15	SE15	SSE11	SE9	SE8	SE7	ESE8	E6	SE6	SE5	ESE5	E2	N6	NNW8	NW10	NW9	NW7	NW8	NW6	NW5	W14	W12	W13	W6	SSW0.8	SE15
4-Nov	SSW5	S5	SSE5	SE5	NE1	WNW2	NW1	NW2	WNW3	WNW5	NNW3	SE6	SE11	SE12	SE11	SSE12	SSE11	SSE10	SSE8	NW4	WNW5	NW2	NNW2	W6	SSE2.9	SE12
5-Nov	NW5	NNW8	NW7	NW8	NW11	NW9	NW9	N12	NNW13	NNW15	NW14	NNW12	N14	N12	N13	NNW12	NW11	NNW10	N13	N10	NNW9	N10	NNE8	N3	NNW10.0	NNW15
6-Nov	NNE4	NE3	ESE3	E5	ESE6	SSE6	SSE7	SE8	SE8	SE7	S6	SE8	SE10	SSE10	SSE8	SE13	SE18	SE25	SE25	SE24	SE24	SE20	SE19	SSE18	SE11.1	SE25
7-Nov	SE15	SE15	SE12	ESE8	E3	ENE2	W9	WSW6	W11	W9	SSW4	W6	WSW14	W7	W5	WSW7	WSW2	SSE1	E1	ENE2	ESE4	ESE3	SE4	ESE5	SSW2.3	SE15
8-Nov	E2	W2	SE2	NW2	ENE1	WNW5	WNW4	WNW4	NW8	N10	NNE16	N14	NNE14	NNE14	NNE15	NNE11	NNE11	NNE9	N6	NNE3	NE3	NNE4	NNW4	NNW4	N5.8	NNE16
9-Nov	N5	NNE7	NW3	NW4	WNW4	WNW2	NW3	NW4	NNE2	NE3	NE2	SSW0	SW9	SSW6	SW6	SSW5	S7	SSW5	S4	SSE6	SSE8	SE12	SE10	SE8	S1.8	SE12
10-Nov	SE8	SE12	SE13	SE14	SE13	SE13	SSE12	SSE13	SSE11	SSE12	S13	SSE14	SSE10	SSE10	SSE12	SSE14	SSE13	SSE15	SSE15	SSE14	SE16	SE14	SE13	ESE12	SSE12.4	SE16
11-Nov	SE9	SE10	SE12	SSE17	SSE14	SSE11	S9	SSW12	SSW10	SSW10	SW12	WSW15	WSW19	WSW22	WSW18	SW11	S7	SW10	WSW13	WSW11	SSW7	SW9	SSW6	SE8	SSW8.4	WSW22
12-Nov	SE10	SE7	SE8	SE7	SE8	SE9	SE8	SE6	SE11	SSE11	SE17	SE14	SSE11	SSE10	SSE9	SSE11	SSE12	SE14	SE17	SE19	SE20	SSE17	SSE18	SSE16	SE12.0	SE20
13-Nov	SSE17	SSE17	SSE14	SSE14	SSE14	SE14	SE14	SE14	SSE14	SSE11	SSE9	SSE10	SE15	S7	WSW17	WSW17	WSW13	WSW11	SW5	SW9	WSW2	W10	WSW11	WSW18	S8.9	WSW18
14-Nov	WSW19	WSW19	W15	WSW17	WSW9	S3	SE3	SE5	ESE4	SE6	SE8	SE13	SE11	WSW5	SW7	S4	S4	ENE1	NNW1	NNE4	ENE2	SE7	E2	WNW2	SSW3.4	WSW19
15-Nov	NW1	E1	NW1	ENE2	ESE8	ENE1	WNW4	W5	WNW4	WNW5	NW7	WNW7	NW6	NW8	NW8	NNW11	N13	N12	WNW9	NW7	NNW6	NW4	WNW2	NW4.4	N13	
16-Nov	NW4	WNW5	NNW4	WNW5	NW6	WNW7	NW10	W11	W18	W24	W21	W23	W19	W18	W18	WSW16	WSW12	SW6	S5	SSE3	SE4	ESE4	SE9	SE11	W8.2	W24
17-Nov	SE14	ESE18	ESE21	SE26	SE21	SE19	SE18	SE18	SE16	SSE18	SSE16	SSE13	SSE9	SW12	SSW11	SSW8	WSW9	W11	WNW18	WNW20	W19	W25	W24	W21	S7.1	SE26
18-Nov	WSW22	WSW23	W19	NW13	NW13	WNW17	WNW16	NW17	NW19	NW19	NW19	NNW18	NNW20	NNW16	NNW14	NW13	NW9	WNW6	WNW3	NW4	NW3	WNW5	WNW5	NW2	NW11.9	WSW23
19-Nov	SE1	N1	E2	ENE1	SE3	SE6	SE6	SE6	ESE7	SSE2	SE6	ESE6	ESE4	WNW2	W5	W6	W7	WSW7	NW2	NW2	WNW3	NW4	WNW3	W3	S1.0	W7
20-Nov	ENE2	E3	NE1	ESE0	E1	N2	W9	W14	W16	W17	WSW13	SW9	SSW7	SSE9	SSE10	SSE12	SE14	SE19	SE18	SSE17	SSE17	SE16	SE15	SE15	S6.5	SE19
21-Nov	SE12	SE10	SSE7	SE8	SE6	WSW10	SW6	SE8	SE10	SE11	SE11	SE14	SE12	SE9	SSE6	SSE5	SE6	SE6	SW5	SW6	SSE5	W13	W19	W19	S5.6	W19
22-Nov	W19	W18	W17	W21	WSW22	W21	W19	WNW14	WNW16	NW17	NNW9	NNW6	N9	N7	NNW8	N8	N10	NNE10	N12	N9	NNW7	NNW8	N10	N10	WNW9.4	WSW22
23-Nov	NNW7	NW6	NW6	NW7	WNW7	NW7	WNW5	NNW4	NW4	NW6	NW5	NW6	NNW6	NNW7	NNW8	N9	N11	NNW8	NNW9	NNW9	NNW12	NNW12	N15	N11	NNW7.5	N15
24-Nov	N9	NW9	NW9	NW9	NW10	NW11	NW10	NW8	NW7	NW5	NW4	SW3	WNW5	NNW9	N11	N5	NW4	NNW2	SE3	SW6	SSW4	SSE6	S6	S6	NW4.1	NW11
25-Nov	SSW9	S7	SSE8	SSE8	SSE8	SSE8	SSE4	NW1	E1	SW5	S3	SSE4	SSE3	SE8	SE9	SE7	E2	E3	SE9	SE12	SE12	SE14	SE13	SE13	SSE6.4	SE14
26-Nov	SE13	SE11	SE13	SE13	SE16	SE15	SE17	SE18	SE18	SE19	SE17	SE20	SE20	SE20	SE13	SE14	SE13	SE13	SE14	SE12	SE10	SE11	SE10	SE12	SE14.6	SE20
27-Nov	SE15	SE13	SE12	SE11	SE12	SE14	SE15	SE5	ESE1	SE7	SE9	SE8	SSE3	SSE4	SE6	SE9	SE8	SE11	SE14	SE14	SE13	SE15	SE13	SE13	SE10.1	SE15
28-Nov	SE11	SE14	SE13	SE12	SE13	SE16	SE17	SE16	SE13	SE15	SE17	SE19	SE19	SE20	SE14	SE11	SE17	SE18	SE17	SE13	SE16	SE18	SE17	SE15	SE15.5	SE20
29-Nov	SE21	SE17	SE13	SE14	SE12	SE14	SE13	SE18	SE17	SE12	SE12	SE13	SE14	SE12	SE13	SE8	ESE7	SE9	SE14	SE18	SE17	SE17	SE19	SE18	SE14.4	SE21
30-Nov	SE17	SE19	SE17	SE19	SE19	SE20	SE21	SE21	SE19	SE15	SE14	SE16	SE15	SE17	SE15	SE16	SE16	SE16	SE16	SE13	SE15	SE14	SE14	SE12	SE16.4	SE21

SSE4.0 SSE3.8 SSE3.7 SSE3.8 SE3.6 SSE3.3 SSE2.7 SSE3.0 S2.3SSW2.0 SSE2.5 SSE3.5 SE3.2 S2.1SSW1.6 S2.3 SSE2.4 SE3.3 SE3.6 SSE3.6 SSE4.1 SSE4.0 SSE3.9 SSE4.3	Diurnal Average
WSW22WSW23 ESE21 SE26 WSW22 W21 SE21 SE21 NW19 W24 W21 W23NNW20 WSW22WSW18 NNE19 SE18 SE25 SE25 SE24 SE24 W25 W24 W21	Diurnal Maximum

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

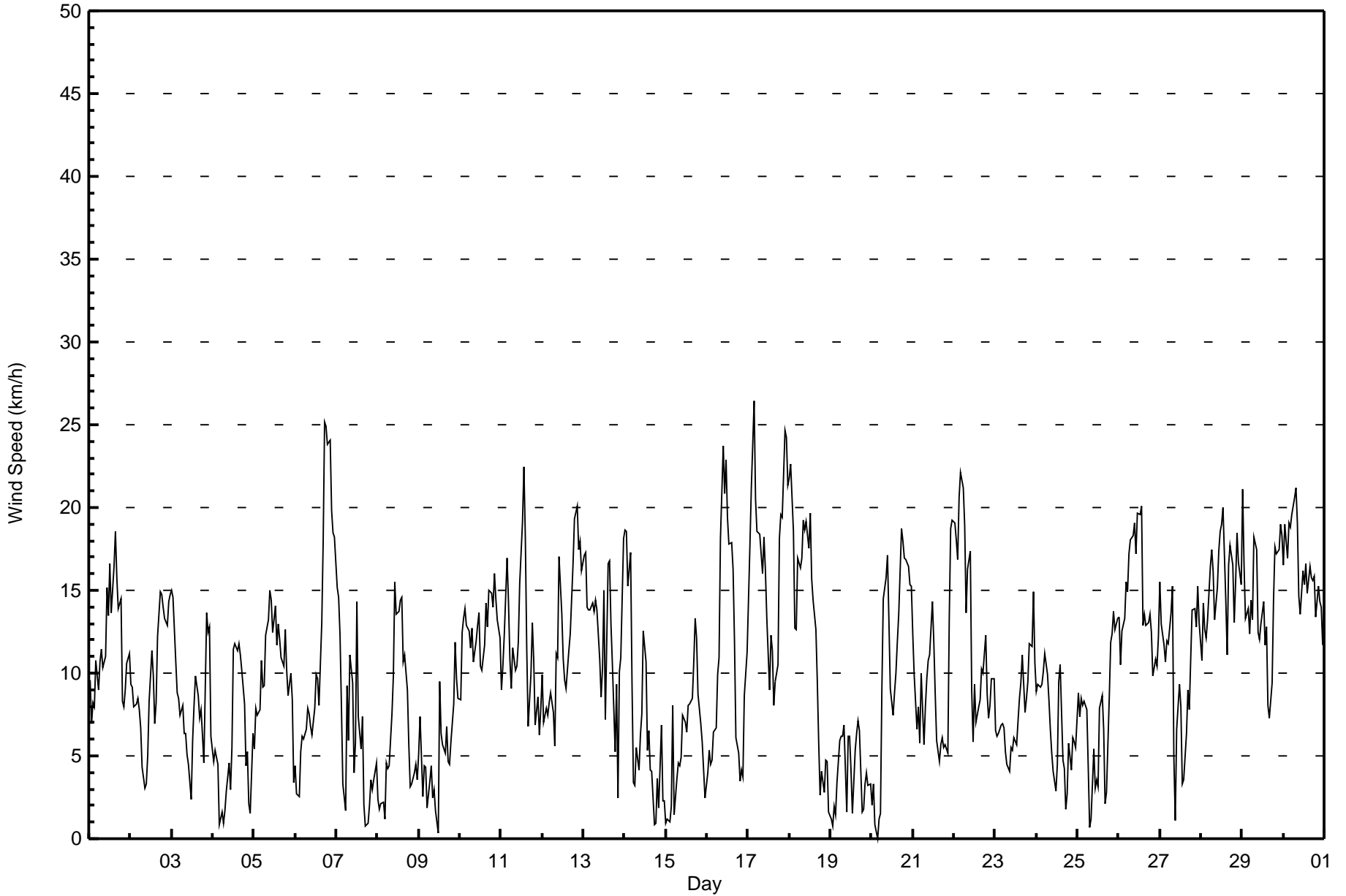


Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Lower Camp - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Nov 17 18:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Nov 18 22:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 5																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Nov	2	2	2	2	2	2	1	2	2	2	3	3	3	2	3	3	3	3	3	2	2	2	2	2	3
2-Nov	2	2	2	1	2	2	1	2	1	1	4	3	3	3	2	3	4	5	4	4	3	3	4	4	5
3-Nov	3	3	3	3	3	2	2	2	2	2	1	1	3	1	2	2	1	2	1	3	3	3	3	3	3
4-Nov	2	1	2	2	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	2	1	1	1	3	3
5-Nov	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	2	3	3	3	2	2	1	2	3
6-Nov	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	4	5	5	4	4	4	5	5	5
7-Nov	4	2	2	3	1	2	3	3	3	2	3	5	3	4	2	1	2	2	1	2	2	1	2	1	5
8-Nov	2	2	1	1	1	1	1	1	1	4	4	4	3	3	3	3	2	3	1	1	1	1	1	1	4
9-Nov	1	1	2	2	1	1	1	1	1	1	1	2	3	2	2	2	3	2	1	2	2	3	2	1	3
10-Nov	2	2	2	3	2	3	3	3	3	3	4	4	3	4	4	4	4	4	4	4	4	4	3	3	4
11-Nov	3	2	3	4	4	3	3	4	3	4	4	3	4	5	4	4	2	3	3	3	3	3	3	3	5
12-Nov	2	2	2	2	2	1	2	3	3	3	4	2	3	3	2	3	3	3	3	4	5	5	5	4	5
13-Nov	5	5	4	5	4	3	3	3	3	4	3	4	3	4	4	4	4	5	3	3	3	3	2	4	5
14-Nov	4	4	4	3	4	2	2	2	2	2	3	2	2	3	3	1	1	1	1	1	1	2	1	1	4
15-Nov	1	1	1	1	2	2	2	1	1	1	1	2	1	2	2	2	2	2	3	2	2	2	1	1	3
16-Nov	2	1	2	1	1	2	2	4	4	4	4	4	4	3	4	4	2	3	2	2	1	1	3	3	4
17-Nov	3	2	5	5	4	5	5	4	4	5	4	3	3	4	4	3	6	7	4	4	4	5	5	4	7
18-Nov	4	4	5	3	4	3	3	4	4	4	4	4	5	4	4	3	2	1	2	2	1	1	1	2	5
19-Nov	1	1	1	1	2	2	2	2	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2
20-Nov	1	2	1	1	1	1	4	2	3	3	3	3	3	3	3	3	5	5	4	4	4	4	4	3	5
21-Nov	2	3	3	3	2	6	4	3	2	2	3	3	2	3	2	2	2	3	4	3	3	5	4	4	6
22-Nov	4	3	3	4	4	4	4	3	6	5	2	2	2	2	2	2	2	3	2	2	1	2	2	2	6
23-Nov	2	2	2	1	1	1	1	1	1	1	1	2	1	2	2	2	4	2	2	2	2	3	3	3	4
24-Nov	2	2	1	1	2	2	2	1	1	1	1	1	1	3	2	2	1	2	1	2	2	2	2	2	3
25-Nov	3	2	2	2	2	2	2	1	1	3	1	1	3	1	1	1	1	2	3	2	2	2	2	3	3
26-Nov	3	3	4	3	3	3	3	3	3	3	3	3	2	2	3	2	3	2	2	3	2	2	2	2	4
27-Nov	3	2	2	2	2	2	3	2	3	2	2	2	3	2	2	2	2	2	2	2	2	2	2	3	3
28-Nov	2	2	3	2	3	2	3	3	3	3	3	2	3	2	3	2	2	3	3	2	2	3	4	3	4
29-Nov	3	3	3	2	2	2	2	2	3	3	3	2	3	2	2	3	3	2	2	3	2	2	2	2	3
30-Nov	3	2	3	3	3	3	3	2	5	3	3	4	3	2	2	3	3	3	3	3	2	2	2	2	5
																	5 5 5 5 4 6 5 4 6 5 4 5 5 5 4 4 6 7 5 4 5 5 5 5 5								
Diurnal Maximum																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	158	21.94	21.94
6 - 11	267	37.08	59.03
12 - 19	264	36.67	95.69
20 - 28	31	4.31	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - November 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	6	7	9	13	10	12	11	7	6	4	3	5	26	25	9	158
6 - 11	24	15	0	0	1	9	67	34	9	10	11	9	13	6	34	25	267
12 - 19	10	12	1	0	0	2	142	35	1	1	2	15	20	5	9	9	264
20 - 28	0	0	0	0	0	1	16	0	0	0	0	4	8	1	0	1	31
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	39	33	8	9	14	22	237	80	17	17	17	31	46	38	68	44	720

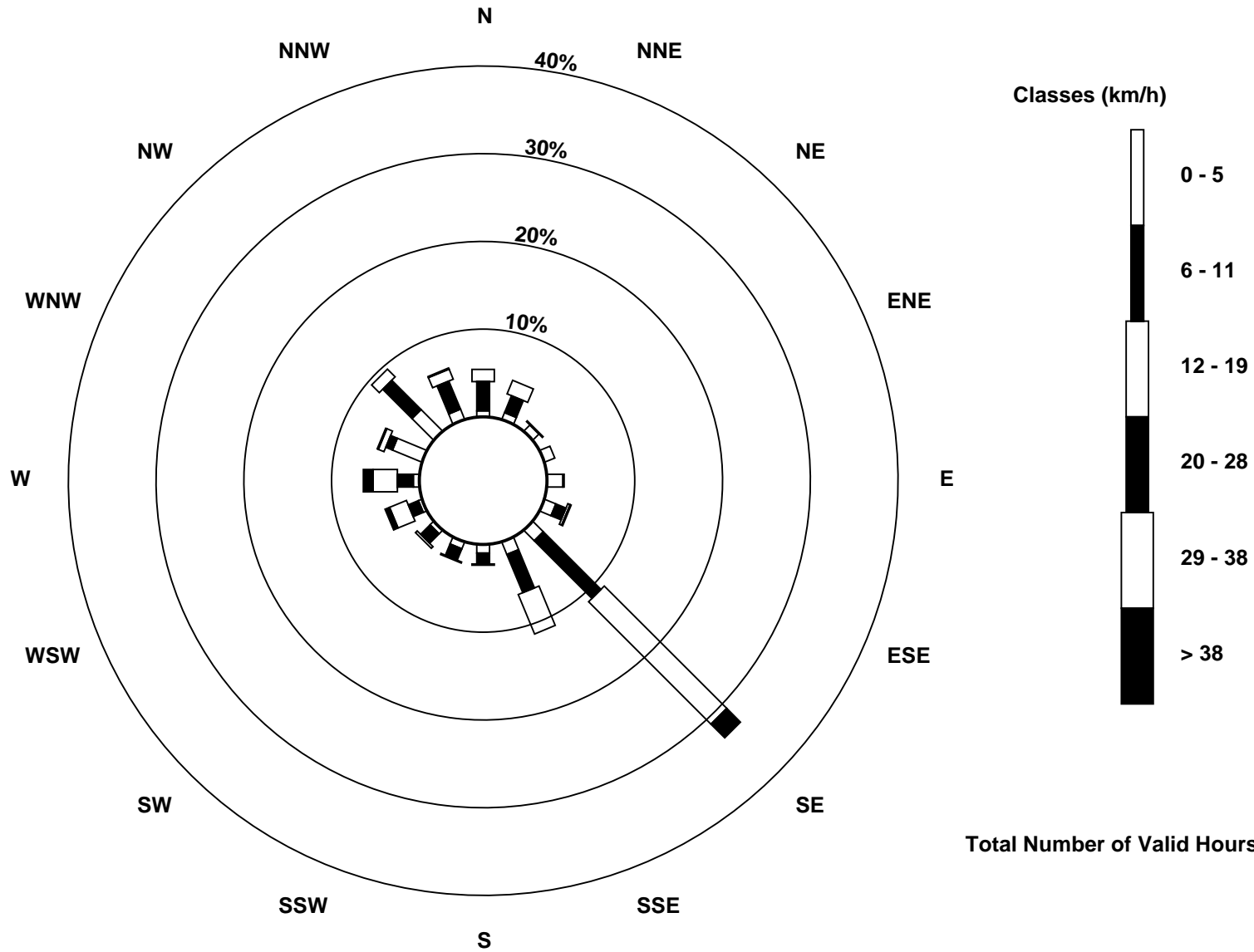
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Lower Camp (AMS 11)



Total Number of Valid Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

**Wind Direction (WD) - deg
Lower Camp - November 2015**

Direction of Maximum Speed: 129 deg on Nov 17 04:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 138.2 deg on Nov 30	Hours of Data: 720
Direction of Minimum Speed: 116 deg on Nov 20 04:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.8 deg on Nov 3	Percent Operational Time: 100.0
Monthly Average Direction: 259.3 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-Nov	358	355	358	347	2	359	6	14	15	15	31	22	38	23	20	14	17	13	30	5	335	334	353	0	11.2
2-Nov	344	348	18	29	24	27	17	16	348	307	135	137	128	148	174	167	147	153	155	152	139	141	146	149	127.0
3-Nov	135	136	150	135	128	127	121	98	134	139	113	89	350	347	320	316	306	313	313	314	278	264	264	266	201.4
4-Nov	194	178	157	130	43	293	326	319	287	295	338	142	129	141	140	153	159	156	152	307	302	309	343	272	161.7
5-Nov	323	332	320	313	318	313	326	9	345	343	317	339	353	351	356	343	324	330	354	354	341	5	13	4	340.8
6-Nov	27	43	118	95	106	151	148	143	138	143	190	138	139	155	166	138	129	131	132	138	137	137	146	149	137.4
7-Nov	133	135	135	119	94	65	268	254	271	272	205	264	257	270	269	249	251	150	92	67	106	114	124	119	201.8
8-Nov	98	274	142	320	78	284	291	288	304	355	23	11	27	19	18	27	17	12	1	25	34	14	346	341	7.3
9-Nov	349	12	308	323	299	283	305	321	12	49	50	194	215	195	214	195	191	194	176	157	163	140	136	136	180.1
10-Nov	138	139	136	135	136	140	164	162	157	158	170	154	163	161	152	156	155	152	153	152	145	134	128	121	148.2
11-Nov	124	125	136	147	153	157	182	201	198	202	220	245	251	258	254	235	187	221	251	248	211	229	212	142	207.5
12-Nov	136	144	143	140	130	139	138	124	129	148	126	136	149	150	160	158	150	138	137	140	142	148	148	147	142.0
13-Nov	154	150	153	163	156	146	143	143	151	165	166	153	140	183	243	241	242	239	228	218	250	260	252	248	184.4
14-Nov	254	258	264	252	252	169	135	135	120	132	128	134	137	241	228	171	182	67	332	27	67	139	82	295	209.9
15-Nov	323	84	41	75	122	66	297	275	283	297	304	300	309	315	320	313	340	350	10	289	317	328	322	291	323.1
16-Nov	317	294	327	295	306	291	310	275	268	262	264	269	273	269	267	258	245	215	186	157	130	109	142	145	262.9
17-Nov	139	122	121	129	127	138	132	128	138	150	149	152	152	216	213	203	258	280	300	302	279	264	266	265	179.5
18-Nov	257	256	279	316	306	297	299	309	314	314	317	327	333	332	332	321	320	300	299	304	308	294	289	305	305.1
19-Nov	145	358	91	59	145	144	145	134	106	159	135	123	114	293	280	264	266	256	326	316	286	311	284	269	188.1
20-Nov	75	99	51	116	95	358	270	261	259	260	256	229	195	159	159	161	141	136	136	150	147	145	140	140	172.1
21-Nov	135	136	154	136	141	237	223	144	139	135	135	136	137	140	161	167	133	146	229	227	165	260	266	262	172.0
22-Nov	260	265	266	265	257	262	266	284	292	307	347	336	10	354	346	353	11	17	3	354	338	344	349	350	303.2
23-Nov	331	322	325	304	303	313	293	327	304	325	321	323	331	336	340	351	350	337	336	343	341	342	358	349	333.9
24-Nov	359	324	313	314	321	321	319	310	306	314	323	232	297	343	6	356	315	327	142	216	196	166	174	173	315.5
25-Nov	203	191	147	152	151	149	159	308	88	236	178	154	152	138	141	141	100	91	134	139	139	139	141	139	148.8
26-Nov	136	131	137	133	136	134	133	136	134	133	135	138	138	140	135	138	139	137	137	138	136	137	136	137	136.0
27-Nov	137	141	140	139	134	132	130	133	129	115	132	137	141	147	162	137	135	129	141	142	140	142	140	139	137.5
28-Nov	140	138	138	139	139	140	137	136	134	139	138	137	134	136	139	140	138	136	140	138	138	136	140	136	137.5
29-Nov	136	139	140	139	139	140	139	139	138	140	137	135	136	136	135	133	121	132	139	140	139	137	139	139	137.5
30-Nov	139	137	136	139	137	137	132	138	138	138	139	139	138	137	139	139	140	142	141	141	140	140	139	135	138.2

154.9 155.2 150.7 148.4 144.1 157.5 166.0 153.9 172.2 197.7 154.9 151.1 144.5 169.1 204.1 181.6 152.8 142.7 136.6 153.9 151.7 159.3 159.7 161.3

Diurnal Average

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



Wood Buffalo Environmental Association

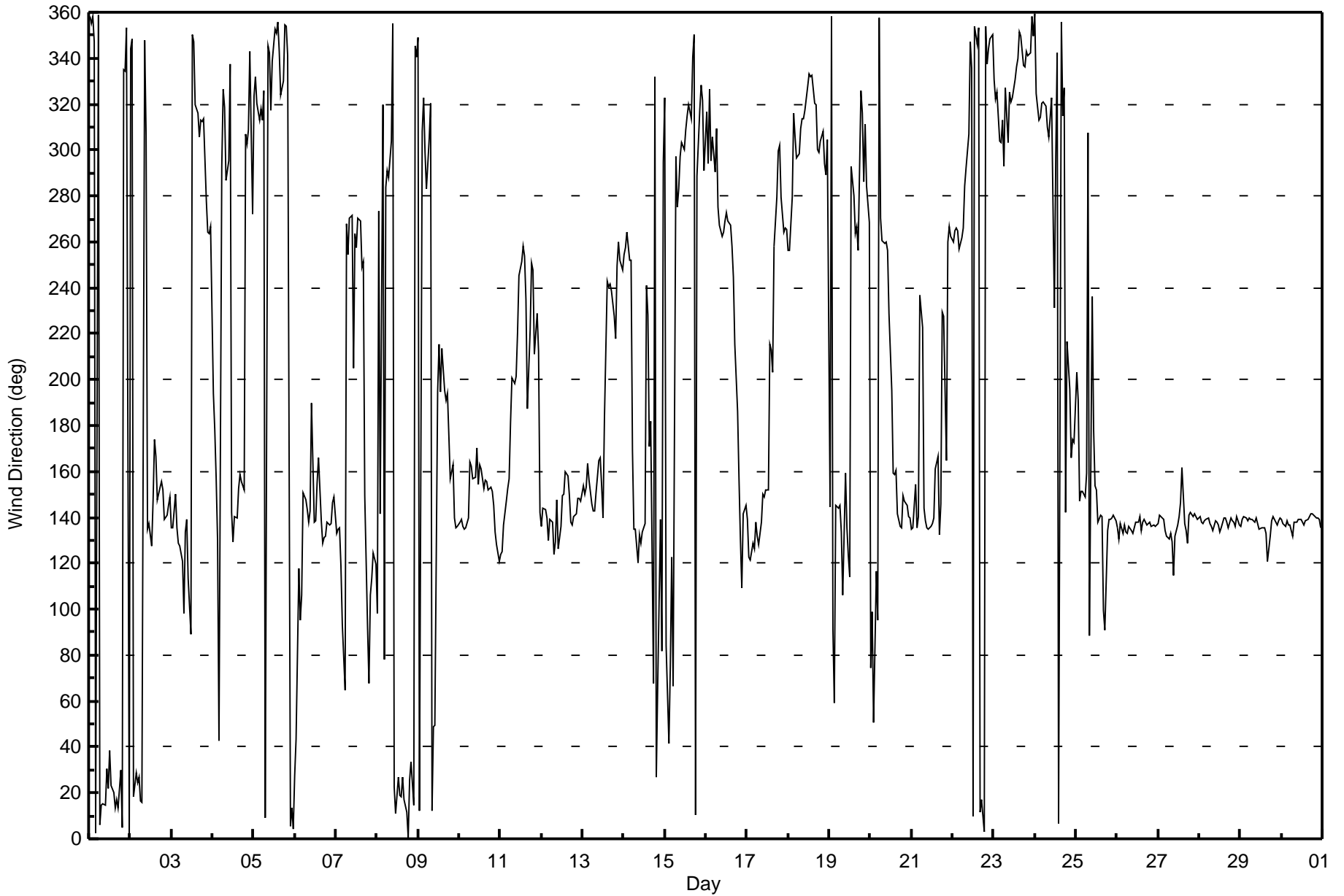
Summary of Hour Standard Deviations

**Wind Direction (WD) - deg
Lower Camp - November 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 96 deg on Nov 25 08:00	Hours of Data: 720
Minimum Value: 5 deg on Nov 26 13:00	Hours of Missing Data: 0
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 17 Q ₃ = 25 P ₉₀ = 48 P ₉₉ = 85	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-Nov	13	19	21	17	13	17	11	13	13	16	11	15	14	17	12	11	10	15	11	29	20	15	18	16	29
2-Nov	20	21	25	13	15	18	16	32	31	37	82	24	14	27	30	28	19	22	20	21	17	18	18	19	82
3-Nov	16	13	21	24	21	27	21	26	18	25	20	48	23	18	12	13	14	11	13	29	11	11	11	46	48
4-Nov	31	18	24	39	92	61	71	55	35	20	47	67	14	21	17	19	17	18	53	16	47	74	32	92	
5-Nov	20	16	18	15	10	12	14	16	19	23	13	23	21	20	16	18	16	20	17	18	19	17	12	55	55
6-Nov	29	28	41	17	15	17	17	20	21	30	34	21	19	24	26	15	13	11	13	12	11	13	19	18	41
7-Nov	16	9	11	30	33	68	20	65	16	20	64	84	14	28	30	10	83	67	79	80	55	63	58	25	84
8-Nov	66	88	63	62	87	35	21	27	18	26	19	18	17	16	21	15	16	16	18	15	19	18	23	25	88
9-Nov	23	11	55	28	26	48	17	10	43	18	47	87	17	36	36	35	27	26	23	23	19	15	14	11	87
10-Nov	13	13	12	12	12	14	18	17	18	19	23	20	26	23	20	18	19	18	19	20	16	20	12	18	26
11-Nov	18	15	15	16	16	17	30	25	26	25	28	13	13	12	13	19	20	27	13	22	29	24	40	17	40
12-Nov	13	16	16	15	20	9	10	29	21	21	11	12	22	21	20	19	19	14	12	14	16	19	18	18	29
13-Nov	19	17	18	24	20	15	15	14	20	25	28	35	10	40	14	14	12	17	51	22	81	15	14	11	81
14-Nov	12	14	13	11	27	56	53	26	43	21	29	10	7	65	27	15	21	81	77	29	81	15	42	75	81
15-Nov	57	73	52	36	15	83	37	16	13	19	11	15	15	15	19	17	18	16	19	25	22	22	20	65	83
16-Nov	35	28	24	23	19	19	15	13	11	10	11	11	12	11	11	12	16	40	27	49	28	35	19	16	49
17-Nov	12	11	14	10	12	19	17	13	21	17	18	16	20	22	20	23	25	19	18	15	19	11	11	11	25
18-Nov	10	10	22	14	16	11	9	11	13	12	13	15	18	16	17	11	17	16	49	42	55	18	21	69	69
19-Nov	72	62	40	39	49	18	16	29	20	61	27	23	47	95	14	16	13	12	48	45	22	15	16	21	95
20-Nov	69	35	92	93	64	59	27	12	11	11	14	32	30	24	23	23	21	14	14	17	16	17	16	11	93
21-Nov	8	14	52	25	28	54	66	22	11	10	12	9	9	30	35	31	23	20	54	39	37	18	12	11	66
22-Nov	11	10	10	11	11	11	11	15	13	23	16	19	14	22	23	20	15	19	15	17	16	17	17	18	23
23-Nov	21	21	23	25	15	20	23	23	29	29	22	21	27	16	19	15	17	17	18	17	18	19	15	21	29
24-Nov	23	15	11	11	13	12	13	11	14	13	20	51	29	21	15	35	30	60	53	22	34	22	25	28	60
25-Nov	22	28	13	15	15	14	53	96	75	31	39	31	40	9	7	15	43	45	18	7	8	8	11	12	96
26-Nov	12	20	16	12	9	10	10	8	9	8	8	7	5	6	20	9	12	9	7	12	14	12	9	7	20
27-Nov	7	9	13	14	6	6	8	8	60	94	53	21	13	42	44	10	9	17	11	9	10	11	8	9	94
28-Nov	12	6	10	10	10	8	7	8	11	10	8	6	7	5	10	11	7	8	9	11	9	8	11	11	12
29-Nov	6	8	12	9	9	8	8	6	7	11	11	8	7	7	6	54	27	9	7	7	7	6	6	8	54
30-Nov	9	7	7	8	8	7	8	6	8	12	12	10	11	7	7	6	9	11	9	10	7	8	8	10	12

72	88	92	93	92	83	71	96	75	94	82	87	47	95	44	54	83	81	79	80	81	63	74	75	
Diurnal Maximum																								





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Last Calibration	October 7, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	14:20
Gas Cert Reference	LL110099	Station temp.	Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	25/03/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	800	801
Calculated slope	1.001264	0.998510	Chamber temp	45.1	44.9
Calculated intercept	1.230449	1.734116	Pressure	707.5	708.7
Analyzer Background	11.1	11.1	Flow	0.486	0.485
Analyzer Coefficient	1.013	1.013	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # 100841398

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	80.9	830.0	830.4	1.000
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	80.9	830.0	830.4	1.000
second point	5000	40.9	419.6	417.5	1.005
third point	5000	20.5	210.3	207.5	1.014
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	80.9	830.0	829.9	1.000
Average Correction Factor					1.006

Corrected As found 830.6 Previous response 827.8 % change -0.3%

Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By: Evan Magill



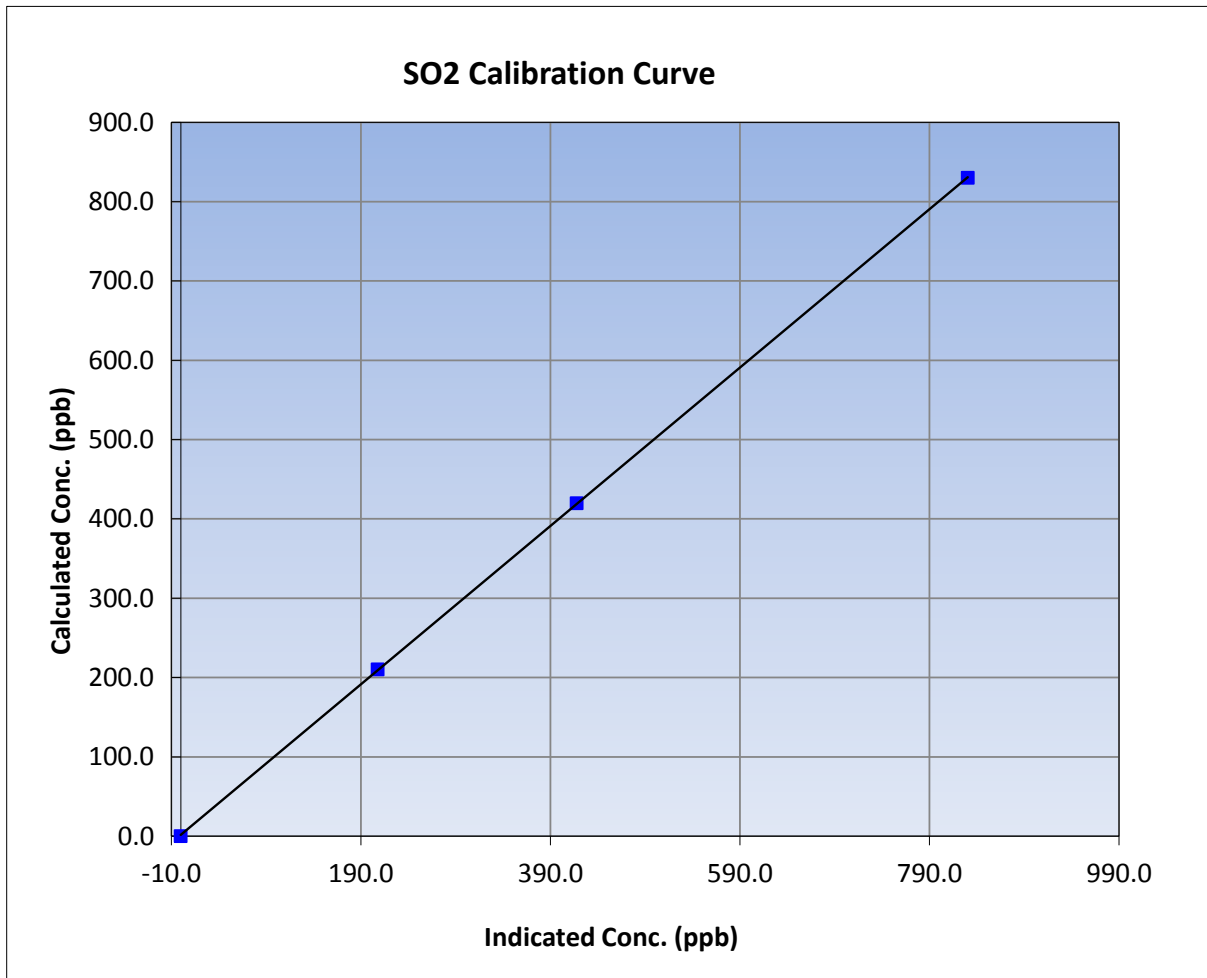
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 7, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:30	End Time (MST)	14:20
Analyzer make	TEI 43i	Analyzer serial #	100841398

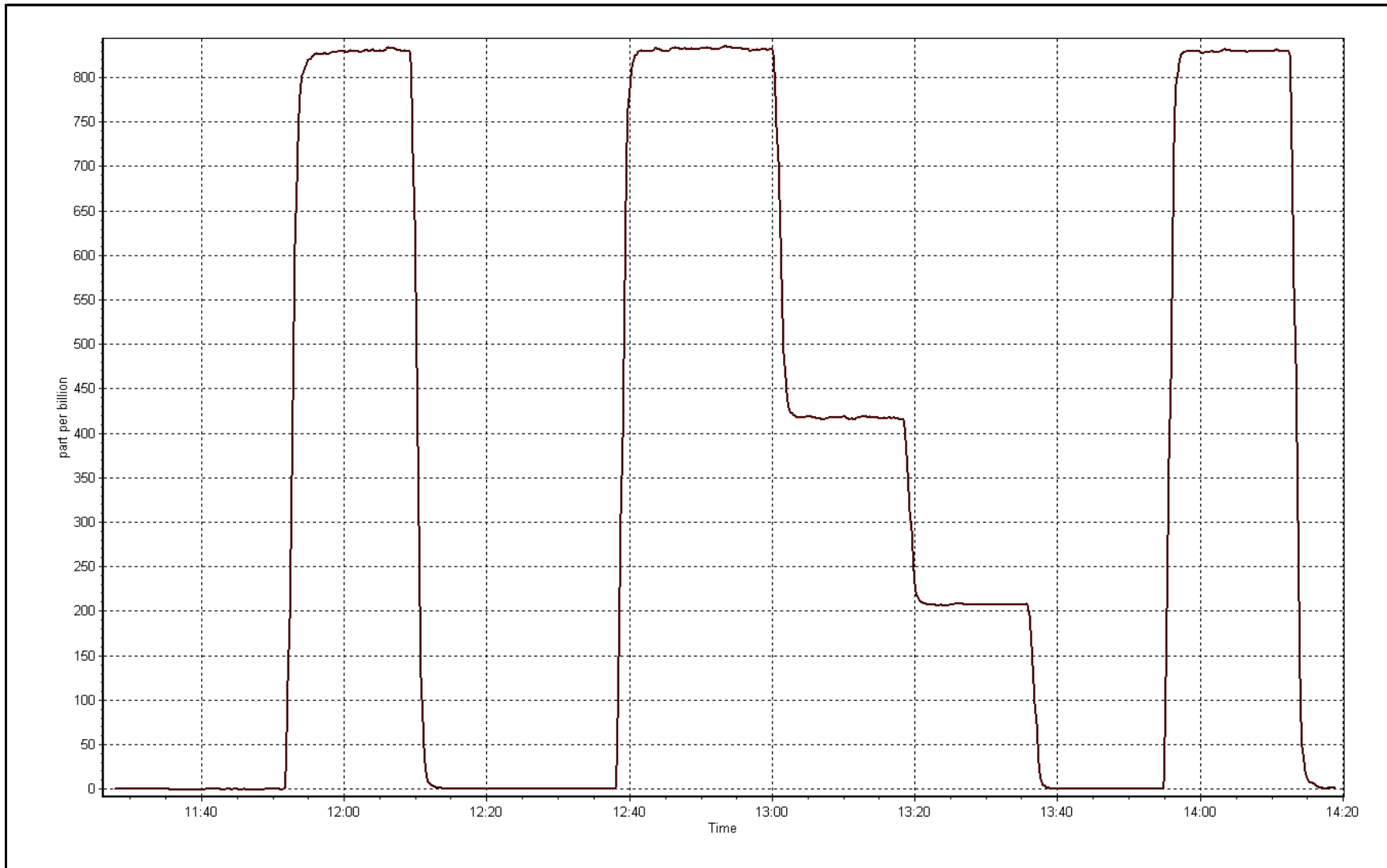
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999984
830.0	830.4	0.9996		
419.6	417.5	1.0050	Slope	0.998510
210.3	207.5	1.0137		
			Intercept	1.734116



SO2 Calibration Plot

Date: November 4, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 4, 2015	Last Calibration	October 16, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	14:25	End Time (MST)	17:13
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	-671	-670
Analyzer IP address	192.168.1.42		Lamp voltage	786	788
Calculated slope	0.998289	1.000725	Chamber temp	45	45
Calculated intercept	-0.171103	-0.216357	Pressure	598.9	590.5
Analyzer Background	9.8	9.8	Flow	1.053	1.041
Analyzer Coefficient	1.238	1.221	Intensity	91	91
			Converter temp.	324	322

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	0.0	----
as found span	5000	72.9	75.1	77.6	0.967
SO2 scrubber check	5000	20.5	210.7	1.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	72.9	75.1	75.1	0.999
second point	5000	38.8	40.0	40.3	0.993
third point	5000	19.4	20.0	20.4	0.980
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	72.9	75.1	76.3	0.984
Average Correction Factor					0.991

Corrected As found	77.6	Previous response	75.4	% change	-2.8%
--------------------	------	-------------------	------	----------	-------

Notes:

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

Calibration Performed By: Evan Magill



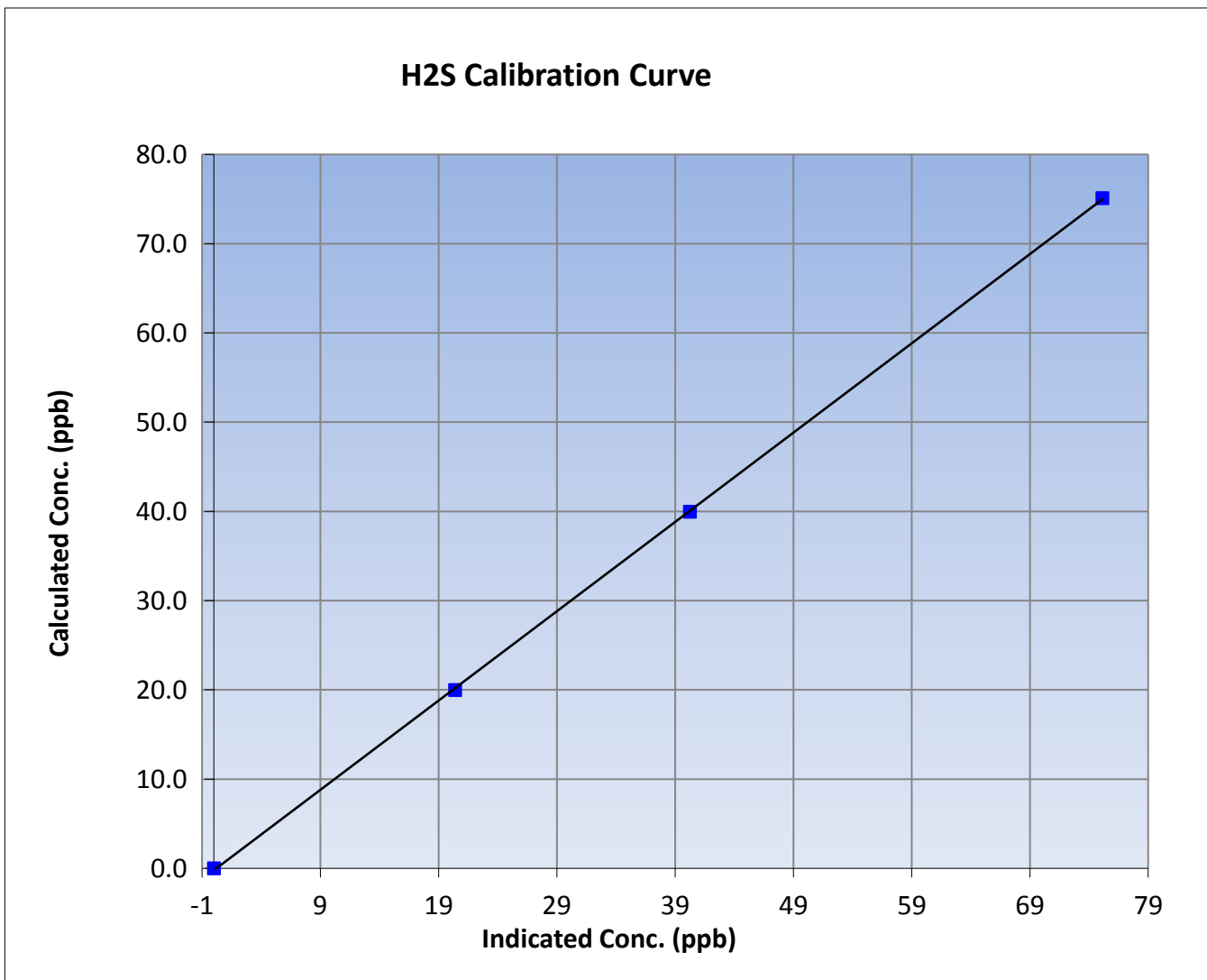
Wood Buffalo Environmental Association H2S Calibration Report

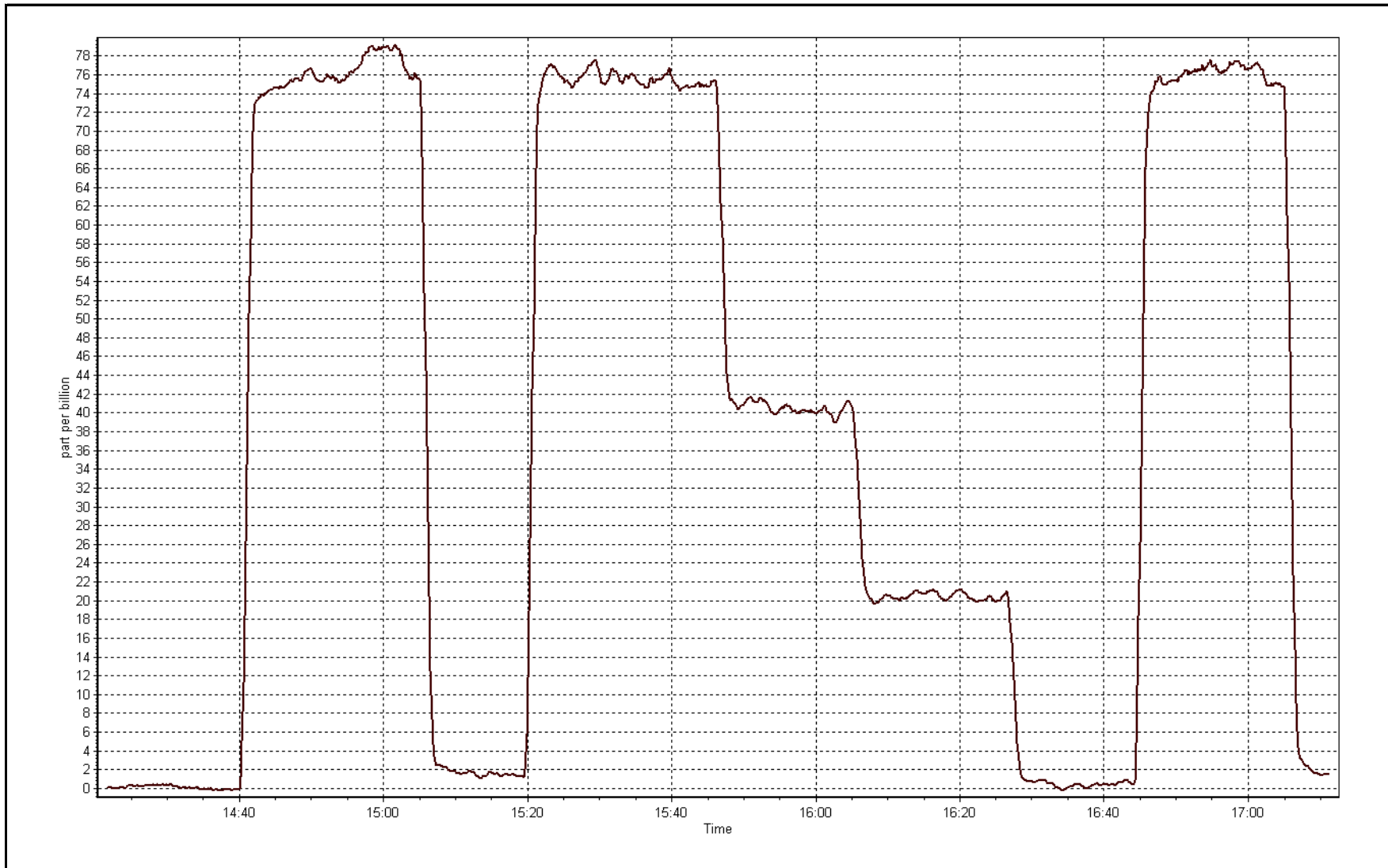
Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 16, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	14:25	End Time (MST)	17:13
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	0.0	----	Correlation Coefficient	0.999967
75.1	75.1	0.9993		
40.0	40.3	0.9929	Slope	1.000725
20.0	20.4	0.9800		
			Intercept	-0.216357







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-04-15	Last Calibration	October-07-15
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	11:30	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	1.000903	1.000947	Fuel Pressure	24.0	24.0
Calculated intercept	0.024757	-0.010605	Analyzer Coeff	4.2	4.3
			Analyzer BKG	6.380	6.320

Analyzer make 51i-LT Analyzer serial # 1410661326

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	-0.10	----
as found span	5000	80.9	17.32	16.92	1.024
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	80.9	17.32	17.28	1.002
second point	5000	40.9	8.76	8.82	0.993
third point	5000	20.5	4.39	4.41	0.995
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	80.9	17.32	17.39	0.996
Average Correction Factor					0.997

Corrected As found 17.02 Previous response 17.28 % change 1.5%

Notes:

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

Calibration Performed By:

Evan Magill



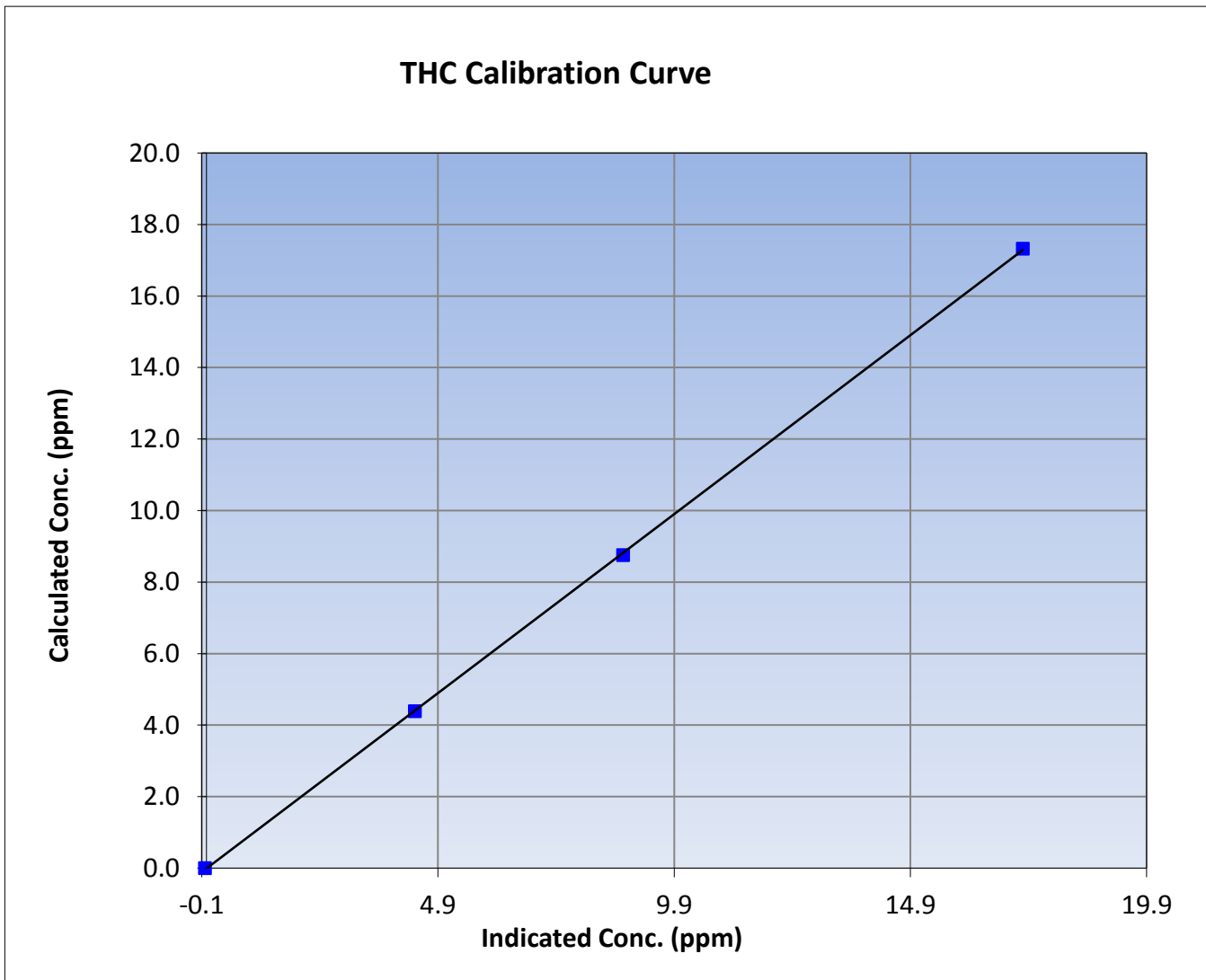
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 7, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	11:30	End Time (MST)	14:15
Analyzer make	51i-LT	Analyzer serial #	1410661326

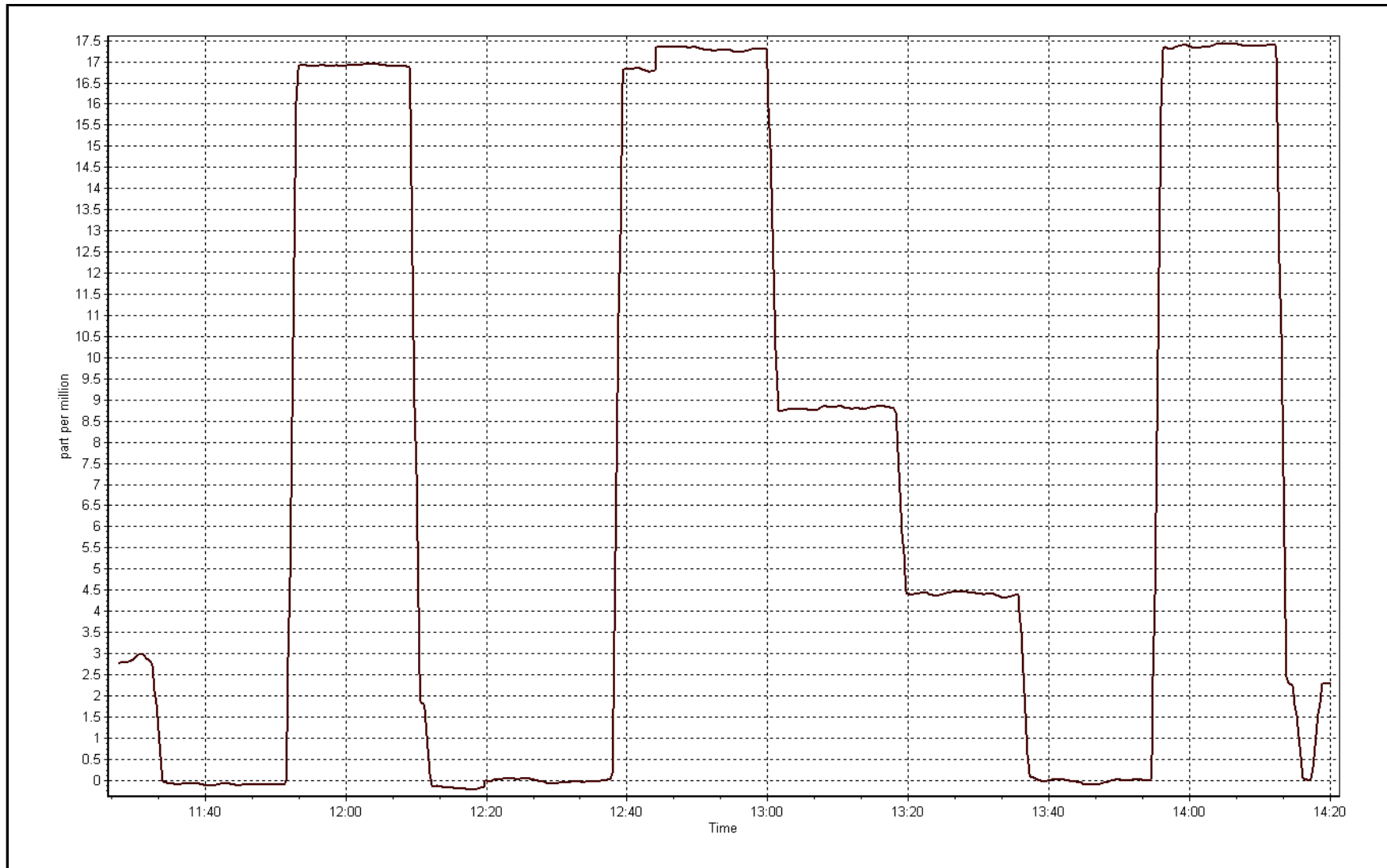
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999958
17.32	17.28	1.0024		
8.76	8.82	0.9928	Slope	1.000947
4.39	4.41	0.9952		
			Intercept	-0.010605



THC Calibration Plot

Date: November 4, 2015





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	676	36	44	98.89	8	0	1	0
TRS(ppb) Average	679	33	41	98.89	1	0	0	0
THC(ppm) Average	675	36	45	98.75	4.1	-	2.9	-
O3(ppb) Average	679	33	41	98.89	35	0	24	-
NO2(ppb) Average	674	36	46	98.61	21	0	13	-
NO(ppb) Average	674	36	46	98.61	41	-	8	-
NOX(ppb) Average	674	36	46	98.61	58	-	21	-
PM2.5(ug/m3) Average	710	2	10	98.89	29.6	-	17	0
ET(C) Average	712	0	8	98.89	8.6	-	2.7	-
RH(%) Average	712	0	8	98.89	97	-	95	-
WS(km/h) Average	710	0	10	98.61	14	-	8	-
WD(deg) Average	710	0	10	98.61	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	676	0.3	1	-	0	0	0	0	0	1	8
TRS(ppb) Average	679	0.2	0	-	0	0	0	0	0	0	1
THC(ppm) Average	675	2.3	0.3	-	2	2	2.1	2.2	2.4	2.7	4.1
O3(ppb) Average	679	13.4	9	-	0	2	6	13	20	26	35
NO2(ppb) Average	674	6	5	-	0	1	2	4	9	15	21
NO(ppb) Average	674	1.6	4	-	0	0	0	0	1	4	41
NOX(ppb) Average	674	7.5	8	-	0	1	2	5	11	18	58
PM2.5(ug/m3) Average	710	4.64	4.1	-	0	1.2	2.1	3.5	5.9	8.9	29.6
Temperature 2 m (C) Average	712	-6.09	6.6	-	-24.6	-14.7	-11	-4.6	-1.2	1.3	8.6
Relative Humidity (%) Average	712	82.1	11	-	40	66	78	85	89	93	97
Wind Speed 10 m (km/h) Average	710	4.5	3	-	0	1	2	4	6	8	14
Wind Direction 10 m (deg) Average	710	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
 NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	27 Nov 2015 11:00	27 Nov 2015 11:00	1	Maintenance - upload new datalogger program
ALL PARAMETERS	27 Nov 2015 12:00	27 Nov 2015 18:00	7	Data logger program uploaded - data not recorded
THC	19 Nov 2015 08:00	19 Nov 2015 08:00	1	Maintenance - verifying analyzer stability
NO2, NO, NOX	19 Nov 2015 09:00	19 Nov 2015 10:00	2	Maintenance - NOX reference point generated for O3 cal
Wind Speed, Wind Direction	04 Nov 2015 20:00	04 Nov 2015 20:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	06 Nov 2015 00:00	06 Nov 2015 00:00	1	Flat line in sensor output signal -sensor frozen

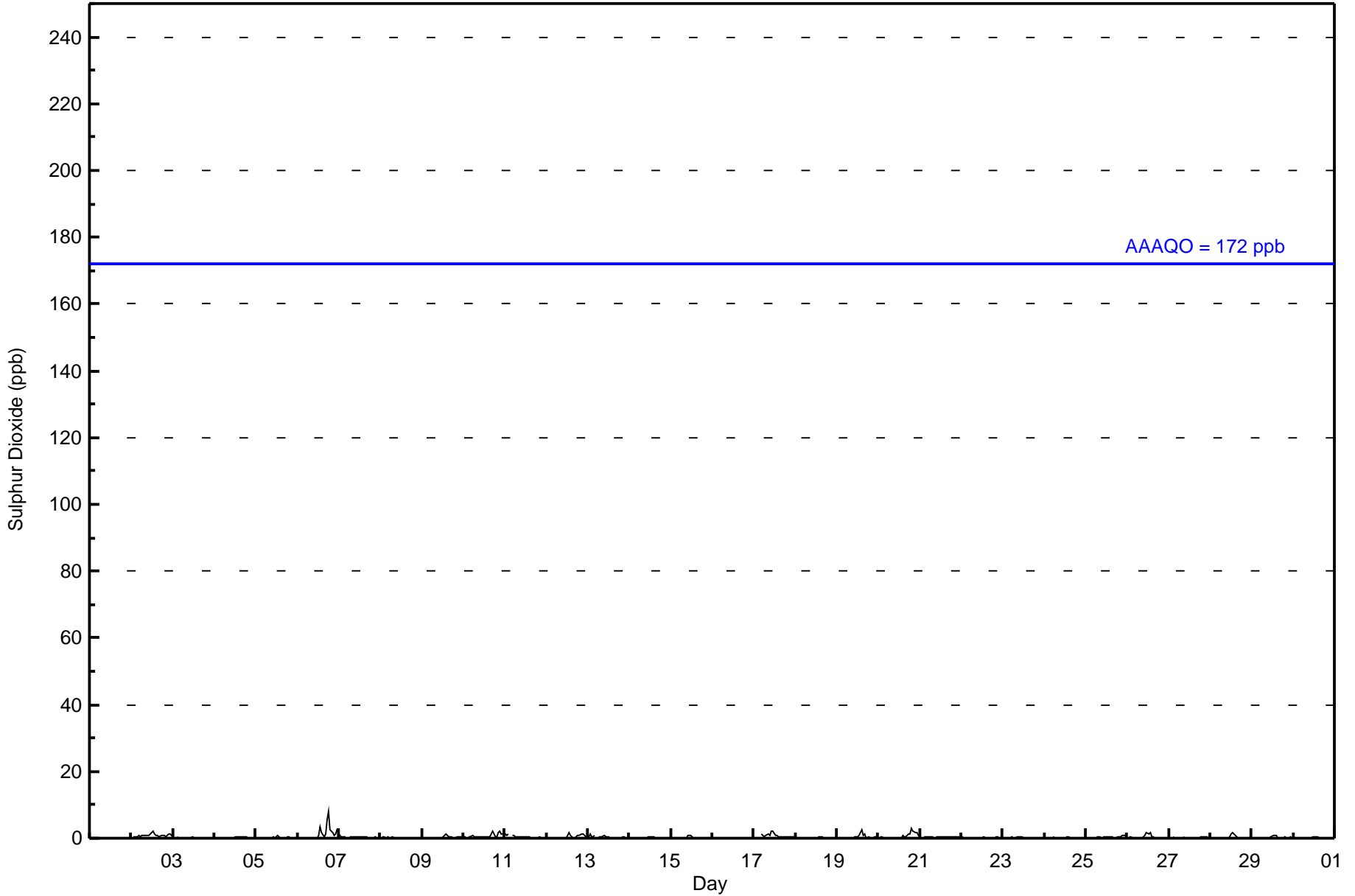


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Nov 6 19:00	Maximum Daily Average: 1.4 ppb on Nov 6		Hours of Data:	676
Minimum Value: 0 ppb on Nov 1 01:00	Minimum Daily Average: 0.0 ppb on Nov 1		Hours of Missing Data:	44
Maximum Diurnal Average: 0.6 ppb at hour 14	Minimum Diurnal Average: 0.2 ppb at hour 7		Hours of Calibration:	36
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 2		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-Nov	0	0	0	0	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-Nov	Z	0	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
3-Nov	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
4-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Nov	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	0.1	1
6-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	1	3	2	1	1	6	8	2	2	1	1	3	1.4	8	
7-Nov	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Nov	Z	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	
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0.3	1	
10-Nov	0	0	Z	1	0	1	0	0	0	0	1	0	0	0	0	0	1	2	1	1	2	2	1	1	0.8	2	
11-Nov	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	1	2	1	0	0	0	1	1	1	1	1	1	0.4	2	
13-Nov	1	1	0	0	1	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1	
14-Nov	Z	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	
15-Nov	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	
16-Nov	0	0	Z	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-Nov	0	0	0	Z	1	1	1	1	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0.6	2	
18-Nov	0	0	0	0	Z	0	0	C	C	C	C	C	C	0	1	0	0	0	0	0	0	0	0	0	--	1	
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	2	1	1	0	1	0	0	0	0	0	0.3	2	
20-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	3	2	2	2	1	0.6	3	
21-Nov	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
25-Nov	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	
26-Nov	Z	0	0	0	0	0	0	0	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0.4	2	
27-Nov	0	Z	0	0	0	0	0	0	0	0	M	DF	DF	DF	DF	DF	DF	DF	0	0	0	0	0	0	--	0	
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0.2	2	
29-Nov	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	

0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.6	0.5	0.3	0.3	0.5	0.5	0.4	0.4	0.4	0.3	0.3	Diurnal Average	
1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	1	1	6	8	3	2	2	2	3	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	676	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: 676

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	82	27	8	2	2	1	8	48	166	94	65	70	24	18	22	37	674
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	82	27	8	2	2	1	8	48	166	94	65	70	24	18	22	37	674

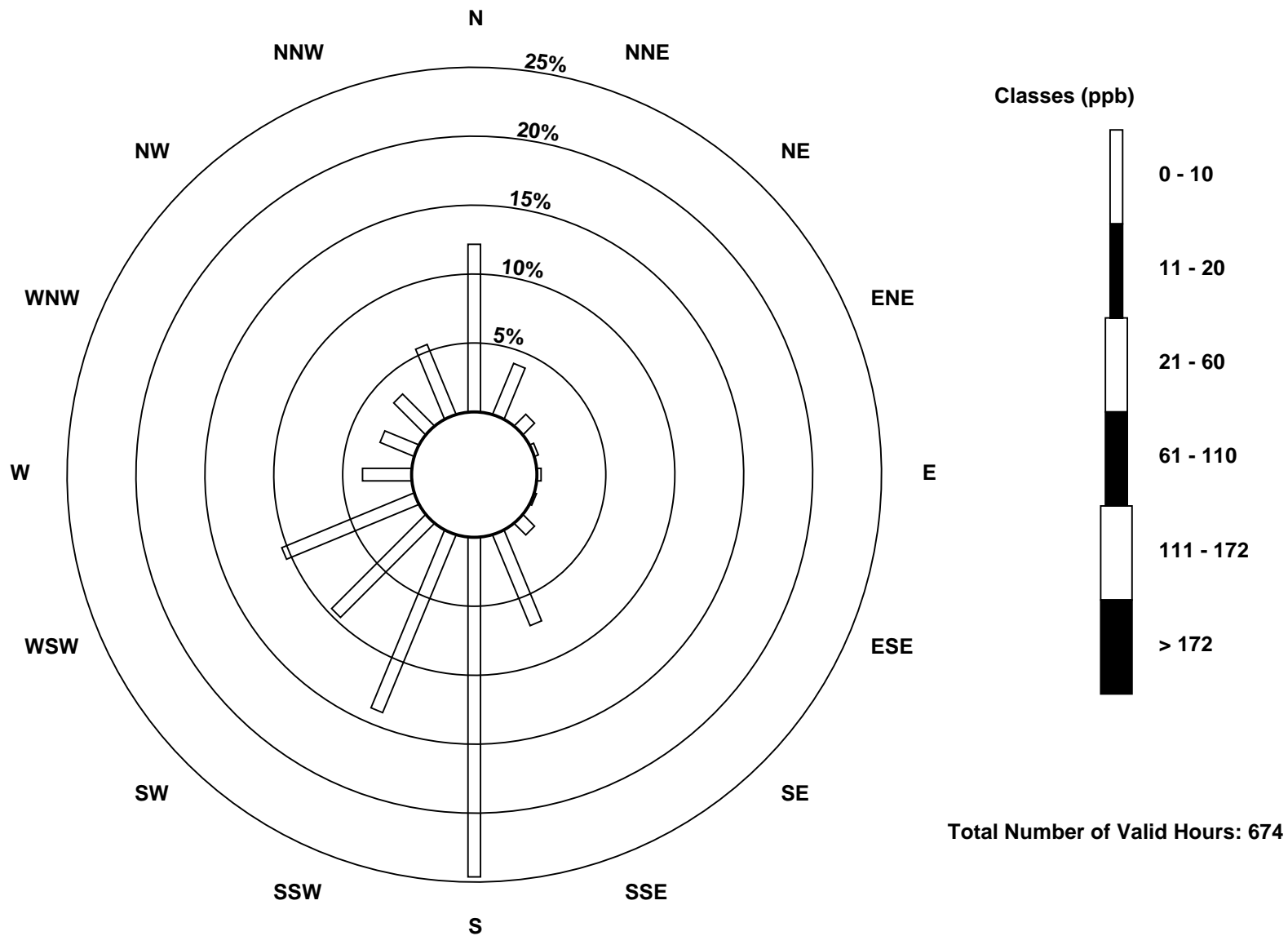
Total Number of Valid Hours: 674

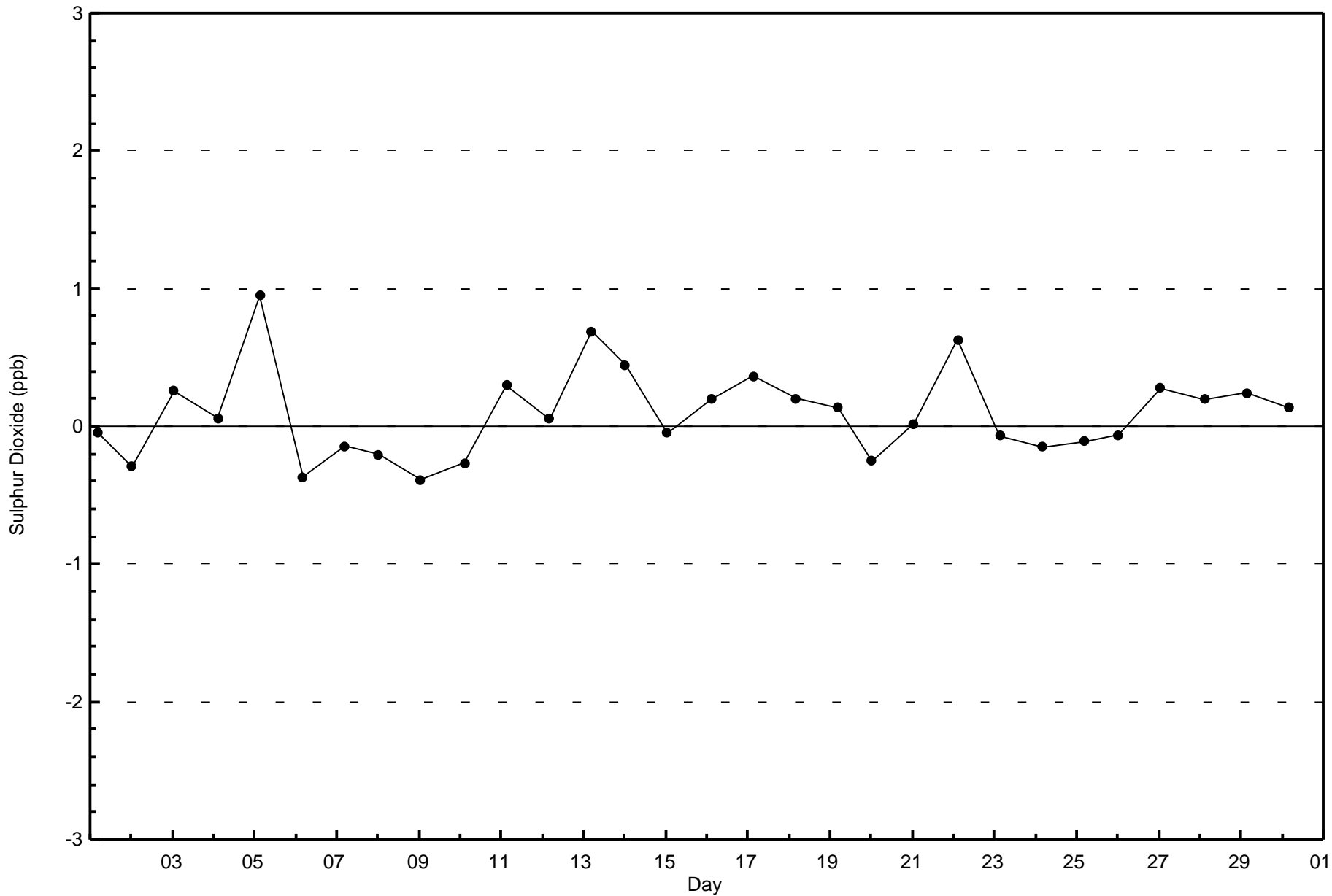
Total Number of Hours: 720

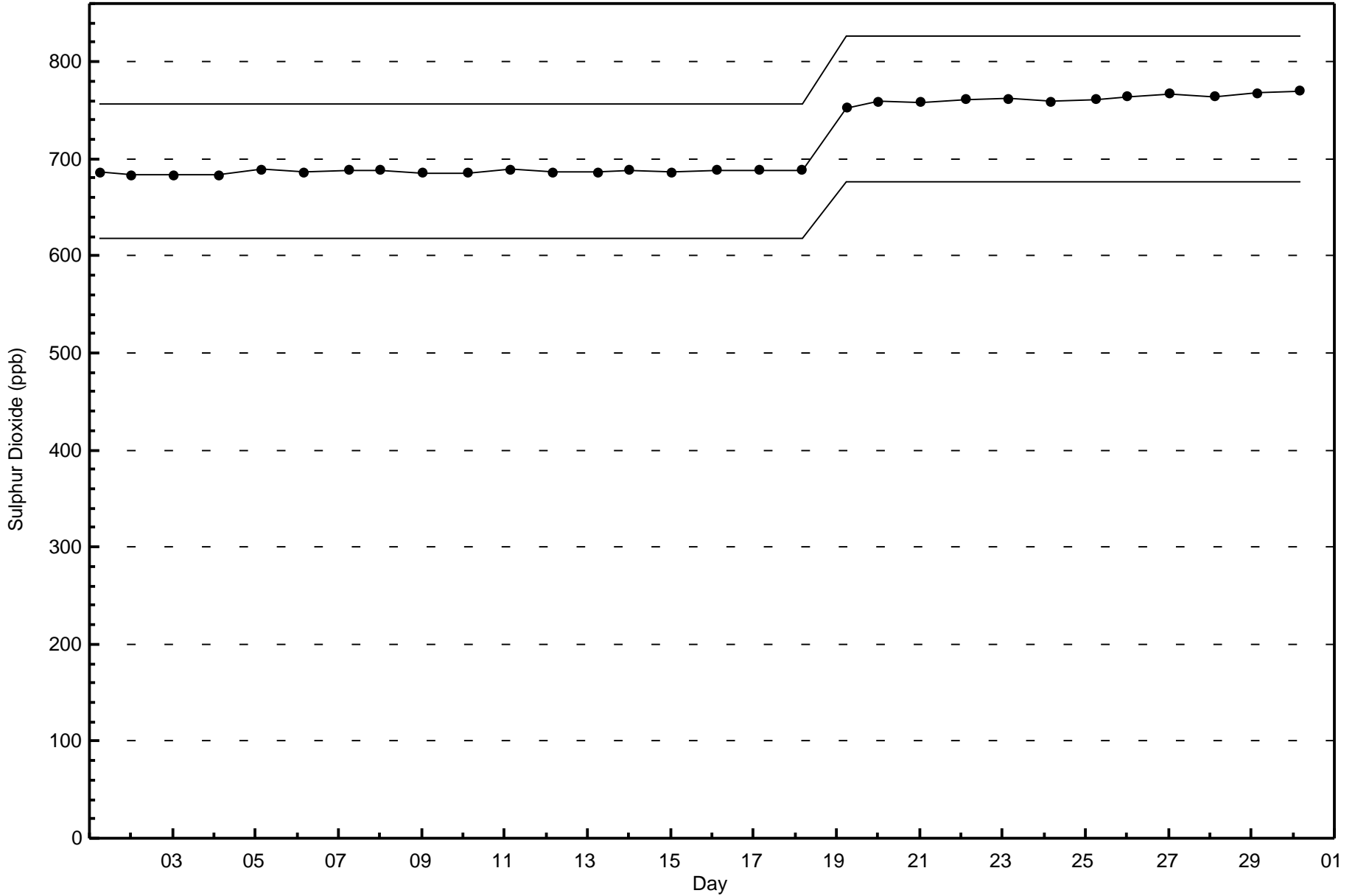


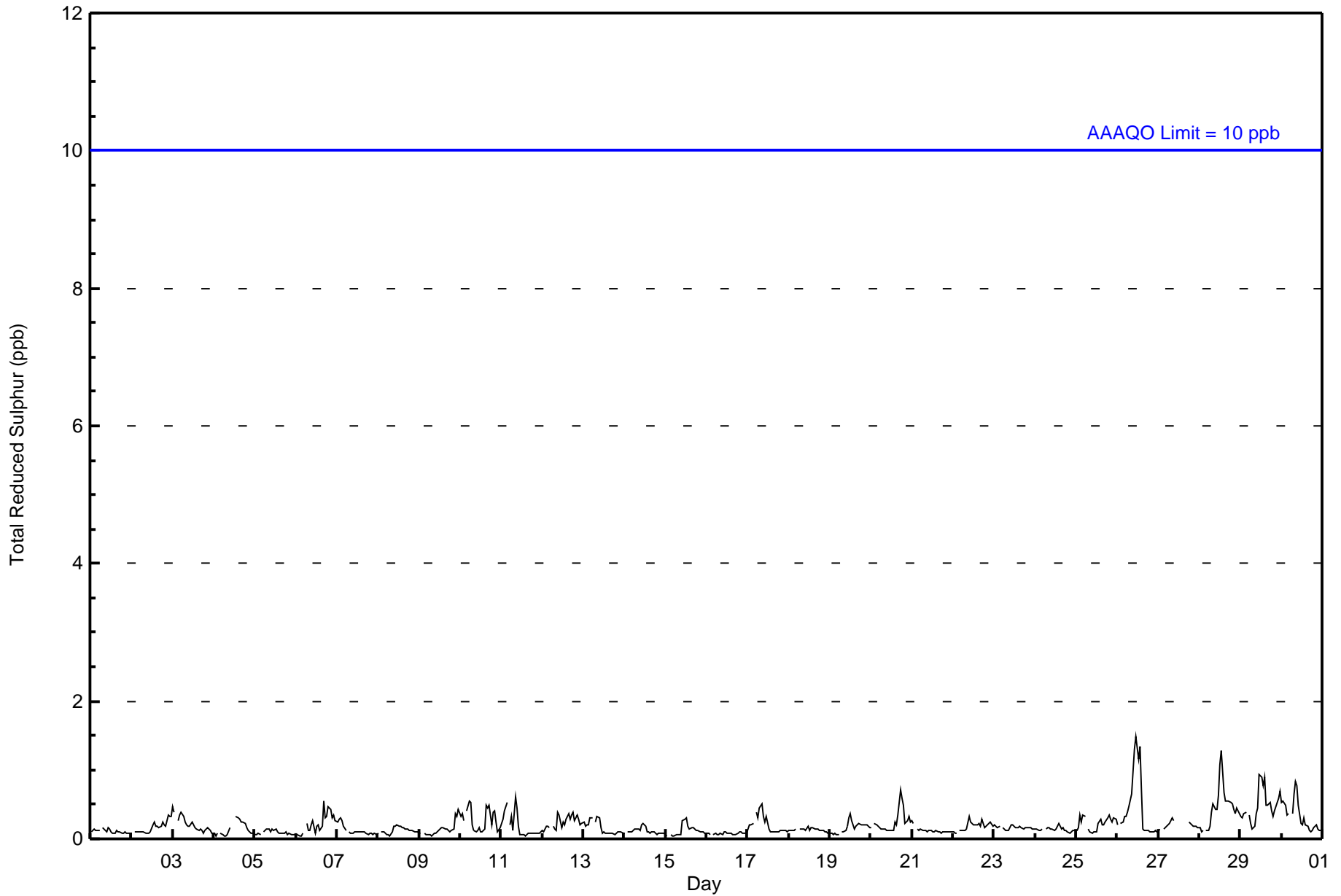
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	679	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: 679

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	84	27	5	2	1	1	8	48	163	96	68	70	23	17	24	40	677
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	84	27	5	2	1	1	8	48	163	96	68	70	23	17	24	40	677

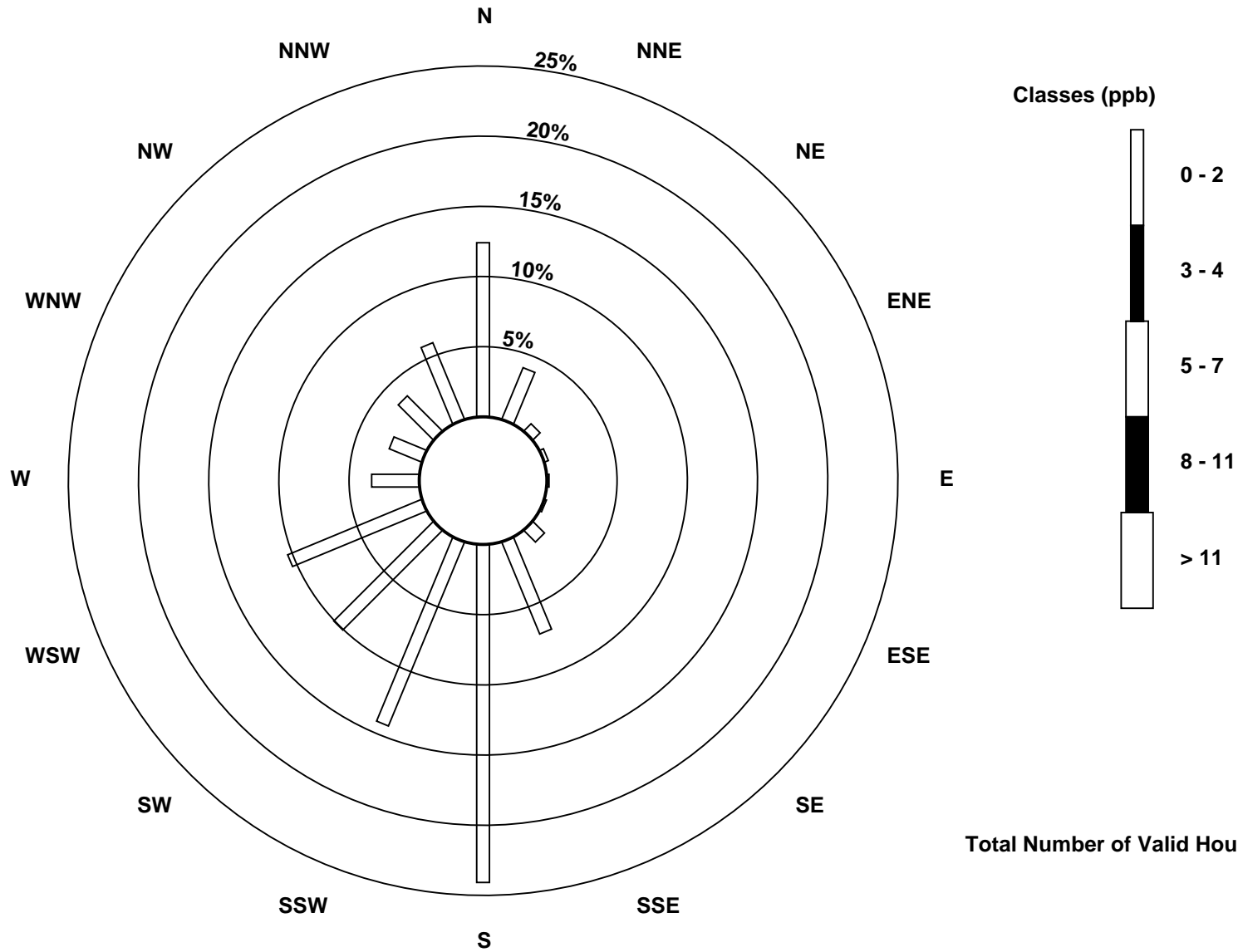
Total Number of Valid Hours: 677

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)

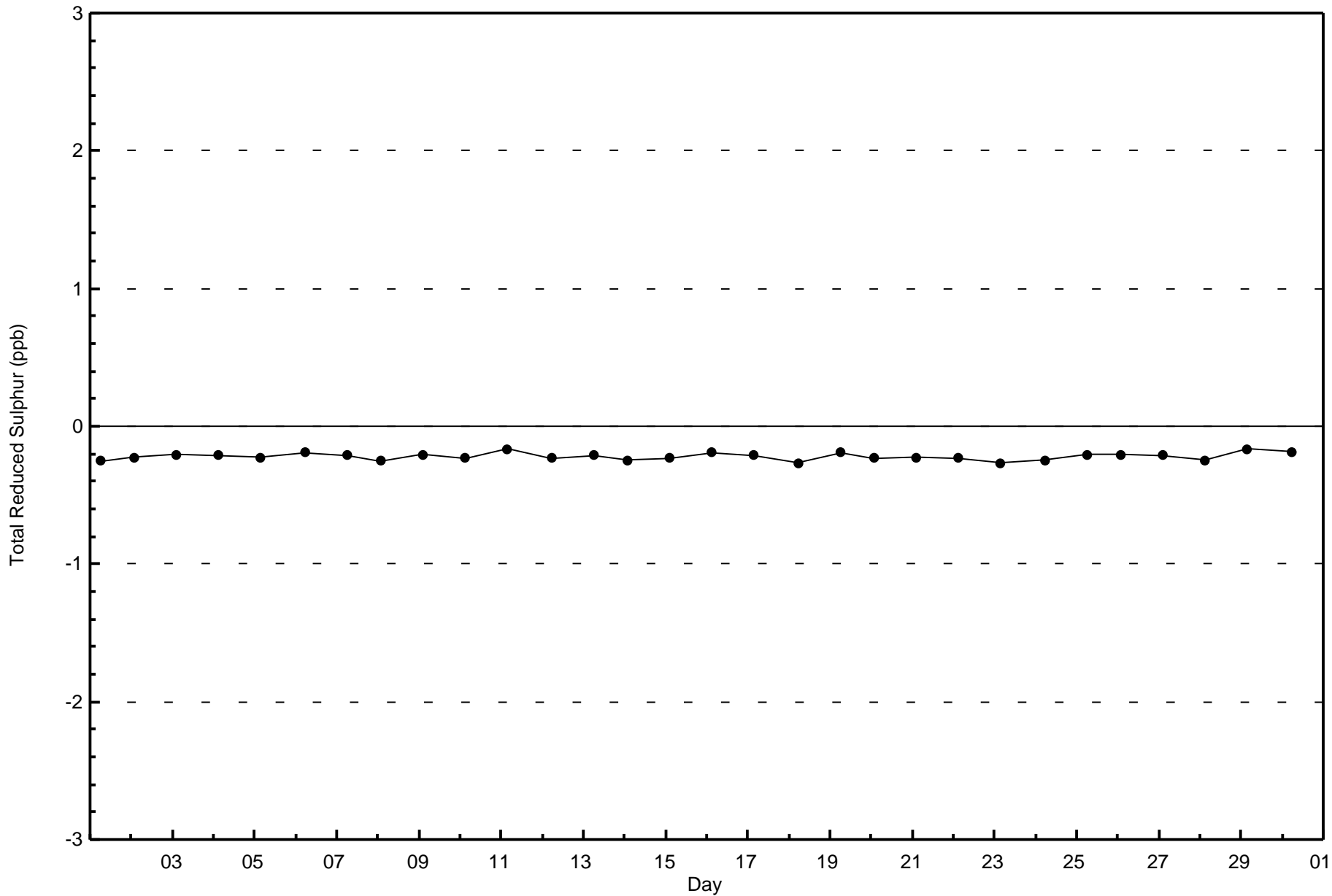


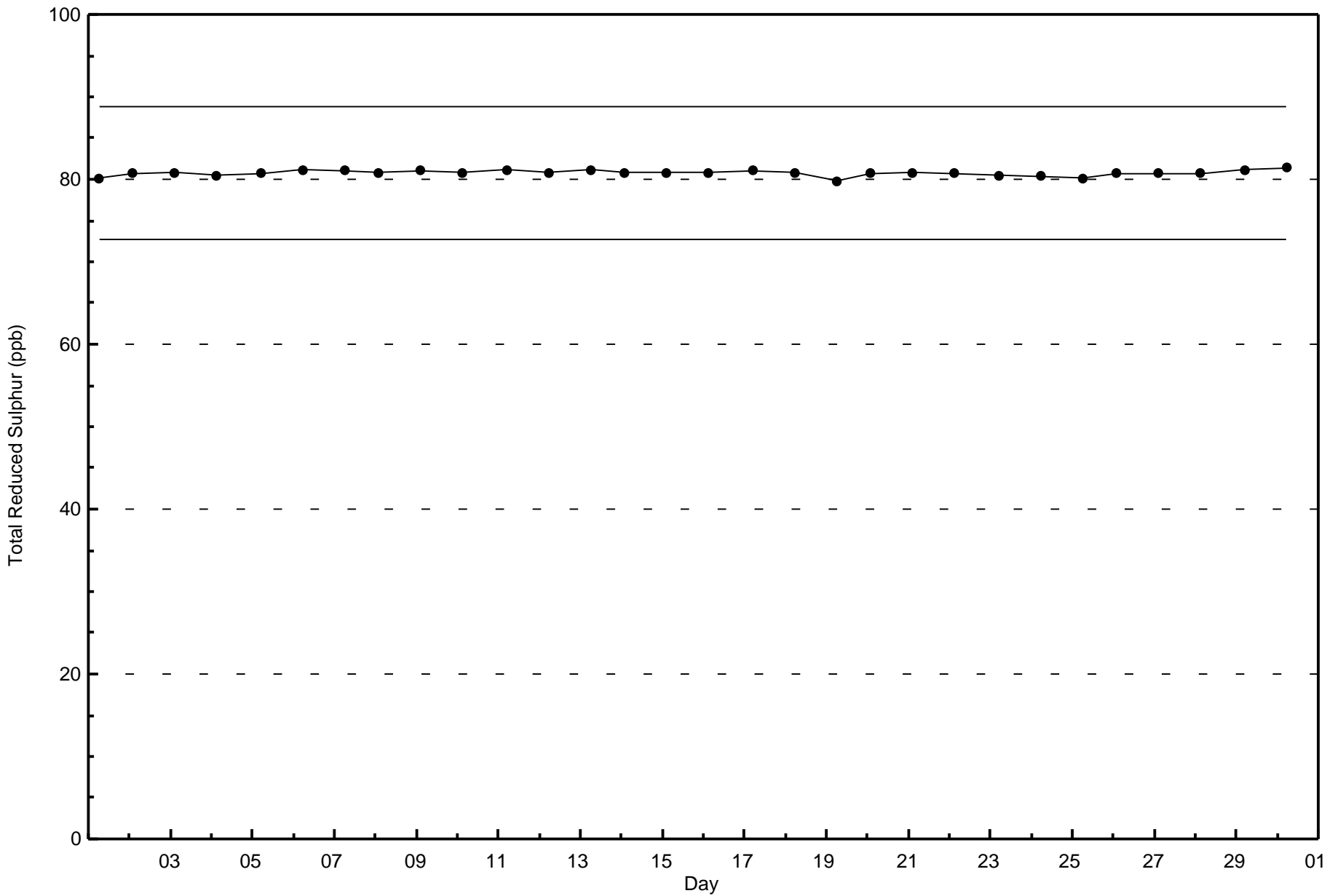
Total Number of Valid Hours: 677



Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - November 2015



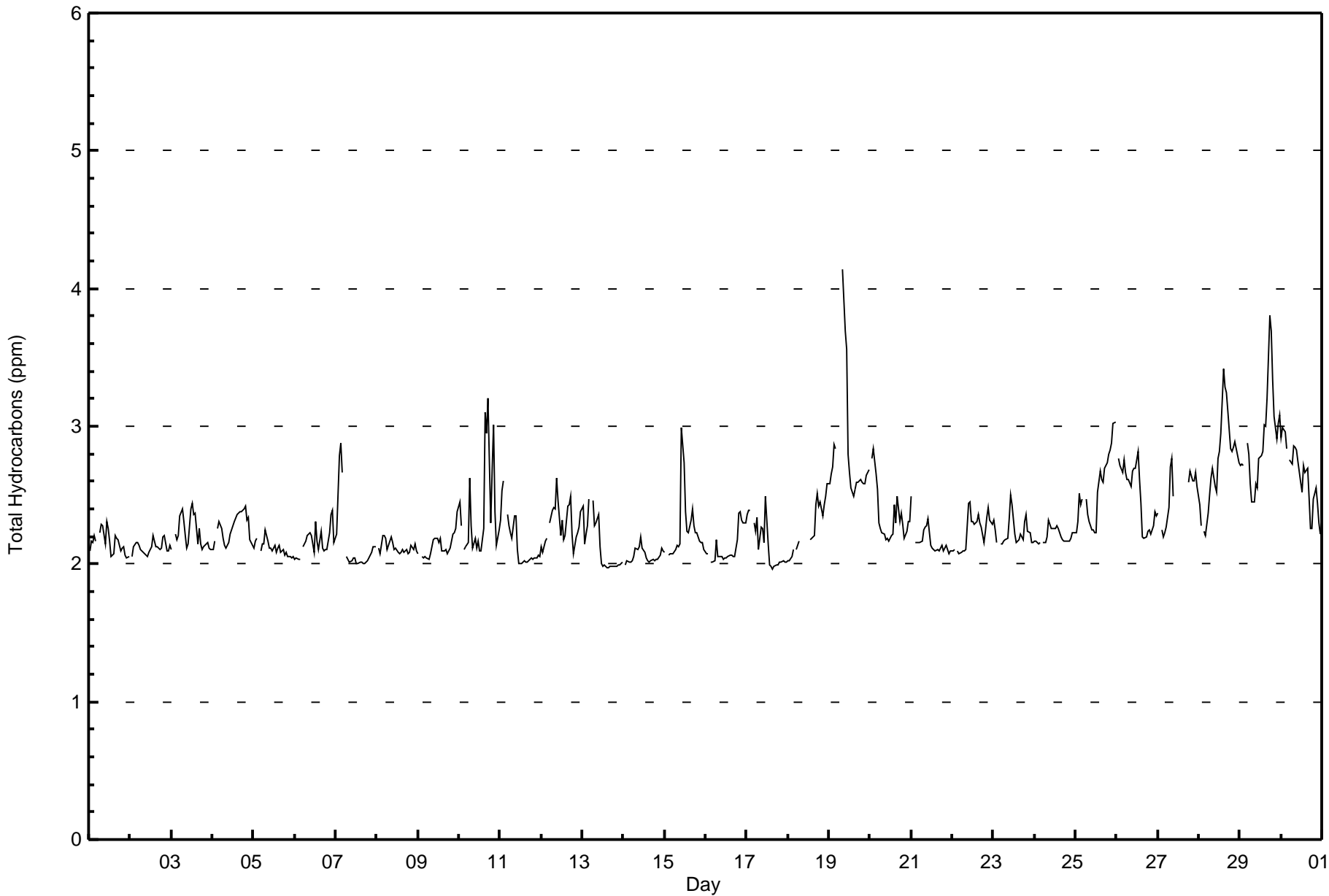




Maximum Value: 4.1 ppm on Nov 19 09:00	Maximum Daily Average: 2.9 ppm on Nov 29	Hours in Service: 720
Minimum Value: 2.0 ppm on Nov 17 16:00	Minimum Daily Average: 2.1 ppm on Nov 14	Hours of Data: 675
Maximum Diurnal Average: 2.3 ppm at hour 11	Minimum Diurnal Average: 2.2 ppm at hour 6	Hours of Missing Data: 45
Monthly Average: 2.30 ppm	Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.4 P ₉₀ = 2.7 P ₉₉ = 3.3	Hours of Calibration: 36
		Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	2.1	2.2	2.2	2.2	2.2	Z	2.2	2.3	2.3	2.1	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.3
2-Nov	Z	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2
3-Nov	2.1	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.4	2.4	2.4	2.1	2.3	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.4
4-Nov	2.1	2.2	Z	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.1	2.3
5-Nov	2.1	2.2	2.2	Z	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	2.0	2.0	2.1	2.2
6-Nov	2.0	2.0	2.0	2.0	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.3	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.4	2.2	2.4
7-Nov	2.2	2.5	2.8	2.9	2.7	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.9
8-Nov	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
9-Nov	2.1	Z	2.1	2.0	2.0	2.0	2.0	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	2.2	2.2	2.3	2.4	2.1	2.4
10-Nov	2.5	2.3	Z	2.1	2.1	2.2	2.6	2.3	2.1	2.2	2.1	2.2	2.1	2.1	2.3	3.1	3.0	3.2	2.3	2.7	3.0	2.4	2.1	2.3	2.4	3.2
11-Nov	2.3	2.5	2.6	Z	2.4	2.3	2.2	2.2	2.3	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.6
12-Nov	2.1	2.1	2.2	2.2	Z	2.3	2.4	2.4	2.4	2.6	2.5	2.2	2.3	2.2	2.2	2.4	2.4	2.5	2.2	2.1	2.2	2.2	2.3	2.4	2.3	2.6
13-Nov	2.4	2.1	2.2	2.3	2.5	Z	2.5	2.3	2.3	2.4	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5
14-Nov	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	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	2.2
15-Nov	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	3.0	2.7	2.4	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	3.0
16-Nov	2.1	2.1	Z	2.0	2.0	2.0	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.4	2.3	2.3	2.3	2.1	2.4
17-Nov	2.4	2.4	2.4	Z	2.3	2.2	2.3	2.1	2.3	2.3	2.2	2.5	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	2.5
18-Nov	2.0	2.0	2.0	2.1	Z	2.1	2.2	C	C	C	C	C	C	2.2	2.2	2.2	2.4	2.5	2.4	2.4	2.3	2.4	2.5	2.6	--	2.6
19-Nov	2.6	2.7	2.7	2.9	2.8	Z	3.0	M	4.1	3.7	3.6	2.8	2.7	2.6	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.8	4.1
20-Nov	Z	2.8	2.8	2.6	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.5	2.3	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.8
21-Nov	2.5	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
22-Nov	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.5	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.3	2.2	2.5
23-Nov	2.3	2.3	2.2	Z	2.1	2.1	2.2	2.2	2.2	2.3	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.5
24-Nov	2.2	2.2	2.1	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
25-Nov	2.2	2.3	2.5	2.4	2.5	Z	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.5	2.7	2.6	2.6	2.7	2.7	2.8	2.8	2.9	3.0	3.0	2.5	3.0
26-Nov	Z	2.8	2.7	2.7	2.8	2.7	2.6	2.6	2.6	2.7	2.7	2.7	2.8	2.6	2.4	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.4	2.3	2.5	2.8
27-Nov	2.4	Z	2.3	2.2	2.2	2.3	2.4	2.7	2.8	2.5	M	DF	DF	DF	DF	DF	DF	DF	2.6	2.7	2.6	2.6	2.7	2.6	--	2.8
28-Nov	2.4	2.3	Z	2.2	2.2	2.4	2.5	2.6	2.7	2.6	2.5	2.8	2.8	2.9	3.4	3.3	3.2	3.1	2.8	2.8	2.9	2.9	2.8	2.7	2.7	3.4
29-Nov	2.7	2.7	2.7	Z	2.9	2.8	2.6	2.4	2.5	2.6	2.6	2.8	2.8	2.8	3.0	3.0	3.2	3.8	3.7	3.3	3.1	2.9	3.0	3.1	2.9	3.8
30-Nov	2.9	3.0	3.0	2.8	Z	2.8	2.7	2.9	2.8	2.8	2.7	2.6	2.5	2.7	2.7	2.7	2.5	2.3	2.3	2.5	2.5	2.4	2.3	2.2	2.6	3.0
																								Diurnal Average		
																								Diurnal Maximum		

Z - zerospan C - Calibration M - Maintenance DF - DAS Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	82	12.15	12.15
2.1 - 3.0	578	85.63	97.78
3.1 - 10.0	15	2.22	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 675

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	0	0	0	0	0	0	1	3	11	25	24	4	8	2	2	81
2.1 - 3.0	81	27	8	2	2	1	8	46	153	79	40	46	20	10	19	35	577
3.1 - 10.0	0	0	0	0	0	0	0	1	10	4	0	0	0	0	0	0	15
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	27	8	2	2	1	8	48	166	94	65	70	24	18	21	37	673

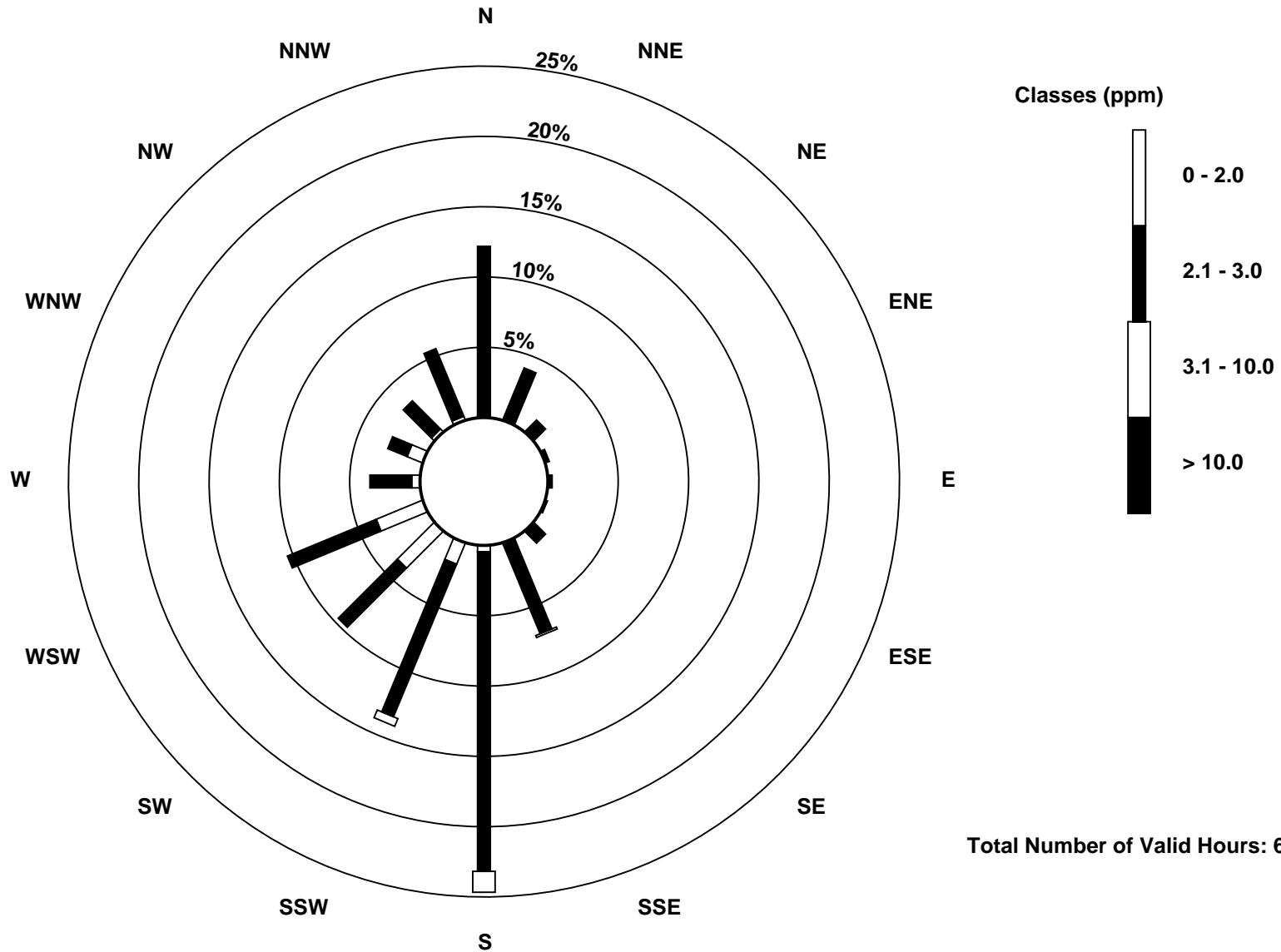
Total Number of Valid Hours: 673

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)

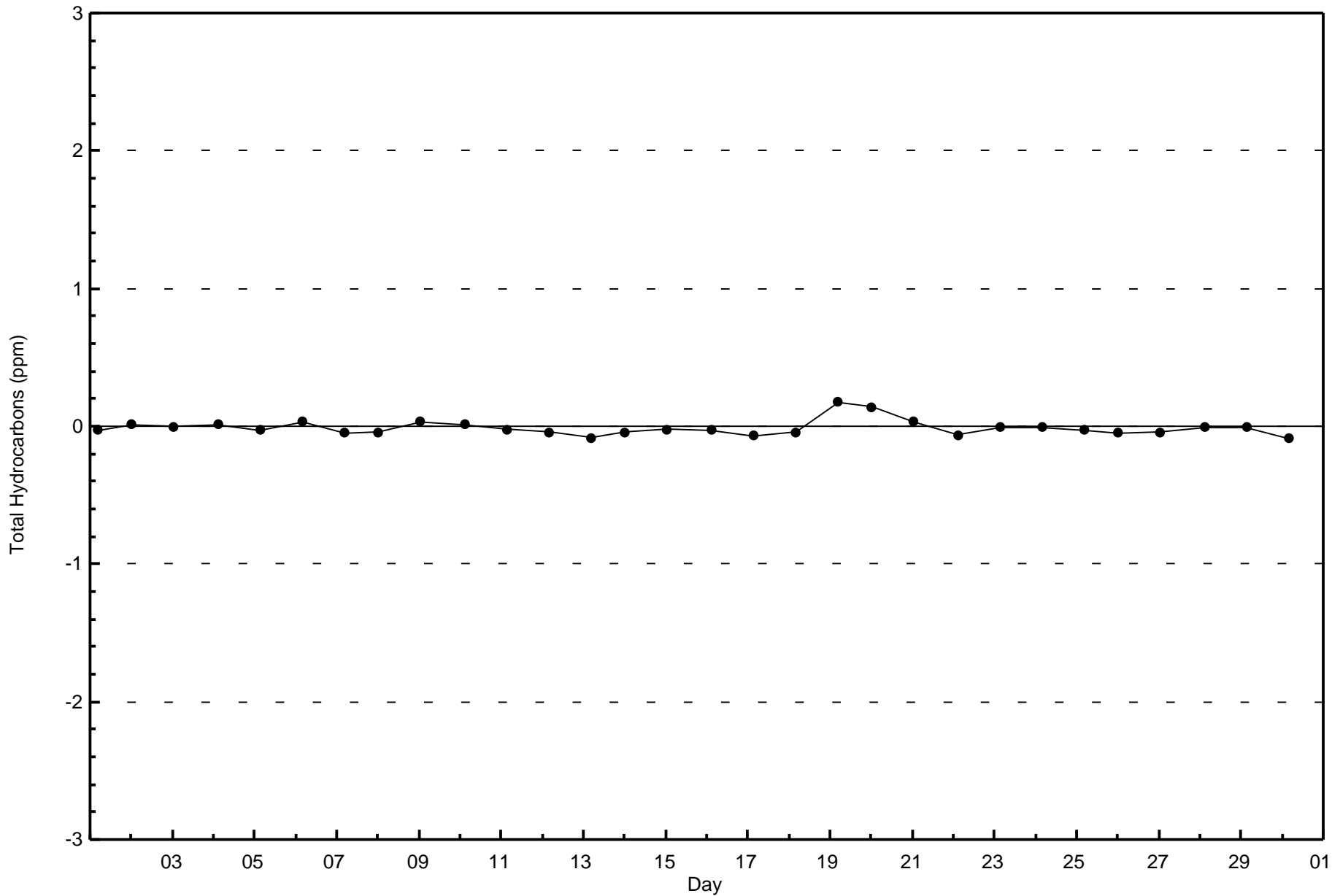


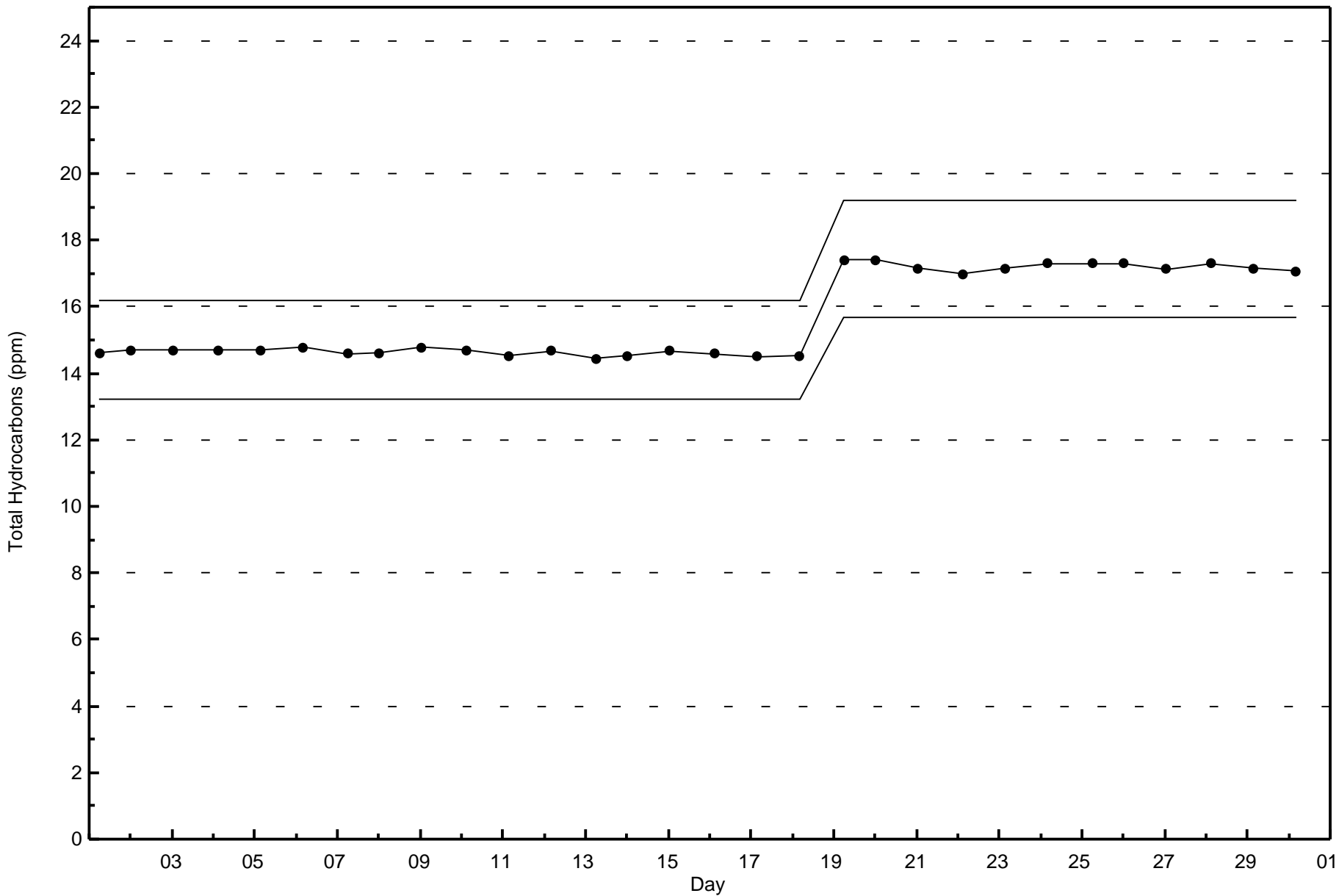
Total Number of Valid Hours: 673



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - November 2015







Summary of Hour Averages

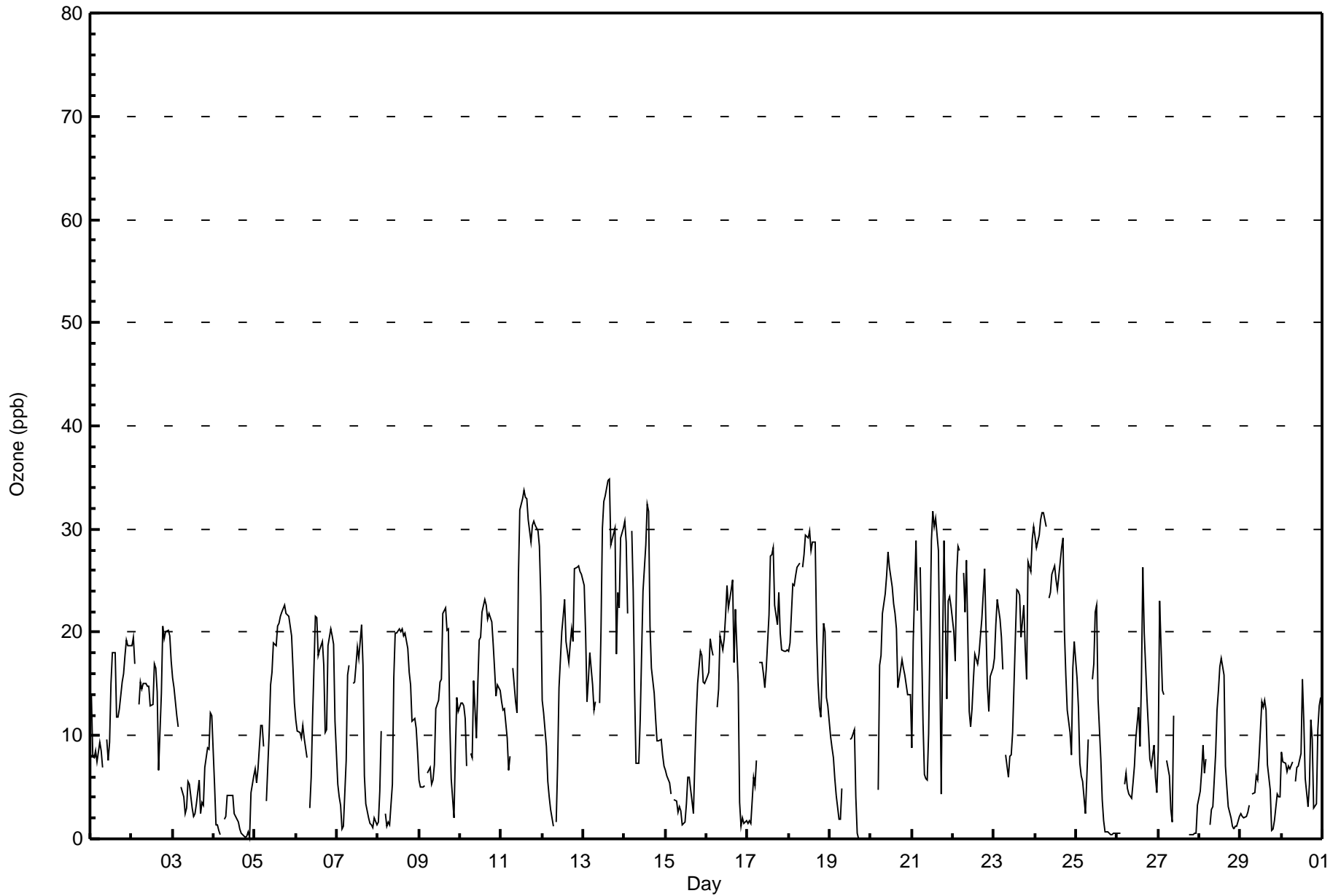
Fort McKay South - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 35 ppb on Nov 13 16:00	Maximum Daily Average: 23.7 ppb on Nov 24		Hours of Data:	679
Minimum Value: 0 ppb on Nov 19 18:00	Minimum Daily Average: 2.2 ppb on Nov 4		Hours of Missing Data:	41
Maximum Diurnal Average: 19.2 ppb at hour 15	Minimum Diurnal Average: 8.8 ppb at hour 8		Hours of Calibration:	33
Monthly Average: 13.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 6 Median = 13 Q ₃ = 20 P ₉₀ = 26 P ₉₉ = 33		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-Nov	14	8	8	9	8	9	9	7	Z	10	8	9	15	18	18	12	12	13	15	16	18	19	19	19	12.6	19
2-Nov	19	20	17	Z	13	15	15	15	15	15	15	13	13	17	17	14	7	14	21	19	20	20	20	17	16.1	21
3-Nov	16	15	12	11	Z	5	4	2	3	5	5	3	2	2	3	6	2	4	3	7	9	9	12	12	6.6	16
4-Nov	5	1	1	1	0	Z	2	2	4	4	4	4	2	2	2	1	1	0	0	0	1	0	4	6	2.2	6
5-Nov	7	5	7	11	11	9	Z	4	10	15	16	19	19	21	21	22	22	23	22	22	22	20	16	13	15.4	23
6-Nov	11	10	10	10	11	10	8	Z	3	6	12	22	21	18	18	19	17	10	11	19	20	20	19	11	13.8	22
7-Nov	5	4	3	1	1	8	16	17	Z	15	15	17	19	17	21	17	6	3	2	2	1	1	2	1	8.5	21
8-Nov	2	5	10	Z	2	1	2	1	5	16	20	20	20	20	20	20	20	18	16	15	11	12	11	8	12.0	20
9-Nov	6	5	5	5	Z	6	7	5	6	7	13	13	15	16	22	22	20	20	11	6	2	9	14	12	10.8	22
10-Nov	13	13	13	12	7	Z	8	8	15	10	15	19	20	22	23	23	21	22	21	19	16	14	15	14	15.8	23
11-Nov	13	13	13	10	7	8	Z	16	13	12	25	32	33	34	33	33	31	29	30	31	30	30	28	23	22.9	34
12-Nov	13	12	9	5	4	3	1	Z	2	7	15	20	22	23	19	17	19	20	19	26	26	26	26	26	15.7	26
13-Nov	25	20	13	15	18	15	12	13	Z	13	20	30	33	33	35	35	28	29	30	18	24	22	29	30	23.6	35
14-Nov	31	29	22	Z	30	24	14	7	7	12	18	24	28	32	32	21	17	14	12	10	10	8	7	18.1	32	
15-Nov	7	6	5	4	Z	4	4	3	3	1	2	3	6	6	4	2	7	12	15	18	18	15	15	7.1	18	
16-Nov	16	16	19	18	18	Z	13	14	20	18	19	22	25	22	24	25	17	22	15	4	1	2	2	2	15.4	25
17-Nov	1	2	1	6	5	8	Z	17	17	16	15	16	22	27	27	28	23	21	24	20	18	18	18	18	16.1	28
18-Nov	18	19	25	25	26	26	27	Z	26	28	29	29	30	28	29	29	20	15	13	12	21	20	14	13	22.6	30
19-Nov	10	9	8	6	4	2	2	5	C	C	C	C	10	10	11	4	1	0	0	0	0	0	0	0	4.0	11
20-Nov	0	0	0	Z	5	17	18	22	24	25	28	26	24	23	22	20	15	16	17	16	16	14	14	14	16.4	28
21-Nov	9	19	29	22	Z	26	11	6	6	6	10	29	32	30	31	28	17	4	19	29	14	23	24	22	19.4	32
22-Nov	20	17	26	28	28	Z	26	22	27	12	11	13	15	18	17	18	20	21	26	20	15	12	16	17	19.3	28
23-Nov	18	21	23	21	20	16	Z	8	6	8	8	10	20	24	24	24	20	23	18	16	27	26	29	30	19.1	30
24-Nov	29	28	29	31	32	32	30	Z	23	24	26	26	25	24	26	28	29	20	16	12	10	8	17	19	23.7	32
25-Nov	16	13	7	6	6	2	6	10	Z	15	17	22	23	14	8	4	2	1	1	1	0	0	1	1	7.5	23
26-Nov	0	1	1	Z	5	6	5	4	4	5	7	10	13	9	15	26	20	13	11	8	7	9	6	5	8.3	26
27-Nov	8	23	14	14	Z	8	6	3	2	12	M	DF	DF	DF	DF	DF	DF	DF	0	0	0	1	1	3	--	23
28-Nov	5	7	9	6	8	Z	1	3	3	8	13	14	17	18	16	7	5	3	2	1	1	1	1	2	6.6	18
29-Nov	2	2	2	2	3	3	Z	4	4	6	6	8	13	13	13	13	7	5	1	1	2	4	4	4	5.3	13
30-Nov	8	7	7	7	7	7	7	Z	6	7	7	8	16	11	6	3	5	12	10	3	3	11	13	14	8.0	16

11.6	11.7	11.7	11.5	11.1	10.8	10.1	8.8	10.2	11.7	14.2	17.2	18.9	19.0	19.2	18.0	14.6	13.9	13.3	12.2	12.1	12.6	13.2	12.7	Diurnal Average	
31	29	29	31	32	32	30	22	27	28	29	32	33	34	35	35	31	29	30	31	30	30	29	30	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance DF - DAS Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	529	77.91	77.91
21 - 50	150	22.09	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	68	25	6	2	2	1	7	36	144	71	45	51	16	14	17	22	527
21 - 50	15	2	1	0	0	0	1	10	17	25	23	21	6	3	7	19	150
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	83	27	7	2	2	1	8	46	161	96	68	72	22	17	24	41	677

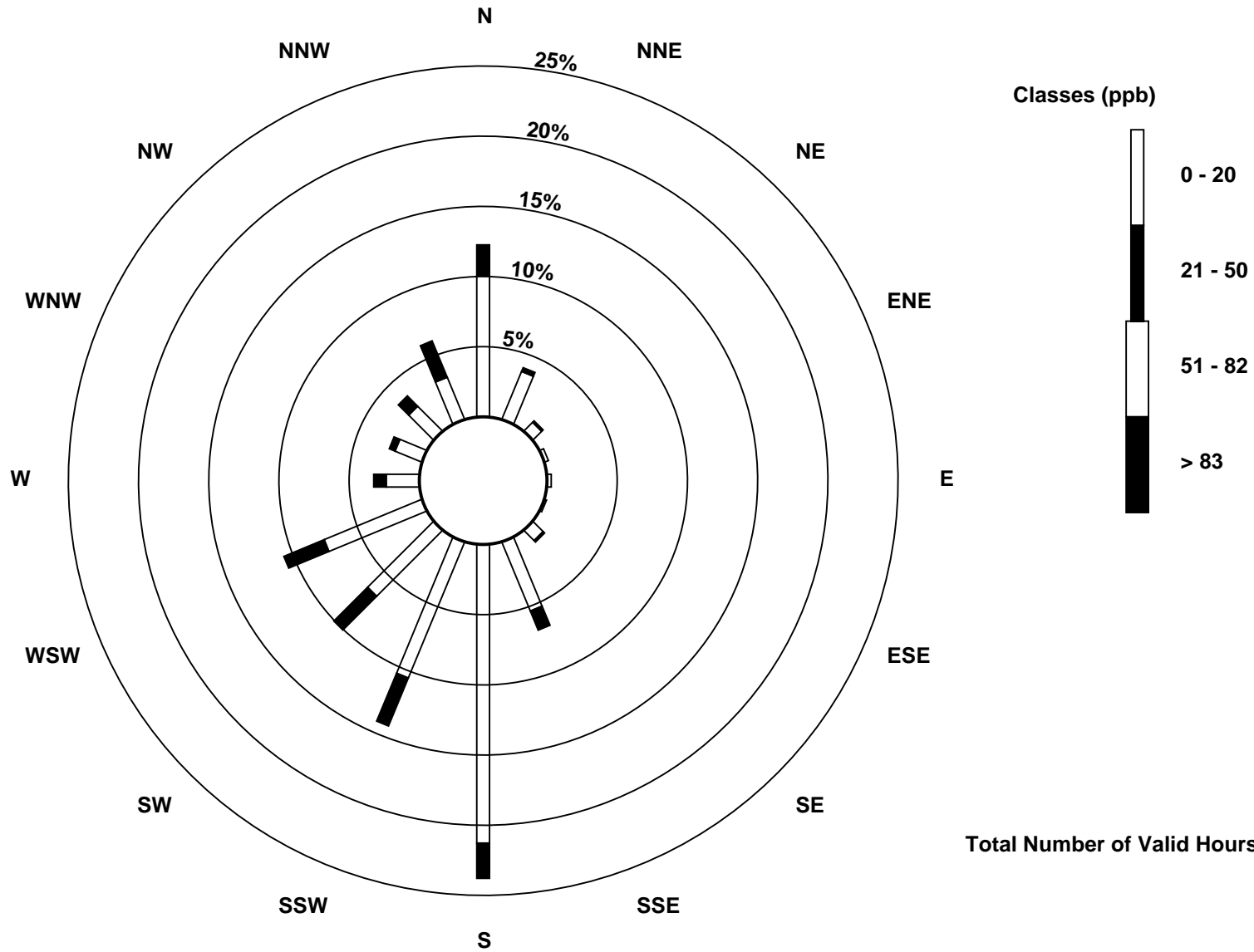
Total Number of Valid Hours: 677

Total Number of Hours: 720

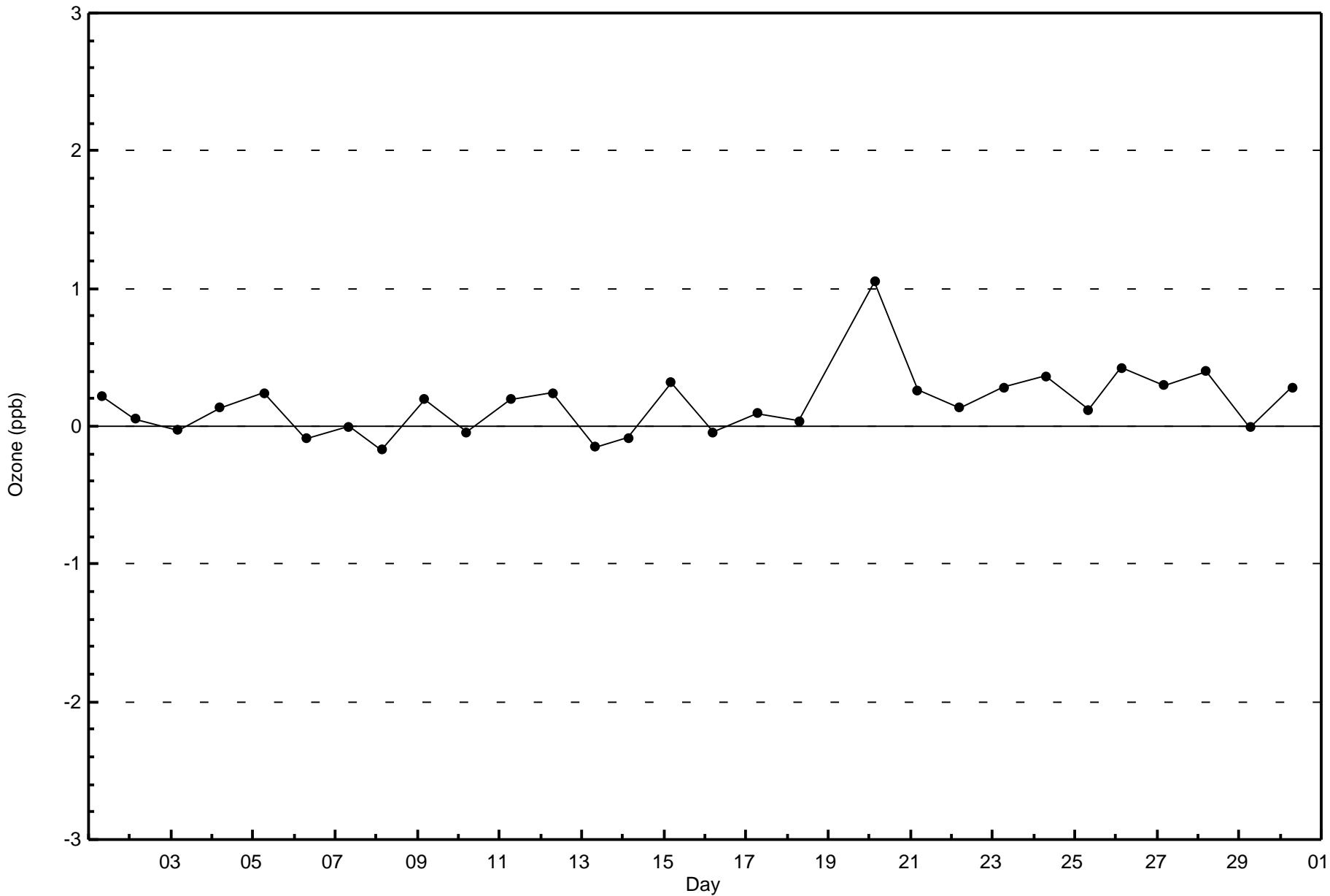


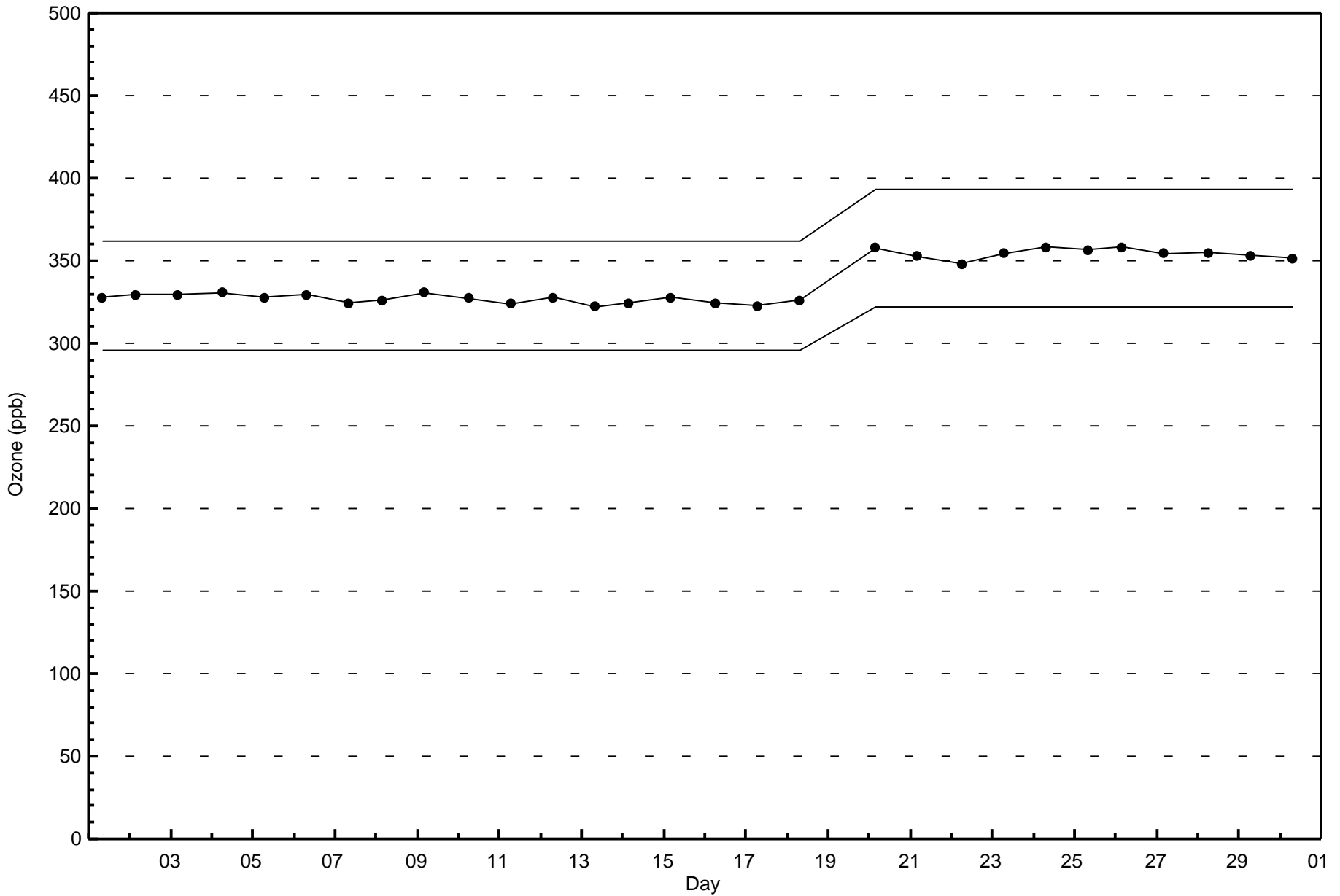
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Ozone (O₃) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 677







Maximum Value: 41 ppb on Nov 26 00:00	Maximum Daily Average: 8.2 ppb on Nov 25	Hours in Service: 720
Minimum Value: 0 ppb on Nov 1 01:00	Minimum Daily Average: 0.1 ppb on Nov 24	Hours of Data: 674
Maximum Diurnal Average: 4.7 ppb at hour 11	Minimum Diurnal Average: 0.1 ppb at hour 1	Hours of Missing Data: 46
Monthly Average: 1.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 22	Hours of Calibration: 36
		Percent Operational Time: 98.6

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-Nov	0	0	0	0	0	Z	0	0	1	1	4	4	1	0	0	1	0	0	0	0	0	0	0	0	0.6	4
2-Nov	Z	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0.3	2
3-Nov	0	Z	0	0	0	0	0	0	0	1	2	10	10	9	7	1	2	0	0	0	0	0	0	2.0	10	
4-Nov	0	2	Z	1	4	3	1	0	0	3	6	6	9	10	13	13	13	10	6	5	3	4	1	0	4.9	13
5-Nov	0	0	0	Z	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
6-Nov	0	0	0	0	Z	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
7-Nov	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
8-Nov	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	
9-Nov	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0.3	1	
10-Nov	0	0	Z	0	0	0	0	2	0	4	3	1	2	1	0	0	0	0	0	0	0	0	0	0.6	4	
11-Nov	0	0	0	Z	0	1	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
12-Nov	0	0	0	0	Z	0	0	1	4	5	3	2	1	1	1	0	0	0	0	0	0	0	0	0.9	5	
13-Nov	0	0	0	0	0	Z	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
14-Nov	Z	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.3	2	
15-Nov	0	Z	0	0	0	0	0	0	0	2	39	27	9	3	2	3	2	0	0	0	0	0	0	3.8	39	
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0.2	2	
17-Nov	0	0	1	Z	0	0	0	0	0	1	3	3	2	0	0	0	0	0	0	0	0	0	0	0.5	3	
18-Nov	0	0	0	0	Z	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0	
19-Nov	0	0	0	0	0	Z	1	0	M	M	21	22	15	10	6	5	4	4	4	4	4	4	6	7	5.6	22
20-Nov	Z	4	5	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.6	5	
21-Nov	0	Z	0	0	0	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3	
22-Nov	0	0	Z	0	0	0	0	0	0	4	2	1	1	1	1	0	0	0	0	0	0	0	0	0.5	4	
23-Nov	0	0	0	Z	0	0	0	0	0	2	9	9	2	0	0	0	0	0	0	0	0	0	0	1.0	9	
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.1	1	
25-Nov	0	0	1	0	1	Z	1	0	0	0	3	1	1	10	11	6	3	4	4	10	22	30	41	41	8.2	41
26-Nov	Z	20	12	8	2	0	0	0	1	7	11	12	8	12	5	0	0	0	0	0	0	0	0	4.3	20	
27-Nov	0	Z	0	0	0	0	0	1	3	2	M	DF	DF	DF	DF	DF	DF	DF	14	24	12	9	14	3	--	24
28-Nov	0	0	Z	0	0	0	1	1	1	3	4	5	5	4	3	1	0	0	0	1	3	3	2	1	1.7	5
29-Nov	0	1	1	Z	0	0	0	0	0	2	5	10	7	4	3	1	0	0	6	14	6	3	4	2	3.0	14
30-Nov	0	0	0	0	Z	0	0	0	0	3	6	8	5	6	6	7	1	0	0	2	2	0	0	2.0	8	

0.1	1.1	0.8	0.5	0.4	0.2	0.2	0.3	0.6	1.7	4.7	4.6	3.1	2.7	2.1	1.4	0.9	0.7	1.2	2.1	1.9	1.8	2.3	1.8	Diurnal Average	
0	20	12	8	4	3	1	2	4	7	39	27	15	12	13	13	13	10	14	24	22	30	41	41	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance DF - DAS Failure

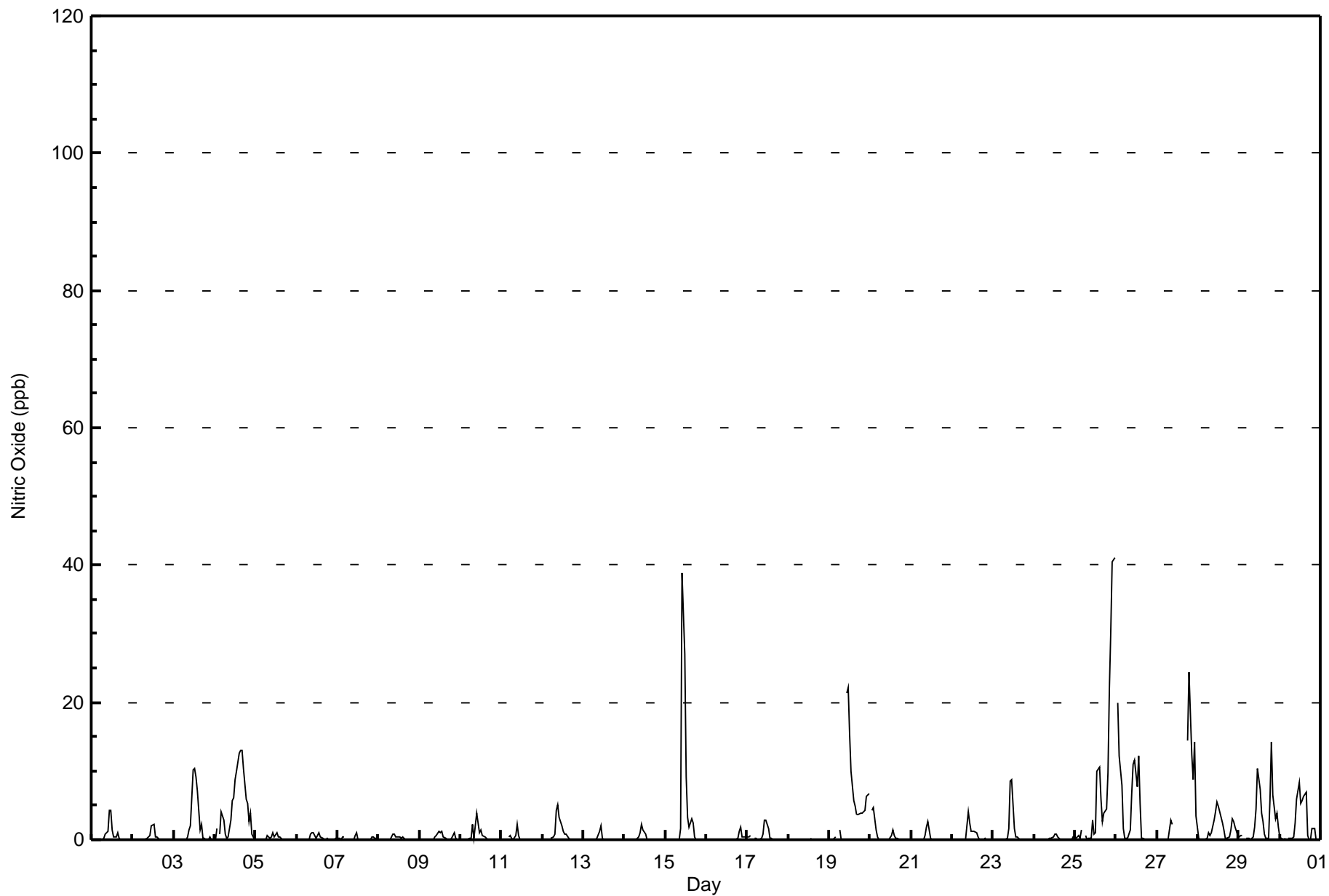


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort McKay South - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	665	98.66	98.66
21 - 40	7	1.04	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: 674

Total Number of Hours: 720



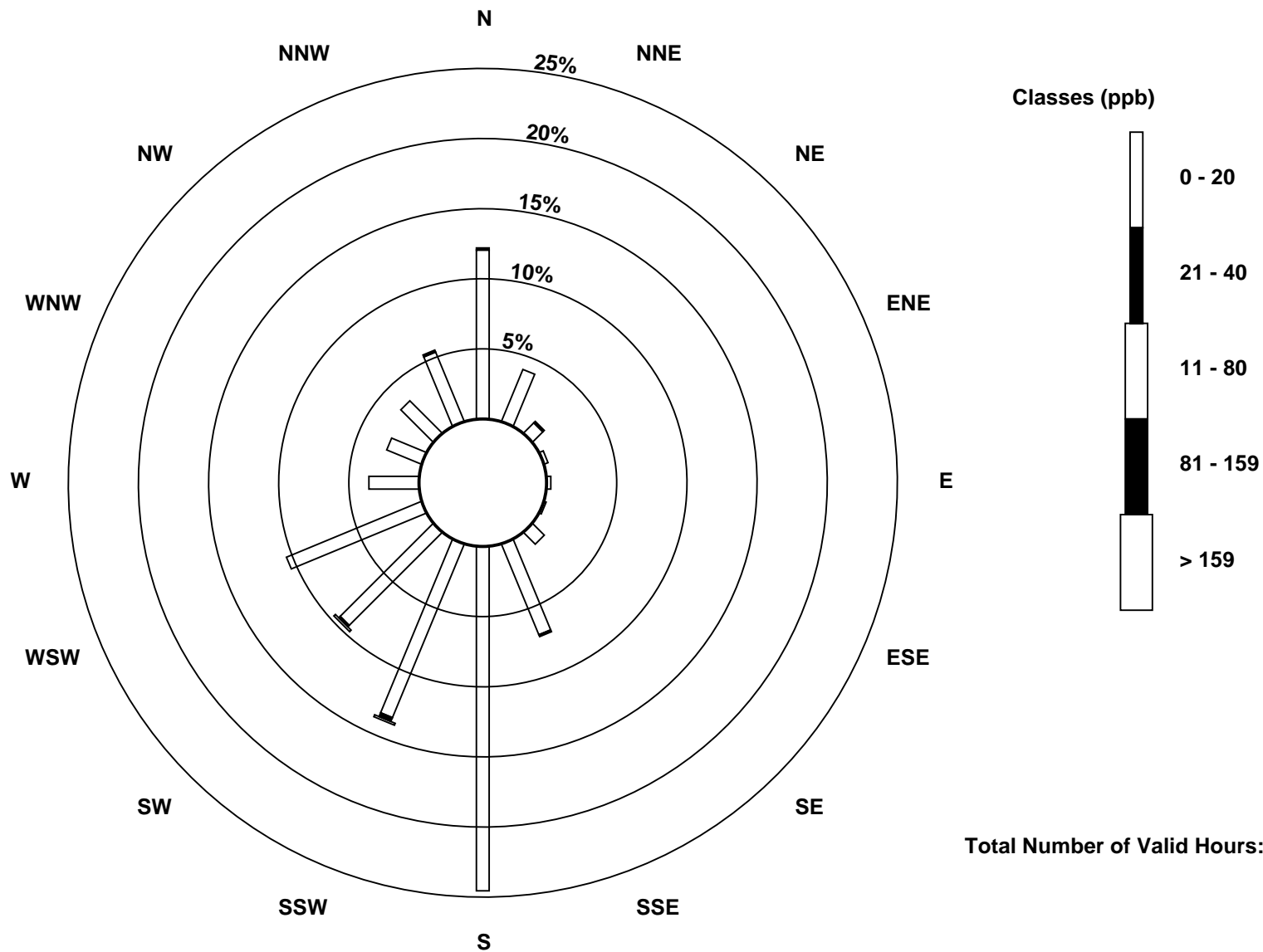
Wood Buffalo Environmental Association
Frequency Distribution

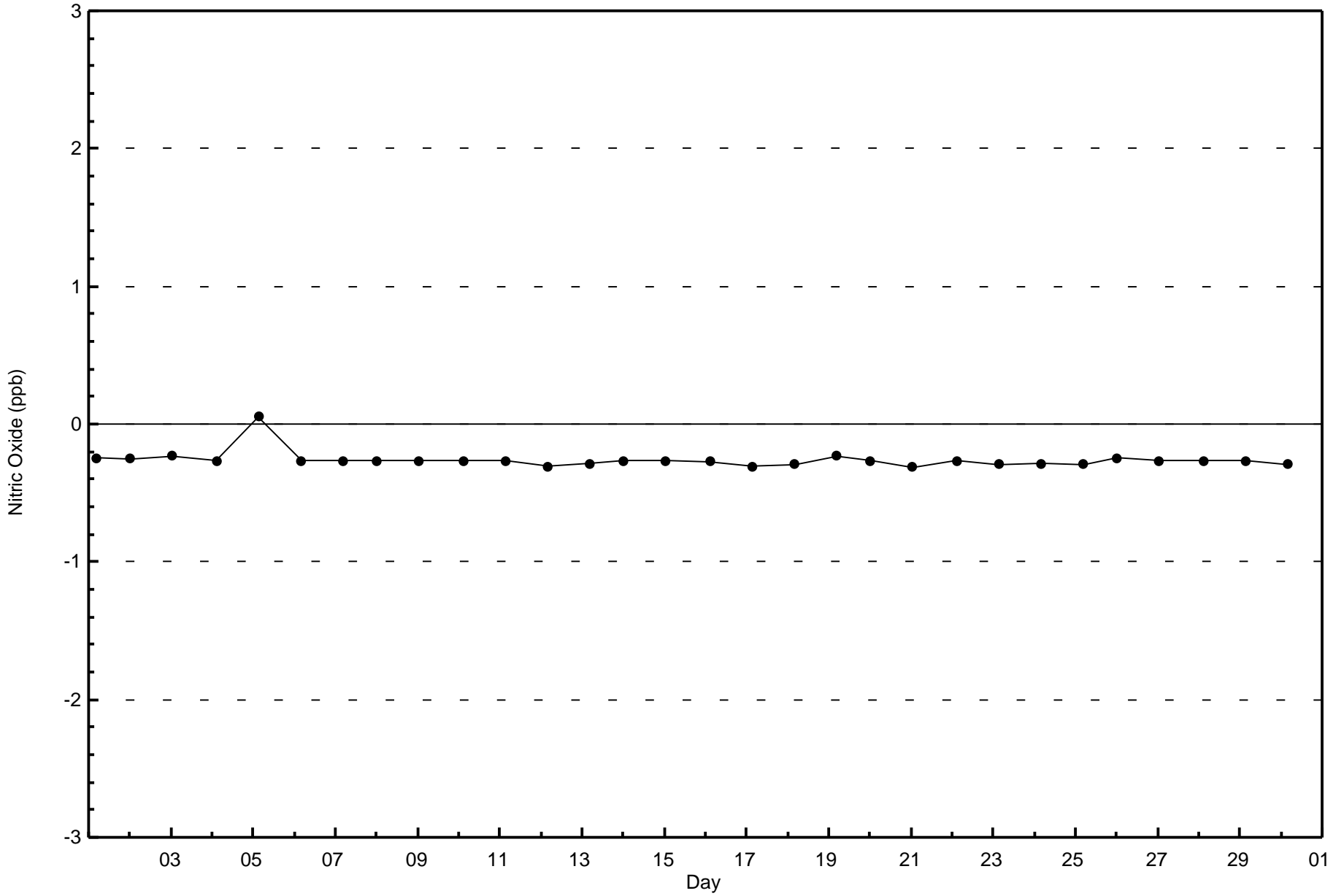
Nitric Oxide (NO) - ppb
Fort McKay South - November 2015

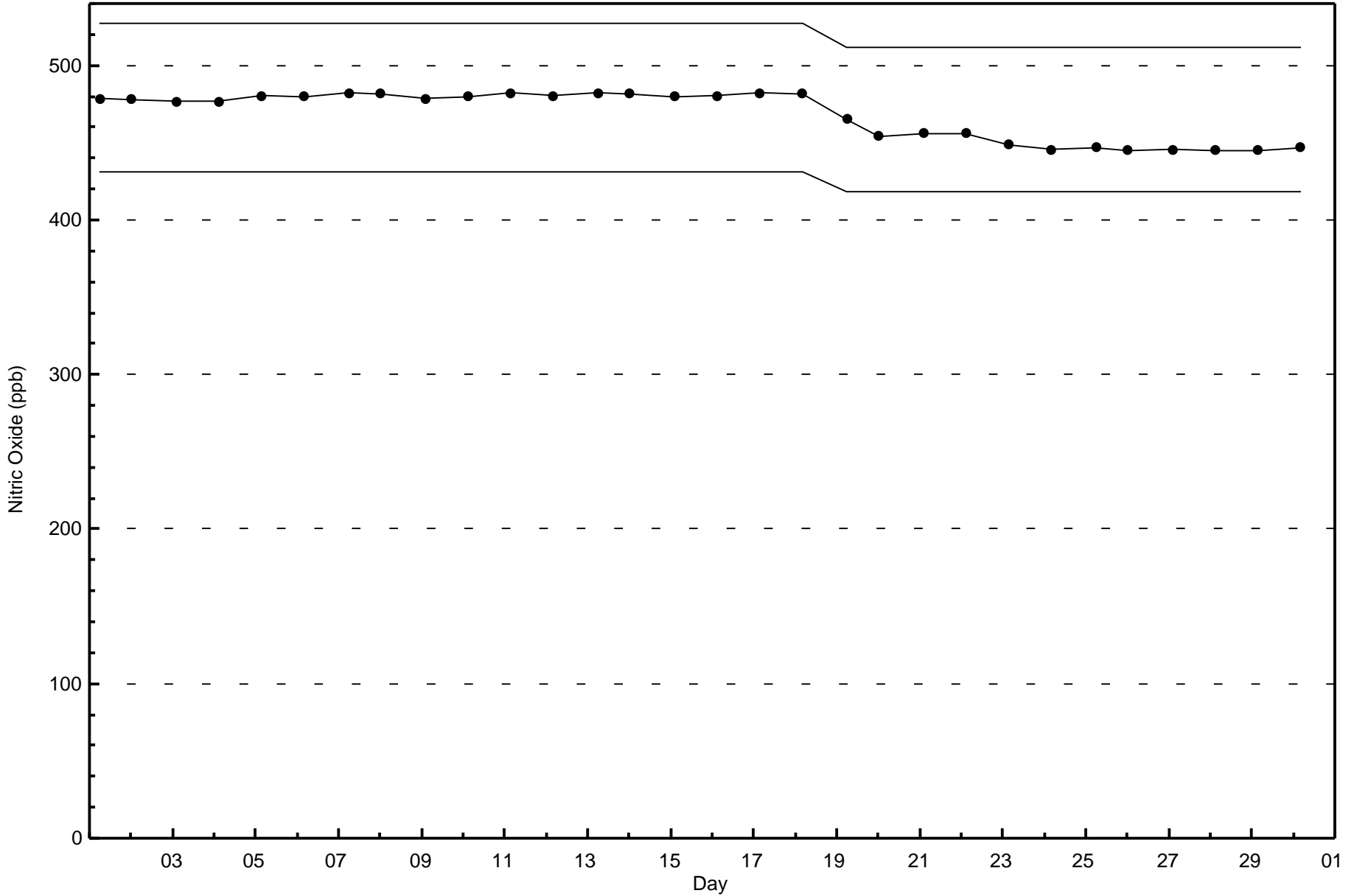
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	81	27	7	2	2	1	8	47	165	90	63	70	24	18	22	36	663
21 - 40	1	0	1	0	0	0	0	1	0	2	1	0	0	0	0	1	7
11 - 80	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	27	8	2	2	1	8	48	165	93	65	70	24	18	22	37	672

Total Number of Valid Hours: 672

Total Number of Hours: 720









Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 21 ppb on Nov 30 21:00	Maximum Daily Average: 13.1 ppb on Nov 28
Minimum Value: 0 ppb on Nov 18 23:00	Minimum Daily Average: 1.9 ppb on Nov 7
Maximum Diurnal Average: 7.3 ppb at hour 11	Minimum Diurnal Average: 4.6 ppb at hour 1
Monthly Average: 6.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 9 P ₉₀ = 15 P ₉₉ = 19
	Hours of Data: 674
	Hours of Missing Data: 46
	Hours of Calibration: 36
	Percent Operational Time: 98.6

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-Nov	3	7	7	7	9	Z	8	10	9	7	11	10	5	2	3	9	9	7	6	5	4	3	2	3	6.3	11	
2-Nov	Z	2	6	7	10	8	7	6	5	4	3	5	7	3	3	3	3	4	2	2	1	1	1	2	4.1	10	
3-Nov	2	Z	2	1	1	2	2	2	2	4	5	9	10	11	11	9	13	10	7	4	3	3	2	1	4.9	13	
4-Nov	1	4	Z	5	6	4	3	1	2	4	5	5	7	7	8	8	7	6	5	4	4	3	3	2	4.5	8	
5-Nov	1	3	3	Z	2	3	3	10	5	2	2	1	3	3	4	3	2	2	2	1	2	1	1	1	2.6	10	
6-Nov	1	1	1	1	Z	2	3	7	7	6	5	2	3	5	4	3	5	11	12	4	2	2	2	8	4.2	12	
7-Nov	7	6	3	4	3	Z	1	1	1	1	2	2	1	0	1	0	0	0	0	1	2	3	3	2	1.9	7	
8-Nov	Z	1	1	2	1	1	1	2	4	7	4	4	3	3	4	4	3	4	4	4	6	5	6	4	3.3	7	
9-Nov	3	Z	2	2	1	1	1	1	2	3	4	6	6	7	4	3	3	3	3	5	8	6	4	5	3.6	8	
10-Nov	3	3	Z	4	6	9	7	12	4	11	7	3	5	3	2	4	5	4	4	5	6	7	5	6	5.3	12	
11-Nov	6	6	5	Z	12	14	11	7	10	14	5	0	0	0	0	0	1	1	0	0	0	0	0	1	4.1	14	
12-Nov	4	2	5	7	Z	9	10	10	11	12	9	6	5	3	6	4	4	5	7	3	3	2	3	2	5.7	12	
13-Nov	3	4	4	4	3	Z	4	5	5	6	6	1	1	1	1	0	0	1	0	1	1	1	1	1	2.3	6	
14-Nov	Z	1	1	1	0	1	4	7	5	5	9	5	3	1	1	1	1	1	1	1	1	2	4	2	2.5	9	
15-Nov	1	Z	1	0	0	1	1	1	1	3	15	16	14	12	12	15	16	11	9	8	7	7	7	5	7.0	16	
16-Nov	4	4	Z	2	2	1	5	1	0	1	0	0	0	0	0	0	0	1	9	18	13	9	7	7	3.7	18	
17-Nov	7	8	9	Z	16	10	4	5	6	8	9	7	5	1	1	1	1	1	1	1	1	1	0	0	4.4	16	
18-Nov	0	0	1	2	Z	3	3	C	C	C	C	C	C	2	1	1	1	1	1	1	1	0	0	0	--	3	
19-Nov	0	0	1	3	6	Z	11	7	M	M	17	17	15	15	13	15	17	17	16	14	11	13	13	12	11.0	17	
20-Nov	Z	17	19	16	12	4	3	2	1	0	0	0	2	4	4	4	10	8	8	10	10	12	11	7	7.0	19	
21-Nov	5	Z	1	2	2	3	4	8	9	6	5	1	1	1	1	1	1	2	6	1	3	2	1	0	2.7	9	
22-Nov	1	1	Z	0	0	0	0	0	0	14	14	9	10	8	10	8	8	6	2	7	13	16	12	11	6.5	16	
23-Nov	10	5	2	Z	1	1	1	1	2	9	17	18	8	4	5	6	10	7	11	14	5	6	3	1	6.3	18	
24-Nov	1	1	1	1	Z	1	2	2	4	3	2	2	3	5	5	1	1	1	0	0	0	3	6	8	2.2	8	
25-Nov	12	14	17	14	21	Z	15	8	4	2	5	2	3	15	19	16	17	17	16	16	16	16	17	17	13.0	21	
26-Nov	Z	19	17	15	13	11	12	13	15	15	16	17	16	21	11	6	6	6	6	5	6	6	10	9	11.8	21	
27-Nov	7	Z	2	2	8	8	10	16	17	9	M	DF	DF	DF	DF	DF	DF	DF	DF	14	16	15	14	17	11	--	17
28-Nov	9	4	Z	5	6	12	17	17	15	13	12	14	14	15	12	10	13	14	15	17	17	18	17	15	13.1	18	
29-Nov	15	14	14	Z	11	10	10	8	8	9	8	15	16	11	13	10	8	11	17	19	18	18	17	15	12.6	19	
30-Nov	10	8	9	10	Z	12	14	14	14	12	11	12	12	13	13	19	13	4	8	19	21	10	3	2	11.4	21	

4.6	5.3	5.4	4.7	6.0	5.1	5.7	6.3	6.0	6.7	7.3	6.9	6.3	6.0	5.8	5.7	6.0	5.7	6.3	6.8	6.6	6.3	5.9	5.3	Diurnal Average		
15	19	19	16	21	14	17	17	17	17	15	17	18	16	21	19	19	17	17	17	19	21	18	17	17	Diurnal Maximum	

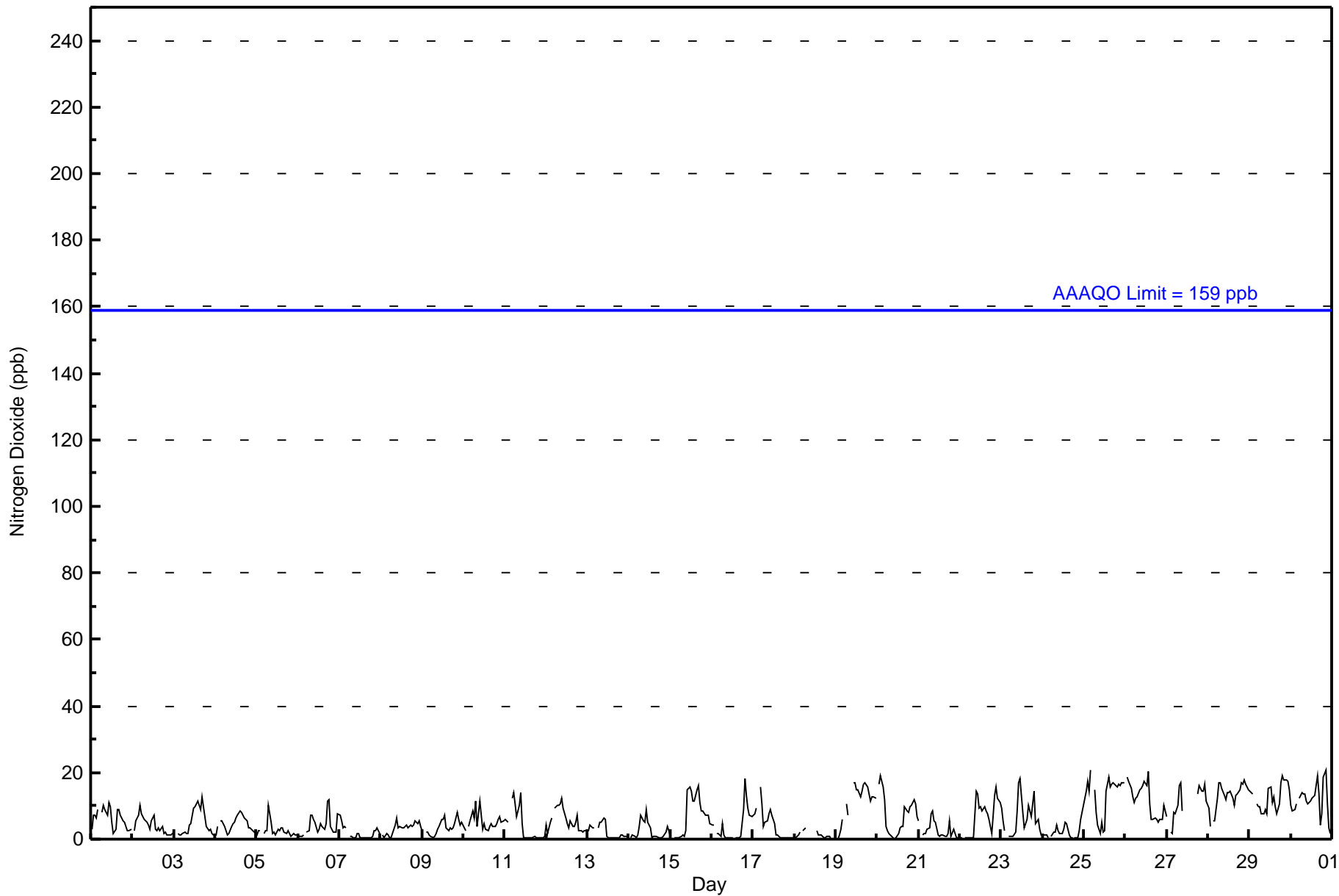
Z - zerspan C - Calibration M - Maintenance DF - DAS Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	671	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: 674

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	82	27	8	2	2	1	8	47	164	93	65	69	24	18	22	37	669
21 - 40	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	82	27	8	2	2	1	8	48	165	93	65	70	24	18	22	37	672

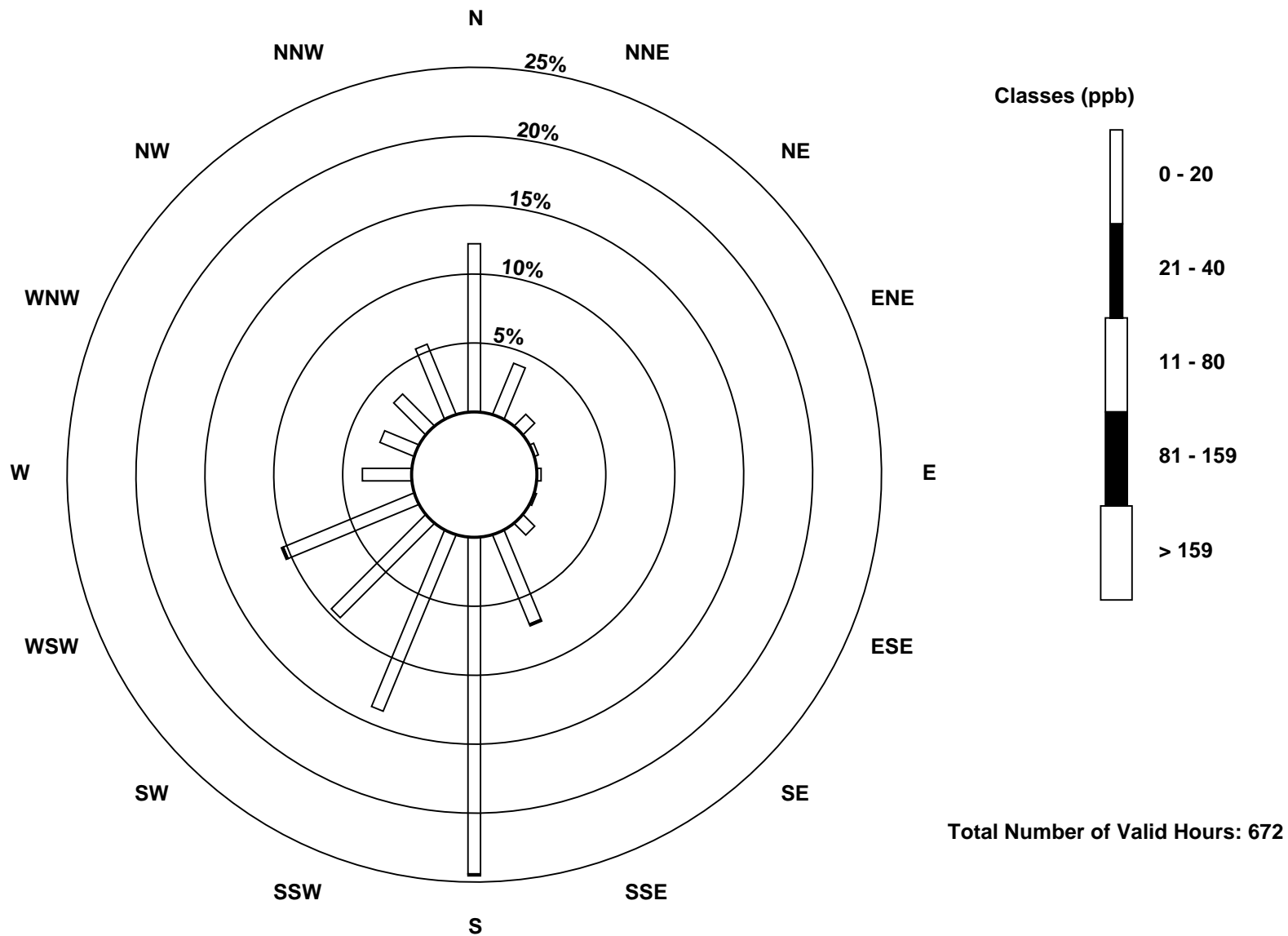
Total Number of Valid Hours: 672

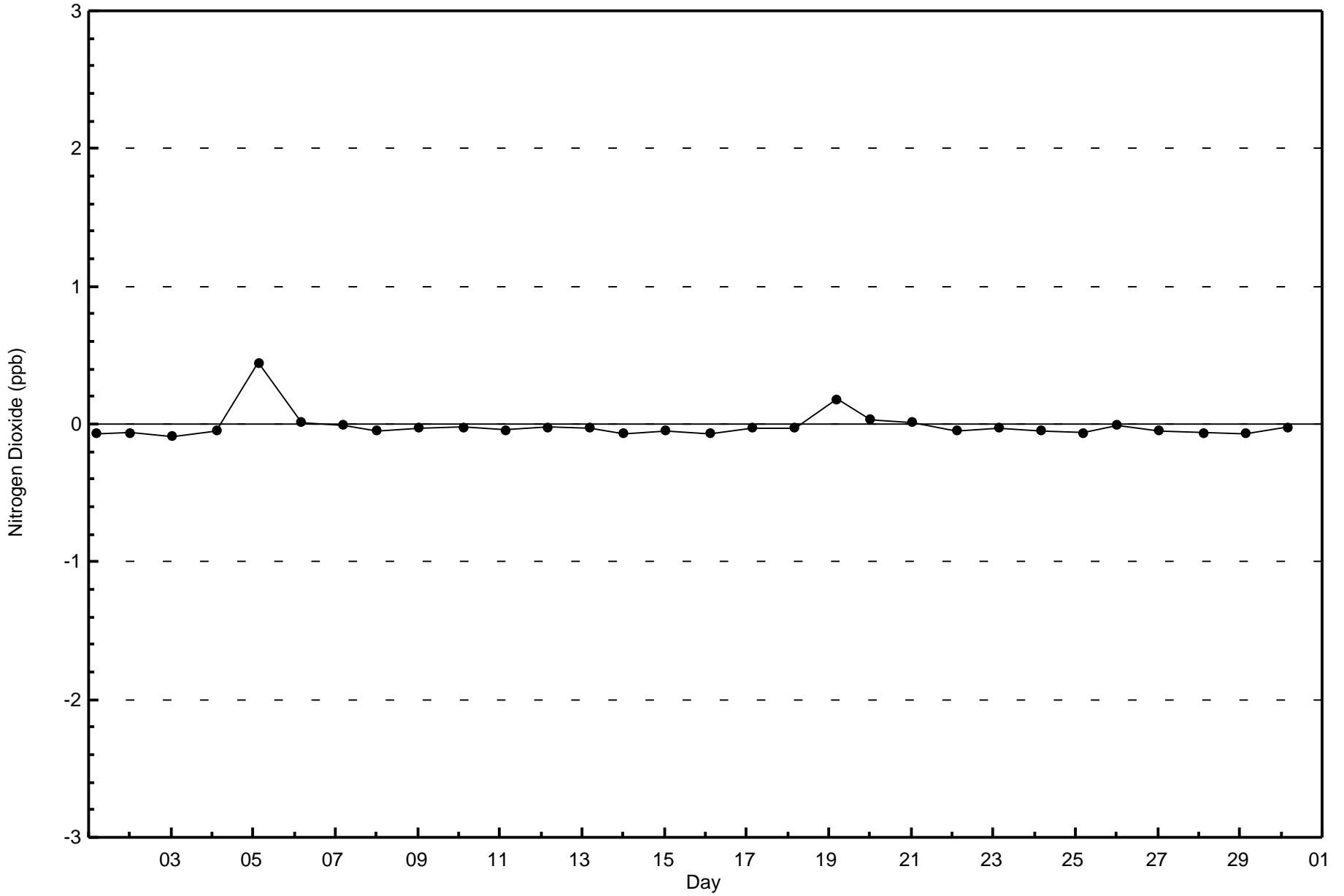
Total Number of Hours: 720

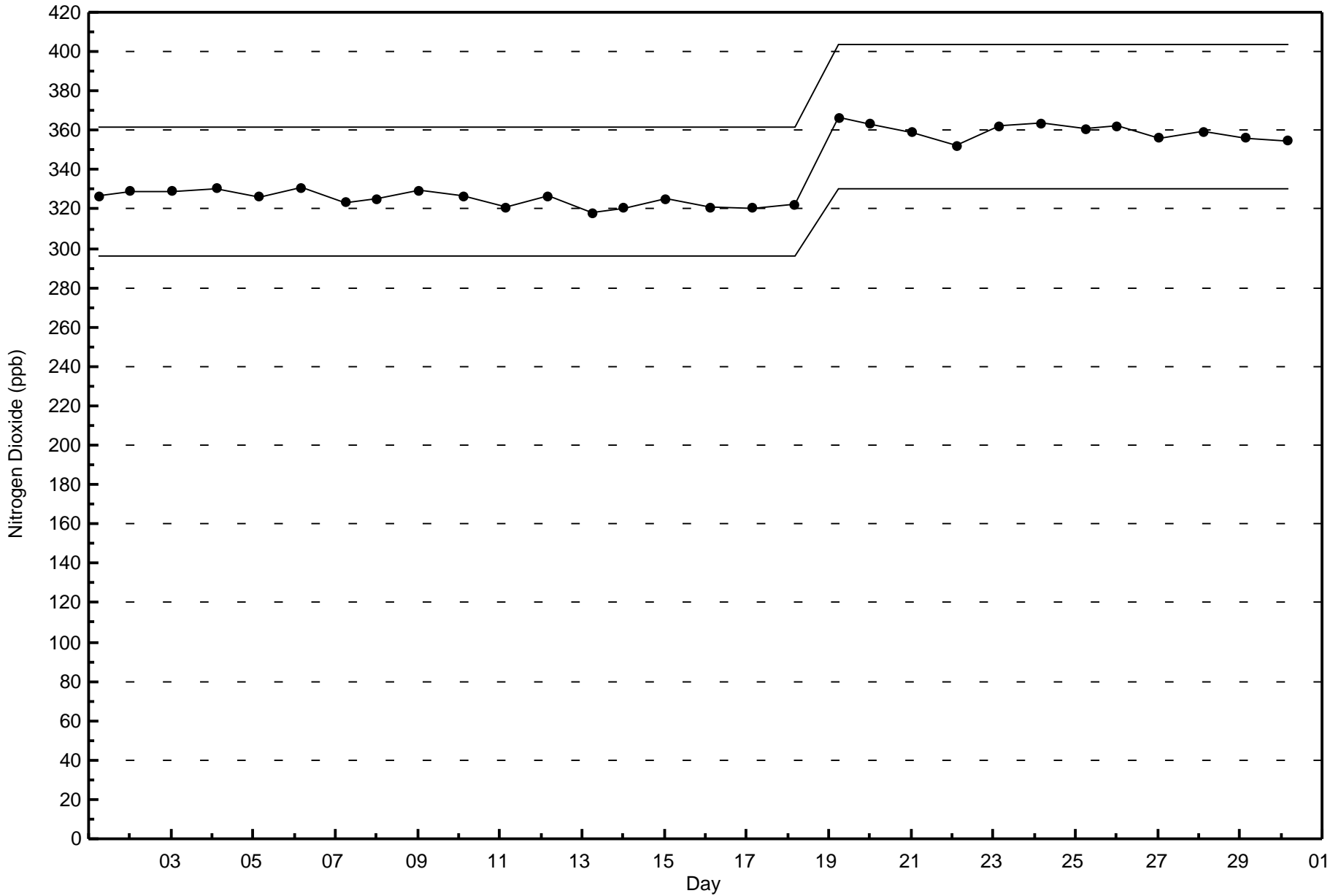


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)







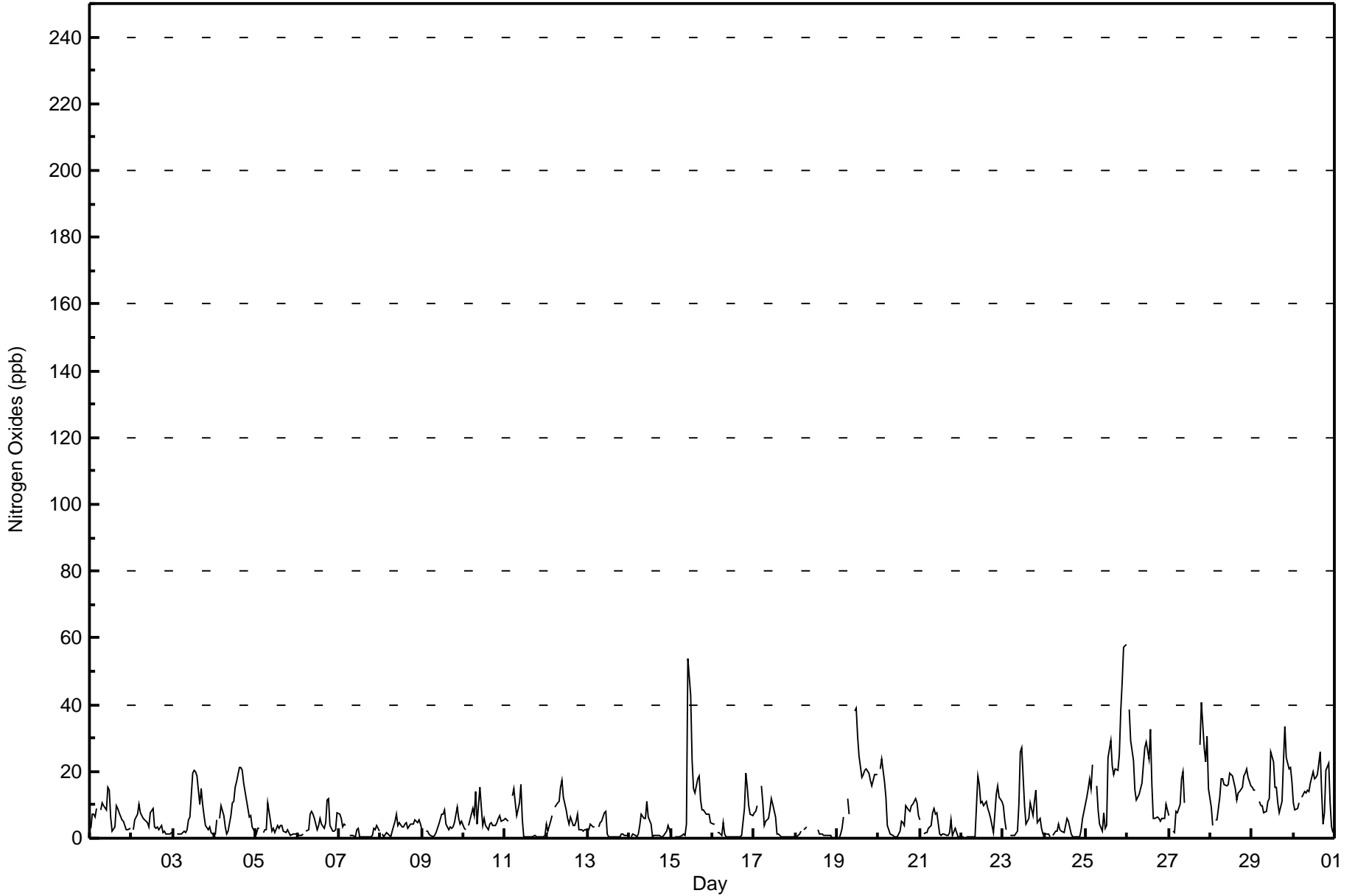


Maximum Value: 58 ppb on Nov 26 00:00	Maximum Daily Average: 21.2 ppb on Nov 25	Hours in Service: 720
Minimum Value: 0 ppb on Nov 18 23:00	Minimum Daily Average: 2.1 ppb on Nov 7	Hours of Data: 674
Maximum Diurnal Average: 12.0 ppb at hour 11	Minimum Diurnal Average: 4.7 ppb at hour 1	Hours of Missing Data: 46
Monthly Average: 7.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 11 P ₉₀ = 18 P ₉₉ = 39	Hours of Calibration: 36
		Percent Operational Time: 98.6

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-Nov	3	7	7	6	9	Z	8	10	10	9	15	14	6	2	3	10	9	7	6	5	4	3	2	3	6.9	15	
2-Nov	Z	2	6	7	10	8	7	6	5	5	4	7	9	3	3	3	3	4	2	2	1	1	1	2	4.4	10	
3-Nov	2	Z	1	1	1	1	2	2	2	6	6	19	20	20	18	10	15	10	7	4	3	3	2	1	6.9	20	
4-Nov	1	6	Z	6	10	7	3	1	2	7	10	11	15	17	21	21	20	17	11	9	6	7	3	2	9.3	21	
5-Nov	1	3	3	Z	2	2	3	11	5	2	3	2	4	3	4	4	2	2	2	2	1	1	1	1	2.8	11	
6-Nov	1	1	1	1	Z	2	2	7	8	7	6	2	4	6	4	3	5	11	12	4	2	2	2	8	4.4	12	
7-Nov	7	6	3	4	4	Z	1	1	1	1	2	3	1	1	0	0	0	0	0	1	3	3	4	2	2.1	7	
8-Nov	Z	1	0	2	1	1	1	2	5	7	4	4	3	4	4	4	3	4	4	4	5	5	6	4	3.5	7	
9-Nov	3	Z	2	2	1	1	1	1	2	3	4	7	7	9	4	3	3	3	3	5	9	6	4	5	3.8	9	
10-Nov	3	3	Z	4	6	9	7	14	4	15	9	4	6	4	3	4	5	4	4	5	6	7	5	6	5.9	15	
11-Nov	6	6	5	Z	13	15	11	7	10	16	5	0	0	0	0	0	1	1	0	0	0	0	0	1	4.3	16	
12-Nov	4	2	5	7	Z	9	11	11	15	17	12	8	6	4	6	4	4	5	7	3	3	2	3	2	6.6	17	
13-Nov	3	4	4	3	3	Z	3	5	5	7	8	1	1	1	0	0	0	0	0	1	1	1	1	1	2.4	8	
14-Nov	Z	0	1	1	0	1	4	7	6	6	11	7	4	1	1	1	1	1	1	1	1	2	4	2	2.7	11	
15-Nov	1	Z	0	0	0	1	1	1	1	1	4	54	43	23	15	13	18	19	11	9	8	7	7	5	10.9	54	
16-Nov	4	4	Z	2	2	1	5	1	0	1	0	0	0	0	0	0	0	1	9	19	15	10	7	7	3.9	19	
17-Nov	7	8	10	Z	16	11	4	5	6	8	12	10	7	1	1	1	1	1	1	1	1	0	0	0	4.8	16	
18-Nov	0	0	1	2	Z	2	3	C	C	C	C	C	C	3	1	1	1	1	1	1	1	0	0	0	--	3	
19-Nov	0	0	1	3	6	Z	12	7	M	M	38	39	30	25	18	19	20	21	19	18	15	17	19	19	16.6	39	
20-Nov	Z	21	24	17	12	4	3	1	1	0	0	1	2	5	5	4	10	8	8	10	10	12	11	7	7.6	24	
21-Nov	5	Z	1	2	2	3	4	8	9	7	8	1	1	1	1	1	1	2	6	1	3	2	0	0	3.0	9	
22-Nov	1	0	Z	0	0	0	0	0	0	19	16	10	11	10	11	9	8	6	2	7	13	16	12	11	7.1	19	
23-Nov	10	5	2	Z	1	1	1	1	2	10	26	27	10	4	5	6	10	7	11	14	5	6	3	1	7.3	27	
24-Nov	1	1	1	1	Z	1	2	2	4	3	2	2	4	6	5	1	1	1	0	0	0	3	6	8	2.4	8	
25-Nov	12	15	18	15	22	Z	16	8	4	2	8	3	4	24	29	21	19	21	20	25	38	47	57	58	21.2	58	
26-Nov	Z	38	29	23	14	11	12	13	16	22	27	29	24	33	16	6	6	6	6	5	6	6	10	9	16.1	38	
27-Nov	7	Z	2	2	8	8	10	18	20	11	M	DF	DF	DF	DF	DF	DF	DF	28	41	27	23	31	15	--	41	
28-Nov	10	4	Z	5	6	12	18	18	16	16	16	20	19	19	15	12	14	14	15	19	20	21	18	16	14.7	21	
29-Nov	15	14	14	Z	11	10	10	8	8	11	12	26	23	15	15	10	8	11	23	34	24	21	21	17	15.7	34	
30-Nov	11	8	9	11	Z	12	14	14	14	14	14	17	20	18	18	19	26	14	4	8	20	23	11	3	2	13.4	26

4.7	6.4	6.1	5.1	6.4	5.3	5.9	6.6	6.6	8.4	12.0	11.5	9.3	8.7	7.9	7.0	6.9	6.3	7.5	8.9	8.4	8.1	8.2	7.1			Diurnal Average
15	38	29	23	22	15	18	18	20	22	54	43	30	33	29	26	20	21	28	41	38	47	57	58			Diurnal Maximum

Z - zerspan C - Calibration M - Maintenance DF - DAS Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	627	93.03	93.03
21 - 40	41	6.08	99.11
41 - 80	6	0.89	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	77	25	6	2	2	1	8	42	150	87	59	68	22	18	22	36	625
21 - 40	4	2	2	0	0	0	0	6	15	3	5	2	2	0	0	0	41
11 - 80	1	0	0	0	0	0	0	0	0	3	1	0	0	0	0	1	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	82	27	8	2	2	1	8	48	165	93	65	70	24	18	22	37	672

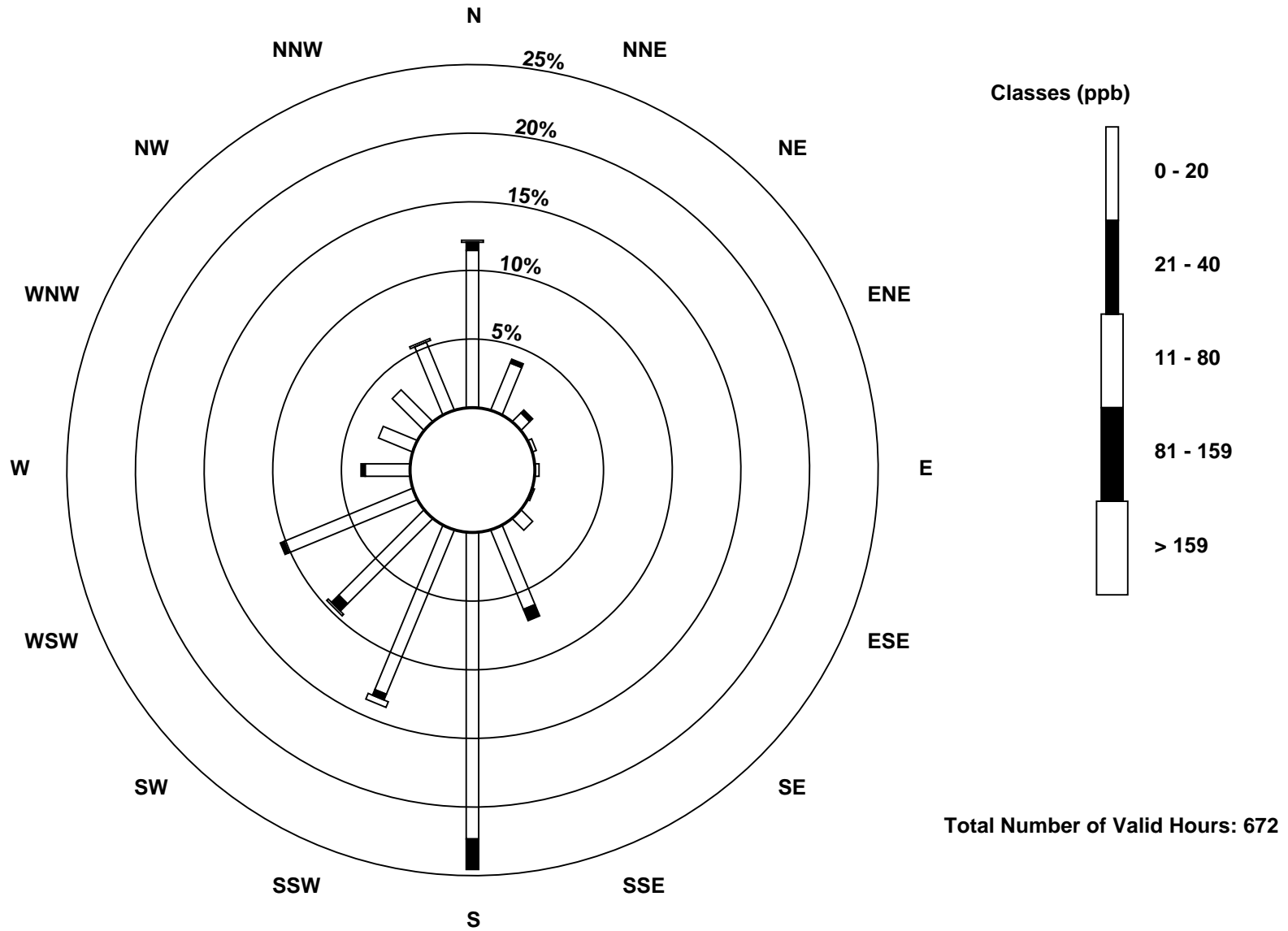
Total Number of Valid Hours: 672

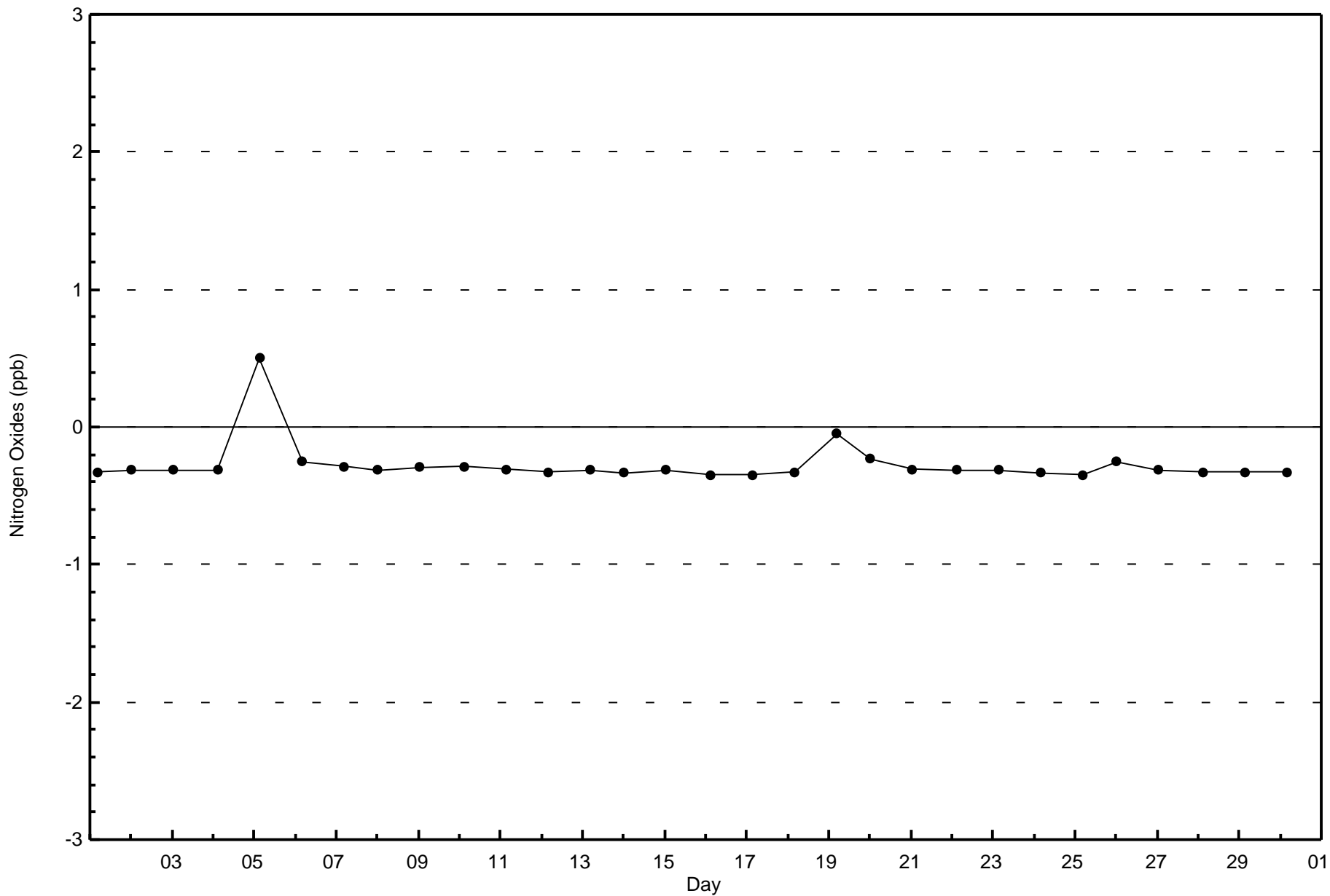
Total Number of Hours: 720

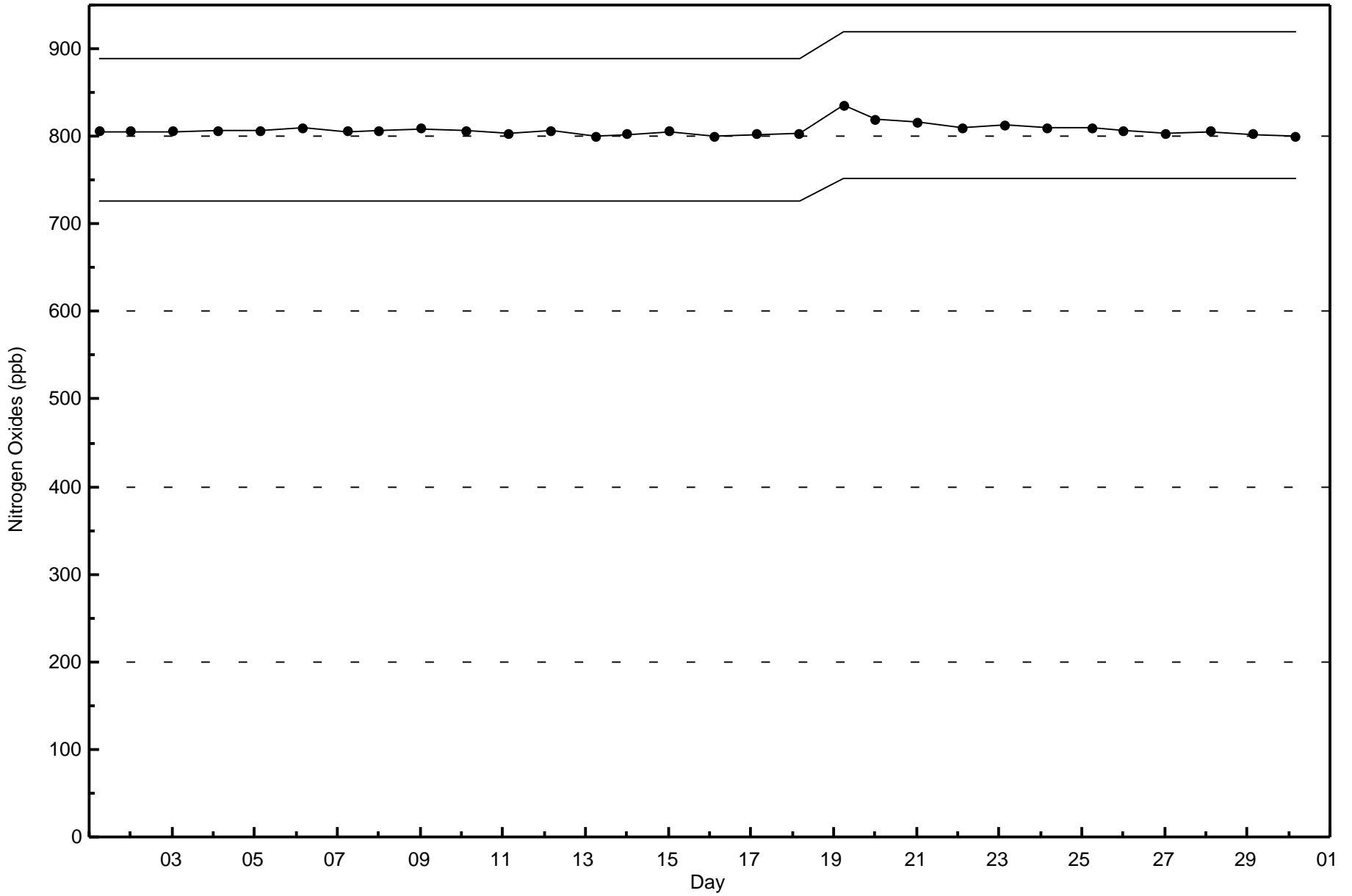


Wood Buffalo Environmental Association
Wind Rose Nov 2015

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 - November 2015

Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 29.6 µg/m ³ on Nov 3 21:00	Maximum Daily Average: 17.0 µg/m ³ on Nov 4
Minimum Value: 0.0 µg/m ³ on Nov 11 16:00	Hours of Data: 710
Maximum Diurnal Average: 5.6 µg/m ³ at hour 20	Hours of Missing Data: 10
Monthly Average: 4.64 µg/m ³	Hours of Calibration: 2
Minimum Daily Average: 1.0 µg/m ³ on Nov 1	Percent Operational Time: 98.9
Minimum Diurnal Average: 4.0 µg/m ³ at hour 4	
Percentiles: P ₁ = 0.3 P ₁₀ = 1.2 Q ₁ = 2.1 Median = 3.5 Q ₃ = 5.9 P ₉₀ = 8.9 P ₉₉ = 26.4	

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-Nov	1.8	1.9	1.6	1.2	0.9	0.8	0.8	1.0	0.9	1.0	1.0	0.9	0.8	0.7	0.7	1.0	0.9	1.1	1.0	0.9	0.8	0.8	0.8	0.8	1.0	1.9	
2-Nov	0.9	0.9	1.2	1.4	1.7	1.5	1.7	1.8	1.9	1.9	1.6	1.4	1.6	1.4	1.2	1.2	1.2	1.2	1.0	1.0	0.8	1.1	1.1	1.2	1.3	1.9	
3-Nov	1.3	1.2	1.2	1.1	1.2	1.3	1.3	1.2	1.2	1.4	1.8	3.1	2.8	3.7	5.9	8.5	10.8	10.0	8.9	19.8	29.6	29.3	17.0	13.2	7.4	29.6	
4-Nov	12.8	12.0	11.0	10.4	10.5	9.3	8.6	7.2	7.0	9.0	16.8	21.3	25.2	27.7	29.6	29.5	29.2	26.9	23.6	20.4	17.7	16.9	14.2	11.2	17.0	29.6	
5-Nov	9.2	7.3	4.8	3.8	6.2	7.8	8.9	14.5	13.0	6.5	9.4	12.5	12.6	9.3	3.3	1.7	2.2	2.8	2.8	2.5	2.6	2.3	2.1	2.2	6.3	14.5	
6-Nov	2.2	2.3	2.6	2.7	2.7	4.0	4.1	4.1	4.4	7.7	9.8	5.6	6.0	7.4	7.3	7.3	9.1	7.9	8.9	11.9	10.7	10.5	8.7	11.4	6.6	11.9	
7-Nov	13.0	11.7	8.5	7.1	7.2	6.0	5.2	4.9	3.9	3.6	3.6	3.5	2.8	2.8	2.5	2.5	3.1	4.0	4.0	3.7	4.2	4.9	5.7	5.3	5.2	13.0	
8-Nov	5.2	4.8	5.0	5.0	4.6	4.1	4.4	4.7	4.5	3.0	2.7	2.6	2.7	3.0	2.5	2.4	3.0	3.4	3.7	3.1	2.9	3.0	2.9	2.9	3.6	5.2	
9-Nov	3.0	2.9	2.4	2.3	2.4	2.3	2.2	2.2	2.3	2.5	2.9	3.4	3.8	7.0	5.4	3.4	2.7	2.6	2.8	3.0	3.7	4.2	4.6	4.8	3.3	7.0	
10-Nov	4.5	4.1	6.1	8.9	10.8	14.4	14.2	9.9	7.8	7.3	6.9	4.0	2.8	2.6	2.2	3.7	4.8	4.4	5.1	5.6	6.8	8.2	7.7	8.9	6.7	14.4	
11-Nov	9.0	8.1	8.0	8.1	9.8	8.0	5.8	4.7	3.7	4.0	1.9	1.1	0.3	0.0	0.0	0.0	0.7	0.9	0.6	0.4	0.3	0.3	0.3	0.5	3.2	9.8	
12-Nov	1.6	1.2	2.0	2.4	2.8	3.1	3.7	3.7	4.3	5.8	4.1	2.5	4.1	2.4	2.4	4.0	3.9	4.3	4.3	2.8	2.8	5.2	9.3	4.2	3.6	9.3	
13-Nov	5.8	13.6	12.2	8.2	7.3	4.8	4.5	4.6	5.2	7.0	4.0	1.6	1.0	0.4	0.1	0.5	0.5	1.1	1.1	1.1	1.2	1.0	1.0	0.9	3.7	13.6	
14-Nov	0.9	0.9	0.9	1.0	1.0	1.2	2.2	2.8	3.2	3.4	3.5	1.9	1.5	0.9	0.7	0.6	0.9	1.1	1.1	1.2	1.3	1.4	1.7	1.6	1.5	3.5	
15-Nov	1.5	1.5	1.4	1.4	1.5	1.4	1.5	1.5	1.5	2.1	6.7	7.5	6.8	6.4	6.3	8.7	6.3	4.3	4.3	3.4	2.9	2.9	2.4	1.9	3.6	8.7	
16-Nov	2.2	2.6	2.6	2.5	2.3	2.7	2.9	2.7	2.7	2.4	2.0	2.2	1.9	2.1	3.1	3.6	3.5	3.4	3.3	3.7	3.9	4.7	4.4	4.1	3.0	4.7	
17-Nov	5.0	5.1	5.7	4.9	4.9	4.9	4.2	3.9	4.0	4.8	7.4	4.6	1.7	1.5	1.7	1.9	2.7	3.5	4.9	7.4	8.0	7.0	5.5	4.6	4.6	8.0	
18-Nov	5.4	4.9	3.3	3.2	2.8	2.4	2.3	2.9	2.9	2.4	1.9	1.5	1.5	1.5	1.6	1.9	1.8	1.6	2.1	3.2	2.2	1.8	2.0	1.9	2.5	5.4	
19-Nov	2.4	2.2	2.6	3.5	3.5	3.6	3.2	2.7	2.6	3.0	4.0	C	C	2.6	3.3	4.9	4.7	4.7	4.0	3.9	3.1	3.8	4.0	4.0	3.5	4.9	
20-Nov	2.9	3.0	3.8	4.1	3.7	8.8	8.6	5.9	4.1	2.7	2.2	4.9	3.4	2.1	6.0	2.7	4.8	5.9	5.9	12.8	11.7	9.6	5.4	4.0	5.4	12.8	
21-Nov	3.5	3.5	2.7	2.8	4.0	5.8	5.6	6.2	5.9	6.0	5.1	3.9	2.5	2.1	1.9	1.9	2.0	1.8	2.2	2.1	1.8	2.2	2.4	2.6	3.4	6.2	
22-Nov	4.0	5.1	5.2	3.9	3.1	2.9	2.6	2.5	2.3	5.4	4.2	4.9	5.9	5.3	5.2	6.0	5.7	5.9	4.3	4.7	4.6	4.3	4.2	3.9	4.4	6.0	
23-Nov	3.3	3.1	3.5	3.8	3.7	3.5	3.4	2.8	2.9	4.1	4.2	3.5	2.7	2.5	2.2	2.2	2.0	2.1	2.3	2.9	2.0	2.0	1.9	2.1	2.9	4.2	
24-Nov	2.3	2.1	1.9	1.8	2.0	1.7	1.6	1.7	2.0	2.0	2.1	1.8	1.9	2.3	2.6	2.7	2.2	2.0	1.9	1.8	1.9	1.8	2.3	2.1	2.0	2.7	
25-Nov	2.1	2.2	3.0	2.6	3.6	3.0	2.4	1.9	1.8	2.1	3.3	3.0	2.6	3.5	4.7	4.2	5.6	7.6	8.1	7.1	5.9	4.9	5.6	4.6	4.0	8.1	
26-Nov	3.9	3.2	3.4	3.8	4.1	4.3	4.7	5.9	6.8	6.7	8.6	8.9	9.2	8.4	6.6	6.7	5.6	5.6	4.8	4.0	3.8	3.5	3.5	2.9	5.4	9.2	
27-Nov	2.8	2.6	2.1	2.6	2.3	2.6	3.4	3.8	4.0	3.0	M	DF	DF	DF	DF	DF	DF	DF	DF	7.7	6.6	5.1	4.8	4.6	4.1	--	7.7
28-Nov	4.0	3.5	3.9	3.5	3.7	4.5	5.0	7.0	7.0	7.6	8.1	10.0	10.5	9.8	8.8	8.3	10.0	10.5	10.0	9.6	8.8	7.9	7.0	6.4	7.3	10.5	
29-Nov	5.9	5.6	5.9	6.4	6.7	5.6	5.4	4.7	5.6	7.2	5.8	6.8	8.2	7.2	7.6	7.6	8.4	9.5	9.0	8.7	9.0	9.2	8.8	8.5	7.2	9.5	
30-Nov	7.8	8.1	7.4	6.3	4.3	2.9	2.1	2.8	3.3	3.3	3.8	4.7	7.9	6.7	5.0	5.5	5.2	6.1	10.8	8.7	6.2	4.6	4.5	6.3	5.6	10.8	

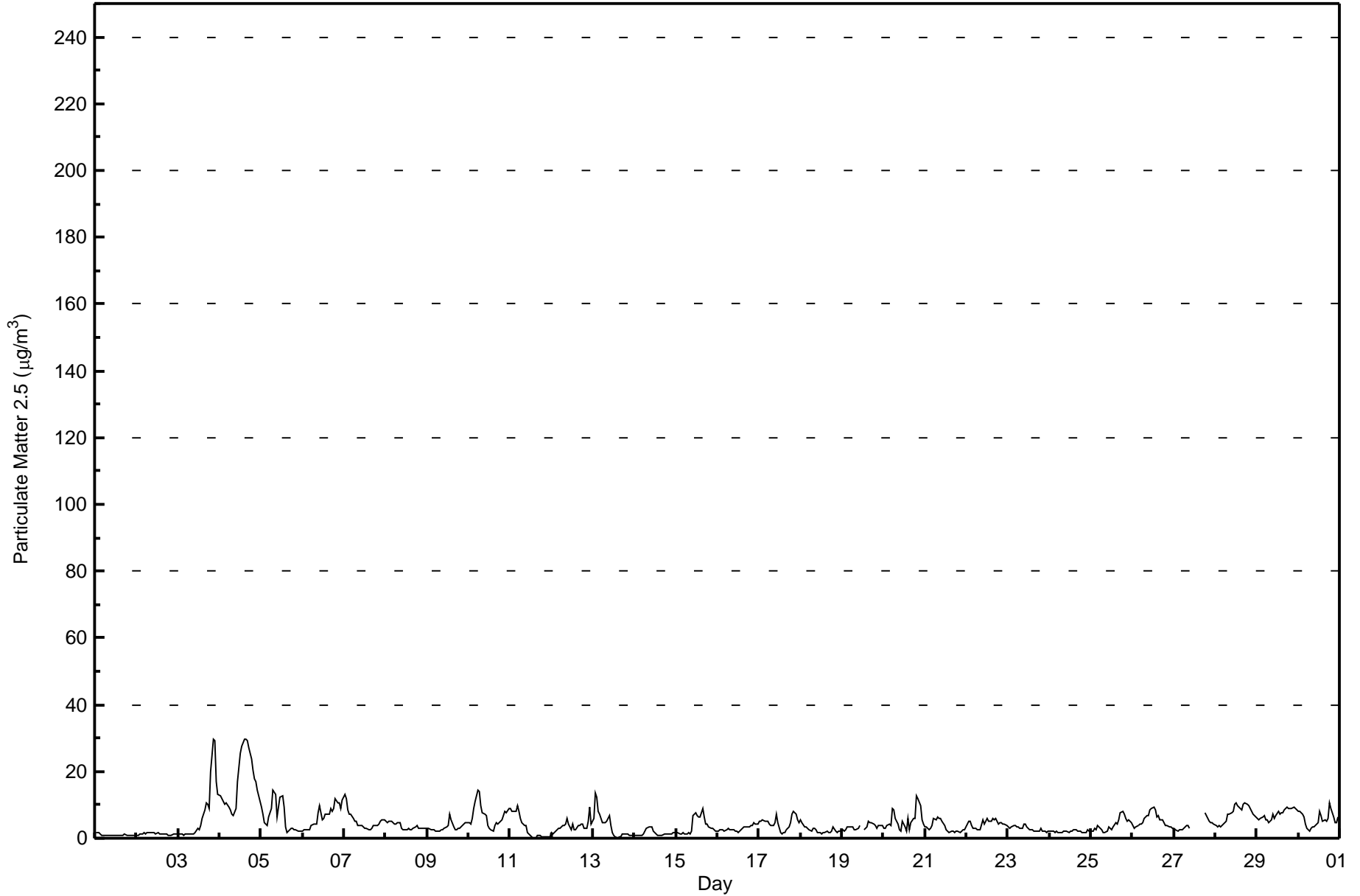
4.3	4.4	4.2	4.0	4.2	4.3	4.2	4.2	4.1	4.3	4.8	4.8	4.8	4.6	4.5	4.7	5.0	5.0	5.2	5.6	5.5	5.5	4.9	4.4	Diurnal Average	
13.0	13.6	12.2	10.4	10.8	14.4	14.2	14.5	13.0	9.0	16.8	21.3	25.2	27.7	29.6	29.5	29.2	26.9	23.6	20.4	29.6	29.3	17.0	13.2	Diurnal Maximum	

C - Calibration M - Maintenance DF - DAS Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	464	65.35	65.35
6 - 15	182	25.63	90.99
16 - 25	9	1.27	92.25
26 - 80	7	0.99	93.24
> 81.0	0	0.00	93.24

Total Number of Valid Hours: 710

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay South - November 2015

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	51	18	4	2	0	1	7	27	95	68	45	52	20	17	22	34	463
6 - 15	15	5	0	0	1	0	1	22	71	28	12	12	3	2	4	6	182
16 - 25	0	0	2	0	1	0	0	0	1	0	0	2	1	0	0	1	8
26 - 80	4	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	70	24	6	2	2	1	8	49	167	96	57	68	24	19	26	41	660

Total Number of Valid Hours: 708

Total Number of Hours: 720

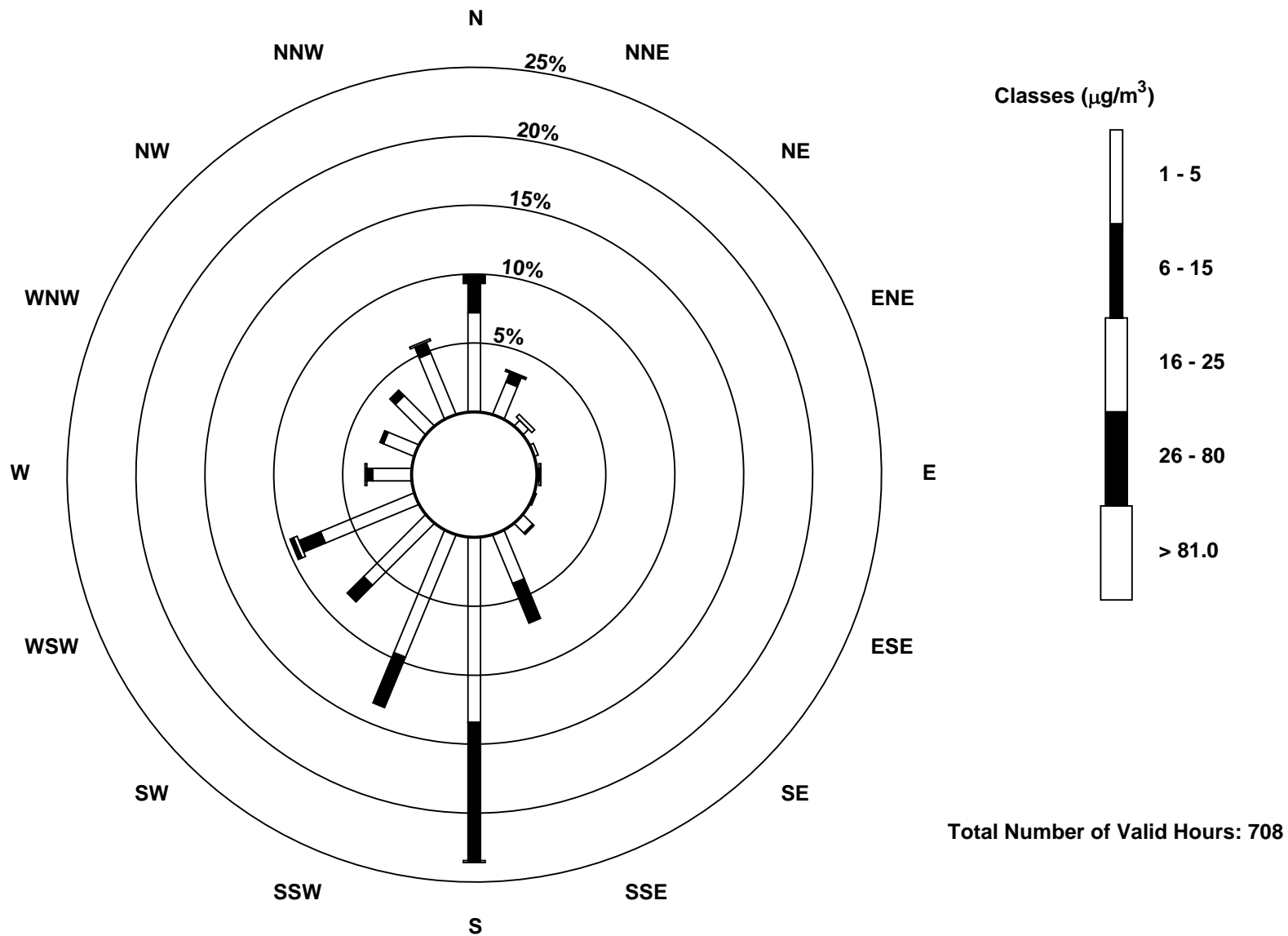


Wood Buffalo Environmental Association

Wind Rose Nov 2015

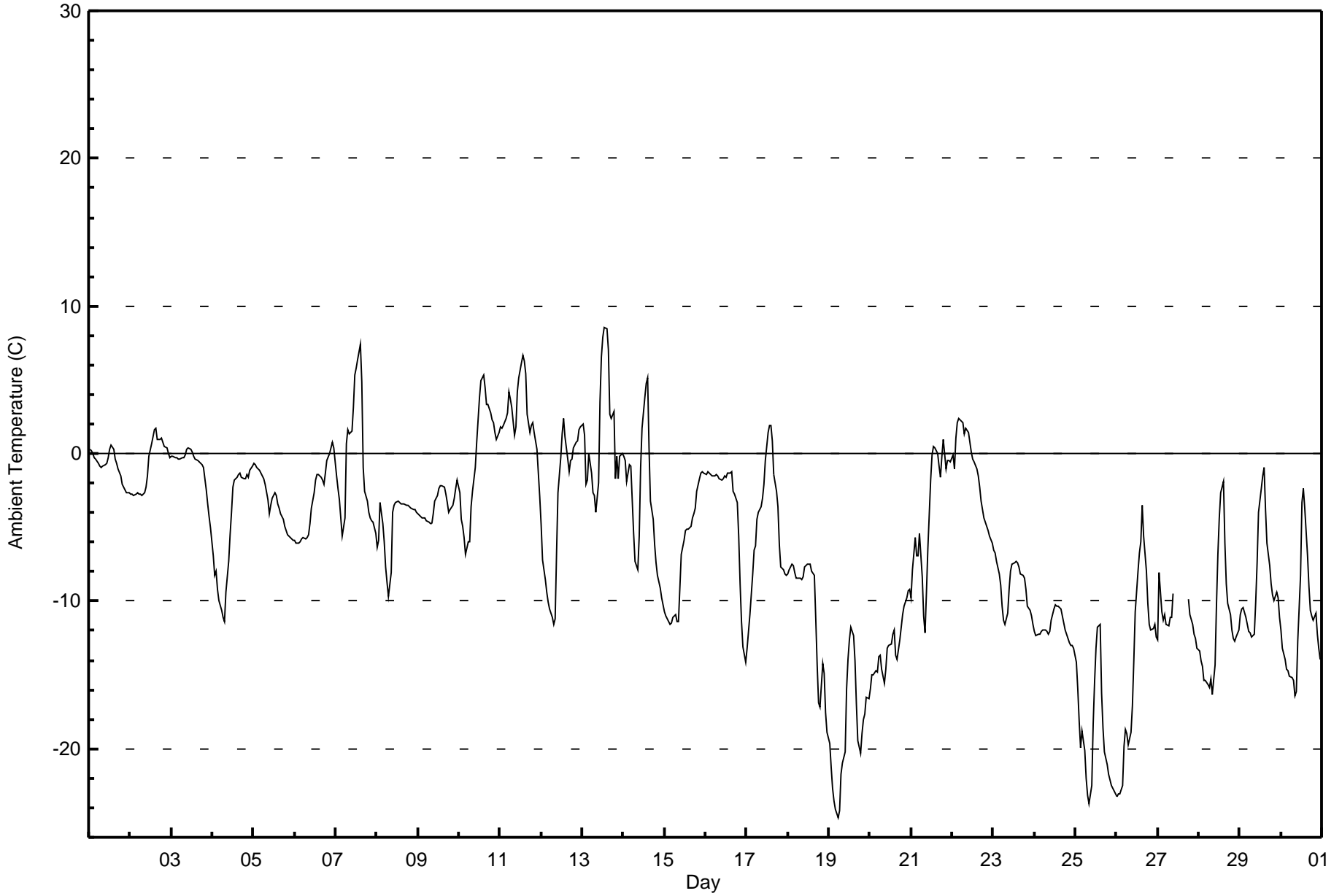
Particulate Matter 2.5 (PM_{2.5}) - μg/m³

Fort McKay South (AMS 13)





Maximum Value: 8.6 C on Nov 13 14:00		Maximum Daily Average: 2.7 C on Nov 11		Hours in Service: 720																							
Minimum Value: -24.6 C on Nov 19 06:00		Minimum Daily Average: -19.0 C on Nov 25		Hours of Data: 712																							
Maximum Diurnal Average: -1.9 C at hour 14		Minimum Diurnal Average: -8.4 C at hour 9		Hours of Missing Data: 8																							
Monthly Average: -6.09 C		Percentiles: P ₁ = -23.0 P ₁₀ = -14.7 Q ₁ = -11.0 Median = -4.6 Q ₃ = -1.2 P ₉₀ = 1.3 P ₉₉ = 6.5		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-Nov	0.3	0.2	0.0	-0.3	-0.4	-0.7	-0.9	-0.9	-0.8	-0.8	-0.6	-0.3	0.3	0.6	0.3	-0.3	-0.6	-1.0	-1.5	-2.1	-2.3	-2.5	-2.7	-2.7	-0.8	0.6	
2-Nov	-2.7	-2.8	-2.8	-2.8	-2.7	-2.7	-2.8	-2.8	-2.6	-2.3	-1.5	-0.2	0.6	1.2	1.6	1.7	1.0	1.0	1.0	0.8	0.5	0.3	0.0	-0.2	-0.8	1.7	
3-Nov	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.3	-0.1	0.3	0.4	0.3	0.1	-0.2	-0.3	-0.4	-0.5	-0.7	-0.7	-0.9	-2.4	-3.4	-4.2	-5.0	-0.8	0.4	
4-Nov	-6.9	-8.3	-8.0	-9.2	-10.0	-10.7	-11.1	-11.4	-9.4	-7.3	-5.5	-4.0	-2.2	-1.8	-1.6	-1.4	-1.4	-1.6	-1.7	-1.7	-1.5	-1.6	-1.1	-0.8	-5.0	-0.8	
5-Nov	-0.7	-0.7	-0.9	-1.1	-1.4	-1.5	-1.7	-2.1	-3.1	-4.0	-3.5	-3.0	-2.6	-2.9	-3.4	-3.7	-4.0	-4.5	-4.9	-5.3	-5.5	-5.7	-5.8	-5.9	-3.3	-0.7	
6-Nov	-5.9	-6.0	-6.0	-6.0	-5.8	-5.7	-5.7	-5.7	-5.5	-4.7	-3.7	-2.7	-1.8	-1.4	-1.5	-1.6	-1.8	-2.0	-1.3	-0.5	0.0	0.4	0.7	0.4	-3.1	0.7	
7-Nov	-1.5	-2.4	-3.1	-4.3	-5.5	-4.4	0.7	1.6	1.4	1.5	3.1	5.3	5.8	6.3	7.4	4.8	-0.9	-2.6	-3.2	-4.0	-4.4	-4.6	-4.6	-5.4	-0.5	7.4	
8-Nov	-6.4	-5.9	-3.3	-4.8	-5.9	-7.7	-8.7	-9.6	-8.1	-4.0	-3.5	-3.3	-3.3	-3.3	-3.4	-3.4	-3.5	-3.5	-3.5	-3.6	-3.7	-3.8	-3.8	-4.0	-4.7	-3.3	
9-Nov	-4.1	-4.2	-4.3	-4.4	-4.4	-4.6	-4.6	-4.7	-4.7	-4.1	-3.2	-2.8	-2.3	-2.1	-2.2	-2.3	-2.8	-3.3	-3.9	-3.8	-3.5	-3.0	-2.3	-1.8	-3.5	-1.8	
10-Nov	-2.7	-4.4	-5.0	-5.7	-6.8	-6.0	-5.9	-3.6	-2.5	-0.9	0.8	2.3	3.8	5.0	5.4	4.4	3.3	3.4	2.8	2.3	2.1	1.4	0.9	1.4	-0.2	5.4	
11-Nov	1.8	1.7	1.9	2.3	2.8	4.2	3.7	3.1	1.3	1.8	4.2	5.1	6.2	6.6	6.3	5.4	2.6	1.4	1.9	2.1	1.4	0.3	-1.3	-2.9	2.7	6.6	
12-Nov	-4.8	-7.2	-8.5	-9.4	-10.1	-10.6	-11.1	-11.6	-11.2	-6.8	-2.6	-0.3	1.3	2.4	1.2	-0.4	-1.2	-0.5	-0.4	0.4	0.8	0.8	1.6	1.8	-3.6	2.4	
13-Nov	2.0	1.2	-2.1	-1.8	0.0	-1.3	-2.7	-2.9	-4.0	-2.0	3.5	6.5	7.9	8.6	8.5	7.1	2.7	2.4	2.9	-1.7	-0.2	-1.7	-0.2	0.0	1.4	8.6	
14-Nov	-0.2	-0.5	-1.9	-0.7	-0.8	-3.1	-5.4	-7.3	-7.9	-5.6	-1.0	1.7	3.8	4.8	5.1	0.4	-3.2	-4.5	-6.2	-7.4	-8.3	-9.1	-9.7	-10.2	-3.2	5.1	
15-Nov	-10.7	-11.0	-11.4	-11.5	-11.4	-11.1	-10.9	-11.4	-11.3	-9.1	-6.8	-5.9	-5.2	-5.1	-5.1	-4.9	-4.4	-4.1	-3.7	-2.6	-1.7	-1.3	-1.2	-1.3	-6.8	-1.2	
16-Nov	-1.4	-1.3	-1.3	-1.4	-1.5	-1.5	-1.4	-1.5	-1.7	-1.8	-1.7	-1.5	-1.6	-1.4	-1.3	-1.2	-2.6	-2.8	-3.4	-5.6	-8.8	-11.3	-13.1	-14.2	-3.5	-1.2	
17-Nov	-13.2	-12.0	-10.9	-8.2	-6.5	-6.3	-4.4	-4.0	-3.6	-3.0	-2.1	-0.5	1.5	1.9	1.9	0.8	-1.4	-2.6	-3.6	-6.1	-7.7	-7.9	-8.1	-8.3	-4.8	1.9	
18-Nov	-8.2	-7.9	-7.5	-7.6	-8.1	-8.5	-8.4	-8.4	-8.6	-8.4	-7.7	-7.5	-7.5	-7.5	-7.9	-8.2	-11.2	-14.3	-16.9	-17.2	-14.2	-14.9	-17.6	-18.9	-10.5	-7.5	
19-Nov	-19.6	-21.2	-22.7	-23.5	-24.1	-24.6	-24.2	-21.7	-21.0	-20.2	-15.9	-14.0	-12.6	-11.7	-12.4	-14.0	-17.0	-19.4	-20.3	-19.0	-18.0	-17.6	-16.5	-16.6	-18.7	-11.7	
20-Nov	-15.9	-15.0	-15.0	-14.7	-14.8	-13.7	-13.7	-14.6	-15.6	-14.6	-13.2	-13.0	-12.9	-12.2	-11.9	-13.6	-13.9	-12.6	-11.8	-10.9	-10.4	-9.7	-9.3	-9.2	-13.0	-9.2	
21-Nov	-9.8	-7.9	-5.7	-7.0	-6.9	-5.4	-8.3	-11.0	-12.1	-9.4	-6.4	-1.8	-0.1	0.5	0.3	0.0	-0.9	-1.6	-0.2	1.0	-1.0	-0.5	-0.5	-0.6	-4.0	1.0	
22-Nov	-0.1	-1.0	1.0	2.1	2.4	2.2	2.1	1.4	1.7	1.4	0.7	0.1	-0.3	-0.6	-1.0	-1.5	-2.3	-3.2	-4.3	-4.6	-5.0	-5.2	-5.6	-6.1	-1.1	2.4	
23-Nov	-6.6	-6.8	-7.3	-8.2	-8.9	-10.3	-11.3	-11.5	-10.9	-9.2	-8.0	-7.5	-7.4	-7.3	-7.4	-7.7	-8.1	-8.2	-8.4	-9.2	-10.3	-10.6	-11.0	-11.6	-8.9	-6.6	
24-Nov	-12.1	-12.4	-12.3	-12.2	-12.0	-12.0	-12.0	-12.2	-12.2	-12.0	-11.3	-10.6	-10.2	-10.4	-10.3	-10.5	-11.0	-11.5	-11.9	-12.3	-12.8	-13.0	-13.0	-13.2	-11.8	-10.2	
25-Nov	-14.2	-16.0	-18.1	-19.9	-18.8	-20.1	-22.0	-23.2	-23.7	-22.4	-18.3	-15.5	-13.2	-11.8	-11.6	-16.3	-18.6	-20.2	-21.1	-21.7	-22.2	-22.5	-22.6	-23.0	-19.0	-11.6	
26-Nov	-23.3	-23.0	-23.0	-22.5	-19.8	-18.7	-19.0	-19.7	-18.9	-17.1	-14.0	-10.7	-7.9	-6.8	-6.0	-3.5	-5.6	-7.9	-10.1	-11.5	-11.9	-11.9	-11.6	-12.4	-14.0	-3.5	
27-Nov	-12.7	-8.0	-10.7	-11.3	-10.9	-11.5	-11.6	-11.1	-11.1	-9.4	M	DF	DF	DF	DF	DF	DF	DF	DF	-9.9	-10.9	-11.5	-12.2	-12.6	-13.2	--	-8.0
28-Nov	-13.4	-14.1	-14.5	-15.4	-15.4	-15.7	-15.8	-15.3	-16.3	-14.3	-10.3	-6.8	-4.3	-2.6	-1.9	-6.1	-8.8	-10.1	-10.9	-12.0	-12.5	-12.7	-12.5	-11.9	-11.4	-1.9	
29-Nov	-10.9	-10.5	-10.5	-11.1	-11.6	-12.1	-12.2	-12.4	-12.2	-10.1	-7.4	-4.0	-2.4	-1.5	-1.0	-3.8	-6.0	-7.6	-8.8	-9.6	-10.0	-9.4	-9.8	-11.1	-8.6	-1.0	
30-Nov	-11.9	-13.2	-13.9	-14.6	-14.7	-15.1	-15.2	-15.4	-16.4	-16.1	-12.7	-8.2	-3.3	-2.4	-3.7	-6.9	-9.0	-10.6	-11.0	-11.3	-10.8	-12.3	-13.2	-14.0	-11.5	-2.4	
																								Diurnal Average			
																								Diurnal Maximum			
																								M - Maintenance DF - DAS Failure			





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Fort McKay South - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	26	3.65	3.65
-20 - 0	576	80.90	84.55
0 - 10	110	15.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 712

Total Number of Hours: 720

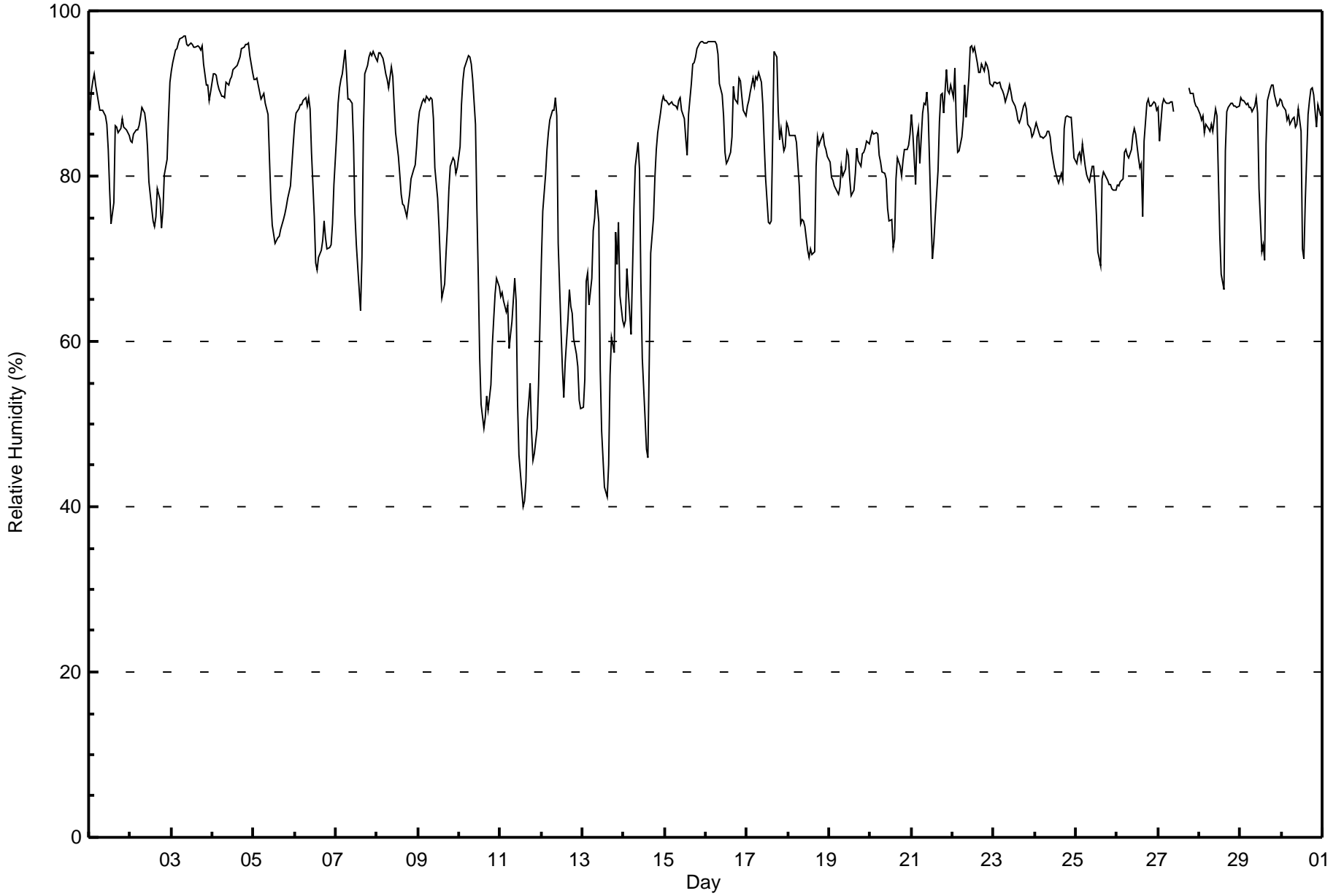


Maximum Value: 97 % on Nov 3 09:00	Maximum Daily Average: 94.7 % on Nov 3	Hours in Service: 720
Minimum Value: 40 % on Nov 11 14:00	Minimum Daily Average: 54.9 % on Nov 11	Hours of Data: 712
Maximum Diurnal Average: 86.4 % at hour 9	Minimum Diurnal Average: 72.0 % at hour 14	Hours of Missing Data: 8
Monthly Average: 82.1 %	Percentiles: P ₁ = 45 P ₁₀ = 66 Q ₁ = 78 Median = 85 Q ₃ = 89 P ₉₀ = 93 P ₉₉ = 96	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-Nov	88	90	91	92	91	89	88	88	88	87	86	83	78	74	77	86	86	85	86	87	86	86	86	85	86.0	92	
2-Nov	84	84	85	86	86	86	87	88	88	86	84	79	76	75	74	75	78	77	74	76	80	82	87	91	82.0	91	
3-Nov	93	94	95	95	96	97	97	97	97	96	96	96	96	96	96	96	96	95	96	94	91	91	89	90	94.7	97	
4-Nov	92	92	92	91	90	90	90	89	91	91	92	92	93	93	94	94	95	96	96	96	96	96	95	93	92.8	96	
5-Nov	92	92	92	90	89	90	90	89	87	82	77	74	72	73	73	74	75	75	76	77	79	81	84	81.5	92		
6-Nov	86	88	88	89	89	89	89	88	90	88	83	75	70	69	70	71	72	74	73	71	71	72	74	79	79.5	90	
7-Nov	85	89	91	92	92	95	93	89	89	89	84	75	72	69	64	70	85	92	93	94	95	95	95	94	86.8	95	
8-Nov	94	95	95	94	93	92	92	91	93	92	88	85	82	80	78	77	76	75	76	78	80	81	81	84	85.5	95	
9-Nov	86	88	89	89	89	90	89	89	89	87	81	77	74	69	65	67	71	74	78	81	82	82	80	81	81.2	90	
10-Nov	84	89	92	93	94	95	94	94	92	86	76	68	58	52	50	51	53	52	55	60	63	66	68	67	72.8	95	
11-Nov	65	66	65	64	64	59	61	62	68	65	53	46	42	40	41	43	50	55	49	46	46	49	55	62	54.9	68	
12-Nov	70	76	80	83	85	87	88	88	89	87	72	62	57	53	57	63	66	64	63	60	58	57	53	52	69.6	89	
13-Nov	52	55	67	68	64	68	73	75	78	74	57	49	46	42	41	45	56	60	59	73	69	74	66	63	61.5	78	
14-Nov	62	62	69	63	61	68	76	81	84	81	67	58	51	47	46	58	71	75	80	83	85	88	89	90	70.6	90	
15-Nov	89	89	89	89	89	89	88	88	89	90	88	87	85	83	87	91	94	94	94	95	96	96	96	96	96	90.4	96
16-Nov	96	96	96	96	96	96	96	95	91	90	87	83	82	82	83	85	91	89	89	92	92	90	88	87	90.3	96	
17-Nov	89	89	90	92	91	92	92	93	91	89	84	80	74	74	75	84	95	94	88	84	86	83	84	86	86.6	95	
18-Nov	86	85	85	85	85	84	79	74	75	75	74	71	70	71	71	71	81	85	84	84	85	84	83	82	79.5	86	
19-Nov	82	80	80	79	78	78	79	81	80	81	83	82	80	78	78	80	83	82	81	83	83	83	84	84	80.9	84	
20-Nov	85	85	85	85	85	83	82	80	80	80	76	74	75	71	72	80	82	81	80	82	83	83	84	85	80.8	85	
21-Nov	87	85	79	85	86	81	88	89	89	90	88	75	70	72	75	81	87	90	90	88	93	90	90	91	84.9	93	
22-Nov	90	93	87	83	83	85	87	91	87	92	96	96	95	96	94	93	93	94	93	94	93	93	91	91	91.1	96	
23-Nov	91	91	91	91	91	90	90	89	90	91	90	89	89	88	87	86	87	88	89	88	86	86	85	85	88.7	91	
24-Nov	86	86	85	85	85	85	85	85	85	85	83	81	80	80	79	80	79	86	87	87	87	87	85	82	84.0	87	
25-Nov	82	83	83	82	84	81	80	80	79	81	81	79	75	71	69	80	81	80	80	79	79	78	78	78	79.3	84	
26-Nov	79	79	79	80	83	83	83	82	83	85	86	85	82	81	82	75	84	89	89	88	88	89	89	88	83.8	89	
27-Nov	88	84	89	89	89	89	89	89	89	88	M	DF	DF	DF	DF	DF	DF	DF	91	90	90	89	89	88	--	91	
28-Nov	87	87	87	85	86	86	85	86	85	88	87	80	73	68	66	83	88	88	89	89	89	88	88	89	84.5	89	
29-Nov	89	89	89	89	89	88	88	88	88	89	88	78	71	72	70	84	89	90	91	91	90	89	89	89	86.2	91	
30-Nov	89	88	88	87	87	86	87	87	86	86	88	85	71	70	77	88	89	90	91	90	86	89	88	87	85.9	91	

84.3	85.0	85.8	85.7	85.7	85.7	86.1	86.2	86.4	85.7	81.9	77.5	73.7	72.0	72.0	76.1	80.4	81.7	81.9	82.6	82.9	83.1	83.0	83.5	Diurnal Average		
96	96	96	96	96	97	97	97	97	96	96	96	96	96	96	96	96	95	96	96	96	96	96	96	96	Diurnal Maximum	

M - Maintenance DF - DAS Failure





Maximum Speed: 14 km/h on Nov 11 14:00	Maximum Daily Speed Average: 8.0 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 3 10:00	Minimum Daily Speed Average: 0.7 km/h on Nov 4	Hours of Data: 710
Maximum Diurnal Speed Average: 2.4 km/h at hour 23	Minimum Diurnal Speed Average: 0.9 km/h at hour 17	Hours of Missing Data: 10
Monthly Average Velocity: 1.5 km/h 224.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 6 P ₉₀ = 8 P ₉₉ = 11	Percent Operational Time: 98.6

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-Nov	NNE6	NNE4	NNE5	N7	N8	N8	N8	N7	N8	N9	N9	N11	NNE10	NNE9	NNE9	N9	N6	N7	N9	N9	N8	N7	N7	N6	N7.6	N11	
2-Nov	NNW5	NNW6	N6	N5	NNE4	ENE4	ENE3	NE3	NE2	NNE2	SE2	SE4	SE5	SSE5	SE4	SE2	N1	SSE5	SSE6	S6	S7	SSE7	SSE6	S5	SE1.6	SSE7	
3-Nov	S5	S6	S4	S3	S2	S2	S2	S1	S1	SE0	N3	N5	N5	N5	N4	NNW3	N3	NW1	WSW4	WSW4	WSW5	WSW8	SW4	WSW1.0	WSW8		
4-Nov	SW1	SSW4	S3	SSW2	SSW2	S2	SW2	WSW1	NNE1	N2	NE2	NE1	E0	N3	NNE4	N2	N2	N3	NNW1	AF	W1	S1	WSW5	W6	W0.7	W6	
5-Nov	W5	NW4	WNW4	WNW6	WNW4	NW4	NNW3	N7	N9	N7	N7	NNW7	NNW7	N7	NNW6	NNW6	NNW4	NNW5	NNW5	NNW4	NNW3	NNW2	WNW1	AF	NNW4.7	N9	
6-Nov	SW1	SSW1	SSW1	S2	S1	S0	SSE1	SSE1	SSW1	S2	SSW4	S4	SSE6	SSE8	SSE7	SSE6	SSE6	SSE6	SSE8	S9	S9	S9	S9	S5	S4.4	S9	
7-Nov	SSW3	SSW3	SW1	WSW2	NW1	WSW7	WSW12	WSW12	WSW10	WSW7	SW4	SW7	SW7	SW5	SW6	SW4	WSW2	WSW3	SW3	SSW3	SW3	SSW2	SW3	WSW1	SW4.4	WSW12	
8-Nov	SW2	W4	WSW2	SSE1	N2	NW2	NW1	NNW1	N4	NNE8	NNE8	NNE8	NNE8	N9	N9	N9	N7	NNE4	N3	NNW3	NNW3	NNW3	NNW3	NW2	N3.7	N9	
9-Nov	NW1	NW1	WNW2	NW1	WNW2	WNW1	WNW1	W1	SW2	WSW1	S2	S3	SSE2	SSW5	SSW6	SSW4	SSW5	SSW5	SW2	S2	SSW2	SSE3	S5	S4	SSW2.0	SSW6	
10-Nov	S4	S5	S6	S5	S4	S5	S5	S8	S8	S10	S12	S11	S12	S11	S10	S9	S9	S11	S11	S8	S7	S7	S7	S7	S8.0	S12	
11-Nov	S6	S6	S6	SSE6	S8	SSW10	SSW9	SSW8	S6	SSW7	SW8	WSW10	WSW12	WSW14	SW10	SW9	SSW6	SW7	WSW9	WSW9	WSW10	SW8	SSW6	S5	SW7.4	WSW14	
12-Nov	SSE2	SSE1	SW2	W1	WSW2	WSW2	SW2	SW2	S4	SSE4	S6	S8	SSE8	SSE7	SSE4	S4	S4	SSE5	SSE7	S9	SSE9	SSE8	SSE9	S10	S4.7	S10	
13-Nov	SSE9	SE4	E1	SSE4	SSE5	S3	SSW4	SSW4	SSW4	S6	SSW9	SW11	SW12	SW9	SW10	SW9	SSW4	SW7	SSW5	SSW5	SSW6	SSW6	SW8	SW9	SSW5.8	SW12	
14-Nov	SW8	S3	S3	WSW2	SW5	SSE1	SSW2	SSW2	S3	SSE3	S4	S6	SW7	SW9	SW6	SW3	WSW4	WSW3	SW3	WSW3	WNW1	W1	SW2	SW2	SW3.2	SW9	
15-Nov	WSW1	SW2	SSW2	SW1	W1	NW1	WSW1	WSW1	W1	NNW3	N4	NNW5	N6	N6	N8	N8	N10	N11	N10	N9	N9	N8	N6	NNW5	N4.3	N11	
16-Nov	N6	NNW5	N6	NNW5	NNW4	WNW4	WNW3	WSW4	W8	WSW8	W7	W9	W8	WSW7	WSW7	WSW5	S3	SSW6	SSW5	S5	SSW2	WSW3	SW2	WSW2	W3.6	W9	
17-Nov	SSW1	SW1	NNW1	SSW3	NE2	S4	S8	S6	S8	S8	SSE6	SSE6	SSW8	SSW8	SSW8	WSW7	SW4	W4	WNW6	WNW6	WSW8	WSW10	WSW9	WSW7	SW4.2	WSW10	
18-Nov	WSW8	WSW8	NW6	NW5	NW7	NW6	NNW8	NNW10	NW7	NNW8	NNW11	NNW11	N9	NNW8	N7	N6	WNW2	NW2	WSW3	WSW3	W2	W1	S1	SW1	NW4.8	NNW11	
19-Nov	SSW2	WSW2	SW2	SW2	WSW2	SW1	WSW1	NW0	SSW2	S3	SSE1	NE3	NE3	NNE4	N4	NNW3	NW3	W2	WSW2	WSW1	SW1	W1	NW1	WSW1	WNW0.7	N4	
20-Nov	SSW1	SW1	W1	W2	S1	W3	WSW6	WSW6	WSW6	WSW6	WSW6	SW6	S9	SSW8	S5	S5	S5	S6	S7	S7	S8	S7	S4	S2	SSW4.1	S9	
21-Nov	W1	WSW5	WSW6	SE2	SW4	SSW6	S3	SSW2	SW2	SW2	SSW1	SW5	SSW5	SSW6	SSW6	S5	S3	S2	SSW5	SSW5	S4	SSW3	SSW3	SSW4	SSW3.6	SSW6	
22-Nov	S2	SW5	WSW9	WSW9	WSW8	WSW6	W5	WSW5	WNW6	N5	N3	NNE5	NNE5	NNE7	N5	NNE6	NNE7	NNE7	NE6	NNE5	N6	NNE6	NNE6	N6	NNW2.8	WSW9	
23-Nov	N5	N4	N4	NW3	NW3	NW2	NW2	WNW1	N2	NNW2	N4	N5	N5	N4	N6	N5	N6	N6	N6	N7	N7	N6	N7	N6	N4.3	N7	
24-Nov	NNW4	NNW4	NNW4	NNW5	NNW6	NNW6	NNW4	NW3	W3	WSW4	SSW1	SSW2	NNE5	N3	NW3	WSW2	WNW2	SSW1	SSW1	S2	SSW1	SSW3	SSW5	SSW6	NW1.6	NNW6	
25-Nov	SSW6	S5	S5	SSW5	S5	WSW1	S1	S2	S2	SSE2	ESE2	SSE3	S4	S5	S3	SSW2	SW2	SW2	WSW2	WSW2	SW2	WSW2	SSW2	SSW2	SSW2	SSW2.5	SSW6
26-Nov	SW2	SW2	S3	S3	S5	S5	S4	S4	S5	S4	S4	SSE4	SSE5	SSE3	SSW6	SSW8	S4	S4	S3	S3	S3	SSW3	SSW3	SSW2	S3.7	SSW8	
27-Nov	S3	SSW2	SSE3	W1	S3	SSW3	S4	S3	SSW3	SW6	M	DF	DF	DF	DF	DF	DF	DF	S3	SSW3	S4	SSW2	S3	WSW1	----	SW6	
28-Nov	S3	S3	S3	S4	SSW3	S2	SSW2	SSW2	S3	S4	S4	SSE3	SSE4	S5	S4	S3	S3	S4	S3	S3	S3	S2	S2	SSW2	S3.1	S5	
29-Nov	SSW1	SW2	SSW2	SSW2	S2	S3	S2	S3	SSW3	S4	S2	SSE3	SSE4	S4	S4	S4	S4	S3	SSW3	S4	S5	S6	S4	SSW3	S3.1	S6	
30-Nov	S4	S2	SSW3	S4	SSW4	S3	S3	S3	SW1	WNW1	WNW1	S4	S4	SSE4	S3	SW2	SSW3	SSW3	SW2	SW4	WSW0	SSW2	SW3	SSW3	SSW2.5	S4	

SW1.5 SW1.6 SW1.3WSW1.3WSW1.3 SW1.6 SW1.8WSW1.8 SW1.8 SW1.5 SW1.0 SW1.3 SW1.5 SW1.6 SW1.4WSW1.3 SW0.9 SW1.2 SW1.5SSW1.8SSW1.8SSW2.0SSW2.4 SW2.1	Diurnal Average
SSE9 WSW8 WSW9 WSW9 N8 SSW10WSW12WSW12WSW10 S10 S12 N11 WSW12WSW14 SW10 S9 N10 N11 S11 N9 WSW10WSW10 SSE9 S10	Diurnal Maximum

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

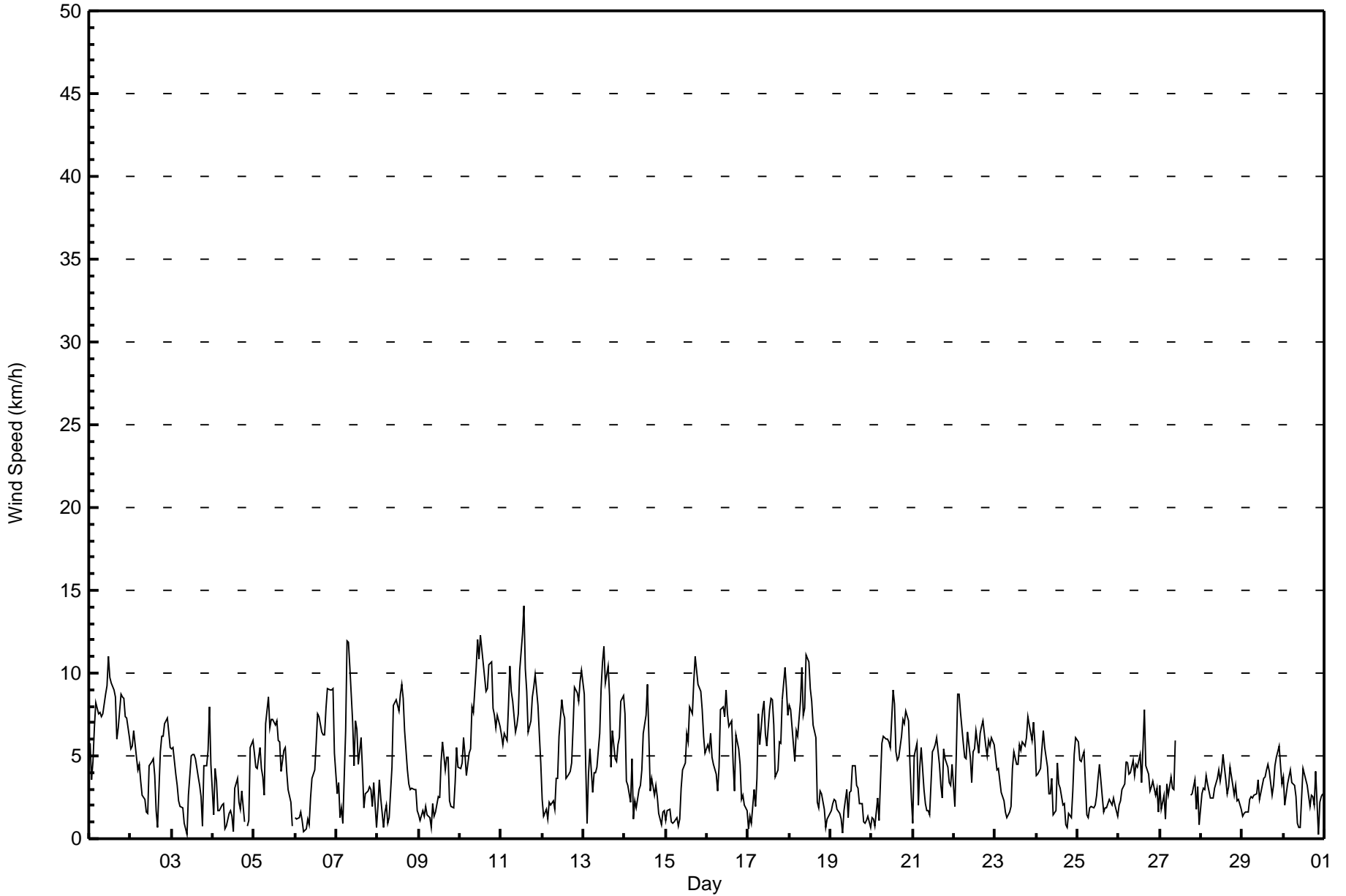


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 5 km/h on Nov 11 14:00	Hours of Data: 710
Minimum Value: 0 km/h on Nov 30 18:00	Hours of Missing Data: 10
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 4	Hours of Calibration: 0
	Percent Operational Time: 98.6

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-Nov	2	2	1	2	3	2	2	2	2	3	3	3	3	3	3	3	2	2	3	3	3	2	2	2	3
2-Nov	2	2	2	2	1	2	1	1	1	1	1	2	2	2	2	1	1	3	2	2	3	3	2	2	3
3-Nov	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	3	1	2	2	2	3
4-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	AF	1	1	2	2	2
5-Nov	2	2	2	2	2	1	1	3	3	2	2	3	2	2	2	2	2	2	2	2	1	1	1	AF	3
6-Nov	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	2	3	3	3	3	3	2	3
7-Nov	1	2	1	1	1	2	3	3	4	4	4	4	4	3	2	2	1	1	1	1	2	2	1	1	4
8-Nov	1	3	2	1	1	1	1	1	2	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	3
9-Nov	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	0	1	1	2	1	2
10-Nov	1	2	2	1	1	2	1	2	2	4	4	4	4	4	3	3	3	4	3	3	2	2	2	2	4
11-Nov	2	1	2	2	4	4	3	2	1	2	2	4	5	5	4	3	2	2	3	3	3	3	1	2	5
12-Nov	1	1	2	1	1	1	1	1	1	1	2	3	3	3	2	1	1	2	3	3	3	3	4	4	4
13-Nov	3	3	1	1	2	1	1	1	1	2	3	4	4	4	4	3	1	2	2	2	1	1	2	2	4
14-Nov	2	2	1	3	2	2	1	1	1	1	2	2	3	3	2	1	1	1	1	1	1	1	1	1	3
15-Nov	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	2	2	3
16-Nov	1	2	2	1	1	1	2	1	3	3	3	4	3	3	3	2	1	2	1	1	1	1	1	1	4
17-Nov	1	1	1	2	2	3	3	2	2	3	2	2	3	3	3	3	2	2	3	3	3	4	3	3	4
18-Nov	3	2	2	2	3	3	4	4	3	4	5	4	4	3	3	3	1	1	1	1	2	1	1	1	5
19-Nov	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	2
20-Nov	1	1	1	1	1	2	2	2	2	2	2	2	3	3	2	2	2	2	3	2	3	2	2	2	3
21-Nov	1	5	3	1	3	3	1	1	1	1	2	3	2	2	2	1	1	1	1	2	2	2	2	2	5
22-Nov	2	1	2	2	2	2	2	2	3	2	1	3	2	2	2	2	2	2	2	2	2	1	2	2	3
23-Nov	2	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	3	3	2	2	2	3
24-Nov	1	1	2	2	2	2	2	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	2	2	2
25-Nov	2	2	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2
26-Nov	1	1	1	1	1	1	1	1	1	1	1	2	2	1	3	2	2	1	1	1	1	1	1	1	3
27-Nov	2	2	1	1	1	1	1	1	1	2	M	DF	DF	DF	DF	DF	DF	DF	DF	1	1	1	1	1	2
28-Nov	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	2
29-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2
30-Nov	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0	1	2	1	1	1	0	2

3	5	3	3	4	4	4	4	4	4	4	5	4	5	5	4	3	3	4	3	3	3	4	4	4	
Diurnal Maximum																									

M - Maintenance DF - DAS Failure AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	471	66.34	66.34
6 - 11	232	32.68	99.01
12 - 19	7	0.99	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: 710

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	31	13	7	2	2	1	8	29	125	77	49	41	20	15	22	29	471
6 - 11	54	14	1	0	0	0	0	20	45	22	20	30	4	4	4	14	232
12 - 19	0	0	0	0	0	0	0	0	2	0	1	4	0	0	0	0	7
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	85	27	8	2	2	1	8	49	172	99	70	75	24	19	26	43	710

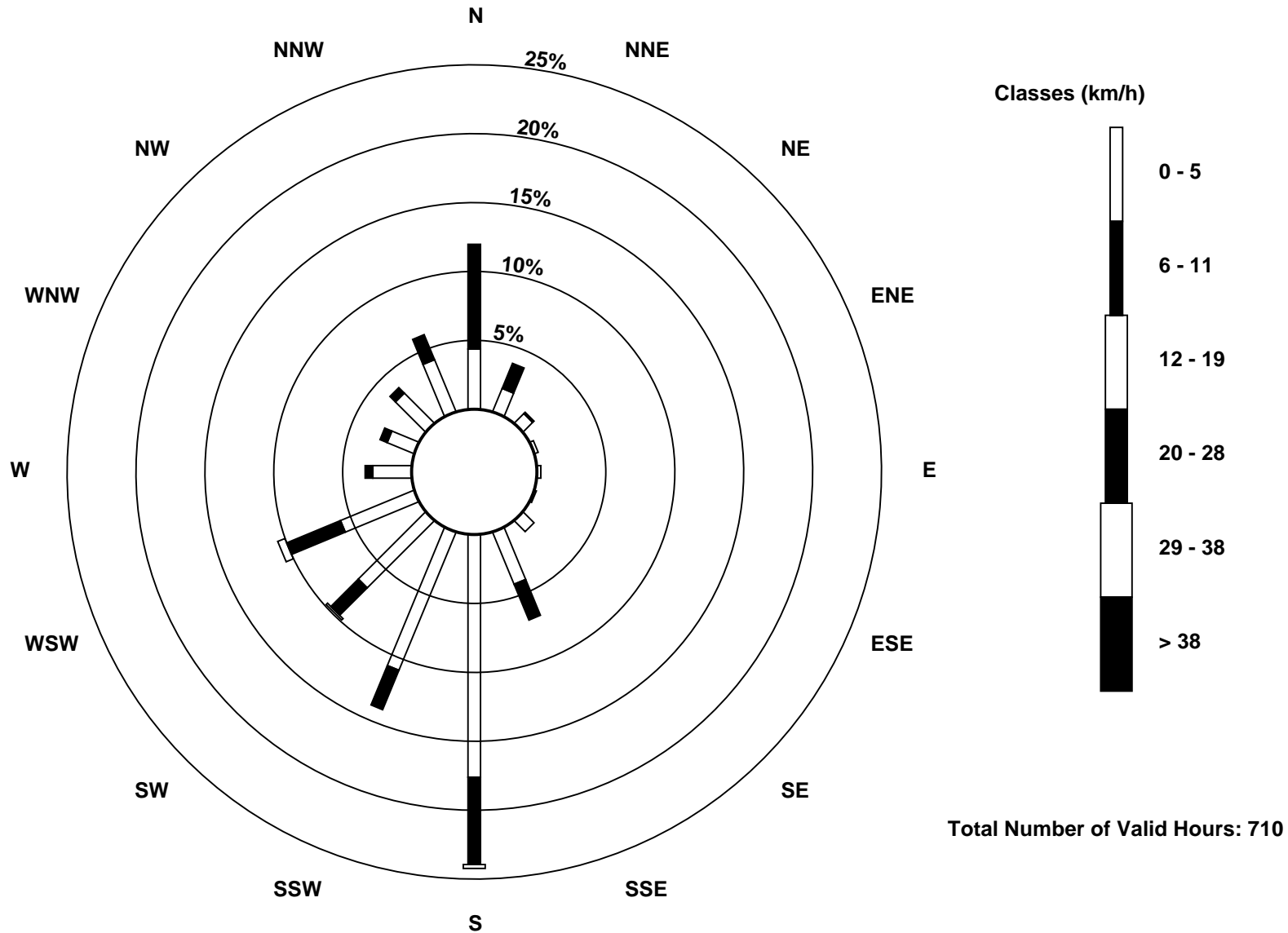
Total Number of Valid Hours: 710

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay South - November 2015

Direction of Maximum Speed: 246 deg on Nov 11 14:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 181.2 deg on Nov 10		Hours of Data:	710
Direction of Minimum Speed: 137 deg on Nov 3 10:00		Hours of Missing Data:	10
Direction of Minimum Daily Speed Average: 0.7 deg on Nov 4		Percent Operational Time:	98.6
Monthly Average Direction: 234.4 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-Nov	32	21	12	6	9	7	2	4	9	5	7	5	14	27	16	4	8	1	5	3	4	359	353	355	7.6	
2-Nov	335	345	5	6	17	58	65	49	40	21	125	136	138	156	145	138	353	159	168	172	170	167	168	171	127.2	
3-Nov	177	176	176	174	178	170	178	186	191	137	9	6	359	350	351	350	343	350	304	253	237	236	245	220	253.9	
4-Nov	225	199	190	210	198	184	222	240	26	351	44	43	87	4	17	6	1	349	332	AF	264	178	255	268	271.5	
5-Nov	280	309	294	293	301	316	333	360	2	353	353	336	340	9	348	342	327	345	347	348	344	333	303	AF	337.1	
6-Nov	220	194	206	185	173	180	157	168	195	184	200	176	164	163	165	164	163	167	165	169	175	170	172	169	171.0	
7-Nov	202	198	233	256	306	243	249	249	241	249	227	236	233	223	233	226	241	245	225	197	217	212	232	244	235.9	
8-Nov	234	265	249	148	5	324	325	329	0	15	28	21	18	10	9	8	3	13	2	346	337	340	346	316	1.7	
9-Nov	321	310	299	304	298	293	295	267	214	239	185	174	150	201	209	202	205	205	216	184	194	163	174	176	204.8	
10-Nov	176	181	177	182	174	169	184	187	185	184	187	184	188	184	179	180	178	181	181	178	177	177	181	176	181.2	
11-Nov	180	178	177	163	182	198	201	199	187	192	219	240	250	246	224	222	208	215	241	246	250	225	207	188	215.2	
12-Nov	147	166	229	260	256	252	227	230	189	167	181	186	167	164	155	169	173	166	160	175	165	166	167	170	174.7	
13-Nov	161	146	89	167	166	169	194	194	197	188	202	225	227	229	234	230	213	224	211	201	198	197	217	225	206.6	
14-Nov	236	188	186	247	234	168	192	193	171	163	173	187	227	232	215	217	237	241	236	238	289	263	225	222	215.7	
15-Nov	243	234	202	214	264	316	251	245	277	342	350	347	352	358	360	356	4	0	360	8	1	3	353	346	353.4	
16-Nov	349	338	354	341	335	287	282	246	259	247	261	275	270	244	241	238	188	209	201	190	201	248	236	254	262.6	
17-Nov	209	221	347	199	54	180	170	183	177	171	155	164	199	212	203	245	215	265	287	287	250	256	258	255	217.4	
18-Nov	256	253	308	325	315	307	329	328	324	331	339	348	351	340	350	352	299	307	245	253	276	279	184	234	319.9	
19-Nov	202	238	220	233	247	235	258	322	207	181	156	42	44	18	4	343	308	281	247	240	224	272	317	253	282.9	
20-Nov	196	224	269	260	175	272	253	258	253	250	244	220	190	195	169	172	176	171	173	173	173	175	171	188	202.1	
21-Nov	279	243	237	136	225	208	191	200	230	214	199	228	207	197	195	187	182	181	193	202	180	206	196	209	205.2	
22-Nov	185	218	241	246	250	254	264	255	284	356	7	12	15	13	11	19	16	30	37	19	11	12	15	4	338.0	
23-Nov	358	354	352	316	319	309	307	289	350	333	3	357	353	360	7	8	358	355	355	2	358	352	1	359	353.8	
24-Nov	348	342	339	335	341	344	342	307	264	254	192	201	14	10	318	258	300	211	213	187	203	193	202	212	306.5	
25-Nov	204	190	184	194	190	237	185	190	170	153	122	168	173	181	181	197	226	232	242	239	236	196	200	218	193.8	
26-Nov	230	215	190	190	191	189	191	188	191	185	181	162	168	162	202	203	170	174	185	185	182	199	196	208	187.6	
27-Nov	183	202	161	259	178	205	172	181	207	218	M	DF	DF	DF	DF	DF	DF	DF	DF	182	200	185	196	179	239	--
28-Nov	185	175	182	181	192	191	193	200	189	186	184	159	162	170	173	177	181	184	182	183	184	187	183	199	181.4	
29-Nov	204	231	204	205	187	186	191	189	195	188	183	158	156	174	173	190	190	191	196	189	182	188	189	192	186.5	
30-Nov	189	178	192	189	198	188	190	185	228	292	294	179	169	167	177	218	195	201	216	214	258	204	221	200	194.0	

220.4	225.2	234.4	237.7	239.2	235.7	230.8	236.3	235.5	229.1	224.3	232.1	222.2	221.9	228.5	242.0	227.9	219.5	215.0	212.6	211.2	208.4	212.2	216.6
Diurnal Average																							

M - Maintenance DF - DAS Failure 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 - November 2015

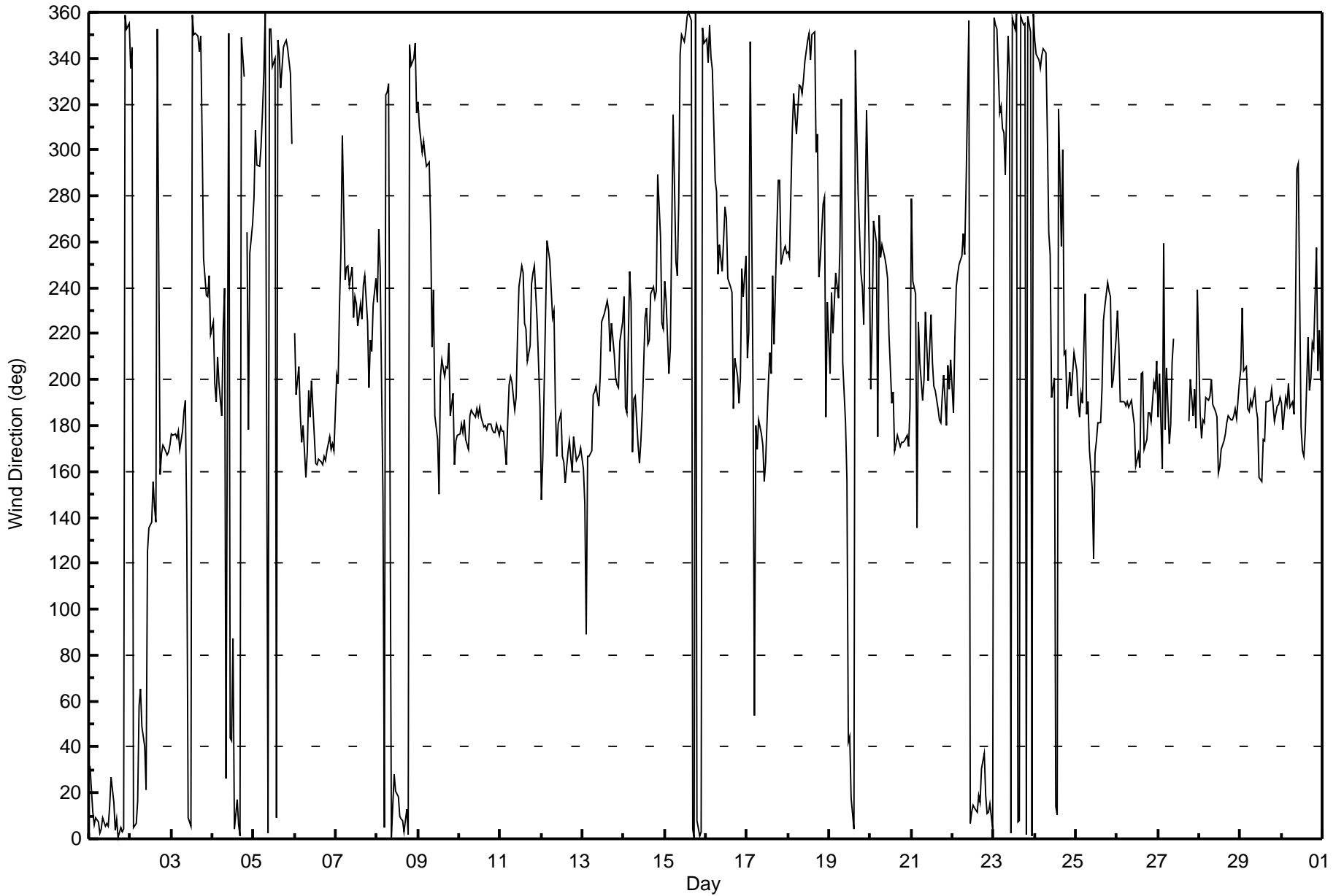
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 98 deg on Nov 3 10:00	Hours of Data: 710
Minimum Value: 8 deg on Nov 14 19:00	Hours of Missing Data: 10
Percentiles: P ₁ = 11 P ₁₀ = 17 Q ₁ = 21 Median = 25 Q ₃ = 32 P ₉₀ = 53 P ₉₉ = 89	Hours of Calibration: 0
	Percent Operational Time: 98.6

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-Nov	29	25	29	25	23	24	23	24	24	25	25	24	25	26	26	22	24	24	25	24	24	23	24	24	29
2-Nov	29	34	23	27	31	34	36	33	30	59	67	43	38	32	36	58	82	30	28	27	27	26	28	26	82
3-Nov	23	25	20	25	17	20	21	67	87	98	30	27	25	28	25	27	24	26	35	23	23	20	18	30	98
4-Nov	55	14	14	26	27	23	25	79	77	67	85	73	90	19	19	34	73	22	60	AF	81	84	28	22	90
5-Nov	29	31	32	28	31	28	37	23	25	26	30	31	31	30	32	29	35	29	28	27	27	39	AF	39	
6-Nov	16	50	15	18	21	51	73	40	51	25	30	31	30	26	28	27	24	28	27	29	26	26	25	22	73
7-Nov	24	17	79	32	62	17	17	19	22	46	72	38	30	33	29	27	36	32	21	30	72	79	36	89	89
8-Nov	66	82	71	92	45	43	60	48	18	23	26	25	24	24	25	26	26	23	28	24	22	21	24	18	92
9-Nov	21	29	16	29	27	48	64	67	44	42	30	41	43	34	28	23	20	24	24	17	33	26	20	23	67
10-Nov	17	16	18	17	24	21	15	17	18	21	23	25	25	23	22	19	20	21	21	22	19	18	18	22	25
11-Nov	20	18	21	25	23	22	21	19	14	17	29	25	27	27	23	22	17	19	22	22	22	19	15	20	29
12-Nov	25	46	55	55	31	45	25	56	21	23	28	25	26	29	29	20	19	26	26	26	25	27	27	26	56
13-Nov	27	36	79	26	22	41	22	21	19	15	25	26	26	27	24	23	18	18	25	15	15	15	16	17	79
14-Nov	20	53	45	90	35	77	20	32	22	22	31	29	32	23	23	25	10	18	8	25	41	71	59	31	90
15-Nov	52	30	39	60	47	49	35	56	46	19	24	24	24	26	23	22	23	24	25	23	22	23	23	23	60
16-Nov	21	26	24	25	27	31	36	25	26	22	28	34	35	28	25	31	26	19	17	14	30	14	37	49	49
17-Nov	93	70	66	63	68	30	26	20	21	22	25	31	24	24	20	36	23	27	37	37	20	25	27	29	93
18-Nov	21	19	37	29	31	36	34	30	31	34	32	30	29	30	26	28	28	43	15	43	78	60	34	23	78
19-Nov	34	13	29	17	23	41	42	50	18	17	86	27	46	28	21	15	16	30	13	30	40	47	41	58	86
20-Nov	54	32	67	44	55	41	22	20	16	17	26	35	26	23	28	22	20	25	26	25	23	21	22	60	67
21-Nov	67	95	31	55	46	32	22	32	32	52	58	54	36	24	19	17	15	30	16	27	19	56	53	41	95
22-Nov	78	21	15	16	17	23	29	22	32	32	27	31	24	21	25	24	21	28	27	23	22	21	23	25	78
23-Nov	24	27	24	26	24	25	29	52	28	34	23	27	24	26	21	24	26	25	24	24	24	23	23	23	52
24-Nov	23	22	28	28	27	28	29	35	22	18	52	52	26	34	41	29	43	73	67	21	41	12	17	18	73
25-Nov	17	15	12	10	14	53	58	31	19	31	37	32	24	25	25	28	19	41	9	20	21	23	22	46	58
26-Nov	15	22	13	14	12	14	14	13	15	17	19	26	25	24	27	20	21	16	21	18	11	23	23	44	44
27-Nov	42	96	29	63	32	30	24	40	45	28	M	DF	DF	DF	DF	DF	DF	DF	25	19	19	27	18	50	96
28-Nov	18	14	29	19	16	25	22	56	31	16	15	25	26	22	20	11	12	11	11	15	14	24	16	24	56
29-Nov	68	42	27	52	21	22	22	13	29	16	23	29	33	21	20	14	14	21	14	12	10	12	14	13	68
30-Nov	13	20	14	10	13	10	11	17	46	59	59	18	30	25	18	40	28	24	49	40	93	33	22	18	93

93	96	79	92	68	77	73	79	87	98	86	73	90	34	41	58	82	73	67	43	93	84	59	89	
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	--

Diurnal Maximum

M - Maintenance DF - DAS Failure AF - Analyzer Failure





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 18, 2015	Last Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:40	End Time (MST)	8:25
Gas Cert Reference	S980455A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	547	547
Analyzer IP address	192.168.1.44		Lamp voltage	1736	1705
Calculated slope	1.004741	1.005435	Box temp	31.5	30.5
Calculated intercept	-0.076419	-0.201087	Pressure	25.9	26.0
Analyzer Background	42.1	42.1	Flow	676	678
Analyzer Coefficient	1.022	1.022	Lamp Ratio	59	58

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	0.2	----
as found span	5000	70.3	703.0	699.4	1.005
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	70.3	703.0	699.4	1.005
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.005

Corrected As found 699.2 Previous response 699.8 % change 0.1%

Notes:

New Cal Gas change out; this calibration reflects as found conditions from original cylinder.

Calibration Performed By: Melissa Lemay



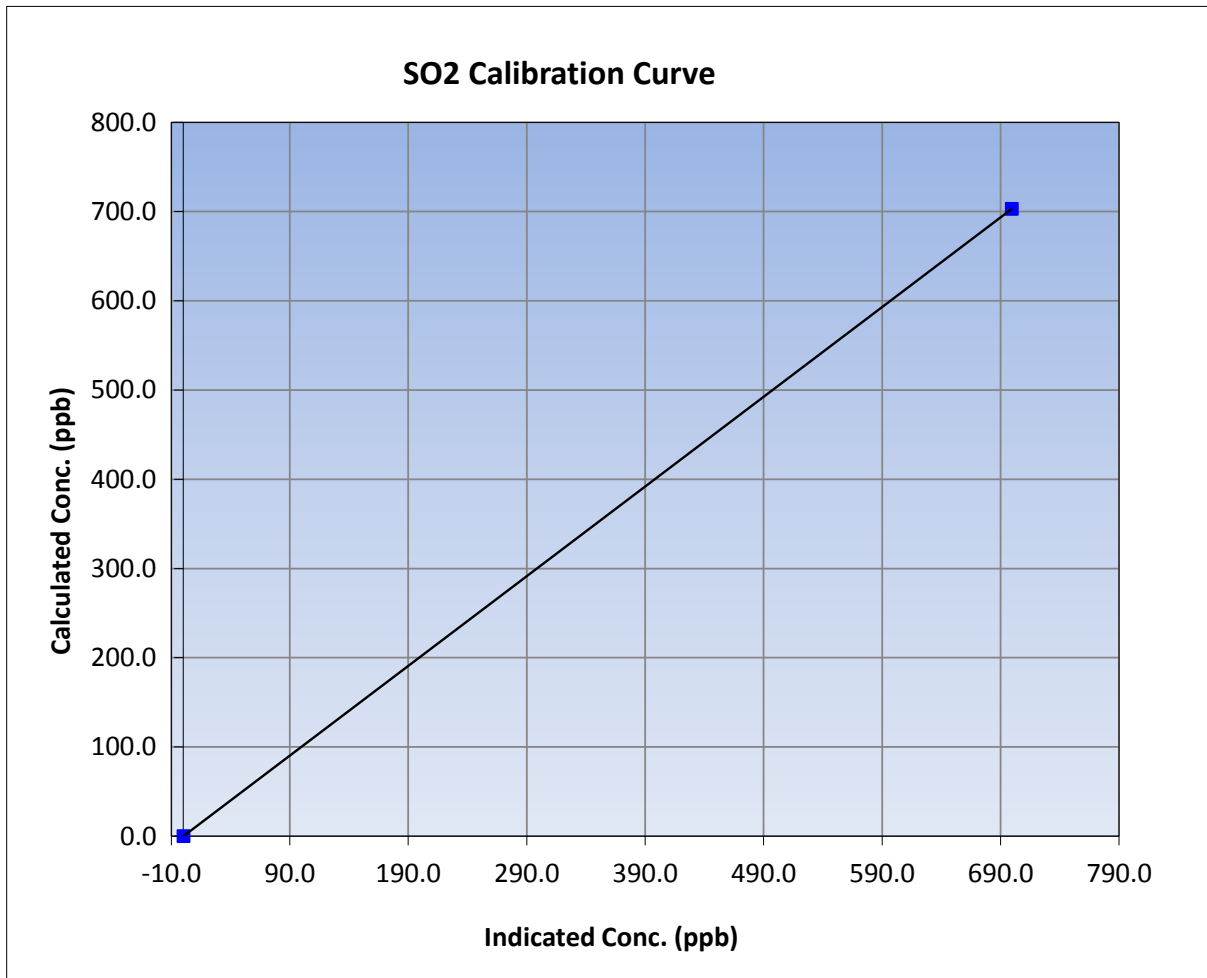
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:40	End Time (MST)	8:25
Analyzer make	API T100	Analyzer serial #	599

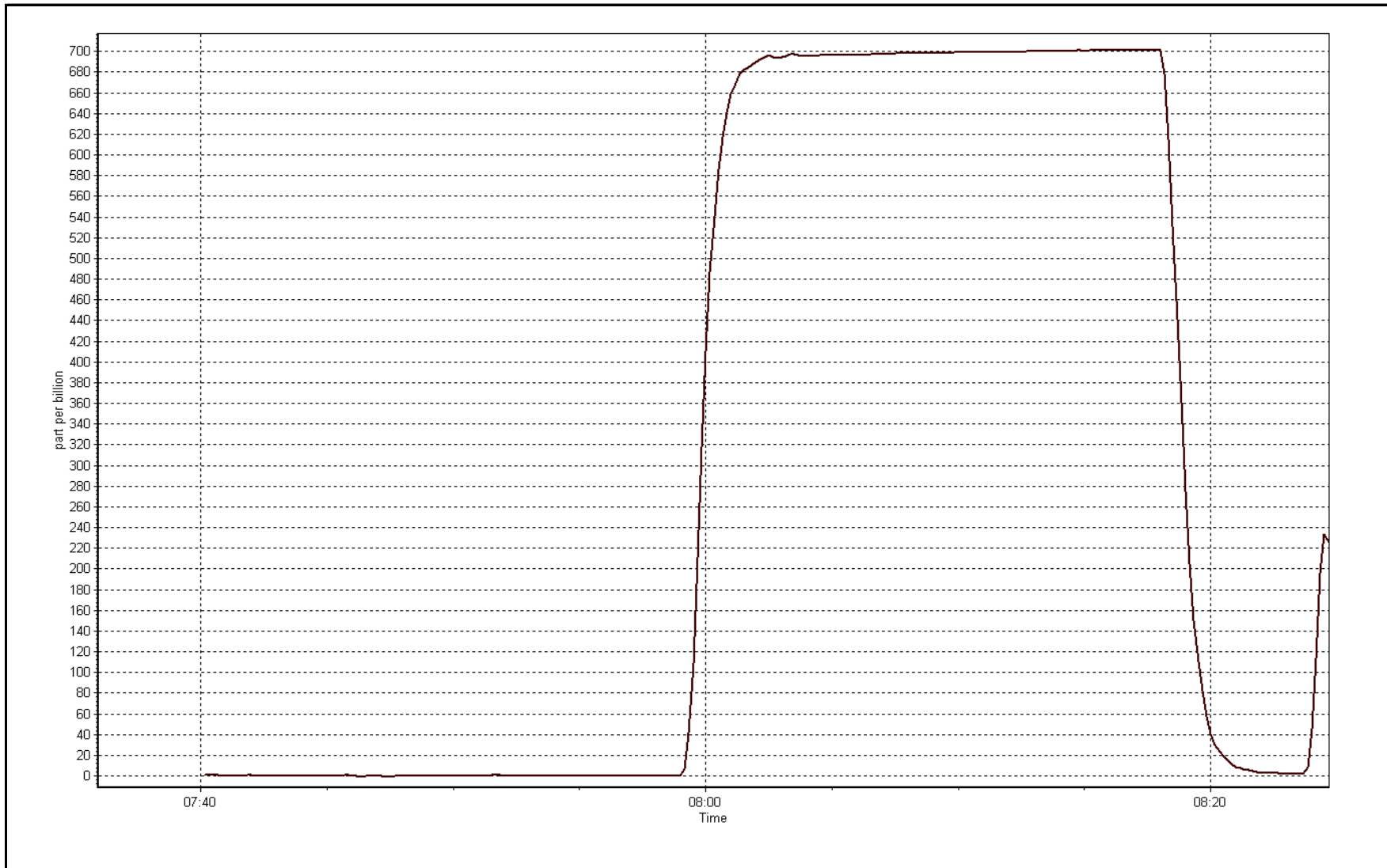
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	1.000000
703.0	699.4	1.0051		
			Slope	1.005435
			Intercept	-0.201087



SO2 Calibration Plot

Date: November 18, 2015





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 18, 2015	Last Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:30
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

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	547	547
Analyzer IP address	192.168.1.44		Lamp voltage	1736	1705
Calculated slope	1.005435	0.999701	Box temp	31.5	30.5
Calculated intercept	-0.201087	2.179682	Pressure	25.9	26.0
Analyzer Background	42.1	42.1	Flow	676	678
Analyzer Coefficient	1.022	0.953	Lamp Ratio	59	58

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	0.6	----
as found span	5000	78.9	785.8	845.1	0.930
calibrator zero	5000	0.0	0.0	0.6	----
high point	5000	78.9	785.8	785.5	1.000
second point	5000	39.4	392.4	388.2	1.011
third point	5000	19.7	196.2	191.9	1.022
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	78.9	785.8	775.8	1.013
Average Correction Factor					1.011

Corrected As found 844.5 Previous response 781.8 % change -7.4%

Notes:

Span adjusted, Cal gas changed out, filter changed out

Calibration Performed By: Melissa Lemay



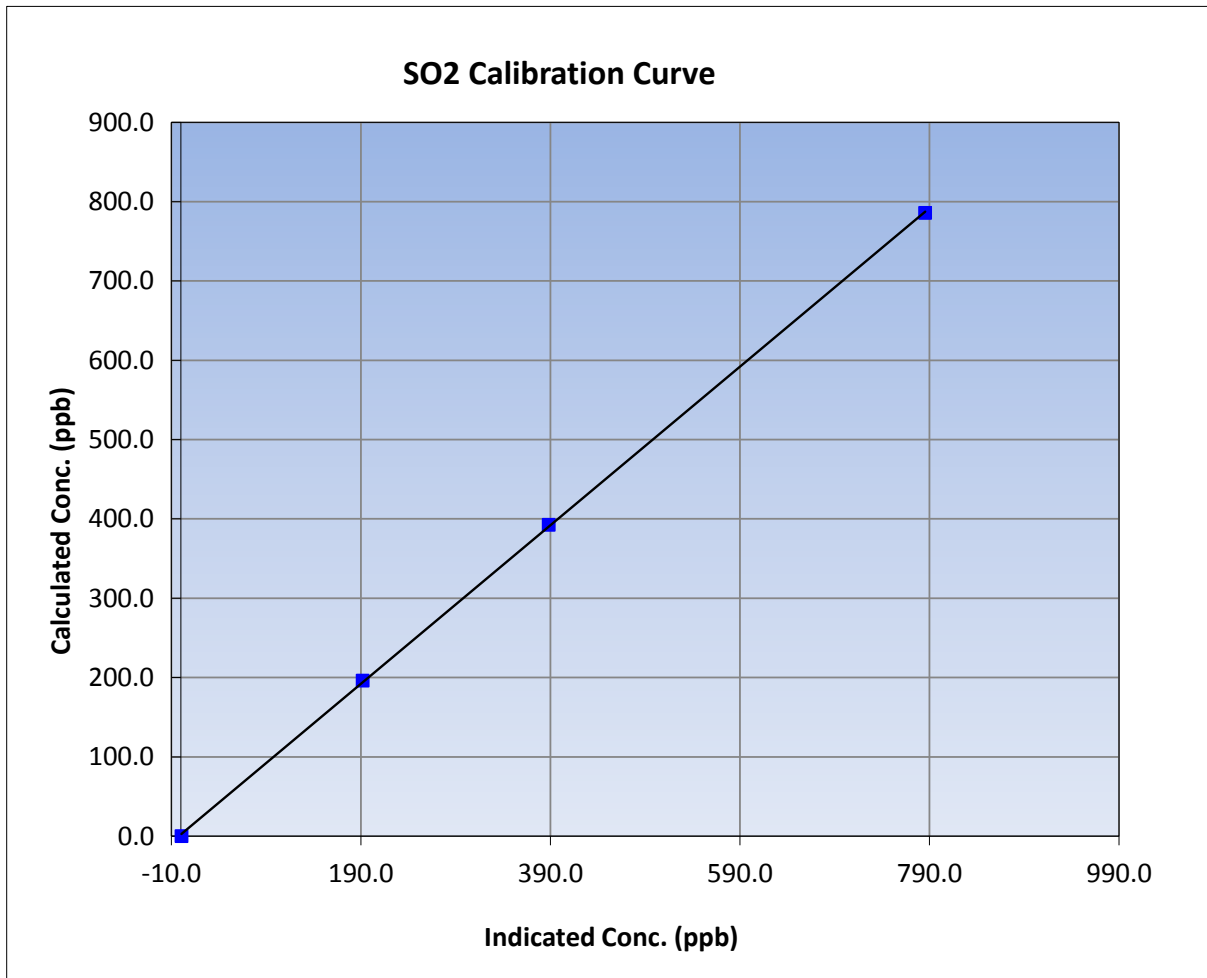
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	12:30
Analyzer make	API T100	Analyzer serial #	599

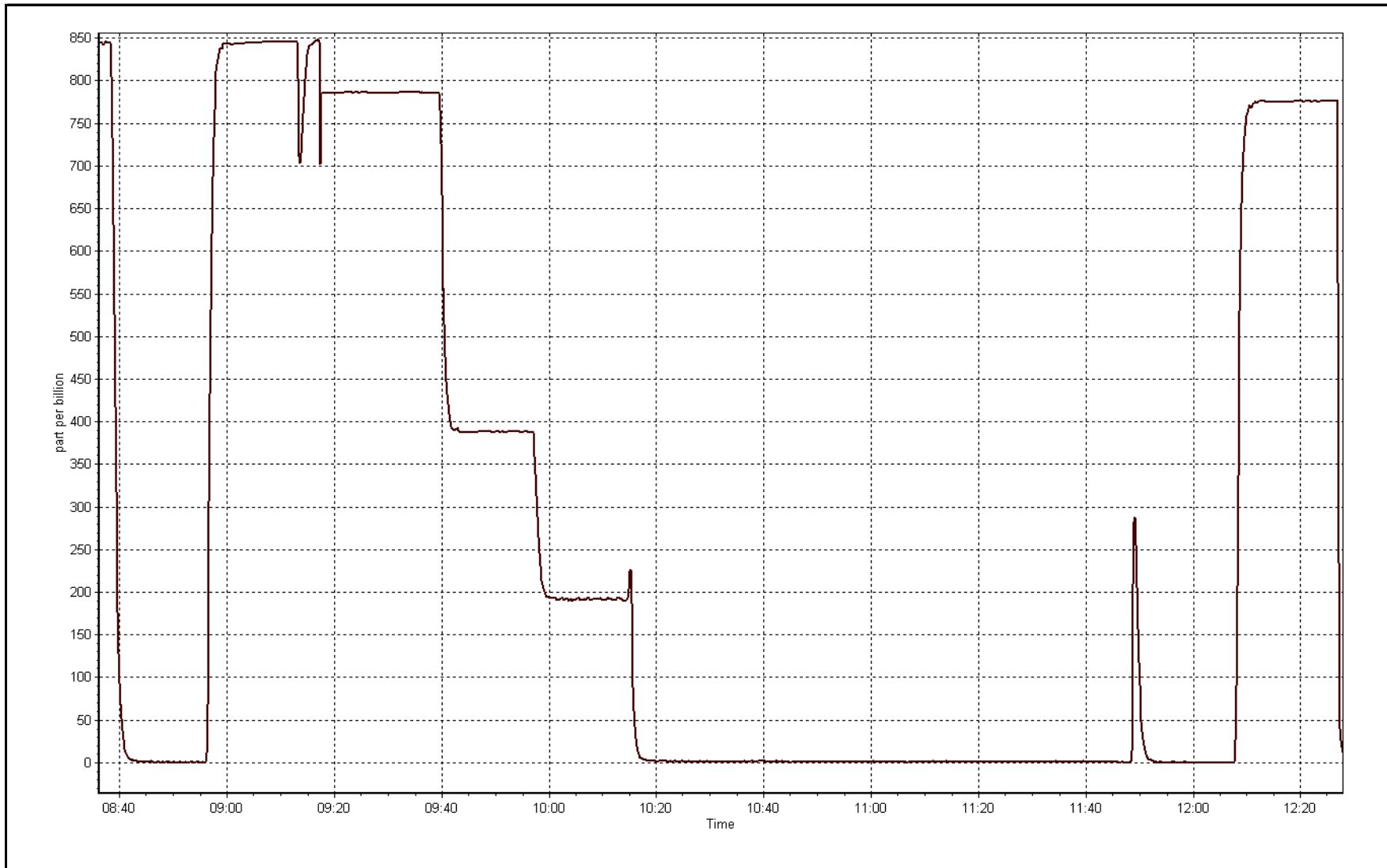
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999942
785.8	785.5	1.0004		
392.4	388.2	1.0109	Slope	0.999701
196.2	191.9	1.0225		
			Intercept	2.179682



SO2 Calibration Plot

Date: November 18, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	November 4, 2015	Last Calibration	October 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	12:31
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	999	998
Calculated slope	0.985238	0.984149	Chamber temp	45	45
Calculated intercept	0.265667	0.429533	Pressure	693.2	687.5
Analyzer Background	2.13	2.13	Flow	0.453	0.451
Analyzer Coefficient	1.038	1.038	Intensity	90	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	78.9	80.0	80.9	0.989
SO2 scrubber check	5000	17.6	179.9	0.2	----
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	78.9	80.0	80.9	0.989
second point	5000	39.4	40.0	40.2	0.994
third point	5000	19.7	20.0	19.6	1.019
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	78.9	80.0	80.8	0.990
Average Correction Factor					1.001

Corrected As found	81.2	Previous response	80.9	% change	-0.3%
--------------------	------	-------------------	------	----------	-------

Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



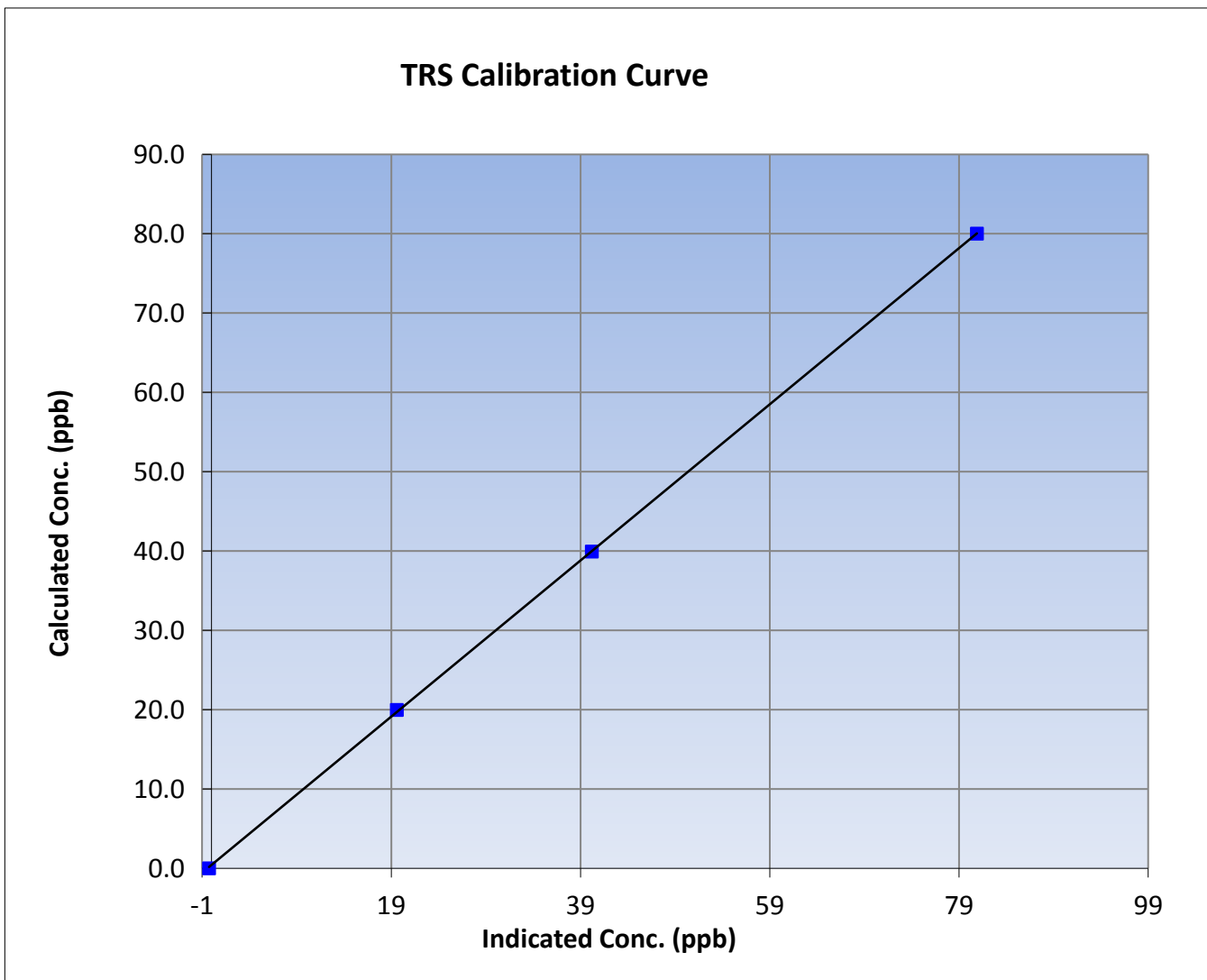
Wood Buffalo Environmental Association TRS Calibration Report

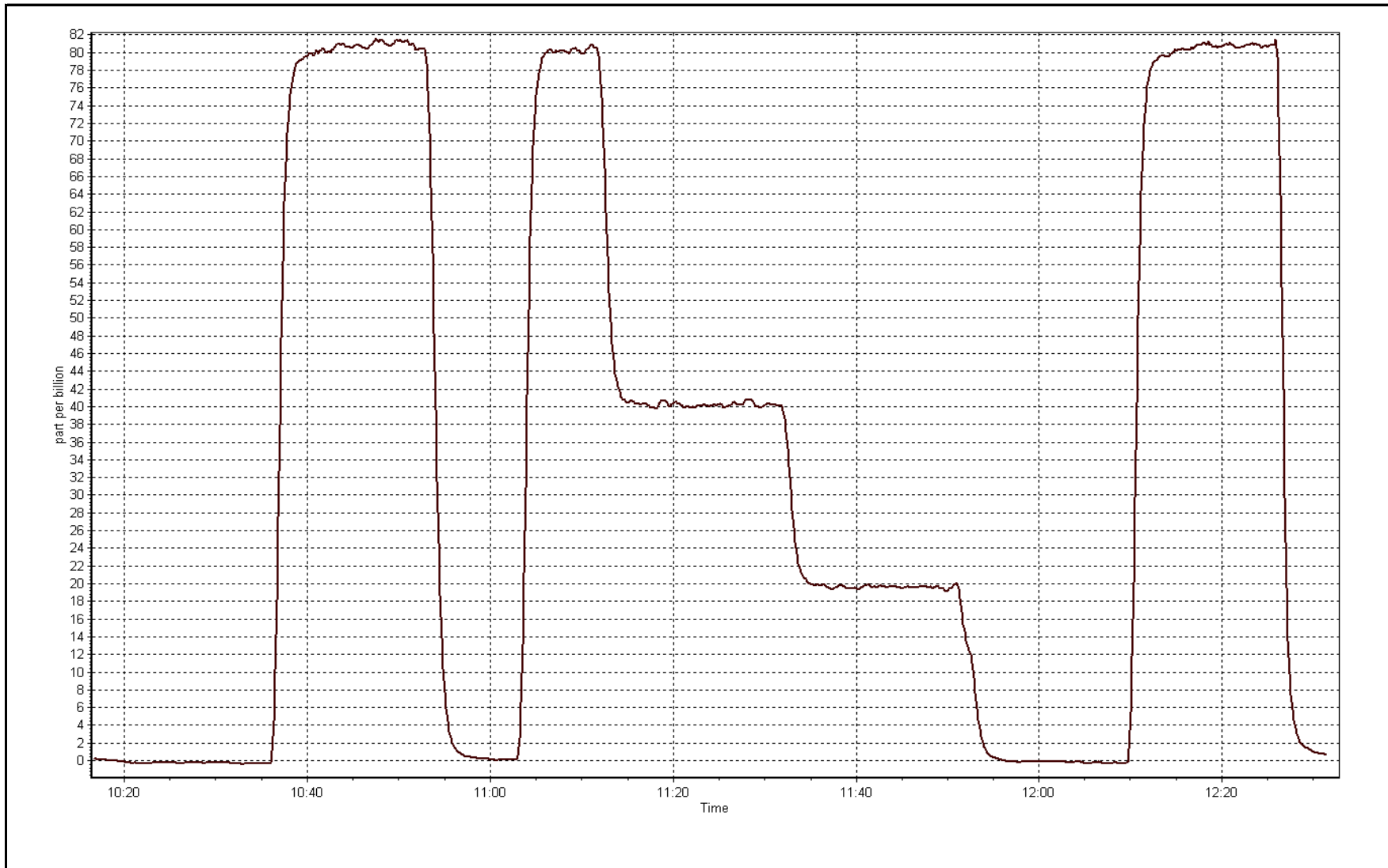
Station Information

Calibration Date	November 4, 2015	Previous Calibration	October 7, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:15	End Time (MST)	12:31
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999972
80.0	80.9	0.9889		
40.0	40.2	0.9938	Slope	0.984149
20.0	19.6	1.0192		
			Intercept	0.429533







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-18-15	Last Calibration	October-22-15
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:40	End Time (MST)	8:25
Gas Cert Reference	S980455A	Cal Gas Expiry Date	26/09/2017
CH4 Cal Gas Conc.	497 ppm	CH4 Equiv Conc.	1033.3 ppm
C3H8 Cal Gas Conc.	195 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.2	34.2
Calculated slope	0.999288	1.006059	Fuel Pressure	23.1	23.1
Calculated intercept	0.004012	0.040242	Analyzer Coeff	2.970	2.970
			Analyzer BKG	1.330	1.330

Analyzer make 51i-LT Analyzer serial # 1505164380

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.04	----
as found span	5000	70.3	14.53	14.40	1.009
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	70.3	14.53	14.40	1.009
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.009

Corrected As found 14.44 Previous response 14.53 % change 0.6%

Notes:

As found data capture prior to installation of new calibration gas.

Calibration Performed By:

Melissa Lemay



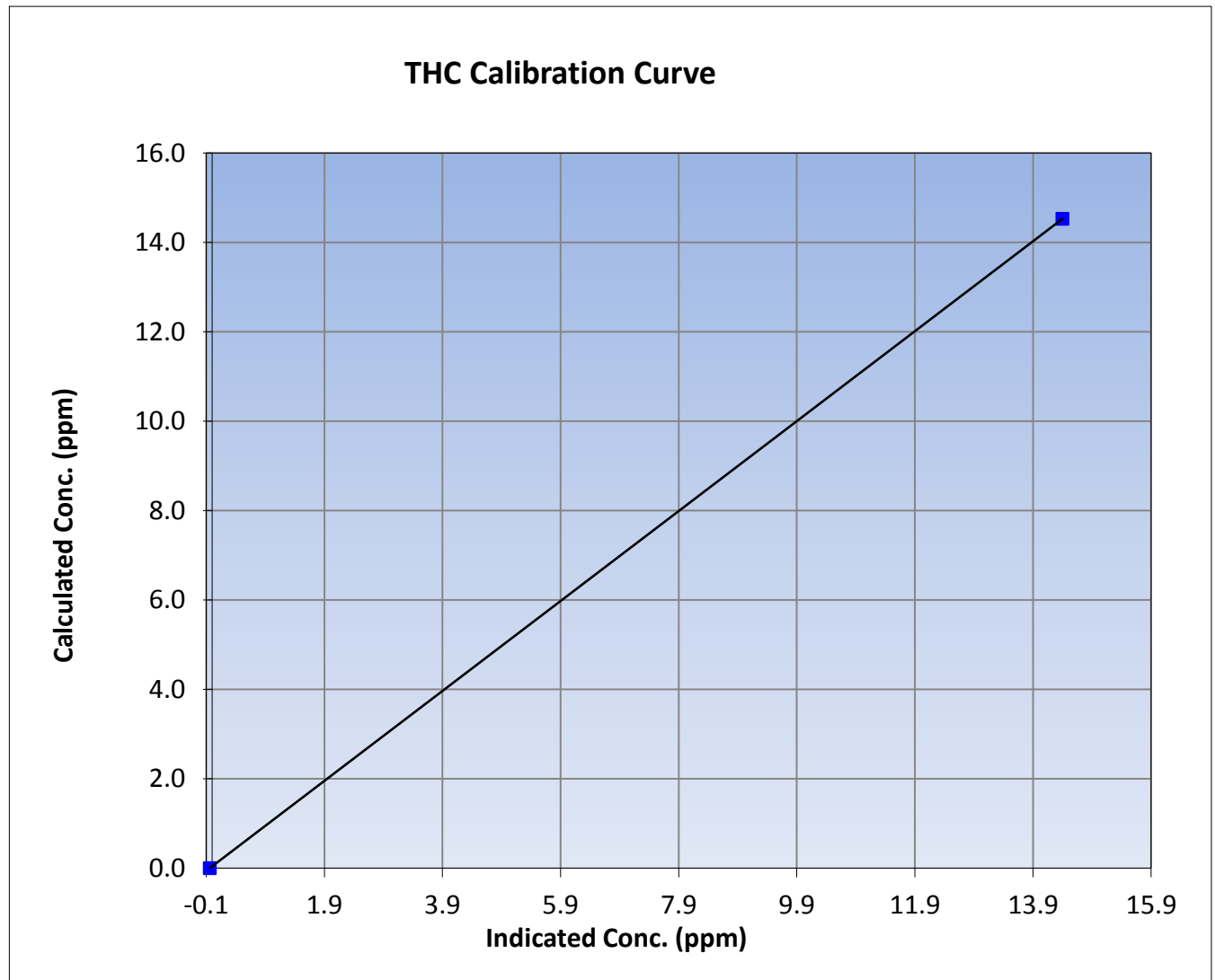
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:40	End Time (MST)	8:25
Analyzer make	51i-LT	Analyzer serial #	1505164380

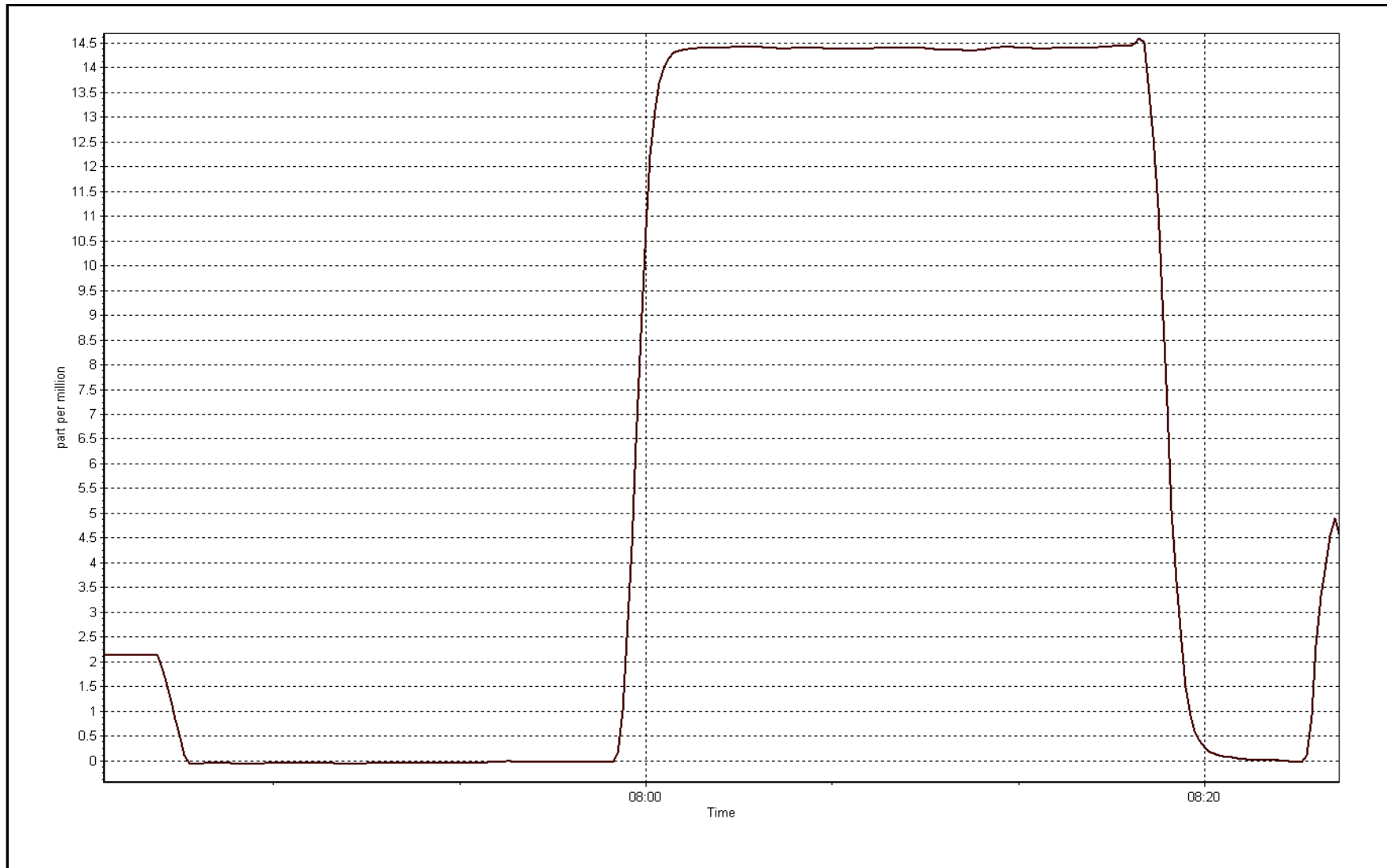
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	1.000000
14.53	14.40	1.0089		
			Slope	1.006059
			Intercept	0.040242



THC Calibration Plot

Date: November 18, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-18-15	Last Calibration	October-22-15
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:30
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	1.006059	0.997821	Fuel Pressure	23.1	23.1
Calculated intercept	0.042420	0.055758	Analyzer Coeff	2.970	3.107
			Analyzer BKG	1.330	1.390

Analyzer make	51i-LT	Analyzer serial #	1505164380
---------------	--------	-------------------	------------

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.03	----
as found span	5000	78.9	16.84	16.11	1.045
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	78.9	16.84	16.84	1.000
second point	5000	39.4	8.41	8.33	1.009
third point	5000	19.7	4.20	4.15	1.013
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	78.9	16.84	17.12	0.983
Average Correction Factor					1.007

Corrected As found	16.14	Previous response	16.69	% change	3.4%
--------------------	-------	-------------------	-------	----------	------

Notes:

Cal gas changed out, filter changed out, span adjusted

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

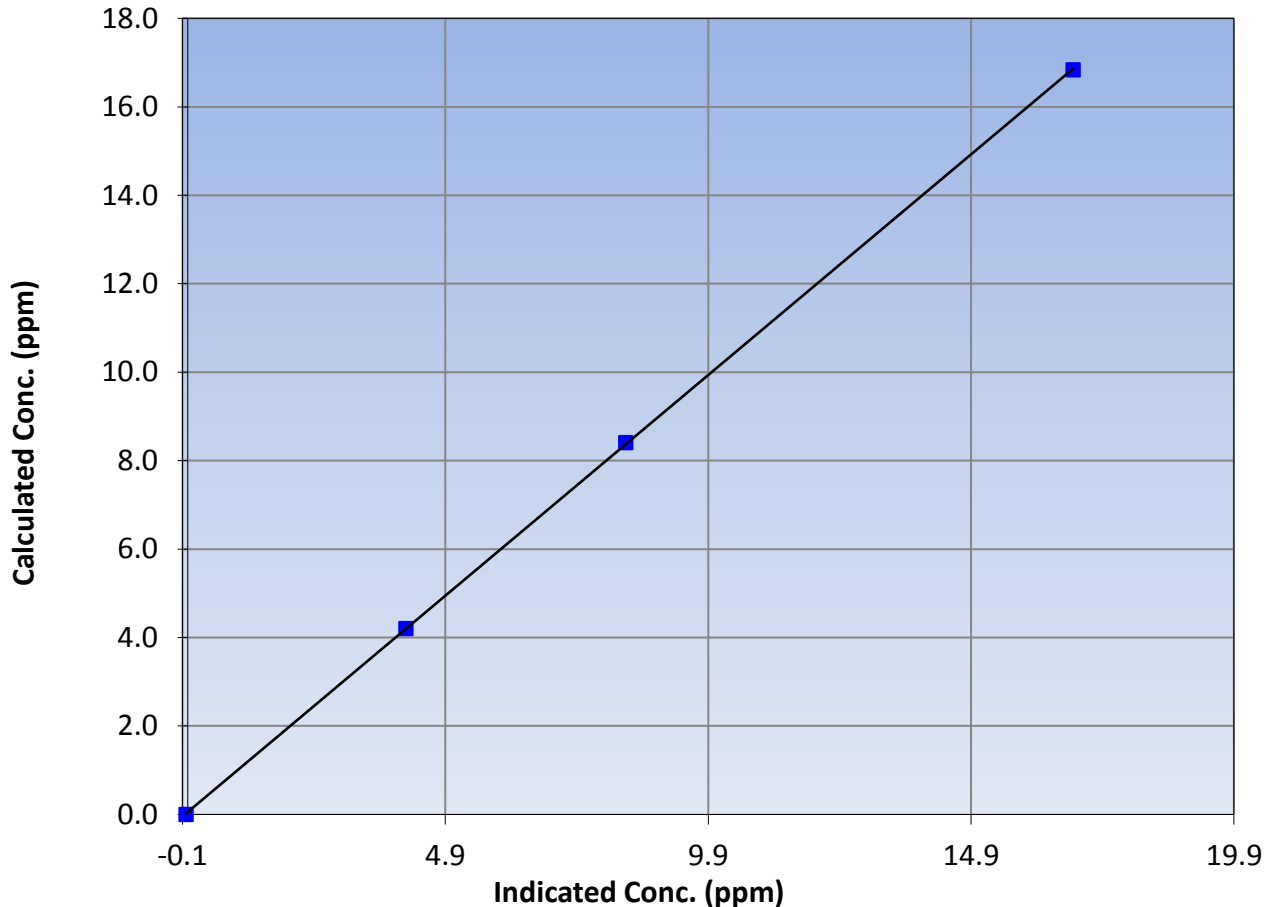
Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	12:30
Analyzer make	51i-LT	Analyzer serial #	1505164380

Calibration Data

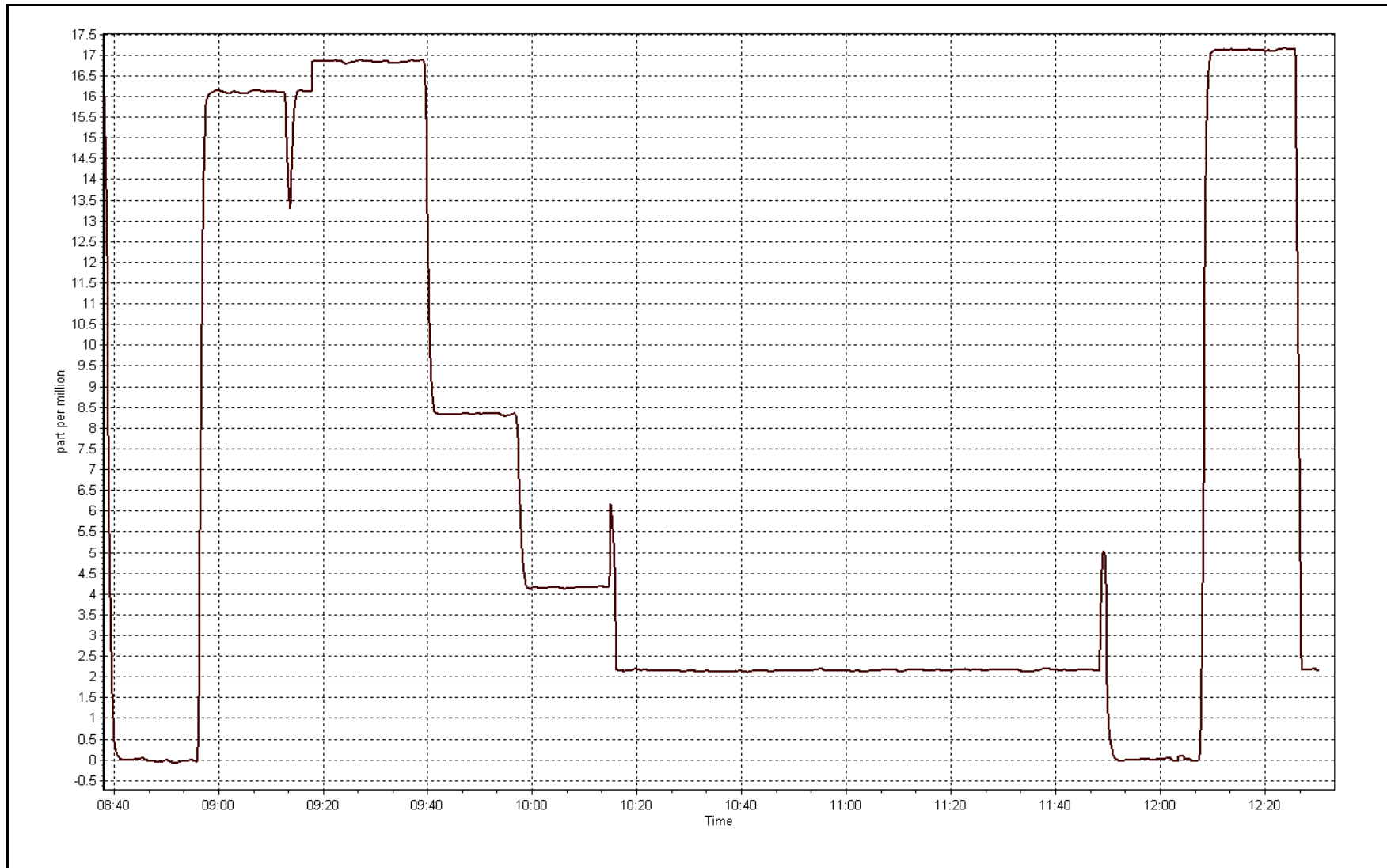
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999982
16.84	16.84	0.9998		
8.41	8.33	1.0094	Slope	0.997821
4.20	4.15	1.0130		
			Intercept	0.055758

THC Calibration Curve



THC Calibration Plot

Date: November 18, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 26, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	11:34
NO2 GPT Ref date	November-18-15	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.	26.1	25.8
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.003636	1.000248	Pressure	26.5	26.5
Calculated intercept	-1.037540	-0.336051	Flow	771.0	755.0
Analyzer Background	0.2	0.2	Intensity	2681.0	2657.7
Analyzer Coefficient	0.916	0.986			

Analyzer make	API T400	Analyzer serial #	825
---------------	----------	-------------------	-----

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.4	----
as found span	5000	0.89	346.7	322.6	1.075
calibrator zero	5000	0.00	0.0	0.4	----
high point	5000	0.89	346.7	346.8	1.000
second point	5000	0.47	205.3	206.0	0.997
third point	5000	0.36	108.4	108.4	1.000
as left zero	5000	0.00	0.0	-0.1	----
as left span	5000	0.89	346.7	354.1	0.979
Average Correction Factor					0.999

Corrected As found	322.2	Previous response	346.5	% change	7.5%
--------------------	-------	-------------------	-------	----------	------

Notes:

Diagonstics were good, GPT was similar to yesterday, during audit 8% low; coefficient back closer to 1.000, adjusted span, filter changed out

Calibration Performed By:

Melissa Lemay



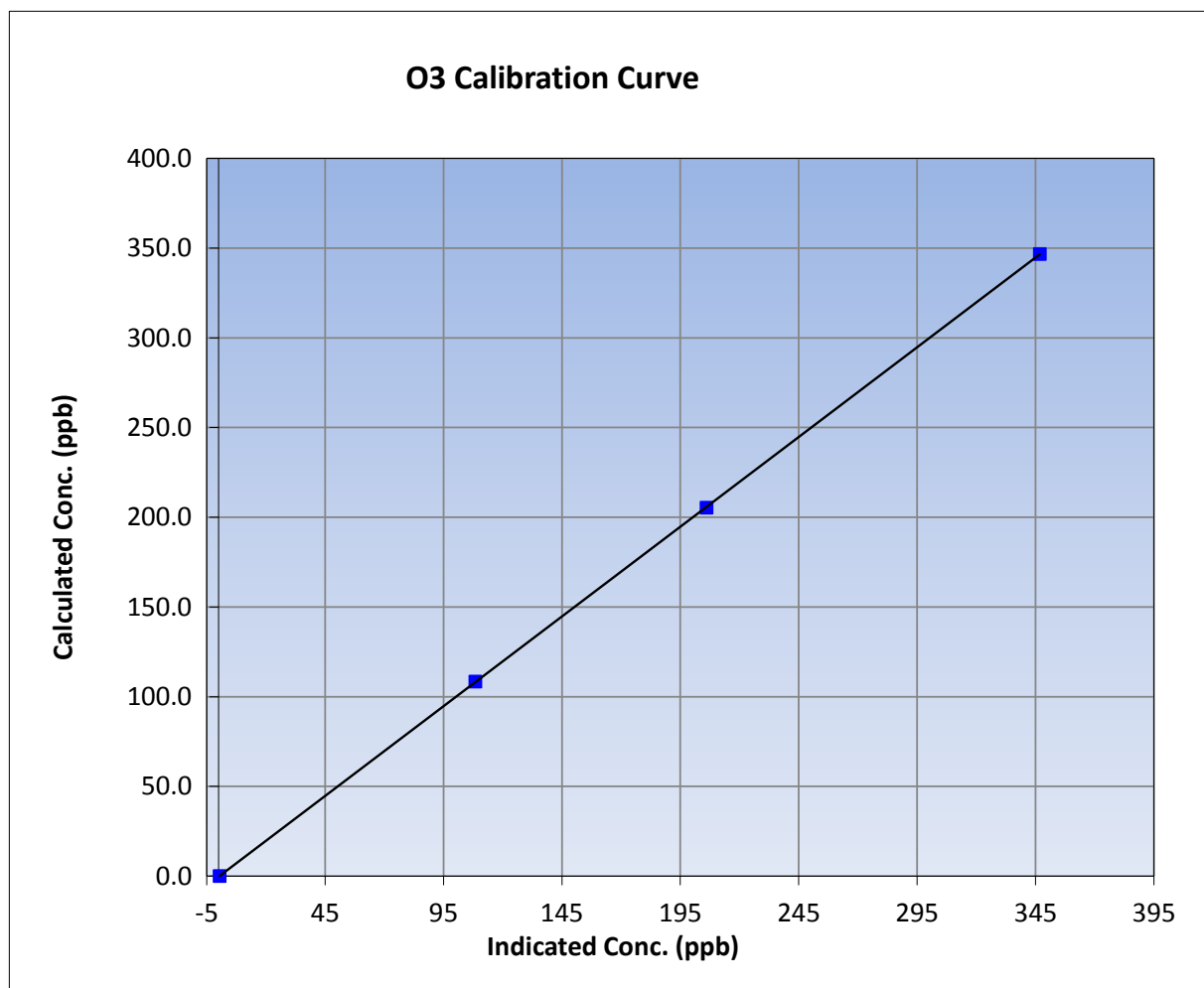
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-19-15	Previous Calibration	October 26, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:05	End Time (MST)	11:34
Analyzer make	API T400	Analyzer serial #	825

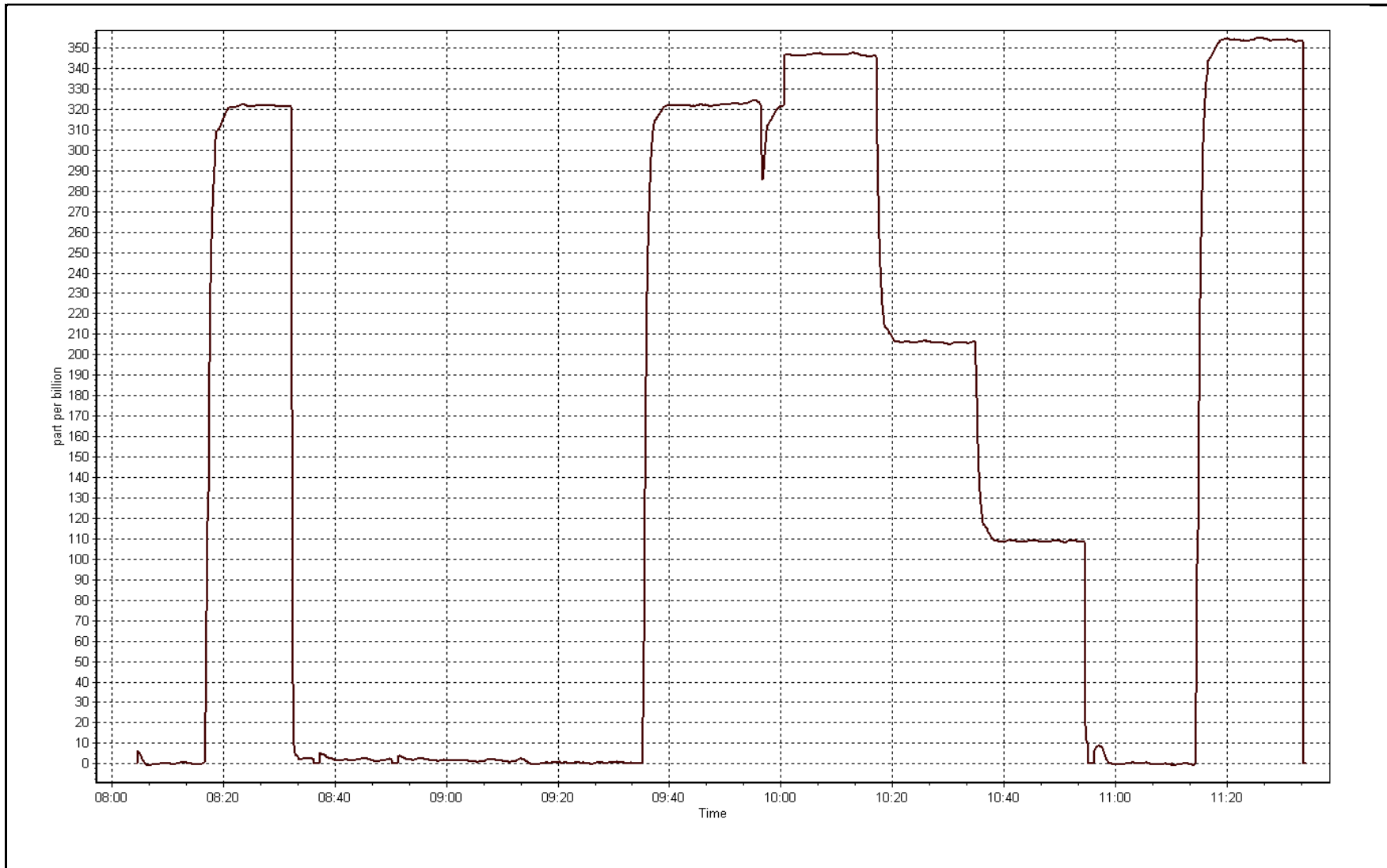
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999996
346.7	346.8	0.9997		
205.3	206.0	0.9966	Slope	1.000248
108.4	108.4	1.0000		
			Intercept	-0.336051



O3 Calibration Plot

Date: November 19, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:43	End Time (MST)	8:25
NO Cal Gas Conc	56.9 ppm	Gas Cert Reference	S980455A
NOX Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	26/9/17
Calibrator	Sabio 4010	Serial Number	11041107
Zero air Generator	Teledyne API T701	Serial Number	5613

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	1850
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997878	0.998515	0.996458
	Data Offset	0.006514	-0.076854	-0.268163
Current Calibration	Data Slope	1.002291	1.003348	
	Data Offset	0.350802	0.311038	

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.742		0.742	
NOX coefficient	0.998		0.998	
NO2 coefficient	0.998		0.998	
NO bkgrnd	6.6		6.6	
NOX bkgrnd	6.7		6.7	
Chamber Temp	50.4	Deg C	50.4	Deg C
Moly Temp	324.7	Deg C	326	Deg C
PMT voltage	-846.2	V	-846.6	V
PMT Temp	-2.9	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	177.9	mmHg	177.9	mmHg
R Cell Press Nox	178.2	mmHg	177.6	mmHg
NO sample flow	0.895	lpm	0.89	lpm
Nox sample Flow	0.896	lpm	0.888	lpm

Notes:

This calibration sheet reflects as found conditions of site calibration gas prior to swap-out.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 18, 2015

Station Number:

AMS 13

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	0.0	----	----
as found span	5000	70.2	798.9	798.9	0.0	796.7	795.9	0.9	1.0027	1.0037
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	0.0	----	----
high point	5000	70.2	798.9	798.9	0.0	796.7	795.9	0.9	1.0027	1.0037
second point										
third point										
as left zero										
as left span										
Average Correction Factor									1.0027	1.0037

Corrected As found

NO_x= 797.1

NO= 796.2

Percent Change

NO_x= 0.4%

NO= 0.5%

Previous Response

NO_x= 800.6

NO= 800.1

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

70.20

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)										
2nd NO2 (200)										
3rd NO2 (100)										
4th NO2 (0)										
Average Correction Factor										

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

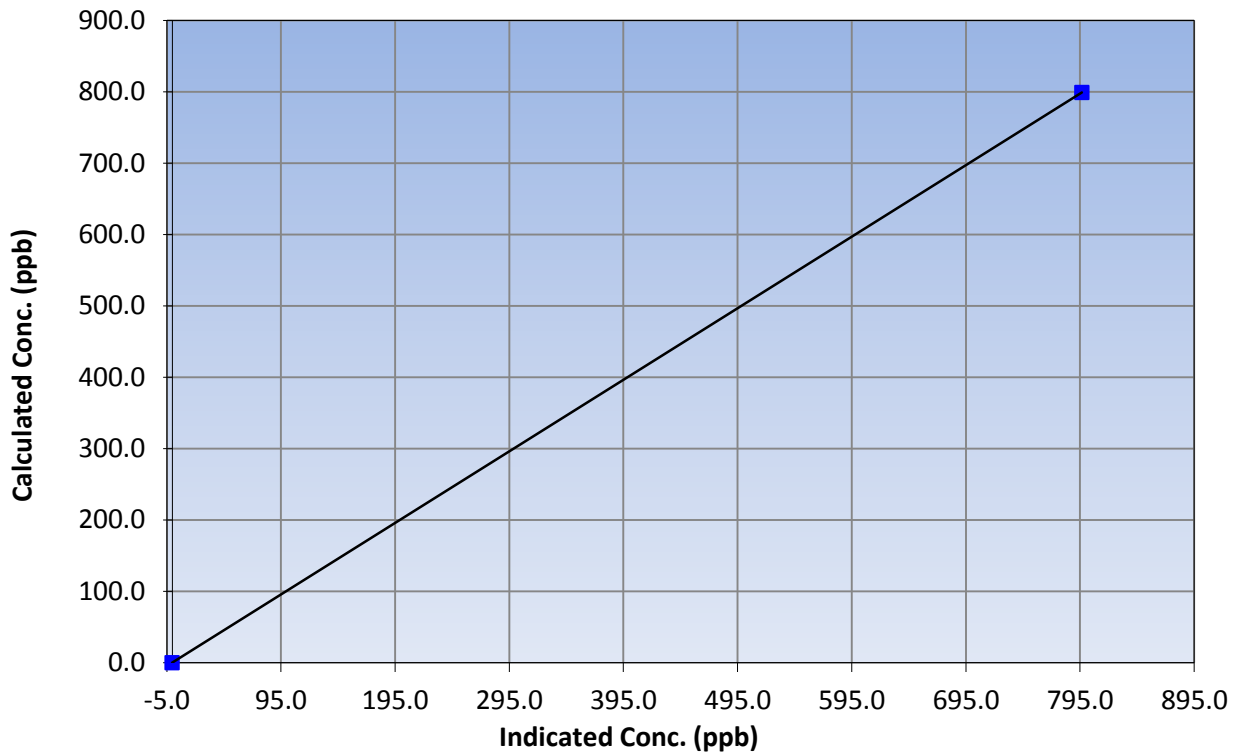
Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:43	End Time (MST)	8:25
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	-0.4	----	Correlation Coefficient	1.000000
798.9	796.7	1.0027		
			Slope	1.002291
			Intercept	0.350802

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

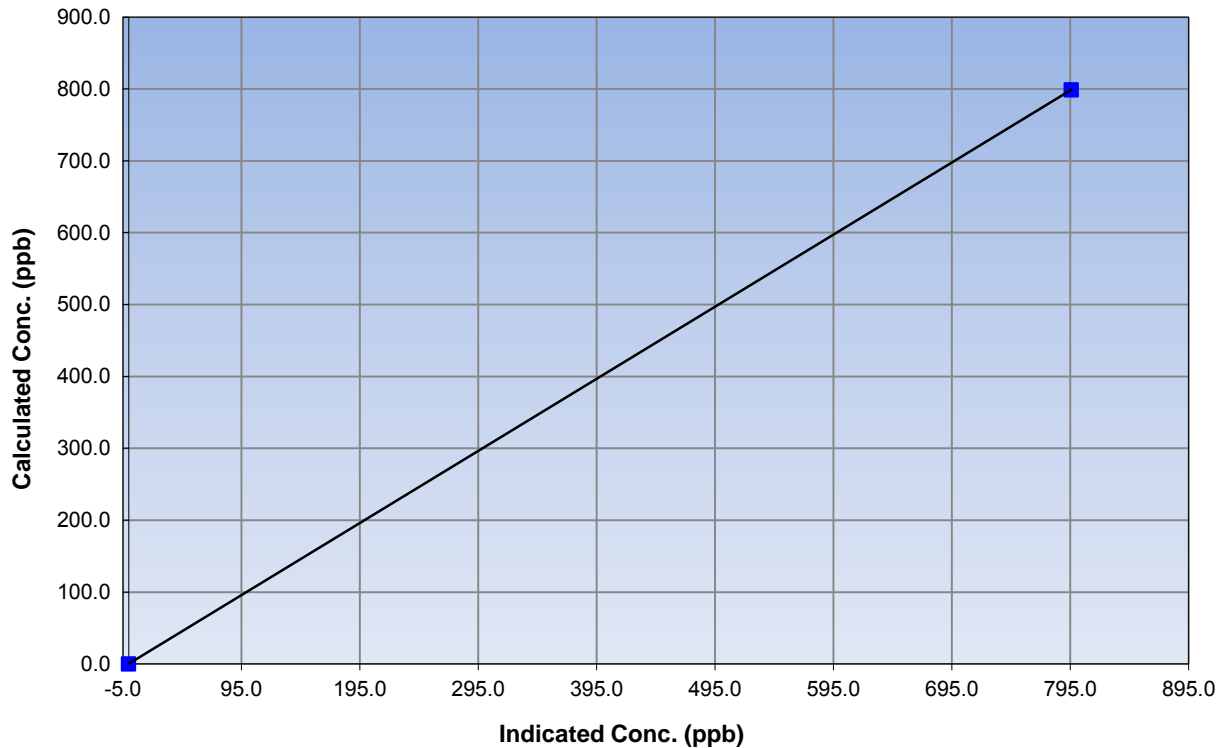
Station Information

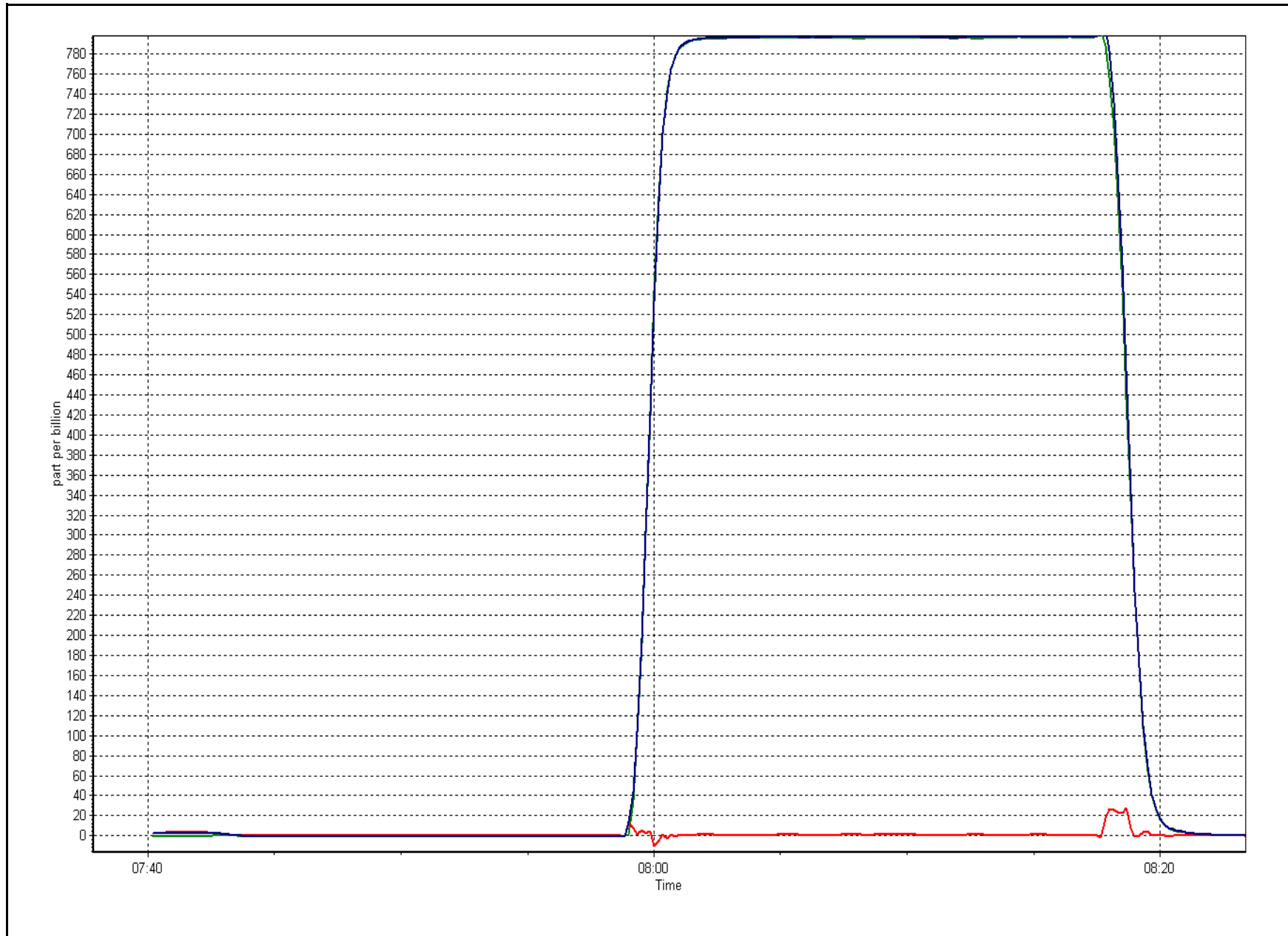
Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:43	End Time (MST)	8:25
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	1.000000
798.9	795.9	1.0037		
			Slope	1.003348
			Intercept	0.311038

NO Calibration Curve







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:30
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL110515
NOX Cal Gas Conc	50.7 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
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002291	1.003348	0.996458
	Data Offset	0.350802	0.311038	-0.268163
Current Calibration	Data Slope	0.996339	0.997450	0.982833
	Data Offset	2.067773	1.505407	-0.286151

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.742		0.817	
NOX coefficient	0.998		0.995	
NO2 coefficient	0.998		0.998	
NO bkgrnd	6.6		7.3	
NOX bkgrnd	6.7		7.3	
Chamber Temp	50.4	Deg C	50.4	Deg C
Moly Temp	324.7	Deg C	326	Deg C
PMT voltage	-846.2	V	-846.6	V
PMT Temp	-2.9	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	177.9	mmHg	177.9	mmHg
R Cell Press Nox	178.2	mmHg	177.6	mmHg
NO sample flow	0.895	lpm	0.89	lpm
Nox sample Flow	0.896	lpm	0.888	lpm

Notes:

Span adjusted, Cal Gas changed out, Second GPT point used, filter changed out



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 18, 2015

Station Number:

AMS 13

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	5000	78.9	800.0	800.0	0.0	728.0	726.6	1.3	1.0990	1.1011
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	78.9	800.0	800.0	0.0	802.4	801.7	0.7	0.9971	0.9979
second point	5000	39.4	399.5	399.5	0.0	396.3	397.0	-0.6	1.0081	1.0063
third point	5000	19.7	199.8	199.8	0.0	197.6	198.3	-0.7	1.0109	1.0074
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	5000	78.9	800.0	450.7	349.3	803.7	448.1	355.6	0.9955	1.0058
Average Correction Factor									1.0054	1.0039

Corrected As found
Previous Response

NO_x= 728.1
NO_x= 797.9

NO= 726.7
NO= 797.1

Percent Change

NO_x= 9.6%

NO= 9.7%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

78.90

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	450.7	346.7	803.4	450.7	352.7	0.9804	1.0000	0.9830	101.7%
2nd NO2 (200)	----	592.1	205.3	801.8	592.1	209.7	0.9823	1.0000	0.9790	102.1%
3rd NO2 (100)	----	689.0	108.4	799.7	689.0	110.7	0.9849	1.0000	0.9792	102.1%
4th NO2 (0)	797.4	----	0.2	797.6	797.4	0.2	0.9875	1.0000	N/A	----
Average Correction Factor							0.9838	1.0000	0.9804	102.0%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

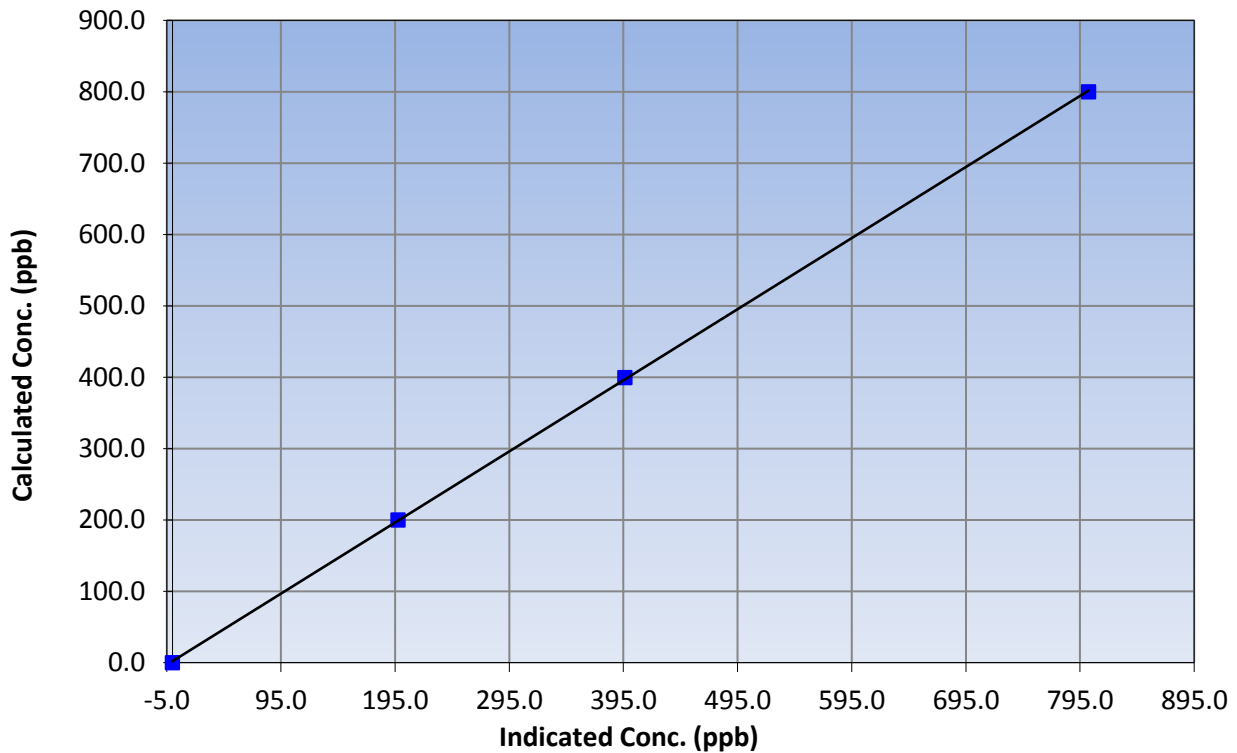
Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	12:30
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	0.999962
800.0	802.4	0.9971		
399.5	396.3	1.0081	Slope	0.996339
199.8	197.6	1.0109		
			Intercept	2.067773

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

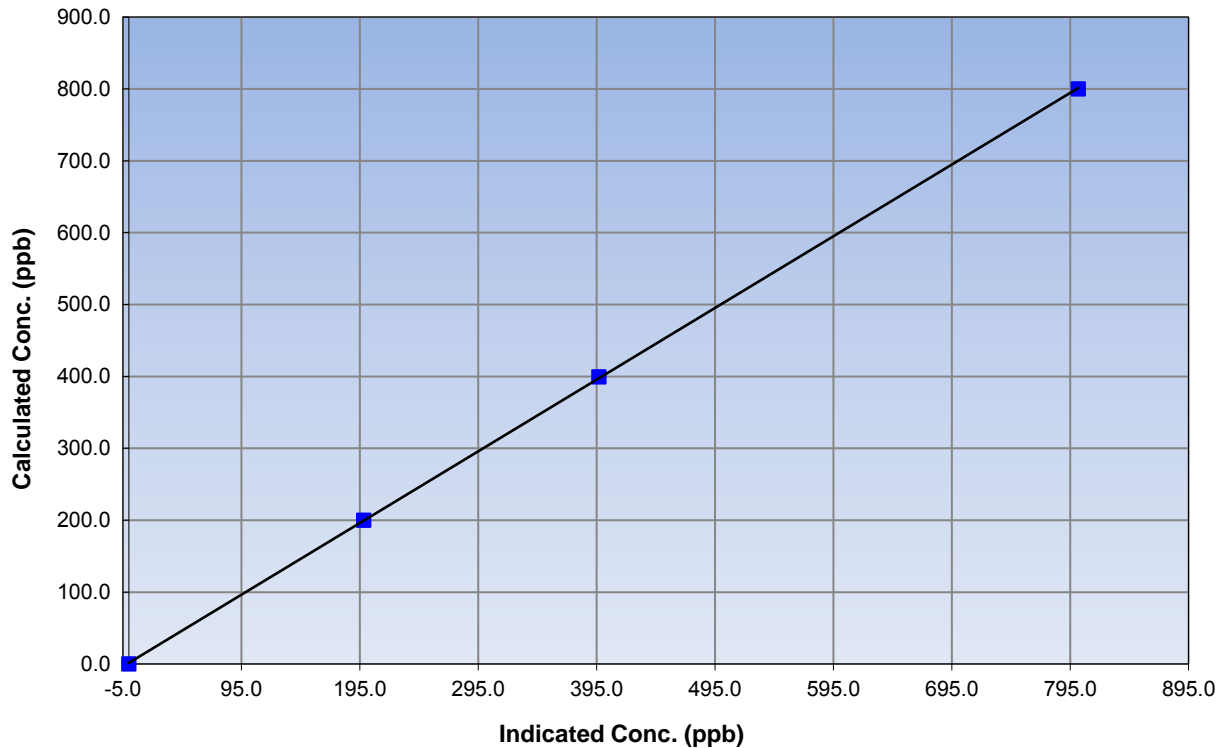
Station Information

Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	12:30
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	0.999979
800.0	801.7	0.9979		
399.5	397.0	1.0063	Slope	0.997450
199.8	198.3	1.0074		
			Intercept	1.505407

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

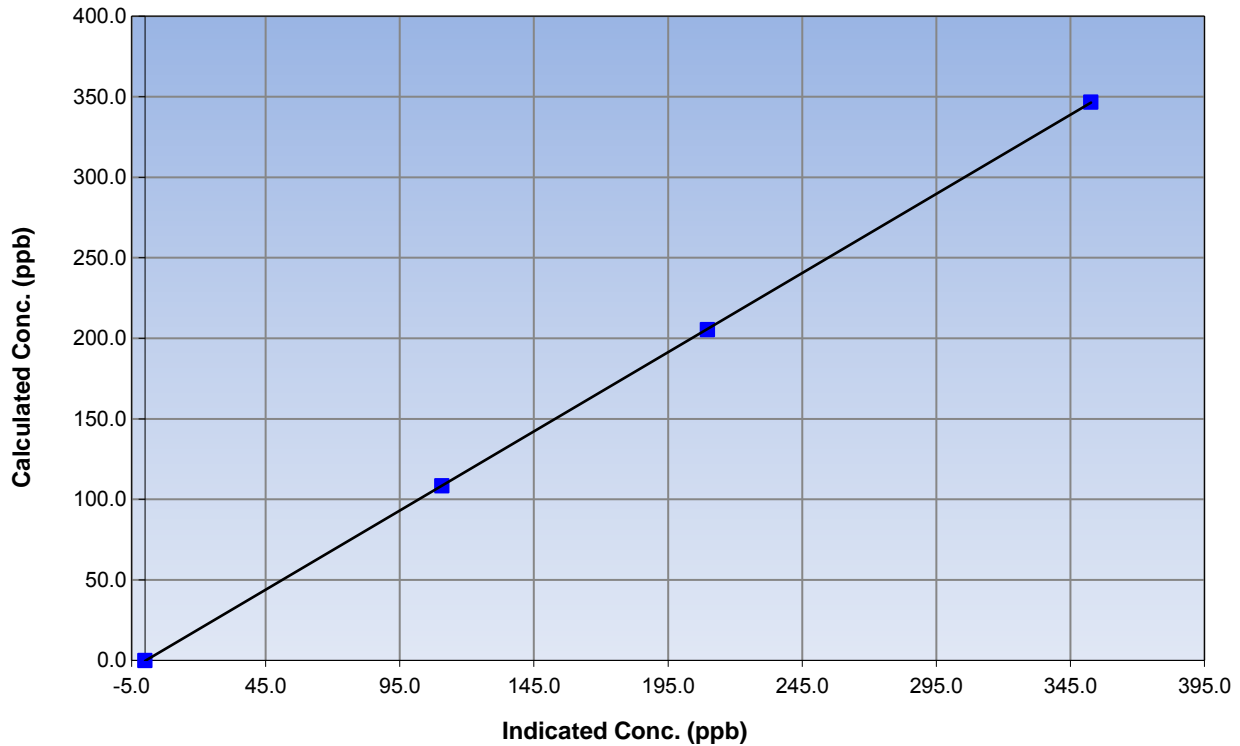
Station Information

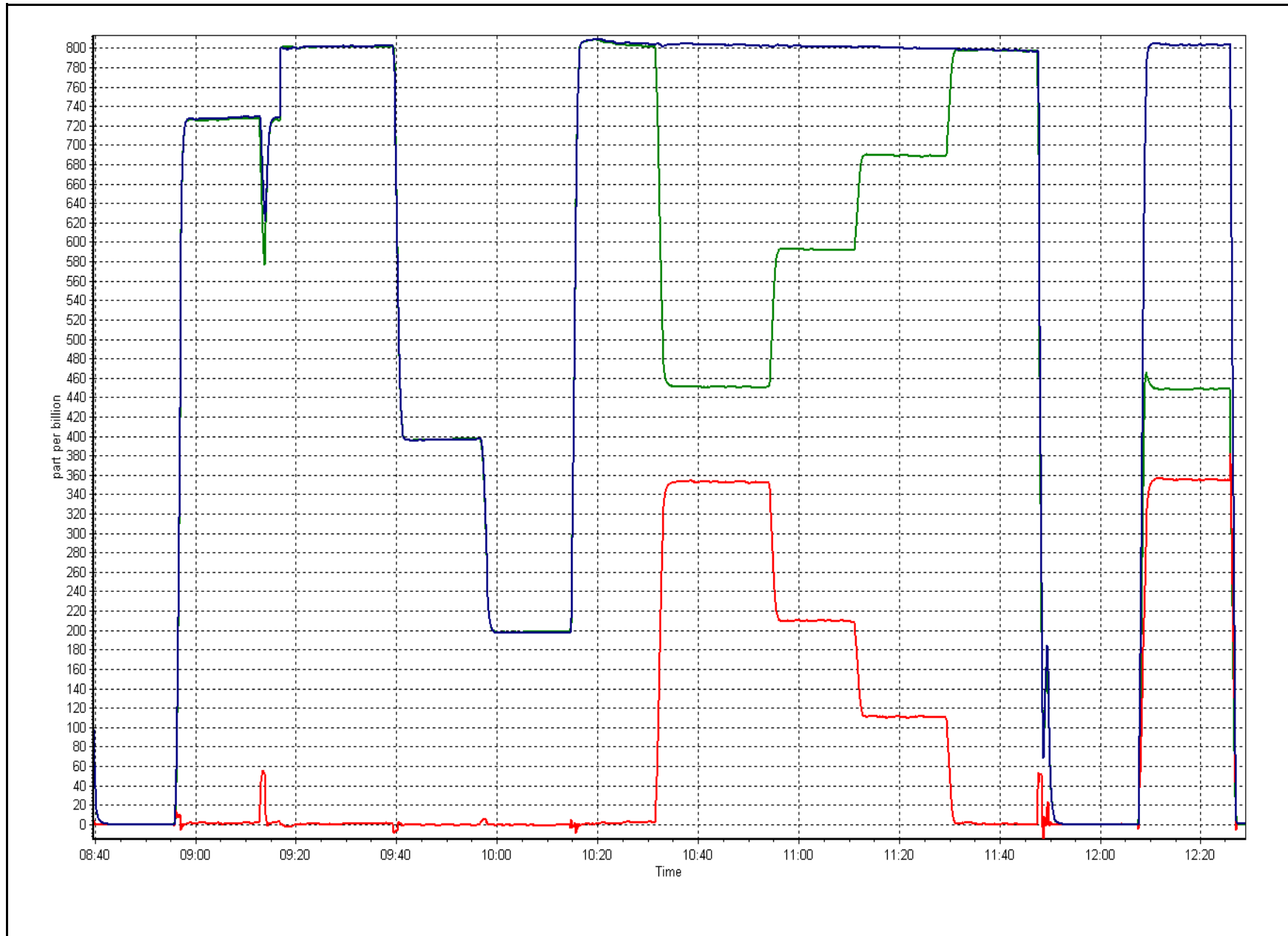
Calibration Date	November 18, 2015	Previous Calibration	October 22, 2015
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:25	End Time (MST)	12:30
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999993
346.7	352.7	0.9830		
205.3	209.7	0.9790	Slope	0.982833
108.4	110.7	0.9792		
			Intercept	-0.286151

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	November 19, 2015	Previous Calibration:	October 26, 2015
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	11:35	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	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	-12.0	-13.6	-1.6	-13.0
T2	16.0	na	na	16.0
T3	19.0	na	na	19.0
T4	16.0	na	na	16.0
RH (%)	15.0	na	na	15.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	980	980.4	0.4	980

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	390		381
Neph	1.6		-0.8
C14	15.4		14.1
Indicated Concentration (ug/m3)	1.1	Yes	-0.7
Offset 1	386		386.9
Offset 2	50.9		50.6

Leak Check (Quarterly)			
Leak Check Date:	September 28, 2015	Previous Leak Check Date:	July 14, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.74		0.10
*Flow with adaptor (LPM):	16.64		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	July 14, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337		Mass foil set S/N:
Previous Correction Factor:	6970		
New Correction Factor:	7080		

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

NOTES:

nephelometer adjusted, sample head cleaned

Calibration Performed By: Melissa Lemay



This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 14
ANZAC
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	684	36	36	100.00	12	0	3	0
TRS(ppb) Average	686	33	34	99.86	2	0	0	0
THC(ppm) Average	684	36	36	100.00	2.1	-	1.9	-
NMHC(ppm) Average	684	36	36	100.00	0.036	-	0.003	-
CH4(ppm) Average	684	36	36	100.00	2.1	-	1.9	-
NO2(ppb) Average	659	35	61	96.39	21	0	7	-
NO(ppb) Average	659	35	61	96.39	13	-	1	-
NOX(ppb) Average	659	35	61	96.39	34	-	7	-
O3(ppb) Average	686	33	34	99.86	46	0	39	-
PM2.5(ug/m3) Average	718	1	2	99.86	87.7	-	20.9	0
AT 2m(C) Average	720	0	0	100.00	7.8	-	4	-
RH(%) Average	720	0	0	100.00	97	-	92	-
Leaf Wetness (% of range) Average	720	0	0	100.00	48	-	7	-
WS(km/h) Average	704	0	16	97.78	21	-	14	-
WD(deg) Average	704	0	16	97.78	-	-	-	-
PC(mm) Total	719	0	1	99.86	0.8	-	2.3	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	684	0.3	1	-	0	0	0	0	0	0	0	12
TRS(ppb) Average	686	0.2	0	-	0	0	0	0	0	0	0	2
THC(ppm) Average	684	1.88	0	-	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.1
NMHC (ppm) Average	684	0	0.003	-	0	0	0	0	0	0	0	0.036
CH4(ppm) Average	684	1.87	0	-	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.1
NO2(ppb) Average	659	2.3	3	-	0	1	1	2	3	5	21	
NO(ppb) Average	659	0.4	1	-	0	0	0	0	0	1	13	
NOX(ppb) Average	659	2.7	3	-	0	0	1	2	3	5	34	
O3(ppb) Average	686	27.8	8	-	4	16	23	28	34	39	46	
PM2.5(ug/m3) Average	718	4.47	8	-	0.4	0.9	1.5	2.8	4.8	7.1	87.7	
Temperature 2 m (C) Average	720	-3.35	5.8	-	-21.9	-12.3	-6.1	-1.9	0.5	2.6	7.8	
Relative Humidity (%) Average	720	74.3	17	-	22	49	64	80	87	91	97	
Leaf Wetness (% of range) Average	720	1.7	4	-	0	0	0	1	1	5	48	
Wind Speed 20 m (km/h) Average	704	8.6	4	-	0	3	5	8	12	15	21	
Wind Direction 20 m (deg) Average	704	-	-	-	-	-	-	-	-	-	-	
Precipitation (mm) Total	719	-	-	4.32	-	-	-	-	-	-	-	

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	19 Nov 2015 14:00	19 Nov 2015 14:00	1	Maintenance - Station operator on site
NO2, NO, NOX	05 Nov 2015 10:00	05 Nov 2015 13:00	4	Maintenance - calibration
NO2, NO, NOX	05 Nov 2015 14:00	06 Nov 2015 09:00	20	Unstable Operation - restricted sample flow
NO2, NO, NOX	16 Nov 2015 10:00	16 Nov 2015 11:00	2	Maintenance - confirmed calibration points for Ozone
O3	26 Nov 2015 19:00	26 Nov 2015 19:00	1	Power spike
PM2.5	16 Nov 2015 14:00	16 Nov 2015 14:00	1	Unstable Operation - stabilization after maintenance
Wind Speed, Wind Direction	01 Nov 2015 01:00	01 Nov 2015 10:00	10	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	16 Nov 2015 01:00	16 Nov 2015 03:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	19 Nov 2015 07:00	19 Nov 2015 07:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	19 Nov 2015 09:00	19 Nov 2015 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	28 Nov 2015 17:00	28 Nov 2015 17:00	1	Flat line in sensor output signal -sensor frozen
Precipitation Collector	16 Nov 2015 11:00	16 Nov 2015 11:00	1	Maintenance - function check and cleaning



Summary of Hour Averages

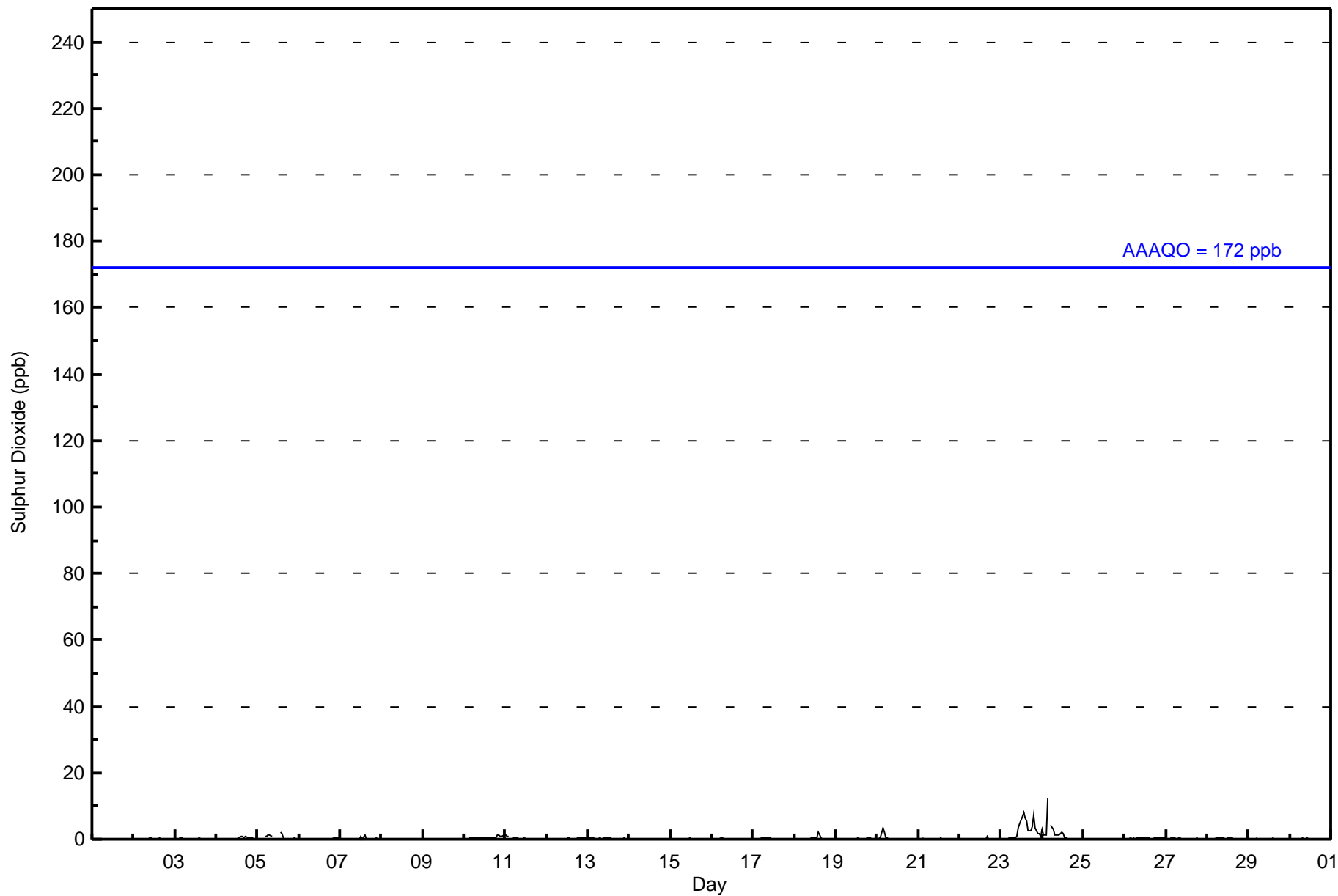
Anzac - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 12 ppb on Nov 24 04:00	Maximum Daily Average: 2.7 ppb on Nov 23		Hours of Data:	684
Minimum Value: 0 ppb on Nov 5 18:00	Minimum Daily Average: 0.0 ppb on Nov 9		Hours of Missing Data:	36
Maximum Diurnal Average: 0.8 ppb at hour 4	Minimum Diurnal Average: 0.2 ppb at hour 24		Hours of Calibration:	36
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 = 5		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Nov	Z	0	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
3-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1
5-Nov	0	0	0	Z	1	1	1	1	1	C	C	C	C	2	2	0	0	0	0	0	0	1	0	0	0.5	2	
6-Nov	0	0	0	0	Z	0	0	0	Z	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Nov	Z	0	0	0	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-Nov	0	Z	0	0	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-Nov	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1
11-Nov	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	0.2	1
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
13-Nov	0	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Nov	Z	0	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
15-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Nov	0	0	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-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.2	2
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Nov	Z	0	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Nov	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	0.1	1
23-Nov	0	0	0	Z	0	0	0	0	1	1	3	5	7	8	6	6	3	2	4	7	3	2	2	1	0	2.7	8
24-Nov	3	1	1	12	Z	4	3	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	12
25-Nov	0	0	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-Nov	Z	0	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
27-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

0.3	0.2	0.2	0.8	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.3	0.2	0.2	0.3	0.4	0.3	0.2	0.2	0.2	0.2	Diurnal Average	
3	1	1	12	2	4	3	1	1	1	1	3	5	7	8	6	6	3	2	4	7	3	2	2	1	Diurnal Maximum		

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	683	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: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	10	7	13	14	14	21	64	46	44	58	45	94	111	65	41	669
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	10	7	13	14	14	21	64	46	44	58	45	94	111	65	42	670

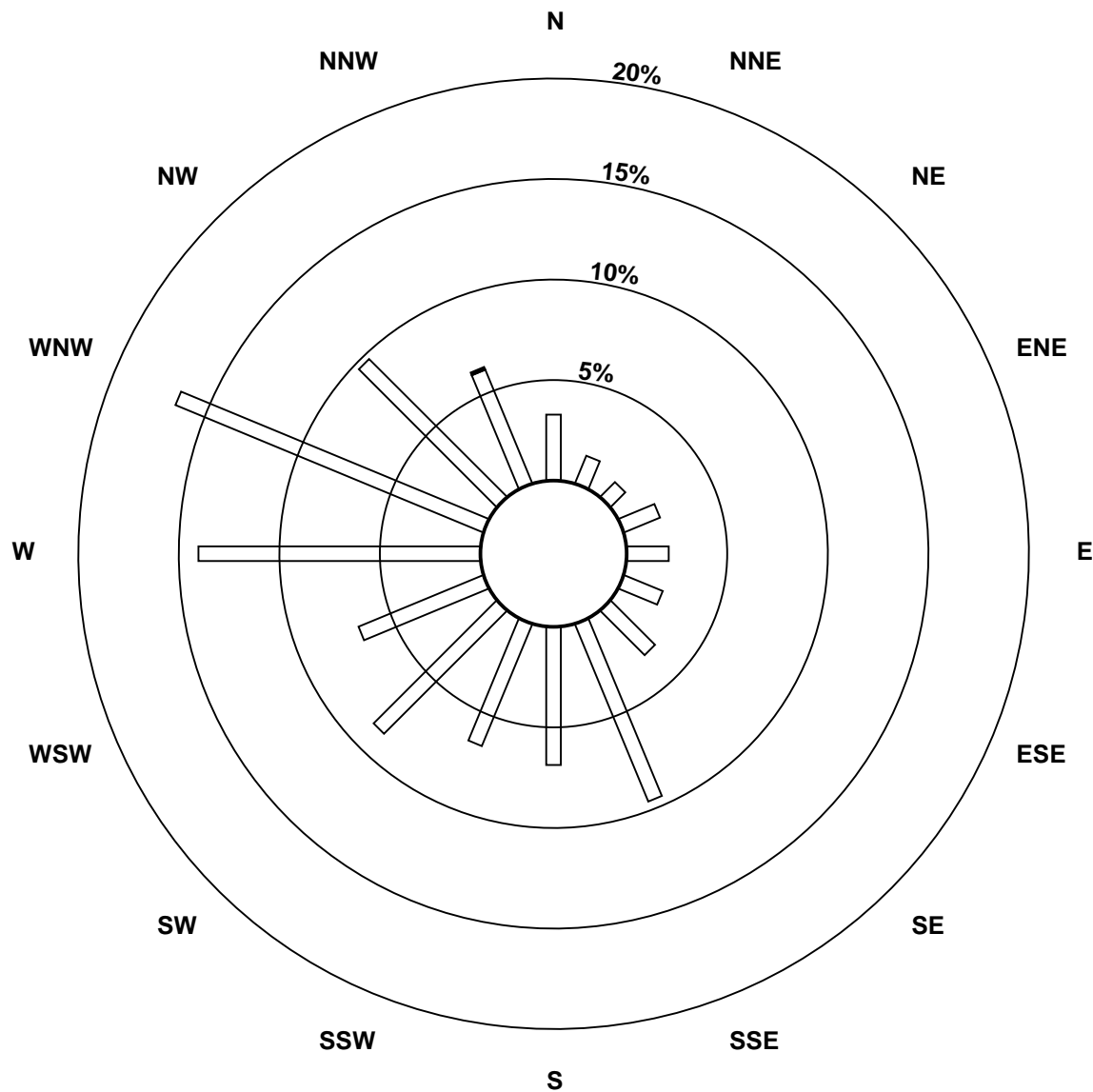
Total Number of Valid Hours: 670

Total Number of Hours: 720

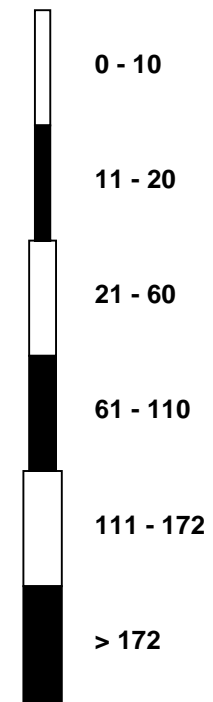


Wood Buffalo Environmental Association
Wind Rose Nov 2015

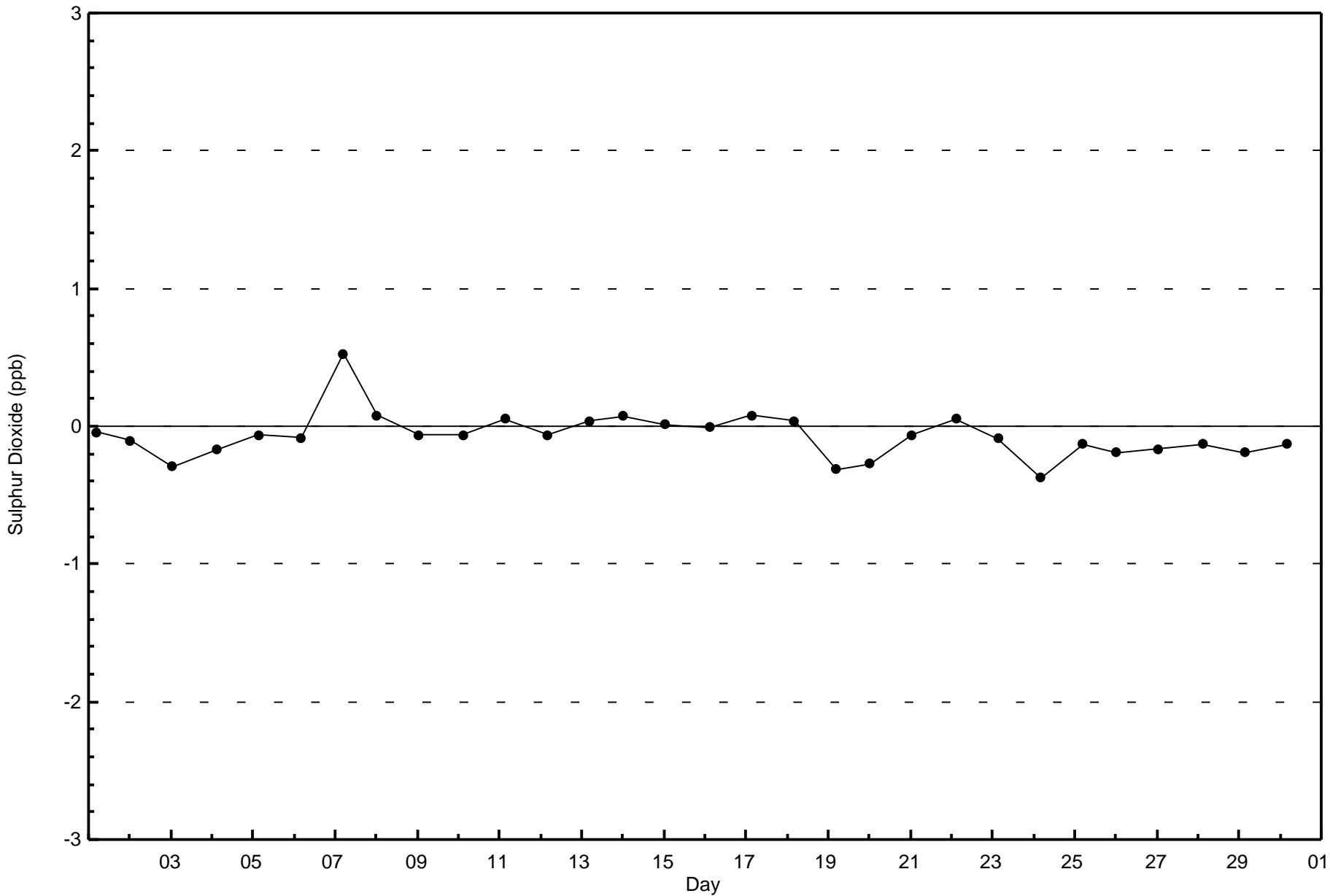
Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)

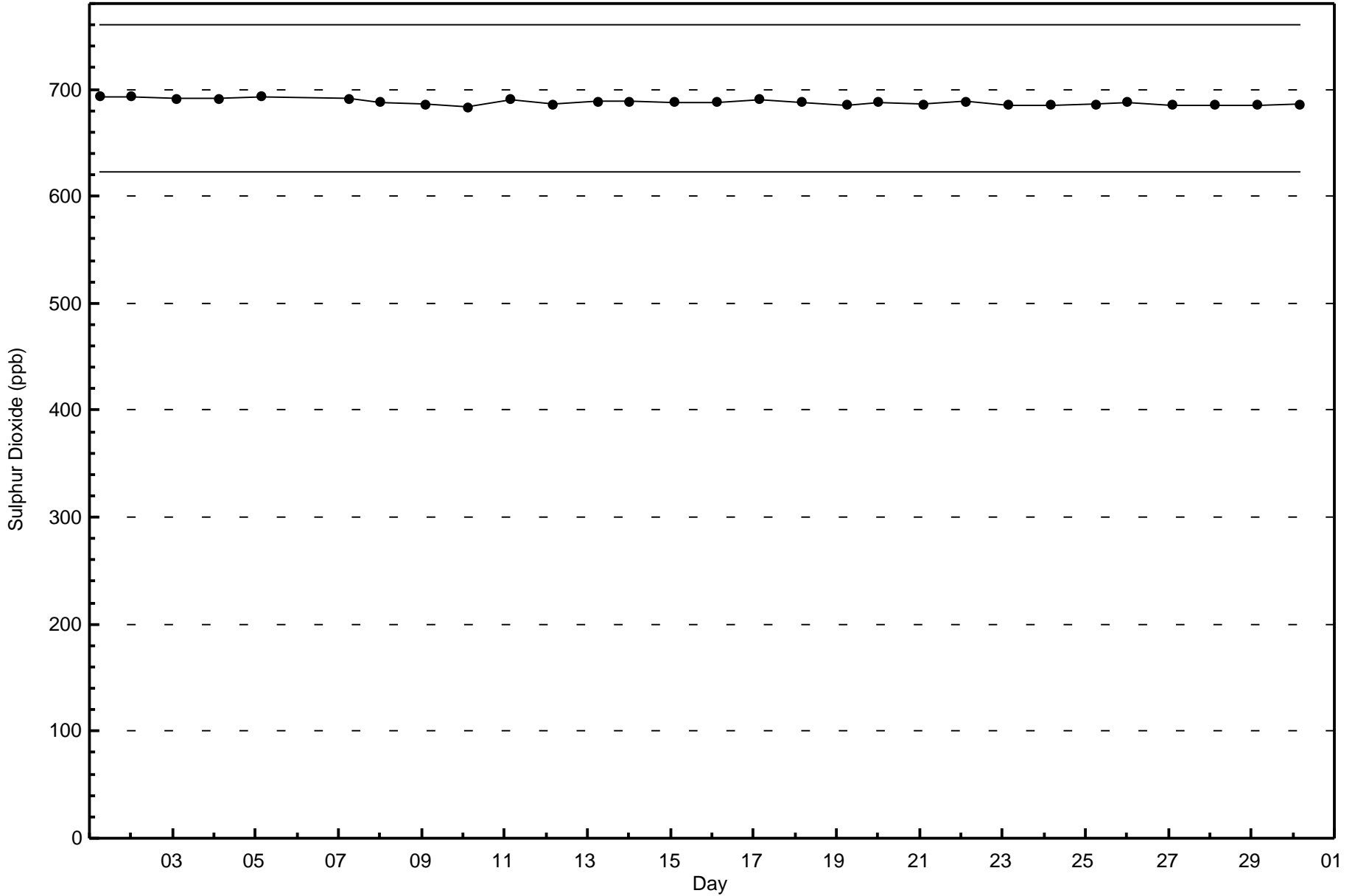


Classes (ppb)



Total Number of Valid Hours: 670







Summary of Hour Averages

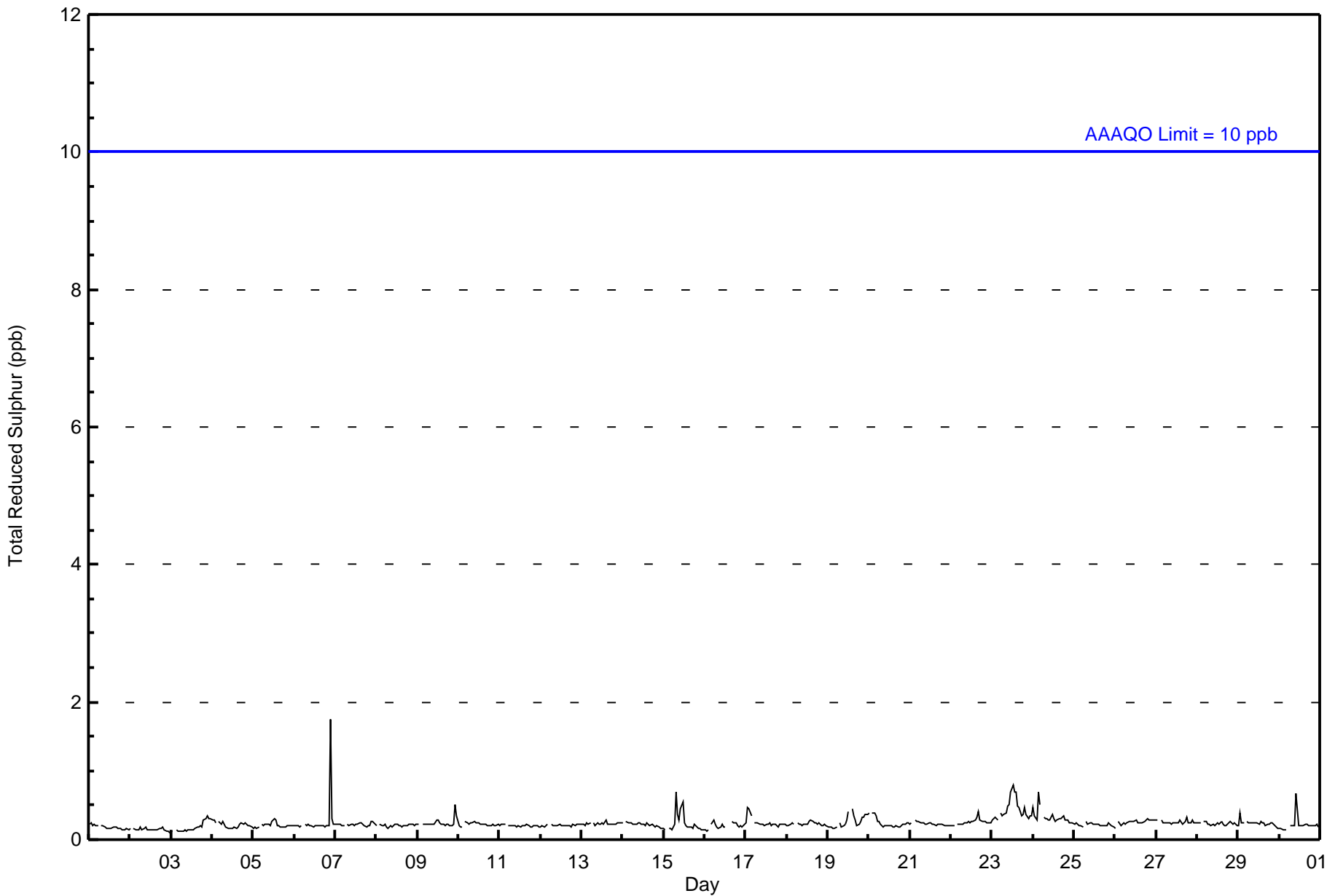
Anzac - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Nov 6 22:00	Maximum Daily Average: 0.4 ppb on Nov 23		Hours of Data:	686
Minimum Value: 0 ppb on Nov 3 00:00	Minimum Daily Average: 0.1 ppb on Nov 2		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 22	Minimum Diurnal Average: 0.2 ppb at hour 18		Hours of Calibration:	33
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	99.9

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

0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	Diurnal Average	
0	0	0	1	1	0	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	2	1	0	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	686	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	21	11	6	13	13	14	21	64	46	47	59	44	93	111	64	45	672
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	11	6	13	13	14	21	64	46	47	59	44	93	111	64	45	672

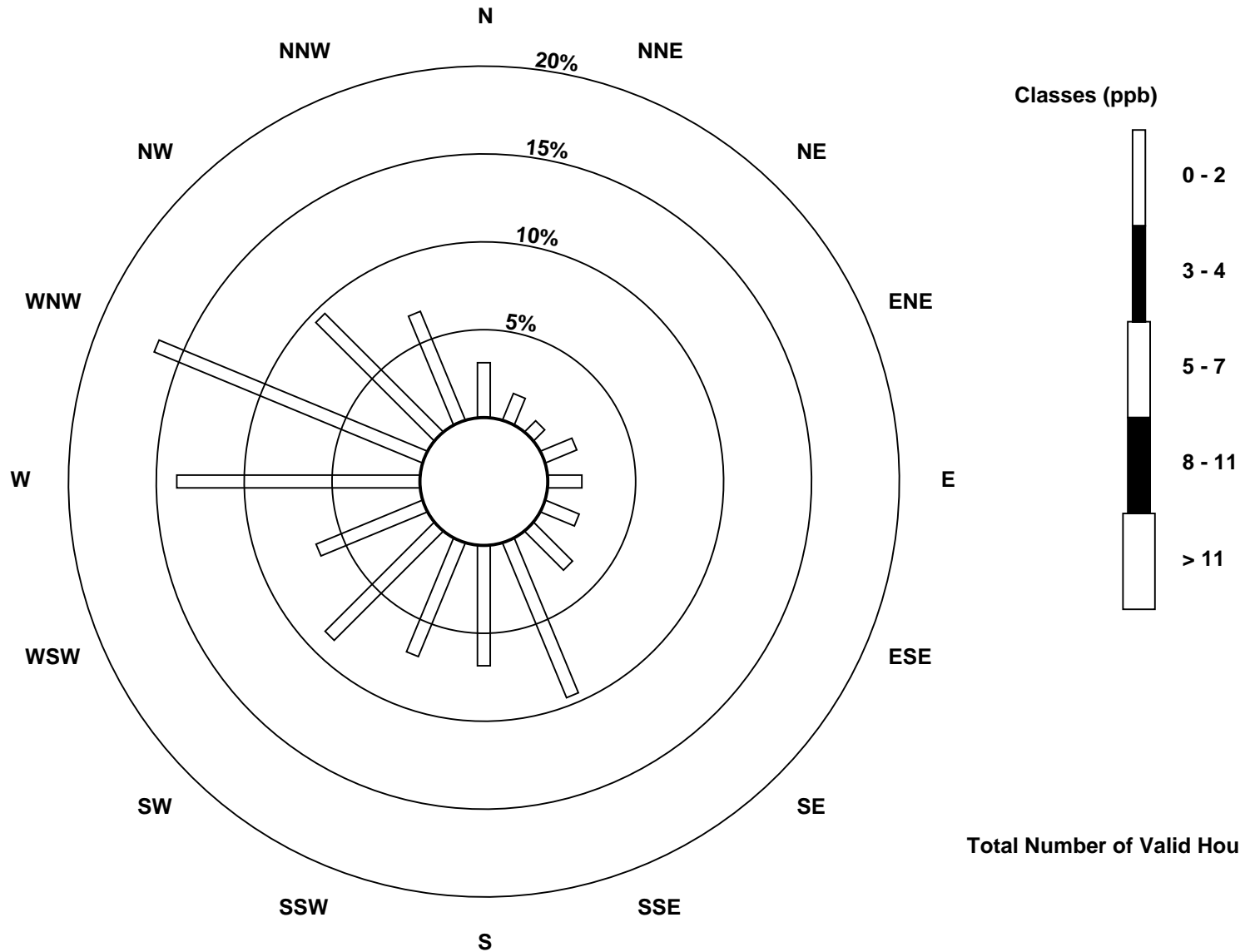
Total Number of Valid Hours: 672

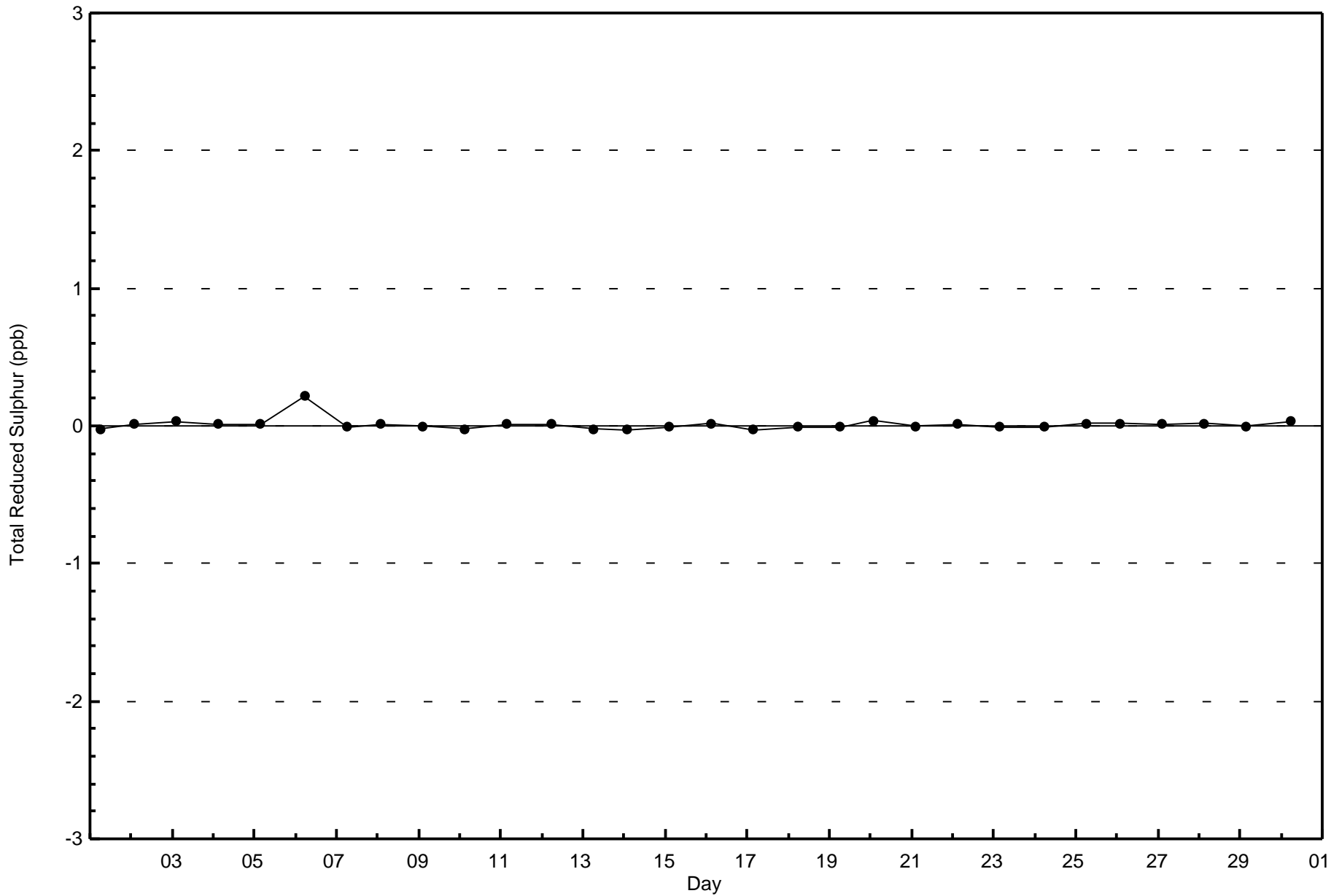
Total Number of Hours: 720

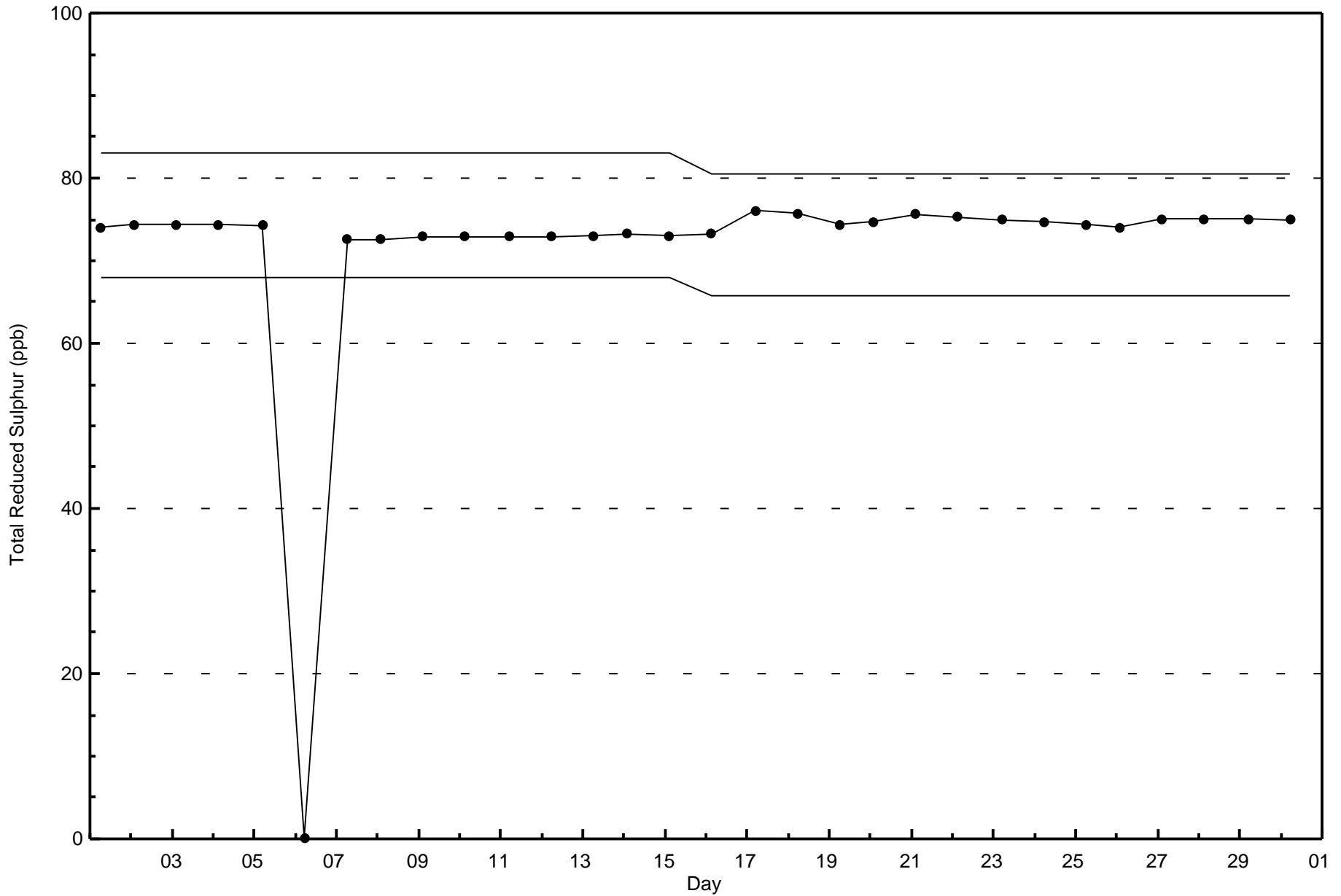


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)

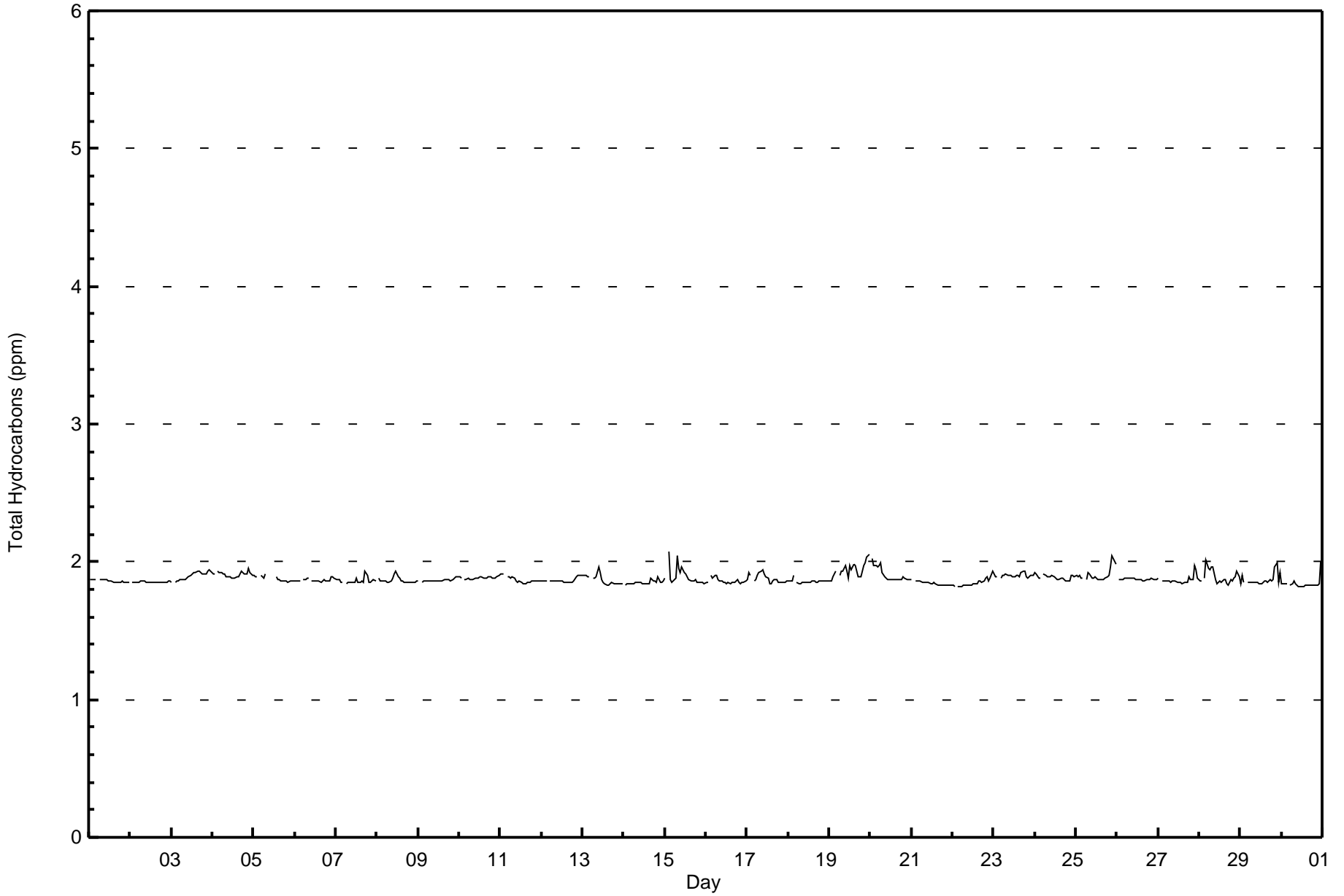








Maximum Value: 2.1 ppm on Nov 15 03:00																			Maximum Daily Average: 1.9 ppm on Nov 19																			Hours in Service: 720	
Minimum Value: 1.8 ppm on Nov 22 04:00																			Minimum Daily Average: 1.8 ppm on Nov 30																			Hours of Data: 684	
Maximum Diurnal Average: 1.9 ppm at hour 24																			Minimum Diurnal Average: 1.9 ppm at hour 15																			Hours of Missing Data: 36	
Monthly Average: 1.88 ppm																			Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.9 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 1.9 P ₉₉ = 2.0																			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-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9													
2-Nov	Z	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
3-Nov	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												
4-Nov	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0												
5-Nov	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
6-Nov	1.9	1.9	1.9	1.9	Z	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												
7-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
8-Nov	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												
9-Nov	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												
10-Nov	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												
11-Nov	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
12-Nov	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	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
13-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0												
14-Nov	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9												
15-Nov	1.9	Z	2.1	1.9	1.8	1.9	1.9	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	2.1												
16-Nov	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9												
17-Nov	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9												
18-Nov	1.9	1.9	1.9	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
19-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	1.9	2.1	2.1												
20-Nov	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0												
21-Nov	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9												
22-Nov	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
23-Nov	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												
24-Nov	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9												
25-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0												
26-Nov	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												
27-Nov	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0												
28-Nov	1.9	1.9	Z	1.9	2.0	2.0	1.9	2.0	2.0	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0												
29-Nov	1.8	1.9	1.9	Z	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0												
30-Nov	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.0												
1.9																								Diurnal Average															
1.9																								Diurnal Maximum															
Z - zerospan C - Calibration																																							





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	682	99.71	99.71
2.1 - 3.0	2	0.29	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	22	10	7	13	14	14	21	64	45	45	58	45	93	111	65	41	668
2.1 - 3.0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	10	7	13	14	14	21	64	46	45	58	45	94	111	65	41	670

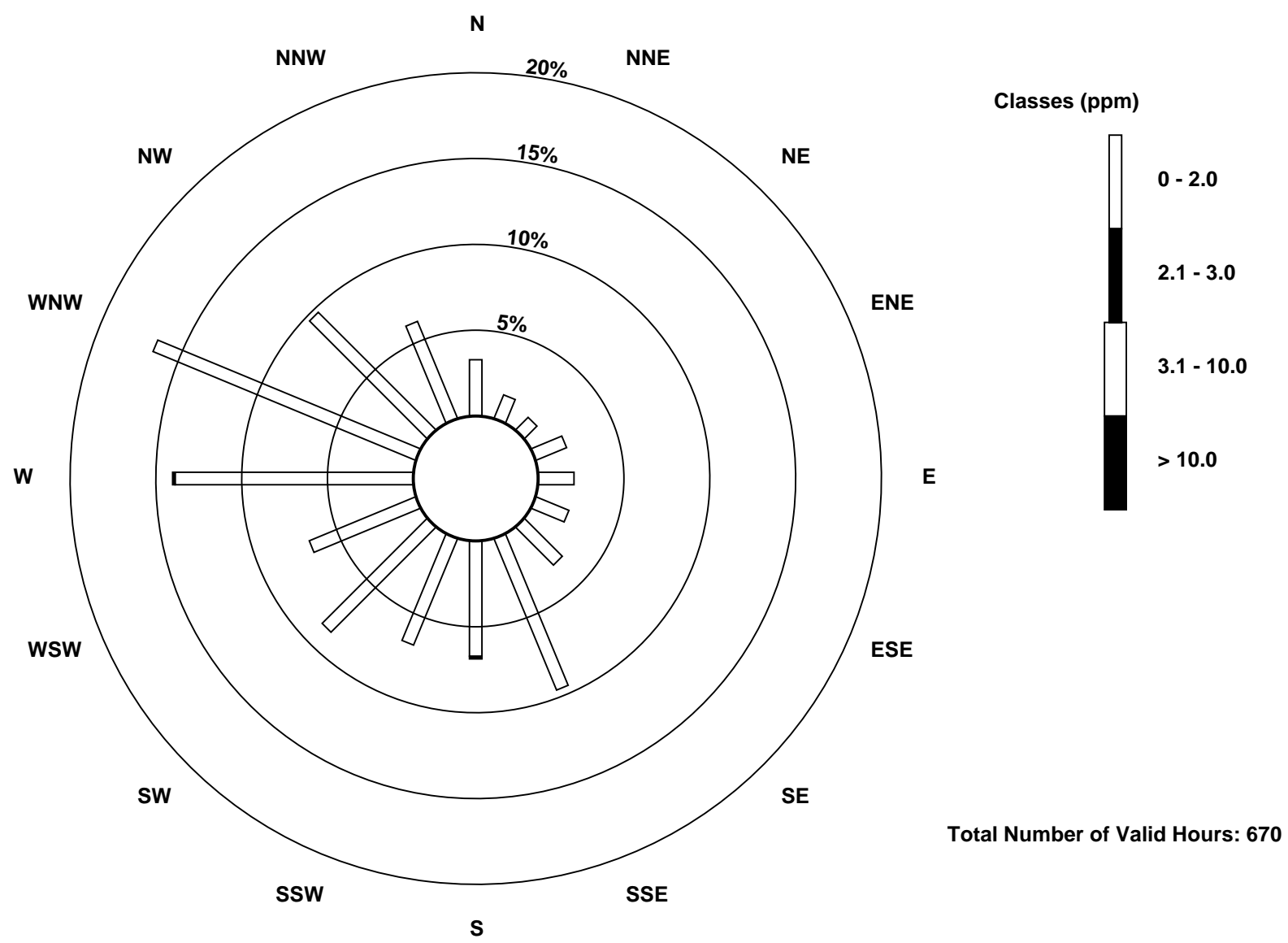
Total Number of Valid Hours: 670

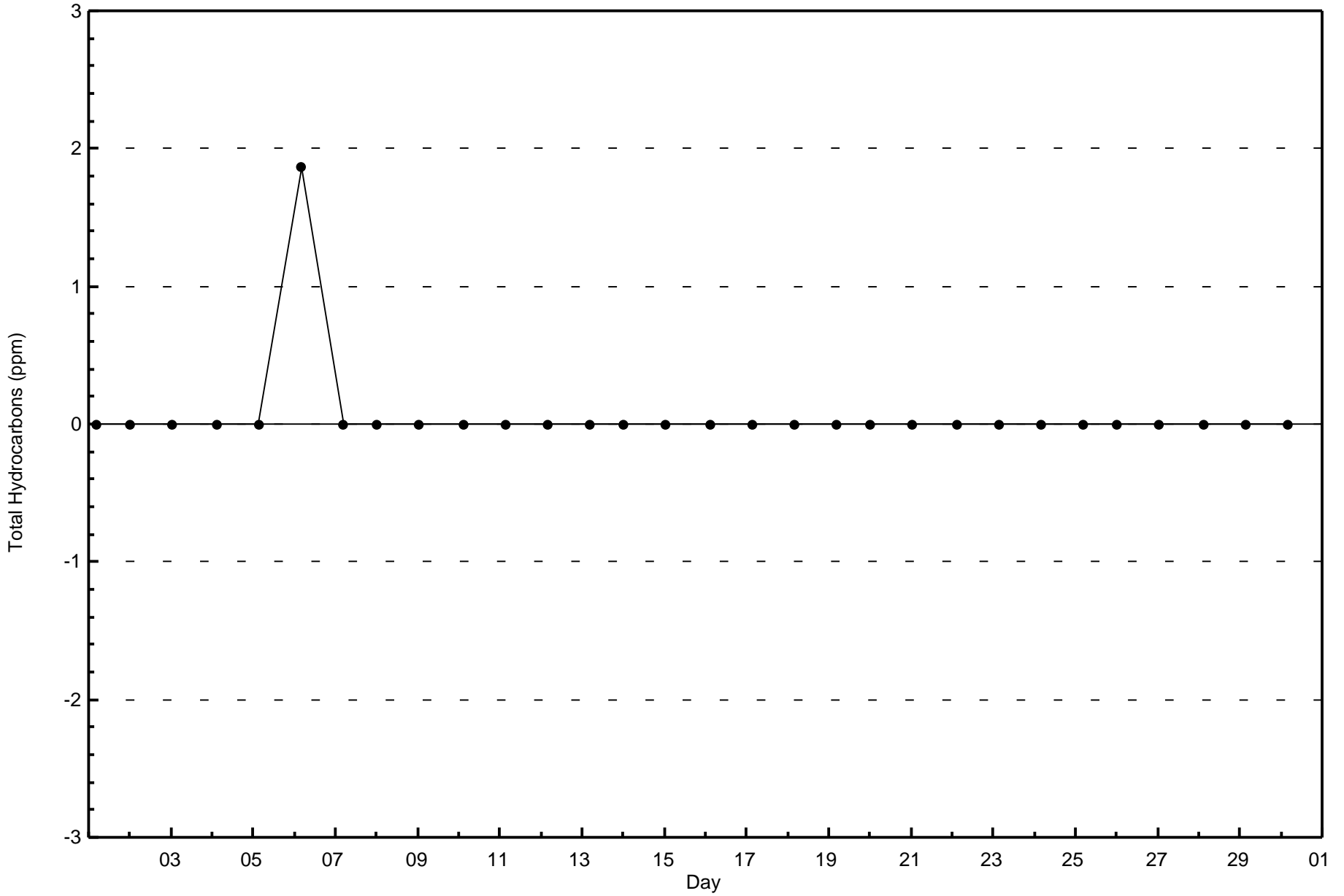
Total Number of Hours: 720

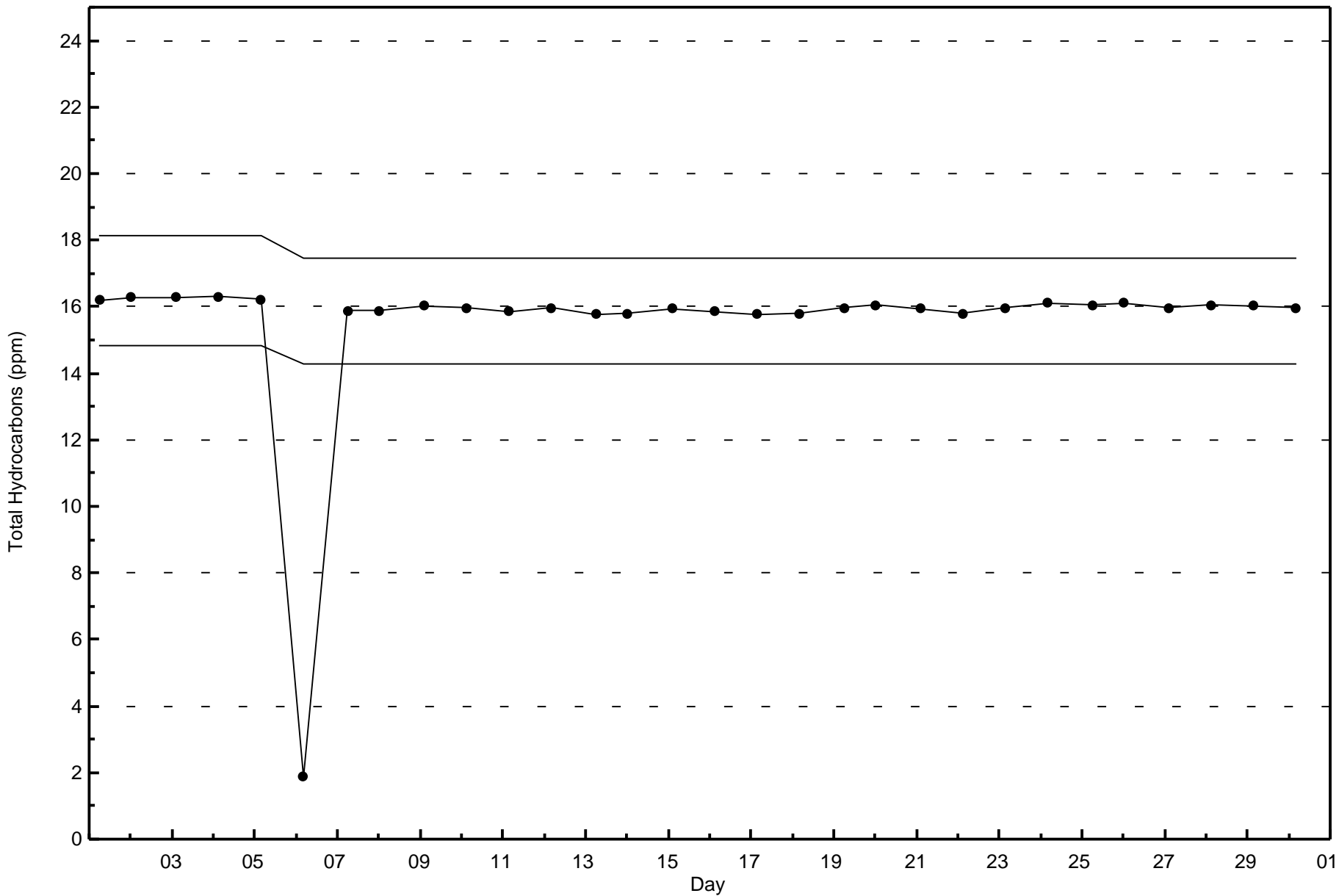


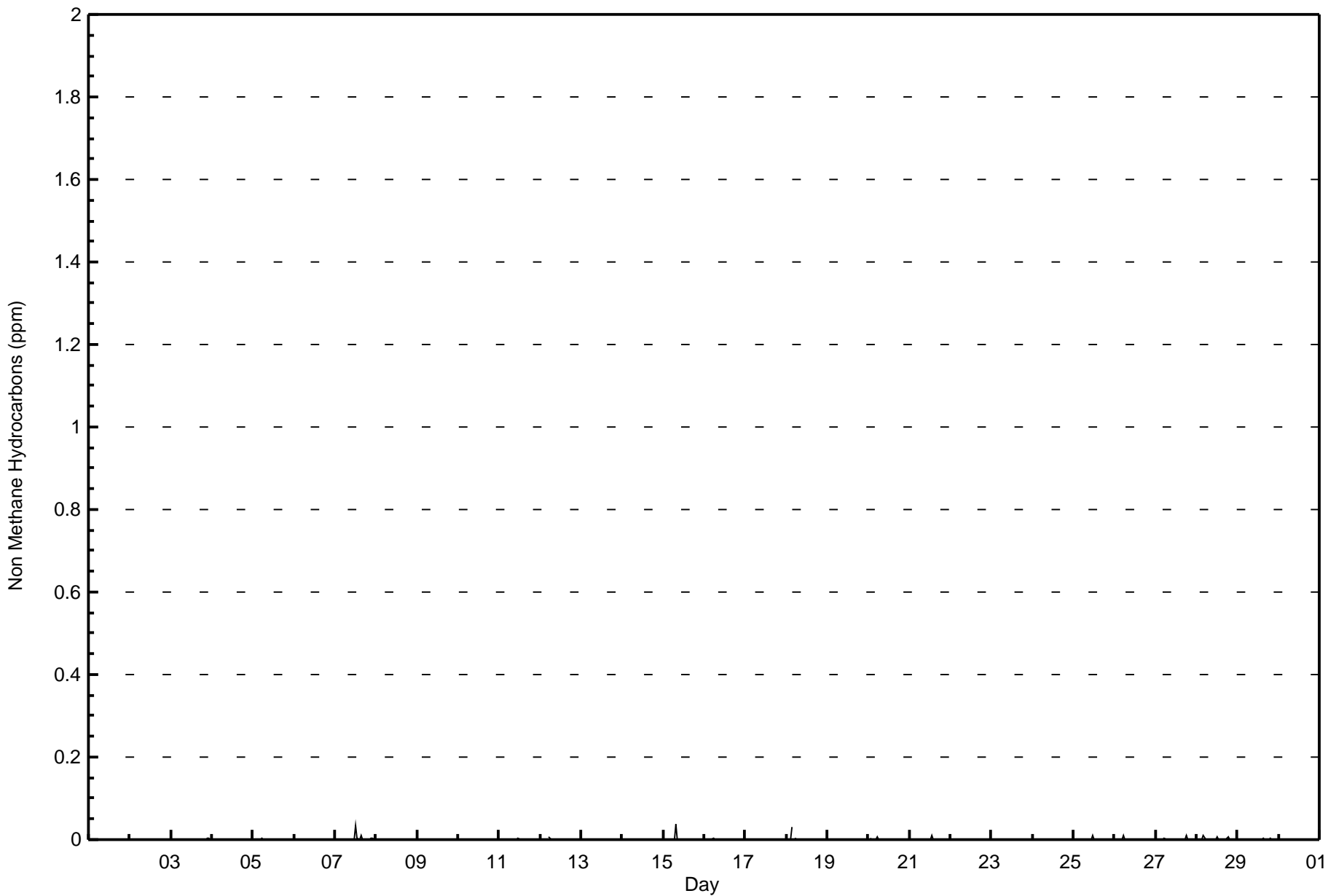
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	671	98.10	98.10
0.006 - 0.05	13	1.90	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



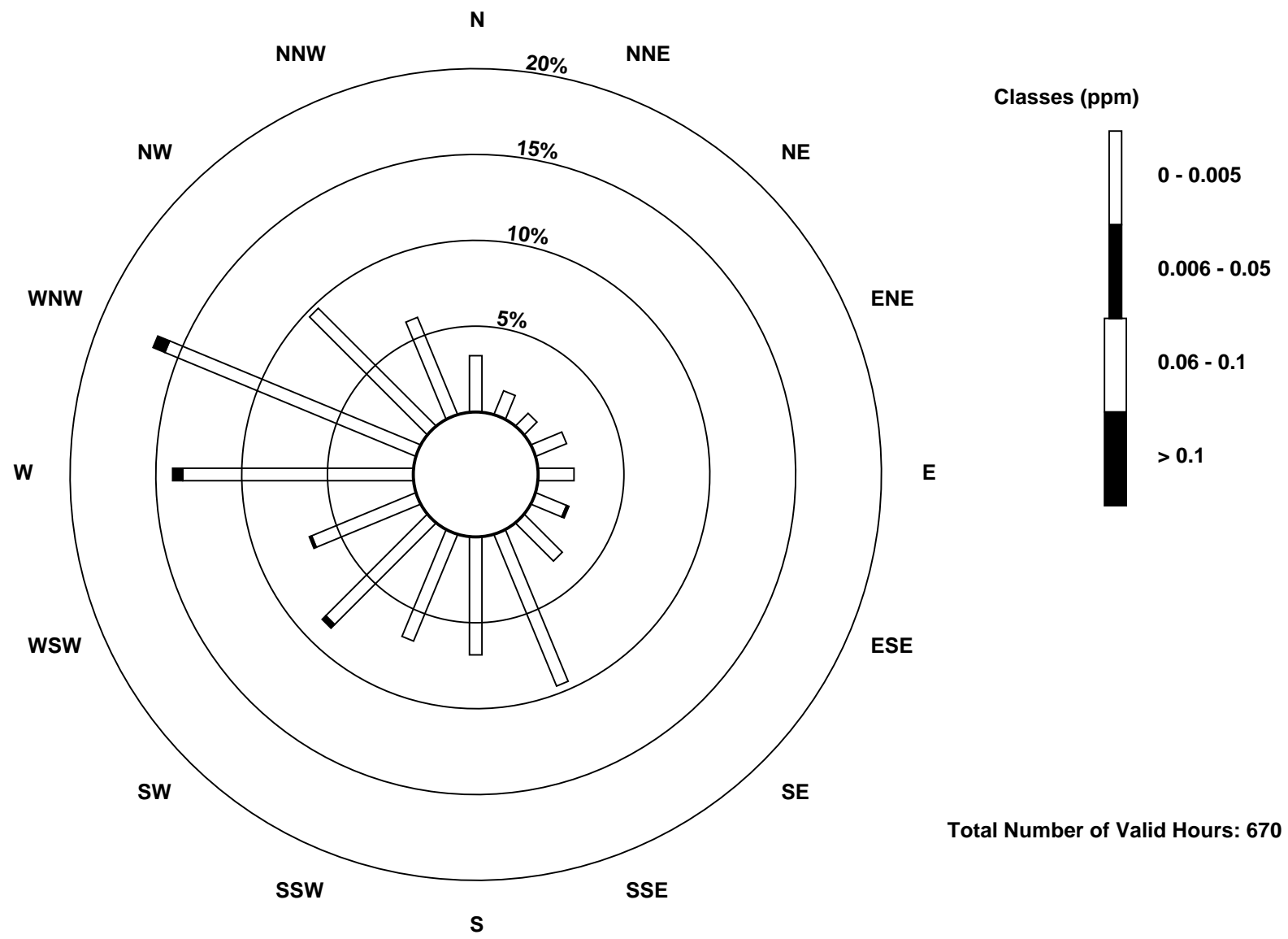
Wood Buffalo Environmental Association
Frequency Distribution

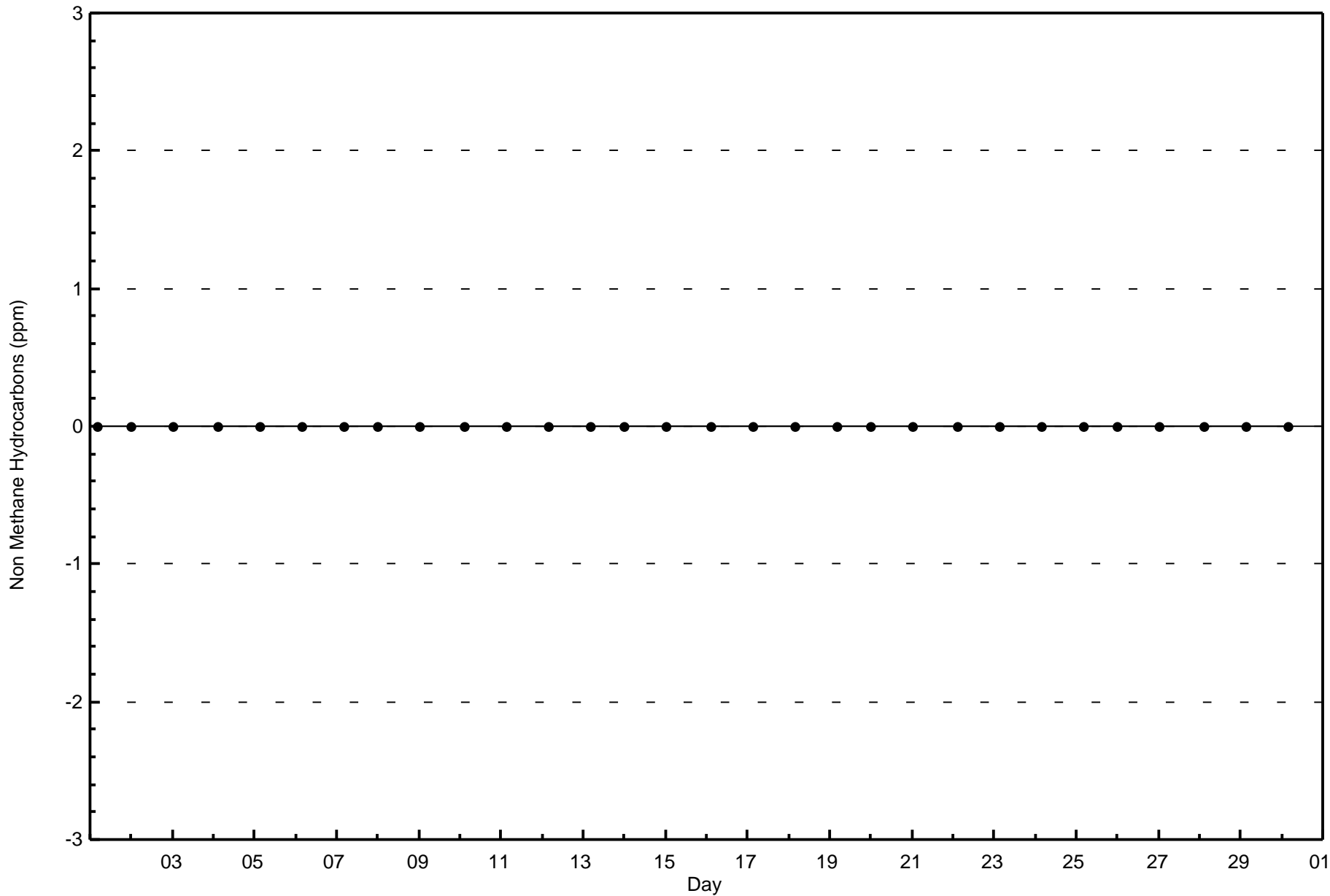
Non Methane Hydrocarbons (NMHC) - ppm
Anzac - November 2015

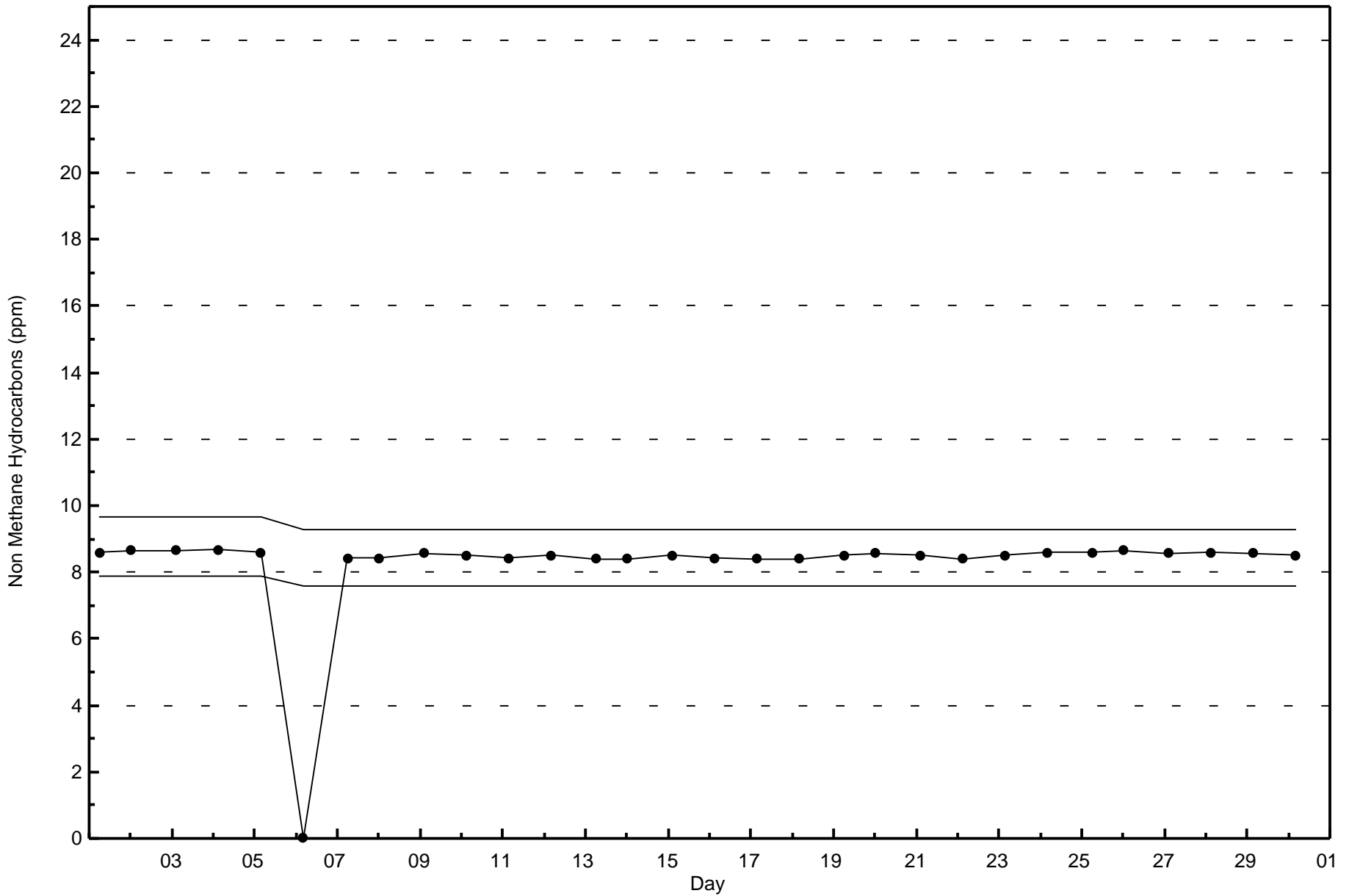
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	22	10	7	13	14	13	21	64	46	45	56	44	90	106	65	41	657
0.006 - 0.05	0	0	0	0	0	1	0	0	0	0	2	1	4	5	0	0	13
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	10	7	13	14	14	21	64	46	45	58	45	94	111	65	41	670

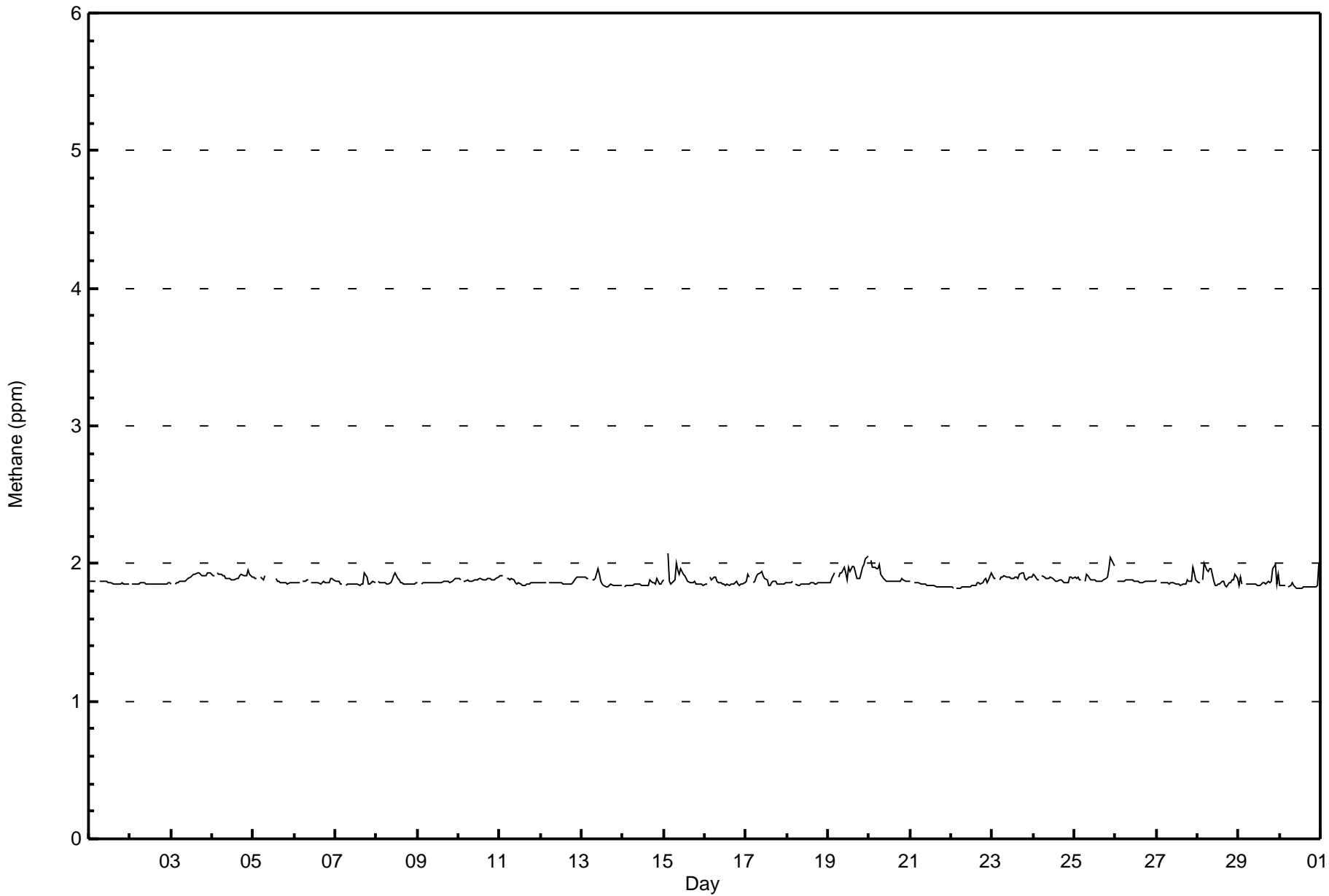
Total Number of Valid Hours: 670

Total Number of Hours: 720











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Anzac - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	682	99.71	99.71
2.1 - 3.0	2	0.29	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - November 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	22	10	7	13	14	14	21	64	45	45	58	45	93	111	65	41	668
2.1 - 3.0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	10	7	13	14	14	21	64	46	45	58	45	94	111	65	41	670

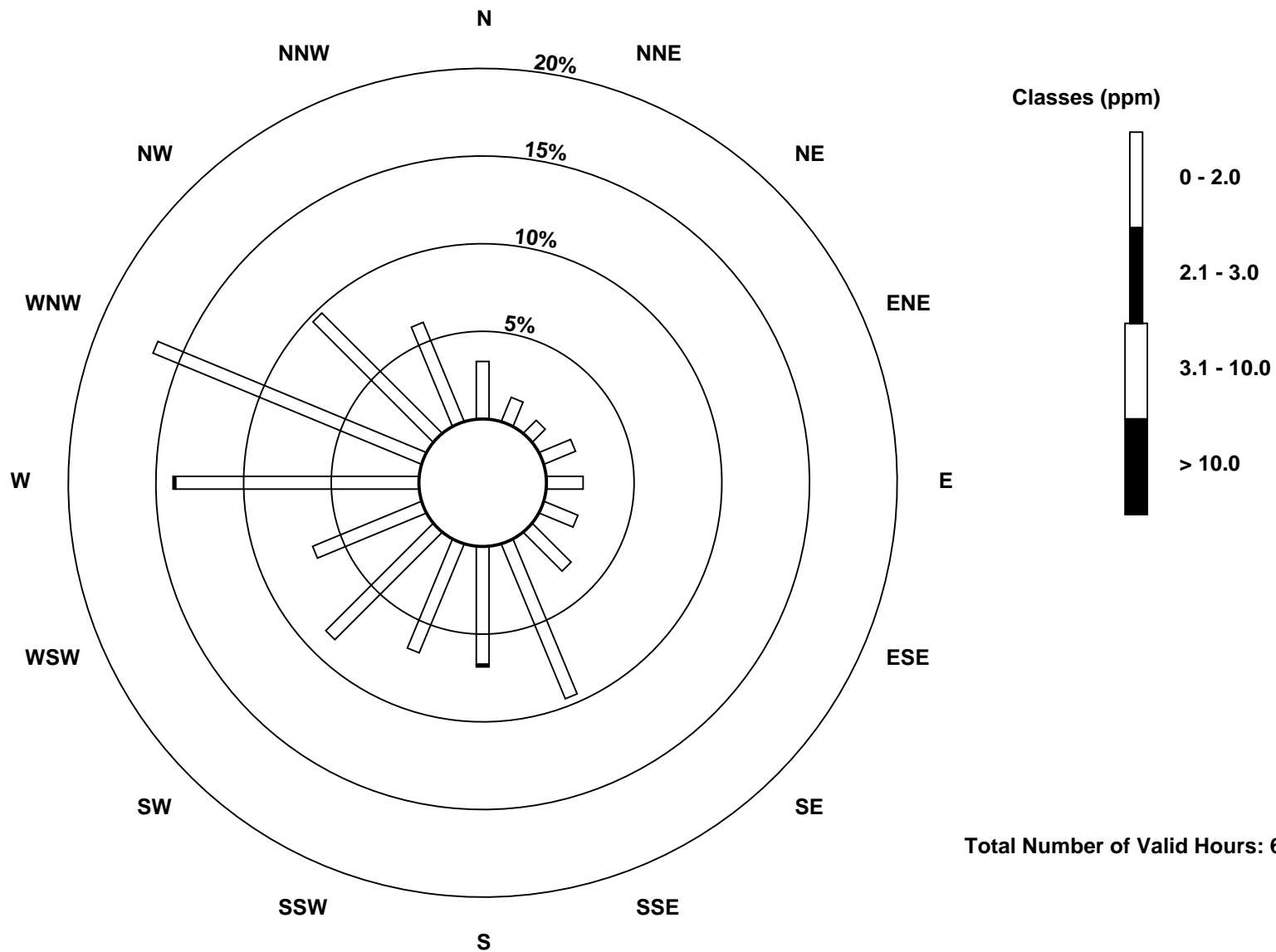
Total Number of Valid Hours: 670

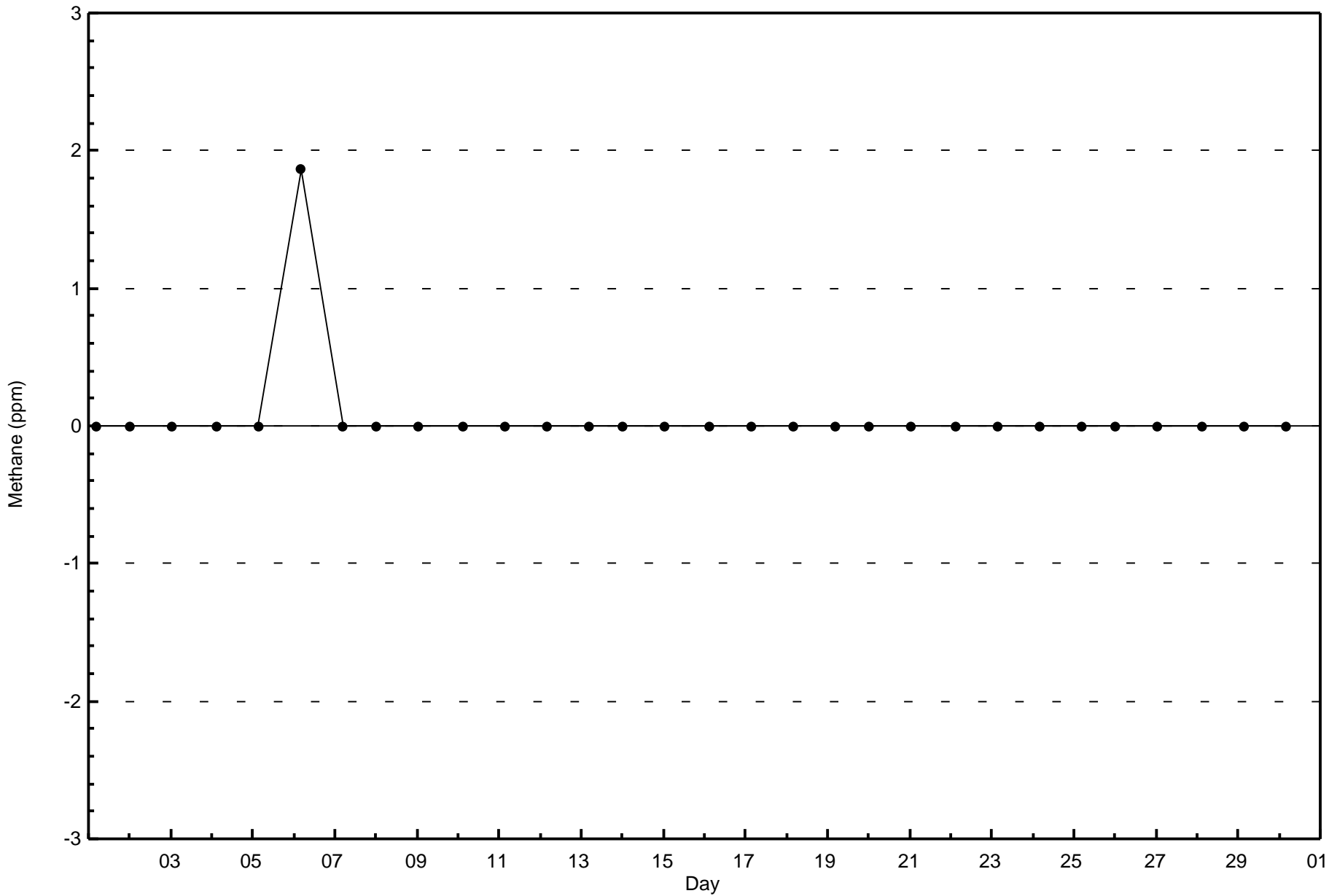
Total Number of Hours: 720

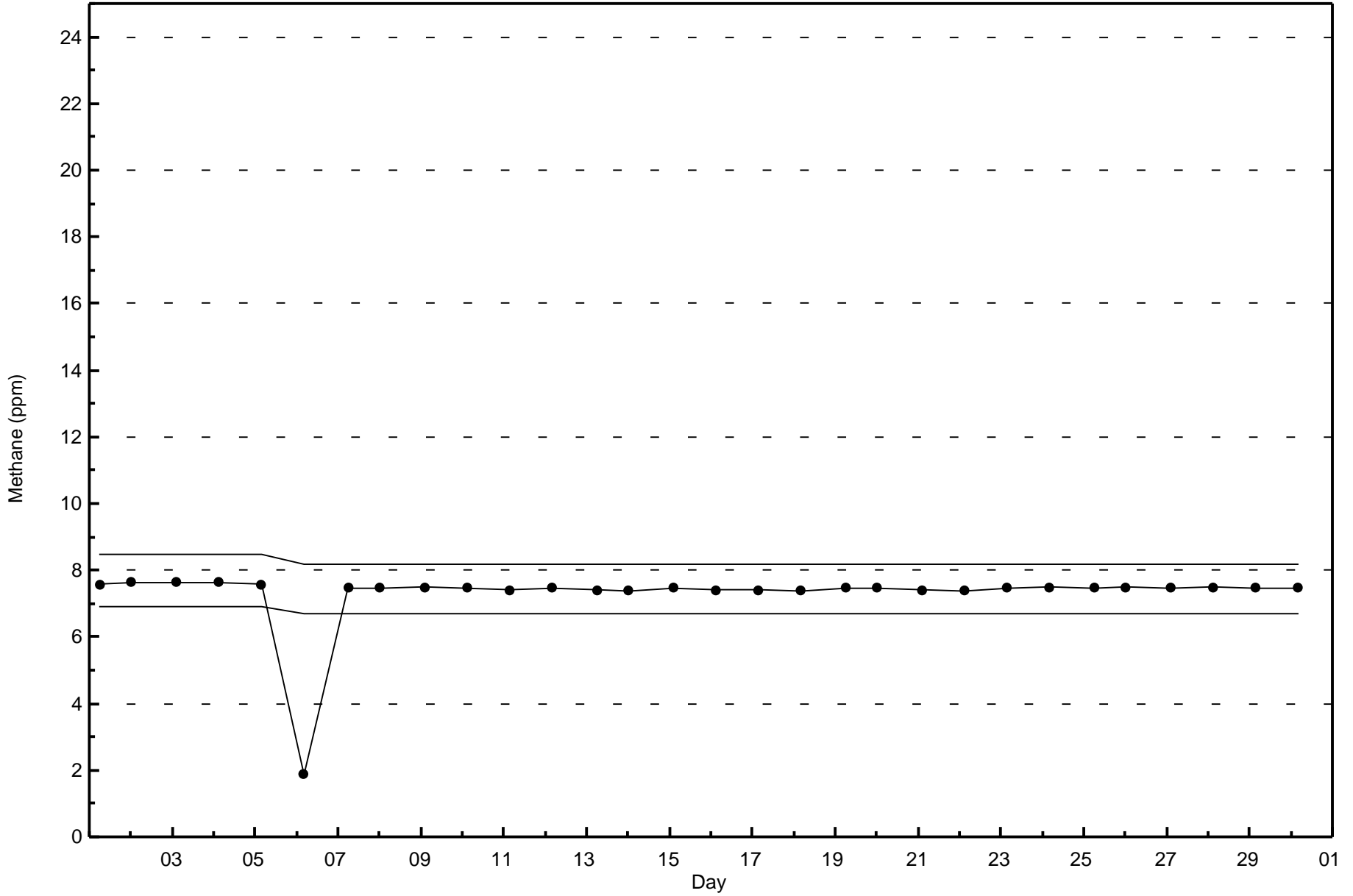


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Methane (CH₄) - ppm
Anzac (AMS 14)









Maximum Value: 13 ppb on Nov 27 19:00	Maximum Daily Average: 1.3 ppb on Nov 19	Hours in Service: 720
Minimum Value: 0 ppb on Nov 1 21:00	Minimum Daily Average: 0.0 ppb on Nov 1	Hours of Data: 659
Maximum Diurnal Average: 0.9 ppb at hour 19	Minimum Diurnal Average: 0.1 ppb at hour 1	Hours of Missing Data: 61
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 = 5	Hours of Calibration: 35
		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-Nov	0	0	0	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-Nov	Z	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	1
3-Nov	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0.4	1
4-Nov	0	0	Z	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Nov	0	0	0	Z	0	0	0	0	0	M	M	M	M	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0
6-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
8-Nov	Z	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.2	2
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.1	2
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0.3	1
11-Nov	0	0	0	Z	0	0	0	0	0	2	4	5	3	1	0	0	0	0	0	0	0	0	0	0	0.7	5
12-Nov	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Nov	Z	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0.4	2
15-Nov	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
16-Nov	0	0	Z	0	0	0	0	0	0	M	M	0	0	1	0	0	0	0	2	0	0	0	0	0	0.3	2
17-Nov	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1
18-Nov	0	0	0	0	Z	1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0.3	2
19-Nov	0	0	0	0	0	Z	1	0	1	2	2	1	1	1	1	1	0	0	5	0	1	2	4	6	1.3	6
20-Nov	Z	3	0	1	0	0	0	0	0	0	0	5	2	1	0	0	0	0	0	0	0	0	1	1	0.6	5
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.3	2
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Nov	0	0	0	Z	0	0	0	0	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.3	2
24-Nov	0	0	0	0	Z	0	0	0	0	2	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0.5	2
25-Nov	0	1	0	0	0	Z	0	1	1	0	0	1	1	1	1	0	0	1	0	1	1	1	0	0	0.5	1
26-Nov	Z	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0.3	2
27-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	13	0	0	1	1	0	0	0.8	13
28-Nov	0	0	Z	2	1	1	1	3	0	8	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0.9	8
29-Nov	0	1	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	11	1	0	0	0	0.7	11
30-Nov	0	0	0	0	Z	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1

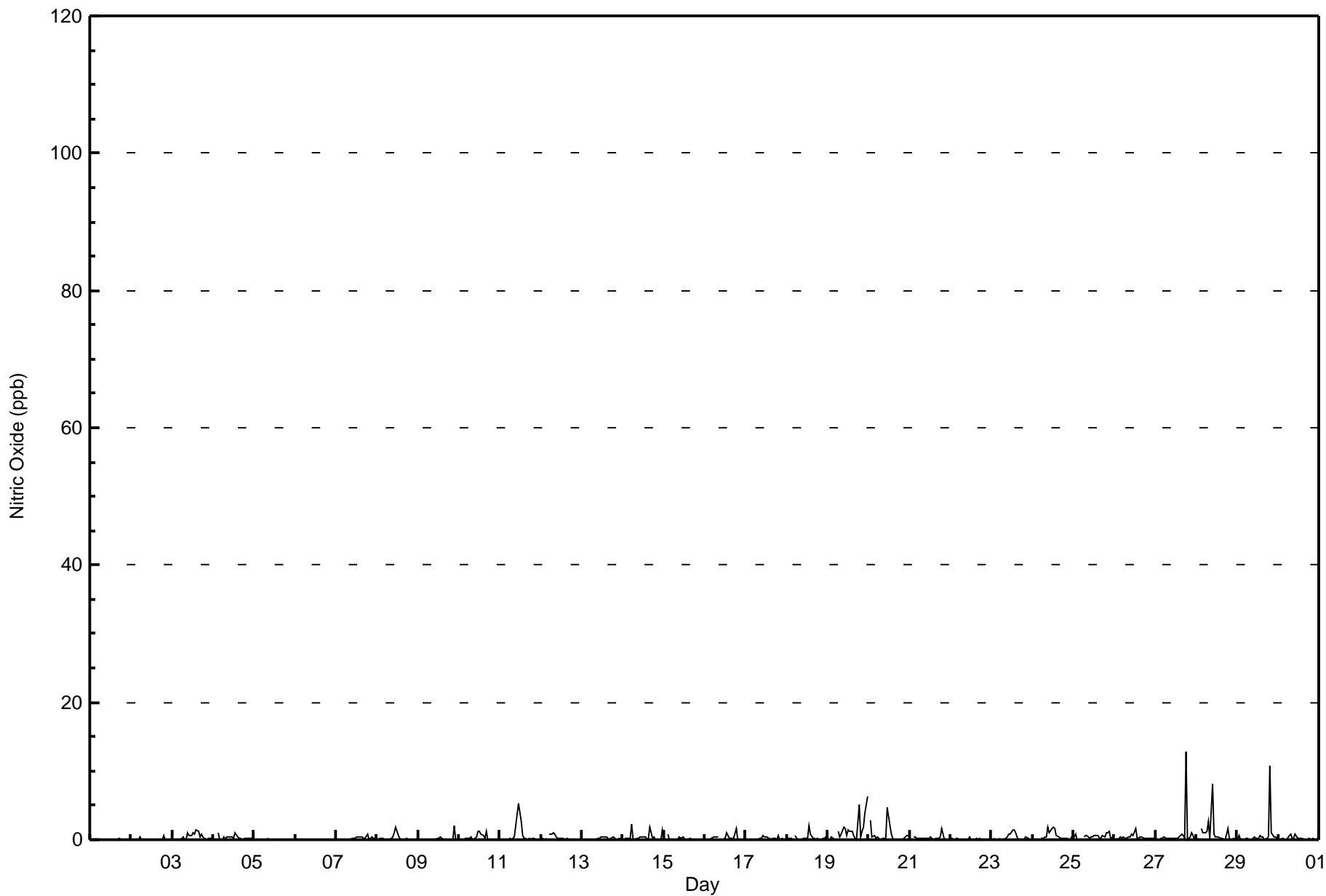
0.1	0.3	0.2	0.2	0.1	0.3	0.2	0.3	0.2	0.7	0.6	0.8	0.7	0.6	0.4	0.3	0.2	0.2	0.9	0.6	0.2	0.3	0.2	0.4	Diurnal Average
0	3	1	2	1	2	1	3	1	8	4	5	3	2	1	1	2	1	13	11	1	2	4	6	Diurnal Maximum

Z - zerspan C - Calibration M - Maintenance UO - Unstable Operation



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	659	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: 659

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	10	7	13	14	14	21	64	41	43	58	45	93	110	60	31	645
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	21	10	7	13	14	14	21	64	41	43	58	45	93	110	60	31	645

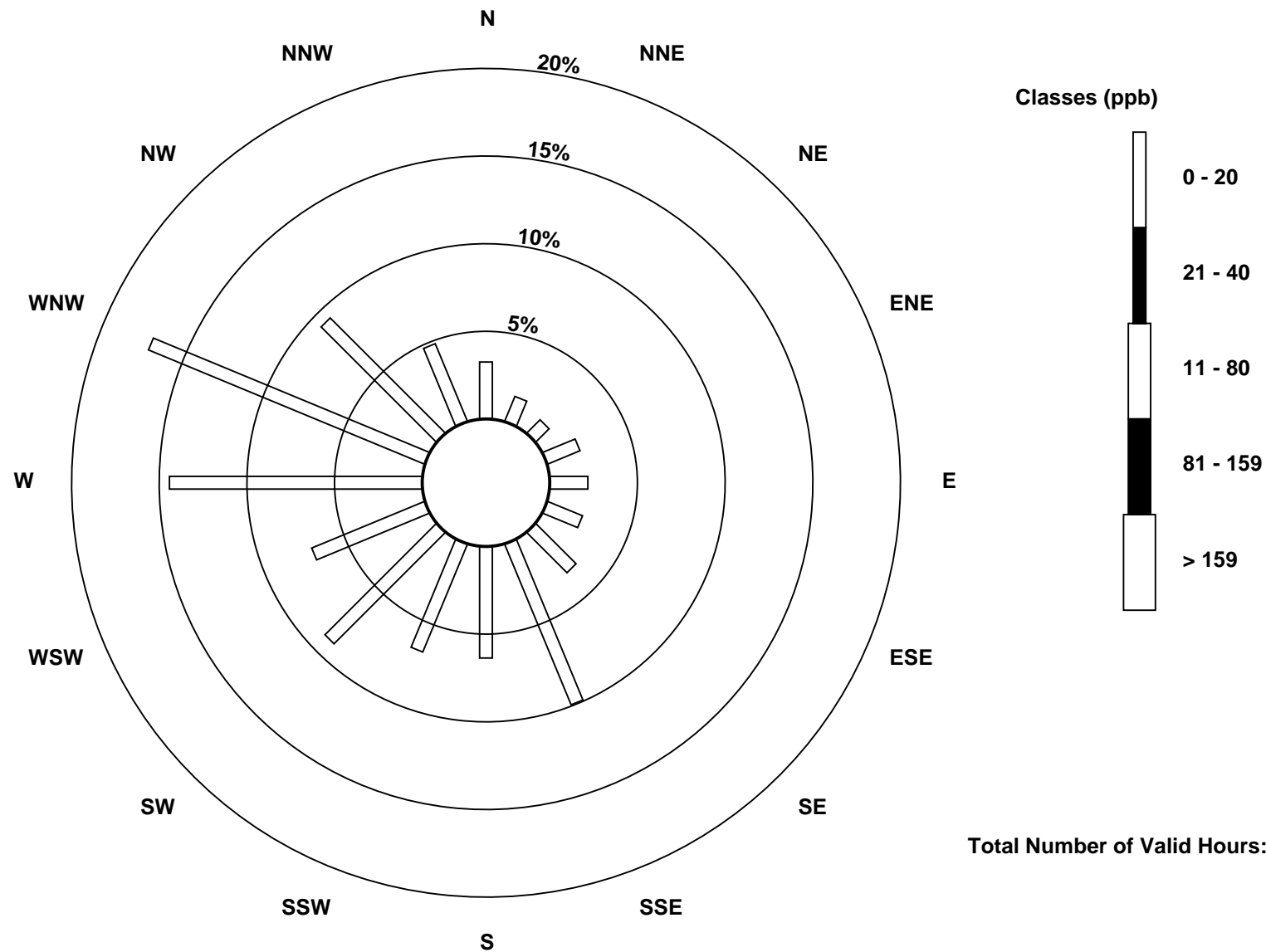
Total Number of Valid Hours: 645

Total Number of Hours: 720

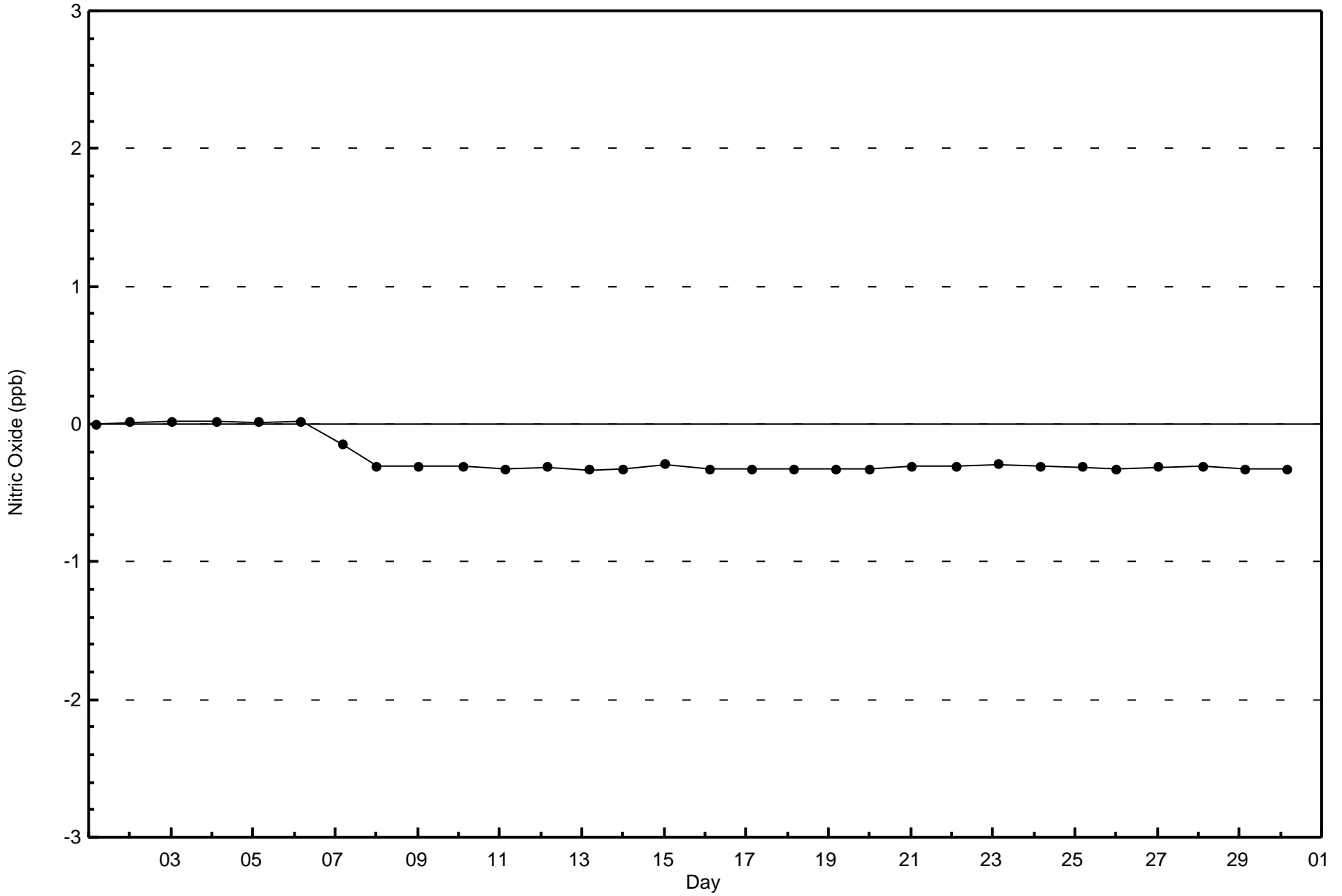


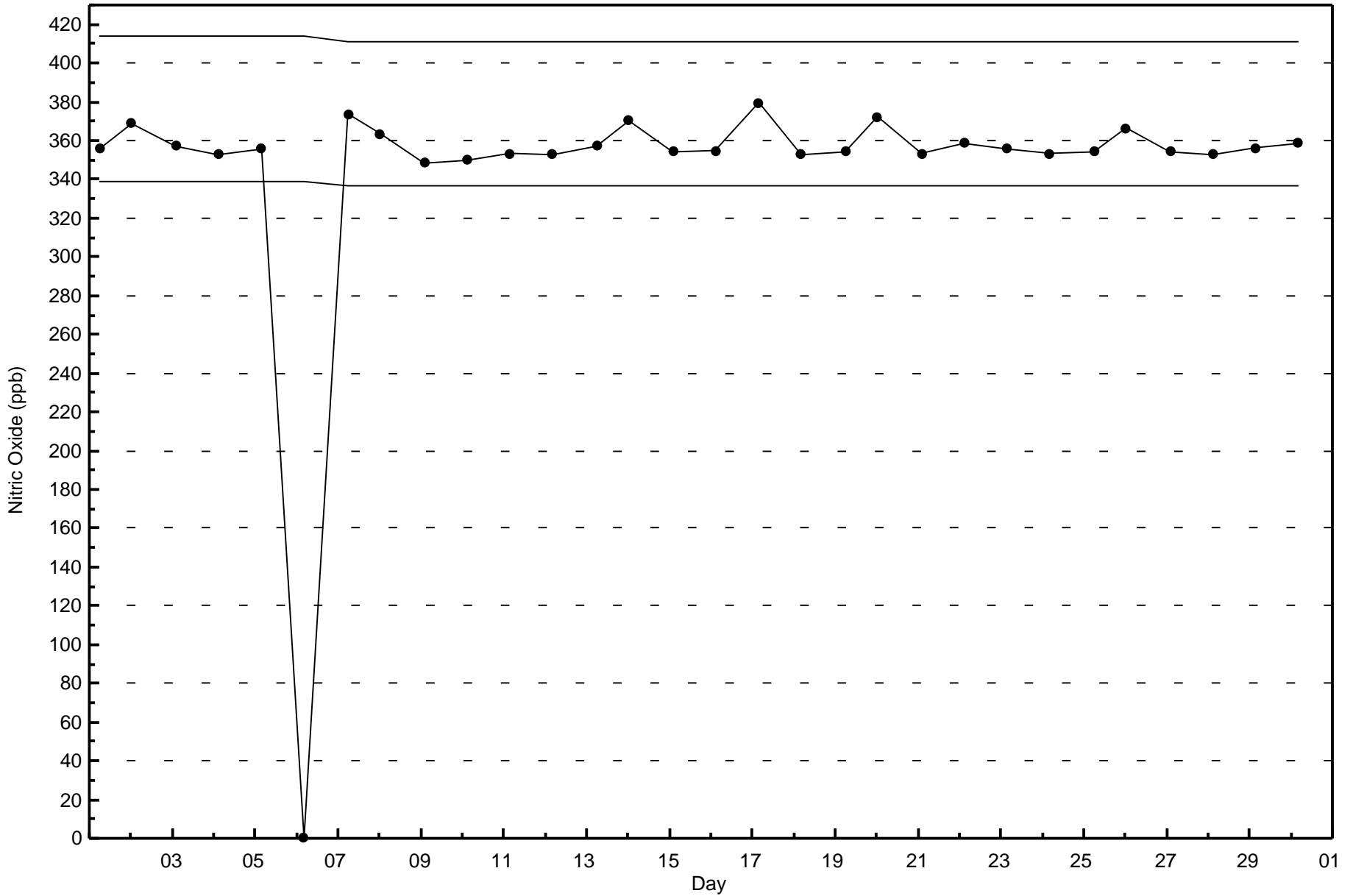
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitric Oxide (NO) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 645







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 21 ppb on Nov 20 04:00	Maximum Daily Average: 6.7 ppb on Nov 23		Hours of Data:	659
Minimum Value: 0 ppb on Nov 1 11:00	Minimum Daily Average: 0.2 ppb on Nov 1		Hours of Missing Data:	61
Maximum Diurnal Average: 3.2 ppb at hour 19	Minimum Diurnal Average: 1.8 ppb at hour 14		Hours of Calibration:	35
Monthly Average: 2.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 15		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-Nov	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
2-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0.3	1
3-Nov	0	Z	1	1	1	1	2	1	1	2	3	2	2	2	3	3	2	2	2	2	4	6	5	5	2.2	6
4-Nov	4	4	Z	4	3	3	3	2	2	1	1	2	2	3	5	4	5	5	4	4	4	4	3	2	3.2	5
5-Nov	2	2	1	Z	3	2	3	4	5	M	M	M	M	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	5	
6-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	C	0	1	1	1	1	1	2	2	2	--	2
7-Nov	2	2	1	1	1	Z	1	1	1	1	1	1	2	2	1	2	2	3	3	2	2	2	2	2	1.7	3
8-Nov	Z	2	1	1	1	1	1	1	1	3	5	7	4	2	1	0	0	1	0	0	0	0	0	0	1.4	7
9-Nov	0	Z	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	0.9	2
10-Nov	1	1	Z	2	2	2	2	2	1	2	2	2	3	2	2	2	3	3	3	4	4	3	4	4	2.4	4
11-Nov	4	4	3	Z	3	2	2	3	3	4	5	6	5	1	1	1	2	2	1	1	1	1	1	1	2.4	6
12-Nov	1	1	1	1	Z	2	3	3	2	2	1	1	1	1	1	1	1	1	1	2	2	3	3	2	1.5	3
13-Nov	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	1	1	2	2	2	1	1	1	1	1	1.5	2
14-Nov	Z	1	1	1	1	3	1	1	1	1	1	1	1	1	1	5	2	2	2	1	1	1	1	6	1.6	6
15-Nov	4	Z	3	1	1	1	1	4	2	2	2	3	2	1	1	1	1	1	1	1	1	0	0	0	1.5	4
16-Nov	0	0	Z	1	2	3	3	2	1	M	M	0	1	1	1	1	1	1	4	1	1	1	1	1	1.1	4
17-Nov	1	3	2	Z	2	3	3	3	3	2	2	2	1	1	1	1	2	3	2	3	1	1	1	1	1.8	3
18-Nov	1	1	1	1	Z	1	0	0	1	1	1	1	1	2	3	2	0	1	1	1	1	1	1	2	0.9	3
19-Nov	2	2	2	2	2	Z	9	4	4	5	4	2	3	3	4	4	3	2	9	11	13	15	15	15	5.8	15
20-Nov	Z	18	20	21	15	9	9	3	2	1	1	2	2	1	1	1	2	2	2	2	2	2	3	3	5.2	21
21-Nov	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.2	2
22-Nov	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	3	4	2	3	4	3	1	3	9	1.8	9	
23-Nov	8	5	5	Z	3	4	4	5	4	4	5	6	8	8	8	7	9	13	14	10	8	8	6	6	6.7	14
24-Nov	7	8	6	10	Z	8	6	5	5	4	5	6	5	2	2	2	1	1	1	1	1	1	1	1	3.8	10
25-Nov	1	4	2	1	1	Z	2	3	3	2	2	1	1	2	2	1	2	4	3	6	7	6	4	3	2.7	7
26-Nov	Z	1	1	2	2	2	2	2	2	3	2	2	3	1	2	1	2	2	3	3	3	2	2	2	2.1	3
27-Nov	2	Z	2	2	2	2	2	1	1	1	1	1	1	1	2	5	5	2	21	3	4	7	8	4	3.4	21
28-Nov	2	2	Z	6	4	4	6	8	4	7	4	2	2	2	2	3	2	1	5	3	2	2	3	1	3.4	8
29-Nov	1	3	1	Z	1	2	1	1	1	2	2	1	2	3	3	4	2	3	3	17	7	4	2	2	2.9	17
30-Nov	2	1	1	1	Z	1	3	4	2	1	2	1	1	1	1	1	1	2	2	2	3	2	1	3	1.7	4

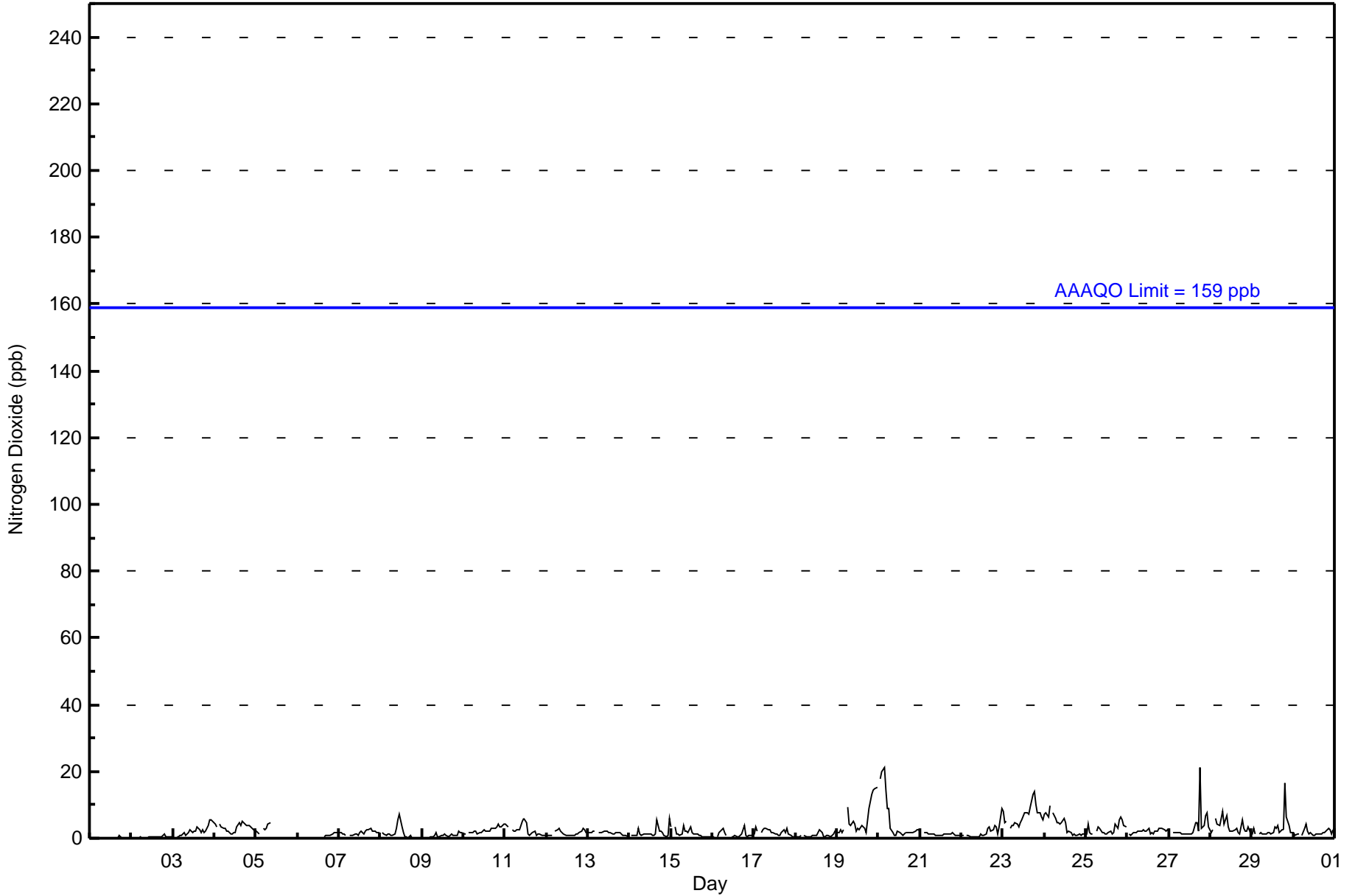
2.1	2.7	2.5	2.6	2.1	2.4	2.5	2.3	2.0	2.0	2.0	2.0	2.0	2.0	1.8	1.8	1.9	2.1	2.2	3.2	3.0	2.7	2.7	2.6	2.8	Diurnal Average	
8	18	20	21	15	9	9	8	5	7	5	7	8	8	8	7	9	13	21	17	13	15	15	15	Diurnal Maximum		

Z - zerspan C - Calibration M - Maintenance UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	657	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: 659

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	10	7	13	14	14	21	64	41	43	58	45	92	110	59	31	643
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	10	7	13	14	14	21	64	41	43	58	45	93	110	60	31	645

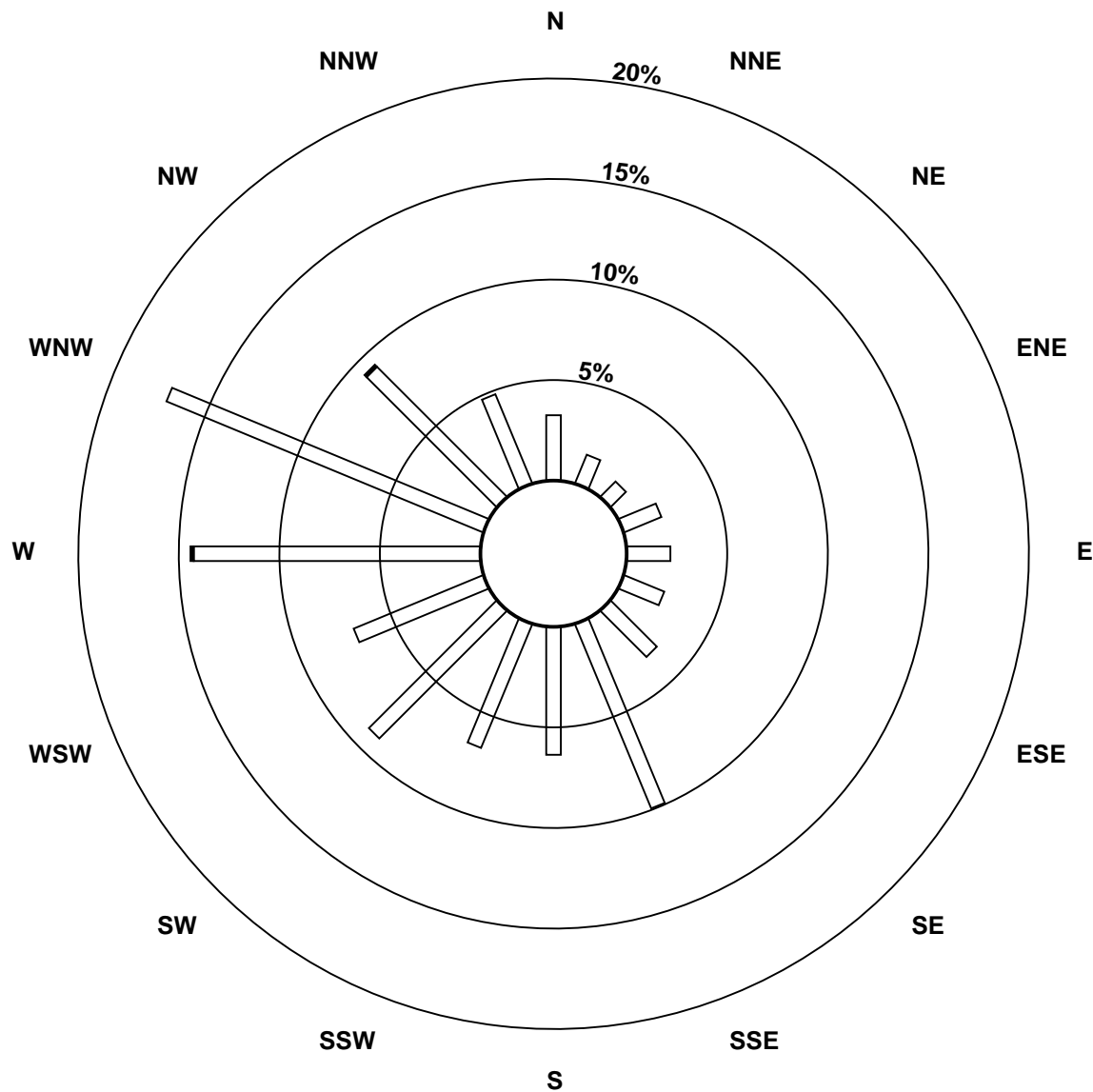
Total Number of Valid Hours: 645

Total Number of Hours: 720

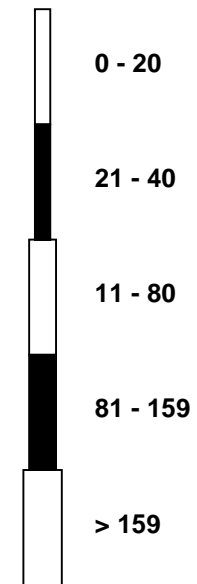


Wood Buffalo Environmental Association
Wind Rose Nov 2015

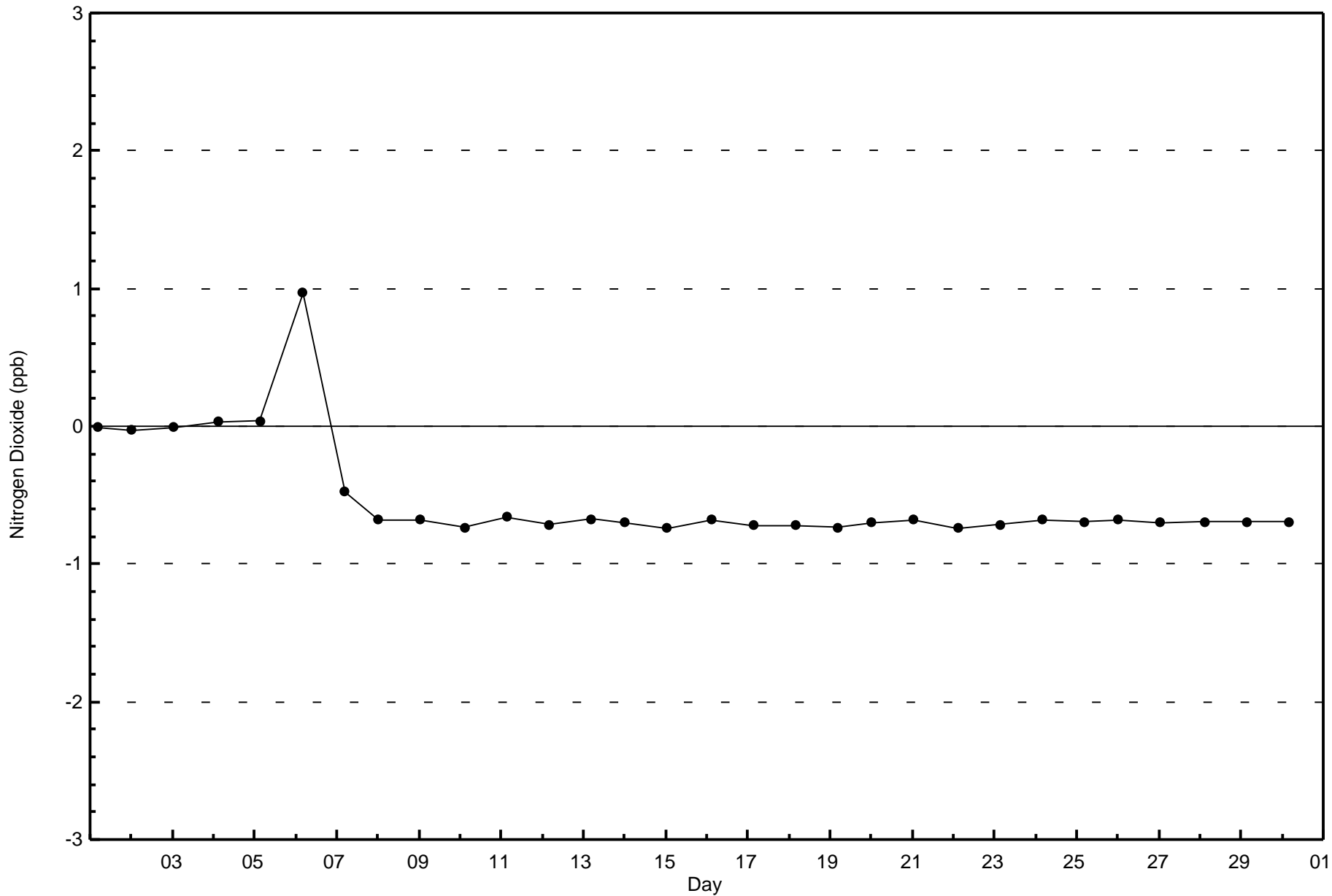
Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)

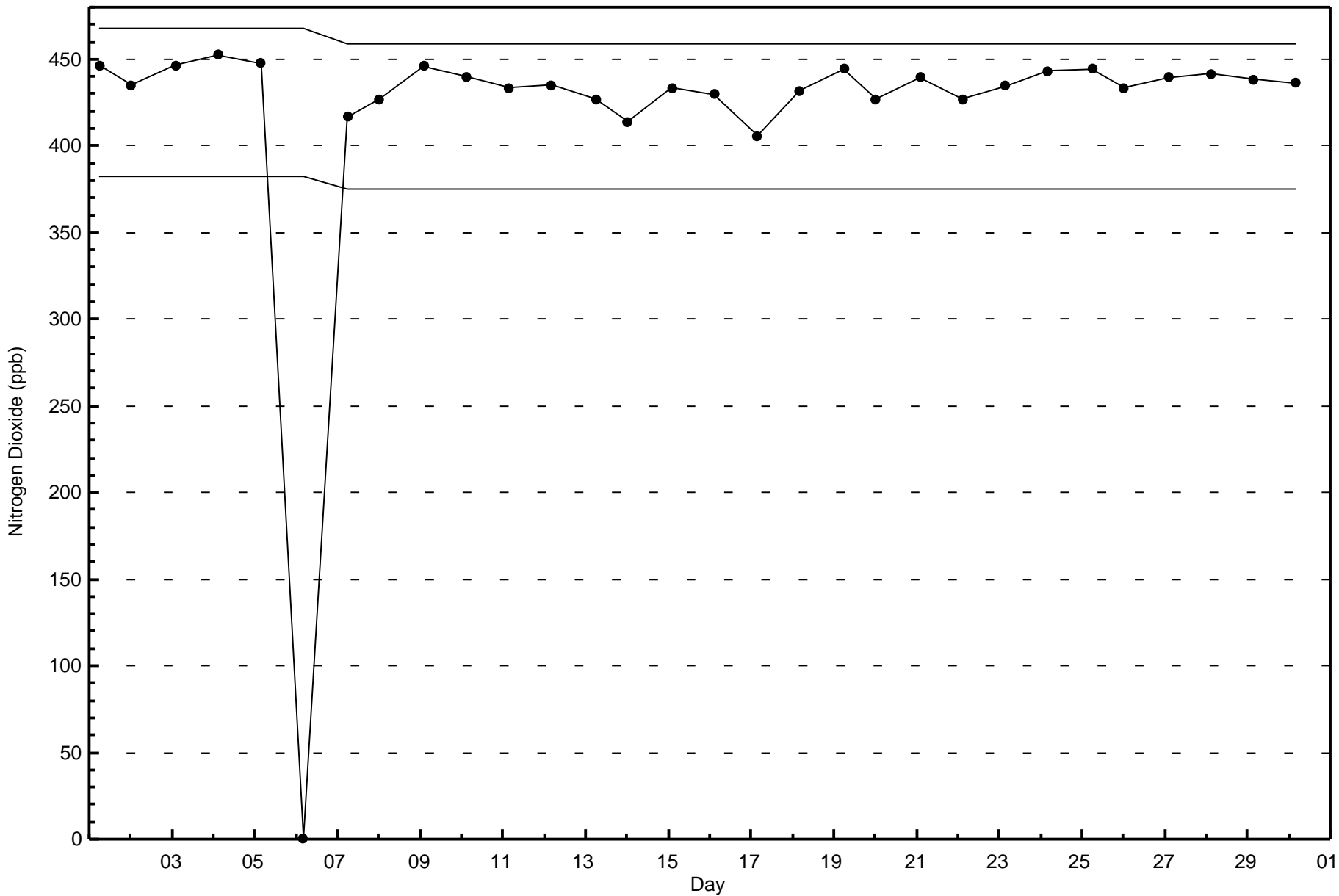


Classes (ppb)



Total Number of Valid Hours: 645





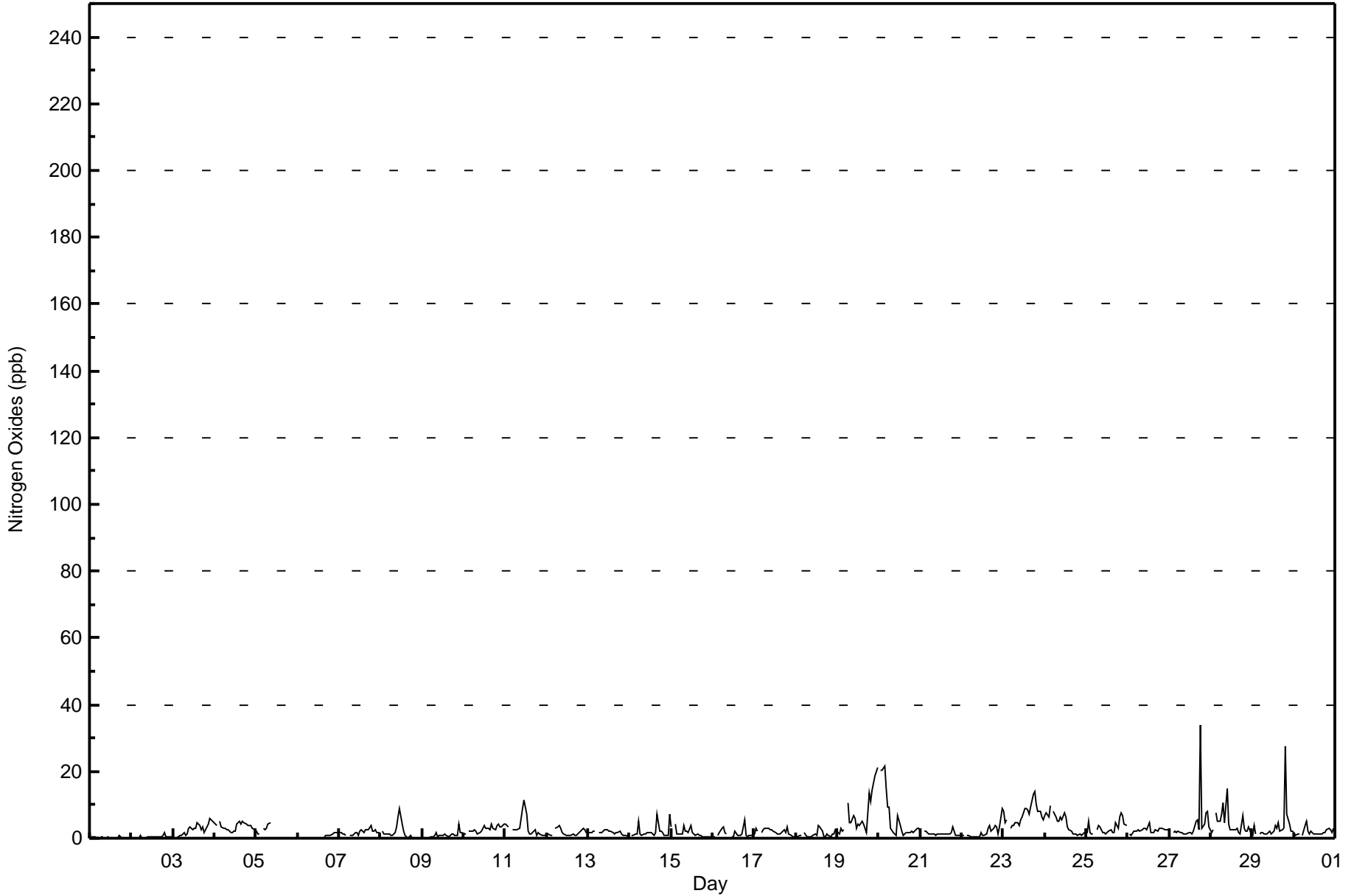


Maximum Value: 34 ppb on Nov 27 19:00	Maximum Daily Average: 7.2 ppb on Nov 19	Hours in Service: 720
Minimum Value: 0 ppb on Nov 2 09:00	Minimum Daily Average: 0.2 ppb on Nov 1	Hours of Data: 659
Maximum Diurnal Average: 4.0 ppb at hour 19	Minimum Diurnal Average: 2.1 ppb at hour 1	Hours of Missing Data: 61
Monthly Average: 2.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 18	Hours of Calibration: 35
		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-Nov	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
2-Nov	Z	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	1	2	0	0	0	0	0.4	2
3-Nov	0	Z	0	1	1	1	2	1	1	3	3	2	3	3	5	4	2	3	2	2	4	6	5	5	2.6	6
4-Nov	4	4	Z	5	3	3	3	2	2	2	2	2	4	5	4	5	5	4	4	4	4	4	3	2	3.5	5
5-Nov	2	1	1	Z	3	2	3	4	5	M	M	M	M	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	5
6-Nov	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	C	0	1	1	1	1	1	2	2	2	--	2
7-Nov	2	2	1	1	1	Z	1	1	1	2	2	1	2	3	2	3	3	3	4	2	2	3	2	2	1.8	4
8-Nov	Z	2	1	1	1	1	1	1	2	3	6	9	4	2	1	0	0	1	0	0	0	0	0	0	1.7	9
9-Nov	0	Z	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	1	1	4	2	2	1.0	4
10-Nov	1	1	Z	2	2	2	2	2	1	2	2	3	4	3	3	2	4	3	3	4	4	3	3	4	2.7	4
11-Nov	4	4	3	Z	3	2	2	3	3	6	9	11	7	2	1	1	2	2	1	2	1	1	1	1	3.1	11
12-Nov	1	1	1	1	Z	3	3	4	3	2	1	1	1	1	1	1	1	1	1	2	2	3	3	2	1.7	4
13-Nov	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	1	2	2	2	1	1	1	1	1	1.7	2
14-Nov	Z	1	1	1	1	5	1	1	1	1	2	2	2	1	1	2	7	2	2	2	1	1	1	7	2.0	7
15-Nov	4	Z	4	1	1	1	1	4	2	2	2	4	2	1	1	1	1	1	1	1	0	0	0	0	1.6	4
16-Nov	0	0	Z	1	2	3	3	2	1	M	M	1	1	2	1	1	1	1	5	1	1	1	1	1	1.4	5
17-Nov	1	3	2	Z	2	3	3	3	3	3	2	2	2	1	1	1	2	3	1	4	1	1	1	1	1.9	4
18-Nov	1	1	1	1	Z	2	0	0	0	1	1	1	1	4	4	2	1	1	1	1	1	1	1	3	1.2	4
19-Nov	2	1	3	2	3	Z	11	5	5	7	6	3	4	4	5	4	3	2	14	11	14	16	19	21	7.2	21
20-Nov	Z	20	20	21	15	9	9	3	2	1	1	7	4	2	1	1	2	2	2	2	2	3	3	3	5.9	21
21-Nov	2	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	1.4	3
22-Nov	1	1	Z	1	1	1	1	0	1	1	1	2	1	1	1	3	4	2	3	4	3	1	3	9	1.9	9
23-Nov	8	5	5	Z	3	4	4	5	5	4	5	6	9	9	8	7	9	13	14	10	8	8	6	6	7.0	14
24-Nov	7	8	6	10	Z	8	6	5	5	6	5	8	6	3	3	2	1	1	1	1	1	1	1	2	4.3	10
25-Nov	2	5	2	1	1	Z	2	4	3	2	2	1	2	2	3	2	2	5	3	6	8	7	4	4	3.1	8
26-Nov	Z	1	1	2	2	2	2	2	2	3	3	3	5	2	2	2	2	2	3	3	3	3	3	2	2.4	5
27-Nov	2	Z	2	2	2	2	2	1	1	1	1	2	1	1	2	5	5	2	34	3	4	8	8	4	4.2	34
28-Nov	2	3	Z	8	5	5	7	11	5	15	4	2	3	2	3	3	2	1	7	3	2	2	3	1	4.3	15
29-Nov	1	4	1	Z	1	2	2	1	1	2	2	1	2	4	3	5	2	3	3	27	7	4	2	2	3.6	27
30-Nov	2	1	1	1	Z	1	4	5	2	1	2	1	1	1	1	1	1	2	2	2	3	2	1	3	1.9	5

2.1	3.0	2.6	2.8	2.3	2.7	2.8	2.6	2.2	2.7	2.6	2.8	2.6	2.3	2.2	2.2	2.3	2.3	4.0	3.6	2.8	3.0	2.8	3.1	Diurnal Average	
8	20	20	21	15	9	11	11	5	15	9	11	9	9	8	7	9	13	34	27	14	16	19	21	Diurnal Maximum	

Z - zerspan C - Calibration M - Maintenance UO - Unstable Operation





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	655	99.39	99.39
21 - 40	4	0.61	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: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	10	7	13	14	14	21	64	41	43	57	45	91	110	59	31	641
21 - 40	0	0	0	0	0	0	0	0	0	0	1	0	2	0	1	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	10	7	13	14	14	21	64	41	43	58	45	93	110	60	31	645

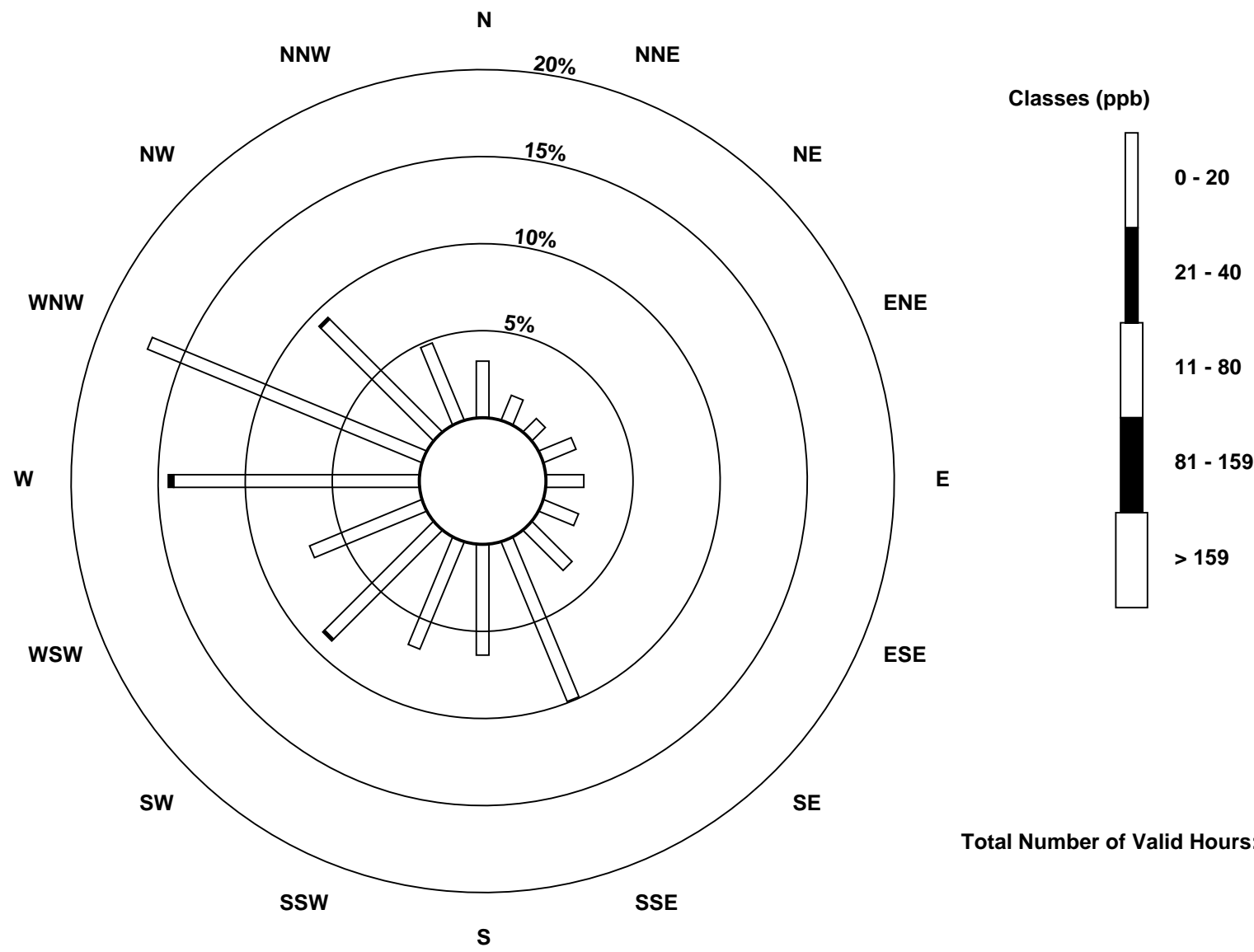
Total Number of Valid Hours: 645

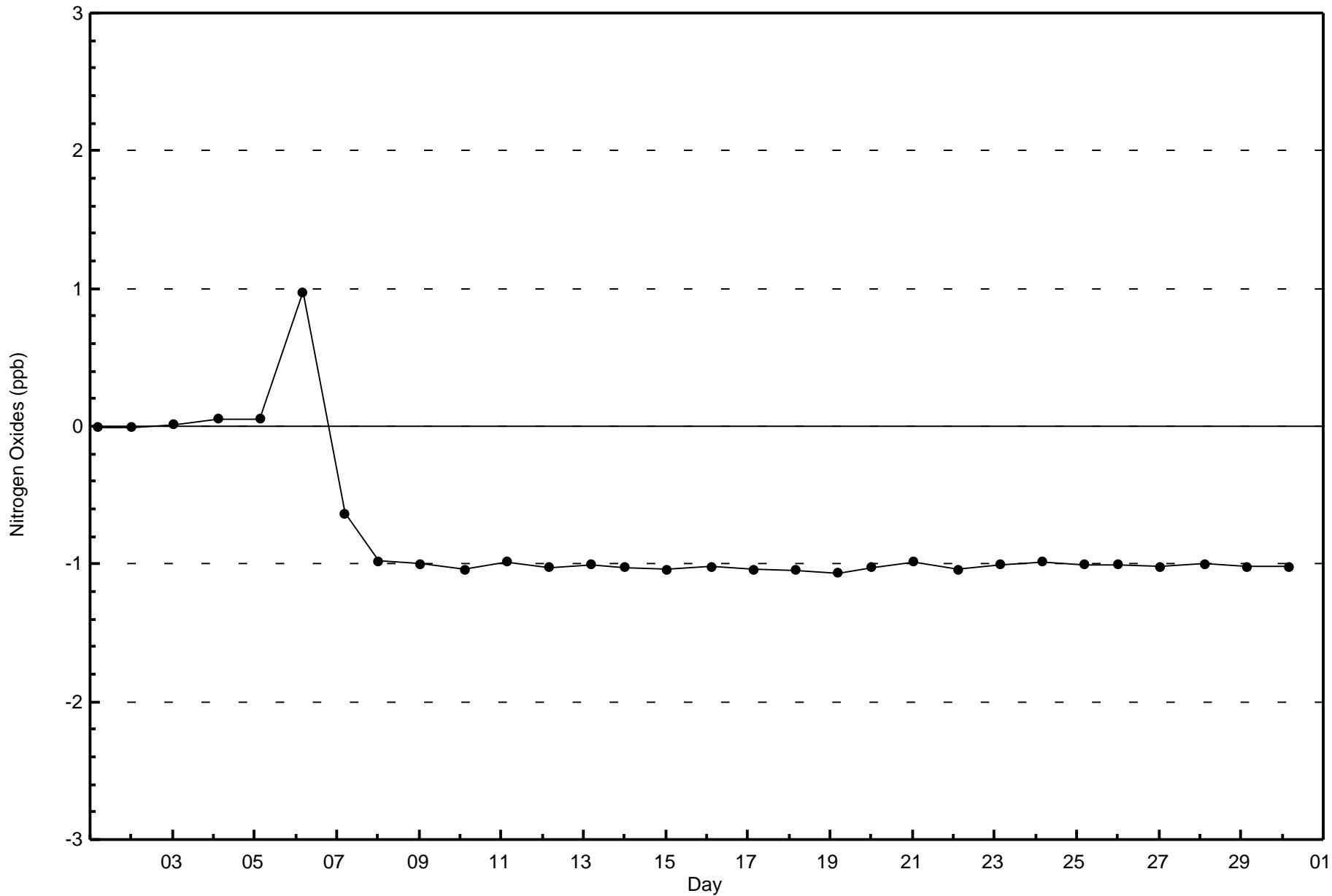
Total Number of Hours: 720

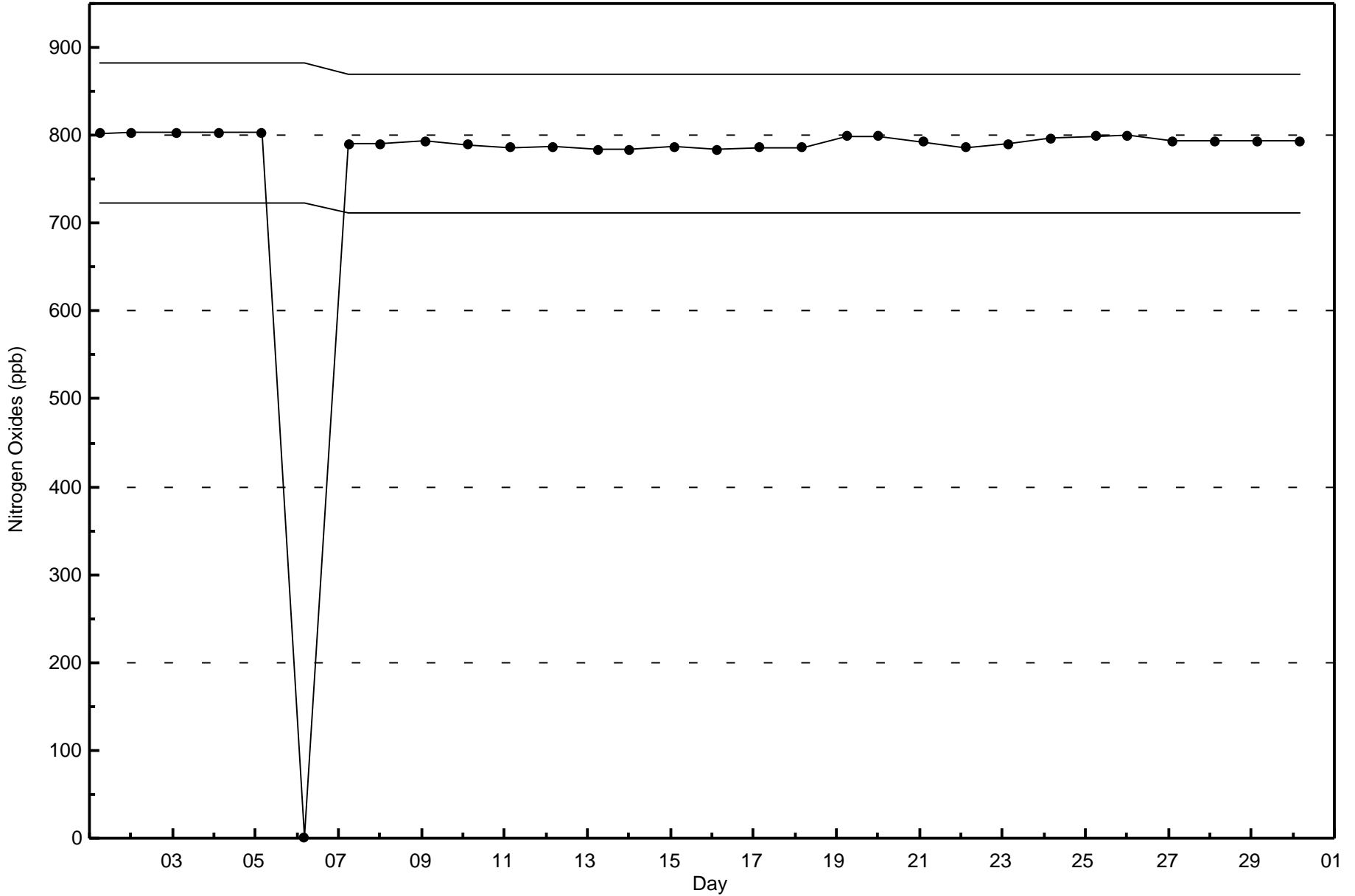


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)







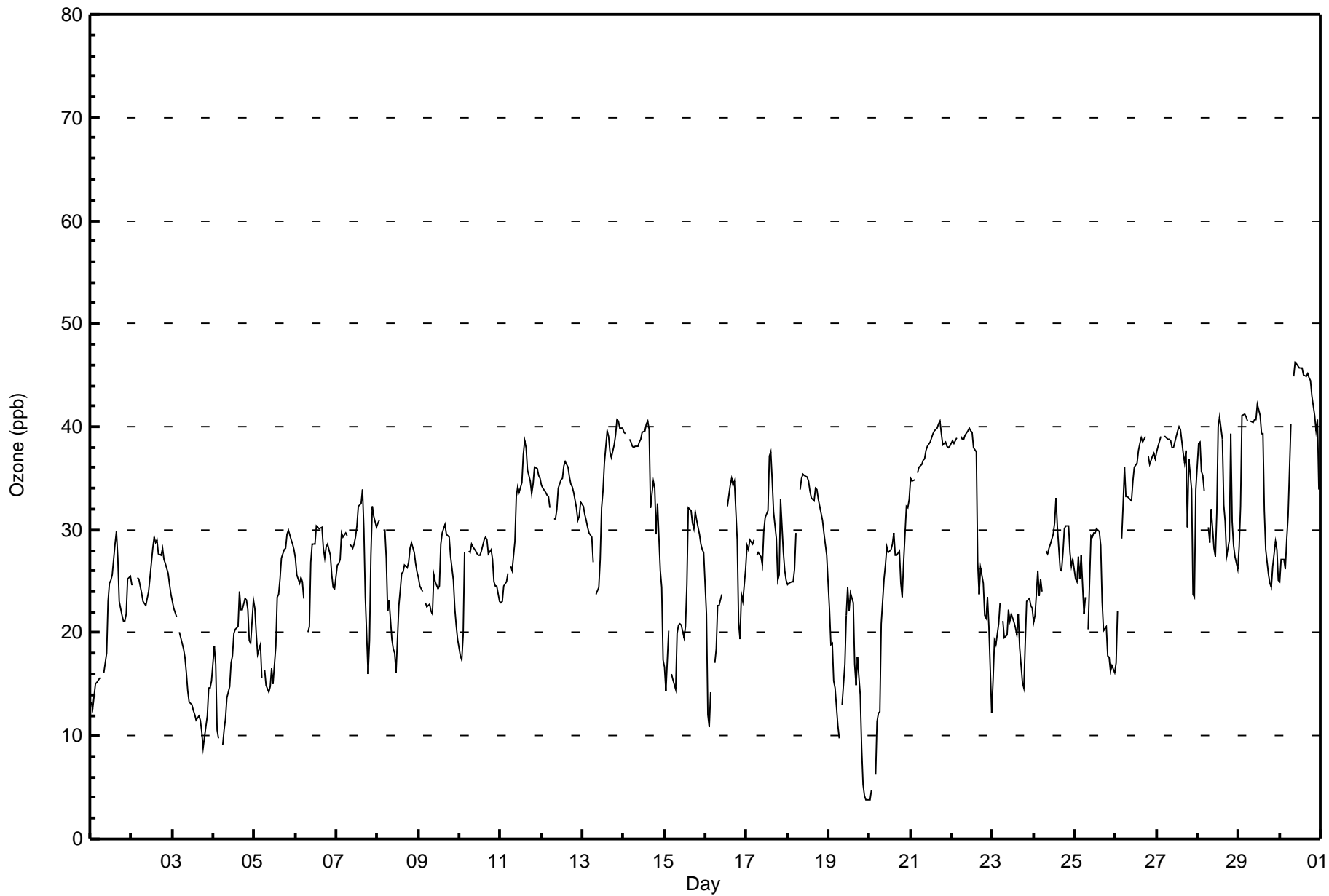


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 46 ppb on Nov 30 10:00	Maximum Daily Average: 39.2 ppb on Nov 30		Hours of Data:	686
Minimum Value: 4 ppb on Nov 20 00:00	Minimum Daily Average: 15.0 ppb on Nov 19		Hours of Missing Data:	34
Maximum Diurnal Average: 32.1 ppb at hour 15	Minimum Diurnal Average: 24.9 ppb at hour 7		Hours of Calibration:	33
Monthly Average: 27.8 ppb	Percentiles: P ₁ = 9 P ₁₀ = 16 Q ₁ = 23 Median = 28 Q ₃ = 34 P ₉₀ = 39 P ₉₉ = 45		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-Nov	13	13	14	15	15	16	16	Z	16	18	23	25	25	26	29	30	27	23	22	21	21	22	25	25	20.8	30	
2-Nov	25	25	Z	25	25	25	24	Z	23	23	23	24	25	28	29	29	28	28	28	27	27	26	25	24	25.8	29	
3-Nov	23	22	22	Z	20	20	19	18	16	14	13	13	12	12	12	10	9	10	12	15	15	15	15	15	15.0	23	
4-Nov	19	17	11	10	Z	9	11	12	14	15	17	18	20	20	21	24	22	22	23	23	22	19	19	23	17.8	24	
5-Nov	22	20	18	19	16	Z	16	15	14	15	17	15	19	23	24	25	27	28	28	30	30	29	29	28	22.0	30	
6-Nov	27	26	25	25	25	23	Z	20	21	27	29	29	30	30	30	30	28	27	28	29	27	26	24	24	26.6	30	
7-Nov	27	27	27	30	29	30	29	Z	29	28	29	29	30	32	33	34	30	23	16	19	28	32	31	30	28.4	34	
8-Nov	31	31	Z	30	30	27	22	Z	23	19	18	18	16	23	24	26	26	27	26	27	28	29	28	27	26	25.3	31
9-Nov	25	25	24	Z	23	22	23	22	22	26	25	24	24	29	30	30	30	29	29	27	25	22	21	19	25.1	30	
10-Nov	18	17	20	28	Z	28	28	29	28	28	28	28	28	28	29	29	29	28	28	27	25	24	25	23	26.1	29	
11-Nov	23	23	25	25	26	Z	26	26	29	33	34	34	35	37	39	38	36	35	33	34	36	36	35	35	31.9	39	
12-Nov	34	34	34	33	33	32	Z	31	31	32	34	35	35	36	37	36	35	34	34	34	32	31	31	33	33.6	37	
13-Nov	32	31	31	30	30	29	27	Z	24	24	27	32	34	36	40	39	38	37	38	39	41	41	40	40	33.9	41	
14-Nov	39	39	Z	39	39	38	38	38	38	39	39	39	40	40	41	40	32	35	34	30	33	26	24	17	35.5	41	
15-Nov	17	14	20	Z	16	15	14	20	21	21	21	20	21	25	32	32	31	30	32	31	30	29	28	28	23.7	32	
16-Nov	22	12	11	14	Z	17	18	23	23	24	C	C	C	32	34	35	34	35	29	21	19	24	23	26	23.8	35	
17-Nov	29	28	29	29	29	Z	28	28	27	27	30	31	32	37	38	35	32	29	25	26	33	28	26	25	29.5	38	
18-Nov	25	25	25	25	26	30	Z	34	35	35	35	35	35	34	33	33	34	34	33	32	31	30	29	28	31.1	35	
19-Nov	22	19	19	15	15	11	10	Z	13	17	22	24	22	24	23	17	15	18	14	9	5	4	4	4	15.0	24	
20-Nov	4	5	Z	6	11	12	12	21	25	27	28	28	28	29	30	28	28	28	25	23	27	32	32	33	22.7	33	
21-Nov	35	35	35	Z	36	36	36	37	37	38	38	39	39	39	40	40	40	41	39	38	38	38	38	38	37.8	41	
22-Nov	39	38	39	39	Z	39	39	39	39	40	40	40	40	38	38	27	24	26	25	22	21	23	21	12	32.4	40	
23-Nov	15	19	19	21	23	Z	21	19	20	22	21	22	21	21	20	22	19	15	15	19	23	23	23	22	20.2	23	
24-Nov	21	22	26	24	25	24	Z	28	28	28	29	30	31	33	30	26	26	28	30	30	30	28	27	27	27.4	33	
25-Nov	25	25	27	25	28	22	23	Z	20	29	29	30	30	30	30	28	23	20	21	18	18	16	17	16	23.9	30	
26-Nov	17	22	Z	29	32	36	33	33	33	33	35	36	37	38	38	39	39	39	PF	37	36	37	37	37	34.3	39	
27-Nov	38	38	39	Z	39	39	39	39	39	38	38	39	40	40	40	37	37	38	30	37	34	24	24	34	36.4	40	
28-Nov	38	38	36	35	34	Z	30	29	32	28	27	32	40	41	39	32	31	27	29	39	31	29	27	26	32.7	41	
29-Nov	28	32	41	41	41	41	Z	41	40	41	41	42	41	39	39	32	28	26	25	24	26	29	28	25	34.4	42	
30-Nov	25	27	27	26	29	31	40	Z	45	46	46	46	46	46	45	45	45	45	45	43	41	40	41	34	39.2	46	

25.3	25.0	25.7	25.5	26.7	26.1	24.9	26.9	26.7	27.8	28.8	29.4	30.4	31.6	32.1	31.0	29.5	28.8	27.4	27.6	27.7	27.0	26.5	26.0	Diurnal Average		
39	39	41	41	41	41	40	41	45	46	46	46	46	46	46	45	45	45	45	45	43	41	41	41	40	Diurnal Maximum	

Z - zerspan C - Calibration PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	123	17.93	17.93
21 - 50	563	82.07	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Anzac - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	1	1	0	0	2	5	17	9	7	4	3	8	20	9	17	110
21 - 50	14	11	6	14	12	12	16	46	39	39	53	41	84	90	55	29	561
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	21	12	7	14	12	14	21	63	48	46	57	44	92	110	64	46	671

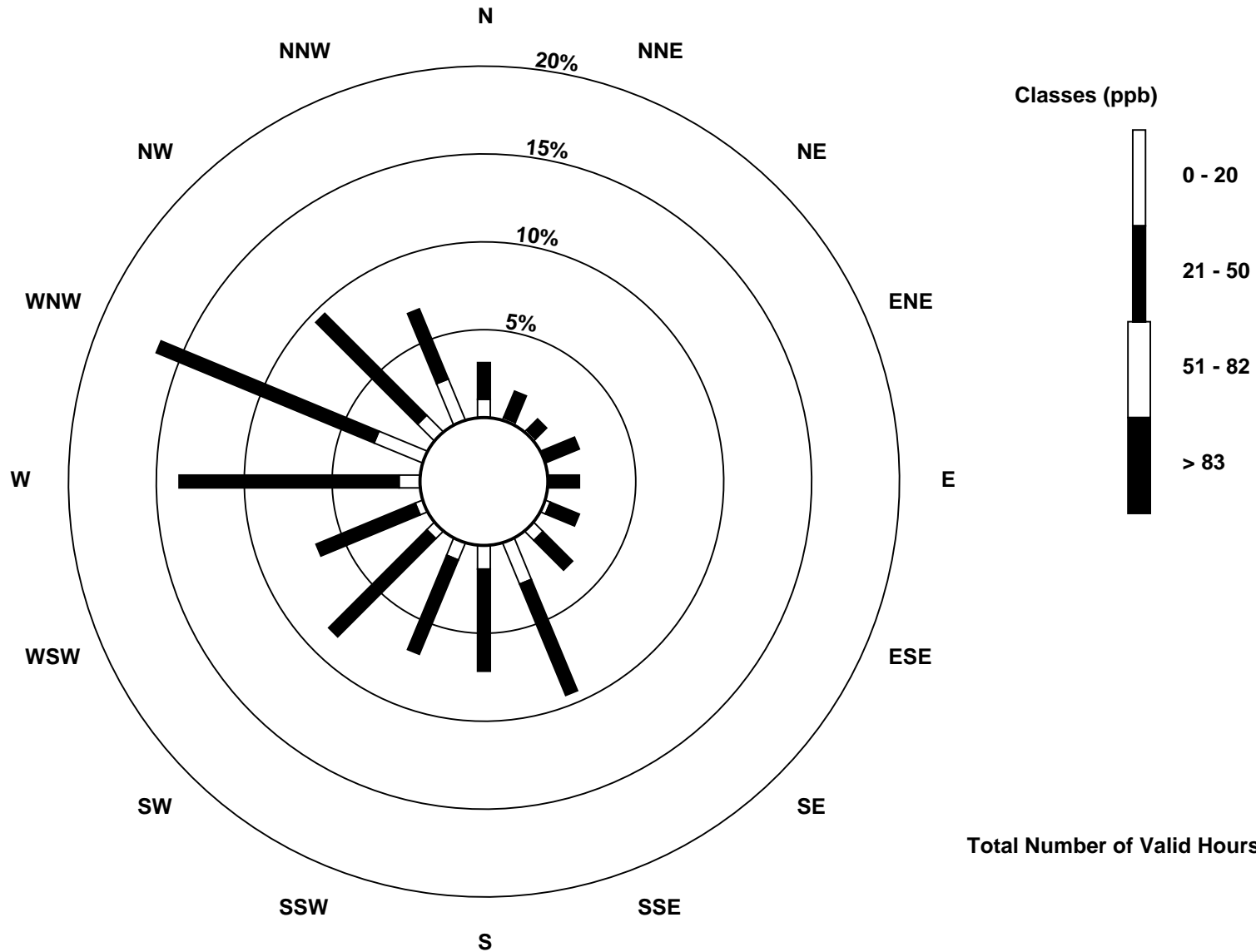
Total Number of Valid Hours: 671

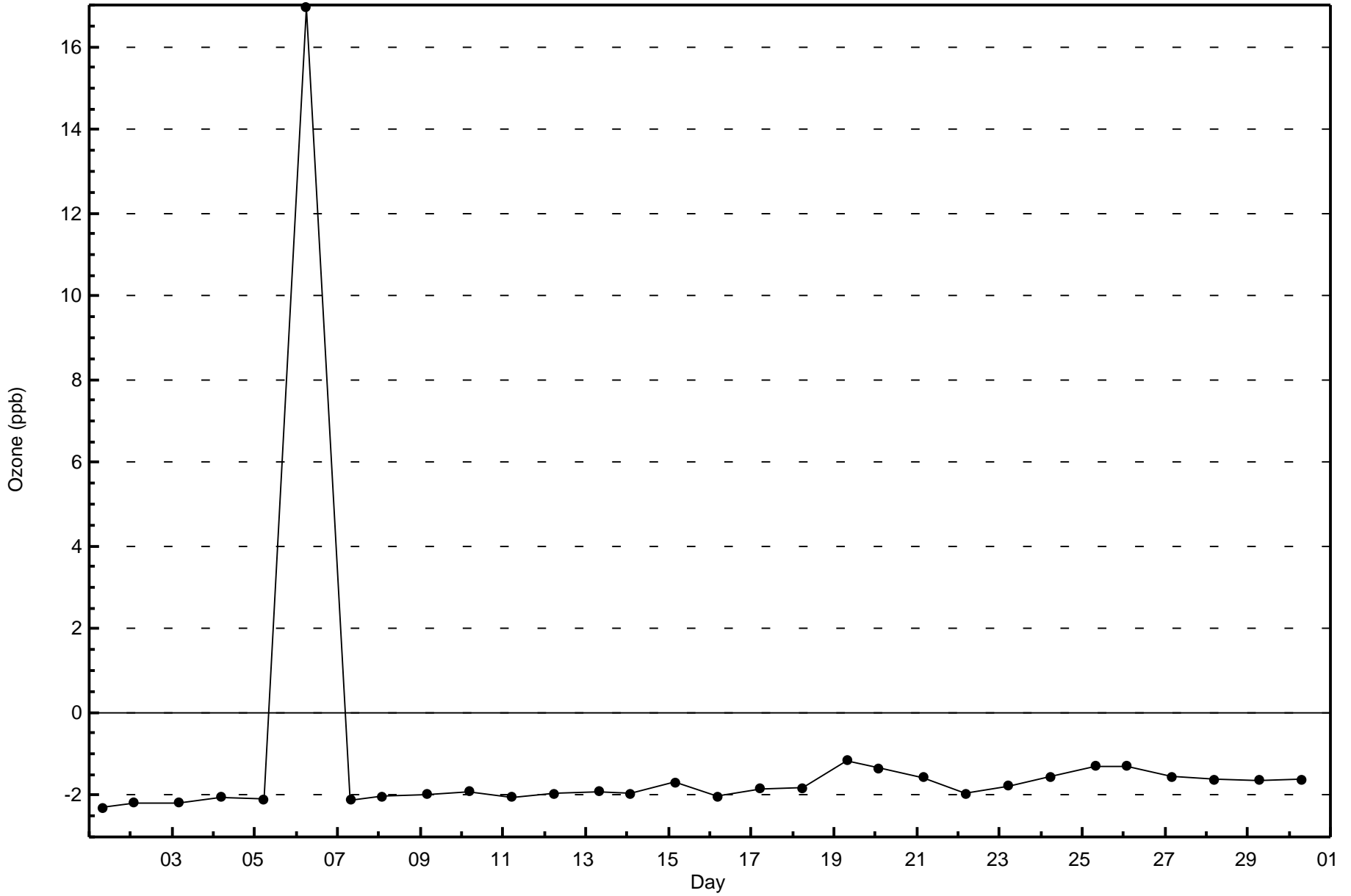
Total Number of Hours: 720

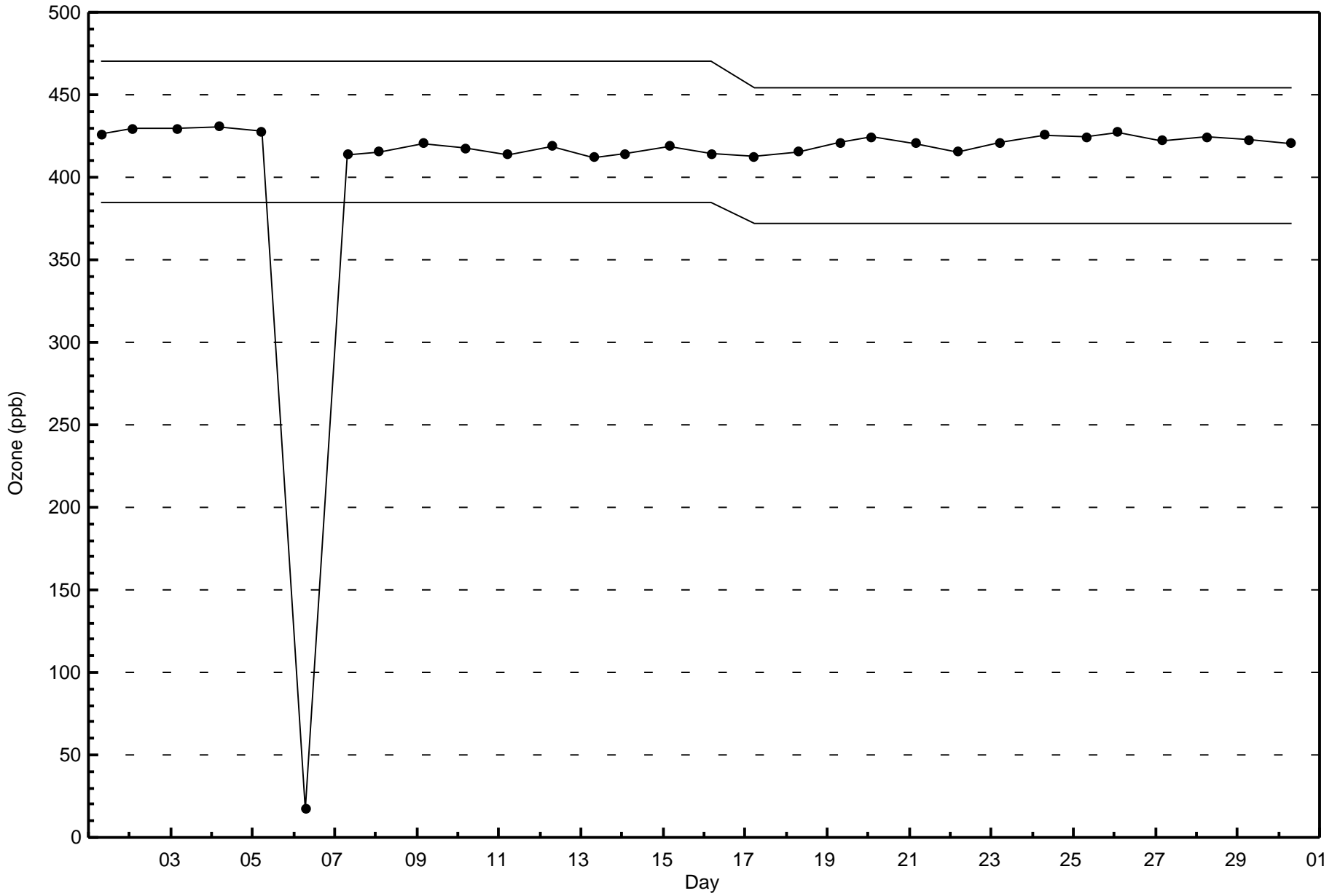


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Ozone (O_3) - ppb
Anzac (AMS 14)









Summary of Hour Averages

Anzac - November 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 87.7 µg/m ³ on Nov 3 22:00	Maximum Daily Average: 20.9 µg/m ³ on Nov 4	Hours of Data:	718
Minimum Value: 0.4 µg/m ³ on Nov 2 17:00	Minimum Daily Average: 0.7 µg/m ³ on Nov 2	Hours of Missing Data:	2
Maximum Diurnal Average: 7.0 µg/m ³ at hour 22	Minimum Diurnal Average: 2.8 µg/m ³ at hour 14	Hours of Calibration:	1
Monthly Average: 4.47 µg/m ³	Percentiles: P ₁ = 0.5 P ₁₀ = 0.9 Q ₁ = 1.5 Median = 2.8 Q ₃ = 4.8 P ₉₀ = 7.1 P ₉₉ = 55.6	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-Nov	1.9	1.9	2.1	3.1	2.8	2.5	2.3	1.9	1.5	1.5	1.3	1.0	0.8	0.8	0.7	0.7	0.8	0.9	0.9	0.8	0.6	0.6	0.6	0.7	1.4	3.1
2-Nov	0.7	0.7	0.9	0.9	0.9	0.9	1.0	1.1	1.0	1.1	0.9	0.6	0.6	0.8	0.7	0.5	0.4	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.7	1.1
3-Nov	0.5	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.1	1.0	1.1	1.5	2.9	3.3	3.4	4.1	3.2	18.5	56.1	87.7	80.0	73.9	14.4	87.7
4-Nov	55.0	50.8	62.8	60.3	56.9	51.6	39.2	25.8	14.2	5.8	3.3	3.3	3.7	4.2	3.4	3.2	6.0	8.2	10.8	13.4	7.2	5.2	3.8	2.9	20.9	62.8
5-Nov	2.9	3.5	5.6	7.3	7.5	6.4	6.9	10.7	13.8	13.4	11.9	17.0	11.2	7.8	6.6	7.6	11.4	5.7	3.5	3.2	3.3	3.6	3.7	3.8	7.4	17.0
6-Nov	4.8	5.7	5.9	9.8	11.6	9.5	19.4	15.7	11.3	6.6	5.2	5.0	4.3	4.9	4.9	4.3	5.4	6.6	7.2	7.7	7.5	7.8	6.3	4.6	7.6	19.4
7-Nov	3.4	2.7	2.4	2.5	2.4	2.2	2.4	2.5	2.7	2.9	2.8	2.5	5.8	7.5	28.8	20.1	7.3	3.9	5.5	7.0	10.2	23.0	18.7	14.8	7.7	28.8
8-Nov	14.0	24.2	8.6	6.6	6.8	10.6	3.9	3.3	3.4	4.3	4.1	4.1	2.5	2.0	1.2	0.9	0.8	0.7	0.8	0.8	1.0	1.1	1.2	1.3	4.5	24.2
9-Nov	1.4	1.5	1.5	1.6	1.8	1.8	1.8	1.9	2.0	1.8	2.0	2.2	2.5	2.2	1.8	1.3	1.3	1.5	1.8	2.0	2.5	2.5	2.5	2.5	1.9	2.5
10-Nov	2.4	2.1	3.1	5.5	5.0	4.1	4.0	3.3	2.6	2.3	2.2	2.2	2.3	2.0	1.7	1.5	2.0	3.0	4.1	5.3	7.4	6.9	7.1	7.0	3.7	7.4
11-Nov	6.4	7.2	6.2	5.3	5.0	4.8	5.5	5.4	3.5	1.5	1.4	1.3	1.2	1.2	1.3	1.2	1.5	1.8	0.9	1.0	0.8	0.7	0.7	0.7	2.8	7.2
12-Nov	0.7	0.8	0.7	0.7	0.7	0.7	0.8	1.0	2.0	1.7	1.4	0.9	0.8	0.8	0.7	0.7	0.7	1.0	1.3	1.5	1.7	1.6	1.3	1.2	1.1	2.0
13-Nov	1.2	1.3	1.4	1.5	1.6	1.7	2.0	1.9	1.8	2.2	2.1	2.0	2.5	1.5	3.5	1.6	3.0	2.5	2.4	2.2	1.5	1.4	1.2	1.1	1.9	3.5
14-Nov	1.0	1.1	1.5	1.5	1.5	1.7	1.7	1.8	1.8	1.7	1.8	1.7	1.5	1.3	1.2	2.2	2.8	2.7	3.3	3.0	2.8	2.4	2.1	2.8	2.0	3.3
15-Nov	3.2	3.5	3.8	3.4	3.3	3.4	3.9	7.6	5.1	5.2	5.0	5.1	3.5	2.7	1.5	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	2.9	7.6
16-Nov	1.5	0.9	0.9	1.2	2.4	3.3	2.8	1.8	2.2	1.8	1.3	1.5	C	UO	3.2	2.5	3.0	2.9	2.7	2.3	2.5	2.6	2.1	2.5	2.2	3.3
17-Nov	3.5	2.9	4.2	2.5	2.7	2.8	2.5	2.1	1.9	1.7	1.5	1.3	1.2	1.8	1.8	2.1	1.2	1.2	1.2	1.2	2.4	2.1	4.1	3.9	2.3	4.2
18-Nov	2.8	2.7	2.4	2.3	2.2	2.2	1.7	1.5	1.6	1.7	2.4	2.6	1.5	2.2	2.0	1.8	1.2	1.3	1.7	1.7	1.6	1.8	1.9	2.3	2.0	2.8
19-Nov	2.3	1.8	1.7	2.6	3.1	3.1	3.5	3.2	2.9	2.5	1.8	2.2	2.2	2.2	2.7	2.1	2.3	2.3	4.9	10.7	10.1	7.3	6.0	5.1	3.7	10.7
20-Nov	4.1	3.4	3.5	5.4	4.5	2.8	3.3	3.6	4.5	4.4	2.5	2.1	2.5	1.8	1.1	1.2	1.4	1.4	1.4	1.9	2.9	4.3	4.0	3.6	3.0	5.4
21-Nov	3.7	4.7	4.8	5.6	6.1	5.4	4.6	3.7	3.2	2.8	2.3	2.0	2.0	2.0	1.9	1.6	1.5	1.5	1.9	2.2	2.1	2.4	3.7	3.7	3.1	6.1
22-Nov	2.7	2.8	2.6	2.9	2.5	3.2	2.9	2.2	1.8	1.7	1.8	2.4	5.1	4.3	3.3	2.7	4.0	1.8	3.6	3.5	3.1	1.8	3.1	5.1	3.0	5.1
23-Nov	5.8	8.3	7.6	5.9	6.2	7.7	7.4	9.9	9.2	6.3	7.0	5.7	6.1	6.5	6.3	5.4	4.9	5.5	5.8	5.2	3.3	2.6	2.7	2.8	6.0	9.9
24-Nov	2.6	1.4	1.3	2.2	2.3	2.8	4.7	2.6	2.1	2.3	1.6	1.5	1.5	0.7	0.8	1.0	1.3	1.5	1.3	1.0	1.0	1.2	1.2	1.5	1.7	4.7
25-Nov	1.2	2.8	5.1	4.8	3.5	2.7	3.2	4.0	4.0	5.4	5.3	4.2	3.1	2.6	2.8	2.9	4.4	4.3	3.8	4.2	4.0	5.5	4.4	3.4	3.8	5.5
26-Nov	1.9	1.6	0.8	0.7	0.8	2.1	4.2	6.6	6.0	5.5	5.0	4.3	5.0	5.1	4.2	3.5	3.6	4.2	5.4	5.5	6.2	5.8	6.3	5.2	4.1	6.6
27-Nov	5.0	5.1	5.3	5.5	5.4	6.6	6.2	5.7	6.0	7.2	7.3	3.9	3.0	2.8	2.9	3.3	4.4	4.5	7.5	4.5	4.2	5.6	5.1	4.2	5.1	7.5
28-Nov	3.8	4.0	3.9	3.9	4.4	6.4	6.4	6.7	7.0	7.5	6.1	4.8	3.8	3.8	4.1	4.2	4.7	4.4	5.6	4.5	4.0	9.7	4.4	4.0	5.1	9.7
29-Nov	4.2	4.7	4.4	4.7	4.8	5.2	5.0	5.0	5.1	5.0	4.1	2.9	3.3	3.9	6.5	12.1	7.0	7.1	6.9	7.7	5.2	5.2	4.0	3.6	5.3	12.1
30-Nov	3.2	3.1	2.8	2.6	2.8	3.0	3.0	2.3	1.8	1.4	12.3	0.9	1.2	0.9	1.0	1.2	1.9	2.2	2.3	2.6	2.8	4.7	6.2	5.8	3.0	12.3

4.9	5.3	5.3	5.4	5.4	5.4	5.2	4.9	4.2	3.7	3.6	3.1	3.0	2.8	3.5	3.2	3.1	3.0	3.4	4.3	5.3	7.0	6.3	5.8	Diurnal Average	
55.0	50.8	62.8	60.3	56.9	51.6	39.2	25.8	14.2	13.4	12.3	17.0	11.2	7.8	28.8	20.1	11.4	8.2	10.8	18.5	56.1	87.7	80.0	73.9	Diurnal Maximum	

C - Calibration UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³

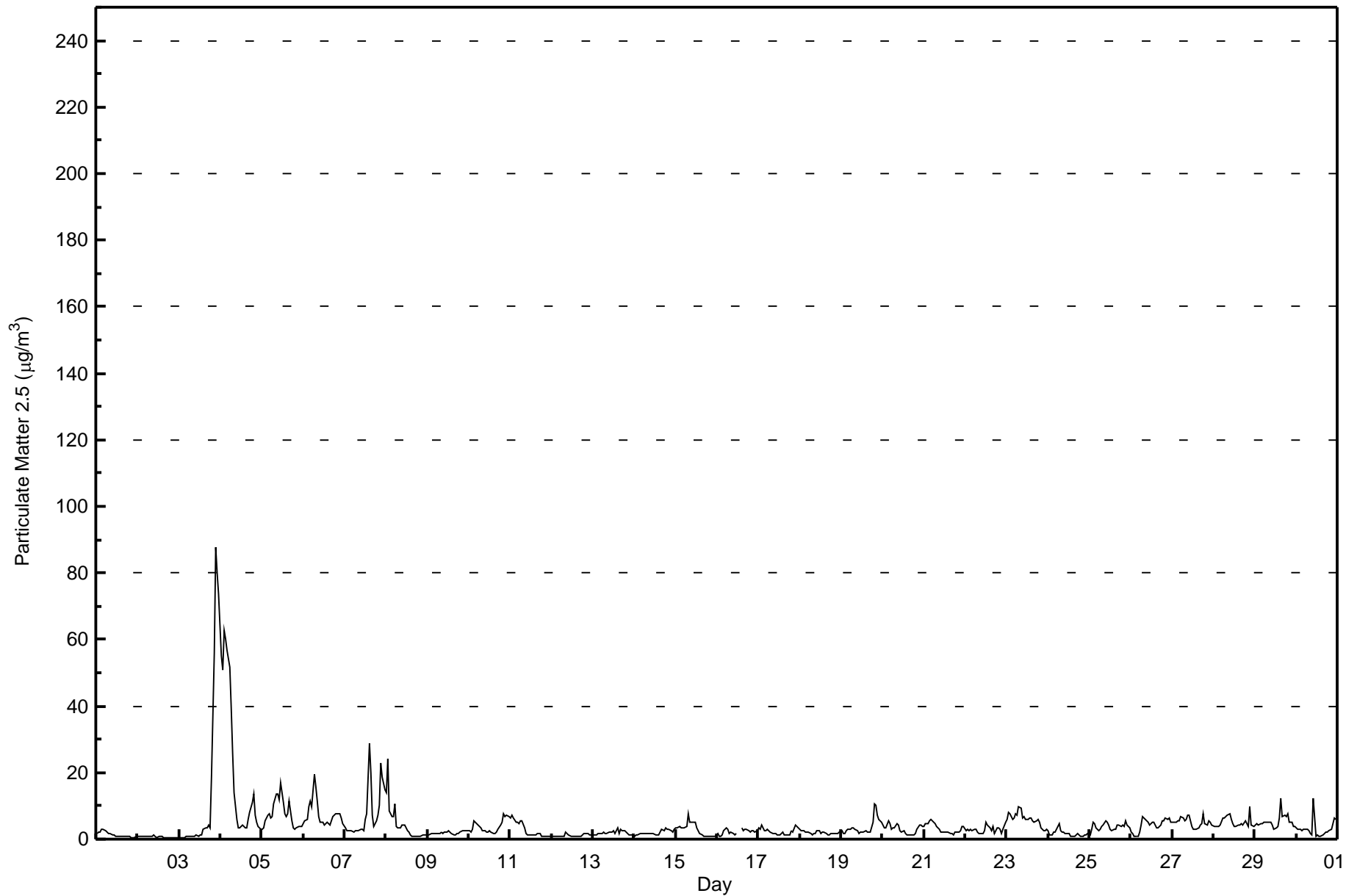


Wood Buffalo Environmental Association

Hourly Averages

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

Anzac - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	499	69.50	69.50
6 - 15	109	15.18	84.68
16 - 25	8	1.11	85.79
26 - 80	12	1.67	87.47
> 81.0	1	0.14	87.60

Total Number of Valid Hours: 718

Total Number of Hours: 720



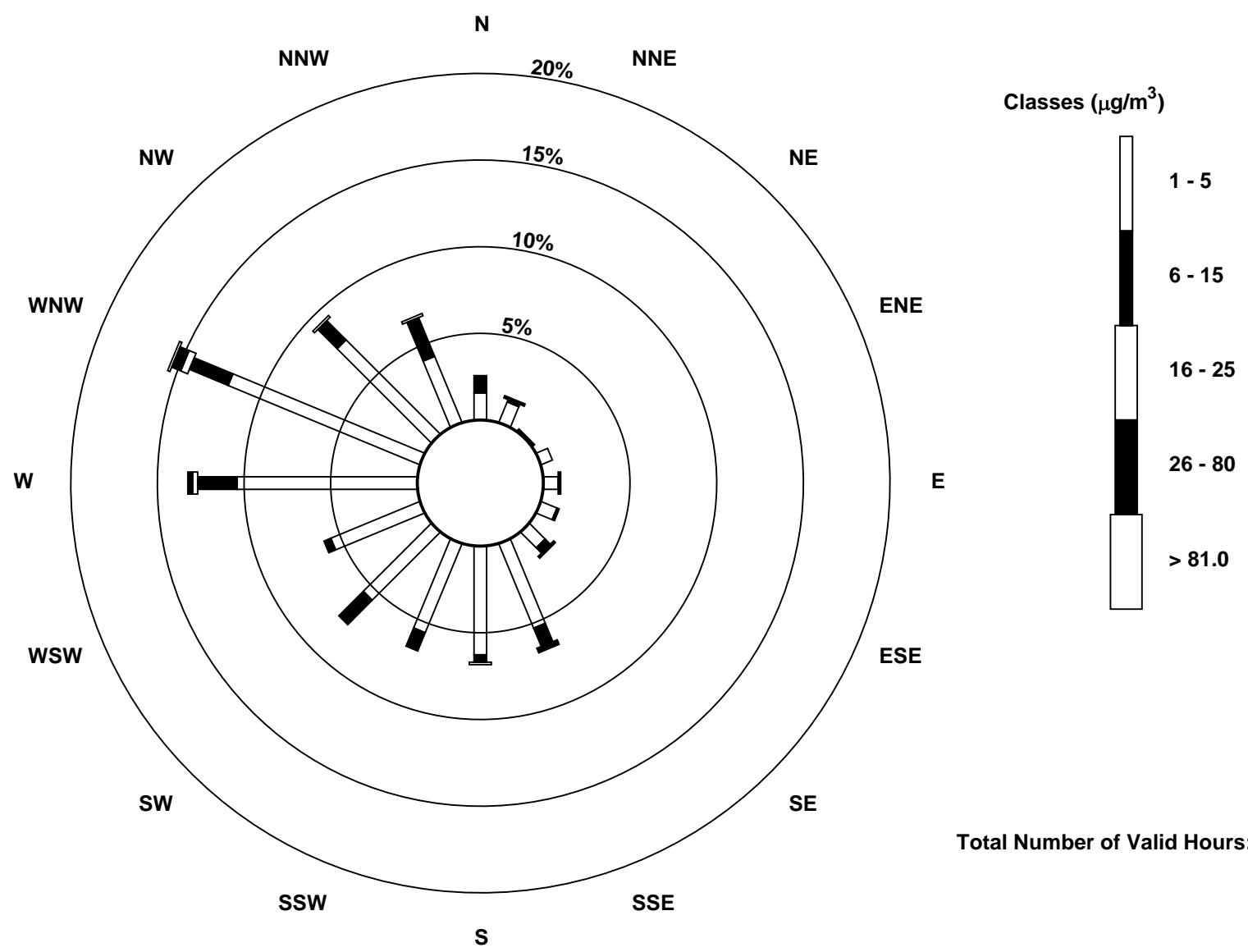
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	11	9	0	5	6	7	9	37	44	39	39	39	73	84	54	29	485
6 - 15	7	1	0	0	0	1	3	8	3	8	14	3	16	17	11	17	109
16 - 25	0	0	0	0	0	0	0	0	1	0	0	0	2	3	1	1	8
26 - 80	0	1	1	0	1	0	1	2	0	0	0	0	2	4	0	0	12
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Totals	18	11	1	5	7	8	13	47	48	47	53	42	93	109	66	47	615

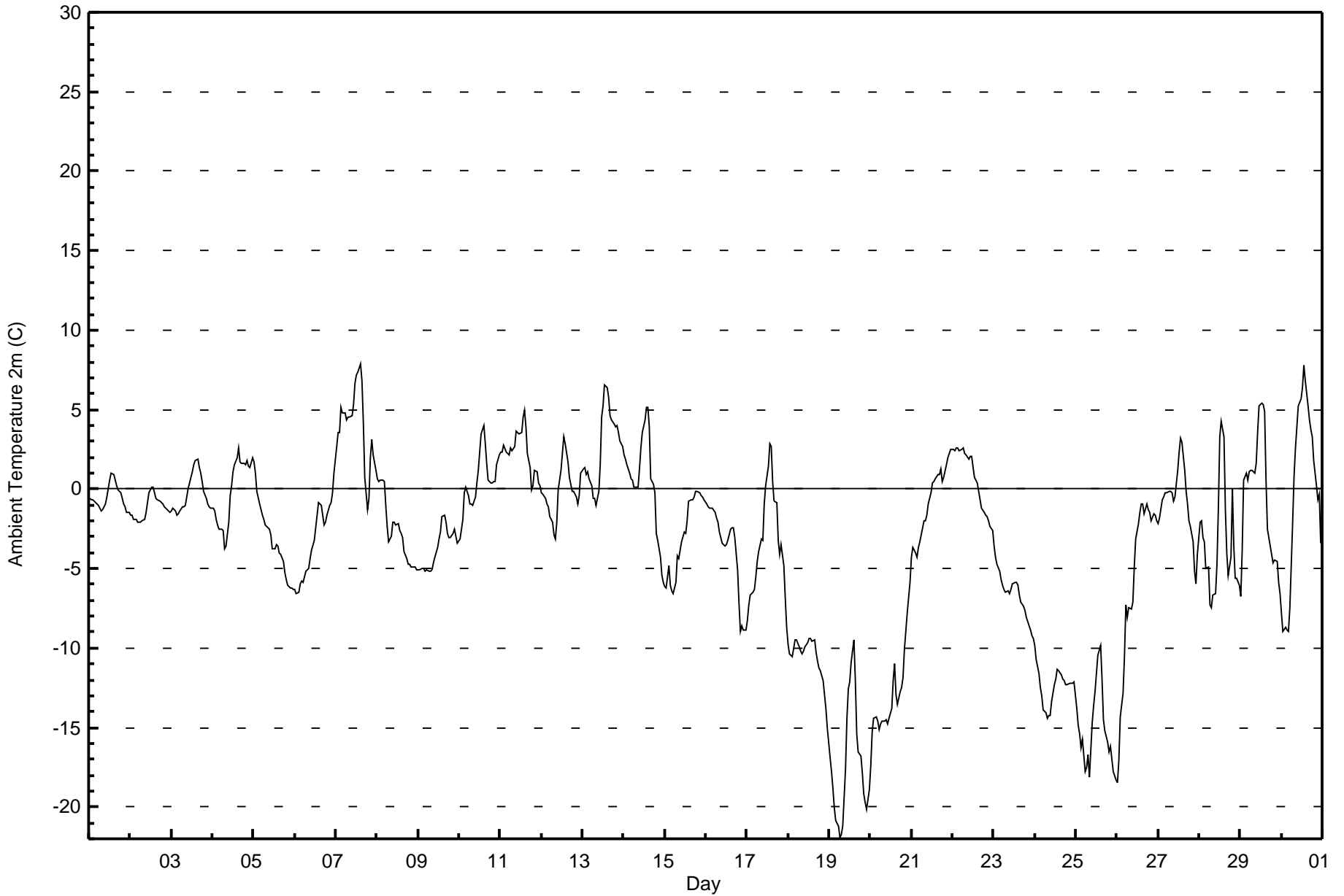
Total Number of Valid Hours: 702

Total Number of Hours: 720





Maximum Value: 7.8 C on Nov 7 15:00		Maximum Daily Average: 4.0 C on Nov 7		Hours in Service: 720																						
Minimum Value: -21.9 C on Nov 19 07:00		Minimum Daily Average: -17.3 C on Nov 19		Hours of Data: 720																						
Maximum Diurnal Average: -0.4 C at hour 15		Minimum Diurnal Average: -4.5 C at hour 24		Hours of Missing Data: 0																						
Monthly Average: -3.35 C		Percentiles: P ₁ = -19.9 P ₁₀ = -12.3 Q ₁ = -6.1 Median = -1.9 Q ₃ = 0.5 P ₉₀ = 2.6 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-Nov	-0.6	-0.6	-0.7	-0.8	-0.9	-1.1	-1.2	-1.3	-1.3	-0.9	-0.5	0.1	0.6	1.0	0.9	0.5	0.2	0.0	-0.3	-0.6	-0.9	-1.1	-1.4	-1.5	-0.5	1.0
2-Nov	-1.6	-1.7	-1.9	-1.9	-2.0	-2.1	-2.0	-2.0	-1.9	-1.4	-0.8	-0.3	0.1	0.1	-0.3	-0.6	-0.6	-0.8	-0.8	-1.0	-1.1	-1.2	-1.4	-1.5	-1.2	0.1
3-Nov	-1.3	-1.2	-1.3	-1.6	-1.6	-1.4	-1.1	-1.1	-1.0	-0.5	0.0	0.8	1.1	1.6	1.8	1.9	1.3	1.0	0.5	-0.2	-0.6	-0.9	-1.1	-1.2	-0.3	1.9
4-Nov	-1.2	-1.4	-1.9	-2.3	-2.6	-2.5	-2.6	-3.8	-3.6	-2.1	-0.5	0.3	1.1	1.6	2.0	2.6	1.7	1.6	1.6	1.8	1.4	1.3	1.9	1.9	-0.2	2.6
5-Nov	1.7	1.0	-0.1	-0.9	-1.3	-1.6	-1.9	-2.3	-2.4	-2.5	-2.9	-3.7	-3.8	-3.5	-3.6	-4.0	-4.1	-4.6	-5.3	-5.7	-6.1	-6.2	-6.3	-6.3	-3.2	1.7
6-Nov	-6.3	-6.6	-6.5	-5.9	-5.8	-5.9	-5.1	-5.1	-5.0	-4.4	-3.9	-3.2	-2.4	-1.6	-0.9	-1.0	-1.6	-2.2	-2.0	-1.6	-1.0	-0.8	-0.3	1.0	-3.3	1.0
7-Nov	2.7	3.5	3.6	5.1	4.8	4.8	4.4	4.5	4.5	4.6	5.3	6.6	7.2	7.3	7.8	6.8	4.2	0.8	-1.3	-0.6	2.0	3.1	2.2	1.2	4.0	7.8
8-Nov	0.7	0.5	0.5	0.5	0.5	-1.0	-2.4	-3.3	-3.0	-2.1	-2.1	-2.3	-2.1	-2.6	-2.8	-3.1	-3.9	-4.4	-4.7	-4.7	-4.9	-4.9	-4.9	-5.1	-2.6	0.7
9-Nov	-5.1	-5.0	-5.0	-5.0	-5.1	-5.1	-5.2	-5.2	-5.0	-4.6	-4.3	-3.7	-3.2	-2.7	-1.7	-1.7	-2.1	-2.8	-3.1	-3.0	-2.8	-2.5	-2.9	-3.4	-3.8	-1.7
10-Nov	-3.2	-2.5	-1.9	-0.3	0.1	-0.4	-0.9	-0.9	-1.0	-0.5	0.4	1.2	2.3	3.4	4.0	2.9	1.6	0.6	0.4	0.4	0.4	0.5	1.5	2.1	0.4	4.0
11-Nov	2.3	2.4	2.7	2.3	2.3	2.2	2.6	2.4	2.7	3.7	3.6	3.5	3.6	4.6	4.9	4.0	2.2	1.3	-0.1	0.2	1.2	1.1	0.4	0.2	2.3	4.9
12-Nov	-0.2	-0.3	-0.5	-0.9	-1.1	-1.7	-2.1	-2.9	-3.2	-2.1	-0.1	1.2	2.2	3.3	2.8	1.7	0.7	0.3	-0.1	-0.2	-0.5	-1.0	-0.4	1.0	-0.2	3.3
13-Nov	1.2	1.3	0.9	1.1	0.6	0.2	-0.6	-0.6	-1.1	-0.2	1.5	4.5	5.2	6.6	6.4	5.7	4.6	4.3	4.1	3.9	4.0	3.6	3.0	2.7	2.6	6.6
14-Nov	2.1	1.9	1.5	1.0	0.6	0.5	0.1	0.1	0.1	1.3	2.6	3.6	4.4	5.1	5.2	3.9	0.7	0.3	-0.2	-2.8	-3.3	-4.3	-5.5	-5.9	0.6	5.2
15-Nov	-6.1	-6.2	-4.8	-6.0	-6.4	-6.6	-5.9	-4.2	-4.4	-3.9	-3.3	-2.7	-2.8	-2.0	-0.7	-0.6	-0.6	-0.5	-0.1	-0.1	-0.2	-0.4	-0.5	-0.6	-2.9	-0.1
16-Nov	-0.9	-1.1	-1.2	-1.2	-1.2	-1.5	-1.8	-2.1	-2.7	-3.4	-3.5	-3.6	-3.5	-3.2	-2.5	-2.5	-2.5	-3.0	-5.1	-7.2	-9.0	-8.6	-8.9	-8.9	-3.7	-0.9
17-Nov	-8.2	-7.2	-6.6	-6.5	-6.3	-5.5	-4.6	-3.9	-3.1	-3.2	-0.9	0.2	1.5	2.8	2.7	0.5	-0.7	-0.9	-3.3	-4.1	-3.5	-4.8	-6.9	-8.7	-3.4	2.8
18-Nov	-9.7	-10.3	-10.5	-10.0	-9.5	-9.5	-9.9	-10.2	-10.4	-10.2	-9.9	-9.6	-9.4	-9.4	-9.6	-9.5	-10.3	-10.8	-11.3	-11.4	-12.1	-12.9	-13.8	-15.0	-10.6	-9.4
19-Nov	-16.9	-17.8	-18.8	-20.0	-20.9	-21.2	-21.9	-21.8	-21.2	-17.6	-14.4	-12.6	-12.1	-10.9	-9.5	-12.0	-15.4	-16.5	-16.8	-17.8	-19.2	-19.7	-20.1	-19.0	-17.3	-9.5
20-Nov	-17.4	-15.3	-14.4	-14.3	-14.6	-15.1	-14.8	-14.6	-14.6	-14.6	-14.7	-14.5	-13.8	-12.1	-11.0	-13.0	-13.6	-12.7	-12.5	-11.8	-10.1	-7.8	-6.9	-5.8	-12.9	-5.8
21-Nov	-4.3	-3.7	-4.0	-4.3	-3.7	-3.3	-2.5	-2.0	-2.0	-1.7	-1.0	-0.3	0.3	0.5	0.7	0.9	1.0	1.3	0.5	0.7	1.6	2.0	2.3	2.5	-0.8	2.5
22-Nov	2.5	2.5	2.6	2.6	2.4	2.5	2.6	2.2	2.1	1.9	2.1	2.1	1.4	0.7	0.4	-0.1	-0.7	-1.2	-1.4	-1.6	-1.8	-2.0	-2.3	-2.6	0.7	2.6
23-Nov	-3.6	-4.3	-4.7	-5.2	-5.7	-6.1	-6.3	-6.5	-6.4	-6.6	-6.3	-6.0	-5.9	-5.9	-6.1	-6.7	-7.1	-7.4	-7.7	-8.1	-8.4	-8.9	-9.2	-9.4	-6.6	-3.6
24-Nov	-9.8	-10.7	-11.6	-12.4	-13.0	-13.9	-14.1	-14.5	-14.3	-14.2	-13.3	-12.3	-12.0	-11.3	-11.4	-11.7	-11.9	-12.0	-12.3	-12.3	-12.2	-12.2	-12.2	-12.1	-12.4	-9.8
25-Nov	-13.8	-14.8	-15.4	-16.2	-15.8	-17.8	-17.5	-16.7	-18.2	-14.7	-13.7	-12.8	-11.6	-10.5	-9.9	-11.9	-14.5	-15.2	-15.9	-16.6	-16.2	-17.0	-17.8	-18.3	-15.1	-9.9
26-Nov	-18.5	-17.1	-14.3	-12.8	-10.5	-7.3	-8.1	-7.4	-7.5	-7.1	-4.9	-3.1	-2.2	-1.5	-1.0	-0.9	-1.6	-0.9	-1.2	-1.5	-2.0	-1.5	-1.6	-2.0	-5.7	-0.9
27-Nov	-2.1	-1.8	-0.7	-0.5	-0.2	-0.2	-0.1	-0.2	-0.2	-0.8	-0.5	1.1	2.3	3.2	3.0	1.2	-0.2	-1.0	-2.0	-2.3	-3.3	-5.2	-6.0	-4.1	-0.9	3.2
28-Nov	-2.1	-2.0	-3.1	-3.3	-5.0	-4.9	-7.3	-7.5	-6.7	-6.6	-4.7	-1.2	3.3	4.3	3.3	-1.3	-4.1	-5.5	-4.3	0.0	-3.5	-5.6	-5.6	-6.1	-3.3	4.3
29-Nov	-6.8	-3.8	0.6	1.0	0.6	1.1	1.1	1.2	1.0	1.6	3.5	5.2	5.4	5.3	4.9	0.5	-2.5	-3.6	-4.1	-4.6	-4.5	-4.6	-5.8	-6.6	-0.6	5.4
30-Nov	-7.8	-8.9	-8.7	-8.9	-9.0	-7.4	-2.1	0.9	2.6	3.9	5.3	5.7	6.4	7.8	6.8	5.2	4.3	3.7	3.3	1.8	0.2	-0.7	-0.3	-3.4	0.0	7.8
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Anzac - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	7	0.97	0.97
-20 - 0	500	69.44	70.42
0 - 10	213	29.58	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

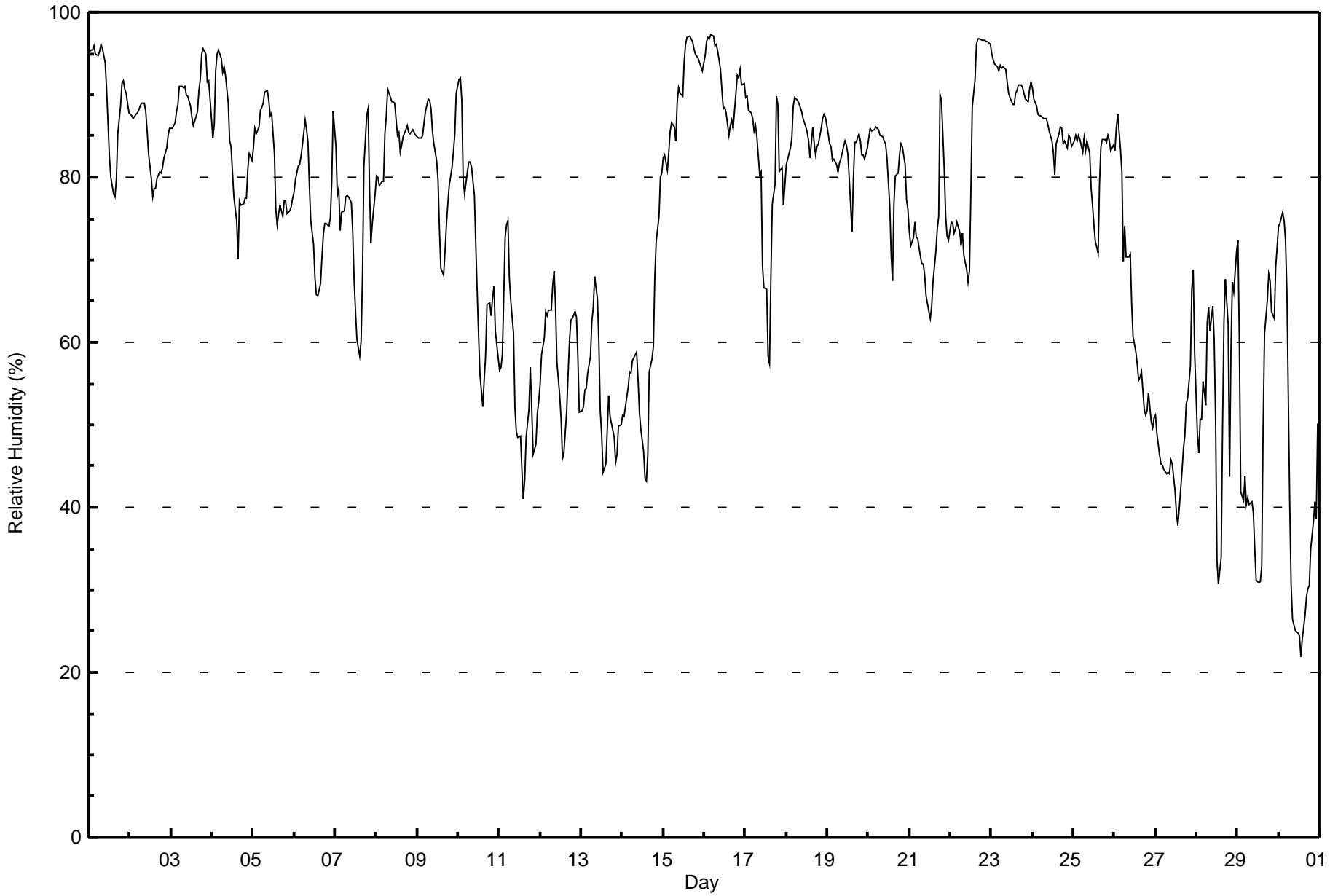


Maximum Value: 97 % on Nov 16 05:00 Maximum Daily Average: 92.0 % on Nov 16																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 22 % on Nov 30 14:00 Minimum Daily Average: 41.7 % on Nov 30 Maximum Diurnal Average: 78.1 % at hour 5 Minimum Diurnal Average: 65.0 % at hour 15 Monthly Average: 74.3 % Percentiles: P ₁ = 26 P ₁₀ = 49 Q ₁ = 64 Median = 80 O ₃ = 87 P ₉₀ = 91 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-Nov	95	95	95	96	95	95	95	96	96	94	91	87	83	80	78	78	80	85	89	91	92	91	90	88	89.7	96
2-Nov	88	87	87	88	88	88	89	89	89	88	86	83	80	78	79	79	80	81	80	81	82	83	85	86	84.3	89
3-Nov	86	86	87	88	89	91	91	91	91	90	90	89	87	86	87	88	90	92	95	96	95	92	92	90	89.9	96
4-Nov	85	86	93	95	95	94	93	93	92	89	84	84	81	78	75	70	77	77	77	77	81	83	82	82	84.1	95
5-Nov	84	86	85	86	88	88	89	90	90	89	87	88	83	76	74	76	77	75	77	77	76	76	78	78	82.2	90
6-Nov	78	80	81	82	83	84	87	86	84	79	75	72	68	66	66	67	70	73	74	74	74	75	80	88	76.9	88
7-Nov	84	78	79	74	76	76	78	78	78	77	73	67	64	60	58	60	68	81	87	88	79	72	74	78	74.5	88
8-Nov	80	80	79	80	80	85	88	91	90	89	89	89	85	86	83	84	85	86	86	85	85	86	85	85	85.0	91
9-Nov	85	85	85	85	87	88	90	89	88	86	84	82	80	74	69	68	71	74	77	79	81	83	85	90	81.8	90
10-Nov	92	92	89	80	78	81	82	82	81	78	72	66	61	56	52	55	58	65	65	63	65	67	61	58	70.8	92
11-Nov	57	57	58	73	74	75	68	65	61	52	49	48	49	44	41	43	48	52	57	52	46	48	51	53	55.1	75
12-Nov	55	58	61	64	63	64	64	67	69	65	58	54	51	46	47	52	56	60	63	63	64	63	58	52	58.9	69
13-Nov	52	52	54	54	56	58	63	64	68	65	60	52	49	44	45	49	54	51	49	48	45	46	50	50	53.4	68
14-Nov	51	51	52	55	56	56	58	58	59	56	52	50	47	44	43	46	56	58	60	68	72	75	80	81	57.6	81
15-Nov	82	83	81	83	86	87	86	84	89	91	90	90	94	96	97	97	97	97	96	95	94	94	93	93	90.6	97
16-Nov	95	96	97	97	97	97	96	96	95	93	91	88	88	88	85	86	87	86	90	92	92	93	91	91	92.0	97
17-Nov	90	90	88	88	87	86	86	85	80	81	69	67	66	58	57	68	77	79	90	89	81	81	77	79	79.1	90
18-Nov	82	82	83	85	89	90	89	89	88	88	87	86	86	84	82	86	84	83	84	84	86	87	88	87	85.8	90
19-Nov	85	84	84	82	82	82	81	82	82	84	84	84	83	80	73	80	84	84	85	84	83	83	82	84	82.5	85
20-Nov	85	86	86	86	86	86	86	85	85	84	84	82	77	71	67	77	80	81	83	84	84	82	77	76	81.6	86
21-Nov	73	72	73	75	73	73	70	70	69	68	66	64	63	64	67	71	74	75	90	89	81	75	73	72	72.5	90
22-Nov	75	74	73	74	75	73	72	73	70	69	67	69	78	89	92	96	97	97	97	97	97	96	96	96	82.9	97
23-Nov	95	94	94	93	93	94	93	93	93	92	90	90	89	89	90	90	91	91	91	90	89	89	91	92	91.5	95
24-Nov	91	89	89	88	87	88	87	87	87	87	86	84	83	80	84	85	86	86	84	84	84	85	85	84	85.8	91
25-Nov	84	85	84	85	85	83	85	83	84	83	79	77	74	72	71	79	84	85	85	84	85	84	83	84	82.0	85
26-Nov	83	86	88	83	81	70	74	70	70	71	65	61	59	57	55	56	57	52	51	52	54	50	50	51	64.4	88
27-Nov	51	49	46	45	45	45	44	44	44	46	45	42	39	38	40	44	47	49	53	53	57	66	69	59	48.4	69
28-Nov	49	47	51	51	55	52	62	64	61	64	60	51	34	31	34	50	63	68	62	44	59	67	66	71	54.8	71
29-Nov	72	60	42	41	44	40	41	40	41	39	35	31	31	31	33	50	61	65	68	67	64	63	69	72	50.0	72
30-Nov	74	74	76	75	72	66	41	31	26	26	25	25	24	22	24	27	29	30	31	35	38	41	39	50	41.7	76
	77.9	77.5	77.3	77.6	78.1	77.8	77.5	77.2	76.8	75.3	72.4	70.0	67.8	65.6	65.0	68.6	72.3	73.9	75.8	75.6	75.4	75.8	76.0	76.6	Diurnal Average	
	95	96	97	97	97	97	96	96	96	94	91	90	94	96	97	97	97	97	97	97	97	96	96	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Anzac - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - November 2015

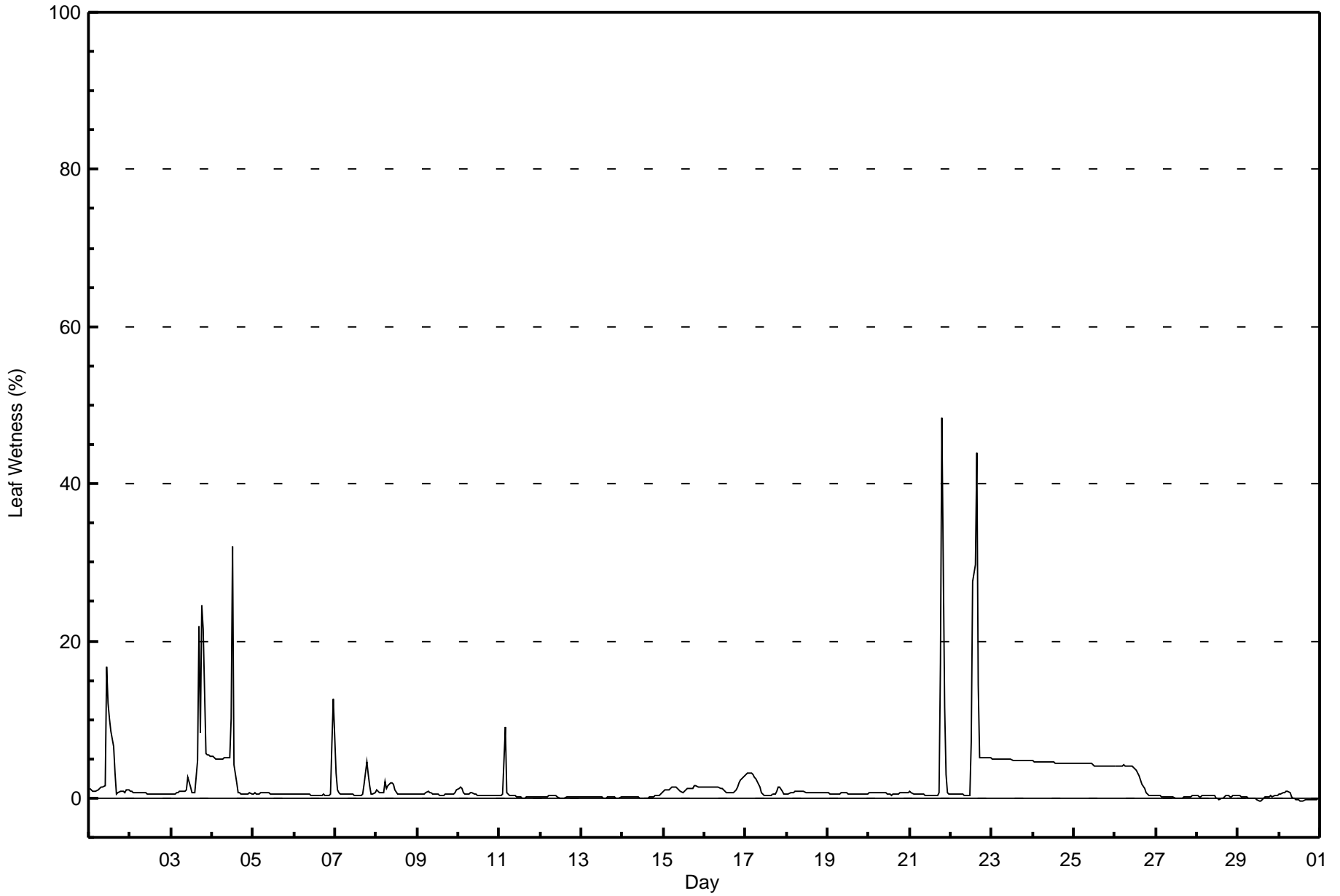
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	27	3.75	3.75
40 - 60	127	17.64	21.39
60 - 80	208	28.89	50.28
80 - 100	358	49.72	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 48 % on Nov 21 20:00																	Maximum Daily Average: 6.8 % on Nov 22																	Hours in Service: 720														
Minimum Value: 0 % on Nov 30 14:00																	Minimum Daily Average: 0.1 % on Nov 30																	Hours of Data: 720														
Maximum Diurnal Average: 3.4 % at hour 20																	Minimum Diurnal Average: 1.3 % at hour 10																	Hours of Missing Data: 0														
Monthly Average: 1.7 %																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 20																	Hours of Calibration: 0														
																																		Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Nov	1	1	1	1	1	1	1	1	1	2	17	12	10	9	7	3	1	1	1	1	1	1	1	1	3.1	17																						
2-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0.6	1																						
3-Nov	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	5	22	8	24	21	6	6	5	5	4.9	24																						
4-Nov	5	5	5	5	5	5	5	5	5	5	10	32	4	2	1	1	1	1	1	1	1	1	1	1	4.6	32																						
5-Nov	1	1	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																						
6-Nov	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7	13	1.2	13																						
7-Nov	3	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	2	5	3	2	1	1	1	1.0	5																						
8-Nov	1	1	1	1	1	2	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2																						
9-Nov	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.6	1																						
10-Nov	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
11-Nov	0	0	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	9																						
12-Nov	0	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-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
14-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1																						
15-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1																						
16-Nov	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	1.3	3																						
17-Nov	3	3	3	3	3	3	2	2	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1.4	3																						
18-Nov	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																						
19-Nov	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1																						
20-Nov	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1																						
21-Nov	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17	48	11	3	1	0	3.7	48																						
22-Nov	0	0	0	0	0	0	0	0	0	0	0	7	28	30	44	14	5	5	5	5	5	5	5	5	6.8	44																						
23-Nov	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9	5																						
24-Nov	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4.6	5																						
25-Nov	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.2	4																						
26-Nov	4	4	4	4	4	4	4	4	4	4	4	4	3	3	2	2	1	1	0	0	0	0	0	0	2.8	4																						
27-Nov	0	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-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
29-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
30-Nov	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
																								1.4	1.4	1.3	1.6	1.3	1.4	1.4	1.3	1.3	1.3	1.8	1.7	2.5	2.1	2.0	2.5	2.0	1.3	2.5	3.4	1.7	1.3	1.5	1.7	Diurnal Average
																								5	5	5	9	5	5	5	5	5	5	17	12	32	28	30	44	22	8	24	48	11	6	7	13	Diurnal Maximum





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	164	23.84	23.84
0.4 - 0.5	138	20.06	43.90
0.6 - 0.7	128	18.60	62.50
0.8 - 1.4	88	12.79	75.29
1.5 - 10	146	21.22	96.51
> 10	16	2.33	98.84

Total Number of Valid Hours: 688

Total Number of Hours: 720



Maximum Speed: 21 km/h on Nov 22 07:00	Maximum Daily Speed Average: 13.7 km/h on Nov 21	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 19 11:00	Minimum Daily Speed Average: 1.1 km/h on Nov 19	Hours of Data: 704
Maximum Diurnal Speed Average: 5.6 km/h at hour 7	Minimum Diurnal Speed Average: 3.2 km/h at hour 23	Hours of Missing Data: 16
Monthly Average Velocity: 4.3 km/h 257.4 deg	Percentiles: P ₁ = 2 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 15 P ₉₉ = 18	Percent Operational Time: 97.8

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-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	ENE8	ENE8	ENE7	ENE7	E8	ENE6	ENE4	NE4	ENE5	NE6	NE6	NE7	NE8	ENE6	----	NE8	
2-Nov	ENE4	ENE3	E6	E5	E6	E5	ESE4	ESE5	ESE5	SE7	SSE8	SSE9	SE10	SE10	SE9	SE10	SE7	SE7	SE7	SE8	SSE9	SSE10	SSE10	SSE11	SE6.5	SSE11	
3-Nov	SSE11	SSE10	SSE8	SSE9	SSE9	SSE8	SSE7	SSE6	SSE4	SSE3	S3	SSE3	S3	S2	WSW3	W6	W7	W6	WNW9	WNW9	WNW10	WNW9	WNW5	W4	SSW3.2	SSE11	
4-Nov	W5	WNW2	NNE2	NE2	E3	SE3	SSE4	SSE6	SSE7	SSE7	SSE8	SSE7	SSE9	SSE12	S12	SSW12	SSW11	SSW11	SW10	SW9	SW10	SSW6	WSW4	WNW8	SSW5.2	S12	
5-Nov	WNW8	NW10	NW11	NW10	NNW10	NW10	NNW11	NNW11	NNW10	NNW10	NNW12	NNW12	NNW12	NNW12	NW11	NW10	NNW11	NNW11	NNW11	NNW11	NNW9	NNW9	NNW7	NNW6	NNW10.0	NNW12	
6-Nov	NNW5	NNW4	NW4	NW5	NNW4	N2	NW4	S2	SSW4	W5	S3	S5	SSW7	S8	S9	SSE8	SSE8	SE10	SSE14	SSE15	SSE14	SE11	SSE12	S11	S4.6	SSE15	
7-Nov	SSW16	SW14	WSW10	W14	W13	W14	W10	W12	W10	W8	W9	W10	W10	W8	WNW9	WNW8	W5	WSW6	NW2	WNW5	WNW7	WNW8	W7	W7	W8.5	SSW16	
8-Nov	WNW7	W7	W8	WNW7	W7	WNW7	WNW6	NW6	NW3	NNW4	N6	N5	NNE6	N7	NNE6	N7	N7	N7	N6	NE7	NNE5	NNE5	NNE4	N4	NNW4.6	W8	
9-Nov	NNE4	NNE4	NNE4	N3	NNW3	NW2	N2	NNW2	NNE1	E2	ESE3	SSE4	S4	SSW5	SSW6	S5	SSW5	SSW6	S5	SE4	SSE6	SSE6	ESE7	SSE8	SSE1.8	SSE8	
10-Nov	SE7	SSE8	S7	SSW12	SSW11	SSW13	SSW12	SSW11	SSW13	SSW15	S15	S17	S14	S13	S12	S17	S18	S17	S16	S18	S13	SSE11	S9	S9	S12.4	S18	
11-Nov	SSW13	SSW12	SSW12	SSE6	SSE7	SSW9	SW15	SW13	WSW11	W16	W15	W14	W12	W11	W12	WSW10	SW10	SW14	SW10	WSW10	W12	W10	W11	W10	WSW9.8	W16	
12-Nov	WSW9	W11	WNW13	WNW13	W12	WSW10	WSW9	WSW9	WSW10	WSW10	SW11	SW10	SSW10	SW12	SSW9	SSE9	SSE11	SSE13	SSE14	SSE15	SSE14	SSE12	SSE13	S16	SSW7.7	S16	
13-Nov	S15	S15	S14	SSW13	SSW10	SSW9	S5	S5	SSE5	SSE7	S7	SW11	SW14	WSW12	WSW15	WSW15	WSW15	WSW17	W15	W17	W20	W17	W17	W18	SW10.3	W20	
14-Nov	W16	W18	W17	W16	W16	W14	WSW12	WSW13	W10	W9	W9	W12	W9	W10	W9	WSW10	SW8	SW10	SW10	SW6	SW6	S3	SSE2	S4	WSW9.5	W18	
15-Nov	S5	S6	S6	SSE2	SE2	SE4	SE5	ESE6	E8	E6	ESE5	ESE5	ENE8	ENE12	ENE15	ENE17	E14	E12	ESE10	ESE10	ESE8	ESE7	ESE7	ESE6	ESE6.7	ENE17	
16-Nov	AF	AF	AF	NW2	WNW7	WNW8	WNW11	WNW11	W14	W15	WNW14	WNW15	WNW17	NW13	WNW13	WNW12	W10	W10	SW7	SSW4	SSW3	S6	S6	SSE8	W7.9	WNW17	
17-Nov	SE8	SE9	SE12	SSE14	SSE16	SSE13	SSE13	SSE13	SSE11	SSE11	SW13	SSW11	S10	WSW11	WSW9	SW10	WSW7	WSW4	SW5	WSW7	WNW8	NW15	NW18	WNW19	SSW5.5	WNW19	
18-Nov	WNW17	NW16	WNW13	WNW12	WNW12	NW12	NW13	NW14	NW16	NW16	NW17	NW15	NNW16	NNW14	NNW12	NW10	NW12	NW10	NW8	NW9	NW8	NW6	NW6	WNW4	NW11.8	WNW17	
19-Nov	W4	W3	SSW2	SSW3	SSW2	SW2	AF	SSW2	AF	SSW2	E0	NNE3	E3	E2	SSW3	SW2	NNW4	N4	NNW5	WNW3	WNW3	W3	WNW3	W3	W1.1	NNW5	
20-Nov	WNW2	NNW2	W1	NW2	NW4	WNW5	WNW5	WNW7	WNW7	WNW7	WNW7	W6	SW6	S6	SSE6	SSE7	SSE9	SSE8	SSE4	S4	SSW6	SW10	SW13	SW13	SW3.5	SW13	
21-Nov	WSW14	W15	W13	W13	W14	W16	W16	W14	W14	W15	W14	W14	W15	W13	W13	WSW11	WSW12	WSW12	WSW9	W11	WNW14	WNW16	W18	WNW18	W13.7	WNW18	
22-Nov	WNW16	WNW14	WNW16	WNW15	WNW15	WNW17	W21	WNW15	WNW17	WNW18	NW15	NW17	NW13	NW11	NW11	NNW6	NNW4	NNW3	NW2	NNW2	N2	N2	NNW3	NNW3	WNW10.3	W21	
23-Nov	NNW4	NW3	WNW3	NW3	NW3	NNW3	N3	N2	NNW2	N3	NNW2	N2	NNE3	N3	N3	N5	N3	N4	NNW4	NNW5	NW5	NW4	NW5	NNW6	NNW3.3	NNW6	
24-Nov	NNW6	NNW6	NNW6	NNW5	NW6	NW5	NW6	NW5	NW5	NNW5	NNW5	NW5	NNW5	NW5	NW5	NNW5	NW5	NW6	NW6	NW4	NW3	SSW2	S1	SW4	NW4.3	NNW6	
25-Nov	SW3	SW6	SW6	SSW4	SSW5	SSW1	WNW4	W4	WNW4	WNW7	WNW8	WNW8	WNW8	NW6	NW6	NW5	NW5	NNW5	WNW5	WNW5	WNW4	WNW6	WSW5	SW3	SW4	W4.1	WNW8
26-Nov	SSW4	SSW6	SW8	SW10	SW8	SW16	SW10	SW14	SW15	SW13	SW14	SW13	SW16	SW15	WSW17	WSW11	WSW14	WSW12	WSW12	WSW12	WSW11	WSW11	W10	W10	SW11.4	WSW17	
27-Nov	W10	WSW11	W13	WNW13	WNW13	WNW12	WNW13	WNW14	WNW14	WNW13	WNW11	WNW13	WNW12	WNW10	NW10	NW8	WNW8	WNW8	W6	WNW8	WNW6	W5	W5	W7	WNW9.9	WNW14	
28-Nov	WNW7	WNW7	WNW6	W7	SW9	SW9	SW6	SW8	SW8	SW6	SW4	WSW3	WNW8	W6	W5	WSW4	AF	WSW3	W9	W11	SW4	W6	WSW6	SSW5	WSW5.7	W11	
29-Nov	SSW2	W9	WNW12	WNW13	WNW13	WNW13	WNW13	WNW13	WNW13	WNW13	WNW10	W6	WNW11	NW8	NW5	W4	SSE3	SE4	SSW4	SW5	SW5	WSW7	SW5	S6	S7	W6.0	WNW13
30-Nov	S5	SSW2	S4	SSE3	SSW3	WSW5	W10	W10	WNW11	WNW12	WNW14	WNW14	WNW14	WNW14	WNW12	WNW13	WNW12	WNW13	WNW12	WNW10	WNW6	W4	NW6	WNW5	SSW6	W7.6	WNW14

WSW4.3	WSW4.6	WSW4.6	W4.6	W4.6	W5.4	W5.6	W5.1	W5.3	W5.3	W4.8	W5.1	W4.6	W4.2	W4.1	WSW3.6	WSW3.6	WSW3.9	WSW3.8	WSW3.4	WSW3.6	WSW3.2	WSW3.2	WSW3.9	Diurnal Average
WNW17	W18	W17	W16	SSE16	WNW17	W21	WNW15	WNW17	WNW18	NW17	S17	WNW17	SW16	SW15	S17	S18	WSW17	S16	S18	W20	W17	WNW18	WNW19	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Anzac - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Nov 13 21:00	Hours in Service: 720 Hours of Data: 703 Hours of Missing Data: 17 Hours of Calibration: 0 Percent Operational Time: 97.6
Minimum Value: 1 km/h on Nov 19 13:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 3 O ₃ = 4 P ₉₀ = 5 P ₉₉ = 6	

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

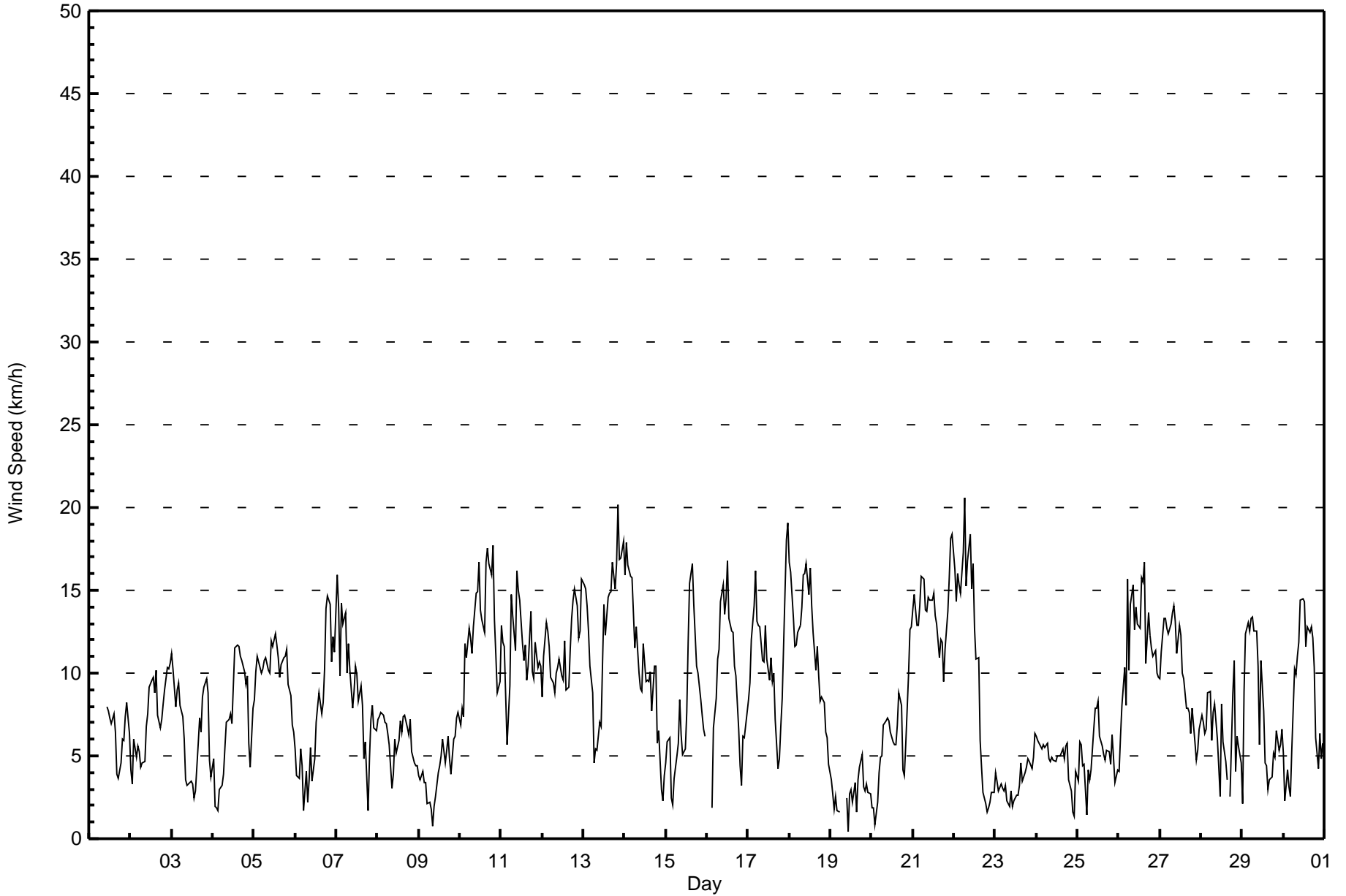
6	6	6	6	6	7	7	6	6	6	6	6	7	6	6	5	5	4	5	5	6	8	6	6	7
Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Anzac - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	207	29.40	29.40
6 - 11	302	42.90	72.30
12 - 19	193	27.41	99.72
20 - 28	2	0.28	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Anzac - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	10	2	4	7	6	6	12	17	21	12	8	14	22	27	23	207
6 - 11	6	2	5	7	5	8	14	39	15	17	29	24	44	43	27	17	302
12 - 19	0	0	0	3	2	0	1	16	16	11	18	14	39	52	14	7	193
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	12	7	14	14	14	21	67	48	49	59	46	99	117	68	47	704

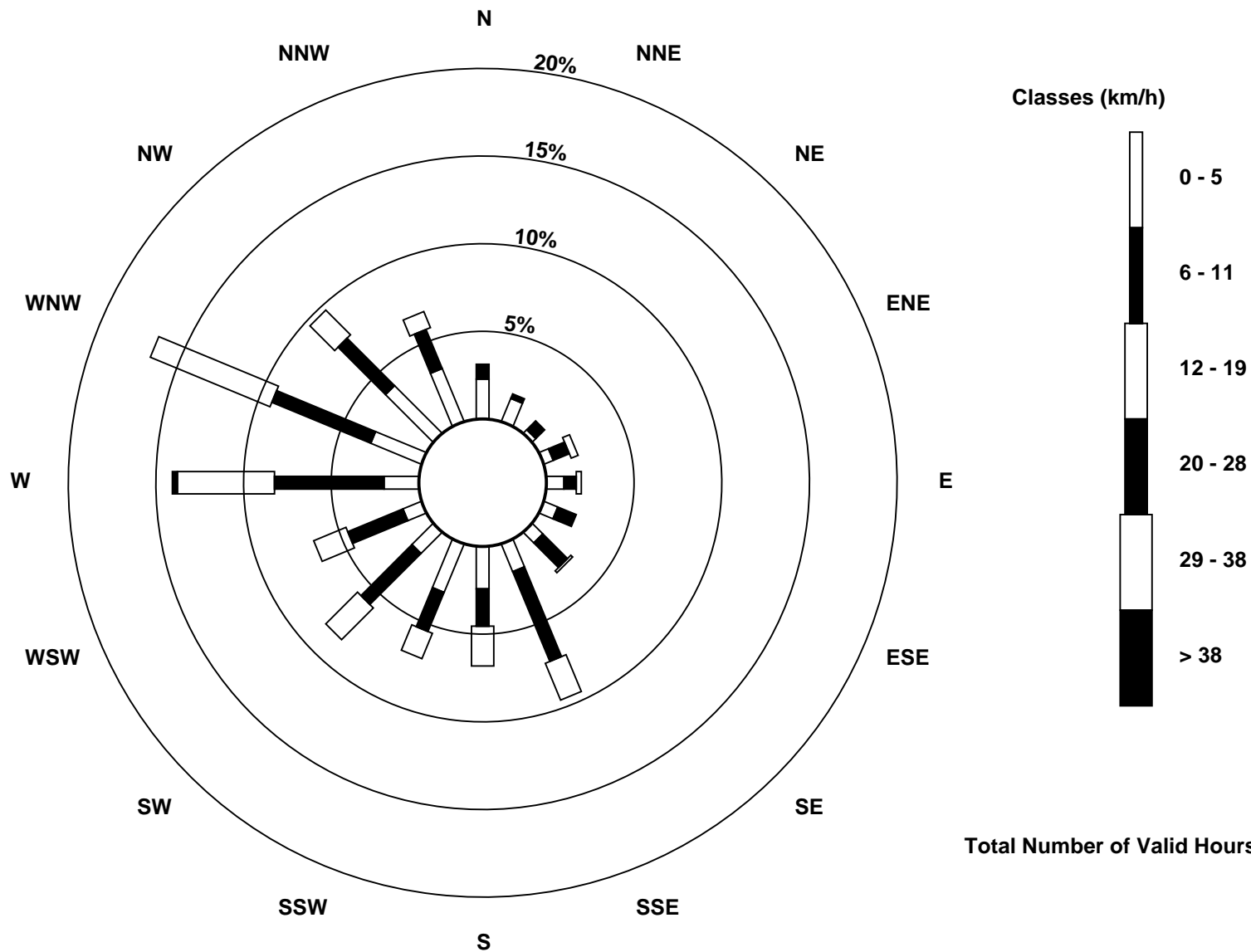
Total Number of Valid Hours: 704

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Anzac (AMS 14)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Anzac - November 2015

Direction of Maximum Speed: 281 deg on Nov 22 07:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 268.3 deg on Nov 21	Hours of Data: 704
Direction of Minimum Speed: 95 deg on Nov 19 11:00	Hours of Missing Data: 16
Direction of Minimum Daily Speed Average: 1.1 deg on Nov 19	Percent Operational Time: 97.8
Monthly Average Direction: 272.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	70	67	66	76	83	76	66	53	61	46	39	40	50	58	--
2-Nov	65	66	82	83	80	87	104	105	103	127	149	156	142	145	145	135	136	133	140	136	152	154	149	154	131.5
3-Nov	153	158	152	150	159	161	156	161	164	155	172	164	175	184	239	272	268	271	294	298	293	284	285	269	205.0
4-Nov	262	301	17	48	93	143	161	152	165	158	149	152	165	168	176	206	204	195	215	222	232	213	246	283	191.6
5-Nov	283	313	323	323	329	322	327	331	333	328	337	344	338	336	322	323	322	328	326	331	341	338	327	328	327.9
6-Nov	331	339	326	312	328	352	304	174	211	259	190	186	204	180	177	160	152	141	157	160	163	144	153	172	172.5
7-Nov	213	221	242	274	277	275	276	275	276	259	264	267	271	275	296	284	259	246	319	302	296	287	278	277	267.2
8-Nov	285	279	274	296	272	282	301	326	315	343	352	351	19	7	15	360	1	358	3	47	32	19	13	11	338.7
9-Nov	21	28	25	355	343	325	349	347	20	97	119	149	172	202	193	185	199	208	191	145	154	152	121	147	156.9
10-Nov	143	147	178	210	194	198	204	205	193	194	190	187	191	183	185	179	178	183	186	177	175	164	175	186	184.9
11-Nov	195	205	198	150	166	211	226	228	245	266	275	274	274	271	265	258	235	225	221	244	262	267	273	273	242.7
12-Nov	258	278	284	288	273	251	257	245	240	237	232	217	192	216	202	166	167	165	161	157	150	148	156	175	208.1
13-Nov	178	181	184	196	199	210	172	169	159	165	189	226	230	251	245	240	237	249	260	261	271	271	268	278	231.8
14-Nov	275	267	270	275	275	261	257	257	259	264	271	281	271	274	268	250	225	222	225	234	227	189	157	176	258.6
15-Nov	173	178	178	156	135	143	138	115	88	96	107	113	59	63	74	75	85	88	105	114	117	114	114	121	101.8
16-Nov	AF	AF	AF	305	297	296	289	292	281	278	285	289	299	304	289	284	277	265	226	208	193	171	170	156	277.3
17-Nov	136	128	140	148	161	159	155	161	161	160	215	213	186	254	254	234	238	251	220	255	300	313	307	302	204.7
18-Nov	303	305	300	296	297	310	319	320	322	322	324	323	328	329	337	321	314	317	315	308	315	314	307	291	315.2
19-Nov	271	275	192	200	193	231	AF	196	AF	195	95	17	79	93	198	231	342	349	341	301	296	266	284	275	278.9
20-Nov	301	337	278	305	312	293	298	301	299	292	293	278	234	180	160	148	160	160	152	169	210	215	222	233	233.3
21-Nov	251	267	263	271	275	279	273	272	265	268	266	268	266	267	260	253	243	249	251	273	282	286	281	282	268.3
22-Nov	286	287	286	292	292	285	281	292	299	300	310	312	312	311	308	329	330	338	317	342	4	355	342	343	299.8
23-Nov	339	320	294	324	326	345	357	350	334	360	348	357	24	6	350	3	3	353	338	348	320	313	312	333	339.9
24-Nov	337	337	335	329	325	314	309	306	305	293	299	306	300	307	304	299	312	312	309	313	307	197	189	232	309.4
25-Nov	218	233	219	198	196	213	285	277	295	296	290	300	298	305	307	326	314	293	294	285	288	247	228	227	276.3
26-Nov	206	203	216	229	225	226	217	220	225	219	227	228	225	235	235	238	243	249	250	252	244	252	266	261	233.9
27-Nov	267	257	278	286	291	287	294	290	286	298	295	292	298	301	319	311	298	295	276	291	295	281	281	281	289.6
28-Nov	283	287	282	266	226	233	233	230	229	220	227	258	287	277	272	258	AF	237	274	268	230	265	258	199	254.1
29-Nov	212	270	289	286	294	302	297	297	294	289	273	300	315	306	278	162	144	198	216	215	239	217	182	177	276.2
30-Nov	186	211	185	159	199	250	274	275	284	289	290	286	283	293	294	288	283	295	286	289	276	315	292	206	279.4

247.2 254.2 255.9 265.2 261.9 260.2 266.0 262.5 265.0 264.9 266.7 269.1 268.5 268.0 262.1 250.1 240.7 240.6 240.3 243.5 250.6 251.8 250.4 243.3

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

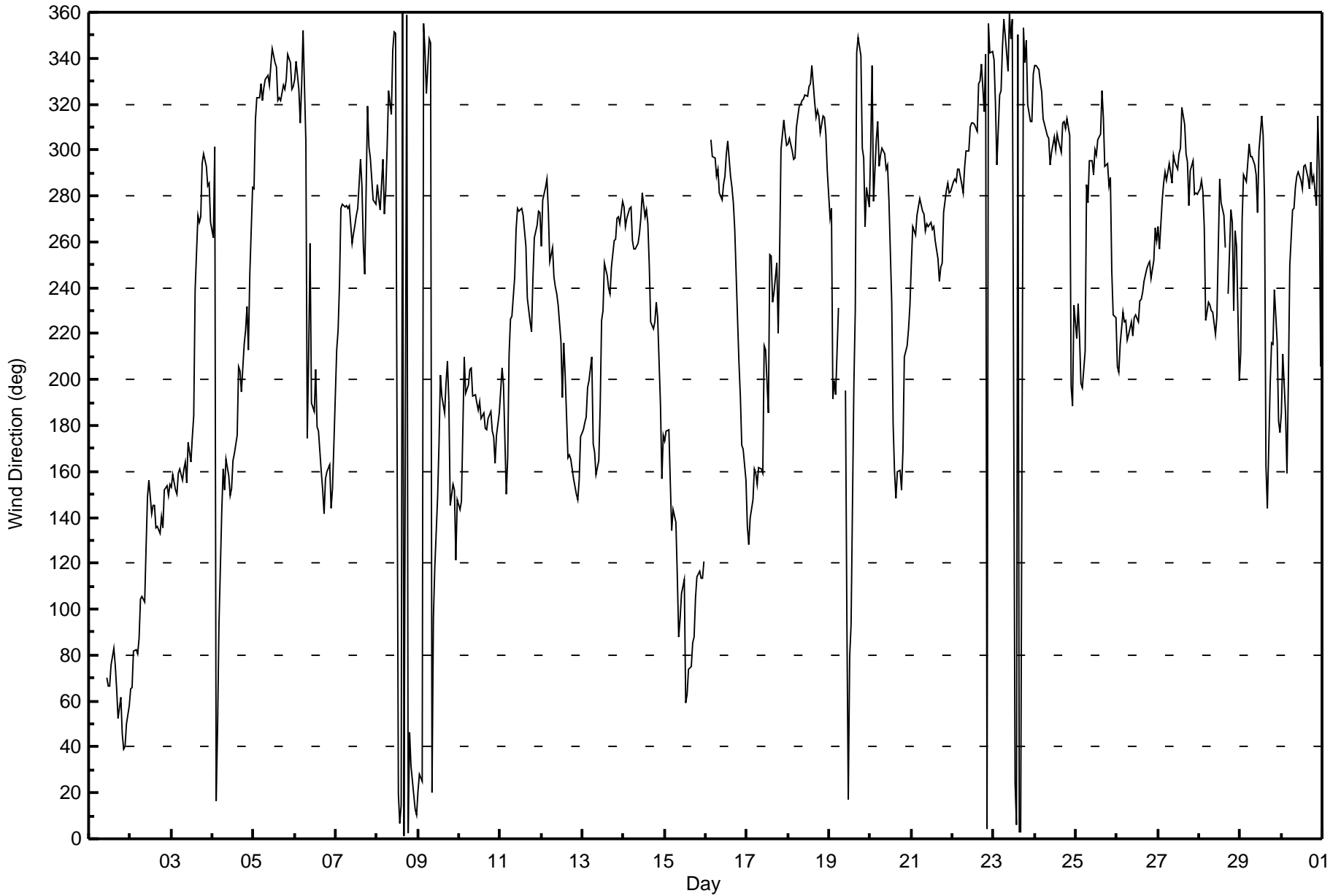
Anzac - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 89 deg on Nov 19 11:00	Hours of Data: 703
Minimum Value: 7 deg on Nov 25 23:00	Hours of Missing Data: 17
Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 18 Median = 22 Q ₃ = 27 P ₉₀ = 31 P ₉₉ = 63	Hours of Calibration: 0
	Percent Operational Time: 97.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	22	22	21	25	31	32	34	19	24	21	19	18	20	34
2-Nov	24	23	16	18	15	17	22	23	26	24	27	23	22	22	22	21	20	19	25	20	19	18	18	19	27
3-Nov	16	17	18	17	16	16	16	20	28	29	19	26	30	36	37	26	24	31	26	25	27	25	30	28	37
4-Nov	33	63	25	51	35	18	18	15	16	18	24	23	16	15	18	24	23	26	20	20	19	16	47	31	63
5-Nov	27	23	19	18	18	18	18	19	17	19	18	17	16	19	20	22	18	19	19	17	18	17	18	18	27
6-Nov	15	16	19	24	23	52	33	75	39	34	32	37	32	24	25	19	18	19	17	15	16	21	18	27	75
7-Nov	24	17	28	32	29	28	29	26	27	27	26	29	27	30	26	26	29	14	66	45	22	24	22	24	66
8-Nov	19	18	21	23	24	18	31	18	20	19	14	20	24	22	21	18	19	16	20	26	26	23	19	18	31
9-Nov	20	18	20	20	15	23	22	24	48	37	51	31	32	31	32	26	23	22	30	19	17	18	16	17	51
10-Nov	16	14	24	23	31	31	29	26	25	23	25	23	24	22	25	18	17	20	23	18	20	18	42	31	42
11-Nov	26	31	25	61	24	31	16	14	22	28	27	28	29	32	28	25	16	13	15	21	26	28	30	30	61
12-Nov	28	32	29	28	27	18	19	15	16	16	18	24	25	21	28	18	15	17	17	18	18	19	16	19	32
13-Nov	20	22	21	24	29	28	51	27	25	18	25	20	19	26	23	20	20	23	27	28	29	28	28	29	51
14-Nov	29	26	29	28	29	26	30	25	27	30	37	28	32	32	31	22	15	12	13	13	13	76	48	16	76
15-Nov	16	11	11	22	43	16	13	27	16	20	30	26	27	19	21	18	22	21	26	21	25	23	27	23	43
16-Nov	AF	AF	AF	26	25	25	27	26	30	28	28	30	24	26	28	28	26	25	19	25	42	19	17	20	42
17-Nov	24	21	17	19	17	18	16	19	18	18	22	20	26	31	26	16	29	26	14	30	24	22	20	23	31
18-Nov	23	23	26	25	25	23	20	20	18	18	18	18	18	18	18	18	20	18	19	21	20	21	20	26	26
19-Nov	18	20	49	27	24	54	AF	21	AF	27	89	32	20	46	15	55	24	12	15	17	21	25	18	29	89
20-Nov	61	38	42	20	20	22	25	27	25	28	29	29	27	28	21	16	17	18	21	25	36	20	20	16	61
21-Nov	22	24	22	23	24	26	27	24	24	29	25	27	27	27	25	24	21	25	25	28	28	28	27	25	29
22-Nov	28	26	26	28	29	30	26	27	25	23	23	22	22	24	22	16	19	21	31	22	23	22	20	18	31
23-Nov	19	20	28	27	27	27	20	23	55	22	25	18	31	26	21	19	18	22	21	20	24	25	24	18	55
24-Nov	18	18	19	17	18	22	22	23	25	24	25	23	24	26	23	24	23	25	23	24	28	58	26	19	58
25-Nov	22	16	13	19	18	51	21	24	20	23	25	24	21	24	25	14	15	19	21	23	18	21	7	13	51
26-Nov	12	14	14	15	20	15	17	16	15	13	13	15	16	17	18	19	21	21	18	18	16	19	22	19	22
27-Nov	19	20	24	26	27	25	26	26	26	25	25	M	23	22	18	17	18	18	18	18	13	14	17	19	27
28-Nov	20	20	19	23	10	9	9	9	13	11	20	55	29	36	28	35	AF	54	20	17	33	14	32	14	55
29-Nov	68	18	23	20	19	18	19	20	20	24	34	20	24	31	38	43	24	26	18	19	22	13	14	13	68
30-Nov	13	64	15	23	54	28	20	20	20	21	21	21	23	22	23	23	22	23	27	30	46	22	36	10	64

68	64	49	61	54	54	51	75	55	37	89	55	32	46	38	55	32	54	66	45	46	76	48	31	
Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure



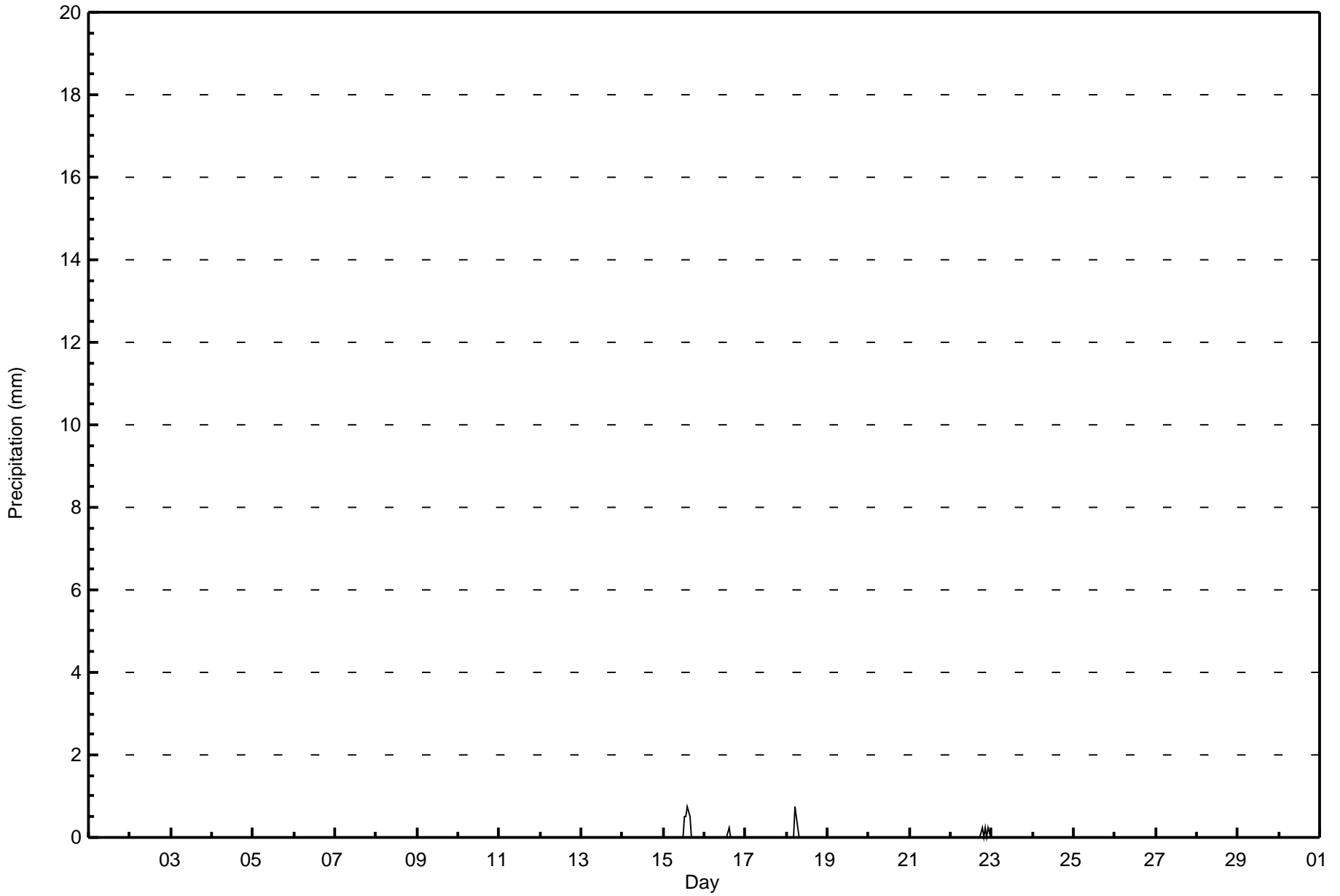


Maximum Value: 0.8 mm on Nov 15 15:00 Maximum Daily Total: 2.3 mm on Nov 15		Hours in Service: 720 Hours of Data: 719 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																																																			
Minimum Value: 0.0 mm on Nov 1 01:00 Maximum Diurnal Total: 1.0 mm at hour 15 Monthly Total: 4.32 mm		Minimum Daily Total: 0.0 mm on Nov 1 Minimum Diurnal Total: 0.0 mm at hour 1 Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.3																																																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																													
1-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	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	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.8																			
16-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	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	0.3	0.3																				
17-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	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	0.0	0.0	0.0	0.0	1.0	0.8																				
19-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3																				
23-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																				
30-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																				
																								0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.5	1.0	0.5	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.3	0.0	Diurnal Average	
																								0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.8	0.5	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.3	0.0	Diurnal Maximum	
M - Maintenance																																																					



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - November 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 5, 2015	Last Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	12:38
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	2712	2673
Calculated slope	1.001898	1.001775	Chamber temp	50.0	50.0
Calculated intercept	-0.713867	-0.147380	Pressure	25.2	25.1
Analyzer Background	19.4	19.4	Flow	658	655
Analyzer Coefficient	1.011	1.011	Intensity	67	66

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	-0.1	----
as found span	5000	74.9	707.1	706.1	1.001
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.9	707.1	706.1	1.001
second point	5000	37.5	354.0	352.8	1.003
third point	5000	18.7	176.5	177.2	0.996
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.9	707.1	701.3	1.008
Average Correction Factor					1.000

Corrected As found 706.2 Previous response 706.4 % change 0.0%

Notes:

Filter changed No adjustments or maintenance done.

Calibration Performed By: Melissa Lemay



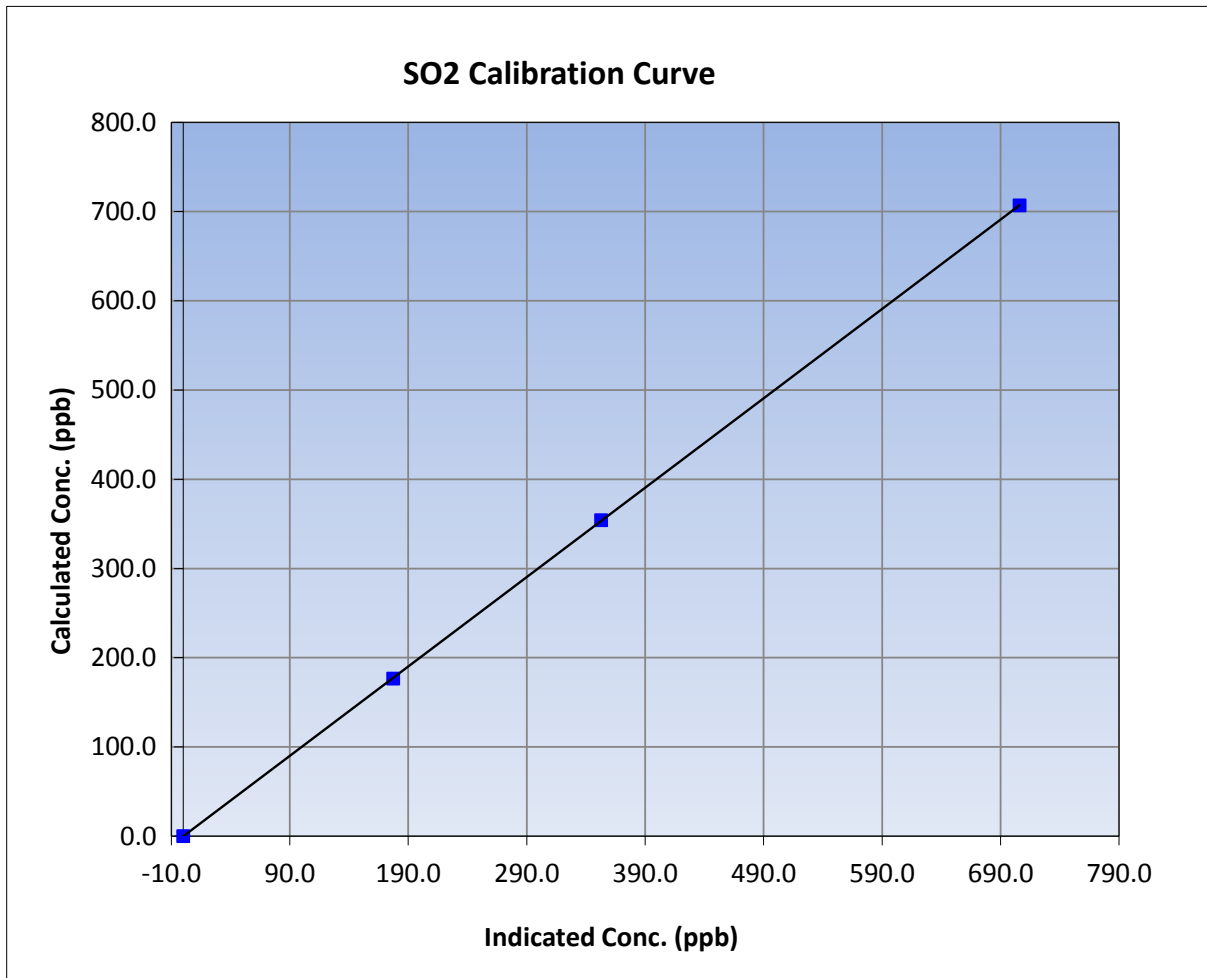
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:45	End Time (MST)	12:38
Analyzer make	API T100	Analyzer serial #	723

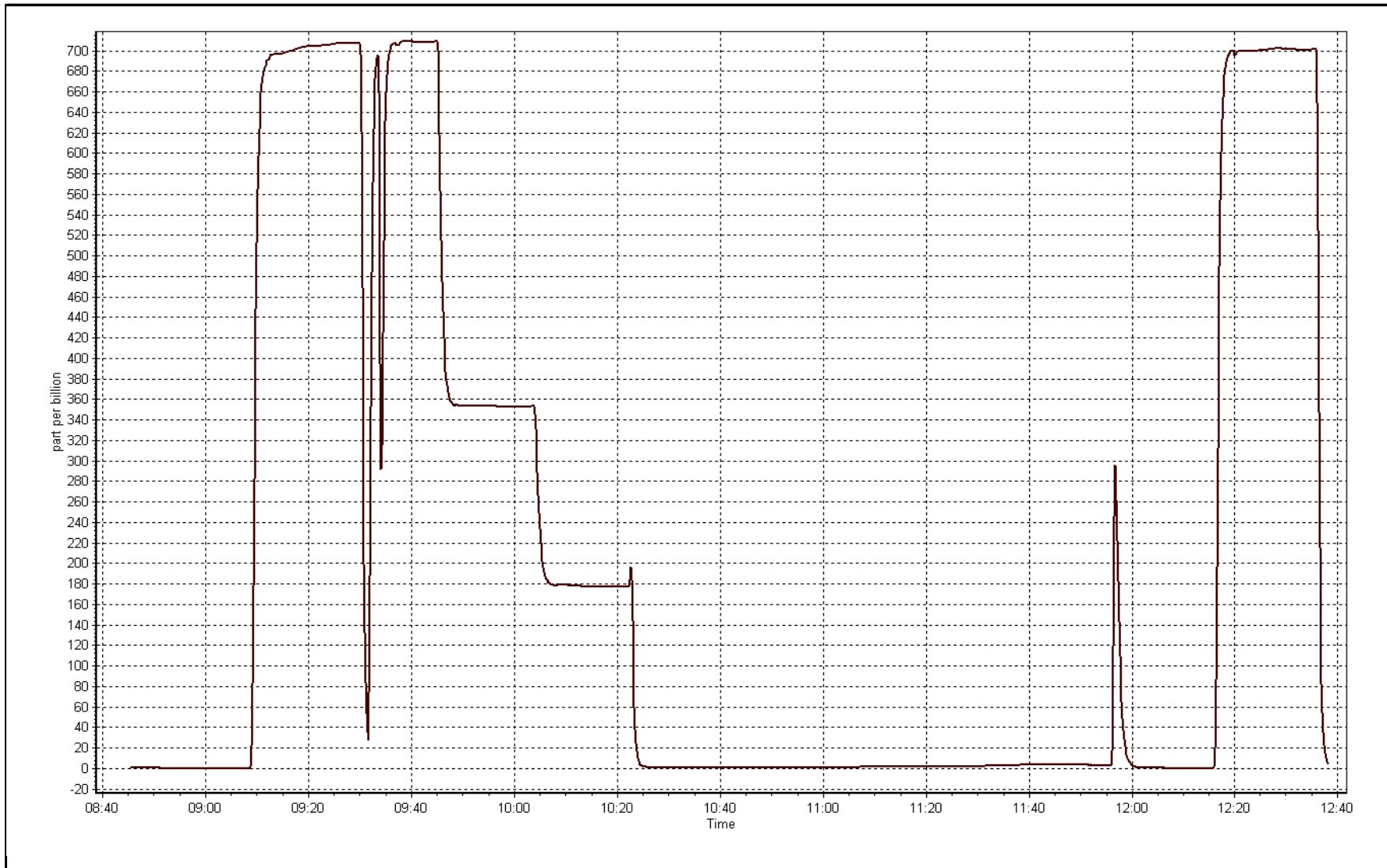
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999995
707.1	706.1	1.0014		
354.0	352.8	1.0034	Slope	1.001775
176.5	177.2	0.9962		
			Intercept	-0.147380



SO2 Calibration Plot

Date: November 5, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	November 16, 2015	Last Calibration	October 6, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	12:55	End Time (MST)	15:01
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	-732	-732
Analyzer IP address	192.168.1.44		Lamp voltage	985	989
Calculated slope	1.007400	0.993938	Chamber temp	45	45
Calculated intercept	-0.134734	0.015038	Pressure	683.7	653.2
Analyzer Background	1.62	1.17	Flow	0.400	0.380
Analyzer Coefficient	1.139	1.168	Intensity	97	98
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	74.3	75.0	73.0	1.028
SO2 scrubber check	5000	18.7	176.5	0.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	75.5	0.994
second point	5000	39.6	40.0	40.2	0.995
third point	5000	19.8	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.3	75.0	74.7	1.005
Average Correction Factor					0.995

Corrected As found	73.0	Previous response	74.6	% change	2.2%
--------------------	------	-------------------	------	----------	------

Notes:

Span Adjusted, filter changed out, no maintenance done

Calibration Performed By:

Melissa Lemay



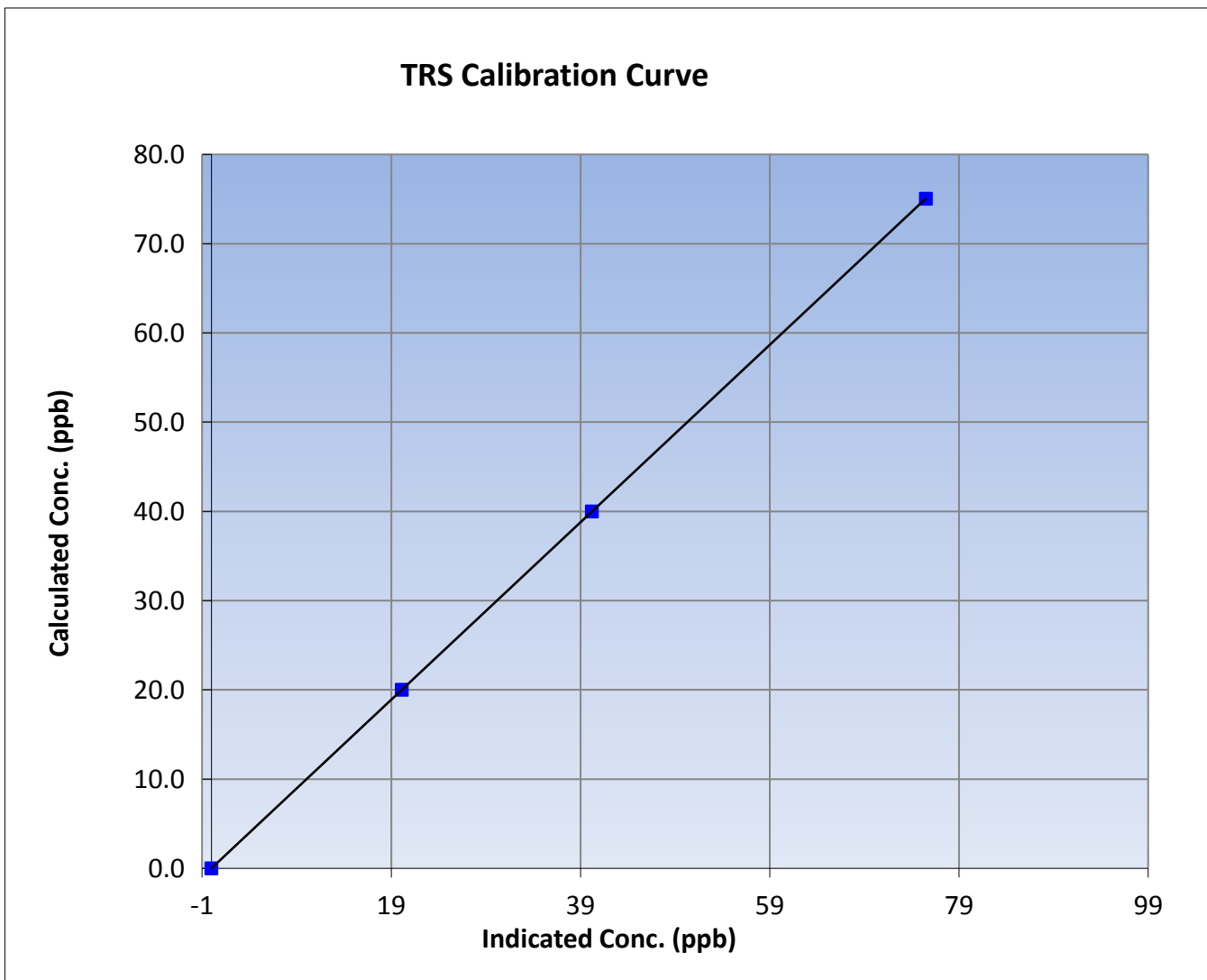
Wood Buffalo Environmental Association TRS Calibration Report

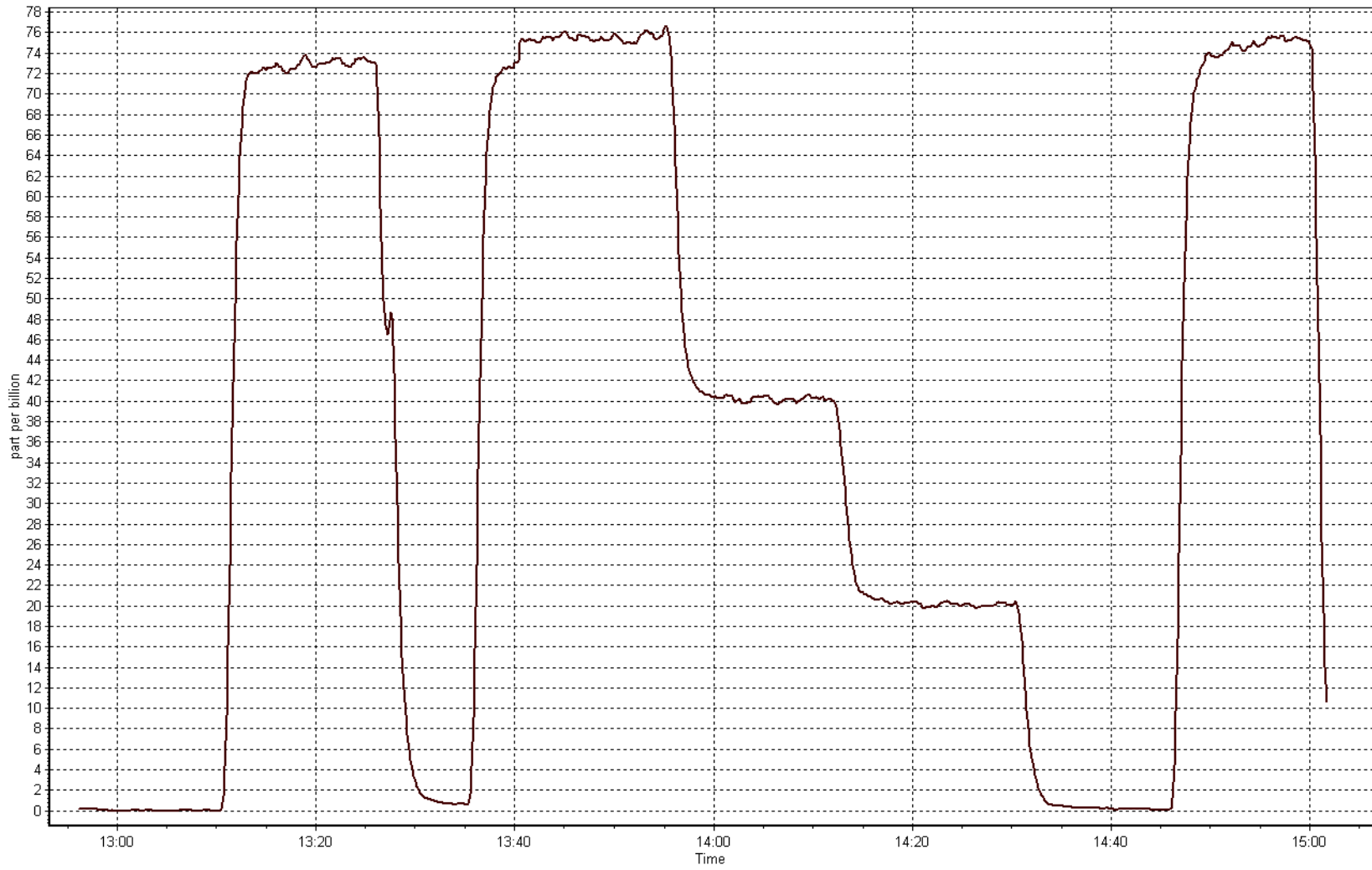
Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 6, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	12:55	End Time (MST)	15:01
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
75.0	75.5	0.9939		
40.0	40.2	0.9949	Slope	0.993938
20.0	20.1	0.9949		
			Intercept	0.015038







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November-05-15	Last Calibration	October-02-15
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	12:39
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	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	392-405	405.0
THC Calc slope	1.000288	1.005119	Carrier Pressure	31.8	31.8
THC Calc intercept	0.020145	0.028382	Fuel Pressure	41.4	41.4
NMHC Calc slope	1.000923	1.002887	Air Pressure	32.6	32.5
NMHC Calc intercept	0.000033	0.010119			

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	16.28	1.005
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.28	1.005
second point	5000	37.5	8.19	8.06	1.016
third point	5000	18.7	4.09	4.04	1.011
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.22	1.009
Average Correction Factor					1.011

Corrected As found 16.28 Previous response 16.34 % change 0.4%

Notes:

No maintenance or adjustments done, filter change 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	74.9	8.69	8.67	1.003
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.67	1.003
second point	5000	37.5	4.35	4.30	1.012
third point	5000	18.7	2.17	2.16	1.005
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.64	1.006
Average Correction Factor					1.006

Corrected As found 8.67 Previous response 8.68 % change 0.2%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	7.61	1.008
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.61	1.008
second point	5000	37.5	3.84	3.75	1.024
third point	5000	18.7	1.91	1.88	1.019
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	7.67	7.59	1.011
Average Correction Factor					1.017

Corrected As found 7.61 Previous response 7.65 % change 0.6%



Wood Buffalo Environmental Association

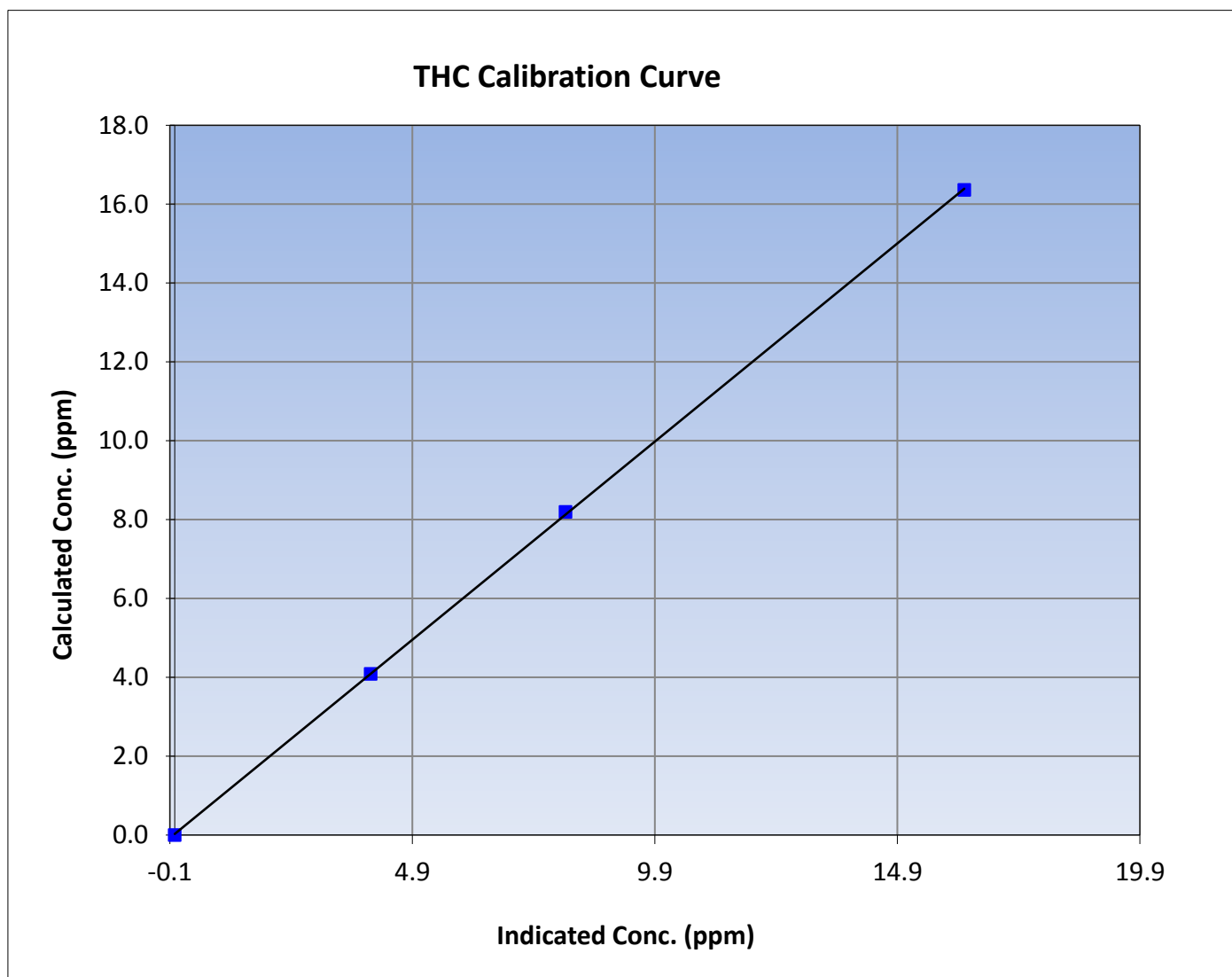
THC Calibration Summary

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:45	End Time (MST)	12:39
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	0.999962
16.36	16.28	1.0050		
8.19	8.06	1.0164	Slope	1.005119
4.09	4.04	1.0111		
			Intercept	0.028382





Wood Buffalo Environmental Association

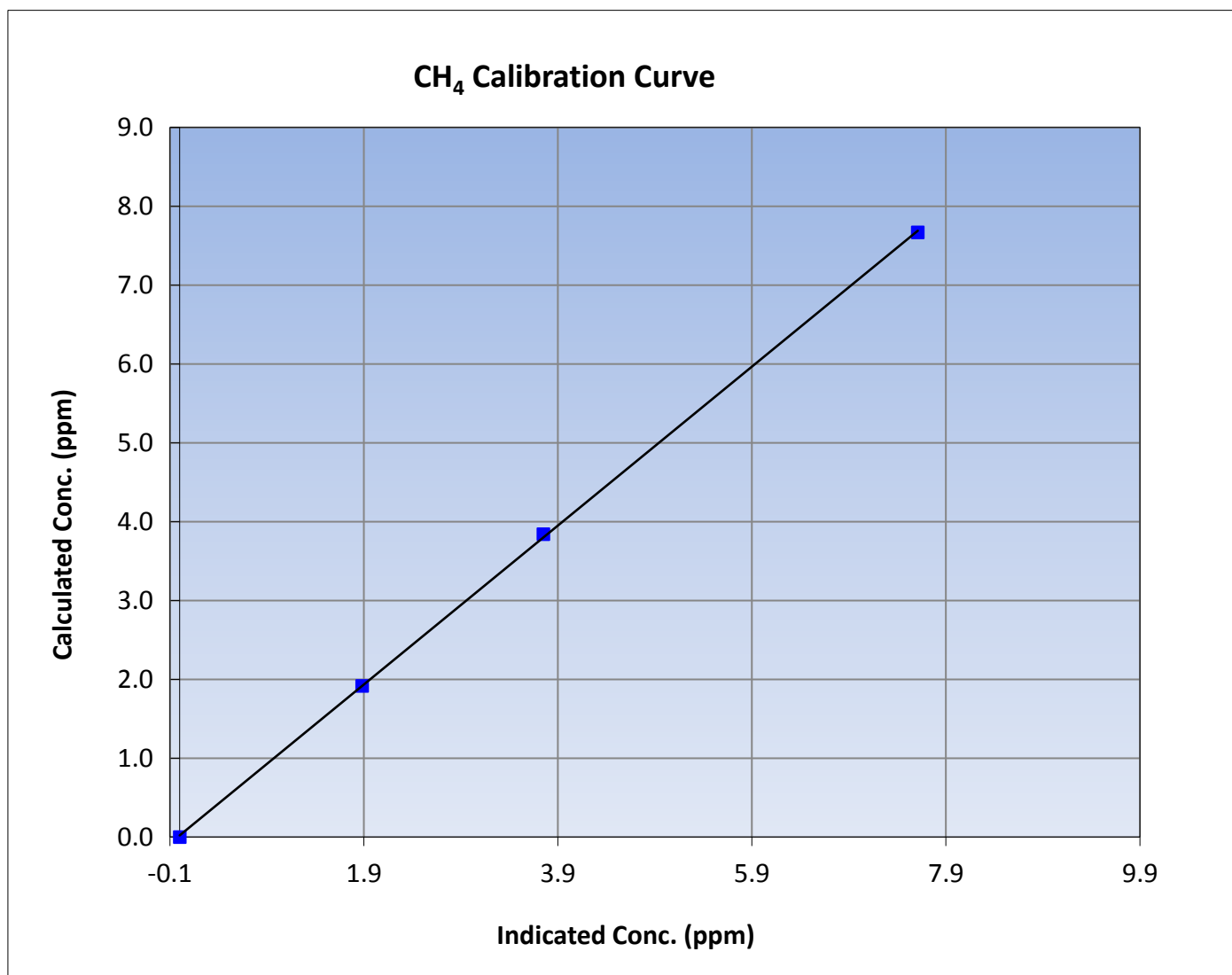
CH₄ Calibration Summary

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:45	End Time (MST)	12:39
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	0.999924
7.67	7.61	1.0079		
3.84	3.75	1.0240	Slope	1.007786
1.91	1.88	1.0186		
			Intercept	0.020389





Wood Buffalo Environmental Association

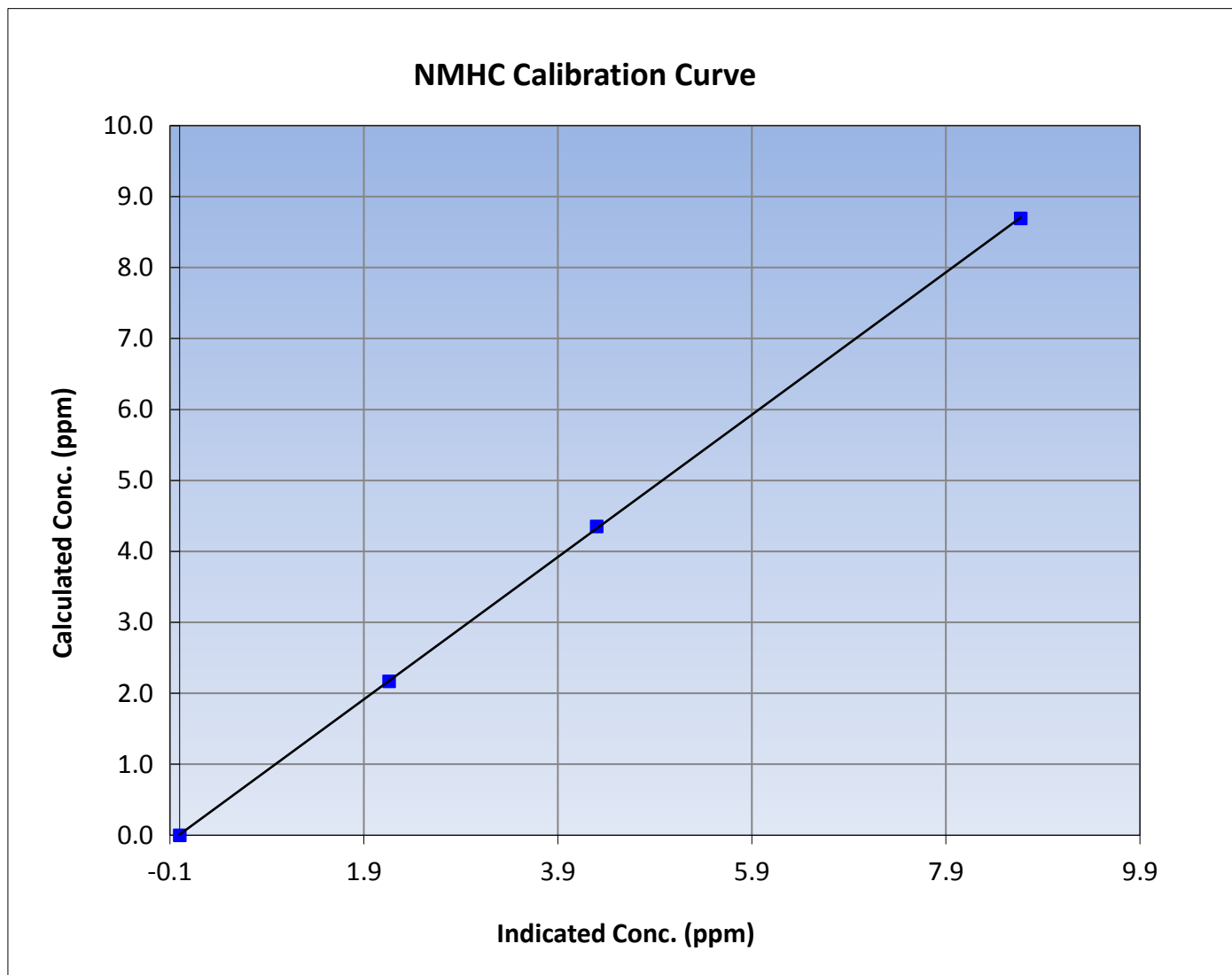
NMHC Calibration Summary

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:45	End Time (MST)	12:39
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

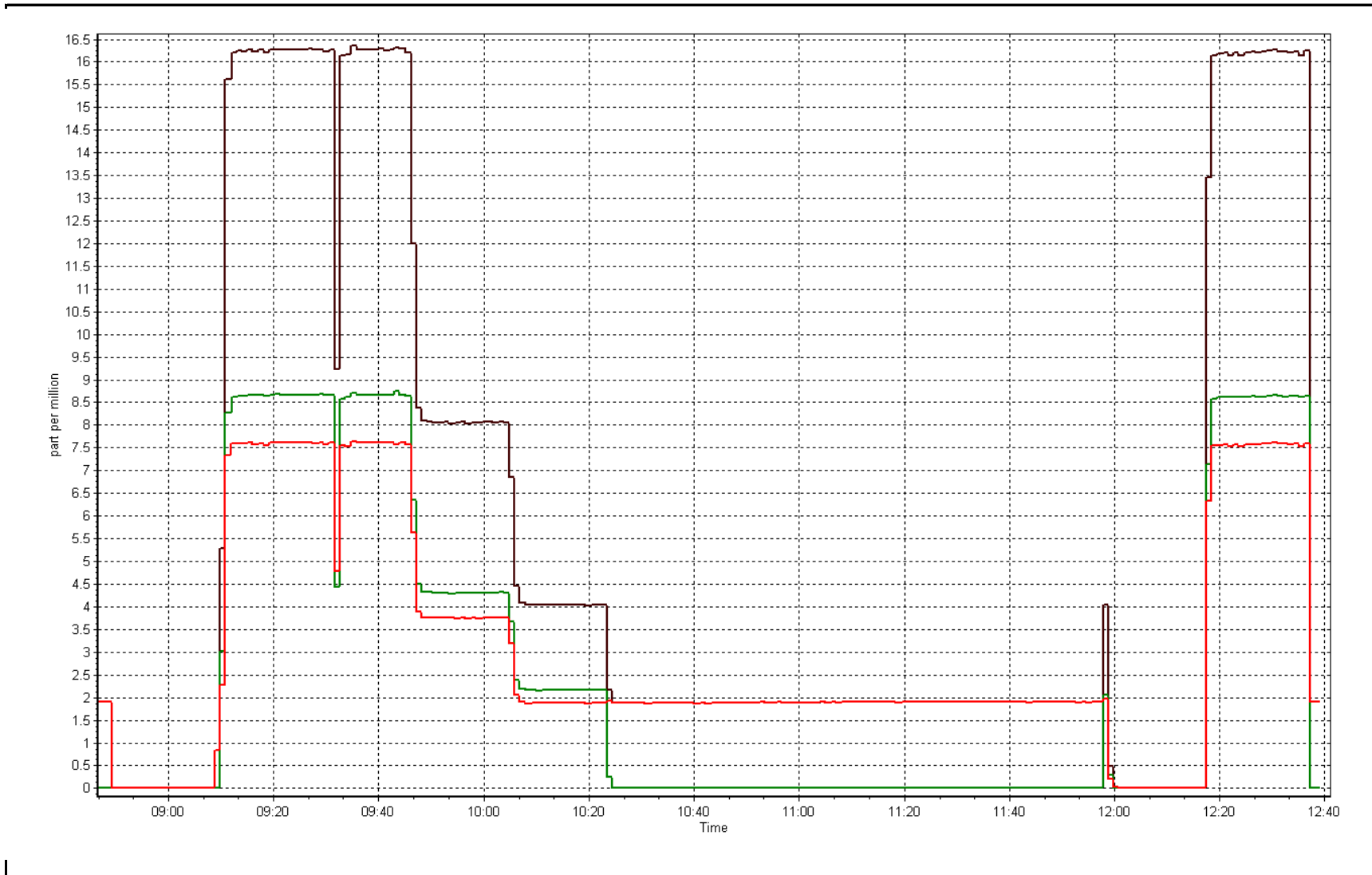
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999972
8.69	8.67	1.0026		
4.35	4.30	1.0121	Slope	1.002887
2.17	2.16	1.0047		
			Intercept	0.010119



THC Calibration Plot

Date: November 5, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 16, 2015	Previous Calibration	October 6, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:49	End Time (MST)	12:55
NO2 GPT Ref date	Nov-6-2015	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.8	26.+
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	0.994915	0.999271	Pressure	666.8	646.7
Calculated intercept	-0.431671	0.492807	Flow cell A	0.713	0.698
Analyzer Background	-2.0	-2.0	Flow cell B	0.715	0.700
Analyzer Coefficient	0.980	0.980	Cell A Intensity	123167	120661
			Cell B Intensity	125438	123716

Analyzer make	Thermo 49i	Analyzer serial #	1426262596
---------------	------------	-------------------	------------

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.0	----
as found span	5000	1.19	431.3	431.2	1.000
calibrator zero	5000	0.00	0.0	0.0	----
high point	5000	1.19	431.3	431.2	1.000
second point	5000	0.85	295.4	295.5	1.000
third point	5000	0.51	154.6	153.3	1.009
as left zero	5000	0.00	0.0	1.5	----
as left span	5000	1.19	431.3	428.2	1.007
Average Correction Factor					1.003

Corrected As found	431.2	Previous response	433.9	% change	0.6%
--------------------	-------	-------------------	-------	----------	------

Notes:

Did Reference check to verify accuracy of Nox. Was within 3%. Will use calibration from Nov 6,2015, No adjustments or maintenance done, filter changed out

Calibration Performed By: _____ Melissa Lemay



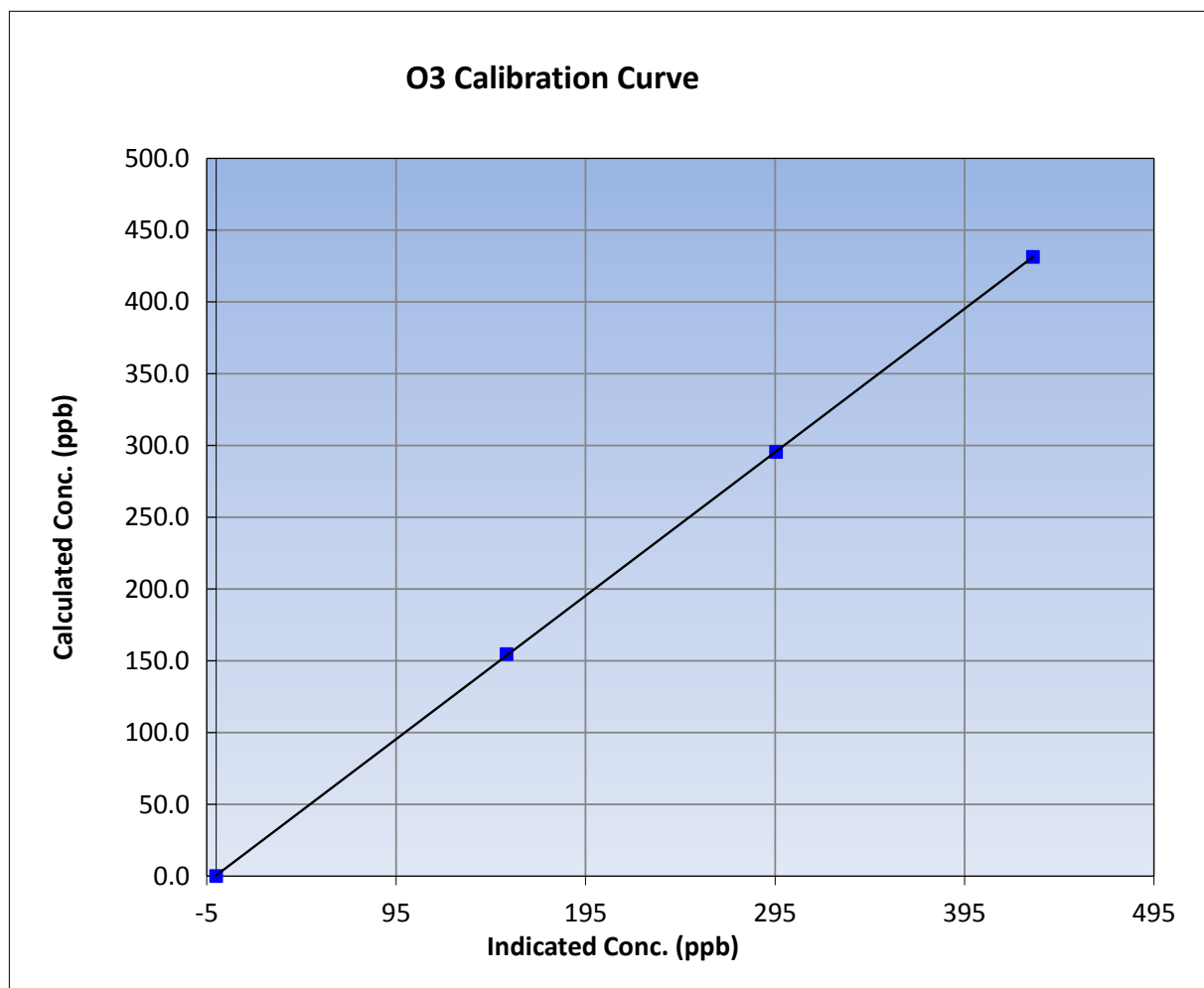
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-16-15	Previous Calibration	October 6, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:49	End Time (MST)	12:55
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

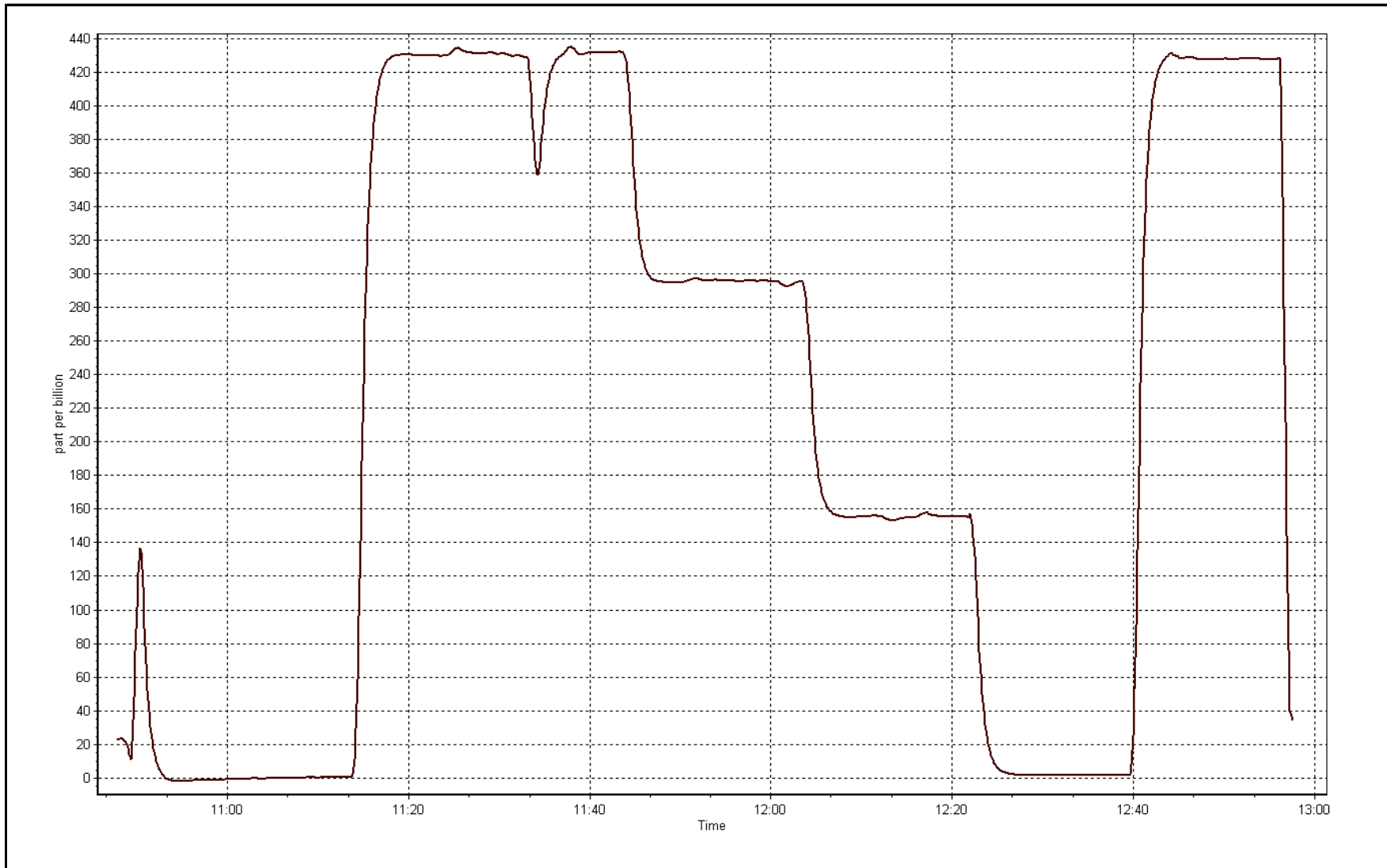
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999987
431.3	431.2	1.0002		
295.4	295.5	0.9997	Slope	0.999271
154.6	153.3	1.0087		
			Intercept	0.492807



O3 Calibration Plot

Date: November 16, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	12:40
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOX Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne API T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001863	1.003014	0.998645
	Data Offset	-0.582586	-0.398468	-0.688703
Current Calibration	Data Slope	0.990312	0.992314	0.999455
	Data Offset	-0.122632	-0.130838	-0.760409

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.976		0.976	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.2		3.2	
NOX bkgrnd	3.3		3.3	
Chamber Temp	50.3	Deg C	50.2	Deg C
Moly Temp	321.6	Deg C	322.6	Deg C
PMT voltage	-802.2	V	-802.9	V
PMT Temp	-2.8	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	159.1	mmHg	156.4	mmHg
R Cell Press Nox	158.8	mmHg	156.7	mmHg
NO sample flow	0.838	lpm	0.823	lpm
Nox sample Flow	0.835	lpm	0.825	lpm

Notes:

No adjustments or maintenance done, filter changed out



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 5, 2015

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as found span	5000	74.9	799.9	799.9	0.0	808.1	806.4	1.7	0.9899	0.9920
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
high point	5000	74.9	799.9	799.9	0.0	808.1	806.4	1.7	0.9899	0.9920
second point	5000	37.5	400.5	400.5	0.0	403.9	403.2	0.7	0.9916	0.9933
third point	5000	18.7	199.7	199.7	0.0	202.2	201.9	0.3	0.9877	0.9892
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	----	----
as left span	5000	74.9	799.9	370.3	429.6	805.8	381.0	424.8	0.9927	0.9719
Average Correction Factor									0.9897	0.9915

Corrected As found

NO_x= 808.0

NO= 806.4

Percent Change

NO_x= -1.1%

NO= -1.0%

Previous Response

NO_x= 799.0

NO= 797.9

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

74.90

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	370.3	437.2	808.0	370.3	437.6	0.9754	1.0000	0.9991	100.1%
2nd NO2 (200)	----	508.2	299.3	808.9	508.2	300.7	0.9743	1.0000	0.9953	100.5%
3rd NO2 (100)	----	651.1	156.4	809.1	651.1	158.0	0.9741	1.0000	0.9899	101.0%
4th NO2 (0)	807.5	----	0.7	808.2	807.5	0.7	0.9752	1.0000	N/A	----
Average Correction Factor							0.9747	1.0000	0.9948	100.5%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

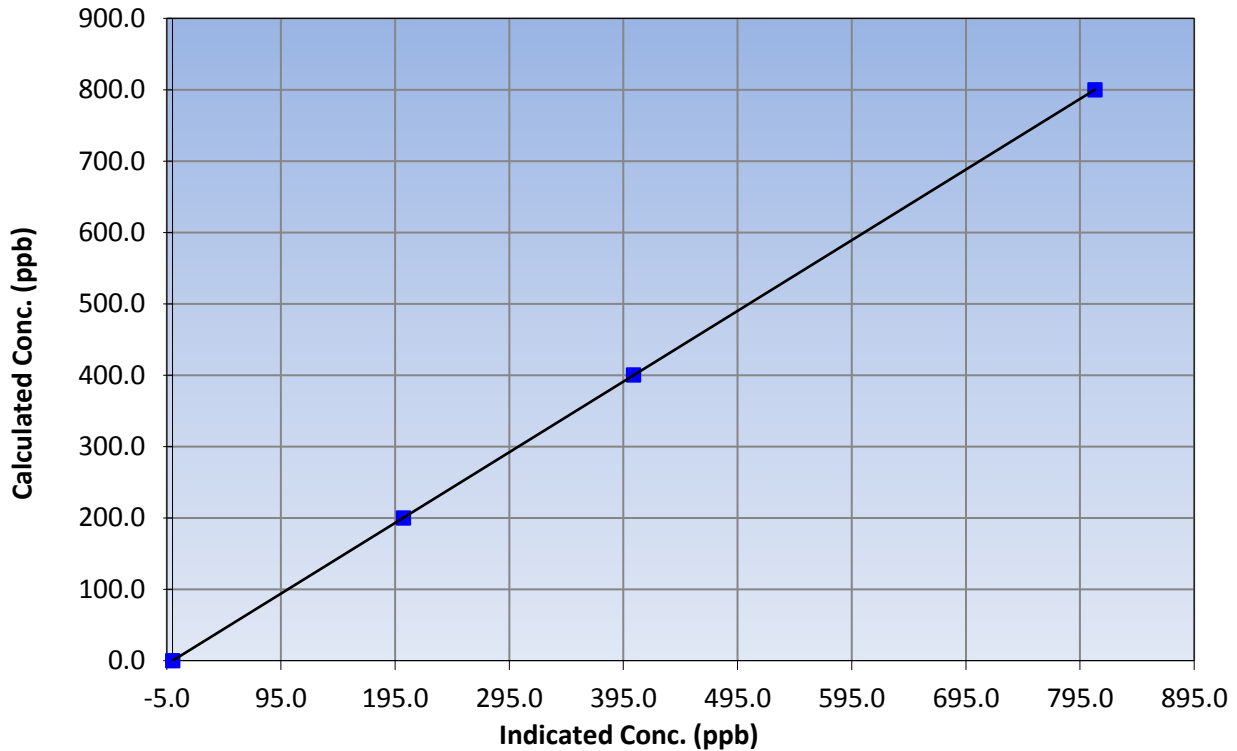
Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	12:40
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999998
799.9	808.1	0.9899		
400.5	403.9	0.9916	Slope	0.990312
199.7	202.2	0.9877		
			Intercept	-0.122632

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

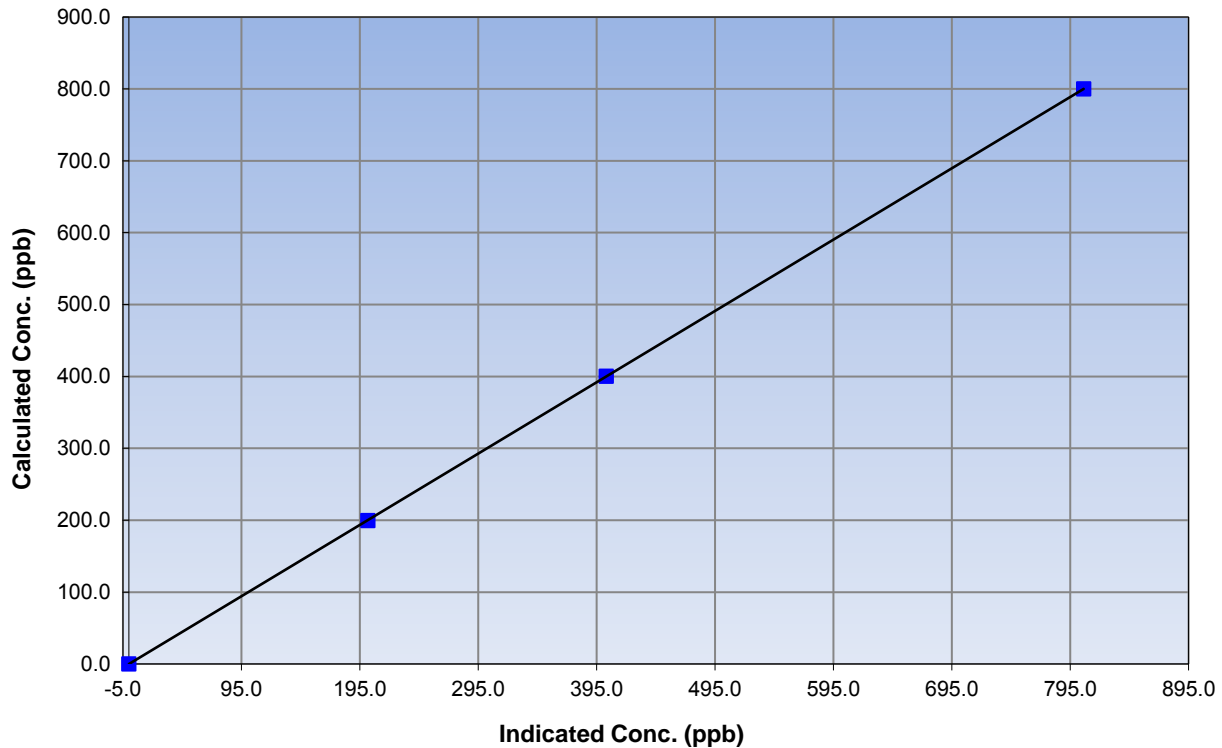
Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	12:40
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	0.999998
799.9	806.4	0.9920		
400.5	403.2	0.9933	Slope	0.992314
199.7	201.9	0.9892		
			Intercept	-0.130838

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

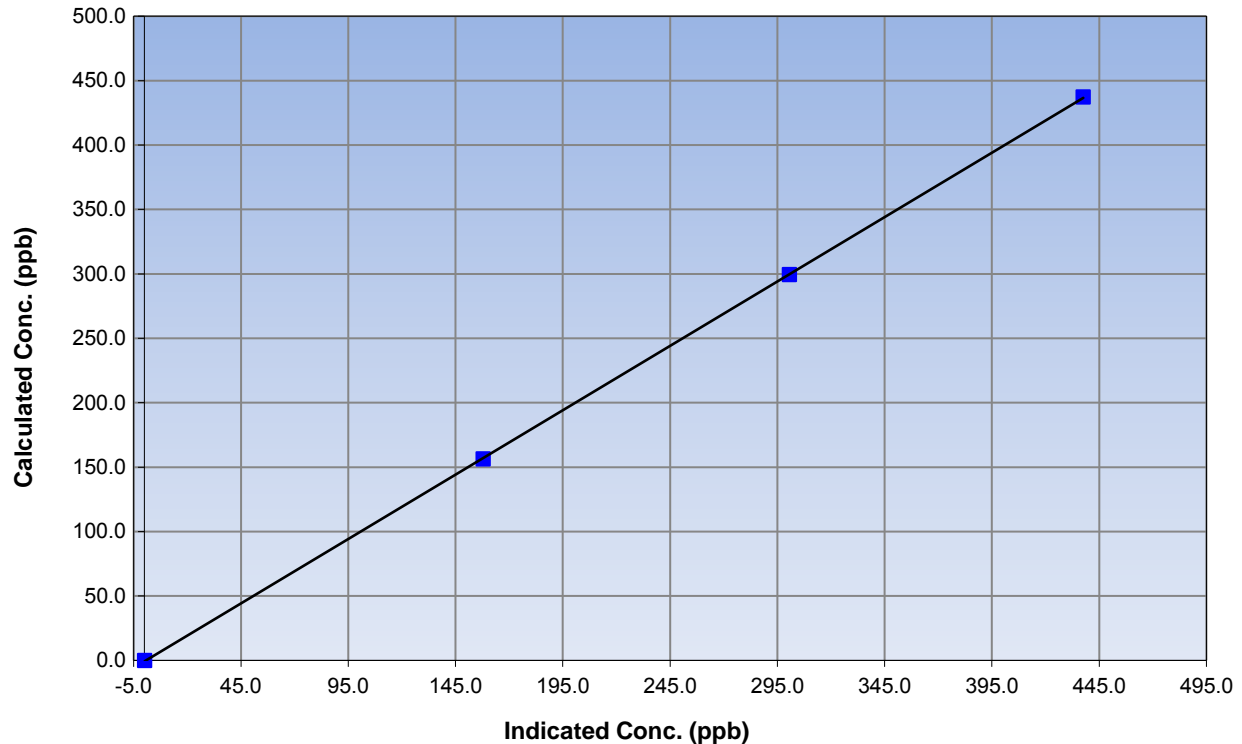
Station Information

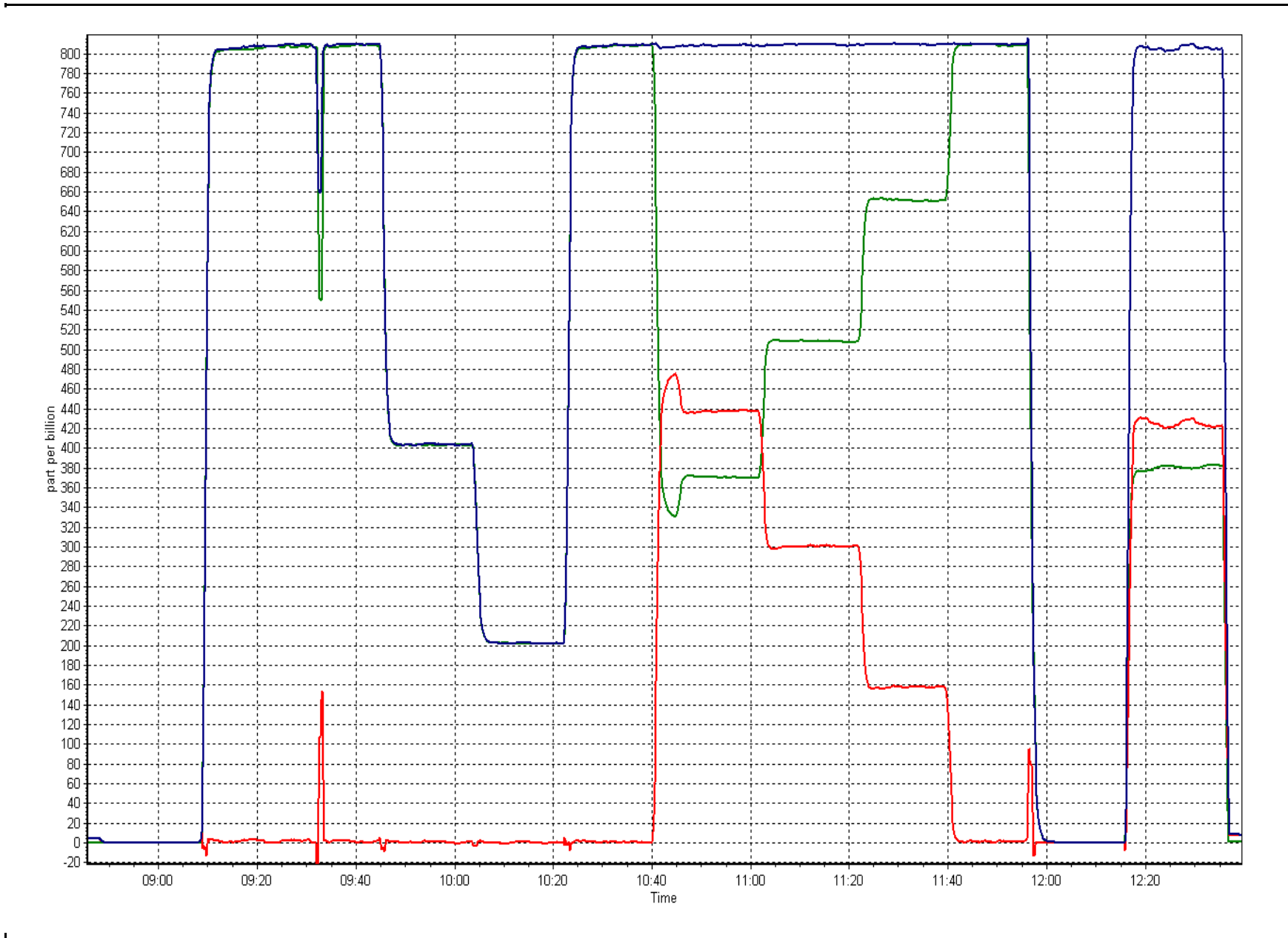
Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	8:30	End Time (MST)	12:40
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999985
437.2	437.6	0.9991		
299.3	300.7	0.9953	Slope	0.999455
156.4	158.0	0.9899		
			Intercept	-0.760409

NO₂ Calibration Curve







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	<input type="checkbox"/> Other: <input type="checkbox"/> Repair		
Start Time (MST)	9:00	End Time (MST)	14:35
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOX Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne API T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.990312	0.992314	0.999455
	Data Offset	-0.122632	-0.130838	-0.760409
Current Calibration	Data Slope	0.998202	0.997682	1.002775
	Data Offset	2.033946	1.960696	0.195802

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.976		0.966	
NOX coefficient	0.999		0.998	
NO2 coefficient	1.000		1.000	
NO bkgnd	3.2		3.5	
NOX bkgnd	3.3		4.3	
Chamber Temp	50.3	Deg C	50.2	Deg C
Moly Temp	321.6	Deg C	322.6	Deg C
PMT voltage	-802.2	V	-802.9	V
PMT Temp	-2.8	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	138.2	mmHg	158.5	mmHg
R Cell Press Nox	138.2	mmHg	158.5	mmHg
NO sample flow	0.674	lpm	0.843	lpm
Nox sample Flow	0.674	lpm	0.843	lpm

Notes:

Flow and Pressure lower then yesterdays calibration. Spans are 10% on nightly span. Found small particle above the capillary on the sample side of the reaction cell. Flow now 0.850 yesterdays calibration 0.875. pressures at 159.7



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 5, 2015

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.4	0.2	0.2	----	----
as found span	5000	74.9	799.9	799.9	0.0	740.8	739.3	1.5	1.0798	1.0820
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	74.9	799.9	799.9	0.0	800.5	801.0	-0.5	0.9993	0.9987
second point	5000	37.5	400.5	400.5	0.0	397.6	397.8	-0.2	1.0073	1.0068
third point	5000	18.7	199.7	199.7	0.0	196.5	196.8	-0.3	1.0164	1.0148
as left zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.2	-0.6	----	----
as left span	5000	74.9	799.9	368.8	431.1	794.8	378.7	416.1	1.0065	0.9739
Average Correction Factor									1.0077	1.0068

Corrected As found
Previous Response

NO_x= 740.4
NO_x= 807.9

NO= 739.1
NO= 806.3

Percent Change

NO_x= 9.1%

NO= 9.1%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

74.90

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	368.8	431.3	798.7	368.8	429.9	0.9868	1.0000	1.0033	99.7%
2nd NO2 (200)	----	504.7	295.4	799.3	504.7	294.6	0.9860	1.0000	1.0027	99.7%
3rd NO2 (100)	----	645.5	154.6	799.2	645.5	153.6	0.9861	1.0000	1.0065	99.4%
4th NO2 (0)	800.1	----	-0.5	799.6	800.1	-0.5	0.9857	1.0000	N/A	----
Average Correction Factor							0.9861	1.0000	1.0042	99.6%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

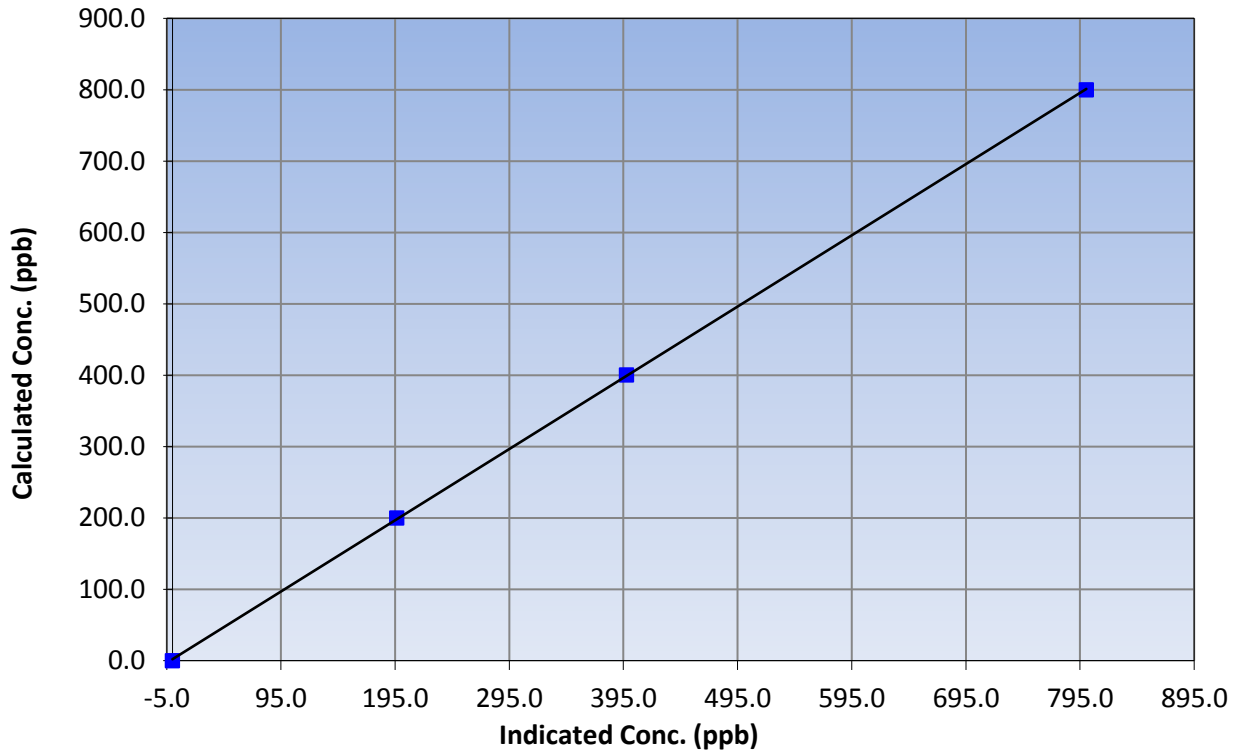
Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999971
799.9	800.5	0.9993		
400.5	397.6	1.0073	Slope	0.998202
199.7	196.5	1.0164		
			Intercept	2.033946

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

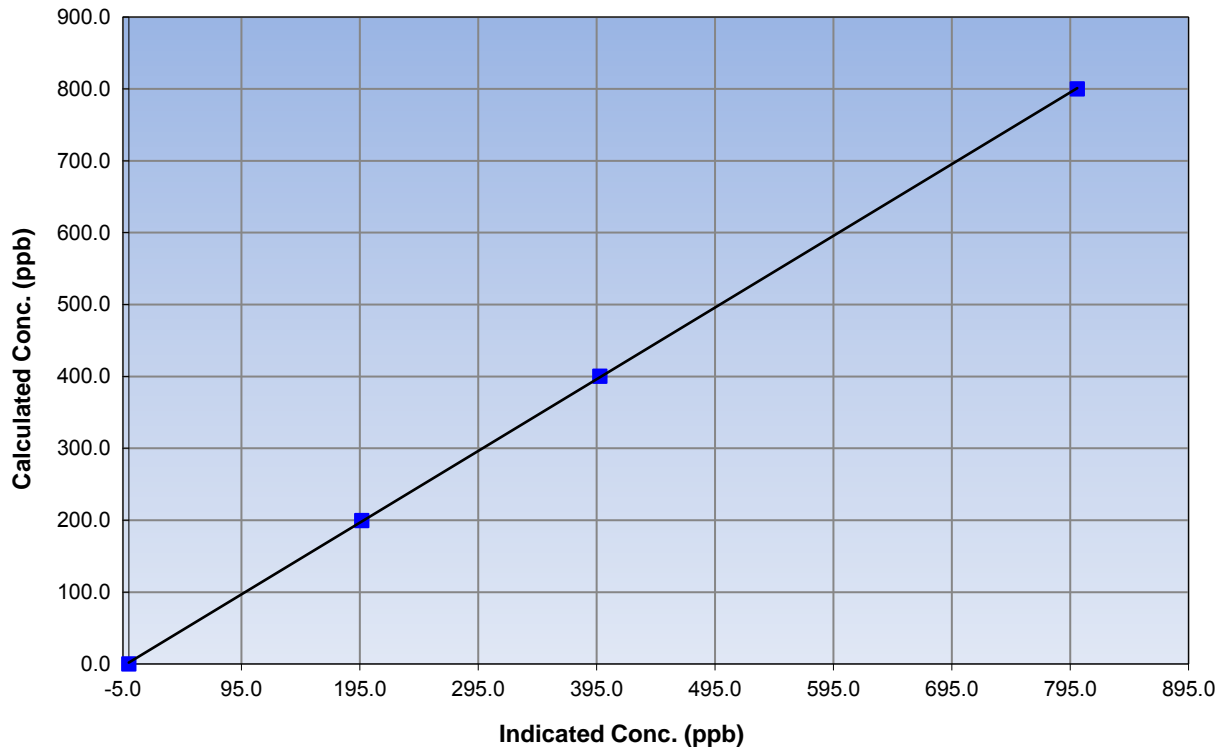
Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999972
799.9	801.0	0.9987		
400.5	397.8	1.0068	Slope	0.997682
199.7	196.8	1.0148		
			Intercept	1.960696

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

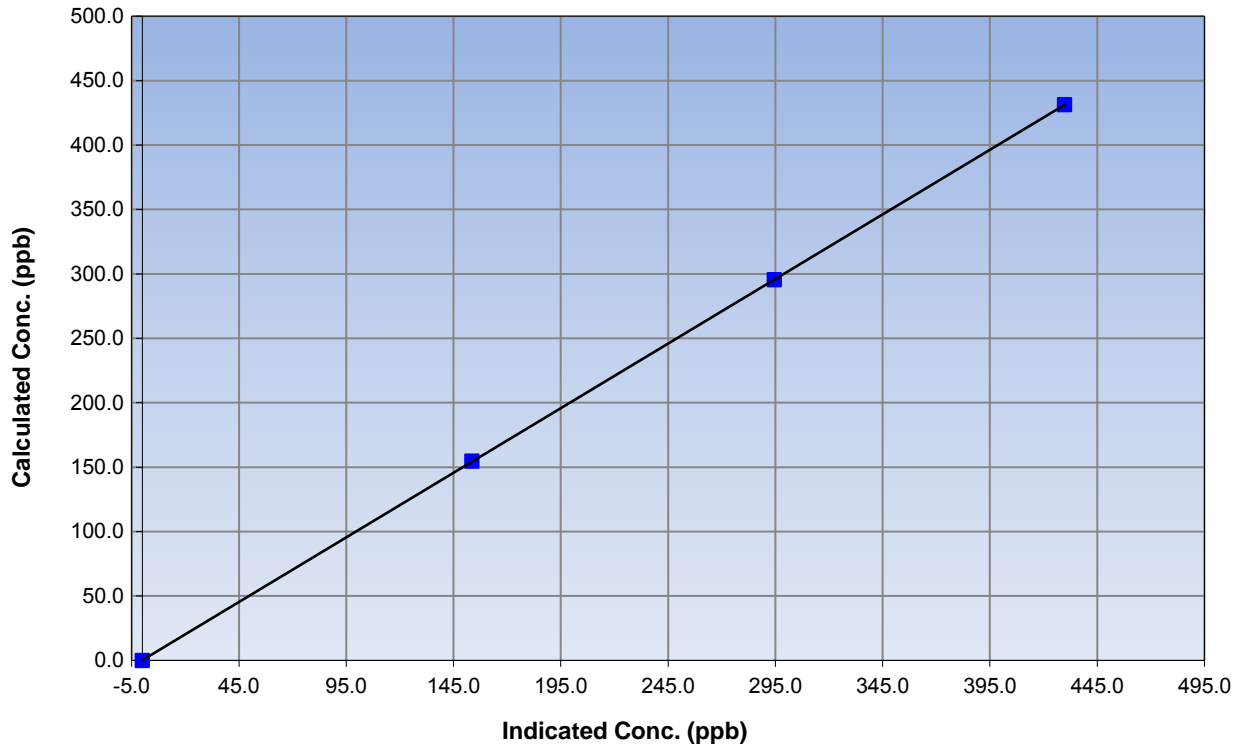
Station Information

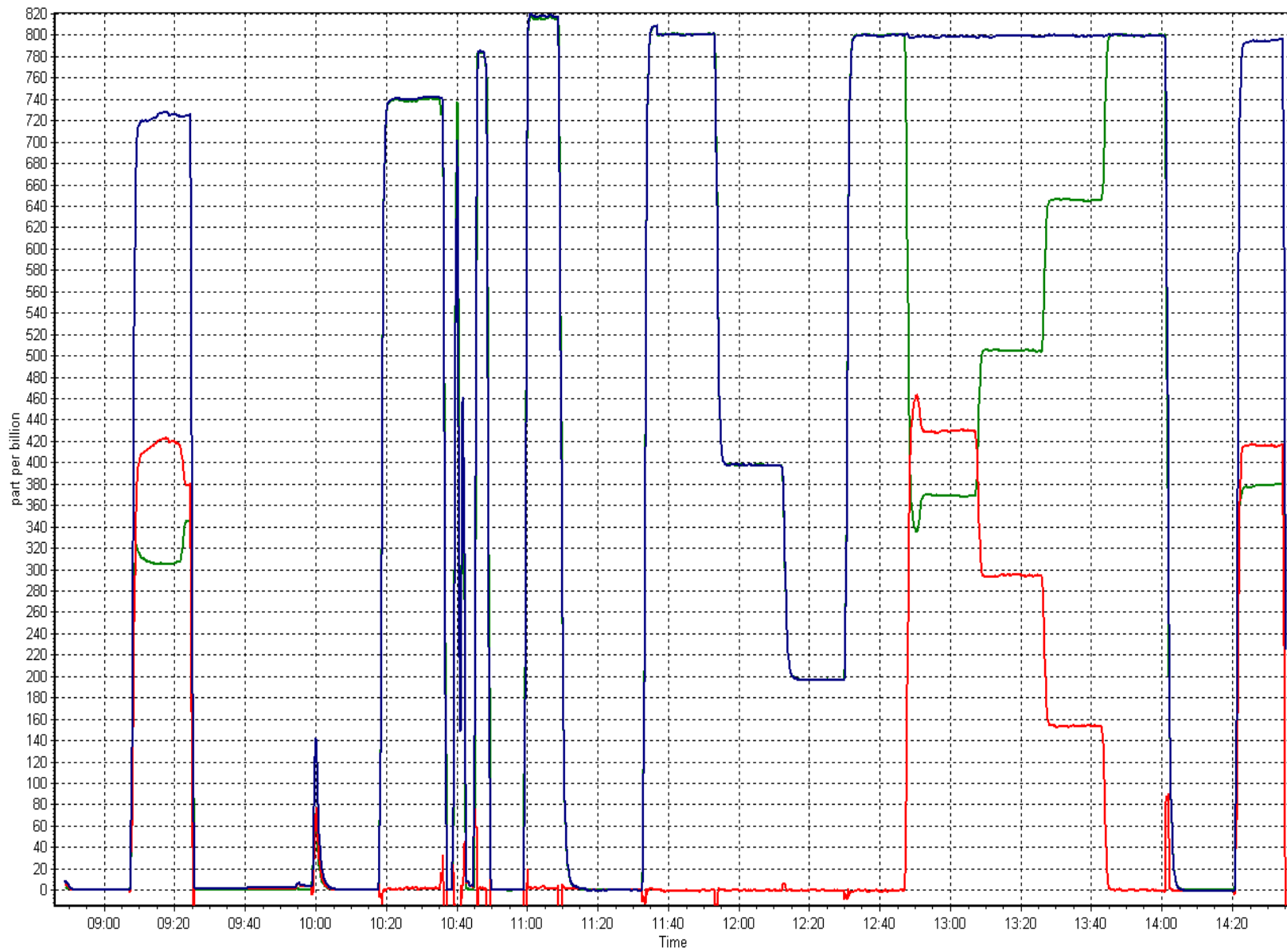
Calibration Date	November 5, 2015	Previous Calibration	October 2, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999998
431.3	429.9	1.0033		
295.4	294.6	1.0027	Slope	1.002775
154.6	153.6	1.0065		
			Intercept	0.195802

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

W B E A

STATION INFORMATION

Calibration Date:	<u>November 16, 2015</u>	Previous Calibration:	<u>October 6, 2015</u>
Station Name:	<u>Anzac</u>	Station Number:	<u>AMS 14</u>
Start Time (MST):	<u>12:08</u>	End Time (MST):	<u>12:47</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1451</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E1093</u>
C ₁₄ Source SN:	<u>4933</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 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	24.0	na	na	24.0
T3	23.0	na	na	23.0
T4	18.0	na	na	18.0
RH (%)	14.0	na	na	14.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	943	943.0	0.0	943

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1028	28	1028	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	192		192
Neph	0.2		0.2
C14	182.4		182.4
Indicated Concentration (ug/m3)	0.1	No	0.1
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	<u>November 16, 2015</u>	Previous Leak Check Date:	<u>August 18, 2015</u>
------------------	--------------------------	---------------------------	------------------------

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	17.18	
*Flow with adaptor (LPM):	17.15	0.03

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

Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>June 17, 2015</u>	Previous Foil Calibration:	
Zeroed?:			
Foil Mass:	<u>1278</u>	Mass foil set S/N:	<u>2520</u>
Previous Correction Factor:	<u>7020</u>		
New Correction Factor:	<u>6936</u>		

INSPECTION DATA

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

NOTES:

No adjustments. Cyclone head cleaned.

Calibration Performed By:	<u>Melissa Lemay</u>
---------------------------	----------------------



This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	36	37	99.86	10	0	2	0
TRS (ppb) Average	686	33	34	99.86	1	0	0	0
THC (ppm) Average	655	35	65	95.83	9	-	2.5	-
NO2 (ppb) Average	681	35	39	99.44	31	0	11	-
NO (ppb) Average	681	35	39	99.44	101	-	17	-
NOX (ppb) Average	681	35	39	99.44	125	-	23	-
PM2.5 (ug/m3) Average	718	1	2	99.86	55.4	-	18.5	0
Temperature 2 m (C) Average	719	0	1	99.86	7.7	-	2	-
Wind Speed 10 m (km/h) Average	689	0	31	95.69	22	-	15	-
Wind Direction 10 m (deg) Average	689	0	31	95.69	-	-	-	-
Precipitation (mm) Total	719	0	1	99.86	2.5	-	4.8	-
Relative Humidity (%) Average	719	0	1	99.86	98	-	95	-
Global Solar Radiation (W/m2) Average	719	0	1	99.86	294	-	53	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	0.3	1	-	0	0	0	0	0	1	10
TRS (ppb) Average	686	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	655	2	0.4	-	1.8	1.8	1.9	1.9	2	2.1	9
NO2 (ppb) Average	681	3.8	5	-	0	0	1	2	5	10	31
NO (ppb) Average	681	1.6	8	-	0	0	0	0	0	2	101
NOX (ppb) Average	681	5.4	12	-	0	0	1	2	5	11	125
PM2.5 (ug/m3) Average	718	5.07	5.2	-	1.3	1.8	2.5	3.7	5.6	8.7	55.4
Temperature 2 m (C) Average	719	-5.03	5.5	-	-22.2	-13.4	-8	-3.9	-1.1	0.6	7.7
Wind Speed 10 m (km/h) Average	689	8.5	4	-	0	4	6	8	11	14	22
Wind Direction 10 m (deg) Average	689	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	719	-	-	13.21	-	-	-	-	-	-	-
Relative Humidity (%) Average	719	78	13	-	39	56	69	81	89	93	98
Global Solar Radiation (W/m2) Average	719	25.6	52	-	0	0	0	0	24	100	294

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	15 Nov 2015 12:00	15 Nov 2015 12:00	1	DAS collection error - new program uploaded
THC	13 Nov 2015 13:00	13 Nov 2015 13:00	1	Intermittent unstable operation - excessive baseline drift
THC	15 Nov 2015 08:00	15 Nov 2015 10:00	3	Intermittent unstable operation - excessive baseline drift
THC	15 Nov 2015 11:00	15 Nov 2015 12:00	2	Maintenance - investigation into baseline drift
THC	16 Nov 2015 00:00	16 Nov 2015 02:00	3	Intermittent unstable operation - excessive baseline drift
THC	16 Nov 2015 11:00	16 Nov 2015 11:00	1	Maintenance - replaced ethernet cable
THC	17 Nov 2015 15:00	17 Nov 2015 16:00	2	Intermittent unstable operation - excessive baseline drift
THC	17 Nov 2015 18:00	17 Nov 2015 18:00	1	Intermittent unstable operation - excessive baseline drift
THC	17 Nov 2015 20:00	17 Nov 2015 21:00	2	Intermittent unstable operation - excessive baseline drift
THC	17 Nov 2015 23:00	18 Nov 2015 00:00	2	Intermittent unstable operation - excessive baseline drift
THC	21 Nov 2015 15:00	21 Nov 2015 17:00	3	Intermittent unstable operation - excessive baseline drift
THC	21 Nov 2015 19:00	22 Nov 2015 02:00	8	Intermittent unstable operation - excessive baseline drift
THC	22 Nov 2015 04:00	22 Nov 2015 04:00	1	Intermittent unstable operation - excessive baseline drift
THC	22 Nov 2015 10:00	22 Nov 2015 10:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	16 Nov 2015 00:00	16 Nov 2015 01:00	2	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	24 Nov 2015 20:00	24 Nov 2015 20:00	1	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	02 Nov 2015 10:00	02 Nov 2015 10:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	03 Nov 2015 07:00	03 Nov 2015 07:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	03 Nov 2015 18:00	03 Nov 2015 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	19 Nov 2015 18:00	19 Nov 2015 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Nov 2015 12:00	23 Nov 2015 13:00	26	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 10 ppb on Nov 18 10:00	Maximum Daily Average: 1.7 ppb on Nov 18
Minimum Value: 0 ppb on Nov 1 23:00	Hours of Data: 683
Maximum Diurnal Average: 0.5 ppb at hour 20	Hours of Missing Data: 37
Monthly Average: 0.3 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.1 ppb on Nov 14	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.2 ppb at hour 8	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 4	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Nov	Z	0	2	1	1	0	0	0	0	0	0	1	2	4	2	2	1	1	2	2	1	1	1	1	1.1	4
3-Nov	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.2	1
5-Nov	0	0	0	Z	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
6-Nov	0	0	0	0	Z	0	1	0	0	0	0	0	0	1	2	2	2	2	4	6	4	5	1	1.5	6	
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Nov	Z	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
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	3	4	4	3	3	4	1.1	4	
13-Nov	3	2	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
14-Nov	Z	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
15-Nov	0	Z	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Nov	0	0	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Nov	0	0	1	1	Z	0	0	1	2	10	8	8	3	2	2	0	0	0	0	0	0	0	0	0	1.7	10
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
20-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2	0	0	0	0.4	4	
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Nov	Z	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
27-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Nov	0	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
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

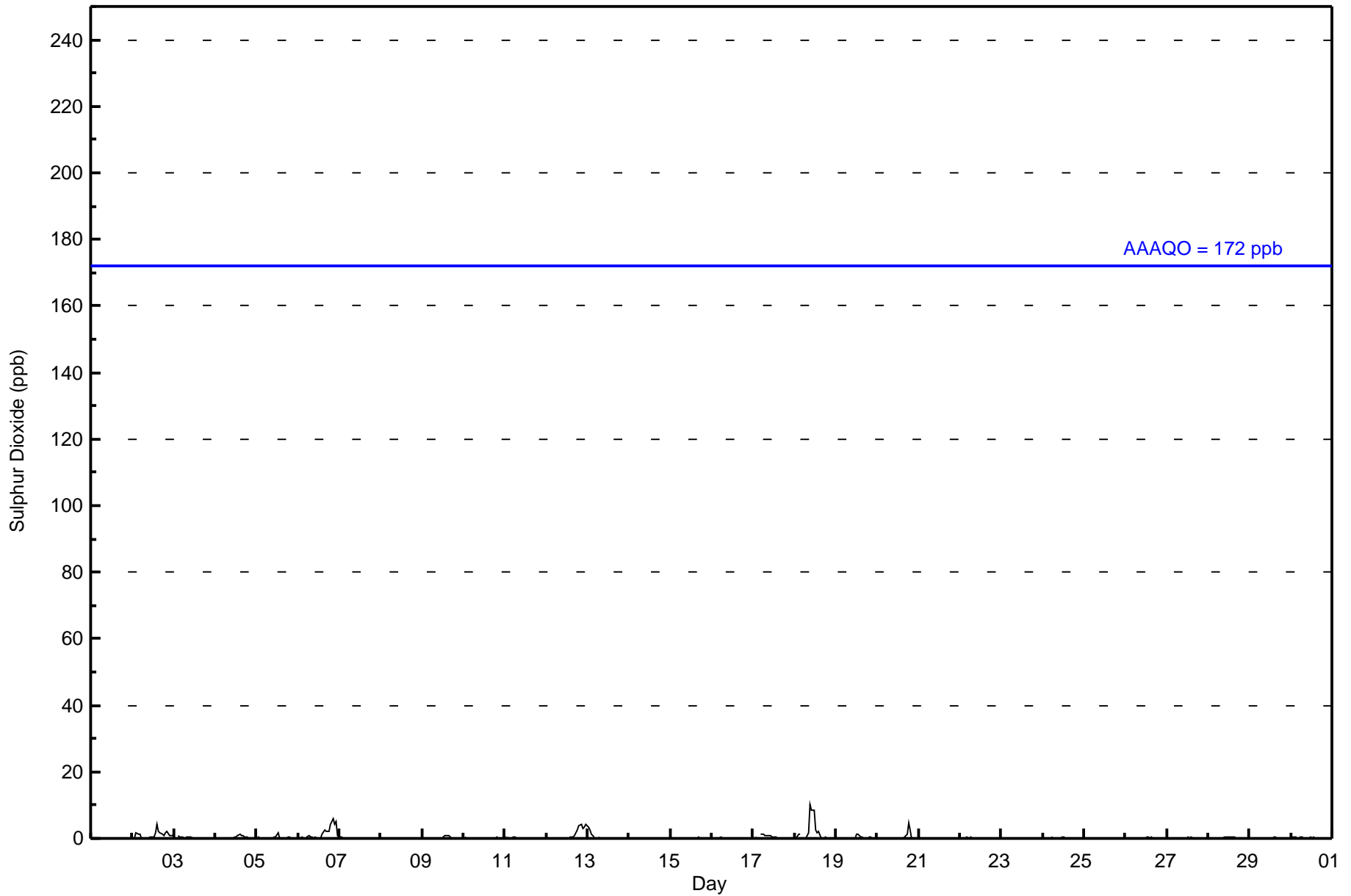
0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.4	0.5	0.4	0.3	0.5	0.3	0.3	0.3	0.4	0.5	0.5	0.3	0.4	0.3	Diurnal Average	
3	2	2	1	1	1	1	1	1	2	10	8	8	3	2	4	2	2	2	4	4	6	4	5	4	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	683	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: 683

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	64	52	8	2	3	3	7	59	156	124	85	33	13	9	25	14	657
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	52	8	2	3	3	7	59	156	124	85	33	13	9	25	14	657

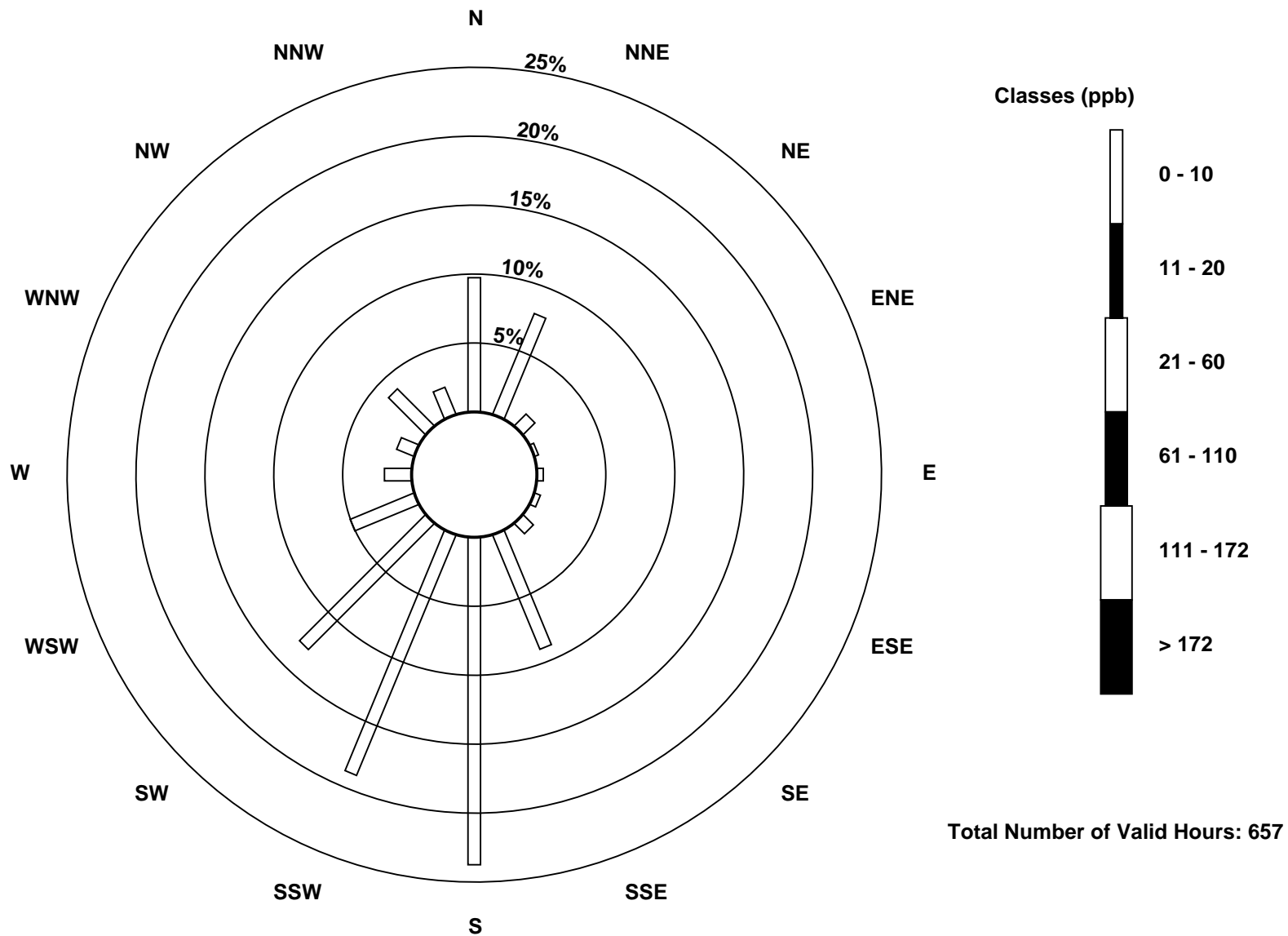
Total Number of Valid Hours: 657

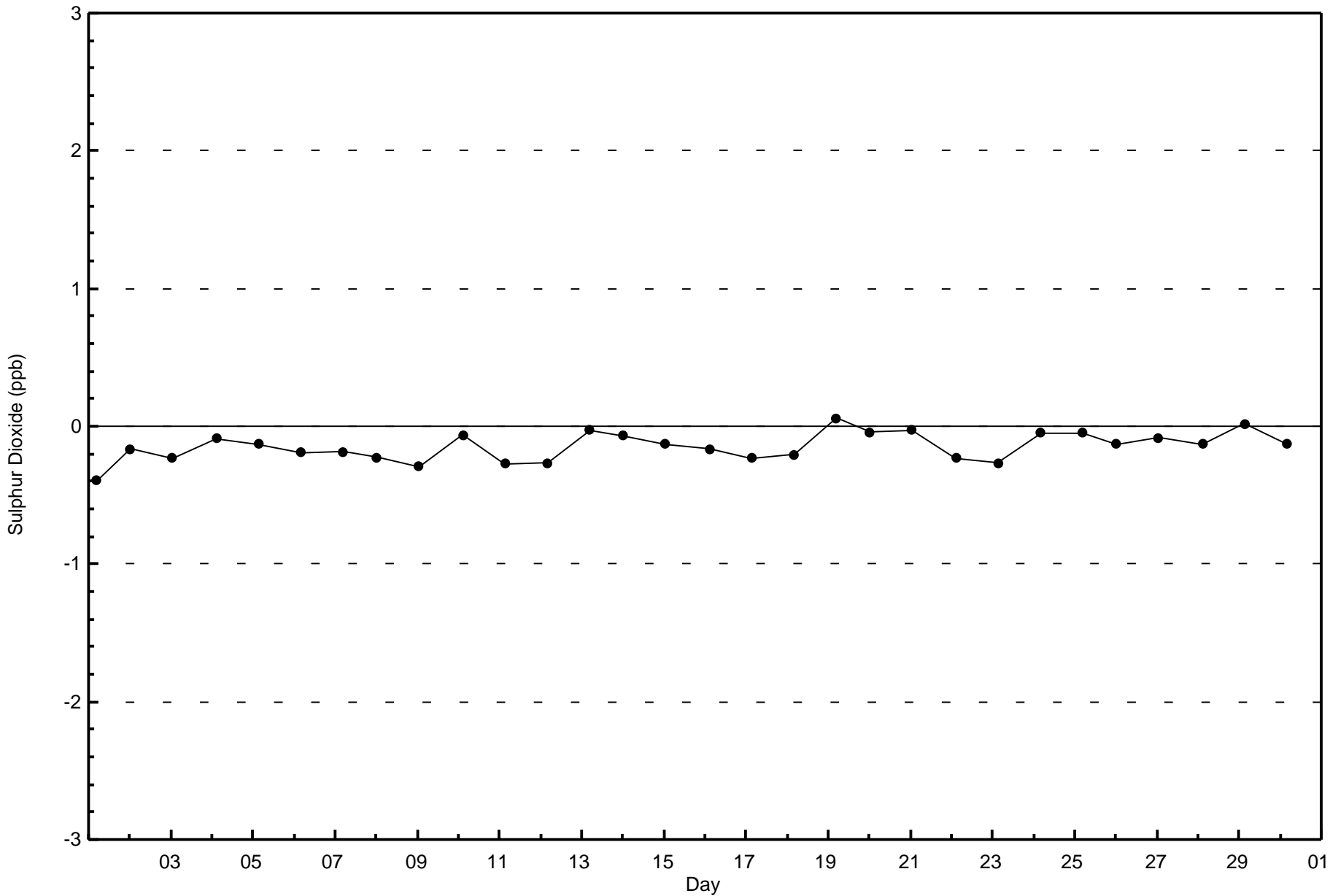
Total Number of Hours: 720

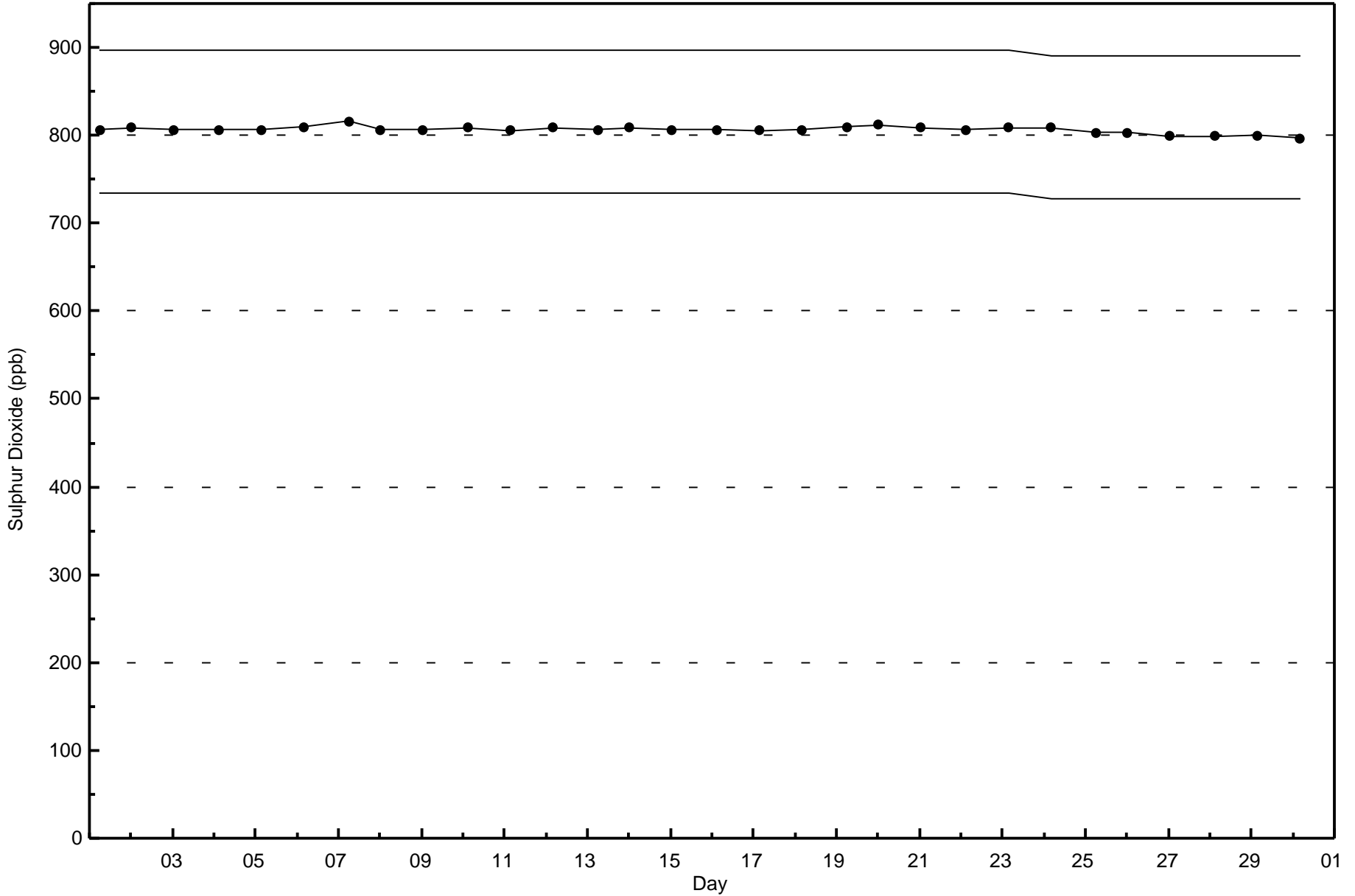


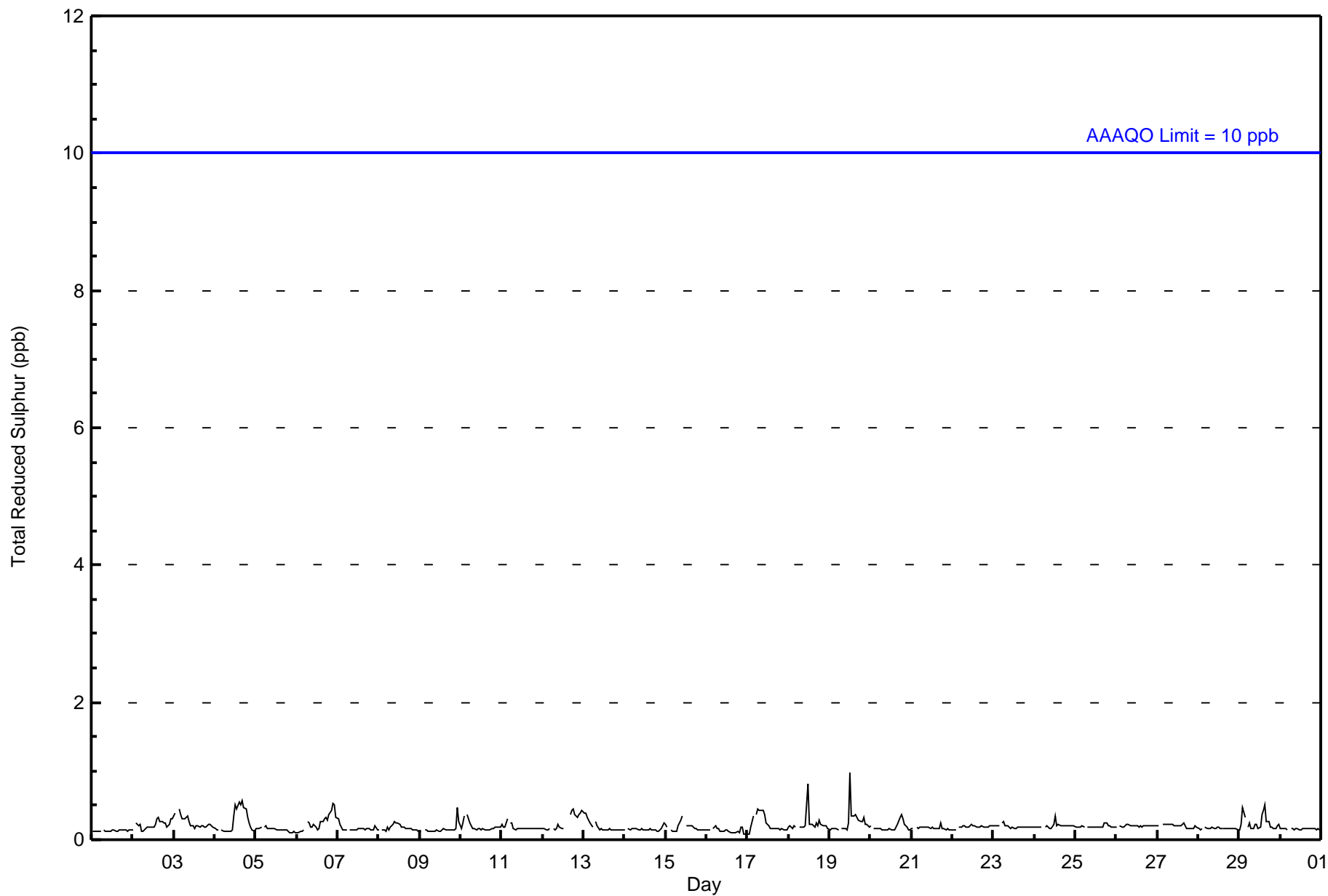
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	686	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	64	56	8	1	3	3	6	59	153	129	80	33	13	9	26	14	657
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	56	8	1	3	3	6	59	153	129	80	33	13	9	26	14	657

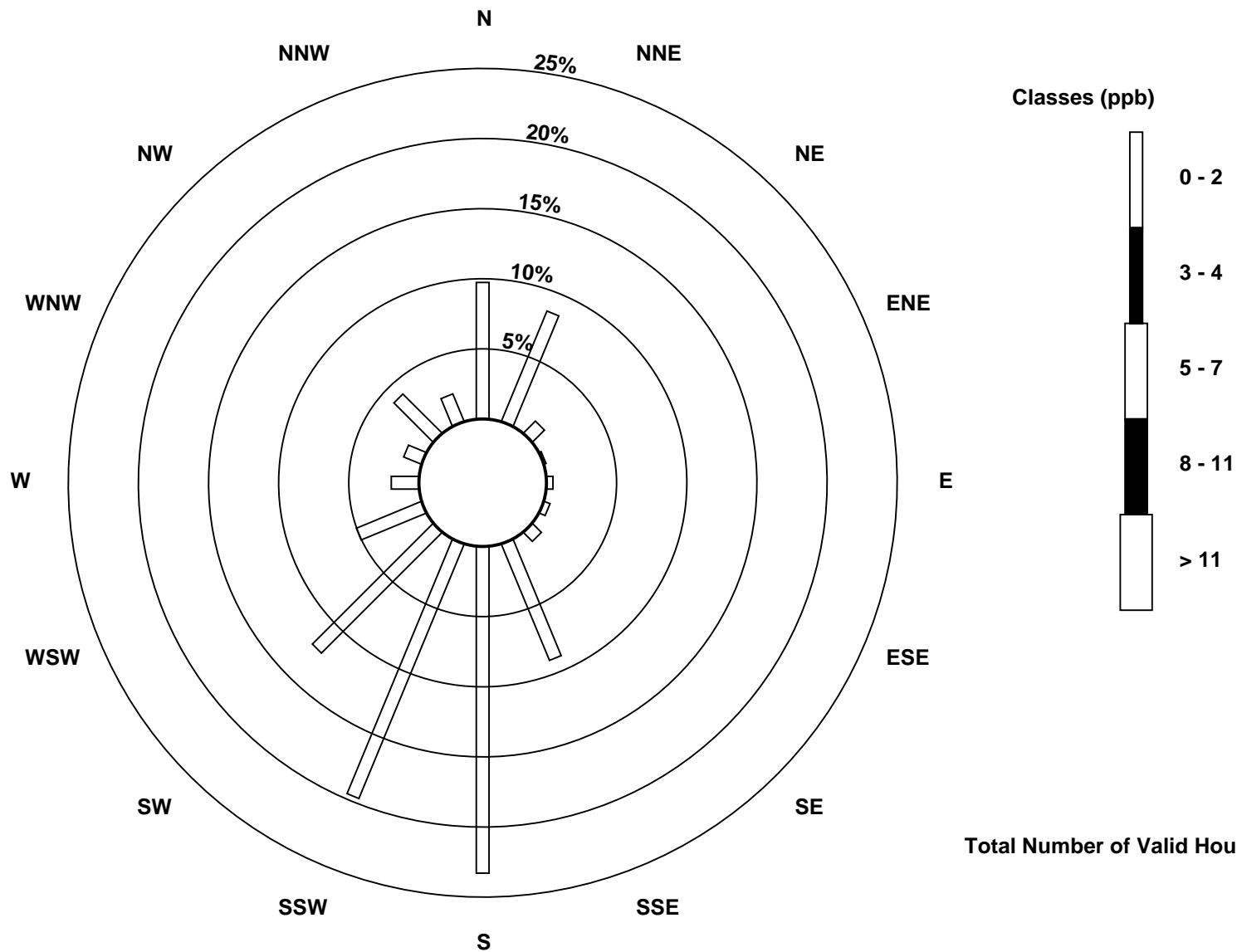
Total Number of Valid Hours: 657

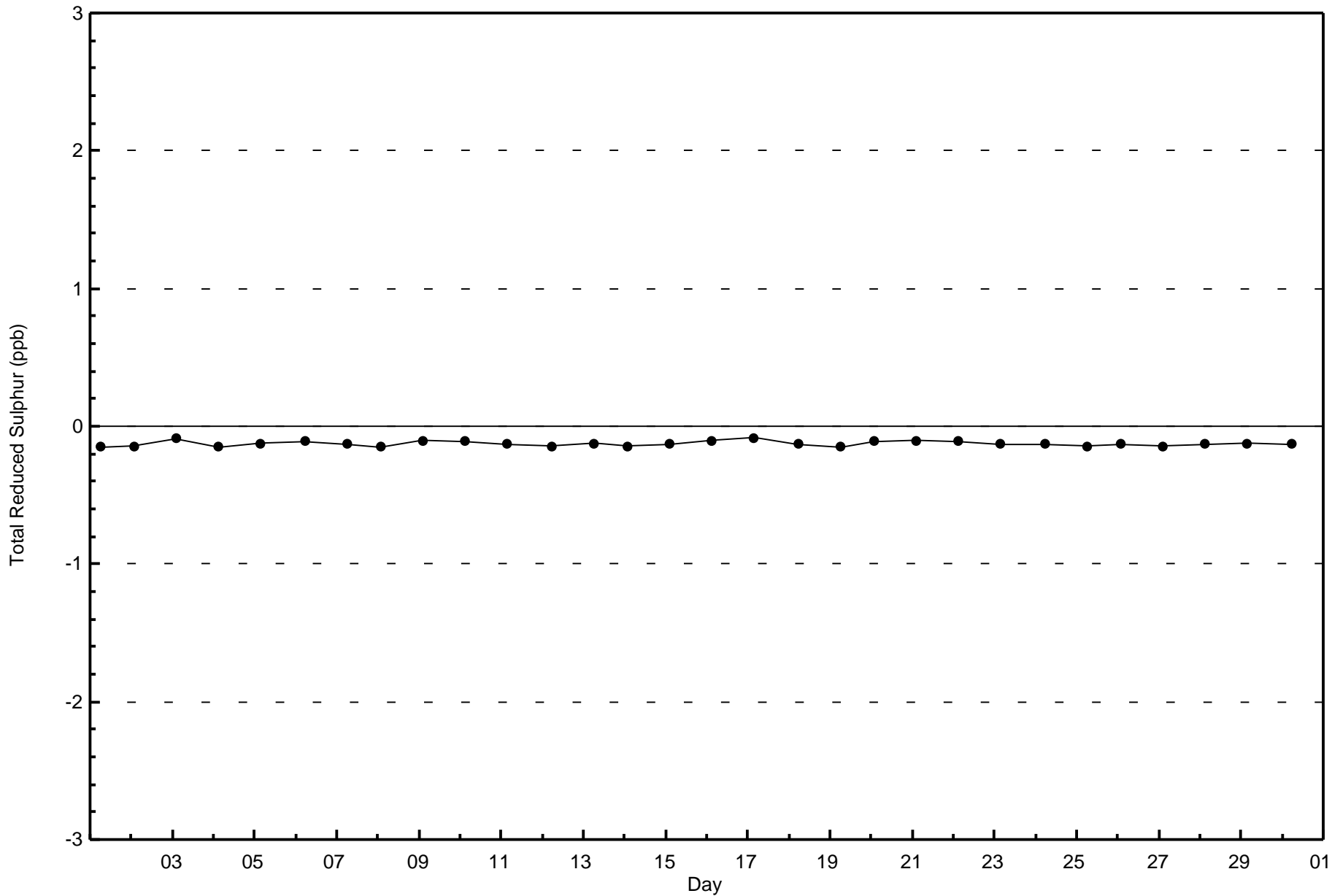
Total Number of Hours: 720

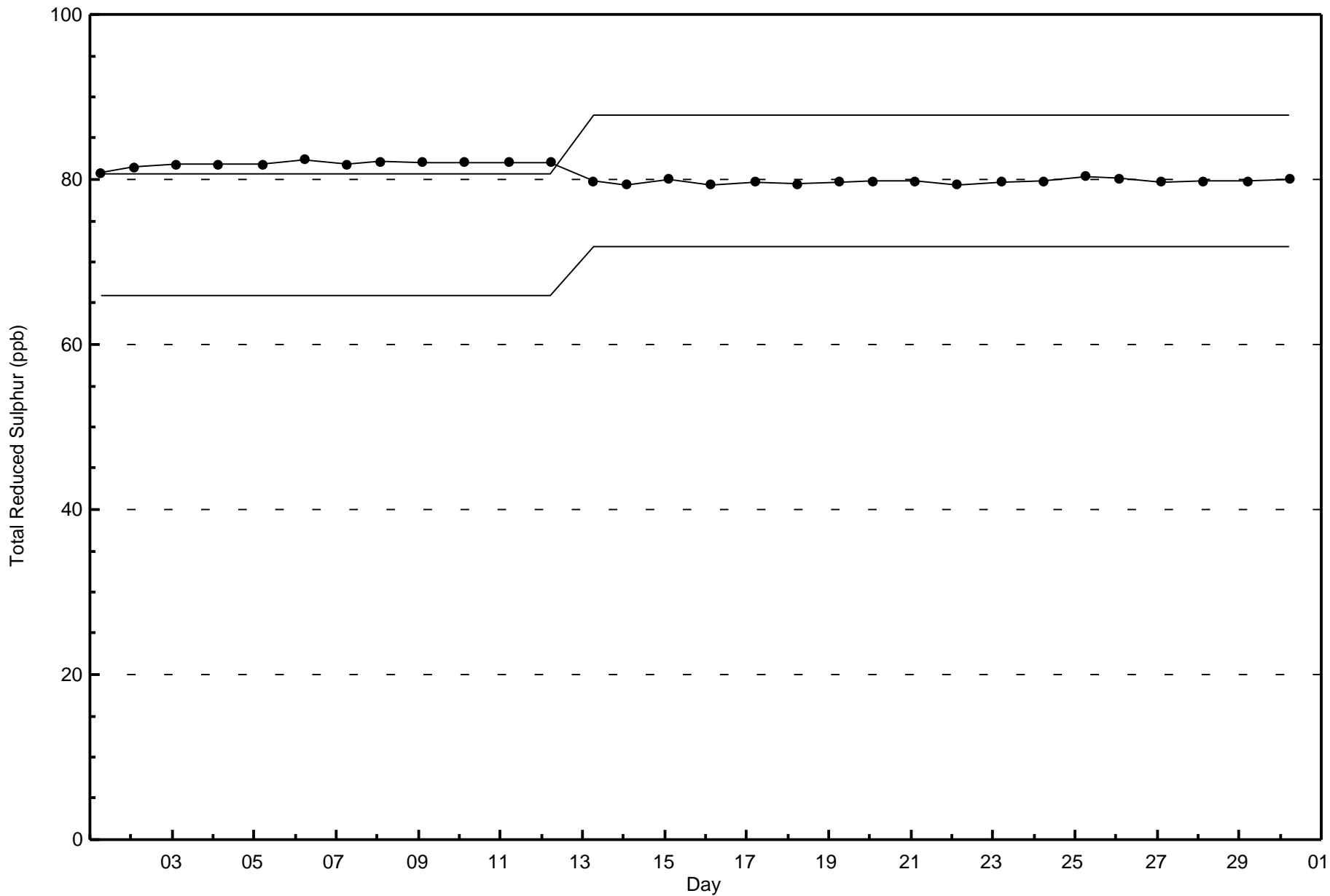


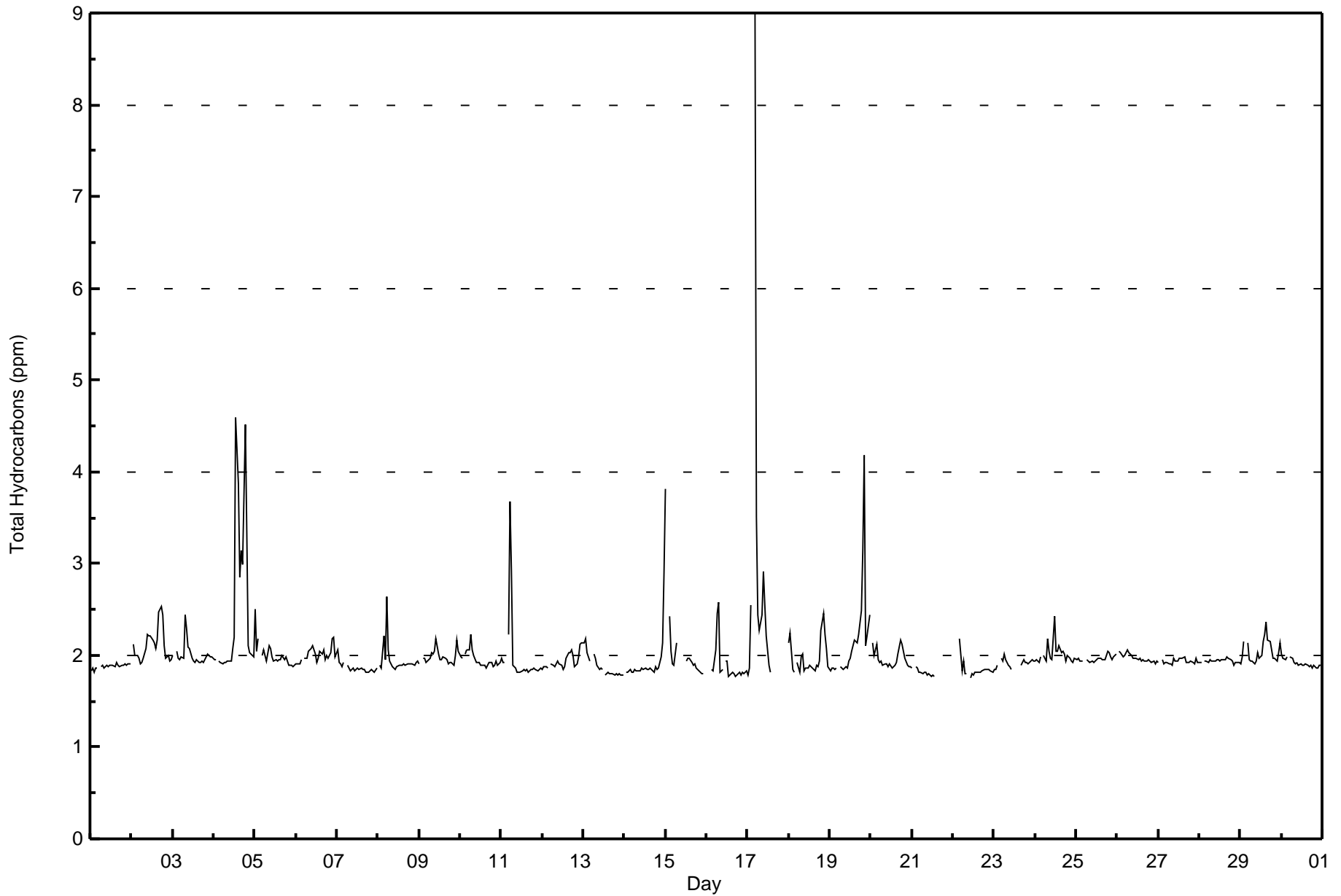
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)











Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	546	83.36	83.36
2.1 - 3.0	98	14.96	98.32
3.1 - 10.0	11	1.68	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 655

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	47	46	7	1	2	2	5	44	139	110	70	20	4	2	12	10	521
2.1 - 3.0	9	4	1	0	1	1	2	14	15	7	6	12	4	6	11	3	96
3.1 - 10.0	1	1	0	1	0	0	0	0	0	2	0	0	2	1	2	1	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	57	51	8	2	3	3	7	58	154	119	76	32	10	9	25	14	628

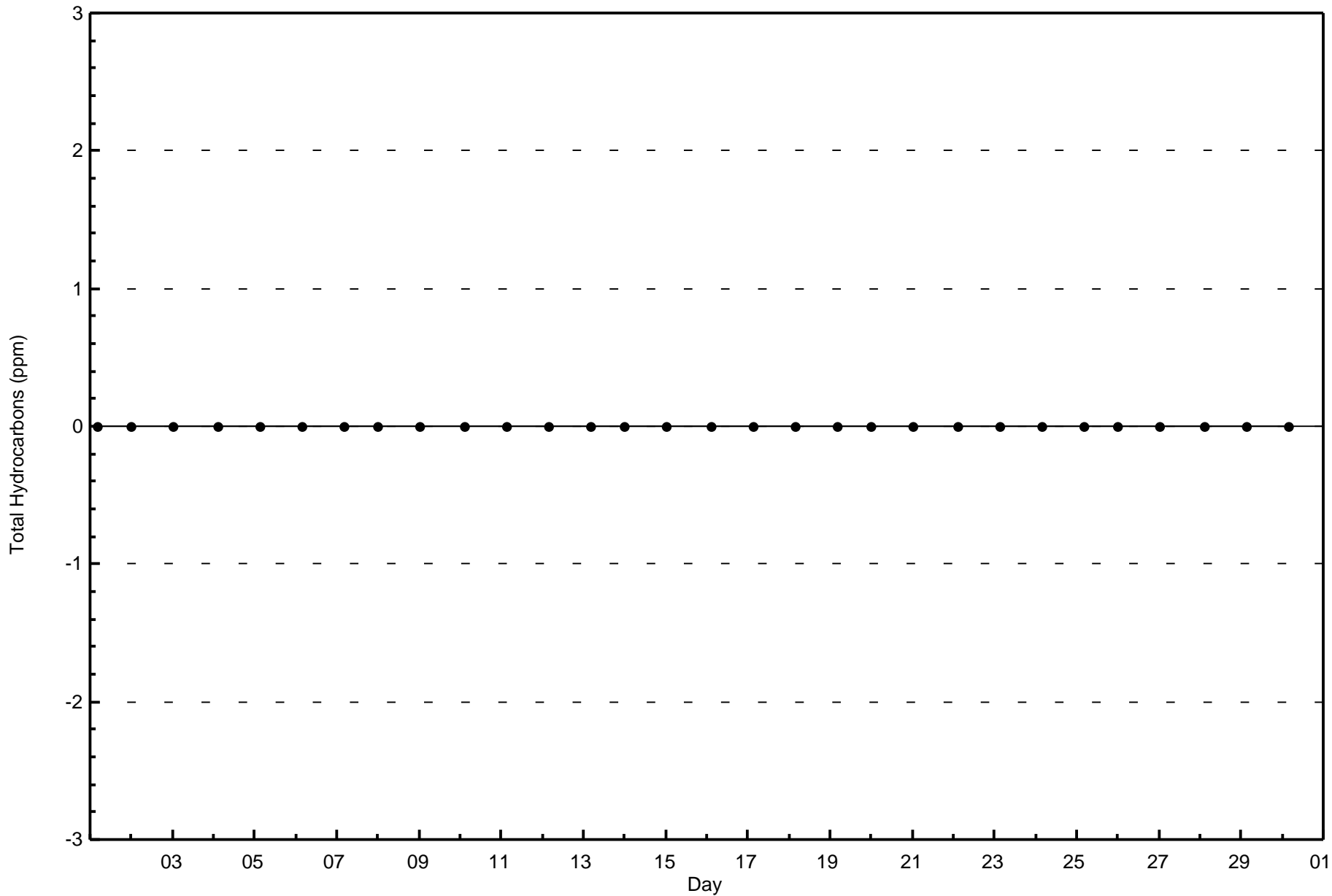
Total Number of Valid Hours: 628

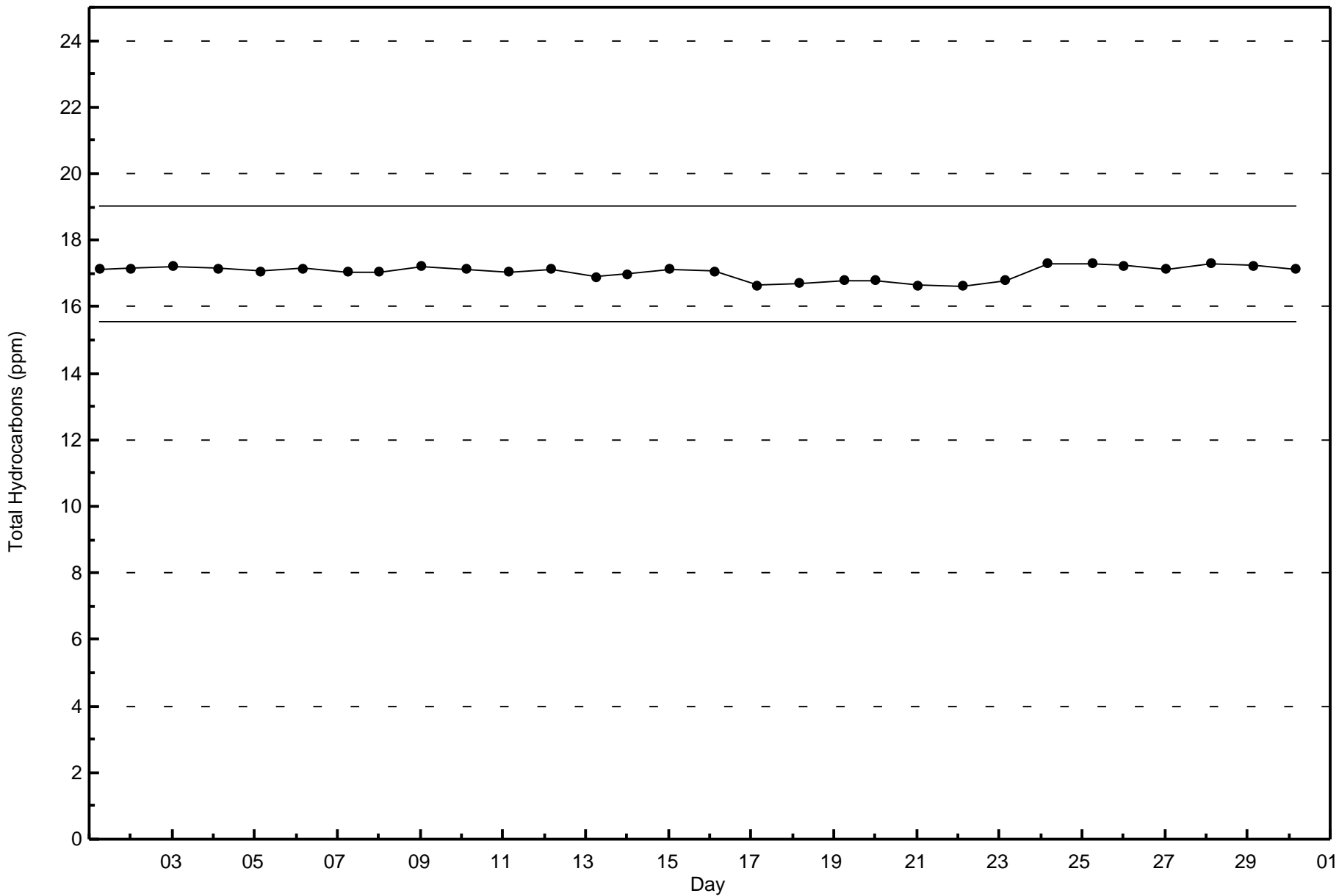
Total Number of Hours: 720



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
CNRL Horizon - November 2015





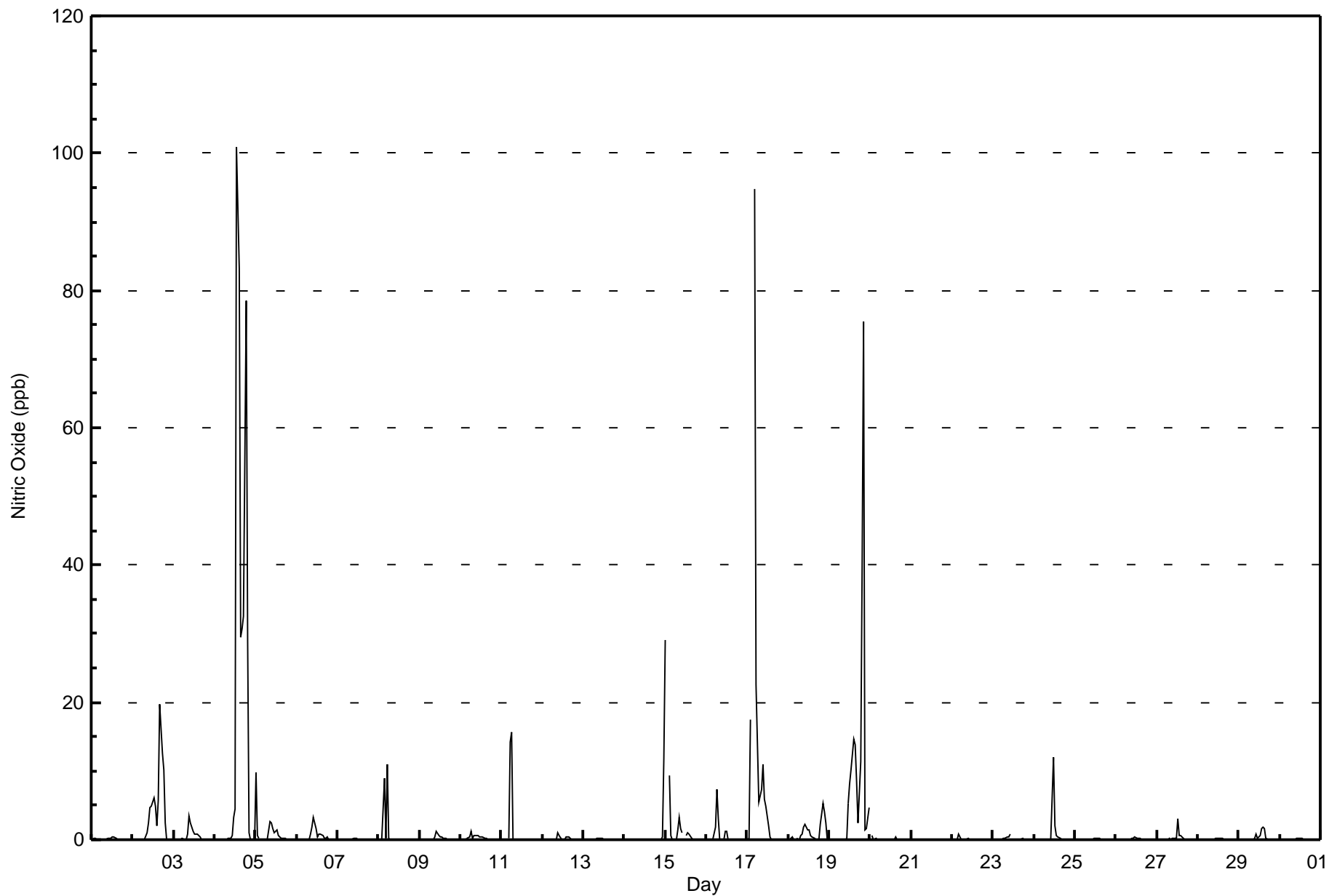


Maximum Value: 101 ppb on Nov 4 14:00	Maximum Daily Average: 17.2 ppb on Nov 4	Hours in Service: 720
Minimum Value: 0 ppb on Nov 4 23:00	Minimum Daily Average: 0.0 ppb on Nov 21	Hours of Data: 681
Maximum Diurnal Average: 4.3 ppb at hour 14	Minimum Diurnal Average: 0.1 ppb at hour 2	Hours of Missing Data: 39
Monthly Average: 1.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 30	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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Nov	Z	0	0	0	0	0	0	0	1	2	5	5	6	5	2	6	20	13	10	3	0	0	0	0	3.4	20
3-Nov	0	Z	0	0	0	0	0	0	1	4	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	4
4-Nov	0	0	Z	0	0	0	0	0	0	0	1	3	4	101	83	30	31	33	79	29	1	0	0	0	17.2	101
5-Nov	10	1	0	Z	0	0	0	0	3	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.9	10
6-Nov	0	0	0	0	Z	0	0	0	1	2	3	2	0	1	1	1	0	0	0	0	0	0	0	0	0.5	3
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Nov	Z	0	0	9	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	11
9-Nov	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
10-Nov	0	0	Z	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Nov	0	0	0	Z	0	14	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	16
12-Nov	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
13-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0.5	12
15-Nov	29	Z	9	1	0	0	0	1	3	2	1	M	1	1	1	0	0	0	0	0	0	0	0	UO	2.3	29
16-Nov	UO	0	Z	0	0	2	7	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	7
17-Nov	0	0	18	Z	95	23	14	6	7	11	6	5	2	0	0	0	0	0	0	0	0	0	0	0	8.1	95
18-Nov	0	0	0	0	Z	0	0	1	1	2	2	1	1	1	0	0	0	0	0	2	5	4	2	0	1.0	5
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	5	8	10	15	14	9	3	11	40	76	2	2	5	8.6	76
20-Nov	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
21-Nov	0	Z	0	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-Nov	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
23-Nov	0	0	0	Z	0	0	0	0	0	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0.1	1
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	12	2	1	0	0	0	0	0	0	0	0	0	UO	0.7	12
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Nov	Z	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
27-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0.3	3
28-Nov	0	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
29-Nov	0	0	0	Z	0	0	0	0	0	0	1	0	1	2	2	2	0	0	0	0	0	0	0	0	0.3	2
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

1.6	0.1	1.1	0.4	3.9	2.0	1.3	0.4	0.6	1.0	0.9	1.4	1.2	4.3	3.7	1.9	2.0	1.6	3.4	2.6	2.7	0.2	0.2	0.6		Diurnal Average
29	1	18	9	95	23	16	6	7	11	6	12	8	101	83	30	31	33	79	40	76	4	2	12		Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	669	98.24	98.24
21 - 40	7	1.03	99.27
41 - 80	2	0.29	99.56
81 - 159	3	0.44	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	60	51	8	1	3	3	7	59	156	122	83	33	11	9	23	13	642
21 - 40	1	0	0	0	0	0	0	0	0	1	1	0	2	0	1	1	7
41 - 80	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
81 - 159	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	52	8	2	3	3	7	59	156	124	84	33	13	9	25	14	654

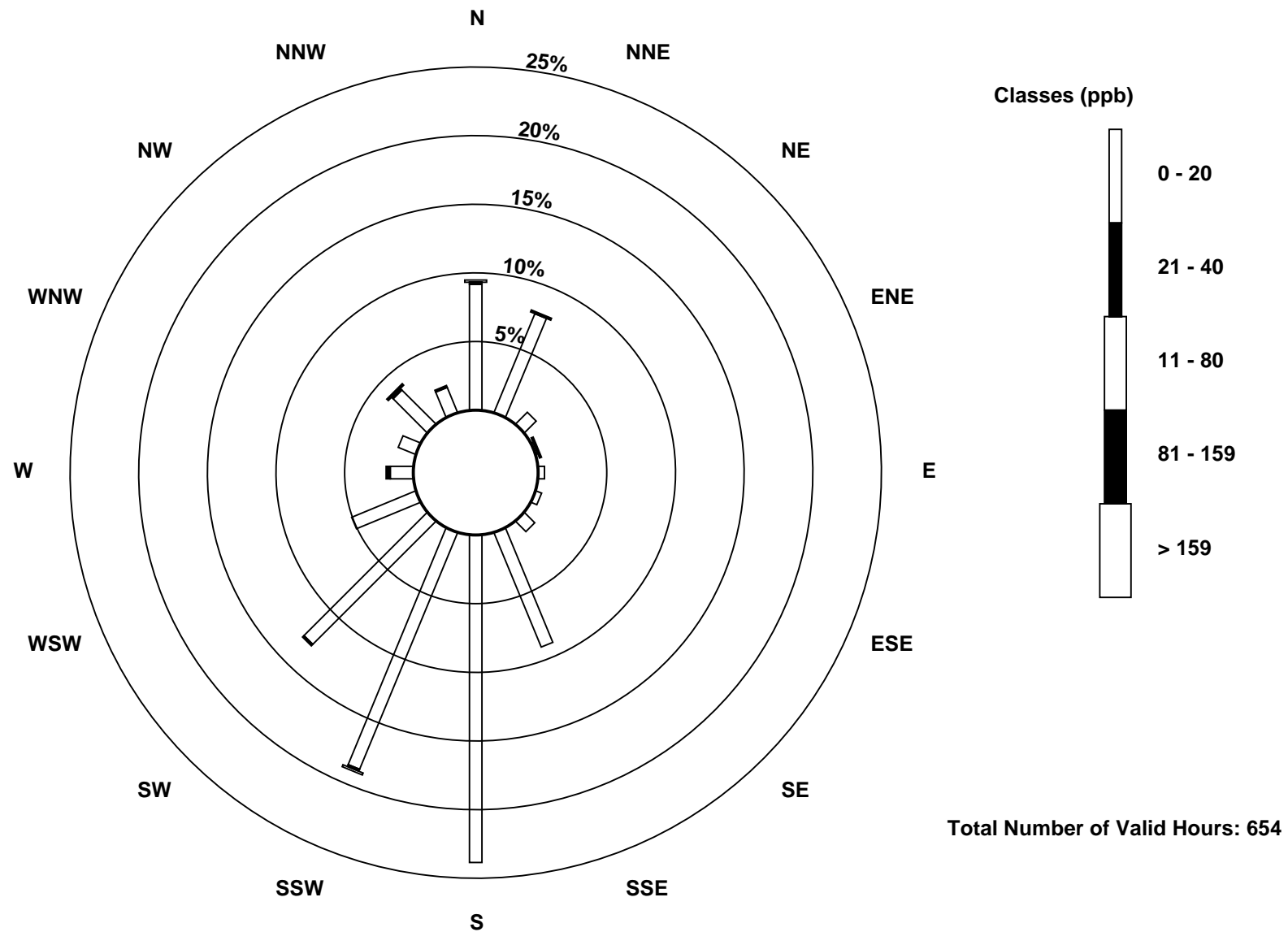
Total Number of Valid Hours: 654

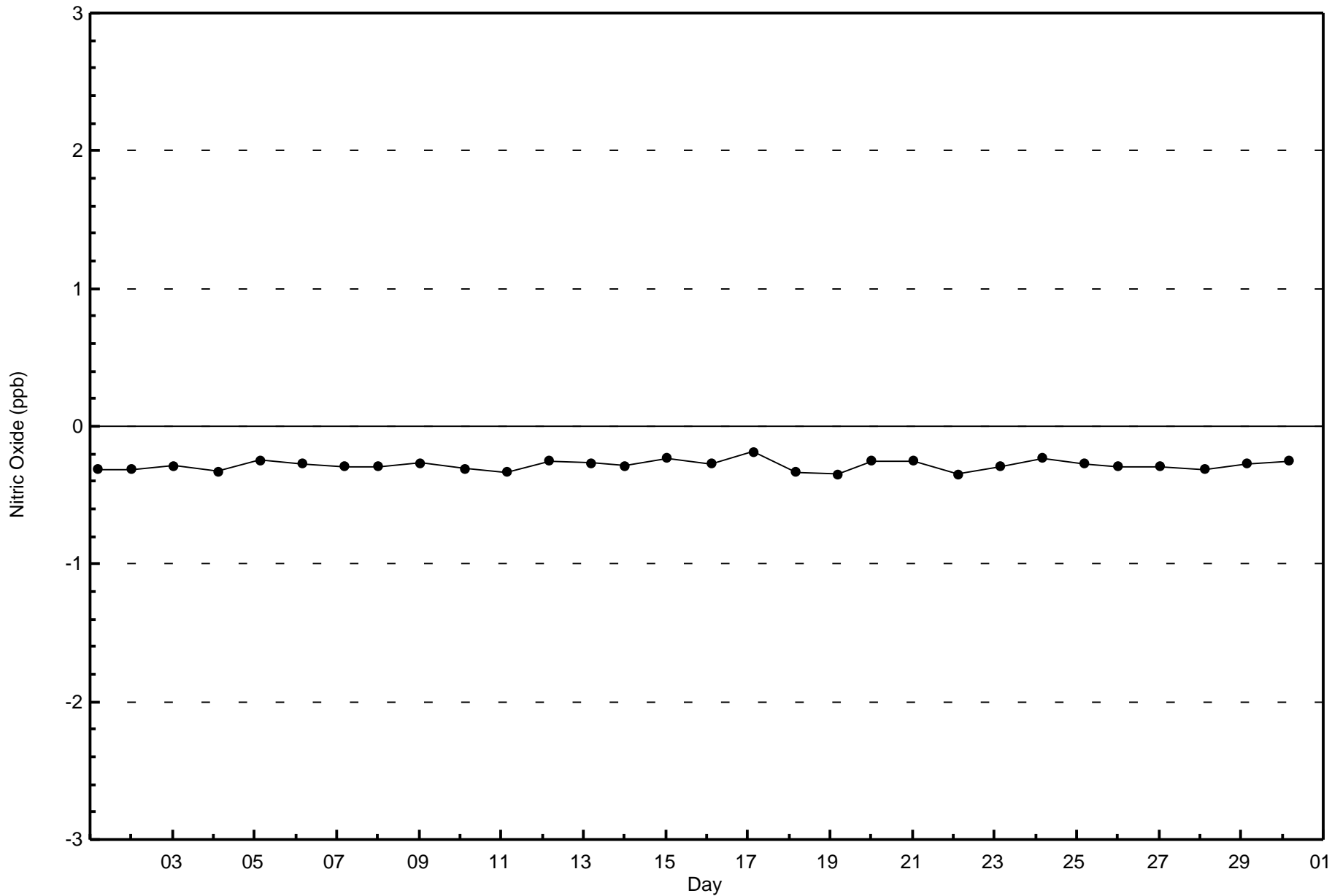
Total Number of Hours: 720

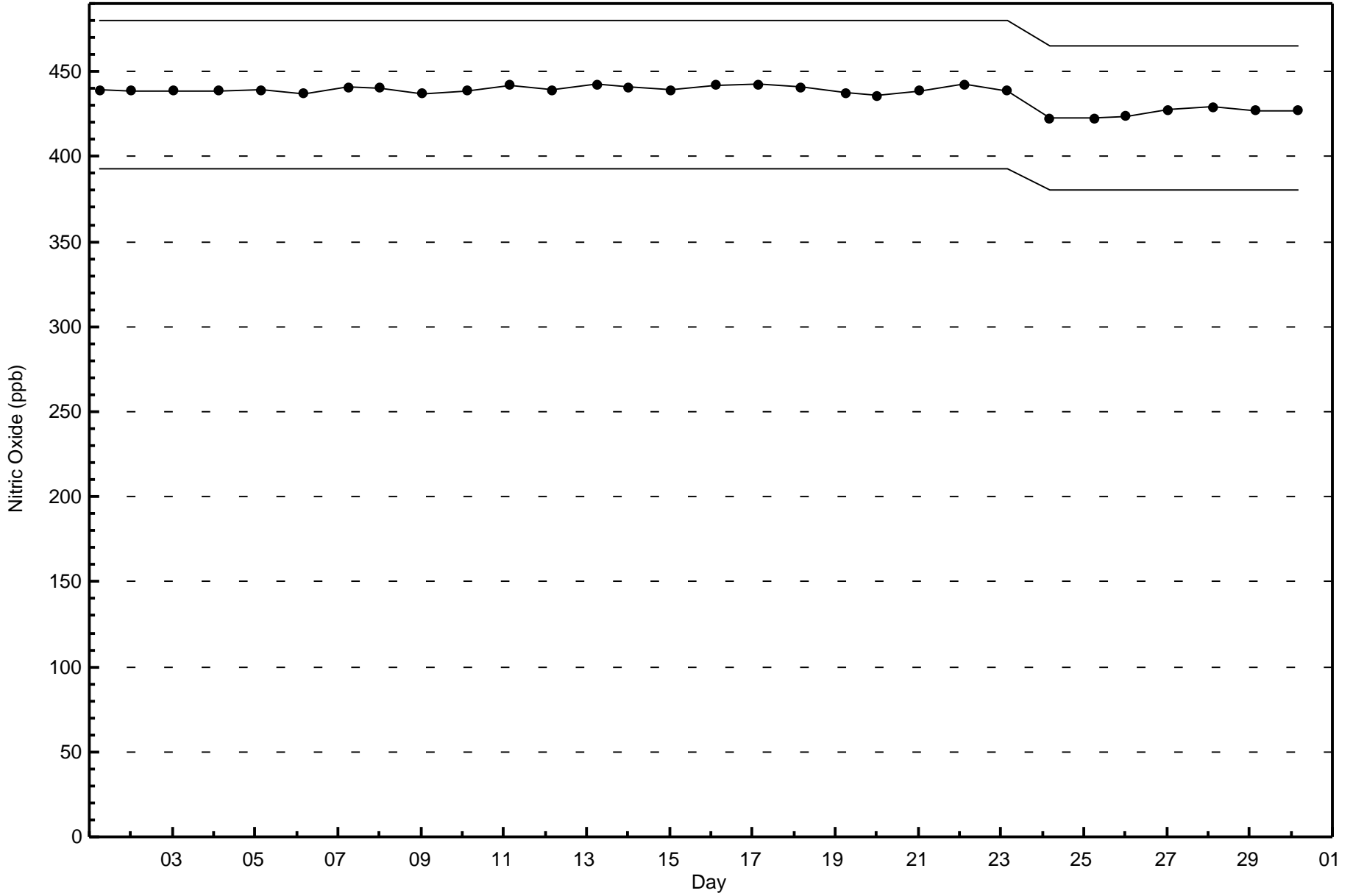


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitric Oxide (NO) - ppb
CNRL Horizon (AMS 15)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 31 ppb on Nov 17 05:00	Maximum Daily Average: 10.7 ppb on Nov 19		Hours of Data:	681
Minimum Value: 0 ppb on Nov 16 15:00	Minimum Daily Average: 0.8 ppb on Nov 21		Hours of Missing Data:	39
Maximum Diurnal Average: 5.1 ppb at hour 7	Minimum Diurnal Average: 2.7 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 3.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 24		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-Nov	0	1	1	0	0	Z	0	2	1	1	1	1	2	2	1	0	1	1	0	1	1	1	1	1	0.8	2
2-Nov	Z	11	9	8	4	1	4	9	13	15	14	12	12	11	8	10	19	19	17	7	3	2	1	2	9.1	19
3-Nov	2	Z	2	2	2	3	2	2	4	7	4	2	2	3	4	3	2	3	2	2	3	2	2	2	2.7	7
4-Nov	1	1	Z	1	1	1	1	1	1	1	1	4	6	21	20	16	16	13	17	11	7	5	3	2	6.3	21
5-Nov	10	5	6	Z	4	4	5	2	10	5	3	2	3	2	2	2	6	4	2	1	1	1	1	1	3.5	10
6-Nov	0	1	1	1	Z	4	2	7	10	10	9	5	2	4	5	6	5	10	18	12	8	8	9	6	6.0	18
7-Nov	8	3	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1.2	8
8-Nov	Z	1	0	9	3	14	7	3	1	0	0	0	0	0	1	1	2	2	1	1	1	1	1	1	2.1	14
9-Nov	2	Z	4	3	3	3	3	3	4	4	7	4	2	3	3	2	2	1	1	1	1	7	7	7	3.3	7
10-Nov	5	5	Z	5	11	11	17	11	6	3	2	2	1	2	1	2	2	4	3	3	3	4	3	5	4.7	17
11-Nov	9	5	7	Z	12	15	13	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.0	15
12-Nov	1	1	1	1	Z	1	1	1	1	5	3	1	1	1	3	6	9	6	8	6	5	4	5	8	3.3	9
13-Nov	7	7	6	6	7	Z	10	8	7	2	1	1	1	1	1	1	1	1	1	0	1	1	1	1	3.0	10
14-Nov	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	5	17	23	2.4	23
15-Nov	24	Z	15	5	1	1	5	10	10	7	4	M	5	7	8	6	4	4	3	1	2	3	1	UO	6.0	24
16-Nov	UO	2	Z	2	2	7	22	15	0	0	1	4	3	0	0	1	0	0	1	0	1	1	1	1	3.0	22
17-Nov	2	5	22	Z	31	24	24	22	21	18	12	9	4	2	1	1	1	3	3	3	0	0	0	0	9.0	31
18-Nov	7	8	5	3	Z	3	2	9	8	9	8	5	5	2	2	1	8	6	8	17	23	23	17	4	7.9	23
19-Nov	0	0	0	1	1	Z	1	1	1	1	0	5	10	13	18	23	26	23	23	24	28	12	16	19	10.7	28
20-Nov	Z	10	4	10	4	1	1	0	0	0	0	0	0	0	1	5	6	8	11	11	8	5	1	1	3.8	11
21-Nov	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.8	2
22-Nov	1	0	Z	0	14	2	6	3	3	2	1	1	0	1	1	1	1	1	1	2	1	1	1	2	2.0	14
23-Nov	1	1	3	Z	9	8	13	9	8	4	4	C	C	C	C	C	2	3	1	1	1	1	1	2	3.9	13
24-Nov	2	3	4	4	Z	4	1	8	3	0	1	14	6	3	4	4	3	3	1	UO	0	0	0	0	3.1	14
25-Nov	0	1	1	1	1	Z	1	1	1	1	0	1	1	1	1	1	2	4	11	8	5	2	1	1	1.8	11
26-Nov	Z	1	1	1	2	4	5	4	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1.6	5
27-Nov	1	Z	1	1	1	1	1	2	2	3	1	1	6	3	4	5	3	1	1	1	1	1	3	2	1.9	6
28-Nov	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1.0	2
29-Nov	1	3	10	Z	7	2	3	1	1	2	5	2	3	7	11	18	13	11	5	2	1	2	6	8	5.2	18
30-Nov	4	2	2	2	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4

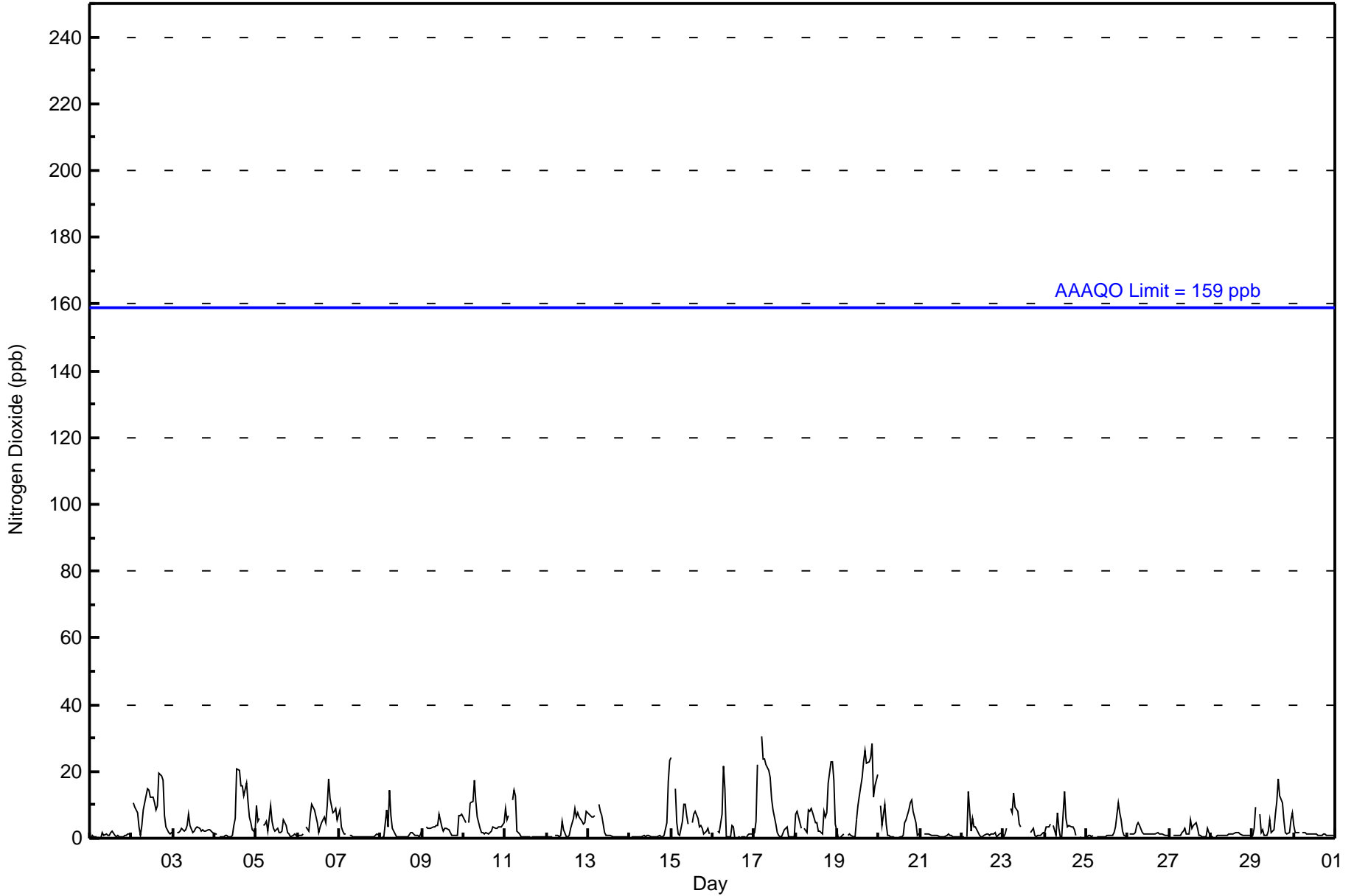
3.8	3.1	4.2	2.7	4.8	4.6	5.1	4.6	4.1	3.5	2.9	2.8	2.8	3.2	3.6	4.0	4.5	4.4	4.7	4.1	3.6	3.1	3.5	3.5	Diurnal Average
24	11	22	10	31	24	24	22	21	18	14	14	12	21	20	23	26	23	23	24	28	23	17	23	Diurnal Maximum

Z - zerspan C - Calibration M - Maintenance UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	663	97.36	97.36
21 - 40	18	2.64	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: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	52	8	1	3	3	7	59	156	124	84	31	9	7	21	13	637
21 - 40	3	0	0	1	0	0	0	0	0	0	0	2	4	2	4	1	17
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	62	52	8	2	3	3	7	59	156	124	84	33	13	9	25	14	654

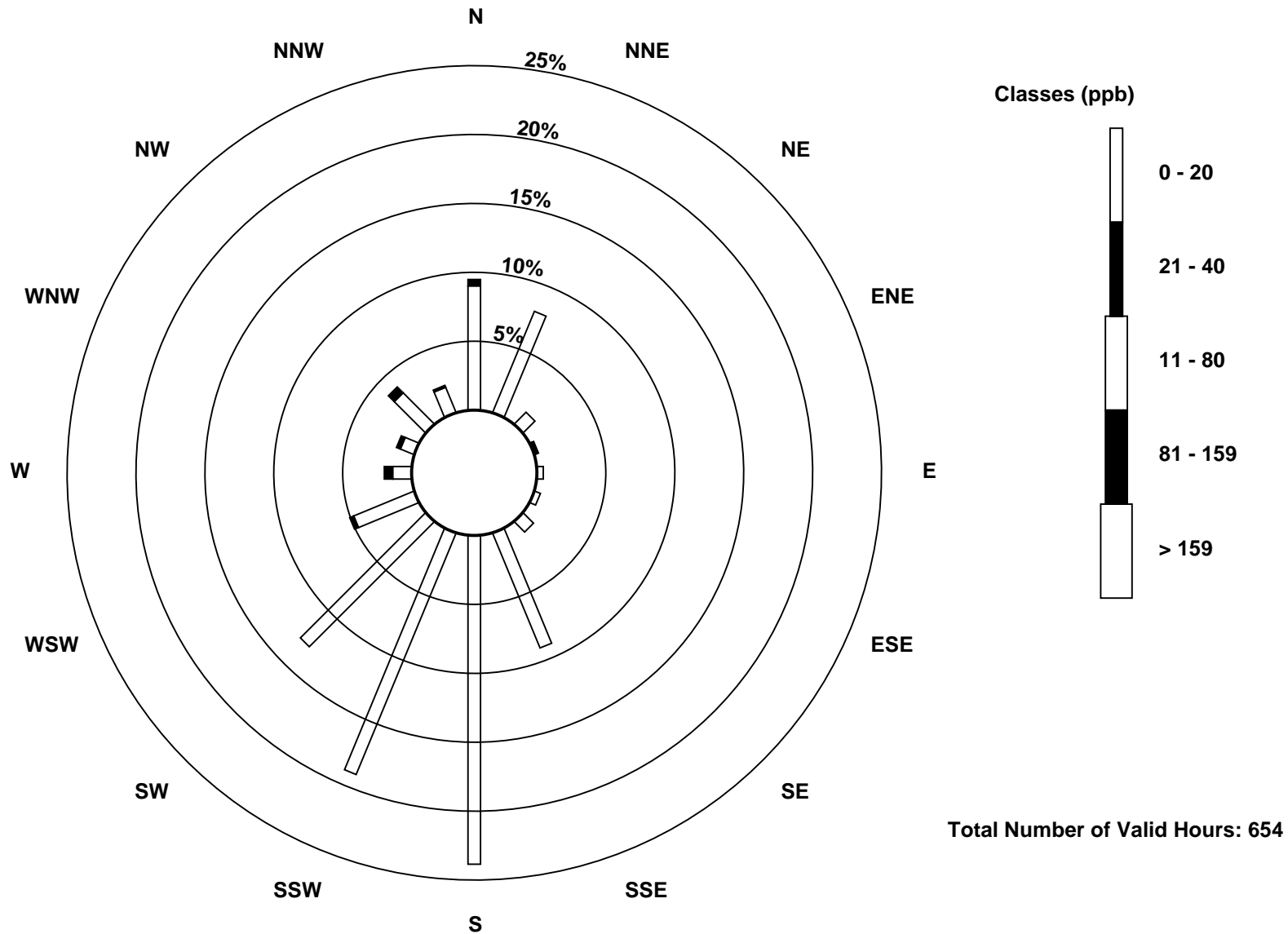
Total Number of Valid Hours: 654

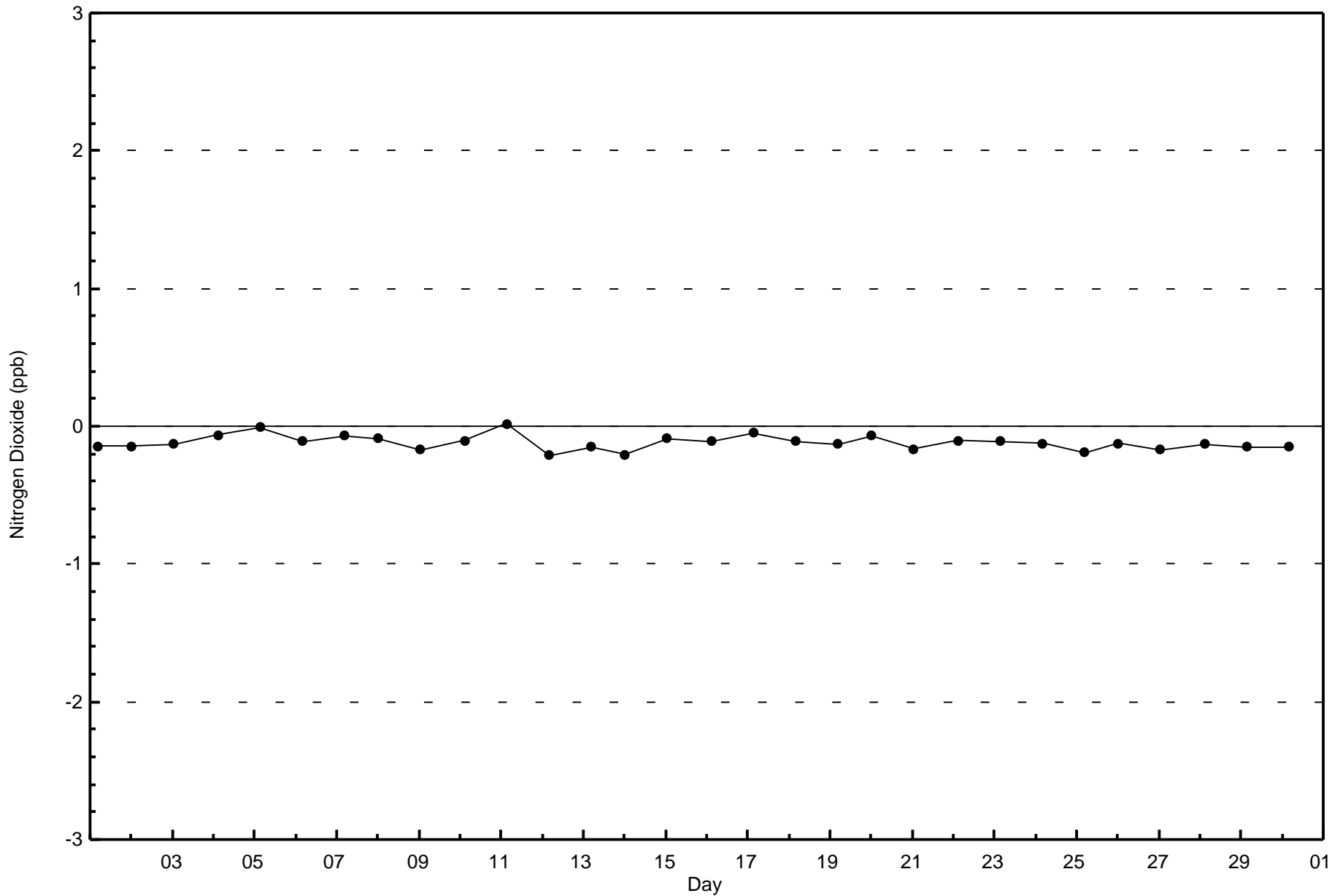
Total Number of Hours: 720

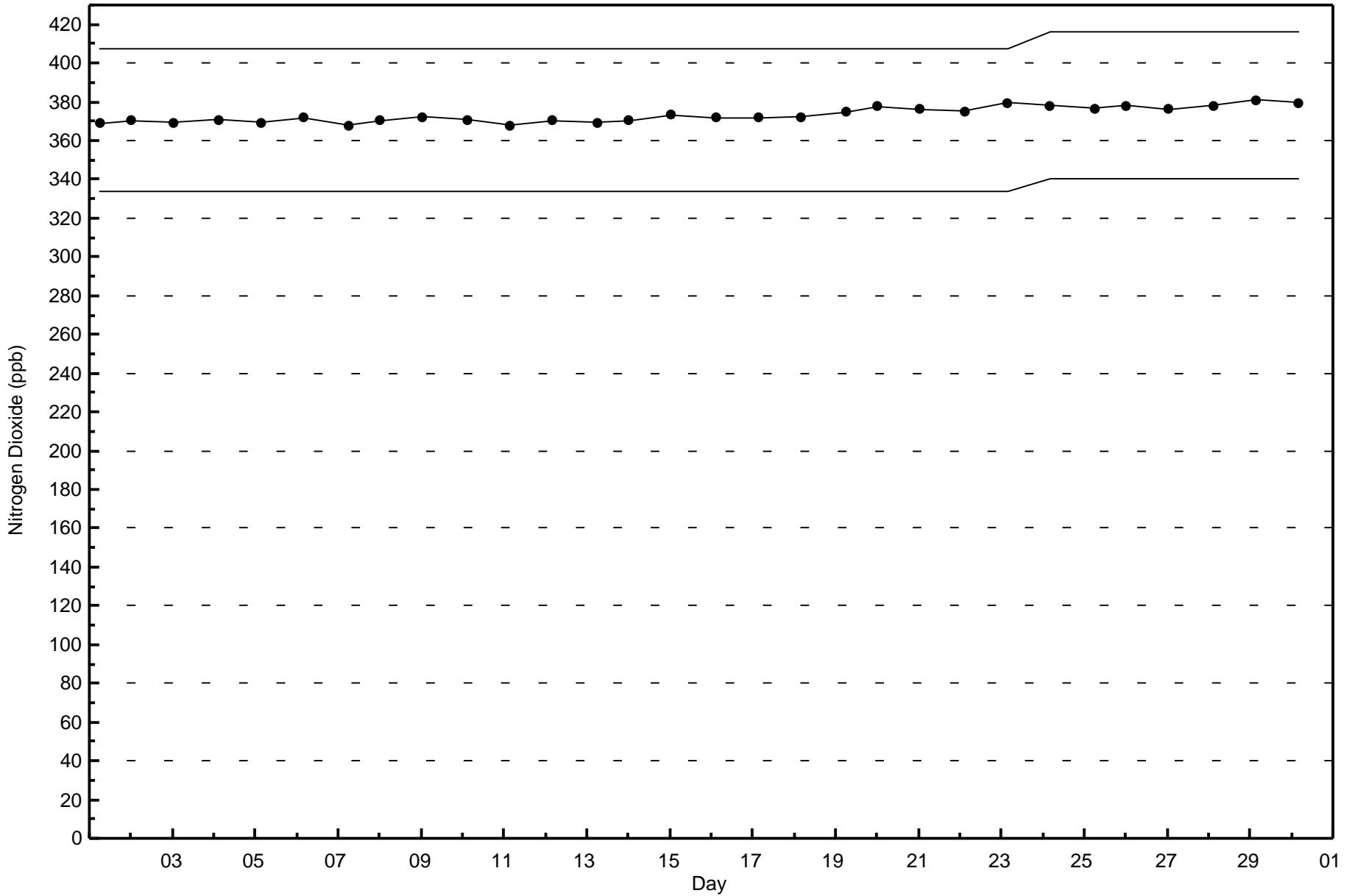


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)

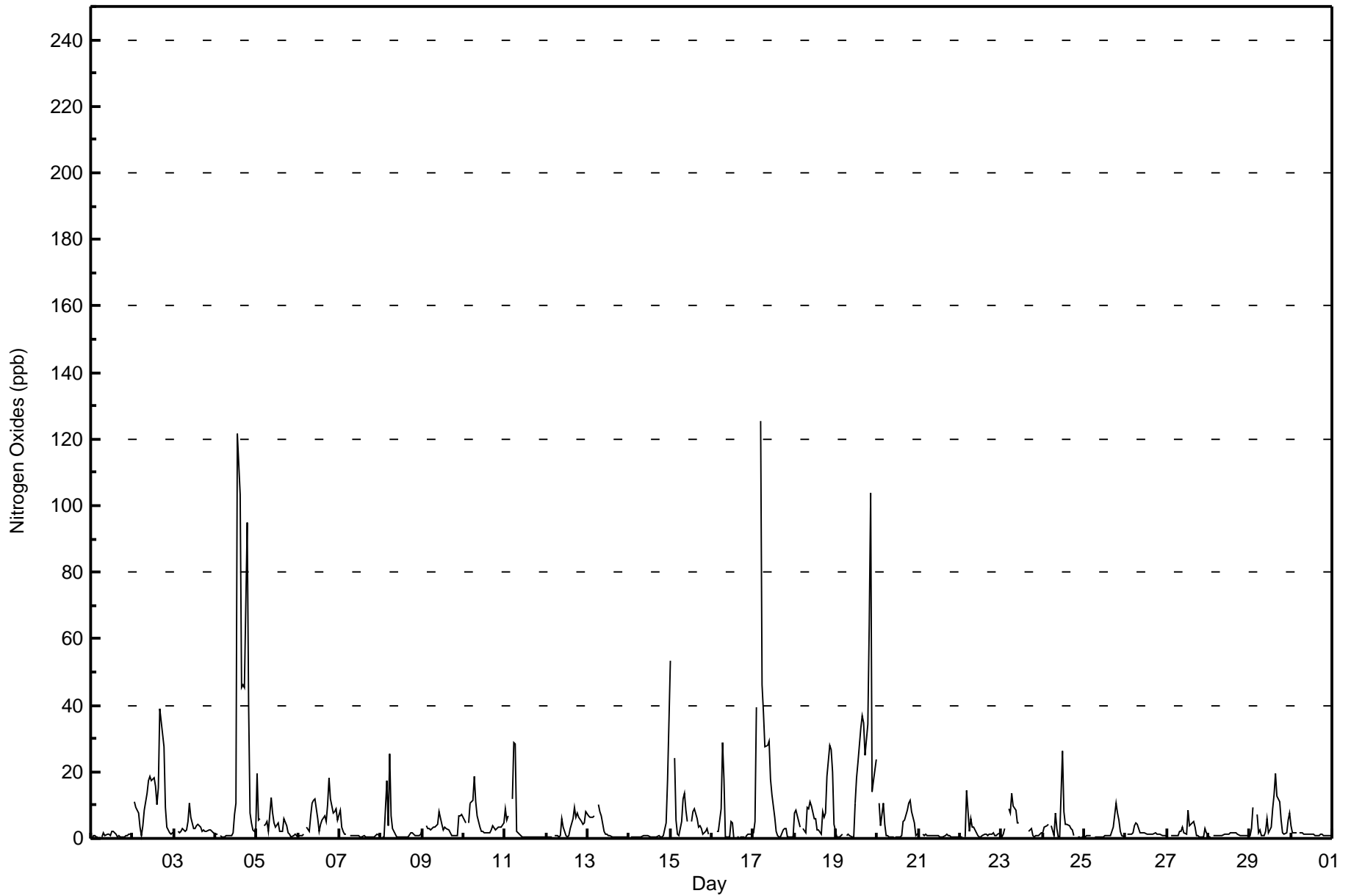








Maximum Value: 125 ppb on Nov 17 05:00																		Maximum Daily Average: 23.5 ppb on Nov 4																		Hours in Service: 720																																																																																																																																																																																																																																																																																																																																																																																																													
Minimum Value: 0 ppb on Nov 16 15:00																		Minimum Daily Average: 0.8 ppb on Nov 21																		Hours of Data: 681																																																																																																																																																																																																																																																																																																																																																																																																													
Maximum Diurnal Average: 8.7 ppb at hour 5																		Minimum Diurnal Average: 3.1 ppb at hour 4																		Hours of Missing Data: 39																																																																																																																																																																																																																																																																																																																																																																																																													
Monthly Average: 5.4 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 11 P ₉₉ = 50																		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-Nov	0	1	1	0	0	Z	0	2	1	1	1	1	2	2	1	1	1	1	0	1	1	1	1	1	1	1.0	2																																																																																																																																																																																																																																																																																																																																																																																																																						
2-Nov	Z	11	9	8	4	1	4	9	14	17	19	17	18	16	10	15	39	31	27	9	3	2	1	2	12.4	39																																																																																																																																																																																																																																																																																																																																																																																																																							
3-Nov	2	Z	2	2	2	3	2	2	5	11	6	3	3	4	4	3	2	3	2	2	3	2	2	2	3.2	11																																																																																																																																																																																																																																																																																																																																																																																																																							
4-Nov	1	1	Z	1	1	1	1	1	1	1	2	7	11	122	103	45	46	45	95	40	8	5	3	2	23.5	122																																																																																																																																																																																																																																																																																																																																																																																																																							
5-Nov	19	6	6	Z	4	4	5	2	12	8	5	3	5	2	2	2	6	4	2	1	1	1	1	1	4.4	19																																																																																																																																																																																																																																																																																																																																																																																																																							
6-Nov	0	1	1	1	Z	3	2	7	11	11	12	6	2	4	5	7	5	10	18	12	8	8	9	6	6.5	18																																																																																																																																																																																																																																																																																																																																																																																																																							
7-Nov	8	3	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1.2	8																																																																																																																																																																																																																																																																																																																																																																																																																							
8-Nov	Z	0	0	18	4	25	7	3	1	0	0	0	0	0	0	0	1	2	2	1	1	1	1	1	3.0	25																																																																																																																																																																																																																																																																																																																																																																																																																							
9-Nov	2	Z	4	3	3	3	3	3	4	4	8	4	2	3	3	3	2	1	1	1	1	7	7	7	3.5	8																																																																																																																																																																																																																																																																																																																																																																																																																							
10-Nov	5	5	Z	5	11	11	19	11	7	3	2	2	2	2	2	2	2	4	3	3	3	4	3	4	5.0	19																																																																																																																																																																																																																																																																																																																																																																																																																							
11-Nov	9	5	7	Z	12	29	29	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.3	29																																																																																																																																																																																																																																																																																																																																																																																																																							
12-Nov	1	1	1	1	Z	1	1	1	1	6	3	1	1	1	3	6	9	6	8	6	5	4	5	8	3.4	9																																																																																																																																																																																																																																																																																																																																																																																																																							
13-Nov	7	7	6	6	7	Z	10	8	7	2	1	1	1	1	1	0	0	0	0	0	1	0	1	1	3.0	10																																																																																																																																																																																																																																																																																																																																																																																																																							
14-Nov	Z	0	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	0	1	5	17	35	3.0	35																																																																																																																																																																																																																																																																																																																																																																																																																							
15-Nov	53	Z	24	5	1	1	5	12	13	9	5	M	5	8	9	6	3	4	3	1	2	3	1	UO	8.3	53																																																																																																																																																																																																																																																																																																																																																																																																																							
16-Nov	UO	2	Z	2	2	9	29	18	0	0	1	5	4	0	0	1	0	0	1	0	1	1	1	1	3.6	29																																																																																																																																																																																																																																																																																																																																																																																																																							
17-Nov	2	5	40	Z	125	46	38	28	28	29	18	13	6	2	1	1	1	3	3	3	0	0	0	0	17.0	125																																																																																																																																																																																																																																																																																																																																																																																																																							
18-Nov	8	8	5	3	Z	3	2	9	9	11	10	6	6	3	3	1	8	6	8	19	28	27	20	4	8.9	28																																																																																																																																																																																																																																																																																																																																																																																																																							
19-Nov	0	0	0	1	1	Z	1	1	1	1	1	11	18	23	33	37	35	25	34	64	104	14	17	24	19.4	104																																																																																																																																																																																																																																																																																																																																																																																																																							
20-Nov	Z	11	4	10	4	1	1	0	0	0	0	0	0	0	1	5	6	8	10	11	8	5	1	1	3.9	11																																																																																																																																																																																																																																																																																																																																																																																																																							
21-Nov	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.8	2																																																																																																																																																																																																																																																																																																																																																																																																																						
22-Nov	1	0	Z	0	15	2	6	3	3	2	1	0	0	1	1	1	1	1	1	2	1	1	1	2	2.1	15																																																																																																																																																																																																																																																																																																																																																																																																																							
23-Nov	0	1	3	Z	9	8	13	10	8	5	4	C	C	C	C	C	2	3	1	1	1	1	1	2	4.0	13																																																																																																																																																																																																																																																																																																																																																																																																																							
24-Nov	2	3	4	4	Z	4	1	8	3	0	1	26	8	4	4	4	3	3	1	UO	0	0	0	0	3.8	26																																																																																																																																																																																																																																																																																																																																																																																																																							
25-Nov	0	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	4	11	8	5	2	1	1	1.9	11																																																																																																																																																																																																																																																																																																																																																																																																																							
26-Nov	Z	1	1	1	1	4	5	4	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.7	5																																																																																																																																																																																																																																																																																																																																																																																																																							
27-Nov	1	Z	1	1	1	1	1	2	2	3	1	1	9	4	4	5	3	1	1	1	1	1	3	2	2.1	9																																																																																																																																																																																																																																																																																																																																																																																																																							
28-Nov	0	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1.1	2																																																																																																																																																																																																																																																																																																																																																																																																																							
29-Nov	1	3	10	Z	7	1	3	1	1	2	6	2	3	9	13	19	13	11	5	2	1	2	6	8	5.5	19																																																																																																																																																																																																																																																																																																																																																																																																																							
30-Nov	4	2	2	2	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4																																																																																																																																																																																																																																																																																																																																																																																																																							
																		Diurnal Average																																																																																																																																																																																																																																																																																																																																																																																																																															
5.4																		3.2																		5.4																		3.1																		8.7																		6.6																		6.4																		5.0																		4.7																		4.5																		3.8																		4.2																		3.9																		7.5																		7.3																		5.9																		6.6																		6.0																		8.1																		6.7																		6.3																		3.3																		3.6																		4.1																		Diurnal Maximum	
53																		11																		40																		18																		125																		46																		38																		28																		28																		29																		19																		26																		18																		122																		103																		45																		46																		45																		95																		64																		104																		27																		20																		35																			
Z - zerospan																								C - Calibration																								M - Maintenance																								UO - Unstable Operation																																																																																																																																																																																																																																																																																																																																																																									





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	645	94.71	94.71
21 - 40	25	3.67	98.38
41 - 80	6	0.88	99.27
81 - 159	5	0.73	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	48	8	1	3	3	7	59	155	122	81	30	9	6	18	13	619
21 - 40	4	3	0	0	0	0	0	0	1	1	2	3	2	3	5	0	24
11 - 80	1	0	0	0	0	0	0	0	0	0	1	0	2	0	1	1	6
81 - 159	1	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	5
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	52	8	2	3	3	7	59	156	124	84	33	13	9	25	14	654

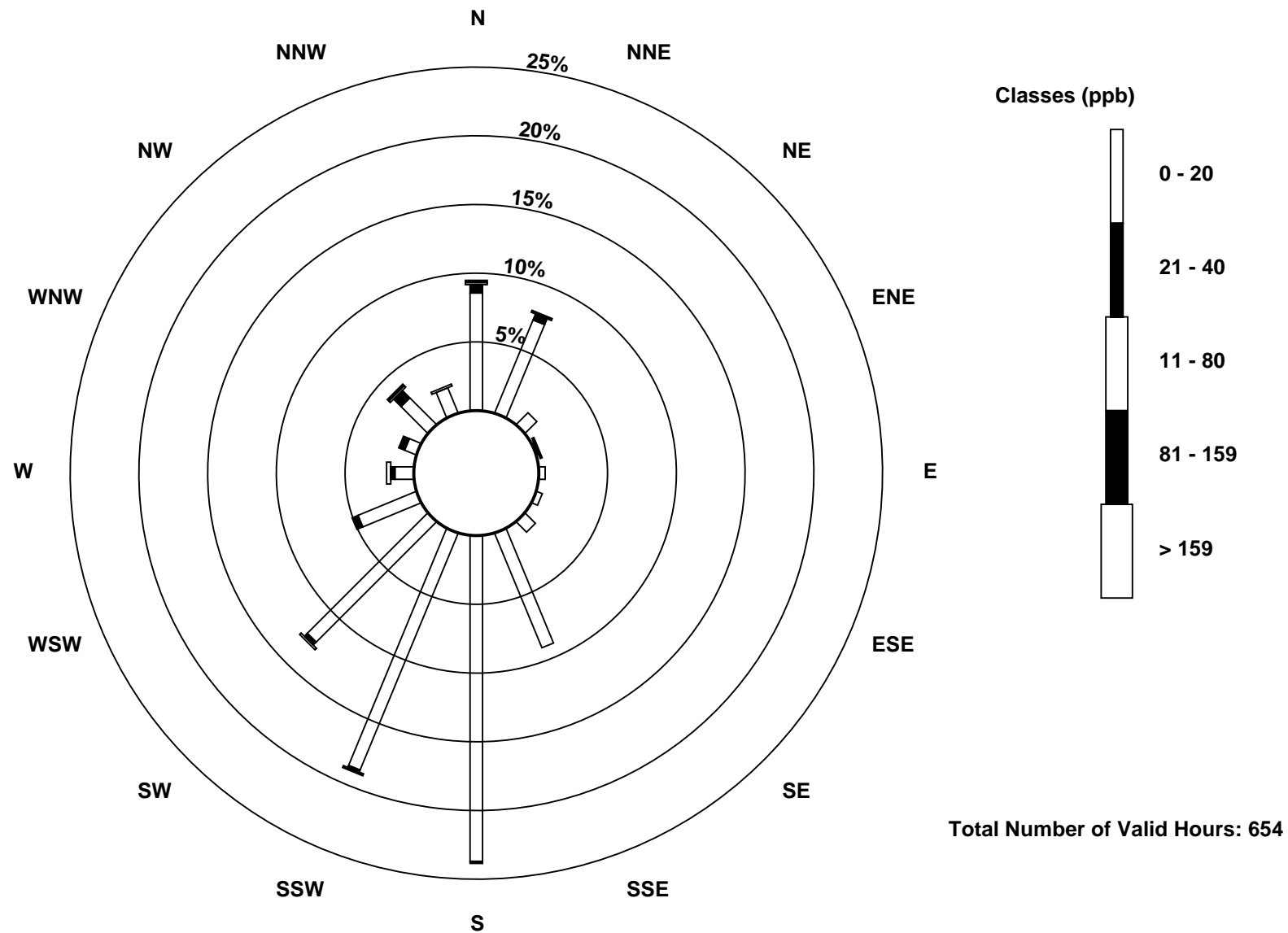
Total Number of Valid Hours: 654

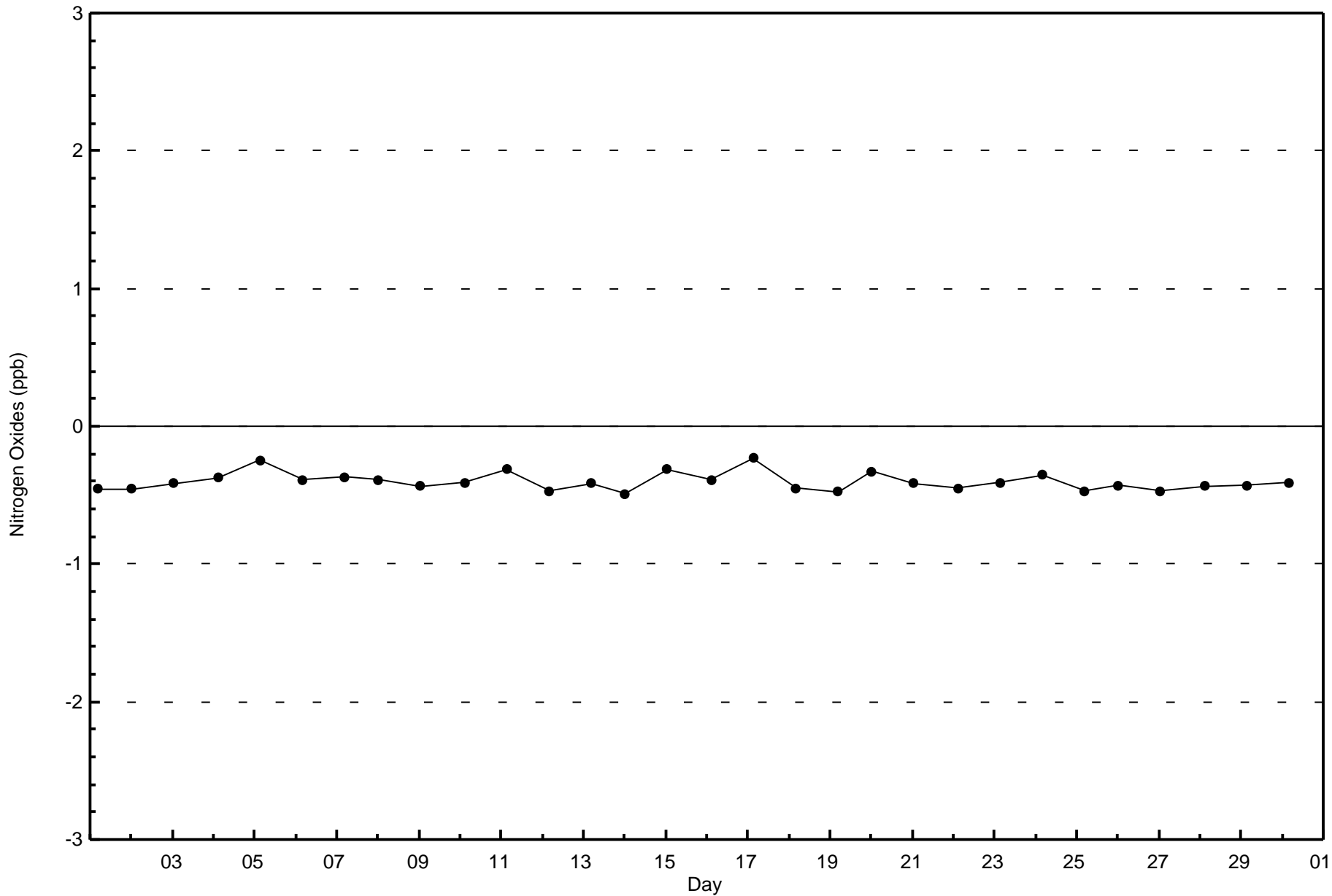
Total Number of Hours: 720

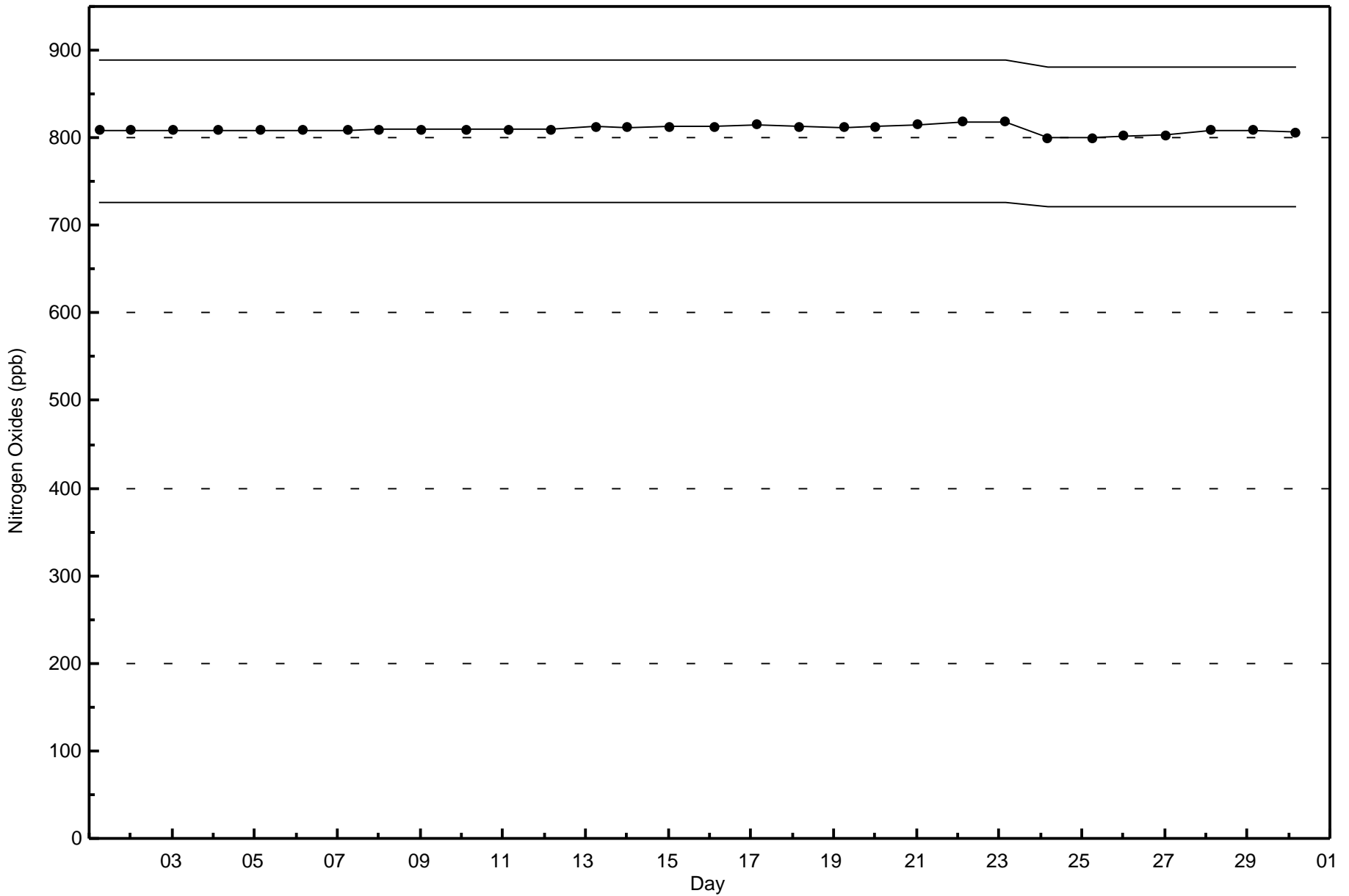


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)









Summary of Hour Averages

CNRL Horizon - November 2015

Number of Exceedences (AAAQO): 24-hr: 0	Hours in Service: 720
Maximum Value: 55.4 µg/m ³ on Nov 3 21:00	Maximum Daily Average: 18.5 µg/m ³ on Nov 4
Minimum Value: 1.3 µg/m ³ on Nov 1 19:00	Hours of Data: 718
Maximum Diurnal Average: 6.5 µg/m ³ at hour 21	Hours of Missing Data: 2
Monthly Average: 5.07 µg/m ³	Hours of Calibration: 1
Minimum Daily Average: 1.5 µg/m ³ on Nov 1	Percent Operational Time: 99.9
Minimum Diurnal Average: 4.2 µg/m ³ at hour 10	
Percentiles: P ₁ = 1.4 P ₁₀ = 1.8 Q ₁ = 2.5 Median = 3.7 Q ₃ = 5.6 P ₉₀ = 8.7 P ₉₉ = 31.1	

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-Nov	1.9	1.9	1.7	1.5	1.4	1.4	1.4	1.6	1.7	1.7	1.6	1.5	1.6	1.6	1.5	1.4	1.4	1.4	1.3	1.4	1.4	1.4	1.5	1.6	1.5	1.9	
2-Nov	1.7	2.4	3.8	4.0	3.9	2.5	2.6	3.5	4.3	5.1	5.0	4.5	4.6	5.0	6.3	6.3	8.2	8.3	8.3	5.1	5.3	2.9	2.1	2.3	4.5	8.3	
3-Nov	2.5	2.7	3.0	2.9	3.9	4.2	4.2	5.5	6.1	5.2	3.7	4.1	8.1	19.8	28.2	20.2	14.5	13.2	12.9	25.7	55.4	52.1	45.0	29.7	15.5	55.4	
4-Nov	20.3	14.6	12.7	9.6	9.3	9.7	9.4	8.7	8.3	9.3	15.0	30.3	33.2	28.7	31.1	31.5	31.1	28.0	24.3	19.7	17.9	17.4	13.9	10.0	18.5	33.2	
5-Nov	10.1	5.1	5.8	8.5	10.1	10.3	12.1	12.5	7.4	8.1	13.5	12.4	7.1	2.4	2.6	3.4	4.3	3.9	3.7	3.6	2.9	2.7	2.7	2.7	6.6	13.5	
6-Nov	2.8	3.2	3.5	3.8	4.2	4.0	4.1	5.1	5.0	5.7	8.6	7.8	5.7	5.6	7.4	8.6	8.2	7.8	8.2	8.6	13.4	10.3	11.1	8.3	6.7	13.4	
7-Nov	8.5	8.8	8.1	6.5	5.5	5.2	4.7	4.4	4.3	3.9	3.5	3.2	3.0	2.9	2.7	3.1	3.8	4.7	4.8	4.6	4.5	4.6	5.0	5.3	4.8	8.8	
8-Nov	5.5	5.5	5.1	6.4	5.9	7.6	6.8	5.8	3.3	2.4	2.2	2.1	2.2	2.2	3.0	3.7	4.3	4.4	4.4	4.0	3.9	3.9	3.9	3.7	4.3	7.6	
9-Nov	3.2	3.0	3.1	3.0	3.3	3.1	3.2	3.4	4.1	3.7	3.8	3.1	4.5	6.6	7.4	5.6	4.8	3.5	3.1	3.1	3.0	3.5	4.7	4.1	3.9	7.4	
10-Nov	3.9	4.3	5.0	6.3	8.2	9.8	10.5	11.6	10.1	7.8	6.7	4.1	3.2	2.9	2.7	2.7	3.2	3.5	3.2	3.4	4.2	4.7	5.0	5.5	5.5	11.6	
11-Nov	7.9	7.1	7.8	9.9	10.2	9.6	8.4	4.5	3.6	2.7	2.4	2.3	2.1	1.9	1.8	1.6	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	4.0	10.2	
12-Nov	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	2.1	2.0	2.0	2.2	2.3	3.2	4.5	7.2	9.3	6.2	6.1	7.7	7.5	6.6	17.2	4.3	17.2	
13-Nov	11.8	8.9	8.4	6.5	5.5	4.6	5.2	4.9	4.3	3.3	2.7	2.3	2.1	1.9	1.8	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3.7	11.8	
14-Nov	1.5	1.5	1.6	1.6	1.7	1.7	1.8	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	1.7	1.8	1.8	1.8	1.7	1.8	2.1	3.4	5.5	2.0	5.5	
15-Nov	6.3	6.1	4.4	3.2	3.4	2.7	9.3	14.5	7.0	4.8	4.1	M	3.4	3.8	4.5	4.0	3.7	3.7	3.2	2.4	2.4	2.3	2.0	1.9	4.5	14.5	
16-Nov	1.9	1.9	2.0	2.0	1.8	2.2	2.4	2.2	1.7	1.5	1.6	1.9	2.1	2.9	3.4	3.4	3.5	3.3	3.1	2.9	3.5	4.2	4.0	3.7	2.6	4.2	
17-Nov	3.2	4.2	11.2	10.3	9.7	10.3	11.9	9.8	9.1	7.9	5.0	3.9	2.6	2.0	1.7	1.8	2.4	3.3	6.3	6.8	5.8	4.7	4.0	3.4	5.9	11.9	
18-Nov	2.8	2.3	2.3	2.2	2.1	2.1	2.0	2.6	2.7	2.0	1.8	2.6	1.9	1.7	1.7	1.6	2.0	2.2	2.5	2.6	2.9	2.9	3.4	2.6	2.3	3.4	
19-Nov	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.3	2.3	3.7	5.8	5.1	9.7	9.0	8.0	6.9	7.9	9.0	11.0	7.1	6.3	5.8	5.1	11.0	
20-Nov	5.8	4.5	4.0	5.7	9.4	9.8	6.8	5.1	4.5	3.1	2.5	2.9	2.9	2.4	2.2	2.6	3.4	4.1	6.9	6.0	3.7	3.6	3.7	3.8	4.6	9.8	
21-Nov	5.1	6.7	7.8	7.4	7.3	7.7	8.4	9.1	8.6	6.5	5.3	4.0	3.4	3.6	3.6	3.2	3.1	3.0	2.8	2.7	2.5	2.5	2.7	2.8	5.0	9.1	
22-Nov	3.2	3.1	2.8	2.5	2.4	1.8	2.1	2.3	2.2	2.1	2.0	2.6	2.8	2.8	2.9	3.9	4.8	5.2	4.2	3.7	3.5	3.6	3.7	3.5	3.1	5.2	
23-Nov	3.1	3.4	3.7	3.8	4.5	5.2	5.4	4.7	4.3	3.1	2.7	2.7	2.4	2.0	C	1.9	1.9	2.1	2.2	2.0	2.1	2.0	2.4	2.5	3.0	5.4	
24-Nov	2.7	2.4	2.3	2.3	2.2	2.2	2.1	2.4	2.3	2.1	2.1	3.0	2.4	2.2	2.5	2.4	2.6	2.6	2.4	2.4	2.5	2.6	2.5	2.5	2.4	3.0	3.0
25-Nov	2.6	2.5	2.6	2.5	2.6	2.7	2.6	2.5	2.5	2.6	2.8	3.0	3.2	3.3	3.3	3.2	4.6	6.1	6.4	4.9	4.1	3.7	3.4	3.5	3.4	6.4	
26-Nov	4.2	5.0	5.1	5.5	5.7	6.1	6.7	6.8	6.6	6.6	6.2	4.9	4.1	4.0	4.2	5.7	5.4	5.2	5.5	5.1	5.0	4.6	4.3	4.1	5.3	6.8	
27-Nov	3.9	3.7	3.5	3.7	3.7	3.8	3.8	3.7	4.0	4.0	3.7	3.6	3.0	3.0	3.4	4.1	5.3	5.4	5.2	4.6	4.2	4.4	4.9	4.8	4.1	5.4	
28-Nov	3.3	3.0	3.3	3.1	3.5	3.6	3.4	3.5	3.6	4.1	4.5	4.6	5.0	4.9	5.2	5.9	6.7	6.7	6.0	5.7	5.5	5.3	4.9	4.8	4.6	6.7	
29-Nov	5.0	6.0	8.7	7.1	7.6	5.7	6.0	5.6	5.4	5.5	5.6	4.4	3.6	5.3	6.4	8.1	8.5	8.5	7.6	7.0	6.8	6.6	6.0	5.4	6.4	8.7	
30-Nov	5.2	5.2	5.2	5.1	5.1	5.1	5.0	4.9	4.5	4.4	4.1	3.5	3.0	2.7	2.6	2.9	3.5	3.8	3.7	3.8	3.8	3.8	3.8	3.8	4.1	5.2	

4.8	4.4	4.7	4.7	4.9	5.0	5.2	5.2	4.6	4.2	4.3	4.6	4.4	4.6	5.5	5.3	5.5	5.5	5.4	5.4	6.5	6.0	5.7	5.3	Diurnal Average	
20.3	14.6	12.7	10.3	10.2	10.3	12.1	14.5	10.1	9.3	15.0	30.3	33.2	28.7	31.1	31.5	31.1	28.0	24.3	25.7	55.4	52.1	45.0	29.7	Diurnal Maximum	

C - Calibration M - Maintenance
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³

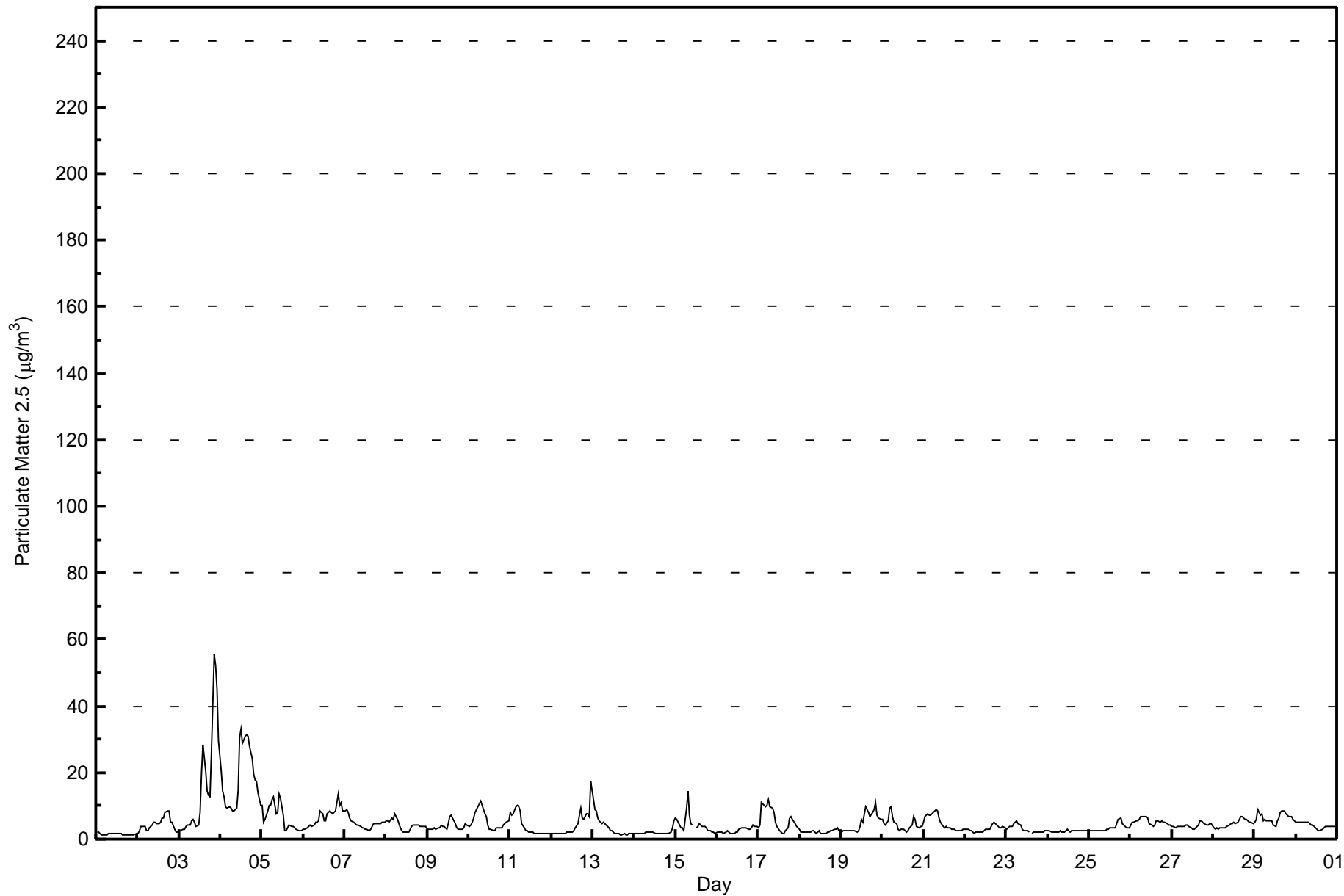


Wood Buffalo Environmental Association

Hourly Averages

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

CNRL Horizon - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	532	74.09	74.09
6 - 15	165	22.98	97.08
16 - 25	8	1.11	98.19
26 - 80	13	1.81	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



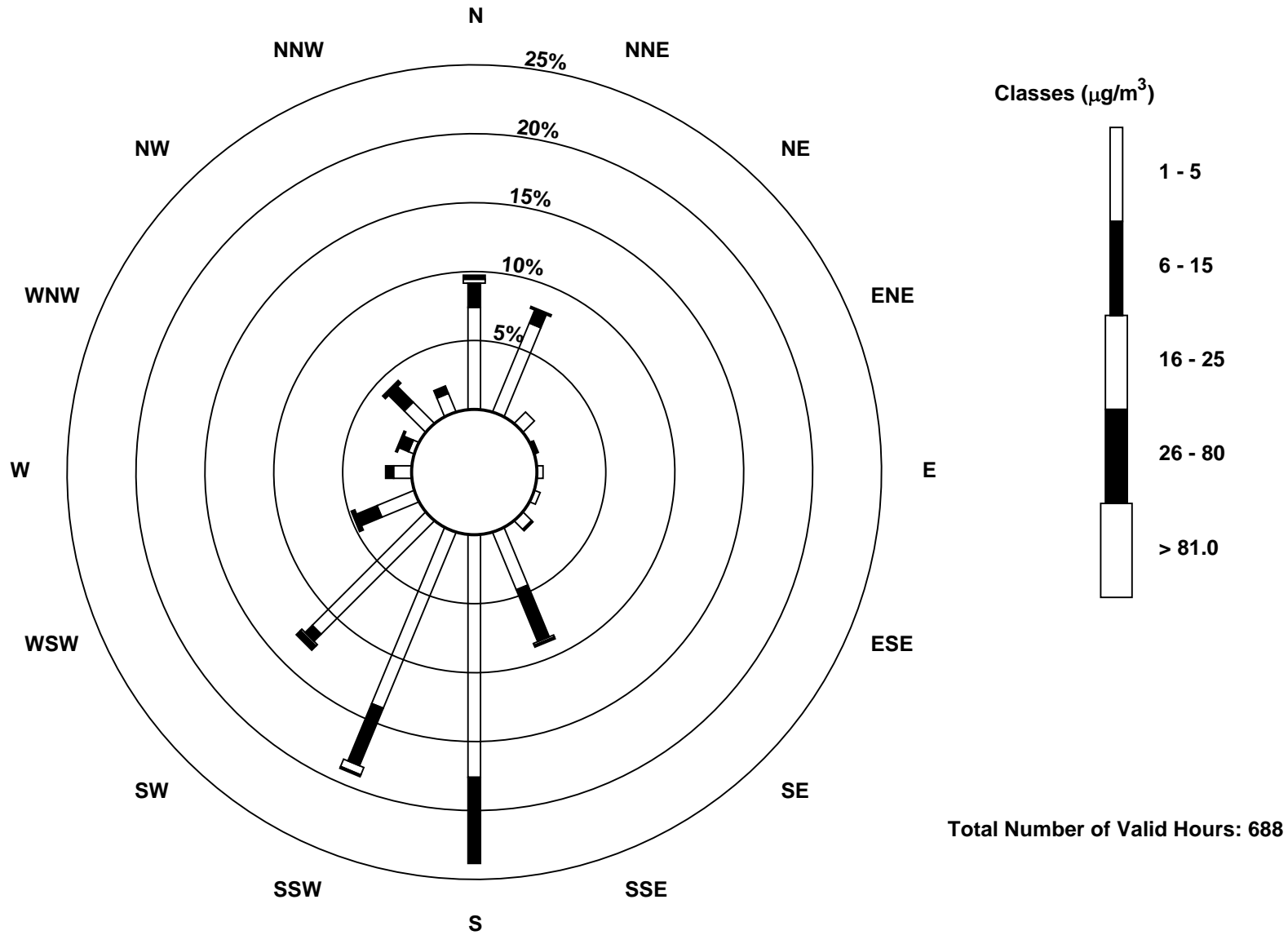
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	51	48	8	1	3	3	6	31	121	95	80	20	9	3	15	10	504
6 - 15	12	7	0	1	0	0	1	28	43	31	5	11	4	5	11	4	163
16 - 25	2	0	0	0	0	0	0	1	0	4	1	0	0	0	0	0	8
26 - 80	2	1	0	0	0	0	0	1	0	1	3	2	0	1	2	0	13
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	67	56	8	2	3	3	7	61	164	131	89	33	13	9	28	14	688

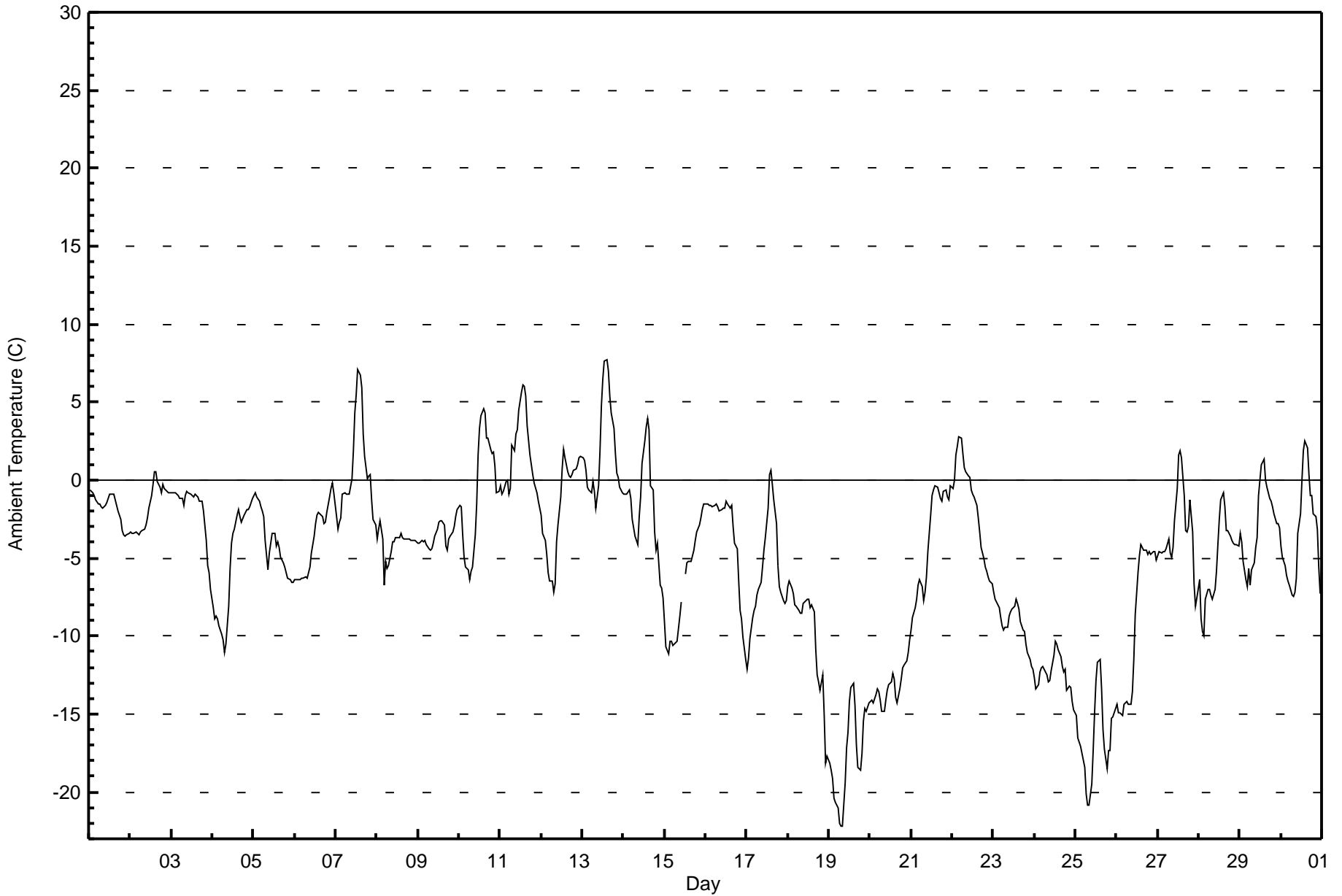
Total Number of Valid Hours: 688

Total Number of Hours: 720





Maximum Value: 7.7 C on Nov 13 15:00		Maximum Daily Average: 2.0 C on Nov 13		Hours in Service: 720																							
Minimum Value: -22.2 C on Nov 19 08:00		Minimum Daily Average: -17.6 C on Nov 19		Hours of Data: 719																							
Maximum Diurnal Average: -1.9 C at hour 15		Minimum Diurnal Average: -6.9 C at hour 8		Hours of Missing Data: 1																							
Monthly Average: -5.03 C		Percentiles: P ₁ = -20.4 P ₁₀ = -13.4 Q ₁ = -8.0 Median = -3.9 Q ₃ = -1.1 P ₉₀ = 0.6 P ₉₉ = 5.8		Hours of Calibration: 0																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	-0.6	-0.8	-0.8	-1.0	-1.3	-1.5	-1.6	-1.7	-1.8	-1.6	-1.5	-1.1	-0.9	-0.9	-0.9	-1.2	-1.6	-2.0	-2.5	-3.3	-3.5	-3.6	-3.5	-3.5	-1.8	-0.6	
2-Nov	-3.3	-3.4	-3.4	-3.4	-3.4	-3.5	-3.3	-3.3	-3.2	-2.9	-2.4	-1.8	-1.0	-0.3	0.5	0.5	-0.1	-0.5	-0.8	-0.3	-0.5	-0.7	-0.8	-0.8	-1.7	0.5	
3-Nov	-0.8	-0.8	-0.8	-0.9	-1.0	-1.2	-1.2	-1.6	-1.0	-0.7	-0.9	-0.9	-1.0	-1.0	-0.9	-1.0	-1.3	-1.4	-1.4	-2.0	-3.9	-5.5	-5.9	-7.0	-1.8	-0.7	
4-Nov	-8.2	-8.9	-8.7	-8.9	-9.4	-9.9	-10.2	-11.0	-10.5	-8.0	-5.6	-4.0	-3.4	-3.1	-2.3	-1.9	-2.3	-2.7	-2.3	-2.1	-1.9	-1.9	-1.7	-1.2	-5.4	-1.2	
5-Nov	-1.0	-0.8	-1.1	-1.4	-1.7	-1.9	-2.3	-3.8	-5.8	-4.7	-4.0	-3.4	-3.4	-4.2	-4.0	-4.4	-4.9	-5.3	-5.6	-5.9	-6.3	-6.4	-6.6	-6.5	-4.0	-0.8	
6-Nov	-6.4	-6.4	-6.4	-6.3	-6.3	-6.3	-6.2	-6.3	-5.9	-5.5	-4.7	-3.6	-2.8	-2.3	-2.1	-2.2	-2.3	-2.8	-2.7	-2.1	-1.1	-0.5	-0.2	-0.8	-3.8	-0.2	
7-Nov	-2.4	-3.1	-2.7	-2.4	-0.9	-0.8	-0.9	-0.9	-0.9	0.1	1.9	4.3	5.4	7.0	6.7	5.9	2.9	1.5	0.1	0.3	0.4	-1.3	-2.5	-2.9	0.6	7.0	
8-Nov	-3.8	-3.2	-2.6	-3.8	-6.8	-5.3	-5.7	-5.5	-4.6	-4.0	-3.9	-3.7	-3.7	-3.7	-3.4	-3.7	-3.8	-3.8	-3.8	-3.8	-3.8	-3.9	-3.9	-4.0	-4.1	-2.6	
9-Nov	-4.0	-4.1	-3.9	-4.0	-3.9	-4.1	-4.4	-4.5	-4.4	-4.0	-3.6	-3.1	-2.7	-2.6	-2.6	-2.9	-4.2	-4.5	-3.8	-3.6	-3.3	-3.0	-2.4	-1.9	-3.6	-1.9	
10-Nov	-1.7	-1.7	-3.5	-4.9	-5.6	-5.7	-6.4	-5.8	-5.5	-3.5	-1.5	1.6	3.3	4.2	4.6	4.4	2.7	2.7	2.0	1.7	1.8	0.9	-0.8	-0.7	-0.7	4.6	
11-Nov	-0.3	-0.9	-0.8	-0.1	0.0	-0.9	-0.6	2.2	1.9	3.0	3.2	4.5	5.7	6.1	6.0	5.4	3.5	1.6	1.0	0.4	-0.2	-0.8	-1.4	-1.8	1.5	6.1	
12-Nov	-2.3	-3.4	-3.8	-4.7	-6.0	-6.4	-6.5	-7.2	-6.6	-4.0	-2.8	-1.1	0.8	1.9	1.5	0.6	0.3	0.2	0.3	0.6	0.7	0.9	1.4	1.6	-1.8	1.9	
13-Nov	1.4	1.2	0.6	-0.5	-0.6	-0.8	-0.1	-0.7	-1.8	-0.3	1.9	4.7	6.5	7.6	7.7	7.0	5.4	4.3	3.4	1.7	0.4	0.2	-0.4	-0.8	2.0	7.7	
14-Nov	-0.9	-0.9	-0.9	-0.6	-1.2	-2.5	-3.1	-3.6	-4.2	-2.3	-1.1	1.1	2.5	3.4	4.0	3.3	-0.3	-0.6	-3.4	-4.5	-4.1	-6.7	-7.0	-7.6	-1.7	4.0	
15-Nov	-9.1	-10.7	-11.1	-10.3	-10.3	-10.6	-10.4	-10.3	-9.5	-8.8	-7.8	M	-6.0	-5.3	-5.2	-5.2	-4.9	-4.5	-3.9	-3.3	-2.9	-2.4	-1.9	-1.6	-6.8	-1.6	
16-Nov	-1.5	-1.5	-1.6	-1.7	-1.7	-1.6	-1.5	-1.7	-2.0	-1.9	-1.8	-1.8	-1.4	-1.5	-1.8	-1.6	-2.9	-4.1	-4.4	-6.5	-8.3	-8.9	-10.1	-11.5	-3.5	-1.4	
17-Nov	-12.1	-11.4	-10.2	-8.8	-8.4	-8.1	-7.4	-7.0	-6.5	-5.6	-4.5	-3.7	-1.8	0.3	0.6	-0.3	-1.3	-2.8	-5.5	-6.8	-7.2	-7.8	-7.9	-7.7	-5.9	0.6	
18-Nov	-6.8	-6.5	-6.9	-7.3	-8.0	-8.1	-8.4	-8.5	-8.5	-8.0	-7.8	-7.7	-7.7	-8.1	-8.0	-8.4	-10.8	-12.4	-13.0	-13.5	-12.5	-15.0	-18.2	-17.7	-9.9	-6.5	
19-Nov	-18.1	-18.6	-19.1	-20.4	-20.7	-21.1	-22.0	-22.2	-22.2	-19.4	-17.1	-16.1	-14.2	-13.3	-13.0	-14.5	-17.0	-18.4	-18.6	-17.5	-15.5	-14.7	-14.8	-14.2	-17.6	-13.0	
20-Nov	-14.2	-14.1	-14.3	-13.7	-13.4	-13.6	-14.1	-14.8	-14.8	-14.1	-13.4	-13.1	-12.9	-12.4	-12.8	-14.0	-14.3	-13.4	-12.8	-12.1	-11.8	-11.6	-11.1	-10.2	-13.2	-10.2	
21-Nov	-9.7	-8.8	-8.2	-7.6	-6.7	-6.4	-6.8	-7.7	-7.1	-6.2	-4.6	-2.3	-1.0	-0.7	-0.3	-0.5	-0.8	-1.1	-1.4	-0.8	-0.6	-1.1	-1.2	-0.4	-3.8	-0.3	
22-Nov	-0.5	0.0	1.6	2.1	2.8	2.7	1.7	0.8	0.5	0.3	0.1	-0.6	-0.9	-1.1	-1.6	-2.4	-3.3	-4.3	-5.0	-5.6	-5.8	-6.2	-6.5	-6.6	-1.6	2.8	
23-Nov	-7.2	-7.6	-7.8	-8.1	-8.8	-9.4	-9.6	-9.5	-9.4	-8.7	-8.5	-8.2	-8.1	-7.6	-7.9	-8.3	-9.0	-9.6	-9.7	-10.5	-11.0	-11.5	-12.0	-12.1	-9.2	-7.2	
24-Nov	-12.7	-13.4	-13.1	-12.3	-12.0	-12.0	-12.3	-12.5	-12.9	-12.8	-12.2	-11.3	-10.3	-10.5	-10.8	-11.3	-12.0	-12.3	-12.1	-13.4	-13.2	-13.3	-14.2	-14.8	-12.4	-10.3	
25-Nov	-15.1	-16.5	-16.8	-17.0	-17.5	-18.4	-20.2	-20.9	-20.9	-19.5	-17.3	-14.9	-12.8	-11.7	-11.5	-13.4	-16.0	-17.3	-18.5	-17.3	-17.3	-15.3	-15.2	-14.6	-16.5	-11.5	
26-Nov	-14.4	-15.0	-14.9	-15.1	-14.4	-14.3	-14.2	-14.4	-14.4	-13.6	-11.5	-8.6	-5.9	-4.8	-4.2	-4.3	-4.5	-4.5	-4.8	-4.6	-4.8	-4.6	-4.6	-5.1	-9.2	-4.2	
27-Nov	-4.9	-4.6	-4.7	-4.6	-4.6	-4.4	-3.8	-4.7	-4.9	-4.3	-2.6	-0.6	1.6	1.9	1.5	-1.0	-3.2	-3.3	-2.9	-1.3	-3.3	-6.6	-8.1	-7.5	-3.4	1.9	
28-Nov	-6.4	-8.9	-9.7	-10.0	-7.7	-7.0	-7.1	-7.4	-7.7	-7.0	-5.8	-4.1	-2.5	-1.2	-0.9	-1.7	-3.2	-3.2	-3.6	-3.9	-4.0	-4.1	-4.1	-4.2	-5.2	-0.9	
29-Nov	-3.5	-3.9	-5.2	-6.4	-6.8	-5.6	-6.7	-5.7	-5.3	-4.3	-3.7	-1.0	1.0	1.1	1.3	0.0	-0.5	-1.2	-1.3	-1.7	-2.2	-2.8	-2.8	-3.0	-2.9	1.3	
30-Nov	-4.3	-4.9	-5.5	-6.1	-6.5	-6.7	-7.4	-7.5	-7.2	-6.3	-3.4	-2.2	0.0	1.9	2.5	2.1	0.4	-1.0	-1.0	-2.2	-2.3	-3.2	-5.6	-7.3	-3.5	2.5	
		-5.8	-6.1	-6.2	-6.3	-6.4	-6.5	-6.8	-6.9	-6.9	-6.0	-4.9	-3.5	-2.6	-2.0	-1.9	-2.5	-3.6	-4.2	-4.6	-4.8	-4.9	-5.4	-5.8	-5.9	Diurnal Average	
		1.4	1.2	1.6	2.1	2.8	2.7	1.7	2.2	1.9	3.0	3.2	4.7	6.5	7.6	7.7	7.0	5.4	4.3	3.4	1.7	1.8	0.9	1.4	1.6	Diurnal Maximum	
M - Maintenance																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
CNRL Horizon - November 2015

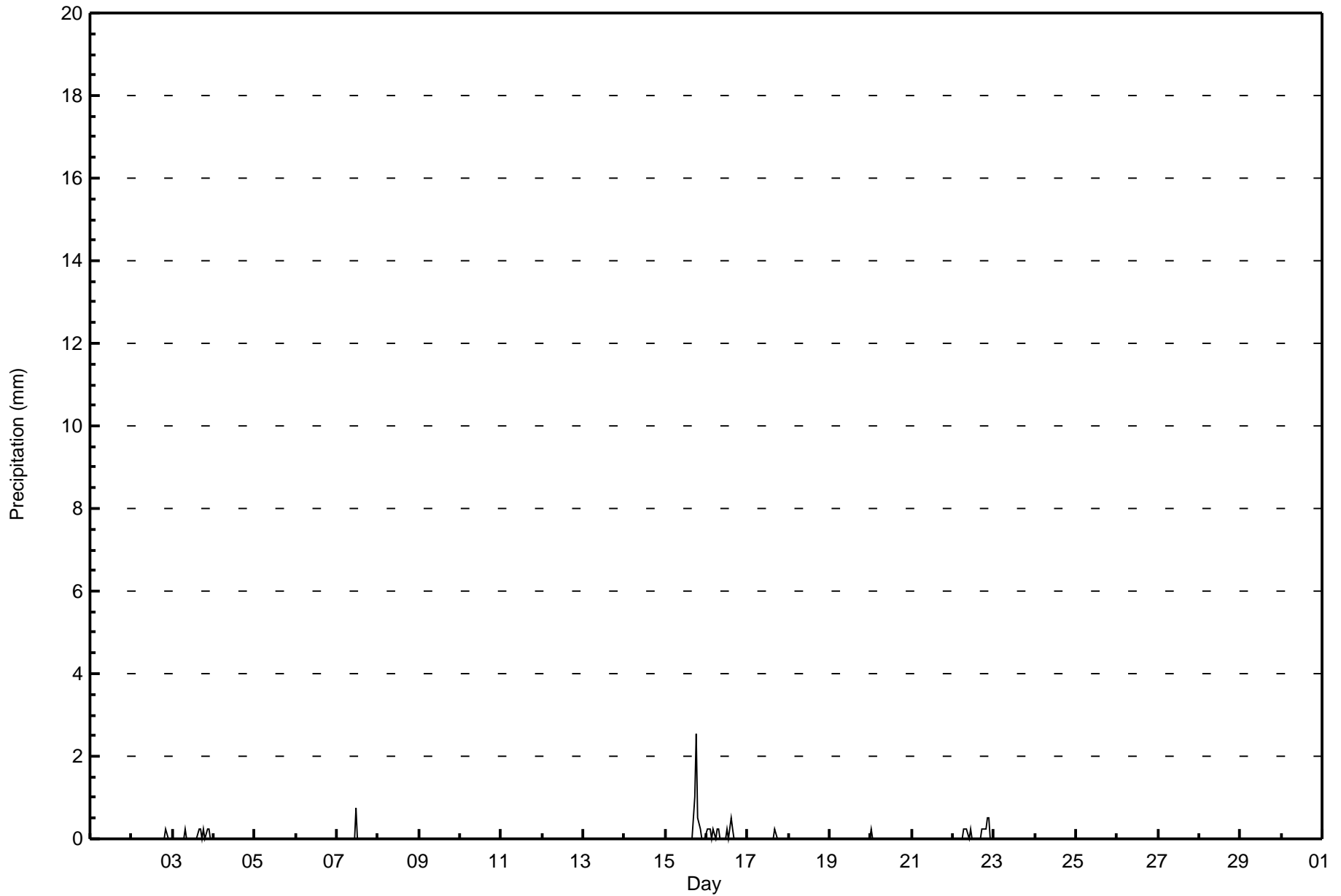
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	9	1.25	1.25
-20 - 0	617	85.81	87.07
0 - 10	93	12.93	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720

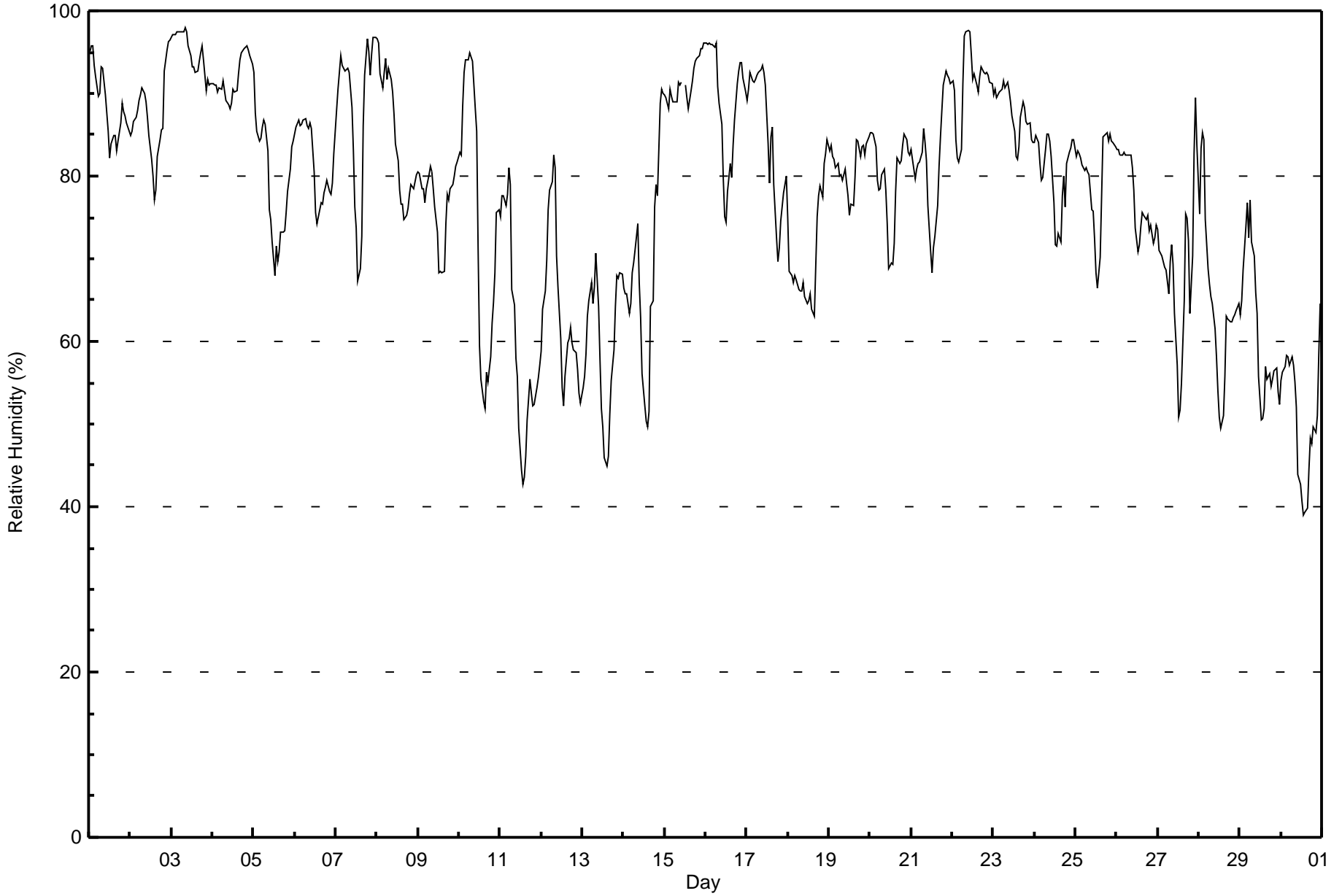


Maximum Value: 2.5 mm on Nov 15 19:00 Maximum Daily Total: 4.8 mm on Nov 15		Hours in Service: 720 Hours of Data: 719 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																																															
Minimum Value: 0.0 mm on Nov 1 01:00 Maximum Diurnal Total: 3.0 mm at hour 19 Monthly Total: 13.21 mm		Minimum Daily Total: 0.0 mm on Nov 1 Minimum Diurnal Total: 0.0 mm at hour 4 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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3														
3-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.3	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	1.5	0.3														
4-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8														
8-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.5	1.0	2.5	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	4.8	2.5														
16-Nov	0.3	0.3	0.3	0.0	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.0	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	2.5	0.5														
17-Nov	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3														
18-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	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	0.0	0.0	0.3	0.3														
21-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.5														
23-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0														
30-Nov	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.0	0.3	0.0	0.5	0.8	0.3	0.0	0.3	0.8	0.3	0.0	0.5	0.5	1.0	1.3	3.0	0.8	1.3	0.8	0.0	0.0	Diurnal Average	
																								0.3	0.3	0.3	0.0	0.3	0.0	0.3	0.3	0.3	0.0	0.3	0.8	0.3	0.0	0.5	0.3	0.5	1.0	2.5	0.5	0.5	0.5	0.0	0.0	Diurnal Maximum	
M - Maintenance																																																	





Maximum Value: 98 % on Nov 3 09:00																	Maximum Daily Average: 95.0 % on Nov 3																	Hours in Service: 720															
Minimum Value: 39 % on Nov 30 14:00																	Minimum Daily Average: 50.9 % on Nov 30																	Hours of Data: 719															
Maximum Diurnal Average: 82.6 % at hour 7																	Minimum Diurnal Average: 68.6 % at hour 14																	Hours of Missing Data: 1															
Monthly Average: 78.0 %																	Percentiles: P ₁ = 44 P ₁₀ = 56 Q ₁ = 69 Median = 81 Q ₃ = 89 P ₉₀ = 93 P ₉₉ = 97																	Hours of Calibration: 0															
																																		Percent Operational Time: 99.9															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	95	96	96	93	92	90	90	93	93	90	88	85	82	84	85	85	83	84	86	89	88	87	86	85	88.6	96																							
2-Nov	85	85	87	87	88	89	90	91	90	89	87	85	82	80	77	78	82	84	86	86	93	95	96	96	87.0	96																							
3-Nov	97	97	97	97	97	97	98	98	98	97	96	95	93	93	93	93	94	95	96	94	90	92	91	91	95.0	98																							
4-Nov	91	91	91	90	91	90	91	90	89	89	88	89	90	90	92	94	95	95	96	96	95	95	94	94	91.8	96																							
5-Nov	93	88	85	84	85	86	87	86	83	76	75	72	68	71	70	71	73	73	73	76	78	81	84	84	79.2	93																							
6-Nov	85	86	87	86	86	87	87	86	86	86	86	81	76	74	75	77	77	78	79	79	78	78	79	83	81.7	87																							
7-Nov	88	90	93	95	93	93	93	93	93	88	83	76	74	67	69	73	86	92	97	95	92	95	97	97	87.9	97																							
8-Nov	97	96	92	91	93	94	92	93	92	90	88	84	82	78	77	77	75	75	76	78	79	79	79	80	84.8	97																							
9-Nov	81	80	78	79	77	78	80	81	81	78	76	73	68	68	68	69	74	78	77	78	79	80	81	82	76.9	82																							
10-Nov	83	83	88	93	94	94	95	94	94	88	85	71	60	55	53	52	56	55	58	62	65	68	76	76	74.9	95																							
11-Nov	75	78	78	76	78	81	79	66	64	58	56	49	44	43	44	46	51	55	54	52	52	54	56	57	60.3	81																							
12-Nov	59	64	66	70	76	78	79	83	81	70	67	60	54	52	56	60	60	62	60	59	59	57	54	53	64.1	83																							
13-Nov	54	56	58	63	65	67	65	67	71	64	58	52	50	46	45	46	51	55	59	64	68	68	68	68	59.5	71																							
14-Nov	66	66	66	63	65	68	69	71	74	67	63	56	52	50	50	52	64	65	76	79	78	89	91	90	67.9	91																							
15-Nov	90	89	88	91	90	89	89	89	91	91	91	M	91	90	88	90	91	93	94	94	95	95	95	96	91.4	96																							
16-Nov	96	96	96	96	96	96	96	91	89	86	80	75	74	78	81	80	84	87	91	93	94	94	92	90	88.7	96																							
17-Nov	89	91	92	92	91	92	92	93	93	93	93	91	84	79	85	86	79	73	70	71	75	78	79	80	85.0	93																							
18-Nov	75	68	68	67	68	67	66	66	66	67	65	65	65	66	64	63	69	75	78	79	77	81	83	84	70.6	84																							
19-Nov	83	84	82	82	81	81	80	80	80	81	79	78	75	77	76	80	84	84	82	84	84	82	84	85	81.2	85																							
20-Nov	85	85	85	84	79	78	79	80	81	78	74	69	69	69	72	78	82	81	82	84	85	84	83	83	79.6	85																							
21-Nov	83	82	80	81	81	82	83	86	84	82	76	71	68	71	73	76	81	85	88	91	93	92	92	91	82.2	93																							
22-Nov	91	90	84	82	82	83	91	97	98	98	98	95	92	92	91	90	92	93	93	92	93	92	91	91	91.3	98																							
23-Nov	90	91	90	90	90	90	91	91	91	90	89	87	86	82	82	84	87	89	88	87	86	86	84	84	87.8	91																							
24-Nov	84	85	84	82	79	80	83	85	85	84	82	77	72	72	73	72	78	80	76	81	83	83	84	84	80.4	85																							
25-Nov	82	83	83	82	81	81	81	81	80	76	76	72	68	66	70	77	85	85	85	84	85	84	84	84	79.9	85																							
26-Nov	83	83	83	82	83	83	82	82	83	81	78	74	71	72	74	76	75	75	75	73	74	72	73	74	77.5	83																							
27-Nov	73	71	70	70	69	69	66	70	72	69	63	57	51	52	55	65	75	75	72	63	70	83	90	84	68.9	90																							
28-Nov	75	83	85	84	75	69	67	65	64	62	58	54	51	49	51	56	63	63	62	62	63	63	64	64	64.8	85																							
29-Nov	63	65	69	74	77	73	77	72	70	66	63	56	51	51	52	57	55	56	55	55	56	57	54	52	61.5	77																							
30-Nov	55	56	57	58	58	57	58	57	55	52	44	43	41	39	39	40	45	48	48	50	49	51	58	65	50.9	65																							
																								81.6	82.0	82.0	82.1	82.0	82.1	82.6	82.6	82.3	79.6	76.9	72.1	69.5	68.6	69.2	71.3	74.9	76.3	77.0	77.7	78.5	79.9	80.7	80.9	Diurnal Average	
																								97	97	97	97	97	97	98	98	98	98	98	95	93	93	93	93	93	94	95	97	96	96	95	97	97	Diurnal Maximum
M - Maintenance																																																	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - November 2015

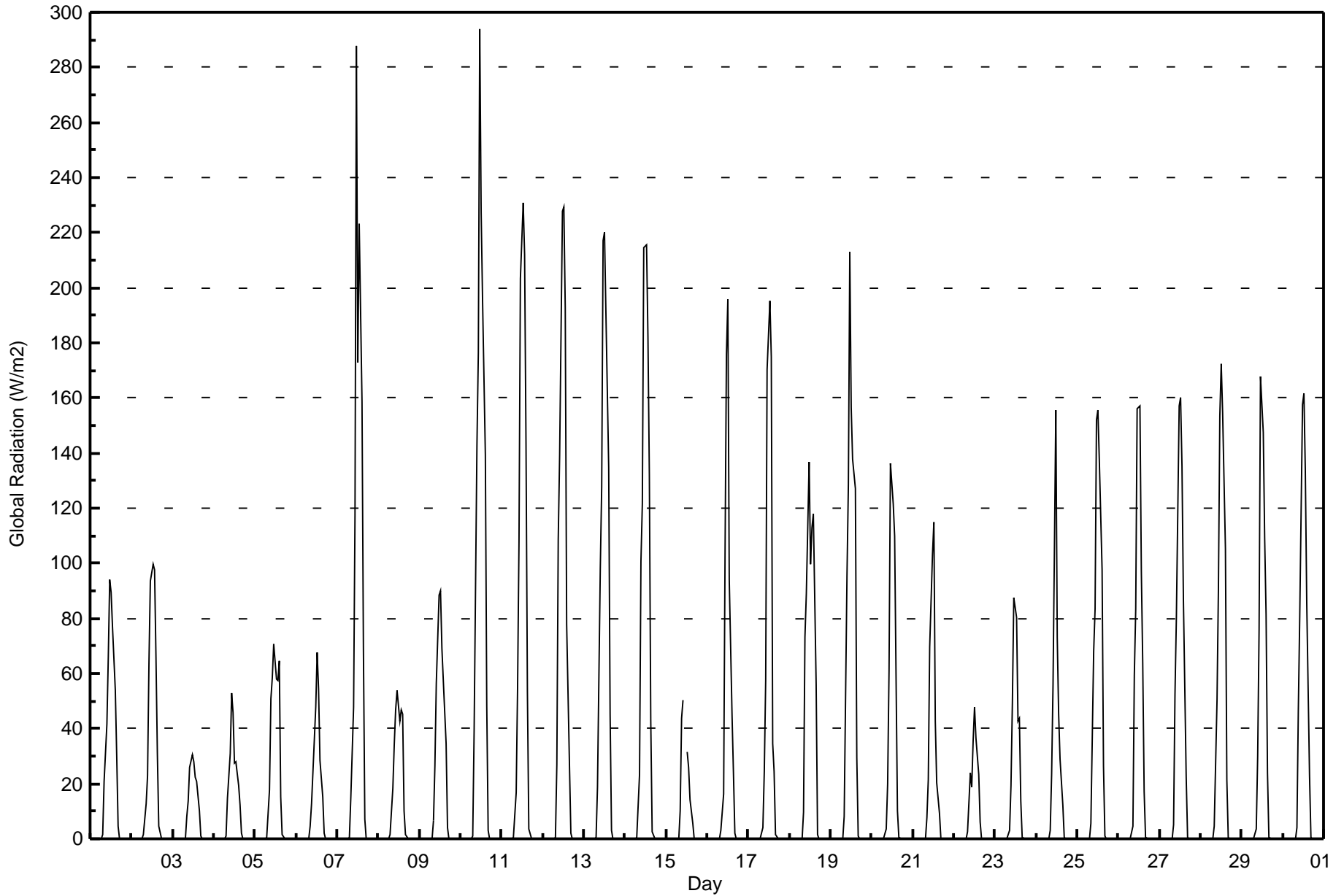
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	3	0.42	0.42
40 - 60	93	12.93	13.35
60 - 80	243	33.80	47.15
80 - 100	380	52.85	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Maximum Value: 294 W/m2 on Nov 10 12:00		Maximum Daily Average: 52.8 W/m2 on Nov 10		Hours in Service: 720																																												
Minimum Value: 0 W/m2 on Nov 1 01:00		Minimum Daily Average: 6.7 W/m2 on Nov 3		Hours of Data: 719																																												
Maximum Diurnal Average: 142.3 W/m2 at hour 12		Minimum Diurnal Average: 0.0 W/m2 at hour 1		Hours of Missing Data: 1																																												
Monthly Average: 25.6 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 24 P ₉₀ = 100 P ₉₉ = 220		Hours of Calibration: 0																																												
				Percent Operational Time: 99.9																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Nov	0	0	0	0	0	0	0	2	21	42	66	94	89	77	54	30	4	0	0	0	0	0	0	0	19.9	94																						
2-Nov	0	0	0	0	0	0	0	1	13	23	63	94	100	98	66	31	5	0	0	0	0	0	0	0	20.5	100																						
3-Nov	0	0	0	0	0	0	0	0	8	13	26	31	28	22	21	10	1	0	0	0	0	0	0	0	6.7	31																						
4-Nov	0	0	0	0	0	0	0	1	15	31	53	46	27	28	19	12	2	0	0	0	0	0	0	0	9.8	53																						
5-Nov	0	0	0	0	0	0	0	0	18	51	59	70	58	57	65	15	2	0	0	0	0	0	0	0	16.5	70																						
6-Nov	0	0	0	0	0	0	0	0	5	13	25	48	68	54	28	15	2	0	0	0	0	0	0	0	10.7	68																						
7-Nov	0	0	0	0	0	0	0	0	15	48	117	288	173	223	159	69	7	0	0	0	0	0	0	0	45.8	288																						
8-Nov	0	0	0	0	0	0	0	1	18	34	47	54	43	47	45	10	2	0	0	0	0	0	0	0	12.5	54																						
9-Nov	0	0	0	0	0	0	0	0	6	27	57	89	90	69	58	34	4	0	0	0	0	0	0	0	18.1	90																						
10-Nov	0	0	0	0	0	0	0	1	40	143	177	294	227	196	139	48	3	0	0	0	0	0	0	0	52.8	294																						
11-Nov	0	0	0	0	0	0	0	0	17	56	108	204	231	212	143	53	3	0	0	0	0	0	0	0	42.8	231																						
12-Nov	0	0	0	0	0	0	0	1	27	109	139	228	229	193	78	27	2	0	0	0	0	0	0	0	43.0	229																						
13-Nov	0	0	0	0	0	0	0	0	19	98	127	217	220	191	135	45	3	0	0	0	0	0	0	0	44.0	220																						
14-Nov	0	0	0	0	0	0	0	1	23	101	122	215	216	182	132	43	3	0	0	0	0	0	0	0	43.2	216																						
15-Nov	0	0	0	0	0	0	0	0	10	44	50	M	31	26	14	6	0	0	0	0	0	0	0	0	7.9	50																						
16-Nov	0	0	0	0	0	0	0	0	3	16	103	176	196	94	45	24	2	0	0	0	0	0	0	0	27.4	196																						
17-Nov	0	0	0	0	0	0	0	0	4	24	57	170	195	175	35	25	2	0	0	0	0	0	0	0	28.6	195																						
18-Nov	0	0	0	0	0	0	0	0	10	73	89	137	100	113	118	56	2	0	0	0	0	0	0	0	29.0	137																						
19-Nov	0	0	0	0	0	0	0	0	8	95	129	213	157	138	127	30	1	0	0	0	0	0	0	0	37.4	213																						
20-Nov	0	0	0	0	0	0	0	0	4	20	61	136	122	110	59	10	0	0	0	0	0	0	0	0	21.7	136																						
21-Nov	0	0	0	0	0	0	0	0	8	21	69	103	115	43	20	9	0	0	0	0	0	0	0	0	16.2	115																						
22-Nov	0	0	0	0	0	0	0	0	2	24	19	36	48	37	24	6	0	0	0	0	0	0	0	0	8.1	48																						
23-Nov	0	0	0	0	0	0	0	0	3	19	49	88	80	43	43	14	0	0	0	0	0	0	0	0	14.2	88																						
24-Nov	0	0	0	0	0	0	0	0	3	23	56	155	73	45	29	12	0	0	0	0	0	0	0	0	16.6	155																						
25-Nov	0	0	0	0	0	0	0	0	6	68	83	152	156	138	98	27	1	0	0	0	0	0	0	0	30.3	156																						
26-Nov	0	0	0	0	0	0	0	0	5	59	83	156	157	97	64	17	1	0	0	0	0	0	0	0	26.6	157																						
27-Nov	0	0	0	0	0	0	0	0	5	53	80	157	160	135	88	22	0	0	0	0	0	0	0	0	29.2	160																						
28-Nov	0	0	0	0	0	0	0	0	5	50	91	154	172	154	105	22	1	0	0	0	0	0	0	0	31.4	172																						
29-Nov	0	0	0	0	0	0	0	0	3	30	76	168	148	109	82	24	1	0	0	0	0	0	0	0	26.7	168																						
30-Nov	0	0	0	0	0	0	0	0	4	47	80	158	162	133	86	23	1	0	0	0	0	0	0	0	28.9	162																						
																								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	10.9	48.5	78.7	142.3	129.0	107.9	72.6	25.7	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
																								0	0	0	0	0	0	0	2	40	143	177	294	231	223	159	69	7	0	0	0	0	0	0	0	Diurnal Maximum
M - Maintenance																																																





Maximum Speed: 22 km/h on Nov 30 08:00	Maximum Daily Speed Average: 14.4 km/h on Nov 30	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 2 14:00	Minimum Daily Speed Average: 0.6 km/h on Nov 3	Hours of Data: 689
Maximum Diurnal Speed Average: 5.6 km/h at hour 24	Minimum Diurnal Speed Average: 2.4 km/h at hour 17	Hours of Missing Data: 31
Monthly Average Velocity: 4.2 km/h 205.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 11 P ₉₀ = 14 P ₉₉ = 19	Percent Operational Time: 95.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	NNE10	NNE10	NNE10	NNE11	NNE11	NNE9	NNE8	N8	N9	N10	NNE12	NNE9	NE8	NE7	N9	NNE9	N9	NNE10	NNE11	N11	N8	N8	N8	N5	NNE9.0	NNE12
2-Nov	N2	SW3	ESE1	NNE6	NNE9	NE7	ENE4	ESE5	ESE4	AF	E2	SE2	WSW1	NE0	SSE4	SSE2	NW4	NNE4	NNE2	SSE6	SSE8	SSE9	SSE8	SSE7	ESE1.7	NNE9
3-Nov	SSE6	S3	SE1	SE1	SE1	SE2	AF	NNW2	N3	N5	N7	N7	N6	N6	N5	N5	NNE3	AF	SSW2	WSW5	WSW6	SW7	SW9	SSW8	NW0.6	SW9
4-Nov	SSW7	S9	SSW9	S10	SSW9	SSW8	SSW9	SSW6	SSW4	SSW3	S3	SSE2	WNW2	NW5	NNE2	N1	NW3	SW3	SSW3	SSW5	SSW5	SW7	SW8	WSW6	SSW4.4	S10
5-Nov	NNW4	NW7	WNW8	NW8	NW7	NW5	NNE6	N9	NW5	NW3	N5	N6	NNW6	NW13	NNE10	NW10	NNW12	NNW12	NNW11	N6	NE4	NE1	SW4	SSE4	NNW5.9	NW13
6-Nov	S5	SSE5	S5	SSE5	SSE5	S5	SSE5	SSE5	SSE5	S5	S6	SSE7	SSE9	SSE10	SSE9	SSE9	SSE10	SSE7	SSE4	S6	S10	S14	S9	SSW8	SSE6.8	S14
7-Nov	WSW4	SSW9	SSW10	SSW15	SSW14	SW12	SW11	SW13	SW11	SW13	SW14	SW13	SW8	SW7	SSW10	SSW8	S7	S7	SSW8	SW10	SW9	S4	SSE6	S5	SSW9.2	SSW15
8-Nov	SSW6	SW11	WSW8	WSW5	WSW3	N7	NNE4	NNE8	NNE13	NNE15	NE13	NNE11	NNE10	NNE12	NNE11	NNE10	NNE8	N6	N5	NNE5	N5	NNE6	NNE6	NNE4	N5.5	NNE15
9-Nov	NNE5	NE4	N5	N4	N4	WNW3	W3	N1	E2	SW2	SSW5	S5	S7	SSW8	SSW9	SSW8	SSW5	SSW9	SSW8	SSW5	S6	SSE6	S9	S11	SSW3.2	S11
10-Nov	S11	SSE11	S9	S10	S10	SSW8	SSW8	SSW9	SSW7	SSW6	SSW6	S13	S15	S17	S15	S11	S11	S12	S13	S13	S12	S8	S5	SSW6	S9.9	S17
11-Nov	SSW5	SSW5	SSW6	SSW6	SSW6	WNW4	S10	SSW12	SSW11	SSW12	SW12	SW14	SW17	SW20	SW15	SW11	SW8	SW8	SW10	SW11	WSW11	SW13	SW12	SW10.0	SW20	
12-Nov	SSW9	SSW9	SSW10	S8	S11	S11	S10	S9	S11	S11	S13	S12	SSW10	S12	SSE10	SSE7	SE7	SSE9	SSE12	SSE14	SSE15	SSE16	SSE14	SSE11	S10.4	SSE16
13-Nov	S9	SSE9	SSE10	SSE7	S6	S9	S11	S9	SSW10	SW8	SW7	SW10	SW16	SW15	SW12	SW10	SW8	SSW9	SW10	SSW7	SSW7	SW9	SW9	WSW11	SSW8.7	SW16
14-Nov	SW14	SW9	S8	SSW10	SW11	SSW9	SSW11	SSW11	SSW9	S11	SSW9	SW12	SW12	SSW11	SSW6	SSW6	SSW7	SW6	SW8	WSW4	NW4	NW6	WNW6	SSW7.8	SW14	
15-Nov	W3	SSW6	SW4	SSW6	SSW5	W3	NNE1	N4	N6	N8	N10	M	N9	NNE7	NNE10	NNE13	NNE15	NNE17	NNE20	NNE18	NNE16	NNE14	NNE11	N11	N7.4	NNE20
16-Nov	N11	N10	N10	N7	N7	NNW6	WSW5	WSW7	WSW9	WSW9	W12	W14	W13	WSW13	WSW10	WSW11	SW6	SW6	S7	S8	SSE6	SSE7	S8	S4	W4.5	W14
17-Nov	SSW3	NW3	N4	NW5	ENE1	NNW3	N2	WNW1	NW2	WSW2	SSW5	SW4	SSW6	SSW7	SW8	SW8	WSW10	W12	W14	W12	WSW12	SW11	SW10	SW9	WSW5.1	W14
18-Nov	W9	NNW13	NW12	NW11	NW14	NW16	NW19	NW14	NW15	NNW20	NNW20	N15	NNW14	N13	N12	N9	NNW7	N7	NW5	WSW6	W7	W6	WSW5	SSW6	NW9.8	NNW20
19-Nov	SSW8	SSW8	SSW8	S7	SSW6	SSW8	S7	SSW7	SSW4	SSW7	S4	N1	NW3	NNE4	NW4	NW4	NW2	AF	WSW4	W3	N3	N4	WNW3	SW2	SW2.8	SSW8
20-Nov	SW4	SW5	SW5	WSW6	WSW7	WSW8	WSW7	SW7	SW6	SW7	SW9	SSW10	S11	S11	S10	SSE7	SSE7	S9	S9	S9	SSW9	SSW8	S9	S11	SSW7.0	S11
21-Nov	S9	S9	SW14	SW14	SSW13	SSW14	S13	S11	S8	S9	SSW7	SSW6	SW10	SSW10	SW13	SW11	SSW7	SSE6	S5	SSW9	SSW10	SSW10	SSW10	SW12	SSW9.4	SW14
22-Nov	SSE10	S10	SSW10	SW9	WSW8	WSW8	NNE2	NE3	NNE5	NNE2	NNE6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	SSW10
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE6	NNE7	NNE8	N8	N8	N11	NNE11	NNE8	N8	N7	N6	---	N11
24-Nov	N6	N6	N8	N9	N12	N9	NNE2	WSW4	SW5	SSW5	SW5	N3	N5	NNW3	NW7	WSW6	SW2	SSW5	W4	SW2	S6	SSW7	SSW8	SSW9	WNW1.9	N12
25-Nov	S10	S10	S12	SSW14	SSW13	SSW6	SW7	SW9	SSW5	S6	S6	S6	S6	S6	S6	S6	SSE6	SSE4	SSW6	SSW7	S9	S10	S10	S12	S7.8	SSW14
26-Nov	S11	S11	S14	S15	S15	S14	S14	S16	S15	SSW14	S10	SSW11	SSW14	SW9	SSW9	S9	S9	S9	S13	SSW15	SSW14	SSW16	SSW15	S12	S12.5	S16
27-Nov	SSW14	SW14	SW15	SW12	SW12	SSW8	S7	S7	S9	S5	S5	S5	E3	SE4	SSE3	S7	S9	SSW9	SW10	SSW7	S4	SSE5	S7	SSW7.2	SW15	
28-Nov	SSW8	S5	S6	S6	S12	SSW16	SSW16	S18	S16	S16	S15	S12	S13	S11	S10	S9	S9	S11	S11	S10	S13	S11	S11	S9	S11.4	S18
29-Nov	S9	SSE6	SE7	SSE5	S7	S7	SSE7	S8	S8	SSE7	SSE8	SSE8	SSE8	SSE7	SSE6	SSE8	S9	S11	S14	S15	S15	S16	S19	S17	S9.4	S19
30-Nov	S19	S18	S18	S13	S15	S19	S17	S22	S21	S17	SSW17	S17	S15	S14	SSW13	SSW14	SSW13	SSW12	SSW12	SSW12	SSW12	SSW12	SSW12	S7	SSW14.4	S22

SSW4.7SSW4.6SSW4.5SSW4.3SSW4.3	SW4.3SSW4.6SSW4.6SSW4.2SSW4.0SSW3.4SSW4.1	SW4.4SSW3.8SSW3.7SSW2.9SSW2.4SSW3.2SSW3.5SSW4.7SSW5.2SSW4.9SSW5.3SSW5.6	Diurnal Average																					
S19	S18	S18	S15	S15	S19	NW19	S22	S21	NNW20	NNW20	S17	SW17	SW20	SW15	SSW14	NNE15	NNE17	NNE20	NNE18	NNE16	SSE16	S19	S17	Diurnal Maximum

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

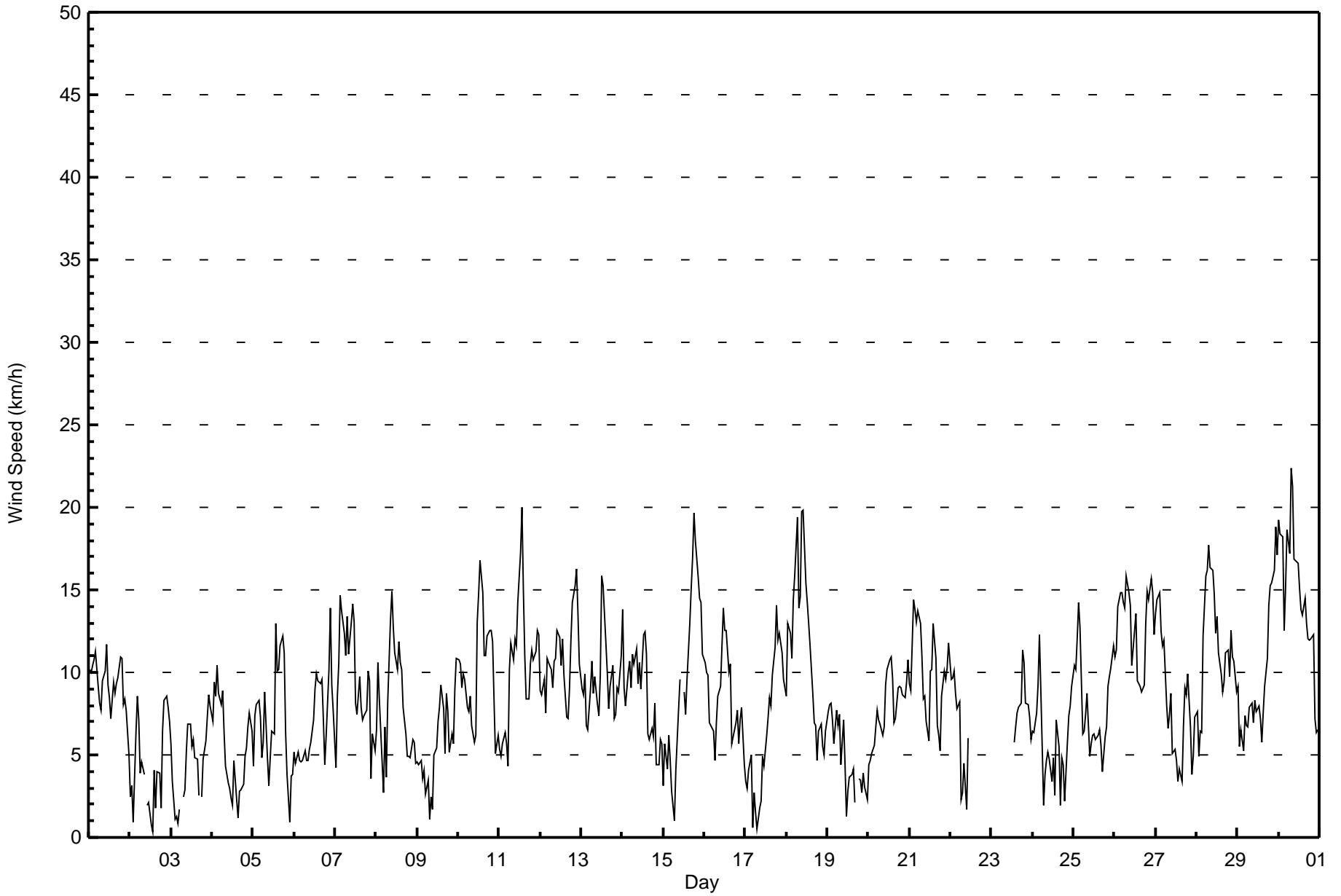


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 6 km/h on Nov 11 14:00	Hours of Data: 689
Minimum Value: 1 km/h on Nov 3 08:00	Hours of Missing Data: 31
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 5	Hours of Calibration: 0
	Percent Operational Time: 95.7

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

4	4	5	5	4	4	4	4	4	4	6	6	5	5	6	5	4	4	4	5	5	4	4	4	4	
Diurnal Maximum																									

M - Maintenance AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	160	23.22	23.22
6 - 11	383	55.59	78.81
12 - 19	140	20.32	99.13
20 - 28	6	0.87	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: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	22	15	4	2	3	3	6	15	17	19	14	12	4	6	13	5	160
6 - 11	41	30	3	0	0	0	1	41	96	88	47	19	3	2	9	3	383
12 - 19	4	11	1	0	0	0	0	5	49	24	27	2	6	1	6	4	140
20 - 28	0	1	0	0	0	0	0	0	2	0	1	0	0	0	0	2	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	67	57	8	2	3	3	7	61	164	131	89	33	13	9	28	14	689

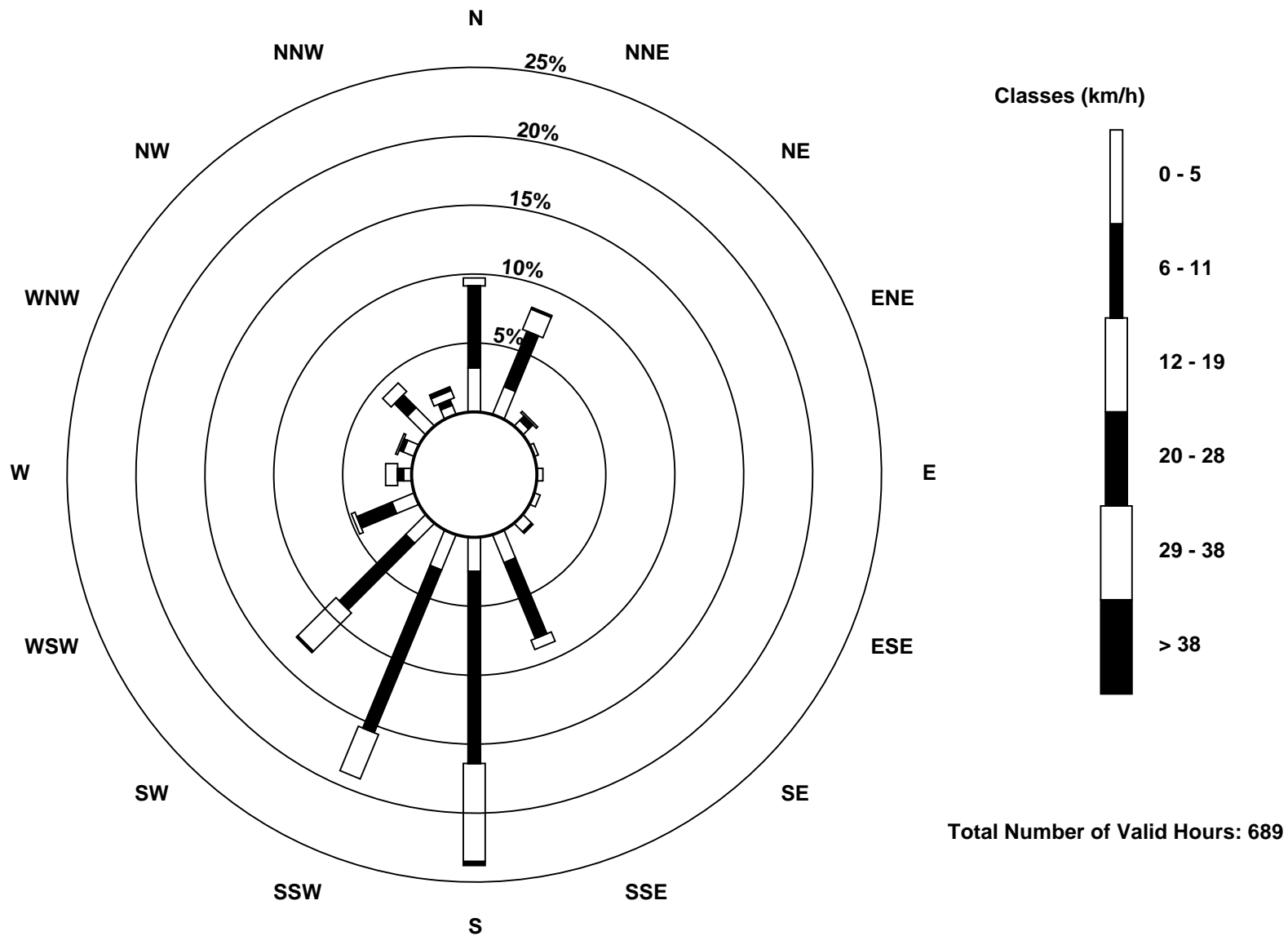
Total Number of Valid Hours: 689

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - November 2015

Direction of Maximum Speed: 188 deg on Nov 30 08:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 191.9 deg on Nov 30		Hours of Data:	689
Direction of Minimum Speed: 46 deg on Nov 2 14:00		Hours of Missing Data:	31
Direction of Minimum Daily Speed Average: 0.6 deg on Nov 3		Percent Operational Time:	95.7
Monthly Average Direction: 216.1 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-Nov	20	16	12	16	16	18	19	9	9	10	13	32	53	34	7	13	9	16	14	4	1	350	351	350	13.4	
2-Nov	4	215	102	19	16	39	61	104	112	AF	93	134	241	46	159	166	308	29	13	167	168	162	160	159	116.3	
3-Nov	167	174	127	124	135	134	AF	341	9	10	8	9	10	2	9	10	30	AF	196	239	243	214	220	203	304.3	
4-Nov	194	184	196	191	195	193	192	207	212	195	170	164	297	313	19	11	318	217	210	206	208	227	236	248	207.5	
5-Nov	332	316	298	310	317	326	15	10	316	324	354	359	332	313	313	308	328	332	336	357	40	36	214	162	328.6	
6-Nov	182	166	189	166	158	171	167	156	167	181	178	158	149	168	162	157	151	154	159	172	174	170	185	195	167.8	
7-Nov	242	203	207	208	211	215	221	225	219	217	217	221	228	217	208	200	178	190	203	221	219	184	156	176	210.7	
8-Nov	207	222	255	254	246	3	20	22	18	23	34	13	21	12	28	22	17	3	11	14	9	18	22	26	11.2	
9-Nov	26	34	353	349	0	292	281	351	101	225	203	189	181	207	195	208	202	192	208	201	178	159	172	177	194.4	
10-Nov	174	165	176	186	189	212	213	200	202	199	205	186	189	181	176	171	178	178	182	184	182	177	190	196	185.1	
11-Nov	204	208	203	195	192	288	189	197	197	196	214	230	235	230	222	223	224	220	227	229	232	237	225	223	219.2	
12-Nov	204	200	208	186	181	183	190	183	177	176	183	190	200	177	163	152	146	153	159	163	163	165	167	167	175.9	
13-Nov	174	159	159	163	175	188	177	185	193	214	224	224	222	216	217	233	231	210	217	205	203	215	230	238	205.2	
14-Nov	229	226	176	213	219	202	209	199	197	196	170	203	215	215	213	211	207	206	219	228	246	318	304	292	213.6	
15-Nov	280	213	216	208	195	261	31	357	359	356	355	M	360	30	26	12	16	12	12	12	17	16	17	13	3	8.0
16-Nov	6	357	6	355	350	313	256	254	240	247	265	278	277	257	237	258	230	227	189	179	160	167	180	175	260.6	
17-Nov	206	319	357	318	63	340	352	302	311	237	199	225	211	199	226	216	252	267	278	259	238	232	227	228	245.6	
18-Nov	277	303	325	322	315	317	319	322	326	334	334	350	330	357	352	355	342	6	304	244	263	260	254	206	322.2	
19-Nov	208	200	208	191	197	194	172	196	199	194	191	354	317	18	322	317	305	AF	257	269	353	352	291	233	218.3	
20-Nov	215	227	229	254	258	250	240	219	225	228	227	207	191	181	182	156	162	169	174	190	194	208	187	171	201.6	
21-Nov	170	191	229	229	213	202	187	182	177	176	202	212	227	211	225	214	199	164	179	193	193	200	200	227	202.9	
22-Nov	166	183	206	227	250	254	27	44	15	24	21	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	13	22	22	10	9	11	22	13	7	0	359	--	
24-Nov	6	355	3	355	354	1	32	237	216	213	226	349	355	344	309	255	229	211	259	225	189	201	196	194	289.8	
25-Nov	189	184	190	192	200	212	208	215	215	203	179	178	172	172	178	175	160	159	192	201	182	185	183	189	189.3	
26-Nov	180	176	179	186	185	183	176	181	181	193	183	194	201	215	208	186	184	172	176	194	202	202	208	191	189.0	
27-Nov	205	222	223	224	219	218	201	172	176	179	171	185	170	83	137	165	179	190	206	230	192	191	149	188	198.7	
28-Nov	197	177	174	184	176	197	195	187	181	179	176	176	182	184	178	172	174	178	177	170	180	177	175	173	180.7	
29-Nov	172	150	141	165	172	176	165	182	176	158	160	163	156	154	153	159	169	171	178	186	185	183	186	187	172.8	
30-Nov	185	183	183	176	182	188	182	188	187	189	197	191	185	186	196	213	206	203	210	207	215	209	208	172	191.9	

197.7	202.4	208.1	213.4	212.2	217.9	200.4	199.7	199.8	205.3	207.5	208.4	214.0	211.9	208.1	210.3	204.3	194.6	209.1	206.4	198.8	197.9	200.2	198.7
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

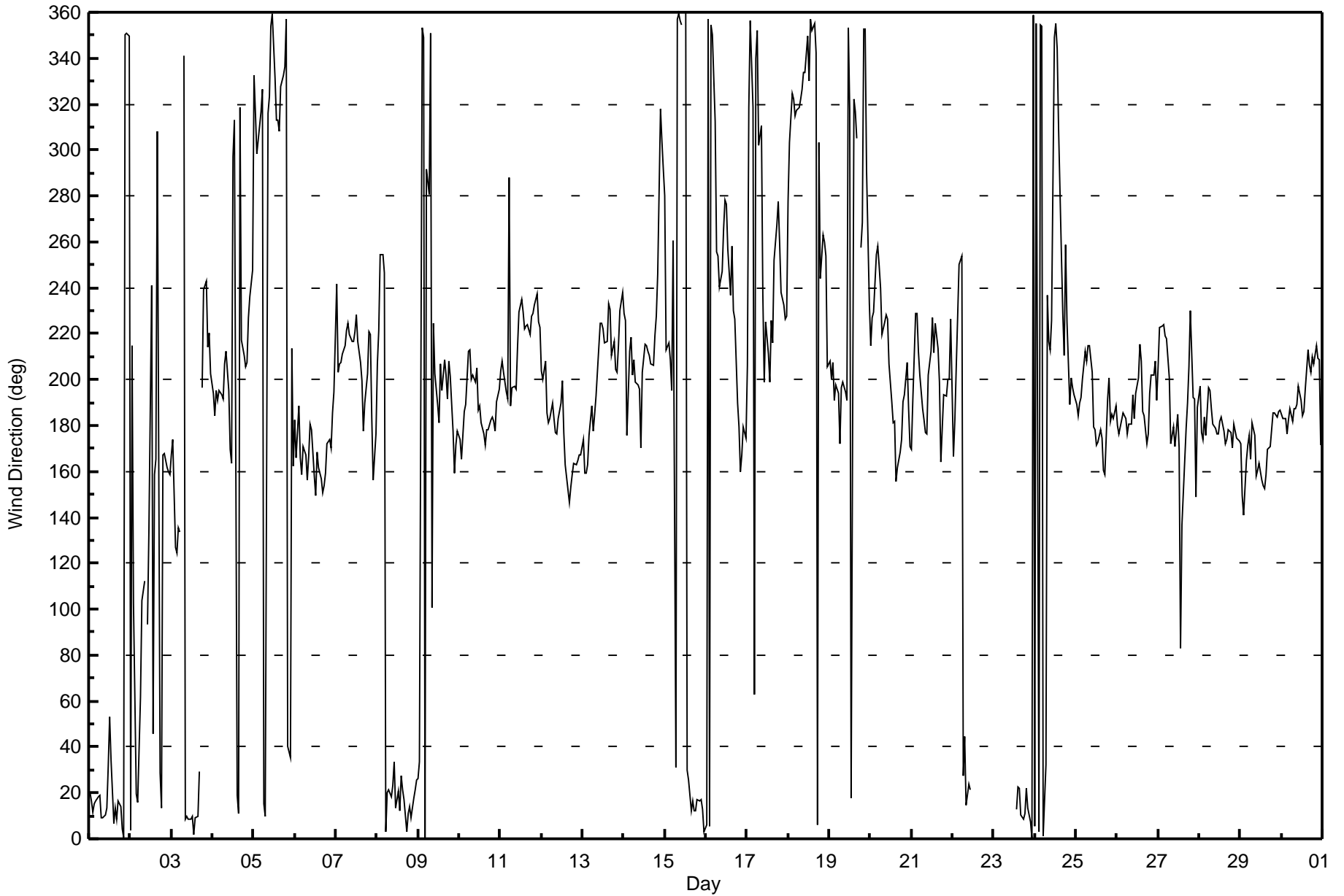
Wind Direction (WD) - deg
CNRL Horizon - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 93 deg on Nov 2 14:00	Hours of Data: 689
Minimum Value: 6 deg on Nov 7 18:00	Hours of Missing Data: 31
Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 15 Median = 18 Q ₃ = 21 P ₉₀ = 32 P ₉₉ = 74	Hours of Calibration: 0
	Percent Operational Time: 95.7

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	19	18	18	18	17	18	17	18	17	18	19	21	22	20	19	20	19	17	18	18	20	18	17	32		
2-Nov	60	49	76	21	19	17	35	22	20	AF	51	57	86	93	34	72	13	24	45	48	16	16	17	93		
3-Nov	17	16	26	36	51	22	AF	14	18	19	19	19	21	18	20	19	21	AF	23	21	20	14	16	15	51	
4-Nov	15	12	14	14	13	14	14	12	19	26	33	48	34	19	21	30	26	22	17	12	14	15	14	40	48	
5-Nov	35	17	15	15	15	21	21	18	24	35	28	25	30	16	20	21	16	16	15	26	17	84	13	20	84	
6-Nov	12	10	14	11	21	11	14	17	19	16	16	21	18	16	17	17	16	16	22	26	15	15	16	17	26	
7-Nov	26	13	14	14	18	18	18	16	16	15	17	19	21	28	20	15	9	6	9	13	14	62	24	21	62	
8-Nov	44	17	16	53	34	18	28	15	18	19	18	20	23	20	22	21	19	19	16	16	18	19	16	19	53	
9-Nov	19	25	19	26	31	33	13	85	58	83	21	24	21	23	21	21	17	15	19	29	21	23	18	16	85	
10-Nov	15	15	14	11	12	15	12	14	14	16	20	18	19	16	15	15	14	15	13	13	14	14	17	13	20	
11-Nov	17	15	16	13	12	53	13	16	17	20	21	21	23	22	21	20	17	16	16	17	18	20	19	19	53	
12-Nov	19	13	14	31	12	10	12	10	13	16	16	19	21	17	17	14	15	16	15	16	15	15	15	16	31	
13-Nov	15	16	14	15	11	14	12	15	16	22	21	26	22	21	23	24	20	17	16	22	14	17	19	17	26	
14-Nov	15	42	30	18	16	20	19	16	16	20	16	26	21	21	21	16	14	9	12	10	71	28	17	11	71	
15-Nov	55	17	21	18	29	40	71	15	14	18	18	M	17	24	23	18	18	19	19	19	18	18	18	18	71	
16-Nov	18	20	19	18	19	29	15	19	18	20	21	21	24	20	18	22	22	33	26	14	9	16	7	29	33	
17-Nov	58	42	52	43	71	48	38	59	25	36	21	24	21	22	29	18	22	21	19	22	20	24	21	16	71	
18-Nov	29	17	16	23	15	15	14	15	16	19	17	20	17	23	20	21	16	15	37	20	17	19	24	11	37	
19-Nov	8	12	14	17	14	12	17	12	26	14	44	88	36	31	28	17	33	AF	24	46	46	23	26	30	88	
20-Nov	27	14	16	16	20	20	19	15	13	19	23	26	19	17	16	14	14	14	13	16	17	22	19	18	27	
21-Nov	18	24	21	21	21	16	14	17	18	19	21	29	34	19	20	18	18	9	10	14	16	14	20	18	34	
22-Nov	27	13	18	15	22	20	75	43	19	24	20	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	75	
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	22	18	17	15	15	18	19	17	17	21	21	22	
24-Nov	17	15	16	19	20	21	73	16	13	15	22	39	23	46	22	24	47	18	25	64	12	13	11	13	73	
25-Nov	13	12	14	16	17	23	14	13	13	26	23	22	17	18	15	10	16	32	23	17	11	12	11	13	32	
26-Nov	14	12	12	13	13	13	14	14	14	14	17	16	18	19	21	18	16	16	23	13	15	15	16	16	22	23
27-Nov	22	22	17	15	14	13	25	36	30	25	36	25	26	32	23	35	14	15	14	25	35	38	15	19	38	
28-Nov	16	33	27	24	14	15	14	13	12	13	14	14	14	15	14	10	11	13	10	11	11	11	11	10	33	
29-Nov	12	29	18	16	22	16	18	17	12	12	15	17	17	18	14	11	11	11	10	12	12	12	13	15	29	
30-Nov	13	14	13	11	13	13	13	14	14	16	17	16	13	13	16	16	14	15	14	13	14	31	25	14	31	

60	49	76	53	71	53	75	85	58	83	51	88	86	93	34	72	47	33	45	64	71	84	26	40	
Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 23, 2015	Last Calibration	October 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	15:38
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	845	848
Calculated slope	0.994665	1.002128	Chamber temp	45.0	45.2
Calculated intercept	0.716876	-0.023089	Pressure	710.6	713.0
Analyzer Background	18.1	18.0	Flow	0.430	0.433
Analyzer Coefficient	0.982	0.973	Intensity	91	91
Analyzer make	Thermo 43i		Analyzer serial #	710321322	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	81.5	815.0	819.1	0.995
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	81.5	815.0	813.5	1.002
second point	5000	40.6	406.0	404.6	1.003
third point	5000	20.2	202.0	201.8	1.001
as left zero	5000	0.0	0.0	0.7	----
as left span	5000	81.5	815.0	812.5	1.003
Average Correction Factor					1.002

Corrected As found 819.1 Previous response 818.7 % change -0.1%

Notes:

Inlet filter replaced after as founds. Adjusted span. As left zero began at 14:55 MST.

Calibration Performed By:

Asad Hidayat



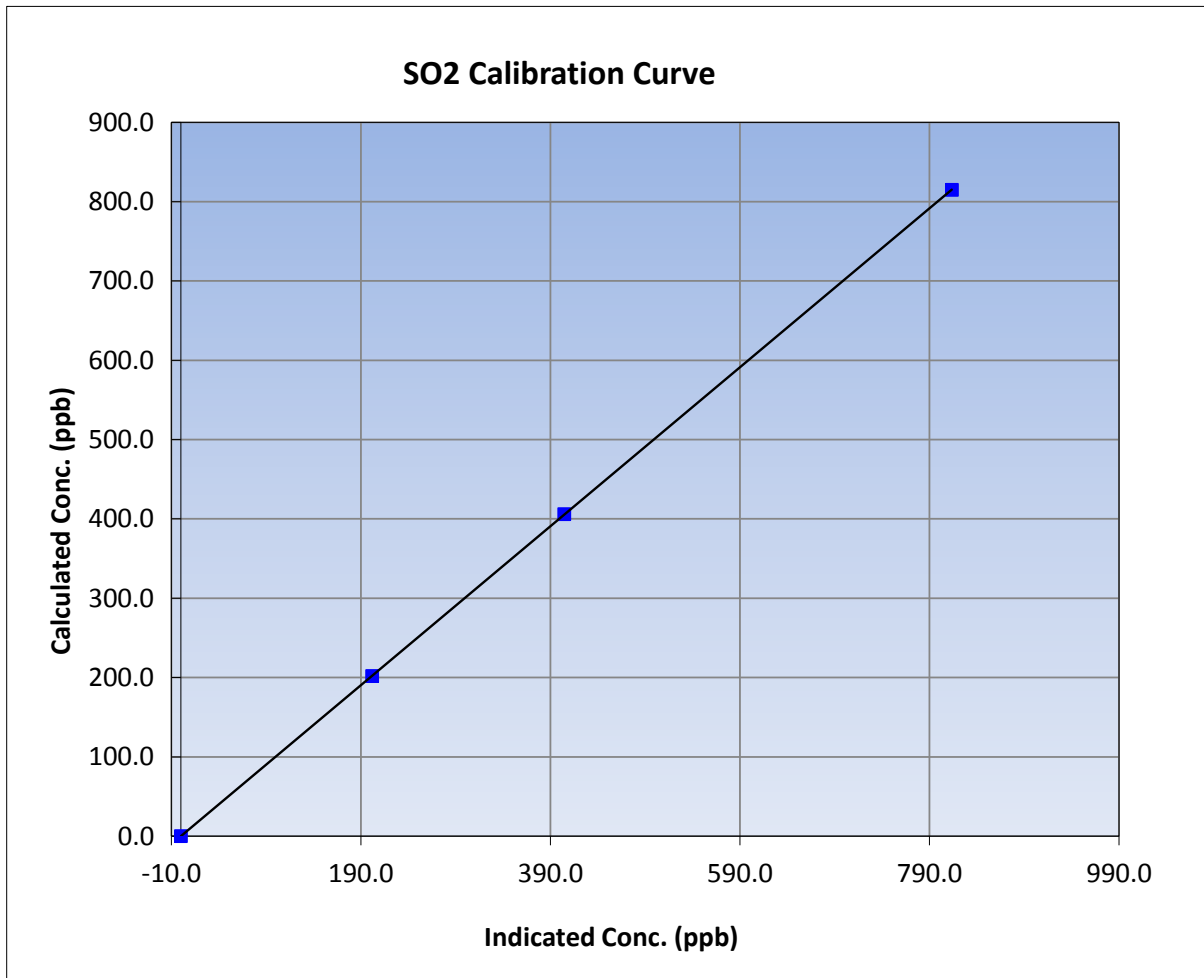
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 23, 2015	Previous Calibration	October 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:45	End Time (MST)	15:38
Analyzer make	Thermo 43i	Analyzer serial #	710321322

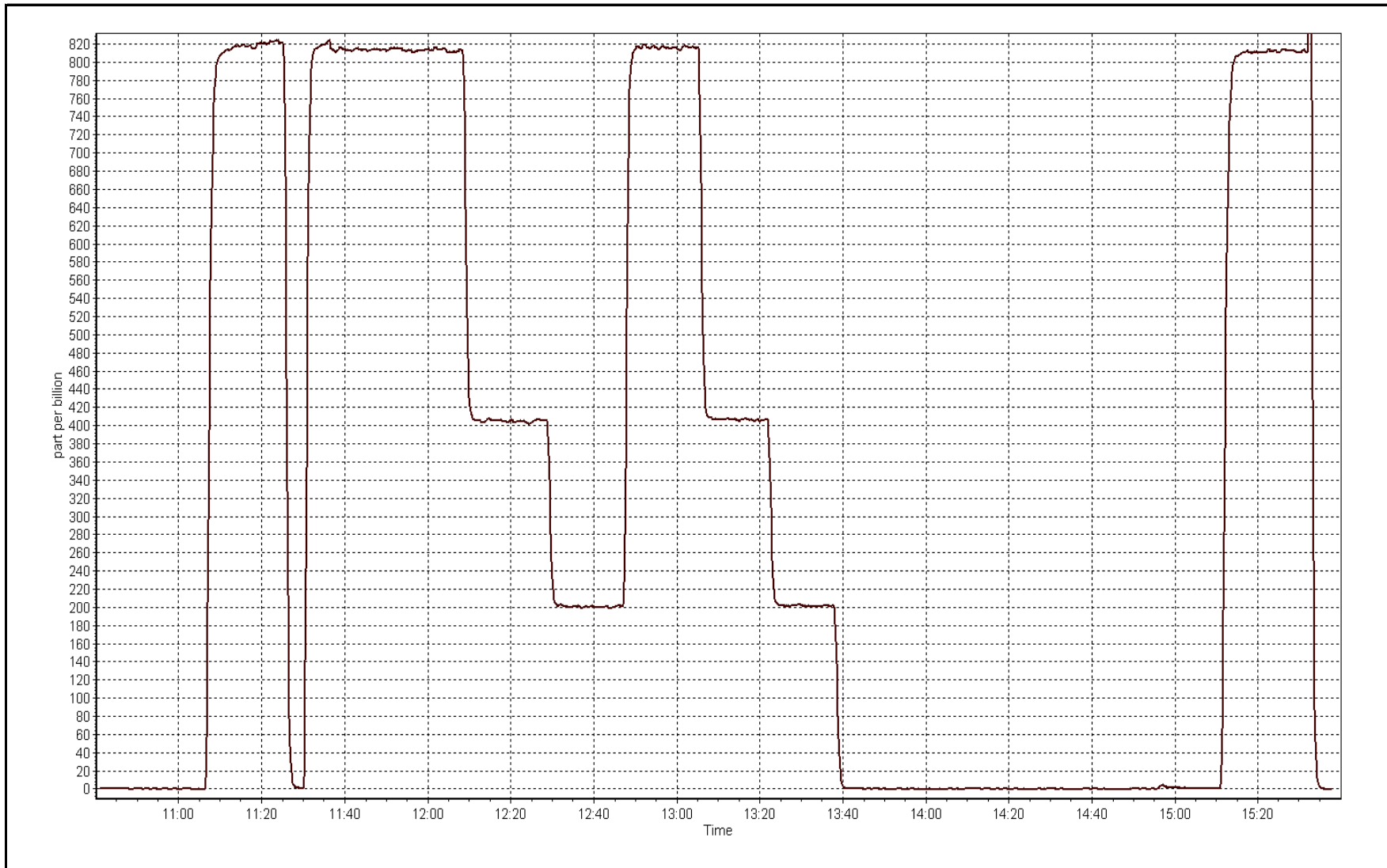
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999999
815.0	813.5	1.0018		
406.0	404.6	1.0034	Slope	1.002128
202.0	201.8	1.0011		
			Intercept	-0.023089



SO2 Calibration Plot

Date: November 23, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	November 12, 2015	Last Calibration	October 13, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	13:02	End Time (MST)	15:36
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	948	974
Calculated slope	0.989041	0.990713	Chamber temp	45	45
Calculated intercept	-0.046372	0.068062	Pressure	698.4	688.7
Analyzer Background	1.38	1.34	Flow	0.436	0.431
Analyzer Coefficient	1.023	0.989	Intensity	91	90
			Converter temp.	809	809
Analyzer make/model	Thermo 43i TLE		Analyzer serial #	1150840012	
Converter make/model	CDN-101		Converter serial #	363	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	41.5	79.7	82.7	0.963
SO2 scrubber check	5000	19.8	198.0	0.3	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	41.5	79.7	80.4	0.992
second point	5000	20.7	39.7	40.1	0.991
third point	5000	10.3	19.8	19.8	0.999
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	41.5	79.7	80.3	0.992
Average Correction Factor					0.994

Corrected As found	82.8	Previous response	80.6	% change	-2.7%
--------------------	------	-------------------	------	----------	-------

Notes:

Scrubber check and inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



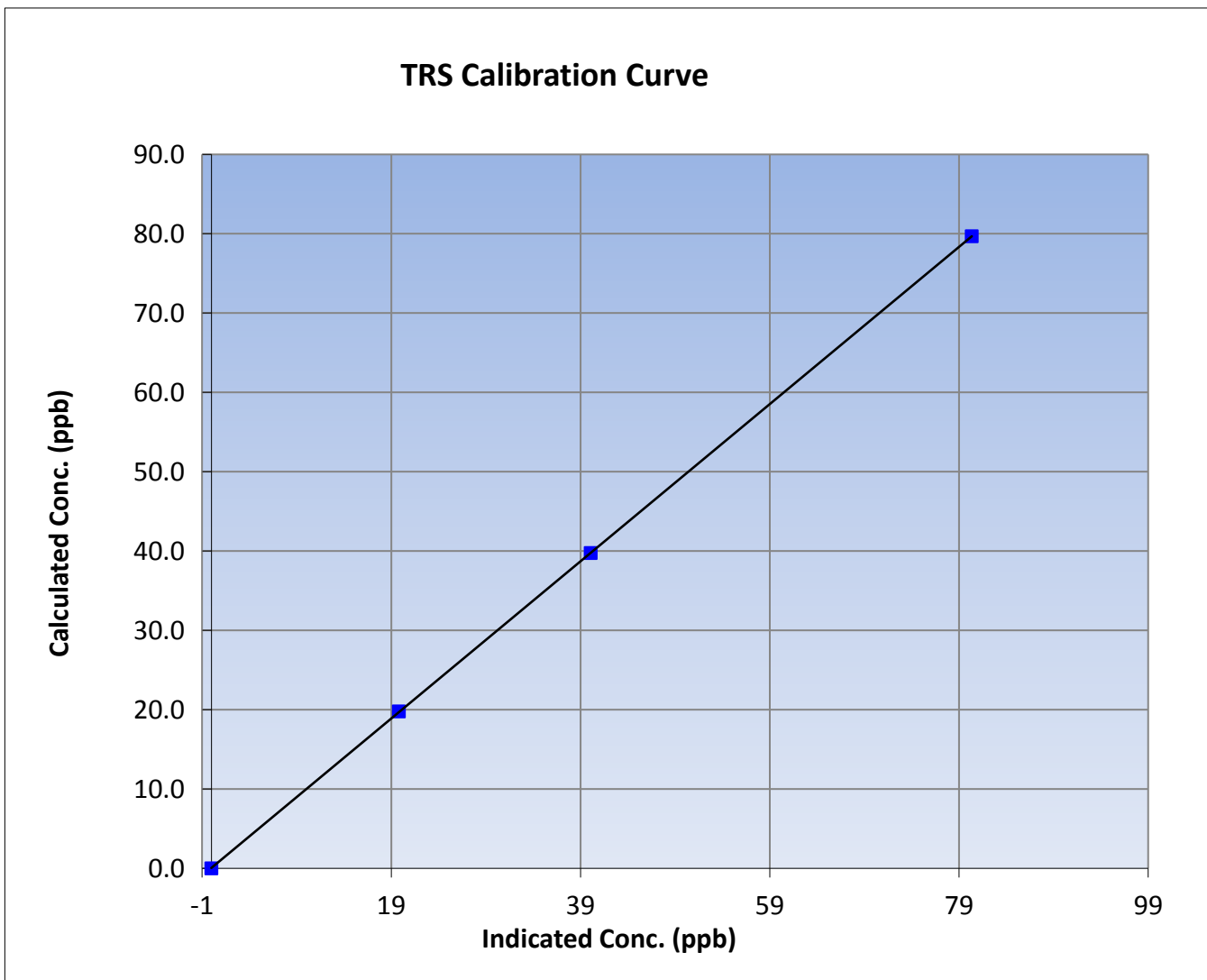
Wood Buffalo Environmental Association TRS Calibration Report

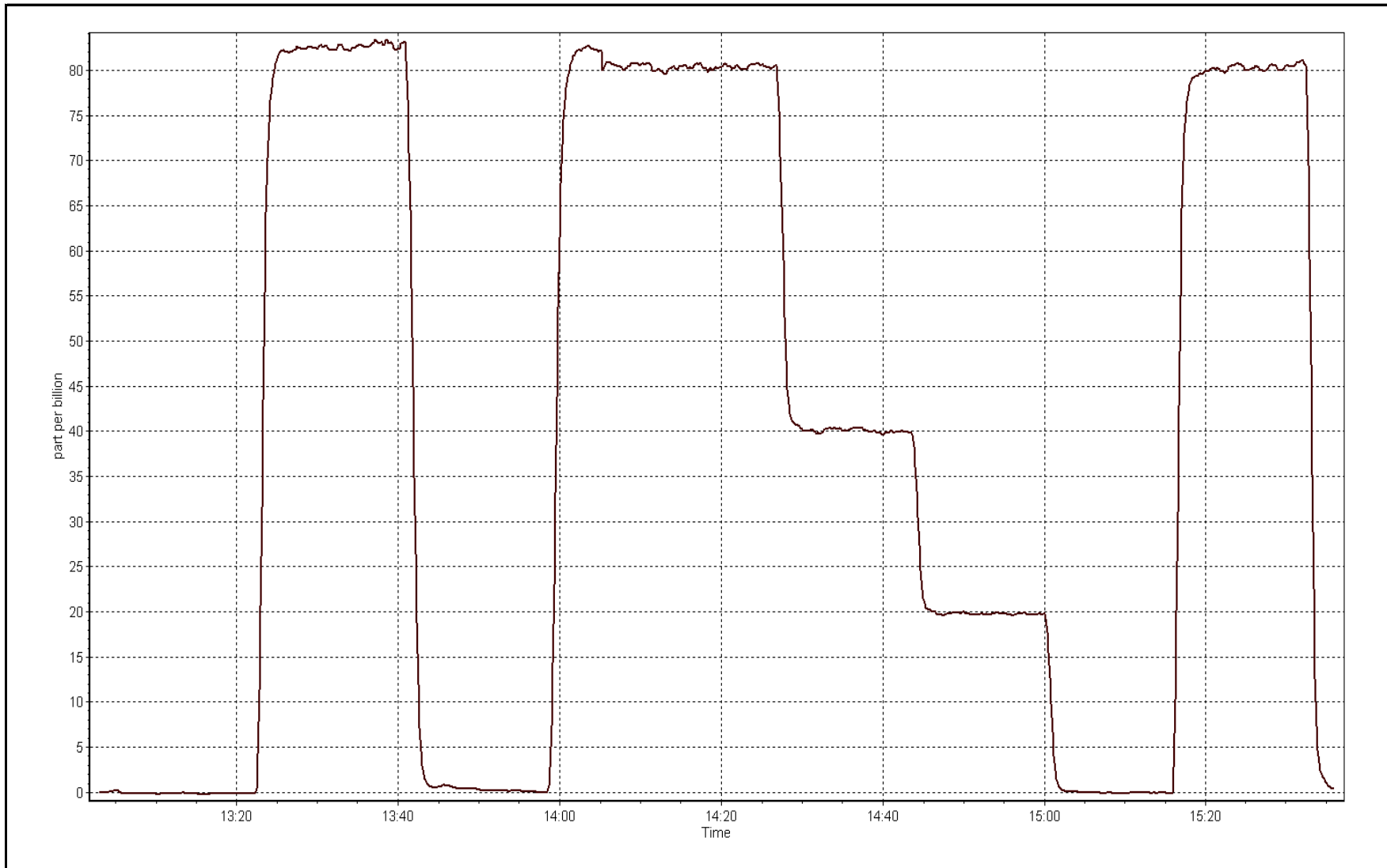
Station Information

Calibration Date	November 12, 2015	Previous Calibration	October 13, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	13:02	End Time (MST)	15:36
Analyzer make	Thermo 43i TLE	Analyzer serial #	1150840012

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
79.7	80.4	0.9915		
39.7	40.1	0.9914	Slope	0.990713
19.8	19.8	0.9988		
			Intercept	0.068062







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-23-15	Last Calibration	October-14-15
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	15:36
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	8.8	8.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	38.0
Calculated slope	1.000136	0.997840	Fuel Pressure	26.3	26.3
Calculated intercept	-0.060897	0.031180	Analyzer Coeff	3.0	3.1
			Analyzer BKG	0.000	0.000

Analyzer make Thermo 51i-LT Analyzer serial # 1327059295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	81.5	17.06	16.72	1.020
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	81.5	17.06	17.09	0.998
second point	5000	40.6	8.50	8.45	1.006
third point	5000	20.2	4.23	4.19	1.009
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	81.5	17.06	17.15	0.995
Average Correction Factor					1.005

Corrected As found 16.72 Previous response 17.12 % change 2.4%

Notes:

Inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



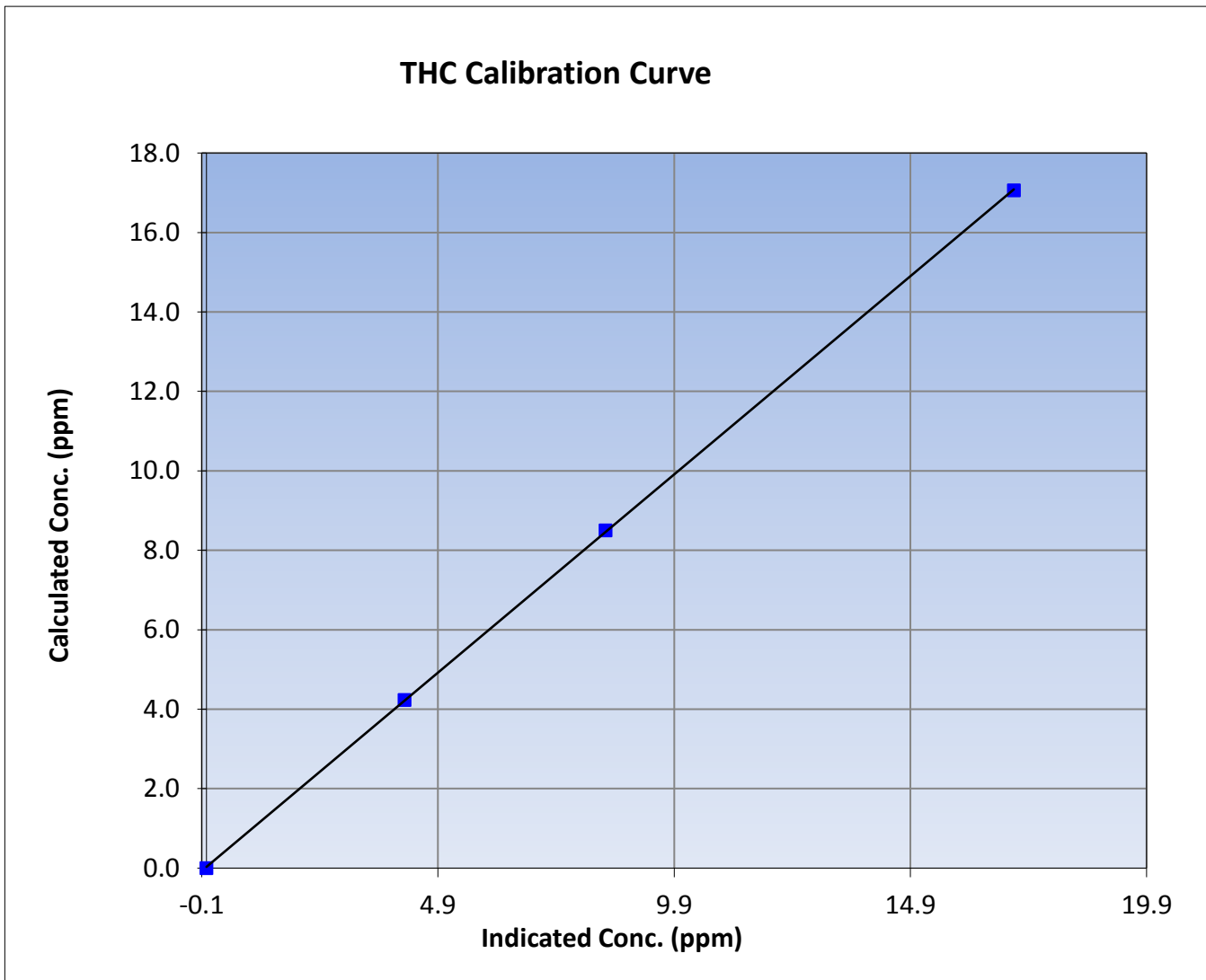
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November 23, 2015	Previous Calibration	October 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:45	End Time (MST)	15:36
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

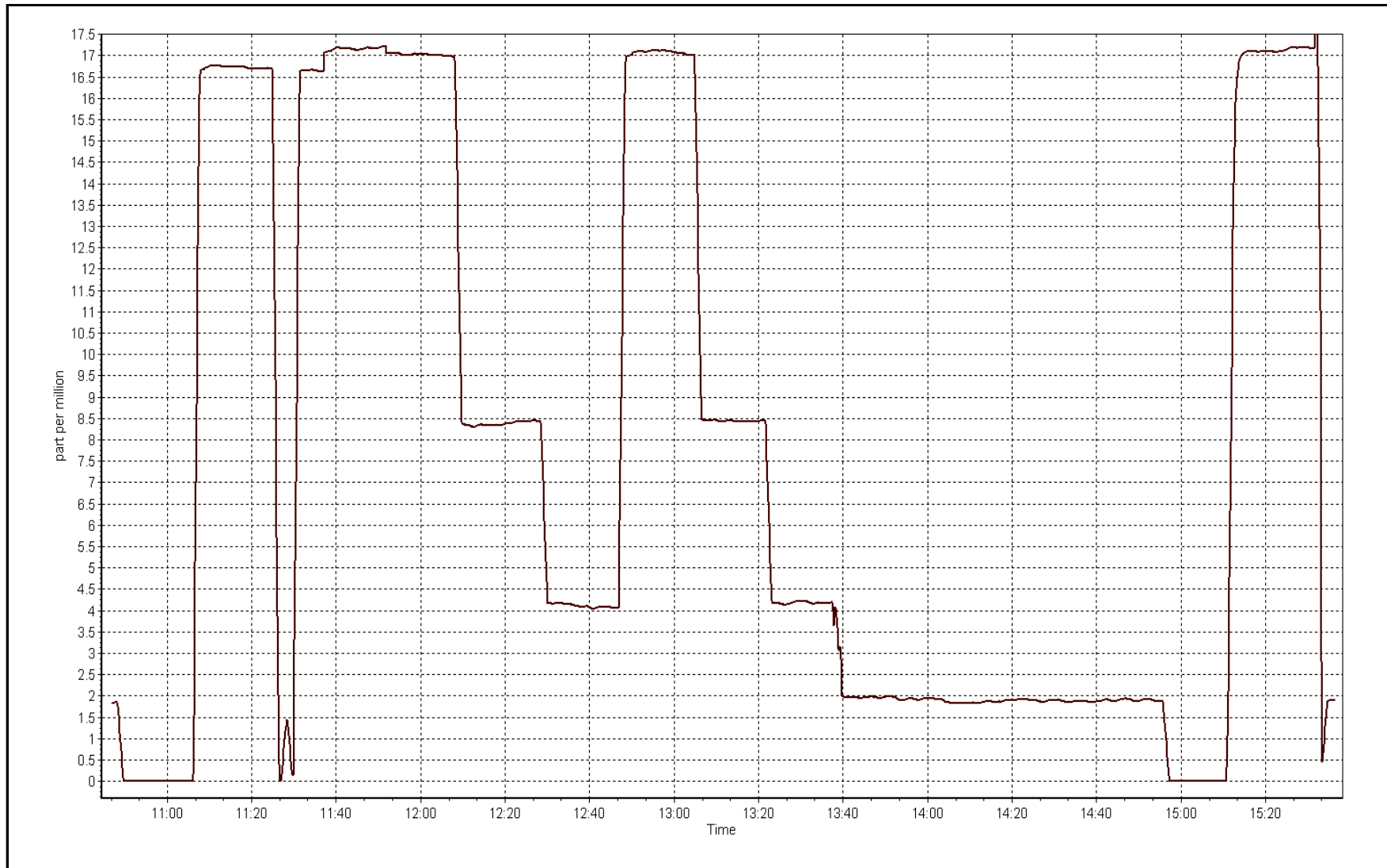
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999981
17.06	17.09	0.9984		
8.50	8.45	1.0059	Slope	0.997840
4.23	4.19	1.0093		
			Intercept	0.031180



THC Calibration Plot

Date: November 23, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 23, 2015	Previous Calibration	October 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	15:38
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
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.995672	0.996816	0.993240
	Data Offset	0.359170	0.343638	-0.839307
Current Calibration	Data Slope	0.994134	0.994970	0.994571
	Data Offset	0.436278	0.589546	-0.642586

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	710321429
---------------------	------------	-------------------	-----------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.761		0.747	
NOX coefficient	1.001		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.6		9.4	
NOX bkgrnd	9.8		9.6	
Chamber Temp	49.8	Deg C	50.2	Deg C
Moly Temp	324.5	Deg C	323.4	Deg C
PMT voltage	-784	V	-784.8	V
PMT Temp	-3	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160	mmHg	159.2	mmHg
R Cell Press Nox	160.2	mmHg	160.2	mmHg
NO sample flow	0.688	lpm	0.686	lpm
Nox sample Flow	0.687	lpm	0.688	lpm

Notes:

Inlet filter replaced after as founds. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 23, 2015

Station Number:

AMS 15

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.2	----	----
as found span	5000	81.5	797.1	797.1	0.0	821.2	820.1	1.1	0.9706	0.9720
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.2	----	----
high point	5000	81.5	797.1	797.1	0.0	801.1	800.5	0.7	0.9949	0.9957
second point	5000	40.6	397.1	397.1	0.0	399.6	398.9	0.7	0.9936	0.9954
third point	5000	20.2	197.6	197.6	0.0	197.8	197.2	0.6	0.9989	1.0017
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	5000	81.5	797.1	428.5	368.6	798.7	425.5	373.2	0.9980	1.0070
Average Correction Factor									0.9958	0.9976

Corrected As found
Previous Response

NO_x= 821.6
NO_x= 800.2

NO= 820.3
NO= 799.3

Percent Change

NO_x= -2.6%

NO= -2.6%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

81.50

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.2			N/A	
1st NO2 (300)	----	428.5	368.1	798.6	428.5	370.1	0.9821	1.0000	0.9946	100.5%
2nd NO2 (200)	----	546.1	250.5	799.1	546.1	252.9	0.9815	1.0000	0.9902	101.0%
3rd NO2 (100)	----	666.6	130.0	799.0	666.6	132.3	0.9816	1.0000	0.9821	101.8%
4th NO2 (0)	796.6	----	2.5	799.1	796.6	2.5	0.9815	1.0000	N/A	----
Average Correction Factor							0.9817	1.0000	0.9890	101.1%

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

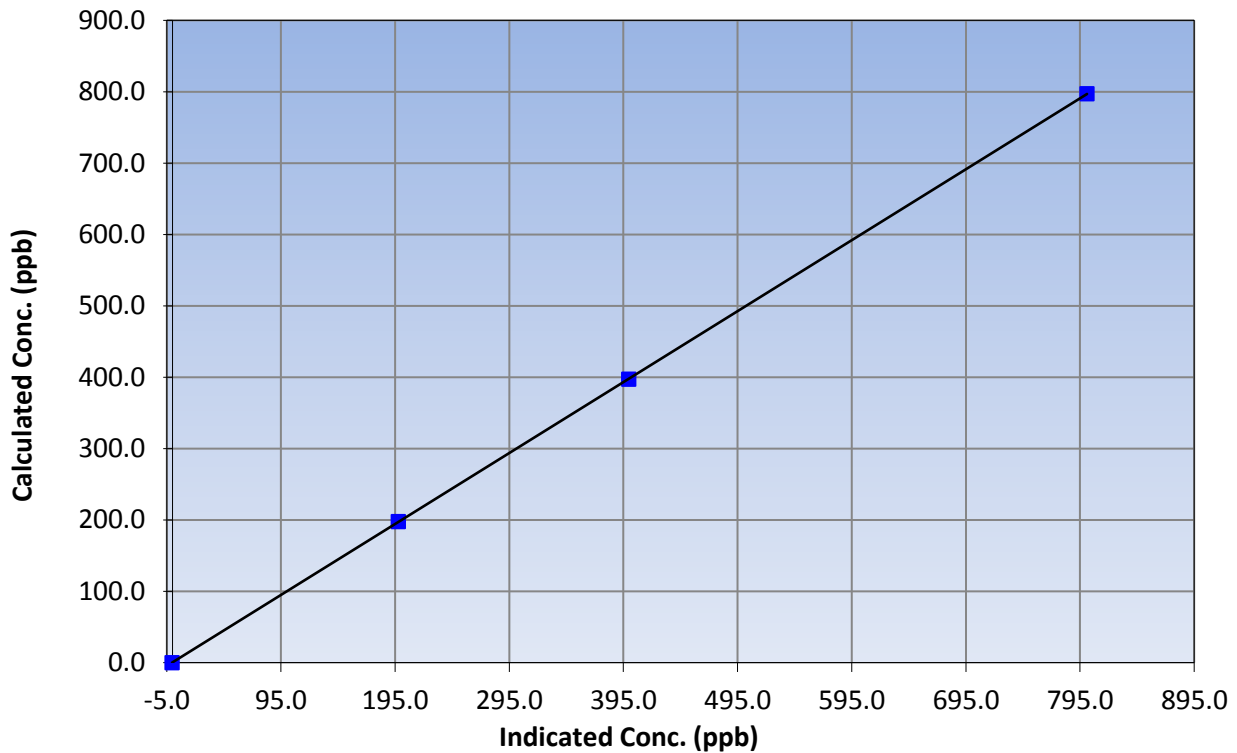
Station Information

Calibration Date	November 23, 2015	Previous Calibration	October 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:45	End Time (MST)	15:38
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	-0.4	----	Correlation Coefficient	0.999998
797.1	801.1	0.9949		
397.1	399.6	0.9936	Slope	0.994134
197.6	197.8	0.9989		
			Intercept	0.436278

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

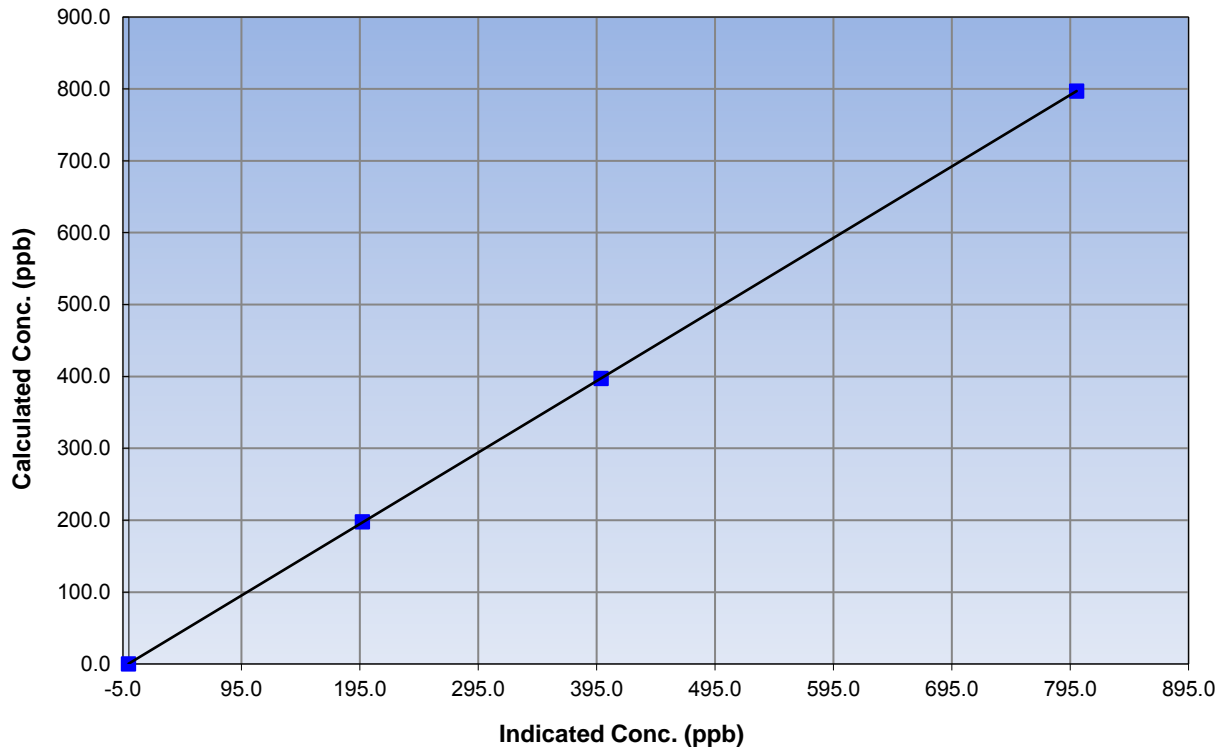
Station Information

Calibration Date	November 23, 2015	Previous Calibration	October 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:45	End Time (MST)	15:38
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	-0.3	N/A	Correlation Coefficient	0.999998
797.1	800.5	0.9957		
397.1	398.9	0.9954	Slope	0.994970
197.6	197.2	1.0017		
			Intercept	0.589546

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

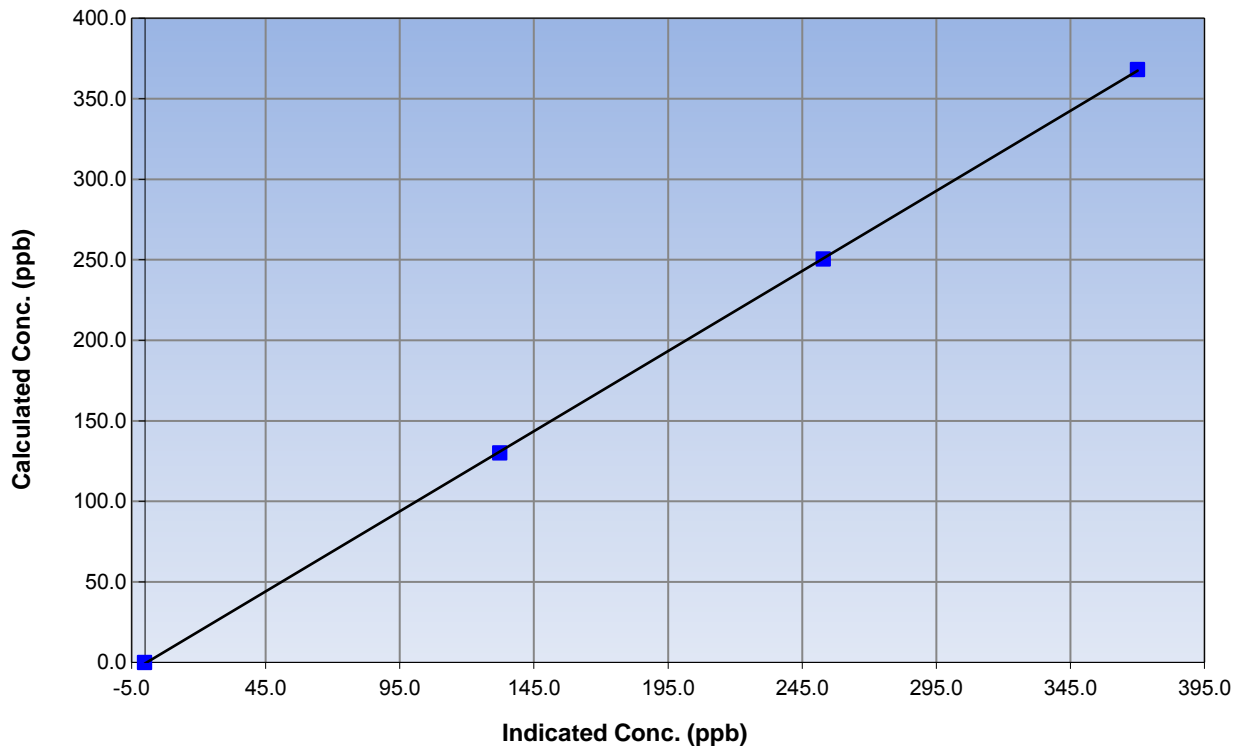
Station Information

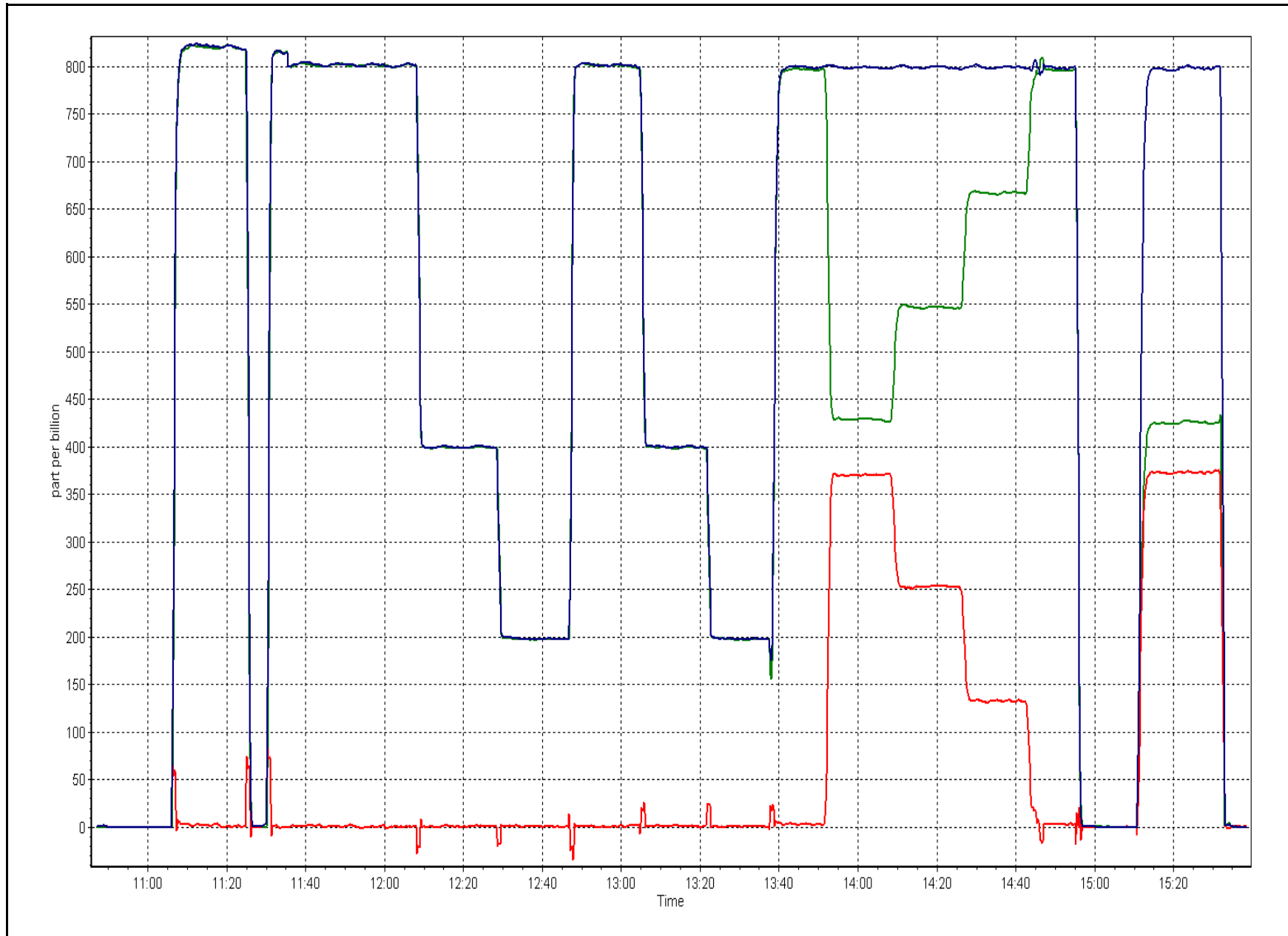
Calibration Date	November 23, 2015	Previous Calibration	October 14, 2015
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:45	End Time (MST)	15:38
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999969
368.1	370.1	0.9946		
250.5	252.9	0.9902	Slope	0.994571
130.0	132.3	0.9821		
			Intercept	-0.642586

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	November 23, 2015	Previous Calibration:	October 14, 2015
Station Name:	CNRL Horizon	Station Number:	AMS 15
Start Time (MST):	14:00	End Time (MST):	14:53
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	-7.0	-7.0	0.0	-7.0
T2	18.0	na	na	18.0
T3	19.0	na	na	19.0
T4	15.0	na	na	15.0
RH (%)	18.0	na	na	18.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	978	979.0	1.0	978

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	993	-7	993	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	164		164
Neph	0.1		0.1
C14	8.4		8.4
Indicated Concentration (ug/m3)	0.1	No	0.1
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	August 26, 2015	Previous Leak Check Date:	May 14, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.72		0.04
*Flow with adaptor (LPM):	16.68		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

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	23/11/2015
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	Good	NA
HEPA filter	Good	09/06/2014

NOTES:

No adjustments. Cleaned cyclone head.

Calibration Performed By: Asad Hidayat



This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 16
SHELL MUSKEG RIVER
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	35	35	100.00	12	0	5	0
THC (ppm) Average	685	35	35	100.00	6	-	2.8	-
NO2 (ppb) Average	685	35	35	100.00	38	0	20	-
NO (ppb) Average	685	35	35	100.00	155	-	29	-
NOX (ppb) Average	685	35	35	100.00	181	-	48	-
PM2.5 (ug/m3) Average	718	2	2	100.00	61.8	-	24.3	0
Temperature 2 m (C) Average	720	0	0	100.00	8	-	2.6	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	94	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.3	-	29.2	-
Wind Speed 10 m (km/h) Average	665	0	55	92.36	28	-	17	-
Wind Direction 10 m (deg) Average	665	0	55	92.36	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	1	2	-	0	0	0	0	1	4	12
THC (ppm) Average	685	2.37	0.3	-	1.9	2.1	2.2	2.3	2.5	2.7	6
NO2 (ppb) Average	685	10.2	8	-	0	2	4	8	14	21	38
NO (ppb) Average	685	5.7	13	-	0	0	0	1	5	15	155
NOX (ppb) Average	685	15.8	19	-	0	2	5	10	18	35	181
PM2.5 (ug/m3) Average	718	5.94	6.8	-	0.7	1.7	2.5	4.1	7.2	10.2	61.8
Temperature 2 m (C) Average	720	-4.72	5.5	-	-21.2	-13.1	-7.8	-3.7	-0.7	1.2	8
Relative Humidity (%) Average	720	78.8	13	-	39	60	70	82	89	94	98
Barometric Pressure (inHg) Average	720	28.76	0.3	-	28.1	28.4	28.6	28.8	28.9	29.1	29.3
Wind Speed 10 m (km/h) Average	665	10.3	5	-	0	4	7	10	14	17	28
Wind Direction 10 m (deg) Average	665	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	15 Nov 2015 08:00	15 Nov 2015 08:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Nov 2015 12:00	24 Nov 2015 16:00	53	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	24 Nov 2015 18:00	24 Nov 2015 18:00	1	Flat line in sensor output signal -sensor frozen

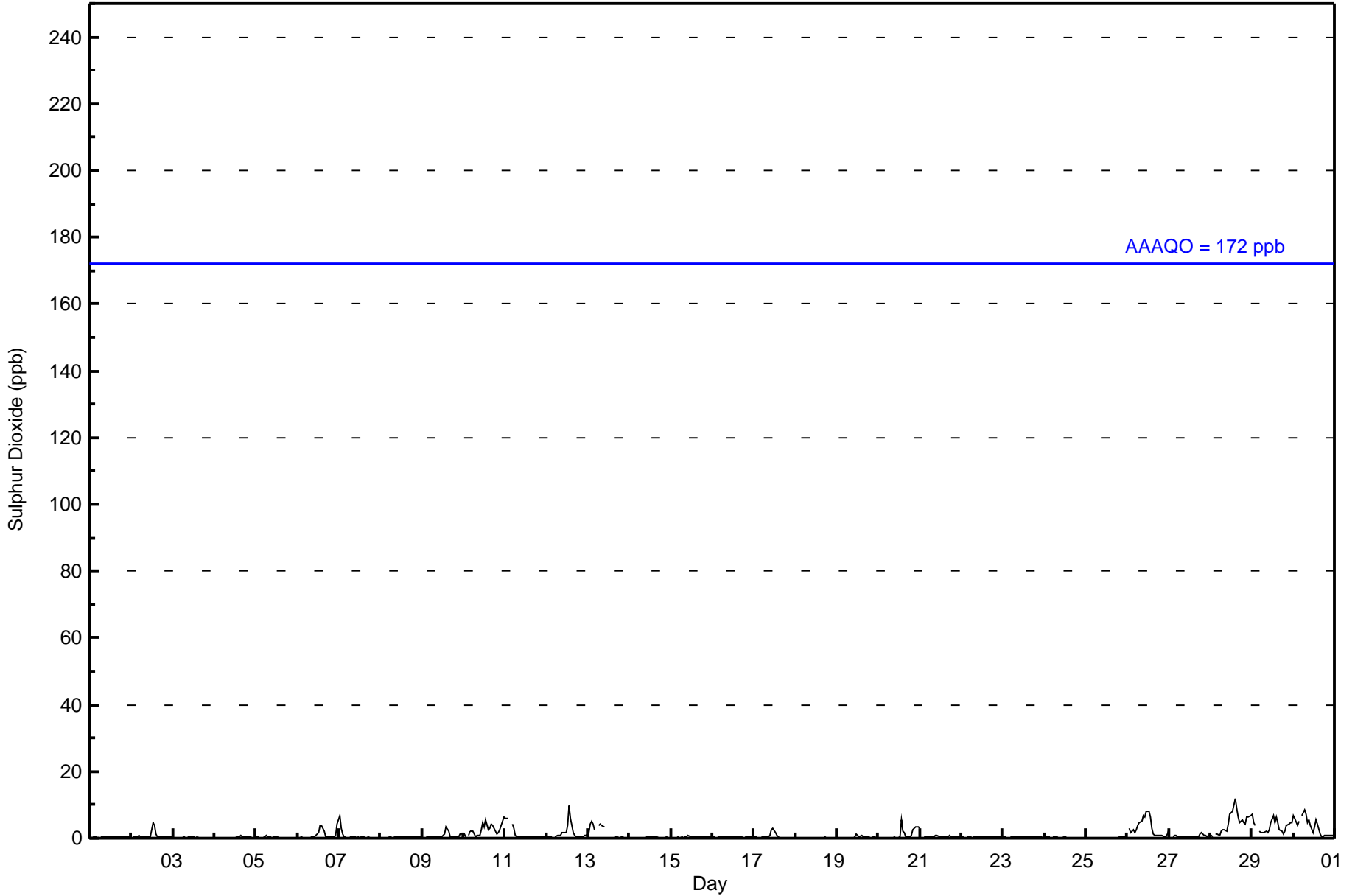


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 12 ppb on Nov 28 15:00	Maximum Daily Average: 4.6 ppb on Nov 28		Hours of Data:	685
Minimum Value: 0 ppb on Nov 4 00:00	Minimum Daily Average: 0.1 ppb on Nov 18		Hours of Missing Data:	35
Maximum Diurnal Average: 2.1 ppb at hour 14	Minimum Diurnal Average: 0.6 ppb at hour 20		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 = 4 P ₉₉ = 8		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Nov	Z	0	0	0	1	0	0	0	1	0	0	0	5	4	1	1	0	0	0	0	0	0	0	0	0.8	5
3-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1
5-Nov	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Nov	0	0	0	0	Z	0	0	0	0	0	0	1	2	4	4	2	0	0	0	0	0	0	1	4	0.9	4
7-Nov	7	3	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	7
8-Nov	Z	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
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	1	1	3	2	1	0	0	0	1	0	1	1	1	0.7	3
10-Nov	1	0	Z	1	2	2	1	1	1	1	2	5	3	6	2	3	4	4	2	1	2	3	4	6	2.5	6
11-Nov	6	6	6	Z	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	6
12-Nov	0	0	0	0	Z	0	1	1	1	2	2	2	4	10	6	2	1	1	0	0	1	0	1	1	1.6	10
13-Nov	2	4	5	4	2	Z	4	4	4	3	C	C	C	C	C	0	0	0	0	0	0	0	0	1.9	5	
14-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Nov	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1	1	0	0	0	0.4	1
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Nov	0	0	0	Z	0	0	0	0	0	1	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0.5	3
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0.3	1
20-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	6	2	2	0	0	1	1	2	3	3	4	1.1	6
21-Nov	3	Z	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0.6	3
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1
26-Nov	Z	3	2	3	2	3	4	5	5	7	6	8	8	7	3	1	1	1	1	1	1	1	1	1	3.2	8
27-Nov	3	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	0.7	3
28-Nov	1	1	Z	1	1	1	2	2	2	2	4	7	7	8	12	9	7	5	5	5	4	6	6	7	4.6	12
29-Nov	7	5	4	Z	2	2	2	2	2	2	3	5	7	5	6	5	2	2	1	2	4	4	5	5	3.6	7
30-Nov	7	6	4	5	Z	7	9	7	4	6	4	2	4	6	4	1	1	0	1	1	1	1	1	1	3.5	9

1.6	1.2	1.1	0.8	0.8	0.9	0.9	0.9	0.9	0.8	1.0	1.0	1.4	1.6	2.1	1.7	1.1	0.8	0.7	0.6	0.6	0.7	0.8	0.9	1.2	Diurnal Average	
7	6	6	5	4	7	9	7	5	7	6	8	8	10	12	9	7	5	5	5	5	4	6	6	7	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	684	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	7	39	28	9	4	2	5	54	211	97	72	30	16	12	16	29	631
11 - 20	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	7	39	28	9	4	2	5	54	212	97	72	30	16	12	16	29	632

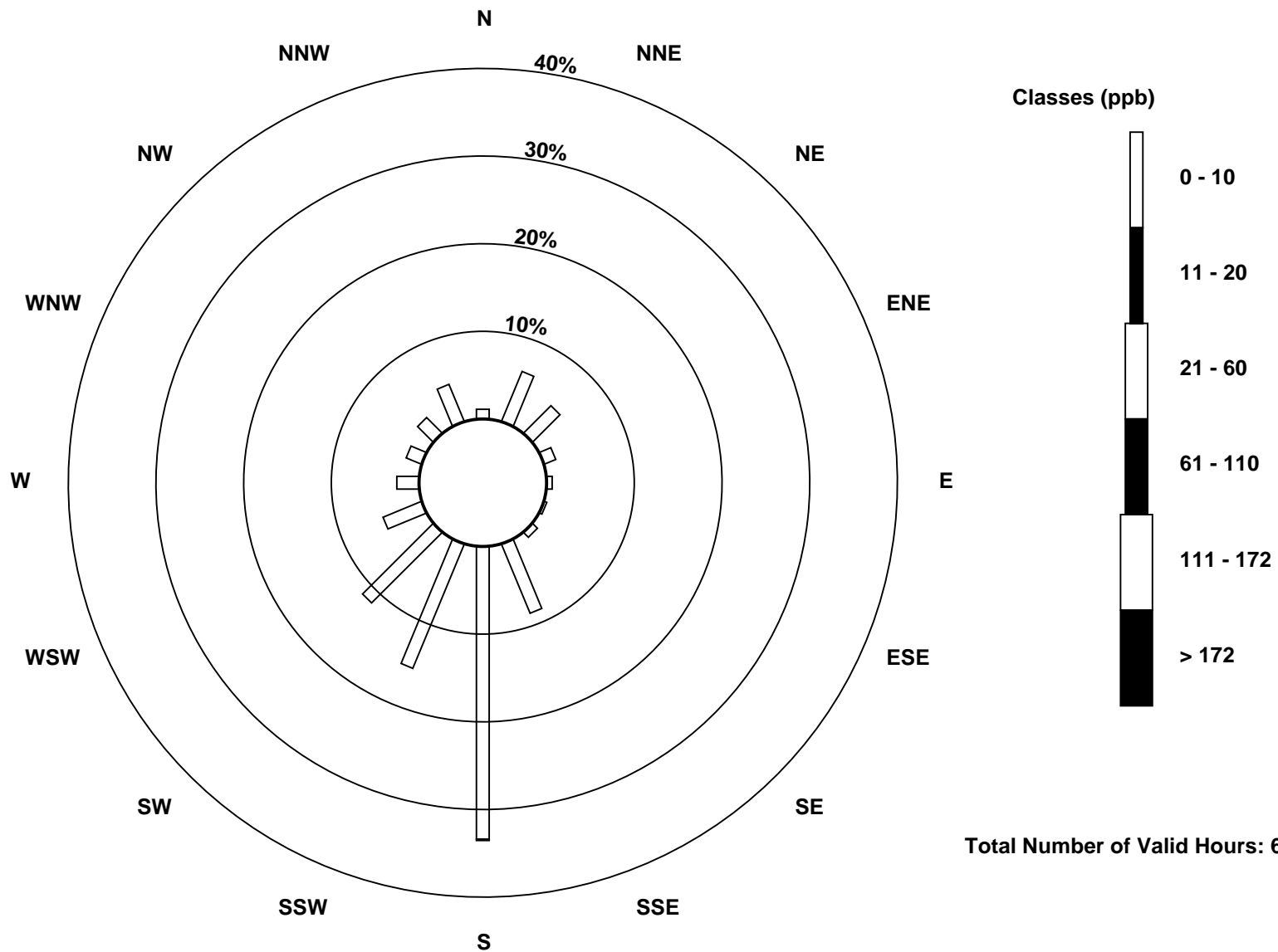
Total Number of Valid Hours: 632

Total Number of Hours: 720

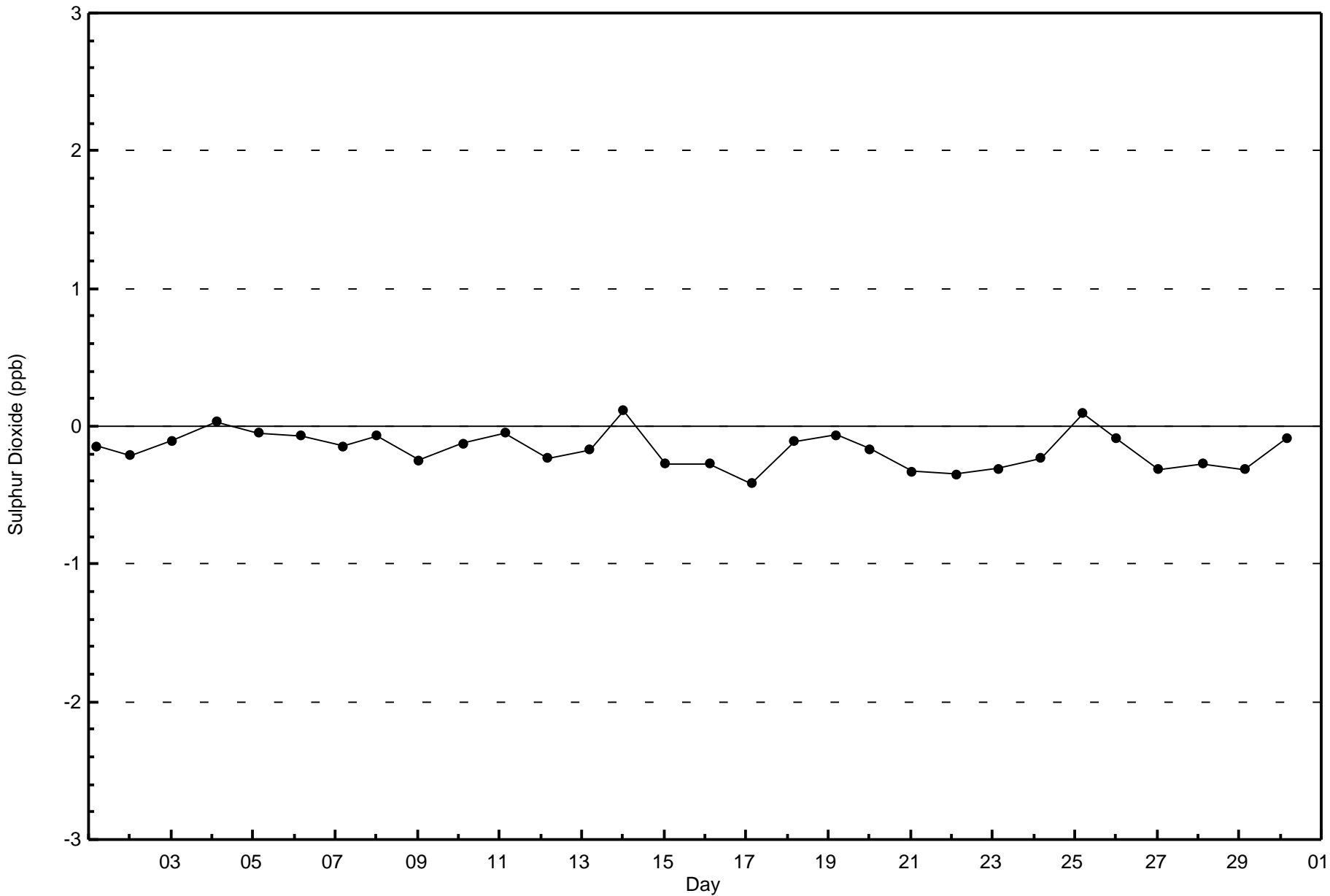


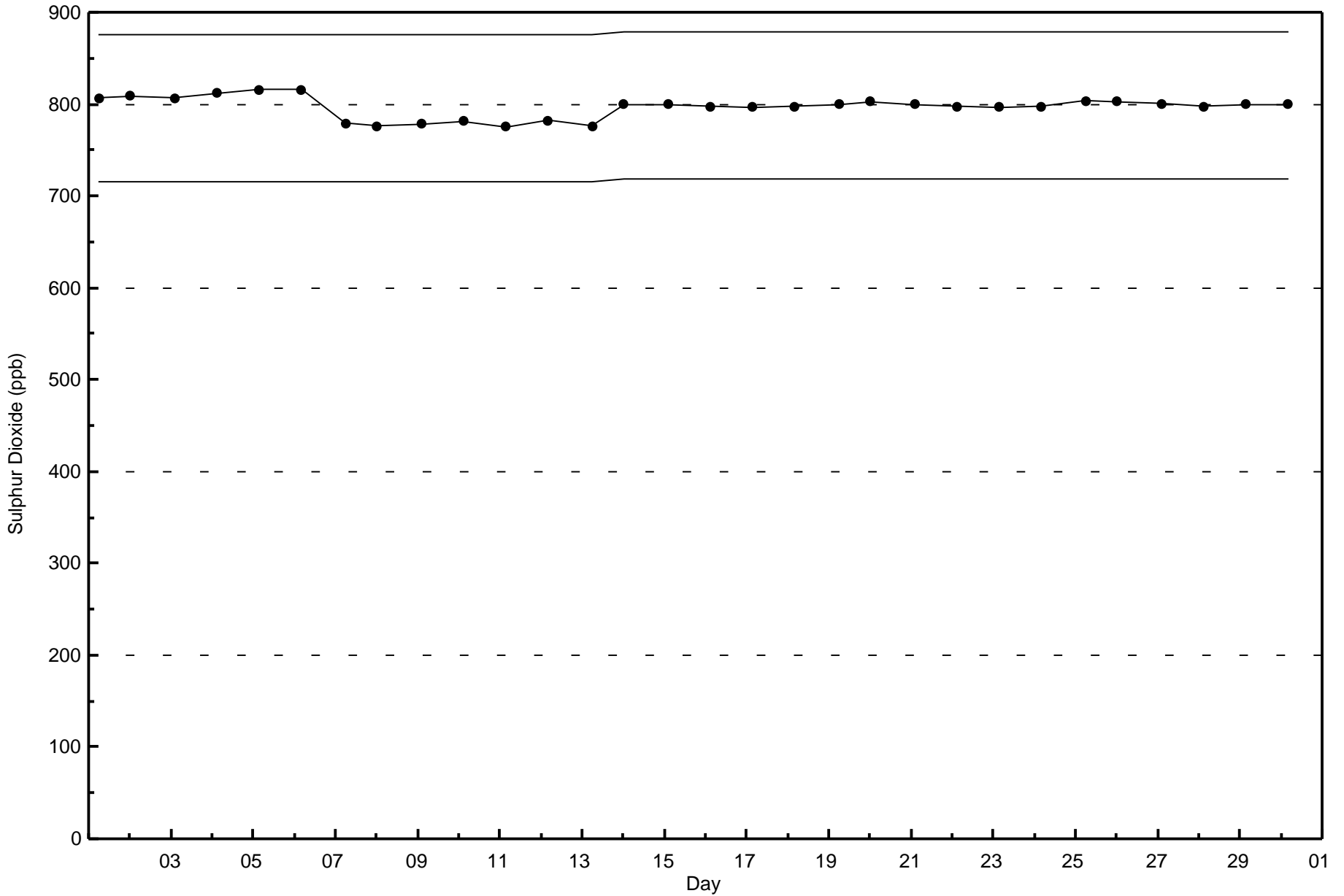
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 632





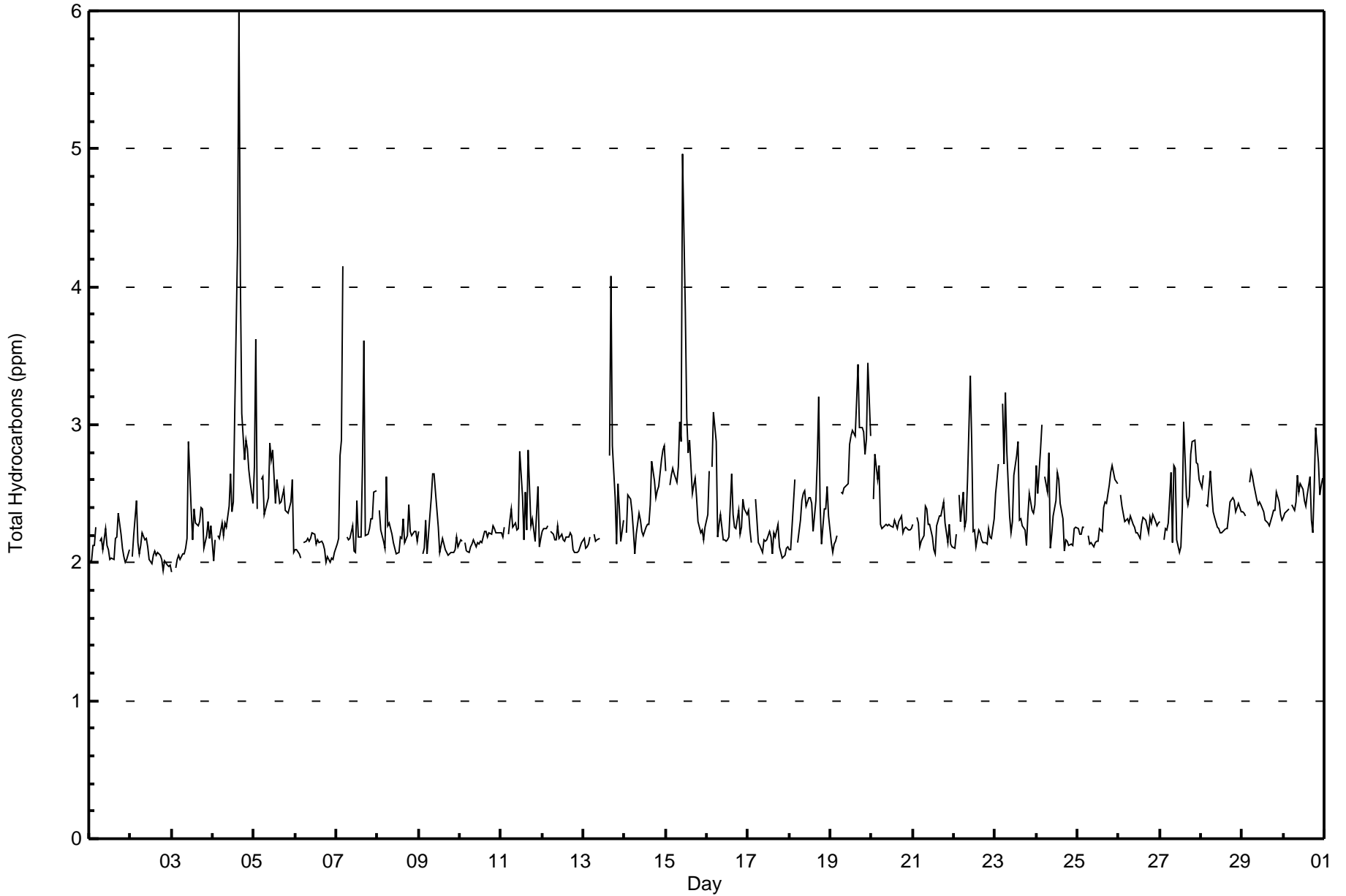


Maximum Value: 6.0 ppm on Nov 4 16:00	Maximum Daily Average: 2.8 ppm on Nov 4	Hours in Service: 720
Minimum Value: 1.9 ppm on Nov 3 01:00	Minimum Daily Average: 2.1 ppm on Nov 2	Hours of Data: 685
Maximum Diurnal Average: 2.5 ppm at hour 17	Minimum Diurnal Average: 2.3 ppm at hour 1	Hours of Missing Data: 35
Monthly Average: 2.37 ppm	Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.3 Q ₃ = 2.5 P ₉₀ = 2.7 P ₉₉ = 3.7	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-Nov	2.0	2.0	2.1	2.1	2.3	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.2	2.2	2.4	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.4	
2-Nov	Z	2.0	2.2	2.5	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.5	
3-Nov	1.9	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.9	2.4	2.2	2.4	2.3	2.3	2.3	2.4	2.4	2.1	2.2	2.3	2.2	2.3	2.2	2.9	
4-Nov	2.0	2.2	Z	2.2	2.2	2.3	2.2	2.3	2.3	2.4	2.6	2.4	2.4	3.1	4.3	6.0	4.1	3.1	2.7	2.9	2.8	2.7	2.6	2.4	2.8	6.0	
5-Nov	2.7	3.6	2.4	Z	2.6	2.6	2.3	2.4	2.5	2.9	2.7	2.8	2.4	2.6	2.5	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.6	2.1	2.6	3.6	
6-Nov	2.1	2.1	2.1	2.0	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	
7-Nov	2.1	2.2	2.8	2.9	4.1	Z	2.2	2.2	2.2	2.3	2.1	2.1	2.5	2.2	2.2	2.7	3.6	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.5	4.1	
8-Nov	Z	2.4	2.2	2.2	2.1	2.6	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.2	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.6	
9-Nov	2.2	Z	2.1	2.1	2.3	2.1	2.3	2.5	2.6	2.6	2.5	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.6	
10-Nov	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	
11-Nov	2.2	2.2	2.3	Z	2.2	2.3	2.4	2.3	2.3	2.2	2.3	2.8	2.5	2.2	2.5	2.2	2.8	2.3	2.3	2.2	2.2	2.6	2.1	2.2	2.3	2.8	
12-Nov	2.2	2.2	2.2	2.3	Z	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	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	
13-Nov	2.2	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.2	2.2	C	C	C	C	C	2.8	4.1	2.9	2.5	2.1	2.6	2.4	2.2	2.3	4.1		
14-Nov	Z	2.2	2.5	2.5	2.4	2.2	2.1	2.2	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.7	2.6	2.5	2.5	2.6	2.7	2.8	2.8	2.4	2.8	
15-Nov	2.7	Z	2.6	2.6	2.7	2.6	2.6	2.7	3.0	2.9	5.0	3.8	3.1	2.8	2.9	2.5	2.6	2.6	2.5	2.3	2.2	2.2	2.2	2.3	2.7	5.0	
16-Nov	2.3	2.7	Z	2.7	3.1	2.9	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.6	2.4	2.3	2.3	2.4	2.2	2.3	2.5	2.4	2.4	2.4	3.1	
17-Nov	2.4	2.2	2.1	Z	2.5	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.5	
18-Nov	2.1	2.1	2.4	2.6	Z	2.1	2.3	2.5	2.5	2.5	2.4	2.5	2.5	2.4	2.2	2.4	2.7	3.2	2.4	2.1	2.4	2.4	2.5	2.3	2.4	3.2	
19-Nov	2.1	2.1	2.1	2.2	2.2	Z	2.5	2.5	2.5	2.6	2.6	2.9	2.9	3.0	2.9	3.2	3.4	3.0	3.0	3.0	2.8	2.9	3.4	2.9	2.7	3.4	
20-Nov	Z	2.5	2.8	2.6	2.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.8	
21-Nov	2.3	Z	2.3	2.3	2.1	2.2	2.2	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.3	2.3	2.3	2.4	2.4	2.3	2.1	2.3	2.1	2.1	2.3	2.4	
22-Nov	2.1	2.2	Z	2.5	2.3	2.5	2.3	2.3	2.6	3.4	2.9	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	3.4	
23-Nov	2.5	2.6	2.7	Z	3.2	2.7	3.2	2.8	2.3	2.2	2.3	2.6	2.8	2.9	2.3	2.3	2.3	2.2	2.1	2.3	2.5	2.4	2.4	2.4	2.5	3.2	
24-Nov	2.7	2.5	2.8	3.0	Z	2.6	2.5	2.8	2.1	2.2	2.3	2.4	2.7	2.6	2.4	2.3	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.3	2.4	3.0	
25-Nov	2.2	2.2	2.2	2.3	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.6	2.7	2.7	2.7	2.6	2.6	2.3	2.7	
26-Nov	Z	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.5	
27-Nov	2.3	Z	2.2	2.2	2.2	2.3	2.6	2.1	2.7	2.7	2.2	2.1	2.1	2.4	3.0	2.5	2.4	2.5	2.8	2.9	2.9	2.7	2.7	2.6	2.5	3.0	
28-Nov	2.5	2.6	Z	2.4	2.4	2.7	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.7	
29-Nov	2.4	2.4	2.3	Z	2.6	2.7	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.3	2.4	2.7
30-Nov	2.3	2.4	2.4	2.4	Z	2.4	2.4	2.4	2.6	2.5	2.6	2.5	2.4	2.4	2.5	2.6	2.3	2.2	2.5	3.0	2.7	2.5	2.6	2.6	2.5	3.0	

2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	Diurnal Average
2.7	3.6	2.8	3.0	4.1	2.9	3.2	2.8	3.0	3.4	5.0	3.8	3.1	3.1	4.3	6.0	4.1	3.2	3.0	3.0	2.9	2.9	3.4	2.9	2.9	2.9	2.9	Diurnal Maximum

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	30	4.38	4.38
2.1 - 3.0	635	92.70	97.08
3.1 - 10.0	20	2.92	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	5	4	0	0	0	9	10	1	0	1	0	0	0	0	30
2.1 - 3.0	5	39	22	5	4	2	4	45	202	96	70	28	15	11	12	24	584
3.1 - 10.0	2	0	1	0	0	0	1	0	0	0	2	1	1	1	4	5	18
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	7	39	28	9	4	2	5	54	212	97	72	30	16	12	16	29	632

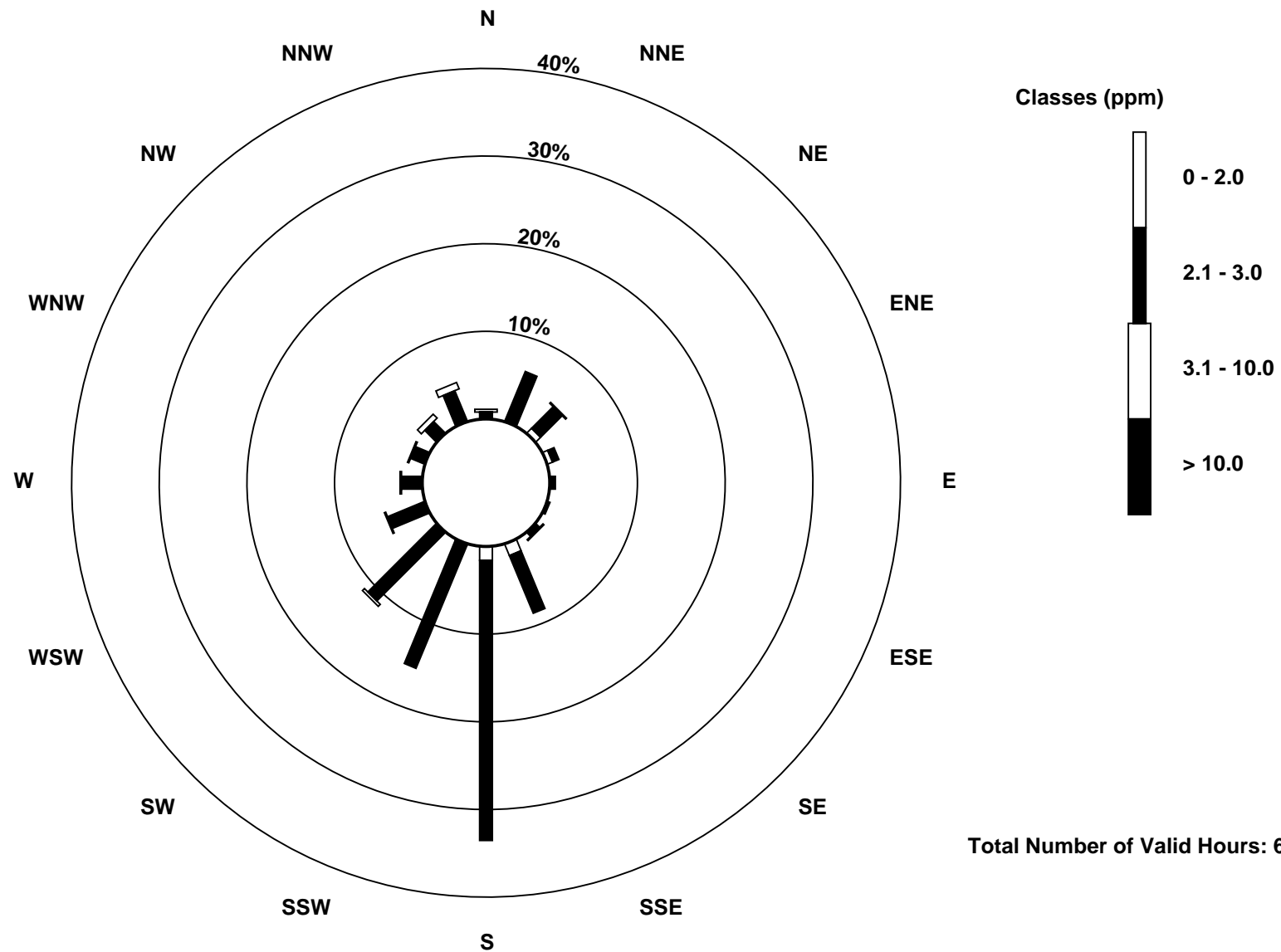
Total Number of Valid Hours: 632

Total Number of Hours: 720

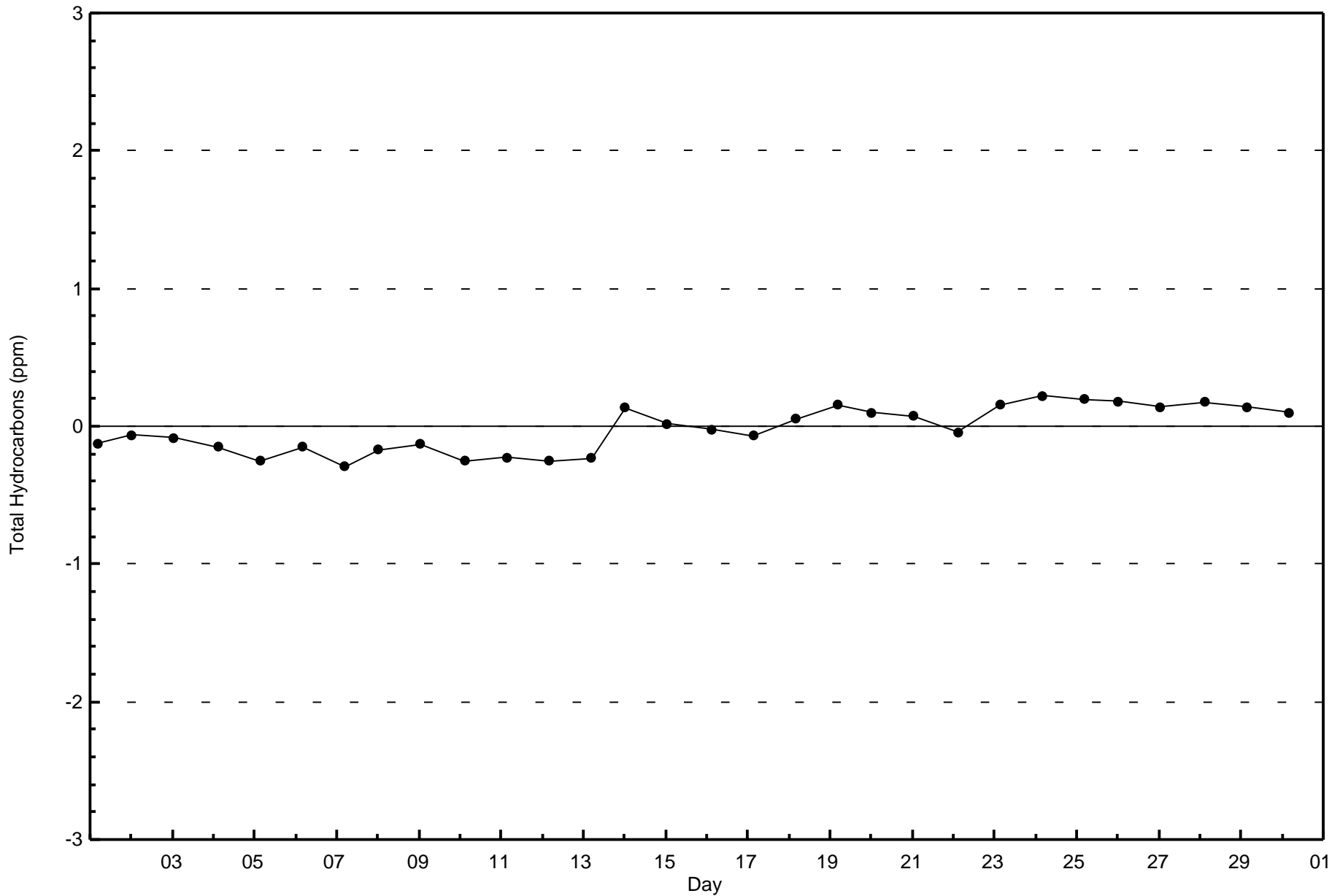


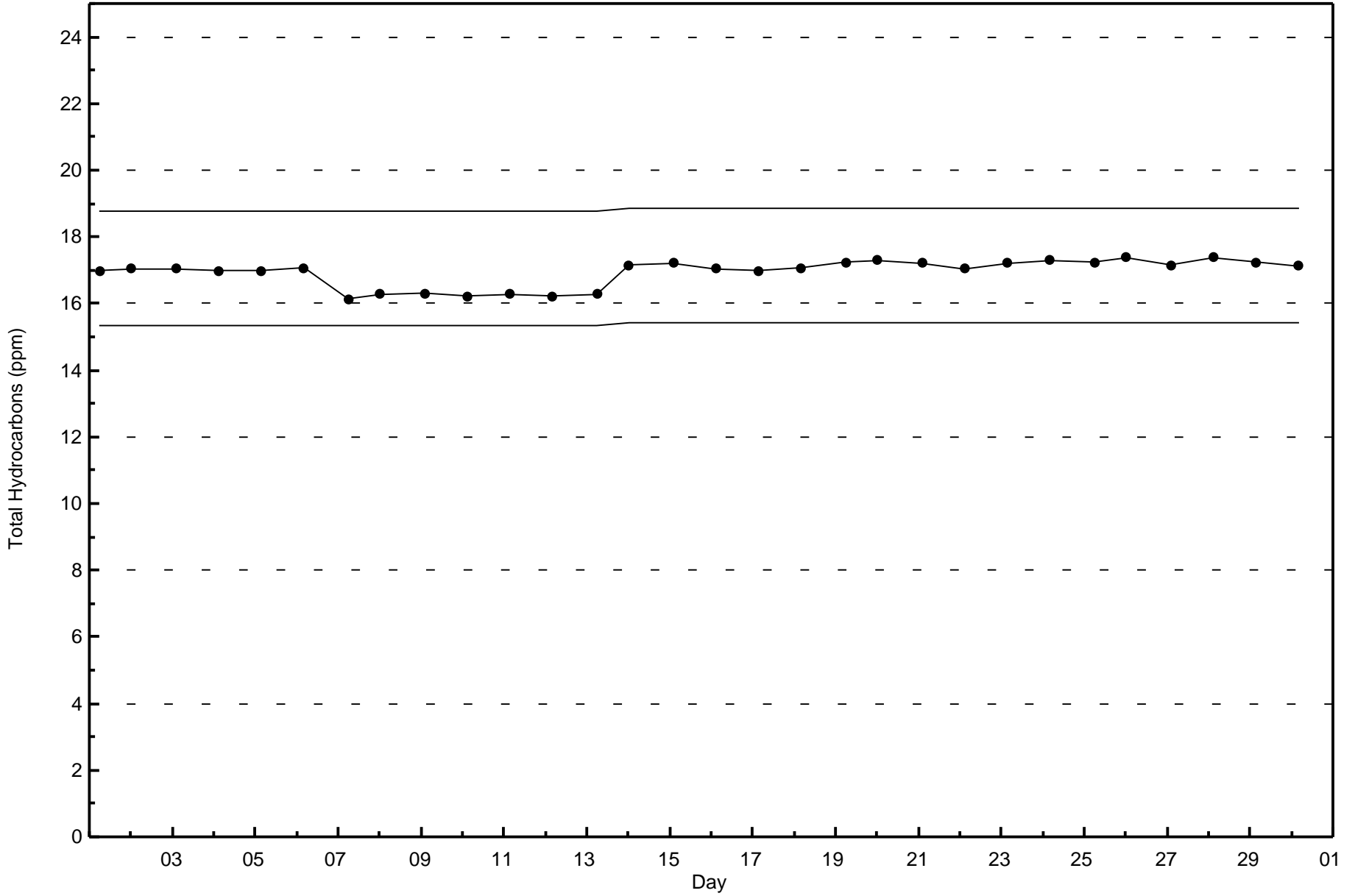
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)



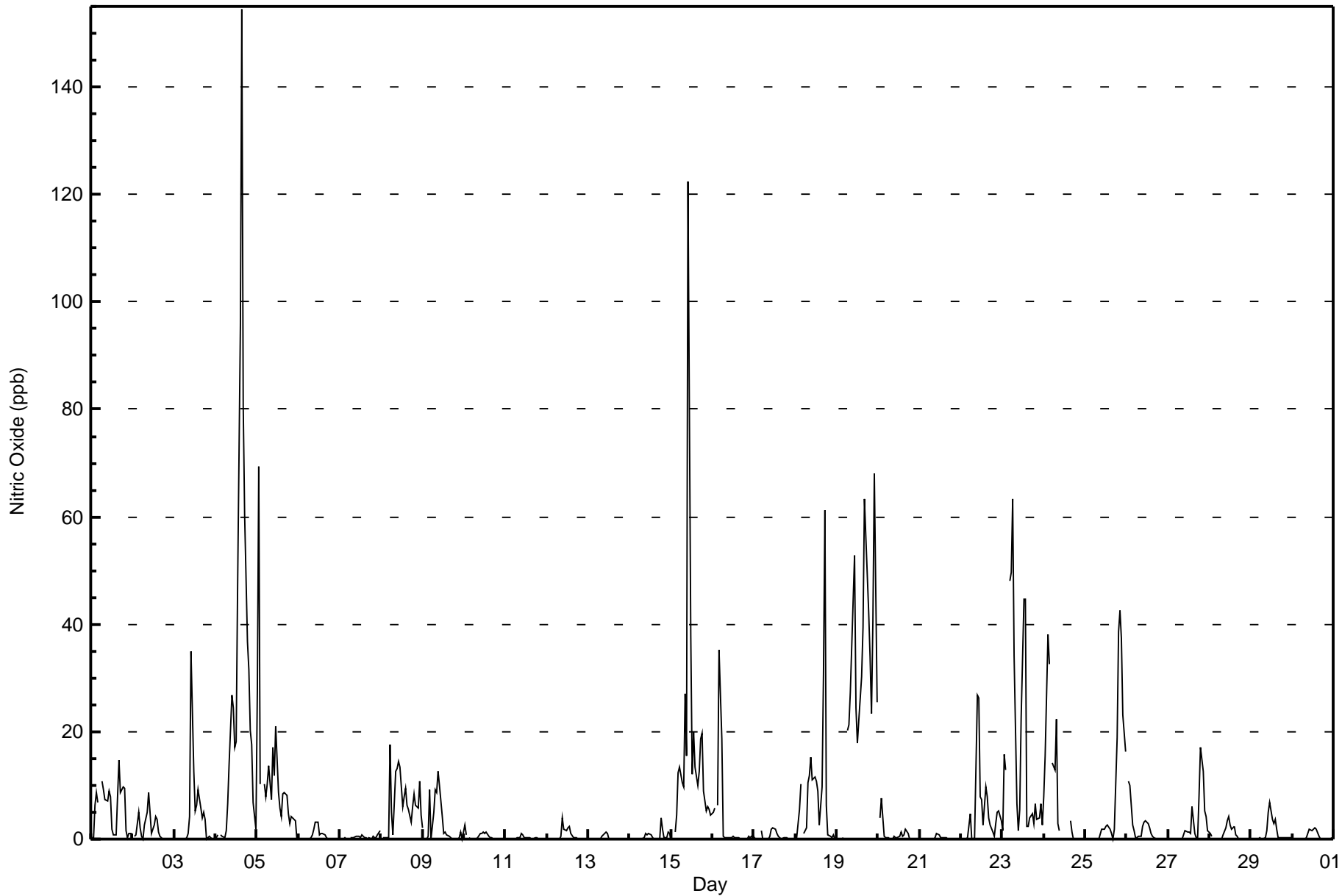
Total Number of Valid Hours: 632







Maximum Value: 155 ppb on Nov 4 16:00		Maximum Daily Average: 28.9 ppb on Nov 4		Hours in Service: 720																																												
Minimum Value: 0 ppb on Nov 13 18:00		Minimum Daily Average: 0.2 ppb on Nov 21		Hours of Data: 685																																												
Maximum Diurnal Average: 12.3 ppb at hour 11		Minimum Diurnal Average: 2.0 ppb at hour 1		Hours of Missing Data: 35																																												
Monthly Average: 5.7 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 5 P ₉₀ = 15 P ₉₉ = 62		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-Nov	0	0	6	9	7	Z	11	9	7	7	9	8	2	1	1	8	15	9	10	9	2	0	1	1	5.7	15																						
2-Nov	Z	0	1	5	2	0	0	3	5	9	5	1	3	4	4	1	1	0	0	0	0	0	0	0	1.9	9																						
3-Nov	0	Z	0	0	0	0	0	0	1	4	35	13	5	6	9	6	4	5	4	0	0	0	0	0	4.1	35																						
4-Nov	0	1	Z	1	1	0	2	6	14	27	25	17	18	46	96	155	81	60	37	31	20	18	7	2	28.9	155																						
5-Nov	28	69	10	Z	10	8	10	14	7	17	12	21	9	6	4	9	8	5	3	4	4	3	0	0	11.7	69																						
6-Nov	0	0	0	0	Z	0	0	0	1	2	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0.6	3																						
7-Nov	0	0	0	0	0	Z	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	2	0.4	2																						
8-Nov	Z	0	0	0	0	18	5	1	13	13	14	13	6	8	9	6	5	3	6	8	6	6	11	5	6.9	18																						
9-Nov	2	Z	0	1	9	0	5	9	9	13	10	4	1	1	1	0	0	0	0	0	0	0	1	0	3.0	13																						
10-Nov	3	1	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	3																						
11-Nov	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
12-Nov	0	0	0	0	Z	0	0	0	0	4	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0.7	4																						
13-Nov	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																						
14-Nov	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	4	2	0	0	1	1	0.6	4																						
15-Nov	0	Z	1	5	12	13	10	10	27	16	123	38	12	20	13	10	13	19	20	9	5	6	5	5	17.0	123																						
16-Nov	5	6	Z	6	35	19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3.3	35																						
17-Nov	0	0	0	Z	1	0	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0.5	2																						
18-Nov	0	0	5	10	Z	1	2	10	12	15	11	12	11	9	3	10	31	61	6	1	0	0	1	0	9.2	61																						
19-Nov	0	0	0	0	0	Z	20	21	27	44	53	24	18	22	30	39	63	56	42	34	23	41	68	26	28.4	68																						
20-Nov	Z	4	8	1	0	0	0	0	0	1	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0.9	8																						
21-Nov	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																						
22-Nov	0	0	Z	0	0	5	0	0	0	27	26	8	7	3	10	8	4	3	1	0	3	5	5	3	5.2	27																						
23-Nov	2	16	13	Z	48	50	63	34	7	1	6	23	45	45	2	2	4	5	3	7	4	4	7	3	17.0	63																						
24-Nov	8	15	38	32	Z	14	13	22	3	2	C	C	C	C	C	3	1	0	0	0	0	0	0	0	8.5	38																						
25-Nov	0	0	0	0	0	Z	0	0	0	2	2	2	2	3	2	1	0	2	19	39	43	37	23	16	8.4	43																						
26-Nov	Z	11	10	3	2	0	0	0	0	2	3	3	3	2	1	1	0	0	0	0	0	0	0	0	1.8	11																						
27-Nov	0	Z	0	0	0	0	0	0	0	1	2	1	1	1	6	1	0	0	8	17	13	5	4	2	2.7	17																						
28-Nov	1	0	Z	0	0	0	0	0	1	2	3	4	3	2	2	1	0	0	0	0	0	0	0	0	0.9	4																						
29-Nov	0	0	0	Z	0	0	0	0	0	2	5	7	4	3	4	2	0	0	0	0	0	0	0	0	1.2	7																						
30-Nov	0	0	0	0	Z	0	0	0	0	1	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0.5	2																						
																								Diurnal Average																								
																								Diurnal Maximum																								
																								2.0	5.0	3.8	2.9	5.2	5.2	4.8	4.7	4.6	7.2	12.3	7.4	5.5	6.6	7.0	8.9	7.8	7.8	5.5	5.4	4.2	4.3	4.7	2.2	
																								28	69	38	32	48	50	63	34	27	44	123	38	45	46	96	155	81	61	42	39	43	41	68	26	
																								Z - zerspan	C - Calibration																							





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	634	92.55	92.55
21 - 40	30	4.38	96.93
41 - 80	17	2.48	99.42
81 - 159	3	0.44	99.85
> 159	0	0.00	99.85

Total Number of Valid Hours: 685

Total Number of Hours: 720



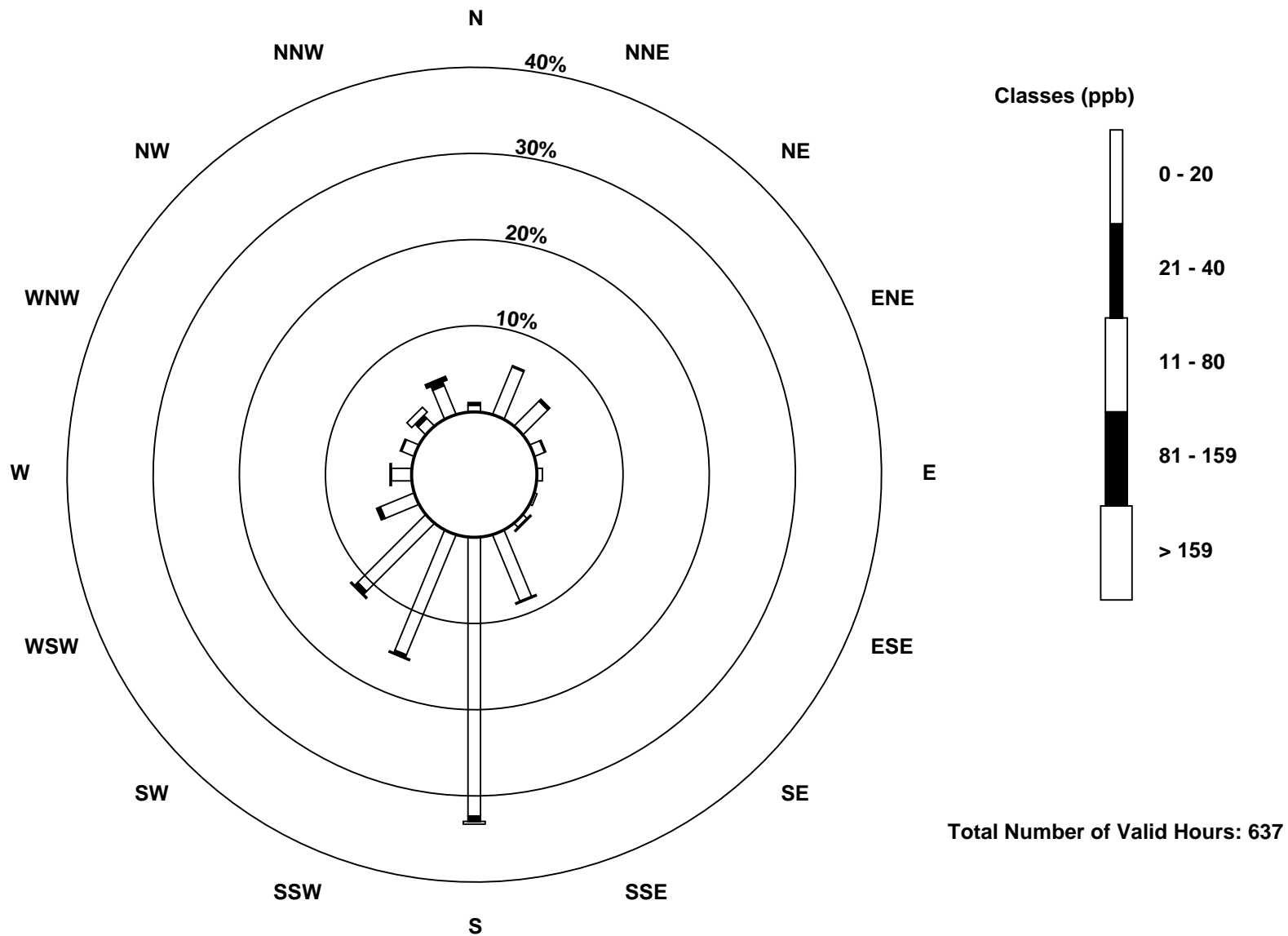
Wood Buffalo Environmental Association
Frequency Distribution

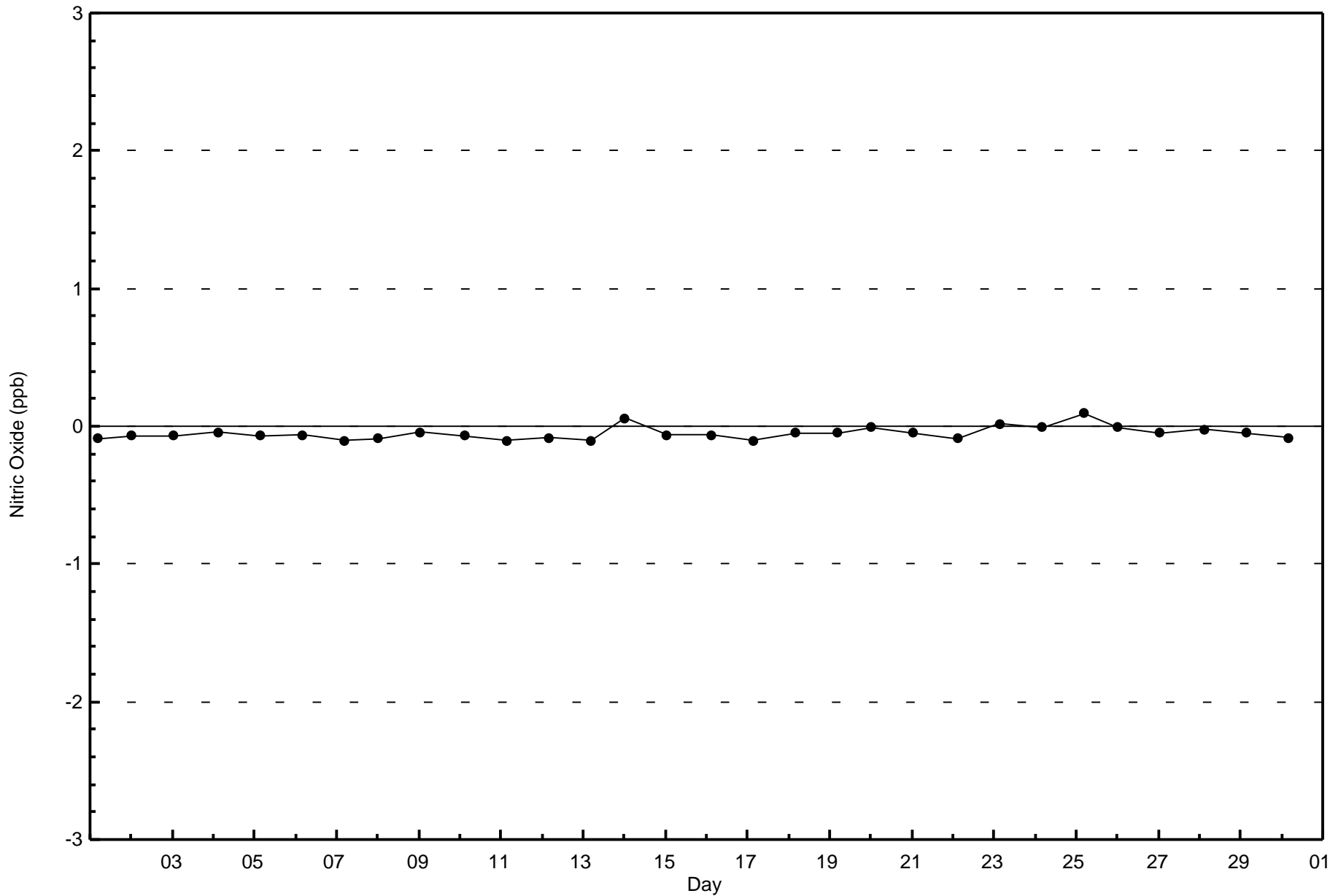
Nitric Oxide (NO) - ppb
Shell Muskeg River - November 2015

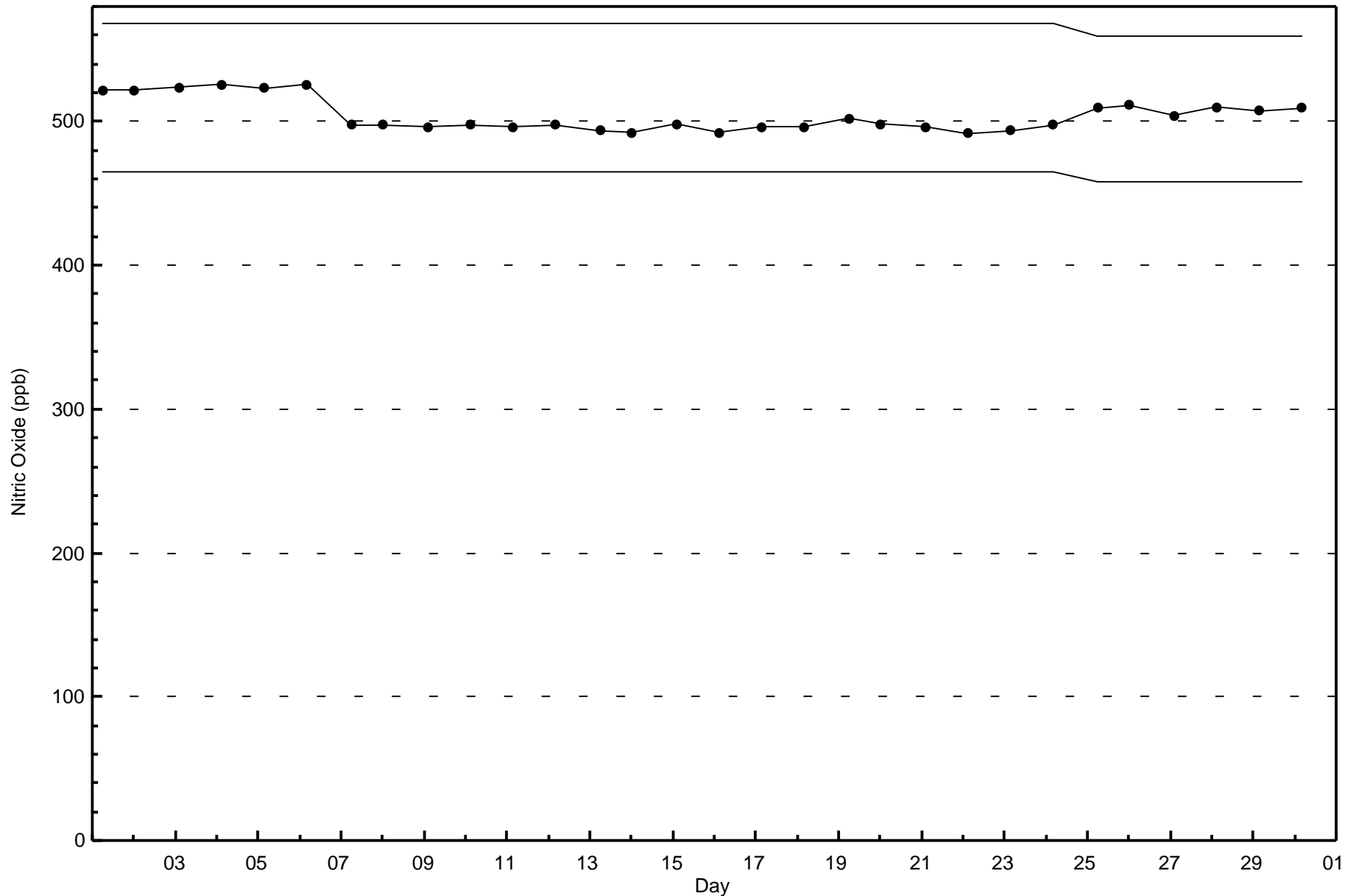
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	5	38	26	8	4	2	4	53	206	96	71	27	15	10	8	23	596
21 - 40	2	1	2	1	0	0	0	0	4	2	3	3	0	1	3	3	25
11 - 80	0	0	0	0	0	0	1	1	2	1	1	0	0	0	5	1	12
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	7	39	28	9	4	2	5	54	212	99	75	30	16	11	16	29	636

Total Number of Valid Hours: 637

Total Number of Hours: 720







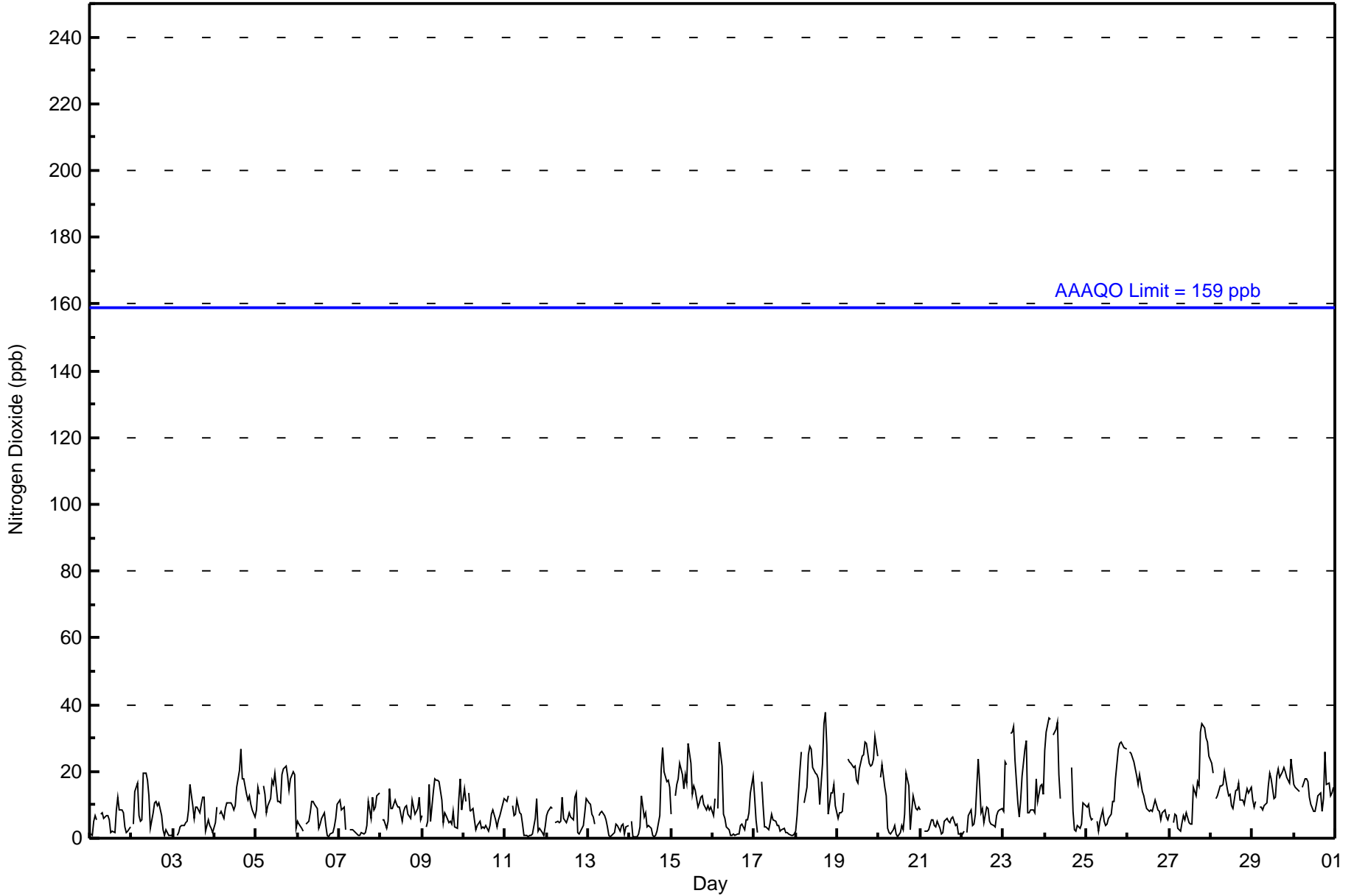


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 38 ppb on Nov 18 18:00	Maximum Daily Average: 20.0 ppb on Nov 19
Minimum Value: 0 ppb on Nov 14 15:00	Hours of Data: 685
Maximum Diurnal Average: 11.6 ppb at hour 23	Hours of Missing Data: 35
Monthly Average: 10.2 ppb	Hours of Calibration: 35
Minimum Daily Average: 4.0 ppb on Nov 21	Percent Operational Time: 100.0
Minimum Diurnal Average: 7.0 ppb at hour 13	
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 14 P ₉₀ = 21 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-Nov	1	1	5	7	5	Z	7	8	6	7	7	6	2	2	2	8	12	9	9	8	3	2	2	4	5.2	12
2-Nov	Z	4	14	17	7	5	6	19	19	17	13	3	8	11	11	10	11	7	2	1	3	1	1	1	8.2	19
3-Nov	1	Z	1	2	3	4	4	5	5	8	16	10	6	9	9	8	10	12	12	2	6	4	3	2	6.1	16
4-Nov	5	9	Z	7	8	6	9	10	10	10	10	8	10	15	21	27	18	18	13	11	13	10	8	6	11.4	27
5-Nov	8	15	13	Z	16	13	8	10	12	17	16	19	11	11	11	19	21	22	19	15	18	20	19	3	14.6	22
6-Nov	5	4	3	2	Z	4	5	8	11	11	10	9	3	4	6	8	4	1	1	1	2	3	6	10	5.3	11
7-Nov	12	9	9	10	3	Z	3	3	3	2	1	1	1	2	1	2	4	11	6	12	8	10	13	14	5.9	14
8-Nov	Z	6	6	3	5	15	9	9	12	10	9	9	5	8	9	10	7	6	11	10	7	9	12	6	8.4	15
9-Nov	7	Z	3	5	16	5	14	18	17	17	17	11	5	8	7	5	5	4	8	3	3	12	18	8	9.4	18
10-Nov	15	11	Z	14	8	9	5	3	4	5	3	4	3	4	2	4	7	9	5	3	6	7	9	12	6.5	15
11-Nov	12	11	13	Z	10	7	7	11	8	7	4	1	1	1	1	1	1	6	12	2	3	2	1	4	5.3	13
12-Nov	7	8	9	9	Z	5	5	5	5	12	6	5	6	8	6	5	12	13	2	1	3	4	8	12	6.8	13
13-Nov	11	10	7	6	4	Z	7	8	8	7	5	4	1	1	1	2	4	4	2	4	4	1	3	4	4.7	11
14-Nov	Z	5	1	1	1	1	4	13	6	8	3	4	3	1	0	1	2	7	21	27	20	17	17	15	7.6	27
15-Nov	7	Z	13	16	18	22	19	15	19	17	28	22	13	16	14	9	11	12	13	10	8	10	9	9	14.3	28
16-Nov	7	12	Z	9	29	22	7	6	4	2	1	1	1	1	1	1	4	4	3	5	6	8	14	19	7.2	29
17-Nov	12	6	2	Z	17	10	3	3	3	5	7	6	5	4	4	2	3	3	2	2	1	1	1	1	4.4	17
18-Nov	2	7	20	26	Z	11	15	25	27	27	21	20	19	18	10	23	34	38	28	7	14	13	16	10	18.7	38
19-Nov	6	8	8	8	14	Z	24	23	23	21	22	18	16	21	25	25	29	29	22	22	22	24	31	25	20.0	31
20-Nov	Z	18	22	15	13	3	2	1	3	4	1	1	2	4	3	7	20	16	3	8	13	9	8	9	7.9	22
21-Nov	9	Z	2	2	2	3	6	6	4	3	5	3	1	2	5	6	5	5	6	7	4	4	1	1	4.0	9
22-Nov	1	2	Z	2	7	9	4	4	7	24	17	8	9	5	9	9	5	4	4	4	7	8	9	9	7.1	24
23-Nov	8	23	22	Z	32	32	33	24	11	6	12	19	27	29	8	8	9	9	8	18	11	16	16	13	17.0	33
24-Nov	26	32	36	35	Z	31	33	35	19	12	C	C	C	C	C	21	8	3	2	4	3	4	11	10	18.0	36
25-Nov	9	10	7	6	6	Z	5	2	5	8	5	4	4	6	7	11	11	18	27	29	29	28	27	27	12.6	29
26-Nov	Z	26	25	23	21	19	16	19	14	13	10	9	8	9	8	10	11	9	8	6	8	9	6	5	12.6	26
27-Nov	7	Z	5	7	7	3	2	5	7	6	8	5	4	4	15	13	17	16	32	34	33	30	29	25	13.6	34
28-Nov	22	20	Z	12	13	16	16	16	20	15	13	13	10	9	15	15	16	11	12	10	13	15	14	15	14.3	22
29-Nov	12	9	11	Z	9	9	8	10	10	16	19	18	12	12	19	21	18	20	21	20	18	17	24	20	15.4	24
30-Nov	16	15	14	14	Z	15	18	18	17	12	10	8	8	10	13	13	8	12	26	16	17	13	14	15	14.1	26

9.1	11.2	10.8	10.3	10.8	11.1	10.1	11.3	10.6	11.0	10.3	8.5	7.0	8.0	8.4	10.0	10.9	11.1	11.2	10.0	10.1	10.3	11.6	10.4	Diurnal Average	
26	32	36	35	32	32	33	35	27	27	28	22	27	29	25	27	34	38	32	34	33	30	31	27	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	610	89.05	89.05
21 - 40	75	10.95	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	6	39	27	8	4	2	4	53	192	91	72	28	15	11	11	15	578
21 - 40	1	0	1	1	0	0	1	1	20	8	3	2	1	1	5	14	59
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	7	39	28	9	4	2	5	54	212	99	75	30	16	12	16	29	637

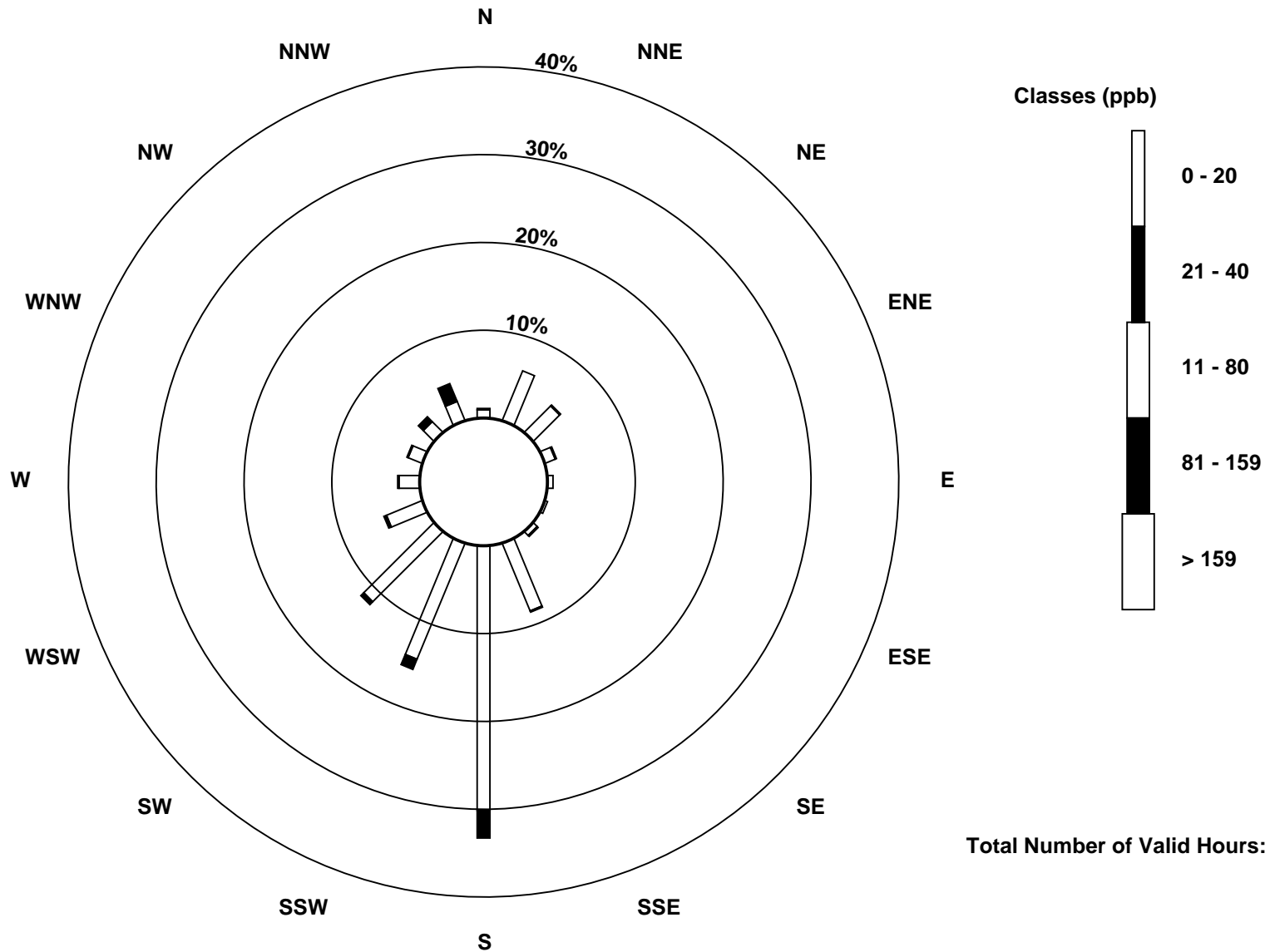
Total Number of Valid Hours: 637

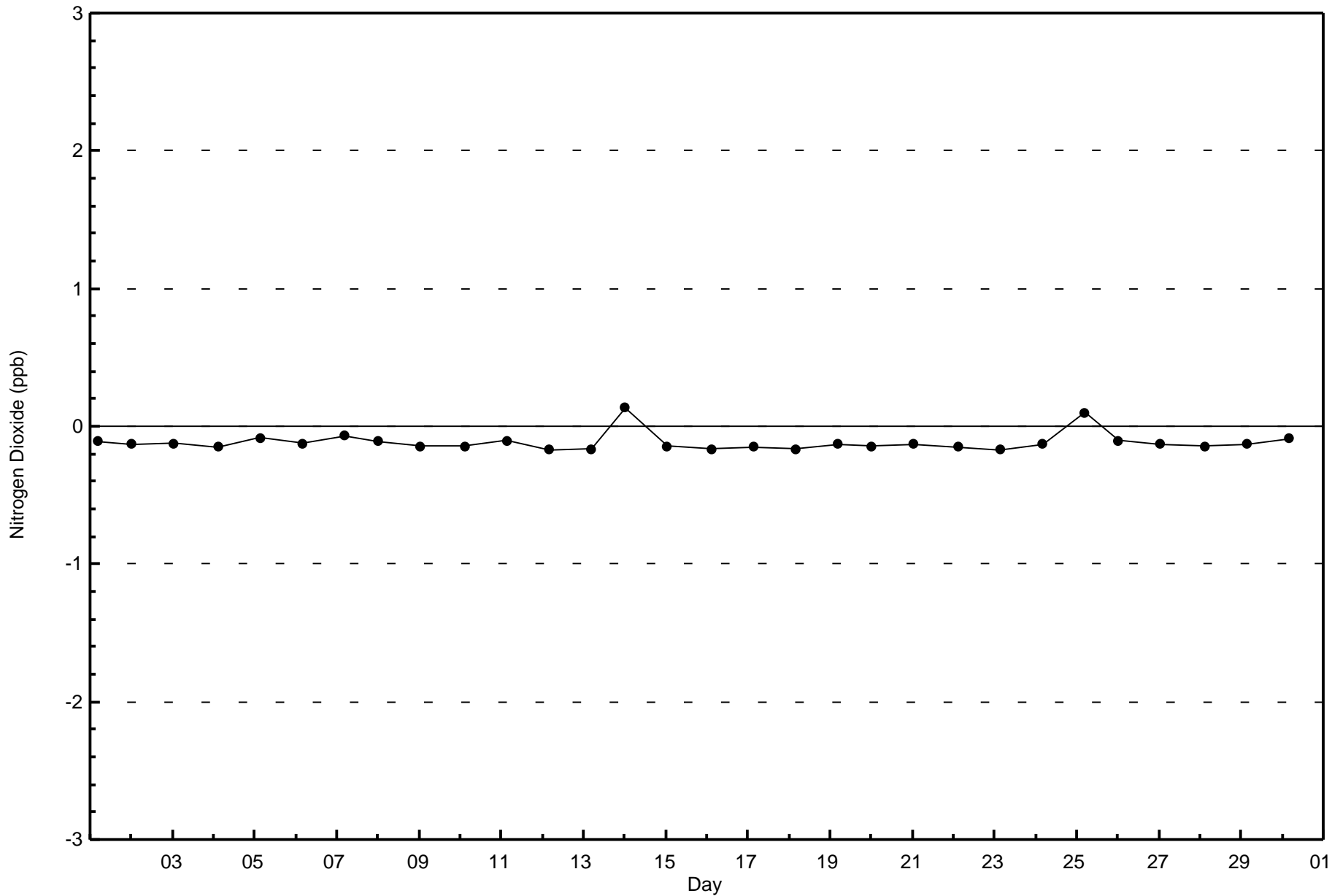
Total Number of Hours: 720

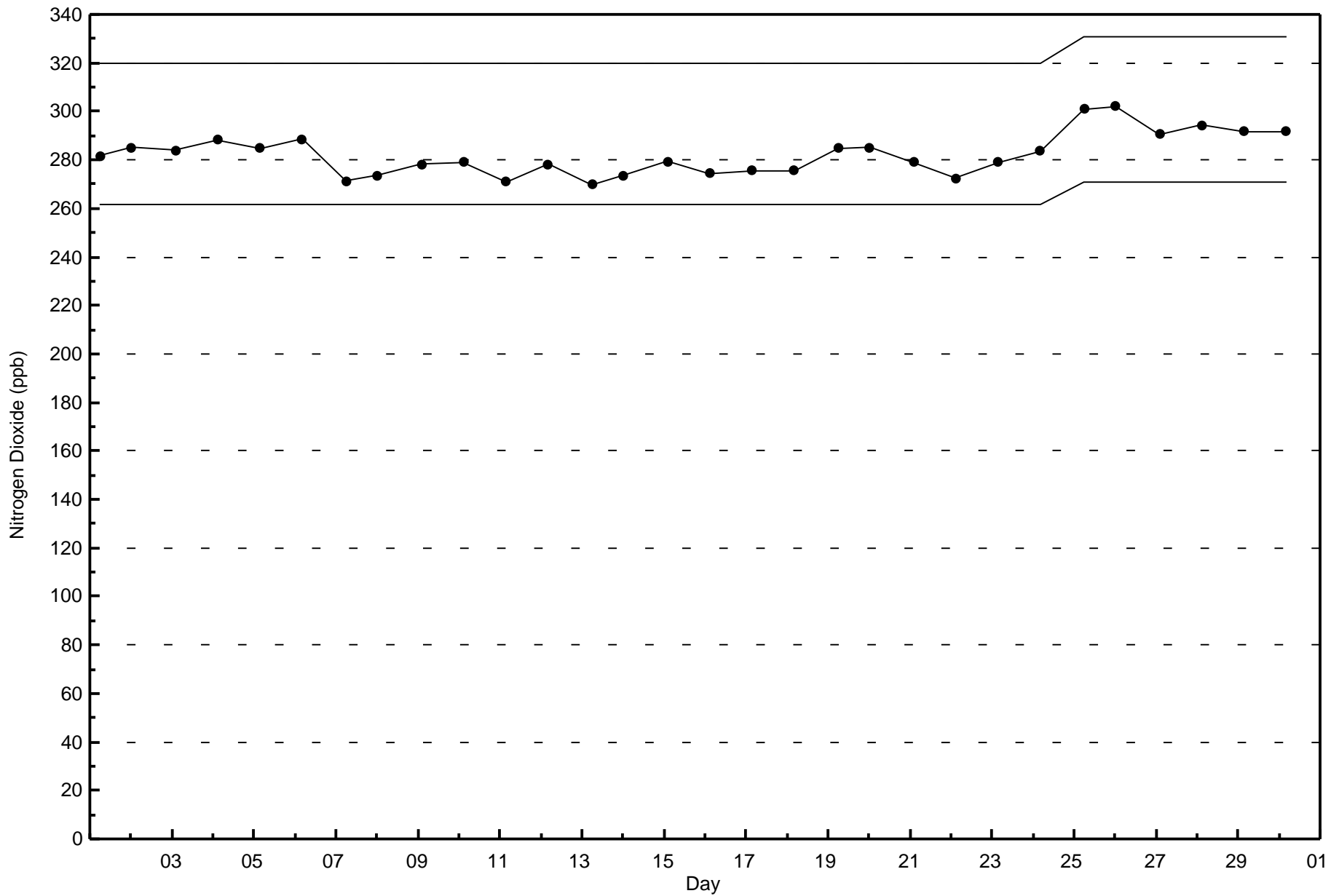


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)







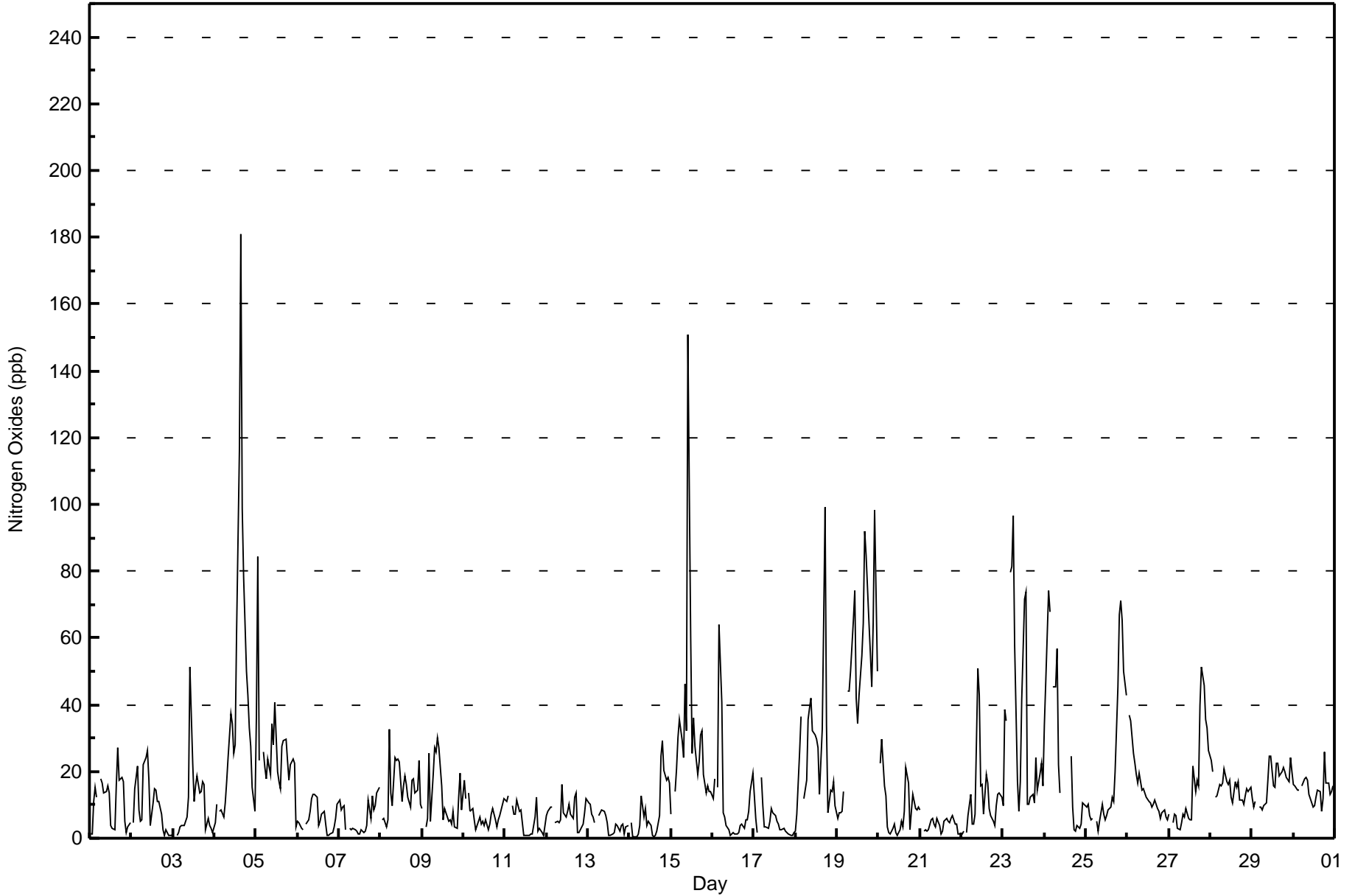


Maximum Value: 181 ppb on Nov 4 16:00	Maximum Daily Average: 48.5 ppb on Nov 19	Hours in Service: 720
Minimum Value: 0 ppb on Nov 14 04:00	Minimum Daily Average: 4.2 ppb on Nov 21	Hours of Data: 685
Maximum Diurnal Average: 22.7 ppb at hour 11	Minimum Diurnal Average: 11.1 ppb at hour 1	Hours of Missing Data: 35
Monthly Average: 15.8 ppb	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 10 Q ₃ = 18 P ₉₀ = 35 P ₉₉ = 96	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-Nov	1	1	11	15	12	Z	18	17	13	14	16	14	4	3	2	16	27	17	18	17	5	2	3	4	10.9	27
2-Nov	Z	5	15	21	9	5	6	22	24	26	18	4	10	15	14	11	11	7	3	1	3	1	1	1	10.1	26
3-Nov	1	Z	1	2	3	4	4	5	6	12	51	22	11	15	19	13	14	17	16	2	6	4	3	2	10.2	51
4-Nov	5	10	Z	8	8	7	11	17	24	37	34	25	28	61	116	181	99	78	50	43	33	28	15	8	40.3	181
5-Nov	36	84	23	Z	26	21	18	24	19	34	28	40	20	17	15	28	29	30	23	17	22	24	23	3	26.3	84
6-Nov	5	4	3	2	Z	4	5	8	12	13	13	12	4	5	7	8	4	1	1	1	2	3	6	10	5.9	13
7-Nov	12	9	9	10	3	Z	3	3	3	2	2	1	1	2	2	2	4	11	6	13	9	10	14	15	6.3	15
8-Nov	Z	6	6	3	5	32	14	10	24	23	24	23	11	16	19	16	12	9	18	18	14	15	23	10	15.2	32
9-Nov	9	Z	3	6	25	5	19	27	26	30	27	16	6	9	8	5	5	4	8	4	3	12	19	8	12.4	30
10-Nov	18	12	Z	14	8	9	5	3	4	6	4	5	4	5	3	4	7	9	5	4	6	7	9	12	7.0	18
11-Nov	12	11	13	Z	10	7	7	12	8	8	5	1	1	1	1	1	1	6	12	2	3	2	1	4	5.6	13
12-Nov	7	8	9	9	Z	5	5	5	5	16	8	6	8	10	7	6	12	14	2	1	3	4	8	12	7.4	16
13-Nov	11	10	7	6	5	Z	7	8	9	8	7	4	1	1	1	2	4	4	2	4	4	1	3	4	4.9	11
14-Nov	Z	5	1	0	1	1	4	13	6	9	4	5	4	1	1	1	2	7	25	29	20	17	18	16	8.2	29
15-Nov	7	Z	14	21	30	36	29	24	46	32	151	60	25	36	28	19	23	31	32	19	14	16	14	14	31.3	151
16-Nov	12	18	Z	15	64	40	8	6	4	3	1	1	2	1	1	2	4	4	3	6	6	8	14	19	10.5	64
17-Nov	13	6	2	Z	18	10	3	4	3	5	9	8	7	5	4	3	3	3	2	2	1	1	1	2	4.9	18
18-Nov	2	7	26	36	Z	12	17	36	39	42	32	31	30	27	13	32	65	99	34	8	14	14	17	10	28.0	99
19-Nov	6	8	8	8	14	Z	44	44	50	65	74	42	34	43	55	65	92	85	65	56	45	65	99	50	48.5	99
20-Nov	Z	22	30	16	13	3	2	1	3	4	2	1	2	5	3	8	21	17	3	8	13	9	9	9	8.8	30
21-Nov	9	Z	2	2	2	3	6	6	4	3	6	4	1	2	5	6	5	5	6	7	4	4	1	1	4.2	9
22-Nov	1	2	Z	2	7	13	4	4	7	51	43	16	16	7	19	17	9	7	5	4	10	13	14	12	12.3	51
23-Nov	10	39	35	Z	79	82	97	58	17	8	17	41	71	74	10	10	12	13	10	24	15	20	23	16	33.9	97
24-Nov	34	47	74	68	Z	45	45	57	22	14	C	C	C	C	C	25	10	3	2	4	3	4	11	10	26.5	74
25-Nov	9	10	7	5	6	Z	5	2	5	10	7	6	7	8	9	12	11	20	45	67	71	65	50	43	21.0	71
26-Nov	Z	37	35	26	22	19	16	19	14	15	14	12	11	11	9	10	12	9	8	6	8	9	6	5	14.5	37
27-Nov	7	Z	5	7	7	3	2	5	7	6	9	6	5	5	22	14	17	16	40	51	46	35	33	26	16.3	51
28-Nov	23	20	Z	12	13	16	16	16	21	17	16	17	12	10	17	15	17	12	12	10	13	15	14	15	15.2	23
29-Nov	12	9	11	Z	9	9	9	10	11	17	24	25	16	15	22	23	18	20	21	20	18	17	24	20	16.6	25
30-Nov	16	15	14	14	Z	16	18	18	17	13	12	9	10	12	15	14	8	12	26	16	17	13	14	15	14.6	26

11.1	16.2	14.6	13.2	16.0	16.3	14.9	16.0	15.2	18.2	22.7	15.8	12.5	14.6	15.4	18.9	18.7	18.9	16.8	15.4	14.3	14.5	16.3	12.6	Diurnal Average	
36	84	74	68	79	82	97	58	50	65	151	60	71	74	116	181	99	99	65	67	71	65	99	50	Diurnal Maximum	

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	536	78.25	78.25
21 - 40	93	13.58	91.82
41 - 80	45	6.57	98.39
81 - 159	10	1.46	99.85
> 159	1	0.15	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	3	24	24	8	1	0	4	53	183	89	67	24	13	8	3	5	509
21 - 40	3	14	2	0	3	2	0	0	20	5	5	4	2	2	6	17	85
11 - 80	1	1	2	1	0	0	0	0	9	5	3	2	0	1	5	4	34
81 - 159	0	0	0	0	0	0	1	1	0	0	0	0	0	1	2	3	8
> 159	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Totals	7	39	28	9	4	2	5	54	212	99	75	30	16	12	16	29	637

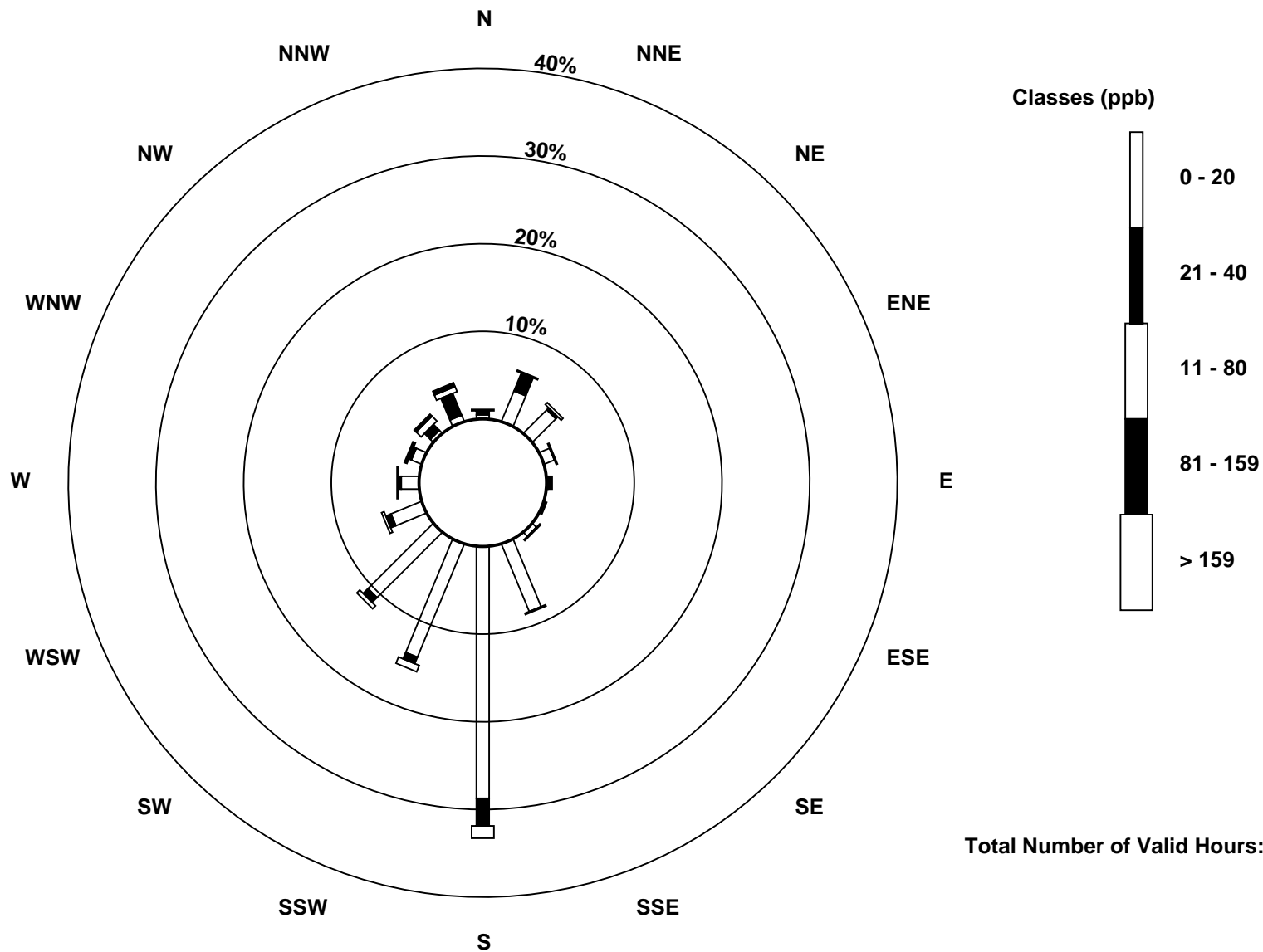
Total Number of Valid Hours: 637

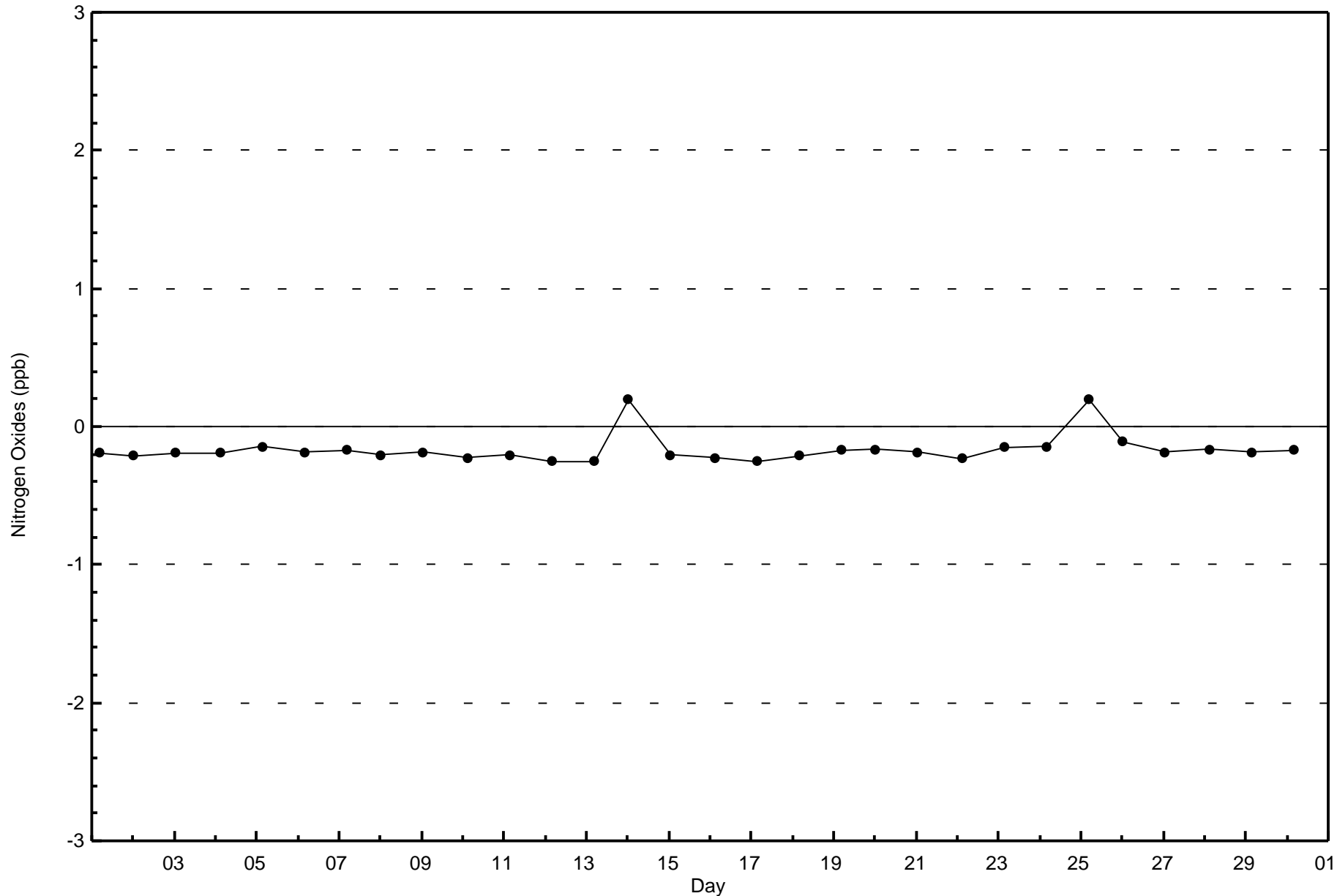
Total Number of Hours: 720

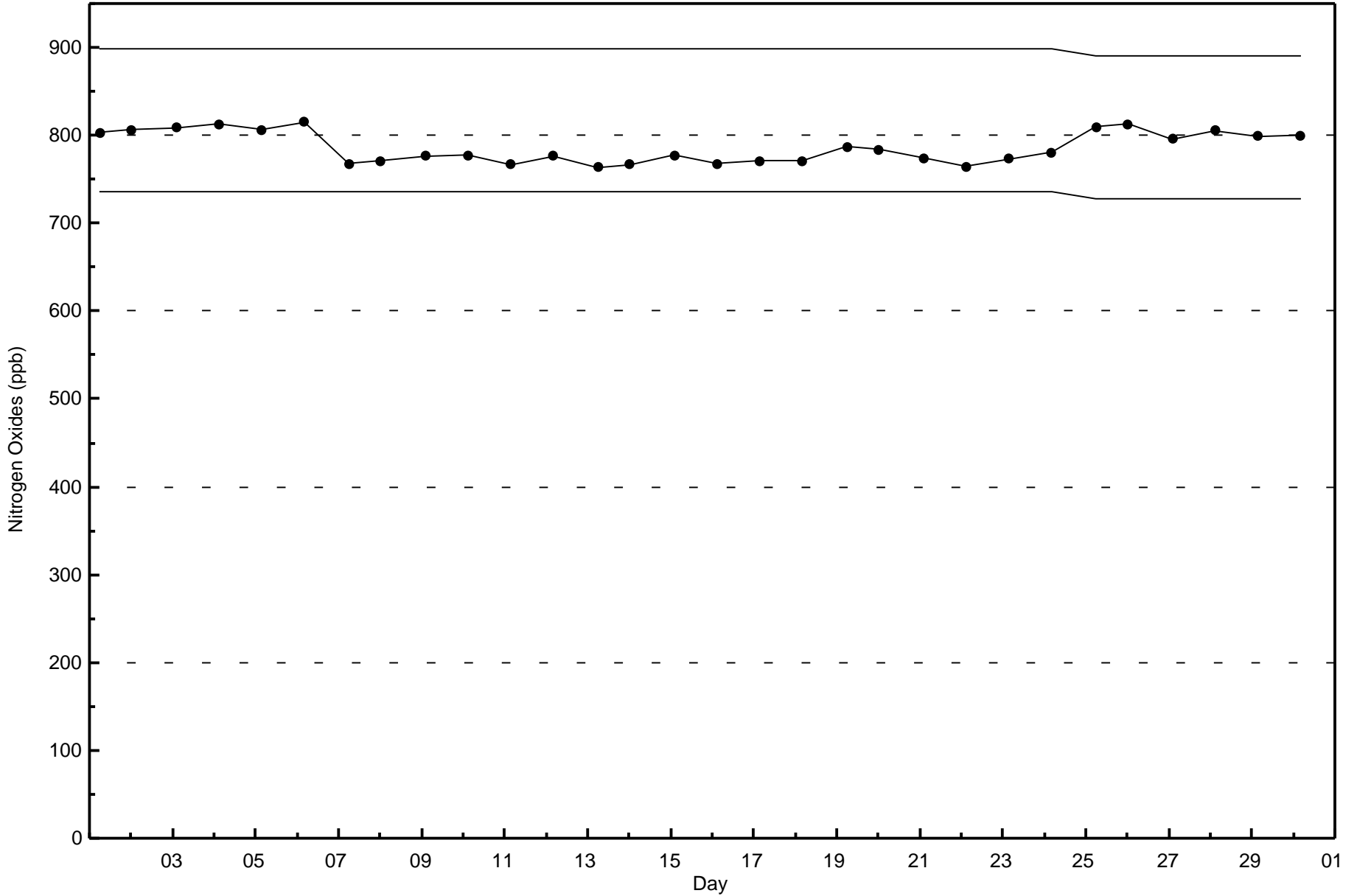


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)









Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 61.8 µg/m ³ on Nov 14 23:00	Maximum Daily Average: 24.3 µg/m ³ on Nov 4	Hours of Data:	718
Minimum Value: 0.7 µg/m ³ on Nov 11 23:00	Minimum Daily Average: 1.5 µg/m ³ on Nov 1	Hours of Missing Data:	2
Maximum Diurnal Average: 8.6 µg/m ³ at hour 23	Minimum Diurnal Average: 4.8 µg/m ³ at hour 4	Hours of Calibration:	2
Monthly Average: 5.94 µg/m ³	Percentiles: P ₁ = 0.8 P ₁₀ = 1.7 Q ₁ = 2.5 Median = 4.1 Q ₃ = 7.2 P ₉₀ = 10.2 P ₉₉ = 43.8	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-Nov	3.4	3.1	2.3	1.6	1.5	1.3	1.1	1.4	1.3	1.3	1.3	1.1	0.8	0.9	1.1	1.5	1.2	1.6	1.1	0.8	1.1	1.2	1.5	1.8	1.5	3.4
2-Nov	2.0	2.5	3.3	4.3	3.4	2.5	3.4	5.8	5.2	3.9	2.8	1.4	1.7	2.2	1.9	1.7	1.8	1.6	1.1	0.7	0.8	0.8	0.8	0.8	2.3	5.8
3-Nov	1.0	1.2	1.4	1.5	1.7	1.8	1.7	1.9	1.9	2.4	7.4	4.5	9.1	12.1	12.8	14.1	18.1	18.6	17.8	14.0	36.5	59.9	51.8	23.5	13.2	59.9
4-Nov	22.8	25.4	4.9	1.5	3.9	3.9	4.4	5.5	8.4	30.7	51.3	44.4	37.3	38.1	45.3	46.5	38.6	35.4	31.8	29.0	21.6	20.4	18.3	14.5	24.3	51.3
5-Nov	11.5	13.0	8.5	8.5	10.1	15.6	16.7	14.1	10.7	10.6	13.8	10.9	8.3	5.1	1.7	2.4	3.3	3.6	3.1	2.9	2.8	2.6	2.7	2.5	7.7	16.7
6-Nov	2.0	1.9	2.5	2.4	2.3	2.5	2.6	3.1	4.1	5.6	7.8	9.3	5.7	4.6	5.4	6.2	5.7	5.7	5.9	6.6	6.7	6.8	6.4	6.7	4.9	9.3
7-Nov	6.3	6.5	7.8	7.8	5.4	4.4	3.8	3.6	3.6	3.5	2.8	2.2	1.7	1.7	1.4	1.6	2.7	4.6	4.7	5.7	5.9	5.8	6.6	7.5	4.5	7.8
8-Nov	7.3	6.7	5.9	6.0	6.3	7.5	5.1	4.9	4.1	2.5	1.8	1.6	1.7	2.0	2.8	3.5	3.1	3.1	3.8	2.9	3.1	3.3	3.3	3.0	4.0	7.5
9-Nov	3.6	4.5	4.2	4.8	5.5	4.4	5.1	5.4	5.1	4.7	4.3	3.5	2.9	5.6	8.8	5.4	4.5	4.6	4.0	3.3	3.5	4.9	4.8	4.6	4.7	8.8
10-Nov	3.6	2.0	3.6	5.1	3.6	1.7	1.8	3.2	4.3	6.2	6.4	3.6	2.2	2.1	1.4	1.4	2.2	3.0	2.9	4.1	4.3	5.1	6.2	7.6	3.7	7.6
11-Nov	7.6	6.6	7.5	8.0	7.8	8.0	5.8	5.0	3.6	2.5	2.0	1.9	1.8	1.8	1.5	0.9	1.1	3.4	4.8	1.1	0.8	0.8	0.7	1.3	3.6	8.0
12-Nov	2.7	4.1	4.5	4.6	7.2	7.0	12.4	9.9	6.5	5.4	3.1	2.6	4.3	2.3	1.4	2.8	3.6	3.7	1.4	1.7	2.0	1.9	2.1	2.4	4.1	12.4
13-Nov	1.9	2.0	2.2	2.3	3.1	2.7	3.0	4.2	3.8	7.1	4.4	2.2	1.6	0.9	2.1	3.0	10.4	8.4	1.5	1.8	2.2	1.3	2.3	1.5	3.2	10.4
14-Nov	1.9	2.6	1.7	2.3	2.2	2.9	3.8	6.5	5.9	4.8	3.0	1.9	1.8	1.2	1.1	1.6	11.0	22.7	30.0	13.1	7.5	12.2	61.8	13.4	9.0	61.8
15-Nov	5.2	5.7	14.1	7.3	20.1	8.4	21.3	29.0	12.5	7.3	18.1	10.4	6.5	5.2	5.8	3.7	4.0	3.7	2.9	2.3	1.7	1.7	1.9	2.1	8.4	29.0
16-Nov	2.1	3.7	5.3	3.0	4.6	3.1	2.0	2.1	1.9	1.3	1.1	1.0	1.0	1.5	1.8	2.3	3.1	4.5	3.4	2.9	3.6	4.7	5.8	5.6	3.0	5.8
17-Nov	3.6	3.1	2.6	2.4	3.9	2.9	2.4	2.3	2.1	2.3	2.5	4.4	3.6	2.3	1.1	1.0	1.7	3.0	4.9	8.0	7.7	6.1	4.8	3.6	3.4	8.0
18-Nov	3.0	2.7	2.6	3.0	2.0	1.8	2.2	2.8	3.2	3.6	3.1	2.8	2.9	2.8	1.6	3.6	7.3	9.0	3.3	1.7	2.2	2.3	3.7	2.7	3.2	9.0
19-Nov	4.4	5.6	3.7	4.6	7.4	9.0	10.2	8.9	8.3	11.4	10.4	9.1	6.7	5.8	6.7	7.1	10.2	10.5	10.0	8.3	7.6	7.9	9.1	5.8	7.9	11.4
20-Nov	4.1	4.6	5.7	5.4	5.5	8.8	8.6	5.3	5.1	4.0	2.3	2.6	3.8	12.2	5.6	2.3	3.5	3.3	2.4	2.6	3.6	4.6	5.0	4.1	4.8	12.2
21-Nov	6.3	6.0	5.6	5.1	5.5	6.3	7.3	7.8	7.3	6.5	4.7	3.0	2.6	2.6	2.9	2.5	2.7	3.3	3.2	2.8	2.2	2.5	2.5	2.8	4.3	7.8
22-Nov	3.1	2.7	2.2	1.9	1.7	1.9	2.0	2.4	2.4	3.8	3.2	2.6	2.9	3.0	3.7	4.8	4.6	4.6	4.5	4.1	4.1	3.1	2.7	3.8	3.2	4.8
23-Nov	4.6	5.3	5.7	6.4	7.0	6.4	6.9	5.9	3.5	2.4	2.5	3.6	3.7	4.0	1.4	1.5	1.7	2.0	2.2	2.5	2.9	2.4	2.6	3.9	3.8	7.0
24-Nov	5.4	6.3	7.4	6.2	5.0	4.5	3.9	5.0	2.6	2.1	2.7	2.9	C	C	5.2	3.7	3.9	3.1	3.1	3.4	3.1	3.3	4.1	3.7	4.1	7.4
25-Nov	3.3	3.0	2.6	3.5	3.6	3.9	2.9	2.8	3.3	3.6	3.4	2.5	2.4	2.5	2.7	4.2	7.8	11.4	14.7	14.5	13.2	11.0	9.3	8.6	5.9	14.7
26-Nov	8.7	7.7	7.3	7.8	6.9	5.9	6.3	6.5	6.5	6.3	6.1	6.2	5.9	6.0	5.8	6.9	7.0	6.9	7.5	6.5	5.2	4.9	4.0	5.5	6.4	8.7
27-Nov	10.5	3.0	2.5	2.7	2.6	2.4	2.3	3.0	2.9	2.7	2.2	1.8	1.6	2.4	3.6	5.3	7.4	11.5	11.3	9.7	9.8	9.2	9.6	5.1	11.5	
28-Nov	7.9	7.0	8.1	7.8	7.5	7.2	6.3	5.6	7.0	9.1	8.8	8.0	8.1	6.5	7.8	8.4	10.8	13.1	11.8	12.3	10.0	8.3	9.6	7.6	8.5	13.1
29-Nov	7.7	8.1	8.5	7.7	8.3	8.6	8.6	8.5	9.0	8.6	8.7	7.9	8.9	6.5	7.2	8.1	9.0	10.1	10.1	10.2	10.5	8.5	8.0	6.8	8.5	10.5
30-Nov	7.2	8.7	8.7	9.4	9.1	8.4	7.6	8.2	9.3	7.8	6.4	5.5	5.4	5.9	5.8	4.6	3.8	4.5	6.1	6.7	6.4	5.4	6.1	7.2	6.8	9.4

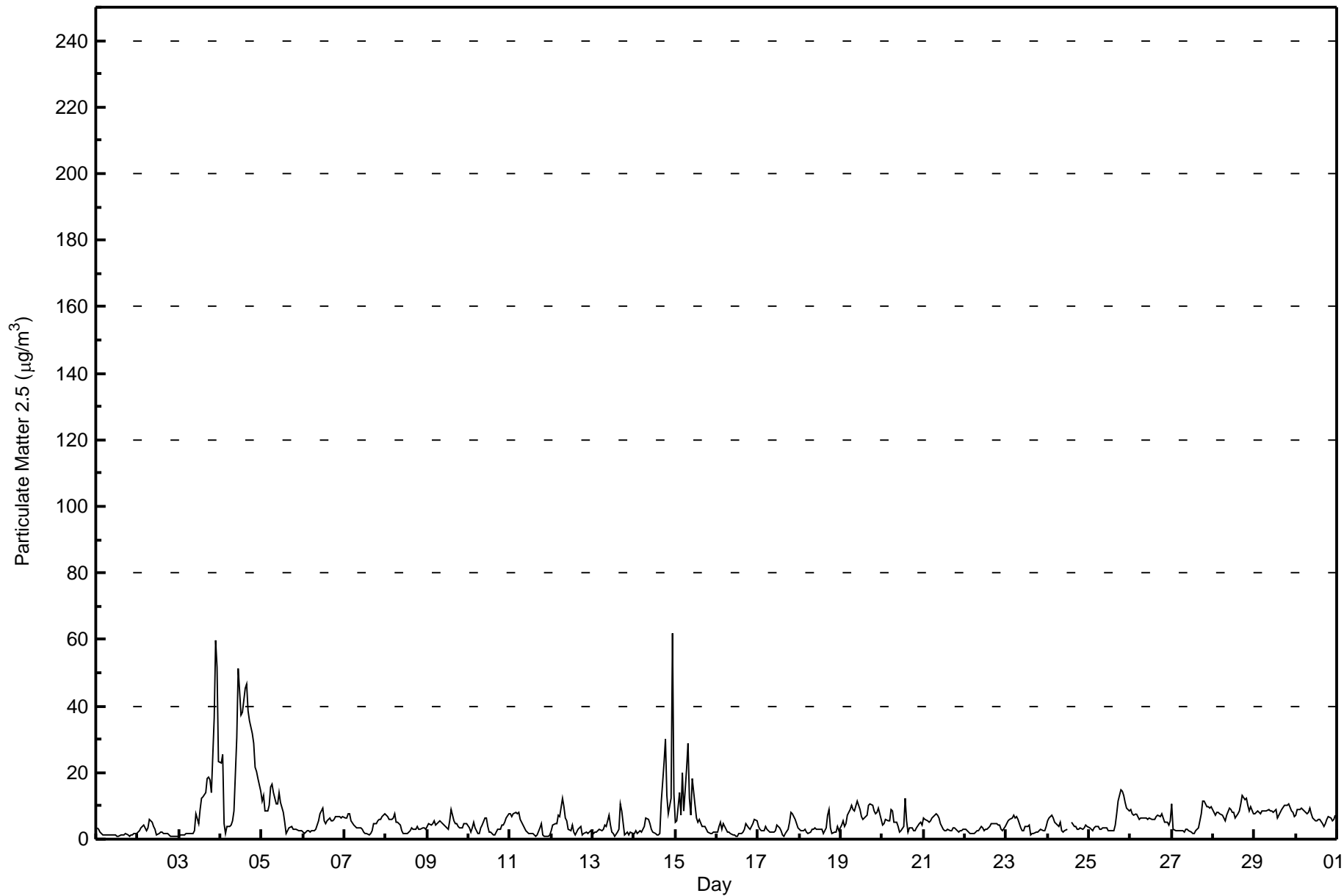
5.5	5.5	5.1	4.8	5.5	5.2	5.7	6.0	5.2	5.8	6.6	5.5	5.1	5.1	5.2	5.4	6.5	7.3	7.2	6.3	6.4	7.1	8.6	5.8	Diurnal Average	
22.8	25.4	14.1	9.4	20.1	15.6	21.3	29.0	12.5	30.7	51.3	44.4	37.3	38.1	45.3	46.5	38.6	35.4	31.8	29.0	36.5	59.9	61.8	23.5	Diurnal Maximum	

C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	430	59.89	59.89
6 - 15	241	33.57	93.45
16 - 25	15	2.09	95.54
26 - 80	17	2.37	97.91
> 81.0	0	0.00	97.91

Total Number of Valid Hours: 718

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Shell Muskeg River - November 2015

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	1	32	22	8	4	1	4	35	98	59	57	19	8	9	7	23	387
6 - 15	5	5	5	1	1	0	1	17	118	41	12	7	5	1	8	5	232
16 - 25	2	2	0	0	0	0	0	0	1	6	1	1	1	0	0	1	15
26 - 80	0	0	0	0	0	1	0	0	1	1	3	4	1	2	2	1	16
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	8	39	27	9	5	2	5	52	218	107	73	31	15	12	17	30	650

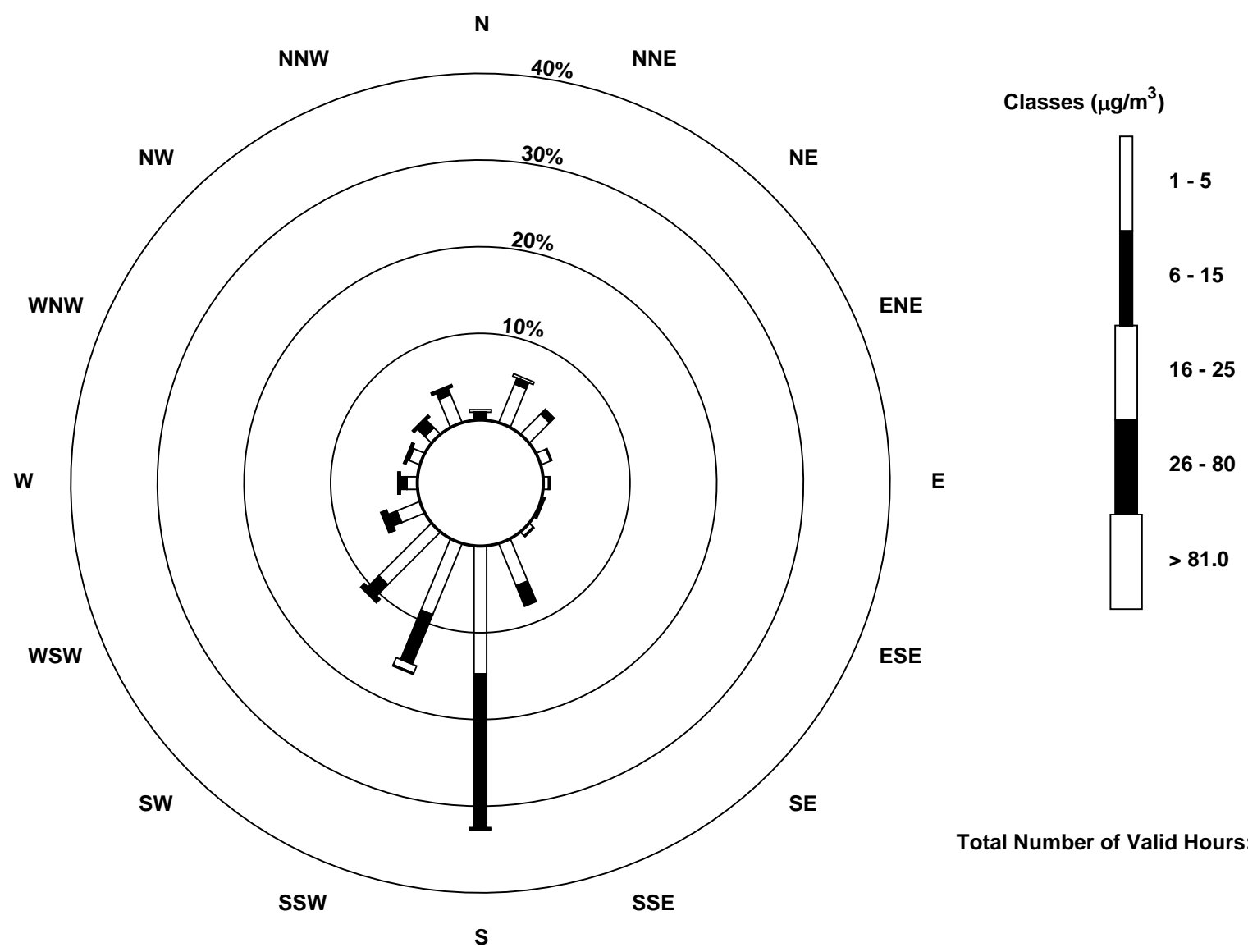
Total Number of Valid Hours: 665

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River (AMS 16)





Summary of Hour Averages

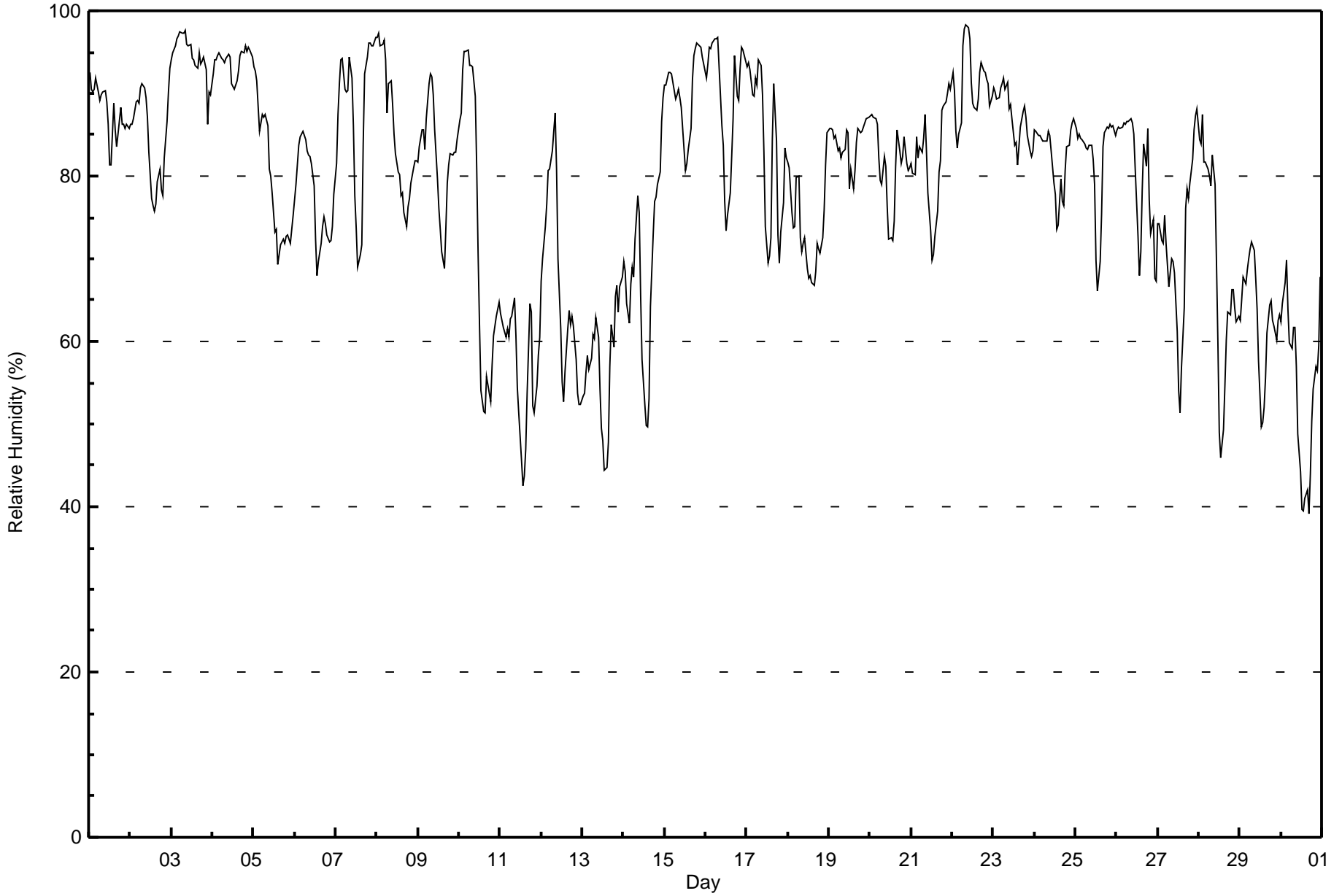
Shell Muskeg River - November 2015

Maximum Value: 98 % on Nov 22 09:00																		Maximum Daily Average: 94.4 % on Nov 3																		Hours in Service: 720													
Minimum Value: 39 % on Nov 30 17:00																		Minimum Daily Average: 54.6 % on Nov 30																		Hours of Data: 720													
Maximum Diurnal Average: 84.6 % at hour 9																		Minimum Diurnal Average: 67.9 % at hour 14																		Hours of Missing Data: 0													
Monthly Average: 78.8 %																		Percentiles: P ₁ = 44 P ₁₀ = 60 Q ₁ = 70 Median = 82 O ₃ = 89 P ₉₀ = 94 P ₉₉ = 97																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Nov	92	91	90	91	92	90	89	90	90	90	89	86	81	81	89	86	84	85	88	86	86	86	86	86	86	87.7	92																						
2-Nov	86	86	87	89	89	89	91	91	91	89	87	83	77	76	76	77	79	81	78	78	82	87	90	93	84.7	93																							
3-Nov	94	95	96	97	97	97	97	97	98	96	96	96	94	94	93	93	95	94	94	94	93	86	90	90	94.4	98																							
4-Nov	92	94	94	95	95	94	94	94	94	95	94	91	91	91	92	93	95	95	95	96	95	96	95	94	93.9	96																							
5-Nov	93	93	92	85	86	87	87	88	86	81	80	78	73	74	69	70	72	72	72	73	73	72	74	75	79.4	93																							
6-Nov	77	79	84	85	85	85	84	83	83	82	81	79	72	68	70	72	74	75	74	73	72	72	74	78	77.6	85																							
7-Nov	82	88	91	94	94	90	90	90	94	92	86	78	74	69	70	72	84	92	94	96	96	96	96	97	87.7	97																							
8-Nov	97	97	96	96	96	94	88	91	92	89	85	83	81	80	78	78	76	74	76	77	79	81	82	82	85.3	97																							
9-Nov	82	84	86	86	83	87	91	92	92	90	86	80	76	74	71	69	74	79	81	83	82	83	83	84	82.4	92																							
10-Nov	87	88	93	95	95	95	93	93	93	90	81	71	62	54	51	51	56	55	53	57	61	62	63	65	73.5	95																							
11-Nov	63	63	62	60	61	60	63	63	65	61	54	51	46	43	44	47	54	65	64	52	51	55	58	60	56.9	65																							
12-Nov	67	70	74	77	81	81	83	85	88	81	70	62	55	53	56	61	64	62	63	62	58	54	52	52	67.1	88																							
13-Nov	53	54	56	58	57	58	61	60	63	60	54	50	48	44	45	48	57	62	59	65	67	64	67	68	57.4	68																							
14-Nov	70	68	65	62	67	69	68	72	78	76	66	58	52	50	50	53	64	73	77	77	79	81	87	89	68.7	89																							
15-Nov	91	91	93	93	92	91	89	90	91	90	88	83	81	82	83	86	92	95	95	96	96	96	94	94	90.4	96																							
16-Nov	92	93	96	95	96	97	97	97	93	86	84	77	73	75	78	82	87	95	90	89	93	96	95	94	89.6	97																							
17-Nov	93	94	93	90	90	92	91	94	93	90	83	74	70	70	73	84	91	84	73	70	73	77	83	82	83.6	94																							
18-Nov	82	81	76	74	74	80	80	72	71	72	73	69	68	68	67	67	69	72	71	71	73	76	81	85	73.7	85																							
19-Nov	86	86	86	85	85	83	83	82	83	83	86	85	78	81	78	81	84	86	85	85	86	87	87	87	84.1	87																							
20-Nov	87	87	87	87	86	82	80	79	82	81	76	72	73	72	75	81	86	83	81	82	85	81	81	81	81.2	87																							
21-Nov	81	80	80	85	82	84	83	85	87	83	78	73	70	70	73	76	80	82	88	89	89	90	91	90	82.1	91																							
22-Nov	93	90	85	83	85	86	96	98	98	98	97	91	89	88	88	89	93	94	93	93	92	91	88	90	91.2	98																							
23-Nov	91	90	89	89	91	91	92	90	91	88	89	87	84	84	81	84	86	88	88	87	85	83	82	83	87.3	92																							
24-Nov	86	85	85	85	85	84	84	84	85	85	83	79	78	74	74	80	77	76	81	84	84	86	86	87	82.3	87																							
25-Nov	86	85	85	85	84	84	83	83	84	84	82	79	70	66	70	75	84	85	86	86	86	86	86	85	82.0	86																							
26-Nov	86	86	86	86	86	86	87	87	87	86	85	81	73	68	71	78	84	81	86	77	73	75	68	67	80.4	87																							
27-Nov	74	74	72	72	75	72	67	68	70	70	68	61	54	51	57	64	76	79	77	79	82	86	87	88	71.8	88																							
28-Nov	84	84	87	82	82	81	80	79	82	79	69	60	49	46	49	55	60	64	63	66	66	64	62	63	69.1	87																							
29-Nov	63	65	68	67	69	70	71	72	71	68	64	58	50	50	52	56	61	64	65	63	62	60	63	63	63.0	72																							
30-Nov	62	65	67	70	64	60	59	62	62	57	49	44	40	39	41	42	39	44	50	54	57	56	59	68	54.6	70																							
																								82.4	82.9	83.3	83.2	83.5	83.4	83.4	83.8	84.6	82.4	78.8	73.9	69.3	67.9	68.8	71.6	75.8	77.8	78.1	78.0	78.5	78.7	79.8	80.7	Diurnal Average	
																								97	97	96	97	97	97	97	98	98	98	97	96	94	94	93	93	95	95	95	96	96	96	96	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Shell Muskeg River - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - November 2015

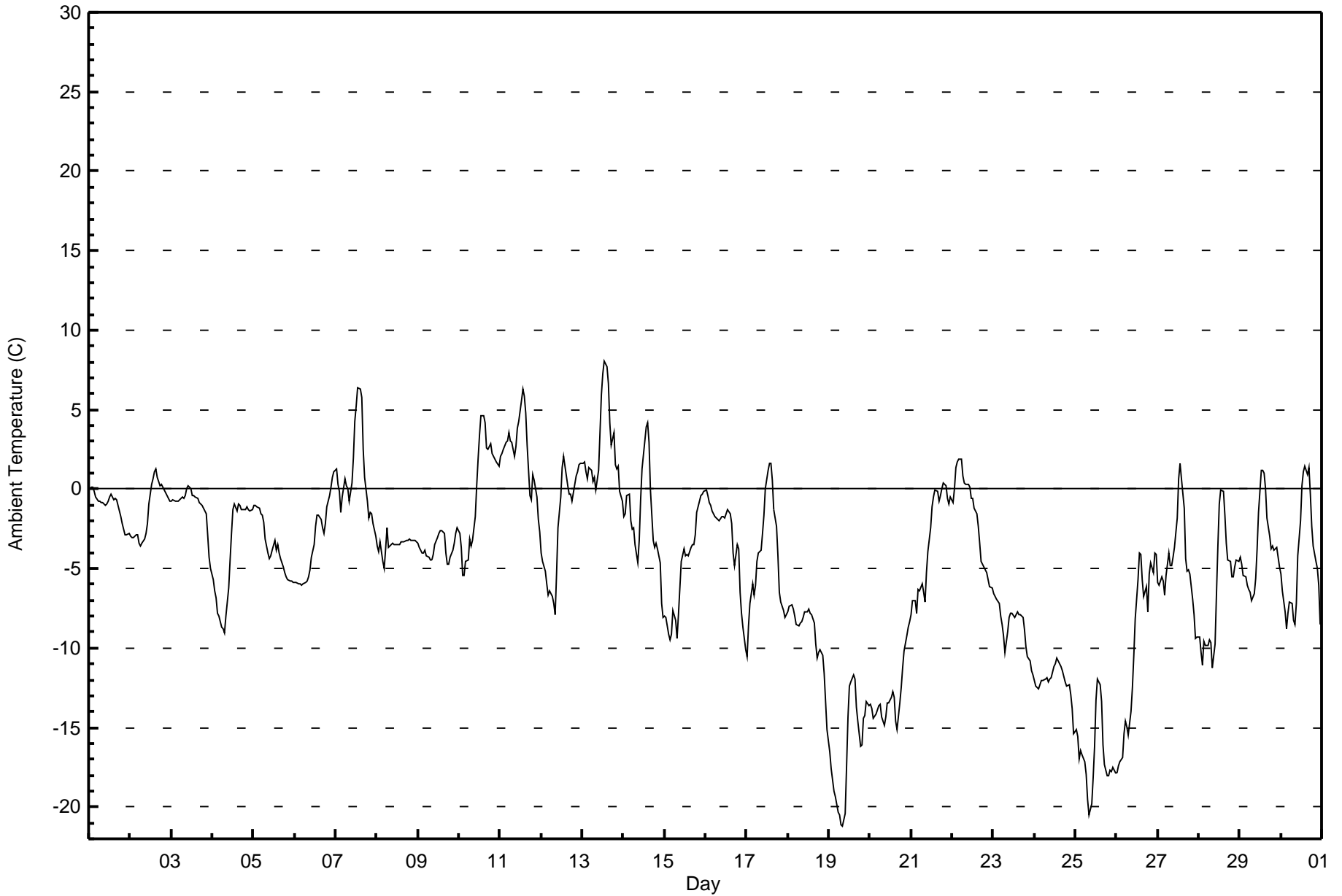
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	3	0.42	0.42
40 - 60	70	9.72	10.14
60 - 80	232	32.22	42.36
80 - 100	415	57.64	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 8.0 C on Nov 13 14:00		Maximum Daily Average: 2.6 C on Nov 13		Hours in Service: 720																							
Minimum Value: -21.2 C on Nov 19 09:00		Minimum Daily Average: -16.7 C on Nov 25		Hours of Data: 720																							
Maximum Diurnal Average: -1.7 C at hour 14		Minimum Diurnal Average: -6.5 C at hour 9		Hours of Missing Data: 0																							
Monthly Average: -4.72 C		Percentiles: P ₁ = -19.6 P ₁₀ = -13.1 Q ₁ = -7.8 Median = -3.7 Q ₃ = -0.7 P ₉₀ = 1.2 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-Nov	0.0	0.1	0.1	-0.1	-0.5	-0.7	-0.8	-0.9	-0.8	-1.0	-1.0	-0.7	-0.5	-0.3	-0.7	-0.6	-0.7	-1.0	-1.7	-2.2	-2.5	-2.9	-2.8	-2.8	-1.0	0.1	
2-Nov	-3.0	-3.1	-3.1	-2.9	-2.9	-3.4	-3.6	-3.4	-3.1	-2.7	-2.2	-0.9	0.3	0.7	1.1	1.2	0.7	0.2	0.3	0.2	-0.1	-0.4	-0.6	-0.7	-1.3	1.2	
3-Nov	-0.7	-0.7	-0.8	-0.8	-0.8	-0.6	-0.5	-0.6	-0.4	0.0	0.2	0.1	-0.4	-0.4	-0.5	-0.6	-0.9	-1.0	-1.0	-1.2	-1.5	-2.9	-4.3	-5.0	-1.1	0.2	
4-Nov	-5.7	-6.4	-6.8	-7.8	-8.0	-8.7	-8.8	-9.1	-8.0	-6.2	-4.5	-2.8	-1.3	-0.9	-1.4	-0.9	-1.0	-1.2	-1.3	-1.2	-1.1	-1.3	-1.3	-1.3	-4.0	-0.9	
5-Nov	-1.0	-1.0	-1.1	-1.2	-1.5	-1.6	-2.1	-3.1	-4.0	-4.3	-4.2	-3.8	-3.3	-3.8	-3.5	-4.0	-4.3	-4.9	-5.2	-5.5	-5.7	-5.8	-5.7	-5.9	-3.6	-1.0	
6-Nov	-5.9	-5.9	-6.0	-6.0	-6.0	-6.0	-5.9	-5.8	-5.6	-5.1	-4.3	-3.5	-2.4	-1.7	-1.6	-1.9	-2.4	-2.8	-2.2	-1.1	-0.4	0.2	0.8	1.1	-3.3	1.1	
7-Nov	1.2	0.3	-0.2	-1.5	-0.5	0.7	0.2	0.1	-0.8	0.4	2.0	4.3	5.3	6.4	6.3	5.8	2.5	0.8	-0.8	-1.8	-1.5	-1.5	-2.1	-2.9	0.9	6.4	
8-Nov	-3.6	-4.0	-3.3	-4.5	-5.0	-3.7	-2.4	-3.6	-3.5	-3.4	-3.4	-3.5	-3.5	-3.5	-3.3	-3.4	-3.3	-3.3	-3.2	-3.1	-3.2	-3.3	-3.2	-3.4	-3.5	-2.4	
9-Nov	-3.4	-3.7	-4.0	-4.0	-3.9	-4.2	-4.3	-4.4	-4.4	-4.1	-3.5	-3.0	-2.8	-2.6	-2.6	-2.8	-4.0	-4.8	-4.7	-4.3	-3.9	-3.4	-2.8	-2.4	-3.7	-2.4	
10-Nov	-2.8	-3.7	-5.4	-5.5	-4.6	-4.5	-3.1	-3.6	-3.2	-1.8	0.2	1.9	3.3	4.6	4.6	4.1	2.6	2.5	2.8	2.2	2.0	1.9	1.7	1.5	-0.1	4.6	
11-Nov	2.0	2.3	2.5	3.0	3.0	3.6	3.1	3.0	2.1	2.7	3.8	4.2	5.6	6.3	5.8	4.8	2.8	-0.4	-0.6	0.9	0.5	-0.5	-1.9	-2.7	2.3	6.3	
12-Nov	-4.0	-4.5	-5.2	-5.9	-6.7	-6.4	-6.7	-7.2	-7.9	-5.3	-2.4	-0.5	1.4	2.1	1.5	0.2	-0.3	-0.3	-0.8	-0.2	0.8	1.1	1.5	1.6	-2.3	2.1	
13-Nov	1.6	1.7	1.1	0.7	1.4	1.1	0.4	0.7	-0.1	1.2	3.5	5.9	7.3	8.0	7.7	6.6	4.2	2.8	3.5	1.5	1.3	1.5	-0.1	-0.8	2.6	8.0	
14-Nov	-1.7	-1.6	-0.4	-0.3	-2.0	-2.5	-2.5	-3.5	-4.6	-3.2	-0.6	1.3	3.1	4.0	4.1	3.0	-0.1	-3.2	-3.7	-3.4	-3.8	-4.7	-7.2	-8.1	-1.7	4.1	
15-Nov	-8.0	-8.1	-9.2	-9.5	-9.1	-7.6	-8.2	-9.4	-7.9	-6.2	-4.5	-3.7	-4.2	-4.1	-4.2	-3.7	-3.5	-3.5	-2.9	-1.5	-0.7	-0.4	-0.4	-0.2	-5.0	-0.2	
16-Nov	0.0	-0.4	-0.9	-1.0	-1.4	-1.7	-1.8	-1.9	-2.0	-1.7	-1.8	-1.6	-1.3	-1.5	-2.2	-4.0	-4.8	-3.5	-3.7	-6.5	-7.8	-8.7	-10.1	-3.0	0.0		
17-Nov	-10.6	-8.6	-7.2	-6.0	-6.6	-6.1	-4.6	-4.1	-3.8	-2.8	-1.6	0.0	1.1	1.7	1.6	0.6	-1.3	-2.4	-4.2	-6.5	-7.1	-7.6	-8.0	-7.9	-4.2	1.7	
18-Nov	-7.7	-7.4	-7.3	-7.6	-8.0	-8.5	-8.6	-8.5	-8.3	-8.1	-7.8	-7.7	-7.6	-7.8	-7.9	-8.4	-9.7	-10.7	-10.3	-10.1	-10.5	-11.6	-13.3	-15.1	-9.1	-7.3	
19-Nov	-16.5	-17.6	-18.3	-19.0	-19.4	-20.3	-20.5	-21.1	-21.2	-20.4	-17.4	-14.4	-12.4	-12.2	-11.7	-11.9	-13.7	-14.6	-16.2	-16.1	-14.4	-14.2	-13.4	-13.6	-16.3	-11.7	
20-Nov	-13.5	-13.8	-14.4	-14.1	-13.9	-13.6	-13.6	-14.3	-14.9	-14.3	-13.5	-13.5	-13.1	-12.8	-13.1	-14.6	-15.2	-13.5	-12.4	-11.2	-10.2	-9.3	-8.7	-8.3	-12.9	-8.3	
21-Nov	-7.9	-7.0	-7.0	-7.8	-6.3	-6.4	-6.0	-6.5	-7.1	-5.3	-4.0	-2.4	-1.1	-0.5	-0.1	-0.2	-0.8	-0.4	0.0	0.4	0.2	-0.6	-0.9	-0.5	-3.3	0.4	
22-Nov	-0.8	0.1	1.3	1.7	1.9	1.9	0.8	0.3	0.3	0.3	0.1	-0.6	-0.6	-1.2	-1.5	-2.4	-3.4	-4.6	-4.9	-5.1	-5.3	-5.7	-6.1	-6.2	-1.6	1.9	
23-Nov	-6.6	-6.8	-6.9	-7.2	-8.0	-8.5	-9.3	-10.3	-9.0	-8.1	-7.8	-7.8	-8.0	-7.9	-7.9	-7.9	-8.1	-8.9	-9.9	-10.5	-10.8	-11.4	-11.7	-8.6	-6.6		
24-Nov	-12.0	-12.4	-12.6	-12.3	-12.1	-12.0	-12.0	-11.8	-12.2	-12.0	-11.8	-11.2	-11.0	-10.6	-10.8	-11.2	-11.4	-11.8	-12.1	-12.4	-12.3	-13.0	-13.8	-15.4	-12.1	-10.6	
25-Nov	-15.2	-15.6	-16.9	-16.5	-16.7	-17.1	-18.0	-19.5	-20.5	-19.8	-18.1	-16.2	-13.3	-12.0	-12.3	-13.4	-16.1	-17.4	-18.1	-18.0	-17.7	-17.8	-17.5	-17.8	-16.7	-12.0	
26-Nov	-17.8	-17.4	-17.2	-16.9	-15.4	-14.6	-14.9	-15.5	-14.0	-12.5	-10.4	-8.2	-5.7	-4.0	-4.1	-5.7	-6.8	-6.1	-7.8	-5.3	-4.6	-5.2	-4.0	-4.1	-9.9	-4.0	
27-Nov	-5.8	-6.0	-5.5	-5.8	-6.7	-5.5	-4.0	-4.8	-4.8	-4.3	-3.7	-1.9	0.7	1.6	0.7	-1.2	-4.4	-5.1	-5.1	-5.4	-6.9	-7.9	-9.4	-9.3	-4.6	1.6	
28-Nov	-9.3	-10.3	-11.1	-9.5	-9.8	-9.9	-9.5	-9.7	-11.3	-9.8	-6.6	-3.6	-0.9	0.0	-0.1	-1.6	-3.4	-4.5	-4.5	-5.5	-5.5	-4.9	-4.4	-4.5	-6.3	0.0	
29-Nov	-4.3	-4.7	-5.5	-5.5	-6.0	-6.3	-6.5	-7.0	-6.6	-5.6	-3.8	-1.5	1.2	1.2	1.0	0.0	-1.8	-3.0	-3.7	-3.6	-3.9	-3.7	-4.3	-4.9	-3.7	1.2	
30-Nov	-5.3	-6.4	-7.7	-8.8	-7.8	-7.1	-7.2	-8.2	-8.5	-7.2	-4.2	-2.0	0.2	1.1	1.5	0.9	1.3	-0.3	-2.4	-3.6	-4.6	-5.0	-6.0	-8.5	-4.4	1.5	
		-5.6	-5.7	-6.0	-6.1	-6.1	-6.0	-6.0	-6.5	-6.5	-5.7	-4.4	-3.3	-2.1	-1.7	-1.8	-2.4	-3.5	-4.2	-4.5	-4.6	-4.7	-4.9	-5.3	-5.7	Diurnal Average	
		2.0	2.3	2.5	3.0	3.0	3.6	3.1	3.0	2.1	2.7	3.8	5.9	7.3	8.0	7.7	6.6	4.2	2.8	3.5	2.2	2.0	1.9	1.7	1.6	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Shell Muskeg River - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	6	0.83	0.83
-20 - 0	587	81.53	82.36
0 - 10	127	17.64	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

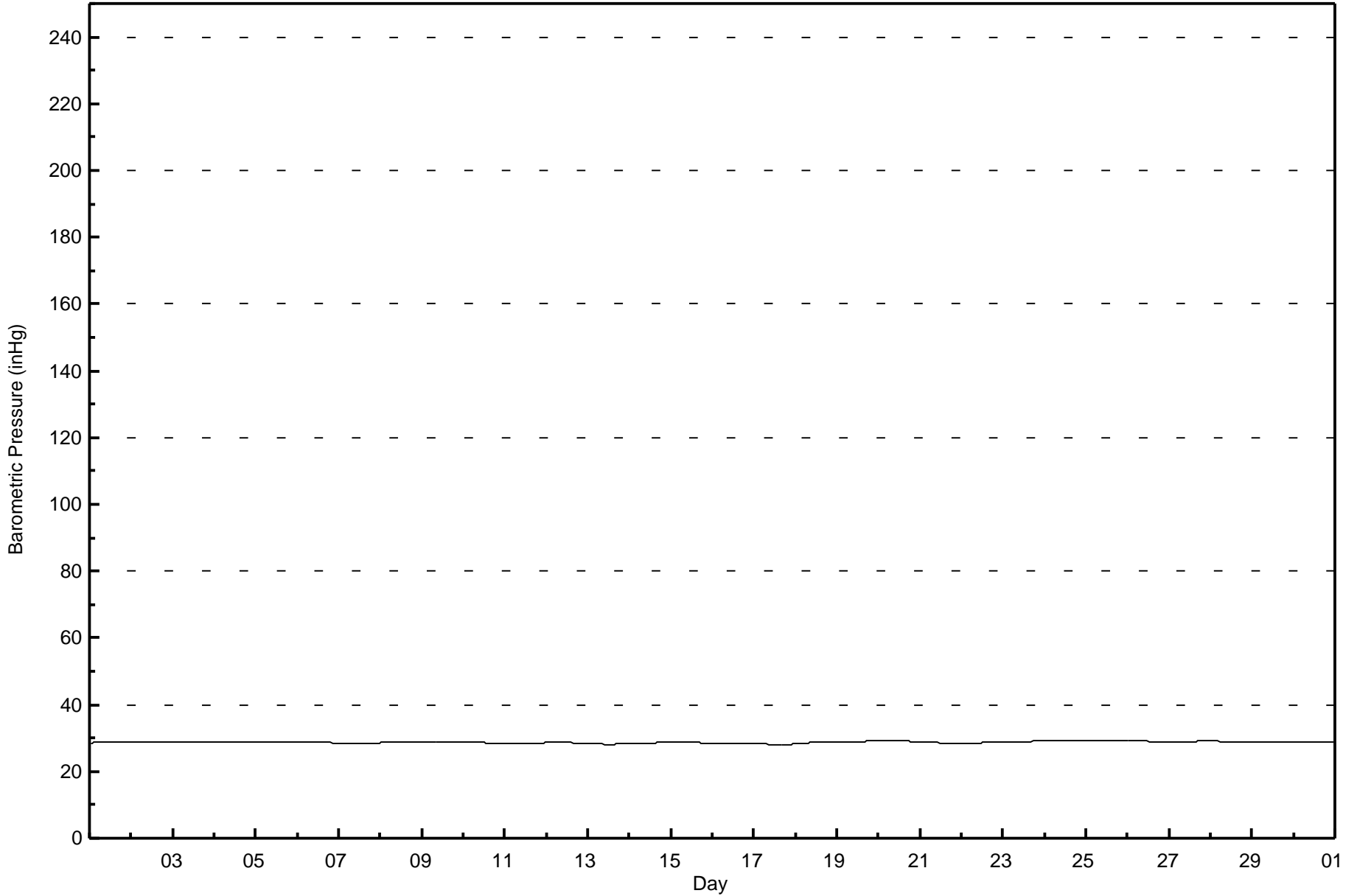


Maximum Value: 29.3 inHg on Nov 24 13:00 Maximum Daily Average: 29.2 inHg on Nov 24																						Hours in Service: 720 Hours of Data: 720																												
Minimum Value: 28.1 inHg on Nov 17 15:00 Minimum Daily Average: 28.2 inHg on Nov 17 Maximum Diurnal Average: 28.8 inHg at hour 11 Minimum Diurnal Average: 28.7 inHg at hour 1 Monthly Average: 28.76 inHg Percentiles: P ₁ = 28.1 P ₁₀ = 28.4 Q ₁ = 28.6 Median = 28.8 Q ₃ = 28.9 P ₉₀ = 29.1 P ₉₉ = 29.3																						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-Nov	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.7	28.9																								
2-Nov	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	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																								
3-Nov	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																								
4-Nov	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.8																								
5-Nov	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0																								
6-Nov	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.6	28.6	28.5	28.5	28.5	28.8	29.0																								
7-Nov	28.5	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.5	28.6																								
8-Nov	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.8	29.0																								
9-Nov	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0																								
10-Nov	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.6	28.8																								
11-Nov	28.4	28.4	28.4	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.5	28.6																								
12-Nov	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.4	28.4	28.3	28.3	28.3	28.6	28.8																								
13-Nov	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.2	28.3																								
14-Nov	28.4	28.4	28.4	28.4	28.4	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	28.7	28.7	28.7	28.7	28.5	28.7																								
15-Nov	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.6	28.7																								
16-Nov	28.4	28.4	28.4	28.4	28.4	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	28.5	28.5	28.5	28.5	28.5	28.6																								
17-Nov	28.5	28.4	28.4	28.3	28.3	28.2	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.2	28.2	28.2	28.2	28.5																								
18-Nov	28.3	28.3	28.3	28.4	28.4	28.5	28.5	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.7	28.9																								
19-Nov	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1																								
20-Nov	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	29.1	29.1	29.1	29.1	29.0	29.0	28.9	28.9	28.8	28.8	29.1	29.2																								
21-Nov	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.6	28.8																								
22-Nov	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.5	28.5	28.5	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	28.6	28.8																									
23-Nov	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	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.0	29.1																									
24-Nov	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3																								
25-Nov	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2																								
26-Nov	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.2																								
27-Nov	28.9	28.8	28.8	28.8	28.8	28.9	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	29.0																								
28-Nov	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	29.0																								
29-Nov	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9																								
30-Nov	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8																								
																								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	28.7	28.7	Diurnal Average			
																								29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - November 2015





Maximum Speed: 28 km/h on Nov 11 14:00	Maximum Daily Speed Average: 15.3 km/h on Nov 11	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 4 16:00	Minimum Daily Speed Average: 0.9 km/h on Nov 3	Hours of Data: 665
Maximum Diurnal Speed Average: 6.5 km/h at hour 24	Minimum Diurnal Speed Average: 2.7 km/h at hour 17	Hours of Missing Data: 55
Monthly Average Velocity: 4.6 km/h 199.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 7 Median = 10 Q ₃ = 14 P ₉₀ = 17 P ₉₉ = 23	Percent Operational Time: 92.4

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-Nov	NE17	NE18	NE16	NNE18	NNE17	NNE17	NNE17	NNE16	NE14	NNE13	NNE18	NE17	NE14	ENE11	NE13	NNE14	NNE16	NNE15	NNE17	NNE19	NE12	ENE10	ENE9	ENE9	NE14.4	NNE19	
2-Nov	E8	ENE6	NNW5	NNE12	NE12	ENE10	ENE9	E5	E2	E2	S1	SSE3	S8	S8	S8	SSE6	SE4	SSE8	SSE11	S11	S10	SSE9	SSE10	SSE9	SE4.3	NE12	
3-Nov	SSE9	SSE10	SSE6	S6	S5	S4	S4	SSE4	SSE1	WNW1	NW4	NNE11	NE13	NNE9	NNE11	NE9	NNE5	N3	SSW1	SSE4	WSW9	WSW12	SW10	SW14	S0.9	SW14	
4-Nov	SSW10	SSW9	SSW8	S8	SSW7	S7	S7	S6	SW5	SW3	WSW4	ESE3	WNW2	NW5	NNW4	W0	WNW4	NW5	SW3	WSW4	WSW3	SSW3	SSW6	W3	SW3.5	SSW10	
5-Nov	NW8	NW7	NW10	NNW11	NW10	N10	NNE14	NNE16	N13	NNW12	NNW16	N15	N12	NNW10	NNW12	NNW11	NNW13	NNW14	NNW12	NNW11	NNW9	NNW8	NW6	W6	NNW10.5	NNE16	
6-Nov	WSW7	SW4	SSW5	S4	SSE4	SSE5	SSE6	SSE6	SSE5	S8	S8	S8	SSE8	S11	S11	SSE11	SSE9	SSE12	SSE14	SSE16	S17	S17	S18	S14	S9.1	S18	
7-Nov	S12	S9	SSW7	SW7	SW16	WSW20	SW12	SW7	S7	SSW7	SW13	SW14	SSW8	S8	SSW11	SW8	SW6	S6	SSW7	SSW8	SSW8	S6	S7	S6	SSW8.6	WSW20	
8-Nov	SSW8	SW7	WSW3	S3	SSE2	NNE10	NE12	NE16	NNE18	NNE22	NE22	NNE20	NE17	NNE16	NNE15	NNE13	NE14	NE11	NNE11	NNE14	NE13	NE11	NNE13	NE9	NNE10.6	NNE22	
9-Nov	ENE7	ENE4	SSW4	SW2	WNW1	S3	SSW4	SW3	ESE3	S2	S5	S6	S7	S7	SSW9	SW10	S6	S7	SSW7	S6	S6	SSE8	S8	S10	S4.6	S10	
10-Nov	SSE8	S9	S11	S12	S12	S13	S15	S14	S15	S16	S16	S16	S16	S17	S16	S15	S15	S17	S21	S21	S20	S19	S15	S12	S14.9	S21	
11-Nov	S12	S10	S14	S17	S16	SSW14	SSW14	SSW16	SW16	SW20	SW21	SW20	WSW23	WSW28	WSW25	SW18	SW16	SSW9	SW15	WSW19	WSW20	SW16	SSW12	SSW9	SW15.3	WSW28	
12-Nov	SW10	SSW7	SW8	S7	SSW7	SSW9	SSW9	SSW9	S9	S8	S11	S13	S13	S14	SSE13	SSE11	SSE11	SSE12	SSE12	SSE15	SSE19	SSE21	S17	SSE19	S11.5	SSE21	
13-Nov	S18	S17	S16	S14	S14	S15	S13	S14	S15	SSW15	SSW16	SSW15	SW23	SW18	SW17	SW14	WSW14	SW12	SW19	SW13	SW16	SW18	SW17	SW14	SSW14.4	SW23	
14-Nov	SSW7	SSW7	SW15	SW15	SW13	SW14	SSW12	S9	SSE9	S10	S10	S8	SW13	SW18	SW16	SW9	SW5	SSW6	SSW6	S7	S7	SW3	S5	SSW7	SSW9.2	SW18	
15-Nov	SW4	S4	S5	S6	S4	WSW4	W3	AF	NE7	NE7	NNW7	N9	N10	NNE8	NNE16	NNE21	NNE24	NNE25	NNE28	NE24	NE23	NE20	NE17	NE16	NNE9.8	NNE28	
16-Nov	NNE18	NNE14	N11	NNE12	NNW6	NW9	NW9	WSW5	WSW9	WSW16	W17	W18	W17	W14	WSW17	WSW18	SW5	SSW8	SW13	SSW10	SSE7	S6	SSW5	SSE6	W6.0	WSW18	
17-Nov	S8	SE8	SE7	S6	SW4	SSE7	SSE10	SSE10	SSE11	S13	S15	S16	S13	SSW14	SSW13	WSW15	SW13	W13	WNW18	W17	WSW18	WSW22	WSW16	WSW17	SW9.3	WSW22	
18-Nov	W13	WNW7	NNW15	NNW14	NW14	NW15	NNW14	NNW14	NNW18	N18	NNW21	NNW22	NNW20	NNW15	NW14	NNW13	NNW14	NNW10	NW9	WNW10	WNW9	WNW8	WNW3	S5	NNW11.7	NNW22	
19-Nov	S7	SSW7	S8	SSW6	SSW5	SSW6	S5	S5	S6	SSW6	SW3	WSW4	W4	NW2	ENE7	NE5	SE2	SSE2	S3	SSW4	SW2	NW2	NW7	WNW3	SSW2.6	S8	
20-Nov	SW4	SW4	WSW6	SW6	SW5	W11	W12	W9	SW6	SW7	WSW15	SW15	SSW12	S12	S11	SSE9	S9	SSE12	SSE13	S13	S14	S15	S11	S10	SSW8.4	SW15	
21-Nov	SSW9	SSW8	SW12	S7	SSW12	S11	SSW10	SSW12	S12	S8	SSW8	SSW10	SSW13	SSW11	S9	S9	S7	S8	SSW9	SW11	S7	SSW9	SSW9	SW10	SSW9.3	SSW13	
22-Nov	SW9	SW12	WSW17	WSW15	WSW11	WNW4	E3	SE3	NE4	NNW9	NNE11	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	WSW17	
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---	
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---	
25-Nov	SSW10	SSW9	SSW9	SSW12	SSW10	SSW6	SW10	SSW6	SSW6	SSW5	S4	SSW4	S5	SSW5	SSW6	SSW5	S6	S5	S7	SSW8	S8	S8	S9	SSW9	SSW7.0	SSW12	
26-Nov	SSW10	SSW10	S10	S12	S13	SSW11	S10	SSW12	S11	S13	S12	S12	S12	S11	S10	S8	SSE8	S8	S9	SW16	S10	S11	SSW14	SSW14	S10.8	SW16	
27-Nov	S11	S11	S12	S8	SSE7	S9	SW18	SSW11	SW8	SW5	S6	SSW5	SW6	WSW2	SSW3	S5	SSE5	S9	S7	SSW7	S6	SSW6	S5	S8	SSW7.1	SW18	
28-Nov	S9	S8	S7	S8	S8	S9	S12	S9	S9	S11	S12	S11	S11	S12	S9	S9	S9	S10	S9	S9	S10	S10	S10	S10	S9.6	S12	
29-Nov	S10	SSE7	S7	S8	S9	S8	SSE7	S9	S9	S9	S8	S9	S11	SSE8	S9	S10	S10	S10	S10	S10	S12	S10	S11	S11	S12	S9.3	S12
30-Nov	S14	S11	S7	S9	SSW12	S12	S13	SSW11	SSW11	SSW9	SSW12	SSW14	SSW15	SSW17	SSW17	S12	SSW14	SW17	SW12	SSW9	SSE7	S7	S6	SSE6	SSW11.1	SSW17	

S5.5 S4.9SSW5.0SSW4.4SSW4.7SSW4.4SSW4.4 S4.4 S3.5SSW3.6 SW4.0SSW4.0SSW4.8SSW5.5SSW5.1SSW3.5SSW2.7 S3.4SSW4.3SSW5.1SSW5.5SSW6.1SSW6.0SSW6.5	Diurnal Average
SSE18 NE18WSW17NNE18 NNE17WSW20 SW18NNE16 NNE18 NNE22 NE22NNW22WSW23WSW28WSW25 NNE21 NNE24 NNE25 NNE28 NE24 NE23WSW22 S18 SSE19	Diurnal Maximum

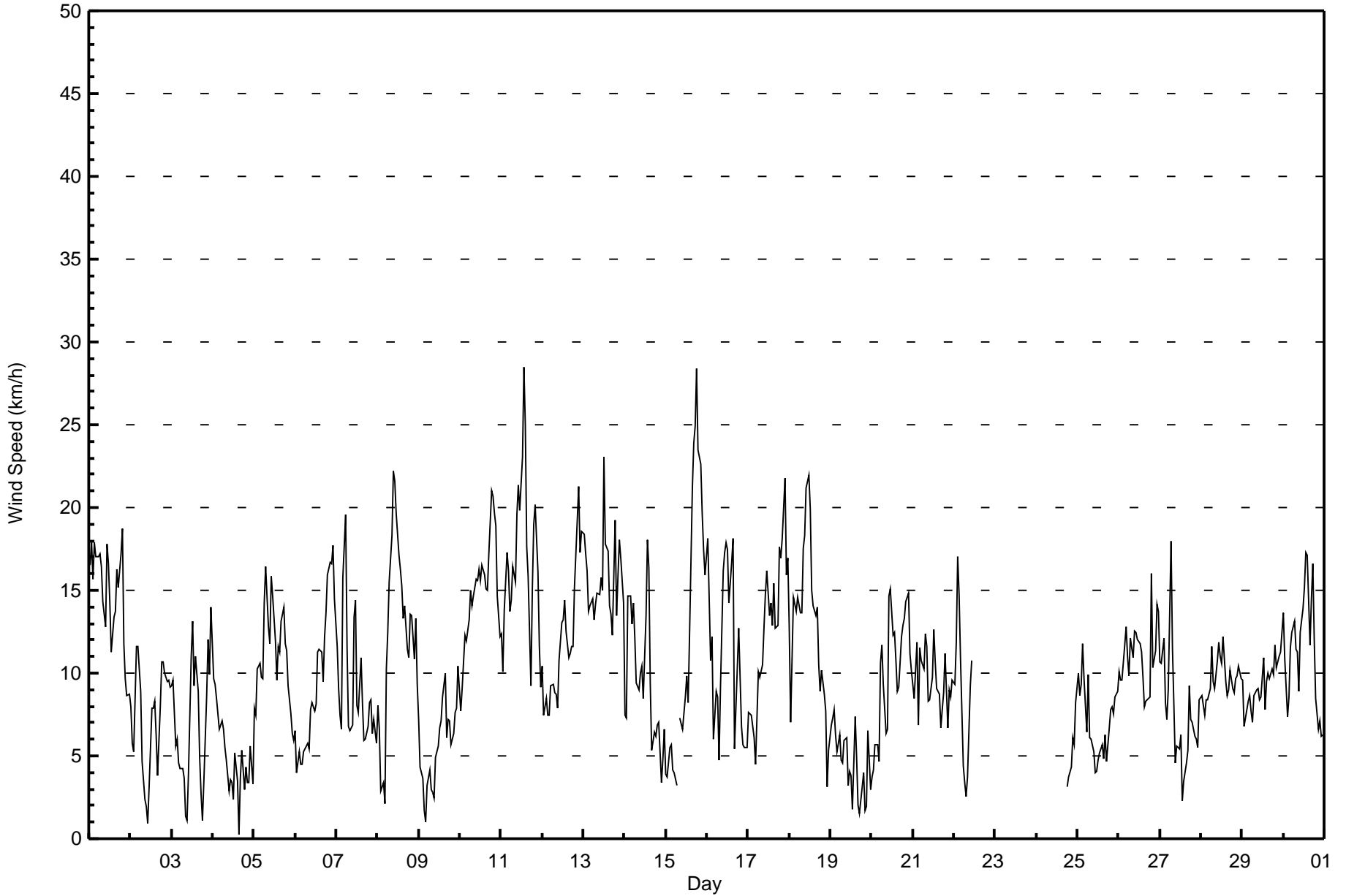
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 km/h on Nov 18 11:00	Hours of Data: 665
Minimum Value: 1 km/h on Nov 15 06:00	Hours of Missing Data: 55
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 92.4

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

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	106	15.94	15.94
6 - 11	310	46.62	62.56
12 - 19	222	33.38	95.94
20 - 28	27	4.06	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 665

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	1	2	1	4	2	3	10	23	15	18	8	4	7	5	2	106
6 - 11	4	7	6	9	1	0	2	33	130	68	18	5	4	4	9	10	310
12 - 19	3	26	16	0	0	0	0	12	64	25	36	13	8	1	3	15	222
20 - 28	0	6	4	0	0	0	0	1	3	0	4	6	0	0	0	3	27
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	8	40	28	10	5	2	5	56	220	108	76	32	16	12	17	30	665

Total Number of Valid Hours: 665

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Shell Muskeg River - November 2015

Direction of Maximum Speed: 248 deg on Nov 11 14:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 220.1 deg on Nov 11		Hours of Data:	665
Direction of Minimum Speed: 269 deg on Nov 4 16:00		Hours of Missing Data:	55
Direction of Minimum Daily Speed Average: 0.9 deg on Nov 3		Percent Operational Time:	92.4
Monthly Average Direction: 208.8 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	52	52	34	27	23	23	27	30	40	31	28	40	51	58	53	31	27	22	23	26	51	69	66	65	37.1
2-Nov	80	74	332	22	47	72	78	96	88	101	183	162	180	186	171	165	144	162	162	171	169	167	168	165	134.8
3-Nov	164	164	167	170	170	170	176	161	151	286	312	33	42	24	25	35	15	9	198	167	253	239	218	230	173.7
4-Nov	201	197	199	186	200	180	185	181	231	225	242	109	282	314	331	269	287	307	235	238	237	192	211	279	216.0
5-Nov	316	322	319	330	321	353	22	17	352	331	340	350	349	348	339	342	343	346	341	343	344	333	319	278	342.1
6-Nov	257	226	201	171	166	165	164	155	161	174	175	182	158	172	175	165	157	154	158	165	171	173	172	182	171.4
7-Nov	189	185	213	223	232	241	232	220	170	196	217	218	193	188	213	216	217	188	193	196	197	174	187	184	208.0
8-Nov	203	224	243	176	164	27	48	52	29	29	36	31	37	27	22	16	35	41	13	26	37	35	33	53	33.1
9-Nov	63	65	212	221	297	183	206	218	106	185	181	176	176	187	196	215	190	191	205	177	179	164	177	176	182.7
10-Nov	166	172	174	179	180	176	178	174	180	179	185	183	183	184	184	179	176	180	181	183	182	185	184	178	180.1
11-Nov	182	185	179	179	179	193	203	209	215	220	225	234	244	248	239	222	228	209	235	247	250	236	207	201	220.1
12-Nov	214	209	215	184	195	199	195	192	181	189	188	182	177	179	168	163	158	159	158	163	168	166	171	167	177.4
13-Nov	169	178	178	179	183	181	181	184	188	192	201	211	226	218	235	231	240	222	233	221	233	231	225	230	207.9
14-Nov	208	199	229	225	220	223	206	186	162	172	181	188	216	227	226	228	217	198	192	181	187	228	176	206	207.3
15-Nov	226	177	191	178	170	241	277	AF	54	44	345	6	6	14	16	26	21	24	25	39	41	41	40	40	29.4
16-Nov	26	14	353	19	342	315	311	240	255	254	260	276	279	262	239	251	219	206	220	205	167	191	194	154	267.7
17-Nov	178	145	135	178	235	160	166	167	168	179	179	184	188	211	206	246	223	275	286	271	256	256	246	252	218.1
18-Nov	260	283	336	337	326	324	329	336	342	349	345	348	344	339	325	337	348	340	321	299	284	282	283	185	329.2
19-Nov	191	193	184	199	199	192	181	190	187	193	222	255	260	324	69	49	141	149	179	197	232	319	324	288	198.4
20-Nov	236	221	253	225	219	266	266	260	218	214	245	233	212	187	183	162	172	168	168	173	178	184	185	191	204.6
21-Nov	204	202	226	173	196	186	192	198	184	183	195	197	210	204	187	187	173	188	204	218	185	209	208	214	198.0
22-Nov	216	230	243	243	254	298	99	138	45	345	24	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	272	AF	227	176	200	196	188	202	--
25-Nov	209	195	195	211	208	202	214	202	200	197	183	193	181	200	194	193	179	173	189	193	187	179	185	193	195.7
26-Nov	197	204	190	185	189	192	190	199	190	184	181	179	182	187	184	171	161	172	177	214	187	187	209	207	189.6
27-Nov	182	180	178	171	150	185	231	213	216	217	175	199	218	238	208	182	165	189	187	199	183	194	171	186	192.7
28-Nov	180	172	173	183	176	190	181	180	175	181	182	180	184	188	176	179	187	188	190	169	171	176	186	178	180.5
29-Nov	186	160	174	184	184	185	168	176	187	179	179	172	177	167	173	183	179	176	182	187	190	188	183	183	180.0
30-Nov	185	182	174	171	194	190	185	202	206	194	200	197	201	207	212	176	201	214	215	192	162	175	173	160	194.1

189.6 185.3 205.7 195.4 202.8 205.1 197.6 189.1 185.8 200.1 213.8 209.1 211.2 213.4 209.5 206.2 197.7 190.1 205.1 199.0 194.0 195.8 191.7 192.5

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

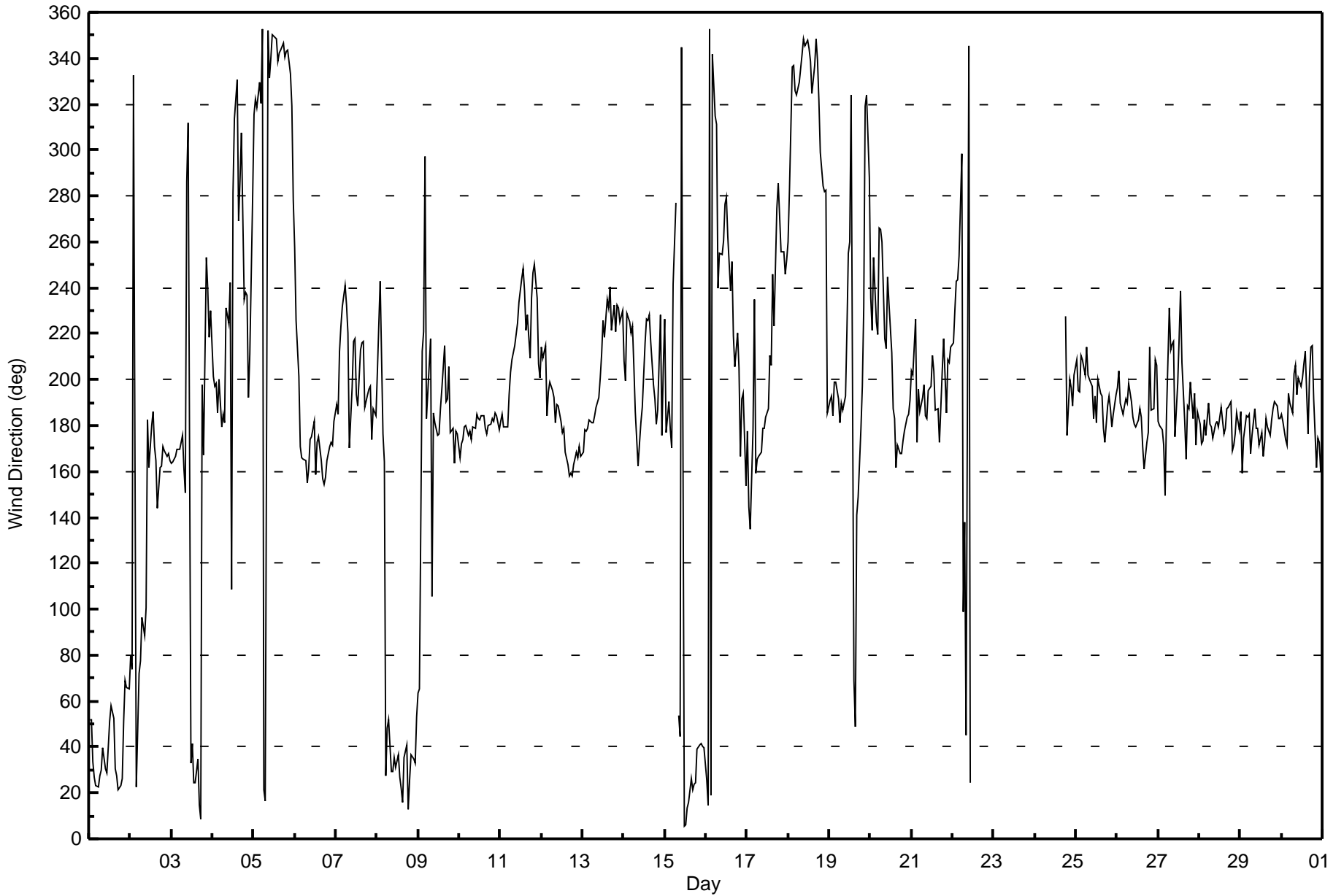
Shell Muskeg River - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 92 deg on Nov 19 22:00			Hours of Data:	665
Minimum Value: 6 deg on Nov 13 23:00			Hours of Missing Data:	55
			Hours of Calibration:	0
			Percent Operational Time:	92.4
Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 13 Median = 16 Q ₃ = 21 P ₉₀ = 30 P ₉₉ = 81				

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	14	9	17	12	14	14	10	12	14	19	12	15	12	18	11	22	12	16	14	11	22	23	26	31	31	
2-Nov	21	55	39	26	15	16	19	19	27	40	81	46	44	21	18	16	16	13	13	15	13	12	13	12	81	
3-Nov	12	13	13	13	13	14	17	11	52	63	51	22	13	22	14	19	41	68	81	26	28	14	14	12	81	
4-Nov	14	17	18	12	15	13	17	16	15	41	38	44	40	18	26	90	32	11	30	24	38	45	25	62	90	
5-Nov	22	19	15	22	16	25	18	20	20	24	22	18	23	28	25	20	17	16	18	17	20	19	23	18	28	
6-Nov	8	40	17	19	16	12	13	17	17	14	14	22	17	20	18	15	15	14	14	13	15	15	14	15	40	
7-Nov	18	15	26	22	10	11	27	62	35	47	12	16	28	26	16	15	25	15	10	12	20	25	17	42	62	
8-Nov	17	53	68	58	71	23	18	9	15	13	13	13	15	19	23	26	21	32	25	15	15	18	14	23	71	
9-Nov	42	71	42	81	91	34	19	31	61	64	24	20	19	20	21	16	13	17	17	17	17	12	18	14	91	
10-Nov	13	12	10	11	12	11	14	12	13	14	17	17	18	18	17	16	13	15	15	16	16	17	17	15	18	
11-Nov	17	16	16	15	15	20	17	16	13	10	11	9	11	10	11	10	9	13	18	8	8	11	16	17	20	
12-Nov	12	15	16	23	17	14	14	15	17	20	20	18	18	18	13	13	13	14	14	15	15	15	18	15	23	
13-Nov	14	15	14	15	17	14	14	16	16	18	19	19	12	15	10	13	7	11	10	8	8	6	6	9	19	
14-Nov	33	30	9	8	10	12	19	13	19	14	19	26	19	10	9	8	23	16	16	11	18	25	12	14	33	
15-Nov	33	15	12	22	26	20	21	AF	10	15	27	18	21	22	17	6	8	10	9	10	9	9	11	11	33	
16-Nov	8	20	21	21	58	18	22	32	15	9	12	13	14	17	14	14	29	15	12	17	20	20	14	21	58	
17-Nov	22	21	22	51	52	20	16	14	14	14	15	16	18	19	19	27	11	26	16	14	11	10	11	9	52	
18-Nov	11	22	22	20	21	20	23	23	20	19	21	19	20	23	21	21	14	19	20	13	15	13	60	15	60	
19-Nov	14	14	11	13	16	17	14	8	11	21	44	29	28	69	15	83	55	73	27	27	78	92	41	66	92	
20-Nov	23	19	19	24	22	13	12	12	16	24	10	16	19	18	18	14	13	14	12	13	14	16	18	19	24	
21-Nov	18	22	12	30	21	23	21	19	13	16	20	23	18	21	19	16	12	15	17	14	24	20	15	15	30	
22-Nov	13	9	9	8	11	74	49	37	46	17	30	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	74	
23-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	23
25-Nov	15	16	16	14	18	17	15	14	12	19	26	29	24	26	20	17	12	21	10	10	12	10	13	15	29	
26-Nov	13	12	13	12	13	13	15	14	14	14	14	16	17	17	19	24	15	13	30	15	23	23	20	22	30	
27-Nov	14	14	17	18	18	27	11	14	47	50	16	23	15	41	27	18	27	13	16	14	28	15	15	13	50	
28-Nov	11	10	21	17	12	15	10	15	14	9	14	14	16	17	16	14	15	14	14	12	14	18	17	16	21	
29-Nov	17	17	16	12	12	16	10	11	13	13	13	16	17	18	14	14	12	11	11	13	16	16	14	13	18	
30-Nov	13	14	13	13	17	15	15	14	12	17	16	19	16	16	13	16	13	10	19	14	24	22	22	13	24	

42	71	68	81	91	74	49	62	61	64	81	46	44	69	27	90	55	73	81	27	78	92	60	66	
Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 13, 2015	Last Calibration	October 26, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	14:30
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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	802	770
Calculated slope	0.993100	1.002701	Chamber temp	44.9	44.9
Calculated intercept	2.775660	0.314501	Pressure	706.3	689.7
Analyzer Background	6.1	8.8	Flow	0.443	0.433
Analyzer Coefficient	1.206	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	778.6	1.037
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	83.6	807.6	805.5	1.003
second point	5000	42.0	405.7	403.5	1.005
third point	5000	21.1	203.8	203.1	1.004
as left zero	6000	0.0	0.0	-0.1	----
as left span	5000	83.6	807.6	804.8	1.003
Average Correction Factor					1.004

Corrected As found 778.7 Previous response 810.4 % change 4.1%

Notes:

Replaced trigger pack after as founds to reduce lamp voltage noise. Changed inlet filter after trigger pack replacement. Adjusted zero and span.

Calibration Performed By: Evan Magill



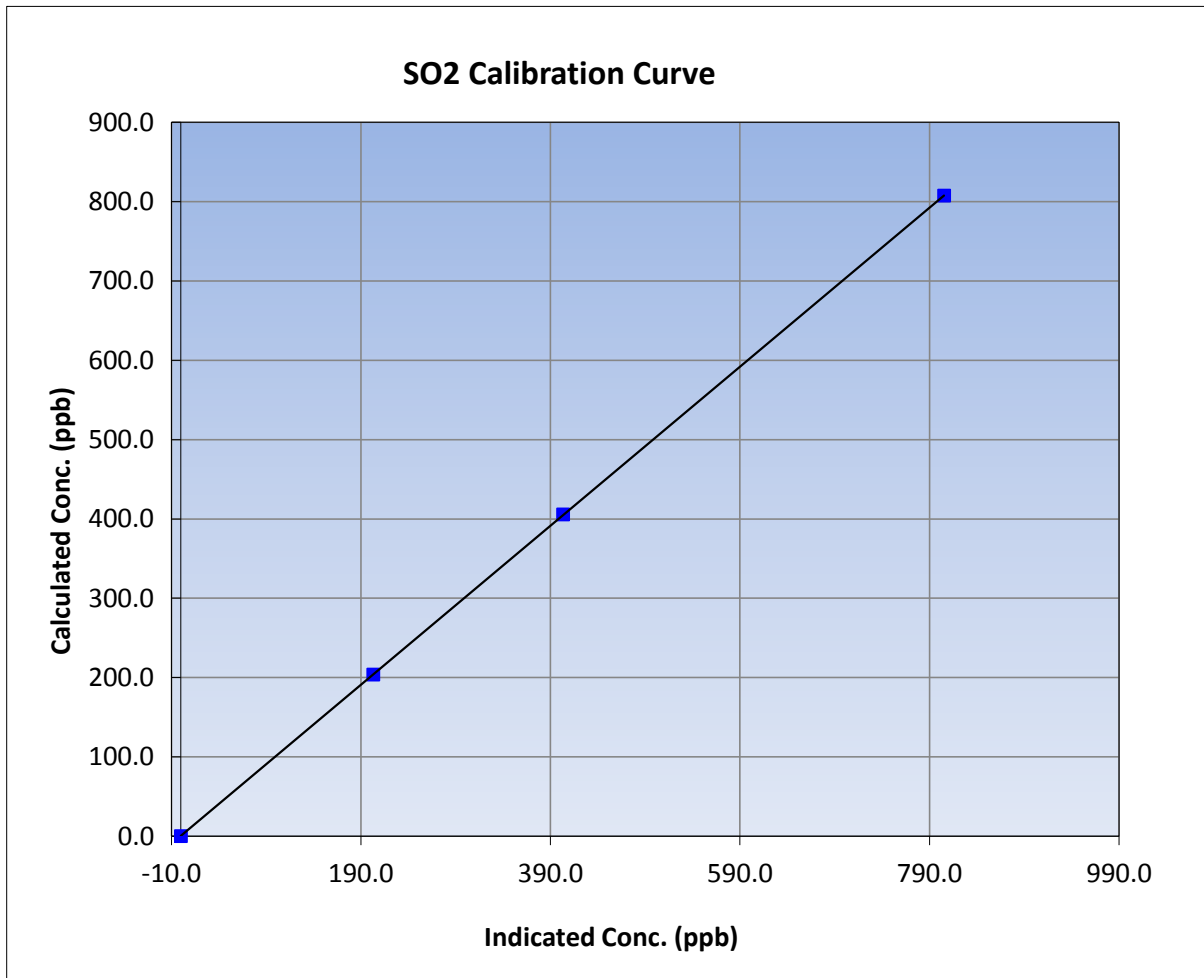
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 13, 2015	Previous Calibration	October 26, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:40	End Time (MST)	14:30
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

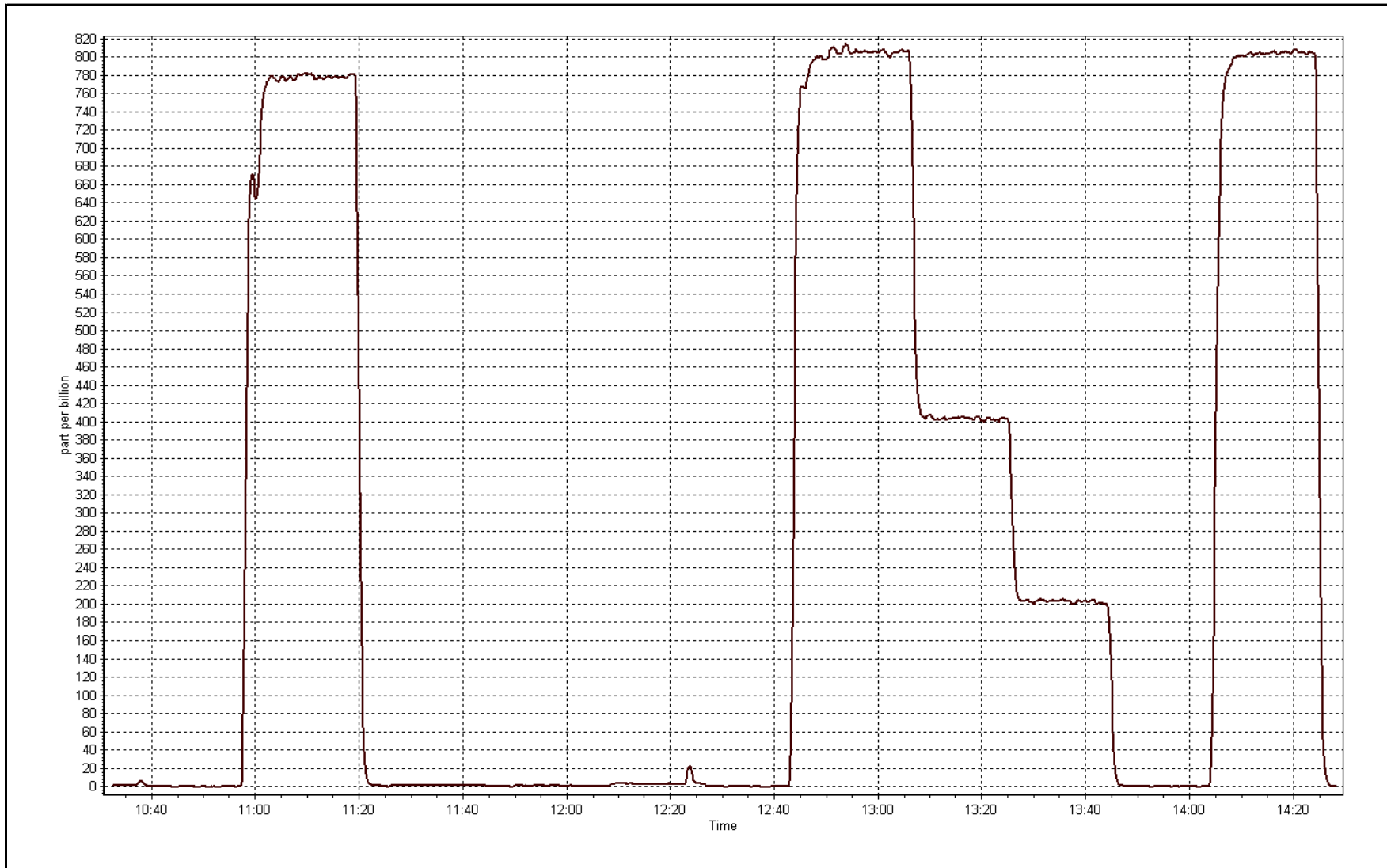
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999997
807.6	805.5	1.0026		
405.7	403.5	1.0055	Slope	1.002701
203.8	203.1	1.0037		
			Intercept	0.314501



SO2 Calibration Plot

Date: November 13, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-13-15	Last Calibration	October-26-15
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	14:30
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	34.9	34.8
Calculated slope	0.993473	0.999881	Fuel Pressure	24.2	24.2
Calculated intercept	0.065942	0.028582	Analyzer Coeff	4.52	4.70
			Analyzer BKG	2.460	2.300

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
---------------	---------------	-------------------	------------

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.26	----
as found span	5000	83.6	17.02	16.12	1.056
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	83.6	17.02	17.01	1.000
second point	5000	42.0	8.55	8.51	1.005
third point	5000	21.1	4.29	4.21	1.020
as left zero	6000	0.0	0.00	0.07	----
as left span	5000	83.6	17.02	17.04	0.999
Average Correction Factor					1.008

Corrected As found	16.38	Previous response	17.06	% change	4.2%
--------------------	-------	-------------------	-------	----------	------

Notes:

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

Calibration Performed By:

Evan Magill



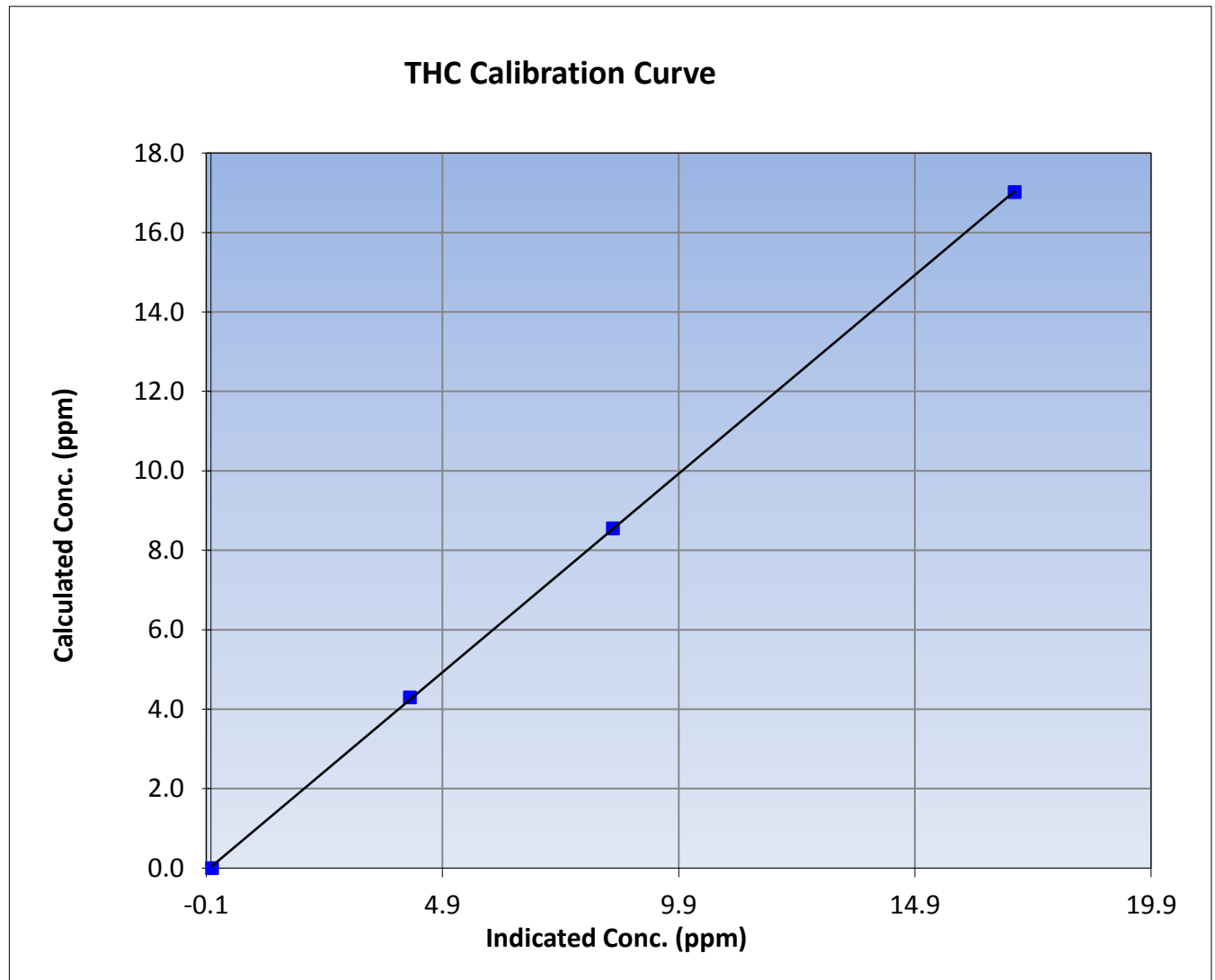
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November 13, 2015	Previous Calibration	October 26, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:40	End Time (MST)	14:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

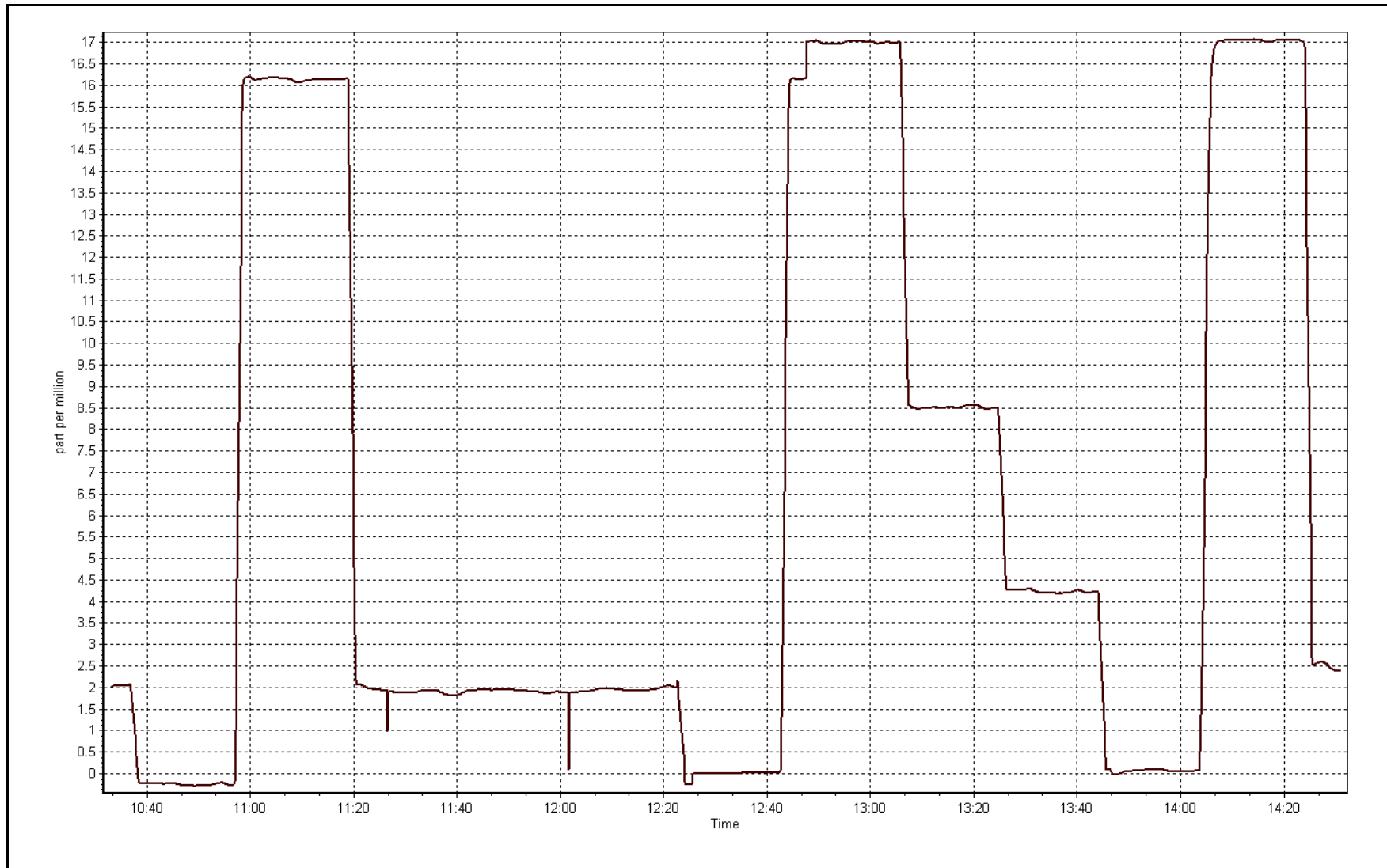
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999961
17.02	17.01	1.0004		
8.55	8.51	1.0046	Slope	0.999881
4.29	4.21	1.0202		
			Intercept	0.028582



THC Calibration Plot

Date: November 13, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 21, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	14:20
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
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999939	0.999693	0.998810
	Data Offset	0.473793	1.117846	1.100402
Current Calibration	Data Slope	0.998879	0.998227	1.004899
	Data Offset	-0.047313	0.384743	1.603146

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.767		0.787	
NOx coefficient	0.997		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.4		8.6	
NOx bkgrnd	8.7		8.9	
Chamber Temp	50.4	Deg C	50	Deg C
Moly Temp	325.3	Deg C	324.2	Deg C
PMT voltage	-744.4	V	-774	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	173.1	mmHg	173.1	mmHg
R Cell Press Nox	172.8	mmHg	172.8	mmHg
NO sample flow	0.874	lpm	0.881	lpm
Nox sample Flow	0.876	lpm	0.884	lpm

Notes:

Changed inlet filter after as founds. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 24, 2015

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
as found span	5000	83.6	802.6	802.6	0.0	783.6	782.8	0.8	1.0242	1.0253
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
high point	5000	83.6	802.6	802.6	0.0	803.3	803.8	-0.5	0.9991	0.9985
second point	5000	42.0	403.2	403.2	0.0	404.2	403.5	0.7	0.9976	0.9993
third point	5000	21.1	202.6	202.6	0.0	202.9	202.0	0.9	0.9984	1.0026
as left zero	6000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2	----	----
as left span	5000	83.6	802.6	510.6	292.0	802.1	503.5	298.6	1.0005	1.0141
Average Correction Factor									0.9984	1.0001

Corrected As found
Previous Response

NO_x= 783.8
NO_x= 802.1

NO= 782.8
NO= 801.7

Percent Change

NO_x= 2.3%

NO= 2.4%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

83.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.2			N/A	
1st NO2 (300)	----	510.6	294.0	802.5	510.6	291.9	0.9837	1.0000	1.0074	99.3%
2nd NO2 (200)	----	601.5	203.1	801.8	601.5	200.3	0.9845	1.0000	1.0140	98.6%
3rd NO2 (100)	----	696.9	107.8	800.5	696.9	103.6	0.9861	1.0000	1.0399	96.2%
4th NO2 (0)	804.6	----	-1.4	803.2	804.6	-1.4	0.9828	1.0000	N/A	----
Average Correction Factor							0.9842	1.0000	1.0204	98.0%

Calibration Performed By:

Evan Magill



Wood Buffalo Environmental Association

NO_x Calibration Summary

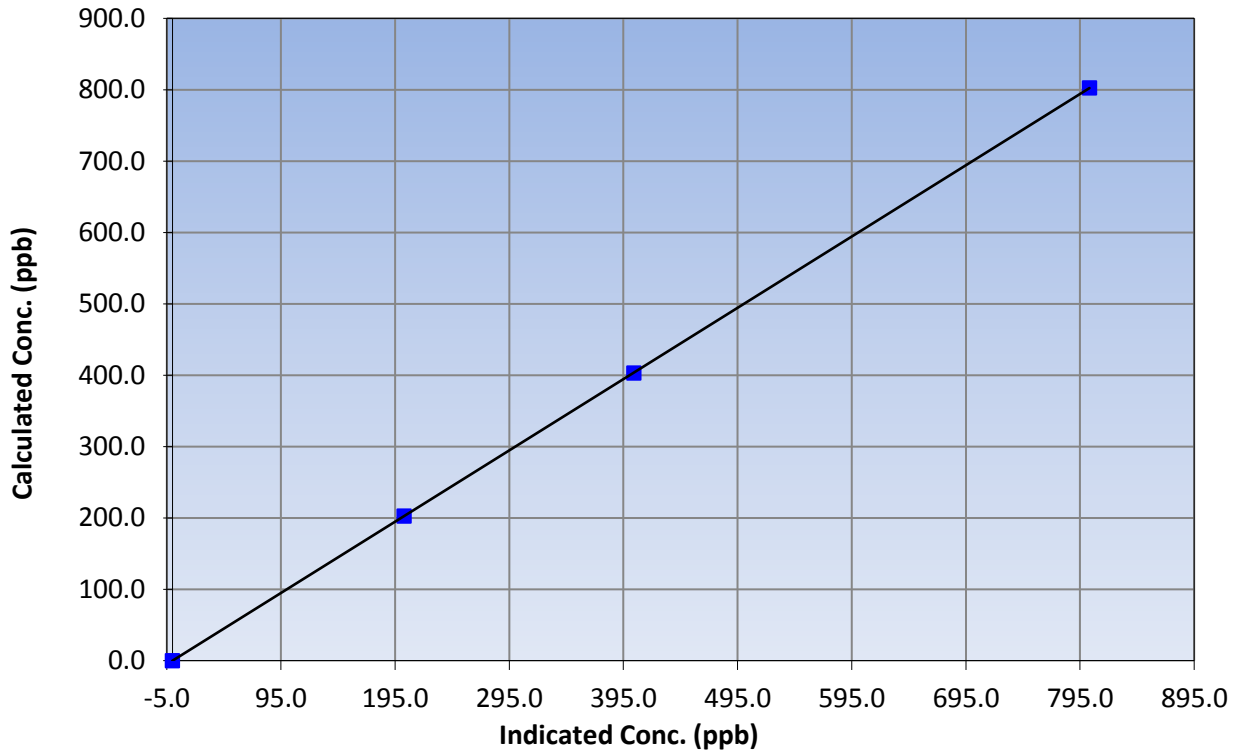
Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 21, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:20	End Time (MST)	14:20
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999999
802.6	803.3	0.9991		
403.2	404.2	0.9976	Slope	0.998879
202.6	202.9	0.9984		
			Intercept	-0.047313

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

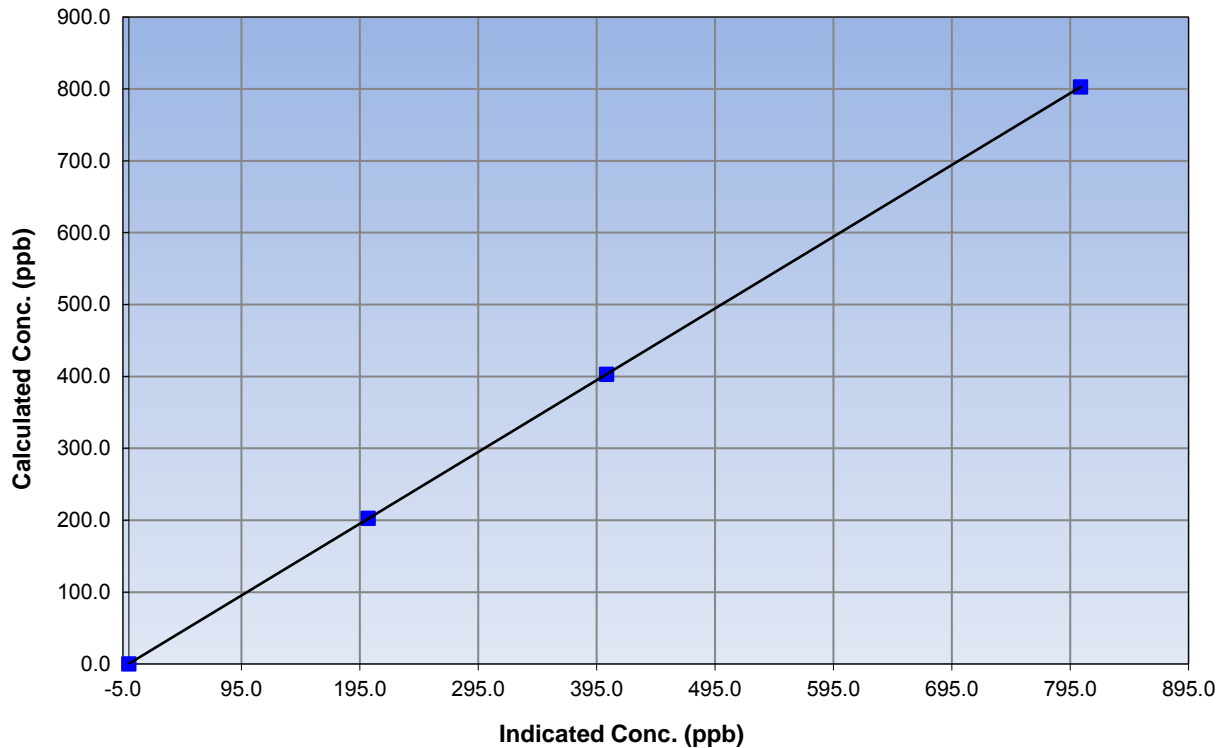
Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 21, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:20	End Time (MST)	14:20
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	0.999999
802.6	803.8	0.9985		
403.2	403.5	0.9993	Slope	0.998227
202.6	202.0	1.0026		
			Intercept	0.384743

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

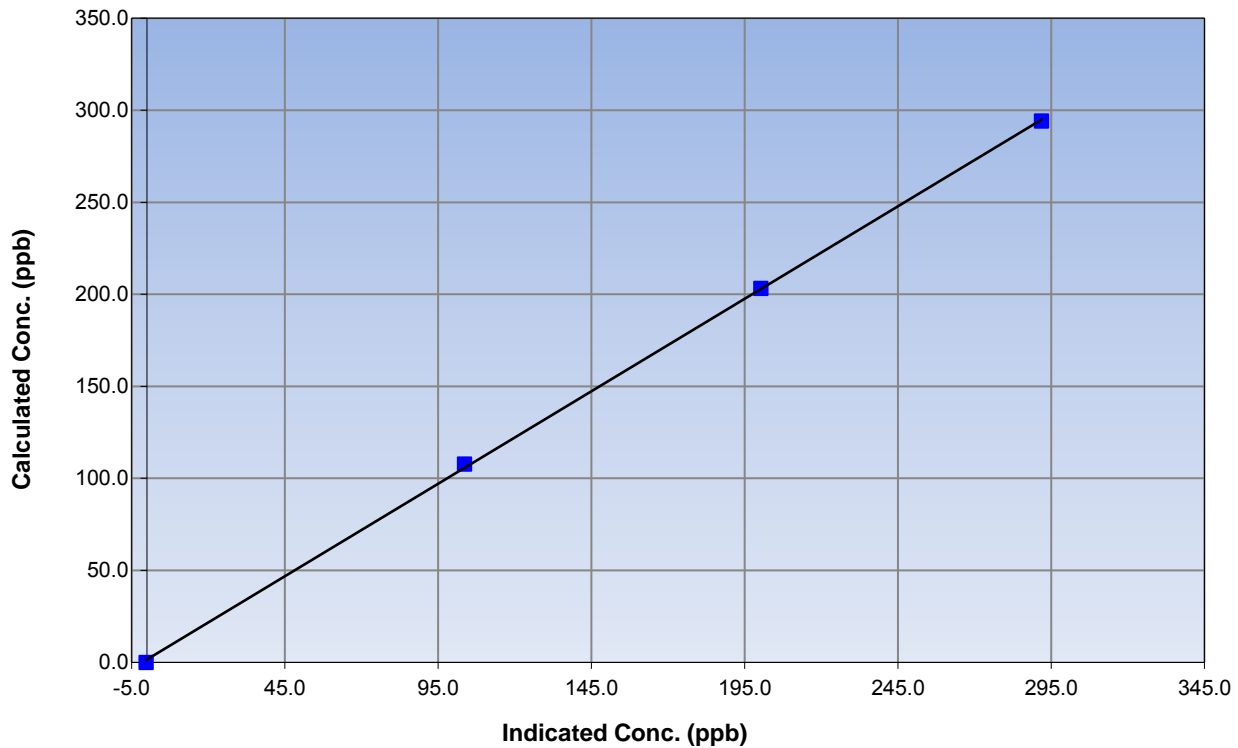
Station Information

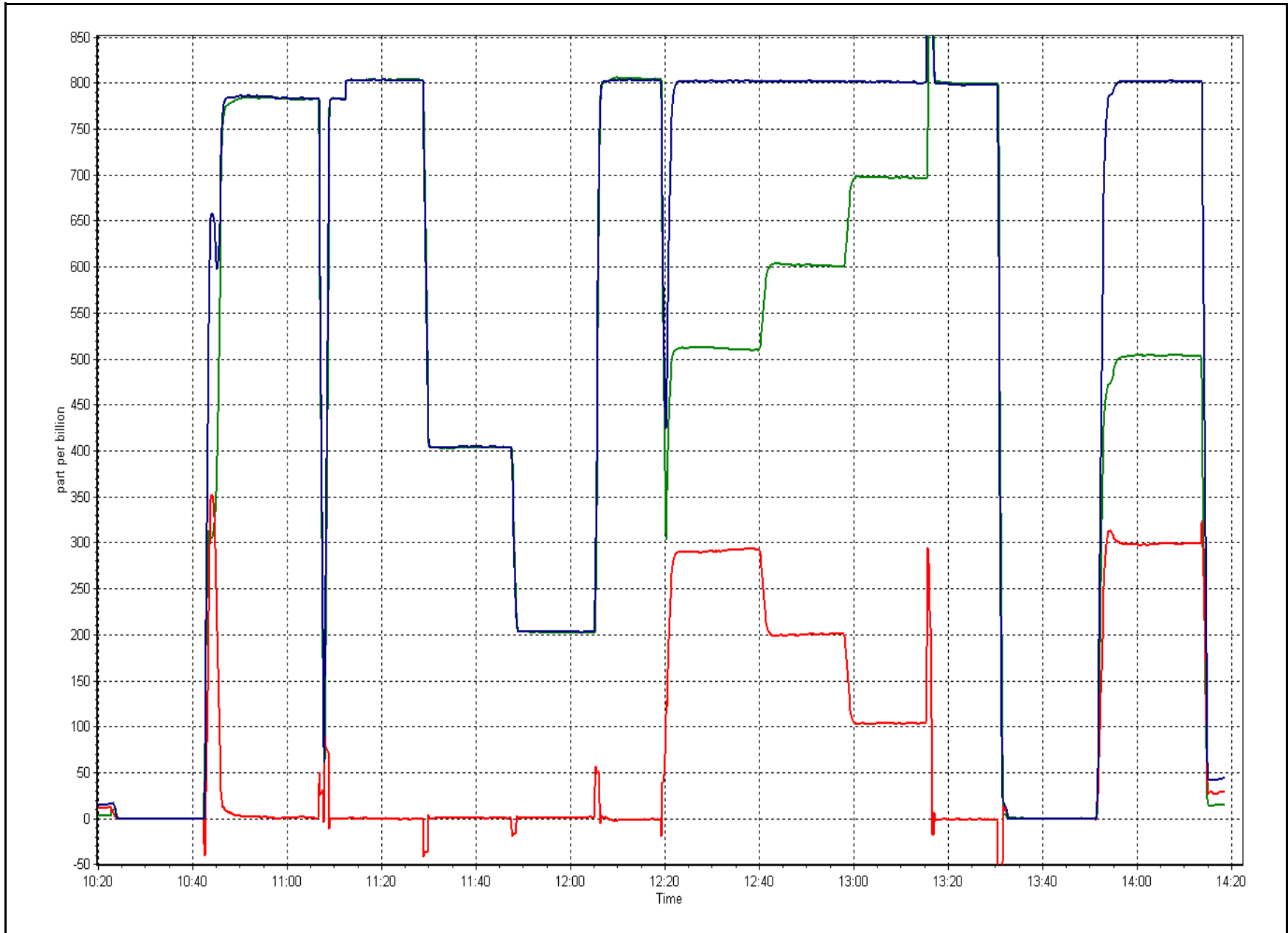
Calibration Date	November 24, 2015	Previous Calibration	October 21, 2015
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:20	End Time (MST)	14:20
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999858
294.0	291.9	1.0074		
203.1	200.3	1.0140	Slope	1.004899
107.8	103.6	1.0399		
			Intercept	1.603146

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	November 24, 2015	Previous Calibration:	October 28, 2015
Station Name:	Shell Muskeg River	Station Number:	AMS 16
Start Time (MST):	12:30	End Time (MST):	13:35
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	-7.5	-8.5	-1.0	-7.5
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	991	990.2	-0.8	991

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1004	4	1004	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	545		545
Neph	0.2		0.2
C14	23.8		23.8
Indicated Concentration (ug/m3)	0	no	0
Offset 1	na		na
Offset 2	na		na

Leak Check (Quarterly)

Leak Check Date:	October 29, 2015	Previous Leak Check Date:	August 11, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.67		0.12
*Flow with adaptor (LPM):	16.55		

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

Mass Foil Calibration (Annually)			
Foil Calibration Date:	May 25, 2015	Previous Foil Calibration:	na
Zeroed?:	yes		
Foil Mass:	1337		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:

No adjustments made. Cleaned PM head at station.

Calibration Performed By: Evan Magill



This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 17
WAPASU
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	684	35	36	99.86	16	0	7	0
H2S (ppb) Average	685	34	35	99.86	6	0	1	0
THC (ppm) Average	684	35	36	99.86	3.4	-	2.4	-
O3 (ppb) Average	669	32	51	97.36	37	0	31	-
NO2 (ppb) Average	684	35	36	99.86	23	0	12	-
NO (ppb) Average	684	35	36	99.86	11	-	2	-
NOX (ppb) Average	684	35	36	99.86	31	-	14	-
PM2.5 (ug/m3) Average	717	2	3	99.86	60.5	-	13.8	0
Temperature 2 m (C) Average	719	0	1	99.86	5.6	-	2.2	-
Relative Humidity (%) Average	719	0	1	99.86	99	-	95	-
Wind Speed 10 m (km/h) Average	718	0	2	99.72	20	-	14	-
Wind Direction 10 m (deg) Average	718	0	2	99.72	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	684	1.7	3	-	0	0	0	1	2	5	16
H2S (ppb) Average	685	0.3	0	-	0	0	0	0	0	0	6
THC (ppm) Average	684	2.22	0.1	-	2.1	2.1	2.2	2.2	2.2	2.3	3.4
O3 (ppb) Average	669	23.3	7	-	2	14	19	24	28	32	37
NO2 (ppb) Average	684	4.4	4	-	0	0	1	3	7	11	23
NO (ppb) Average	684	0.4	1	-	0	0	0	0	0	1	11
NOX (ppb) Average	684	4.9	5	-	0	0	1	3	7	12	31
PM2.5 (ug/m3) Average	717	4.69	5.4	-	0.4	1	1.7	3.2	6	8.9	60.5
Temperature 2 m (C) Average	719	-4.86	5.2	-	-19.2	-13.5	-7.4	-4.1	-1.1	0.8	5.6
Relative Humidity (%) Average	719	80.1	15	-	34	56	71	85	92	95	99
Wind Speed 10 m (km/h) Average	718	8.2	4	-	1	3	5	8	10	14	20
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	24 Nov 2015 13:00	24 Nov 2015 13:00	1	DAS Failure - required memory cleanup after restart
O3	20 Nov 2015 23:00	21 Nov 2015 12:00	13	Analyzer Failure - lamp voltage dropped below setpoint
O3	21 Nov 2015 13:00	21 Nov 2015 13:00	2	Maintenance - lamp voltage adjustment and re-calibration
O3	24 Nov 2015 13:00	24 Nov 2015 16:00	4	Maintenance - lamp optimization and re-calibration
Wind Speed, Wind Direction	20 Nov 2015 02:00	20 Nov 2015 02:00	1	Flat line in sensor output signal -sensor frozen

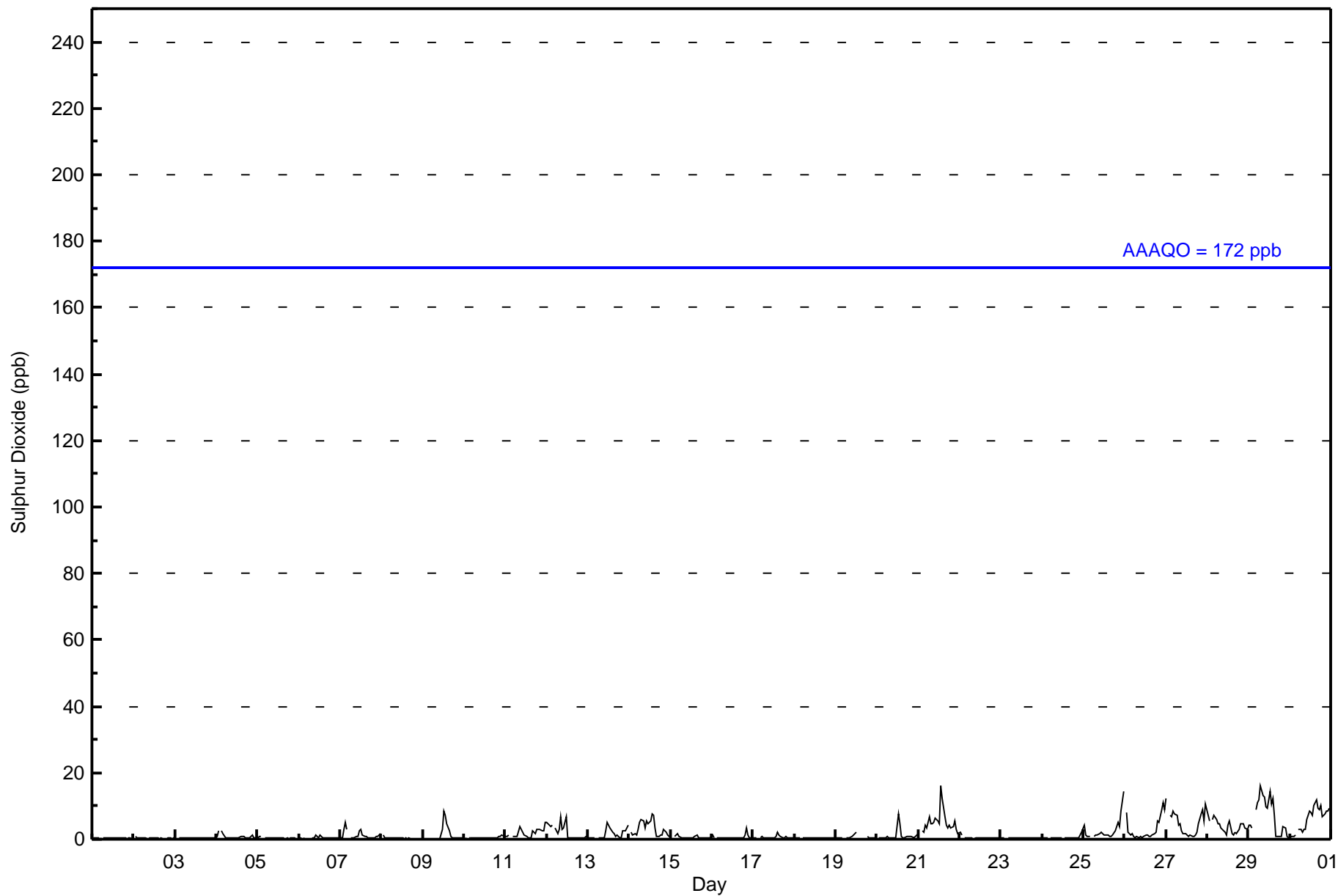


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 16 ppb on Nov 21 14:00	Maximum Daily Average: 7.0 ppb on Nov 29		Hours of Data:	684
Minimum Value: 0 ppb on Nov 9 06:00	Minimum Daily Average: 0.3 ppb on Nov 2		Hours of Missing Data:	36
Maximum Diurnal Average: 2.6 ppb at hour 14	Minimum Diurnal Average: 1.0 ppb at hour 18		Hours of Calibration:	35
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 12		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
2-Nov	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	
3-Nov	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
4-Nov	1	2	Z	3	2	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0.8	3	
5-Nov	0	1	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
6-Nov	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
7-Nov	0	1	3	5	3	Z	0	0	0	1	1	2	3	1	1	1	1	0	0	0	1	1	1	2	1.3	5	
8-Nov	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	
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	3	8	7	5	3	1	1	0	0	0	0	0	0	1.3	8	
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	1	1	1	1	0.5	1	
11-Nov	1	1	1	Z	1	1	1	1	4	3	2	1	1	0	0	0	2	2	3	3	3	2	3	5	1.8	5	
12-Nov	5	5	4	4	Z	3	2	3	7	3	3	7	0	0	0	0	0	0	0	0	0	0	1	1	2.2	7	
13-Nov	1	1	1	1	1	Z	0	0	0	1	3	5	4	3	2	2	1	1	1	0	2	2	2	4	1.7	5	
14-Nov	Z	2	1	2	1	3	5	6	5	3	6	5	5	8	7	3	1	1	1	1	3	2	1	1	3.2	8	
15-Nov	1	Z	1	1	2	1	1	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.6	2	
16-Nov	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3	1	0	0	0.6	3	
17-Nov	0	0	0	Z	1	1	1	0	1	0	0	0	1	1	2	1	1	0	0	1	0	0	0	0	0.6	2	
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
19-Nov	0	0	0	0	0	Z	0	0	0	1	1	2	2	C	C	C	C	C	1	1	1	1	0	1	0.7	2	
20-Nov	Z	1	1	0	1	1	1	1	1	1	1	1	8	5	1	1	1	1	1	1	1	1	1	1	1.1	8	
21-Nov	2	Z	2	2	4	4	7	5	5	5	6	6	5	16	12	7	4	3	4	4	4	4	5	3	2	5.1	16
22-Nov	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	DF	0	0	0	0	0	0	0	1	1	2	0.5	2	
25-Nov	4	1	1	1	1	Z	1	1	1	2	2	2	1	1	1	1	1	1	1	3	4	5	4	8	14	2.7	14
26-Nov	Z	8	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	6	5	9	11	9	2.9	11	
27-Nov	12	Z	7	7	9	7	7	4	5	2	2	2	1	1	1	1	1	1	2	5	7	9	6	11	4.8	12	
28-Nov	7	6	Z	6	7	6	5	5	4	3	2	1	4	5	2	1	2	2	3	5	5	4	4	3	3.9	7	
29-Nov	4	4	4	Z	9	11	12	16	13	13	10	9	14	11	12	7	1	1	1	1	4	3	1	1	7.0	16	
30-Nov	1	1	1	1	Z	3	3	2	3	3	6	8	8	7	10	12	9	9	10	7	7	9	9	9	6.0	12	

1.8	1.5	1.3	1.5	1.8	1.8	1.7	1.7	1.8	1.5	1.7	2.0	2.5	2.6	2.2	1.6	1.1	1.0	1.2	1.4	1.9	2.0	1.9	2.3	Diurnal Average	
12	8	7	7	9	11	12	16	13	13	10	9	14	16	12	12	9	9	10	7	7	9	11	14	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	669	97.81	97.81
11 - 20	15	2.19	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



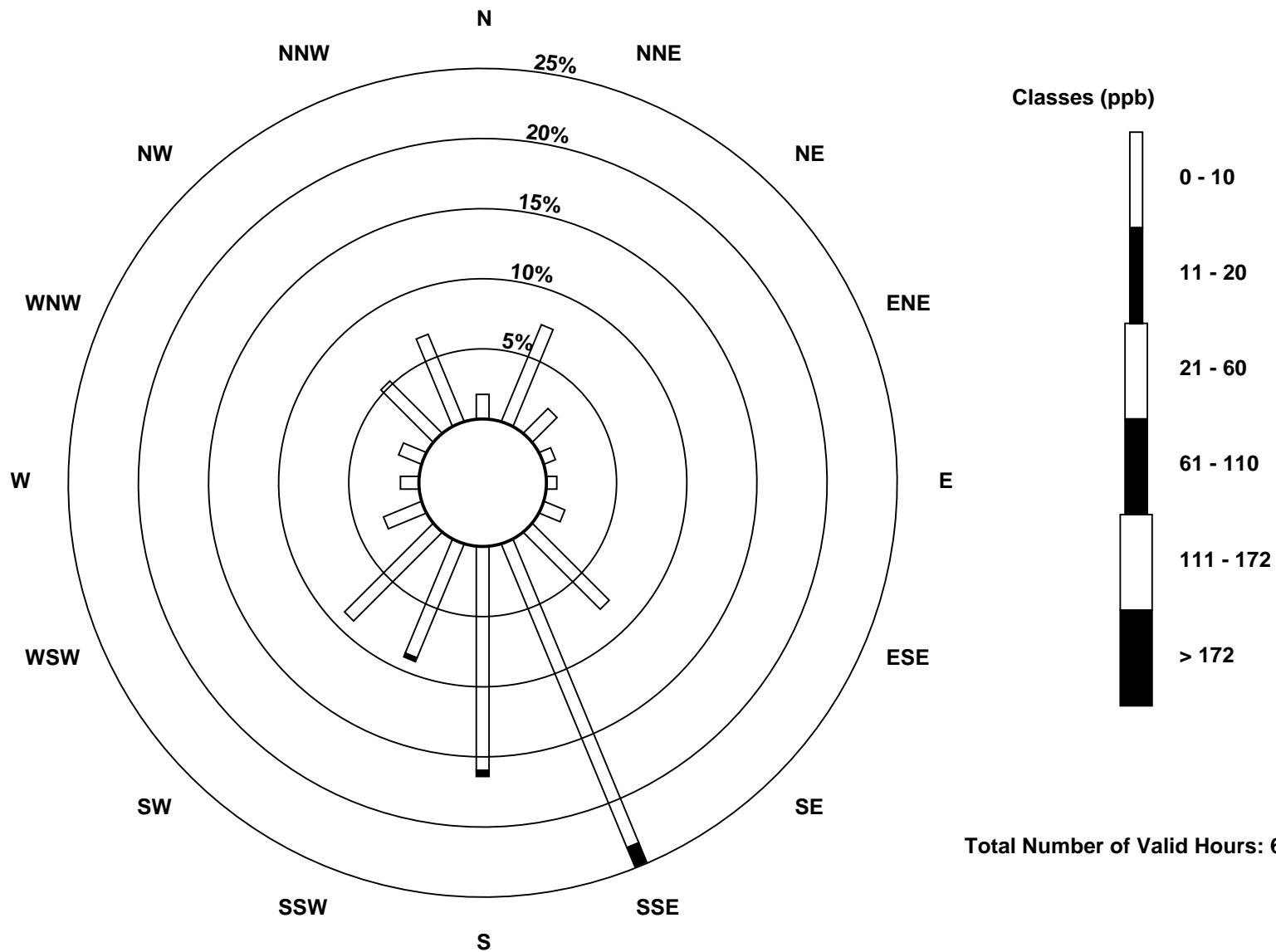
Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - November 2015

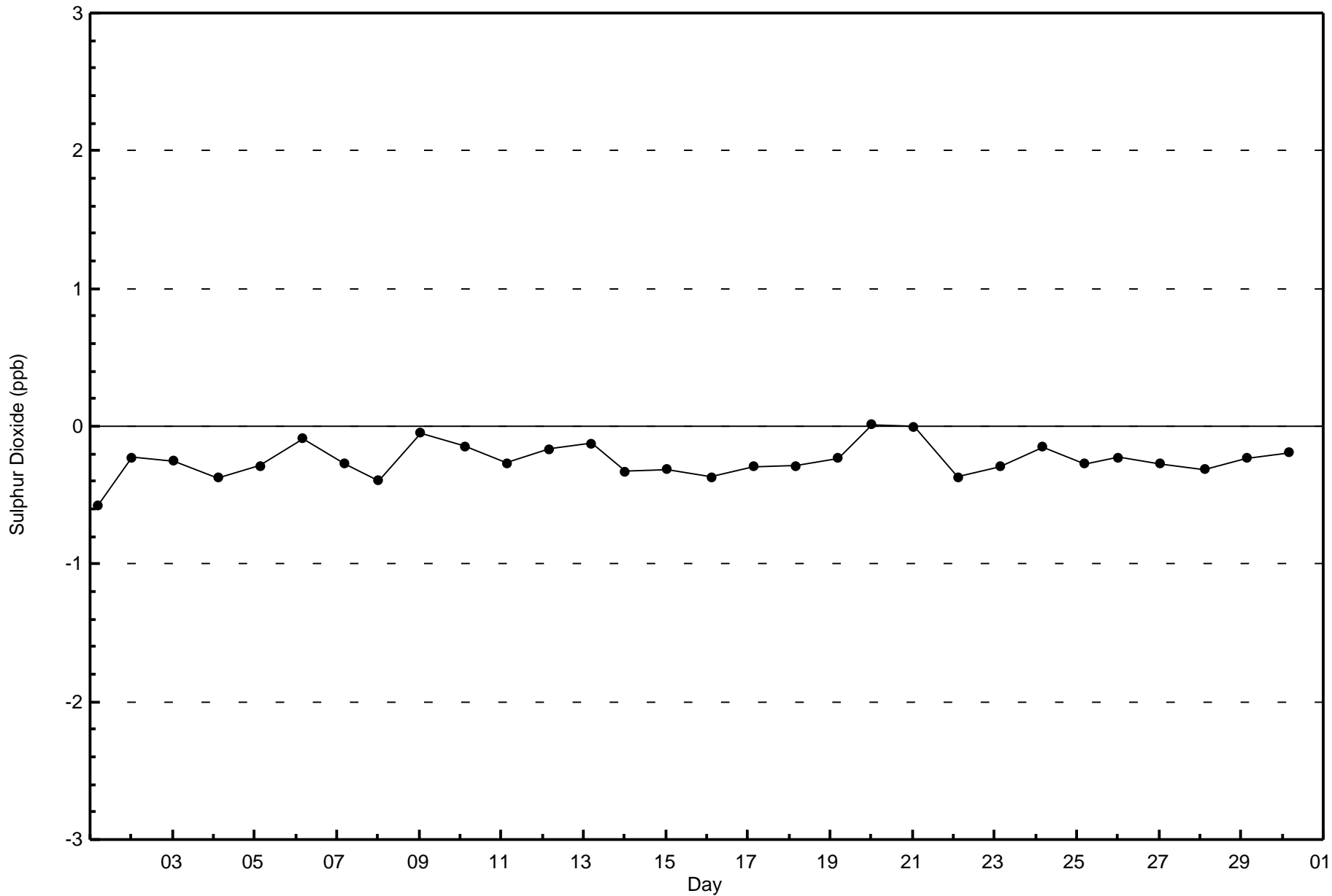
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	12	51	17	6	5	11	53	160	109	60	61	20	9	12	36	46	668
11 - 20	0	0	0	0	0	0	0	10	3	2	0	0	0	0	0	0	15
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	12	51	17	6	5	11	53	170	112	62	61	20	9	12	36	46	683

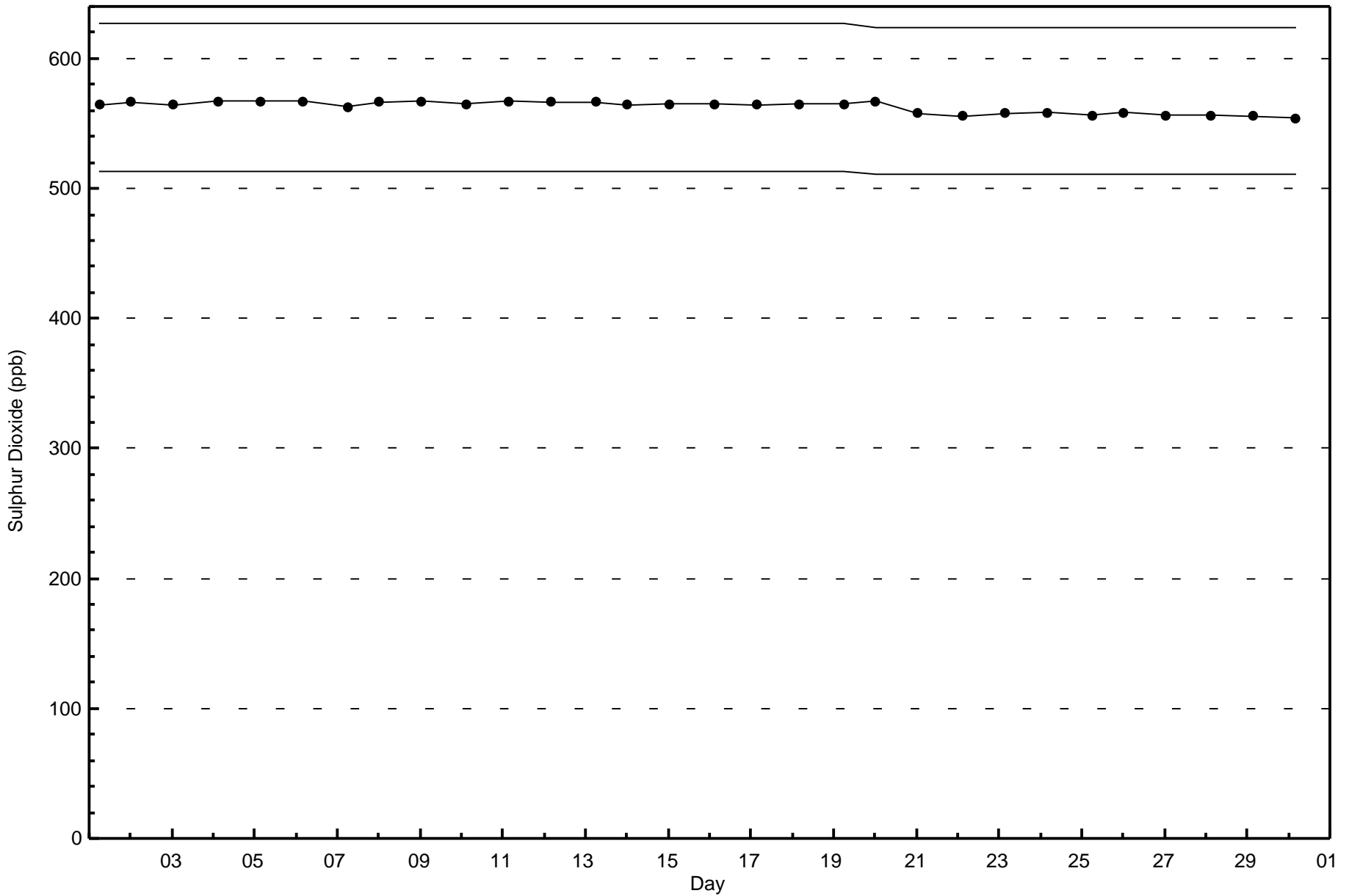
Total Number of Valid Hours: 683

Total Number of Hours: 720



Total Number of Valid Hours: 683





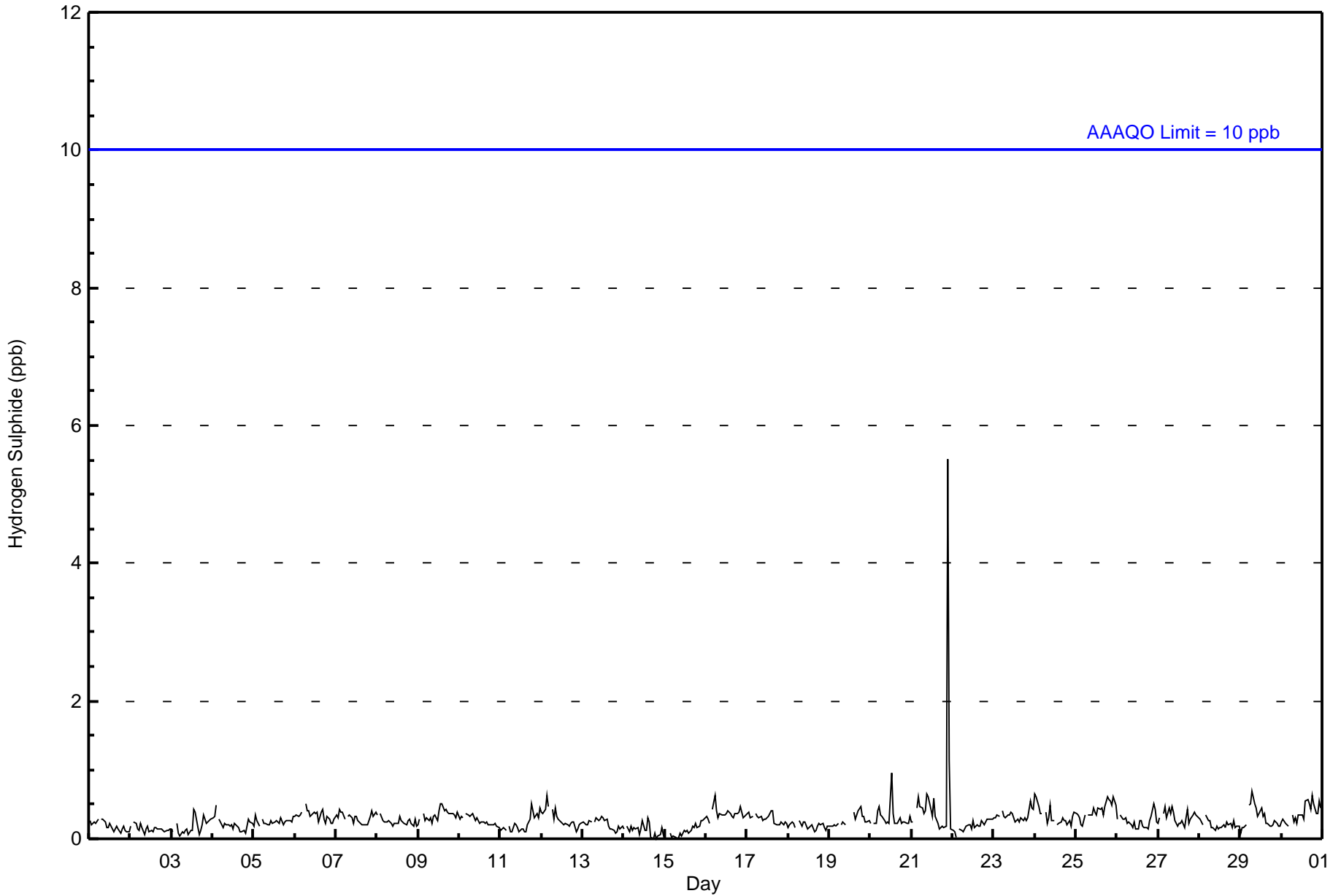


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 6 ppb on Nov 21 22:00	Maximum Daily Average: 0.6 ppb on Nov 21		Hours of Data:	685
Minimum Value: 0 ppb on Nov 14 18:00	Minimum Daily Average: 0.1 ppb on Nov 15		Hours of Missing Data:	35
Maximum Diurnal Average: 0.4 ppb at hour 22	Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	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-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Nov	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	0.3	1
7-Nov	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
8-Nov	0	Z	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
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
12-Nov	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Nov	0	Z	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
15-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Nov	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Nov	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
20-Nov	0	Z	0	0	0	0	0	0	0	0	0	C	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Nov	0	0	Z	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	6	1	0	0.6	6	
22-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1	
24-Nov	1	1	0	0	0	Z	0	0	0	0	0	0	DF	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0.4	1
26-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1	
27-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Nov	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	0.3	1
30-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0	0.4	1	

0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.3	Diurnal Average	
1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	6	1	0	Diurnal Maximum	

Z - zerospan C - Calibration DF - DAS Failure
 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 - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	684	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	12	52	16	7	5	11	55	169	110	63	60	19	9	11	36	49	684
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	1	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	12	52	16	7	5	11	55	169	110	63	61	19	9	11	36	49	685

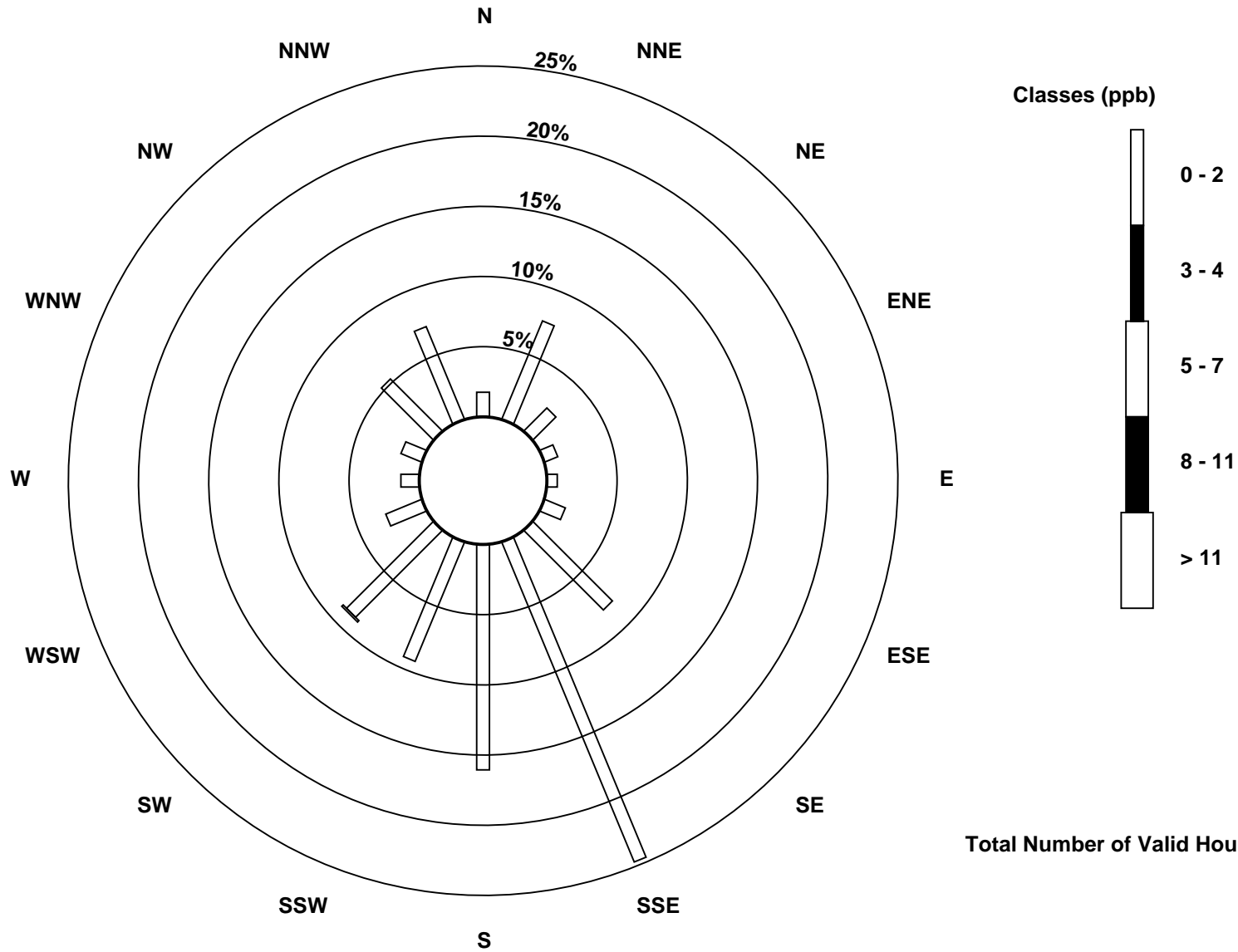
Total Number of Valid Hours: 685

Total Number of Hours: 720

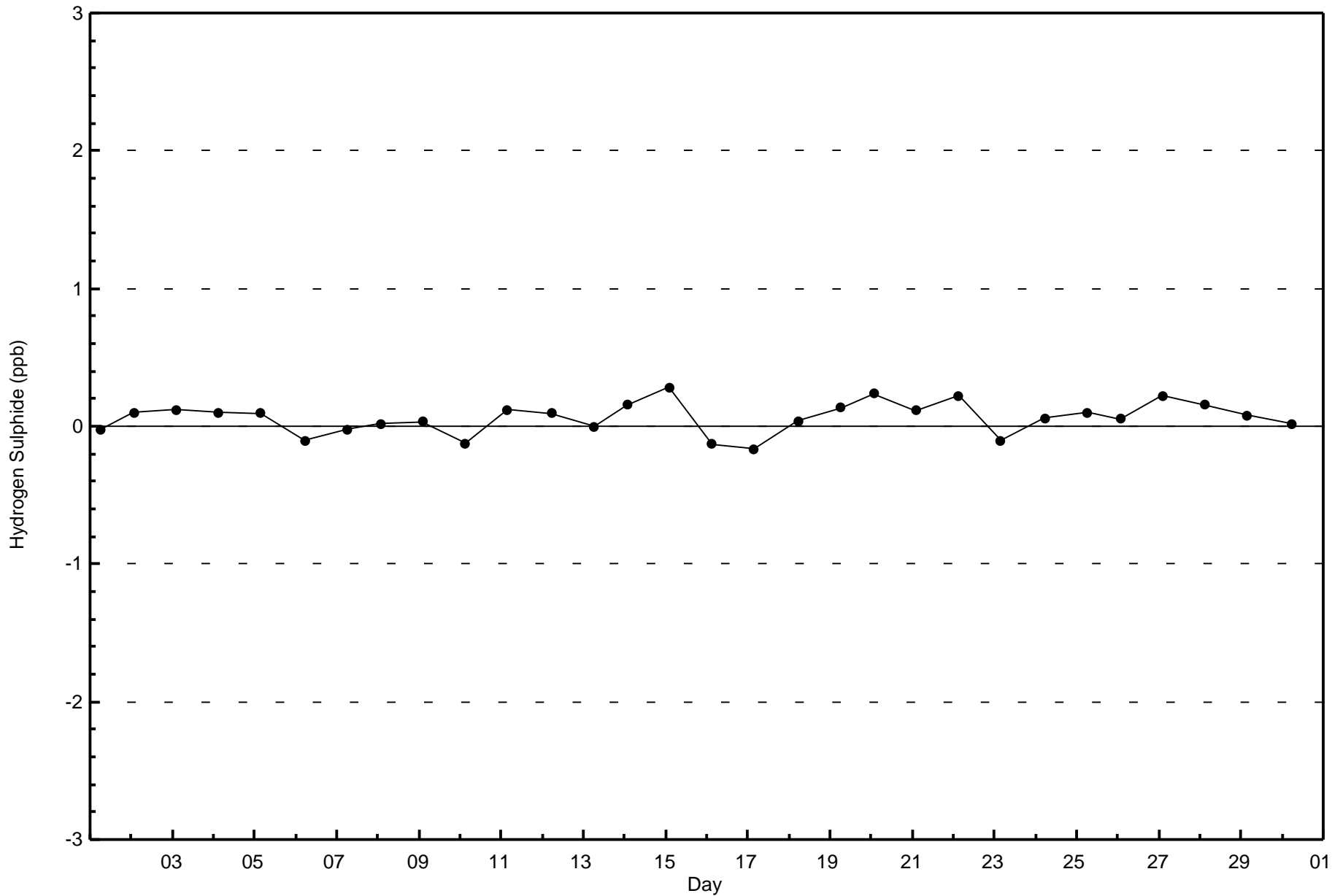


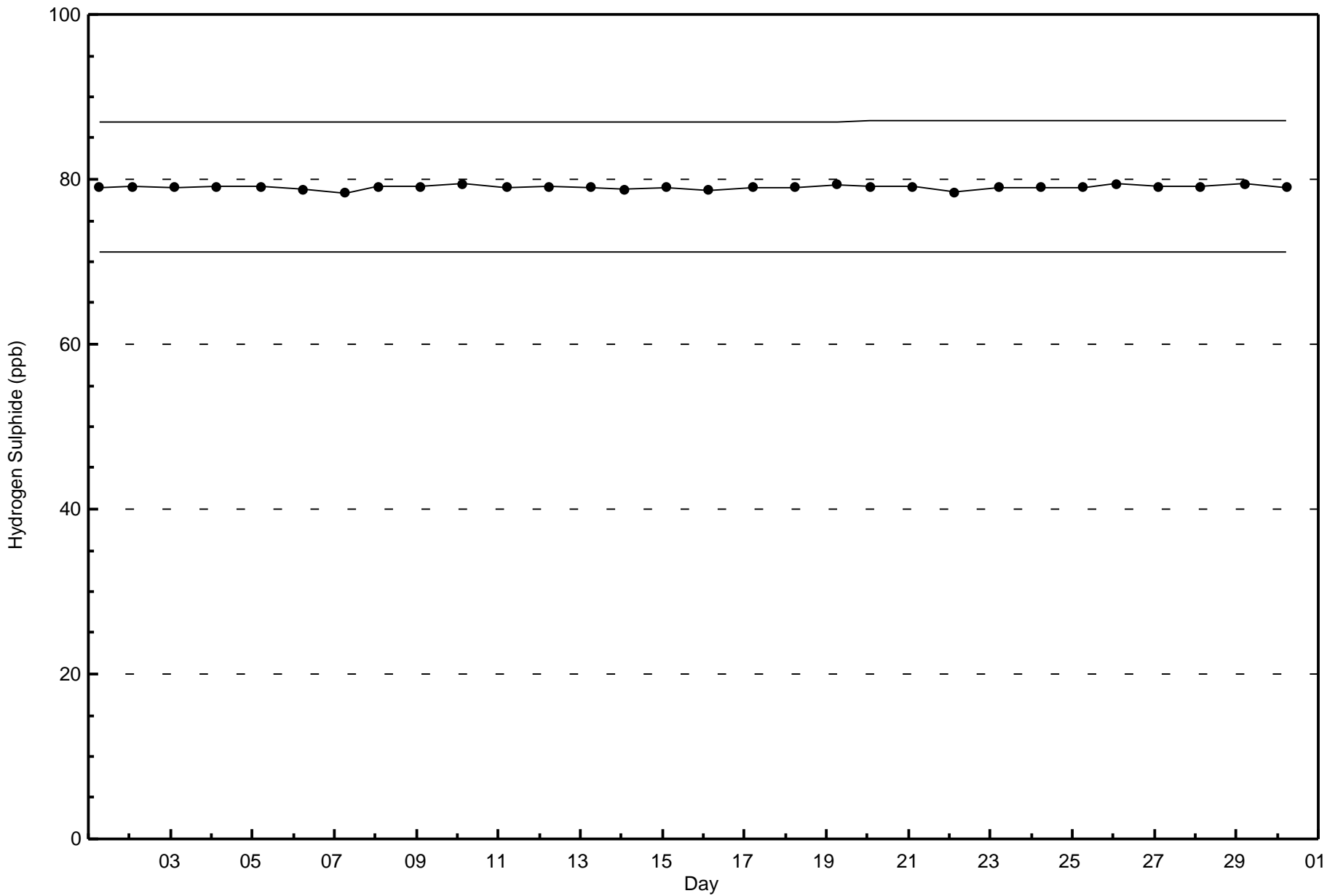
Wood Buffalo Environmental Association
Wind Rose Nov 2015

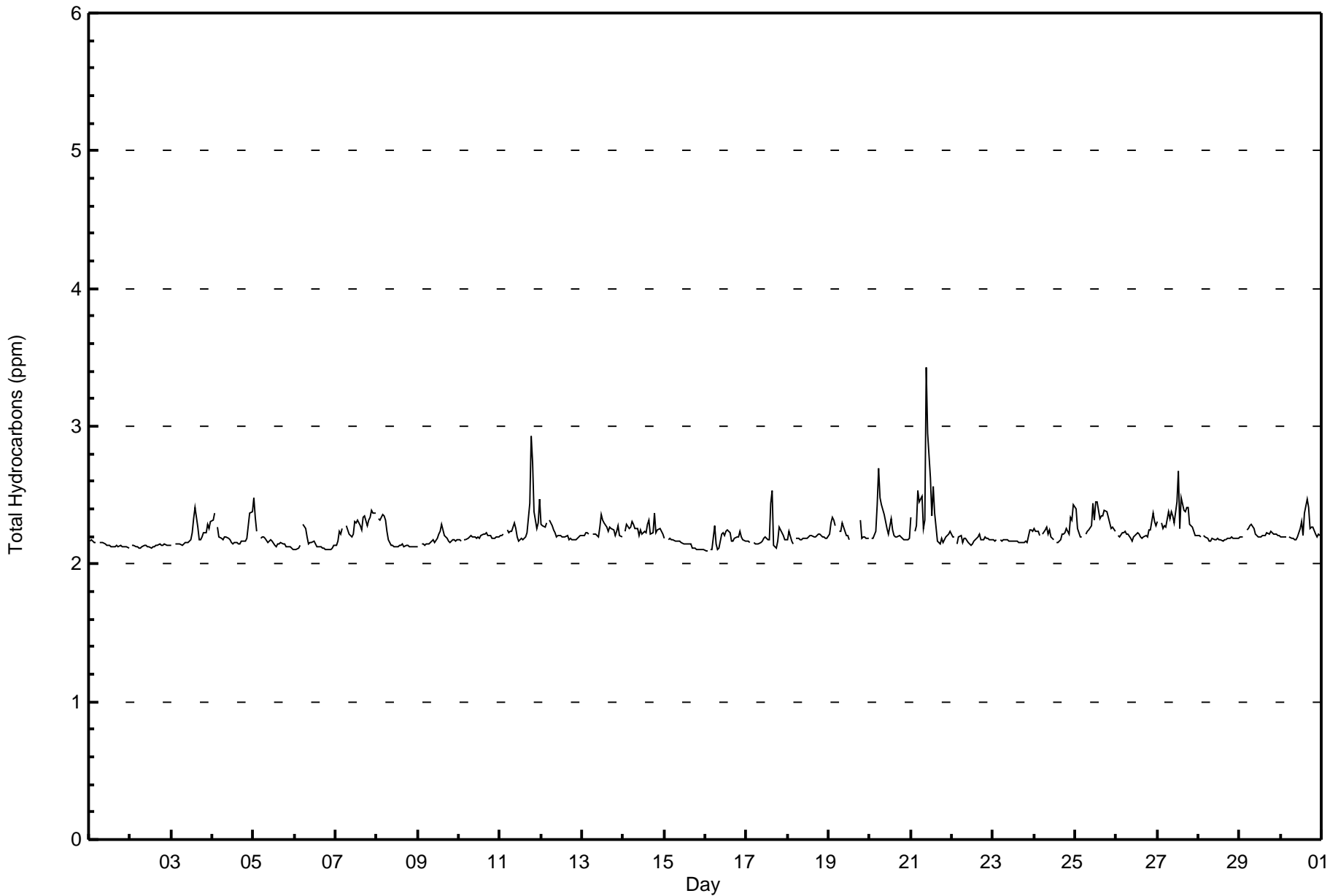
Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 685









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	683	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: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	12	51	17	6	5	11	53	170	112	61	61	20	9	12	36	46	682
3.1 - 10.0	0	0	0	0	0	0	0	0	0	1	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	12	51	17	6	5	11	53	170	112	62	61	20	9	12	36	46	683

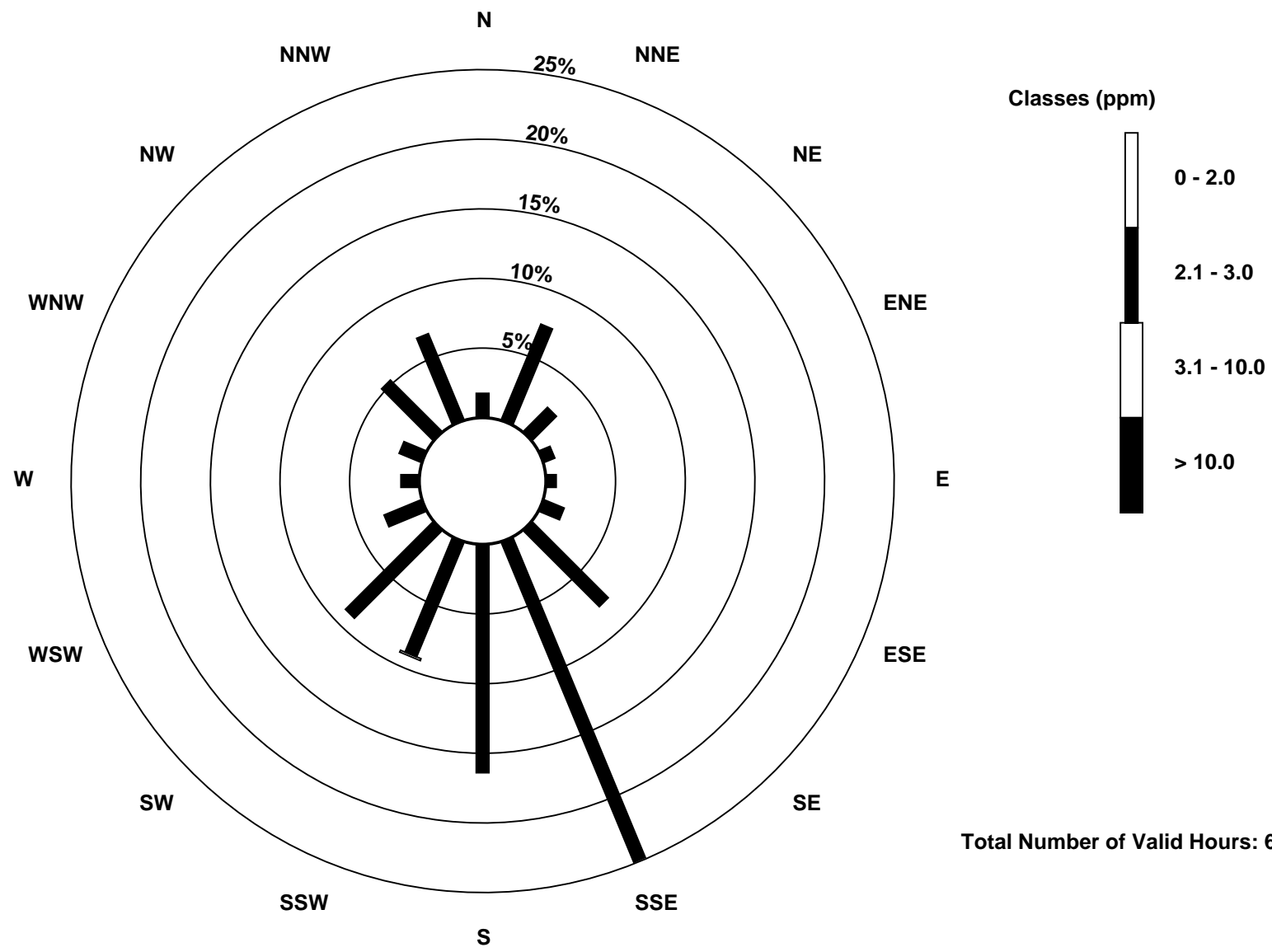
Total Number of Valid Hours: 683

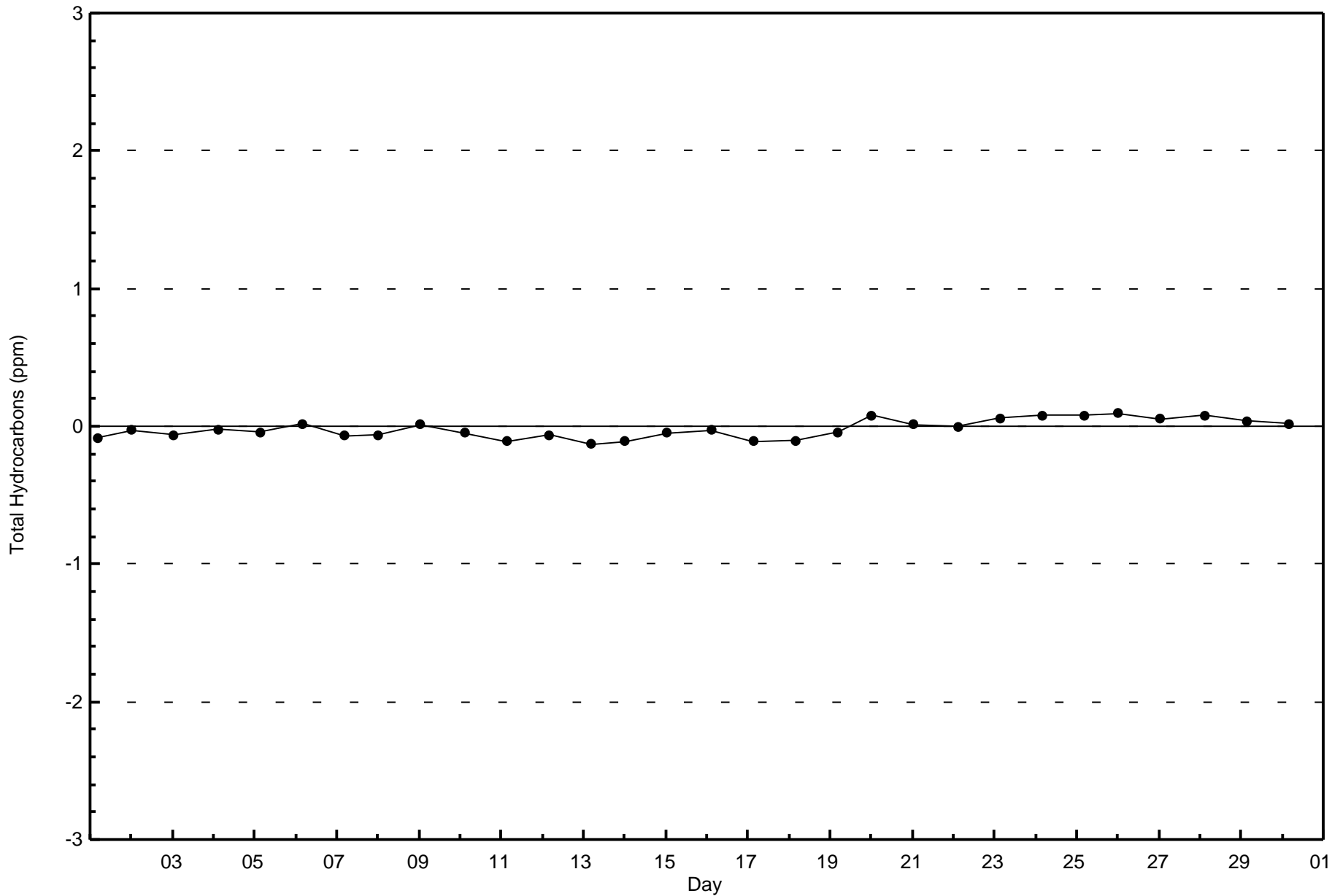
Total Number of Hours: 720

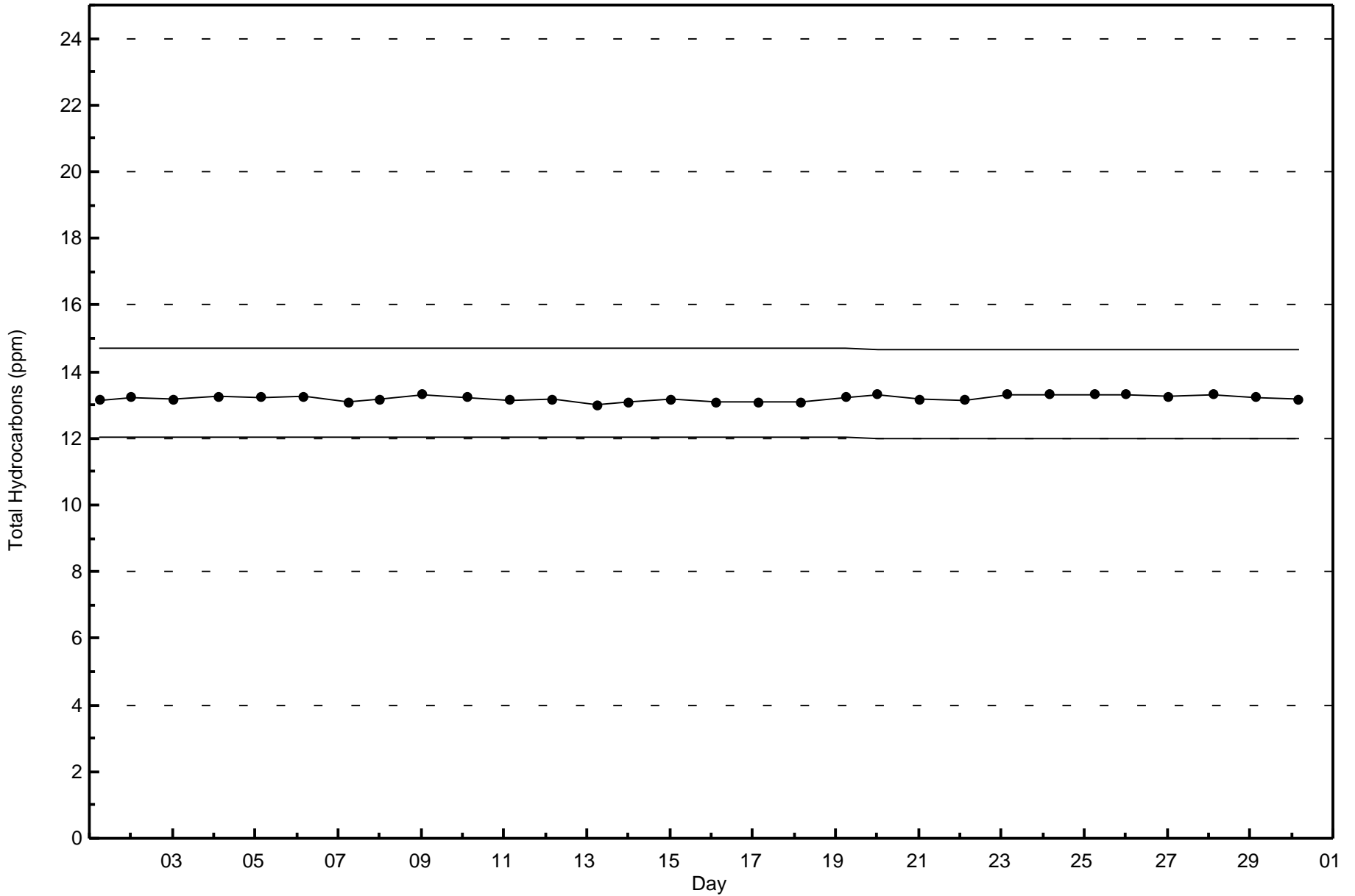


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)







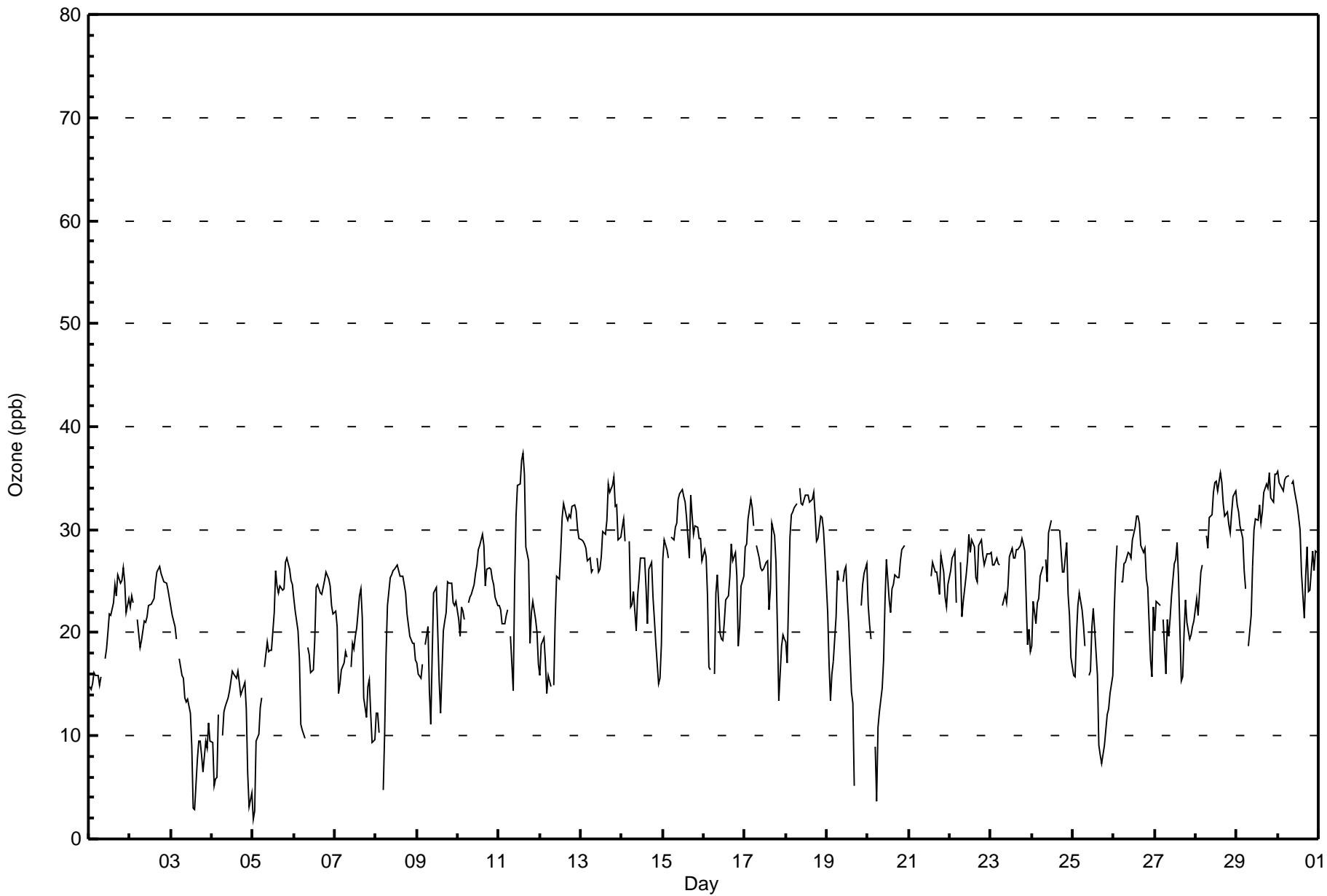


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 37 ppb on Nov 11 15:00	Maximum Daily Average: 30.6 ppb on Nov 28		Hours of Data:	669
Minimum Value: 2 ppb on Nov 5 01:00	Minimum Daily Average: 11.6 ppb on Nov 4		Hours of Missing Data:	51
Maximum Diurnal Average: 25.8 ppb at hour 14	Minimum Diurnal Average: 20.9 ppb at hour 5		Hours of Calibration:	32
Monthly Average: 23.3 ppb	Percentiles: P ₁ = 5 P ₁₀ = 14 Q ₁ = 19 Median = 24 Q ₃ = 28 P ₉₀ = 32 P ₉₉ = 35		Percent Operational Time:	97.4

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-Nov	15	14	15	16	16	16	15	16	Z	18	18	20	22	22	23	25	24	26	25	25	26	25	22	23	20.2	26
2-Nov	22	24	23	Z	21	20	19	19	21	21	22	23	23	23	23	25	26	26	26	25	25	25	24	23	23.0	26
3-Nov	23	22	21	19	Z	17	16	16	14	13	14	12	9	3	3	8	9	9	8	7	10	9	11	10	12.2	23
4-Nov	9	5	6	6	12	Z	10	12	13	14	14	15	16	16	16	15	14	15	15	13	6	3	5	11.6	16	
5-Nov	2	3	9	10	13	14	Z	17	19	18	18	18	22	26	25	24	25	24	24	27	27	26	25	25	19.2	27
6-Nov	23	22	20	17	11	11	10	Z	19	18	16	16	19	24	25	24	24	24	25	26	25	25	23	22	20.4	26
7-Nov	22	21	14	15	16	17	18	18	Z	17	19	19	20	20	24	24	21	14	12	15	15	12	9	10	17.0	24
8-Nov	12	12	10	Z	5	10	18	23	25	26	26	26	27	26	25	25	25	24	22	21	20	19	19	17	20.2	27
9-Nov	17	16	16	17	Z	19	21	14	11	18	24	24	20	15	12	20	21	22	25	25	25	23	23	23	19.6	25
10-Nov	21	20	23	22	21	Z	23	23	24	25	26	27	28	28	30	28	24	26	26	26	25	25	23	23	24.7	30
11-Nov	23	22	21	21	22	22	Z	20	14	25	31	34	34	37	37	35	28	27	19	22	23	21	20	17	25.1	37
12-Nov	16	19	20	17	14	16	15	Z	15	21	25	25	28	31	33	31	31	31	31	32	32	32	30	29	25.0	33
13-Nov	29	29	29	28	27	27	26	26	Z	27	26	26	27	30	30	31	34	34	34	35	32	32	29	29	29.5	35
14-Nov	30	31	29	Z	29	23	23	24	20	24	25	27	27	24	21	26	27	24	21	19	15	16	19	19	23.9	31
15-Nov	27	29	28	27	Z	29	29	30	31	33	33	34	33	33	31	27	33	31	30	30	30	29	29	27	30.2	34
16-Nov	28	27	24	17	16	Z	16	24	26	20	19	19	21	23	24	26	29	27	28	26	19	21	25	26	23.0	29
17-Nov	28	29	31	33	32	30	Z	28	27	26	26	26	27	27	22	24	31	29	27	21	13	19	20	19	25.9	33
18-Nov	19	17	29	31	32	32	33	Z	34	33	32	33	33	33	33	33	34	31	29	29	31	31	30	27	30.5	34
19-Nov	22	17	13	16	17	22	26	25	Z	25	26	26	23	21	14	13	5	C	C	C	23	25	26	27	20.6	27
20-Nov	23	21	19	Z	9	4	11	12	15	17	23	27	23	22	24	25	26	25	25	27	28	29	AF	AF	20.7	29
21-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	26	27	26	26	25	24	27	26	23	23	25	--	27
22-Nov	26	27	27	28	23	Z	27	21	23	25	27	29	M	28	29	28	25	28	29	27	27	27	28	28	26.7	29
23-Nov	28	27	27	27	27	Z	23	24	23	25	27	28	27	28	28	29	29	29	29	29	28	19	20	18	25.8	29
24-Nov	19	23	21	23	23	25	26	Z	27	25	30	31	M	M	M	M	30	28	26	26	29	24	22	18	25.0	31
25-Nov	16	16	20	23	24	22	21	19	Z	16	16	20	22	20	16	9	8	7	9	11	12	13	14	16	16.1	24
26-Nov	22	26	28	Z	25	25	27	27	28	28	27	29	30	31	31	31	29	28	28	25	24	17	16	23	26.3	31
27-Nov	20	23	23	23	Z	21	16	21	20	21	24	27	27	29	25	15	16	20	23	21	19	20	21	21	21.6	29
28-Nov	23	22	24	26	27	Z	29	28	31	31	34	35	35	34	36	35	33	31	32	30	30	32	33	34	30.6	36
29-Nov	32	32	30	29	26	24	Z	19	22	26	30	31	31	32	31	32	34	34	34	36	33	33	35	35	30.5	36
30-Nov	36	35	34	34	35	35	35	Z	34	35	34	32	31	30	26	21	25	28	24	24	28	26	28	28	30.4	36

21.9	21.7	21.9	21.9	20.9	21.2	21.2	21.1	22.3	23.0	24.5	25.6	25.6	25.8	25.0	24.4	24.8	25.3	24.6	24.5	23.9	22.7	22.3	22.2	Diurnal Average	
36	35	34	34	35	35	35	30	34	35	34	35	35	37	37	35	34	34	34	36	33	33	35	35	Diurnal Maximum	

Z - zerspan C - Calibration M - Maintenance AF - Analyzer Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	198	29.60	29.60
21 - 50	471	70.40	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 669

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	3	16	4	1	2	1	14	46	24	21	25	10	3	3	12	13	198
21 - 50	8	34	13	6	3	10	41	120	82	34	39	9	6	8	23	34	470
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	11	50	17	7	5	11	55	166	106	55	64	19	9	11	35	47	668

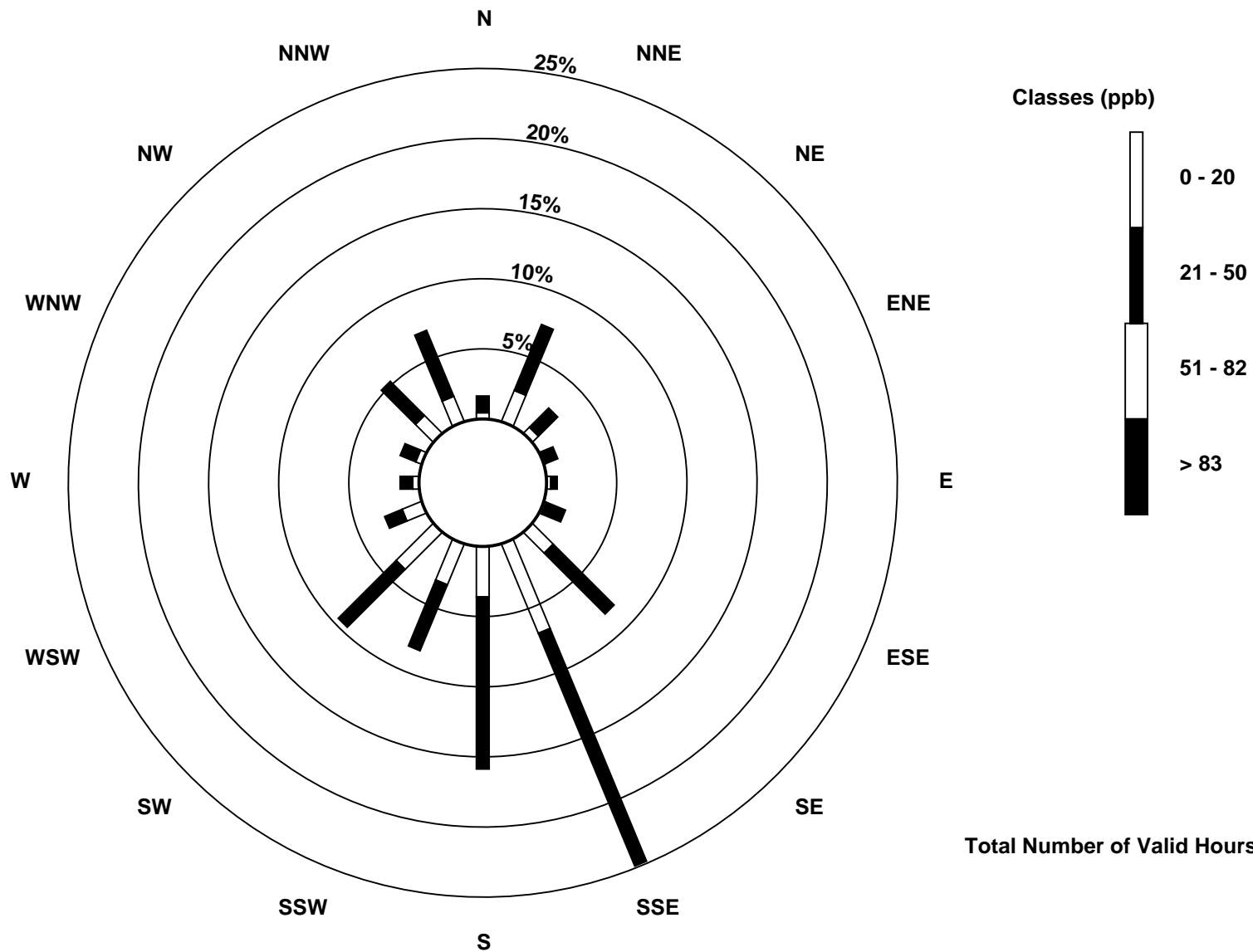
Total Number of Valid Hours: 668

Total Number of Hours: 720

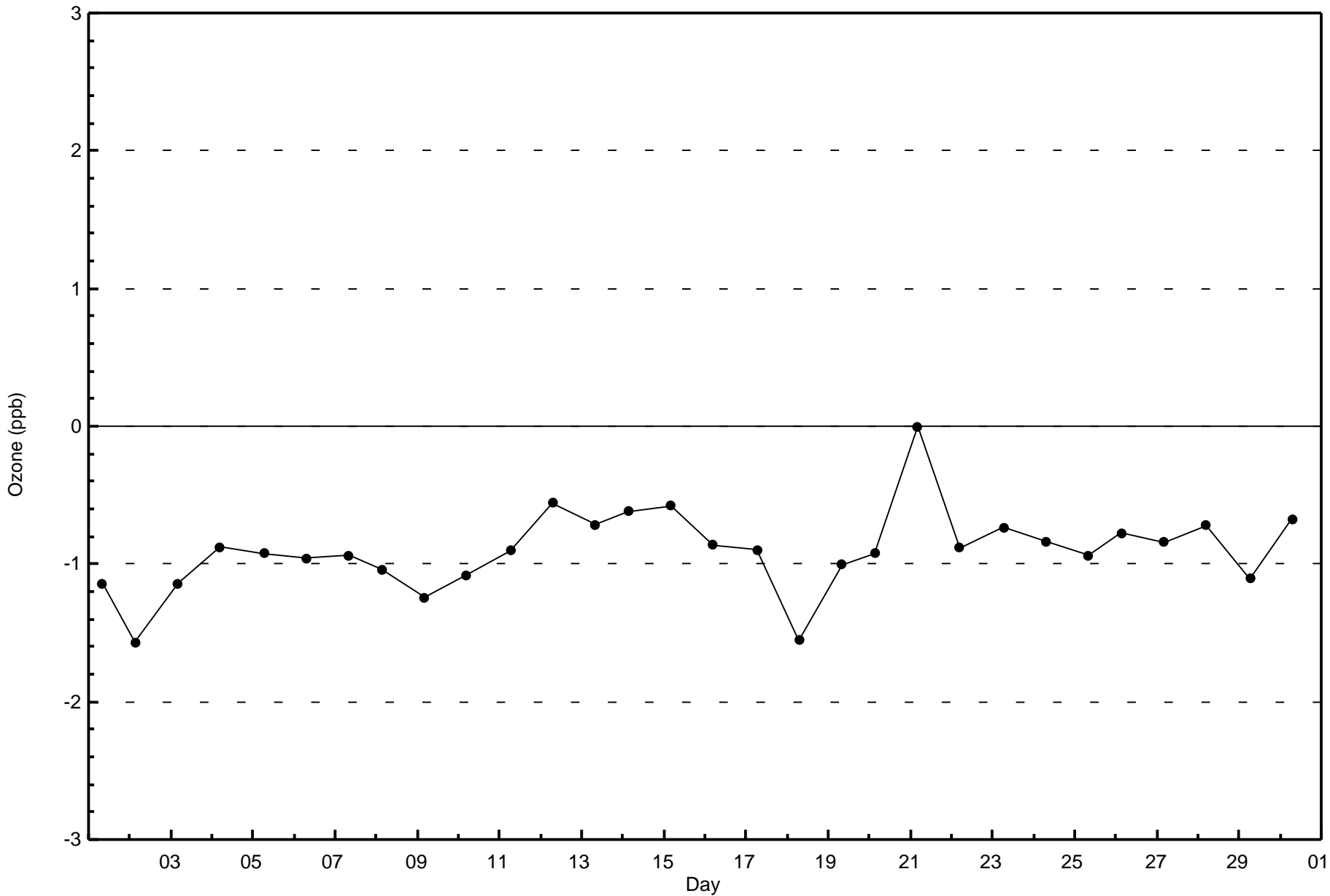


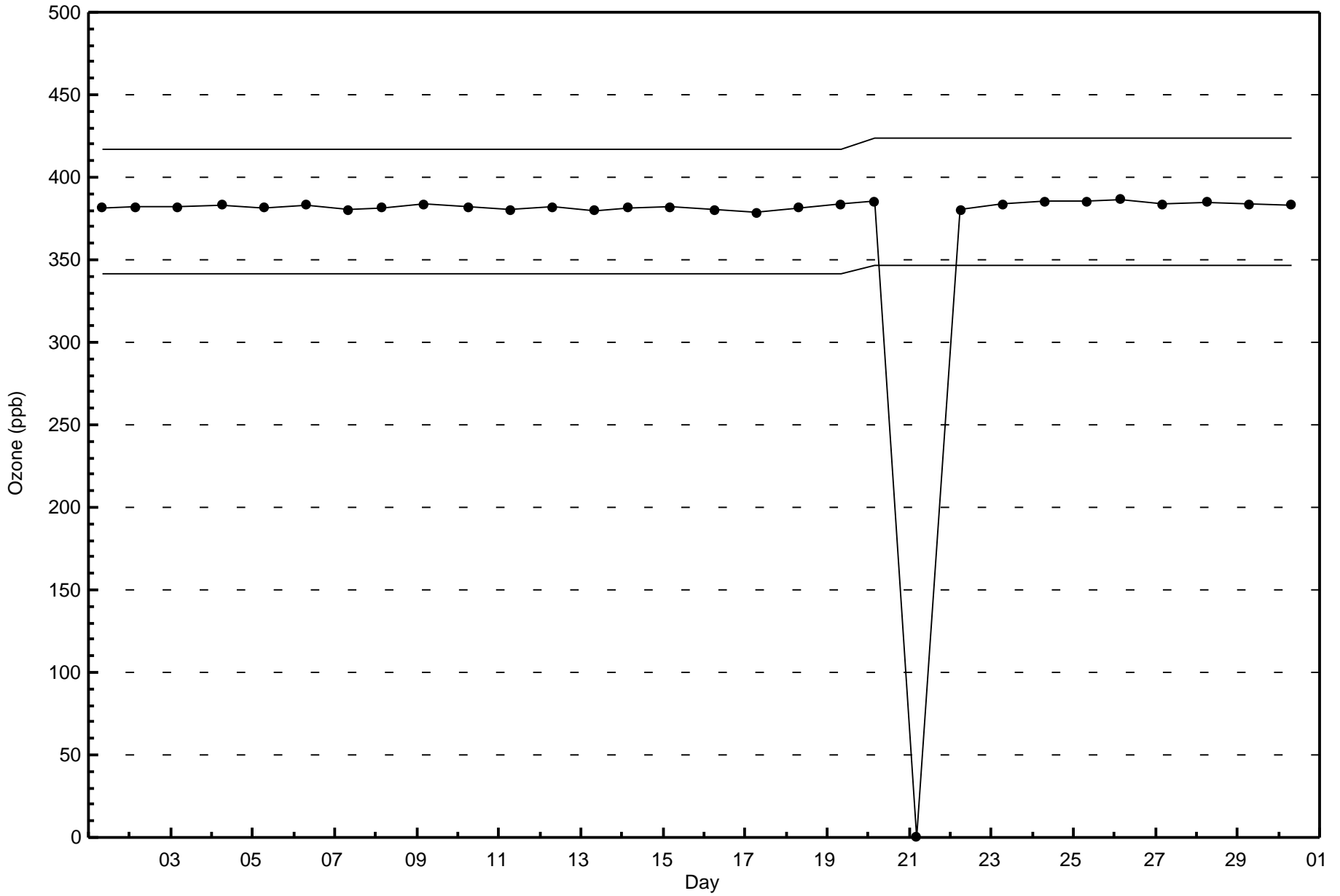
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Ozone (O₃) - ppb
Wapasu (AMS 17)



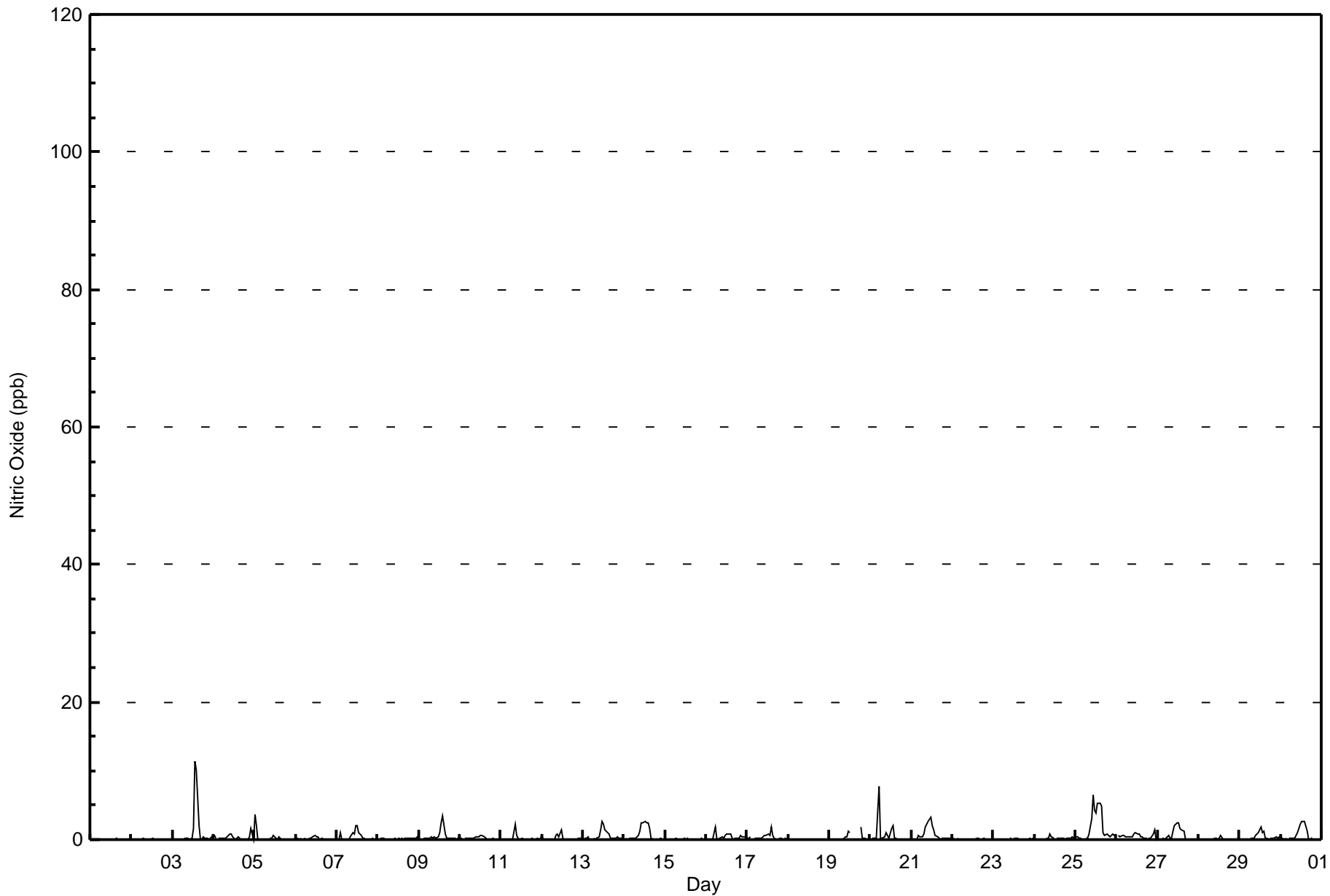
Total Number of Valid Hours: 668







Maximum Value: 11 ppb on Nov 3 14:00														Maximum Daily Average: 1.8 ppb on Nov 25														Hours in Service: 720	
Minimum Value: 0 ppb on Nov 1 01:00														Minimum Daily Average: 0.0 ppb on Nov 18														Hours of Data: 684	
Maximum Diurnal Average: 1.3 ppb at hour 14														Minimum Diurnal Average: 0.1 ppb at hour 18														Hours of Missing Data: 36	
Monthly Average: 0.4 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 5														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-Nov	0	0	0	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-Nov	Z	0	0	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-Nov	0	Z	0	0	0	0	0	0	0	0	0	2	11	10	2	0	0	0	0	0	0	0	0	0	1.2	11			
4-Nov	1	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0.3	2			
5-Nov	4	2	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	4			
6-Nov	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1			
7-Nov	0	0	1	0	0	Z	0	0	0	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0.4	2			
8-Nov	Z	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			
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	1	2	3	1	0	0	0	0	0	0	0	0	0	0.5	3			
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
11-Nov	0	0	0	Z	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2			
12-Nov	1	0	0	0	Z	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
13-Nov	0	0	0	0	0	Z	0	0	0	0	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0.6	3			
14-Nov	Z	0	0	0	0	0	0	0	1	1	2	3	3	2	2	2	0	0	0	0	0	0	0	0	0.8	3			
15-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0			
16-Nov	0	0	Z	0	0	2	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0.4	2			
17-Nov	0	0	0	Z	0	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.4	2			
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0			
19-Nov	0	0	0	0	0	Z	0	0	0	1	1	1	C	C	C	C	C	2	0	0	0	0	0	0	0.3	2			
20-Nov	Z	0	0	0	4	8	0	0	0	1	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0.8	8			
21-Nov	0	Z	0	0	1	0	0	1	2	2	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0.8	3			
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0			
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0			
24-Nov	0	0	0	0	Z	0	0	0	0	1	0	0	DF	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
25-Nov	0	0	0	0	0	Z	0	0	1	3	7	4	4	5	5	5	1	1	1	1	0	1	1	0	1.8	7			
26-Nov	Z	1	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0.5	1			
27-Nov	0	Z	0	0	0	0	1	0	0	1	2	2	3	2	1	1	0	0	0	0	0	0	0	0	0.6	3			
28-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1			
29-Nov	0	0	0	Z	0	0	0	0	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.4	2			
30-Nov	0	0	0	0	Z	0	0	0	0	1	1	2	3	3	3	1	0	0	0	0	0	0	0	0	0.7	3			
																								Diurnal Average					
																								Diurnal Maximum					
0.3 0.2 0.1 0.1 0.3 0.5 0.1 0.1 0.4 0.6 0.8 1.0 1.0 1.3 1.2 0.6 0.1 0.1 0.2 0.1 0.1 0.2 0.2 0.1																													
4 2 1 1 4 8 1 1 2 3 7 4 4 11 10 5 1 1 2 1 1 1 2 0																													
Z - zerspan C - Calibration DF - DAS Failure																													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	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: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	51	17	6	5	11	53	170	112	62	61	20	9	12	36	46	683
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	12	51	17	6	5	11	53	170	112	62	61	20	9	12	36	46	683

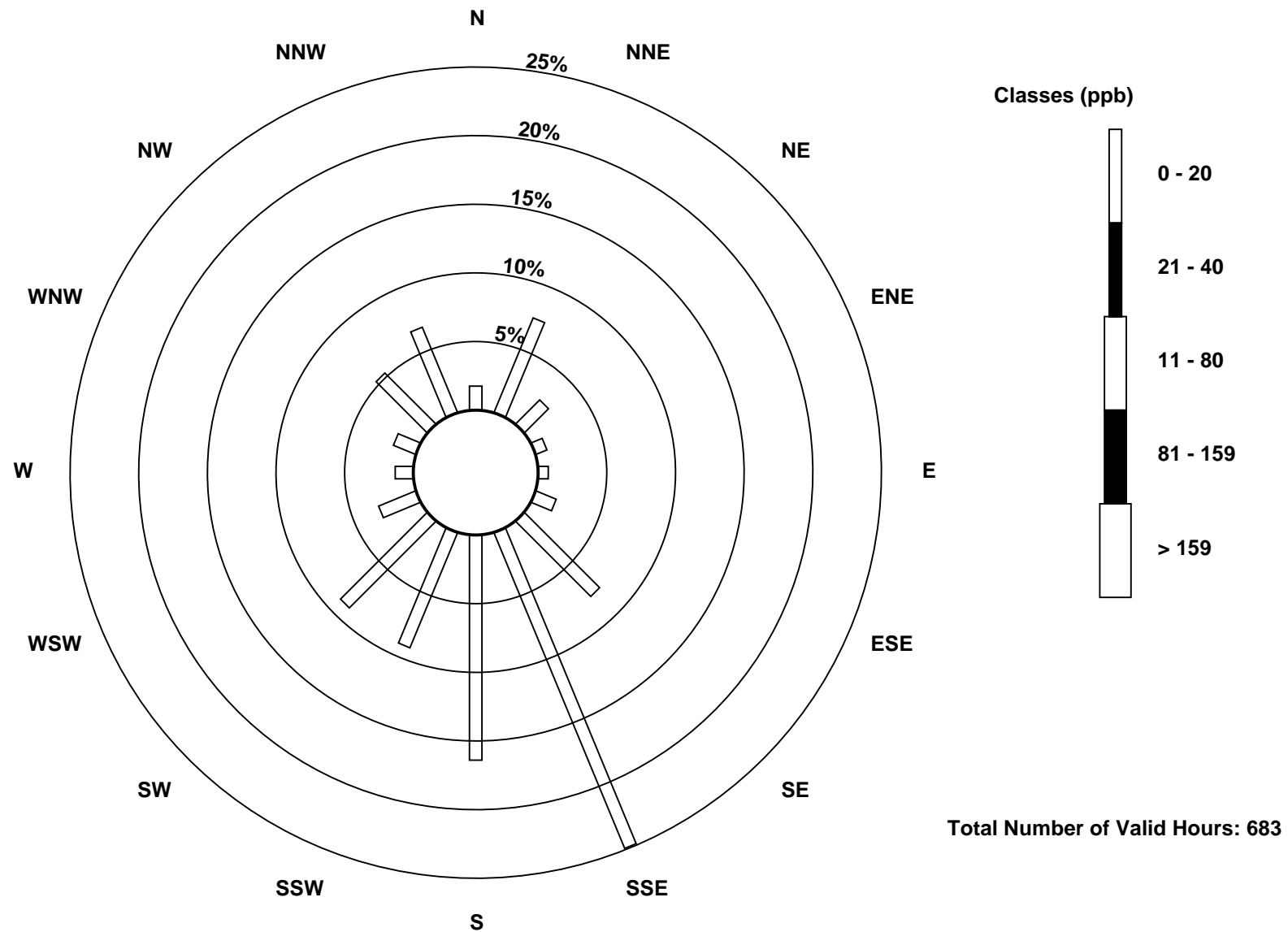
Total Number of Valid Hours: 683

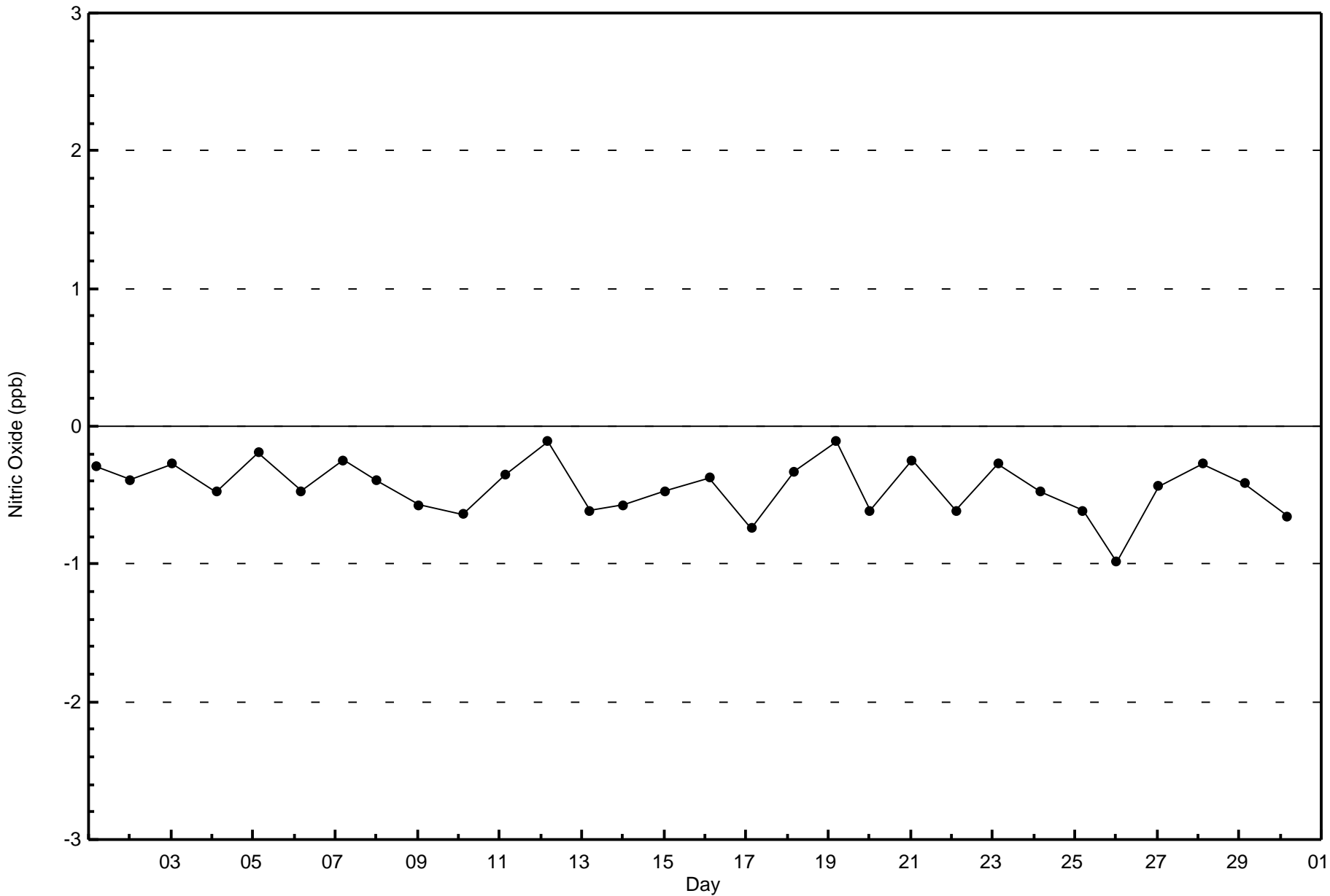
Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)

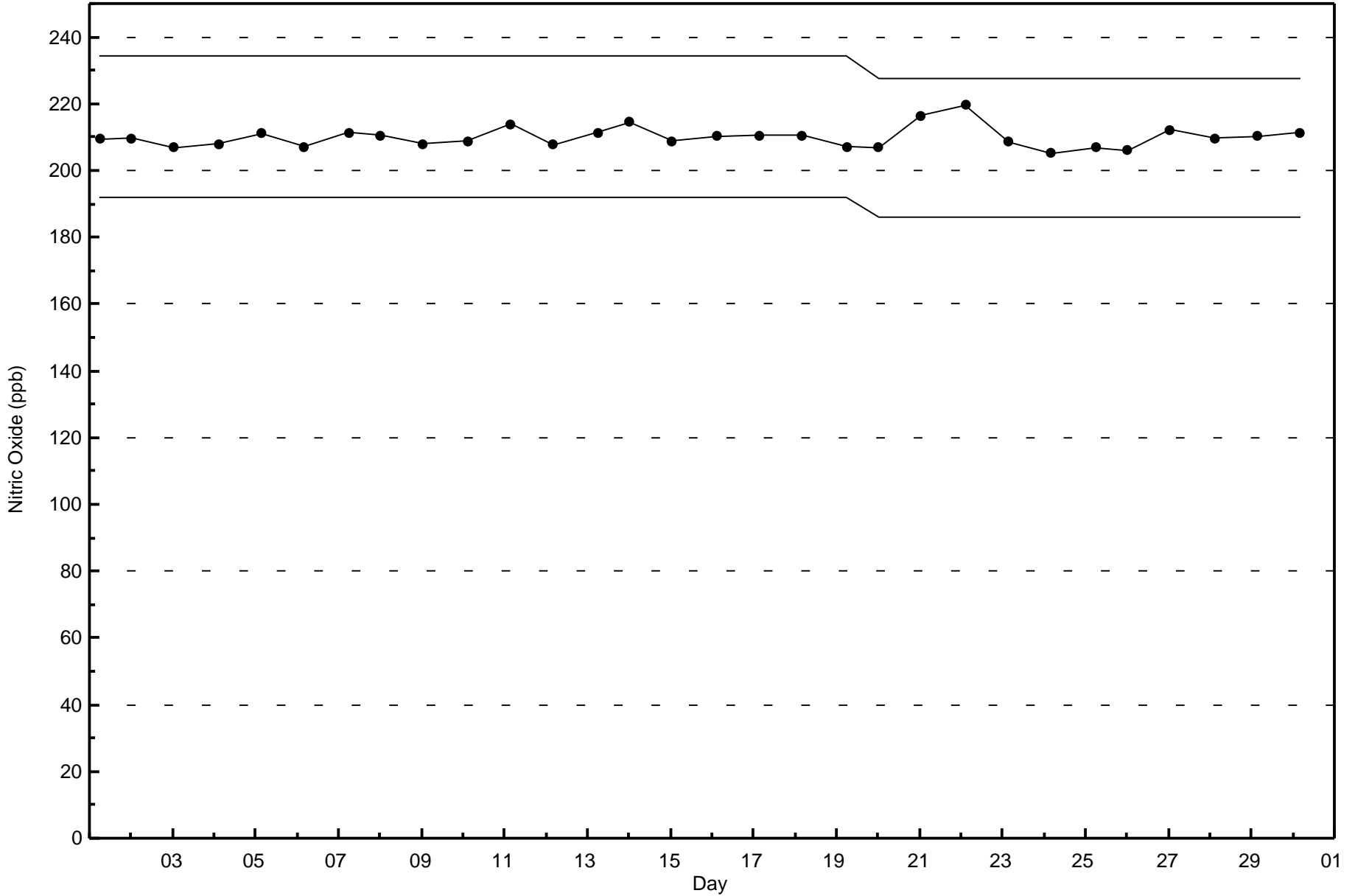






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - November 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 23 ppb on Nov 20 06:00	Maximum Daily Average: 12.0 ppb on Nov 25		Hours of Data:	684
Minimum Value: 0 ppb on Nov 2 22:00	Minimum Daily Average: 0.4 ppb on Nov 1		Hours of Missing Data:	36
Maximum Diurnal Average: 5.9 ppb at hour 6	Minimum Diurnal Average: 3.4 ppb at hour 12		Hours of Calibration:	35
Monthly Average: 4.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 11 P ₉₉ = 18		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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0.4	4	
2-Nov	Z	3	2	2	2	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	3
3-Nov	0	Z	0	1	1	1	2	1	2	2	1	1	3	11	10	4	1	1	5	9	5	7	4	6	3.3	11	
4-Nov	6	9	Z	11	4	4	5	3	3	3	2	2	2	2	2	2	2	3	3	3	5	10	11	8	4.4	11	
5-Nov	11	14	7	Z	4	3	3	3	2	2	3	4	2	1	3	3	2	2	2	1	0	0	0	0	3.3	14	
6-Nov	0	0	2	3	Z	9	9	7	3	3	4	3	3	2	1	1	1	1	1	1	1	1	2	2	2.5	9	
7-Nov	2	3	10	9	7	Z	4	4	5	5	3	4	5	4	3	3	4	3	3	4	8	10	7	9	5.1	10	
8-Nov	Z	9	6	4	4	6	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	9	
9-Nov	0	Z	0	0	0	0	0	1	2	3	2	3	8	12	14	8	7	5	2	1	1	1	1	1	3.1	14	
10-Nov	2	3	Z	1	1	2	2	1	2	1	1	1	1	2	1	2	3	2	2	2	3	3	3	3	1.8	3	
11-Nov	3	3	3	Z	3	3	3	5	14	7	3	2	2	1	0	1	8	7	15	11	10	12	12	15	6.2	15	
12-Nov	17	13	11	13	Z	12	10	10	11	6	2	4	2	1	1	1	1	1	1	1	1	1	2	3	5.3	17	
13-Nov	2	2	2	2	3	Z	3	2	2	2	5	8	7	5	5	6	3	3	3	2	3	3	7	6	3.7	8	
14-Nov	Z	4	5	4	4	10	10	9	11	8	9	8	8	9	12	15	7	5	9	10	12	14	11	10	8.8	15	
15-Nov	4	Z	2	3	2	1	1	1	2	1	1	1	1	1	1	5	1	1	0	0	0	1	0	3	1.5	5	
16-Nov	2	0	Z	0	0	16	6	1	1	3	2	3	5	4	5	1	1	2	2	3	10	6	2	3	3.3	16	
17-Nov	1	1	1	Z	1	1	1	1	1	2	2	2	2	3	10	8	3	1	3	6	10	3	1	1	2.7	10	
18-Nov	1	4	2	1	Z	1	1	1	1	2	2	2	2	2	2	2	0	2	4	4	2	1	1	1	1.6	4	
19-Nov	1	6	5	7	5	Z	2	2	6	4	4	4	6	C	C	C	C	C	4	1	1	1	0	0	3.2	7	
20-Nov	Z	0	1	3	14	23	12	10	7	6	3	1	6	6	2	2	1	1	2	1	1	1	1	2	4.7	23	
21-Nov	4	Z	6	9	17	14	15	15	17	14	10	10	8	8	7	8	7	7	10	6	6	8	9	6	9.5	17	
22-Nov	4	3	Z	1	4	5	2	5	4	3	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1.6	5	
23-Nov	0	0	0	Z	0	0	0	0	1	1	2	1	1	1	1	1	0	0	0	1	11	12	13	2.1	13		
24-Nov	13	8	10	7	Z	7	7	1	4	7	3	1	1	1	1	2	2	3	5	2	6	8	10	4.9	13		
25-Nov	13	12	8	6	4	Z	6	8	11	10	12	8	7	11	13	20	19	20	18	17	15	15	14	12	12.0	20	
26-Nov	Z	4	2	2	2	2	2	2	2	2	3	2	2	3	3	4	5	5	5	8	8	18	20	12	5.1	20	
27-Nov	13	Z	11	10	11	10	18	14	15	12	9	8	9	7	10	12	9	11	9	11	14	12	11	11	11.2	18	
28-Nov	9	11	Z	8	7	6	5	5	4	4	3	2	3	4	2	2	3	4	5	6	6	4	3	3	4.6	11	
29-Nov	3	4	5	Z	8	10	15	17	14	10	6	6	7	6	8	5	2	1	2	1	4	4	2	2	6.1	17	
30-Nov	1	2	3	3	Z	3	3	3	4	4	7	10	11	13	18	22	17	12	15	14	10	11	10	11	8.9	22	

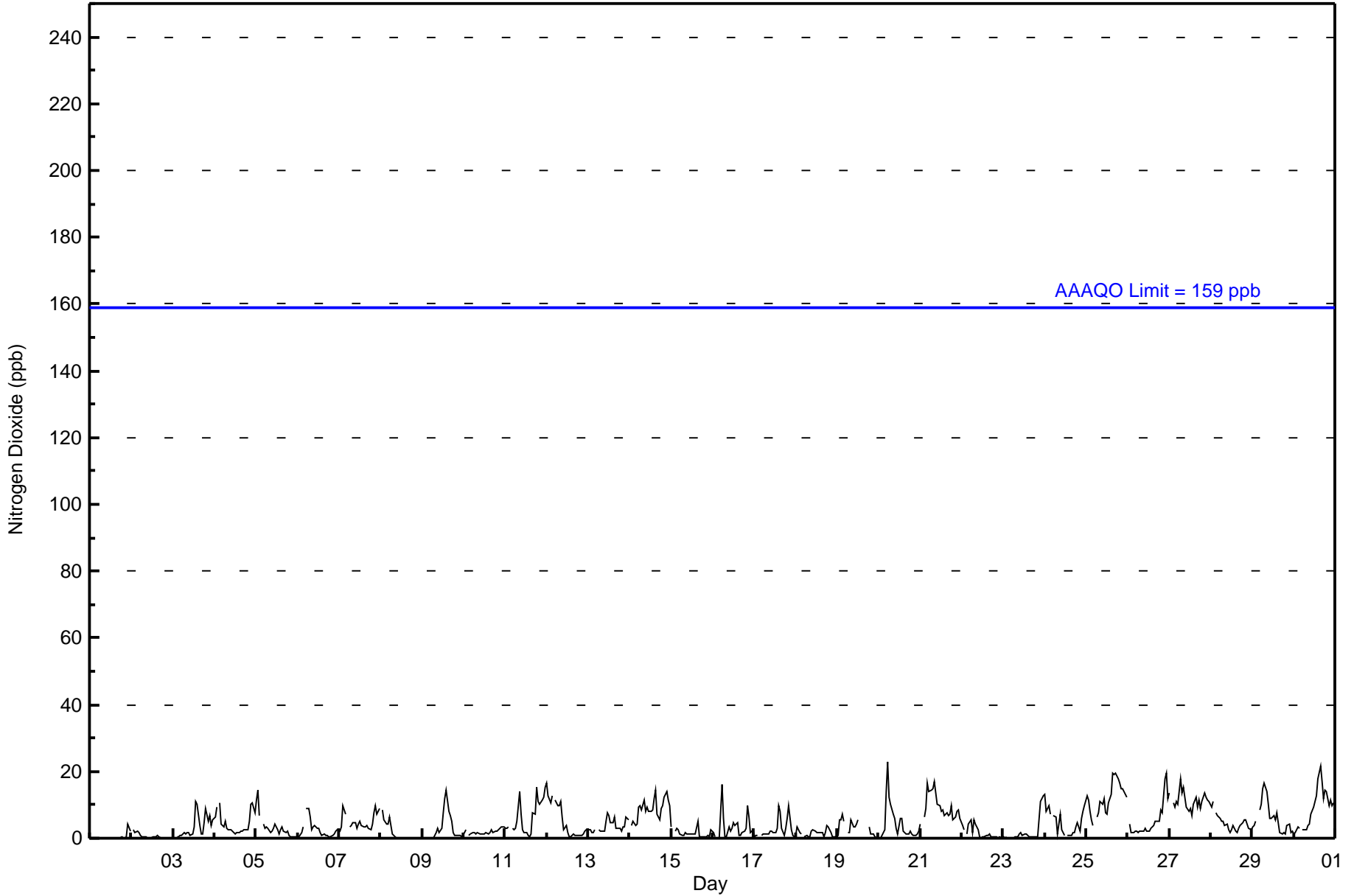
4.5	4.7	4.1	4.3	4.4	5.9	4.9	4.4	5.0	4.3	3.5	3.4	3.9	4.1	4.6	4.8	3.8	3.5	4.2	4.3	4.6	5.5	5.3	5.1	Diurnal Average	
17	14	11	13	17	23	18	17	17	14	12	10	11	13	18	22	19	20	18	17	15	18	20	15	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	51	17	6	5	11	53	170	112	60	61	20	9	12	36	46	681
21 - 40	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	51	17	6	5	11	53	170	112	62	61	20	9	12	36	46	683

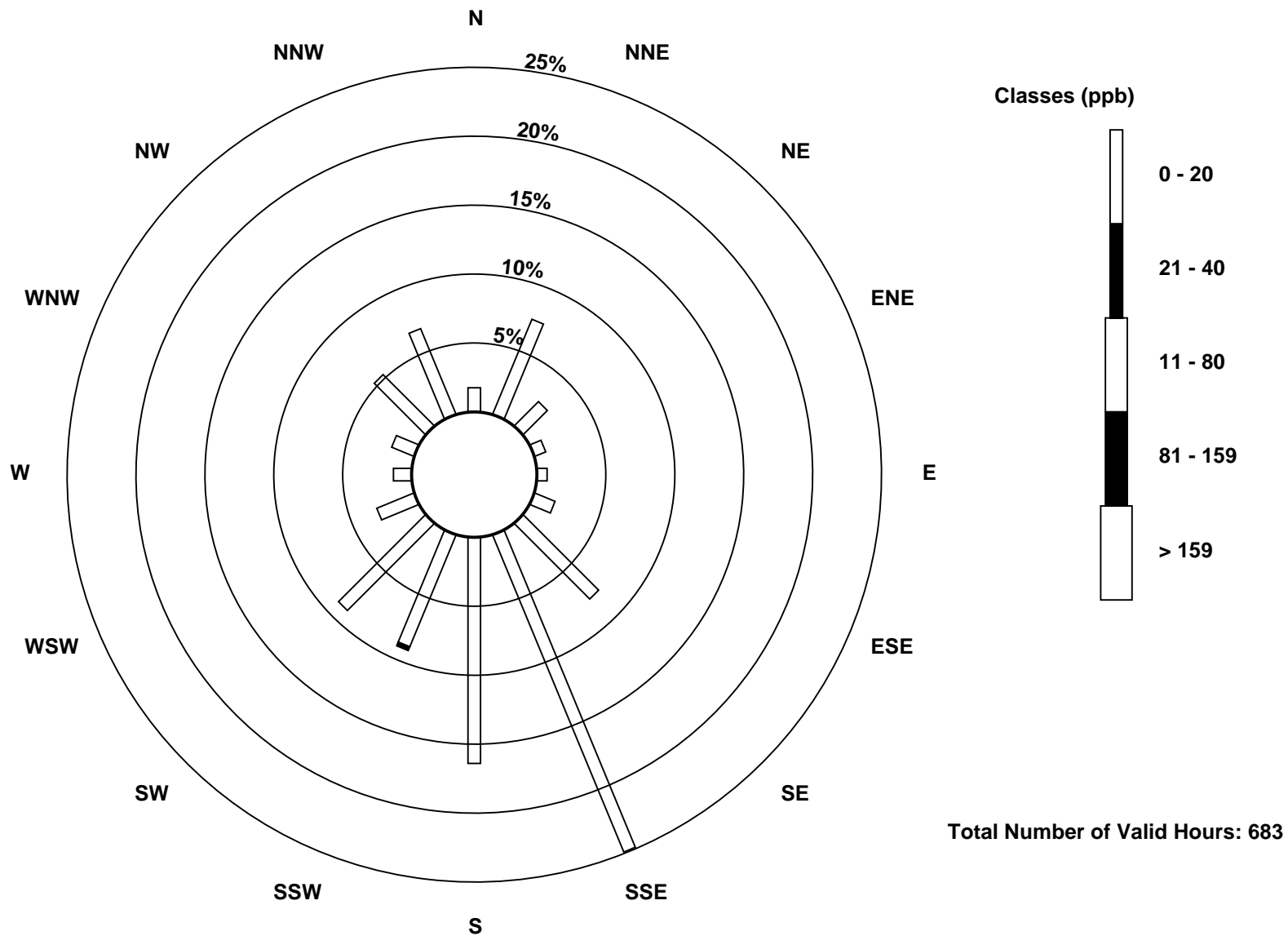
Total Number of Valid Hours: 683

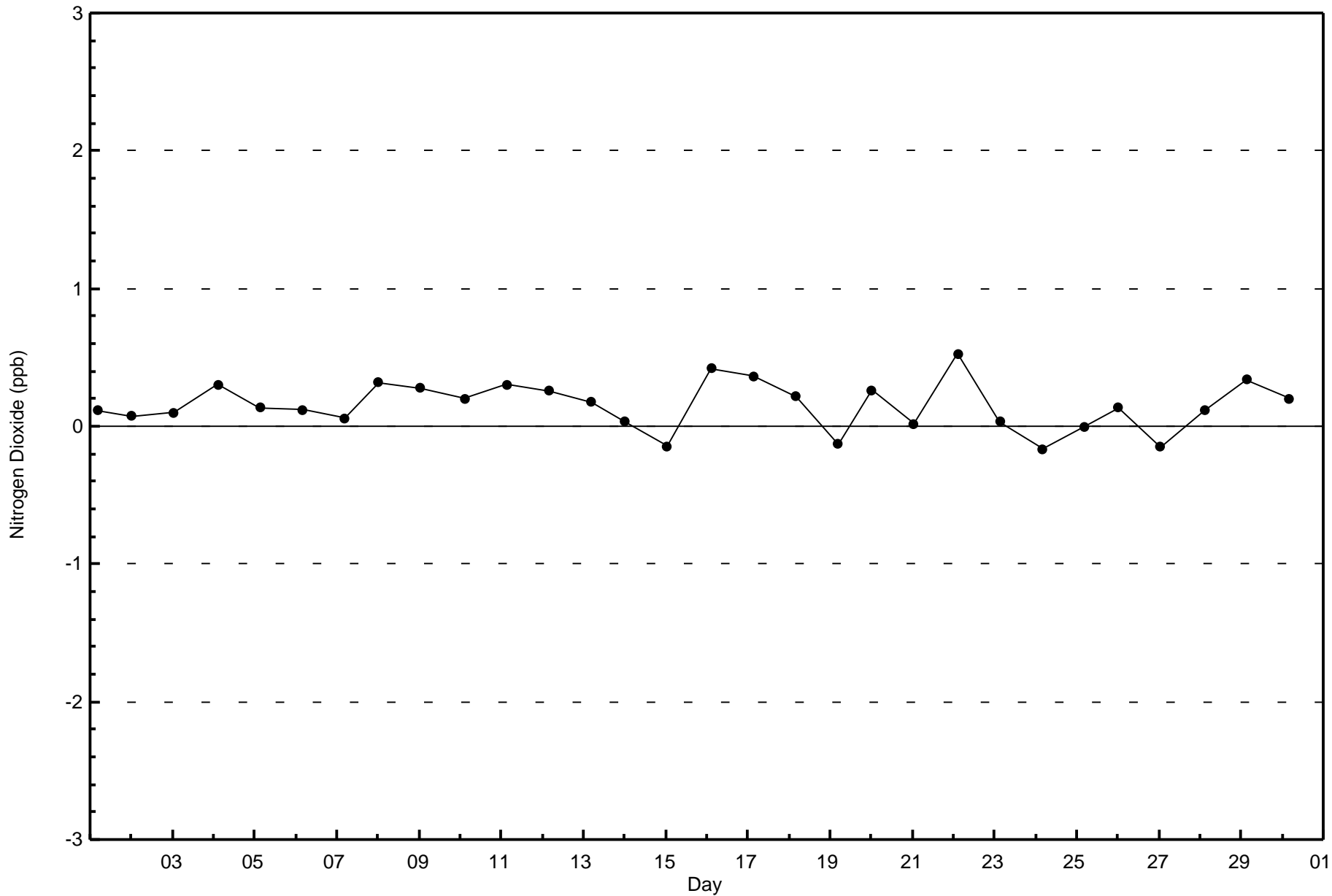
Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)





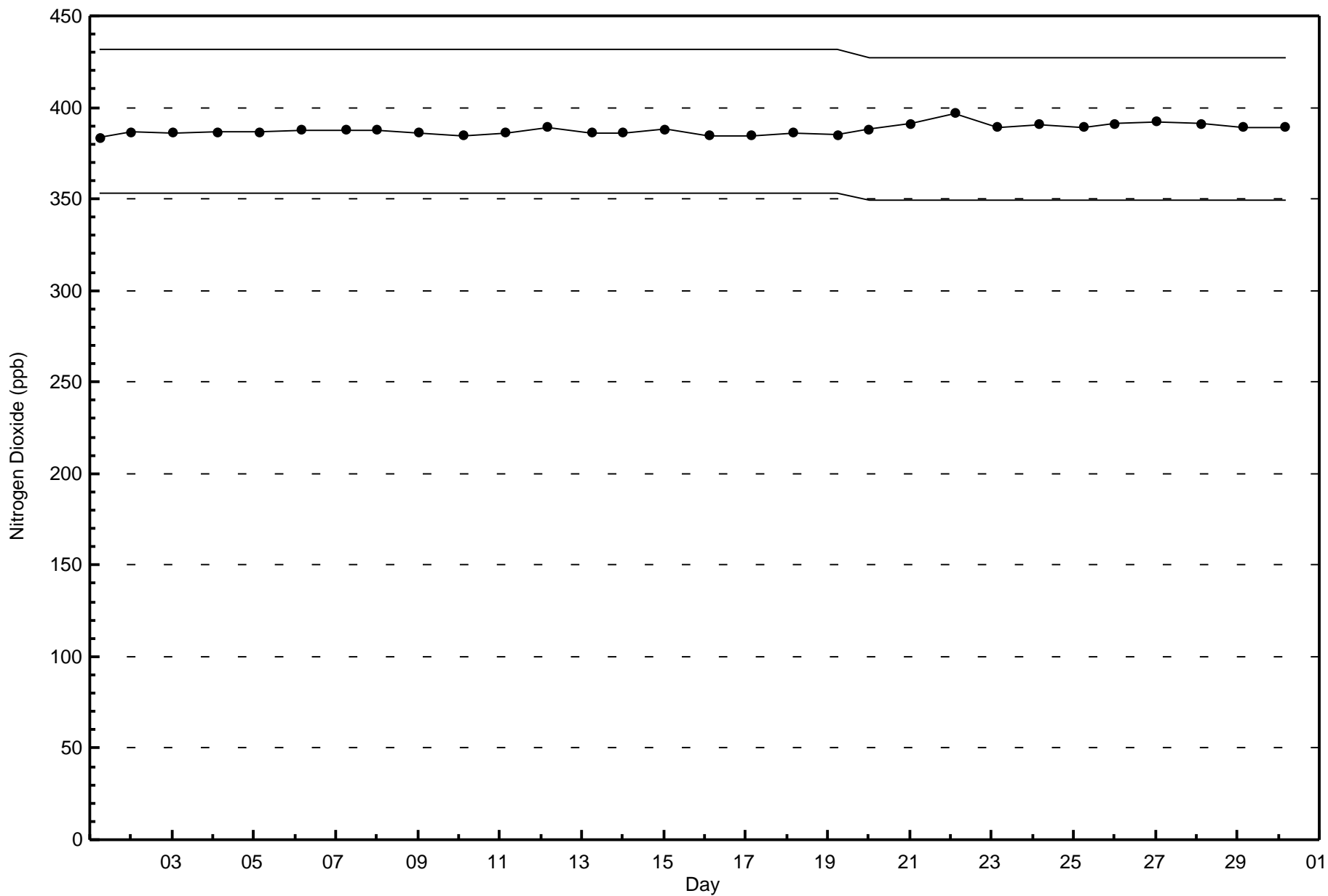


Wood Buffalo Environmental Association

Span Responses

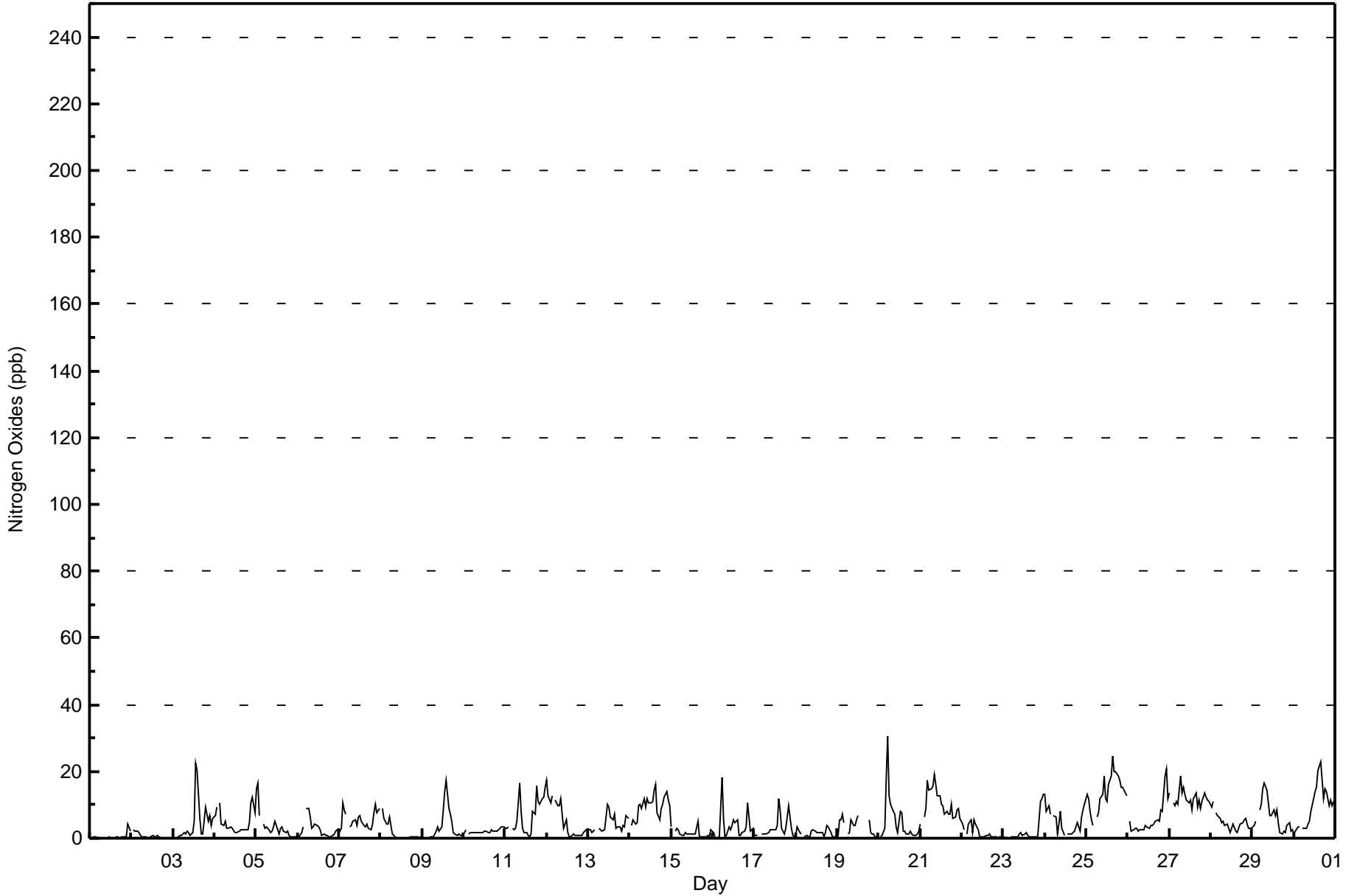
Nitrogen Dioxide (NO₂) - ppb

Wapasu - November 2015





Maximum Value: 31 ppb on Nov 20 06:00																		Maximum Daily Average: 13.8 ppb on Nov 25																		Hours in Service: 720	
Minimum Value: 0 ppb on Nov 2 22:00																		Minimum Daily Average: 0.5 ppb on Nov 1																		Hours of Data: 684	
Maximum Diurnal Average: 6.4 ppb at hour 6																		Minimum Diurnal Average: 3.6 ppb at hour 18																		Hours of Missing Data: 36	
Monthly Average: 4.9 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 12 P ₉₉ = 20																		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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0.5	4											
2-Nov	Z	2	2	2	2	1	1	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0.6	2											
3-Nov	0	Z	0	1	1	1	2	1	2	2	1	2	5	22	20	6	1	1	5	9	5	7	4	6	4.5	22											
4-Nov	7	9	Z	11	4	4	5	3	3	3	3	2	1	2	2	2	2	3	3	3	5	11	12	8	4.7	12											
5-Nov	15	16	7	Z	4	3	3	3	2	2	3	5	3	1	3	3	2	2	2	1	0	0	0	0	3.6	16											
6-Nov	0	1	1	3	Z	9	9	7	3	4	4	4	3	2	1	1	1	1	0	1	1	1	2	2	2.6	9											
7-Nov	2	3	11	9	7	Z	4	4	5	5	4	6	7	5	4	3	4	3	2	4	7	10	7	9	5.5	11											
8-Nov	Z	9	6	4	4	6	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	9											
9-Nov	0	Z	0	0	0	0	0	1	2	3	2	3	9	14	18	9	7	5	2	1	1	1	1	1	3.6	18											
10-Nov	2	3	Z	1	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	3	3	3	3	2.1	3											
11-Nov	3	3	3	Z	3	3	3	5	16	8	3	2	2	1	0	1	8	7	16	11	10	12	12	15	6.4	16											
12-Nov	17	13	11	13	Z	12	10	10	12	7	3	5	2	1	1	1	1	1	1	1	1	2	2	3	5.5	17											
13-Nov	2	3	2	2	3	Z	3	2	2	2	6	10	9	6	6	7	3	3	3	2	4	4	7	6	4.3	10											
14-Nov	Z	4	5	4	5	10	10	9	12	10	12	10	11	11	14	16	7	6	9	10	12	14	11	10	9.6	16											
15-Nov	4	Z	2	3	2	1	1	1	2	1	1	1	1	1	1	5	1	0	0	0	0	1	1	3	1.5	5											
16-Nov	2	0	Z	0	0	18	6	0	1	3	2	4	5	5	5	1	1	2	2	3	11	6	2	3	3.7	18											
17-Nov	1	1	1	Z	1	1	1	1	2	3	3	2	3	4	12	9	3	1	3	6	10	3	1	1	3.1	12											
18-Nov	1	4	2	1	Z	1	1	1	0	2	2	2	2	2	2	2	0	2	4	4	2	1	1	1	1.6	4											
19-Nov	1	6	5	7	5	Z	1	2	6	4	4	5	7	C	C	C	C	C	5	2	1	1	0	0	3.5	7											
20-Nov	Z	0	1	3	18	31	13	10	8	7	4	2	8	8	2	2	1	1	2	1	1	1	1	2	5.5	31											
21-Nov	4	Z	6	9	17	15	15	16	19	16	13	13	10	10	7	8	7	7	10	6	6	8	9	6	10.3	19											
22-Nov	4	3	Z	1	4	5	2	5	4	3	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1.7	5											
23-Nov	0	0	0	Z	0	0	0	0	1	1	2	1	1	2	1	0	0	0	0	0	0	11	12	13	2.1	13											
24-Nov	13	8	10	7	Z	7	7	1	4	8	3	1	DF	1	1	1	2	2	3	5	2	6	9	10	5.1	13											
25-Nov	13	12	8	6	4	Z	7	8	12	13	18	12	11	16	19	25	20	20	19	17	15	15	15	13	13.8	25											
26-Nov	Z	5	2	2	3	3	2	3	2	2	4	3	3	4	4	4	5	5	5	9	8	19	21	12	5.6	21											
27-Nov	14	Z	11	10	11	10	19	14	15	13	11	10	11	8	12	14	9	11	9	11	13	12	11	11	11.8	19											
28-Nov	9	11	Z	8	7	6	5	5	4	4	3	2	3	4	2	2	3	4	5	6	6	4	3	3	4.7	11											
29-Nov	3	4	5	Z	9	10	15	17	14	11	7	7	9	7	9	5	2	1	2	2	4	5	2	2	6.5	17											
30-Nov	1	2	3	3	Z	3	3	3	4	5	8	12	14	15	20	23	17	12	15	14	10	11	10	11	9.5	23											
																		4.8 4.9 4.2 4.4 4.6 6.4 5.1 4.5 5.3 4.9 4.3 4.3 4.9 5.3 5.8 5.4 3.9 3.6 4.3 4.4 4.7 5.7 5.5 5.2																		Diurnal Average	
																		17 16 11 13 18 31 19 17 19 16 18 13 14 22 20 25 20 20 20 19 17 15 19 21 15																		Diurnal Maximum	
Z - zerspan		C - Calibration						DF - DAS Failure																													





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	679	99.27	99.27
21 - 40	5	0.73	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: 684

Total Number of Hours: 720



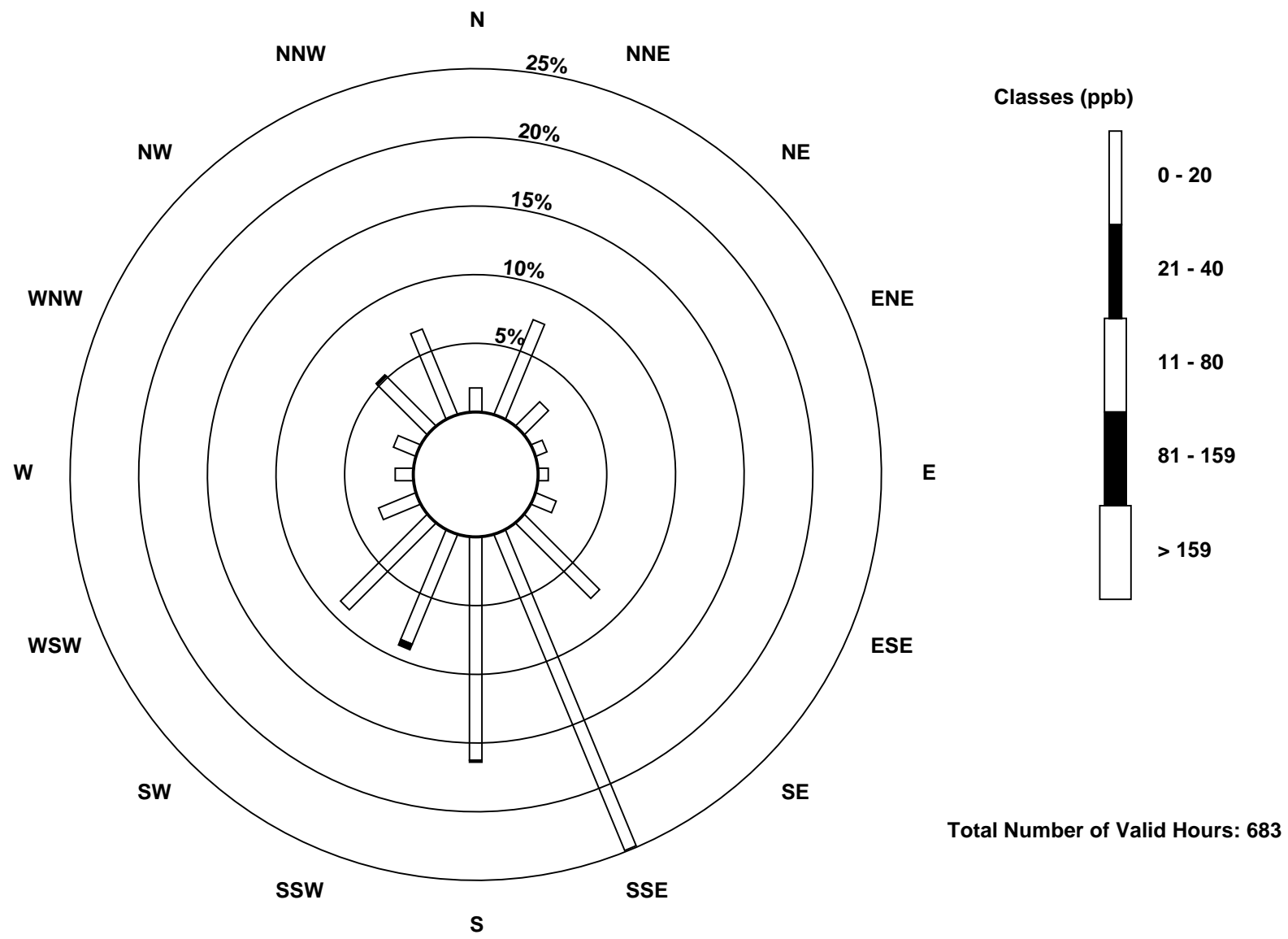
Wood Buffalo Environmental Association
Frequency Distribution

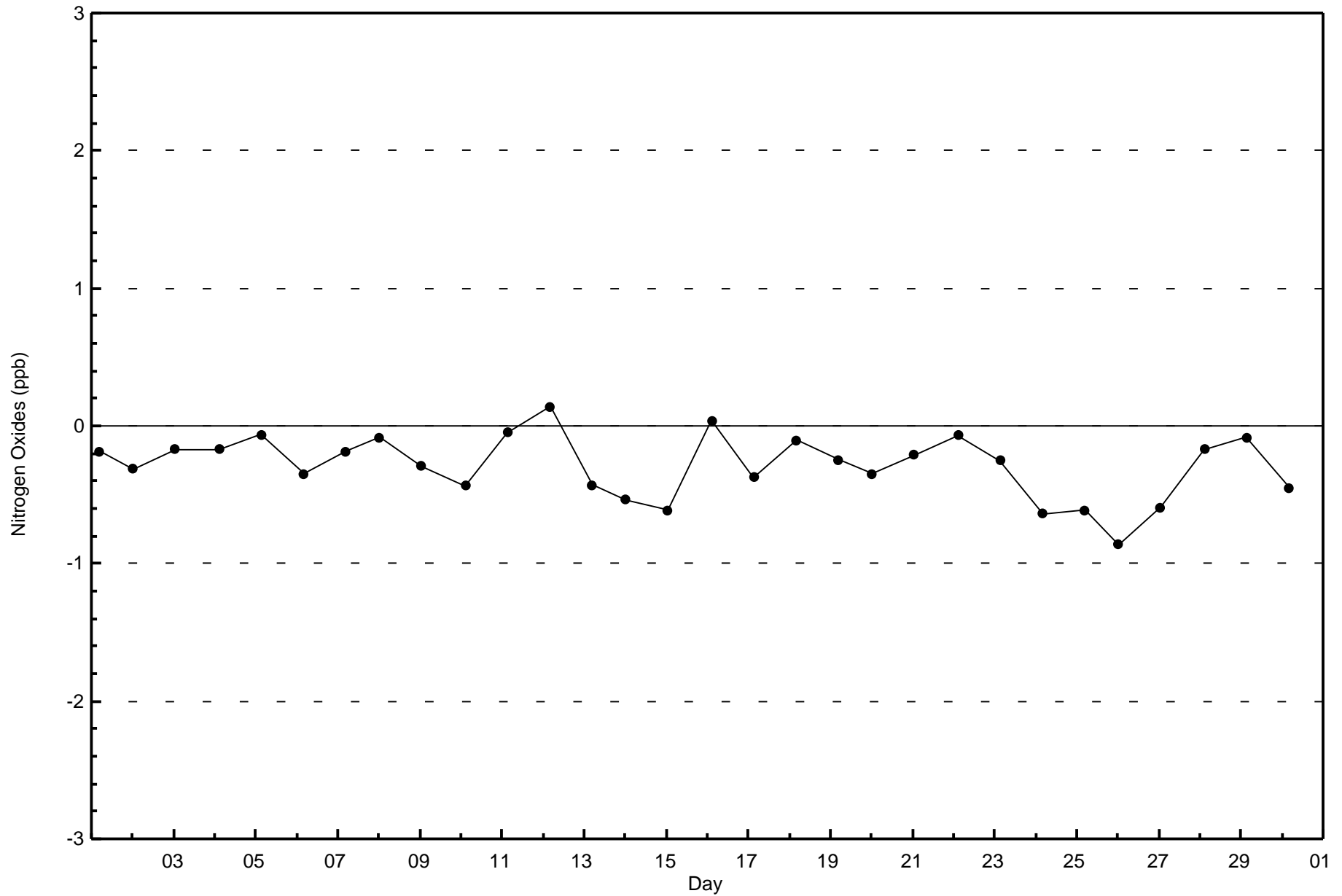
Nitrogen Oxides (NO_x) - ppb
Wapasu - November 2015

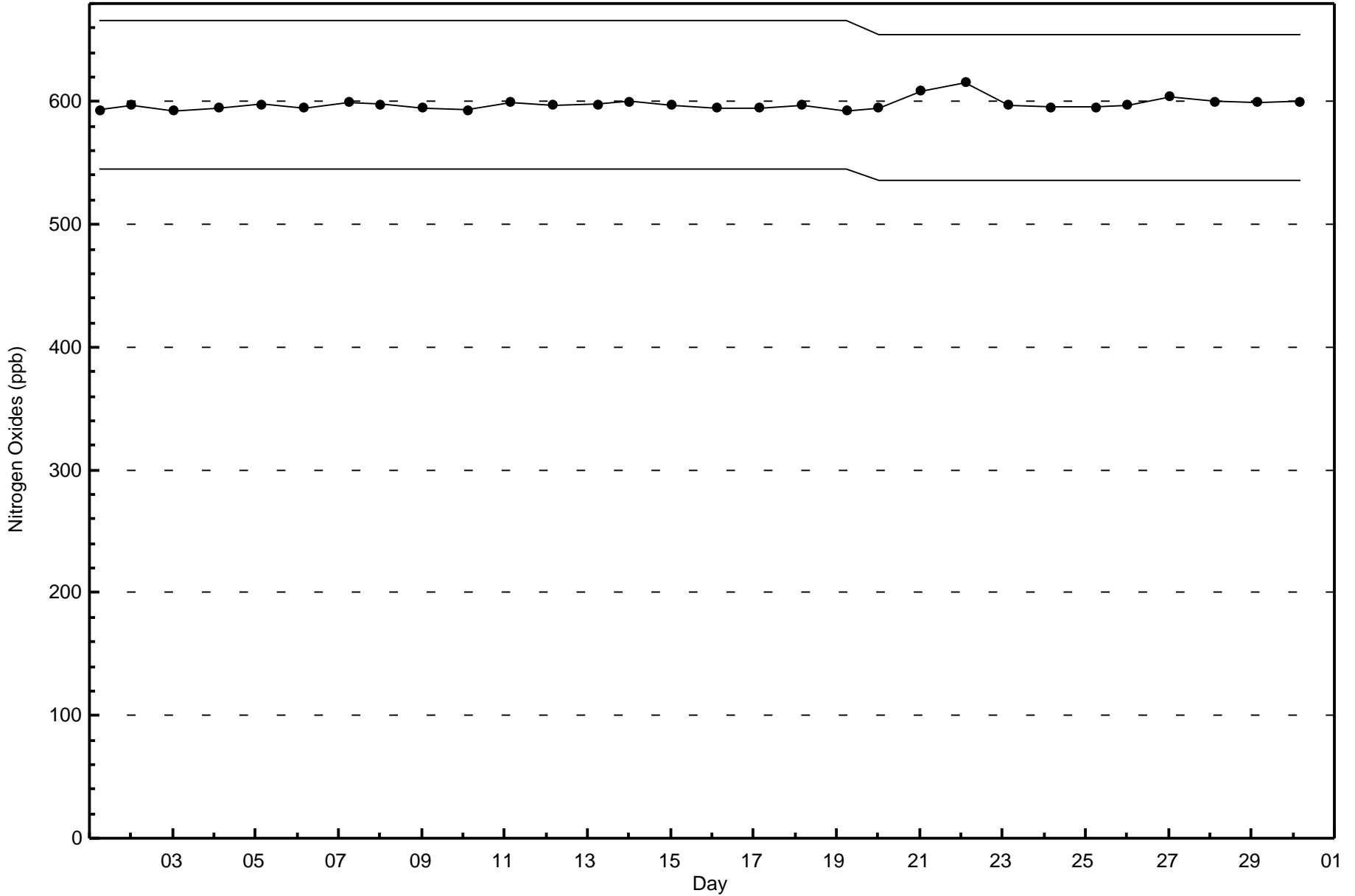
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	51	17	6	5	11	53	170	111	59	61	20	9	12	35	46	678
21 - 40	0	0	0	0	0	0	0	0	1	3	0	0	0	0	1	0	5
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	51	17	6	5	11	53	170	112	62	61	20	9	12	36	46	683

Total Number of Valid Hours: 683

Total Number of Hours: 720









Summary of Hour Averages

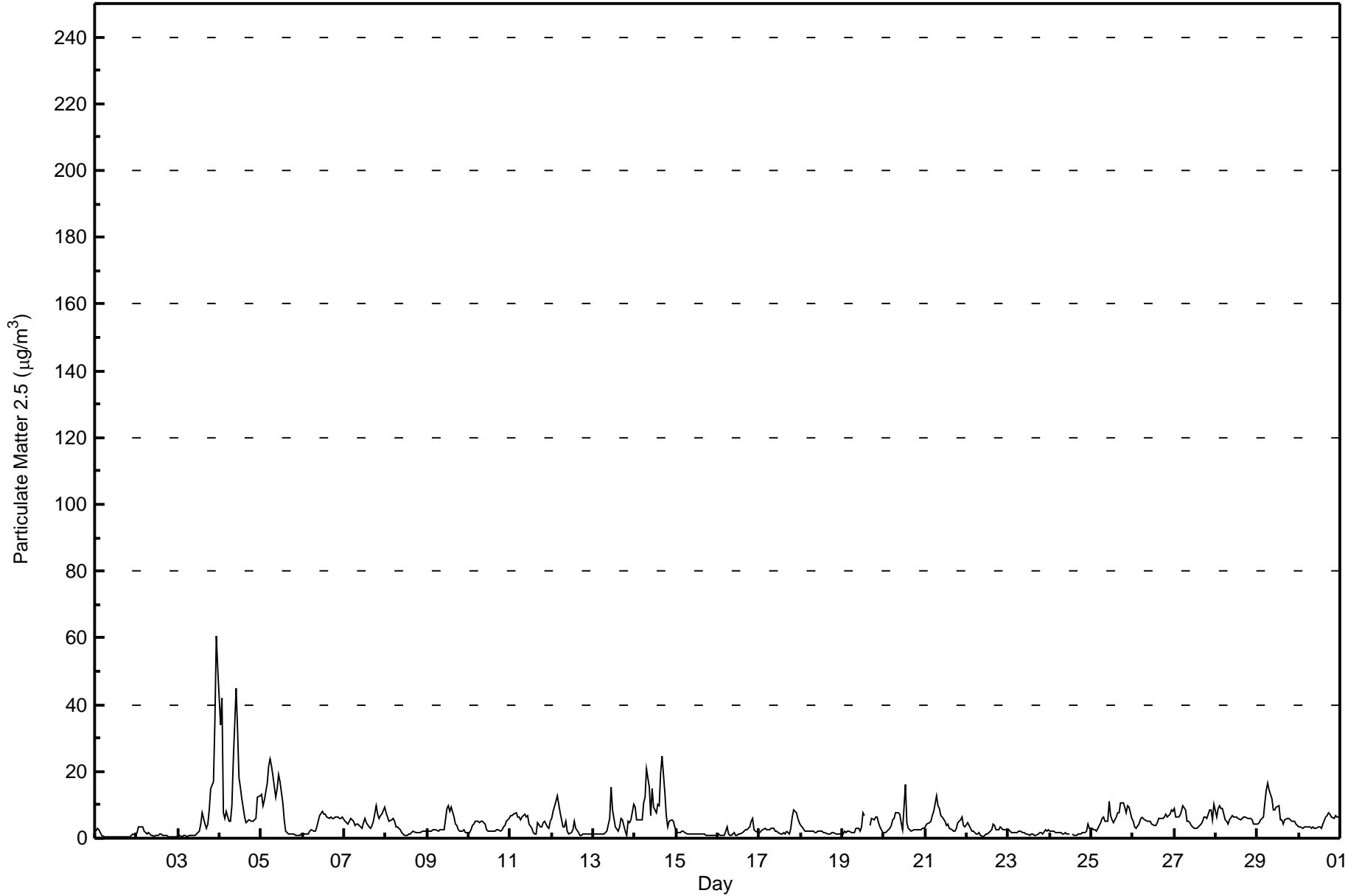
Wapasu - November 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 60.5 µg/m ³ on Nov 3 23:00	Maximum Daily Average: 13.8 µg/m ³ on Nov 4	Hours of Data:	717
Minimum Value: 0.4 µg/m ³ on Nov 1 17:00	Minimum Daily Average: 0.9 µg/m ³ on Nov 1	Hours of Missing Data:	3
Maximum Diurnal Average: 6.0 µg/m ³ at hour 23	Minimum Diurnal Average: 3.6 µg/m ³ at hour 15	Hours of Calibration:	2
Monthly Average: 4.69 µg/m ³	Percentiles: P ₁ = 0.5 P ₁₀ = 1.0 Q ₁ = 1.7 Median = 3.2 Q ₃ = 6.0 P ₉₀ = 8.9 P ₉₉ = 31.9	Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	2.3	3.1	2.7	1.9	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.7	1.1	1.0	0.9	3.1
2-Nov	1.6	3.3	3.3	3.4	2.0	1.5	1.4	1.6	0.8	0.7	0.6	0.7	1.0	1.1	1.1	0.8	0.7	0.7	0.6	0.5	0.5	0.4	0.5	0.6	1.2	3.4
3-Nov	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.8	0.9	1.0	1.0	1.5	2.1	4.2	7.5	4.3	3.1	4.2	8.6	14.7	16.9	35.3	60.5	50.8	9.2	60.5
4-Nov	34.0	41.8	7.5	5.8	8.2	5.2	5.0	9.9	23.1	45.0	32.8	18.1	15.3	12.0	6.4	4.6	5.0	5.4	5.0	4.9	5.3	6.0	12.3	12.9	13.8	45.0
5-Nov	13.3	9.8	11.4	16.7	21.5	23.7	21.7	18.7	12.4	14.8	18.9	16.8	10.7	5.6	1.9	1.6	1.5	1.3	1.2	1.1	0.9	0.9	0.9	1.1	9.5	23.7
6-Nov	1.2	1.3	1.2	1.4	2.1	2.3	2.2	2.2	3.5	4.9	6.9	8.2	7.4	7.1	6.4	6.0	6.2	6.0	6.0	6.2	6.2	6.1	6.0	6.2	4.7	8.2
7-Nov	5.1	4.5	4.0	5.0	5.8	5.0	3.9	4.4	4.3	3.4	3.0	4.5	5.8	4.6	3.3	2.9	3.8	5.0	9.8	7.4	5.9	6.8	7.1	9.3	5.2	9.8
8-Nov	7.6	6.2	4.9	5.5	6.0	5.0	3.6	3.2	2.4	1.6	1.1	0.9	0.9	1.2	1.5	1.8	1.9	1.8	1.8	1.8	1.8	2.0	2.0	1.9	2.8	7.6
9-Nov	2.0	2.2	2.3	2.5	2.3	2.4	2.0	2.4	2.4	2.5	2.4	9.0	9.5	8.2	9.4	6.6	4.1	3.7	2.5	2.2	2.1	2.4	1.7	1.9	3.7	9.5
10-Nov	1.8	2.4	3.8	4.4	4.9	5.0	4.6	5.0	5.2	4.2	2.6	2.2	2.1	2.1	2.1	2.2	2.6	2.5	2.3	2.6	3.3	4.0	4.9	5.9	3.5	5.9
11-Nov	6.7	7.0	7.2	7.6	6.5	6.3	5.5	6.2	7.3	6.4	7.0	4.2	3.0	1.7	1.4	1.5	4.8	3.3	3.4	4.5	5.0	3.4	3.1	5.0	4.9	7.6
12-Nov	5.9	8.1	11.1	12.6	10.1	7.8	3.6	3.3	4.9	2.0	1.3	1.8	2.4	5.2	3.2	1.5	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.4	3.9	12.6
13-Nov	1.3	1.2	1.2	1.2	1.2	1.3	1.4	1.8	2.0	5.8	15.4	8.6	5.8	3.4	2.3	3.2	6.1	5.4	2.1	1.0	5.1	4.8	5.7	10.0	4.0	15.4
14-Nov	9.1	5.4	5.4	5.4	5.3	10.5	12.4	20.6	15.3	6.6	14.6	9.2	7.7	10.1	9.6	19.7	24.7	13.4	7.0	3.2	5.0	5.5	5.1	3.3	9.8	24.7
15-Nov	2.2	1.8	1.8	2.2	2.1	1.6	1.3	1.4	1.3	1.2	1.3	1.5	1.5	1.4	1.5	1.4	1.1	1.0	0.9	0.7	0.8	1.0	1.1	1.0	1.4	2.2
16-Nov	1.2	1.0	1.0	1.0	1.0	3.3	1.4	0.8	1.0	1.7	1.0	0.8	1.1	1.3	1.7	2.1	2.6	2.4	3.2	5.1	5.9	2.5	2.0	1.5	1.9	5.9
17-Nov	1.5	1.9	2.5	2.8	2.6	2.4	2.6	2.9	2.8	2.3	2.0	1.7	1.4	1.3	1.6	1.5	2.1	1.3	3.1	6.2	8.4	7.6	6.1	4.7	3.1	8.4
18-Nov	3.7	3.5	2.1	2.2	2.1	2.1	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.6	1.5	1.4	1.3	1.4	1.5	1.6	1.3	1.2	1.3	1.3	1.9	3.7
19-Nov	1.2	2.0	1.9	2.2	2.0	1.7	1.8	1.9	2.9	2.8	2.0	3.3	7.6	6.6	C	C	3.8	5.9	5.7	6.3	6.4	4.7	3.3	1.8	3.5	7.6
20-Nov	1.6	1.6	2.0	2.9	3.9	5.3	6.0	7.6	7.6	7.1	4.5	2.7	15.9	4.7	2.9	2.7	2.2	2.5	2.5	2.3	2.6	2.7	2.9	3.1	4.2	15.9
21-Nov	3.5	4.2	4.9	5.2	6.7	7.9	12.6	10.0	8.7	6.6	6.2	5.1	3.8	4.4	3.1	2.3	2.3	2.2	2.8	4.7	5.5	6.5	4.0	3.3	5.3	12.6
22-Nov	4.7	3.8	2.8	2.2	2.2	1.1	1.1	1.6	1.0	0.6	0.9	1.1	1.5	1.7	2.6	4.2	4.0	2.4	2.7	3.4	3.1	2.6	2.7	2.5	2.4	4.7
23-Nov	2.5	1.9	1.9	1.7	1.9	1.9	2.0	2.1	1.8	1.7	1.4	1.1	1.0	1.2	1.2	0.9	0.8	1.2	1.9	1.7	1.5	2.4	2.3	2.3	1.7	2.5
24-Nov	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.2	1.4	1.6	1.2	1.1	DF	1.1	1.0	1.0	1.1	1.1	1.3	1.8	1.6	2.1	4.4	2.8	1.7	4.4
25-Nov	3.0	2.7	2.3	2.2	2.8	4.8	5.9	6.2	5.0	5.1	11.1	6.9	5.3	4.7	6.2	7.7	7.7	10.4	10.8	9.2	7.8	9.9	9.1	5.9	6.4	11.1
26-Nov	4.9	3.4	3.0	4.3	5.3	6.3	5.9	5.4	5.0	4.9	4.9	4.3	4.0	3.9	4.8	5.8	5.8	6.0	6.2	7.4	6.4	7.1	8.5	8.2	5.5	8.5
27-Nov	8.9	6.5	6.5	6.7	8.1	9.7	8.3	5.0	5.0	4.8	3.9	3.1	3.1	3.0	3.4	4.1	5.2	6.5	6.2	6.0	8.5	8.3	5.6	10.2	6.1	10.2
28-Nov	6.4	8.9	9.6	8.8	8.9	5.6	4.9	4.3	5.5	6.9	6.4	6.3	6.2	6.1	5.4	5.8	6.5	6.4	6.0	5.9	5.8	5.5	4.4	4.4	6.3	9.6
29-Nov	4.4	4.5	5.3	6.5	10.5	14.5	16.4	14.3	11.7	8.5	8.6	9.2	9.8	5.4	5.5	4.3	5.3	5.9	5.9	5.4	5.2	5.1	4.3	4.0	7.5	16.4
30-Nov	3.5	3.2	3.2	3.2	3.2	3.4	3.3	3.0	3.2	3.2	2.9	3.2	3.5	3.1	4.2	6.5	6.6	7.4	7.3	6.3	5.9	6.7	6.4	6.4	4.5	7.4

4.9	5.0	4.0	4.3	4.8	5.0	4.8	5.0	5.0	5.3	5.6	4.6	4.9	4.0	3.6	3.7	4.1	4.0	4.0	4.2	4.6	5.2	6.0	5.8	Diurnal Average	
34.0	41.8	11.4	16.7	21.5	23.7	21.7	20.6	23.1	45.0	32.8	18.1	15.9	12.0	9.6	19.7	24.7	13.4	10.8	14.7	16.9	35.3	60.5	50.8	Diurnal Maximum	

C - Calibration DF - DAS Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	444	61.92	61.92
6 - 15	188	26.22	88.15
16 - 25	15	2.09	90.24
26 - 80	7	0.98	91.21
> 81.0	0	0.00	91.21

Total Number of Valid Hours: 717

Total Number of Hours: 720



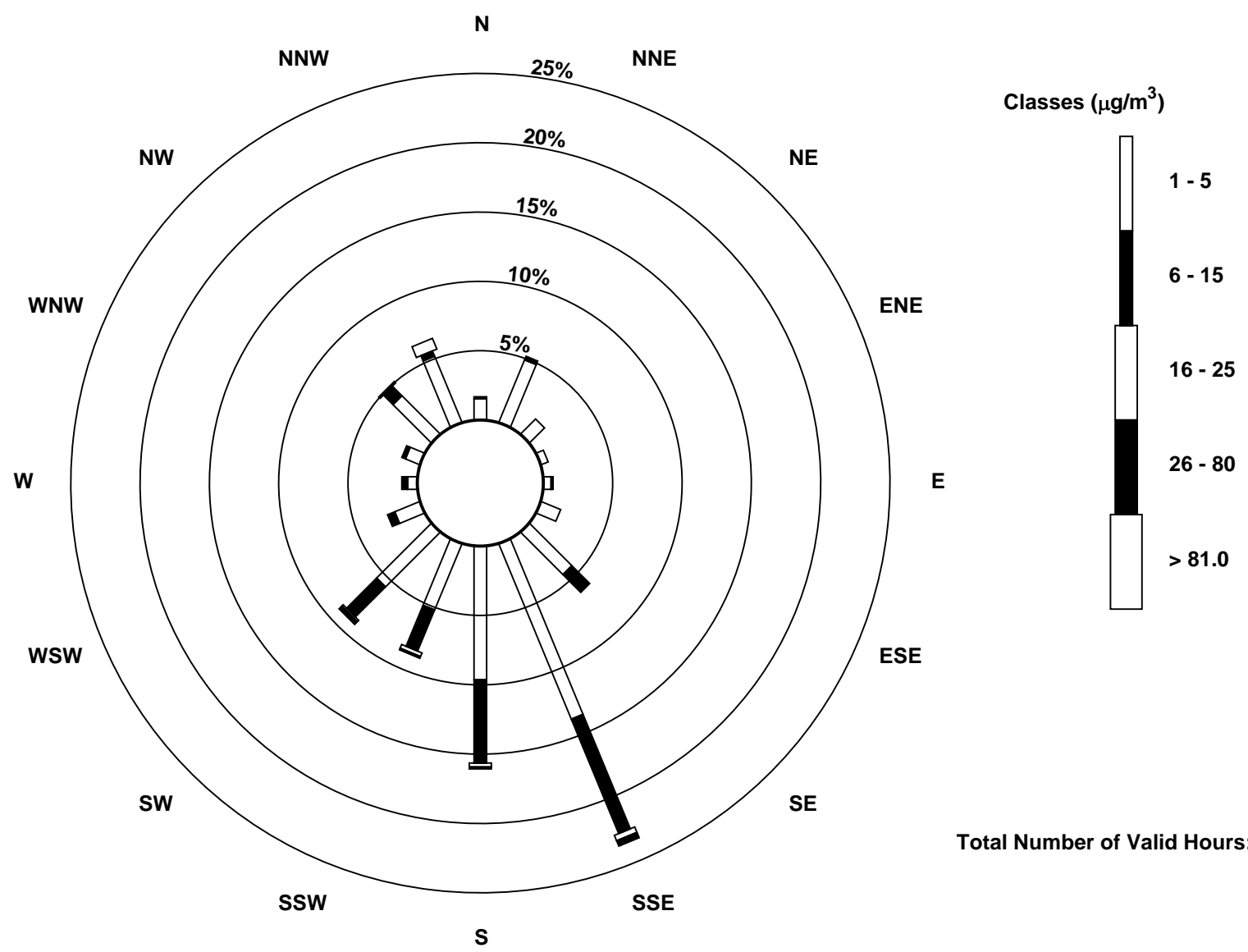
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - November 2015

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	11	35	11	4	4	11	31	98	69	37	40	14	5	8	28	37	443
6 - 15	1	2	0	0	1	0	13	64	43	23	22	4	3	2	7	3	188
16 - 25	0	0	0	0	0	0	0	3	2	2	1	0	0	0	1	6	15
26 - 80	0	0	0	0	0	0	0	3	1	1	2	0	0	0	0	0	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	37	11	4	5	11	44	168	115	63	65	18	8	10	36	46	653

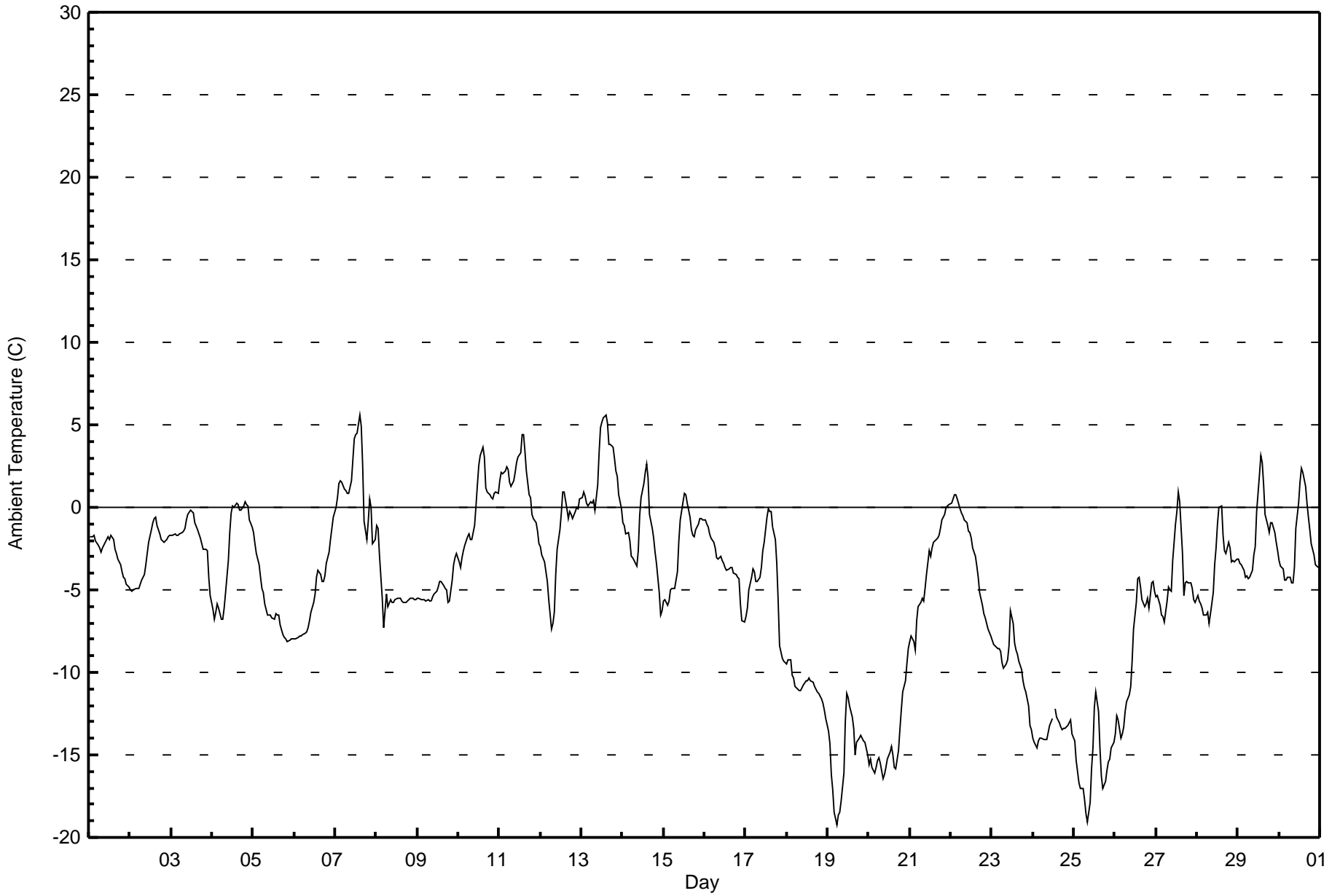
Total Number of Valid Hours: 716

Total Number of Hours: 720





Maximum Value: 5.6 C on Nov 7 15:00		Maximum Daily Average: 2.2 C on Nov 13		Hours in Service: 720																							
Minimum Value: -19.2 C on Nov 19 06:00		Minimum Daily Average: -15.6 C on Nov 25		Hours of Data: 719																							
Maximum Diurnal Average: -2.6 C at hour 14		Minimum Diurnal Average: -6.2 C at hour 8		Hours of Missing Data: 1																							
Monthly Average: -4.86 C		Percentiles: P ₁ = -17.9 P ₁₀ = -13.5 Q ₁ = -7.4 Median = -4.1 Q ₃ = -1.1 P ₉₀ = 0.8 P ₉₉ = 4.8		Hours of Calibration: 0																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	-1.8	-1.8	-1.7	-1.7	-2.0	-2.2	-2.4	-2.7	-2.5	-2.1	-1.9	-1.8	-2.0	-1.7	-2.0	-2.5	-2.8	-3.2	-3.5	-3.9	-4.2	-4.3	-4.7	-4.8	-2.7	-1.7	
2-Nov	-5.0	-5.1	-5.0	-4.9	-4.9	-4.9	-4.7	-4.4	-4.0	-3.5	-2.8	-2.1	-1.4	-0.9	-0.7	-0.6	-1.1	-1.6	-1.9	-2.0	-2.1	-1.9	-1.7	-1.7	-2.9	-0.6	
3-Nov	-1.7	-1.7	-1.6	-1.7	-1.7	-1.6	-1.5	-1.5	-1.2	-0.7	-0.5	-0.2	-0.3	-0.3	-1.0	-1.4	-1.6	-1.9	-2.2	-2.5	-2.5	-2.6	-4.2	-5.4	-1.7	-0.2	
4-Nov	-6.2	-6.7	-6.3	-5.8	-6.1	-6.8	-6.8	-6.1	-5.2	-3.2	-1.6	-0.4	0.1	0.0	0.3	0.2	-0.1	-0.2	0.1	0.3	0.2	0.1	-0.7	-1.2	-2.6	0.3	
5-Nov	-1.6	-2.2	-2.8	-3.5	-4.2	-4.9	-5.2	-5.8	-6.5	-6.5	-6.6	-6.7	-6.8	-6.4	-6.5	-6.5	-7.1	-7.7	-7.8	-7.9	-8.1	-8.0	-8.0	-8.0	-6.1	-1.6	
6-Nov	-8.0	-8.0	-7.8	-7.8	-7.8	-7.7	-7.6	-7.6	-7.3	-6.9	-6.4	-5.8	-5.2	-4.2	-3.8	-4.1	-4.5	-4.5	-4.1	-3.4	-2.7	-2.0	-1.2	-0.6	-5.4	-0.6	
7-Nov	0.0	0.6	1.5	1.6	1.5	1.1	1.0	0.9	0.8	1.6	2.9	4.2	4.4	4.5	5.6	4.9	2.6	-0.8	-2.0	-0.9	0.5	0.0	-2.2	-2.0	1.3	5.6	
8-Nov	-1.1	-1.2	-2.9	-5.5	-7.3	-6.2	-5.3	-6.0	-5.6	-5.7	-5.7	-5.6	-5.5	-5.5	-5.5	-5.7	-5.7	-5.7	-5.7	-5.6	-5.5	-5.6	-5.6	-5.6	-5.2	-1.1	
9-Nov	-5.5	-5.5	-5.6	-5.6	-5.6	-5.6	-5.6	-5.7	-5.6	-5.4	-5.3	-5.1	-4.8	-4.5	-4.5	-4.7	-4.9	-5.0	-5.8	-5.7	-4.4	-3.5	-3.0	-2.8	-5.0	-2.8	
10-Nov	-3.3	-3.6	-3.0	-2.6	-2.3	-1.8	-1.7	-1.9	-1.9	-1.1	0.1	1.4	2.5	3.2	3.6	3.0	1.2	1.0	0.8	0.6	0.5	0.8	0.9	0.8	-0.1	3.6	
11-Nov	1.6	2.1	2.0	2.2	2.4	2.3	1.6	1.3	1.7	2.1	2.7	3.0	3.3	4.4	4.4	3.4	2.2	0.8	0.6	-0.4	-0.6	-0.9	-1.5	-2.2	1.6	4.4	
12-Nov	-2.4	-2.9	-3.3	-3.9	-4.5	-5.6	-7.3	-7.1	-6.3	-4.1	-2.6	-1.4	-0.3	1.0	0.9	-0.1	-0.6	-0.2	-0.4	-0.7	-0.3	0.0	-0.1	0.5	-2.2	1.0	
13-Nov	0.6	0.9	0.7	0.3	0.1	0.4	0.3	0.5	-0.2	1.3	3.3	4.8	5.2	5.4	5.6	5.1	3.8	3.8	3.6	3.0	2.2	1.9	0.8	-0.1	2.2	5.6	
14-Nov	-0.9	-1.1	-1.6	-1.6	-2.1	-3.0	-3.0	-3.2	-3.6	-2.7	-0.5	0.6	1.4	2.1	2.6	1.8	-0.4	-1.3	-1.9	-2.7	-3.4	-5.1	-6.6	-6.3	-1.8	2.6	
15-Nov	-5.7	-5.6	-6.0	-5.7	-5.0	-4.9	-4.9	-4.4	-3.9	-2.1	-0.8	0.3	0.8	0.8	0.3	-0.6	-1.4	-1.7	-1.8	-1.4	-1.0	-0.7	-0.7	-0.7	-2.4	0.8	
16-Nov	-0.8	-1.0	-1.2	-1.6	-1.9	-2.1	-2.4	-3.0	-3.1	-3.0	-3.2	-3.4	-3.7	-3.8	-3.7	-3.7	-3.6	-4.0	-4.0	-4.3	-4.4	-5.8	-6.8	-6.9	-3.4	-0.8	
17-Nov	-6.6	-6.1	-5.0	-4.3	-3.7	-3.9	-4.5	-4.5	-4.2	-3.7	-2.6	-2.1	-0.6	-0.1	-0.3	-0.2	-1.2	-1.9	-3.4	-5.7	-8.4	-9.2	-9.3	-9.4	-4.2	-0.1	
18-Nov	-9.5	-9.3	-9.2	-10.2	-10.3	-10.8	-11.1	-11.1	-11.1	-10.9	-10.7	-10.5	-10.5	-10.4	-10.5	-10.6	-10.8	-11.0	-11.2	-11.3	-11.6	-11.9	-12.2	-12.8	-10.8	-9.2	
19-Nov	-13.5	-14.3	-16.2	-17.1	-18.4	-19.2	-18.6	-18.5	-17.8	-16.1	-12.9	-11.3	-11.5	-12.1	-12.7	-13.4	-15.0	-14.2	-13.9	-13.8	-14.0	-14.2	-14.2	-15.0	-14.9	-11.3	
20-Nov	-15.6	-15.2	-15.8	-16.1	-15.8	-15.3	-15.2	-15.5	-16.5	-16.2	-15.8	-15.2	-14.8	-14.5	-15.0	-15.7	-15.9	-14.8	-13.5	-12.3	-11.2	-10.5	-9.5	-8.6	-14.3	-8.6	
21-Nov	-8.1	-7.8	-8.1	-8.6	-6.9	-6.0	-5.7	-5.5	-5.7	-4.9	-4.0	-2.6	-2.9	-2.5	-2.1	-2.0	-1.9	-1.7	-1.3	-0.8	-0.4	0.0	0.1	0.2	-3.7	0.2	
22-Nov	0.3	0.5	0.7	0.8	0.5	-0.1	-0.4	-0.5	-0.8	-1.0	-1.4	-1.5	-1.9	-2.4	-3.0	-3.6	-4.2	-5.2	-5.9	-6.5	-6.7	-7.0	-7.4	-7.8	-2.7	0.8	
23-Nov	-8.1	-8.3	-8.3	-8.5	-8.6	-8.7	-9.4	-9.8	-9.5	-9.2	-8.4	-6.3	-7.0	-8.2	-8.6	-8.9	-9.3	-9.8	-10.5	-11.0	-11.2	-12.0	-13.2	-13.5	-9.4	-6.3	
24-Nov	-14.0	-14.2	-14.5	-14.1	-14.0	-14.0	-14.1	-14.1	-14.1	-13.7	-13.2	-12.8	DF	-12.2	-12.7	-13.1	-13.3	-13.5	-13.4	-13.4	-13.3	-13.1	-12.9	-13.7	-13.5	-12.2	
25-Nov	-14.2	-15.3	-16.0	-16.7	-17.0	-17.1	-17.7	-18.5	-19.1	-17.9	-15.8	-14.6	-12.1	-11.2	-12.4	-14.6	-16.3	-17.0	-16.6	-15.9	-15.4	-15.3	-14.6	-14.2	-15.6	-11.2	
26-Nov	-13.7	-12.6	-12.9	-14.0	-13.7	-13.3	-12.4	-11.8	-11.4	-10.8	-9.3	-7.3	-5.8	-4.3	-4.3	-4.8	-5.6	-6.0	-5.9	-5.5	-6.1	-4.6	-4.5	-5.1	-8.6	-4.3	
27-Nov	-5.4	-5.3	-5.9	-6.5	-6.6	-7.0	-5.7	-4.8	-5.0	-5.1	-3.2	-1.0	-0.3	0.9	0.4	-2.8	-5.3	-4.6	-4.5	-4.6	-4.6	-5.0	-5.6	-5.8	-4.3	0.9	
28-Nov	-5.3	-5.6	-5.8	-6.1	-6.5	-6.5	-6.3	-7.0	-6.4	-5.2	-3.5	-2.4	-1.0	0.0	0.1	-1.7	-2.6	-2.8	-2.1	-2.4	-3.3	-3.3	-3.3	-3.2	-3.8	0.1	
29-Nov	-3.2	-3.4	-3.5	-3.8	-4.2	-4.1	-4.3	-4.2	-3.8	-2.9	-2.4	-0.3	2.0	3.1	2.7	1.4	-0.4	-1.1	-1.6	-0.9	-1.0	-1.5	-2.1	-2.6	-1.8	3.1	
30-Nov	-3.2	-3.5	-3.7	-4.4	-4.4	-4.2	-4.3	-4.6	-4.6	-3.6	-1.3	0.2	1.5	2.3	2.1	1.3	0.3	-0.6	-1.4	-2.2	-2.9	-3.5	-3.5	-3.7	-2.2	2.3	
		-5.4	-5.4	-5.6	-5.9	-6.0	-6.1	-6.2	-6.2	-6.1	-5.4	-4.5	-3.5	-2.7	-2.6	-2.7	-3.3	-4.2	-4.6	-4.7	-4.8	-4.9	-5.0	-5.3	-5.4	Diurnal Average	
		1.6	2.1	2.0	2.2	2.4	2.3	1.6	1.3	1.7	2.1	3.3	4.8	5.2	5.4	5.6	5.1	3.8	3.8	3.6	3.0	2.2	1.9	0.9	0.8	Diurnal Maximum	
DF - DAS Failure																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Wapasu - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	604	84.01	84.01
0 - 10	115	15.99	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

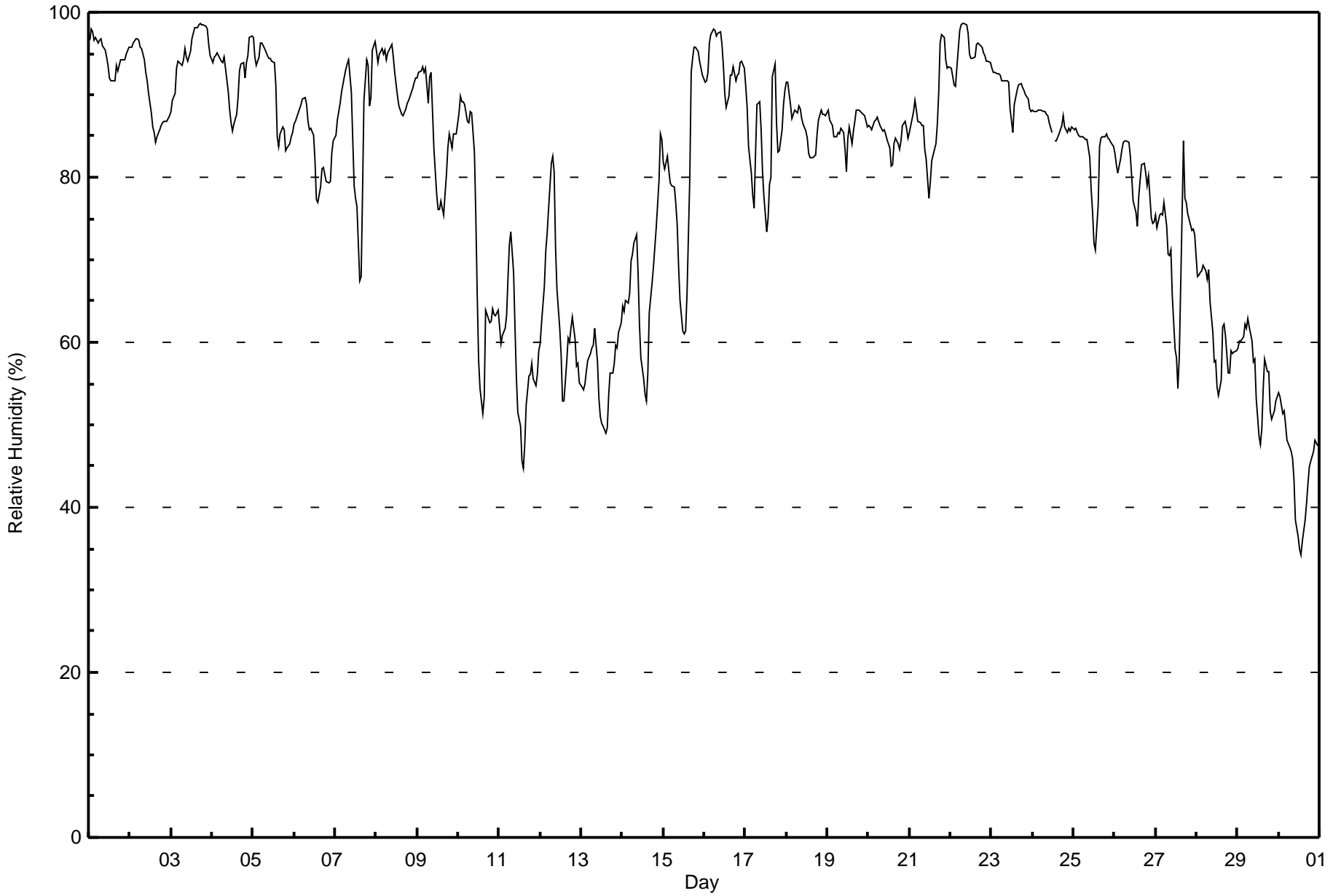
Wapasu - November 2015

Maximum Value: 99 % on Nov 22 09:00 Maximum Daily Average: 95.3 % on Nov 3																		Hours in Service: 720 Hours of Data: 719 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Minimum Value: 34 % on Nov 30 14:00 Minimum Daily Average: 44.8 % on Nov 30 Maximum Diurnal Average: 84.2 % at hour 8 Minimum Diurnal Average: 72.9 % at hour 14 Monthly Average: 80.1 % Percentiles: P ₁ = 43 P ₁₀ = 56 Q ₁ = 71 Median = 85 O ₃ = 92 P ₉₀ = 95 P ₉₉ = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	97	98	98	97	97	96	97	97	96	95	94	94	92	92	92	92	94	93	94	94	94	94	95	96	94.8	98
2-Nov	96	96	96	97	97	97	96	96	94	93	92	90	88	86	85	84	85	86	86	87	87	87	87	87	90.6	97
3-Nov	88	89	90	93	94	94	94	94	96	95	94	95	97	97	98	98	98	99	98	98	98	98	96	95	95.3	99
4-Nov	94	95	95	95	94	94	94	95	93	90	88	87	86	87	88	90	93	94	94	92	94	95	97	97	92.4	97
5-Nov	97	95	94	95	96	96	96	96	95	94	94	94	91	85	84	85	86	86	83	83	84	85	85	90.6	97	
6-Nov	86	87	88	88	89	89	90	89	87	86	86	85	82	77	77	79	81	81	80	79	79	79	83	84	83.9	90
7-Nov	85	87	88	89	90	92	93	94	94	90	85	79	77	76	67	68	78	89	94	94	89	90	95	96	86.7	96
8-Nov	95	94	95	96	95	95	94	95	96	96	95	93	90	89	88	88	88	88	89	89	90	91	91	92	92.2	96
9-Nov	92	93	93	93	93	93	89	92	93	88	84	78	76	76	77	76	78	80	84	85	84	85	85	85	85.5	93
10-Nov	88	90	89	89	89	87	87	88	88	83	75	66	58	54	51	53	64	63	62	62	64	63	63	64	72.6	90
11-Nov	62	60	61	62	63	68	72	73	68	62	56	52	50	46	45	48	52	56	56	57	56	55	56	59	58.1	73
12-Nov	60	62	67	71	73	76	82	83	81	72	66	62	58	53	53	58	61	60	62	63	60	57	57	55	64.6	83
13-Nov	55	54	55	56	58	59	59	60	62	58	53	51	50	50	49	50	54	56	56	58	60	59	61	62	56.0	62
14-Nov	64	64	65	65	66	70	71	72	73	69	62	58	56	54	53	56	64	67	69	72	74	80	85	85	67.2	85
15-Nov	82	81	82	81	79	79	79	77	74	69	65	61	61	61	66	80	93	94	96	96	95	94	93	92	80.5	96
16-Nov	92	92	93	96	97	98	98	97	97	98	96	94	90	89	90	92	92	93	92	92	93	94	94	93	93.8	98
17-Nov	91	89	84	81	78	76	83	89	89	86	81	78	73	75	79	80	92	94	87	83	83	86	89	90	83.9	94
18-Nov	91	92	89	87	88	88	88	89	88	87	87	86	85	83	82	82	82	83	85	87	88	88	88	87	86.6	92
19-Nov	88	87	87	86	85	85	85	85	86	85	83	81	85	86	84	86	87	88	88	88	88	88	87	86	86.0	88
20-Nov	86	86	86	87	87	87	87	86	86	86	85	84	84	81	82	84	85	84	83	84	86	87	86	85	85.2	87
21-Nov	85	86	88	89	88	87	87	86	86	83	82	77	79	82	83	84	86	90	96	97	97	94	93	93	87.6	97
22-Nov	93	92	91	91	93	98	99	99	99	99	97	95	94	94	95	96	96	96	96	95	95	94	94	94	95.2	99
23-Nov	93	93	93	93	93	92	92	92	92	92	92	88	86	89	90	90	91	91	91	91	90	89	88	88	90.7	93
24-Nov	88	88	88	88	88	88	88	88	88	87	87	85	DF	84	84	85	86	86	88	86	85	86	86	86	86.7	88
25-Nov	86	86	85	85	85	85	85	85	85	85	82	78	76	72	71	77	84	85	85	85	85	85	84	84	82.6	86
26-Nov	83	82	80	82	83	84	84	84	84	82	80	77	76	74	78	80	82	82	80	79	80	75	74	75	80.1	84
27-Nov	75	74	75	76	75	77	74	71	71	71	66	59	58	54	58	75	84	77	77	76	74	74	74	73	71.6	84
28-Nov	68	68	69	69	69	69	68	69	65	61	58	58	55	54	55	62	62	61	56	56	59	59	59	59	61.9	69
29-Nov	59	60	60	61	62	62	63	62	60	58	58	53	49	48	50	54	58	56	56	52	51	52	53	53	56.2	63
30-Nov	54	53	51	52	50	48	47	47	46	43	38	36	35	34	36	39	41	43	45	46	47	48	48	48	44.8	54
82.5 82.4 82.5 83.0 83.2 83.7 83.9 84.2 83.7 81.3 78.6 75.7 73.6 72.9 73.2 75.9 79.2 80.1 80.4 80.3 80.3 80.3 80.9 81.0																								Diurnal Average		
97 98 98 97 97 98 99 99 99 99 97 95 97 97 98 98 98 99 98 98 98 98 97 97																								Diurnal Maximum		
DF - DAS Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Wapasu - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	6	0.83	0.83
40 - 60	103	14.33	15.16
60 - 80	144	20.03	35.19
80 - 100	466	64.81	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Wapasu - November 2015

Maximum Speed: 20 km/h on Nov 12 22:00	Maximum Daily Speed Average: 13.8 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 9 09:00	Minimum Daily Speed Average: 0.4 km/h on Nov 19	Hours of Data: 718
Maximum Diurnal Speed Average: 5.4 km/h at hour 24	Minimum Diurnal Speed Average: 3.3 km/h at hour 9	Hours of Missing Data: 2
Monthly Average Velocity: 4.0 km/h 177.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 10 P ₉₀ = 14 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-Nov	NE8	NE8	NNE7	NNE6	NNE7	NNE5	NNE5	NNE5	NNE5	NNE4	NNE5	NNE7	NE7	NE5	NNE6	NE6	NE5	NNE6	NNE5	NNE5	NNE5	ENE4	NE5	NNE5	NNE5.5	NE8	
2-Nov	ENE3	NE4	NNW3	NNW3	NE4	NE4	ENE3	ESE4	SE6	SE7	SE7	SSE7	S5	SSE7	SSE9	SSE9	SE8	SE11	SE13	SE13	SE14	SE14	SE13	SE13	SE6.4	SE14	
3-Nov	SE12	SE12	SSE11	SSE10	SSE8	SSE7	SSE7	SSE7	SSE6	SSE5	SSE5	SSW3	WNW4	NW3	NNW6	NNW5	NNW4	NW4	WNW5	W4	SW4	SW8	SW8	SSW6	S3.3	SE12	
4-Nov	S5	SSE6	SSE6	S7	SSE7	SSE6	SSE6	SSE8	SSE8	SSE8	SSE9	SSE11	SE12	SE11	SE11	SSE11	SE11	SSE9	SSE8	S7	S6	SW6	WSW6	W5	SSE7.1	SE12	
5-Nov	NW7	NNW9	NW13	NNW12	NW15	NNW12	NNW10	NNW13	NW14	NW12	NNW10	NNW10	NW12	NNW11	NNW9	NNW8	NNW9	NNW8	NNW7	NW8	WNW7	NW4	W3	W3	NW9.3	NW15	
6-Nov	WSW3	SW2	SW3	SW3	SSW3	SSE3	SSE4	SE6	SE7	SSE7	SSE7	SSE8	S8	S10	SSE10	SSE11	SE14	SE18	SE20	SE19	SE19	SSE18	SSE17	SSE17	SSE9.4	SE20	
7-Nov	S14	SSW13	SW13	SW14	SW16	SW14	SW10	SSW7	S7	S8	SSW9	SW10	SW8	SW8	SW6	SSW5	SSE4	SSE4	S5	SSW6	S4	SE5	S5	SSW8.1	SW16		
8-Nov	SW7	SW7	SW2	SSE3	E3	NNE6	NNE4	NNE7	NNE10	NNE10	NNE10	NNE8	NNE7	NNE7	NNE7	NNE7	NNE6	NNE4	NNE3	NNE3	NNE3	NNE3	NNE3	NE2	NNE3.9	NNE10	
9-Nov	NNE2	NNE1	N2	N2	N2	N1	SW2	SW1	E1	SSW2	S4	S4	SSW5	S6	SSW7	S8	S7	S7	S7	S8	S9	S8	S9	S9	S3.8	S9	
10-Nov	SSE11	SSE13	SSE12	SSE12	SSE14	SSE13	SSE13	S13	SSE13	SSE14	S15	S14	S14	S14	S14	SSE13	SSE15	SSE17	SSE15	S16	S16	S15	SSE13	SSE15	SSE13.8	SSE17	
11-Nov	SSE15	SSE14	SSE16	SSE16	S13	S12	S11	S10	SSW11	SW13	SW15	WSW14	SW13	WSW16	WSW15	SW11	SSW9	SSW8	SSW9	SSW8	SSW9	SSW9	SSW8	SSW8	SSW10.3	SSE16	
12-Nov	SW8	SW9	SSW8	SSW6	S5	S6	SSE6	S7	SSE7	SSE7	SSE9	S11	S12	S11	S12	SSE10	SE12	SE15	SE17	SE19	SE19	SE20	SSE19	SSE16	SSE10.5	SE20	
13-Nov	SSE17	SSE16	SSE13	SSE14	SSE14	SSE13	SSE12	SSE11	SSE11	S12	SSW14	SSW13	SSW12	SSW11	SSW10	SW9	SW7	SW10	SW12	SW10	SW10	SW10	SW8	SW9	S10.2	SSE17	
14-Nov	SW9	SW8	SSW8	SW9	SSW6	S6	S7	S8	S7	S8	SSW9	SSW9	SW11	SW11	SSW9	SSW7	S5	S6	SSE5	SSE6	SSE5	SE5	SE6	SE6	SSW6.6	SW11	
15-Nov	SE7	SE7	SE7	SE6	SE7	SE6	ESE6	ESE6	ESE6	ESE7	ESE9	ESE10	ESE12	ESE11	E11	E12	ENE14	NE13	NE11	NE11	ENE10	ENE8	ENE9	E10	E7.7	ENE14	
16-Nov	E9	ESE7	NNW1	NNW3	NW3	WNW4	WNW6	WNW7	WNW7	WSW7	WSW9	WSW11	W12	W10	WSW9	SW11	WSW9	SW7	SW9	SW12	SW10	S7	SSE8	SSE9	WSW4.9	W12	
17-Nov	SE10	SE11	SE15	SE17	SE17	SE20	SE18	SE16	SSE16	SSE15	SSE14	SSE13	S12	S12	SSW10	SSW8	WSW11	SW9	W11	W10	WSW9	WSW9	WSW9	WSW9	S9.1	SE20	
18-Nov	WSW8	W7	NW15	NNW14	NW17	NW18	NW16	NW17	NW19	NNW18	NNW18	NNW17	NNW17	NNW16	NNW15	NW15	NW12	NNW8	NNW7	NW5	NW6	NW4	WNW4	WNW1	NW11.8	NW19	
19-Nov	SSE2	SSE2	SE5	SE5	SE5	SE5	SE5	SE5	SE5	SSE4	S4	SW5	WNW6	NW5	NW4	NNW4	NNW4	NNE4	N4	N3	NW3	NNW3	NNW3	NNE3	ESE0.4	WNW6	
20-Nov	SE1	AF	WSW2	WSW2	S2	SSW3	SW4	SW6	SW4	SW5	SW6	SW8	SSW8	S8	SSE8	SSE10	SSE12	SSE13	SSE13	SSE13	S14	S14	S12	S12	S7.0	S14	
21-Nov	S9	S7	SSE6	S7	SSW8	SSW9	SSW10	SSW11	SSW11	SSW9	S9	SSW10	S9	S9	S10	SSW10	S7	S7	SSW7	SW9	SW8	SW9	SW9	SW11	SSW8.5	SSW11	
22-Nov	SW11	SW12	SW10	WSW8	WNW6	NW9	NNW8	NNW7	NNW8	NNW7	NNW8	NNW7	NNW7	NNW7	N7	NNW8	N7	N7	NNE8	NNE6	NNE5	NNE5	NNE5	NNE6	NNW4.6	SW12	
23-Nov	NE5	NNE3	NNE3	N3	NNE2	NNE3	NNE3	NE3	NNE3	NE2	N2	NNW4	NNW5	NNW5	N3	NNE5	NNE6	NNE5	N4	N4	NW6	NNW5	NW4	N3.4	NW6		
24-Nov	NW5	NW5	NW4	NW3	NW5	NW6	NNW5	NNW5	NW3	WNW4	NW5	NW5	DF	NW5	NW6	NW3	NNW1	SSW1	SW2	SW3	SW4	SSW5	SSW5	S5	WNW2.7	NW6	
25-Nov	S5	S6	S6	S6	S6	S6	S5	SSE4	SSE4	S3	SSE4	S2	SSW3	SSW3	S3	SE4	SE5	SSE6	SSE5	SSE6	SSE6	SSE6	SSE6	SSE6	SSE4.5	S6	
26-Nov	SSE6	SSE7	SSE7	SSE8	SSE8	SSE8	SSE9	S9	S9	S10	SSE10	S11	S12	S12	S11	S10	S8	SSE7	S8	S8	S8	SSW10	SSW10	S9	S8.7	S12	
27-Nov	S9	S8	S7	S7	S7	S6	SSW7	SSW7	SSW6	S5	SSE5	S4	SSW5	WSW2	S3	SSE4	SSE6	SSE7	SSE7	SSE7	SSE7	SSE7	SSE7	SSE7	S5.7	S9	
28-Nov	SSE7	SSE8	SSE7	SSE8	SSE8	SSE9	SSE9	SSE9	SSE10	SSE10	SSE10	SSE10	S9	S9	S9	S8	SSE9	SSE10	S11	S9	SSE9	SSE10	SSE10	S10	SSE9.0	S11	
29-Nov	SSE10	SSE9	SSE8	SSE8	SSE8	SSE8	SSE8	SSE7	SSE8	SSE7	SSE7	SSE7	SSE7	SSE8	SSE7	SSE8	SE8	SSE9	SSE9	SSE9	S9	S8	SSE10	SSE10	SSE10	SSE8.2	SSE10
30-Nov	SSE9	SSE10	SSE10	SSE10	SSE11	S10	SSE11	SSE11	SSE11	SSE10	S11	SSW12	SSW11	SSW11	SSW10	SSW8	S8	S7	S8	SSE7	SSE7	SSE7	SSE7	SSE8	S8.9	SSW12	

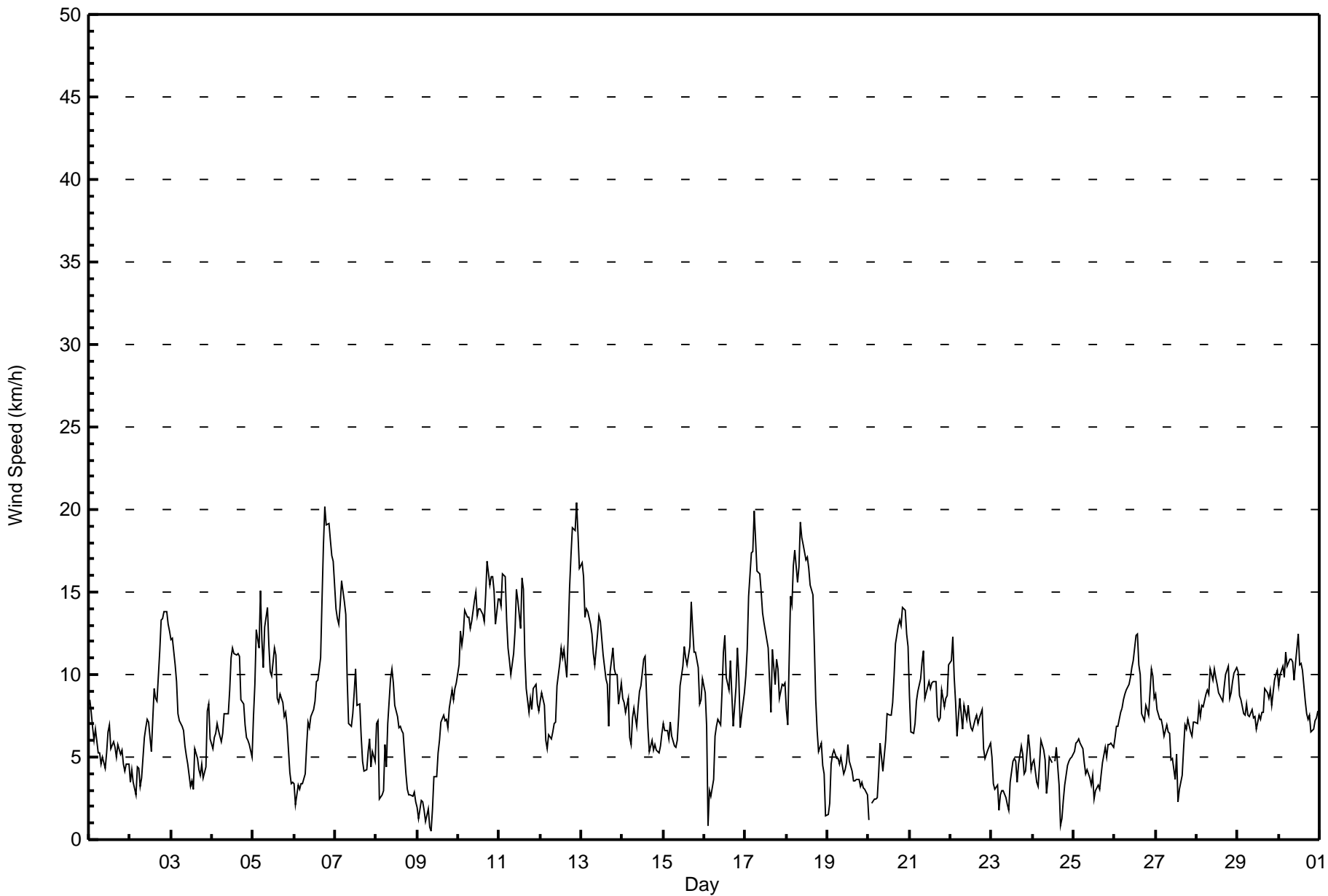
S5.0	S4.8	S4.0	S3.9	S3.6	S3.3	S3.4	S3.3	S3.3	S3.3	S3.7	S4.1	SSW4.2	SSW4.4	SSW4.0	SSW3.7	S3.4	SSE3.4	SSE4.0	SSE4.1	S4.5	S5.0	S5.2	S5.1	S5.4	Diurnal Average
SSE17	SSE16	SSE16	SE17	SE17	SE20	SE18	NW17	NW19	NNW18	NNW18	NNW17	NNW17	NNW16	NNW15	NW15	SSE15	SE18	SE20	SE19	SE19	SE20	SSE19	SSE17	Diurnal Maximum	

DF - DAS Failure 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 - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	188	26.18	26.18
6 - 11	396	55.15	81.34
12 - 19	131	18.25	99.58
20 - 28	3	0.42	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	33	10	3	2	1	11	20	20	13	13	4	4	6	21	17	188
6 - 11	3	21	6	3	2	9	21	119	74	45	41	13	4	6	6	23	396
12 - 19	0	0	1	1	1	1	23	39	22	5	11	3	1	0	13	10	131
20 - 28	0	0	0	0	0	0	3	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	13	54	17	7	5	11	58	178	116	63	65	20	9	12	40	50	718

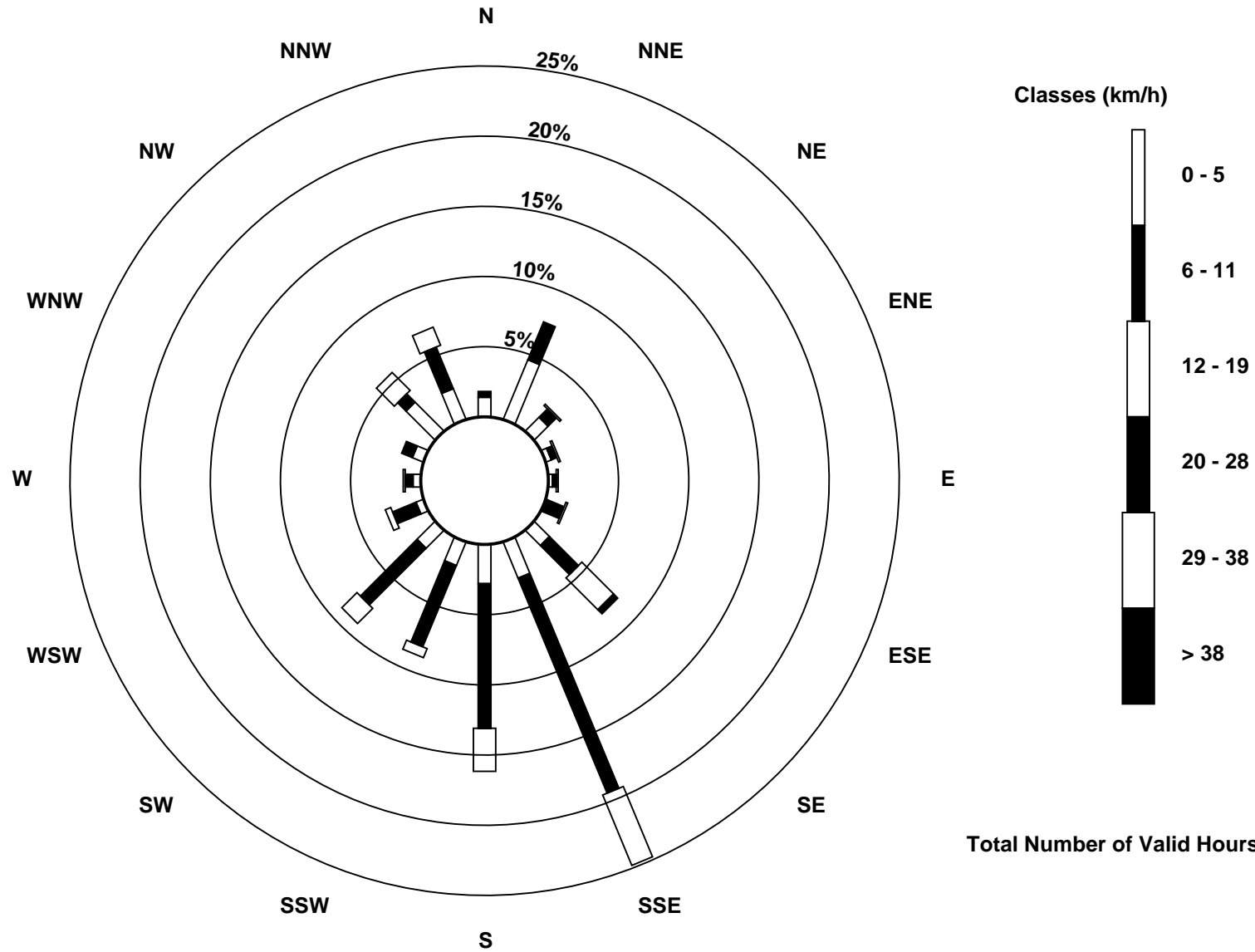
Total Number of Valid Hours: 718

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Wapasu (AMS 17)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Nov 18 11:00	Hours in Service: 720 Hours of Data: 718 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 0 km/h on Nov 19 05:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

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

6	5	6	5	5	6	5	5	5	6	6	7	5	6	5	5	4	5	5	5	5	6	6	6	6	5	
Diurnal Maximum																										

DF - DAS Failure AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Wapasu - November 2015

Direction of Maximum Speed: 145 deg on Nov 12 22:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 168.1 deg on Nov 10	Hours of Data: 718
Direction of Minimum Speed: 100 deg on Nov 9 09:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.4 deg on Nov 19	Percent Operational Time: 99.7
Monthly Average Direction: 204.4 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-Nov	36	37	33	23	17	17	16	22	22	20	21	30	46	56	24	41	54	30	32	22	25	67	51	33	32.0
2-Nov	77	50	333	338	43	47	62	109	129	135	142	152	186	166	150	153	145	141	140	140	144	141	141	138	136.3
3-Nov	141	143	147	151	157	154	155	150	150	154	162	198	283	321	333	335	331	318	297	267	222	226	224	204	177.1
4-Nov	191	166	162	176	160	151	153	150	148	160	157	158	141	144	144	147	142	155	165	179	186	227	246	266	161.8
5-Nov	310	331	322	330	325	328	337	333	324	324	327	330	324	334	337	327	343	334	330	326	301	304	281	271	326.1
6-Nov	241	226	223	217	192	158	150	139	140	152	158	164	185	185	164	150	144	141	141	143	145	153	156	165	155.8
7-Nov	177	192	215	223	227	229	232	224	207	177	184	199	220	217	221	221	210	161	157	185	206	187	135	187	206.4
8-Nov	214	222	229	155	87	15	24	32	26	24	22	22	19	18	15	12	29	16	18	24	24	25	26	35	21.7
9-Nov	16	12	353	4	354	10	214	215	100	201	186	174	212	188	205	188	185	181	178	181	177	179	171	175	184.1
10-Nov	155	149	160	168	168	166	167	172	165	165	175	184	186	185	179	165	161	161	163	169	169	170	166	162	168.1
11-Nov	162	165	153	164	173	184	180	187	207	217	231	238	227	248	244	224	210	194	204	192	206	213	210	201	201.4
12-Nov	215	216	213	209	186	171	158	171	168	165	166	172	173	178	174	156	145	146	145	143	145	145	150	152	162.3
13-Nov	149	152	160	159	153	158	156	164	167	175	193	199	204	196	197	221	222	225	232	234	224	220	216	219	186.9
14-Nov	223	225	213	218	213	184	187	185	172	176	193	212	219	217	208	202	171	174	159	154	148	140	138	141	191.8
15-Nov	139	136	143	142	135	124	116	112	109	108	111	109	106	104	101	84	66	45	34	52	65	65	67	87	92.5
16-Nov	99	104	328	330	324	295	291	290	293	254	249	257	261	265	242	232	242	221	222	221	214	173	159	153	236.7
17-Nov	146	138	134	131	135	144	144	146	148	153	159	163	179	191	202	200	243	227	264	262	253	245	243	240	173.3
18-Nov	249	274	315	327	320	321	323	324	323	327	333	331	328	327	327	324	313	328	329	324	320	305	297	303	321.2
19-Nov	166	148	137	140	130	135	136	136	146	151	173	220	295	315	325	327	333	15	11	11	310	341	347	12	112.5
20-Nov	146	AF	250	248	190	201	220	236	222	217	219	226	211	186	162	151	153	157	156	163	173	176	179	183	181.0
21-Nov	187	177	168	178	199	206	207	208	211	193	191	209	189	191	190	193	184	188	203	220	217	215	215	219	199.5
22-Nov	221	228	231	254	297	323	333	333	333	346	348	345	342	345	352	348	357	8	28	20	25	21	23	33	334.0
23-Nov	43	30	16	10	21	19	26	42	30	51	1	345	341	317	338	351	18	26	15	10	0	324	330	321	2.0
24-Nov	318	326	325	314	313	320	336	337	321	300	315	312	DF	313	323	315	331	209	227	221	220	203	209	182	297.7
25-Nov	187	180	177	175	176	180	171	167	158	167	177	159	184	206	202	181	144	146	147	156	153	151	160	164	168.1
26-Nov	159	163	168	161	164	160	162	174	170	171	162	172	176	182	182	182	170	163	179	182	175	205	204	189	174.9
27-Nov	181	176	179	176	170	169	201	201	208	188	157	173	198	240	174	155	153	150	162	152	164	157	145	147	171.9
28-Nov	157	149	150	150	148	152	150	150	151	155	163	163	170	170	179	175	165	162	169	171	165	165	166	171	161.3
29-Nov	167	163	157	156	162	161	157	154	147	151	150	163	164	156	154	145	152	163	154	171	170	157	161	154	158.1
30-Nov	162	159	150	153	163	169	163	158	167	165	188	195	193	209	199	199	184	175	171	159	166	147	159	154	171.8

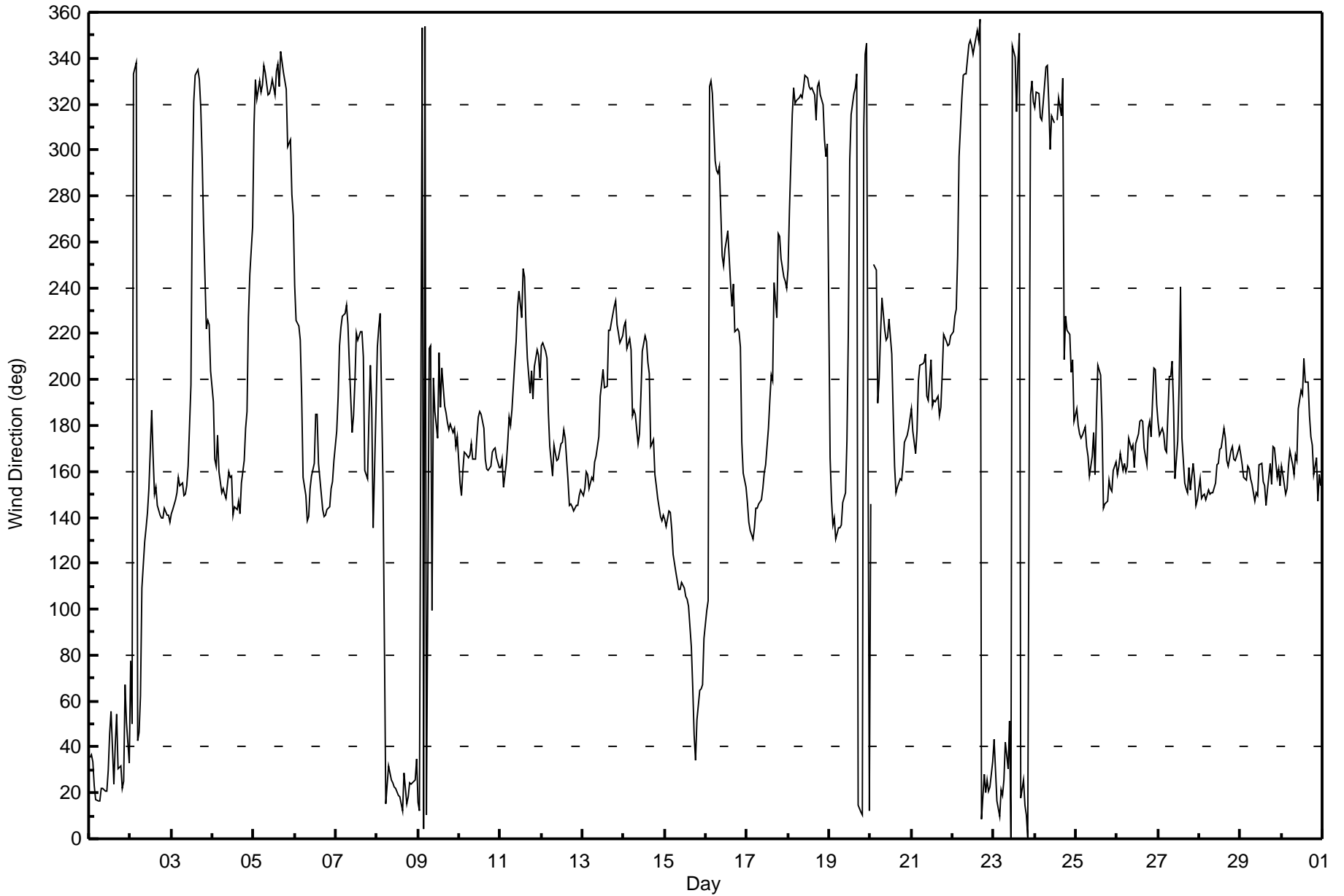
170.7	169.4	175.6	175.6	174.2	173.8	173.4	174.0	172.7	172.9	182.2	195.2	203.4	205.9	197.9	184.9	165.1	159.7	166.1	171.6	175.3	175.4	172.9	171.0
Diurnal Average																							

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Wapasu - November 2015





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Wapasu - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 90 deg on Nov 9 09:00	Hours of Data: 718
Minimum Value: 6 deg on Nov 19 05:00	Hours of Missing Data: 2
Percentiles: P ₁ = 9 P ₁₀ = 19 Q ₁ = 23 Median = 27 Q ₃ = 32 P ₉₀ = 36 P ₉₉ = 55	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-Nov	26	28	26	31	36	35	31	34	32	43	37	30	26	29	39	32	26	33	36	36	37	41	33	34	43
2-Nov	52	24	31	42	27	25	30	27	19	20	21	28	39	33	26	27	20	20	20	19	20	21	21	19	52
3-Nov	20	21	22	27	32	29	29	25	24	27	27	44	36	26	23	25	24	24	22	34	25	25	23	32	44
4-Nov	33	24	26	30	26	21	22	22	23	27	28	30	22	23	23	22	21	27	27	35	32	33	23	27	35
5-Nov	31	26	23	28	22	23	28	28	22	24	24	29	24	33	30	25	33	31	30	26	24	25	27	28	33
6-Nov	22	41	23	27	26	26	24	18	18	26	25	31	35	35	29	26	21	20	19	24	22	26	27	31	41
7-Nov	32	34	32	26	24	21	22	26	34	30	33	35	24	27	27	26	23	18	12	30	30	40	13	35	40
8-Nov	25	25	42	32	23	29	29	22	32	33	33	36	36	34	36	36	29	34	37	27	35	37	32	23	42
9-Nov	28	29	36	33	44	39	54	54	90	55	39	45	32	36	35	35	35	33	29	31	30	31	30	32	90
10-Nov	25	24	28	31	31	30	28	29	30	30	32	34	33	34	33	31	28	28	31	30	30	33	30	29	34
11-Nov	28	30	31	31	33	38	33	32	33	29	23	24	25	24	26	28	31	31	33	33	30	30	28	30	38
12-Nov	29	29	28	30	32	25	17	25	25	27	29	30	33	33	32	23	21	22	22	20	23	23	25	27	33
13-Nov	25	27	34	30	28	29	29	34	31	32	37	33	36	37	34	28	25	23	23	23	24	27	30	30	37
14-Nov	27	30	31	28	29	29	34	31	26	30	34	33	31	32	38	30	21	23	22	16	11	8	10	7	38
15-Nov	9	9	7	12	12	11	12	12	13	18	19	19	20	20	21	22	25	27	27	24	24	25	24	24	27
16-Nov	22	22	82	40	35	18	24	25	25	24	23	25	25	25	23	25	24	28	27	28	31	28	23	26	82
17-Nov	23	21	18	19	20	22	22	23	23	27	28	30	33	35	34	39	25	24	27	27	27	23	22	20	39
18-Nov	23	26	21	27	22	21	22	23	23	27	29	27	26	25	24	23	20	26	28	25	20	24	25	63	63
19-Nov	41	20	9	8	6	8	8	10	16	19	31	28	30	28	23	24	29	33	37	32	22	44	41	46	46
20-Nov	64	AF	27	24	31	28	29	23	23	27	29	25	35	37	31	24	25	27	28	31	31	33	34	37	64
21-Nov	34	34	22	30	33	36	34	36	31	34	37	38	33	34	32	34	31	33	36	29	31	31	33	27	38
22-Nov	27	23	25	26	35	24	31	29	30	33	36	32	36	36	32	33	38	37	28	36	36	32	34	29	38
23-Nov	27	31	33	33	43	31	23	21	28	28	38	35	37	23	31	30	34	31	36	32	32	25	28	22	43
24-Nov	19	21	23	19	19	25	29	31	23	20	25	24	DF	21	26	29	72	55	30	30	31	33	35	33	72
25-Nov	35	33	31	31	33	33	27	20	14	24	31	24	41	39	32	26	15	12	11	17	13	12	22	24	41
26-Nov	19	20	27	27	26	28	27	31	30	32	28	33	34	37	33	31	28	25	30	29	31	32	32	30	37
27-Nov	31	29	26	30	27	24	33	25	25	31	15	29	28	47	25	22	13	12	18	12	21	16	12	10	47
28-Nov	17	13	18	15	16	20	19	20	18	19	22	24	26	29	30	29	24	25	28	26	25	25	26	27	30
29-Nov	26	24	21	18	20	18	17	16	13	22	18	26	23	18	16	17	27	25	20	27	25	24	25	21	27
30-Nov	25	21	20	23	24	29	26	25	27	26	33	33	37	31	32	32	28	24	27	19	22	14	16	14	37

64	41	82	42	44	39	54	54	90	55	39	45	41	47	39	39	72	55	37	36	37	44	41	63	
Diurnal Maximum																								

DF - DAS Failure AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 19, 2015	Last Calibration	October 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	17:55
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	864	872
Calculated slope	0.992073	1.001162	Chamber temp	44.9	44.9
Calculated intercept	0.905252	0.942041	Pressure	687.4	695.5
Analyzer Background	9.0	8.8	Flow	0.451	0.455
Analyzer Coefficient	0.853	0.840	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	-0.1	----
as found span	5000	60.4	577.4	579.1	0.997
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.4	577.4	576.1	1.002
second point	5000	30.2	288.7	287.4	1.005
third point	5000	15.2	145.3	143.2	1.015
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.4	577.4	573.5	1.007
Average Correction Factor					1.007

Corrected As found 579.2 Previous response 581.1 % change 0.3%

Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



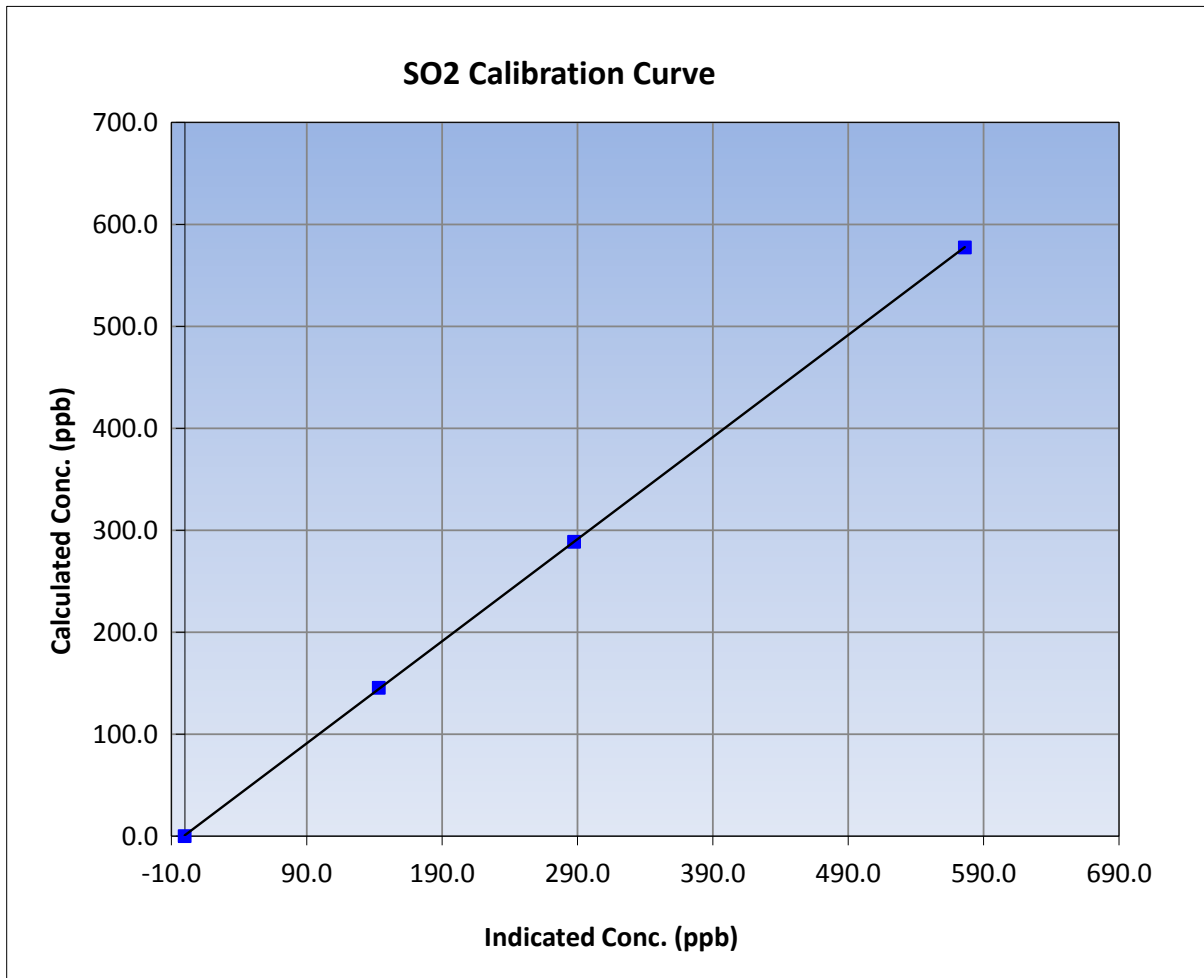
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	13:15	End Time (MST)	17:55
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

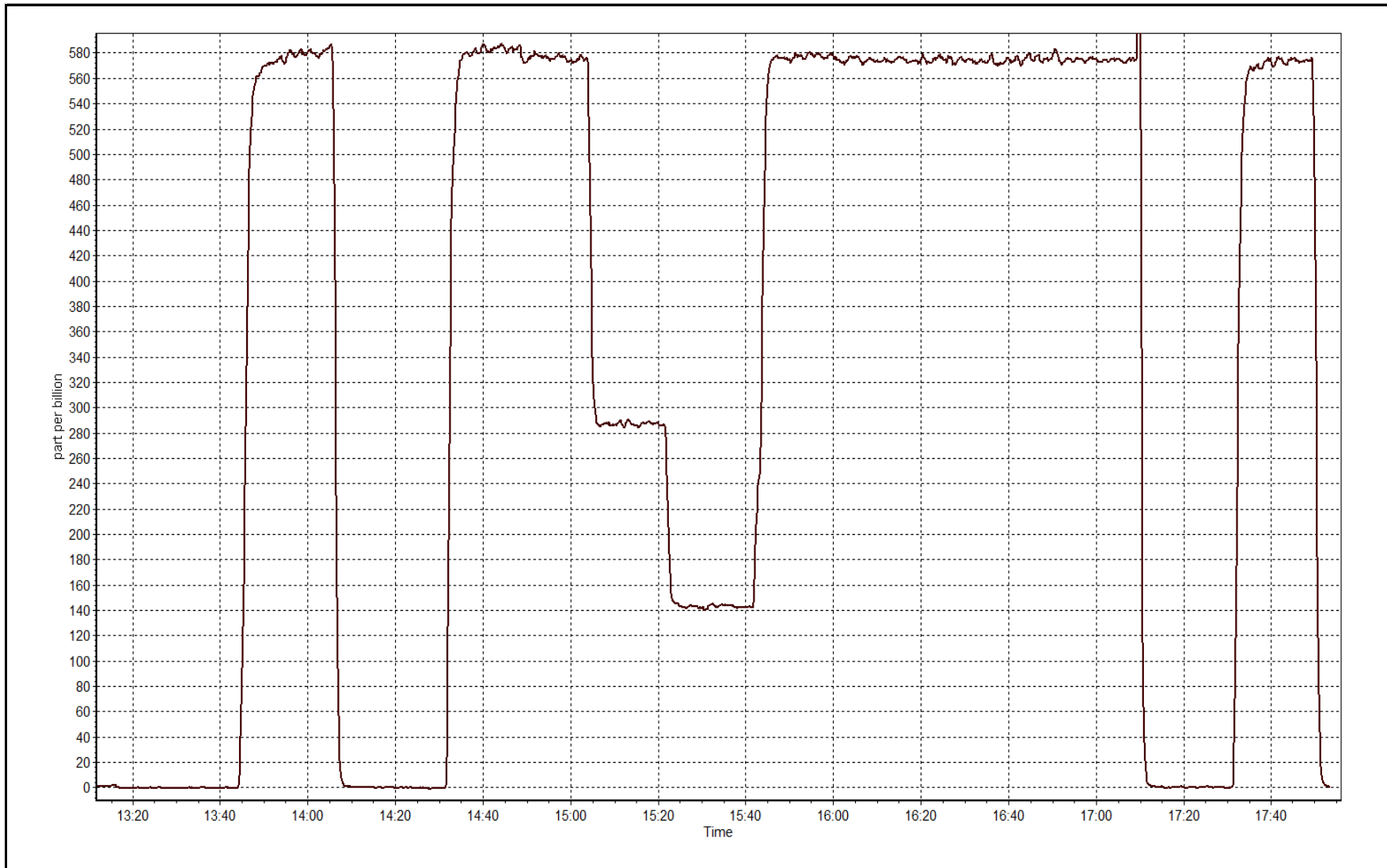
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999991
577.4	576.1	1.0023		
288.7	287.4	1.0046	Slope	1.001162
145.3	143.2	1.0147		
			Intercept	0.942041



SO2 Calibration Plot

Date: November 19, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 19, 2015	Last Calibration	October 23, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	13:25
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12-Dec-16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.45		Lamp voltage	799	801
Calculated slope	1.002700	0.999602	Chamber temp	45	45
Calculated intercept	-0.215420	-0.231452	Pressure	552.2	550.4
Analyzer Background	14.3	14.3	Flow	0.945	0.958
Analyzer Coefficient	1.222	1.222	Intensity	113	112
			Converter temp.	340	340

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
Converter make/model		Converter serial #	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	78.4	80.0	80.1	0.999
SO2 scrubber check	5000	20.9	199.8	2.0	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.4	80.0	80.2	0.997
second point	5000	39.3	40.1	40.3	0.996
third point	5000	19.7	20.1	20.6	0.975
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	78.5	80.1	79.9	1.002
Average Correction Factor					0.989

Corrected As found	80.0	Previous response	80.0	% change	0.0%
--------------------	------	-------------------	------	----------	------

Notes:

Sample inlet filter replaced and scrubber check completed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



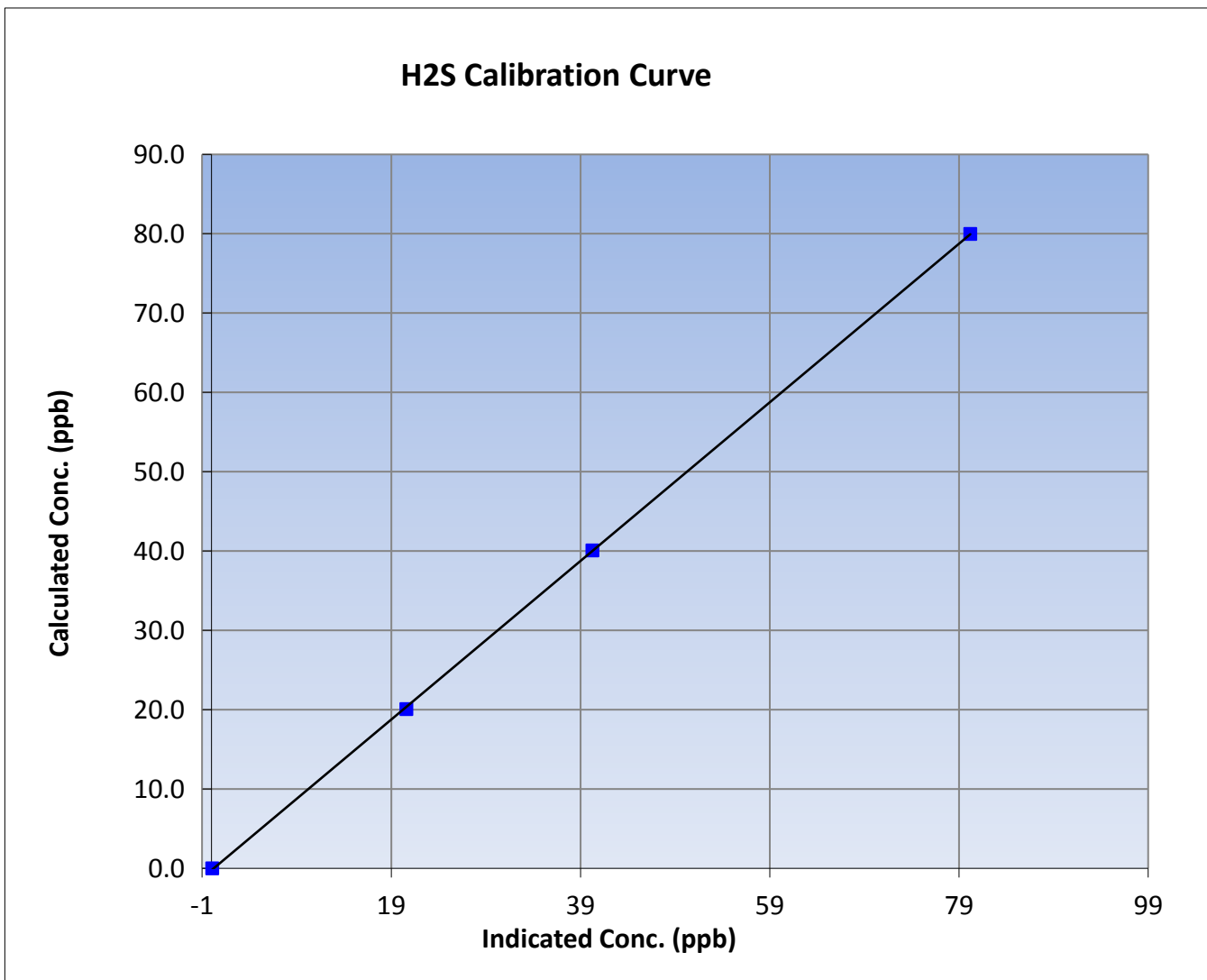
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 23, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	13:25
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

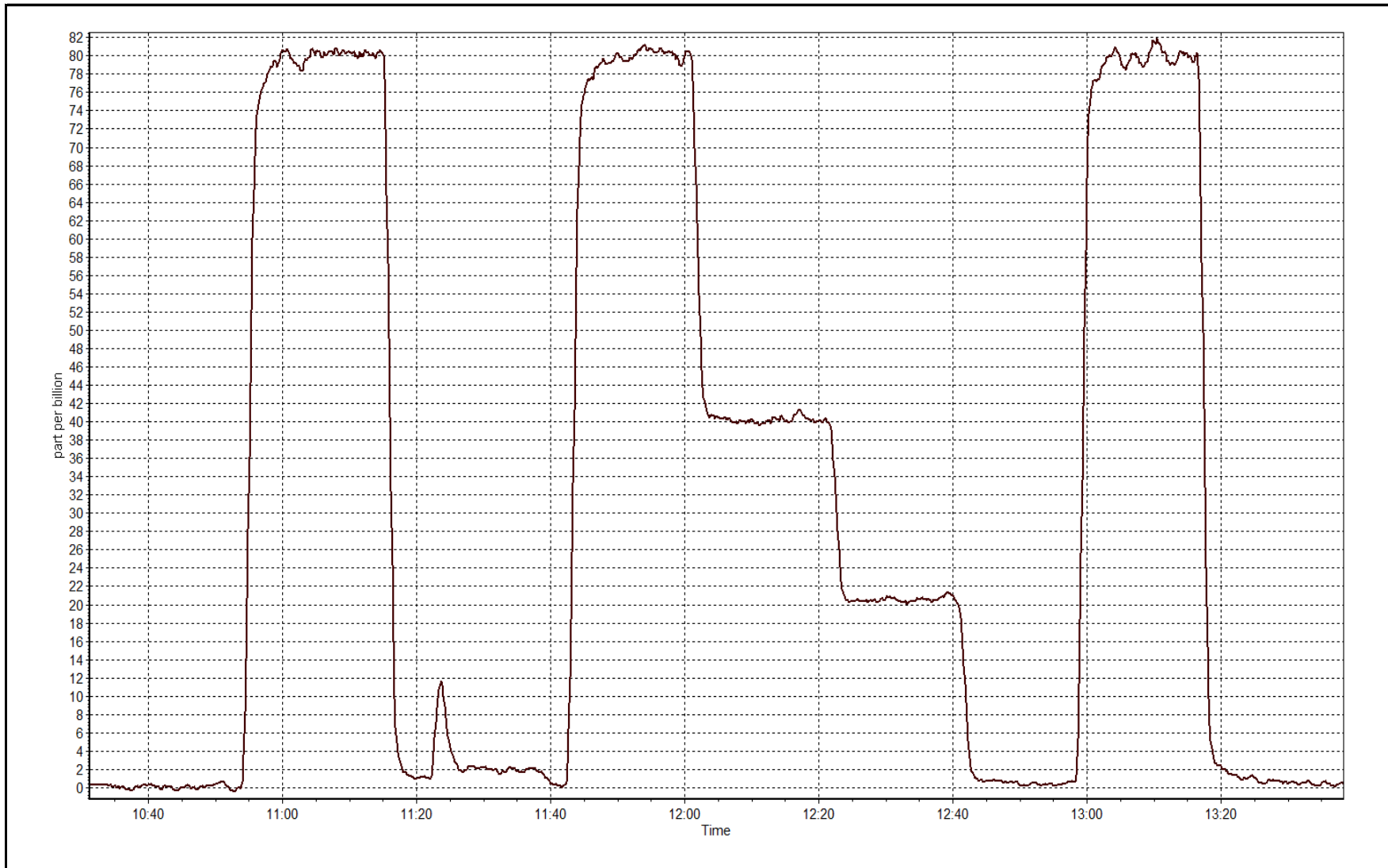
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999970
80.0	80.2	0.9971		
40.1	40.3	0.9957	Slope	0.999602
20.1	20.6	0.9754		
			Intercept	-0.231452



H2S Calibration Plot

Date: November 19, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-19-15	Last Calibration	October-14-15
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	17:55
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	39.0	40.1
Calculated slope	0.997010	1.005524	Fuel Pressure	24.8	24.8
Calculated intercept	-0.027088	-0.031411	Analyzer Coeff	4.3	4.3
			Analyzer BKG	2.730	2.680

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	-0.08	----
as found span	5000	60.4	13.19	13.15	1.003
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	60.4	13.19	13.16	1.003
second point	5000	30.2	6.60	6.57	1.004
third point	5000	15.2	3.32	3.35	0.991
as left zero	5000	0.0	0.00	0.07	----
as left span	5000	60.4	13.19	13.29	0.993
Average Correction Factor					0.999

Corrected As found 13.23 Previous response 13.26 % change 0.2%

Notes:

Filter changed after as founds. Zero adjusted. H2 cylinder changed after third point.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association THC Calibration Report

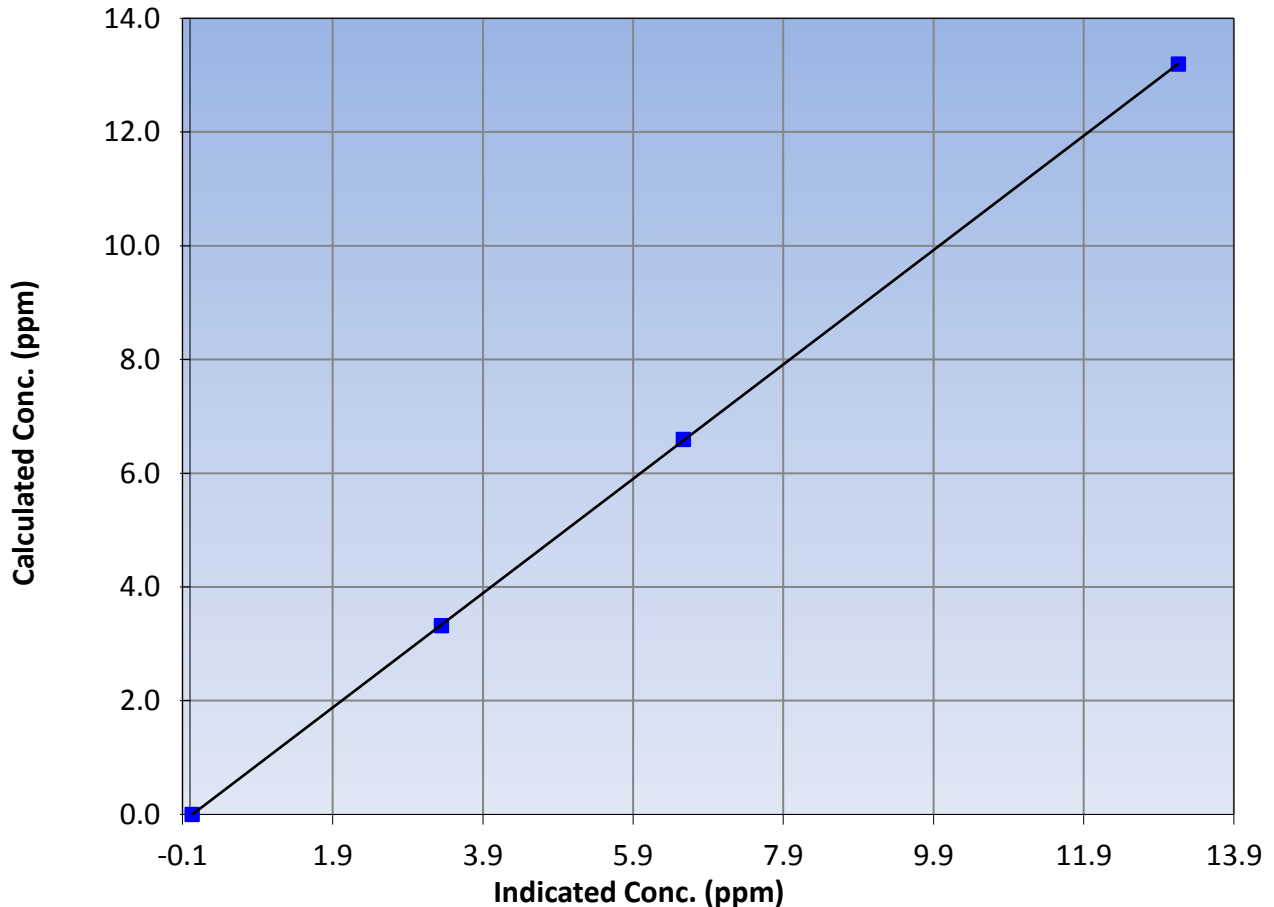
Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	13:15	End Time (MST)	17:55
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

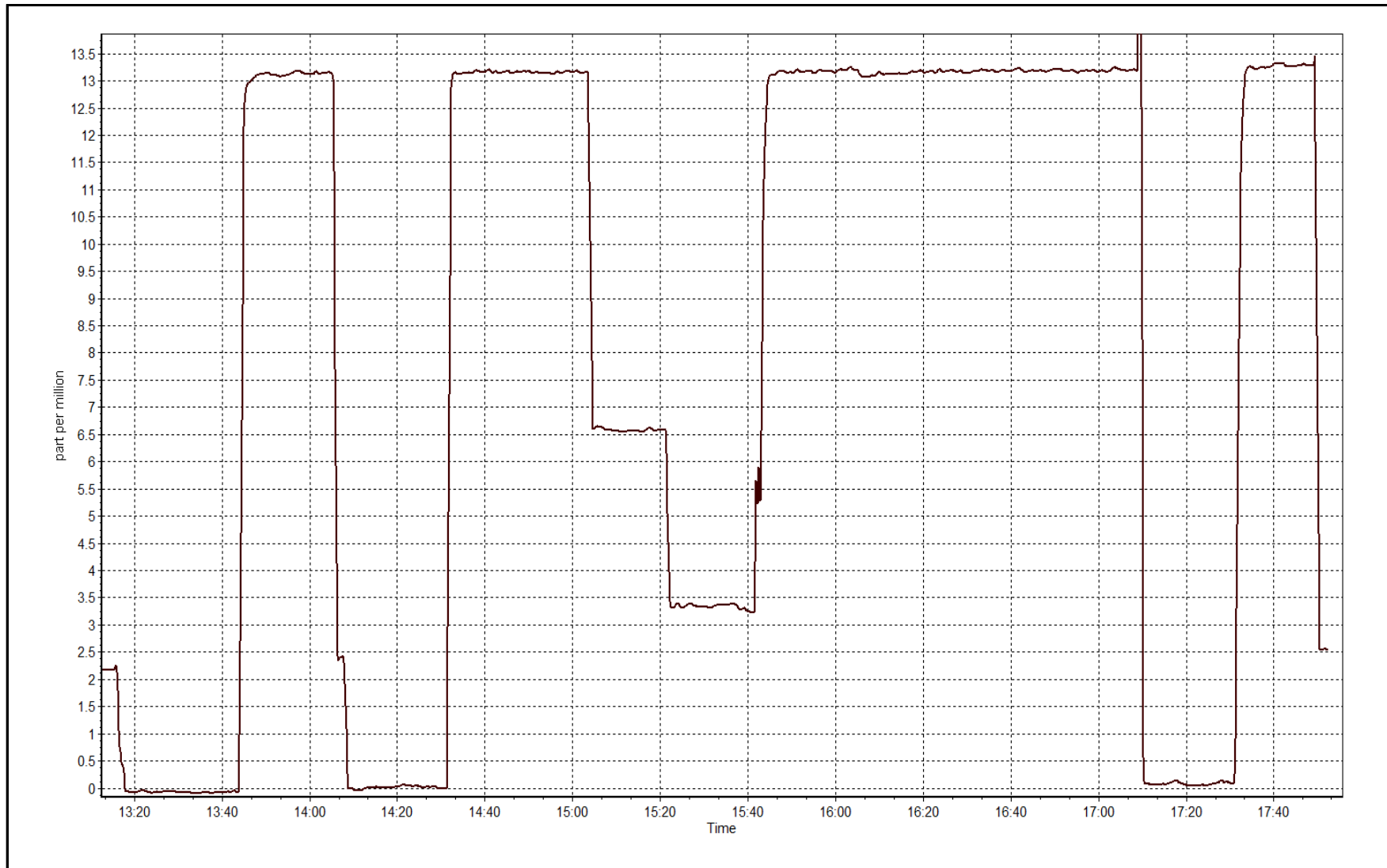
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999991
13.19	13.16	1.0026		
6.60	6.57	1.0041	Slope	1.005524
3.32	3.35	0.9912		
			Intercept	-0.031411

THC Calibration Curve



THC Calibration Plot

Date: November 19, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 15, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	17:10	End Time (MST)	19:15
NO2 GPT Ref date	October-14-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	28.3	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	1.000358	1.004749	Pressure	26.0	26.2
Calculated intercept	-0.324740	-1.001737	Flow cell A	748.000	740.000
Analyzer Background	6.6	6.6	Flow cell B	726.000	725.000
Analyzer Coefficient	0.991	0.991	Cell A Intensity		
			Cell B Intensity		

Analyzer make	Teledyne API T400	Analyzer serial #	824
---------------	-------------------	-------------------	-----

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	193.1/800	0.0	-0.2	----
as found span	5000	713.6/1082.0	385.4	381.9	1.009
calibrator zero	5000	193.1/800	0.0	-0.2	----
high point	5000	713.6/1082.0	385.4	383.0	1.006
second point	5000	496.5/973.6	257.3	258.9	0.994
third point	5000	260.3/849.3	131.2	132.4	0.991
as left zero					
as left span					
Average Correction Factor					0.997

Corrected As found	382.0	Previous response	385.6	% change	0.9%
--------------------	-------	-------------------	-------	----------	------

Notes:

As found zero completed with Nox as left zero. Ambient readings in between as founds zero and span. No adjustments made.

Calibration Performed By:

Devin Russell



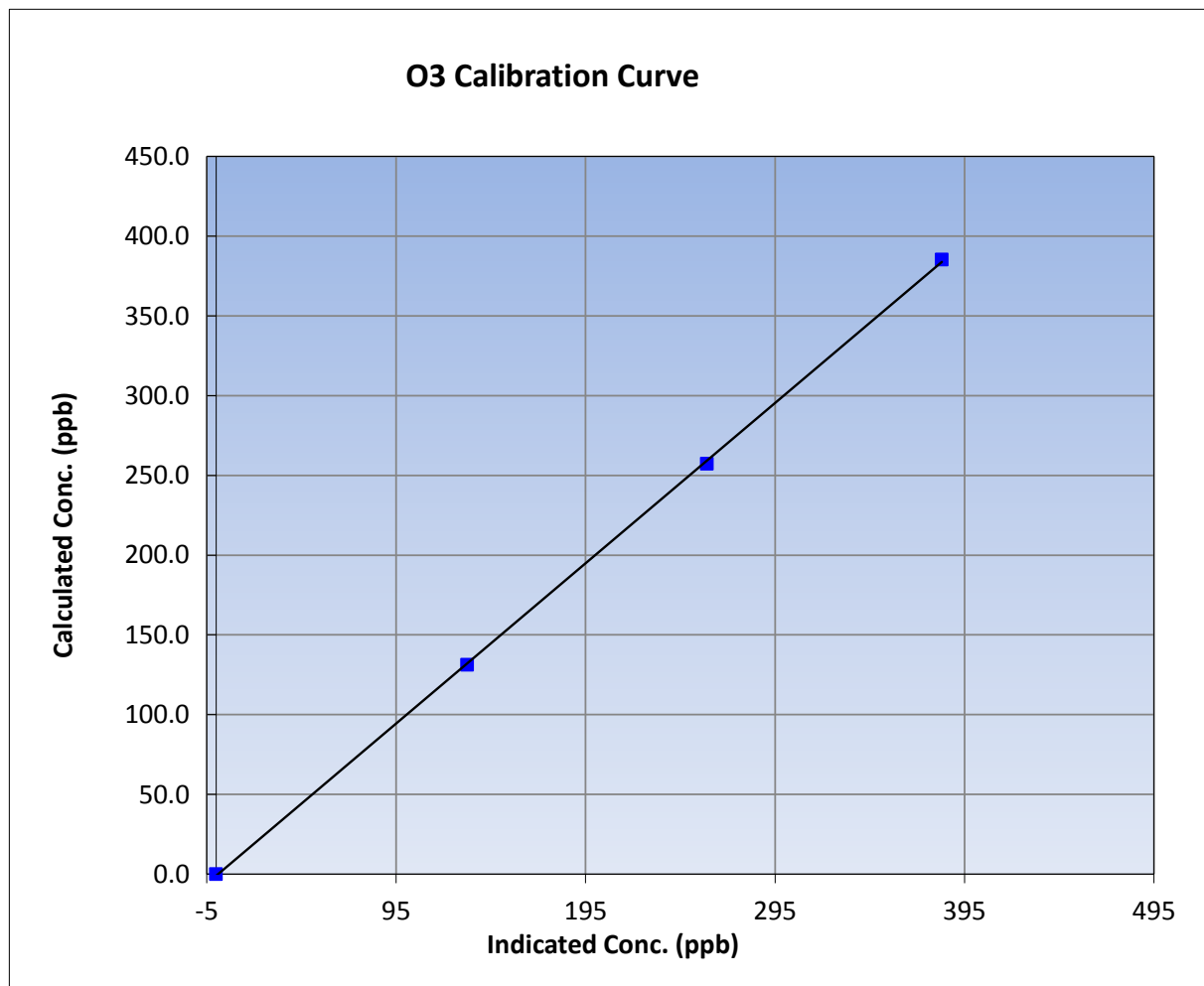
Wood Buffalo Environmental Association O3 Calibration Report

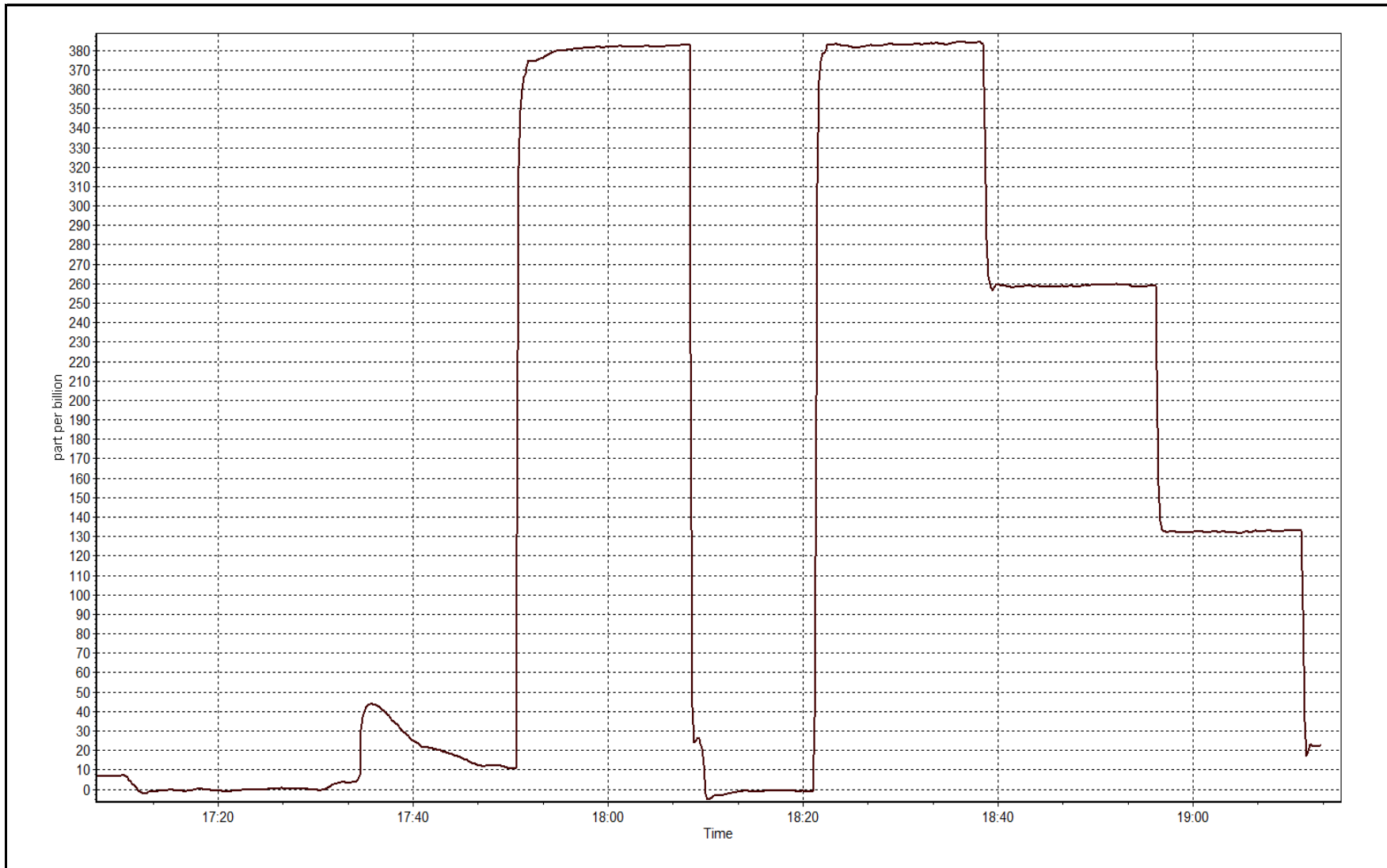
Station Information

Calibration Date	November-19-15	Previous Calibration	October 15, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	17:10	End Time (MST)	19:15
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	0.999904
385.4	383.0	1.0062		
257.3	258.9	0.9937	Slope	1.004749
131.2	132.4	0.9909		
			Intercept	-1.001737







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 21, 2015	Previous Calibration	November 19, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Calibration following diagnostic adjustment		
Start Time (MST)	11:15	End Time (MST)	12:45
NO2 GPT Ref date	November-19-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.7	27.7
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	NA	1.005849	Pressure	25.8	25.8
Calculated intercept	NA	-0.226296	Flow cell A	740	705
Analyzer Background	6.6	6.6	Flow cell B	725	696
Analyzer Coefficient	0.991	0.991	O3 measure	2477	2533
			O3 reference	2478	2533

Analyzer make	Teledyne API T400	Analyzer serial #	824
---------------	-------------------	-------------------	-----

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000		0.0	-0.9	----
high point	5000	713.6/1082.0	385.4	382.1	1.009
second point	5000	496.5/973.6	257.3	257.4	1.000
third point	5000	260.3/849.3	131.2	131.7	0.996
as left zero					
as left span					
Average Correction Factor					1.001

Corrected As found	NA	Previous response	NA	% change	NA
--------------------	----	-------------------	----	----------	----

Notes:

O₃ signal failure observed last evening; diagnostics indicate lamp value fell below 2500 mV. Adjusted lamp power and re-calibrated; lamp to be replaced soon.

Calibration Performed By: Kelly Baragar



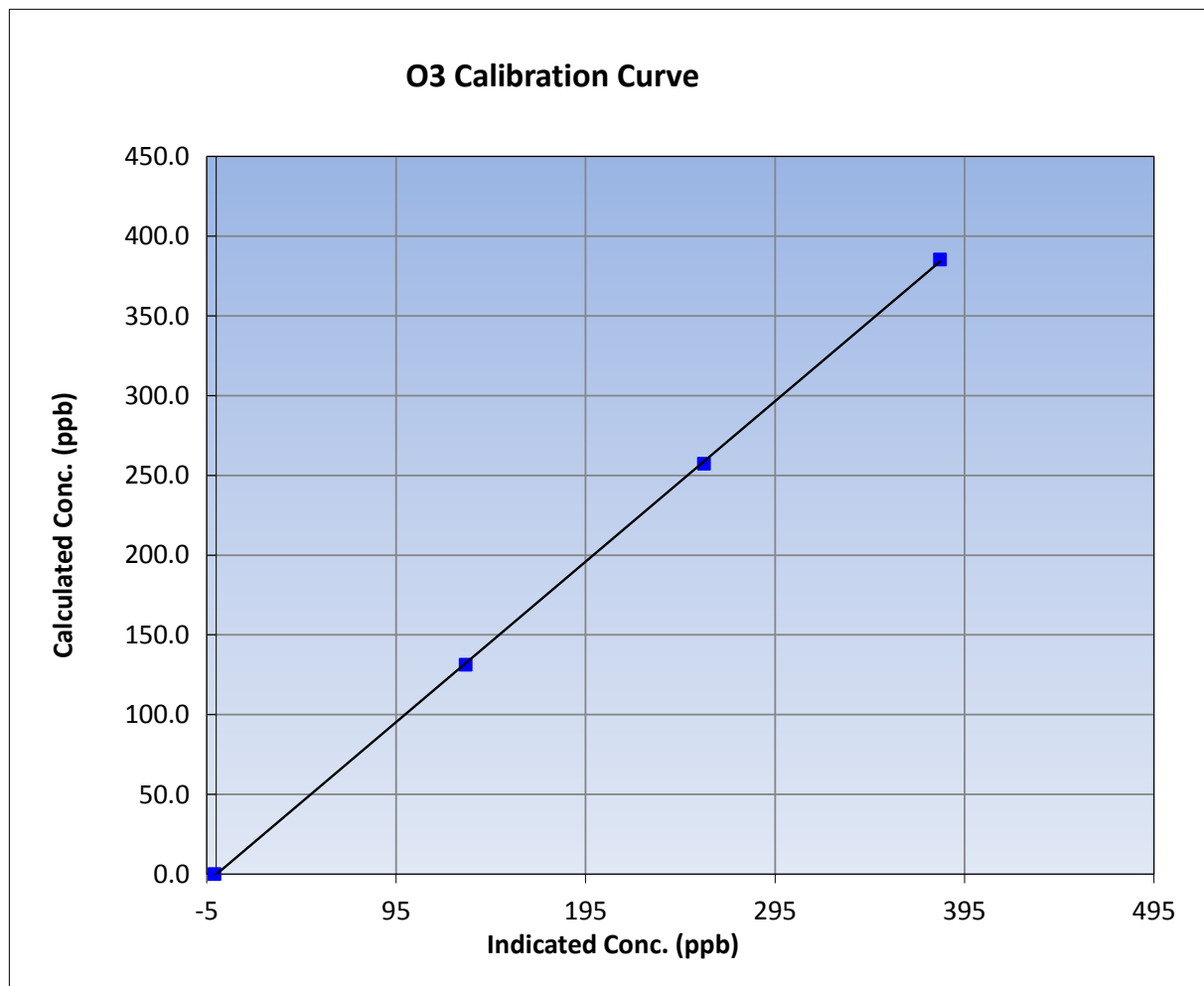
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-21-15	Previous Calibration	November 19, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	11:15	End Time (MST)	12:45
Analyzer make	Teledyne API T400	Analyzer serial #	824

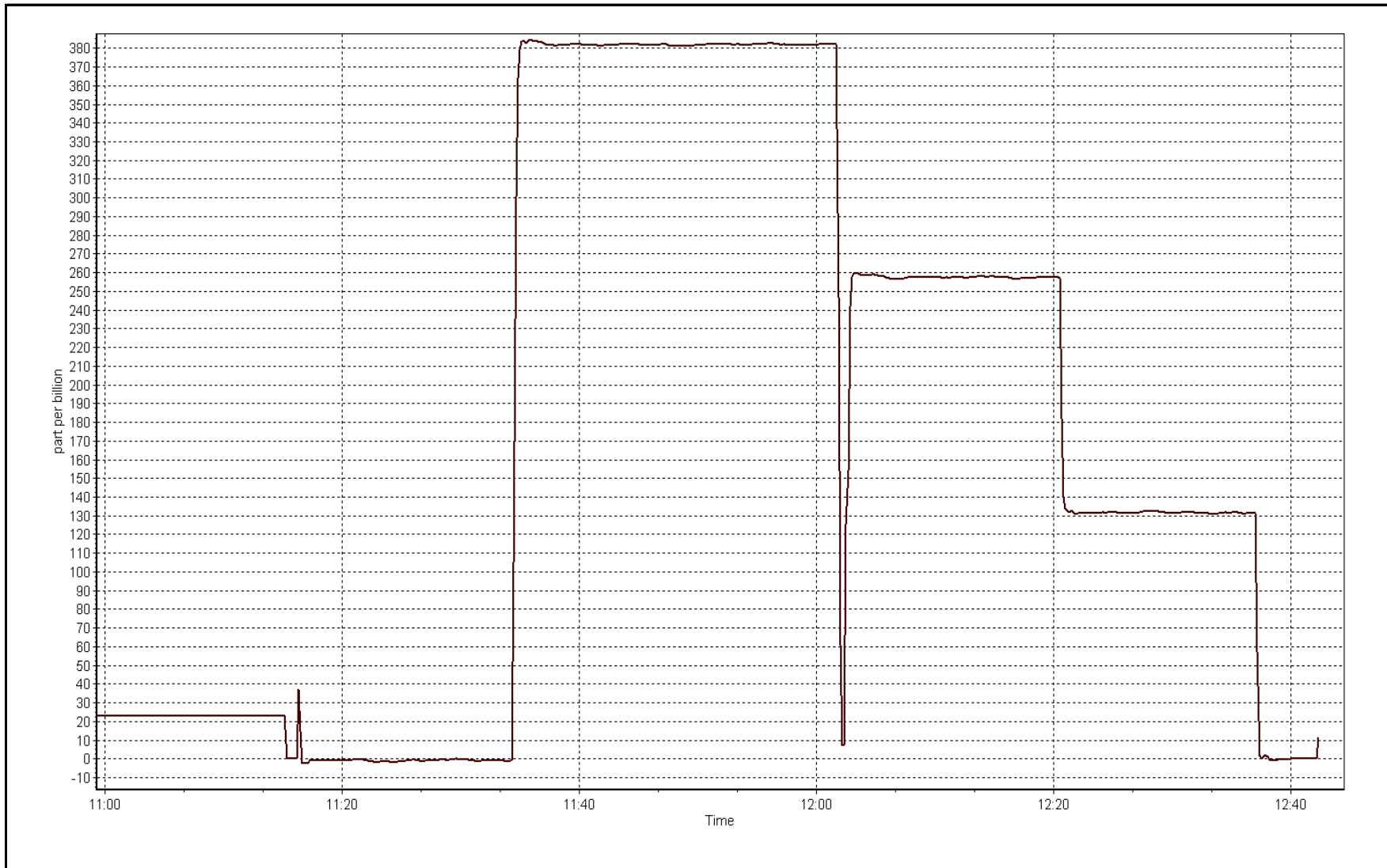
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.9	----	Correlation Coefficient	0.999928
385.4	382.1	1.0086		
257.3	257.4	0.9996	Slope	1.005849
131.2	131.7	0.9962		
			Intercept	-0.226296



O3 Calibration Plot

Date: November 21, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 24, 2015	Previous Calibration	November 21, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	<input type="checkbox"/> Other: Calibration following physical lamp adjustment		
Start Time (MST)	12:05	End Time (MST)	15:10
NO2 GPT Ref date	November-19-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.7	27.0
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	1.005849	0.994930	Pressure	25.8	26.4
Calculated intercept	-0.226296	-0.397079	Flow cell A	705	750
Analyzer Background	6.6	6.6	Flow cell B	696	738
Analyzer Coefficient	0.991	0.991	O3 measure	2533	4602.1
			O3 reference	2533	4602.3

Analyzer make	Teledyne API T400	Analyzer serial #	824
---------------	-------------------	-------------------	-----

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	-0.6	----
as found span	5000	713.6/1082.0	385.4	385.6	1.000
calibrator zero	5000		0.0	-0.8	----
high point	5000	713.6/1082.0	385.4	386.4	0.997
second point	5000	496.5/973.6	257.3	260.4	0.988
third point	5000	260.3/849.3	131.2	133.4	0.984
as left zero	5000		0.0	-0.5	----
as left span	5000	713.6/1082.0	385.4	386.8	0.996
Average Correction Factor					0.990

Corrected As found	386.2	Previous response	383.4	% change	-0.7%
--------------------	-------	-------------------	-------	----------	-------

Notes:

Lamp rotated after as founds. Lamp measurement value jumped from 2500 mv to 4000 mv. Lamp pot adjusted so that lamp measurement value read 4608 mv. Calibration completed, no adjustments made.

Calibration Performed By: Devin Russell



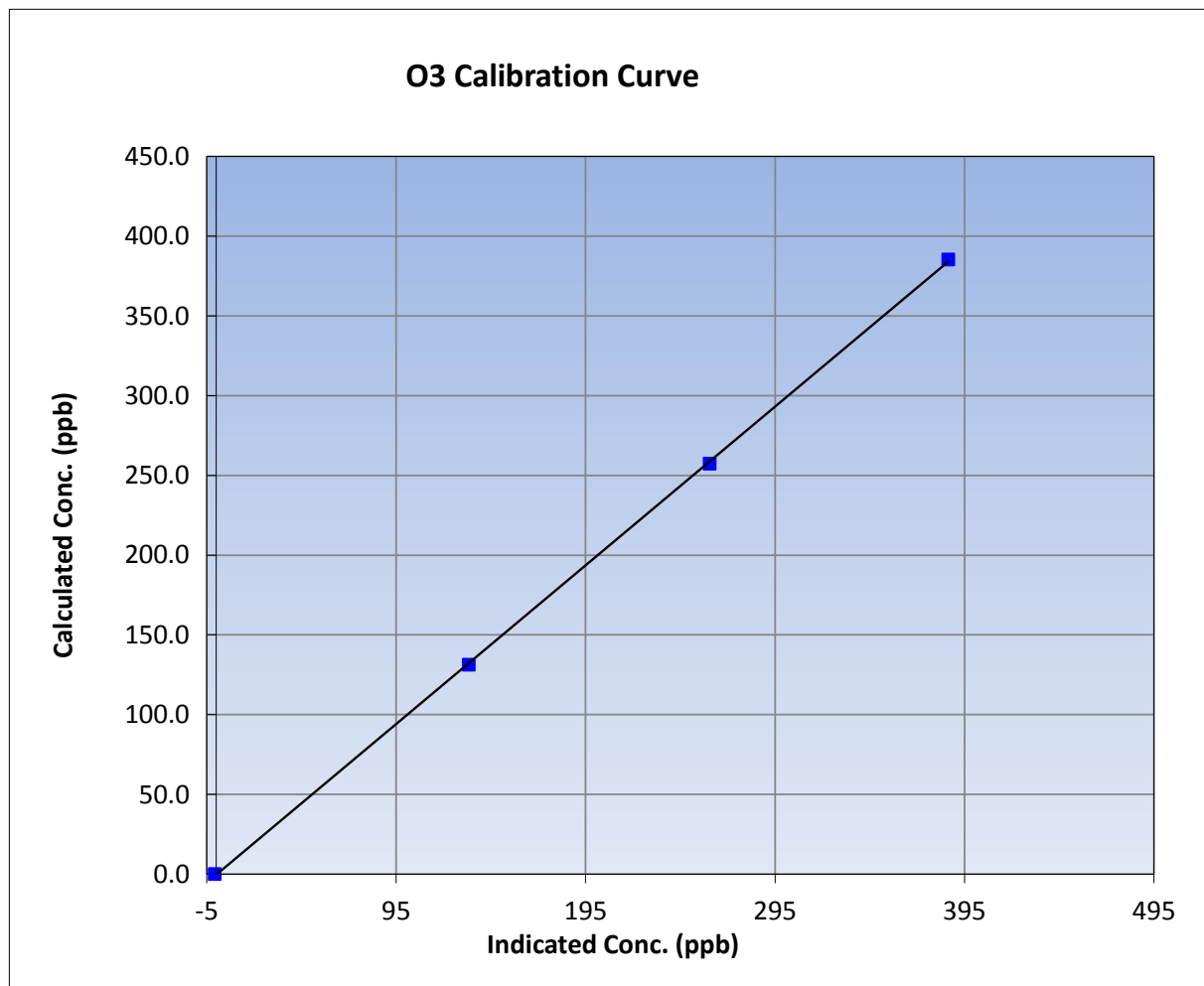
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-24-15	Previous Calibration	November 21, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	12:05	End Time (MST)	15:10
Analyzer make	Teledyne API T400	Analyzer serial #	824

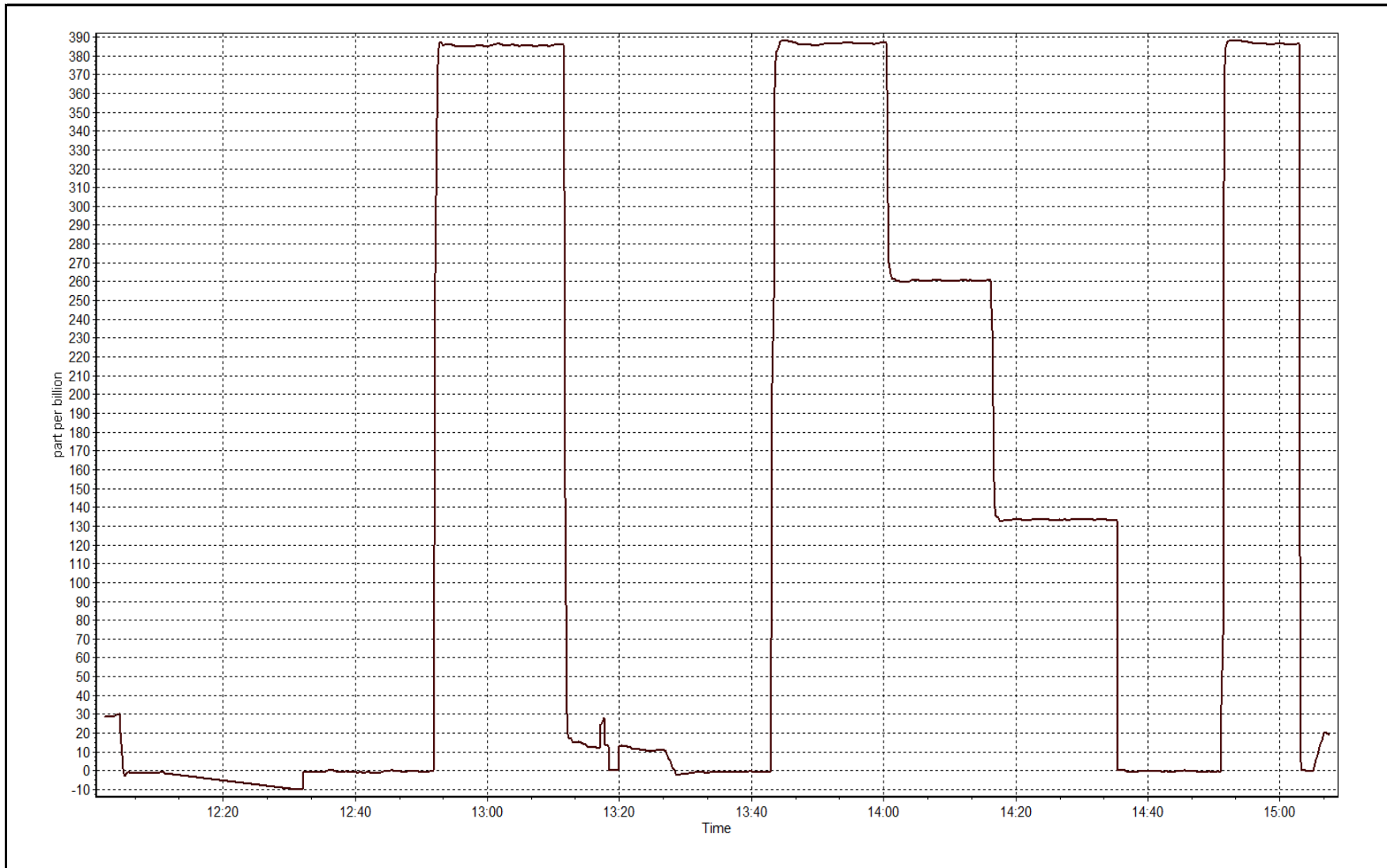
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	----	Correlation Coefficient	0.999923
385.4	386.4	0.9974		
257.3	260.4	0.9879	Slope	0.994930
131.2	133.4	0.9838		
			Intercept	-0.397079



O3 Calibration Plot

Date: November 24, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	17:55
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOX Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997261	0.996999	1.001777
	Data Offset	2.710259	2.661461	0.500424
Current Calibration	Data Slope	0.999608	0.994950	1.002478
	Data Offset	3.104855	2.691373	-0.787711

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
---------------------	----------	-------------------	-----

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.952		0.964	
NOX coefficient	0.950		0.960	
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	314.5	Deg C	314.8	Deg C
PMT voltage	781	V	781	V
PMT Temp	7	Deg C	7	Deg C
O3 flow	71	ccm	72	ccm
R Cell press NO	4.6	mmHg	4.9	mmHg
R Cell Press Nox	4.6	mmHg	4.9	mmHg
NO sample flow	0.443	lpm	0.442	lpm
Nox sample Flow	0.443	lpm	0.446	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: November 19, 2015 Station Number: AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.4	-0.3	----	----
as found span	5000	60.4	600.4	600.4	0.0	595.4	594.9	0.5	1.0084	1.0092
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.4	-0.3	----	----
high point	5000	60.4	600.4	600.4	0.0	598.8	602.0	-3.3	1.0027	0.9972
second point	5000	30.2	300.2	300.2	0.0	295.8	297.3	-1.5	1.0149	1.0099
third point	5000	15.2	151.1	151.1	0.0	145.8	147.3	-1.5	1.0363	1.0257
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.2	----	----
as left span	5000	60.4	600.4	209.8	390.5	592.9	209.9	383.1	1.0126	0.9996
Average Correction Factor									1.0180	1.0109

Corrccted As found NO_x= 596.1 NO= 595.3 Percent Change NO_x= 0.5% NO= 0.7%
 Previous Response NO_x= 599.3 NO= 599.5

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.3			N/A	
1st NO2 (300)	----	209.8	385.4	594.1	209.8	384.3	0.9985	1.0000	1.0031	99.7%
2nd NO2 (200)	----	338.0	257.3	596.4	338.0	258.3	0.9947	1.0000	0.9959	100.4%
3rd NO2 (100)	----	464.1	131.2	596.9	464.1	132.8	0.9939	1.0000	0.9878	101.2%
4th NO2 (0)	595.3	----	-1.0	594.2	595.3	-1.1	0.9983	1.0000	N/A	----
Average Correction Factor							0.9964	1.0000	0.9956	100.4%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

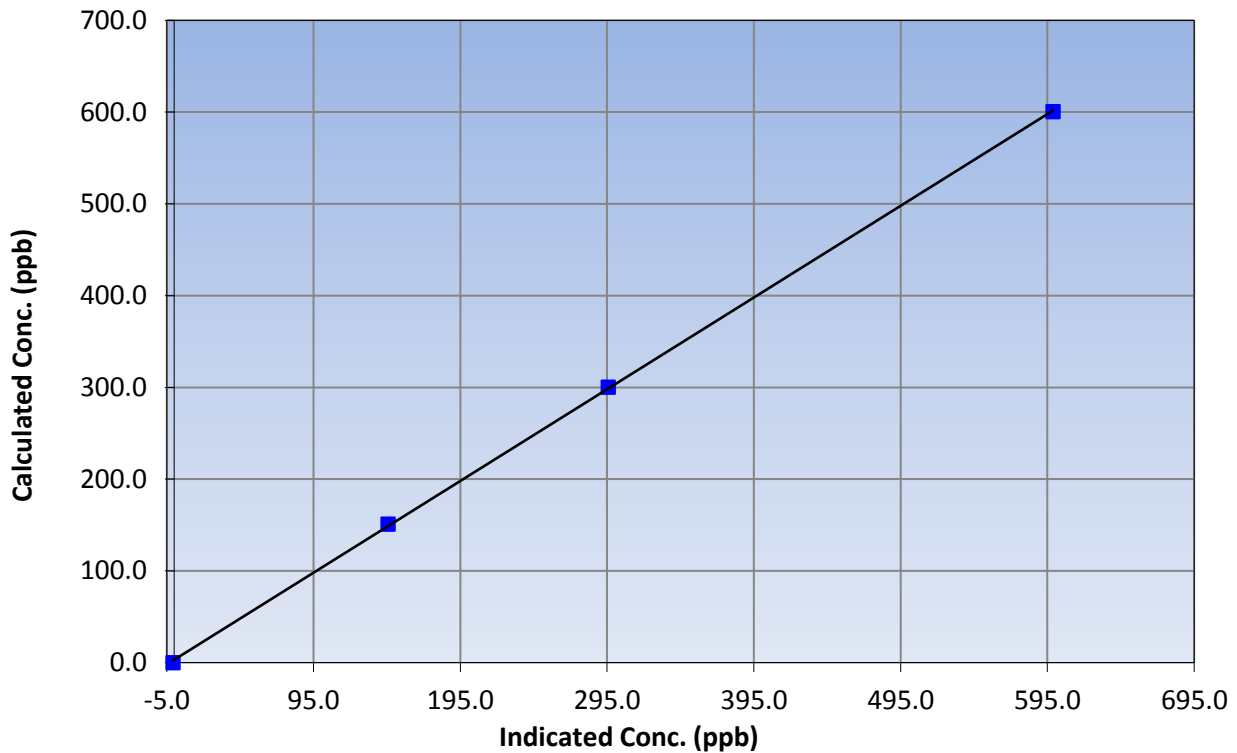
Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	13:15	End Time (MST)	17:55
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	-0.7	----	Correlation Coefficient	0.999927
600.4	598.8	1.0027		
300.2	295.8	1.0149	Slope	0.999608
151.1	145.8	1.0363		
			Intercept	3.104855

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

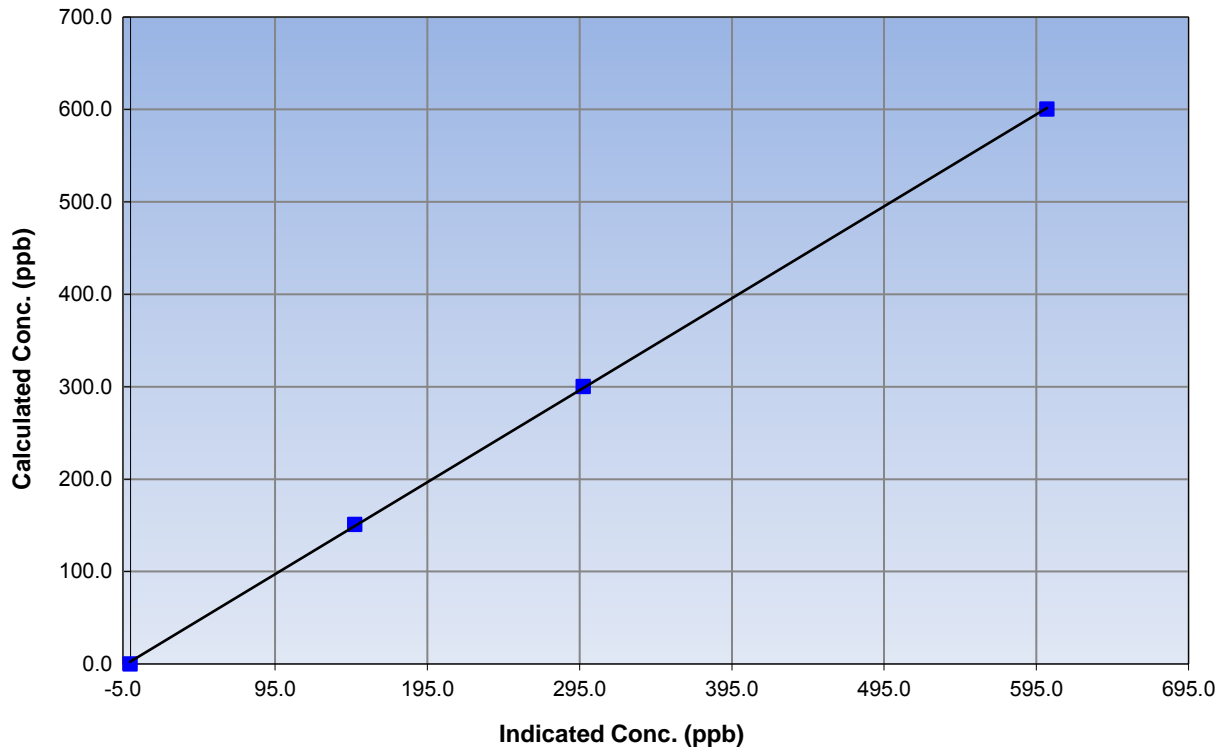
Station Information

Calibration Date	November 19, 2015	Previous Calibration	October 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	13:15	End Time (MST)	17:55
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	0.999932
600.4	602.0	0.9972		
300.2	297.3	1.0099	Slope	0.994950
151.1	147.3	1.0257		
			Intercept	2.691373

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

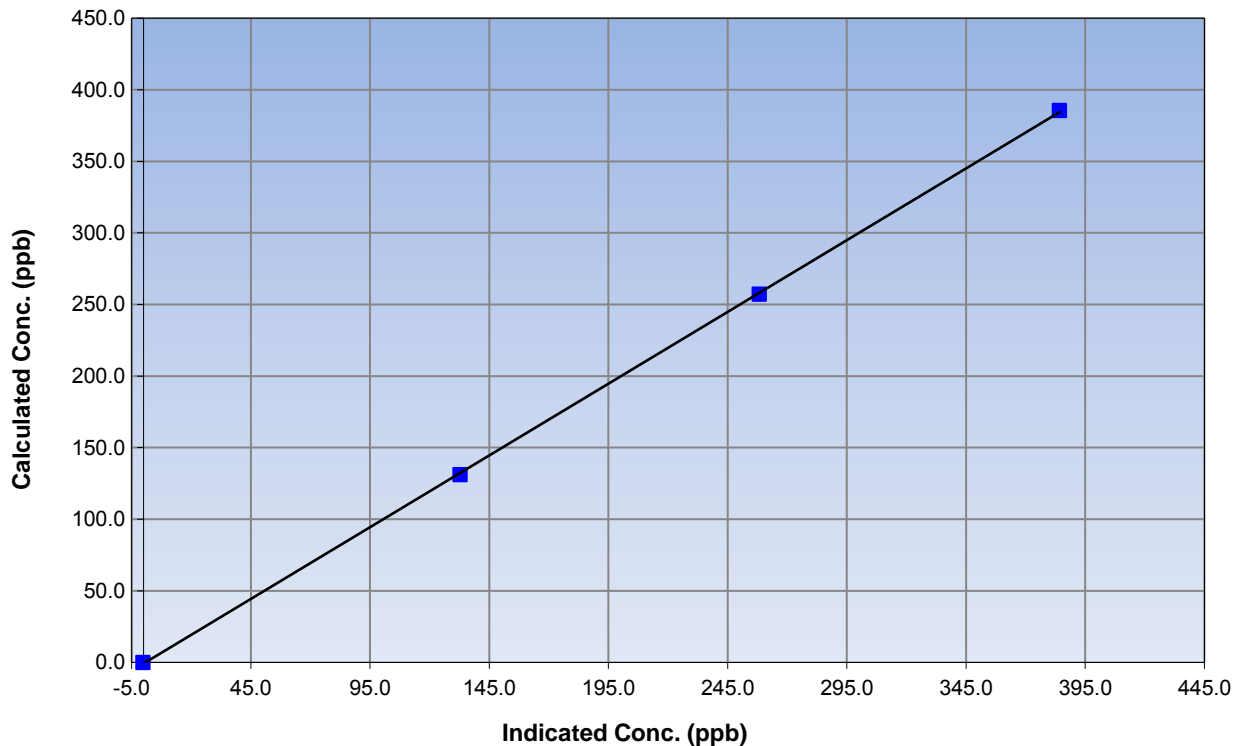
Station Information

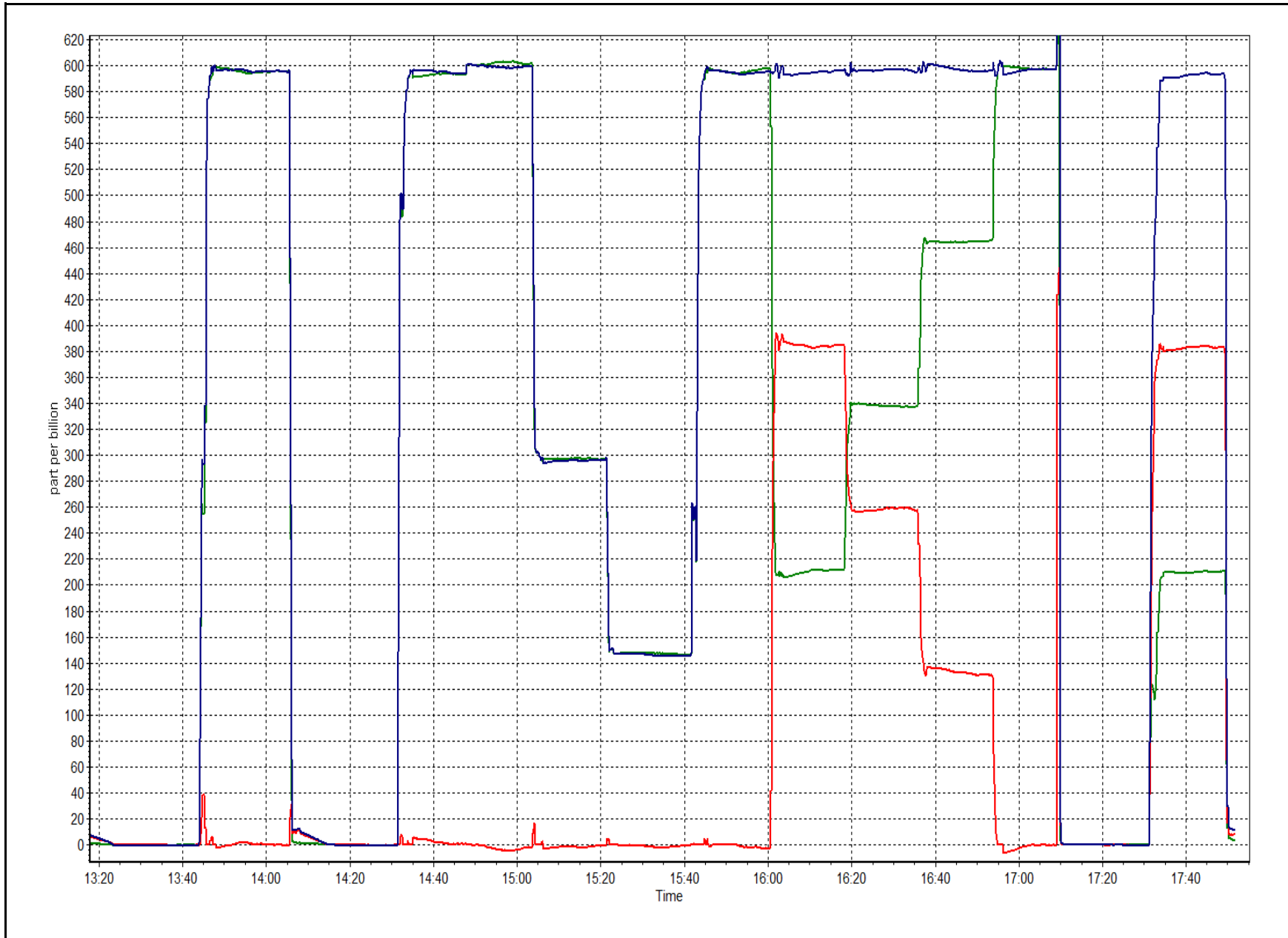
Calibration Date	November 19, 2015	Previous Calibration	October 14, 2015
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	13:15	End Time (MST)	17:55
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999947
385.4	384.3	1.0031		
257.3	258.3	0.9959	Slope	1.002478
131.2	132.8	0.9878		
			Intercept	-0.787711

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	November 19, 2015	Previous Calibration:	October 23, 2015
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	14:14	End Time (MST):	15:15
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number:	E-1107		
C ₁₄ Source SN:	2518		
Confirmation of Time settings:	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	-12.0	-13.1	-1.1	-12.0
T2	16.0	na	na	
T3	19.0	na	na	
T4	17.0	na	na	
RH (%)	10.0	na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	953	949.0	-4.0	953

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	996	4	996	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	199		199
Neph	0.5		0.5
C14	12.6		12.6
Indicated Concentration (ug/m3)	0.1	no	0.1
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:		Previous Leak Check Date:	June 10, 2015
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):		0.00	
*Flow with adaptor (LPM):			
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

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

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	23/10/2015
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head cleaned. No adjustments made.

Calibration Performed By: Devin Russell



This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 18
CONKLIN LOOKOUT
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	686	34	34	100.00	3	0	1	0
TRS(ppb) Average	686	34	34	100.00	1	0	0	0
THC(ppm) Average	686	34	34	100.00	2.2	-	2	-
NMHC(ppm) Average	686	34	34	100.00	0.252	-	0.018	-
CH4(ppm) Average	686	34	34	100.00	2.1	-	2	-
O3 (ppb) Average	687	33	33	100.00	46	0	43	-
NO2 (ppb) Average	437	24	283	64.03	8	0	4	-
NO (ppb) Average	437	24	283	64.03	1	-	0	-
NOX (ppb) Average	437	24	283	64.03	8	-	4	-
PM2.5 (ug/m3) Average	698	2	22	97.22	36.5	-	12.6	0
Wind Speed 10 m (km/h) Average	720	0	0	100.00	24	-	18	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	7.4	-	3.7	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	95.0	-
Leaf Wetness (% of range) Average	720	0	0	100.00	34	-	3.0	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	346	-	68.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	686	0.3	0	-	0	0	0	0	0	1	3
TRS (ppb) Average	686	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	686	1.96	0.1	-	1.9	1.9	1.9	2	2	2	2.2
NMHC(ppm) Average	686	0.002	0.012	-	0	0	0	0	0	0	0.252
CH4(ppm) Average	686	1.95	0	-	1.9	1.9	1.9	2	2	2	2.1
O3 (ppb) Average	687	31.3	7	-	13	22	26	31	37	42	46
NO2 (ppb) Average	437	1.5	1	-	0	0	1	1	2	3	8
NO (ppb) Average	437	0.1	0	-	0	0	0	0	0	0	1
NOX (ppb) Average	437	1.5	1	-	0	0	1	1	2	3	8
PM2.5 (ug/m3) Average	698	4.35	4.3	-	0	0.8	1.4	3.1	5.9	8.8	36.5
Wind Speed 10 m (km/h) Average	720	10.7	5	-	0	5	7	10	14	17	24
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	-3.18	5	-	-17.1	-11.5	-5.4	-2	0.1	1.9	7.4
Relative Humidity (%) Average	720	73.5	19	-	19	36	65	79	87	94	98
Surface Wetness (% of range) Average	720	0.7	2	-	0	0	0	0	0	3	34
Global Solar Radiation (W/m2) Average	720	35.4	69	-	0	0	0	0	37	133	346

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	10 Nov 2015 15:00	21 Nov 2015 09:00	259	Analyzer Failure - disconnected from sample manifold
PM2.5	25 Nov 2015 17:00	25 Nov 2015 17:00	1	Unstable Operation - debris in nephelometer chamber
PM2.5	28 Nov 2015 14:00	29 Nov 2015 08:00	19	Analyzer Failure - debris in nephelometer chamber

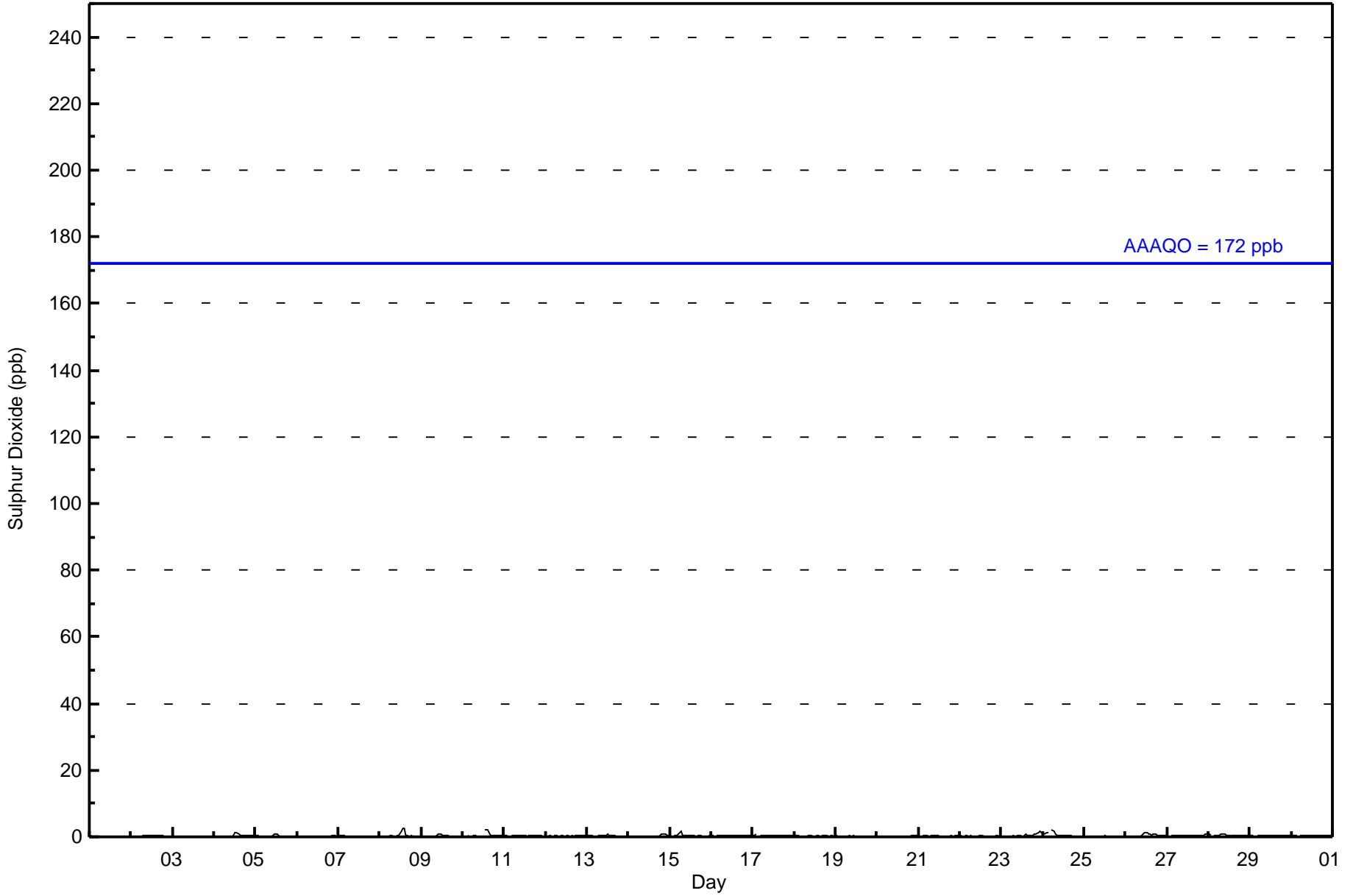


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 3 ppb on Nov 8 14:00	Maximum Daily Average: 0.6 ppb on Nov 10
Minimum Value: 0 ppb on Nov 1 08:00	Hours of Data: 686
Maximum Diurnal Average: 0.4 ppb at hour 14	Hours of Missing Data: 34
Monthly Average: 0.3 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.0 ppb on Nov 3	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.2 ppb at hour 5	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 1 P ₉₉ = 2	

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

0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	Diurnal Average
1	1	1	1	1	2	2	1	1	1	1	1	1	2	3	2	1	1	1	0	1	1	1	2	1	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	686	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	7	12	29	28	8	7	13	10	28	92	134	74	75	89	52	28	686
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	7	12	29	28	8	7	13	10	28	92	134	74	75	89	52	28	686

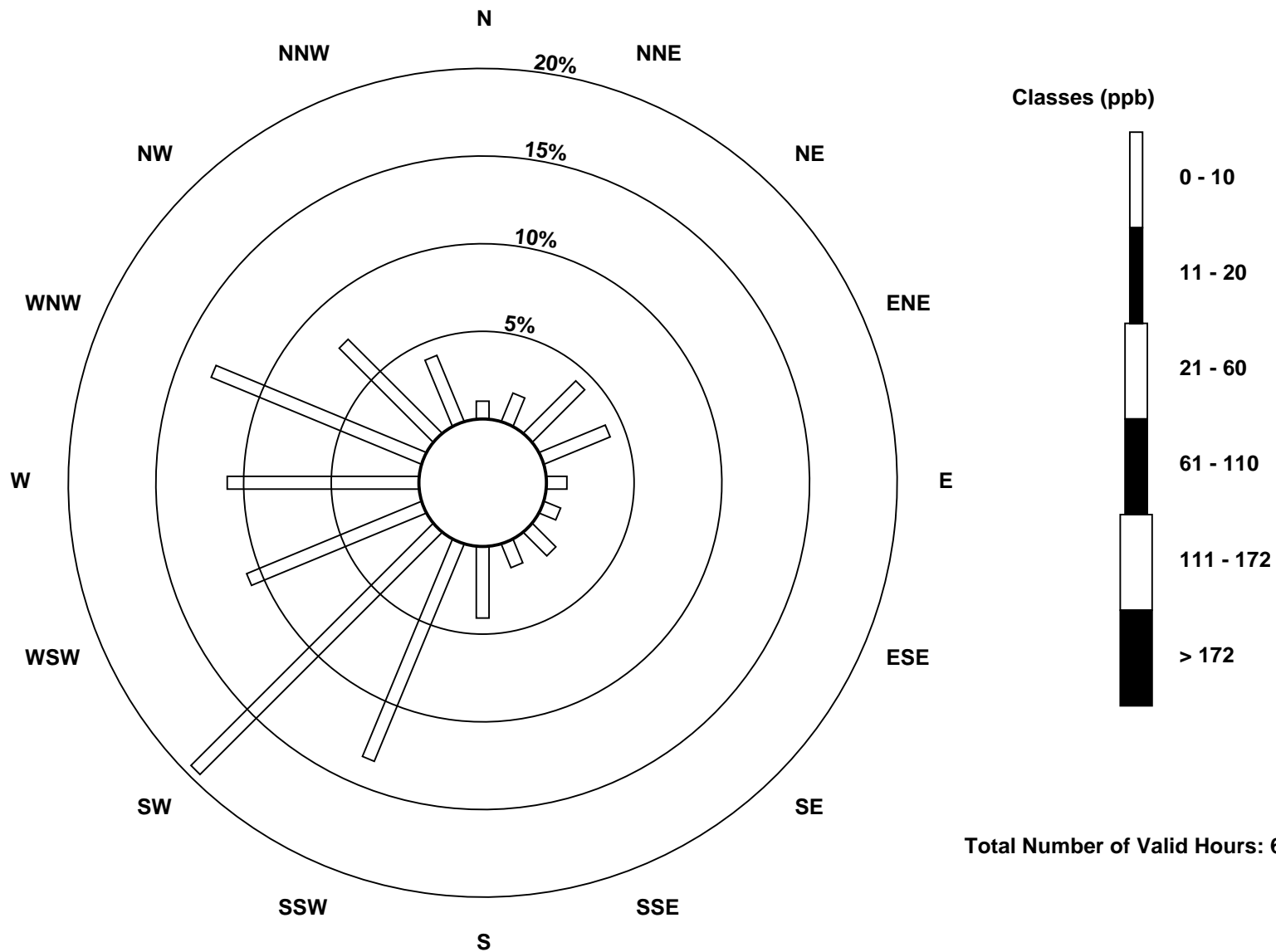
Total Number of Valid Hours: 686

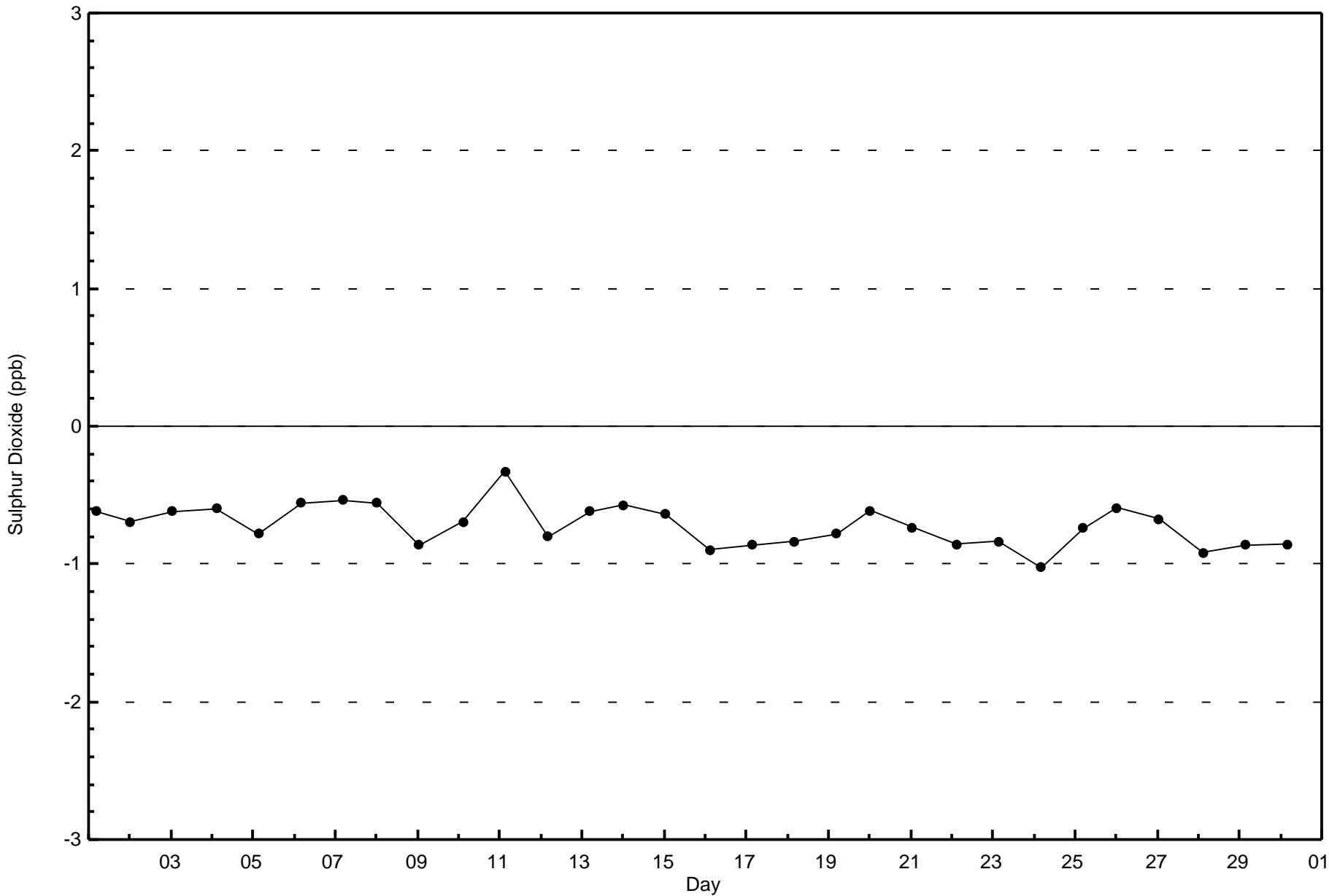
Total Number of Hours: 720

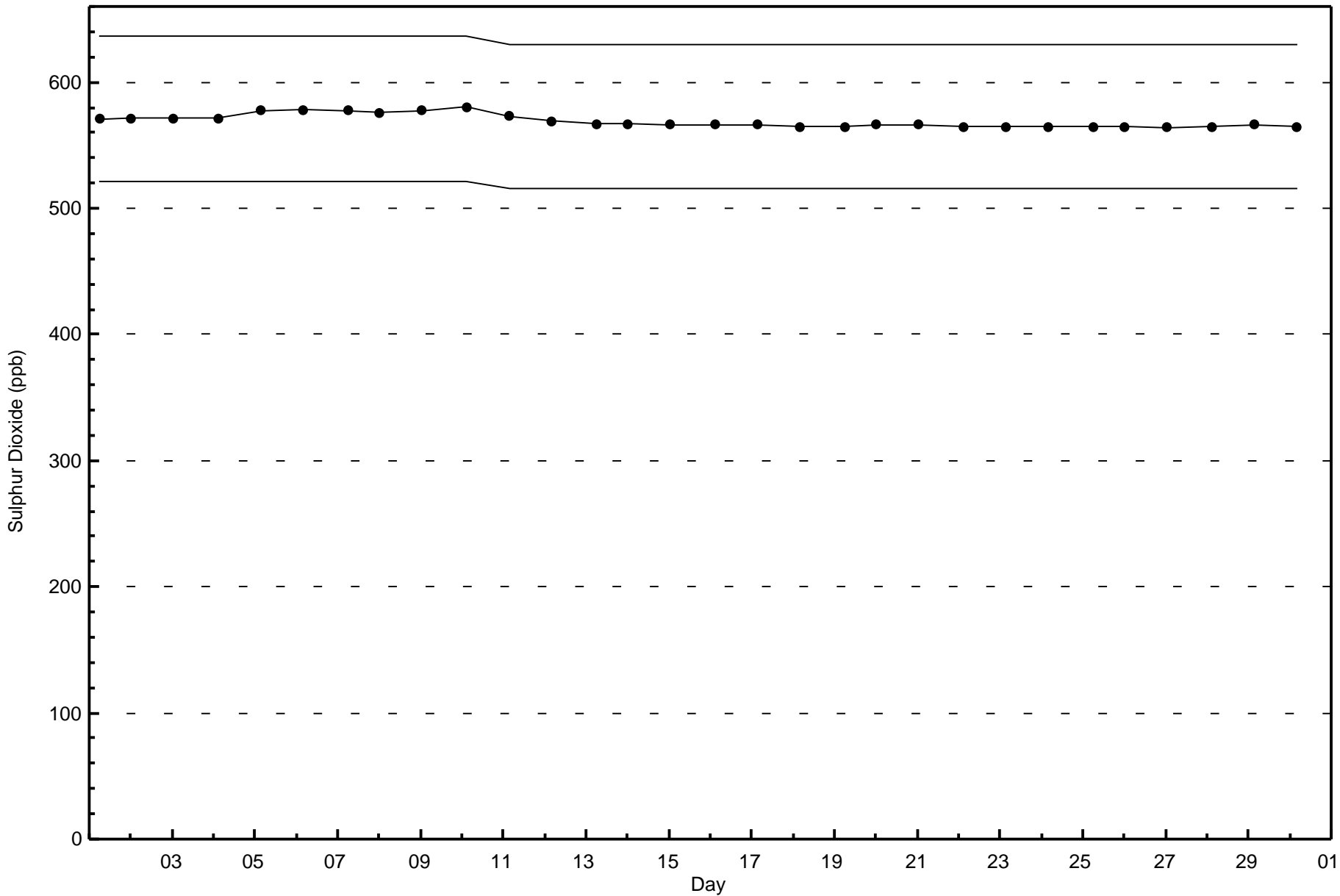


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Sulphur Dioxide (SO₂) - ppb
Conklin Lookout (AMS 18)







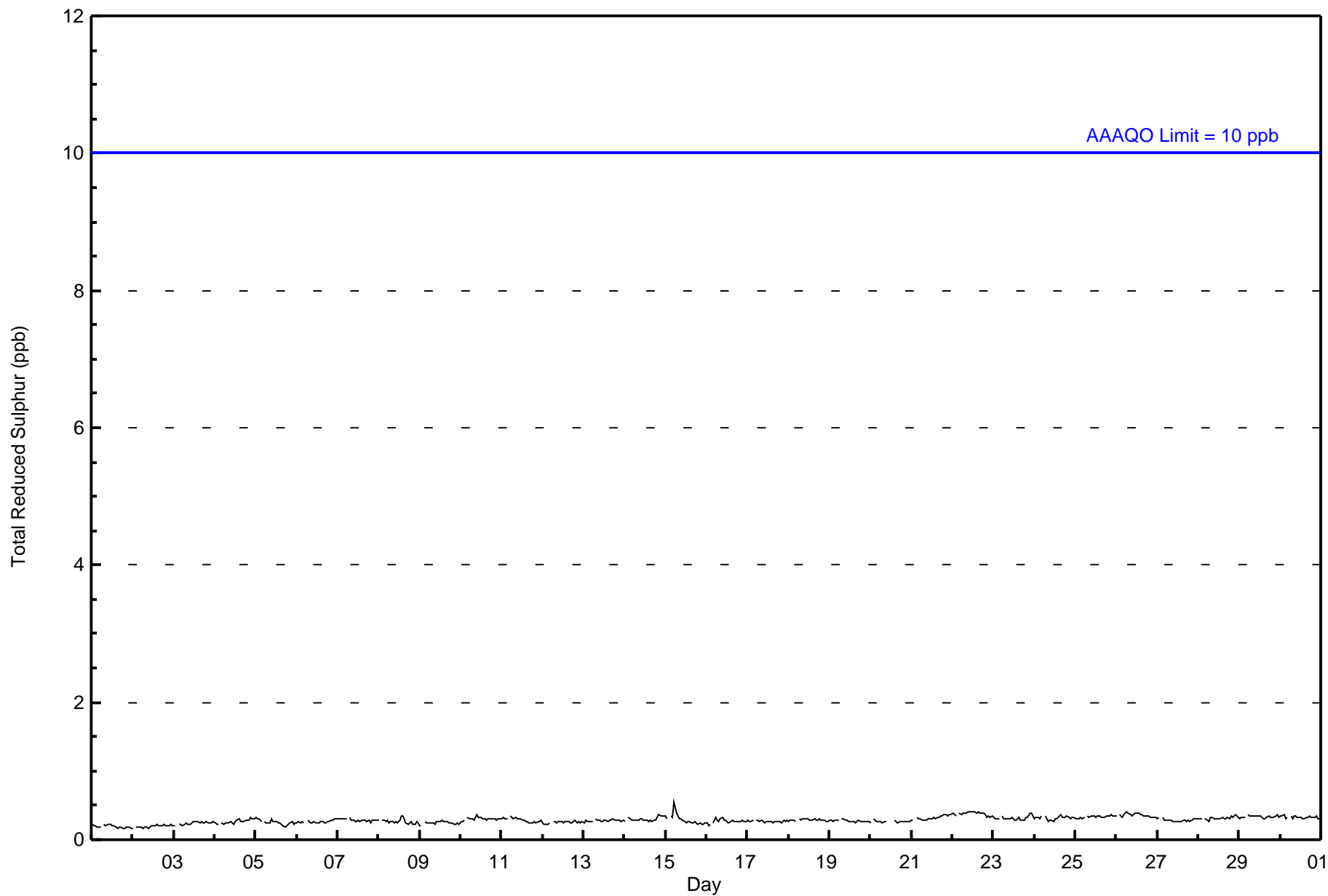


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Nov 15 06:00	Maximum Daily Average: 0.4 ppb on Nov 22		Hours of Data:	686
Minimum Value: 0 ppb on Nov 2 10:00	Minimum Daily Average: 0.2 ppb on Nov 1		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 6	Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	0	Z	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
3-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Nov	0	0	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
5-Nov	0	0	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
6-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Nov	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
8-Nov	0	Z	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
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Nov	0	0	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
13-Nov	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
14-Nov	0	Z	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
15-Nov	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-Nov	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
20-Nov	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Nov	0	0	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
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Nov	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
26-Nov	0	Z	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
27-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
29-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0

0.3	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	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average
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	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	686	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: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin Lookout - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	7	12	30	27	8	7	13	10	28	95	134	72	76	89	50	28	686
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	7	12	30	27	8	7	13	10	28	95	134	72	76	89	50	28	686

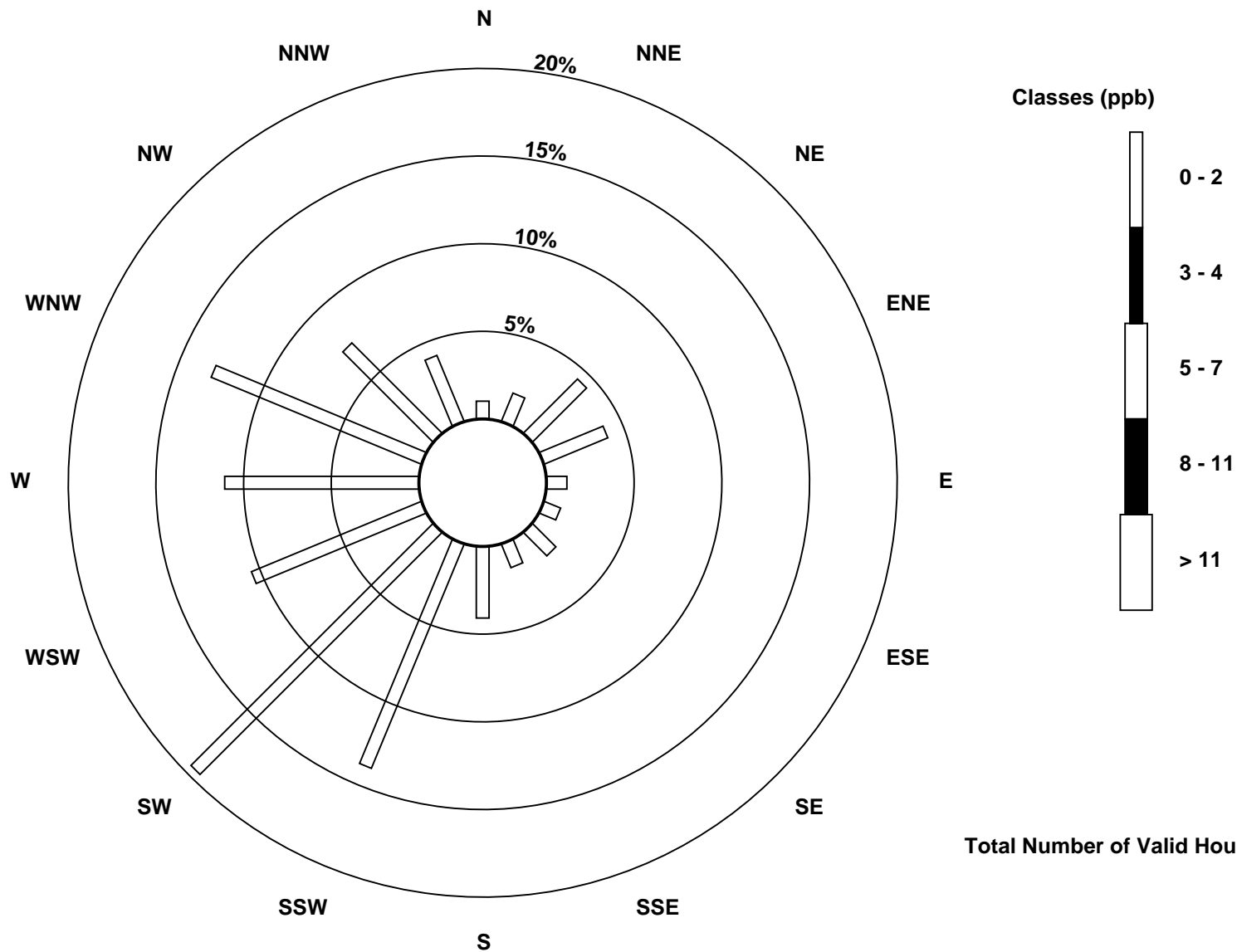
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Reduced Sulphur (TRS) - ppb
Conklin Lookout (AMS 18)

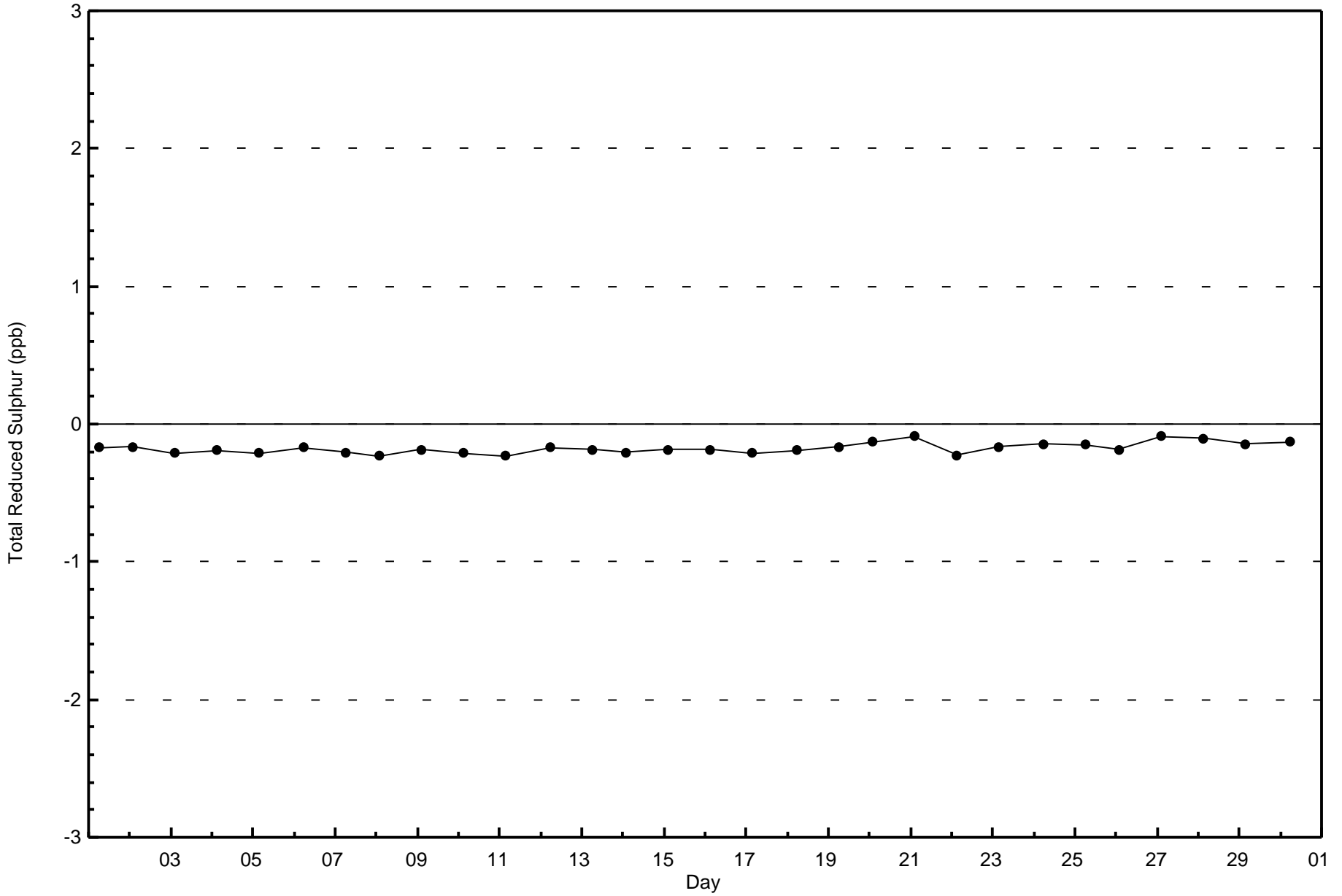


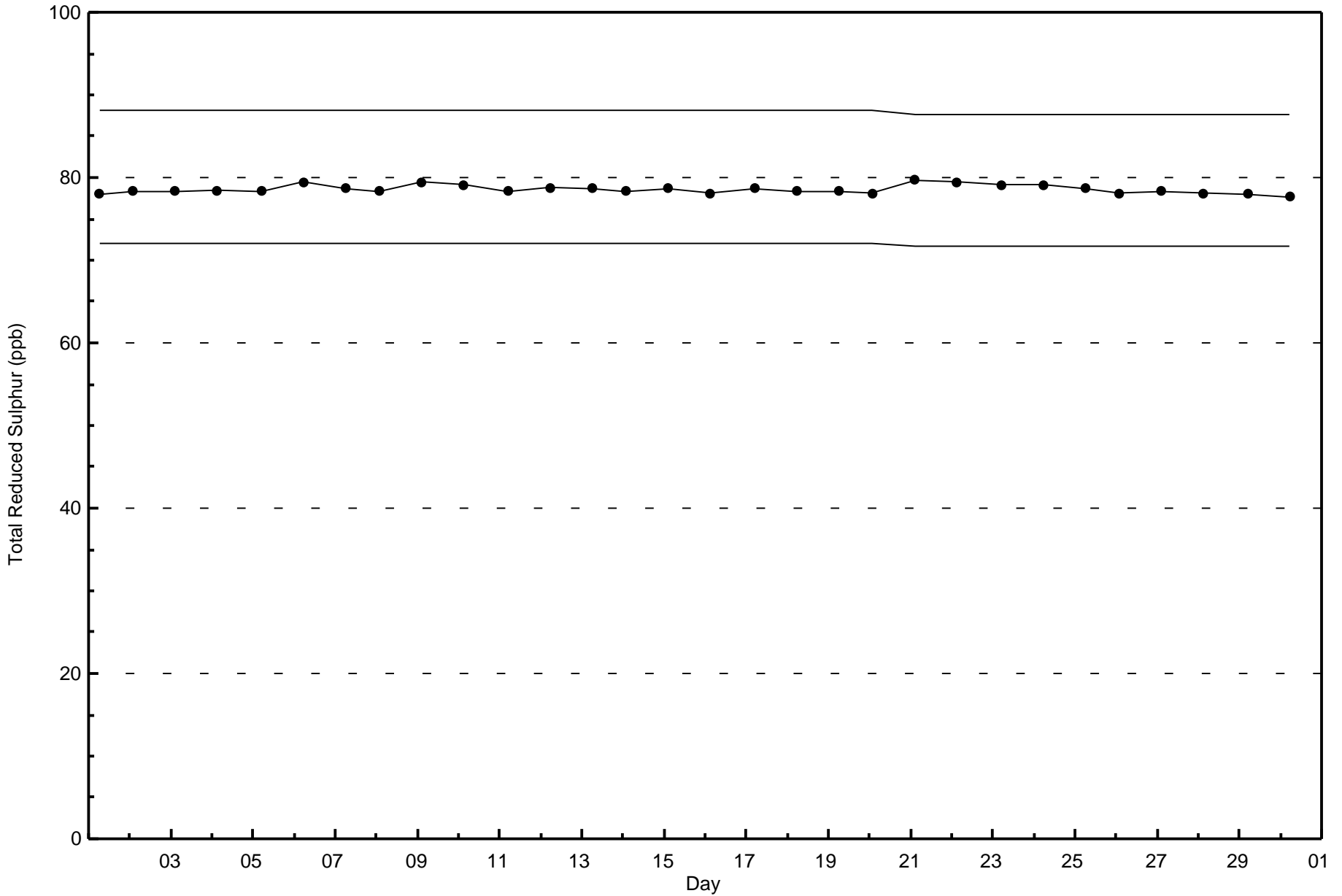
Total Number of Valid Hours: 686



Wood Buffalo Environmental Association
Zero Responses

Total Reduced Sulphur (TRS) - ppb
Conklin Lookout - November 2015







Wood Buffalo Environmental Association
Summary of Hour Averages

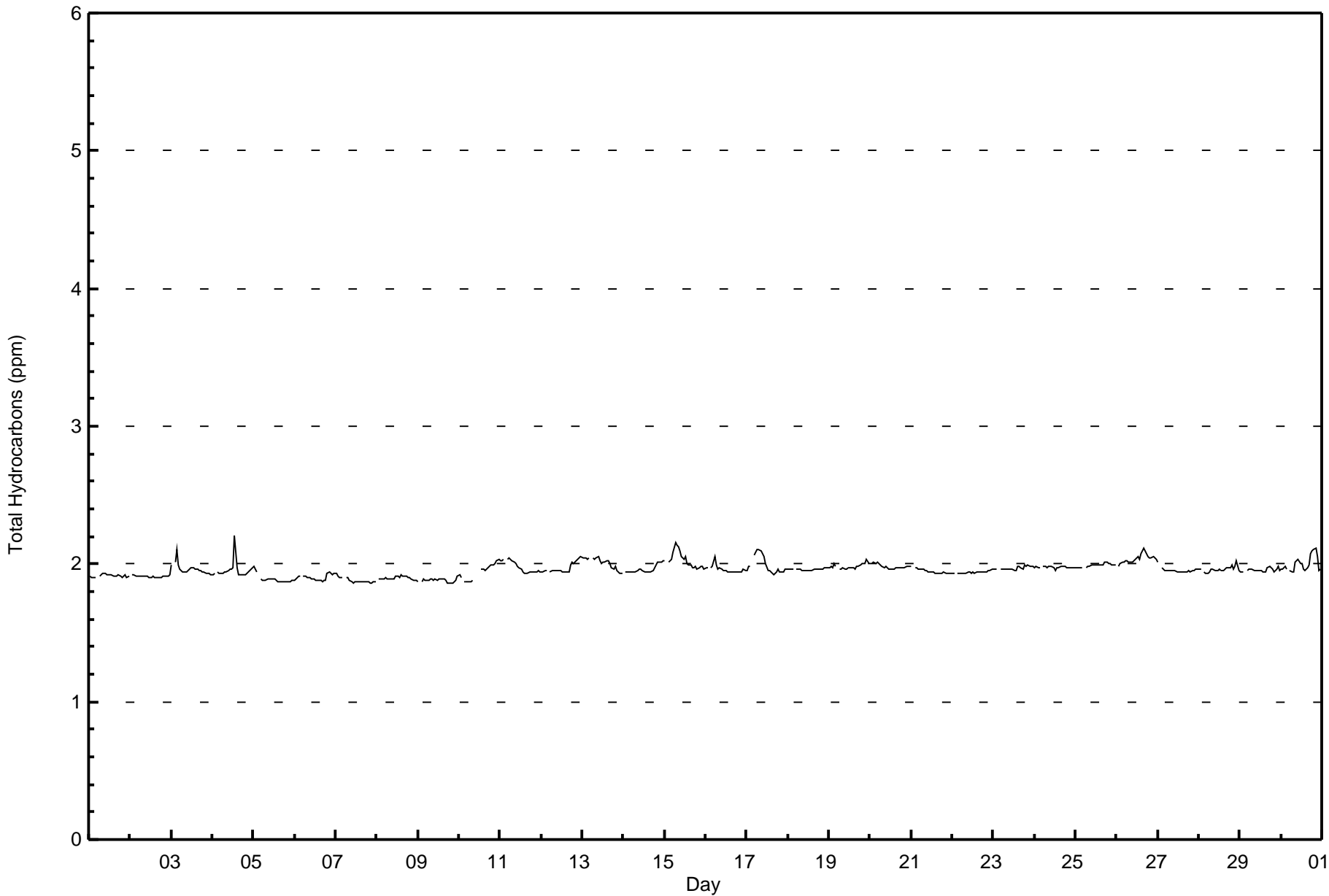
Total Hydrocarbons (THC) - ppm
Conklin Lookout - November 2015

Maximum Value: 2.2 ppm on Nov 4 14:00		Maximum Daily Average: 2.0 ppm on Nov 26		Hours in Service: 720																																	
Minimum Value: 1.9 ppm on Nov 9 18:00		Minimum Daily Average: 1.9 ppm on Nov 9		Hours of Data: 686																																	
Maximum Diurnal Average: 2.0 ppm at hour 10		Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Missing Data: 34																																	
Monthly Average: 1.96 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.0 P ₉₉ = 2.1		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-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
2-Nov	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
3-Nov	2.0	Z	2.0	2.1	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	
4-Nov	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
5-Nov	2.0	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
6-Nov	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
7-Nov	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
8-Nov	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
9-Nov	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	1.9	1.9	1.9	1.9	1.9	1.9	
10-Nov	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
11-Nov	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	
12-Nov	1.9	1.9	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
13-Nov	2.0	2.0	2.0	2.0	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	2.0	2.0	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
14-Nov	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
15-Nov	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2
16-Nov	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1
17-Nov	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
18-Nov	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	2.0	2.0
19-Nov	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	2.0
20-Nov	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	2.0
21-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
22-Nov	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	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-Nov	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
24-Nov	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	2.0	2.0
25-Nov	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	2.0
26-Nov	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	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	2.1	2.1
27-Nov	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
28-Nov	2.0	2.0	Z	1.9	1.9	1.9	1.9	2.0	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
29-Nov	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	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
30-Nov	2.0	2.0	2.0	2.0	Z	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	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	2.0	2.0	2.1	2.1
																								Diurnal Average													
																								Diurnal Maximum													
Z - zerospan C - Calibration																																					



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Conklin Lookout - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Conklin Lookout - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	655	95.48	95.48
2.1 - 3.0	31	4.52	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Conklin Lookout - November 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	7	11	27	25	7	7	13	10	23	84	125	73	75	88	52	28	655
2.1 - 3.0	0	1	2	3	1	0	0	0	5	8	9	1	0	1	0	0	31
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	7	12	29	28	8	7	13	10	28	92	134	74	75	89	52	28	686

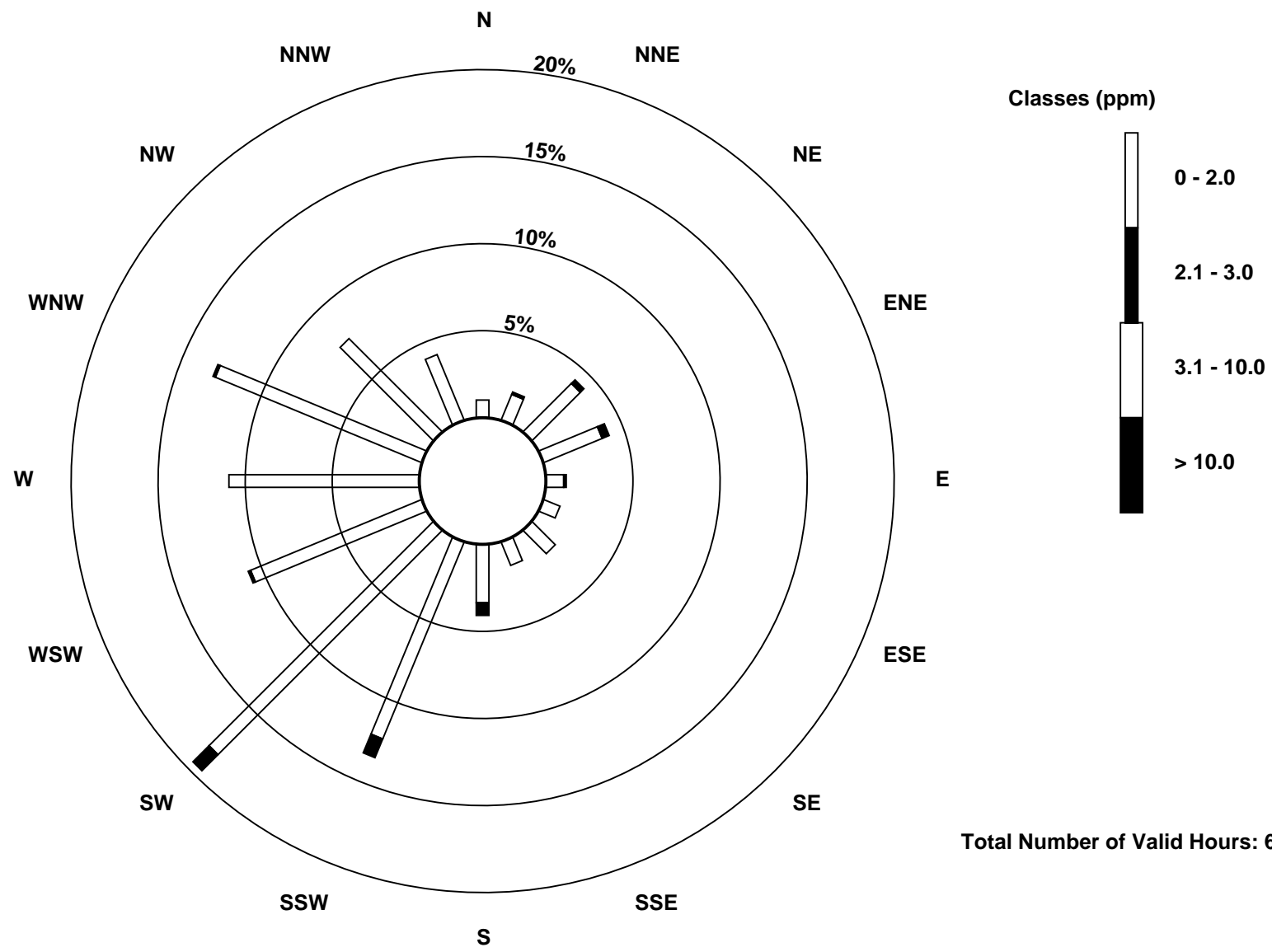
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

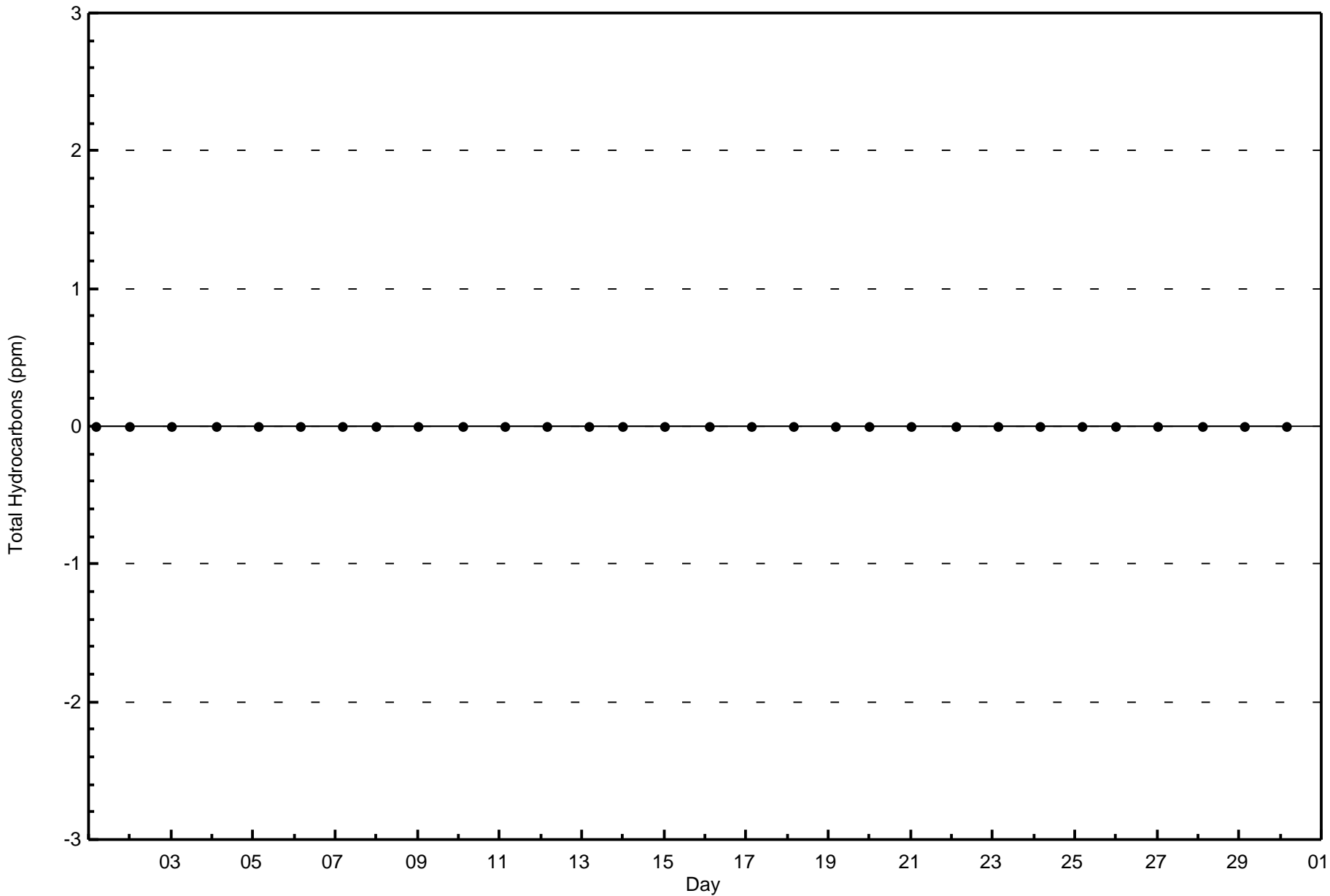
Total Hydrocarbons (THC) - ppm
Conklin Lookout (AMS 18)

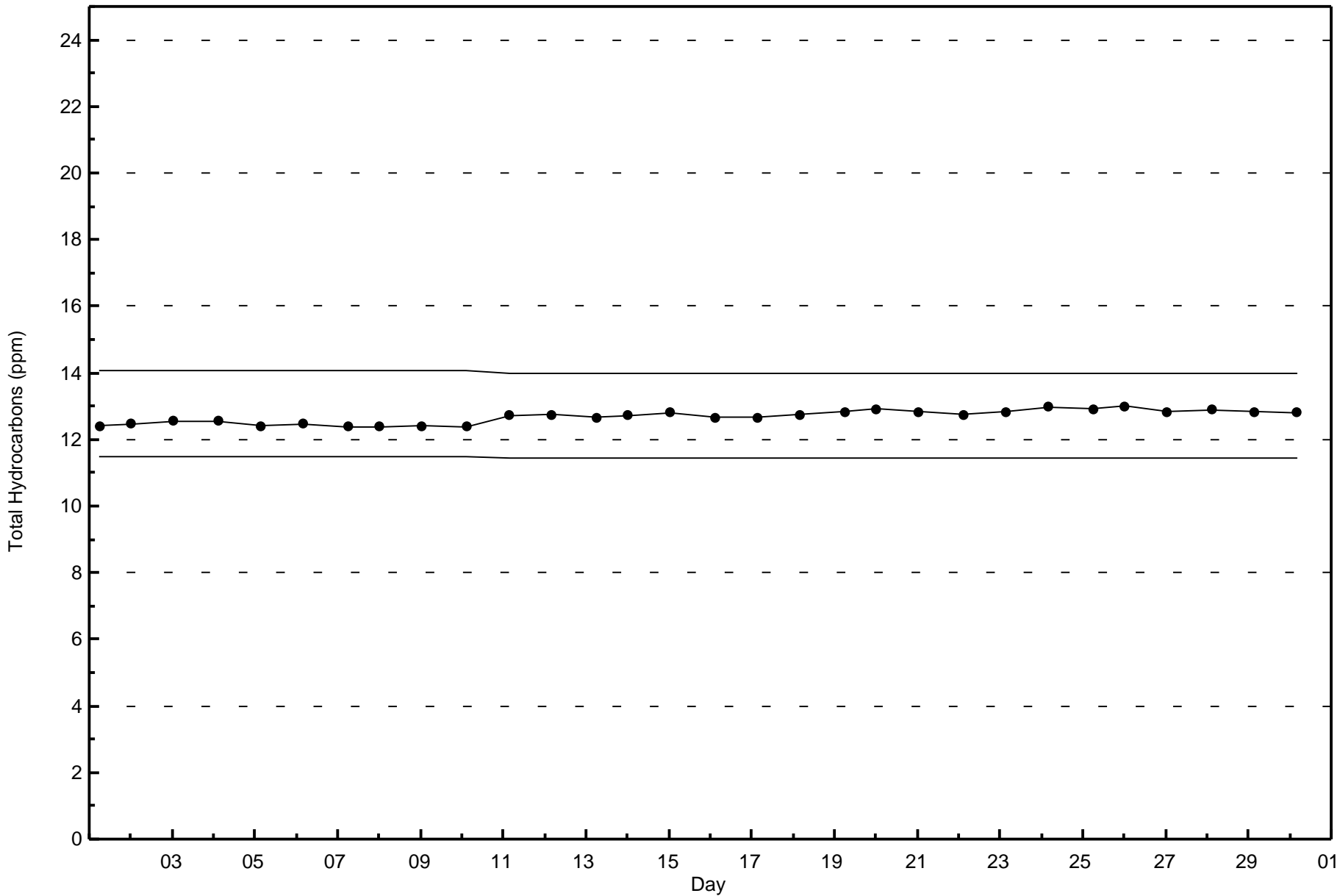




Wood Buffalo Environmental Association
Zero Responses

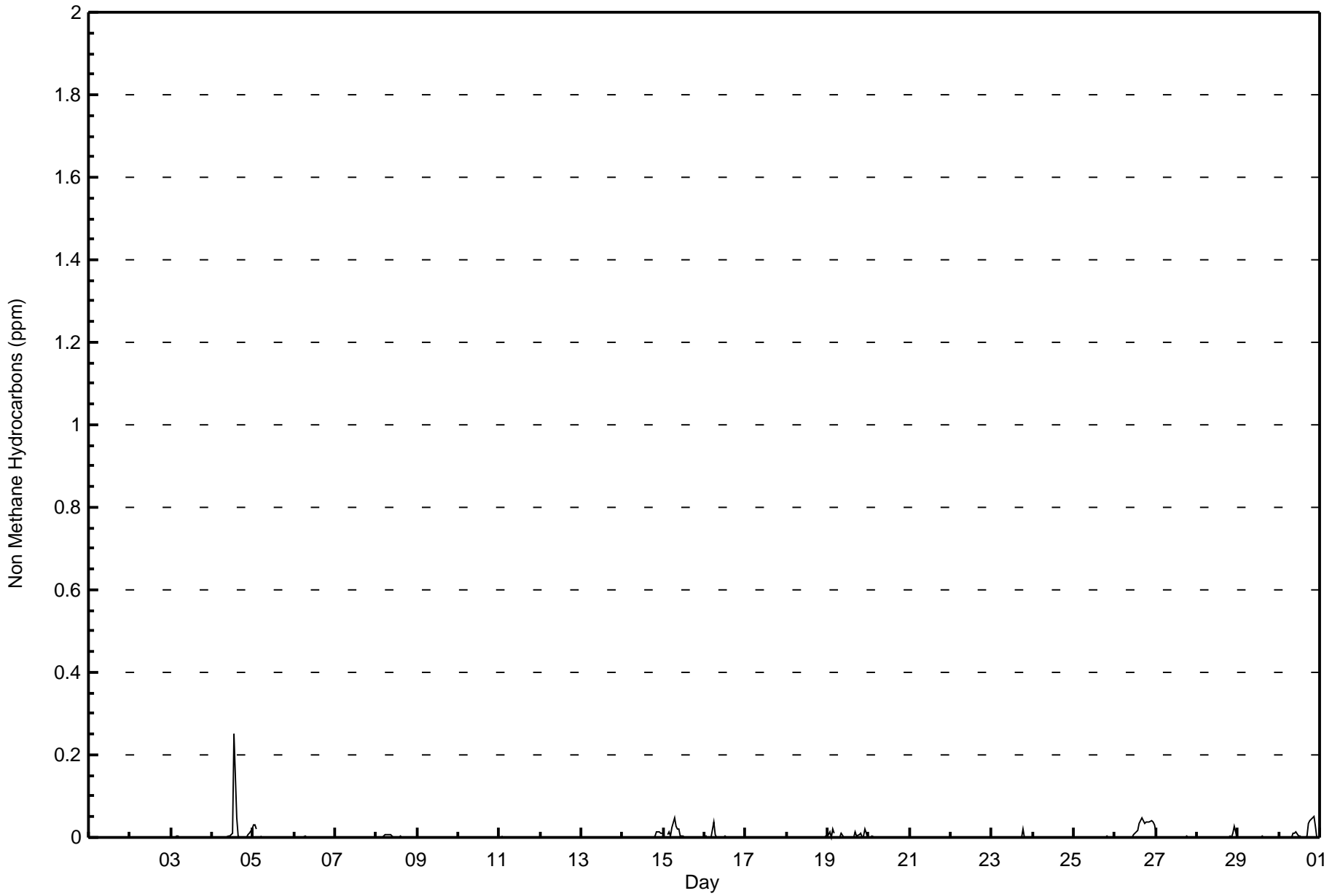
Total Hydrocarbons (THC) - ppm
Conklin Lookout - November 2015







Maximum Value: 0.252 ppm on Nov 4 14:00		Maximum Daily Average: 0.018 ppm on Nov 26		Hours in Service: 720																																																				
Minimum Value: 0.000 ppm on Nov 1 01:00		Minimum Daily Average: 0.000 ppm on Nov 1		Hours of Data: 686																																																				
Maximum Diurnal Average: 0.009 ppm at hour 14		Minimum Diurnal Average: 0.001 ppm at hour 12		Hours of Missing Data: 34																																																				
Monthly Average: 0.002 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0		Hours of Calibration: 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-Nov	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
2-Nov	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
3-Nov	0.001	Z	0.000	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
4-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.003	0.003	0.006	0.009	0.252	0.048	0.002	0.001	0.000	0.000	0.000	0.000	0.002	0.006	0.011	0.022											0.016	0.252																			
5-Nov	0.031	0.030	0.021	Z	0.003	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.031																				
6-Nov	0.000	0.000	0.000	0.000	Z	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002																				
7-Nov	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																				
8-Nov	Z	0.000	0.001	0.000	0.003	0.008	0.007	0.008	0.006	0.005	0.000	0.000	0.000	0.001	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.008																				
9-Nov	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
10-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																				
11-Nov	0.001	0.001	0.002	Z	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002																				
12-Nov	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
13-Nov	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	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																				
14-Nov	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.012	0.014	0.010	0.011									0.002	0.014																				
15-Nov	0.011	Z	0.008	0.015	0.003	0.025	0.048	0.028	0.020	0.021	0.005	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.048																			
16-Nov	0.002	0.002	Z	0.000	0.000	0.037	0.008	0.000	0.000	0.000	0.000	0.000	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.037																				
17-Nov	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
18-Nov	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003																				
19-Nov	0.005	0.013	0.000	0.022	0.011	Z	0.000	0.000	0.012	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.012	0.005	0.006	0.009	0.001	0.004	0.021	0.000										0.005	0.022																				
20-Nov	Z	0.000	0.003	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003																				
21-Nov	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
22-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
23-Nov	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																				
24-Nov	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002																				
25-Nov	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
26-Nov	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.006	0.013	0.018	0.035	0.040	0.049	0.035	0.037	0.036	0.036	0.040	0.037	0.030										0.018	0.049																				
27-Nov	0.013	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																					
28-Nov	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002																				
29-Nov	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
30-Nov	0.000	0.000	0.002	0.000	Z	0.000	0.000	0.000	0.009	0.011	0.012	0.005	0.005	0.000	0.000	0.001	0.004	0.033	0.041	0.044	0.050	0.028	0.001	0.000											0.011	0.050																				
																												0.003	0.002	0.002	0.002	0.001	0.003	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.004	0.003	0.004	0.004	0.004	0.004	0.002	Diurnal Average	
																												0.031	0.030	0.021	0.022	0.011	0.037	0.048	0.028	0.020	0.021	0.012	0.006	0.013	0.252	0.048	0.040	0.049	0.035	0.041	0.044	0.050	0.040	0.037	0.030	Diurnal Maximum				
Z - zerospan C - Calibration																																																								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Lookout - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	625	91.11	91.11
0.006 - 0.05	60	8.75	99.85
0.06 - 0.1	0	0.00	99.85
> 0.1	1	0.15	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



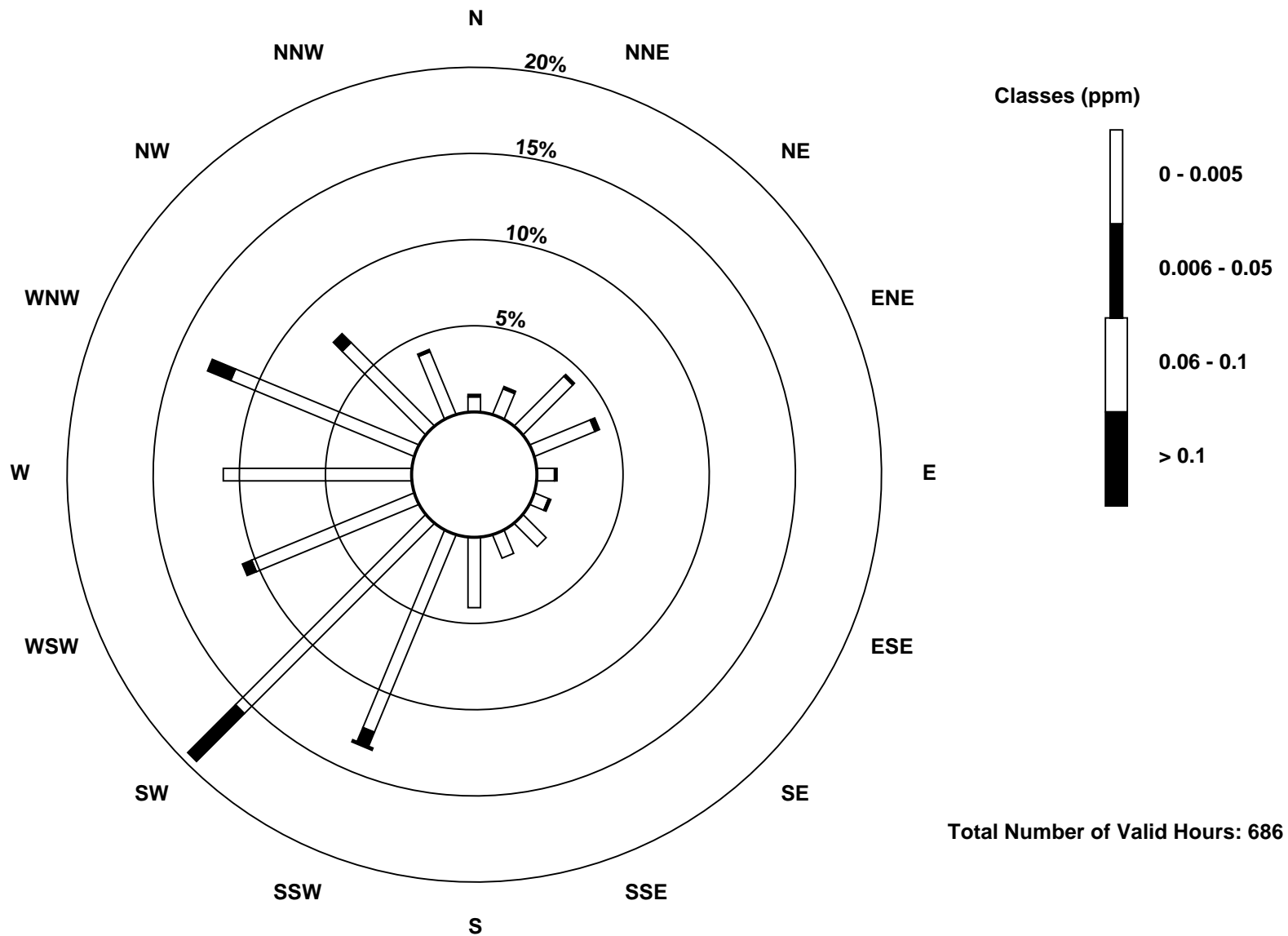
Wood Buffalo Environmental Association
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Lookout - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	6	11	28	26	7	6	13	10	28	85	107	70	75	79	47	27	625
0.006 - 0.05	1	1	1	2	1	1	0	0	0	6	27	4	0	10	5	1	60
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Totals	7	12	29	28	8	7	13	10	28	92	134	74	75	89	52	28	686

Total Number of Valid Hours: 686

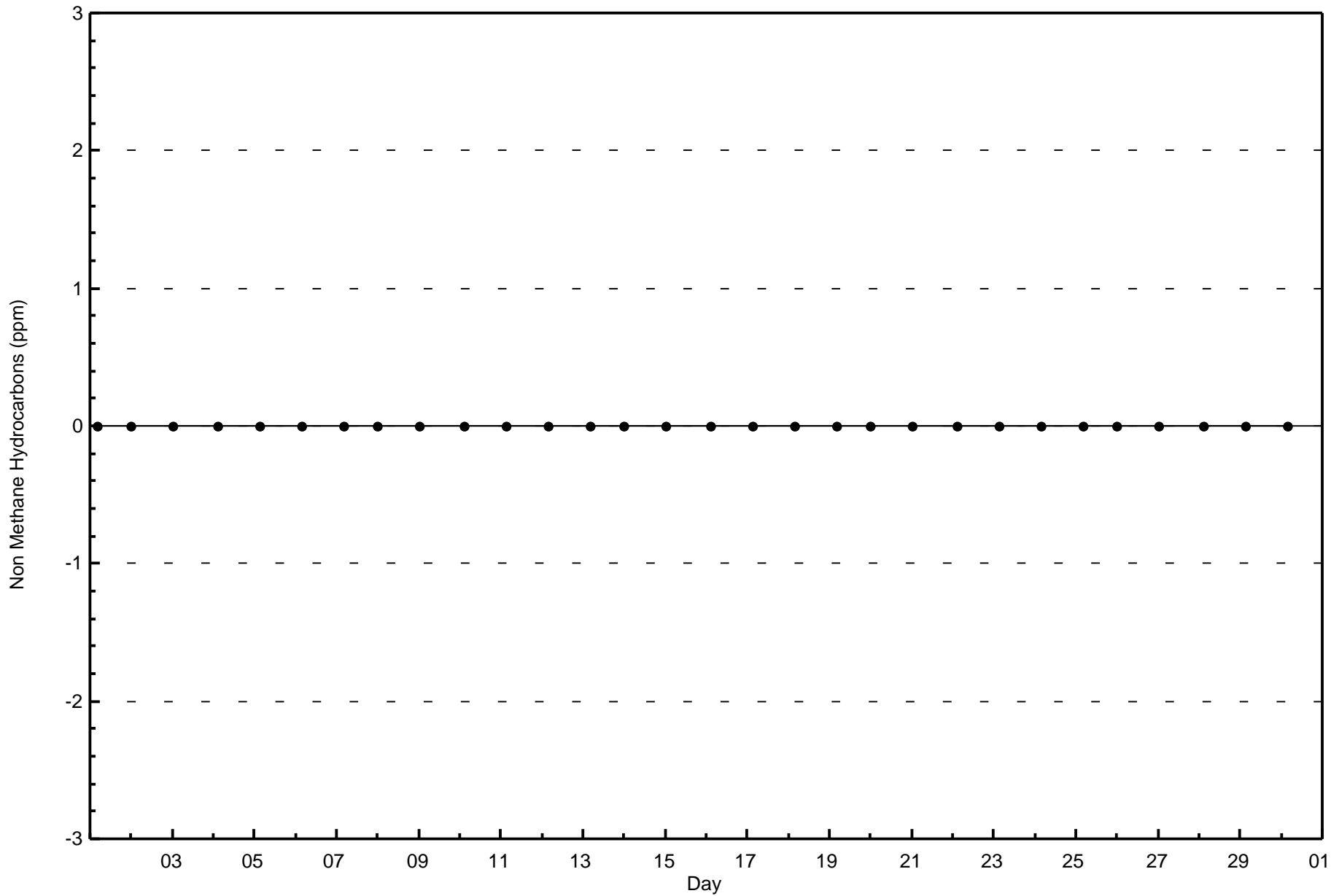
Total Number of Hours: 720

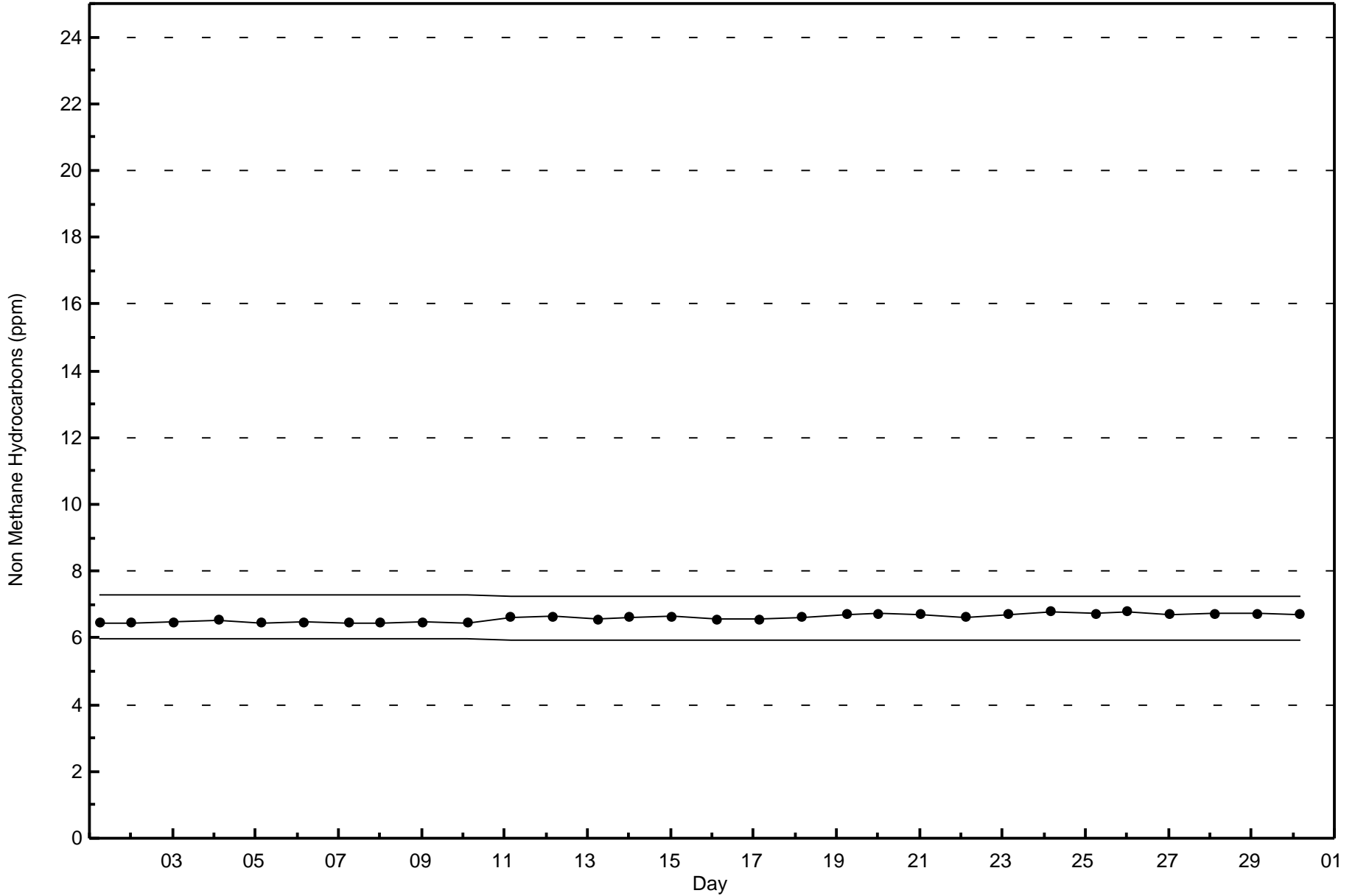


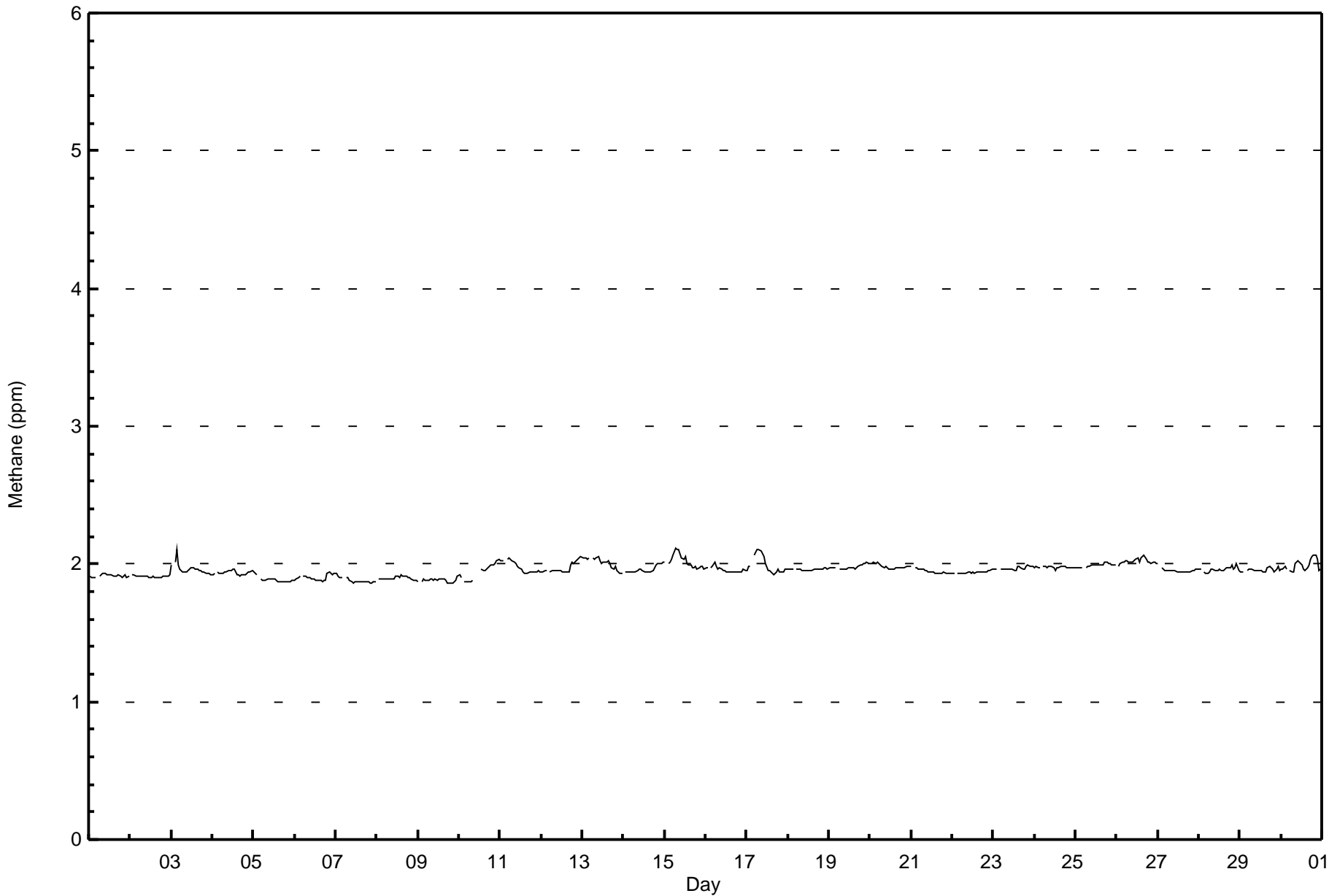


Wood Buffalo Environmental Association
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Lookout - November 2015









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Conklin Lookout - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	666	97.08	97.08
2.1 - 3.0	20	2.92	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Conklin Lookout - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	7	11	27	26	7	7	13	10	23	87	130	74	75	89	52	28	666
2.1 - 3.0	0	1	2	2	1	0	0	0	5	5	4	0	0	0	0	0	20
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	7	12	29	28	8	7	13	10	28	92	134	74	75	89	52	28	686

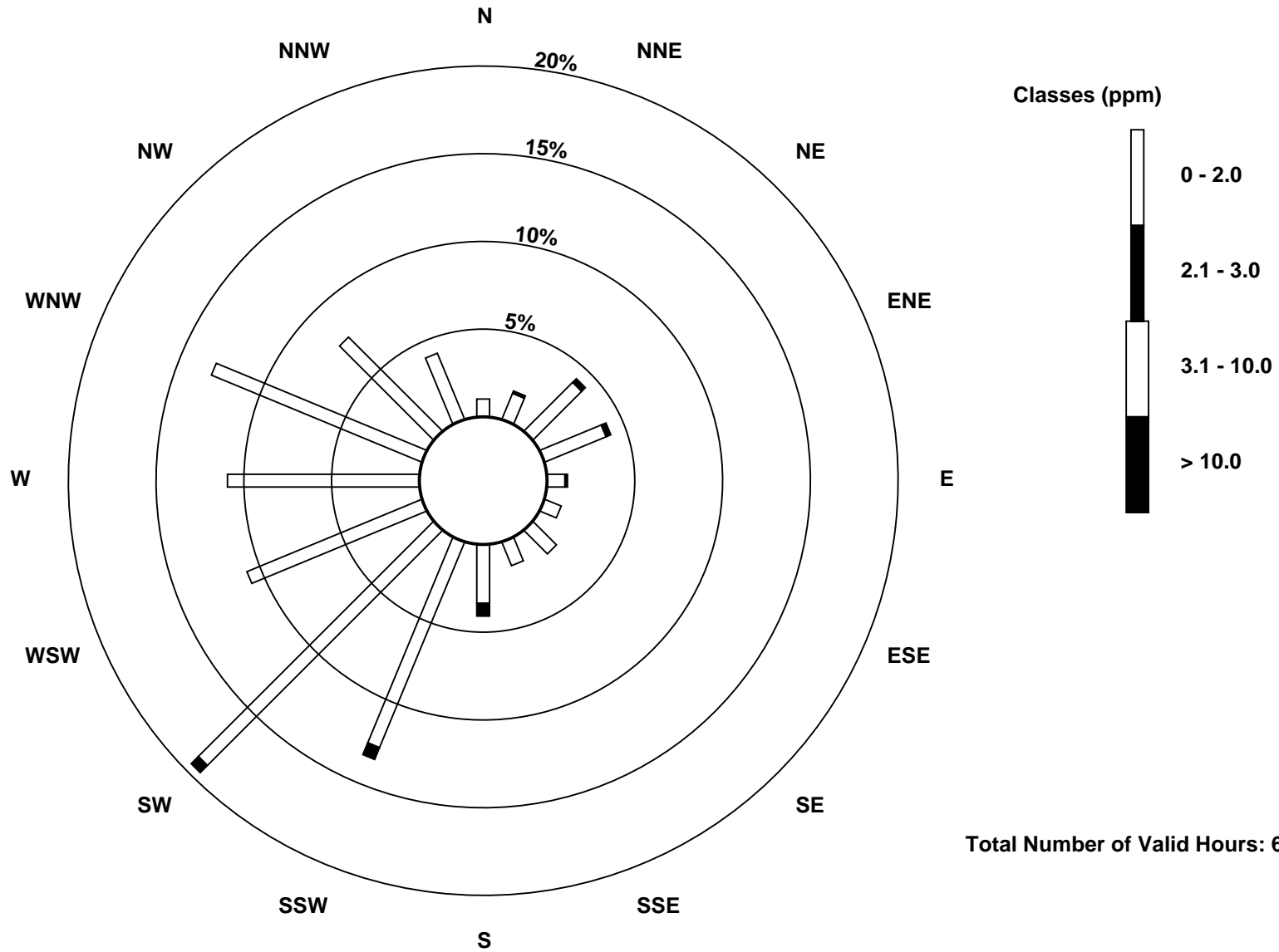
Total Number of Valid Hours: 686

Total Number of Hours: 720

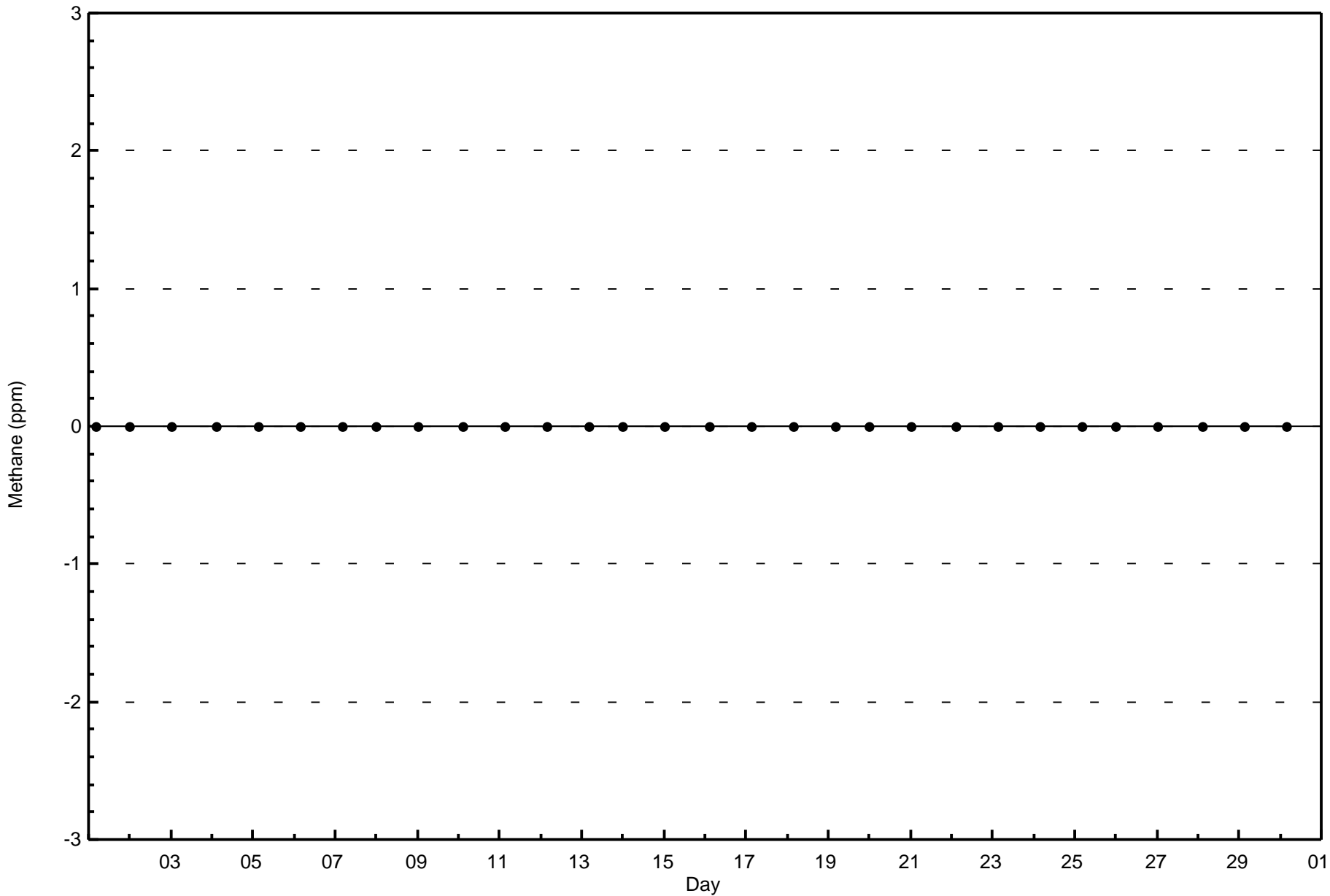


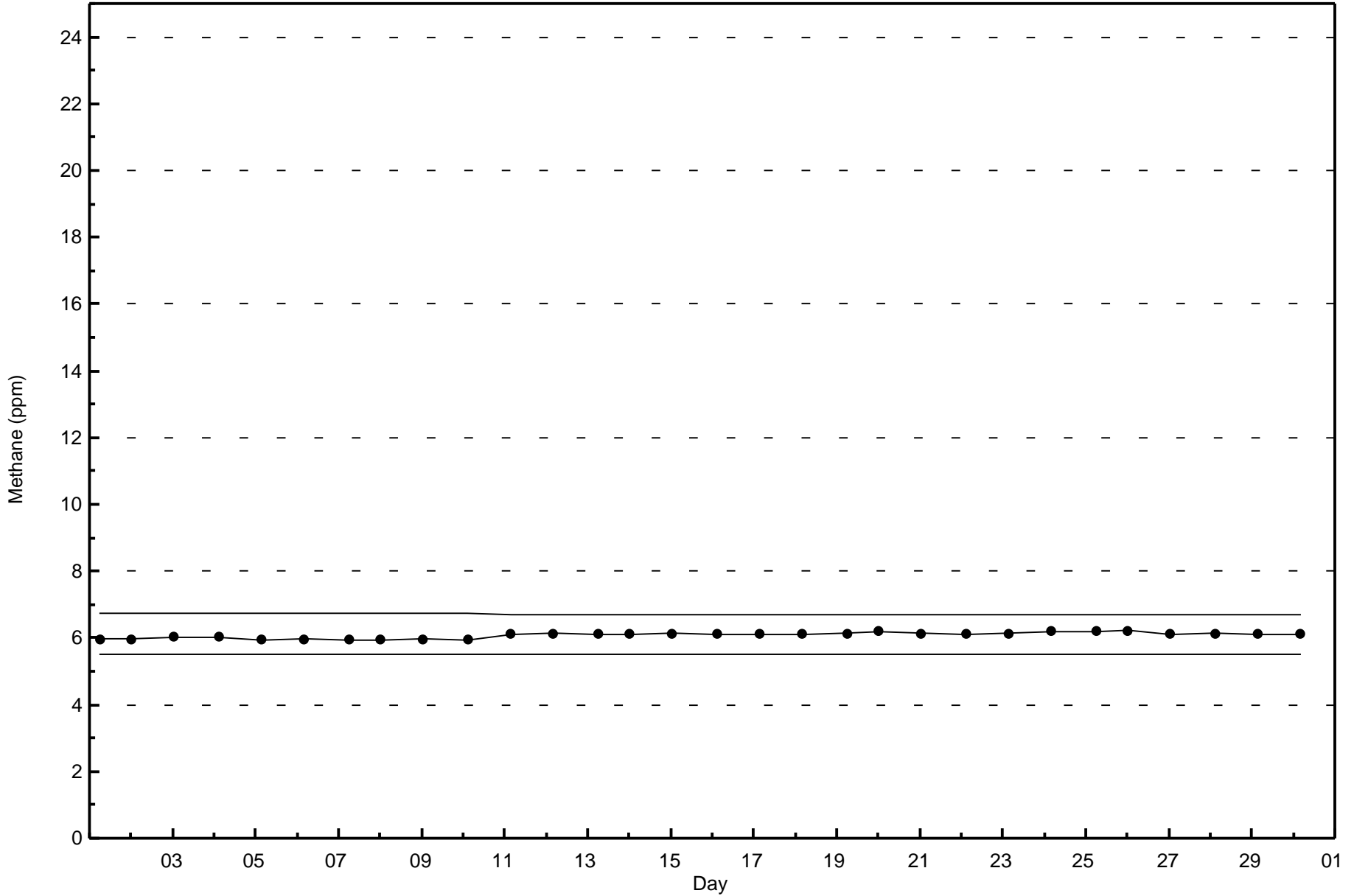
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Methane (CH₄) - ppm
Conklin Lookout (AMS 18)



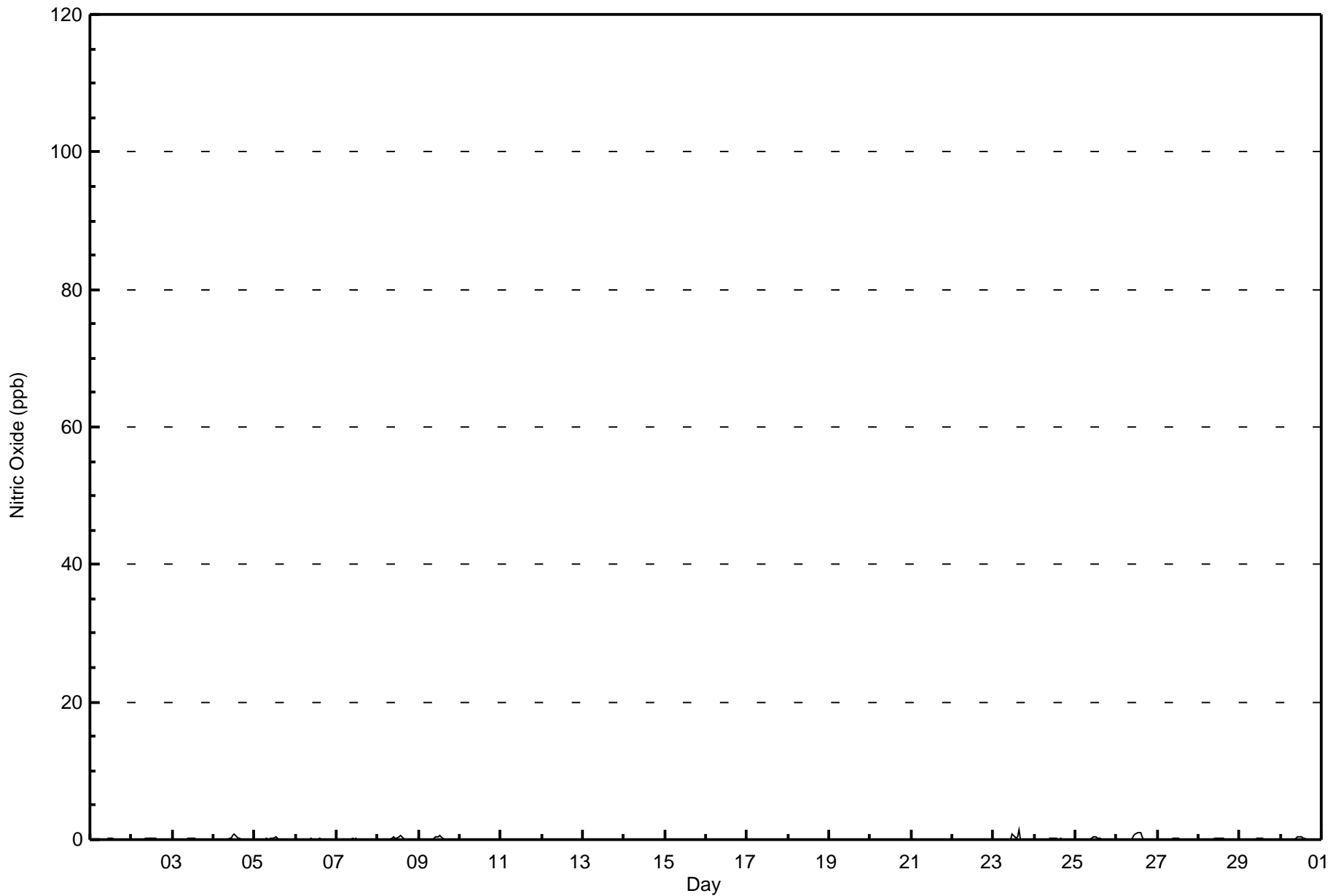
Total Number of Valid Hours: 686







Maximum Value: 1 ppb on Nov 23 16:00																	Maximum Daily Average: 0.3 ppb on Nov 26																	Hours in Service: 720	
Minimum Value: 0 ppb on Nov 2 18:00																	Minimum Daily Average: 0.0 ppb on Nov 22																	Hours of Data: 437	
Maximum Diurnal Average: 0.3 ppb at hour 13																	Minimum Diurnal Average: 0.0 ppb at hour 24																	Hours of Missing Data: 283	
Monthly Average: 0.1 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																	Hours of Calibration: 24	
																	Percent Operational Time: 64.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
2-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
3-Nov	0	Z	0	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-Nov	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1									
5-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
6-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
8-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1									
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
10-Nov	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0									
11-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
12-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
13-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
14-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
15-Nov	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-Nov	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-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
18-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
19-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
20-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--									
21-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	0									
22-Nov	0	0	Z	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-Nov	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1									
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
26-Nov	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1									
27-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
28-Nov	0	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									
29-Nov	0	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									
30-Nov	0	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									
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan C - Calibration AF - Analyzer Failure																																			





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	437	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: 437

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitric Oxide (NO) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	11	23	17	7	6	12	9	8	48	81	44	60	54	32	18	437
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	7	11	23	17	7	6	12	9	8	48	81	44	60	54	32	18	437

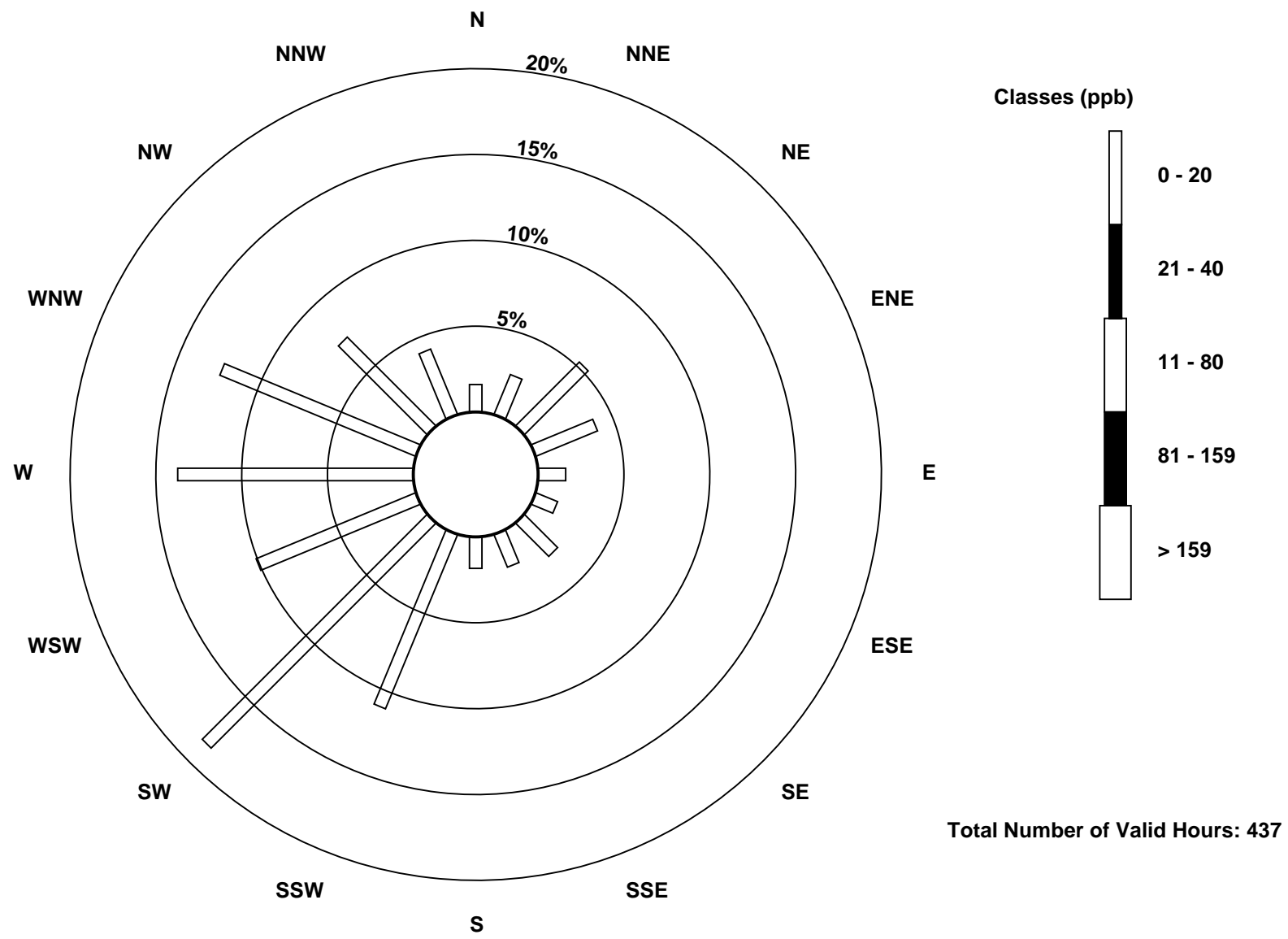
Total Number of Valid Hours: 437

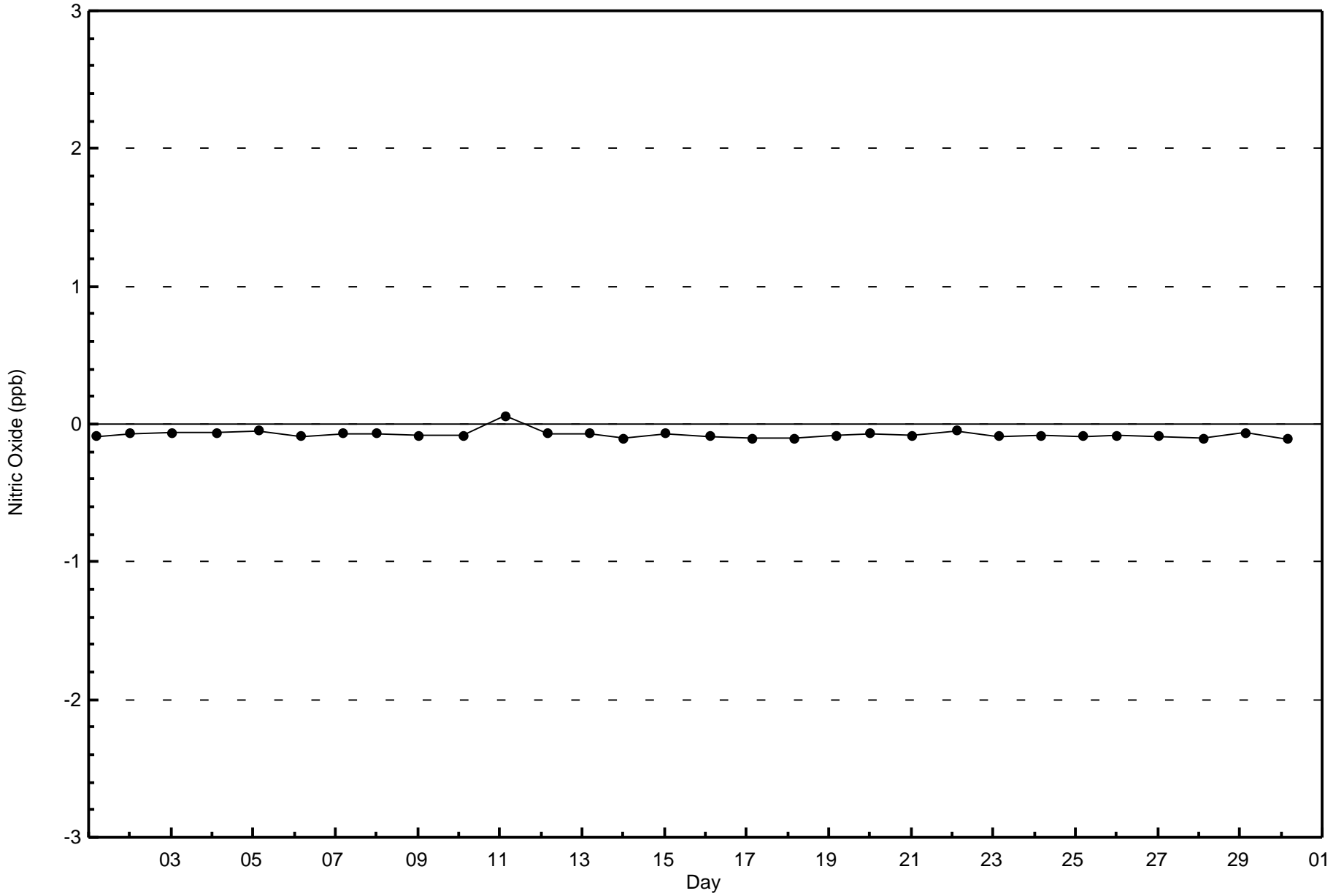
Total Number of Hours: 720

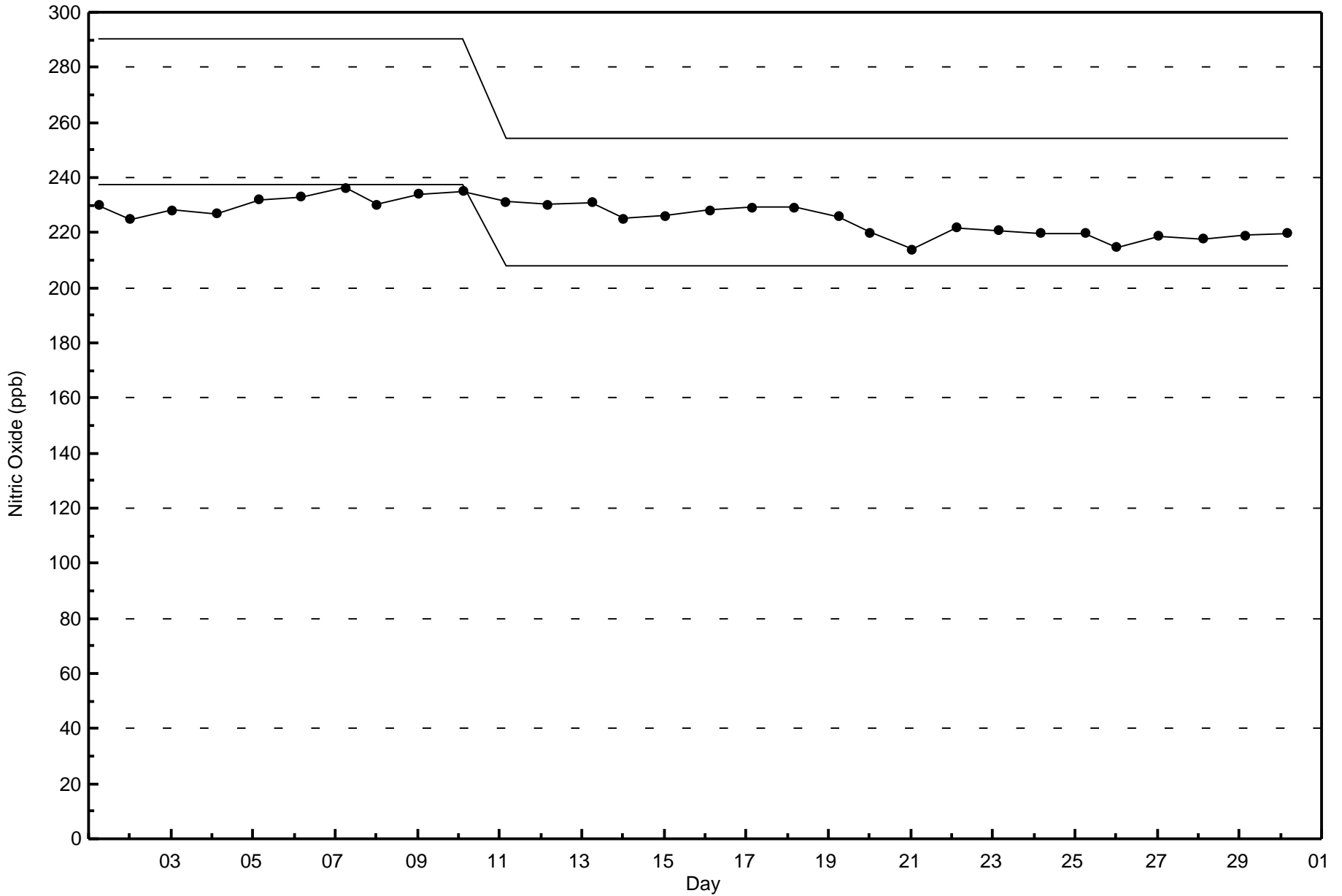


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitric Oxide (NO) - ppb
Conklin Lookout (AMS 18)







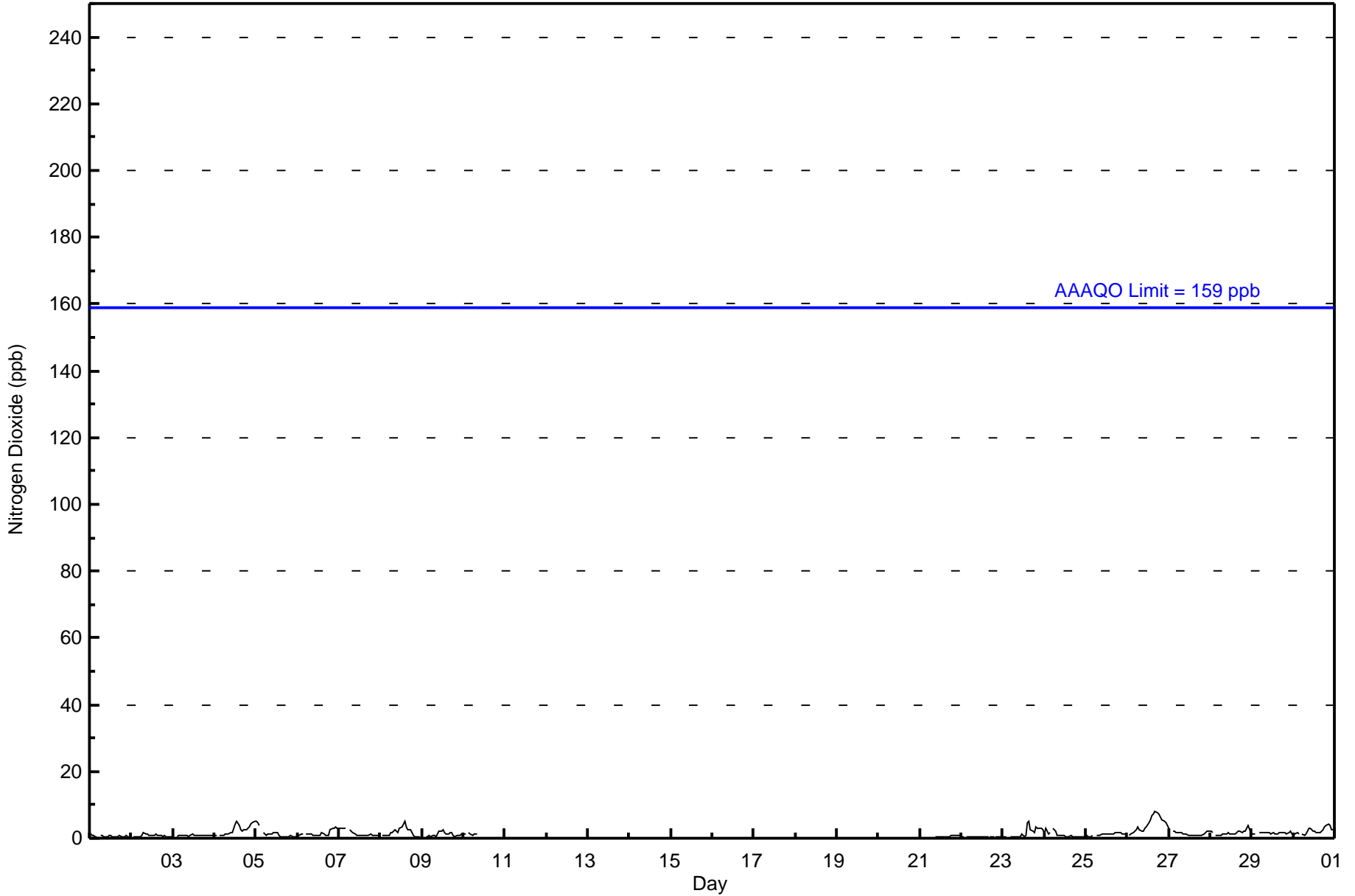


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Nov 26 17:00	Maximum Daily Average: 4.3 ppb on Nov 26		Hours of Data:	437
Minimum Value: 0 ppb on Nov 22 17:00	Minimum Daily Average: 0.4 ppb on Nov 22		Hours of Missing Data:	283
Maximum Diurnal Average: 1.8 ppb at hour 15	Minimum Diurnal Average: 1.1 ppb at hour 5		Hours of Calibration:	24
Monthly Average: 1.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 2 P ₉₀ = 3 P ₉₉ = 7		Percent Operational Time:	64.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	1	1	1	1	1	Z	1	1	1	0	1	1	1	1	0	1	0	1	0	0	1	1	0	0	0.6	1
2-Nov	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0.8	2
3-Nov	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
4-Nov	1	1	Z	1	1	1	1	1	1	2	2	3	4	5	4	3	2	3	3	3	3	4	5	5	2.5	5
5-Nov	5	5	4	Z	2	1	1	1	1	1	2	2	2	1	1	1	1	1	0	1	1	1	1	1	1.4	5
6-Nov	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	3	3	3	3	1.5	3
7-Nov	3	3	3	3	3	Z	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	3
8-Nov	Z	1	1	1	1	1	2	2	3	2	2	3	4	4	5	4	3	3	2	1	1	0	0	0	1.9	5
9-Nov	0	Z	0	1	1	1	1	1	1	1	2	2	3	2	1	1	2	2	1	1	1	1	1	1	1.2	3
10-Nov	1	1	Z	2	1	1	1	1	1	1	C	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2
11-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
12-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
13-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
14-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
15-Nov	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-Nov	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-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
18-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
19-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
20-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
21-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	--	1
22-Nov	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.4	1
23-Nov	1	0	0	Z	0	0	0	0	0	0	0	1	1	1	5	5	2	2	2	3	3	3	3	3	1.6	5
24-Nov	1	3	1	2	Z	3	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1.0	3
25-Nov	1	0	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1.1	2
26-Nov	Z	1	1	2	2	3	3	3	2	2	3	4	5	5	7	7	8	8	7	6	6	5	5	4	4.3	8
27-Nov	3	Z	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.4	3
28-Nov	2	2	Z	1	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	3	4	2	1.7	4
29-Nov	1	1	1	Z	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	1	2	2	1	1.5	2
30-Nov	1	1	2	1	Z	1	1	1	2	3	3	2	2	2	2	2	2	2	3	4	4	4	3	2	2.2	4

1.5	1.4	1.3	1.2	1.1	1.2	1.3	1.2	1.2	1.2	1.2	1.3	1.4	1.6	1.5	1.8	1.7	1.6	1.6	1.5	1.7	1.6	1.7	1.7	1.6	Diurnal Average
5	5	4	3	3	3	3	3	3	3	3	3	4	5	5	7	7	8	8	7	6	6	5	5	5	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	437	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: 437

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	11	23	17	7	6	12	9	8	48	81	44	60	54	32	18	437
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	7	11	23	17	7	6	12	9	8	48	81	44	60	54	32	18	437

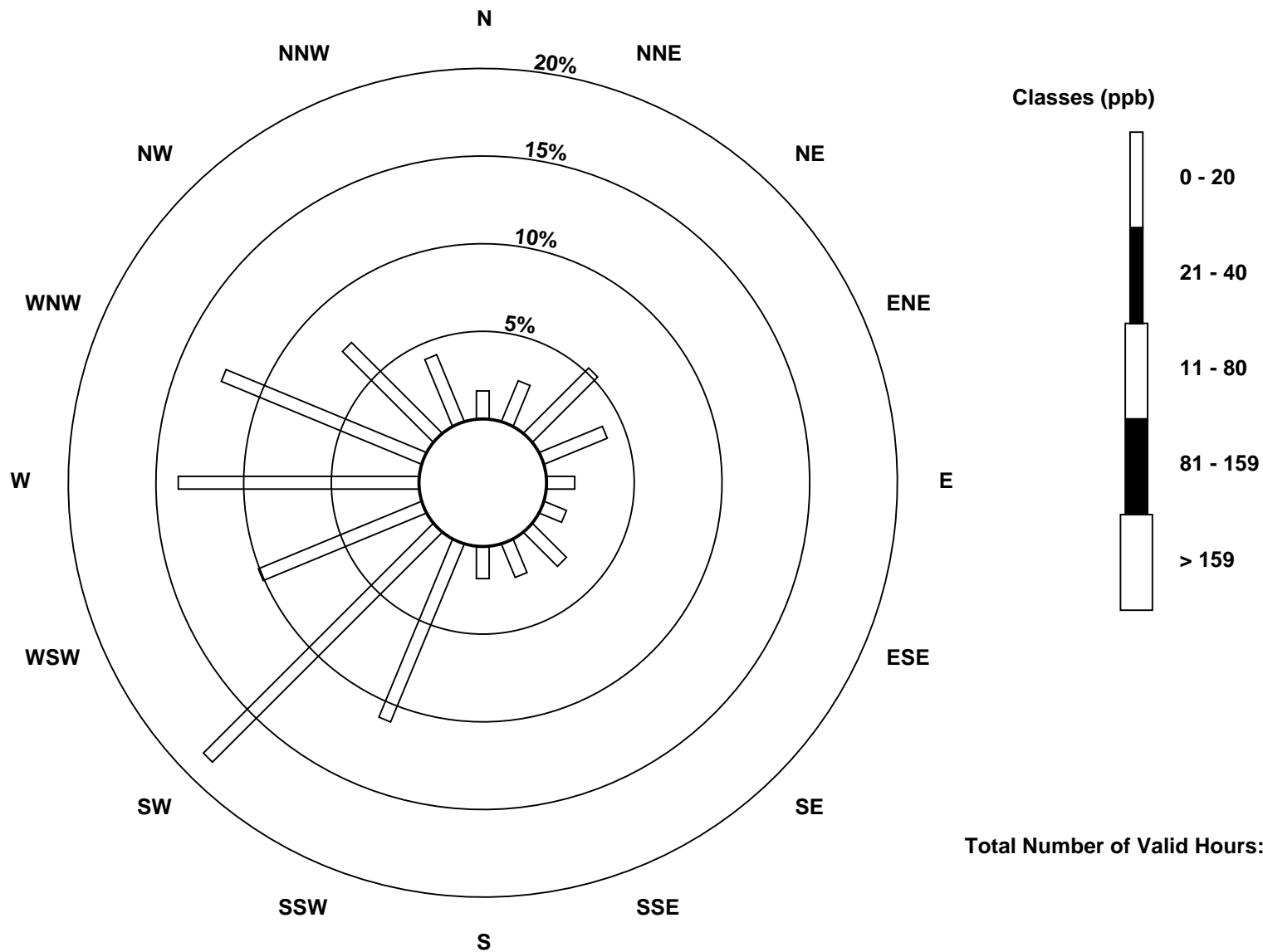
Total Number of Valid Hours: 437

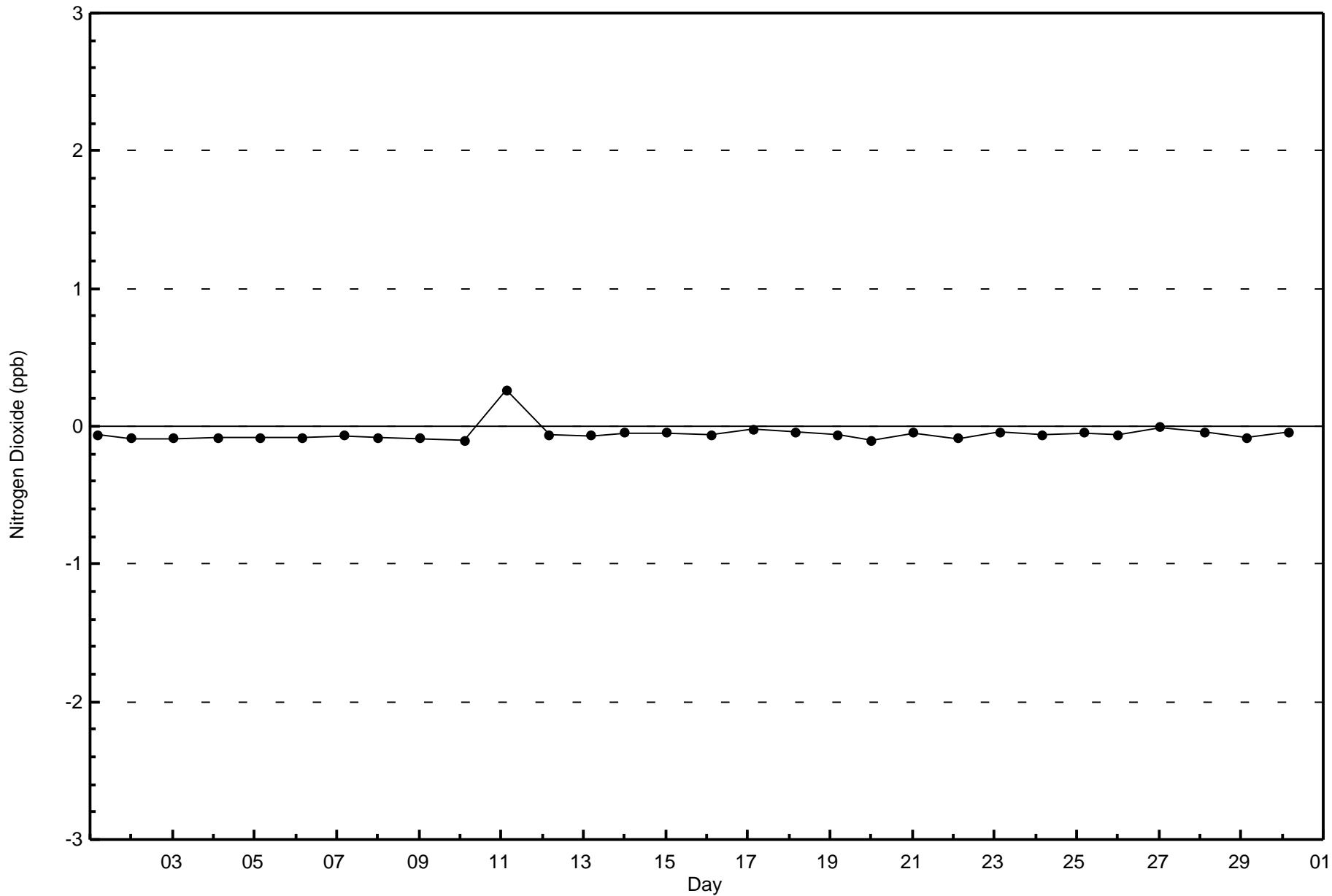
Total Number of Hours: 720

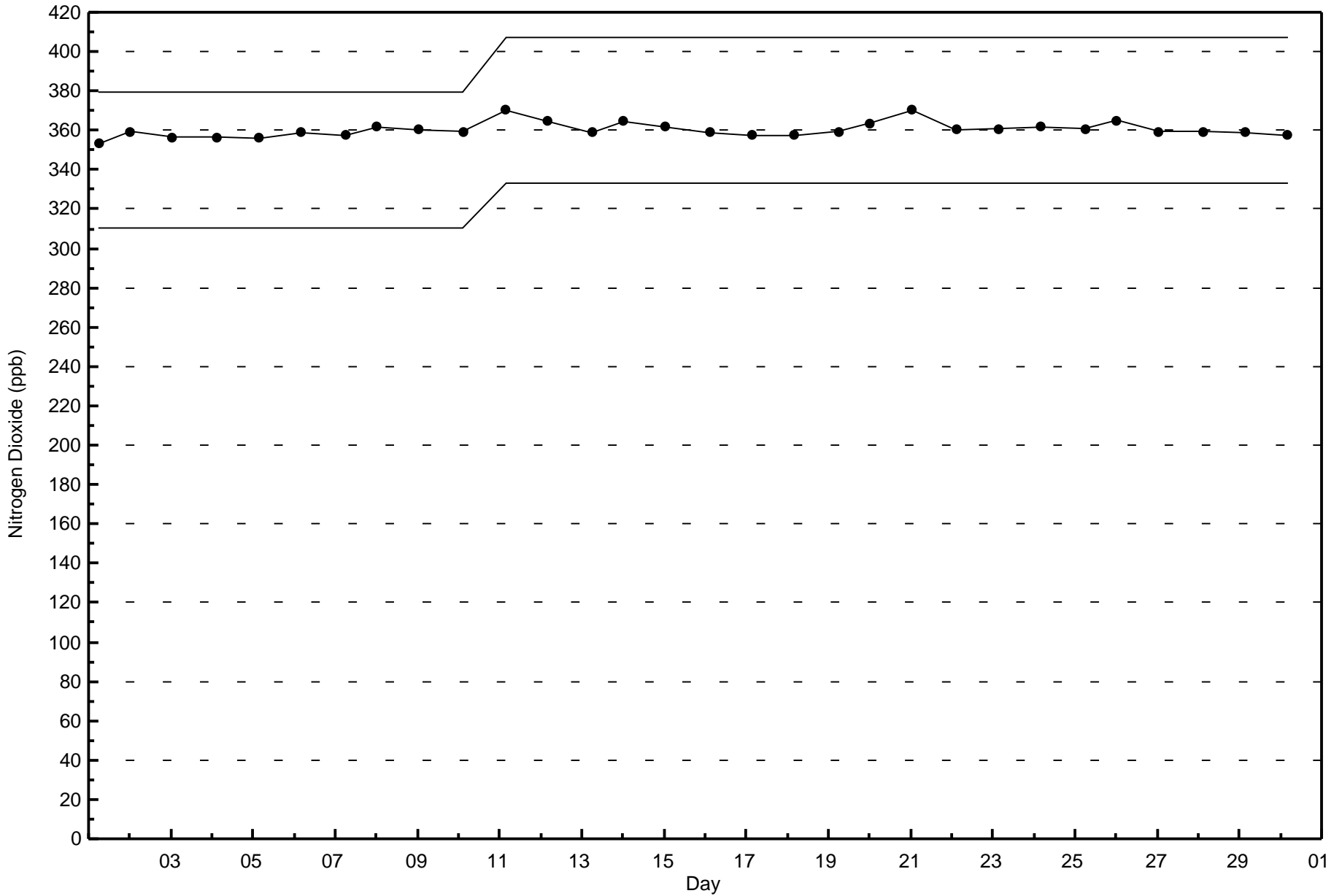


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
Conklin Lookout (AMS 18)







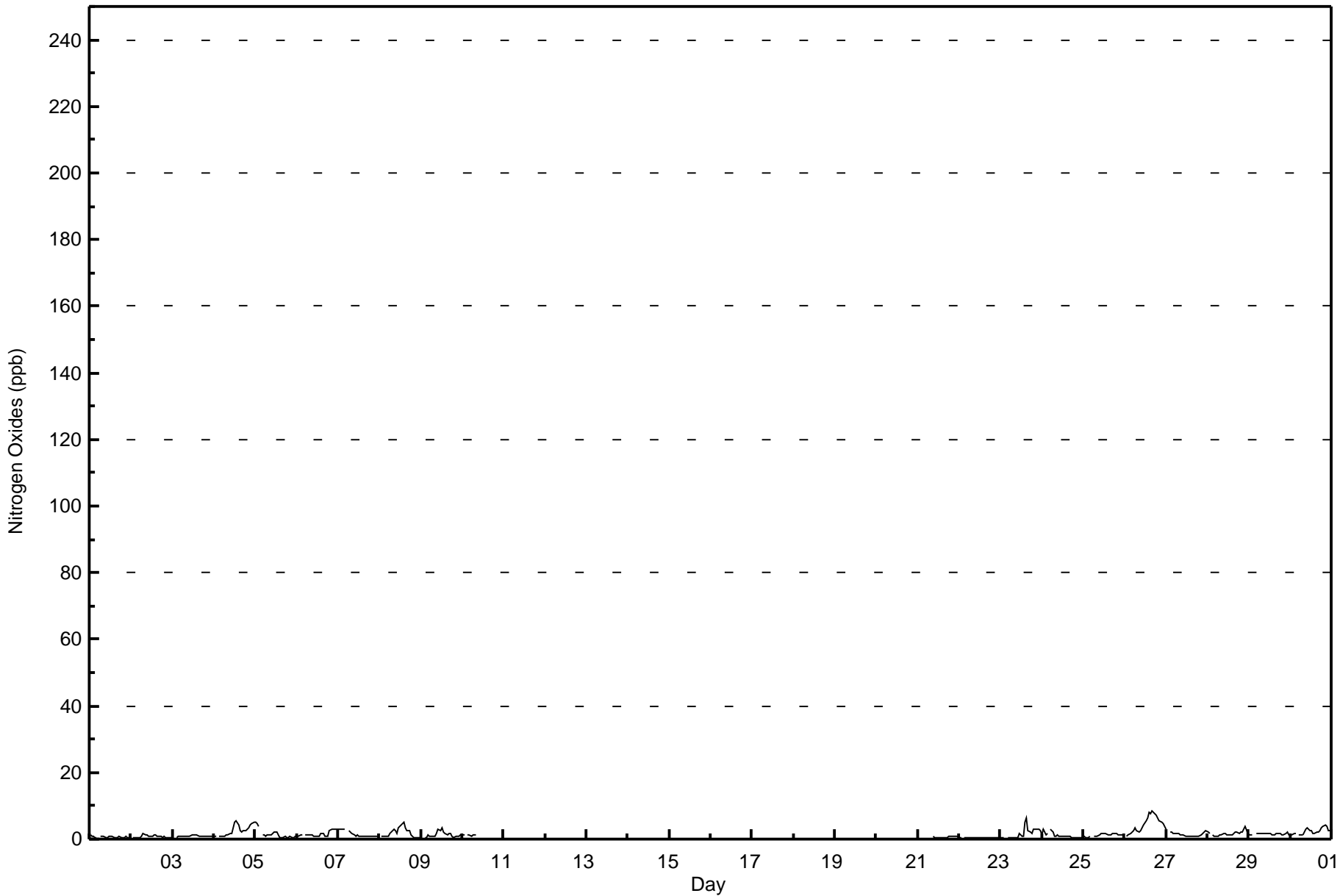


Maximum Value: 8 ppb on Nov 26 17:00	Maximum Daily Average: 4.5 ppb on Nov 26	Hours in Service: 720
Minimum Value: 0 ppb on Nov 22 20:00	Minimum Daily Average: 0.4 ppb on Nov 22	Hours of Data: 437
Maximum Diurnal Average: 2.0 ppb at hour 15	Minimum Diurnal Average: 1.2 ppb at hour 5	Hours of Missing Data: 283
Monthly Average: 1.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 O ₃ = 2 P ₉₀ = 3 P ₉₉ = 7	Hours of Calibration: 24
		Percent Operational Time: 64.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	1	1	1	1	0	Z	1	1	1	0	1	1	1	1	0	1	0	1	0	0	1	1	0	0	0.7	1	
2-Nov	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0.8	2	
3-Nov	0	Z	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	
4-Nov	1	1	Z	1	1	1	1	1	1	2	2	3	5	6	4	3	2	3	3	3	3	4	5	5	2.6	6	
5-Nov	5	5	4	Z	1	1	1	1	1	1	2	2	2	1	1	1	1	1	0	1	1	1	1	1	1.5	5	
6-Nov	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	2	1	1	1	3	3	3	3	3	1.5	3	
7-Nov	3	3	3	3	3	Z	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	3	
8-Nov	Z	1	1	1	1	1	2	2	3	3	2	3	4	5	5	4	3	3	1	1	0	0	0	0	2.0	5	
9-Nov	0	Z	0	1	1	1	1	1	1	2	3	3	3	2	2	1	2	2	1	1	1	1	1	1	1.3	3	
10-Nov	1	1	Z	1	1	1	1	1	1	C	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1	
11-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
12-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
13-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
14-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
15-Nov	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-Nov	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-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
18-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
19-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
20-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
21-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	--	1	
22-Nov	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1	
23-Nov	0	0	0	Z	0	0	0	0	0	0	2	1	1	5	6	3	2	2	3	3	3	3	3	3	1.7	6	
24-Nov	1	3	1	2	Z	3	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1.0	3		
25-Nov	1	0	0	1	1	Z	1	1	1	1	2	2	2	2	1	1	1	2	2	2	1	1	1	1	1.2	2	
26-Nov	Z	1	1	2	2	3	3	3	2	2	3	4	6	6	8	8	8	8	8	7	7	6	5	5	4	4.5	8
27-Nov	3	Z	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.4	3	
28-Nov	2	2	Z	1	1	1	1	1	1	2	2	1	1	1	2	2	2	2	2	2	2	3	4	2	1.7	4	
29-Nov	1	1	1	Z	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	1	1	2	2	1	1.6	2	
30-Nov	1	1	2	2	Z	1	1	1	2	3	3	3	2	2	2	2	2	2	3	4	4	4	3	2	2.3	4	

1.5	1.4	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.5	1.7	1.9	1.8	2.0	1.9	1.7	1.6	1.5	1.7	1.6	1.7	1.7	1.6	1.6	Diurnal Average
5	5	4	3	3	3	3	3	3	3	3	3	4	6	6	8	8	8	8	7	7	6	5	5	5	Diurnal Maximum

Z - zerspan C - Calibration AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	437	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: 437

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	11	23	17	7	6	12	9	8	48	81	44	60	54	32	18	437
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	7	11	23	17	7	6	12	9	8	48	81	44	60	54	32	18	437

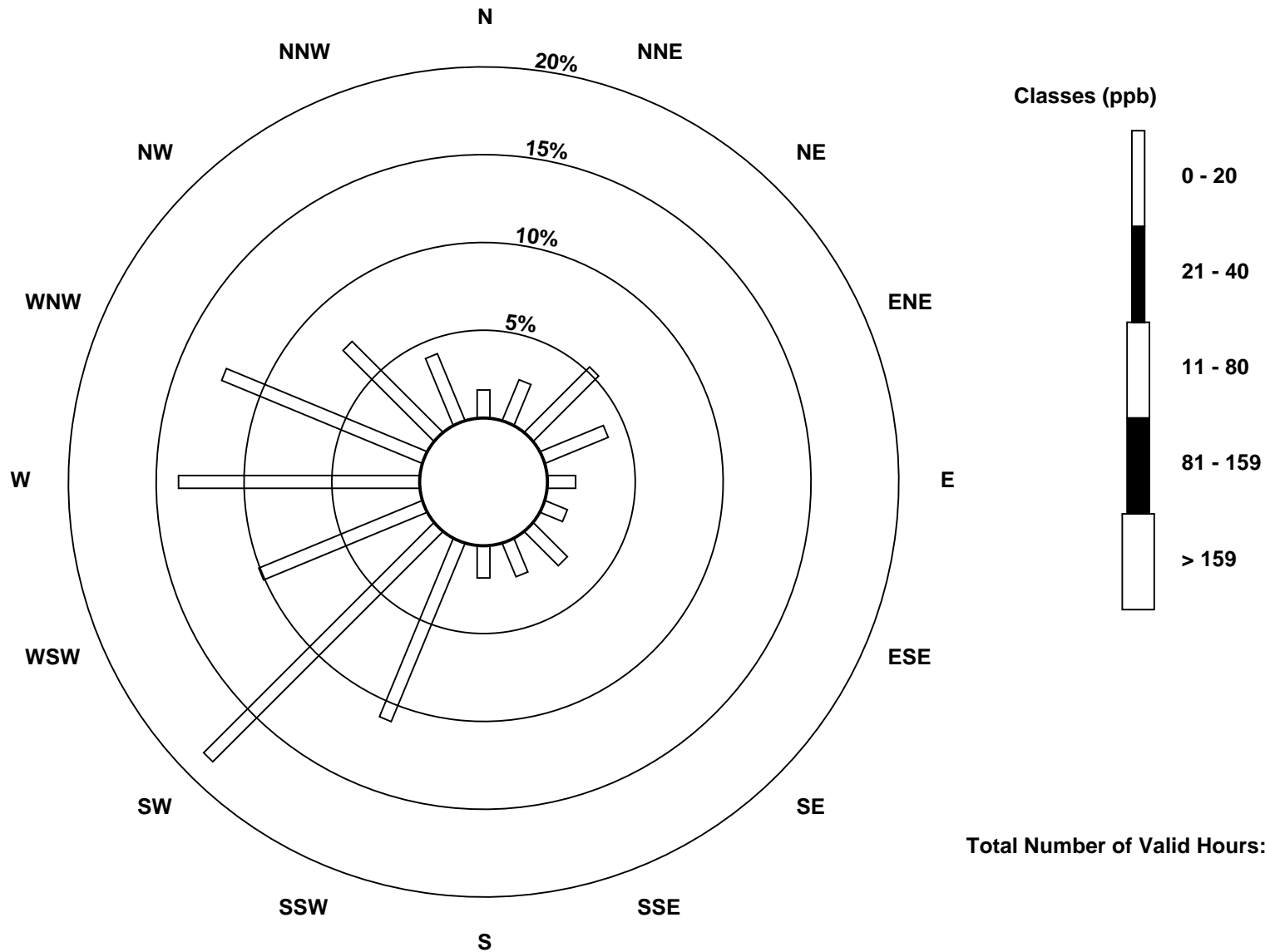
Total Number of Valid Hours: 437

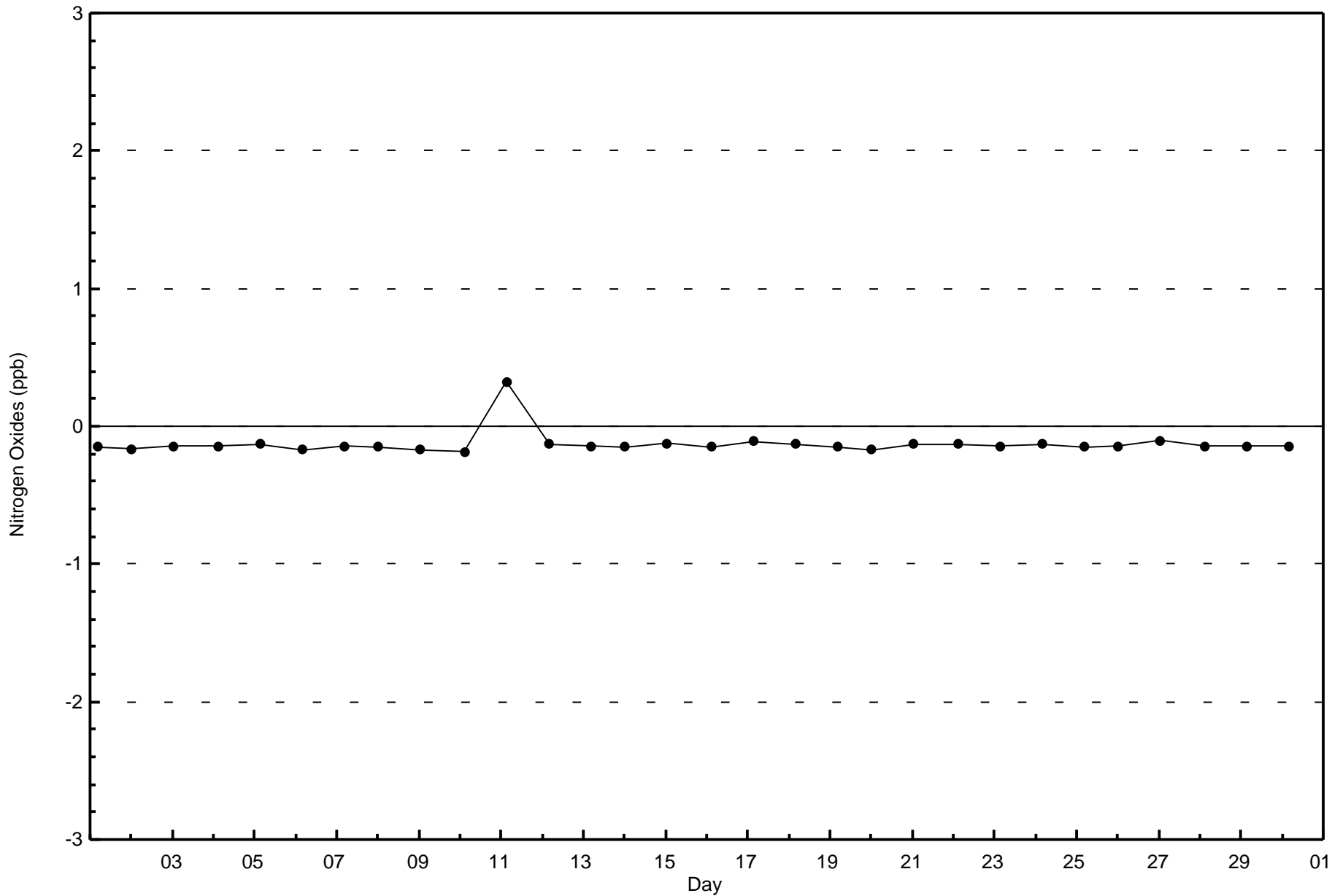
Total Number of Hours: 720

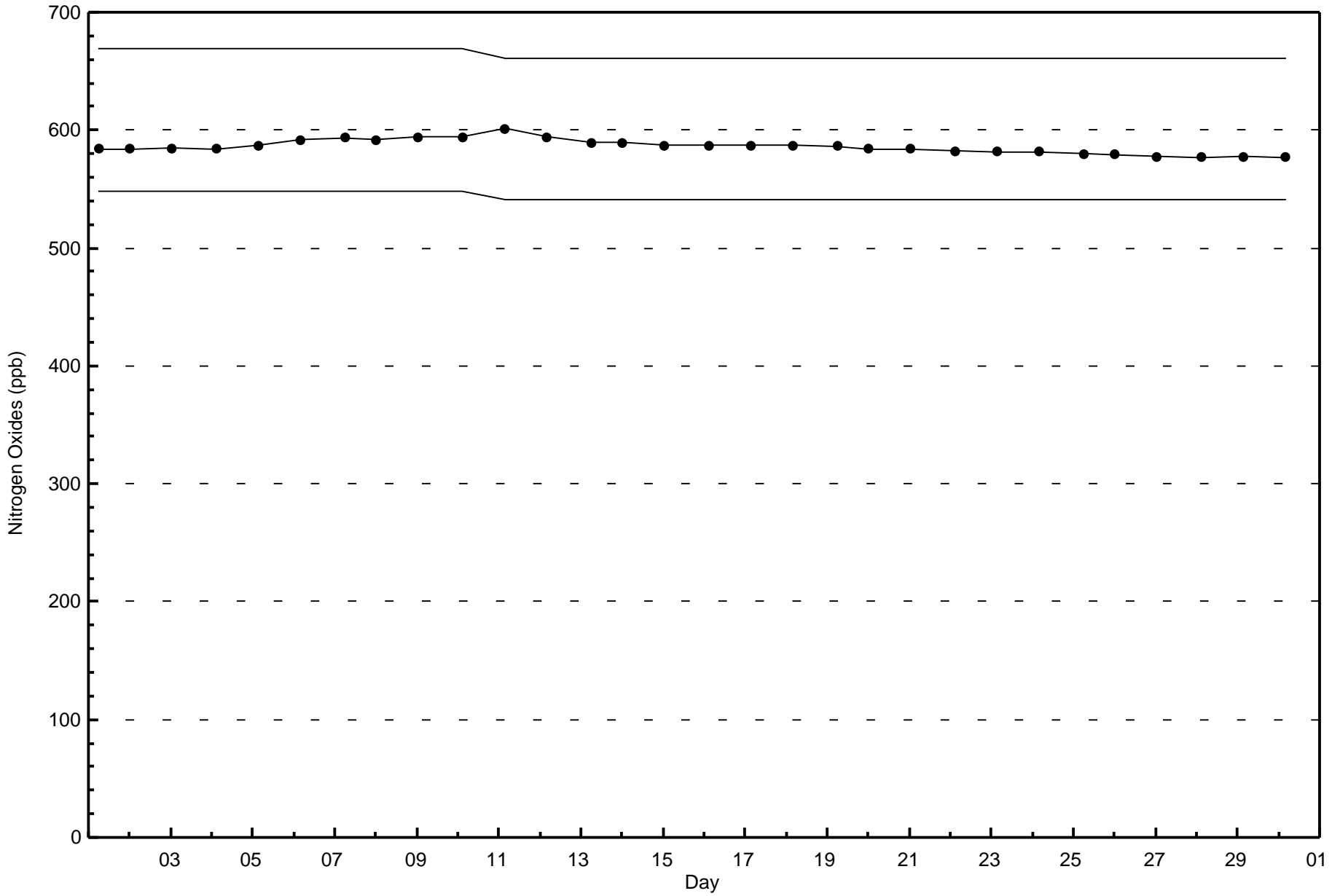


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxides (NO_x) - ppb
Conklin Lookout (AMS 18)







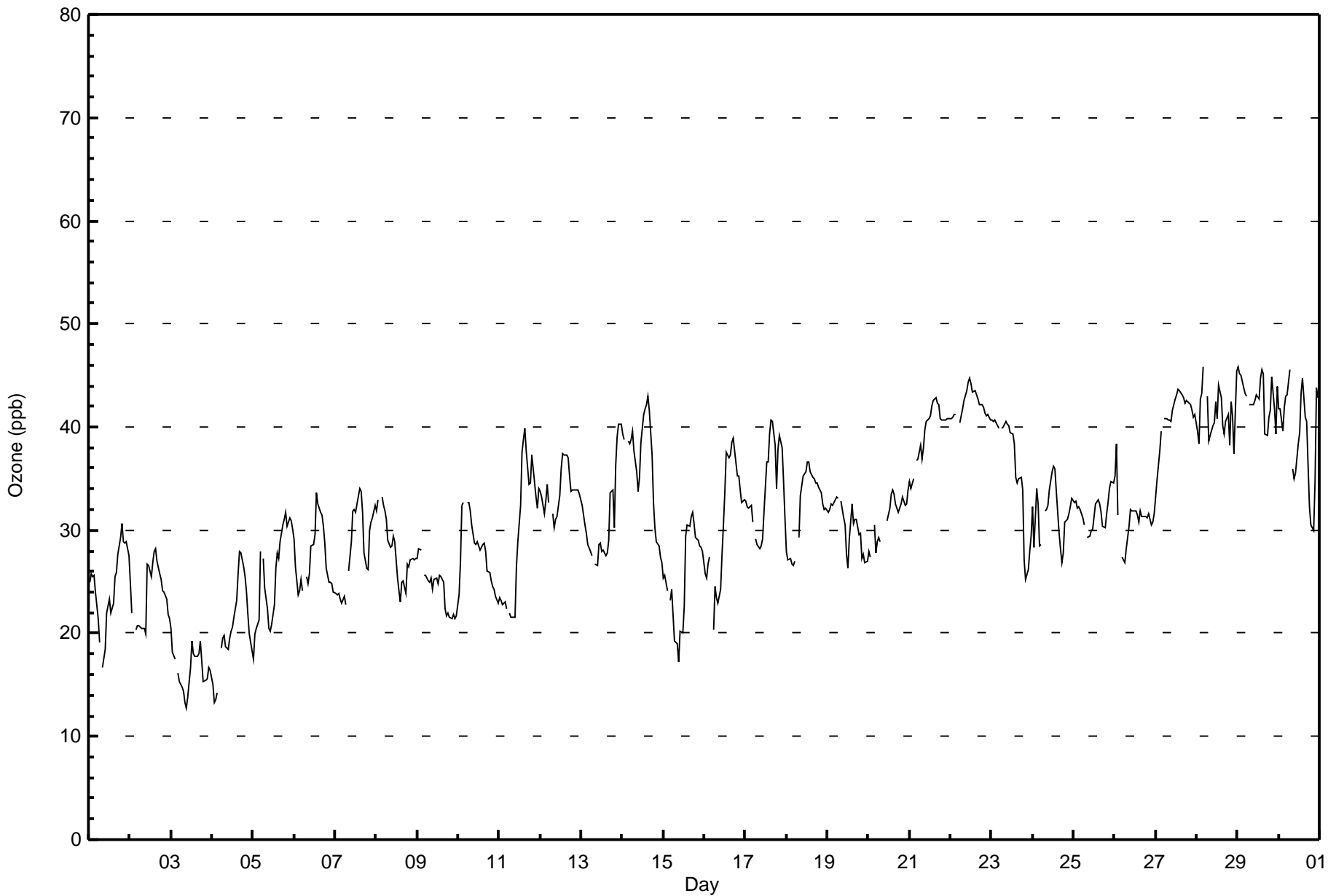


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 46 ppb on Nov 29 01:00	Maximum Daily Average: 42.9 ppb on Nov 29		Hours of Data:	687
Minimum Value: 13 ppb on Nov 3 10:00	Minimum Daily Average: 16.5 ppb on Nov 3		Hours of Missing Data:	33
Maximum Diurnal Average: 33.8 ppb at hour 15	Minimum Diurnal Average: 29.2 ppb at hour 9		Hours of Calibration:	33
Monthly Average: 31.3 ppb	Percentiles: P ₁ = 15 P ₁₀ = 22 Q ₁ = 26 Median = 31 Q ₃ = 37 P ₉₀ = 42 P ₉₉ = 45		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	25	26	25	26	24	21	19	Z	17	18	22	23	23	22	23	25	26	28	29	31	29	29	29	27	24.7	31
2-Nov	25	22	Z	20	21	21	21	21	20	20	27	27	25	27	28	28	27	26	25	24	24	23	22	21	23.7	28
3-Nov	20	18	17	Z	16	15	15	14	13	13	14	17	19	18	18	18	18	19	17	15	15	16	17	16	16.5	20
4-Nov	15	13	14	14	Z	19	20	20	19	18	20	20	21	22	23	26	28	28	26	25	24	22	20	18	20.6	28
5-Nov	17	20	21	21	28	Z	27	24	22	20	20	21	23	26	28	27	29	31	31	32	30	31	31	30	25.7	32
6-Nov	29	26	24	24	25	24	Z	25	25	26	28	29	30	34	33	32	31	30	29	26	25	25	24	27.3	34	
7-Nov	24	24	24	23	23	24	23	Z	26	29	32	32	32	33	34	34	32	28	26	26	30	31	31	32	28.3	34
8-Nov	32	33	Z	33	32	32	31	29	28	29	29	29	25	24	23	25	25	24	27	26	27	27	27	27	28.1	33
9-Nov	27	28	28	Z	26	26	25	25	25	24	25	25	25	26	25	25	22	22	22	22	21	22	21	22	24.3	28
10-Nov	24	27	32	33	Z	33	33	32	31	29	29	29	28	28	29	29	28	26	26	25	25	24	24	23	28.0	33
11-Nov	23	23	23	23	22	Z	22	22	22	22	26	29	32	38	39	40	38	34	35	37	36	33	32	34	29.8	40
12-Nov	34	33	32	33	34	33	Z	32	30	31	31	33	36	37	37	37	37	35	34	34	34	34	34	34	33.9	37
13-Nov	32	31	30	30	29	28	Z	27	27	29	29	28	28	27	28	29	34	34	30	36	39	40	40	40	31.0	40
14-Nov	39	39	Z	39	38	39	40	38	36	34	35	39	41	42	42	43	42	37	33	30	29	28	27	27	36.3	43
15-Nov	25	26	24	Z	23	24	19	19	19	17	20	20	23	29	31	30	31	32	31	29	29	28	28	28	25.5	32
16-Nov	26	25	27	27	Z	20	25	23	23	24	28	30	34	38	37	37	39	39	36	35	35	34	33	33	30.8	39
17-Nov	33	32	32	32	31	Z	29	29	28	28	29	32	37	37	39	41	41	38	34	38	39	38	35	31	34.0	41
18-Nov	28	27	27	27	27	27	Z	29	33	34	35	36	37	37	36	35	35	35	35	34	34	32	32	32	32.3	37
19-Nov	32	32	33	32	33	33	33	Z	33	31	31	28	26	29	33	31	31	31	30	30	27	28	27	27	30.4	33
20-Nov	28	27	Z	30	28	29	29	29	C	C	C	31	32	33	34	33	33	32	32	33	33	32	33	34	31.3	34
21-Nov	35	34	35	Z	37	37	38	37	38	40	41	41	41	42	43	43	42	42	41	41	41	41	41	41	39.5	43
22-Nov	41	41	41	41	Z	40	41	42	43	44	44	45	44	43	44	43	43	42	42	42	41	41	41	41	42.2	45
23-Nov	41	41	41	40	40	Z	40	40	40	40	40	39	39	38	35	35	35	34	27	25	26	28	29	36.1	41	
24-Nov	32	28	34	33	28	29	Z	32	32	32	34	36	36	36	34	30	28	27	28	31	31	32	32	33	31.6	36
25-Nov	33	33	32	32	32	31	31	Z	29	29	30	30	31	33	33	33	32	30	30	32	33	34	35	35	31.8	35
26-Nov	35	38	31	Z	27	27	27	28	30	32	32	32	32	32	31	32	31	31	31	31	32	31	31	32	31.2	38
27-Nov	33	35	38	40	Z	41	41	41	41	40	42	43	43	44	44	43	43	42	43	42	42	42	41	41	41.0	44
28-Nov	40	38	43	43	46	Z	43	39	39	40	40	42	41	44	43	40	39	41	41	38	42	41	37	45	41.2	46
29-Nov	46	45	45	44	43	43	Z	42	42	42	43	43	43	45	46	45	39	39	41	42	45	42	39	44	42.9	46
30-Nov	42	42	40	42	43	43	46	Z	36	35	35	38	39	43	45	41	41	36	32	31	30	35	44	43	39.2	46

30.5	30.3	30.5	31.3	30.2	29.5	29.7	29.6	29.2	29.3	30.7	31.5	32.2	33.5	33.8	33.6	33.1	32.5	31.8	31.3	31.5	31.4	31.2	31.5	Diurnal Average	
46	45	45	44	46	43	46	42	43	44	44	45	44	45	46	45	43	42	43	42	45	42	44	45	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	53	7.71	7.71
21 - 50	634	92.29	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Conklin Lookout - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	0	1	3	4	3	1	1	2	2	11	11	7	2	2	1	2	53
21 - 50	7	11	27	23	5	5	12	9	25	85	121	71	72	85	50	26	634
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	7	12	30	27	8	6	13	11	27	96	132	78	74	87	51	28	687

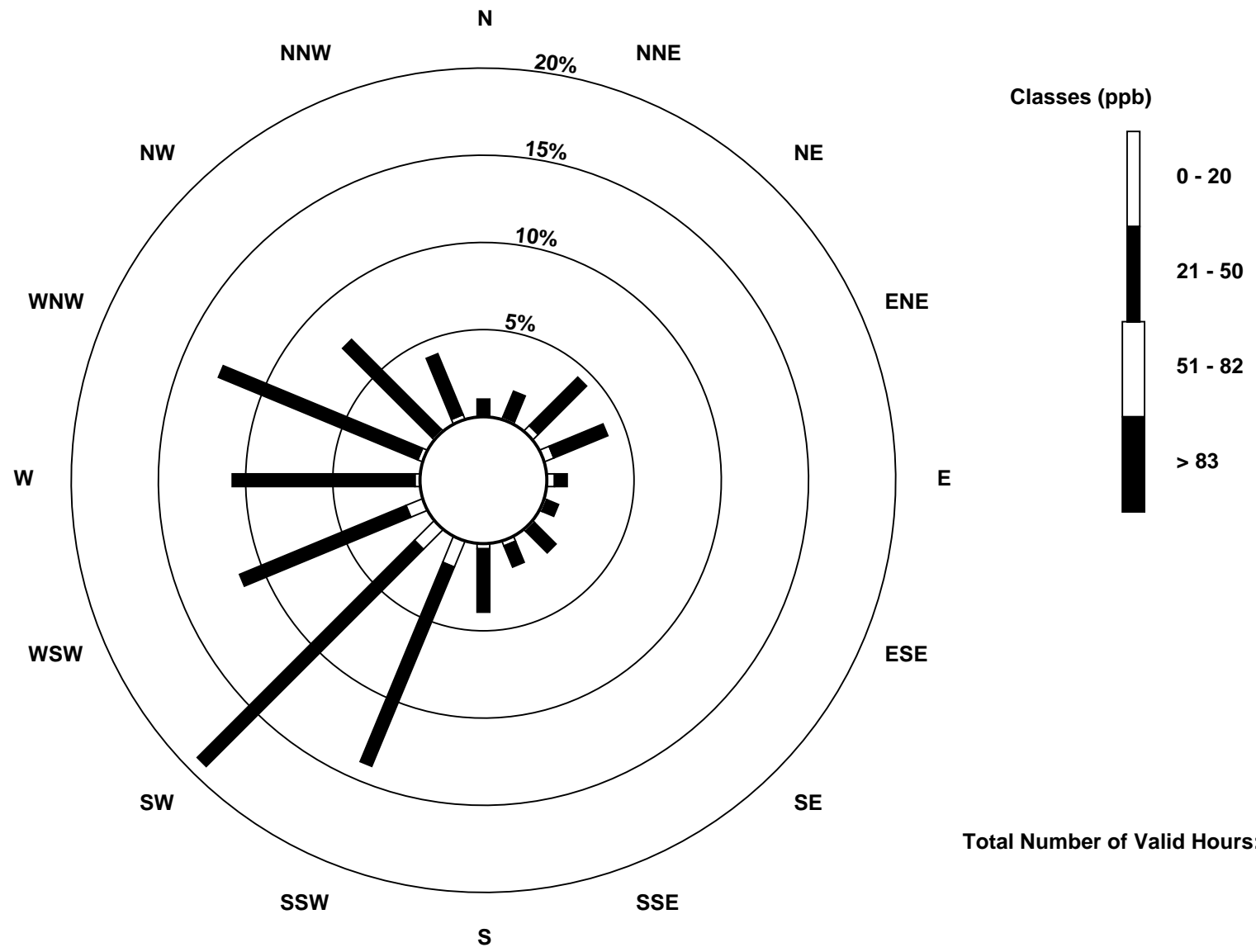
Total Number of Valid Hours: 687

Total Number of Hours: 720

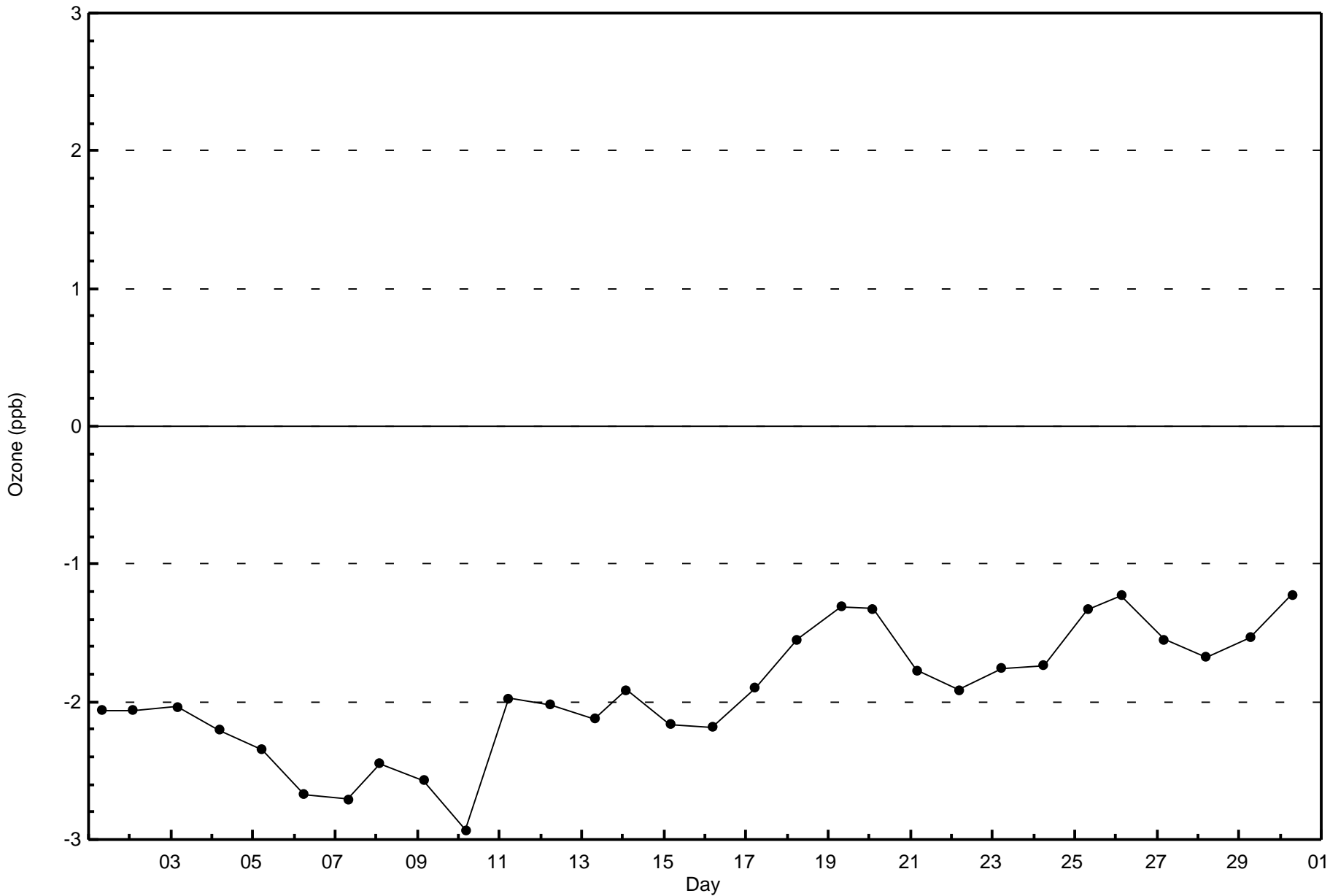


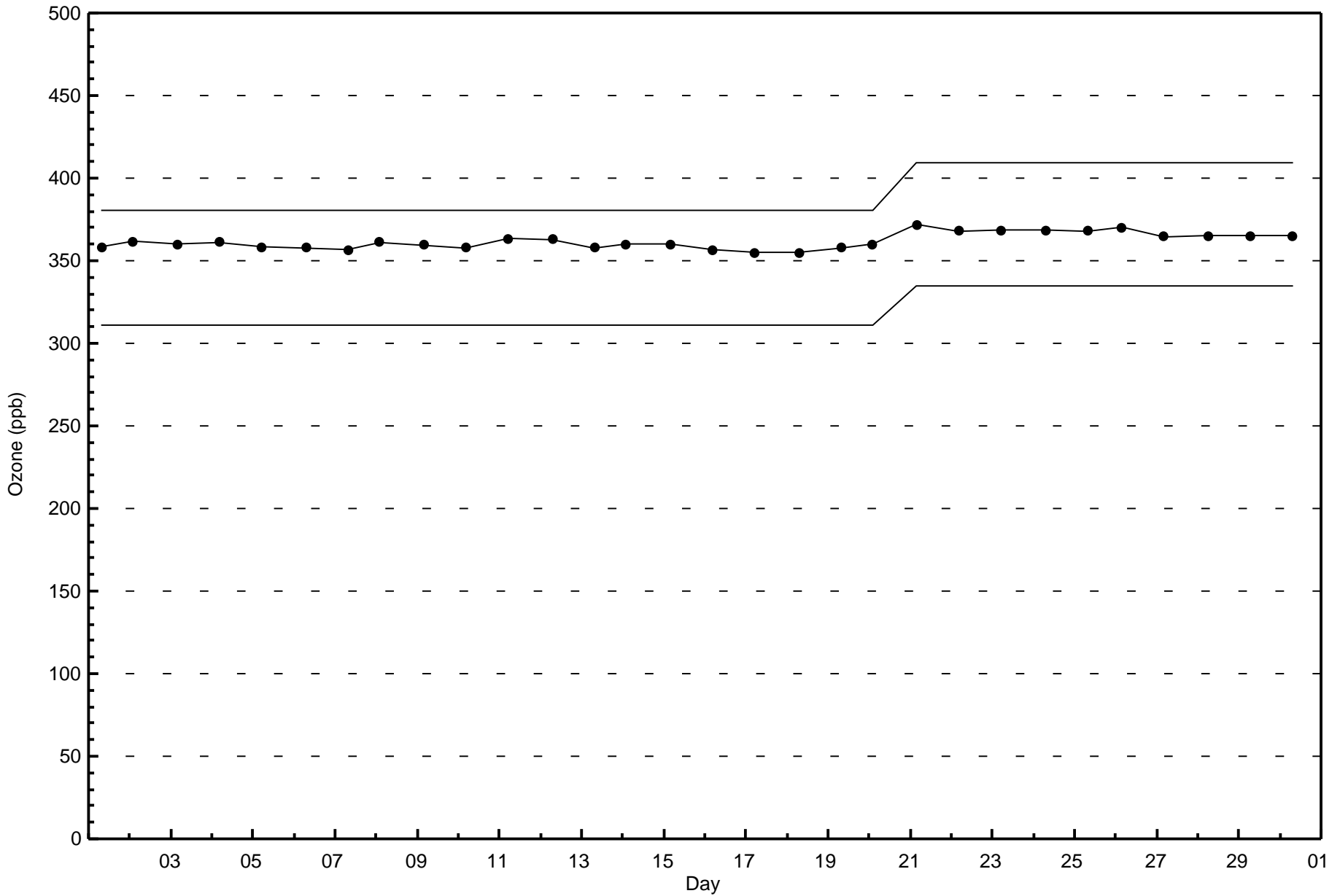
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Ozone (O₃) - ppb
Conklin Lookout (AMS 18)



Total Number of Valid Hours: 687







Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 36.5 µg/m ³ on Nov 30 18:00	Maximum Daily Average: 12.6 µg/m ³ on Nov 6	Hours of Data:	698
Minimum Value: 0.0 µg/m ³ on Nov 19 09:00	Minimum Daily Average: 0.7 µg/m ³ on Nov 18	Hours of Missing Data:	22
Maximum Diurnal Average: 5.6 µg/m ³ at hour 18	Minimum Diurnal Average: 3.6 µg/m ³ at hour 14	Hours of Calibration:	2
Monthly Average: 4.35 µg/m ³	Percentiles: P ₁ = 0.3 P ₁₀ = 0.8 Q ₁ = 1.4 Median = 3.1 Q ₃ = 5.9 P ₉₀ = 8.8 P ₉₉ = 22.9	Percent Operational Time:	97.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	8.3	8.4	5.0	2.9	3.0	3.4	3.5	3.2	2.8	2.0	1.8	1.9	1.9	2.0	1.9	1.6	1.4	1.3	1.2	1.2	1.0	1.0	0.9	0.9	2.6	8.4	
2-Nov	1.1	1.5	1.8	1.5	1.5	1.5	1.5	1.5	1.5	1.3	1.1	1.0	1.1	1.2	1.0	1.0	0.9	0.9	0.9	1.0	1.1	1.0	1.0	1.0	1.2	1.8	
3-Nov	1.1	1.2	2.0	3.0	2.4	3.2	3.7	2.9	3.0	4.5	6.4	6.7	7.7	4.8	3.4	2.9	2.6	2.3	2.2	2.0	2.7	3.7	7.6	7.8	3.7	7.8	
4-Nov	5.1	4.2	3.4	3.2	3.1	3.6	4.8	6.5	7.7	9.0	7.1	5.8	6.7	8.8	9.3	8.1	6.5	5.4	5.1	5.2	6.0	7.7	7.9	8.0	6.2	9.3	
5-Nov	8.2	6.6	5.3	4.3	2.8	3.3	3.9	5.3	5.2	5.2	6.2	6.9	7.6	4.9	2.9	2.9	5.2	4.1	2.9	3.1	4.6	5.2	5.5	8.5	5.0	8.5	
6-Nov	12.1	15.4	20.1	21.9	24.8	24.4	22.5	17.0	17.0	15.0	10.1	10.4	9.1	7.9	9.1	10.0	8.1	6.4	6.4	7.7	8.2	7.4	6.6	5.4	12.6	24.8	
7-Nov	4.0	2.7	2.1	2.1	2.2	2.4	2.3	2.5	2.8	2.6	2.6	2.9	3.5	4.1	4.5	5.5	6.1	5.9	5.5	4.7	4.2	3.8	3.6	3.5	3.6	6.1	
8-Nov	3.4	3.3	3.7	3.7	4.2	4.4	4.6	4.4	4.0	3.5	3.3	3.4	4.9	5.4	5.3	4.5	3.5	3.6	2.2	1.6	1.3	0.9	0.5	0.4	3.3	5.4	
9-Nov	0.4	0.5	0.6	0.5	0.6	0.6	0.7	0.9	1.1	1.4	1.5	1.5	1.7	1.9	2.0	2.0	2.1	1.8	1.5	2.3	3.3	2.7	2.9	3.1	1.6	3.3	
10-Nov	3.9	6.4	6.9	7.0	8.3	7.7	6.6	5.4	4.7	4.1	6.0	8.3	8.9	8.8	8.7	8.7	9.3	11.4	11.8	11.2	10.2	8.8	7.8	8.1	7.9	11.8	
11-Nov	10.5	12.3	11.1	9.7	9.8	9.7	9.8	9.4	8.9	8.4	5.5	3.6	2.0	0.7	0.5	0.4	0.6	0.8	0.8	0.6	0.6	1.3	1.6	1.1	5.0	12.3	
12-Nov	1.0	1.0	0.9	0.8	0.7	0.8	0.9	0.9	0.7	0.7	0.7	0.8	0.7	0.7	1.1	1.4	1.3	1.6	1.7	1.4	1.1	0.9	1.0	0.9	1.0	1.7	
13-Nov	1.0	1.1	1.4	1.7	1.8	2.1	2.1	2.2	2.2	2.0	2.3	2.4	2.4	2.5	2.5	3.8	3.6	3.4	4.9	5.3	2.7	1.7	1.4	1.4	2.5	5.3	
14-Nov	2.0	2.7	4.1	5.3	4.4	4.4	3.8	3.7	4.6	5.1	4.6	3.1	2.3	2.4	2.4	2.6	3.3	3.6	4.4	5.2	4.9	5.0	5.7	6.4	4.0	6.4	
15-Nov	7.6	9.9	10.7	8.6	6.8	7.4	7.1	5.6	5.8	4.6	4.0	3.0	2.4	2.1	1.6	1.3	1.0	0.9	0.8	0.7	0.7	0.7	0.8	0.8	4.0	10.7	
16-Nov	0.8	0.8	0.8	0.9	1.3	1.6	2.5	2.4	2.0	1.8	1.2	1.2	1.7	1.4	1.5	1.6	1.6	1.3	1.2	1.2	1.2	1.3	1.9	2.3	1.5	2.5	
17-Nov	2.1	2.5	2.3	2.2	2.2	2.2	2.1	2.3	2.1	1.9	1.8	1.8	1.5	2.0	2.7	1.8	1.5	1.4	2.0	1.5	1.1	1.2	1.8	2.8	2.0	2.8	
18-Nov	2.5	1.7	1.3	1.1	0.9	0.8	0.9	1.0	0.8	0.6	0.5	0.5	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.7	2.5	
19-Nov	0.5	0.4	0.3	0.4	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.4	1.1	1.5	2.9	2.8	4.7	6.1	7.2	7.4	5.5	4.3	3.8	3.2	2.2	7.4	
20-Nov	2.7	2.7	3.1	5.1	6.4	3.8	3.7	4.4	5.3	C	9.3	8.7	5.4	4.2	5.0	7.9	8.8	11.1	11.5	10.7	10.5	10.1	8.8	7.3	6.8	11.5	
21-Nov	7.5	7.6	7.1	6.5	5.8	5.0	4.3	4.0	3.5	3.3	3.0	3.0	2.9	3.0	2.9	2.8	2.4	2.4	2.6	3.0	2.6	2.6	3.6	4.3	4.0	7.6	
22-Nov	2.8	2.4	2.6	2.7	2.6	2.6	2.0	1.8	1.5	1.4	1.5	1.5	1.5	1.4	1.1	1.1	1.1	1.1	2.4	1.7	1.1	1.1	1.1	1.0	1.7	2.8	
23-Nov	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.9	1.3	12.6	28.2	6.9	2.9	2.8	3.5	3.3	4.7	3.9	4.2	3.6	28.2	
24-Nov	3.1	3.1	2.4	2.6	5.0	4.2	8.1	2.0	3.2	3.5	5.1	1.4	2.1	1.4	1.7	1.8	1.6	1.0	1.2	0.7	0.5	0.6	0.9	1.5	2.4	8.1	
25-Nov	3.7	2.2	2.3	3.5	4.1	7.3	6.0	6.9	9.5	13.0	10.5	9.1	7.6	7.0	7.0	6.8	UO	1.3	1.3	1.2	1.1	0.9	0.9	1.0	5.0	13.0	
26-Nov	1.0	0.9	1.8	2.8	4.9	5.8	5.7	5.6	4.6	4.4	5.6	5.9	6.5	6.8	7.1	6.0	7.4	8.0	7.8	6.8	6.2	6.2	6.8	6.3	5.5	8.0	
27-Nov	6.4	6.2	5.9	5.3	5.3	5.3	5.5	5.4	5.6	5.4	4.7	4.1	3.8	4.0	4.0	4.0	4.4	4.2	4.2	3.4	3.3	5.0	7.8	10.8	5.2	10.8	
28-Nov	11.3	8.2	13.8	8.1	4.5	4.0	3.7	5.5	6.4	5.9	5.1	4.3	4.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	13.8	
29-Nov	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	7.8	6.7	5.1	4.9	4.1	3.6	3.7	15.7	29.4	24.3	15.2	7.9	21.8	22.3	7.0	--	29.4
30-Nov	9.7	11.2	12.0	5.2	3.8	3.7	3.1	3.5	12.4	16.0	16.4	13.1	12.7	7.5	5.6	12.4	23.3	36.5	19.9	12.8	10.9	8.5	6.2	6.5	11.4	36.5	

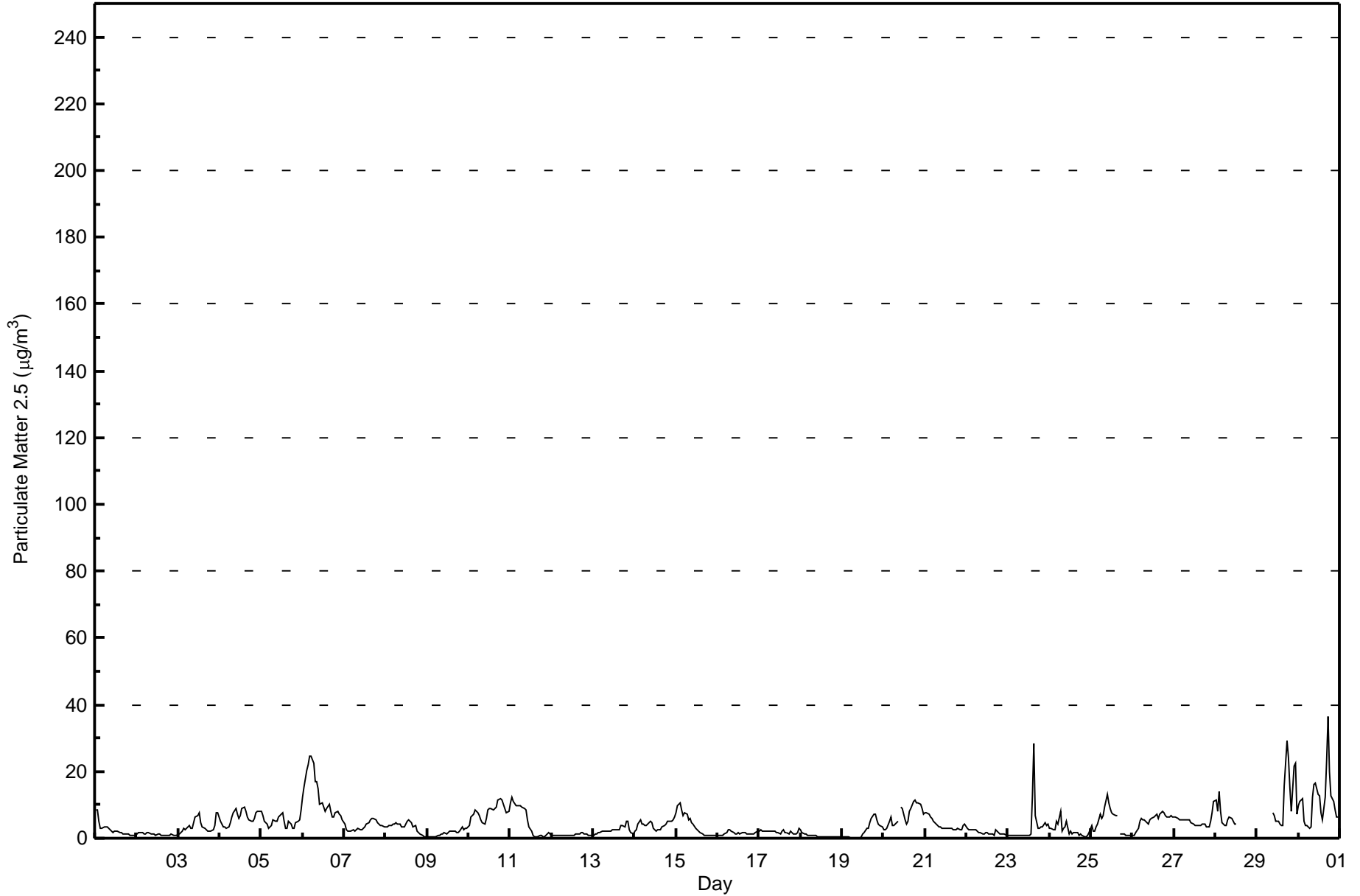
4.3	4.4	4.7	4.3	4.3	4.3	4.4	4.0	4.5	4.7	4.5	4.1	4.0	3.6	3.9	4.7	4.8	5.6	4.8	4.2	3.8	4.2	4.3	4.0	Diurnal Average	
12.1	15.4	20.1	21.9	24.8	24.4	22.5	17.0	17.0	16.0	16.4	13.1	12.7	8.8	12.6	28.2	23.3	36.5	24.3	15.2	10.9	21.8	22.3	10.8	Diurnal Maximum	

C - Calibration AF - Analyzer Failure UO - Unstable Operation
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Lookout - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Lookout - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	400	57.31	57.31
6 - 15	173	24.79	82.09
16 - 25	15	2.15	84.24
26 - 80	3	0.43	84.67
> 81.0	0	0.00	84.67

Total Number of Valid Hours: 698

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Lookout - November 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	4	6	23	19	4	6	7	9	21	42	59	48	44	56	35	17	400
6 - 15	1	1	1	4	1	1	1	1	5	53	53	20	15	8	3	5	173
16 - 25	0	0	0	0	0	0	0	0	0	0	7	1	7	0	0	0	15
26 - 80	0	1	0	0	0	0	0	0	0	0	2	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	5	8	24	23	5	7	8	10	26	95	121	69	66	64	38	22	591

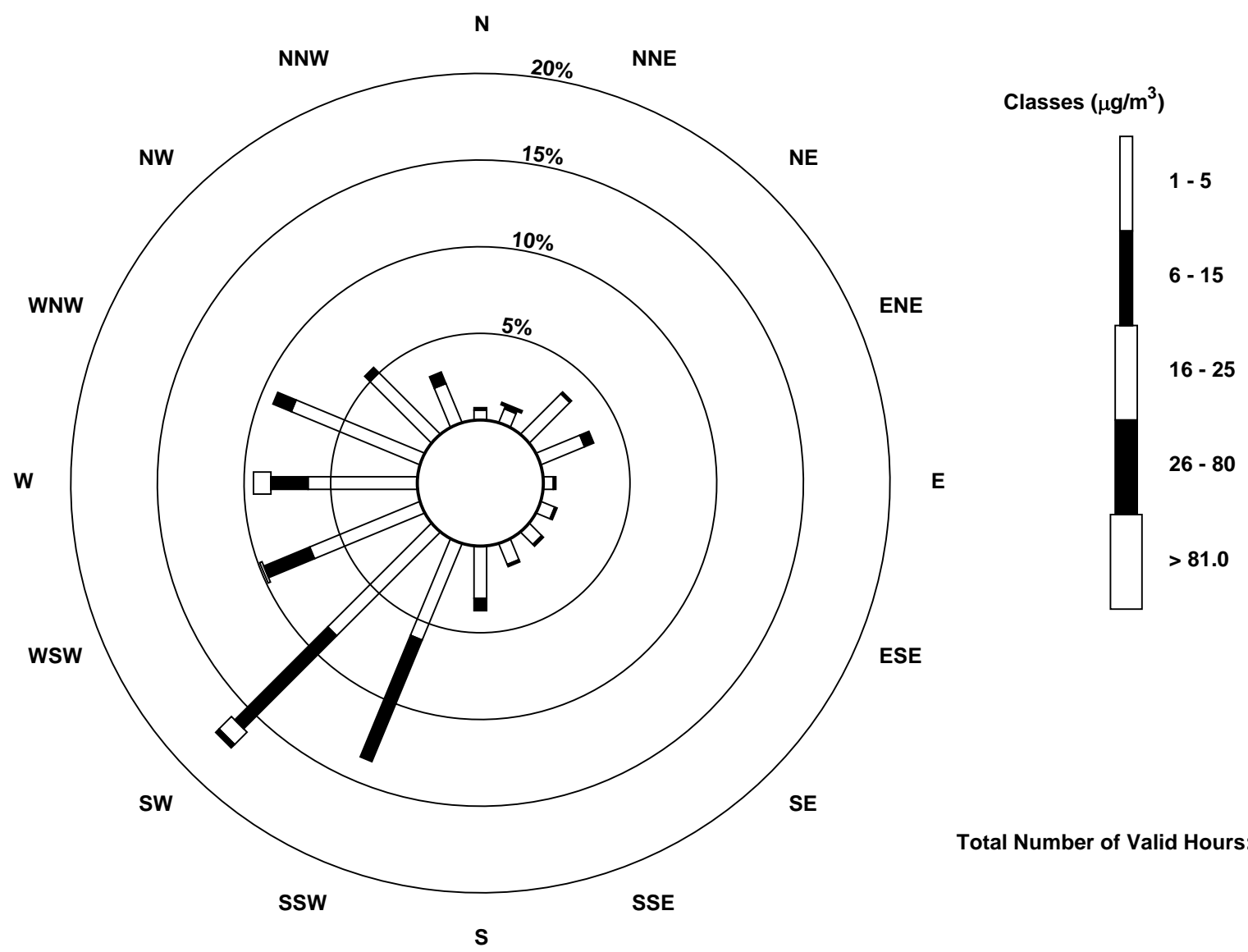
Total Number of Valid Hours: 698

Total Number of Hours: 720



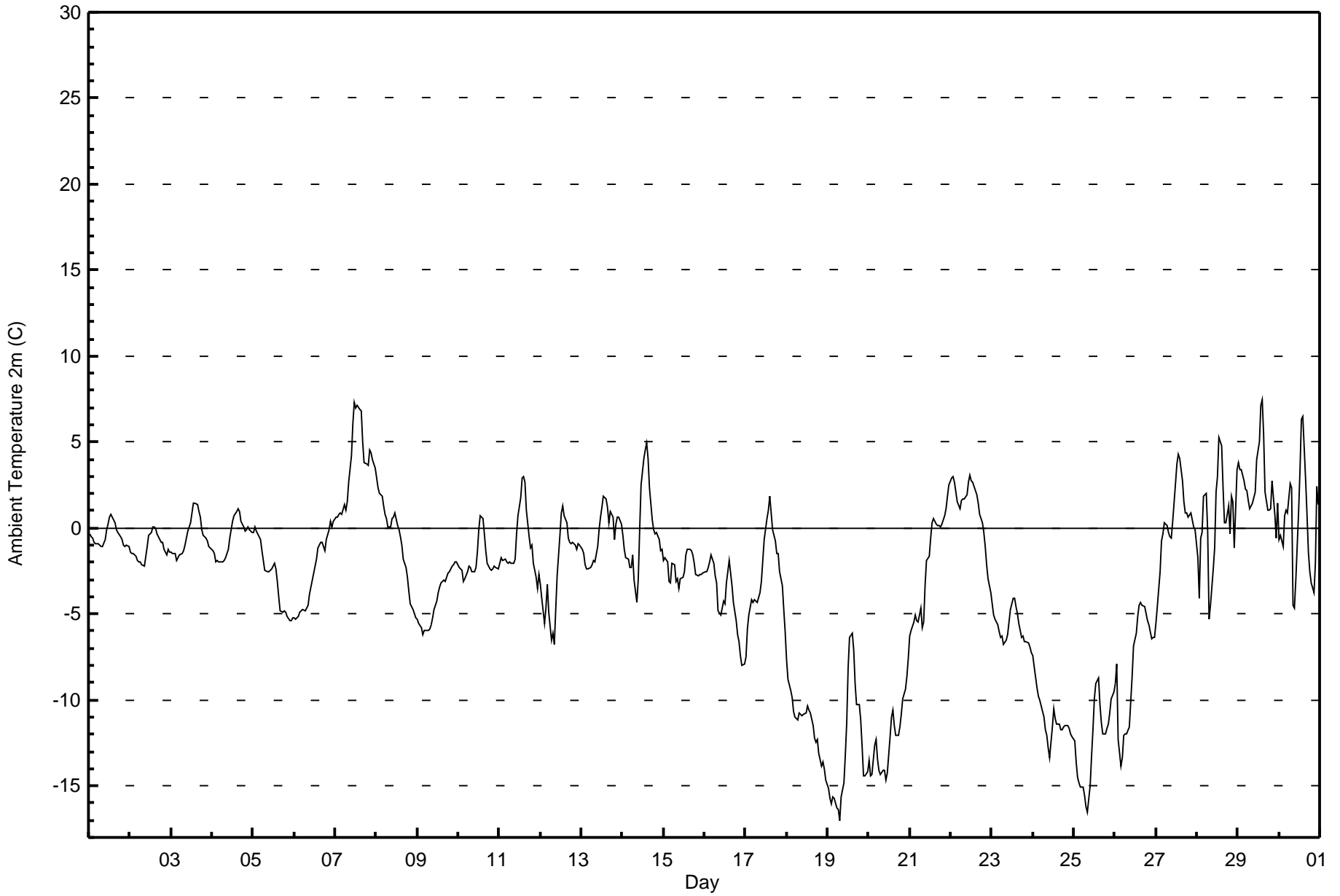
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Lookout (AMS 18)





Maximum Value: 7.4 C on Nov 29 15:00																				Maximum Daily Average: 3.7 C on Nov 7					Hours in Service: 720				
Minimum Value: -17.1 C on Nov 19 08:00																				Minimum Daily Average: -12.8 C on Nov 19					Hours of Data: 720				
Maximum Diurnal Average: -0.7 C at hour 15																				Minimum Diurnal Average: -4.8 C at hour 9					Hours of Missing Data: 0				
Monthly Average: -3.18 C																				Percentiles: P ₁ = -15.8 P ₁₀ = -11.5 Q ₁ = -5.4 Median = -2.0 Q ₃ = 0.1 P ₉₀ = 1.9 P ₉₉ = 6.7					Hours of Calibration: 0				
																				Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Nov	-0.4	-0.5	-0.6	-0.8	-0.9	-0.9	-1.0	-1.1	-1.0	-0.7	-0.1	0.2	0.7	0.8	0.4	0.3	-0.1	-0.3	-0.5	-0.7	-1.0	-1.0	-1.0	-1.1	-0.5	0.8			
2-Nov	-1.4	-1.5	-1.5	-1.6	-1.9	-2.0	-2.0	-2.1	-2.2	-1.7	-1.1	-0.5	-0.2	0.1	0.1	0.0	-0.3	-0.6	-0.9	-0.9	-1.2	-1.5	-1.2	-1.4	-1.1	0.1			
3-Nov	-1.4	-1.5	-1.5	-1.9	-1.7	-1.6	-1.5	-1.3	-1.0	-0.6	-0.2	0.3	0.9	1.5	1.5	1.4	0.9	0.6	-0.1	-0.5	-0.6	-0.7	-1.1	-1.2	-0.5	1.5			
4-Nov	-1.3	-1.5	-2.0	-1.9	-2.0	-2.0	-2.0	-1.9	-1.8	-1.3	-0.6	-0.1	0.4	0.7	1.0	1.1	0.9	0.4	0.0	-0.2	-0.1	0.1	-0.1	-0.3	-0.6	1.1			
5-Nov	-0.2	0.1	-0.2	-0.5	-0.7	-1.3	-1.9	-2.5	-2.6	-2.5	-2.4	-2.4	-2.1	-2.4	-3.1	-4.0	-4.8	-4.9	-4.8	-4.9	-5.1	-5.4	-5.4	-5.2	-2.9	0.1			
6-Nov	-5.2	-5.3	-5.1	-4.9	-4.8	-4.7	-4.8	-4.7	-4.5	-3.9	-3.4	-2.6	-2.2	-1.8	-1.2	-0.8	-0.8	-1.1	-1.3	-0.7	-0.1	0.4	0.0	0.4	-2.6	0.4			
7-Nov	0.6	0.6	0.8	0.9	0.8	1.4	1.0	1.5	2.6	4.2	6.1	7.3	7.0	7.1	6.9	6.8	5.0	3.8	3.7	3.7	4.5	4.4	4.0	3.4	3.7	7.3			
8-Nov	2.9	2.3	2.1	1.9	1.3	0.8	0.6	0.1	0.1	0.5	0.6	0.8	0.2	-0.1	-0.5	-1.0	-1.8	-2.3	-2.8	-3.7	-4.5	-4.7	-5.0	-5.2	-0.7	2.9			
9-Nov	-5.3	-5.5	-5.8	-6.2	-5.9	-6.0	-6.0	-5.9	-5.6	-5.2	-4.7	-4.3	-3.8	-3.5	-3.2	-3.0	-3.1	-2.9	-2.6	-2.5	-2.2	-2.1	-2.0	-2.0	-4.1	-2.0			
10-Nov	-2.3	-2.4	-2.5	-3.1	-3.0	-2.6	-2.3	-2.3	-2.5	-2.5	-2.3	-1.4	-0.1	0.7	0.6	-0.3	-1.3	-2.1	-2.4	-2.4	-2.4	-2.2	-2.3	-2.4	-1.9	0.7			
11-Nov	-2.1	-1.7	-1.9	-1.8	-2.0	-2.1	-2.0	-2.1	-2.0	-1.8	-0.3	0.7	1.8	2.9	3.0	2.7	1.0	-0.5	-1.2	-1.0	-2.1	-2.9	-3.5	-2.7	-0.9	3.0			
12-Nov	-3.3	-4.1	-5.6	-4.7	-3.3	-4.9	-6.5	-6.1	-6.8	-4.8	-2.8	-0.5	0.9	1.3	0.7	0.3	-0.6	-0.8	-0.9	-0.8	-1.0	-1.3	-0.9	-1.0	-2.4	1.3			
13-Nov	-1.2	-1.5	-2.1	-2.4	-2.4	-2.3	-2.1	-1.9	-2.0	-1.1	-0.1	0.6	1.2	1.8	1.7	1.2	0.3	1.0	0.7	-0.7	0.2	0.7	0.6	0.2	-0.4	1.8			
14-Nov	-0.4	-1.3	-1.8	-1.8	-2.3	-2.3	-1.6	-3.0	-4.4	-3.0	-0.1	2.5	4.0	4.5	4.9	4.1	2.3	0.5	-0.1	-0.3	-0.3	-0.7	-1.3	-1.2	-0.1	4.9			
15-Nov	-1.9	-1.7	-1.9	-3.1	-3.2	-2.1	-2.1	-3.1	-3.0	-3.5	-3.0	-2.8	-2.5	-1.6	-1.3	-1.2	-1.3	-1.6	-2.0	-2.7	-2.7	-2.7	-2.7	-2.6	-2.4	-1.2			
16-Nov	-2.6	-2.6	-2.3	-2.0	-1.5	-2.0	-2.8	-3.2	-4.8	-5.0	-4.6	-4.3	-4.4	-3.2	-1.9	-2.6	-3.3	-4.3	-5.4	-6.2	-6.6	-7.4	-8.0	-7.9	-4.1	-1.5			
17-Nov	-7.5	-5.9	-5.1	-4.1	-4.3	-4.2	-4.3	-4.3	-3.8	-3.1	-1.9	-0.7	0.5	1.0	1.9	0.9	-0.1	-0.7	-1.5	-1.5	-2.5	-3.3	-4.8	-6.1	-2.7	1.9			
18-Nov	-7.7	-8.8	-9.4	-9.9	-10.6	-11.0	-11.1	-10.8	-10.8	-10.9	-10.9	-10.8	-10.3	-10.6	-10.7	-11.5	-12.3	-12.4	-12.3	-13.1	-13.8	-13.6	-14.0	-14.7	-11.3	-7.7			
19-Nov	-15.1	-15.7	-16.0	-15.7	-15.8	-16.3	-16.4	-17.1	-15.7	-14.9	-13.2	-11.3	-8.2	-6.4	-6.1	-7.1	-9.0	-10.3	-10.2	-11.1	-12.7	-14.4	-14.5	-14.2	-12.8	-6.1			
20-Nov	-13.5	-14.4	-14.4	-12.6	-12.3	-13.5	-14.1	-14.3	-14.1	-14.1	-14.7	-14.2	-12.1	-11.0	-10.6	-11.5	-12.0	-12.1	-11.5	-10.8	-10.0	-9.4	-8.6	-7.6	-12.2	-7.6			
21-Nov	-6.3	-6.0	-5.5	-5.1	-5.4	-5.5	-4.6	-5.8	-5.5	-3.3	-1.9	-1.6	-0.5	0.3	0.5	0.3	0.1	0.1	0.1	0.2	0.7	1.1	1.9	2.5	-2.1	2.5			
22-Nov	2.9	3.0	2.7	2.1	1.5	1.2	1.6	1.7	1.7	2.0	2.7	3.1	2.7	2.6	2.2	1.9	1.5	0.8	0.3	-0.3	-1.1	-2.2	-3.0	-3.8	1.2	3.1			
23-Nov	-4.4	-5.1	-5.3	-5.7	-6.1	-6.4	-6.3	-6.7	-6.6	-6.2	-5.5	-4.8	-4.1	-4.1	-4.5	-5.0	-5.6	-6.4	-6.3	-6.6	-6.6	-6.7	-7.0	-7.3	-5.8	-4.1			
24-Nov	-7.4	-8.0	-9.3	-9.8	-10.0	-10.3	-11.0	-11.7	-12.0	-12.8	-13.4	-11.6	-10.5	-11.1	-11.4	-11.4	-11.8	-11.8	-11.6	-11.5	-11.5	-11.7	-12.0	-12.1	-11.1	-7.4			
25-Nov	-12.4	-13.6	-14.5	-14.8	-15.1	-15.1	-15.6	-16.2	-16.5	-15.0	-13.2	-11.7	-9.9	-9.0	-8.7	-10.3	-11.4	-12.0	-11.9	-11.7	-11.4	-10.8	-9.9	-9.6	-12.5	-8.7			
26-Nov	-9.1	-7.9	-12.3	-13.9	-13.4	-12.1	-12.0	-12.0	-11.6	-10.1	-8.6	-6.9	-6.1	-5.2	-4.5	-4.3	-4.5	-4.6	-5.0	-5.4	-5.6	-6.4	-6.4	-6.3	-8.1	-4.3			
27-Nov	-5.5	-4.6	-2.6	-0.7	-0.4	0.3	0.1	-0.3	-0.5	-0.6	0.4	2.6	3.7	4.3	4.1	2.8	1.5	0.9	0.9	0.7	0.8	0.5	0.0	-0.1	0.3	4.3			
28-Nov	-1.8	-4.1	-0.6	-0.2	1.8	2.0	-0.2	-5.3	-4.5	-2.4	-1.2	2.1	3.0	5.2	4.8	2.4	0.3	0.3	1.3	-0.3	1.8	1.5	-1.2	3.4	0.3	5.2			
29-Nov	3.8	3.4	3.4	2.7	2.3	2.2	1.6	1.1	1.4	1.8	2.1	3.9	5.0	7.2	7.4	5.4	2.1	1.0	1.0	1.1	2.8	0.8	-0.6	1.4	2.7	7.4			
30-Nov	-0.7	-0.5	-1.1	0.7	1.1	0.9	2.6	2.3	-4.5	-4.6	-3.1	0.9	3.4	6.3	6.5	2.9	0.8	-1.4	-2.5	-3.2	-3.8	-2.0	2.4	1.4	0.2	6.5			
																								Diurnal Average					
																								Diurnal Maximum					





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Conklin Lookout - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	527	73.19	73.19
0 - 10	193	26.81	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

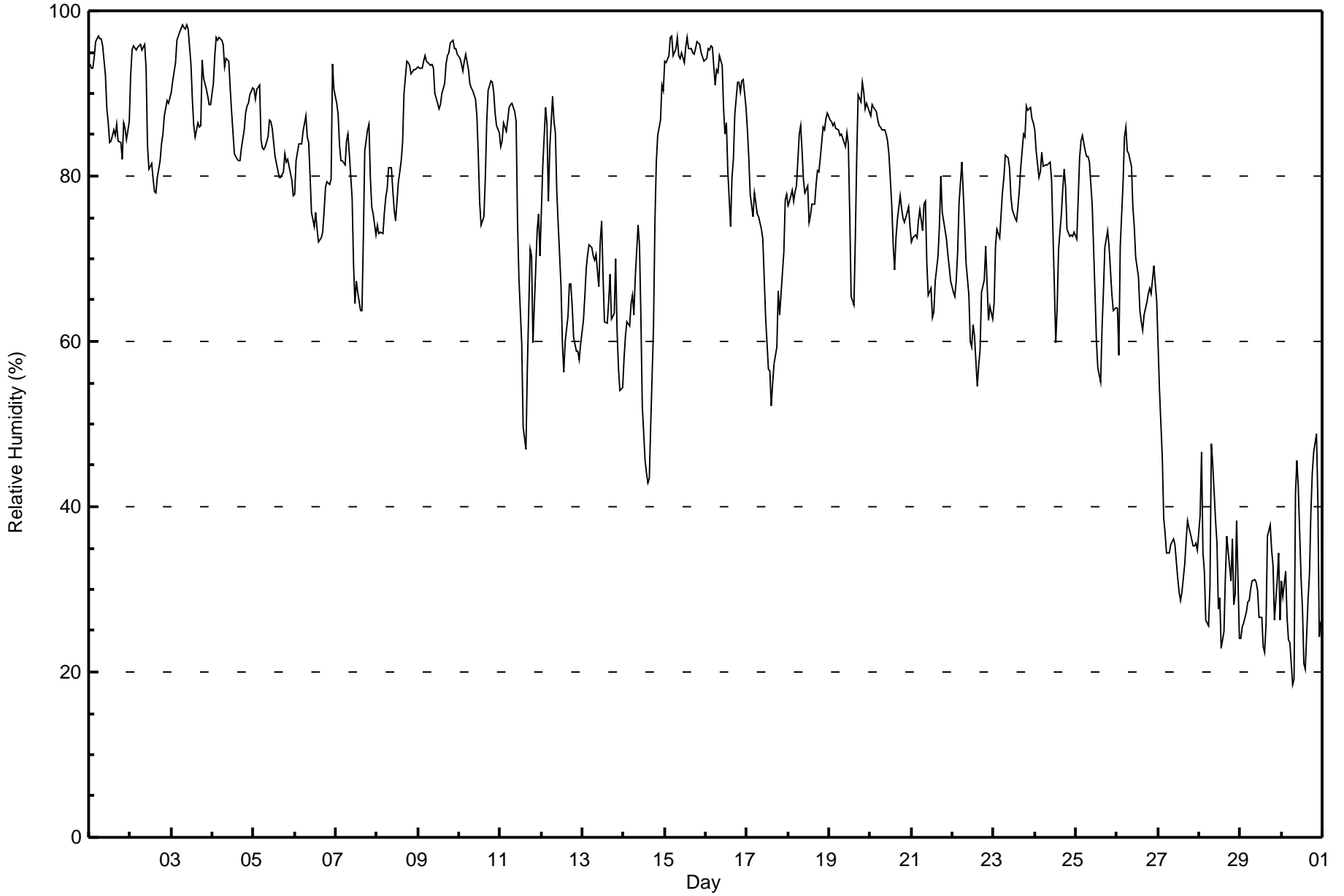


Maximum Value: 98 % on Nov 3 10:00																		Maximum Daily Average: 95.2 % on Nov 15																		Hours in Service: 720	
Minimum Value: 19 % on Nov 30 07:00																		Minimum Daily Average: 29.0 % on Nov 29																		Hours of Data: 720	
Maximum Diurnal Average: 78.7 % at hour 9																		Minimum Diurnal Average: 64.1 % at hour 15																		Hours of Missing Data: 0	
Monthly Average: 73.5 %																		Percentiles: P ₁ = 23 P ₁₀ = 36 Q ₁ = 65 Median = 79 Q ₃ = 87 P ₉₀ = 94 P ₉₉ = 97																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Nov	94	93	93	94	96	97	97	97	96	92	88	86	84	84	86	85	86	84	84	82	87	86	84	87	89.2	97											
2-Nov	92	95	96	95	96	96	96	95	96	93	84	81	82	80	78	78	80	82	84	85	87	89	89	89	88.2	96											
3-Nov	90	91	94	96	97	98	98	98	98	98	98	94	89	86	85	86	86	86	94	92	91	90	89	89	92.2	98											
4-Nov	91	95	97	96	97	96	96	93	94	94	91	88	85	83	82	82	82	83	86	88	88	89	90	91	89.8	97											
5-Nov	91	89	91	91	84	83	83	84	85	87	87	86	82	81	81	80	80	81	83	82	82	80	80	78	83.7	91											
6-Nov	78	82	84	84	84	85	87	85	84	80	76	74	76	74	72	73	73	76	79	79	79	80	94	91	80.2	94											
7-Nov	89	87	84	82	82	81	84	85	83	77	69	65	67	66	64	64	73	83	86	86	80	76	75	73	77.5	89											
8-Nov	74	73	73	73	76	78	79	81	81	78	76	75	79	80	82	84	90	94	94	93	92	93	93	93	82.7	94											
9-Nov	93	93	93	94	95	94	94	93	94	93	90	89	88	89	90	91	94	95	95	96	97	95	95	95	93.1	97											
10-Nov	94	94	93	94	95	93	91	91	90	89	87	83	77	74	75	80	86	90	92	91	90	88	86	85	87.8	95											
11-Nov	84	84	86	85	87	88	89	89	88	87	74	68	60	50	48	47	57	71	70	60	64	73	75	70	73.1	89											
12-Nov	76	81	88	86	77	83	90	87	85	78	74	67	60	56	60	63	67	67	64	61	59	59	58	60	71.0	90											
13-Nov	63	65	69	70	72	71	70	70	71	67	72	75	68	62	62	65	68	63	63	70	61	57	54	54	65.9	75											
14-Nov	58	61	62	62	65	66	63	68	74	72	63	52	46	44	43	43	50	62	74	82	85	87	91	90	65.1	91											
15-Nov	94	94	95	97	97	95	95	97	95	94	95	94	96	97	95	95	95	95	95	96	96	95	94	94	95.2	97											
16-Nov	94	95	95	96	96	91	93	93	95	93	88	85	86	81	74	80	82	87	91	91	90	91	92	88	89.5	96											
17-Nov	86	82	78	75	78	77	75	75	74	72	68	63	57	56	52	55	57	59	66	63	66	71	77	78	69.1	86											
18-Nov	76	77	78	77	78	79	85	86	83	80	78	79	74	75	77	77	79	81	81	82	86	86	87	88	80.3	88											
19-Nov	87	87	86	87	86	86	85	85	85	84	85	84	75	65	64	73	83	90	89	91	90	88	89	88	83.8	91											
20-Nov	87	89	88	88	87	86	86	86	86	85	84	83	76	72	69	73	75	78	76	75	74	76	76	74	80.3	89											
21-Nov	72	73	73	73	75	76	73	77	77	69	66	66	63	64	67	70	74	80	76	75	72	70	69	67	71.5	80											
22-Nov	66	65	67	71	77	82	78	74	70	66	60	59	62	61	55	57	59	66	67	71	67	63	64	63	66.2	82											
23-Nov	64	71	74	73	75	78	80	83	82	81	77	76	75	75	76	78	81	85	85	89	88	88	87	86	79.5	89											
24-Nov	86	83	80	81	83	81	81	81	81	82	80	67	60	64	71	75	78	81	79	74	73	73	73	73	76.6	86											
25-Nov	72	77	82	84	85	83	82	82	82	76	71	66	60	57	55	61	66	71	73	71	69	66	64	64	71.7	85											
26-Nov	64	58	72	79	85	86	83	83	81	76	74	70	68	64	62	61	63	65	66	66	66	69	67	65	70.6	86											
27-Nov	60	54	46	39	37	34	34	35	36	36	35	31	30	29	30	33	36	38	37	37	35	35	36	35	37.0	60											
28-Nov	39	47	34	32	26	26	30	48	45	38	36	28	29	23	25	32	37	35	31	36	28	29	38	24	33.1	48											
29-Nov	24	25	26	27	28	29	30	31	31	31	30	27	27	23	22	26	36	38	35	33	26	31	34	26	29.0	38											
30-Nov	31	29	32	27	24	24	19	19	42	46	42	31	28	21	20	29	32	39	44	47	49	41	24	26	31.9	49											
75.6 76.4 77.0 76.9 77.2 77.4 77.6 78.3 78.7 76.5 73.3 69.6 66.9 64.5 64.1 66.5 70.1 73.5 74.6 74.8 73.9 73.8 74.1 72.8																		Diurnal Average																			
94 95 97 97 97 98 98 98 98 98 98 94 96 97 95 95 95 95 95 96 97 95 95 95																		Diurnal Maximum																			



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Conklin Lookout - November 2015

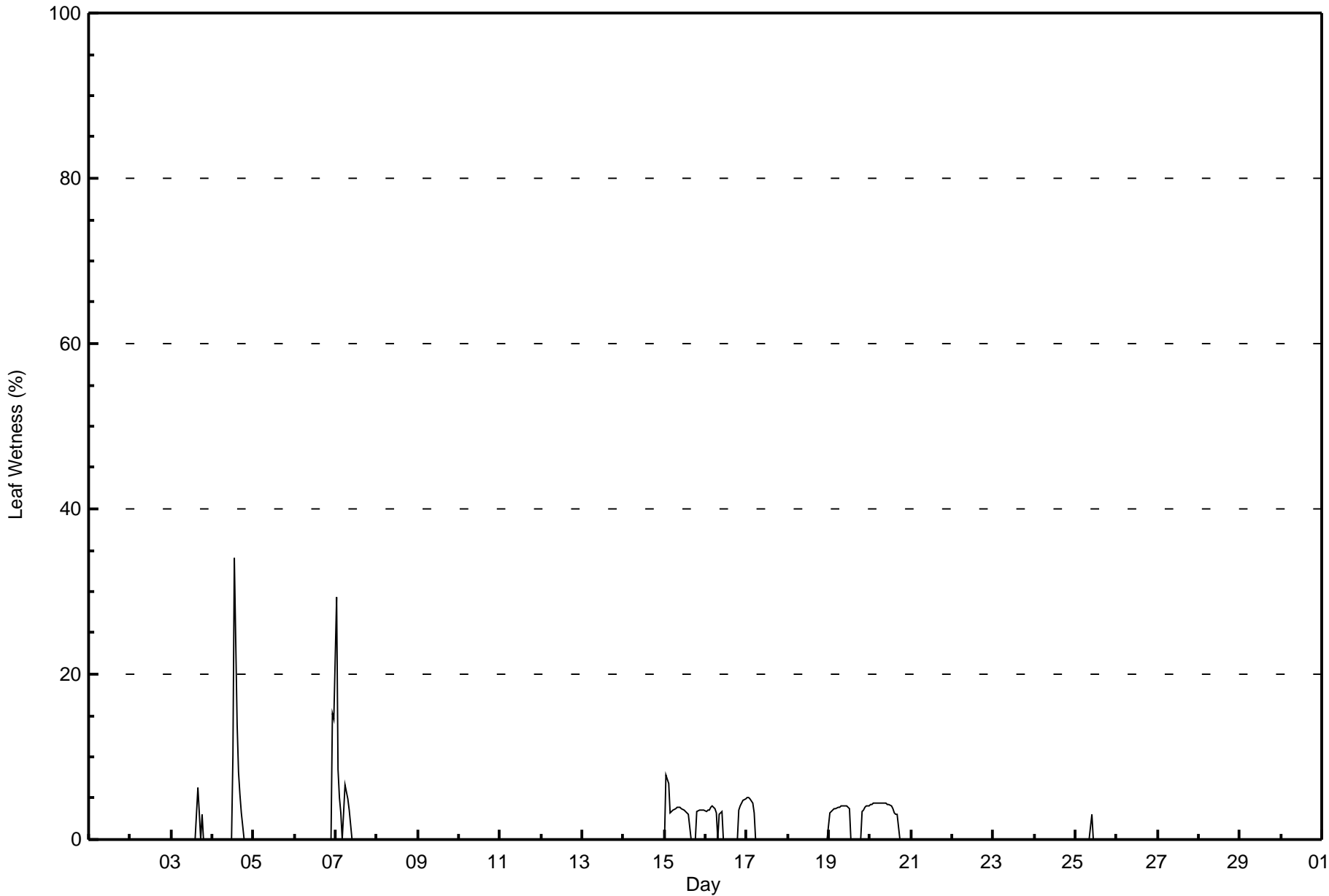




Summary of Hour Averages

Conklin Lookout - November 2015

Maximum Value: 34 % on Nov 4 14:00																	Maximum Daily Average: 3.1 % on Nov 4																	Hours in Service: 720	
Minimum Value: 0 % on Nov 1 01:00																	Minimum Daily Average: 0.0 % on Nov 1																	Hours of Data: 720	
Maximum Diurnal Average: 1.5 % at hour 1																	Minimum Diurnal Average: 0.1 % at hour 19																	Hours of Missing Data: 0	
Monthly Average: 0.7 %																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 3 P ₉₉ = 7																	Hours of Calibration: 0	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Nov	0	0	0	0	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-Nov	0	0	0	0	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-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	0	3	0	0	0	0	0	0	0.5	6								
4-Nov	0	0	0	0	0	0	0	0	0	0	0	0	10	34	14	8	5	3	0	0	0	0	0	0	0	3.1	34								
5-Nov	0	0	0	0	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-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	1.2	15									
7-Nov	29	9	5	3	0	7	6	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.8	29									
8-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	8	7	3	3	4	4	4	4	4	4	4	3	3	3	0	0	0	0	3	4	4	4	3	3.1	8									
16-Nov	3	3	4	4	4	4	3	0	3	3	0	0	0	0	0	0	0	0	4	4	4	5	5	2.2	5										
17-Nov	5	5	5	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5									
18-Nov	0	0	0	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-Nov	3	3	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	3	4	4	4	4	4	2.8	4									
20-Nov	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	0	0	0	0	0	0	0	2.9	4									
21-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	3									
26-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	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-Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
30-Nov	0	0	0	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	1.1	0.9	0.8	0.6	0.7	0.7	0.6	0.6	0.6	0.4	0.4	0.7	1.4	0.7	0.6	0.4	0.1	0.1	0.3	0.4	0.4	0.9	0.9	Diurnal Average										
	29	9	7	4	4	7	6	5	4	4	4	4	10	34	14	8	5	3	3	4	4	4	15	15	Diurnal Maximum										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Conklin Lookout - November 2015

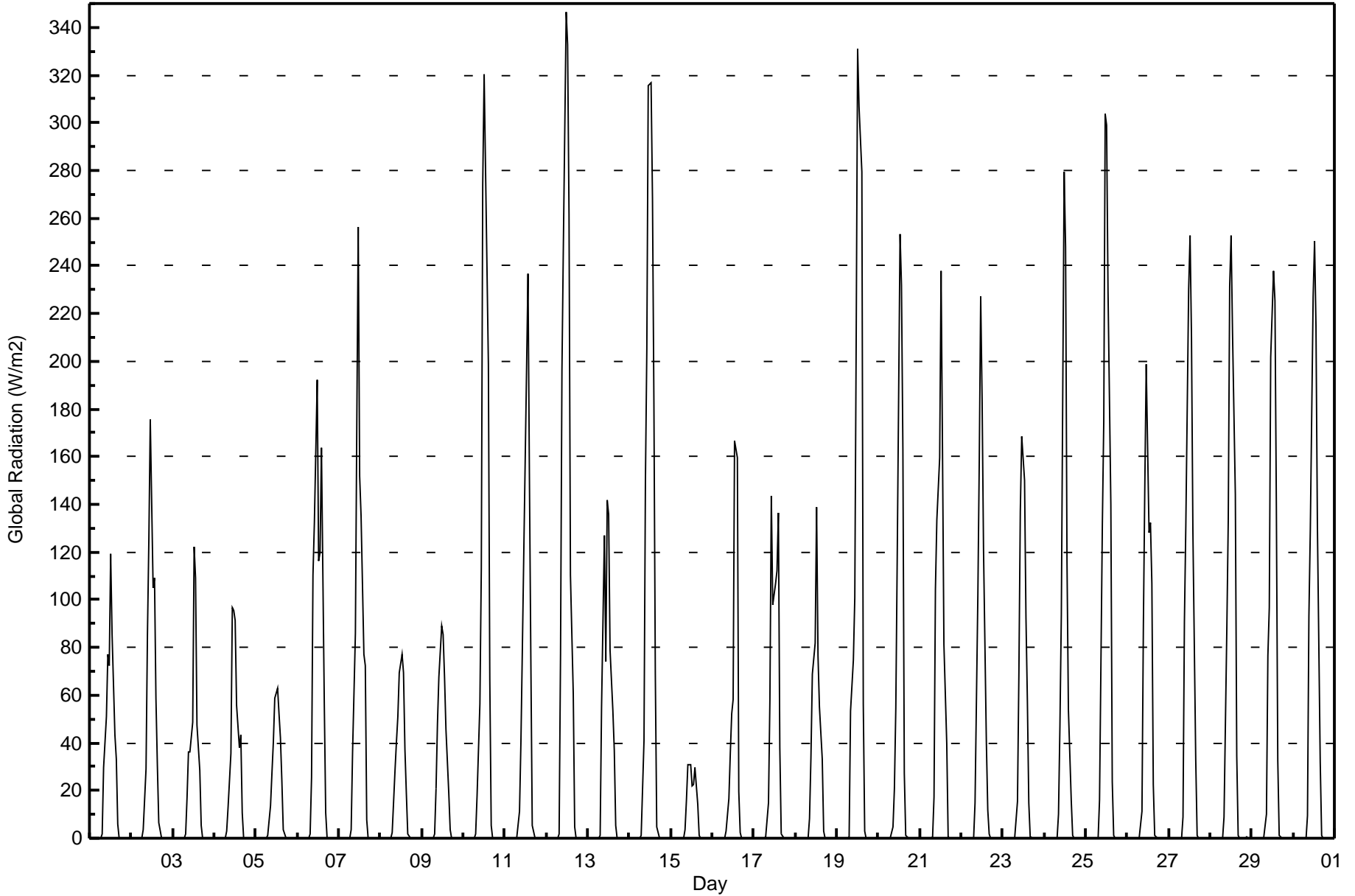
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	627	87.08	87.08
0.4 - 0.5	0	0.00	87.08
0.6 - 0.7	0	0.00	87.08
0.8 - 1.4	0	0.00	87.08
1.5 - 10	87	12.08	99.17
> 10	6	0.83	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 346 W/m2 on Nov 12 12:00																			Maximum Daily Average: 68.3 W/m2 on Nov 12						Hours in Service: 720	
Minimum Value: 0 W/m2 on Nov 1 01:00																			Minimum Daily Average: 7.1 W/m2 on Nov 15						Hours of Data: 720	
Maximum Diurnal Average: 179.5 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 24						Hours of Missing Data: 0	
Monthly Average: 35.4 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 37 P ₉₀ = 133 P ₉₉ = 301						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	0	0	2	29	51	77	72	119	85	44	33	6	0	0	0	0	0	0	0	21.6	119
2-Nov	0	0	0	0	0	0	0	3	29	85	125	176	105	109	59	31	6	0	0	0	0	0	0	0	30.4	176
3-Nov	0	0	0	0	0	0	0	2	17	36	36	49	122	109	47	28	5	0	0	0	0	0	0	0	18.8	122
4-Nov	0	0	0	0	0	0	0	3	13	36	97	96	91	56	38	43	10	0	0	0	0	0	0	0	20.1	97
5-Nov	0	0	0	0	0	0	0	1	14	27	40	59	63	52	42	24	3	0	0	0	0	0	0	0	13.6	63
6-Nov	0	0	0	0	0	0	0	2	25	111	132	192	116	120	164	57	10	0	0	0	0	0	0	0	38.7	192
7-Nov	0	0	0	0	0	0	0	4	36	86	175	257	152	135	77	72	8	0	0	0	0	0	0	0	41.7	257
8-Nov	0	0	0	0	0	0	0	3	28	40	51	69	77	69	38	19	2	0	0	0	0	0	0	0	16.5	77
9-Nov	0	0	0	0	0	0	0	2	21	48	68	89	86	68	45	19	4	0	0	0	0	0	0	0	18.7	89
10-Nov	0	0	0	0	0	0	0	2	18	57	113	274	320	280	198	66	5	0	0	0	0	0	0	0	55.5	320
11-Nov	0	0	0	0	0	0	0	0	11	41	79	118	197	237	152	76	6	0	0	0	0	0	0	0	38.2	237
12-Nov	0	0	0	0	0	0	0	2	77	196	248	346	333	262	110	61	4	0	0	0	0	0	0	0	68.3	346
13-Nov	0	0	0	0	0	0	0	1	55	127	74	142	136	79	53	37	5	0	0	0	0	0	0	0	29.5	142
14-Nov	0	0	0	0	0	0	0	1	41	149	205	316	317	268	183	69	5	0	0	0	0	0	0	0	64.7	317
15-Nov	0	0	0	0	0	0	0	0	3	16	31	31	22	22	29	14	1	0	0	0	0	0	0	0	7.1	31
16-Nov	0	0	0	0	0	0	0	0	3	17	35	52	58	166	160	20	2	0	0	0	0	0	0	0	21.4	166
17-Nov	0	0	0	0	0	0	0	0	15	58	143	98	107	112	136	38	2	0	0	0	0	0	0	0	29.6	143
18-Nov	0	0	0	0	0	0	0	0	8	34	69	82	139	76	55	33	3	0	0	0	0	0	0	0	20.8	139
19-Nov	0	0	0	0	0	0	0	0	54	75	101	211	331	307	279	57	3	0	0	0	0	0	0	0	59.1	331
20-Nov	0	0	0	0	0	0	0	0	5	21	54	118	253	232	163	27	1	0	0	0	0	0	0	0	36.4	253
21-Nov	0	0	0	0	0	0	0	0	17	105	133	160	238	162	81	40	1	0	0	0	0	0	0	0	39.1	238
22-Nov	0	0	0	0	0	0	0	0	15	102	159	227	184	121	40	12	2	0	0	0	0	0	0	0	35.9	227
23-Nov	0	0	0	0	0	0	0	0	15	69	137	169	150	92	58	15	1	0	0	0	0	0	0	0	29.4	169
24-Nov	0	0	0	0	0	0	0	0	10	47	93	280	248	116	54	16	1	0	0	0	0	0	0	0	36.1	280
25-Nov	0	0	0	0	0	0	0	0	16	131	175	303	299	230	140	24	1	0	0	0	0	0	0	0	55.0	303
26-Nov	0	0	0	0	0	0	0	0	12	90	147	199	128	132	107	23	1	0	0	0	0	0	0	0	35.0	199
27-Nov	0	0	0	0	0	0	0	0	9	91	131	230	252	210	129	33	1	0	0	0	0	0	0	0	45.3	252
28-Nov	0	0	0	0	0	0	0	0	9	88	133	231	253	212	144	34	1	0	0	0	0	0	0	0	46.1	253
29-Nov	0	0	0	0	0	0	0	0	10	77	97	202	238	225	139	33	1	0	0	0	0	0	0	0	42.5	238
30-Nov	0	0	0	0	0	0	0	0	9	93	129	227	251	215	132	32	1	0	0	0	0	0	0	0	45.4	251
																			0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 20.8 73.4 109.7 169.1 179.5 152.1 103.2 36.2 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 0 4 77 196 248 346 333 307 279 76 10 0 0 0 0 0 0 0						Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Conklin Lookout - November 2015

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	509	70.69	70.69
21 - 100	108	15.00	85.69
101 - 300	95	13.19	98.89
301 - 600	8	1.11	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

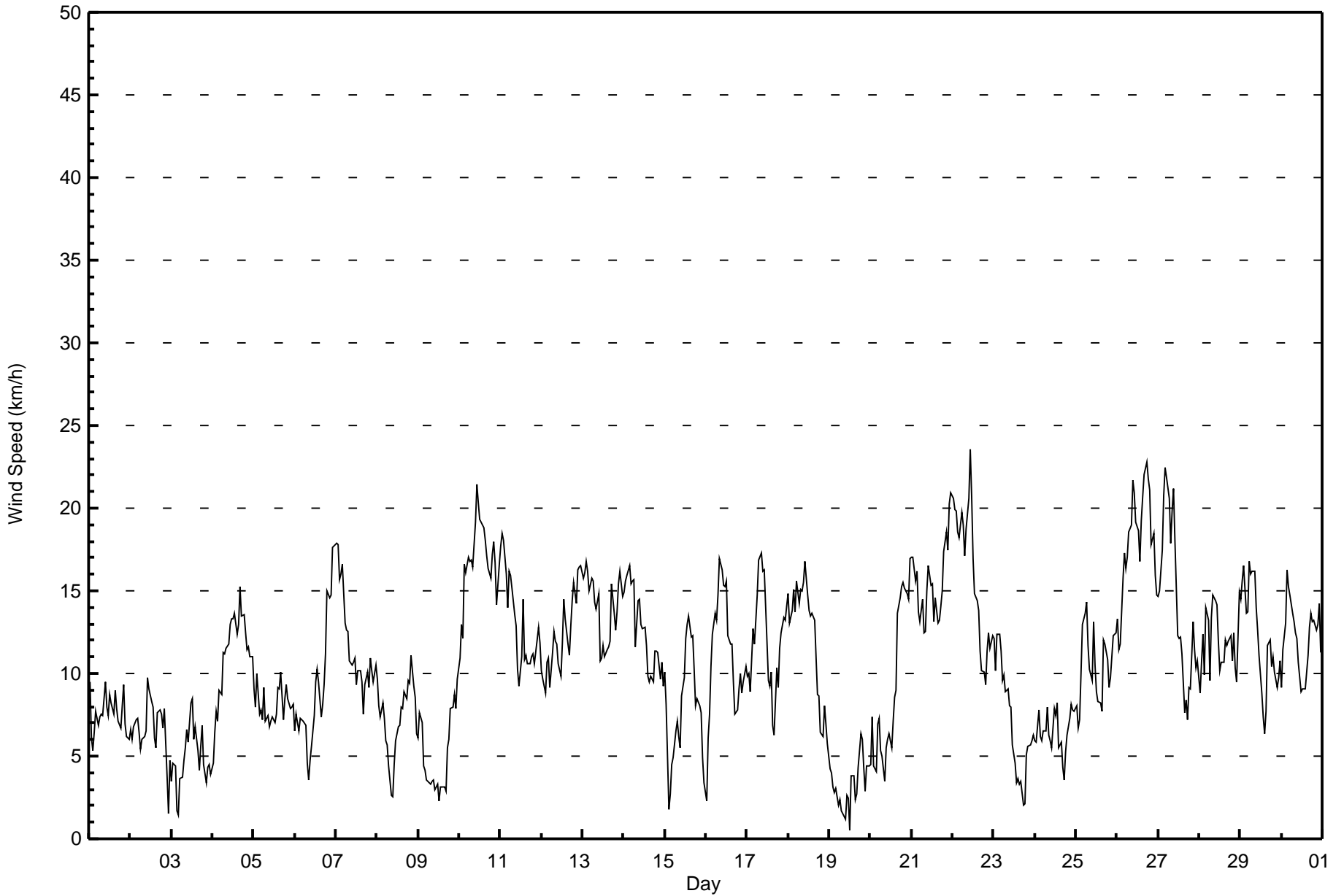


Maximum Speed: 24 km/h on Nov 22 11:00	Maximum Daily Speed Average: 17.6 km/h on Nov 26	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 19 13:00	Minimum Daily Speed Average: 2.1 km/h on Nov 9	Hours of Data: 720
Maximum Diurnal Speed Average: 7.8 km/h at hour 5	Minimum Diurnal Speed Average: 4.9 km/h at hour 16	Hours of Missing Data: 0
Monthly Average Velocity: 6.5 km/h 245.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 7 Median = 10 Q ₃ = 14 P ₉₀ = 17 P ₉₉ = 22	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	ENE9	ENE6	NE5	NE6	NE8	NE7	NE7	NE8	ENE7	ENE10	E8	ENE7	ENE9	ENE8	NE8	NE9	ENE8	ENE7	NE7	NE8	ENE9	E7	E6	NE6	ENE7.4	ENE10	
2-Nov	NE7	ENE6	ENE7	E7	ENE7	ENE6	ENE5	E6	E6	ESE7	SE10	ESE9	ESE8	ESE8	SE6	SE6	SE8	SE8	SE8	SE7	SSE8	SSE4	SSE2	SE5	ESE5.6	SE10	
3-Nov	SE3	SSE5	SSE4	S2	NW1	S4	S4	SSW5	SSW5	SSW7	SW6	SW8	WSW8	SW6	WSW7	WSW5	SW4	WSW6	WNW7	WSW5	WSW3	W4	W4	SW4	SW3.9	WSW8	
4-Nov	SSW5	SW6	SW8	SSW7	SSW9	SSW9	SW11	SSW11	SSW11	SSW12	SSW13	SSW13	SSW13	SSW14	SSW12	SSW13	SSW15	SSW13	SSW14	SSW12	SSW11	SW12	SW11	SW11	SSW11.0	SSW15	
5-Nov	SW9	WSW8	WNW10	WNW8	NW8	NW7	NW9	NNW7	NW7	NNW7	NW7	NNW7	NNW8	NW9	NW9	NW10	NW7	NW9	NW9	NW8	WNW8	WNW8	NW8	NW7.5	NW10		
6-Nov	WNW7	W8	W7	W7	W7	W7	W7	W5	W4	W5	SW6	SSW7	SSW10	SSW10	SSW10	S7	SSE8	S9	S11	SSW15	SSW15	SSW15	SSW18	SSW18	SSW7.2	SSW18	
7-Nov	SSW18	SSW18	SW16	SW16	SW17	SW13	SW13	SW13	SW11	WSW10	WSW11	WSW11	W9	W10	W10	WSW9	SW8	SW9	SW10	SW9	W11	W10	W9	WNW10	WSW10.8	SSW18	
8-Nov	WNW10	WNW8	WNW7	W8	WNW7	NW6	WNW6	NW4	NW3	N3	NE4	ENE6	NE7	NE7	NNE8	NNE8	NE9	NNE9	NE10	NE9	NE11	NNE9	NNE9	N6	N4.8	NE11	
9-Nov	NNE6	NE8	NE7	NE4	N4	NNE4	NE3	E3	SE3	ESE4	SE3	SE3	ESE2	SSE3	SSE3	SSE3	SSE3	S5	SSW6	SSW8	SSW8	SSW9	S8	SSW10	SE2.1	SSW10	
10-Nov	SSW11	SSW13	SSW12	SSW17	SSW16	SSW17	SSW17	SSW17	SSW16	SSW19	SSW21	SSW20	SSW19	SSW19	SSW19	SSW18	SSW17	S16	S16	SSW17	SSW18	SSW17	SSW14	SSW17	SSW16.8	SSW21	
11-Nov	SSW18	SSW19	SSW18	SSW16	SSW14	SSW16	SW16	SW15	SW14	SW13	WSW10	WSW9	W11	W15	W11	W11	WSW11	SW11	SW11	WSW11	SW11	SW12	SW13	WSW12	SW12.0	SSW19	
12-Nov	SW10	SW10	SW9	SW11	WSW11	SW9	SW11	SW13	SW12	SW12	SW11	SSW10	SSW12	SSW14	SSW13	S12	S11	S13	S14	S15	S14	S16	S16	S16	SSW11.5	S16	
13-Nov	S16	SSW16	SSW17	SSW16	SSW15	SSW16	SSW16	SW14	SSW14	SW15	WSW11	SSW11	SSW12	SSW11	SSW11	SW12	SW12	WSW15	SW14	SW13	WSW14	W15	WSW16	WSW15	SW13.0	SSW17	
14-Nov	WSW15	WSW16	WSW16	WSW17	WSW15	WSW16	WSW16	SW12	SW14	SW14	SW13	SW13	WSW13	WSW12	WSW10	SW10	SW10	SW10	SW11	SW11	SW11	SW10	SW11	SW9	SW12.5	WSW17	
15-Nov	SSW10	SW8	NW2	ESE3	SE5	ENE5	ENE7	E7	NE6	NNE6	ENE9	NE10	NE12	ENE13	ENE13	ENE12	ENE10	NE8	NE9	NE8	ENE8	ENE5	ENE3	ENE6.0	ENE13		
16-Nov	NNW2	WNW6	WNW8	WNW10	WNW12	WNW14	WNW13	WNW15	WNW17	WNW16	WNW15	WNW15	WNW16	WNW12	WNW12	W10	W8	SSW8	SW9	SW10	SSW9	S9	S10	W9.2	WNW17		
17-Nov	S10	S10	S9	S13	S12	S13	S15	SSW17	SSW17	SSW16	SSW16	SW14	SW10	SW9	SW10	SW7	SW6	SW10	WSW9	W12	WNW12	WNW13	NW13	NW14	SW9.0	SSW17	
18-Nov	NW15	NW13	WNW14	WNW15	WNW14	WNW16	WNW14	NW15	NW15	NW16	NW17	NW15	NNW14	NNW14	NW14	NW13	NW11	NNW9	NNW9	NNW6	NW6	NW8	NW7	WNW6	NW12.0	NW17	
19-Nov	WNW4	W4	W3	WNW3	WNW3	W2	WSW2	SW2	NW2	SSE1	SW3	SSW2	W0	WNW4	NNW4	NNW2	WNW3	WNW4	WNW6	NW6	NNW4	NW3	WNW4	WSW4	WNW2.6	WNW6	
20-Nov	W4	WNW7	WNW4	WSW4	WNW7	NW7	NW5	WNW5	WNW3	W5	W6	W6	WSW6	SW7	SSW9	SSW9	SSW14	SSW15	SSW15	SSW15	SSW15	SSW15	SW15	SW14	SW17	SW7.5	SW17
21-Nov	WSW17	WSW17	WSW16	W16	WSW14	WSW13	W15	WSW12	WSW13	WSW15	W17	WSW15	W15	WSW13	WSW15	WSW13	WSW13	SW14	SW15	WSW17	W19	W17	W20	W21	WSW15.0	W21	
22-Nov	W21	W20	W20	W19	W18	W20	WNW19	WNW17	WNW19	WNW21	WNW24	NW21	NW17	NW15	NW14	WNW14	NW11	NW10	NW10	WNW9	WNW11	WNW12	WNW12	W12	WNW15.7	WNW24	
23-Nov	WNW12	WNW10	WNW12	WNW12	WNW11	WNW10	W10	WNW9	WNW9	WNW8	WNW8	NW6	NW5	N3	N4	NNE3	NNE4	WSW2	N2	ENE5	NE6	NE6	NE6	NE6	NW5.2	WNW12	
24-Nov	NNE6	N6	NNW8	N6	NNW6	NNW7	NNW7	NNW8	NNW6	NNW6	NNW6	NNW8	NNW7	NW8	NNW6	NNW6	NW4	NW4	NW5	NW6	WNW7	WNW8	WNW8	W8	NW5.9	NW8	
25-Nov	W8	WSW7	WSW7	SW10	SW13	SW14	SW14	SW12	SW10	SW10	W13	W10	W9	WNW8	WNW8	W8	WNW12	WNW12	WNW11	WNW9	WNW10	WNW11	WNW12	WNW12	W9.0	SW14	
26-Nov	W13	WSW11	SW12	SW16	SW17	SW16	SW17	SW19	SW19	SW22	SW21	SW19	SW19	SW17	SSW19	SSW21	SW22	SW23	SW22	SW21	SW18	SW18	SW16	SW15	SW17.6	SW23	
27-Nov	SW15	WSW15	WSW17	W21	W23	W22	W21	W18	W20	W21	WNW18	WNW12	WNW12	WNW12	WNW11	NW8	NW8	NW7	WNW9	WNW9	W13	W11	W10	W11	W13.7	W23	
28-Nov	SW9	SSW11	WSW12	WSW10	W14	W13	WSW10	SW13	SW15	SW14	SW14	SW12	SW10	WSW11	WSW11	SW12	SW12	SW12	WSW12	SW11	WSW12	WSW10	WSW9	W15	WSW11.4	W15	
29-Nov	W15	W16	W17	W14	W14	W17	WNW16	WNW16	WNW16	WNW14	W13	W11	W9	W7	W6	SW8	SW12	SW12	WSW10	WSW11	WSW10	SW9	SW10	WSW11	W11.3	W17	
30-Nov	SW9	SW11	SW13	WSW16	WSW15	WSW15	WSW14	WSW13	SW12	SW12	SW11	SW9	SW9	WSW9	WSW9	SW11	SW13	SW14	SW13	SW13	SW13	SW13	WSW13	W14	W11	SW11.9	WSW16

WSW6.3	WSW7.2	WSW7.1	WSW7.7	WSW7.8	WSW7.6	WSW7.5	WSW7.1	WSW7.1	WSW7.2	WSW7.0	WSW6.2	WSW5.5	WSW5.5	WSW5.5	WSW5.4	WSW4.9	WSW5.2	SW6.0	SW6.2	SW6.2	SW6.3	WSW6.4	WSW6.6	WSW6.7	WSW7.2	Diurnal Average
W21	W20	W20	W21	W23	W22	W21	SW19	W20	SW22	WNW24	NW21	SSW19	SSW19	SSW19	SSW21	SW22	SW23	SW22	SW21	W19	SW18	W20	W21	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 - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	91	12.64	12.64
6 - 11	329	45.69	58.33
12 - 19	276	38.33	96.67
20 - 28	24	3.33	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Conklin Lookout - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	3	4	5	1	3	6	9	4	4	4	8	9	11	10	6	91
6 - 11	3	9	27	19	7	4	7	2	10	27	59	33	33	41	27	21	329
12 - 19	0	0	1	4	0	0	0	0	15	65	69	39	27	40	14	2	276
20 - 28	0	0	0	0	0	0	0	0	0	3	6	0	12	2	1	0	24
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	7	12	32	28	8	7	13	11	29	99	138	80	81	94	52	29	720

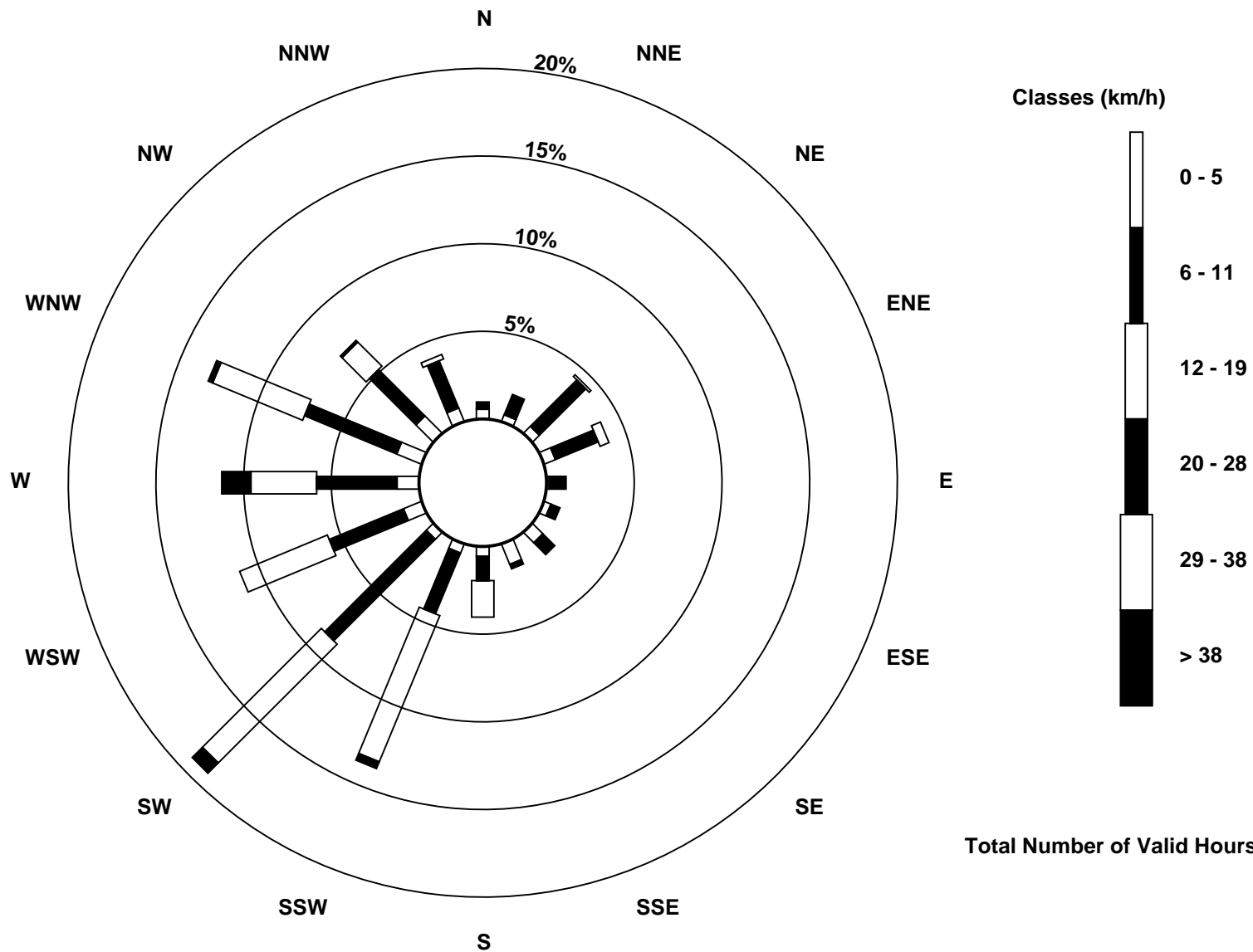
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Conklin Lookout (AMS 18)





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 8 km/h on Nov 22 12:00	Hours of Data: 720
Minimum Value: 1 km/h on Nov 19 07:00	Hours of Missing Data: 0
	Hours of Calibration: 0
	Percent Operational Time: 100.0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6	

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

7	6	6	6	6	7	6	6	6	7	8	8	6	5	6	6	6	6	6	6	6	6	5	6	6	
Diurnal Maximum																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Conklin Lookout - November 2015

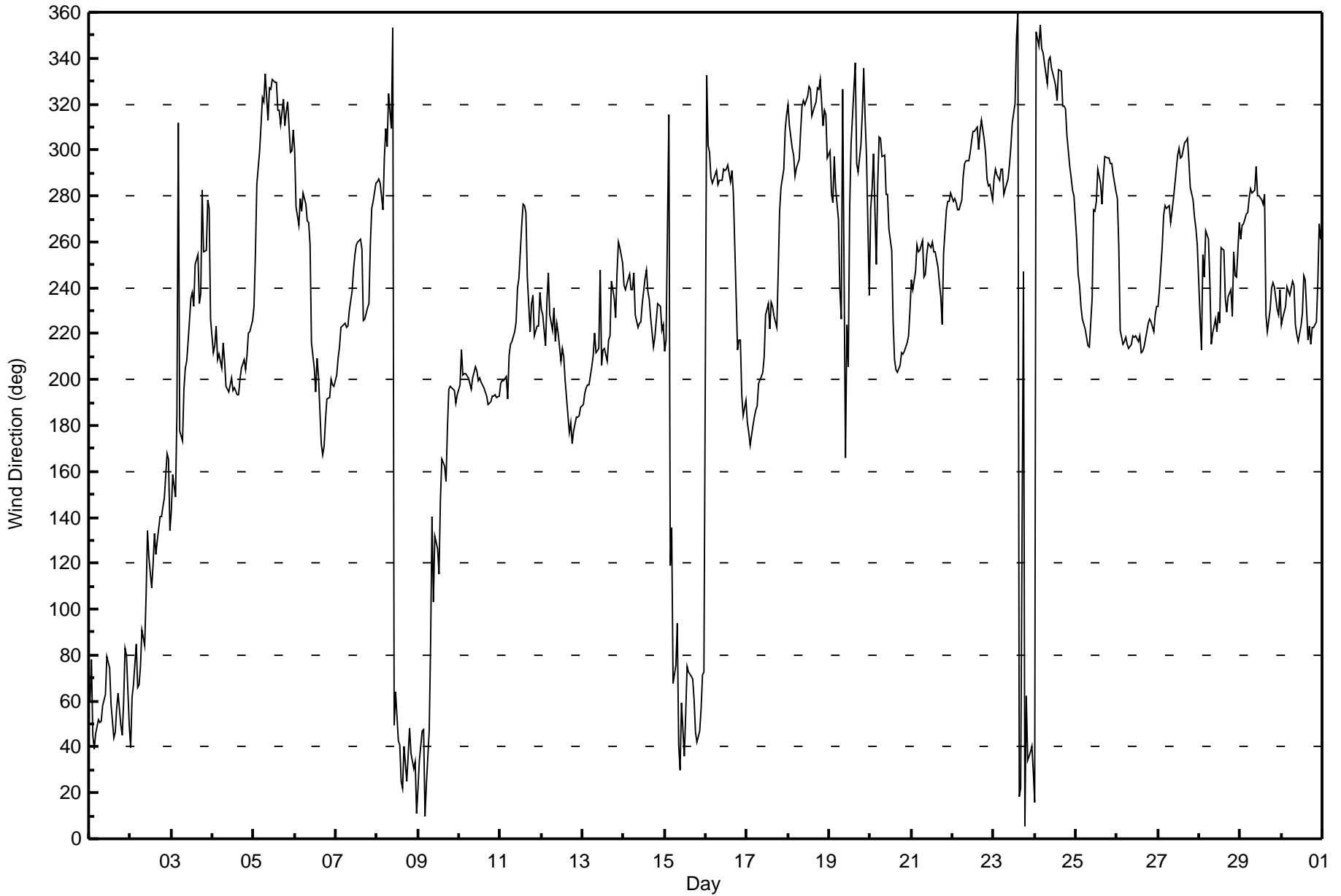
Direction of Maximum Speed: 299 deg on Nov 22 11:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 221.7 deg on Nov 26		Hours of Data:	720
Direction of Minimum Speed: 275 deg on Nov 19 13:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.1 deg on Nov 9		Percent Operational Time:	100.0
Monthly Average Direction: 258.1 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-Nov	60	78	45	39	46	52	51	52	58	63	79	77	74	59	44	46	57	63	49	45	60	83	80	49	58.7
2-Nov	40	62	67	85	66	67	75	91	84	106	134	123	109	119	133	124	130	140	141	145	148	168	165	134	110.0
3-Nov	143	159	149	186	312	177	173	196	205	208	217	236	238	232	250	255	233	237	282	256	256	278	275	227	227.5
4-Nov	212	214	223	209	211	205	216	208	197	195	198	201	196	196	193	193	200	205	209	205	211	220	221	226	205.7
5-Nov	232	254	285	299	311	323	321	333	313	327	326	331	330	329	318	318	311	322	310	317	321	299	299	309	310.2
6-Nov	299	275	267	279	274	281	277	269	269	259	216	205	194	209	201	172	167	171	183	192	192	200	198	197	213.7
7-Nov	202	209	214	222	223	225	223	223	230	239	248	254	259	260	261	257	226	226	231	233	259	274	278	286	236.3
8-Nov	286	288	285	274	297	309	302	325	310	353	50	64	43	41	25	22	40	25	37	48	37	30	33	11	5.2
9-Nov	22	34	47	47	10	24	47	85	141	103	132	126	116	147	166	162	155	179	196	197	196	195	190	193	146.1
10-Nov	198	213	202	202	203	201	198	196	201	205	204	200	201	199	197	195	193	189	190	193	193	193	192	193	197.9
11-Nov	198	200	200	201	192	211	215	216	221	225	240	244	267	277	276	273	245	221	233	237	219	223	223	238	225.2
12-Nov	231	228	215	234	247	228	221	231	217	224	220	208	213	210	199	184	177	181	172	177	183	184	184	188	203.8
13-Nov	189	194	196	198	198	205	210	220	212	214	248	206	213	213	208	217	219	243	236	227	247	260	258	251	219.5
14-Nov	241	239	241	246	239	239	246	228	223	224	225	233	244	248	239	235	227	214	218	226	233	232	221	224	233.7
15-Nov	212	217	316	119	135	68	75	94	41	30	59	36	54	75	73	71	70	60	46	42	47	57	72	72	65.9
16-Nov	333	302	299	288	286	289	291	285	287	287	292	291	292	293	286	291	281	259	213	218	217	193	184	191	274.6
17-Nov	181	177	172	180	184	187	189	198	201	203	210	228	233	222	234	232	228	223	247	273	284	292	309	315	221.3
18-Nov	319	311	301	298	289	292	296	308	319	322	320	323	328	327	315	319	321	327	327	331	310	317	315	297	313.3
19-Nov	299	281	277	297	283	270	239	226	326	166	224	206	275	302	327	338	294	290	302	316	336	314	297	237	290.6
20-Nov	275	283	299	250	286	306	305	297	298	281	281	265	256	225	209	204	203	206	211	211	212	216	219	230	234.7
21-Nov	243	239	247	259	256	256	261	245	246	254	259	258	260	255	255	249	242	236	224	255	274	278	277	281	255.8
22-Nov	278	279	277	274	274	278	289	294	295	295	299	304	308	308	310	300	308	313	305	298	288	284	285	278	291.4
23-Nov	287	292	289	287	292	292	281	283	288	294	301	312	320	349	360	18	22	247	5	62	34	38	40	29	310.4
24-Nov	16	351	345	355	344	342	333	329	339	340	336	330	328	322	335	334	319	319	318	306	293	288	282	280	325.8
25-Nov	261	246	241	232	226	222	218	215	214	235	274	273	278	292	285	276	289	297	296	294	294	294	289	282	263.2
26-Nov	279	258	221	216	216	219	215	214	215	219	218	219	217	219	212	212	214	221	225	226	225	221	228	232	221.7
27-Nov	232	239	258	272	276	274	276	268	273	279	285	298	301	297	297	304	304	305	295	284	278	271	266	259	276.2
28-Nov	228	213	255	245	265	261	242	215	220	227	221	230	224	257	256	236	230	236	239	227	255	246	245	269	239.4
29-Nov	261	267	268	272	273	279	283	282	283	293	280	280	278	276	281	228	221	231	240	242	240	231	228	239	263.4
30-Nov	224	227	232	240	239	237	243	241	224	219	217	223	229	245	244	217	223	216	223	222	225	242	268	261	232.8

244.2 242.1 247.8 246.8 250.3 251.0 249.5 243.5 244.2 247.2 250.0 250.8 253.6 254.0 251.5 242.7 231.6 229.1 234.2 234.3 242.1 244.0 245.9 246.6

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

Conklin Lookout - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 84 deg on Nov 19 13:00																			Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: 13 deg on Nov 15 05:00																									
Percentiles: P ₁ = 14 P ₁₀ = 17 Q ₁ = 18 Median = 20 Q ₃ = 23 P ₉₀ = 27 P ₉₉ = 60																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Nov	18	23	19	16	17	15	17	15	16	17	24	21	22	24	21	17	18	19	20	17	17	23	20	19	24
2-Nov	17	18	19	21	20	19	18	19	20	24	23	24	22	26	24	25	20	18	18	16	18	35	69	15	69
3-Nov	20	26	18	71	84	22	21	19	17	18	25	24	25	28	24	22	21	21	27	26	42	28	41	25	84
4-Nov	23	18	19	19	19	18	20	19	19	19	18	19	19	21	20	20	19	20	19	21	18	18	18	18	23
5-Nov	20	24	20	23	21	26	22	29	28	27	28	29	31	32	25	25	25	25	25	26	28	25	23	24	32
6-Nov	27	21	24	23	23	22	30	37	35	32	31	26	19	27	25	23	19	19	19	19	18	18	18	17	37
7-Nov	17	19	18	18	18	17	15	16	18	24	25	26	24	26	24	24	17	16	18	19	25	21	21	18	26
8-Nov	18	19	21	27	19	16	22	15	42	27	35	23	16	20	18	20	18	18	18	18	18	20	19	21	42
9-Nov	20	20	16	26	29	30	30	24	30	29	35	44	61	35	26	25	31	26	21	20	19	19	23	21	61
10-Nov	19	21	21	20	20	20	20	20	19	19	19	19	20	20	20	20	18	18	18	18	17	18	18	18	21
11-Nov	17	17	17	19	24	21	20	18	18	17	22	24	24	22	20	22	21	17	20	19	17	16	16	19	24
12-Nov	20	17	15	18	23	18	16	17	15	17	18	20	21	23	19	21	20	22	22	24	22	19	20	18	24
13-Nov	18	17	16	17	16	17	18	17	16	19	31	17	16	16	18	20	18	21	23	19	21	23	22	22	31
14-Nov	22	20	20	21	20	20	21	19	17	17	18	21	26	29	24	20	19	15	16	16	17	17	16	16	29
15-Nov	16	15	61	47	13	18	17	19	27	25	21	20	16	21	18	18	17	17	17	15	15	15	20	24	61
16-Nov	56	16	21	19	20	21	22	22	21	22	23	23	24	22	25	23	25	27	16	15	17	16	16	16	56
17-Nov	18	19	21	21	20	18	18	17	16	17	19	22	22	22	21	19	17	18	21	19	19	21	23	24	24
18-Nov	22	22	22	22	22	21	23	23	23	22	21	24	25	24	23	24	24	25	24	23	18	18	18	21	25
19-Nov	19	21	16	17	17	17	28	60	54	36	29	31	84	30	42	46	28	25	18	17	13	22	15	19	84
20-Nov	28	19	22	28	24	23	28	24	34	27	32	29	31	23	20	18	16	17	18	18	18	18	18	20	34
21-Nov	21	21	23	22	25	24	23	24	22	22	22	24	22	25	23	23	23	23	19	23	22	22	21	21	25
22-Nov	22	21	20	21	23	22	22	22	21	22	23	25	26	23	26	24	22	23	22	23	21	23	20	20	26
23-Nov	21	20	20	20	20	20	20	21	21	20	23	23	31	26	26	17	52	31	32	19	21	20	18	19	52
24-Nov	20	29	26	25	23	26	28	26	29	26	26	28	30	25	28	30	20	21	26	25	25	24	26	25	30
25-Nov	24	18	19	20	18	18	18	17	17	23	21	23	25	26	23	19	19	20	19	18	17	17	17	17	26
26-Nov	15	23	15	16	17	17	17	18	17	18	18	19	19	18	18	19	18	20	20	19	21	19	19	20	23
27-Nov	19	19	25	21	19	20	21	22	21	20	20	21	21	21	22	18	18	19	18	20	18	19	22	23	25
28-Nov	21	15	25	27	23	24	26	15	16	17	16	19	20	27	23	18	18	20	20	18	24	33	38	25	38
29-Nov	23	24	22	23	23	21	19	18	20	21	21	19	24	22	22	26	14	17	21	17	20	20	17	16	26
30-Nov	19	15	16	18	16	17	20	21	13	14	16	17	21	26	24	13	14	14	15	15	15	20	20	19	26
																			56 29 61 71 84 30 30 60 54 36 35 44 84 35 42 46 52 31 32 26 42 35 69 25						
Diurnal Maximum																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 10, 2015	Last Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	13:03
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	885	889
Calculated slope	0.994299	1.000843	Chamber temp	44.9	45.1
Calculated intercept	-0.904979	1.489674	Pressure	660.7	654.6
Analyzer Background	23.1	23.4	Flow	0.431	0.426
Analyzer Coefficient	0.928	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	-0.6	----
as found span	5000	58.6	574.3	582.2	0.986
calibrator zero	5000	0.0	0.0	-0.6	----
high point	5000	58.6	574.3	573.0	1.002
second point	5000	29.3	287.1	284.2	1.010
third point	5000	14.6	143.1	141.1	1.014
as left zero	5000	0.0	0.0	-0.6	----
as left span	5000	58.6	574.3	574.4	1.000
Average Correction Factor					1.009

Corrected As found 582.8 Previous response 578.5 % change -0.7%

Notes:

No maintenance done, Span adjusted filter changed out

Calibration Performed By: Melissa Lemay



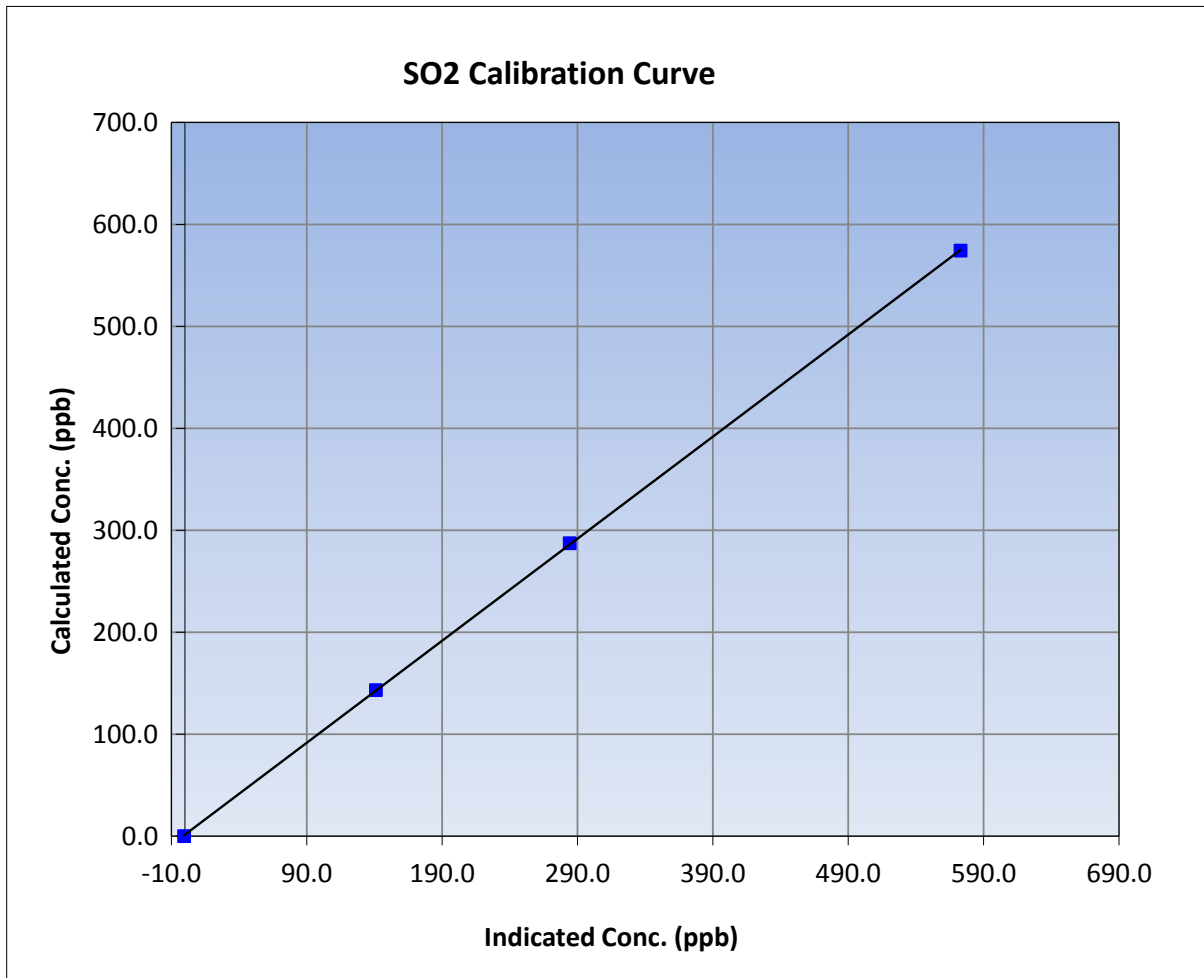
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:40	End Time (MST)	13:03
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

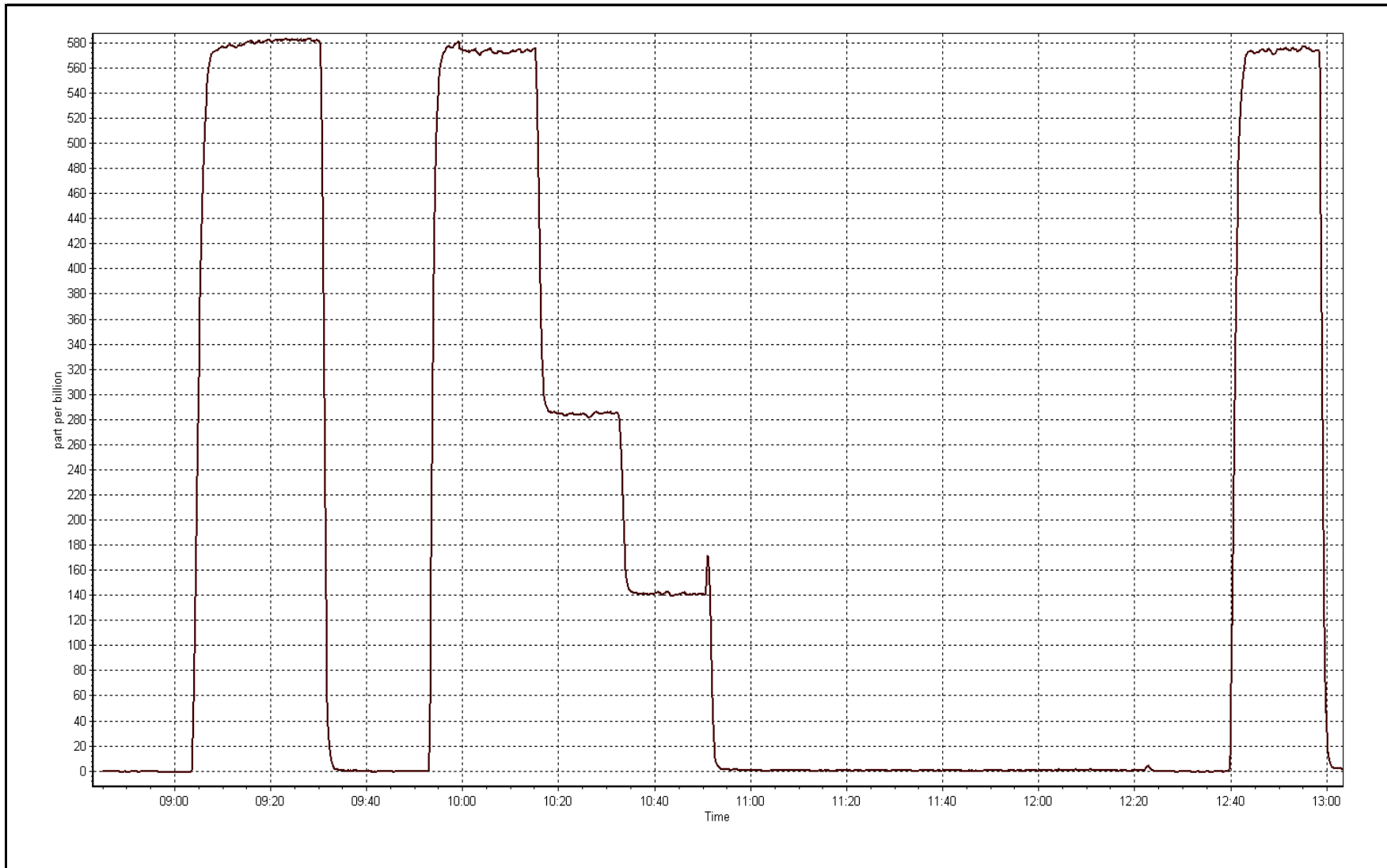
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	----	Correlation Coefficient	0.999984
574.3	573.0	1.0022		
287.1	284.2	1.0103	Slope	1.000843
143.1	141.1	1.0140		
			Intercept	1.489674



SO2 Calibration Plot

Date: November 10, 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	November 20, 2015	Last Calibration	October 8, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	13:05
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	06/10/2014
Calibrator Make/Model	API 700	Serial Number	1222
Dil air Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000368 10/Jun/15

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-699
Analyzer IP address	192.168.1.44		Lamp voltage	1013	1018
Calculated slope	1.001230	1.010422	Chamber temp	45	45
Calculated intercept	-0.186744	-0.072921	Pressure	640.2	641.7
Analyzer Background	1.63	1.63	Flow	0.413	0.414
Analyzer Coefficient	0.976	0.976	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	-0.1	----
as found span	5000	82.0	80.0	79.1	1.012
SO2 scrubber check	5000	19.5	191.1	1.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	82.0	80.0	79.1	1.012
second point	5000	41.0	40.0	40.0	1.000
third point	5000	20.5	20.0	19.9	1.004
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	82.0	80.0	80.1	0.999
Average Correction Factor					1.005

Corrected As found	79.2	Previous response	80.1	% change	1.1%
--------------------	------	-------------------	------	----------	------

Notes:

no maintenance or adjustments done, filter changed out

Calibration Performed By:

Melissa Lemay



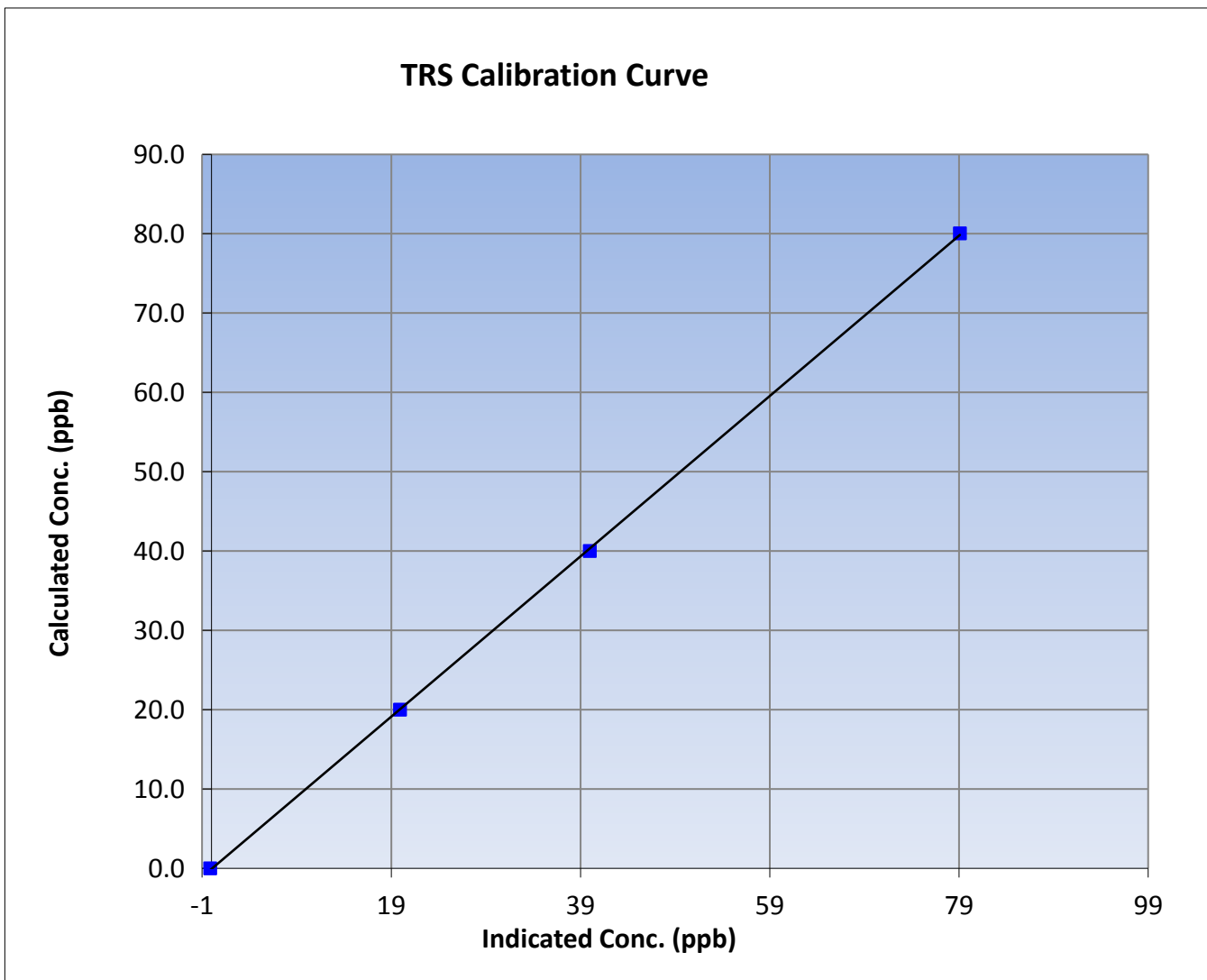
Wood Buffalo Environmental Association TRS Calibration Report

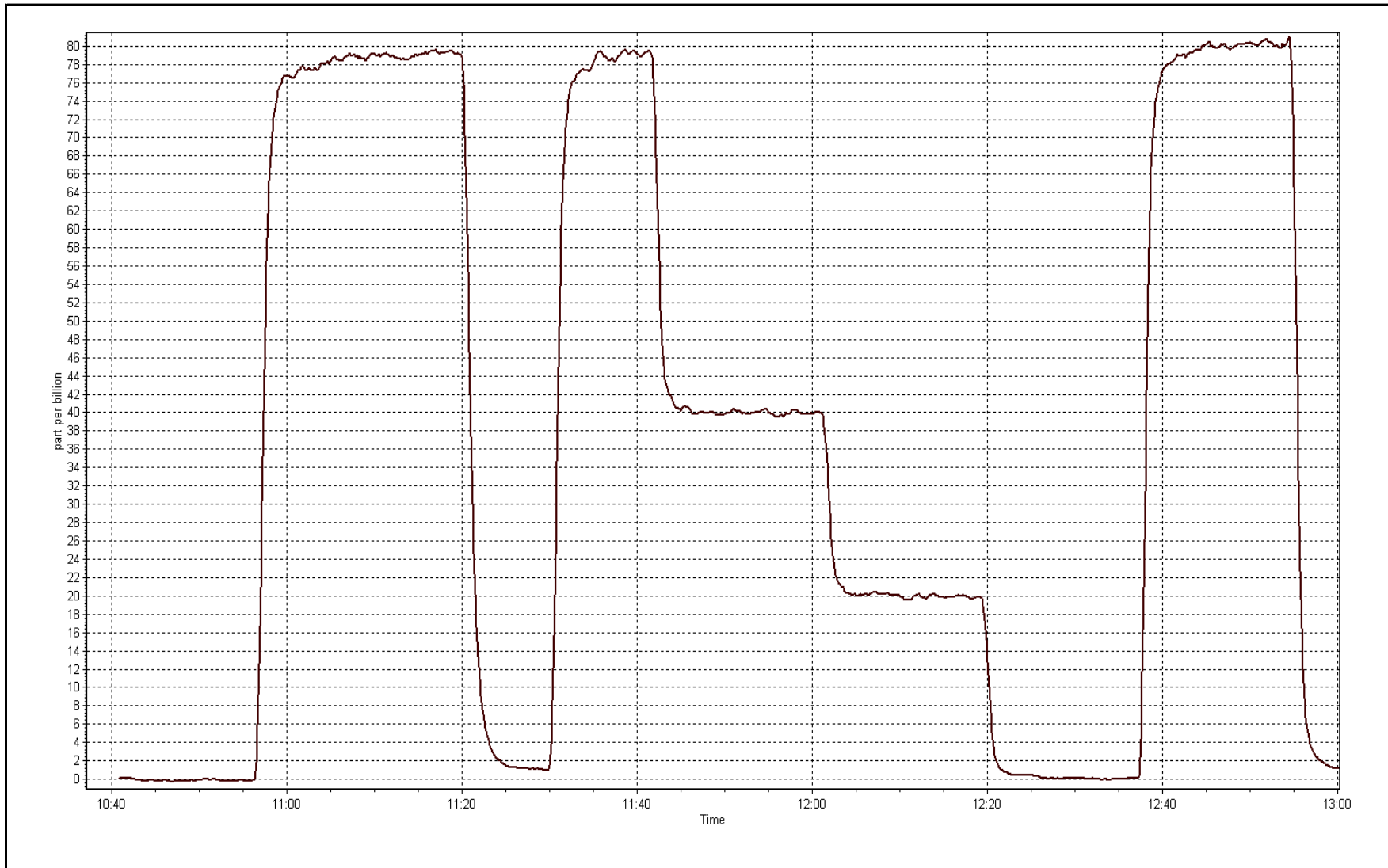
Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 8, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	10:40	End Time (MST)	13:05
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	-0.1	----	Correlation Coefficient	0.999947
80.0	79.1	1.0118		
40.0	40.0	1.0004	Slope	1.010422
20.0	19.9	1.0039		
			Intercept	-0.072921







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	November 10, 2015	Last Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	13:03
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	75.4	75.1
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	0.999774	0.999271	Carrier Pressure	31.7	31.7
THC Calc intercept	-0.067954	0.019789	Fuel Pressure	42.2	42.2
NMHC Calc slope	0.995137	1.000087	Air Pressure	32.5	32.4
NMHC Calc intercept	-0.029841	0.005782			

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	12.29	1.026
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	12.61	12.62	0.999
second point	5000	29.3	6.31	6.26	1.007
third point	5000	14.6	3.14	3.12	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	12.61	12.74	0.990
Average Correction Factor					1.005

Corrected As found 12.29 Previous response 12.68 % change 3.2%

Notes:

No maintenance done, 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	6.37	1.027
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	3.26	1.003
third point	5000	14.6	1.63	1.62	1.006
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.54	6.62	0.988
Average Correction Factor					1.003

Corrected As found 6.37 Previous response 6.60 % change 3.7%

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	58.6	6.07	5.92	1.026
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.07	6.08	0.999
second point	5000	29.3	3.04	3.00	1.012
third point	5000	14.6	1.51	1.49	1.015
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.07	6.12	0.992
Average Correction Factor					1.008

Corrected As found 5.92 Previous response 6.08 % change 2.7%



Wood Buffalo Environmental Association

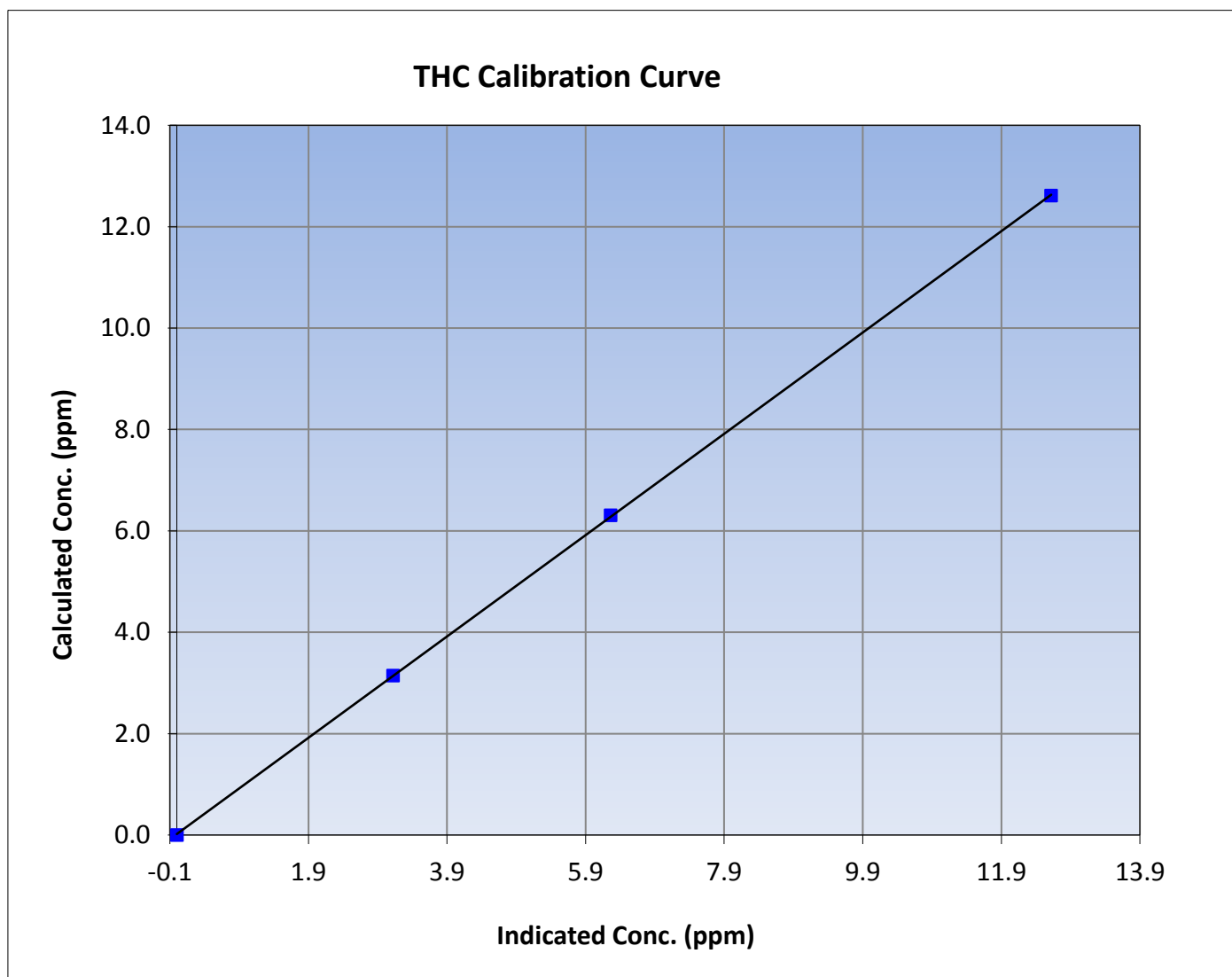
THC Calibration Summary

Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:40	End Time (MST)	13:03
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	0.999980
12.61	12.62	0.9995		
6.31	6.26	1.0075	Slope	0.999271
3.14	3.12	1.0073		
			Intercept	0.019789





Wood Buffalo Environmental Association

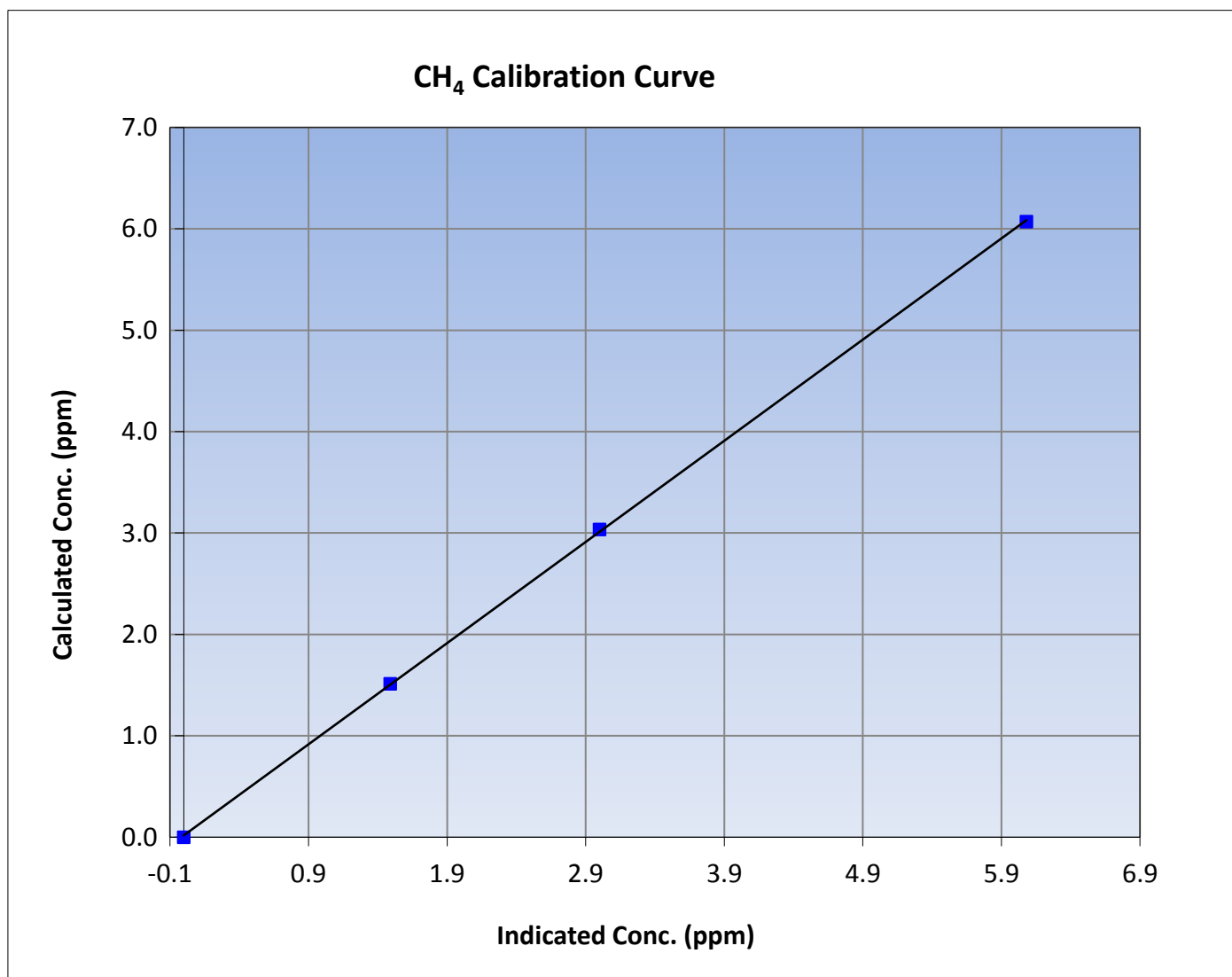
CH₄ Calibration Summary

Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:40	End Time (MST)	13:03
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	0.999943
6.07	6.08	0.9985		
3.04	3.00	1.0118	Slope	0.997808
1.51	1.49	1.0151		
			Intercept	0.018041





Wood Buffalo Environmental Association

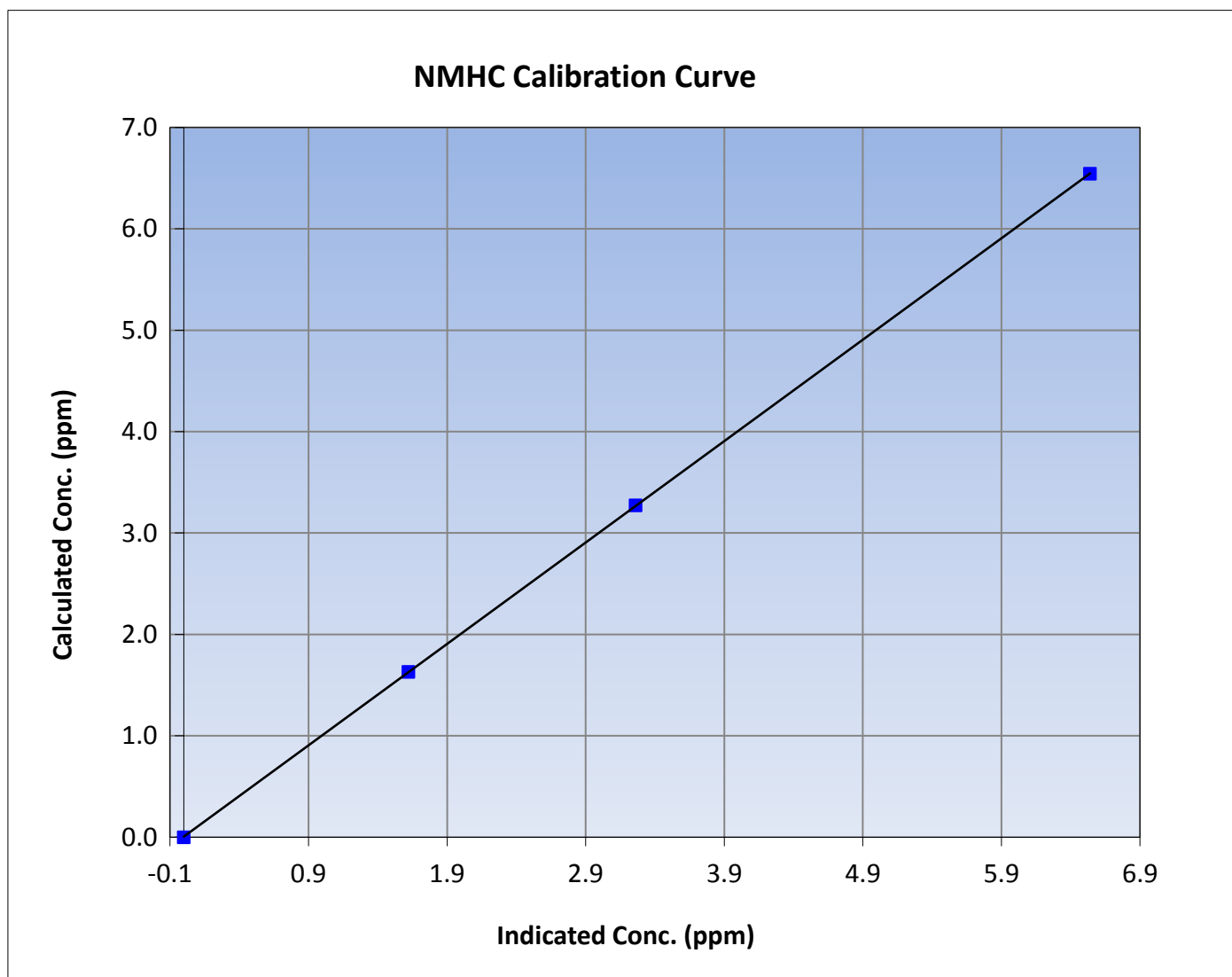
NMHC Calibration Summary

Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:40	End Time (MST)	13:03
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

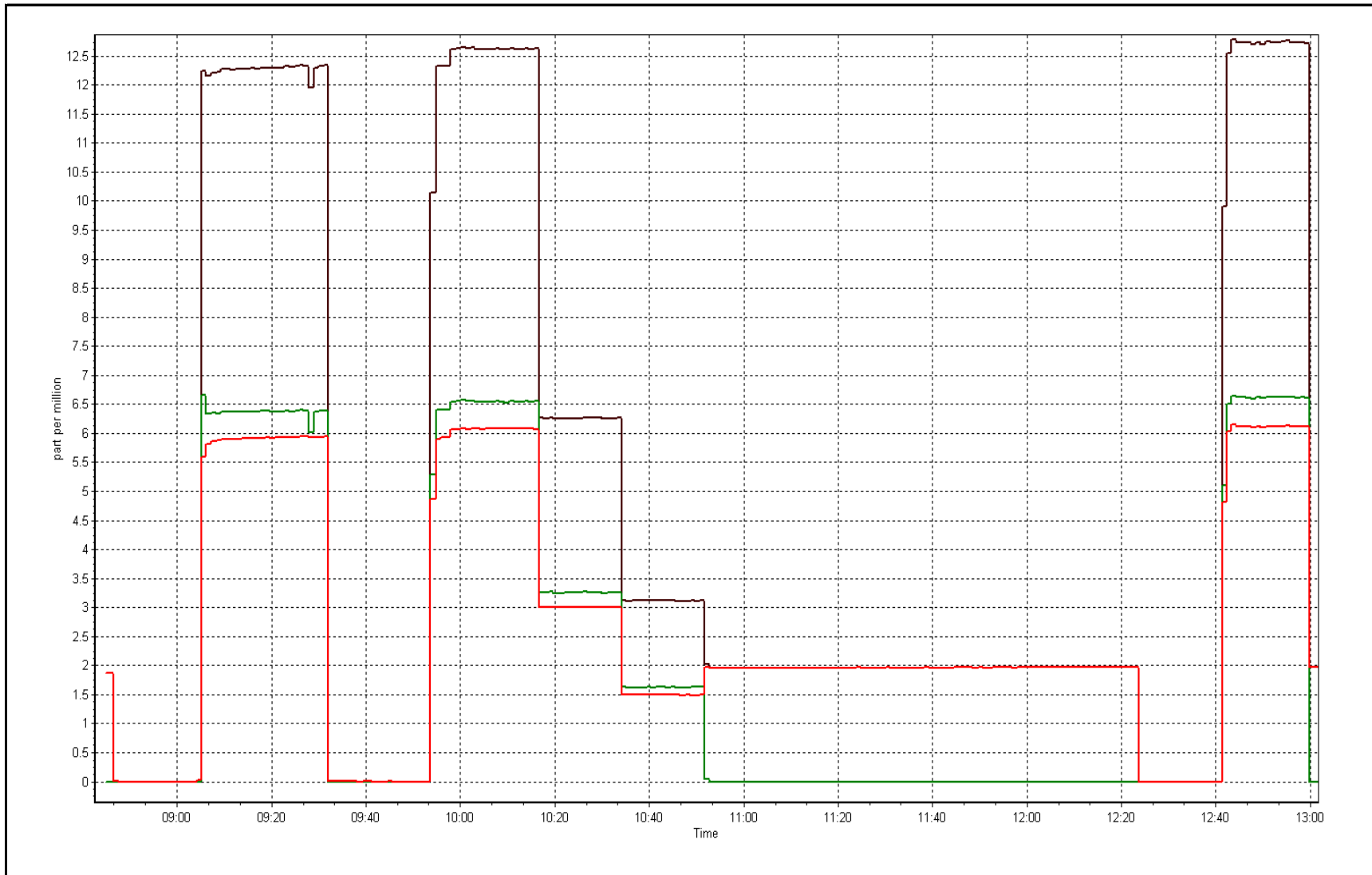
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
6.54	6.54	1.0004		
3.27	3.26	1.0035	Slope	1.000087
1.63	1.62	1.0062		
			Intercept	0.005782



THC Calibration Plot

Date: November 10, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 6, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	10:43
NO2 GPT Ref date	November-10-15	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9305

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.7	26.9
Analyzer IP address	192.168.1.48		Lamp temp.	53.2	53.2
Calculated slope	1.000241	0.994709	Pressure	615.8	633.5
Calculated intercept	-1.179931	0.184699	Flow cell A	0.695	0.708
Analyzer Background	-1.6	-1.6	Flow cell B	0.692	0.705
Analyzer Coefficient	1.016	1.043	Cell A Intensity	88012	82600
			Cell B Intensity	79668	76466

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
---------------	------------	-------------------	------------

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.4	----
as found span	5000	757.00	369.3	358.6	1.030
calibrator zero	5000	0.00	0.0	-0.7	----
high point	5000	757.00	369.3	370.9	0.996
second point	5000	520.00	251.5	252.5	0.996
third point	5000	270.00	129.9	131.2	0.990
as left zero	5000	0.00	0.0	1.4	----
as left span	5000	757.00	369.3	376.9	0.980
Average Correction Factor					0.994

Corrected As found	359.0	Previous response	370.4	% change	3.2%
--------------------	-------	-------------------	-------	----------	------

Notes:

Filter changed out, span adjusted, no maintenance done

Calibration Performed By: Melissa Lemay



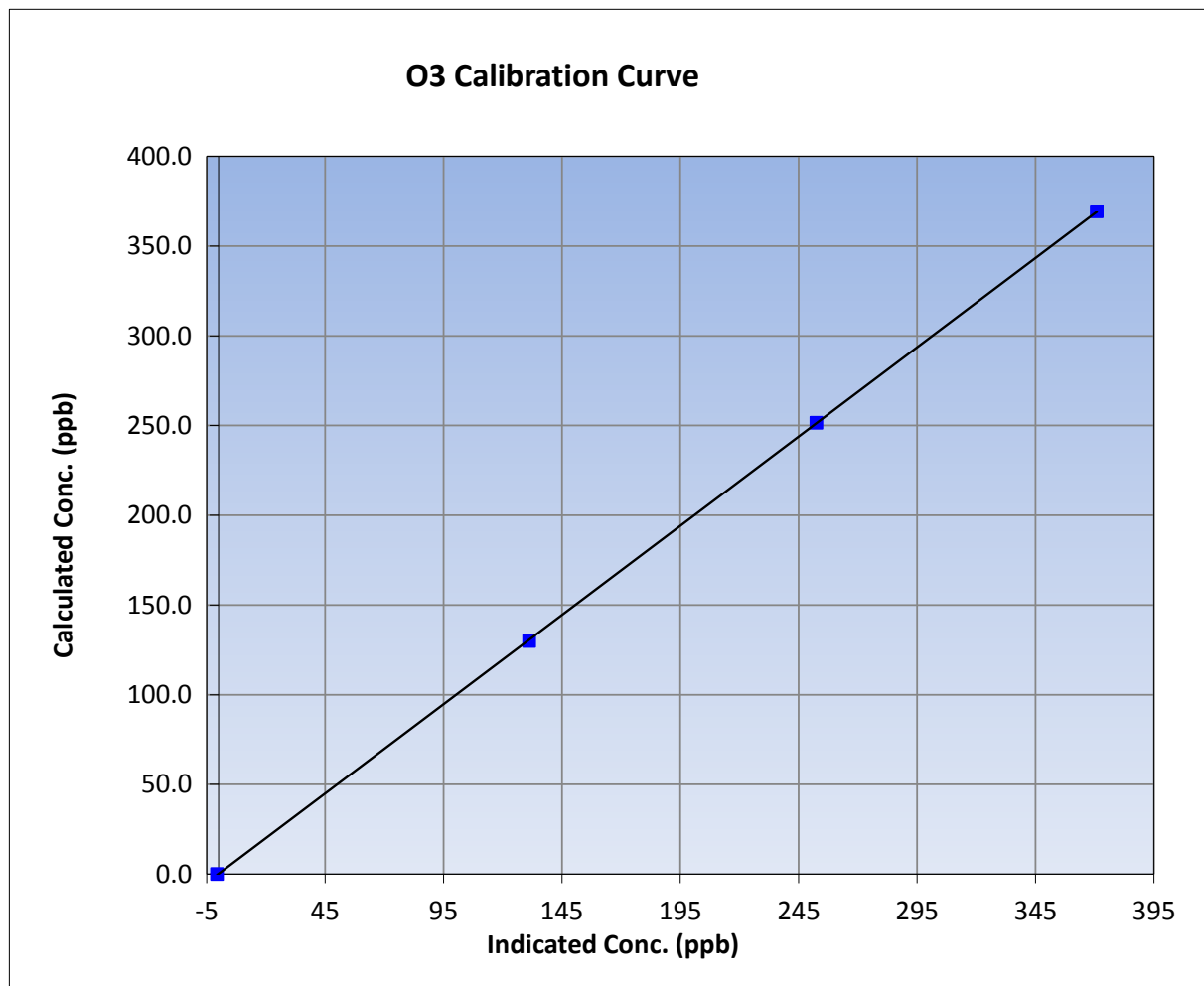
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	November-20-15	Previous Calibration	October 6, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:25	End Time (MST)	10:43
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

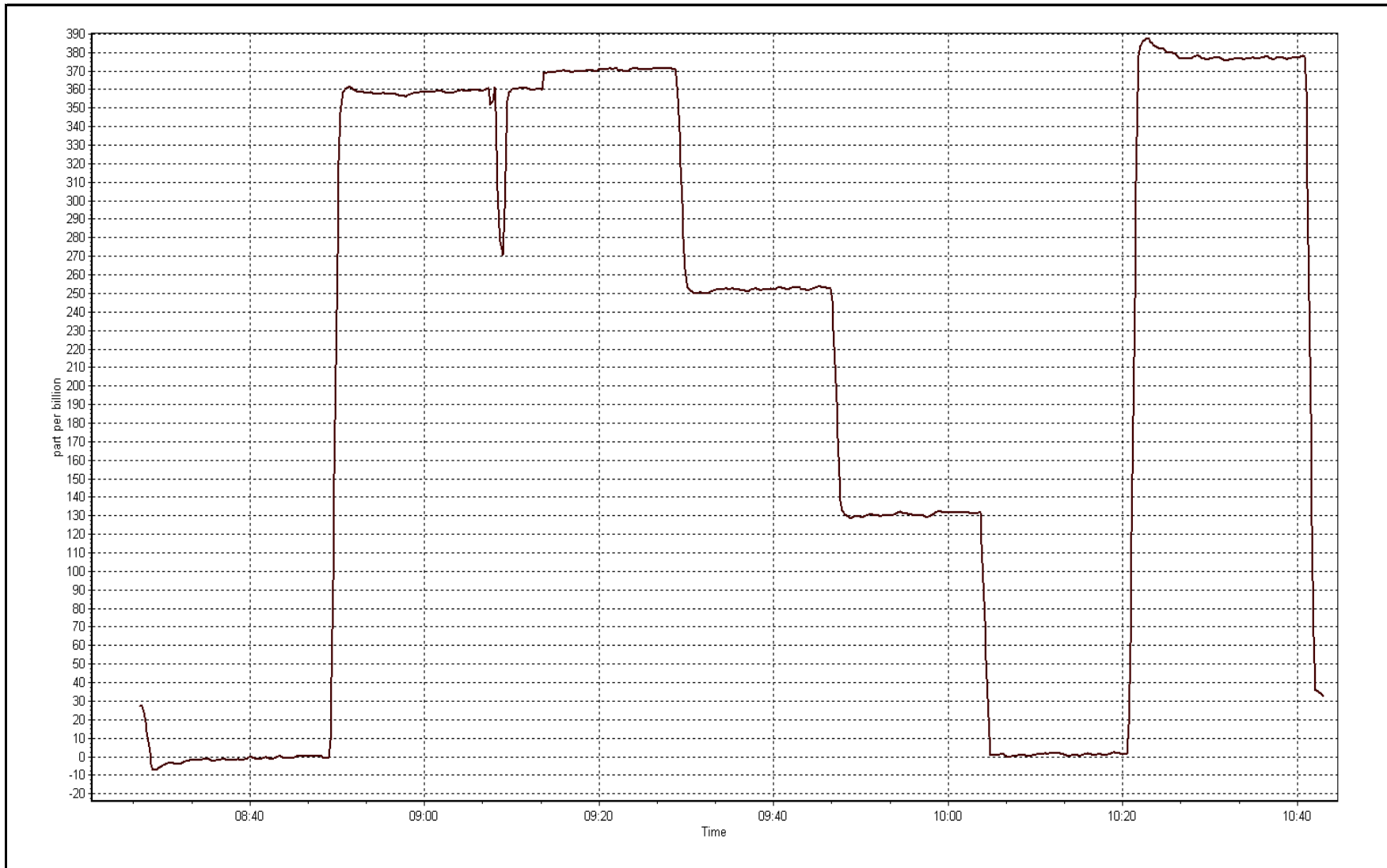
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	----	Correlation Coefficient	0.999988
369.3	370.9	0.9957		
251.5	252.5	0.9960	Slope	0.994709
129.9	131.2	0.9901		
			Intercept	0.184699



O3 Calibration Plot

Date: November 20, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	13:03
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
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.004967	1.003335	0.993329
	Data Offset	-2.941345	-2.645904	-1.258143
Current Calibration	Data Slope	0.997565	0.997063	0.995291
	Data Offset	0.414372	0.995050	-0.231056

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	0.764		0.771	
NOX coefficient	0.995		0.997	
NO2 coefficient	0.999		0.999	
NO bkgrnd	1.6		1.6	
NOX bkgrnd	1.7		1.7	
Chamber Temp	50.5	Deg C	50.6	Deg C
Moly Temp	322.1	Deg C	327.1	Deg C
PMT voltage	-842.5	V	-842.9	V
PMT Temp	-2.8	Deg C	-2.7	Deg C
O3 flow	OK	ccm	OK	ccm
R Cell press NO	152.4	mmHg	153.6	mmHg
R Cell Press Nox	152.4	mmHg	153.6	mmHg
NO sample flow	0.981	lpm	0.957	lpm
Nox sample Flow	0.983	lpm	0.958	lpm

Notes:

No maintenance done, Span adjusted, filter changed out



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 10, 2015

Station Number:

AMS 18

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	5000	58.6	600.1	600.1	0.0	592.6	592.5	0.1	1.0126	1.0128
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	58.6	600.1	600.1	0.0	601.4	601.4	0.0	0.9978	0.9978
second point	5000	29.3	300.0	300.0	0.0	299.8	299.1	0.7	1.0008	1.0031
third point	5000	14.6	149.5	149.5	0.0	149.4	148.3	1.1	1.0007	1.0081
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
as left span	5000	58.6	600.1	235.6	364.5	603.6	226.7	376.9	0.9941	1.0393
Average Correction Factor									0.9997	1.0030

Corrected As found
Previous Response

NO_x= 592.7
NO_x= 600.0

NO= 592.6
NO= 600.7

Percent Change

NO_x= 1.2%

NO= 1.4%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	235.6	369.3	606.6	235.6	371.0	0.9778	1.0000	0.9954	100.5%
2nd NO2 (200)	----	353.4	251.5	606.5	353.4	253.2	0.9779	1.0000	0.9933	100.7%
3rd NO2 (100)	----	475.0	129.9	606.0	475.0	131.0	0.9787	1.0000	0.9916	100.8%
4th NO2 (0)	604.9	----	0.0	604.9	604.9	0.0	0.9805	1.0000	N/A	----
Average Correction Factor							0.9787	1.0000	0.9934	100.7%

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

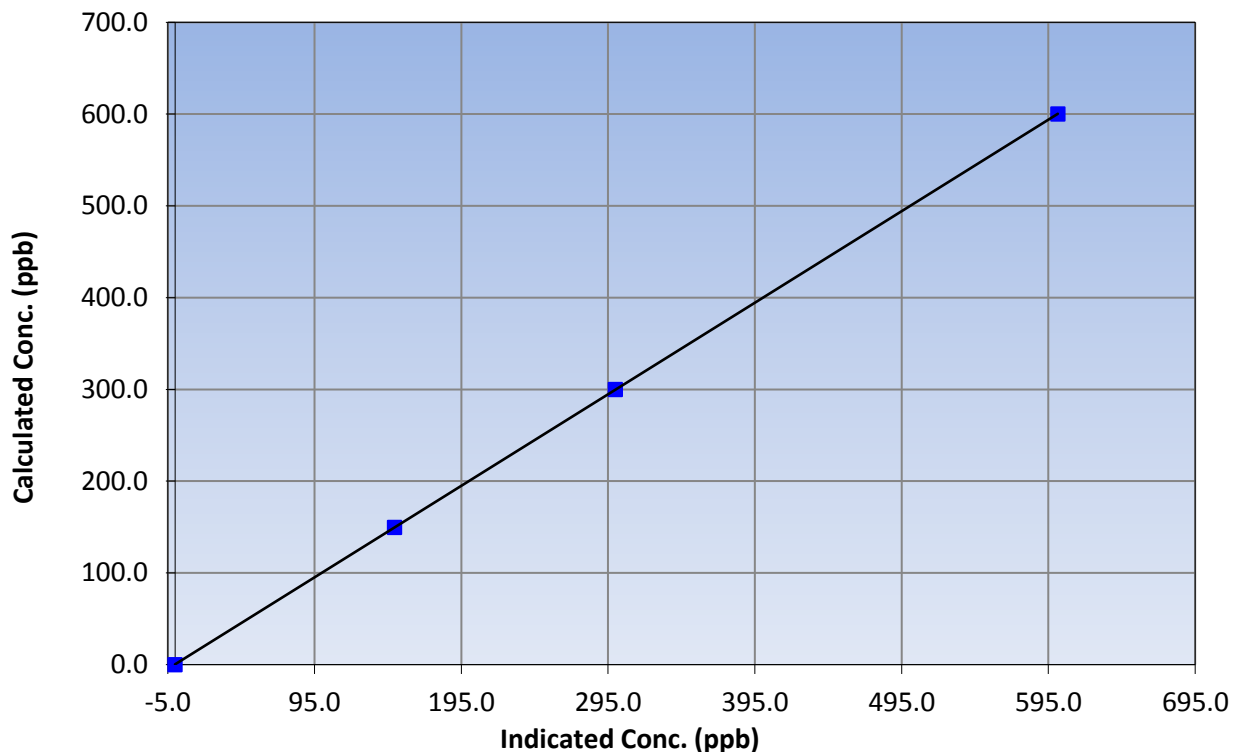
Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:40	End Time (MST)	13:03
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
600.1	601.4	0.9978		
300.0	299.8	1.0008	Slope	0.997565
149.5	149.4	1.0007		
			Intercept	0.414372

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

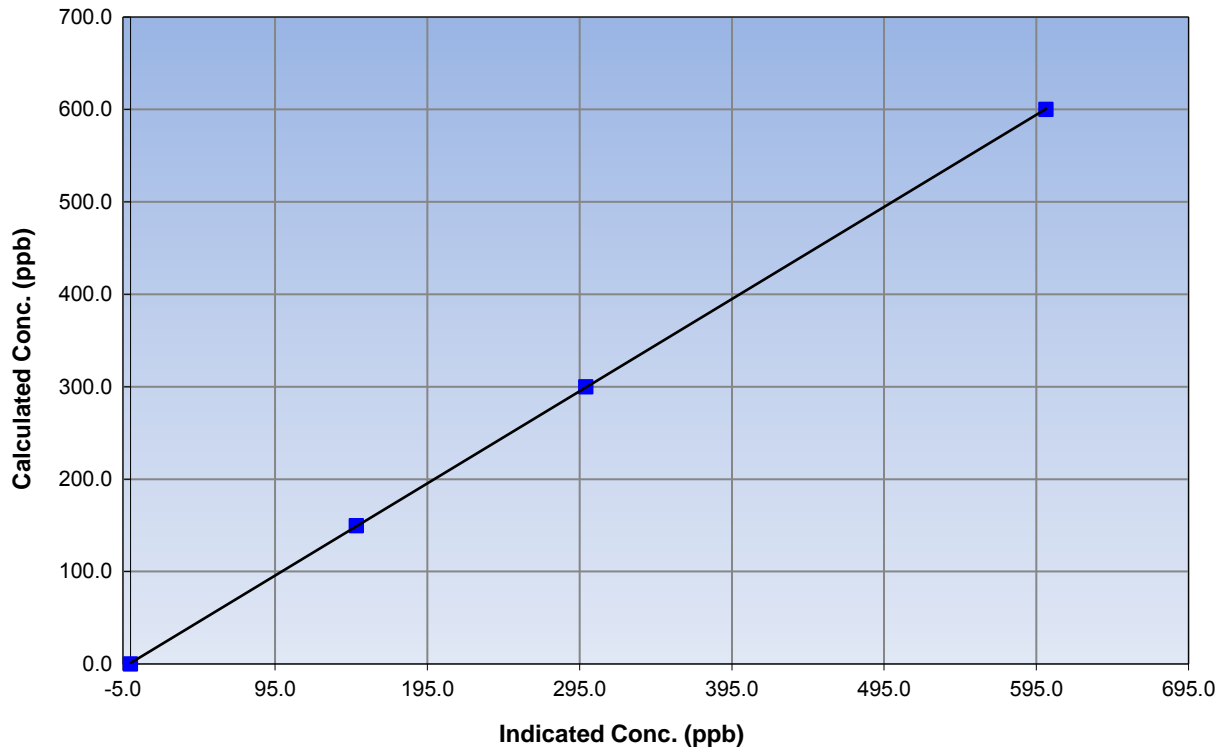
Station Information

Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:40	End Time (MST)	13:03
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999989
600.1	601.4	0.9978		
300.0	299.1	1.0031	Slope	0.997063
149.5	148.3	1.0081		
			Intercept	0.995050

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

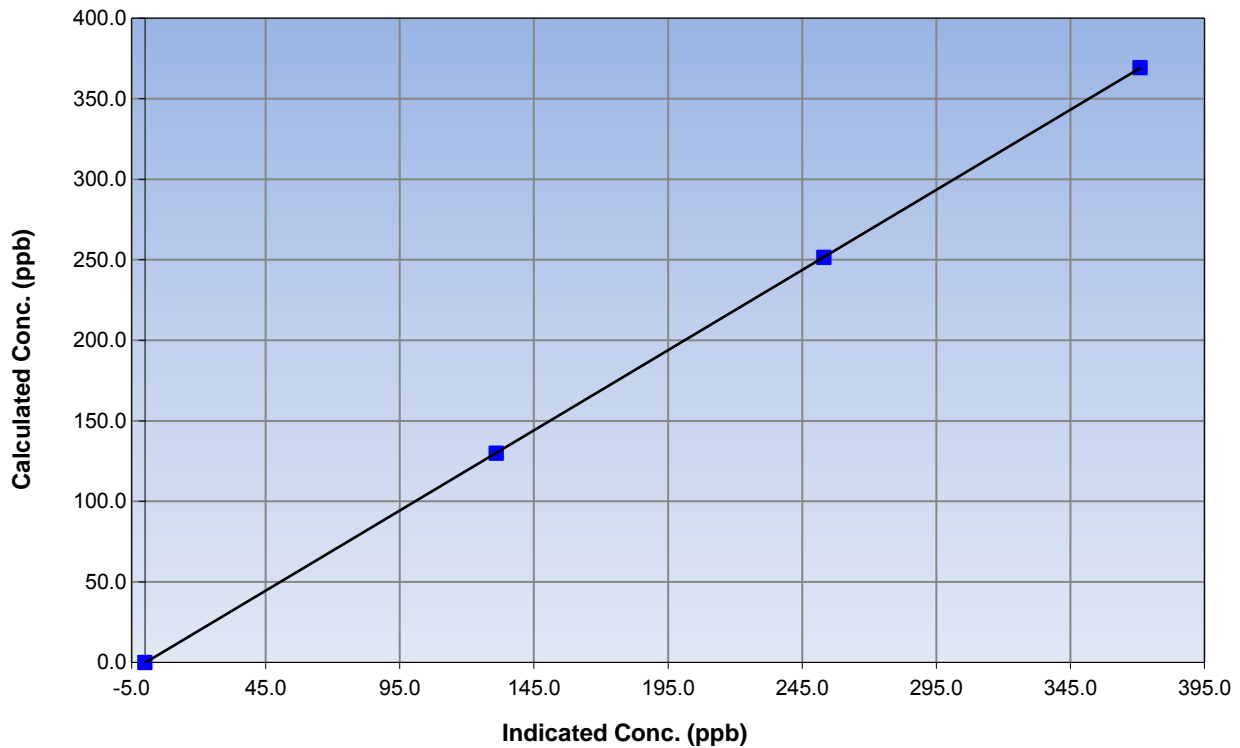
Station Information

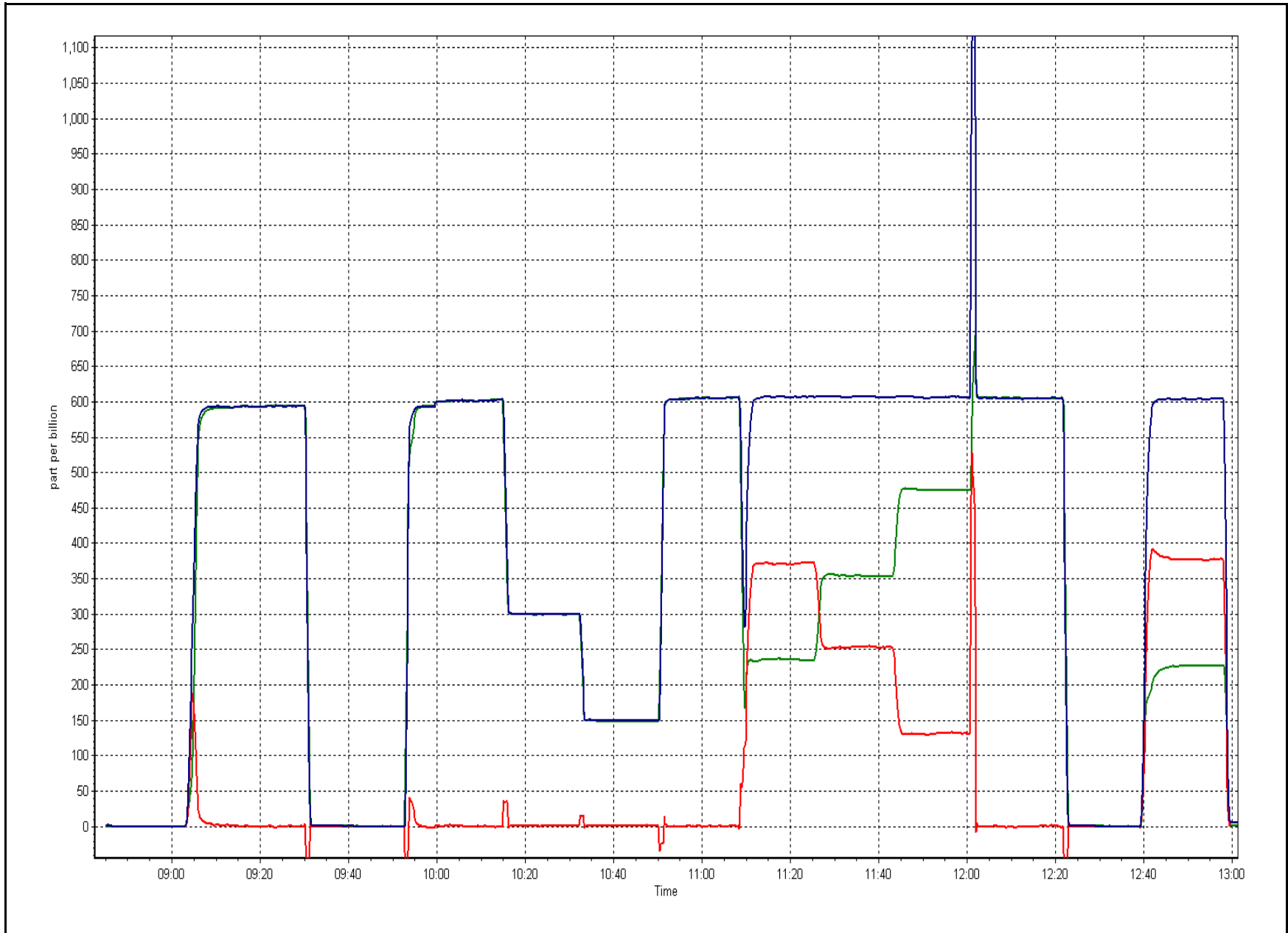
Calibration Date	November 10, 2015	Previous Calibration	October 1, 2015
Station Number	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:40	End Time (MST)	13:03
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999996
369.3	371.0	0.9954		
251.5	253.2	0.9933	Slope	0.995291
129.9	131.0	0.9916		
			Intercept	-0.231056

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

W B E A

STATION INFORMATION

Calibration Date:	<u>November 20, 2015</u>	Previous Calibration:	<u>October 8, 2015</u>
Station Name:	<u>Conklin Lookout</u>	Station Number:	<u>AMS 18</u>
Start Time (MST):	<u>9:29</u>	End Time (MST):	<u>10:10</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1097</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number	<u>E-781</u>
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	-13.0	-14.1	-1.1	-13.0
T2	17.0	na	na	17.0
T3	26.0	na	na	26.0
T4	15.0	na	na	15.0
RH (%)	13.0	na	na	13.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	941	945.0	4.0	941

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	0		0
C14	43.7		43.7
Indicated Concentration (ug/m3)	-0.1	No	-0.1
Offset 1			
Offset 2			

Leak Check (Quarterly)

Leak Check Date:	<u>September 29, 2015</u>	Previous Leak Check Date:	<u>June 30, 2015</u>
------------------	---------------------------	---------------------------	----------------------

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.72	
*Flow with adaptor (LPM):	16.52	0.20

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

Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>June 30, 2015</u>	Previous Foil Calibration:	
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1337</u>	Mass foil set S/N:	12111
Previous Correction Factor:	<u>6983</u>		
New Correction Factor:	<u>7050</u>		

INSPECTION DATA

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

NOTES:

No adjustments made, sample head cleaned

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	<u>November 29, 2015</u>	Previous Calibration:	<u>November 20, 2015</u>
Station Name:	<u>Conklin Lookout</u>	Station Number:	<u>AMS 18</u>
Start Time (MST):	<u>7:40</u>	End Time (MST):	<u>8:50</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1097</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number	<u>E-781</u>
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	2.0	1.6	-0.4	2.0
T2	21.0	na	na	21.0
T3	28.0	na	na	28.0
T4	20.0	na	na	20.0
RH (%)	12.0	na	na	12.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	938	933.0	-5.0	938

Main Flow (Lph)

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

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	291		291
Neph	0.1		0.1
C14	1874		1874
Indicated Concentration (ug/m3)	0.1	No	0.1

Offset 1
Offset 2

Leak Check (Quarterly)

Leak Check Date:	<u>November 29, 2015</u>	Previous Leak Check Date:	<u>September 29, 2015</u>
------------------	--------------------------	---------------------------	---------------------------

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.63	
*Flow with adaptor (LPM):	16.60	0.03

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

Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>June 30, 2015</u>	Previous Foil Calibration:	
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1337</u>	Mass foil set S/N:	12111
Previous Correction Factor:	<u>6983</u>		
New Correction Factor:	<u>7050</u>		

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:

Numbers were high; Beta chamber had a dust ball inside; removed, SHARP checked No adjustments made, sample head cleaned,

Calibration Performed By: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 19
SUNCOR FIREBAG
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 NOVEMBER 2015
 MONTHLY SUMMARY for
 AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	686	34	34	100.00	20	0	8	0
H2S (ppb) Average	686	34	34	100.00	3	0	0	0
THC (ppm) Average	686	34	34	100.00	2.7	-	2.3	-
NO2 (ppb) Average	686	34	34	100.00	23	0	9	-
NO (ppb) Average	686	34	34	100.00	12	-	2	-
NOX (ppb) Average	686	34	34	100.00	31	-	10	-
Temperature 2 m (C) Average	720	0	0	100.00	4.4	-	1.3	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	95	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	34	-	27	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	686	1.7	3	-	0	0	0	0	2	6	20
H2S (ppb) Average	686	0.2	0	-	0	0	0	0	0	0	3
THC (ppm) Average	686	2.16	0.1	-	2.1	2.1	2.1	2.2	2.2	2.2	2.7
NO2 (ppb) Average	686	3.6	4	-	0	0	1	2	5	9	23
NO (ppb) Average	686	0.4	1	-	0	0	0	0	0	1	12
NOX (ppb) Average	686	4	4	-	0	0	1	3	6	10	31
Temperature 2 m (C) Average	720	-5.25	5.1	-	-19.3	-13.9	-8	-4.2	-1.5	0.2	4.4
Relative Humidity (%) Average	720	80.4	15	-	37	56	70	86	92	95	98
Wind Speed 10 m (km/h) Average	720	14.3	7	-	1	5	8	14	19	25	34
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
-----------	-----------------	---------------	---------------------	-------

No operational issues to report

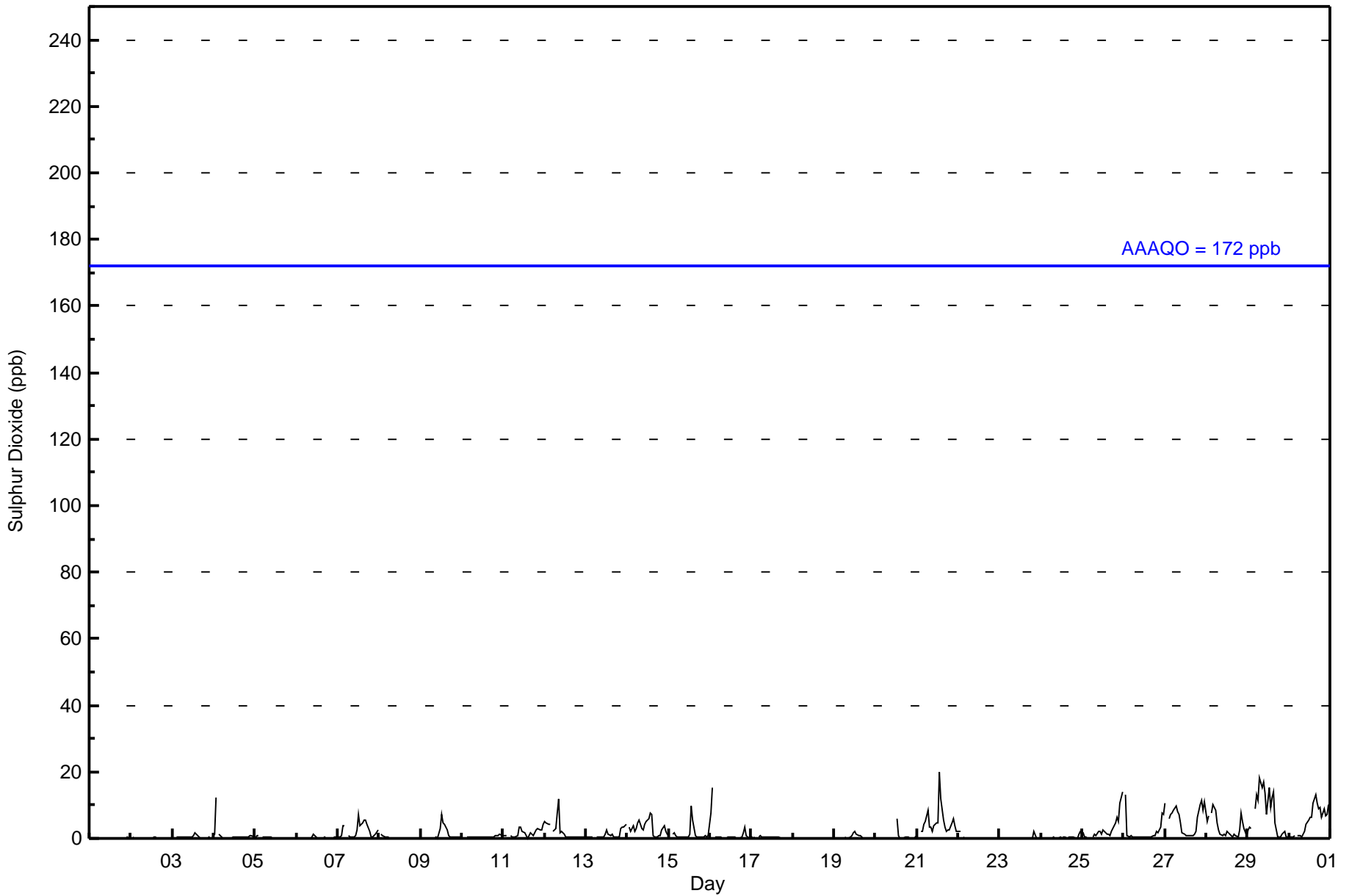


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 20 ppb on Nov 21 14:00	Maximum Daily Average: 7.6 ppb on Nov 29		Hours of Data:	686
Minimum Value: 0 ppb on Nov 22 18:00	Minimum Daily Average: 0.1 ppb on Nov 18		Hours of Missing Data:	34
Maximum Diurnal Average: 2.7 ppb at hour 2	Minimum Diurnal Average: 0.9 ppb at hour 18		Hours of Calibration:	34
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 = 13		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0.3	2
4-Nov	1	12	Z	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0	1.0	12	
5-Nov	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	
6-Nov	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
7-Nov	0	0	1	4	4	Z	1	0	0	0	1	2	7	4	5	5	6	4	2	1	1	1	1	2.3	7	
8-Nov	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
9-Nov	0	Z	0	0	0	0	0	0	0	0	3	7	5	4	3	1	0	0	0	0	0	0	0	1.1	7	
10-Nov	0	0	Z	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	1	1	1	1	1	0.5	1	
11-Nov	1	1	1	Z	1	1	1	1	1	3	3	2	2	1	0	1	2	1	1	3	3	2	2	1.6	4	
12-Nov	5	5	4	4	Z	2	3	8	12	2	2	1	0	0	0	0	0	0	0	0	0	1	1	2.3	12	
13-Nov	1	1	1	1	0	Z	0	0	0	0	1	2	1	1	1	1	1	1	1	0	3	3	4	1.2	4	
14-Nov	Z	3	2	4	2	3	5	6	3	2	4	5	6	8	7	1	0	0	1	1	2	4	2	3.2	8	
15-Nov	1	Z	1	2	1	0	0	0	0	0	0	1	10	6	1	0	0	0	0	0	0	1	0	1.2	10	
16-Nov	7	15	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	1.4	15	
17-Nov	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
19-Nov	0	0	0	0	0	Z	0	0	0	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0.4	2	
20-Nov	Z	0	0	0	0	0	0	0	0	C	C	C	C	6	1	0	0	0	1	0	0	0	0	0.5	6	
21-Nov	1	Z	2	2	4	5	8	3	3	2	4	5	5	20	12	6	3	2	3	3	5	6	4	4.8	20	
22-Nov	2	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
23-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.2	2	
24-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.3	2	
25-Nov	2	0	0	0	0	Z	1	1	1	2	2	1	2	2	1	1	1	2	4	5	6	5	10	2.8	14	
26-Nov	Z	13	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	3	8	7	1.9	13	
27-Nov	10	Z	6	7	8	9	10	8	7	4	2	1	1	1	1	1	1	2	6	10	11	8	11	5.5	11	
28-Nov	5	7	Z	7	10	9	4	3	1	1	1	1	2	2	1	1	1	1	0	2	8	5	3	3.3	10	
29-Nov	2	3	3	Z	9	13	12	18	15	17	14	7	15	9	12	14	5	1	1	1	1	2	1	7.6	18	
30-Nov	1	1	1	1	Z	1	1	1	1	2	4	6	6	6	10	13	11	9	9	6	9	7	7	5.3	13	

1.7	2.7	1.0	1.4	1.7	1.8	1.6	1.7	1.7	1.7	1.4	1.5	1.4	2.3	2.5	2.2	1.7	1.1	0.9	0.9	1.1	2.0	1.8	1.9	2.2	Diurnal Average	
10	15	6	7	10	13	12	18	15	17	14	7	15	20	12	14	11	9	9	6	10	11	10	14	Diurnal Maximum		

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	666	97.08	97.08
11 - 20	20	2.92	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	31	28	13	9	8	5	18	75	96	152	82	30	22	11	50	666
11 - 20	0	0	0	0	0	1	0	0	0	3	15	1	0	0	0	0	20
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	36	31	28	13	9	9	5	18	75	99	167	83	30	22	11	50	686

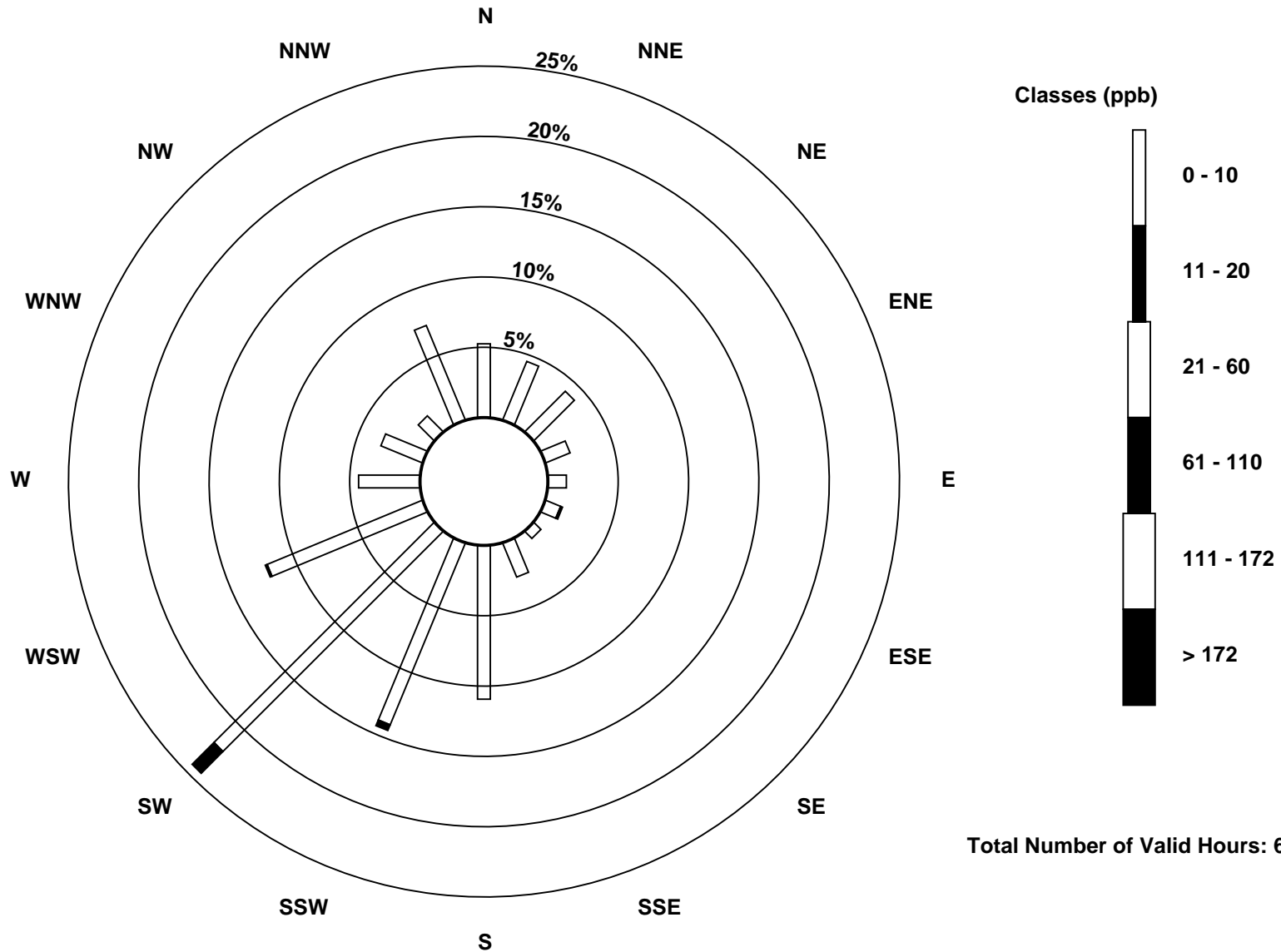
Total Number of Valid Hours: 686

Total Number of Hours: 720

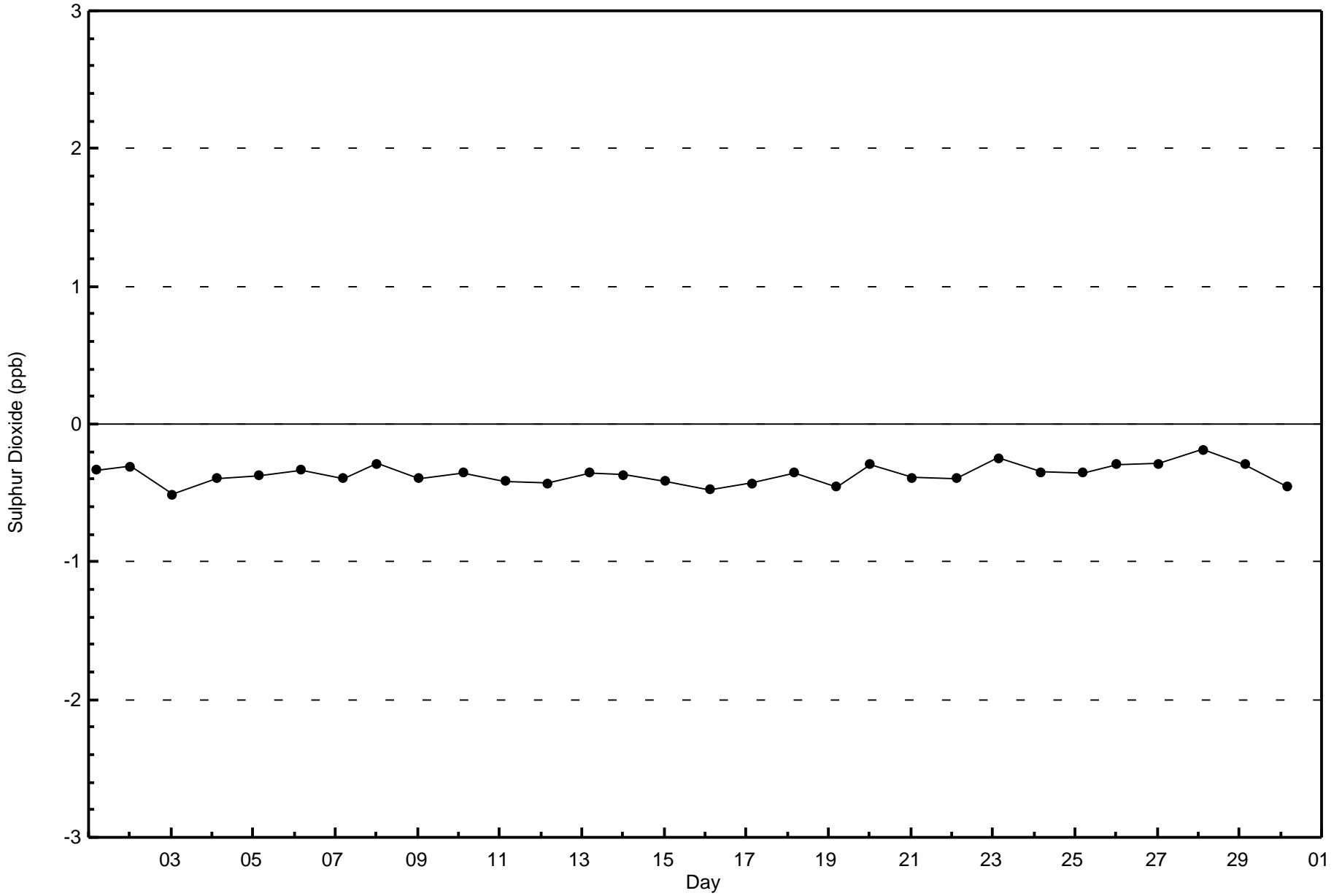


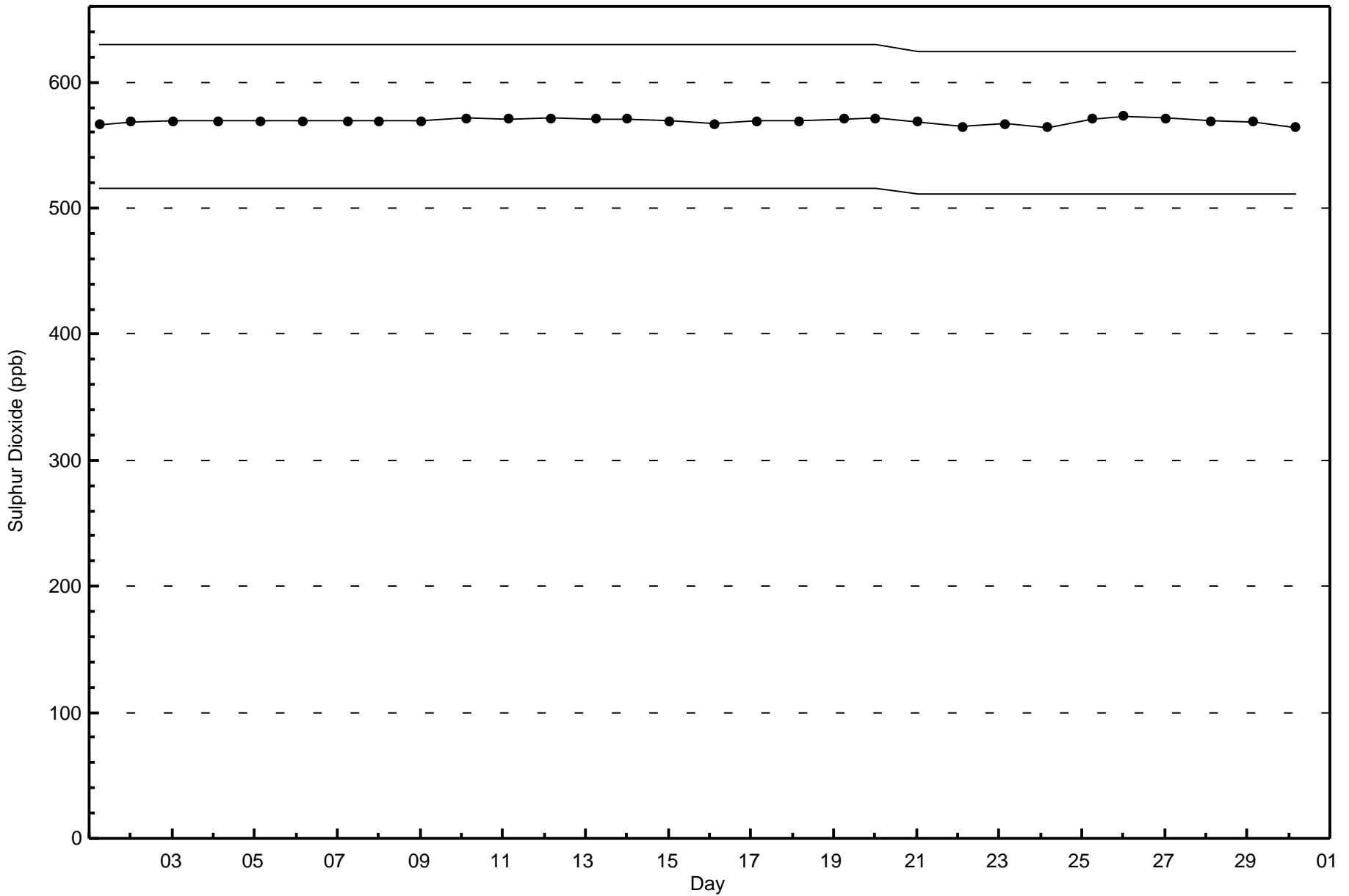
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 686





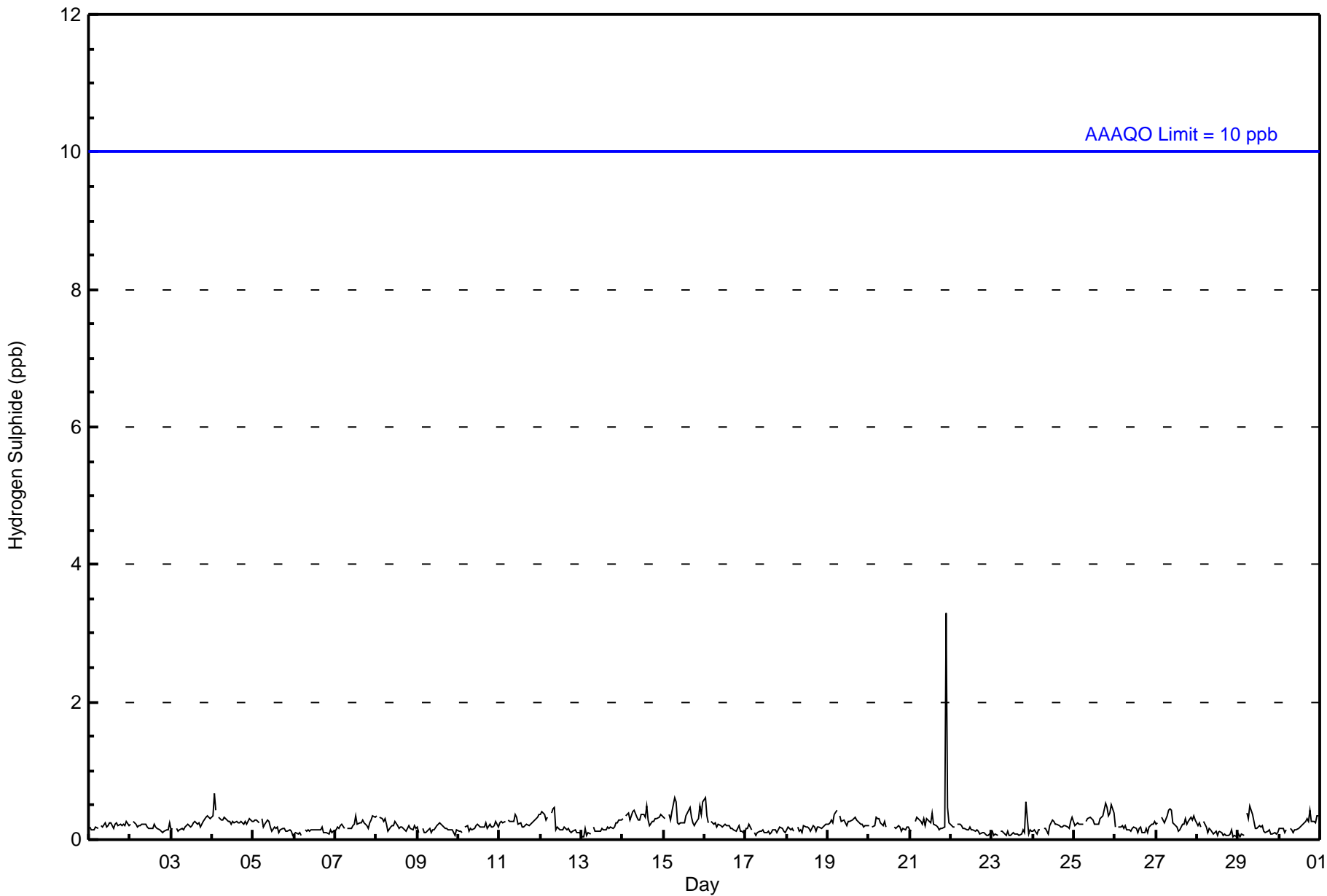


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Nov 21 22:00	Maximum Daily Average: 0.4 ppb on Nov 21		Hours of Data:	686
Minimum Value: 0 ppb on Nov 29 02:00	Minimum Daily Average: 0.1 ppb on Nov 23		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 22	Minimum Diurnal Average: 0.2 ppb at hour 18		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O 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-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	0	Z	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
3-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Nov	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Nov	0	0	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
7-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Nov	0	Z	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
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Nov	0	Z	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
15-Nov	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
16-Nov	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	0.2	1
17-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Nov	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
20-Nov	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
21-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0.4	3
22-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1
24-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0.3	1
26-Nov	0	Z	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
27-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Nov	0	0	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
29-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	Diurnal Average	
1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	1	1	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	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: 686

Total Number of Hours: 720



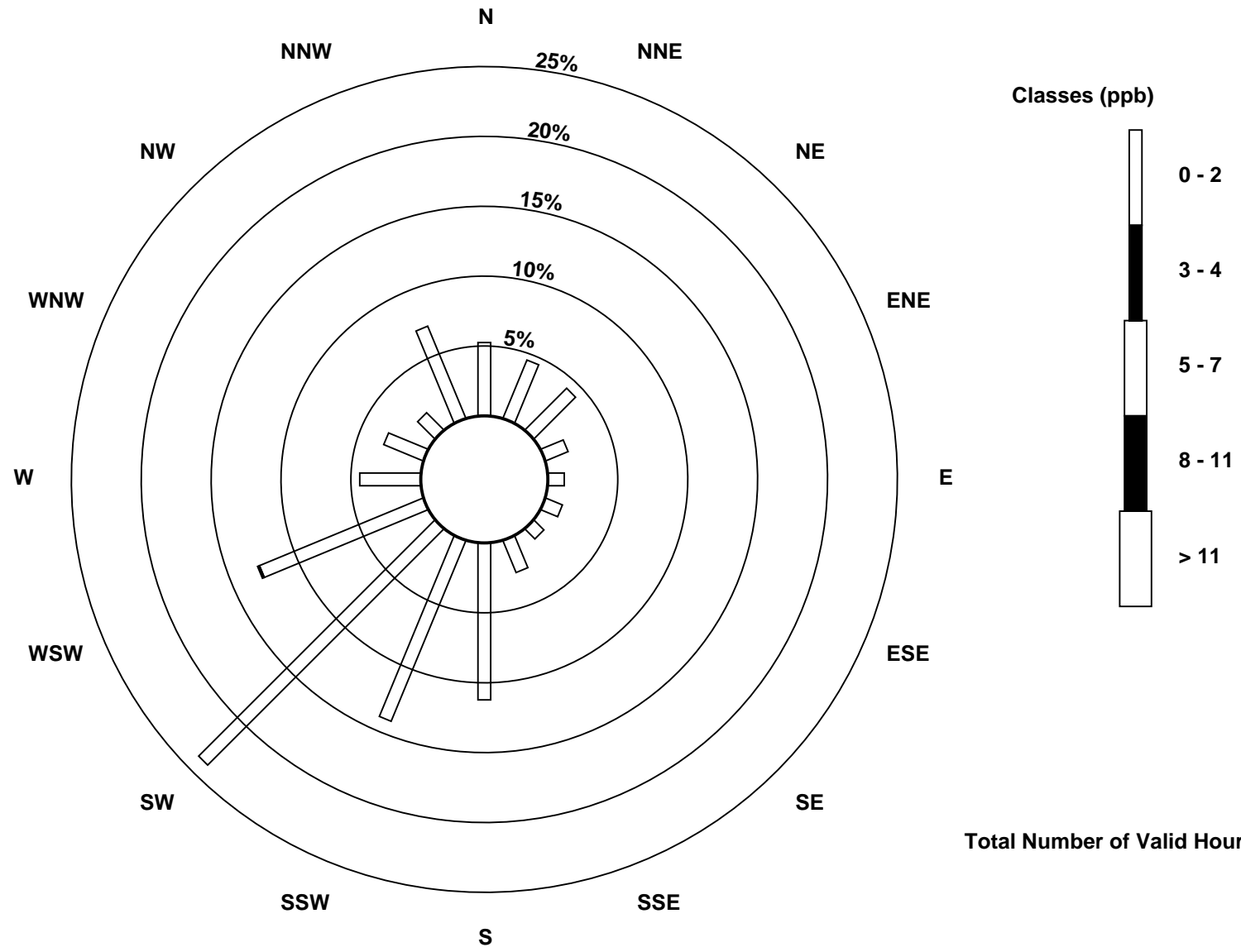
Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - November 2015

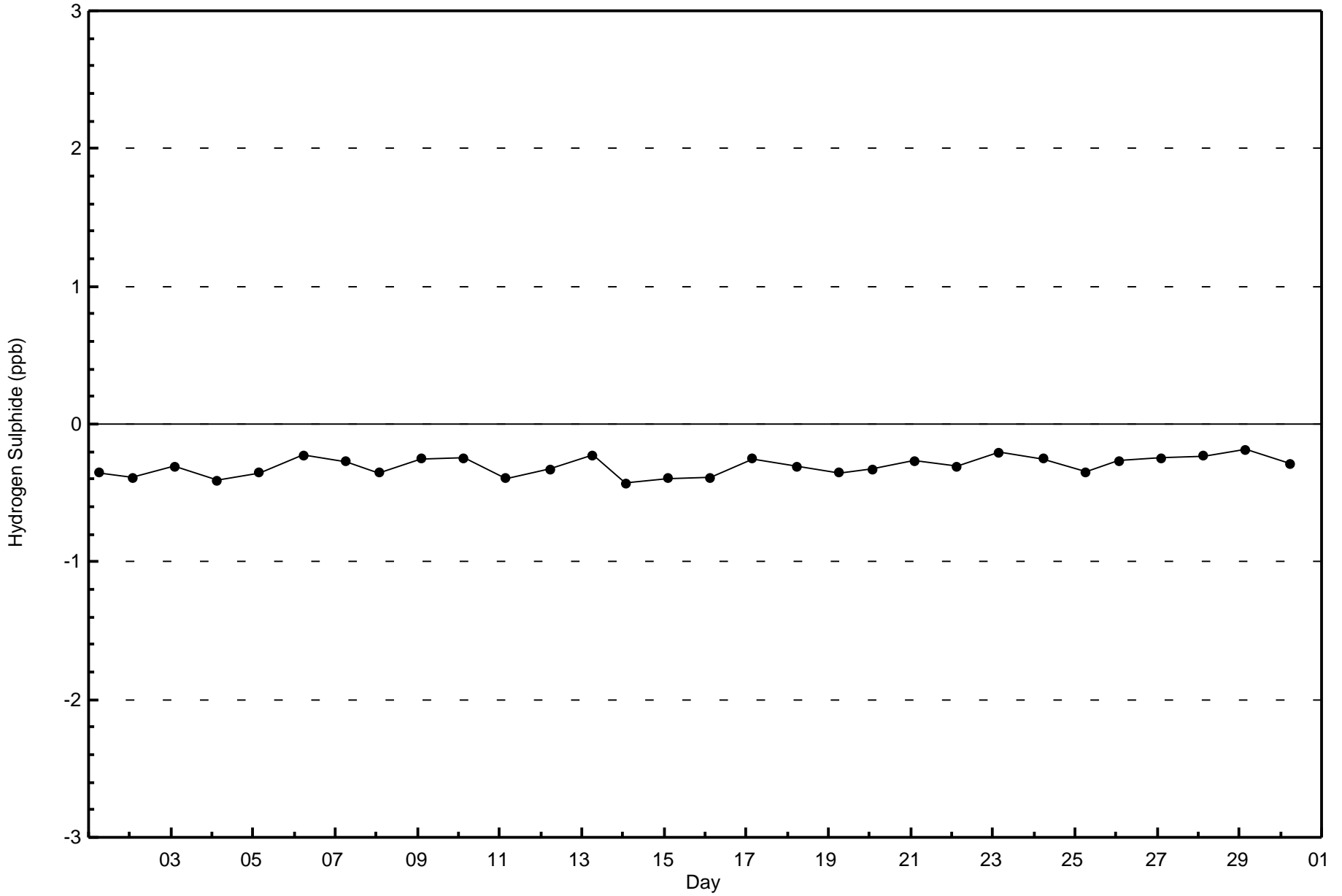
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	36	31	29	12	8	9	7	17	77	96	164	87	30	21	12	49	685
3 - 4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	31	29	12	8	9	7	17	77	96	164	88	30	21	12	49	686

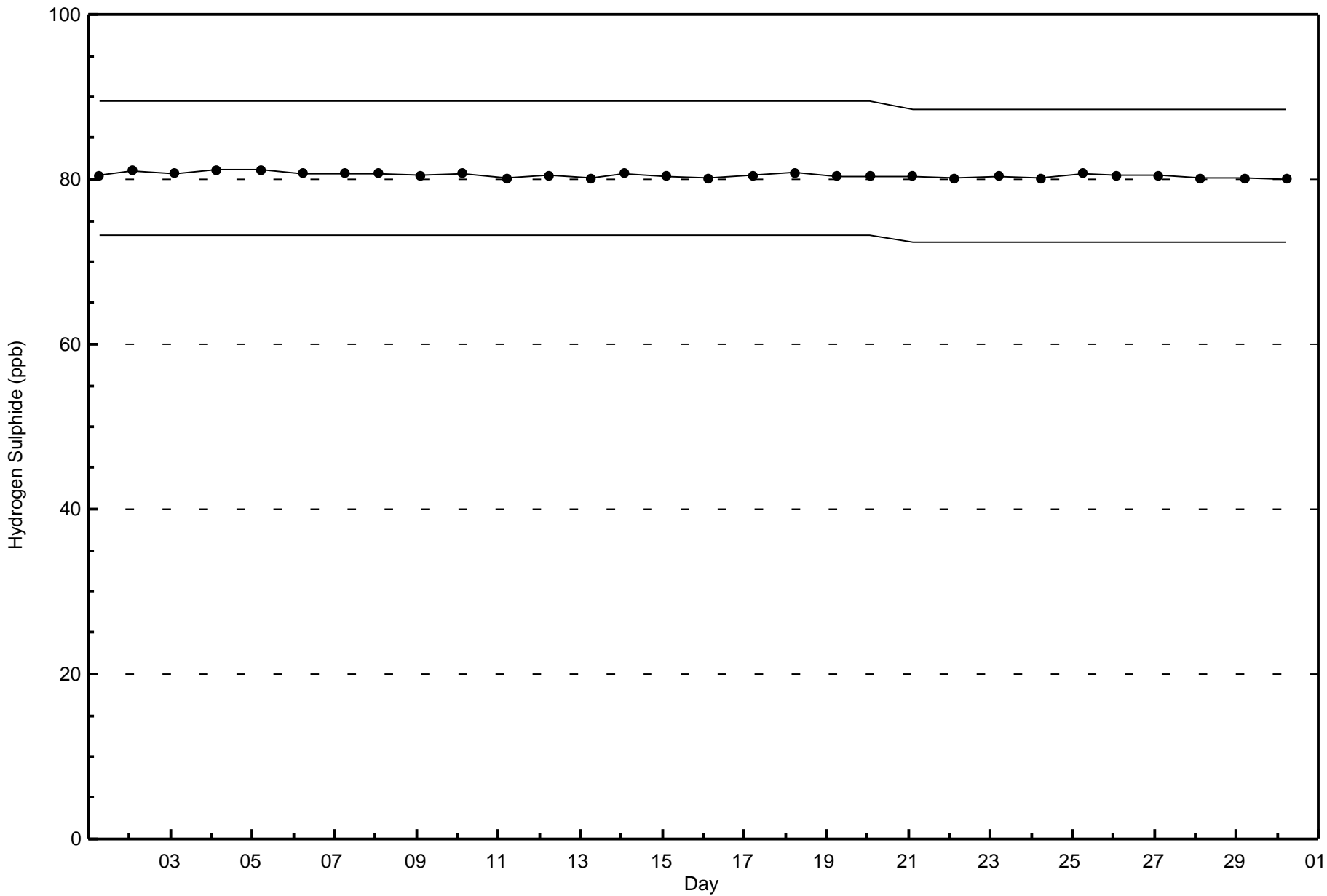
Total Number of Valid Hours: 686

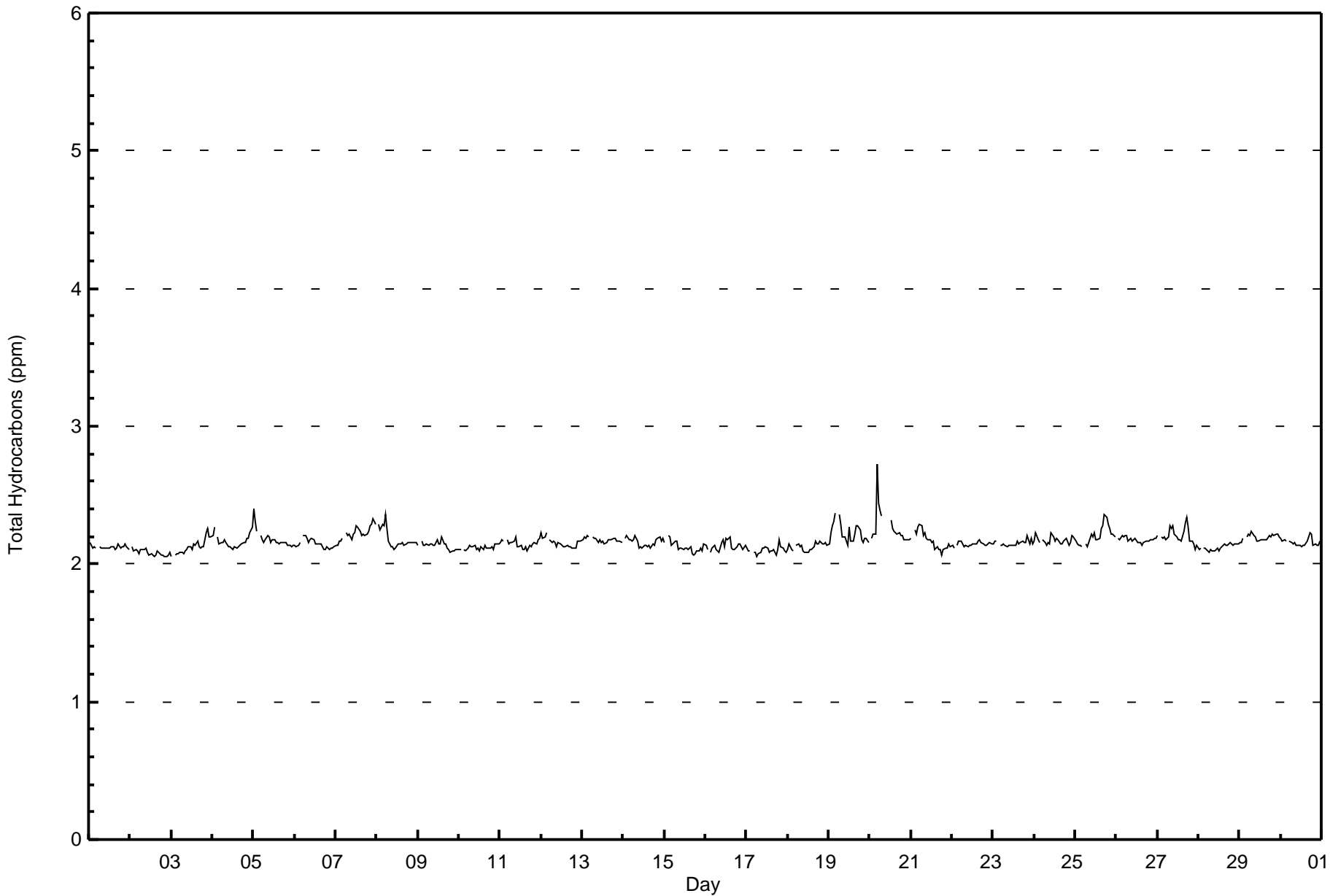
Total Number of Hours: 720



Total Number of Valid Hours: 686









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - November 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	686	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - November 2015

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	36	31	28	13	9	9	5	18	75	99	167	83	30	22	11	50	686	
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	36	31	28	13	9	9	5	18	75	99	167	83	30	22	11	50	686	

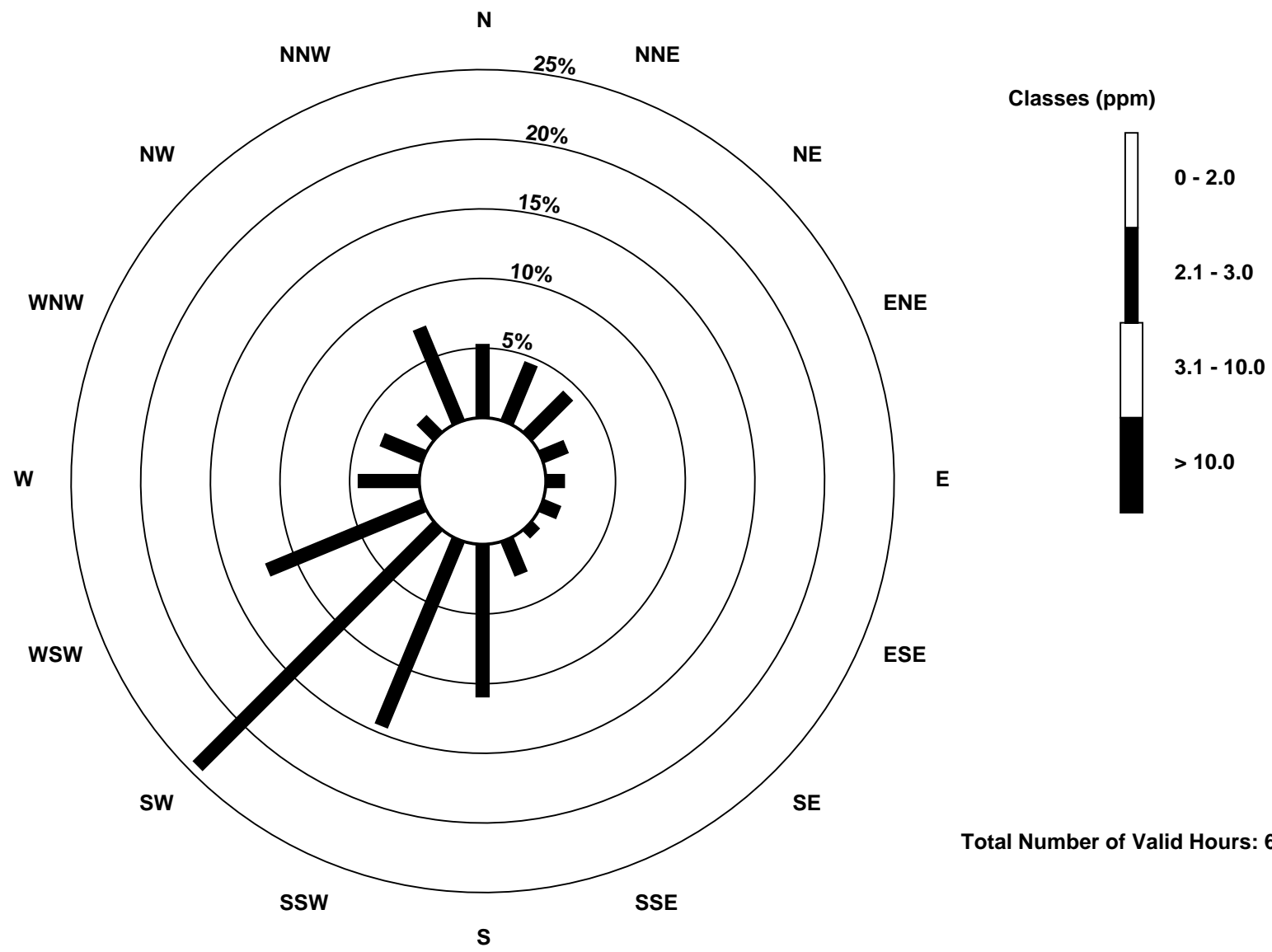
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)



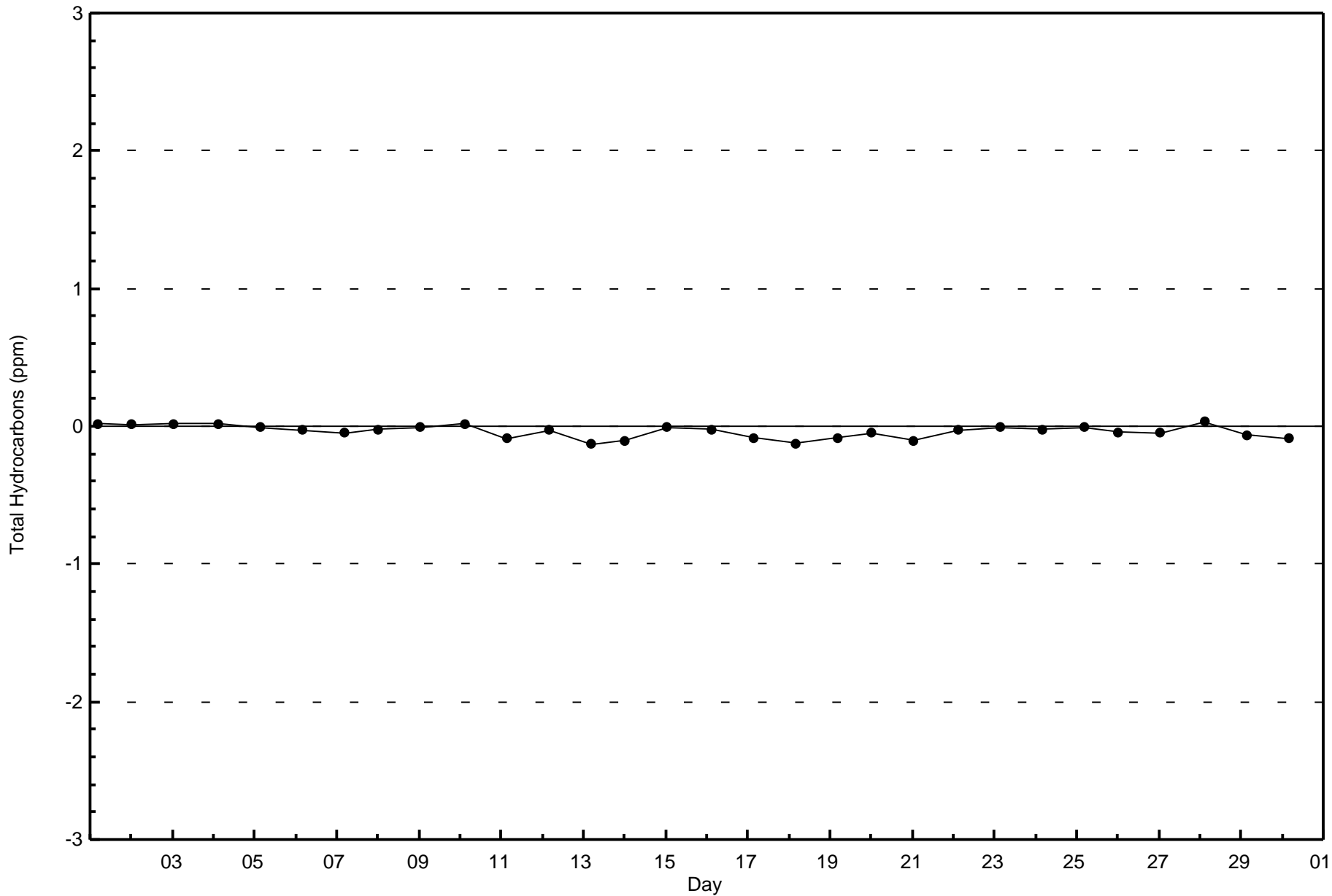


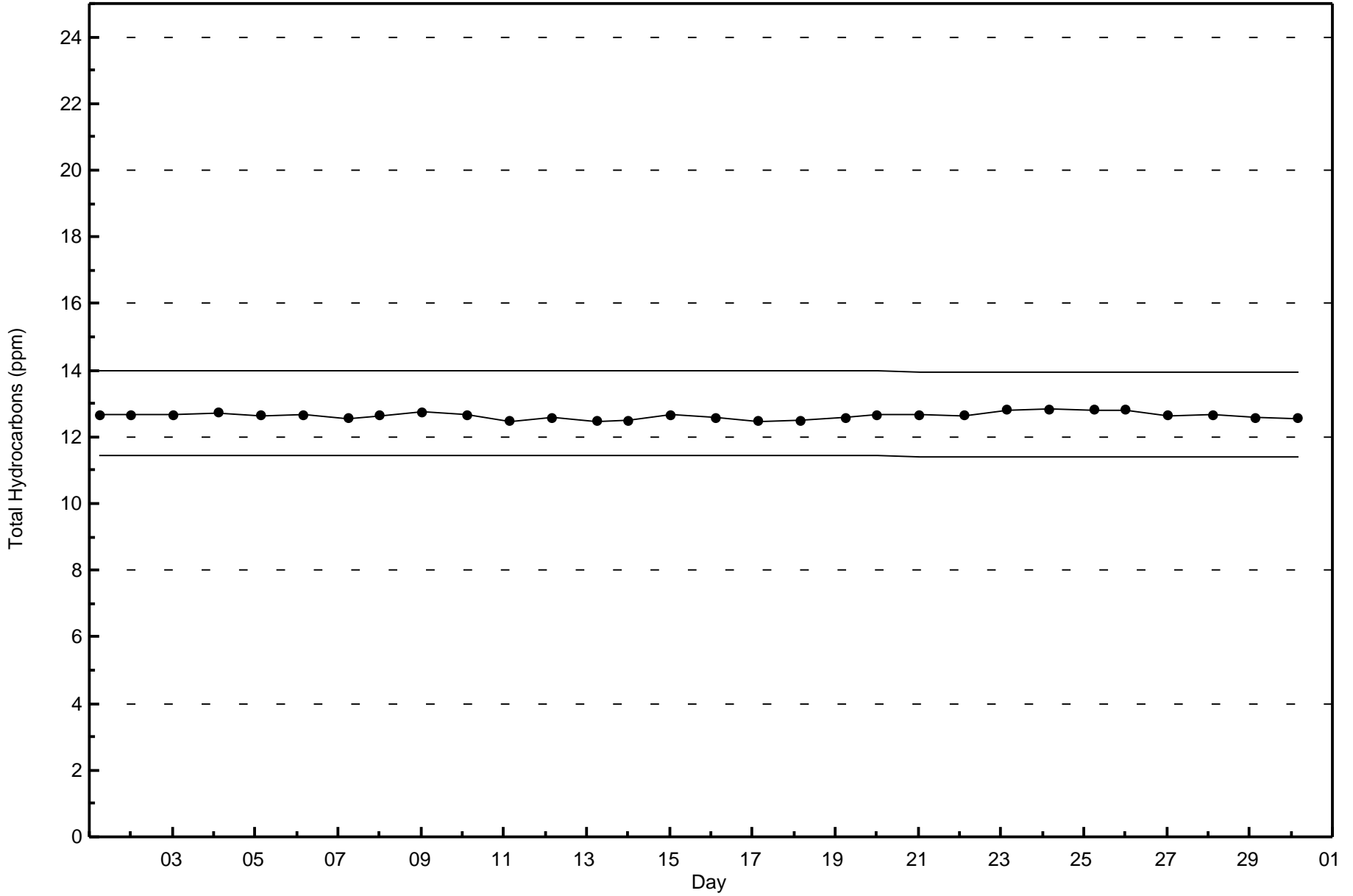
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Firebag - November 2015







Maximum Value: 12 ppb on Nov 15 07:00																	Maximum Daily Average: 1.7 ppb on Nov 15																	Hours in Service: 720	
Minimum Value: 0 ppb on Nov 19 20:00																	Minimum Daily Average: 0.0 ppb on Nov 8																	Hours of Data: 686	
Maximum Diurnal Average: 0.9 ppb at hour 13																	Minimum Diurnal Average: 0.1 ppb at hour 19																	Hours of Missing Data: 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 = 4																	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-Nov	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0.3	1									
2-Nov	Z	1	0	0	0	0	1	1	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4									
3-Nov	0	Z	0	1	1	1	2	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0.5	2									
4-Nov	0	2	Z	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	2									
5-Nov	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
6-Nov	0	0	0	0	Z	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1									
7-Nov	0	0	0	0	0	Z	0	0	0	1	1	2	4	2	2	1	0	0	0	0	0	0	0	0	0.6	4									
8-Nov	Z	0	0	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-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0.3	2									
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0									
11-Nov	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
12-Nov	0	0	0	0	Z	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1									
13-Nov	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
14-Nov	Z	0	0	0	0	0	0	0	1	1	1	1	2	2	1	1	0	0	0	0	0	1	3	0.6	3										
15-Nov	3	Z	1	1	1	4	12	7	1	1	1	0	0	0	1	1	1	0	0	1	1	1	0	0	1.7	12									
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0.3	1									
17-Nov	1	1	3	Z	2	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	3									
18-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
19-Nov	0	0	1	1	4	Z	8	0	1	2	1	1	1	1	2	1	0	0	0	0	0	0	0	0	1.0	8									
20-Nov	Z	0	0	0	0	1	0	0	C	C	C	C	2	2	1	0	0	0	0	0	0	0	0	0	0.4	2									
21-Nov	0	Z	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0.5	2									
22-Nov	0	0	Z	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-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
24-Nov	0	0	0	0	Z	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.2	2									
25-Nov	0	0	0	0	0	Z	0	0	0	3	4	4	3	2	1	2	1	1	0	0	0	1	0	0	1.0	4									
26-Nov	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
27-Nov	0	Z	0	0	0	0	0	0	0	2	2	2	2	1	1	1	0	1	0	0	0	0	0	0	0.6	2									
28-Nov	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
29-Nov	0	0	0	Z	0	0	0	0	0	1	1	1	2	1	2	1	0	0	0	0	0	0	0	0	0.5	2									
30-Nov	0	0	0	0	Z	0	0	0	0	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0.4	2									
																	Diurnal Average		Diurnal Maximum																
																	0.3		3																
																	0.2		2																
																	0.2		3																
																	0.1		1																
																	0.4		4																
																	0.4		4																
																	0.9		12																
																	0.4		7																
																	0.4		1																
																	0.8		4																
																	0.8		4																
																	0.9		4																
																	0.9		4																
																	0.8		2																
																	0.6		2																
																	0.5		2																
																	0.2		1																
																	0.2		1																
																	0.1		1																
																	0.1		1																
																	0.1		1																
																	0.1		1																
																	0.1		1																
																	0.2		3																
Z - zerospan																	C - Calibration																		

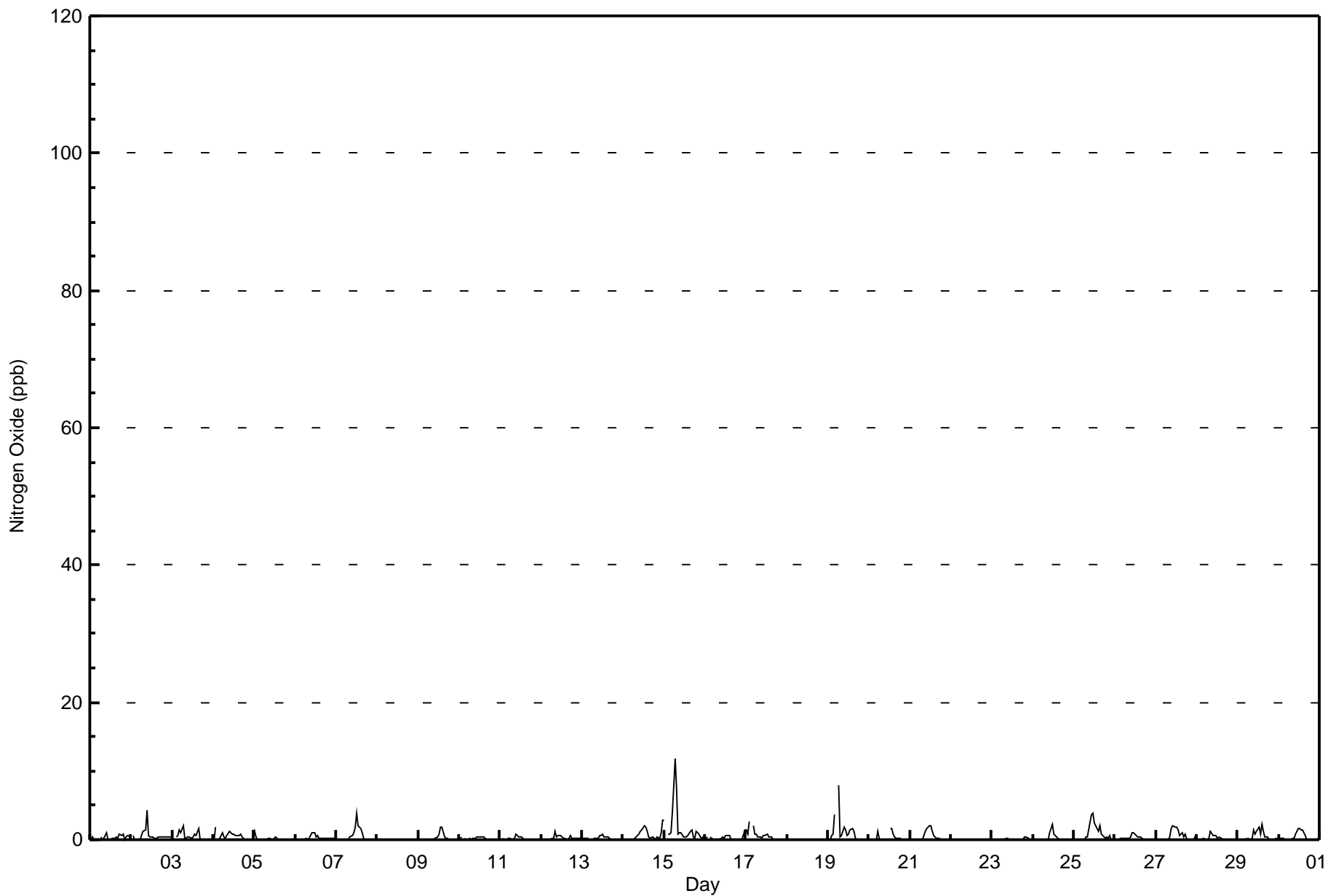


Wood Buffalo Environmental Association

Hourly Averages

Nitrogen Oxide (NO) - ppb

Firebag - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	686	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: 686

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - November 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	31	28	13	9	9	5	18	75	99	167	83	30	22	11	50	686
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	31	28	13	9	9	5	18	75	99	167	83	30	22	11	50	686

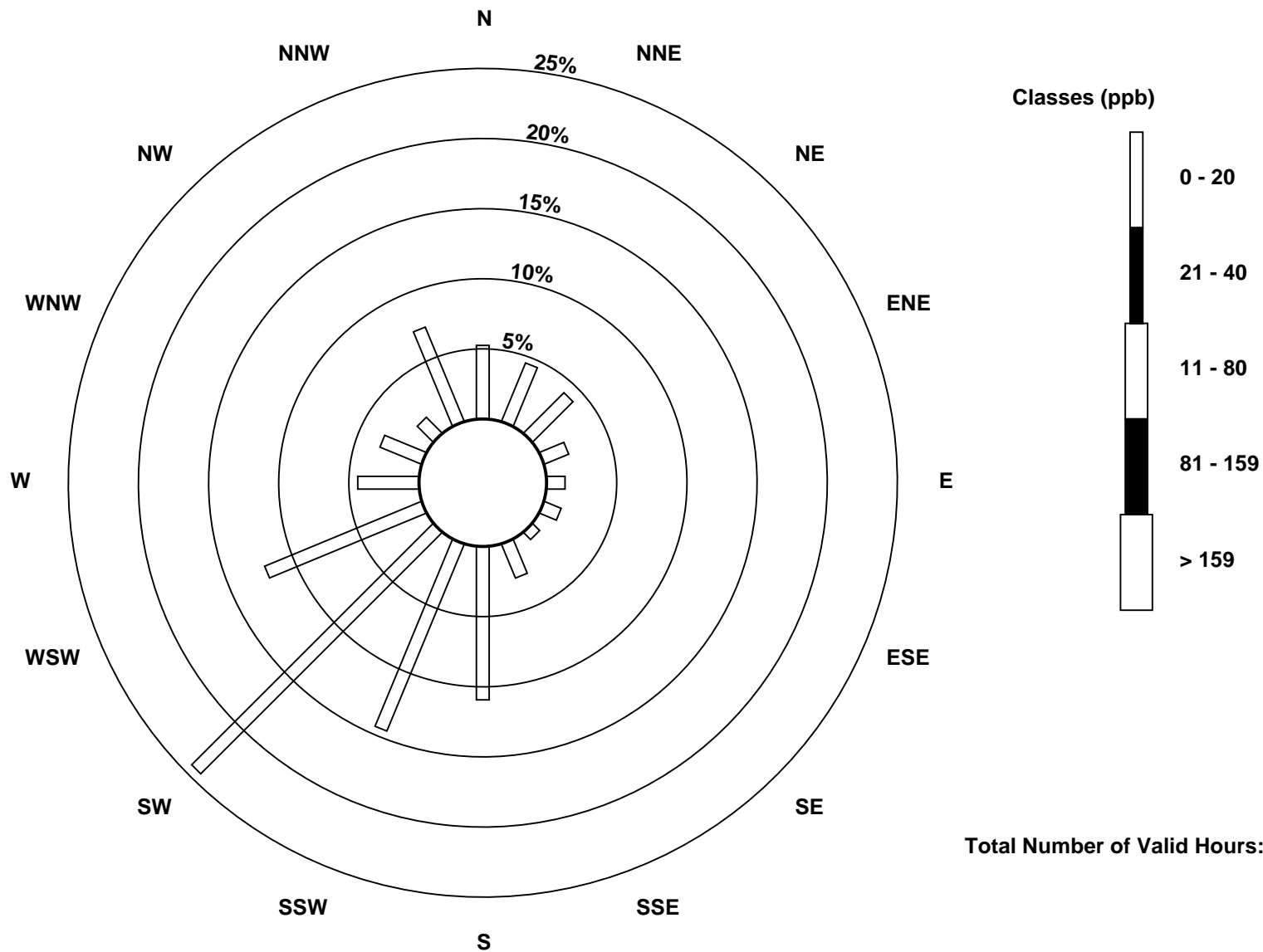
Total Number of Valid Hours: 686

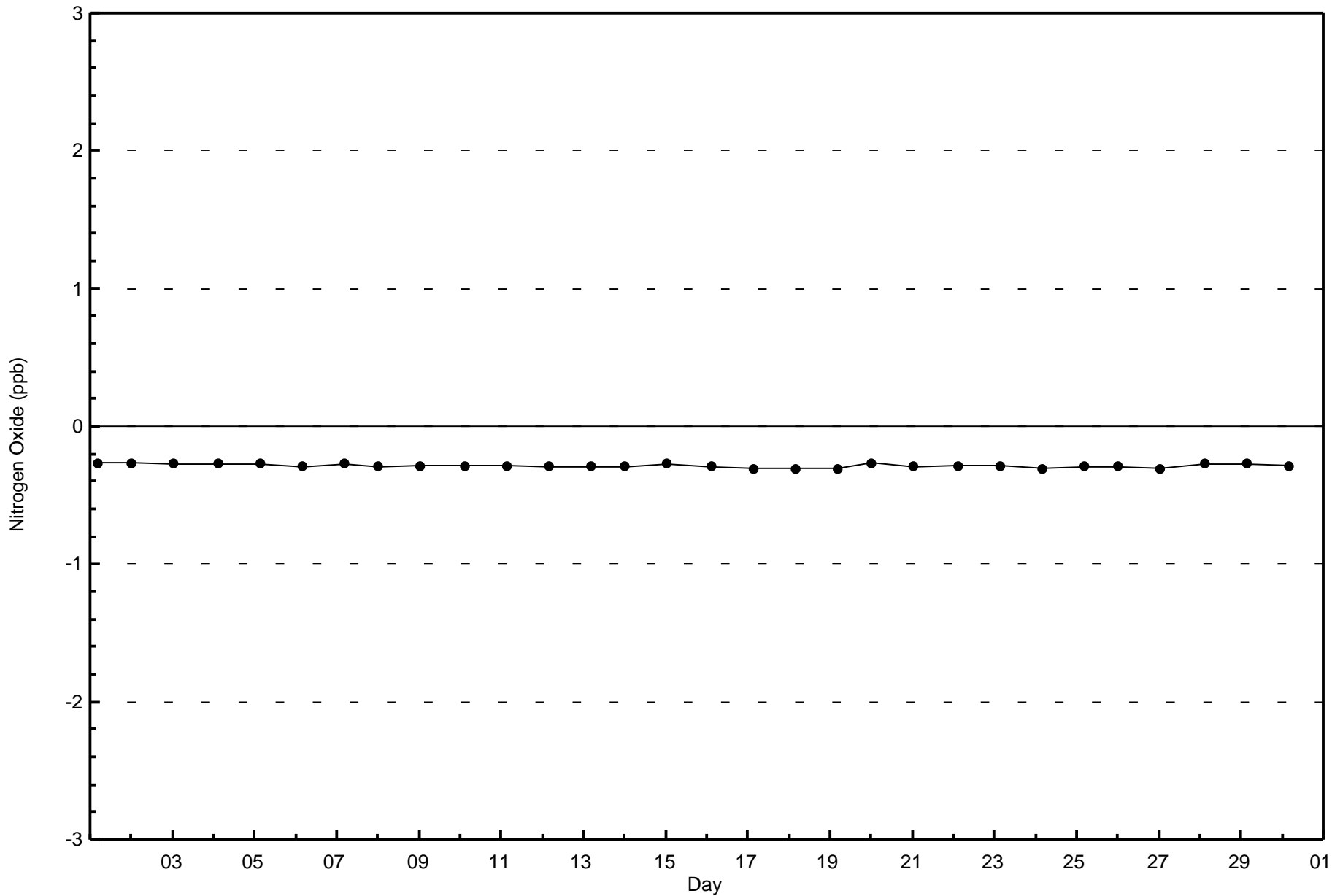
Total Number of Hours: 720

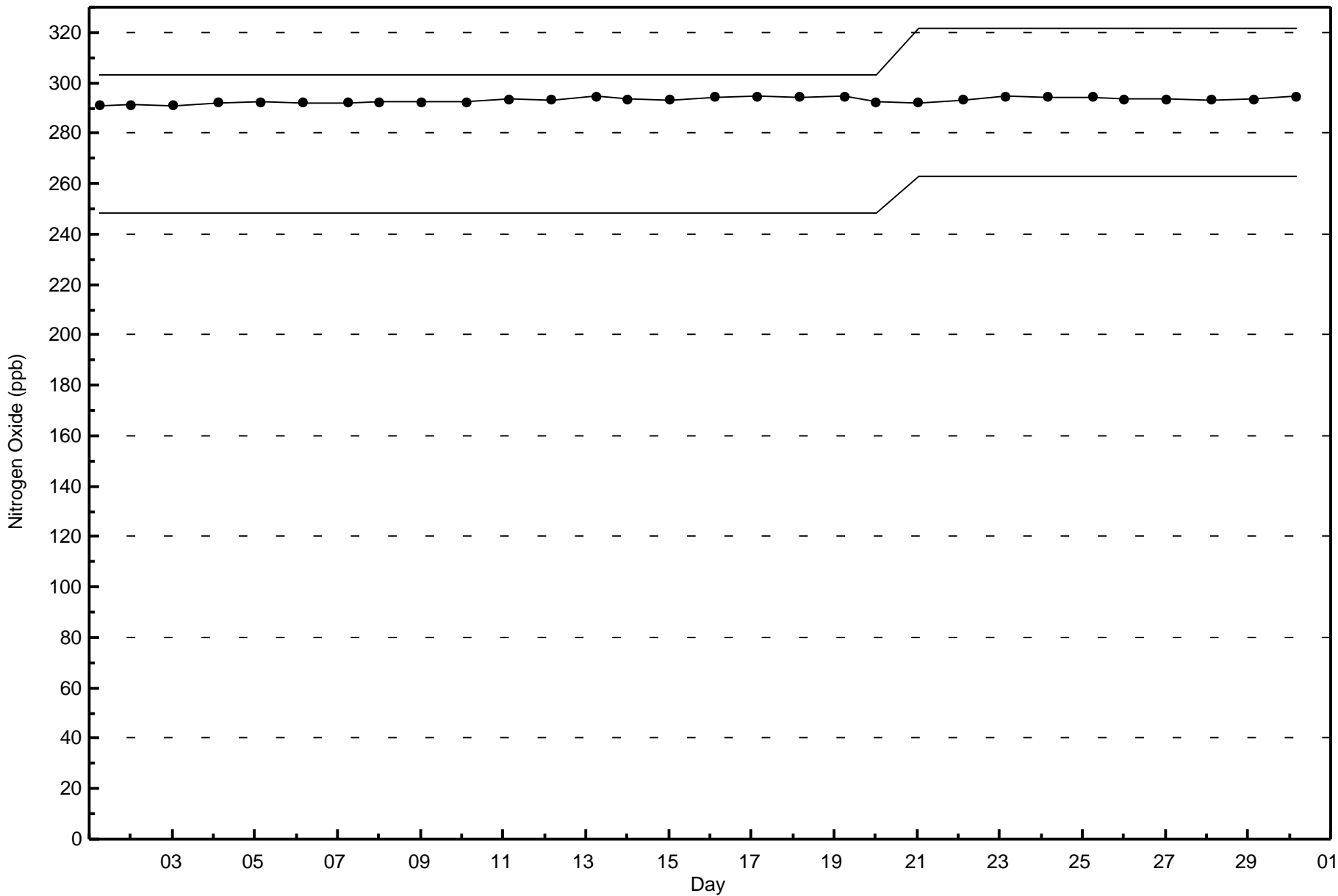


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)







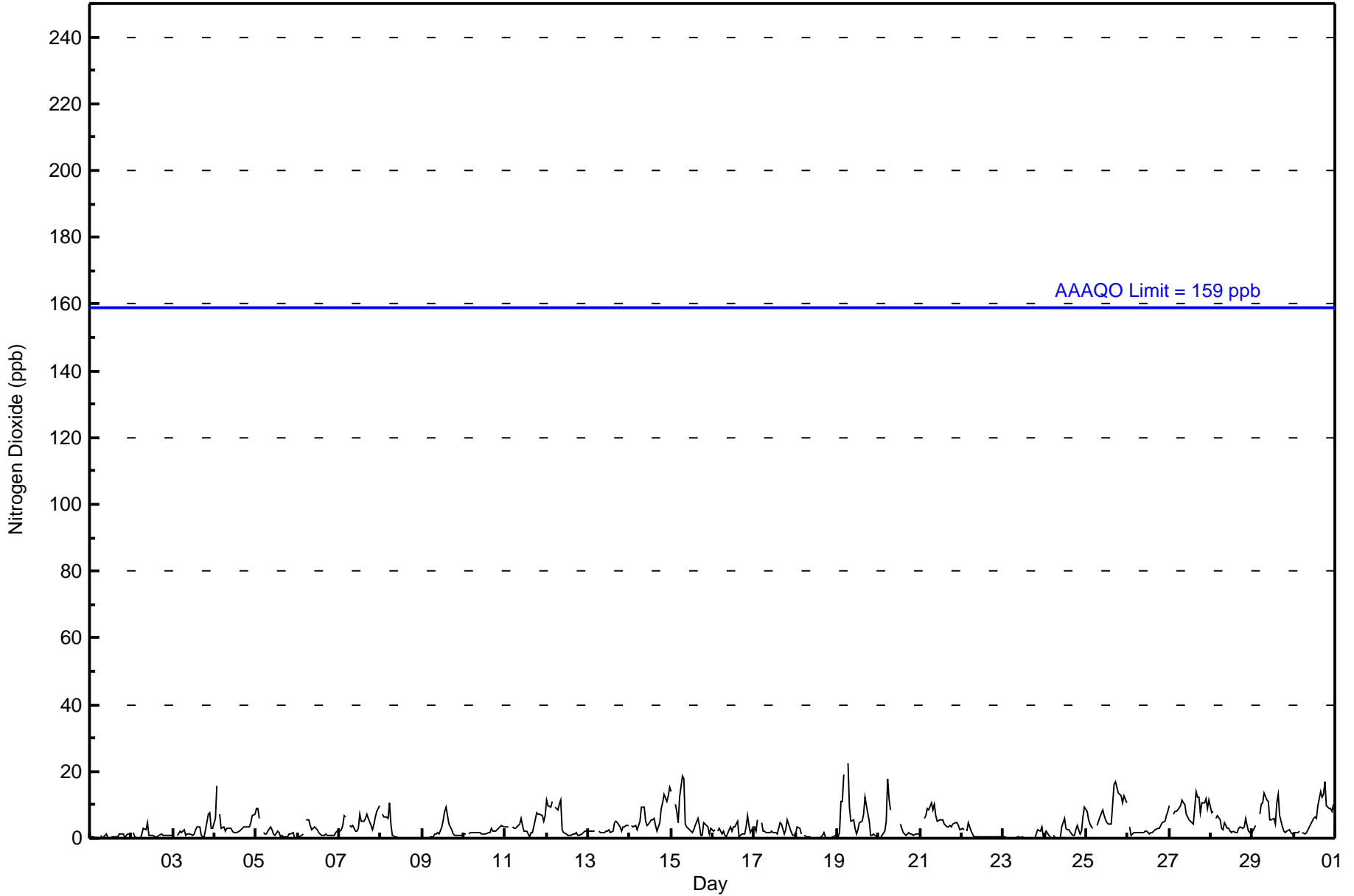


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 23 ppb on Nov 19 07:00	Maximum Daily Average: 9.2 ppb on Nov 27
Minimum Value: 0 ppb on Nov 1 12:00	Hours of Data: 686
Maximum Diurnal Average: 4.8 ppb at hour 7	Hours of Missing Data: 34
Monthly Average: 3.6 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.6 ppb on Nov 1	Percent Operational Time: 100.0
Minimum Diurnal Average: 2.4 ppb at hour 12	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 17	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	0	1	0	0	0	Z	1	0	0	1	0	0	0	0	1	1	0	1	1	1	0	1	1	1	0.6	1
2-Nov	Z	2	1	0	0	0	1	3	3	5	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1.1	5
3-Nov	1	Z	1	1	2	2	2	1	1	1	1	1	1	3	3	4	1	1	1	3	7	8	3	3	2.2	8
4-Nov	6	16	Z	7	3	3	2	3	3	3	2	2	2	2	2	2	3	3	3	3	4	5	7	7	4.1	16
5-Nov	9	9	6	Z	2	1	1	2	4	3	1	1	2	2	0	1	1	0	0	1	1	2	0	0	2.1	9
6-Nov	0	1	1	1	Z	5	6	4	3	3	4	3	2	1	1	1	1	1	1	1	1	1	2	2	1.9	6
7-Nov	2	3	4	7	6	Z	4	3	4	2	2	3	7	5	5	6	7	6	4	2	4	6	8	10	4.8	10
8-Nov	Z	7	6	6	6	11	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	11
9-Nov	0	Z	0	0	0	0	1	1	1	2	1	3	6	8	10	4	4	3	1	1	1	1	1	1	2.2	10
10-Nov	1	1	Z	1	2	2	2	2	2	2	1	1	1	1	2	2	3	2	2	3	3	3	4	4	2.0	4
11-Nov	3	3	3	Z	3	3	3	3	4	6	4	2	2	1	1	2	2	6	8	7	7	7	5	7	4.0	8
12-Nov	11	10	9	11	Z	9	9	10	11	3	2	1	1	1	1	1	1	2	1	1	1	2	2	2	4.5	11
13-Nov	2	2	2	2	2	Z	2	2	2	2	2	2	3	2	2	5	5	5	4	2	3	4	4	4	2.8	5
14-Nov	Z	4	4	4	3	4	5	9	10	5	4	4	5	6	6	4	2	5	9	11	13	11	13	15	6.7	15
15-Nov	14	Z	10	8	5	12	19	18	4	3	3	2	2	3	4	6	4	1	1	5	4	3	1	3	5.8	19
16-Nov	2	2	Z	2	3	1	2	1	1	3	3	2	4	4	5	1	1	1	1	3	7	4	2	3	2.5	7
17-Nov	3	2	6	Z	5	2	2	2	2	2	2	2	2	1	3	5	4	1	3	5	4	2	1	1	2.6	6
18-Nov	1	3	3	1	Z	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	1	1	0.7	3
19-Nov	1	2	11	11	19	Z	23	10	5	5	3	1	3	5	5	7	12	10	5	1	1	1	1	0	6.1	23
20-Nov	Z	0	1	2	5	18	12	9	C	C	C	C	4	3	2	1	1	2	1	1	1	1	1	1	3.5	18
21-Nov	2	Z	6	7	9	9	11	8	10	7	5	6	5	6	4	3	4	4	4	4	5	5	4	3	5.6	11
22-Nov	3	3	Z	2	5	2	1	0	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1.0	5
23-Nov	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	3	2	4	0	0.6	4
24-Nov	0	2	1	0	Z	1	0	0	0	0	3	6	3	3	1	1	1	3	4	1	2	6	9	9	2.2	9
25-Nov	8	5	4	3	3	Z	4	5	6	9	7	6	5	4	4	10	16	17	14	13	13	11	13	11	8.3	17
26-Nov	Z	4	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	3	3	4	5	5	7	8	2.8	8
27-Nov	10	Z	7	8	8	8	10	11	11	10	7	6	5	5	4	14	12	12	8	10	11	12	9	12	9.2	14
28-Nov	8	8	Z	6	7	5	3	2	5	3	3	2	2	2	2	3	4	3	3	6	4	2	1	1	3.7	8
29-Nov	2	3	4	Z	7	10	11	14	12	11	5	6	6	4	10	13	7	3	2	2	2	3	2	1	6.1	14
30-Nov	2	2	2	2	Z	2	1	2	3	3	4	6	6	6	10	14	12	13	17	10	9	9	8	10	6.6	17

3.7	3.7	3.7	3.9	4.3	4.6	4.8	4.3	3.8	3.3	2.6	2.4	2.7	2.7	3.0	3.8	3.8	3.6	3.3	3.5	3.9	3.8	3.7	4.0	Diurnal Average	
14	16	11	11	19	18	23	18	12	11	7	6	7	8	10	14	16	17	17	13	13	12	13	15	Diurnal Maximum	

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	31	28	13	9	9	5	18	74	99	167	83	30	22	11	50	685
21 - 40	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	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	36	31	28	13	9	9	5	18	75	99	167	83	30	22	11	50	686

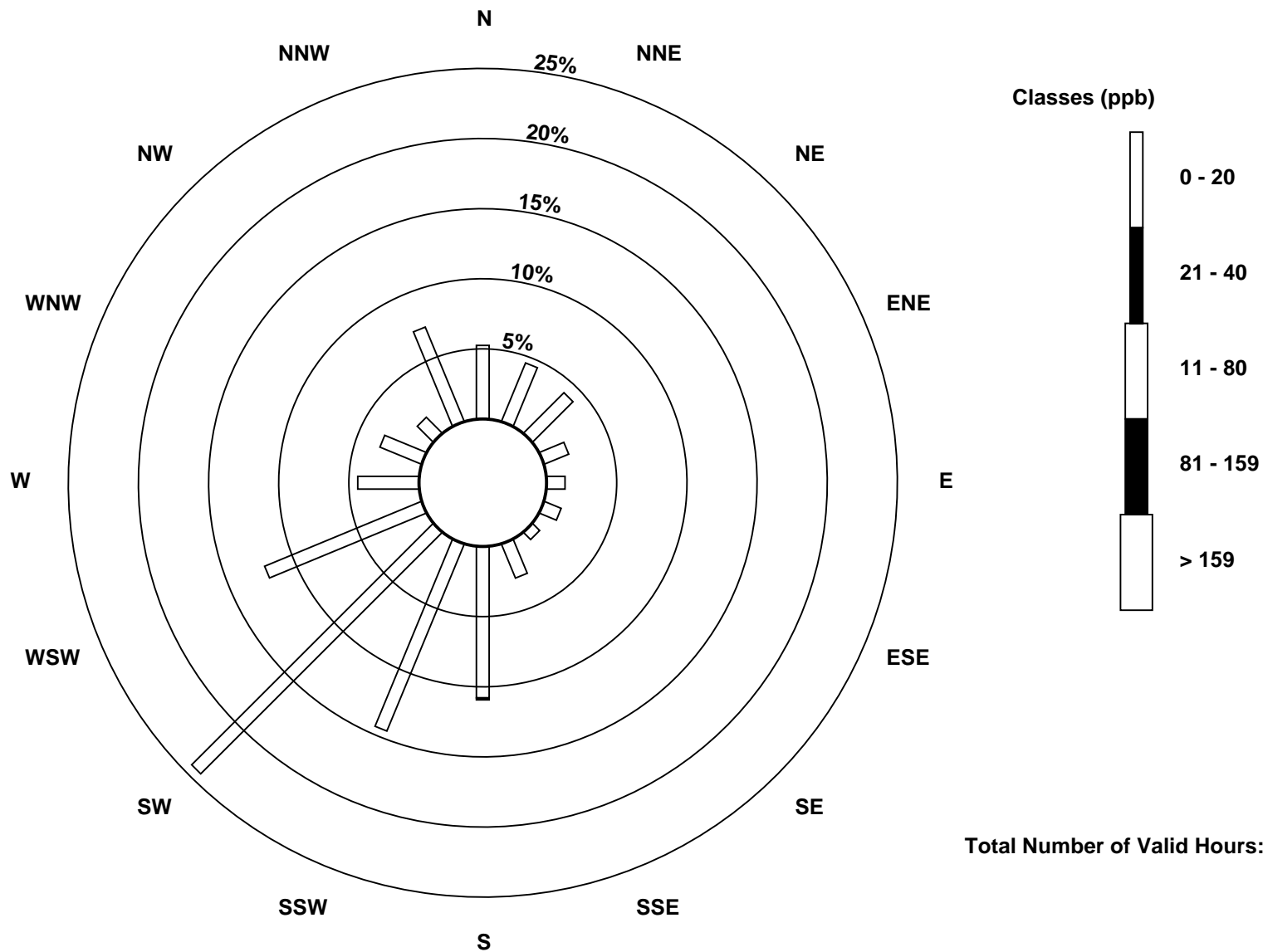
Total Number of Valid Hours: 686

Total Number of Hours: 720

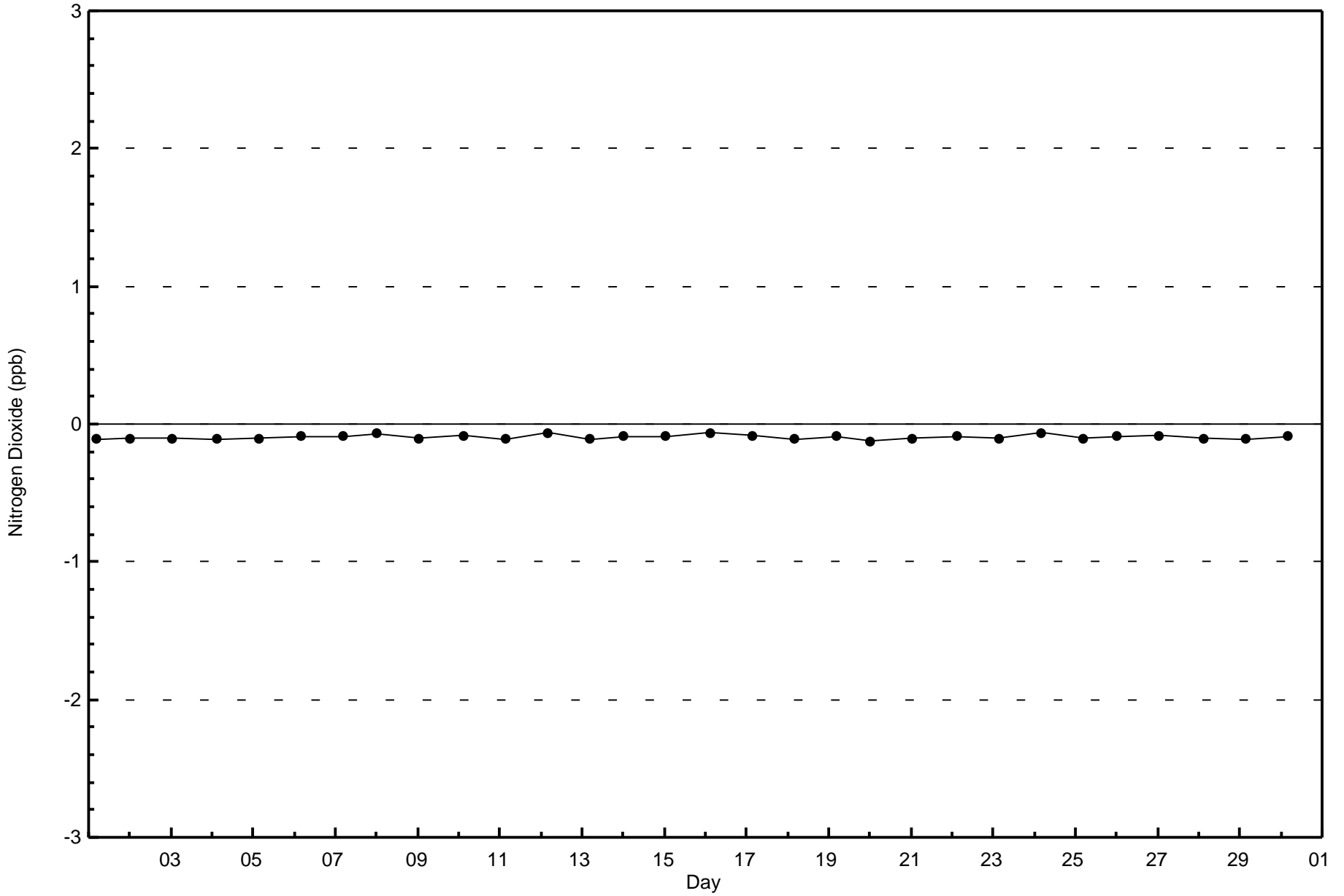


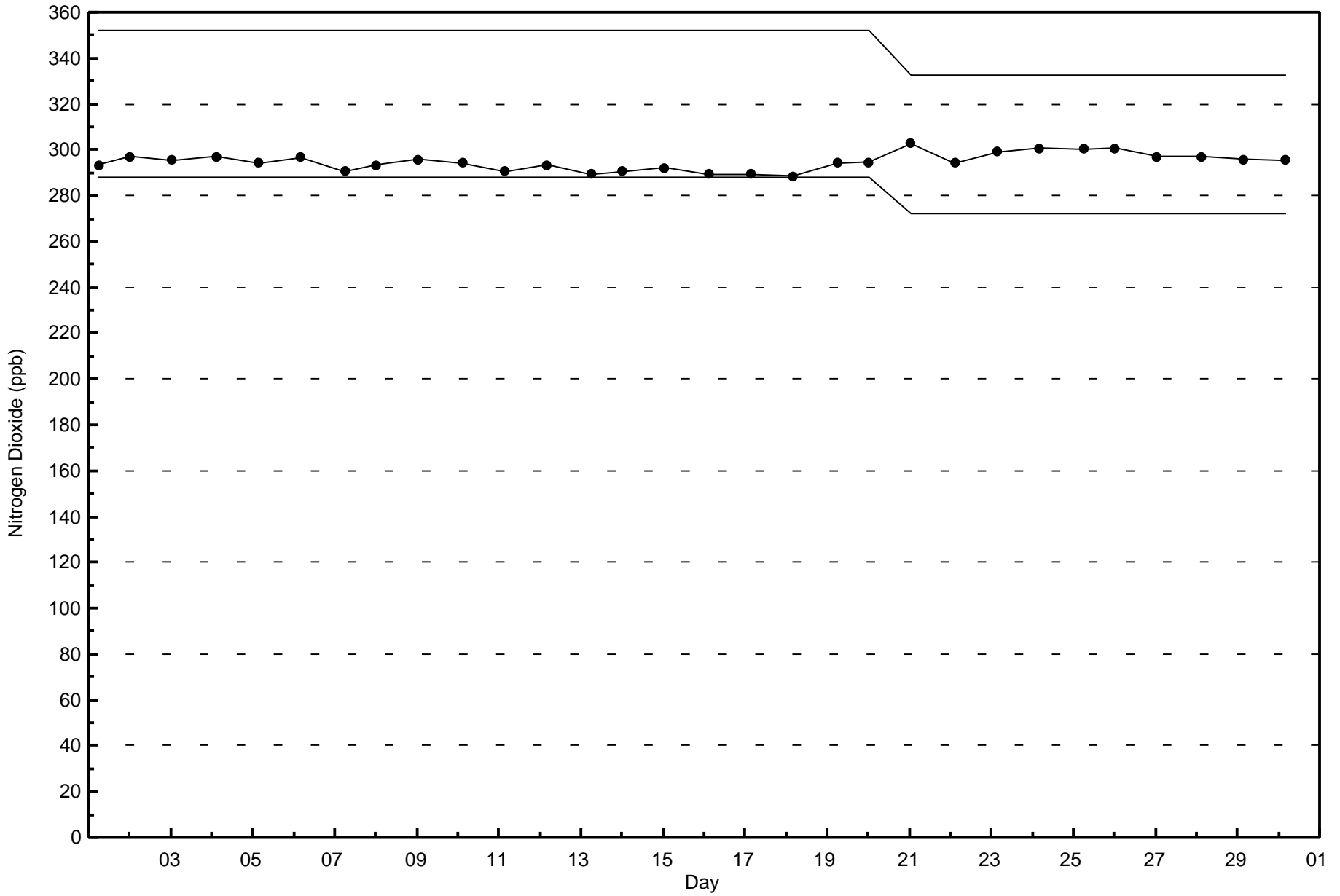
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 686





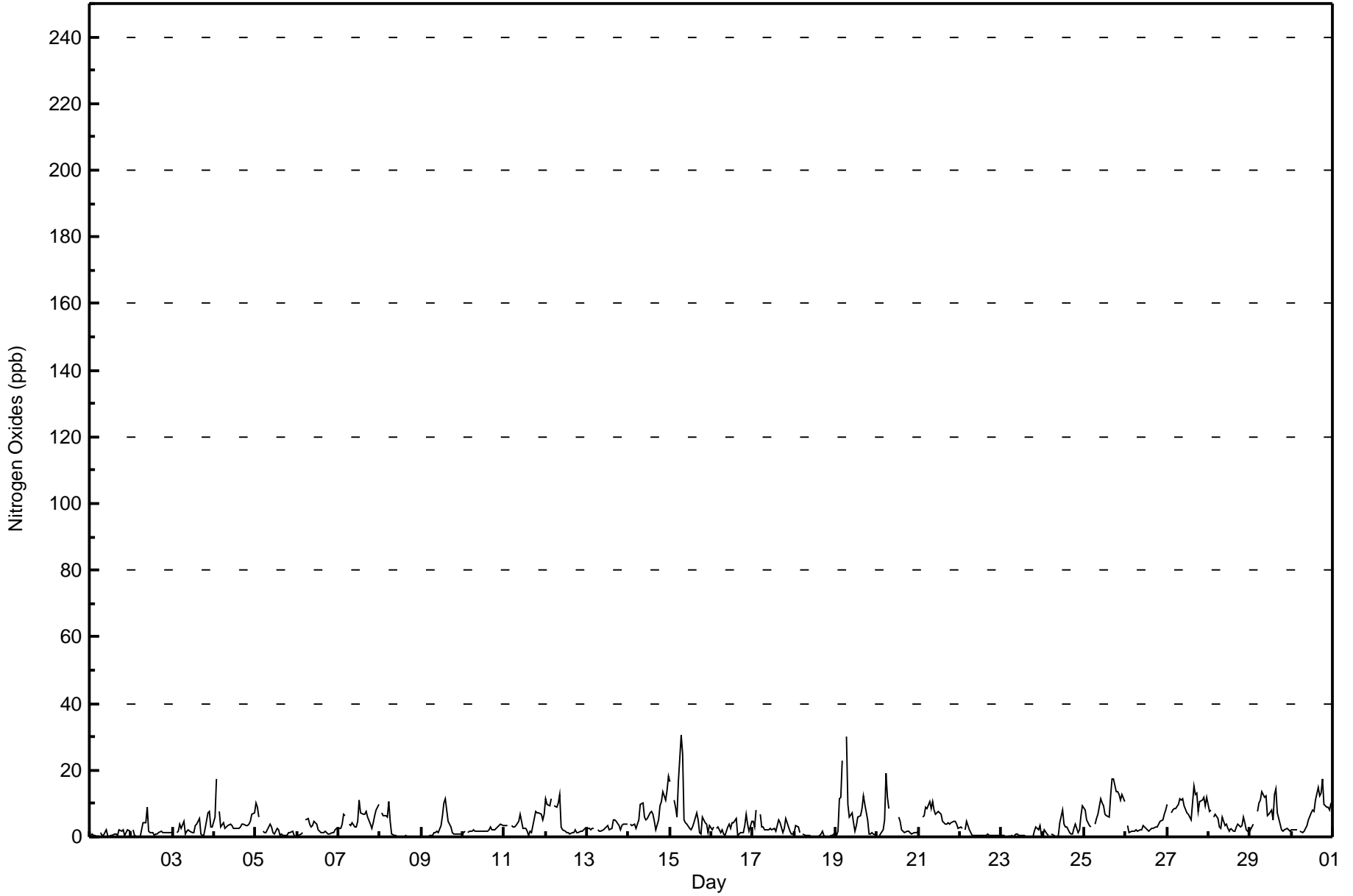


Maximum Value: 31 ppb on Nov 15 07:00																		Maximum Daily Average: 9.7 ppb on Nov 27																		Hours in Service: 720																																																																									
Minimum Value: 0 ppb on Nov 23 19:00																		Minimum Daily Average: 0.7 ppb on Nov 23																		Hours of Data: 686																																																																									
Maximum Diurnal Average: 5.6 ppb at hour 7																		Minimum Diurnal Average: 3.3 ppb at hour 12																		Hours of Missing Data: 34																																																																									
Monthly Average: 4.0 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 10 P ₉₉ = 17																		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-Nov	0	1	0	0	0	Z	1	0	1	2	0	0	0	1	1	1	1	2	2	2	0	1	2	2	0.9	2																																																																																			
2-Nov	Z	2	0	0	0	0	2	4	4	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	9																																																																																			
3-Nov	1	Z	1	2	4	3	5	1	2	2	2	1	1	3	4	5	1	1	1	3	7	8	3	3	2.7	8																																																																																			
4-Nov	6	17	Z	7	3	4	3	3	3	4	3	3	3	2	3	3	4	4	3	3	4	5	7	7	4.5	17																																																																																			
5-Nov	10	9	6	Z	2	1	1	2	4	3	1	1	3	2	0	1	1	0	0	1	1	2	0	0	2.3	10																																																																																			
6-Nov	0	0	1	1	Z	5	6	4	3	4	5	4	2	2	1	1	2	1	1	1	1	1	2	2	2.2	6																																																																																			
7-Nov	2	3	4	7	6	Z	4	4	4	3	3	5	11	7	7	7	7	6	4	2	4	6	8	10	5.4	11																																																																																			
8-Nov	Z	7	6	6	6	11	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	11																																																																																			
9-Nov	0	Z	0	0	0	0	1	1	1	2	1	4	6	10	11	5	4	3	1	1	1	1	1	1	2.4	11																																																																																			
10-Nov	1	2	Z	1	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	3	3	3	4	4	2.2	4																																																																																			
11-Nov	4	3	3	Z	3	3	3	3	4	7	5	2	2	2	1	2	1	6	8	7	7	7	5	7	4.1	8																																																																																			
12-Nov	11	10	9	11	Z	10	9	10	13	3	2	2	1	1	1	1	1	2	1	1	2	2	2	3	4.7	13																																																																																			
13-Nov	3	2	2	2	2	Z	2	2	2	2	3	3	3	2	3	5	5	5	3	2	3	4	4	4	3.0	5																																																																																			
14-Nov	Z	4	4	4	3	4	5	10	10	6	5	6	7	7	7	4	2	5	9	11	14	11	14	18	7.4	18																																																																																			
15-Nov	17	Z	11	9	6	16	31	25	5	4	4	3	2	3	4	7	5	1	1	6	4	4	1	3	7.5	31																																																																																			
16-Nov	2	3	Z	3	3	1	2	1	1	3	4	2	4	4	5	1	1	1	1	3	7	4	2	5	2.7	7																																																																																			
17-Nov	5	3	8	Z	7	3	3	2	2	2	3	2	3	2	4	5	4	1	3	5	4	2	1	1	3.2	8																																																																																			
18-Nov	1	3	3	1	Z	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	1	1	0.8	3																																																																																			
19-Nov	1	2	11	12	23	Z	30	10	6	7	4	2	3	6	6	9	12	10	5	1	1	1	1	0	7.1	30																																																																																			
20-Nov	Z	0	1	2	5	19	12	9	C	C	C	C	6	5	2	2	1	2	2	1	1	1	1	1	3.8	19																																																																																			
21-Nov	2	Z	6	7	9	9	10	8	11	8	7	8	7	7	5	4	4	4	4	4	5	5	4	3	6.0	11																																																																																			
22-Nov	3	2	Z	2	5	2	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1.0	5																																																																																			
23-Nov	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	3	2	4	0	0.7	4																																																																																			
24-Nov	0	2	1	0	Z	1	0	0	0	0	4	8	4	3	3	1	1	1	2	4	1	2	6	9	2.4	9																																																																																			
25-Nov	8	5	4	3	3	Z	4	6	7	11	10	10	7	6	6	12	17	17	14	14	13	11	13	11	9.2	17																																																																																			
26-Nov	Z	4	1	2	2	2	2	2	2	2	3	3	2	2	2	3	2	3	3	4	5	5	7	8	3.0	8																																																																																			
27-Nov	10	Z	7	8	8	8	10	12	11	12	9	7	7	6	5	15	13	13	8	11	11	12	9	12	9.7	15																																																																																			
28-Nov	8	8	Z	6	7	5	3	3	6	3	4	3	2	2	2	3	4	3	3	6	4	2	1	1	3.9	8																																																																																			
29-Nov	2	3	4	Z	7	10	11	14	12	12	6	7	8	5	13	14	7	4	2	2	2	3	2	2	6.6	14																																																																																			
30-Nov	2	2	2	2	Z	2	1	2	3	4	5	7	8	7	11	15	12	13	17	10	9	9	8	10	7.0	17																																																																																			
																		Diurnal Average				Diurnal Maximum																																																																																							
4.0																		3.9				3.9				4.0				4.6				4.9				5.6				4.6				4.1				4.1				3.4				3.3				3.6				3.4				3.7				4.3				4.0				3.8				3.4				3.6				4.0				3.9				3.9				4.3			
17																		17				11				12				23				19				31				25				13				12				10				10				11				10				13				15				17				17				17				14				14				12				14				18			
Z - zerospan																		C - Calibration																																																																																											



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	682	99.42	99.42
21 - 40	4	0.58	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	31	28	13	9	9	4	17	73	99	167	83	30	22	11	50	682
21 - 40	0	0	0	0	0	0	1	1	2	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	36	31	28	13	9	9	5	18	75	99	167	83	30	22	11	50	686

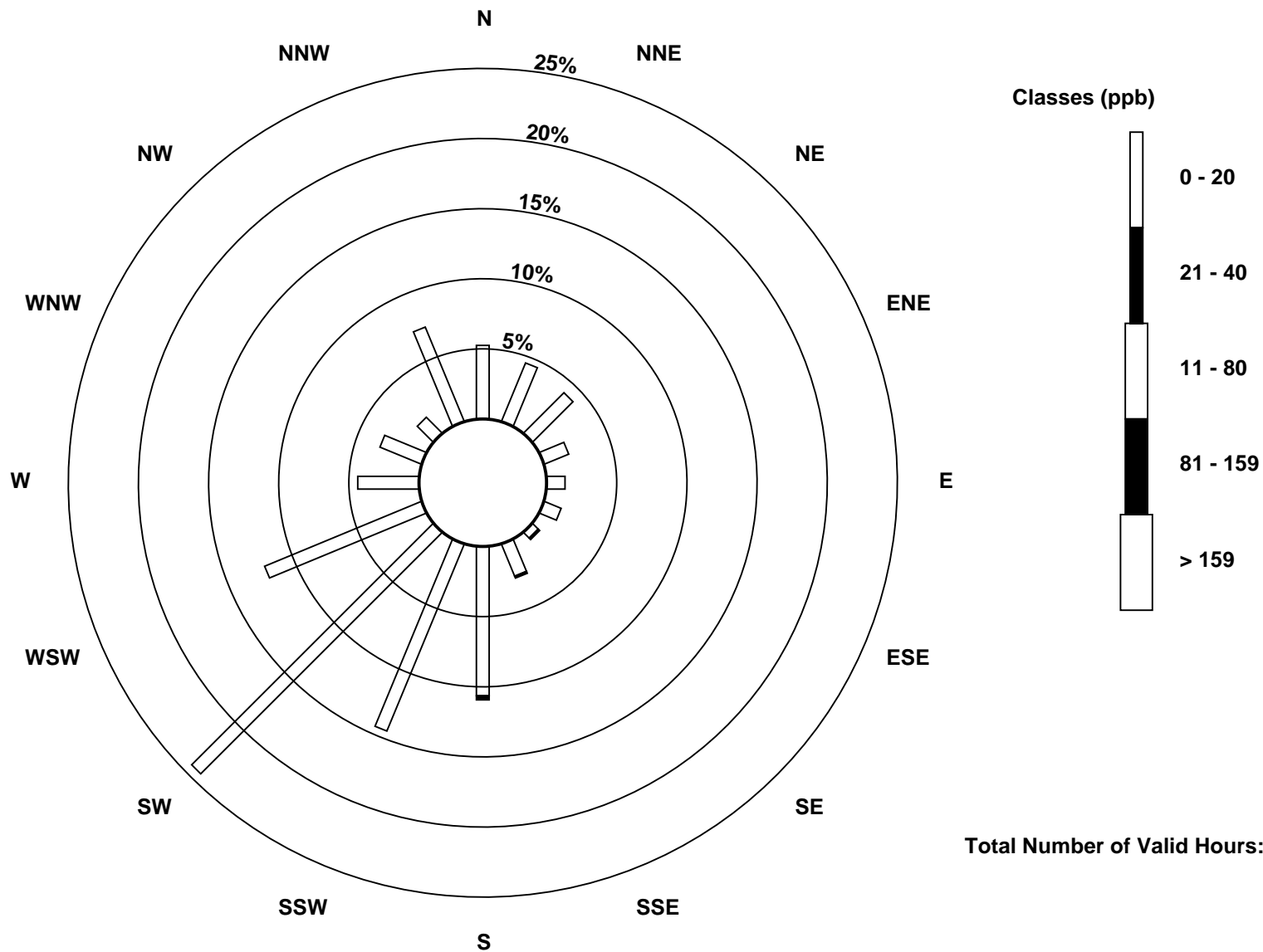
Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

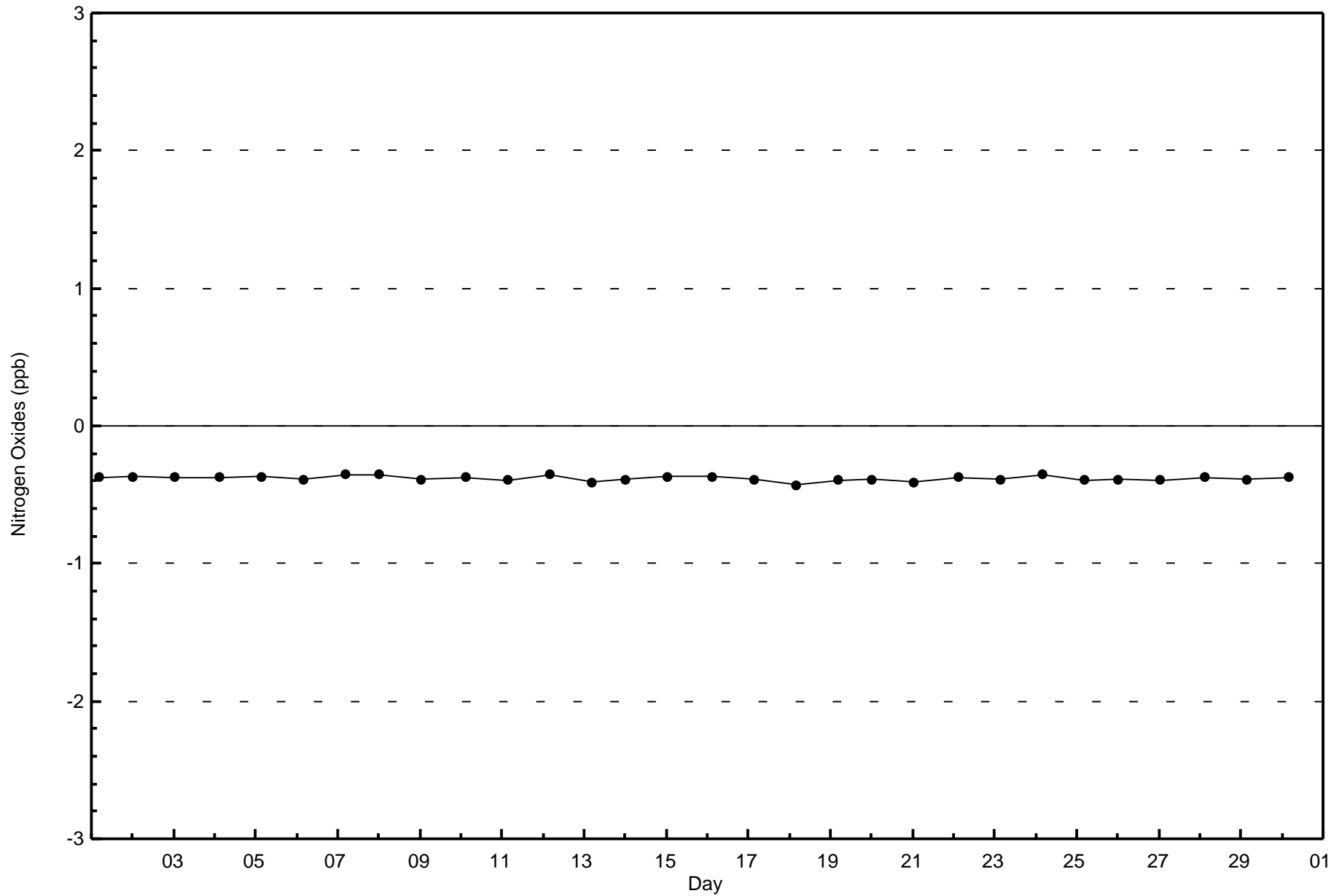
Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)

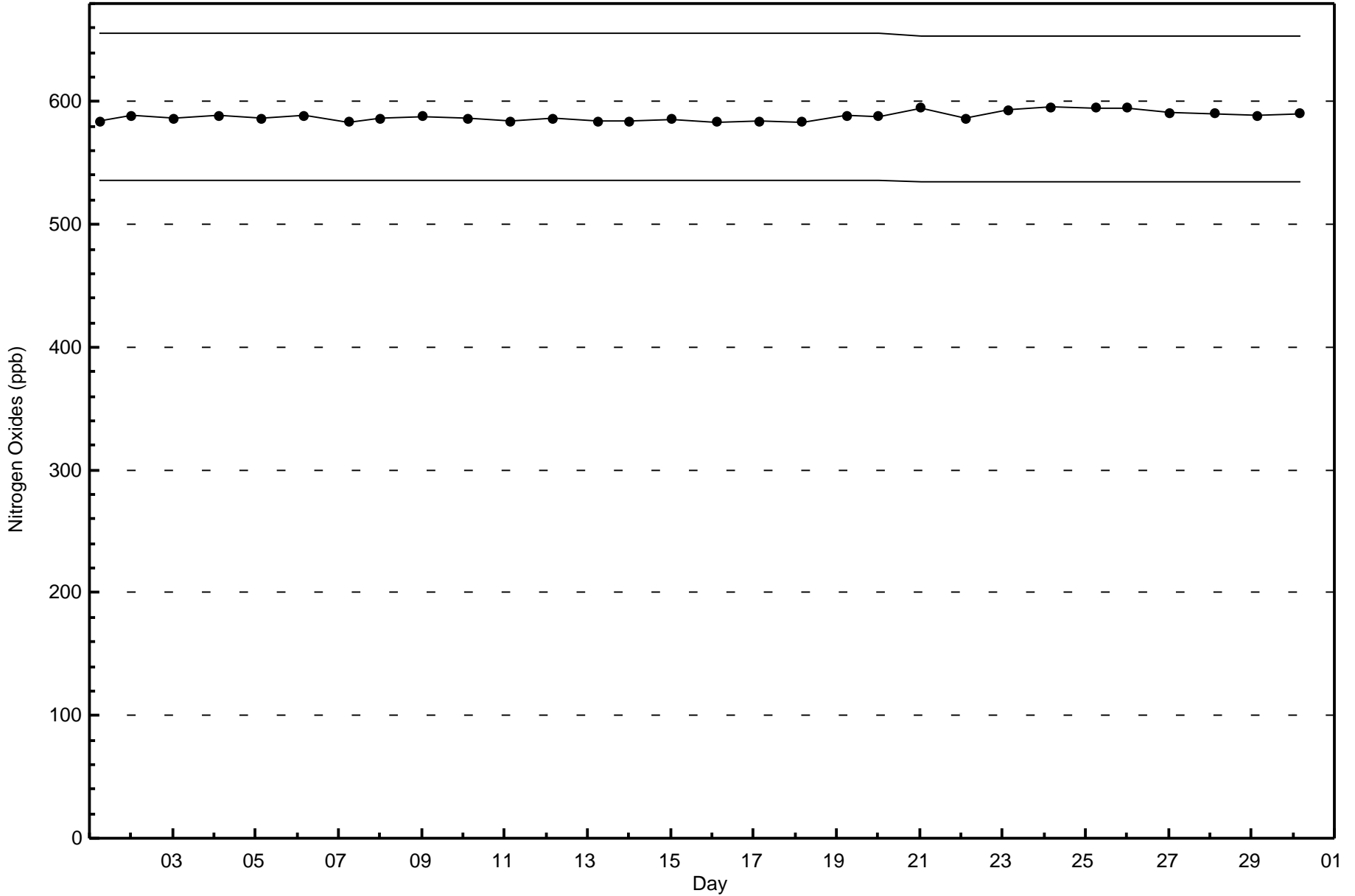




Wood Buffalo Environmental Association
Zero Responses

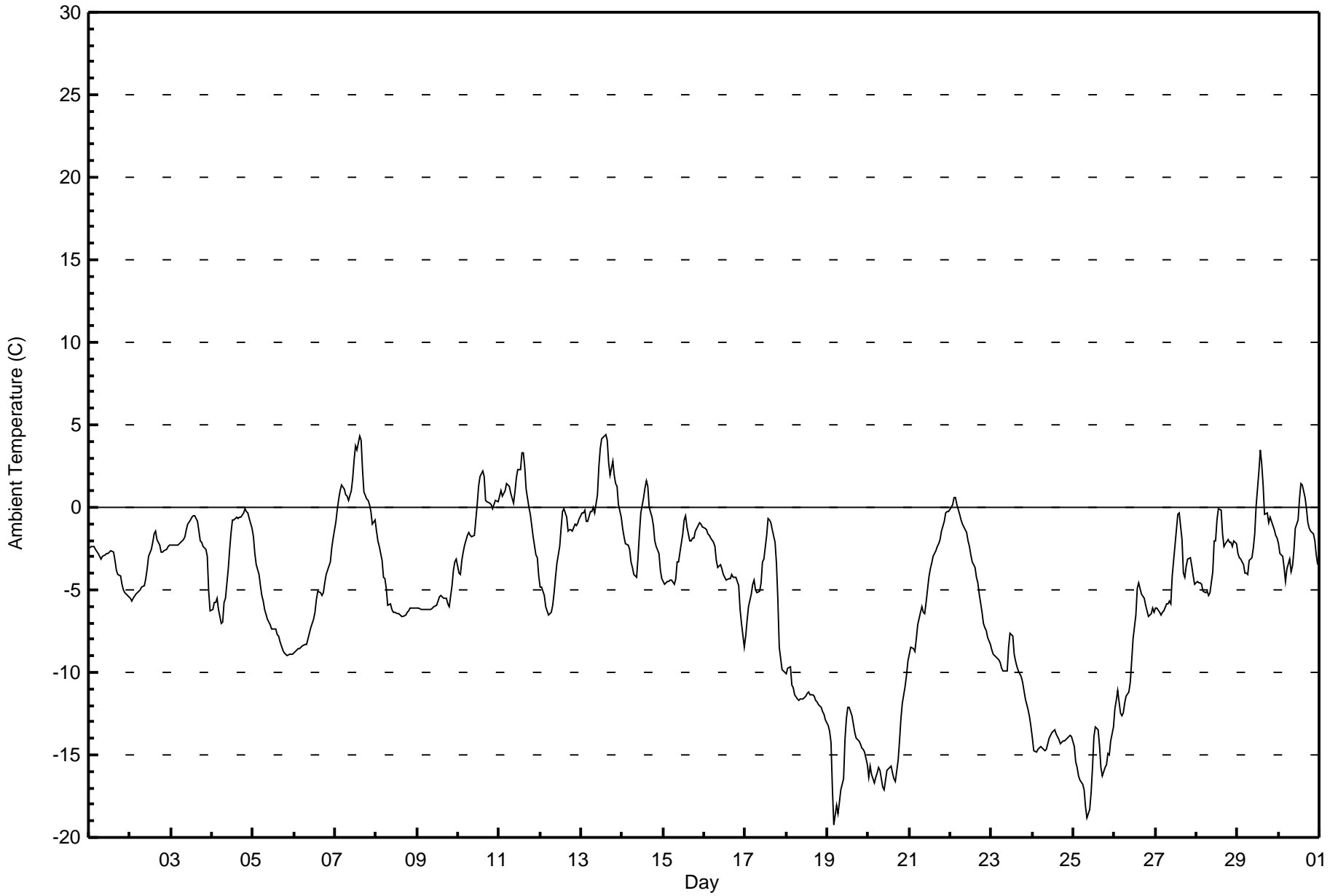
Nitrogen Oxides (NO_x) - ppb
Firebag - November 2015







Maximum Value: 4.4 C on Nov 13 15:00		Maximum Daily Average: 1.3 C on Nov 13		Hours in Service: 720																							
Minimum Value: -19.3 C on Nov 19 05:00		Minimum Daily Average: -15.7 C on Nov 25		Hours of Data: 720																							
Maximum Diurnal Average: -3.5 C at hour 14		Minimum Diurnal Average: -6.3 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -5.25 C		Percentiles: P ₁ = -17.4 P ₁₀ = -13.9 Q ₁ = -8.0 Median = -4.2 Q ₃ = -1.5 P ₉₀ = 0.2 P ₉₉ = 3.6		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	-2.5	-2.4	-2.4	-2.4	-2.5	-2.8	-3.0	-3.1	-3.0	-2.9	-2.8	-2.8	-2.7	-2.6	-2.7	-3.2	-3.8	-4.0	-4.1	-4.6	-5.0	-5.1	-5.2	-5.5	-3.4	-2.4	
2-Nov	-5.5	-5.6	-5.5	-5.3	-5.1	-5.1	-5.0	-4.8	-4.7	-4.3	-3.7	-3.0	-2.5	-2.1	-1.6	-1.5	-1.9	-2.3	-2.7	-2.7	-2.6	-2.6	-2.4	-2.3	-3.5	-1.5	
3-Nov	-2.3	-2.3	-2.3	-2.3	-2.2	-2.2	-2.1	-1.9	-1.8	-1.4	-1.0	-0.8	-0.6	-0.5	-0.5	-0.9	-1.4	-2.0	-2.1	-2.3	-2.6	-2.9	-5.1	-6.3	-2.1	-0.5	
4-Nov	-6.2	-5.7	-5.8	-5.5	-6.2	-7.0	-6.9	-5.7	-5.5	-3.7	-2.6	-1.5	-0.7	-0.8	-0.6	-0.6	-0.6	-0.6	-0.3	-0.1	-0.2	-0.4	-0.7	-1.3	-2.9	-0.1	
5-Nov	-1.8	-2.8	-3.5	-4.1	-4.8	-5.3	-5.7	-6.2	-6.8	-7.0	-7.1	-7.4	-7.3	-7.3	-7.7	-7.8	-8.1	-8.7	-8.8	-8.9	-9.0	-8.9	-8.9	-8.9	-6.8	-1.8	
6-Nov	-8.8	-8.7	-8.6	-8.6	-8.5	-8.4	-8.3	-8.3	-8.0	-7.7	-7.3	-6.8	-6.4	-5.6	-5.1	-5.1	-5.3	-5.1	-4.6	-4.0	-3.6	-3.3	-2.5	-1.9	-6.3	-1.9	
7-Nov	-0.9	-0.1	0.5	1.0	1.4	1.1	0.8	0.6	0.4	1.0	1.8	2.9	3.8	3.5	4.4	4.0	2.3	0.9	0.5	0.4	0.2	-0.3	-1.0	-0.8	1.2	4.4	
8-Nov	-1.4	-2.0	-2.4	-3.2	-4.3	-4.3	-5.0	-6.0	-5.9	-6.2	-6.4	-6.4	-6.5	-6.4	-6.5	-6.6	-6.6	-6.5	-6.3	-6.2	-6.1	-6.1	-6.1	-6.1	-5.4	-1.4	
9-Nov	-6.1	-6.1	-6.1	-6.2	-6.2	-6.2	-6.2	-6.2	-6.2	-6.1	-6.0	-5.9	-5.7	-5.4	-5.4	-5.5	-5.5	-5.5	-5.8	-6.0	-4.8	-3.8	-3.3	-3.1	-5.6	-3.1	
10-Nov	-4.0	-4.1	-3.2	-2.7	-2.3	-1.7	-1.5	-1.7	-1.8	-1.7	-0.8	0.2	1.3	1.8	2.2	1.9	0.5	0.4	0.3	0.2	-0.1	0.2	0.5	0.4	-0.7	2.2	
11-Nov	0.7	1.0	0.7	1.1	1.5	1.4	1.3	0.9	0.3	1.0	1.8	2.2	2.3	3.3	3.3	2.5	1.1	0.0	-0.5	-1.1	-1.8	-2.9	-3.0	-4.1	0.5	3.3	
12-Nov	-4.9	-4.9	-5.4	-6.0	-6.2	-6.6	-6.4	-5.9	-5.2	-4.2	-3.3	-2.4	-1.3	-0.3	-0.1	-0.6	-1.4	-1.3	-1.4	-1.4	-1.0	-1.1	-0.9	-0.7	-3.0	-0.1	
13-Nov	-0.3	-0.4	-0.2	-0.8	-0.9	-0.2	-0.3	0.0	-0.4	0.8	2.4	3.6	4.1	4.3	4.4	4.1	2.7	1.9	2.8	2.0	1.5	1.2	0.2	-0.6	1.3	4.4	
14-Nov	-1.3	-1.8	-2.2	-2.3	-2.5	-3.3	-3.7	-4.1	-4.2	-3.1	-1.6	-0.3	0.6	1.2	1.6	1.3	0.0	-0.6	-1.1	-2.0	-2.4	-2.8	-3.8	-4.4	-1.8	1.6	
15-Nov	-4.5	-4.6	-4.5	-4.5	-4.4	-4.4	-4.7	-4.3	-3.3	-3.3	-2.7	-1.6	-0.8	-0.5	-1.2	-2.0	-2.0	-1.9	-1.8	-1.4	-1.1	-0.9	-1.0	-1.2	-2.6	-0.5	
16-Nov	-1.2	-1.4	-1.6	-1.7	-1.8	-2.2	-2.4	-3.2	-3.6	-3.5	-3.7	-4.0	-4.2	-4.4	-4.4	-4.3	-4.1	-4.2	-4.3	-4.5	-4.8	-6.2	-7.1	-8.5	-3.8	-1.2	
17-Nov	-7.8	-6.9	-6.0	-5.3	-4.6	-4.4	-5.0	-5.1	-5.1	-4.5	-3.3	-3.1	-1.7	-0.7	-0.8	-1.0	-1.4	-2.1	-3.4	-5.6	-8.5	-9.8	-9.9	-10.0	-4.8	-0.7	
18-Nov	-10.1	-9.8	-9.7	-10.8	-10.9	-11.3	-11.6	-11.7	-11.6	-11.6	-11.6	-11.4	-11.3	-11.2	-11.4	-11.3	-11.5	-11.7	-11.8	-11.9	-12.1	-12.3	-12.6	-12.9	-11.4	-9.7	
19-Nov	-13.2	-13.5	-14.2	-17.0	-19.3	-18.0	-18.5	-17.9	-17.1	-16.4	-14.0	-12.8	-12.1	-12.1	-12.6	-13.1	-13.6	-14.0	-14.2	-14.3	-14.6	-14.6	-14.9	-15.6	-14.9	-12.1	
20-Nov	-16.4	-15.7	-16.2	-16.7	-16.4	-16.1	-15.8	-15.9	-17.0	-17.1	-16.5	-15.9	-15.8	-15.6	-16.1	-16.4	-16.6	-15.4	-14.2	-12.8	-11.8	-10.9	-10.2	-9.3	-15.0	-9.3	
21-Nov	-8.9	-8.5	-8.6	-8.7	-8.0	-7.1	-6.3	-6.0	-6.3	-6.5	-5.7	-4.2	-3.7	-3.4	-3.0	-2.7	-2.3	-2.2	-2.0	-1.4	-0.8	-0.4	-0.3	-0.2	-4.5	-0.2	
22-Nov	0.0	0.2	0.6	0.6	0.2	-0.4	-0.8	-1.0	-1.2	-1.6	-2.0	-2.3	-2.8	-3.3	-3.7	-4.2	-4.6	-5.3	-6.3	-7.0	-7.3	-7.5	-7.9	-8.3	-3.2	0.6	
23-Nov	-8.7	-8.9	-9.0	-9.1	-9.2	-9.4	-9.8	-9.9	-9.9	-9.9	-8.5	-7.7	-7.8	-8.9	-9.3	-9.6	-9.9	-10.2	-10.6	-11.1	-11.6	-12.3	-12.7	-13.3	-9.9	-7.7	
24-Nov	-14.0	-14.7	-14.8	-14.7	-14.6	-14.5	-14.6	-14.8	-14.7	-14.3	-14.0	-13.7	-13.6	-13.5	-13.7	-14.1	-14.3	-14.2	-14.2	-14.1	-14.0	-13.9	-13.8	-13.9	-14.2	-13.5	-13.5
25-Nov	-14.5	-15.4	-15.8	-16.3	-16.5	-16.8	-17.1	-18.1	-18.8	-18.3	-17.3	-15.8	-13.9	-13.3	-13.5	-14.4	-15.7	-16.3	-15.8	-15.6	-14.9	-15.0	-14.1	-13.3	-15.7	-13.3	
26-Nov	-12.2	-11.7	-11.1	-12.4	-12.6	-12.5	-11.8	-11.5	-11.2	-10.6	-9.3	-8.0	-6.5	-4.9	-4.6	-4.9	-5.2	-5.5	-6.0	-6.3	-6.6	-6.5	-6.1	-6.4	-8.5	-4.6	
27-Nov	-6.1	-6.1	-6.4	-6.5	-6.4	-6.3	-5.9	-5.8	-5.7	-5.8	-4.1	-2.3	-1.4	-0.5	-0.4	-2.0	-4.0	-4.2	-3.6	-3.1	-3.1	-3.5	-4.1	-4.6	-4.2	-0.4	
28-Nov	-4.5	-4.6	-4.5	-4.7	-5.1	-5.1	-5.1	-5.4	-5.2	-3.9	-2.1	-2.0	-0.7	-0.1	-0.1	-1.6	-2.4	-2.2	-2.0	-2.1	-2.1	-2.3	-2.0	-2.2	-3.0	-0.1	
29-Nov	-2.8	-3.1	-3.1	-3.5	-4.0	-4.0	-4.1	-3.3	-3.0	-2.4	-1.6	0.0	2.2	3.5	2.6	1.4	-0.4	-0.4	-1.0	-0.6	-0.9	-1.4	-1.7	-1.8	-1.4	3.5	
30-Nov	-2.2	-2.8	-3.0	-3.7	-4.5	-3.7	-3.1	-3.9	-3.6	-2.6	-1.3	-0.7	0.5	1.4	1.3	0.6	-0.1	-1.0	-1.3	-1.4	-1.6	-2.1	-2.9	-3.4	-1.9	1.4	
		-5.7	-5.8	-5.8	-6.1	-6.2	-6.2	-6.3	-6.3	-6.3	-5.9	-5.2	-4.5	-3.8	-3.5	-3.5	-3.9	-4.5	-4.8	-4.9	-5.0	-5.1	-5.3	-5.4	-5.7	Diurnal Average	
		0.7	1.0	0.7	1.1	1.5	1.4	1.3	0.9	0.4	1.0	2.4	3.6	4.1	4.3	4.4	4.1	2.7	1.9	2.8	2.0	1.5	1.2	0.5	0.4	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Firebag - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	639	88.75	88.75
0 - 10	81	11.25	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

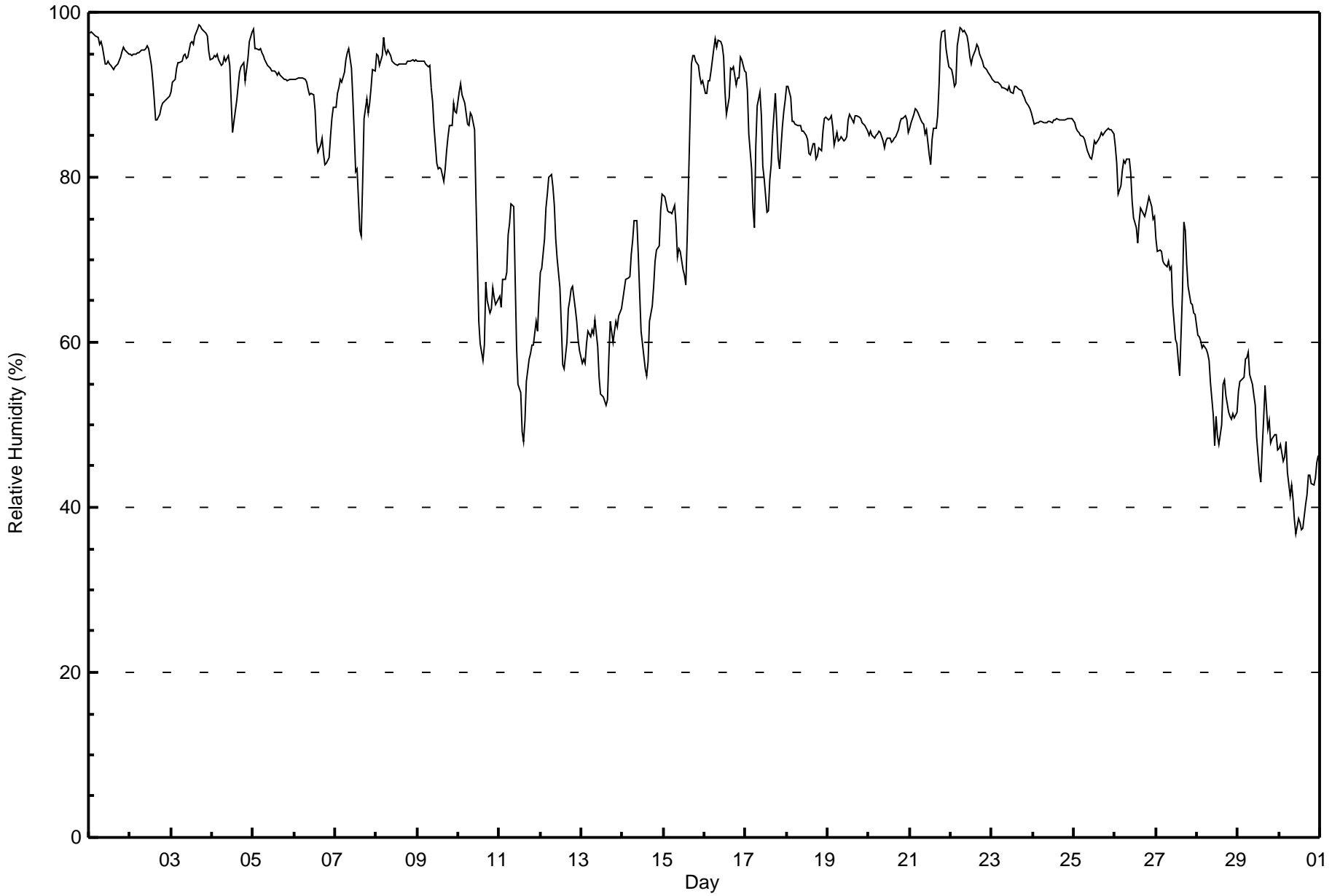


Maximum Value: 98 % on Nov 3 17:00																		Maximum Daily Average: 95.3 % on Nov 3																		Hours in Service: 720			
Minimum Value: 37 % on Nov 30 11:00																		Minimum Daily Average: 42.5 % on Nov 30																		Hours of Data: 720			
Maximum Diurnal Average: 83.3 % at hour 8																		Minimum Diurnal Average: 75.4 % at hour 14																		Hours of Missing Data: 0			
Monthly Average: 80.4 %																		Percentiles: P ₁ = 41 P ₁₀ = 56 Q ₁ = 70 Median = 86 Q ₃ = 92 P ₉₀ = 95 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-Nov	97	98	97	97	97	97	96	96	96	94	94	94	94	94	93	93	94	94	95	95	96	95	95	95	95	95.3	98												
2-Nov	95	95	95	95	95	95	95	95	95	96	96	96	94	92	90	87	87	88	89	89	89	89	90	90	90	92.3	96												
3-Nov	90	91	92	93	94	94	94	95	95	94	95	96	96	96	97	98	98	98	98	98	98	97	95	94	95.3	98													
4-Nov	94	95	95	95	94	94	94	95	94	95	94	89	85	87	89	91	93	93	94	92	93	94	96	98	93.0	98													
5-Nov	98	96	96	95	96	95	95	94	94	93	93	93	93	93	92	93	92	92	92	92	92	92	92	92	93.5	98													
6-Nov	92	92	92	92	92	92	92	92	91	90	90	90	88	84	83	84	85	83	82	82	82	85	87	88	87.9	92													
7-Nov	88	90	91	92	91	93	94	95	96	93	90	85	81	81	74	73	80	87	89	88	89	91	93	93	88.2	96													
8-Nov	95	95	94	95	97	95	95	95	95	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94.3	97													
9-Nov	94	94	94	94	94	94	93	94	91	89	86	82	81	81	81	79	81	83	85	86	86	89	88	88	87.8	94													
10-Nov	90	91	90	90	89	86	86	88	87	86	77	70	62	60	58	60	67	65	64	64	67	65	65	65	74.7	91													
11-Nov	66	64	68	68	69	73	74	77	76	68	59	55	54	49	48	51	55	58	59	60	60	62	61	65	62.4	77													
12-Nov	68	69	73	76	78	80	80	79	77	73	70	67	62	57	57	60	64	65	67	67	64	63	60	59	68.1	80													
13-Nov	57	58	57	60	61	61	62	61	63	60	56	54	54	53	52	53	58	63	60	61	63	62	63	64	59.0	64													
14-Nov	65	66	68	68	68	71	72	75	75	71	66	61	58	57	56	58	63	64	67	70	71	72	76	78	67.3	78													
15-Nov	78	78	76	76	76	76	77	74	70	71	71	69	68	67	73	87	94	95	95	94	94	92	91	92	80.5	95													
16-Nov	90	90	92	92	93	96	97	96	97	96	96	95	90	88	90	93	93	93	91	92	92	95	94	93	93.1	97													
17-Nov	93	91	85	81	76	74	84	89	90	87	81	80	76	76	80	81	85	90	86	82	81	86	88	89	83.9	93													
18-Nov	91	91	90	87	87	86	86	86	86	86	86	85	85	83	83	84	84	82	82	84	83	86	87	87	85.7	91													
19-Nov	87	87	87	86	84	85	84	85	85	84	85	85	87	88	87	87	87	87	87	87	87	86	86	86	86.1	88													
20-Nov	85	86	85	85	85	85	86	85	84	84	84	85	85	84	84	85	85	86	87	87	87	87	87	85	85.4	87													
21-Nov	86	87	88	88	88	88	87	87	86	85	86	83	82	85	86	86	87	91	97	98	98	96	94	93	88.8	98													
22-Nov	93	92	91	91	96	98	98	98	98	97	96	95	94	95	95	96	96	95	94	93	93	93	93	92	94.7	98													
23-Nov	92	92	92	91	91	91	91	91	91	91	91	90	90	91	91	91	91	90	90	90	89	89	88	88	90.5	92													
24-Nov	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	86.9	87													
25-Nov	87	86	86	85	85	85	85	84	83	82	82	83	84	84	85	85	85	85	86	86	86	86	86	85	84.8	87													
26-Nov	84	82	78	79	81	82	82	82	82	81	77	75	74	72	75	76	76	75	76	77	78	76	75	75	77.9	84													
27-Nov	73	71	71	71	70	70	69	70	69	69	65	60	60	58	56	66	75	74	69	67	65	65	64	63	67.0	75													
28-Nov	61	61	60	59	60	59	59	58	55	51	48	51	49	48	50	55	55	54	52	51	51	51	51	52	54.1	61													
29-Nov	54	55	55	56	58	58	59	56	55	54	52	48	44	43	47	51	55	49	51	48	48	49	49	47	51.7	59													
30-Nov	47	48	46	46	48	44	41	43	41	38	37	39	38	37	37	40	42	44	44	43	43	43	45	46	42.5	48													
	82.6	82.5	82.3	82.3	82.7	82.8	83.1	83.3	82.8	81.3	79.4	77.8	76.3	75.4	75.7	77.4	79.6	80.2	80.2	80.1	80.1	80.6	80.7	80.8	Diurnal Average														
	98	98	97	97	97	98	98	98	98	97	96	96	96	96	97	98	98	98	98	98	98	97	96	98	Diurnal Maximum														



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Firebag - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	6	0.83	0.83
40 - 60	99	13.75	14.58
60 - 80	141	19.58	34.17
80 - 100	474	65.83	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

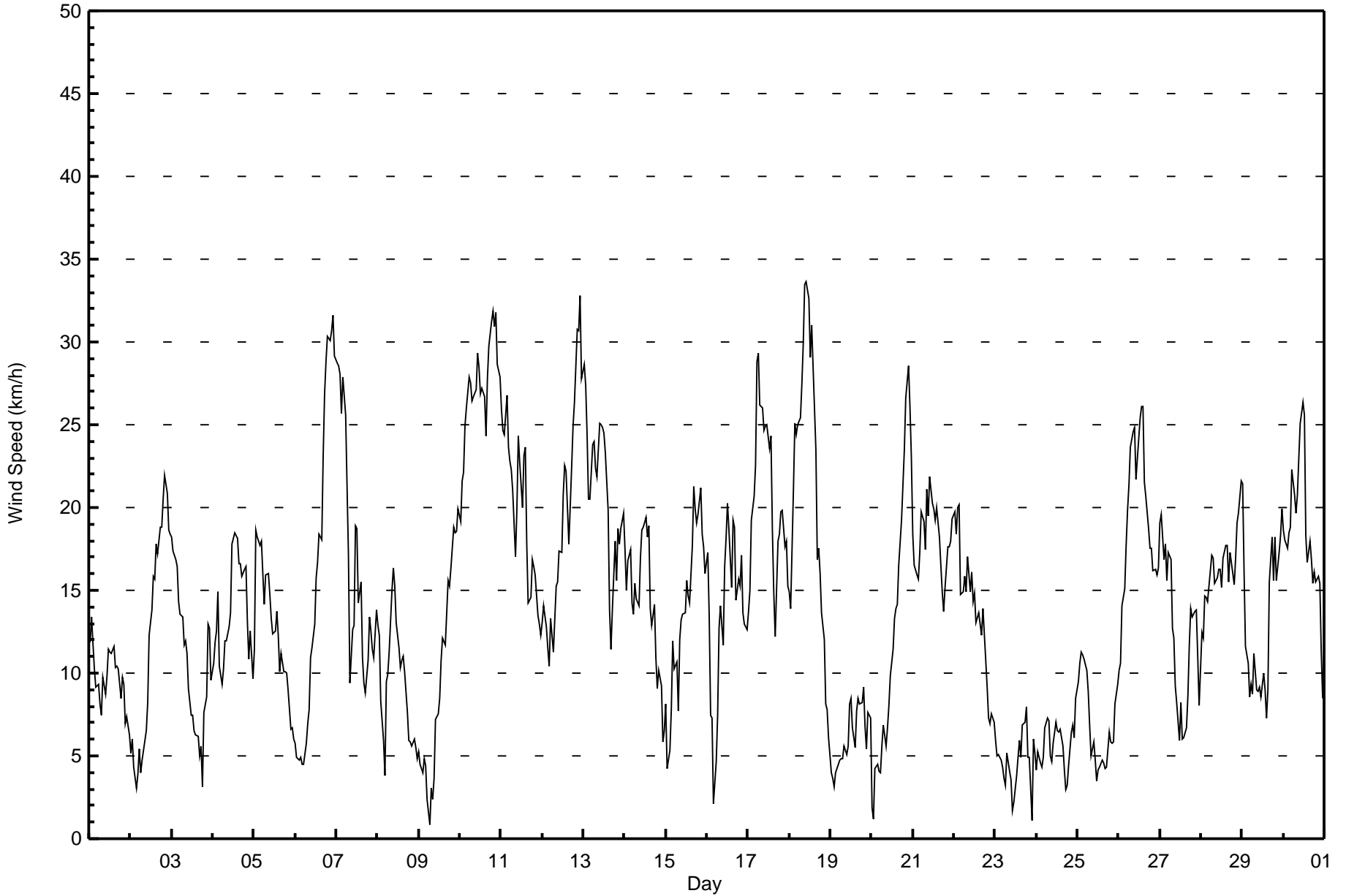


Maximum Speed: 34 km/h on Nov 18 11:00	Maximum Daily Speed Average: 27.1 km/h on Nov 10	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 9 07:00	Minimum Daily Speed Average: 2.2 km/h on Nov 19	Hours of Data: 720
Maximum Diurnal Speed Average: 10.0 km/h at hour 22	Minimum Diurnal Speed Average: 6.3 km/h at hour 17	Hours of Missing Data: 0
Monthly Average Velocity: 8.0 km/h 221.5 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 14 Q ₃ = 19 P ₉₀ = 25 P ₉₉ = 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-Nov	NE12	ENE13	NE12	NE10	NE9	NE9	ENE8	NE7	NE10	ENE9	NE10	NE11	NE11	NE11	NE12	NE10	NE10	ENE10	ENE8	ENE10	NE9	NE7	E7	ENE6	NE9.6	ENE13
2-Nov	SE5	E6	NNE4	NE3	NE4	NE5	E4	SE5	SSE6	SSE7	S8	S12	S14	S16	S16	S18	S17	SSE19	SSE19	SSE21	S22	S21	S19	SSE18	SSE10.4	S22
3-Nov	S18	S17	S17	S16	S14	S14	S13	S12	S12	S11	SSW9	SW7	WSW7	WSW7	W6	N6	NNE5	N6	NW3	WNW8	W9WSW13	WSW13	WSW10	SSW7.2	S18	
4-Nov	SW11	SSW12	SSW13	SSW15	SSW10	S9	SSW10	S12	S12	SSW13	S14	S18	S18	S19	S18	S17	S17	S16	SSW16	SSW16	SW13	SW11	W13WNW10	SSW12.4	S19	
5-Nov	NNW11	NNW19	NNW18	NNW18	NNW18	NNW16	NNW14	NNW16	NNW15	NNW13	NNW13	NNW12	NNW13	NNW14	N12	NNW10	N11	NNW10	NNW10	NW10	NW9	NW7	WNW7	WNW6	NNW12.4	NNW19
6-Nov	W6	WNW5	WSW5	WSW5	WSW5	SW4	SSW6	S7	S8	S11	S12	SSW13	SSW16	SSW17	S18	S18	S23	SSE27	S29	S30	S30	S31	S32	S29	S14.9	S32
7-Nov	SSW29	SW29	SW28	WSW26	WSW28	WSW26	WSW21	WSW17	W9WSW13	SW13	SW19	WSW19	WSW14	WSW16	WSW11	WSW9	WSW9	SW11	WSW13	WSW13	WSW11	WSW11	WSW14	WSW16.5	SSW29	
8-Nov	WSW13	WSW12	WNW8	WSW6	NW4	N10	NNE10	NE11	NNE15	NNE16	NNE15	NNE13	NNE12	NNE10	NNE11	NNE11	NE10	NE8	NNE6	NNE6	NNE6	N6	NNE6	NNE5	NNE7.0	NNE16
9-Nov	N5	N4	N4	N5	NNE4	NE2	W1	W3	WNW2	WSW4	SW7	SW8	SW8	SSW11	SW12	SW12	SSW14	SSW16	SSW15	SSW16	SSW19	SW19	SSW19	SSW20	SSW7.3	SSW20
10-Nov	S19	S22	S22	SSW25	SSW26	SSW28	SSW28	SSW26	SSW27	SSW27	SSW29	SSW28	SSW27	SSW27	SSW27	SSW24	S28	SSW30	SSW31	SSW32	SSW31	SSW32	SSW29	SSW28	SSW27.1	SSW32
11-Nov	S26	SSW25	S24	S27	SSW24	SSW23	SSW22	SW21	SW17	WSW20	WSW24	W23	WSW20	W23	W24	WSW18	SW14	SW15	SW17	SW16	SW16	SW13	WSW13	SW12	SW17.9	S27
12-Nov	WSW13	WSW14	WSW13	WSW12	SW10	SW13	SW11	SW13	SW15	SW15	SSW17	SSW17	SSW21	SSW23	SSW22	S18	S20	S22	S25	S26	S31	S31	S33	S28	SSW17.7	S33
13-Nov	S29	S27	S24	S21	S20	SSW24	SSW24	SSW22	SSW22	SSW25	SW25	SW25	SW25	SW23	SW20	SW14	SW11	SW14	WSW18	W16	WSW19	WSW18	WSW19	WSW20	SW18.8	S29
14-Nov	WSW17	W15	WSW17	WSW17	WSW14	SW14	SW15	SW15	SW14	SW17	SW19	WSW19	WSW19	WSW18	SW19	SW14	SSW13	SW14	SW11	SW9	SW10	SW9	SSW6	SSW7	SW13.8	WSW19
15-Nov	S8	S4	S5	SSE8	SSE12	SSE10	SSE11	SE8	SE12	SE13	SE14	ESE14	ESE16	ESE15	ESE14	E18	ENE21	ENE20	ENE19	E20	E21	E18	E18	E16	ESE11.8	ENE21
16-Nov	ESE17	ESE13	ESE7	ESE7	SSE2	WNW5	WNW7	WNW13	NW14	WNW12	W16	W18	W20	WNW19	W15	W19	W19	WSW14	WSW16	WSW15	WSW17	SW14	SSW13	S13	WSW8.5	W20
17-Nov	S14	S15	SSE19	SE21	SSE23	SSE29	S29	S26	S26	S25	SSW25	SSW25	SSW24	SW24	SW19	SW15	WSW12	WSW18	W18	WNW20	W20	W18	W18	W15	SSW15.1	S29
18-Nov	W15	WNW14	NNW21	NNW25	NNW24	NNW25	NNW25	NNW27	NNW30	NNW33	N34	N33	N29	NNW31	N28	NNW23	NNW17	N18	N16	N14	NNW12	NNW8	NW8	NW6	NNW20.7	N34
19-Nov	WNW4	W4	SSE3	SSE4	S4	S5	S5	SSW5	SSW6	SSW5	SSW6	WSW8	WNW8	NW7	NW6	NNW8	NNW8	N8	N8	N9	N7	N5	N8	N7	NW2.2	N9
20-Nov	NW2	NNW1	W4	W5	W4	WSW4	WSW6	W7	WSW6	WSW7	WSW8	WSW10	SW11	SSW13	SSW14	S14	S17	S19	S21	SSW23	SSW27	SSW29	SW26	SW23	SSW11.2	SSW29
21-Nov	SW18	SW17	SW16	SW16	WSW17	WSW20	WSW19	WSW17	SW21	SW20	SW22	WSW20	SW20	SW19	SW20	SW18	SW17	SW15	SW14	WSW15	WSW18	WSW18	WSW18	WSW19	SW17.9	SW22
22-Nov	WSW20	WSW18	W20	WNW20	NW15	NNW15	NNW16	NNW15	N17	N15	N16	N14	N15	N13	N14	N13	N12	NNE14	NNE11	NNE9	NNE7	NNE7	NNE8	NNE7	NNW10.1	WNW20
23-Nov	NNE6	N5	N5	NNE5	NNE4	NNE4	NE3	NE5	ENE4	ENE4	NNE2	NNE2	N4	N5	NNE6	NNE5	NE7	NE7	NE8	ENE5	ESE5	ESE1	NNW6	NNW5	NNE4.1	NE8
24-Nov	NNW4	NNW5	NNW5	NNW4	NNW5	NNW7	N7	N7	NNW5	NNW5	NNW6	NNW7	NNW7	NNW6	NNW7	NNW6	WNW4	WNW3	WSW3	WSW4	WSW6	SW7	SW6	SW9	NW4.0	SW9
25-Nov	SW9	SW11	SW11	SW11	SW10	SW9	SW7	SW5	WSW6	WSW5	WSW3	WNW4	W4	WSW5	SW5	SW4	SW4	SW6	SW6	SW6	SW6	SW6	SW8	SW9	SW6.7	SW11
26-Nov	SW10	SW11	SW14	SSW15	SSW18	SSW20	SSW21	SSW24	SW25	SW25	SSW22	SSW23	SSW25	SW26	SW26	SW22	SW21	SW19	SW18	SW18	SW16	SW16	SW16	SW16	SW19.2	SW26
27-Nov	SW19	SW20	SW17	SW18	SW16	SW17	SW17	WSW13	WSW12	WSW9	WSW8	W6	W8	NW6	WNW6	WSW7	SW9	SSW12	SW14	SW13	SW14	SW14	SW11	SW8	SW11.6	SW20
28-Nov	SW12	SW12	SW15	SW15	SW14	SW16	SW17	SW17	SSW15	SSW16	SSW16	SW16	SW15	SSW17	SW18	SW18	SW15	SW17	SW16	SW15	SW17	SW19	SSW20	SW22	SW16.3	SW22
29-Nov	SW21	SW16	SW12	SW11	SW9	SW9	SW9	SW11	SW9	SW9	SW9	SW9	SW10	SW9	SSW7	SSW9	SSW16	SSW18	SSW16	SW18	SSW16	SSW17	SSW18	SSW20	SW12.6	SW21
30-Nov	SSW19	SSW18	SSW18	SSW18	SSW19	SW22	SW21	SW20	SW21	SW23	SW25	SW26	SW26	WSW18	WSW17	WSW18	SW17	SW15	SW16	SW15	SW16	SW15	SW11	SW8	SW18.1	SW26

SW9.2	SW8.3	SW7.8	SW7.5	SW7.1	SW7.5	SW7.5	SW7.2	SW6.6	SW7.2	SW8.1	SW8.4	SW8.9	SW8.5	SW7.9	SW6.7	SSW6.3	SSW7.2	SSW7.6	SW8.4	SW9.6	SW10.0	SW9.7	SW9.3	Diurnal Average
SSW29	SW29	SW28	S27	WSW28	SSE29	S29	NNW27	NNW30	NNW33	N34	N33	N29	NNW31	N28	SSW24	S28	SSW30	SSW31	SSW32	SSW31	SSW32	S33	S29	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Firebag - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	84	11.67	11.67
6 - 11	190	26.39	38.06
12 - 19	290	40.28	78.33
20 - 28	128	17.78	96.11
29 - 38	28	3.89	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - November 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	9	9	7	3	1	2	2	3	5	2	5	10	7	7	3	9	84
6 - 11	11	17	19	6	2	2	1	5	7	11	51	20	6	9	7	16	190
12 - 19	13	6	3	2	4	6	3	5	36	41	85	50	12	4	2	18	290
20 - 28	1	0	0	2	2	0	1	4	21	39	32	11	6	2	0	7	128
29 - 38	3	0	0	0	0	0	0	1	11	9	1	0	0	0	0	3	28
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	32	29	13	9	10	7	18	80	102	174	91	31	22	12	53	720

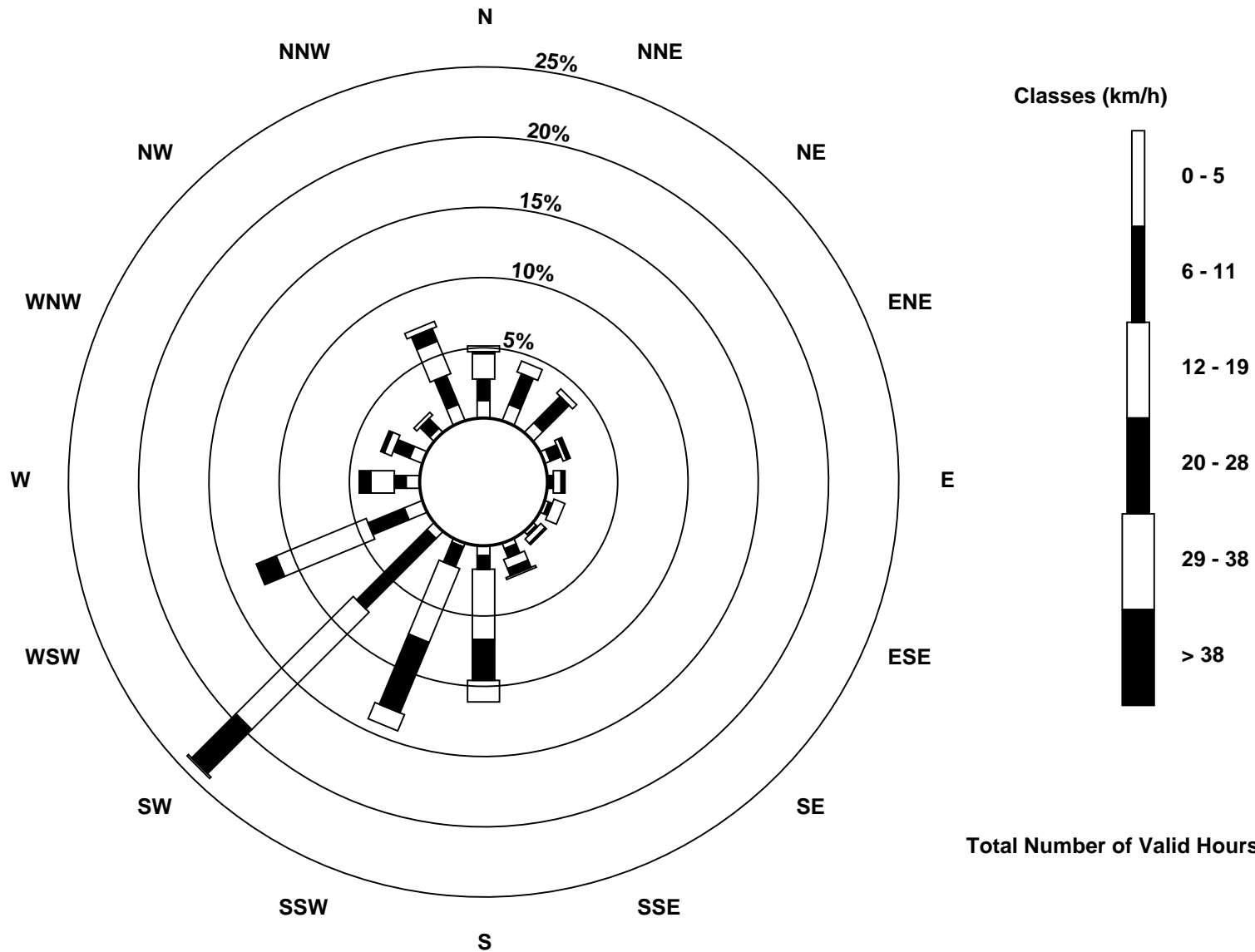
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Firebag (AMS 19)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Nov 18 10:00	Hours of Data: 720
Minimum Value: 0 km/h on Nov 19 08:00	Hours of Missing Data: 0
	Hours of Calibration: 0
	Percent Operational Time: 100.0
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

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

4	5	5	5	6	6	5	5	6	7	7	7	7	6	5	5	4	4	5	5	6	5	5	5	5	
Diurnal Maximum																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Firebag - November 2015

Direction of Maximum Speed: 351 deg on Nov 18 11:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 197.0 deg on Nov 10		Hours of Data:	720
Direction of Minimum Speed: 281 deg on Nov 9 07:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 2.2 deg on Nov 19		Percent Operational Time:	100.0
Monthly Average Direction: 239.6 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-Nov	48	62	53	55	35	40	62	47	52	66	43	45	56	50	52	49	46	69	72	64	44	55	87	69	54.3
2-Nov	126	94	25	34	42	56	81	131	152	155	170	172	171	180	179	178	170	168	168	168	173	171	169	167	164.0
3-Nov	173	174	175	179	177	178	182	189	189	189	199	217	240	247	280	355	16	3	313	289	267	255	251	239	205.6
4-Nov	236	212	194	199	201	190	198	190	188	199	189	191	174	173	171	176	174	185	195	201	220	231	267	296	196.5
5-Nov	321	336	328	336	338	338	347	338	331	342	346	346	332	342	351	337	350	348	341	326	323	310	286	299	335.5
6-Nov	281	284	254	245	242	225	198	188	182	186	190	193	205	209	190	178	169	168	171	175	176	177	182	188	185.9
7-Nov	207	220	235	247	254	257	258	254	261	246	224	232	242	250	248	248	245	233	236	241	248	240	237	246	241.1
8-Nov	254	257	289	257	308	7	18	34	32	26	33	31	32	32	19	21	35	35	28	23	18	7	14	28	13.9
9-Nov	10	9	6	6	27	50	281	271	287	237	227	219	225	212	221	215	207	203	199	201	206	215	205	201	213.5
10-Nov	191	184	189	198	194	200	193	195	193	193	200	203	207	206	201	197	190	193	194	199	199	202	203	195	197.0
11-Nov	191	194	188	190	196	201	212	216	219	239	250	259	252	268	266	246	234	222	232	224	229	232	241	229	224.7
12-Nov	238	245	246	248	234	222	216	218	220	218	209	204	201	206	196	187	174	179	172	172	176	173	176	181	196.5
13-Nov	180	177	184	185	184	196	194	199	197	205	216	224	226	224	227	229	221	234	258	259	251	250	251	253	214.1
14-Nov	255	259	251	253	248	235	229	229	220	227	229	239	240	241	232	220	210	221	215	225	224	234	212	192	233.5
15-Nov	190	181	176	167	166	152	149	140	130	127	127	119	118	119	116	93	76	64	60	83	95	96	97	101	109.9
16-Nov	118	121	121	122	161	284	292	301	308	292	275	278	279	286	272	259	267	255	250	243	240	218	196	175	254.8
17-Nov	169	171	157	145	149	167	172	174	174	179	192	198	207	219	226	222	241	251	278	283	273	271	271	267	203.8
18-Nov	275	288	327	340	335	339	342	341	344	348	351	353	351	347	349	338	342	350	355	352	343	340	320	318	341.0
19-Nov	286	275	162	167	173	174	183	195	193	197	211	244	282	308	314	348	345	1	11	5	349	356	352	11	312.0
20-Nov	312	348	277	267	266	250	249	261	255	241	244	248	229	210	196	179	182	190	189	193	200	205	215	221	211.6
21-Nov	224	228	229	230	241	241	243	237	236	229	233	241	233	233	228	221	223	223	229	243	251	246	247	248	235.1
22-Nov	243	253	270	287	310	331	340	345	349	357	3	1	6	4	360	359	7	19	19	24	27	22	24	25	341.2
23-Nov	23	8	6	25	32	19	38	47	58	59	54	26	10	3	27	30	35	41	40	68	112	121	336	347	30.2
24-Nov	345	340	341	346	329	334	350	353	346	335	329	330	329	333	332	328	302	292	248	246	254	225	231	219	314.1
25-Nov	225	225	221	218	220	225	229	228	224	243	249	247	283	261	250	236	226	228	221	223	224	217	228	226	228.8
26-Nov	222	217	214	213	210	203	206	212	215	214	212	205	213	216	220	222	228	228	219	223	221	231	234	228	217.0
27-Nov	227	230	232	232	226	227	232	245	245	243	256	281	259	304	302	258	225	212	221	221	223	229	234	223	234.9
28-Nov	222	219	219	218	217	217	219	218	209	211	212	214	222	211	219	219	217	214	215	220	218	215	212	218	216.3
29-Nov	220	228	224	227	219	223	224	231	220	217	225	232	228	224	203	193	196	210	210	214	213	205	206	210	215.6
30-Nov	210	203	207	204	200	215	219	216	223	228	232	235	236	237	241	237	234	229	231	227	222	223	221	218	223.4

215.2 217.7 222.6 222.5 222.1 223.1 222.1 226.5 223.4 223.8 228.3 232.7 233.9 235.7 231.9 223.7 211.4 209.6 212.8 214.6 216.3 215.3 217.6 215.5

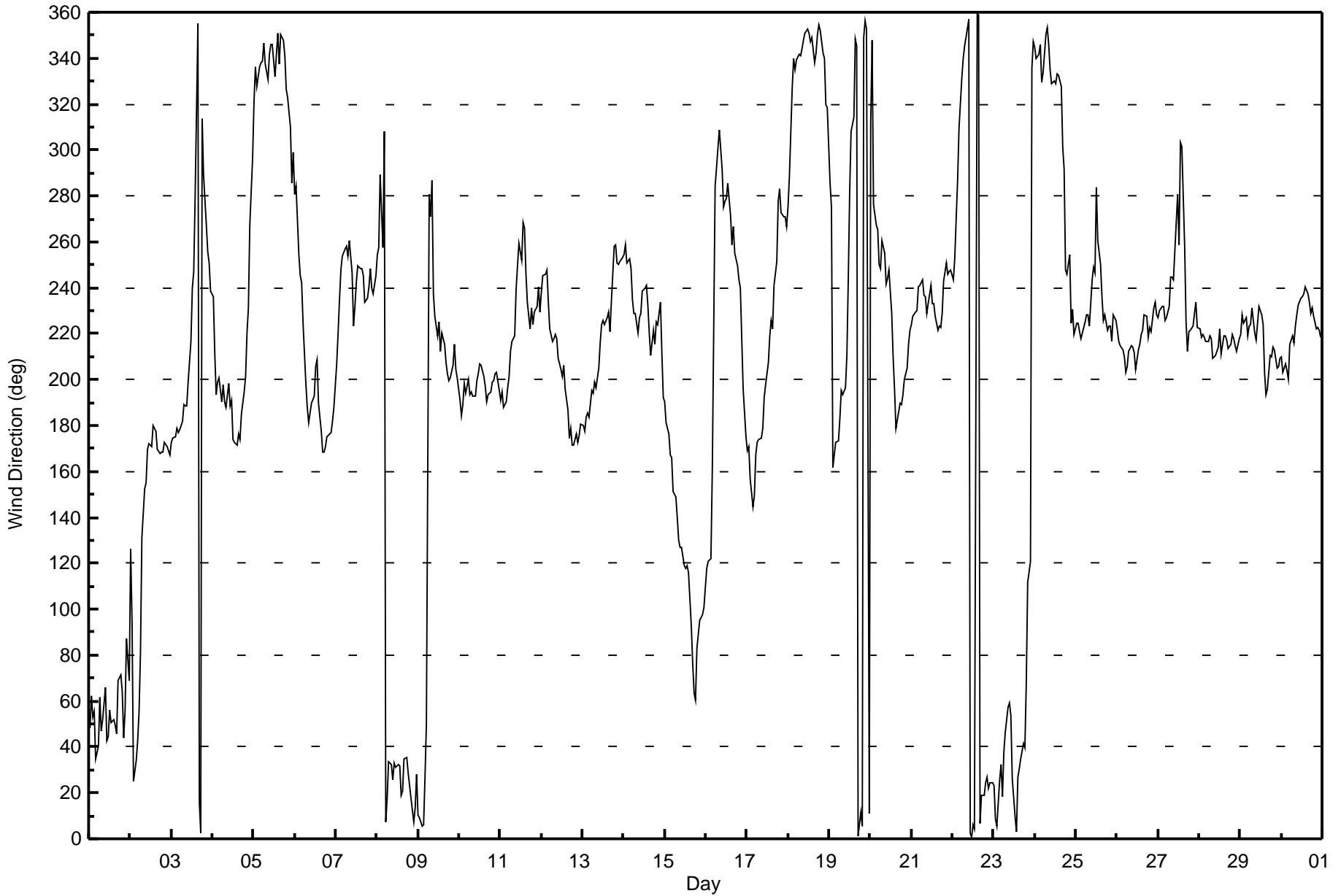
Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Firebag - November 2015





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Firebag - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 79 deg on Nov 23 22:00			Hours of Data:	720
Minimum Value: 4 deg on Nov 19 08:00			Hours of Missing Data:	0
Percentiles: P ₁ = 6 P ₁₀ = 7 Q ₁ = 8 Median = 10 Q ₃ = 12 P ₉₀ = 15 P ₉₉ = 32			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-Nov	10	12	12	10	16	14	17	15	16	14	14	11	12	15	16	19	18	12	16	24	17	22	23	17	24
2-Nov	39	31	28	15	19	11	23	20	16	13	10	10	9	9	9	8	9	9	8	9	9	9	9	9	39
3-Nov	8	8	8	8	8	8	8	8	8	7	13	12	14	12	17	17	21	13	39	12	10	10	8	11	39
4-Nov	12	15	8	7	11	6	7	8	7	8	11	9	10	9	9	12	9	11	8	8	10	11	14	11	15
5-Nov	16	12	11	12	11	11	13	12	12	13	13	12	12	12	12	13	13	12	15	11	12	13	10	15	16
6-Nov	12	14	13	11	14	13	10	10	8	8	8	8	11	9	9	10	9	8	8	8	8	8	8	12	14
7-Nov	9	9	10	9	9	10	10	11	11	9	12	10	9	9	9	8	9	8	5	10	8	7	6	10	12
8-Nov	11	10	11	35	31	10	10	9	10	12	12	14	16	17	16	17	13	11	12	12	14	11	14	14	35
9-Nov	12	13	14	13	15	16	74	18	26	33	17	20	14	12	12	12	10	8	6	6	10	9	9	7	74
10-Nov	7	8	7	8	7	7	8	9	7	9	8	8	9	9	8	8	7	7	7	10	10	8	7	8	10
11-Nov	7	8	8	8	11	10	9	9	9	11	10	11	10	14	13	11	8	8	7	8	8	11	7	9	14
12-Nov	8	7	7	7	12	7	8	8	7	7	9	10	8	9	7	10	8	8	8	9	9	9	10	9	12
13-Nov	9	8	10	13	12	7	7	7	7	10	9	10	11	10	9	12	10	15	11	11	10	9	8	9	15
14-Nov	9	9	8	8	9	10	10	9	8	10	9	12	11	11	10	10	8	9	8	8	12	13	9	10	13
15-Nov	5	17	12	21	8	9	7	10	9	10	10	9	9	10	14	13	12	11	12	15	11	10	11	21	
16-Nov	10	10	12	15	58	10	12	11	12	15	11	11	12	12	14	11	11	10	10	11	10	8	12	7	58
17-Nov	11	10	10	10	11	9	9	9	8	8	8	7	9	9	10	10	21	11	16	13	12	10	10	10	21
18-Nov	10	14	14	12	10	11	11	11	11	13	13	15	13	13	12	10	12	11	14	16	12	10	14	17	17
19-Nov	22	68	24	16	15	11	8	4	6	6	13	11	28	22	20	13	15	15	12	13	17	13	13	14	68
20-Nov	35	25	13	15	20	10	10	12	14	12	10	13	12	12	7	8	9	7	6	7	8	8	8	16	35
21-Nov	10	8	7	8	8	8	8	8	8	8	8	11	9	8	8	8	8	8	9	9	9	8	8	9	11
22-Nov	8	12	9	11	17	12	12	11	11	12	14	13	11	13	12	13	11	11	12	12	14	12	14	14	17
23-Nov	14	9	11	13	15	17	16	10	10	11	25	34	29	13	9	11	9	9	9	21	16	79	10	10	79
24-Nov	13	9	11	10	13	12	12	11	12	11	12	13	14	13	19	15	17	21	10	11	11	10	10	8	21
25-Nov	8	8	8	7	8	8	8	8	10	7	8	8	15	10	14	9	12	15	7	8	9	8	7	7	15
26-Nov	7	7	7	7	7	5	6	8	7	7	8	7	8	10	8	8	8	8	8	7	8	8	9	8	10
27-Nov	8	7	8	6	8	7	7	9	8	8	10	19	13	21	28	6	11	7	8	7	7	7	8	10	28
28-Nov	8	8	7	7	7	6	7	7	7	6	6	8	9	7	7	7	8	7	8	8	7	7	7	7	9
29-Nov	7	10	10	10	10	9	11	9	8	9	11	12	9	8	16	9	6	7	7	7	7	8	7	8	16
30-Nov	6	5	6	5	6	8	7	9	8	8	8	8	7	8	9	7	7	7	6	6	7	7	8	9	9

	39	68	28	35	58	17	74	20	26	33	25	34	29	22	28	19	21	21	39	24	17	79	23	17	
	Diurnal Maximum																								



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 20, 2015	Last Calibration	October 6, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	11:45
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	-605	-606
Analyzer IP address	192.168.1.43		Lamp voltage	792	798
Calculated slope	0.992920	0.998108	Chamber temp	45.0	45.0
Calculated intercept	-0.517010	-0.580793	Pressure	695.6	688.6
Analyzer Background	7.9	7.9	Flow	0.454	0.448
Analyzer Coefficient	0.960	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	-0.4	----
as found span	5000	58.3	574.8	577.6	0.995
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	58.3	574.8	575.7	0.999
second point	5000	29.2	287.9	290.6	0.991
third point	5000	14.7	144.9	146.1	0.992
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	58.3	574.8	573.7	1.002
Average Correction Factor					0.994

Corrected As found 577.9 Previous response 579.5 % change 0.3%

Notes:

Sample inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



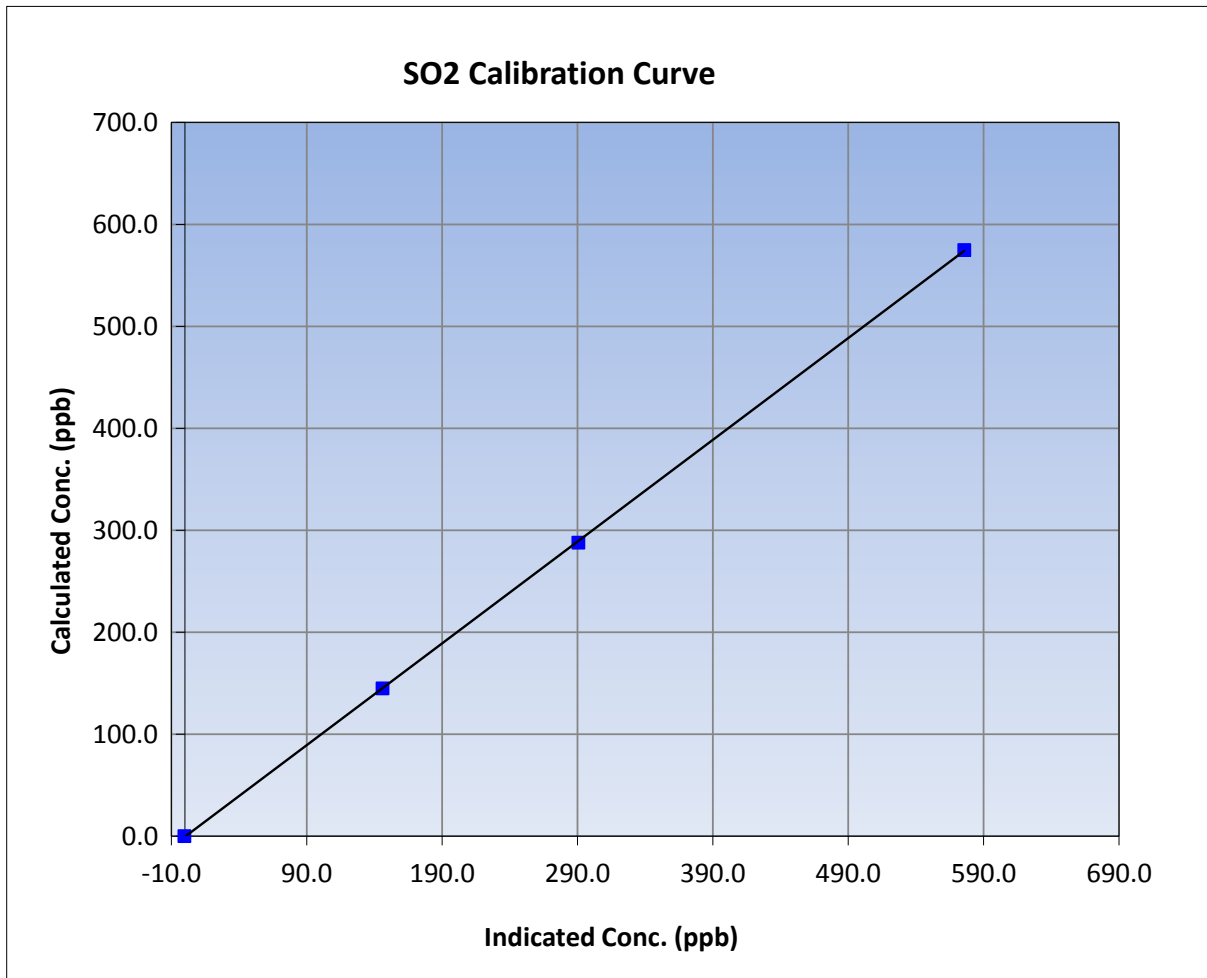
Wood Buffalo Environmental Association SO2 Calibration Report

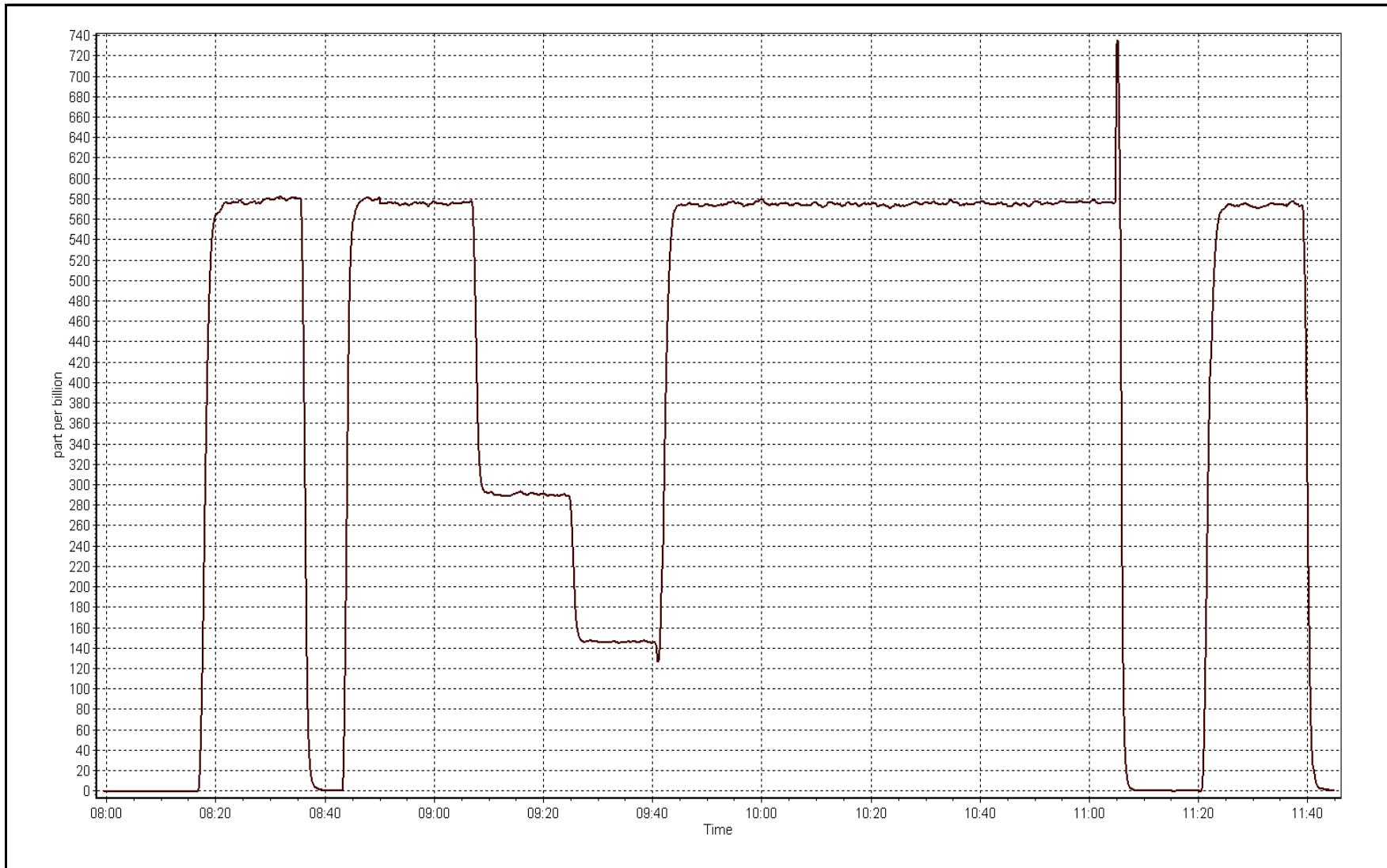
Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 6, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:00	End Time (MST)	11:45
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	-0.4	----	Correlation Coefficient	0.999977
574.8	575.7	0.9986		
287.9	290.6	0.9907	Slope	0.998108
144.9	146.1	0.9923		
			Intercept	-0.580793







Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 20, 2015	Last Calibration	October 28, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	13:55
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	0.985408	0.995766	Chamber temp	45	45
Calculated intercept	0.237453	0.106286	Pressure	534.0	547.3
Analyzer Background	12.8	12.7	Flow	0.950	0.972
Analyzer Coefficient	1.131	1.131	Intensity	85	84
			Converter temp.	335	337

Analyzer make/model	Thermo 450i	Analyzer serial #	815129098
Converter make/model	NA	Converter serial #	NA

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	83.4	80.9	80.2	1.009
SO2 scrubber check	5000	15.2	149.9	1.1	----
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	83.4	80.9	81.1	0.998
second point	5000	41.8	40.5	40.7	0.996
third point	5000	21.0	20.4	20.5	0.995
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	83.4	80.9	81.1	0.998
Average Correction Factor					0.996

Corrected As found	80.4	Previous response	81.9	% change	1.8%
--------------------	------	-------------------	------	----------	------

Notes:

Inlet filter replaced and scrubber check done after as founds. No adjustments made.

Calibration Performed By: Devin Russell



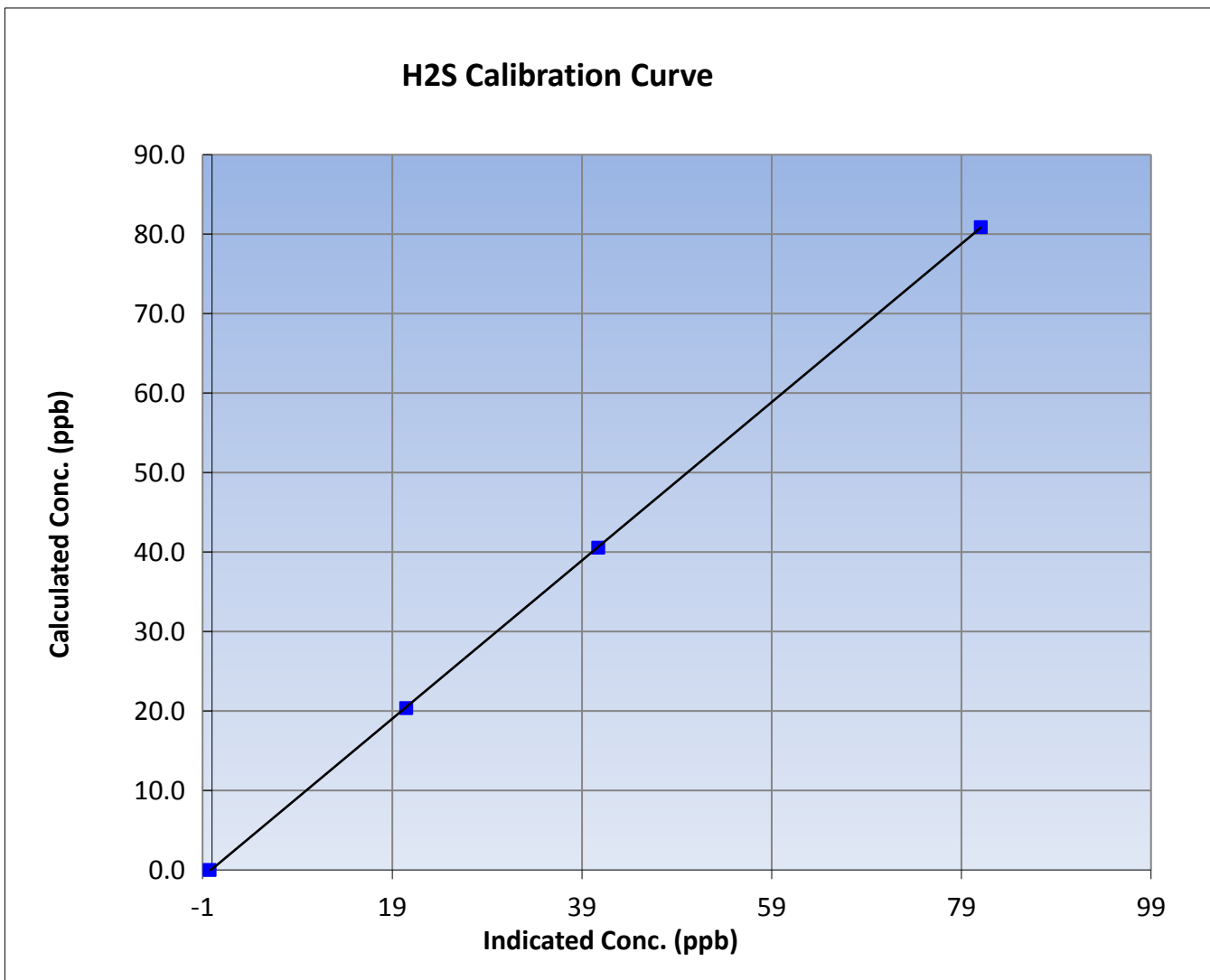
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 28, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	11:05	End Time (MST)	13:55
Analyzer make	Thermo 450i	Analyzer serial #	815129098

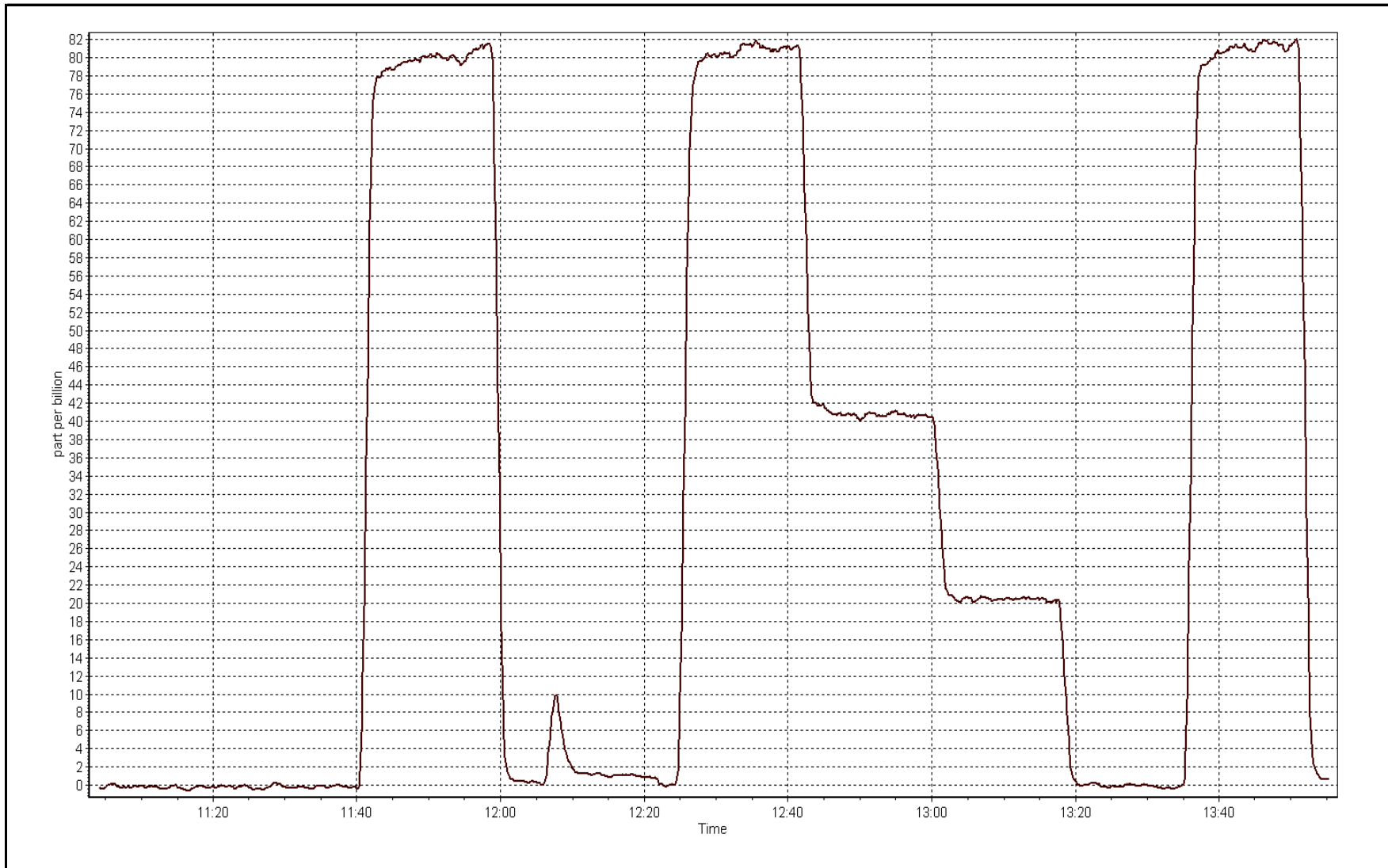
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999985
80.9	81.1	0.9981		
40.5	40.7	0.9957	Slope	0.995766
20.4	20.5	0.9951		
			Intercept	0.106286



H2S Calibration Plot

Date: November 20, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	November-20-15	Last Calibration	October-06-15
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	11:45
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	8.6	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.005856	0.994021	Fuel Pressure	23.0	23.0
Calculated intercept	-0.089114	0.007422	Analyzer Coeff	3.5	3.5
			Analyzer BKG	4.800	4.840

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
---------------	---------------	-------------------	------------

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.04	----
as found span	5000	58.3	12.74	12.60	1.011
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	58.3	12.74	12.78	0.997
second point	5000	29.2	6.38	6.45	0.989
third point	5000	14.7	3.21	3.24	0.991
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	58.3	12.74	12.82	0.993
Average Correction Factor					0.992

Corrected As found	12.64	Previous response	12.75	% change	0.9%
--------------------	-------	-------------------	-------	----------	------

Notes:

Sample inlet filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association THC Calibration Report

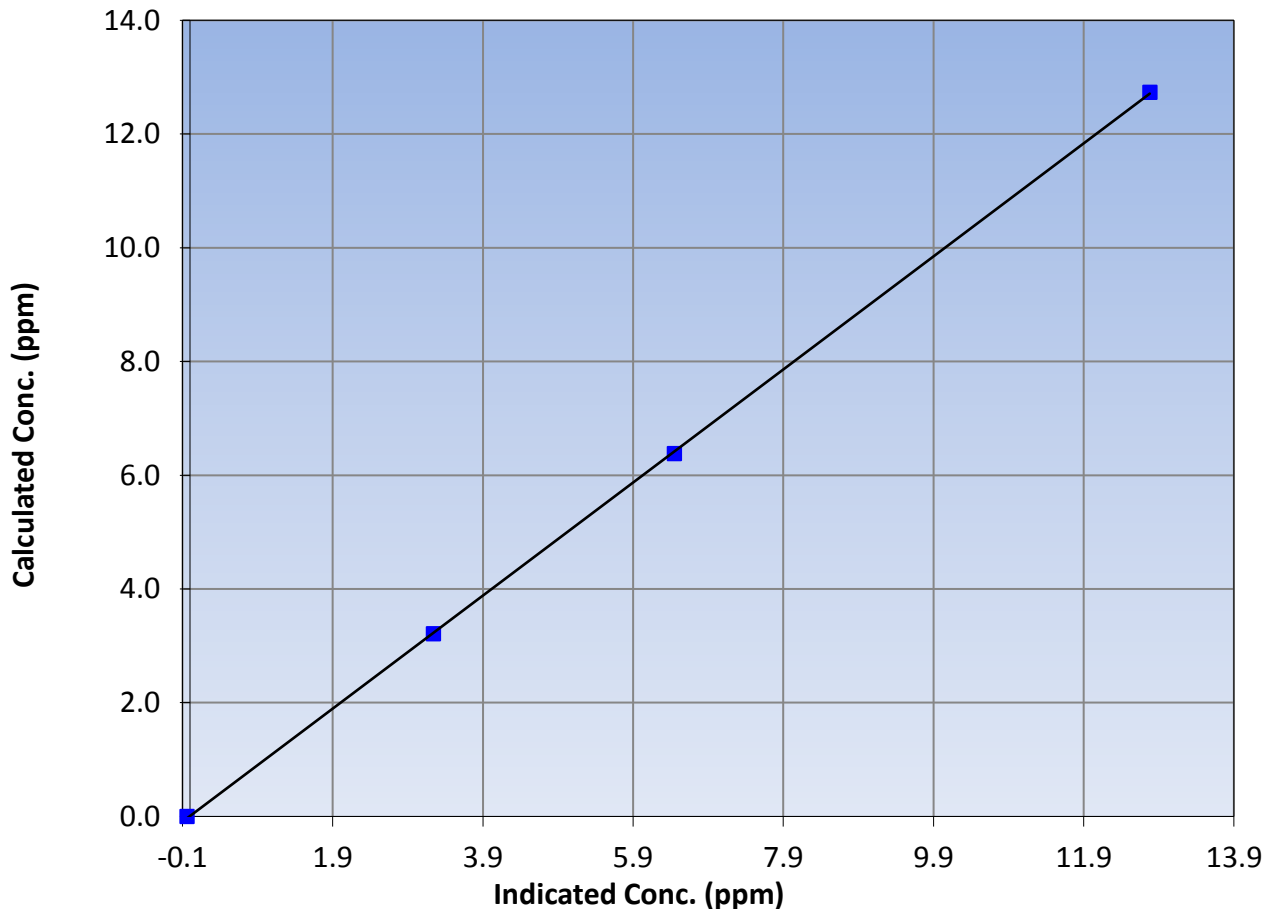
Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 6, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:00	End Time (MST)	11:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

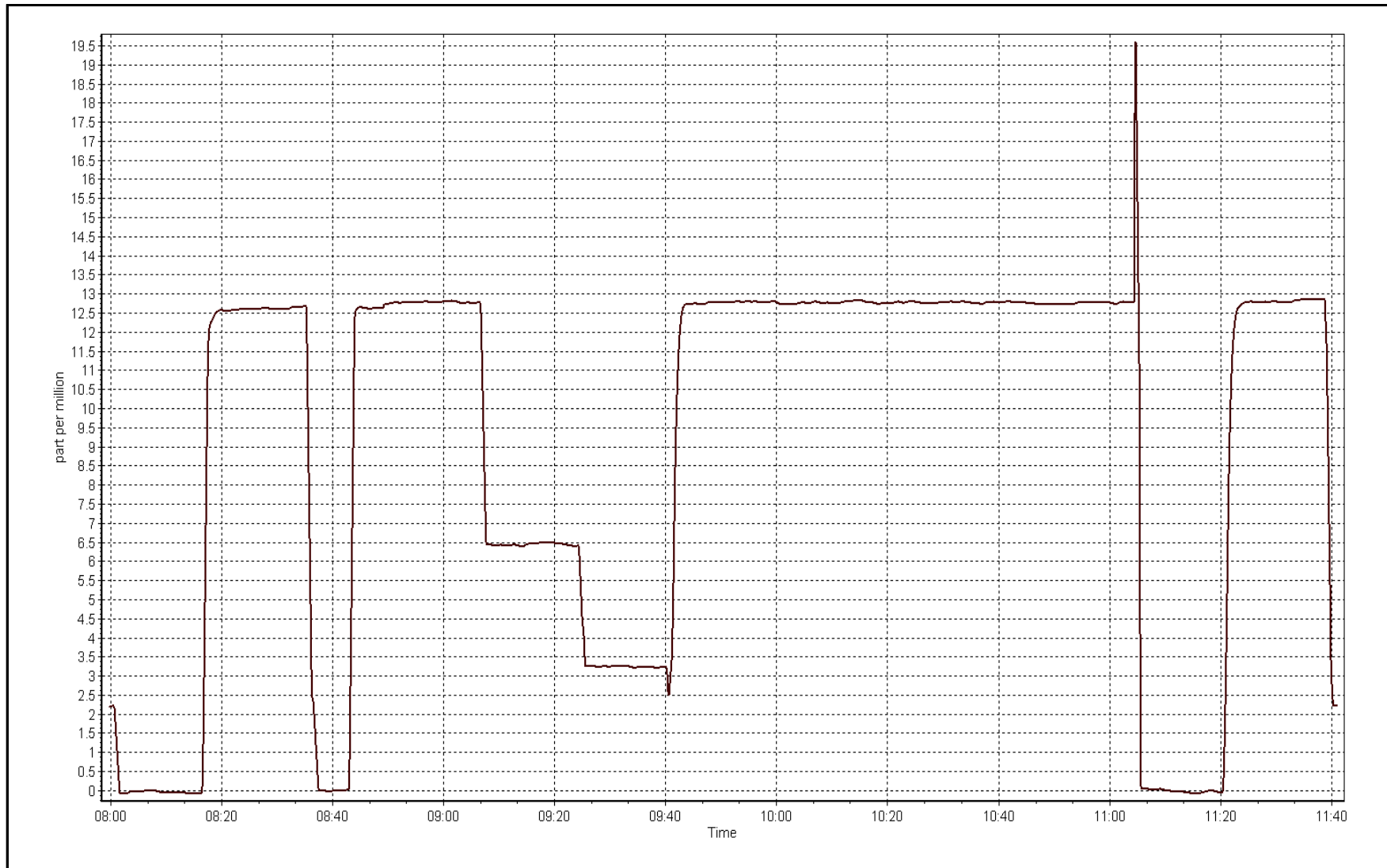
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	0.999960
12.74	12.78	0.9965		
6.38	6.45	0.9890		
3.21	3.24	0.9911		
			Slope	0.994021
			Intercept	0.007422

THC Calibration Curve



THC Calibration Plot

Date: November 20, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 6, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	11:45
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
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997006	0.995570	0.999317
	Data Offset	-0.779806	-0.618714	0.147398
Current Calibration	Data Slope	0.998434	0.998715	0.997635
	Data Offset	-0.833450	-0.670545	-0.206699

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.869		0.885	
NOX coefficient	0.998		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.9		4.0	
NOX bkgrnd	4.0		4.1	
Chamber Temp	50.7	Deg C	50.4	Deg C
Moly Temp	325.5	Deg C	324.5	Deg C
PMT voltage	-780	V	-780.3	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	159.3	mmHg	164.2	mmHg
R Cell Press Nox	158.9	mmHg	164.2	mmHg
NO sample flow	0.633	lpm	0.624	lpm
Nox sample Flow	0.633	lpm	0.624	lpm

Notes:

Sample inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 20, 2015

Station Number:

AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.1	----	----
as found span	5000	58.3	600.5	600.5	0.0	588.4	588.1	0.3	1.0206	1.0211
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.1	----	----
high point	5000	58.3	600.5	600.5	0.0	601.4	601.2	0.2	0.9985	0.9988
second point	5000	29.2	300.8	300.8	0.0	303.4	303.0	0.4	0.9913	0.9926
third point	5000	14.7	151.4	151.4	0.0	153.2	152.8	0.4	0.9882	0.9910
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	----	----
as left span	5000	58.3	600.5	299.9	300.6	602.7	297.1	305.6	0.9963	1.0095
Average Correction Factor									0.9926	0.9941

Corrced As found NO_x= 588.8 NO= 588.4 Percent Change NO_x= 2.4% NO= 2.6%
 Previous Response NO_x= 603.1 NO= 603.8

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 58.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	299.9	298.8	599.5	299.9	299.6	0.9901	1.0000	0.9973	100.3%
2nd NO2 (200)	----	397.0	201.8	599.3	397.0	202.3	0.9905	1.0000	0.9972	100.3%
3rd NO2 (100)	----	495.5	103.2	599.7	495.5	104.2	0.9898	1.0000	0.9907	100.9%
4th NO2 (0)	598.7	----	1.5	600.2	598.7	1.5	0.9890	1.0000	N/A	----
Average Correction Factor							0.9898	1.0000	0.9951	100.5%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

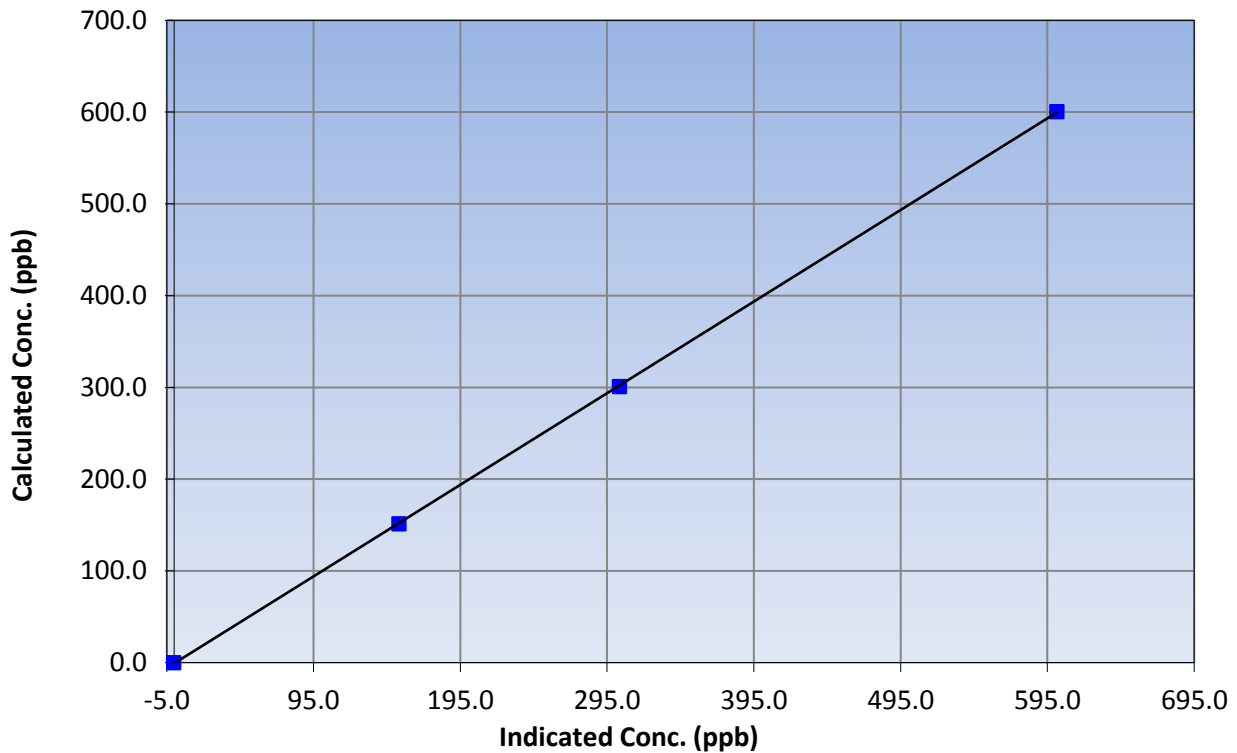
Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 6, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:00	End Time (MST)	11:45
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	-0.4	----	Correlation Coefficient	0.999977
600.5	601.4	0.9985		
300.8	303.4	0.9913	Slope	0.998434
151.4	153.2	0.9882		
			Intercept	-0.833450

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

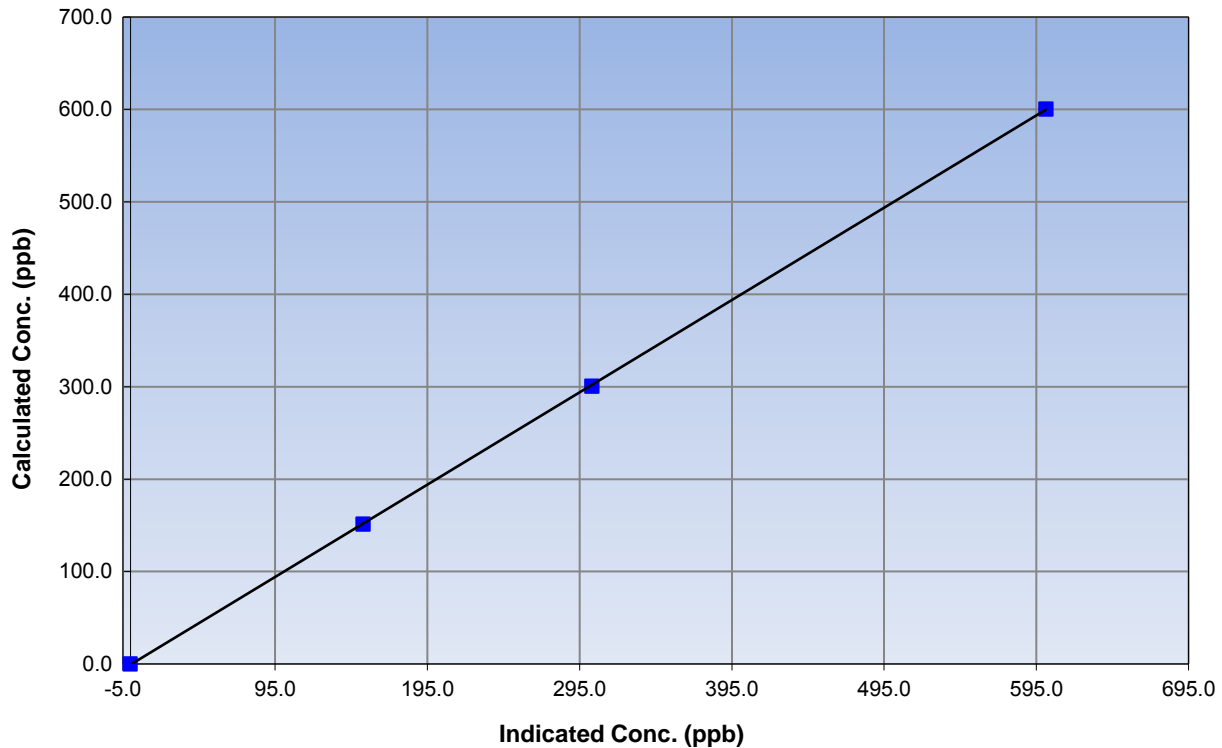
Station Information

Calibration Date	November 20, 2015	Previous Calibration	October 6, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:00	End Time (MST)	11:45
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999984
600.5	601.2	0.9988		
300.8	303.0	0.9926	Slope	0.998715
151.4	152.8	0.9910		
			Intercept	-0.670545

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

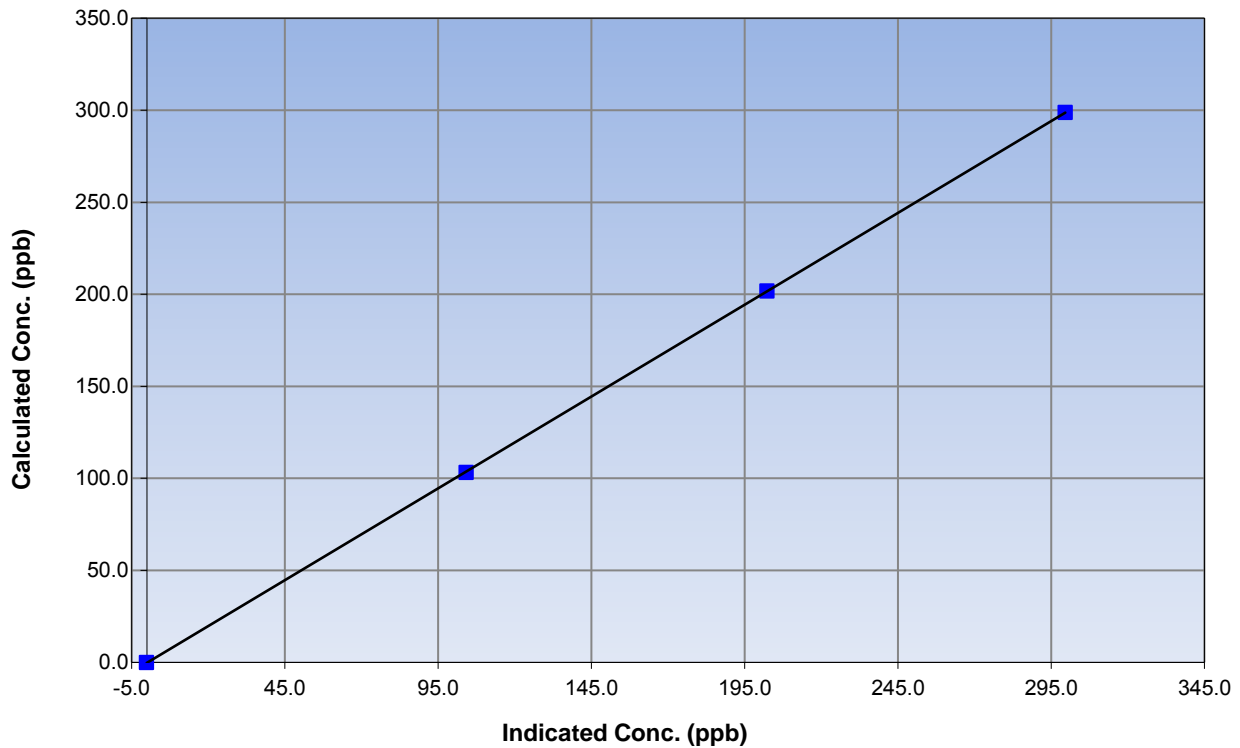
Station Information

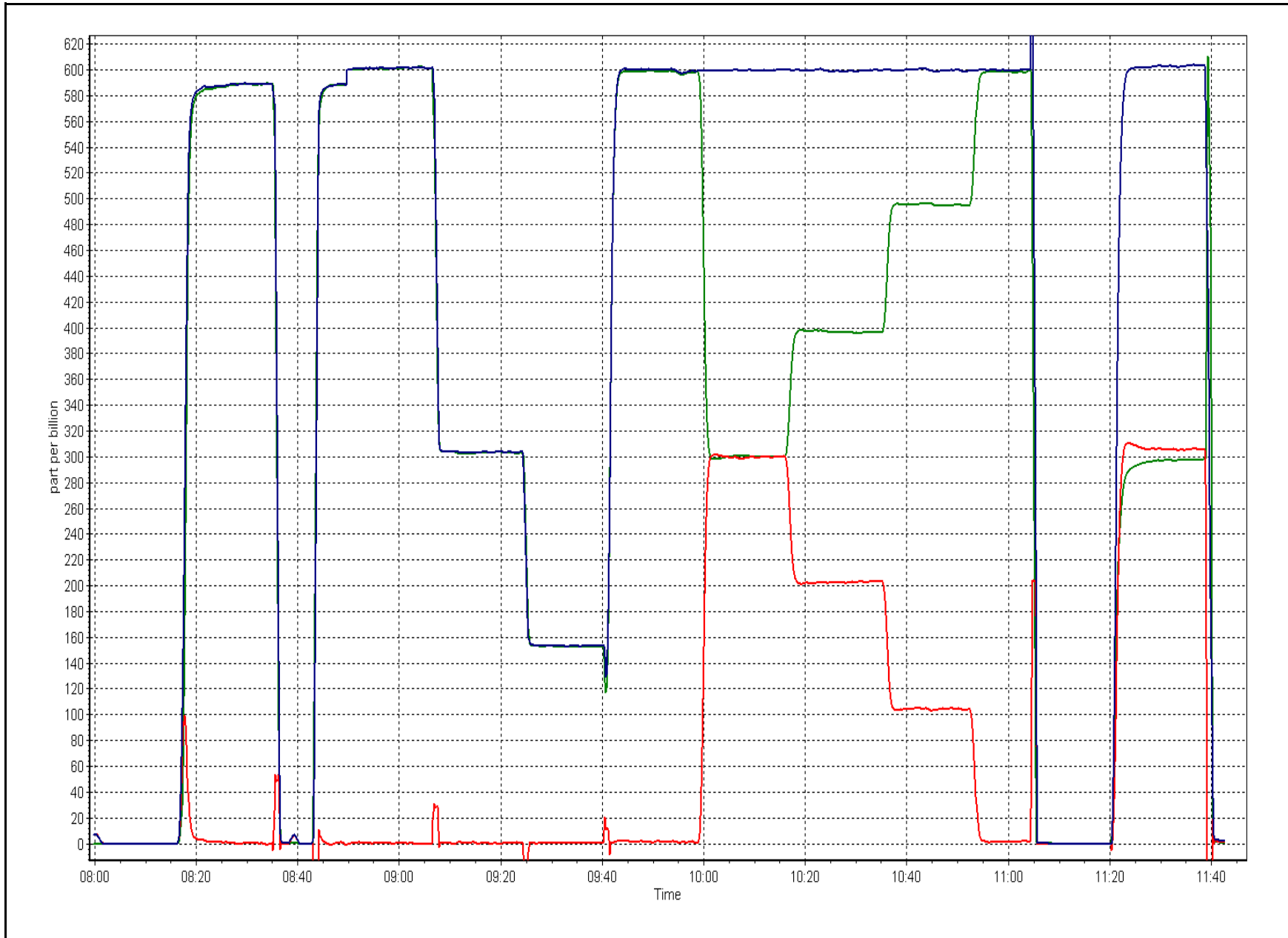
Calibration Date	November 20, 2015	Previous Calibration	October 6, 2015
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	8:00	End Time (MST)	11:45
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999992
298.8	299.6	0.9973		
201.8	202.3	0.9972	Slope	0.997635
103.2	104.2	0.9907		
			Intercept	-0.206699

NO₂ Calibration Curve







This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 501
STATOIL
LEISMER
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	681	35	39	99.44	8	0	2	0
H2S (ppb) Average	676	34	44	98.61	1	0	1	0
NO2 (ppb) Average	685	35	35	100	12	0	3	-
NO (ppb) Average	685	35	35	100	13	-	3	-
NOX (ppb) Average	685	35	35	100	24	-	6	-
Temperature 2 m (C) Average	720	0	0	100	6.9	-	3	-
Relative Humidity (%) Average	720	0	0	100	98	-	94	-
Wind Speed 10 m (km/h) Average	719	0	1	99.86	32	-	21	-
Wind Direction 10 m (deg) Average	719	0	1	99.86	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	681	0.5	1	-	0	0	0	0	0	1	8
H2S (ppb) Average	676	0.3	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	685	1.8	2	-	0	1	1	1	2	4	12
NO (ppb) Average	685	0.6	2	-	0	0	0	0	0	2	13
NOX (ppb) Average	685	2.4	3	-	0	1	1	2	3	5	24
Temperature 2 m (C) Average	720	-3.78	5.2	-	-20.9	-12	-5.8	-2.3	-0.5	1.4	6.9
Relative Humidity (%) Average	720	74.5	18	-	18	41	68	80	87	92	98
Wind Speed 10 m (km/h) Average	719	9.5	6	-	1	3	5	8	12	17	32
Wind Direction 10 m (deg) Average	719	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Nov 2015 07:00	01 Nov 2015 07:00	1	Intermittent unstable operation - excessive baseline drift
SO2	02 Nov 2015 02:00	02 Nov 2015 02:00	1	Intermittent unstable operation - excessive baseline drift
SO2	03 Nov 2015 03:00	03 Nov 2015 03:00	1	Intermittent unstable operation - excessive baseline drift
SO2	04 Nov 2015 04:00	04 Nov 2015 04:00	1	Intermittent unstable operation - excessive baseline drift
H2S	02 Nov 2015 06:00	02 Nov 2015 06:00	1	Intermittent unstable operation - excessive baseline drift
H2S	20 Nov 2015 10:00	20 Nov 2015 18:00	9	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	15 Nov 2015 05:00	15 Nov 2015 05:00	1	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Nov 18 08:00	Maximum Daily Average: 1.9 ppb on Nov 18		Hours of Data:	681
Minimum Value: 0 ppb on Nov 4 08:00	Minimum Daily Average: 0.1 ppb on Nov 3		Hours of Missing Data:	39
Maximum Diurnal Average: 0.9 ppb at hour 15	Minimum Diurnal Average: 0.3 ppb at hour 12		Hours of Calibration:	35
Monthly Average: 0.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 6		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-Nov	0	0	0	0	0	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Nov	0	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Nov	0	0	Z	UO	0	0	0	0	0	0	0	1	2	1	1	0	0	0	1	1	1	1	0	0	0.4	2
5-Nov	0	0	1	Z	1	3	0	0	0	0	1	0	1	1	2	3	4	4	4	2	2	1	3	2	1.6	4
6-Nov	1	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Nov	Z	0	0	2	0	0	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0.6	2
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Nov	0	0	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1
11-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Nov	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
13-Nov	0	0	0	0	0	Z	1	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0.4	1
14-Nov	Z	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
15-Nov	0	Z	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Nov	0	0	Z	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-Nov	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	7	1.1	7
18-Nov	5	7	2	0	Z	0	3	8	2	2	1	0	0	3	3	3	2	0	1	0	0	0	0	0	1.9	8
19-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Nov	Z	0	0	0	2	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Nov	0	0	Z	0	0	0	0	1	0	0	0	0	1	8	8	4	3	6	6	1	1	0	0	0	1.8	8
23-Nov	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0.4	1
24-Nov	2	1	2	4	Z	2	0	0	C	C	C	C	C	0	1	1	1	1	0	1	0	0	0	0	0.9	4
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	0	0	0.2	2
26-Nov	Z	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
27-Nov	0	Z	1	0	0	0	0	0	1	1	1	0	5	2	3	4	5	3	1	1	1	0	0	1	1.4	5
28-Nov	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
29-Nov	0	0	0	Z	1	1	1	2	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.6	2
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0

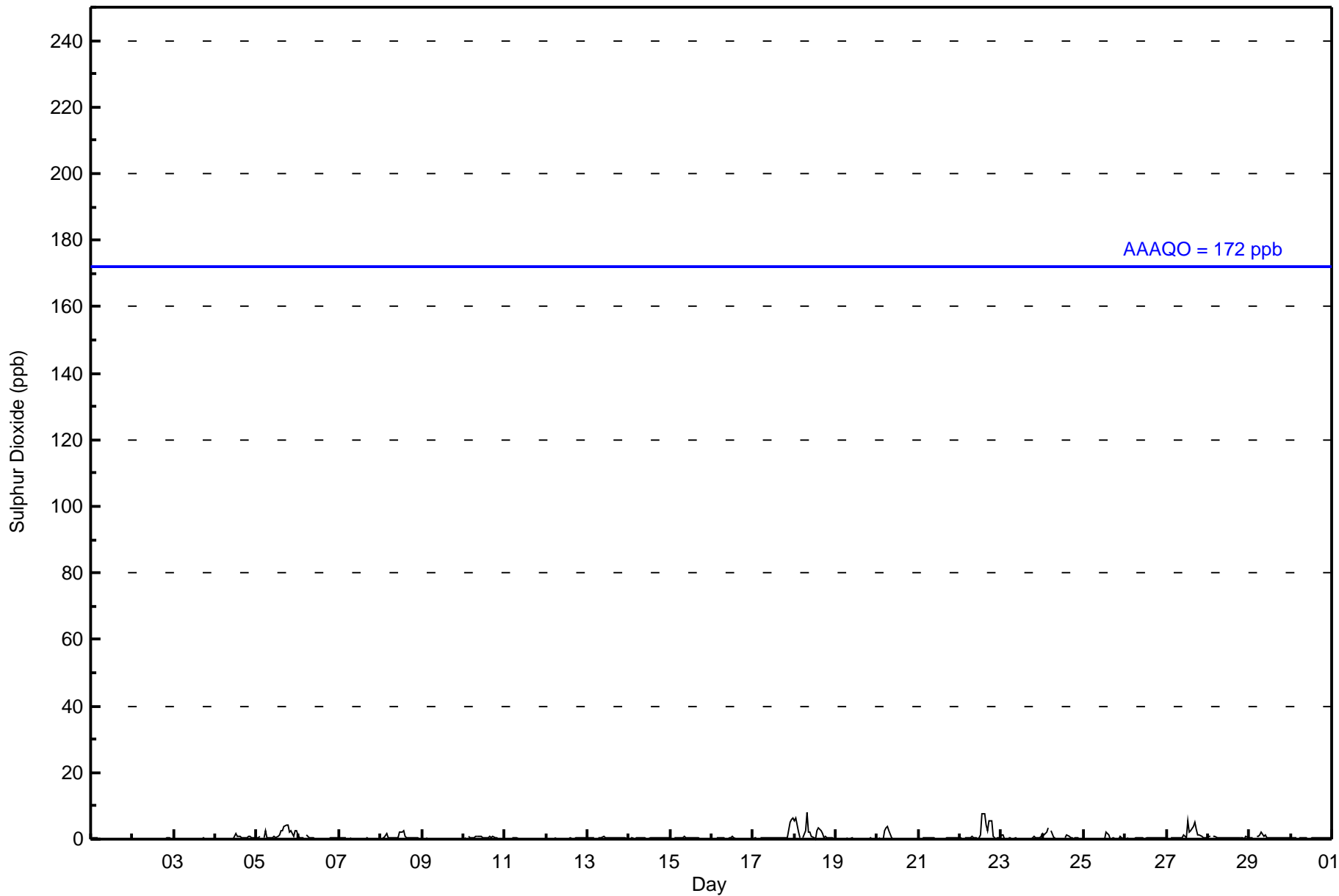
0.6	0.6	0.5	0.5	0.4	0.7	0.5	0.7	0.4	0.4	0.3	0.3	0.6	0.8	0.9	0.7	0.6	0.6	0.6	0.6	0.4	0.4	0.5	0.5	0.5	Diurnal Average	
5	7	2	4	2	3	4	8	2	2	1	2	5	8	8	4	5	6	6	6	2	2	5	6	7	Diurnal Maximum	

Z - zeronspan 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
Statoil - Leismer - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	681	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: 681

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	13	11	10	15	30	26	18	21	43	113	44	29	115	112	38	42	680
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	11	10	15	30	26	18	21	43	113	44	29	115	112	38	42	680

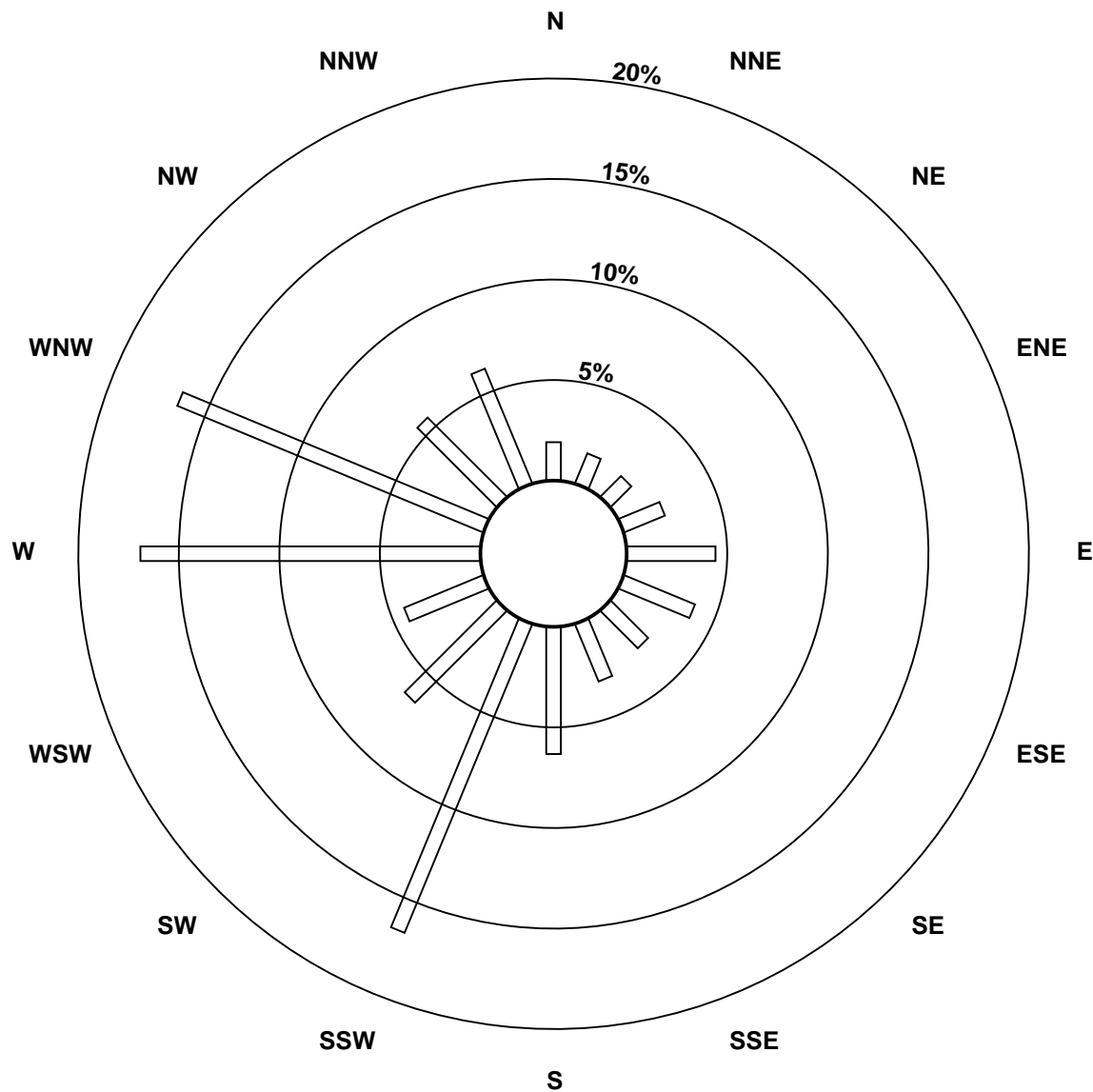
Total Number of Valid Hours: 680

Total Number of Hours: 720

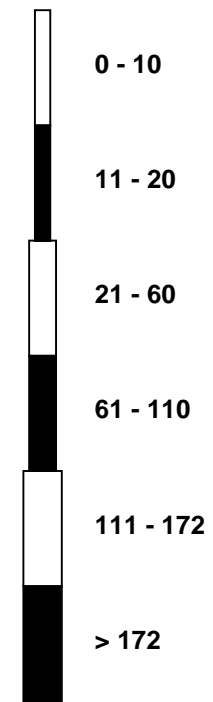


Wood Buffalo Environmental Association
Wind Rose Nov 2015

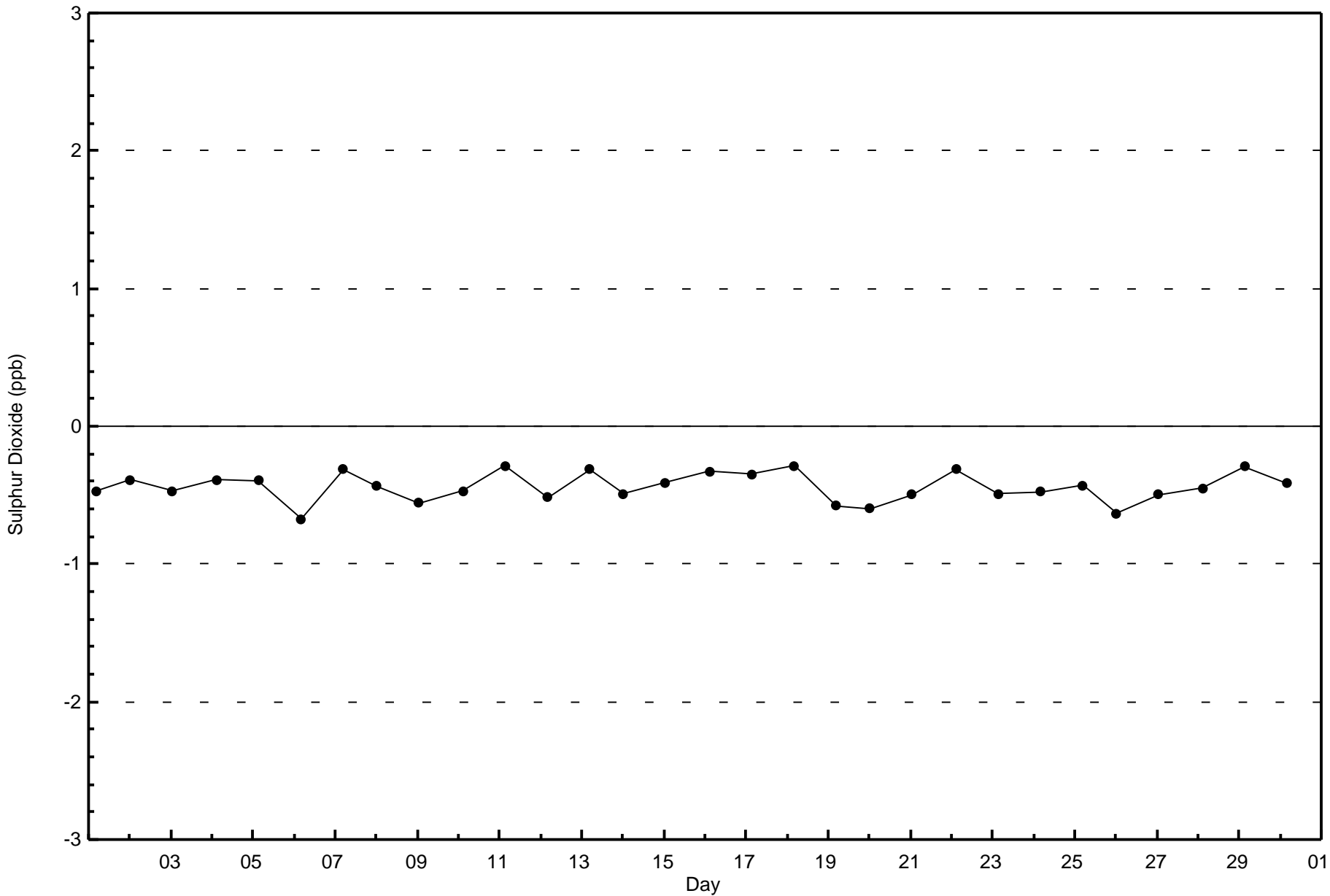
Sulphur Dioxide (SO₂) - ppb
Statoil - Leismer (AMS501)

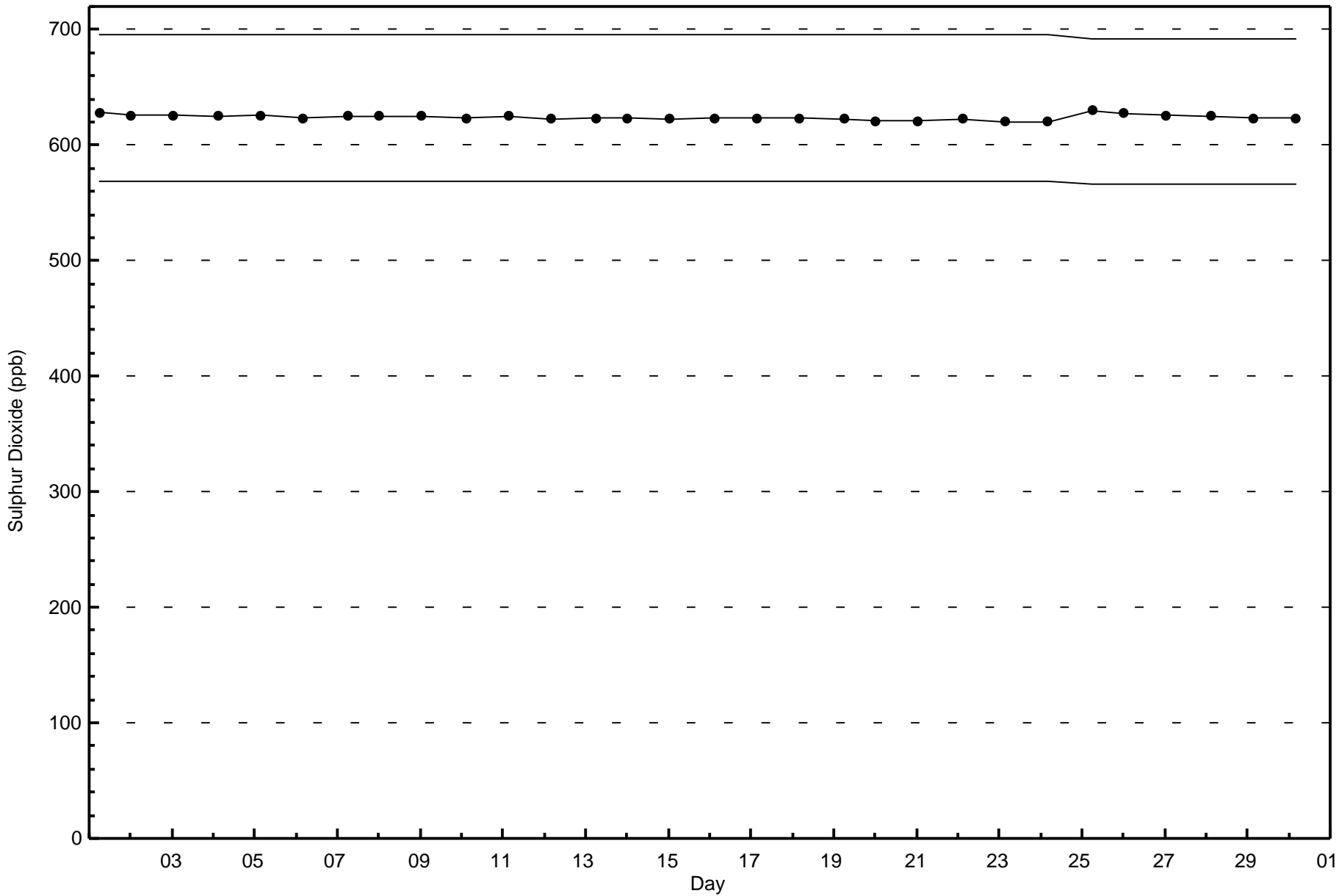


Classes (ppb)



Total Number of Valid Hours: 680





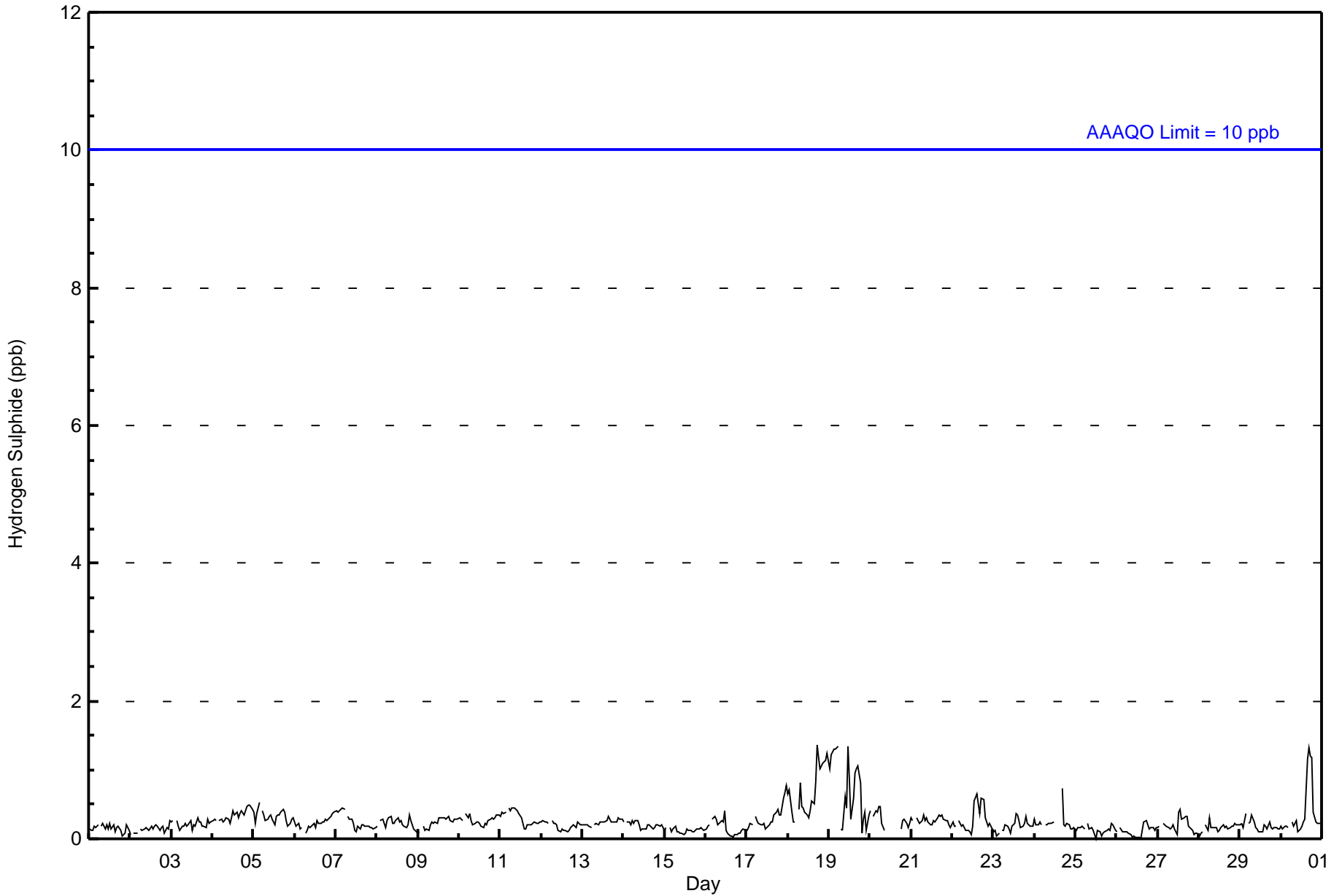


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 1 ppb on Nov 18 18:00	Maximum Daily Average: 0.7 ppb on Nov 19
Minimum Value: 0 ppb on Nov 25 13:00	Hours of Data: 676
Maximum Diurnal Average: 0.3 ppb at hour 18	Hours of Missing Data: 44
Monthly Average: 0.3 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.1 ppb on Nov 26	Percent Operational Time: 98.6
Minimum Diurnal Average: 0.2 ppb at hour 11	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 O 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-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	0	Z	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
5-Nov	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Nov	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
8-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Nov	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
14-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Nov	0	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-Nov	0	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-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
18-Nov	1	1	0	0	0	Z	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.7	1
19-Nov	1	1	1	1	1	1	Z	0	0	1	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0.7	1
20-Nov	0	Z	0	0	0	0	0	0	0	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	--	0
21-Nov	0	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
22-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0.3	1
23-Nov	0	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
24-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	1	0	0	0	0	0	0	0	0.2	1
25-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Nov	0	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-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.4	1

0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	Diurnal Average
1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	676	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: 676

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	14	11	9	15	31	26	20	21	42	110	45	30	110	111	39	41	675
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	14	11	9	15	31	26	20	21	42	110	45	30	110	111	39	41	675

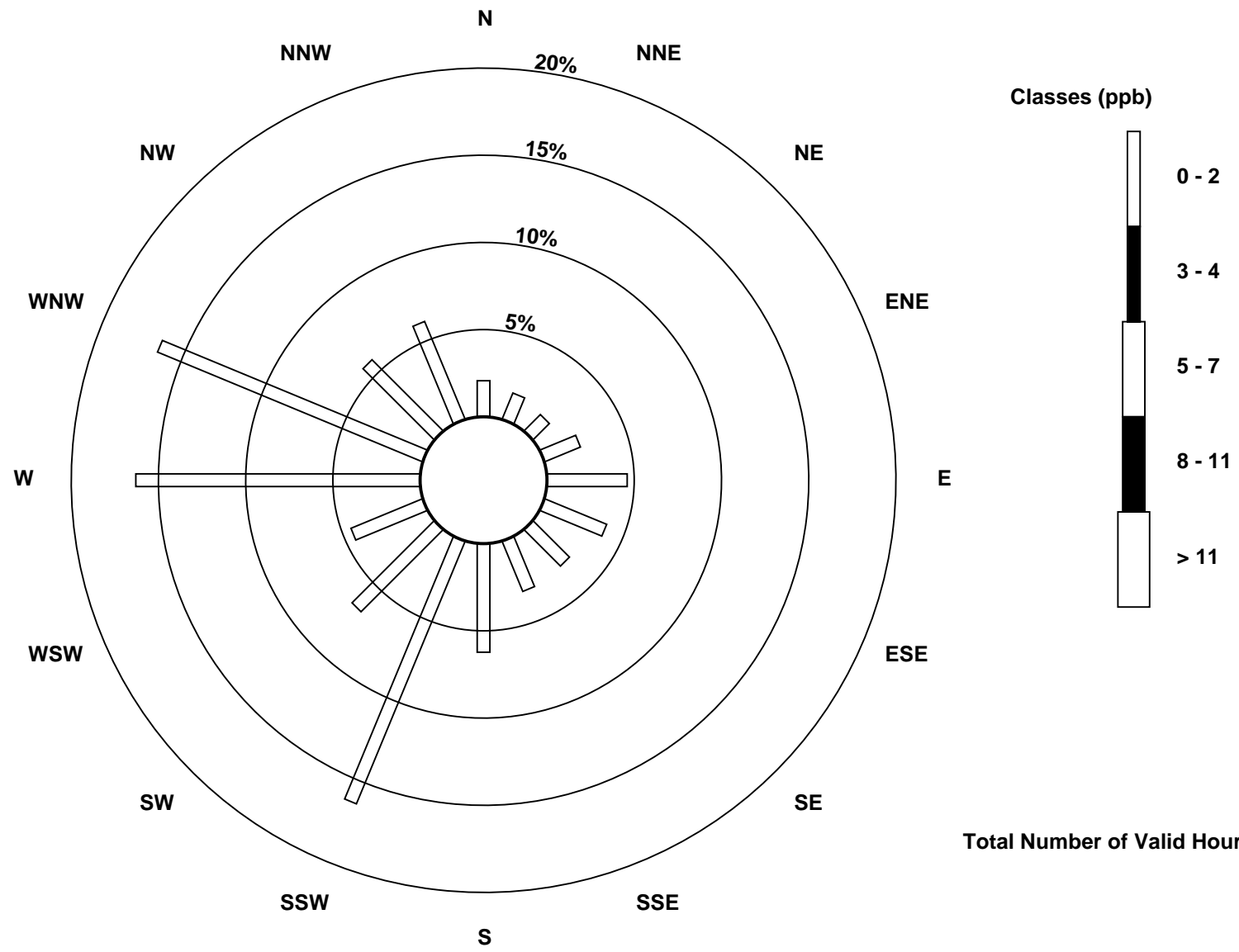
Total Number of Valid Hours: 675

Total Number of Hours: 720

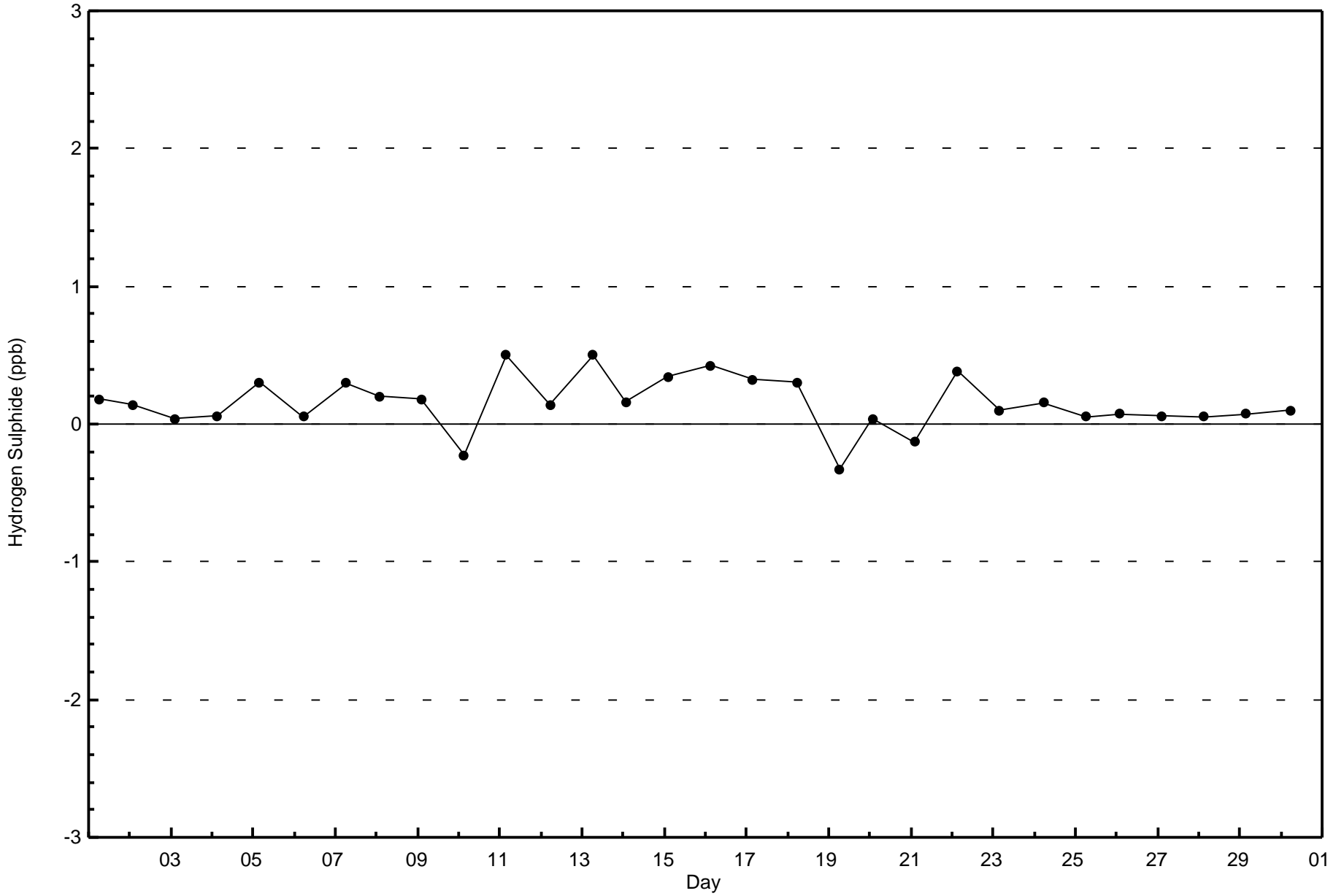


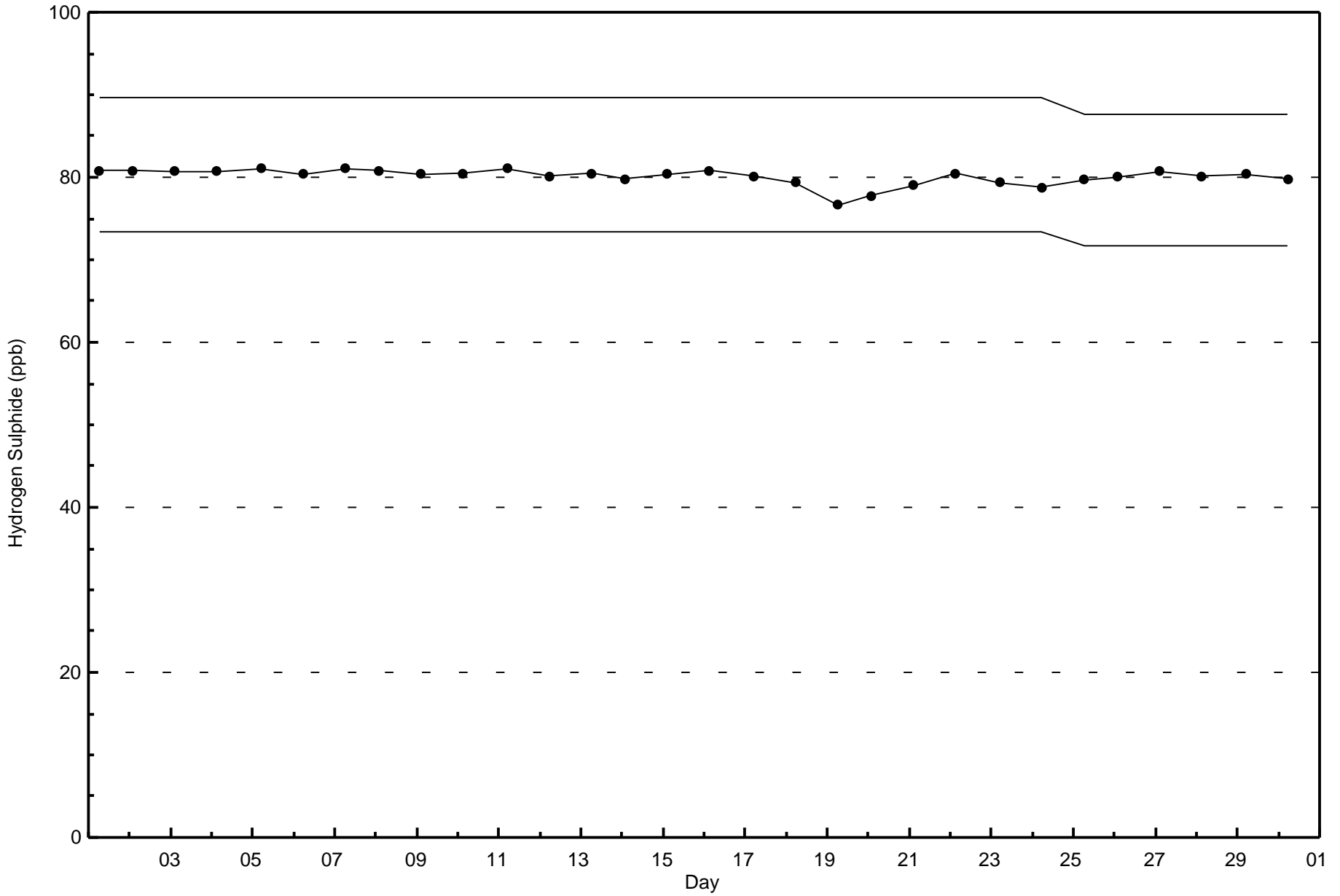
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Hydrogen Sulphide (H₂S) - ppb
Statoil - Leismer (AMS501)



Total Number of Valid Hours: 675





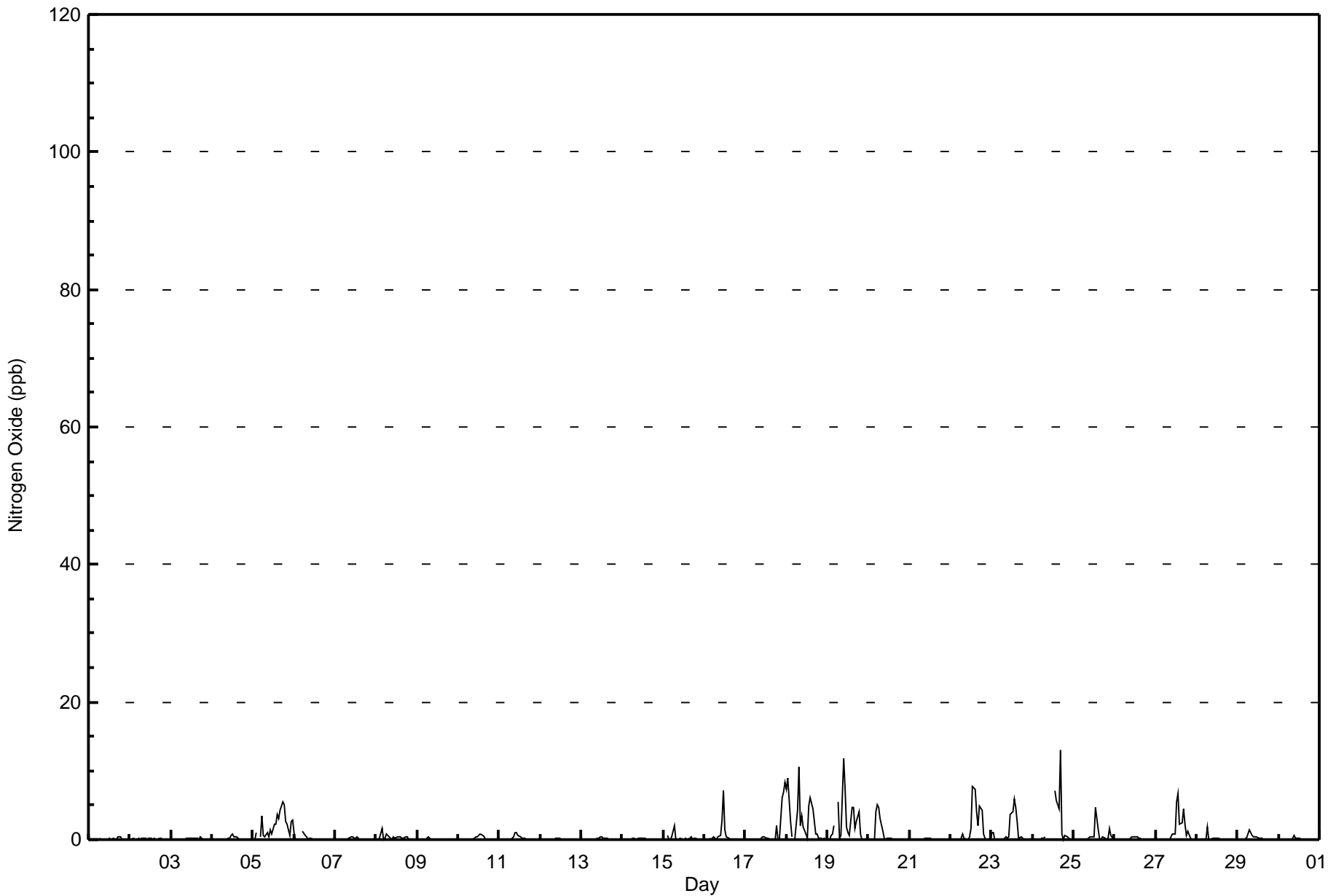


Maximum Value: 13 ppb on Nov 24 17:00	Maximum Daily Average: 2.7 ppb on Nov 18	Hours in Service: 720
Minimum Value: 0 ppb on Nov 11 02:00	Minimum Daily Average: 0.0 ppb on Nov 21	Hours of Data: 685
Maximum Diurnal Average: 1.5 ppb at hour 14	Minimum Diurnal Average: 0.1 ppb at hour 21	Hours of Missing Data: 35
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 7	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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Nov	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Nov	0	0	1	Z	0	4	1	0	1	0	2	1	2	2	4	3	4	5	5	3	2	1	3	3	2.0	5
6-Nov	1	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Nov	Z	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Nov	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Nov	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Nov	Z	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
15-Nov	0	Z	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
16-Nov	0	0	Z	0	0	0	0	0	0	1	3	7	1	0	0	0	0	0	0	0	0	0	0	0	0.6	7
17-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	6	7	8	1.1	8
18-Nov	7	9	3	0	Z	0	4	10	2	3	2	1	0	5	6	4	3	1	1	0	0	0	0	0	2.7	10
19-Nov	0	0	1	1	2	Z	5	0	1	12	7	2	1	1	5	5	2	3	4	1	0	0	0	0	2.2	12
20-Nov	Z	0	0	0	4	5	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5
21-Nov	0	Z	0	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-Nov	0	0	Z	0	0	0	0	1	0	0	0	0	2	8	7	4	2	5	4	1	0	0	0	0	1.5	8
23-Nov	1	1	0	Z	0	0	0	0	0	0	0	4	4	6	5	3	0	0	0	0	0	0	0	0	1.1	6
24-Nov	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	7	6	4	13	1	0	1	0	0	0	1.8	13
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	2	1	0	0.5	5
26-Nov	Z	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
27-Nov	0	Z	0	0	0	0	0	0	0	1	1	6	7	2	2	4	2	1	1	0	0	0	0	0	1.2	7
28-Nov	0	0	Z	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2
29-Nov	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Nov	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1

0.4	0.4	0.2	0.1	0.3	0.5	0.8	0.6	0.3	0.8	0.7	0.7	0.8	1.5	1.3	0.9	1.0	0.7	0.6	0.2	0.1	0.3	0.4	0.4	Diurnal Average	
7	9	3	2	4	5	5	10	2	12	7	7	6	8	7	5	13	5	5	3	2	6	7	8	Diurnal Maximum	

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	11	10	15	31	28	18	21	44	113	44	29	115	112	38	42	684
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	13	11	10	15	31	28	18	21	44	113	44	29	115	112	38	42	684

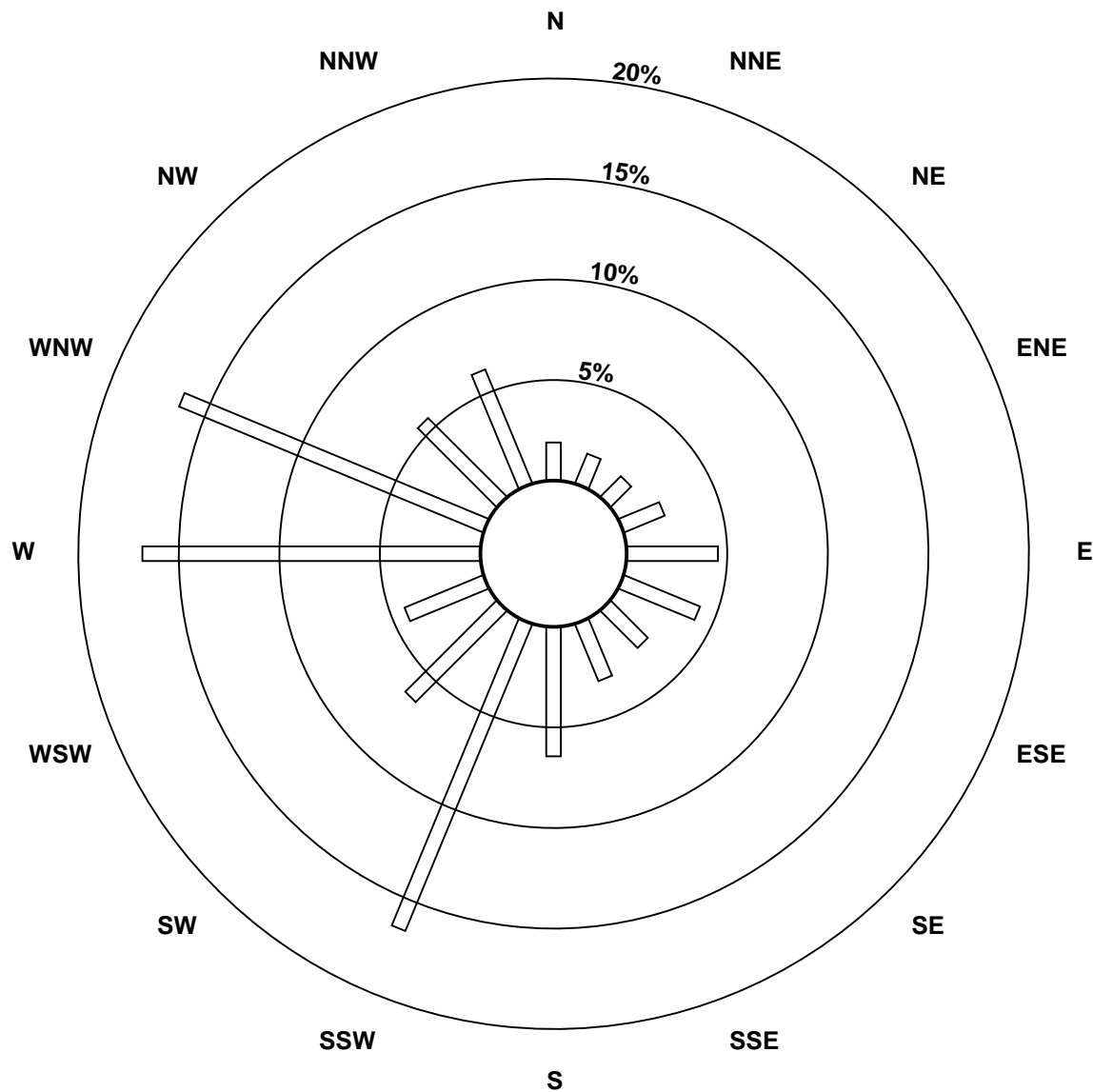
Total Number of Valid Hours: 684

Total Number of Hours: 720

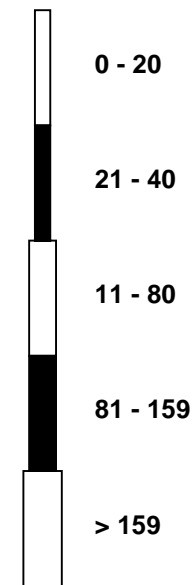


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxide (NO) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)

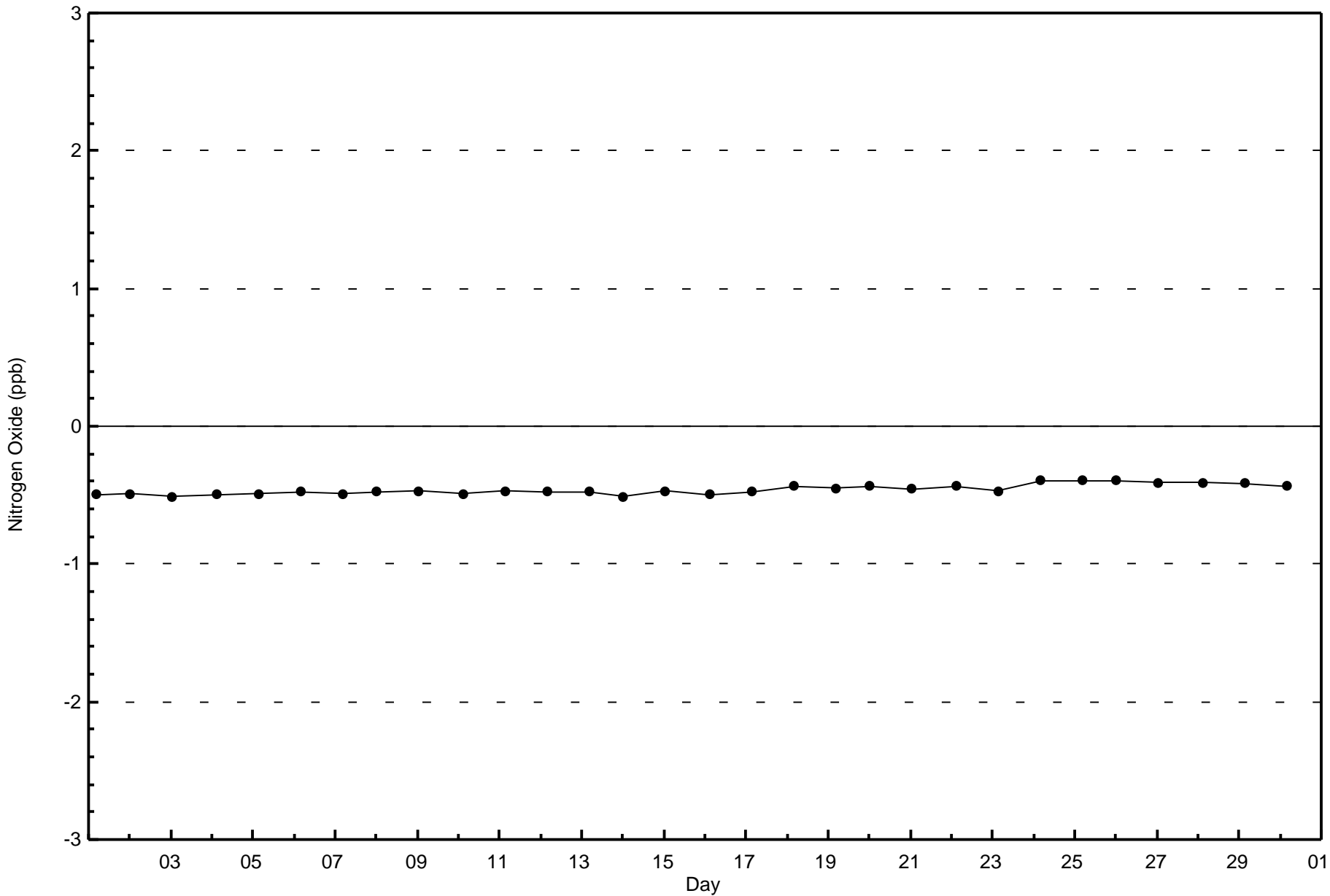


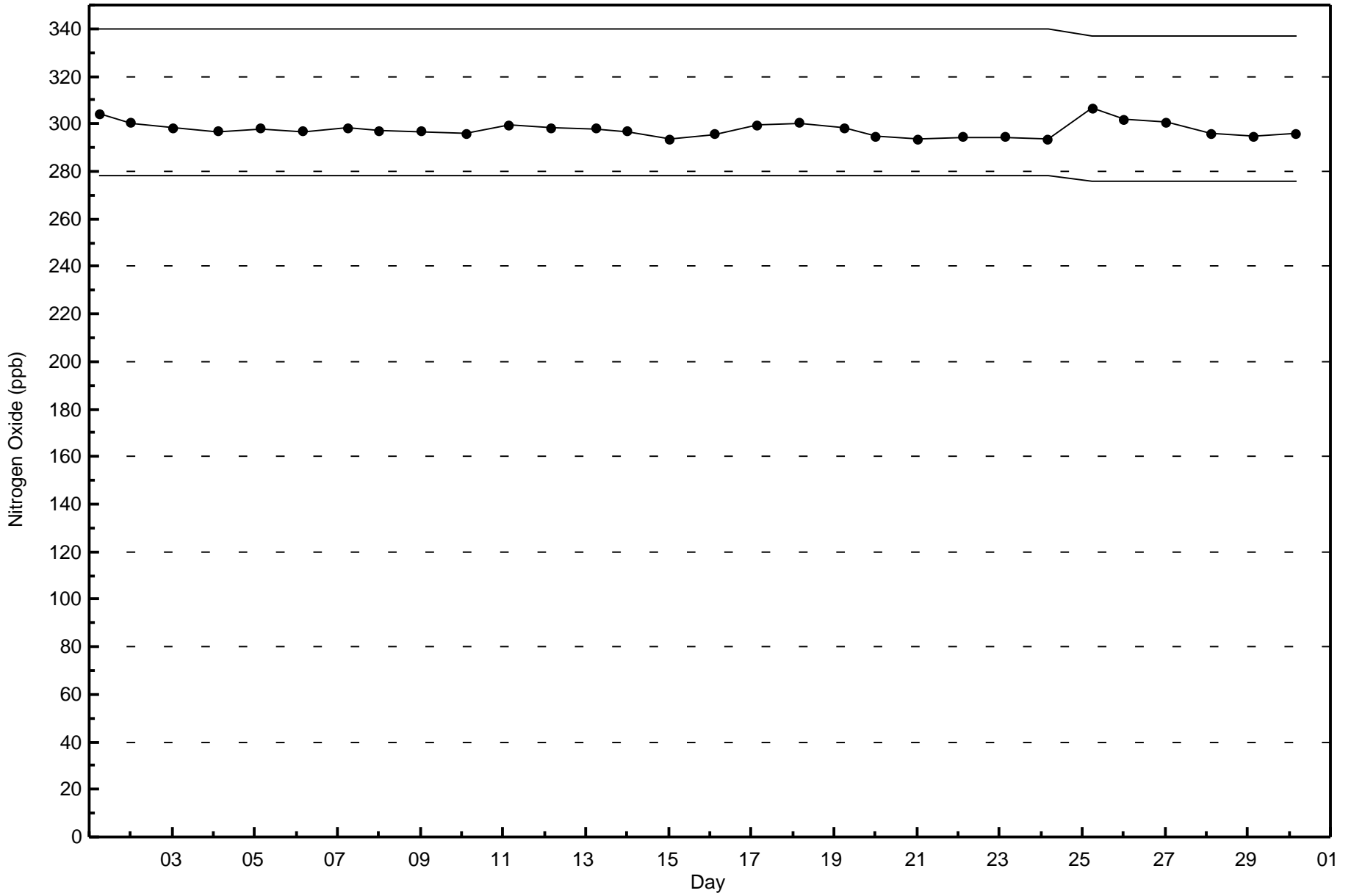
Total Number of Valid Hours: 684



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxide (NO) - ppb
Statoil - Leismer - November 2015





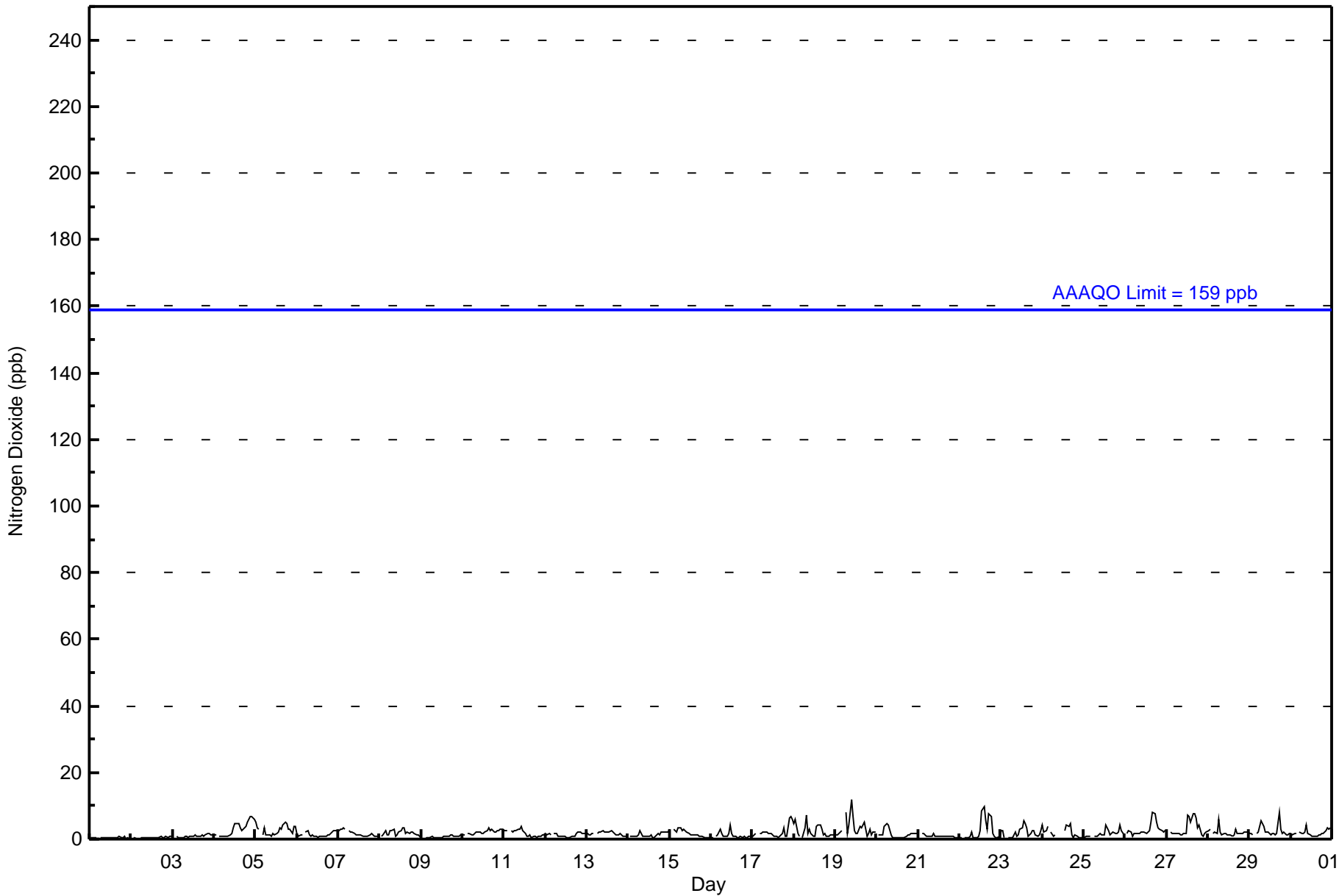


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 12 ppb on Nov 19 10:00	Maximum Daily Average: 3.3 ppb on Nov 19
Minimum Value: 0 ppb on Nov 1 22:00	Hours of Data: 685
Maximum Diurnal Average: 2.4 ppb at hour 18	Hours of Missing Data: 35
Monthly Average: 1.8 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.4 ppb on Nov 1	Percent Operational Time: 100.0
Minimum Diurnal Average: 1.4 ppb at hour 5	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0.4	1
2-Nov	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	0.5	1
3-Nov	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	0.9	2
4-Nov	1	1	Z	1	1	1	1	1	1	1	2	3	5	5	5	3	3	3	4	5	6	7	7	6	3.1	7
5-Nov	5	4	3	Z	1	3	1	1	1	1	2	1	2	2	3	3	4	5	5	3	3	2	4	4	2.7	5
6-Nov	2	1	1	1	Z	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	1.4	3
7-Nov	3	3	3	3	3	Z	3	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.6	3
8-Nov	Z	1	1	3	1	1	3	3	3	1	1	2	2	3	3	2	2	2	2	2	2	1	1	1	1.9	3
9-Nov	0	Z	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
10-Nov	1	1	Z	2	2	1	1	2	2	2	2	2	2	2	3	3	3	3	2	2	2	3	3	3	2.1	3
11-Nov	3	3	3	Z	2	2	3	3	3	3	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1.8	4
12-Nov	2	1	2	1	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1.2	2
13-Nov	2	1	1	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1.7	2
14-Nov	Z	1	1	1	1	1	1	3	1	1	1	1	1	1	0	1	1	2	1	2	2	2	2	2	1.3	3
15-Nov	3	Z	3	3	2	3	3	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1.7	3
16-Nov	1	1	Z	1	1	3	2	1	1	1	2	4	2	1	1	0	1	1	1	1	1	1	1	1	1.1	4
17-Nov	1	1	2	Z	2	2	2	2	2	2	2	2	1	1	1	1	1	2	4	1	1	6	7	6	2.1	7
18-Nov	5	6	2	1	Z	1	4	7	2	3	2	1	1	4	4	4	3	1	2	1	1	1	1	1	2.4	7
19-Nov	1	1	2	2	3	Z	8	2	4	12	7	3	2	2	4	3	4	5	1	2	3	1	2	2	3.3	12
20-Nov	Z	1	1	1	4	4	5	4	1	1	1	0	1	1	1	1	1	1	1	1	2	2	2	2	1.6	5
21-Nov	2	Z	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
22-Nov	1	1	Z	1	1	1	1	2	1	0	1	1	3	9	10	6	3	8	7	2	1	0	1	1	2.4	10
23-Nov	3	2	0	Z	1	0	0	0	2	1	1	3	4	5	5	4	1	2	2	3	1	1	1	3	1.9	5
24-Nov	4	2	2	4	Z	2	1	1	1	C	C	C	C	C	3	4	4	5	1	1	1	1	0	1	2.1	5
25-Nov	1	1	1	1	1	Z	1	1	1	2	1	1	1	4	3	1	2	2	2	2	2	4	3	1	1.6	4
26-Nov	Z	2	3	2	1	2	2	2	2	2	2	2	2	2	5	8	8	8	5	4	3	3	2	2	2.9	8
27-Nov	3	Z	2	2	2	2	2	2	1	1	2	2	7	7	5	8	8	6	4	4	1	1	2	2	3.1	8
28-Nov	3	3	Z	2	2	2	6	2	1	2	2	1	1	1	1	1	3	2	2	2	2	2	2	2	2.0	6
29-Nov	2	2	1	Z	2	2	4	5	4	2	2	2	1	2	2	1	2	8	3	2	2	1	1	2	2.4	8
30-Nov	2	1	2	2	Z	2	2	2	2	4	2	1	1	1	1	1	1	1	2	2	3	3	3	3	1.9	4

1.9	1.7	1.5	1.4	1.4	1.6	2.1	1.9	1.6	1.9	1.6	1.5	1.6	2.1	2.2	2.0	2.1	2.4	2.0	1.7	1.7	1.8	1.9	1.9	Diurnal Average
5	6	3	4	4	4	8	7	4	12	7	4	7	9	10	8	8	8	7	5	6	7	7	6	Diurnal Maximum

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	685	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	11	10	15	31	28	18	21	44	113	44	29	115	112	38	42	684
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	13	11	10	15	31	28	18	21	44	113	44	29	115	112	38	42	684

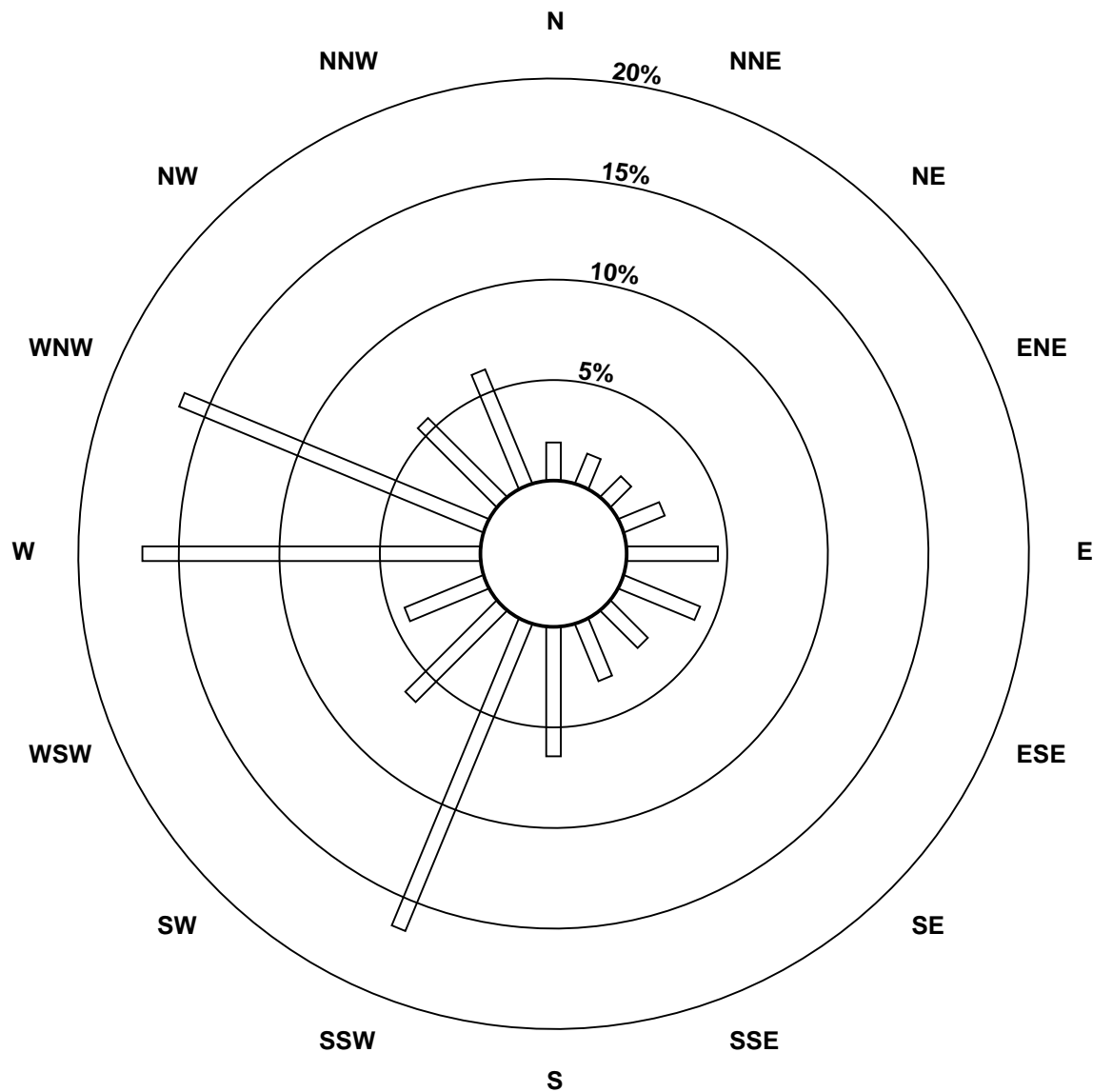
Total Number of Valid Hours: 684

Total Number of Hours: 720

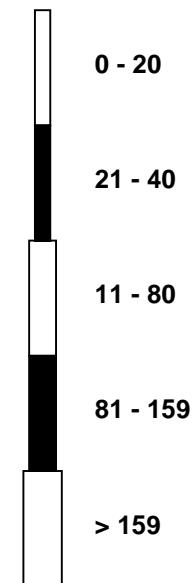


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer (AMS501)



Classes (ppb)

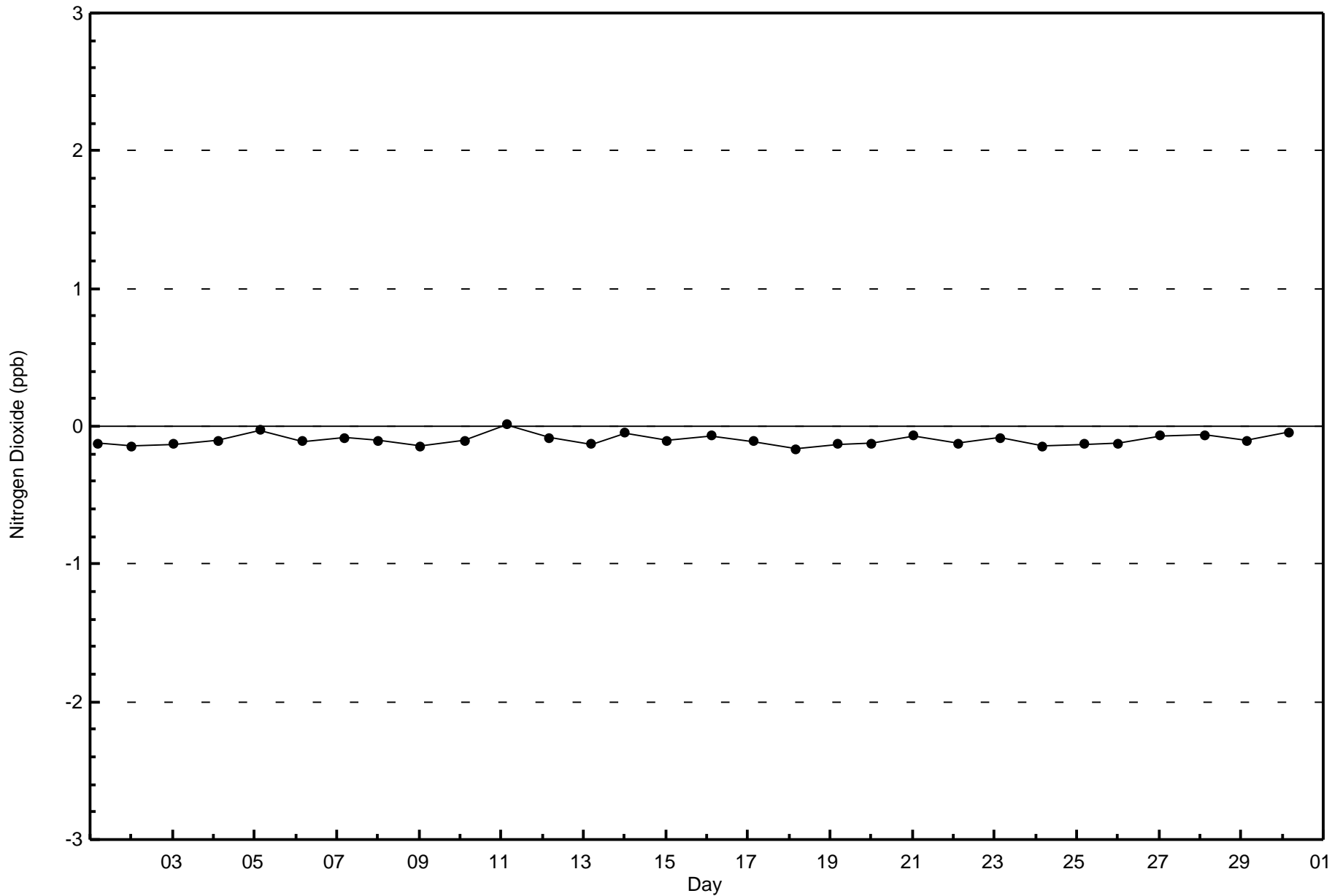


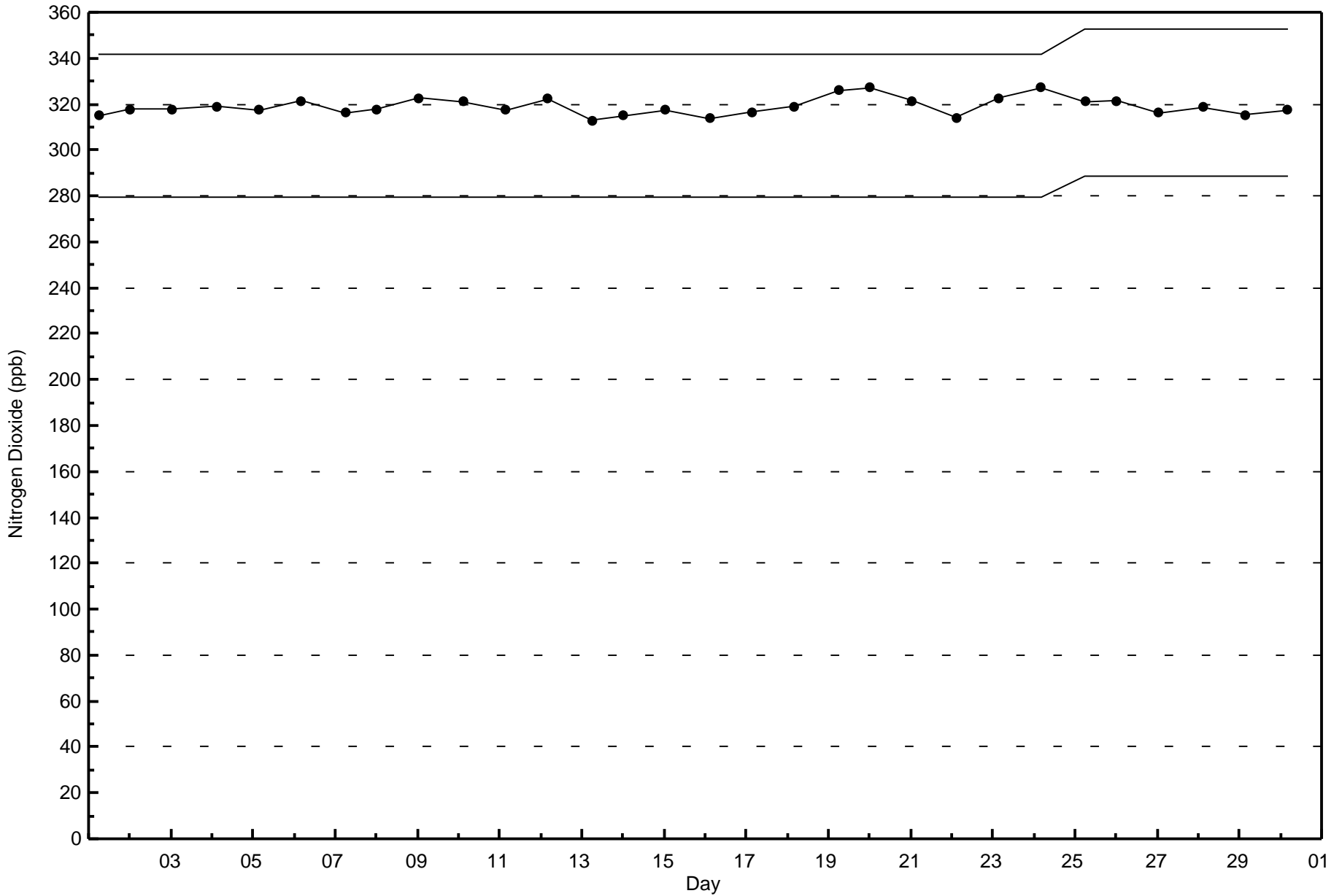
Total Number of Valid Hours: 684



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Dioxide (NO₂) - ppb
Statoil - Leismer - November 2015







Maximum Value: 24 ppb on Nov 19 10:00	Maximum Daily Average: 5.5 ppb on Nov 19	Hours in Service: 720
Minimum Value: 0 ppb on Nov 2 05:00	Minimum Daily Average: 0.4 ppb on Nov 1	Hours of Data: 685
Maximum Diurnal Average: 3.6 ppb at hour 14	Minimum Diurnal Average: 1.6 ppb at hour 4	Hours of Missing Data: 35
Monthly Average: 2.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 14	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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0.4	1
2-Nov	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0.6	1
3-Nov	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	1	1	1.0	2
4-Nov	1	1	Z	1	1	1	1	1	1	2	2	4	5	5	5	3	3	3	4	5	6	7	7	6	3.2	7
5-Nov	5	4	4	Z	2	7	2	1	2	1	3	2	4	4	7	6	8	10	10	6	5	2	7	7	4.7	10
6-Nov	3	1	1	1	Z	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	1.5	3
7-Nov	3	3	3	3	3	Z	3	2	2	2	2	1	2	2	1	1	1	1	1	2	1	1	1	1	1.7	3
8-Nov	Z	1	1	4	1	2	4	3	3	1	2	2	3	4	4	2	3	2	2	2	2	1	1	1	2.2	4
9-Nov	0	Z	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
10-Nov	1	1	Z	2	1	1	1	2	2	2	2	2	2	3	3	4	3	3	2	2	2	3	3	3	2.2	4
11-Nov	3	3	3	Z	2	2	2	3	3	4	5	3	2	1	1	1	1	1	1	1	1	1	1	1	2.0	5
12-Nov	2	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1.3	2
13-Nov	1	1	1	1	2	Z	2	2	2	3	2	3	2	2	3	2	2	1	1	1	1	1	1	1	1.8	3
14-Nov	Z	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	1.3	3
15-Nov	3	Z	3	3	2	4	5	3	3	3	2	2	1	1	1	1	1	2	1	1	1	1	0	0	1.9	5
16-Nov	1	1	Z	1	1	4	2	1	1	1	5	12	3	1	1	1	0	1	1	1	1	1	1	1	1.7	12
17-Nov	1	1	2	Z	2	2	2	2	2	2	2	2	1	1	1	1	1	2	6	1	1	12	14	14	3.2	14
18-Nov	12	15	5	1	Z	0	8	17	4	6	3	2	1	9	10	9	5	2	2	1	1	1	1	1	5.1	17
19-Nov	1	1	2	3	5	Z	13	2	5	24	14	4	3	2	9	8	6	8	5	3	3	1	2	2	5.5	24
20-Nov	Z	1	1	1	8	9	9	7	2	1	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2.4	9
21-Nov	2	Z	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
22-Nov	1	1	Z	1	0	0	1	3	1	0	1	1	4	16	17	10	5	12	11	3	1	0	1	1	4.0	17
23-Nov	4	4	0	Z	1	0	0	0	3	1	1	7	8	11	9	6	1	2	3	3	1	1	1	3	3.0	11
24-Nov	4	2	2	4	Z	2	1	2	C	C	C	C	C	10	10	8	18	2	1	2	1	1	0	0	3.9	18
25-Nov	1	1	1	1	1	Z	1	1	1	2	2	1	1	9	4	1	2	3	2	2	2	6	3	1	2.1	9
26-Nov	Z	2	2	2	1	2	2	1	2	2	3	3	2	2	3	5	8	8	5	4	3	3	2	2	3.0	8
27-Nov	2	Z	2	2	1	2	2	2	1	2	3	2	13	13	7	10	12	8	4	5	2	1	1	2	4.3	13
28-Nov	3	3	Z	2	2	2	8	2	1	2	2	1	1	1	1	1	3	2	2	2	2	2	2	2	2.1	8
29-Nov	2	1	1	Z	2	2	5	7	5	3	3	3	2	2	2	1	2	8	3	2	2	1	1	1	2.6	8
30-Nov	2	1	2	2	Z	2	2	2	2	5	2	1	1	1	1	1	1	1	2	2	3	3	3	3	1.9	5

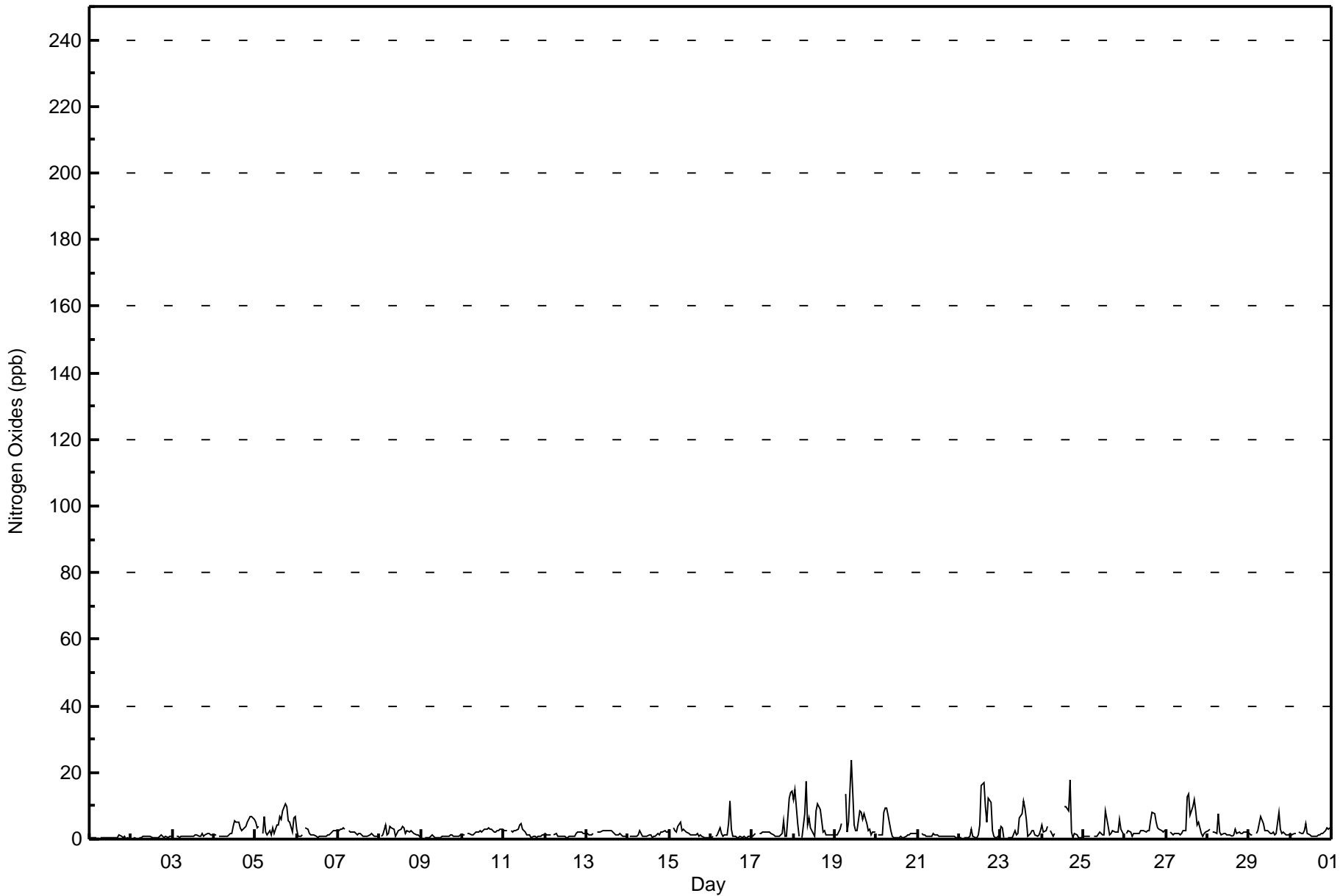
2.3	2.1	1.7	1.6	1.6	2.1	2.8	2.5	1.9	2.6	2.3	2.2	2.4	3.6	3.5	3.0	3.1	3.1	2.6	1.9	1.8	2.1	2.2	2.3	Diurnal Average	
12	15	5	4	8	9	13	17	5	24	14	12	13	16	17	10	18	12	11	6	6	12	14	14	Diurnal Maximum	

Z - zerospan C - Calibration



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	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: 685

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	11	10	15	31	28	18	21	44	113	44	29	115	112	38	42	683
21 - 40	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	11	10	15	31	28	18	21	44	113	44	29	115	112	38	42	684

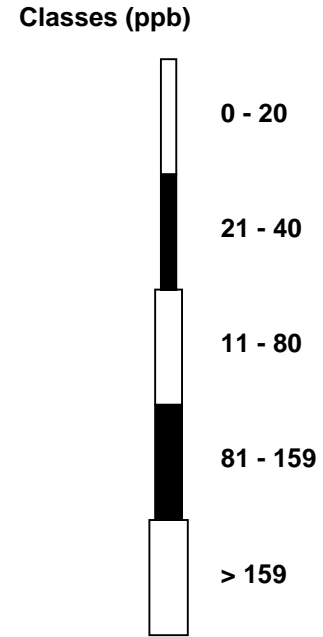
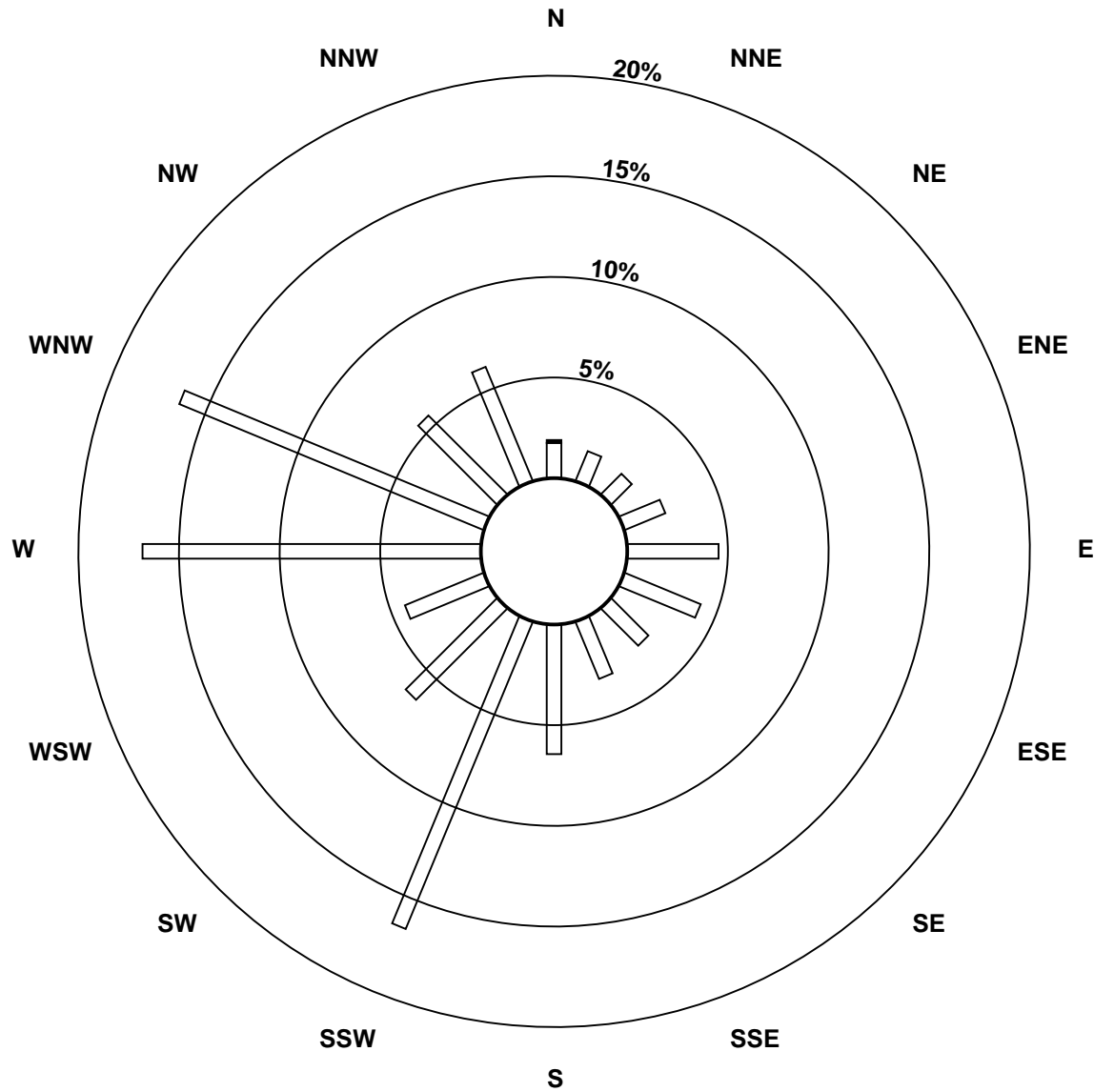
Total Number of Valid Hours: 684

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer (AMS501)

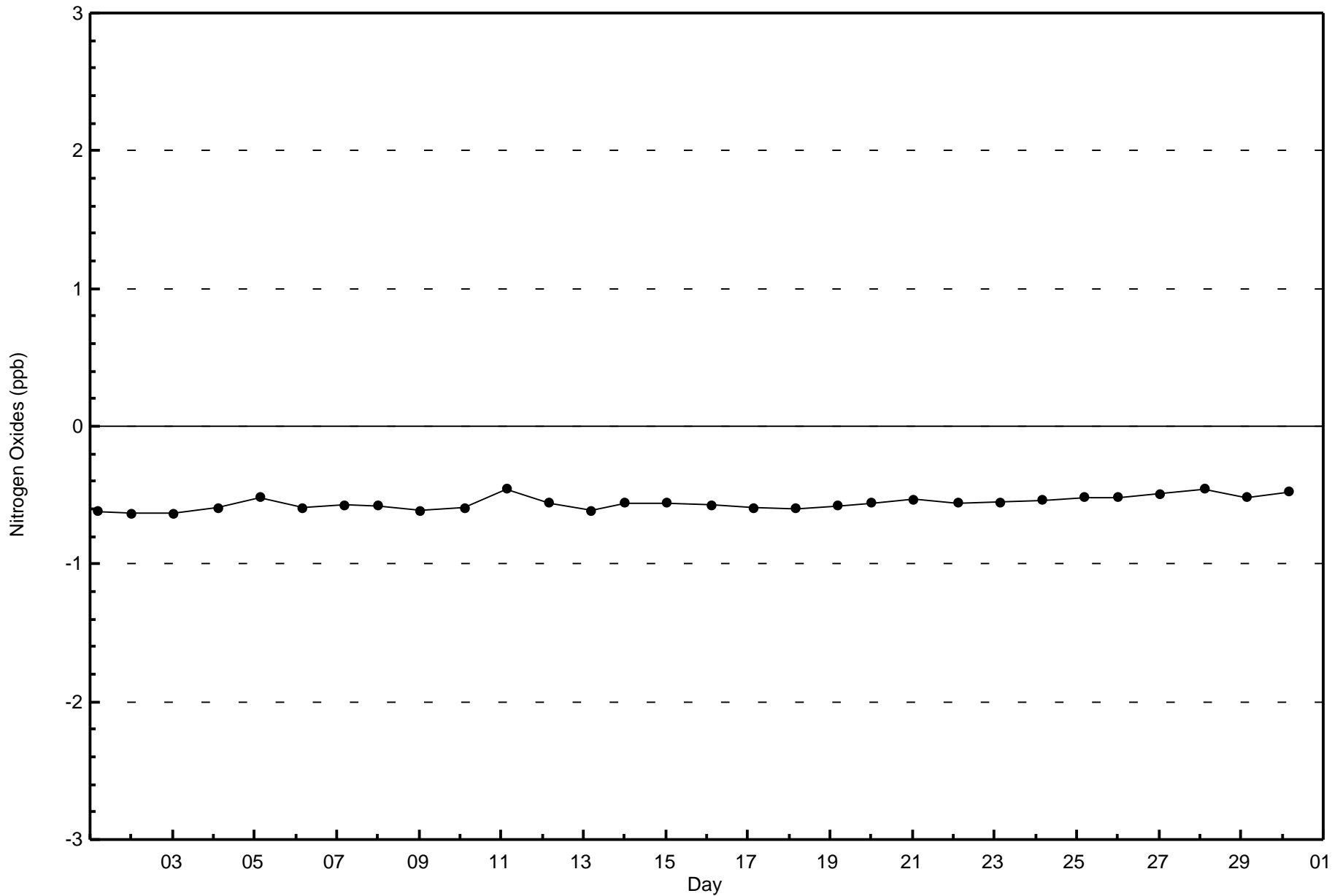


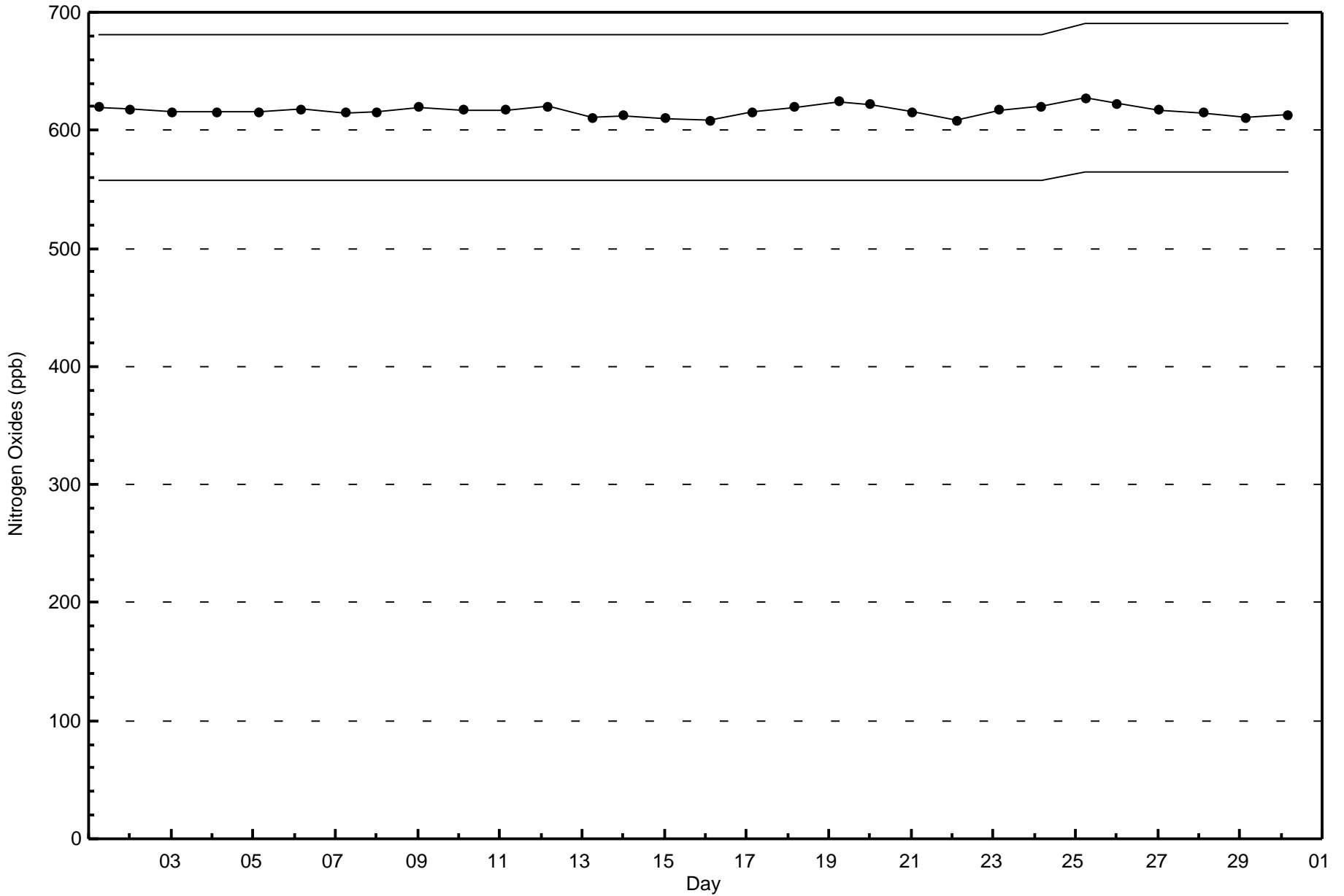
Total Number of Valid Hours: 684



Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Statoil - Leismer - November 2015







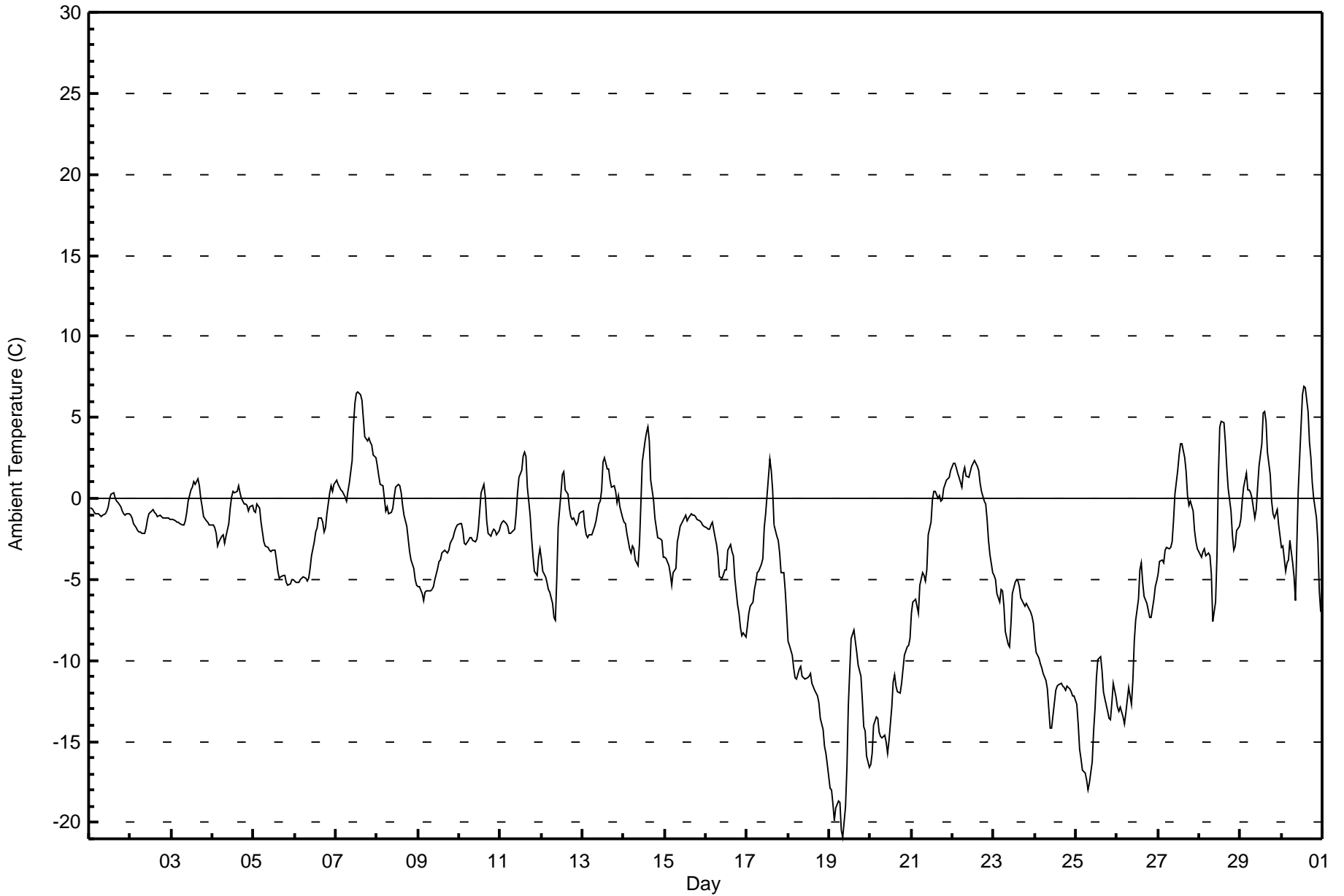
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Statoil - Leismer - November 2015

Maximum Value: 6.9 C on Nov 30 14:00		Maximum Daily Average: 3.0 C on Nov 7		Hours in Service: 720																							
Minimum Value: -20.9 C on Nov 19 09:00		Minimum Daily Average: -15.0 C on Nov 19		Hours of Data: 720																							
Maximum Diurnal Average: -1.0 C at hour 14		Minimum Diurnal Average: -5.6 C at hour 9		Hours of Missing Data: 0																							
Monthly Average: -3.78 C		Percentiles: P ₁ = -18.9 P ₁₀ = -12.0 Q ₁ = -5.8 Median = -2.3 Q ₃ = -0.5 P ₉₀ = 1.4 P ₉₉ = 5.8		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Nov	-0.6	-0.6	-0.7	-0.8	-0.9	-1.0	-1.0	-1.1	-1.1	-0.9	-0.7	-0.5	0.0	0.3	0.3	0.0	-0.1	-0.3	-0.5	-0.8	-0.9	-1.0	-0.9	-1.0	-0.6	0.3	
2-Nov	-1.0	-1.2	-1.5	-1.8	-1.9	-2.1	-2.1	-2.2	-2.1	-1.8	-1.2	-0.9	-0.8	-0.7	-0.8	-1.0	-1.1	-1.1	-1.1	-1.2	-1.2	-1.2	-1.2	-1.3	-1.4	-0.7	
3-Nov	-1.3	-1.3	-1.4	-1.5	-1.5	-1.5	-1.6	-1.6	-1.4	-0.9	-0.2	0.5	0.7	1.1	0.9	1.2	0.7	0.0	-0.5	-1.1	-1.4	-1.5	-1.6	-1.7	-0.7	1.2	
4-Nov	-1.7	-1.8	-2.1	-2.9	-2.7	-2.3	-2.2	-2.7	-2.3	-1.5	-0.6	0.1	0.4	0.4	0.5	0.8	0.4	0.0	-0.3	-0.3	-0.4	-0.8	-0.5	-0.4	-1.0	0.8	
5-Nov	-0.8	-0.8	-0.4	-0.6	-1.5	-2.1	-2.7	-2.9	-3.0	-3.2	-3.3	-3.2	-3.2	-3.8	-4.5	-4.9	-4.8	-4.7	-4.8	-5.2	-5.4	-5.2	-5.0	-5.0	-3.4	-0.4	
6-Nov	-5.1	-5.2	-5.1	-5.0	-4.9	-4.9	-4.9	-5.1	-4.9	-4.3	-3.5	-2.7	-2.1	-1.8	-1.2	-1.2	-1.5	-2.1	-1.8	-1.0	0.3	0.8	0.4	0.9	-2.7	0.9	
7-Nov	1.1	0.9	0.7	0.5	0.4	0.1	-0.1	0.4	1.0	2.4	4.6	5.9	6.5	6.6	6.4	6.1	4.9	3.8	3.6	3.7	3.4	3.3	2.7	2.5	3.0	6.6	
8-Nov	2.0	1.4	0.8	0.8	0.0	-0.8	-0.5	-1.0	-0.8	-0.6	0.1	0.7	0.9	0.8	0.4	-0.4	-1.0	-1.7	-2.5	-3.3	-3.8	-4.3	-5.0	-5.3	-1.0	2.0	
9-Nov	-5.5	-5.5	-5.9	-6.3	-5.8	-5.7	-5.7	-5.7	-5.6	-5.4	-5.0	-4.3	-3.8	-3.8	-3.4	-3.2	-3.3	-3.4	-3.2	-2.8	-2.4	-2.1	-1.8	-1.6	-4.2	-1.6	
10-Nov	-1.6	-1.5	-2.0	-2.7	-2.9	-2.6	-2.4	-2.4	-2.6	-2.7	-2.5	-1.9	-0.8	0.3	0.9	0.1	-1.4	-2.1	-2.3	-2.0	-1.9	-2.0	-2.2	-1.9	-1.8	0.9	
11-Nov	-1.6	-1.5	-1.4	-1.5	-1.8	-2.1	-2.1	-2.1	-1.9	-0.9	0.4	1.3	1.7	2.6	2.8	2.6	0.7	-1.0	-2.4	-3.6	-4.5	-4.8	-3.7	-3.1	-1.2	2.8	
12-Nov	-3.7	-4.5	-4.9	-5.2	-5.6	-5.8	-6.4	-7.3	-7.5	-4.9	-1.7	0.3	1.4	1.6	0.5	0.2	-0.6	-1.1	-1.3	-1.2	-1.7	-1.5	-0.9	-0.8	-2.6	1.6	
13-Nov	-0.8	-1.7	-2.2	-2.4	-2.3	-2.2	-2.0	-1.7	-1.4	-0.3	-0.2	0.6	2.3	2.5	1.8	1.8	1.1	0.7	0.8	0.5	-0.3	0.2	-0.5	-1.2	-0.3	2.5	
14-Nov	-1.4	-1.5	-2.2	-3.1	-3.4	-3.0	-3.1	-3.8	-4.1	-2.8	-0.3	2.2	3.5	4.1	4.4	3.6	1.1	-0.1	-1.2	-1.8	-2.4	-2.5	-2.6	-3.6	-1.0	4.4	
15-Nov	-3.6	-3.7	-4.1	-4.7	-5.4	-4.6	-4.3	-2.7	-2.2	-1.7	-1.5	-1.2	-1.0	-1.4	-1.2	-1.0	-1.0	-1.1	-1.1	-1.3	-1.4	-1.5	-1.6	-1.8	-2.3	-1.0	
16-Nov	-1.8	-1.9	-1.9	-1.6	-1.4	-2.4	-2.9	-3.6	-4.8	-4.9	-4.7	-4.4	-4.4	-3.2	-2.9	-3.2	-3.5	-4.9	-6.5	-7.0	-7.9	-8.5	-8.3	-8.6	-4.4	-1.4	
17-Nov	-7.8	-7.0	-6.7	-6.4	-5.6	-5.2	-4.6	-4.5	-4.1	-3.7	-1.8	-1.0	1.3	2.4	1.8	0.5	-1.6	-2.3	-2.6	-3.4	-4.6	-4.6	-5.7	-7.2	-3.5	2.4	
18-Nov	-8.8	-9.1	-9.7	-10.4	-11.0	-11.2	-10.5	-10.4	-10.9	-11.1	-11.2	-11.0	-11.0	-10.8	-11.4	-11.8	-12.0	-12.2	-12.6	-13.5	-14.2	-15.3	-15.7	-16.4	-11.8	-8.8	
19-Nov	-17.9	-18.0	-18.8	-19.8	-19.1	-18.7	-18.7	-20.5	-20.9	-19.0	-16.6	-12.7	-10.7	-8.6	-8.1	-8.8	-9.5	-10.2	-11.0	-12.4	-14.1	-14.4	-15.9	-16.6	-15.0	-8.1	
20-Nov	-16.4	-15.7	-14.0	-13.5	-13.6	-14.4	-14.7	-14.8	-14.6	-15.1	-15.7	-15.0	-12.9	-11.3	-10.8	-11.6	-11.9	-12.0	-11.4	-10.5	-9.7	-9.1	-9.1	-8.6	-12.8	-8.6	
21-Nov	-7.1	-6.4	-6.2	-6.6	-7.1	-5.4	-4.6	-4.8	-5.1	-4.4	-2.3	-1.5	-0.1	0.4	0.5	0.0	0.2	-0.2	-0.1	0.6	1.1	1.2	1.3	1.7	-2.3	1.7	
22-Nov	2.2	2.2	1.9	1.5	1.3	0.7	1.6	1.9	1.4	1.3	1.6	2.0	2.2	2.3	2.0	1.7	1.0	0.4	-0.2	-0.3	-1.3	-2.6	-3.5	-4.6	0.7	2.3	
23-Nov	-4.8	-5.0	-5.9	-6.4	-5.6	-5.7	-6.6	-8.2	-9.0	-9.2	-7.8	-5.9	-5.2	-5.0	-5.1	-5.5	-6.1	-6.5	-6.7	-6.5	-6.6	-7.0	-7.2	-7.7	-6.5	-4.8	
24-Nov	-8.7	-9.5	-9.8	-10.2	-10.5	-10.8	-11.2	-11.8	-13.0	-14.2	-14.1	-12.6	-11.8	-11.6	-11.5	-11.4	-11.6	-11.7	-11.8	-11.6	-11.7	-11.9	-12.2	-12.2	-11.6	-8.7	
25-Nov	-12.7	-13.9	-15.5	-16.1	-16.7	-17.0	-17.3	-17.9	-17.6	-16.3	-14.3	-13.0	-11.1	-10.0	-9.8	-10.6	-12.0	-12.3	-13.1	-13.6	-13.7	-12.6	-11.4	-12.3	-13.8	-9.8	
26-Nov	-12.9	-13.1	-12.9	-13.5	-13.9	-13.3	-12.5	-11.6	-12.7	-11.2	-8.8	-7.5	-6.2	-4.4	-4.0	-5.2	-6.0	-6.4	-6.9	-7.4	-7.3	-6.2	-5.4	-5.1	-8.9	-4.0	
27-Nov	-4.7	-3.9	-3.8	-4.0	-3.2	-3.0	-3.1	-3.0	-2.7	-1.4	0.3	1.7	2.7	3.4	3.3	2.5	1.7	0.2	-0.4	-0.2	-0.8	-2.0	-2.7	-3.1	-1.1	3.4	
28-Nov	-3.4	-3.6	-3.3	-3.1	-3.6	-3.4	-3.6	-4.7	-7.6	-6.4	-3.6	1.4	4.4	4.8	4.7	3.5	1.9	0.6	-0.8	-2.2	-3.2	-2.9	-2.0	-1.7	-1.6	4.8	
29-Nov	-1.3	-0.1	0.7	1.6	0.5	0.5	0.4	0.0	-1.2	-0.6	0.7	2.0	3.4	5.3	5.4	4.8	2.8	1.4	-0.2	-1.0	-1.2	-0.7	-1.6	-2.3	0.8	5.4	
30-Nov	-3.1	-2.9	-4.5	-4.0	-3.8	-2.6	-4.0	-4.9	-6.3	-2.7	0.5	4.5	6.4	6.9	6.9	5.4	3.4	2.5	1.0	0.0	-1.2	-2.7	-5.7	-7.0	-0.7	6.9	
		-4.5	-4.6	-4.8	-5.0	-5.1	-5.1	-5.1	-5.3	-5.6	-5.0	-3.8	-2.5	-1.6	-1.0	-1.0	-1.5	-2.3	-2.9	-3.4	-3.7	-4.0	-4.1	-4.3	-4.6	Diurnal Average	
		2.2	2.2	1.9	1.6	1.3	0.7	1.6	1.9	1.4	2.4	4.6	5.9	6.5	6.9	6.9	6.1	4.9	3.8	3.6	3.7	3.4	3.3	2.7	2.5	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Statoil - Leismer - November 2015

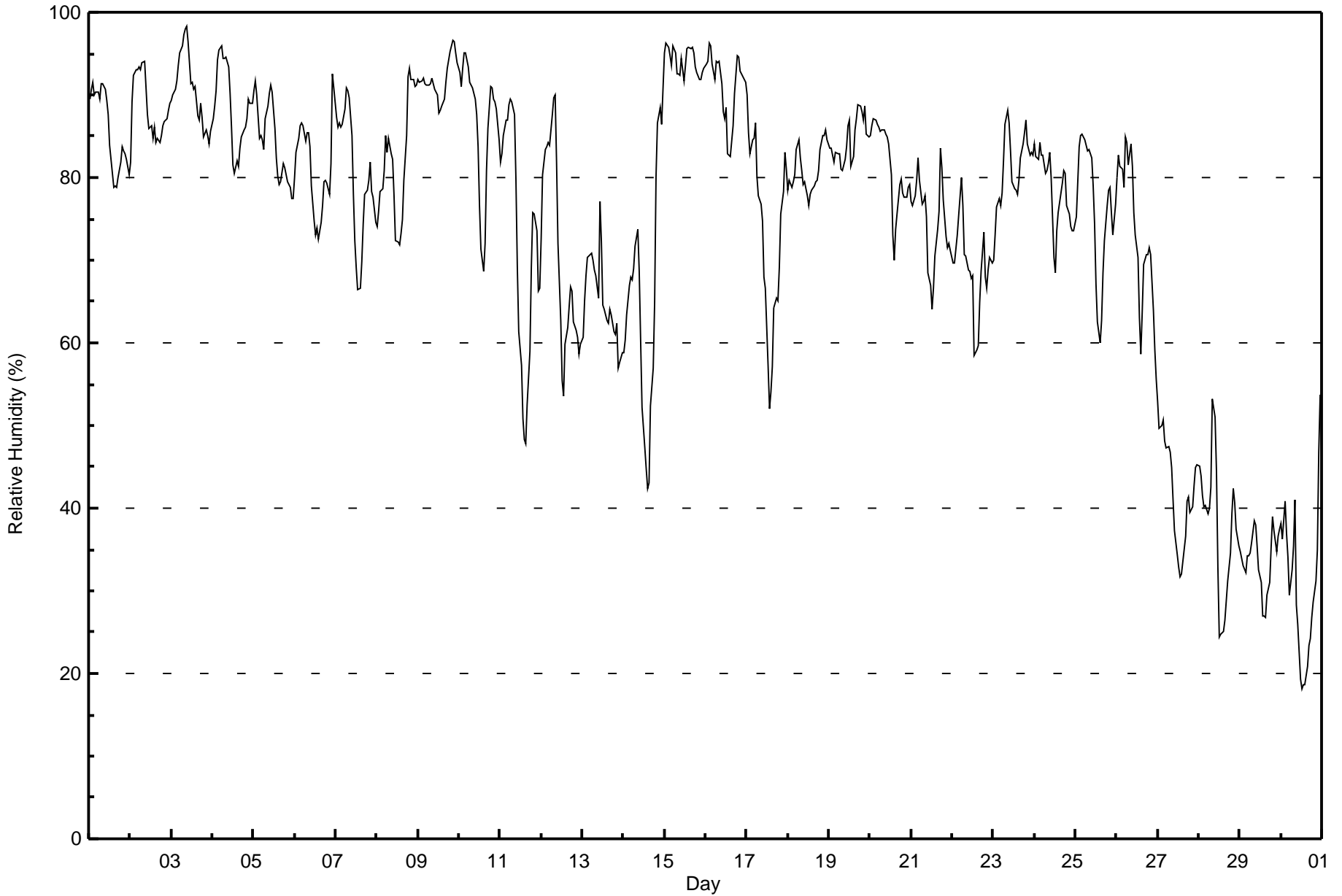
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	2	0.28	0.28
-20 - 0	565	78.47	78.75
0 - 10	153	21.25	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 98 % on Nov 3 10:00																		Maximum Daily Average: 94.1 % on Nov 15																		Hours in Service: 720														
Minimum Value: 18 % on Nov 30 13:00																		Minimum Daily Average: 31.0 % on Nov 30																		Hours of Data: 720														
Maximum Diurnal Average: 80.0 % at hour 9																		Minimum Diurnal Average: 65.6 % at hour 15																		Hours of Missing Data: 0														
Monthly Average: 74.5 %																		Percentiles: P ₁ = 24 P ₁₀ = 41 Q ₁ = 68 Median = 80 Q ₃ = 87 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-Nov	89	91	91	90	90	90	89	91	91	91	89	88	84	82	79	79	79	80	82	84	83	83	82	80	85.8	91																								
2-Nov	82	89	92	93	93	93	93	94	94	91	88	86	86	85	86	84	85	84	85	86	87	87	88	89	88.4	94																								
3-Nov	89	90	91	92	94	95	96	97	98	98	96	91	91	91	87	87	89	87	85	86	85	84	86	90.7	98																									
4-Nov	87	89	91	94	95	96	94	94	95	93	90	86	82	81	82	81	84	85	86	86	87	89	89	89	88.6	96																								
5-Nov	91	92	90	85	85	85	83	87	89	90	91	90	86	82	80	79	80	82	81	80	79	79	77	77	84.2	92																								
6-Nov	80	83	85	86	87	86	84	85	85	84	79	75	73	74	73	74	77	79	80	79	78	82	93	91	81.3	93																								
7-Nov	87	86	87	86	86	88	91	91	90	85	78	72	69	67	67	70	74	78	78	80	82	78	78	75	80.1	91																								
8-Nov	74	76	78	79	81	85	83	85	83	82	78	72	72	72	73	75	80	85	92	93	92	92	91	91	81.8	93																								
9-Nov	92	92	92	92	91	91	91	91	92	91	91	90	88	88	89	90	92	93	94	95	97	96	95	94	91.9	97																								
10-Nov	93	91	93	95	95	93	92	91	91	89	88	84	77	71	69	72	81	86	91	91	90	89	88	85	86.8	95																								
11-Nov	82	83	85	87	87	89	90	89	88	80	69	61	57	51	48	48	53	59	69	76	76	73	66	67	72.2	90																								
12-Nov	73	80	83	84	84	84	88	90	90	82	72	63	55	54	60	62	64	67	66	63	62	61	59	60	71.0	90																								
13-Nov	61	65	68	70	71	71	70	69	68	65	77	72	65	64	63	62	64	63	61	61	62	57	58	59	65.3	77																								
14-Nov	59	60	63	67	68	68	69	72	74	69	60	52	47	45	42	43	52	57	65	80	87	88	87	91	65.2	91																								
15-Nov	95	96	96	95	94	96	95	93	93	92	94	92	94	96	96	96	95	93	93	92	92	93	93	93	94.1	96																								
16-Nov	94	94	96	96	94	92	94	94	94	91	88	87	89	83	83	84	86	90	95	95	93	93	92	92	91.1	96																								
17-Nov	90	86	83	85	85	87	80	78	77	75	68	67	57	52	54	57	64	65	65	69	76	78	83	81	73.3	90																								
18-Nov	79	80	79	79	80	83	85	82	81	79	80	78	77	78	79	79	80	80	81	83	85	85	86	85	80.9	86																								
19-Nov	84	83	83	82	83	83	83	81	81	82	84	86	87	81	83	86	87	89	89	88	87	89	85	85	84.5	89																								
20-Nov	85	86	87	87	86	86	86	86	86	85	85	84	80	73	70	74	76	79	80	78	78	78	79	79	81.3	87																								
21-Nov	77	77	78	80	82	80	77	77	78	75	68	67	64	67	71	74	76	84	81	77	73	72	72	71	74.8	84																								
22-Nov	70	70	71	73	75	80	77	71	70	69	69	68	68	58	59	60	65	69	73	68	67	69	70	70	69.1	80																								
23-Nov	70	73	76	77	77	78	82	86	88	87	83	80	79	78	78	80	82	84	85	87	84	83	83	83	81.0	88																								
24-Nov	84	83	82	84	83	83	80	81	82	83	80	70	69	74	76	78	79	81	80	77	76	74	74	74	74	78.5	84																							
25-Nov	75	79	84	85	85	85	84	83	83	82	79	74	67	63	60	63	68	72	77	78	79	76	73	77	76.3	85																								
26-Nov	80	83	81	81	79	85	84	82	84	81	76	73	70	63	59	64	70	71	71	72	71	64	59	56	73.2	85																								
27-Nov	53	50	50	51	48	47	47	47	45	41	37	34	33	32	32	35	37	41	41	40	40	43	45	45	42.2	53																								
28-Nov	45	44	41	40	40	39	40	43	53	51	44	33	24	25	25	26	29	31	35	39	42	41	37	35	37.7	53																								
29-Nov	35	34	33	32	34	34	35	36	38	38	35	32	31	27	27	27	30	31	35	39	37	35	37	38	33.7	39																								
30-Nov	38	36	41	37	34	30	33	35	41	28	26	19	18	19	19	21	23	24	27	29	31	35	47	54	31.0	54																								
																								76.4	77.3	78.4	78.8	78.9	79.4	79.1	79.3	80.0	77.7	74.8	70.9	68.0	65.8	65.6	67.0	69.9	72.4	74.2	75.0	75.2	74.8	75.0	74.9	Diurnal Average		
																								95	96	96	96	95	96	96	97	98	98	96	92	94	96	96	96	96	96	95	95	95	97	96	95	94	Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Statoil - Leismer - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	4	0.56	0.56
20 - 40	61	8.47	9.03
40 - 60	64	8.89	17.92
60 - 80	227	31.53	49.44
80 - 100	364	50.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

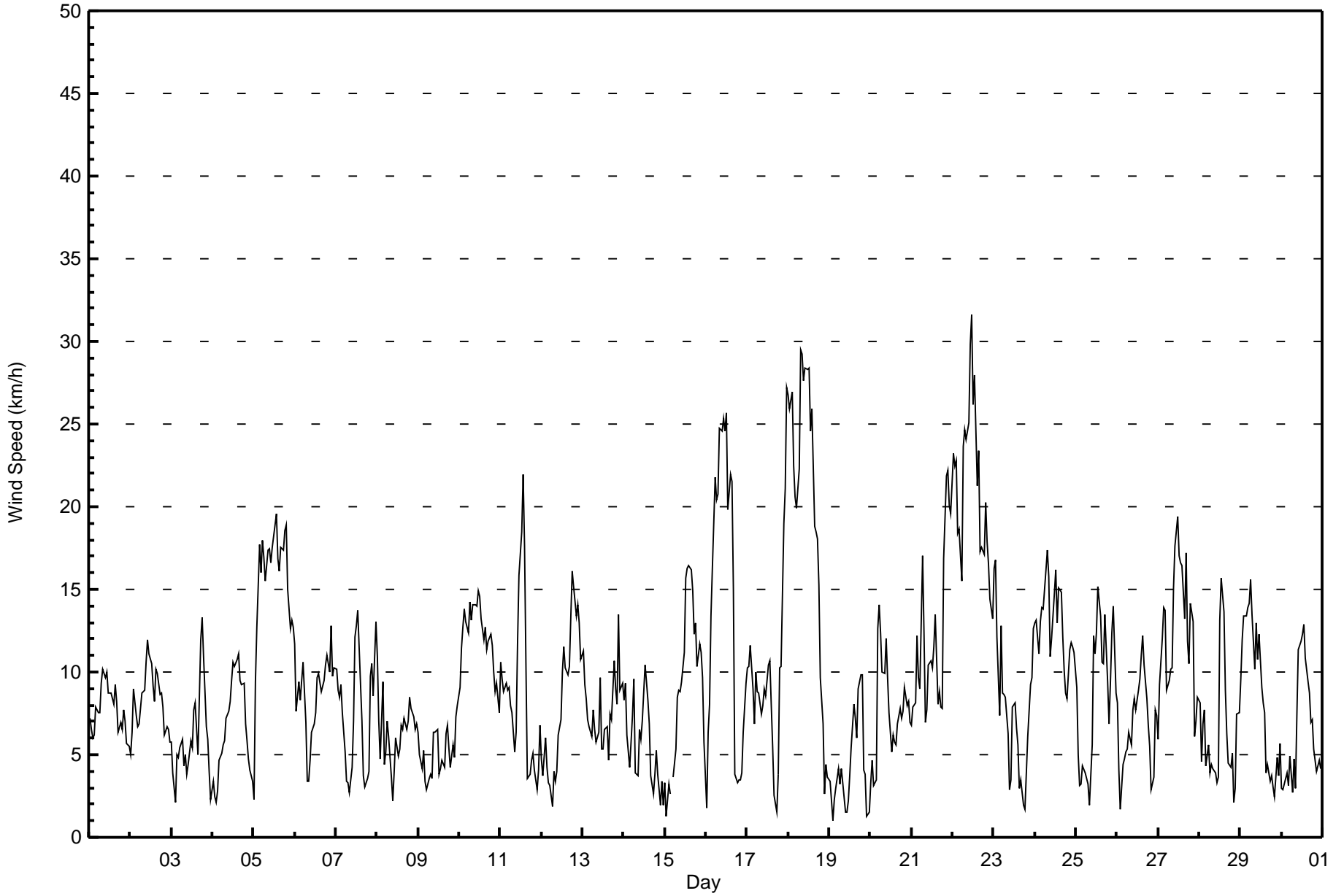


Maximum Speed: 32 km/h on Nov 22 12:00	Maximum Daily Speed Average: 20.9 km/h on Nov 22	Hours in Service: 720
Minimum Speed Value: 1 km/h on Nov 19 03:00	Minimum Daily Speed Average: 3.3 km/h on Nov 3	Hours of Data: 719
Maximum Diurnal Speed Average: 6.9 km/h at hour 14	Minimum Diurnal Speed Average: 2.7 km/h at hour 18	Hours of Missing Data: 1
Monthly Average Velocity: 4.5 km/h 274.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 3 Q ₁ = 5 Median = 8 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 28	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-Nov	ENE7	E7	ESE6	E6	E8	E8	ESE8	ESE9	E10	E10	E10	ESE9	E9	ESE9	ESE8	ESE9	ESE8	E6	E7	ENE6	ENE8	ENE7	ENE6	ENE6	E7.5	E10	
2-Nov	E5	E6	E9	ESE7	E7	E7	ESE8	ESE9	ESE9	SE11	SE12	SE11	ESE10	E9	ESE8	ESE10	ESE10	ESE9	SE9	SE8	SE6	SE7	SE7	SSE6	ESE8.0	SE12	
3-Nov	SE6	SE4	ESE2	SE5	SE5	SSE5	SSE6	SSE4	SSE5	S4	SSW4	SW6	SW5	W8	W8	W5	W8WNW12	WNW13	WNW11	W7	W6	WSW4	WSW2	WSW3.3	WNW13		
4-Nov	WSW3	WSW2	SW2	S3	S5	SSW5	SSW6	S6	S7	S8	SSW8	SSW9	SSW11	S10	S11	SSW11	SSW10	SSW9	SSW9	SW7	SSW6	SSW5	SSW4	SSW6.4	SSW11		
5-Nov	SW2	WNW9	WNW13	NW18	NNW16	NNW18	NNW17	NNW16	NNW17	NNW17	NNW17	NNW18	NNW19	NNW20	NNW17	NNW16	NW18	NW17	NW19	NW19	NW15	WNW13	NW13	NW15.2	NNW20		
6-Nov	WNW12	W8	W9	W8	W10	WNW11	WNW7	WSW3	SW3	SW5	SSW6	SSW7	SSW8	SSW10	S10	S9	SSE9	SSE9	SSE10	S11	SSW10	SSW13	SSW10	SSW10	SW5.7	SSW13	
7-Nov	SW10	SW9	SW8	SSW9	SW8	SSW5	SSW3	WSW3	SW3	W4	W7	W12	W13	W14	W9	W7	SW4	SW3	WSW4	W4	WNW10	WNW10	WNW9	WNW13	WSW6.5	W14	
8-Nov	WNW11	W7	W5	NNW9	NNW4	N5	NNW7	N6	NNE4	NNE2	NE4	ESE6	ESE5	E5	E7	E7	NE7	ENE7	NE7	NE8	NE8	ENE7	ENE6	NE7	NNE3.6	WNW11	
9-Nov	NE6	ENE5	ENE4	NNE5	E3	SE3	ESE4	ESE4	SSE4	SE6	SSE6	SSE7	SSW4	SW4	S5	S4	SSE6	SSE7	S5	S4	S6	S5	S7	S8	SSE3.5	S8	
10-Nov	S9	SSW11	SSW13	SSW14	SSW13	SSW12	SSW14	SSW13	SSW14	SSW14	SSW14	SSW14	SSW15	SSW15	SSW13	SSW12	SSW13	SSW11	SSW12	SSW12	SSW12	SSW10	SSW9	S9	SSW8	SSW12.1	SSW15
11-Nov	SSW11	SSW10	SSW9	SSW9	SSW9	SSW9	SSW8	SSW8	SW5	W6	W12	W16	W18	WNW22	WNW18	W10	SW4	SSW4	SSW5	SSW5	SSW4	SSW3	W4	W7	WSW7.0	WNW22	
12-Nov	W5	WSW4	W6	W4	WSW3	W3	S2	S4	S3	S4	SSW6	SW7	SW10	SSW12	S10	S10	SSE10	SSE13	SSE16	SSE15	SSE13	S14	S13	S11	S7.1	SSE16	
13-Nov	S11	S9	S8	S7	SSW7	SSW6	SW8	SSW6	SSW6	SW6	S10	SW5	SSW5	SSW6	SSW7	SW5	SW7	WSW7	W11	W9	W8	W14	W9	W9	SW6.4	W14	
14-Nov	W8	W9	W6	SW4	W6	WSW7	W10	WSW4	SSW4	SSW7	SW6	SW7	W10	W9	WSW8	WSW7	SSW4	S3	SSW4	SSW5	SSW4	W2	WNW3	S2	WSW5.2	W10	
15-Nov	S3	SE1	NE3	ENE3	AF	SE4	ENE5	E8	E9	E9	ENE9	E11	E16	E16	E16	E16	E15	E12	E13	E10	E12	E11	ESE10	ESE6	E9.2	ESE16	
16-Nov	NW2	W6	W8	WNW13	WNW16	WNW22	WNW20	W21	WNW25	WNW25	WNW25	WNW25	WNW26	WNW20	WNW22	WNW22	W15	WSW4	SSW3	S3	SSW3	S4	SSE6	SE9	WNW12.5	WNW26	
17-Nov	SE10	ESE10	SE12	SSE9	SSE7	SSE10	S9	SSW9	SSW7	SSW8	SSW9	SW9	W10	W11	SW8	SW6	S3	SSW1	W4	WNW10	WNW10	NW19	NW21	NW27	WSW4.2	NW27	
18-Nov	NW27	NW26	WNW27	WNW22	WNW21	WNW20	WNW22	NW29	NNW29	NW28	NNW28	NNW28	NNW28	NW25	NW26	NNW19	NNW19	NNW18	NNW15	NW10	NW7	NW3	NW4	W4	NW19.6	NW29	
19-Nov	SE3	N2	E1	NNE2	NNW3	N4	NNW3	NNE4	NNE3	N1	WNW2	WNW2	NNW4	NW5	NNW8	N7	NNW6	NNW9	NNW10	N10	NNE4	NNE4	SE1	N2	N3.6	NNW10	
20-Nov	WNW3	W5	W3	W3	NW13	NW14	NW12	NW10	WNW10	WNW12	W10	W8	W5	SSW6	SSW6	S6	SSW7	SSW8	SSW7	SSW8	SSW9	SW8	SW8	SW7	WSW5.4	NW14	
21-Nov	SW7	WSW8	W8	W12	W10	W9	WNW17	W12	W7	W8	W10	W11	W10	W12	W13	WSW8	WSW9	WSW8	WSW8	W17	WNW22	WNW22	WNW20	W20	W11.6	WNW22	
22-Nov	W23	WNW22	WNW23	WNW18	WNW19	W16	WNW24	WNW25	WNW24	WNW25	WNW30	WNW32	WNW26	NW28	NW21	NW23	NW17	NW18	NW17	WNW20	WNW18	WNW16	WNW14	WNW13	WNW20.9	WNW32	
23-Nov	WNW16	WNW17	WNW12	W7	WNW13	W9	W9	WNW8	NW6	W3	WNW3	NNW8	NNW8	NNW7	N6	NE3	NE3	ENE2	ENE2	NNE4	NNE6	NNE9	N10	N13	WNW5.6	WNW17	
24-Nov	N13	N13	N11	NNW13	NNW14	NNW14	NNW16	NNW17	NNW16	NNW11	NW12	NNW15	NNW16	NNW13	NNW15	NNW15	NNW12	NW10	W9	WNW8	WNW11	WNW12	W12	W11	NNW11.9	NNW17	
25-Nov	W9	W5	SW3	SW3	SSW4	SSW4	SSW4	SSW3	W2	W6	W12	W11	WNW12	NW15	WNW13	W11	WNW11	WNW14	WNW9	WNW7	WNW9	WNW12	WNW14	WNW9	WNW7.6	NW15	
26-Nov	WNW8	W4	WSW2	S4	SSW5	SSW5	SSW5	SSW6	SSW6	SSW8	SSW8	SSW8	SSW9	SSW10	SSW11	SW12	SW10	SSW8	SSW7	SSW6	SSW3	WNW4	W8	W7	SW6.0	SW12	
27-Nov	W6	WNW9	WNW12	WNW14	W14	W9	W9	W10	W10	WNW15	WNW18	WNW19	NW17	WNW17	NW16	NW13	NW17	NW12	WNW11	WNW14	WNW13	W6	WNW7	W8	WNW12.0	WNW19	
28-Nov	W8	WSW5	WNW7	WNW8	W4	W6	WNW4	SW4	SSW4	SSW4	SSW3	WSW4	W13	WNW16	W14	W9	W6	WSW4	SW4	SSW5	SSW2	W3	WNW7	W8	W5.7	WNW16	
29-Nov	WNW10	WNW12	WNW13	WNW13	WNW14	WNW14	WNW16	WNW13	WNW10	WNW13	WNW11	WNW12	WNW9	W8	WNW8	WSW4	W4	W3	SW4	SW3	W2	WNW5	W4	WNW6	WNW8.5	WNW16	
30-Nov	SW3	WSW3	SSW4	WSW4	SW3	W5	SW3	SSW5	SSW3	WNW7	WNW11	W12	W12	W13	W11	W9	WNW9	W7	W7	W5	WSW4	WSW4	SW5	SW4	W5.6	W13	

W4.3	W4.6	W4.5	W4.4	W4.8	W4.6	W5.0	W4.2	W3.6	W4.5	W5.8	W6.3	WNW6.7	WNW6.9	W5.7	W4.1	W3.0	W2.7	WSW3.0	W3.7	W3.7	W4.0	W4.1	W4.3	Diurnal Average	
NW27	NW26	WNW27	WNW22	WNW21	WNW22	WNW24	NW29	NNW29	NNW28	WNW30	WNW32	NNW28	NW28	NW26	NW23	NNW19	NNW18	NW19	WNW20	WNW22	WNW22	NW21	NW27	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 - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	189	26.29	26.29
6 - 11	327	45.48	71.77
12 - 19	155	21.56	93.32
20 - 28	44	6.12	99.44
29 - 38	4	0.56	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Statoil - Leismer - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	9	4	6	3	5	8	4	19	38	25	22	25	9	3	4	189
6 - 11	6	2	6	10	23	22	10	14	23	61	20	9	70	36	4	11	327
12 - 19	3	0	0	0	7	1	2	4	2	19	1	0	22	45	22	27	155
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	2	28	9	5	44
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	14	11	10	16	33	28	20	22	44	118	46	31	119	120	39	48	719

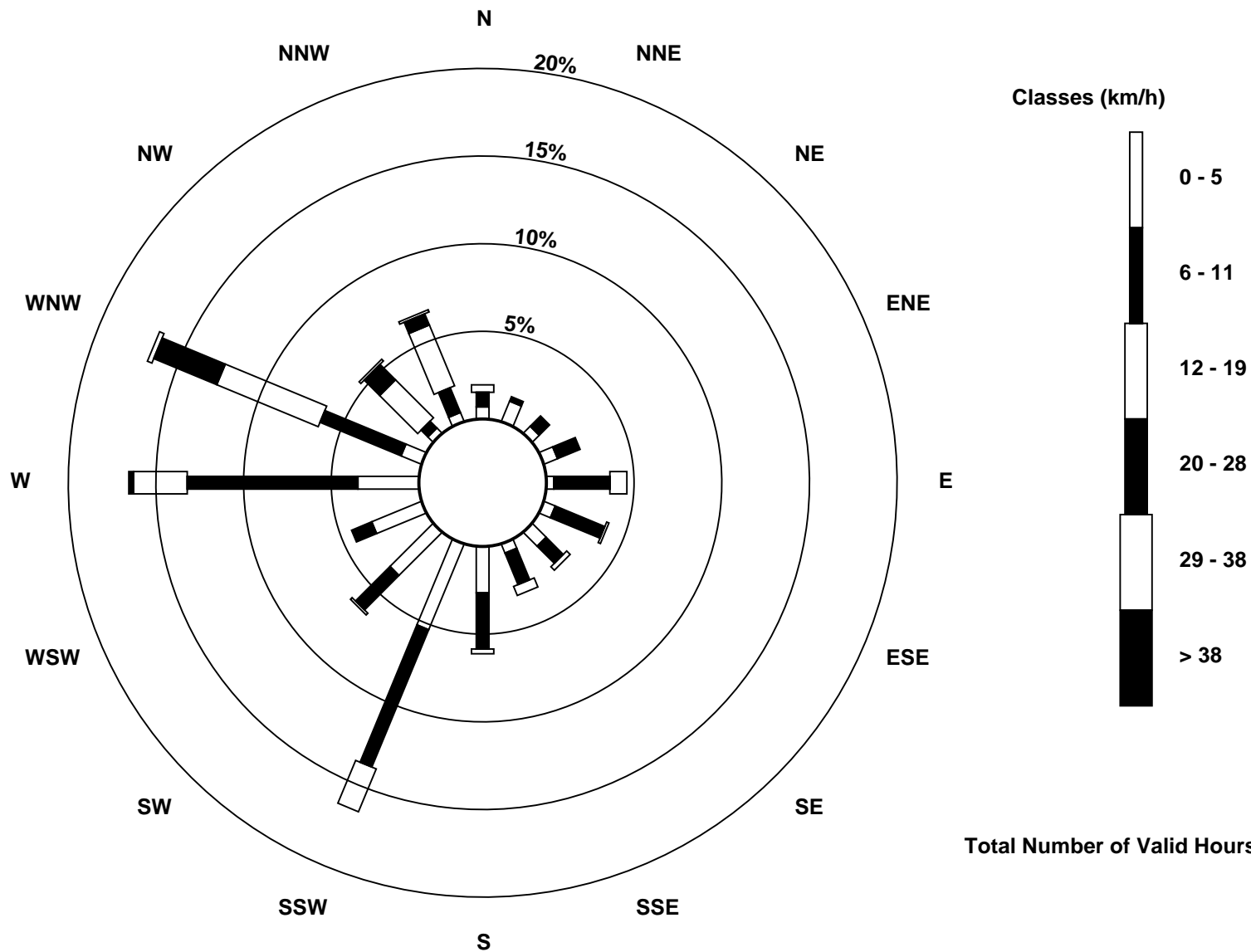
Total Number of Valid Hours: 719

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
Statoil - Leismer (AMS501)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Statoil - Leismer - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 6 km/h on Nov 22 13:00			Hours of Data:	719
Minimum Value: 1 km/h on Nov 19 23:00			Hours of Missing Data:	1
			Hours of Calibration:	0
			Percent Operational Time:	99.9
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6				

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

6 6 5 4 4 5 5 6 6 5 6 6 6 6 6 6 6 5 4 4 5 4 5 5 6

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Statoil - Leismer - November 2015

Direction of Maximum Speed: 296 deg on Nov 22 12:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 296.1 deg on Nov 22		Hours of Data:	719
Direction of Minimum Speed: 96 deg on Nov 19 03:00		Hours of Missing Data:	1
Direction of Minimum Daily Speed Average: 3.3 deg on Nov 3		Percent Operational Time:	99.9
Monthly Average Direction: 266.7 deg			

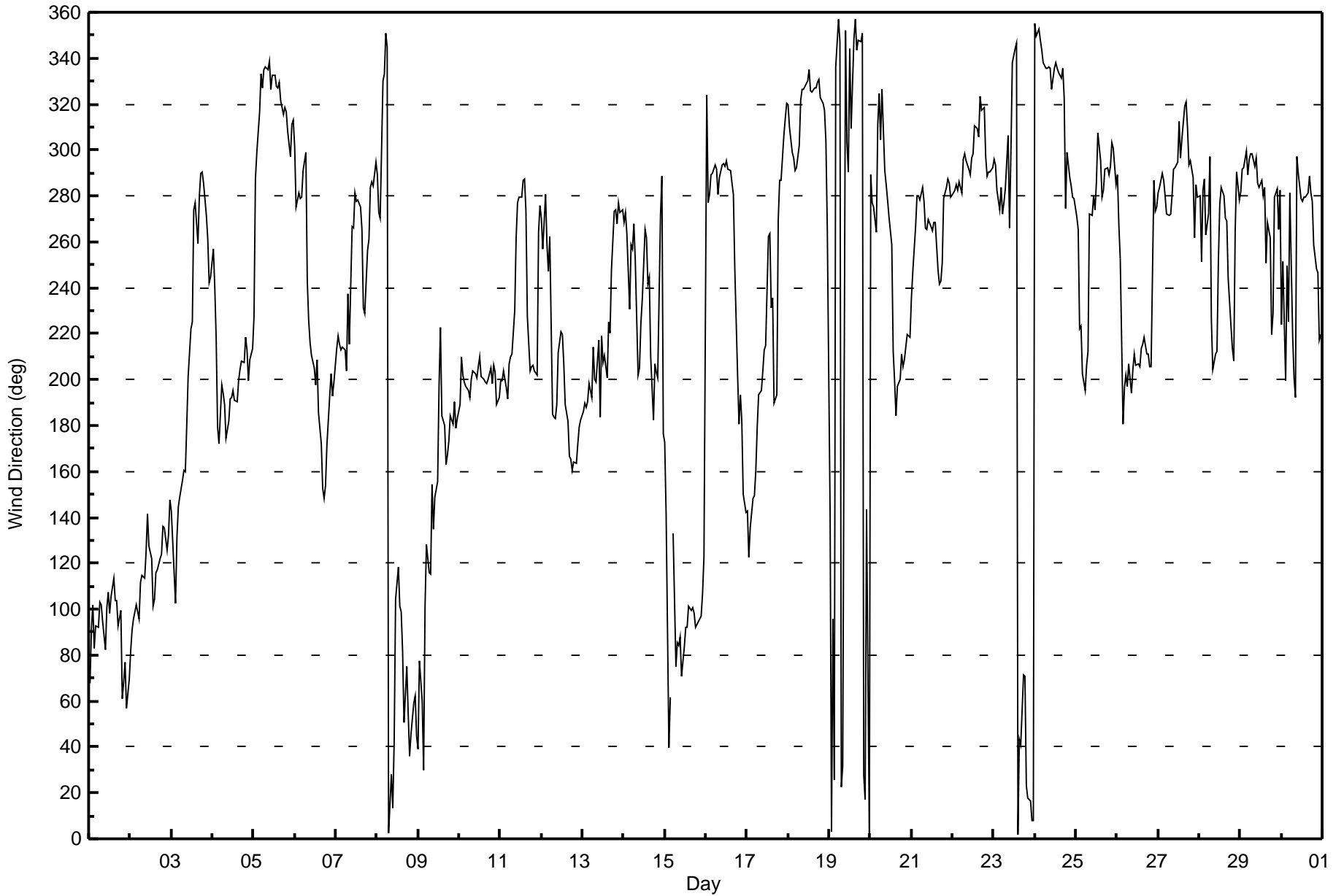
Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	67	91	102	83	93	92	103	102	94	82	101	107	98	105	113	104	104	93	99	61	69	77	57	70	91.9	
2-Nov	82	91	96	102	99	96	111	115	113	125	141	127	122	101	104	116	117	122	124	136	135	126	132	148	116.9	
3-Nov	143	129	102	131	144	149	156	160	160	180	201	222	225	274	277	259	280	290	290	285	272	261	242	245	239.4	
4-Nov	257	240	218	180	172	197	194	189	174	182	192	193	195	191	190	200	205	208	208	208	219	213	200	209	214	198.5
5-Nov	228	287	299	317	333	327	335	336	335	339	326	333	333	328	327	329	322	316	319	317	308	297	311	313	322.4	
6-Nov	302	275	281	279	279	291	299	243	226	216	211	205	198	209	186	172	153	149	154	172	193	203	193	199	215.1	
7-Nov	214	219	215	213	214	213	204	237	215	267	266	281	278	278	275	266	232	229	256	261	284	286	284	295	256.9	
8-Nov	289	273	271	330	333	351	345	3	28	14	43	104	118	101	99	82	50	75	54	36	46	59	62	44	33.3	
9-Nov	39	77	60	30	101	128	116	115	155	135	149	156	197	223	184	180	163	167	173	185	180	191	179	183	153.5	
10-Nov	189	210	202	199	197	195	192	200	204	202	201	205	210	201	200	199	198	200	205	199	206	203	189	192	200.4	
11-Nov	199	200	204	197	192	207	210	211	230	262	277	280	280	287	287	274	228	204	206	206	204	202	264	276	244.8	
12-Nov	270	257	281	259	247	262	185	184	183	189	212	221	219	207	189	182	167	165	160	164	164	172	179	183	189.1	
13-Nov	186	190	188	190	198	192	214	200	199	217	184	219	207	210	201	225	220	248	273	274	268	277	273	274	224.4	
14-Nov	268	272	263	231	259	257	268	252	202	205	224	235	266	262	242	245	210	182	207	203	201	272	289	176	244.9	
15-Nov	173	142	40	62	AF	133	75	86	84	88	71	84	92	92	101	99	101	98	92	93	96	97	107	122	94.5	
16-Nov	324	277	281	290	290	294	292	281	288	293	294	293	296	292	291	286	281	249	202	180	193	182	150	142	285.2	
17-Nov	143	123	135	148	150	160	179	194	196	204	213	215	262	264	231	235	190	193	270	287	287	306	314	321	238.1	
18-Nov	320	310	299	296	291	293	302	321	327	326	327	330	335	326	325	327	327	330	331	323	320	318	304	265	318.2	
19-Nov	142	3	96	26	336	357	347	22	32	352	303	291	344	310	348	357	344	348	347	351	27	17	143	0	354.0	
20-Nov	289	277	275	264	311	325	305	326	291	285	278	271	259	213	200	184	197	200	211	206	209	220	219	219	258.7	
21-Nov	235	247	266	280	280	278	284	277	266	265	270	266	265	268	268	248	242	243	251	279	283	288	285	280	272.0	
22-Nov	281	283	285	282	286	281	296	298	295	292	289	296	298	310	309	306	324	317	319	297	289	290	290	292	296.1	
23-Nov	296	294	282	274	284	272	277	283	306	266	299	338	344	347	2	43	41	71	71	23	18	17	8	8	319.3	
24-Nov	355	350	353	348	343	338	335	335	336	335	326	335	338	335	334	331	335	323	274	299	288	284	279	279	327.9	
25-Nov	271	265	222	223	203	195	206	213	272	271	280	274	286	308	295	279	283	291	292	289	293	303	301	285	281.9	
26-Nov	289	268	253	181	197	202	197	207	194	205	211	207	207	206	213	216	218	211	211	205	206	287	273	275	219.4	
27-Nov	281	284	290	286	280	272	272	272	281	292	292	295	312	297	305	319	321	309	294	296	288	262	285	280	293.1	
28-Nov	280	252	282	287	263	272	297	227	204	211	212	252	276	284	280	271	269	244	223	213	208	265	291	278	266.2	
29-Nov	282	292	292	300	289	296	299	299	293	297	286	284	287	280	284	251	268	262	220	229	279	283	266	282	287.1	
30-Nov	224	251	200	250	225	281	219	201	192	297	290	279	278	280	279	281	289	281	278	259	248	247	217	220	266.6	

273.2 271.7 271.5 276.0 274.2 276.7 280.6 280.7 280.9 277.7 273.6 277.9 283.3 282.4 278.7 270.7 271.0 263.2 257.8 265.1 263.7 270.4 270.2 273.6

Diurnal Average

AF - Analyzer Failure

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Statoil - Leismer - November 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 81 deg on Nov 15 00:00			Hours of Data:	719
Minimum Value: 7 deg on Nov 30 17:00			Hours of Missing Data:	1
			Hours of Calibration:	0
			Percent Operational Time:	99.9
Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 13 Median = 17 Q ₃ = 25 P ₉₀ = 34 P ₉₉ = 65				

Day	Hourly Period Ending At (MST)																								Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Nov	25	27	25	23	20	20	19	16	20	22	23	25	26	28	25	26	26	24	21	28	26	22	23	32	32																							
2-Nov	24	28	20	20	23	26	24	15	16	18	16	17	19	21	19	17	14	15	16	19	15	14	18	10	28																							
3-Nov	14	21	47	17	13	9	10	10	12	17	23	21	22	19	22	27	16	13	12	11	21	29	32	36	47																							
4-Nov	32	39	33	14	13	18	20	17	12	17	18	17	17	16	17	16	16	16	16	18	16	15	15	29	39																							
5-Nov	50	10	19	16	11	10	11	13	11	11	11	14	12	13	15	18	15	16	15	18	20	17	18	20	50																							
6-Nov	20	15	12	12	14	21	32	29	27	27	24	19	23	20	19	16	10	8	10	12	16	15	15	16	32																							
7-Nov	17	18	16	14	18	18	22	39	46	41	30	14	16	16	18	26	30	39	46	30	13	11	18	9	46																							
8-Nov	10	17	49	27	41	15	44	17	21	41	28	26	23	25	23	25	23	25	24	17	21	24	27	21	49																							
9-Nov	15	26	35	13	43	37	35	30	18	17	16	19	46	39	28	21	9	12	14	13	13	14	13	14	46																							
10-Nov	16	18	16	16	17	17	17	19	17	17	17	17	17	19	18	17	15	15	13	16	13	14	15	16	19																							
11-Nov	16	17	18	18	25	17	17	15	33	33	14	13	12	12	17	20	39	16	14	12	18	61	46	26	61																							
12-Nov	34	50	26	46	53	65	51	16	17	22	22	25	22	21	17	14	12	10	10	11	10	13	14	16	65																							
13-Nov	17	15	15	13	14	15	18	18	18	29	20	28	23	16	16	34	18	36	24	22	30	17	23	21	36																							
14-Nov	29	24	34	33	38	36	27	55	30	16	30	34	27	30	31	29	27	31	16	12	13	46	32	81	81																							
15-Nov	26	65	34	35	AF	32	31	20	21	21	24	25	24	26	24	21	20	22	20	21	19	19	18	24	65																							
16-Nov	67	9	9	12	11	12	11	11	12	11	11	12	13	13	11	12	14	38	14	16	17	13	18	10	67																							
17-Nov	11	13	18	11	31	12	16	16	14	14	19	20	30	28	26	30	21	54	42	11	10	15	14	13	54																							
18-Nov	14	13	12	11	11	11	13	11	10	11	11	11	13	14	12	13	11	11	10	16	22	66	41	56	66																							
19-Nov	23	53	79	45	21	15	29	17	27	70	79	30	20	29	16	17	23	8	8	12	45	12	53	54	79																							
20-Nov	17	13	30	27	17	12	16	16	14	13	20	25	33	23	19	11	14	14	18	16	14	22	17	20	33																							
21-Nov	33	34	29	14	16	15	10	14	28	24	21	21	26	25	25	30	29	29	30	15	10	10	10	12	34																							
22-Nov	12	11	11	12	10	14	11	11	10	11	12	12	14	15	14	15	14	14	16	12	11	10	11	13	16																							
23-Nov	11	12	11	18	14	15	13	10	24	61	24	14	12	12	15	27	19	57	51	27	12	15	15	14	61																							
24-Nov	15	14	16	13	12	12	10	12	11	10	10	12	13	17	13	10	10	19	14	23	17	15	15	15	23																							
25-Nov	25	34	35	26	9	18	29	16	72	24	12	14	16	19	15	8	8	10	13	10	13	11	11	11	72																							
26-Nov	8	41	58	20	18	14	16	14	12	15	19	19	15	16	16	15	18	16	17	18	47	54	27	34	58																							
27-Nov	29	15	10	10	13	16	16	15	15	12	13	11	17	13	16	12	12	15	16	11	11	24	12	10	29																							
28-Nov	10	44	22	9	32	19	28	33	28	54	52	40	16	11	13	23	20	25	24	10	28	38	13	20	54																							
29-Nov	10	10	9	17	12	9	9	12	16	10	11	11	13	17	24	24	26	29	24	26	53	10	36	34	53																							
30-Nov	34	42	13	35	41	28	36	12	41	10	8	13	12	11	13	11	7	11	11	23	24	21	13	14	42																							
Diurnal Maximum																								67	65	79	46	53	65	51	55	72	70	79	40	46	39	31	34	39	57	51	30	53	66	53	81	

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 24, 2015	Last Calibration	October 29, 2015
Station Name	Statoil - Leismer	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:12
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	2705	2708
Calculated slope	0.982763	0.992933	Chamber temp	50.1	50.1
Calculated intercept	1.852623	1.527899	Pressure	25.3	25.9
Analyzer Background	18.2	18.2	Flow	0.454	0.448
Analyzer Coefficient	1.052	1.052	Intensity	67	67

Analyzer make API T100 Analyzer serial # 721

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.7	----
as found span	5000	63.1	631.0	634.1	0.995
calibrator zero	5000	0.0	0.0	-0.7	----
high point	5000	63.1	631.0	634.1	0.995
second point	5000	31.6	316.0	317.1	0.997
third point	5000	15.8	158.0	156.2	1.012
as left zero	5000	0.0	0.0	-0.3	----
as left span	5000	63.1	631.0	631.8	0.999
Average Correction Factor					1.001

Corrected As found 634.8 Previous response 640.2 % change 0.9%

Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay



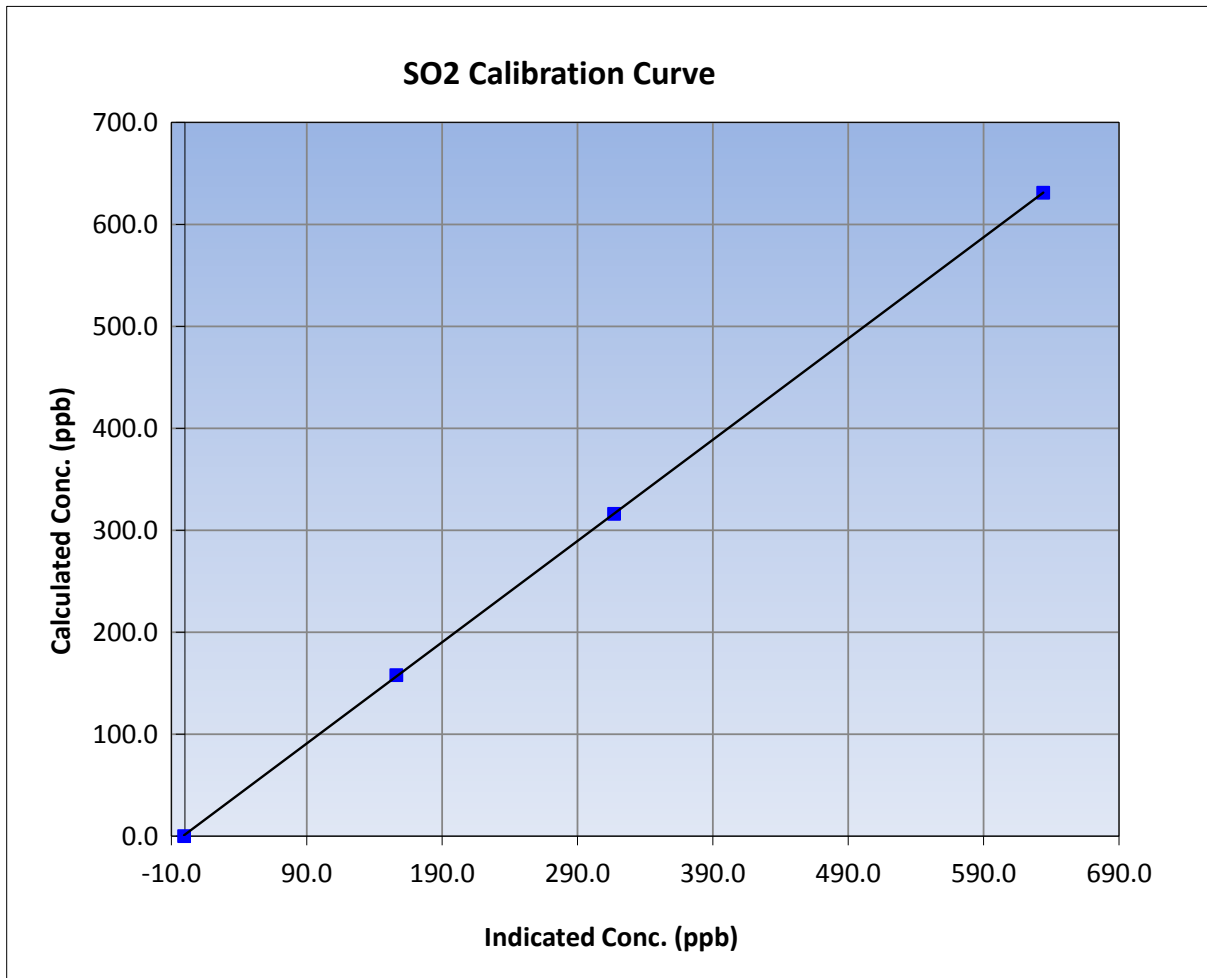
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 29, 2015
Station Name	Statoil - Leismer	Station Number	AMS 501
Start Time (MST)	8:40	End Time (MST)	12:12
Analyzer make	API T100	Analyzer serial #	721

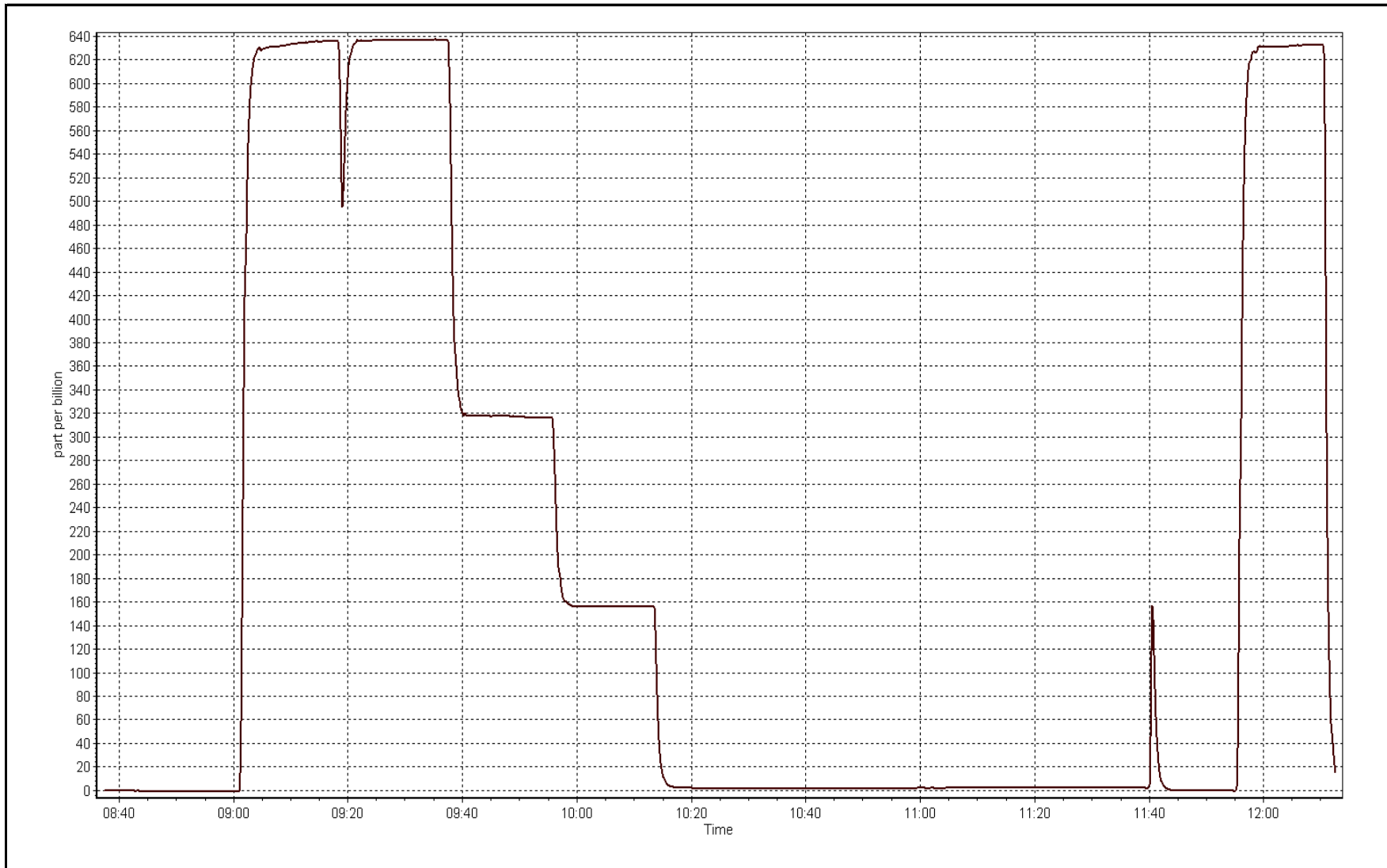
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	----	Correlation Coefficient	0.999987
631.0	634.1	0.9951		
316.0	317.1	0.9965	Slope	0.992933
158.0	156.2	1.0115		
			Intercept	1.527899



SO2 Calibration Plot

Date: November 24, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 24, 2015	Last Calibration	October 11, 2015
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	12:10	End Time (MST)	15:00
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	512	512
Analyzer IP address	192.168.1.75		Lamp voltage	1676	1623
Calculated slope	0.997378	1.000578	Chamber temp	50	50
Calculated intercept	0.061414	-0.279868	Pressure	22.6	22.8
Analyzer Background	19.4	19.4	Flow	0.542	0.553
Analyzer Coefficient	1.007	1.037	Intensity	41	40
			Converter temp.	317	316

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	na	Converter serial #	na

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	78.6	80.0	78.5	1.019
SO2 scrubber check	5000	15.8	158.0	4.4	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.6	80.0	80.1	0.999
second point	5000	39.3	40.0	40.5	0.988
third point	5000	24.6	25.0	25.4	0.986
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.6	80.0	79.8	1.003
Average Correction Factor					0.991

Corrected As found	78.4	Previous response	80.2	% change	2.2%
--------------------	------	-------------------	------	----------	------

Notes:

Span adjusted, filter changed out, no maintenance done

Calibration Performed By: Melissa Lemay



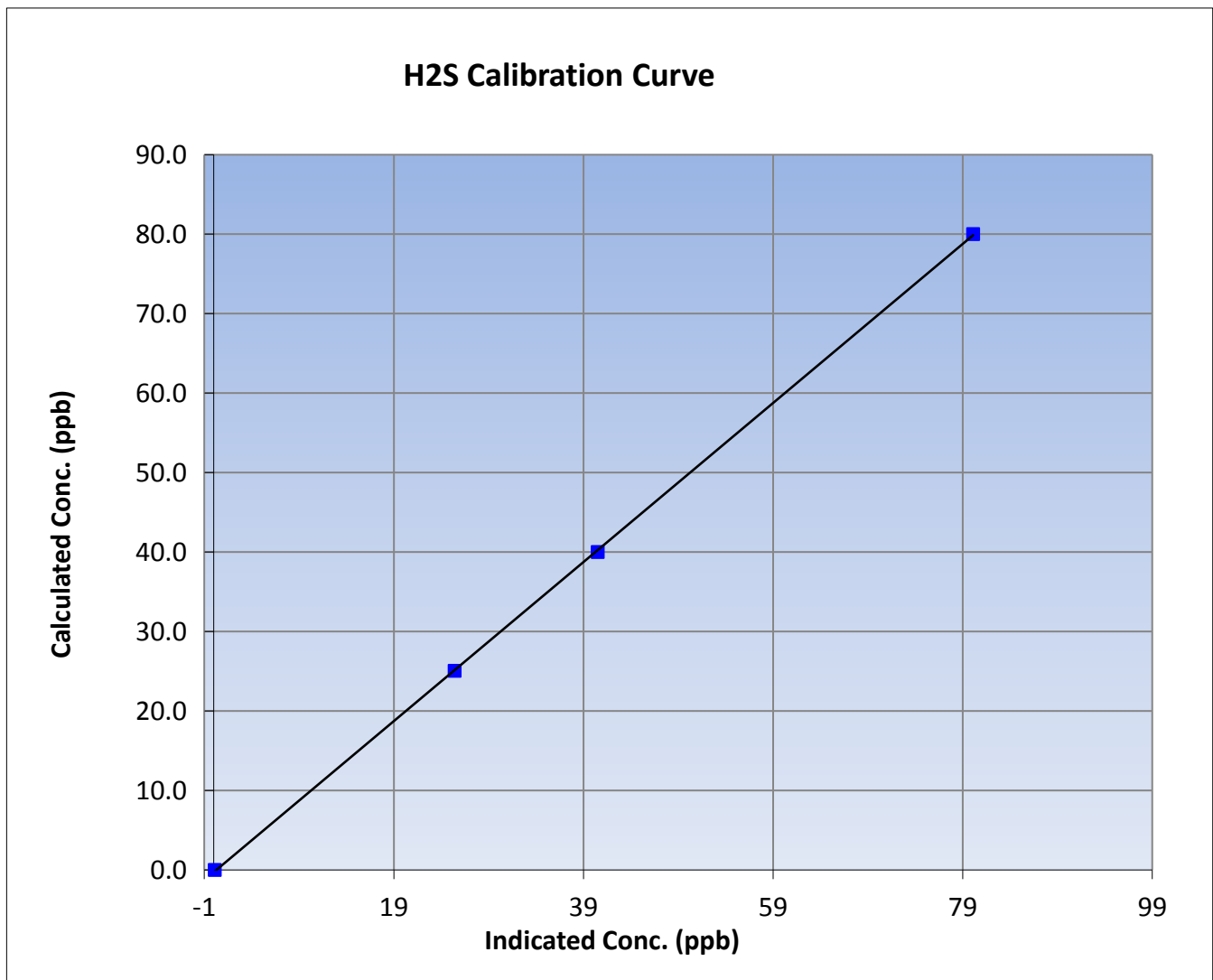
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 11, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	12:10	End Time (MST)	15:00
Analyzer make	API T101	Analyzer serial #	157

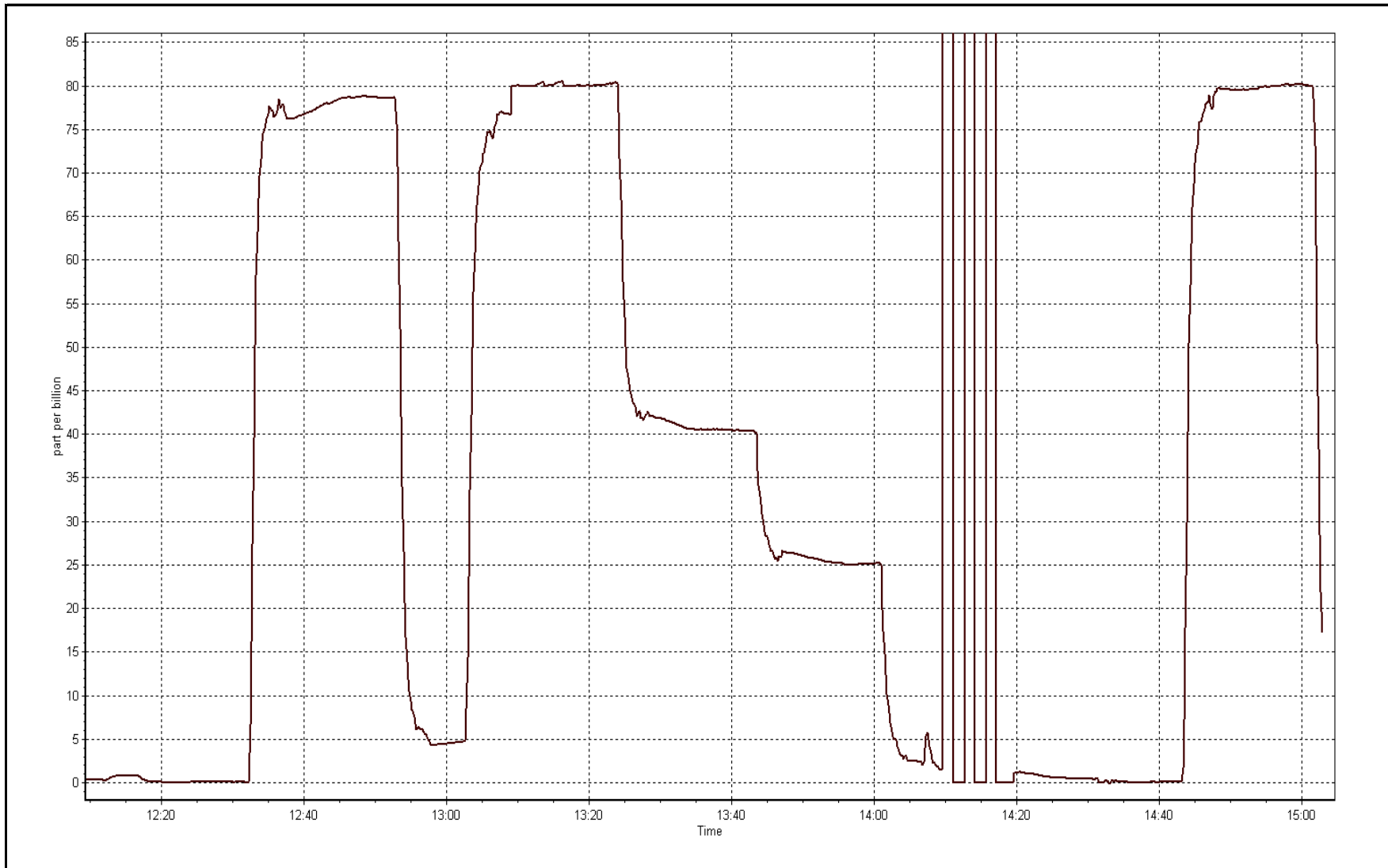
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999965
80.0	80.1	0.9989		
40.0	40.5	0.9878	Slope	1.000578
25.0	25.4	0.9859		
			Intercept	-0.279868



H2S Calibration Plot

Date: November 24, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 29, 2015
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:12
NO Cal Gas Conc	47.5 ppm	Gas Cert Reference	S990374A
NOx Cal Gas Conc	47.5 ppm	Cal Gas Expiry Date	26-Sep-17
Calibrator	Sabio 4010	Serial Number	11581008
Zero air Generator	Teledyne API T701	Serial Number	4522

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2579
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997211	0.997517	0.997773
	Data Offset	1.310325	1.357355	-1.758631
Current Calibration	Data Slope	0.997944	0.995818	1.010237
	Data Offset	1.450140	1.508190	-0.762311

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1118148498
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.870		0.852	
NOx coefficient	0.998		0.996	
NO2 coefficient	1.000		1.000	
NO bkgnd	4.5		4.4	
NOx bkgnd	4.7		4.5	
Chamber Temp	49.8	Deg C	50	Deg C
Moly Temp	327.1	Deg C	322.6	Deg C
PMT voltage	-756.3	V	-756.3	V
PMT Temp	-2.8	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	181.3	mmHg	183.7	mmHg
R Cell Press Nox	181.3	mmHg	183.7	mmHg
NO sample flow	0.704	lpm	0.723	lpm
Nox sample Flow	0.704	lpm	0.724	lpm

Notes:

Span adjusted, filter changed out, no maintenance done, As left span 5% out, diagnostics similar to before calibrations



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: November 24, 2015 Station Number: AMS 501

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.4	-0.1	----	----
as found span	5000	63.1	599.5	599.5	0.0	614.3	613.8	0.6	0.9758	0.9766
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.4	-0.1	----	----
high point	5000	63.1	599.5	599.5	0.0	599.6	600.9	-1.4	0.9997	0.9976
second point	5000	31.6	300.2	300.2	0.0	299.2	299.7	-0.6	1.0033	1.0017
third point	5000	15.8	150.1	150.1	0.0	147.8	147.9	-0.1	1.0156	1.0149
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
as left span	5000	63.1	599.5	287.1	312.4	613.5	302.2	311.3	0.9771	0.9500
Average Correction Factor									1.0062	1.0047

Corrected As found NO_x= 614.8 NO= 614.2 Percent Change NO_x= -2.4% NO= -2.4%
 Previous Response NO_x= 599.8 NO= 599.6

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)	----	287.1	315.0	599.2	287.1	312.1	0.9879	1.0000	1.0093	99.1%
2nd NO2 (200)	----	406.6	195.5	600.8	406.6	194.2	0.9853	1.0000	1.0067	99.3%
3rd NO2 (100)	----	489.1	113.0	603.0	489.1	114.0	0.9817	1.0000	0.9912	100.9%
4th NO2 (0)	602.1	----	-2.1	600.0	602.1	-2.2	0.9866	1.0000	N/A	----
Average Correction Factor							0.9854	1.0000	1.0024	99.8%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

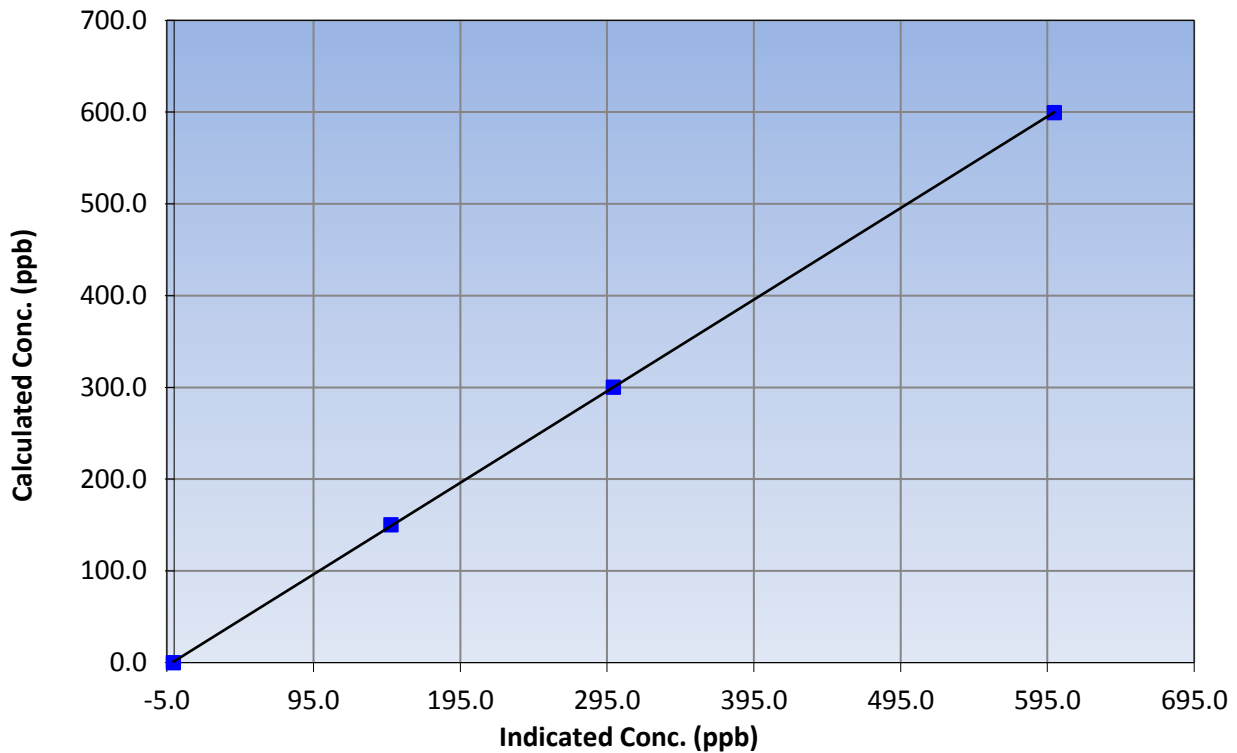
Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 29, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:40	End Time (MST)	12:12
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999988
599.5	599.6	0.9997		
300.2	299.2	1.0033	Slope	0.997944
150.1	147.8	1.0156		
			Intercept	1.450140

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

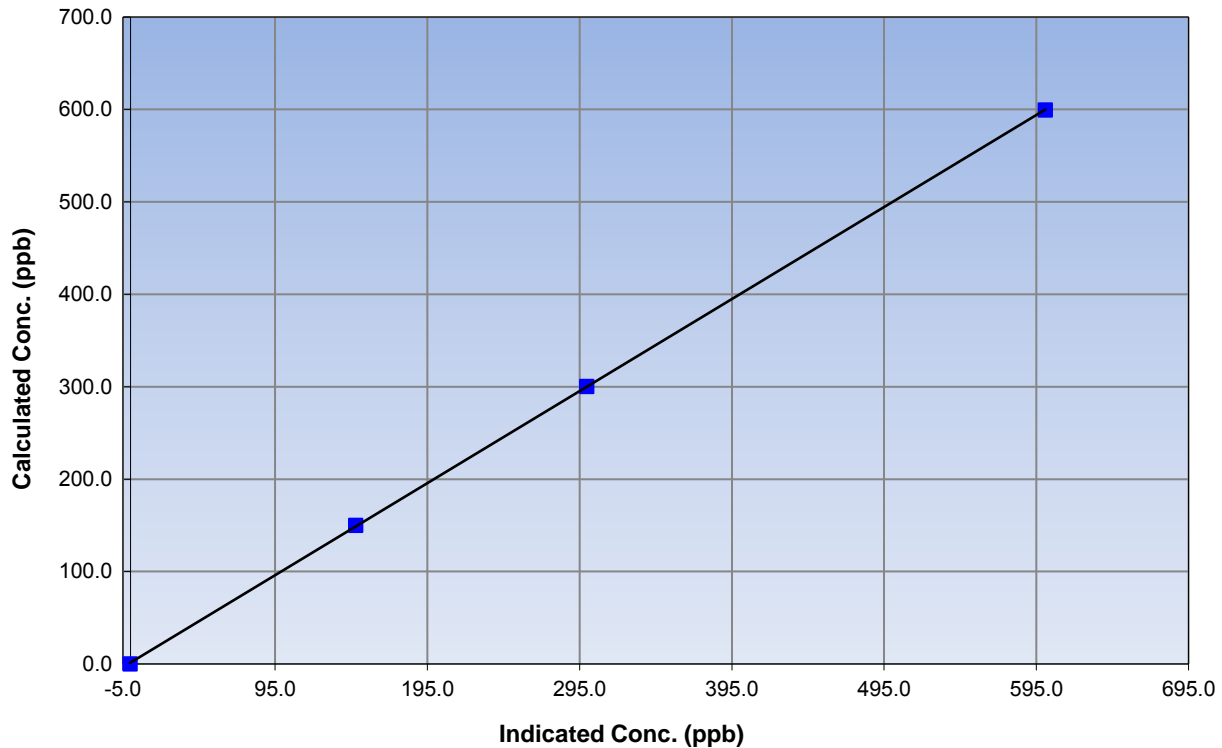
Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 29, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:40	End Time (MST)	12:12
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	-0.4	N/A	Correlation Coefficient	0.999984
599.5	600.9	0.9976		
300.2	299.7	1.0017	Slope	0.995818
150.1	147.9	1.0149		
			Intercept	1.508190

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

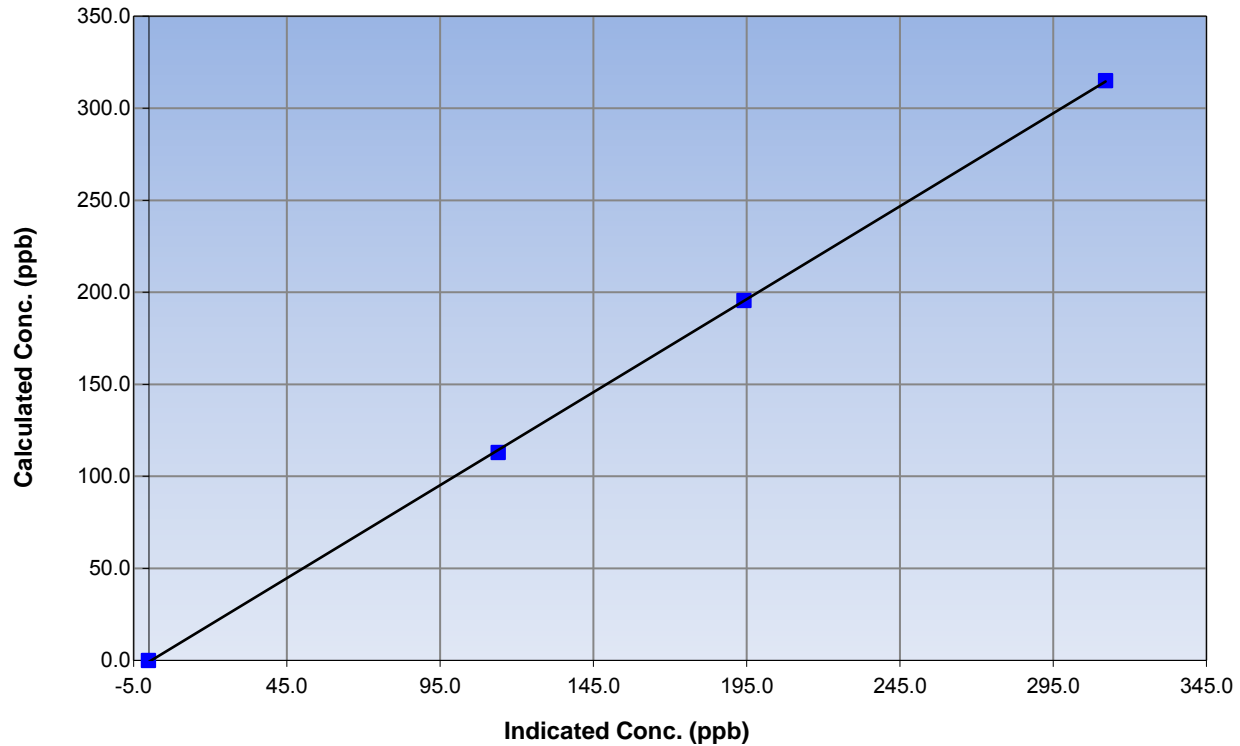
Station Information

Calibration Date	November 24, 2015	Previous Calibration	October 29, 2015
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	8:40	End Time (MST)	12:12
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

Calibration Information

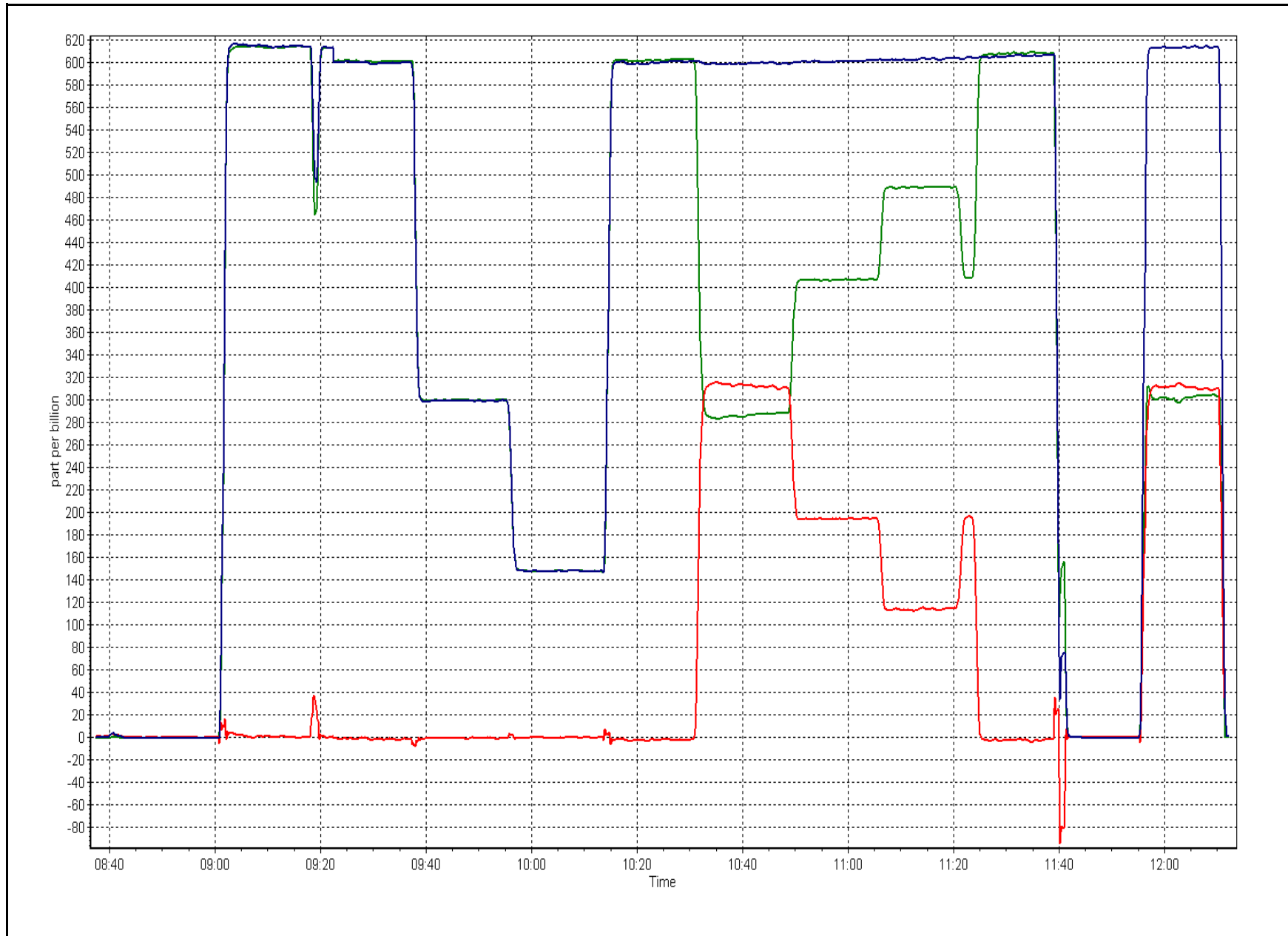
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999945
315.0	312.1	1.0093		
195.5	194.2	1.0067	Slope	1.010237
113.0	114.0	0.9912		
			Intercept	-0.762311

NO₂ Calibration Curve



NOX Calibration Plot

Date: November 24, 2015





This page intentionally left blank



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
NOVEMBER 2015**

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

December 22, 2015



This page intentionally left blank

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 NOVEMBER 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	686	34	34	100.00	14	0	6	0
H2S (ppb) Average	686	34	34	100.00	3	0	1	0
NO2 (ppb) Average	686	34	34	100.00	18	0	5	-
NO (ppb) Average	686	34	34	100.00	23	-	9	-
NOX (ppb) Average	686	34	34	100.00	35	-	15	-
Temperature 2 m (C) Average	720	0	0	100.00	9.2	-	4.5	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	94	-
Wind Speed 10 m (km/h) Average	700	0	20	97.22	37	-	27	-
Wind Direction 10 m (deg) Average	700	0	20	97.22	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 NOVEMBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	686	0.9	2	-	0	0	0	0	1	2	14
H2S (ppb) Average	686	0.2	0	-	0	0	0	0	0	0	3
NO2 (ppb) Average	686	2.1	2	-	0	1	1	1	3	5	18
NO (ppb) Average	686	1.1	3	-	0	0	0	0	1	3	23
NOX (ppb) Average	686	3.2	4	-	0	1	1	2	3	7	35
Temperature 2 m (C) Average	720	-2.89	5.2	-	-17.3	-11.7	-5.4	-1.6	0.5	2.5	9.2
Relative Humidity (%) Average	720	72.9	20	-	17	36	63	80	87	92	99
Wind Speed 10 m (km/h) Average	700	15.6	7	-	0	7	10	15	20	27	37
Wind Direction 10 m (deg) Average	700	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
NOVEMBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	01 Nov 2015 01:00	01 Nov 2015 01:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	01 Nov 2015 04:00	01 Nov 2015 11:00	8	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	02 Nov 2015 03:00	02 Nov 2015 11:00	9	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	05 Nov 2015 15:00	05 Nov 2015 16:00	2	Maintenance - replaced wind speed sensor



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 14 ppb on Nov 18 10:00	Maximum Daily Average: 5.7 ppb on Nov 18		Hours of Data:	686
Minimum Value: 0 ppb on Nov 20 11:00	Minimum Daily Average: 0.1 ppb on Nov 3		Hours of Missing Data:	34
Maximum Diurnal Average: 1.3 ppb at hour 12	Minimum Diurnal Average: 0.5 ppb at hour 4		Hours of Calibration:	34
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 = 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-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Nov	Z	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-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3	1	0	1	0	0	0	0.5	3
5-Nov	0	0	1	Z	2	2	3	5	3	3	4	6	3	2	2	4	3	3	5	6	3	3	3	3	3.0	6
6-Nov	2	2	1	1	Z	0	0	0	0	0	0	0	C	C	C	C	1	2	1	2	1	1	1	1	0.8	2
7-Nov	1	1	1	1	0	Z	0	1	0	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1
8-Nov	Z	1	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
9-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Nov	0	0	Z	0	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
11-Nov	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	2	1	1	0.7	3
13-Nov	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Nov	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
15-Nov	0	Z	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
17-Nov	0	0	1	Z	2	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	2	2	0.7	2
18-Nov	0	1	1	0	Z	1	6	10	11	14	13	11	11	10	9	5	4	7	6	4	4	2	2	1	5.7	14
19-Nov	0	0	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	5	6	1.0	6
20-Nov	Z	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	4	2	1	1	1	1	1	1	0	0	0	0	0	0.6	4
23-Nov	0	1	0	Z	1	0	0	0	0	0	0	0	1	2	2	3	4	2	2	3	1	1	2	1	1.2	4
24-Nov	2	1	2	1	Z	4	4	6	4	4	8	7	4	5	3	1	1	2	1	3	2	1	0	0	2.9	8
25-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	0.5	1
26-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
27-Nov	1	Z	1	1	1	0	0	0	0	1	2	3	8	5	3	0	0	0	0	0	0	2	0	0	1.4	8
28-Nov	0	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
29-Nov	1	1	1	Z	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	0.6	1
30-Nov	1	2	2	1	Z	1	1	1	1	1	0	0	1	1	1	1	1	1	3	2	0	0	3	1	1.0	3

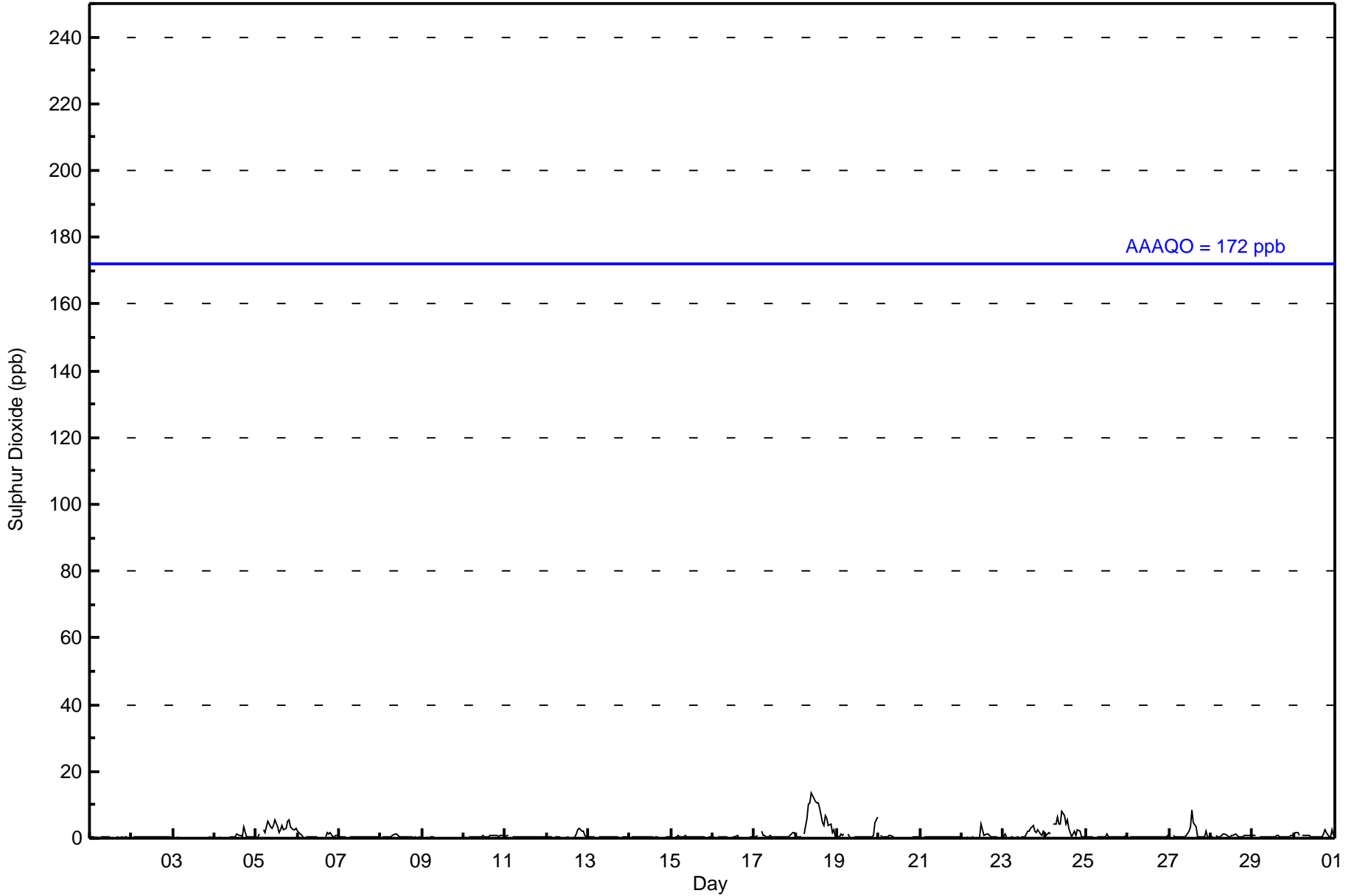
0.5	0.6	0.6	0.5	0.6	0.6	0.9	1.1	1.0	1.0	1.2	1.3	1.2	1.3	1.1	0.9	0.7	1.0	0.9	0.9	0.8	0.7	0.8	0.8	Diurnal Average
2	2	2	1	2	4	6	10	11	14	13	11	11	10	9	5	4	7	6	6	4	3	5	6	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	681	99.27	99.27
11 - 20	5	0.73	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	20	13	11	11	11	4	20	7	48	59	54	135	123	103	29	14	662
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	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	13	11	11	11	4	20	7	48	59	54	135	123	103	34	14	667

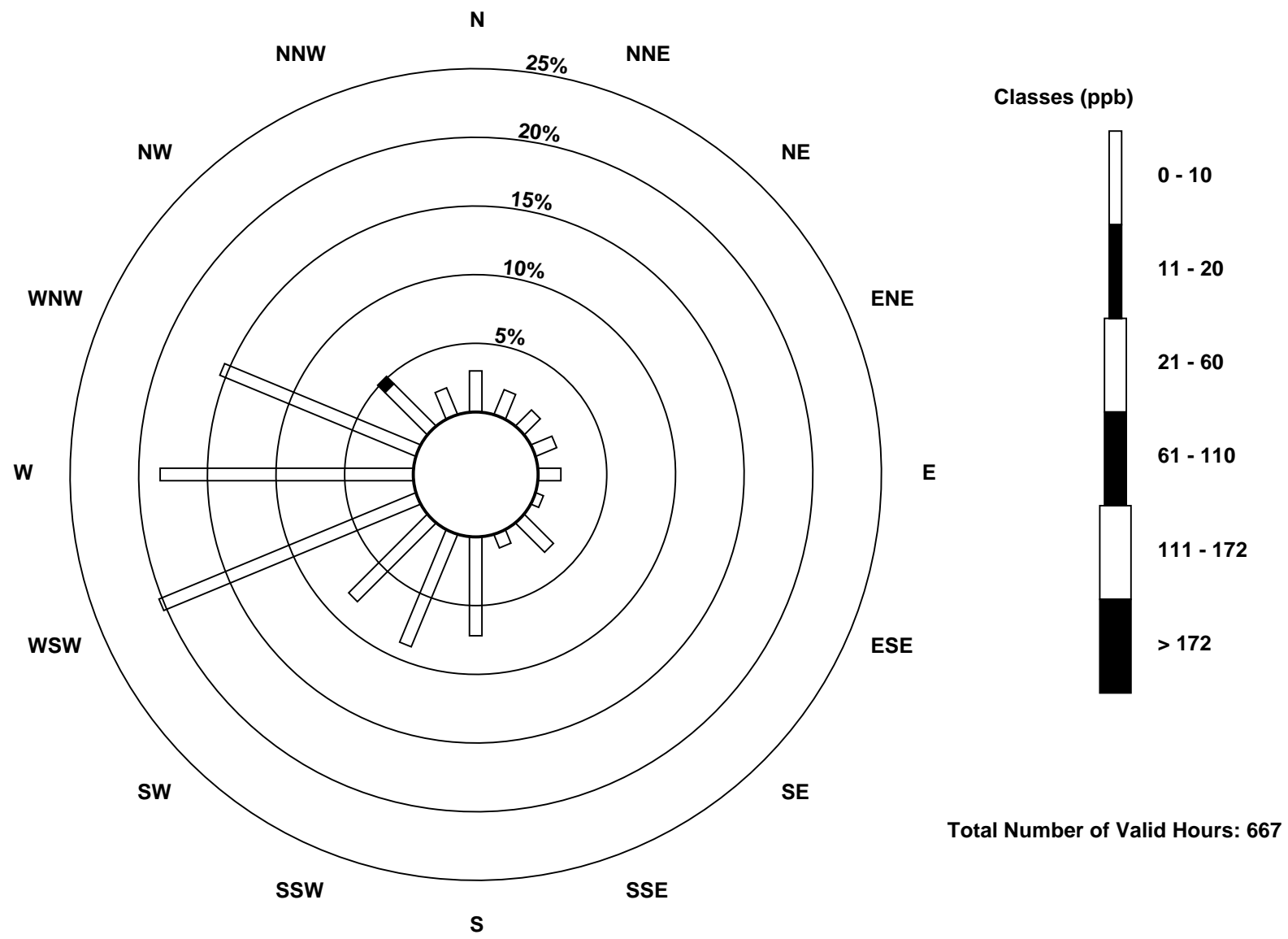
Total Number of Valid Hours: 667

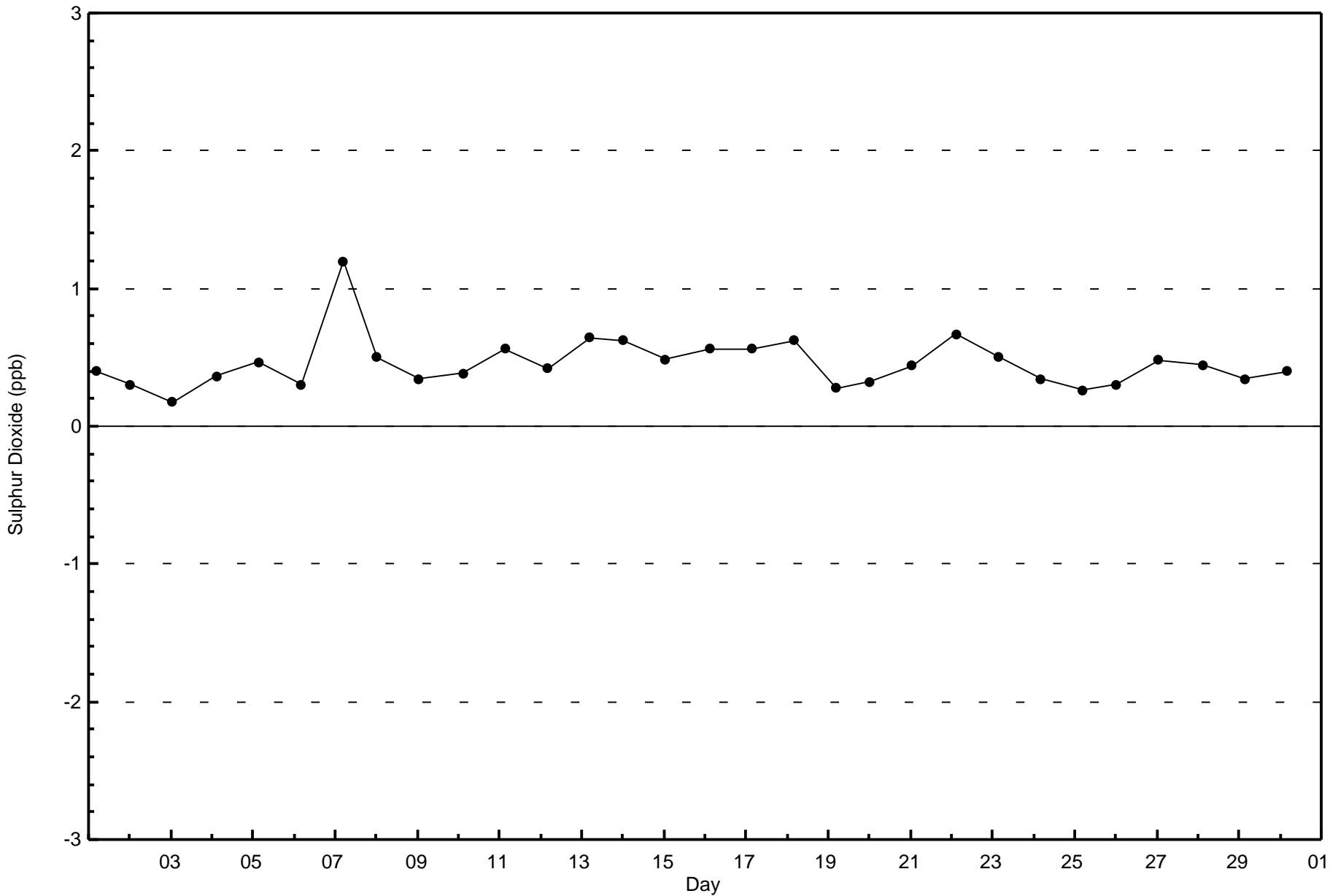
Total Number of Hours: 720

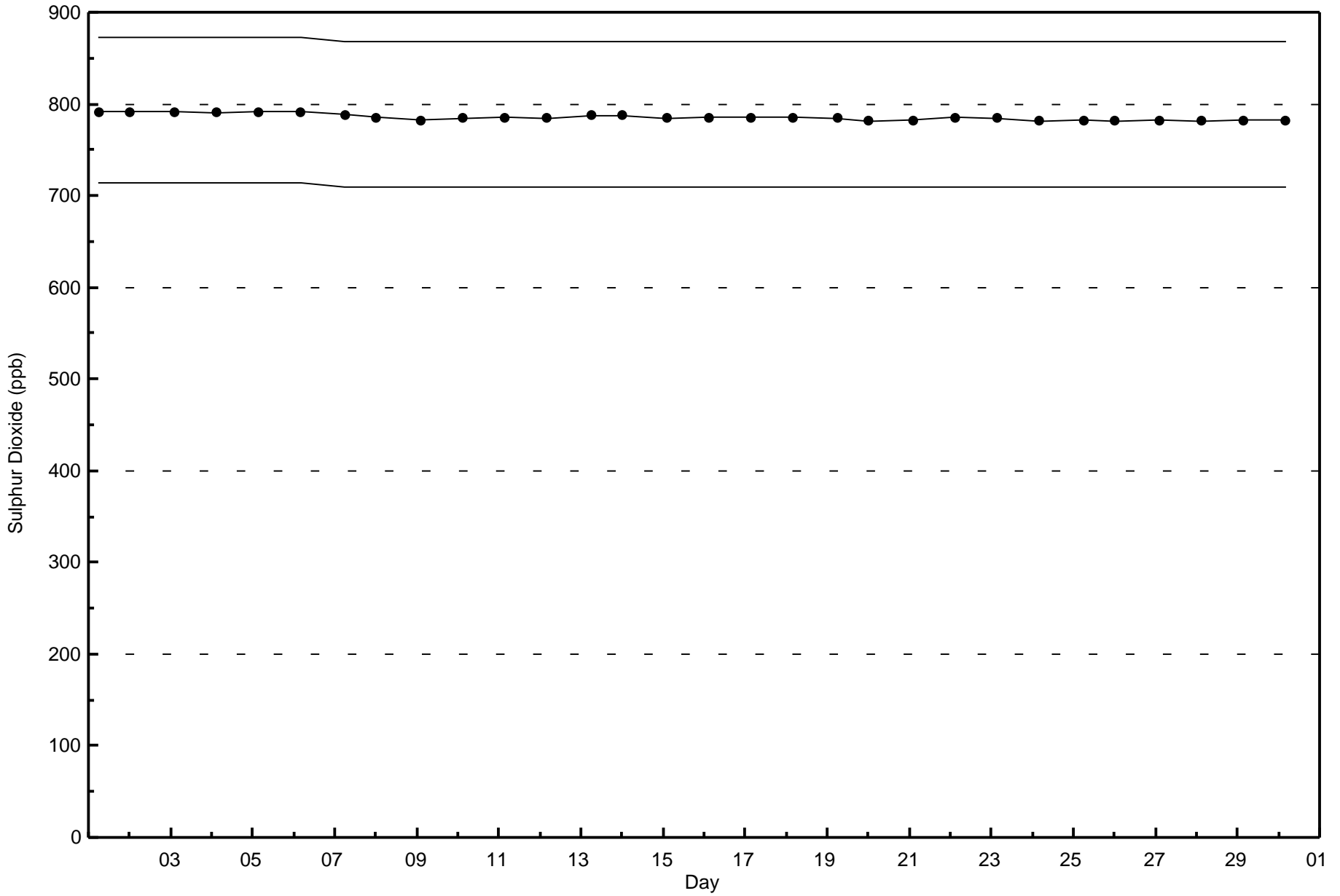


Wood Buffalo Environmental Association
Wind Rose Nov 2015

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)







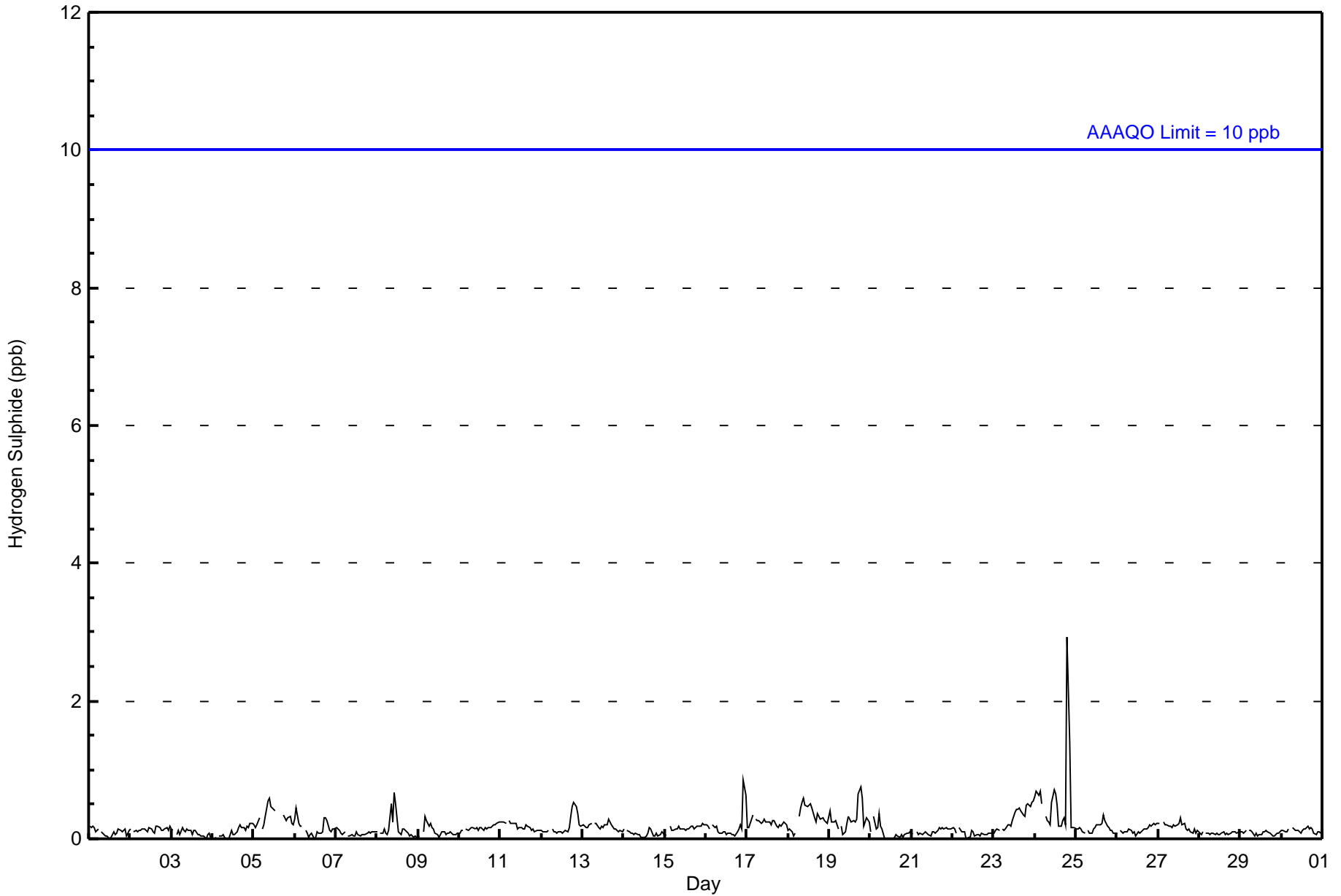


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3 ppb on Nov 24 20:00	Maximum Daily Average: 0.5 ppb on Nov 24		Hours of Data:	686
Minimum Value: 0 ppb on Nov 3 21:00	Minimum Daily Average: 0.1 ppb on Nov 14		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 20	Minimum Diurnal Average: 0.1 ppb at hour 15		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P 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-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Nov	0	0	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
5-Nov	0	0	0	0	Z	0	0	0	1	1	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.3	1
6-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Nov	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	0.2	1
9-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Nov	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	0.2	1
13-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Nov	0	Z	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
15-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
17-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Nov	0	0	0	0	0	Z	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1
20-Nov	0	Z	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
21-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0.3	1
24-Nov	1	1	1	1	1	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	3	1	0	0	0	0	0.5	3
25-Nov	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Nov	0	Z	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
27-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Nov	0	0	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
29-Nov	0	0	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
30-Nov	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	Diurnal Average	
1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	1	1	3	1	0	1	1	Diurnal Maximum		

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	685	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	20	14	11	12	10	4	21	7	47	63	55	131	127	101	33	12	668
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	14	11	12	10	4	21	7	47	63	55	131	127	102	33	12	669

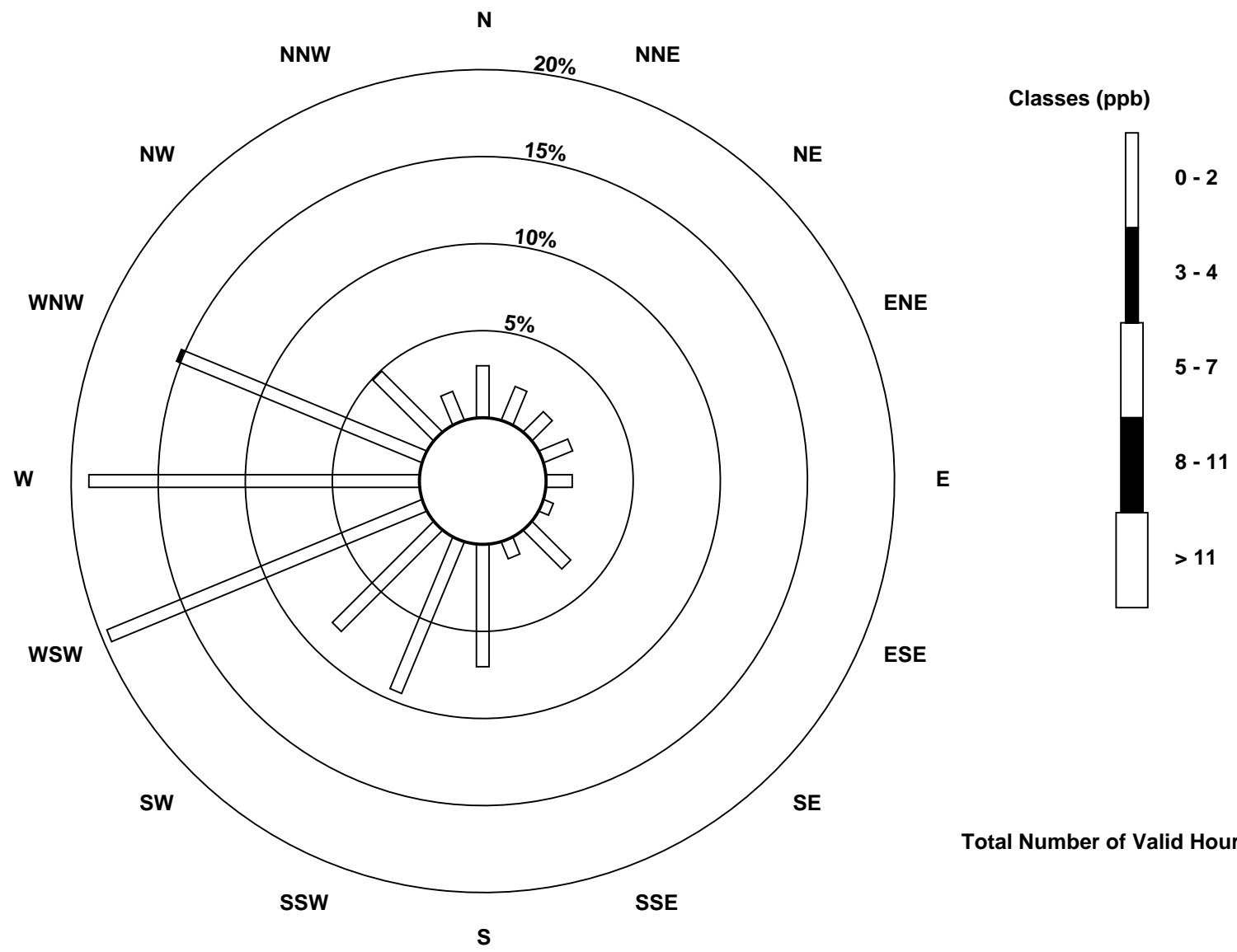
Total Number of Valid Hours: 669

Total Number of Hours: 720

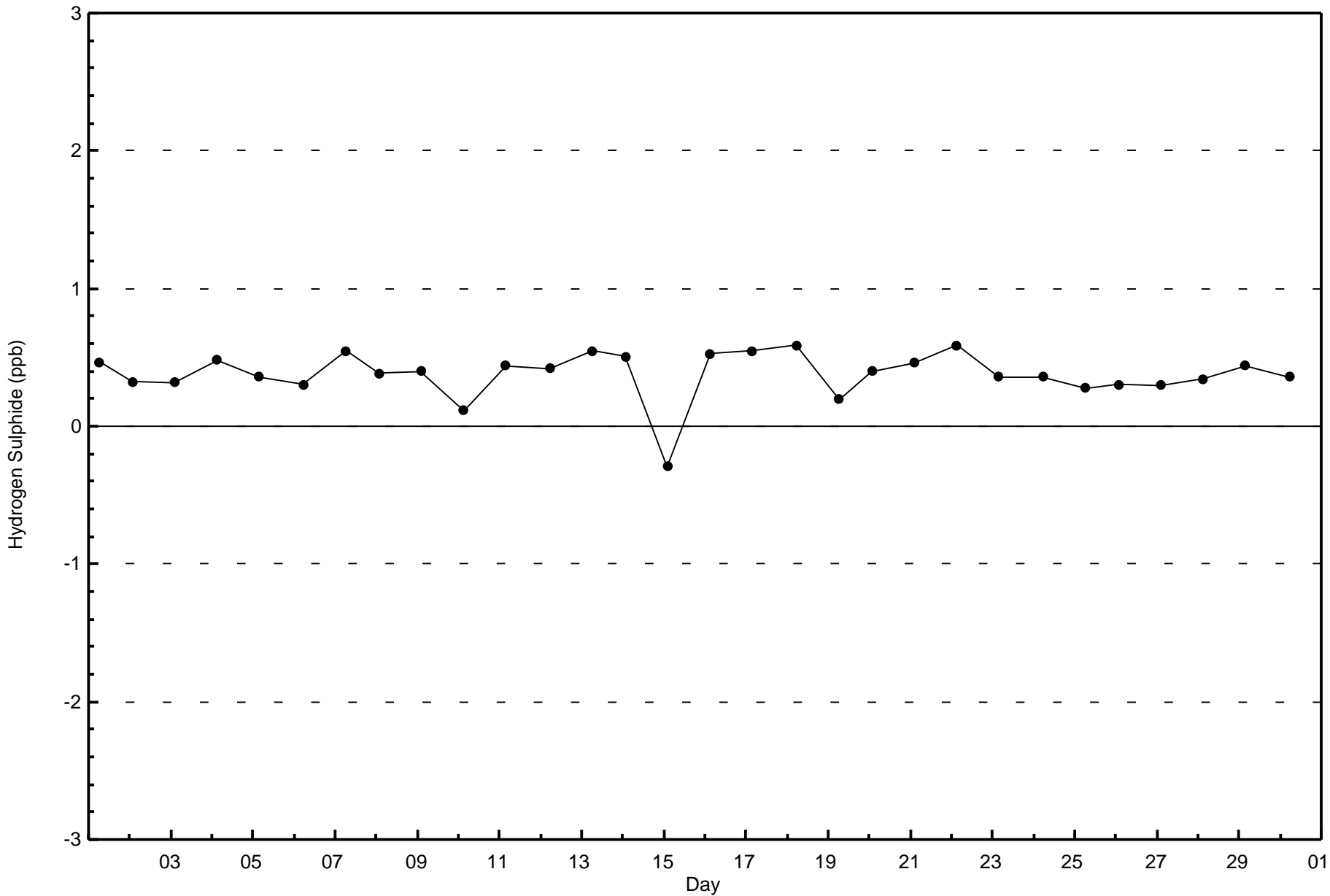


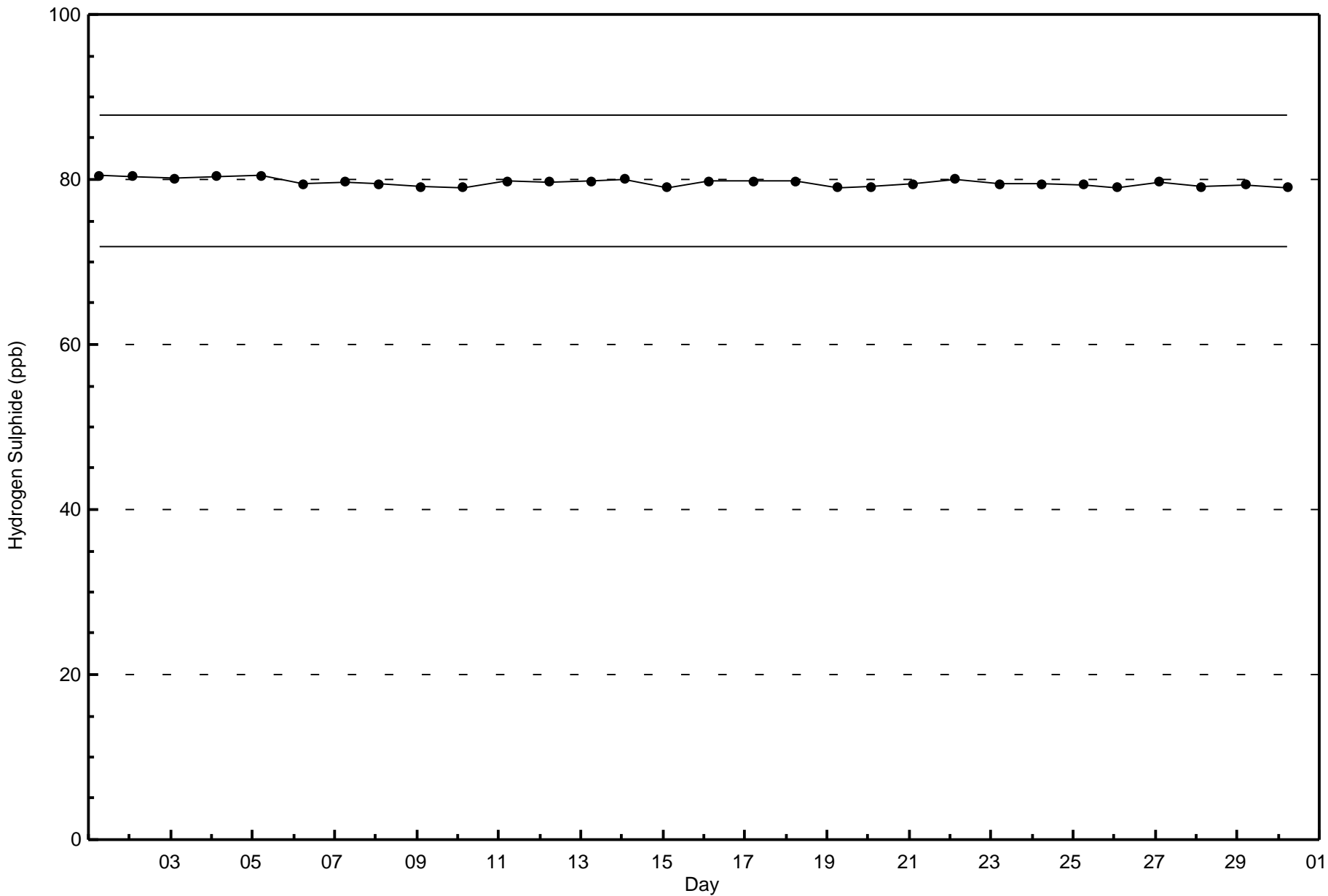
Wood Buffalo Environmental Association
Wind Rose Nov 2015

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 669





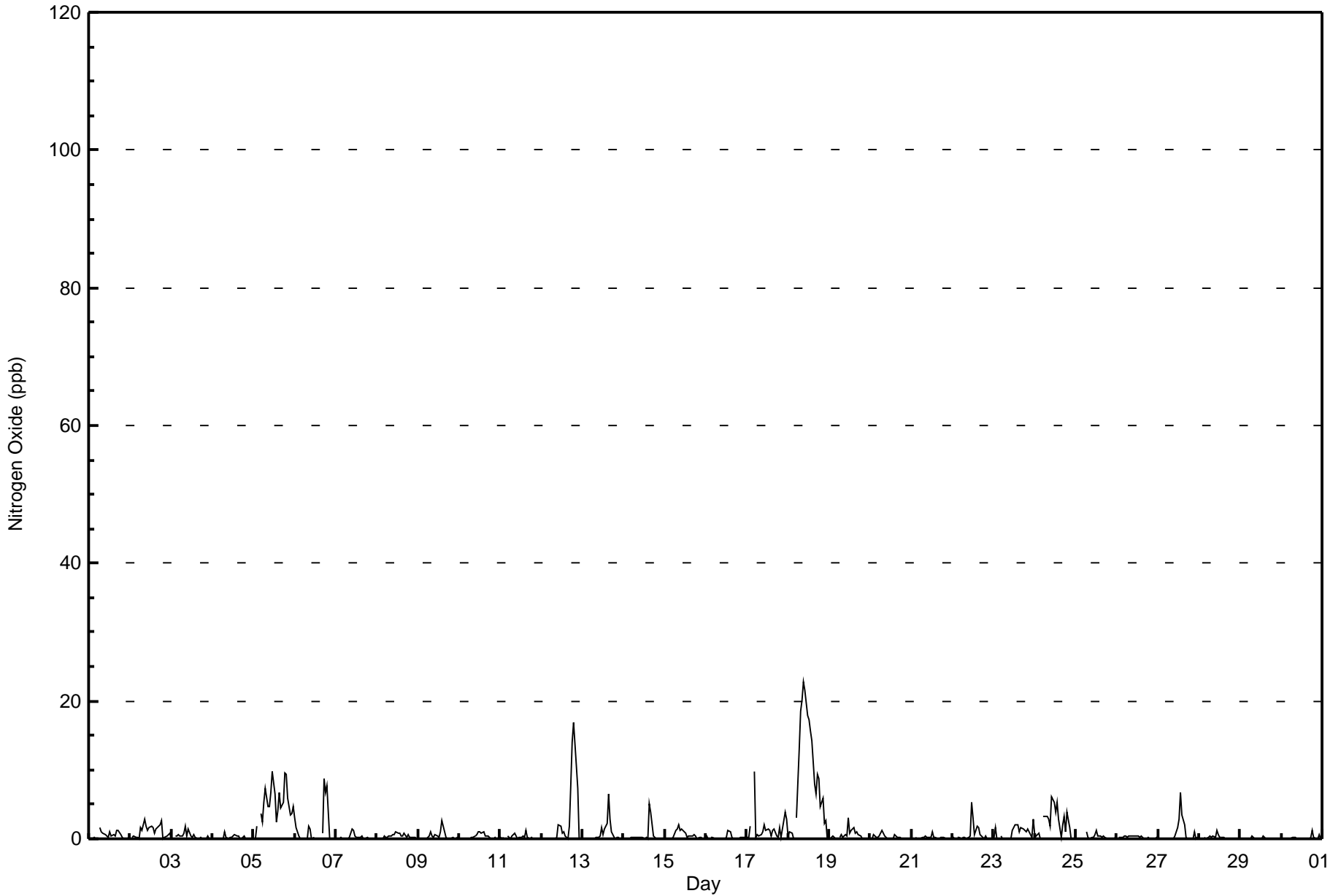


Maximum Value: 23 ppb on Nov 18 10:00																		Maximum Daily Average: 9.3 ppb on Nov 18						Hours in Service: 720		
Minimum Value: 0 ppb on Nov 3 17:00																		Minimum Daily Average: 0.0 ppb on Nov 29						Hours of Data: 686		
Maximum Diurnal Average: 1.9 ppb at hour 12																		Minimum Diurnal Average: 0.1 ppb at hour 4						Hours of Missing Data: 34		
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 = 17						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-Nov	0	0	0	0	0	Z	2	1	1	1	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0.5	2
2-Nov	Z	0	0	0	0	0	2	1	3	2	1	2	2	2	1	1	2	2	3	0	0	0	1	1	1.1	3
3-Nov	0	Z	0	0	1	0	0	1	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	2
4-Nov	0	0	Z	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Nov	0	0	2	Z	4	2	5	7	5	5	7	10	6	2	4	7	5	5	10	9	6	3	4	5	4.9	10
6-Nov	3	2	0	0	Z	0	0	0	2	1	0	0	C	C	C	C	1	9	7	8	0	0	0	0	1.7	9
7-Nov	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Nov	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0	1	0	0	0	0	0	0.4	1
9-Nov	0	Z	0	0	0	0	0	1	0	0	1	0	0	1	3	1	0	0	0	0	0	0	0	0	0.4	3
10-Nov	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
11-Nov	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
12-Nov	0	0	0	0	Z	0	0	0	0	0	2	2	1	1	0	0	2	8	14	17	11	7	0	0	2.8	17
13-Nov	0	0	0	0	0	Z	0	0	0	0	0	2	1	1	2	6	3	1	0	0	0	0	0	0	0.8	6
14-Nov	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0.5	5
15-Nov	0	Z	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0.6	2
16-Nov	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1
17-Nov	0	0	2	Z	10	0	1	0	1	1	2	1	1	1	0	1	1	0	0	2	0	3	4	3	1.5	10
18-Nov	1	1	1	0	Z	3	13	19	20	23	22	18	17	16	14	8	7	9	9	5	6	2	3	0	9.3	23
19-Nov	0	0	0	0	0	Z	0	1	0	1	0	3	1	1	2	1	1	1	0	0	0	0	0	0	0.5	3
20-Nov	Z	0	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
21-Nov	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1
22-Nov	0	0	Z	0	0	0	0	0	0	0	0	5	3	1	2	2	1	0	0	0	0	0	0	0	0.7	5
23-Nov	0	2	0	Z	0	0	0	0	0	0	0	1	2	2	2	1	2	1	1	1	1	1	0	3	0.9	3
24-Nov	1	0	1	0	Z	3	3	3	3	2	6	5	4	5	3	0	2	3	1	4	2	0	0	0	2.2	6
25-Nov	0	0	0	0	0	Z	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Nov	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
27-Nov	0	Z	0	0	0	0	0	0	0	0	2	3	7	3	2	0	0	0	0	0	0	1	0	0	0.8	7
28-Nov	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
29-Nov	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Nov	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0.1	1
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	684	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	13	11	11	11	4	20	7	48	59	54	135	123	103	32	14	665
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	20	13	11	11	11	4	20	7	48	59	54	135	123	103	34	14	667

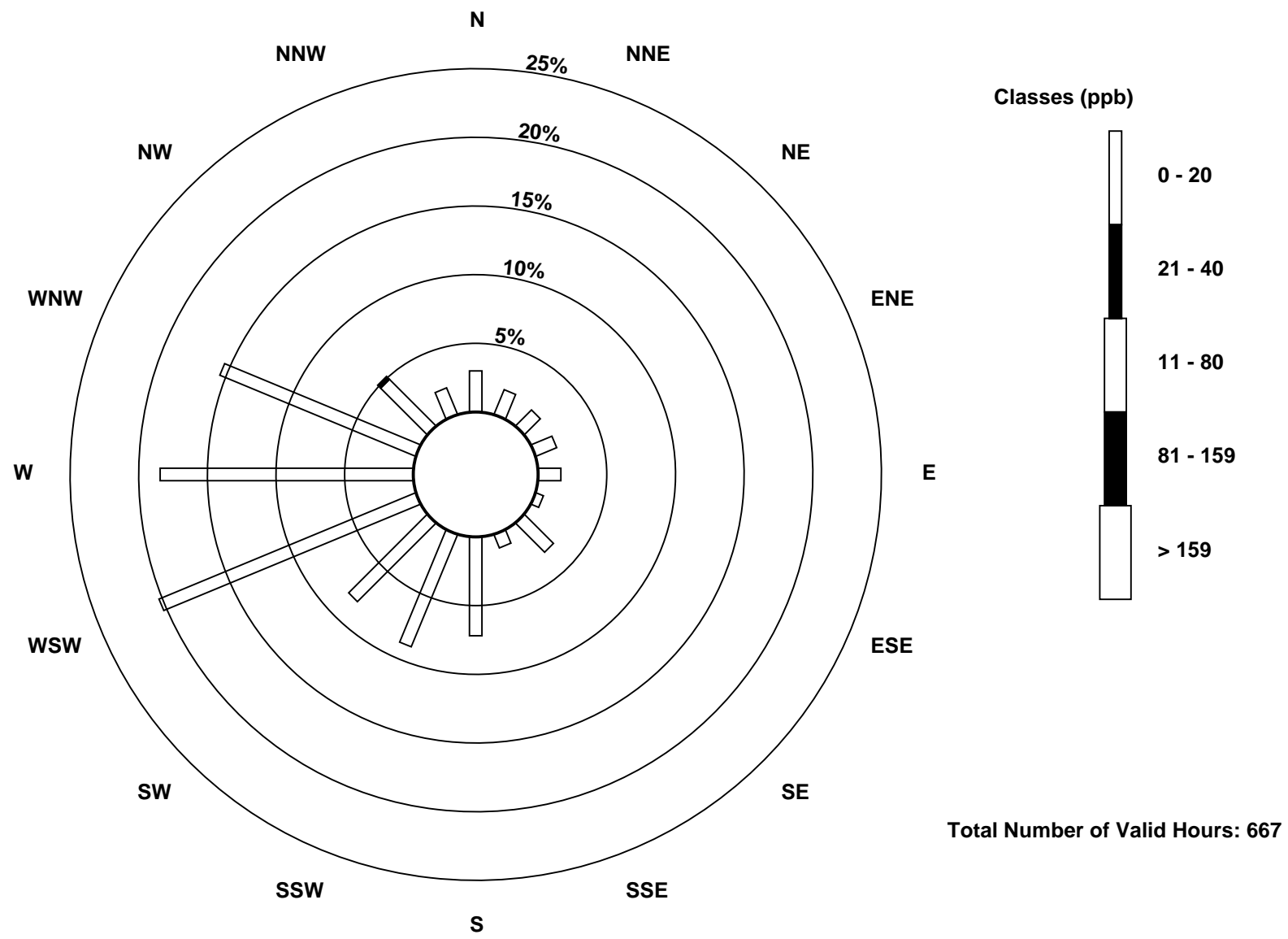
Total Number of Valid Hours: 667

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)

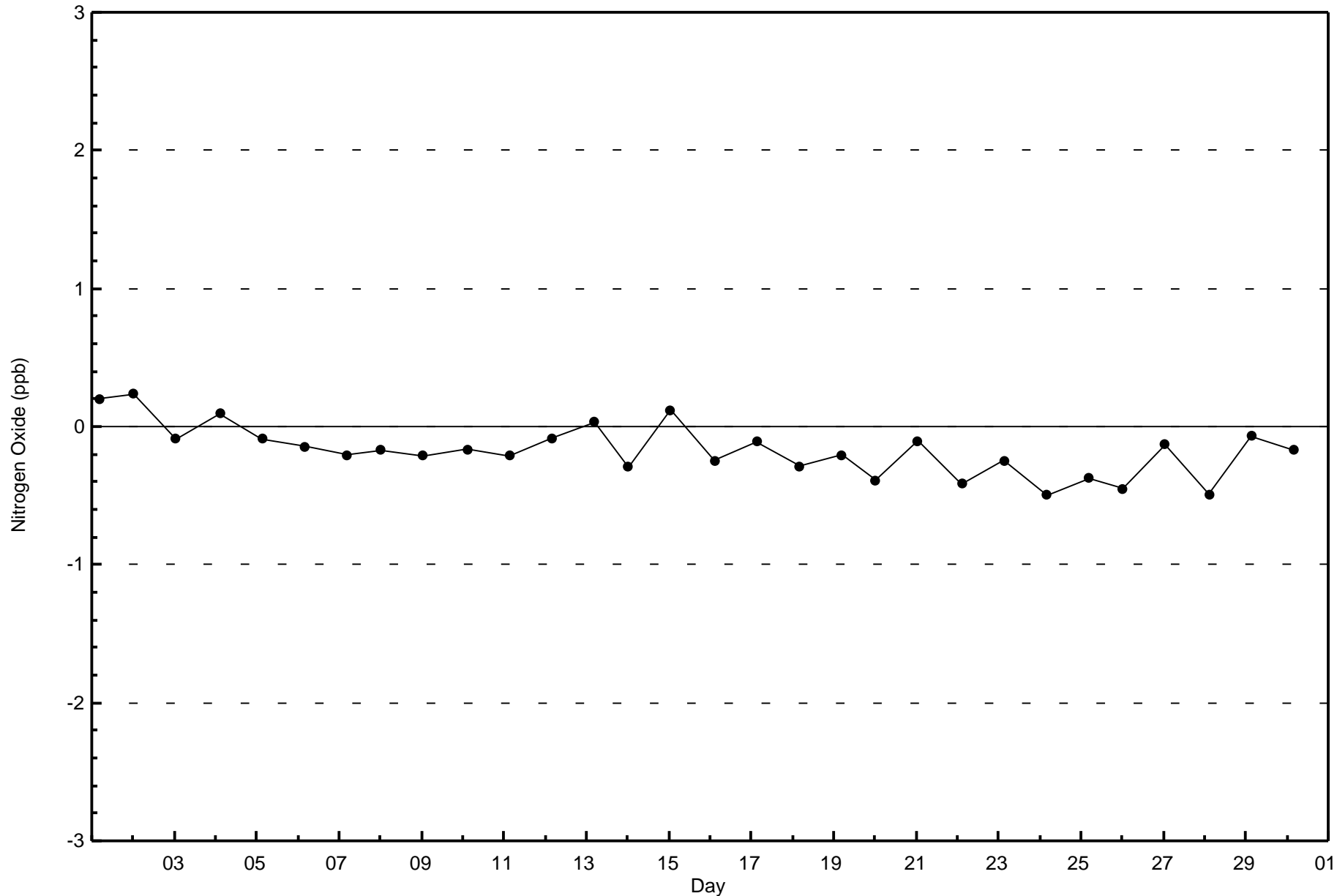


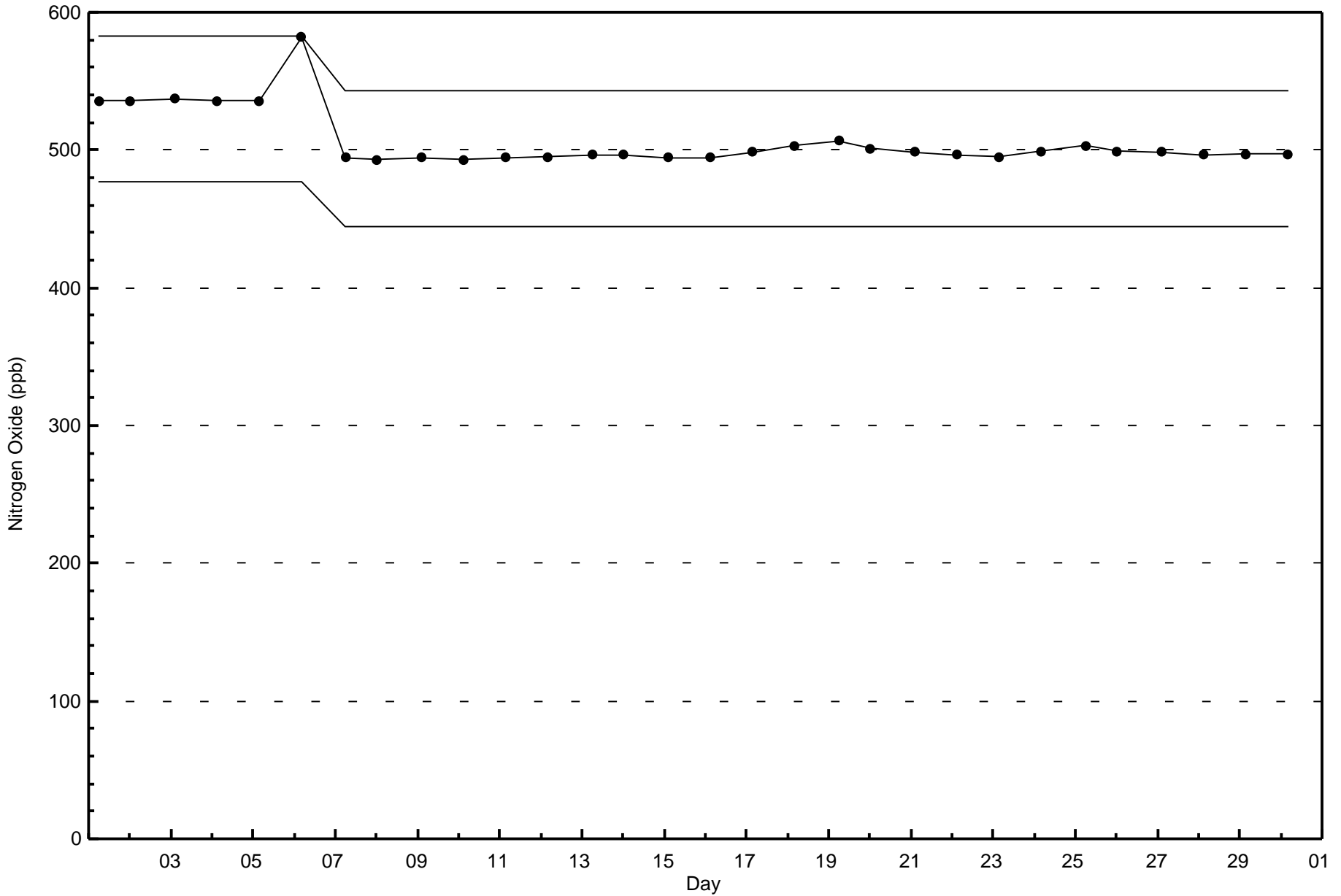


Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - November 2015







Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 18 ppb on Nov 12 20:00	Maximum Daily Average: 5.3 ppb on Nov 18
Minimum Value: 0 ppb on Nov 2 00:00	Hours of Data: 686
Maximum Diurnal Average: 2.9 ppb at hour 18	Hours of Missing Data: 34
Monthly Average: 2.1 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.8 ppb on Nov 22	Percent Operational Time: 100.0
Minimum Diurnal Average: 1.2 ppb at hour 4	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 10	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	1	2	1	1	1	Z	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	0	0	0.9	2
2-Nov	Z	0	1	1	0	1	2	2	1	1	1	2	1	1	2	1	3	4	2	0	0	0	0	1	1.2	4
3-Nov	0	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	3	3	2	1.3	3
4-Nov	2	1	Z	2	1	1	1	3	1	1	1	1	2	4	5	5	4	3	3	3	4	4	4	3	2.5	5
5-Nov	2	1	2	Z	2	3	4	5	6	4	5	5	4	4	4	4	3	3	4	5	5	4	3	4	3.7	6
6-Nov	3	2	1	1	Z	1	1	1	2	2	1	1	C	C	C	C	2	11	9	9	2	2	2	2	2.8	11
7-Nov	2	2	2	2	2	Z	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2
8-Nov	Z	1	1	1	2	1	1	3	3	4	4	5	3	3	2	2	2	1	1	1	0	0	0	0	1.8	5
9-Nov	0	Z	0	0	1	1	1	2	2	2	1	1	1	1	2	1	1	1	2	1	2	2	2	2	1.2	2
10-Nov	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	3	3	4	3	3	3	3	3	3	3	2.3	4
11-Nov	3	3	3	Z	3	2	2	3	3	3	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1.7	3
12-Nov	1	1	1	1	Z	1	1	1	1	1	2	2	2	2	1	1	5	11	16	18	14	11	3	3	4.2	18
13-Nov	2	2	2	2	2	Z	2	2	2	2	2	3	2	2	3	7	4	2	1	1	1	1	1	1	2.0	7
14-Nov	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	1	1	1	1	1	3	1	1.1	4
15-Nov	2	Z	2	2	5	5	5	5	5	5	3	3	2	2	1	2	2	1	1	1	1	2	1	1	2.3	5
16-Nov	2	1	Z	1	1	1	2	1	1	0	0	1	1	1	1	1	0	0	1	1	2	1	2	2	1.1	2
17-Nov	2	2	5	Z	11	4	5	4	4	4	3	3	2	2	1	1	3	1	1	2	1	2	2	1	2.9	11
18-Nov	1	1	1	1	Z	2	6	8	10	10	10	11	11	10	7	4	5	7	5	4	4	2	2	1	5.3	11
19-Nov	1	1	2	2	3	Z	2	1	1	1	1	4	2	3	5	3	5	5	4	2	1	2	6	7	2.7	7
20-Nov	Z	2	2	1	2	3	5	4	1	1	1	1	1	0	1	2	2	1	1	1	1	1	1	1	1.5	5
21-Nov	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
22-Nov	0	1	Z	0	0	0	0	0	1	1	1	4	2	1	2	2	1	1	0	1	0	0	0	0	0.8	4
23-Nov	1	2	1	Z	1	1	1	1	1	1	1	2	5	6	6	7	8	7	8	9	8	6	8	7	4.2	9
24-Nov	5	6	6	4	Z	7	6	8	7	6	9	6	5	6	3	2	3	2	3	2	3	2	0	0	4.2	9
25-Nov	0	1	1	1	1	Z	2	1	2	2	2	2	2	1	2	2	2	3	2	2	1	1	1	1	1.5	3
26-Nov	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	2	2	2	2	2	1.4	3
27-Nov	2	Z	2	2	1	1	1	1	1	1	2	3	3	5	4	3	2	3	2	1	1	3	1	1	2.0	5
28-Nov	1	1	Z	2	1	1	2	2	2	2	4	2	2	2	2	2	1	1	1	2	2	2	2	2	1.6	4
29-Nov	2	2	1	Z	1	1	1	1	1	1	1	1	1	4	3	3	2	2	1	1	1	1	1	1	1.5	4
30-Nov	1	3	3	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	5	4	4	1	1	5	2	1.8	5

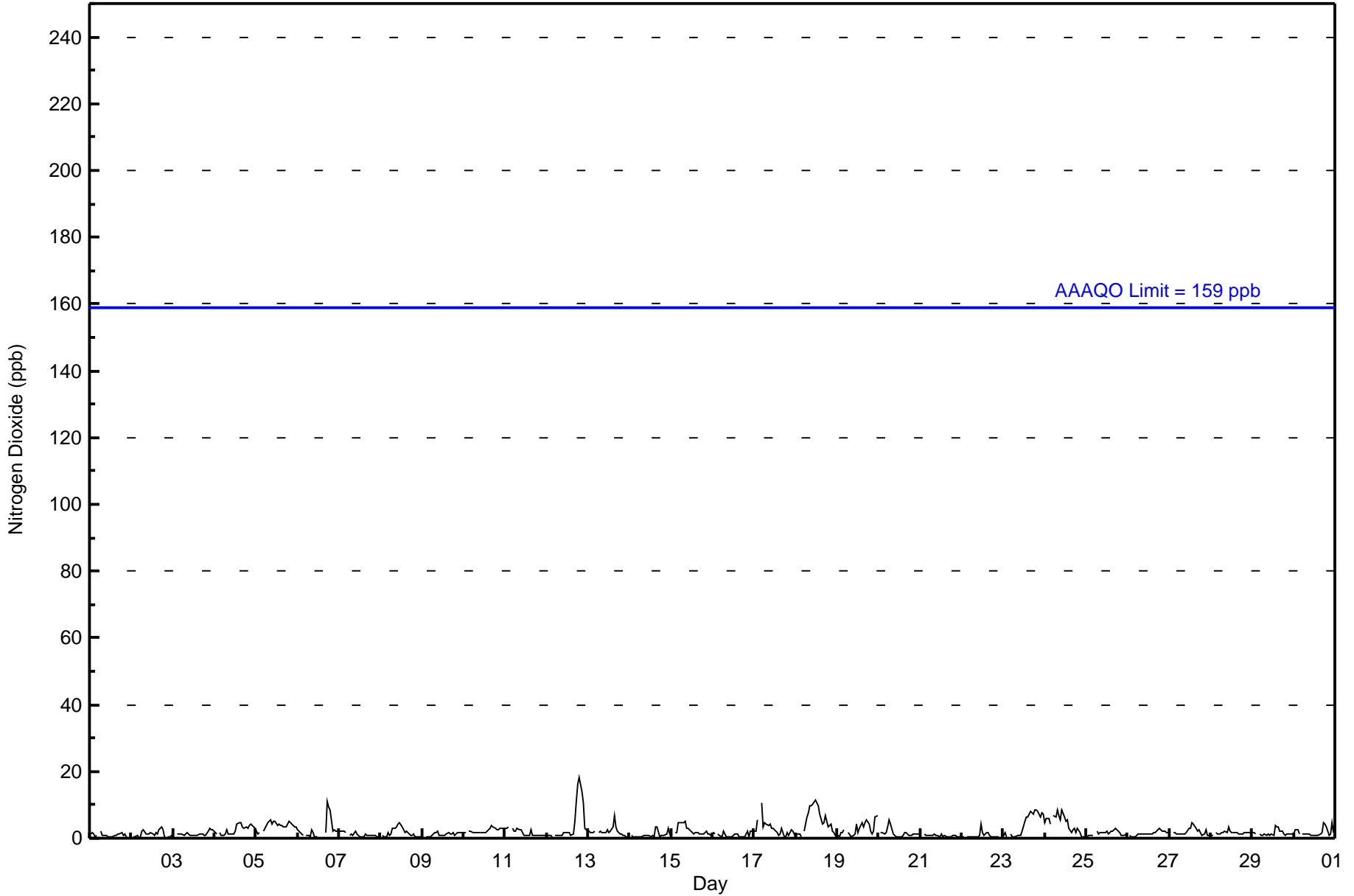
1.5	1.6	1.7	1.2	1.8	1.7	2.1	2.2	2.2	2.1	2.1	2.3	2.0	2.3	2.2	2.4	2.4	2.9	2.8	2.7	2.2	2.0	2.0	1.7	Diurnal Average
5	6	6	4	11	7	6	8	10	10	10	11	11	10	7	7	8	11	16	18	14	11	8	7	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	686	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	13	11	11	11	4	20	7	48	59	54	135	123	103	34	14	667
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	20	13	11	11	11	4	20	7	48	59	54	135	123	103	34	14	667

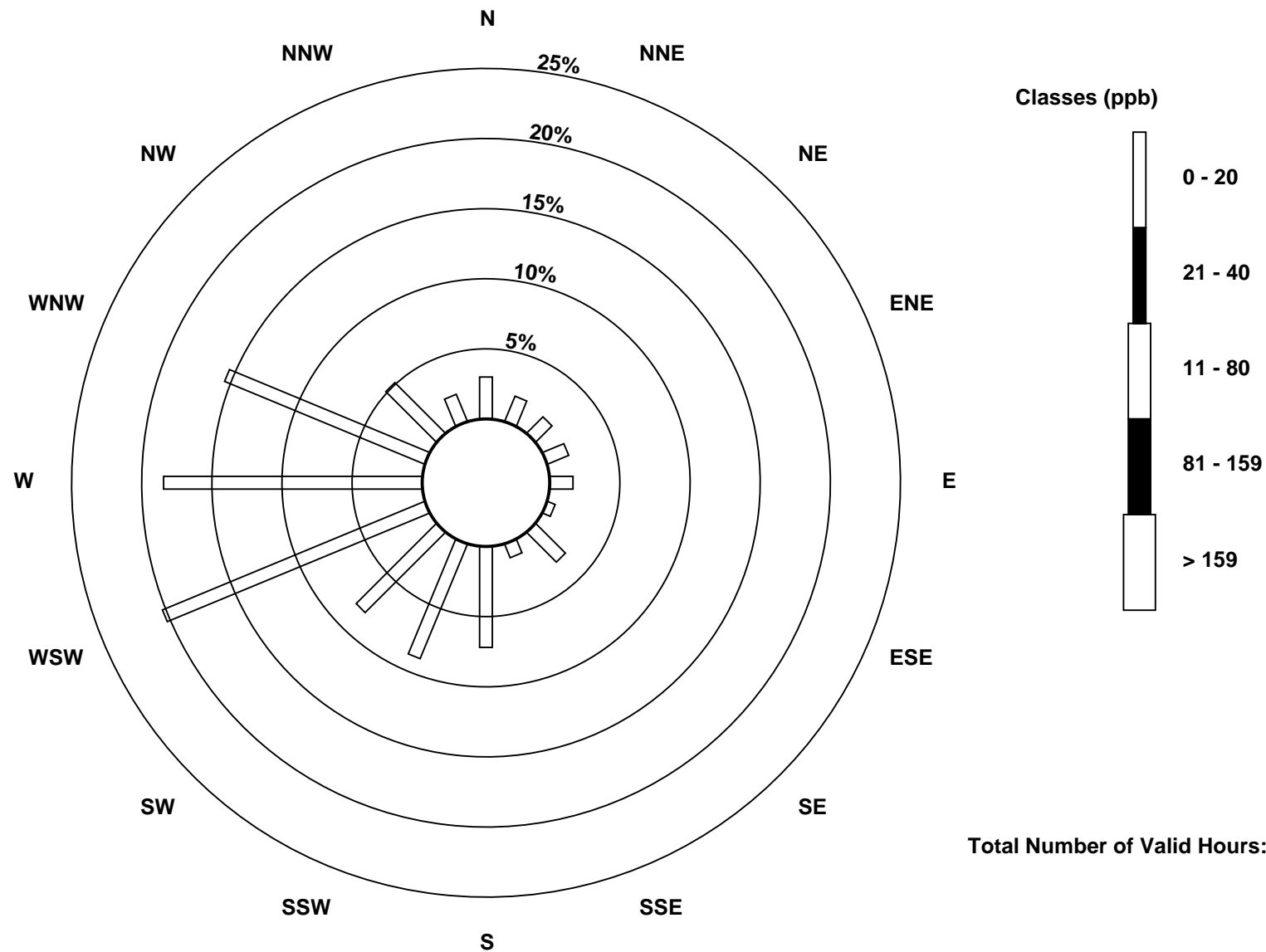
Total Number of Valid Hours: 667

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

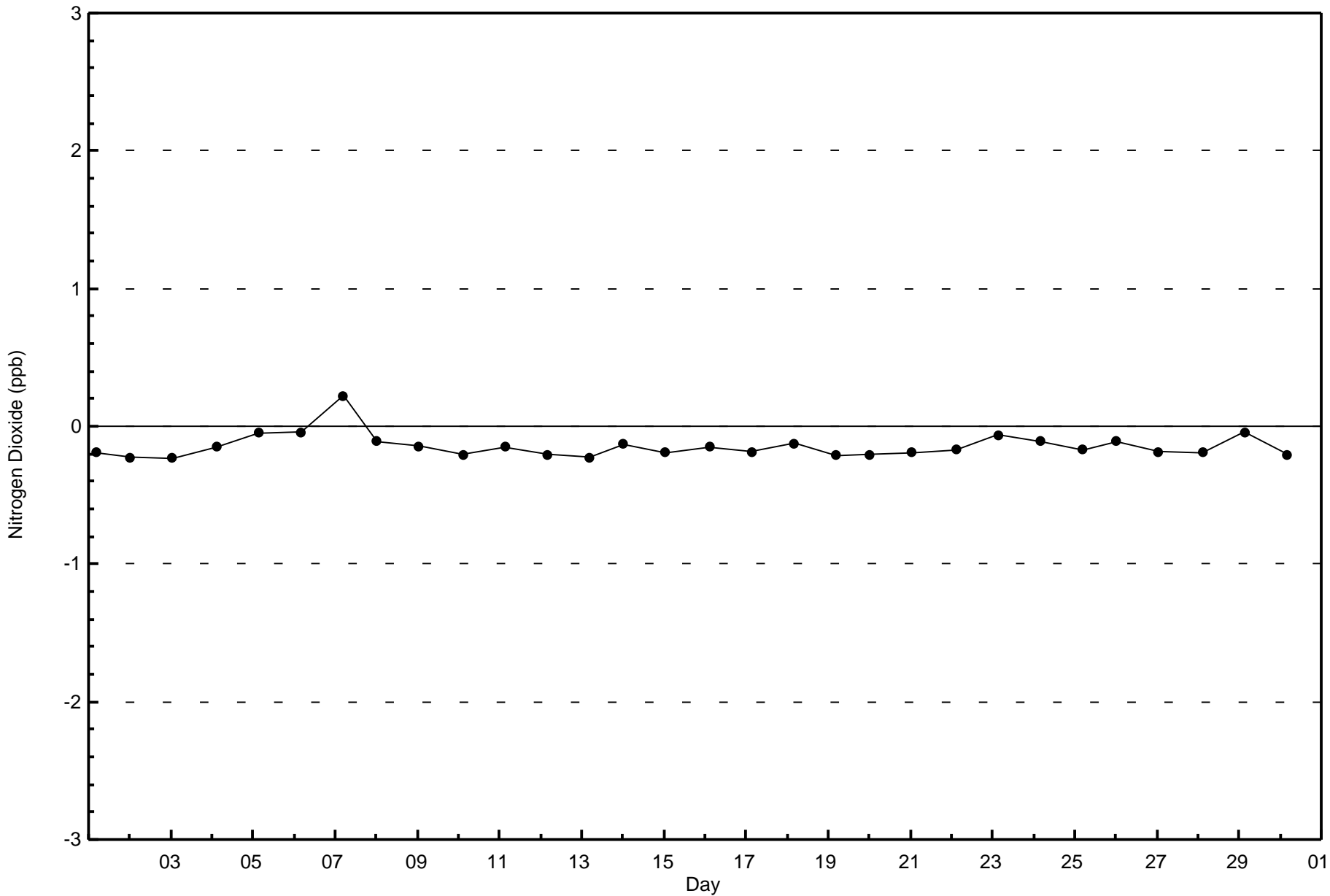
Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)

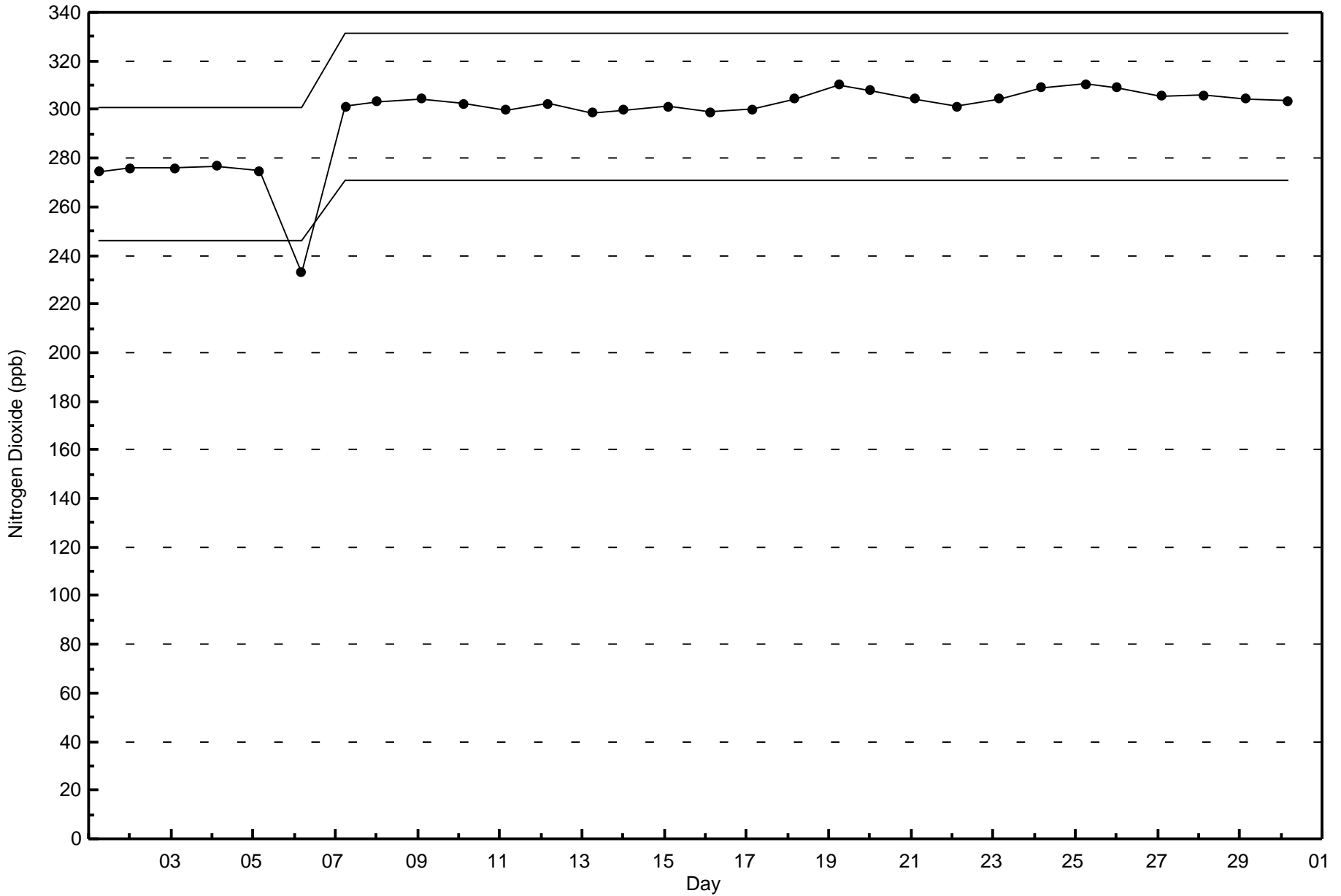




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surrmont - November 2015







Maximum Value: 35 ppb on Nov 12 20:00	Maximum Daily Average: 14.6 ppb on Nov 18	Hours in Service: 720
Minimum Value: 0 ppb on Nov 22 23:00	Minimum Daily Average: 0.9 ppb on Nov 21	Hours of Data: 686
Maximum Diurnal Average: 4.5 ppb at hour 19	Minimum Diurnal Average: 1.3 ppb at hour 4	Hours of Missing Data: 34
Monthly Average: 3.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 27	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-Nov	1	1	1	1	1	Z	4	2	2	1	1	1	1	1	1	1	2	3	2	1	1	1	0	0	1.4	4
2-Nov	Z	1	1	1	0	1	4	4	4	3	2	3	3	3	2	3	4	6	5	1	0	1	1	2	2.3	6
3-Nov	0	Z	2	2	2	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	2	4	3	2	1.7	4
4-Nov	1	1	Z	2	1	1	1	4	1	1	1	3	5	5	4	3	4	3	4	3	4	4	4	3	2.7	5
5-Nov	2	1	3	Z	6	5	9	12	10	9	12	15	10	7	8	11	8	9	14	14	10	7	7	8	8.6	15
6-Nov	6	4	2	1	Z	1	1	1	4	3	1	1	C	C	C	C	3	20	16	16	2	2	2	2	4.6	20
7-Nov	2	2	2	2	2	Z	1	1	1	4	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1.4	4
8-Nov	Z	1	1	1	2	1	2	3	4	4	5	5	4	3	2	3	3	1	2	1	1	1	0	0	2.1	5
9-Nov	0	Z	0	0	1	1	2	3	2	3	1	1	1	2	4	3	1	1	2	1	2	2	2	2	1.6	4
10-Nov	2	2	Z	2	2	2	2	2	2	2	2	3	3	3	4	4	4	4	3	3	2	3	3	3	2.6	4
11-Nov	3	3	3	Z	3	2	2	3	3	3	2	1	1	1	1	4	1	1	1	1	1	1	1	1	1.9	4
12-Nov	1	1	1	1	Z	1	1	1	1	1	4	3	2	3	2	1	7	19	30	35	25	18	3	3	7.0	35
13-Nov	2	2	2	2	2	Z	2	2	2	2	4	2	4	5	13	7	3	1	1	1	1	1	1	1	2.8	13
14-Nov	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	7	1	1	1	1	1	3	1	1.6	8
15-Nov	2	Z	2	2	5	5	6	6	7	4	4	3	2	2	2	2	2	2	2	1	2	1	1	1	2.9	7
16-Nov	2	1	Z	1	1	1	2	1	1	0	0	1	1	2	2	1	0	0	1	1	3	1	2	2	1.2	3
17-Nov	2	2	7	Z	20	4	5	5	5	5	5	4	4	3	1	3	4	1	1	3	1	5	6	4	4.4	20
18-Nov	1	2	2	1	Z	5	19	26	30	32	32	29	28	25	21	12	11	16	14	8	10	5	4	1	14.6	32
19-Nov	1	1	2	2	3	Z	2	2	1	1	2	7	2	4	6	4	5	6	5	2	1	2	6	7	3.3	7
20-Nov	Z	2	3	2	2	4	6	5	2	1	1	0	1	0	2	2	2	1	1	1	1	1	1	1	1.8	6
21-Nov	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0.9	2
22-Nov	1	1	Z	1	1	0	1	1	1	1	1	9	5	2	4	3	1	1	0	1	0	0	0	0	1.5	9
23-Nov	1	3	1	Z	2	1	0	1	1	1	1	3	7	8	8	8	10	9	10	10	10	7	8	10	5.1	10
24-Nov	5	6	7	4	Z	10	9	12	10	7	15	12	9	11	6	2	5	6	3	7	3	0	0	0	6.5	15
25-Nov	0	1	1	1	1	Z	3	2	2	2	2	3	2	2	2	3	3	2	2	1	1	1	1	1	1.7	3
26-Nov	Z	1	1	1	1	1	1	2	2	2	2	2	2	1	2	2	2	3	3	2	2	2	2	2	1.6	3
27-Nov	2	Z	2	1	1	1	1	1	1	1	2	4	6	11	8	5	2	3	2	1	1	4	1	1	2.8	11
28-Nov	1	1	Z	2	1	1	2	2	3	2	5	3	2	2	2	2	1	1	1	2	2	2	2	2	1.8	5
29-Nov	2	1	1	Z	1	1	1	2	1	1	1	1	1	4	3	3	2	2	1	1	1	1	1	1	1.6	4
30-Nov	1	3	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	5	5	4	1	1	5	2	1.9	5

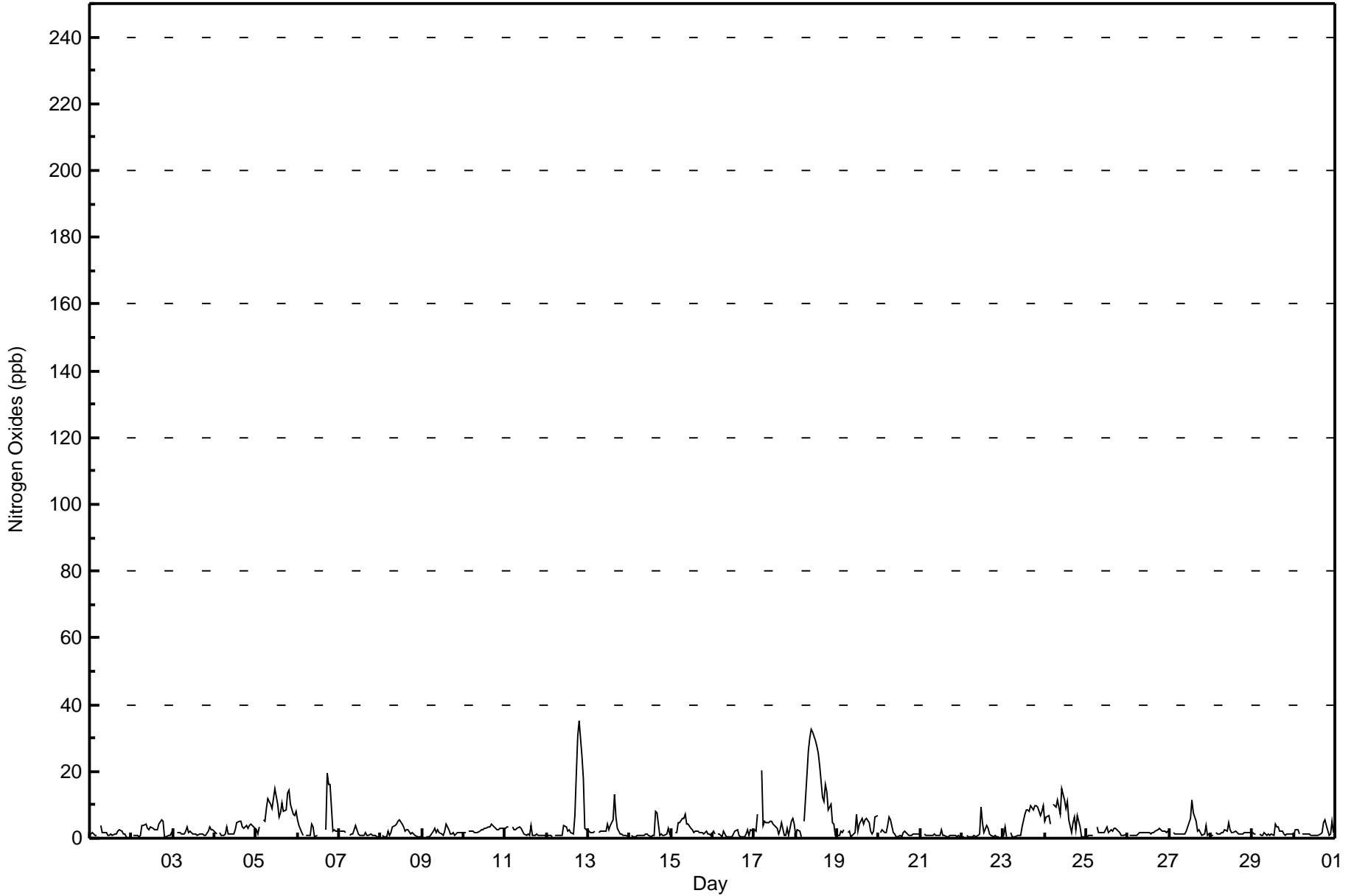
1.7	1.8	2.0	1.3	2.4	2.1	3.1	3.6	3.6	3.4	3.8	4.2	3.7	3.9	3.7	3.8	3.6	4.4	4.5	4.3	3.1	2.6	2.4	2.2	Diurnal Average	
6	6	7	4	20	10	19	26	30	32	32	29	28	25	21	13	11	20	30	35	25	18	8	10	Diurnal Maximum	

Z - zerspan C - Calibration



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	675	98.40	98.40
21 - 40	11	1.60	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: 686

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - November 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	13	11	11	11	4	20	4	48	59	54	135	123	103	26	14	656
21 - 40	0	0	0	0	0	0	0	3	0	0	0	0	0	0	8	0	11
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	20	13	11	11	11	4	20	7	48	59	54	135	123	103	34	14	667

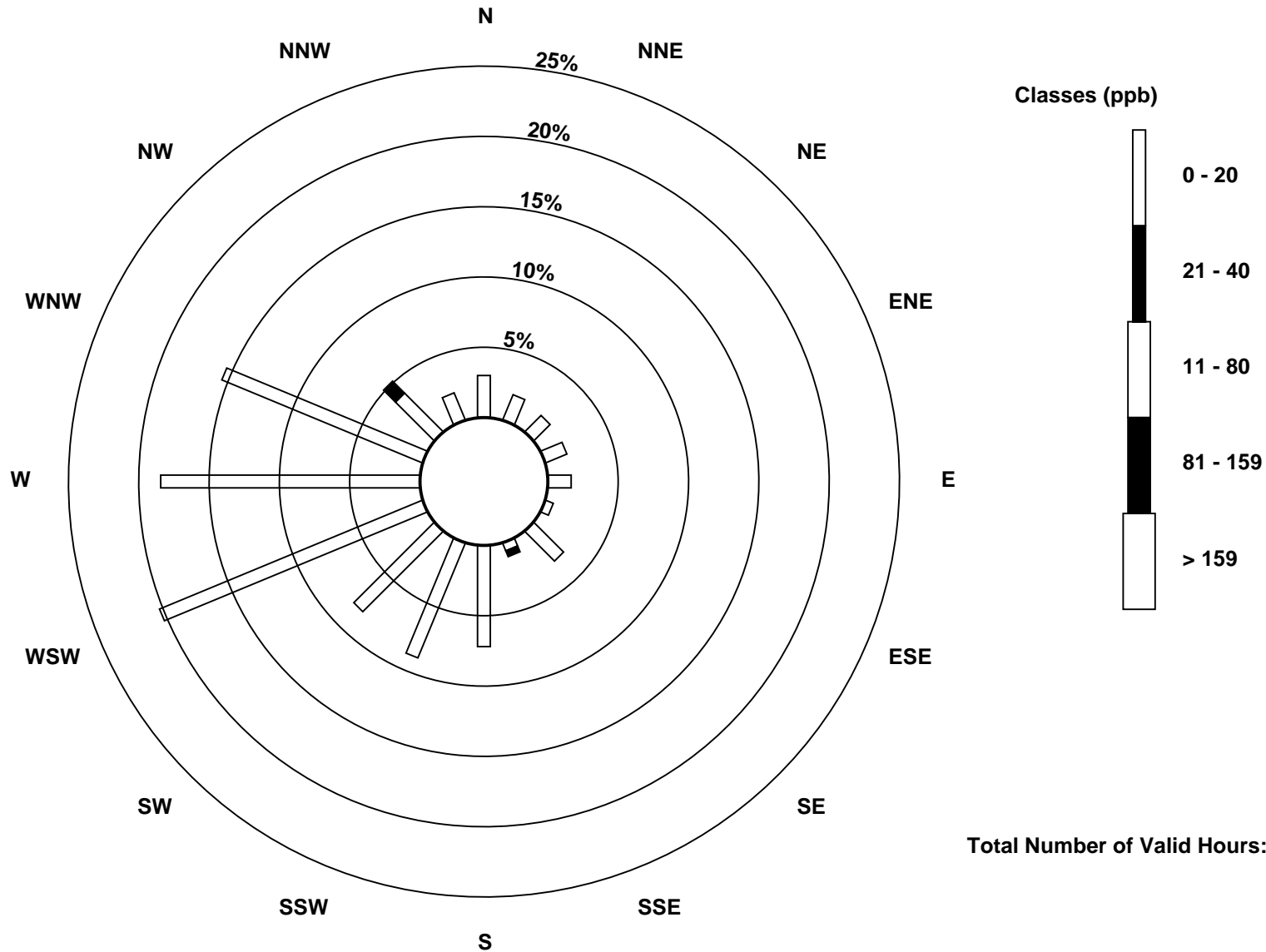
Total Number of Valid Hours: 667

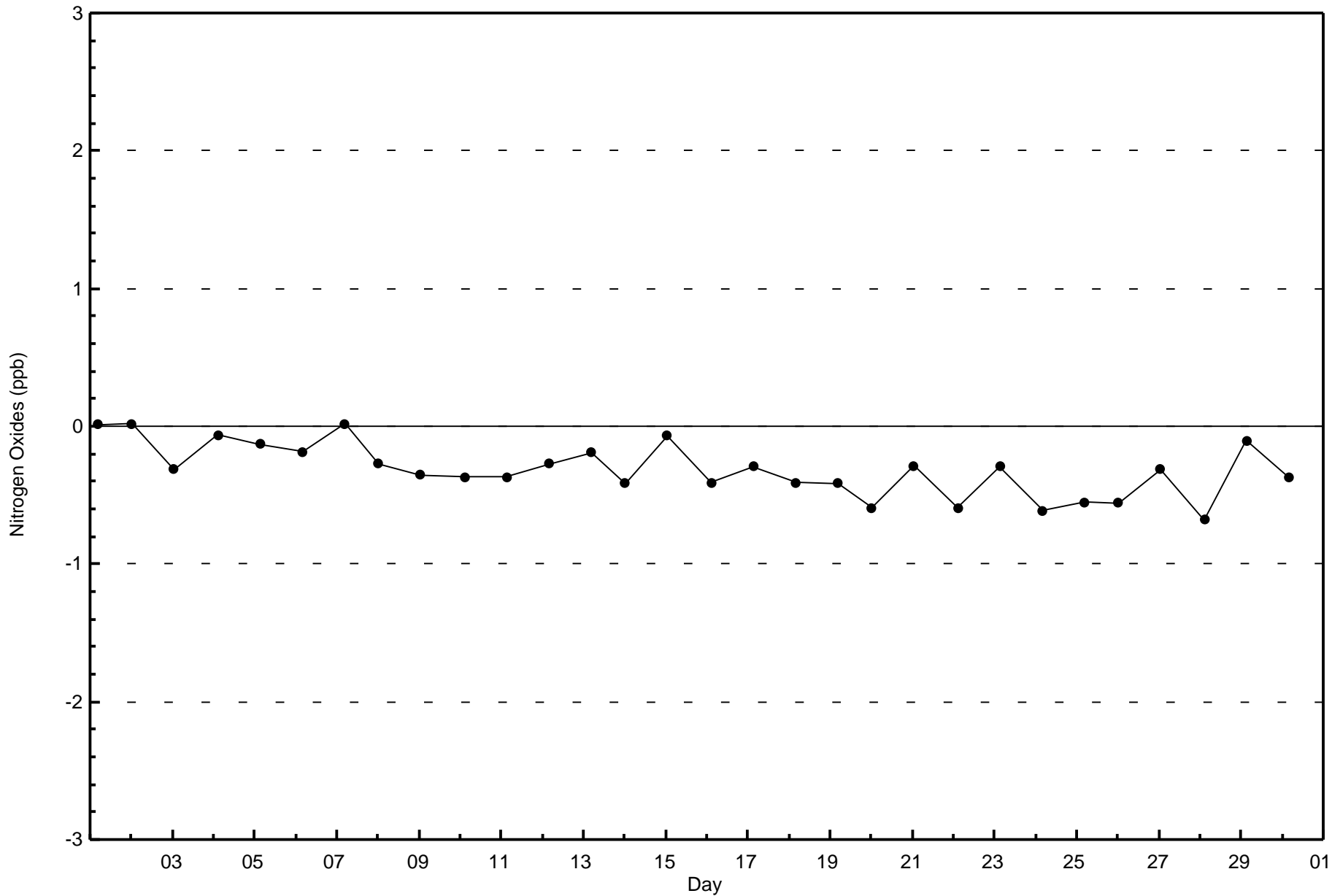
Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)





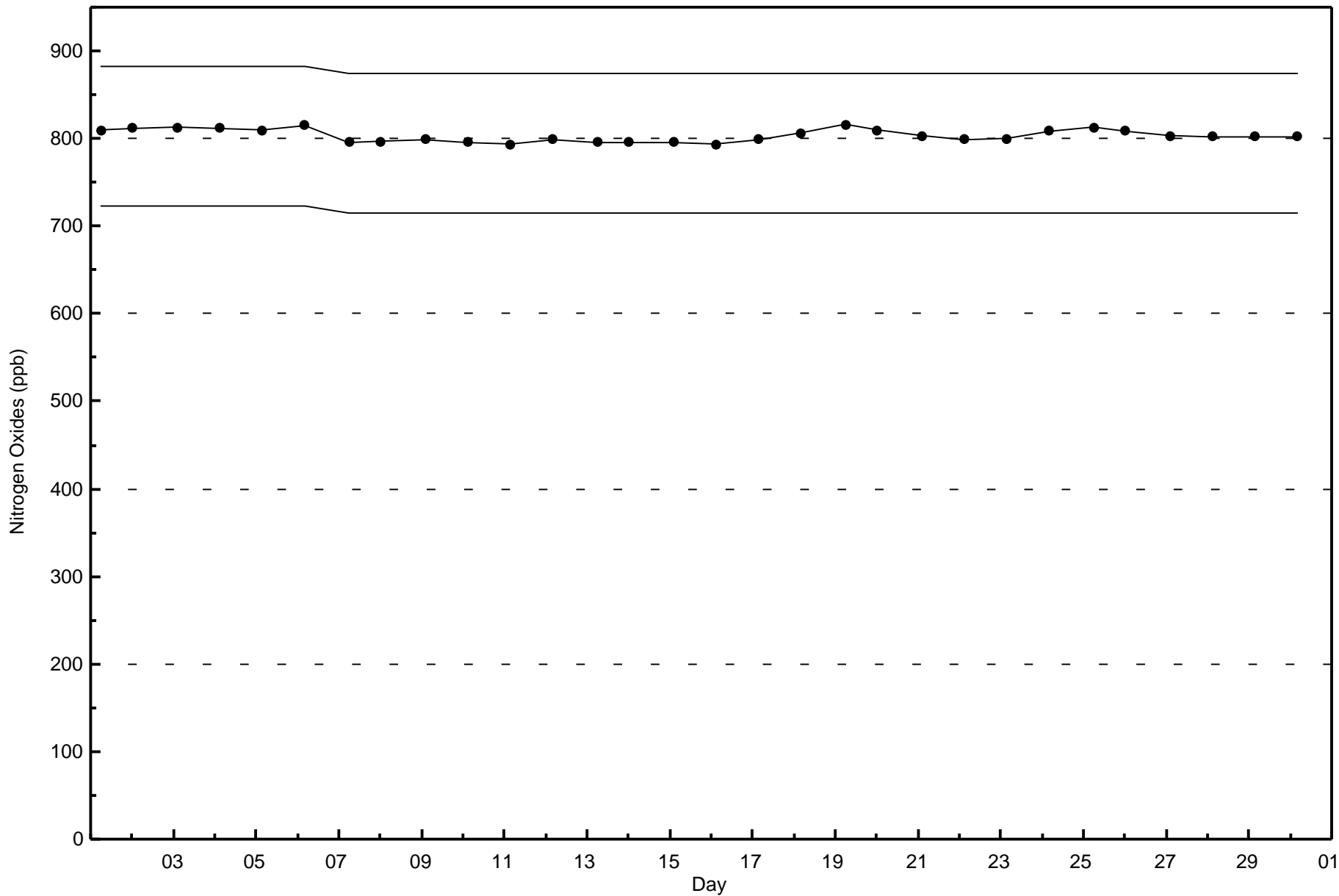


Wood Buffalo Environmental Association

Span Responses

Nitrogen Oxides (NO_x) - ppb

ConocoPhillips - Surmont - November 2015



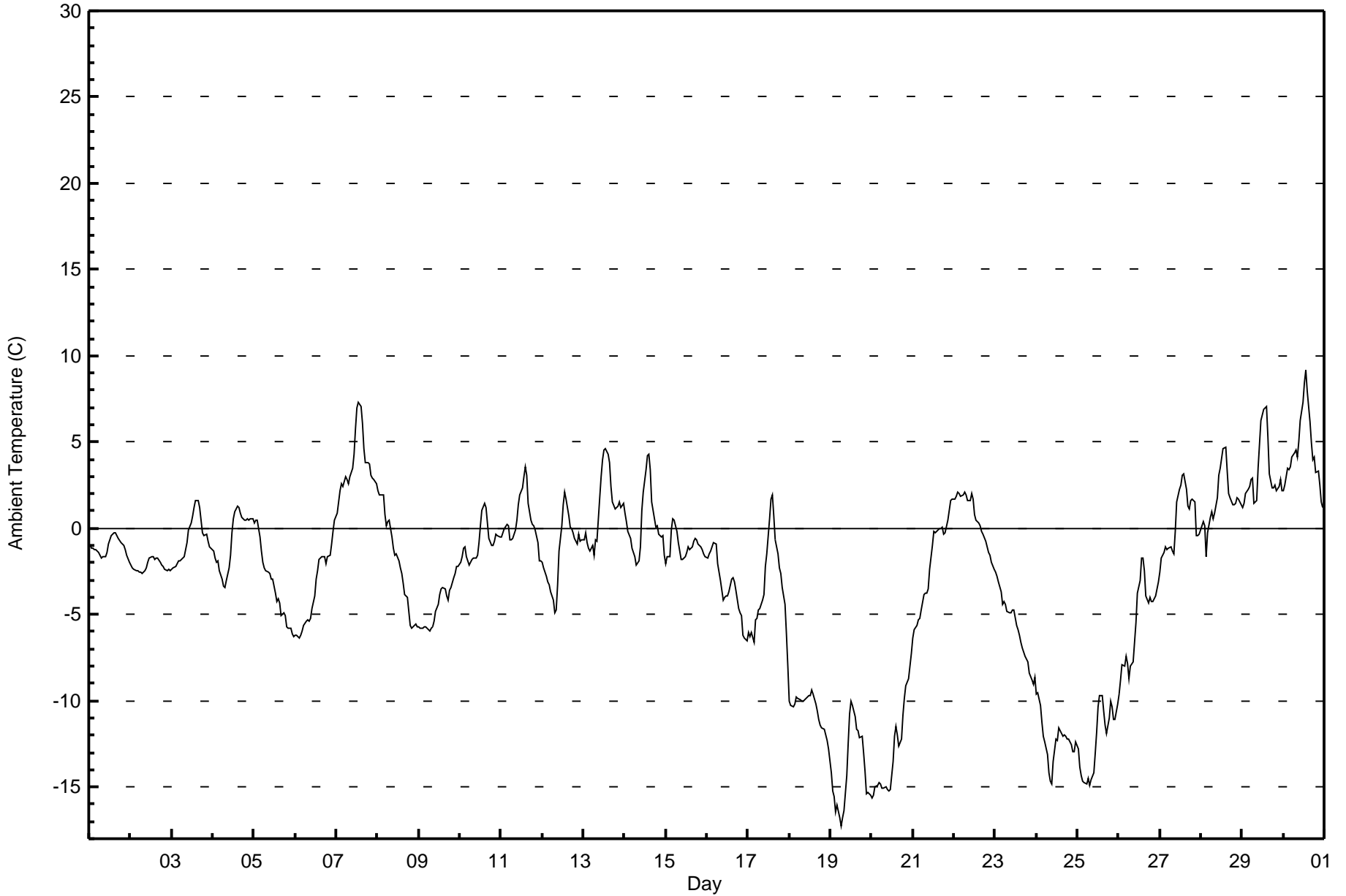


Maximum Value: 9.2 C on Nov 30 14:00 Maximum Daily Average: 4.5 C on Nov 30																				Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: -17.3 C on Nov 19 07:00 Minimum Daily Average: -13.9 C on Nov 19 Maximum Diurnal Average: -1.0 C at hour 15 Minimum Diurnal Average: -3.9 C at hour 8 Monthly Average: -2.89 C Percentiles: P ₁ = -15.6 P ₁₀ = -11.7 Q ₁ = -5.4 Median = -1.6 Q ₃ = 0.5 P ₉₀ = 2.5 P ₉₉ = 7.1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	-1.0	-1.1	-1.1	-1.2	-1.3	-1.4	-1.6	-1.7	-1.7	-1.6	-1.4	-0.9	-0.7	-0.4	-0.3	-0.2	-0.4	-0.6	-0.8	-0.9	-1.0	-1.2	-1.5	-2.0	-1.1	-0.2
2-Nov	-2.1	-2.3	-2.4	-2.4	-2.5	-2.5	-2.6	-2.6	-2.5	-2.3	-2.0	-1.7	-1.6	-1.6	-1.8	-1.7	-1.7	-1.9	-2.2	-2.3	-2.4	-2.4	-2.4	-2.5	-2.2	-1.6
3-Nov	-2.4	-2.3	-2.2	-2.0	-1.9	-1.9	-1.7	-1.7	-1.2	-0.8	-0.1	0.3	0.7	1.2	1.6	1.6	1.2	0.4	-0.3	-0.4	-0.4	-0.8	-1.1	-1.1	-0.6	1.6
4-Nov	-1.3	-1.7	-2.0	-1.9	-2.5	-3.0	-3.4	-3.4	-3.0	-2.3	-1.6	-0.3	0.5	1.0	1.3	1.2	0.9	0.6	0.5	0.4	0.5	0.5	0.5	0.6	-0.7	1.3
5-Nov	0.3	0.4	0.4	-0.5	-1.3	-2.0	-2.3	-2.4	-2.6	-2.6	-2.9	-3.0	-3.7	-4.3	-4.1	-4.4	-5.1	-4.9	-5.0	0.7	-5.7	-5.8	-6.1	-6.3	-3.3	0.4
6-Nov	-6.2	-6.2	-6.3	-6.2	-6.0	-5.6	-5.4	-5.3	-5.4	-5.2	-4.6	-4.0	-2.9	-2.4	-1.8	-1.6	-1.6	-1.6	-2.0	-1.7	-1.5	-0.9	-0.2	0.5	-3.5	0.5
7-Nov	0.8	1.5	2.2	2.6	2.4	3.0	2.8	2.6	3.0	3.5	4.3	5.7	7.0	7.3	7.1	6.1	4.6	3.8	3.8	3.7	3.1	2.9	2.9	2.6	3.7	7.3
8-Nov	2.2	1.9	1.9	1.9	0.8	0.2	0.4	0.5	-0.5	-1.1	-1.5	-1.5	-1.9	-2.3	-2.6	-3.2	-3.8	-4.0	-4.8	-5.6	-5.8	-5.6	-5.6	-5.7	-1.9	2.2
9-Nov	-5.7	-5.8	-5.8	-5.7	-5.7	-5.8	-5.9	-5.8	-5.7	-5.4	-4.8	-4.4	-3.9	-3.5	-3.5	-3.5	-3.9	-4.2	-3.6	-3.4	-2.8	-2.6	-2.2	-2.2	-4.4	-2.2
10-Nov	-2.0	-1.6	-1.2	-1.1	-1.6	-2.2	-2.0	-1.8	-1.7	-1.8	-1.6	-0.9	0.1	1.0	1.4	1.2	0.3	-0.6	-1.0	-1.0	-0.8	-0.3	-0.4	-0.5	-0.8	1.4
11-Nov	-0.5	-0.3	0.0	0.2	0.1	-0.7	-0.7	-0.6	-0.1	0.4	1.4	1.9	2.3	3.0	3.6	3.0	1.4	0.5	0.2	0.1	-0.1	-0.9	-1.9	-1.9	0.4	3.6
12-Nov	-2.0	-2.3	-2.8	-3.2	-3.3	-3.6	-4.2	-4.9	-4.8	-3.3	-1.3	0.1	1.3	2.1	1.7	0.7	0.0	0.0	-0.2	-0.6	-0.9	-0.3	-0.7	-0.7	-1.4	2.1
13-Nov	-0.7	-0.3	-0.8	-1.1	-1.3	-1.0	-1.6	-0.7	-0.7	1.8	3.0	3.9	4.5	4.6	4.3	3.8	2.4	1.5	1.1	1.2	1.2	1.5	1.2	1.4	1.2	4.6
14-Nov	0.9	0.4	-0.2	-0.6	-1.1	-1.4	-1.7	-2.1	-1.9	-1.1	1.1	2.1	3.4	4.2	4.3	3.4	1.6	0.6	0.0	0.1	-0.3	-0.5	-0.4	-1.5	0.4	4.3
15-Nov	-2.0	-1.7	-1.7	-0.1	0.5	0.5	-0.2	-0.8	-1.3	-1.8	-1.8	-1.6	-1.4	-1.0	-1.3	-1.1	-0.7	-0.6	-0.7	-0.9	-1.1	-1.3	-1.5	-1.6	-1.1	0.5
16-Nov	-1.7	-1.5	-1.4	-1.1	-0.8	-1.0	-2.0	-2.5	-3.1	-4.1	-4.0	-3.9	-3.9	-3.7	-3.0	-2.9	-3.1	-3.6	-4.7	-4.9	-5.1	-6.2	-6.4	-6.5	-3.4	-0.8
17-Nov	-6.0	-6.3	-6.0	-6.6	-5.3	-5.2	-4.8	-4.6	-4.1	-3.8	-2.2	-1.5	0.5	1.7	1.9	0.7	-0.7	-1.5	-2.3	-2.6	-3.5	-4.4	-6.1	-8.0	-3.4	1.9
18-Nov	-10.0	-10.3	-10.3	-10.2	-9.8	-9.9	-10.0	-10.0	-10.0	-10.0	-9.9	-9.7	-9.7	-9.4	-9.6	-10.2	-10.6	-11.0	-11.4	-11.6	-11.7	-11.9	-12.3	-12.8	-10.5	-9.4
19-Nov	-14.2	-15.2	-15.6	-16.5	-16.0	-16.8	-17.3	-16.8	-16.4	-14.4	-12.4	-10.7	-10.0	-10.2	-10.9	-11.6	-11.7	-12.2	-12.1	-13.0	-14.1	-15.4	-15.3	-15.5	-13.9	-10.0
20-Nov	-15.6	-15.5	-15.0	-14.9	-14.7	-14.8	-15.1	-15.1	-15.0	-15.2	-15.2	-15.2	-13.5	-12.1	-11.5	-12.0	-12.6	-12.2	-10.8	-9.9	-9.2	-8.7	-8.0	-7.2	-12.9	-7.2
21-Nov	-6.4	-5.9	-5.7	-5.3	-5.3	-4.7	-3.8	-3.7	-3.8	-3.5	-2.4	-1.0	-0.2	-0.2	-0.2	0.0	0.0	0.1	-0.3	-0.3	0.5	1.0	1.6	1.7	-2.0	1.7
22-Nov	1.7	1.9	2.1	2.0	1.9	1.9	2.1	2.0	1.6	1.6	2.0	1.7	0.8	0.5	0.3	0.1	-0.2	-0.4	-0.8	-1.1	-1.4	-1.6	-2.0	-2.4	0.6	2.1
23-Nov	-2.6	-2.8	-3.1	-3.7	-4.4	-4.2	-4.4	-4.8	-4.9	-4.9	-4.8	-4.8	-5.7	-5.9	-6.2	-6.6	-6.9	-7.4	-7.6	-7.7	-8.4	-8.8	-9.0	-8.6	-5.8	-2.6
24-Nov	-9.6	-9.5	-10.3	-11.2	-12.1	-12.4	-13.1	-14.1	-14.6	-14.8	-13.5	-12.2	-12.3	-11.5	-11.7	-12.1	-11.9	-12.1	-12.2	-12.3	-12.6	-13.0	-13.0	-12.4	-12.3	-9.5
25-Nov	-12.8	-13.9	-14.4	-14.6	-14.8	-14.9	-14.5	-14.9	-14.6	-14.2	-13.0	-11.8	-10.4	-9.7	-9.7	-10.6	-11.4	-11.9	-11.0	-10.0	-10.3	-11.0	-11.0	-10.2	-12.3	-9.7
26-Nov	-9.6	-8.8	-8.0	-8.0	-7.4	-7.8	-8.7	-8.0	-7.7	-6.6	-5.5	-3.8	-3.0	-1.8	-1.7	-2.5	-3.9	-4.3	-4.0	-4.2	-4.2	-3.9	-3.5	-3.1	-5.4	-1.7
27-Nov	-2.5	-1.7	-1.4	-1.1	-1.3	-1.2	-1.1	-1.3	-1.5	-0.2	1.6	2.2	2.5	3.0	3.1	2.3	1.3	1.2	1.6	1.7	1.5	-0.4	-0.4	-0.3	0.3	3.1
28-Nov	0.1	0.4	0.2	-1.6	-0.3	0.7	1.0	0.6	0.9	1.8	3.1	3.5	4.1	4.6	4.7	3.3	2.0	1.7	1.3	1.4	1.4	1.7	1.6	1.4	1.6	4.7
29-Nov	1.2	1.5	2.0	2.2	2.4	2.9	2.9	1.5	1.6	3.5	4.8	6.2	6.9	7.0	7.1	5.3	3.2	2.3	2.3	2.5	2.2	2.4	2.8	2.2	3.3	7.1
30-Nov	2.2	2.5	3.5	3.4	3.6	4.1	4.3	4.5	4.1	5.0	6.3	7.3	8.5	9.2	8.0	6.2	5.0	4.0	4.1	3.2	3.3	2.5	1.5	1.2	4.5	9.2
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surrmont - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - November 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	504	70.00	70.00
0 - 10	216	30.00	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

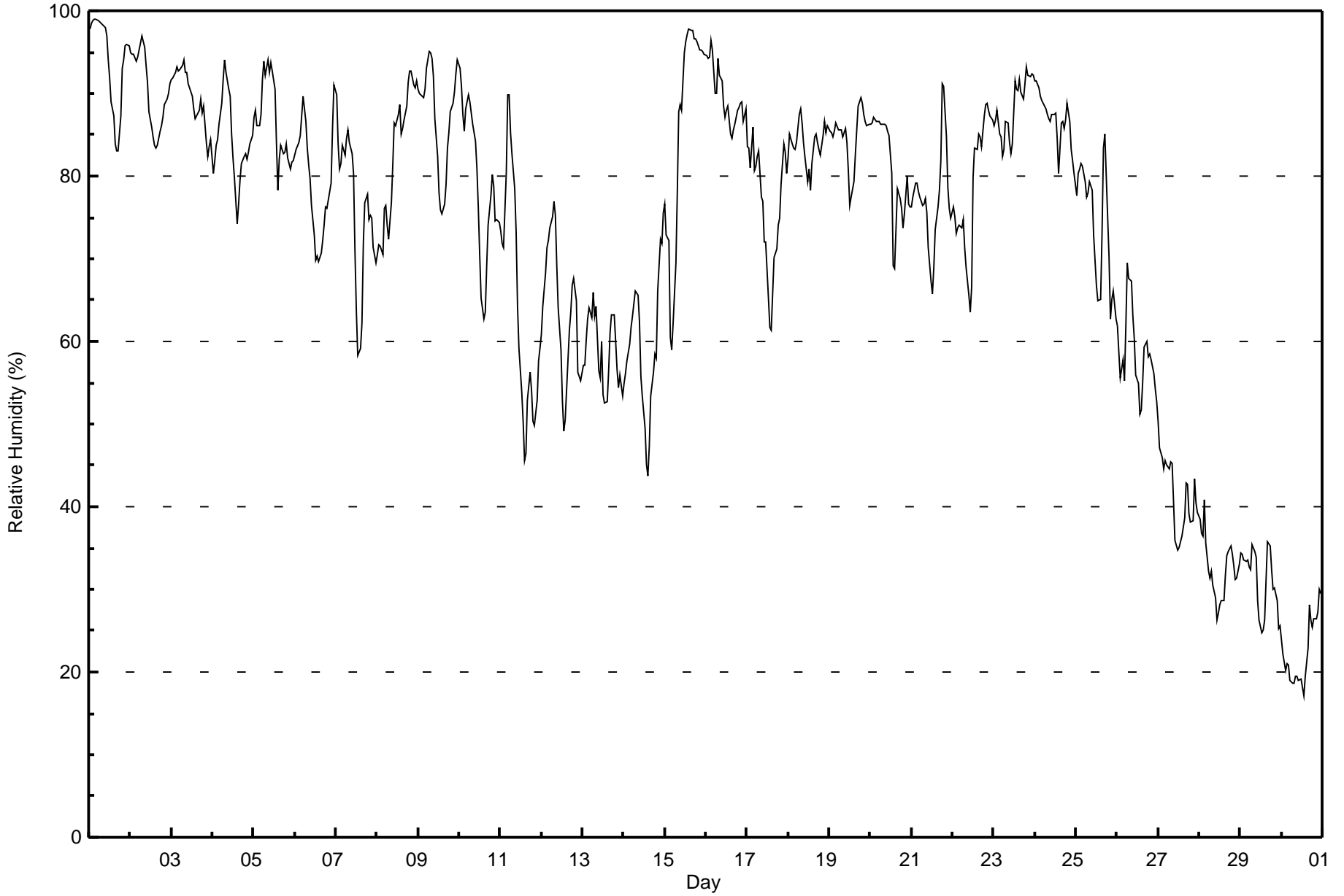


Maximum Value: 99 % on Nov 1 05:00																		Maximum Daily Average: 94.0 % on Nov 1																		Hours in Service: 720													
Minimum Value: 17 % on Nov 30 14:00																		Minimum Daily Average: 22.4 % on Nov 30																		Hours of Data: 720													
Maximum Diurnal Average: 76.8 % at hour 8																		Minimum Diurnal Average: 66.1 % at hour 15																		Hours of Missing Data: 0													
Monthly Average: 72.9 %																		Percentiles: P ₁ = 19 P ₁₀ = 36 Q ₁ = 63 Median = 80 Q ₃ = 87 P ₉₀ = 92 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-Nov	98	98	99	99	99	99	99	98	98	98	97	94	92	89	87	84	83	83	87	93	94	96	96	96	94.0	99																							
2-Nov	95	95	95	94	94	95	96	97	96	93	91	88	86	85	84	83	84	85	86	87	89	89	90	91	90.4	97																							
3-Nov	92	92	93	93	93	93	93	94	93	93	91	90	90	88	87	88	88	89	88	88	84	82	84	84	89.5	94																							
4-Nov	80	82	84	84	86	89	92	94	93	91	90	85	82	80	74	77	79	81	82	83	82	83	84	85	84.2	94																							
5-Nov	87	88	86	86	87	92	94	92	94	93	94	93	91	84	78	82	84	83	83	84	82	81	82	82	86.7	94																							
6-Nov	83	83	84	85	87	90	87	83	81	80	77	73	70	70	71	72	74	76	76	78	79	86	91	79.4	91																								
7-Nov	90	84	81	82	84	83	84	86	84	83	80	71	64	58	59	62	72	77	78	75	75	75	71	69	76.1	90																							
8-Nov	71	72	71	71	76	76	74	72	77	81	86	86	87	89	85	86	87	89	91	93	93	91	91	92	82.8	93																							
9-Nov	90	90	90	89	91	93	95	95	94	92	87	82	78	76	75	77	79	83	85	88	89	90	92	94	87.3	95																							
10-Nov	93	91	88	85	88	90	89	88	86	84	81	76	70	65	63	64	69	74	78	80	79	75	75	74	79.4	93																							
11-Nov	73	72	71	81	90	90	85	83	78	73	64	59	54	50	46	46	53	56	54	50	50	53	58	59	64.5	90																							
12-Nov	61	64	68	71	72	74	75	77	75	69	64	59	53	49	50	58	61	64	67	68	65	56	56	55	63.8	77																							
13-Nov	57	57	60	63	64	63	66	63	64	56	56	60	54	53	53	56	61	63	63	60	57	54	56	53	58.8	66																							
14-Nov	55	56	58	60	62	63	65	66	66	62	56	53	49	45	44	47	53	56	59	58	66	72	72	76	59.1	76																							
15-Nov	77	73	72	61	59	62	69	78	88	89	88	95	96	97	98	98	98	97	97	96	95	95	95	95	86.1	98																							
16-Nov	95	94	94	97	95	90	90	94	92	92	89	87	88	89	85	85	86	86	88	88	89	89	87	88	89.8	97																							
17-Nov	84	83	81	86	81	81	82	83	77	77	72	72	65	62	61	66	70	71	74	75	79	84	83	80	76.2	86																							
18-Nov	82	85	84	83	83	84	87	88	86	84	82	79	81	78	82	85	85	84	83	83	85	87	85	86	83.9	88																							
19-Nov	85	85	85	85	86	86	86	86	85	86	84	81	76	77	79	83	86	88	90	89	88	87	86	86	84.7	90																							
20-Nov	86	86	87	87	87	87	86	86	86	86	85	85	80	69	69	74	78	77	76	74	75	80	77	76	80.9	87																							
21-Nov	76	78	79	79	78	77	76	77	77	76	71	67	66	69	74	76	78	82	91	91	85	79	76	75	77.2	91																							
22-Nov	76	75	73	74	74	74	75	71	69	66	64	67	80	83	83	85	85	84	87	89	89	88	87	87	78.5	89																							
23-Nov	86	87	88	85	85	82	83	87	86	84	83	84	92	91	90	92	90	89	91	93	92	92	92	92	88.2	93																							
24-Nov	91	91	91	90	89	89	88	87	87	87	87	87	88	85	80	87	87	86	87	89	87	83	82	80	86.8	91																							
25-Nov	78	80	81	81	81	79	77	78	79	78	73	70	67	65	65	73	83	85	75	70	63	65	66	63	74.0	85																							
26-Nov	62	59	56	58	55	62	70	68	67	63	60	56	55	51	52	55	59	60	58	59	58	56	54	53	58.5	70																							
27-Nov	50	47	46	45	46	45	45	45	45	41	36	35	35	36	36	39	43	43	39	38	38	43	40	39	41.5	50																							
28-Nov	39	37	36	41	36	32	31	32	30	29	26	27	28	29	29	32	34	35	35	34	33	31	31	33	32.5	41																							
29-Nov	34	34	34	33	34	33	32	35	35	34	29	26	25	25	26	31	36	35	32	30	30	29	25	26	31.0	36																							
30-Nov	24	22	20	21	21	19	19	19	20	19	19	19	18	17	19	23	28	26	25	26	26	27	30	29	22.4	30																							
																								75.0	74.7	74.4	74.9	75.4	75.7	76.4	76.8	76.3	74.6	72.1	70.2	68.6	66.8	66.1	68.7	71.7	72.9	73.6	73.5	73.1	73.1	73.0	73.0	Diurnal Average	
																								98	98	99	99	99	99	99	98	98	98	97	95	96	97	98	98	98	97	97	96	95	96	96	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - November 2015





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - November 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	10	1.39	1.39
20 - 40	71	9.86	11.25
40 - 60	84	11.67	22.92
60 - 80	191	26.53	49.44
80 - 100	364	50.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

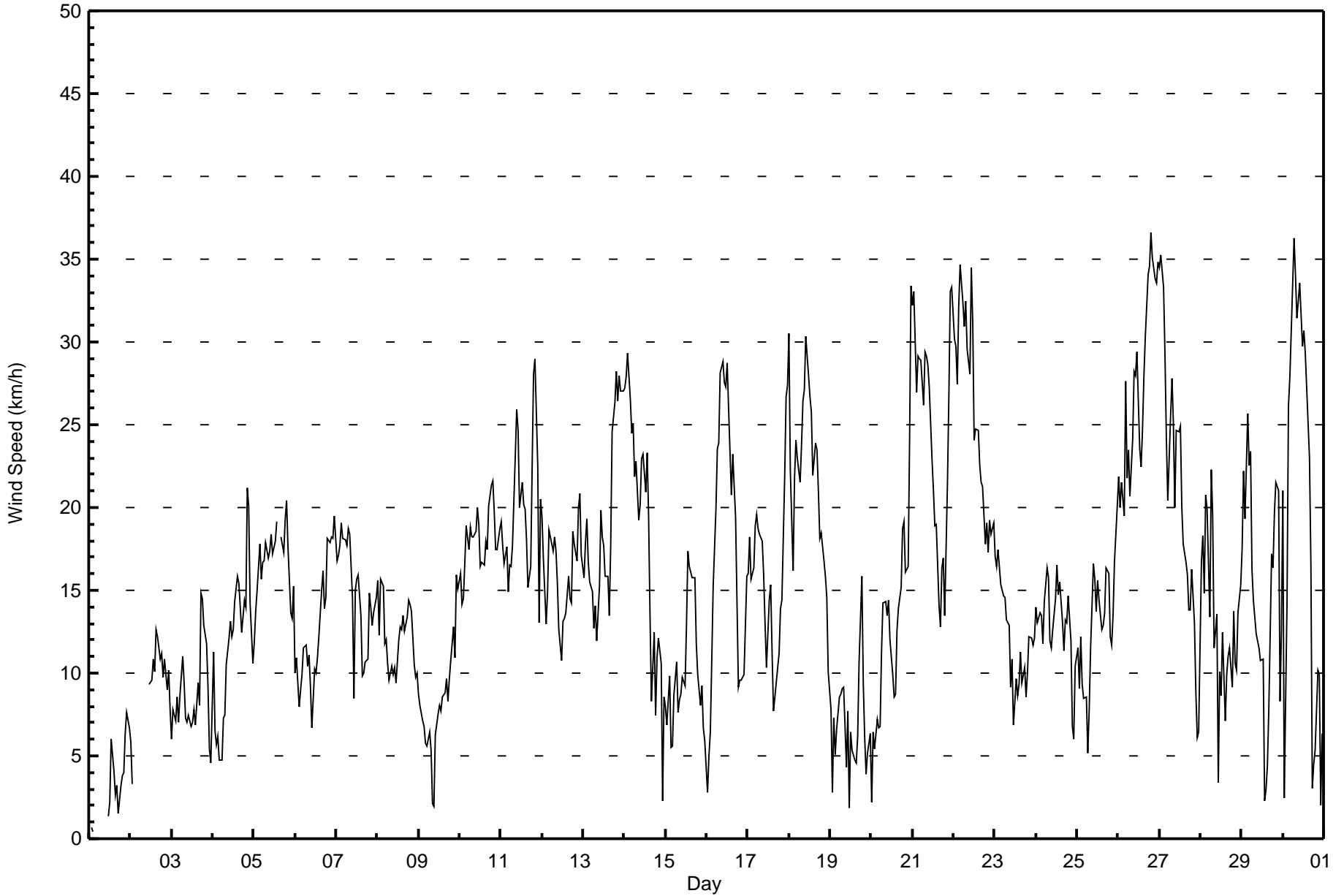


Maximum Speed: 37 km/h on Nov 26 20:00	Maximum Daily Speed Average: 27.3 km/h on Nov 26	Hours in Service: 720
Minimum Speed Value: 0 km/h on Nov 1 03:00	Minimum Daily Speed Average: 3.4 km/h on Nov 9	Hours of Data: 700
Maximum Diurnal Speed Average: 13.9 km/h at hour 8	Minimum Diurnal Speed Average: 8.1 km/h at hour 17	Hours of Missing Data: 20
Monthly Average Velocity: 10.8 km/h 258.1 deg	Percentiles: P ₁ = 2 P ₁₀ = 7 Q ₁ = 10 Median = 15 Q ₃ = 20 P ₉₀ = 27 P ₉₉ = 35	Percent Operational Time: 97.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Nov	AF	NE1	NE0	AF	AF	AF	AF	AF	AF	AF	AF	ENE1	ENE2	ENE6	ENE4	ENE3	NE3	ENE1	NE3	NE4	NE4	NE6	ENE8	ENE7	----	ENE8
2-Nov	ENE6	E3	AF	AF	AF	AF	AF	AF	AF	AF	AF	SE9	ESE10	SE11	SE10	SE13	SE12	SE11	SE11	SE10	SE11	SE9	SE10	SE8	----	SE13
3-Nov	SE6	SE8	SSE7	S9	SSE7	S9	S11	SSW9	S7	SSW7	SSW7	SW7	SW7	WSW8	WSW7	W9	W8	W15WSW14	W13WNNW12	WNNW9	SW5	SSW5	SW6.2	W15		
4-Nov	WSW11	WSW7	SSW6	SSW6	SSW5	SSW5	SSW7	S7	SSW11	SSW12	SSW13	SSW12	S13	S14	S16	S15	SSW14	S12	S14	SW14WSW21	WSW20WSW14	WSW11	SSW10.5	WSW21		
5-Nov	W12	W14WNNW15	WNNW18	WNNW16	WNNW17	WNNW17	NW18	NW17	NNW17	NNW18	NW17	NW18	NNW19	M	M	NW18	NW17	NW19	NW20	NW18	NW14WNNW13	WNNW15	NW16.1	NW20		
6-Nov	NW10	NW11	WNNW8	WNNW9	W10	W12WNNW12	W10	W11	W9	WSW7	SW10	SW10	SSW11	SSW12	SSW15	S16	S14	SSE15	S18	S18	S18	SSW18	SSW19	SW8.6	SSW19	
7-Nov	SSW17	SW17	SW18WSW19	WSW18	W18WSW18	WSW19	WSW18	WSW15	SW8	W15WSW16	WSW16	WSW16	WSW13	WSW10	WSW11	WSW11	W15WSW14	WSW13	W14WNNW15	WSW14.2	WSW19					
8-Nov	W16	W12	W16	W15WNNW12	WNNW12	WNNW11	NW10	N10	N10	NNW10	N9	N12	N13	NNE13	N13	N13	N13	NNE14	NNE14	NNE14	NNE10	NNE10	N10	NNW9.1	W16	
9-Nov	NNE9	NNE8	N7	N7	N6	N6	N6	N5	NNW2	SE2	SSW6	SSW8	SW8	SW8	SSW9	SW9	SW10	SSW8	S10	S11	S13	S11	S16	S15	SSW3.4	S16
10-Nov	S16	SSW14	SSW15	SSW17	SSW19	SSW17	S19	SSW18	SSW18	SSW19	SSW20	S19	S16	SSW17	S17	S18	S17	S20	S21	S22	SSW20	SSW17	SSW17	SSW19	SSW17.9	S22
11-Nov	SSW19	S18	SSW17	SW18	SSW15	SW17	SW16	SW18WSW23	WSW26	W25	W20	W22	W20	W20WSW18	WSW15	WSW16	WSW22	WSW28	W29WSW23	WSW13	WSW20	WSW18.1	W29			
12-Nov	WSW19	WSW17	WSW13	WSW15	W19WSW18	WSW17	WSW18	WSW17	WSW15	SW13	SW11	SW13	SW13	SSW14	S16	S14	SSE14	S19	SSE18	SSE17	S20	S21	S17	SW13.0	S21	
13-Nov	S16	SSW18	SSW19	SSW17	SSW16	SSW15	SSW13	SW14	SW12WSW15	WSW20	WSW18	WSW18	WSW16	SW16	SW14	SW18WSW25	WSW26	WSW28	W26	W28	W27	W27	SW17.5	WSW28		
14-Nov	W27	W28	W29	W27	W24	W25WSW22	WSW23	WSW19	WSW20	W23WSW23	WSW21	WSW23	WSW20	WSW14	SW8WSW12	SW7	SSW11	SW12WSW11	WNNW2	SW9	WSW17.9	W29				
15-Nov	WSW8	SSW7	SSW10	SSW5	SE6	SE9	SE11	SE8	ESE9	SE10	E9	ENE13	E17	ENE16	E16	E16	E16	E12	E10	E8	E9	E7	ESE6	ESE7.8	E17	
16-Nov	ESE3	WNNW5	WNNW6	WNNW11	WNNW15	W20	W24	W24	W28	W29	W28WNNW27	WNNW29	WNNW26	WNNW21	W23	W21	W19	SW9	SSW10	SSW10	SSW10	SSW10	SSW16	W15.3	W29	
17-Nov	S16	S18	S16	SSE16	S19	S20	S19	SSW18	SSW18	S16	SW13	SSW10	WSW14	WSW15	WSW11	SW8	SSW9	SW10WSW11	W14	W14WNNW22	WNNW27	WNNW27	SW11.6	WNNW27		
18-Nov	WNNW30	WNNW22	W16WNNW22	WNNW24	WNNW23	NW22	NW24	NW26	NW27	NW30	NW28	NW27	NW26	NW22	WNNW24	WNNW23	NW21	NW18	NW19	NW17	WNNW16	WNNW15	WNNW10	NW21.6	WNNW30	
19-Nov	W8	SW3	WSW7	SW5	SW7	SW9	SW9	SW9	SW9	WSW4	WSW8	ENE2	NNE6	NE5	NE5	WSW5	W6	WNNW11	WNNW16	WNNW9	WNNW6	W4	WSW5	W6	W4.1	WNNW16
20-Nov	W2	W6	WNNW5	WNNW7	WNNW7	NW7	WNNW11	WNNW14	WNNW14	W13	W14	W12WSW10	SW9	SSW9	S13	S14	SSW15	SW19	SW19	SW16	SW16	SW24	WSW33	WSW10.8	WSW33	
21-Nov	WSW32	WSW33	WSW27	WSW29	W29	W29	W26	W29WSW29	W29	W27	W23	W21	W19	W19WSW14	WSW13	WSW16	WSW17	WSW14	W22	W27	W33	W33	W24.4	W33		
22-Nov	W30	W30	W27	W32	W35	W32	W31	W32	WNNW30	WNNW28	WNNW34	WNNW31	WNNW24	WNNW25	WNNW25	WNNW23	WNNW22	WNNW21	W18	WNNW19	WNNW17	WNNW19	WNNW18	WNNW19	WNNW25.6	W35
23-Nov	WNNW17	WNNW16	WNNW17	WNNW15	WNNW15	WNNW15	WNNW15	WNNW13	WNNW13	W9WNNW11	NW7	NE10	NE9	NNE9	NNE11	NNE9	NNE10	NNE9	N10	N12	N12	N12	NNW12	NNW9.0	WNNW17	
24-Nov	NW14	NNW13	NNW14	N13	N12	NNW14	NW16	WNNW16	WNNW12	WNNW12	NW13	NNW14	NNW17	NW15	WNNW15	WNNW13	WNNW11	WNNW13	WNNW13	WNNW15	WNNW12	WSW7	SW6	WSW10	NW11.5	WNNW17
25-Nov	WSW11	WSW9	SW12	SSW9	SSW8	SSW9	WSW5	WSW8	W12	W17WNNW16	WNNW14	WNNW16	WNNW14	WNNW13	WNNW13	WNNW14	WNNW16	WNNW16	WNNW12	W12WSW14	WSW17	WSW20	W11.3	WSW20		
26-Nov	WSW22	WSW20	WSW22	WSW19	WSW28	SW22	WSW23	SW21	WSW24	WSW28	WSW28	WSW29	WSW24	SW22	SW25	WSW28	WSW30	WSW34	WSW35	WSW37	WSW35	WSW34	WSW34	WSW35	WSW27.3	WSW37
27-Nov	WSW34	WSW35	W33	W29	W24	W20	W26	W28	W25WNNW20	WNNW25	WNNW25	WNNW25	WNNW20	WNNW18	WNNW17	WNNW16	WNNW14	WNNW14	W16	WNNW13	WNNW9	SW6	SW6	W19.9	WSW35	
28-Nov	W17	W18	W15WSW21	W20	W13	W22	WSW20	WSW11	WSW14	S3	W10	W9	W12	W7	WSW10	W11	W11	W9	W14	W11	W10	W14	WSW15	W13.0	W22	
29-Nov	W18	W22	W19	W26	WNNW23	WNNW23	WNNW16	W14	W12	W12WSW12	WSW11	W11	NW2	W3	SSW4	SW8	WSW17	WSW16	WSW20	WSW22	WSW21	WSW8	WSW13	W14.0	W26	
30-Nov	WSW21	W2	W14	W26	W28	WSW31	WSW36	WSW34	W31	W32	W34	W30	W31	W29	W27	W23	W17	W3	WNNW5	W5	W10	W10	NW2	W6	W20.2	WSW36

WSW12WSW10WSW11WSW13.0	W12.8	W12.9	W13.5	W13.9	W13.3	W13.2	W13.3	W10.9	W10.0	W8.9	WSW8.2	WSW8.2	WSW8.1	WSW8.7	WSW8.1	WSW10.0	WSW10.0	WSW9.8	WSW11.3	Diurnal Average				
WSW34WSW35	W33	W32	W35	W32	WSW36	WSW34	W31	W32	WNNW34	WNNW31	W31	W29	W27	WSW28	WSW30	WSW34	WSW35	WSW37	WSW35	WSW34	WSW34	WSW35	Diurnal Maximum	

M - Maintenance 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 - November 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	44	6.29	6.29
6 - 11	185	26.43	32.71
12 - 19	294	42.00	74.71
20 - 28	128	18.29	93.00
29 - 38	49	7.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 720



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - November 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	0	8	6	1	1	1	0	1	5	3	5	5	4	2	1	44
6 - 11	10	10	3	4	5	3	18	2	8	24	27	26	23	14	6	2	185
12 - 19	10	4	0	2	5	0	2	6	33	36	22	49	41	58	15	11	294
20 - 28	0	0	0	0	0	0	0	0	6	2	5	39	40	26	10	0	128
29 - 38	0	0	0	0	0	0	0	0	0	0	0	19	24	5	1	0	49
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21	14	11	12	11	4	21	8	48	67	57	138	133	107	34	14	700

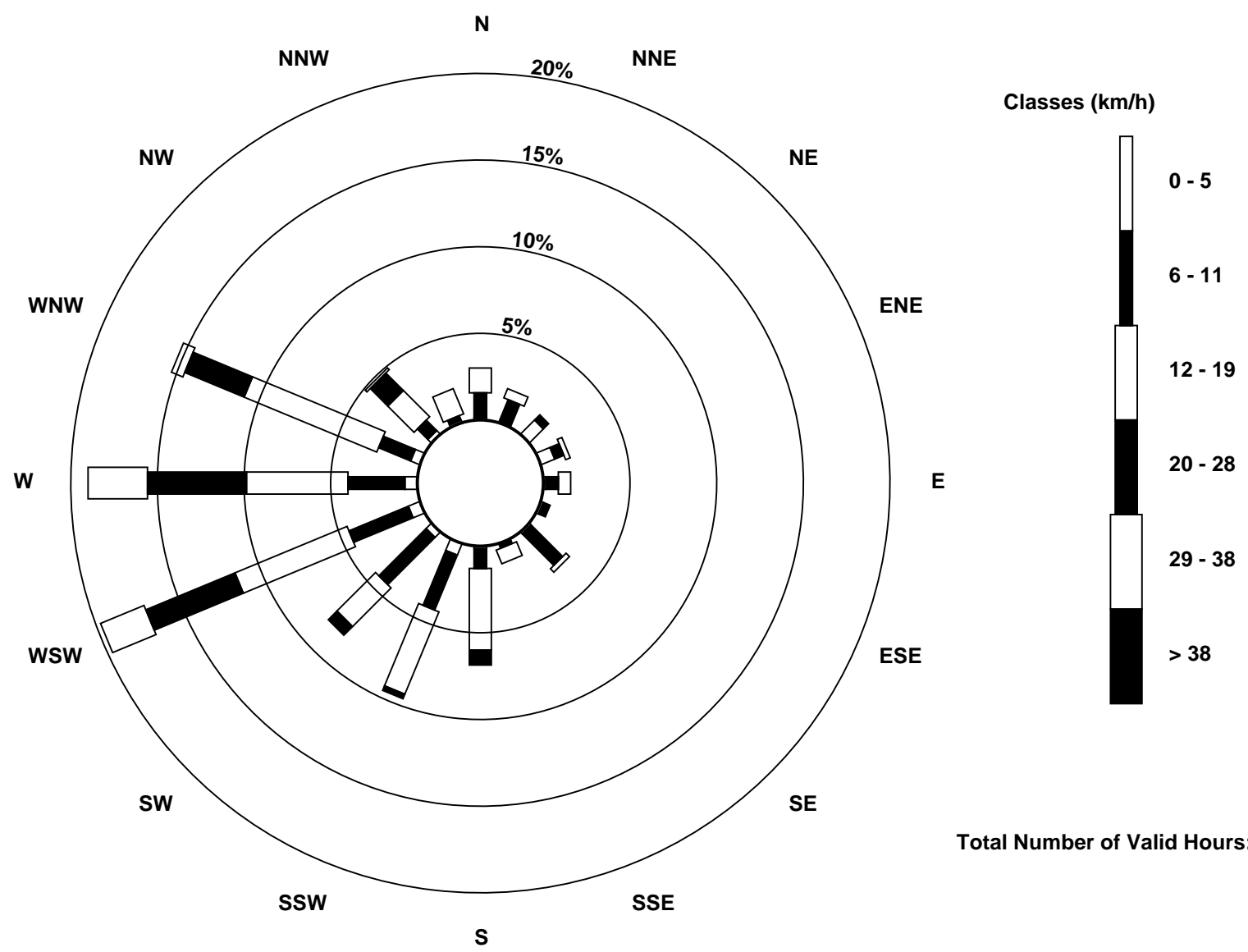
Total Number of Valid Hours: 700

Total Number of Hours: 720



Wood Buffalo Environmental Association
Wind Rose Nov 2015

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - November 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 10 km/h on Nov 30 03:00	Hours of Data: 700
Minimum Value: 1 km/h on Nov 15 01:00	Hours of Missing Data: 20
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 97.2

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

Diurnal Maximum

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - November 2015

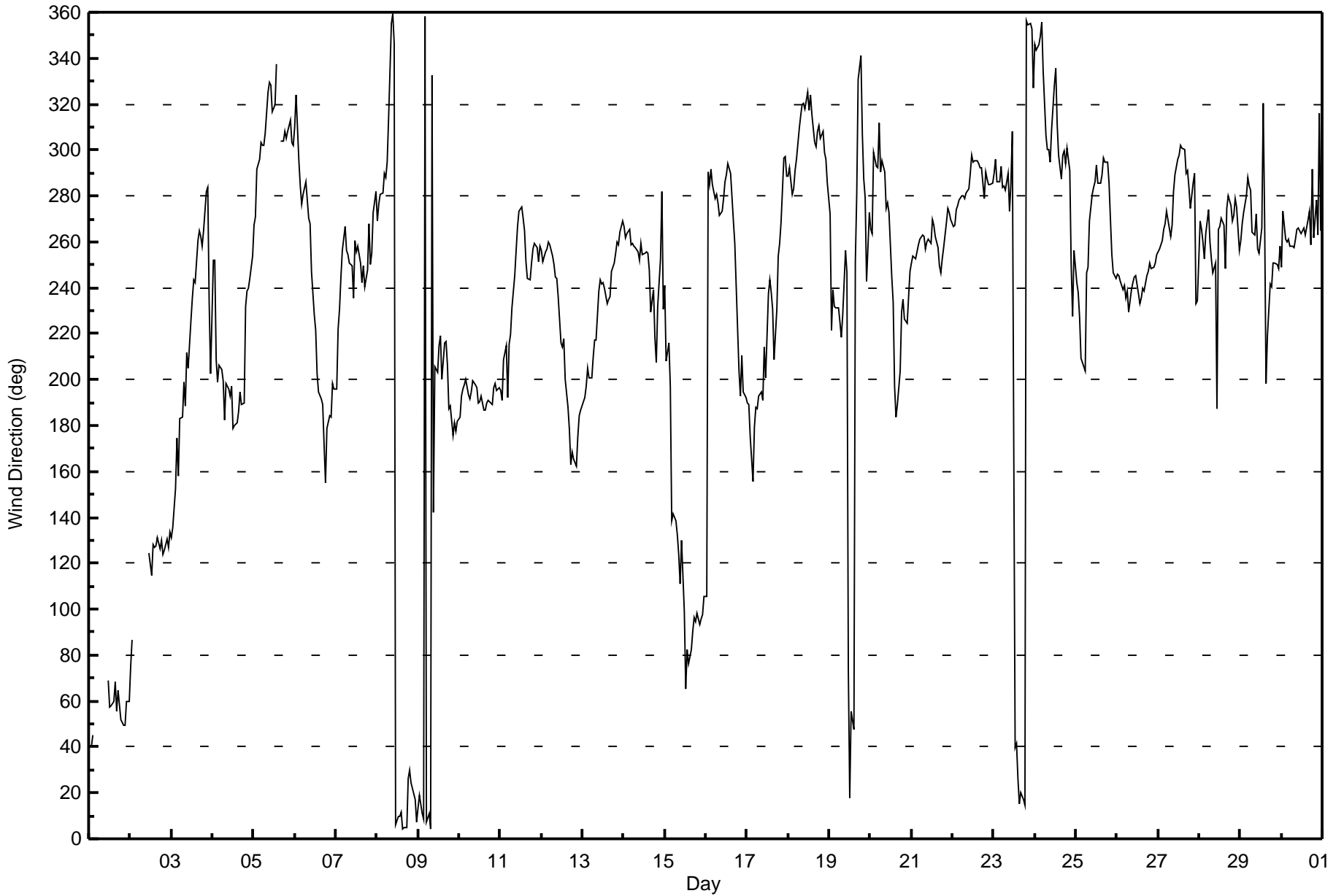
Direction of Maximum Speed: 251 deg on Nov 26 20:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 243.3 deg on Nov 26		Hours of Data:	700
Direction of Minimum Speed: 45 deg on Nov 1 03:00		Hours of Missing Data:	20
Direction of Minimum Daily Speed Average: 3.4 deg on Nov 9		Percent Operational Time:	97.2
Monthly Average Direction: 260.8 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	AF	40	45	AF	AF	AF	AF	AF	AF	AF	AF	69	57	58	60	68	55	65	52	51	49	49	59	60	--
2-Nov	75	87	AF	AF	AF	AF	AF	AF	AF	AF	AF	125	115	128	127	128	131	126	130	124	125	130	127	133	--
3-Nov	131	135	153	175	158	183	183	199	189	212	205	226	235	243	242	261	265	262	258	265	282	284	234	203	224.6
4-Nov	252	252	209	199	206	205	200	183	198	196	193	197	179	180	181	186	194	189	190	232	239	240	244	254	208.5
5-Nov	267	271	292	296	303	302	302	307	325	329	328	317	320	338	M	M	304	304	308	305	308	313	303	302	308.0
6-Nov	310	324	295	284	276	281	286	278	270	268	247	228	222	203	195	192	189	171	155	179	184	184	198	196	219.7
7-Nov	196	222	231	245	256	267	256	254	251	249	236	260	256	258	251	242	250	240	247	268	250	255	273	282	250.2
8-Nov	269	277	281	281	290	288	295	313	355	359	346	6	10	10	12	4	5	5	26	30	24	20	17	8	343.1
9-Nov	13	19	11	8	358	7	11	4	332	142	206	203	215	219	200	216	217	206	187	189	175	181	178	182	198.1
10-Nov	184	193	196	197	200	193	191	195	199	197	196	190	191	193	187	187	190	191	190	189	197	198	195	196	193.2
11-Nov	195	191	209	215	192	215	220	232	245	256	266	273	275	271	265	251	244	243	251	257	259	257	252	258	244.8
12-Nov	256	251	256	257	260	258	254	250	245	244	236	216	214	218	200	188	178	163	169	165	163	175	184	187	216.3
13-Nov	191	192	197	205	201	201	210	217	217	238	244	242	242	240	233	235	236	247	251	255	260	259	264	269	236.1
14-Nov	266	262	264	265	259	259	258	258	256	252	259	255	255	256	255	247	230	239	218	208	232	252	282	231	254.4
15-Nov	241	208	216	197	138	142	138	132	124	111	130	99	65	82	77	83	90	96	95	98	93	96	98	106	107.7
16-Nov	105	291	285	292	285	279	280	277	271	273	279	286	289	294	290	279	269	260	222	204	193	210	195	192	270.6
17-Nov	190	189	175	155	180	188	188	193	195	191	214	201	237	244	238	231	208	231	254	259	268	296	297	289	222.0
18-Nov	288	292	281	283	291	296	309	315	320	320	318	325	317	324	315	303	301	308	310	305	308	299	296	286	306.2
19-Nov	272	221	239	232	231	231	225	218	228	256	247	74	18	55	47	251	281	330	341	307	287	279	243	273	270.8
20-Nov	266	264	299	293	292	312	291	295	290	275	277	273	245	234	197	184	189	204	230	235	226	225	236	247	247.3
21-Nov	251	254	253	256	259	261	263	262	257	260	261	259	269	267	262	257	249	246	252	258	269	274	273	270	260.6
22-Nov	267	267	274	276	278	280	280	279	282	283	290	298	295	295	295	294	292	292	279	291	287	285	285	285	283.8
23-Nov	290	296	286	286	293	283	284	283	290	273	286	308	40	41	27	15	20	17	15	356	354	355	353	327	320.2
24-Nov	346	344	346	350	356	334	306	300	300	295	309	328	336	311	298	288	298	299	294	301	291	250	227	256	311.3
25-Nov	242	238	227	209	207	204	246	249	269	280	284	286	293	286	285	289	297	295	294	286	270	255	246	244	266.8
26-Nov	246	246	243	239	241	235	239	229	239	242	245	245	238	233	236	240	239	245	247	251	249	249	251	254	243.3
27-Nov	256	257	260	265	268	274	266	262	267	282	289	296	298	302	301	300	290	291	284	275	286	290	233	234	275.5
28-Nov	269	266	260	253	264	274	260	253	247	251	188	266	267	270	267	248	275	280	276	269	272	279	275	256	263.4
29-Nov	261	268	273	280	288	284	283	264	263	272	257	255	266	321	270	198	219	242	241	251	251	250	249	258	262.9
30-Nov	249	273	261	260	261	258	258	257	261	266	266	264	265	266	263	270	274	259	291	262	278	263	316	265	263.0

253.2 254.0 254.3 257.5 259.2 260.1 259.4 258.8 260.2 262.8 265.4 267.6 272.3 270.1 258.6 251.2 251.4 253.2 251.5 254.2 254.8 254.7 251.8 252.5

Diurnal Average

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 101 deg on Nov 30 23:00	Hours of Data: 700
Minimum Value: 5 deg on Nov 25 22:00	Hours of Missing Data: 20
Percentiles: P ₁ = 8 P ₁₀ = 9 Q ₁ = 10 Median = 13 Q ₃ = 16 P ₉₀ = 22 P ₉₉ = 74	Hours of Calibration: 0
	Percent Operational Time: 97.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Nov	AF	17	21	AF	AF	AF	AF	AF	AF	AF	AF	17	12	15	15	18	13	11	20	14	17	14	14	14	21
2-Nov	16	14	AF	AF	AF	AF	AF	AF	AF	AF	AF	13	13	16	14	13	13	12	12	13	11	18	12	21	21
3-Nov	19	15	28	23	27	22	14	16	29	21	15	18	14	14	20	14	10	9	9	10	13	18	19	32	32
4-Nov	19	18	23	17	16	14	17	21	17	14	14	16	15	15	15	17	15	16	15	15	9	11	12	12	23
5-Nov	10	8	15	11	14	14	12	13	16	14	15	16	21	14	M	M	13	11	16	14	16	18	15	13	21
6-Nov	23	24	23	11	12	11	12	12	14	14	32	24	25	17	18	15	15	17	14	16	13	14	15	15	32
7-Nov	16	16	14	12	11	10	10	10	9	9	16	11	14	15	12	17	14	11	11	9	10	8	9	9	17
8-Nov	16	12	9	9	18	6	8	17	15	14	13	19	15	17	15	17	16	14	15	13	14	14	14	15	19
9-Nov	14	15	15	17	24	21	15	16	68	63	22	26	29	29	22	21	19	16	17	17	13	16	12	13	68
10-Nov	14	15	15	16	16	16	16	16	16	16	15	16	17	18	16	14	15	15	14	15	14	15	14	13	18
11-Nov	13	13	16	13	15	17	12	16	9	10	10	11	12	11	10	10	8	9	10	9	9	10	12	9	17
12-Nov	8	10	13	10	9	9	9	8	9	11	18	24	20	19	20	14	20	17	14	14	16	15	14	15	24
13-Nov	15	15	14	14	14	14	17	18	17	15	11	11	11	12	14	14	14	9	9	8	9	9	9	9	18
14-Nov	9	9	9	9	9	10	9	10	11	11	11	11	12	11	11	13	11	11	21	15	15	15	75	8	75
15-Nov	10	19	9	30	17	10	9	11	13	15	13	33	16	14	14	15	14	13	12	13	11	11	12	11	33
16-Nov	57	26	16	11	11	10	10	11	10	11	10	11	11	11	13	11	9	10	24	19	16	11	15	13	57
17-Nov	14	14	24	15	15	13	14	13	13	14	15	17	18	13	16	18	14	12	18	8	12	11	11	12	24
18-Nov	10	12	15	11	10	11	13	13	14	14	14	14	15	14	15	10	10	12	12	13	13	10	12	16	16
19-Nov	30	69	19	9	8	7	10	12	14	35	29	86	40	38	24	52	42	20	11	25	12	51	60	25	86
20-Nov	73	28	39	14	20	35	10	9	11	11	15	15	17	21	17	16	15	14	15	12	16	15	17	9	73
21-Nov	8	8	8	8	8	9	9	9	9	8	9	11	13	14	12	14	16	14	11	13	10	10	9	8	16
22-Nov	9	9	10	9	10	10	10	10	10	10	11	12	11	10	10	10	11	10	10	13	10	9	9	10	13
23-Nov	12	11	10	12	10	11	11	11	8	12	14	51	14	14	13	14	14	12	14	25	15	15	15	23	51
24-Nov	15	14	14	12	15	19	14	11	11	9	16	19	16	19	11	9	15	15	11	13	18	17	13	20	20
25-Nov	15	15	22	19	21	27	61	23	22	12	11	11	10	8	10	9	9	8	8	9	6	5	8	7	61
26-Nov	8	8	8	12	10	13	14	16	13	10	9	10	13	13	12	11	11	9	8	8	9	9	9	8	16
27-Nov	8	8	8	9	12	11	8	9	9	10	12	10	10	13	14	9	7	8	10	11	11	20	41	39	41
28-Nov	9	8	12	9	10	13	9	8	19	46	80	33	20	17	21	13	18	16	31	13	17	18	16	15	80
29-Nov	11	9	12	10	10	8	11	10	9	12	11	7	8	74	50	29	24	11	9	10	9	9	27	20	74
30-Nov	10	89	50	9	10	9	8	8	10	9	9	9	9	9	9	10	12	87	69	66	14	20	101	24	101

73	89	50	30	27	35	61	23	68	63	80	86	40	74	50	52	42	87	69	66	18	51	101	39	
Diurnal Maximum																								

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	November 6, 2015	Last Calibration	October 8, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	13:35
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	2254	2195
Calculated slope	1.000207	1.000495	Chamber temp	49.8	49.9
Calculated intercept	0.078626	-1.080393	Pressure	21.7	21.8
Analyzer Background	19.3	19.3	Flow	0.539	0.546
Analyzer Coefficient	1.010	1.010	Intensity	56	54

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	0.4	----
as found span	5000	83.2	803.7	802.1	1.002
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	83.2	803.7	803.8	1.000
second point	5000	41.6	401.9	403.8	0.995
third point	5000	20.8	200.9	202.3	0.993
as left zero	5000	0.0	0.0	0.9	----
as left span	5000	83.2	803.7	797.1	1.008
Average Correction Factor					0.996

Corrected As found 801.7 Previous response 803.5 % change 0.2%

Notes:

Inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



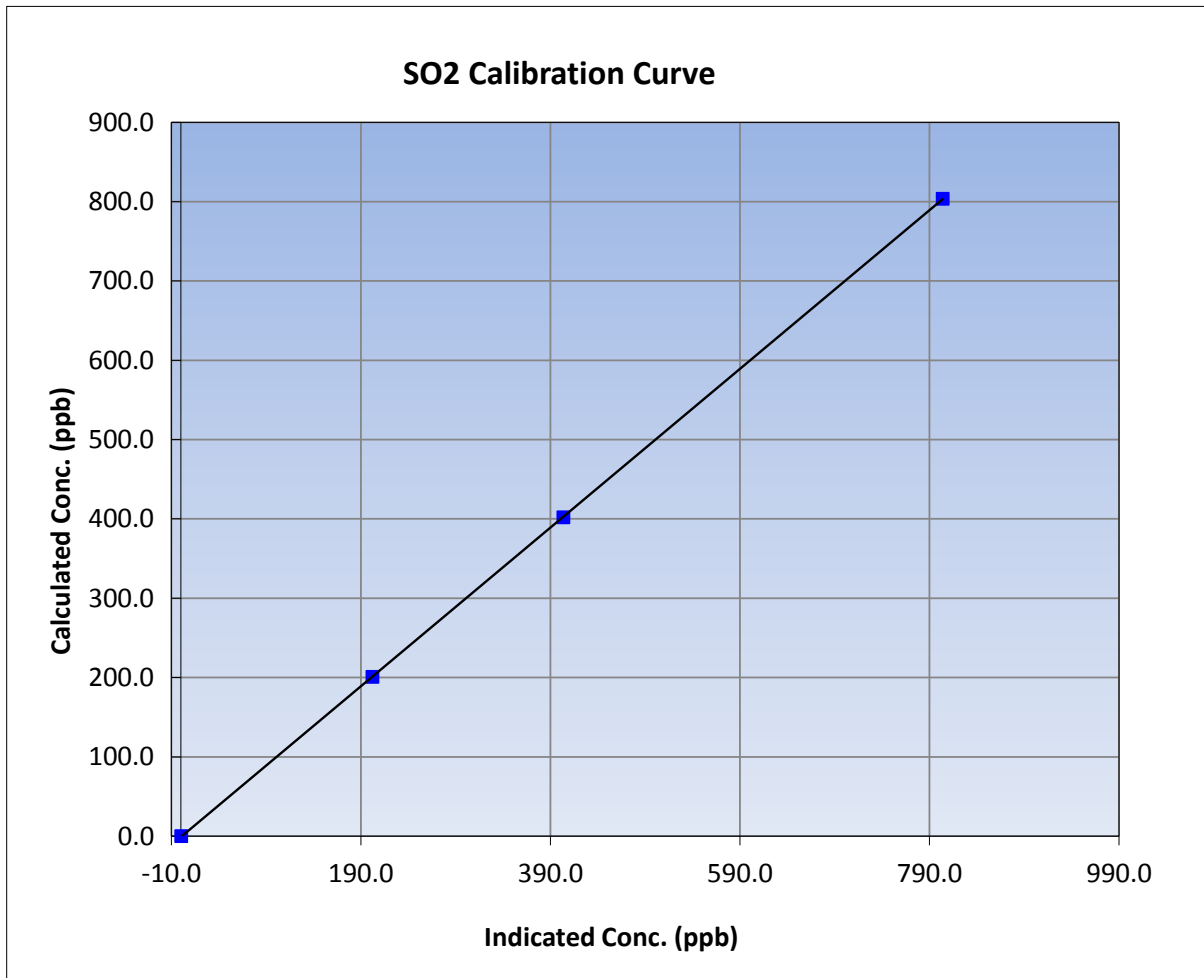
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	November 6, 2015	Previous Calibration	October 8, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	11:45	End Time (MST)	13:35
Analyzer make	API T100	Analyzer serial #	598

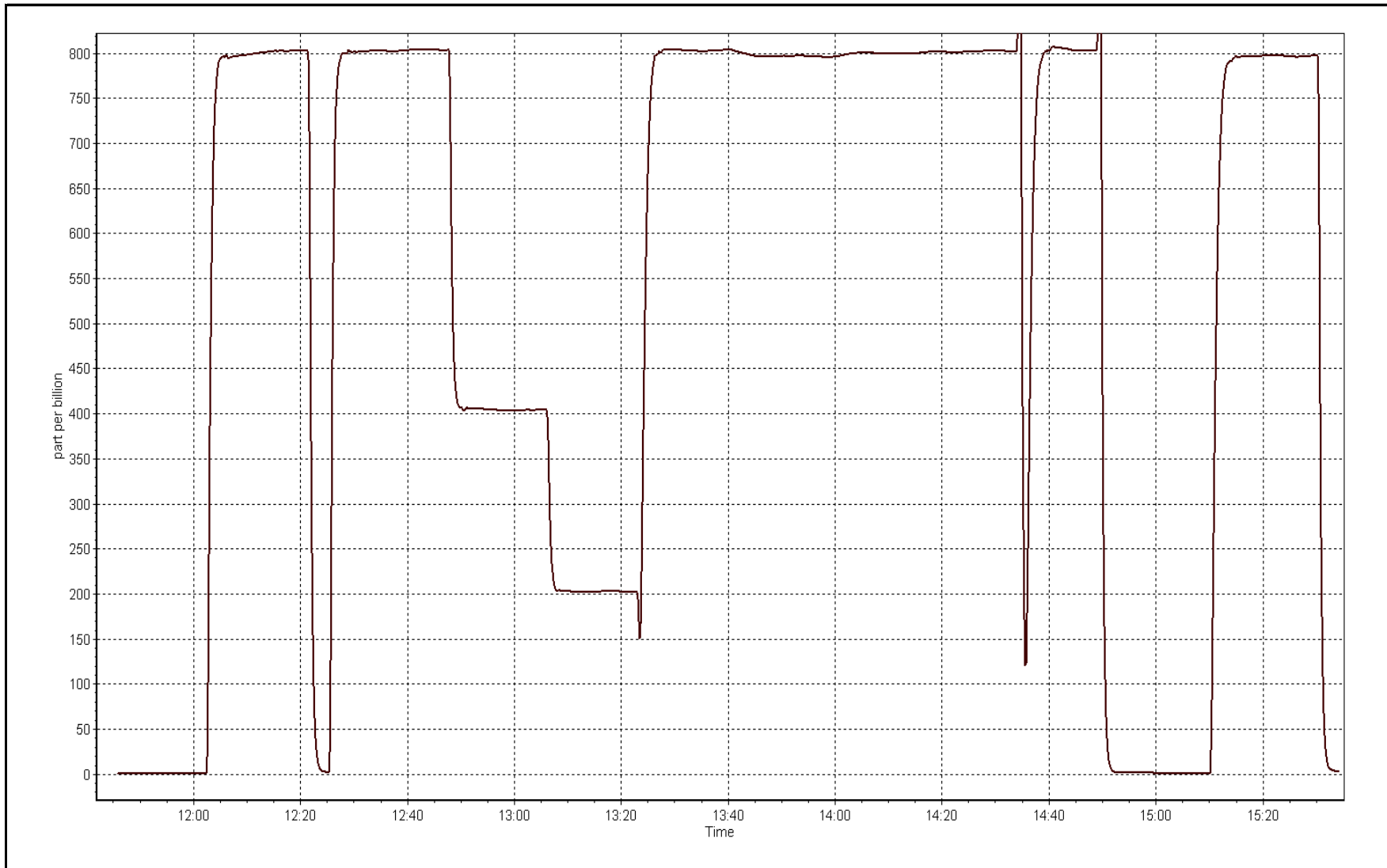
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999994
803.7	803.8	0.9999		
401.9	403.8	0.9953	Slope	1.000495
200.9	202.3	0.9934		
			Intercept	-1.080393



SO2 Calibration Plot

Date: November 6, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	November 5, 2015	Last Calibration	October 7, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	13:35	End Time (MST)	17:00
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	LL110503 April-1-2016

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	513	513
Analyzer IP address	192.168.1.75		Lamp voltage	2172	2114
Calculated slope	1.004300	1.005983	Chamber temp	50	50
Calculated intercept	-0.226105	-0.387990	Pressure	22.7	22.9
Analyzer Background	20.6	20.6	Flow	0.564	0.569
Analyzer Coefficient	0.920	0.0908	Intensity	48	47
			Converter temp.	316	314

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	0.3	----
as found span	5000	38.5	80.1	80.9	0.990
SO2 scrubber check	5000	20.7	211.6	3.8	----
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	38.5	80.1	80.0	1.002
second point	5000	19.3	40.1	40.3	0.997
third point	5000	12.1	25.2	25.5	0.986
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	38.5	80.1	79.6	1.006
Average Correction Factor					0.995

Corrected As found	80.6	Previous response	80.0	% change	-0.8%
--------------------	------	-------------------	------	----------	-------

Notes:

Inlet filter replaced and scrubber check done after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



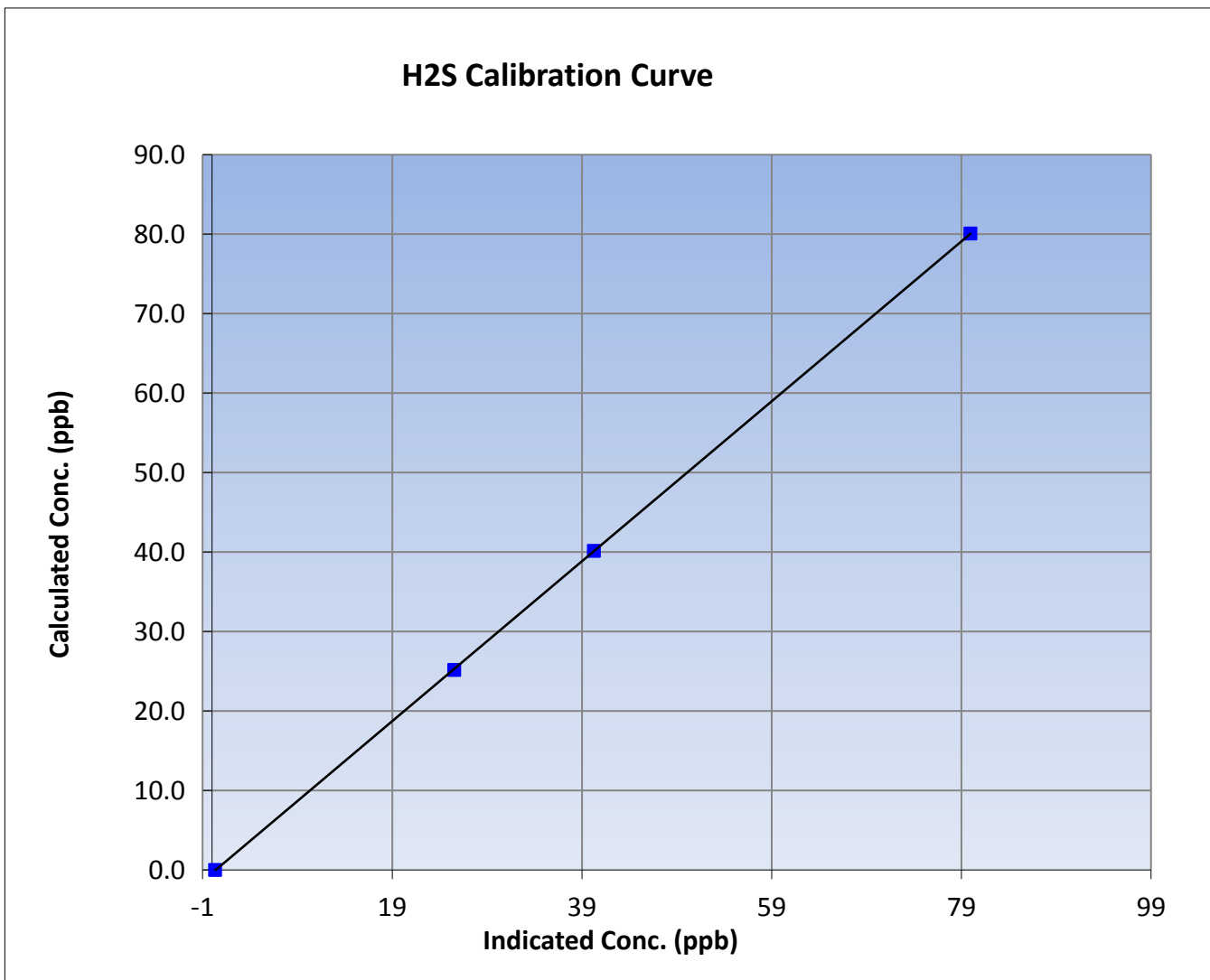
Wood Buffalo Environmental Association H2S Calibration Report

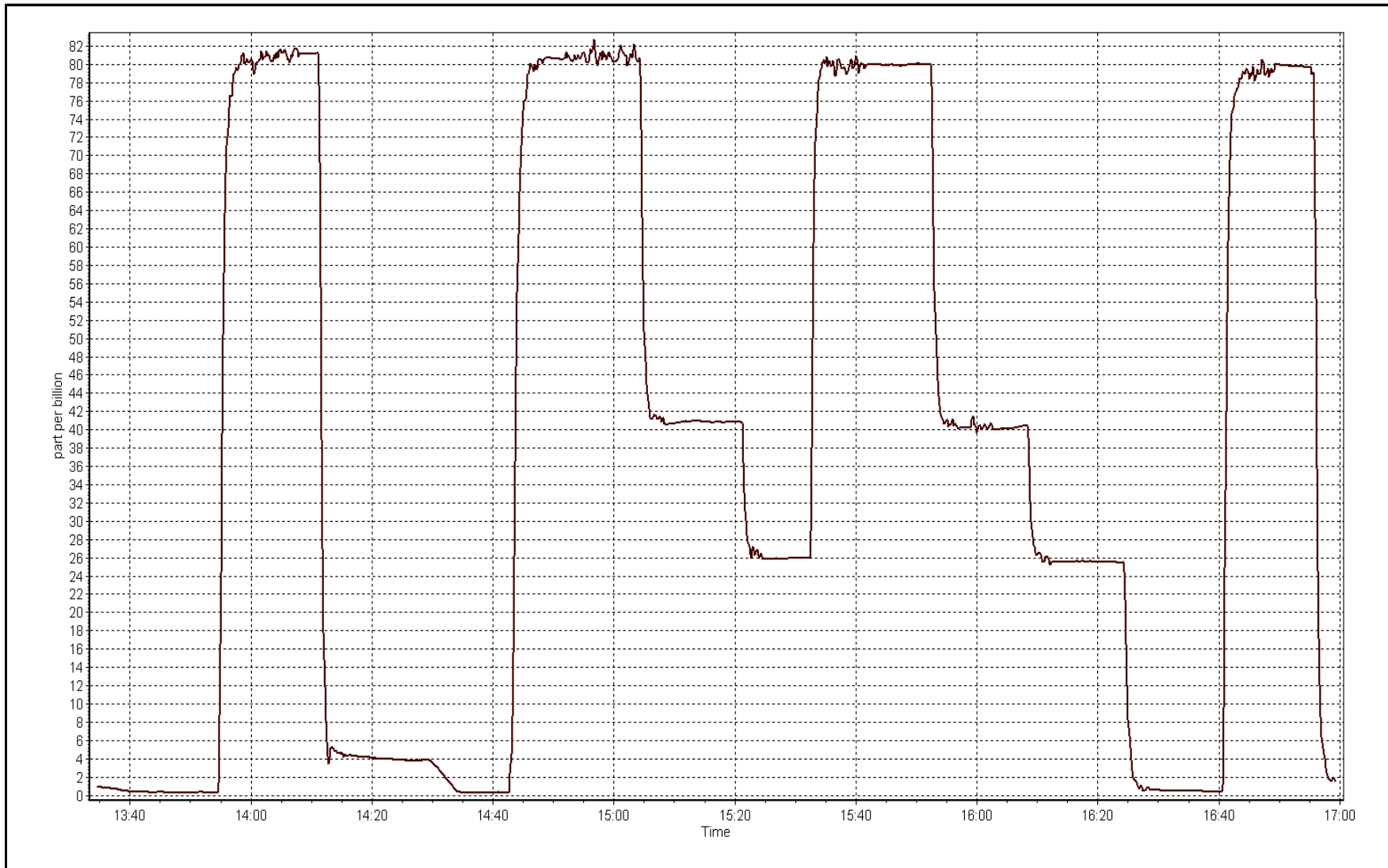
Station Information

Calibration Date	November 5, 2015	Previous Calibration	October 7, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:35	End Time (MST)	17:00
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	0.3	----	Correlation Coefficient	0.999993
80.1	80.0	1.0015		
40.1	40.3	0.9969	Slope	1.005983
25.2	25.5	0.9858		
			Intercept	-0.387990







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	November 6, 2015	Previous Calibration	October 8, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	15:35
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
-------------------	----------------------------	-----------------	------

Calibration Statistics

Parameter	NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997950	0.996803
	Data Offset	0.291575	0.576786
Current Calibration	Data Slope	0.999268	1.000115
	Data Offset	-0.380273	-0.047189

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
---------------------	------------	-------------------	------------

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.958		0.950	
NOX coefficient	1.001		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.4		4.4	
NOX bkgrnd	4.7		4.7	
Chamber Temp	50.1	Deg C	50.1	Deg C
Moly Temp	322.4	Deg C	323.7	Deg C
PMT voltage	-866.9	V	-866.9	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.3	mmHg	159.4	mmHg
R Cell Press Nox	160.6	mmHg	159.7	mmHg
NO sample flow	0.653	lpm	0.662	lpm
Nox sample Flow	0.651	lpm	0.658	lpm

Notes:

Inlet filter replaced after as founds. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

November 6, 2015

Station Number:

AMS 502

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
as found span	5000	83.2	800.4	800.4	0.0	807.6	805.8	1.8	0.9911	0.9932
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
high point	5000	83.2	800.4	800.4	0.0	800.9	800.1	0.9	0.9993	1.0004
second point	5000	41.6	400.2	400.2	0.0	401.9	401.0	0.9	0.9958	0.9981
third point	5000	20.8	200.1	200.1	0.0	200.2	199.7	0.5	0.9993	1.0019
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.2	----	----
as left span	5000	83.2	800.4	498.7	301.7	802.0	500.1	301.9	0.9980	0.9972
Average Correction Factor									0.9981	1.0001

Corrected As found
Previous Response

NO_x= 807.4
NO_x= 801.7

NO= 805.9
NO= 802.4

Percent Change

NO_x= -0.7%

NO= -0.4%

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

83.20

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO2 (400)	----	498.7	297.4	798.7	498.7	299.9	0.9858	1.0000	0.9915	100.9%
2nd NO2 (200)	----	640.1	156.0	799.0	640.1	158.9	0.9854	1.0000	0.9821	101.8%
3rd NO2 (100)	----	713.3	82.8	798.5	713.3	85.2	0.9860	1.0000	0.9719	102.9%
4th NO2 (0)	796.1	----	3.1	799.2	796.1	3.1	0.9851	1.0000	N/A	----
Average Correction Factor							0.9856	1.0000	0.9819	101.9%

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

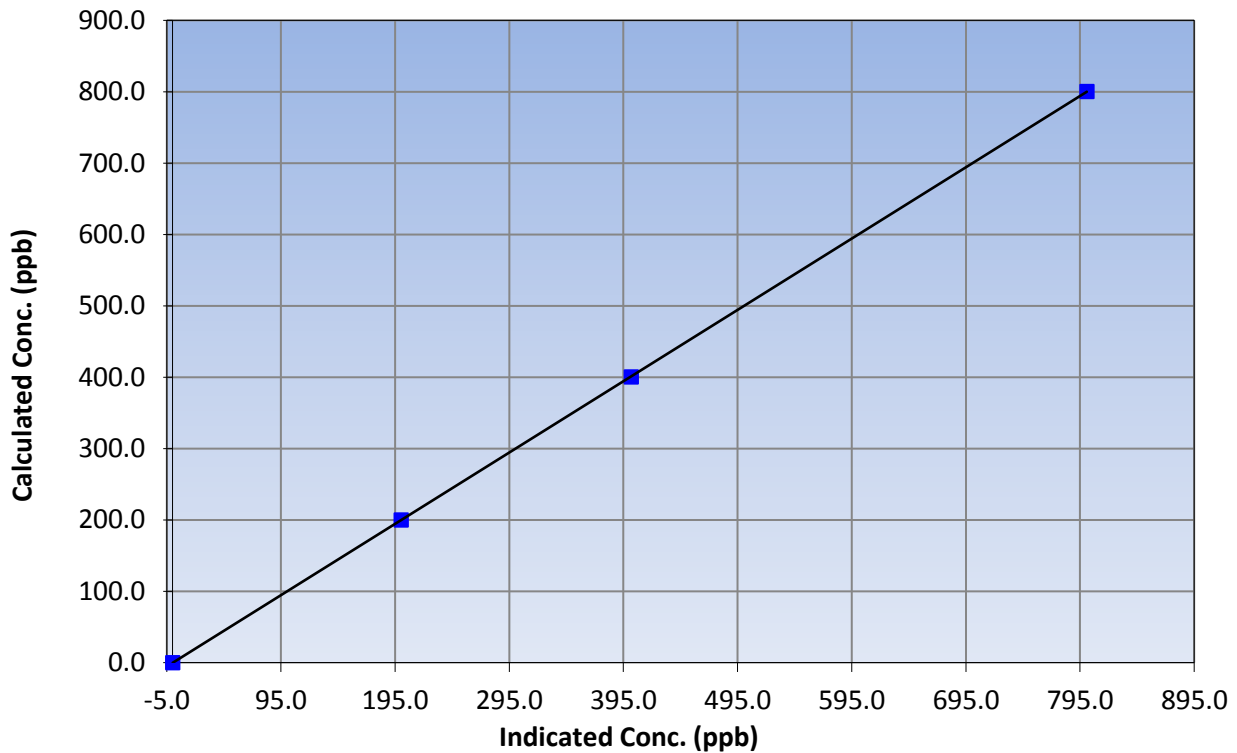
Station Information

Calibration Date	November 6, 2015	Previous Calibration	October 8, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	11:45	End Time (MST)	15:35
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	0.999996
800.4	800.9	0.9993		
400.2	401.9	0.9958	Slope	0.999268
200.1	200.2	0.9993		
			Intercept	-0.380273

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

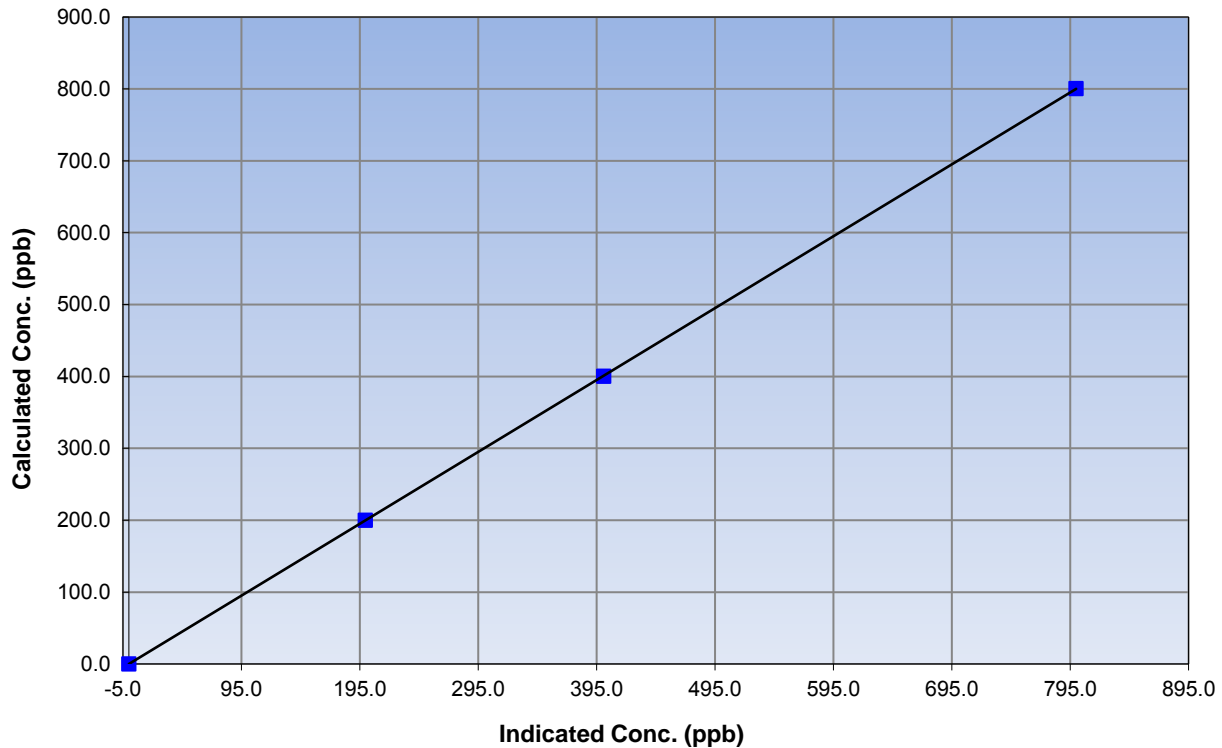
Station Information

Calibration Date	November 6, 2015	Previous Calibration	October 8, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	11:45	End Time (MST)	15:35
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	0.999998
800.4	800.1	1.0004		
400.2	401.0	0.9981	Slope	1.000115
200.1	199.7	1.0019		
			Intercept	-0.047189

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

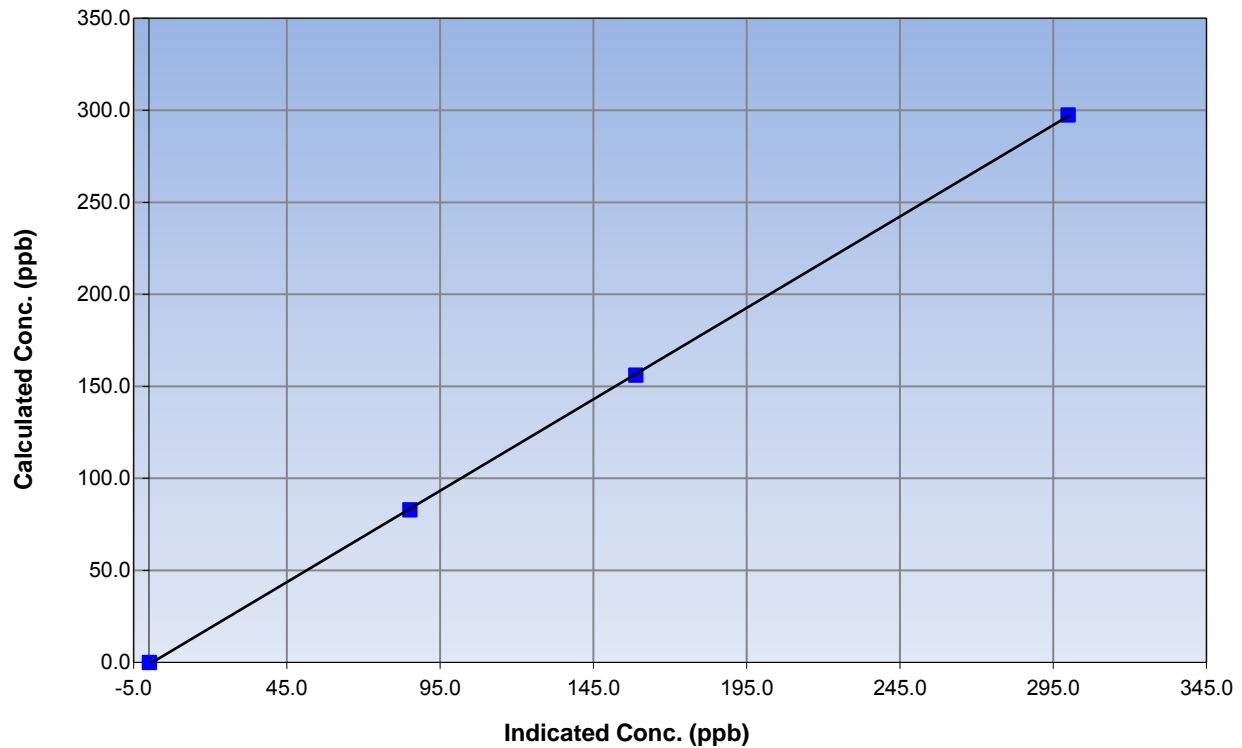
Station Information

Calibration Date	November 6, 2015	Previous Calibration	October 8, 2015
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	11:45	End Time (MST)	15:35
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

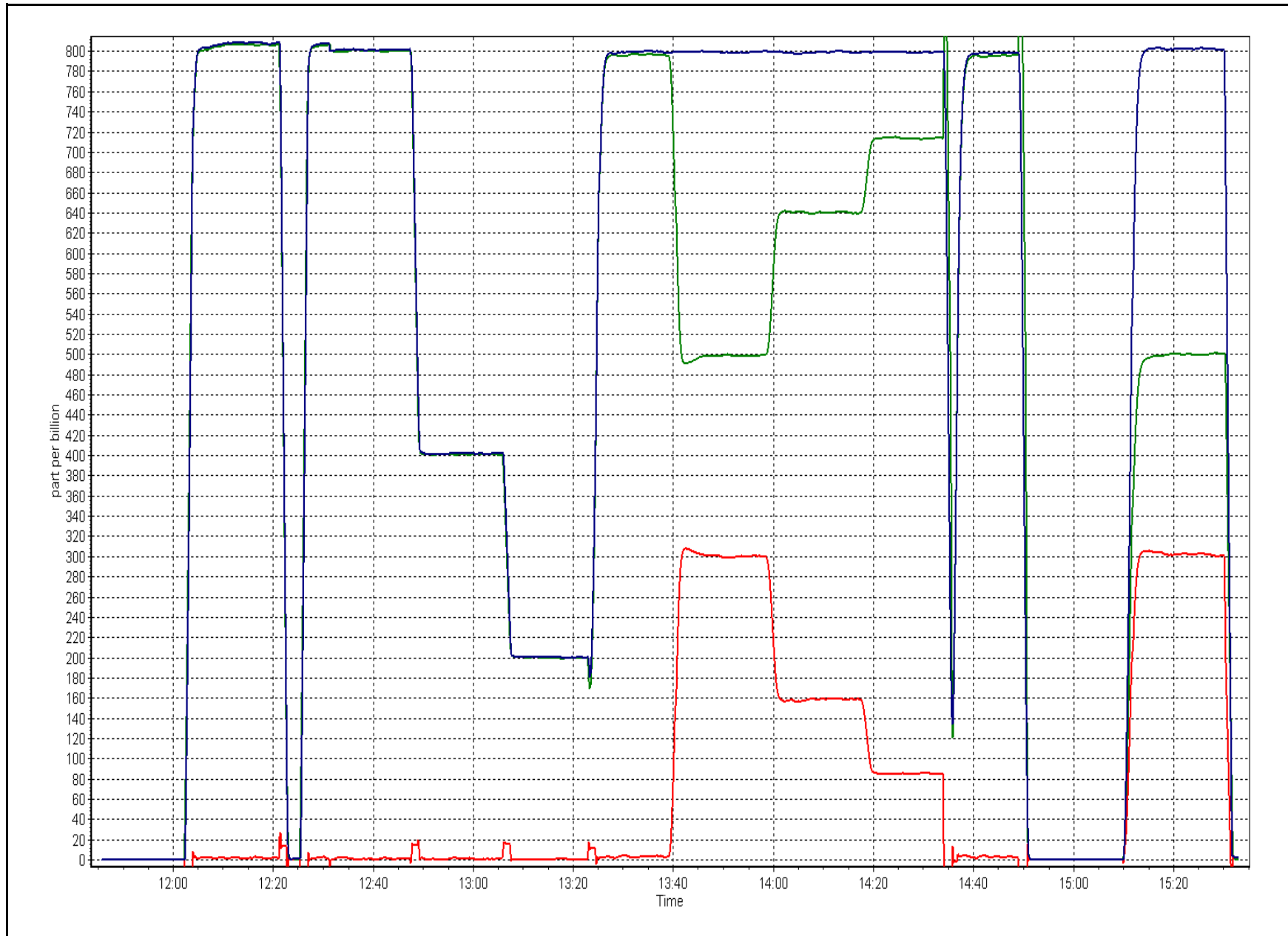
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999956
297.4	299.9	0.9915		
156.0	158.9	0.9821	Slope	0.993102
82.8	85.2	0.9719		
			Intercept	-1.056493

NO₂ Calibration Curve



NOX Calibration Plot

Date: November 6, 2015





Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	November-05-15	Previous Calibration	October-07-15
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine	Removal	
Start Time (MST)	14:05	End Time (MST)	15:40
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	K13090

WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	na
DACS make	Campbel Scientific CR3000	DACS serial No.	7882
DACS voltage range	5000	DACS channel #	NA
	<u>Before</u>		<u>After</u>
Calculated slope		Calculated slope	0.998177
Calculated intercept		Calculated intercept	0.003137

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.3	0.9957
400	39.4	39.4	0.9990
600	58.6	58.5	1.0003
800	77.8	78.0	0.9971
Average Correction Factor			0.9980

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	G3835
DACS make	Campbel Scientific CR3000	DACS serial No.	7882
DACS voltage range	5000	DACS channel #	NA
	<u>Before</u>		<u>After</u>
Calculated slope	1.002645152	Calculated slope	1.003187
Calculated intercept	-1.489217091	Calculated intercept	-1.476663
As Found Declination (west of North)	344	As Left Declination (west of North)	14.000000

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	0.3	n/a
90	92.1	0.9769
180	181.6	0.9912
270	271.3	0.9951
357	356.2	1.0022
Average Correction Factor		0.9914

Notes:

Replaced wind speed sensor. Cal passed.

Calibration Performed By: Asad Hidayat